7 REQUIREMENTS FOR BASE STATION CDMA OPERATION

This section only details requirements that are specific to CDMA base station equipment and operation. See Section 3 and Section 5 for analog base station requirements.

7.1 Transmitter

7.1.1 Frequency Parameters

7.1.1.1 Channel Spacing and Designation

Channel spacing and designation for the base station transmissions shall be as specified in 2.1.1.1. The base station shall support CDMA operations on channel numbers 1013 through 1023, and 1 through 777 inclusive, as shown in Table 6.1.1.1-1.

The CDMA frequency assignment in MHz corresponding to the CDMA Channel number shown in Table 6.1.1.1-1 (expressed as N) is calculated as shown in Table 6.1.1.1-2.

The Primary CDMA Channel shall be channel number 283 for System A and channel number 384 for System B.

The Secondary CDMA Channel shall be channel number 691 for System A and channel number 777 for System B.

7.1.1.2 Frequency Tolerance

The base station transmit carrier frequency shall be maintained within $\pm 5 \times 10^{-8}$ of the CDMA frequency assignment.

7.1.2 Power Output Characteristics

Maximum effective radiated power (ERP) and antenna height above average terrain (HAAT) shall be coordinated locally on an ongoing basis.

7.1.3 Modulation Characteristics

7.1.3.1 Forward CDMA Channel Signals

The Forward CDMA Channel has the overall structure shown in Figure 7.1.3.1-1. The Forward CDMA Channel consists of the following code channels: the Pilot Channel, up to one Sync Channel, up to seven Paging Channels, and Forward Traffic Channels. Each of these code channels is covered with the appropriate Walsh cover and spread by the appropriate PN sequence at a fixed chip rate of 1.2288 Mcps (million chips/sec). Multiple Forward CDMA Channels may be used within a base station in a frequency multiplexed manner.

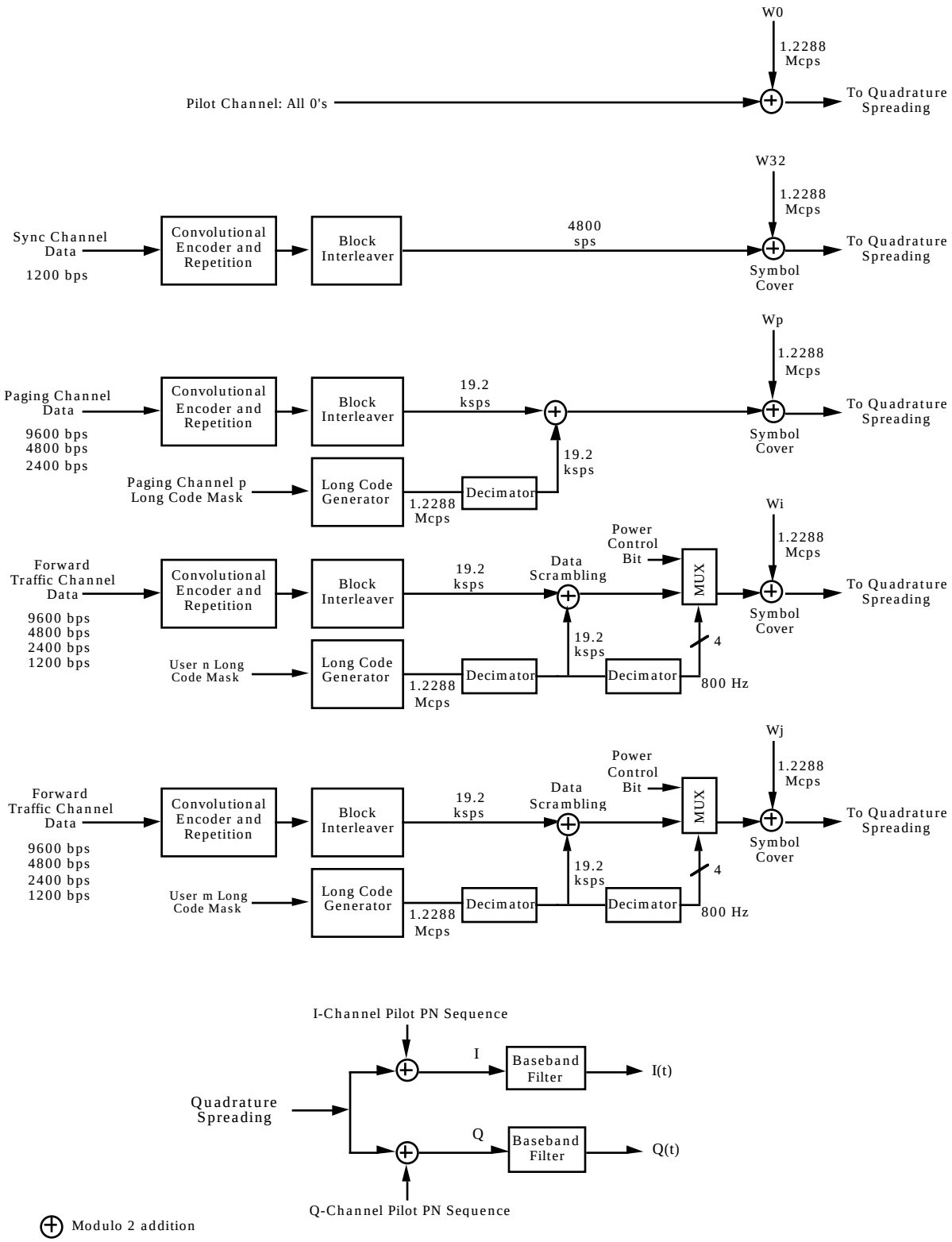

Figure 7.1.3.1-1. Forward CDMA Channel Structure

An example assignment of the code channels transmitted by a base station is shown in Figure 7.1.3.1-2. Out of the 64 code channels available for use, the example depicts the Pilot Channel (always required), one Sync Channel, seven Paging Channels (the maximum number allowed), and 55 Traffic Channels. Another possible configuration could replace all the Paging Channels and the Sync Channel one for one with Traffic Channels, for a maximum of one Pilot Channel, zero Paging Channels, zero Sync Channels, and 63 Traffic Channels.

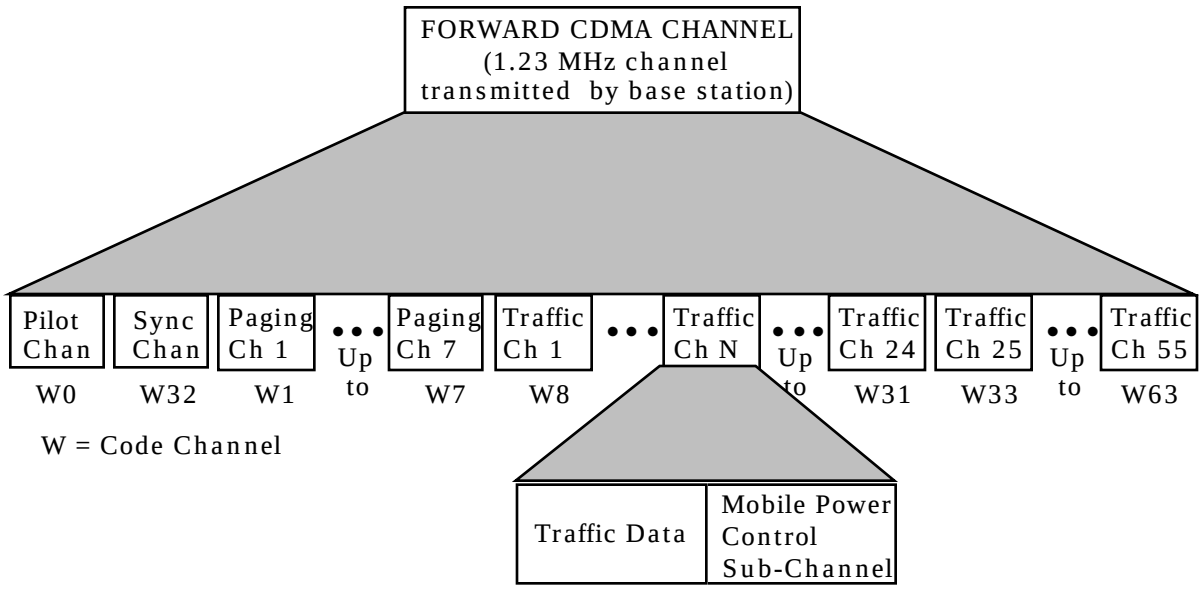

Figure 7.1.3.1-2. Example of a Forward CDMA Channel Transmitted by a Base Station

7.1.3.1.1 Modulation Parameters

The modulation parameters for the Forward CDMA Channel are as shown in Tables 7.1.3.1.1-1, 7.1.3.1.1-2, and 7.1.3.1.1-3.

Table 7.1.3.1.1-1. Sync Channel Modulation Parameters

	Data Rate (bps)	
Parameter	**1200**	**Units**
PN Chip Rate	1.2288	Mcps
Code Rate	1/2	bits/code symbol
Code Repetition	2	mod sym/code sym*
Modulation Symbol Rate	4,800	sps
PN Chips/Modulation Symbol	256	PN chips/mod sym
PN Chips/Bit	1024	PN chips/bit

*Each repetition of a code symbol is a modulation symbol.

Table 7.1.3.1.1-2. Paging Channel Modulation Parameters

	Data Rate (bps)			
Parameter	**9600**	**4800**	**2400**	**Units**
PN Chip Rate	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	bits/code symbol
Code Repetition	1	2	4	mod sym/code sym*
Modulation Symbol Rate	19,200	19,200	19,200	sps
PN Chips/Modulation Symbol	64	64	64	PN chips/mod sym
PN Chips/Bit	128	256	512	PN chips/bit

*Each repetition of a code symbol is a modulation symbol.

Table 7.1.3.1.1-3. Forward Traffic Channel Modulation Parameters

	Data Rate (bps)				
Parameter	**9600**	**4800**	**2400**	**1200**	**Units**
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Repetition	1	2	4	8	mod sym/code sym*
Modulation Symbol Rate	19,200	19,200	19,200	19,200	sps
PN Chips/Modulation Symbol	64	64	64	64	PN chips/mod sym
PN Chips/Bit	128	256	512	1024	PN chips/bit

*Each repetition of a code symbol is a modulation symbol.

7.1.3.1.2 Data Rates

The Sync Channel shall operate at a fixed rate of 1200 bps. The Paging Channel shall support fixed data rate operation at 9600, 4800, or 2400 bps. The Forward Traffic Channel shall support variable data rate operation at 9600, 4800, 2400, or 1200 bps.

7.1.3.1.3 Convolutional Encoding

The Sync Channel, Paging Channel, and Forward Traffic Channel shall be convolutionally encoded prior to transmission. The convolutional code shall be rate 1/2, with constraint length (K) of 9. The generator functions of the code shall be g_0 equals 753 (octal) and g_1 equals 561 (octal). Because this is a rate 1/2 code, two code symbols are generated for each data bit input to the encoder. These code symbols shall be output so that the code symbol (c_0) encoded with generator function g_0 is output first, and the code symbol (c_1) encoded with generator function g_1 is output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol output after initialization shall be a code symbol encoded with generator function g_0.

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to K-1. Figure 7.1.3.1.3-1 illustrates the specific K equals 9, rate 1/2 code that is used for these channels.

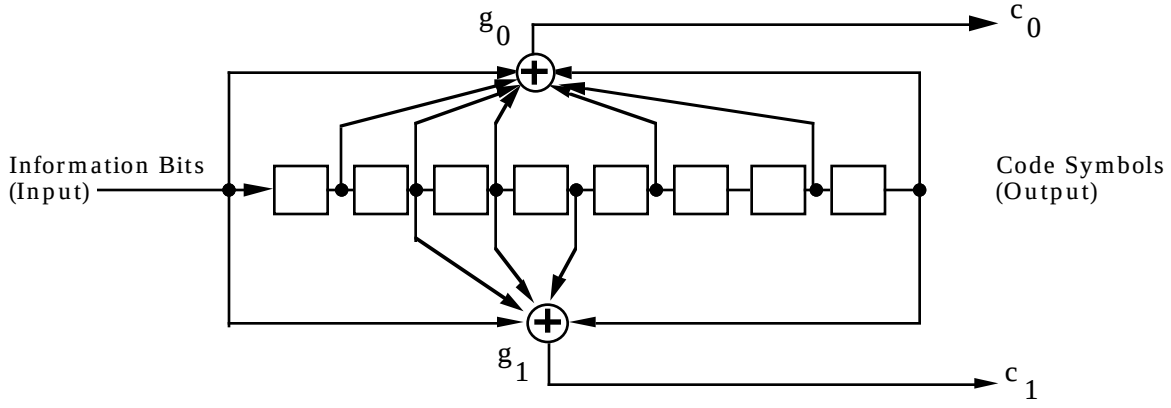

Figure 7.1.3.1.3-1. K = 9, Rate 1/2 Convolutional Encoder

7.1.3.1.4 Code Symbol Repetition

For the Sync Channel, each convolutionally encoded symbol shall be repeated 1 time (each symbol occurs 2 consecutive times) prior to block interleaving.

For the Paging and Forward Traffic Channels, each convolutionally encoded symbol shall be repeated prior to block interleaving whenever the information rate is lower than 9600 bps. Each code symbol at the 4800 bps rate shall be repeated 1 time (each symbol occurs 2 consecutive times). Each code symbol at the 2400 bps data rate shall be repeated 3 times (each symbol occurs 4 consecutive times). Each code symbol at the 1200 bps data rate shall be repeated 7 times (each symbol occurs 8 consecutive times). For all the data rates

(9600, 4800, 2400, and 1200 bps) this results in a constant modulation symbol rate of 19200 modulation symbols per second.

7.1.3.1.5 Block Interleaving

All symbols after repetition on the Sync Channel, Paging Channel, and Forward Traffic Channel are block interleaved.

The Sync Channel shall use a block interleaver spanning 26.666... ms which is equivalent to 128 modulation symbols at the symbol rate of 4800 sps.[1]

The input (array write) symbol sequence to the Sync Channel interleaver is given in Table 7.1.3.1.5-1. The table is read down by columns from the left to the right. That is, the first input symbol (1) is at the top left, the second input symbol (1) is just below the first input symbol, and the 17th input symbol (9) is just to the right of the first input symbol. The output (array read) symbol sequence shall be as given in Table 7.1.3.1.5-2. The table is read the same way as Table 7.1.3.1.5-1. That is, the first output symbol (1) is at the top left, the second output symbol (33) is just below the first output symbol, and the 17th output symbol (3) is just to the right of the first output symbol.

The interleaver block shall align with the Sync Channel frame, such that the first bit of the frame influences the first 36 (numbered 1 1 2 2 . . . 18 18) modulation symbols input into the interleaver block.[2]

The Forward Traffic and Paging Channels shall use the identical block interleaver spanning 20 ms equivalent to 384 modulation symbols at the modulation symbol rate of 19200 sps.

The input (array write) and output (array read) symbol sequence for the four data rates shall be as given in Tables 7.1.3.1.5-3 through 7.1.3.1.5-10. These tables are read down by columns from the left to the right as with the Sync Channel interleaver. In these tables, symbols with the same number denote repeated code symbols.

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[1]The Sync Channel symbols are interleaved by a technique that is best described as a bit reversal method.

[2]Since the Sync Channel is not convolutionally encoded by blocks (the state of the encoder is not reset after initialization), the last 8 bits of a Sync Channel frame influences symbols in the successive interleaver block.

Table 7.1.3.1.5-1. Sync Channel Interleaver Input (Array Write Operation)

1	9	17	25	33	41	49	57
1	9	17	25	33	41	49	57
2	10	18	26	34	42	50	58
2	10	18	26	34	42	50	58
3	11	19	27	35	43	51	59
3	11	19	27	35	43	51	59
4	12	20	28	36	44	52	60
4	12	20	28	36	44	52	60
5	13	21	29	37	45	53	61
5	13	21	29	37	45	53	61
6	14	22	30	38	46	54	62
6	14	22	30	38	46	54	62
7	15	23	31	39	47	55	63
7	15	23	31	39	47	55	63
8	16	24	32	40	48	56	64
8	16	24	32	40	48	56	64

Table 7.1.3.1.5-2. Sync Channel Interleaver Output (Array Read Operation)

1	3	2	4	1	3	2	4
33	35	34	36	33	35	34	36
17	19	18	20	17	19	18	20
49	51	50	52	49	51	50	52
9	11	10	12	9	11	10	12
41	43	42	44	41	43	42	44
25	27	26	28	25	27	26	28
57	59	58	60	57	59	58	60
5	7	6	8	5	7	6	8
37	39	38	40	37	39	38	40
21	23	22	24	21	23	22	24
53	55	54	56	53	55	54	56
13	15	14	16	13	15	14	16
45	47	46	48	45	47	46	48
29	31	30	32	29	31	30	32
61	63	62	64	61	63	62	64

Table 7.1.3.1.5-3. Forward Traffic and Paging Channel Interleaver Input (Array Write Operation at 9600 bps)

1	25	49	73	97	121	145	169	193	217	241	265	289	313	337	361
2	26	50	74	98	122	146	170	194	218	242	266	290	314	338	362
3	27	51	75	99	123	147	171	195	219	243	267	291	315	339	363
4	28	52	76	100	124	148	172	196	220	244	268	292	316	340	364
5	29	53	77	101	125	149	173	197	221	245	269	293	317	341	365
6	30	54	78	102	126	150	174	198	222	246	270	294	318	342	366
7	31	55	79	103	127	151	175	199	223	247	271	295	319	343	367
8	32	56	80	104	128	152	176	200	224	248	272	296	320	344	368
9	33	57	81	105	129	153	177	201	225	249	273	297	321	345	369
10	34	58	82	106	130	154	178	202	226	250	274	298	322	346	370
11	35	59	83	107	131	155	179	203	227	251	275	299	323	347	371
12	36	60	84	108	132	156	180	204	228	252	276	300	324	348	372
13	37	61	85	109	133	157	181	205	229	253	277	301	325	349	373
14	38	62	86	110	134	158	182	206	230	254	278	302	326	350	374
15	39	63	87	111	135	159	183	207	231	255	279	303	327	351	375
16	40	64	88	112	136	160	184	208	232	256	280	304	328	352	376
17	41	65	89	113	137	161	185	209	233	257	281	305	329	353	377
18	42	66	90	114	138	162	186	210	234	258	282	306	330	354	378
19	43	67	91	115	139	163	187	211	235	259	283	307	331	355	379
20	44	68	92	116	140	164	188	212	236	260	284	308	332	356	380
21	45	69	93	117	141	165	189	213	237	261	285	309	333	357	381
22	46	70	94	118	142	166	190	214	238	262	286	310	334	358	382
23	47	71	95	119	143	167	191	215	239	263	287	311	335	359	383
24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384

Table 7.1.3.1.5-4. Forward Traffic and Paging Channel Interleaver Output (Array Read Operation at 9600 bps)

1	9	5	13	3	11	7	15	2	10	6	14	4	12	8	16
65	73	69	77	67	75	71	79	66	74	70	78	68	76	72	80
129	137	133	141	131	139	135	143	130	138	134	142	132	140	136	144
193	201	197	205	195	203	199	207	194	202	198	206	196	204	200	208
257	265	261	269	259	267	263	271	258	266	262	270	260	268	264	272
321	329	325	333	323	331	327	335	322	330	326	334	324	332	328	336
33	41	37	45	35	43	39	47	34	42	38	46	36	44	40	48
97	105	101	109	99	107	103	111	98	106	102	110	100	108	104	112
161	169	165	173	163	171	167	175	162	170	166	174	164	172	168	176
225	233	229	237	227	235	231	239	226	234	230	238	228	236	232	240
289	297	293	301	291	299	295	303	290	298	294	302	292	300	296	304
353	361	357	365	355	363	359	367	354	362	358	366	356	364	360	368
17	25	21	29	19	27	23	31	18	26	22	30	20	28	24	32
81	89	85	93	83	91	87	95	82	90	86	94	84	92	88	96
145	153	149	157	147	155	151	159	146	154	150	158	148	156	152	160
209	217	213	221	211	219	215	223	210	218	214	222	212	220	216	224
273	281	277	285	275	283	279	287	274	282	278	286	276	284	280	288
337	345	341	349	339	347	343	351	338	346	342	350	340	348	344	352
49	57	53	61	51	59	55	63	50	58	54	62	52	60	56	64
113	121	117	125	115	123	119	127	114	122	118	126	116	124	120	128
177	185	181	189	179	187	183	191	178	186	182	190	180	188	184	192
241	249	245	253	243	251	247	255	242	250	246	254	244	252	248	256
305	313	309	317	307	315	311	319	306	314	310	318	308	316	312	320
369	377	373	381	371	379	375	383	370	378	374	382	372	380	376	384

Table 7.1.3.1.5-5. Forward Traffic and Paging Channel Interleaver Input (Array Write Operation at 4800 bps)

1	13	25	37	49	61	73	85	97	109	121	133	145	157	169	181
1	13	25	37	49	61	73	85	97	109	121	133	145	157	169	181
2	14	26	38	50	62	74	86	98	110	122	134	146	158	170	182
2	14	26	38	50	62	74	86	98	110	122	134	146	158	170	182
3	15	27	39	51	63	75	87	99	111	123	135	147	159	171	183
3	15	27	39	51	63	75	87	99	111	123	135	147	159	171	183
4	16	28	40	52	64	76	88	100	112	124	136	148	160	172	184
4	16	28	40	52	64	76	88	100	112	124	136	148	160	172	184
5	17	29	41	53	65	77	89	101	113	125	137	149	161	173	185
5	17	29	41	53	65	77	89	101	113	125	137	149	161	173	185
6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186
6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186
7	19	31	43	55	67	79	91	103	115	127	139	151	163	175	187
7	19	31	43	55	67	79	91	103	115	127	139	151	163	175	187
8	20	32	44	56	68	80	92	104	116	128	140	152	164	176	188
8	20	32	44	56	68	80	92	104	116	128	140	152	164	176	188
9	21	33	45	57	69	81	93	105	117	129	141	153	165	177	189
9	21	33	45	57	69	81	93	105	117	129	141	153	165	177	189
10	22	34	46	58	70	82	94	106	118	130	142	154	166	178	190
10	22	34	46	58	70	82	94	106	118	130	142	154	166	178	190
11	23	35	47	59	71	83	95	107	119	131	143	155	167	179	191
11	23	35	47	59	71	83	95	107	119	131	143	155	167	179	191
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192

Table 7.1.3.1.5-6. Forward Traffic and Paging Channel Interleaver Output (Array Read Operation at 4800 bps)

1	5	3	7	2	6	4	8	1	5	3	7	2	6	4	8
33	37	35	39	34	38	36	40	33	37	35	39	34	38	36	40
65	69	67	71	66	70	68	72	65	69	67	71	66	70	68	72
97	101	99	103	98	102	100	104	97	101	99	103	98	102	100	104
129	133	131	135	130	134	132	136	129	133	131	135	130	134	132	136
161	165	163	167	162	166	164	168	161	165	163	167	162	166	164	168
17	21	19	23	18	22	20	24	17	21	19	23	18	22	20	24
49	53	51	55	50	54	52	56	49	53	51	55	50	54	52	56
81	85	83	87	82	86	84	88	81	85	83	87	82	86	84	88
113	117	115	119	114	118	116	120	113	117	115	119	114	118	116	120
145	149	147	151	146	150	148	152	145	149	147	151	146	150	148	152
177	181	179	183	178	182	180	184	177	181	179	183	178	182	180	184
9	13	11	15	10	14	12	16	9	13	11	15	10	14	12	16
41	45	43	47	42	46	44	48	41	45	43	47	42	46	44	48
73	77	75	79	74	78	76	80	73	77	75	79	74	78	76	80
105	109	107	111	106	110	108	112	105	109	107	111	106	110	108	112
137	141	139	143	138	142	140	144	137	141	139	143	138	142	140	144
169	173	171	175	170	174	172	176	169	173	171	175	170	174	172	176
25	29	27	31	26	30	28	32	25	29	27	31	26	30	28	32
57	61	59	63	58	62	60	64	57	61	59	63	58	62	60	64
89	93	91	95	90	94	92	96	89	93	91	95	90	94	92	96
121	125	123	127	122	126	124	128	121	125	123	127	122	126	124	128
153	157	155	159	154	158	156	160	153	157	155	159	154	158	156	160
185	189	187	191	186	190	188	192	185	189	187	191	186	190	188	192

Table 7.1.3.1.5-7. Forward Traffic and Paging Channel Interleaver Input (Array Write Operation at 2400 bps)

1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96

Table 7.1.3.1.5-8. Forward Traffic and Paging Channel Interleaver Output (Array Read Operation at 2400 bps)

1	3	2	4	1	3	2	4	1	3	2	4	1	3	2	4
17	19	18	20	17	19	18	20	17	19	18	20	17	19	18	20
33	35	34	36	33	35	34	36	33	35	34	36	33	35	34	36
49	51	50	52	49	51	50	52	49	51	50	52	49	51	50	52
65	67	66	68	65	67	66	68	65	67	66	68	65	67	66	68
81	83	82	84	81	83	82	84	81	83	82	84	81	83	82	84
9	11	10	12	9	11	10	12	9	11	10	12	9	11	10	12
25	27	26	28	25	27	26	28	25	27	26	28	25	27	26	28
41	43	42	44	41	43	42	44	41	43	42	44	41	43	42	44
57	59	58	60	57	59	58	60	57	59	58	60	57	59	58	60
73	75	74	76	73	75	74	76	73	75	74	76	73	75	74	76
89	91	90	92	89	91	90	92	89	91	90	92	89	91	90	92
5	7	6	8	5	7	6	8	5	7	6	8	5	7	6	8
21	23	22	24	21	23	22	24	21	23	22	24	21	23	22	24
37	39	38	40	37	39	38	40	37	39	38	40	37	39	38	40
53	55	54	56	53	55	54	56	53	55	54	56	53	55	54	56
69	71	70	72	69	71	70	72	69	71	70	72	69	71	70	72
85	87	86	88	85	87	86	88	85	87	86	88	85	87	86	88
13	15	14	16	13	15	14	16	13	15	14	16	13	15	14	16
29	31	30	32	29	31	30	32	29	31	30	32	29	31	30	32
45	47	46	48	45	47	46	48	45	47	46	48	45	47	46	48
61	63	62	64	61	63	62	64	61	63	62	64	61	63	62	64
77	79	78	80	77	79	78	80	77	79	78	80	77	79	78	80
93	95	94	96	93	95	94	96	93	95	94	96	93	95	94	96

Table 7.1.3.1.5-9. Forward Traffic Channel Interleaver Input (Array Write Operation at 1200 bps)

1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48

Table 7.1.3.1.5-10. Forward Traffic Channel Interleaver Output (Array Read Operation at 1200 bps)

1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
9	10	9	10	9	10	9	10	9	10	9	10	9	10	9	10
17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18
25	26	25	26	25	26	25	26	25	26	25	26	25	26	25	26
33	34	33	34	33	34	33	34	33	34	33	34	33	34	33	34
41	42	41	42	41	42	41	42	41	42	41	42	41	42	41	42
5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6
13	14	13	14	13	14	13	14	13	14	13	14	13	14	13	14
21	22	21	22	21	22	21	22	21	22	21	22	21	22	21	22
29	30	29	30	29	30	29	30	29	30	29	30	29	30	29	30
37	38	37	38	37	38	37	38	37	38	37	38	37	38	37	38
45	46	45	46	45	46	45	46	45	46	45	46	45	46	45	46
3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
11	12	11	12	11	12	11	12	11	12	11	12	11	12	11	12
19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20
27	28	27	28	27	28	27	28	27	28	27	28	27	28	27	28
35	36	35	36	35	36	35	36	35	36	35	36	35	36	35	36
43	44	43	44	43	44	43	44	43	44	43	44	43	44	43	44
7	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8
15	16	15	16	15	16	15	16	15	16	15	16	15	16	15	16
23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24
31	32	31	32	31	32	31	32	31	32	31	32	31	32	31	32
39	40	39	40	39	40	39	40	39	40	39	40	39	40	39	40
47	48	47	48	47	48	47	48	47	48	47	48	47	48	47	48

7.1.3.1.6 Data Scrambling

Data scrambling applies to the Paging and Forward Traffic Channels. Data scrambling is performed on the modulation symbols output from the block interleaver at the 19,200 sps rate.

The data scrambling shall be accomplished by performing the modulo-2 addition of the interleaver output symbol with the binary value of the long code PN chip that is valid at the start of the transmission period for that symbol as shown in Figure 7.1.3.1.6-1. This PN sequence shall be the equivalent of the long code operating at 1.2288 MHz clock rate where only the first output of every 64 is used for the data scrambling (i.e., at a 19200 sps rate). The long code may be generated as described in 6.1.3.1.8. The long code masks to be used for the Paging and Forward Traffic Channels are specified in 7.1.3.4.5 and 7.1.3.5.5, respectively.

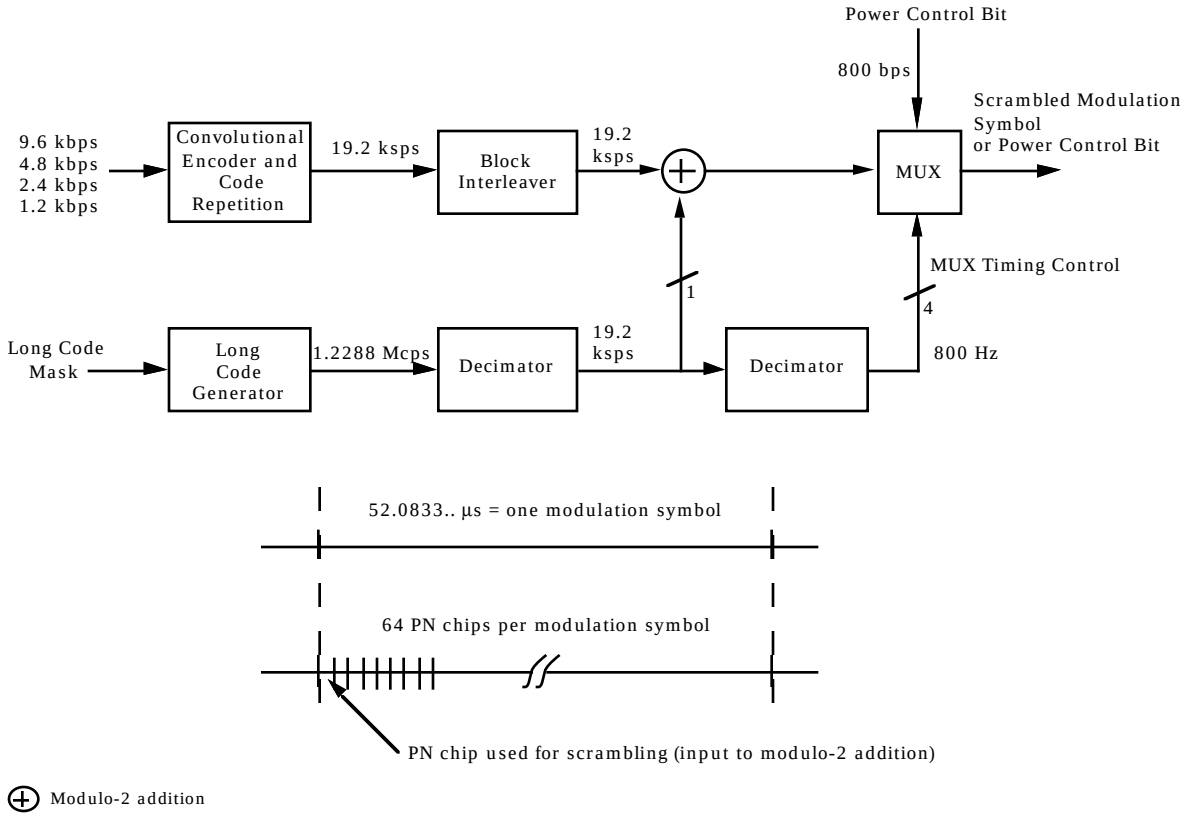

Figure 7.1.3.1.6-1. Data Scrambler Function and Timing

7.1.3.1.7 Power Control Subchannel

A power control subchannel is continuously transmitted on the Forward Traffic Channel. The sub-channel shall transmit at a rate of one bit ('0' or '1') every 1.25 ms (i.e., 800 bps). A '0' bit shall indicate to the mobile station to increase the mean output power level and a '1' bit shall indicate to the mobile station to decrease the mean output power level. The

amount that the mobile station increases and decreases its power for every power control bit is specified in 6.1.2.3.2.

The base station Reverse Traffic Channel receiver shall estimate the received signal strength of the particular mobile station it is assigned to over a 1.25 ms period, equivalent to 6 Walsh symbols. The base station receiver shall use the estimate to determine the value of the power control bit ('0' or '1'). The base station shall transmit the power control bit on the corresponding Forward Traffic Channel using the puncturing technique described below. The transmission of the power control bit shall occur on the Forward Traffic Channel in the second power control group following the corresponding Reverse Traffic Channel power control group in which the signal strength was estimated.[3]

The length of one power control bit shall correspond exactly to two modulation symbols of the Forward Traffic Channel (i.e., 104.166... μs). Each power control bit shall replace two consecutive Forward Traffic Channel modulation symbols[4] and should be transmitted with energy equal to E_b, namely the energy per information bit of the Forward Traffic Channel, as shown in Figure 7.1.3.1.7-1.

The power control bits shall be inserted into the Forward Traffic Channel data stream after the data scrambling.

There are 16 possible starting positions for the power control bit as shown in Figure 7.1.3.1.7-2. Each position corresponds to one of the first 16 modulation symbols (numbered 0 through 15) of a 1.25 ms period. In each 1.25 ms period, a total of 24 bits from the long code are used for scrambling. These bits are numbered 0 through 23, where bit 0 is the first to be used and bit 23 the last in each 1.25 ms period.

