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CERTIFICATION TEST REPORT

Manufacturer: Embedded Planet
4760 Richmond Road, Suite 400
Cleveland, Ohio 44128 USA

Applicant: Same As Above

Product Name: Radio Module

Product Description: The EPM2M-LORA-DC-8-NA Radio Module is a LoRa Data Collector Radio for use in LoRaWAN packet forwarding gateways. The radio module is based on the Semtech SX1301 Base Band Processor and the SX1257 Radio Transceiver. Both SPI and USB interfaces are provided for easy interfacing to processor based systems. The module acts as a data collector of LoRa packets received from remote radio modules. This module also transmits data to remote radio modules allowing for two-way control of remote devices. The radio module nominally operates in the 915MHz ISM band in uplink and downlink paths.

Model: EPM2M-LORA-DC-8-NA

FCC ID: PZSLORA-DC-8

Testing Commenced: Mar. 31, 2016

Testing Ended: Apr. 1, 2016

Summary of Test Results: In Compliance

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Standards:

- **FCC Part 15 Subpart C, Section 15.247**
- **FCC15.207 - Conducted Limits**
- **FCC Part 15.31(e)**
- **ANSI C63.10:2013**



Order Number: F2LQ8292

Client: Embedded Planet
Model: EPM2M-LORA-DC-8-NA

Evaluation Conducted by:

Julius Chiller, EMC/Wireless Eng.
for Joe Knepper, EMC Proj. Eng.

Report Reviewed by:

Ken Littell, Director of EMC & Wireless Operations

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of DTS equipment operating under Section 15.247 and in KDB558074. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data, and are expressed with a 95% confidence factor. Note: Only measurements listed below which relate to tests included in this Test Report are applicable to it.

Measurement Range	Expanded Uncertainty	Combined Uncertainty
Radiated Emissions <1 GHz @ 3m	±5.07dB	±2.54
Radiated Emissions <1 GHz @ 10m	±5.09dB	±2.55
Radiated Emissions 1 GHz to 2.7 GHz	±3.62dB	±1.81
Radiated Emissions 2.7 GHz to 18 GHz	±3.10dB	±1.55
AC Power Line Conducted Emissions, 150kHz to 30 MHz	±2.76dB	±1.38

This Uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2LQ8292-01E	First Issue	Apr. 4, 2016	K. Littell

**2 SUMMARY OF TEST RESULTS**

Test Name	Standard(s)	Results
99% Occupied Bandwidth	CFR 47 Part 15.247(a)(2) / KDB558074	Complies
Conducted Output Power	CFR 47 Part 15.247(b)(3) / KDB558074	Complies
Voltage Variations	CFR 47 Part 15.31(e)	Complies
Conducted Spurious Emissions	CFR 47 Part 15.247(d) / Part 15.207 / KDB558074	Complies
Radiated Spurious Emission with 1.2dBi Integral Antenna	CFR 47 Part 15.247(d) / Part 15.209 / KDB558074	Complies
Peak Power Spectral Density	CFR 47 Part 15.247(e) / KDB558074	Complies
Conducted Emissions	CFR 47 Part 15.207(a)	Complies

Modifications Made to the Equipment
None



3 TABLE OF MEASURED RESULTS

Test	Low Channel 923.3 MHz	Mid Channel 925.1 MHz	High Channel 927.5 MHz
99% Occupied Bandwidth	502.8	502.8	502.4
Limit	>500kHz	>500kHz	>500kHz
Conducted Output Power	255.3mW 24.07dBm	205.12mW 23.12dBm	216.77mW 23.36dBm
Limit	1W 30dBm	1W 30dBm	1W 30dBm
E.I.R.P. with 1.2dBi antenna	336.5mW	270.4mW	285.75mW
Limit	4W	4W	4W

**To meet the requirements of 15.31, voltage was varied by $\pm 15\%$ of the nominal voltage. All tests were then performed at the highest output power voltage setting.*



4 ENGINEERING STATEMENT

This report has been prepared on behalf of Embedded Planet to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.247 of the FCC Rules using ANSI C63.10 2013 and KDB558074 standards. The test results found in this test report relate only to the items tested.



5 EUT INFORMATION AND DATA

5.1 Equipment Under Test:

Product: Radio Module
Model: EPM2M-LORA-DC-8-NA
Serial No.: None Spec.
FCC ID: PZSLORA-DC-8

5.2 Trade Name:

Embedded Planet

5.3 Power Supply:

AC/DC Supply-Globtek GT21089-1305-T3

5.4 Applicable Rules:

CFR 47, Part 15.247, subpart C

5.5 Equipment Category:

Radio Transmitter-DTS

5.6 Antenna:

1.2dBi Integral antenna

5.7 Accessories:

N/A

5.8 Test Item Condition:

The equipment to be tested was received in good condition.

5.9 Testing Algorithm:

EUT was operated in a test mode at low (923.3 MHz), mid (925.1 MHz) and High (927.5 MHz) frequencies at constant transmission.

**6 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166	AlbatrossProjects	B83117-DF435-T261	US140023	Apr. 30, 2016
Spectrum Analyzer	CL147	Agilent	E7402A	MY45101241	Dec. 3, 2016
Temp/Hum. Recorder	CL137	Extech	RH520	CH16992	May 7, 2016
Receiver	CL151	Rohde & Schwarz	ESU40	100319	Nov. 25, 2016
Receiver	0105	Sunol Sciences	JB1	A101101	July 13, 2017
Horn Antenna	CL098	Emco	3115	9809-5580	Dec. 10, 2016
Amplifier w/Monopole & 18" Loop	CL163	A.H. Systems, Inc.	EHA-52B	100	Apr. 20, 2016
Software:	Tile Version 1.0 Software Verified: Mar. 24 & 28, 2016				
Software:	EMC 32, Version 5.20.2 Software Verified: Mar. 24, 2016				
Spectrum Analyzer	CL138	Agilent Technologies	E4407B	US41192779	Nov. 13, 2016
Temp/Hum. Rec.	CL119	Extech	RH520	H005869	Jan. 29, 2017
Spectrum Analyzer	0141	Hewlett Packard	8591E	3520A04145	Feb. 1, 2017
Transient Limiter	CL102	Hewlett Packard	11947A	3107A03325	Feb. 1, 2017
LISN	CL181	Com-Power	LI-125A	191226	June 24, 2016
LISN	CL182	Com-Power	LI-125A	191225	June 24, 2016



7 FCC PART 15.247(a)(2) – OCCUPIED BANDWIDTH

7.1 Requirements:

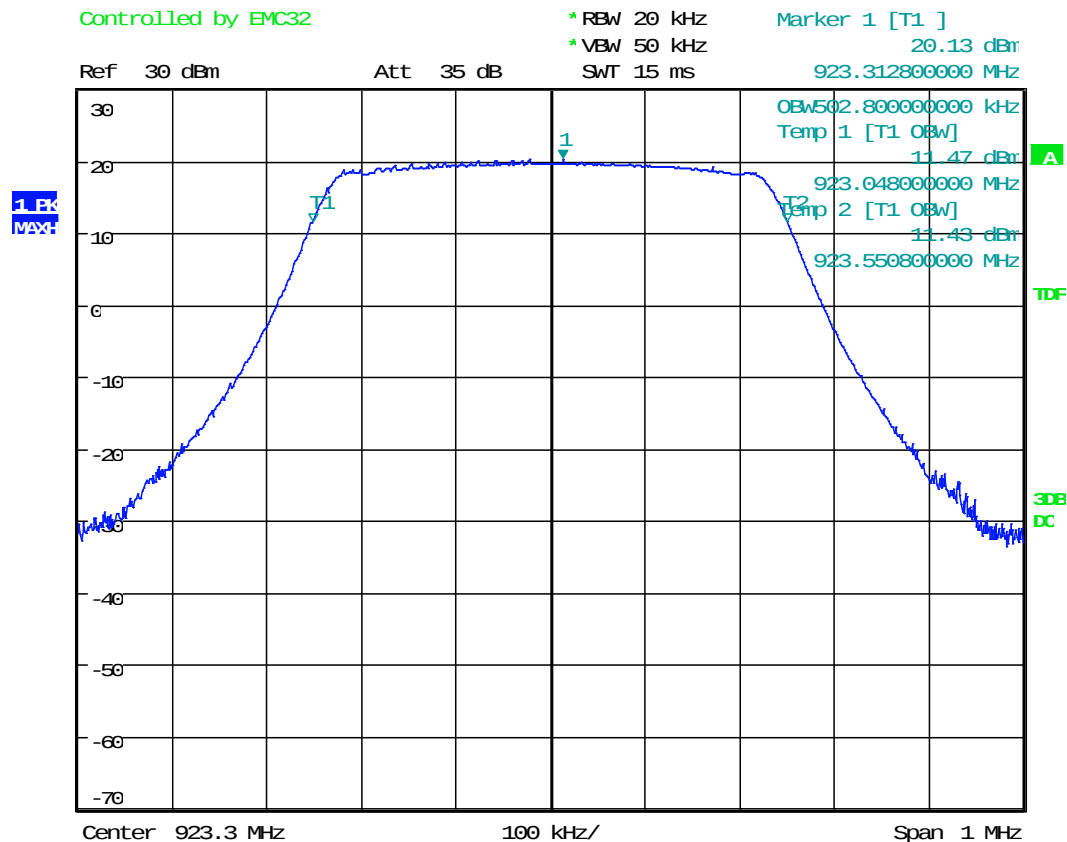
Bandwidth measurements were made at the low (923.3 MHz), mid (925.1 MHz) and upper (927.5 MHz) frequencies. The bandwidth was measured using the analyzer's marker function.



7.2 Occupied Bandwidth Test Data

Test Date:	Mar. 31, 2016	Test Engineer:	J. Knepper
Standards:	CFR 47 Part 15.247(a)(2); KDB558074	Air Temperature:	21.2°C
		Relative Humidity:	42%

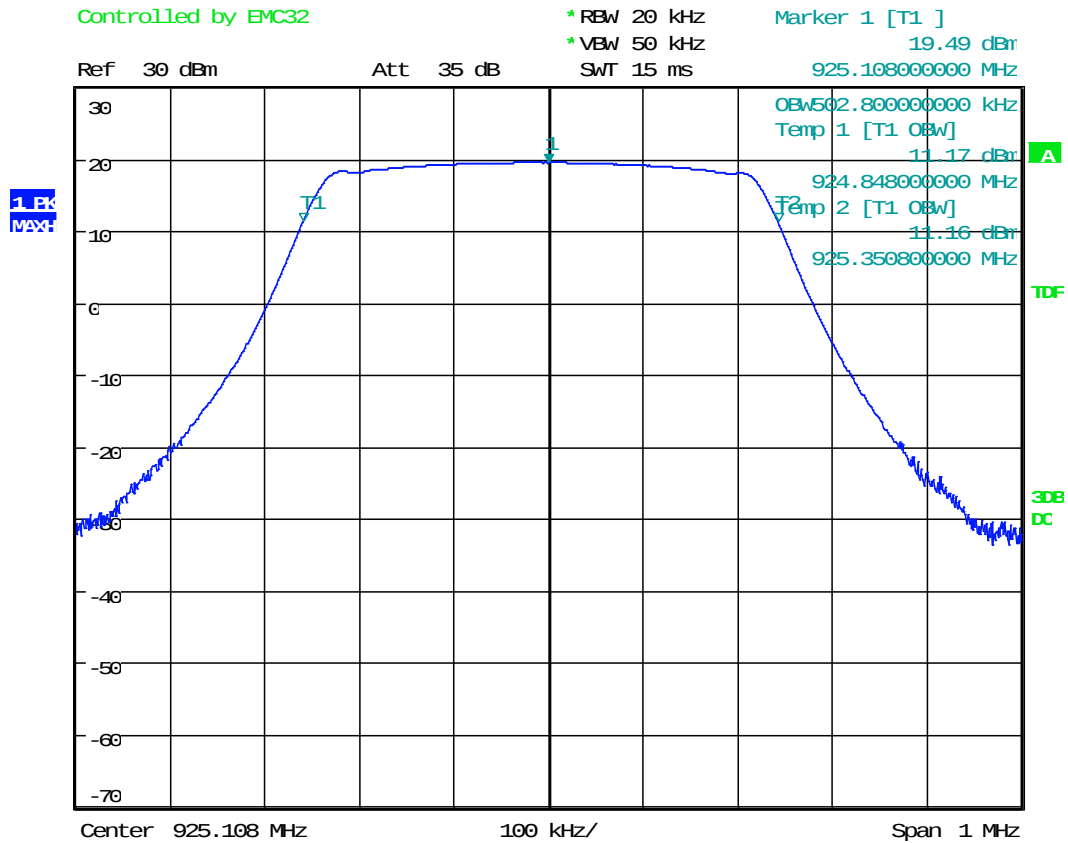
Low Channel



Date: 31.MAR.2016 13:35:26



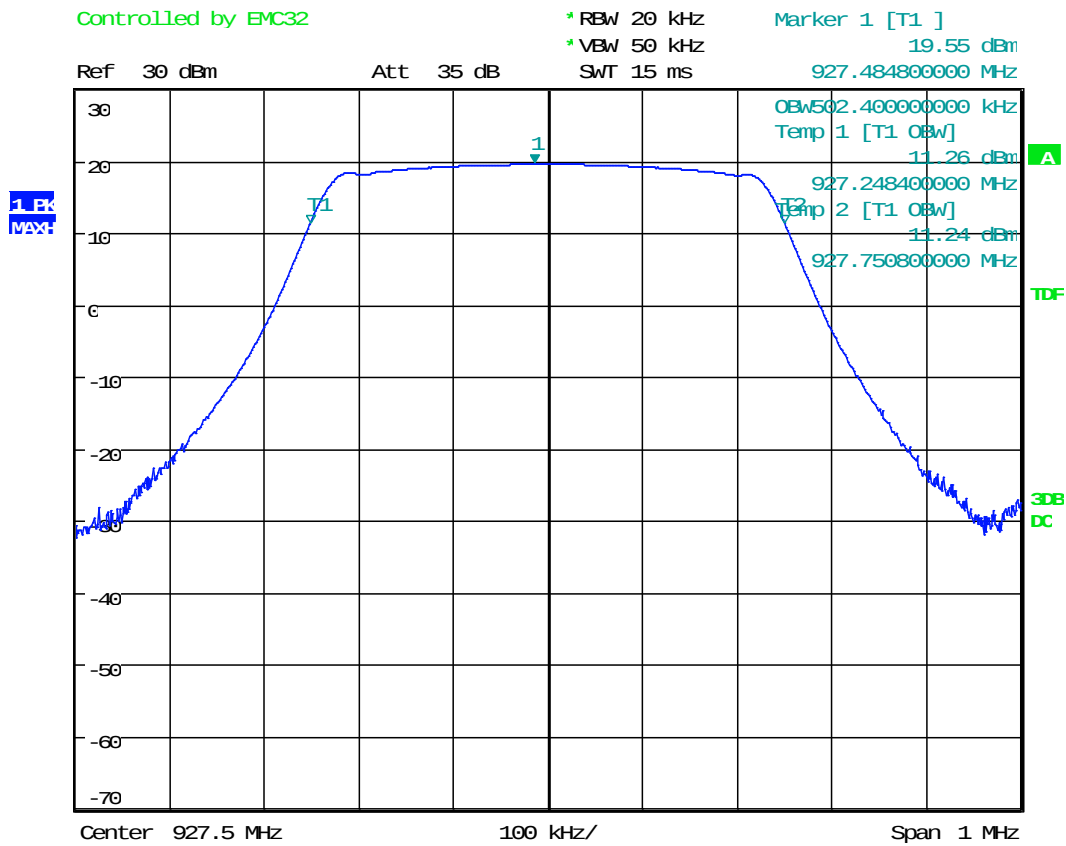
Mid Channel



Date: 31.MAR.2016 13:32:39



High Channel



Date: 31.MAR.2016 13:34:08



8 FCC PART 15.247(b)(3) – CONDUCTED OUTPUT POWER

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the receiver. The peak power output was measured.

