3.2.2.2.5 Data Reduction and Presentation.

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

3.2.2.3 Spurious Output

3.2.2.3.1 Scope.

a. References: C/S T.001, paragraph 2.3.4.

b. The objective was to determine the level of the transmitter harmonic and spurious signals. These are unwanted signals at discrete frequencies due to frequency synthesis or to non-linearities at the output stages of the transmitter.

c. A *harmonic* is a signal with a frequency which is an integer multiple of the transmitter frequency.

d. A *spurious signal* is an unwanted signal with a frequency that is not an integer multiple of the transmitter frequency.

e. Harmonic and spurious signal powers are expressed as levels in decibels with reference to the carrier (dBc), related to the transmitter power.

3.2.2.3.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System (see Figure 3-1).
  - IBM Compatible Computer System
  - HP-8568B Spectrum Analyzer
  - HP-8662A Synthesizer
  - HP-1631D Logic Analyzer
  - 20-dB Attenuator
  - 3-dB Attenuator
  - 2 each HP-11667A Power Splitter

3.2.2.3.3 Test Conditions.

a. Normal ambient conditions or any other specified environmental conditions.

b. Nominal operating voltage.

3.2.2.3.4 Test Procedures.

a. The Spectrum Analyzer was programmed with the following settings:

Center frequency:	406.025 MHz
Frequency span:	50.000 kHz
Resolution Bandwidth:	100.000 Hz
Sweep time:	10 seconds
Trace mode:	maximum hold

b. The "maximum hold" mode displayed and held on the cathode ray tube (CRT), the maximum response of the input signal. In order to capture the spectral characteristics of the 406-MHz signal, the Spectrum Analyzer sweep was allowed to freely run continuously until the full spectral response was integrated without gaps. The integration period could take up to 5 hours. In order to facilitate expeditious completion of this process, the trigger of the Spectrum Analyzer was dithered under program control to randomize over a small period, the start of the sweep.

c. When the spectral response was fully integrated or after 5 hours (whichever came first), the marker peak function found the unmodulated carrier amplitude that was the 0-dB carrier reference. The marker function of the Spectrum Analyzer and the computer verified that the spurious response was lower than the allowable limits as indicated in Figure 3-5.

3.2.2.3.5 Data Reduction and Presentation.

a. Presented the computer plots of the spectral response with the limit mask superimposed on the spectral response.

b. Presented the recorded data in tabulated form with the frequency and amplitude of those spurs, which exceeded the specified limits.

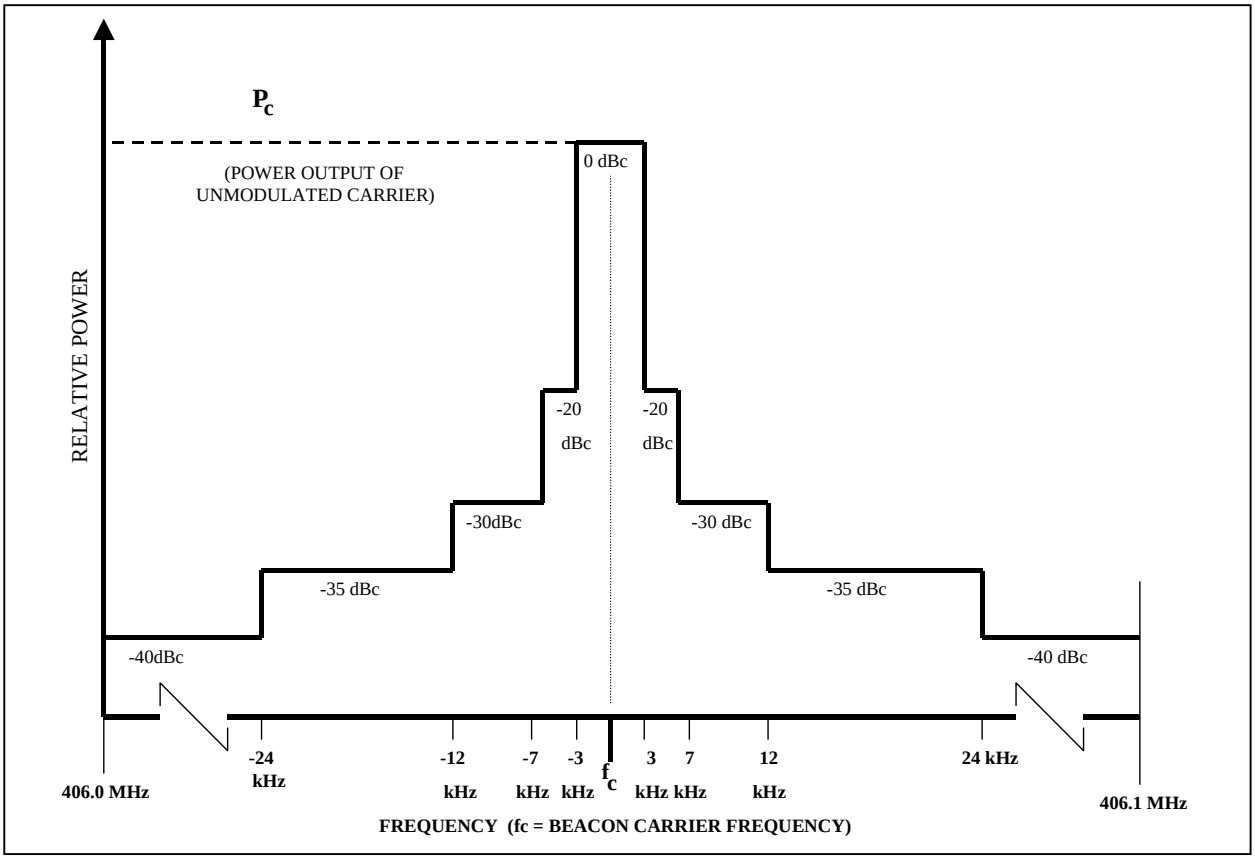


Figure 3-5. In-band spurious emission mask.