The 4-bit binary number with values 0 through 15 formed by scrambling bits 23, 22, 21, and 20 shall be used to determine the position of the power control bit as shown in Figure 7.1.3.1.7-2. Bit 20 shall be the least significant bit, and bit 23 shall be the most significant bit. In the example of Figure 7.1.3.1.7-2, the values of bits 23, 22, 21, and 20 are '1011' (11 decimal), and the power control bit starting position is the eleventh. Figure 7.1.3.1.6-1 shows the relationship between the scrambled modulation symbols (at 19200 sps) and the punctured power control subchannel (at 800 bps).

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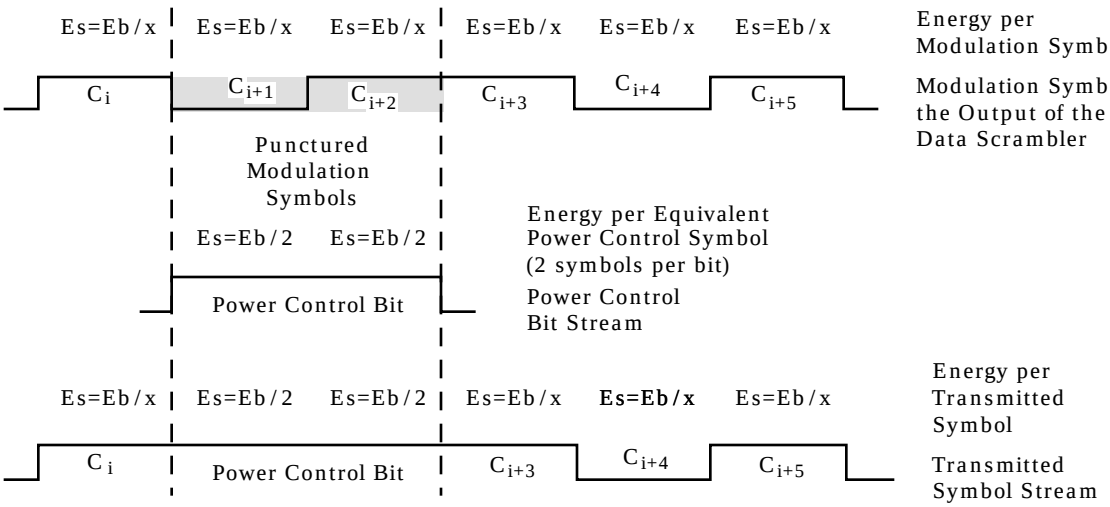
[3]For instance, as shown in Figure 7.1.3.1.7-2, the signal is received on the Reverse Traffic Channel in power control group number 5, and the corresponding power control bit is transmitted on the Forward Traffic Channel during power control group number 5 + 2 = 7. Notice that the delay is actually less than 1.25 ms because of the round-trip delay.

[4] This technique is commonly known as symbol puncturing. In this case, the punctured modulation symbols are replaced by the power control bits.



Where x Is Given by:

Transmit Rate	Value of x
9600 bps	2
4800 bps	4
2400 bps	8
1200 bps	16

All modulation symbols in a frame are transmitted at the same power level. Modulation symbols in adjacent frames may be sent at different power levels.

Figure 7.1.3.1.7-1. Power Control Sub-Channel Structure and Puncturing

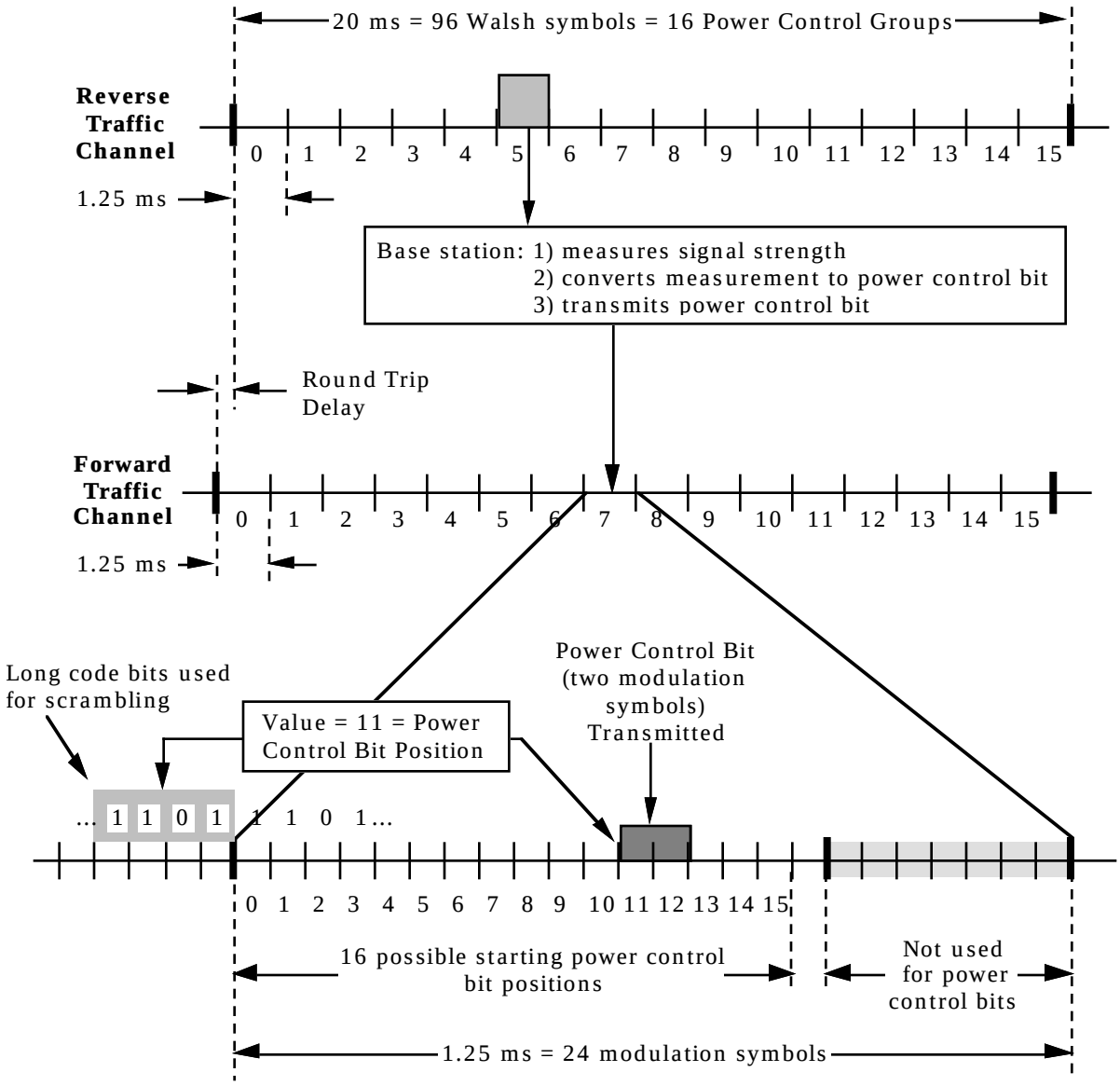


Figure 7.1.3.1.7-2. Randomization of Power Control Bit Positions

7.1.3.1.8 Orthogonal Covering

Each code channel transmitted on the Forward CDMA Channel shall be covered with a Walsh function at a fixed chip rate of 1.2288 Mcps to provide orthogonal channelization among all code channels on a given Forward CDMA Channel. One of sixty-four time-orthogonal Walsh functions, as defined in Table 7.1.3.1.8-1, shall be used. A code channel that is covered using Walsh function n shall be assigned to code channel number n (n = 0 to 63). Walsh function time alignment shall be such that the first Walsh chip, designated by 0 in the column headings of Table 7.1.3.1.8-1, begins at the even second time marks referenced to base station transmission time (see 7.1.5). The Walsh function cover

sequence shall repeat with a period of 52.083... μs (= 64/1.2288 Mcps) which is equal to the length of one Forward Traffic Channel modulation symbol.

Code channel number 0 shall always be assigned to the Pilot Channel. If the Sync Channel is present, it shall be assigned code channel number 32. If Paging Channels are present, they shall be assigned to code channel numbers one through seven (inclusive) in sequence. The remaining code channels are available for assignment to the Forward Traffic Channels.

Table 7.1.3.1.8-1. 64-ary Walsh Functions

Walsh Chip within a Walsh Function

Walsh Function Number	0 1 2 3	4 5 6 7	8 9 10 11	12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63
0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1
2	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1
3	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0
4	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1
5	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0
6	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0
7	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1
8	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1
9	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0
10	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0
11	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1
12	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0
13	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1
14	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1
15	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0
16	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
17	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0
18	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0
19	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1
20	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0
21	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1
22	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1
23	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0
24	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0
25	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1
26	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1
27	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0
28	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1
29	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0
30	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0
31	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1
32	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
33	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0
34	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0
35	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1
36	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0
37	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1
38	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0
39	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0
40	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0
41	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1
42	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1
43	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0
44	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1
45	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0
46	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0
47	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1
48	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
49	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1
50	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1
51	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0
52	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1
53	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0
54	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0
55	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1
56	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1
57	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0
58	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0
59	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1
60	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0	1 1 1 1	1 1 1 1	0 0 0 0
61	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1	0 1 0 1	1 0 1 0	0 1 0 1	1 0 1 0	1 0 1 0	0 1 0 1
62	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1	0 0 1 1	1 1 0 0	0 0 1 1	1 1 0 0	1 1 0 0	0 0 1 1
63	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0	0 1 1 0	1 0 0 1	0 1 1 0	1 0 0 1	1 0 0 1	0 1 1 0

7.1.3.1.9 Quadrature Spreading

The Forward CDMA Channel combines binary phase shift keying (BPSK) data modulation with quadrature phase shift keying (QPSK) PN spreading.

Following the orthogonal covering, each code channel is spread in quadrature as shown in Figure 7.1.3.1-1. The spreading sequence shall be a quadrature sequence of length 2^{15} (i.e., 32768 PN chips in length). This sequence is called the pilot PN sequence and shall be based on the following characteristic polynomials:

$$P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

(for the in-phase (I) sequence)

and

$$P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

(for the quadrature (Q) phase sequence).

The maximum length linear feedback shift register sequence {i(n)} and {q(n)} based on the above polynomials are of length $2^{15} - 1$ and can be generated by the following linear recursions:

$$i(n) = i(n-15) \oplus i(n-10) \oplus i(n-8) \oplus i(n-7) \oplus i(n-6) \oplus i(n-2)$$

(based on $P_I(x)$ as the characteristic polynomial)

and

$$q(n) = q(n-15) \oplus q(n-12) \oplus q(n-11) \oplus q(n-10) \oplus q(n-9) \oplus q(n-5) \oplus q(n-4) \oplus q(n-3)$$

(based on $P_Q(x)$ as the characteristic polynomial),

where i(n) and q(n) are binary-valued (‘0’ and ‘1’) and the additions are modulo-2. In order to generate the pilot PN sequence of length 2^{15}, a ‘0’ is inserted in the sequence after the contiguous succession of fourteen ‘0’s (which occurs only once per period of the sequence). Therefore the sequence has one run of 15 consecutive ‘0’s instead of 14.

The chip rate for the pilot PN sequence shall be 1.2288 Mcps. The pilot PN sequence period is 32768/1228800 = 26.666... ms, and exactly 75 pilot PN sequence repetitions occur every 2 seconds. The pilot PN sequence offset shall be as specified in 7.1.3.2.1.

The binary (‘0’s and ‘1’s) I and Q at the output of the quadrature spreading (shown in Figure 7.1.3.1-1) shall be mapped into phase according to Table 7.1.3.1.9-1.

Table 7.1.3.1.9-1. Forward CDMA Channel I and Q Mapping

I	Q	Phase
0	0	$\pi/4$
1	0	$3\pi/4$
1	1	$-3\pi/4$
0	1	$-\pi/4$

The resulting signal constellation and phase transitions are shown in Figure 7.1.3.1.9-1.

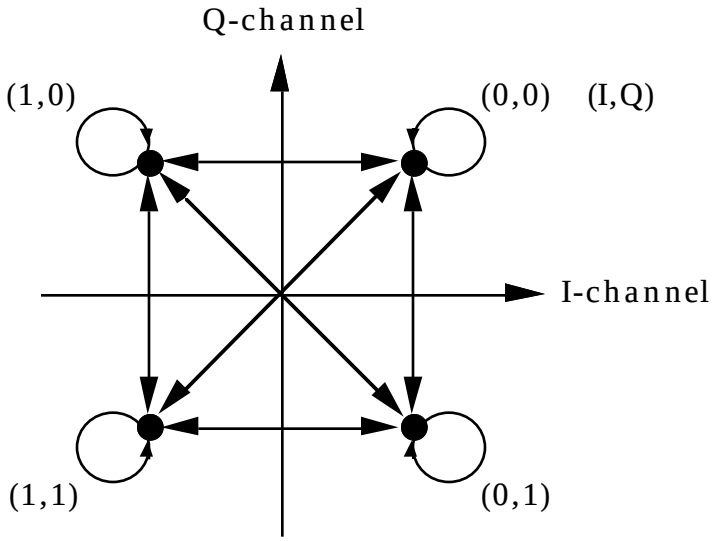


Figure 7.1.3.1.9-1. Forward CDMA Channel Signal Constellation and Phase Transition

7.1.3.1.10 Filtering

7.1.3.1.10.1 Baseband Filtering

Following the spreading operation, the I and Q impulses are applied to the inputs of the I and Q baseband filters as shown in Figure 7.1.3.1-1. The baseband filters shall have linear phase. The baseband filters shall have a frequency response S(f) that satisfies the limits given in Figure 7.1.3.1.10.1-1. Specifically, the normalized frequency response of the filter shall be contained within $\pm\delta_1$ in the passband $0 \le f \le f_p$ and shall be less than or equal to δ_2 in the stopband $f \ge f_s$. The numerical values for the parameters are δ_1 = 1.5 dB, δ_2 = -40 dB, f_p = 590 kHz, and f_s = 740 kHz.

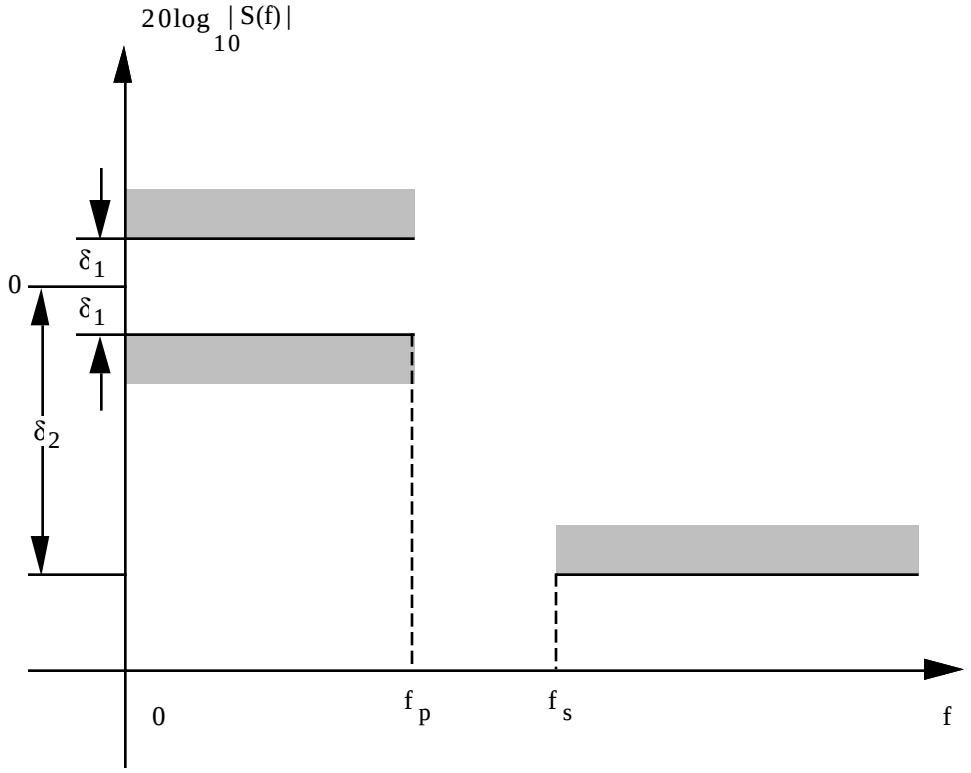


Figure 7.1.3.1.10.1-1. Baseband Filters Frequency Response Limits

Let s(t) be the impulse response of the baseband filter. Then s(t) shall be such that the following equation is satisfied:

$$\text{Mean Squared Error} = \sum_{k=0}^{47} [\alpha s(kT_S - \tau) - h(k)]^2 \leq 0.03,$$

where the constants α and τ are used to minimize the mean squared error. The constant T_s is equal to 203.451... ns, which equals one quarter of a PN chip. The values of the coefficients h(k) are given in Table 7.1.3.1.10.1-1. Note that h(k) equals h(47 - k).

Table 7.1.3.1.10.1-1. Coefficients h(k)

k	h(k)
0, 47	-0.025288315
1, 46	-0.034167931
2, 45	-0.035752323
3, 44	-0.016733702
4, 43	0.021602514
5, 42	0.064938487
6, 41	0.091002137
7, 40	0.081894974
8, 39	0.037071157
9, 38	-0.021998074
10, 37	-0.060716277
11, 36	-0.051178658
12, 35	0.007874526
13, 34	0.084368728
14, 33	0.126869306
15, 32	0.094528345
16, 31	-0.012839661
17, 30	-0.143477028
18, 29	-0.211829088
19, 28	-0.140513128
20, 27	0.094601918
21, 26	0.441387140
22, 25	0.785875640
23, 24	1.0

7.1.3.1.10.2 Phase Characteristics

The base station shall provide phase equalization for the transmit signal path.[5] The equalizing filter shall be designed to provide the equivalent baseband transfer function

$$H(\omega) = K\frac{\omega^2 + j\alpha\omega\omega_0 - {\omega_0}^2}{\omega^2 - j\alpha\omega\omega_0 - {\omega_0}^2},$$

where K is an arbitrary gain, j equals $\sqrt{-1}$, α equals 1.36, and ω_0 equals $2\pi \times 3.15 \times 10^5$. The equalizing filter implementation shall be equivalent to applying baseband filters with this transfer function individually to the baseband I and Q waveforms.

The overall base station transmitter analog filter response (including the equalizing filter) shall be such that, for a cascaded filter consisting of the base station filter and a filter with a transfer function that is the inverse of the equalization filter specified above, the mean squared phase error from the best fit linear phase response, integrated over the frequency range 1 kHz $\leq |f - f_C| \leq$ 630 kHz, shall be no greater than 0.01 squared radians. For purposes of this requirement, “overall” shall mean from the baseband I and Q inputs to the RF output of the transmitter.

7.1.3.2 Pilot Channel

A Pilot Channel is transmitted at all times by the base station on each active Forward CDMA Channel. The Pilot Channel is an unmodulated spread spectrum signal that is used by a mobile station operating within the coverage area of the base station.

7.1.3.2.1 Pilot PN Sequence Offset

Each base station shall use a time offset of the pilot PN sequence to identify a Forward CDMA Channel. Time offsets may be reused within a CDMA cellular system.

Distinct Pilot Channels shall be identified by an offset index (0 through 511 inclusive). This offset index specifies the offset value from the zero offset pilot PN sequence. The zero offset pilot PN sequence shall be such that the start of the sequence shall be output at the beginning of every even second in time, referenced to base station transmission time (see 7.1.5). The start of the zero offset pilot PN sequence for either the I or Q sequence shall be defined as the state of the sequence for which the previous 15 outputs were ‘0’ (see Figure 1.2-1).

Five hundred twelve unique values are possible for the pilot PN sequence offset. The offset (in chips) for a given pilot PN sequence from the zero shift pilot PN sequence equals the index value multiplied by 64. For example, if the pilot PN sequence offset index is 15, the pilot PN sequence offset will be $15 \times 64 = 960$ PN chips. In this case the pilot PN sequence will start 781.25 μs after the start of every even second of time, referenced to base station transmission time. The pilot PN sequence offset is illustrated in Figure 7.1.3.2.1-1. The same pilot PN sequence offset shall be used on all CDMA frequency assignments for a given base station.

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[5] This equalization simplifies the design of the mobile station receive filters.

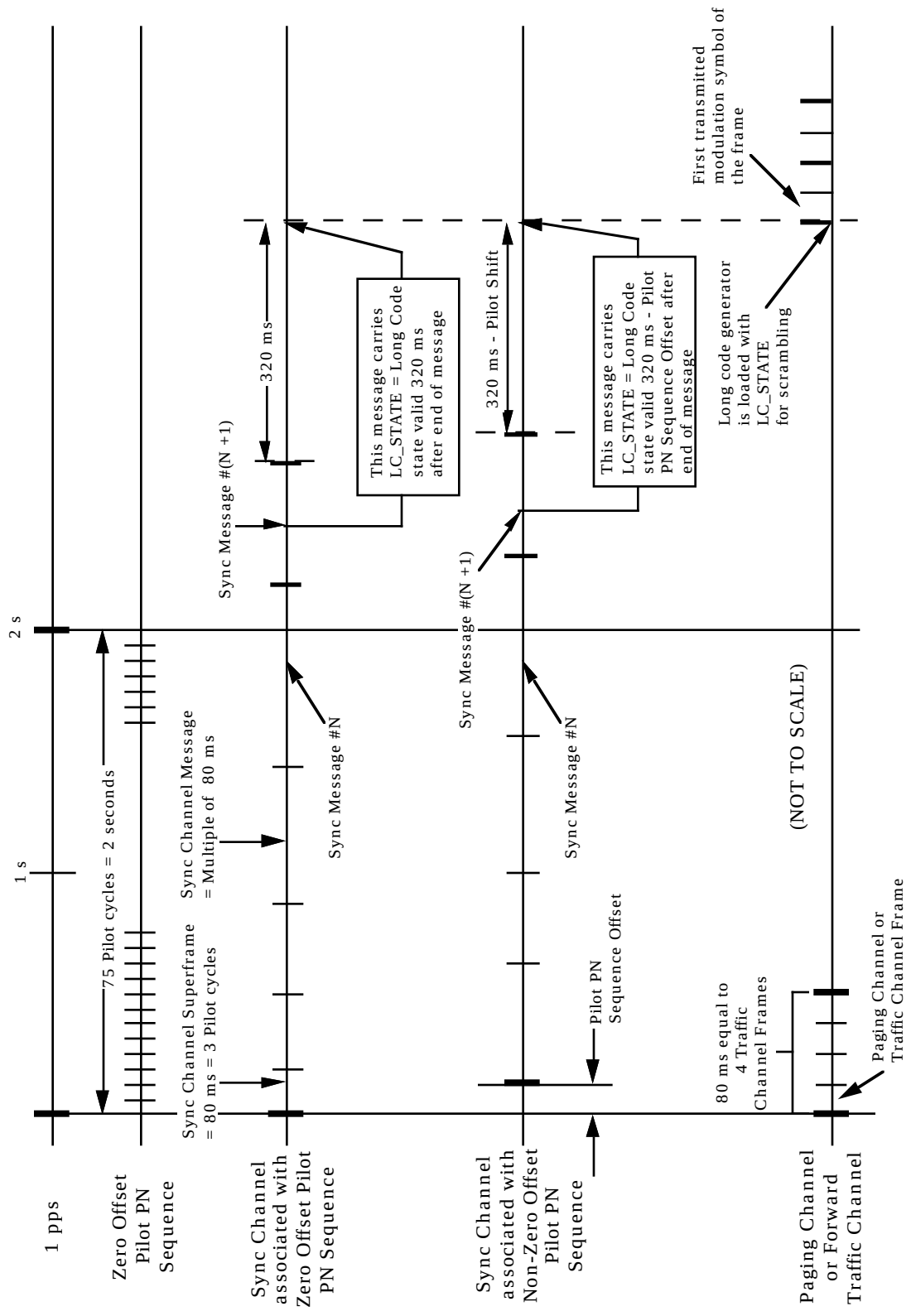


Figure 7.1.3.2.1-1. Forward CDMA Channel Pilot PN Sequence Offset

7.1.3.2.2 Pilot Channel Walsh Covering

Prior to transmission, the pilot channel shall be covered with Walsh cover sequence 0 as specified in 7.1.3.1.8.

7.1.3.2.3 Pilot Channel Quadrature Spreading,

The Pilot Channel shall be PN spread as specified in 7.1.3.1.9.

7.1.3.2.4 Pilot Channel Filtering

Filtering for the Pilot Channel shall be as specified in 7.1.3.1.10.

7.1.3.3 Sync Channel

The Sync Channel is an encoded, interleaved, covered, modulated direct-sequence spread spectrum signal that is used by mobile stations operating within the coverage area of the base station to acquire synchronization.

7.1.3.3.1 Sync Channel Time Alignment and Modulation Rates

The bit rate for the Sync Channel is 1200 bps. A Sync Channel frame is 26.666... ms in length. The Sync Channel uses the same pilot PN sequence, chip rate, and time offset as the Pilot Channel for a given base station.

Once the mobile station achieves pilot PN sequence synchronization by acquiring the Pilot Channel, the synchronization for the Sync Channel is immediately known. This is because the Sync Channel (and all other channels) are covered with the same pilot PN sequence, and because the frame and interleaver timing on the Sync Channel are aligned with the pilot PN sequence.

The start of the interleaver block and frame of the Sync Channel shall align with the start of the pilot PN sequence being used to spread the Forward CDMA Channel (see Figure 7.1.3.2.1-1). See Table 7.1.3.1.1-1 for a summary of Sync Channel modulation parameters.

7.1.3.3.2 Sync Channel Convolutional Encoding

The Sync Channel data shall be convolutionally encoded prior to transmission as specified in 7.1.3.1.3.

7.1.3.3.3 Sync Channel Code Symbol Repetition

The Sync Channel code symbols shall be repeated as specified in 7.1.3.1.4.

7.1.3.3.4 Sync Channel Interleaver

The modulation symbols on the Sync Channel shall be interleaved as specified in 7.1.3.1.5. Since the Sync Channel is not convolutionally encoded by blocks, the last 8 bits of a Sync Channel frame influence symbols in the successive interleaver block.

7.1.3.3.5 Sync Channel Data Scrambling

The Sync Channel data shall not be scrambled.

7.1.3.3.6 Sync Channel Power Control Subchannel

The base station shall not insert a power control subchannel on the Sync Channel.

7.1.3.3.7 Sync Channel Walsh Covering

Prior to transmission, the Sync Channel shall be covered with Walsh function 32 as specified in 7.1.3.1.8.

7.1.3.3.8 Sync Channel Quadrature Spreading

The Sync Channel shall be PN spread as specified in 7.1.3.1.9.

7.1.3.3.9 Sync Channel Filtering

Filtering for the Sync Channel shall be as specified in 7.1.3.1.10.

7.1.3.3.10 Sync Channel Structure

A Sync Channel superframe is formed by three Sync Channel frames (i.e., 80 ms) as shown in Figure 7.1.3.2.1-1. Messages transmitted on the Sync Channel begin only at the start of a Sync Channel superframe.

When using the zero-offset Pilot PN sequence, Sync Channel superframes begin at the even-second time mark referenced to base station transmission time (see 7.1.5) or at the start of any third Sync Channel frame after that. When using a Pilot PN sequence other than the zero-offset sequence, the Sync Channel superframe shall begin at the even second time mark plus the pilot PN offset value in time.

7.1.3.4 Paging Channel

The Paging Channel is an encoded, interleaved, covered, and modulated spread spectrum signal that is used by mobile stations operating within the coverage area of the base station. The base station uses Paging Channel to transmit system overhead information and mobile station specific messages.

7.1.3.4.1 Paging Channel Time Alignment and Modulation Rates

The Paging Channel shall transmit information at a fixed data rate of 9600, 4800, or 2400 bps. The 1200 bps data rate is not supported on the Paging Channel. All Paging Channels in a given system (i.e., with the same SID) should transmit information at the same data rate. The Paging Channel frame is 20 ms in length.

The Paging Channel uses the same pilot PN sequence, chip rate, and time offset as the Pilot Channel for a given base station.

The start of the interleaver block and frame of the Paging Channel shall align with the start of the zero-offset pilot PN sequence at every even second time mark (see Figure 7.1.3.2.1-1). The first Paging Channel frame shall occur at the start of base station transmission time (see 7.1.5). See Table 7.1.3.1.1-2 for a summary of Paging Channel modulation parameters.

7.1.3.4.2 Paging Channel Convolutional Encoding

The Paging Channel data shall be convolutionally encoded prior to transmission as specified in 7.1.3.1.3. The state of the Paging Channel convolutional encoder shall not be reset between Paging Channel frames.

7.1.3.4.3 Paging Channel Code Symbol Repetition

The Paging Channel code symbols shall be repeated as specified in 7.1.3.1.4.

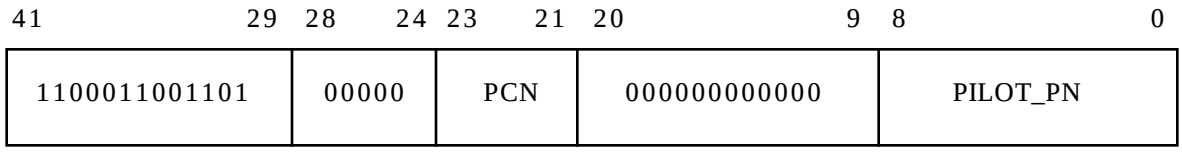
7.1.3.4.4 Paging Channel Interleaving

The modulation symbols on the Paging Channel shall be interleaved as specified in 7.1.3.1.5. The interleaver block shall align with the Paging Channel frame. The alignment shall be such that the first bit of the frame influences the first 18 (for 9600 bps), 36 (for 4800 bps), or 72 (for 2400 bps) modulation symbols input into the interleaver.

Since the Paging Channel is not convolutionally encoded by blocks, the last 8 bits of a Paging Channel frame influence symbols in the successive interleaver block.

7.1.3.4.5 Paging Channel Data Scrambling

The Paging Channel data shall be scrambled as specified in 7.1.3.1.6 utilizing the Paging Channel long code mask as shown in Figure 7.1.3.4.5-1.



PCN - Paging Channel Number
PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

Figure 7.1.3.4.5-1. Paging Channel Long Code Mask

7.1.3.4.6 Paging Channel Power Control Subchannel

The base station shall not insert a power control subchannel on the Paging Channel.

7.1.3.4.7 Paging Channel Walsh Covering

Prior to transmission, the Paging Channel shall be covered with a Walsh cover sequence as specified in 7.1.3.1.8.

7.1.3.4.8 Paging Channel Quadrature Spreading

The Paging Channel shall be PN spread as specified in 7.1.3.1.9.

7.1.3.4.9 Paging Channel Filtering

Filtering for the Paging Channel shall be as specified in 7.1.3.1.10.

7.1.3.4.10 Paging Channel Structure

The Paging Channel shall consist of Paging Channel slots that are each 200 ms in length as shown in the example in Figure 6.6.2.1.1.1-1.

7.1.3.5 Forward Traffic Channel

The Forward Traffic Channel is used for the transmission of primary traffic, secondary traffic, or signaling traffic to a specific mobile station during a call. The maximum number of Forward Traffic Channels that can be simultaneously supported by a given Forward CDMA Channel is equal to 63 minus the number of Paging Channels and Sync Channels operating on the same Forward CDMA Channel.

7.1.3.5.1 Forward Traffic Channel Time Alignment and Modulation Rates

The Forward Traffic Channel shall support transmission of information at a variable data rate of 9600, 4800, 2400, or 1200 bps. The Forward Traffic Channel frame is 20 ms in length. The data rate shall be selected on a frame-by-frame (i.e., 20 ms) basis. Although the data rate may vary on a frame-by-frame basis, the modulation symbol rate is kept constant by code repetition at 19,200 symbols per second (sps).

The modulation symbols that are transmitted at the lower data rates shall be transmitted using lower energy. Specifically, the energy per modulation symbol (E_s) for the supported data rates should be as in Table 7.1.3.5.1-1 where E_b is the energy per information bit. Note that all symbols in an interleaver block are from the same frame. Thus they are all transmitted at the same energy. Power control bits should be transmitted with energy E_b. The energy per power control symbol (two symbols per bit) equals the energy per modulation symbol for the 9600 bps data rate (see 7.1.3.1.7).

Table 7.1.3.5.1-1. Transmitted Symbol Energy Versus Data Rate

Data Rate (bps)	Energy per Modulation Symbol
9600	$E_s = E_b/2$
4800	$E_s = E_b/4$
2400	$E_s = E_b/8$
1200	$E_s = E_b/16$

A zero-offset Traffic Channel frame shall have the FRAME_OFFSET parameter (see the *Channel Assignment Message* in 7.7.2.3.2.8) set to zero. A zero-offset Forward Traffic Channel frame shall be such that every 100th frame shall align with the even-second time mark referenced to base station transmission time (see 7.1.5). A base station may implement staggered Forward Traffic Channel frames. A staggered frame shall begin 1.25 × FRAME_OFFSET ms later than the zero-offset Traffic Channel frame. The Forward Traffic Channel block interleaver shall always be aligned with the Forward Traffic Channel frame.

7.1.3.5.2 Forward Traffic Channel Convolutional Encoding

The Forward Traffic Channel data shall be convolutionally encoded prior to transmission as specified in 7.1.3.1.3.

When generating Forward Traffic Channel data, the encoder shall be initialized to the all zero state at the end of each 20 ms frame.

7.1.3.5.3 Forward Traffic Channel Code Symbol Repetition

The Forward Traffic Channel code symbols shall be repeated as specified in 7.1.3.1.4.

7.1.3.5.4 Forward Traffic Channel Interleaving

The modulation symbols on the Forward Traffic Channel shall be interleaved as specified in 7.1.3.1.5. The interleaver block shall align with the Traffic Channel frame. The alignment shall be such that the first bit of the frame influences the first 18 (for 9600 bps), 36 (for 4800 bps), 72 (for 2400 bps) or 144 (for 1200 bps) modulation symbols input into the interleaver.[6]

7.1.3.5.5 Forward Traffic Channel Data Scrambling

The Forward Traffic Channel data shall be scrambled as specified in 7.1.3.1.6. The long code mask shall be as shown in Figure 7.1.3.5.5-1. The permutation of the ESN bits in the public long code mask shall be as specified in 6.1.3.1.8. The generation of the private long code mask shall be as specified in 6.3.12.3.

