

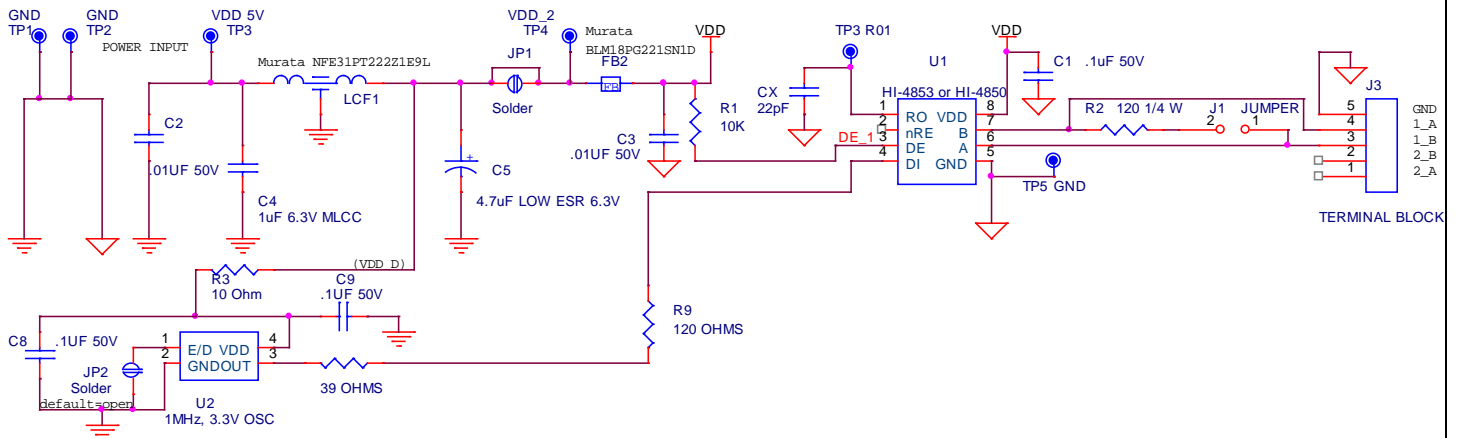
Introduction

The HI-4850 is a 3.0V to 5.5V RS-422/485 transceiver with slew rate control. The HI-4850 demonstration board was used to qualify the HI-4850 to RTCA/DO-160G (Section 21).

The DO-160G compliance test was performed to evaluate the electromagnetic interference of the HI-4850 in its anticipated operating environment in aeronautical applications. The HI-4850 was tested against Section 21, radiated and conducted emissions and category 'P', where equipment and associated wiring are located in areas close to high frequency, VHF or GPS radio receiver antennas, or where the aircraft structure provides little shielding.

Hardware used

To qualify the DO-160G (Section 21, Category P) the HI-4850 demonstration board was used with some modifications shown below and in appendix B2. See page B2 for details.



**DO-160G TEST REPORT
SECTION 21***for:***HI-4850 RS-485/RS-422 TRANSCEIVER
MODEL: HI-4850**

Prepared for

**HOLT INTEGRATED CIRCUITS, INC.
23351 MADERO
MISSION VIEJO, CA 92691-2730**

Prepared by: _____

JOEY MADLANGBAYAN

Approved by: _____

JOSH HANSEN**COMPATIBLE ELECTRONICS, INC.
20621 PASCAL WAY
LAKE FOREST, CALIFORNIA 92630
(949) 587-0400**

DATE: NOVEMBER 16, 2011

	REPORT BODY	APPENDICES					TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
PAGES	12	2	2	2	7	18	43

This report shall not be reproduced, except in full, without the written approval of Compatible Electronics.

TABLE OF CONTENTS

Section / Title	PAGE
<i>SUMMARY OF TEST RESULTS</i>	4
1. INTRODUCTION	5
2. PURPOSE	5
3. TEST CATEGORIES	5
4. APPLICABLE DOCUMENTS	6
5. ADMINISTRATIVE DATA	7
5.1 Location of Testing	7
5.2 Cognizant Personnel	7
5.3 Date Test Sample was Received	7
5.4 Disposition of the Test Sample	7
5.5 Abbreviations and Acronyms	7
6. LIST OF TEST EQUIPMENT	8
7. TEST SITE DESCRIPTION	9
7.1 Test Facility Description	9
7.2 EUT Test Configuration	9
7.3 EUT Mounting, Bonding and Grounding	9
7.4 Power Characteristics	9
8. GENERAL TEST PROCEDURES	10
8.1 Emissions of Radio Frequency Energy	10
8.1.1 Conducted RF Emission	10
8.1.2 Radiated RF Emission	11
9. CONCLUSION	12

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Photos <ul style="list-style-type: none">• Test Setup Diagrams• Radiated and Conducted Emissions Photos
E	Data Sheets

GENERAL REPORT SUMMARY

This electromagnetic emissions test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate to the EUT. This report may not be reproduced in any form unless done so in full.

Device Tested: The EUT is a RS-485/RS422 data transceiver.

Modifications: The EUT was modified during the testing. See Appendix B for a list of Modifications made to the EUT during the tests.

Manufacturer: Holt Integrated Circuits, Inc.
23351 Madero
Mission Viejo, California 92691-2730

Test Date: November 10, 2011.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	DO-160G Section 21: Radio Frequency Conducted and Radiated Emissions	Complies with the relevant requirements of the RTCA/DO-160G, Category P , Section 21 specifications.

1. INTRODUCTION

This document is a report of the EMI tests performed on the RS-485/RS-422 Transceiver Model: HI-4850 referred to as EUT hereafter. Compatible Electronics personnel performed the tests while Holt Integrated Circuits Personnel operated the system. The photographs of the test setups are included in Appendix D. The final test data is located in Appendix E.

2. PURPOSE

The purpose of the tests covered by this document was to evaluate the electromagnetic interference of the EUT with its anticipated operating environment in actual aeronautical operation and to determine the compliance of the EUT with the applicable EMI/EMC requirements of the Radio Technical Commission for Aeronautics (RTCA) document DO-160G.

3. TEST CATEGORIES

The device was categorized as shown in the following table:

SECTION	TEST	EQUIPMENT CATEGORY
21	Emission of Radio Frequency Energy (Radiated & Conducted):	<i>'P' - This category is defined for equipment and associated wiring located in areas close to high frequency, VHF, or GPS radio receiver antenna, or where the aircraft structure provides little shielding</i>

4. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI/EMC Test Report.

SPECIFICATION	TITLE
RTCA DO-160G	Environmental Conditions and Test Procedures for Airborne Equipment
MIL-STD-45662	Calibration System Requirements

5. ADMINISTRATIVE DATA

5.1 Location of Testing

The EMI/EMC tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, CA 92630.

5.2 Cognizant Personnel

Holt Integrated Circuits, Inc.

Scott Paladichuk	Director of Quality
William Soto	Apps Engineer

Compatible Electronics Inc.

Joey Madlangbayan	Test Engineer
Josh Hansen	Lab Manager – Lake Forest Division
Jeff Klinger	Director, EMC Engineering

5.3 Date Test Sample was Received

The test sample was received on November 10, 2011.

5.4 Disposition of the Test Sample

The test sample has been returned to Holt Integrated Circuits, Inc.

5.5 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

AC	Alternating Current	AF	Audio Frequency
CW	Continuous Wave	DC	Direct Current
EMC	Electromagnetic Compatibility	EMI	Electromagnetic Interference
ESD	Electrostatic Discharge	EUT	Equipment Under Test
LISN	Line Impedance Stabilization Network	REP	Repetition
RTCA	Radio Technical Commission for Aeronautics	RF	Radio Frequency
Rx	Receive	SPEC	Specification
S/N	Serial Number	SW	Square Wave
Tx	Transmit	TWT	Traveling Wave Tube

6. LIST OF TEST EQUIPMENT

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Spectrum Analyzer - Display	Hewlett Packard	85662A	2648A15455	May 27, 2011	May 27, 2012
Spectrum Analyzer - Main	Hewlett Packard	8566B	2937A06129	May 27, 2011	May 27, 2012
Biconical Antenna (Receiving)	Com-Power	AB-900	15226	6/08/2011	6/08/2012
Log Periodic Antenna (Receiving)	Com-Power	AL-100	16203	6/08/2011	6/08/2012
Horn Antenna (Receiving)	Com-Power	AH-118	71225	N.C.R.	N/A
Preamplifier	Com-Power	PA-103A	161237	January 18, 2011	January 18, 2012
Preamplifier	Com-Power	PA-118	181923	February 1, 2010	February 1, 2012
Current Probe	Fischer Custom Communications	F-42	145	Apr 29, 2009	Apr 29, 2012
5 μ H LISN	Com-Power	LI-300	1372	N/A	N/A
5 μ H LISN	Com-Power	LI-300	1337	N/A	N/A
10 μ F RF Capacitor	Solar Electronics	6512-106R	NONE	N/A	N/A
10 μ F RF Capacitor	Solar Electronics	6512-106R	NONE	N/A	N/A

7. TEST SITE DESCRIPTION

7.1 Test Facility Description

All the EMI tests described herein were performed in the shielded enclosure of Compatible Electronics, Inc. at 20621 Pascal Way Lake Forest, California, 92630.

7.2 EUT Test Configuration

The EUT was installed in a fully metallic box and connected to the DC power source via the DC power bus pins. The metallic box was placed on the ground plane. The bus line connected to the EUT was connected to a 3 meter wire braid shielded harness terminated with a 120-ohm resistor. The cable had a metallic DB-9 connector at the metallic box and the wires were hardwired to the resistor. The shield of the cable was grounded to the metallic box via the connector.

