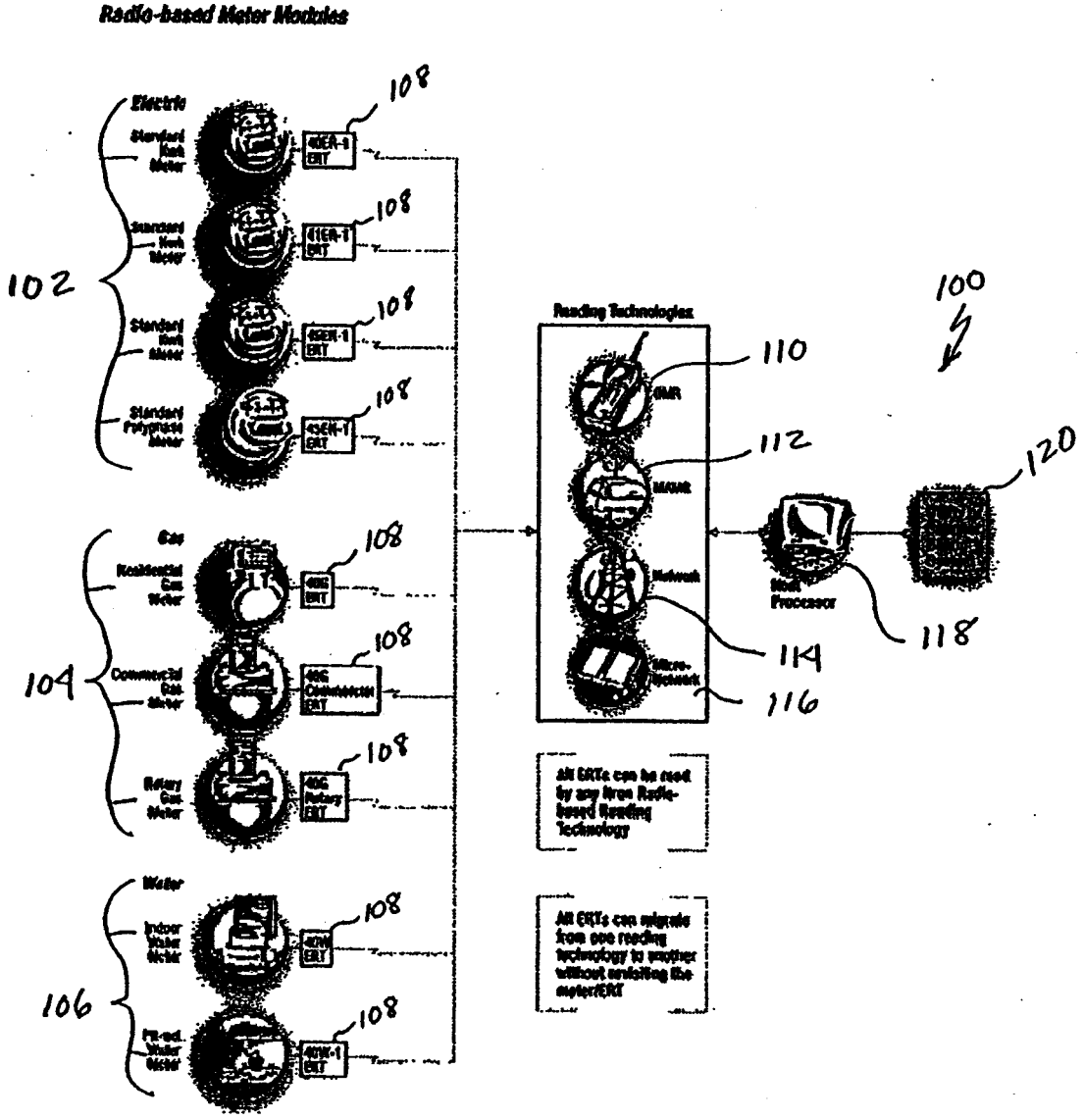

Radio-based Meter Modules
Electric
Standard Kwh Meter
Standard Kwh Meter
Standard Kwh Meter
Standard Polyphase Meter
102
108
108
108
108
Gas
Residential Gas Meter
Commercial Gas Meter
Rotary Gas Meter
104
108
108
108
Water
Indoor Water Meter
Pit-set Water Meter
106
108
108
Reading Technologies
110
112
114
116
118
120
100
All ERTs can be read by any three Radio-based Reading Technology
All ERTs can migrate from one reading technology to another without enabling the meter/ERT

FIG. 1

Two Way 1430 MHz -Reader

Quantity	Value
Operational Mode(s)	Fixed and Mobile
Frequency Band	1427.0 to 1432.0 MHz
Channel Bandwidth	50 KHz (6.25 kHz center freq)
Modulation Scheme	FSK (spectral shaping allowed)
Deviation	+/- 15 KHz (+/- 500 Hz)
Encoding	Manchester
Bit Rate	1,512 ticks of an ideal 8.000 MHz clock (Tolerance 0.1 %)
Frequency Stability	+/- 1 ppm – CCU +/- 1 ppm – DCU +/- 1.5 ppm – HHC
Minimum RX Sensitivity	-113 dBm for 0.01% BER - CCU -110 dBm for 0.01% BER - DCU -105 dBm for 0.01% BER - HHC
TX Power	+36 dBm (-1 /+1 dB) EIRP - CCU + 30 dBm (-1 /+1 dB) EIRP - CCU +30 dBm (-1 /+1 dB) EIRP - DCU +14 dBm (-1 /+1 dB) EIRP - HHC
Preamble Length	24 bits
TX Modes – Transmitted Value	01 – CCU 00 - DCU 00 - HHC

FIG. 2

Two Way 1430 MHz – EndPoint

Date Rate 1

Quantity	Value
Operational Mode(s)	Fixed and Mobile
Frequency Band	1427.0 to 1432.0 MHz
Channel Bandwidth	50 KHz (6.25 kHz center freq)
Modulation Scheme	FSK (spectral shaping allowed)
Deviation	+/- 12.5 KHz (+/- 1 KHz tolerance)
Encoding	Manchester
Bit Rate	704 ticks of an ideal 8.000 MHz clock. (Tolerance 0.5 %)
Frequency Stability	+/- 2 ppm
Minimum RX Sensitivity	-105 dBm for 0.01 % BER
TX Power	+14 dBm (-1 /+1 dB) for TX Mode 00 +30 dBm (-2 /+0 dB) for TX Mode 01
Minimum Preamble Length	24 bits
Factory Default Frequency	The endpoint will always have the factory default frequency of 1431.925 MHz (FCC Channel 349) programmed into channel 15 (Default receive channel)

