

**PHYSICAL TEST REPORT
FOR THE
L3 COMMUNICATIONS
AVIATION RECORDERS CORPORATION
MOBILE III AUTOMATIC IDENTIFICATION SYSTEM
PART NUMBER AISA3-000-10**

Prepared for:

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Submitted by:

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Accredited
Cert 898.01 Test Laboratory

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L3 Communications Aviation Recorders Corporation
Physical Testing
At
Green Mountain Electromagnetics, Inc.

Unit: Mobile III Automatic Identification System (AISA3-000-10)

Received: 6/11/10

Tested: June 14 - June 28, 2010, and October 23, 2010

Revision 1: Add Co-channel Data for ± 3 kHz

Revision 2: Identify EUT Serial Number and Test Equipment for 10/23 Co-channel Tests.

Revision 3: Add L3 report for Paragraph 15.3.10 tests as Appendix A.

I. Applicable Standards:

The unit described in this report was evaluated for compliance with paragraph 15, "Physical Tests" of IEC 61993-2, "Maritime Navigation and Radiocommunication Equipment and Systems – Automatic Identification Systems (AIS), Part 2: Class A Shipborne Equipment of the Universal AIS – Operational and Performance Requirements, Methods of Test and Required Test Results (December 2001)."

II. Unit Tested:

The L3 Communications Aviation Recorders Corporation, Mobile III Automatic Identification System (AISA3-000-10) provides continuous RF signal and data transmission for ship identification. The AISA3-000-10 uses DC power, has two 25-kHz TDMA transmitters, a DSC transmitter and TDMA/DSC/GPS receivers. It consists of the two-piece metal enclosure with connector hardware, the transmit/receive circuits, the microprocessor/data-storage electronics, and the antenna interfaces. There is no 12.5-kHz operation supported. The table below describes the unit that was subjected to measurements determining compliance with applicable standards:

Model/P/N	Manufacturer	Serial Number
AISA3-000-10	L3 Communications Corp.	663496/663494*

* 663494 used for Co-channel Rejection tests at ± 3 kHz only



The following table describes the system physical and electrical properties:

Model/P/N	Volts/Watts	H/W/D in cm
AISA3-000-10	12-24 VDC, 50 W	8/16/19

The following table describes the L3 support equipment supplied for testing:

Product	Manufacturer	Model	L3ID
PC/Keyboard/Mouse	Dell	T3400	502104
Modulation Generator	Sine Qua Non	PMG1	5540
Line Driver	Pulse Research	PRL414B	5480

The following table describes the GME support equipment used during testing:

Product	Manufacturer	Model	Serial
Power Supply	CSI/Speco	PSV-5	n/a
Attenuator 10 dB 10W	JFW	50FH-010-10	n/a
Attenuator 20 dB 50W	JFW	50FHC-020-50	n/a
GPS Antenna	Matsushita	n/a	n/a

The following table describes the system cables:

Type	Description	Manufacturer
Power	DC Shielded Twisted Pair	n/a
Signal/RF	Coaxial RG8A/U	Amphenol
Signal/Control	RS-232	n/a
Signal/GPS	Coaxial RG213/U	Pasternack

Proprietary LabView AIS control software written by L3 was used for evaluating AIS performance.



III. Summary of Results:

The L3 Communications Aviation Recorders Corporation AISA3-000-10 complies with the requirements in IEC 61993-2, paragraph 15. Section X contains the results summarized in the table below.

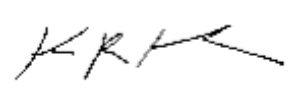
Test	Mode/Port	IEC 61993-2		Specified Value	Measured Value
		Para.	Tolerance/Limit		
1	Frequency Error	TDMA Transmit	15.1.1	±500 Hz	156,025,000 Hz
		DSC Transmit	15.2.1	13 Hz (1%)	162,025,000 Hz
				21 Hz (1%)	1300 Hz
2	Carrier Power	TDMA Transmit	15.1.2	±1.5 dB	40.96 dBm
					30.00 dBm
					28.89 dBm
3	Modulation Spectrum/ Modulation Rate	TDMA/DSC Transmit	15.1.3	25 kHz lmt.	61993-2 Fig. 4
		DSC Transmit	15.2.2	±30 ppm	1200 b/s or
				.018 Hz	600 Hz
4	Attack/ Release Time	TDMA Transmit	15.1.5	+1.5 dB	<1 ms
			15.1.6	-50 dBpc	<1 ms
					<1 ms
5	Sensitivity and Error at High Input	TDMA1/2	15.3.1	-107 dBm	≤20% PER
		TDMA1/2	15.3.3	-7 dBm	≤1.0% PER
		DSC	15.4.1	-107 dBm	≤0.01 BER
		DSC	15.4.2	-7 dBm	≤0.01 BER
		Receive			
6	Co-channel Rejection	TDMA1/2	15.3.4	-10 dB	≤20% PER
		DSC	15.4.3	-10 dB	≤0.01 BER
		Receive			
7	Adjacent Channel Selectivity	TDMA1/2	15.3.6	≥70 dB	≤20% PER
		DSC	15.4.4	≥70 dB	≤0.01 BER
		Receive			
8	Spurious Rejection	TDMA1/2	15.3.8	≥70 dB	≤20% PER
		DSC	15.4.5	≥70 dB	≤0.01 BER
		Receive			
9	Inter-modulation Rejection & Blocking	TDMA1/2	15.3.9	Table 18	≤20% PER
		DSC	15.4.6	≥65 dB	≤0.01 BER
		DSC	15.4.7	≥84 dB	≤0.01 BER
		Receive			
10	Conducted Spurious	Transmit	15.5.1	150 kHz -	-36/-30 dBm
		Receive	15.5.2	2 GHz	-57/-47 dBm



11	Switching Time	Transmit Receive	15.3.10	-107 dBm	≤20% PER	7.3% * See Appendix A
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Testing was performed by Kyle R. Kowalczyk, president, Green Mountain Electromagnetics and requested by:

L3 Communications Aviation Recorders Corp.
100 Cattlemen Road/PO Box 3041, 34230
Sarasota, FL 34232 USA



Kyle R. Kowalczyk
11/12/10

IV. Measurement Location:

The GME laboratory and Open Area Test Site (OATS) are located at 219 Blake Roy Road, Middlebury, VT. The OATS is a 10-meter site complete with antenna positioner, ground plane and motorized turntable. The OATS is constructed in accordance with ANSI C63.7-2005 and complies with the requirements for radiated emissions testing in ANSI C63.4-2003 and CISPR standards. The electromagnetic laboratory is constructed in accordance with CE immunity standards and ANSI C63.4-2003. GME is internationally accredited by the American Association for Laboratory Accreditation (A2LA) and meets the quality requirements in ISO/IEC 17025 (2005), "General Requirements for the Competence of Testing and Calibration Laboratories." Paragraph 15.3.10 tests were performed by L3 and are included as Appendix A.

V. Measuring Equipment:

The table below describes the instrumentation used by Green Mountain Electromagnetics to perform this testing:

Unit	Manufacturer	Model	Serial #	Last Cal.	Next Cal.
Oscilloscope	Hewlett-Packard	DSO5054A	MY7150566	6/16/10	6/16/11



Spectrum Analyzer	Hewlett-Packard	8594E	3639A03459	5/24/10	5/24/11
Signal Generator	Rohde & Schwarz	SMA100A	5000-44074/2010	5/16/10	5/16/11
Signal Generator	Hewlett-Packard	E4421B	US38220195	2/11/10	2/11/11
Signal Generator	Hewlett-Packard	8656	2135A01749	1/25/10	1/25/11
Signal Generator	Hewlett-Packard	8671B	2823A00756	10/21/10	10/21/11
Frequency Counter	B&K	1856D	1856412450 9030071	10/22/10	10/22/11
Combiner	MiniCircuits	ZFSC-4-1W+	n/a	6/10/10	6/10/11
Weather Station	Davis Instruments	Perception II	PC30923A0 7	11/16/09	11/16/10
Plotter	Hewlett-Packard	7550A	2444A05912	n/a	n/a

VI. Measurement Procedures:

1. Frequency Error.

TDMA Frequencies: 156.025,162.025 MHz

Specification: ± 0.5 kHz Normal Operation

DSC Frequencies: 1300 Hz, 2100 Hz

Specification: ± 13 Hz, ± 21 Hz

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
- b. Verify frequency counter and AIS operation.
 - i. Frequency counter is connected to 30-dB attenuator.
 - ii. AIS channels are selected from front panel.
 - iii. Frequency counter requires warm-up period.
- c. Operate EUT at first selected channel with no modulation.
- e. Record frequency displayed on counter.
 - i. Repeat for each TDMA channel – settings are 1060 & 2088.
- f. Perform state error on DSC channel 70 using demodulated output.
 - i. Demodulation is connected between 30 dB and counter.
 - ii. States B & Y are D21 and D13 on AIS front panel.



2. Carrier Power.

High Specification: 40.96 ± 1.5 dBm (12.5W) Normal Operation

Low Specification: 30.00 ± 1.5 dBm (1W) Normal Operation

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna.
- b. Verify spectrum analyzer and AIS operation.
 - i. Spectrum analyzer uses external 10- and 20-dB attenuators.
 - ii. AIS channels are selected from PC. Use 162.025 MHz channel.
- c. Operate EUT at normal power unmodulated.
- d. Record level displayed on analyzer.

3. Modulation Spectrum and Rate.

25 kHz Envelope: 0dB ± 10 kHz, decrease -25dBc to -70dBc from ± 10 kHz to ± 25 kHz

DSC Specification: 1200 b/s ± 30 ppm

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
- b. Verify analyzer and AIS operation. Set for 161.975 MHz.
 - i. Spectrum analyzer is connected to external 10- and 20-dB attenuators.
 - ii. AIS test signals 1, 2 & 3 per 61993-2, para. 10.4 are selected from front panel.
- c. Verify AIS test signal on spectrum analyzer.
- d. Operate EUT at first selected test signal with standard modulation.
- e. Record frequency spectrum displayed on analyzer.
- f. Repeat for each TDMA and DSC test signal.
- g. Connect demodulated output of spectrum analyzer to oscilloscope.
- h. Record modulation rate output displayed on oscilloscope.

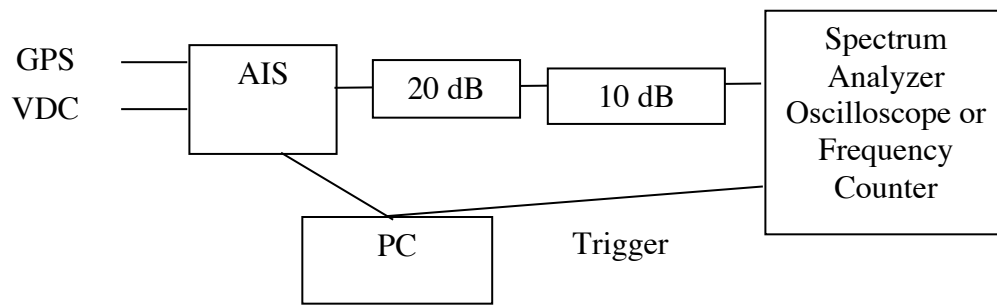
4. Attack/Release Time.

Attack Specification: ± 1.5 dB at 1 ms

Release Specification: 50 dB below power at 1 ms

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
- b. Verify oscilloscope and AIS operation.
 - i. Oscilloscope is connected to external 10- and 20-dB attenuators.
 - ii. AIS test signal is selected from PC.
- c. Operate EUT with test signal. Trigger is on leading edge supplied from AIS control port.
- d. Record rise time (attack) transient displayed on oscilloscope.
- e. Repeat for falling edge (release time).





Block Diagram of Transmitter Tests

5. Sensitivity including Error at High Input.

TDMA Specification: -107 dBm @ 20% PER Normal, -7dBm @ 1% PER High Input

DSC Specification: -107 dBm @ 0.01 BER Normal, -7 dBm @ .01 BER High Input

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
 - ii. Connect PC to signal generator and modulation generator.
 - iii. Connect line driver to signal generator and modulation generator.
- b. Verify PC and AIS operation.
 - i. PC provides input to AIS.
 - ii. Signal generator set to provide -107 dBm at EUT (25 kHz).
 - iii. Spectrum analyzer verifies correct signal level.
- c. Operate with standard modulation at 156.025 MHz.
- d. Run packet error rate software program on PC.
 - i. Software determines and records TDMA packet error rate.
- e. Repeat step d. at 162.025 MHz.
- f. Repeat step d-e. for second receiver.
- g. Repeat step d-f. while providing -77 dBm and -7 dBm at the AIS receiver input.
- h. Connect PC DAQ ports to AIS and modulation generator.
- i. Operate with DSC modulation at 156.525 MHz.
- j. Run bit error rate software program on PC.
 - i. Software determines and records DSC bit error rate.
- k. Repeat step j. at 156.525 MHz $\pm$ 1.5 kHz.



6. Co-Channel Rejection.

TDMA Specification: -10 dB dB @ 20% PER

DSC Specification: -10 dBm @ 0.01 BER

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
 - ii. Connect PC to signal generator and modulation generator.
 - iii. Connect line driver to signal generator and modulation generator.
- b. Verify PC and AIS operation.
 - i. PC provides input to AIS.
 - ii. Signal generator A is set at 162.025 MHz to provide -104 dBm at EUT.
 - iii. Signal generator B is set at 162.025 MHz to provide -114 dBm at EUT.
 - iv. Spectrum analyzer verifies correct signal level.
- c. Operate A with standard modulation and B with 400Hz/3kHz FM modulation.
- d. Run packet error rate software program on PC.
 - i. Software determines and records TDMA packet error rate.
- e. Repeat step d. for second receiver.
- e. Repeat step d-e. with signal generator B is set at 162.025 MHz $\pm$ 3kHz.
- f. Connect PC DAQ ports to AIS and modulation generator.
- g. Operate with DSC modulation at 156.525 MHz to provide -101 dBm at EUT.
 - i. Signal generator B is set at 156.525 MHz to provide -111 dBm at EUT.
- h. Run bit error rate software program on PC.
 - i. Software determines and records DSC bit error rate.

7. Adjacent Channel Selectivity.

TDMA Specification: >70 dB dB @ 20% PER

DSC Specification: >70 dBm @ 0.01 BER

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
 - ii. Connect PC to signal generator and modulation generator.
 - iii. Connect line driver to signal generator and modulation generator.
- b. Verify PC and AIS operation.
 - i. PC provides input to AIS.
 - ii. Signal generator A is set at 161.975 MHz to provide -104 dBm at EUT.
 - iii. Signal generator B is set at 162.000 MHz to provide -34 dBm at EUT.
 - iv. Spectrum analyzer verifies correct signal level.



- c. Operate A with standard modulation and B with 400Hz/3kHz FM modulation.
- d. Run packet error rate software program on PC.
 - i. Software determines and records TDMA packet error rate.
- e. Repeat step d. for B at 161.950 MHz.
- f. Repeat step d-e. for second receiver.
- g. Connect PC DAQ ports to AIS and modulation generator.
- h. Operate with DSC modulation at 156.525 MHz.
- i. Run bit error rate software program on PC.
 - i. Software determines and records DSC bit error rate.

8. Spurious Response Rejection.

TDMA Specification: >70 dB @ 20% PER

DSC Specification: >70 dBm @ 0.01 BER

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
 - ii. Connect PC to signal generator and modulation generator.
 - iii. Connect line driver to signal generator and modulation generator.
- b. Verify PC and AIS operation.
 - i. PC provides input to AIS.
 - ii. Signal generator A is set at 161.975 MHz to provide -104 dBm at EUT.
 - iii. Signal generator B is set to provide -27 dBm at EUT.
 - iv. Signal generator B set to provide sweeps and discrete frequencies to EUT per calculations in results (X.8).
 - v. Spectrum analyzer verifies correct signal level.
- c. Operate A with standard modulation and B with 400Hz/3kHz FM modulation.
- d. Run packet error rate software program on PC.
 - i. Software determines and records TDMA packet error rate.
 - ii. Proceed as in IEC 61993 para. 15.3.8 steps a. – h. if PER >20%.
- e. Repeat step d. for second receiver.
- f. Connect PC DAQ ports to AIS and modulation generator.
- g. Operate with DSC modulation at 156.525 MHz.
 - i. Generator B provides -24-dBm unmodulated from 100kHz to 2GHz.
- h. Run bit error rate software program on PC.
 - i. Software determines and records DSC bit error rate.



9. Intermodulation Response Rejection and Blocking.

TDMA Specification: Table 18 @ 20% PER

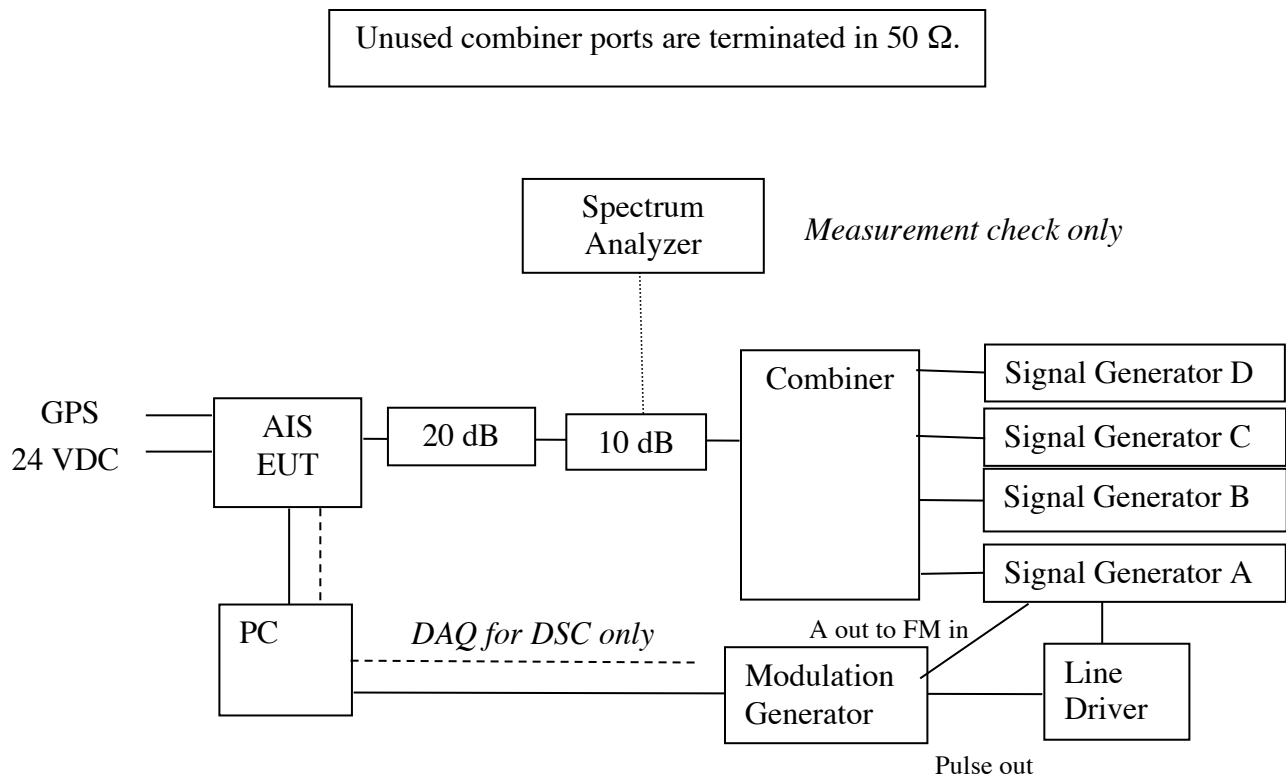
DSC Intermodulation Specification: >65 dB @ 0.01 BER

DSC Blocking Specification: >84 dB @ <.01 BER

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to DC power, PC, and GPS antenna; attach attenuators to VHF port.
 - ii. Connect PC to signal generator and modulation generator.
 - iii. Connect line driver to signal generator and modulation generator.
- b. Verify PC and AIS operation.
 - i. PC provides input to AIS.
 - ii. Signal generator A is set at 156.025 MHz to provide -101 dBm at EUT.
 - iii. Signal generator B is set at 156.525 MHz to provide -27 dBm at EUT.
 - iv. Signal generator C is set at 157.025 MHz unmodulated to provide -27 dBm at EUT.
 - v. Signal generator D is set at 161.750 MHz unmodulated to provide -15 dBm at EUT.
(This signal generator has a non-ISO type calibration and is verified with an ISO-type calibrated spectrum analyzer at the time of testing.)
 - vi. Spectrum analyzer verifies correct signal levels.
- c. Operate A with standard modulation and B with 400Hz/3kHz FM modulation.
- d. Run packet error rate software program on PC.
 - i. Software determines and records TDMA packet error rate.
- e. Repeat step d. for A = 162.025 MHz, B = 161.525 MHz, C = 161.025 MHz, and D = 156.300 MHz.
- f. Repeat step d-e. for second receiver.
- g. Connect PC DAQ ports to AIS and modulation generator.
- h. DSC Intermodulation: Set A = -104 dBm, test signal 1, B = -39 dBm, nominal ± 50 kHz, and C = -39 dBm, modulated at 400 Hz/ ± 3 kHz, nominal ± 100 kHz.
- i. Operate with DSC modulation at 156.525 MHz.
- j. Run bit error rate software program on PC.
 - i. Software determines and records DSC bit error rate.
- k. DSC Blocking: Repeat step j. with signal generator also set to provide -20 dBm to EUT.
 - i. Sweep from -10 MHz to -1 MHz and 1 MHz to 10 MHz relative to nominal frequency.



VI. Measurement Procedures Cont'd:



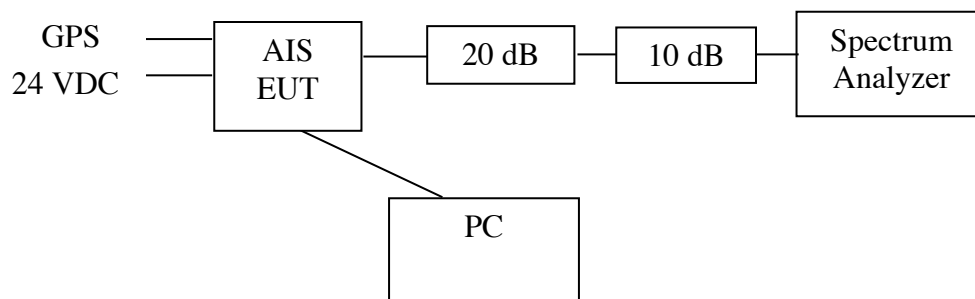
Block Diagram of Receiver Tests

10. Conducted Spurious Emissions.

Specification: 150 kHz to 1 GHz: -36 dBm transmit/-57 receive

1 GHz to 2 GHz: -30 dBm transmit/ -47 receive

- a. Set up EUT and test instrumentation in laboratory.
 - i. Connect AIS to 24 VDC power and PC.
- b. Verify analyzer and AIS operation.
 - i. Spectrum analyzer is connected to VHF port.
 - ii. Spectrum analyzer requires warm-up period.
- d. Transmit AIS unmodulated.
- e. Record transmitter frequency spectrum displayed on analyzer.
- f. Disable transmitter and remove 30 dB attenuator.
- e. Record receiver frequency spectrum displayed on analyzer.



