Serial No. GM26033E
Revised

EXTREME CONDITIONS TEST REPORT
FOR THE
L3 COMMUNICATIONS
AVIATION RECORDERS CORPORATION
AUTOMATIC IDENTIFICATION SYSTEM (AISA1)
PERFORMANCE TESTS

Prepared for:

L3 Communications Aviation Recorders Corp.
6000 Fruitville Road
Sarasota, FL 34232
USA

Submitted by:

Green Mountain Electromagnetics, Inc.

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219 Blake Roy Road • Middlebury, Vermont 05753

Accredited
Cert 898.01

L3 Communications Aviation Recorders Corporation
Extreme Condition Tests
At
Green Mountain Electromagnetics, Inc.
Middlebury, Vermont

Unit: Automatic Identification System (AISA1)
Tested: October 30 - November 2, 2006

I. Applicable Standards:

The unit described in this report was evaluated for compliance with European standard:

IEC 60945 Ed. 4, "Maritime Navigation and Radiocommunication Equipment and Systems – General Requirements – Methods of Testing and Required Test Results (August 2002);" paragraphs 7.1/2 "Extreme Power Supply," 8.2 "Dry Heat," 8.3 "Damp Heat," and 8.4 "Low Temperature."

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)," paragraph 15, "Physical Tests."

All procedures and equipment are in accordance with IEC 60945 and IEC 61993-2. Performance checks and tests are per L3 Test Matrix 905-M0754-54. See Appendix A for DSC waiver.

II. Measurement Location:

The GME environmental laboratory is located at 219 Blake Roy Road, Middlebury, VT. The chamber, equipment and facilities comply with the requirements in IEC 60945 for temperature, humidity and extreme power testing. 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." For scope of accreditation, contact GME.

III. Unit Tested:

The L3 Communications Aviation Recorders Corporation, Automatic Identification System provides continuous signal and data transmission for ship identification. The AISA1 uses DC power and has TDMA/DSC transmitters and TDMA/GPS/DSC receivers. It consists of the two-piece metal enclosure with connector hardware, the transmit/receive circuits, the micro-processor/data-storage electronics, and the antenna interface. The table below describes the unit tested to determine compliance with the standards:

Model/P/N	Manufacturer	Serial Number
AISA1-000-10	L3 Communications Corp.	000383088

The following table describes the system physical and electrical properties:

Model	Volts/Amps/Hertz	H/W/D in cm
AISA1-000-10	24 VDC, 5 A	8/16/19

The table below describes the support equipment used:

Product	Manufacturer	Model	Serial Number
AISA1	L3	AISA1-000-90	000374785
Power Supply	MFJ	MFJ-4035MV	L31D 5144
Power Supply	Tenma	72-7695	0003094
PC	Antec	Custom by L3	L3ID 9851
Attenuator, Fixed	Bird	25-A-MFN-30	0323
Attenuator, Variable	Agilent	8496A	MY42140708
Attenuator, Variable	Agilent	8494A	MY42140564
Monitor	Princeton	EO700	KNAA4621773
Mouse	Microsoft	Intellimouse	3882A611
Keyboard	Microsoft	KWD 203	9910249571
Antennas (2)	L3	GPS	n/a

The table below describes the cables used:

Type	Description	Rating
Power	Twisted Shielded Pair	n/a
RF Power/Signal	UHF Coaxial	n/a
Digital	Serial Twisted Shielded Pair	n/a
Signal	Ethernet Unshielded, Plastic Jack	UL

IV. Summary of Results:

The L3 Communications Aviation Recorders Corporation AISA1 complies with the requirements in IEC 61993-2, paragraph 15 under the conditions required in IEC 60945 paragraphs 8.2.2 "Dry Heat Functional Test," 8.3.1 "Damp Heat Functional Test," 8.4.2 "Low Temperature Functional Test," and per 7.1/2 "Extreme Power Supply." Section XI contains the results for normal and extreme conditions that are summarized in the tables below. Performance checks are frequency error and 25-kHz sensitivity only at extreme power.

1. Dry Heat Normal Power

	Test	Mode/Port	IEC 61993-2 Para.	Tolerance/Limit	Specified Value	Measured Value
A	Frequency Error	TDMA Transmit	**15.1.1**	±1000 Hz ±1000 Hz ±1000 Hz ±1000 Hz	156,025,000 Hz 157,412,500 Hz 160,637,500 Hz 162,025,000 Hz	156,024,195 Hz 157,411,687 Hz 160,636,678 Hz 162,024,171 Hz
B	Carrier Power	TDMA Transmit	**15.1.2**	+2/-3 dB	40.96 dBm 33.01 dBm	40.12 dBm 33.83 dBm
C	Sensitivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.1** **15.3.2**	-101 dBm -92 dBm	<20% PER Ch1 <20% PER Ch2 <20% PER Ch1 <20% PER Ch2	0% PER 0% PER 0% PER 0% PER
D	Adjacent Channel Selectivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.6** **15.3.7**	≥60 dB C1L ≥60 dB C2L ≥60 dB C1H ≥60 dB C2H ≥50 dB C1H ≥50 dB C2H ≥50 dB C1L ≥50 dB C2L	<20% PER <20% PER <20% PER <20% PER <20% PER <20% PER <20% PER <20% PER	6% PER 5% PER 2% PER 2% PER 0% PER 0% PER 0% PER 1% PER

1. Dry Heat High Power

	Test	Mode/Port	IEC 61993-2 Para.	Tolerance/Limit	Specified Value	Measured Value
A	Frequency Error	TDMA Transmit	**15.1.1**	±1000 Hz ±1000 Hz ±1000 Hz ±1000 Hz	156,025,000 Hz 157,412,500 Hz 160,637,500 Hz 162,025,000 Hz	156,024,826 Hz 157,411,660Hz 160,636,648 Hz 162,024,159Hz
B	Carrier Power	TDMA Transmit	**15.1.2**	+2/-3 dB	40.96 dBm 33.01 dBm	40.14 dBm 33.84 dBm
C	Sensitivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.1** **15.3.2**	-101 dBm -92 dBm	<20% PER Ch1 <20% PER Ch2 <20% PER Ch1 <20% PER Ch2	1% PER 0% PER 0% PER 0% PER

2. Damp Heat Normal Power

	Test	Mode/Port	IEC 61993-2 Para.	Tolerance/Limit	Specified Value	Measured Value
A	Frequency Error	TDMA Transmit	**15.1.1**	±1000 Hz ±1000 Hz ±1000 Hz ±1000 Hz	156,025,000 Hz 157,412,500 Hz 160,637,500 Hz 162,025,000 Hz	156,024,894 Hz 157,412,393 Hz 160,637,389 Hz 162,024,889Hz
B	Carrier Power	TDMA Transmit	**15.1.2**	+2/-3 dB	40.96 dBm 33.01 dBm	40.18 dBm 33.92 dBm
C	Sensitivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.1** **15.3.2**	-101 dBm -92 dBm	<20% PER Ch1 <20% PER Ch2 <20% PER Ch1 <20% PER Ch2	0% PER 0% PER 3% PER 2% PER
D	Adjacent Channel Selectivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.6** **15.3.7**	≥60 dB C1L ≥60 dB C2L ≥60 dB C1H ≥60 dB C2H ≥50 dB C1L ≥50 dB C2L ≥50 dB C1H ≥50 dB C2H	<20% PER <20% PER <20% PER <20% PER <20% PER <20% PER <20% PER <20% PER	0% PER 0% PER 4% PER 0% PER 0% PER 0% PER 0% PER 0% PER

3. Low Temperature Normal Power

	Test	Mode/Port	IEC 61993-2 Para.	Tolerance/Limit	Specified Value	Measured Value
A	Frequency Error	TDMA Transmit	**15.1.1**	±1000 Hz ±1000 Hz ±1000 Hz ±1000 Hz	156,025,000 Hz 157,412,500 Hz 160,637,500 Hz 162,025,000 Hz	156,025,167 Hz 157,412,661 Hz 160,637,658 Hz 162,025,157Hz
B	Carrier Power	TDMA Transmit	**15.1.2**	+2/-3 dB	40.96 dBm 33.01 dBm	40.77 dBm 34.23 dBm
C	Sensitivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.1** **15.3.2**	-101 dBm -92 dBm	<20% PER Ch1 <20% PER Ch2 <20% PER Ch1 <20% PER Ch2	0% PER 0% PER 3% PER 3% PER
D	Adjacent Channel Selectivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.6** **15.3.7**	≥60 dB C1L ≥60 dB C2L ≥60 dB C1H ≥60 dB C2H ≥50 dB C1H ≥50 dB C2H ≥50 dB C1L ≥50 dB C2L	<20% PER <20% PER <20% PER <20% PER <20% PER <20% PER <20% PER <20% PER	0% PER 0% PER 0% PER 0% PER 4% PER 2% PER 0% PER 1% PER

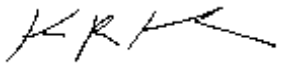
3. Low Temperature Low Power

	Test	Mode/Port	IEC 61993-2 Para.	Tolerance/Limit	Specified Value	Measured Value
A	Frequency Error	TDMA Transmit	**15.1.1**	±1000 Hz ±1000 Hz ±1000 Hz ±1000 Hz	156,025,000 Hz 157,412,500 Hz 160,637,500 Hz 162,025,000 Hz	156,025,256 Hz 157,412,742 Hz 160,637,729 Hz 162,025,232Hz
B	Carrier Power	TDMA Transmit	**15.1.2**	+2/-3 dB	40.96 dBm 33.01 dBm	40.25dBm 34.02 dBm
C	Sensitivity	TDMA Receive 25-kHz Ext. 12.5-kHz Ext.	**15.3.1** **15.3.2**	-101 dBm -92 dBm	<20% PER Ch1 <20% PER Ch2 <20% PER Ch1 <20% PER Ch2	0% PER 0% PER 3% PER 3% PER

The unit performs acceptably under reverse polarity for a period of 5 minutes, per 60945, par.7.2.

Testing was performed by Kyle R. Kowalczyk, president, Green Mountain Electromagnetics and requested by:

L3 Communications Aviation Recorders Corp.
6000 Fruitville Road
Sarasota, FL 34232
USA



Kyle R. Kowalczyk
12/11/06

V. Equipment and Cable Configuration:

GME witnessed the unit in satisfactory condition for testing, however the manufacturer is responsible for ensuring that the equipment under test (EUT) represents the product line. The manufacturer is also responsible for the test plan and for assuring that this report is consistent with that plan. The EUT configuration was arranged as shown in the block diagram below, as well as in the photographs in Section VIII. The GME measurement uncertainty is available upon request.

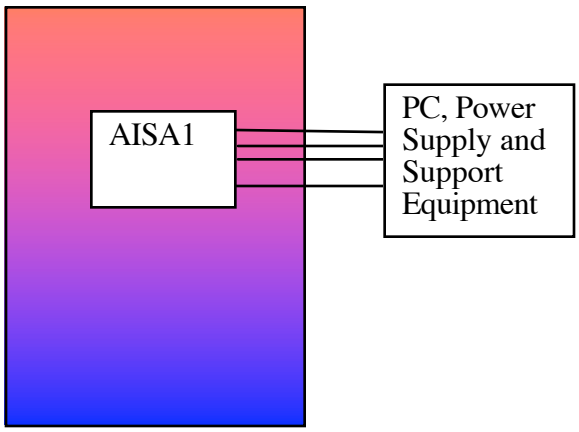


Figure 1 – Block Diagram of EUT in Temperature Humidity Chamber

VI. 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.
Temperature-Humidity Chamber	Thermotron	SM8S	25-2300-04	9/10/05	9/10/07
Frequency Counter	Agilent	53181A	MY40003289	4/26/06	4/27/07
Power Meter	Agilent	E4418B	GB42421582	4/26/05	4/27/07
Volt-Ohm-Amp, Meter	BK Precision	Test Bench Model 390	25205312	6/06/06	6/06/07
Signal Generator	Hewlett-Packard	8657B	3538U07387	4/4/06	4/4/07
Splitter/Combiner	Mini-Circuits	ZSC-4-1	n/a	n/a	n/a
Temperature/ Humidity Sensor with Recorder	Supco	Model CR4 with KTH	n/a	2/22/06	2/22/07
Spectrum Analyzer	Hewlett-Packard	8592	3624A00631	3/8/06	3/08/07

VII. Measurement Procedures for AISA1 Extreme Power Supply & Excessive Condition:

1. Dry Heat in accordance with 60945, paragraph 8.2.

Functional Test: Protected Equipment +55˚C ± 3˚C

a. Set up instrumentation in laboratory.
b. Verify temperature-humidity chamber operation.
c. Place EUT in chamber at normal climate.
d. Raise and maintain temperature at +55˚C for 10 hours.
e. At end of soak, run performance checks and tests as appropriate under normal and extreme power conditions.

