

EMC Test Report

Project Number: 3910067

Report Number: 3910067EMC01

Revision Level: 1

Client: Time Domain Corporation

Equipment Under Test: UWB transmitter

Model Number: P440

FCC ID: NUF-P440-A

Applicable Standards: FCC Part 15, Subpart F

ANSI C63.10:2013

Report issued on: 19 January 2016

Test Result: Compliant

Tested by:

A handwritten signature in blue ink, appearing to read 'F. Nica'.

Fabian Nica, Senior Engineering Technician

Reviewed by:

A handwritten signature in blue ink, appearing to read 'David Schramm'.

David Schramm, EMC/RF/SAR/HAC Manager

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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1 Summary of Test Results

Reference	Description	Test Result
15.519(b)	10dB bandwidth contained within 3100 to 10600 MHz	Compliant
15.503(d)	10dB bandwidth greater than 500 MHz	Compliant
15.519(c)	Radiated emissions above 960 MHz	Compliant
15.519(d)	Radiated emissions in GPS receive band	Compliant
15.519(e)	Peak emission in a 50 MHz bandwidth	Compliant
15.519(c)	Radiated emissions below 960 MHz per 15.209	Compliant
15.107	Conducted emissions	Compliant

1.1 Modifications Required to Compliance

None

2 General Information

2.1 *Client Information*

Name: Time Domain
Address: 4955 CORPORATE DR NW
SUITE 101
City, State, Zip, Country: HUNTSVILLE AL 35805
United States

2.2 *Test Laboratory*

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

2.3 *General Information of EUT*

Model Number: P440
Serial Number: 2246BBJ40N0001
Hardware Version: P440 Rev. B
Firmware Version: NA
Voltage: 120Vac 60Hz

Sample Received Date: 7 December 2015
Dates of testing: 7 December to 8 December 2015

2.4 *Operating Modes and Conditions*

The EUT was programmed by the manufacturer to run continuously exercising all modes of operation.

3 UWB Bandwidth requirements

3.1 Test Result

Test Description	Reference	Test Result
10dB bandwidth contained within 3100 MHz and 10,600 MHz	15.519(b)	Compliant
10dB bandwidth greater than 500 MHz	15.503(d)	Compliant

3.2 Test Method

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3,100 MHz and 10,600 MHz.

Ultra-wideband (UWB) transmitter: An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

3.3 Test Site

3m Absorber Lined Shielded Enclosure, SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.8°C

Relative Humidity: 31 %

3.4 Test Equipment

Test Date: 7-Dec-2015

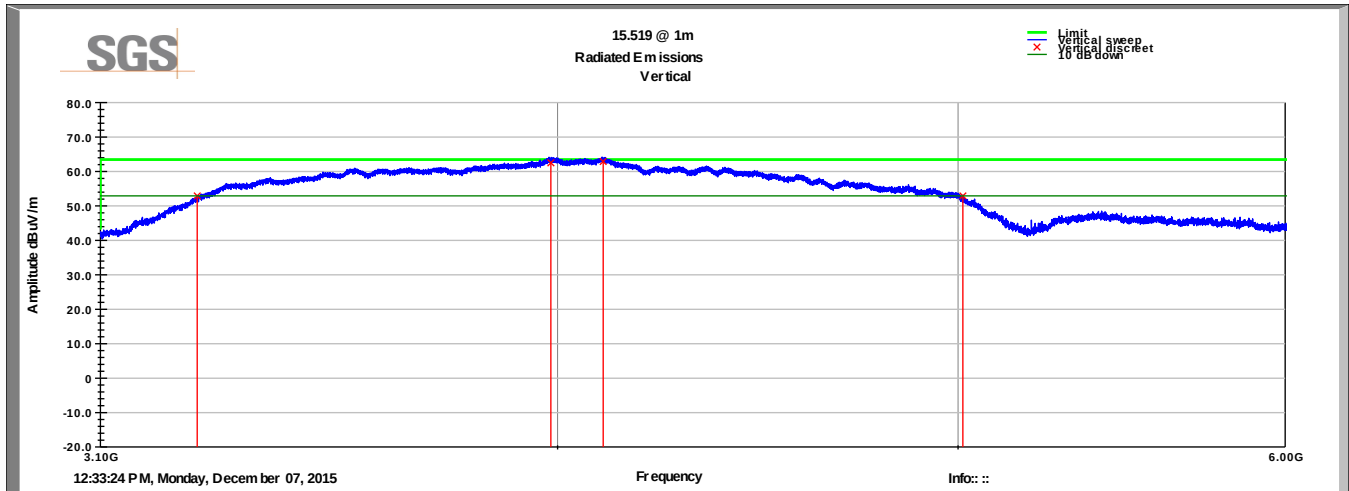
Tester: D Schramm

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079691	9-Jul-2016
PREAMPLIFIER-ANTENNA SYS	TS-PR18	ROHDE & SCHWARZ	15003	24-Aug-2016
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	4-Aug-2016
TYPE N CABLE	104PE	HUBER&SUHNER	B079793	4-Aug-2016

Note: The calibration period for this equipment is 1 year.

3.5 Test Data

Bandwidth Plot



Bandwidth Results					
Antenna Polarity	Frequency 10dB below peak MHz	Frequency 10dB above peak MHz	10 dB bandwidth MHz	Bandwidth requirement >500 MHz	Detectors / RBW / VBW
V	3272	5014	1742	Compliant	RMS 1MHz / 3MHz

4 Radiated emissions above 960 MHz

4.1 Test Result

Test Description	Reference	Test Result
Radiated emissions above 960 MHz	15.519(c)	Compliant

4.2 Test Method

Emissions from a transmitter operating under this section shall not exceed the following equivalent isotropically radiated power (EIRP) density levels:

- 1) The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following RMS average limits based on measurements using a 1 MHz resolution bandwidth:

Frequency (MHz)	EIRP in dBm	EIRP (dB μ V/m) at 3m	EIRP (dB μ V/m) at 1m
960–1610	-75.3	19.9	29.4
1610–1990	-63.3	31.9	41.4
1990–3100	-61.3	33.9	43.4
3100–10600	-41.3	53.9	63.4
Above 10600	-61.3	33.9	43.4

Because the limits are so low, some bands may have been scanned at a distance closer than 1 meter. If any emissions were detected in these bands, final measurements were made at distance of 1 meter or greater. The actual distance for final measurement was indicated in the measurement data.

4.3 Test Site

3m Absorber Lined Shielded Enclosure, SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.8°C

Relative Humidity: 31 %

4.4 Test Equipment

Test Date: 7-Dec-2015

Tester: D Schramm

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079691	9-Jul-2016
PREAMPLIFIER-ANTENNA SYS	TS-PR18	ROHDE & SCHWARZ	15003	24-Aug-2016
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	4-Aug-2016
TYPE N CABLE	104PE	HUBER&SUHNER	B079793	4-Aug-2016
FILTER	LPM17270	MICRO-TRONICS	B093646	5-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079823	4-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079822	4-Aug-2016
FIXED GAIN AMPLIFIER	NSP1840-HG	MITEQ	B087572	15-Oct-2016
SMALL HORN	LB-180400-20-C-KF	A-INFOMW	15007	11-Mar-2016

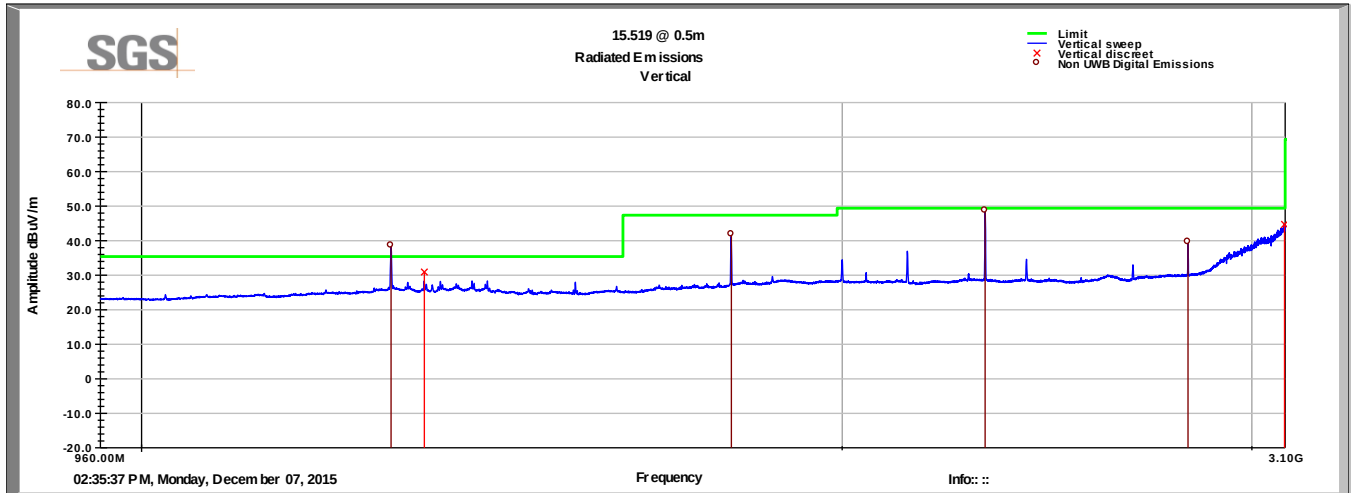
Note: The calibration period equipment is 1 year.