Block Diagram of Conducted Spurious Test

VII. EUT Label Photograph:



VIII. Transmitter Test Setup Photograph:



IX. Receiver Test Setup Photograph:

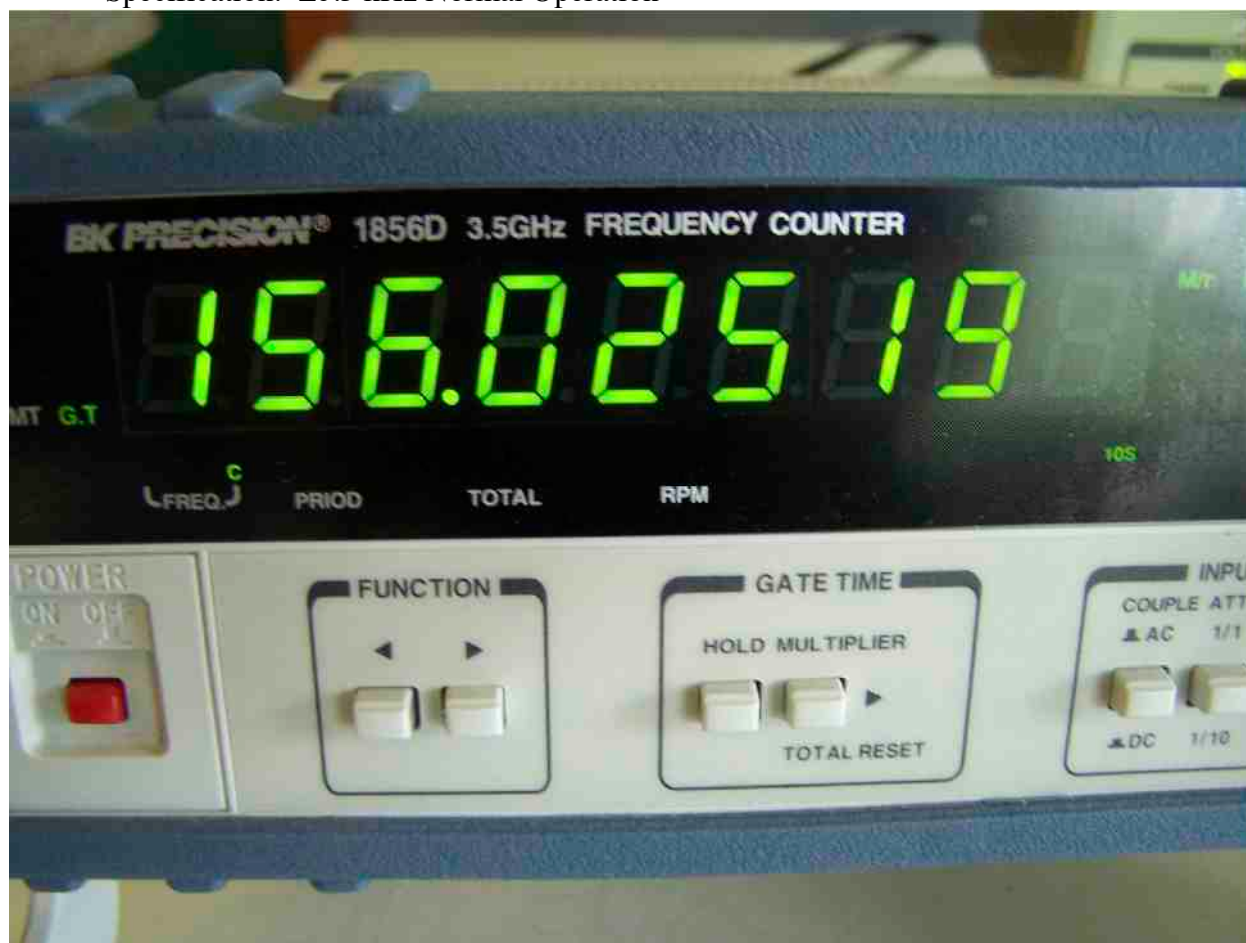


X. Measurement Results:

1. Frequency Error.

Frequency: 156.025 MHz

Specification: ± 0.5 kHz Normal Operation

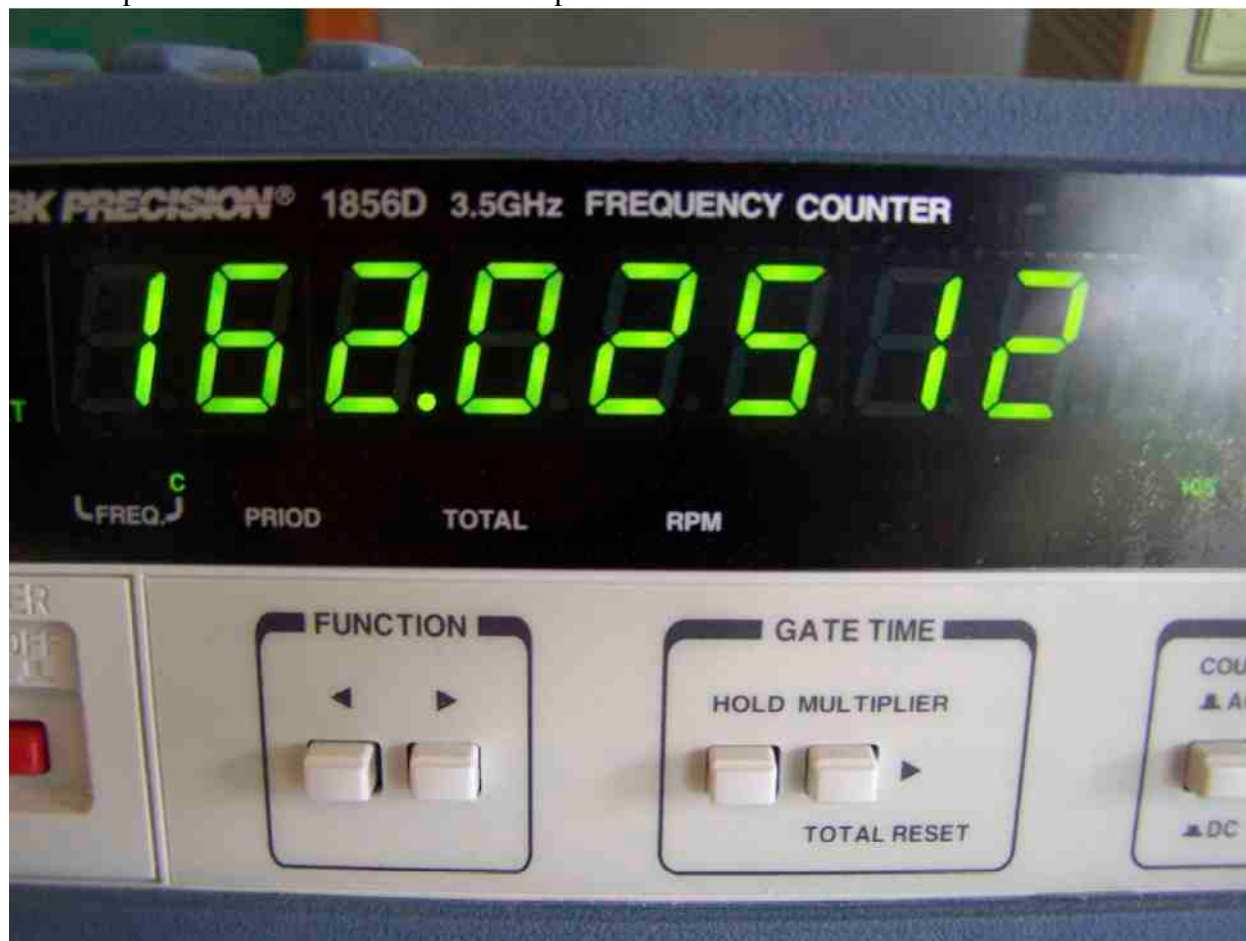


X. Measurement Results Cont'd:

1. Frequency Error.

Frequency: 162.025 MHz

Specification: ± 0.5 kHz Normal Operation



X. Measurement Results Cont'd:

1. Frequency Error.

Frequency: 1300 Hz

Specification: ± 13 Hz Normal Operation



X. Measurement Results Cont'd:

1. Frequency Error.

Frequency: 2100 Hz

Specification: ± 21 Hz Normal Operation

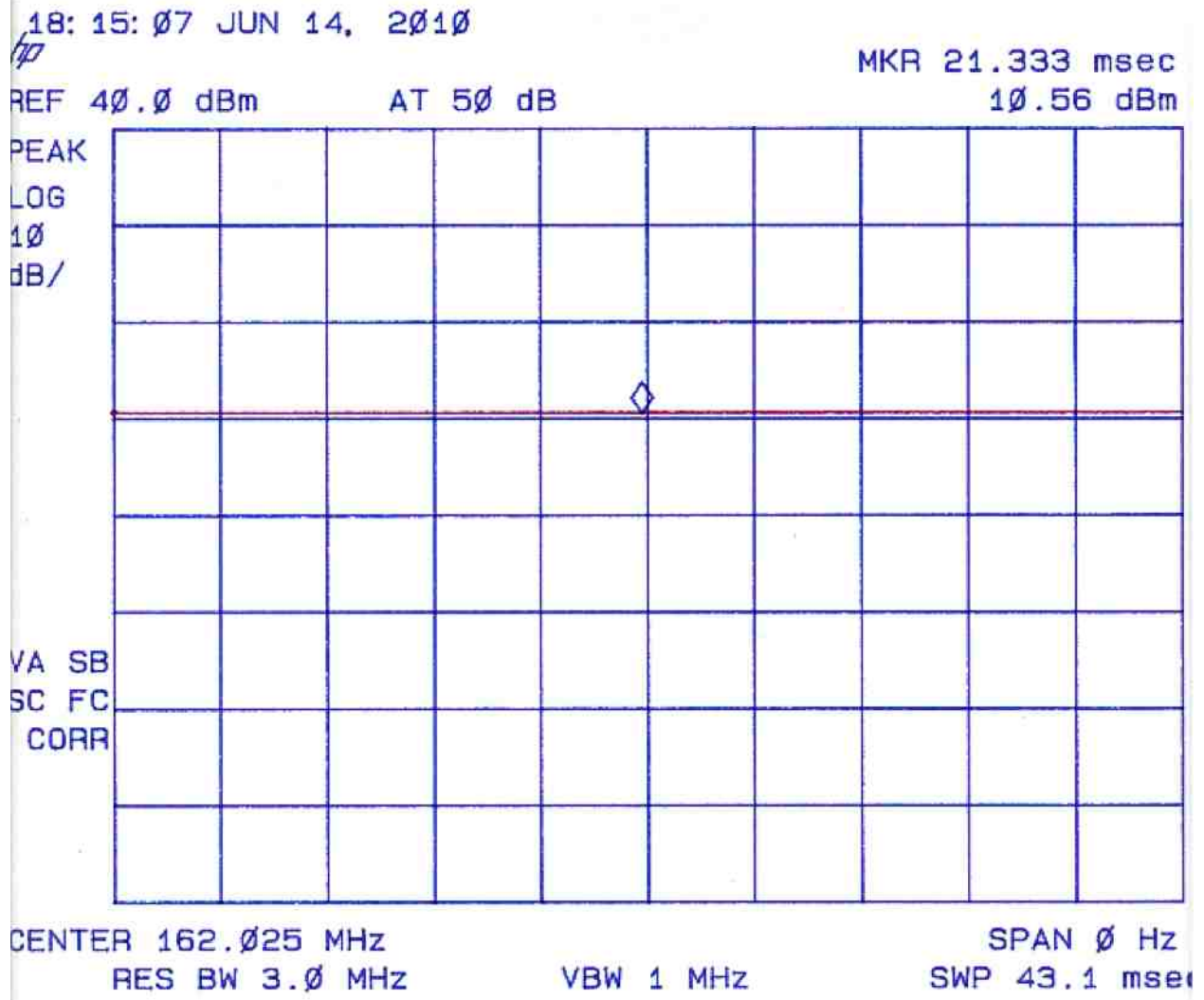


X. Measurement Results Cont'd:

2. Carrier Power.

High Specification: $10.96 \pm 1.5 \text{ dBm} = 40.96 \text{ dBm} - 30 \text{ dB external attenuation}$

$40.56 \text{ dBm} = 10.56 \text{ dBm} + 30 \text{ dB attenuation}$

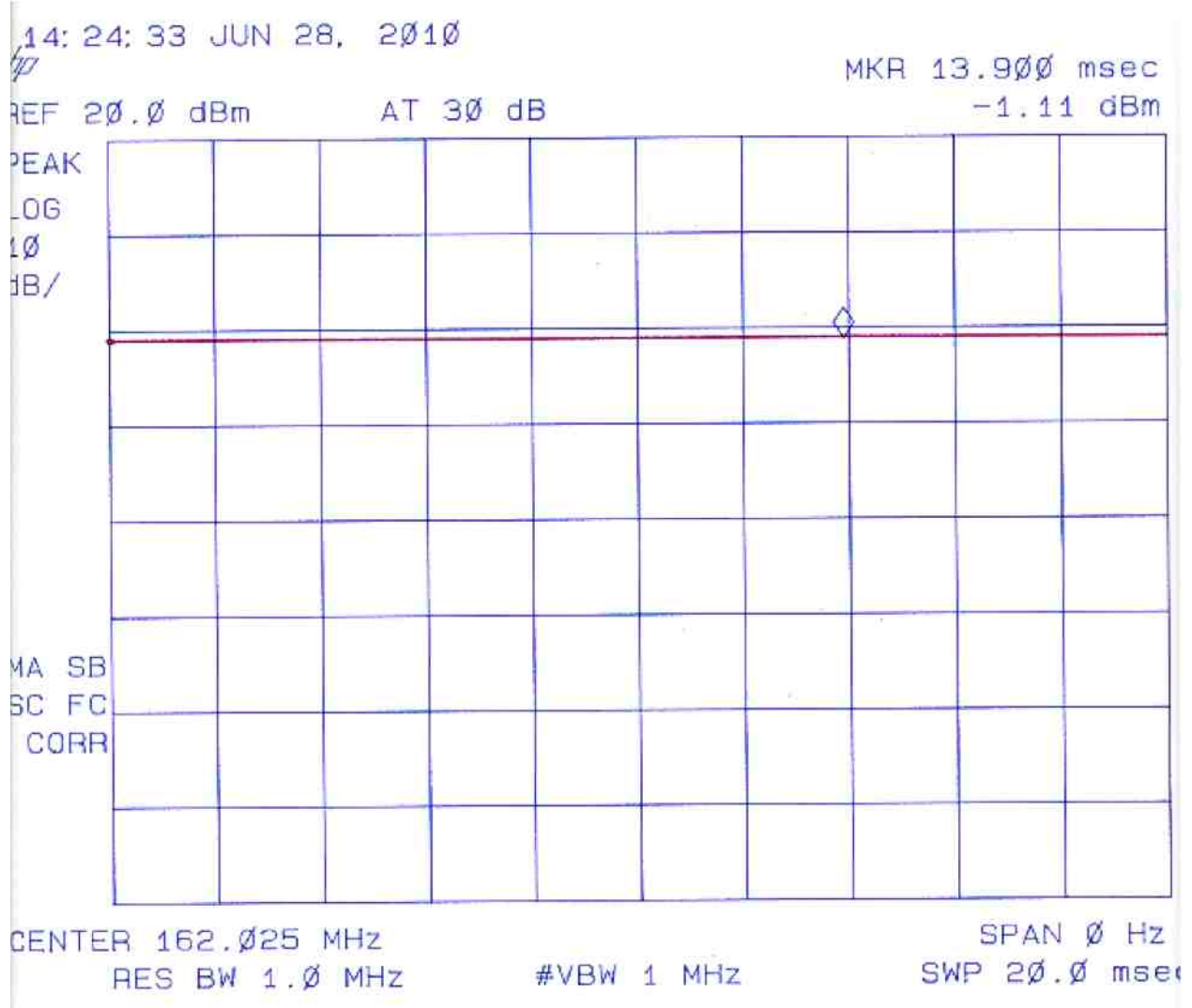


X. Measurement Results Cont'd:

2. Carrier Power.

Low Specification: $0.00 \pm 1.5 \text{ dBm} = 30.00 \text{ dBm} - 30 \text{ dB external attenuation}$

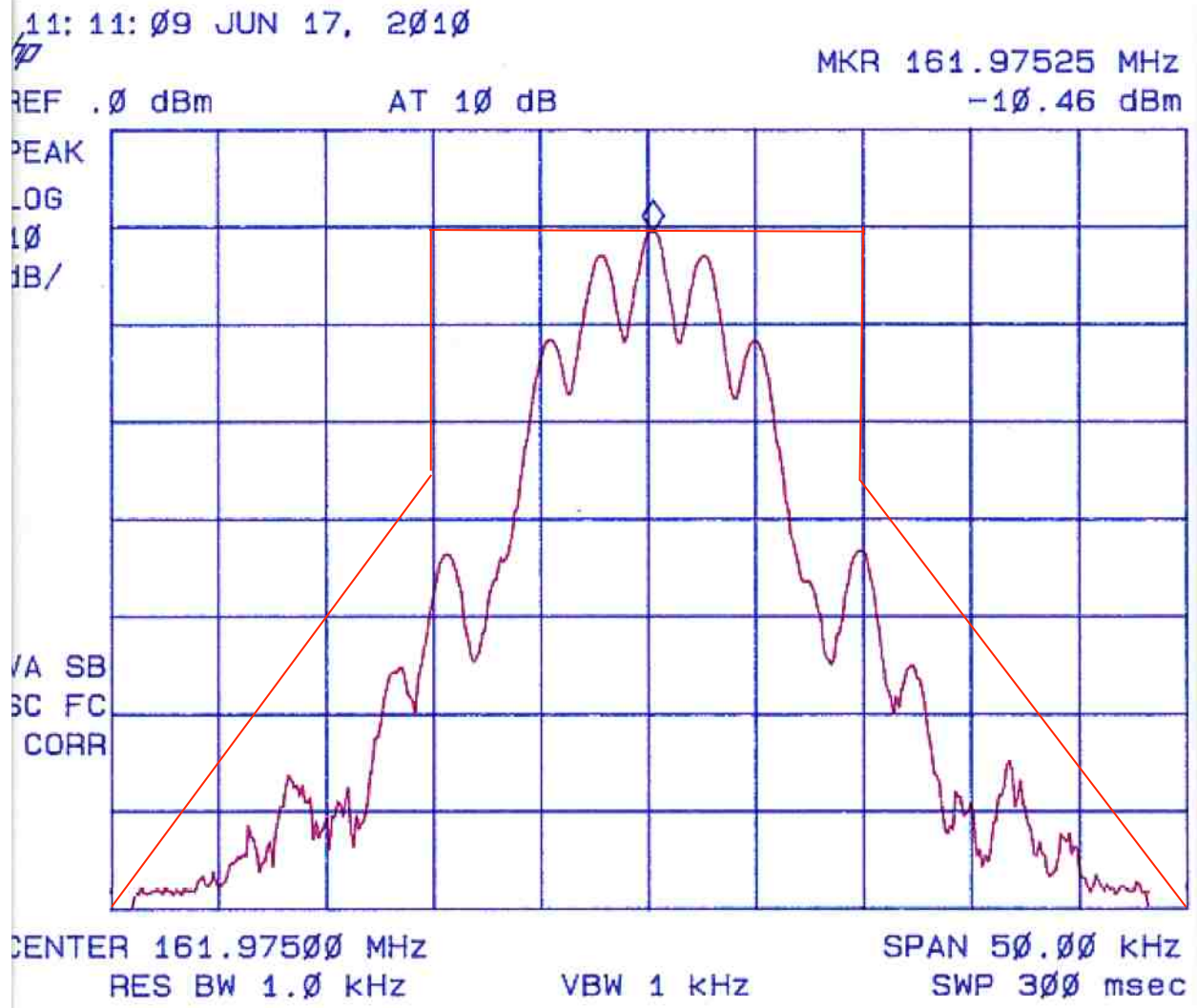
$28.89 \text{ dBm} = -1.11 \text{ dBm} + 30 \text{ dB attenuation}$