#	EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER
EUT	RS-485/RS-422 Transceiver	HOLT INTEGRATED CIRCUITS	HI-4850	NONE
1	DC POWER SUPPLY	KIKUSUI	PWR800L	MG002165

7.3 EUT Mounting, Bonding and Grounding

The tests were performed with the EUT positioned on an aluminum ground plane. The dimensions of the ground plane are 3.0 meters by 1.2 meters and it is bonded to the shield room wall. The minimum thickness of the ground plane is 0.3 mm. During all the tests, the EUT power was routed through a LISN and a 10 uF feed-through capacitor. An LISN and a 10 uF capacitor were placed on the positive and negative sides of the DC power input line. The LISN and the capacitor were bonded to the ground plane. The noise generated or transmitted by the equipment other than the EUT was minimized during the EMI emissions test by keeping all equipment other than the EUT outside of the shield room as well as filtering with ferrite clamps.

7.4 Power Characteristics

The voltage applied to the test sample was measured and recorded prior to testing. The power to the EUT was as follows:

5VDC \pm 0.5

8. GENERAL TEST PROCEDURES

The general procedures followed in performing the EMI tests are described here. Detailed test results for each test are included in the following sections.

During the emissions tests, ambient measurements were made to distinguish between the emissions from the system under test and those from other sources.

8.1 Emissions of Radio Frequency Energy

8.1.1 Conducted RF Emission

The EUT was configured as described in section 7.2 of this test report. The photographs of the test setup are shown with the data sheets in Appendix D.

The radio frequency emissions tests were performed as described in the RTCA standard DO-160G to determine the emissions levels of electromagnetic energy in the frequency range of 150 kHz to 152 MHz. The EUT was tested to measure if the RF conducted emissions were within the Category P limits specified in the RTCA standard DO-160G. The conducted emissions on power input line and power output line were measured using a current probe.

The conducted emissions were measured with a spectrum analyzer under program control. The Compatible Electronics Shield Room Emissions EMI measurement software (Version SR21) was used to collect the data. The plotted data is shown with respect to the actual specification limit. The data has been corrected for all factors, including current probe and cable loss factors.

Test Results:

The summary of the test is listed below.

Cable Description	Result
5V _{DC} Power Input Cable	PASS
TX/RX Interconnecting Cable	PASS

Complies with the relevant requirements of the RTCA/DO-160G, Section 21.4, **Category P**.

8.1.2 Radiated RF Emission

The EUT was configured as described in section 7.2 of this test report. The photographs of the test setup are shown with the data sheets in Appendix D.

The EUT was placed 10cm from the front edge of the ground plane and the receiving antenna was placed 90cm away from the edge of the ground plane. The receiving antenna height was mounted with its center being 30cm above the ground plane. The antennas used and their applicable frequency ranges are listed below.

Antenna	Frequency Range
Biconical Antenna	100 MHz to 300 MHz
Log Periodic Antenna	300 MHz to 1 GHz
Horn Antenna	1 GHz to 6 GHz

The radiated emissions were measured using the broadband antennas listed above with a spectrum analyzer under program control. The Compatible Electronics Shield Room Emissions EMI measurement software (Version SR21) was used to collect the data. The EUT was tested to measure if the RF radiated emissions were within the Category P limit levels specified in the RTCA standard DO-160G. The data is shown with respect to the actual specification limit, i.e., it has been corrected for antenna factors, amplifier gain and cable loss factors.

Test Results:

The summary of the test is listed below.

Frequency Range (MHz)	Antenna	Polarization	Result
100 to 300	Biconical	Horizontal	PASS
100 to 300	Biconical	Vertical	PASS
300 to 1000	Log Periodic	Horizontal	PASS
300 to 1000	Log Periodic	Vertical	PASS
1000 to 6000	Horn	Horizontal	PASS
1000 to 6000	Horn	Vertical	PASS

Complies with the relevant requirements of the RTCA/DO-160G, Section 21.5, **Category P**.

9. CONCLUSION

The RS-485/RS-422 Transceiver Model: HI-4850 as configured was tested as specified in the RTCA document DO-160G “Environmental Conditions and Test Procedures for Airborne Equipment” and meets the applicable requirements of section 21.

APPENDIX A

LABORATORY ACCREDITATIONS

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP LAB CODES 200063-0,
200528-0, 200527-0

For US, Canada, Australia/New Zealand, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 an ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

NVLAP listing links

Agoura Division - <http://ts.nist.gov/Standards/scopes/2000630.htm>

Brea Division - <http://ts.nist.gov/Standards/scopes/2005280.htm>

Silverado/Lake Forest Division - <http://ts.nist.gov/Standards/scopes/2005270.htm>

The test methods used in DO-160G section 21 were not accredited or listed in Compatible Electronics' scope of accreditation.



ANSI listing

CETCB

<https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4>



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

We are also certified/listed for IT products by the following country/agency:



VCCI Listing, from VCCI site

[Enter "Compatible" in search form](http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html) http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html



FCC Listing, from FCC OET site

[FCC test lab search](https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>



Compatible Electronics IC listing can be found at:

<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home>

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX B***MODIFICATIONS TO THE EUT***

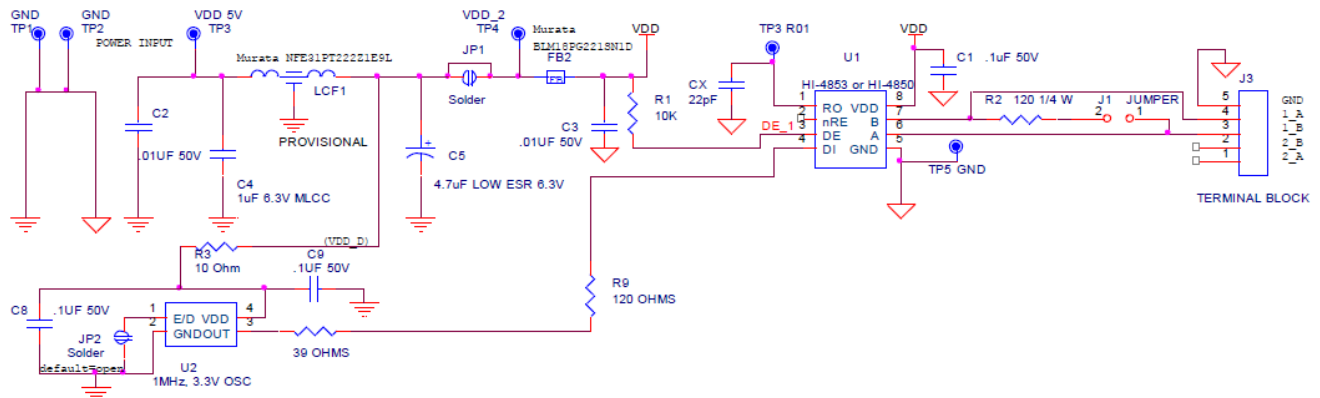
MODIFICATIONS TO THE EUT

The following modifications were made to the EUT during the test in order to comply with DO-160G Category P limits. The modifications were made in such a way that they could be reproduced during manufacturing.

1. A filter was installed onto the DC source input of the circuit. The placement of the filter is shown in the schematic diagram below.

LCF1 = Murata NFE31PT222Z1E9L

3. 39-ohm resistor was connected to the 1MHz oscillator at U2.