FIG. 3A

Two Way 1430 MHz – EndPoint

Data Rate 2

Quantity	Value
Operational Mode(s)	Fixed and Mobile
Frequency Band	1427.0 to 1432.0 MHz
Channel Bandwidth	50 KHz (6.25 kHz center freq)
Modulation Scheme	FSK (spectral shaping allowed)
Deviation	+/- 12.5 KHz (+/- 1 KHz tolerance)
Encoding	NRZ with bit stuffing (1 in 7 ?)
Bit Rate	352 ticks of an ideal 8.000 MHz clock (Tolerance 0.5 %)
Frequency Stability	+/- 2 ppm
Minimum RX Sensitivity	-105 dBm for 0.01 % BER
TX Power	+14 dBm (-1 /+1 dB) for TX Mode 00 +30 dBm (-2 /+0 dB) for TX Mode 01
Preamble Length	24 bits
Factory Default Frequency	The endpoint will always have the factory default frequency of 1431.925 MHz (FCC Channel 349) programmed into channel 15 (Default receive channel)

FIG. 3B

One Way 1430 MHz – Endpoint

Quantity	Value
Operational Mode(s)	Fixed and Mobile
Frequency Band	1427.0 to 1432.0 MHz
Channel Bandwidth	50 KHz (6.25 kHz center freq)
Modulation Scheme	FSK (Specifically TFM)
Deviation	+/- 12.5 KHz (+/- 1 KHz tolerance)
Encoding	NRZ
Bit Rate	352 ticks of an ideal 8.000 MHz clock (Tolerance 0.5 %)
Frequency Stability	+/- 2 ppm
Minimum RX Sensitivity	N.A. (Programming RX –80 dBm)
TX Power	+14 dBm (-2 /+1 dB)
Preamble Length	24 bits
Programming receiver default frequency	The endpoint will leave the factory with a default frequency of 1431.925 MHZ (FCC Channel 349) in the programming receiver.

