

3.4 ANTENNA CHARACTERISTICS

3.4.1 Scope.

- a. Reference: C/S T.007, Annex B.
- b. The objective was to measure the radiation characteristics of the beacon.
- c. The beacon shall produce a field equivalent to an ERP in the range of 1.6 to 20 watts. The polarization of the beacon antenna shall be linear or right-hand circular. The gain variation shall not exceed 3 dB at an elevation angle of 40 degrees. The voltage standing wave ratio (VSWR) shall not exceed 1.5:1 at 406.028 MHz.

3.4.2 Facilities and Instrumentation.

- HP-8562A Spectrum Analyzer
- HP-83640A Synthesized Sweeper
- Scientific-Atlanta-26-0.1 log periodic dipole antennas
- HP-438A Power Meter
- HP-8481A Power Sensor
- HP-8510B Network Analyzer

3.4.3 Test Conditions.

- a. Normal ambient conditions or any other environmental conditions.
- b. Nominal operating voltage.

3.4.4 Test Procedures.

- a. Description of test range. The arc range utilizes a vertically mounted, 75-foot (23 meter) radius arc with a 60-foot (18.3 meter) diameter horizontal turntable below its focal point. The arc range is constructed of non-metallic materials, with the exception of some RF components and the turntable. The vertical arc member is supported by four laminated wooden legs in a four-sided, pyramidal design. The inside curvature of the arc is covered with a metallic track and RF energy scatter shield that facilitate the movement of a sled-mounted probe antenna. The scatter shield is designed to prevent the reflection of RF energy back into the test area. A wooden test item rack is used to position the beacon antenna up to the focal point of the arc, approximately 29 feet above ground level. RF energy is radiated from the

beacon antenna and is received by the probe antenna 75 feet (23 meters) away on the vertical arc. The probe antenna maintains a constant distance to the beacon antenna and also remains oriented perpendicular to the direction of propagation from the beacon antenna as it is raised and lowered in elevation (see Figure 3-, Arc Range).

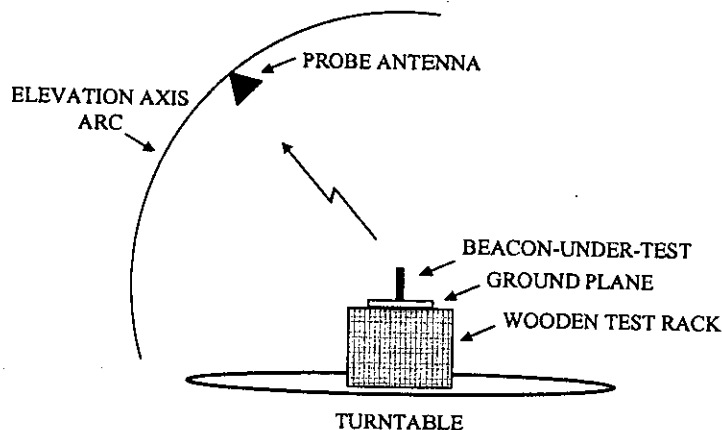


Figure 3-6. Arc Range

- b. Test item configuration. The beacon was placed over the center of the test range turntable on top of the wooden test item rack. The beacon was placed in the center of a 125-centimeter radius ground plane constructed of plywood covered with aluminum window screen material. The beacon was oriented on top of the ground plane in the manner in which it is designed to operate.
- c. Range calibration. A standard gain antenna was used to calibrate the range for all ERP measurements. The range was calibrated at 0 degrees elevation and 0 degrees azimuth by radiating a known ERP level at the location of the beacon antenna under test, and measuring the received signal level of a spectrum analyzer connected to the probe antenna.
- d. Beacon ERP measurement. The beacon under test was transmitting normally with a fresh battery. The elevation angle of the probe antenna on the vertical arc member was held constant at the desired elevation angle relative to the beacon antenna. A spectrum analyzer was connected to the probe antenna to capture one beacon test pulse for each azimuth and elevation angle combination. Data were collected as the turntable stepped in 30-degree azimuth increments from 0 to 330 degrees. Measurements were conducted at elevation angles of 10, 20, 30, 40 and 50 degrees. Position accuracy was within ± 3 degrees.

The maximum ERP variation at 40 degrees elevation was determined by calculating the difference between the maximum and minimum ERP values tabulated in Appendix B, Table B-3. For an elevation angle of 40 degrees.

- e. Antenna polarization measurement. Spectrum analyzer received signal levels were measured for all azimuth and elevation angle combinations using both vertical and horizontal polarization for the probe antenna.

The polarization of the beacon antenna was determined by calculating the difference between the vertically and horizontally received signal levels of tables B-1 and B-2 of Appendix B. The vertical polarization levels were at least 10 dB greater than the horizontal polarization levels for all of the 60 azimuth/elevation points (100% of all data collected).

- f. The antenna VSWR was measured directly using the HP-8510B Network Analyzer with the antenna mounted on a ground plane located away from any structures.

3.4.5 Data Reduction and Presentation.

Presented the recorded data in tabular form and annotated those readings which exceeded the specified limits.

APPENDIX A. DATA SHEETS

- Annex I. Electrical and Functional Tests at Constant Temperature
- Annex II. Thermal Shock Test
- Annex III. Operating Lifetime at Minimum Temperature
- Annex IV. Frequency Stability Test with Temperature Gradient
- Annex V. Satellite Qualitative Tests

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**ANNEX I. ELECTRICAL AND FUNCTIONAL TESTS
AT CONSTANT TEMPERATURE**

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 1 Aug 2002 TIME: 12:01:49

TESTED BY: J. H.

APPROVED BY: Rosa Barrincau

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	0	0	1	0	1	1	1	1

*** FRAME SYNCHRONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D D C 0 7 C 0 0 8 4 0 4 0 1 7 5 D 2 C 7

BEACON BCH CODE VERIFICATION

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	1	1	1	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	0	0
Decoded:	0	1	1	1	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	0	0

*** BCH CODE OK ***

TESTED BY: J. H. [Signature] APPROVED BY: Rosa Barrineau

BIT NUMBER:

BIT NUMBER:

BIT NUMBER:

```

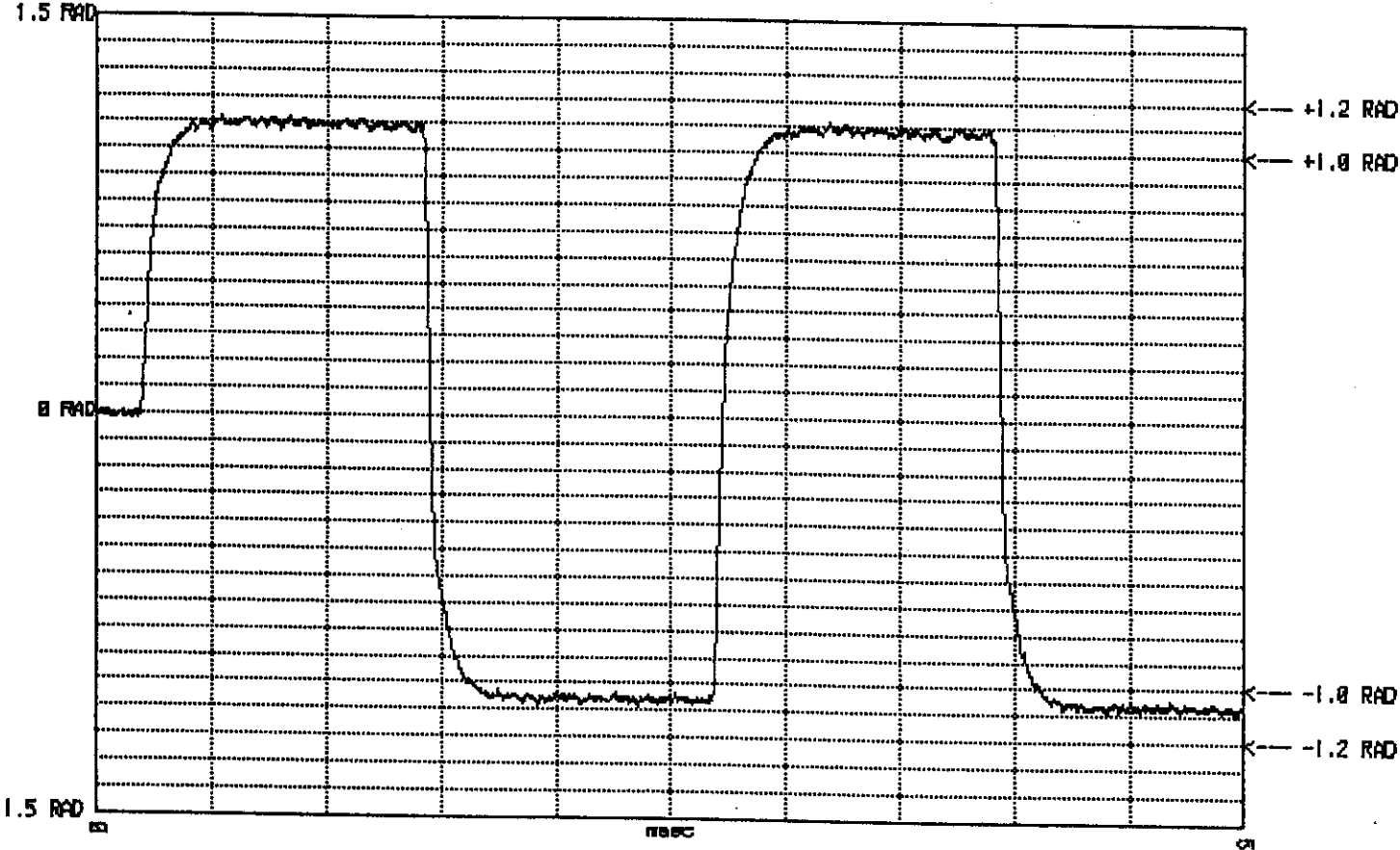
BIT NUMBER:
8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
-----
0 0 0 0 0 1 0 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0 1 1 1 1 1 0

