Test Type: Emissions [X] Immunity []

Product Type: Wireless Speaker

Product Name/Number: *Model Number: 423816*
FCC ID: A94423816
IC: 3232A-423816

Prepared For: *Design Assurance Engineering Department, Bose Corporation*

Test Results: Pass [**X**] Fail []

Applicable Standards: FCC CFR 47 PART 15 SUBPART C
Industry Canada RSS-247 Issue 2
Industry Canada RSS-GEN Issue 4

Report Number: *EMC.423816.17. 88.2*

General Comments/Special Test Conditions:
This report relates only to the items tested. This report covers EMC marking requirements for
Enter product and any special modifications or test conditions.

	Print Name	Signature	Date
Prepared By:	Chad Bell	Chad Bell	August 24, 2017
Electrical Engineer Review* By:	Michael Royer	Michael A. Royer	August 24, 2017

* Since every test result is separately reviewed after its completion, the electrical engineer review indicated above represents a higher level review to ensure this report lists and contains all applicable and appropriate requirements.
If the report carries the “accredited” logo, the reviewer must verify all the tests in this report are covered under the current ISO17025 accreditation. The A2LA-accredited logo must be removed if any of the tests in the report are not performed under the current scope of accreditation. It is the responsibility or the reviewer to ensure the A2LA advertising policy is followed.

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Tests Performed (Table of Contents):

Test Report Summary

Product Information:

Description

The EUT is a wireless speaker that contains Bluetooth/BLE transceivers, manufactured by Cambridge Silicon Radio, CSR8670.

Setup (Cables and Accessories)

Radiated emission and power line conducted emission were performed with the EUT set to transmit while hopping on all channels. EUT is not sold with a power supply so when necessary a Bose part number 745559-0030 power supply was used for charging. For radio tests the BT radio was configured with CSR Blue Suite software (details provided in SOFTWARE AND FIRMWARE section).

EUT Antenna Description

The antenna is an internal inverted F antenna with antenna gain of 3.574dBi formed by printed circuit board etch.

SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 0.1.4.5437
The test utility software used during testing was Polycomm, version 0.2.0.0 and CSR Blue Suite version 2.6.2.

Scope:

This report covers EMC requirements. Enter specific EMC requirements covered by this report (i.e. FCC).

Test Objective:

Verify product meets all applicable EMC requirements.

Results:

Product complies with all applicable EMC requirements. All final results represent worst-case emissions and/or immunity.

Conclusions:

The device under test (D.U.T.):
[**X**] meets all test standards selected in section 2 of this report.
[ ] does not meet all test standards selected in section 2 of this report.

Affirmation of Test Results:

	Print Name	Signature	Date
Testing Engineer/Technician	Chad Bell	Chad Bell	March 29, 2017

Test Standards

Emissions:

	Standard
[X]	FCC Part 15C
[X]	Canada RSS-247
[X]	Canada RSS-GEN

Environmental Conditions

Ambient:

Temperature:	22±4°C
Humidity:	30-60%RH
Mains Voltage:	[X] 120VAC

6dB Bandwidth

Requirement:

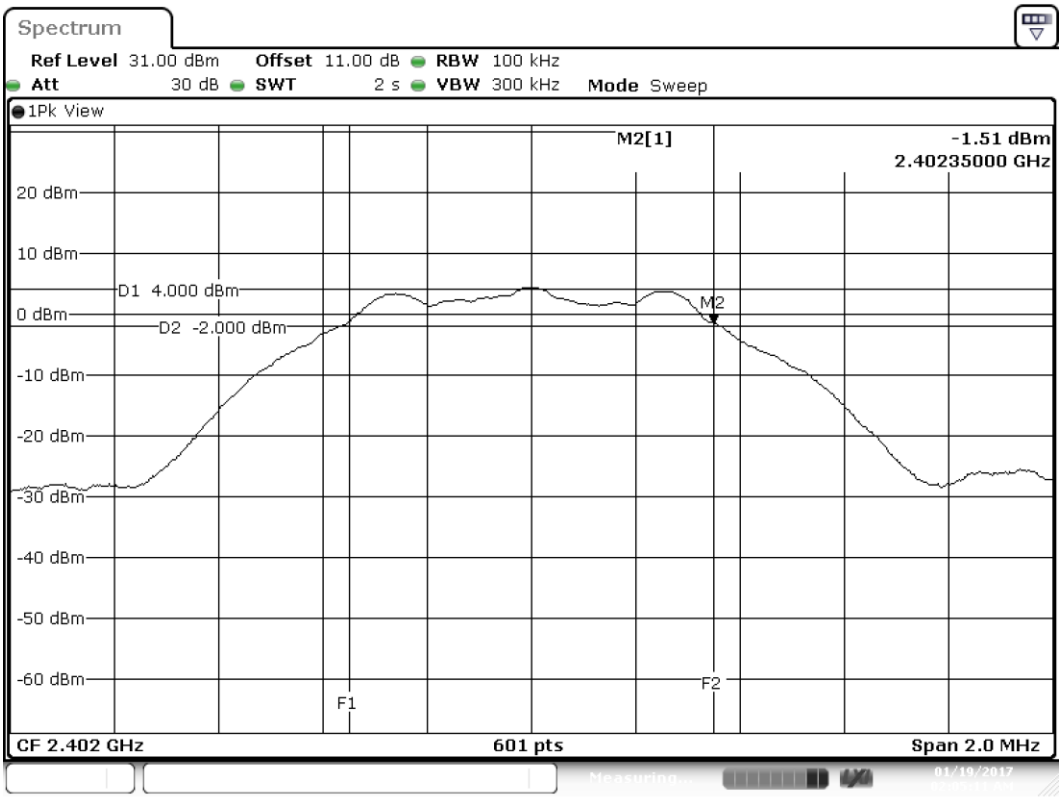
FCC 15.247(a)(2); IC RSS-247 5.2 (1)
The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure:

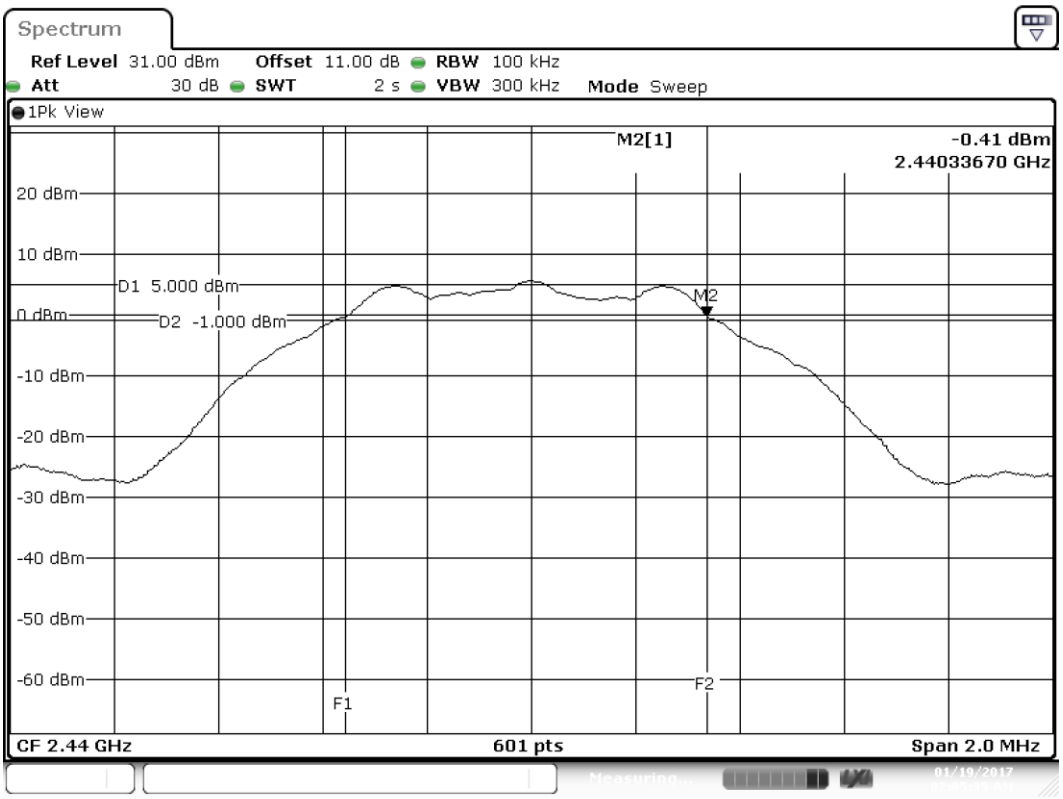
The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 99% Occupied Bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

Test Results:

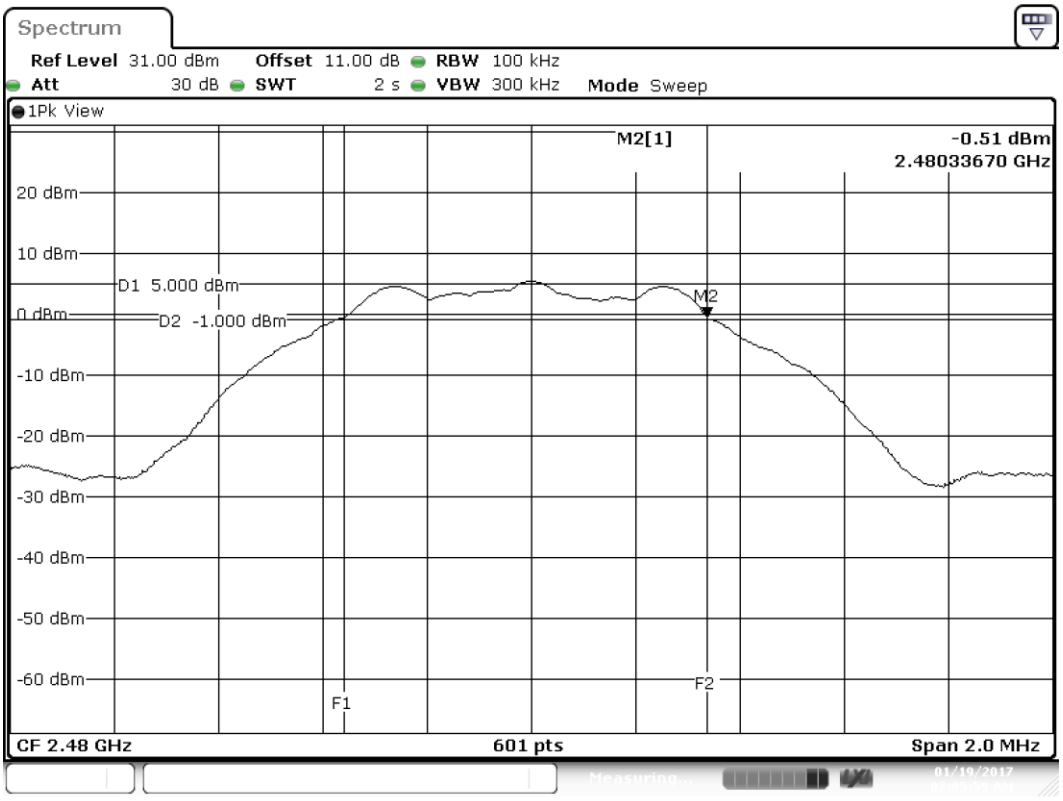
DTS Bandwidth Summary Table (BLE)						
Channel	Frequency (MHz)	Mode	DTS BW (kHz)	Limit (kHz)	Margin (kHz)	Result
Low	2402	BLE	700.0	500	-200.0	Pass
Middle	2440	BLE	693.3	500	-193.3	Pass
High	2480	BLE	696.7	500	-196.7	Pass



Plot1 DTS BW BLE 2402 MHz



Plot2 DTS BW BLE 2440 MHz



Plot3 DTS BW BLE 2480 MHz

The minimum 6dB bandwidth is 693.3kHz which is more than the 500kHz minimum required.