8.1 Requirements:

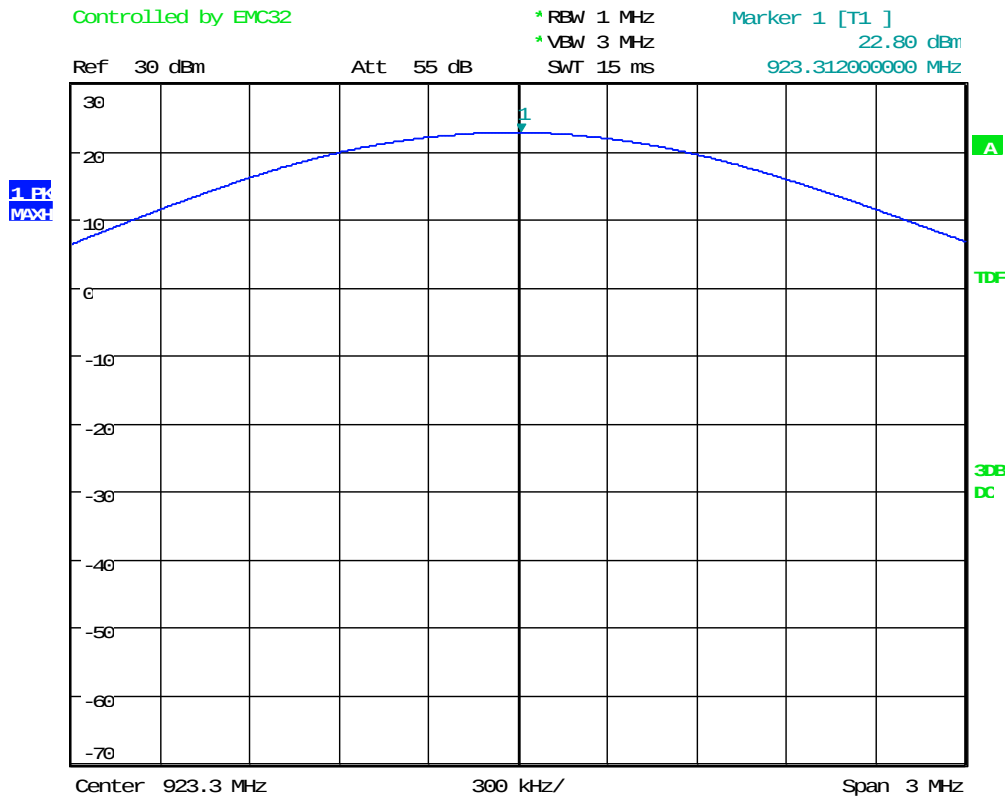
The peak power output shall be 1 watt (30 dBm) or less when using an antenna with a gain of less than 6dBi. For antennas having a gain of more than 6dBi, the limit is reduced by 1dB for every dB the antenna gain is over 6dBi.



8.2 Conducted Output Power Test Data

Test Date:	Mar. 31, 2016	Test Engineer:	J. Knepper
Standards:	CFR 47 Part 15.247(b)(3); KDB558074	Air Temperature:	21.2°C
		Relative Humidity:	42%

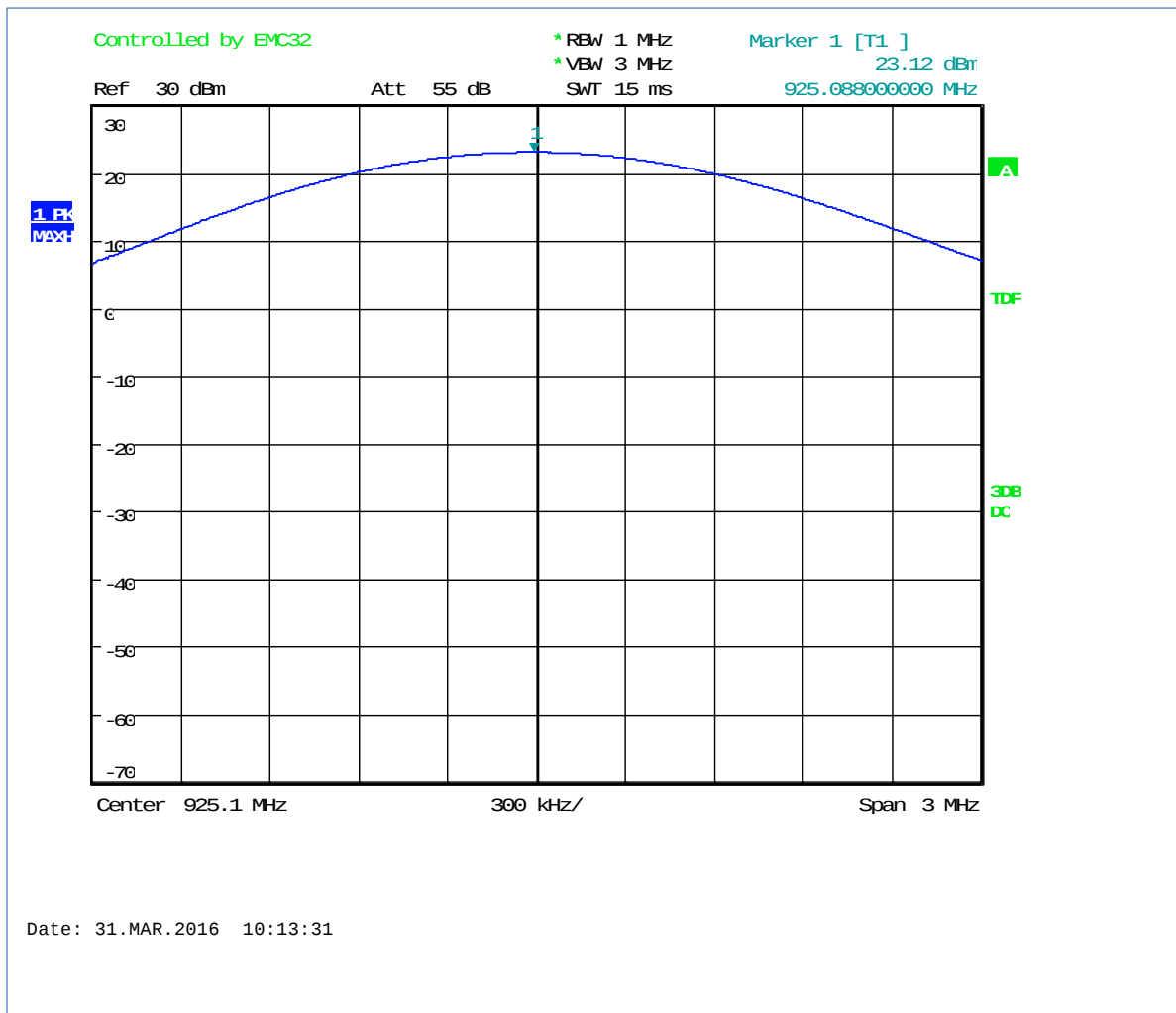
Low Channel



Date: 31.MAR.2016 10:01:57

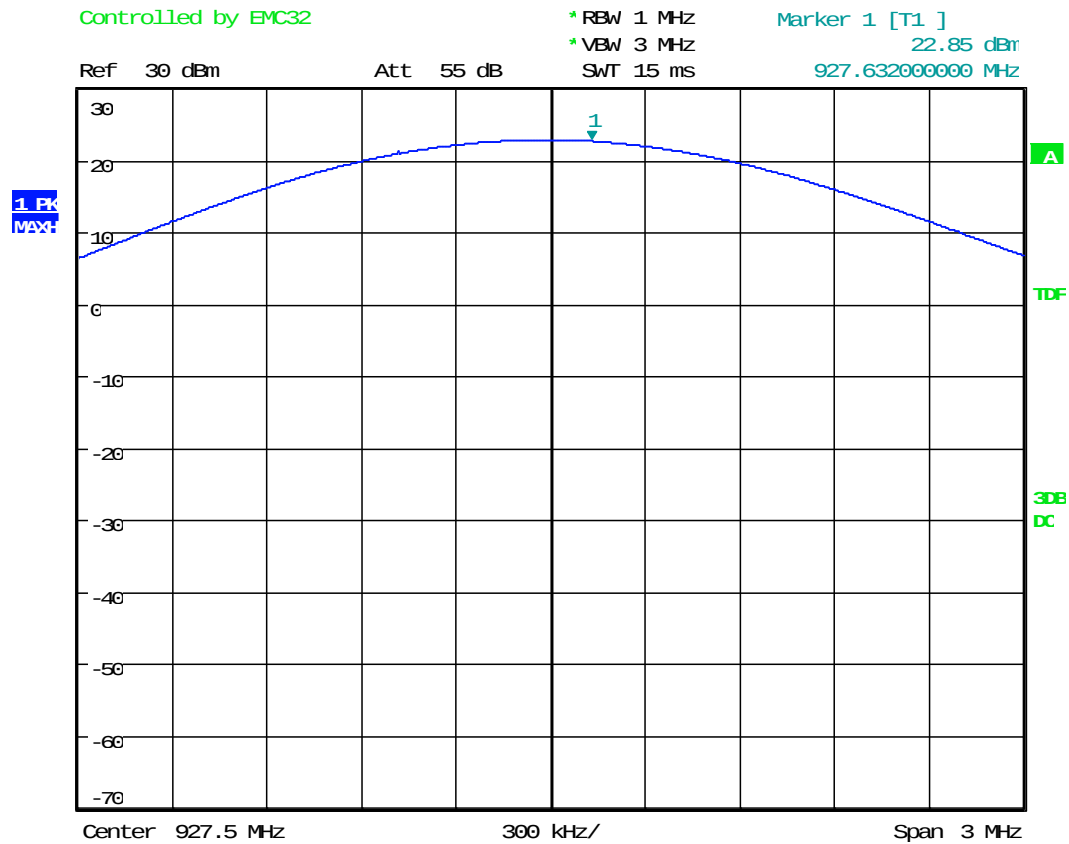


Mid Channel





High Channel



Date: 31.MAR.2016 10:32:18



9 FCC PART 15.31(e) – VOLTAGE VARIATIONS

9.1 Requirements

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery-operated equipment, the equipment tests shall be performed using a new battery.



9.2 Voltage Variations Test Data

Test Date(s):	Mar. 31, 2016	Test Engineer:	J. Knepper
Rule:	15.31(e)	Air Temperature:	20.8° C
Test Results:	Complies	Relative Humidity:	45%

Controlled by EMC32

Ref 30 dBm Att 55 dB

*RBW 1 MHz
*VBW 3 MHz
SWT 15 ms

Marker 1 [T1] 24.07 dBm
923.202800000 MHz

1.84 VAC

300 kHz/

Center 923.3 MHz Span 3 MHz

Controlled by EMC32

Ref 30 dBm Att 55 dB

RBW 1 MHz VBW 3 MHz Swt 15 ms

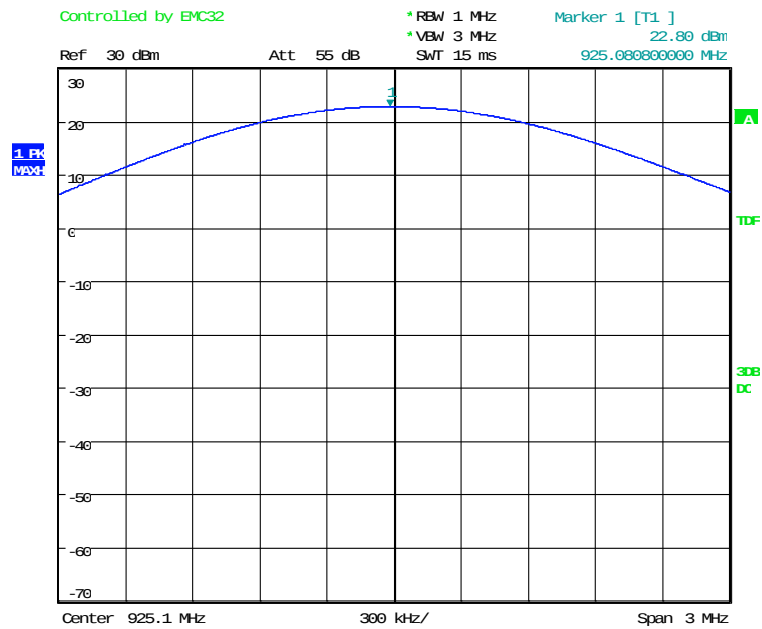
Marker 1 [T1.] 23.03 dBm 923.30600000 MHz

