

## ANNEX VII. SELF-TEST MODE

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA

MANU: MMI      MODEL NO: MBT-040600      SERIAL NO: 096

BEACON CERTIFICATION TEST RESULTS - SELF TEST VERIFICATION

MEASUREMENT DATE: 20 Apr 1999      TIME: 07:59:00

TESTED BY:

*J.C. Holt*

APPROVED BY:

*Edwin King*

FRAME SYNCHRONIZATION BIT #:    16 17 18 19 20 21 22 23 24

-----  
Should be:    0 1 1 0 1 0 0 0 0

Decoded:    0 1 1 0 1 0 0 0 0

NUMBER OF BURST DURING SELF TEST CYCLE: 1

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA

MANU: MMI MODEL NO: MBT-040600 SERIAL NO. 000

BEACON CERTIFICATION TEST RESULTS - SELF TEST

MEASUREMENT DATE: 20 Apr 1999 TIME: 08:14:34

TESTED BY:                     

APPROVED BY:                     

# BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

-----  
Should be: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
Decoded: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

\*\*\* BIT SYNCHRONIZATION OK \*\*\*

FRAME SYNCHRONIZATION BIT #: 16 17 18 19 20 21 22 23 24

-----  
Should be: 0 0 0 1 0 1 1 1 1  
Decoded: 0 1 1 0 1 0 0 0 0

\*\*\* ERROR IN FRAME SYNCHRONIZATION \*\*\*

MESSAGE TYPE: LONG MESSAGE (bit 25 = 1)

15 Hex Beacon ID (bits 26-85): 2DD60030BF81FE0

30 Hex Message (bits 25-144): 96EB00185FC0FF01CE953400000000

BCH CODE BIT #: 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06

-----  
Should be: 0 0 1 1 1 0 0 1 1 1 0 1 0 0 1 0 1 0 1 0 0  
Decoded: 0 0 1 1 1 0 0 1 1 1 0 1 0 0 1 0 1 0 1 0 0

\*\*\* BCH CODE OK \*\*\*

BCH CODE BIT #: 33 34 35 36 37 38 39 40 41 42 43 44

-----  
Should be: 1 1 1 1 0 0 0 1 1 0 0 1  
Decoded: 0 0 0 0 0 0 0 0 0 0 0 0

\*\*\* ERROR IN BCH CODE \*\*\*

MEASUREMENT DATE: 20 Apr 1999/ TIME: 08:15:22

APPROVED BY: Ethel King

DIGITAL MESSAGE IN BINARY:

[illegible]