```

WSMR ELECTRONIC PROVING GROUND, US ARMY, PORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 1 Aug 2002 TIME: 12:32:05

TESTED BY: J. H. APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



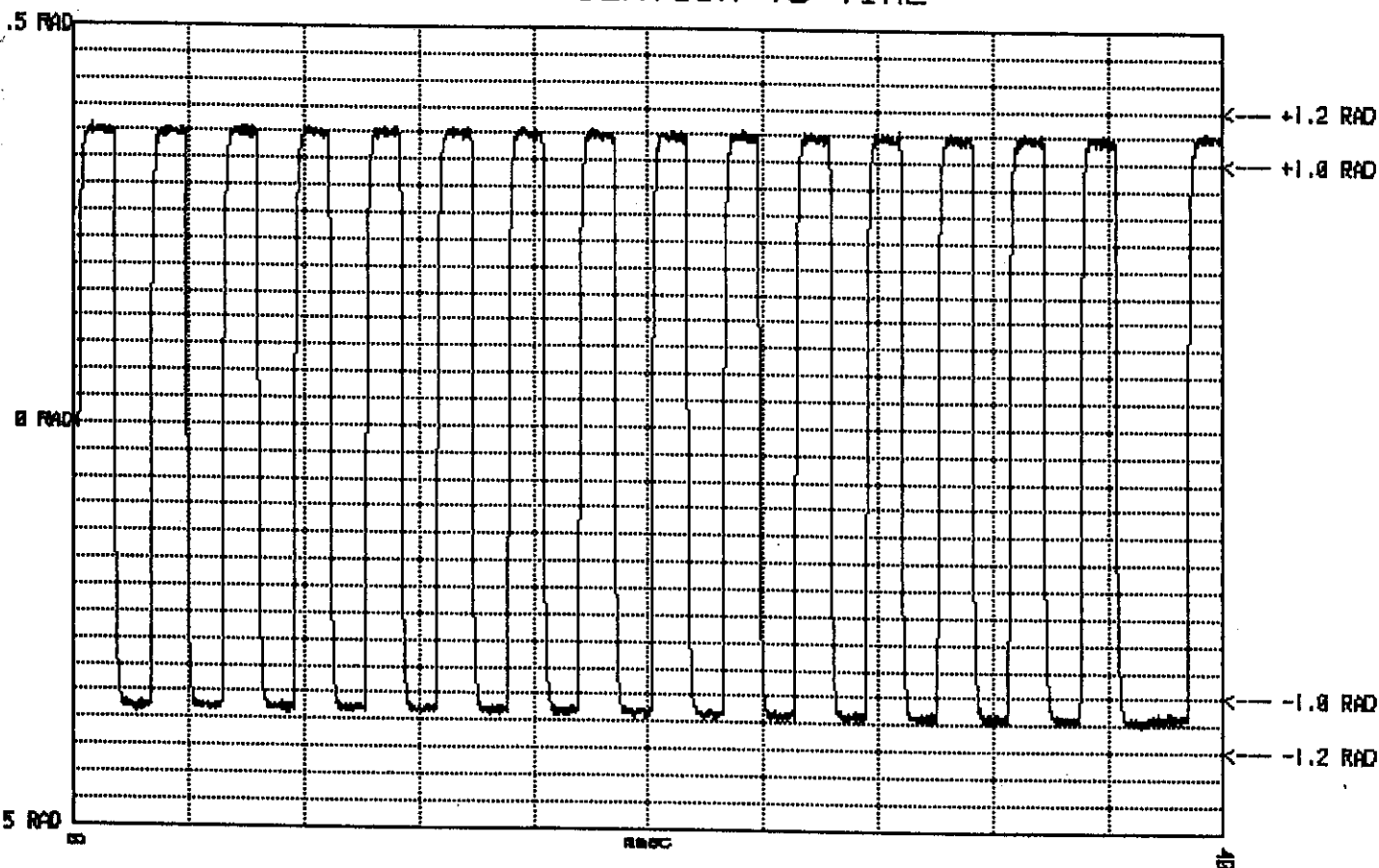
SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Modulation: symmetry	< 0.05	.0194		pas
Modulation: rise time	150 $\pm$ 100	178.2	us	pas
Modulation: fall time	150 $\pm$ 100	159.8	us	pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
 MEASUREMENT DATE: 1 Aug 2002 TIME: 12:33:43

TESTED BY: J. [Signature]

APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Phase modulation: + AVG	+1.1 $\pm$ 0.1	1.10	rad	pas
- AVG	-1.1 $\pm$ 0.1	-1.07	rad	pas

Peak positive phase modulation: 1.13 rad
 Peak negative phase modulation: -1.10 rad

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
 MEASUREMENT DATE: 1 Aug 2002 TIME: 12:35:23

TESTED BY: J. H.

APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.027919	MHz	pas
Short term frequency stability	< 2.0E-9	2.81E-10		pas
Medium term: mean slope	< 1.0E-9	+6.04E-10	/min	pas
residual deviation	< 3.0E-9	2.56E-10		pas
Tx output power level	3.15 TO 7.93	4.25	W	pas
Burst envelope: rise time	< 5	.98	ms	pas
fall time	< 5	1.34	ms	pas
Phase modulation: + AVG	+1.1 ±0.1	1.10	rad	pas
- AVG	-1.1 ±0.1	-1.07	rad	pas
Modulation: symmetry	< 0.05	.0194		pas
Modulation: rise time	150 ±100	178.2	us	pas
fall time	150 ±100	159.8	us	pas
Repetition period minimum	47.5 TO 52.5	48.8	s	pas
Repetition period maximum	47.5 TO 52.5	51.5	s	pas
Repetition period (max - min)	>1	2.6	s	pas
Total transmission time minimum	435.6 TO 444.4	440.8	ms	pas
Total transmission time maximum	435.6 TO 444.4	440.8	ms	pas
Cw preamble minimum	158.4 TO 161.6	159.6	ms	pas
Cw preamble maximum	158.4 TO 161.6	159.7	ms	pas
Message bit rate minimum	396.0 TO 404.0	401.4	bps	pas
Message bit rate maximum	396.0 TO 404.0	401.5	bps	pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS
MEASUREMENT DATE: 1 Aug 2002 TIME: 12:51:13

TESTED BY: *J. [Signature]*

APPROVED BY: *Rosa Barrineau*

SPURIOUS EMISSIONS

FREQUENCY
(MHz)

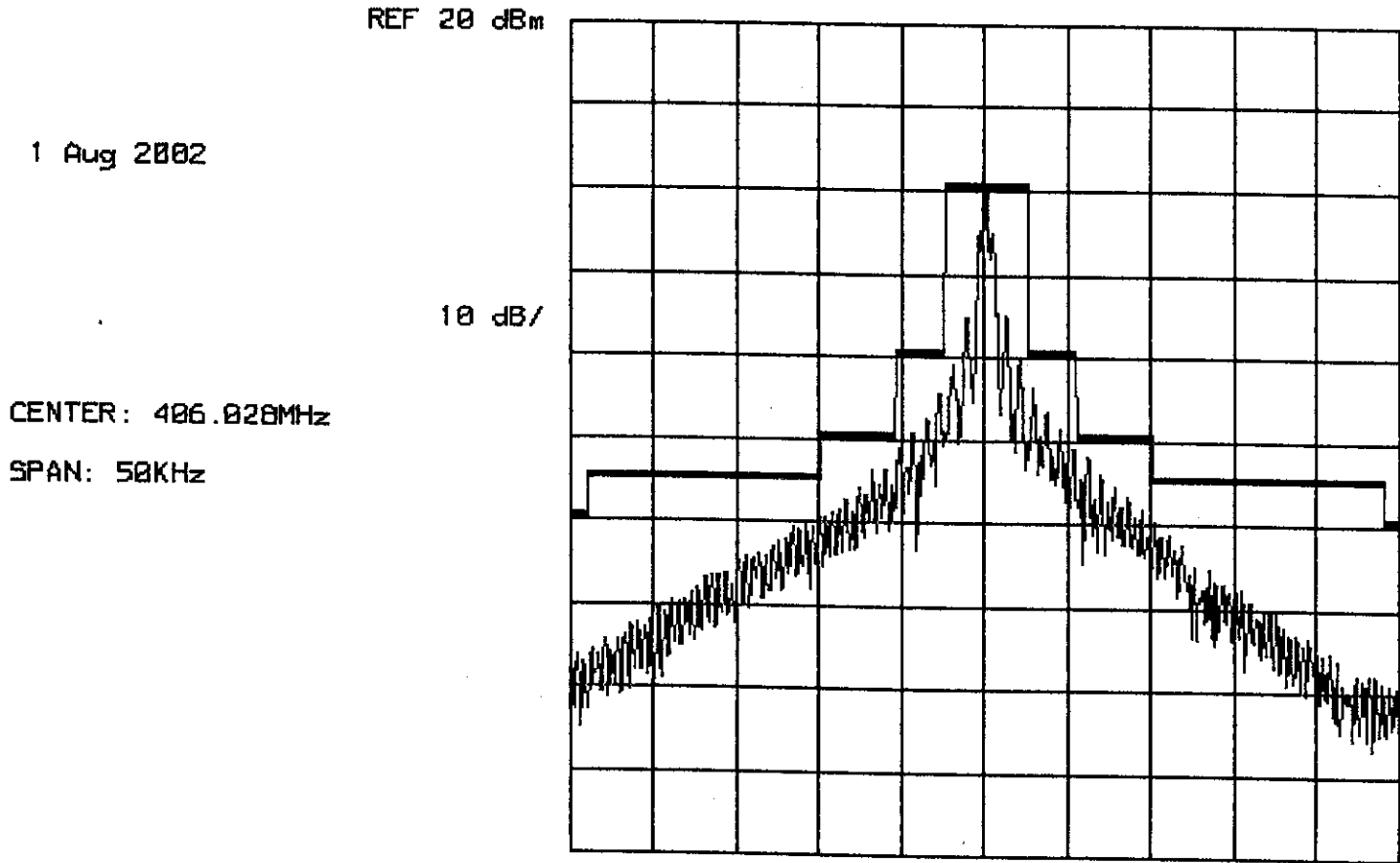
RESULTS
(dBc)

LIMITS
(dBc)

*** SPURIOUS TEST OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS
MEASUREMENT DATE: 1 Aug 2002 TIME: 15:56:28

TESTED BY: J. H. APPROVED BY: Rosa Barrineau



SPURIOUS EMISSIONS SPECTRUM

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 1 Aug 2002 TIME: 15:57:32

TESTED BY: J. H.