FIG. 4

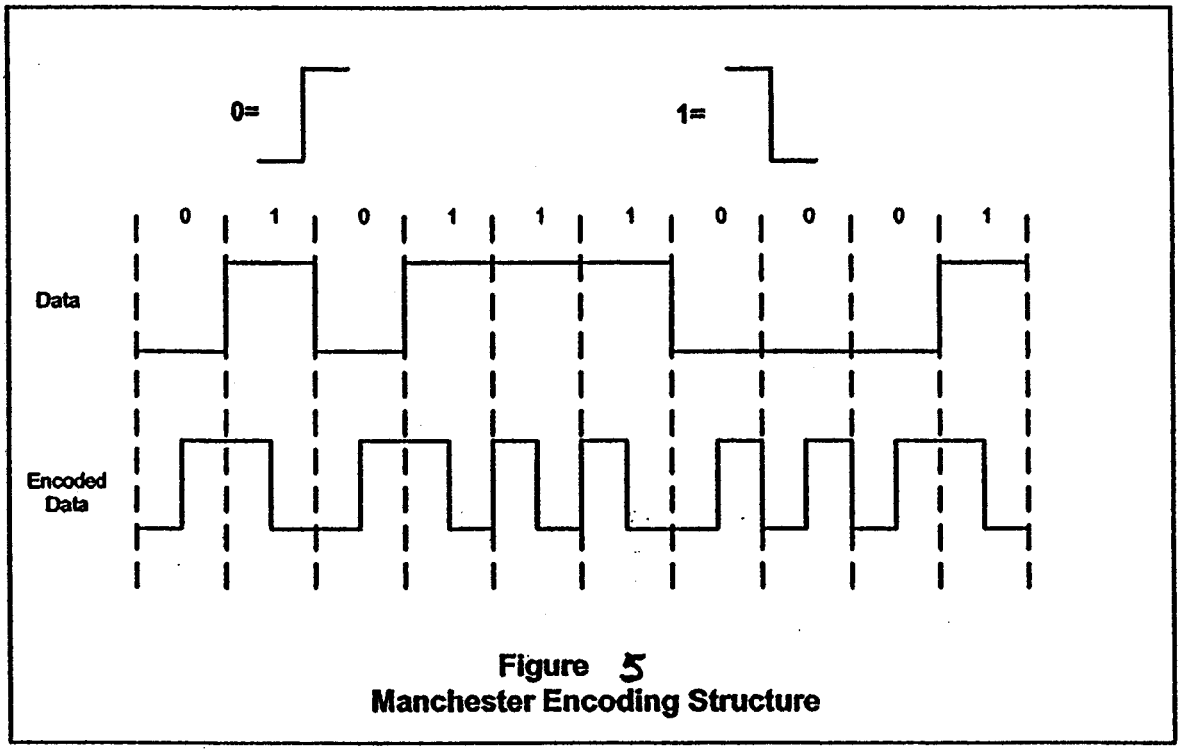


Figure 5
Manchester Encoding Structure

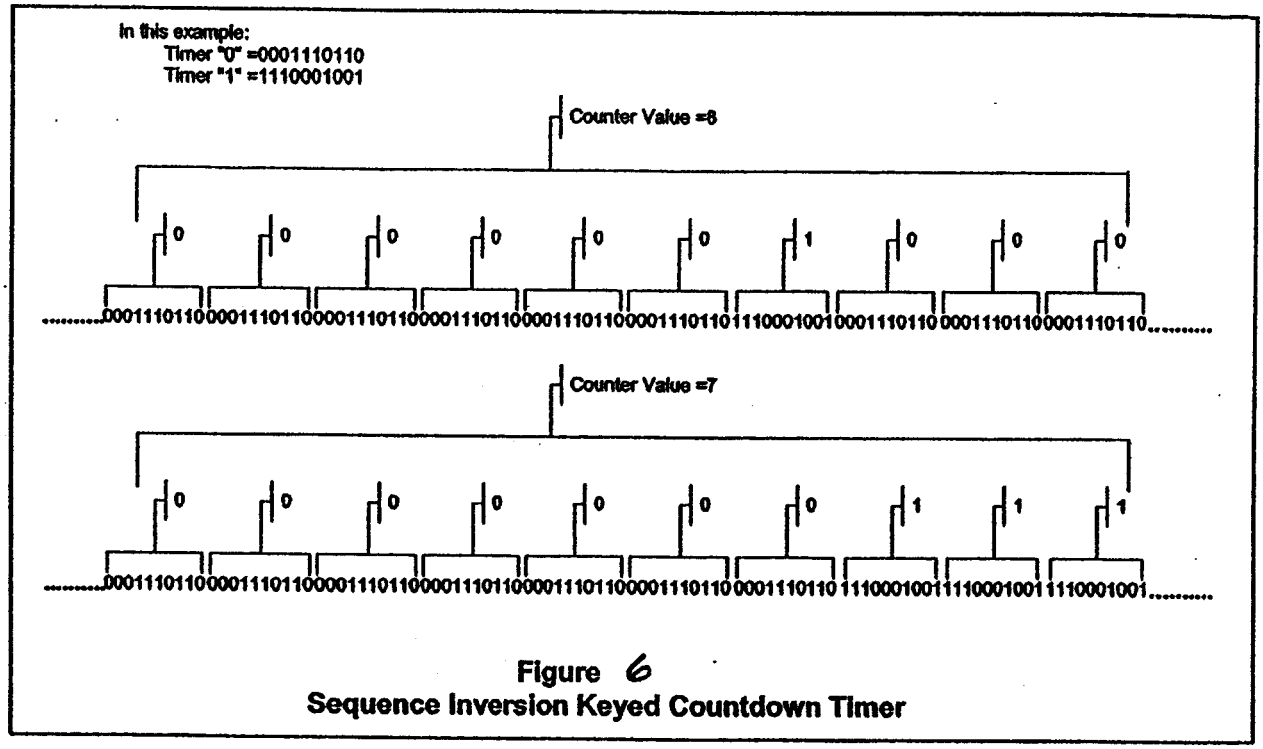


Figure 6
Sequence Inversion Keyed Countdown Timer

0	Preamble
1	Preamble
2	Preamble
3	Length
4	Length_BAR
5	EPID HI
6	EPID
7	EPID
8	EPID LO
9	Endpoint_Type
10	Message Type
11	Flags
12	Message

• •
• •
• •

n-2	Message
n-1	CRC HI
n	CRC LO

FIG. 7

0	Preamble
1	Preamble
2	Preamble
3	EPID_HI
4	EPID
5	EPID
6	EPID_LO
7	Endpoint_Type
8	Decode Type
9	Flags
10	Consumption_HI
11	Consumption
12	Consumption
13	Consumption_LO
14	Tamper_HI
15	Tamper_LO
16	Reserved-Type Specific
17	Reserved-Type Specific
18	CRC_HI
19	CRC_LO

FIG. 8

P.	Preamble
P.	Preamble
P.	Preamble
0	System ID
1.	Frame ID
2.	Cell ID.
3.	RTC_HI
4.	RTC.
5.	RTC.
6.	RTC_LO.
7.	Command_Flags_1.
8.	Command_Flags_2.
9.	Slot Offset
10.	First_UM_HI
11.	First_UM_LO.
12.	EPID_HI
13.	EPID.
14.	EPID.
15.	EPID_LO.
16.	Security_HI
17.	Security_LO.
18.	Command Set
19.	Command
20.	Command_Body_HI
21.	Command_Body_LO.
22.	Response_Freq_HI
23.	Response_Freq_LO.
24.	Reserved
25.	Length of Extended C&C.
26.	CRC_HI
27.	CRC_LO.

Note: All bytes are sent MSB first.

FIG. 9A

P	Preamble
P	Preamble
P	Preamble
0	System ID
1	Command_Flags
2	EPID_HI
3	EPID
4	EPID
5	EPID_LO
6	Security_HI
7	Security_LO
8	Number of Commands
9	Command 1
10	Command_1_Body HI
11	Command_1_Body LO
12	Command 2
13	Command_2_Body HI
14	Command_2_Body LO

• •
• •
• •

j-6	Command_n
j-5	Command_n_Body HI
j-4	Command_n_Body LO
j-3	Reserved
j-2	Reserved
j-1	CRC_HI
j	CRC_LO

Note: All bytes are sent MSB first.

FIG. 9B

Universal Command Types

Value	Bit Value	Command Type	Command Body	Response Message Type
0	00000000	Report Status	0x0000	0
1	00000001	Change System Number	New System Number	75
2	00000010	Change Group Number	New Group Number	75
3	00000011	Change Subgroup Number	New Subgroup Number	75
4	00000100	Change System Slot Number	New System Slot Number	75
5	00000101	Change Group Slot Number	New Group Slot Number	75
6	00000110	Change Subgroup Slot Number	New Subgroup Slot Number	75
7	00000111	Change Cell ID	New Cell ID	75
8	00001000	Report Slot Numbers	0x0000	75
9	00001001	Resend Packet	Packet Number to Resend	varies
10	00001010	Set Receiver Bubble-Up Period	Time in tenths of sec.	75
11	00001011	Change PN Sequence	New PN Sequence	75
12	00001100	Set High-Power Bubble Up Channel	Channel Number	75
13	00001101	Set High-Power Bubble-Up Period	Time in Minutes	75
14	00001110	Enable/Disable High-Power Bubble-Up	0x0000 to Disable Any non-zero value to enable	75
15	00001111	<<Reserved>>	0x0000	n/a
16	00010000	<<Reserved>>	0x0000	n/a
17	00010001	<<Reserved>>	0x0000	n/a
18	00010010	<<Reserved>>	0x0000	n/a
19	00010011	<<Reserved>>	0x0000	n/a
20	00010100	Reset Endpoint Password	New Password	75
21	00010101	Reset XOR Data Mask	New XOR Data Mask	75
22	00010110	<<Reserved>>	0x0000	n/a
23	00010111	<<Reserved>>	0x0000	n/a
24	00011000	<<Reserved>>	0x0000	n/a
25	00011001	<<Reserved>>	0x0000	n/a
26	00011010	<<Reserved>>	0x0000	n/a
27	00011011	<<Reserved>>	0x0000	n/a
28	00011100	<<Reserved>>	0x0000	n/a
29	00011101	<<Reserved>>	0x0000	n/a
30	00011110	<<Reserved>>	0x0000	n/a
31	00011111	<<Reserved>>	0x0000	n/a
32	00100000	Configure Tx Power	Level in dBm (integer, 0=-20)	75
33	00100001	Set Channel Frequency (3.2.1)	Channel Number	75
34	00100010	Set Deviation	New Deviation	75
35	00100011	Set Data Rate	New Data Rate	75
36	00100100	<<Reserved>>	0x0000	n/a
37	00100101	<<Reserved>>	0x0000	n/a