Software:

"Direct_Final_Radiated Emissions 1-18GHz.TIL" TILE! profile dated 03 MAY 2012

"Direct_Final_Radiated Emissions 18-40GHz.TIL" TILE! profile dated 03 MAY 2012

4.5 Test Data

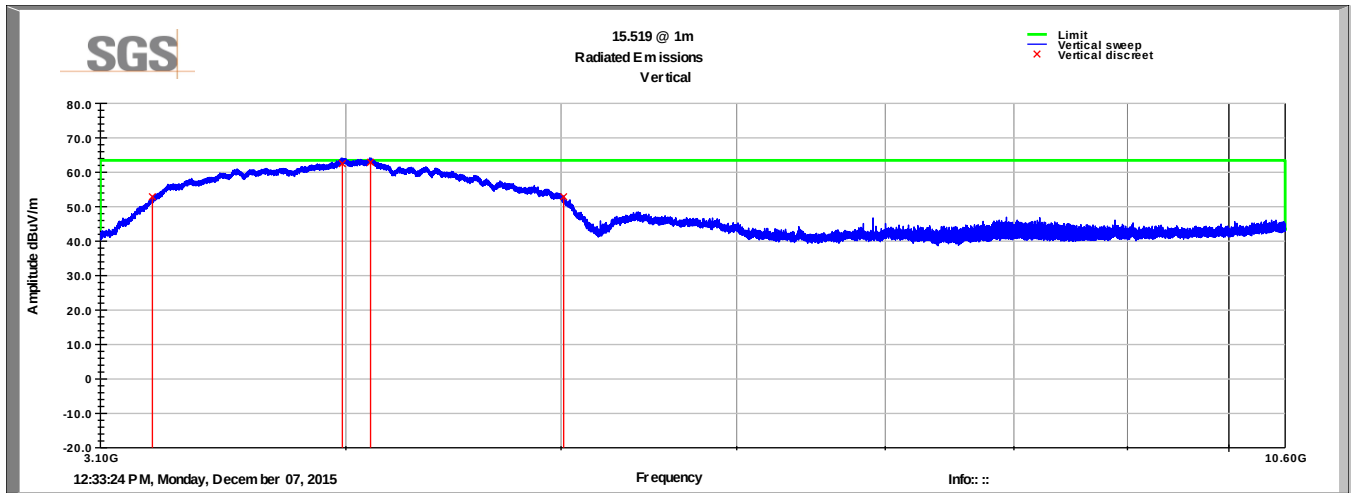


Digital Emissions not related to UWB intentional transmissions

Test Distance: 0.5m

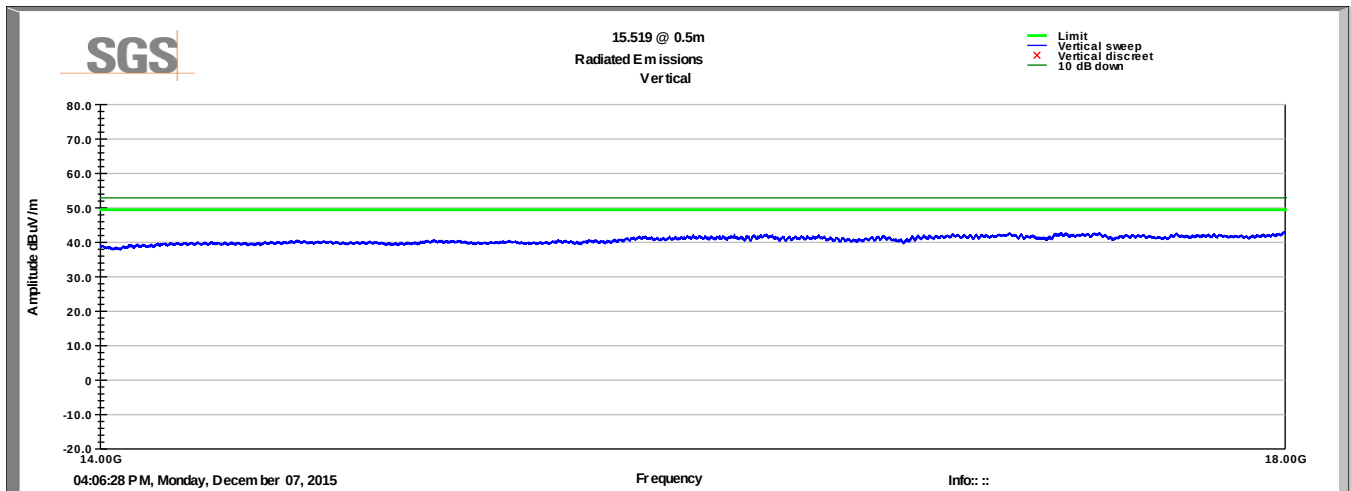
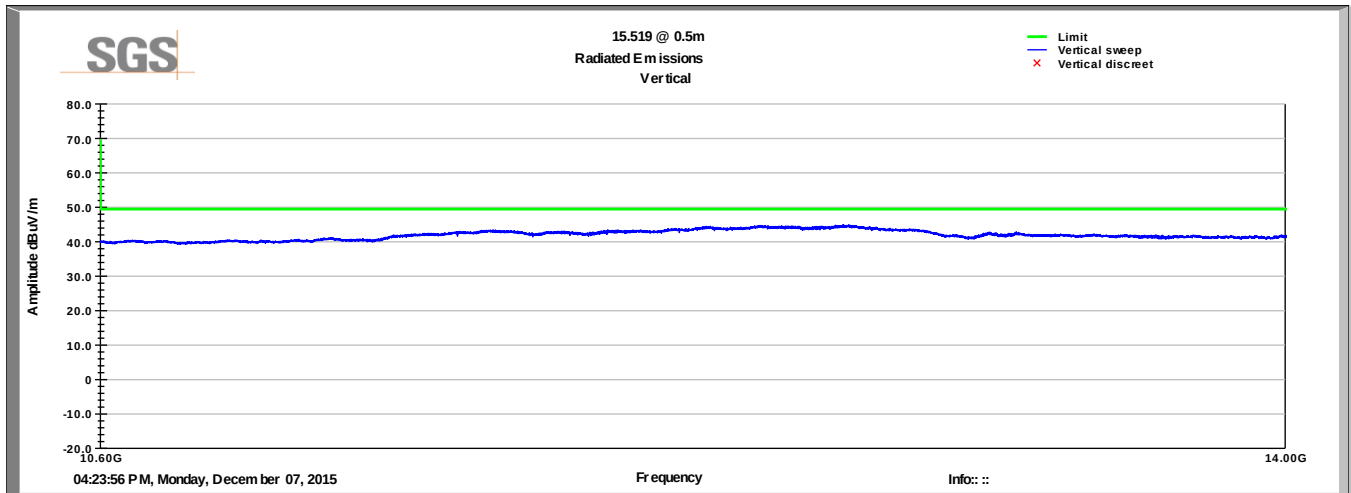
Frequency MHz	Level RMS dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	RMS Value (dBuV/m)	RMS Limit (dBuV/m)	Margin (dB)
3098.20	42.4	V	356.0	172.0	32.8	3.3	33.9	44.7	49.4	-4.7
1322.73	34.3	V	2.3	172.4	29.1	1.4	33.7	31.1	35.4	-4.3
RMS Value = Level + AF + CL - Amp										
Margin = RMS Value - RMS Limit										

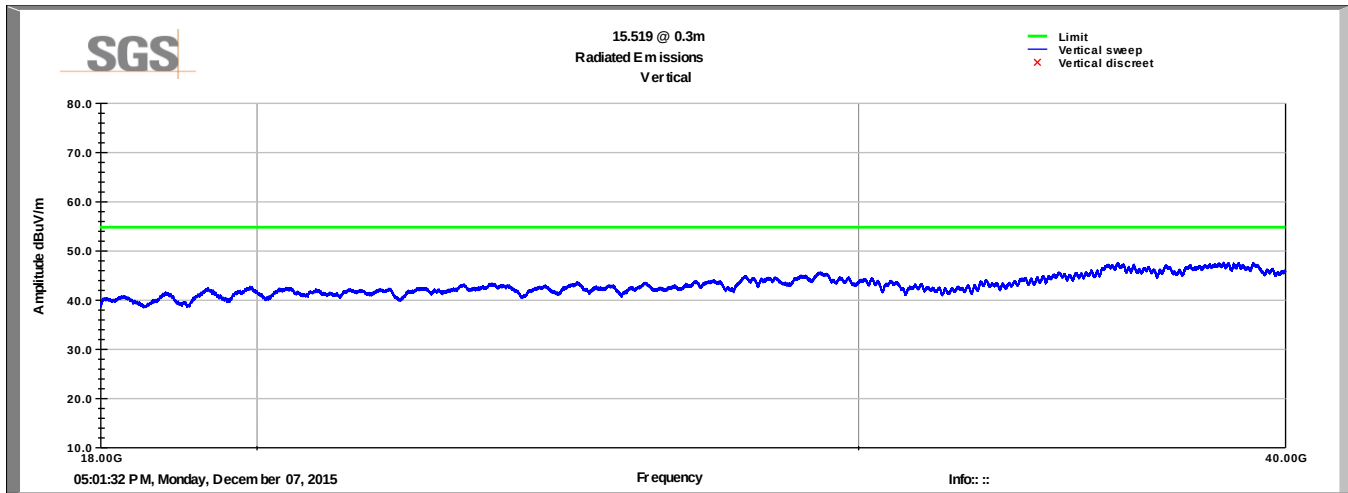
Frequency MHz	Antenna Polarity	Measured RMS value	RMS Limit dBm	Margin dB
3098.2	V	-66.0	-61.3	-4.7
1322.73	V	-79.6	-75.3	-4.3