1. dB Max

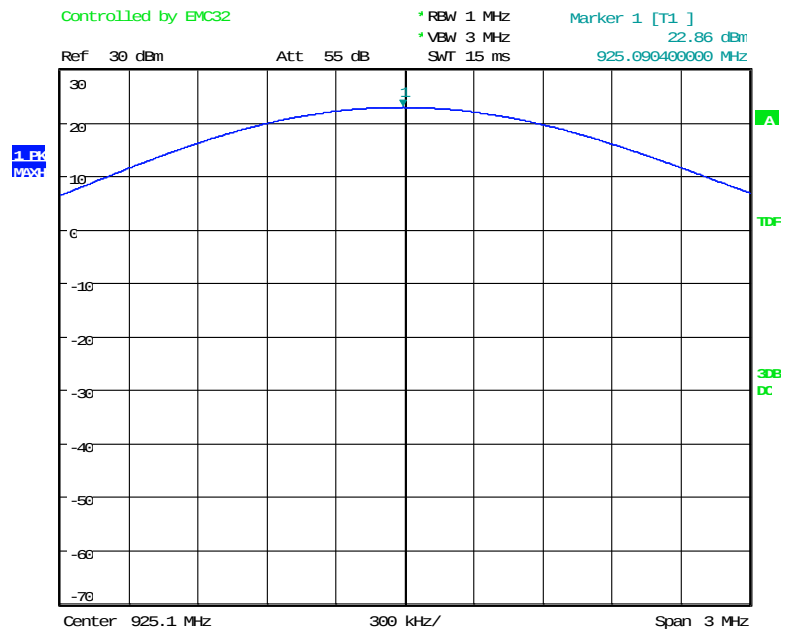
Center 923.3 MHz Span 3 MHz



Mid Channel, 100V

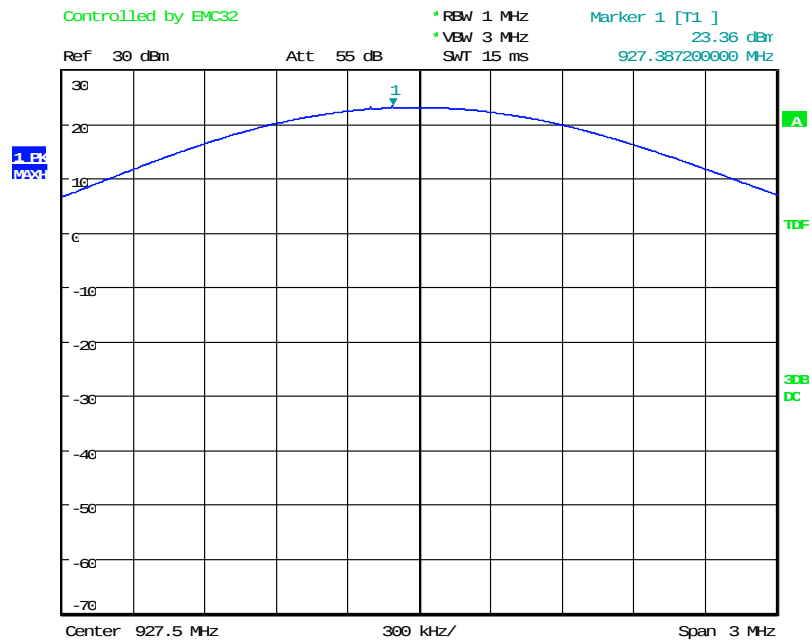


Mid Channel, 140V

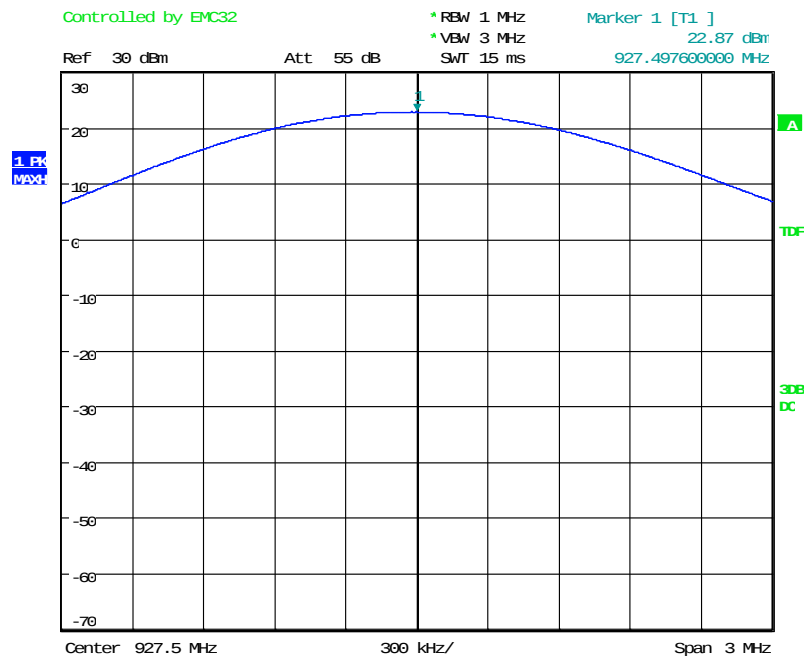




High Channel, 100V



High Channel, 140V





10 FCC Part 15.247(d) – CONDUCTED SPURIOUS EMISSIONS

The following tests were performed to demonstrate compliance.

RF Antenna Conducted Test

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the spectrum analyzer.

10.1 Requirements:

All Spurious Emissions must be at least 20dB down from the highest emission level measured within the authorized band up through the tenth harmonic.

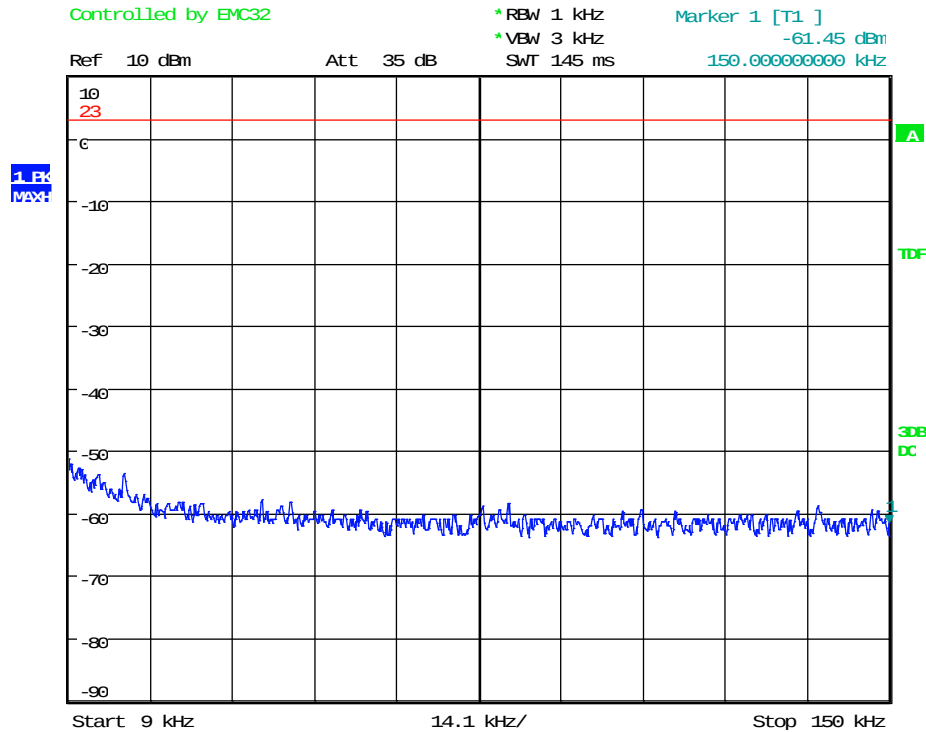
Spurious emissions measurements were made at the low, mid, and upper channels with the appropriate spectrum analyzer impulse bandwidth. Additionally, 20dB down points were measured for the low and high channels to verify band edge compliance.



10.2 Test Data – Conducted Spurious Emissions

Test Date:	Mar. 31, 2016	Test Engineer:	J. Knepper
Standards:	CFR 47 Part 15.247(d) / Part 15.207 KDB558074	Air Temperature:	21.2°C
		Relative Humidity:	42%