X. Measurement Results Cont'd:

3. Modulation Spectrum 25-kHz Channel TDMA Signal 2.

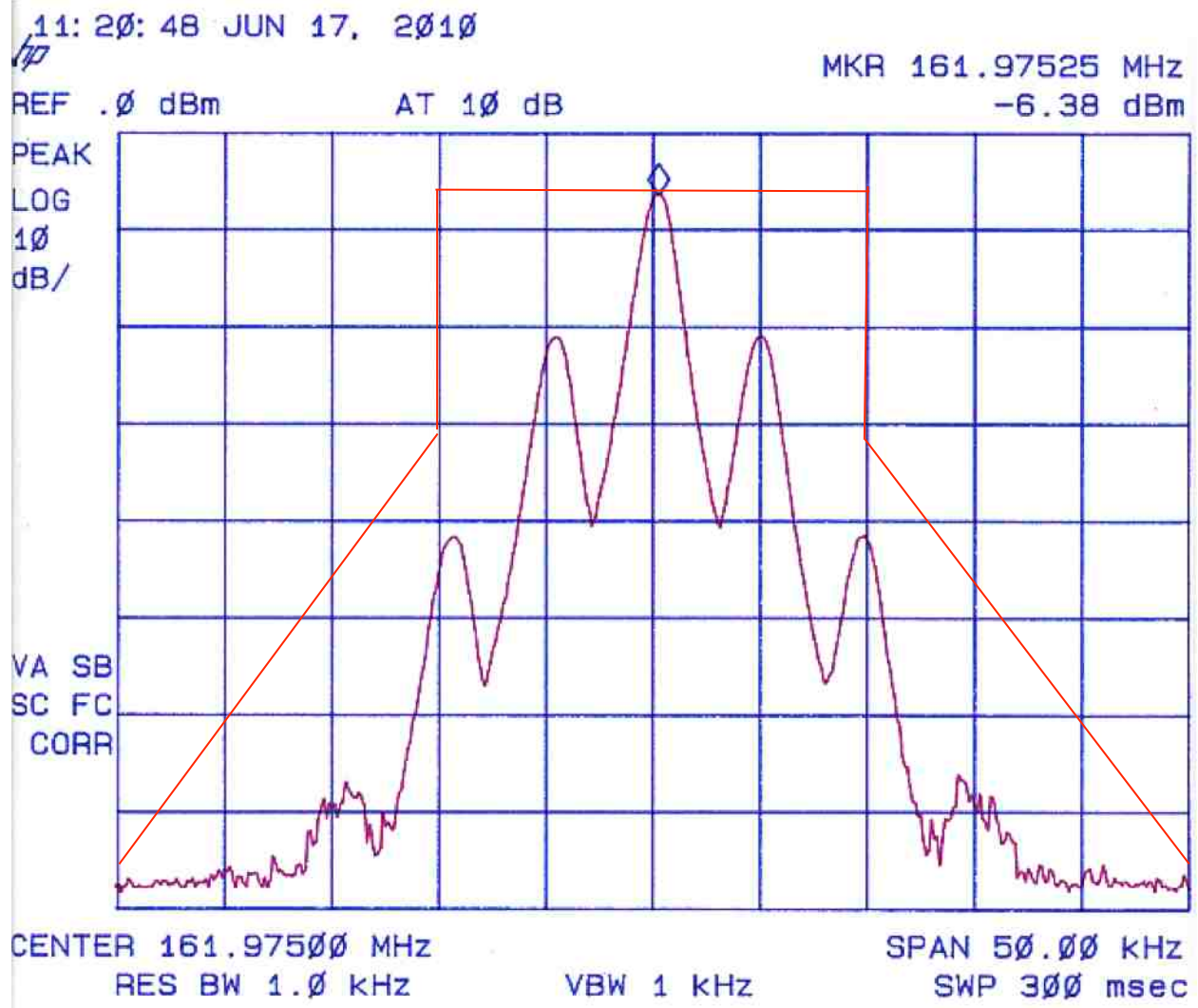
25kHz Envelope: 0dB $\pm$ 10kHz, decrease -25dBc to -70dBc from $\pm$ 10kHz to $\pm$ 25kHz



X. Measurement Results Cont'd:

3. Modulation Spectrum 25-kHz Channel TDMA Signal 3.

25kHz Envelope: 0dB $\pm$ 10kHz, decrease -25dBc to -70dBc from $\pm$ 10kHz to $\pm$ 25kHz



X. Measurement Results Cont'd:

3. Modulation Spectrum 25-kHz Channel DSC Test Signal 1.

25kHz Envelope: 0dB $\pm$ 10kHz, decrease -25dBc to -70dBc from $\pm$ 10kHz to $\pm$ 25kHz



X. Measurement Results Cont'd:

3. Modulation Rate for DSC Signal.

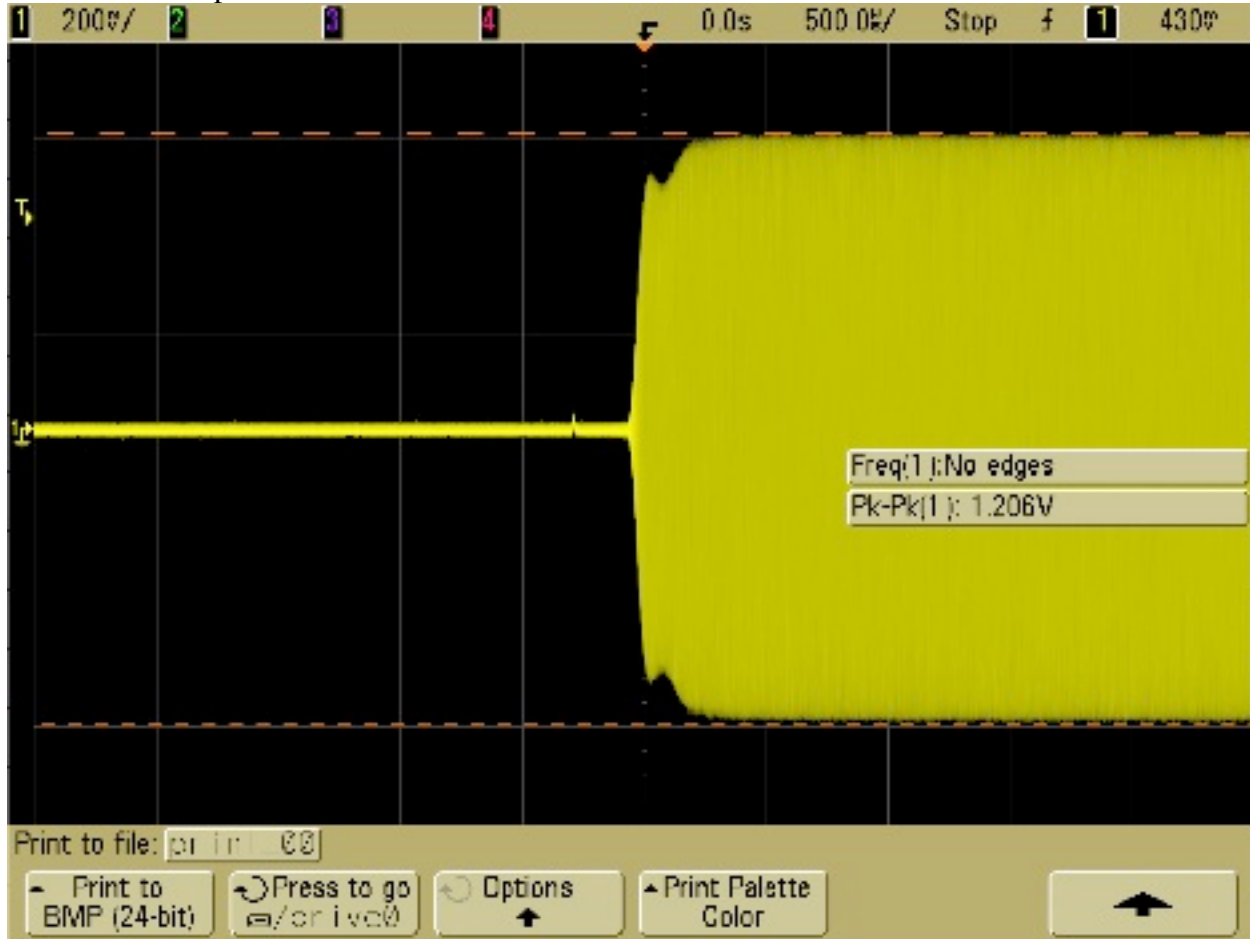
$$1200 \text{ b/s} \pm 30 \text{ ppm} = 600.000 \pm 0.018 \text{ Hz}$$



X. Measurement Results Cont'd:

4. Attack/Release Time.

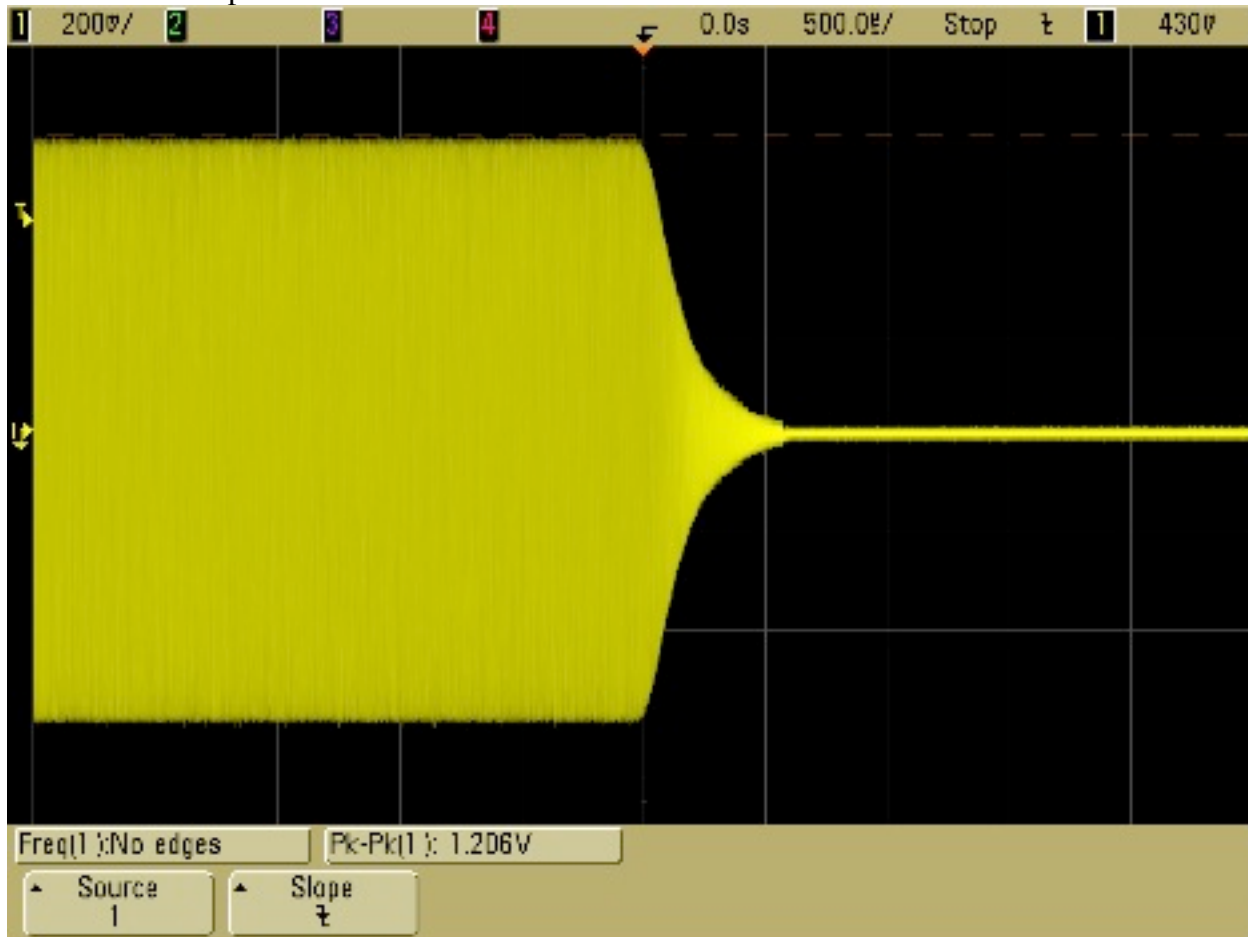
Attack Specification: +1.5 dB at 1 ms



X. Measurement Results Cont'd:

4. Attack/Release Time.

Release Specification: -50% dBp at 1 ms



X. Measurement Results Cont'd:

5. Sensitivity/EHI - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -107 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SENSITIVITY 15.3.1 RX 1 1060

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SENSITIVITY 15.3.1 RX 1 2088

Packet Error Rate (<20%) 0.70%

Total test Packets Sent: 1000
Valid Test Packets: 993

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

5. Sensitivity/EHI - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -107 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SENSITIVITY 15.3.1 RX 2 1060

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SENSITIVITY 15.3.1 RX 2 2088

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

5. Sensitivity/EHI - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 1\%$ at -7 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663496

Test Specification: IEC 61993-2

Test Description: ERROR HI INPUT 15.3.3 RX 1 -77

Packet Error Rate (<1%) 0.10%

Total test Packets Sent: 1000

Valid Test Packets: 999

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663496

Test Specification: IEC 61993-2

Test Description: ERROR HI INPUT 15.3.3 RX 1 -7

Packet Error Rate (<1%) 0.70%

Total test Packets Sent: 1000

Valid Test Packets: 993

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

5. Sensitivity/EHI - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 1\%$ at -7 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663496