APPENDIX C

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

RS-485/RS-422 Transceiver
Model: HI-4850
S/N: NONE

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

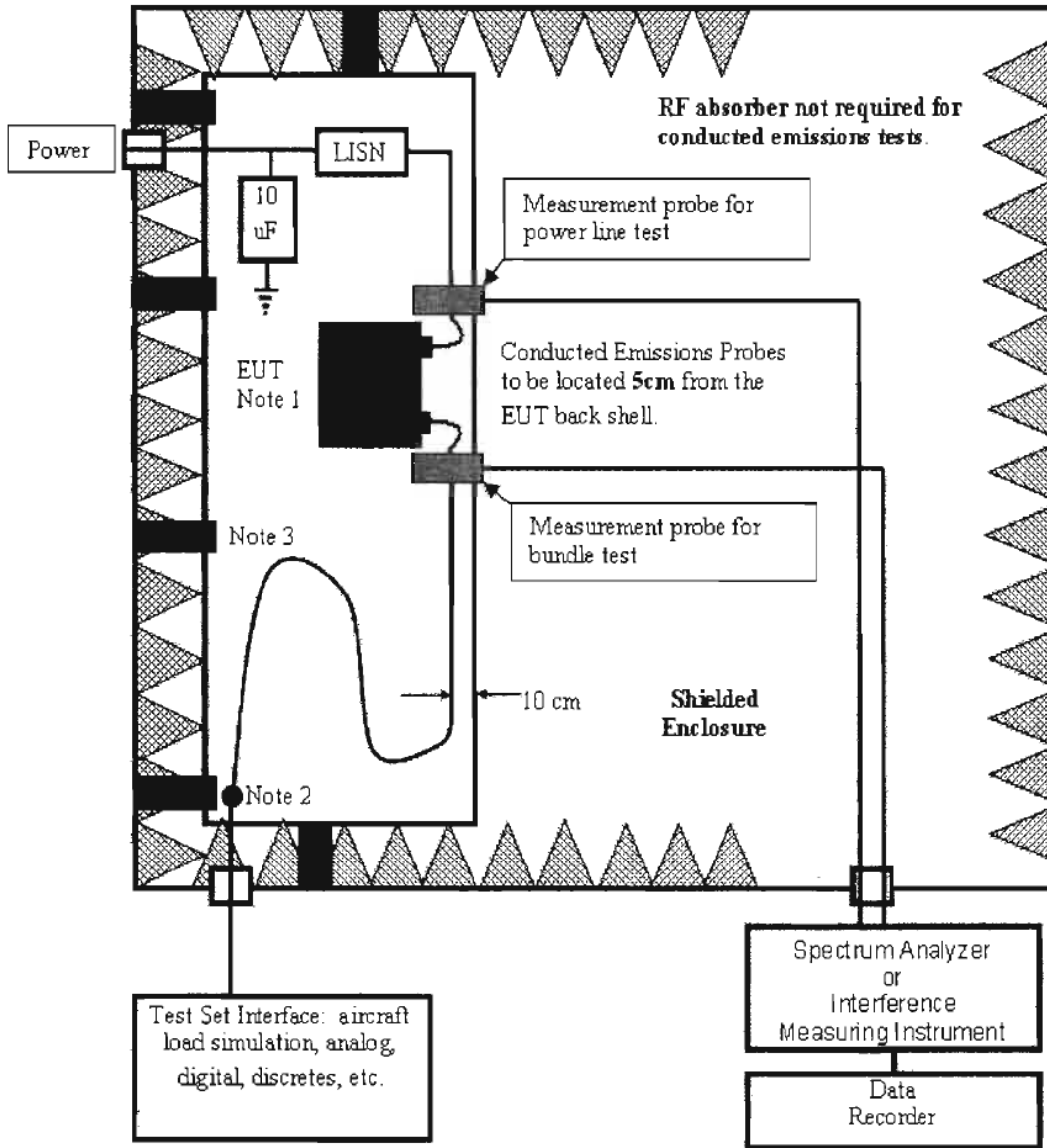


Figure 21-6 Typical Setup for Conducted RF Interference Test

FIGURE 2: RADIATED EMISSIONS TEST SETUP

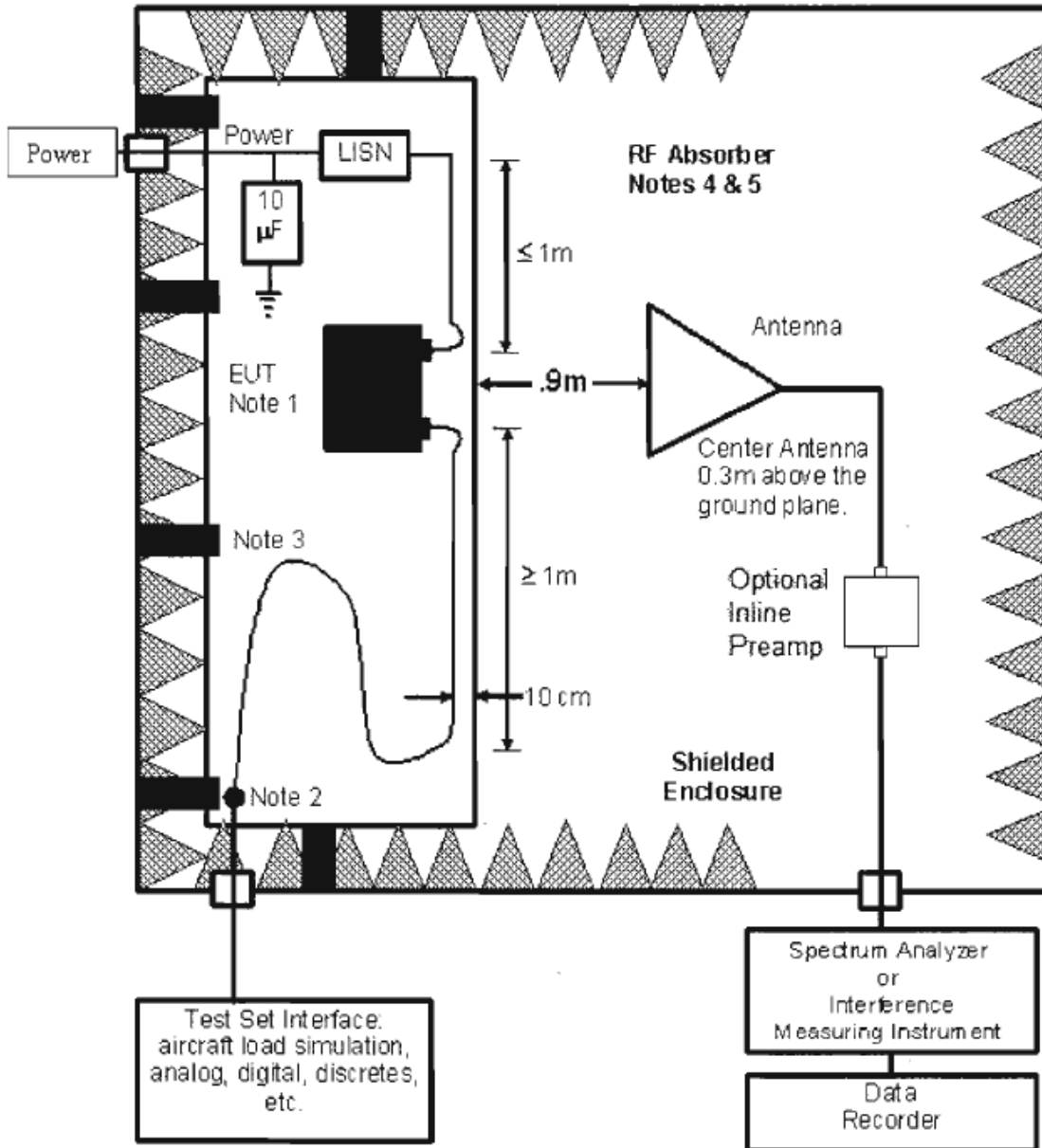
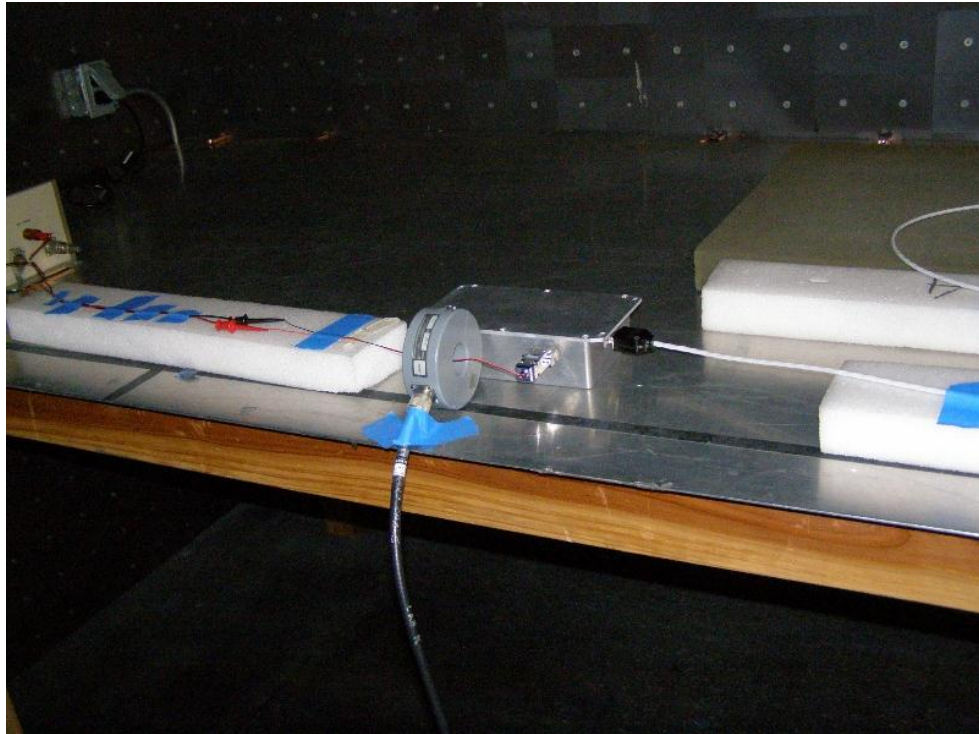


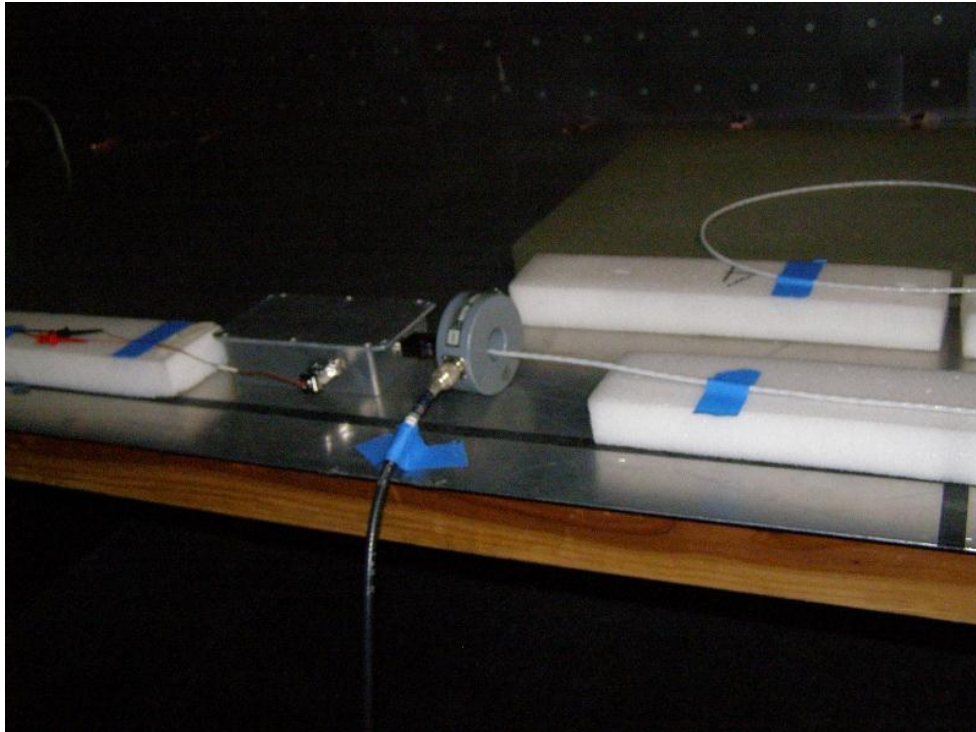
Figure 21-11 – Radiated Emissions Test Setup



