FCC/IC Test Report

FOR

August Home Inc

Model Number: ASL-01

Automatic Bluetooth Low Energy (BLE)™ Smart Door Lock

FCC ID: 2AB6UASL01
IC ID: 12163A-ASL01

47 CFR Part 15.247 for DSSS Systems

IC RSS-210 Issue 8

TEST REPORT #: EMC_AUGUH-002-14001_DTS
DATE: 07-21-2014

ACCREDITED
TESTING LABORATORY
Certificate #2135.01

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab
LAB CODE 20120924-00

FCC listed
A2LA Accredited

IC recognized #
3462B

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686

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1 Assessment

The following equipment (and as identified in Ch.3 of this test report) was evaluated against the applicable criteria specified in FCC CFR47 Part 15.247 and Industry Canada Standards RSS 210 Issue 8
No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
August Home Inc	Automatic Door lock -remote controllable via Bluetooth (LE) and application running on IOS and/or Android. System contains x4 AA batteries for power.	ASL-01

Responsible for Testing Laboratory:

Date	Section	Name	Signature
07-21-2014	Compliance	Milton Ponce de Leon (Test Lab Manager)	Milton Ponce de Leon Digitally signed by Milton Ponce de Leon DN: cn=Milton Ponce de Leon, c=US, o=Cetecom Inc., ou=OTA, email=milton.deleon@cetecom.com Date: 2014.08.12 15:38:55 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
07-21-2014	Compliance	Muhammad Umair Anees (EMC Engineer)	Muhammad Umair Anees Digitally signed by Muhammad Umair Anees DN: cn=Muhammad Umair Anees, c=US, o=EMC, ou=Compliance, email=Muhammad.Anees@cetecom.com Date: 2014.08.12 15:37:19 -07'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	6370 Nancy Ridge Drive, Suite 101 San Diego, CA 92121 U.S.A.
Telephone:	+1 (858) 362 2400
Fax:	+1 (858) 587 4809
Test Lab Manager:	Milton Deleon

2.2 Identification of the Client

Applicant's Name:	August Home Inc
Street Address:	665 3rd St. Suite 100
City/Zip Code	San Francisco CA 94107
Country	United States
Contact Person:	Shannon Petty
Phone No.	(415)652-4108
Fax:	
e-mail:	shannon@august.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Gener8, Inc.
Manufacturers Address:	500 Mercury Drive
City/Zip Code	Sunnyvale, CA 94085
Country	USA

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	August
Model Number:	ASL-01
FCC-ID :	2AB6UASL01
IC ID:	12163A-ASL01
Product Description:	Automatic Door lock -remote controllable via Bluetooth Low Energy and application running on IOS and/or Android. System contains x4 AA batteries for power.
Technology / Type(s) of Modulation:	Bluetooth v4.0, LE, using FHSS with GFSK
Operating Frequency Ranges (MHz) / Channels:	Nominal band: 2400 – 2483.5; Center to center: 2402(ch 0) – 2480(ch 39), 40 channels
Antenna info:	IFA PCB antenna (meander pattern) Manufacturer stated antenna gain: 3dBi
Other Radios included:	None
Rated Operating Voltage Range:	Vmin: 4.00V/ Vnom: 6.00V/ Vmax: 6.50V
Rated Operating Temperature Range:	Tmin: 0^{o}C/ Tmax: 50^{o}C
Test Sample Status:	Prototype

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	Sample	HW/SW Version	Note
1	L1GREU00002	Radiated	8A/20160618	
2	L1GREU00003	Conducted	8A/20160618	

3.3 Identification of Accessory Equipment

STE #	Type	Manufacturer	Model	Serial Number
1	Not Applicable			

3.4 Environmental conditions during Test:

The following environmental conditions were maintained during the course of testing:
Ambient Temperature: 20-25^{o}C
Relative humidity: 40-60%

3.5 Dates of Testing:

06/19/2014-06/30/2014

3.6 Test Mode of Operation

Mode	Data rate (Mbps)	Modulation scheme
802.15 BTLE	1.0	GFSK

4 Subject of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-210 Issue 8, Annex 8 of Industry Canada.

This test report is to support a request for new equipment authorization under the
FCC ID**: 2AB6UASL01** and IC ID**: 12163A-ASL01**

During the testing process the EUT was tested on low, mid and high channels for all the supported modes of operation. For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

5 Summary of Measurement Results

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§15.247(e) RSS210 A8.2(b)	Power Spectral Density	Nominal	802.15 (LE)	■	☐	☐	☐	Complies
§15.247(a)(1) RSS210 A8.2(a)	Emission Bandwidth	Nominal	802.15 (LE)	■	☐	☐	☐	Complies
§15.247(b)(1) RSS210 A8.4(4)	Maximum Peak Conducted Output Power and EIRP	Nominal	802.15 (LE)	■	☐	☐	☐	Complies
§15.247(d) RSS210 A8.5	Band edge compliance	Nominal	802.15 (LE)	■	☐	☐	☐	Complies
§15.247(d) §15.209 RSS210 A8.5	TX Spurious emissions-Conducted	Nominal	802.15 (LE)	☐	☐	☐	■	1
§15.247(d) §15.209 RSS210 A8.5 RSS-Gen 7.2.2	TX Spurious emissions-Radiated	Nominal	802.15 (LE)	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

1. Conducted spurious emissions test against non-restricted band limits is NOT PERFORMED since radiated spurious emissions against more stringent restricted band limits over the complete measurement range (9kHz to 26GHz) is passed.

6 Measurements Procedure

6.1 Radiated Measurement Procedure

ANSI C63.4 (2009) Section 8.3.1.1: Exploratory radiated emission measurements

Exploratory radiated measurements shall be performed at the measurement distance or at a closer distance than that specified for compliance to determine the emission characteristics of the EUT. At near distances, for EUTs of comparably small size, it is relatively easy to determine the spectrum signature of the EUT and, if applicable, the EUT configuration that produces the maximum level of emissions. A shielded room may be used for exploratory testing, but may have anomalies that can lead to significant errors in amplitude measurements.

Broadband antennas and a spectrum analyzer or a radio-noise meter with a panoramic display are often useful in this type of testing. It is recommended that either a headset or loudspeaker be connected as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT when the exploratory and final testing is performed in an OATS with strong ambient signals. Caution should be taken if either antenna height between 1 and 4 meters or EUT azimuth is not fully explored. Not fully exploring these parameters during exploratory testing may require complete testing at the OATS or semi-anechoic chamber when the final full spectrum testing is conducted.

The EUT should be set up in its typical configuration and arrangement, and operated in its various modes. For tabletop systems, cables or wires should be manipulated within the range of likely arrangements. For floor-standing equipment, the cables or wires should be located in the same manner as the user would install them and no further manipulation is made. For combination EUTs, the tabletop and floor-standing portions of the EUT shall follow the procedures for their respective setups and cable manipulation. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions.

For each mode of operation required to be tested, the frequency spectrum shall be monitored. Variations in antenna height between 1 and 4 m, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) shall be explored to produce the emission that has the highest amplitude relative to the limit. A step-by-step technique for determining this emission can be found in Annex C.

When measuring emissions above 1 GHz, the frequencies of maximum emission shall be determined by manually positioning the antenna close to the EUT and by moving the antenna over all sides of the EUT while observing a spectral display. It will be advantageous to have prior knowledge of the frequencies of emissions above 1 GHz. If the EUT is a device with dimensions approximately equal to that of the measurement antenna beam width, the measurement antenna shall be aligned with the EUT.

ANSI C63.4 (2009) Section 8.3.1.2: Final radiated emission measurements

Based on the measurement results in 8.3.1.1, the one EUT, cable and wire arrangement, and mode of operation that produces the emission that has the highest amplitude relative to the limit is selected for the final measurement. The final measurement is then performed on a site meeting the requirements of 5.3, 5.4, or 5.5 as appropriate without variation of the EUT arrangement or EUT mode of operation. If the EUT is relocated from an exploratory test site to a final test site, the highest emission shall be re-maximized at the final test location before final radiated emissions measurements are performed. However, antenna height and polarity and EUT azimuth are to be varied. In addition, the full frequency spectrum (for the range to be checked for meeting compliance) shall be investigated.

This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. During the full frequency spectrum investigation, particular focus should be made on those frequencies found in exploratory testing that were used to find the final test configuration, mode of operation, and arrangement (associated with achieving the least margin with respect to the limit). This full spectrum test constitutes the compliance measurement.

For measurements above 1 GHz, use the cable, EUT arrangement, and mode of operation determined in the exploratory testing to produce the emission that has the highest amplitude relative to the limit. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the antenna in the "cone of radiation" from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response. The antenna may have to be higher or lower than the EUT, depending on the EUT's size and mounting height, but the antenna should be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. If the transmission line for the measurement antenna restricts its range of height and polarization, the steps needed to ensure the correct measurement of the maximum emissions, shall be described in detail in the report of measurements. Data collected shall satisfy the report requirements of Clause 10.

NOTES
1— Where limits are specified by agencies for both average and peak (or quasi-peak) detection, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
2—Use of waveguide and flexible waveguide may be necessary at frequencies above 10 GHz to achieve usable signal-to noise ratios at required measurement distances. If so, it may be necessary to restrict the height search of the antenna, and special care should be taken to ensure that maximum emissions are correctly measured.
3—All presently known devices causing emissions above 10 GHz are physically small compared with the beam-widths of typical horn antennas used for EMC measurements. For such EUTs and frequencies, it may be preferable to vary the height and polarization of the EUT instead of the receiving antenna to maximize the measured emissions.

Measurement Uncertainty: ±3dB

6.1.1 Sample Calculations for Radiated Measurements

Measurements from the Spectrum Analyzer/ Receiver are used to calculate the Field Strength, taking into account the following parameters:

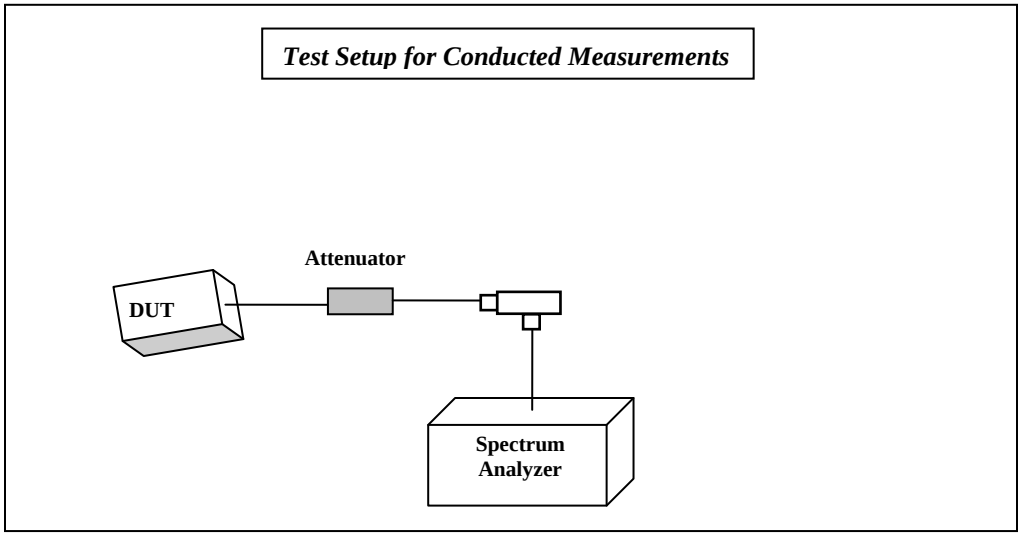
1. Measured reading in dBµV
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

FS (dBµV/m) = Measured Value on SA (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m)
Eg:

Frequency (MHz)	Measured SA (dBµV)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dBµV/m)
1000	80.5	3.5	14	98.0

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the above equation.

6.2 Conducted Measurement Procedure



1. Connect the equipment as shown in the above diagram.
2. Test instructions provided by the manufacturer is used to control the different modulations, data rates and max output power configurations.
3. Measurements are to be performed with the EUT set to the low, middle and high channels.