3.2.3 Data Encoding and Modulation

3.2.3.1 Scope.

a. References:

(1) C/S T.001, paragraph 2.3.5.

(2) C/S T.001, paragraph 2.3.6.

b. The objective was to measure data encoding, modulation sense, modulation phase deviation, modulation rise and fall times, and modulation symmetry of the bi-phase demodulated signal were measured.

3.2.3.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System (see Figure 3-1.)
  - IBM Compatible Computer System
  - HP-1631D Logic Analyzer
  - HP-8901A Modulation Analyzer/Down Converter
  - HP-5371A Frequency and Time Interval Analyzer
  - HP-8662A Frequency Synthesizer
  - HP-11667A Power Splitter (2 each)
  - 20-dB Attenuator
  - 10-dB Attenuator
  - 3-dB Attenuator

3.2.3.3 Test Conditions.

a. Normal ambient conditions or any other specified environmental conditions.

b. Nominal operating voltage.

3.2.3.4 Test Procedure.

a. The Frequency and Time Interval Analyzer captured time versus event data of the down converted modulated burst waveform.

b. Following capture of the time versus event data, the data were processed to remove the effect of the difference between the actual carrier frequency and the estimated carrier frequency represented by the downconverter frequency. This removed the increasing phase versus time offset, which would compromise the accuracy of the measurement of the demodulated waveform characteristics.

c. Modulation rise and fall times, modulation symmetry, and phase deviation were then derived from the processed waveform.

3.2.3.5 Data Reduction and Presentation.

a. Presented a printout of the modulation waveform and tabulated data on the measure modulation parameters.

b. Annotated those readings which exceeded specified limits.

3.3 VOLTAGE STANDING WAVE RATIO

3.3.1 Scope.

a. References:

(1) C/S T.001, paragraph 2.3.7.

(2) C/S T.007 Annex A, paragraph A3.3.

b. The objective was to determine if the transmitter would be damaged by any load from open circuit to short circuit. For the purpose of this test, the test loads were:

(1) Open circuit

(2) Short circuit

(3) 3:1 VSWR load

3.3.2 Facilities and Instrumentation.

- Environmental Test Facility

- Cospas-Sarsat Measurement System (see Figure 3-1).
- IBM Compatible Computer System
- HP-1631D Logic Analyzer
- HP-5371A Frequency and Time Interval Analyzer
- 20-dB Attenuator
- 3-dB Attenuator w/shorting plug
- 3-dB Attenuator
- HP-1667A Power Splitter (2 each)

3.3.3 Test Conditions.

a. Normal ambient conditions or any other environmental conditions.

b. Nominal operating voltage.

3.3.4 Test Procedure.

3.3.4.1 Mismatched Load Simulation.

a. Short circuit condition was achieved with a shorting connector attached to the end of the transmission cable.

b. A 3:1 VSWR was achieved by using a 3-dB attenuator with a shorting connector attached to one end of the attenuator. This configuration presented a load to the transmitter with 6-dB return loss. The shorted attenuator was then attached to the end of the transmission cable.

3.3.4.2 Measurement Procedure.

a. With the transmitter on, a short circuit condition was applied to the transmitter output for 5 minutes.

b. An open circuit condition was then applied to the transmitter output for 5 minutes.

c. A 3:1 VSWR load was then applied to the transmitter output for 5 minutes.

d. Measured the transmitter nominal frequency, digital message content, and modulation parameters to verify that transmitter performance had not been degraded.

3.3.5 Data Reduction and Presentation.

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

3.4 SELF-TEST MODE

3.4.1 Scope.

a. Reference: C/S T.001, paragraph 2.3.7

b. The objective was to test the built-in self-test capability of the UUT.

3.4.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System (see Figure 3-1).
  - IBM Compatible Computer System
  - HP-1631D Logic Analyzer
  - HP-5371A Frequency and Time Interval Analyzer
  - 20-dB Attenuator
  - 3-dB Attenuator w/shorting plug
  - 3-dB Attenuator
  - HP-1667A Power Splitter (2 each)

3.4.3 Test Conditions.

a. Normal ambient conditions or any other specified environmental conditions.

b. Perform these tests on the modulated portion of the carrier.

c. Nominal operating voltage.

3.4.4 Test Procedure.

a. Activated the self-test mode on the UUT.

b. The modulated portion of the transmitted signal was demodulated.

c. The message data were decoded and the encoded location was checked for the correct default code. The format flag bit was reported.

d. Checked the frame synchronization pattern and encoded location for the default code.

e. Burst envelope timing was measured to ensure compliance to specification.

3.4.5 Data Reduction and Presentation.

a. Processed the bit sequence captured by the measurement system.

b. Presented the decoded message by field and checked the results for validity and compliance with the format for each field. Verified that the decoded message complied with the test user protocol.