HOLT INTEGRATED CIRCUITS, INC.
RS-485/RS-422 TRANSCEIVER
Model: HI-4850

DO-160G - CONDUCTED EMISSIONS (POWER INPUT) – 11-10-2011

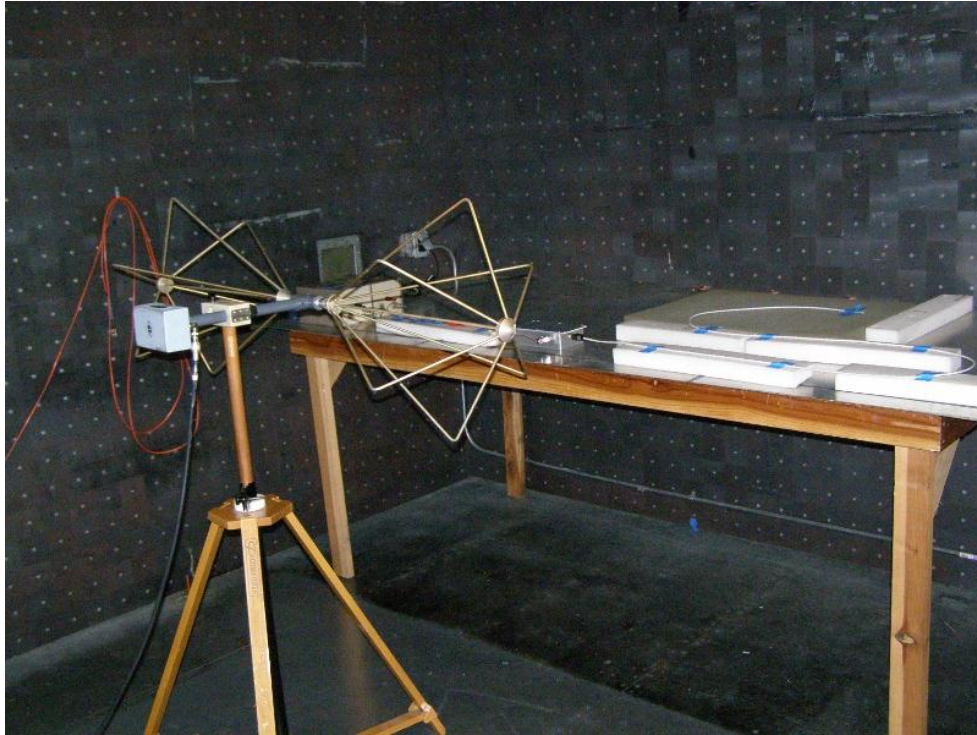
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



HOLT INTEGRATED CIRCUITS, INC.
RS-485/RS-422 TRANSCEIVER
Model: HI-4850

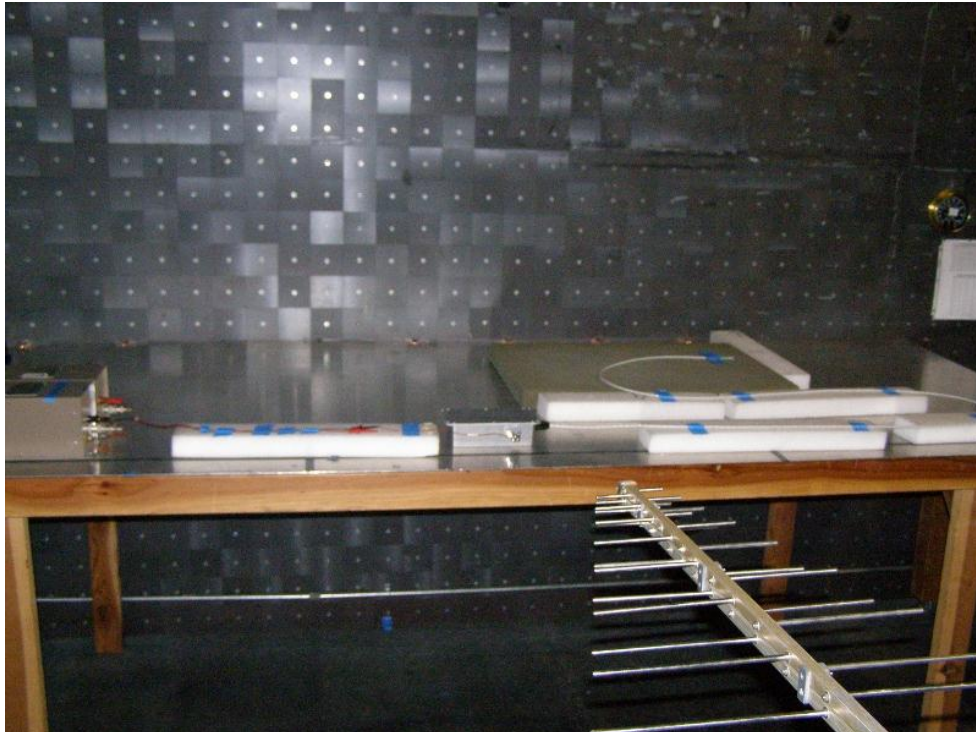
DO-160G - CONDUCTED EMISSIONS (INTERCONNECTING LINES) – 11-10-2011

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



HOLT INTEGRATED CIRCUITS, INC.
RS-485/RS-422 TRANSCEIVER
Model: HI-4850
DO-160G - RADIATED EMISSIONS – 11-10-2011

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



HOLT INTEGRATED CIRCUITS, INC.
RS-485/RS-422 TRANSCEIVER
Model: HI-4850
DO-160G - RADIATED EMISSIONS – 11-10-2011

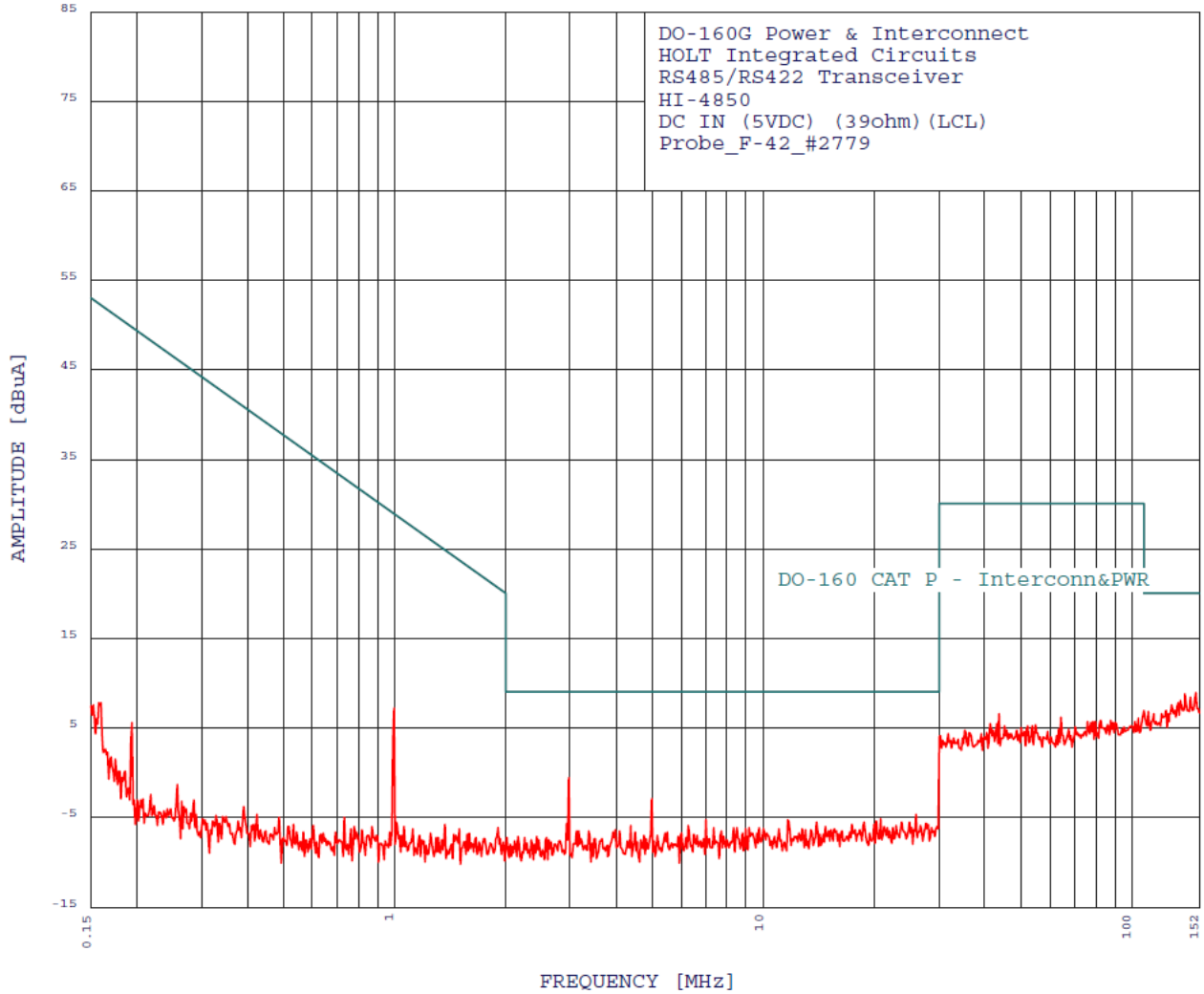
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

APPENDIX E

CONDUCTED EMISSIONS DATA SHEETS

EMISSION LEVEL [dBuA] PEAK
Graph for Peak

11/10/2011 16:45:43



DO-160G Power & Interconnect 11/10/2011 16:45:43
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
DC IN (5VDC) (39ohm) (LCL)
Probe F-42 #2779
TEST ENGINEER : Joey Madlangbayan