99% Bandwidth

Requirement:

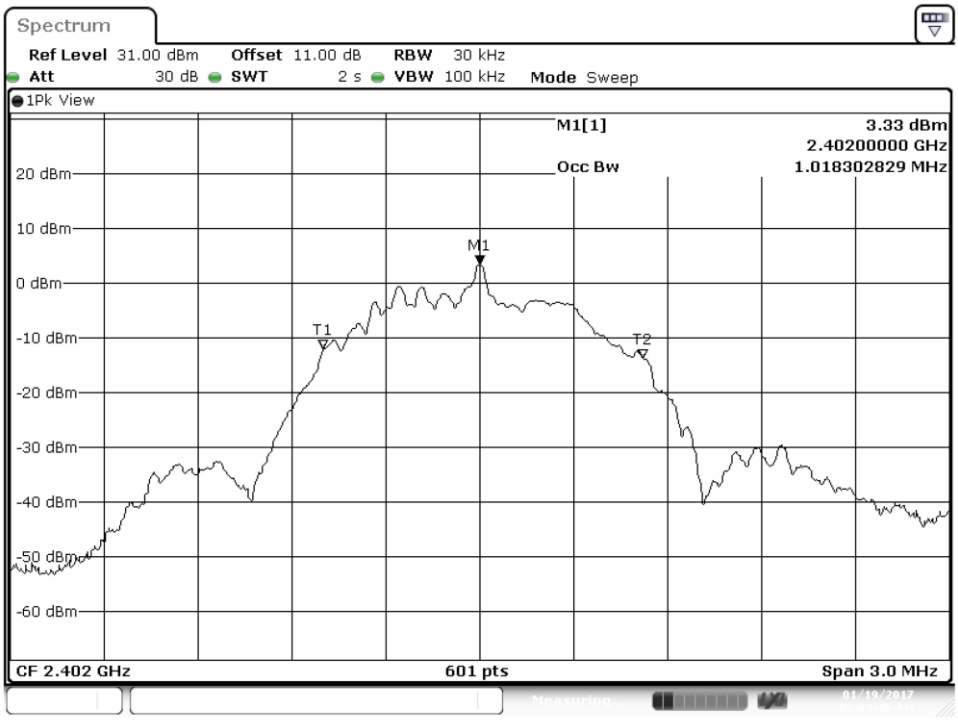
None; for reporting purposes, only. Test per FCC 15.247(a)(1); IC RSS-247 5.1 (1), RSS-Gen 6.6.

Test Procedure:

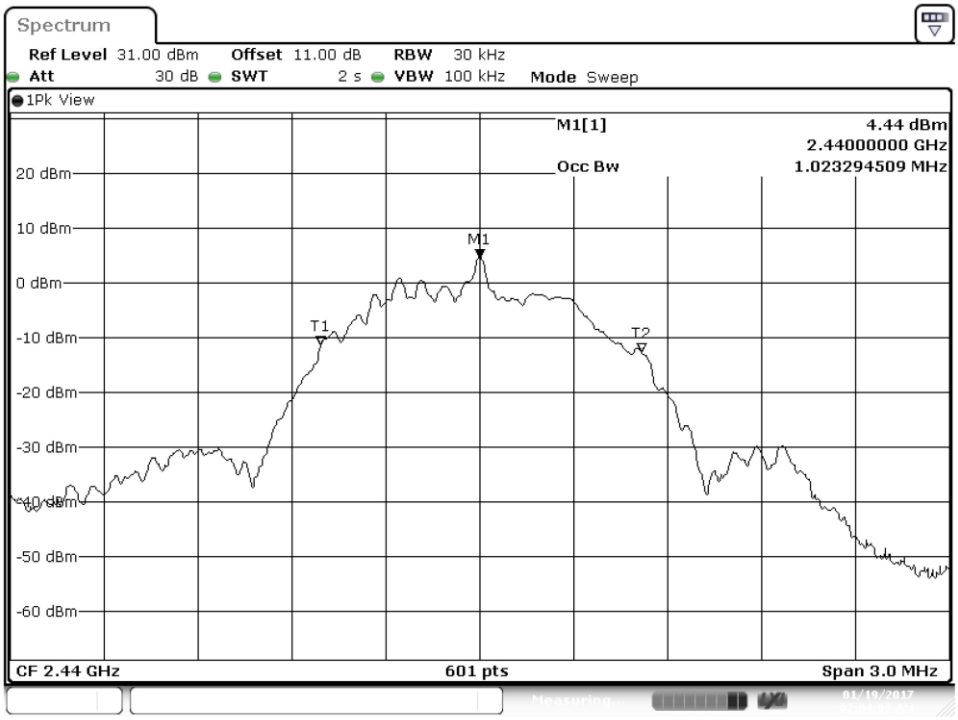
The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 99% Occupied Bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

Test Results:

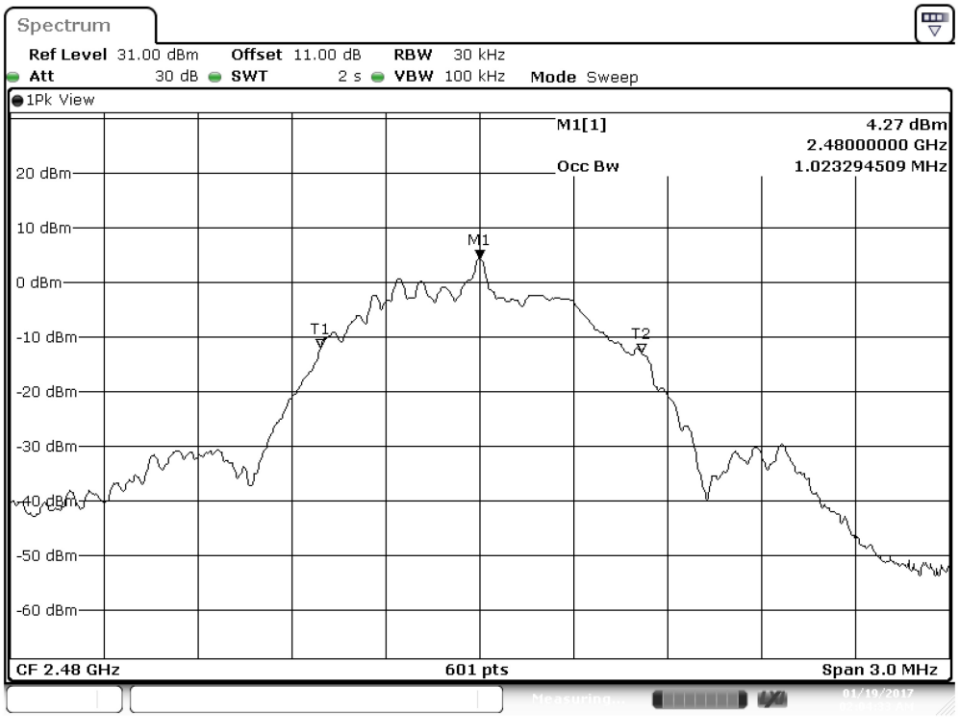
99% Bandwidth Summary Table (BLE)			
Channel	Frequency (MHz)	Mode	99% Bandwidth (kHz)
Low	2402	DH5	1018.3
Middle	2440	DH5	1023.3
High	2480	DH5	1023.3



Plot1 99 Percent BW BLE 2402 MHz



Plot2 99 Percent BW BLE 2440 MHz



Plot3 99 Percent BW BLE 2480 MHz

Conducted Output Power

Requirements:

FCC 15.247 (b) (3)
For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

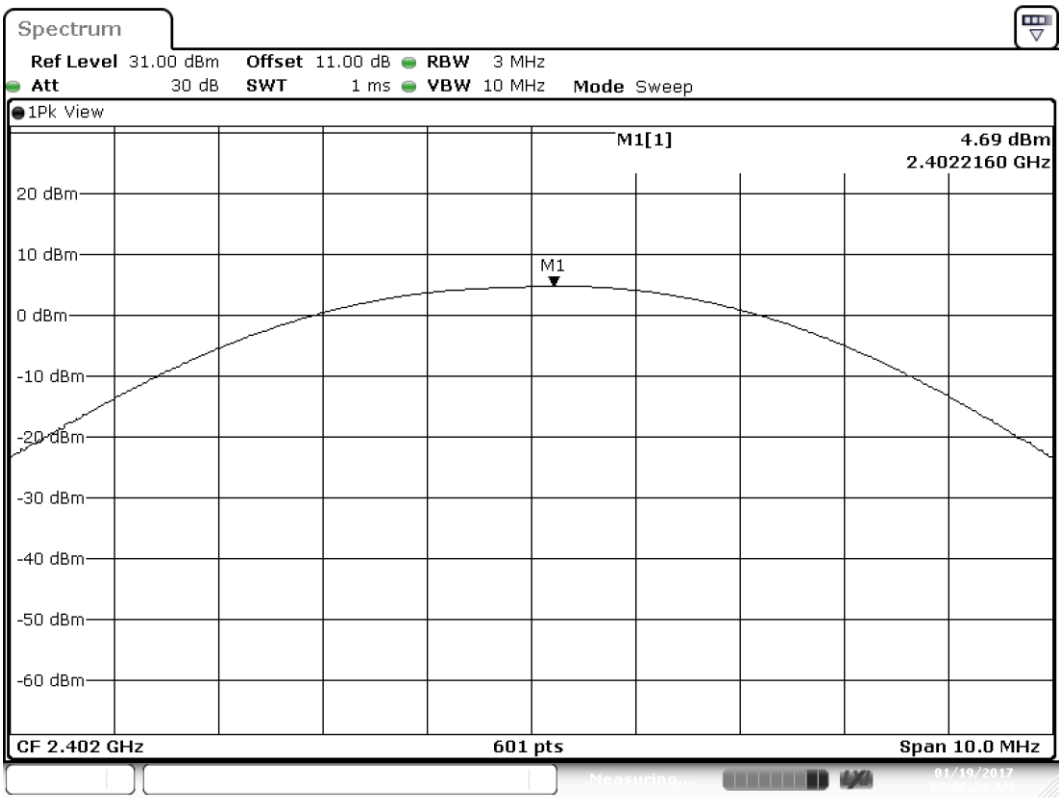
RSS-247 5.4 (4)
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