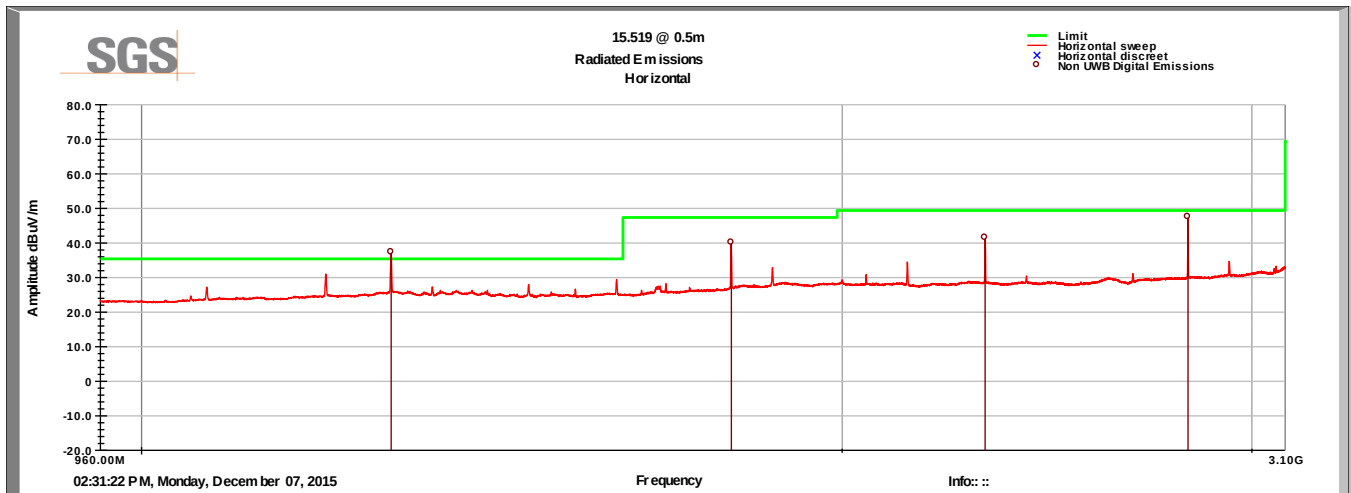


Frequency MHz	Level RMS dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	RMS Value (dBuV/m)	RMS Limit (dBuV/m)	Margin (dB)
3984.97	60.8	V	2.0	176.0	33.5	2.3	34.0	62.5	63.4	-0.9
4102.93	61.1	V	2.0	176.0	33.4	2.4	34.0	62.9	63.4	-0.5
RMS Value = Level + AF + CL - Amp										
Margin = RMS Value - RMS Limit										

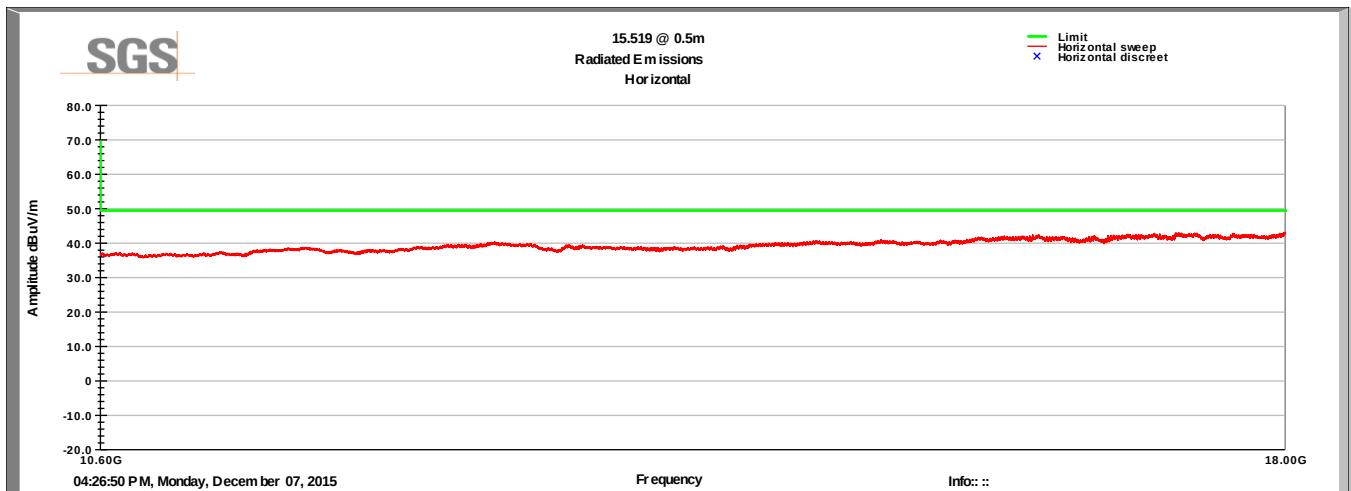
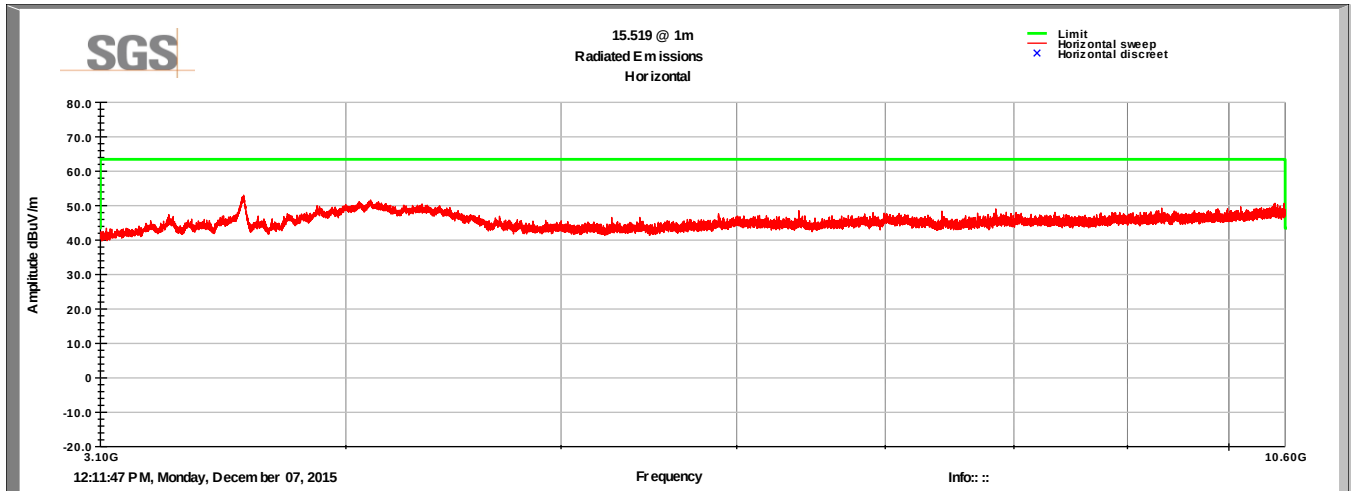
Antenna Polarity	Measured RMS value	RMS Limit dBm	Margin dB
V	-42.2	-41.3	-0.5

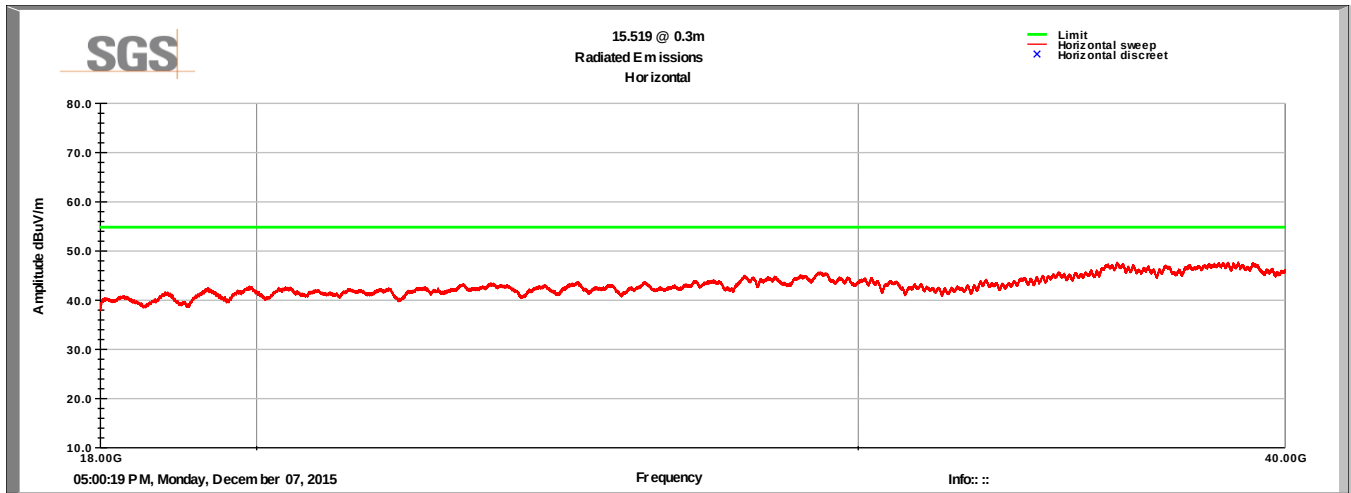






Digital Emissions not related to UWB intentional transmissions





5 Radiated emissions in GPS receive band

5.1 Test Result

Test Description	Reference	Test Result
Radiated emissions in GPS receive band	15.519(d)	Compliant