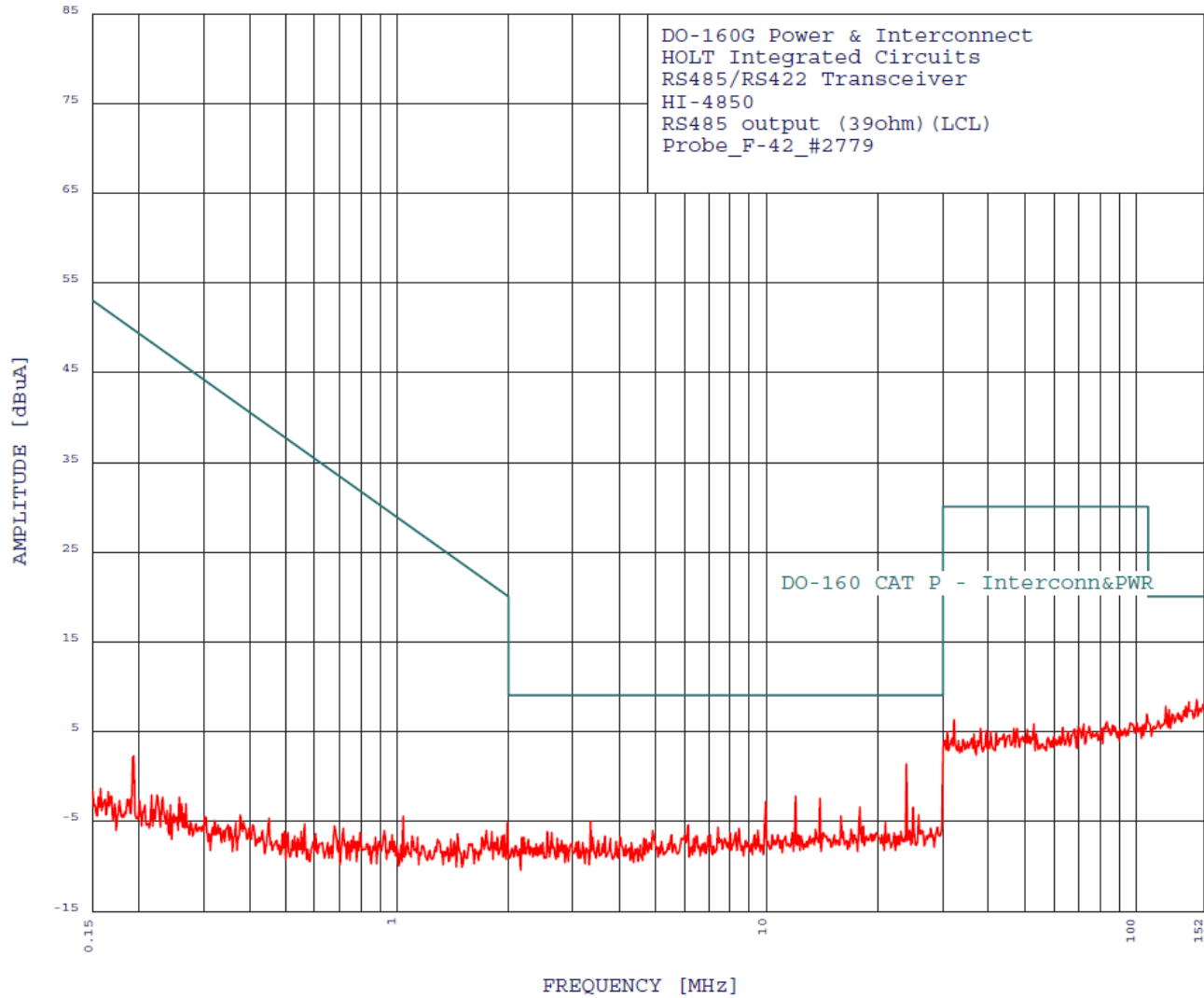
27 highest peaks above -50.00 dB of DO-160 CAT P - Interconn&PWR limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	2.985	-0.58	9.00	-9.58
2	149.003	8.94	20.00	-11.06
3	4.979	-3.00	9.00	-12.00
4	6.993	-5.26	9.00	-14.26
5	11.672	-5.30	9.00	-14.30
6	4.368	-5.96	9.00	-14.96
7	6.261	-5.97	9.00	-14.97
8	1.000	7.20	28.84	-21.64
9	43.746	6.60	30.00	-23.40
10	64.498	6.12	30.00	-23.88
11	1.917	-6.21	20.54	-26.76
12	1.505	-6.26	23.63	-29.89
13	1.375	-5.85	24.77	-30.62
14	0.871	-6.02	30.59	-36.61
15	0.733	-5.04	32.80	-37.84
16	0.780	-6.07	32.00	-38.07
17	0.604	-5.96	35.26	-41.23
18	0.532	-5.82	36.86	-42.68
19	0.487	-5.00	38.01	-43.01
20	0.194	5.58	49.73	-44.15
21	0.424	-4.74	39.76	-44.50
22	0.158	7.80	52.37	-44.57
23	0.390	-3.79	40.82	-44.61
24	0.257	-1.40	46.12	-47.52
25	0.328	-4.83	43.03	-47.85
26	0.286	-3.11	44.79	-47.90
27	0.265	-3.26	45.76	-49.01

EMISSION LEVEL [dBuA] PEAK
Graph for Peak

11/10/2011 16:34:19



DO-160G Power & Interconnect 11/10/2011 16:34:19
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
RS485 output (39ohm) (LCL)
Probe F-42 #2779
TEST ENGINEER : Joey Madlangbayan

30 highest peaks above -50.00 dB of DO-160 CAT P - Interconn&PWR limit line

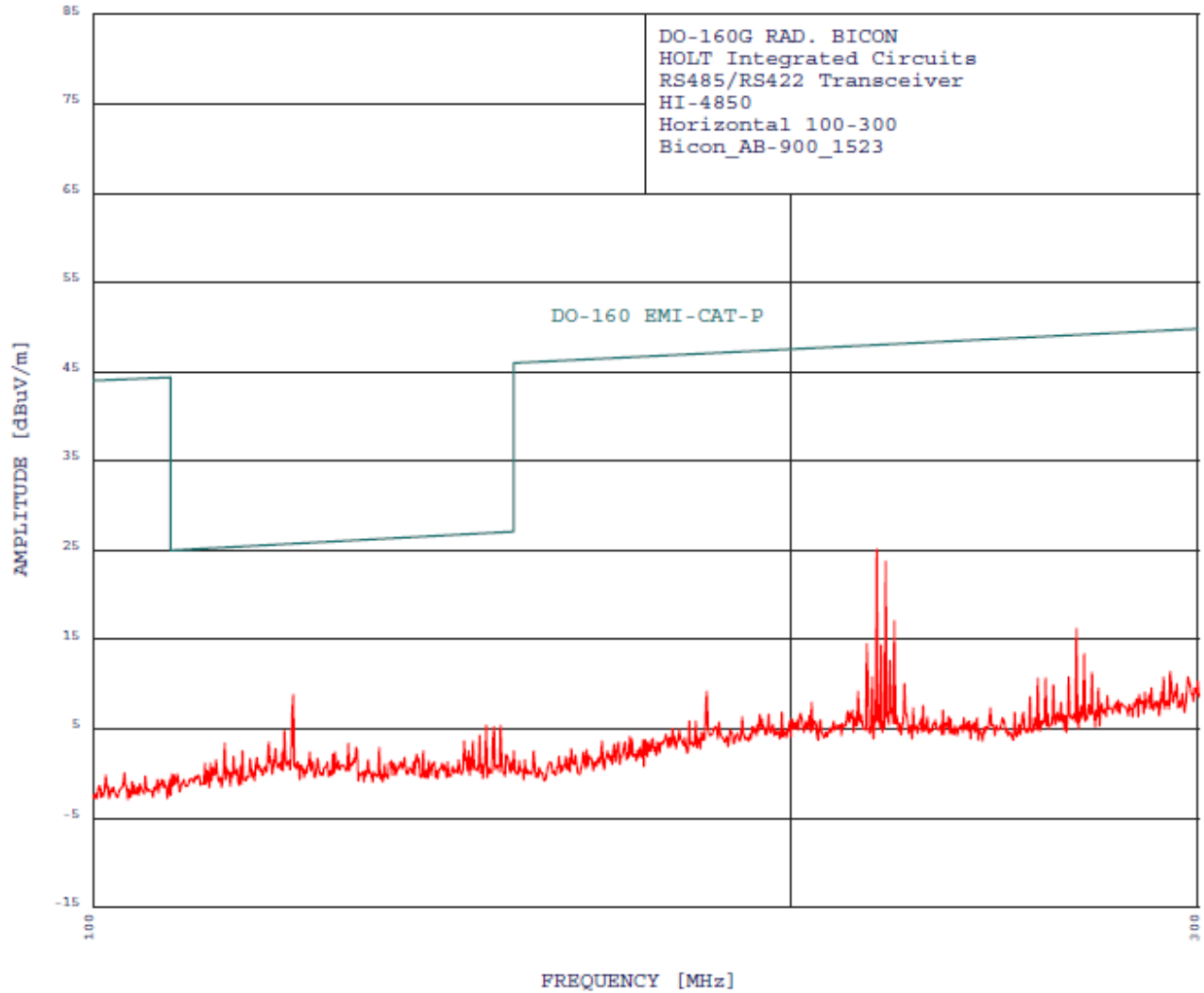
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	23.973	1.38	9.00	-7.62
2	11.998	-2.20	9.00	-11.20
3	13.973	-2.50	9.00	-11.50
4	145.964	8.46	20.00	-11.54
5	9.954	-2.90	9.00	-11.90
6	17.918	-3.40	9.00	-12.40
7	24.978	-3.40	9.00	-12.40
8	25.864	-4.28	9.00	-13.28
9	15.929	-4.40	9.00	-13.40
10	3.335	-5.00	9.00	-14.00
11	21.005	-5.18	9.00	-14.18
12	6.130	-5.48	9.00	-14.48
13	7.391	-5.65	9.00	-14.65
14	4.912	-5.99	9.00	-14.99
15	2.564	-6.16	9.00	-15.16
16	32.279	6.28	30.00	-23.72
17	53.123	5.81	30.00	-24.19
18	1.998	-5.22	20.01	-25.24
19	1.752	-6.09	21.69	-27.78
20	1.463	-6.46	23.98	-30.44
21	1.043	-4.41	28.30	-32.70
22	0.927	-6.06	29.80	-35.86
23	0.796	-6.28	31.74	-38.01
24	0.717	-5.83	33.06	-38.89
25	0.679	-5.51	33.77	-39.28
26	0.563	-5.34	36.15	-41.49
27	0.451	-4.74	38.97	-43.71
28	0.377	-4.29	41.26	-45.55
29	0.366	-5.21	41.62	-46.83
30	0.194	2.18	49.73	-47.55