2. Damp Heat in accordance with 60945, paragraph 8.3.

Functional Test: Protected Equipment +40˚C ± 2˚C and 93% ± 3%

a. Set up instrumentation in laboratory.
b. Verify temperature-humidity chamber operation.

c. Place EUT in chamber at normal climate.
d. Raise humidity and temperature to +40˚C and 93% ± 3% over 3 hours.
e. Raise and maintain temperature at +40˚C and 93% ± 3% for 10 hours.
f. Thirty-minutes after the end of soak, power up the EUT and operate EUT for 2 hours.
g. At end of operation, run performance checks and tests as appropriate under normal power conditions.
h. At end of performance checks and tests, bring EUT to room temperature within 1 hour.

3. Low Temperature in accordance with 60945, paragraph 8.4.

Functional Test: Protected Equipment -15˚C ± 3˚C

a. Set up instrumentation in laboratory.
b. Verify temperature-humidity chamber operation.
c. Place EUT in chamber at normal climate.
d. Raise and maintain temperature at -15˚C for 10-16 hours.
e. Thirty-minutes after the end of soak, power up the EUT and operate EUT for 2 hours.
f. At end of soak, run performance checks and tests as appropriate under normal and extreme power conditions. Maintain low temperature throughout test.

4. Extreme Power Supply and Excessive Condition in accordance with 60945, paragraph 7.1/2.

Performance Check: Dry Heat and Low Temperature
Performance Test: Normal Temperature
High Input Voltage: 31.2 VDC (+30%)
Low Input Voltage: 21.6 VDC (-10%)

a. Set up instrumentation in laboratory.
b. Verify temperature-humidity chamber operation.
   i. Perform model self-test. Verify requirements.
c. Set up, power and operate EUT as described in Section V.
d. Do performance test under normal temperature and extreme power-supply conditions.
e. Perform appropriate 60945, par. 8 test under extreme power-supply conditions.
f. Perform final evaluation of unit by reversing polarity of power input at extreme voltages and noting EUT operation.

VII. Measurement Procedures for AISA1 Performance Tests:

A. Frequency Error.

TDMA Frequencies: 156.025, 157.4125, 160.6375, 162.025 MHz

Specification: ±1-kHz Extreme Operation

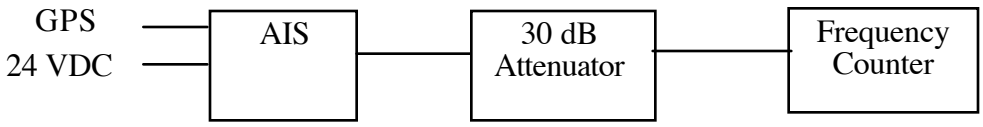
a. Set up EUT and test instrumentation in laboratory.
   i. Connect AISA1 to 24-VDC power and GPS antenna; attach 30-dB attenuator to VHF port.

b. Verify frequency counter and AISA1 operation.
   i. Frequency counter is connected to 30-dB attenuator.
   ii. AISA1 channels are selected from front panel.
   iii. Frequency counter requires warm-up period.

c. Verify AISA1 frequency with non-contact probe and spectrum analyzer.

d. Operate EUT at first selected channel with no modulation.

e. Record frequency displayed on counter.
   i. Repeat for each TDMA channel – settings are 1060, 1228, 2260 & 2088.



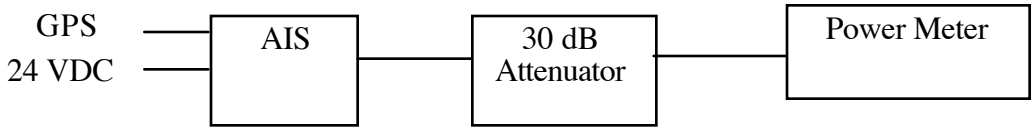
Block Diagram of Frequency Test

VII. Measurement Procedures for AISA1 Performance Tests Cont'd:

B. Carrier Power.

High/Low Specification: 40.96/33.01-dBm +2/-3-dB Extreme Operation

a. Set up EUT and test instrumentation in laboratory.
   i. Connect AISA1 to 24-VDC power and GPS antenna; attach 30-dB attenuator to VHF port.
b. Verify power meter and AISA1 operation.
   i. Power meter is connected to 30-dB attenuator.
   ii. AISA1 channels are selected from front panel.
   iii. Power meter requires warm-up period, calibration and zeroing.
c. Verify AISA1 frequency with spectrum analyzer.
d. Operate EUT at high power unmodulated.
e. Record level displayed on meter.
f. Repeat for low power.



Block Diagram of Carrier Power Test

VII. Measurement Procedures for AISA1 Performance Tests Cont'd:

C. Sensitivity.

25-kHz Specification: -101 dBm @ 20% PER Extreme

12.5-kHz Specification: -92 dBm @ 20% PER Extreme

a. Set up EUT and test instrumentation in laboratory.
   i. Connect AISA1 to 24-VDC power and GPS antenna.

b. Verify PC and AISA1 operation.
   i. PC provides input to AISA1.
   ii. Signal generator set to provide -101 dBm at EUT (25 kHz) through combiner.
   iii. Spectrum analyzer verifies correct signal level.

c. Operate with standard modulation at 156.025 MHz.

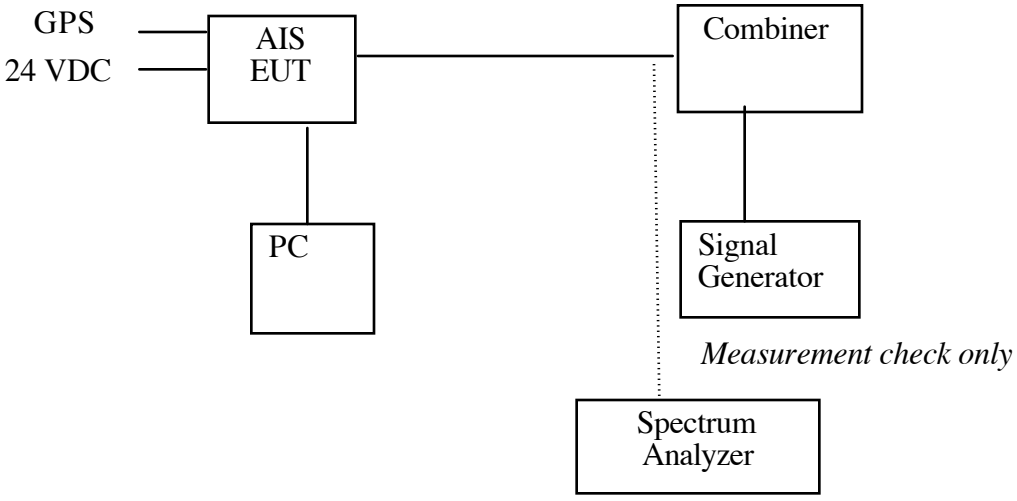
d. Operate AISA1 EUT with standard modulation at 156.025 MHz.

e. Run sensitivity software program on PC.
   i. Software determines TDMA packet error rate.

f. Repeat step e. for 162.025 MHz.

g. Set signal generator to provide -92 dBm (12.5 kHz).

h. Repeat step e. for 157.4125 MHz and 160.6375 MHz.



Block Diagram of Receiver Sensitivity Test

VII. Measurement Procedures for AISA1 Performance Tests Cont'd:

D. Adjacent-Channel Selectivity.

25-kHz Specification: 60-dB Extreme Operation

12.5-kHz Specification: 50-dB Extreme Operation

a. Set up EUT and test instrumentation in laboratory.
   i. Connect AISA1 to PC, 24-VDC power, GPS antenna.

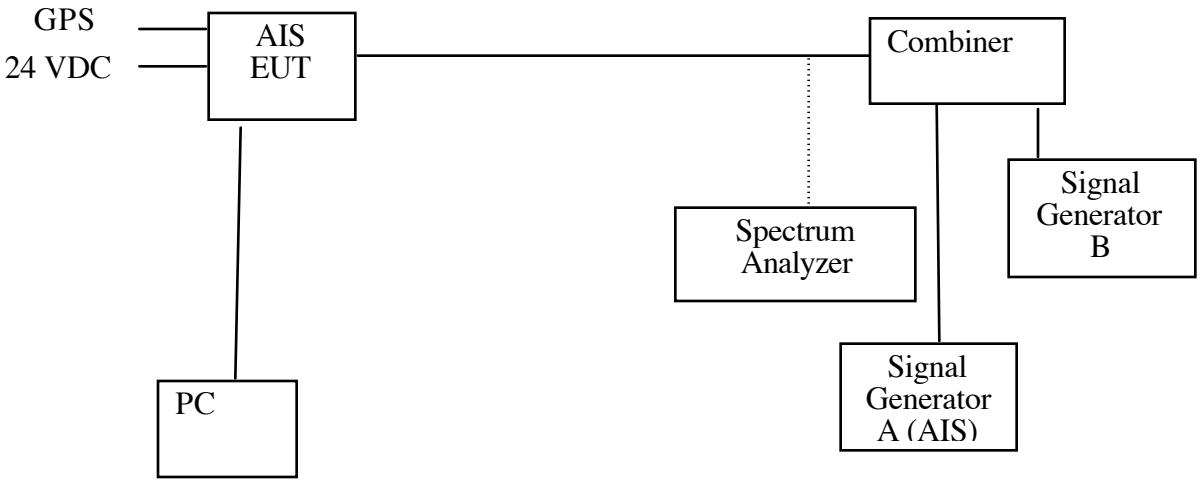
b. Verify PC and AISA1 operation.
   i. PC monitors AISA1, then sig. gen. A & B are connected to combiner.
   ii. Signal generator is set to provide 60-dB result (25 kHz).
   iii. Signal generator B is set to provide 60-dB result at channel immediately above the AISA1 channel.
   iv. Spectrum analyzer verifies correct signal level.

c. Operate PC and AISA1 EUT with standard modulation at default channel.

d. Run adjacent-channel software program on PC.
   i. Software determines packet error rate from messages.
   ii. Proceed as in IEC 61993 para. 15.3.6 steps a. – k. if PER >20%.