7 Measurements

7.1 Maximum Peak Conducted Output Power

7.1.1 Limits:

Maximum Peak Output Power:
FCC §15.247 (b)(1): 1W
IC RSS-210 issue 8, annex 8.4(2): 1W
EIRP:
IC RSS-210 issue 8, annex 8.4(2): 4W
(RSS-GEN: Antenna is only added to conducted value if it is >10dBm)

7.1.2 Test Conditions:

Tnom: 21°C; Vnom: 3.8V

7.1.3 Test Procedure

Measurement according to FCC KDB 558074 D01 v03r01 section 9.1.1

Peak Conducted Output Power
RBW ≥ DTS bandwidth of the emission being measured
VBW ≥ 3x RBW
Span ≥ 3 x RBW
Sweep = auto
Detector function = peak
Trace = max hold
Use the marker-peak function to set the marker to the peak of the emission

Antenna Gain (dBi): 3 dBi for 2.4GHz band of operation

7.1.4 Test Results:

Measured Maximum Peak Conducted Output Power (dBm)			
Mode	**Frequency (MHz)**		
	2402 Channel 0	**2440 Channel 18**	**2480 Channel 39**
	Peak	Peak	Peak
802.15 (BTLE)	-1.72	-2.17	-3.11

Calculated Maximum Peak Radiated Output Power (dBm)			
Mode	**Frequency (MHz)**		
	2402 Channel 0	**2440 Channel 18**	**2480 Channel 39**
802.15 (BTLE)	1.28	0.83	-0.11

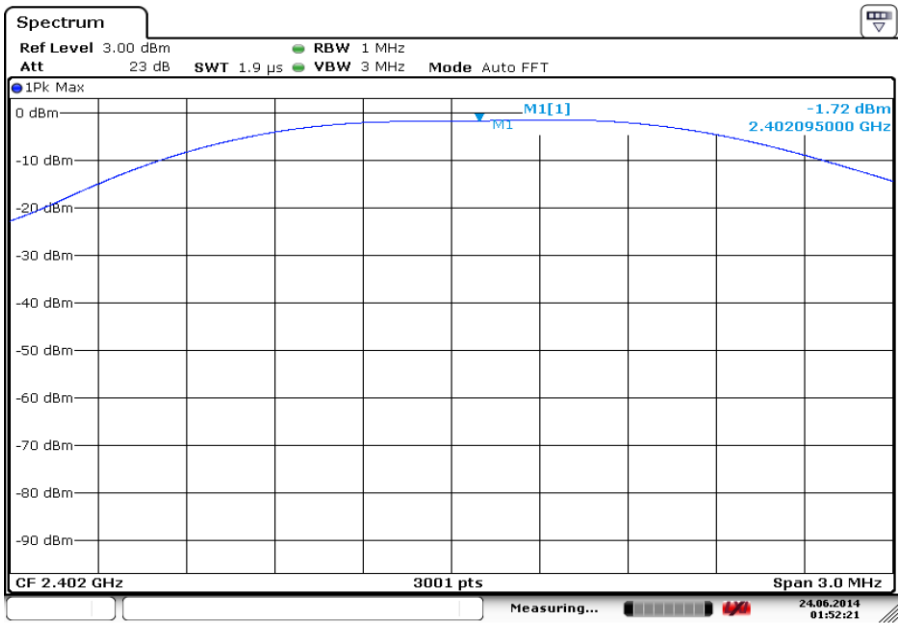
Note: Radiated EIRP is calculated as
Conducted Measurement + Antenna Gain

7.1.4.1 Measurement Verdict:

Pass.

7.1.5 Test Data/plots:

Measured Maximum Peak Conducted Output Power: 2402 MHz



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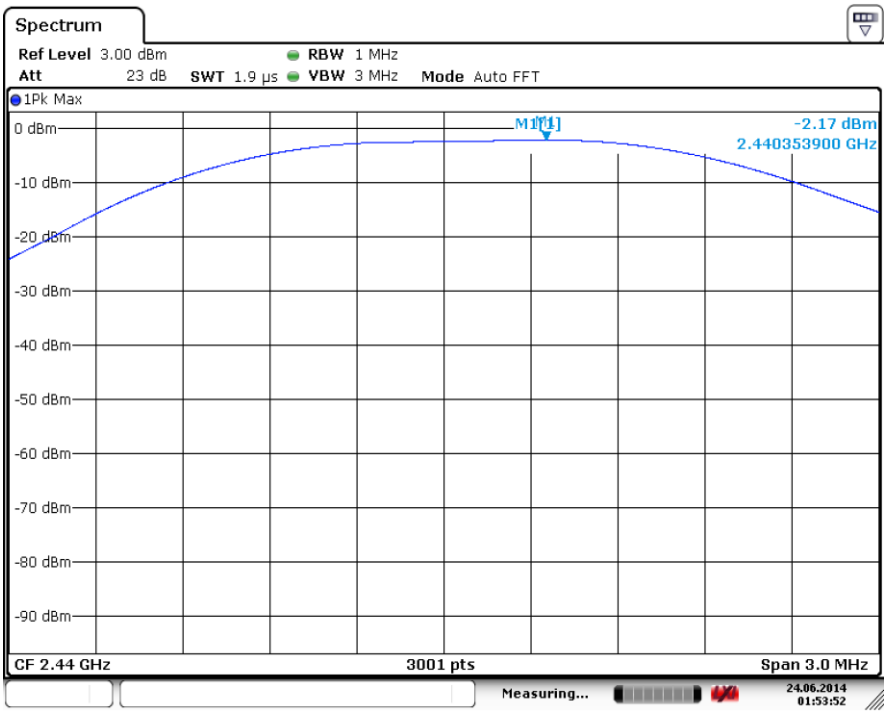
Measured Maximum Peak Conducted Output Power: 2440 MHz



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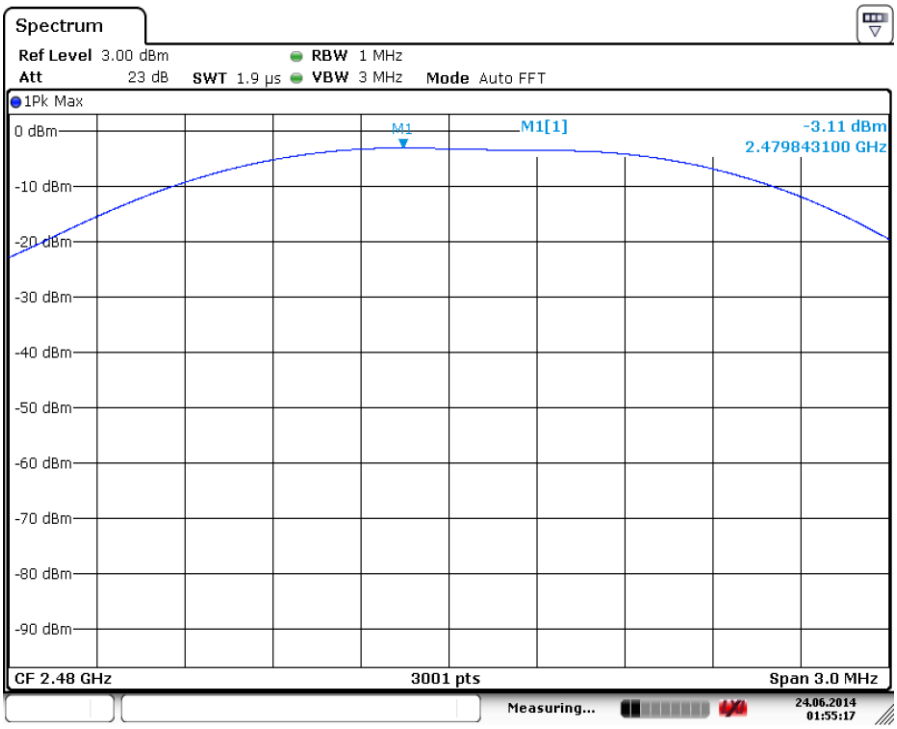
Measured Maximum Peak Conducted Output Power: 2480 MHz



7.2 Emission/ Occupied Bandwidth

7.2.1 Limits:

7.2.1.1 §15.247 (a)(2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2.2 Test Conditions:

Tnom: 22 ºC; Vnom: 3.8V

7.2.3 Test Procedure

Measurement according to FCC KDB 558074 D01 v01r03 section 8.1

For 6 dB bandwidth:

Spectrum Analyzer settings:

Span= Wide enough to capture the entire emission bandwidth
RBW= 100 KHz
VBW≥ 3xRBW
Detector: Peak-
Sweep Time: Auto
Trace = Max Hold

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the peak level measured in the fundamental emission.

For 99% bandwidth:

Use the occupied bandwidth in the measurement function of the spectrum analyzer with power bandwidth setting at 99%

7.2.4 Test Results:

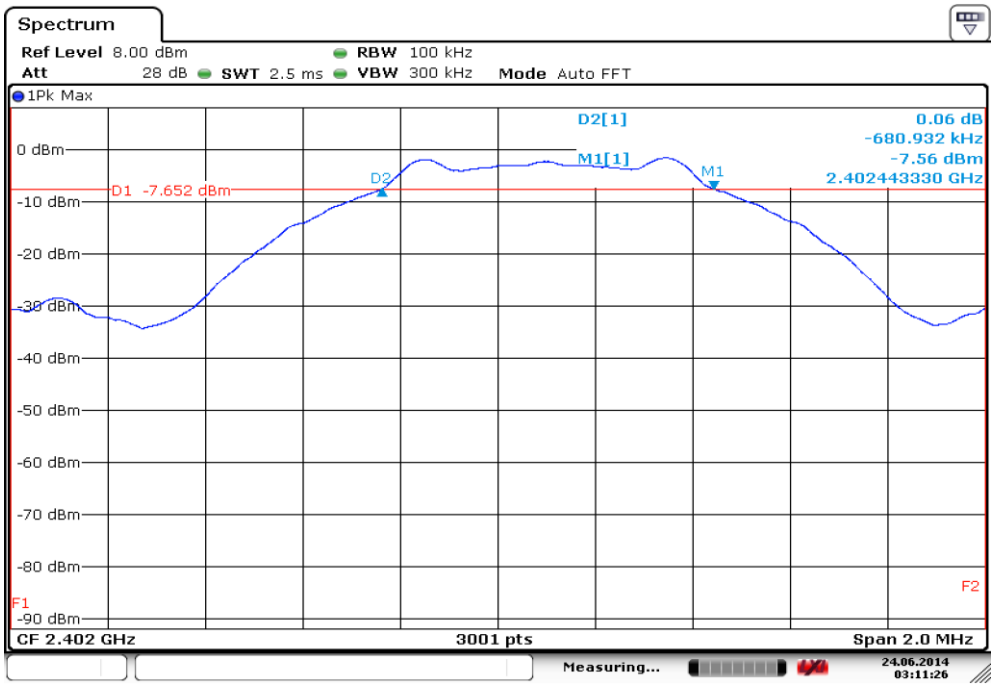
Occupied Bandwidth (MHz)						
Mode	Frequency (MHz)					
	2402 Channel 0		2440 Channel 18		2480 Channel 25	
	6dB (KHz)	99% (GHz)	6dB (KHz)	99% (GHz)	6dB (KHz)	99% (GHz)
802.15.1	680.9	1.12	683.8	1.10	686.7	1.09

7.2.4.1 Measurement Verdict:

Pass.

7.2.5 Test Data/plots:

6dB Bandwidth: 2402 MHz



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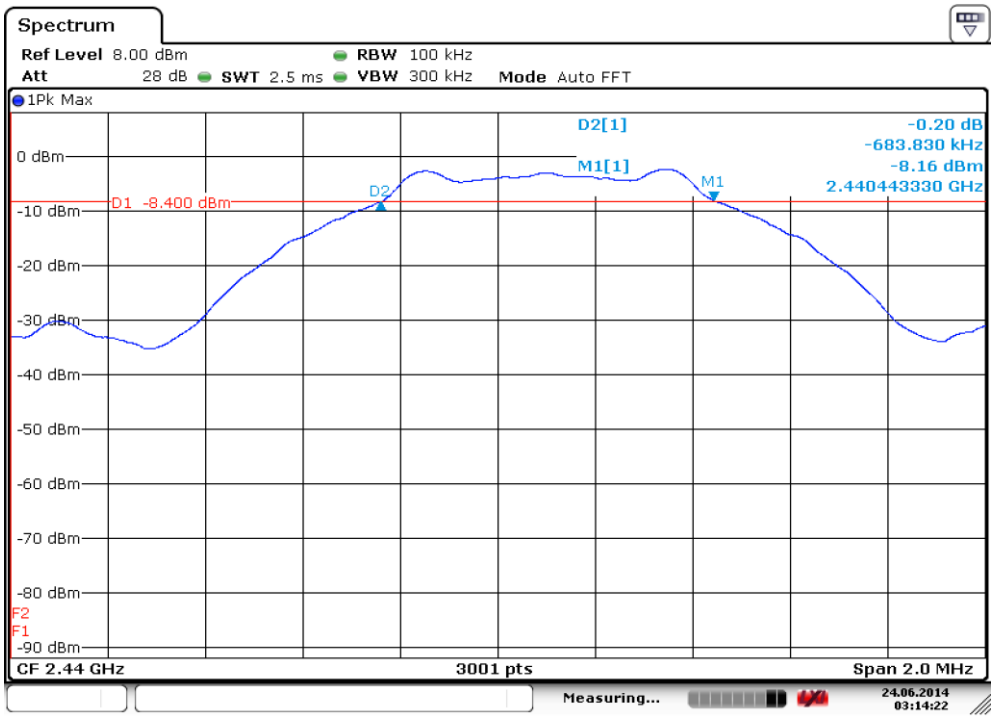
6dB Bandwidth: 2440 MHz