FIG. 10

Value	Bit Value	Command Type	Command Body	Response Message Type
38	00100110	<<Reserved>>	0x0000	n/a
39	00100111	<<Reserved>>	0x0000	n/a
40	00101000	<<Reserved>>	0x0000	n/a
41	00101001	<<Reserved>>	0x0000	n/a
42	00101010	<<Reserved>>	0x0000	n/a
43	00101011	<<Reserved>>	0x0000	n/a
44	00101100	<<Reserved>>	0x0000	n/a
45	00101101	<<Reserved>>	0x0000	n/a
46	00101110	<<Reserved>>	0x0000	n/a
47	00101111	<<Reserved>>	0x0000	n/a
48	00110000	Multiple Ungrouped Endpoint (3.2.3.1)	Multiple Addressed Endpoint Slot Number	See 3.2.4.1
49	00110001	Vector and Listen (3.2.3.2)	Slot Number	See 3.2.4.2
50	00110010	Multiple Commands to Individual Endpoint (3.2.3.3)	Slot Number	See 3.2.4.3
51	00110011	<<Reserved>>	0x0000	n/a
52	00110100	<<Reserved>>	0x0000	n/a
53	00110101	<<Reserved>>	0x0000	n/a
54	00110110	<<Reserved>>	0x0000	n/a
55	00110111	<<Reserved>>	0x0000	n/a
56	00111000	<<Reserved>>	0x0000	n/a
57	00111001	<<Reserved>>	0x0000	n/a
58	00111010	<<Reserved>>	0x0000	n/a
59	00111011	<<Reserved>>	0x0000	n/a
60	00111100	<<Reserved Engineering Use Only>>	0x0000	n/a
61	00111101	<<Reserved Engineering Use Only>>	0x0000	n/a
62	00111110	<<Reserved Engineering Use Only>>	0x0000	n/a
63	00111111	<<Reserved Engineering Use Only>>	0x0000	n/a

FIG. 10 (CONT'D)

Type Specific Commands

Value	Bit Value	Command Type	Command Body	Response Message Type
64	01000000	Report Encoder/Meter Status	0x0000	32
65	01000001	Report Consumption	0x0000	1
66	01000010	Report Consumption/Tamper	0x0000	2
67	01000011	Report Interval Data	0x0000	3
68	01000100	Report TOU Data	0x0000	4
69	01000101	Reset TOU Data	0x0000	75
70	01000110	Report Daily Read Data	0x0000	5
71	01000111	Report Multi-Encoder Consumption	0x0000	6
72	01001000	Report Multi-Encoder Consumption with Tamper	0x0000	7
73	01001001	Report Default Message	0x0000	Default
74	01001010	Report Logged Data	0x0000	10
75	01001011	<<Reserved>>	0x0000	n/a
76	01001100	<<Reserved>>	0x0000	n/a
77	01001101	<<Reserved>>	0x0000	n/a
78	01001110	<<Reserved>>	0x0000	n/a
79	01001111	<<Reserved>>	0x0000	n/a
80	01010000	<<Reserved>>	0x0000	n/a
81	01010001	<<Reserved>>	0x0000	n/a
82	01010010	<<Reserved>>	0x0000	n/a
83	01010011	<<Reserved>>	0x0000	n/a
84	01010100	Report Temperature	0x0000	20
85	01010101	<<Reserved>>	0x0000	n/a
86	01010110	<<Reserved>>	0x0000	n/a
87	01010111	<<Reserved>>	0x0000	n/a
88	01011000	<<Reserved>>	0x0000	n/a
89	01011001	<<Reserved>>	0x0000	n/a
90	01011010	Set Configuration Flags 1	See Figure 3.1.2.1	75
91	01011011	Set Configuration Flags 2	See Figure 3.1.2.2	75
92	01011100	Set Configuration Flags 3	See Figure 3.1.2.3	75
93	01011101	Initialize 16 LSB of Consumption	New Consumption (low half)	75
94	01011110	Initialize 16 MSB of Consumption	New Consumption (high half)	75
89	01011001	<<Reserved>>	0x0000	n/a
96	01100000	Program Daily Read Latch Time	Hour of Day (Midnight=0, Noon=12, 11:00 P.M. = 23)	75
97	01100001	Set Interval Data Bucket Size	Size, in minutes	75
98	01100010	Set Default Message	Type of Default Message	75
99	01100011	Set Default Message Body	Default Message Body	n/a
100	01100100	Acknowledge Alarm	Message Type of Alarm	None

FIG. 11

Value	Bit Value	Command Type	Command Body	Response Message Type
101	01100101	<<Reserved>>	0x0000	n/a
102	01100110	<<Reserved>>	0x0000	n/a
103	01100111	<<Reserved>>	0x0000	n/a
104	01101000	<<Reserved>>	0x0000	n/a
105	01101001	<<Reserved>>	0x0000	n/a
106	01101010	<<Reserved>>	0x0000	n/a
107	01101011	<<Reserved>>	0x0000	n/a
108	01101100	<<Reserved>>	0x0000	n/a
109	01101101	<<Reserved>>	0x0000	n/a
110	01101110	<<Reserved>>	0x0000	n/a
111	01101111	<<Reserved>>	0x0000	n/a
112	01110000	<<Reserved>>	0x0000	n/a
113	01110001	<<Reserved>>	0x0000	n/a
114	01110010	<<Reserved>>	0x0000	n/a
115	01110011	<<Reserved>>	0x0000	n/a
116	01110100	<<Reserved>>	0x0000	n/a
117	01110101	<<Reserved>>	0x0000	n/a
118	01110110	<<Reserved>>	0x0000	n/a
119	01110111	<<Reserved>>	0x0000	n/a
120	01111000	<<Reserved>>	0x0000	n/a
121	01111001	<<Reserved>>	0x0000	n/a
122	01111010	<<Reserved>>	0x0000	n/a
123	01111011	<<Reserved>>	0x0000	n/a
124	01111100	<<Reserved>>	0x0000	n/a
125	01111101	<<Reserved>>	0x0000	n/a
126	01111110	<<Reserved>>	0x0000	n/a
127	01111111	<<Reserved>>	0x0000	n/a
128	10000000	<<Reserved>>	0x0000	n/a
129	10000001	<<Reserved>>	0x0000	n/a
130	10000010	<<Reserved>>	0x0000	n/a
131	10000011	<<Reserved>>	0x0000	n/a
132	10000100	<<Reserved>>	0x0000	n/a
133	10000101	<<Reserved>>	0x0000	n/a
134	10000110	<<Reserved>>	0x0000	n/a
135	10000111	<<Reserved>>	0x0000	n/a
136	10001000	<<Reserved>>	0x0000	n/a
137	10001001	<<Reserved>>	0x0000	n/a
138	10001010	<<Reserved>>	0x0000	n/a
139	10001011	<<Reserved>>	0x0000	n/a
140	10001100	<<Reserved>>	0x0000	n/a
141	10001101	<<Reserved>>	0x0000	n/a

FIG. 11 (CONT'D)