Test Specification: IEC 61993-2

Test Description: ERROR HI INPUT 15.3.3 RX 2 1060

Packet Error Rate (<1%) 0.00%

Total test Packets Sent: 1000

Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663496

Test Specification: IEC 61993-2

Test Description: ERROR HI INPUT 15.3.3 RX 2 2088

Packet Error Rate (<1%) 0.00%

Total test Packets Sent: 1000

Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

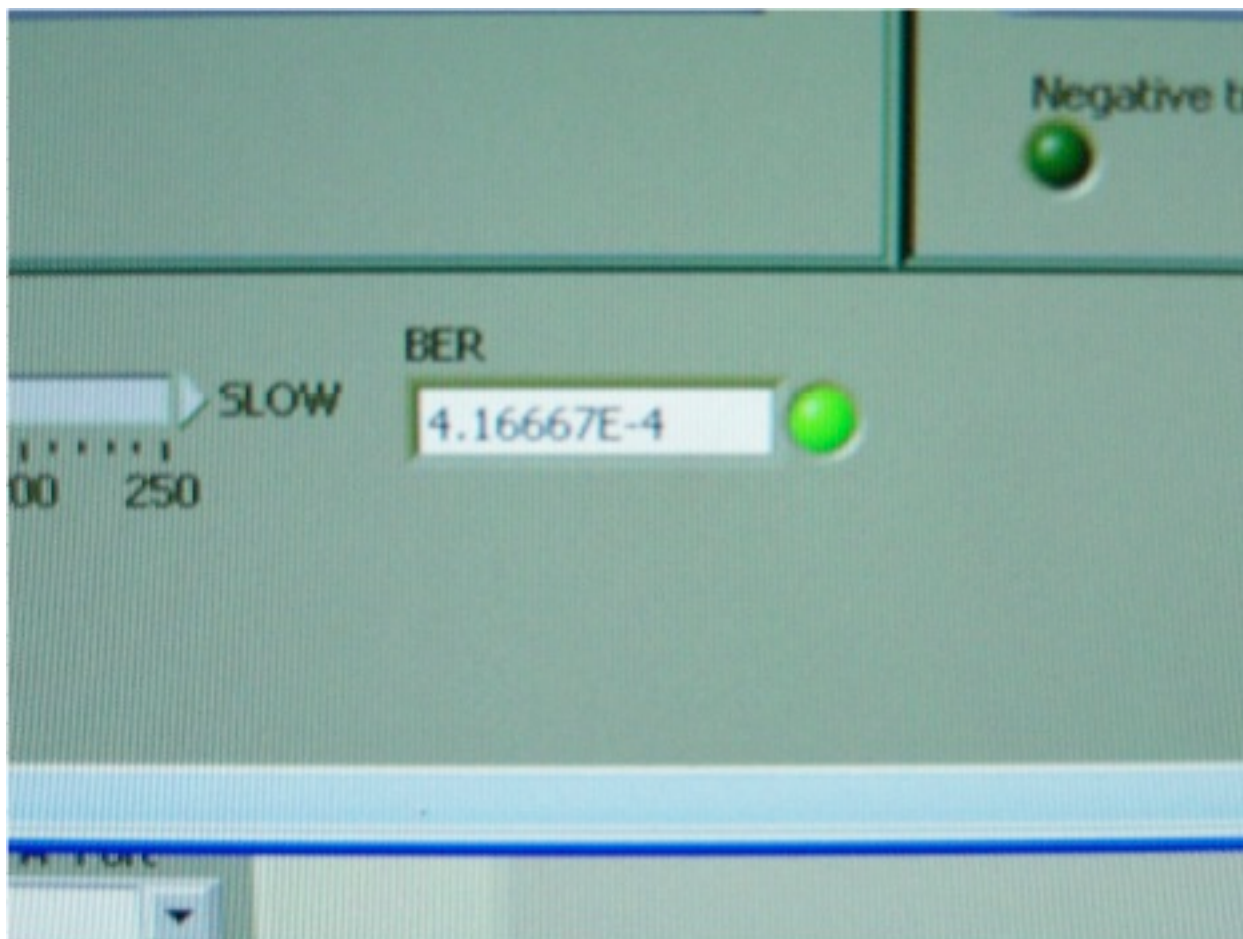


X. Measurement Results Cont'd:

5. Sensitivity/EHI - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -107 dBm signal input.

Frequency: 156.525 MHz

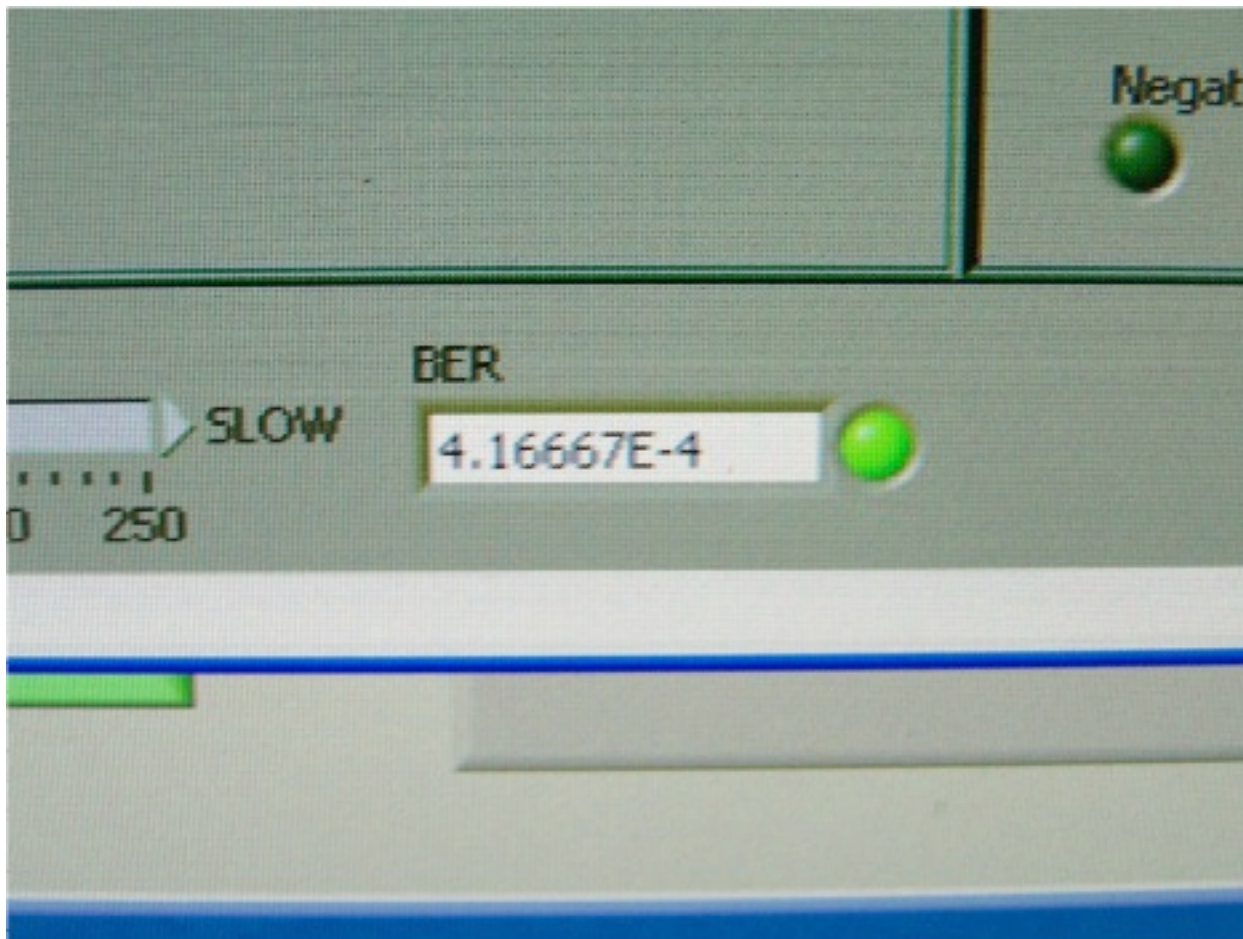


X. Measurement Results Cont'd:

5. Sensitivity/EHI - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -107 dBm signal input.

Frequency: 156.5235 MHz

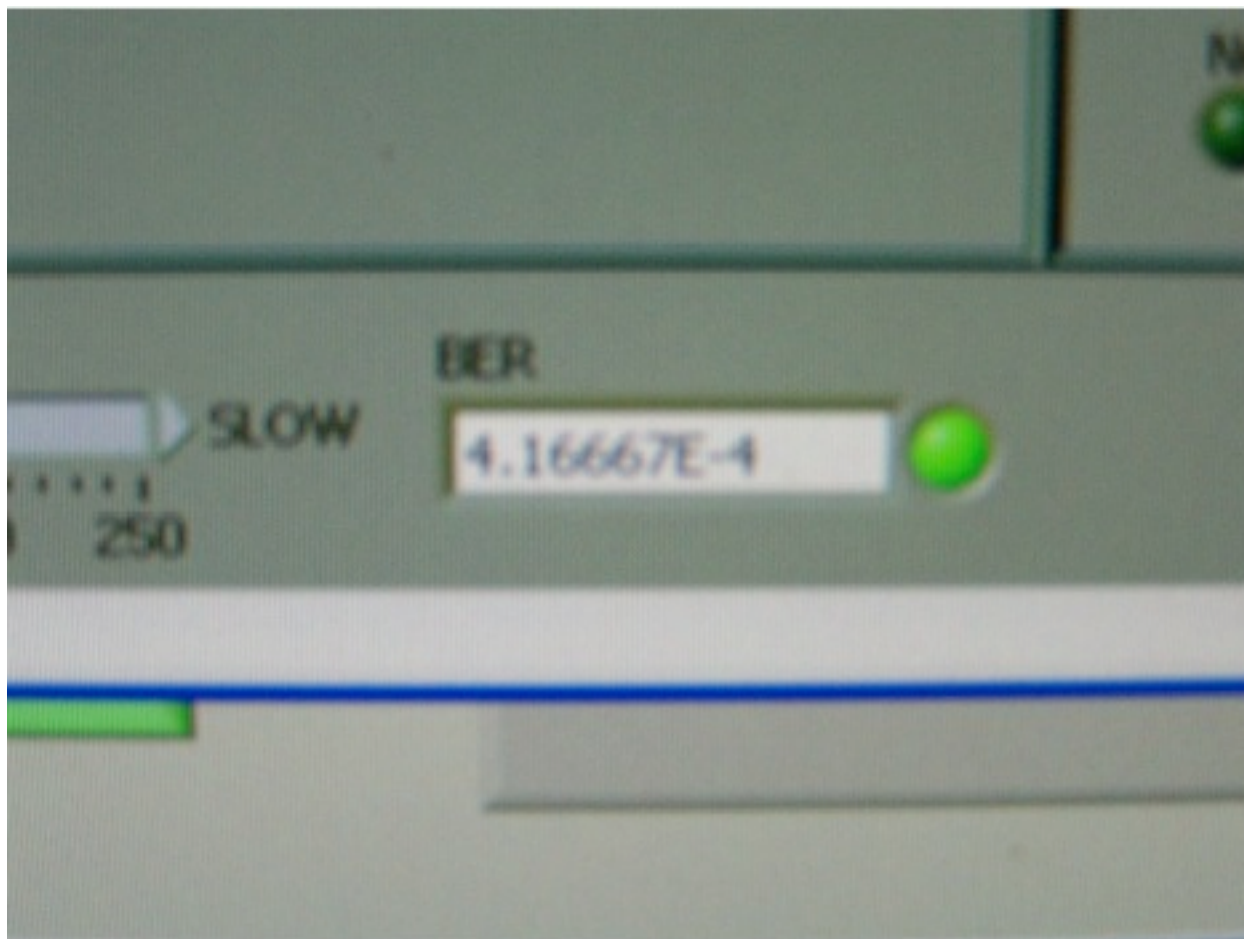


X. Measurement Results Cont'd:

5. Sensitivity/EHI - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -107 dBm signal input.

Frequency: 156.5265 MHz

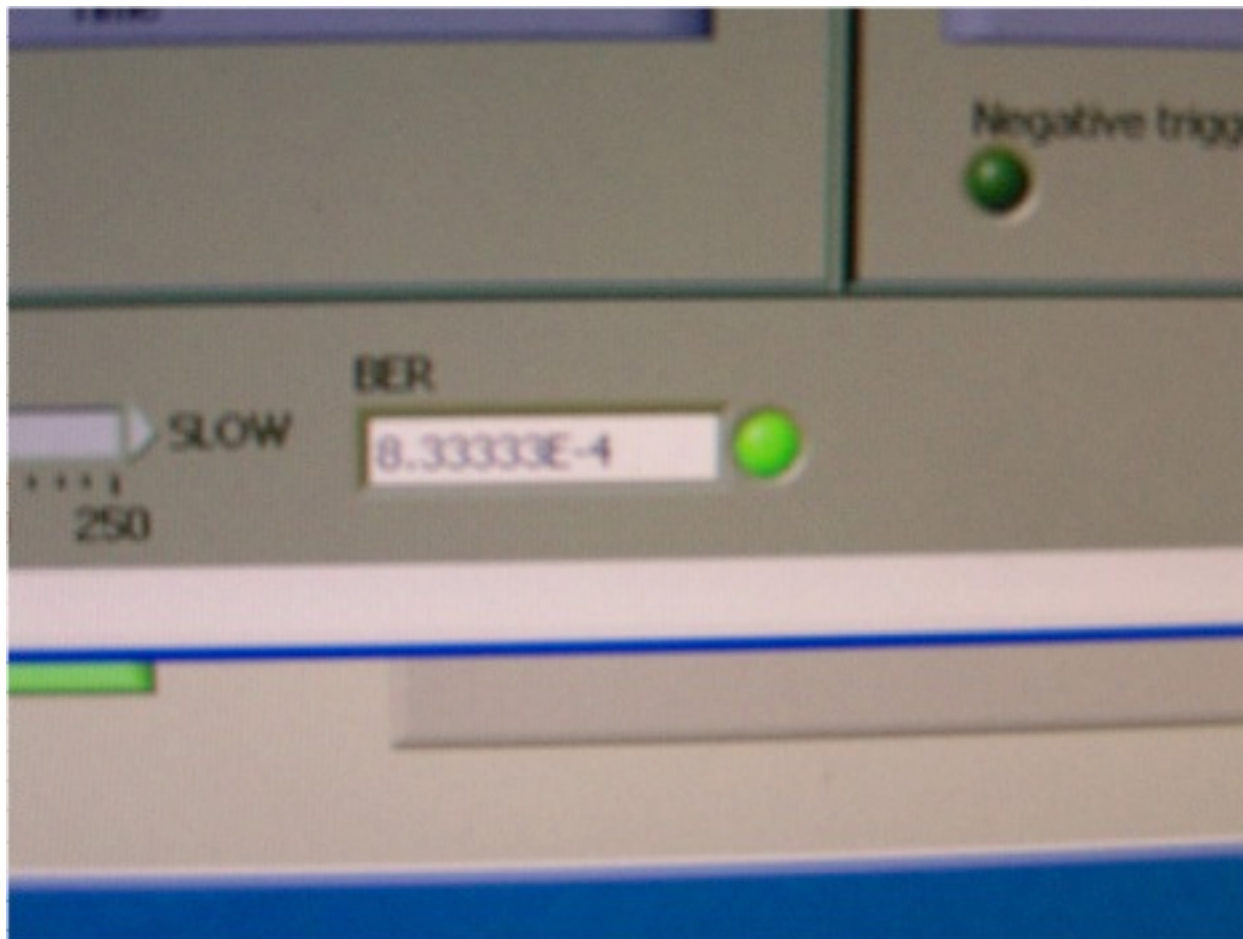


X. Measurement Results Cont'd:

5. Sensitivity/EHI - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -7 dBm signal input.

Frequency: 156.525 MHz



X. Measurement Results Cont'd:

6. CoChannel - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

Frequencies: 162.025 MHz & 162.025 MHz $\pm$ 3kHz

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: CoChan 15.3.4 RX 1

Packet Error Rate (<20%) 0.20%

Total test Packets Sent: 1000
Valid Test Packets: 998
VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663494
Test Specification: IEC 61993-2
Test Description: CoChan 15.3.4 RX 1 2088 + 3kHz

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000
VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663494
Test Specification: IEC 61993-2
Test Description: CoChan 15.3.4 RX 1 2088 - 3 kHz

Packet Error Rate (<20%) 0.30%

Total test Packets Sent: 1000
Valid Test Packets: 997
VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

6. CoChannel - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

Frequencies: 162.025 MHz & 162.025 MHz $\pm$ 3kHz

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663496

Test Specification: IEC 61993-2

Test Description: CoChan 15.3.4 RX 2 2088

Packet Error Rate (<20%) 0.40%

Total test Packets Sent: 1000

Valid Test Packets: 996

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663494

Test Specification: IEC 61993-2

Test Description: CoChan 15.3.4 RX 2 2088 + 3 kHz

Packet Error Rate (<20%) 0.10%

Total test Packets Sent: 1000

Valid Test Packets: 999

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10

EUT Serial Number: 663494

Test Specification: IEC 61993-2

Test Description: CoChan 15.3.4 RX 2 2088 - 3 kHz

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000

Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

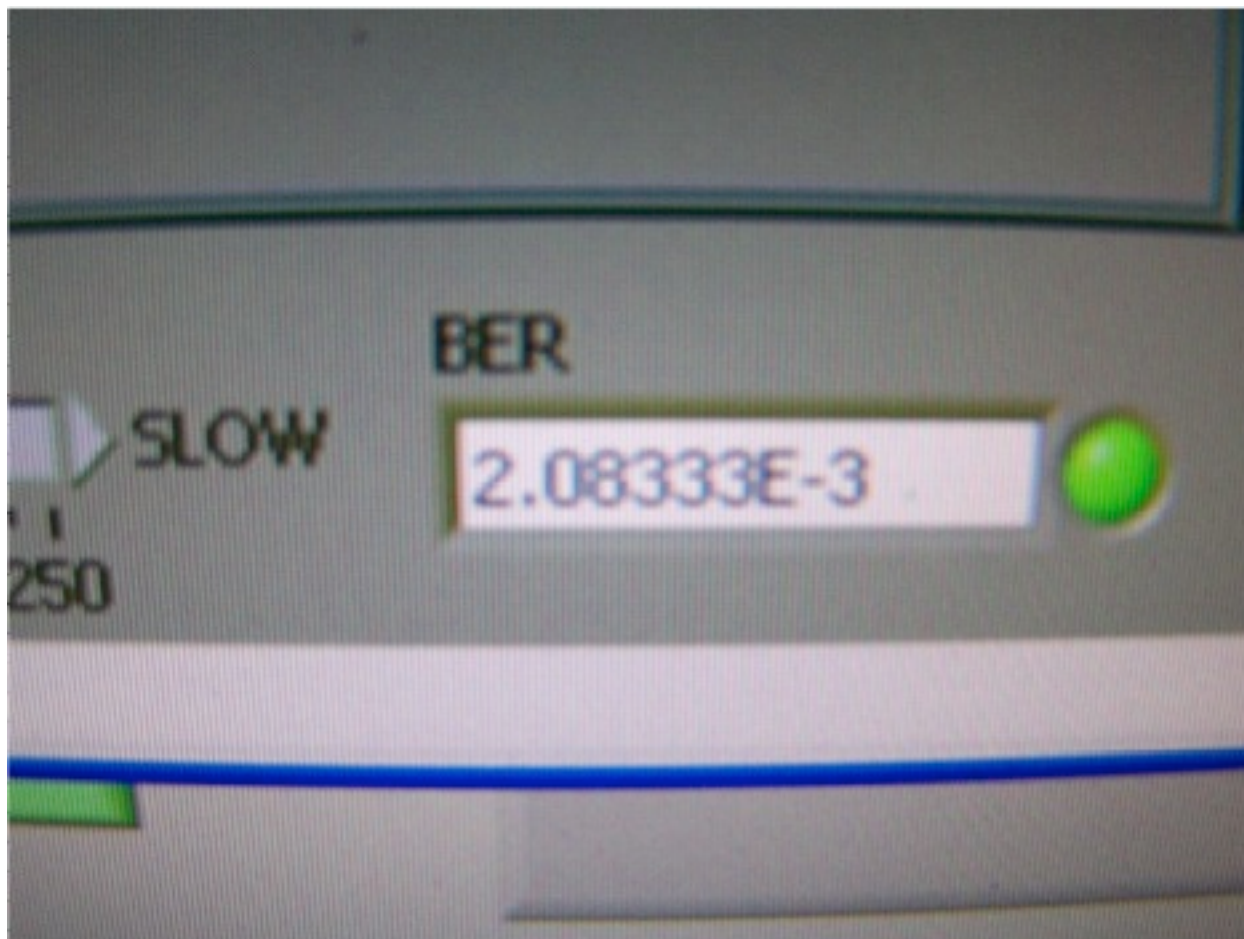


X. Measurement Results Cont'd:

6. CoChannel - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -112 dBm signal input.

Frequency: 156.525 MHz

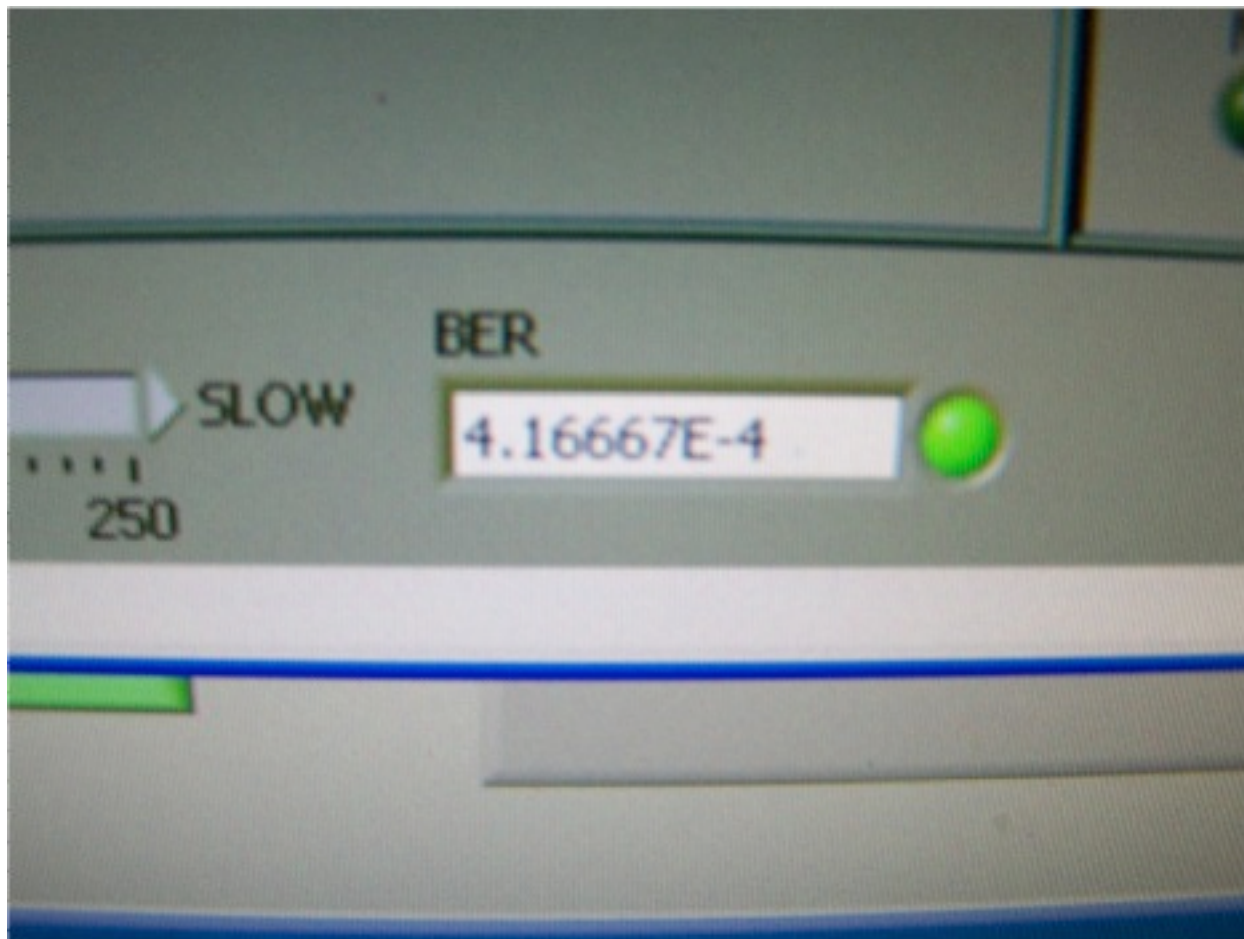


X. Measurement Results Cont'd:

6. CoChannel - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -112 dBm signal input.

Frequency: 156.528 MHz

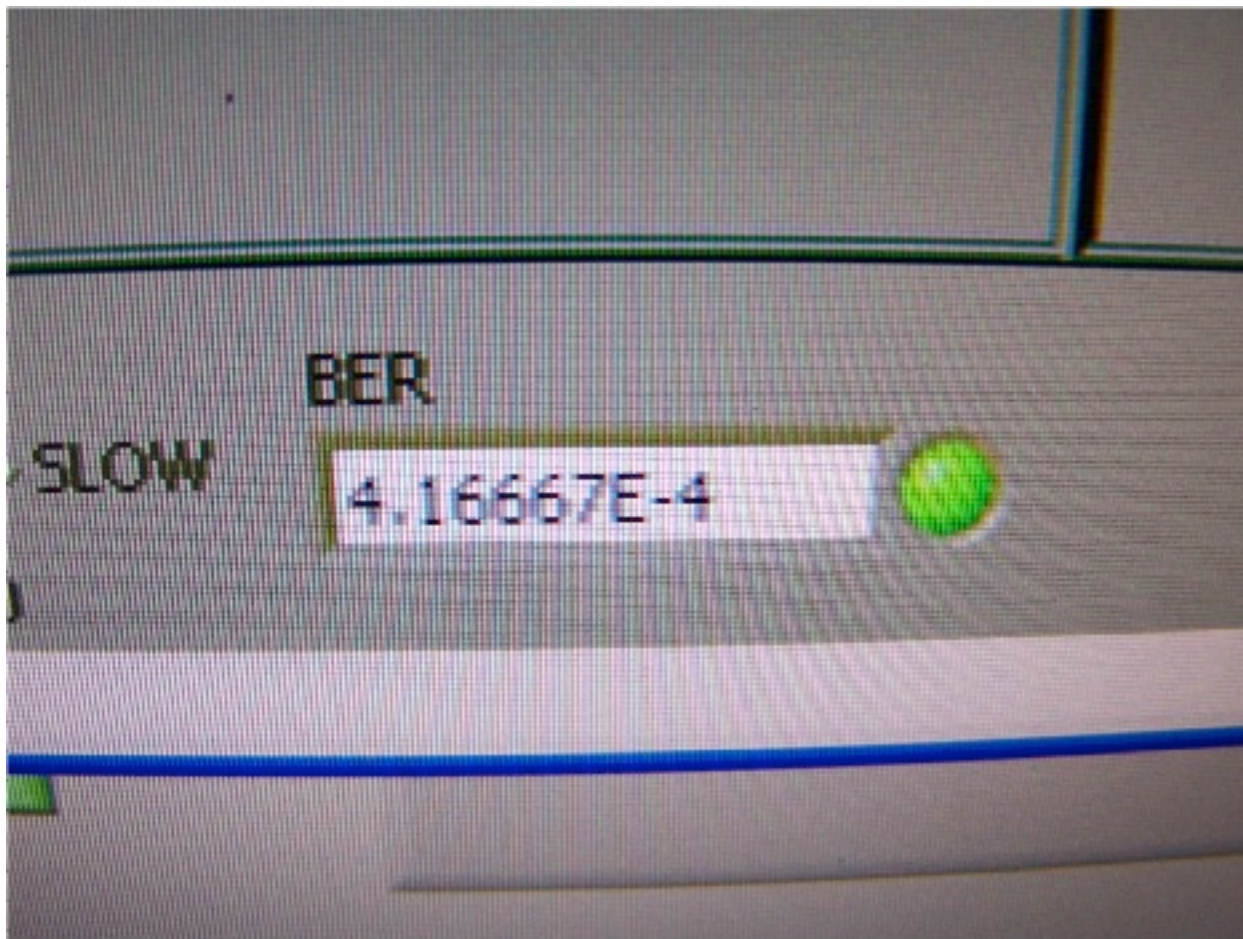


X. Measurement Results Cont'd:

6. CoChannel - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -112 dBm signal input.

Frequency: 156.522 MHz



X. Measurement Results Cont'd:

7. Adjacent Channel Selectivity - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: ADJCHAN 15.3.6 RX 1 down ch

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: ADJCHAN 15.3.6 RX 1 up chan

Packet Error Rate (<20%) 0.30%

Total test Packets Sent: 1000
Valid Test Packets: 997

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

7. Adjacent Channel Selectivity - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: ADJCHAN 15.3.6 RX 2 down ch

Packet Error Rate (<20%) 1.40%

Total test Packets Sent: 1000
Valid Test Packets: 986

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: ADJCHAN 15.3.6 RX 2 up chan