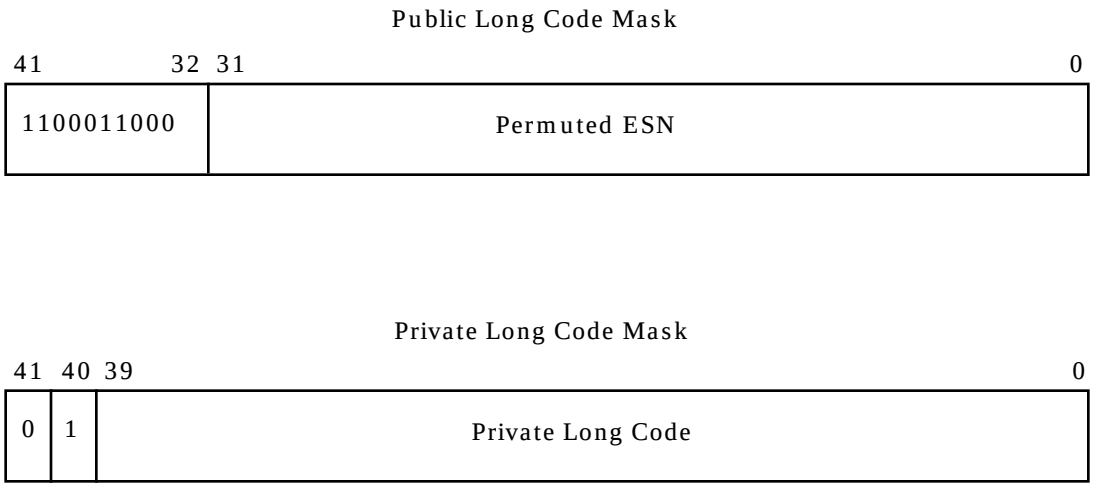


Figure 7.1.3.5.5-1. Forward Traffic Channel Long Code Mask

[6]Since the Forward Traffic Channel is convolutionally encoded by blocks (the state of the encoder is reset at the end of each frame), all bits of one Forward Traffic Channel frame influence symbols in only one interleaver block.

7.1.3.5.6 Forward Traffic Channel Power Control Subchannel

The base station shall insert on every Forward Traffic Channel a power control subchannel as specified in 7.1.3.1.7.

7.1.3.5.7 Forward Traffic Channel Walsh Covering

Prior to transmission, the Forward Traffic Channel shall be covered with a Walsh cover sequence as specified in 7.1.3.1.8.

7.1.3.5.8 Forward Traffic Channel Quadrature Spreading,

The Forward Traffic Channel shall be PN spread as specified in 7.1.3.1.9.

7.1.3.5.9 Forward Traffic Channel Filtering

Filtering for the Forward Traffic Channel shall be as specified in 7.1.3.1.10.

7.1.3.5.10 Forward Traffic Channel Frame Structure

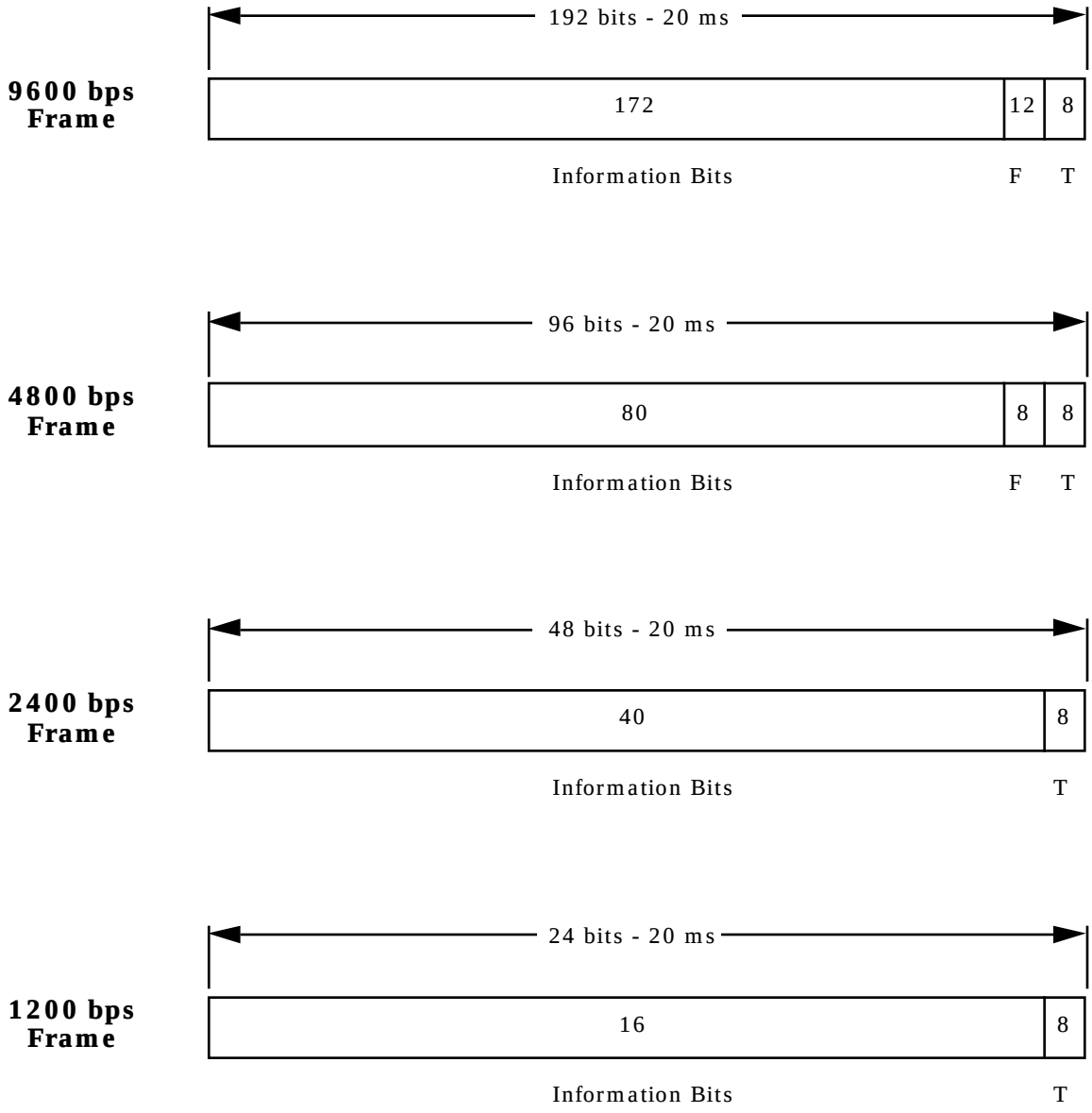
Forward Traffic Channel frames sent at the 9600 bps transmission rate shall consist of 192 bits. These 192 bits shall be composed of 172 information bits followed by 12 frame quality indicator (CRC) bits and eight Encoder Tail Bits as shown in Figure 7.1.3.5.10-1.

Forward Traffic Channel frames sent at the 4800 bps transmission rate shall consist of 96 bits. These 96 bits shall be composed of 80 information bits followed by eight frame quality indicator (CRC) bits and eight Encoder Tail Bits as shown in Figure 7.1.3.5.10-1.

Forward Traffic Channel frames sent at the 2400 bps transmission rate shall consist of 48 bits. These 48 bits shall be composed of 40 information bits followed by eight Encoder Tail Bits as shown in Figure 7.1.3.5.10-1.

Forward Traffic Channel frames sent at the 1200 bps transmission rate shall consist of 24 bits. These 24 bits shall be composed of 16 information bits followed by eight Encoder Tail Bits as shown in Figure 7.1.3.5.10-1.

The number of bits in the frame and the frame format, described in 7.1.3.5.11, shall be variable on a frame-by-frame basis.



Notation

F - Frame Quality Indicator (CRC)
T - Encoder Tail Bits

Figure 7.1.3.5.10-1. Forward Traffic Channel Frame Structure

7.1.3.5.10.1 Forward Traffic Channel Frame Quality Indicator

Each 9600 bps and 4800 bps frame shall include a frame quality indicator. This frame quality indicator is a CRC.[7] No frame quality indicator is used for the 2400 bps and 1200 bps transmission rates.

For both the 9600 bps and 4800 bps rates, the frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits. The 9600 bps transmission rate shall use a 12-bit frame quality indicator. The generator polynomial for this frame quality indicator shall be as follows:

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1.$$

The 4800 bps transmission rate shall use an 8-bit frame quality indicator. The generator polynomial for this frame quality indicator shall be as follows:

$$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1.$$

The CRCs shall be computed according to the following procedure using the logic shown in Figures 7.1.3.5.10.1-1 and 7.1.3.5.10.1-2:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked 172 times (for 192-bit frame) or 80 times (for 96-bit frame) with the information bits as input.
- The switches shall be set in the down position, and the register shall be clocked an additional 12 times (for 192-bit frame) or 8 times (for 96-bit frame). The 12 or 8 additional output bits shall be the check bits.
- The bits shall be transmitted in the order calculated.

[7] The frame quality indicator supports two functions at the receiver. The first function is to determine the transmission rate of the frame; the second is to determine whether the frame is in error.

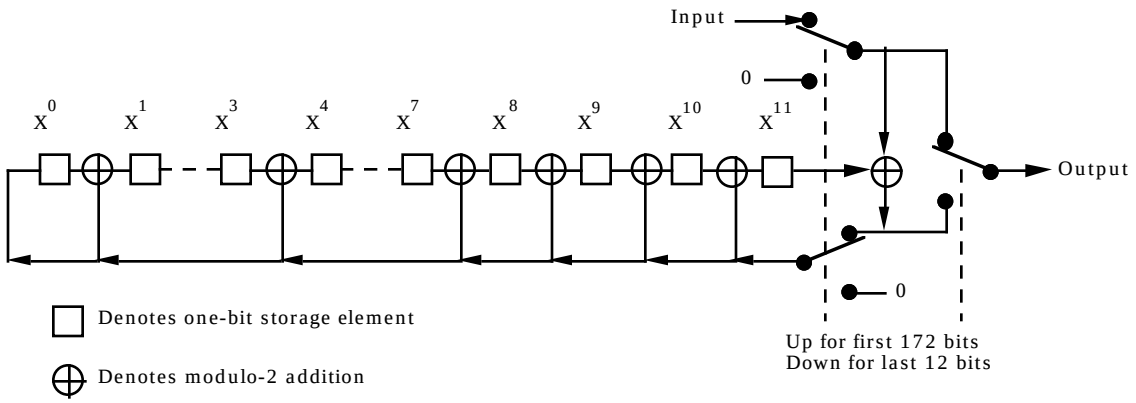


Figure 7.1.3.5.10.1-1. Forward Traffic Channel Frame Quality Indicator Calculation at the 9600 bps Rate

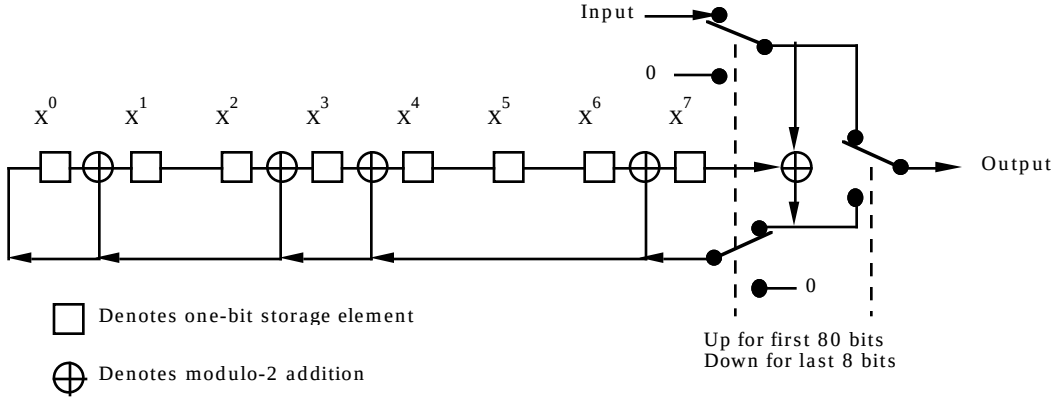


Figure 7.1.3.5.10.1-2. Forward Traffic Channel Frame Quality Indicator Calculation at the 4800 bps Rate

7.1.3.5.10.2 Forward Traffic Channel Encoder Tail Bits

The last 8 bits of each Forward Traffic Channel frame are called the Encoder Tail Bits. These 8 bits shall be set to '0'. The base station shall not include these bits in the computation of the 9600 and 4800 bps frame quality indicators.

7.1.3.5.10.3 Reserved

7.1.3.5.10.4 Null Traffic Channel Data

Null Traffic Channel data shall consist of frames of 16 ones followed by 8 zeros (the Encoder Tail Bits) sent at the 1200 bps rate.

The base station transmits null Traffic Channel data when no service option is active. Null Traffic Channel data serves as a "keep-alive" operation so that the mobile station can maintain synchronization with the base station.

7.1.3.5.11 Multiplex Option 1 Information Bits

Multiplex Option 1 is also referred to as the default multiplex option.[8] It provides for the transmission of primary traffic and signaling traffic. Signaling traffic may be transmitted via blank-and-burst with the signaling traffic using all of the frame or via dim-and-burst with the primary traffic and signaling traffic sharing the frame. Multiplex Option 1 also supports the transmission of secondary traffic. When primary traffic is active, secondary traffic is transmitted via dim-and-burst with the primary traffic and secondary traffic sharing the frame. When primary traffic is not active, secondary traffic is transmitted via blank-and-burst with the secondary traffic using all of the frame. The information bit structures for primary and signaling traffic are specified in 7.1.3.5.11.1. The information bit structures for secondary traffic are specified in 7.1.3.5.11.2. Table 7.1.3.5.11-1 shows the information bit structures supported by Multiplex Option 1.

The base station shall support Multiplex Option 1. The base station shall support the transmission of primary traffic and signaling traffic using the information bit structures specified in 7.1.3.5.11.1. The base station may support secondary traffic, and if so, the base station shall also use the information bit structures specified in 7.1.3.5.11.2.

[8] The multiplex option is the same on both the Forward Traffic Channel and the Reverse Traffic Channel.

Table 7.1.3.5.11-1. Forward Traffic Channel Information Bits for Multiplex Option 1

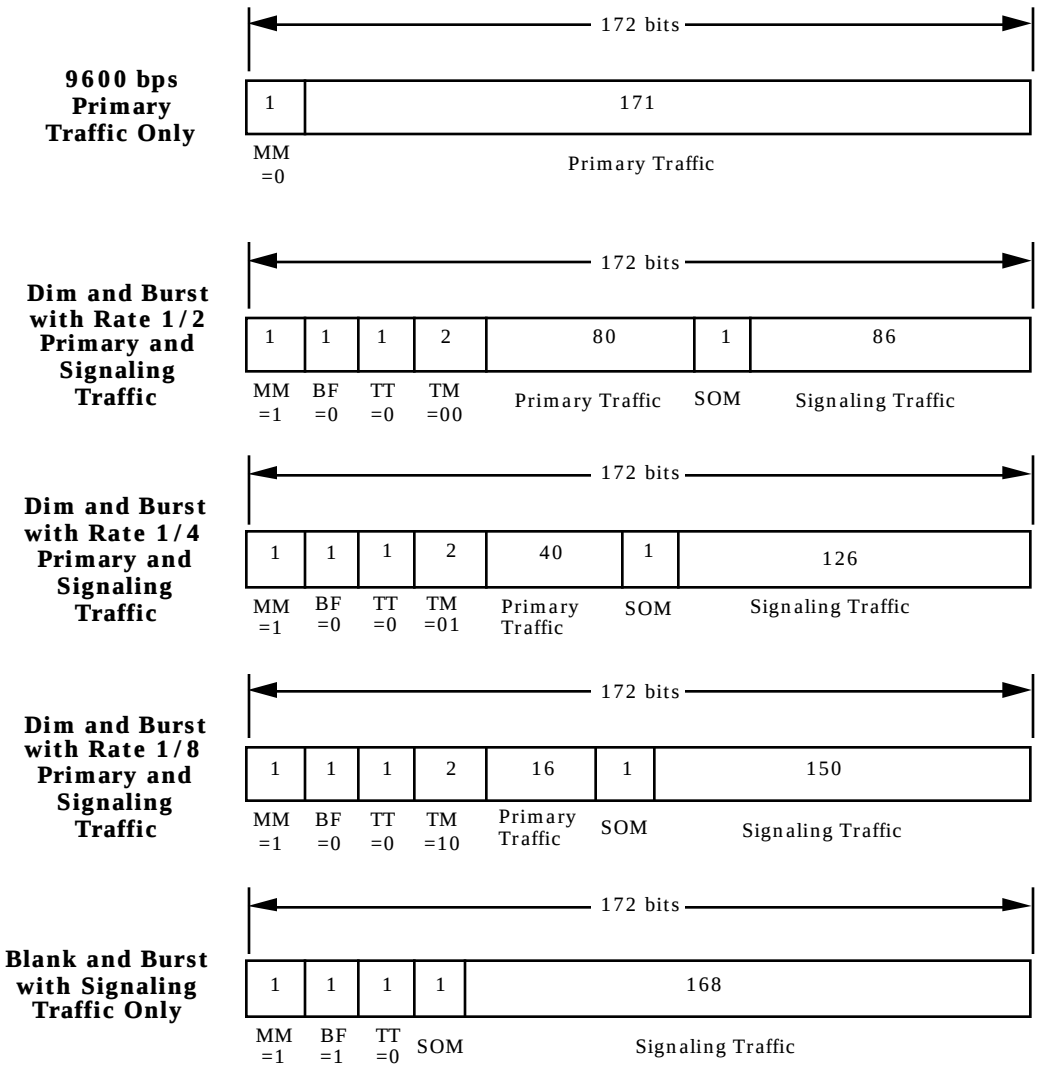
	Format Bits				Primary Traffic		Signaling Traffic		Secondary Traffic	
Transmit Rate (bits/sec)	**Mixed Mode (MM)**	**Burst Format (BF)**	**Traffic Type (TT)**	**Traffic Mode (TM)**	bits/ frame	bits/ sec	bits/ frame	bits/ sec	bits/ frame	bits/ sec
	0	-	-	-	171	8550	0	0	0	0
	1	0	0	00	80	4000	86	4300	0	0
	1	0	0	01	40	2000	126	6300	0	0
	1	0	0	10	16	800	150	7500	0	0
	1	1	0	-	0	0	168	8400	0	0
9600 *	1	1	1	-	0	0	0	0	169	8450
*	1	0	1	00	80	4000	0	0	87	4350
*	1	0	1	01	40	2000	0	0	127	6350
*	1	0	1	10	16	800	0	0	151	7550
4800	-	-	-	-	80	4000	0	0	0	0
2400	-	-	-	-	40	2000	0	0	0	0
1200	-	-	-	-	16	800	0	0	0	0

Notes: Secondary traffic structures, marked with *, are optional.
Signaling traffic bits do not include the SOM bit.

7.1.3.5.11.1 Primary and Signaling Traffic with Multiplex Option 1

The base station shall support the information bit structures described in Table 7.1.3.5.11-1 and Figure 7.1.3.5.11.1-1.

For signaling traffic, the first bit of the frame's signaling portion shall be a SOM (Start of Message) Bit. The SOM Bit shall be a '1' if a Reverse Traffic Channel message (signaling message) begins at the following bit. A Reverse Traffic Channel Message shall not begin anywhere else in the frame. The SOM Bit shall be a '0' if a message does not begin at the following bit. This occurs if the frame contains part of a message that began in a previous frame.



Notation

MM - Mixed Mode Bit
- 0 - Primary Traffic Only
- 1 - Primary Traffic and/or Signaling/Secondary Traffic

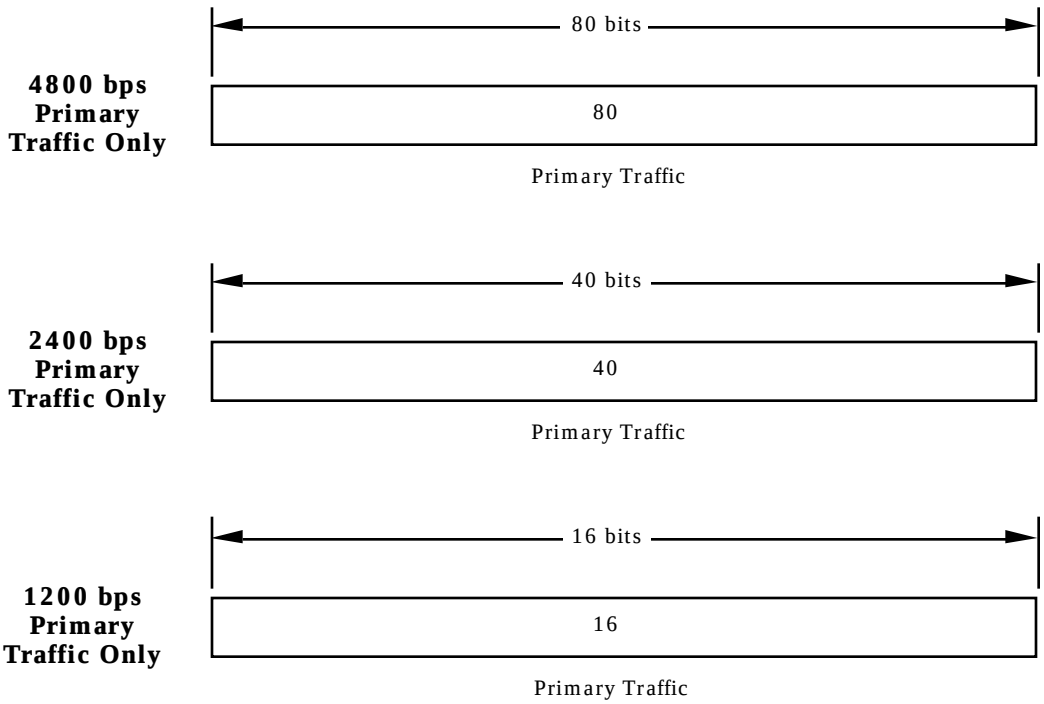
BF - Burst Format Bit
- 0 - Dim-and-burst
- 1 - Blank-and-burst

TT - Traffic Type Bit
- 0 - Signaling
- 1 - Secondary

TM - Traffic Mode Bits
- 00 - 80 Primary Traffic Bits and either 86 Signaling Traffic or 87 Secondary Traffic Bits
- 01 - 40 Primary Traffic Bits and either 126 Signaling Traffic Bits or 127 Secondary Traffic Bits
- 10 - 16 Primary Traffic Bits and either 150 Signaling Traffic Bits or 151 Secondary Traffic Bits
- 11 - Reserved

SOM - Start of Message Bit
- 0 - Message does not begin at the following bit
- 1 - Message begins at the following bit

Figure 7.1.3.5.11.1-1. Information Bits for Primary Traffic and Signaling Traffic (Part 1 of 2)



Notation

MM - Mixed Mode Bit
- 0 - Primary Traffic Only
- 1 - Primary Traffic and/or Signaling/Secondary Traffic

BF - Burst Format Bit
- 0 - Dim-and-burst
- 1 - Blank-and-burst

TT - Traffic Type Bit
- 0 - Signaling
- 1 - Secondary

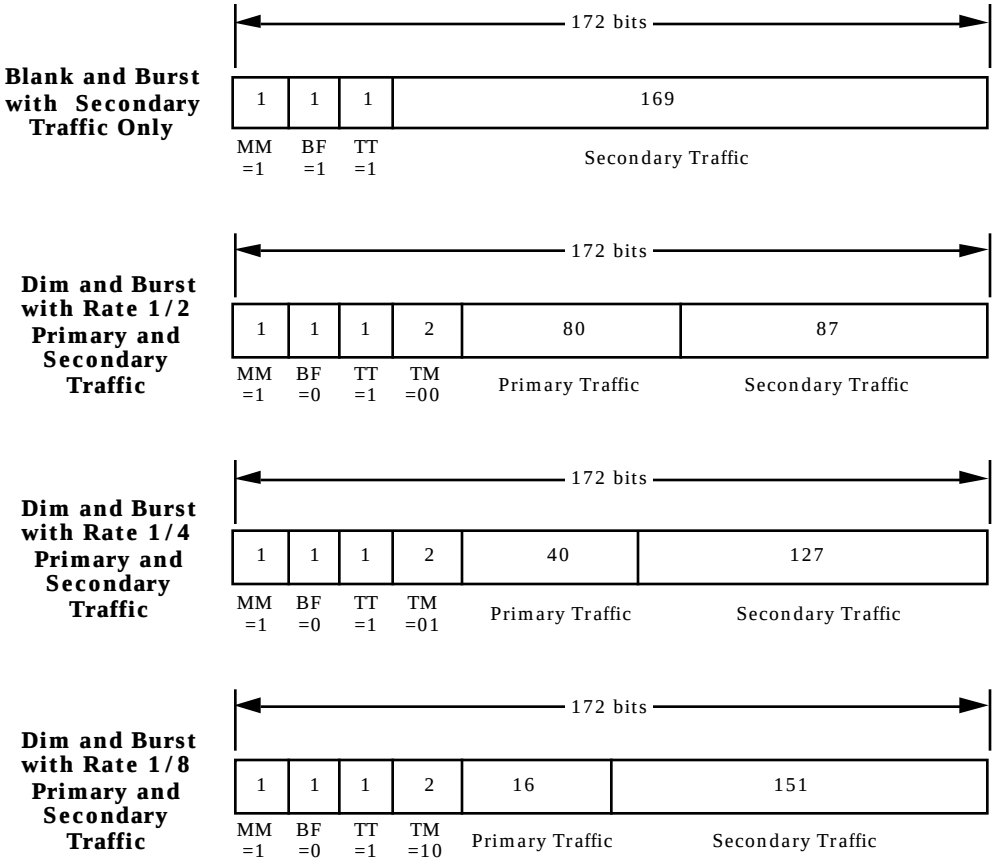
TM - Traffic Mode Bits
- 00 - 80 Primary Traffic Bits and either 86 Signaling Traffic or 87 Secondary Traffic Bits
- 01 - 40 Primary Traffic Bits and either 126 Signaling Traffic Bits or 127 Secondary Traffic Bits
- 10 - 16 Primary Traffic Bits and either 150 Signaling Traffic Bits or 151 Secondary Traffic Bits
- 11 - Reserved

SOM - Start of Message Bit
- 0 - Message does not begin at the following bit
- 1 - Message begins at the following bit

Figure 7.1.3.5.11.1-1. Information Bits for Primary Traffic and Signaling Traffic (Part 2 of 2)

7.1.3.5.11.2 Secondary Traffic with Multiplex Option 1

If the base station supports secondary traffic, the base station shall use the information bit structures described in Table 7.1.3.5.11-1 and Figure 7.1.3.5.11.2-1.



Notation

MM - Mixed Mode Bit
- 0 - Primary Traffic Only
- 1 - Primary Traffic and/or Signaling/Secondary Traffic

BF - Burst Format Bit
- 0 - Dim-and-burst
- 1 - Blank-and-burst

TT - Traffic Type Bit
- 0 - Signaling
- 1 - Secondary

TM - Traffic Mode Bits
- 00 - 80 Primary Traffic Bits and either 86 Signaling Traffic or 87 Secondary Traffic Bits
- 01 - 40 Primary Traffic Bits and either 126 Signaling Traffic Bits or 127 Secondary Traffic Bits
- 10 - 16 Primary Traffic Bits and either 150 Signaling Traffic Bits or 151 Secondary Traffic Bits
- 11 - Reserved

SOM - Start of Message Bit
- 0 - Message does not begin at the following bit
- 1 - Message begins at the following bit

Figure 7.1.3.5.11.2-1. Information Bits for Secondary Traffic

7.1.3.5.11.3 Use of Various Information Bit Formats

When neither a primary traffic service option nor a secondary traffic service option is active, the base station shall transmit signaling traffic using only blank-and-burst frames. When not transmitting signaling traffic, the base station shall transmit only null Traffic Channel data frames.

When a primary traffic service option is active and a secondary traffic service option is not active, the base station shall use the information formats specified in 7.1.3.5.11.1. The base station shall not transmit null Traffic Channel data. The base station should use the dim-and-burst information format specified in 7.1.3.5.11.1 for signaling traffic.

When a primary traffic service option is not active and a secondary traffic service option is active, the base station shall use the information formats specified in 7.1.3.5.11.2 to transmit secondary traffic. The base station shall use the blank-and-burst format specified in 7.1.3.5.11.1 for signaling traffic. The base station shall transmit null Traffic Channel data when neither secondary traffic nor signaling traffic is to be sent.

When both a primary traffic service option and a secondary traffic service option are active, the base station shall use the information formats specified in 7.1.3.5.11.1 and 7.1.3.5.11.2. The base station shall not transmit null Traffic Channel data. The base station should use the dim-and-burst information format specified in 7.1.3.5.11.1 for signaling traffic.

7.1.3.5.11.4 Control of Service Options

Multiplex Option 1 controls the number of bits that the connected service options supplies for a frame (see Appendix A).

The base station shall use the following rules when a primary traffic service option is active: If signaling traffic is to be transmitted in a frame, Multiplex Option 1 shall either restrict the primary traffic service option to generate zero bits (for a blank-and-burst frame) or to generate less than 171 bits (for a dim-and-burst frame). If secondary traffic is to be transmitted in a frame, Multiplex Option 1 may restrict the primary traffic service option to generate less than 171 bits but shall allow the primary traffic service option to generate at least 16 bits. In all other cases, Multiplex Option 1 should allow the primary traffic service option to generate either 16, 40, 80, or 171 bits for a frame.

7.1.4 Limitations on Emissions

7.1.4.1 Bandwidth Occupied

Modulation products in a bandwidth of 30 kHz centered ±750 kHz from the CDMA Channel center frequency shall be at least 45 dB below the mean output power level.

7.1.4.2 Conducted Spurious Emissions

Current FCC rules shall apply.

7.1.4.3 Radiated Spurious Emissions

Current FCC rules shall apply.

7.1.4.4 Intermodulation

Radiated products from co-located transmitters shall not exceed FCC spurious and harmonic level requirements that would apply to any of the transmitters operated separately.

7.1.5 Synchronization, Timing, and Phase

7.1.5.1 Timing Reference Source

Each base station shall contain a time base reference from which all time critical CDMA transmissions, including pilot PN sequences, frames, and Walsh functions, shall be derived. The time base reference shall be time-aligned to CDMA System Time, as described in 1.2. Reliable external means should be provided at each base station to synchronize each base station's time base reference to CDMA System Time. Each base station should contain a frequency reference of sufficient accuracy to maintain time alignment to CDMA System Time, in the event that the external source of System Time is lost.[9]

7.1.5.2 Base Station Transmission Time

All base stations, except base stations in an isolated system or isolated network, should radiate the pilot PN sequence within ±3 μs of CDMA System Time and shall radiate the pilot PN sequence within ±10 μs of CDMA System Time. All CDMA Channels radiated by a base station shall be within ±1 μs of each other.

The coverage region of a CDMA base station is defined as the region where the forward link field strength exceeds 32 dBμ (= 39.811 microvolt/meter = -100 dBm from a dipole). An isolated base station is a base station with boundaries that do not cross the boundaries of another base station in more than one percent of its coverage region. An isolated system or network is composed of base stations which are all isolated from all the base stations in any other system or network. All base stations within an isolated system or network should radiate the pilot PN sequence within ±1 second of CDMA System Time. All base stations within isolated systems and networks should radiate the pilot PN sequence within ±6 μs of each other and shall radiate the pilot PN sequence within ±20 μs of each other.

Time measurements are made at the base station antenna connector.

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[9]These guidelines on time keeping requirements reflect the fact that the amount of time error between base stations that can be tolerated in a CDMA network is not a hard limit. Each mobile station can search an ever increasing time window as directed by the base stations. However, increasing this window gradually degrades performance since wider windows require a longer time for the mobile stations to search out and locate the various arrivals from all base stations that may be in view. An eventual limit on time errors occurs since pilot addresses are derived as 64 chip time shifts of a length 32768 chip sequence. In a very extreme case where the maximum number of 512 sequences were assigned to base stations, these address sequences would be 64 chips apart. In this situation it is possible that large time errors between base station transmissions would be confused with path-delayed arrivals from a given base station.

The rate of change for timing corrections shall not exceed 1/8 chip (101.725 ns) per 200 ms.

7.1.5.3 Pilot to Walsh Cover Time Tolerance

The time error between the pilot PN sequence and all Walsh cover sequences sharing a common Forward CDMA Channel shall be less than ±50 ns.

7.1.5.4 Pilot to Walsh Cover Phase Tolerance

The phase difference between the RF carrier of the Pilot Channel and the RF carrier of any other code channels on the same forward CDMA Channel emitted by the base station shall not exceed 0.05 radian.

7.2 Receiver

7.2.1 Frequency Parameters

7.2.1.1 Channel Spacing and Designation

Channel spacing and designations for the base station reception shall be as specified in 2.1.1.1.

7.2.2 Demodulation Characteristics

The base station demodulation process shall perform complementary operations to the mobile station modulation process on the Reverse CDMA Channel (see 6.1.3).

The Reverse Traffic Channel frame is described in 6.1.3.3.10. A base station may implement staggered Reverse Traffic Channel frames as described in 6.1.3.3.1. The Reverse Traffic Channel block deinterleaver shall be aligned with the Reverse Traffic Channel frame.

7.2.3 Limitations on Emissions

Current FCC rules shall apply.

7.2.4 Receiver Performance Requirements

The receiver performance shall meet the requirements set in the “Recommended Minimum Standards for 800 MHz Base Station Supporting Wideband Spread Spectrum Dual-Mode Mobile Stations.”

7.3 Security and Identification

7.3.1 Authentication

The base station may be equipped with a database that includes unique mobile station authentication keys and/or shared secret data for each registered mobile station in the system. The authentication keys and shared secret data are as defined in “Wideband Spread Spectrum Dual-Mode Cellular System Authentication and Privacy Procedures”. This database is used for authentication of mobile stations that are equipped for authentication operation.