RADIATED EMISSIONS DATA SHEETS

EMISSION LEVEL [dBuV/m] PEAK
 Graph for Peak

11/10/2011 17:40:37



DO-160G RAD. BICON 11/10/2011 17:40:37
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
Horizontal 100-300
Bicon_AB-900_1523
TEST ENGINEER : Joey Madlangbayan

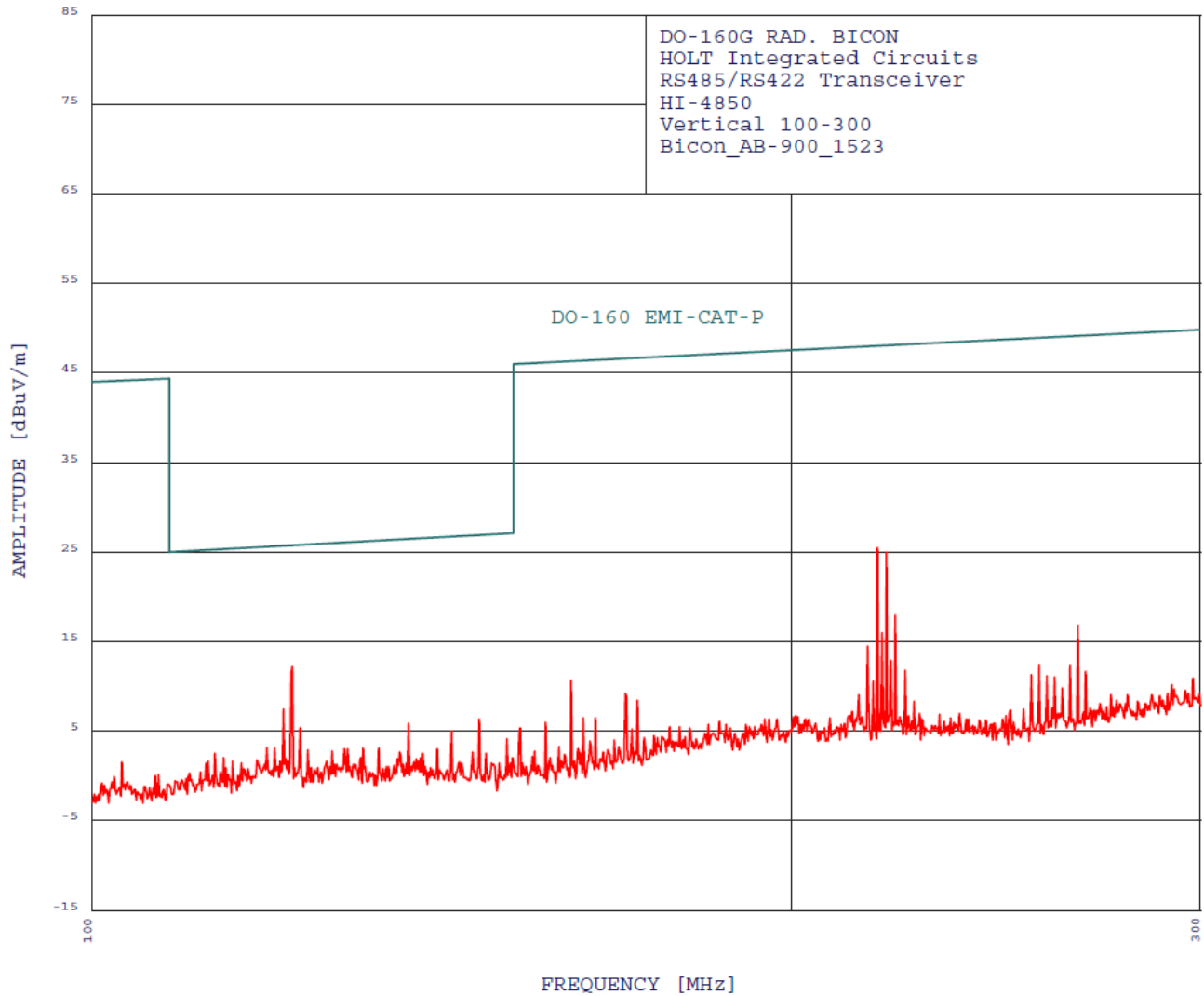
30 highest peaks above -50.00 dB of DO-160 EMI-CAT-P limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	122.001	8.71	25.71	-17.00
2	120.935	4.73	25.66	-20.94
3	147.865	5.35	26.84	-21.49
4	149.992	5.26	26.92	-21.66
5	149.004	5.15	26.88	-21.73
6	113.968	3.31	25.31	-22.01
7	119.089	3.50	25.57	-22.08
8	146.891	4.24	26.80	-22.56
9	128.891	3.31	26.03	-22.73
10	115.990	2.52	25.42	-22.90
11	217.916	25.00	47.93	-22.93
12	144.650	3.53	26.71	-23.18
13	145.929	3.53	26.76	-23.23
14	132.916	2.83	26.21	-23.38
15	114.975	1.86	25.37	-23.50
16	112.972	1.46	25.26	-23.81
17	138.886	2.52	26.47	-23.95
18	219.837	23.71	47.98	-24.27
19	221.779	17.01	48.03	-31.02
20	265.857	16.16	49.05	-32.89
21	215.770	14.50	47.88	-33.38
22	218.873	14.31	47.96	-33.65
23	220.808	12.61	48.01	-35.40
24	267.903	13.34	49.10	-35.76
25	216.959	10.80	47.91	-37.11
26	183.997	9.08	46.98	-37.90
27	269.978	11.22	49.14	-37.92
28	223.985	10.02	48.09	-38.07
29	291.872	11.39	49.58	-38.20
30	263.816	10.78	49.01	-38.23

EMISSION LEVEL [dBuV/m] PEAK
 Graph for **Peak**

11/10/2011 17:30:34



DO-160G RAD. BICON 11/10/2011 17:30:34
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
Vertical 100-300
Bicon AB-900 1523
TEST ENGINEER : Joey Madlangbayan

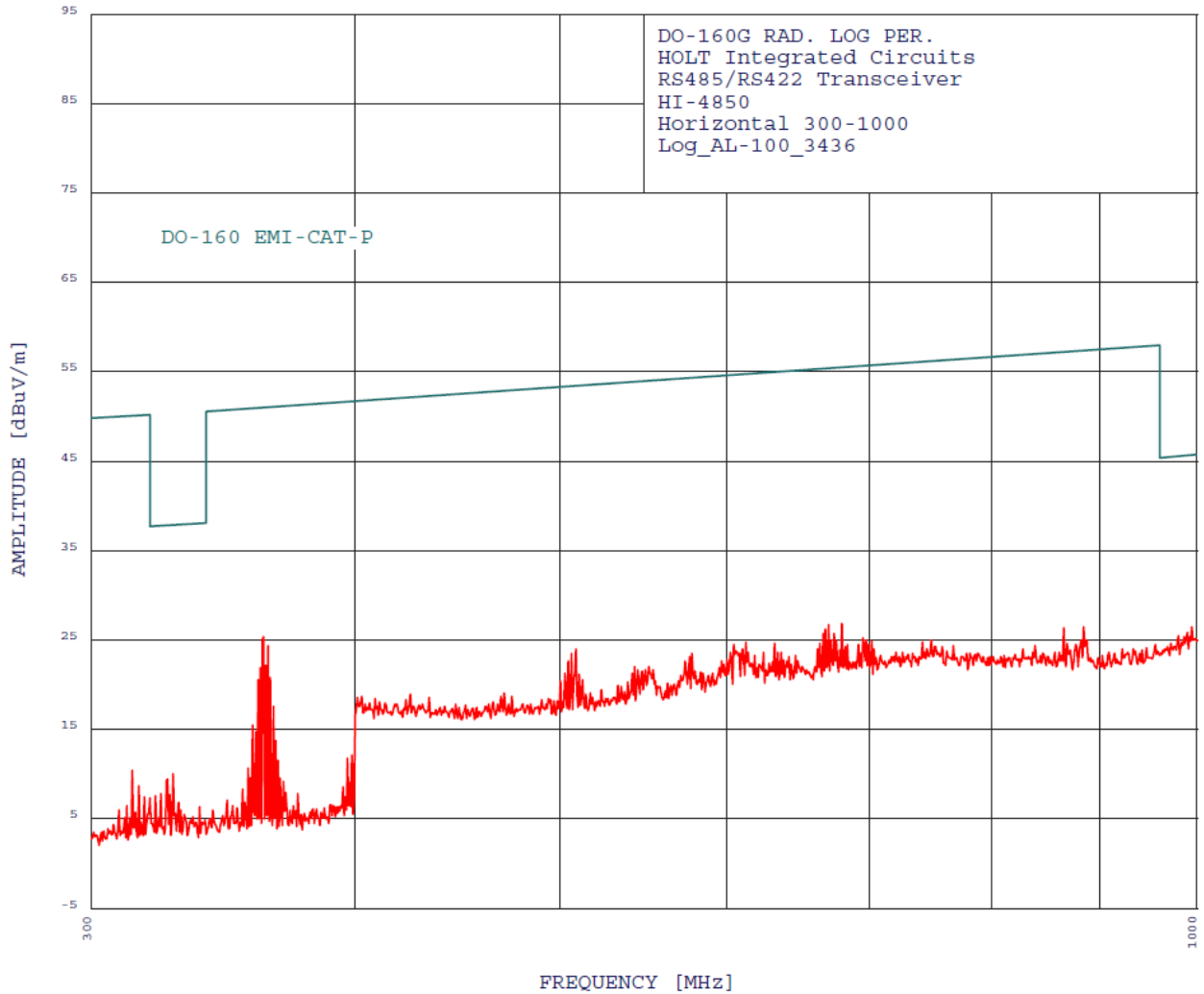
30 highest peaks above -50.00 dB of DO-160 EMI-CAT-P limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	122.001	12.21	25.71	-13.50
2	120.935	7.43	25.66	-18.24
3	122.945	5.30	25.76	-20.46
4	146.891	6.24	26.80	-20.56
5	136.917	5.76	26.39	-20.63
6	142.911	4.92	26.64	-21.72
7	118.957	3.08	25.57	-22.49
8	119.877	3.12	25.61	-22.49
9	217.916	25.40	47.93	-22.53
10	112.972	2.46	25.26	-22.81
11	150.982	4.08	26.96	-22.88
12	123.891	2.89	25.80	-22.91
13	128.468	3.01	26.02	-23.00
14	130.888	3.07	26.12	-23.06
15	219.837	24.91	47.98	-23.07
16	132.916	3.03	26.21	-23.18
17	113.968	2.01	25.31	-23.31
18	140.884	3.00	26.56	-23.55
19	112.228	1.64	25.22	-23.58
20	114.975	1.66	25.37	-23.70
21	147.865	2.45	26.84	-24.39
22	221.779	17.91	48.03	-30.12
23	218.873	15.91	47.96	-32.05
24	265.857	16.76	49.05	-32.29
25	215.770	14.50	47.88	-33.38
26	220.808	12.81	48.01	-35.20
27	160.917	10.67	46.22	-35.55
28	223.985	11.72	48.09	-36.37
29	255.827	12.29	48.84	-36.55
30	263.816	12.28	49.01	-36.73