APPROVED BY: Rosa Barrineau

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 0 0 1 0 1 1 1 1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D D C 0 7 C 0 0 8 4 0 4 0 1 7 5 D 2 C 7

BEACON BCH CODE VERIFICATION

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 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0
Decoded: 0 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 1 Aug 2002 TIME: 16:32:08

TESTED BY: J. [Signature] APPROVED BY: Rosa Barrinuan

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

										1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	
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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	1	0	1	1	0	1	1	1	0	1	1	1

BIT NUMBER:

4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	7	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	

0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0

BIT NUMBER:

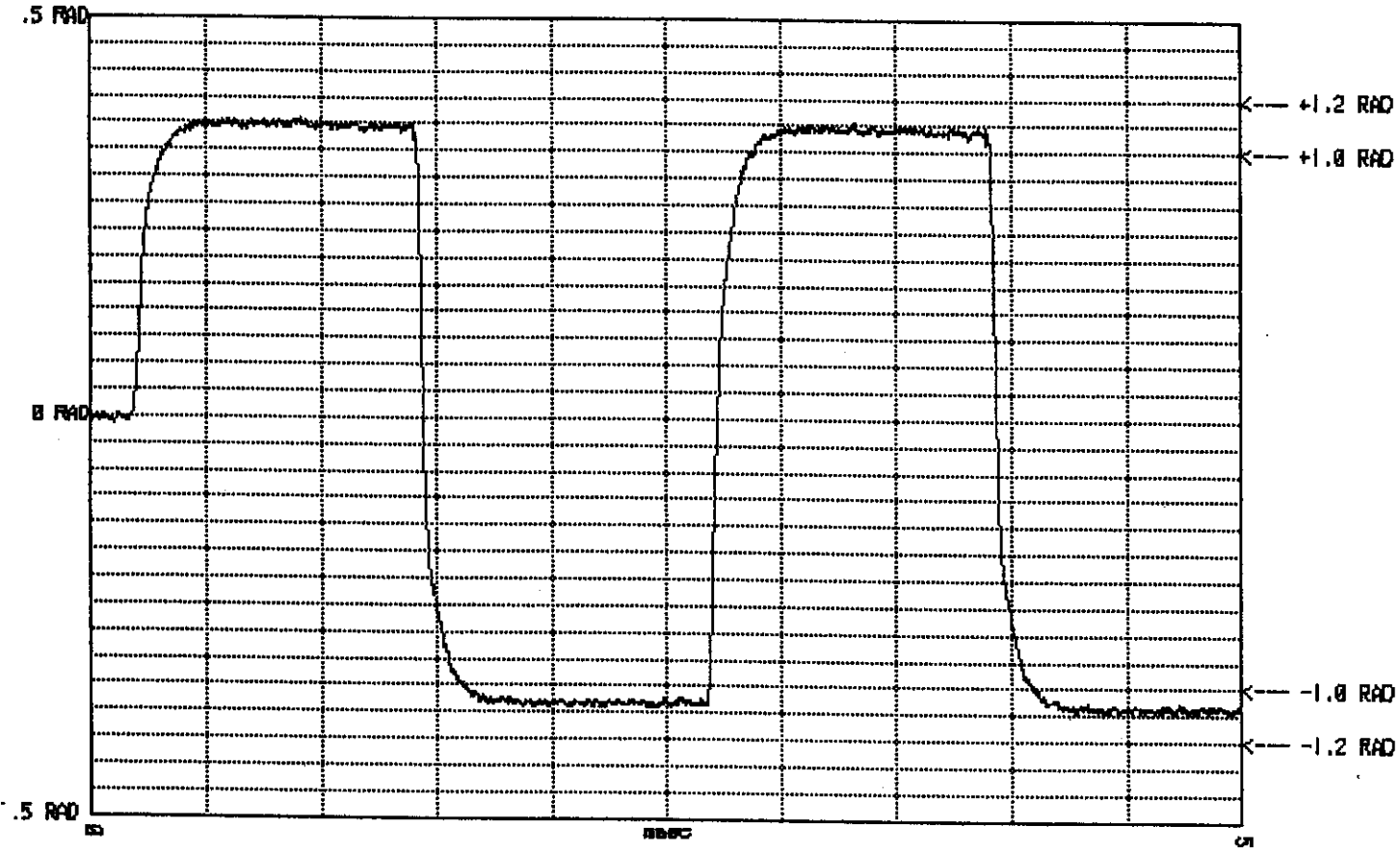
																					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2							

0	0	0	0	0	1	0	1	1	1	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0		

SMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 1 Aug 2002 TIME: 16:32:16

TESTED BY: [Signature] APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



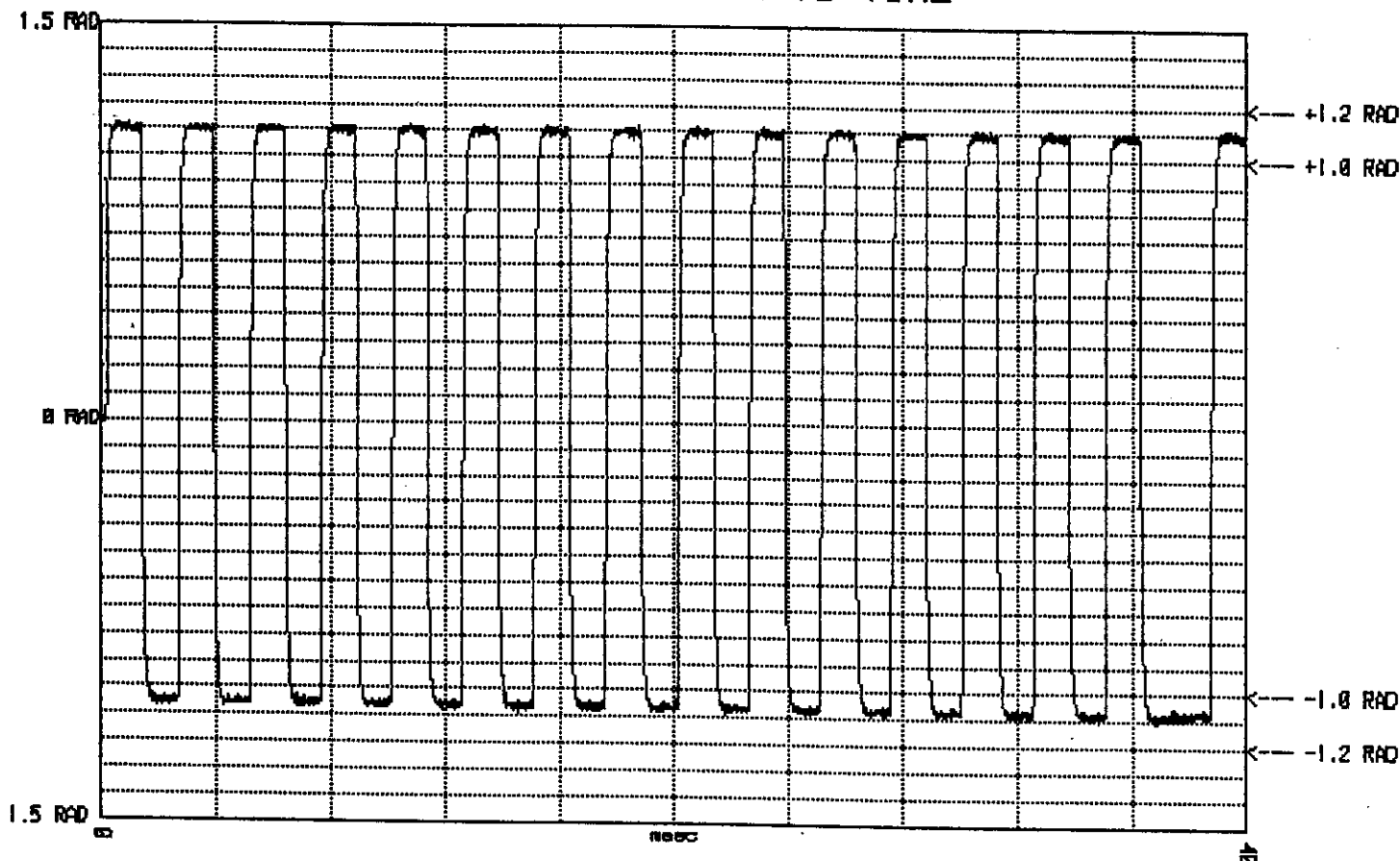
SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Modulation: symmetry	< 0.05	.0202		pas
Modulation: rise time	150 ±100	170.2	us	pas
fall time	150 ±100	165.8	us	pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
 MEASUREMENT DATE: 1 Aug 2002 TIME: 16:33:54