Test setup details:

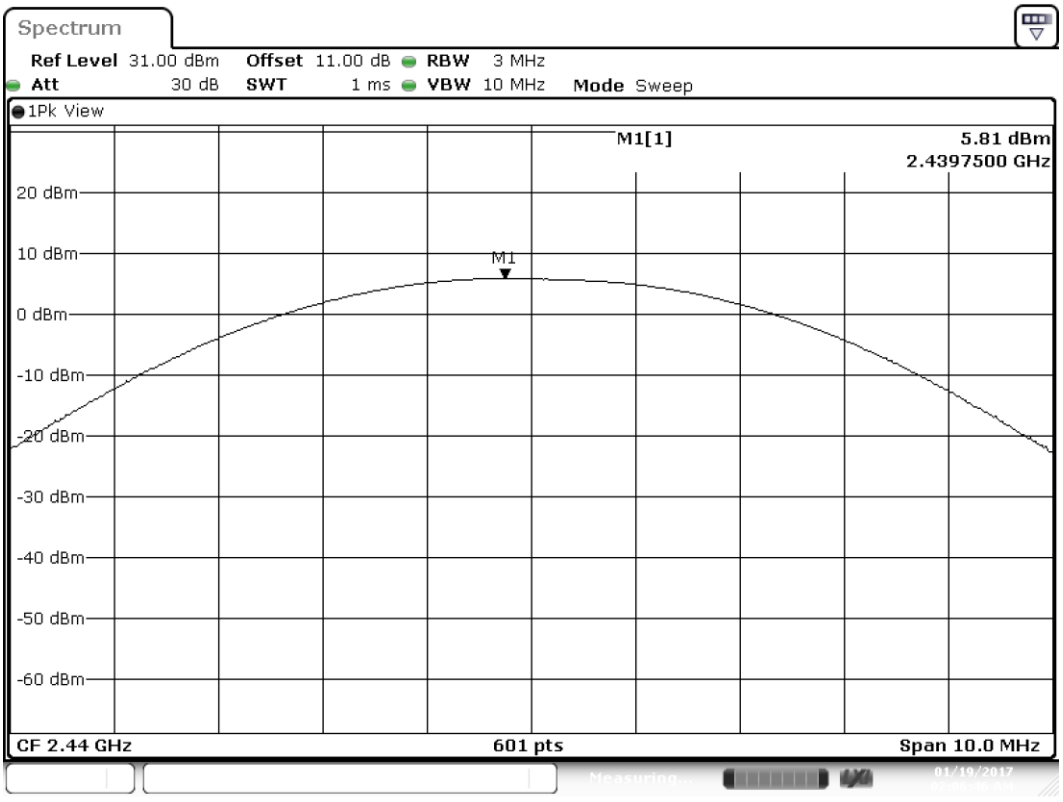
The EUT is controlled via the USB port with CSR's Blue Suite software which is used to set the test modes of the Bluetooth device. The EUT antenna is disconnected. A temporary test connector is mounted to the PCB. An 8 inch u.FL to SMA adapter cable with 1 dB loss and a 10 dB pad were used for all conducted measurements. To compensate for the cable loss and pad attenuation, the reference level offset feature of the spectrum analyzer was used. The EUT is programmed to operate on fixed frequencies at the low, middle, and high end of the authorized frequency band. The spectrum analyzer resolution bandwidth is set to 3 MHz (higher than the occupied bandwidth), peak detector and max hold. The maximum output power is recorded for each of the three frequencies.

Test Results:

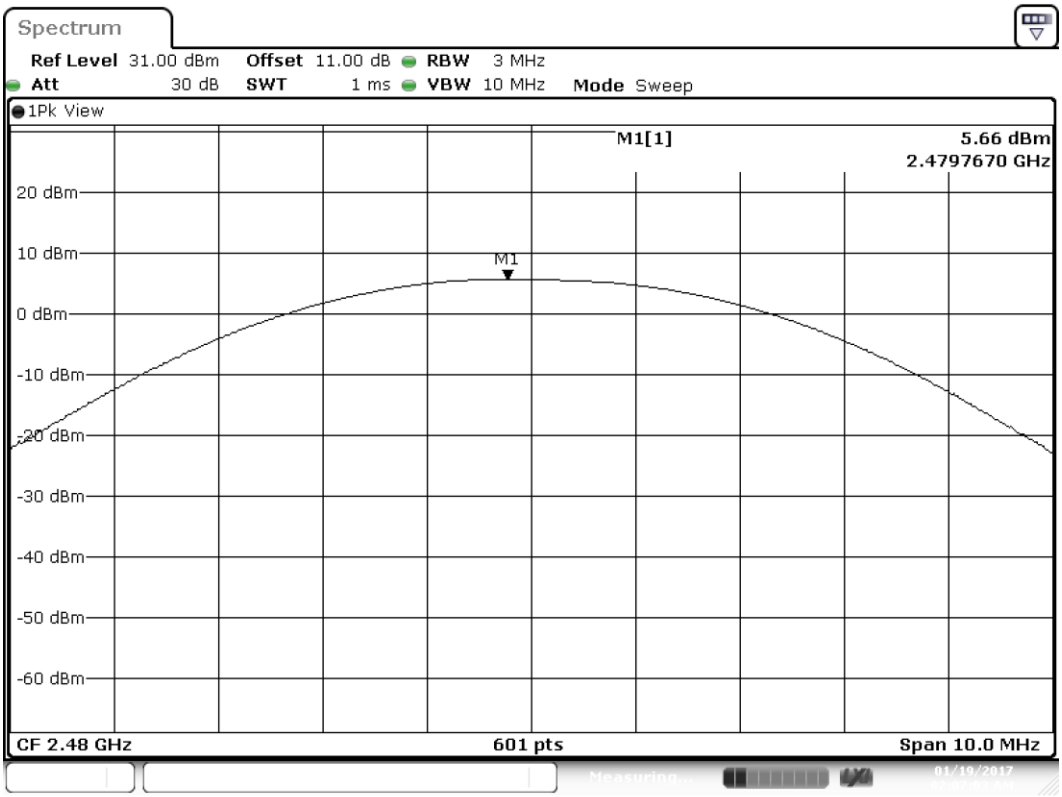
Output Power Summary Table (BLE)						
Channel	Frequency (MHz)	Output Power (dBm)	Directional Gain (dBi)	Limit (dB)	Margin (dB)	Result
Low	2402	4.69	3.574	30	21.74	Pass
Middle	2440	5.81	3.574	30	20.62	Pass
High	2480	5.66	3.574	30	20.77	Pass



Plot1 BLE Power 2402 MHz



Plot2 BLE Power 2440 MHz



Plot3 BLE Power 2480 MHz

Model 423816 meets the conducted power limit of 1W (30dBm) by 20.62dB at 2440MHz.

Power Spectral Density

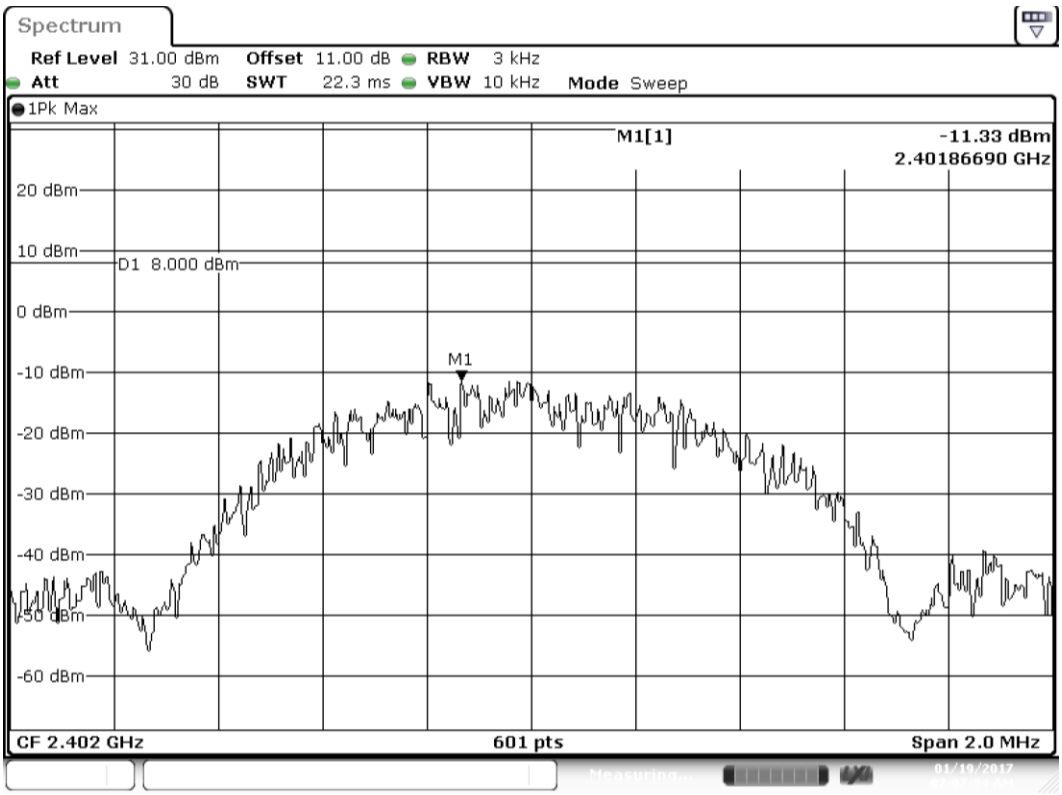
Requirements:

FCC 15.247 (e) and IC RSS-247 5.2 (2)