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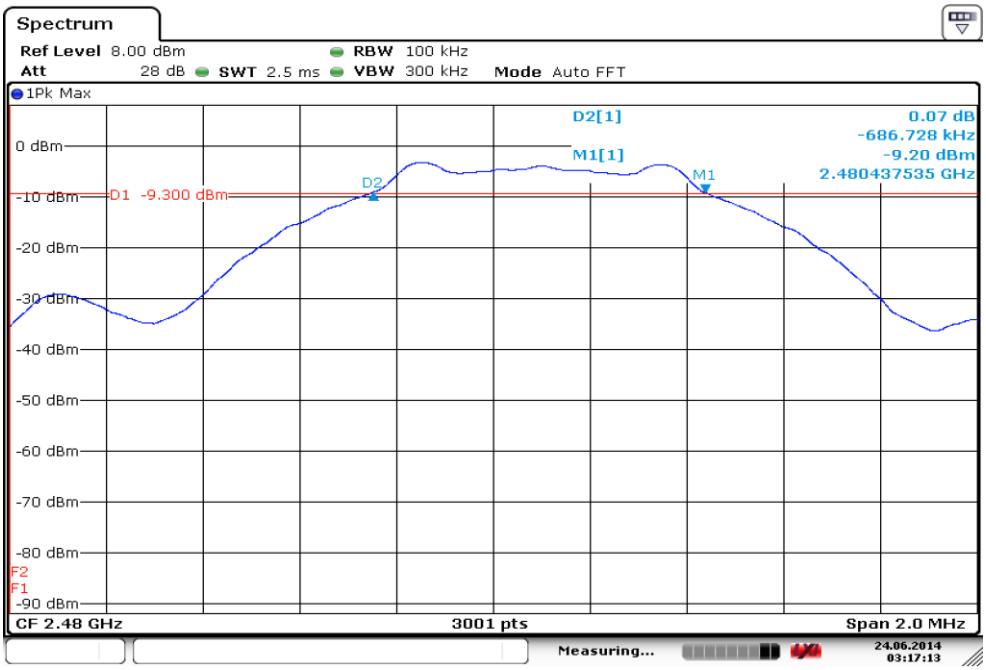
6dB Bandwidth: 2480 MHz



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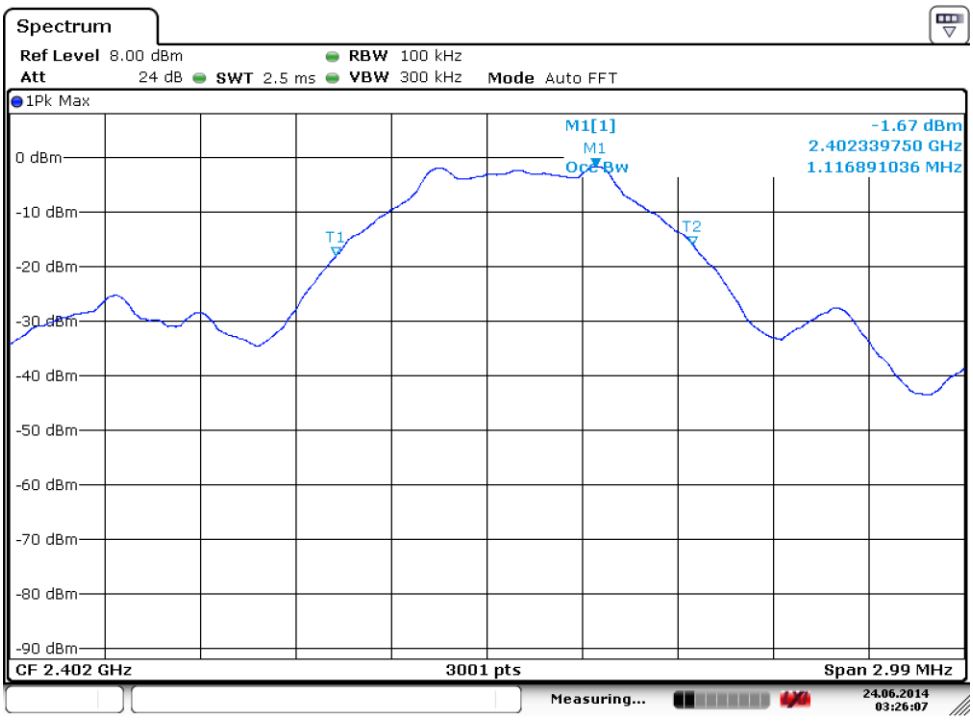
99% Bandwidth: 2402 MHz



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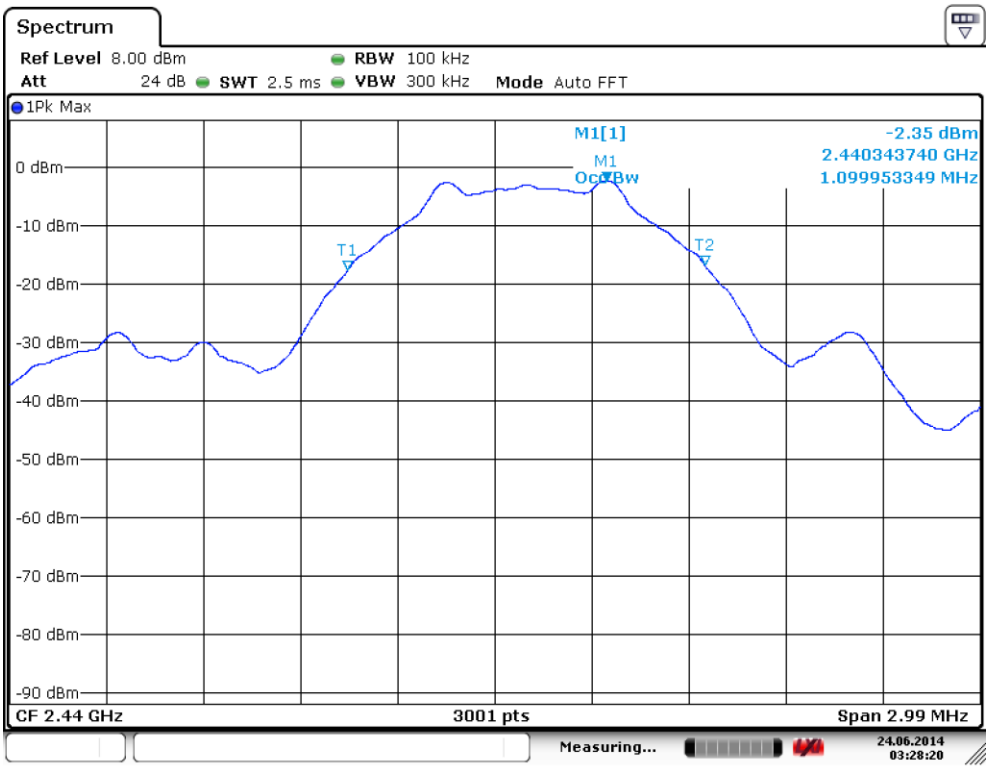
99% Bandwidth: 2440 MHz



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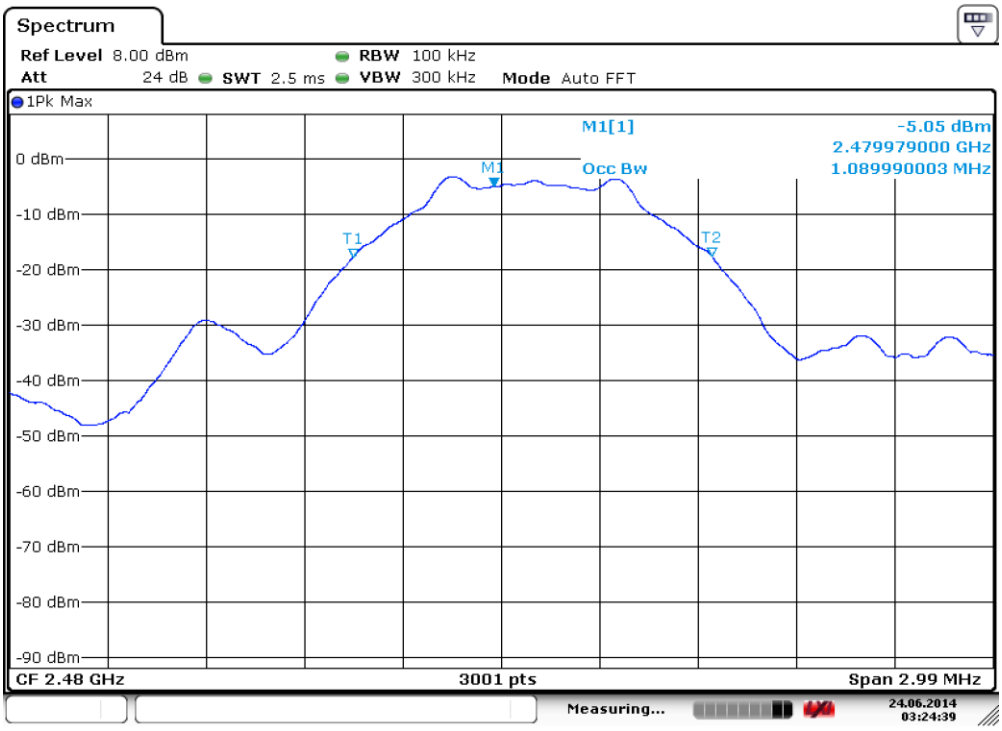
99% Bandwidth: 2480 MHz



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7.3 Maximum Power Spectral Density Level in the Fundamental Emission

7.3.1 Limits:

§ 15.247 (e)
RSS-210 A8.2 (b)
For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

7.3.2 Test procedure:

Measurement according to FCC KDB 558074 D01 V03R01 section 10.2

1. Set the analyzer center frequency to DTS channel center frequency
2. Span = 1.5 x DTS channel Bandwidth
3. RBW = 100 KHz; VBW = 300 KHz; Detector: Peak – Max hold
4. Use the peak marker function to determine the maximum power level in any 100kHz band segment within the fundamental EBW.
5. Scale the observed power level to an equivalent value in 3KHz by adjusting using the bandwidth correction factor(BWCF) where BWCF = 10log(3kHz/100kHz)= -15.2

7.3.3 Test Conditions:

Tnom: 20ºC; Vnom: 6 VDC
Measurement Uncertainty: ±0.5dB

7.3.4 Test results:

Measured Conducted Power Spectral Density (dBm)			
Mode	**Frequency (MHz)**		
	2402 Channel 0	**2440 Channel 18**	**2480 Channel 39**
802.15 (BTLE)	-1.74	-2.70	-3.73
Measurement Uncertainty: ±0.5dB			

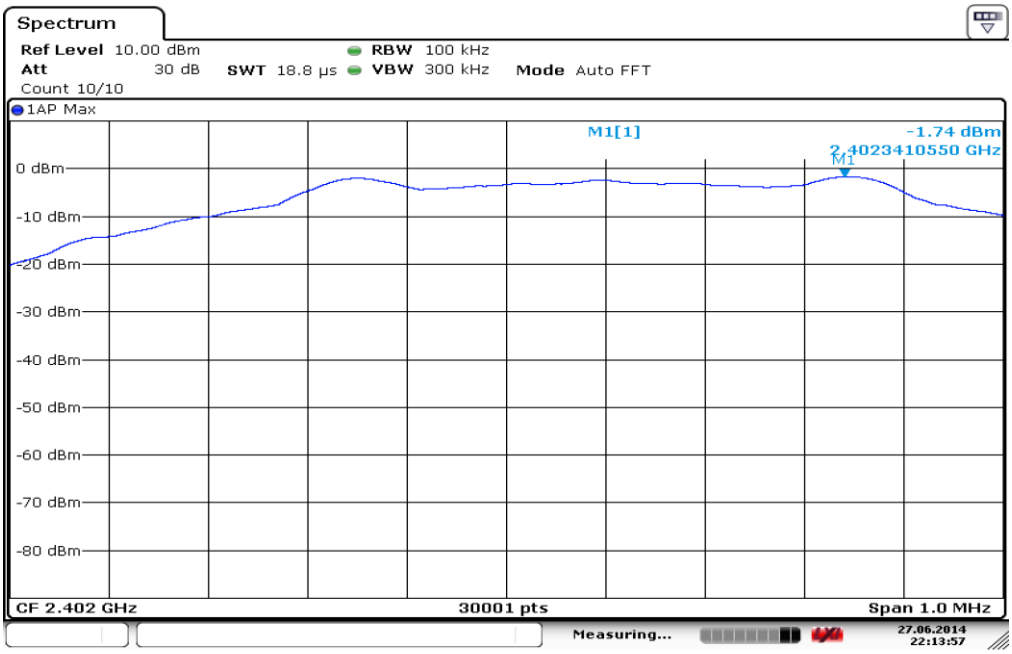
Corrected Power Spectral Density (dBm) for 3kHz BW			
Mode	**Frequency (MHz)**		
	2402 Channel 0	**2440 Channel 18**	**2480 Channel 39**
802.15 (BTLE)	-16.94	-17.9	-18.93
Measurement Uncertainty: ±0.5dB			