5.2 Test Method

In addition to the radiated emission limits specified in the table in paragraph (c) of this section, transmitters operating under the provisions of this section shall not exceed the following RMS average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency (MHz)	EIRP dBm	EIRP (dB μ V/m) at 3m	EIRP (dB μ V/m) at 1m
1164–1240	-85.3	9.9	19.4
1559–1610	-85.3	9.9	19.4

5.3 Test Site

3m Absorber Lined Shielded Enclosure, SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.0°C

Relative Humidity: 32 %

5.4 Test Equipment

Test Date: 7-Dec-2015

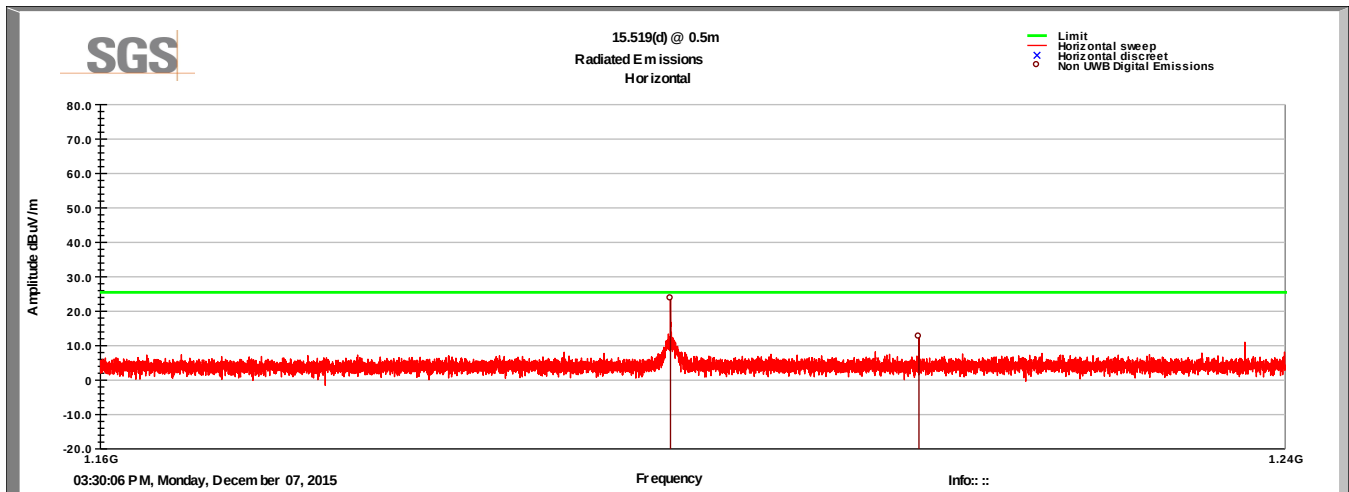
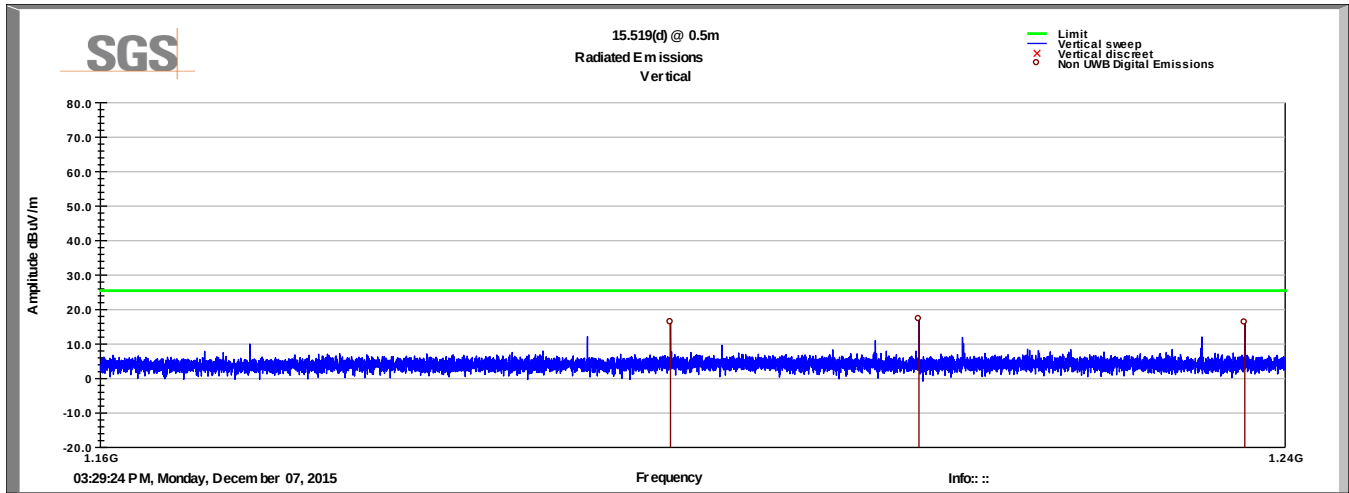
Tester: D Schramm

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079691	9-Jul-2016
PREAMPLIFIER-ANTENNA SYS	TS-PR18	ROHDE & SCHWARZ	15003	24-Aug-2016
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	4-Aug-2016
TYPE N CABLE	104PE	HUBER&SUHNER	B079793	4-Aug-2016
FILTER	LPM17270	MICRO-TRONICS	B093646	5-Aug-2016

Note: The calibration period equipment is 1 year.

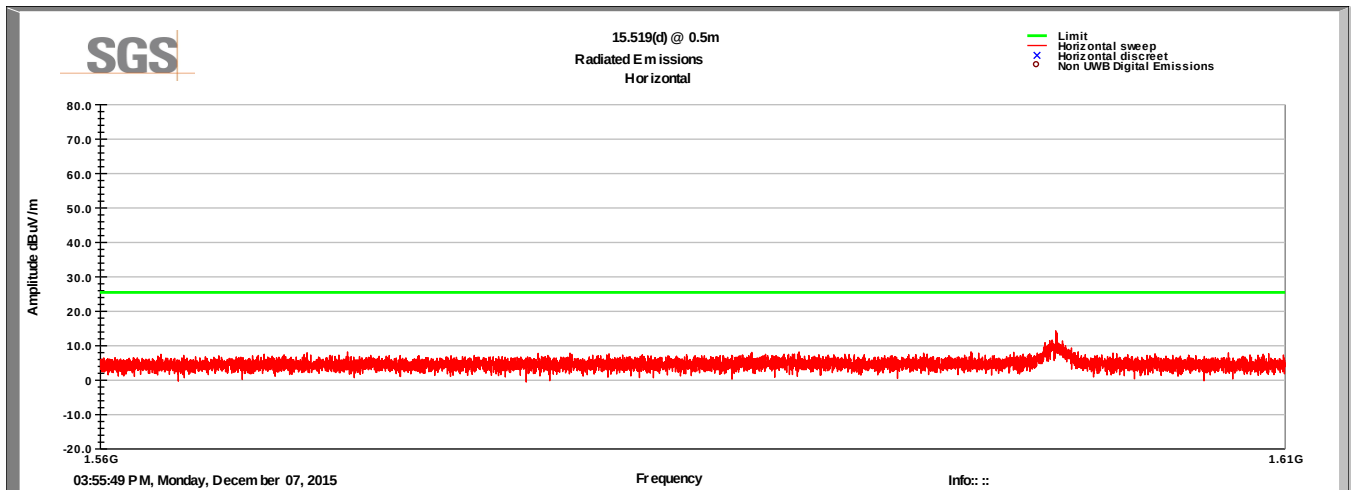
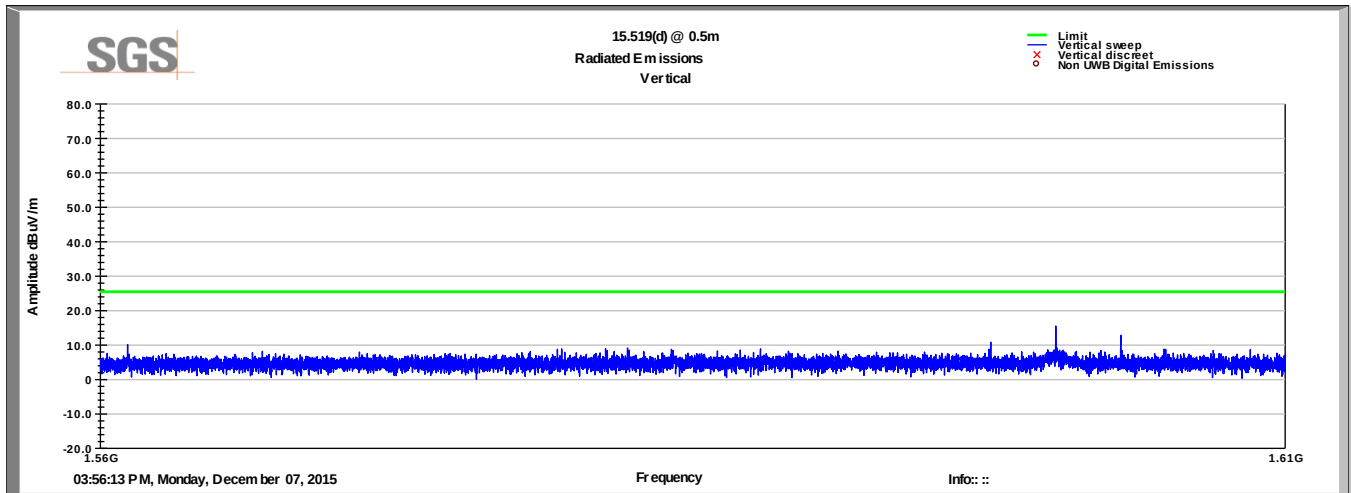
5.5 Test Data