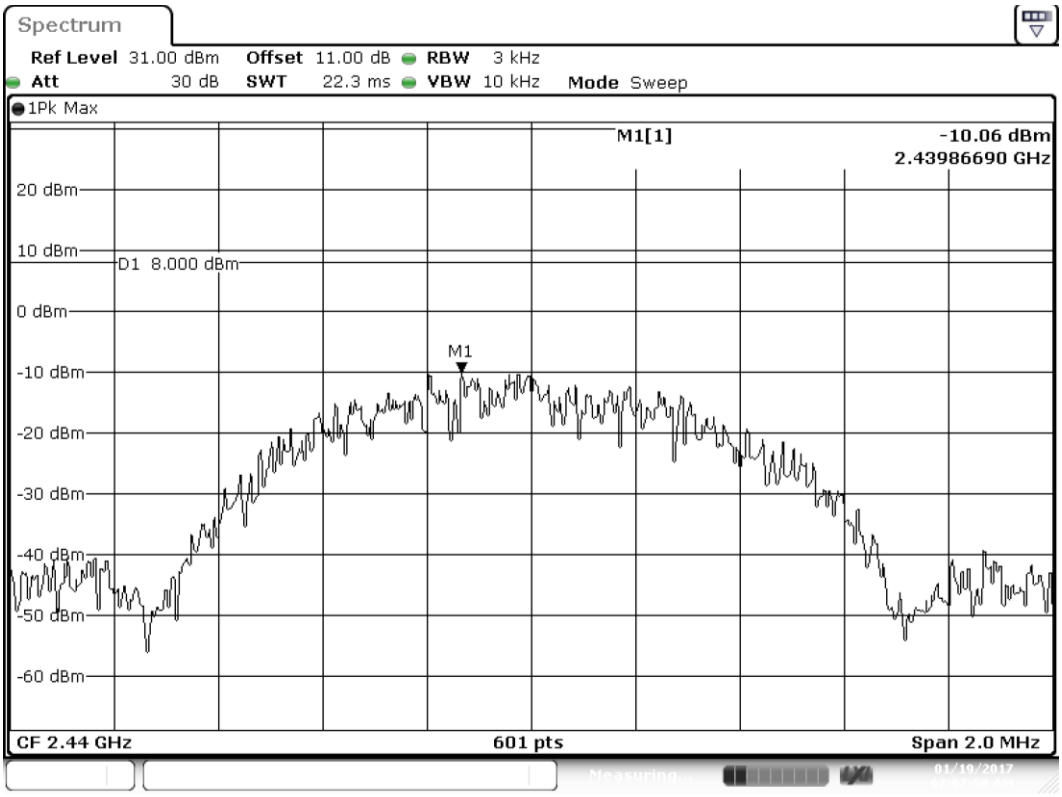
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Results:

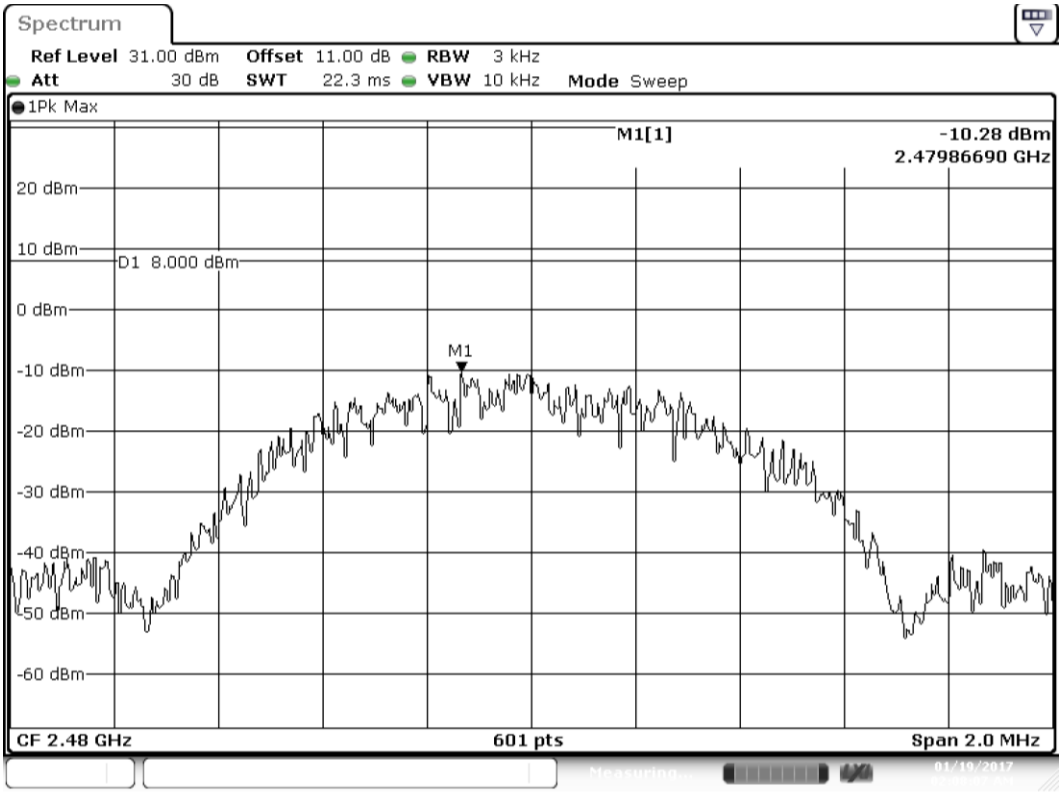
Power Spectral Density Summary Table (BLE)					
Channel	Frequency (MHz)	PSD (dBm)	Limit (dB)	Margin (dB)	Result
Low	2402	-11.40	8	19.40	Pass
Middle	2440	-10.06	8	18.06	Pass
High	2480	-10.28	8	18.28	Pass



Plot1 BLE PSD 2402 MHz



Plot2 BLE PSD 2440 MHz



Plot3 BLE PSD 2480 MHz

Conducted Spurious Emissions

Requirements:

FCC 15.247 (d)

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) (see 15.205(c)).

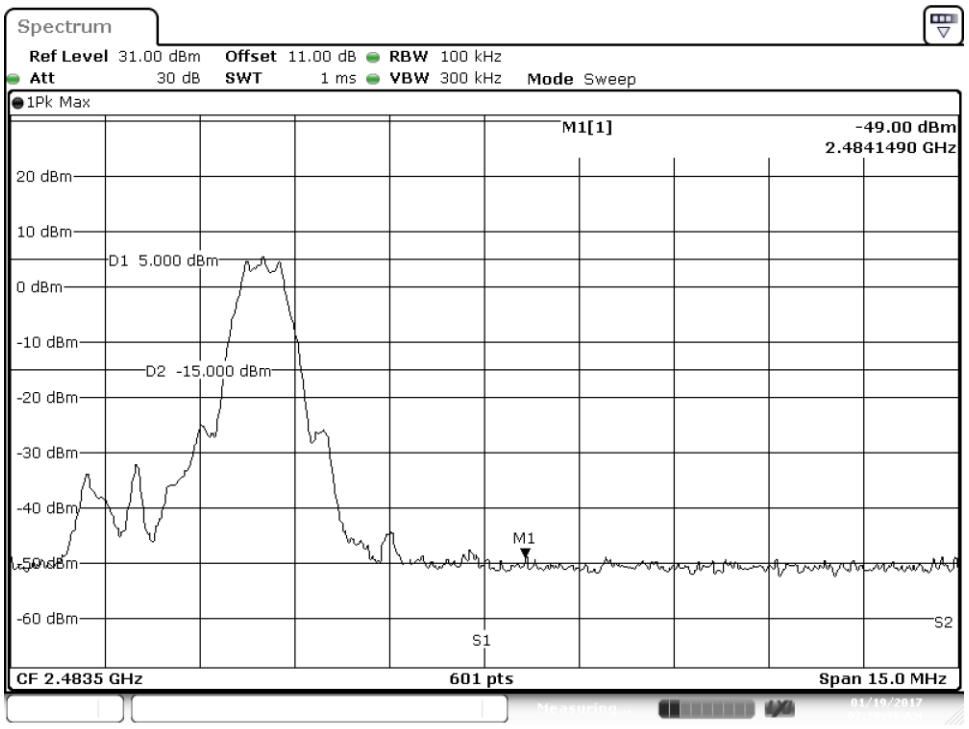
IC RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Note: Antenna gain outside of the wanted band was assumed to be zero. The conducted spurious readings are for additional information as the radiated readings take precedence.

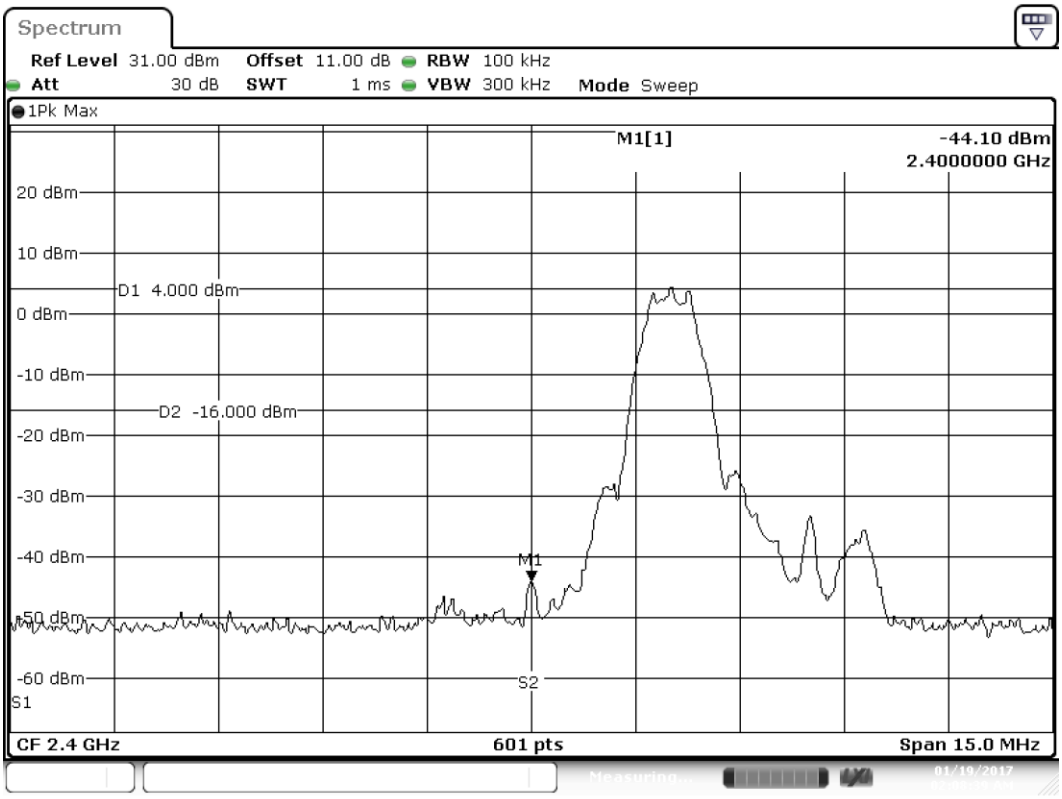
Spurious Band-edge Emissions

Upper Band Edge (BLE) (Peak Detector)						
Channel	Frequency (MHz)	Mode	Worst Case (dBc)	Limit (dBc)	Margin (dB)	Result
High	2480	BLE	54.00	20	34.00	Pass