If the base station supports mobile station authentication, it shall provide the following capabilities: The base station shall send and receive authentication messages and perform the authentication calculations described in 6.3.12.1. The base station shall set the RAND parameter of the *Access Parameters Message* to the same value transmitted on the forward analog control channel (see 2.3.12.1.2).

7.3.2 Encryption

If the base station supports mobile station authentication (see 7.3.1), it may also support message encryption by providing the capability to send encryption control messages and to perform the operations of encryption and decryption as specified in 6.3.12.2.

7.3.3 Voice Privacy

If the base station supports mobile station authentication (see 7.3.1), it may also support voice privacy using the private long code mask, as specified in 6.3.12.3.

7.4 Supervision

7.4.1 Access Channel

The base station shall check the CRC of all received Access Channel messages (see 6.7.1.2.2). The base station should ignore any message that has a CRC that does not check.

The base station shall continually monitor each active Access Channel and provide control in cases of overload by using the *Access Parameters Message*.

7.4.2 Reverse Traffic Channel

The base station shall check the CRC of all received Reverse Traffic Channel messages (see 6.7.2.2.2). The base station should ignore any message that has a CRC that does not check.

The base station shall continually monitor each active Reverse Traffic Channel to determine if the call is active. If the base station detects that the call is no longer active, the base station shall declare loss of Reverse Traffic Channel continuity (see 7.6.4).

7.5 Malfunction Detection

Reserved.

No text

7.6 Call Processing

This section describes base station call processing. It contains frequent references to the messages that flow between the base station and the mobile station. While reading this section, it may be helpful to refer to the message formats (see 6.7 and 7.7), and to the call flow examples (see Appendix B).

The values for the time and numeric constants used in this section (e.g., T_{1b} and N_{4m}) are specified in Appendix D.

Base station call processing consists of the following types of processing:

- *Pilot and Sync Channel Processing* - During *Pilot and Sync Channel Processing*, the base station transmits the Pilot Channel and Sync Channel which the mobile station uses to acquire and synchronize to the CDMA system while the mobile station is in the *Mobile Station Initialization State*.
- *Paging Channel Processing* - During *Paging Channel Processing*, the base station transmits the Paging Channel which the mobile station monitors to receive messages while the mobile station is in the *Mobile Station Idle State* and the *System Access State*.
- *Access Channel Processing* - During *Access Channel Processing*, the base station monitors the Access Channel to receive messages which the mobile station sends while the mobile station is in the *System Access State*.
- *Traffic Channel Processing* - During *Traffic Channel Processing*, the base station uses the Forward and Reverse Traffic Channels to communicate with the mobile station while the mobile station is in the *Mobile Station Control on the Traffic Channel State*.

7.6.1 Pilot and Sync Channel Processing

During *Pilot and Sync Channel Processing*, the base station transmits the Pilot and Sync Channels which the mobile station uses to acquire and synchronize to the CDMA system while the mobile station is in the *Mobile Station Initialization State*.

7.6.1.1 Primary and Secondary CDMA Channels

The Primary and Secondary CDMA Channels are the CDMA Channels on which the mobile station attempts to acquire the CDMA system (see 7.1.1.1).

The base station shall support the Primary CDMA Channel, or the Secondary CDMA Channel, or both. The base station may support additional CDMA Channels.

7.6.1.2 Pilot Channel Operation

The Pilot Channel (see 7.1.3.2) is a reference channel which the mobile station uses for acquisition, timing, and as a phase reference for coherent demodulation.

The base station shall continually transmit a Pilot Channel for every CDMA Channel supported by the base station.

7.6.1.3 Sync Channel Operation

The Sync Channel provides the mobile station with system configuration and timing information (see 7.1.3.3).

The base station shall transmit at most one Sync Channel for each supported CDMA Channel. If the base station supports the Primary CDMA Channel, the base station shall transmit a Sync Channel on the Primary CDMA Channel. If the base station does not support the Primary CDMA Channel, the base station shall transmit a Sync Channel on the Secondary CDMA Channel.

The base station shall continually send the *Sync Channel Message* on each Sync Channel that the base station transmits.

7.6.2 Paging Channel Processing

During *Paging Channel Processing*, the base station transmits the Paging Channel (see 7.1.3.4) which the mobile station monitors to receive messages while the mobile station is in the *Mobile Station Idle State* and the *System Access State*.

The base station may transmit up to seven Paging Channels on each supported CDMA Channel. For each supported CDMA Channel for which the base station transmits a Sync Channel, the base station shall transmit at least one Paging Channel.

For each Paging Channel that the base station transmits, the base station shall continually send valid Paging Channel messages (see 7.7.2).

The base station shall not send any message which ends in a Paging Channel slot other than the Paging Channel slot in which the message begins, or the Paging Channel slot following the Paging Channel slot in which the message begins.

7.6.2.1 Paging Channel Procedures

7.6.2.1.1 CDMA Channel Determination

To determine the mobile station's assigned CDMA Channel, the base station shall use the hash function specified in 6.6.7.1 with the following inputs:

- Mobile station's ESN.
- Number of CDMA Channels on which the base station transmits Paging Channels.

7.6.2.1.2 Paging Channel Determination

To determine the mobile station's assigned Paging Channel, the base station shall use the hash function specified in 6.6.7.1 with the following inputs:

- Mobile station's ESN.
- Number of Paging Channels which the base station transmits on the mobile station's assigned CDMA Channel.

7.6.2.1.3 Paging Slot Determination

To determine the assigned Paging Channel slots for a mobile station with a given SLOT_CYCLE_INDEX, the base station shall select a number PGSLOT using the hash function specified in 6.6.7.1 with the following inputs:

- Mobile station's ESN.
- Maximum number of Paging Channel slots (640).

The assigned Paging Channel slots for the mobile station are those slots for which

$$(\lfloor t/10 \rfloor - \text{PGSLOT}) \bmod (5 \times T) = 0,$$

where t is the System Time in frames, and T is the slot cycle length in seconds given by

$$T = 2^{\text{SLOT\_CYCLE\_INDEX}}.$$

7.6.2.1.4 Message Transmission and Acknowledgement Procedures

The Paging Channel acknowledgement procedures facilitate the reliable exchange of messages between the base station and the mobile station on the Paging Channel and Access Channel (see 7.6.3.1.1). The base station uses the fields ACK_SEQ (acknowledgement sequence number), MSG_SEQ (message sequence number), ACK_REQ (acknowledgement required), and VALID_ACK (valid acknowledgement) to support this mechanism. These fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields and the processing thereof are referred to as pertaining to layer 3. (See Appendix C for further discussion of layering.)

Paging Channel messages can be directed (addressed) either to a specific mobile station, by means of the ESN, or to a specific MIN (*Page Message* and *Slotted Page Message* only). Since MINs can be active in more than one mobile station and a mobile station can have more than one active MIN, separate acknowledgement and message sequence numbering procedures are used for each message address.

The base station shall set the ACK_SEQ and VALID_ACK fields of all Paging Channel messages as specified in 7.6.3.1.1.

The base station shall maintain independent message numbering sequences (MSG_SEQ) on the Paging Channel for each message address (ESN or MIN). All Paging Channel messages containing an ESN shall be considered to be addressed by ESN. The *Page Message* and *Slotted Page Message* shall be considered to be addressed by MIN.

For each message address (ESN or MIN), separate message numbering sequences shall be maintained for messages requiring acknowledgement and for messages not requiring acknowledgment. Each base station may maintain the sequence numbers independently of other base stations. For each new message sent to a message address, the base station shall increment the appropriate MSG_SEQ value, modulo 4.

The base station shall wait at least T_{4m} seconds after transmitting a MSG_SEQ number in a message sent to a message address before using the same MSG_SEQ number in a different message (see Figure 7.6.2.1.4-1).

The base station may send a message several times to increase the probability of message reception. The base station shall complete all retransmissions of the same message within T_{4m} seconds after the first transmission, as shown in Figure 7.6.2.1.4-1. If the base station sends a message with the same contents more than T_{4m} seconds after the first transmission, it shall use a different message sequence number.

The base station should not retransmit a message requiring acknowledgement after it has received an acknowledgement of the message. The base station shall process a *Page Response Message* including an acknowledgement as acknowledging a MIN-addressed *Page Message* or *Slotted Page Message*. The base station shall process all other Access Channel messages including an acknowledgement as acknowledging an ESN-addressed Paging Channel message.

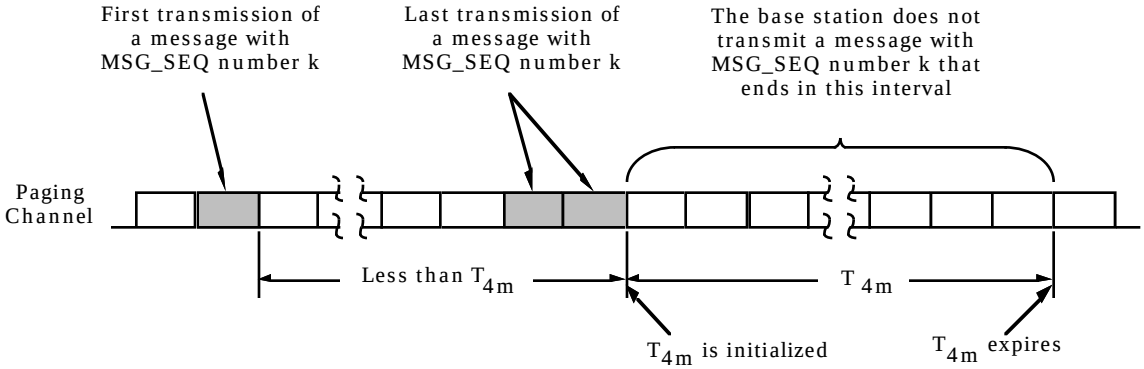

Figure 7.6.2.1.4-1. MSG_SEQ Reuse

7.6.2.2 Overhead Information

The base station sends overhead messages to provide the mobile station with the information it needs to operate with the base station.

The base station shall maintain a configuration sequence number (CONFIG_SEQ), and shall increment CONFIG_SEQ modulo 64 whenever the base station modifies the *System Parameters Message*, the *Neighbor List Message*, or the *CDMA Channel List Message*.

The base station shall maintain an access configuration sequence number (ACC_CONFIG_SEQ), and shall increment ACC_CONFIG_SEQ modulo 64 whenever the base station modifies the *Access Parameters Message*.

On each of the Paging Channels the base station transmits, the base station shall send each of the following system overhead messages at least once per T_{1b} seconds:

1. *Access Parameters Message*
2. *CDMA Channel List Message*
3. *Neighbor List Message*
4. *System Parameters Message*

7.6.2.3 Mobile Station Directed Messages

The base station shall use the following rules for selecting the Paging Channel slot in which to send a message to a mobile station:

- If the base station is able to determine that the mobile station is operating in the non-slotted mode, the base station may send the message to the mobile station in any Paging Channel slot.
- If the base station is able to determine that the mobile station is operating in the slotted mode and is able to determine the mobile station's SLOT_CYCLE_INDEX, the base station shall send the message, at least once, as follows:
    1. The base shall send the message in an assigned Paging Channel slot for the mobile station (see 7.6.2.1.3); and
    2. The base station shall not send the message after the last *Slotted Page Message* sent in that Paging Channel slot.
- If the base station is not able to determine whether the mobile station is operating in the non-slotted mode, or the base is not able to determine the mobile station's SLOT_CYCLE_INDEX, the base station shall assume that the mobile station is operating in the slotted mode with SLOT_CYCLE_INDEX = 1. The base station shall send the message, at least once, as follows:
    1. The base shall send the message in an assigned Paging Channel slot for the mobile station (see 7.6.2.1.3); and
    2. The base station shall not send the message after the last *Slotted Page Message* sent in that Paging Channel slot.

The base station shall send at least one *Slotted Page Message* in each Paging Channel slot (see 7.7.2.1.1).

The base station may send the following messages directed to a mobile station on the Paging Channel. If the base station sends a message, the base station shall comply with the specified requirements for sending the message.

1. *Abbreviated Alert Order:* No requirements.
2. *Added MIN Rejected Order:* No requirements.
3. *Authentication Challenge Message:* No requirements.
4. *Base Station Acknowledgement Order:* No requirements.
5. *Base Station Challenge Confirmation Order:* No requirements.
6. *Channel Assignment Message:* No requirements.
7. *Data Burst Message:* No requirements.
8. *Intercept Order:* No requirements.
9. *Local Control Order:* No requirements.
10. *Lock Order:* No requirements.

11. *Lock Until Power-Cycled Order:* No requirements.
12. *Message Waiting Order:* No requirements.
13. *Page Message:* The base station shall include both MIN1 and MIN2 fields in the message when paging either a foreign SID roamer or a foreign NID roamer (see 6.6.5.3).
14. *Registration Accepted Order:* No requirements.
15. *Registration Rejected Order:* No requirements.
16. *Registration Request Order:* No requirements.
17. *Release Order:* No requirements.
18. *Reorder Order:* No requirements.
19. *Slotted Page Message:* The base station shall include both MIN1 and MIN2 fields in the message when paging either a foreign SID roamer or a foreign NID roamer (see 6.6.5.3).
20. *SSD Update Message:* No requirements.
21. *Unlock Order:* No requirements.

7.6.3 Access Channel Processing

During *Access Channel Processing*, the base station monitors the Access Channel to receive messages which the mobile station sends while the mobile station is in the *System Access State*.

Each Access Channel is associated with a Paging Channel. Up to 32 Access Channels can be associated with a Paging Channel. The number of Access Channels associated with a particular Paging Channel is specified in the *Access Parameters Message* sent on that Paging Channel.

The base station shall continually monitor all Access Channels associated with each Paging Channel that the base station transmits.

7.6.3.1 Access Channel Procedures

7.6.3.1.1 Message Reception and Acknowledgement Procedures

The Access Channel acknowledgement procedures facilitate the reliable exchange of messages between the base station and the mobile station on the Paging Channel (see 7.6.2.1.4) and Access Channel. The base station uses the fields ACK_SEQ (acknowledgement sequence number), MSG_SEQ (message sequence number), ACK_REQ (acknowledgement required), and VALID_ACK (valid acknowledgement) to support this mechanism. These fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields and the processing thereof are referred to as pertaining to layer 3. (See Appendix C for further discussion of layering.)

A message received on the Access Channel requires acknowledgement if the ACK_REQ field is set to '1'. In this specification, all messages sent on the Access Channel require acknowledgement. All messages sent on the Access Channel contain the ESN of the mobile station sending the message, and are acknowledged by Paging Channel messages addressed by ESN.

The base station acknowledges a received message by transmitting a message on the Paging Channel with the ACK_SEQ field set equal to the MSG_SEQ field of the received message, and with the VALID_ACK field set to '1'. A message transmitted with the ACK_SEQ and VALID_ACK fields set in this manner is referred to as including an acknowledgement of the received message.

After receiving a message requiring acknowledgement from a mobile station on the Access Channel, the base station shall transmit a message directed to that mobile station (i.e., addressed to the mobile station's ESN), including acknowledgement, on the corresponding Paging Channel. The acknowledgement shall be transmitted within ACC_TMO × 80 ms after receiving the message, where ACC_TMO is the value sent in the *Access Parameters Message* on the mobile station's assigned Paging Channel.

When a received message requires acknowledgement and no message directed to the mobile station is available within ACC_TMO × 80 ms after the message is received, the base station shall transmit a *Base Station Acknowledgement Order* directed to the mobile station, including the acknowledgement.

Whenever a message requiring acknowledgement is received from a mobile station, the base station shall set the ACK_SEQ field in subsequent Paging Channel messages directed to that mobile station, to the MSG_SEQ specified in the received message. The VALID_ACK field shall be set to '1' for the first message with this value of ACK_SEQ sent to the mobile station on the Paging Channel. For all Paging Channel messages after the first, directed to the same mobile station and containing the same ACK_SEQ field value:

- The base station may set VALID_ACK to '1' if the message is sent within T_{4m} seconds after the first message (see Figure 7.6.2.1.4-1).
- The base station shall set VALID_ACK field to '0' if the message is sent more than T_{4m} seconds after the first message.

If the base station performs duplicate message detection using Access Channel message sequence numbers, it should use the following procedures. The base station should store, for each mobile station that is active on the Access Channel, a received status indicator for each possible value of the Access Channel message MSG_SEQ field (MSG_SEQ_RCVD[n], where n is 0 through 3).

The base station should consider a mobile station active on the Access Channel when it receives an Access Channel message from the mobile station. The base station should consider the mobile station inactive on the Access Channel if:

- It has received no message from the mobile station within a time period to be selected by the base station manufacturer; or
- The mobile station has been assigned to a Traffic Channel; or

- The mobile station has been assigned to the analog system; or
- The base station has received a power-down registration from the mobile station.

When the base station receives an Access Channel message from an inactive mobile station, it should set MSG_SEQ_RCVD[n] to NO for all values of n from 0 to 3. The base station should then consider the mobile station active on the Access Channel.

For each active mobile station, the base station should perform the following procedures:

- When a message requiring acknowledgement is received (including a message received while the mobile station was inactive), with message sequence number MSG_SEQ, and MSG_SEQ_RCVD[MSG_SEQ] is equal to NO, the base station should process the message as a new message. The base station should set MSG_SEQ_RCVD[MSG_SEQ] to YES, and should set MSG_SEQ_RCVD[(MSG_SEQ + 2) modulo 4] to NO.
- When a message requiring acknowledgement is received, with message sequence number MSG_SEQ, and MSG_SEQ_RCVD[MSG_SEQ] is equal to YES, the base station shall acknowledge the message as specified earlier in this section but should not perform any further processing of the message.

7.6.3.2 Reserved

7.6.3.3 Response to *Page Response Message*

If the base station receives a *Page Response Message*, the base station should send a *Channel Assignment Message* or a *Release Order*. The base station may also commence authentication procedures (see 6.3.12).

If the base station sends a *Channel Assignment Message*, the base station shall perform the following:

- If the *Channel Assignment Message* directs the mobile station to a Traffic Channel, the base station shall begin *Traffic Channel Processing* (see 7.6.4) for the mobile station.
- If the *Channel Assignment Message* directs the mobile station to an analog voice channel, the base station shall follow the procedure described in 3.6.4.

7.6.3.4 Response to Orders

No requirements.

7.6.3.5 Response to *Origination Message*

If the base station receives an *Origination Message*, the base station should send a *Channel Assignment Message*, an *Intercept Order*, a *Reorder Order*, or a *Release Order*. The base station may also commence authentication procedures (see 6.3.12).

If the base station sends a *Channel Assignment Message*, the base station shall perform the following:

- If the *Channel Assignment Message* directs the mobile station to a Traffic Channel, the base station shall begin *Traffic Channel Processing* (see 7.6.4) for the mobile station.
- If the *Channel Assignment Message* directs the mobile station to an analog voice channel, the base station shall follow the procedure described in 3.6.4.

7.6.3.6 Response to *Initial Registration Message* or *Registration Update Message*

If the base station receives an *Initial Registration Message* or a *Registration Update Message*, the base station may send a *Registration Acknowledgement Order*, a *Registration Accepted Order*, or a *Registration Rejected Order*.

7.6.3.7 Response to *Data Burst Message*

No requirements.

7.6.4 Traffic Channel Processing

During *Traffic Channel Processing*, the base station uses the Forward and Reverse Traffic Channels to communicate with the mobile station while the mobile station is in the *Mobile Station Control on the Traffic Channel State*.

Traffic Channel processing consists of the following substates:

- *Traffic Channel Initialization Substate* - In this substate, the base station begins transmitting on the Forward Traffic Channel and receiving on the Reverse Traffic Channel.
- *Waiting for Order Substate* - In this substate, the base station sends the *Alert With Information Message* to the mobile station.
- *Waiting for Answer Substate* - In this substate, the base station waits for the *Connect Order* from the mobile station.
- *Conversation Substate* - In this substate, the base station exchanges primary traffic packets with the mobile station's primary service option application.
- *Release Substate* - In this substate, the base station disconnects the call.

7.6.4.1 Special Functions and Actions

The base station performs the following special functions and actions in one or more of the Traffic Channel processing substates.

7.6.4.1.1 Forward Traffic Channel Power Control

When the base station enables Forward Traffic Channel power control, the mobile station reports frame error rate statistics to the base station using the *Power Measurement Report Message*.

The base station may enable Forward Traffic Channel power control using the *System Parameters Message* sent on the Paging Channel and the *Power Control Parameters Message* sent on the Forward Traffic Channel. The base station may enable periodic

reporting which causes the mobile station to report frame error rate statistics at specified intervals. The base station may also enable threshold reporting which causes the mobile station to report frame error rate statistics when the frame error rate reaches a specified threshold.

The base station may use the reported frame error rate statistics to adjust the transmit power of the Forward Traffic Channel.

7.6.4.1.2 Service Options

7.6.4.1.2.1 Overview

While operating on the Traffic Channel, the base station and mobile station can use the default service option, Service Option 1, or request an alternative service option. If the base station requests an alternative service option that is acceptable to the mobile station, the base station and the mobile station begin using the new service option.

If the base station requests a service option that is not acceptable to the mobile station, the mobile station can reject the requested service option or request an alternative service option. If the mobile station requests an alternative service option, the base station can accept or reject the mobile station's alternative service option, or request another service option. This process, called service option negotiation, ends when the base station and mobile station find a mutually acceptable service option, or when the base station rejects a service option request from the mobile station or the mobile station rejects a service option request from the base station.

The base station and mobile station use the *Service Option Request Order* to request a service option, and the *Service Option Response Order* to accept or reject a service option request. In addition, the mobile station can request a service option in the *Origination Message*.

The base station uses a variable (SO_REQ) to record the number of the service option for which the base station has sent a *Service Option Request Order* and is expecting a *Service Option Response Order*. SO_REQ is set to a special value NULL when the base station is not expecting a *Service Option Response Order*.

7.6.4.1.2.2 Requirements

7.6.4.1.2.2.1 Processing Service Option Requests

When the base station receives an *Origination Message* requesting a service option other than the default service option, or the base station receives a *Service Option Request Order*, the base station shall perform the following:

- If the base station supports and accepts the requested service option, the base station shall set SO_REQ to NULL and send a *Service Option Response Order* accepting the requested service option within the time limit required by the requested service option. The base station shall begin using the requested service option in accordance with the requirements for the requested service option.

- If the base station supports the requested service option and the base station has an alternative service option to request, the base station shall set SO_REQ to the alternative service option number and send a *Service Option Request Order* requesting the alternative service option within the time limit required by the service option specified in the received message.
- If the base station supports the requested service option and does not accept it and does not have an alternative service option to request, the base station shall set SO_REQ to NULL and send a *Service Option Response Order* to reject the request within the time limit required by the requested service option.
- If the base station does not support the requested service option and the base station has an alternative service option to request, the base station shall set SO_REQ to the alternative service option number and send a *Service Option Request Order* requesting the alternative service option within T_{4b} seconds.
- If the base station does not support the requested service option and does not have an alternative service option to request, the base station shall set SO_REQ to NULL and send a *Service Option Response Order* to reject the request within T_{4b} seconds.

7.6.4.1.2.2.2 Processing the *Service Option Response Order*

When the base station receives a *Service Option Response Order,* it shall perform the following:

- If the service option number specified in the order is equal to SO_REQ, the base station shall set SO_REQ to NULL and begin using the specified service option in accordance with the requirements for the service option.
- If the order indicates a service option rejection, the base station shall set SO_REQ to NULL.
- If the order does not indicate a service option rejection and the service option specified in the order is not equal to SO_REQ, the base station shall set SO_REQ to NULL and should send a *Release Order* (ORDQ = '00000010').

7.6.4.1.2.2.3 Service Option Request Initialization

To perform service option request initialization, the base station shall set SO_REQ to the selected service option number.

7.6.4.1.3 Acknowledgement Procedures

The acknowledgement procedures facilitate the reliable exchange of messages between the mobile station and the base station. The base station uses the fields ACK_SEQ (acknowledgement sequence number), MSG_SEQ (message sequence number) and ACK_REQ (acknowledgement required) to detect duplicate messages and provide a reference for acknowledgements. These message fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields are referred to as layer 3 fields, and the processing of layer 3 fields is referred to as layer 3 processing. (See Appendix C for further discussion of layering.)

On both the Reverse Traffic Channel and the Forward Traffic Channel, the procedure for messages requiring acknowledgement is a selective repeat scheme in which a message is retransmitted only if an acknowledgement for it is not received.

7.6.4.1.3.1 Messages Requiring Acknowledgement

A Traffic Channel message requires acknowledgement when the ACK_REQ field is set to '1'.

7.6.4.1.3.1.1 Transmitting a Message and Receiving an Acknowledgement

If the base station requires that the mobile station receive one message before another message, the base station shall wait for an acknowledgement to the first message before transmitting the second. Otherwise, the base station may transmit up to four different messages requiring acknowledgement before receiving an acknowledgement for the first message.

The base station shall store the next message sequence number to be transmitted for messages requiring acknowledgement (MSG_SEQ_ACK). The base station shall store an acknowledgement status indicator for each possible value of the Forward Traffic Channel message MSG_SEQ field (ACK_WAITING[n], where n is 0 through 7). The base station shall not send a new message requiring acknowledgement when ACK_WAITING[(MSG_SEQ_ACK + 4) modulo 8] is equal to YES.

The base station shall perform the following procedures:

- When the base station receives a message on the Reverse Traffic Channel, with acknowledgement sequence number ACK_SEQ, it shall set ACK_WAITING[ACK_SEQ] to NO.
- When the base station sends a new message requiring acknowledgement on the Forward Traffic Channel, it shall set ACK_WAITING[MSG_SEQ_ACK] to YES and shall set the MSG_SEQ field of the message to MSG_SEQ_ACK. The base station shall then increment MSG_SEQ_ACK, modulo 8.

The base station shall not retransmit a message for which it has received an acknowledgement.

If the base station does not receive an acknowledgement after transmitting the message, the base station shall retransmit the message. If the base station retransmits a message, the base station shall use the same MSG_SEQ number for the retransmission.

The base station shall store a retransmission counter (RETRY_COUNT) for each transmitted message requiring acknowledgement. The base station shall set RETRY_COUNT to zero prior to the first transmission of the message. After each transmission of the message, the base station shall increment RETRY_COUNT if no acknowledgement is received. The base station shall not exceed a maximum number of retransmissions, to be selected by the base station manufacturer. When RETRY_COUNT is equal to the maximum number of retransmissions, the base station shall declare an acknowledgement failure.

7.6.4.1.3.1.2 Receiving a Message and Returning an Acknowledgement

Messages received on the Reverse Traffic Channel contain MSG_SEQ fields that are incremented by the same rules as messages transmitted on the Forward Traffic Channel. Separate sequence numbers are maintained for Reverse Traffic Channel Messages that require acknowledgement and for messages that do not require acknowledgement.

The base station acknowledges a received message by transmitting a message with the ACK_SEQ field set equal to the MSG_SEQ field of the received message. A message transmitted with the ACK_SEQ field set in this manner is referred to as including an acknowledgement of the received message.

Whenever a message requiring acknowledgement is received, the base station shall set the ACK_SEQ field of subsequent Forward Traffic Channel messages to the MSG_SEQ field of the received message.

After receiving a message requiring acknowledgement the base station shall transmit a message including an acknowledgement within T_{1m} seconds as shown in Figure 6.6.4.1.3.1.1-1.

When a received message requires acknowledgement and no message is available within T_{1m} seconds after the message is received, the base station shall transmit a *Base Station Acknowledgement Order* including the acknowledgement.

For duplicate message detection, the base station shall store a received status indicator for each possible value of the Reverse Traffic Channel message MSG_SEQ field (MSG_SEQ_RCVD[n], where n is 0 through 7). The base station shall perform the following procedures:

- When a message requiring acknowledgement is received, with message sequence number MSG_SEQ, and MSG_SEQ_RCVD[MSG_SEQ] is equal to NO, the base station shall process the message as a new message. The base station shall then set MSG_SEQ_RCVD[MSG_SEQ] to YES, and shall set MSG_SEQ_RCVD[(MSG_SEQ + 4) modulo 8] to NO.
- When a message requiring acknowledgement is received, with message sequence number MSG_SEQ, and MSG_SEQ_RCVD[MSG_SEQ] is equal to YES, the base station shall acknowledge the message but shall not perform any further processing of the message.

7.6.4.1.3.2 Messages not Requiring Acknowledgement

A Traffic Channel message does not require acknowledgement when the ACK_REQ field is set to ‘0’.

The base station shall store the next message sequence number to be transmitted for messages not requiring acknowledgement (MSG_SEQ_NOACK). For each new message sent that does not require acknowledgement, the base station shall set the MSG_SEQ field of the message to MSG_SEQ_NOACK and shall then increment MSG_SEQ_NOACK, modulo 8.

If the base station transmits the same message not requiring acknowledgement more than once, it shall use the same MSG_SEQ number for all transmissions. The base station shall

complete all retransmissions of the same message within T_{3m} seconds after the first transmission, as shown in Figure 7.6.4.1.3.2-1. The base station shall wait at least T_{3m} seconds after the last transmission of a message not requiring acknowledgement before transmitting another message not requiring acknowledgement that has the same MSG_SEQ number, as shown in Figure 7.6.4.1.3.2-1.[10]

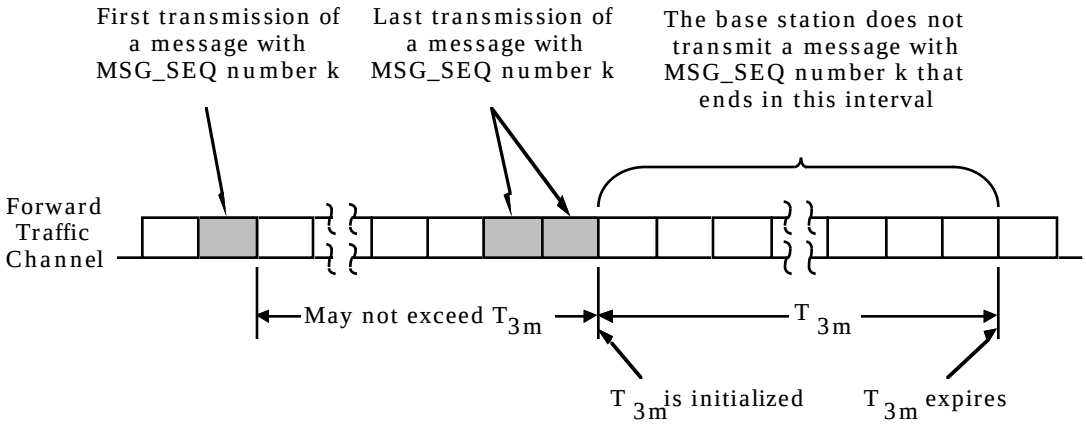

Figure 7.6.4.1.3.2-1. Time Requirement for the Base Station Not to Reuse a MSG_SEQ Number

7.6.4.1.3.3 Acknowledgement Procedures Reset

The base station shall reset the acknowledgement procedures as follows:

- Message sequence number reset. The base station shall set MSG_SEQ_ACK to 0, MSG_SEQ_NOACK to 0, and shall set ACK_WAITING[n] to NO for all values of n from 0 to 7.
- Retransmission counter reset. The base station shall set the retransmission counter (RETRY_COUNT) to zero.
- Acknowledgement sequence number reset. The base station shall set the ACK_SEQ field of all Forward Traffic Channel messages to 7 until the first message requiring acknowledgement is received.
- Duplicate detection reset. The base station shall set MSG_SEQ_RCVD[n] to NO for all values of n from 0 to 7.

7.6.4.1.4 Message Action Times

A Forward Traffic Channel message without a USE_TIME field or with a USE_TIME field set to '0' has an implicit action time. A message with its USE_TIME field set to '1' has an explicit action time which is specified in the ACTION_TIME field of the message. A message with a future action time is called a pending message.

[10] This is necessary because it is possible that the mobile station receives only the last transmission.

Unless otherwise specified, a message having an implicit action time shall take effect as soon as it is sent, and a message with an explicit action time should take effect when System Time (in 80 ms units) modulo 64 becomes equal to the message's ACTION_TIME.

The base station shall support one pending message at any given time, not including pending *Service Option Control Order*s. The number of pending *Service Option Control Order*s that the base station is required to support is specific to the service option (see Appendix A).

7.6.4.1.5 Long Code Transition Procedures

The base station shall process the *Long Code Transition Request Order* as follows:

- If the *Long Code Transition Request Order* requests a private long code transition and the base station accepts the request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000001'). If the base station does not accept the private long code transition request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000000').
- If the *Long Code Transition Request Order* requests a public long code transition and the base station accepts the request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000000'). If the base station does not accept the public long code transition request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000001').

The base station shall process the *Long Code Transition Response Order* as follows:

- If the *Long Code Transition Response Order* indicates that the mobile station accepts the long code transition requested in the *Long Code Transition Request Order* sent by the base station, the base station shall use the requested long code mask on both the Forward Traffic Channel and the Reverse Traffic Channel. If the base station did not specify an explicit action time in the *Long Code Transition Request Order*, the base station should begin using the requested long code mask at the first 80 ms boundary (relative to the start of System Time) after N_{4m} frames after the last frame in which any portion of the *Long Code Transition Response Order* was received.

7.6.4.2 Traffic Channel Initialization Substate

In this substate, the base station begins transmitting on the Forward Traffic Channel and acquires the Reverse Traffic Channel.

Upon entering the *Traffic Channel Initialization Substate*, the base station shall perform the following:

- The base station shall reset the message acknowledgement procedures as specified in 7.6.4.1.3.3.
- The base station shall set its Forward and Reverse Traffic Channel long code masks to the public long code mask (see 7.1.3.5.5).
- The base station shall set its Forward and Reverse Traffic Channel frame offsets (see 7.1.3.5.1) to the frame offset assigned to the mobile station.