Radiated Emissions in lower GPS Receive Band



Digital Emissions not related to UWB intentional transmissions

Plot: Radiated Emissions in upper GPS Receive Band



Data: Radiated Emissions in GPS Receive Bands

Upper

Frequency MHz	Level dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	RMS Value dBuV/m	Limit (dBuV/m)	Margin dB
1583.65	15.6	V	107.0	100.0	29.2	2.5	40.4	6.9	19.4	-12.6

Frequency MHz	RMS Value dBm	Limit (dBm)	Margin dB
1583.65	-97.9	-85.3	-12.6

Frequency MHz	Raw RMS dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	RMS Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1583.65	18.2	H	283.0	125.0	29.2	2.5	40.4	9.5	19.4	-9.9

Frequency MHz	RMS Value dBm	Limit (dBm)	Margin dB
1583.65	-95.2	-85.3	-9.9

6 Peak Power within a 50 MHz bandwidth

6.1 Test Result

Test Description	Basic Standards	Test Result
Peak Power in a 50 MHz Bandwidth	15.519(e)	Compliant

6.2 Test Method

- 1) There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs and this 50 MHz bandwidth must be contained within the 3100–10600 MHz band.
- 2) The peak EIRP limit is $20 \log (RBW/50)$ dBm where RBW is the resolution bandwidth in megahertz that is employed by the measurement instrument. RBW shall not be lower than 1 MHz or greater than 50 MHz. The video bandwidth of the measurement instrument shall not be less than RBW.
- 3) If RBW is greater than 3 MHz, the application for certification filed with the Commission shall contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed in the testing.

Limits

Frequency (MHz)	EIRP in 50 MHz BW dBm	EIRP in 50 MHz BW (dB μ V/m) at 3m	EIRP in 50 MHz BW (dB μ V/m) at .5m
3100 - 10600	0	95.2	104.7

Limits converted to 1 MHz RBW

Frequency (MHz)	EIRP in 1 MHz BW dBm	EIRP in 1 MHz BW (dB μ V/m) at 3m	EIRP in 50 MHz BW (dB μ V/m) at .5m
3100 - 10600	-34	61.2	80.3

6.3 Test Site

3m Absorber Lined Shielded Enclosure, SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.8°C
Relative Humidity: 31 %

6.4 Test Equipment

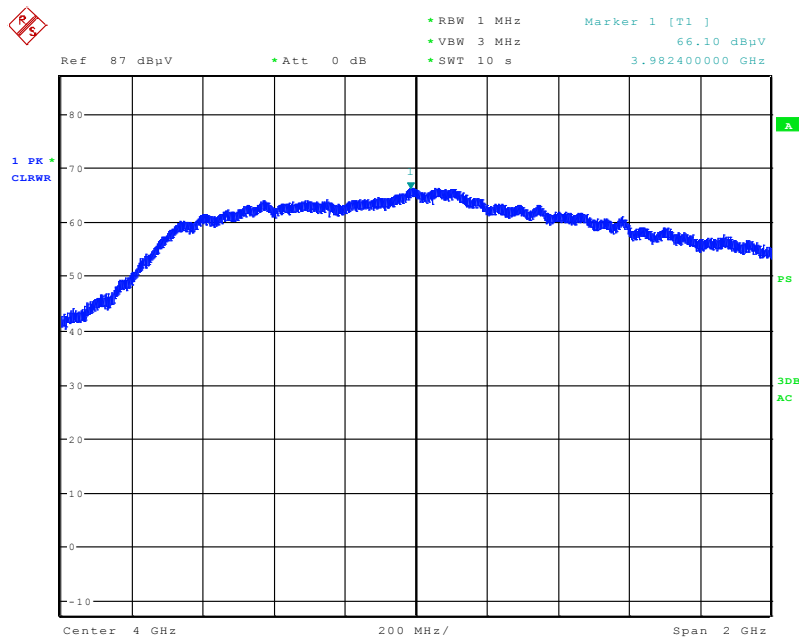
Test Date: 7-Dec-2015

Tester: D Schramm

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079691	9-Jul-2016
PREAMPLIFIER-ANTENNA SYS	TS-PR18	ROHDE & SCHWARZ	15003	24-Aug-2016
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	4-Aug-2016
TYPE N CABLE	104PE	HUBER&SUHNER	B079793	4-Aug-2016

Note: The calibration period for this equipment is 1 year.

6.5 Test Data



Frequency MHz	Level Peak dBμV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	FStoERP Correction @1m	Bandwidth Correction 1/50 MHz	Peak Value dBm	Peak Limit dBm	Margin dB
3982.40	66.1	V	3.5	176.0	33.5	2.3	34.0	-104.8	34.0	-2.9	0.0	-2.9
Peak Value = Level + AF + CL - Amp + FStoERP + Bandwidth												
Margin = Peak Value - Peak Limit												

7 Radiated emissions below 960 MHz

7.1 Test Result

Test Description	Basic Standards	Test Result
Radiated Emissions	FCC Part 15.517(c) and 15.209	Compliant

7.2 Test Method

The initial scans were performed over the frequency range as indicated in the tables below using the max hold function and incorporating a Peak detector and using TILE! software. The final test data was measured using a Quasi-Peak detector. The receiver's resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency. The radiated measurements were recorded and compared to the limits indicated in the table below.

Radiated emissions limit below 1 GHz		
Frequency Range(MHz)	Limit(QP dBμV/m)	Distance
30 – 88	40	3m
88 – 216	43.5	3m
216 – 960	46	3m