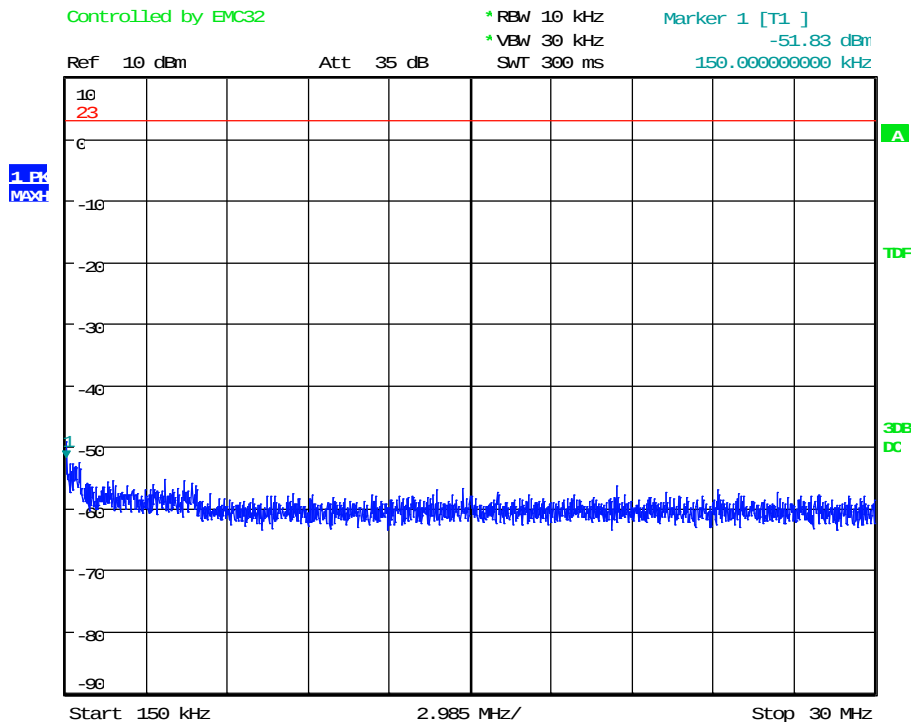
Low Channel



Date: 31.MAR.2016 10:05:51



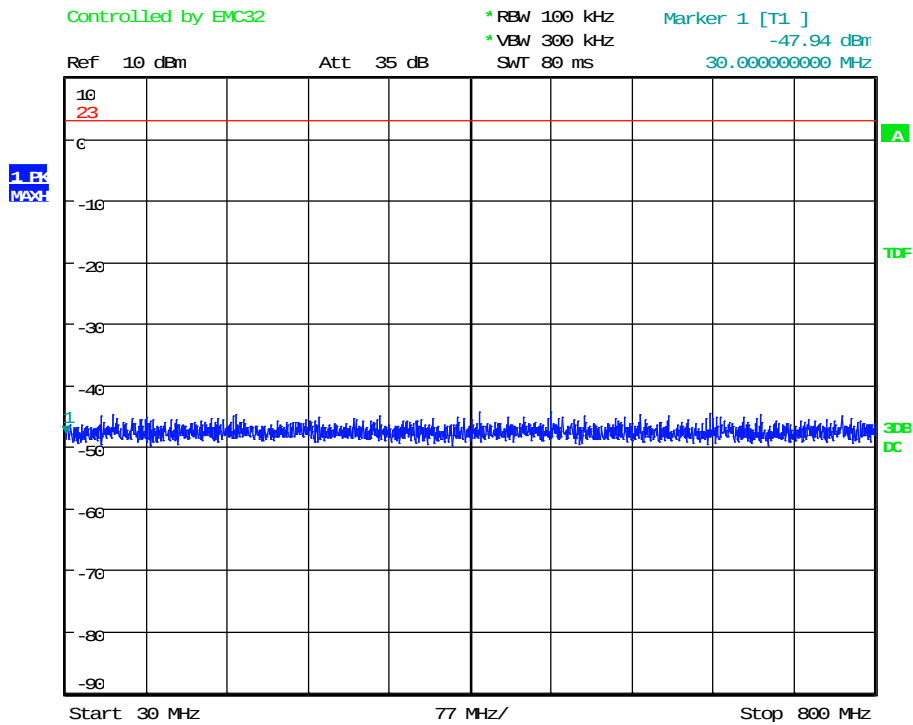
Low Channel, cont'd



Date: 31.MAR.2016 10:06:16



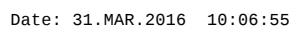
Low Channel, cont'd



Date: 31.MAR.2016 10:06:36

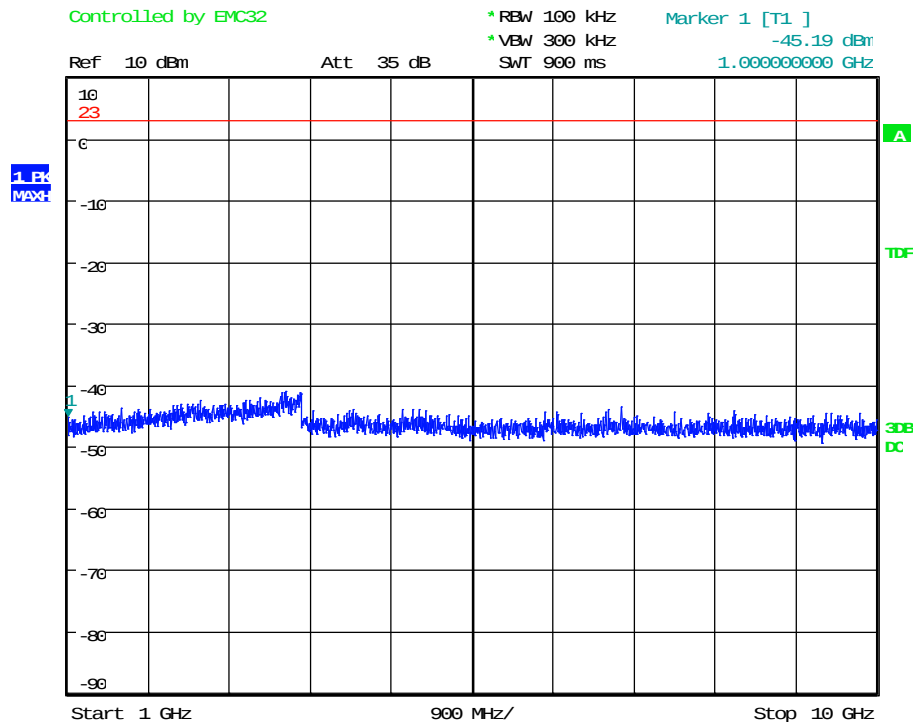


Low Channel, cont'd





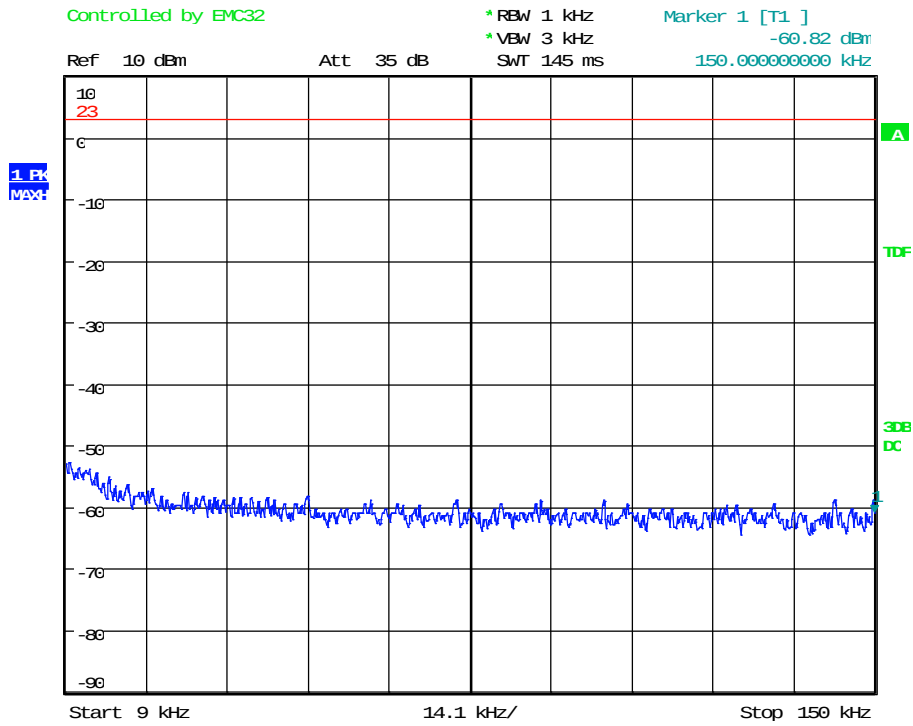
Low Channel, cont'd



Date: 31.MAR.2016 10:07:16



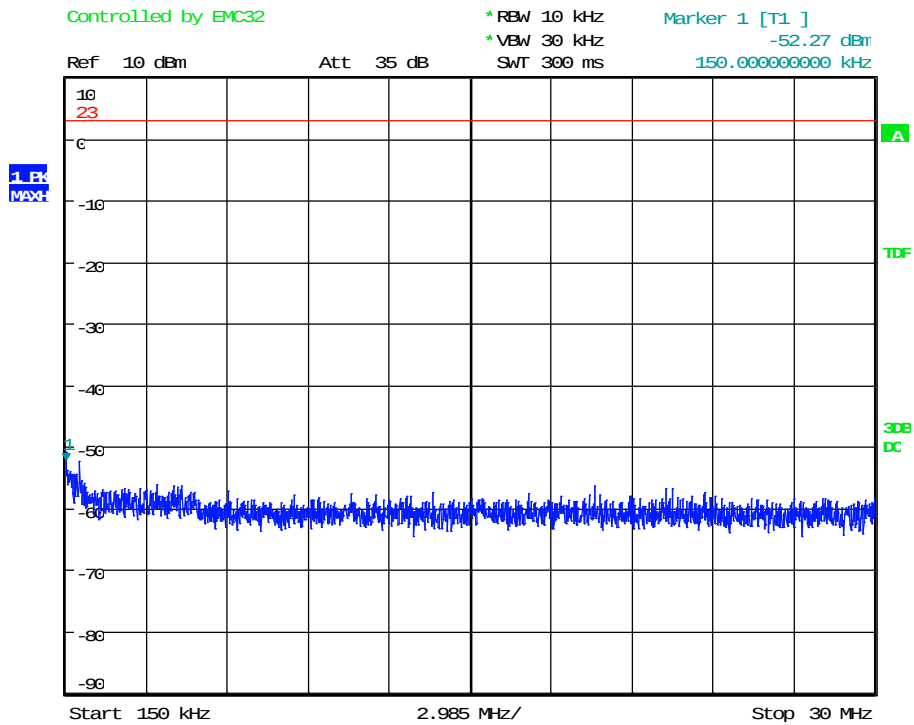
Mid Channel



Date: 31.MAR.2016 10:15:20



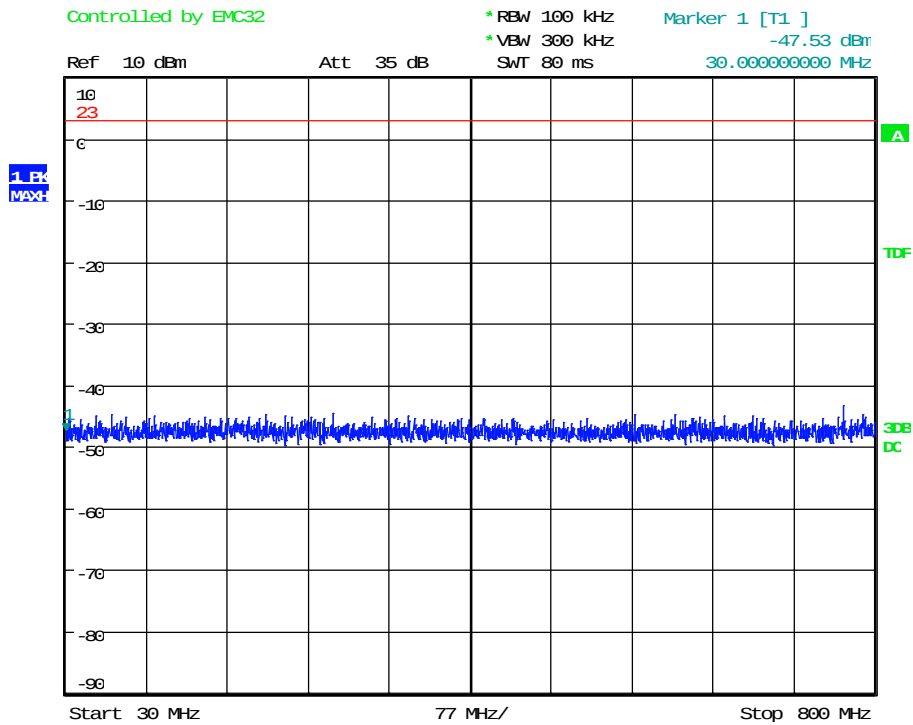
Mid Channel, cont'd



Date: 31.MAR.2016 10:15:38



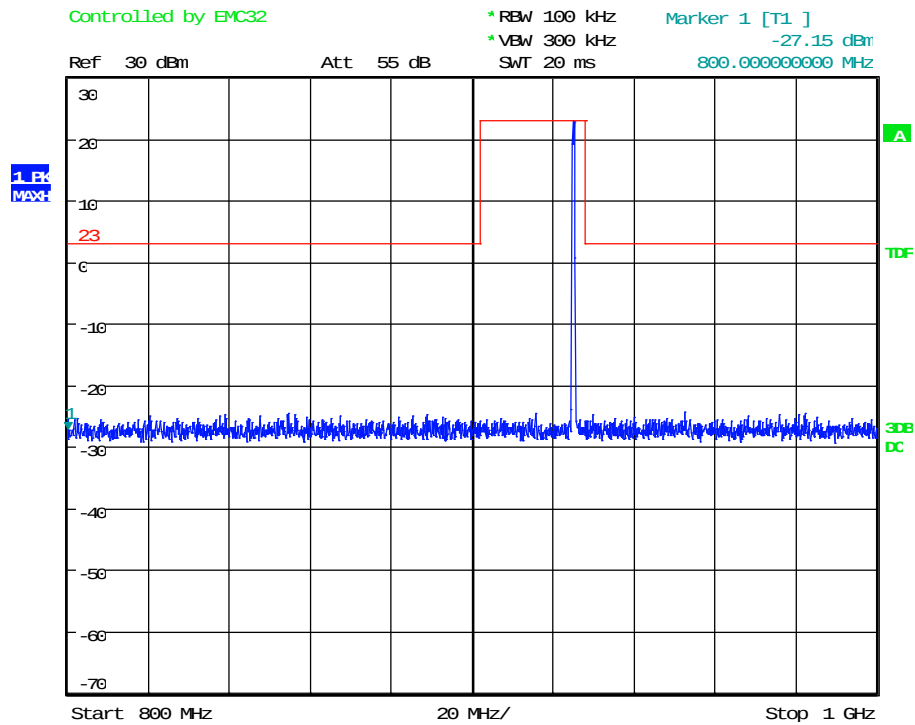
Mid Channel, cont'd



Date: 31.MAR.2016 10:15:56



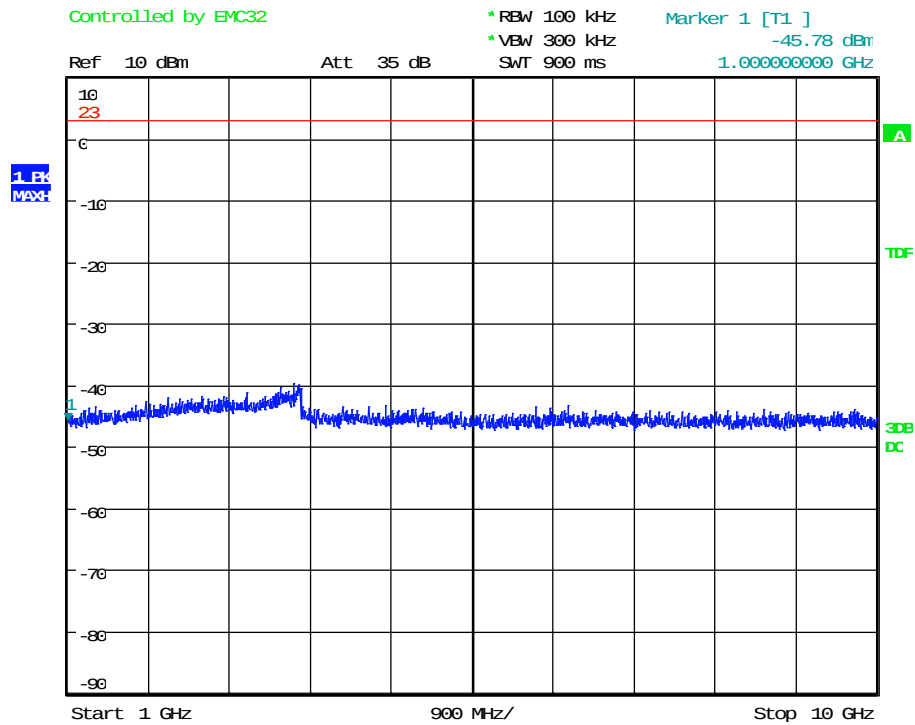
Mid Channel, cont'd



Date: 31.MAR.2016 10:16:16



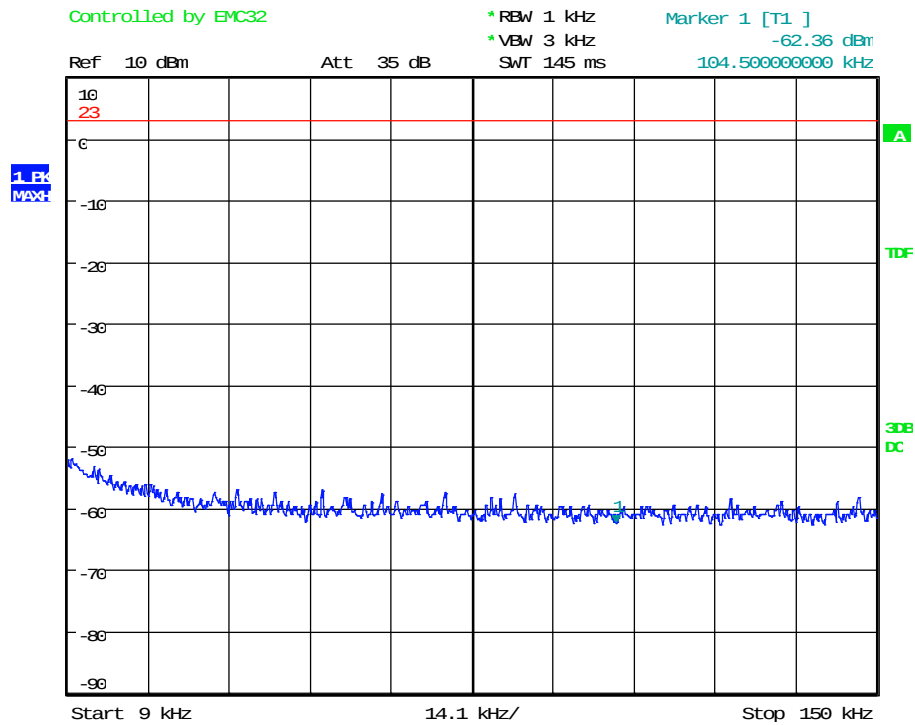
Mid Channel, cont'd



Date: 31.MAR.2016 10:17:43



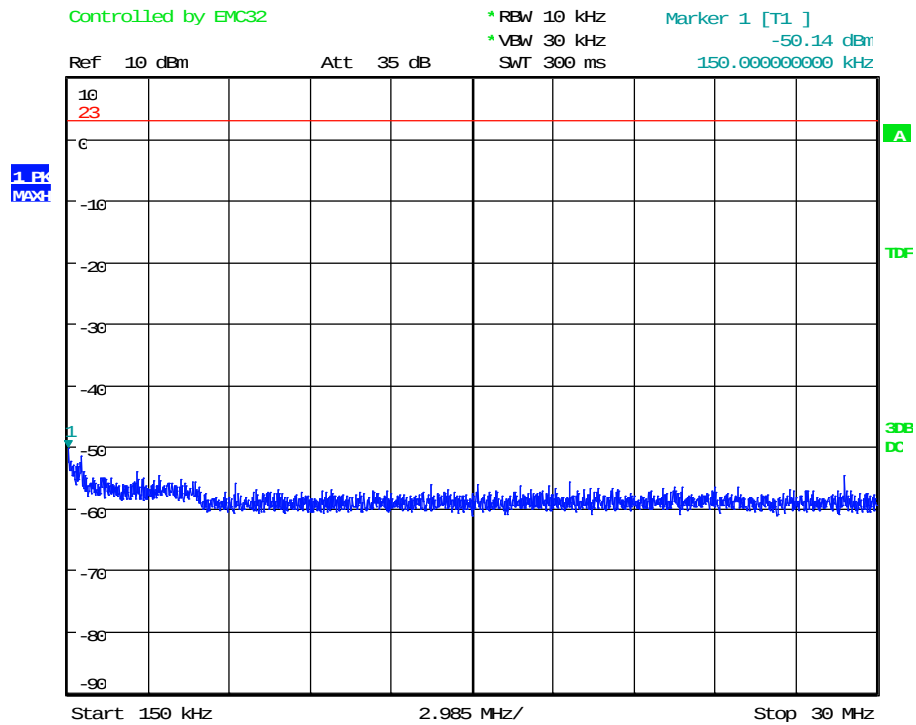
High Channel



Date: 31.MAR.2016 10:41:04



High Channel, cont'd



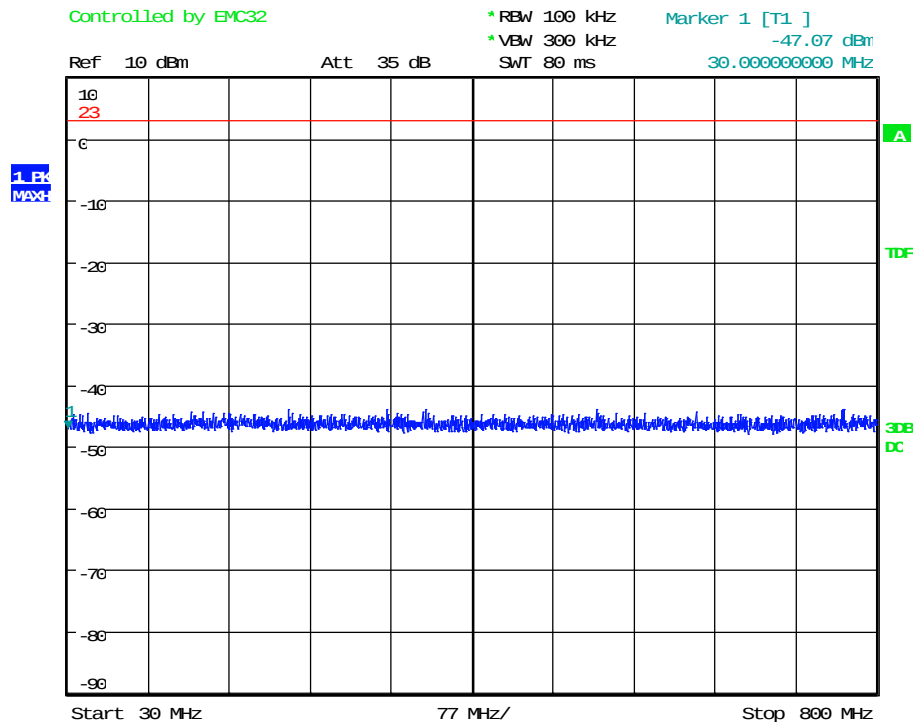
Date: 31.MAR.2016 10:42:17



Order Number: F2LQ8292

Client: Embedded Planet
Model: EPM2M-LORA-DC-8-NA

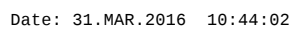
High Channel, cont'd



Date: 31.MAR.2016 10:43:23

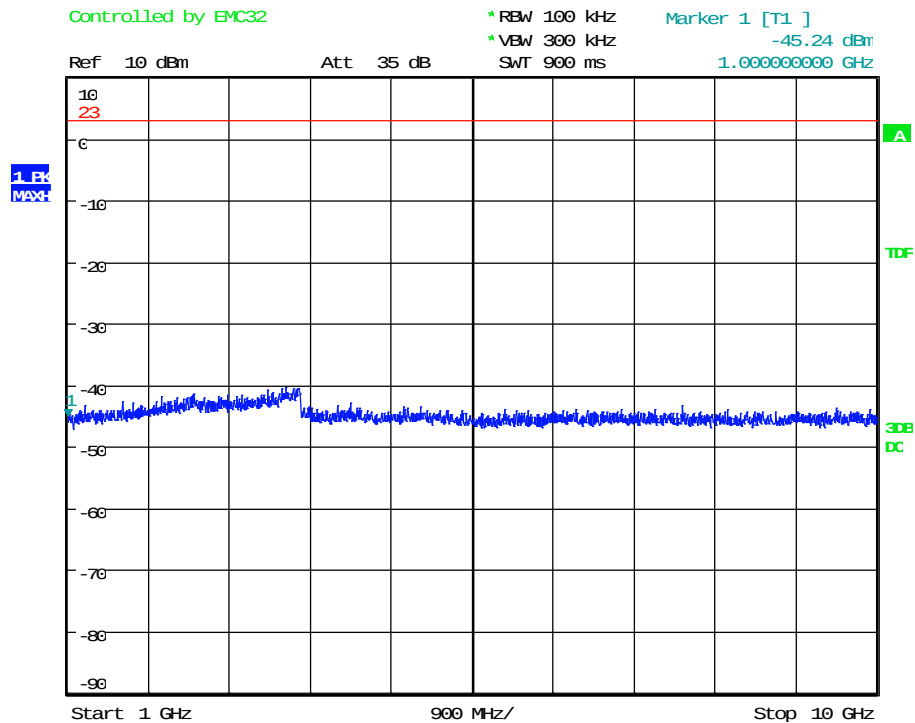


High Channel, cont'd





High Channel, cont'd



Date: 31.MAR.2016 10:47:25



11 RADIATED SPURIOUS EMISSION

The EUT antenna port was fitted with its integral/internal chip antenna. Radiated emissions were measured in a Semi-Anechoic Chamber. All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

11.1 Requirements:

All emissions that fall in the restricted bands defined in FCC Part 15.205 shall not exceed the maximum field strength listed in FCC Part 15.209(a).