7.3.4.1 Measurement Verdict

Pass

7.3.5 Test Data/plots:

Power Spectral Density: 2402 MHz



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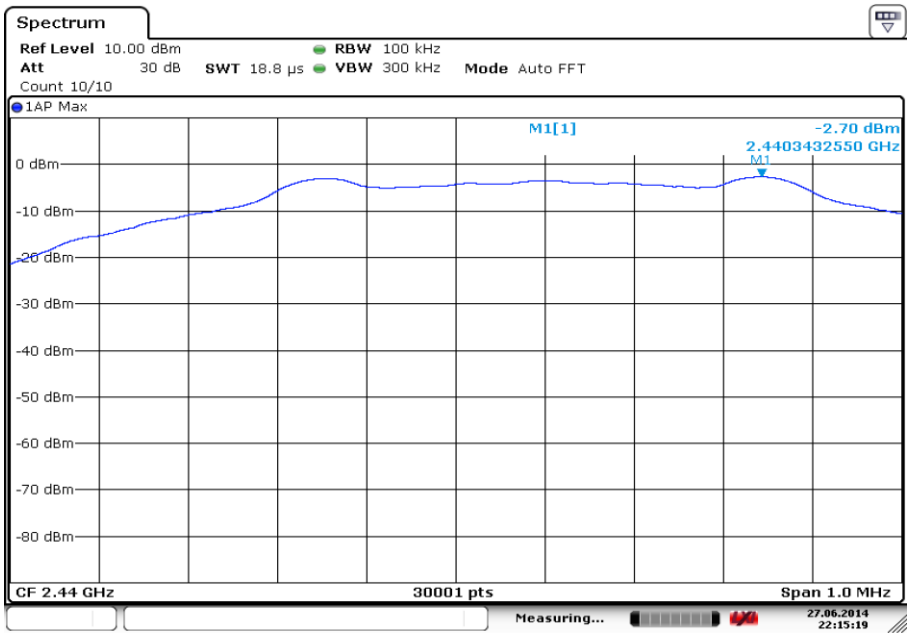
Power Spectral Density: 2440 MHz



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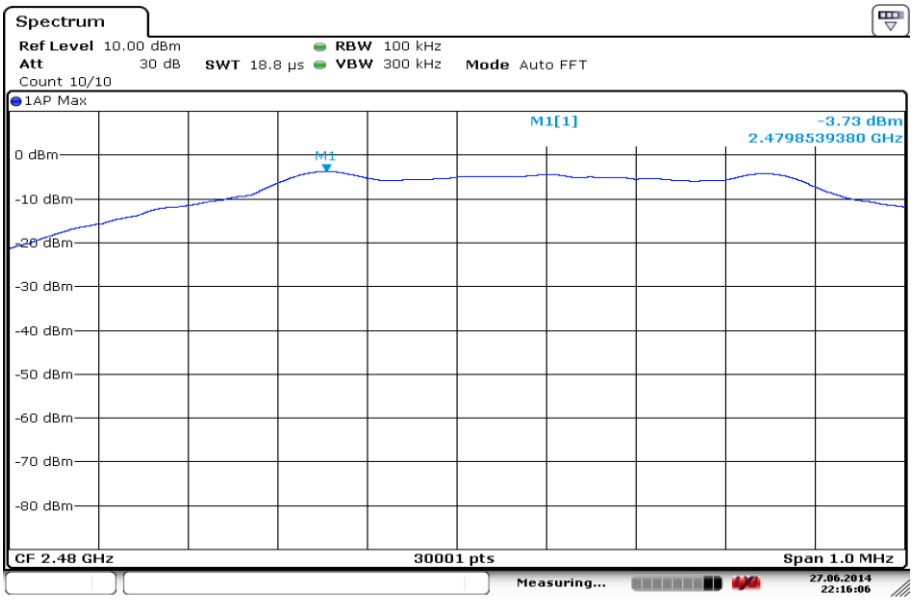
Power Spectral Density: 2480 MHz



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7.4 Band Edge Compliance – at restricted and non-restricted band edges

7.4.1 Limits:

§15.209/15.205/15.247 (d) & RSS-Gen 7.2.2/ 7.2.5, RSS-210 8.5

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).
15.209 (a) Emission Limits:

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

7.4.2 Test Conditions:
Tnom: 20°C; Vnom: 6 VDC

7.4.3 Test Procedure:
Peak measurements are made using a peak detector and RBW=1MHz.
*PEAK LIMIT= 74dBµV/m

Average measurements performed using a peak detector and according to video averaging procedure with RBW=1MHz and VBW=10Hz.
*AVG. LIMIT= 54dBµV/m

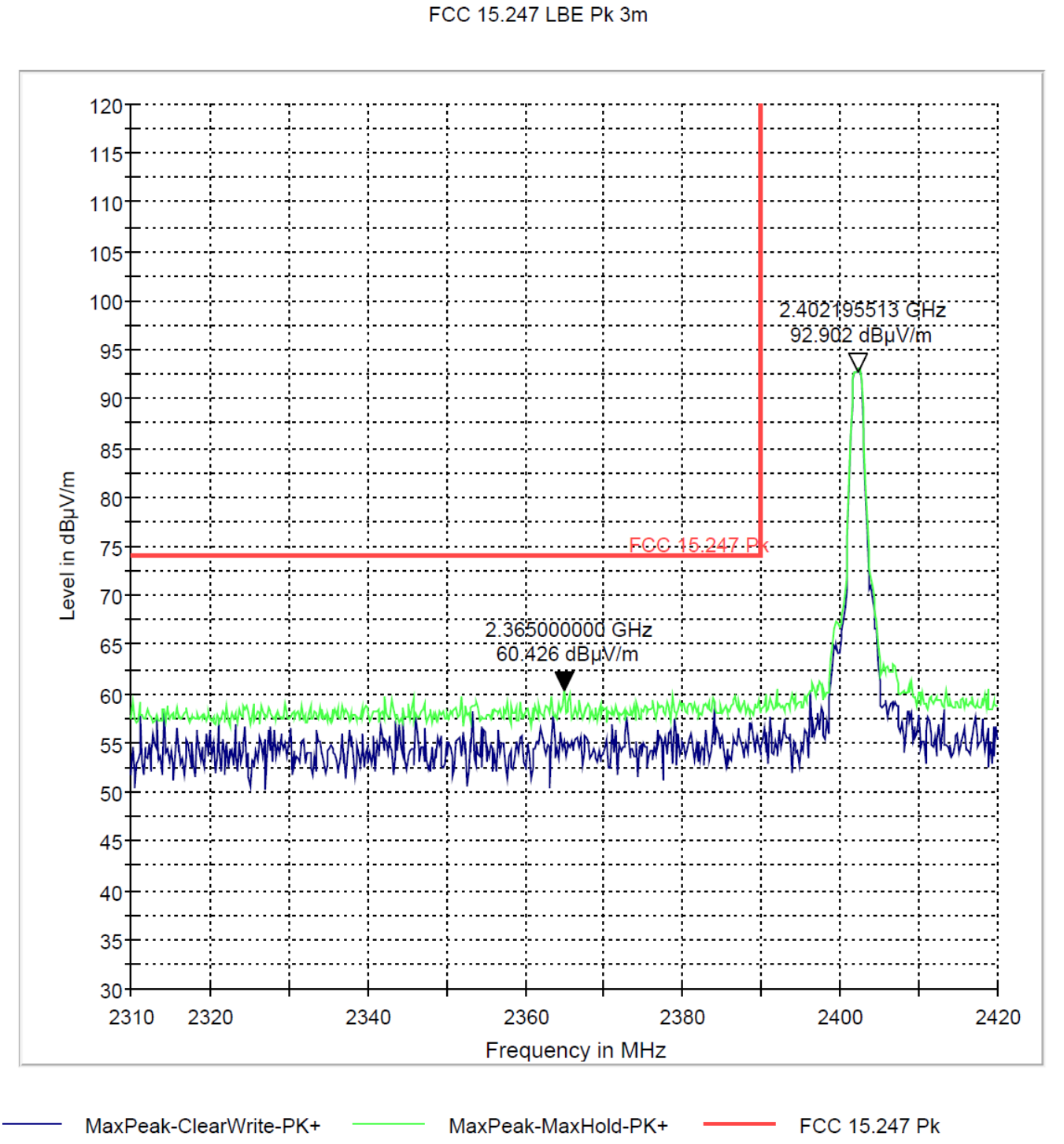
Measurement Uncertainty: ±3.0dB

7.4.3.1 Measurement Result

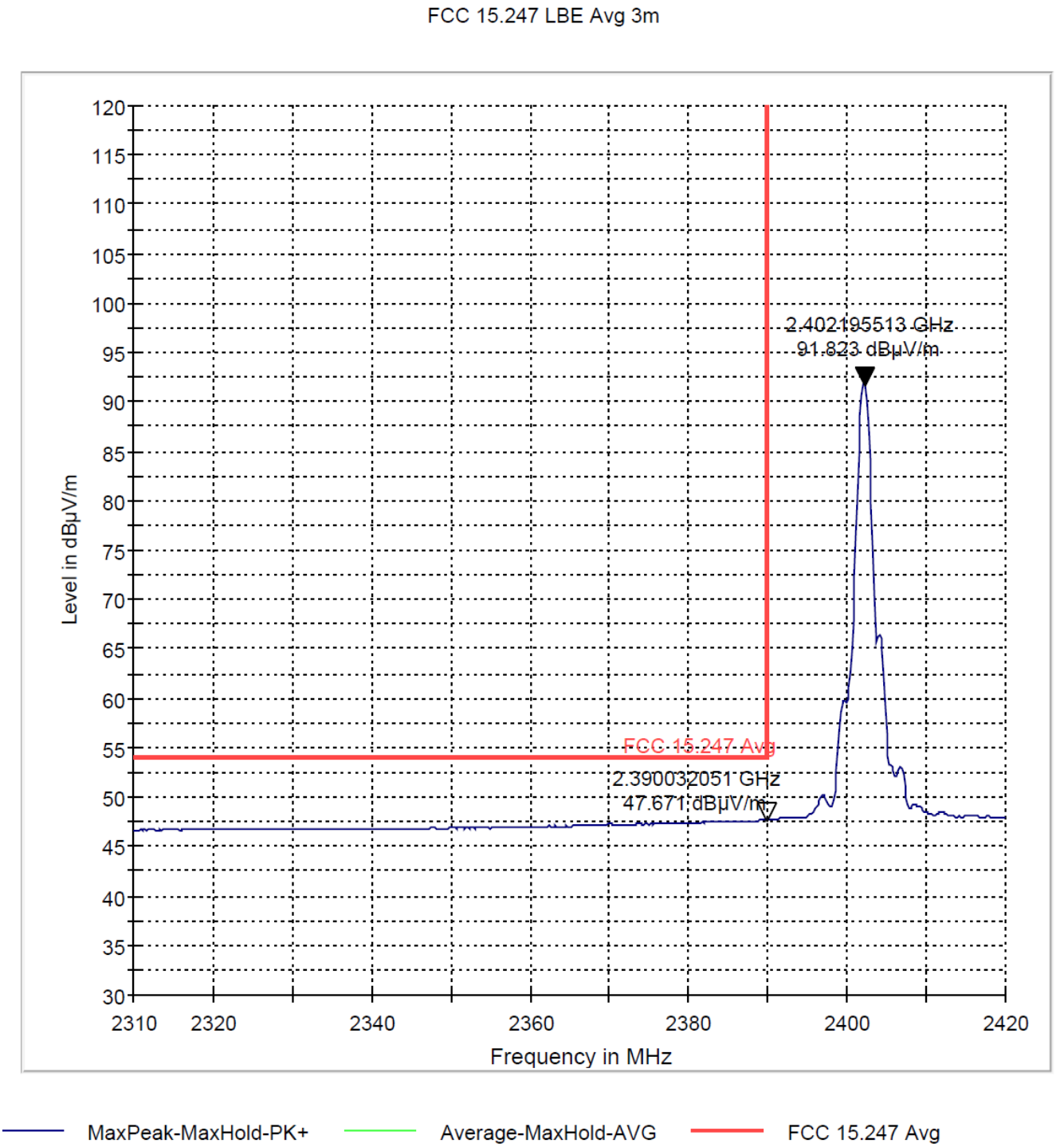
Pass.