While in the *Traffic Channel Initialization Substate*, the base station shall perform the following:

- The base station shall send valid frames or transmit null Traffic Channel data on the Forward Traffic Channel (see 7.1.3.5.10).
- The base station shall perform the message acknowledgement procedures as specified in 7.6.4.1.3.
- If the base station acquires the Reverse Traffic Channel, the base station shall send a *Base Station Acknowledgement Order*. The base station should send the *Base Station Acknowledgement Order* as a message requiring acknowledgement. If the call is a mobile station terminated call, the base station shall enter the *Waiting for Order Substate* (see 7.6.4.3.1). If the call is a mobile station originated call, the base station shall enter the *Conversation Substate* (see 7.6.4.4).
- If the base station fails to acquire the Reverse Traffic Channel, the base station shall either retransmit the *Channel Assignment Message* on the Paging Channel and remain in the *Traffic Channel Initialization Substate*, or the base station should disable transmission on the Forward Traffic Channel and discontinue the *Traffic Channel Processing* for the mobile station.

7.6.4.3 Alerting

7.6.4.3.1 Waiting for Order Substate

In this substate, the base station sends an *Alert With Information Message* to the mobile station.

While in the *Waiting for Order Substate*, the base station shall perform the following:

- The base station shall transmit the power control subchannel as specified in 7.1.3.1.7.
- The base station shall send valid frames or transmit null Traffic Channel data on the Forward Traffic Channel (see 7.1.3.5.10).
- The base station shall perform the message acknowledgement procedures as specified in 7.6.4.1.3.
- If the base station detects a loss of Reverse Traffic Channel continuity (see 7.4.2), the base station should send a *Release Order* to the mobile station. If the base station sends a *Release Order*, the base station shall enter the *Release Substate*.
- The base station may perform Forward Traffic Channel power control as specified in 7.6.4.1.1.
- The base station may request a service option as specified in 7.6.4.1.2.
- The base station may request a long code transition as specified in 7.6.4.1.5.
- The base station may perform authentication procedures as specified in 7.3.1.

- The base station may send the following messages. If the base station sends a message, the base station shall comply with the specified requirements for sending the message.

  1. *Alert With Information Message:* The base station shall enter the *Waiting for Answer Substate*.
  2. *Analog Handoff Direction Message:* The base station shall enter the Waiting for Order Task (see 3.6.4.3.1).
  3. *Authentication Challenge Message:* No requirements.
  4. *Base Station Acknowledgement Order:* No requirements.
  5. *Base Station Challenge Confirmation Order:* No requirements.
  6. *Data Burst Message:* No requirements.
  7. *Handoff Direction Message:* No requirements.
  8. *In-Traffic System Parameters Message:* No requirements.
  9. *Local Control Order:* No requirements.
  10. *Lock Order:* No requirements.
  11. *Lock Until Power-Cycled Order:* No requirements.
  12. *Long Code Transition Request Order:* No requirements.
  13. *Maintenance Order:* The base station shall enter the *Waiting for Answer Substate*.
  14. *Message Encryption Mode Order:* No requirements.
  15. *Message Waiting Order:* No requirements.
  16. *Mobile Station Registered Message:* No requirements.
  17. *Neighbor List Update Message:* No requirements.
  18. *Pilot Measurement Request Order:* No requirements.
  19. *Power Control Parameters Message:* No requirements.
  20. *Release Order:* The base station shall enter the *Release Substate*.
  21. *Retrieve Parameters Message:* No requirements.
  22. *Service Option Control Order:* No requirements.
  23. *Service Option Request Order:* No requirements.
  24. *Service Option Response Order:* No requirements.
  25. *Set Parameters Message:* No requirements.
  26. *SSD Update Message:* No requirements.
  27. *Status Request Order:* No requirements.

- If the base station receives one of the following autonomous messages from the mobile station, the base station shall process the message as specified:

  1. *Data Burst Message:* No requirements.
  2. *Pilot Strength Measurement Message:* The base station shall process the message as described in 7.6.6.2.2.1.
  3. *Power Measurement Report Message:* The base station may process the message as described in 7.6.4.1.1.
  4. *Long Code Transition Request Order:* The base station shall process the message as described in 7.6.4.1.5.
  5. *Release Order:* The base station shall send the mobile station a *Release Order*, within T_{2b} seconds, and enter the *Release Substate*, or the base station shall send an *Alert with Information Message*, within T_{2b} seconds, and enter the *Waiting for Answer Substate*.
  6. *Request Analog Service Order:* The base station may respond with an *Analog Handoff Direction Message*.
  7. *Service Option Request Order:* The base station shall process the message as described in 7.6.4.1.2.

7.6.4.3.2 Waiting for Answer Substate

In this substate, the base station waits for a *Connect Order* from the mobile station.

While in the *Waiting for Answer Substate*, the base station shall perform the following:

- The base station shall transmit the power control subchannel as specified in 7.1.3.1.7.
- The base station shall send valid frames or transmit null Traffic Channel data on the Forward Traffic Channel (see 7.1.3.5.10).
- The base station shall perform the message acknowledgement procedures as specified in 7.6.4.1.3.
- If the base station detects a loss of Reverse Traffic Channel continuity (see 7.4.2), the base station should send a *Release Order* to the mobile station. If the base station sends a *Release Order*, the base station shall enter the *Release Substate*.
- The base station may perform Forward Traffic Channel power control as specified in 7.6.4.1.1.
- The base station may request a service option as specified in 7.6.4.1.2.
- The base station may request a long code transition as specified in 7.6.4.1.5.
- The base station may perform authentication procedures as specified in 7.3.1.
- The base station may send the following messages. If the base station sends a message, the base station shall comply with the specified requirements for sending the message.

1. *Alert With Information Message:* No requirements.
2. *Analog Handoff Direction Message:* The base station shall enter the Waiting for Answer Task (see 3.6.4.3.2).
3. *Authentication Challenge Message:* No requirements.
4. *Base Station Acknowledgement Order:* No requirements.
5. *Base Station Challenge Confirmation Order:* No requirements.
6. *Data Burst Message:* No requirements.
7. *Handoff Direction Message:* No requirements.
8. *In-Traffic System Parameters Message:* No requirements.
9. *Local Control Order:* No requirements.
10. *Lock Order:* No requirements.
11. *Lock Until Power-Cycled Order:* No requirements.
12. *Long Code Transition Request Order:* No requirements.
13. *Maintenance Order:* No requirements.
14. *Message Encryption Mode Order:* No requirements.
15. *Message Waiting Order:* No requirements.
16. *Mobile Station Registered Message:* No requirements.
17. *Neighbor List Update Message:* No requirements.
18. *Pilot Measurement Request Order:* No requirements.
19. *Power Control Parameters Message:* No requirements.
20. *Release Order:* The base station shall enter the *Release Substate*.
21. *Retrieve Parameters Message:* No requirements.
22. *Service Option Control Order:* No requirements.
23. *Service Option Request Order:* No requirements.
24. *Service Option Response Order:* No requirements.
25. *Set Parameters Message:* No requirements.
26. *SSD Update Message:* No requirements.
27. *Status Request Order:* No requirements.

- If the base station receives one of the following autonomous messages from the mobile station, the base station shall process the message as specified:

1. *Connect Order:* The base station shall enter the *Conversation Substate*.
2. *Data Burst Message:* No requirements.

3. *Pilot Strength Measurement Message:* The base station shall process the message as described in 7.6.6.2.2.1.

4. *Power Measurement Report Message:* The base station may process the message as described in 7.6.4.1.1.

5. *Long Code Transition Request Order:* The base station shall process the message as described in 7.6.4.1.5.

6. *Release Order:* The base station shall send the mobile station a *Release Order*, within T_{2b} seconds, and enter the *Release Substate*, or the base station shall send an *Alert with Information Message*, within T_{2b} seconds, and enter the *Waiting for Answer Substate*.

7. *Request Analog Service Order:* The base station may respond with an *Analog Handoff Direction Message*.

8. *Service Option Request Order:* The base station shall process the message as described in 7.6.4.1.2.

7.6.4.4 Conversation Substate

In this substate, the base station exchanges primary traffic packets with the mobile station's primary traffic service option application.

While in the *Conversation Substate*, the base station shall perform the following:

- The base station shall transmit the power control subchannel as specified in 7.1.3.1.7.
- The base station shall send valid frames or transmit null Traffic Channel data on the Forward Traffic Channel (see 7.1.3.5.10).
- The base station shall perform the message acknowledgement procedures as specified in 7.6.4.1.3.
- If the base station detects a loss of Reverse Traffic Channel continuity (see 7.4.2), the base station should send a *Release Order* to the mobile station. If the base station sends a *Release Order*, the base station shall enter the *Release Substate*.
- The base station may perform Forward Traffic Channel power control as specified in 7.6.4.1.1.
- If the call is mobile station originated and the *Origination Message* requests a service option other than the default service option, the base station shall process the request as specified in 7.6.4.1.2.2.1.
- The base station may request a service option as specified in 7.6.4.1.2.
- The base station may request a long code transition as specified in 7.6.4.1.5.
- The base station may perform authentication procedures as specified in 7.3.1.
- The base station may send the following messages. If the base station sends a message, the base station shall comply with the specified requirements for sending the message.

1. *Alert With Information Message:* If the message contains a signal information record with the SIGNAL_TYPE field set to '01' or '10', the base station shall enter the *Waiting for Answer Substate*.
2. *Analog Handoff Direction Message:* The base station shall enter the Conversation Task (see 3.6.4.3.4).
3. *Authentication Challenge Message:* No requirements.
4. *Base Station Acknowledgement Order:* No requirements.
5. *Base Station Challenge Confirmation Order:* No requirements.
6. *Continuous DTMF Tone Order:* No requirements.
7. *Data Burst Message:* No requirements.
8. *Flash With Information Message:* No requirements.
9. *Handoff Direction Message:* No requirements.
10. *In-Traffic System Parameters Message:* No requirements.
11. *Local Control Order:* No requirements.
12. *Lock Order:* No requirements.
13. *Lock Until Power-Cycled Order:* No requirements.
14. *Long Code Transition Request Order:* No requirements.
15. *Maintenance Order:* The base station shall enter the *Waiting for Answer Substate*.
16. *Message Encryption Mode Order:* No requirements.
17. *Message Waiting Order:* No requirements.
18. *Mobile Station Registered Message:* No requirements.
19. *Neighbor List Update Message:* No requirements.
20. *Pilot Measurement Request Order:* No requirements.
21. *Power Control Parameters Message:* No requirements.
22. *Release Order:* The base station shall enter the *Release Substate*.
23. *Retrieve Parameters Message:* No requirements.
24. *Send Burst DTMF Message:* No requirements.
25. *Service Option Control Order:* No requirements.
26. *Service Option Request Order:* No requirements.
27. *Service Option Response Order:* No requirements.
28. *Set Parameters Message:* No requirements.
29. *SSD Update Message:* No requirements.

30. *Status Request Order:* No requirements.

- If the base station receives one of the following autonomous messages from the mobile station, the base station shall process the message as specified:

1. *Continuous DTMF Tone Order:* No requirements.
2. *Data Burst Message:* No requirements.
3. *Flash With Information Message:* No requirements.
4. *Pilot Strength Measurement Message:* The base station shall process the message as described in 7.6.6.2.2.1.
5. *Power Measurement Report Message:* The base station may process the message as described in 7.6.4.1.1.
6. *Long Code Transition Request Order:* The base station shall process the message as described in 7.6.4.1.5.
7. *Origination Continuation Message:* No requirements.
8. *Release Order:* The base station shall send the mobile station a *Release Order*, within T_{2b} seconds, and enter the *Release Substate*, or the base station shall send an *Alert with Information Message*, within T_{2b} seconds, and enter the *Waiting for Answer Substate*.
9. *Request Analog Service Order:* The base station may respond with an *Analog Handoff Direction Message*.
10. *Send Burst DTMF Message:* No requirements.
11. *Service Option Request Order:* The base station shall process the message as described in 7.6.4.1.2.

7.6.4.5 Release Substate

In this substate, the base station disconnects the call.

While in the *Release Substate*, the base station shall perform the following:

- The base station shall transmit the power control subchannel as specified in 7.1.3.1.7.
- The base station shall send valid frames or transmit null Traffic Channel data on the Forward Traffic Channel (see 7.1.3.5.10) for at least T_{3b} seconds. After this interval, the base station should stop transmitting on the Forward Traffic Channel.
- The base station shall perform the message acknowledgement procedures as specified in 7.6.4.1.3.
- The base station may perform Forward Traffic Channel power control as specified in 7.6.4.1.1.
- If the base station receives one of the following autonomous messages from the mobile station, the base station shall process the message as specified:

1. *Connect Order:* No requirements.
2. *Continuous DTMF Tone Order:* No requirements.
3. *Data Burst Message:* No requirements.
4. *Flash With Information Message:* No requirements.
5. *Pilot Strength Measurement Message:* No requirements.
6. *Power Measurement Report Message:* No requirements.
7. *Long Code Transition Request Order:* No requirements.
8. *Origination Continuation Message:* No requirements.
9. *Release Order:* No requirements.
10. *Request Analog Service Order:* No requirements.
11. *Send Burst DTMF Message:* No requirements.
12. *Service Option Request Order:* No requirements.

7.6.5 Registration

Registration is the process by which a mobile station notifies the base station of its location, status, identification, slot cycle, station class, and other characteristics. The base station can make use of location information to efficiently page the mobile station when establishing a mobile-terminated call. Registration also provides the mobile station's SLOT-_CYCLE_INDEX parameter so that the base station can determine which Paging Channel slots the mobile station operating in the slotted mode is monitoring. Registration also provides the station class mark and CAI revision number so that the base station knows the capabilities of the mobile station.

The CDMA system supports nine different forms of registration:

1. Power-up registration. The mobile station registers when it powers on, switches from using the alternate serving system, or switches from using the analog system.
2. Power-down registration. The mobile station registers when it powers off if previously registered in the current serving system.
3. Timer-based registration. The mobile station registers when a timer expires.
4. Distance-based registration. The mobile station registers when the distance between the current base station and the base station in which it last registered exceeds a threshold.
5. Zone-based registration. The mobile station registers when it enters a new zone.
6. Parameter-change registration. The mobile station registers when certain of its stored parameters change.
7. Ordered registration. The mobile station registers when the base station requests it.

8. Implicit registration. When a mobile station successfully uses the Access Channel, the base station can infer the mobile station's location, causing an implicit registration.

9. Traffic Channel registration. Whenever the base station has registration information for a mobile station that has been assigned to a Traffic Channel, the base station can notify the mobile station that it is registered.

The first six forms are called autonomous registrations since the mobile station initiates the registration in response to an event, (i.e., without being explicitly directed to register by the base station). The first five forms of registration, as a group, are called Class C registration and are enabled by roaming status (see 6.6.5.3). Autonomous parameter-change registration is independent of roaming status. Ordered registration is initiated by the base station through an *Order Message*. Implicit registration does not involve the exchange of any registration messages between the base station and the mobile station. While a mobile station is assigned a Traffic Channel, the base station can obtain registration information by using the *Status Request Order* to obtain *Status Messages* from the mobile station. The mobile station can be notified that it is registered through the *Mobile Station Registered Message*.

7.6.5.1 Registration on the Paging and Access Channels

The base station shall specify the forms of registration that are enabled, the corresponding registration parameters, and the roaming status conditions for which registration is enabled in the *System Parameters Message*. If any of the autonomous registration forms are enabled, the base station should also enable parameter-based registration.

The base station should process any message sent on the Access Channel as an implicit registration of the mobile station sending the message. If the base station does not have complete registration information about the mobile station, the base station may send a *Registration Request Order* to the mobile station.

7.6.5.2 Registration on the Traffic Channels

The base station can obtain registration information from a mobile station on the traffic channel by means of the *Status Request Order*. When the base station has registration data for a mobile station, the base station may send a *Mobile Station Registered Message* to the mobile station, specifying the base station's registration system, zone and location information.

7.6.6 Handoff Procedures

7.6.6.1 Overview

7.6.6.1.1 Types of Handoff

The base station supports the following three handoff procedures:

- *Soft Handoff:* A handoff in which a new base station commences communications with the mobile station without interrupting the communications from the old base station. The base station can direct the mobile station to perform a soft handoff only

when all Forward Traffic Channels assigned to the mobile station have identical frequency assignments. Soft handoff provides diversity of Forward Traffic Channels and Reverse Traffic Channel paths on the boundaries between base stations.

- *CDMA to CDMA Hard Handoff:* A handoff in which the base station directs the mobile station to transition between disjoint sets of base stations, different frequency assignments, or different frame offsets.
- *CDMA to Analog Handoff:* A handoff in which the base station directs the mobile station from a Forward Traffic Channel to an analog voice channel.

Section 6.6.6 describes the mobile station requirements during handoff.

7.6.6.1.2 The Active Set

The Active Set contains the pilots (see 6.6.6.1.2) associated with the Forward Traffic Channels assigned to the mobile station. The base station informs the mobile station of the contents of the Active Set using the *Channel Assignment Message* and the *Handoff Direction Message*.

7.6.6.2 Requirements

7.6.6.2.1 Overhead Information

The base station sends the following messages governing the pilot search procedures performed by the mobile station:

- *System Parameters Message*
- *In-Traffic System Parameters Message*
- *Neighbor List Message*
- *Neighbor List Update Message*

7.6.6.2.1.1 System Parameters

The base station sends handoff related parameters on the Paging Channel in the *System Parameters Message*.

The base station may revise handoff related parameters for a mobile station operating on the Traffic Channel by sending the *In-Traffic System Parameters Message*.

The base station may also modify the values of the handoff parameters T_ADD, T_DROP, T_COMP, and T_TDROP through the *Handoff Direction Message*.

7.6.6.2.1.2 Neighbor List

The base station sends a Neighbor List on the Paging Channel, in the *Neighbor List Message*.

The base station may revise the Neighbor List for a mobile station operating on the Traffic Channel by sending a *Neighbor List Update Message*.

The base station shall not include a pilot that is a member of the mobile station's Active Set in a *Neighbor List Update Message*. The base station shall not specify more than N_{8m} pilots in the *Neighbor List Message* or in the *Neighbor List Update Message*. The base station should list the pilots in the *Neighbor List Update Message* in descending priority order (see 6.6.6.2.6.3).

7.6.6.2.2 Call Processing During Handoff

7.6.6.2.2.1 Processing the *Pilot Strength Measurement Message*

The base station should use the pilot strength measurements in the *Pilot Strength Measurement Message* to determine a new Active Set.

The base station may also use the PN phase measurements in the *Pilot Strength Measurement Message* to estimate the propagation delay to the mobile station. This estimate can be used to reduce Reverse Traffic Channel acquisition time.

The base station may respond to a *Pilot Strength Measurement Message* received from the mobile station by sending the *Handoff Direction Message*.

7.6.6.2.2.2. Processing the *Handoff Direction Message*

The base station shall maintain a *Handoff Direction Message* sequence number (HDM_LIST_SEQ). The sequence number shall be initialized to zero prior to the transmission of the first *Handoff Direction Message* to the mobile station. The base station shall increment HDM_LIST_SEQ modulo 4 each time the base station modifies the pilot list (including the order in which pilots are specified within the list) sent to the mobile station in a *Handoff Direction Message*.

The base station shall set the contents of a *Handoff Direction Message* according to the following rules:

- A *Handoff Direction Message* shall list no more than N_{6m} pilots in the new Active Set.
- A *Handoff Direction Message* shall identify the identical power control subchannels (i.e., those carrying identical power control symbols).
- When the CDMA frequency assignment is not changed, the *Handoff Direction Message* shall not change the code channel associated with an Active Set pilot that remains in the new Active Set.
- For CDMA to CDMA hard handoffs, the base station may require that the mobile station change to the public long code mask using the PRIVATE_LCM field of the *Handoff Direction Message*. If the base station requires that the mobile station change to the public long code mask, and the base station does not specify an explicit action time in the *Handoff Direction Message*, the base station shall begin using the public long code mask at the first 80 ms boundary (relative to the start of System Time) after N_{4m} frames after the last frame in which any portion of the *Handoff Direction Message* was received.
- For CDMA to CDMA hard handoffs, the base station may require the mobile station to perform a reset of the acknowledgement procedures by using the RESET_L2 field

of the *Handoff Direction Message*. If the base station requires the mobile station to reset the acknowledgement procedures, the base station shall also reset the acknowledgement procedures, as specified in 7.6.4.1.3.3.

- For CDMA to CDMA hard handoffs, the base station may alter the frame offset by setting the FRAME_OFFSET field to a new value. If the base station specifies a new frame offset and does not specify an explicit action time, the base station shall change its Forward and Reverse Traffic Channel frame offsets at the second 80 ms boundary (relative to System Time) after the end of transmission of the *Handoff Direction Message*, unless the end of transmission of the message coincides with an 80 ms boundary, in which case the change in frame offsets shall occur 80 ms after the end of transmission.

7.6.6.2.2.3 Transmitting During Handoff

The base station shall continue transmission to the mobile station on a Forward Traffic Channel removed from the Active Set until it receives the *Handoff Completion Message* from the mobile station or determines that the call has been released.

The base station should discontinue transmission to the mobile station on a Forward Traffic Channel removed from the Active Set after it receives the *Handoff Completion Message*.

7.6.6.2.2.4 Ordering Pilot Measurements From the Mobile Station

The base station may direct the mobile station to send a *Pilot Strength Measurement Message* by sending a *Pilot Measurement Request Order*.

7.6.6.2.3 Active Set Maintenance

The base station shall maintain an Active Set for each mobile station under its control as follows:

- When the base station sends the *Channel Assignment Message* it shall initialize the Active Set to contain only the pilot associated with the assigned Forward Traffic Channel.
- When the base station sends a *Handoff Direction Message* it shall add to the Active Set, before the action time of the message, all pilots named in the message, if they are not already in the Active Set.
- The base station shall delete the pilots that were not named in the most recent *Handoff Direction Message* from the Active Set upon receipt of the *Handoff Completion Message*.

7.6.6.2.4 Soft Handoff

The base station should use soft handoff when directing a mobile station from one Forward Traffic Channel to another Forward Traffic Channel having the same frequency assignment.

7.6.6.2.4.1 Receiving During Soft Handoff

Each base station in the Active Set should demodulate the Reverse Traffic Channel. The base station should provide diversity combining of the demodulated signals obtained by each base station in the Active Set.

7.6.6.2.4.2 Transmitting During Soft Handoff

The base station shall begin transmitting identical modulation symbols on all Forward Traffic Channels specified in a *Handoff Direction Message* (with the possible exception of the power control subchannel) by the action time of the message.

The base station shall transmit identical power control symbols on all identical power control subchannels that were identified as such in the last *Handoff Direction Message*.

The base station shall use the same long code mask on the Reverse Traffic Channel and on all Forward Traffic Channels whose associated pilots are in the Active Set.

7.6.6.2.5 CDMA to Analog Hard Handoff

The base station may direct the mobile station to perform a handoff from the CDMA system to the analog system by sending an *Analog Handoff Direction Message*.

7.7 Signaling Formats

The following sections specify the requirements on the signaling message formats transmitted on the Sync Channel, the Paging Channel, and the Traffic Channel.

In any multi-bit field in the following messages, the most significant bit (MSB) shall be transmitted first.

7.7.1 Sync Channel

The sync channel is used to provide time and frame synchronization to the mobile station. Only one message, the *Sync Channel Message*, is sent on the Sync Channel.

7.7.1.1 Sync Channel Structure

The Sync Channel is divided into 80 ms superframes (see 7.1.3.3.10). Each superframe is divided into three 26.666... ms frames. The first bit of each frame is a SOM Bit, and the remaining bits in the frame comprise the Sync Channel frame body.

A Sync Channel message capsule is composed of a Sync Channel message and padding. A Sync Channel message consists of a length field, a message body, and a CRC field. Padding consists of zero or more bits.

Sync Channel message capsules shall begin with the first bit of the first Sync Channel frame body of a Sync Channel superframe. The base station shall set the SOM Bit immediately preceding the beginning of a Sync Channel message capsule to ‘1’, and shall set all other SOM Bits to ‘0’. The base station shall transmit the Sync Channel message in consecutive Sync Channel frame bodies. The base station shall include sufficient padding bits in each Sync Channel message capsule to extend it through the bit preceding the SOM Bit at the beginning of the next Sync Channel superframe. The base station shall begin a new Sync Channel message capsule in the first Sync Channel frame of that superframe.

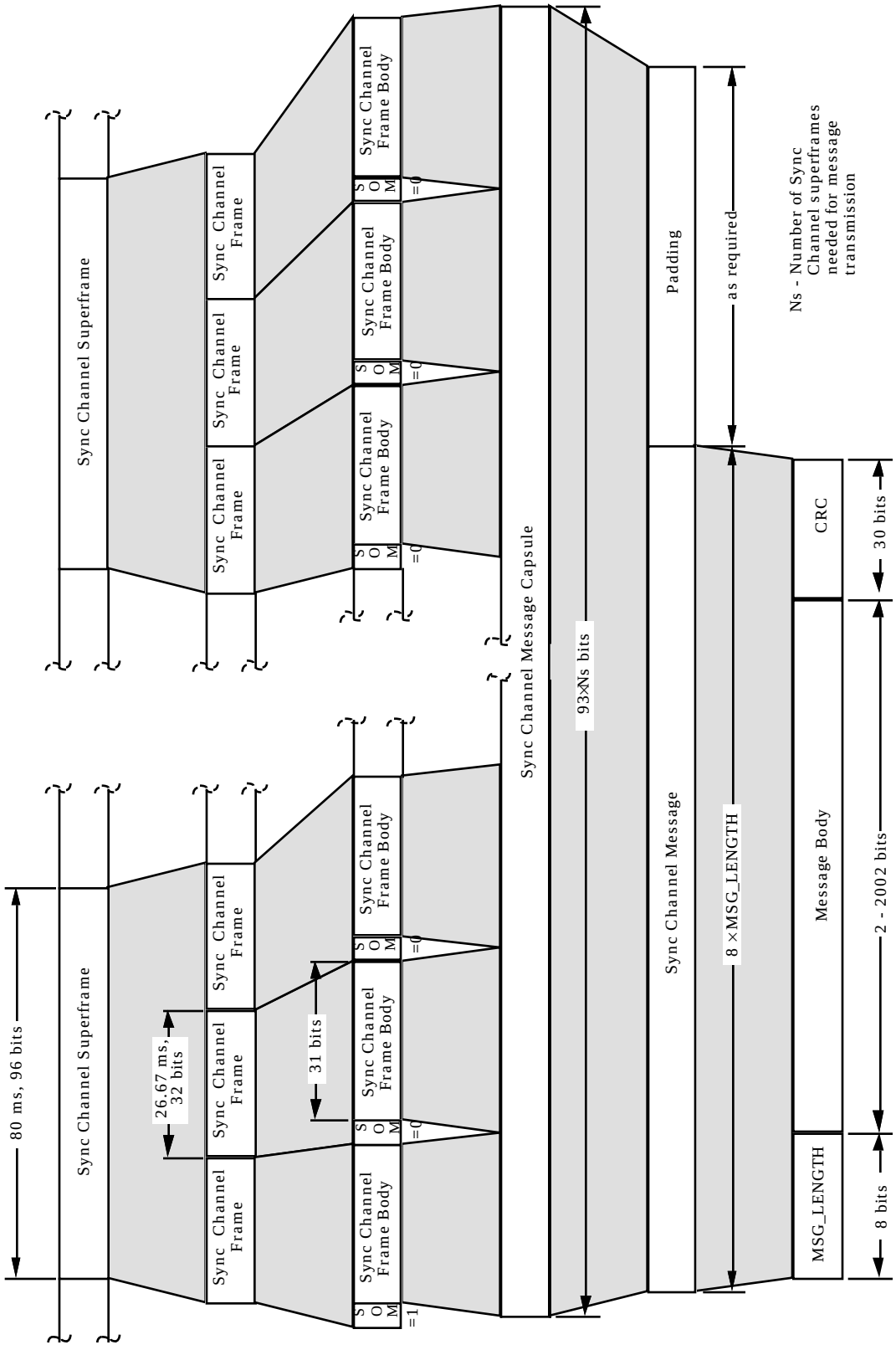

Figure 7.7.1.1-1. Sync Channel Structure (1200 bps) Example

7.7.1.2 Sync Channel Message Structure

The *Sync Channel Message* shall consist of a MSG_LENGTH field, a *Sync Channel Message* body field, and a CRC field. Padding bits shall be appended to the end of the *Sync Channel Message* so that the total of the *Sync Channel Message* length added to the length of the padding bits shall be equal to an integer multiple of 93 bits. Padding bits shall be set to '0'.

7.7.1.2.1 Sync Channel MSG_LENGTH Field

The base station shall set the MSG_LENGTH field of the *Sync Channel Message* to the length of the *Sync Channel Message* in octets, including the MSG_LENGTH field, the *Sync Channel Message* body, and the CRC. The maximum *Sync Channel Message* length is therefore equal to 255 octets, or 2040 bits.

7.7.1.2.2 Sync Channel Signaling Message CRC

A 30-bit CRC shall be computed for each *Sync Channel Message*. The CRC includes the MSG_LENGTH field and the message body field. The generator polynomial for the CRC shall be as follows:

$$g(x) = x^{30} + x^{29} + x^{21} + x^{20} + x^{15} + x^{13} + x^{12} + x^{11} + x^{8} + x^{7} + x^{6} + x^{2} + x + 1.$$

The following procedure and the logic shown in Figure 7.7.1.2.2-1 (or equivalent) shall be used to compute the CRC:

- All shift register elements shall be initialized to logical one.[11]
- The switches shall be set in the up position.
- The information bit count k shall be defined as 8 + message body length in bits.
- The register shall be clocked k times, with the length and message body fields of the message as the k input bits.
- The switches shall be set in the down position.
- The register shall be clocked an additional 30 times.
- The 30 additional output bits shall be the check bits.
- The bits shall be transmitted in the order in which they are calculated.

[11] Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

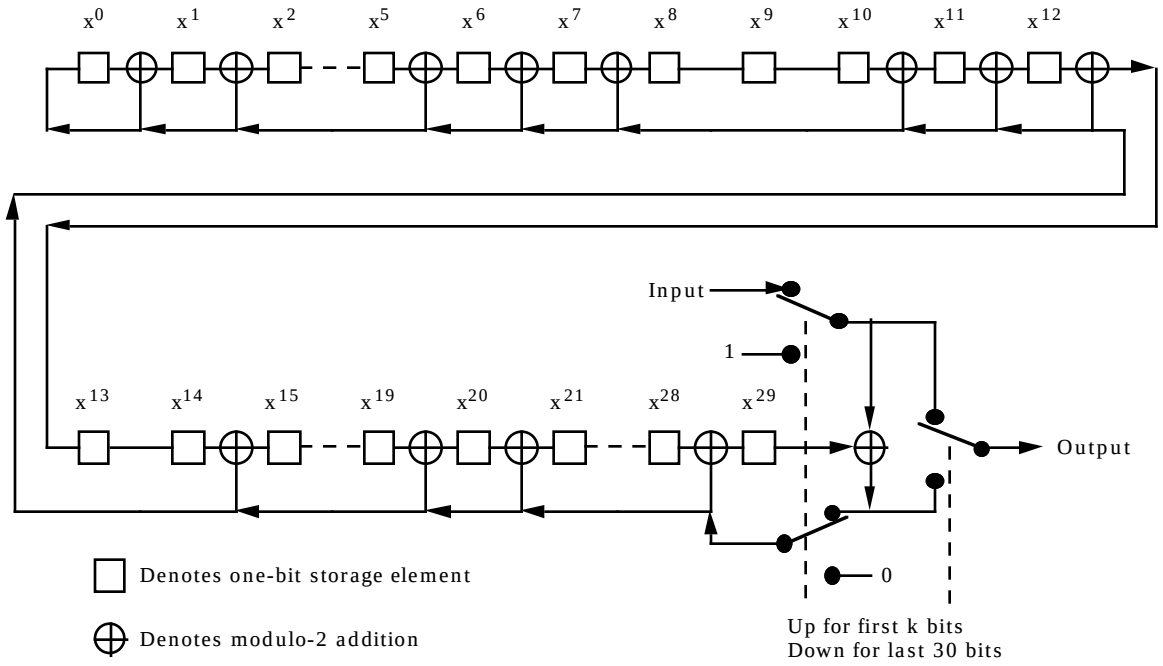

Figure 7.7.1.2.2-1. Sync Channel CRC Calculation

7.7.1.3 Sync Channel Message Body Format

When the base station sends a *Sync Channel Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00000001’)	8
CAI_REV	8
MIN_CAI_REV	8
SID	15
NID	16
PILOT_PN	9
LC_STATE	42
SYS_TIME	36
LP_SEC	8
LTM_OFF	6
DAYLT	1
PRAT	3
RESERVED	2

MSG_TYPE - Message type.

The base station shall set this field to ‘00000001’.

CAI_REV - Common Air Interface revision level.

The base station shall set this field to ‘00000001’.

MIN_CAI_REV - Minimum Common Air Interface revision level.

Only mobile stations that support revision numbers greater than or equal to this field access the system.

The base station shall set this field to the minimum CAI revision level that it supports.[12]

SID - System identification.

The base station shall set this field to the system identification number for this cellular system.

[12]It is intended that all future revisions of this specification be backward compatible. However, if a future revision is not compatible, the MIN_CAI_REV level field allows the protocol to be upgraded, preventing incompatible mobile stations from attempting system acquisition.

NID - Network identification.

This field serves as a sub-identifier of a system as defined by the owner of the SID.

The base station shall set this field to the network identification number for this network. The NID value of 65,535 is reserved.

PILOT_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

LC_STATE - Long code state.

The base station shall set this field to the long code state at the time given by the SYS_TIME field of this message.

SYS_TIME - System time.

The base station shall set this field to the System Time as of four Sync Channel superframes (320 ms) after the end of the last superframe containing any part of this *Sync Channel Message*, minus the pilot PN sequence offset, in units of 80 ms (see 1.2).

LP_SEC - The number of leap seconds that have occurred since the start of System Time.

The base station shall set this field to the number of leap seconds that have occurred since the start of System Time, as of the time given by the SYS_TIME field of this message.

LTM_OFF - Offset of local time from System Time.

The current local time of day is equal to SYS_TIME + LP_SEC + LTM_OFF.

The base station shall set this field to the two's complement offset of local time from System Time, in units of 30 minutes.

DAYLT - Daylight savings time indicator.