Value	Bit Value	Command Type	Command Body	Response Message Type
142	10001110	<<Reserved>>	0x0000	n/a
143	10001111	<<Reserved>>	0x0000	n/a
144	10010000	<<Reserved>>	0x0000	n/a
145	10010001	<<Reserved>>	0x0000	n/a
146	10010010	<<Reserved>>	0x0000	n/a
147	10010011	<<Reserved>>	0x0000	n/a
148	10010100	<<Reserved>>	0x0000	n/a
149	10010101	<<Reserved>>	0x0000	n/a
150	10010110	Report Event Summary	0x0000	150
151	10010111	Report Individual Event Information	Event Number (1= most recent, 2= next most recent, max 4)	varies
152	10011000	<<Reserved>>	0x0000	n/a
153	10011001	<<Reserved>>	0x0000	n/a
154	10011010	<<Reserved>>	0x0000	n/a
155	10011011	<<Reserved>>	0x0000	n/a
156	10011100	<<Reserved>>	0x0000	n/a
157	10011101	<<Reserved>>	0x0000	n/a
158	10011110	<<Reserved>>	0x0000	n/a
159	10011111	<<Reserved>>	0x0000	n/a
160	10100000	<<Reserved>>	0x0000	n/a
161	10100001	<<Reserved>>	0x0000	n/a
162	10100010	<<Reserved>>	0x0000	n/a
163	10100011	<<Reserved>>	0x0000	n/a
164	10100100	<<Reserved>>	0x0000	n/a
165	10100101	<<Reserved>>	0x0000	n/a
166	10100110	<<Reserved>>	0x0000	n/a
167	10100111	<<Reserved>>	0x0000	n/a
168	10101000	<<Reserved>>	0x0000	n/a
169	10101001	<<Reserved>>	0x0000	n/a
170	10101010	<<Reserved>>	0x0000	n/a
171	10101011	<<Reserved>>	0x0000	n/a
172	10101100	<<Reserved>>	0x0000	n/a
173	10101101	<<Reserved>>	0x0000	n/a
174	10101110	<<Reserved>>	0x0000	n/a
175	10101111	<<Reserved>>	0x0000	n/a
176	10110000	<<Reserved>>	0x0000	n/a
177	10110001	<<Reserved>>	0x0000	n/a
178	10110010	<<Reserved>>	0x0000	n/a
179	10110011	<<Reserved>>	0x0000	n/a
180	10110100	<<Reserved>>	0x0000	n/a

FIG. 11 (CONT'D)

Value	Bit Value	Command Type	Command Body	Response Message Type
181	10110101	<<Reserved>>	0x0000	n/a
182	10110110	<<Reserved>>	0x0000	n/a
183	10110111	<<Reserved>>	0x0000	n/a
184	10111000	<<Reserved>>	0x0000	n/a
185	10111001	<<Reserved>>	0x0000	n/a
186	10111010	<<Reserved>>	0x0000	n/a
187	10111011	<<Reserved>>	0x0000	n/a
188	10111100	<<Reserved>>	0x0000	n/a
189	10111101	<<Reserved>>	0x0000	n/a
190	10111110	<<Reserved>>	0x0000	n/a
191	10111111	<<Reserved>>	0x0000	n/a
192	11000000	<<Reserved>>	0x0000	n/a
193	11000001	<<Reserved>>	0x0000	n/a
194	11000010	<<Reserved>>	0x0000	n/a
195	11000011	<<Reserved>>	0x0000	n/a
196	11000100	<<Reserved>>	0x0000	n/a
197	11000101	<<Reserved>>	0x0000	n/a
198	11000110	<<Reserved>>	0x0000	n/a
199	11000111	<<Reserved>>	0x0000	n/a
200	11001000	Perform EP Diagnostic:ROM check	0x0000	200
201	11001001	Perform EP Diagnostic:RAM check	0x0000	200
202	11001010	Perform EP Diagnostic: HW check	Test Point Number	200
203	11001011	Report RSSI	0x0000	203
204	11001100	<<Reserved>>	0x0000	n/a
205	11001101	Report Current RTC	0x0000	205
206	11001110	<<Reserved>>	0x0000	n/a
207	11001111	<<Reserved>>	0x0000	n/a
208	11010000	<<Reserved>>	0x0000	n/a
209	11010001	<<Reserved>>	0x0000	n/a
210	11010010	Test: Generate UM	0x0000	See 3.2.3.1
211	11010011	Enter Screaming Viking Mode	Number of Seconds	See 3.2.3.2
212	11010100	<<Reserved>>	0x0000	n/a
213	11010101	<<Reserved>>	0x0000	n/a
214	11010110	<<Reserved>>	0x0000	n/a
215	11010111	<<Reserved>>	0x0000	n/a
216	11011000	<<Reserved>>	0x0000	n/a
217	11011001	<<Reserved>>	0x0000	n/a
218	11011010	<<Reserved>>	0x0000	n/a
219	11011011	<<Reserved>>	0x0000	n/a
220	11011100	Report Information Memory Contents	0x0000	254

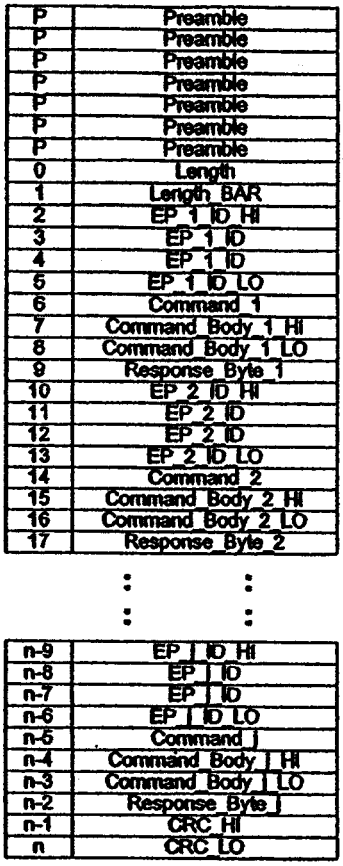
FIG. 11 (CONT'D)