Packet Error Rate (<20%) 0.90%

Total test Packets Sent: 1000
Valid Test Packets: 991

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

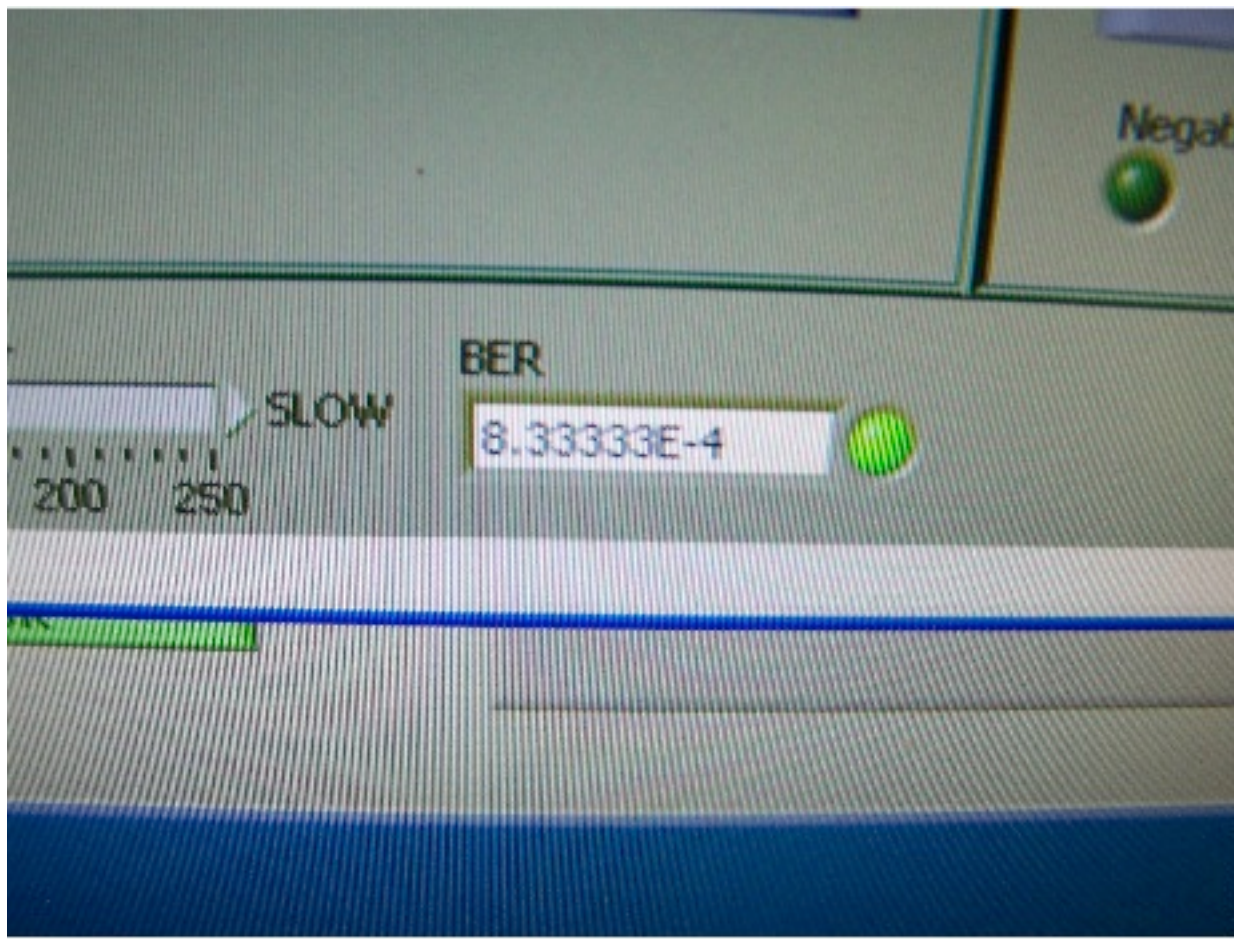


X. Measurement Results Cont'd:

7. Adjacent Channel Selectivity - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Frequency: 156.550 MHz

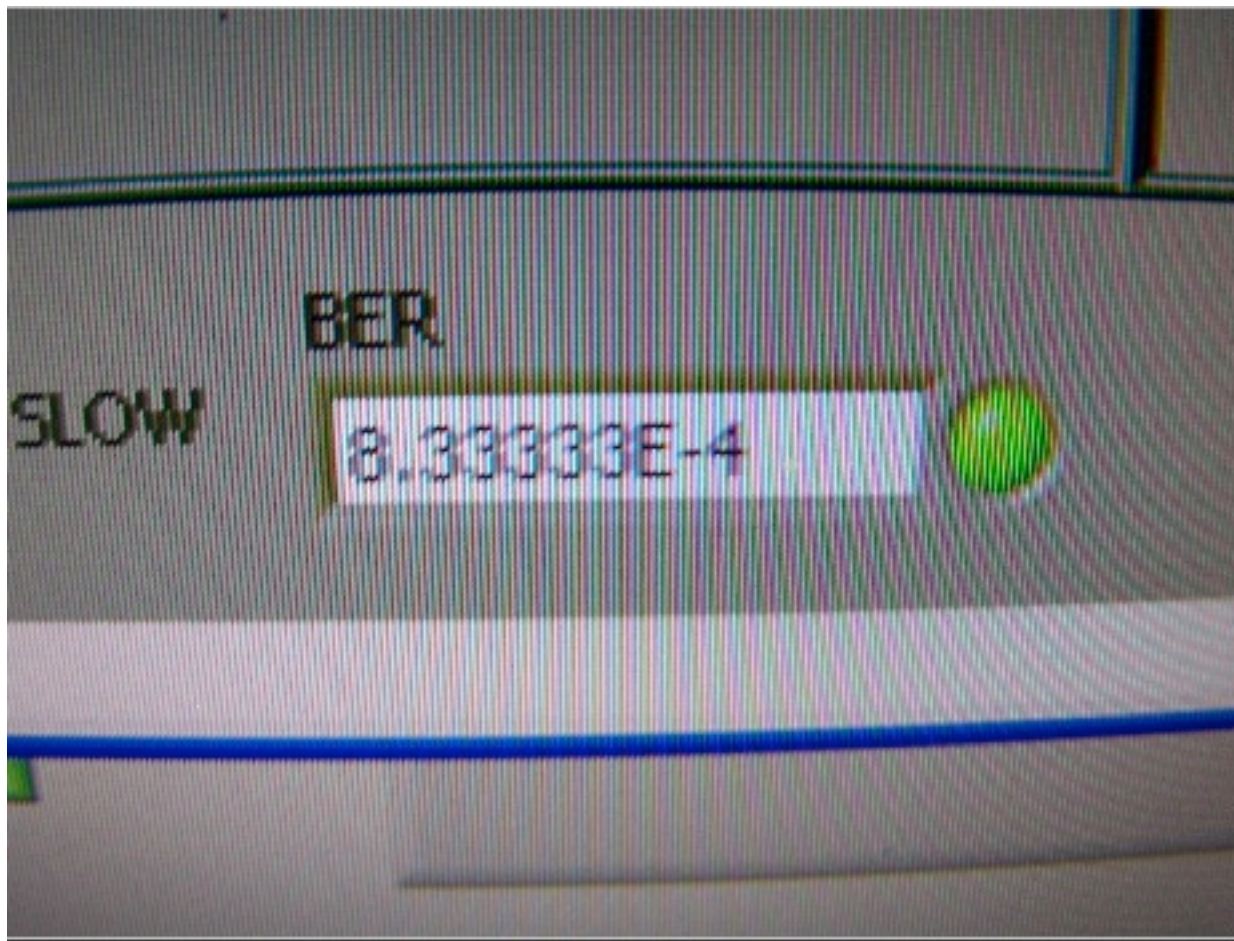


X. Measurement Results Cont'd:

7. Adjacent Channel Selectivity - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Frequency: 156.500 MHz



X. Measurement Results Cont'd:

8. Spurious Rejection - Manufacturer Declaration.

Calculations for limited frequency band of interest "LFR_{HI} to LFR_{LO}":

$$\text{LFR}_{\text{HI}} = f_{\text{loh}} + (\text{IF}_1 + \text{IF}_2 + \text{sr}/2)$$

$$\text{LFR}_{\text{LO}} = f_{\text{lol}} - (\text{IF}_1 + \text{IF}_2 + \text{sr}/2)$$

$$\text{sr} = 6 \text{ MHz} (162 \text{ MHz} - 156 \text{ MHz})$$

	f_{lol} MHz	f_{loh} MHz	IF_1 MHz	IF_2 MHz	LFR _{HI}	LFR _{LO}
Rx1/Rx2	177.425	183.425	21.4	0.455	152.57	208.28

Calculations for spurious responses outside the limited frequency band of interest "SFI₁ and SFI₂" where K = 2, 3 & 4:

$$\text{SFI}_1 = (K * f_{\text{loh}}) + \text{IF}_1$$

$$\text{SFI}_2 = (K * f_{\text{lol}}) - \text{IF}_1$$

		K=2	K=3	K=4
	f_{loh} MHz	SFI ₁	SFI ₁	SFI ₁
Rx1/Rx2	183.425	388.25	571.675	755.1

		K=2	K=3	K=4
	f_{lol} MHz	SFI ₂	SFI ₂	SFI ₂
Rx1/Rx2	177.425	333.45	510.875	688.3



X. Measurement Results Cont'd:

8. Spurious Rejection - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SPUR 15.3.8 RX 1 lo sweep

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SPUR 15.3.8 RX 1 hi sweep

Packet Error Rate (<20%) 0.30%

Total test Packets Sent: 1000
Valid Test Packets: 997

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

8. Spurious Rejection - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SPUR 15.3.8 RX 2 lo sweep

Packet Error Rate (<20%) 0.10%

Total test Packets Sent: 1000
Valid Test Packets: 999

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SPUR 15.3.8 RX 2 hi sweep

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

8. Spurious Rejection - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SPUR 15.3.8 RX 1 Discretes

Packet Error Rate (<20%) 0.00%

388.25

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.70%

571.675

Total test Packets Sent: 1000

Valid Test Packets: 993

Packet Error Rate (<20%) 0.00%

755.1

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

333.45

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

510.875

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

688.3

Total test Packets Sent: 1000

Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

8. Spurious Rejection - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -104 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: SPUR 15.3.8 RX 2 Discretes

Packet Error Rate (<20%) 0.00%

388.25

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

571.675

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

755.1

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

333.45

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

510.875

Total test Packets Sent: 1000

Valid Test Packets: 1000

Packet Error Rate (<20%) 0.00%

688.3

Total test Packets Sent: 1000

Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k<k=,0*77

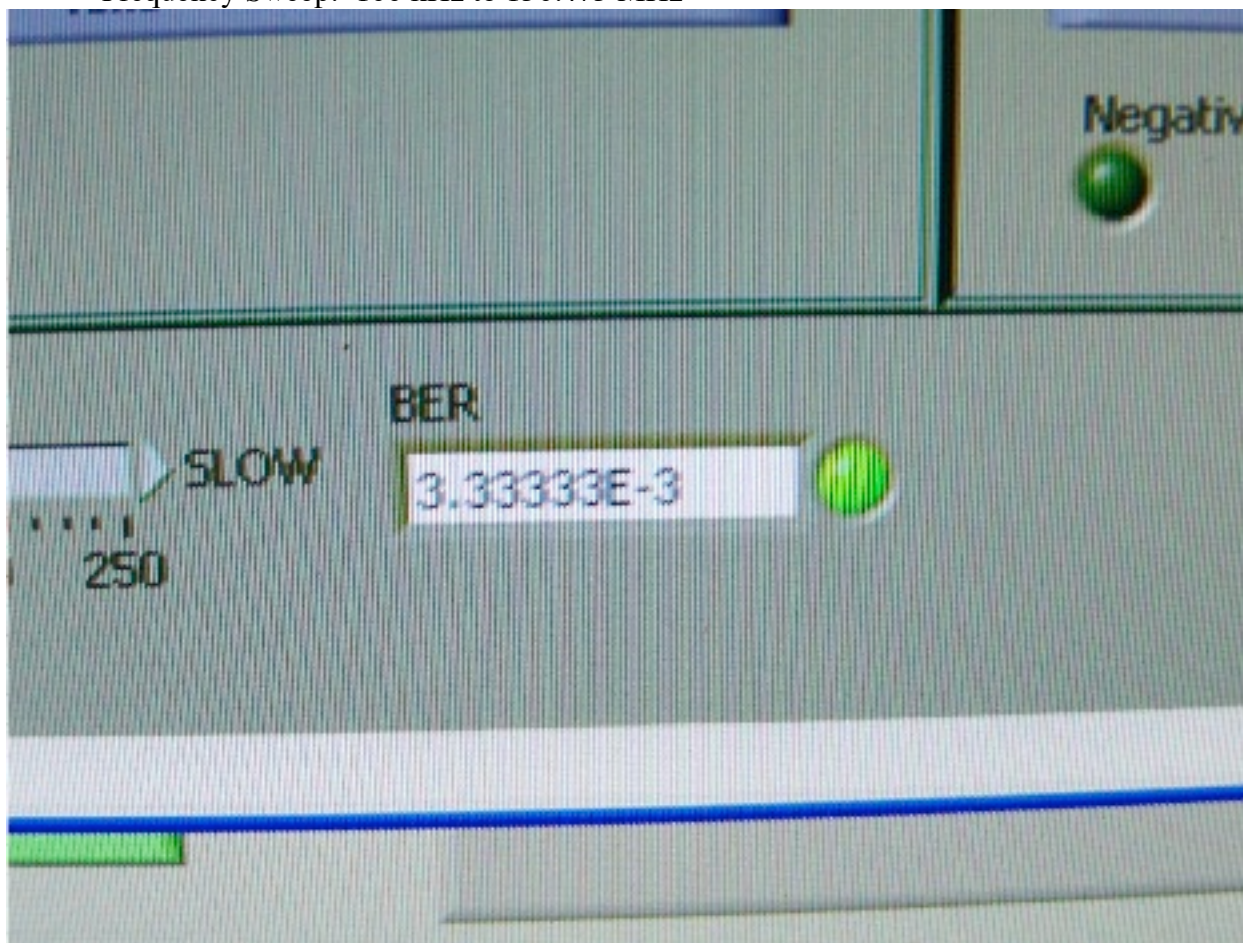


X. Measurement Results Cont'd:

8. Spurious Response Rejection - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Frequency Sweep: 100 kHz to 156.475 MHz

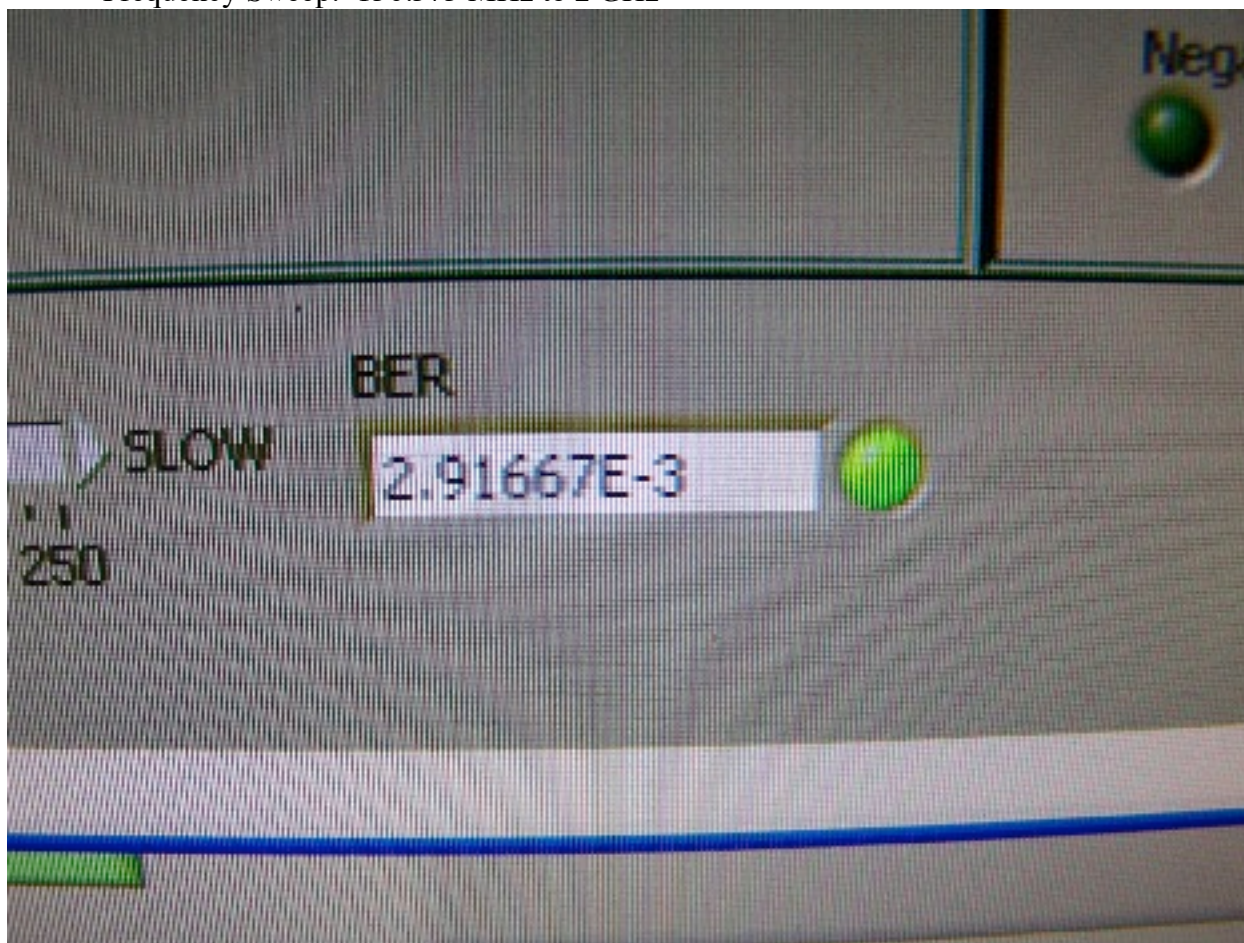


X. Measurement Results Cont'd:

8. Spurious Response Rejection - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Frequency Sweep: 156.575 MHz to 2 GHz



X. Measurement Results Cont'd:

9. Intermodulation and Blocking - Receiver 1 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -101 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: INTERMODS 15.3.9 RX 1 T1

Packet Error Rate (<20%) 0.10%

Total test Packets Sent: 1000
Valid Test Packets: 999

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: INTERMODS 15.3.9 RX 1 T1

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77



X. Measurement Results Cont'd:

9. Intermodulation and Blocking - Receiver 2 - Packet Error Test Program Output.

Specification: Packet Error Rate $\leq 20\%$ at -101 dBm signal input.

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: INTERMODS 15.3.9 RX 2 T1

Packet Error Rate (<20%) 0.10%

Total test Packets Sent: 1000
Valid Test Packets: 999

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

L3 AIS TEST LOG

EUT Part Number: AISA3-000-10
EUT Serial Number: 663496
Test Specification: IEC 61993-2
Test Description: INTERMODS 15.3.9 RX 2 T1

Packet Error Rate (<20%) 0.00%

Total test Packets Sent: 1000
Valid Test Packets: 1000

VDM,1,1,,A,8?wwwk<k<k<k<k<k<k<k<k<k=,0*77

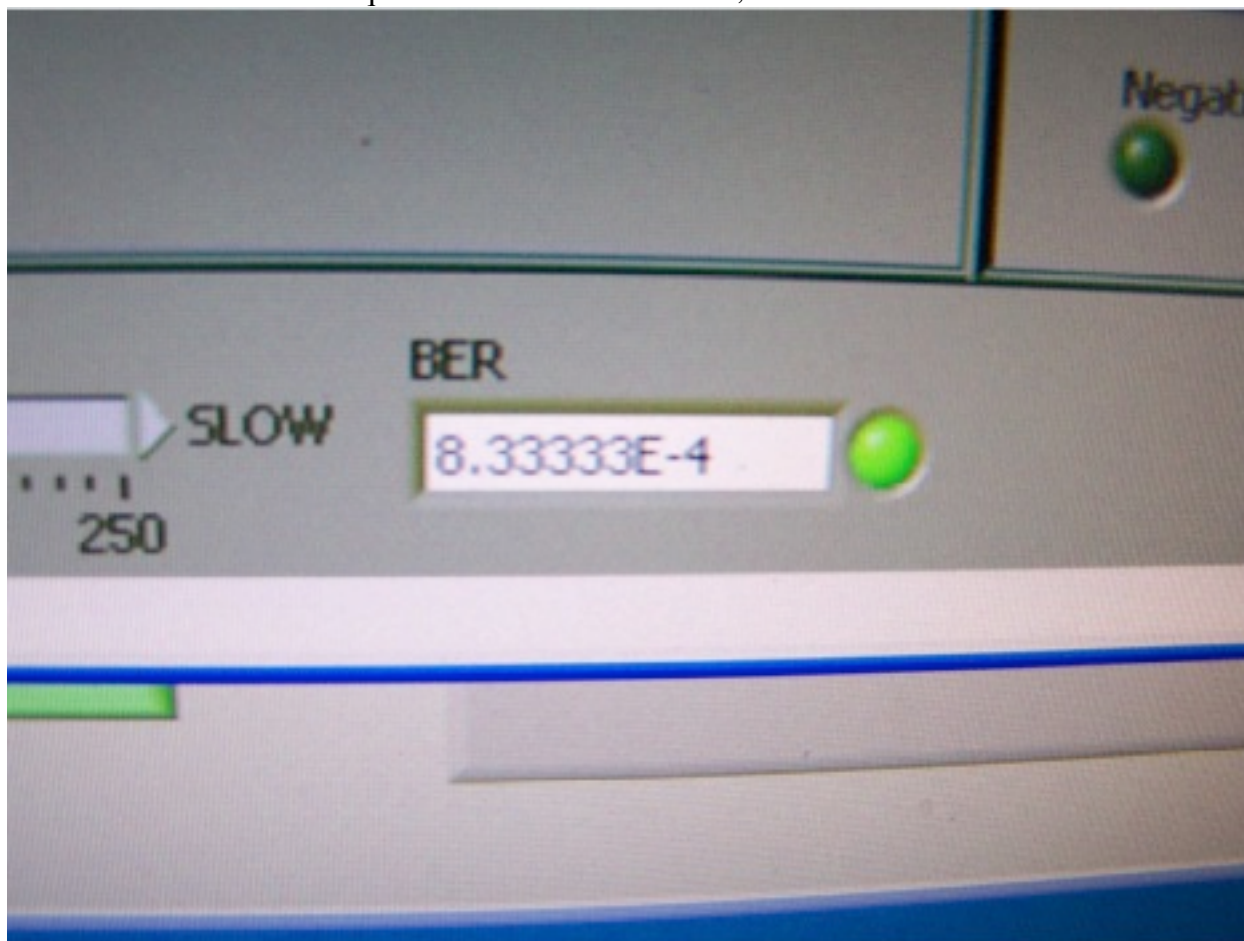


X. Measurement Results Cont'd:

9. Intermodulation and Blocking - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Intermodulation Frequencies: B at 156.575 MHz, C at 156.625

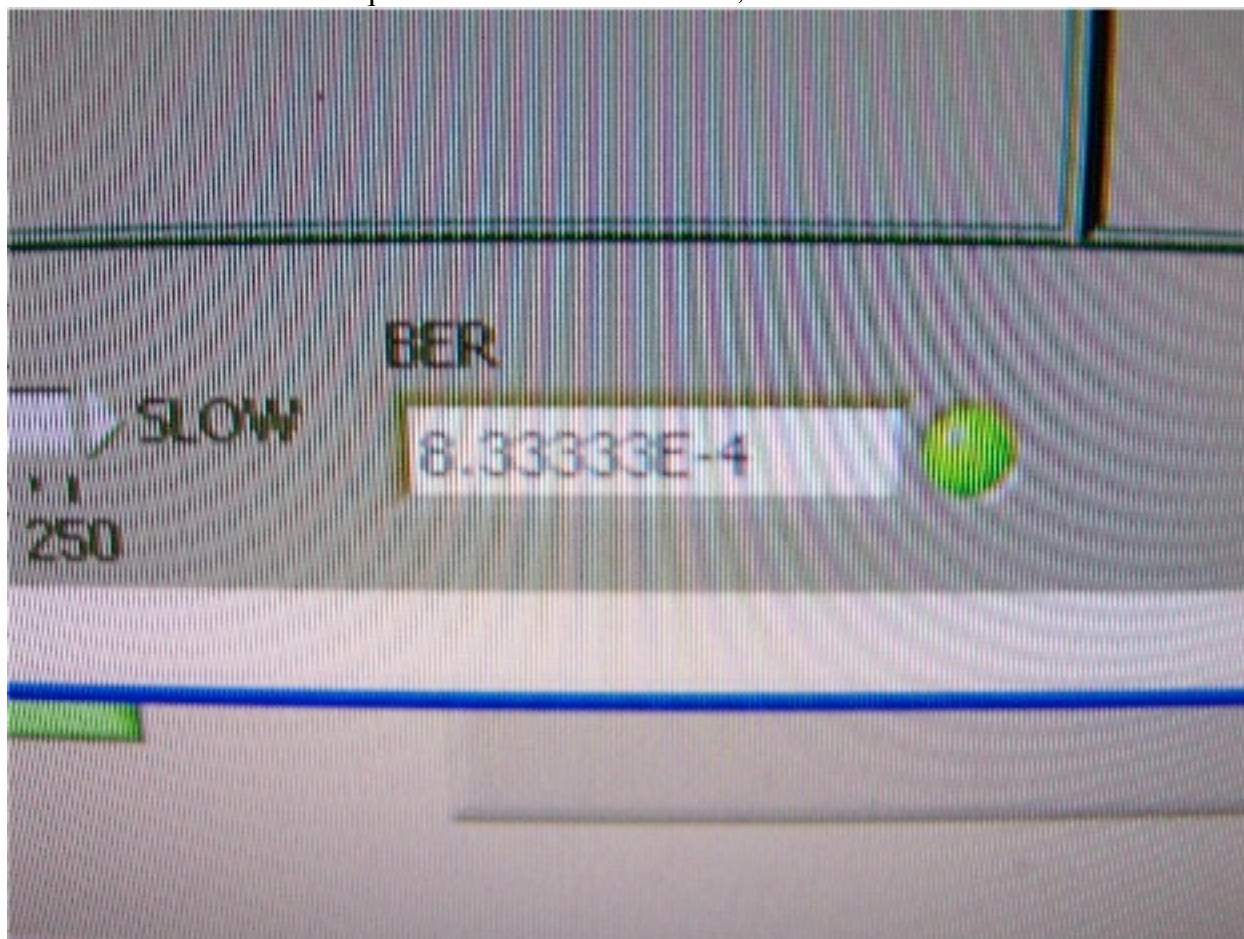


X. Measurement Results Cont'd:

9. Intermodulation and Blocking - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Intermodulation Frequencies: B at 156.475 MHz, C at 156.425 MHz