If the daylight savings time is in effect, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

PRAT - Paging Channel data rate.

The base station shall set this field to the PRAT field value shown in Table 7.7.1.3-1 corresponding to the data rate used by the Paging Channels in the system.

Table 7.7.1.3-1. Paging Channel Data Rate

PRAT Field (binary)	Paging Channel data rate
000	9600 bps
001	4800 bps
010	2400 bps
All other PRAT values are reserved.	

RESERVED - Reserved bits.

The base station shall set this field to '00'.

7.7.2 Paging Channel

The Paging Channel is used to send control information to mobile stations that have not been assigned to a Traffic Channel.

7.7.2.1 Paging Channel Structure

7.7.2.1.1 Paging Channel Slot Structure

The Paging Channel is divided into slot cycles of 128 seconds. Each slot cycle begins at the start of the frame when System Time is zero modulo 128 seconds. Each slot cycle is divided into 200 ms slots, which are numbered from 0 to 639, as shown in Figure 7.7.2.1.1-1.

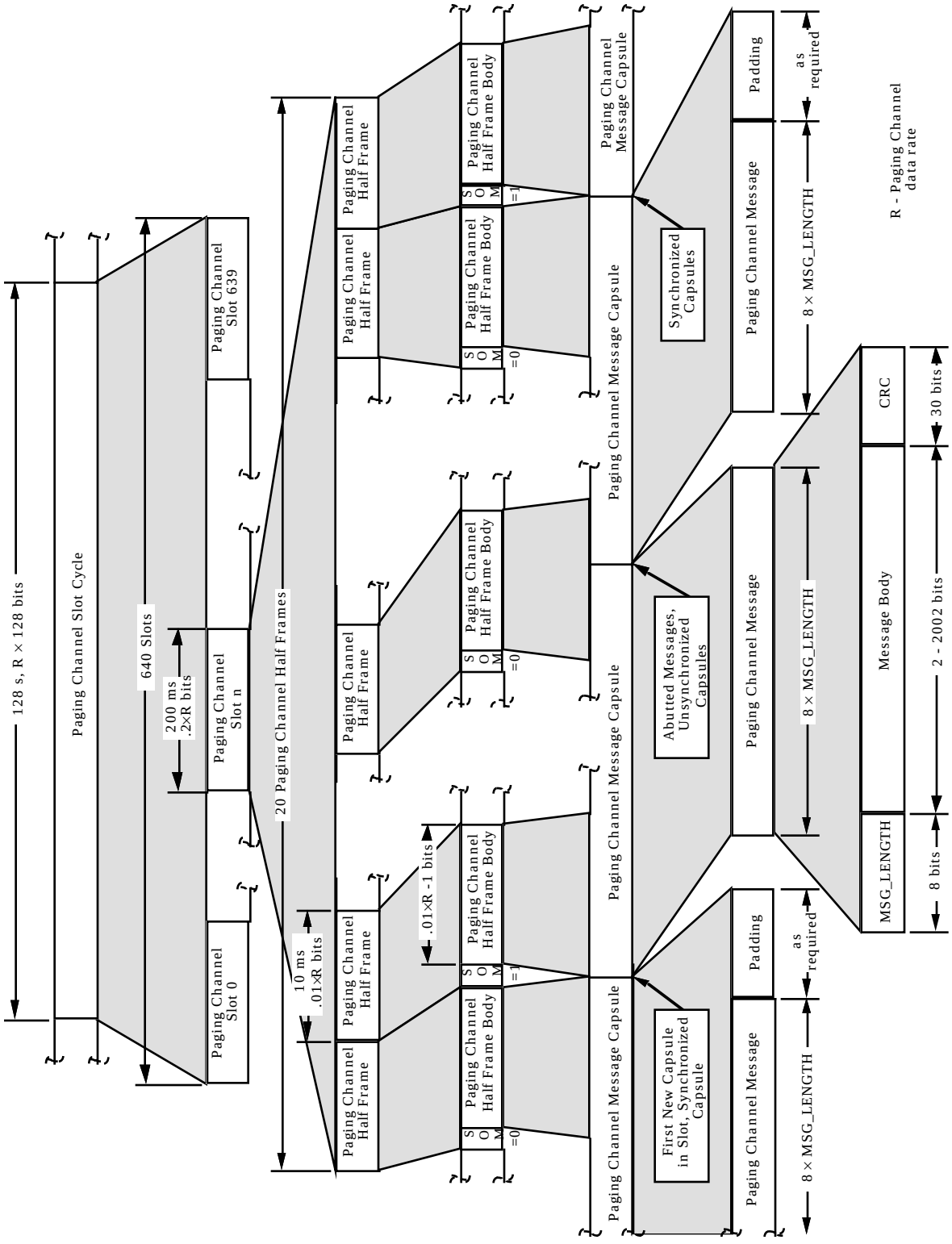

Figure 7.7.2.1.1-1. Paging Channel Structure Example

7.7.2.1.2 Paging Channel Message Capsule Structure

Each 200 ms slot is composed of ten Paging Channel frames, each 20 ms in length. As shown in Figure 7.7.2.1.1-1, a 20 ms long Paging Channel frame is divided into 10 ms long Paging Channel half frames. The first bit in any Paging Channel half frame is a SOM Bit.

A Paging Channel message capsule is composed of a Paging Channel message and padding. A Paging Channel message consists of a length field, a message body, and a CRC field. Padding consists of zero or more bits.

The base station may transmit synchronized or unsynchronized Paging Channel capsules. A synchronized capsule starts on the second bit of a Paging Channel half frame. An unsynchronized capsule begins immediately after the previous message capsule.

If a Paging Channel message ends 9 bits or more[13] before the next SOM Bit, the base station may transmit an unsynchronized message capsule immediately following that message. The base station shall not include any padding bits in a Paging Channel message capsule that is followed by an unsynchronized Paging Channel message capsule.

If a Paging Channel message ends within 8 bits of the next SOM Bit, or if no unsynchronized message capsule is transmitted following a Paging Channel message capsule, the base station shall include sufficient padding bits in that message capsule to extend it through the bit preceding the next SOM Bit, and the base station shall transmit a synchronized message capsule immediately following that SOM Bit.[14] The base station shall set all padding bits to '0'.

When a message capsule immediately follows an SOM Bit, the base station shall set that SOM Bit to '1'. The base station shall set all other SOM Bits to '0'.

The base station shall transmit the first message that begins in each Paging Channel slot in a synchronized message capsule.[15]

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[13]This restriction permits the mobile station to determine whether an unsynchronized message is being transmitted by checking the first 8 bits after the end of the message for a nonzero MSG_LENGTH value.

[14]This implies that all bits transmitted on the Paging Channel are either SOM bits or are part of a message capsule.

[15]This permits mobile stations operating in the slotted mode to obtain synchronization immediately after becoming active.

7.7.2.2 Paging Channel Message Structure

7.7.2.2.1 Paging Channel MSG_LENGTH Field

The base station shall set the MSG_LENGTH field of each Paging Channel message to the length of the message in octets, including the MSG_LENGTH field, the message body, and the CRC. The MSG_LENGTH field shall be 8 bits in length. The base station shall limit the maximum Paging Channel message length to 148 octets, or 1184 bits. That is, the MSG_LENGTH field shall not exceed 148.

7.7.2.2.2 Paging Channel Message CRC

A 30-bit CRC shall be computed for each Paging Channel signaling message. The CRC shall include the MSG_LENGTH field and the message body field. The generator polynomial for the CRC shall be as follows:

$$g(x) = x^{30} + x^{29} + x^{21} + x^{20} + x^{15} + x^{13} + x^{12} + x^{11} + x^{8} + x^{7} + x^{6} + x^{2} + x + 1.$$

The CRC shall be the value computed by the following procedure and the logic shown in Figure 7.7.2.2.2-1:

- All shift register elements shall be initialized to logical one.[16]
- The switches shall be set in the up position.
- The information bit count k shall be defined as 8 + message body length in bits.
- The register shall be clocked k times, with the length and message body fields of the message as the k input bits.
- The switches shall be set in the down position.
- The register shall be clocked an additional 30 times.
- The 30 additional output bits shall be the check bits.
- The bits shall be transmitted in the order in which they are calculated.

[16] Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

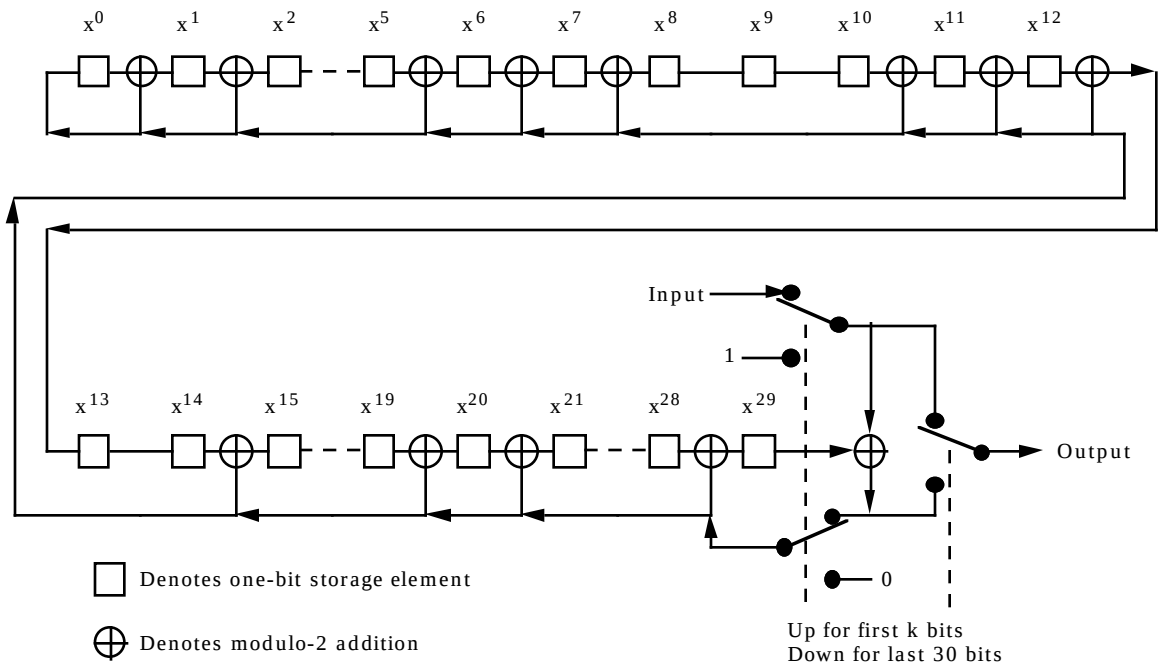

Figure 7.7.2.2.2-1. Paging Channel CRC Calculation

7.7.2.3 Paging Channel Message Body Format

The Paging Channel messages are summarized in Table 7.7.2.3-1. Paging Channel messages are grouped into the message groups shown in the table. Messages of each group are sent either periodically or on an as-needed basis.

Table 7.7.2.3-1. Paging Channel Messages

Message Name	Message Type (binary)
System Parameters Message	00000001
Access Parameters Message	00000010
Neighbor List Message	00000011
CDMA Channel List Message	00000100
Slotted Page Message	00000101
Page Message	00000111
Mobile Station Directed Order Message	00001000
Channel Assignment Message	00001001
Data Burst Message	00001010
Authentication Challenge Message	00001011
SSD Update Message	00001100
Null Message	--

7.7.2.3.1 Reserved

7.7.2.3.2 Message Body Contents

The following sections specify the contents of the message body for each message that may be sent on the Paging Channel.

7.7.2.3.2.1 System Parameters Message

When the base station sends a *System Parameters Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00000001’)	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
SID	15
NID	16
REG_ZONE	12
TOTAL_ZONES	3
ZONE_TIMER	3
BASE_ID	16
BASE_CLASS	4
PAGE_CHAN	3
HOME_REG	1
FOR_NID_REG	1
FOR_SID_REG	1
POWER_UP_REG	1
POWER_DOWN_REG	1
PARAMETER_REG	1
REG_PRD	7
BASE_LAT	22
BASE_LONG	23
REG_DIST	11
SRCH_WIN_A	4
SRCH_WIN_N	4
SRCH_WIN_R	4
NGHBR_MAX_AGE	4
PWR_REP_THRESH	5
PWR_REP_FRAMES	4

(continues on next page)

Field	Length (bits)
PWR_REP_MODE	1
PWR_REP_DELAY	5
RESCAN	1
T_ADD	6
T_DROP	6
T_COMP	4
T_TDROP	4
RESERVED	2

MSG_TYPE - Message type.

The base station shall set this field to '00000001'.

PILOT_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

CONFIG_MSG_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG_SEQ (see 7.6.2.2).

SID - System identification.

The base station shall set this field to the system identification number for this cellular system.

NID - Network identification.

This field serves as a sub-identifier of a system as defined by the owner of the SID.

The base station shall set this field to the network identification number for this network. The NID value of 65,535 is reserved.

REG_ZONE - Registration zone.

The base station shall set this field to its registration zone number (see 6.6.5.1.5).

TOTAL_ZONES - Number of registration zones to be retained.

The base station shall set this field to the number of registration zones the mobile station is to retain for purposes of zone-based registration (see 6.6.5.1.5).

If zone-based registration is to be disabled, the base station shall set this field to '000'.

ZONE_TIMER - Zone timer length.

The base station shall set this field to the ZONE_TIMER value shown in Table 7.7.2.3.2.1-1 corresponding to the length of the zone registration timer to be used by mobile stations.

Table 7.7.2.3.2.1-1. Value of Zone Timer

ZONE_TIMER Value (binary)	Timer Length (Minutes)
000	5
001	10
010	15
011	20
100	30
101	40
110	50
111	60

BASE_ID - Base station identification.

The base station shall set this field to its identification number.

BASE_CLASS - Base station class.

The base station shall set this field to the value shown in Table 7.7.2.3.2.1-2 corresponding to the class of service provided by this base station.

Table 7.7.2.3.2.1-2. Base Station Classes

Value (binary)	Class of Service Provided
0000	Public Macrocellular System
All other values are reserved.	

PAGE_CHAN - Number of Paging Channels.

The base station shall set this field to the number of Paging Channels on this CDMA Channel. The base station shall not set this field to '000'.

HOME_REG - Home registration indicator.

If mobile stations that have a home (SID, NID) pair matching that of the base station and have MOB_TERM_HOME equal to '1' are to be enabled for class C registrations, the base station shall set this field to '1'. If such stations are not to be enabled for class C registration, the base station shall set this field to '0'.

FOR_SID_REG - SID roamer registration indicator.

If mobile stations that are actively supporting a MIN having a home (SID, NID) pair with SID matching that of the base station and have MOB_TERM_FOR_SID equal to '1' for that MIN are to be enabled for class C registration, the base station shall set this field to '1'. If such stations are not to be enabled for class C registration, the base station shall set this field to '0'.

FOR_NID_REG - NID roamer registration indicator.

If mobile stations that are actively supporting a MIN having a home (SID, NID) pair with SID matching that of the base station, but not having a home (SID, NID) pair matching the (SID, NID) pair of the base station, and having MOB_TERM_FOR_SID equal to '1' for that MIN, the base station shall set this field to '1'. If such stations are not to be enabled for class C registration, the base station shall set this field to '0'.

POWER_UP_REG - Power-up registration indicator.

If mobile stations enabled for class C registration are to register immediately after powering on and receiving the system overhead messages, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

POWER_DOWN_REG - Power-down registration indicator.

If mobile stations enabled for class C registration are to register immediately before powering down, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

PARAMETER_REG - Parameter-change registration indicator.

If mobile stations are to register on parameter change events as specified in 6.6.5.1.6, the base station shall set this field to '1'. If not, the base station shall set this field to '0'.

REG_PRD - Registration period.

If mobile stations are not to perform timer-based registration, the base station shall set this field to '0000000'. If mobile stations are to perform timer-based registration, the base station shall set this field to the value in the range 24 to 80 inclusive, such that the desired timer value is

$$\lfloor 2^{\mathrm{REG\_PRD}/4} \rfloor \times 0.2 \text{ seconds.}$$

BASE_LAT - Base station latitude.

The base station shall set this field to its latitude in units of 0.25 second, expressed as a two's complement signed number with positive numbers signifying North latitudes.

BASE_LONG - Base station longitude.

The base station shall set this field to its longitude in units of 0.25 second, expressed as a two's complement signed number with positive numbers signifying East latitudes.

REG_DIST - Registration distance.

If mobile stations are to perform distance-based registration, the base station shall set this field to the non-zero "distance" beyond which the mobile is to re-register (see 6.6.5.1.4). If mobile stations are not to perform distance-based registration, the base station shall set this field to 0.

SRCH_WIN_A - Search window size for the Active Set and Candidate Set.

The base station shall set this field to the value shown in Table 6.6.6.2.1-1 corresponding to the search window size to be used by mobile stations for the Active Set and Candidate Set.

SRCH_WIN_N - Search window size for the Neighbor Set.

The base station shall set this field to the value shown in Table 6.6.6.2.1-1 corresponding to the search window size to be used by mobile stations for the Neighbor Set.

SRCH_WIN_R - Search window size for the Remaining Set.

The base station shall set this field to the value shown in Table 6.6.6.2.1-1 corresponding to the search window size to be used by mobile stations for the Remaining Set.

NGHBR_MAX_AGE - Neighbor Set maximum AGE.

The base station shall set this field to the maximum AGE value beyond which mobile stations are to drop members from the Neighbor Set (see 6.6.6.2.6.3).

PWR_REP_THRESH - Power control reporting threshold.

The base station shall set this field to the number of bad frames (see 6.2.2.2) to be received in a measurement period before the mobile station is to generate a *Power Measurement Report Message* (see 6.6.4.1.1). If mobile stations are not to generate any *Power Measurement Report Message*s, the base station shall set this field to '00000'.

PWR_REP_FRAMES - Power control reporting frame count.

The base station shall set this field to the value such that the number given by

$$\lfloor 2^{(\text{PWR\_REP\_FRAMES}/2)} \times 5 \rfloor \text{ frames}$$

is the number of frames over which the mobile station is to count frame errors.

PWR_REP_MODE - Power report mode indicator.

If the mobile station is to generate periodic *Power Measurement Report Messages*, the base station shall set this field to '1'. If the mobile station is to generate *Power Measurement Report Messages* only when PWR_REP_THRESH frame errors are detected within one measurement period, the base station shall set this field to '0'.

PWR_REP_DELAY - Power report delay.

The period that the mobile station waits following an autonomous *Power Measurement Report* before restarting frame counting for power control purposes.

The base station shall set this field to the power report delay value, in units of PWR_REP_DELAY × 4 frames (see 6.6.4.1.1).

RESCAN - Rescan indicator.

If mobile stations are to re-initialize and re-acquire the system upon receiving this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

T_ADD - Pilot detection threshold.

This value is used by the mobile station to trigger the sending of the *Pilot Strength Measurement Message* initiating the handoff process (see 6.6.6).

The base station shall set this field to the pilot detection threshold, expressed as an unsigned binary number equal to $\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$.

T_DROP - Pilot drop threshold.

This value is used by the mobile station to trigger the sending of the *Pilot Strength Measurement Message* terminating the handoff process and to move pilots from the Candidate Set to the Neighbor Set (see 6.6.6).

The base station shall set this field to the pilot drop threshold, expressed as an unsigned binary number equal to $\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$.

T_COMP - Active Set versus Candidate Set comparison threshold.

The mobile station transmits an autonomous Pilot Strength Measurement Message when the strength of a pilot in the Candidate Set exceeds that of a pilot in the Active Set by this margin (see 6.6.6.2.5.2).

The base station shall set this field to the threshold Candidate Set pilot to Active Set pilot ratio, in units of 0.5 dB.

T_TDROP - Drop timer value.

Timer value after which an action is taken by the mobile station for a pilot that is a member of the Active Set or Candidate Set, and whose strength has not become greater than T_DROP. If the pilot is a member of the Active Set, a *Pilot Strength Measurement Message* is issued. If the pilot is a member of the Candidate Set, it will be moved to the Neighbor Set.

The base station shall set this field to the T_TDROP value shown in Table 6.6.6.2.3-1 corresponding to the drop timer value to be used by the mobile station.

RESERVED - Reserved bits.

The base station shall set this field to '00'.

1 7.7.2.3.2.2 Access Parameters Message

2 The *Access Parameters Message* defines the parameters used by the mobile station when
3 transmitting to the base station on an Access Channel. When the base station sends a
4 *Access Parameters Message*, it shall use the following variable-length message format:

5

Field	**Length (bits)**
MSG_TYPE (‘00000010’)	8
PILOT_PN	9
ACC_MSG_SEQ	6
ACC_CHAN	5
NOM_PWR	8
INIT_PWR	6
PWR_STEP	4
NUM_STEP	4
MAX_CAP_SZ	3
PAM_SZ	4
PSIST(0-9)	6
PSIST(10)	3
PSIST(11)	3
PSIST(12)	3
PSIST(13)	3
PSIST(14)	3
PSIST(15)	3
MSG_PSIST	3
REG_PSIST	3
PROBE_PN_RAN	4
ACC_TMO	6
PROBE_BKOFF	4
PROBE_BKOFF_RSV	4
BKOFF	4
BKOFF_RSV	4

6 (continues on next page)

Field	Length (bits)
MAX_REQ_SEQ	4
MAX_RSP_SEQ	4
AUTH	2
RAND	0 or 32
RESERVED	7

MSG_TYPE - Message type.

The base station shall set this field to '00000010'.

PILOT_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

ACC_MSG_SEQ - Access parameters message sequence number.

The base station shall set this field to ACC_CONFIG_SEQ (see 7.6.2.2).

ACC_CHAN - Number of Access Channels.

The base station shall set this field to one less than the number of Access Channels associated with this Paging Channel.

NOM_PWR - Nominal transmit power offset.

The base station shall set this field to the correction factor to be used by mobile stations in the open loop power estimate, expressed as a two's complement value in units of 0.5 dB (see 6.1.2.3.1).

INIT_PWR - Initial power offset for access.

The base station shall set this field to the correction factor to be used by mobile stations in the open loop power estimate for the initial transmission on an Access Channel, expressed as a two's complement value in units of 0.5 dB (see 6.1.2.3.1).

PWR_STEP - Power increment.

The base station shall set this field to the value by which a mobile stations is to increase its transmit power between successive access probes in an access probe sequence, in units of 0.5 dB.

NUM_STEP - Number of access probes.

The base station shall set this field to one less than the maximum number of access probes a mobile station is to transmit in a single access probe sequence.

MAX_CAP_SZ - Maximum Access Channel message capsule size.

The base station shall set this field to the value in the range 0 to 7, three less than the maximum number of Access Channel frames in an Access Channel message capsule.

PAM_SZ - Access Channel preamble length.

The base station shall set this field to one less than the number of Access Channel frames that the mobile station is to transmit in each Access Channel preamble.

PSIST(0-9) - Persistence value for access overload classes 0 through 9.

If mobile stations in access overload classes 0 through 9 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111111'.

PSIST(10) - Persistence value for access overload class 10 (test mobile stations).

If mobile stations in access overload class 10 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111'.

PSIST(11) - Persistence value for access overload class 11 (emergency mobile stations).

If mobile stations in access overload class 11 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111'.

PSIST(12) - Persistence value for access overload class 12.

If mobile stations in access overload class 12 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111'.

PSIST(13) - Persistence value for access overload class 13.

If mobile stations in access overload class 13 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111'.

PSIST(14) - Persistence value for access overload class 14.

If mobile stations in access overload class 14 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111'.

PSIST(15) - Persistence value for access overload class 15.

If mobile stations in access overload class 15 are permitted to transmit requests on the Access Channel, the base station shall set this field to the persistence value to be used. If such mobile stations are not permitted to transmit requests on the Access Channel, the base station shall set this field to '111'.

MSG_PSIST - Persistence modifier for Access Channel attempts for message transmissions.

The mobile station multiplies its transmission probability by $2^{-\text{MSG\_PSIST}}$ for such attempts.

The base station shall set this field to the persistence modifier for Access Channel attempts for message transmissions.

REG_PSIST - Persistence modifier for Access Channel attempts for registrations which are not responses to the *Registration Request Order*.

The mobile station multiplies its transmission probability by $2^{-\text{REG\_PSIST}}$ for such attempts.

The base station shall set this field to the persistence modifier for Access Channel attempts for registrations which are not responses to the *Registration Request Order*.

PROBE_PN_RAN - Time randomization for Access Channel probes.

The mobile station delays its transmission from System Time by RN PN chips, where RN is a number determined by hashing between 0 and $2^{\text{PROBE\_PN\_RAN}}$ - 1 PN chips.

The base station shall set this field to the value in the range 0 to 9 inclusive such that the time randomization range is $2^{\text{PROBE\_PN\_RAN}}$ - 1 PN chips.

ACC_TMO - Acknowledgement timeout.

The base station shall set this field to the length of time mobile stations are to wait after the end of an Access Channel transmission before determining that the base station did not receive the transmission, in units of 80 ms. The base station shall set this field to a value greater than 1 (see 6.6.3.1.1.2).

PROBE_BKOFF - Access Channel probe backoff range.

The base station shall set this field to one less than the maximum number of slots the mobile station is to delay due to random backoff between consecutive access probes.

PROBE_BKOFF_RSV - Reserved for future access probe backoff values.

The base station shall set this field to '0000'.

BKOFF - Access Channel probe sequence backoff range.

The base station shall set this field to one less than the maximum number of slots the mobile station is to delay due to random backoff between successive access probe sequences and before the first access probe sequence of a response access.

BKOFF_RSV - Reserved for future access sequence backoff values.

The base station shall set this field to '0000'.

MAX_REQ_SEQ - Maximum number of access probe sequences for an Access Channel request.

The base station shall set this field to the maximum number of access probe sequences the mobile station is to transmit for an Access Channel request. The base station shall set this field to a value greater than 0.

MAX_RSP_SEQ - Maximum number of access probe sequences for an Access Channel response.

The base station shall set this field to the maximum number of access probe sequences the mobile station is to transmit for an Access Channel response. The base station shall set this field to a value greater than 0.

AUTH - Authentication mode.

If the mobile station is to include standard authentication data in Access Channel messages, the base station shall set this field to '01'. If the mobile station is not to include authentication data in Access Channel messages, the base station shall set this field to '00'. All other values are reserved.

RAND - Random challenge value.

If the AUTH field is set to '01', the base station shall set this field to the random challenge value to be used by the mobile station for authentication. If the AUTH field is set to any other value, the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall set this field to '0000000'.

7.7.2.3.2.3 Neighbor List Message

When the base station sends a *Neighbor List Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000011’)	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
PILOT_INC	4
Zero or more occurrences of the following record:	
NGHBR_CONFIG	3
NGHBR_PN	9
RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00000011’.

PILOT_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

CONFIG_MSG_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG_SEQ (see 7.6.2.2).

PILOT_INC - Pilot PN sequence offset index increment.

The mobile station searches for Remaining Set pilots at pilot PN sequence index values that are multiples of this value.

The base station shall set this field to the pilot PN sequence increment, in units of 64 PN chips, that the mobile station is to use for searching the Remaining Set. The base station should set this field to the largest increment such that the pilot PN sequence offsets of all its neighbor base stations are integer multiples of that increment.

The base station shall include one occurrence of the following two-field record for each member mobile stations are to place in their Neighbor Sets. The base station may include zero or more occurrences of the following record.

NGHBR_CONFIG - Neighbor configuration.

The base station shall set this field to the value shown in Table 7.7.2.3.2.3-1 corresponding to the configuration of this neighbor.

Table 7.7.2.3.2.3-1. Neighbor Configuration Field

Value (bin)	Neighbor Configuration
000	Same configuration.
001	The base station does not have a Paging Channel using this code channel on this CDMA frequency assignment. It does have a Primary Paging Channel on this CDMA frequency assignment.
010	The base station does not have a Paging Channel on this CDMA frequency assignment.
011	Basic base station configuration is different or unknown.
100-111	Reserved.

NGHBR_PN - Neighbor pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this neighbor, in units of 64 PN chips.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.2.3.2.4 CDMA Channel List Message

When the base station sends a *CDMA Channel List Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000100’)	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
One or more occurrences of the following field:	
CDMA_FREQ	11
RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00000100’.

PILOT_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

CONFIG_MSG_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG_SEQ (see 7.6.2.2).

CDMA_FREQ - CDMA Channel frequency assignment.

The order in which occurrences of this field are included gives the designations of the supported CDMA Channels as CDMA Channel 1 through CDMA Channel N.

The base station shall include one occurrence of this field for each CDMA Channel containing a Paging Channel that is supported by this base station. If the Primary CDMA Channel is supported by this base station, the base station shall include its occurrence of this field first. If the Primary CDMA Channel is not supported and the Secondary CDMA Channel is supported, the base station shall include the occurrence of this field corresponding to the Secondary CDMA Channel first.

The base station shall set each occurrence of this field to the CDMA channel number corresponding to the CDMA frequency assignment for that CDMA Channel (see 7.1.1.1).

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.2.3.2.5 Slotted Page Message

When the base station sends a *Slotted Page Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000101’)	8
SLOT_NUM	10
CONFIG_MSG_SEQ	6
ACC_MSG_SEQ	6
RESERVED	1
MORE_PAGES	1

Zero or more occurrences of the following record:

MSG_SEQ	2
EXT_ADDR	1
MIN1	24
MIN2	0 or 10

RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘0000101’.

SLOT_NUM - Paging Channel slot number.

Paging Channel slot numbers are relative to the longest slot cycle.

The base station shall set this field to

$$\lfloor t/10 \rfloor \bmod 640,$$

where t is the System Time in frames of the frame in which this message began.

CONFIG_MSG_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG_SEQ (see 7.6.2.2).

ACC_MSG_SEQ - Access parameters message sequence number.

The base station shall set this field to ACC_CONFIG_SEQ (see 7.6.2.2).

RESERVED - Reserved bit.

The base station shall set this field to '0'.

MORE_PAGES - More slotted pages to follow indicator.

If this message is the last *Slotted Page Message* to begin in the current Paging Channel slot, the base station shall set this field to '0'. Otherwise, the base station shall set this field to '1'.

The base station shall include one occurrence of the following four-field record for each mobile station MIN to be paged in this message.

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.3.1.1).

EXT_ADDR - Extra address indicator.

If the MIN2 field is included in this record, the base station shall set this field to '1'. If the MIN2 field is not included in this record, the base station shall set this field to '0'.

MIN1 - First part of the mobile station identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN specified by this record.

MIN2 - Second part of the mobile station identification number (MIN).

If the EXT_ADDR field is set to '1', the base station shall set this field to the MIN2 value for the MIN specified by this record. If the EXT_ADDR field is set to '0', the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.2.3.2.6 Page Message

When the base station sends a *Page Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000111’)	8
CONFIG_MSG_SEQ	6
ACC_MSG_SEQ	6
RESERVED	1

Zero or more occurrences of the following record:

MSG_SEQ	2
EXT_ADDR	1
MIN1	24
MIN2	0 or 10

RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00000111’.

CONFIG_MSG_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG_SEQ (see 7.6.2.2).

ACC_MSG_SEQ - Access parameters message sequence number.

The base station shall set this field to ACC_CONFIG_SEQ (see 7.6.2.2).

RESERVED - Reserved bit.

The base station shall set this field to '0'.

The base station shall include one occurrence of the following four-field record for each mobile station MIN to be paged in this message.

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.3.1.1).

EXT_ADDR - Extra address indicator.

If the MIN2 field is included in this record, the base station shall set this field to ‘1’. If the MIN2 field is not included in this record, the base station shall set this field to ‘0’.

MIN1 - First part of the mobile station identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN specified by this record.

MIN2 - Second part of the mobile station identification number (MIN).

If the EXT_ADDR field is set to '1', the base station shall set this field to the MIN2 value for the MIN specified by this record. If the EXT_ADDR field is set to '0', the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.2.3.2.7 Mobile Station Directed Order Message

When the base station sends a *Mobile Station Directed Order Message*, it shall use the following variable-length message format:

Field	**Length (bits)**
MSG_TYPE (‘00001000’)	8
One or more occurrences of the following record:	
ACK_SEQ	2
MSG_SEQ	2
ACK_REQ	1
VALID_ACK	1
ESN	32
ORDER	6
ADD_RECORD_LEN	3
order specific fields (if used)	8 × ADD_RECORD_LEN
RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00001000’.

The base station shall include one or more occurrences of the following variable-length order record:

ACK_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this order (see 7.6.3.1.1).

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this order (see 7.6.3.1.1).

ACK_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this order, the base station shall set this field to ‘1’. If the mobile station is not to acknowledge this order, the base station shall set this field to ‘0’ (see 7.6.3.1.1).

VALID_ACK - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '1'. If this order record does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '0'.

ESN - Mobile station's electronic serial number.

The base station shall set this field to the electronic serial number of the mobile station to which this order is addressed.

ORDER - Order code.

The base station shall set this field to the ORDER code (see 7.7.4) for this type of order.

ADD_RECORD_LEN - Additional record length.

The base station shall set this field to the number of octets in the order specific fields included in this order record.

order specific fields - Order specific fields.

The base station shall include order specific fields as specified in 7.7.4 for this type of order.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.2.3.2.8 Channel Assignment Message

When the base station sends a *Channel Assignment Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001001’)	8
One or more occurrences of the following record:	
ACK_SEQ	2
MSG_SEQ	2
ACK_REQ	1
VALID_ACK	1
ESN	32
ASSIGN_MODE	3
ADD_RECORD_LEN	3
If ASSIGN_MODE = ‘000’, the record also includes the following fields:	
FREQ_INCL	1
CODE_CHAN	8
CDMA_FREQ	0 or 11
FRAME_OFFSET	4
ENCRYPT_MODE	4
RESERVED	0 - 7 (as needed)
If ASSIGN_MODE = ‘001’, the record also includes the following fields:	
FREQ_INCL	1
CODE_CHAN	8
CDMA_FREQ	0 or 11
RESERVED	0 - 7 (as needed)
If ASSIGN_MODE = ‘010’, the record also includes the following fields:	
RESPOND	1
RESERVED	7

(continues on next page)

If ASSIGN_MODE = '011', the record also includes the following fields:

SID	15
VMAC	3
ANALOG_CHAN	11
SCC	2
MEM	1
RESERVED	0

RESERVED	6

MSG_TYPE - Message type.