11.2 Radiated Spurious Emission Test Data

Test Date(s):	Apr. 1, 2016	Test Engineer:	J. Knepper
Standards:	CFR 47 Part 15.247(d); Part 15.209 / KDB558074	Air Temperature:	20.2°C
		Relative Humidity:	44%

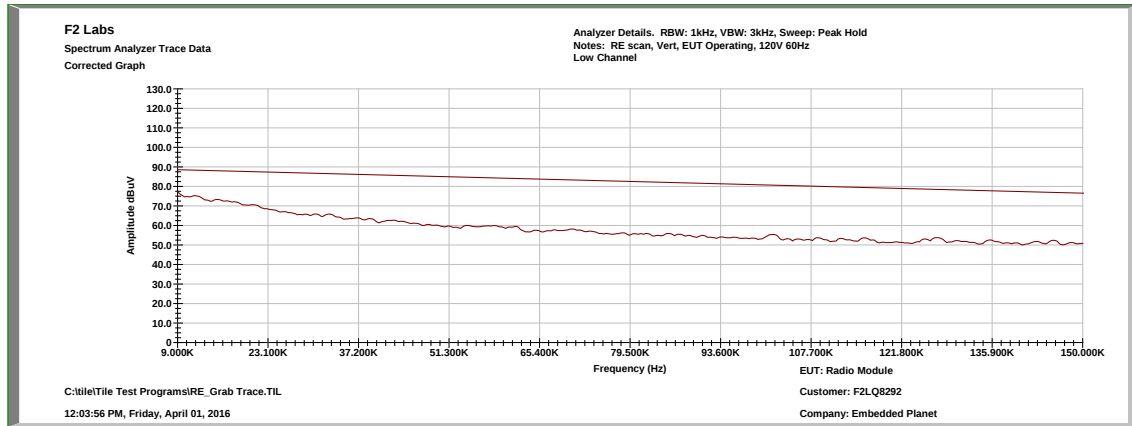
Notes: Plots are peak, max hold prescan data included only to determine what frequencies to investigate and measure. The EUT was initially placed in a semi-anechoic chamber, and rotated in all three orthogonal positions to maximize the emissions. Characterization measurements were then performed to determine at which frequencies significant emissions occurred. These graphs are shown below.

The equipment was fully exercised with all cabling attached to the EUT and was positioned on the OATS for maximum emissions. While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength. The tables of measured results can be found below.

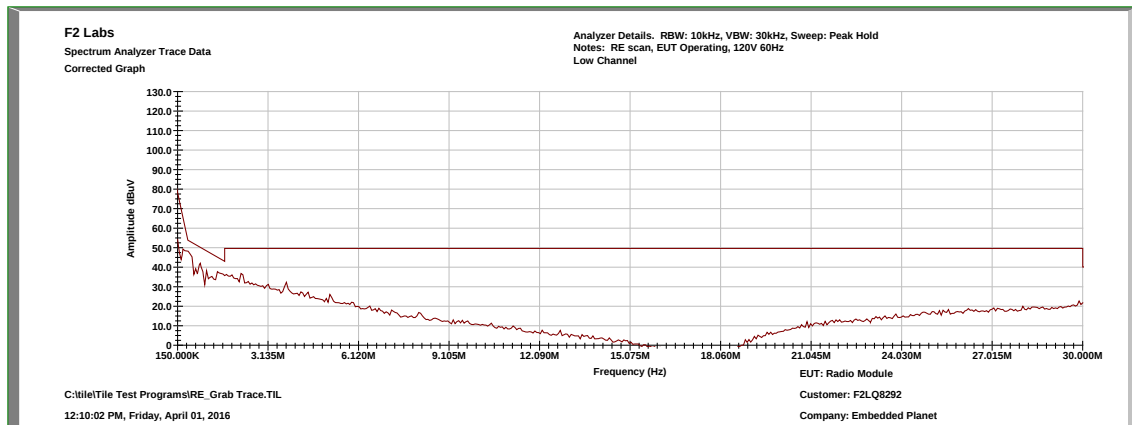
Some of the frequencies did not change with the EUT on or off. At those frequencies, the test distance was shortened to 1 meter and still no emissions from the EUT were visible or over the ambient or limit.