Value	Bit Value	Command Type	Command Body	Response Message Type
221	11011101	Report EEPROM Contents	0x0000	255
222	11011110	<<Reserved>>	0x0000	n/a
223	11011111	<<Reserved>>	0x0000	n/a
224	11100000	<<Reserved>>	0x0000	n/a
225	11100001	<<Reserved>>	0x0000	n/a
226	11100010	<<Reserved>>	0x0000	n/a
227	11100011	<<Reserved>>	0x0000	n/a
228	11100100	<<Reserved>>	0x0000	n/a
229	11100101	<<Reserved>>	0x0000	n/a
230	11100110	<<Reserved Engineering Use Only>>	0x0000	n/a
231	11100111	<<Reserved Engineering Use Only>>	0x0000	n/a
232	11101000	<<Reserved Engineering Use Only>>	0x0000	n/a
233	11101001	<<Reserved Engineering Use Only>>	0x0000	n/a
234	11101010	<<Reserved Engineering Use Only>>	0x0000	n/a
235	11101011	<<Reserved Engineering Use Only>>	0x0000	n/a
236	11101100	<<Reserved Engineering Use Only>>	0x0000	n/a
237	11101101	<<Reserved Engineering Use Only>>	0x0000	n/a
238	11101110	<<Reserved Engineering Use Only>>	0x0000	n/a
239	11101111	<<Reserved Engineering Use Only>>	0x0000	n/a
240	11110000	<<Reserved Engineering Use Only>>	0x0000	n/a
241	11110001	<<Reserved Engineering Use Only>>	0x0000	n/a
242	11110010	<<Reserved Engineering Use Only>>	0x0000	n/a
243	11110011	<<Reserved Engineering Use Only>>	0x0000	n/a
244	11110100	<<Reserved Engineering Use Only>>	0x0000	
245	11110101	<<Reserved Engineering Use Only>>	0x0000	n/a
246	11110110	<<Reserved Engineering Use	0x0000	n/a

FIG. 11 (CONT'D)

Value	Bit Value	Command Type	Command Body	Response Message Type
		Only>>		
247	11110111	<<Reserved Engineering Use Only>>	0x0000	n/a
248	11111000	<<Reserved Engineering Use Only>>	0x0000	n/a
249	11111001	<<Reserved Engineering Use Only>>	0x0000	n/a
250	11111010	<<Reserved Engineering Use Only>>	0x0000	n/a
251	11111011	<<Reserved Engineering Use Only>>	0x0000	n/a
252	11111100	<<Reserved Engineering Use Only>>	0x0000	n/a
253	11111101	<<Reserved Engineering Use Only>>	0x0000	n/a
254	11111110	<<Reserved Engineering Use Only>>	0x0000	n/a
255	11111111	<<Reserved Engineering Use Only>>	0x0000	n/a

FIG. 11 (CONT'D)



P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
0	Length
1	Length_BAR
2	EP_1_ID_HI
3	EP_1_ID
4	EP_1_ID
5	EP_1_ID_LO
6	Command_1
7	Command_Body_1_HI
8	Command_Body_1_LO
9	Response_Byte_1
10	EP_2_ID_HI
11	EP_2_ID
12	EP_2_ID
13	EP_2_ID_LO
14	Command_2
15	Command_Body_2_HI
16	Command_Body_2_LO
17	Response_Byte_2
:	:
:	:
n-9	EP_]_ID_HI
n-8	EP_]_ID
n-7	EP_]_ID
n-6	EP_]_ID_LO
n-5	Command_]
n-4	Command_Body_]_HI
n-3	Command_Body_]_LO
n-2	Response_Byte_]
n-1	CRC_HI
n	CRC_LO

Figure 12

Note: All bytes are sent MSB first. **Command 48: Multiple Ungrouped Endpoint Command**

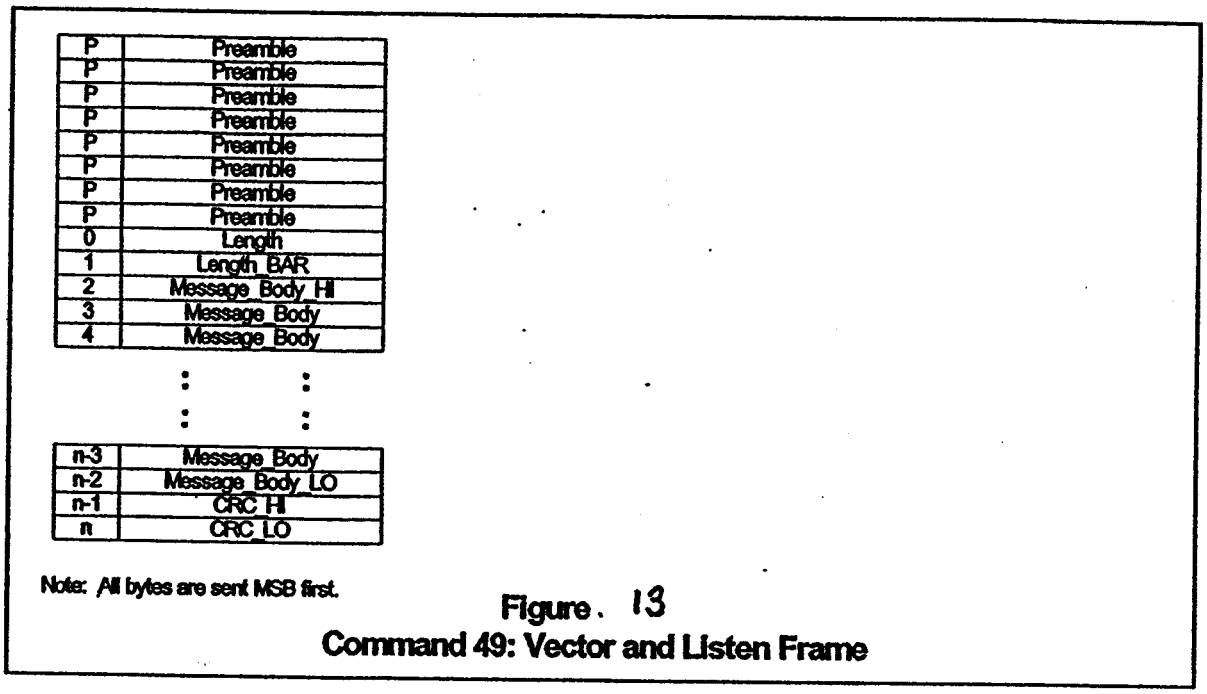
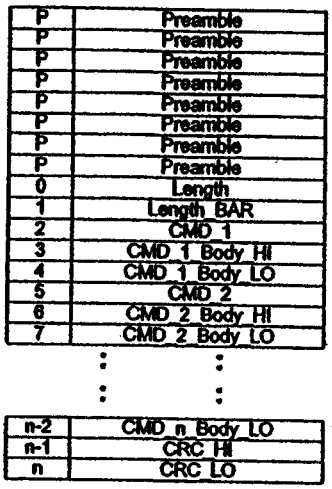


Figure. 13
Command 49: Vector and Listen Frame



P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
P	Preamble
0	Length
1	Length_BAR
2	CMD_1
3	CMD_1_Body_HI
4	CMD_1_Body_LO
5	CMD_2
6	CMD_2_Body_HI
7	CMD_2_Body_LO
⋮	⋮
n-2	CMD_n_Body_LO
n-1	CRC_HI
n	CRC_LO

Note: All bytes are sent MSB first.