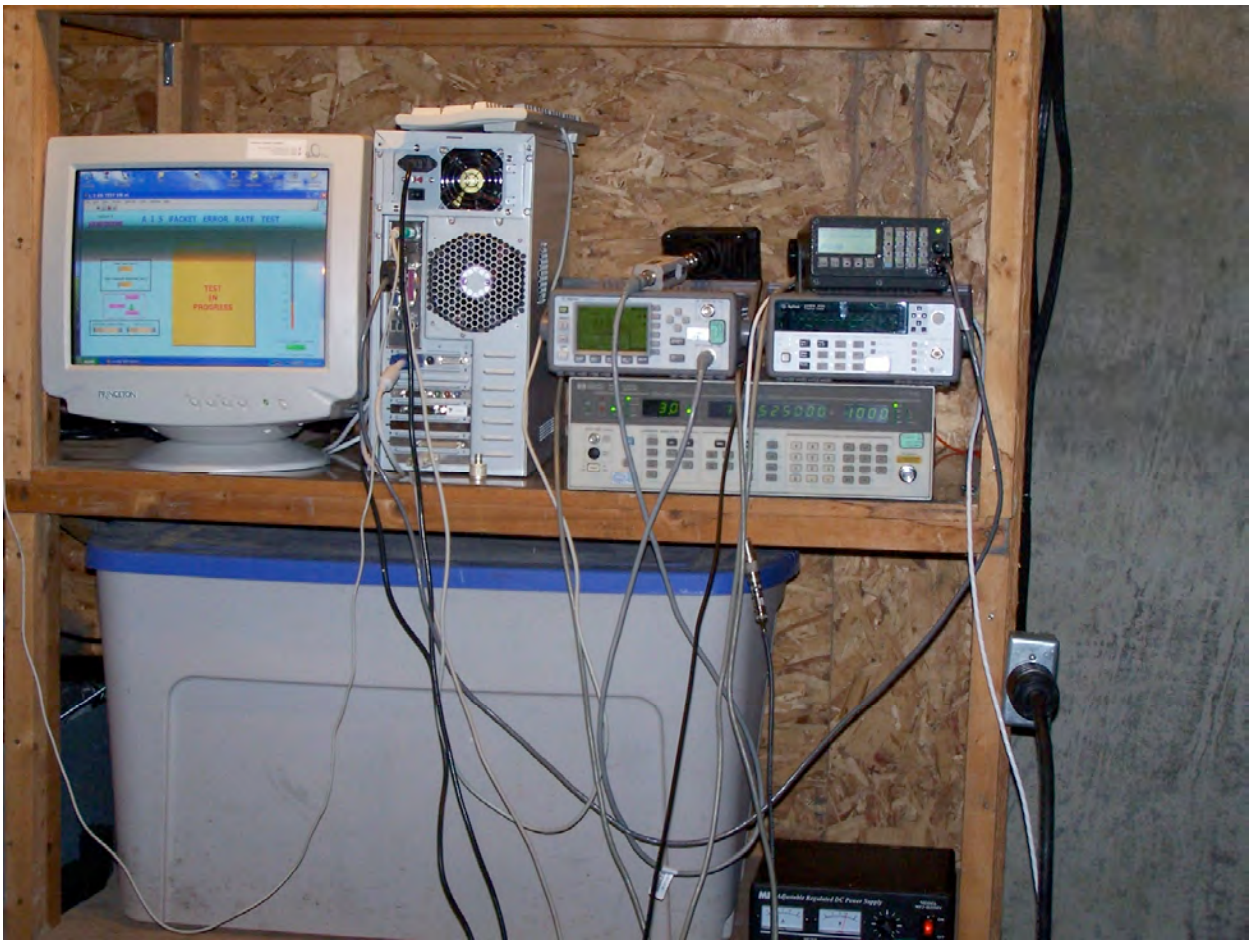
e. Repeat step d. for channel immediately below AISA1 channel.

f. Repeat steps d. and e. for 12.5-kHz AISA1 channel.
   i. Set signal generator to provide 50-dB result.



Block Diagram of Receiver Adjacent-Channel Test

VIII. Test Setup Photographs for Environmental Tests:



Temperature and Humidity Test Support Equipment

VIII. Test Setup Photographs for Environmental Tests Cont'd:

Temperature and Humidity Test Setup – EUT in Chamber

IX. Measurement Results:

1. Dry Heat (Includes Extreme Power/Excessive Conditions) per 60945, par. 8.2.2. – Data.

The AISA1 performs acceptably under dry heat with normal and excessive power supply. The table below is the record of the soak. The following page contains the applied output from device calibration.

Time Minutes	Temperature ˚C	Unit	Power
30	+55	AISA1	Normal
60	+55	AISA1	Normal
90	+55	AISA1	Normal
120	+55	AISA1	Normal
150	+55	AISA1	Normal
180	+55	AISA1	Normal
210	+55	AISA1	Normal
240	+55	AISA1	Normal
270	+55	AISA1	Normal
300	+55	AISA1	Normal
330	+55	AISA1	Normal
360	+55	AISA1	Normal
390	+55	AISA1	Normal
420	+55	AISA1	Normal
450	+55	AISA1	Normal
480	+55	AISA1	Normal
510	+55	AISA1	Normal
540	+55	AISA1	Normal
570	+55	AISA1	Normal
600	+55	AISA1	Normal
630	+55	AISA1	Extreme High
660	+55	AISA1	Extreme Low

IX. Measurement Results Cont'd:

1. Dry Heat/Normal Power Performance Test – System Output.

IX. Measurement Results Cont'd:

1. Dry Heat/Normal Power Performance Test – Frequency Error.

IX. Measurement Results Cont'd:

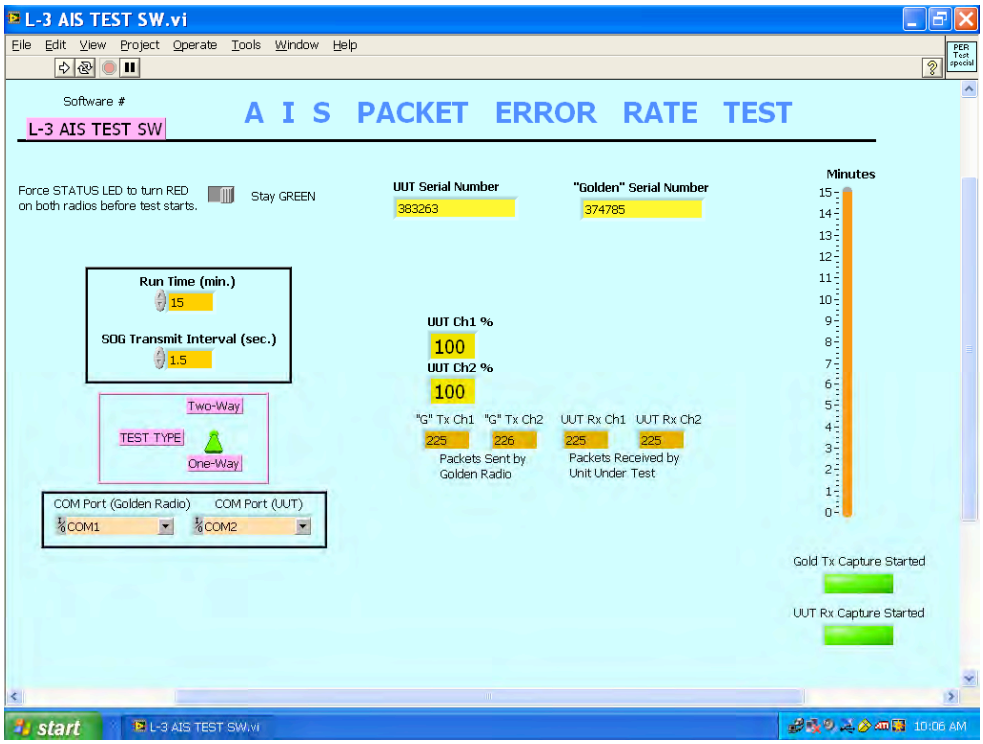
1. Dry Heat/Normal Power Performance Test – Frequency Error Cont'd.

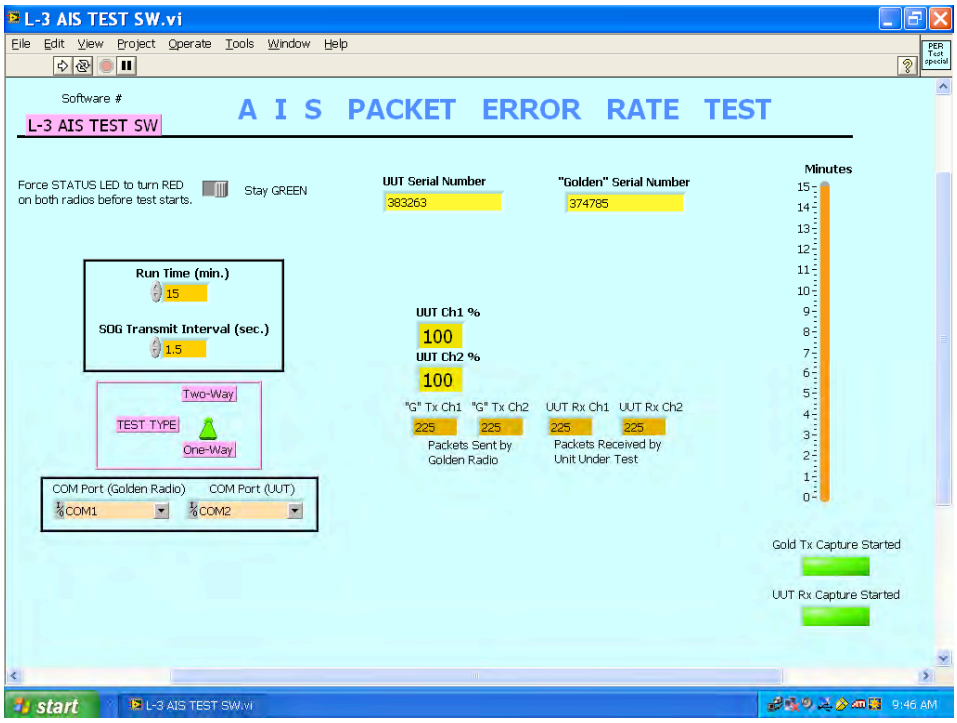
IX. Measurement Results Cont'd:

1. Dry Heat/Normal Power Performance Test – Carrier Power.

IX. Measurement Results Cont'd:

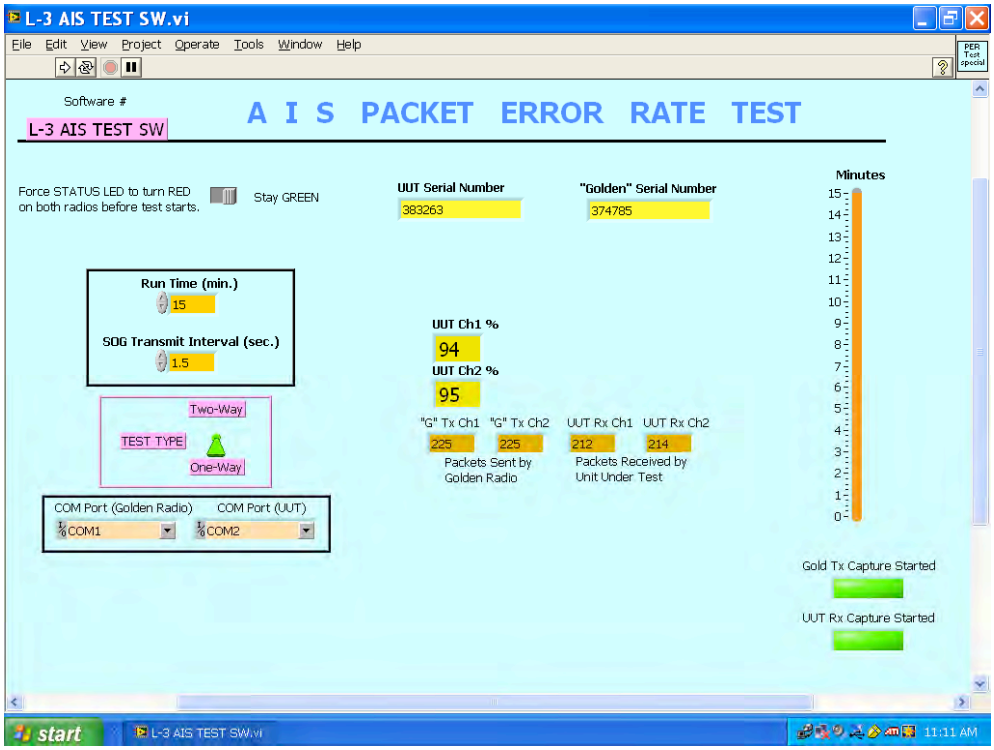
1. Dry Heat/Normal Power Performance Test – Sensitivity 12.5 kHz & 25 kHz.