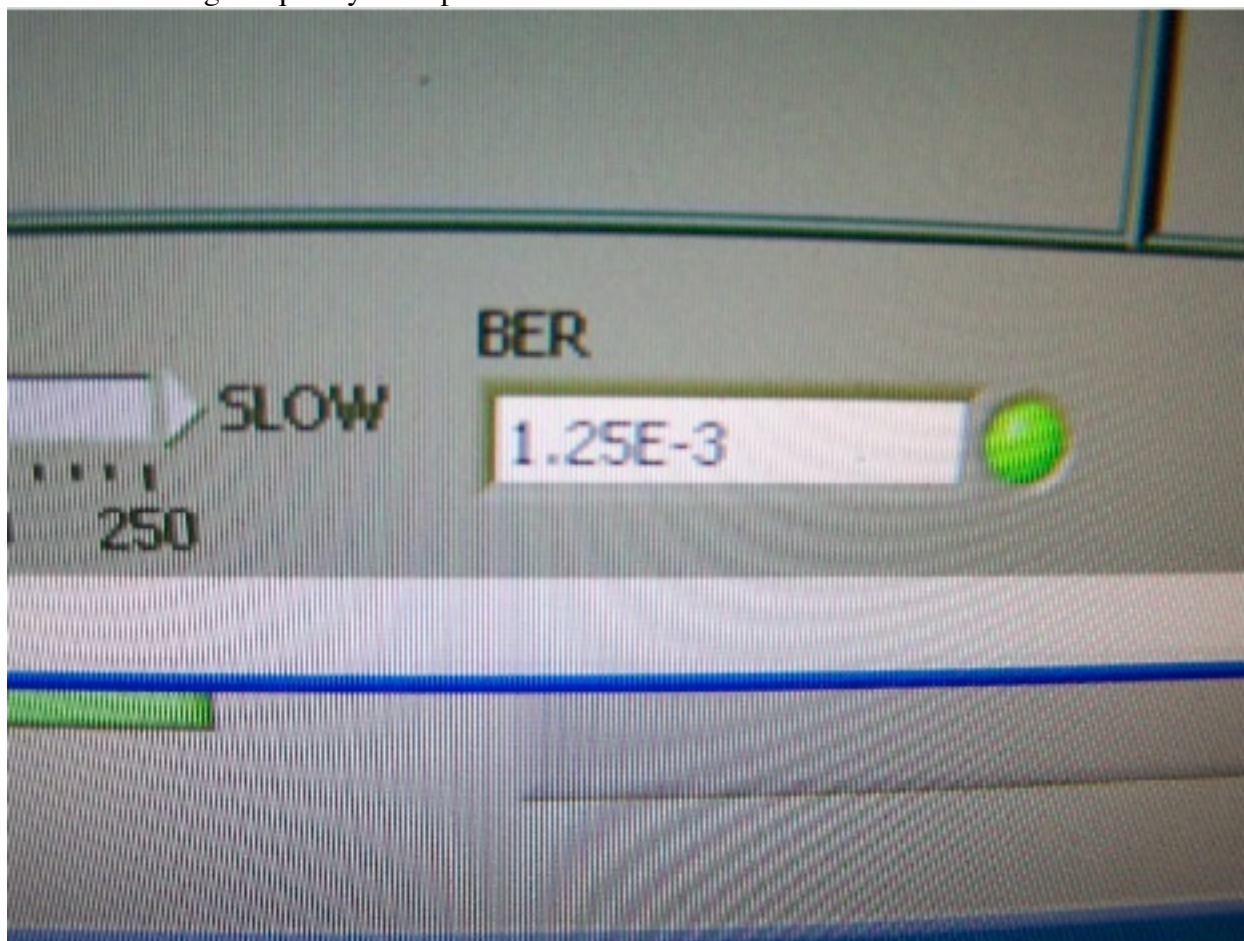


X. Measurement Results Cont'd:

9. Intermodulation and Blocking - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

Blocking Frequency Sweep: 146.525 to 155.525 MHz

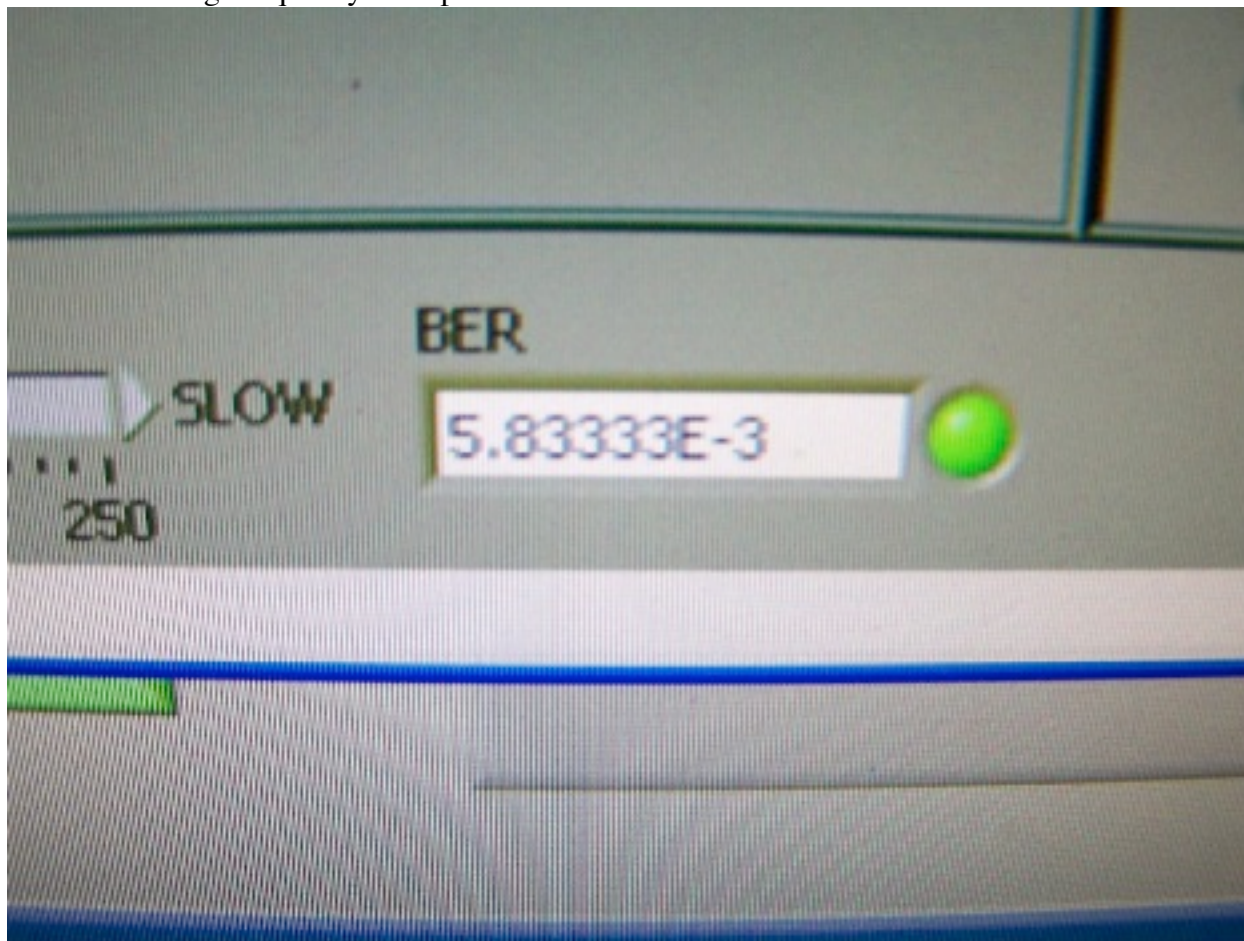


X. Measurement Results Cont'd:

9. Intermodulation and Blocking - DSC Receiver - Bit Error Test Program Output.

Specification: Bit Error Rate $\leq 1\%$ at -104 dBm signal input.

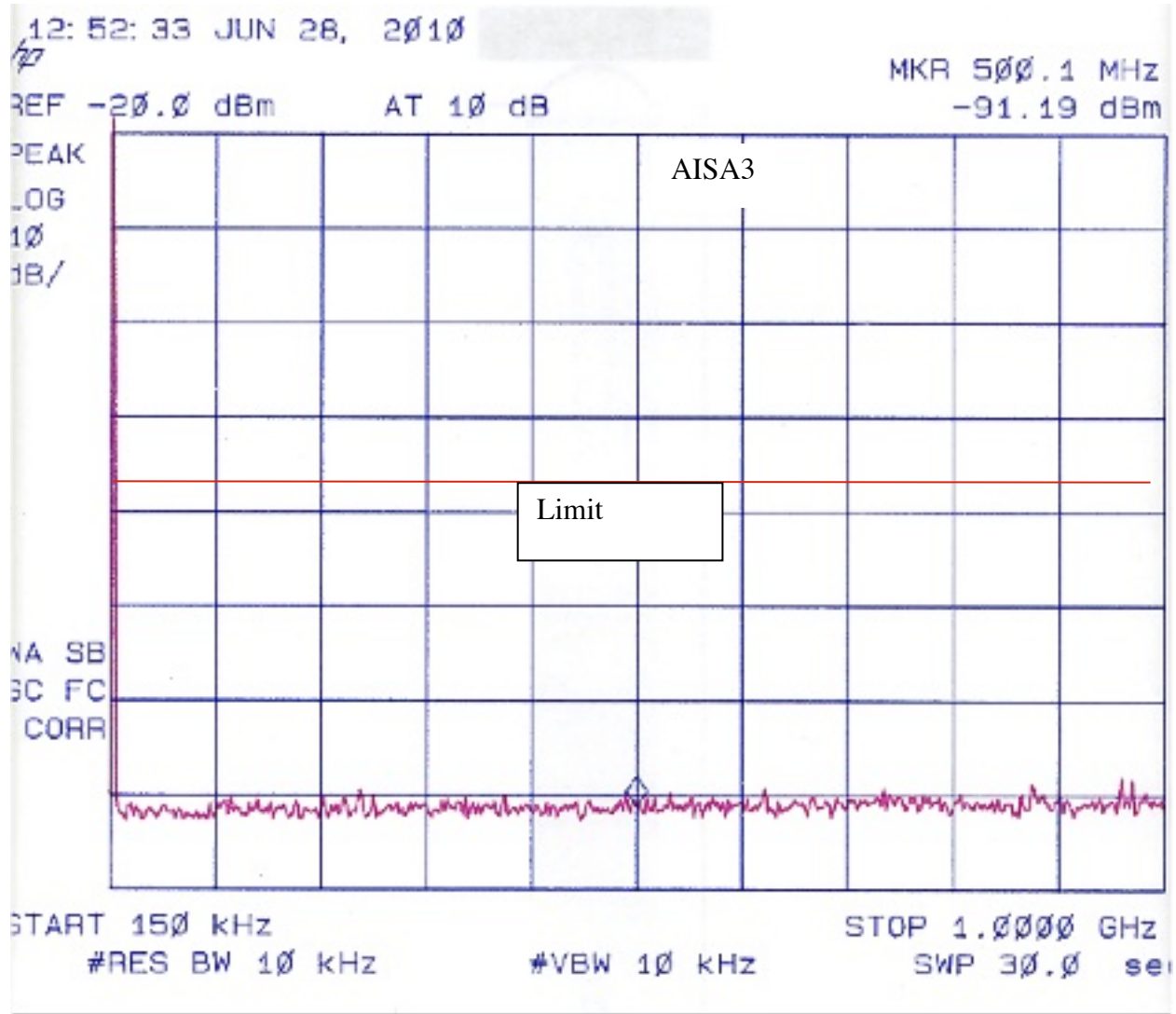
Blocking Frequency Sweep: 157.525 to 166.525



X. Measurement Results Cont'd:

10. Conducted Spurious.

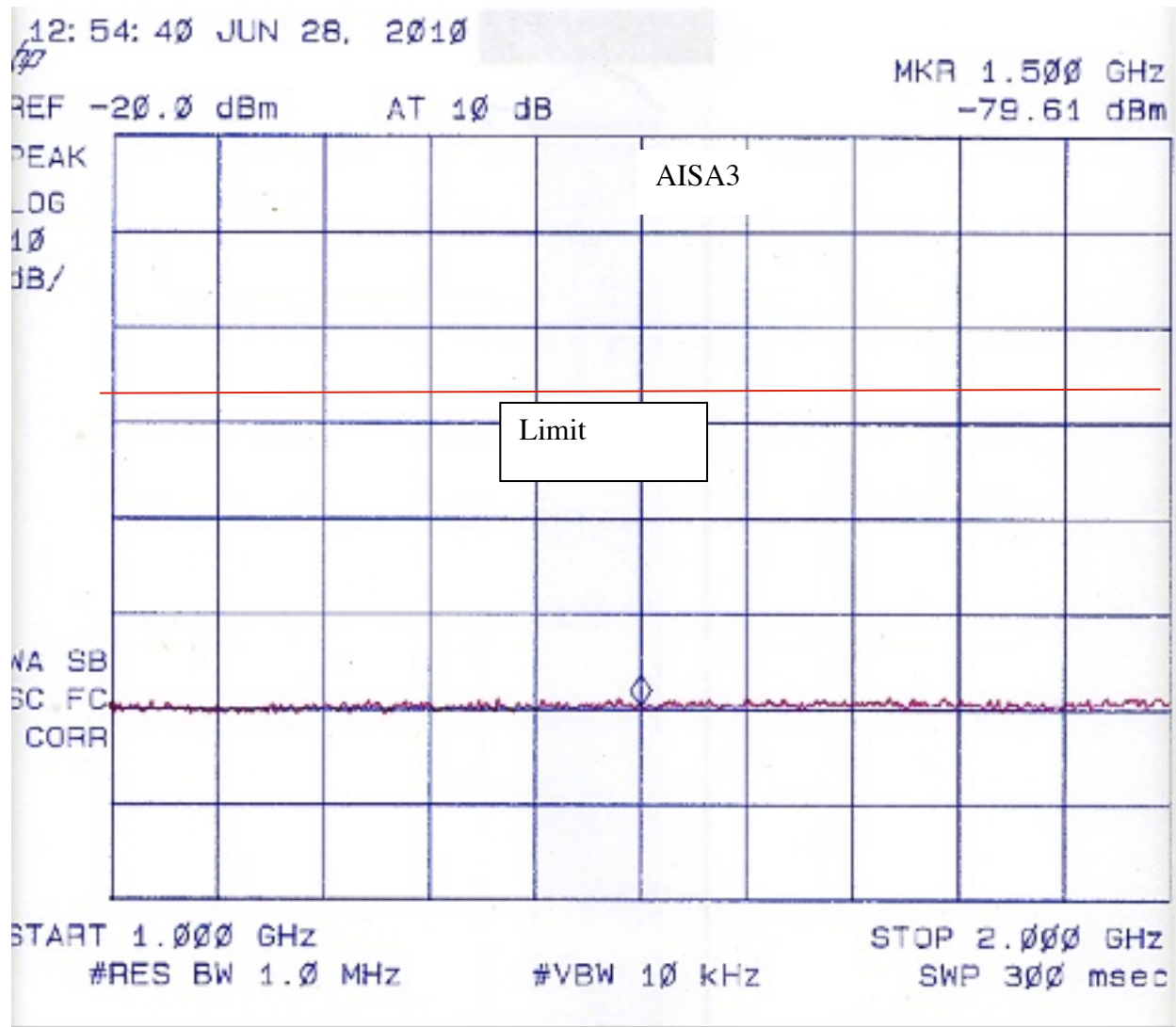
Receiver Specification: 150 kHz - 1 GHz: -57 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

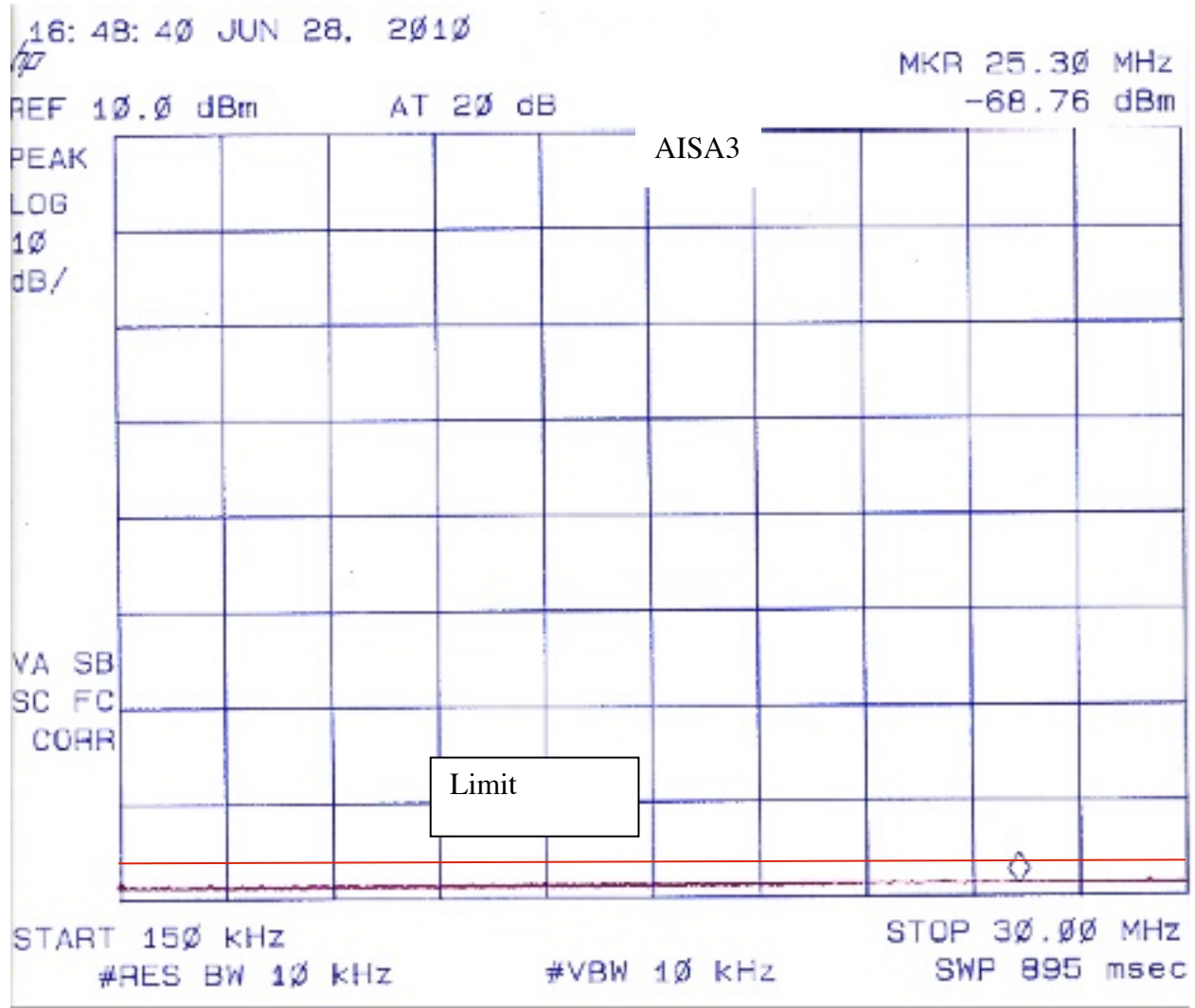
Receiver Specification: 1 - 2 GHz: -47 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

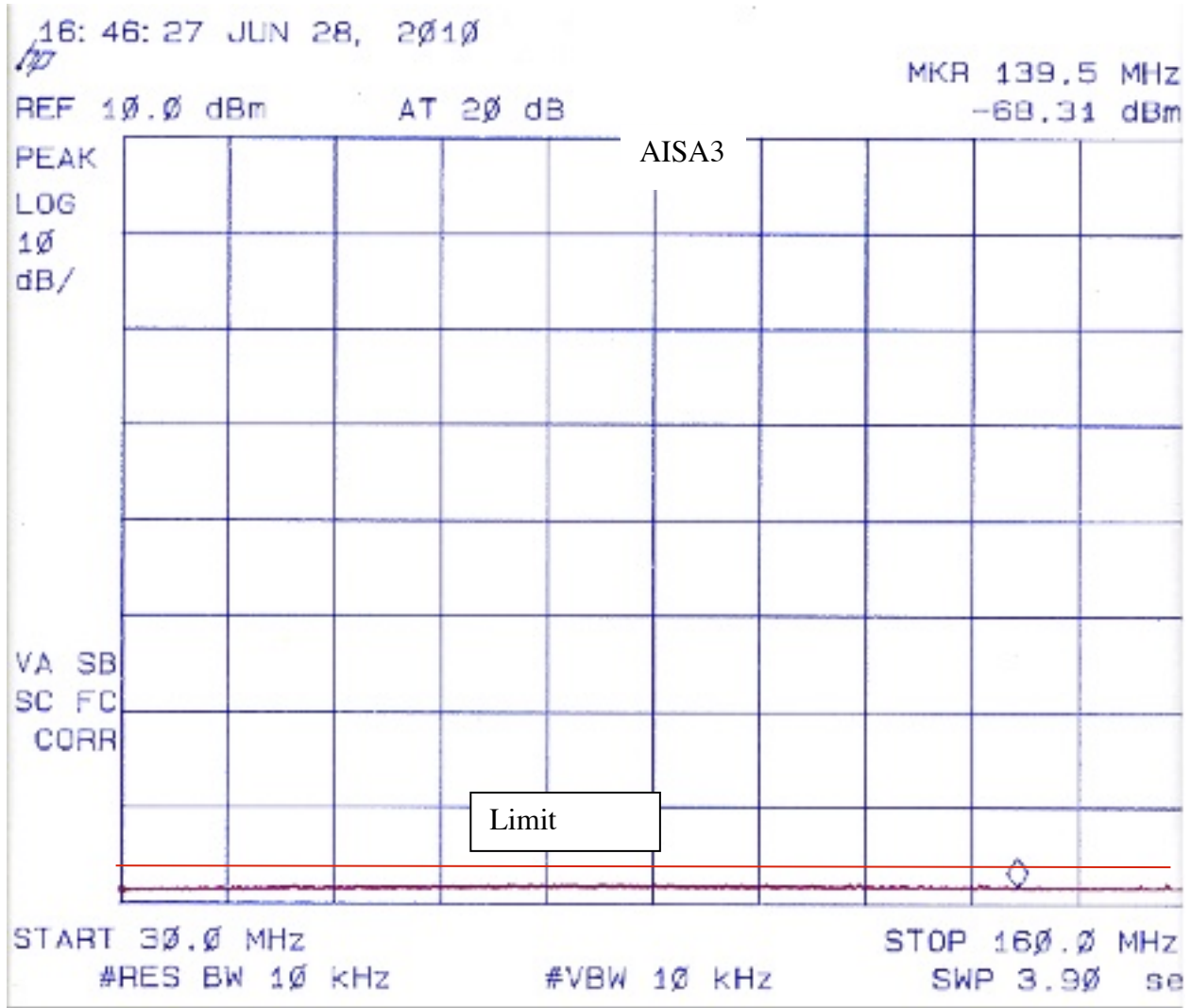
Transmitter Specification: 150 kHz - 30 MHz: -36 dBm -30 dB attenuator = -66 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