Plot1 Upper Band Edge BLE Peak 2480 MHz

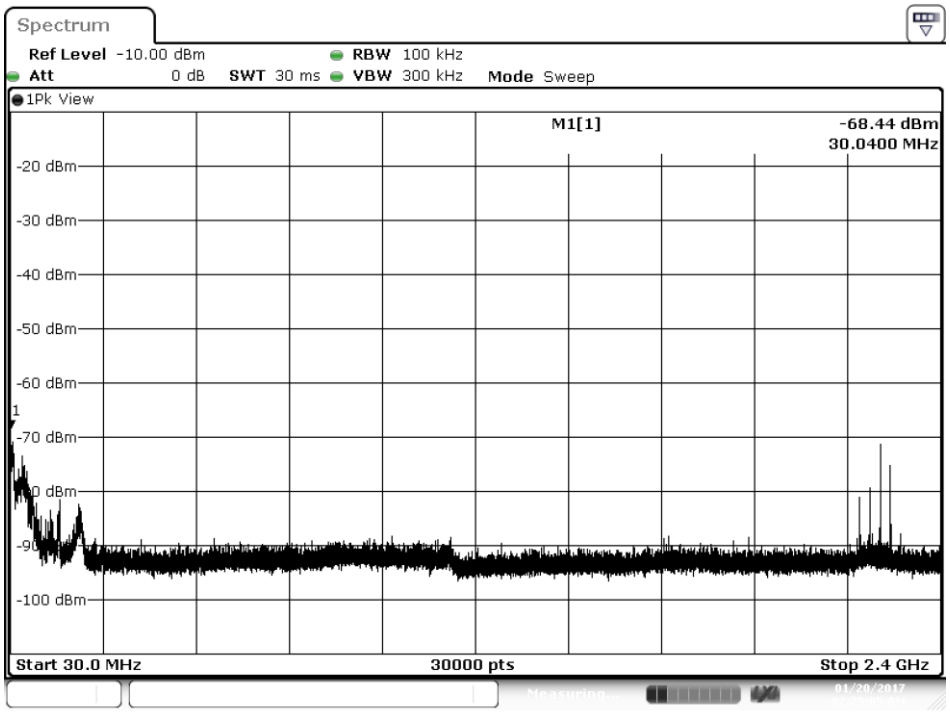
Lower Band Edge (BLE)						
Channel	Frequency (MHz)	Mode	Worst Case (dBc)	Limit (dBc)	Margin (dB)	Result
Low	2402	BLE	48.10	20	28.10	Pass



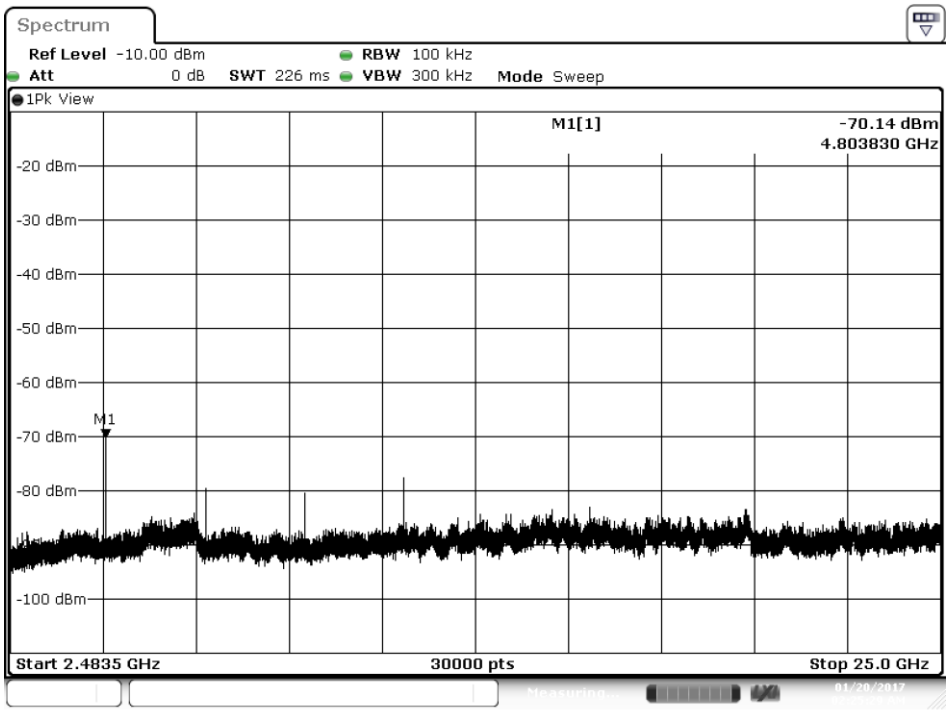
Plot1 Lower Band Edge BLE PK 2402 MHz

Spurious Emissions

Spurious Summary Table (BLE)											
Channel	Band Range (MHz)	Mode	Raw Measurement (dBm)	Test Cable Loss (dB)	Pad ATTN (dB)	EUT Antenna Gain At Harmonic Frequency (dBi)	Corrected Reading (dBm)	Convert to E-Field at 3 meters (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Result
Low	30 To 1000	BLE	-68.4	1.0	10.0	0.0	-57.4	37.79	74	36.21	Pass
Low	2483.5 To 25000	BLE	-70.1	1.0	10.0	0.0	-59.1	36.09	74	37.91	Pass

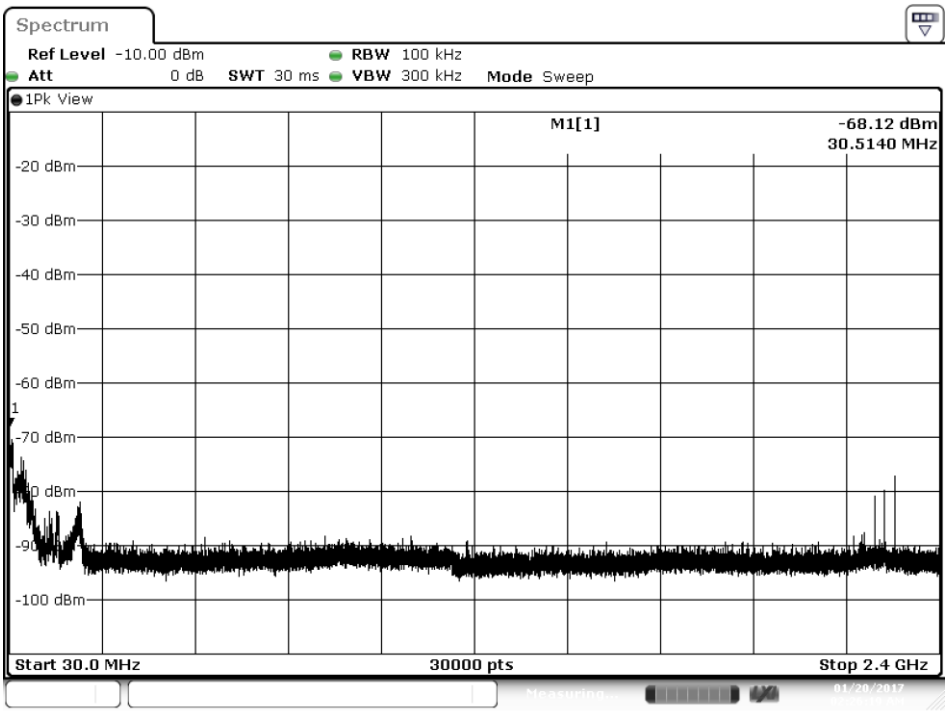


Plot1 BLE 2402 MHz Peak Band 1

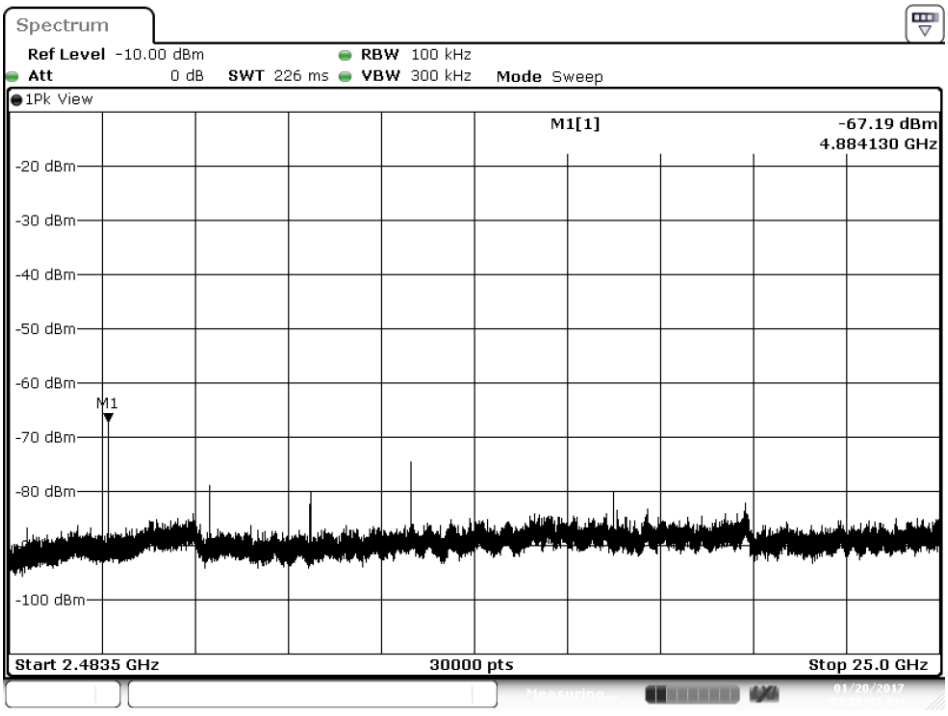


Plot2 BLE 2402 MHz Peak Band 2

Spurious Summary Table (BLE)											
Channel	Band Range (MHz)	Mode	Raw Measurement (dBm)	Test Cable Loss (dB)	Pad ATTN (dB)	EUT Antenna Gain At Harmonic Frequency (dBi)	Corrected Reading (dBm)	Convert to E-Field at 3 meters (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Result
Mid	30 To 1000	BLE	-68.1	1.0	10.0	0.0	-57.1	38.11	74	35.89	Pass
Mid	2483.5 To 25000	BLE	-67.2	1.0	10.0	0.0	-56.2	39.04	74	34.96	Pass