7.4.4 Test Data/plots:

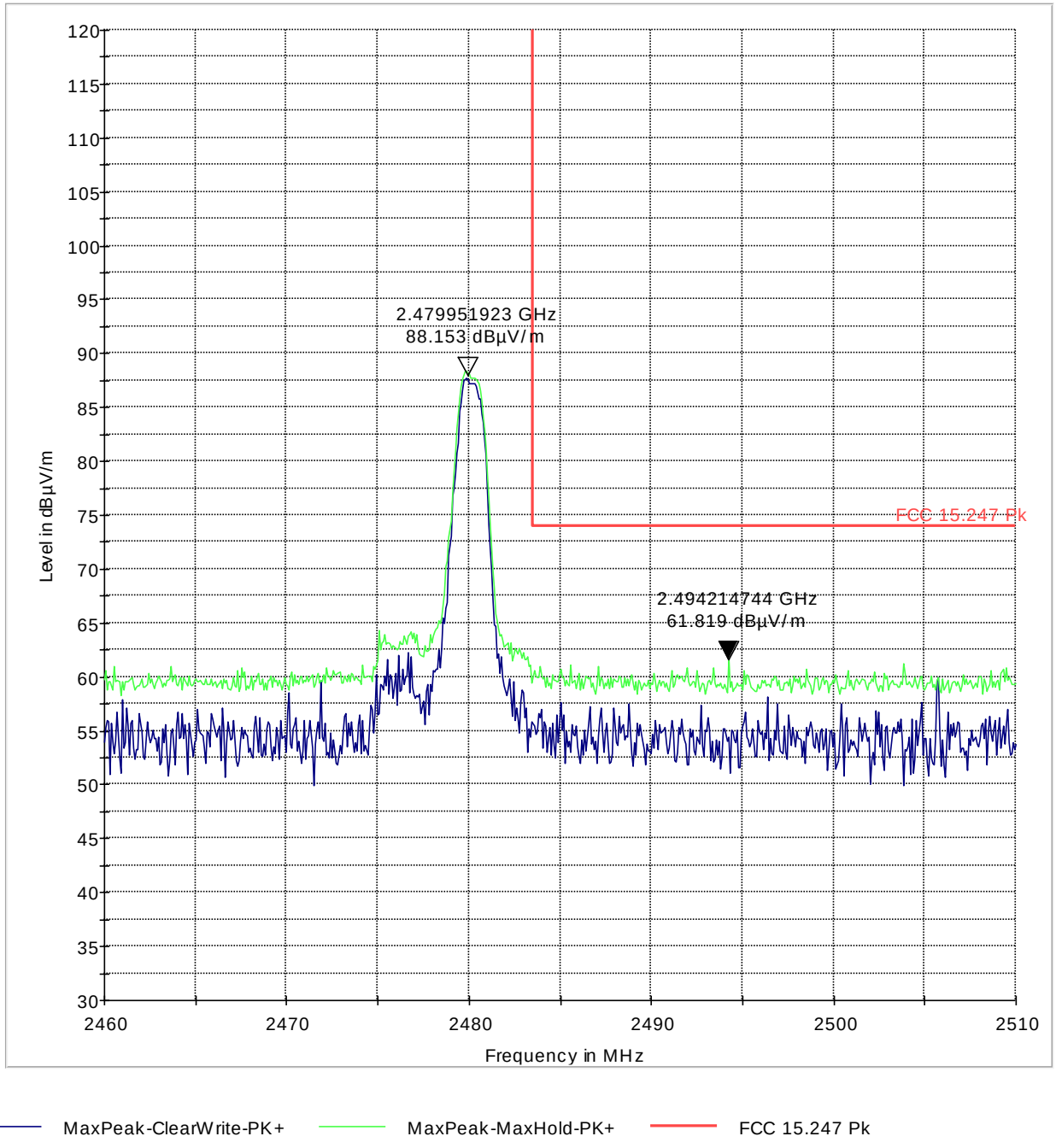
Lower band edge peak – Bluetooth mode: 2402 MHz



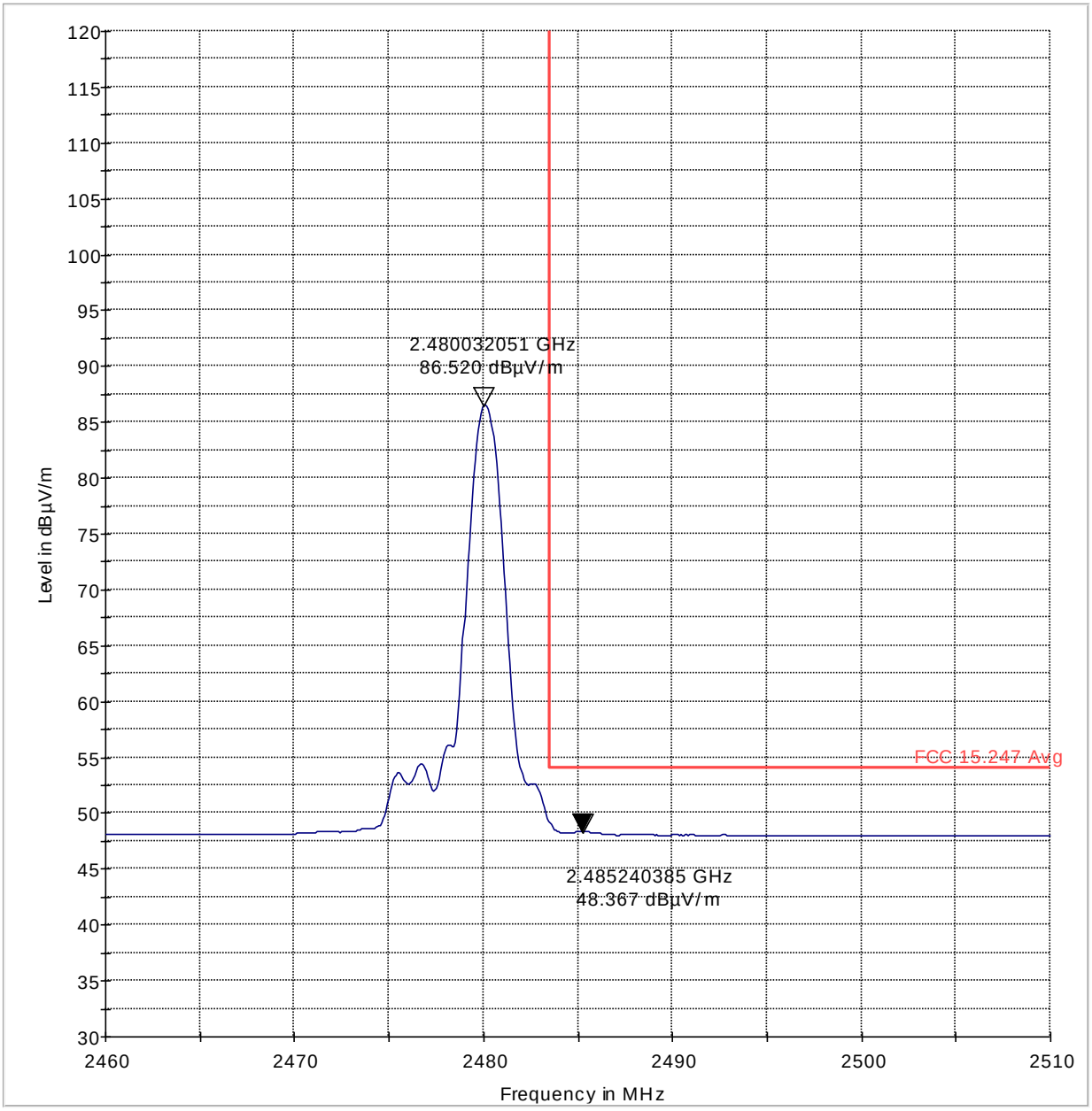
Lower band edge average -Bluetooth mode: 2402 MHz



Higher band edge peak -Bluetooth mode: 2480 MHz



Higher band edge average-Bluetooth mode: 2480 MHz



7.5 Transmitter Spurious Emissions- Radiated

7.5.1 Limits:

§15.209/15.205/15.247 & RSS-Gen 7.2.2/ 7.2.5, RSS-210 A8.5

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

Table 1:

Frequency of emission (MHz)	Field strength (µV/m)	Measurement Distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30

Table 2:

Frequency of emission (MHz)	Field strength (µV/m)
30–88	100 (40dBµV/m)
88–216	150 (43.5 dBµV/m)
216–960	200 (46 dBµV/m)
Above 960	500 (54 dBµV/m)

7.5.2 Test Conditions:
Tnom: 20°C; Vnom: 6 VDC

7.5.3 Measurement procedure:
Measurement according to ANSI C63.10:2009 (also refer to section 6.1 in this test report)

7.5.4 Test Result:
Plots reported here represent the worst case emissions for horizontal and vertical antenna polarizations and for three orientations of the EUT.

Unless mentioned otherwise, the emissions outside the limit lines in the plots are from the transmit signal.