3.5 ANTENNA CHARACTERISTICS

3.5.1 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 406.025 MHz.

3.5.1 Facilities and Instrumentation.

- Antenna Test Facility

  - 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

3.5.2 Test Conditions.

a. Normal ambient conditions or any other environmental conditions.

b. Nominal operating voltage.

3.5.4 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).

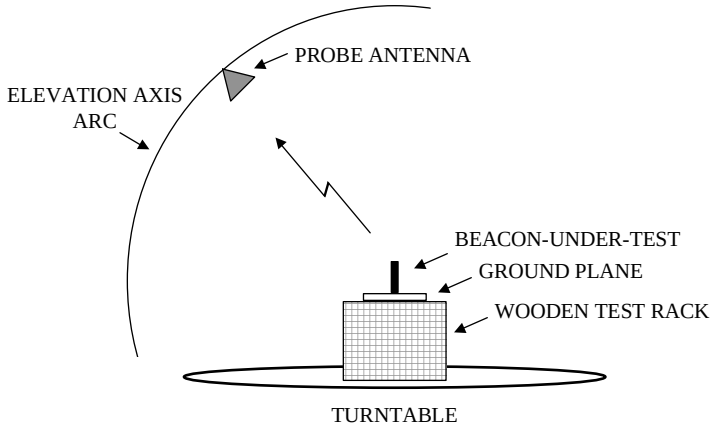


Figure 3-6. Arc Range

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 polariztion levels for all of the 60 azimuth/elevation points (100% of all data collected).

3.5.5 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 Test

Ambient Temperature

Maximum Temperature

Minimum Temperature

Annex II. Frequency Stability Test with Temperature Gradient

Annex III. Thermal Shock Test

Annex IV. Operating Lifetime at Minimum Temperature

Annex V. Self-Test Mode

Intentionally Blank

ANNEX I. ELECTRICAL AND FUNCTIONAL TESTS AT CONSTANT TEMPERATURE

AMBIENT TEMPERATURE

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 2 Oct 2000 TIME: 15:38:56

TESTED BY: _____ **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 C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

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

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 2 Oct 2000 TIME: 15:58:28

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

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
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	0	1	1	

BIT NUMBER:

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0

BIT NUMBER:

81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0	

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 2 Oct 2000 TIME: 15:58:29

TESTED BY: _____ APPROVED BY: Rosa Barrineau

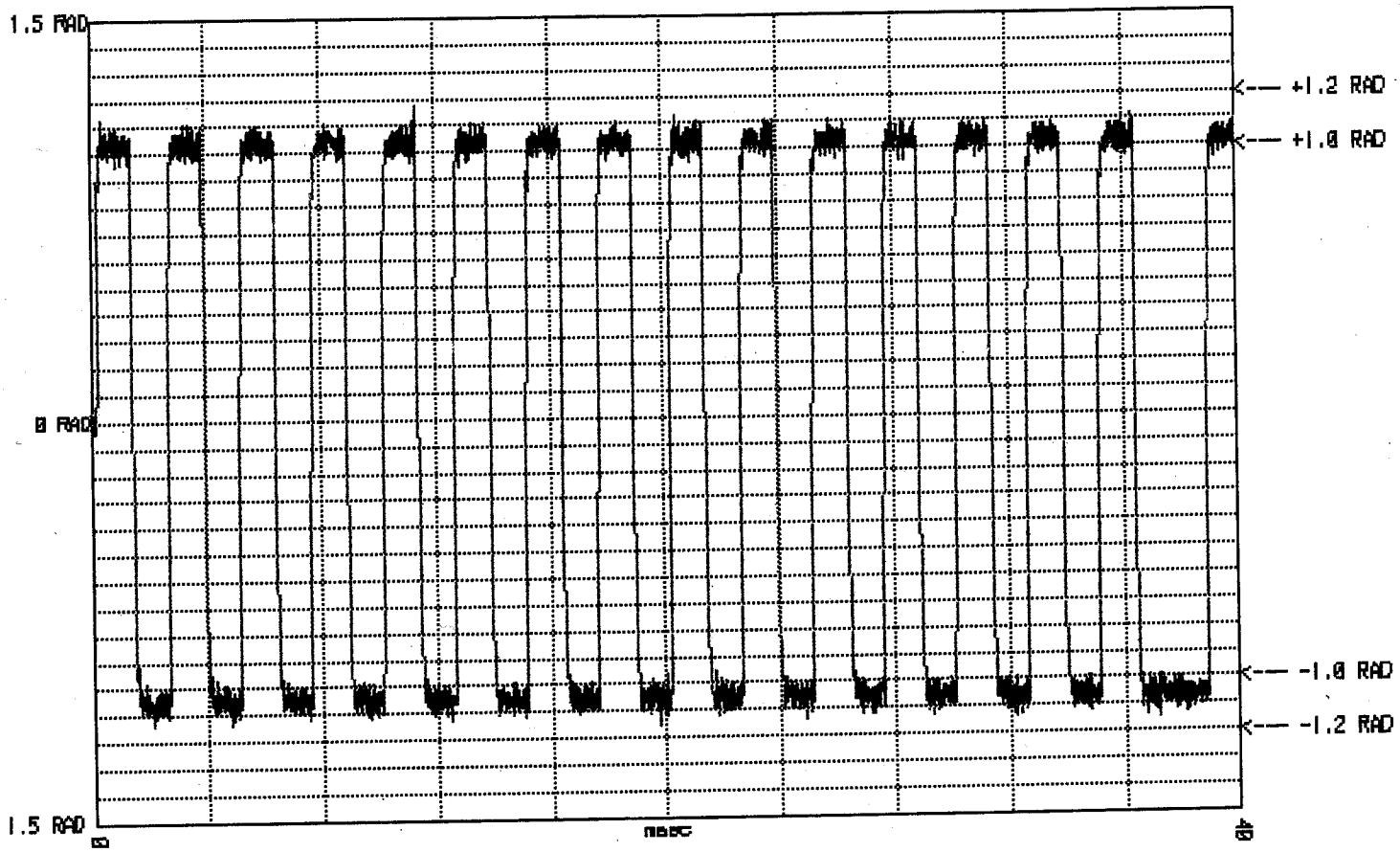
PHASE MODULATION vs TIME

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Modulation: symmetry	< 0.05	0.0000		passed
Modulation: rise time	150 ±100	134.2	us	passed
fall time	150 ±100	129.8	us	passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 2 Oct 2000 TIME: 16:00:11

TESTED BY: _____ APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



SPECIFICATIONS TESTED		LIMITS	RESULTS	UNITS	COMMENTS
Phase modulation:	+ AVG	+1.1 ±0.1	1.04	rad	passed
	- AVG	-1.1 ±0.1	-1.05	rad	passed

Peak positive phase modulation: 1.18 rad
Peak negative phase modulation: -1.15 rad

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - FULL PARAMETER AMBIENT
MEASUREMENT DATE: 2 Oct 2000 TIME: 16:01:51

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Nominal transmitted frequency	406.028 ±.001	406.028022	MHz	passed
Short term frequency stability	< 2.0E-9	4.32E-10		passed
Medium term: mean slope	< 1.0E-9	-3.00E-11	/min	passed
residual deviation	< 3.0E-9	6.03E-10		passed
Tx ouput power level	3.15 TO 7.93	4.57	W	passed
Burst envelope: rise time	< 5	.52	ms	passed
fall time	< 5	< 0.01	ms	passed
Phase modulation: + AVG	+1.1 ±0.1	1.04	rad	passed
- AVG	-1.1 ±0.1	-1.05	rad	passed
Modulation: symmetry	< 0.05	0.0000		passed
Modulation: rise time	150 ±100	134.2	us	passed
fall time	150 ±100	129.8	us	passed
Repetition period minimum	47.5 TO 52.5	48.3	s	passed
Repetition period maximum	47.5 TO 52.5	52.2	s	passed
Repetition period (max - min)	>1	3.9	s	passed
Total transmission time minimum	435.6 TO 444.4	439.4	ms	passed
Total transmission time maximum	435.6 TO 444.4	439.4	ms	passed
Cw preamble minimum	158.4 TO 161.6	159.1	ms	passed
Cw preamble maximum	158.4 TO 161.6	159.3	ms	passed
Message bit rate minimum	396.0 TO 404.0	399.9	bps	passed
Message bit rate maximum	396.0 TO 404.0	400.1	bps	passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS
MEASUREMENT DATE: 2 Oct 2000 TIME: 16:18:00

TESTED BY: _____ 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: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS
MEASUREMENT DATE: 2 Oct 2000 TIME: 19:13:23

TESTED BY: CBol APPROVED BY: Rosa Barrineau

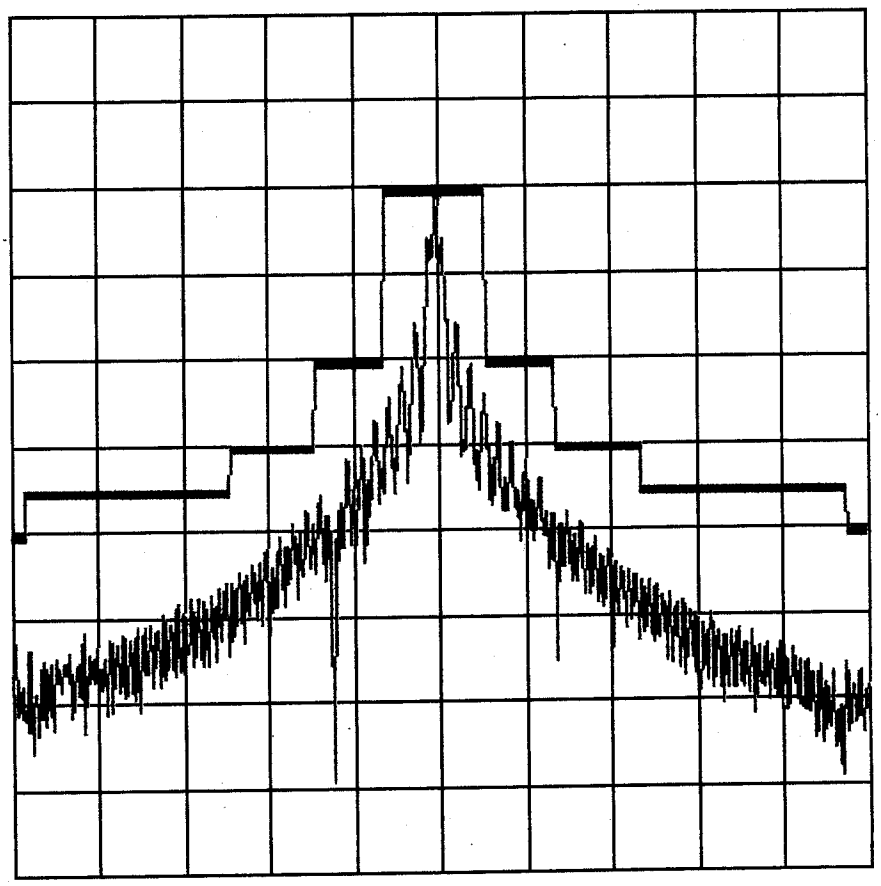
REF 20 dBm

2 Oct 2000

10 dB/

CENTER: 406.028MHz

SPAN: 50KHz



SPURIOUS EMISSIONS SPECTRUM

Post open/short/VSWR (ambient)