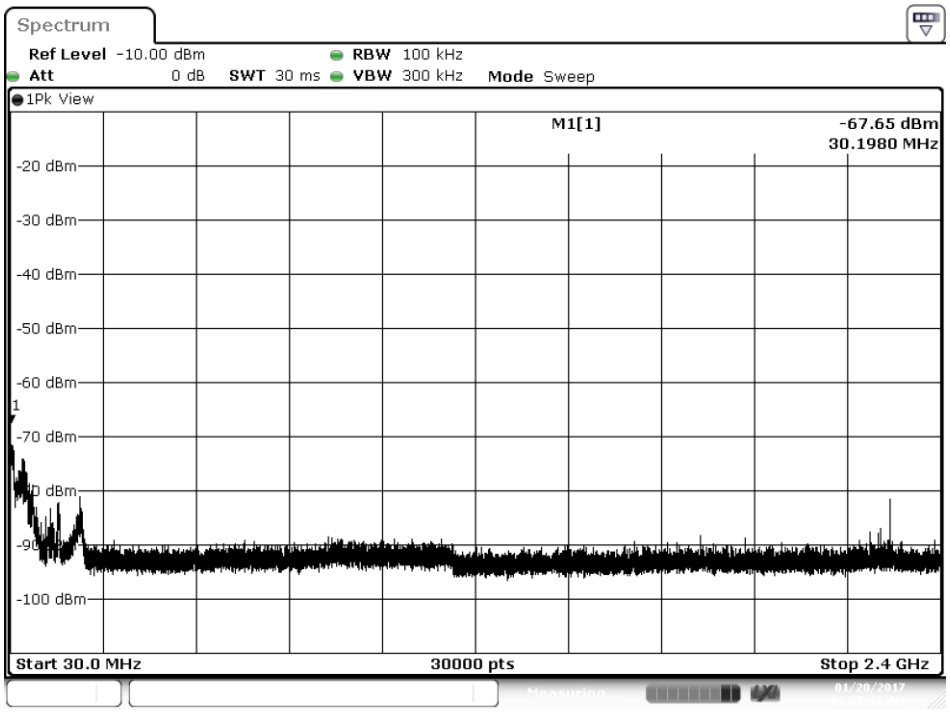


Plot1 BLE 2442 MHz Peak Band 1

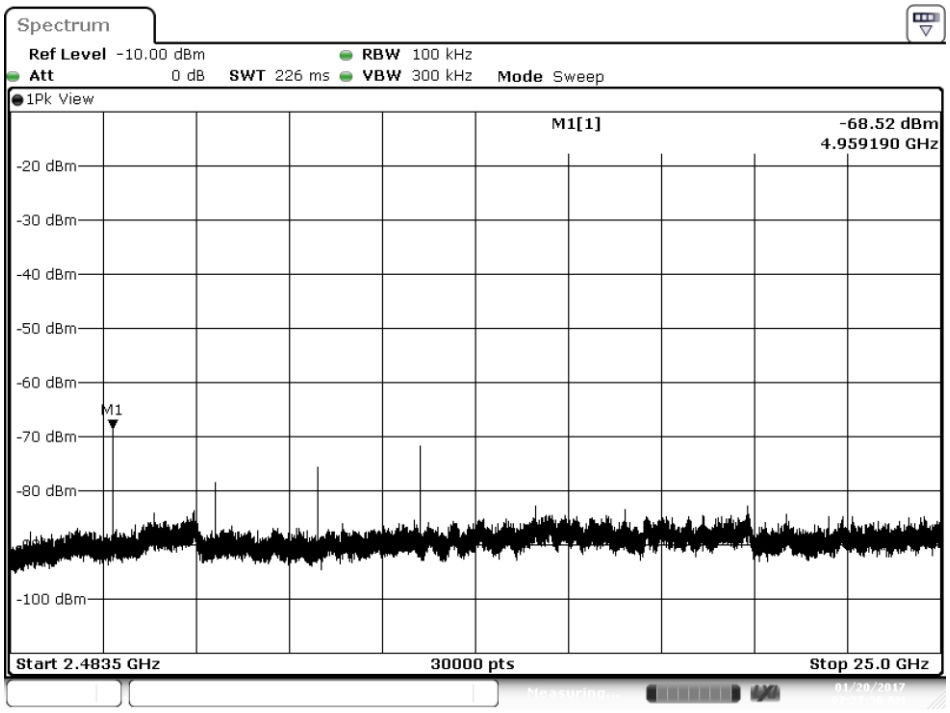


Plot2 BLE 2442 MHz Peak Band 2

Spurious Summary Table (BLE)											
Channel	Band Range (MHz)	Mode	Raw Measurement (dBm)	Test Cable Loss (dB)	Pad ATTN (dB)	EUT Antenna Gain At Harmonic Frequency (dBi)	Corrected Reading (dBm)	Convert to E-Field at 3 meters (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Result
High	30 To 1000	BLE	-67.6	1.0	10.0	0.0	-56.6	38.58	74	35.42	Pass
High	2483.5 To 25000	BLE	-68.5	1.0	10.0	0.0	-57.5	37.71	74	36.29	Pass



Plot1 BLE 2480 MHz Peak Band 1



Plot2 BLE 2480 MHz Peak Band 2

Conducted Measurements Resources Used

TN	Description	Model	S/N	Manufacturer	Most Recent Calibration	Calibration Due Date	Most Recent Verification	Verification Due Date
2409	Spectrum Analyzer	FSV40	101413	Rohde & Schwarz	07-Apr-2016	07-Apr-2017	n/a	n/a
2342	Band Reject Filter	BRM50702-07	001	Micro-Tronics	n/a	n/a	29-Mar-2016	29-Mar-2017

Radiated Emissions Test Results

Requirements:

FCC 15.205, 15.209, 15.247 (d), IC RSS-GEN Clause 8.9 (Transmitter)

In any of the restricted bands defined in FCC part 15.209(a), the field strength at 3 meters shall not exceed 54dBµV/m (average) or 74dBµV/m (peak)

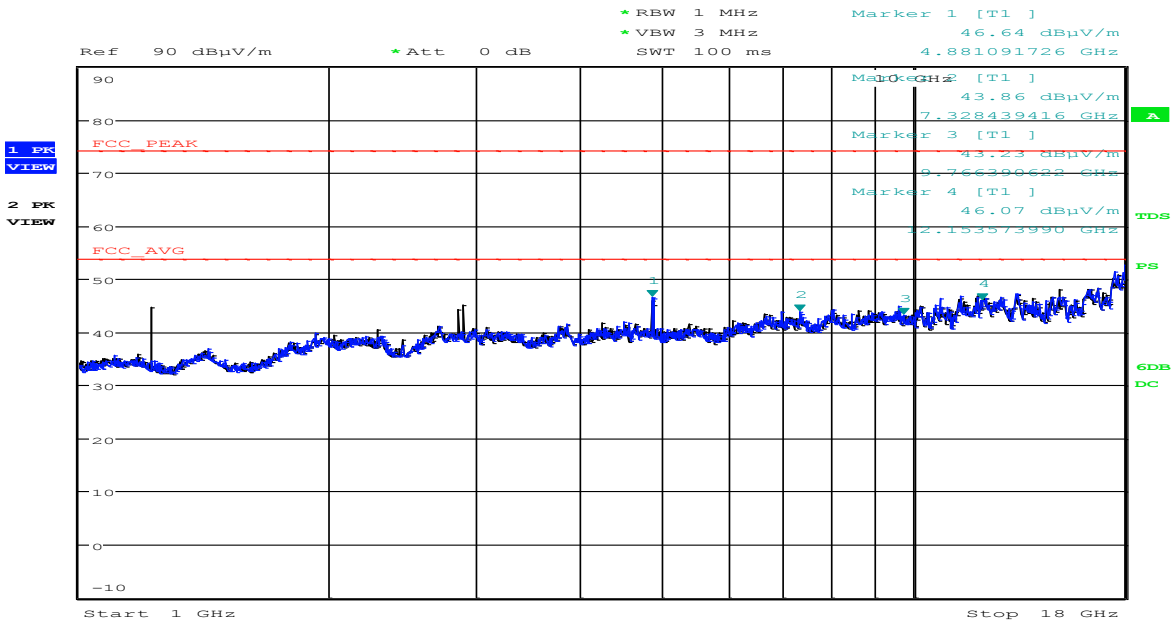
Test Setup

The EUT is placed in a standard ANSI C63.10 test setup. Standard Gain Horn Antennas and Double Ridged Guide Horn Antennas with suitable pre-amps mounted directly on the horn antennas are used for the measurement of the harmonics. The EUT hopping is stopped and measurements are made in the low, mid and high end of the frequency range at the defined limit distance of 3 meters. The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The EUT is rotated around the vertical axis, the antenna polarization changed from H to V and the antenna height is varied from 1 to 4 meters in order to find the maximum value of the harmonic emission. Account is taken of the beam width of the horn antennas to make sure the EUT remains in the main lobe of the antenna. EUT was tested in 3 orthogonal axes and the worst-case results are shown below.