|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4     | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |   |   |   |
| 0     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| <hr/> |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1     | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |   |

```

BIT NUMBER:
8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 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 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9
-----
1 0 0 0 0 0 0 0 1 1 1 0 0 1 1 1 0 1 0 0 1 0 1 0 1 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

[illegible]

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA  
MANU: MMI MODEL NO: MBT-040600 SERIAL NO: 096  
BEACON CERTIFICATION TEST RESULTS - SELF TEST  
MEASUREMENT DATE: 20 Apr 1999 TIME: 08:15:23

TESTED BY:

*J. C. Holt*

APPROVED BY:

*Edwin R. King*

MESSAGE DATA:

Message Format: 1  
Protocol Flag: 0  
Country Code: 0101101110  
Protocol Code: 1011  
Serial Number: 000000000001100000  
Reported Latitude: N127 0  
Reported Longitude: E255 0  
Position Data Source Flag: 1  
Spare (108): 1  
Homing Device Flag: 0  
Additional Data Flag: 1  
Spare (111,112):  
00  
Delta Latitude (min): 0  
Delta Latitude (sec): 0  
Delta Longitude (min): 0  
Delta Longitude (sec): 0  
Spare (127-132): 000000

Corrected latitude: N127 0 0  
Corrected longitude: E255 0 0

Self-test burst envelope time: 441.0 msec

## APPENDIX B. ANTENNA CHARACTERISTICS

TABLE B-1. VERTICAL POLARIZATION RECEIVED SIGNAL LEVELS (PV, IN DBM)

| AZIMUTH<br>ANGLE<br>(degrees) | ELEVATION ANGLE (degrees) |        |        |        |        |
|-------------------------------|---------------------------|--------|--------|--------|--------|
|                               | 10                        | 20     | 30     | 40     | 50     |
| 0                             | -21.33                    | -19.67 | -19.83 | -20.00 | -20.83 |
| 30                            | -21.50                    | -19.33 | -18.33 | -20.00 | -21.00 |
| 60                            | -20.50                    | -19.67 | -18.67 | -20.00 | -21.17 |
| 90                            | -21.33                    | -19.00 | -18.17 | -18.67 | -23.33 |
| 120                           | -20.83                    | -18.33 | -18.00 | -19.67 | -23.50 |
| 150                           | -19.83                    | -18.00 | -18.83 | -19.17 | -23.00 |
| 180                           | -20.00                    | -18.67 | -18.50 | -19.17 | -23.83 |
| 210                           | -20.33                    | -18.67 | -17.67 | -19.33 | -23.50 |
| 240                           | -20.33                    | -18.67 | -17.67 | -19.33 | -23.50 |
| 270                           | -20.17                    | -18.83 | -18.33 | -20.83 | -21.50 |
| 300                           | -20.67                    | -19.33 | -20.00 | -19.17 | -22.33 |
| 330                           | -21.17                    | -20.00 | -19.17 | -20.67 | -22.00 |

TABLE B-2. HORIZONTAL POLARIZATION RECEIVED SIGNAL LEVELS  
(PH, IN dBm)

| AZIMUTH<br>ANGLE<br>(degrees) | ELEVATION ANGLE (degrees) |        |        |        |        |
|-------------------------------|---------------------------|--------|--------|--------|--------|
|                               | 10                        | 20     | 30     | 40     | 50     |
| 0                             | -48.83                    | -45.33 | -48.83 | -44.17 | -45.00 |
| 30                            | -42.17                    | -39.00 | -62.17 | -40.33 | -43.00 |
| 60                            | -50.50                    | -41.50 | -48.67 | -47.17 | -39.50 |
| 90                            | -46.17                    | -40.17 | -51.33 | -41.67 | -50.67 |
| 120                           | -42.67                    | -42.67 | -41.00 | -45.83 | -42.83 |
| 150                           | -43.50                    | -61.33 | -42.17 | -44.33 | -42.33 |
| 180                           | -45.83                    | -38.17 | -47.50 | -41.17 | -67.83 |
| 210                           | -51.83                    | -48.33 | -49.17 | -44.33 | -40.83 |
| 240                           | -39.50                    | -44.17 | -36.33 | -42.33 | -47.67 |
| 270                           | -48.83                    | -42.83 | -45.83 | -48.67 | -46.50 |
| 300                           | -43.50                    | -48.33 | -40.83 | -42.67 | -40.50 |
| 330                           | -45.83                    | -40.83 | -49.67 | -40.83 | -45.33 |

TABLE B-3. TOTAL ERP (IN dBm) / ANTENNA GAIN (IN dBi)

| AZIMUTH<br>ANGLE<br>(degrees) | ELEVATION ANGLE (degrees) |               |               |               |               |
|-------------------------------|---------------------------|---------------|---------------|---------------|---------------|
|                               | 10                        | 20            | 30            | 40            | 50            |
| 0                             | 32.28 / -3.83             | 33.94 / -2.17 | 33.78 / -2.33 | 33.62 / -2.49 | 32.79 / -3.32 |
| 30                            | 32.14 / -3.97             | 34.32 / -1.79 | 35.27 / -0.84 | 33.64 / -2.47 | 32.63 / -3.48 |
| 60                            | 33.10 / -3.01             | 33.96 / -2.15 | 34.93 / -1.18 | 33.61 / -2.50 | 32.49 / -3.62 |
| 90                            | 32.28 / -3.83             | 34.63 / -1.48 | 35.43 / -0.68 | 34.95 / -1.16 | 30.28 / -5.83 |
| 120                           | 32.80 / -3.31             | 35.29 / -0.82 | 35.62 / -0.49 | 33.94 / -2.17 | 30.15 / -5.96 |
| 150                           | 33.79 / -2.32             | 35.60 / -0.51 | 34.79 / -1.32 | 34.44 / -1.67 | 30.65 / -5.46 |
| 180                           | 33.61 / -2.50             | 34.98 / -1.13 | 35.11 / -1.00 | 34.46 / -1.65 | 29.77 / -6.34 |
| 210                           | 33.27 / -2.84             | 34.93 / -1.18 | 35.93 / -0.18 | 34.28 / -1.83 | 30.18 / -5.93 |
| 240                           | 33.32 / -2.79             | 34.94 / -1.17 | 35.99 / -0.12 | 34.29 / -1.82 | 30.12 / -5.99 |
| 270                           | 33.44 / -2.67             | 34.79 / -1.32 | 35.28 / -0.83 | 32.78 / -3.33 | 32.11 / -4.00 |
| 300                           | 32.95 / -3.16             | 34.28 / -1.83 | 33.64 / -2.47 | 34.45 / -1.66 | 31.34 / -4.77 |
| 330                           | 32.44 / -3.67             | 33.64 / -2.47 | 34.43 / -1.68 | 32.97 / -3.14 | 31.62 / -4.49 |

Antenna Gain is based on measured power output of 4.09 watts (36.11 dBm)

$$ERP_{\max EOL} = ERP_{\max} - ERP_{\text{LOSS}} = 35.99 - (-0.54) = 36.53 \text{ dBm} = 4.498 \text{ watts}$$

$$ERP_{\min EOL} = ERP_{\min} - ERP_{\text{LOSS}} = 29.77 - (-0.54) = 30.31 \text{ dBm} = 1.074 \text{ watts}$$

NOTE: These values do NOT include the range instrumentation accuracy of  $\pm 2.45$  dB.