TESTED BY: *[Signature]*

APPROVED BY: *Rosa Barrineau*

PHASE MODULATION vs TIME



SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Phase modulation: + AVG	+1.1 ±0.1	1.10	rad	pas
- AVG	-1.1 ±0.1	-1.07	rad	pas

Peak positive phase modulation: 1.13 rad
 Peak negative phase modulation: -1.10 rad

A-I-12

WSMR ELECTRONIC PROVING GROUND, US ARMY, PORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
 MEASUREMENT DATE: 1 Aug 2002 TIME: 16:35:35

TESTED BY: J. [Signature]

APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.027928	MHz	pas
Short term frequency stability	< 2.0E-9	2.98E-10		pas
Medium term: mean slope	< 1.0E-9	+2.51E-11	/min	pas
residual deviation	< 3.0E-9	9.71E-11		pas
Tx output power level	3.15 TO 7.93	4.61	W	pas
Burst envelope: rise time	< 5	.89	ms	pas
fall time	< 5	1.51	ms	pas
Phase modulation: + AVG	+1.1 ±0.1	1.10	rad	pas
- AVG	-1.1 ±0.1	-1.07	rad	pas
Modulation: symmetry	< 0.05	.0202		pas
Modulation: rise time	150 ±100	170.2	us	pas
fall time	150 ±100	165.8	us	pas
Repetition period minimum	47.5 TO 52.5	48.5	s	pas
Repetition period maximum	47.5 TO 52.5	51.8	s	pas
Repetition period (max - min)	>1	3.3	s	pas
Total transmission time minimum	435.6 TO 444.4	441.1	ms	pas
Total transmission time maximum	435.6 TO 444.4	441.2	ms	pas
Cw preamble minimum	158.4 TO 161.6	159.8	ms	pas
Cw preamble maximum	158.4 TO 161.6	159.8	ms	pas
Message bit rate minimum	396.0 TO 404.0	401.3	bps	pas
Message bit rate maximum	396.0 TO 404.0	401.4	bps	pas

Manual Data Collection / Observation Record

Date: 8/7/02

Time: 0730

Tested by: J. 2th

Approved by: Rosa Barrineau

Test Description: 1st burst delay and power
out 1msec prior to burst @ ambient

Specification Reference: C/S T.007

Test Results: 1st burst delay = 4min, 13sec
power out = -36.6 dBm

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS AT MAXIMUM TEMP
MEASUREMENT DATE: 6 Aug 2002 TIME: 16:07:27

TESTED BY:

J. [Signature]

APPROVED BY:

Rosa Farrineau

SPURIOUS EMISSIONS

FREQUENCY
(MHz)

RESULTS
(dBc)

LIMITS
(dBc)

*** SPURIOUS TEST OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS AT MAXIMUM TEM
MEASUREMENT DATE: 6 Aug 2002 TIME: 20:08:37

TESTED BY: J. H.

APPROVED BY: Rosa Bannineau

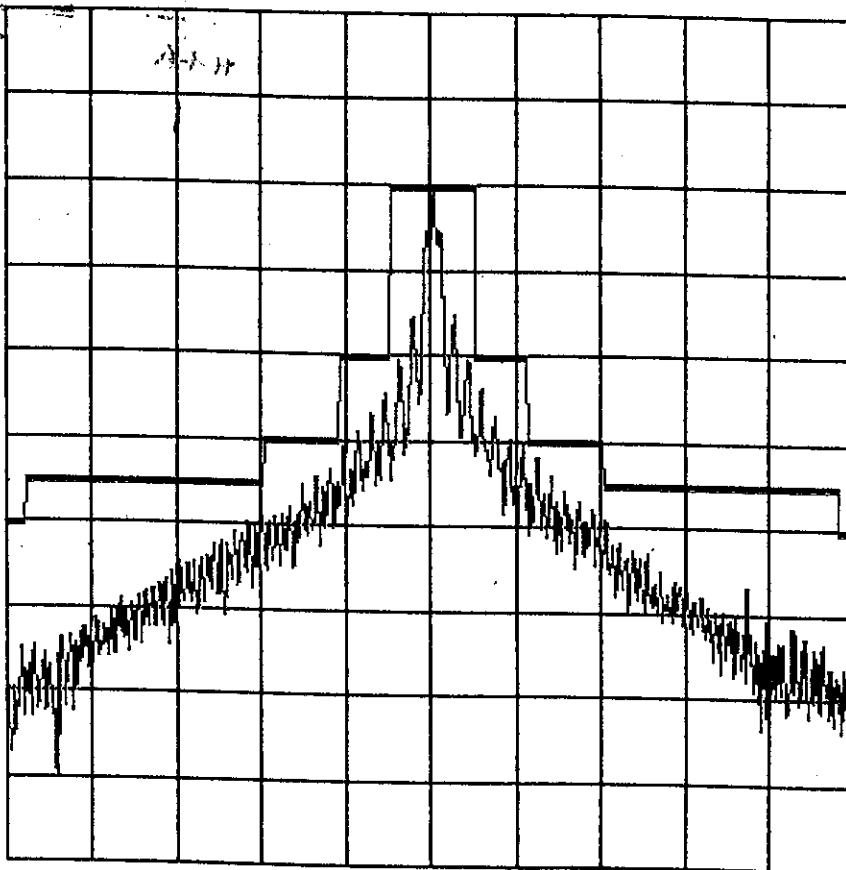
REF 20 dBm

6 Aug 2002

10 dB/

CENTER: 406.028MHz

SPAN: 50KHz



SPURIOUS EMISSIONS SPECTRUM

MR ELECTRONIC PROVING GROUND, US ARMY, PORT HUACHUCA, ARIZONA
INU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
EACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT MAXIM
ASUREMENT DATE: 6 Aug 2002 TIME: 20:09:42

TESTED BY:

[Signature]

APPROVED BY:

Rosa Barrineau

EACON DIGITAL MESSAGE VERIFICATION

YNCHRONIZATION 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 0 0 1 0 1 1 1 1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D D C 0 7 C 0 0 8 4 0 4 0 1 7 5 D 2 C 7

EACON BCH CODE VERIFICATION

CH 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 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0

Decoded: 0 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT MAXIM
MEASUREMENT DATE: 6 Aug 2002 TIME: 20:43:45

TESTED BY: J. 24

APPROVED BY: Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

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	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	1	1	1	1	1	1

BIT NUMBER:

4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	7	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		
0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0

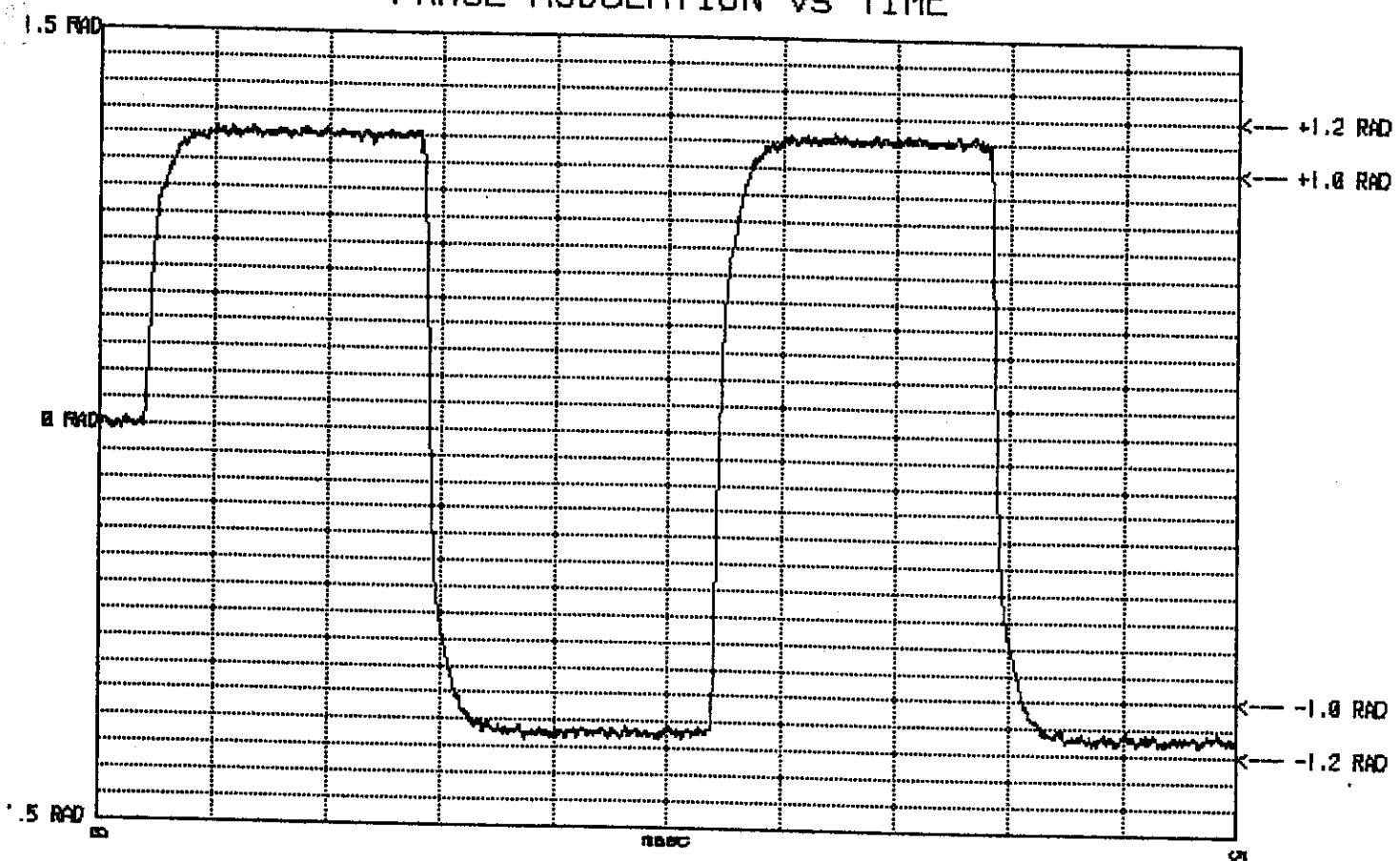
BIT NUMBER:

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	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							
0	0	0	0	0	1	0	1	1	1	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	0	0	1	1	1	1	1	1	1	0					

SMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT MAXIM
 MEASUREMENT DATE: 6 Aug 2002 TIME: 20:43:54

TESTED BY: J 2K APPROVED BY: Rosa Barinian

PHASE MODULATION vs TIME



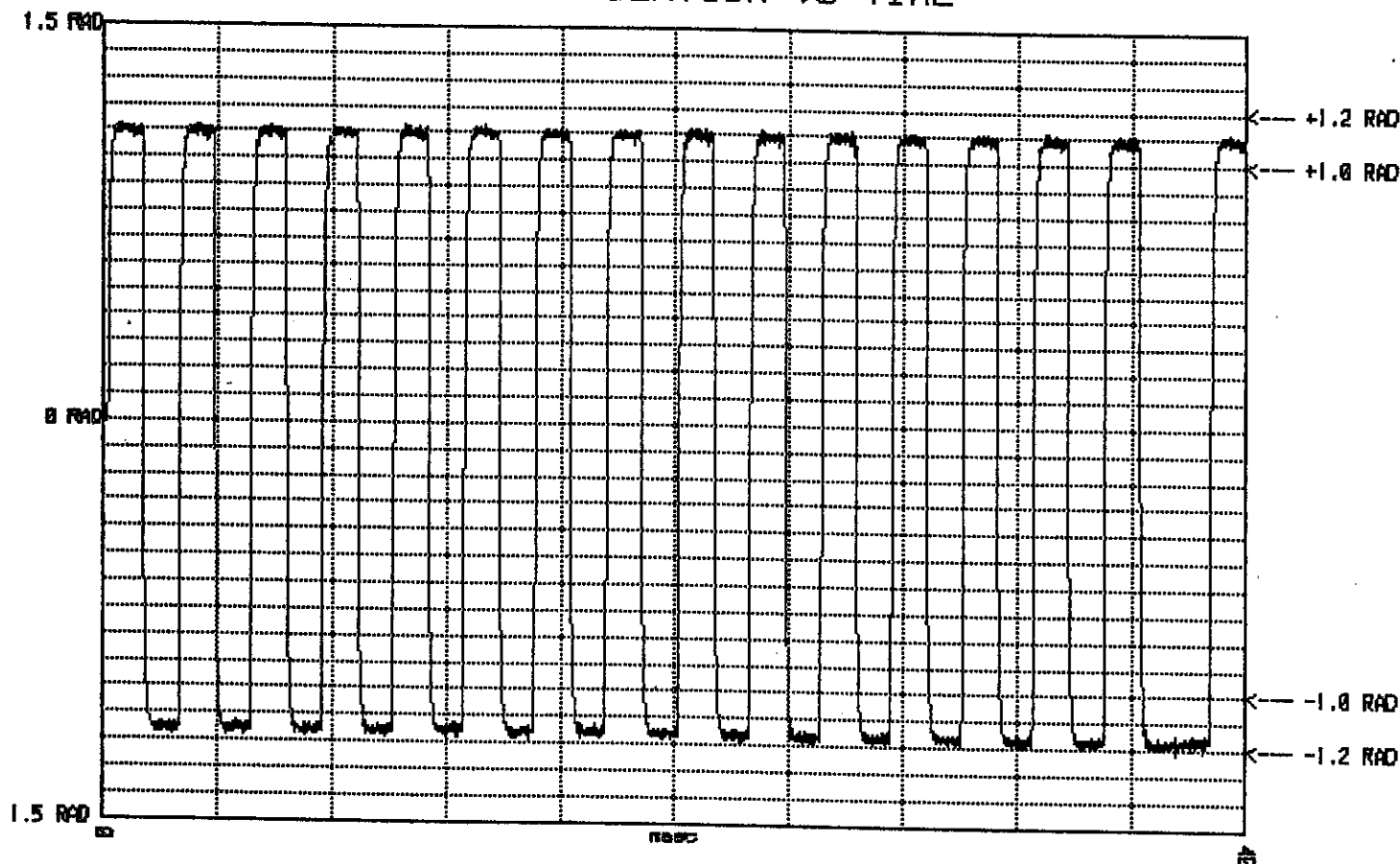
SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Modulation: symmetry	< 0.05	.0193		pas
Modulation: rise time	150 ±100	164.2	us	pas
fall time	150 ±100	161.8	us	pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT
 MEASUREMENT DATE: 6 Aug 2002 TIME: 20:45:32

TESTED BY: J. H.

APPROVED BY: Rosa Barineau

PHASE MODULATION vs TIME



SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COM
Phase modulation: + AVG	+1.1 $\pm$ 0.1	1.09	rad	pas
- AVG	-1.1 $\pm$ 0.1	-1.16	rad	pas

Peak positive phase modulation: 1.13 rad
 Peak negative phase modulation: -1.22 rad

A-I-20

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT
 MEASUREMENT DATE: 6 Aug 2002 TIME: 20:47:14

TESTED BY: J. J. [Signature]

APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.027984	MHz	pas
Short term frequency stability	< 2.0E-9	2.20E-10		pas
Medium term: mean slope	< 1.0E-9	+2.78E-11	/min	pas
residual deviation	< 3.0E-9	1.43E-10		pas
Tx ouput power level	3.15 TO 7.93	4.01	W	pas
Burst envelope: rise time	< 5	1.00	ms	pas
fall time	< 5	1.74	ms	pas
Phase modulation: + AVG	+1.1 ±0.1	1.09	rad	pas
- AVG	-1.1 ±0.1	-1.16	rad	pas
Modulation: symmetry	< 0.05	.0193		pas
Modulation: rise time	150 ±100	164.2	us	pas
fall time	150 ±100	161.8	us	pas
Repetition period minimum	47.5 TO 52.5	48.8	s	pas
Repetition period maximum	47.5 TO 52.5	51.5	s	pas
Repetition period (max - min)	>1	2.6	s	pas
Total transmission time minimum	435.6 TO 444.4	440.7	ms	pas
Total transmission time maximum	435.6 TO 444.4	440.8	ms	pas
Cw preamble minimum	158.4 TO 161.6	159.6	ms	pas
Cw preamble maximum	158.4 TO 161.6	159.7	ms	pas
Message bit rate minimum	396.0 TO 404.0	401.3	bps	pas
Message bit rate maximum	396.0 TO 404.0	401.5	bps	pas

Manual Data Collection / Observation Record

Date: 8/6/02

Time: 1600

Tested by: J. Whit

Approved by: Rosa Barineau

Test Description: 1st burst delay and power out
1 msec prior to burst @ maximum temp

Specification Reference: C/S T.007

Test Results: 1st burst delay = 4 minutes, 15 sec
Power out = -36.9 dBm

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
ANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS AT MINIMUM TEM
MEASUREMENT DATE: 6 Aug 2002 TIME: 11:53:02

TESTED BY: *J. [Signature]* APPROVED BY: *Rosa Barrineau*

SPURIOUS EMISSIONS

FREQUENCY (MHz)	RESULTS (dBc)	LIMITS (dBc)
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*** SPURIOUS TEST OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 6 Aug 2002 TIME: 13:02:15

TESTED BY: J. [Signature]

APPROVED BY: Rosa Barrineau

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 0 0 1 0 1 1 1 1

*** FRAME SYNCHRONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D D C 0 7 C 0 0 8 4 0 4 0 1 7 5 D 2 C 7

BEACON BCH CODE VERIFICATION

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 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0
Decoded: 0 1 1 1 0 1 0 1 1 1 0 1 0 0 1 0 1 1 0 0 0

*** BCH CODE OK ***

TESTED BY:

APPROVED BY:

BIT NUMBER:

BIT NUMBER:

BIT NUMBER:

```

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
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
-----
0 0 0 0 0 1 0 1 1 1 0 1 0 1 1 0 1 0 0 1 0 1 1 0 0 0 0 1 1 1 1 1 0

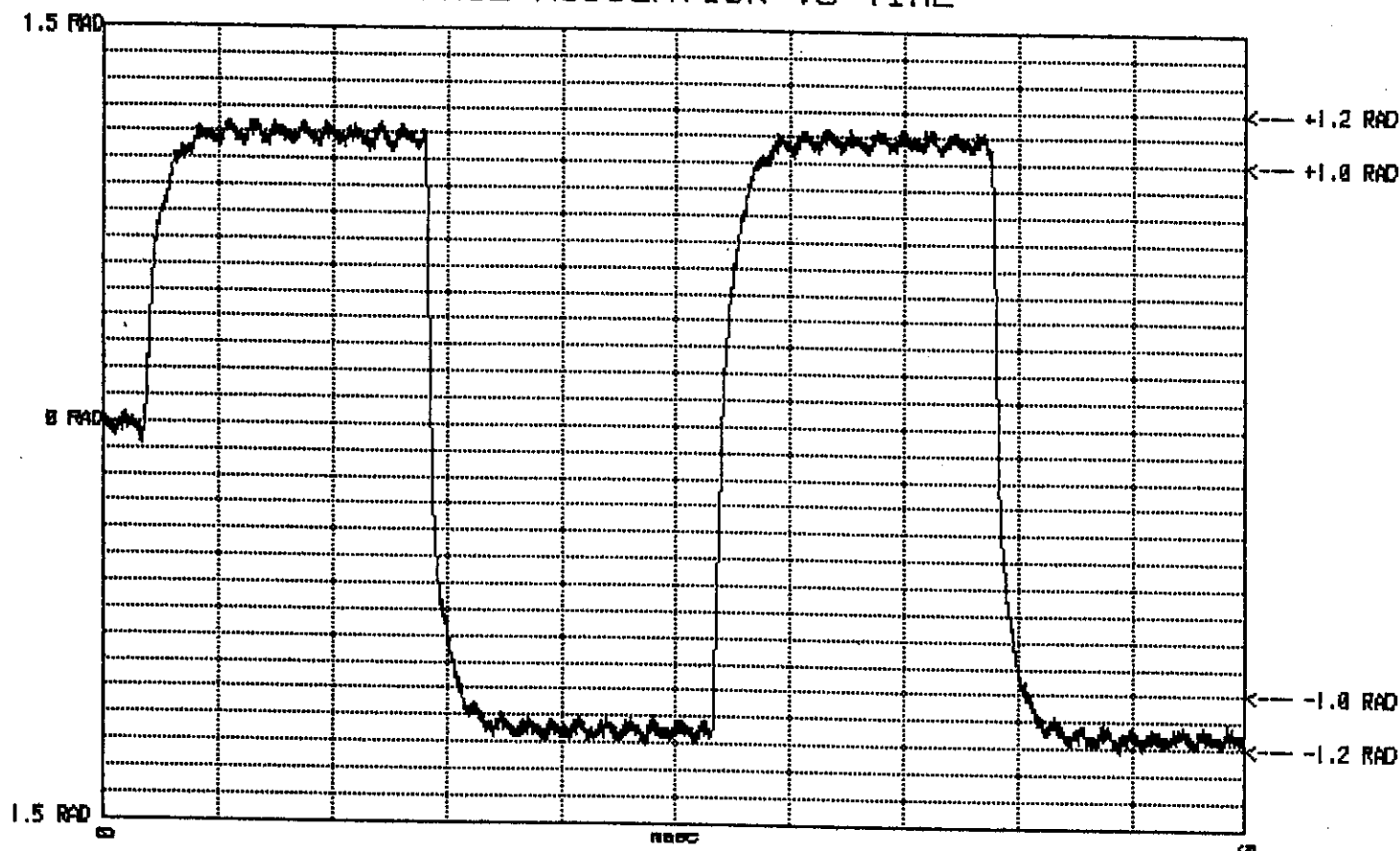
```

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
 MEASUREMENT DATE: 6 Aug 2002 TIME: 13:36:17

TESTED BY: J. [Signature]

APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



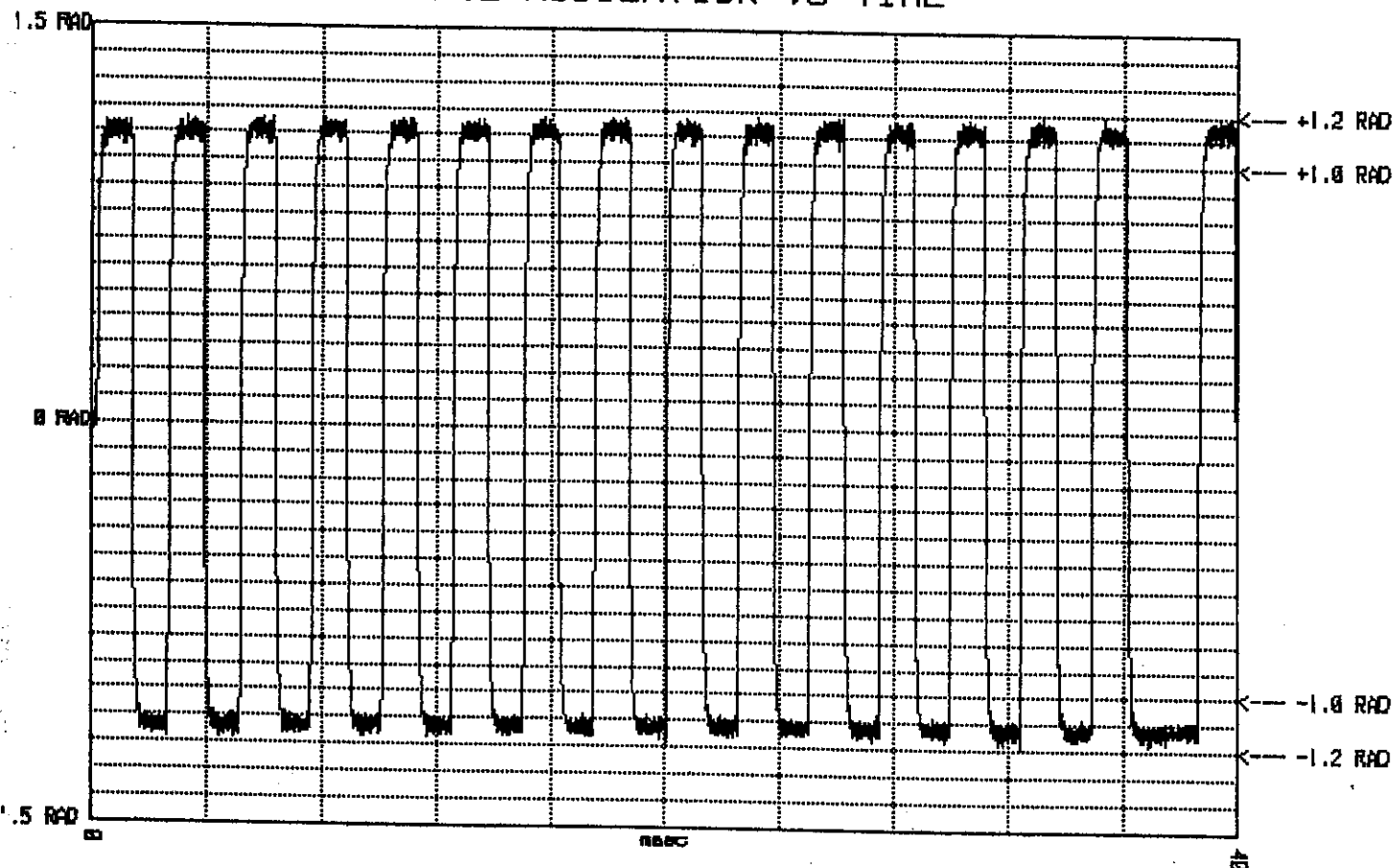
SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COM
Modulation: symmetry	< 0.05	.0236		pas
Modulation: rise time	150 ±100	172.2	us	pa
Modulation: fall time	150 ±100	167.8	us	pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
 MEASUREMENT DATE: 6 Aug 2002 TIME: 13:37:56

TESTED BY: J. [Signature]

APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Phase modulation: + AVG	+1.1 ±0.1	1.12	rad	pas
- AVG	-1.1 ±0.1	-1.13	rad	pas

Peak positive phase modulation: 1.20 rad
 Peak negative phase modulation: -1.19 rad

A-I-27

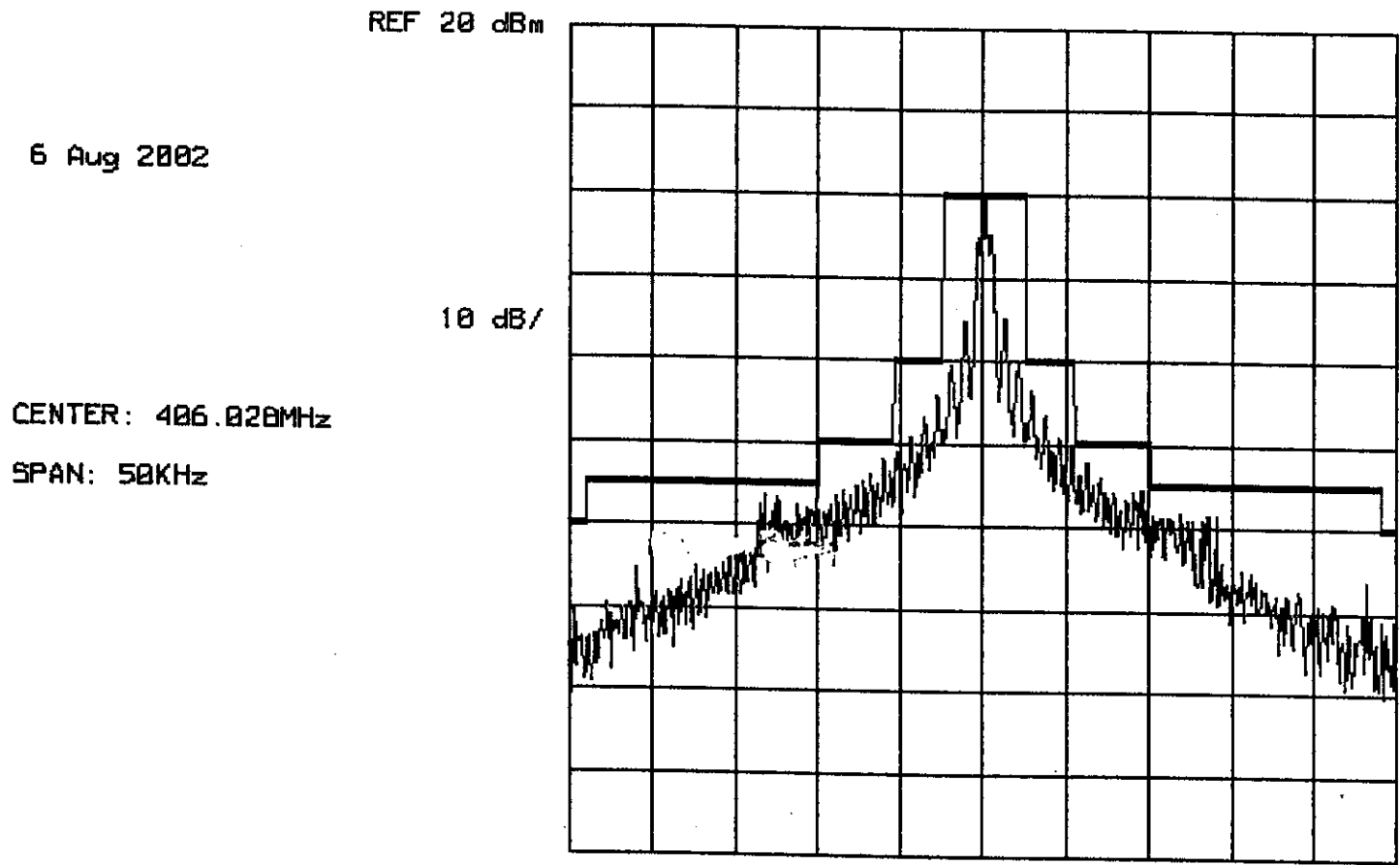
WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
 MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
 BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
 MEASUREMENT DATE: 6 Aug 2002 TIME: 13:39:36