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 2 Oct 2000 TIME: 19:14:14

TESTED BY: CBL **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 C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

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

*** BCH CODE OK ***

First burst delay time: 52.0 sec (ambient)

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 2 Oct 2000 TIME: 19:49:02

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

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
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	0	1	1

BIT NUMBER:

40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0

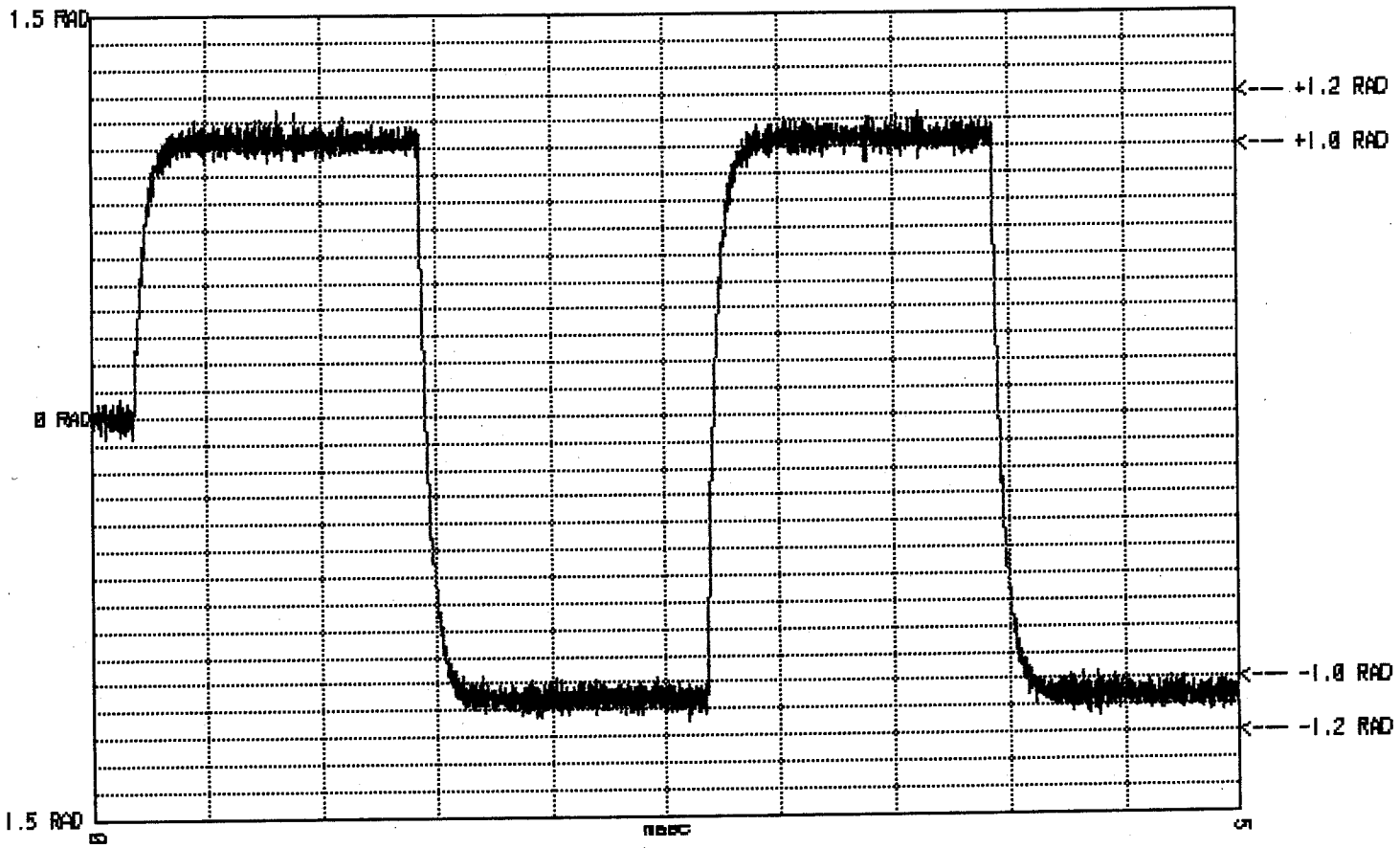
BIT NUMBER:

79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0			

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 2 Oct 2000 TIME: 19:49:03

TESTED BY: _____ APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME

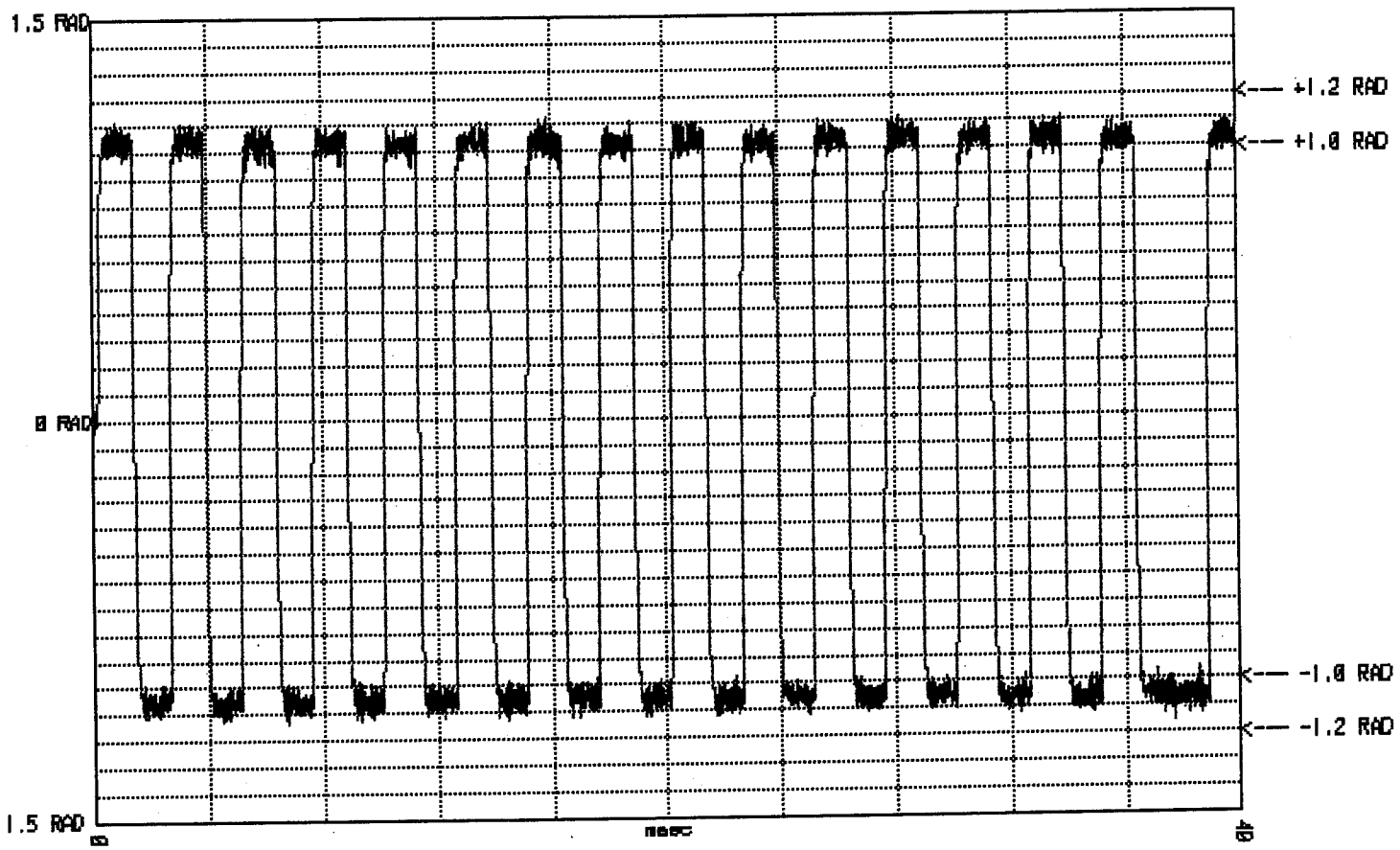


SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Modulation: symmetry	< 0.05	.0019		passed
Modulation: rise time	150 ±100	117.5	us	passed
fall time	150 ±100	122.5	us	passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 2 Oct 2000 TIME: 19:50:42

TESTED BY: _____ APPROVED BY: Rosa Barrineau

PHASE MODULATION vs TIME



SPECIFICATIONS TESTED		LIMITS	RESULTS	UNITS	COMMENTS
Phase modulation:	+ AVG	+1.1 ±0.1	1.04	rad	passed
	- AVG	-1.1 ±0.1	-1.05	rad	passed

Peak positive phase modulation: 1.13 rad
Peak negative phase modulation: -1.15 rad

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMANCE
MEASUREMENT DATE: 2 Oct 2000 TIME: 19:52:25

TESTED BY: C Bal **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Nominal transmitted frequency	406.028 ±.001	406.028021	MHz	passed
Short term frequency stability	< 2.0E-9	4.09E-10		passed
Medium term: mean slope	< 1.0E-9	+1.54E-13	/min	passed
residual deviation	< 3.0E-9	1.60E-10		passed
Tx ouput power level	3.15 TO 7.93	4.55	W	passed
Burst envelope: rise time	< 5	.41	ms	passed
fall time	< 5	.01	ms	passed
Phase modulation: + AVG	+1.1 ±0.1	1.04	rad	passed
- AVG	-1.1 ±0.1	-1.05	rad	passed
Modulation: symmetry	< 0.05	.0019		passed
Modulation: rise time	150 ±100	117.5	us	passed
fall time	150 ±100	122.5	us	passed
Repetition period minimum	47.5 TO 52.5	47.7	s	passed
Repetition period maximum	47.5 TO 52.5	52.1	s	passed
Repetition period (max - min)	>1	4.4	s	passed
Total transmission time minimum	435.6 TO 444.4	439.4	ms	passed
Total transmission time maximum	435.6 TO 444.4	439.4	ms	passed
Cw preamble minimum	158.4 TO 161.6	159.3	ms	passed
Cw preamble maximum	158.4 TO 161.6	159.3	ms	passed
Message bit rate minimum	396.0 TO 404.0	399.9	bps	passed
Message bit rate maximum	396.0 TO 404.0	400.1	bps	passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - SELF TEST VERIFICATION
MEASUREMENT DATE: 2 Oct 2000 TIME: 20:08:54