EMISSION LEVEL [dBuV/m] PEAK
Graph for Peak

11/10/2011 18:02:26



DO-160G RAD. LOG PER. 11/10/2011 18:02:26
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
Horizontal 300-1000
Log AL-100 3436
TEST ENGINEER : Joey Madlangbayan

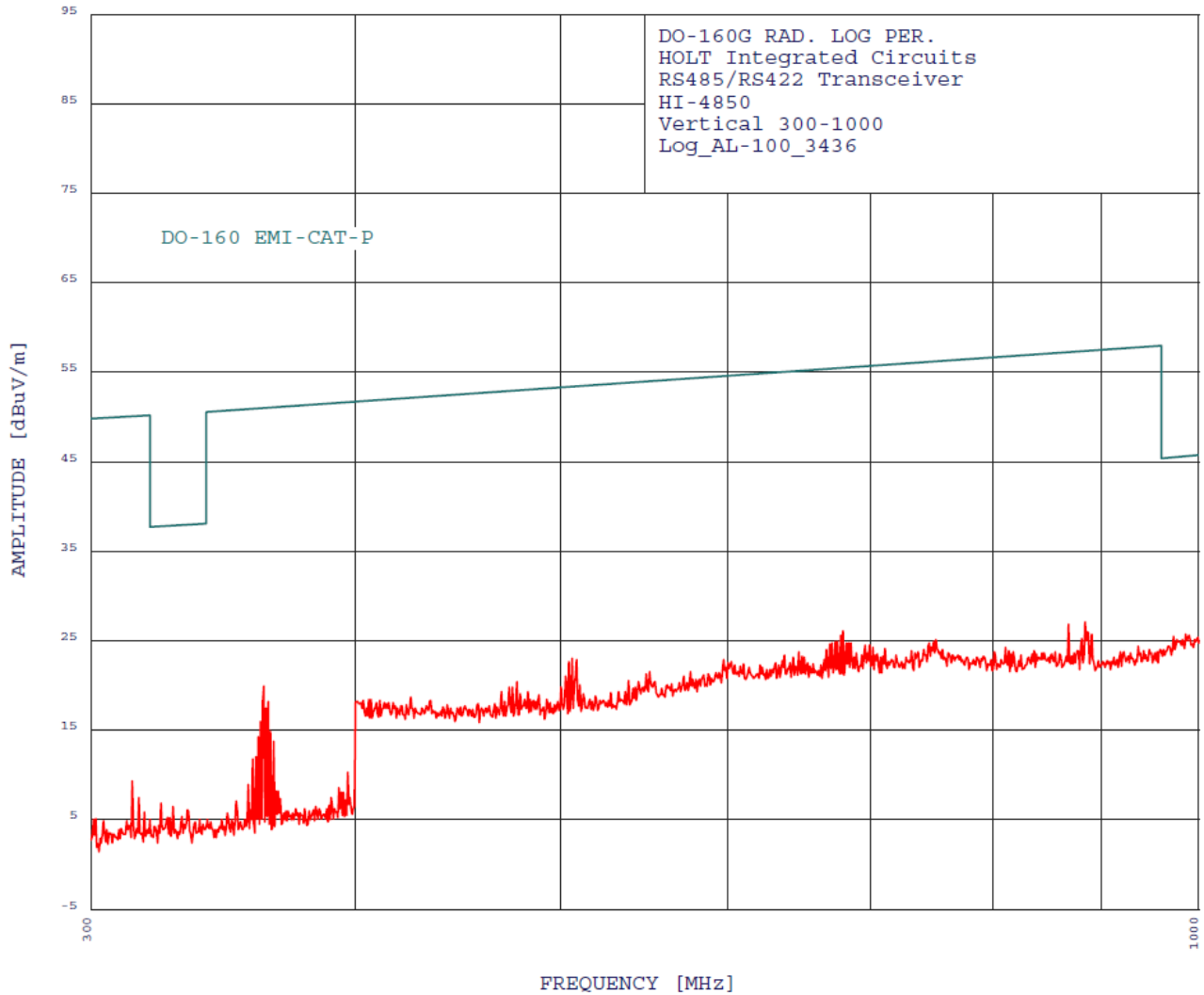
30 highest peaks above -50.00 dB of DO-160 EMI-CAT-P limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit (dB)	Delta (dB)
1	994.028	26.36	45.61	-19.25
2	361.985	25.32	50.95	-25.63
3	363.742	24.28	50.98	-26.71
4	327.964	9.97	37.82	-27.85
5	325.995	9.41	37.79	-28.39
6	669.719	26.65	55.33	-28.68
7	679.462	26.73	55.44	-28.71
8	362.863	22.15	50.96	-28.82
9	360.688	21.88	50.92	-29.04
10	667.293	26.21	55.31	-29.10
11	508.949	23.90	53.38	-29.48
12	665.688	25.68	55.29	-29.61
13	673.763	25.73	55.38	-29.65
14	323.645	7.83	37.76	-29.92
15	506.508	23.41	53.34	-29.93
16	611.897	24.72	54.69	-29.97
17	321.708	7.57	37.73	-30.15
18	603.844	24.44	54.59	-30.16
19	326.783	7.63	37.80	-30.17
20	364.620	20.70	51.00	-30.30
21	359.823	20.55	50.90	-30.35
22	695.187	25.21	55.60	-30.39
23	631.355	24.51	54.91	-30.40
24	663.299	24.54	55.26	-30.72
25	504.678	22.55	53.32	-30.76
26	576.838	23.46	54.27	-30.81
27	865.497	26.35	57.16	-30.81
28	701.916	24.84	55.67	-30.83
29	884.443	26.40	57.32	-30.91
30	601.670	23.62	54.57	-30.95

EMISSION LEVEL [dBuV/m] PEAK
 Graph for Peak

11/10/2011 17:52:15



DO-160G RAD. LOG PER. 11/10/2011 17:52:15
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
Vertical 300-1000
Log AL-100 3436
TEST ENGINEER : Joey Madlangbayan