Low Channel, 9kHz to 150kHz

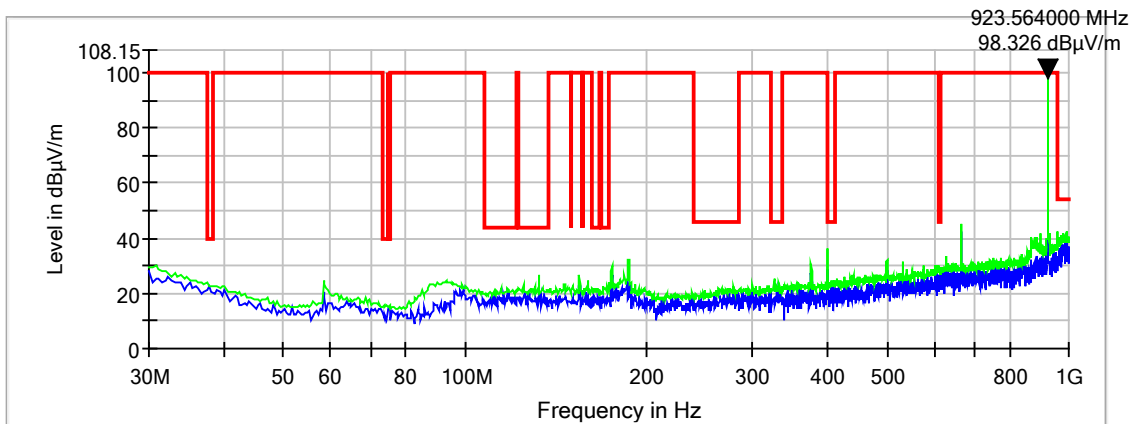


Low Channel, 150kHz to 30 MHz

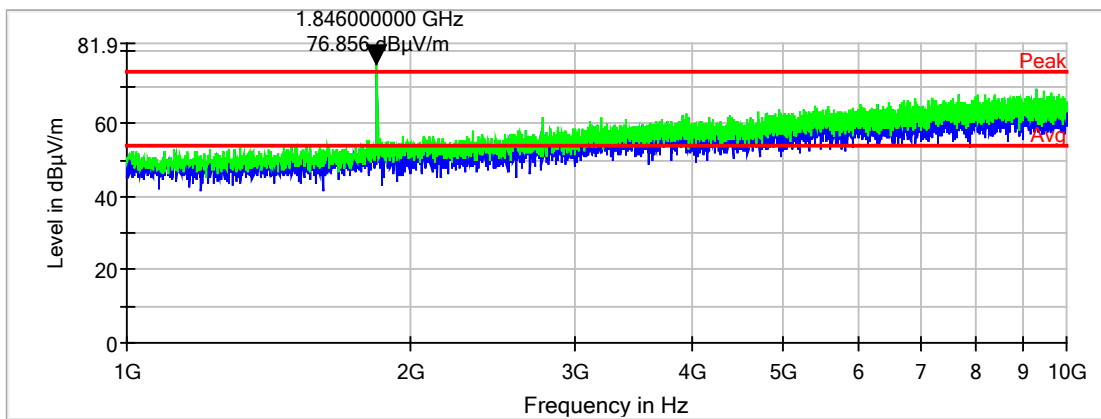




Low Channel, 30 MHz to 1 GHz, Vertical

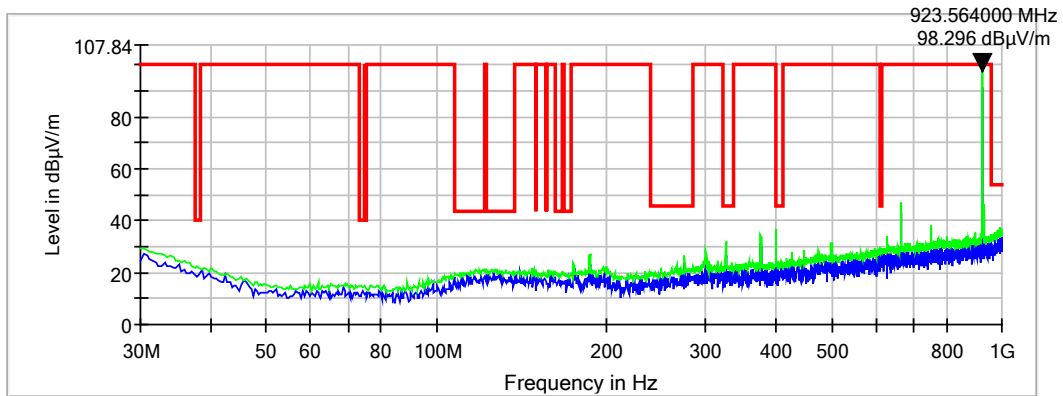


Low Channel, 1 GHz to 10 GHz, Vertical

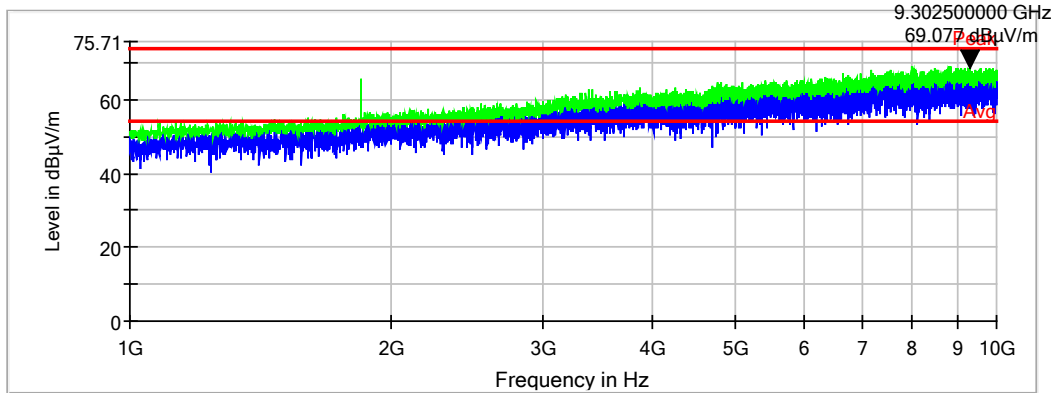




Low Channel, 30 MHz to 1 GHz, Horizontal

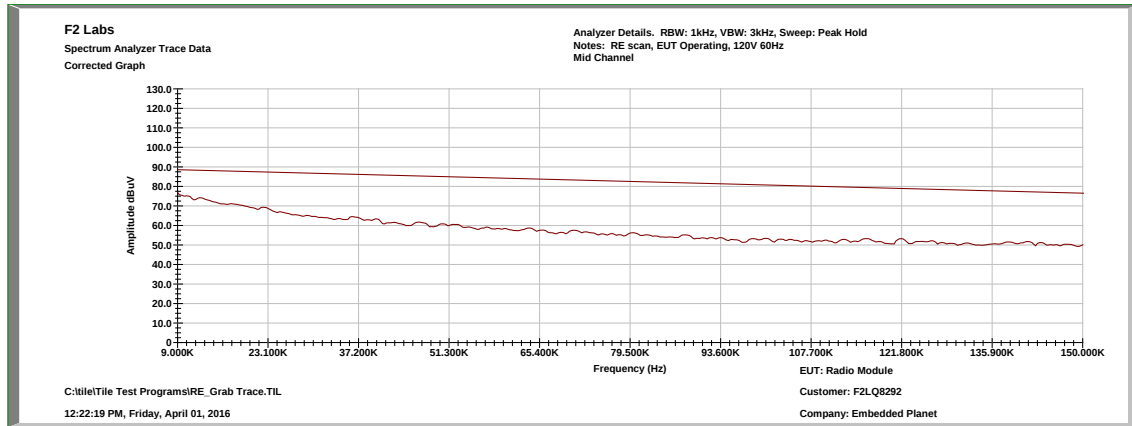


Low Channel, 1 GHz to 10 GHz, Horizontal

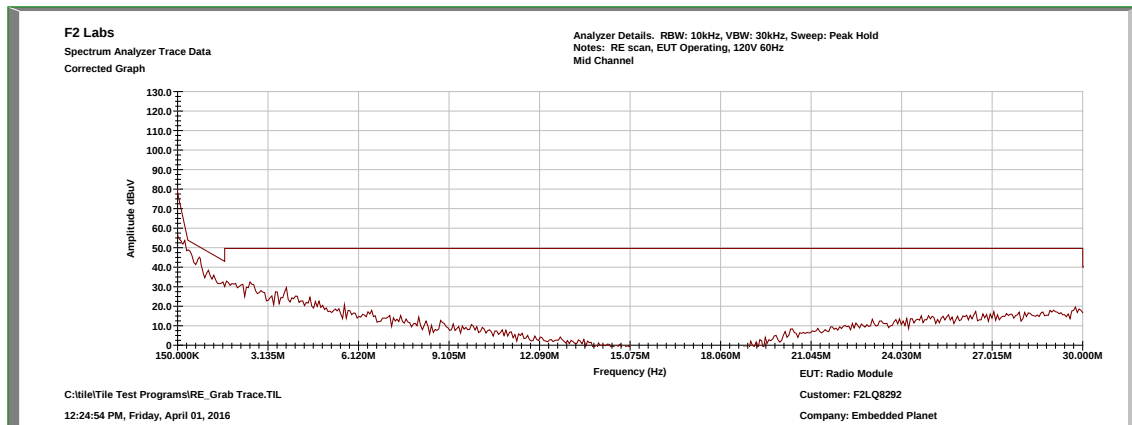




Mid Channel, 9kHz to 150kHz

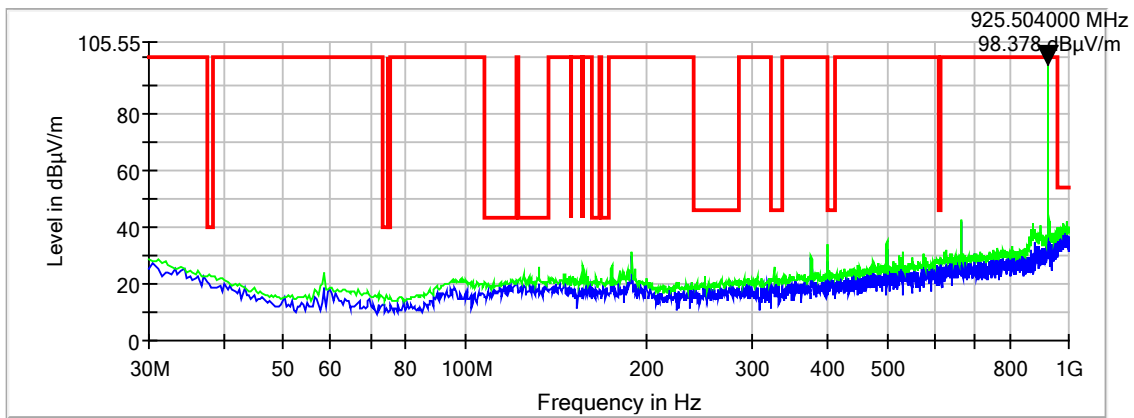


Mid Channel, 150kHz to 30 MHz

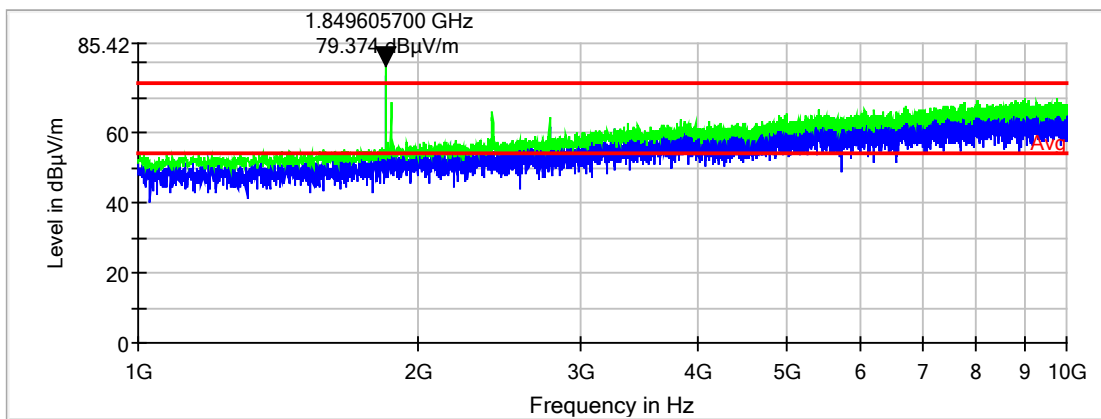




Mid Channel, 30 MHz to 1 GHz, Vertical

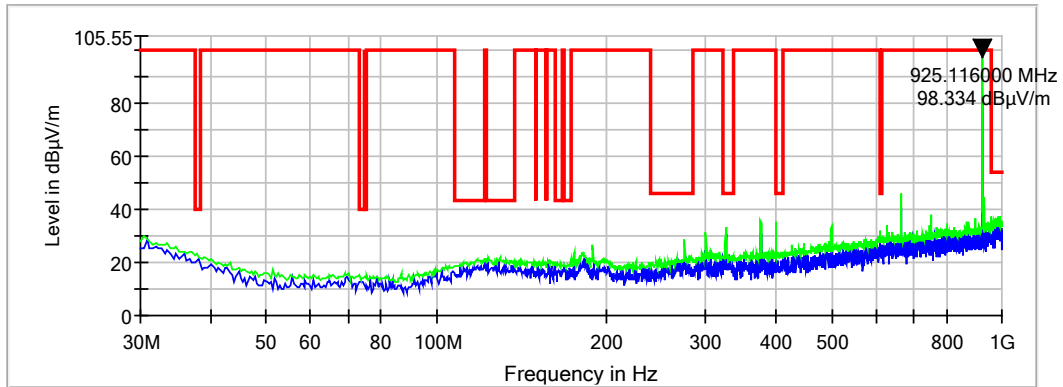


Mid Channel, 1 GHz to 10 GHz, Vertical

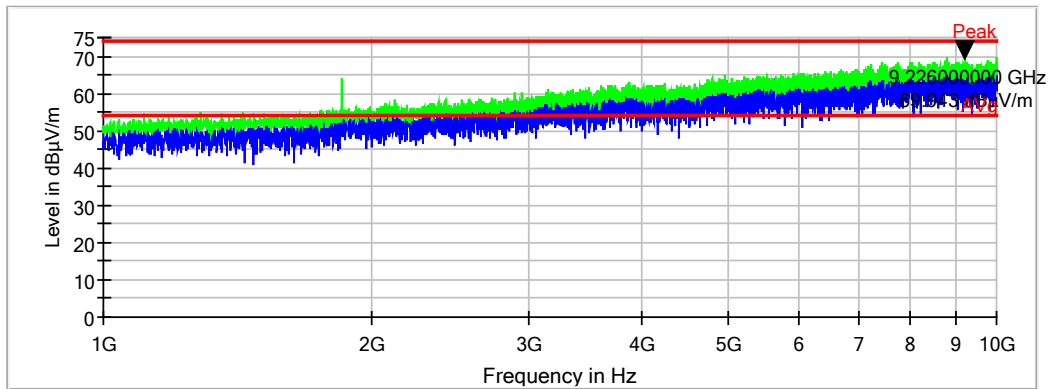




Mid Channel, 30 MHz to 1 GHz, Horizontal

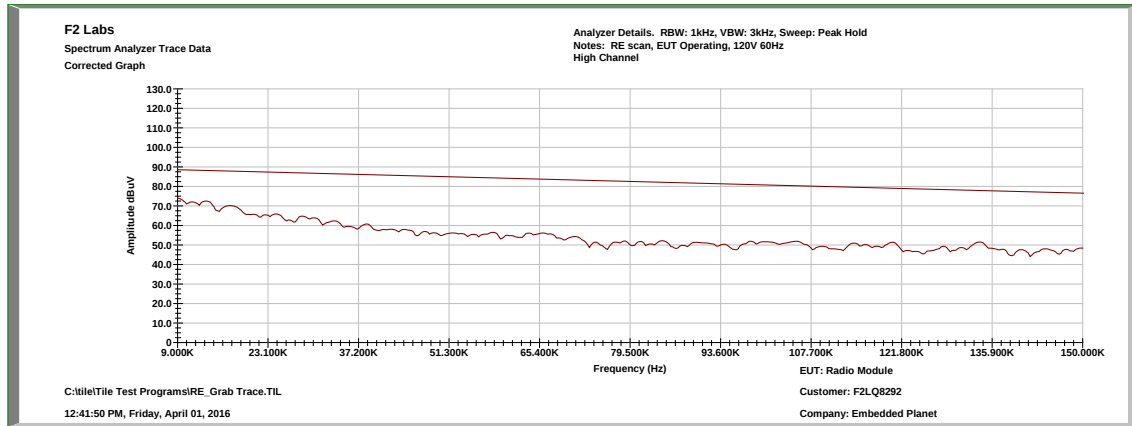


Mid Channel, 1 GHz to 10 GHz, Horizontal

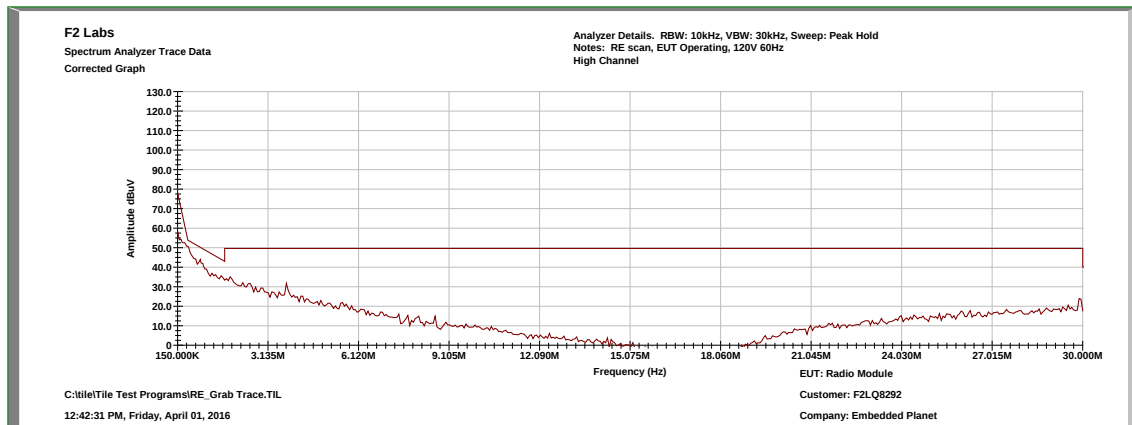




High Channel, 9kHz to 150kHz

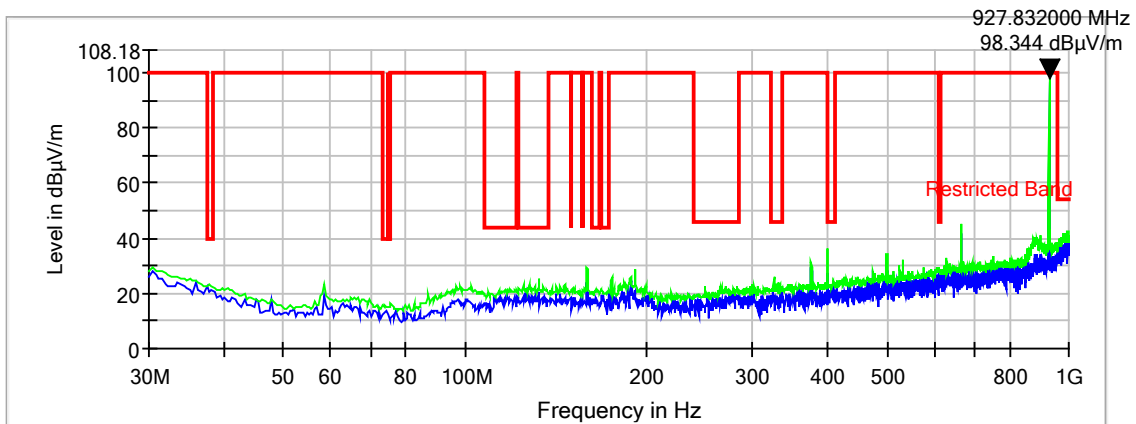


High Channel, 150kHz to 30 MHz

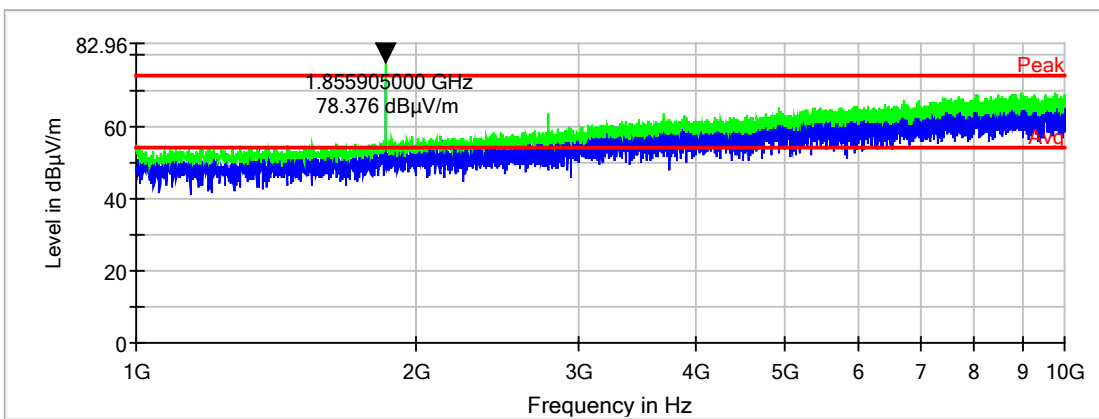




High Channel, 30 MHz to 1 GHz, Vertical

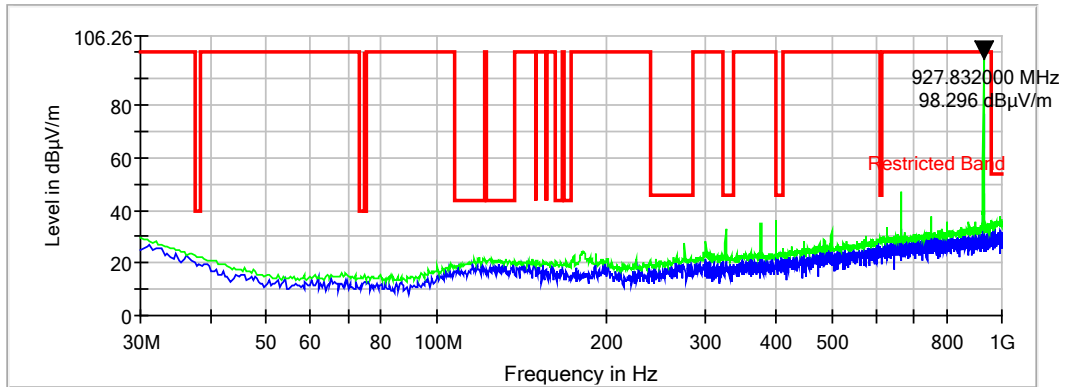


High Channel, 1 GHz to 10 GHz, Vertical

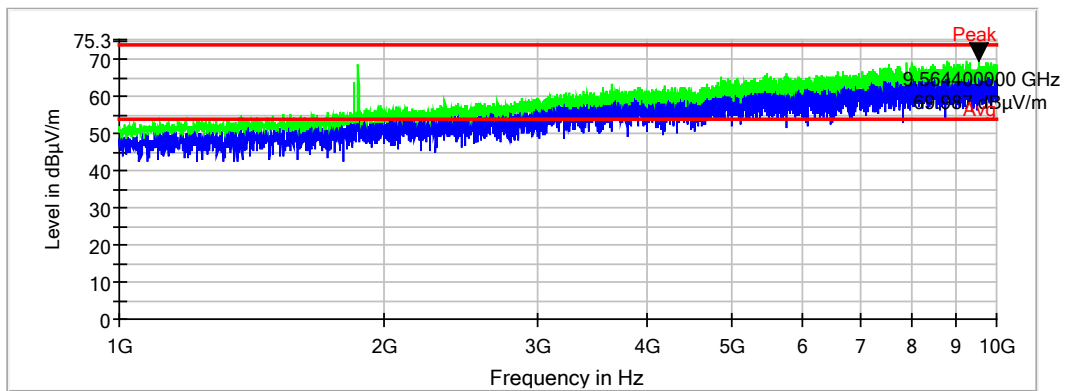




High Channel, 30 MHz to 1 GHz, Horizontal



High Channel, 1 GHz to 10 GHz, Horizontal



**Measurements****Low Channel - MaxPeak**

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2770.000000	V	50.3	16.7	67.00	74.0	-7.0
3693.119000	V	45.2	19.9	65.10	74.0	-8.9

Low Channel - Average

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Emission w/DCCF	Limit (dBμV/m)	Margin (dB)
2770.000000	V	41.3	16.7	58.00	38.35	54.0	-15.7
3693.119000	V	32.7	19.9	52.60	32.95	54.0	-21.1