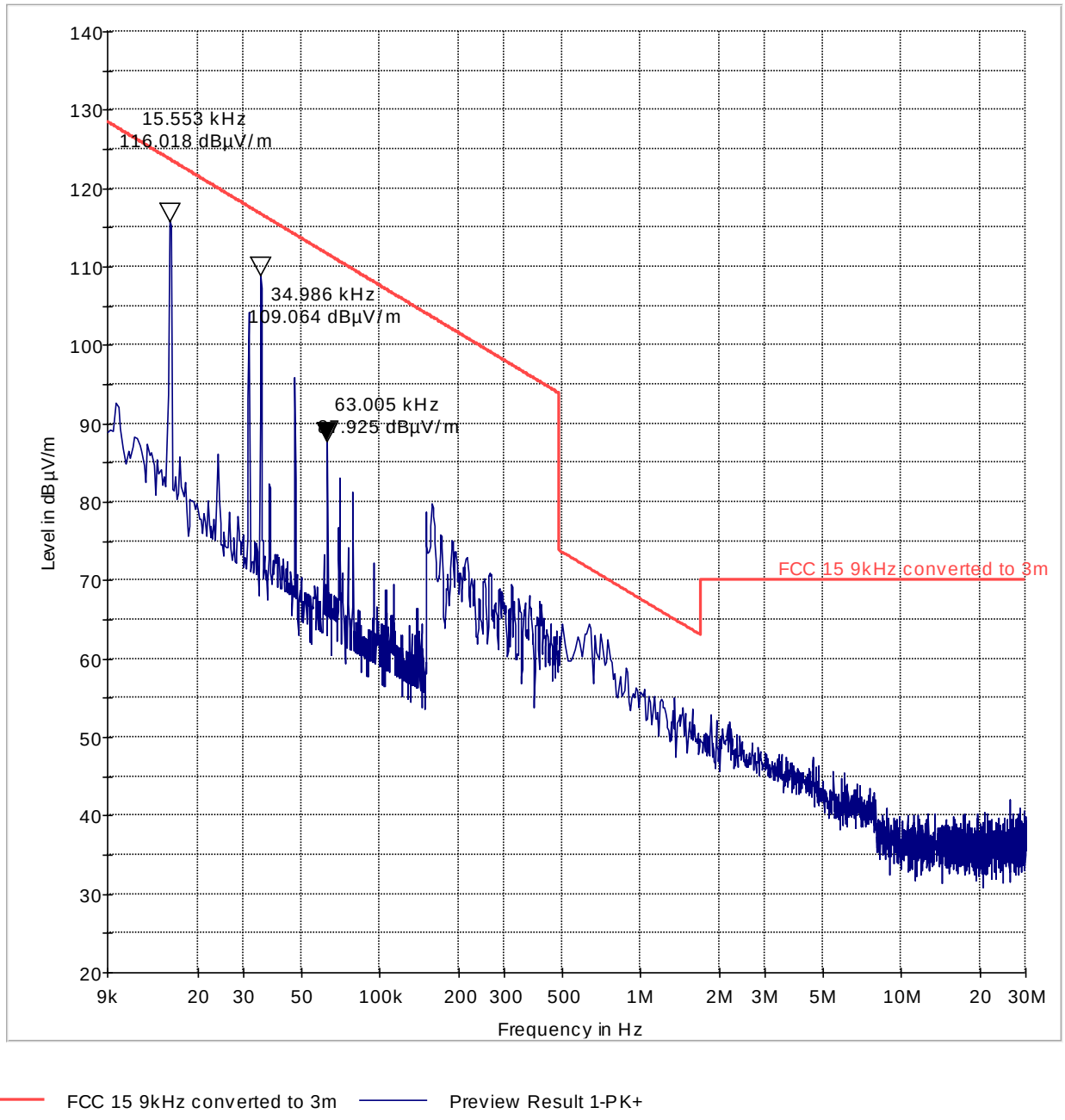
Measurement Uncertainty: ±3.0dB

7.5.4.1 Measurement Verdict

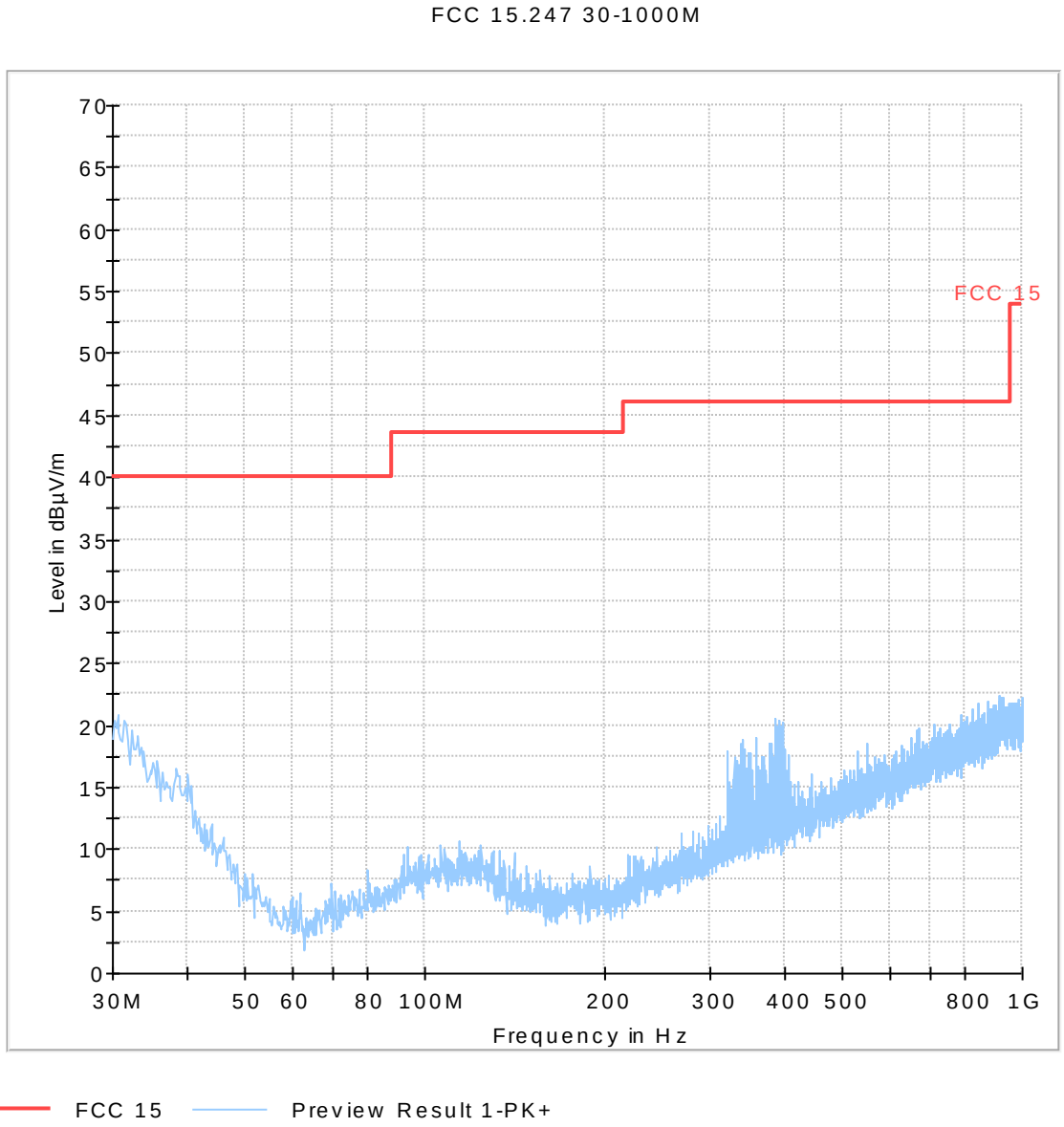
Pass.

7.5.5 Test data/ plots:

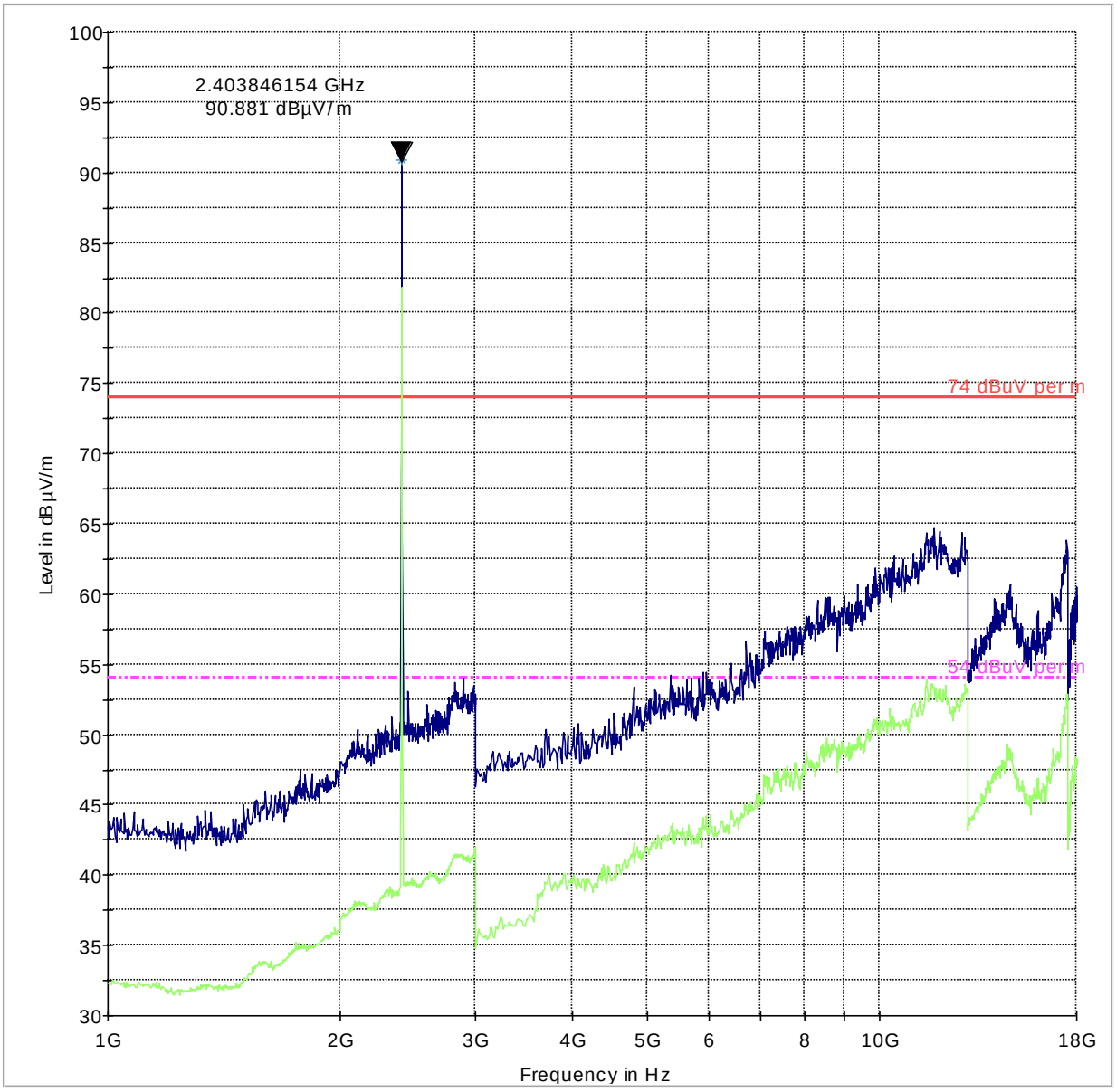
Transmitter Radiated Spurious Emission- 802.15 (LE); <30MHz
Note: Worst case representation for all channels of operation in this frequency range-
Limits adjusted for 3m measurement.



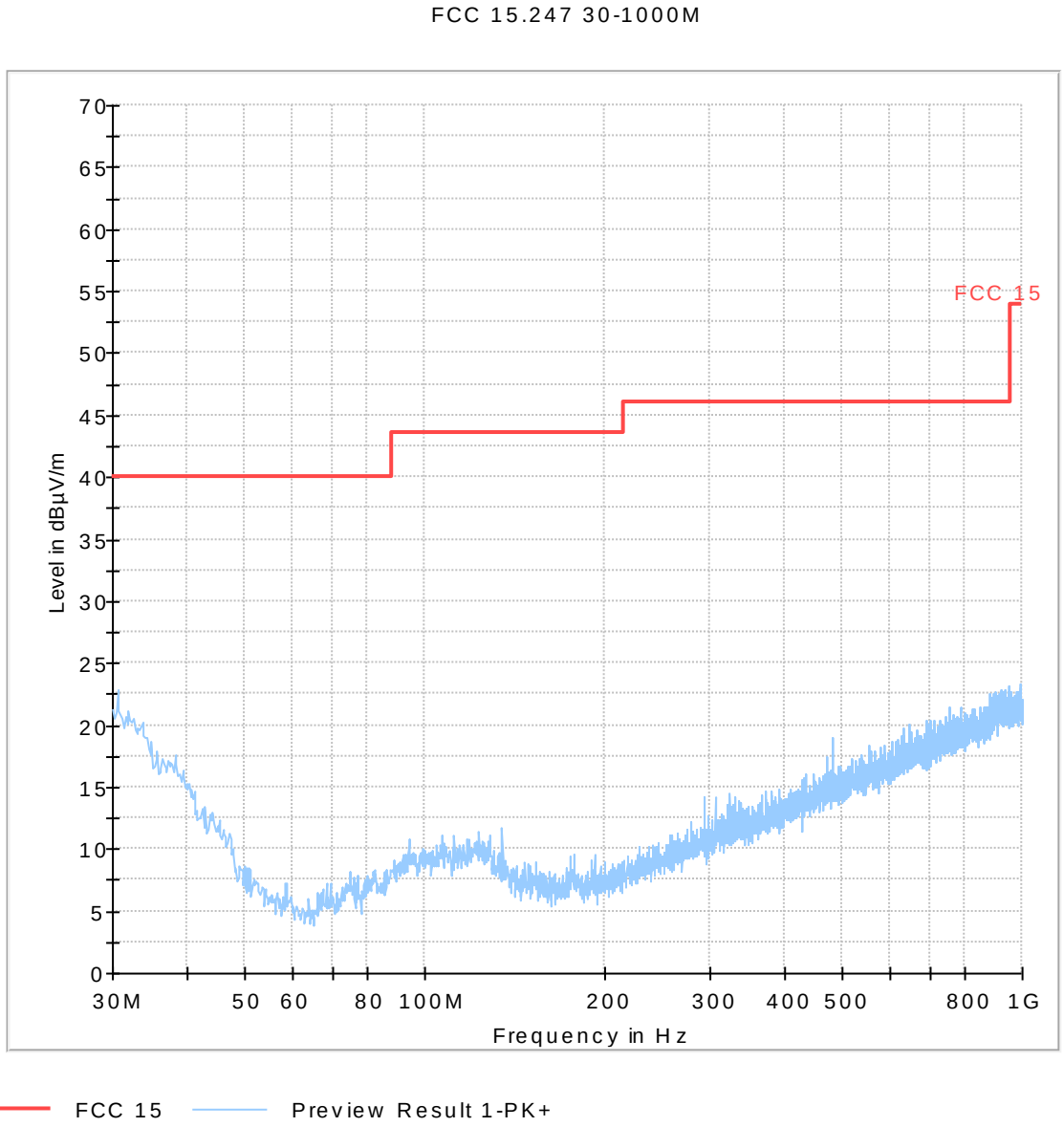
Transmitter Radiated Spurious Emission- Ch0 (2402 MHz): 30M-1GHz