TESTED BY: C Bal **APPROVED BY:** Rota Barrineau

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

Duration 440.3 ms.
First Burst Delay 52 Sec

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - SELF TEST VERIFICATION
MEASUREMENT DATE: 2 Oct 2000 TIME: 20:10:25

TESTED BY: C Bah **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	1	1	0	1	0	0	0	0

*** ERROR IN FRAME SYNCHRONIZATION *** SELF TEST Verification

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

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

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - SELF TEST VERIFICATION
MEASUREMENT DATE: 2 Oct 2000 TIME: 20:11:00

TESTED BY: CBol **APPROVED BY:** Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

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

BIT NUMBER:

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0

BIT NUMBER:

81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0

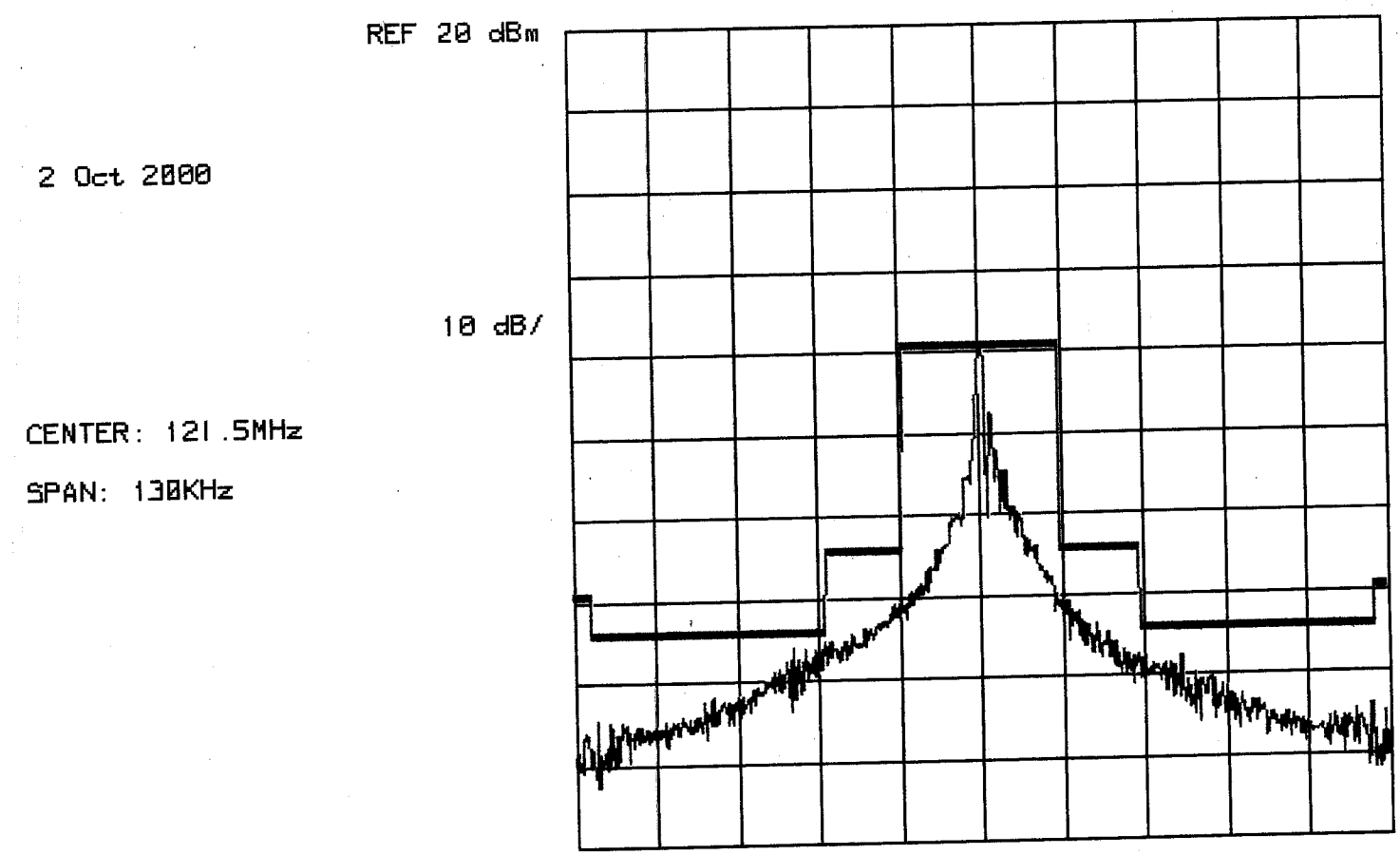
SPURIOUS EMISSIONS

FREQUENCY (MHz)	RESULTS (dBc)	LIMITS (dBc)