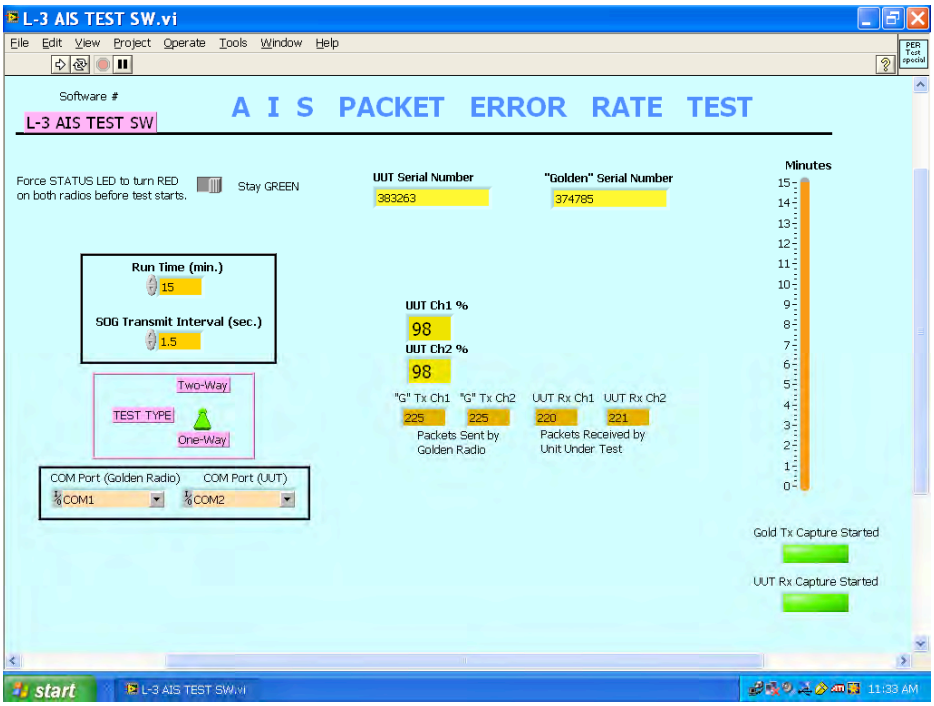




IX. Measurement Results Cont'd:

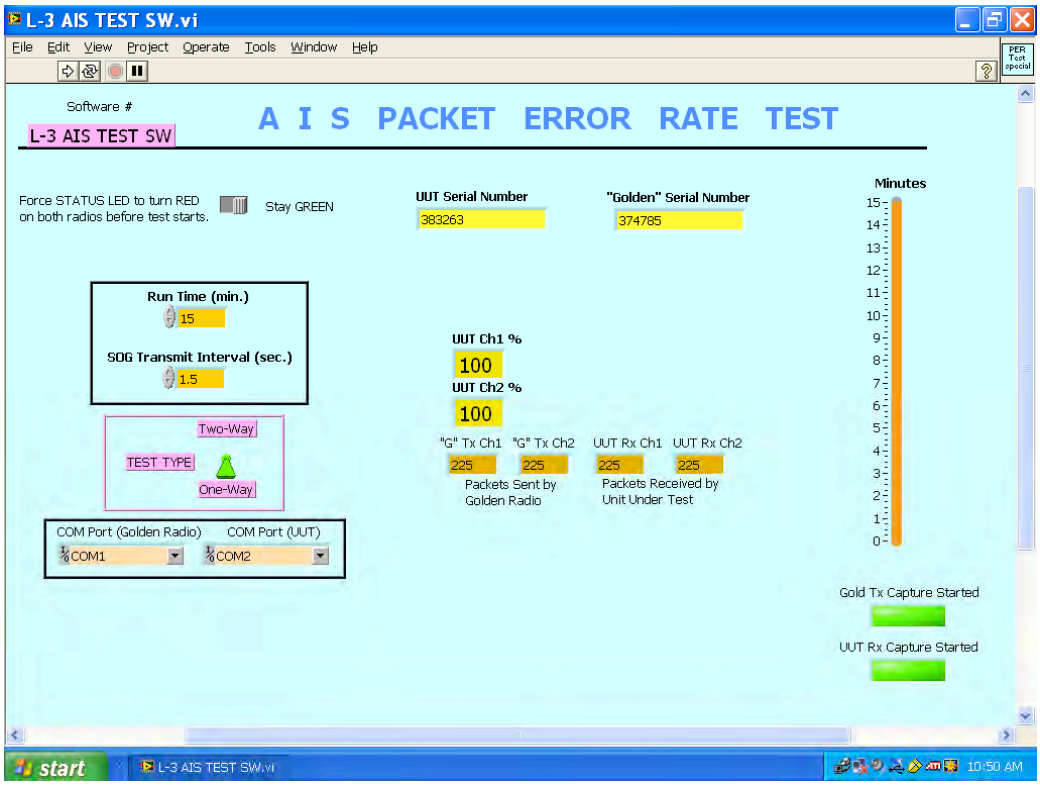
1. Dry Heat/Normal Power Performance Test – Adjacent Channel 25-kHz High/Low.

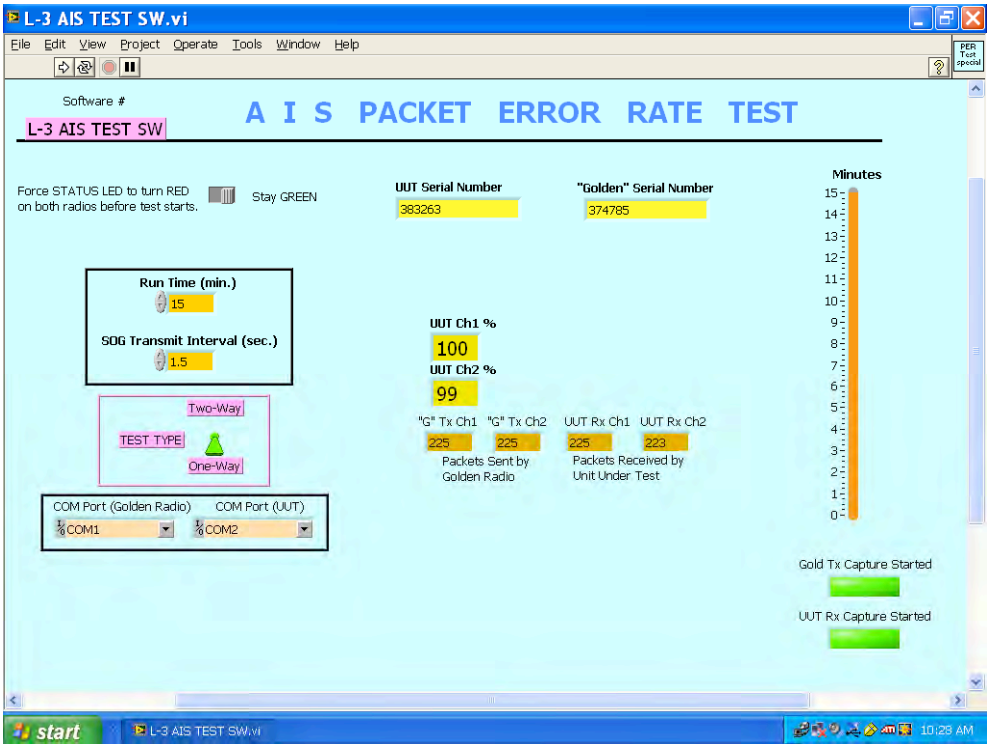




IX. Measurement Results Cont'd:

1. Dry Heat/Normal Power Performance Test– Adjacent Channel 12.5-kHz High/Low.





IX. Measurement Results Cont'd:

1. Dry Heat/High Power Performance Check – System Output.

IX. Measurement Results Cont'd:

1. Dry Heat/High Power Performance Check – Frequency Error.

IX. Measurement Results Cont'd:

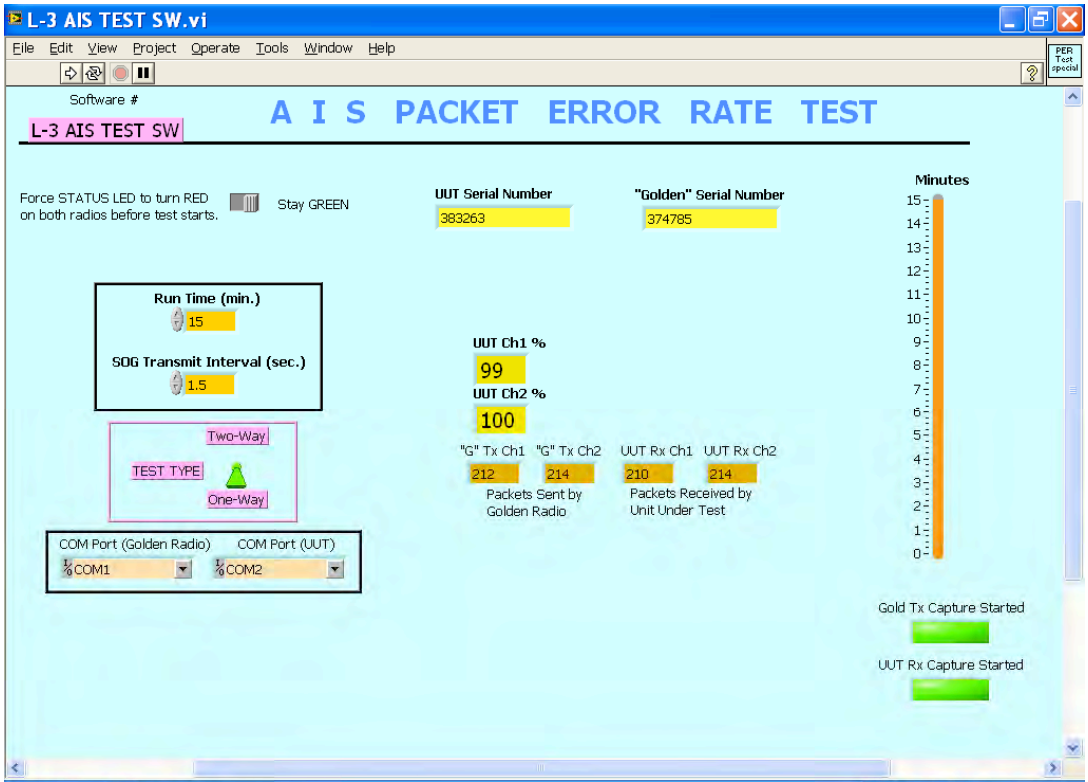
1. Dry Heat/High Power Performance Check – Frequency Error Cont'd.