Figure 14
Command 50: Multiple Commands to Individual Endpoint Frame

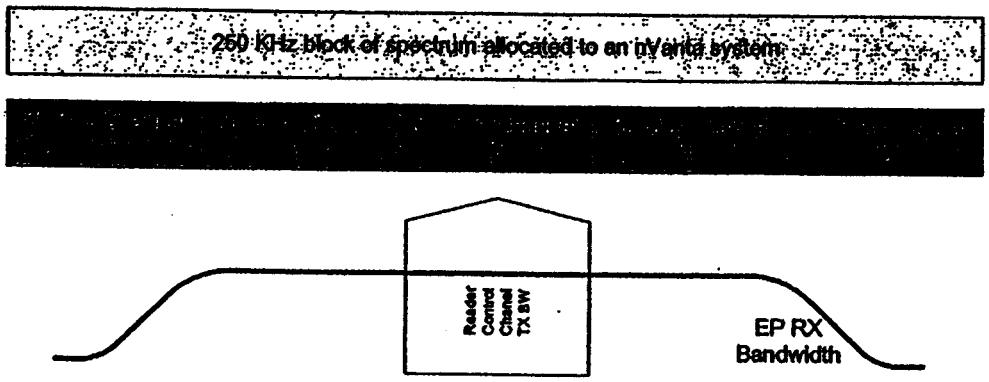

250 kHz block of spectrum allocated to an nVantic system
Reader Control Channel TX BW
EP RX Bandwidth

FIG. 15

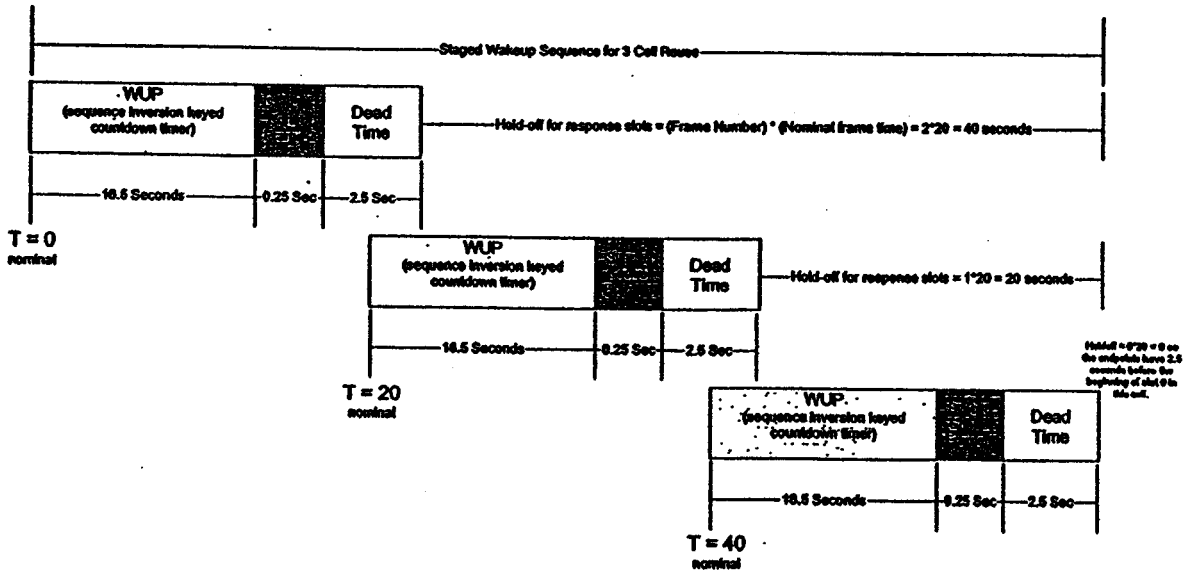

Staged Wakeup Sequence for 3 Cell Reuse
WUP (sequence inversion keyed countdown timer)
Dead Time
Hold-off for response slots = (Frame Number) * (Nominal frame time) = 2*20 = 40 seconds
16.5 Seconds
0.25 Sec
2.5 Sec
T = 0 nominal
WUP (sequence inversion keyed countdown timer)
Dead Time
Hold-off for response slots = 1*20 = 20 seconds
16.5 Seconds
0.25 Sec
2.5 Sec
T = 20 nominal
WUP (sequence inversion keyed countdown timer)
Dead Time
16.5 Seconds
0.25 Sec
2.5 Sec
T = 40 nominal