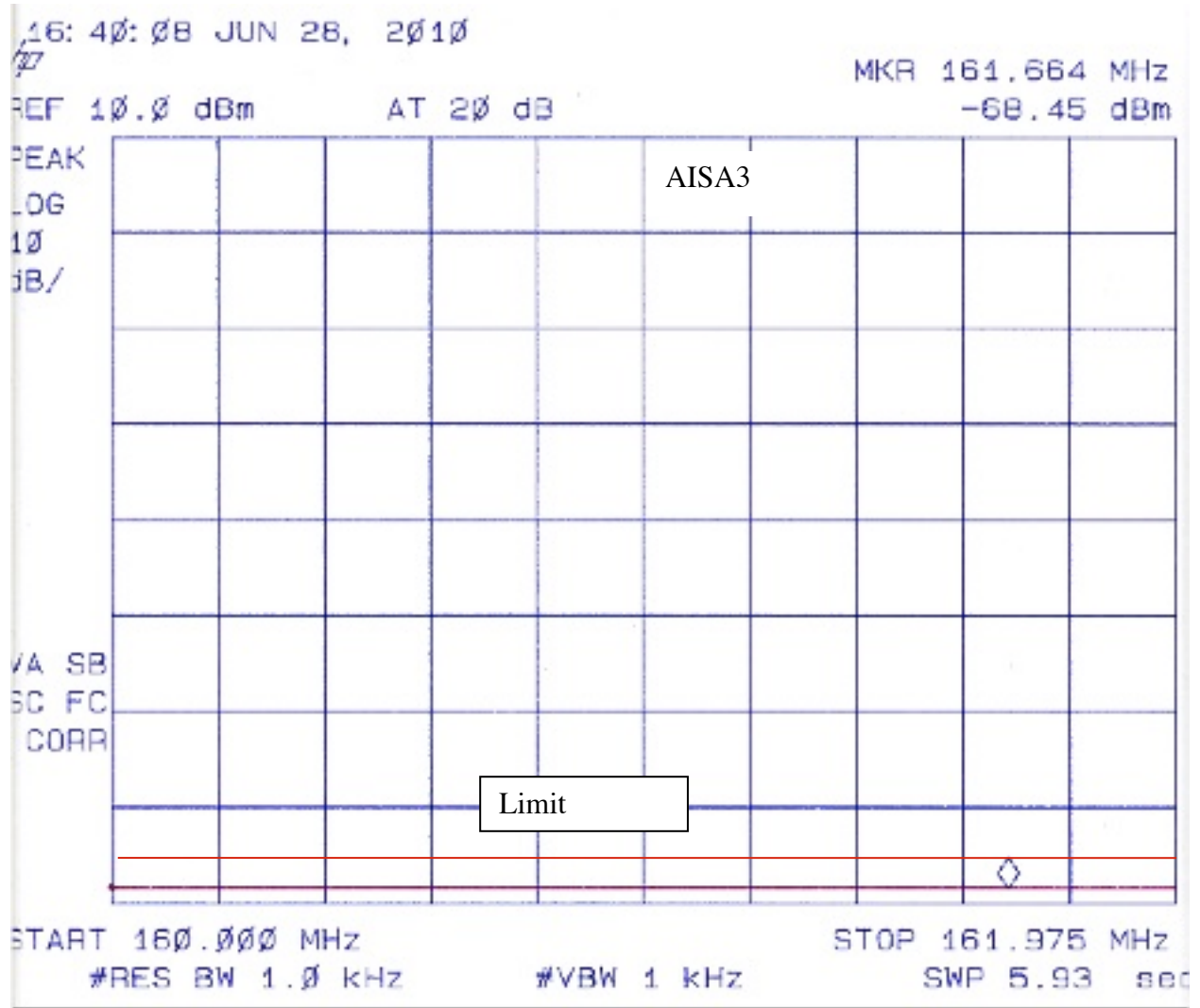
Transmitter Specification: 30 – 160 MHz: -36 dBm -30 dB attenuator = -66 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

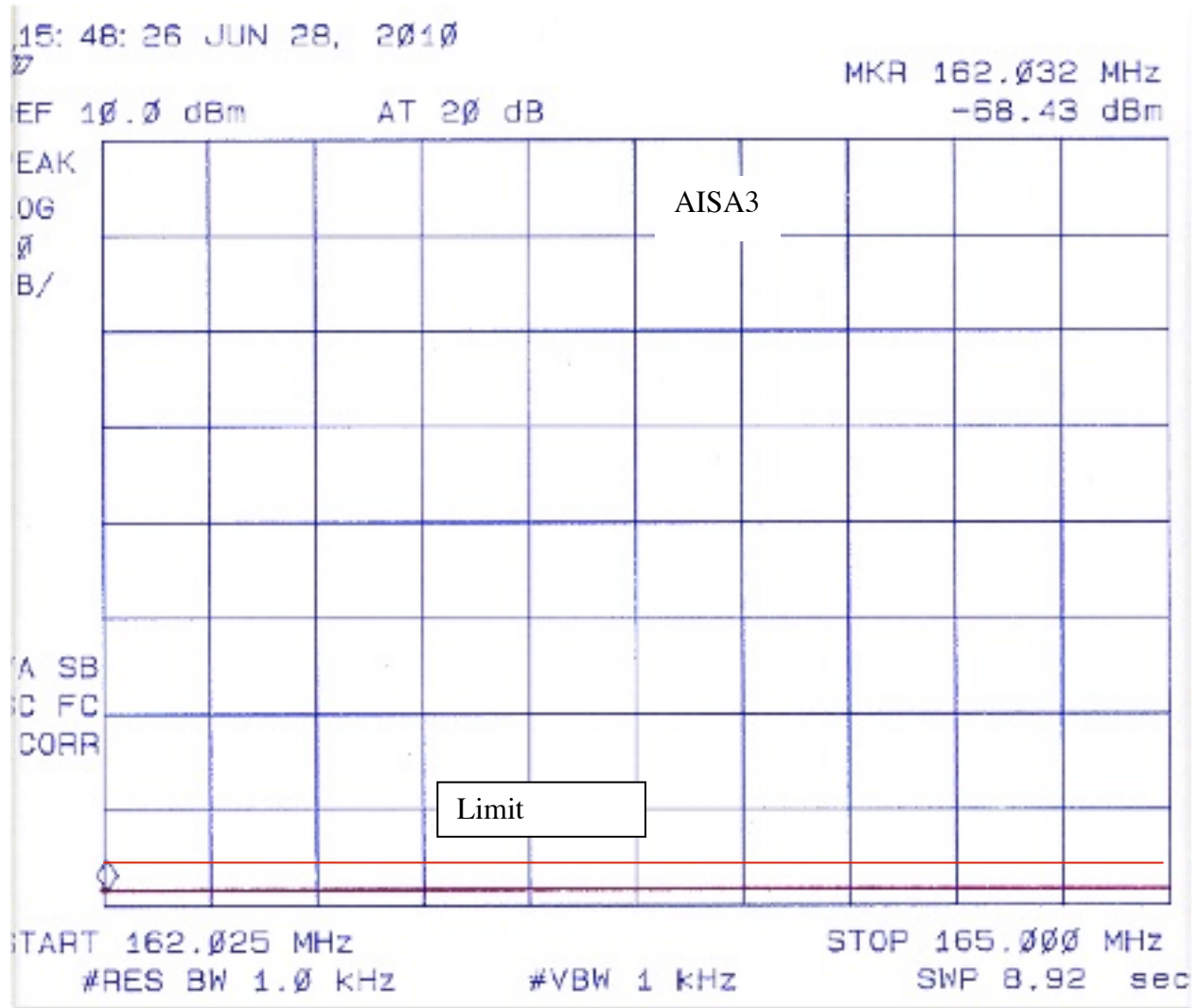
Transmitter Specification: 160 - 161.975 MHz : -36 dBm -30 dB attenuator = -66 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

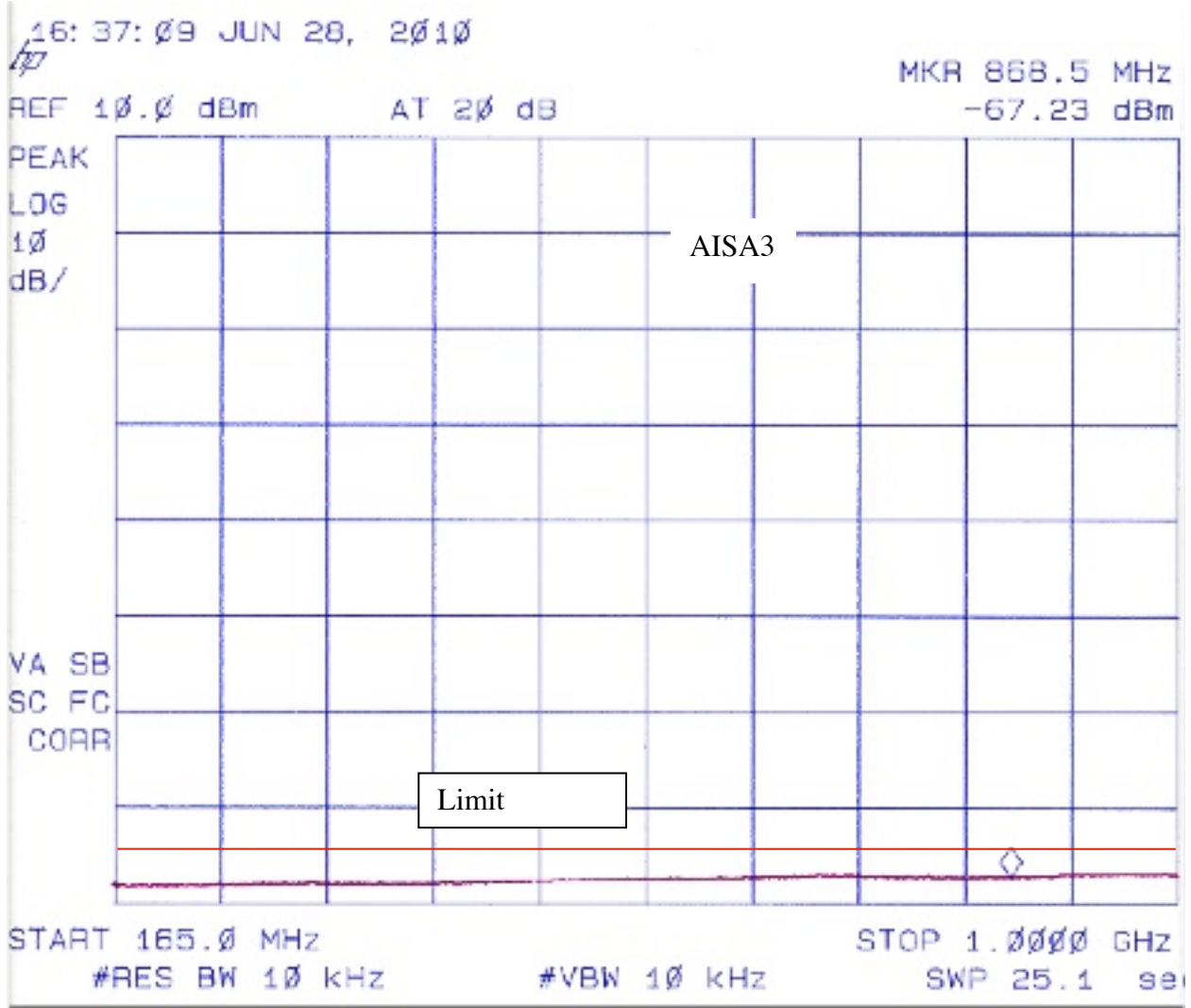
Transmitter Specification: 162.025 – 165 MHz: -36 dBm -30 dB attenuator = -66 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

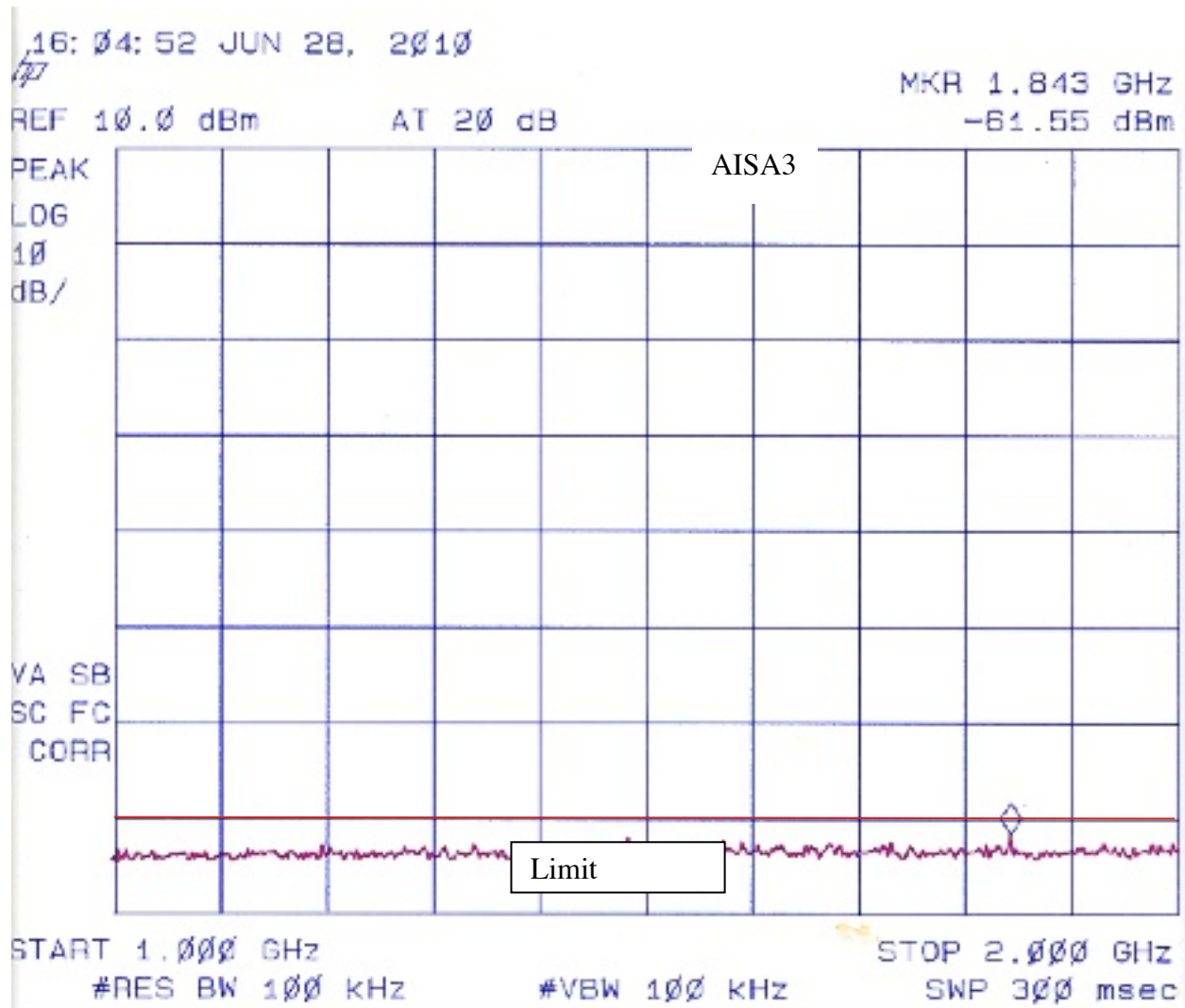
Transmitter Specification: 165 – 1000 MHz: -36 dBm -30 dB attenuator = -66 dBm



X. Measurement Results Cont'd:

10. Conducted Spurious.

Transmitter Specification: 1 – 2 GHz: -30 dBm -30 dB attenuator = -60 dBm



Appendix A. Measurement Results from T/R Switching Time Test at L3:



communications
Aviation Recorders

P.O. Box 3041
Sarasota, Florida 34230

Cage Code: 06141

Test Summary Report
For
AIS Mobiles
P/N AISA3-000-XX

TR-391

Performed by: Luis Sandoval, Principal Reliability Engineer

11/10/10

Proprietary Data

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1.0 PURPOSE

This report provides the results from the 'Transmit to receive switching time' test performed per IEC-61993-2 section 15.3.10. This test describes the capability of the TDMA receiver to receive in the slot immediately following the transmission slot. The requirement is 20% PER @ -107 dBm.

2.0 SUMMARY OF TESTING

The following equipment was used for this test:

- Agilent attenuator model 8494A ID 5125 Cal due 10-31-2011
- Agilent attenuator model 8496A ID 5711 Cal due 10-31-2011
- Spectrum Analyzer HP8594E ID 501628 Cal due 10-31-2011
- Rohde & Schwartz PWR sensor NRP-Z81 ID 502166 Cal due 02-28-2011
- DC Power Supply TENMA 72-7695 ID 5431 Cal due 05-31-2011
- Base Station Application V 11.6
- Dell computer w/ MS Excel
- Miscellaneous cables and Attenuators
- 1 Base Station S/N 000597801
- 1 Mobile Phase III (AISA3-000-XX) S/N 000663495
- 1 Mobile Phase III (AISA3-000-XX) S/N 000663494 (UUT) with the following SW:

AISA1-000-xx V3.7.02 8A81I 7A71V 35DBF

Figure 1 shows the test set-up:

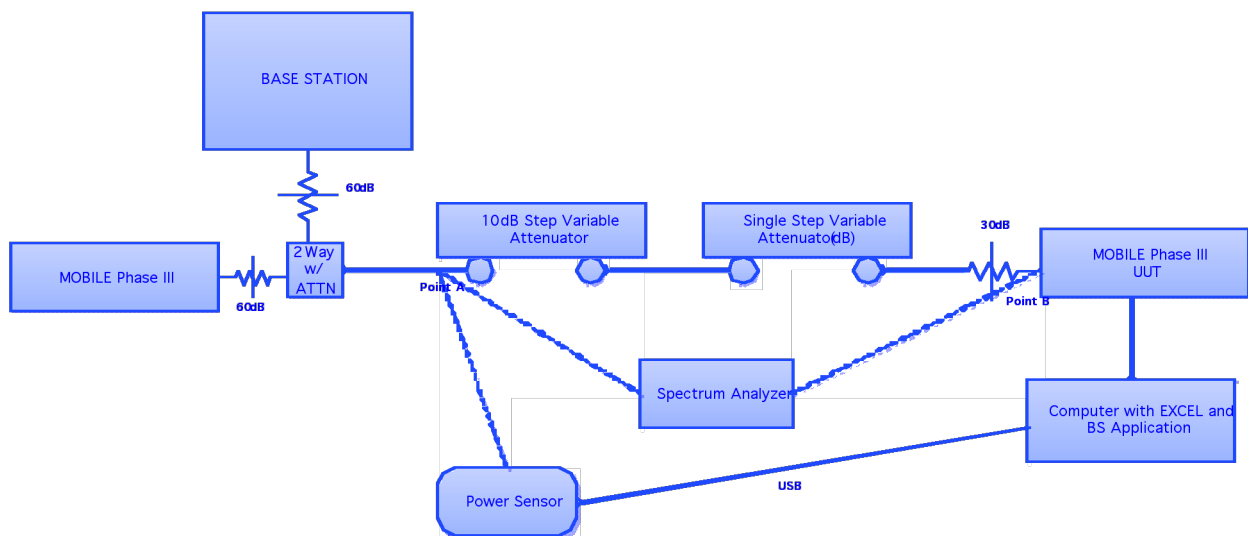
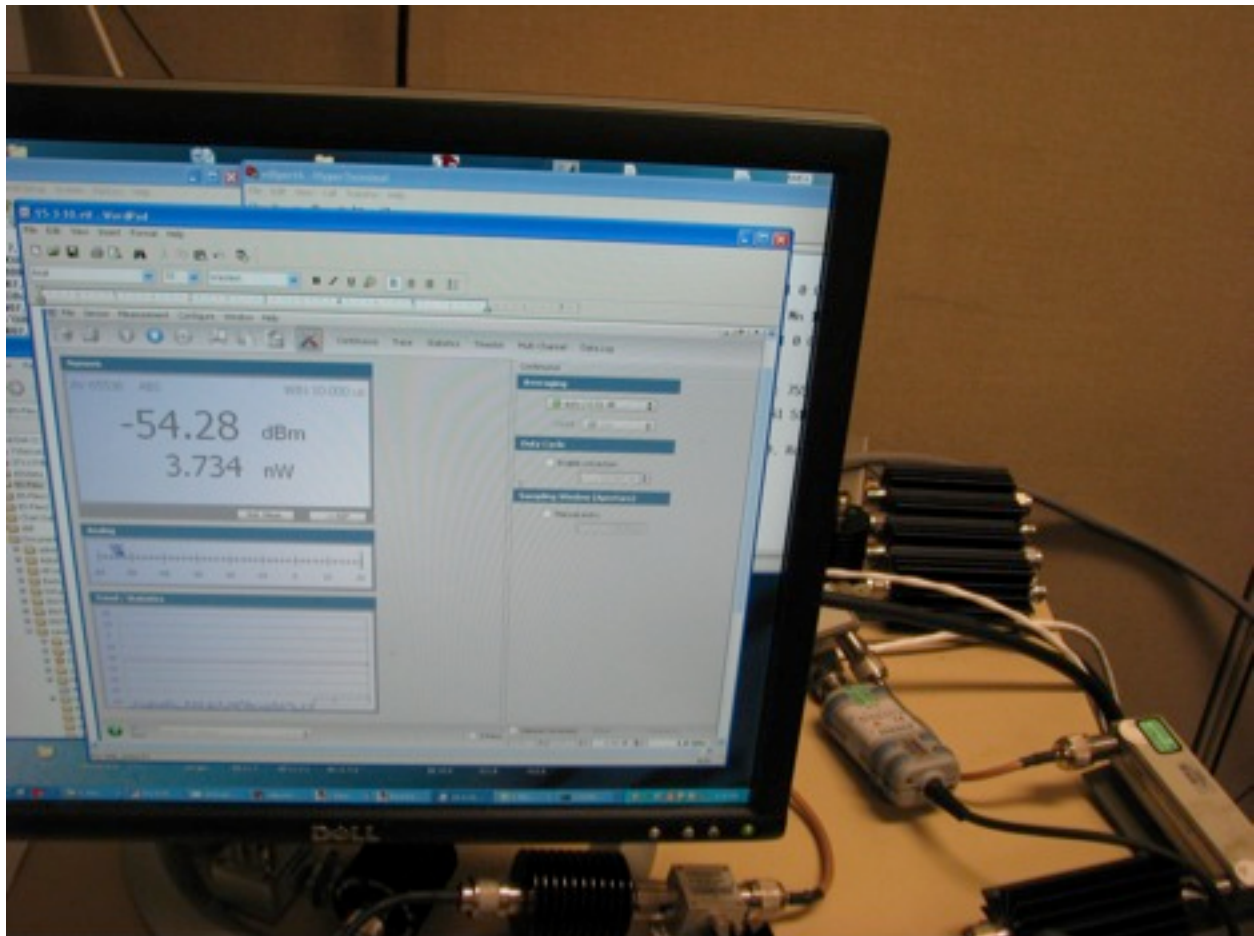