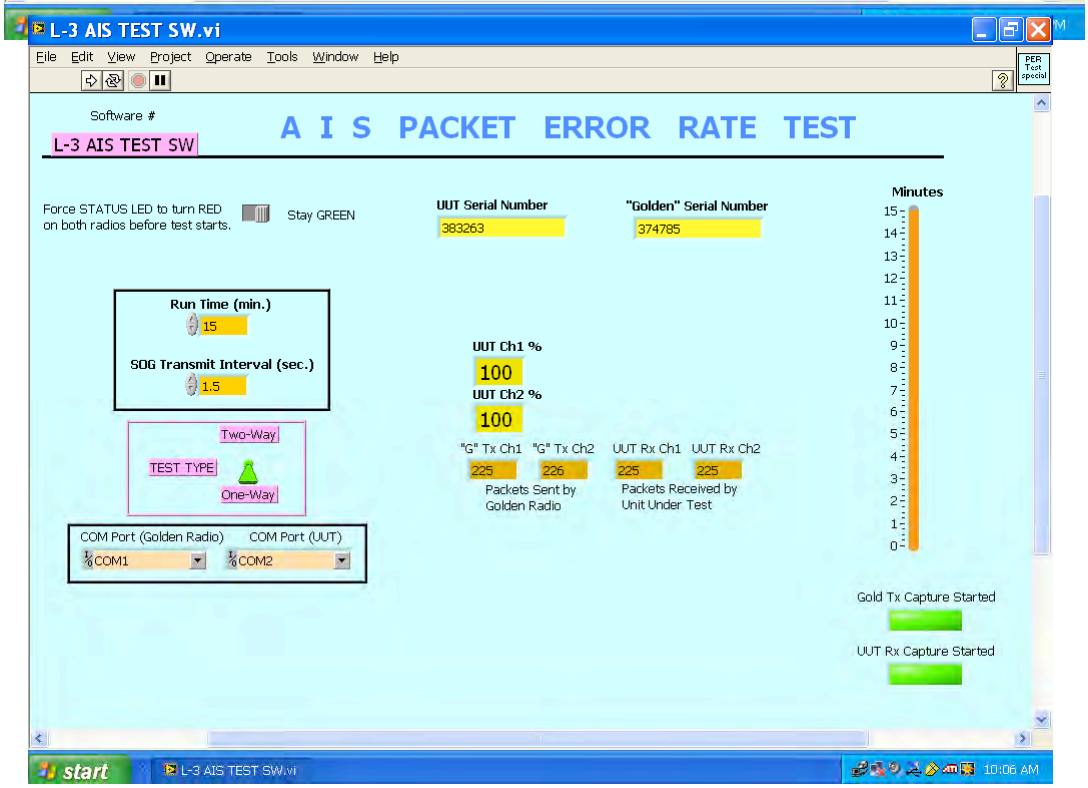
IX. Measurement Results Cont'd:

1. Dry Heat/High Power Performance Check – Carrier Power.

IX. Measurement Results Cont'd:

1. Dry Heat/High Power Performance Check – Sensitivity 25 kHz & 12.5 kHz.





IX. Measurement Results cont'd:

2. Damp Heat per 60945, par. 8.3.1. – Data.

The AISA1 performs acceptably under damp heat with normal power supply. The table below is the record of the soak. The following page contains the applied output from device calibration.

Time Minutes	Temperature ° C	Humidity %	Unit	Power
30	+40	93	AISA1	Off
60	+40	93	AISA1	Off
90	+40	93	AISA1	Off
120	+40	93	AISA1	Off
150	+40	93	AISA1	Off
180	+40	93	AISA1	Off
210	+40	93	AISA1	Off
240	+40	93	AISA1	Off
270	+40	93	AISA1	Off
300	+40	93	AISA1	Off
330	+40	93	AISA1	Off
360	+40	93	AISA1	Off
390	+40	93	AISA1	Off
420	+40	93	AISA1	Off
450	+40	93	AISA1	Off
480	+40	93	AISA1	Off
510	+40	93	AISA1	Off
540	+40	93	AISA1	Off
570	+40	93	AISA1	Off
600	+40	93	AISA1	Off
630	+40	93	AISA1	Off
660	+40	93	AISA1	Normal
690	+40	93	AISA1	Normal
720	+40	93	AISA1	Normal
750	+40	93	AISA1	Normal

IX. Measurement Results cont'd:

2. Damp Heat Performance Test – System Output.

IX. Measurement Results Cont'd:

2. Damp Heat Performance Test – Frequency Error.

IX. Measurement Results Cont'd:

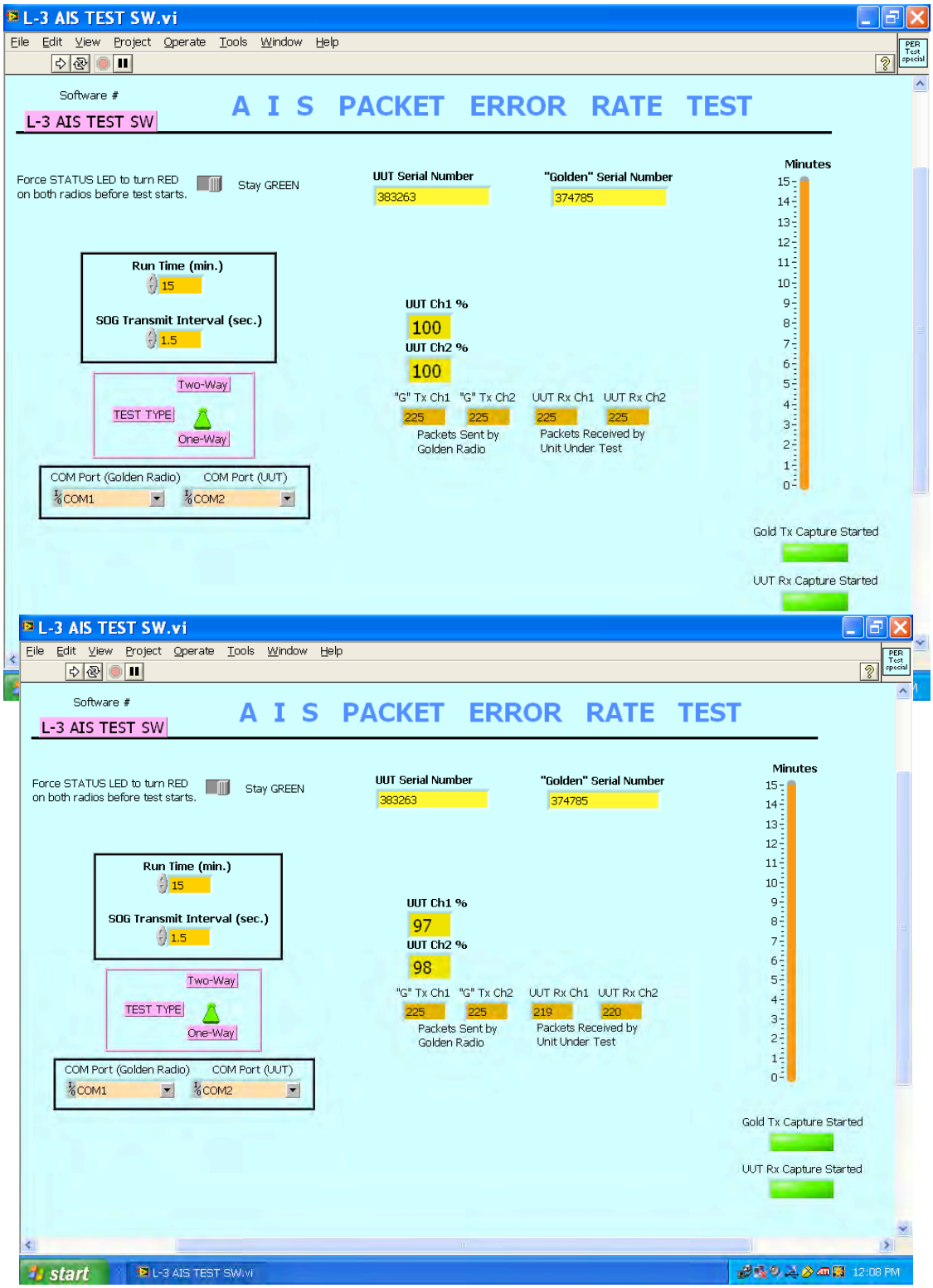
2. Damp Heat Performance Test – Frequency Error Cont'd.

IX. Measurement Results Cont'd:

2. Damp Heat Performance Test – Carrier Power.

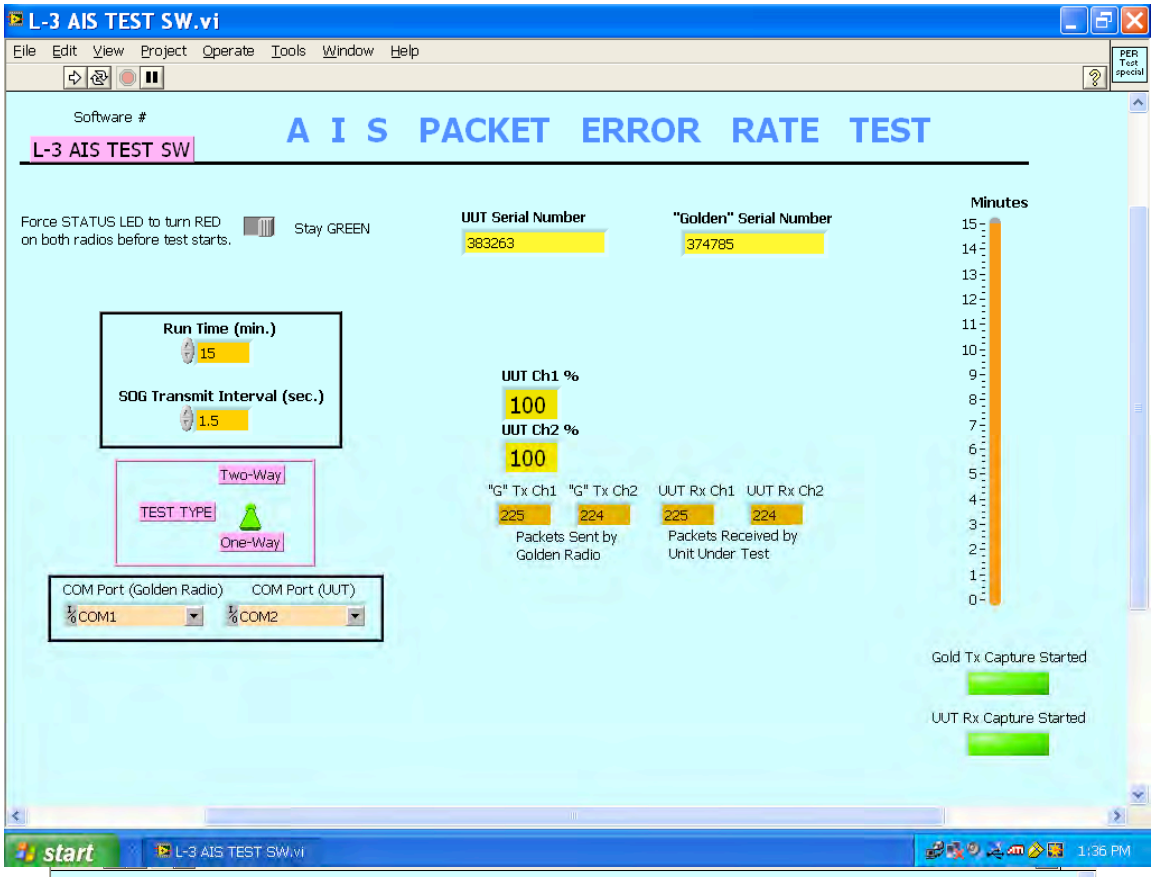
IX. Measurement Results Cont'd:

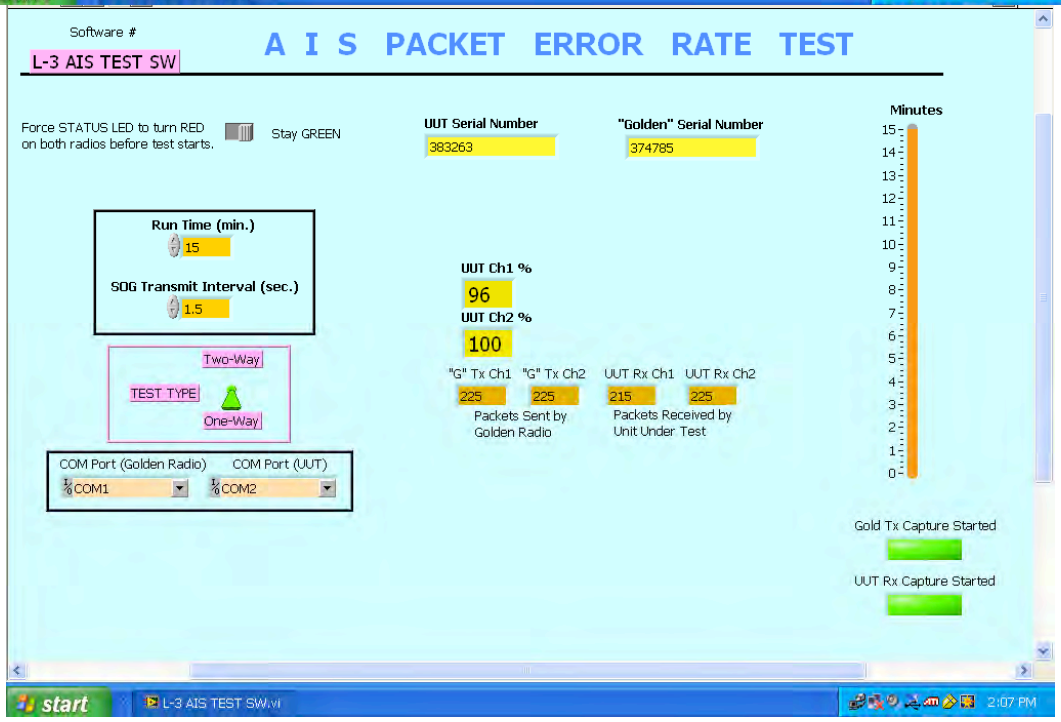
2. Damp Heat Performance Test – Sensitivity 25 kHz & 12.5 kHz.



IX. Measurement Results Cont'd:

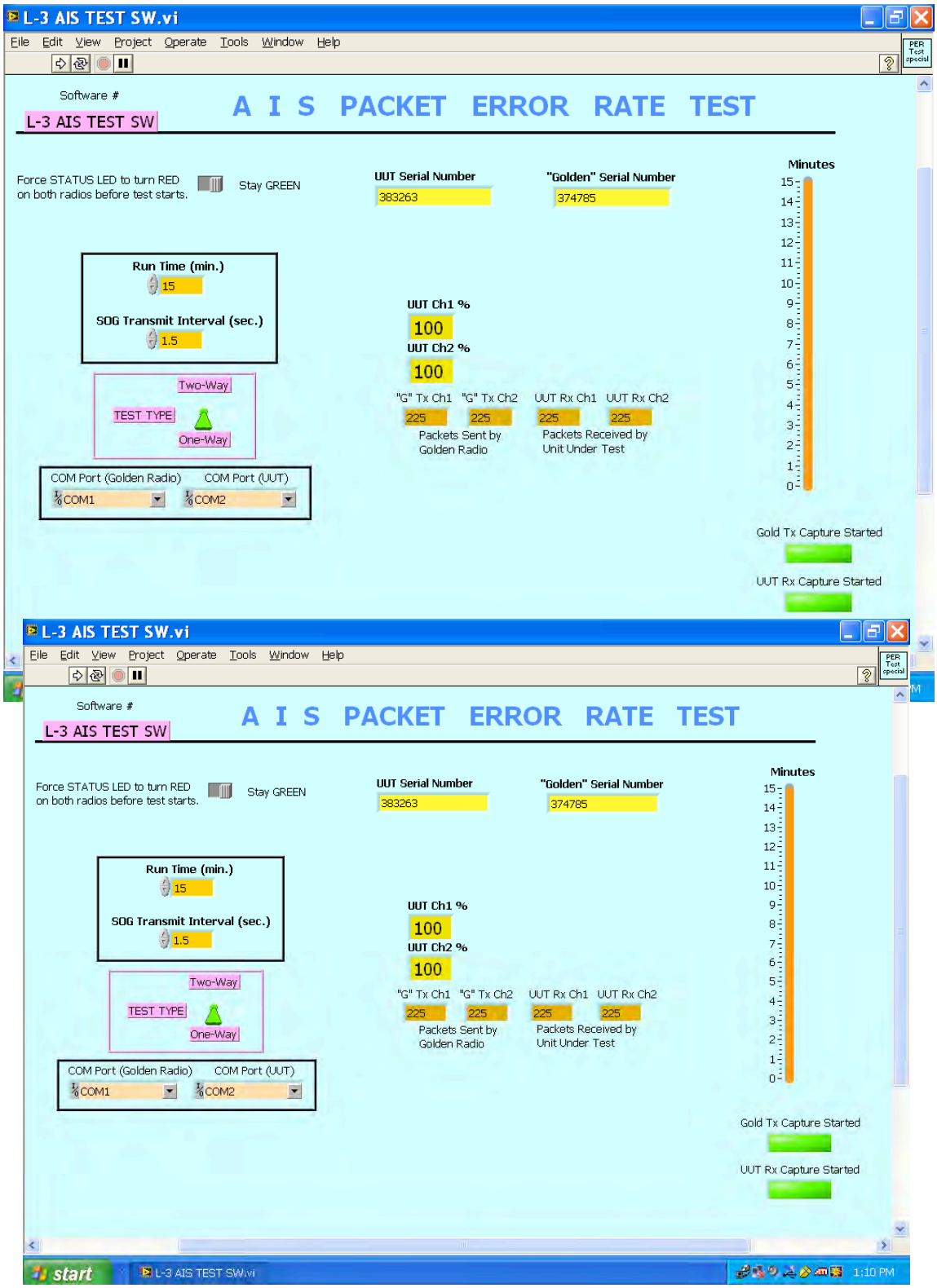
2. Damp Heat Performance Test – Adjacent Channel 25 kHz.





IX. Measurement Results Cont'd:

2. Damp Heat Performance Test – Adjacent Channel 12.5 kHz.



IX. Measurement Results Cont'd:

3. Low Temperature (Includes Extreme Power/Excessive Conditions) per 60945, par. 8.4.2. – Data.

The AISA1 performs acceptably under low temperature conditions with normal and excessive power supply. The table below is the record of the soak. The following page contains the applied output from device calibration.

Time Minutes	Temperature ˚C	Unit	Power
30	-15	AISA1	Off
60	-15	AISA1	Off
90	-15	AISA1	Off
120	-15	AISA1	Off
150	-15	AISA1	Off
180	-15	AISA1	Off
210	-15	AISA1	Off
240	-15	AISA1	Off
270	-15	AISA1	Off
300	-15	AISA1	Off
330	-15	AISA1	Off
360	-15	AISA1	Off
390	-15	AISA1	Off
420	-15	AISA1	Off
450	-15	AISA1	Off
480	-15	AISA1	Off
510	-15	AISA1	Off
540	-15	AISA1	Off
570	-15	AISA1	Off
600	-15	AISA1	Off
630	-15	AISA1	Normal
750	-15	AISA1	Normal
780	-15	AISA1	Extreme High
810	-15	AISA1	Extreme Low

IX. Measurement Results Cont'd:

3. Low Temperature/Normal Voltage – System Output.

IX. Measurement Results Cont'd:

3. Low Temperature/Normal Voltage – Performance Test – Frequency Error.

IX. Measurement Results Cont'd:

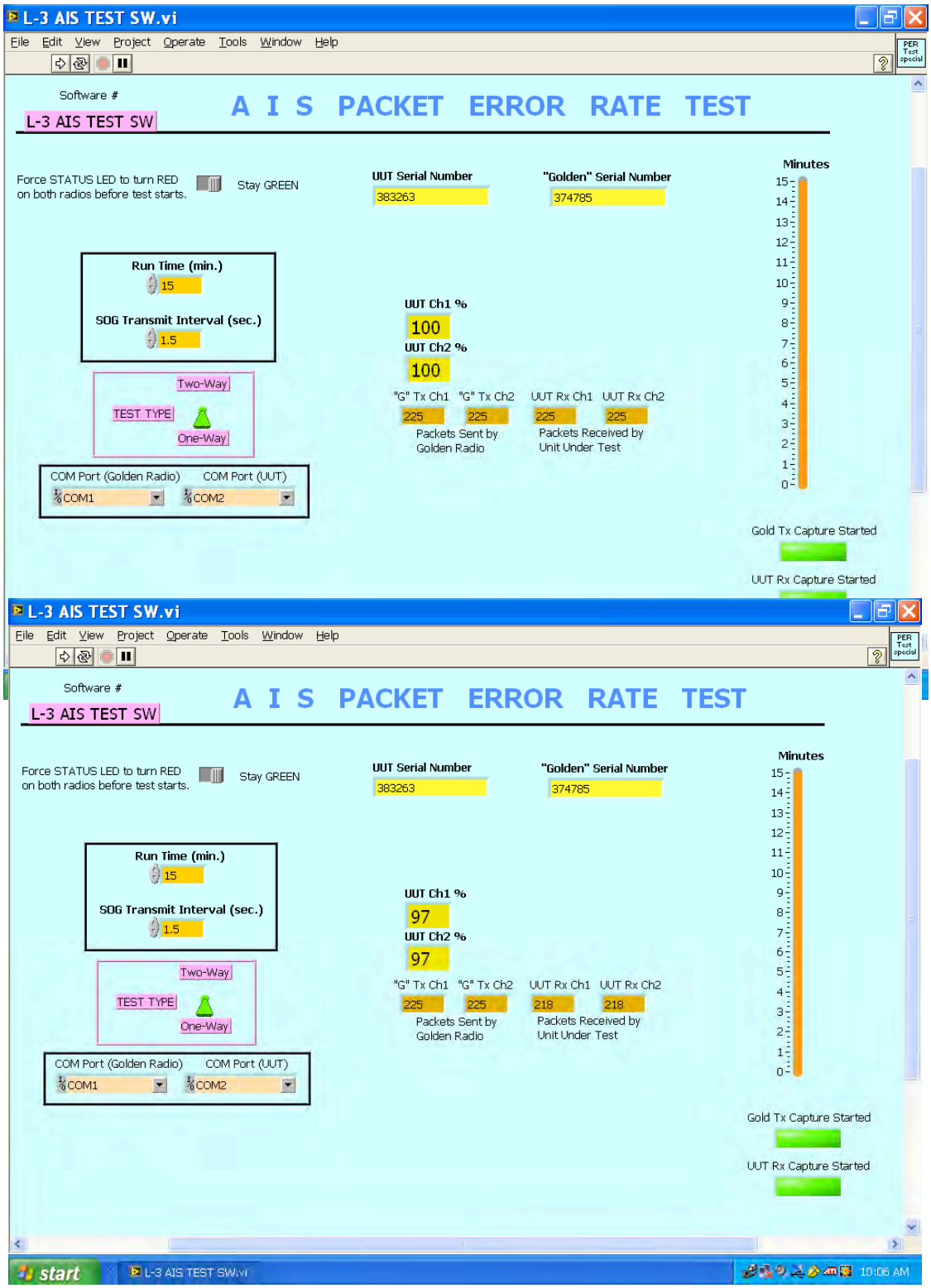
3. Low Temperature/Normal Voltage – Performance Test – Frequency Error Cont'd.