TESTED BY: *[Signature]*

APPROVED BY: *Rosa Barrineau*

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.027933	MHz	pas
Short term frequency stability	< 2.0E-9	5.61E-10		pas
Medium term: mean slope	< 1.0E-9	-4.10E-12	/min	pas
residual deviation	< 3.0E-9	1.60E-10		pas
Tx output power level	3.15 TO 7.93	4.35	W	pas
Burst envelope: rise time	< 5	.97	ms	pas
fall time	< 5	.74	ms	pas
Phase modulation: + AVG	+1.1 ±0.1	1.12	rad	pas
- AVG	-1.1 ±0.1	-1.13	rad	pas
Modulation: symmetry	< 0.05	.0236		pas
Modulation: rise time	150 ±100	172.2	us	pas
fall time	150 ±100	167.8	us	pas
Repetition period minimum	47.5 TO 52.5	48.8	s	pas
Repetition period maximum	47.5 TO 52.5	51.4	s	pas
Repetition period (max - min)	>1	2.6	s	pas
Total transmission time minimum	435.6 TO 444.4	439.9	ms	pas
Total transmission time maximum	435.6 TO 444.4	440.0	ms	pas
Cw preamble minimum	158.4 TO 161.6	159.3	ms	pas
Cw preamble maximum	158.4 TO 161.6	159.6	ms	pas
Message bit rate minimum	396.0 TO 404.0	402.8	bps	pas
Message bit rate maximum	396.0 TO 404.0	403.1	bps	pas

SMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: DME CORP MODEL NO: SRB-406 SERIAL NO: 126978
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS AT MINIMUM TEM
MEASUREMENT DATE: 6 Aug 2002 TIME: 11:54:17
TESTED BY: [Signature] APPROVED BY: Rosa Barrineau



SPURIOUS EMISSIONS SPECTRUM

Manual Data Collection / Observation Record

Date: 8/6/02

Time: 1300

Tested by: J. H.

Approved by: Rosa Bruneau

Test Description: 1st burst delay and power output
1 msec prior to burst at minimum
temp

Specification Reference: C/S T.007

Test Results: 1st burst delay = 4 minutes, 13 sec
Pwr out = -36 dBm

ANNEX II. THERMAL SHOCK TEST

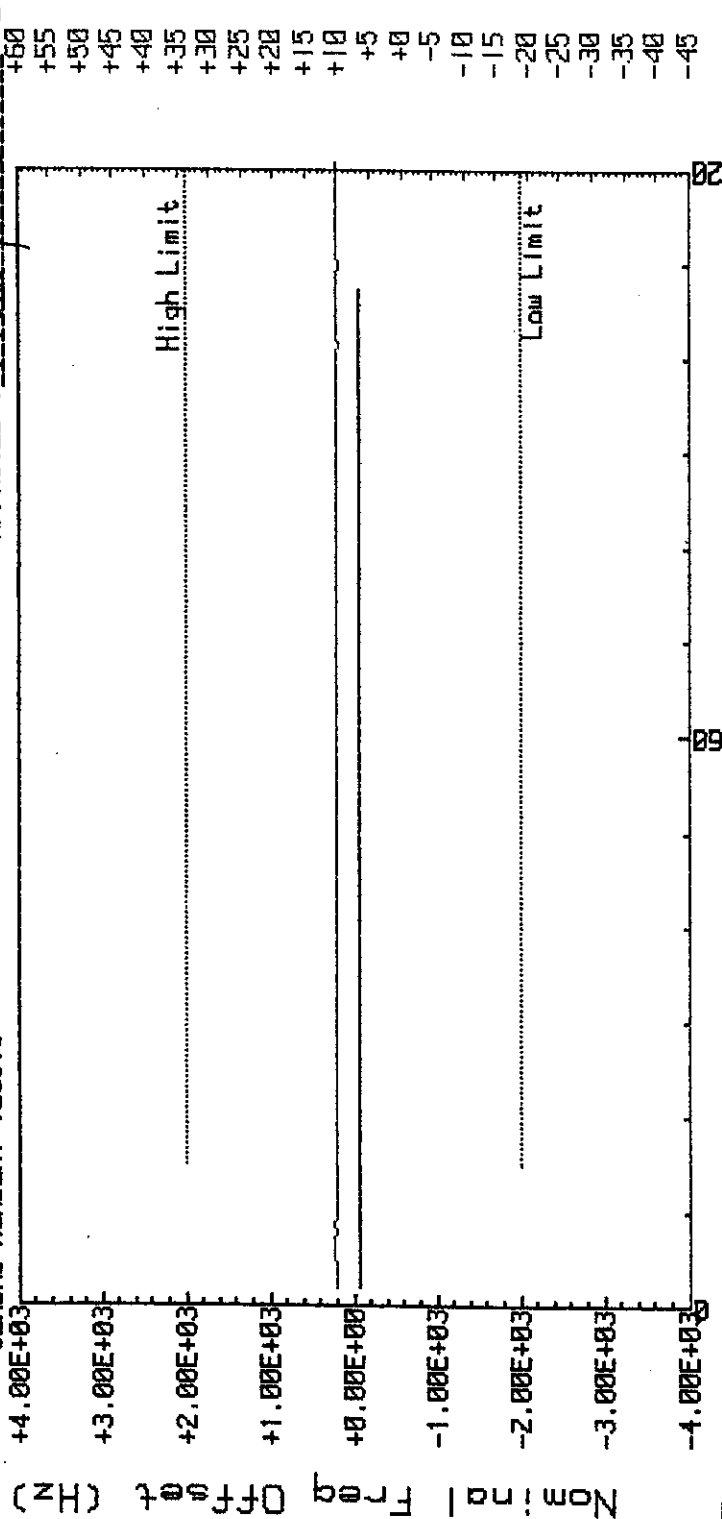
THERMAL SHOCK TEST BEACON NOMINAL FREQUENCY