7.3 Test Site

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions

Temperature: 22.2°C

Relative Humidity: 30.5 %

7.4 Test Equipment

Test Date: 8-Dec-2015

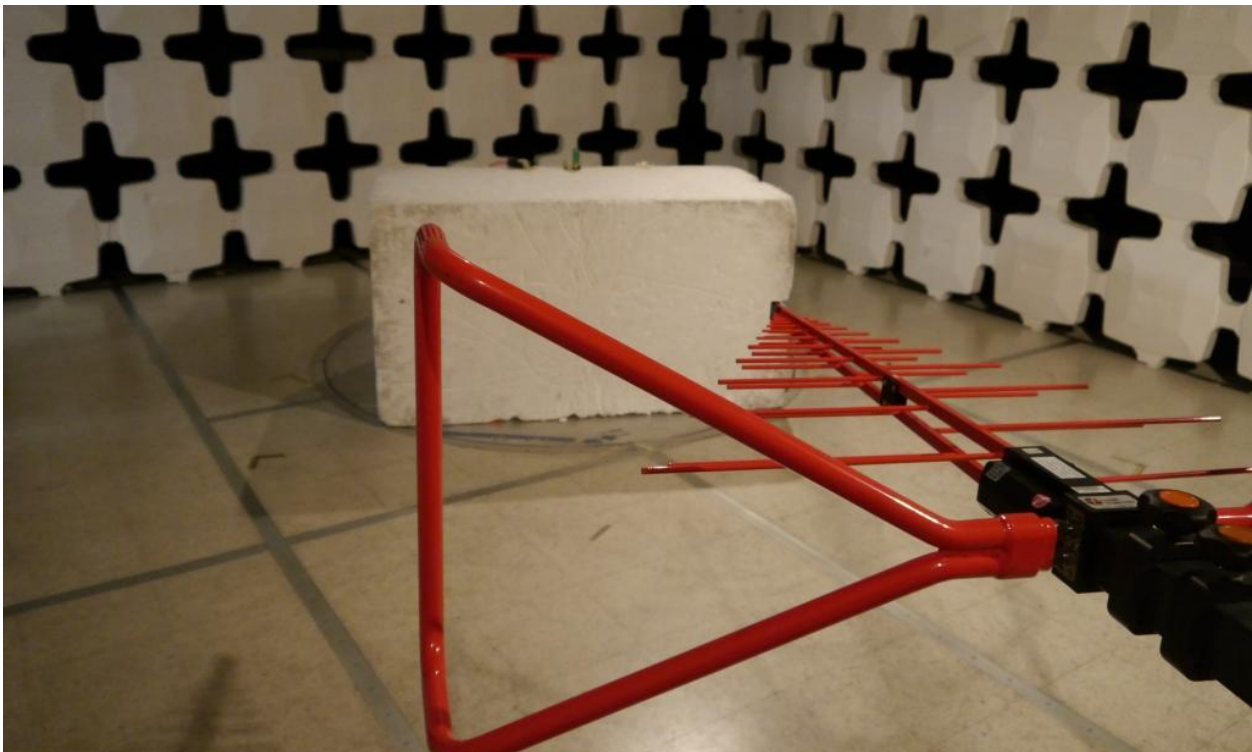
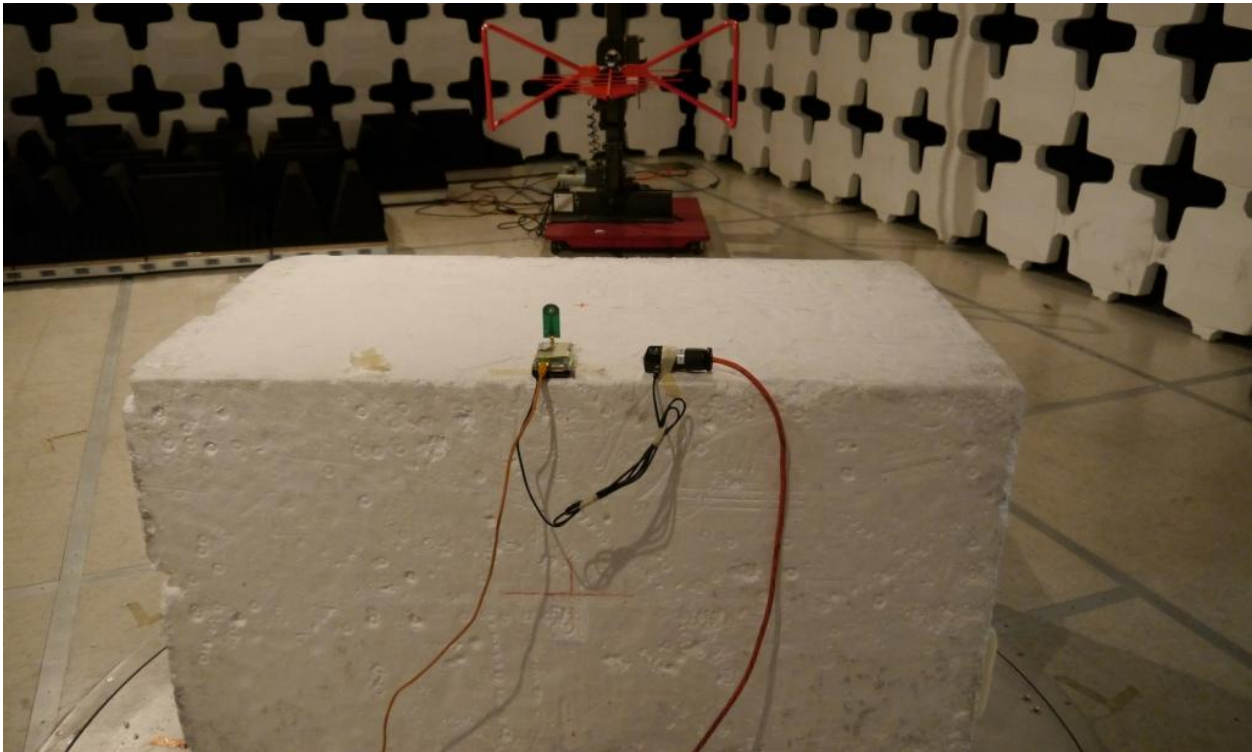
Tester: FN

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
ANTENNA, BILOG	JB6	SUNOL	B079689	11-Sep-2016
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	4-Aug-2016
RF CABLE	NFS-290-78.7-NFS	FLORIDA RF LABS	B095019	4-Aug-2016
RF CABLE - 7000MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079716	3-Aug-2016
TYPE N CABLE	104PE	HUBER&SUHNER	B079793	4-Aug-2016
PREAMPLIFIER-ANTENNA SYS	TS-PR18	ROHDE & SCHWARZ	15003	24-Aug-2016

Note: The calibration period equipment is 1 year.

Software: "Radiated Emissions" TILE! profile dated 29 Jun 2014

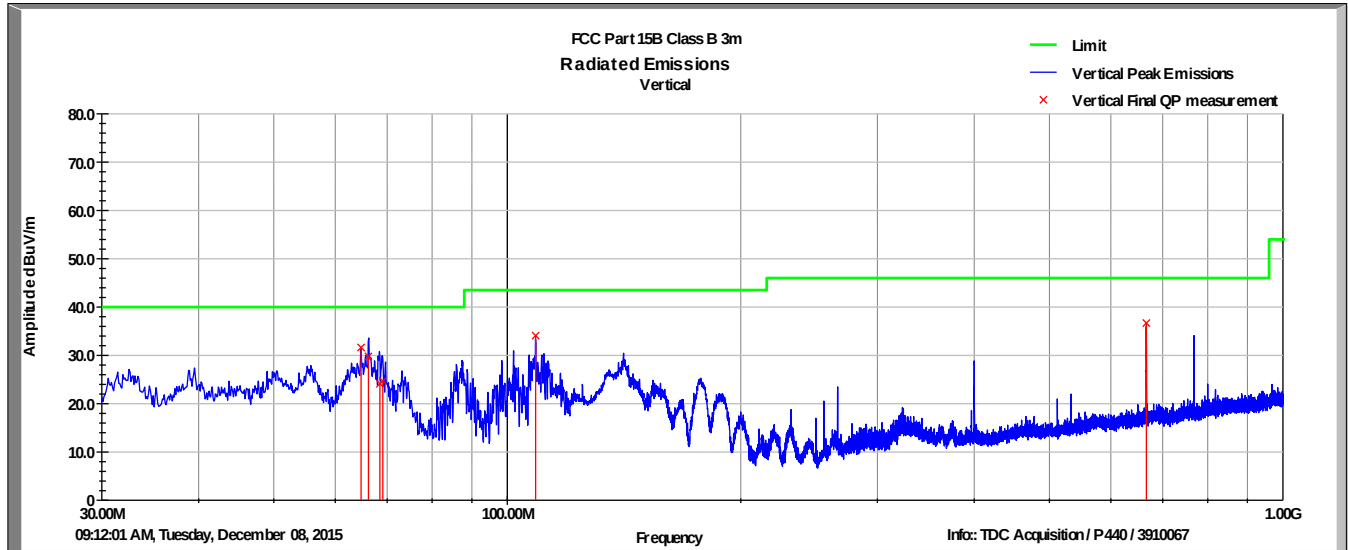
7.5 Test Setup Photographs



7.6 Test Data

Operator: Fabian Nica

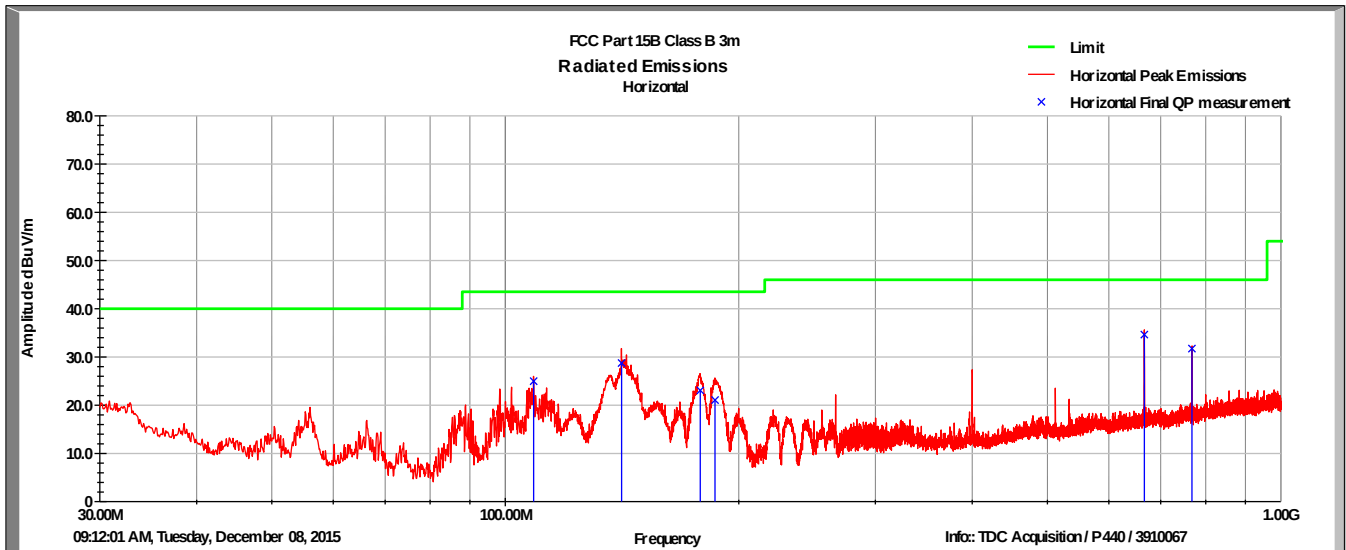
Vertical Radiated Emissions Plot EUT on TX-OFF