The base station shall set this field to "00001001'.

The base station shall include one or more occurrences of the following variable-length assignment record:

ACK_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this assignment (see 7.6.3.1.1).

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this assignment (see 7.6.3.1.1).

ACK_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this order, the base station shall set this field to '1'. If the mobile station is not to acknowledge this order, the base station shall set this field to '0' (see 7.6.3.1.1).

VALID_ACK - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '1'. If this assignment record does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '0'.

ESN - Mobile station's electronic serial number.

The base station shall set this field to the electronic serial number of the mobile station to which this assignment is addressed.

ASSIGN_MODE - Assignment mode.

The base station shall set this field to the value shown in Table 7.7.2.3.2.8-1 corresponding to the assignment mode for this assignment.

Table 7.7.2.3.2.8-1. Assignment Mode

Value (binary)	Assignment Mode
000	Traffic Channel Assignment
001	Paging Channel Assignment
010	Acquire Analog System
011	Analog Voice Channel Assignment
All other values are reserved.	

ADD_RECORD_LEN - Additional record length.

The base station shall set this field to the number of octets in the fields included after this one in this assignment record.

If the ASSIGN_MODE field is set to '000', the base station shall include the following five fields in the assignment record:

FREQ_INCL - Frequency included indicator.

If the CDMA_FREQ field is included in this assignment record, the base station shall set this bit to '1'. If the CDMA_FREQ field is not included in this assignment record, the base station shall set this bit to '0'.

CODE_CHAN - Code channel.

The base station shall set this field to the code channel in the range 1 to 63 inclusive that the mobile station is to use on the Forward Traffic Channel.

CDMA_FREQ - Frequency assignment.

If the FREQ_INCL bit is set to '1', the base station shall set this field to the CDMA Channel number corresponding to the CDMA frequency assignment for the CDMA Channel containing the Forward Traffic Channel the mobile station is to use. If the FREQ_INCL bit is set to '0', the base station shall omit this field.

FRAME_OFFSET - Frame offset.

The Forward and Reverse Traffic Channel frames are delayed FRAME_OFFSET $\times$ 1.25 ms relative to system timing (see 7.1.3.5.1).

The base station shall set this field to the Forward and Reverse Traffic Channel frame offset.

ENCRYPT_MODE - Message encryption mode.

The base station shall set this field to the ENCRYPT_MODE value shown in Table 7.7.2.3.2.8-2 corresponding to the encrypting mode that is to be used for messages sent on the Forward and Reverse Traffic Channels, as specified in 6.3.12.2.

Table 7.7.2.3.2.8-2. Message Encryption Modes

ENCRYPT_MODE Field (binary)	Encryption Mode Used
0000	Encryption disabled
0001	Encrypt call control messages
All other ENCRYPT_MODE values are reserved.	

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the total length of the fields after the preceding ADD_RECORD_LEN field through this RESERVED field equal to an integer number of octets. The base station shall set these bits to '0'.

If the ASSIGN_MODE field is set to '001', the base station shall include the following four fields in the assignment record:

FREQ_INCL - Frequency included indicator.

If the CDMA_FREQ field is included in this assignment record, the base station shall set this bit to '1'. If the CDMA_FREQ field is not included in this assignment record, the base station shall set this bit to '0'.

CODE_CHAN - Code channel.

The base station shall set this field to the code channel in the range 1 to 7 inclusive that the mobile station is to use on the Paging Channel.

CDMA_FREQ - Frequency assignment.

If the FREQ_INCL bit is set to '1', the base station shall set this field to the CDMA Channel number corresponding to the CDMA frequency assignment for the CDMA Channel containing the Paging Channel the mobile station is to use. If the FREQ_INCL bit is set to '0', the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the total length of the fields after the preceding ADD_RECORD_LEN field through this RESERVED field equal to an integer number of octets. The base station shall set these bits to '0'.

If the ASSIGN_MODE field is set to '010', the base station shall include the following two fields in the assignment record:

RESPOND - Respond on analog control channel indicator.

If the mobile station is to respond on the analog control channel after processing this channel assignment, the base station shall set this field to '1'. If not, the base station shall set this field to '0'.

RESERVED - Reserved bits.

The base station shall set this field to '0000000'.

If the ASSIGN_MODE field is set to '011', the base station shall include the following six fields in the assignment record:

SID - System identification of the analog system.

The base station shall set this field to the system identification of the analog system supporting the assigned voice channel for this assignment (see 2.3.8).

VMAC - Voice mobile station attenuation code.

The base station shall set this field to the mobile station power level associated with the assigned voice channel for this assignment (see 2.1.2).

ANALOG_CHAN - Voice channel number.

The base station shall set this field to the voice channel number for this assignment (see 2.1.1.1).

SCC - SAT color code.

The base station shall set this field to the supervisory audio tone associated with the assigned voice channel.

MEM - Message encryption mode indicator.

If analog control message encryption is to be enabled on the assigned forward and reverse analog voice channels, the base station shall set this bit to '1'. Otherwise, the base station shall set this bit to '0'.

RESERVED - Reserved bits.

The base station shall omit this field.

RESERVED - Reserved bits.

The base station shall set this field to '000000'.

7.7.2.3.2.9 Data Burst Message

When the base station sends a *Data Burst Message* on the Paging Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001010’)	8
ACK_SEQ	2
MSG_SEQ	2
ACK_REQ	1
VALID_ACK	1
ESN	32
MSG_NUMBER	8
MIN1	24
MIN2	10
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8
NUM_FIELDS occurrences of the following field:	
CHARi	8
RESERVED	4

MSG_TYPE - Message type.

The base station shall set this field to ‘00001010’.

ACK_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.3.1.1).

ACK_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this message, the base station shall set this field to '1'. If the mobile station is not to acknowledge this message, the base station shall set this field to '0' (see 7.6.3.1.1).

VALID_ACK - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '1'. If this message does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '0'.

ESN - Mobile station's electronic serial number.

The base station shall set this field to the electronic serial number of the mobile station to which this message is addressed.

MSG_NUMBER - Message number.

The base station shall set this field to the number of this message within the data burst stream.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being sent the message.

MIN2 - Second part of the mobile identification number (MIN).

The base station shall set this field to the MIN2 value for the MIN being sent the message.

BURST_TYPE - Data burst type.

The base station shall set this field to the value shown in Table 7.7.2.3.2.9-1 for the type of this data burst.

Table 7.7.2.3.2.9-1. Burst Data Types

Value (binary)	Burst Data Type
000000	Unknown burst data type
All other burst data type codes are reserved.	

NUM_MSGS - Number of messages in the data burst stream.

The base station shall set this field to the number of messages in this data burst stream.

NUM_FIELDS - Number of characters in this message.

The base station shall set this field to the number of occurrences of the CHARi field included in this message.

CHARi - Character.

The base station shall include NUM_FIELDS occurrences of this field. The base station shall set these fields to the corresponding octet of the data burst stream.

RESERVED - Reserved bits.

The base station shall set this field to '0000'.

7.7.2.3.2.10 Authentication Challenge Message

When the base station sends an *Authentication Challenge Message* on the Paging Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00001011’)	8
ACK_SEQ	2
MSG_SEQ	2
ACK_REQ	1
VALID_ACK	1
ESN	32
MIN1	24
MIN2	10
RANDU	24
RESERVED	2

MSG_TYPE - Message type.

The base station shall set this field to ‘00001011’.

ACK_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.3.1.1).

ACK_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this message, the base station shall set this field to ‘1’. If the mobile station is not to acknowledge this message, the base station shall set this field to ‘0’ (see 7.6.3.1.1).

VALID_ACK - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to ‘1’. If this message does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to ‘0’.

ESN - Mobile station's electronic serial number.

The base station shall set this field to the electronic serial number of the mobile station to which this message is addressed.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being sent the message.

MIN2 - Second part of the mobile identification number (MIN).

The base station shall set this field to the MIN2 value for the MIN being sent the message.

RANDU - Random challenge data.

The base station shall set this field to the random challenge data (see 6.3.12.1.5).

RESERVED - Reserved bits.

The base station shall set this field to '00'.

7.7.2.3.2.11 SSD Update Message

When the base station sends an *SSD Update Message* on the Paging Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00001100’)	8
ACK_SEQ	2
MSG_SEQ	2
ACK_REQ	1
VALID_ACK	1
ESN	32
MIN1	24
MIN2	10
RANDSSD	56
RESERVED	2

MSG_TYPE - Message type.

The base station shall set this field to ‘00001100’.

ACK_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG_SEQ - Message sequence number.

The base station shall set this field to the acknowledgement sequence number for this message (see 7.6.3.1.1).

ACK_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this message, the base station shall set this field to ‘1’. If the mobile station is not to acknowledge this message, the base station shall set this field to ‘0’ (see 7.6.3.1.1).

VALID_ACK - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to ‘1’. If this message does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to ‘0’.

ESN - Mobile station's electronic serial number.

The base station shall set this field to the electronic serial number of the mobile station to which this message is addressed.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being sent the message.

MIN2 - Second part of the mobile identification number (MIN).

The base station shall set this field to the MIN2 value for the MIN being sent the message.

RANDSSD - Random data for the computation of SSD.

The base station shall set this field to the random data the mobile station is to use in computing the shared secret data.

RESERVED - Reserved bits.

The base station shall set this field to '00'.

7.7.2.3.2.12 Null Message

When the base station sends a *Null Message*, it shall use the following fixed-length message format:

Field	Length (bits)
RESERVED	2

RESERVED - Reserved bits.

The base station shall set this field to '00'.

7.7.3 Forward Traffic Channel

The Forward Traffic Channel is used to send signaling information to the mobile station during Traffic Channel operation.

7.7.3.1 Forward Traffic Channel Structure

Figure 7.7.3.1-1 shows several examples of the format for signaling messages on the Forward Traffic Channel.

When sending a message on the Forward Traffic Channel, the base station may use any combination of blank-and-burst and dim-and-burst information bit structures (see 7.1.3.5.11) that allocates enough signaling traffic bits to contain the message. If the number of allocated bits exceeds the number of bits in the message, the base station shall transmit the message beginning with the first allocated bit. In the remaining allocated bits, the base station shall transmit padding bits. The base station shall set the padding bits to '0'.

All Forward Traffic Channel messages shall start with the second bit of the signaling portion of a Forward Traffic Channel frame. The first bit in the signaling portion of a dim-and-burst or a blank-and-burst frame shall be a Start of Message (SOM) Bit. This bit shall be set to '1' if a Forward Traffic Channel message begins in the frame. If no message begins in that frame, the SOM Bit shall be set to '0'.

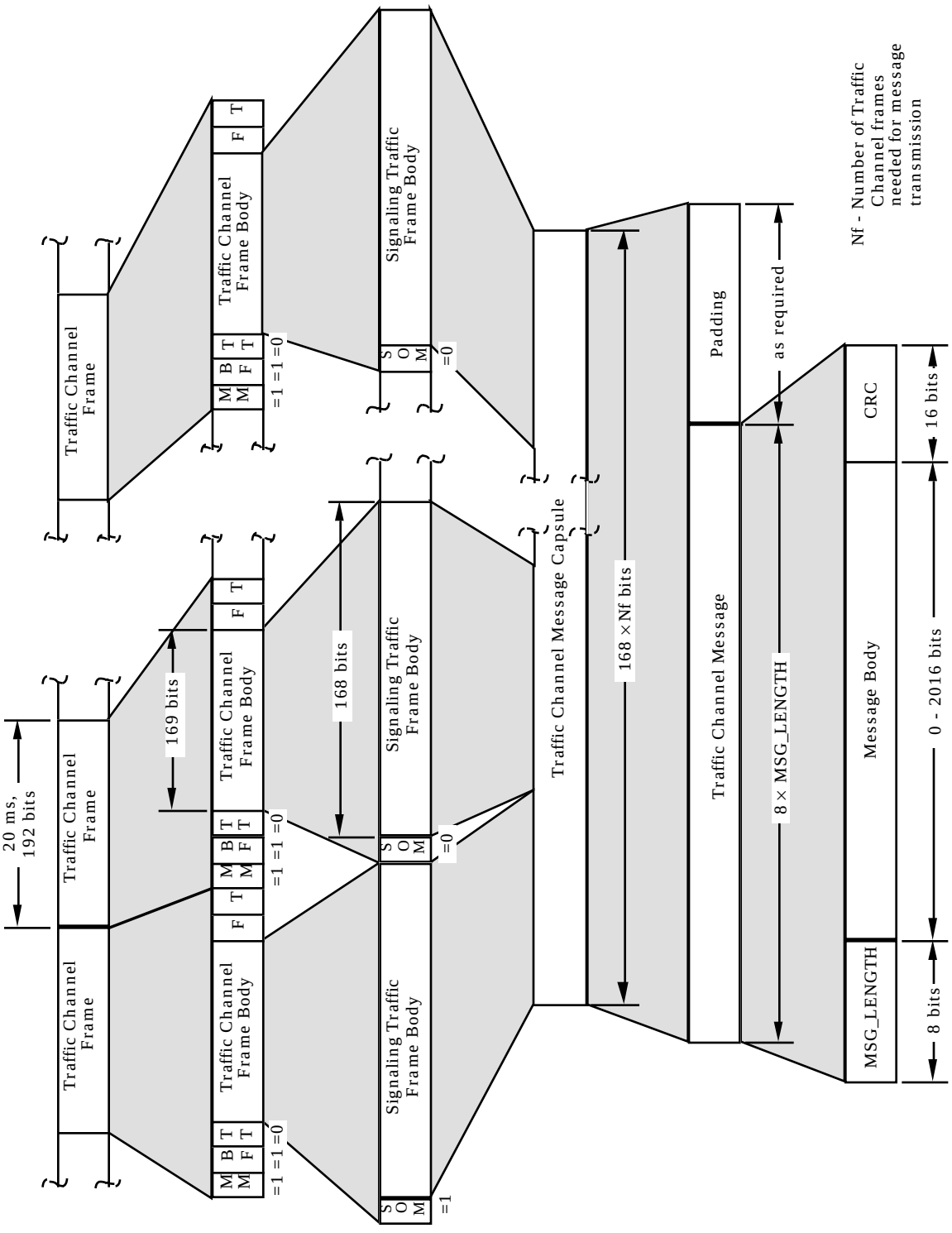

Figure 7.7.3.1-1A. Forward Traffic Channel Structure - Blank-and-Burst at 9600 bps

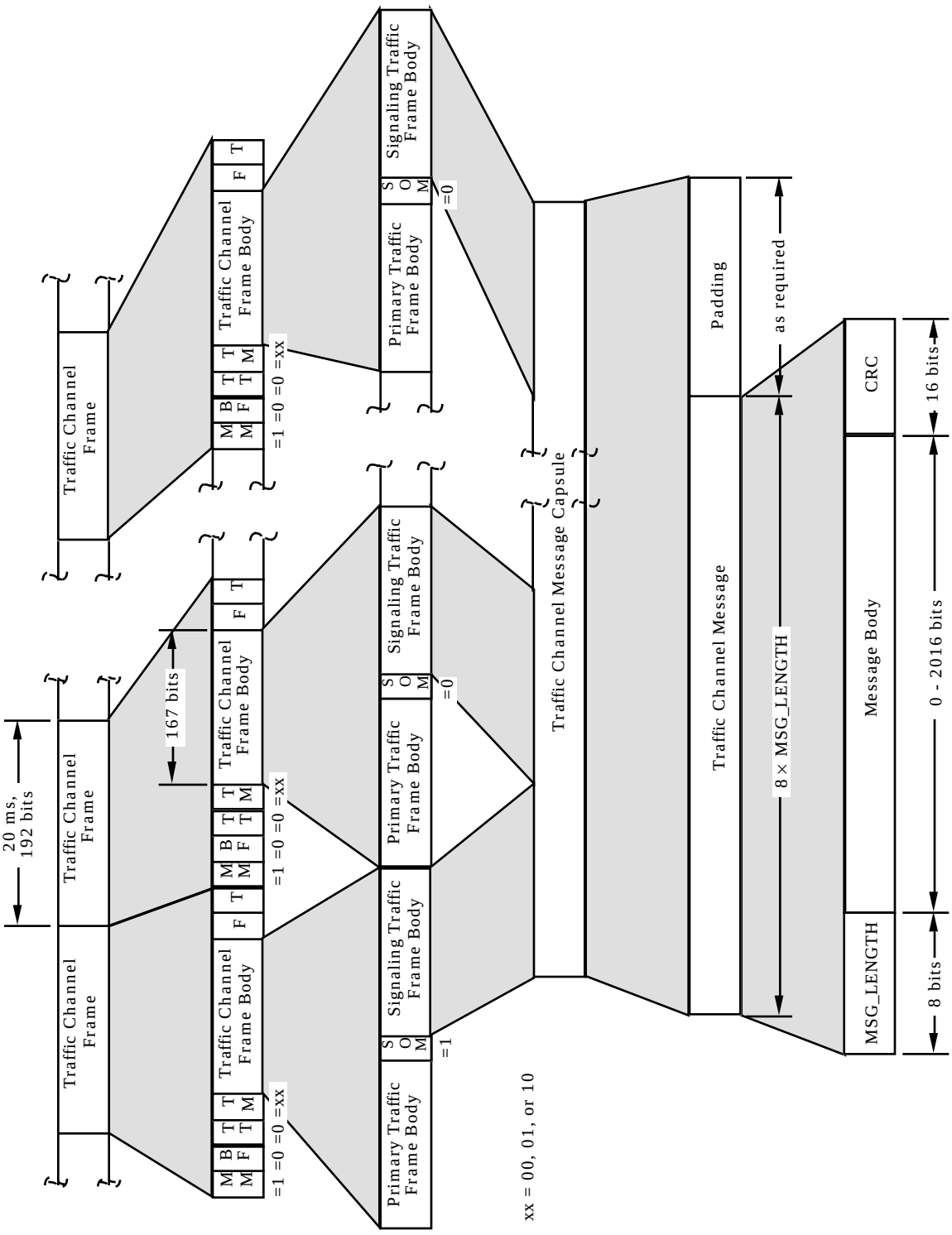

Figure 7.7.3.1-1B. Forward Traffic Channel Structure - Dim-and-Burst at 9600 bps

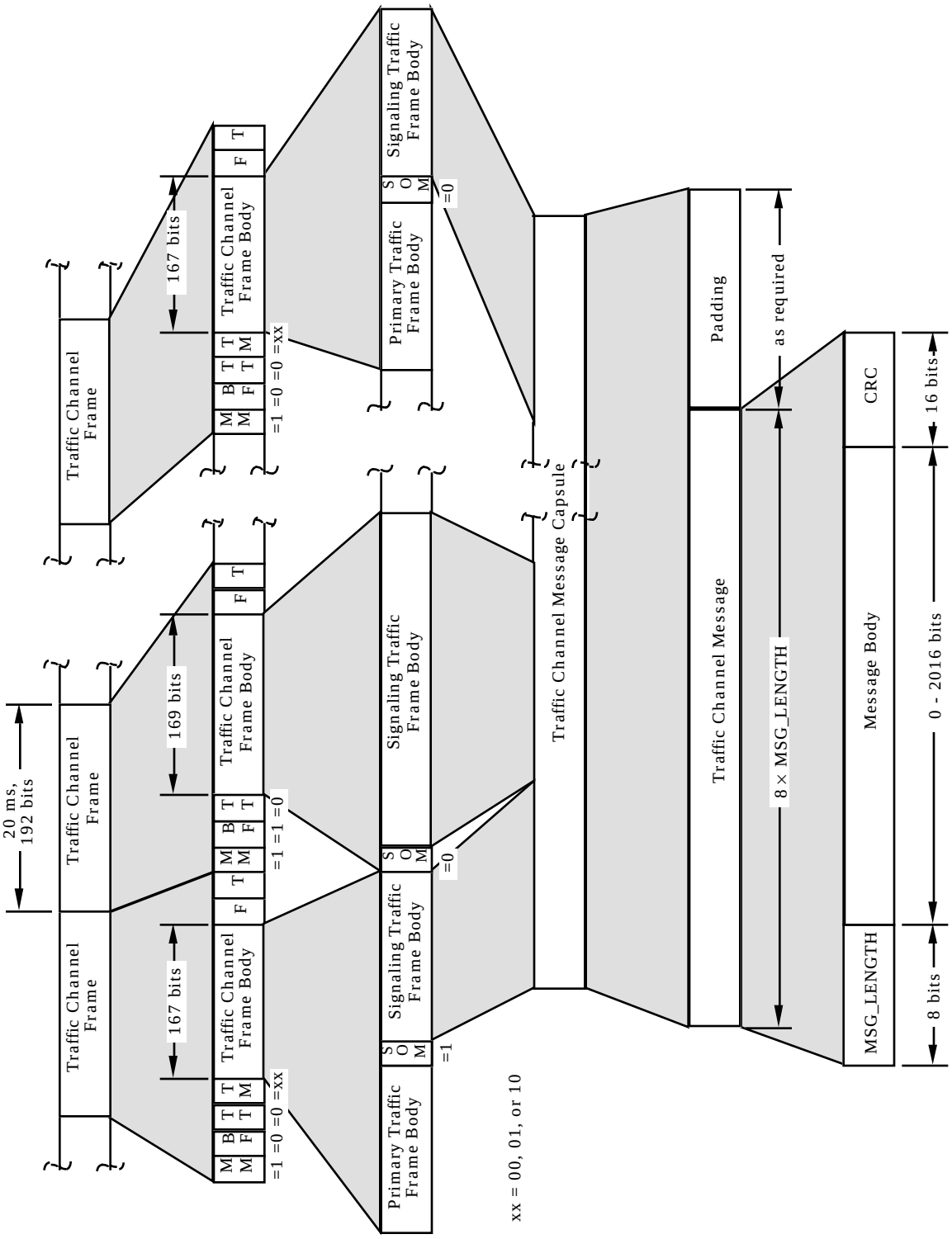

Figure 7.7.3.1-1C. Forward Traffic Channel Structure - Mixed Dim-and-Burst and Blank-and-Burst at 9600 bps

7.7.3.2 Forward Traffic Channel Message Structure

Each Traffic Channel message shall consist of a message length field MSG_LENGTH, the message body, and a CRC field, in that order.

7.7.3.2.1 Forward Traffic Channel MSG_LENGTH Field

The base station shall set the MSG_LENGTH field of a Forward Traffic Channel signaling message to the length of the message in octets, including the MSG_LENGTH field, the message body, and the CRC. The base station shall limit the maximum Forward Traffic Channel signaling message length to 148 octets or 1184 bits. That is, the value of the MSG_LENGTH field shall not exceed 148.

7.7.3.2.2 Forward Traffic Channel Signaling Message CRC

A 16-bit CRC shall be computed for each Forward Traffic Channel signaling message. The CRC includes the MSG_LENGTH field and the message body field. The generator polynomial for the CRC shall use the standard CRC-CCITT polynomial:

$$g(x) = x^{16} + x^{12} + x^5 + 1.$$

The following procedure and the logic shown in Figure 7.7.3.2.2-1 (or equivalent) shall be used to compute the CRC:

- All shift register elements shall be initialized to logical one.[17]
- The switches shall be set in the up position.
- The information bit count k shall be defined as 8 + message body length in bits.
- The register shall be clocked k times, with the length and message body fields of the message as the k input bits.
- The switches shall be set in the down position.
- The register shall be clocked an additional 16 times.
- The 16 additional output bits shall be the check bits.
- The bits shall be transmitted in the order in which they are calculated.

[17] Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

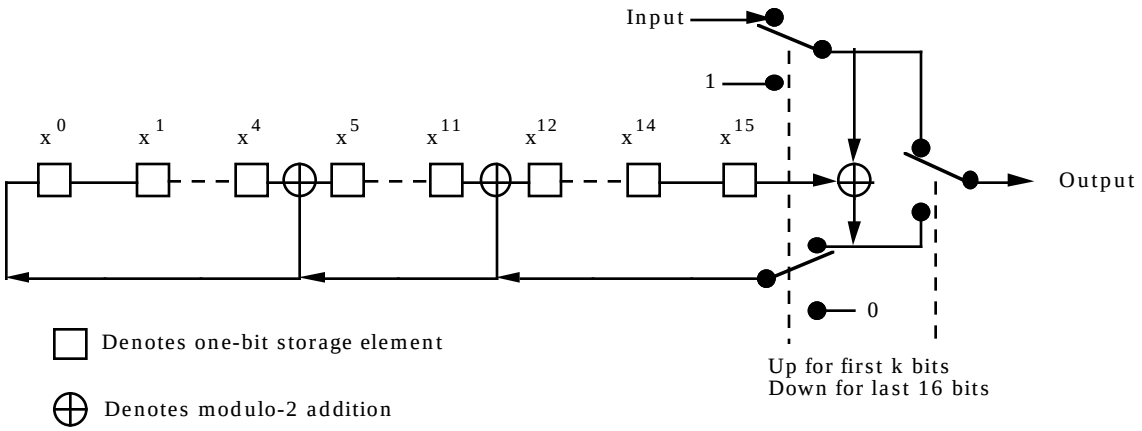

Figure 7.7.3.2.2-1. Forward Traffic Channel Signaling CRC Calculation

7.7.3.3 Forward Traffic Channel Message Body Formats

The signaling messages sent over the Forward Traffic Channel are summarized in Table 7.7.3.3-1.

Table 7.7.3.3-1. Forward Traffic Channel Messages

Message Name	Message type (binary)
Order Message	00000001
Authentication Challenge Message	00000010
Alert With Information Message	00000011
Data Burst Message	00000100
Handoff Direction Message	00000101
Analog Handoff Direction Message	00000110
In-Traffic System Parameters Message	00000111
Neighbor List Update Message	00001000
Send Burst DTMF Message	00001001
Power Control Parameters Message	00001010
Retrieve Parameters Message	00001011
Set Parameters Message	00001100
SSD Update Message	00001101
Flash with Information Message	00001110
Mobile Station Registered Message	00001111

7.7.3.3.1 Common Fields

7.7.3.3.1.1 Common Acknowledgement Fields

All Forward Traffic Channel messages share the same acknowledgement fields:

ACK_SEQ - Acknowledgement sequence number.

The base station shall set this field to the value of the MSG_SEQ field from the most recently received Reverse Traffic Channel message requiring acknowledgement (see 7.6.4.1.3).

MSG_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.3.1.1).

ACK_REQ - Acknowledgement required indicator.

This field indicates whether this message requires an acknowledgement.

To indicate that this message requires acknowledgement, the base station shall set this field to '1'. To indicate that this message does not require acknowledgement, the base station shall set this field to '0'.

7.7.3.3.1.2 Common Encryption Field

Many Forward Traffic Channel messages contain the following field:

ENCRYPTED - Message encryption indicator.

If this message is encrypted, the base station shall set this field to '1'. If this message is not encrypted, the base station shall set this field to '0' (see 6.3.12.2).

7.7.3.3.2 Message Body Contents

The following sections specify the contents of the message body for each message that may be sent on the Forward Traffic Channel.

7.7.3.3.2.1 Order Message

When the base station sends an *Order Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000001’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1
USE_TIME	1
ACTION_TIME	6
ORDER	6
ADD_RECORD_LEN	3
order specific fields (if used)	8 × ADD_RECORD_LEN
RESERVED	0

MSG_TYPE - Message type.

The base station shall set this field to ‘00000001’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator.

See 7.7.3.3.1.2. The base station shall set this field to ‘0’ unless orders of this type are required to be encrypted.

USE_TIME - Use action time indicator.

This field indicates whether an ACTION_TIME is specified in this order.

If an ACTION_TIME can be specified for this order code, as shown in table 7.7.4-1, the base station may set this field to '1'. Otherwise, the base station shall set this field to '0'.

ACTION_TIME - Action time.

If the USE_TIME field is set to '1', the base station shall set this field to the System Time, in units of 80 ms (modulo 64), at which the order is to take effect. If the USE_TIME field is set to '0' the base station shall set this field to '000000'.

ORDER - Order code.

The base station shall set this field to the ORDER code for this type of order message (see 7.7.4).

ADD_RECORD_LEN - Additional record length.

The base station shall set this field to the number of octets in the order specific fields included in this message.

order specific fields - Order specific fields.

The base station shall include order specific fields as specified in 7.7.4.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.3.3.2.2 Authentication Challenge Message

When the base station sends an *Authentication Challenge Message* on the Forward Traffic Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00000010’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
RANDU	24
RESERVED	0

MSG_TYPE - Message type.
The base station shall set this field to ‘00000010’.

ACK_SEQ - Acknowledgement sequence number.
See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.
See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.
See 7.7.3.3.1.1.

RESERVED - Reserved bit.
This field takes the place of the ENCRYPTED field.
The base station shall set this field to '0'.

RANDU - Random challenge data.
The base station shall set this field as specified in 6.3.12.1.5.

RESERVED - Reserved bits.
The base station shall omit this field.

7.7.3.3.2.3 Alert With Information Message

When the base station sends an *Alert With Information Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000011’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1

One or more occurrences of the following record:

RECORD_TYPE	8
RECORD_LEN	6
Type-specific fields	8 × RECORD_LEN

RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00000011’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator.

See 7.7.3.3.1.2.

The base station shall include occurrences of the following three-field record as specified in 7.7.5.

RECORD_TYPE - Information record type.

The base station shall set this field as specified in 7.7.5.

RECORD_LEN - Information record length.

The base station shall set this field to the number of octets in the type-specific fields included in this message.

type-specific fields - Record specific fields.

The base station shall include type-specific fields as specified in 7.7.5.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.3.3.2.4 Data Burst Message

When the base station sends a *Data Burst Message* on the Forward Traffic Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00000100’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1
MSG_NUMBER	8
MIN1	24
MIN2	10
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8

NUM_FIELDS occurrences of the following field:

CHARi	8

RESERVED	0

MSG_TYPE - Message type.

The base station shall set this field to ‘00000100’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator.

See 7.7.3.3.1.2.

MSG_NUMBER - Message number.

The base station shall set this field to the number of this message within the data burst stream.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being sent the message.

MIN2 - Second part of the mobile identification number (MIN).

The base station shall set this field to the MIN2 value for the MIN being sent the message.

BURST_TYPE - Data burst type.

The base station shall set this field to the value shown in Table 7.7.2.3.2.9-1 for the type of this data burst.

NUM_MSGS - Number of messages in the data burst stream.

The base station shall set this field to the number of messages in this data burst stream.

NUM_FIELDS - Number of characters in this message.

The base station shall set this field to the number of occurrences of the CHARi field included in this message.

CHARi - Character.

The base station shall include NUM_FIELDS occurrences of this field. The base station shall set these fields to the corresponding octet of the data burst stream.

RESERVED - Reserved bits.

The base station shall omit this field.

1 7.7.3.3.2.5 Handoff Direction Message

2 When the base station sends a *Handoff Direction Message*, it shall use the following
3 variable-length message format:

4

Field	Length (bits)
MSG_TYPE('00000101')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
USE_TIME	1
ACTION_TIME	6
HDM_SEQ	2
T_ADD	6
T_DROP	6
T_COMP	4
T_TDROP	4
FRAME_OFFSET	4
PRIVATE_LCM	1
RESET_L2	1
ENCRYPT_MODE	4

One or more occurrences of the following record:

FREQ_INCL	1
PILOT_PN	9
PWR_COMB_IND	1
CODE_CHAN	8
CDMA_FREQ	0 or 11

RESERVED	0 - 7 (as needed)

5

6 MSG_TYPE - Message type.

7 The base station shall set this field to '00000101'.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

RESERVED - Reserved bit.

This field takes the place of the ENCRYPTED field.

The base station shall set this field to '0'.

USE_TIME - Use action time indicator.

This field indicates whether an ACTION_TIME is specified in this message.

If an ACTION_TIME is specified in this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

ACTION_TIME - Action time.

If the USE_TIME field is set to '1', the base station shall set this field to the System Time, in units of 80 ms (modulo 64), at which the handoff is to take effect. If the USE_TIME field is set to '0' the base station shall set this field to '000000'.

HDM_SEQ - *Handoff Direction Message* sequence number.

This field is used by the mobile station in the *Power Measurement Report Message* to identify the order in which the reported pilot strengths are sent.

The base station shall set this field to the *Handoff Direction Message* sequence number, HDM_LIST_SEQ, as specified in 7.6.6.2.2.

T_ADD - Pilot detection threshold.

This value is used by the mobile station to trigger the sending of the *Pilot Strength Measurement Message* initiating the handoff process (see 6.6.6).

The base station shall set this field to the pilot detection threshold, expressed as an unsigned binary number equal to $\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$.

T_DROP - Pilot drop threshold.

This value is used by the mobile station to trigger the sending of the *Pilot Strength Measurement Message* terminating the handoff process and to move pilots from the Candidate Set to the Neighbor Set (see 6.6.6).

The base station shall set this field to the pilot drop threshold, expressed as an unsigned binary number equal to $\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$.

T_COMP - Active Set versus Candidate Set comparison threshold.

The mobile station transmits an autonomous Pilot Strength Measurement Message when the strength of a pilot in the Candidate Set exceeds that of a pilot in the Active Set by this margin (see 6.6.6.2.5.2).

The base station shall set this field to the threshold Candidate Set pilot to Active Set pilot ratio, in units of 0.5 dB.

T_TDROP - Drop timer value.

Timer value after which an action is taken by the mobile station for a pilot that is a member of the Active Set or Candidate Set, and whose strength has not become greater than T_DROP. If the pilot is a member of the Active Set, a *Pilot Strength Measurement Message* is issued. If the pilot is a member of the Candidate Set, it will be moved to the Neighbor Set.

The base station shall set this field to the T_TDROP value shown in Table 6.6.6.2.3-1 corresponding to the drop timer value to be used by the mobile station.

FRAME_OFFSET - Frame offset.

The Forward and Reverse Traffic Channel frames are delayed FRAME_OFFSET $\times$ 1.25 ms relative to system timing (see 7.1.3.5.1).

The base station shall set this field to the Forward and Reverse Traffic Channel frame offset.

PRIVATE_LCM - Private long code mask indicator.