FIGURE 1

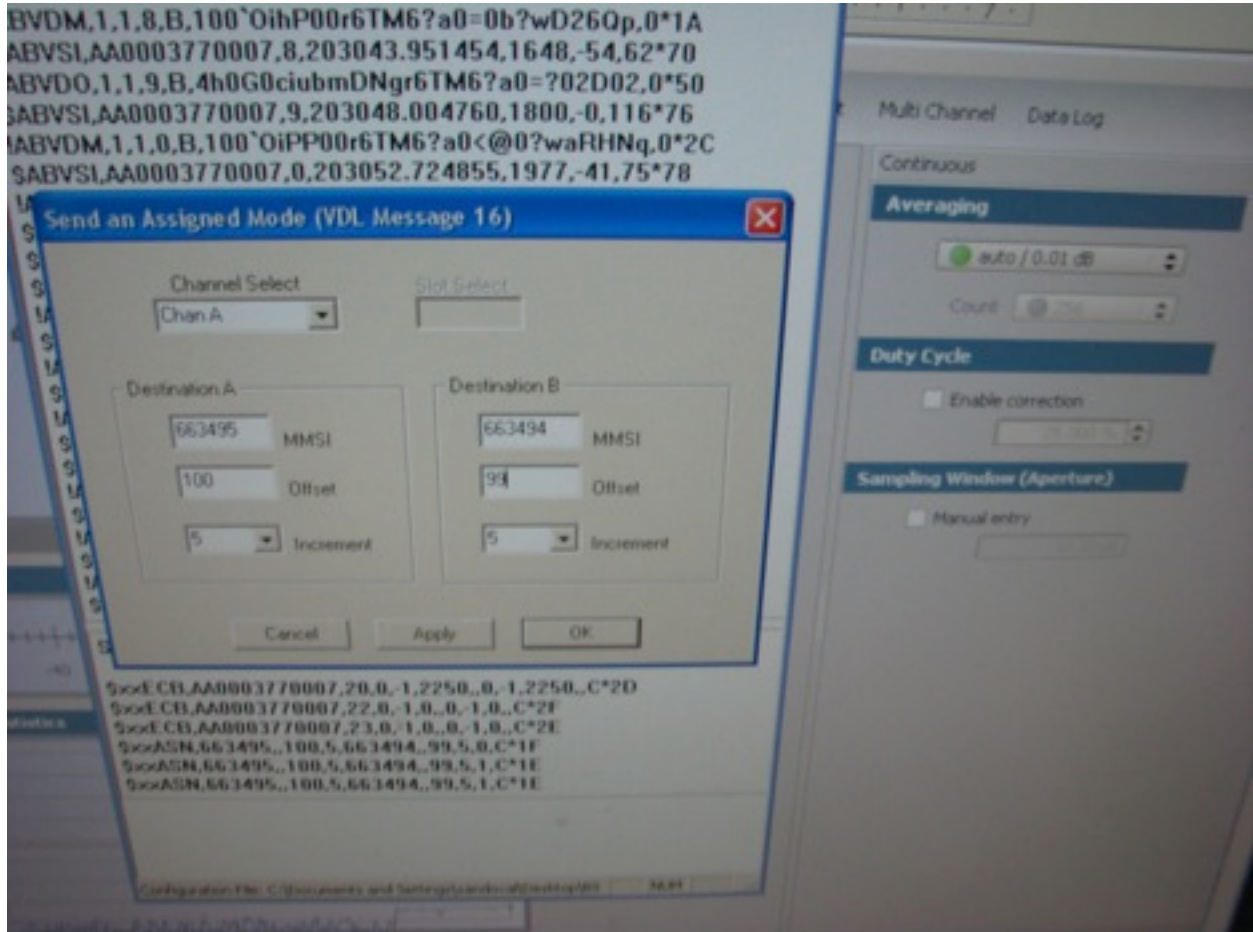


The procedure to perform the test was as follows:

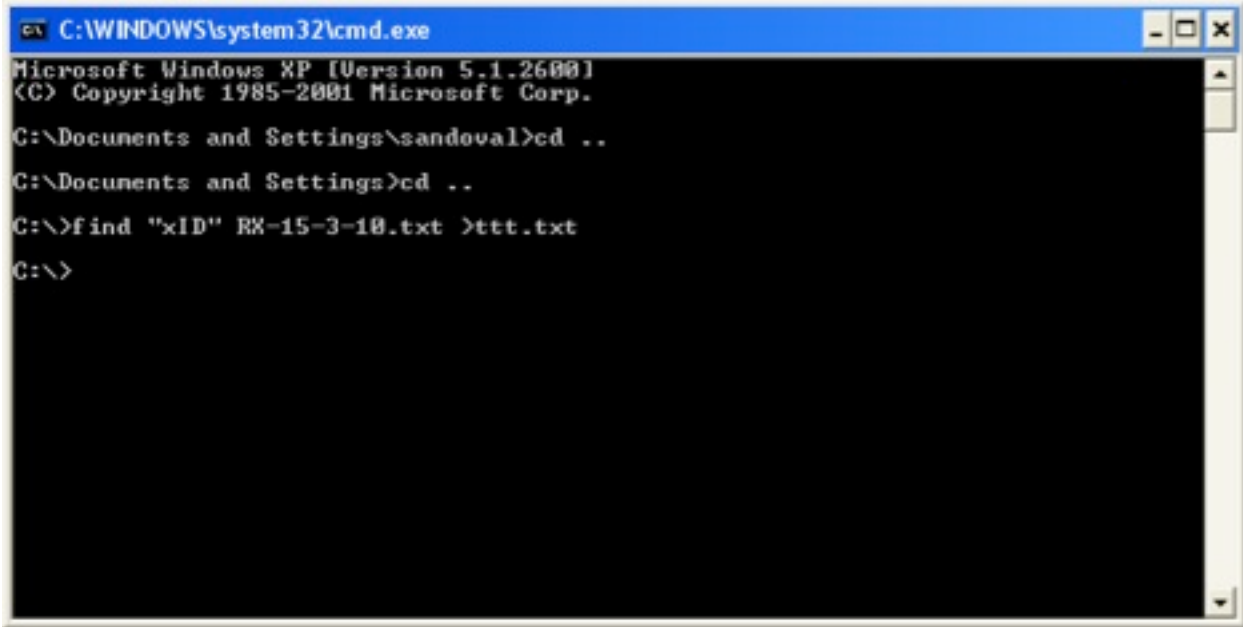
1. Establish -107 dBm: Measured with Spectrum Analyzer and Power Sensor at Point A in Figure 1. Result -54.28 dBm. See below.
2. Swept with Spectrum Analyzer both of the variable attenuators and the fix attenuator for accuracy. Then, measured with Spectrum Analyzer at Point B while injecting signal at Point A until we obtained -53 dBm giving us an overall attenuation of -107.28 dBm (-54.28dBm -53.0dBm).



3. Sent an assigned message, a MSG 16, with BS Application to both the UUT and other Mobile. See below. This resulted in the UUT RX in the slot immediately following the TX slot.



4. Test was allowed to run for several times to complete at least 200 packets in the assigned mode while taking VDL trace data at level 2 from the UUT.
5. After completion of the 200 packets, the VDL trace file, RX-15-3-10.txt, was obtained and the pertinent TX/RX data was extracted, per below, and file ttt.txt was generated.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\sandoval>cd ..
C:\Documents and Settings>cd ..
C:\>find "xID" RX-15-3-10.txt >ttt.txt
C:\>
```

6. File ttt.txt was imported into MS Excel and then analyzed for all TX/RX in the correct slots verifying that UUT RX in the slot immediately following its TX. See below for pattern TX/RX starting in slot 24 for UUT TX and slot 25 for UUT RX and so on.
7. PER was verified by counting the packets per frame and missing RX's. Below, in red, a missing RX for slot 1150 is shown.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
72	001:35:00.984	VTxID	2 Ch		2 r/si 220	5 r/si 24 M	i 6	63494 S		ym 0 TOut 4 r/si 24 Cht 0 RvSt 0 Pwr 300, Asn 0						
73	001:35:01.024	VWxID	2 Ch		2 r/si 220	6 r/si 25 M	i 6	63495 S		ym 0 TOut 5 r/si 0 Cht 0 RvSt 2 TQA 4236 R55i 254, Gain 0, Asn 0						
74	001:35:02.984	VTxID	2 Ch		1 r/si 30	r/si 99 M		663 494 Syn		0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
75	001:35:03.024	VWxID	2 Ch		1 r/si 31	r/si 100 M		66 3495 Sy		n 0 TOut 4 r/si 300 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0						
76	001:35:04.984	VTxID	2 Ch		2 r/si 105	r/si 174 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
77	001:35:05.024	VWxID	2 Ch		2 r/si 106	r/si 175 M	i 6	63495 S		ym 0 TOut 4 r/si 175 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0						
78	001:35:06.984	VTxID	2 Ch		1 r/si 180	r/si 249 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
79	001:35:07.024	VWxID	2 Ch		1 r/si 181	r/si 250 M	i 6	63495 S		ym 0 TOut 4 r/si 250 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0						
80	001:35:08.984	VTxID	2 Ch		2 r/si 235	r/si 324 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
81	001:35:09.022	VWxID	2 Ch		2 r/si 234	r/si 325 M	i 6	63495 S		ym 0 TOut 4 r/si 325 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0						
82	001:35:10.984	VTxID	2 Ch		1 r/si 330	r/si 399 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
83	001:35:11.024	VWxID	2 Ch		1 r/si 331	r/si 400 M	i 6	63495 S		ym 0 TOut 4 r/si 400 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0						
84	001:35:12.984	VTxID	2 Ch		2 r/si 405	r/si 474 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
85	001:35:13.024	VWxID	2 Ch		2 r/si 406	r/si 475 M	i 6	63495 S		ym 0 TOut 4 r/si 475 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0						
86	001:35:14.984	VTxID	2 Ch		1 r/si 480	r/si 549 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
87	001:35:15.024	VWxID	2 Ch		1 r/si 481	r/si 550 M	i 6	63495 S		ym 0 TOut 4 r/si 550 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0						
88	001:35:16.986	VTxID	2 Ch		2 r/si 555	r/si 624 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
89	001:35:17.024	VWxID	2 Ch		2 r/si 556	r/si 625 M	i 6	63495 S		ym 0 TOut 4 r/si 625 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0						
90	001:35:18.984	VTxID	2 Ch		1 r/si 630	r/si 699 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
91	001:35:19.024	VWxID	2 Ch		1 r/si 631	r/si 700 M	i 6	63495 S		ym 0 TOut 4 r/si 700 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0						
92	001:35:20.984	VTxID	2 Ch		2 r/si 705	r/si 774 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
93	001:35:21.024	VWxID	2 Ch		2 r/si 706	r/si 775 M	i 6	63495 S		ym 0 TOut 4 r/si 775 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0						
94	001:35:22.986	VTxID	2 Ch		1 r/si 780	r/si 849 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
95	001:35:23.024	VWxID	2 Ch		1 r/si 781	r/si 850 M	i 6	63495 S		ym 0 TOut 4 r/si 850 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0						
96	001:35:24.984	VTxID	2 Ch		2 r/si 855	r/si 924 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
97	001:35:25.024	VWxID	2 Ch		2 r/si 856	r/si 925 M	i 6	63495 S		ym 0 TOut 4 r/si 925 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0						
98	001:35:26.984	VTxID	2 Ch		1 r/si 930	r/si 999 M	i 6	63494 S		ym 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0						
99	001:35:27.024	VWxID	2 Ch		1 r/si 931	r/si 1000 M			663495 Syn 0 TOut 4 r/si 1000 Cht 0 RvSt 0 TQA 4236 R55i 250, Gain 0, Asn 0							
100	001:35:28.986	VTxID	2 Ch		2 r/si 100	5 r/si 1074 M			663494 Syn 0 TOut 5 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0							
101	001:35:29.024	VWxID	2 Ch		2 r/si 100	6 r/si 1075 M			663495 Syn 0 TOut 4 r/si 1075 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0							
102	001:35:30.986	VTxID	2 Ch		1 r/si 108	0 r/si 1149 M			663494 Syn 0 TOut 3 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0							
103	001:35:32.984	VTxID	2 Ch		2 r/si 115	5 r/si 1224 M			663494 Syn 0 TOut 5 r/si 0 Cht 0 RvSt 2 Pwr 300, Asn 0							
104	001:35:33.024	VWxID	2 Ch		2 r/si 115	6 r/si 1225 M			663495 Syn 0 TOut 4 r/si 1225 Cht 0 RvSt 0 TQA 4236 R55i 254, Gain 0, Asn 0							

8. Below are pictures of the test set-up.

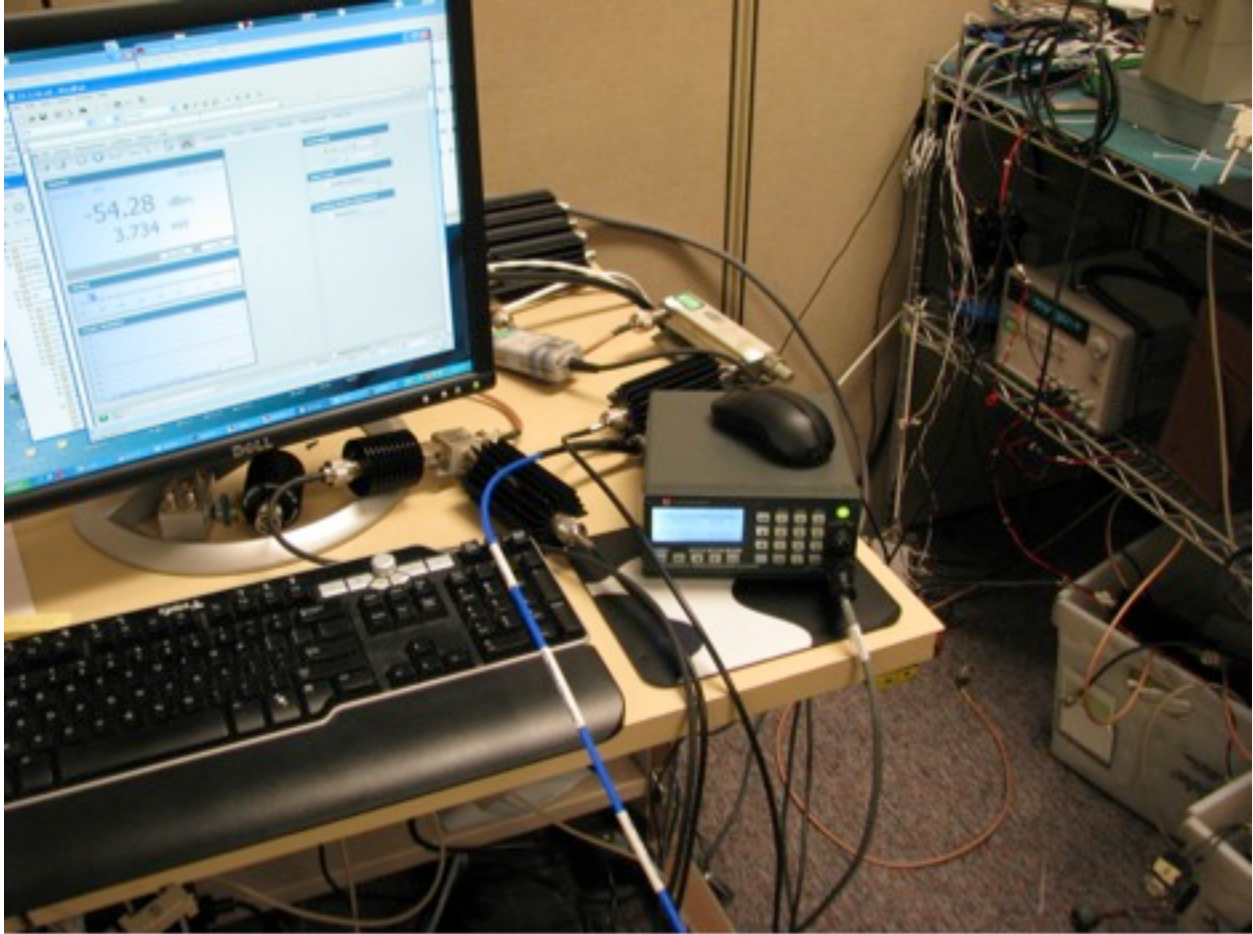


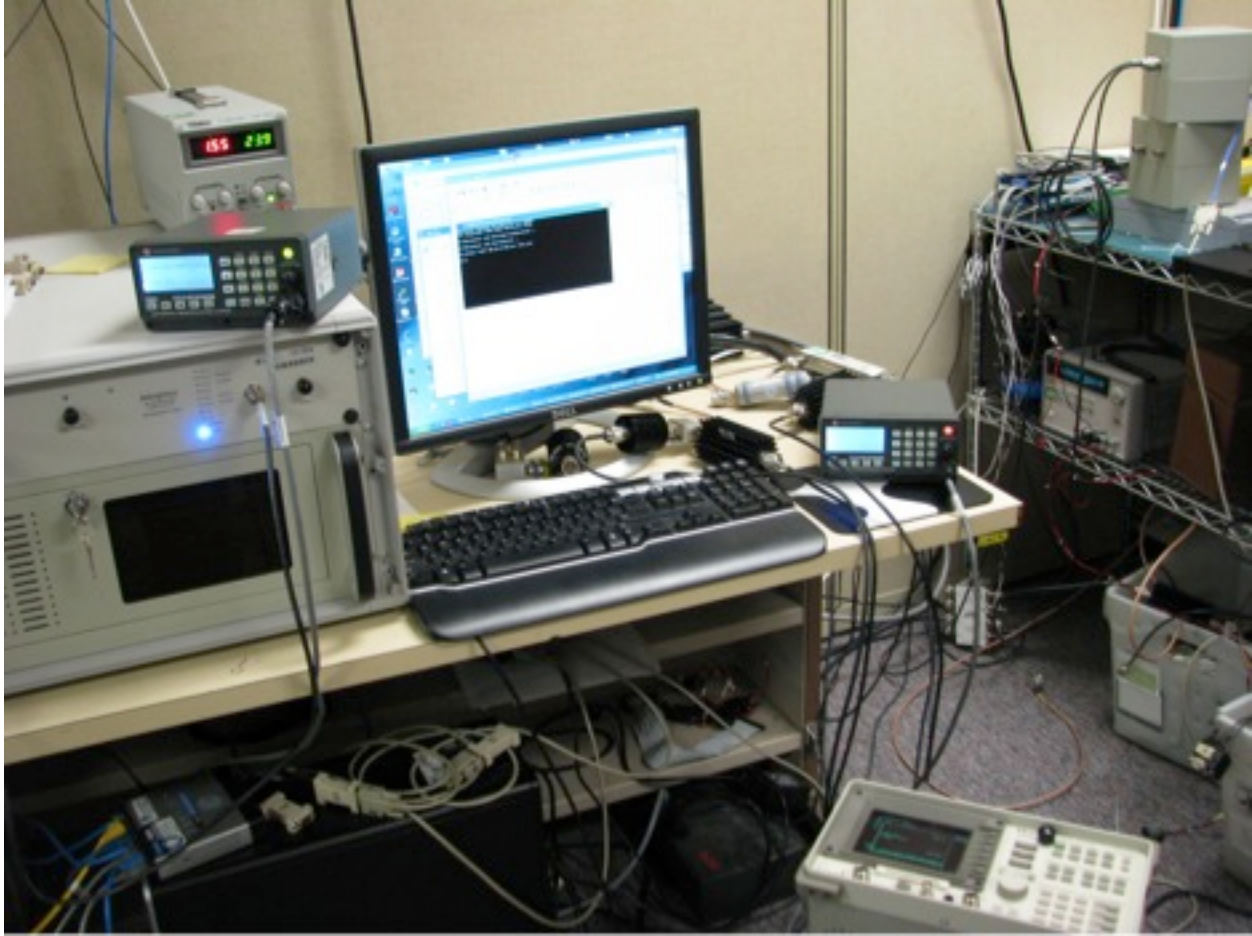


UUT

UUT







3.0 RESULTS/CONCLUSION

The UUT was set-up to RX at -107 dBm and it did RX in the slot immediately following the TX slot. Also, the PER measured was for 220 packets with only 16 RX missing which results in a PER of 7.3%. From the results of the testing above, this test is PASSED.