Vertical Radiated Emissions Data EUT on TX-OFF

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
64.78	56.1	V	294.0	100.0	8.0	0.6	33.1	31.6	40.0	-8.4
66.21	54.2	V	271.0	100.0	8.1	0.6	33.2	29.8	40.0	-10.2
68.50	48.6	V	262.0	195.0	8.2	0.6	33.4	24.1	40.0	-15.9
69.11	49.2	V	240.0	110.0	8.2	0.6	33.4	24.7	40.0	-15.3
108.77	54.8	V	154.0	100.0	12.7	0.8	34.2	34.1	43.5	-9.4
666.67	47.4	V	173.0	157.0	20.8	2.0	33.7	36.7	46.0	-9.3
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

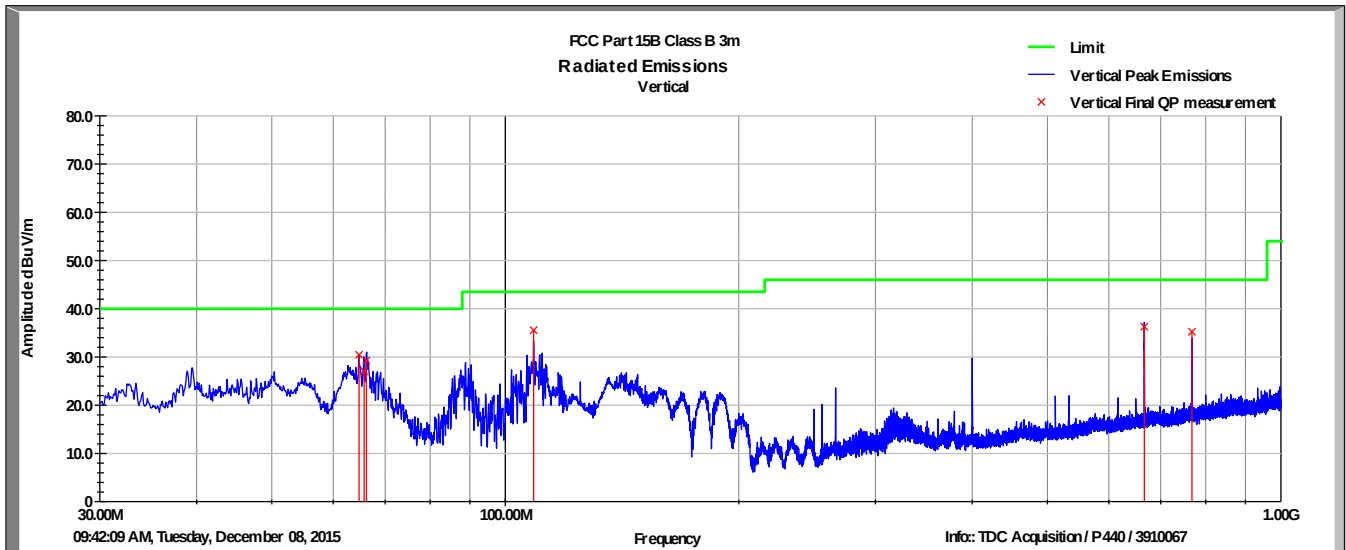
Horizontal Radiated Emissions Plot EUT on TX-OFF



Horizontal Radiated Emissions Data EUT on TX-OFF

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
108.77	45.6	H	221.0	289.0	12.7	0.8	34.2	25.0	43.5	-18.5
141.23	49.0	H	340.0	224.0	13.2	0.9	34.4	28.7	43.5	-14.8
178.39	44.3	H	182.0	128.0	11.6	1.0	33.9	23.0	43.5	-20.5
186.39	42.5	H	184.0	166.0	11.4	1.0	33.9	21.0	43.5	-22.5
666.67	45.4	H	295.0	138.0	20.8	2.0	33.7	34.6	46.0	-11.4
768.00	41.4	H	65.0	186.0	21.7	2.1	33.7	31.7	46.0	-14.3
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

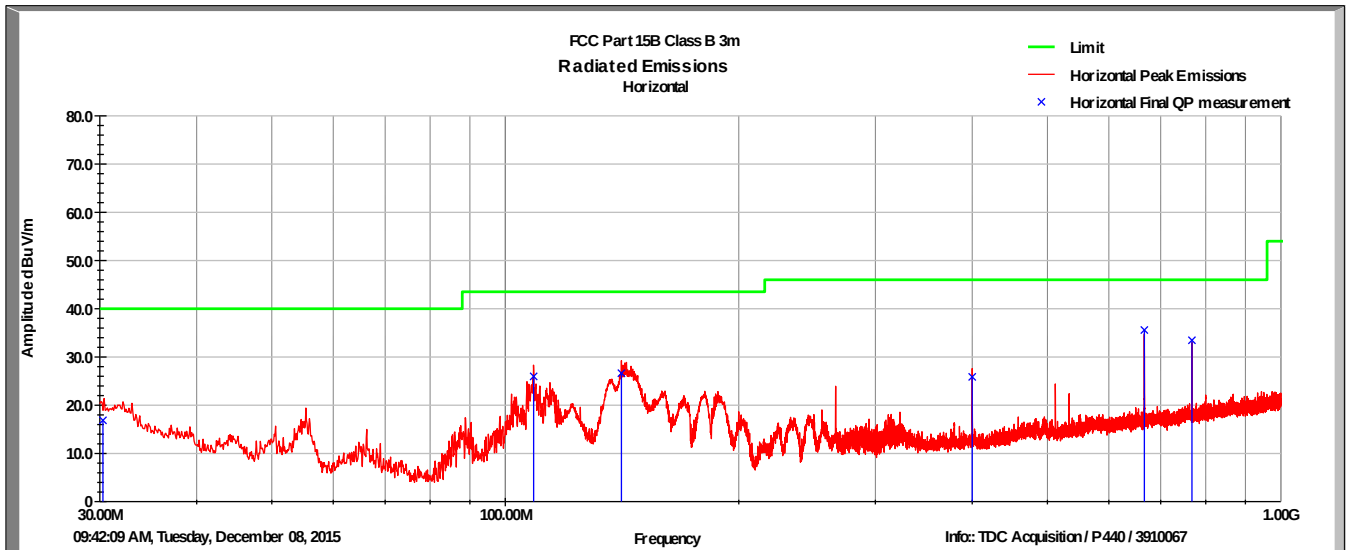
Vertical Radiated Emissions Plot EUT on TX-ON



Vertical Radiated Emissions Data EUT on TX-ON

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
64.78	54.9	V	293.0	100.0	8.0	0.6	33.1	30.4	40.0	-9.6
65.76	51.5	V	290.0	109.0	8.1	0.6	33.2	27.1	40.0	-12.9
66.21	53.7	V	256.0	111.0	8.1	0.6	33.2	29.2	40.0	-10.8
108.77	56.2	V	203.0	100.0	12.7	0.8	34.2	35.5	43.5	-8.0
666.67	47.0	V	202.0	100.0	20.8	2.0	33.7	36.3	46.0	-9.7
768.00	44.9	V	317.0	155.0	21.7	2.1	33.7	35.2	46.0	-10.8
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

Horizontal Radiated Emissions Plot EUT on TX-ON



Horizontal Radiated Emissions Data EUT on TX-ON

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.28	26.7	H	325.0	250.0	22.0	0.4	32.2	16.9	40.0	-23.1
108.77	46.6	H	25.0	278.0	12.7	0.8	34.2	26.0	43.5	-17.5
141.17	46.9	H	357.0	259.0	13.2	0.9	34.4	26.6	43.5	-16.9
400.00	41.5	H	206.0	334.0	16.5	1.5	33.8	25.8	46.0	-20.2
666.67	46.3	H	117.0	260.0	20.8	2.0	33.7	35.6	46.0	-10.4
768.00	43.1	H	71.0	196.0	21.7	2.1	33.7	33.4	46.0	-12.6
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

8 Conducted Emissions

8.1 Test Result

Test Description	Basic Standards	Test Result
Conducted Emissions, Class B	FCC Part 15, Subpart B	Compliant

8.2 Test Method

With the receiver's resolution bandwidth set to 9 kHz the initial preliminary exploratory scans were performed over the measuring frequency range (0.15MHz to 30MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

Frequency Range	Class A Limits (dBuV)	Class B Limits (dBuV)
0.15 to 0.5 MHz	Avg 66 QP 79	Avg 56 to 46 QP 66 to 56
0.5 to 5 MHz	Avg 60 QP 73	Avg 46 Pk 56
5 to 30 MHz	Avg 60 QP 73	Avg 50 Pk 60