This field is used to change the long code mask from the private long code mask to the public long code mask after a hard handoff.

If the private long code mask is currently in use and is to be used after the handoff, the base station shall set this field to '1'. Otherwise the base station shall set this field to '0'.

RESET_L2 - Reset acknowledgement procedures command.

This field is used to reset acknowledgement processing in the mobile station.

To direct the mobile station to reset its acknowledgement procedures, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

ENCRYPT_MODE - Message encryption mode.

The base station shall set this field to the ENCRYPT_MODE value shown in Table 7.7.2.3.2.8-2 corresponding to the encrypting mode that is to be used for messages sent on the Forward and Reverse Traffic Channels, as specified in 6.3.12.2.

The base station shall include one occurrence of the following five-field record for each member of the mobile station's new Active Set.

FREQ_INCL - Alternate frequency assignment indicator.

If the CDMA_FREQ field is included for this record, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

PILOT_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this pilot in units of 64 PN chips.

PWR_COMB_IND - Power control symbol combining indicator.

If the Forward Traffic Channel associated with this pilot will carry the same closed-loop power control subchannel bits as that of the previous pilot in this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'. The base station shall set this field of the first pilot to '0'.

CODE_CHAN - Code channel index.

The base station shall set this field to the code channel index (see 7.1.3.1.8) corresponding to the Forward Traffic Channel assigned to this mobile station.

CDMA_FREQ - Frequency assignment for the CDMA Channel.

If the FREQ_INCL field is set to '1', the base station shall set this field to the CDMA Channel number corresponding to the CDMA frequency assignment for the CDMA Channel as specified in 7.1.1.1. Otherwise, the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.3.3.2.6 Analog Handoff Direction Message

When the base station sends an *Analog Handoff Direction Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00000110’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
USE_TIME	1
ACTION_TIME	6
SID	15
VMAC	3
ANALOG_CHAN	11
SCC	2
MEM	1
RESERVED	1

MSG_TYPE - Message type.

The base station shall set this field to ‘00000110’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

RESERVED - Reserved bit.

This field takes the place of the ENCRYPTED field.

The base station shall set this field to '0'.

USE_TIME - Use action time indicator.

This field indicates whether an ACTION_TIME is specified in this message.

If an ACTION_TIME is specified in this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

ACTION_TIME - Action time.

If the USE_TIME field is set to '1', the base station shall set this field to the System Time, in units of 80 ms (modulo 64), at which the handoff is to take effect. If the USE_TIME field is set to '0' the base station shall set this field to '000000'.

SID - System identification of the analog system.

The base station shall set this field to the system identification number for the analog cellular system (see 2.3.8).

VMAC - Voice mobile station attenuation code.

This field indicates the mobile station's power level associated with the designated voice channel.

The base shall set this field to the MAC value shown in Table 2.1.2.2-1 corresponding to the nominal power for this mobile station.

ANALOG_CHAN - Analog voice channel number.

The base station shall set this field to the channel number of the analog voice channel, as specified in Table 2.1.1.1-1.

SCC - SAT color code.

This indicates the supervisory audio tone associated with the designated analog voice channel.

The base station shall set this field to the SAT value shown in Table 3.7.1.1-2 (see 2.4.1).

MEM - Message encryption mode indicator.

To indicate that all messages sent on the Analog Control Channel will be encrypted the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

RESERVED - Reserved bits.

The base station shall set this field to '0'.

1 7.7.3.3.2.7 In-Traffic System Parameters Message

2 When the base station sends an *In-Traffic System Parameters Message* , it shall use the
3 following fixed-length message format:

4

Field	Length (bits)
MSG_TYPE (“00000111”)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
SID	15
NID	16
SRCH_WIN_A	4
SRCH_WIN_N	4
SRCH_WIN_R	4
T_ADD	6
T_DROP	6
T_COMP	4
T_TDROP	4
NGHBR_MAX_AGE	4
RESERVED	5

5

6 MSG_TYPE - Message type.
7 The base station shall set this field to ‘00000111’.
8 ACK_SEQ - Acknowledgement sequence number.
9 See 7.7.3.3.1.1.
10 MSG_SEQ - Message sequence number.
11 See 7.7.3.3.1.1.
12 ACK_REQ - Acknowledgement required indicator.
13 See 7.7.3.3.1.1.
14 RESERVED - Reserved bit.
15 This field takes the place of the ENCRYPTED field.
16 The base station shall set this field to '0'.

SID - System identification.

The base station shall set this field to the system identification number for this cellular system.

NID - Network identification.

This field serves as a sub-identifier of a system as defined by the owner of the SID.

The base station shall set this field to the network identification number for this network. The NID value of 65,535 is reserved.

SRCH_WIN_A - Search window size for the Active Set and Candidate Set.

The base station shall set this field to the window size parameter shown in Table 6.6.6.2.1-1 corresponding to the number of PN chips that the mobile station is to search for pilots in the Active Set and Candidate Set.

SRCH_WIN_N - Search window size for the Neighbor Set.

The base station shall set this field to the window size parameter shown in Table 6.6.6.2.1-1 corresponding to the number of PN chips that the mobile station is to search for pilots in the Neighbor Set.

SRCH_WIN_R - Search window size for the Remaining Set.

The base station shall set this field to the window size parameter shown in Table 6.6.6.2.1-1 corresponding to the number of PN chips that the mobile station is to search for pilots in the Remaining Set.

T_ADD - Pilot detection threshold.

This value is used by the mobile station to trigger the sending of the *Pilot Strength Measurement Message* initiating the handoff process (see 6.6.6).

The base station shall set this field to the pilot detection threshold, expressed as an unsigned binary number equal to $\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$.

T_DROP - Pilot drop threshold.

This value is used by the mobile station to trigger the sending of the *Pilot Strength Measurement Message* terminating the handoff process and to move pilots from the Candidate Set to the Neighbor Set (see 6.6.6).

The base station shall set this field to the pilot drop threshold, expressed as an unsigned binary number equal to $\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$.

T_COMP - Active Set versus Candidate Set comparison threshold.

The mobile station transmits an autonomous Pilot Strength Measurement Message when the strength of a pilot in the Candidate Set exceeds that of a pilot in the Active Set by this margin (see 6.6.6.2.5.2).

The base station shall set this field to the threshold Candidate Set pilot to Active Set pilot ratio, in units of 0.5 dB.

T_TDROP - Drop timer value.

Timer value after which an action is taken by the mobile station for a pilot that is a member of the Active Set or Candidate Set, and whose strength has not become greater than T_DROP. If the pilot is a member of the Active Set, a *Pilot Strength Measurement Message* is issued. If the pilot is a member of the Candidate Set, it will be moved to the Neighbor Set.

The base station shall set this field to the T_TDROP value shown in Table 6.6.6.2.3-1 corresponding to the drop timer value to be used by the mobile station.

NGHBR_MAX_AGE - Maximum age for retention of Neighbor Set members.

The mobile station drops neighbor set members whose AGE count exceeds this field.

The base station shall set this field to the Neighbor Set maximum age retention value (see 6.6.6.2.6.3).

RESERVED - Reserved bits.

The base station shall set this field to '00000'.

7.7.3.3.2.8 Neighbor List Update Message

When the base station sends a *Neighbor List Update Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001000’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
PILOT_INC	4
One or more occurrences of the following field:	
NGHBR_PN	9
RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00001000’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

RESERVED - Reserved bit.

This field takes the place of the ENCRYPTED field.

The base station shall set this field to '0'.

PILOT_INC - Pilot PN sequence offset index increment.

The mobile station searches for Remaining Set pilots at pilot PN sequence offset index values that are multiples of this value.

The base station shall set this field to the pilot PN sequence increment, in units of 64 PN chips, that the mobile station is to use for searching the Remaining Set. The base station should set this field to the largest increment such that the pilot PN sequence offsets of all its neighbor base stations are integer multiples of that increment.

NGHBR_PN - Neighbor pilot PN sequence offset index.

The base station shall include one occurrence of this field for each pilot in its neighbor list. The base station shall set this field to the pilot's PN sequence offset, in units of 64 PN chips.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.3.3.2.9 Send Burst DTMF Message

When the base station sends a *Send Burst DTMF Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001001’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1
NUM_DIGITS	8
DTMF_ON_LENGTH	3
DTMF_OFF_LENGTH	3
NUM_DIGITS occurrences of the following field:	
DIGITi	4
RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00001001’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator

See 7.7.3.3.1.2.

NUM_DIGITS - Number of DTMF digits.

The base station shall set this field to the number of DTMF digits included in this message.

DTMF_ON_LENGTH - DTMF pulse width code.

The base station shall set this field to the DTMF_ON_LENGTH value shown in Table 6.7.2.3.2.7-1 corresponding to the requested pulse width of the DTMF pulse to be generated by the mobile station.

DTMF_OFF_LENGTH - DTMF interdigit interval code.

The base station shall set this field to the DTMF_OFF_LENGTH value shown in Table 6.7.2.3.2.7-2 corresponding to the requested minimum interdigit interval between DTMF pulses to be generated by the mobile station.

DIGITi - DTMF digit.

The base station shall include one occurrence of this field for each DTMF digit to be generated by the mobile station. The base station shall set each occurrence of this field to the code value shown in Table 6.7.1.3.2.4-5 corresponding to the dialed digit.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.3.3.2.10 Power Control Parameters Message

When the base station sends a *Power Control Parameters Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00001010’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
PWR_REP_THRESH	5
PWR_REP_FRAMES	4
PWR_REP_MODE	1
PWR_REP_DELAY	5
RESERVED	1

MSG_TYPE - Message type.

The base station shall set this field to ‘00001010’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

RESERVED - Reserved bit.

This field takes the place of the ENCRYPTED field.

The base station shall set this field to '0'.

PWR_REP_THRESH - Power control reporting threshold.

The base station shall set this field to the number of bad frames (see 6.2.2.2) to be received in a measurement period before the mobile station is to generate a *Power Measurement Report Message* (see 6.6.4.1.1). If mobile stations are not to generate any *Power Measurement Report Message*s, the base station shall set this field to ‘00000’.

PWR_REP_FRAMES - Power control reporting frame count.

The base station shall set this field to the value such that the number given by

$$\lfloor 2^{(\text{PWR\_REP\_FRAMES}/2)} \times 5 \rfloor \text{ frames}$$

is the number of frames over which the mobile station is to count frame errors.

PWR_REP_MODE - Power report mode indicator.

If the mobile station is to generate periodic *Power Measurement Report Messages*, the base station shall set this field to '1'. If the mobile station is to generate *Power Measurement Report Messages* only when PWR_REP_THRESH frame errors are detected within one measurement period, the base station shall set this field to '0'.

PWR_REP_DELAY - Power report delay.

The period that the mobile station waits following an autonomous *Power Measurement Report* before restarting frame counting for power control purposes.

The base station shall set this field to the power report delay value, in units of PWR_REP_DELAY × 4 frames (see 6.6.4.1.1).

RESERVED - Reserved bits.

The base station shall set this field to '0'.

7.7.3.3.2.11 Retrieve Parameters Message

When the base station sends a *Retrieve Parameters Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001011’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1
One or more occurrences of the following field:	
PARAMETER_ID	16
RESERVED	0

MSG_TYPE - Message type.

The base station shall set this field to ‘00001011’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator.

See 7.7.3.3.1.2.

PARAMETER_ID - Parameter identification.

The base station can request the mobile station to report any parameter specified in Table E-1.

The base station shall include one occurrence of this field for each parameter requested. The base station shall set this field to the parameter identification number specified in Table E-1 corresponding to the parameter requested.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.3.3.2.12 Set Parameters Message

When the base station sends a *Set Parameters Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001100’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1
One or more occurrences of the following record:	
PARAMETER_ID	16
PARAMETER_LEN	10
PARAMETER	PARAMETER_LEN + 1
RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00001100’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator.

See 7.7.3.3.1.2.

The base station shall include one occurrence of the following three-field record for each parameter to be set.

PARAMETER_ID - Parameter identification.

The base station shall set this field to the identification shown in Table E-1 corresponding to the settable parameter to be set.

PARAMETER_LEN - Parameter length.

The base station shall set this field to the length shown in Table E-1 corresponding to the parameter to be set.

PARAMETER - Parameter value.

The base station shall set this field to the value of the parameter specified by the PARAMETER_ID field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.3.3.2.13 SSD Update Message

When the base station sends an *SSD Update Message* on the Forward Traffic Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00001101’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
RANDSSD	56
RESERVED	0

MSG_TYPE - Message type. The base station shall set this field to ‘00001101’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

RESERVED - Reserved bit.

This field takes the place of the ENCRYPTED field.

The base station shall set this field to '0'.

RANDSSD - Random data.

The base station shall set this field as specified in 6.3.12.1.9.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.3.3.2.14 Flash With Information Message

When the base station sends a *Flash With Information Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (‘00001110’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTED	1

One or more occurrences of the following record:

RECORD_TYPE	8
RECORD_LEN	6
Type-specific fields	8 × RECORD_LEN

RESERVED	0 - 7 (as needed)

MSG_TYPE - Message type.

The base station shall set this field to ‘00001110’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTED - Message encryption indicator.

See 7.7.3.3.1.2.

The base station shall include occurrences of the following three-field record as specified in 7.7.5.

RECORD_TYPE - Information record type.

The base station shall set this field as specified in 7.7.5.

RECORD_LEN - Information record length.

The base station shall set this field to the number of octets in the type-specific fields included in this message.

type-specific fields - Type-specific fields.

The base station shall include type-specific fields as specified in 7.7.5.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.3.3.2.15 Mobile Station Registered Message

When the base station sends a *Mobile Station Registered Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE (‘00001111’)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
RESERVED	1
SID	15
NID	16
REG_ZONE	12
TOTAL_ZONES	3
ZONE_TIMER	3
BASE_LAT	22
BASE_LONG	23
REG_DIST	11
RESERVED	7

MSG_TYPE - Message type.

The base station shall set this field to ‘00001111’.

ACK_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

RESERVED - Reserved bit.

This field takes the place of the ENCRYPTED field.

The base station shall set this field to '0'.

SID - System identification.

The base station shall set this field to the system identification number for this cellular system.

NID - Network identification.

This field serves as a sub-identifier of a system as defined by the owner of the SID.

The base station shall set this field to the network identification number for this network. The NID value of 65,535 is reserved.

REG_ZONE - Registration zone.

The base station shall set this field to its registration zone number (see 6.6.5.1.5).

TOTAL_ZONES - Number of registration zones to be retained.

The base station shall set this field to the number of registration zones the mobile station is to retain for purposes of zone-based registration (see 6.6.5.1.5).

If zone-based registration is to be disabled, the base station shall set this field to '000'.

ZONE_TIMER - Zone timer length.

The base station shall set this field to the ZONE_TIMER value shown in Table 7.7.2.3.2.1-1 corresponding to the length of the zone registration timer to be used by mobile stations.

BASE_LAT - Base station latitude.

The base station shall set this field to its latitude in units of 0.25 second, expressed as a two's complement signed number with positive numbers signifying North latitudes.

BASE_LONG - Base station longitude.

The base station shall set this field to its longitude in units of 0.25 second, expressed as a two's complement signed number with positive numbers signifying East latitudes.

REG_DIST - Registration distance.

If mobile stations are to perform distance-based registration, the base station shall set this field to the non-zero "distance" beyond which the mobile is to re-register (see 6.6.5.1.4). If mobile stations are not to perform distance-based registration, the base station shall set this field to 0.

RESERVED - Reserved bits.

The base station shall set this field to '00'.

7.7.4 Orders

Order Messages are sent by the base station on the Paging Channel and on the Forward Traffic Channel. The general format used on the Paging Channel is defined in 7.7.2.3.2.7, and the general format used on the Forward Traffic Channel is defined in 7.7.3.3.2.1. There are many specific types of *Order Messages*, as shown in Table 7.7.4-1.

The base station may send on the Paging Channel any type of order shown in Table 7.7.4-1 with a 'Y' in the first column, but shall not send on the Paging Channel any type of order with an 'N' in the first column. The base station may send on the Forward Traffic Channel any type of order shown in Table 7.7.4-1 with a 'Y' in the second column, but shall not send on the Forward Traffic Channel any type of order with an 'N' in the second column.

An order consists of a 6-bit order code, an 8-bit order qualification code, and zero or more additional order-specific fields. The base station shall set the ORDER field in the *Order Message* to the order code shown in Table 7.7.4-1 corresponding to the type of order being sent.

If the order qualification code is '00000000' and there are no other additional fields as shown in Table 7.7.4-1 by an 'N' in the sixth column, the base station shall include no order specific fields in the *Order Message*.

If the order qualification code is not '00000000' and there are no other additional fields as shown in Table 7.7.4-1 by an 'N' in the sixth column, the base station shall include the order qualification code as the only order specific field in the *Order Message*.

If there are other additional fields as shown in Table 7.7.4-1 by a 'Y' in the sixth column, the base station shall include order specific fields as specified in the corresponding subsection of this section.

Table 7.7.4-1. Order and Order Qualification Codes Used on the Paging Channel and the Forward Traffic Channel (Part 1 of 3)

Paging Channel Order	Forward Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	ACTION_TIME can be specified	Additional Fields other than ORDQ	Name/Function
Y	N	000001	00000000	N	Y	*Abbreviated Alert Order* (see 7.7.4.1)
Y	Y	000010	00000000	N	Y	*Base Station Challenge Confirmation Order* (see 7.7.4.2)
N	Y	000011	0000nnnn	Y	N	*Message Encryption Mode Order* (where nnnn is the mode per Table 7.7.2.3.2.8-2
Y	N	000100	00000000	N	N	*Reorder Order*
Y	N	001001	00000000	N	N	*Intercept Order*
N	Y	001010	00000000	N	N	*Maintenance Order*
Y	Y	010000	00000000	N	N	*Base Station Acknowledgement Order*
N	Y	010001	00000000	N	N	*Pilot Measurement Request Order*
Y	Y	010010	0000nnnn	N	N	*Lock Order* (where nnnn is the lock reason)
Y	Y	010010	0001nnnn	N	N	*Lock Until Power-Cycled Order* (where nnnn is the lock reason)
Y	N	010010	00100000	N	N	*Unlock Order*
N	Y	010011	00000000	Y	Y	*Service Option Request Order* (see 7.7.4.3)

Table 7.7.4-1. Order and Order Qualification Codes Used on the Paging Channel and the Forward Traffic Channel (Part 2 of 3)

Paging Channel Order	Forward Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	ACTION_TIME can be specified	Additional Fields other than ORDQ	Name/Function
N	Y	010100	00000000	Y	Y	*Service Option Response Order* (see 7.7.4.4)
Y	Y	010101	00000000	N	N	*Release Order* (no reason given)
Y	N	010101	00000010	N	Y	*Release Order* (indicates that requested service option is not available; see 7.7.4.5)
N	Y	010111	00000000	Y	N	*Long Code Transition Request Order* (request public)
N	Y	010111	00000001	Y	N	*Long Code Request Transition Order* (request private)
N	Y	011001	0000nnnn	N	N	*Continuous DTMF Tone Order* (where the tone is designated by 'nnnn' as defined in Table 6.7.1.3.2.4-5)
N	Y	011001	11111111	N	N	*Continuous DTMF Tone Order* (Stop continuous DTMF tone)
N	Y	011010	nnnnnnnn	N	Y	*Status Request Order* (see 7.7.4.6)
Y	N	011011	00000000	N	N	*Registration Accepted Order*
Y	N	011011	00000001	N	N	*Registration Request Order* (use *Initial Registration Message* and send entire set of MINs)

Table 7.7.4-1. Order and Order Qualification Codes Used on the Paging Channel and the Forward Traffic Channel (Part 3 of 3)

Paging Channel Order	Forward Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	ACTION_TIME can be specified	Additional Fields other than ORDQ	Name/Function
Y	N	011011	00000010	N	N	*Registration Request Order* (use *Registration Update Message*)
Y	N	011011	00000011	N	N	*Registration Rejected Order*
Y	N	011011	00000100	N	Y	*Added MIN Rejected Order* (see 7.7.4.7)
N	Y	011101	nnnnnnnn	Y	N	*Service Option Control Order* (the specific control is designated by 'nnnnnnnn' as determined by each service option)
Y	Y	011110	nnnnnnnn	N	N	*Local Control Order* (the specific order is designated by 'nnnnnnnn' as determined by each system)
Y	Y	011111	00000000	N	Y	*Message Waiting Order* (see 7.7.4.8)
All other codes are reserved.						

7.7.4.1 Abbreviated Alert Order

The *Abbreviated Alert Order* can be sent only on the Paging Channel. The base station shall use the following variable-length format for the order-specific fields:

Order Specific Field	**Length (bits)**
ORDQ	8
EXT_ADDR	1
MIN1	24
MIN2	10
RESERVED	0 - 7 (as needed)

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

EXT_ADDR - Extra address indicator.

To indicate that both MIN1 and MIN2 values are included in this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being sent the message.

MIN2 - Second part of the mobile identification number (MIN).

If the EXT_ADDR field is set to '1', the base station shall set this field to the MIN2 value for the MIN being sent the message. Otherwise, the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the order specific fields equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.4.2 Base Station Challenge Confirmation Order

The *Base Station Challenge Confirmation Order* can be sent on either the Paging Channel or on the Forward Traffic Channel. The base station shall set the ENCRYPTED bit in the *Order Message* containing this order to '0'. The base station shall use the following fixed-length format for the order-specific fields:

Order Specific Field	**Length (bits)**
ORDQ	8
AUTHBS	18
RESERVED	6

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

AUTHBS - Challenge response.

The base station shall set this field as specified in 6.3.12.1.9.

RESERVED - Reserved bits.

The base station shall set this field to '000000'.

7.7.4.3 Service Option Request Order

The *Service Option Request Order* can be sent only on the Forward Traffic Channel. The base station shall use the following fixed-length format for the order-specific fields:

Order Specific Field	**Length (bits)**
ORDQ	8
SERVICE_OPTION	16
RESERVED	0

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

SERVICE_OPTION - Service option.

The base station shall set this field to the service option code shown in Table A-1 corresponding to the service option it requests, or to '0000000000000000' to reject the last service option requested by the mobile station.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.4.4 Service Option Response Order

The *Service Option Response Order* can be sent only on the Forward Traffic Channel. The base station shall use the following fixed-length format for the order-specific fields:

Order Specific Field	**Length (bits)**
ORDQ	8
SERVICE_OPTION	16
RESERVED	0

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

SERVICE_OPTION - Service option.

The base station shall set this field to the service option code shown in Table A-1 corresponding to the service option it accepts.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.4.5 Release Order

When the base station sends the Release Order with ORDQ equal to '00000010' on the Paging Channel, it shall use the following fixed-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8
SERVICE_OPTION	16
RESERVED	0

ORDQ — Order qualification code.

The base station shall set this field to the order qualification code shown in Table 7.7.4-1 corresponding to the reason for this release order.

SERVICE_OPTION - Service option.

The base station may set this field to the service option code shown in Table A-1 corresponding to a suggested alternative service option. Otherwise, the base station shall set this field to '0000000000000000'.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.4.6 Status Request Order

The *Status Request Order* can be sent only on the Forward Traffic Channel. The ORDQ field of the *Status Request Order* specifies the information record to be returned by the mobile station in the *Status Message*. The base station shall use the following variable-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8
MIN1	0 or 24
MIN2	0 or 10
SID	0 or 15
NID	0 or 16
RESERVED	0 - 7 as needed

ORDQ Order qualification code.

The base station shall set this field to the order qualification code corresponding to the information record type to be returned by the mobile station in the *Status Message*, as shown in Table 7.7.4.6-1.

Table 7.7.4.6-1. Status Request ORDQ Values

Information Record Requested	ORDQ (binary)
Identification	00000110
Call Mode	00000111
Terminal Information	00001000
MIN Information	00001001
Security Status	00001010
All other ORDQ values are reserved.	

MIN1 - First part of the mobile identification number (MIN).

If the ORDQ field is set to '00001001', the base station shall set this field to the MIN1 value for the MIN being sent the message. Otherwise, the base station shall omit this field.

MIN2 - Second part of the mobile identification number (MIN).

If the ORDQ field is set to '00001001', the base station shall set this field to the MIN2 value for the MIN being sent the message. Otherwise, the base station shall omit this field.

SID - System identification.

If the ORDQ field is set to '00000110', the base station shall set this field to the system identification number for this cellular system. Otherwise, the base station shall omit this field.

NID - Network identification.

This field serves as a sub-identifier of a system as defined by the owner of the SID.

If the ORDQ field is set to '00000110', the base station shall set this field to the network identification number for this network. The NID value of 65,535 is reserved. Otherwise, the base station shall omit this field.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the order specific fields equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.4.7 Added MIN Rejected Order

When the base station sends an *Added MIN Rejected Order* it shall use the following fixed-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8
MIN1	24
MIN2	10
RESERVED	6

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being rejected.

MIN2 - Second part of the mobile identification number (MIN).

If the EXT_ADDR field is set to '1', the base station shall set this field to the MIN2 value for the MIN being rejected.

RESERVED - Reserved bits.

The base station shall set this field to '000000'.

7.7.4.8 Message Waiting Order

The *Message Waiting Order* may be sent on the Paging Channel or on the Forward Traffic Channel. The base station shall use the following variable-length format for the order-specific fields:

Order Specific Field	**Length (bits)**
ORDQ	8
EXT_ADDR	1
MIN1	24
MIN2	0 or 10
MSG_COUNT	8
RESERVED	0 - 7 (as needed)

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

EXT_ADDR - Extra address indicator. To indicate that both MIN1 and MIN2 values are included in this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this field to the MIN1 value for the MIN being sent the message.

MIN2 - Second part of the mobile identification number (MIN).

If the EXT_ADDR field is set to '1', the base station shall set this field to the MIN2 value for the MIN being sent the message. Otherwise, the base station shall omit this field.

MSG_COUNT - Number of waiting messages.

The base station shall set this field to the number of messages waiting for this MIN.

RESERVED - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the order specific fields equal to an integer number of octets. The base station shall set these bits to '0'.

7.7.5 Forward Traffic Channel Information Records

On the Forward Traffic Channel, information records may be included in the *Alert with Information Message* and the *Flash with Information Message*. Table 7.7.5-1 lists the information record type values that may be used with each message type. The following sections describe the contents of each of the record types in detail.

Table 7.7.5-1. Information Record Types

Alert	Flash	Information Record	Record Type (binary)
Y	N	Display	00000001
Y	N	Called Party Number	00000010
Y	N	Calling Party Number	00000011
N	Y	Connected Number	00000100
Y	N	Signal	00000101
All other record type values are reserved.			

7.7.5.1 Display

This information record allows the network to supply display information that may be displayed by the mobile station. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
One or more occurrences of the following field:	
CHARi	8
RESERVED	0

CHARi - Character.

The base station shall include one occurrence of this field for each character to be displayed. The base station shall set each occurrence of this field to the ASCII representation corresponding to the character entered, as specified in ANSI X3.4, with the most significant bit set to '0'.

RESERVED - Reserved bits.

The base station shall omit this field.

7.7.5.2 Called Party Number

This information record identifies the called party's number. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
Zero or more occurrences of the following field:	
CHARi	8
RESERVED	1

NUMBER_TYPE - Type of number.

The base station shall set this field to the NUMBER_TYPE value shown in Table 6.7.1.3.2.4-3 corresponding to the type of the called number, as defined in ANSI T1.607 §4.5.9.

NUMBER_PLAN - Numbering plan.

The base station shall set this field to the NUMBER_PLAN value shown in Table 6.7.1.3.2.4-4 corresponding to the numbering plan used for the called number, as defined in ANSI T1.607 §4.5.9.

CHARi - Character.

The base station shall include one occurrence of this field for each character in the called number. The base station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

RESERVED - Reserved bits.

The base station shall set this field to '0'.

7.7.5.3 Calling Party Number

This information record identifies the calling party's number. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
PI	2
SI	2
Zero or more occurrences of the following field:	
CHARi	8
RESERVED	1

NUMBER_TYPE - Type of number.

The base station shall set this field to the NUMBER_TYPE value shown in Table 6.7.1.3.2.4-3 corresponding to the type of the calling number, as defined in ANSI T1.607 §4.5.9.

NUMBER_PLAN - Numbering plan.

The base station shall set this field to the NUMBER_PLAN value shown in Table 6.7.1.3.2.4-4 corresponding to the numbering plan used for the calling number, as defined in ANSI T1.607 §4.5.9.

PI - Presentation indicator.

This field indicates whether or not the calling number should be displayed.

The base station shall set this field to the PI value shown in Table 6.7.4.4-1 corresponding to the presentation indicator, as defined in ANSI T1.607 §4.5.9.

SI - Screening indicator.

This field indicates how the calling number was screened.

The base station shall set this field to the SI value shown in Table 6.7.4.4-2 corresponding to the screening indicator value, as defined in ANSI T1.607 §4.5.9.

CHARi - Character.

The base stations shall include one occurrence of this field for each character in the calling number. The base station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

RESERVED - Reserved bits.

The base station shall set this field to '0'.

7.7.5.4 Connected Number

This information record identifies the responding party to a call. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
PI	2
SI	2
Zero or more occurrences of the following field:	
CHARi	8
RESERVED	1

NUMBER_TYPE - Type of number.

The base station shall set this field to the NUMBER_TYPE value shown in Table 6.7.1.3.2.4-3 corresponding to the type of the connected number, as defined in ANSI T1.607 §4.5.9.

NUMBER_PLAN - Numbering plan.

The base station shall set this field to the NUMBER_PLAN value shown in Table 6.7.1.3.2.4-4 corresponding to the numbering plan used for the connected number, as defined in ANSI T1.607 §4.5.9.

PI - Presentation indicator.

This field indicates whether or not the connected number should be displayed.

The base station shall set this field to the PI value shown in Table 6.7.4.4-1 corresponding to the presentation indicator, as defined in ANSI T1.607 §4.5.9.

SI - Screening indicator.

This field indicates how the connected number was screened.

The base station shall set this field to the SI value shown in Table 6.7.4.4-2 corresponding to the screening indicator value, as defined in ANSI T1.607 §4.5.9.

CHARi - Character.

The base station shall include one occurrence of this field for each character in the connected number. The base station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

RESERVED - Reserved bits.

The base station shall set this field to '0'.

7.7.5.5 Signal

This information record allows the network to convey information to a user by means of tones and other alerting signals. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
SIGNAL_TYPE	2
ALERT_PITCH	2
SIGNAL	6
RESERVED	6

SIGNAL_TYPE - Signal type.

The base station shall set this field to the signal type value shown in Table 7.7.5.5-1.

Table 7.7.5.5-1. Signal Type

Description	SIGNAL_ TYPE (binary)
Tone signal	00
ISDN Alerting	01
IS-54B Alerting	10
Reserved	11

ALERT_PITCH - Pitch of the alerting signal.

If SIGNAL_TYPE is '10', the base station shall set this field to the alert pitch shown in Table 7.7.5.5-2. Otherwise, the base station shall set this field to '00'.

Table 7.7.5.5-2. Alert Pitch

Description	ALERT_ PITCH (binary)
Medium pitch (standard alert)	00
High pitch	01
Low pitch	10
Reserved	11

SIGNAL - Signal code.

The base station shall set this field to the specific signal desired. If SIGNAL_TYPE is '00', the base station shall set this field as described in Table 7.7.5.5-3. If SIGNAL_TYPE is '01', the base station shall set this field as described in Table 7.7.5.5-4. If SIGNAL_TYPE is '10', the base station shall set this field as described in Table 7.7.5.5-5.

Table 7.7.5.5-3. Tone Signals (SIGNAL_TYPE = '00')

Description	SIGNAL (binary)
Dial tone on	000000
Ring back tone on	000001
Intercept tone on	000010
Network congestion (reorder) tone on	000011
Busy tone on	000100
Confirm tone on	000101
Answer tone on	000110
Call waiting tone on	000111
Off-hook warning tone on	001000
Tones off	111111
All other SIGNAL values are reserved	

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Table 7.7.5.5-4. ISDN Alerting (SIGNAL_TYPE = '01')

Description	SIGNAL (binary)
Normal Alerting: 2.0 s on, 4.0 s off, repeating	000000
Intergroup Alerting: 0.8 s on, 0.4 s off, 0.8 s on, 4.0 s off, repeating	000001
Special/Priority Alerting: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 4.0 s off, repeating	000010
Reserved (ISDN Alerting pattern 3)	000011
"Ping ring": single burst of 500 ms	000100
Reserved (ISDN Alerting pattern 5)	000101
Reserved (ISDN Alerting pattern 6)	000110
Reserved (ISDN Alerting pattern 7)	000111
Alerting off	001111
All other SIGNAL values are reserved	

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Table 7.7.5.5-5. IS-54B Alerting (SIGNAL_TYPE = '10')

Description	SIGNAL (binary)
No Tone: Off	000000
Long: 2.0 s on, 4.0 s off, repeating (standard alert)	000001
Short-Short: 0.8 s on, 0.4 s off, 0.8 s on, 4.0 s off, repeating	000010
Short-Short-Long: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 4.0 s off, repeating	000011
Short-Short-2: 1.0 s on, 1.0 s off, 1.0 s on, 3.0 s off, repeating.	000100
Short-Long-Short: 0.5 s on, 0.5 s off, 1.0 s on, 0.5 s off, 0.5 s on, 3.0 s off, repeating.	000101
Short-Short-Short-Short: 0.5 s on, 0.5 s off, 0.5 s on, 0.5 s off, 0.5 s on, 0.5 s off, 0.5 s, 2.5 s off, repeating.	000110
PBX Long: 1.0 s on, 2.0 s off, repeating.	000111
PBX Short-Short: 0.4 s on, 0.2 s off, 0.4 s on, 2.0 off, repeating.	001000
PBX Short-Short-Long: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 1.0 s off, repeating.	001001
PBX Short-Long-Short: 0.4 s on, 0.2 s off, 0.8 s on, 0.2 s off, 0.4 s on, 1.0 s off, repeating.	001010
PBX Short-Short-Short-Short: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.4 s, 0.8 s off, repeating.	001011
All other SIGNAL values are reserved	

RESERVED - Reserved bits.

The base station shall set this field to '000000'.

No text.