FIG. 16

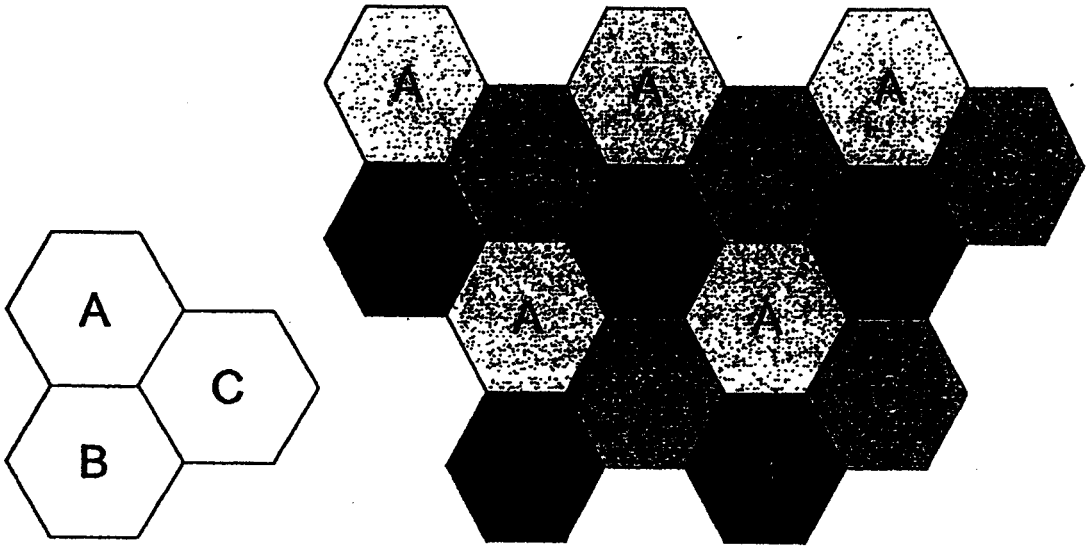


FIG.17

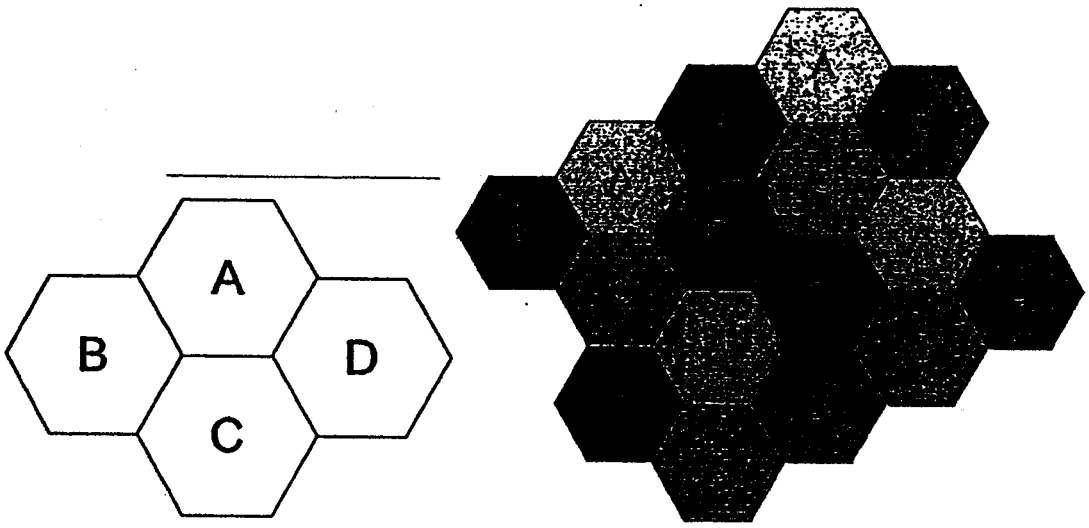


FIG. 18

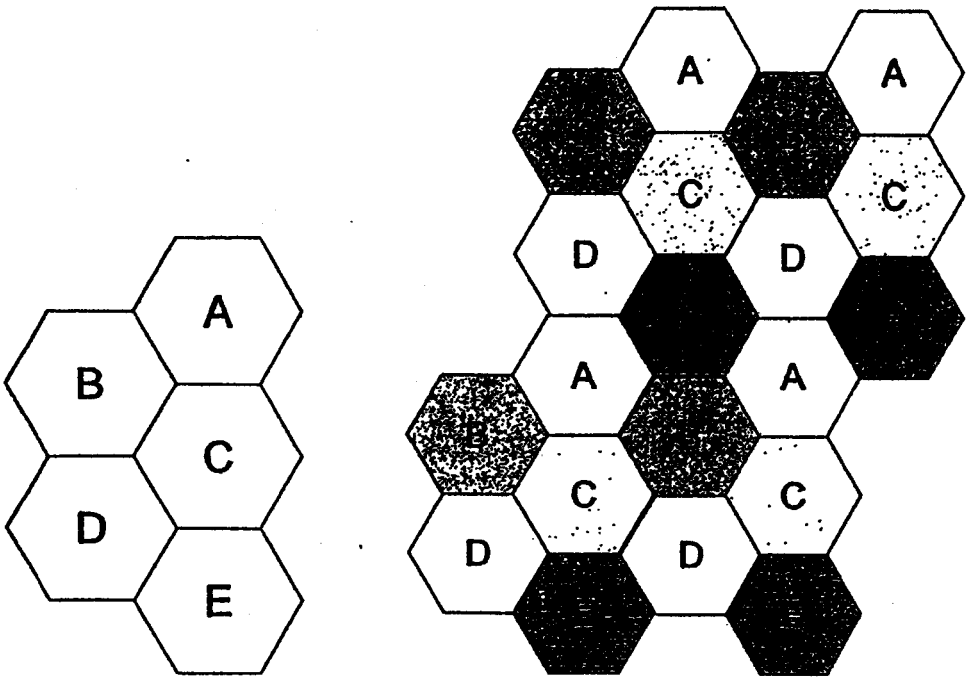

A
B
C
D
E
A
A
C
C
D
D
A
A
B
C
C
D
D

FIG. 19

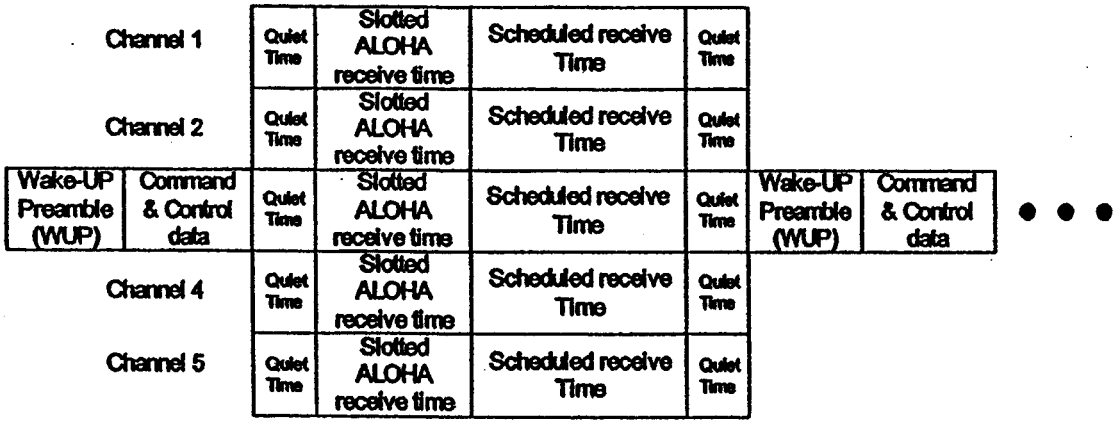

Channel 1
Channel 2
Wake-UP Preamble (WUP)
Command & Control data
Channel 4
Channel 5
Quiet Time
Slotted ALOHA receive time
Scheduled receive Time
Quiet Time
Wake-UP Preamble (WUP)
Command & Control data

FIG. 20

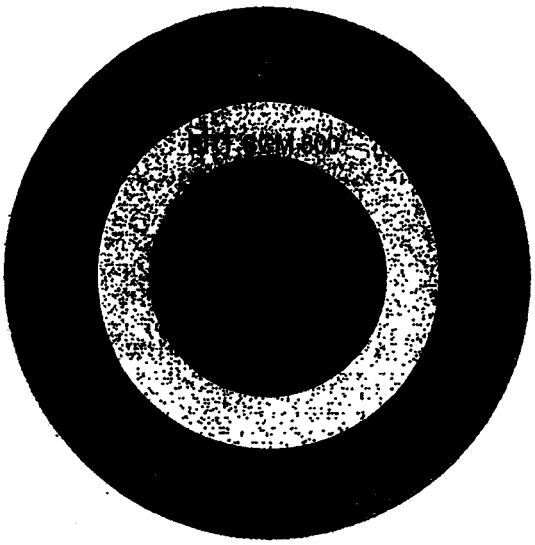


FIG. 21