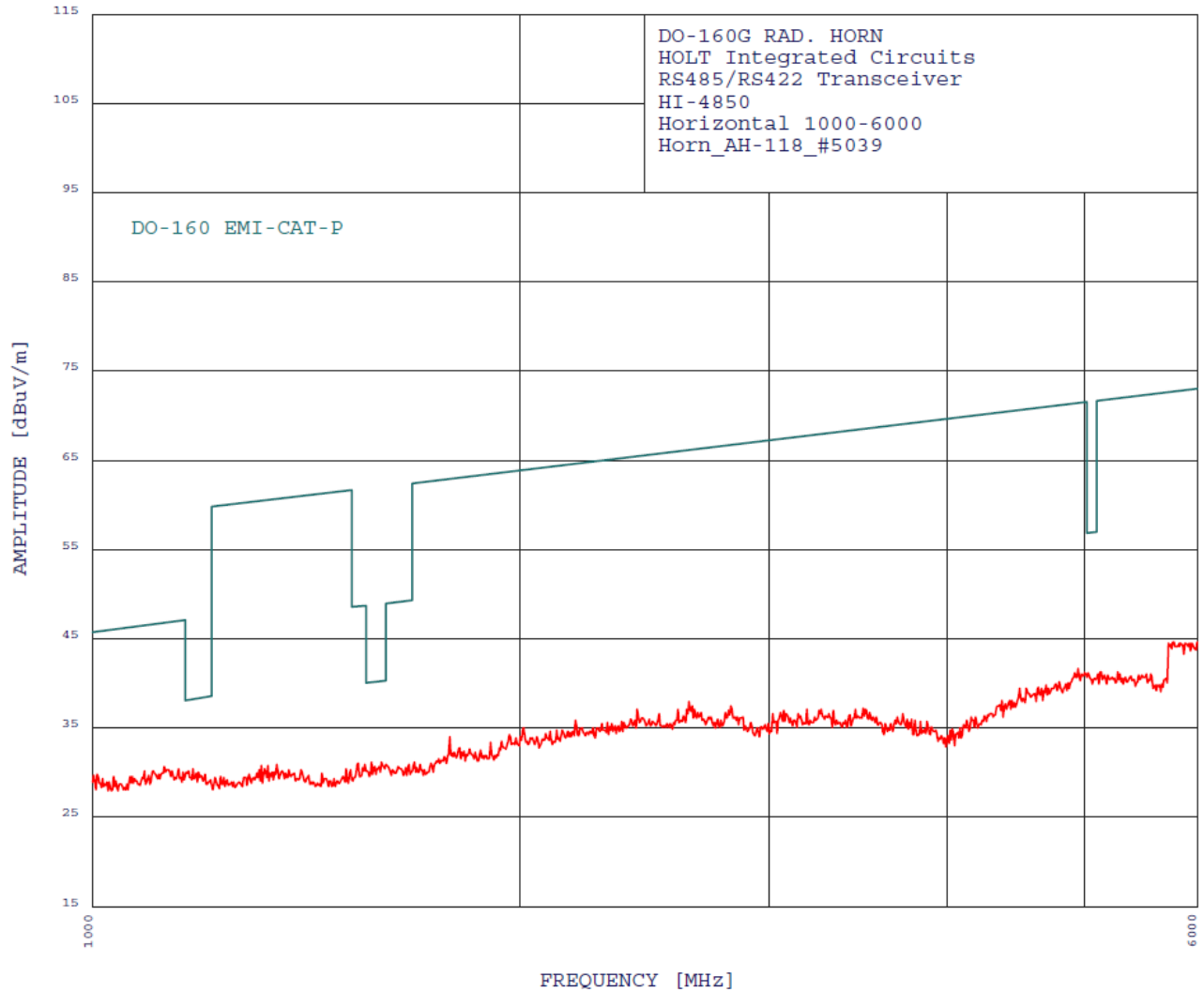
30 highest peaks above -50.00 dB of DO-160 EMI-CAT-P limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	986.852	25.67	45.54	-19.87
2	679.462	26.03	55.44	-29.41
3	677.819	25.60	55.42	-29.82
4	884.443	27.00	57.32	-30.31
5	868.614	26.81	57.19	-30.38
6	506.508	22.91	53.34	-30.43
7	673.763	24.83	55.38	-30.55
8	508.949	22.80	53.38	-30.58
9	675.380	24.76	55.39	-30.64
10	671.336	24.68	55.35	-30.67
11	504.678	22.55	53.32	-30.76
12	685.213	24.73	55.50	-30.76
13	323.645	6.73	37.76	-31.02
14	361.985	19.82	50.95	-31.13
15	751.777	25.02	56.16	-31.14
16	667.293	23.91	55.31	-31.40
17	327.964	6.37	37.82	-31.45
18	890.875	25.62	57.37	-31.75
19	333.137	6.03	37.90	-31.87
20	502.847	20.99	53.29	-32.30
21	476.916	20.32	52.91	-32.60
22	363.742	18.18	50.98	-32.81
23	472.904	19.78	52.85	-33.07
24	362.863	17.45	50.96	-33.52
25	360.688	15.98	50.92	-34.94
26	364.620	14.80	51.00	-36.20
27	359.823	14.15	50.90	-36.75
28	365.938	13.74	51.02	-37.28
29	358.958	11.93	50.89	-38.96
30	357.660	11.69	50.86	-39.17

EMISSION LEVEL [dBuV/m] PEAK
 Graph for Peak

11/10/2011 18:34:21



DO-160G RAD. HORN 11/10/2011 18:34:21
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
Horizontal 1000-6000
Horn AH-118 #5039
TEST ENGINEER : Joey Madlangbayan

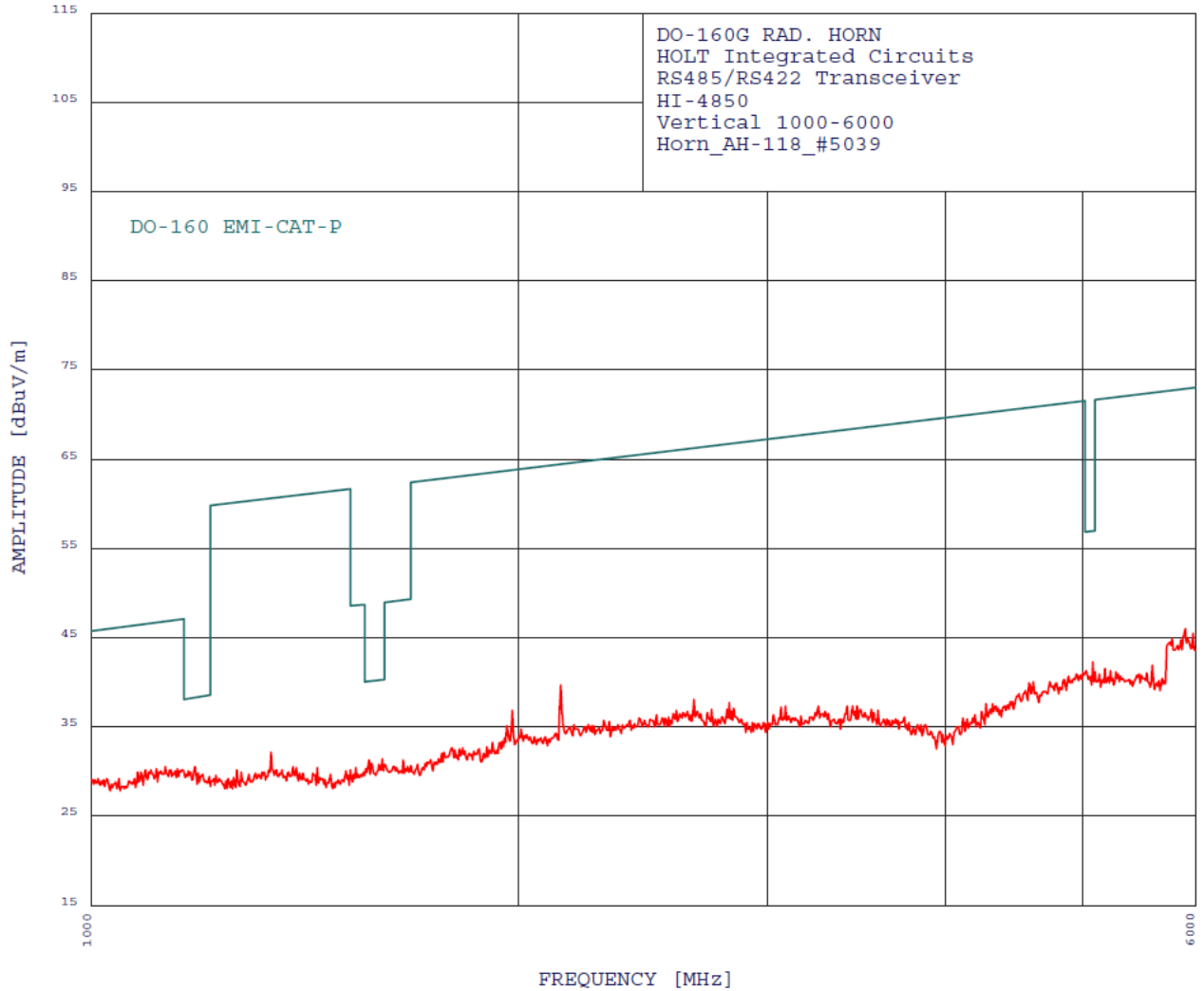
27 highest peaks above -50.00 dB of DO-160 EMI-CAT-P limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	2.985	-0.58	9.00	-9.58
2	149.003	8.94	20.00	-11.06
3	4.979	-3.00	9.00	-12.00
4	6.993	-5.26	9.00	-14.26
5	11.672	-5.30	9.00	-14.30
6	4.368	-5.96	9.00	-14.96
7	6.261	-5.97	9.00	-14.97
8	1.000	7.20	28.84	-21.64
9	43.746	6.60	30.00	-23.40
10	64.498	6.12	30.00	-23.88
11	1.917	-6.21	20.54	-26.76
12	1.505	-6.26	23.63	-29.89
13	1.375	-5.85	24.77	-30.62
14	0.871	-6.02	30.59	-36.61
15	0.733	-5.04	32.80	-37.84
16	0.780	-6.07	32.00	-38.07
17	0.604	-5.96	35.26	-41.23
18	0.532	-5.82	36.86	-42.68
19	0.487	-5.00	38.01	-43.01
20	0.194	5.58	49.73	-44.15
21	0.424	-4.74	39.76	-44.50
22	0.158	7.80	52.37	-44.57
23	0.390	-3.79	40.82	-44.61
24	0.257	-1.40	46.12	-47.52
25	0.328	-4.83	43.03	-47.85
26	0.286	-3.11	44.79	-47.90
27	0.265	-3.26	45.76	-49.01

EMISSION LEVEL [dBuV/m] PEAK
 Graph for Peak

11/10/2011 18:44:33



DO-160G RAD. HORN 11/10/2011 18:44:33
HOLT Integrated Circuits
RS485/RS422 Transceiver
HI-4850
Vertical 1000-6000
Horn AH-118 #5039
TEST ENGINEER : Joey Madlangbayan

7 highest peaks above -50.00 dB of DO-160 EMI-CAT-P limit line

Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	5088.346	42.24	56.89	-14.65
2	2145.425	39.64	64.36	-24.72
3	1982.813	36.80	63.69	-26.89
4	5904.306	45.94	72.86	-26.92
5	2659.933	37.98	66.16	-28.18
6	1339.269	32.13	60.57	-28.44
7	3412.390	37.35	68.26	-30.91