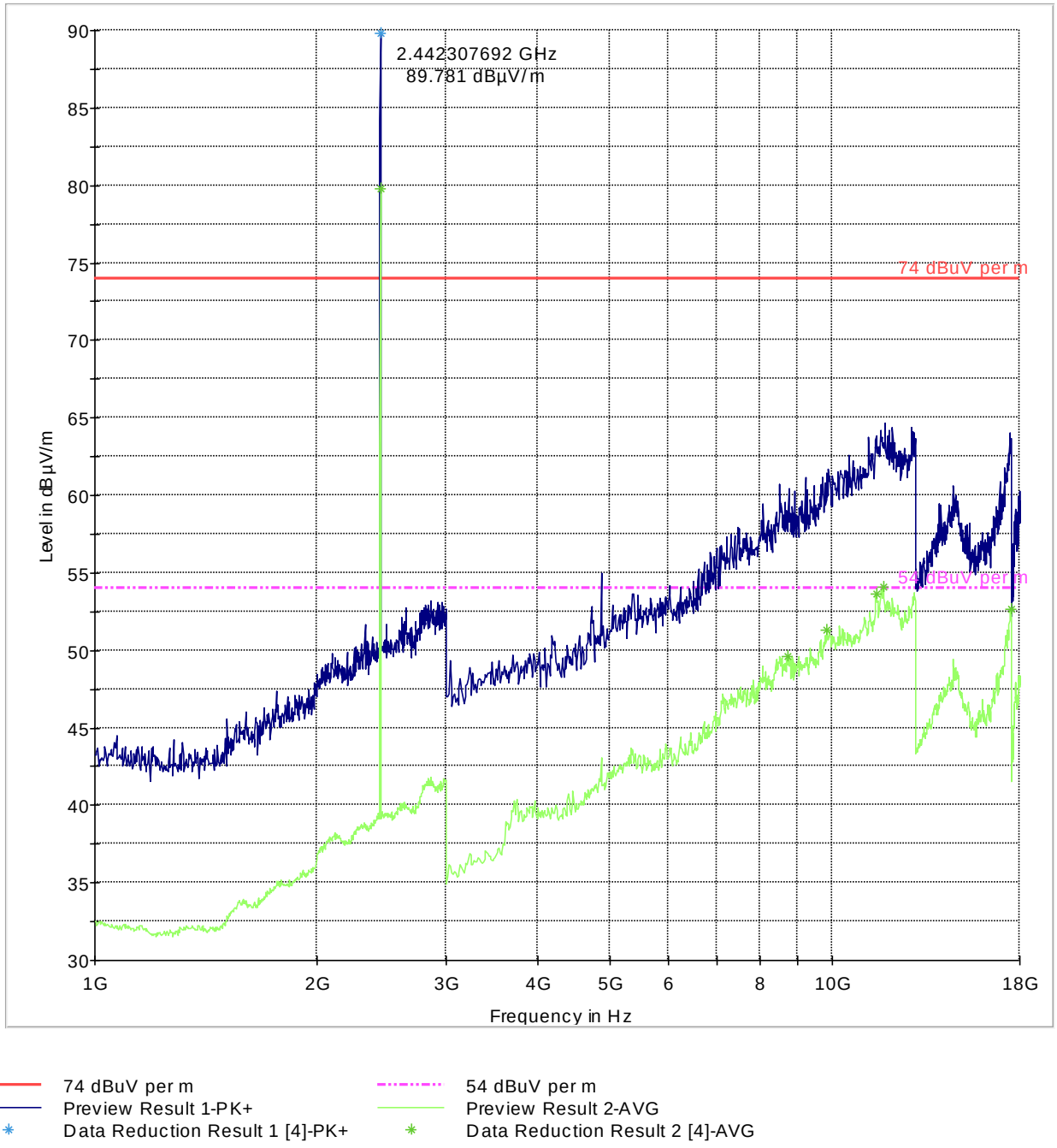
Transmitter Radiated Spurious Emission- Ch0 (2402 MHz): 1G-18GHz
Emission above the limit line from the transmitter.



Transmitter Radiated Spurious Emission- Ch18 (2440 MHz): 30M-1GHz

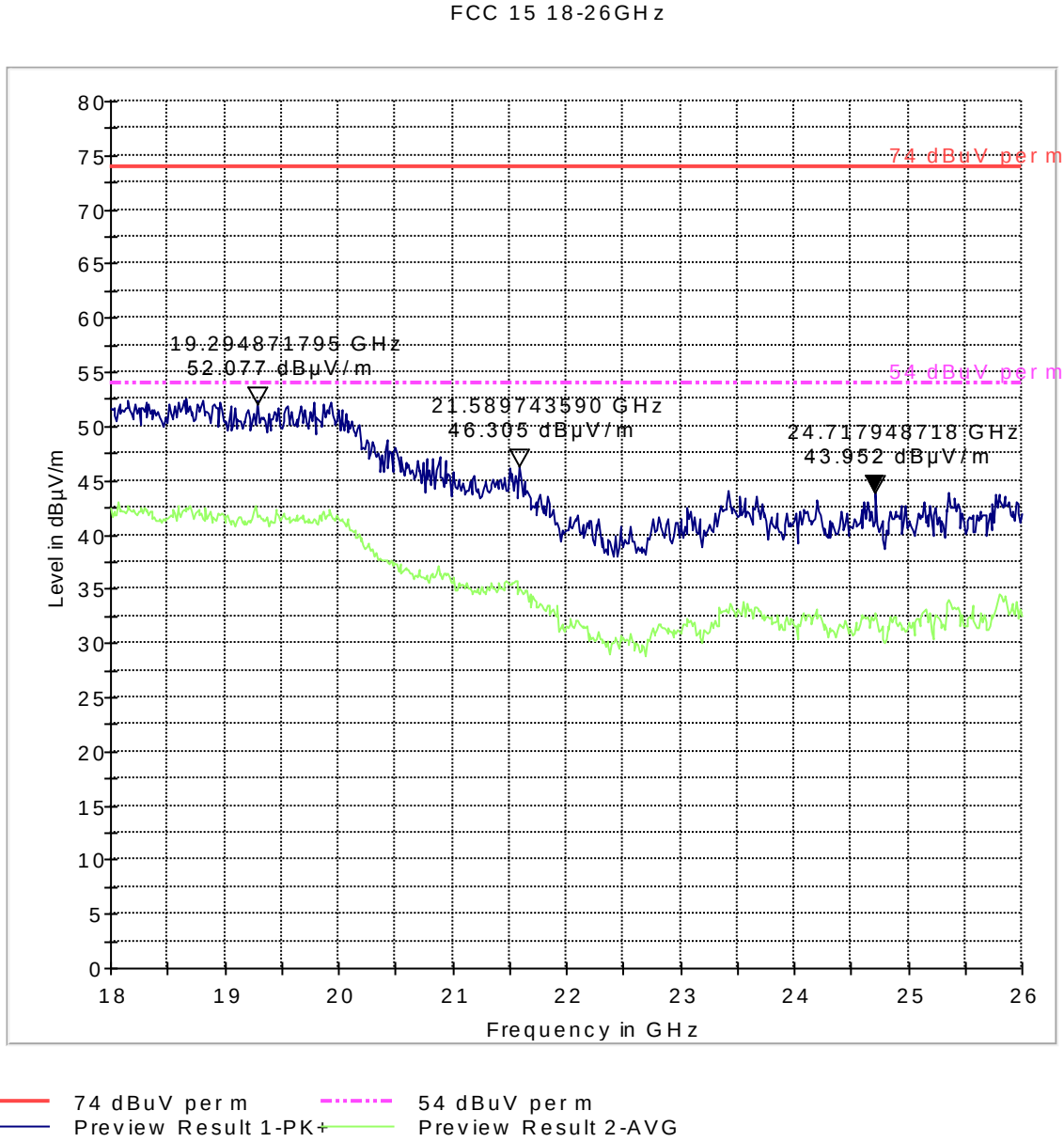


Transmitter Radiated Spurious Emission- Ch18(2440 MHz): 1G-18GHz
Emission above the limit line from the transmitter.