IX. Measurement Results Cont'd:

3. Low Temperature/Normal Voltage – Performance Test – Carrier Power.

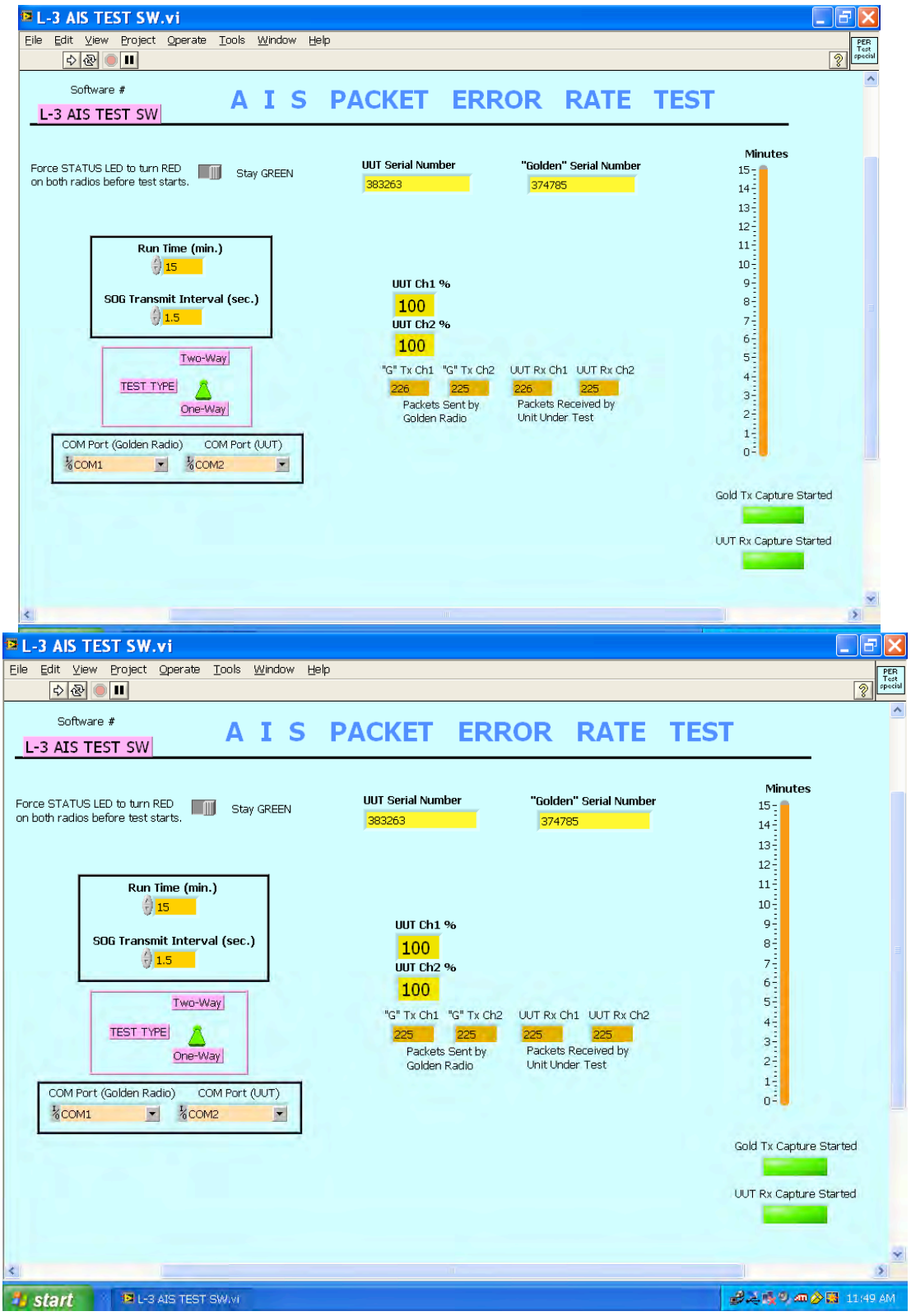
IX. Measurement Results Cont'd:

3. Low Temperature/Normal Voltage – Performance Test – Sensitivity 25 kHz & 12.5 kHz.



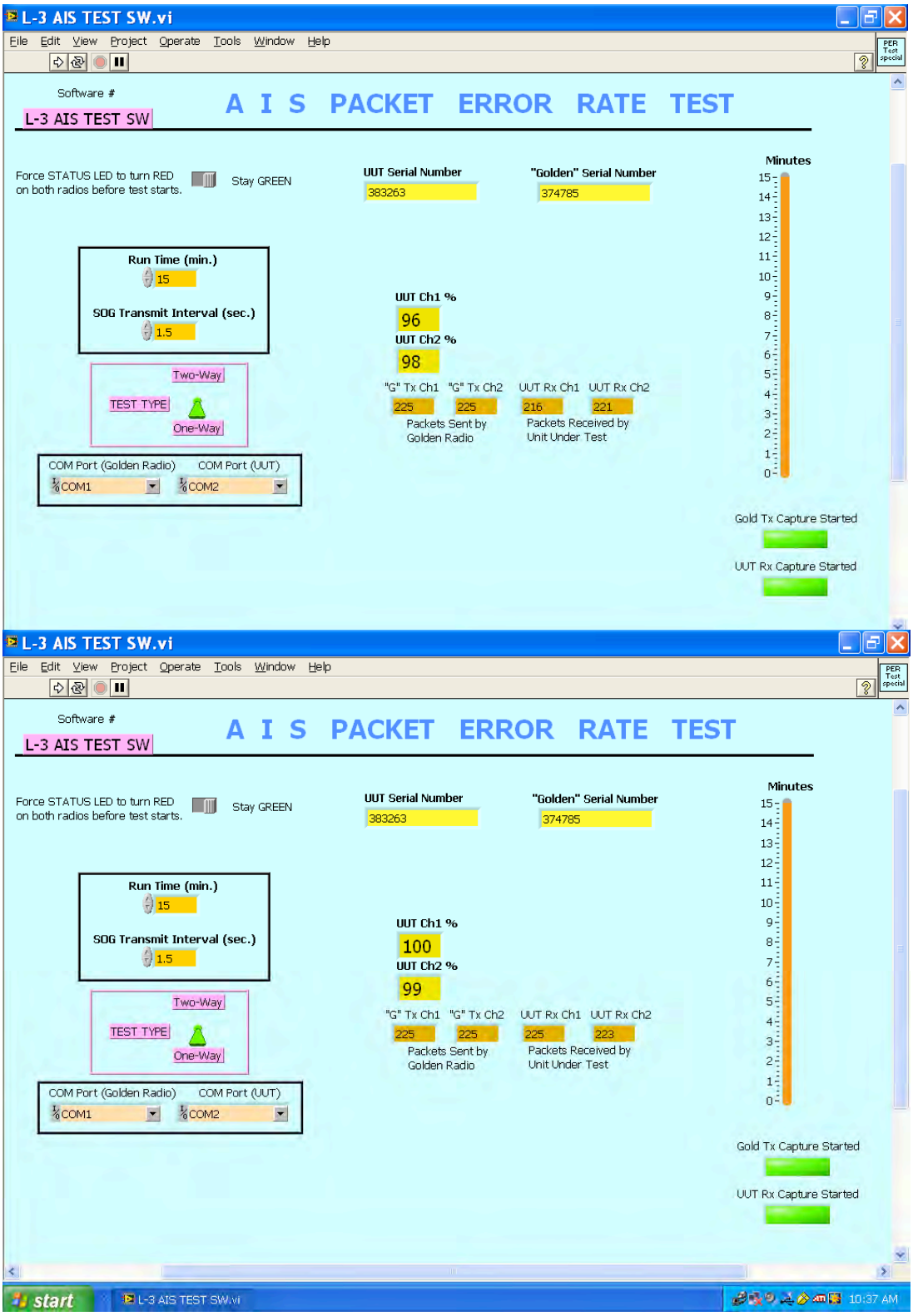
IX. Measurement Results Cont'd:

3. Low Temperature/Normal Voltage – Performance Test – Adjacent Channel 25 kHz.



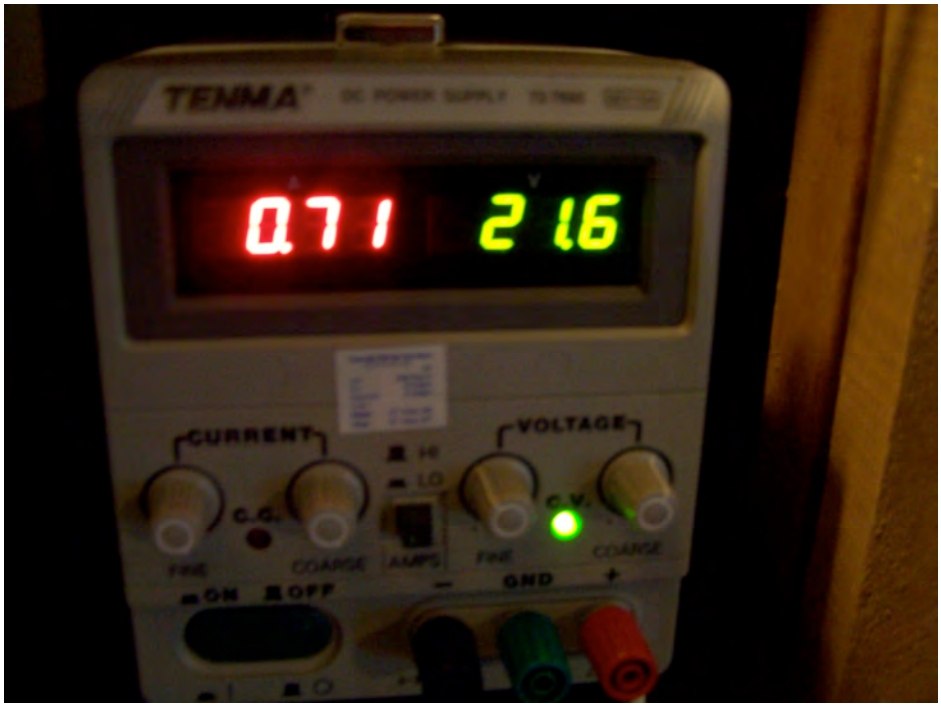
IX. Measurement Results Cont'd:

3. Low Temperature/Normal Voltage – Performance Test – Adjacent Channel 12.5 kHz.



IX. Measurement Results cont'd:

3. Low Temperature/Low Voltage – Performance Check – System Output.

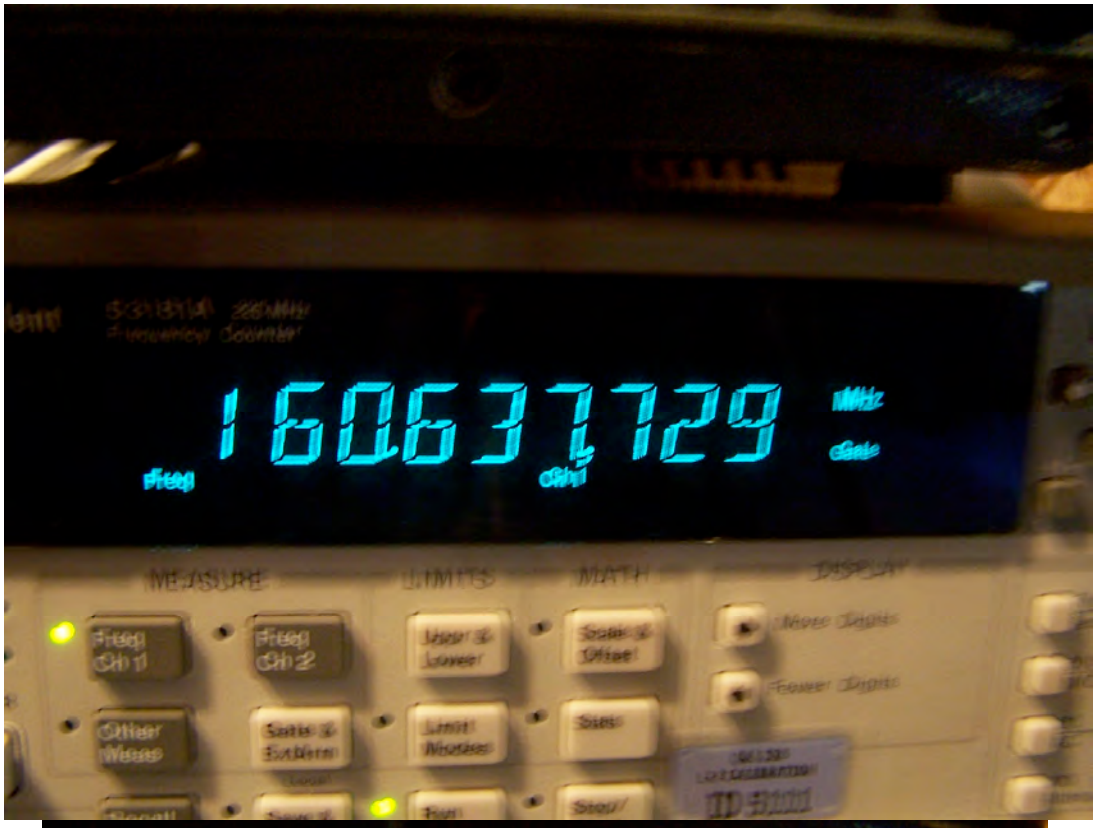


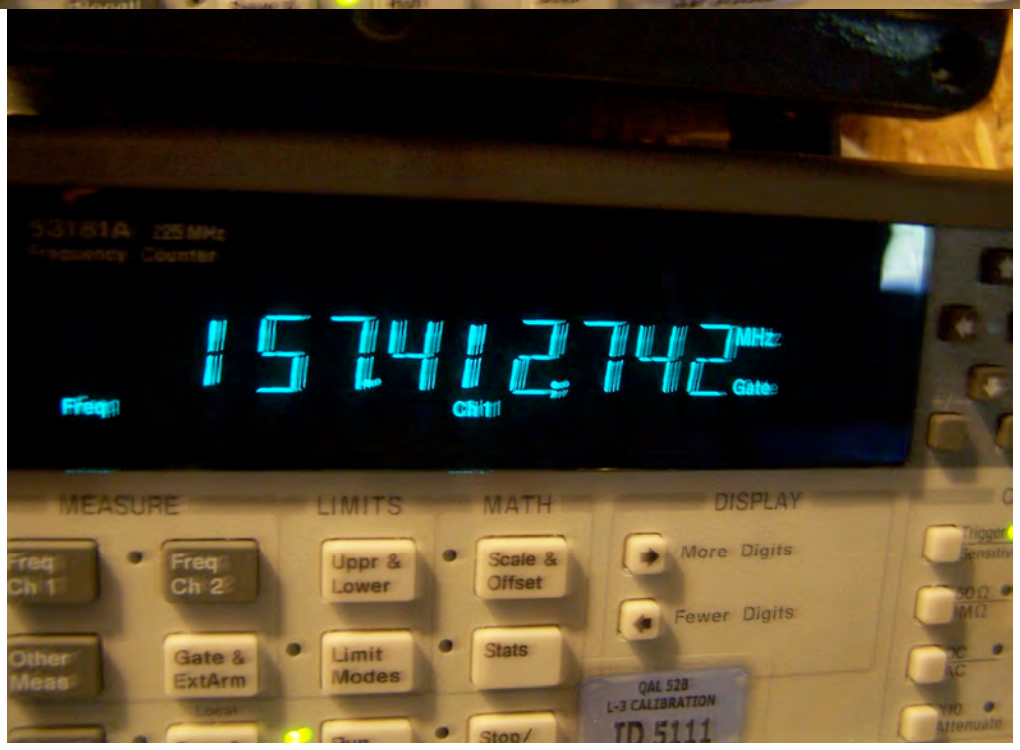
IX. Measurement Results Cont'd:

3. Low Temperature/Low Voltage – Performance Check – Frequency Error.

IX. Measurement Results Cont'd:

3. Low Temperature/Low Voltage – Performance Check – Frequency Error Cont'd.



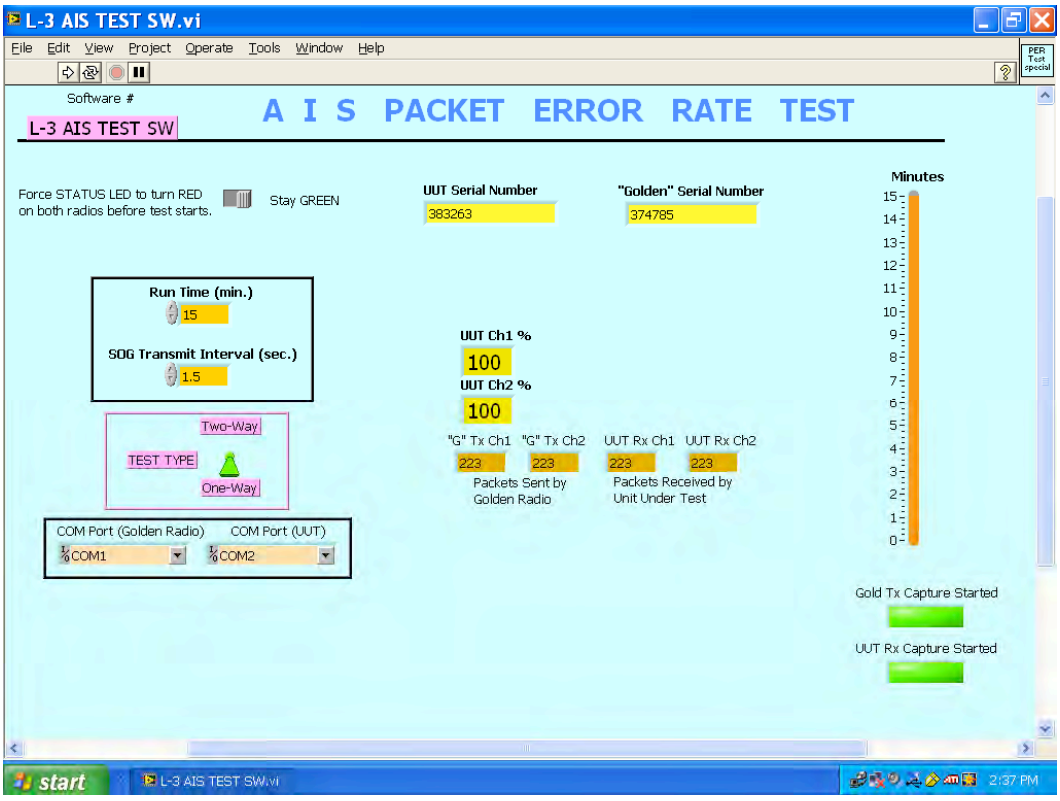


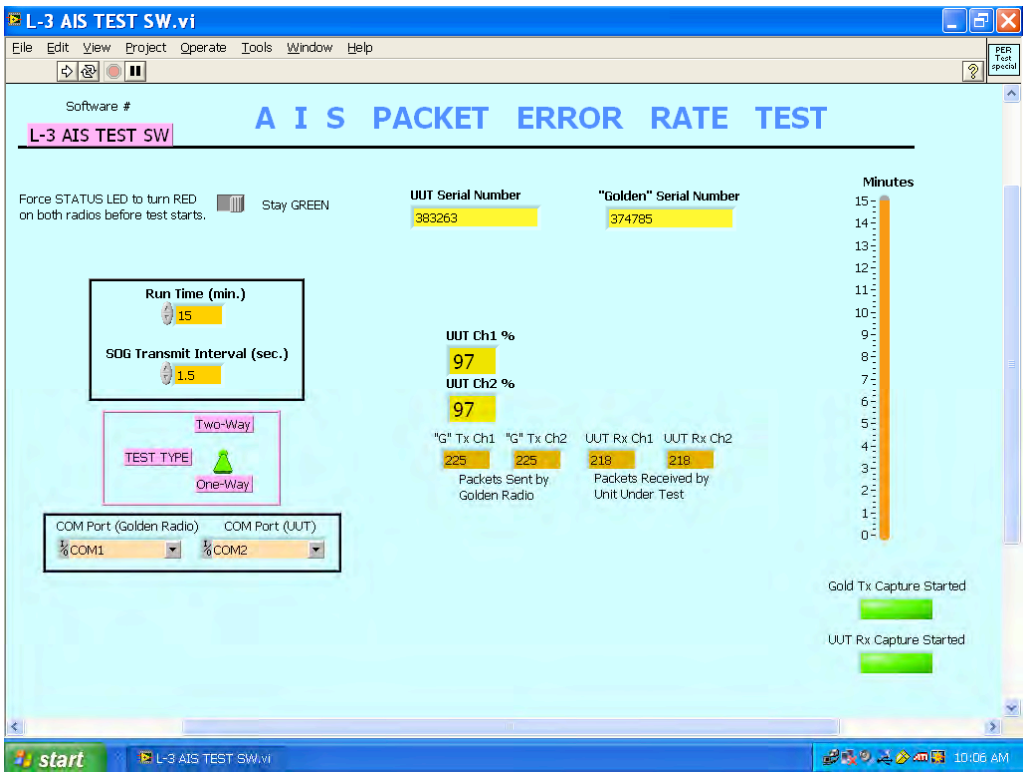
IX. Measurement Results Cont'd:

3. Low Temperature/Low Voltage – Performance Check – Carrier Power.

IX. Measurement Results Cont'd:

3. Low Temperature/Low Voltage – Performance Check Sensitivity 25 kHz & 12.5 kHz.





Appendix A

L3 Communications Aviation Recorders
P.O. Box3041
Sarasota, FL 34230-3041
941-371-081 1
January 30,2007
To: BSH Bundesamt fur Seeschiffahrt und Hyrdrographie
Bernhard-Nocht-StraBe 78
Postfach301220
20305 Hamburg Germany
Business: 0 40 31 90 731 0

IEC61993-2 DSC Test waver

L-3 Communications, Aviation Recorders Division requests a waver for the certification tests pertaining to the DSC functionality of the L3 Part Number AISAl00010. This waver is requested based upon the previous certification testing and approval of L3 Part number AISA100000 performed August 15,2003 and the fact that the current design has not changed fit, form, or function since the original certification. The original Physical Test Report prepared by Green Mountain August 15 2003,"GM230040xa 61 993 .pdf ', contains the specific tests with passing results for the following tests:

Dry heat *1* extreme **high** voltage / Frequency error of the DSC signal
(IEC61993-2:2001 chapter 15.2.1).
Dry heat / extreme **high** voltage *1* DSC receiver maximum sensitivity
(IEC61993-2:2001 chapter 15.4.1).
Low temperature / extreme low voltage *1* Frequency error of the DSC signal
(IEC61993-2:2001 chapter 15.2.1).
Low temperature / extreme low voltage / DSC receiver maximum sensitivity
(IEC61993-2:2001 chapter 15.4.1).
Normal temperature / normal voltage / Frequency error of the DSC signal
(IEC61993-2:2001 chapter 15.2.1).
Normal temperature / normal voltage / DSC receiver maximum sensitivity
(IEC61993-2:2001 chapter 15.4.1).

The DSC circuit board in question, 205M000301 derived from 205M028701, has incorporated Engineering Change Orders(EC0s) from the original certified circuit board that pertain to quality andlor manufacturing improvements only. The list of incorporated ECO numbers and their associated reason for change are list below:

10059 Components getting damaged move to the back of board.
101 10 Drawing note change.
101 70 Breakout 01 configuration
101 94 Drawing clarification.
10246 Finger stock change.
10278 TP 701
10361 Hand solder Y701
10488 Y701 not to go through drag solder.
1 l345Rl Drawing clarification
11859 Ribbon cable getting punctured
11303 BOM change one part listed twice.
1 1345 Document change
1 1623 Document change.

If further information is required, please contact me via email at **jimfulmele@l-3com.com**
Regards,
James Fulmele
Director or Maritime Engineering
L-3 CommunicationsAviation Recorders