Low Channel - QuasiPeak

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.596000	H	7.1	17.0	24.10	40.0	-15.9
37.372000	V	6.5	16.4	22.90	40.0	-17.1
72.292000	V	7.0	8.4	15.40	40.0	-24.6
108.764000	V	6.9	12.7	19.60	43.5	-23.9
119.628000	H	6.1	14.5	20.60	43.5	-22.9
174.724000	V	9.9	11.9	21.80	43.5	-21.7
174.724000	H	7.2	11.9	19.10	43.5	-24.4
274.828000	H	11.8	13.9	25.70	46.0	-20.3
324.880000	H	16.4	14.7	31.10	46.0	-14.9
398.988000	H	21.4	16.2	37.60	46.0	-8.4
398.988000	V	21.2	16.2	37.40	46.0	-8.6
398.988000	V	21.2	16.2	37.40	46.0	-8.6
608.120000	H	7.7	19.4	27.10	46.0	-18.9
625.192000	V	8.0	19.8	27.80	46.0	-18.2
960.000000	H	14.3	23.4	37.70	46.0	-8.3
960.424000	V	14.0	23.4	37.40	54.0	-16.6



Mid Channel - MaxPeak

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2410.243400	V	44.8	15.8	60.60	74.0	-13.4
2774.702900	V	4.0	61.7	65.70	74.0	-8.3

Mid Channel - Average

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Emission w/DCCF	Limit (dBμV/m)	Margin (dB)
2410.243400	V	31.0	15.8	46.80	27.15	54.0	-26.9
2774.702900	V	-6.9	61.7	54.80	35.15	54.0	-18.9

Mid Channel - QuasiPeak

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
37.250000	V	6.4	16.5	22.90	40.0	-17.1
38.148000	H	6.1	15.8	21.90	40.0	-18.1
73.136000	V	6.8	8.4	15.20	40.0	-24.8
73.844000	H	6.0	8.4	14.40	40.0	-25.6
116.524000	H	6.1	14.1	20.20	43.5	-23.3
120.016000	H	6.4	14.4	20.80	43.5	-22.7
132.820000	H	6.1	14.0	20.10	43.5	-23.4
132.996000	V	12.9	14.0	26.90	43.5	-16.6
166.068000	V	8.1	12.6	20.70	43.5	-22.8
175.112000	H	9.2	11.9	21.10	43.5	-22.4
325.268000	H	12.1	14.7	26.80	46.0	-19.2
398.988000	H	21.3	16.2	37.50	46.0	-8.5
399.952000	V	7.2	16.3	23.50	46.0	-22.5
611.928000	V	7.6	19.4	27.00	46.0	-19.0
614.000000	H	7.5	19.5	27.00	46.0	-19.0
614.000000	H	7.5	19.5	27.00	46.0	-19.0
960.024000	V	18.2	23.4	41.60	54.0	-12.4

**High Channel - MaxPeak**

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2783.000000	V	48.8	16.7	65.50	74.0	-8.5
3693.000000	V	45.0	19.9	64.90	74.0	-9.1

High Channel - Average

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Emission w/ DCCF	Limit (dBμV/m)	Margin (dB)
2783.000000	V	38.5	16.7	55.20	35.55	54.0	-18.5
3693.000000	V	31.2	19.9	51.10	31.45	54.0	-22.6

High Channel - QuasiPeak

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
37.500000	H	6.2	16.3	22.50	40.0	-17.5
37.760000	V	16.2	16.1	32.30	40.0	-7.7
73.000000	H	6.1	8.4	14.50	40.0	-25.5
74.600000	V	16.2	8.4	24.60	40.0	-15.4
109.540000	V	6.8	12.8	19.60	43.5	-23.9
119.240000	H	6.1	14.6	20.70	43.5	-22.8
132.820000	H	6.2	14.0	20.20	43.5	-23.3
162.012500	V	16.6	12.8	29.40	43.5	-14.1
173.200000	H	6.8	12.1	18.90	43.5	-24.6
249.996000	V	17.7	12.2	29.90	46.0	-16.1
324.880000	H	17.8	14.7	32.50	46.0	-13.5
399.900000	V	16.9	16.3	33.20	46.0	-12.8
399.900000	H	7.6	16.3	23.90	46.0	-22.1
608.000000	V	18.3	19.4	37.70	46.0	-8.3
614.000000	H	7.6	19.5	27.10	46.0	-18.9
960.000000	V	21.4	23.4	44.80	46.0	-1.2
960.000000	H	14.0	23.4	37.40	46.0	-8.6

15.35(c) - DUTY CYCLE

A duty cycle correction of -19.65dB was added to the Average field strength measured because the EUT has a 1% duty cycle.

The formula used was: $DCCF = 20 \log \left(\frac{10.41ms}{100ms} \right) = -19.65$



12 FCC PART 15.247(e) – PEAK POWER SPECTRAL DENSITY (PSD)

Peak power spectral density measurements were performed.

12.1 Requirements:

The peak power spectral density shall not exceed +8dBm in any 3 kHz band during any time interval of continuous transmission.

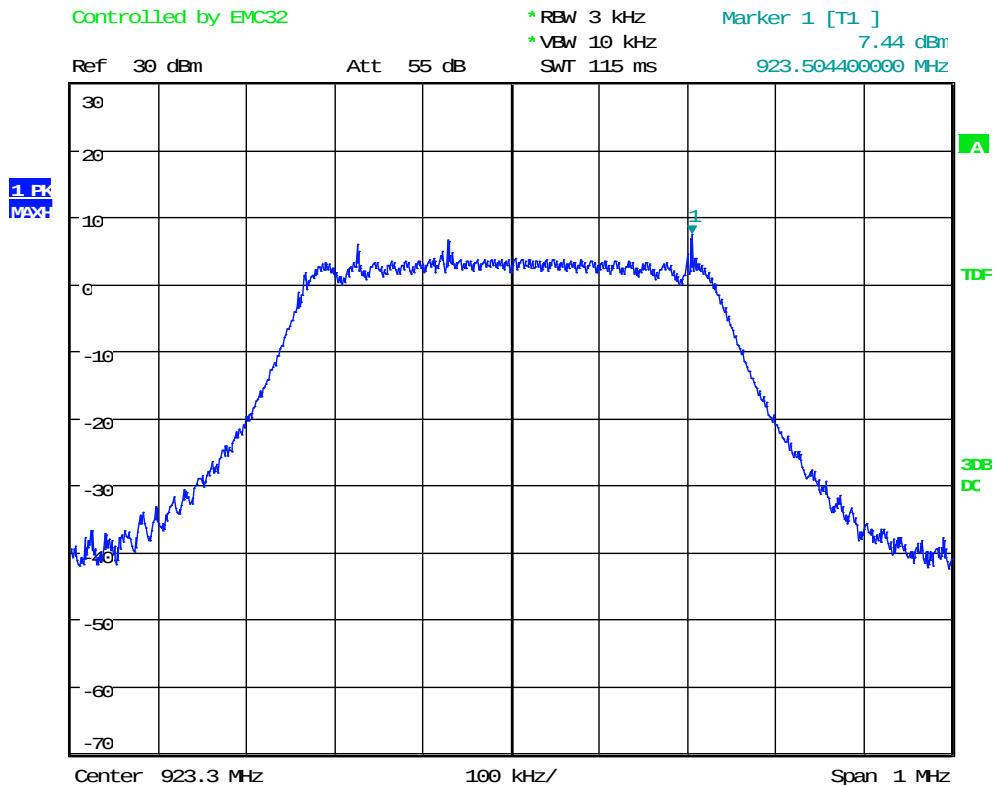
Power spectral density measurements were performed at a resolution bandwidth of 3 kHz (video bandwidth set at 10 KHz). The peak spectral densities were measured at the low, mid, and upper channels.



12.2 Peak Power Spectral Density Test Data

Test Date(s):	Mar. 31, 2016	Test Engineer:	J. Knepper
Standards:	CFR 47 Part 15.247(e); KDB558074	Air Temperature:	21.2°C
		Relative Humidity:	42%

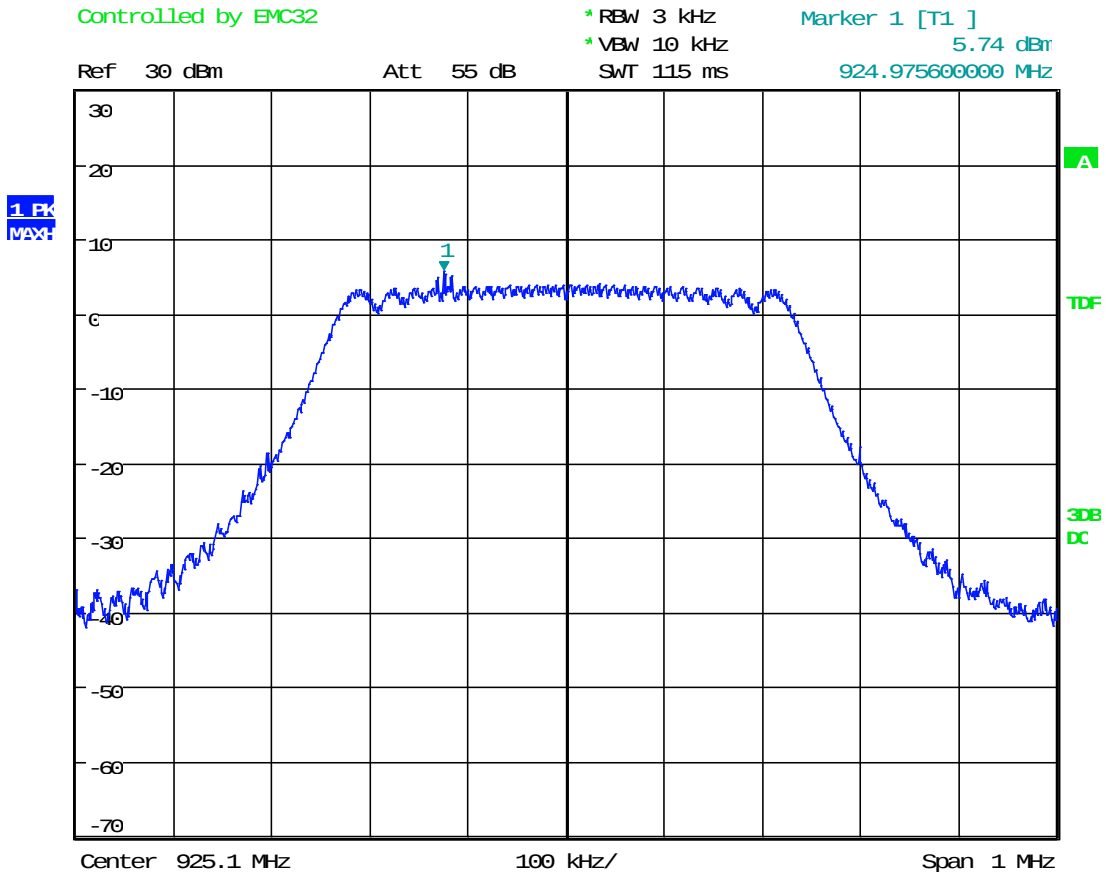
Low Channel



Date: 31.MAR.2016 11:05:52



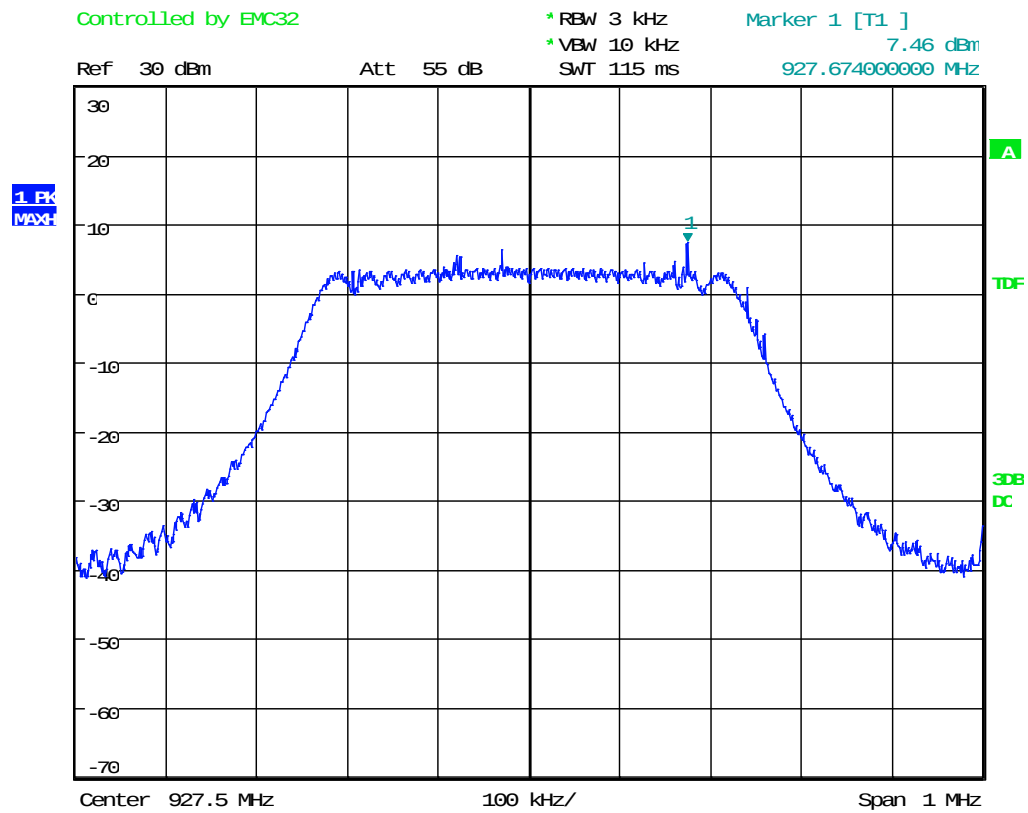
Mid Channel



Date: 31.MAR.2016 11:10:33



High Channel



Date: 31.MAR.2016 10:39:06



13 CONDUCTED EMISSIONS

13.1 Requirements

In accordance with FCC CFR 47 Part 15.207(a), "Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

13.2 Procedure

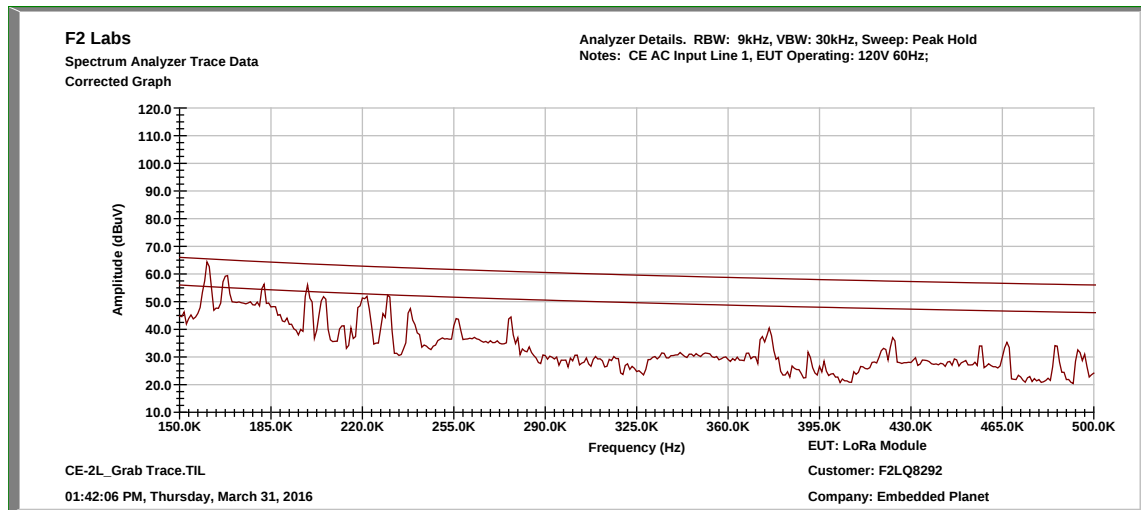
The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.