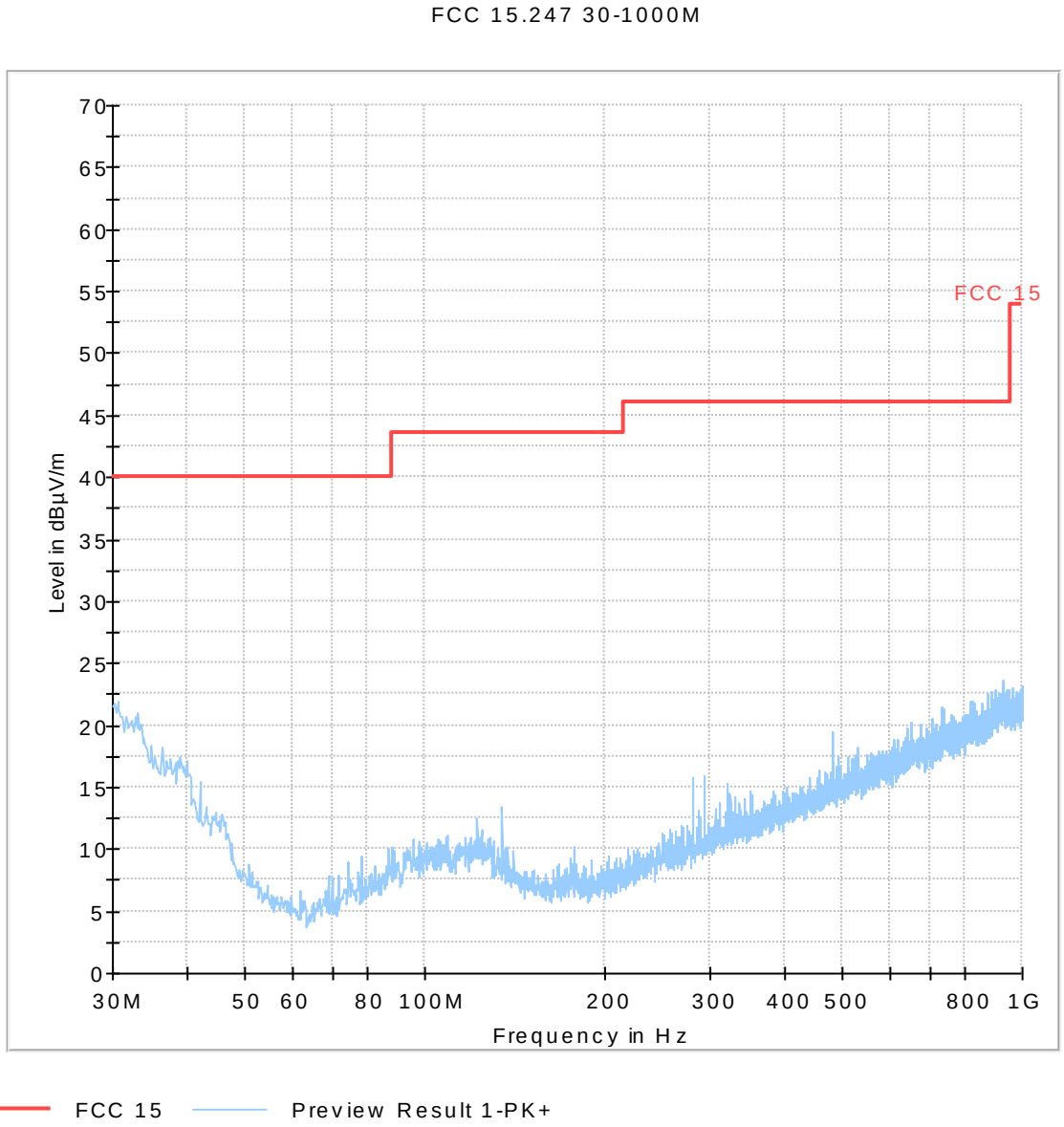


Transmitter Radiated Spurious Emission- Ch18 (2440 MHz): 18G-26GHz

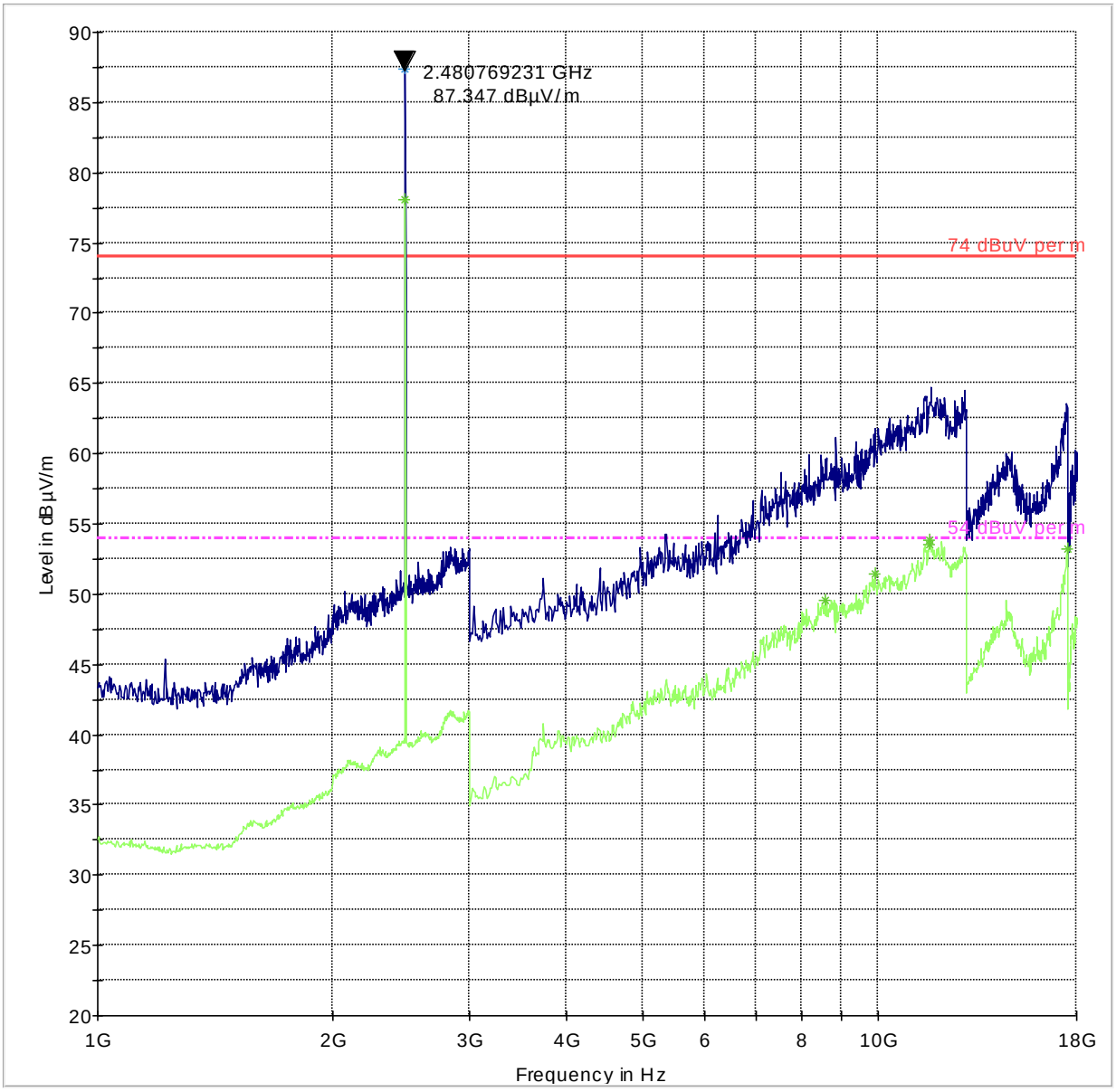
Note: Worst case representation of all channels



Transmitter Radiated Spurious Emission- Ch39 (2480 MHz): 30M-1GHz



Transmitter Radiated Spurious Emission- Ch39 (2480 MHz): 1G-18GHz
Emission above the limit line from the transmitter.



8 Test Equipment and Ancillaries used for tests

8.1 San Diego EMC Lab

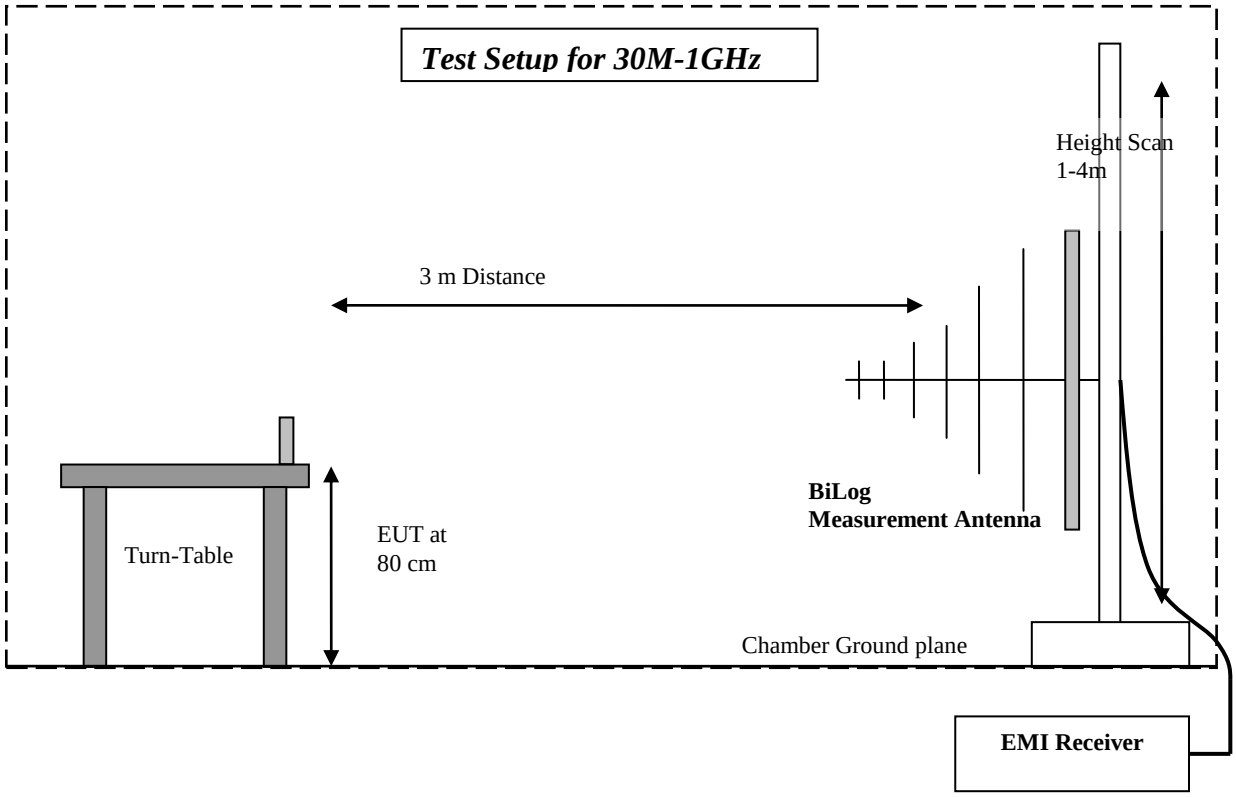
Equipment Name	Manufacturer	Type/Model	Serial No.	Cal Date	Cal Interval	Next cal date
3m Semi- Anechoic Chamber:						
Spectrum Analyzer	Rohde und Schwarz	FSU 26	200302	6/2013	2 years	6/2015
Receiver	Rohde und Schwarz	ESR3	101663	2/2013	2 years	2/2015
LISN	Rohde und Schwarz	ESV 216	101129	1/2013	2 years	1/2015
Radiocommunication Tester	Rohde and Schwarz	CMU 200	121672	7/2013	2 years	7/2015
Log Periodic Antenna	Rohde and Schwarz	HL 050	100515	4/2013	3 year	4/2016
Ultralog Antenna	Rohde and Schwarz	HL 562	100495	2/2012	3 year	2/2015
Open Switch Control Unit	Rohde and Schwarz	OPS 130	10085	n/a		
Extention Unit Open Switch Control Unit	Rohde and Schwarz	OSP 150	10086	n/a		
Turn Table TT	Maturo	1.5 SI	TT 1.5SI/204/6070910	n/a		
Compact antenna Mast	Maturo	CAM 4.0-P	CAM4.0-P/067/6000910	n/a		
Multiple Control Unit	Maturo	MCU	2140910	n/a		
Pre-Amplifier	Rohde and Schwarz	TS-PR 18	100072	Part of the system calibration		
High Pass Filter	Mini-Circuits	SHP-1200+	RUU11201224	Part of the system calibration		
High Pass Filter	Wainwright Instr.	WHKX 3.0/18	109	Part of the system calibration		

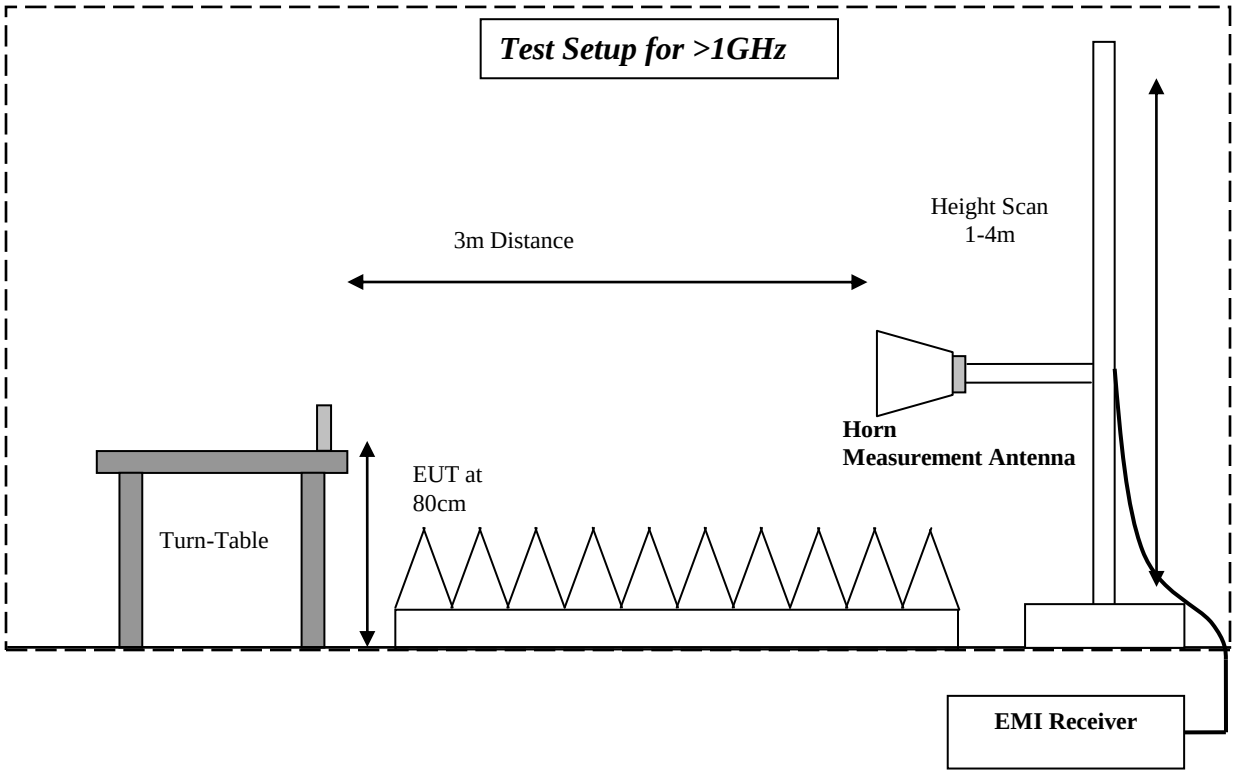
8.2 Milpitas EMC Lab

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
EMI Receiver/Analyzer	ESU 40	Rohde & Schwarz	100251	Sept 2013	1 Years
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	Jun 2013	2 Years
Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
Binconilog Antenna	EMCO	3141	0005-1186	Apr 2012	3 Years
Binconilog Antenna	ETS	3149	J000123908	Feb 2012	3 years
Horn Antenna	EMCO	3115	35114	Mar 2012	3 Years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	Part of system calibration	
High Pass Filter	4HC1600	Trilithic Inc.	9922307	Part of system calibration	
6GHz High Pass Filter	HPM50106	Microtronics	001	Part of system calibration	
Pre-Amplifier	JS4-00102600	Miteq	00616	Part of system calibration	
LISN	R&S	ESH3-Z5	836679/003	Jun 2013	3 Years

Calibration status valid at the time of testing.
Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.
Calibration due dates, unless defined specifically, falls on the last day of the month.
Items indicated “N/A” for cal status either do not specifically require calibration or is internally characterized before use.

9 Test Setup Diagrams:





10 Revision History

Date	Report Name	Changes to report	Report prepared by
07-21-2014	EMC_AUGUH-002-14001_DTS	First version	R.Custodio
08-06-2014	EMC_AUGUH-002-14001_DTS_rev1	Product description edited, section numbering changed, corrected plot for section 6.2	M.Anees