*** SPURIOUS TEST OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS -
MEASUREMENT DATE: 2 Oct 2000 TIME: 20:24:47

TESTED BY: CBah **APPROVED BY:** Rosa Barrineau



SPURIOUS EMISSIONS SPECTRUM

MAXIMUM TEMPERATURE

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS AT MAXIMUM TEMP
MEASUREMENT DATE: 3 Oct 2000 TIME: 11:01:24

TESTED BY: C Bahn **APPROVED BY:** Rosa Barrineau

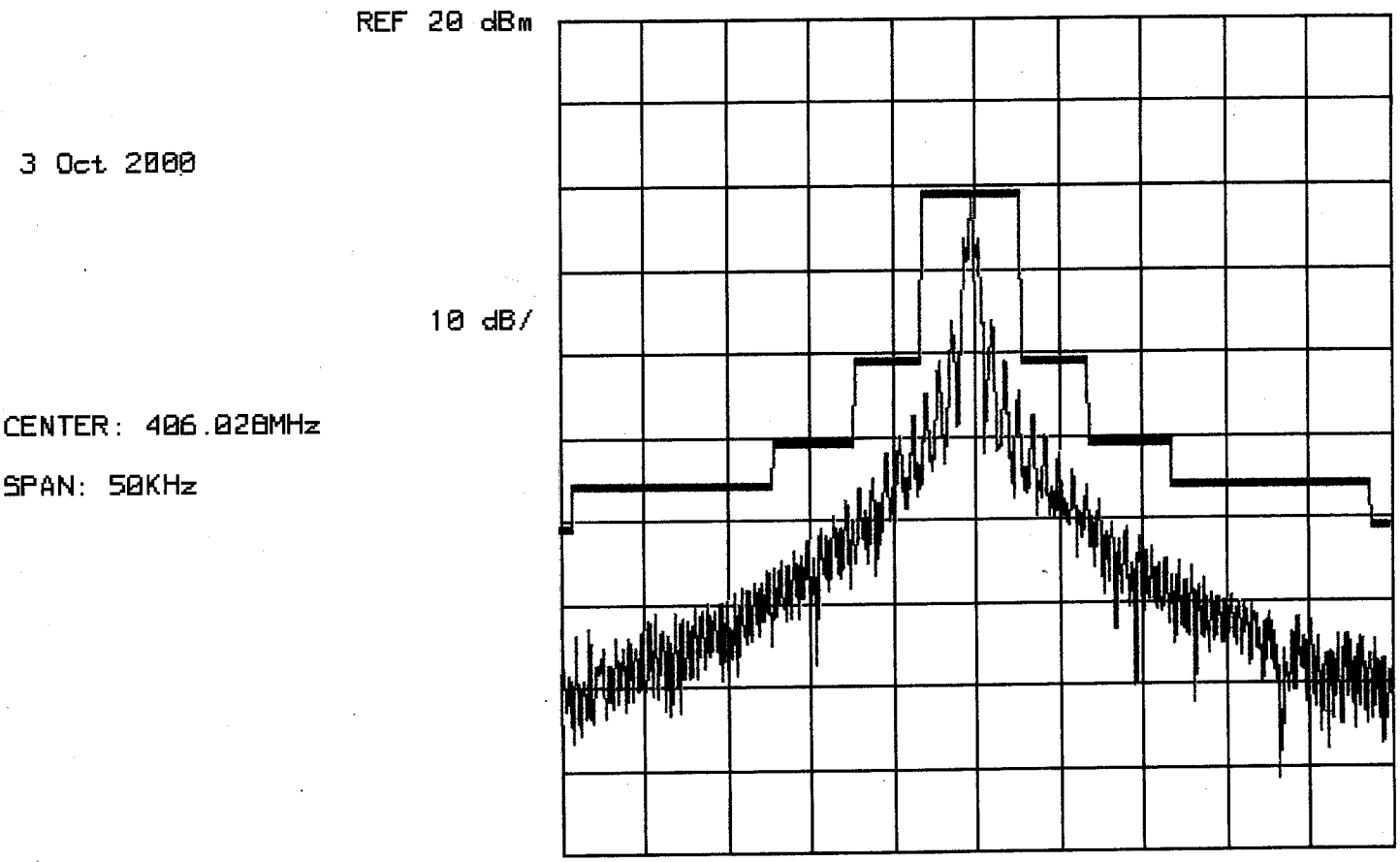
SPURIOUS EMISSIONS

FREQUENCY (MHz)	RESULTS (dBc)	LIMITS (dBc)

*** SPURIOUS TEST OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - 406 SIGNAL SPURIOUS EMISSIONS AT MAXIMUM TEMP
MEASUREMENT DATE: 3 Oct 2000 TIME: 13:34:10

TESTED BY: C. Bahn APPROVED BY: Rosa Barrineau



SPURIOUS EMISSIONS SPECTRUM

Post open/short/VSWR (maximum)

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT MAXIMUM TEMP
MEASUREMENT DATE: 3 Oct 2000 TIME: 13:35:08

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	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

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

*** BCH CODE OK ***

First burst delay time: 53.0 sec (maximum)

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - OPEN / SHORT / 3:1 VSWR PERFORMNACE AT MAXIMUM TEMP
MEASUREMENT DATE: 3 Oct 2000 TIME: 14:09:43

TESTED BY: C. Bl **APPROVED BY:** Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

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
1	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	0	1	1

BIT NUMBER:

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0

BIT NUMBER:

81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0	0