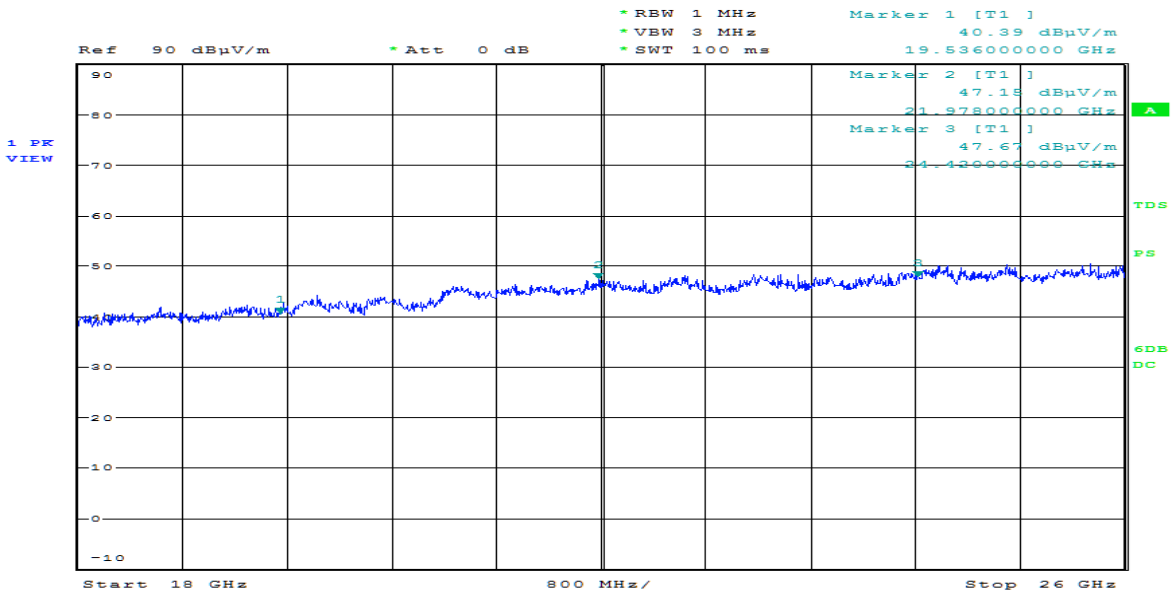
For measurements below 1 GHz the resolution bandwidth is set to 120 kHz and a quasi-peak detector was used. For peak measurements above 1 GHz, a resolution bandwidth of 1 MHz was used and video bandwidth of 3 MHz was used. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. An average detector was used and a duty cycle correction factor was added to correspond to the average during the transmission.

Transmitter Harmonics/Spurious

For these readings, a notch filter was used to protect the EMI receiver from overload. A correction factor was applied to account for the effect of the notch filter. For the plots capturing the entire frequency range the EUT was hopping on all channels to capture all emissions. For individual readings, the hopping was disabled to maximize the duty cycle.



BLE, 2442, horizontal orientation
Date: 20.JAN.2017 20:51:59

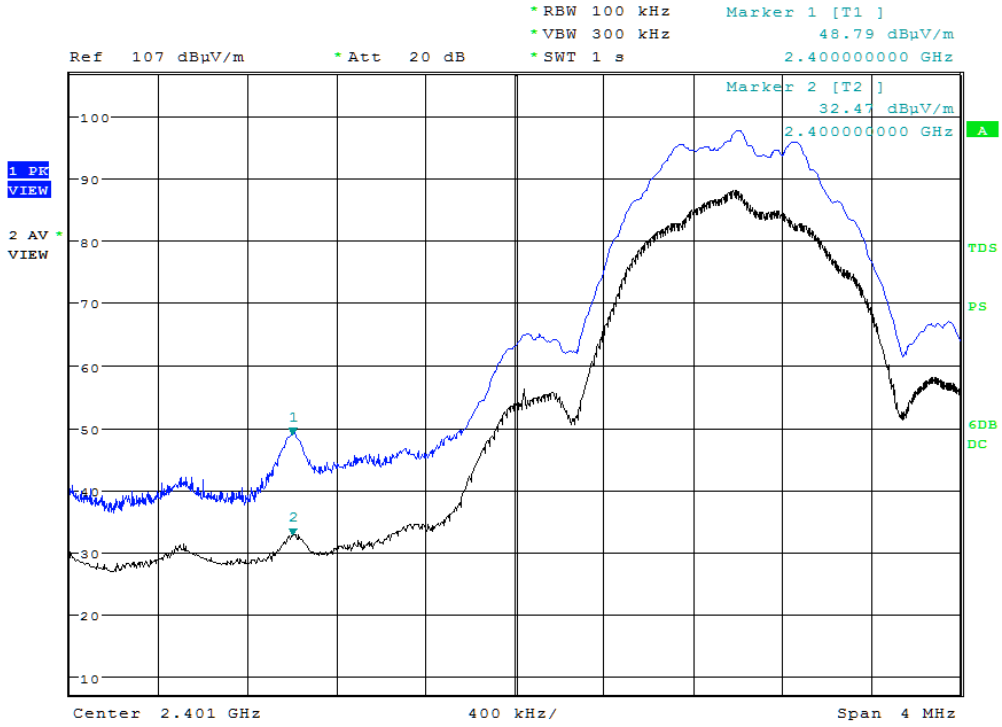


BLE at 2402, 2442, and 2480. 1 m antenna distance.
No harmonics visible.
Date: 24.JAN.2017 19:48:40

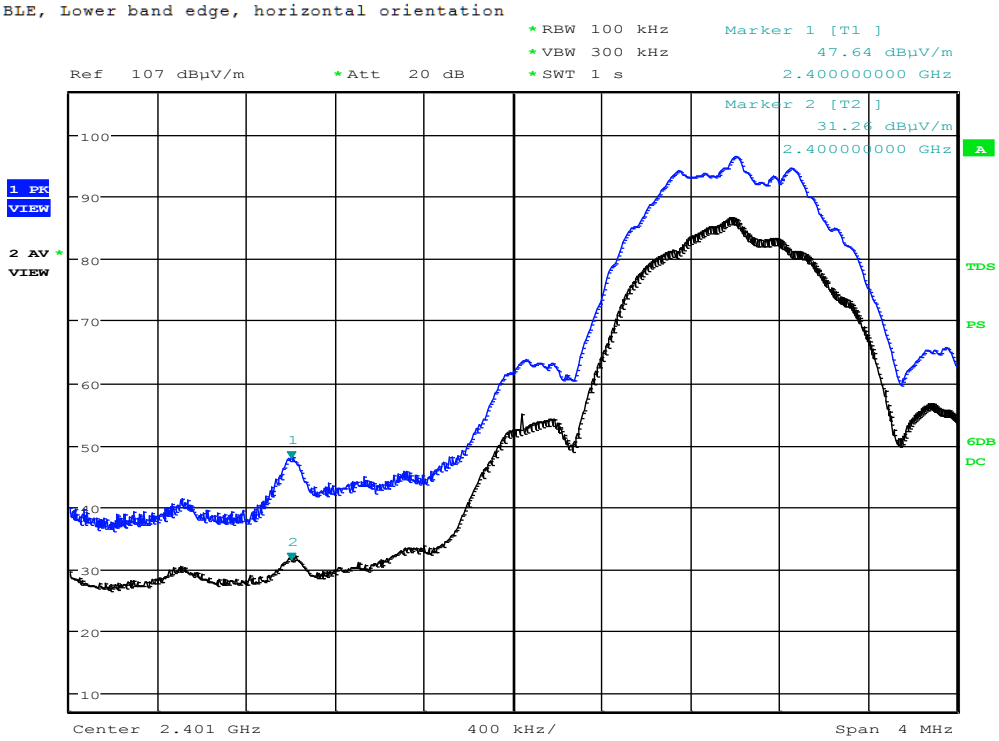
FCC Tx Harmonics @ 3 Meters										
Emission Frequency (MHz)	Measured Amplitude (dBµV/m) AVG	Measured Amplitude (dBµV/m) Peak	FCC 15B Limit (dBµV/m) AVG	FCC 15B Limit (dBµV/m) Peak	FCC 15B Margin (dB) AVG	FCC 15B Margin (dB) Peak	Table Azimuth (0° closest to ant)	Receiving Antenna Pol (H/V)	Receiving Antenna Height (Meters)	Notes / Mode
2402, horizontal										
4803.976	41.10	50.80	54.0	74.0	12.9	23.2	333	V	1.0	
7205.961	33.50	47.30	65.5	78.1	32.0	30.8	297	V	1.0	
9608.000	32.10	46.30	65.5	78.1	33.4	31.8				noise floor
12009.975	34.20	48.60	54.0	74.0	19.8	25.4	340	H	2.4	
14412.000	33.50	47.70	65.5	78.1	32.0	30.4				noise floor
16814.000	33.60	47.90	65.5	78.1	31.9	30.2				noise floor
2442, horizontal										
4883.967	39.30	49.40	54.0	74.0	14.7	24.6	330	V	1.0	
7325.930	34.70	48.60	54.0	74.0	19.3	25.4	299	V	1.0	
9768.000	31.10	45.20	65.5	78.1	34.4	32.9				noise floor
12209.981	35.40	49.90	54.0	74.0	18.6	24.1	218	H	1.2	
14652.000	34.40	48.70	65.5	78.1	31.1	29.4				noise floor
17094.000	34.20	48.40	65.5	78.1	31.3	29.7				noise floor
2480, horizontal										
4959.958	37.80	48.10	54.0	74.0	16.2	25.9	318	V	1.0	
7439.948	33.30	47.80	54.0	74.0	20.7	26.2	301	V	1.0	
9920.000	31.40	45.50	65.5	78.1	34.1	32.6				noise floor
12399.966	34.50	49.60	54.0	74.0	19.5	24.4	3	H	2.4	
14880.000	33.90	48.10	65.5	78.1	31.6	30.0				noise floor
17360.000	38.00	52.20	65.5	78.1	27.5	25.9				noise floor

FCC Tx Harmonics @ 3 Meters										
Emission Frequency (MHz)	Measured Amplitude (dBµV/m) AVG	Measured Amplitude (dBµV/m) Peak	FCC 15B Limit (dBµV/m) AVG	FCC 15B Limit (dBµV/m) Peak	FCC 15B Margin (dB) AVG	FCC 15B Margin (dB) Peak	Table Azimuth (0° closest to ant)	Receiving Antenna Pol (H/V)	Receiving Antenna Height (Meters)	Notes / Mode
2402, vertical										
4803.976	38.80	49.00	54.0	74.0	15.2	25.0	41	H	2.1	
7205.961	34.50	47.90	64.0	76.6	29.5	28.7	321	H	2.5	
9608.000	32.10	46.40	64.0	76.6	31.9	30.2				noise floor
12009.975	34.50	49.60	54.0	74.0	19.5	24.4	325	V	1.0	
14412.000	33.50	47.60	64.0	76.6	30.5	29.0				noise floor
16814.000	33.60	47.20	64.0	76.6	30.4	29.4				noise floor
2441, vertical										
4883.967	40.80	50.40	54.0	74.0	13.2	23.6	358	H	3.2	
7325.930	35.20	48.50	54.0	74.0	18.8	25.5	327	H	2.9	
9768.000	31.10	44.70	64.0	76.6	32.9	31.9				noise floor
12209.981	36.10	51.60	54.0	74.0	17.9	22.4	328	V	1.0	
14652.000	34.40	48.60	64.0	76.6	29.6	28.0				noise floor
17094.000	34.20	47.90	64.0	76.6	29.8	28.7				noise floor
2480, vertical										
4959.958	38.30	48.60	54.0	74.0	15.7	25.4	46	H	1.4	
7439.948	34.20	48.00	54.0	74.0	19.8	26.0	327	H	2.6	
9920.000	31.40	44.90	64.0	76.6	32.6	31.7				noise floor
12399.966	34.70	50.20	54.0	74.0	19.3	23.8	335	V	1.0	
14880.000	33.90	48.10	64.0	76.6	30.1	28.5				noise floor
17360.000	37.90	51.70	64.0	76.6	26.1	24.9				noise floor