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.2°C

Relative Humidity: 30.1%

8.4 Test Equipment

Test Date: 8-Dec-2015

Tester: FN

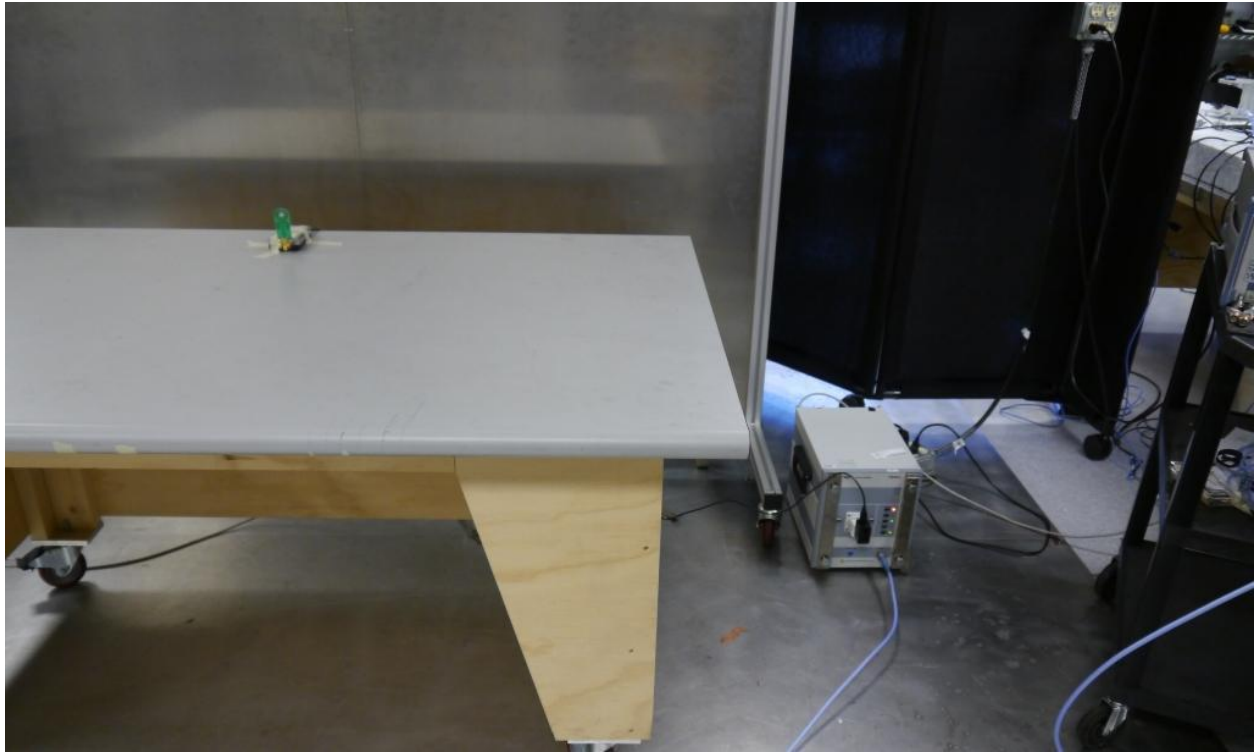
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
RF CABLE - 7000MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079716	3-Aug-2016
TWO-LINE V-NETWORK	NNB 51	TESEQ	B087573	12-Nov-2016

Note: The calibration period equipment is 1 year.

Software:

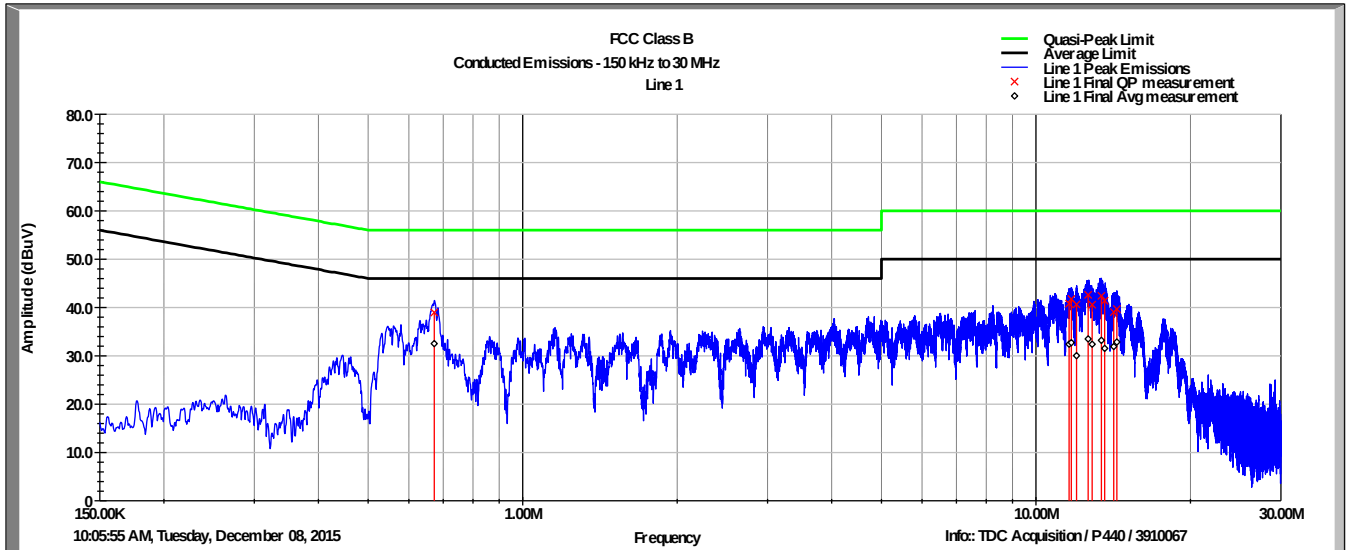
"Conducted Emissions" TILE! profile dated 6 Mar 2013

8.5 Test Setup Photographs



8.6 Test Data

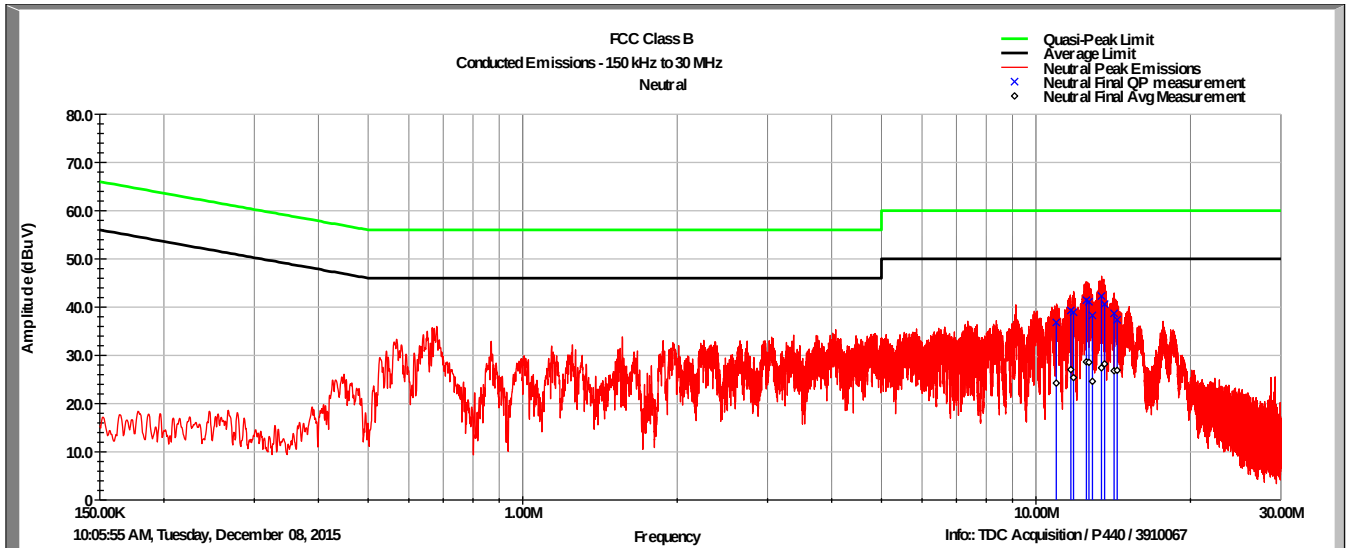
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.672	39.0	56.0	-17.0	32.5	46.0	-13.5
11.601	40.8	60.0	-19.2	32.4	50.0	-17.6
11.718	41.8	60.0	-18.2	32.7	50.0	-17.3
11.993	40.6	60.0	-19.4	30.0	50.0	-20.0
12.636	42.6	60.0	-17.4	33.5	50.0	-16.5
12.868	40.6	60.0	-19.4	32.4	50.0	-17.6
13.409	42.4	60.0	-17.6	33.2	50.0	-16.8
13.613	41.4	60.0	-18.6	31.5	50.0	-18.5
14.175	39.0	60.0	-21.0	31.9	50.0	-18.1
14.378	39.7	60.0	-20.3	32.8	50.0	-17.2

Neutral Conducted Emissions Plot



Neutral Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
10.952	36.8	60.0	-23.2	24.2	50.0	-25.8
11.694	39.3	60.0	-20.7	27.0	50.0	-23.0
11.833	38.9	60.0	-21.1	25.4	50.0	-24.6
12.539	41.4	60.0	-18.6	28.7	50.0	-21.3
12.685	41.1	60.0	-18.9	28.5	50.0	-21.5
12.879	38.3	60.0	-21.7	24.6	50.0	-25.4
13.417	42.3	60.0	-17.7	27.4	50.0	-22.6
13.603	40.6	60.0	-19.4	28.2	50.0	-21.8
14.195	38.7	60.0	-21.3	26.8	50.0	-23.2
14.396	37.4	60.0	-22.6	26.9	50.0	-23.1

9 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	8 December 2015
1	Added FCC ID Added reference to ANSI C63.10:2013.	19 January 2016