MANUFACTURER: DME CORP
MODEL NUMBER: SRB-406
SERIAL NUMBER: 126976

DATE: 9 Aug 2006

TESTED BY: *P. H. [Signature]*

APPROVED: *Rosa [Signature]*



THERMAL SHOCK TEST BEACON SHORT TERM STABILITY

MANUFACTURER: DME CORP

MODEL NUMBER: SRB-426

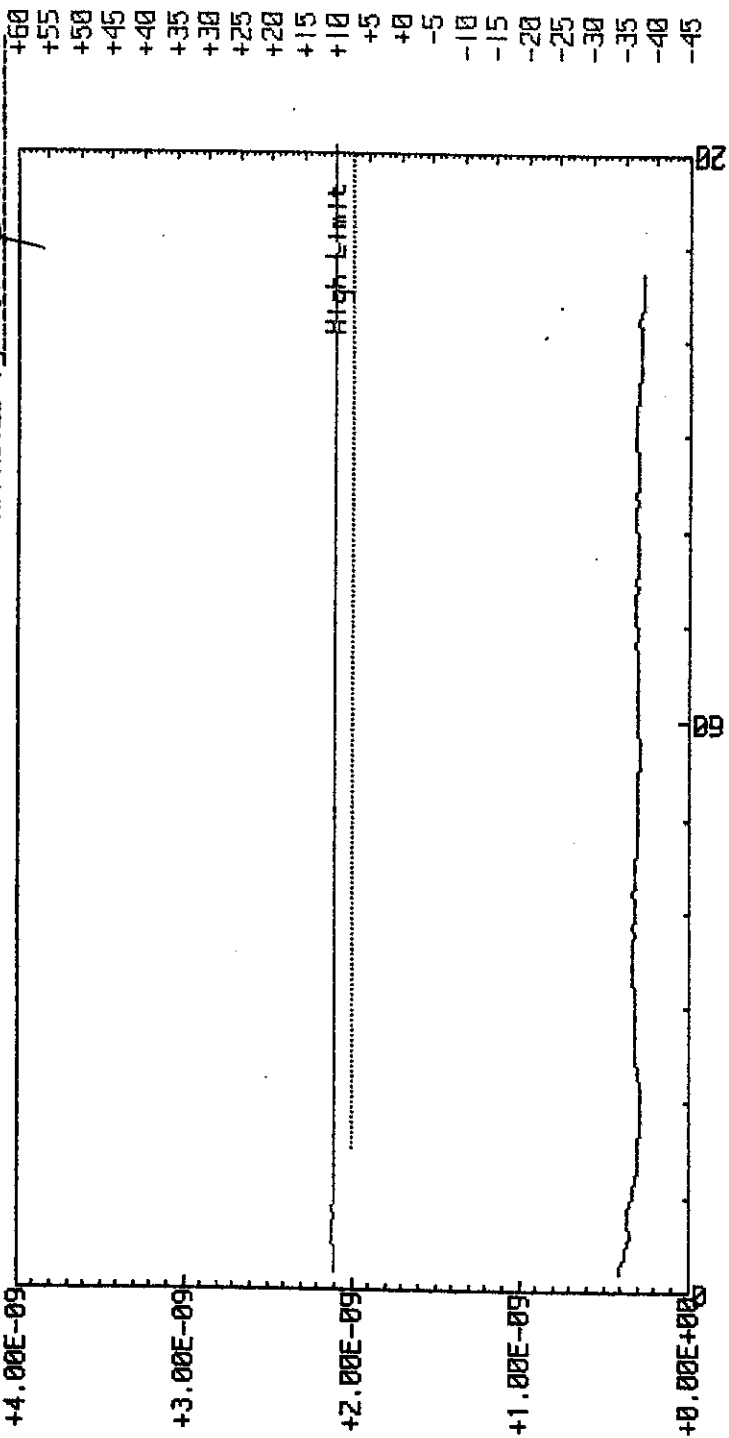
SERIAL NUMBER: 126978

DATE: 9 Aug 2002

TESTED BY: *P. J.*

APPROVED: *Rosa Barineau*

Short term (part in 10⁹)



Time (minutes)

THERMAL SHOCK TEST BEACON MEDIUM TERM STABILITY

MANUFACTURER: DME CORP

MODEL NUMBER: SRB-426

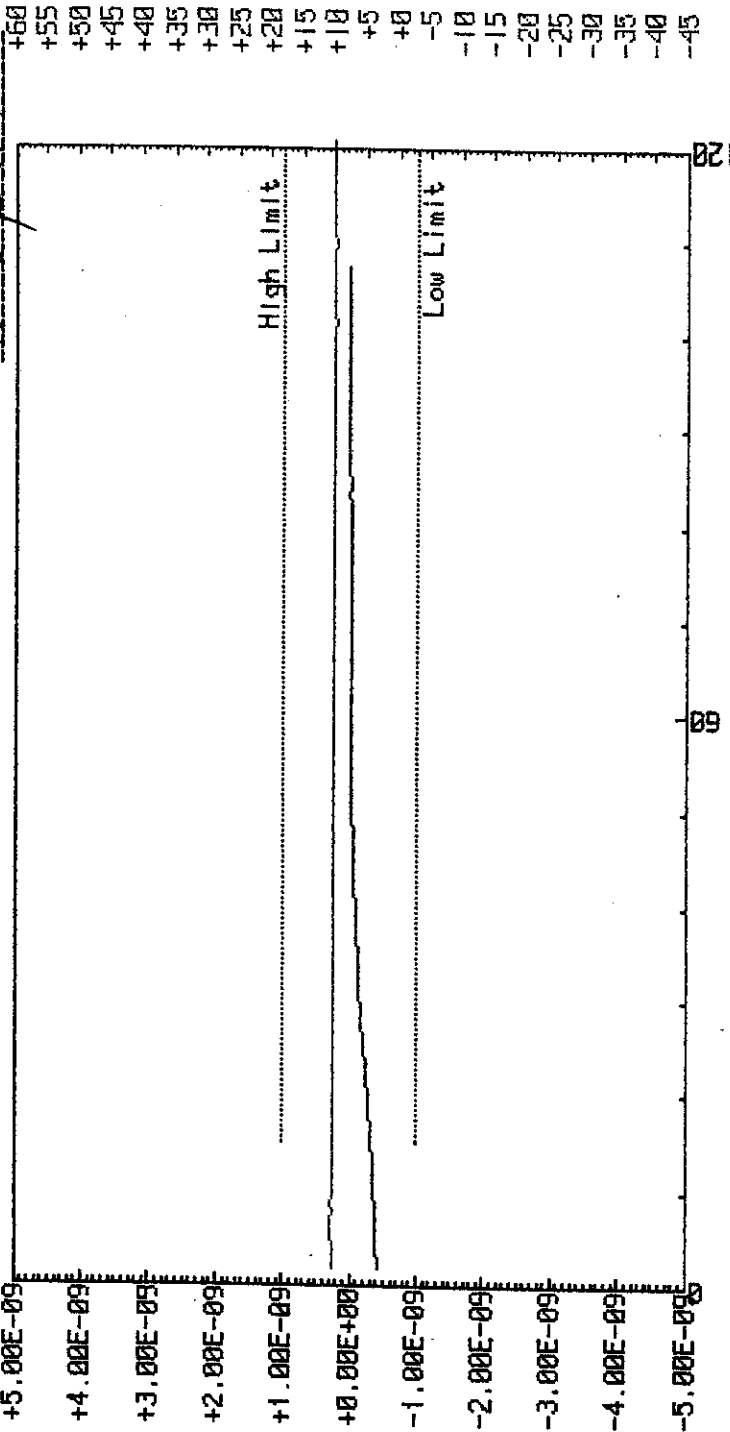
SERIAL NUMBER: 126978

DATE: 9 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barineau*

Mean Slope (part in 10^9 /in)



THERMAL SHOCK TEST BEACON MEDIUM TERM STABILITY

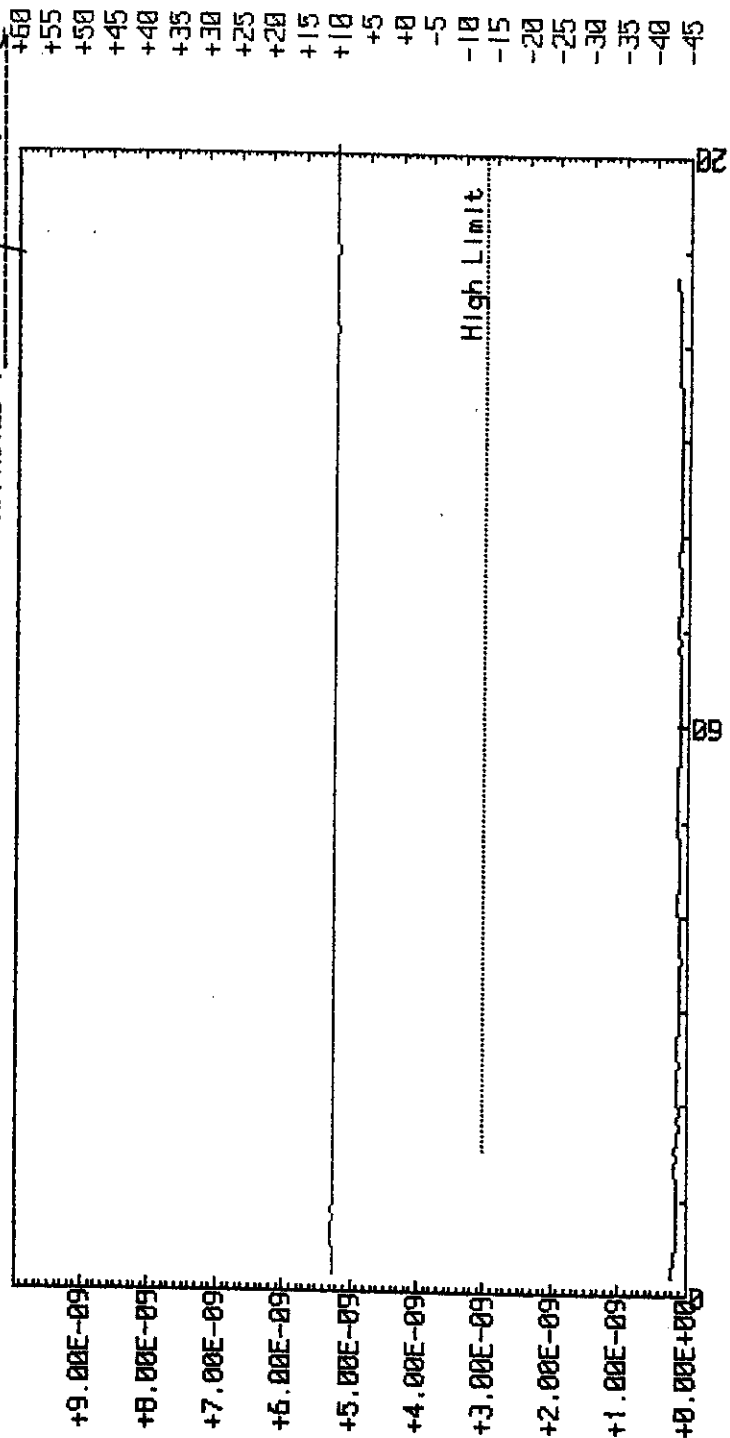
MANUFACTURER: DME CORP
MODEL NUMBER: SRB-406
SERIAL NUMBER: 126978

DATE: 9 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barinau*

Res. freq. var. (part in 10^4)



THERMAL SHOCK TEST 406 SIGNAL OUTPUT POWER

MANUFACTURER: DME CORP
MODEL NUMBER: SRS-406
SERIAL NUMBER: 126978

DATE: 9 Aug 2002

TESTED BY: *[Signature]*

APPROVED: *Rosa Barrineau*