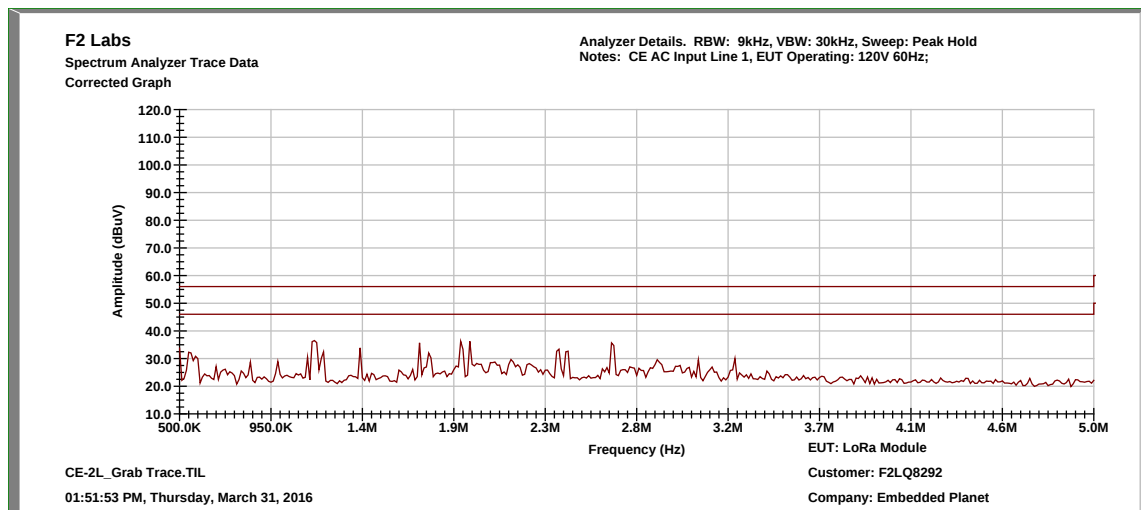
13.3 Conducted Emissions Test Data

Test Date:	Mar. 31, 2016	Test Engineer:	J. Knepper
Rule:	15.207	Air Temperature:	22.1° C
Test Results:	Pass	Relative Humidity:	43%

Conducted Test – Line 1: 0.15 MHz to 0.5 MHz

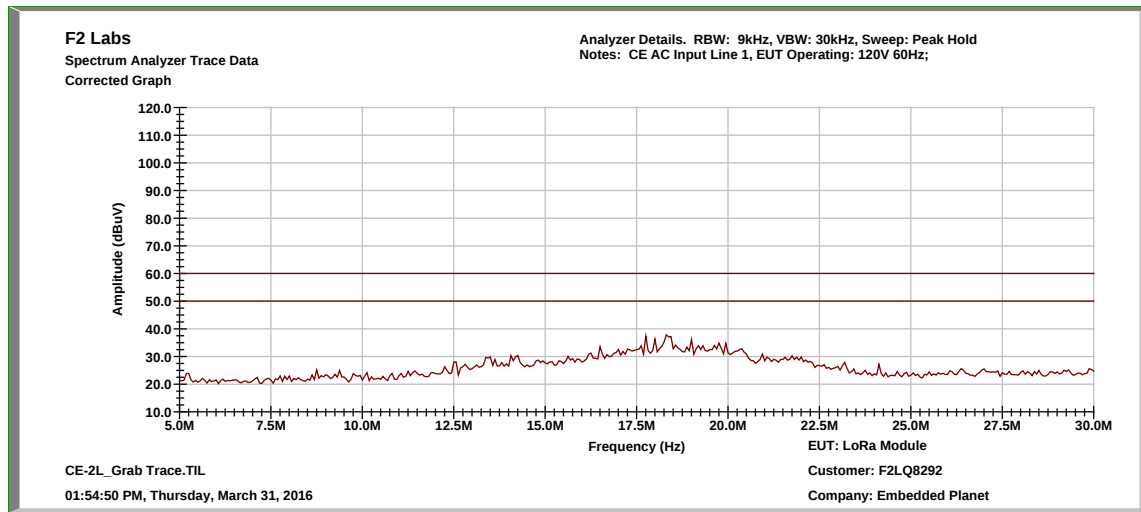


Conducted Test – Line 1: 0.5 MHz to 5.0 MHz





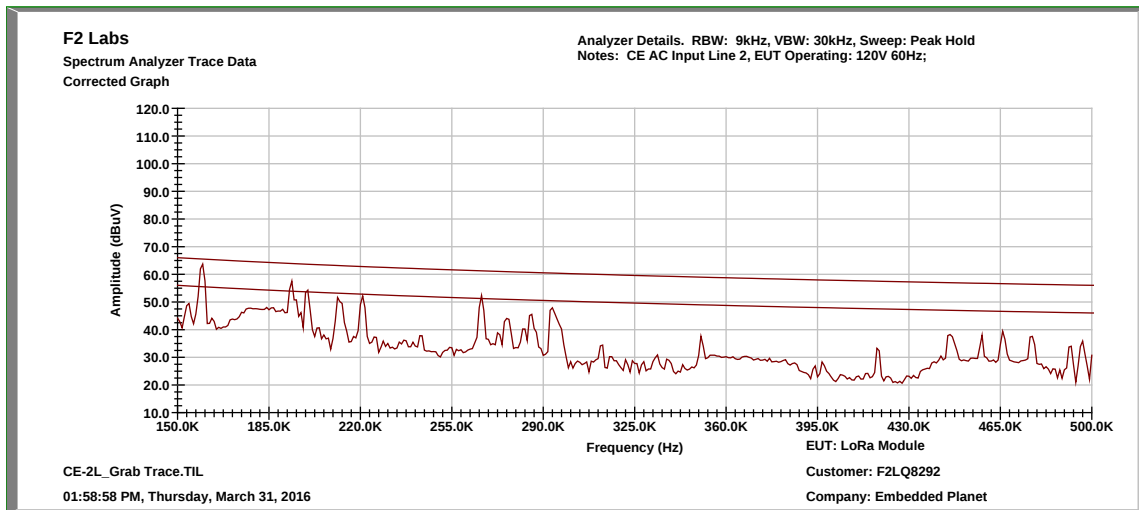
Conducted Test – Line 1: 5.0 MHz to 30.0 MHz



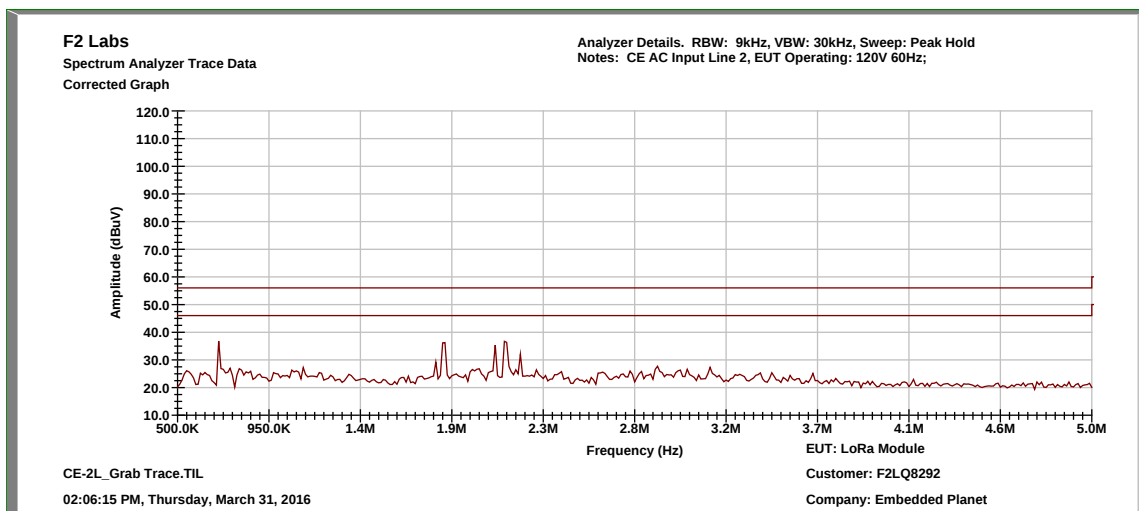
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Line 1	0.161	Quasi-Peak	26.170	11.000	37.17	65.39	-28.220
		0.161	Average	3.800	11.000	14.80	55.39	-40.590
2	Line 1	0.168	Quasi-Peak	13.580	11.000	24.58	65.04	-40.46
		0.168	Average	2.330	11.000	13.33	55.24	-41.910
3	Line 1	0.199	Quasi-Peak	15.180	11.000	26.18	63.65	-37.470
		0.199	Average	2.400	11.000	13.40	53.65	-40.250
4	Line 1	0.23	Quasi-Peak	17.170	11.000	28.17	62.45	-34.28
		0.23	Average	8.860	11.000	19.86	52.45	-32.590
5	Line 1	1.16	Quasi-Peak	8.680	11.000	19.68	56.0	-36.320
		1.16	Average	1.560	11.000	12.56	46.0	-33.440
6	Line 1	18.31	Quasi-Peak	24.380	11.000	35.38	60.0	-24.620
		18.31	Average	20.950	11.000	31.95	50.0	-18.050



Conducted Test – Line 2: 0.15 MHz to 0.5 MHz

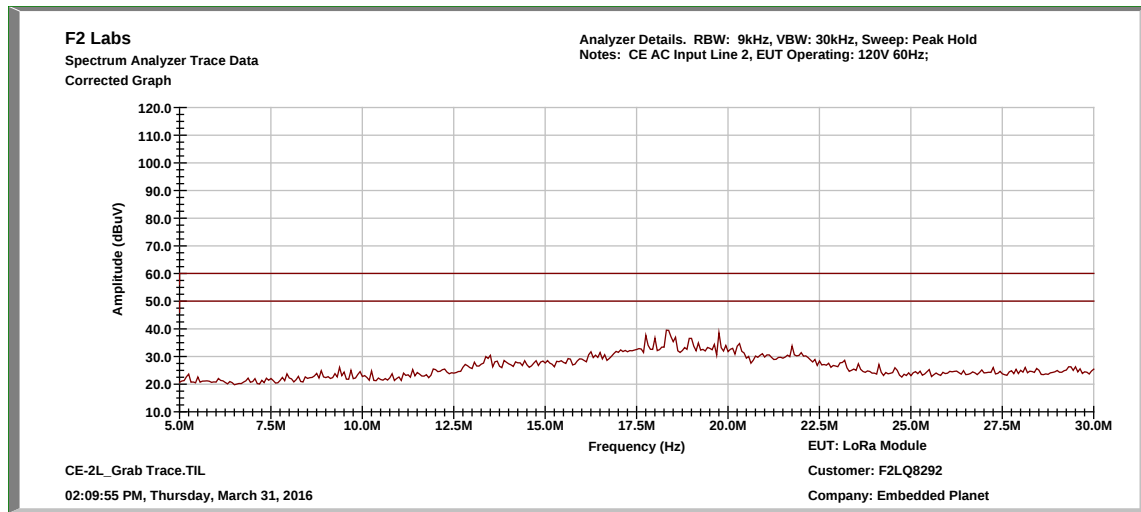


Conducted Test – Line 2: 0.5 MHz to 5.0 MHz





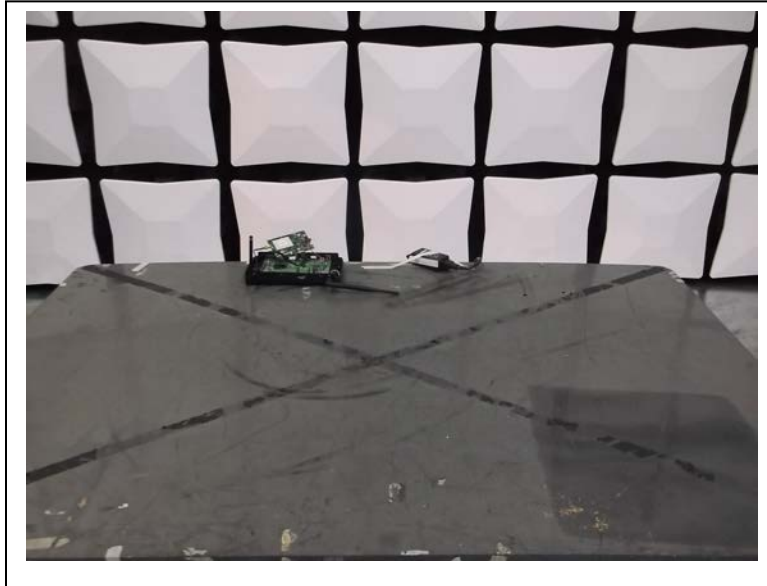
Conducted Test – Line 2: 5.0 MHz to 30.0 MHz



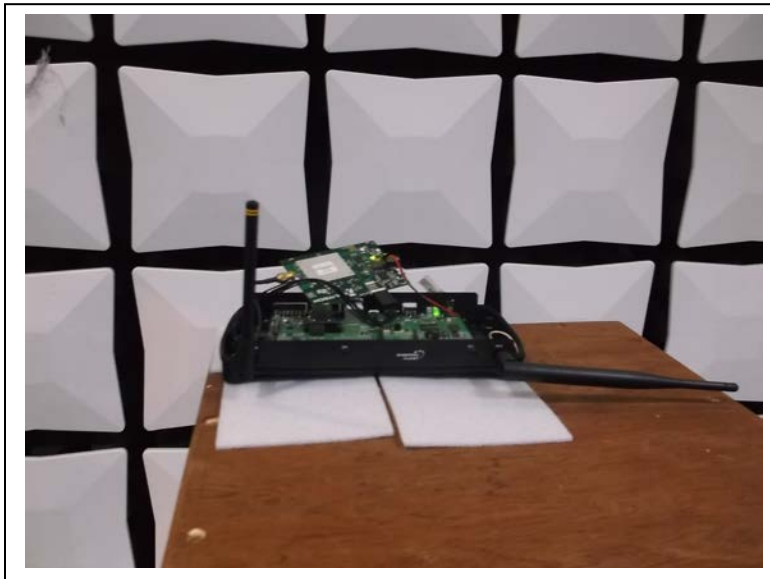
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Line 2	0.159	Quasi-Peak	21.560	11.000	32.56	65.484	-32.924
		0.159	Average	5.400	11.000	16.40	55.484	-39.084
2	Line 2	0.193	Quasi-Peak	29.950	11.000	40.95	63.875	-22.93
		0.193	Average	15.650	11.000	26.65	53.875	-27.225
3	Line 2	0.266	Quasi-Peak	19.660	11.000	30.66	61.23	-30.570
		0.266	Average	7.000	11.000	18.00	51.23	-33.230
4	Line 2	1.81	Quasi-Peak	9.420	11.000	20.42	56.0	-35.58
		1.81	Average	2.030	11.000	13.03	46.0	-32.970
5	Line 2	2.12	Quasi-Peak	8.930	11.000	19.93	56.0	-36.070
		2.12	Average	2.420	11.000	13.42	46.0	-32.580
6	Line 2	18.31	Quasi-Peak	26.350	11.000	37.35	60.0	-22.650
		18.31	Average	17.890	11.000	28.89	50.0	-21.110

14 PHOTOGRAPHS/EXHIBITS – PRODUCT PHOTOS, TEST SETUPS

Radiated Spurious Emission, <1 GHz



Radiated Spurious Emission, >1 GHz





**Conducted Output Power, Peak Power Spectral Density,
-99% Occupied Bandwidth, and Conducted Spurious Emissions**





Conducted Emissions