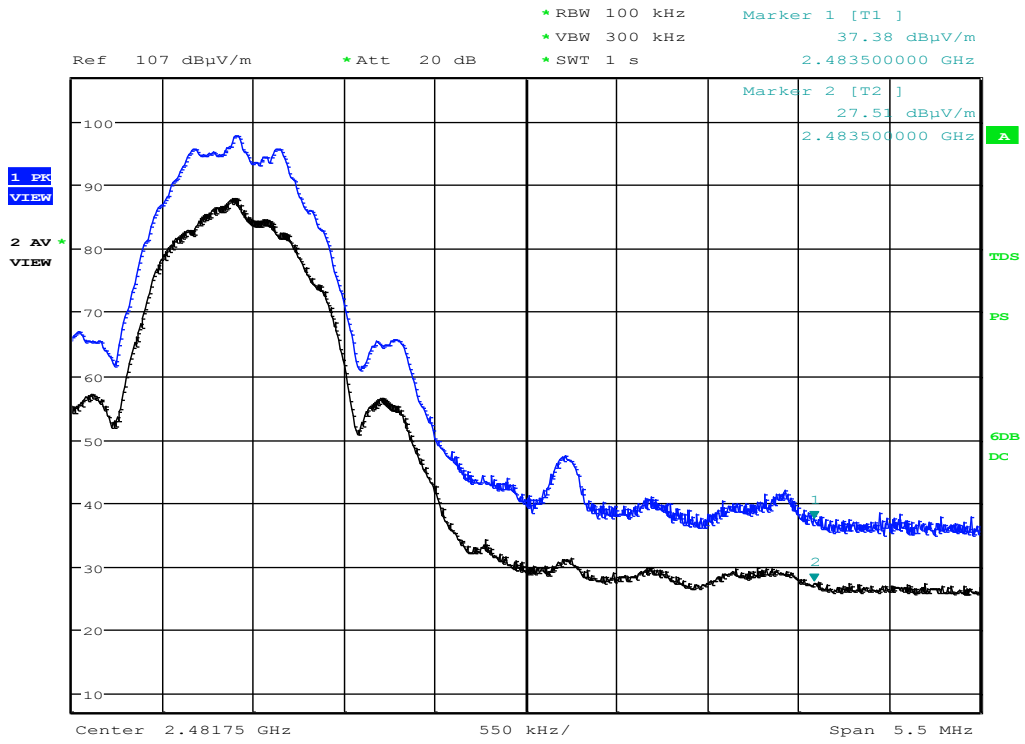
Band edge radiated emission measurements:



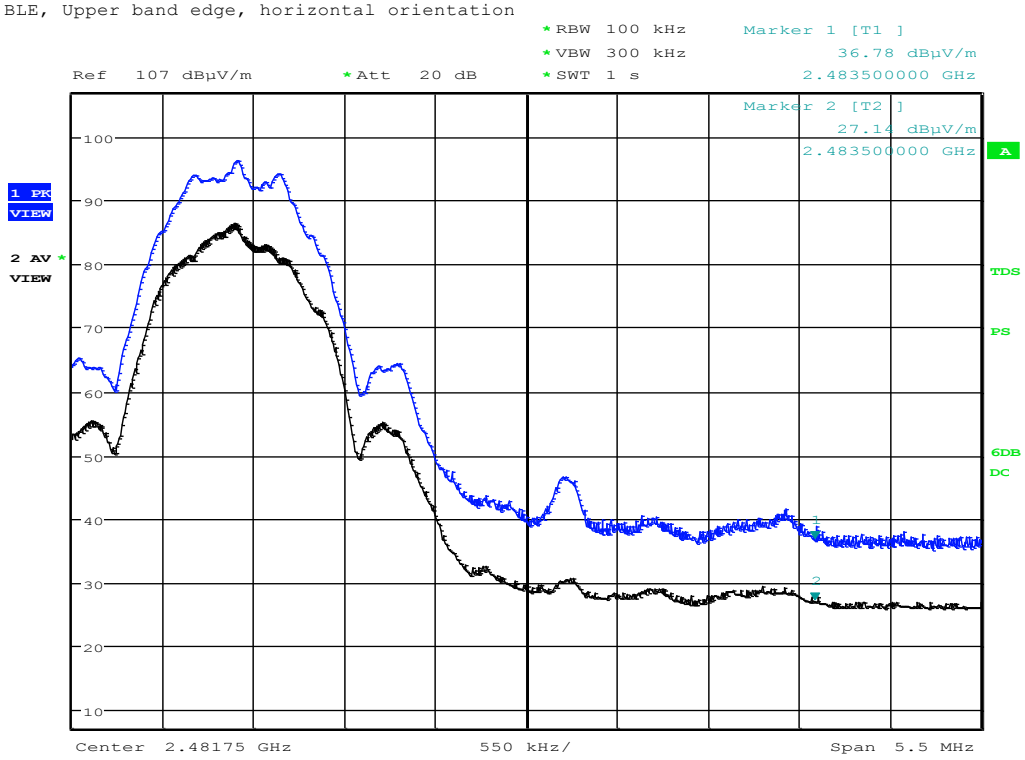
BLE, Lower band edge, horizontal orientation



BLE, Lower band edge, vertical orientation



BLE, Upper band edge, horizontal orientation



BLE, Upper band edge, vertical orientation

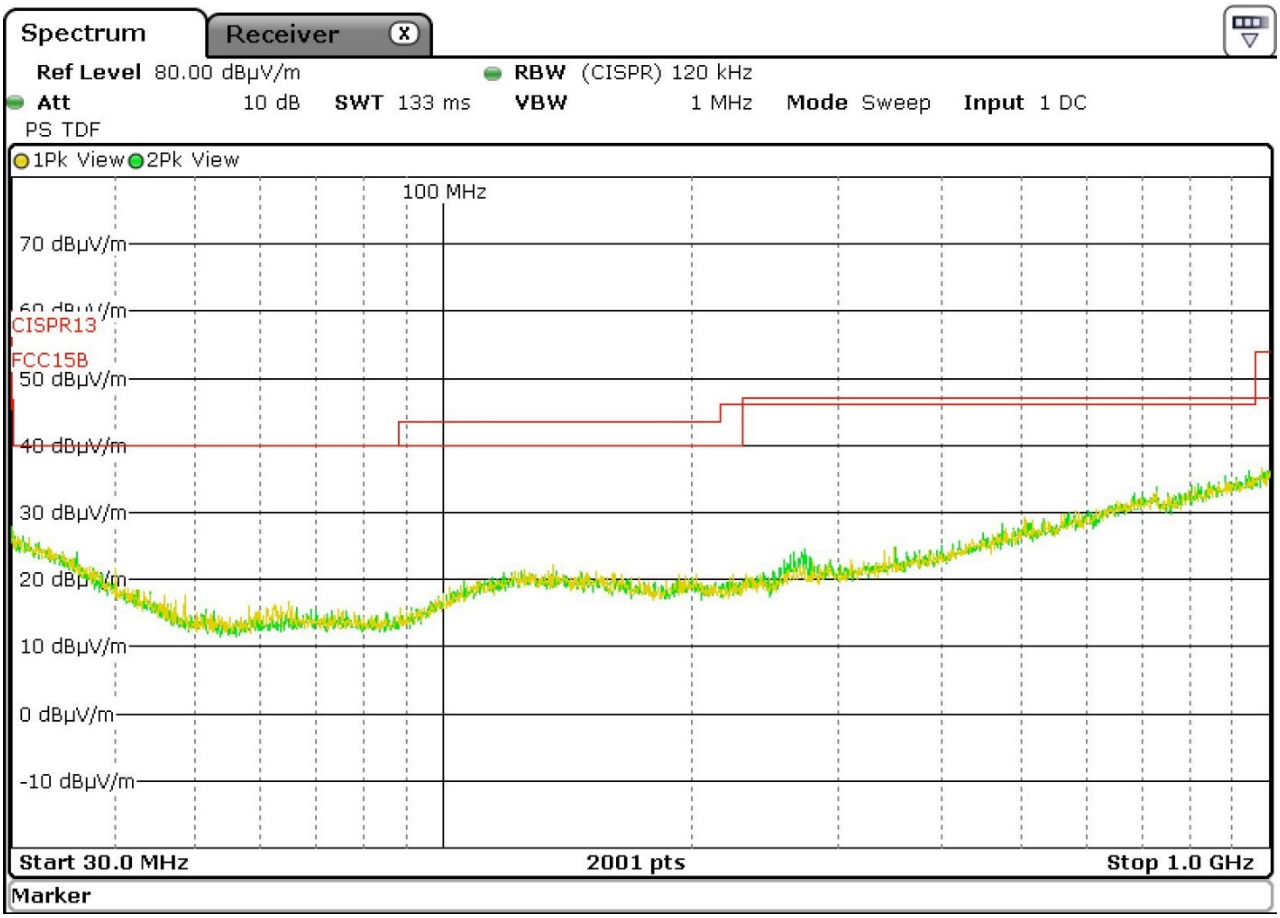
FCC 15B Class B Product (Residential) @ 3 Meters										
Emission Frequency (MHz)	Measured Amplitude (dBµV/m) AVG	Measured Amplitude (dBµV/m) Peak	FCC 15B Limit (dBµV/m) AVG	FCC 15B Limit (dBµV/m) Peak	FCC 15B Margin (dB) AVG	FCC 15B Margin (dB) Peak	Table Azimuth (0° closest to ant)	Receiving Antenna Pol (H/V)	Receiving Antenna Height (Meters)	Notes / Mode
Lower Band Edge										
2400.000	38.40	60.00	65.5	78.1	27.1	18.1	32	H	1.7	Standard method
2400.000	40.40	49.10	65.5	78.1	25.1	29.0				Marker Delta, calculated
Upper Band Edge										
2483.500	35.70	50.70	54.0	74.0	18.3	23.3	34	H	1.6	Standard method
2483.500	35.40	37.80	54.0	74.0	18.6	36.2				Marker Delta, calculated

FCC 15B Class B Product (Residential) @ 3 Meters										
Emission Frequency (MHz)	Measured Amplitude (dBµV/m) AVG	Measured Amplitude (dBµV/m) Peak	FCC 15B Limit (dBµV/m) AVG	FCC 15B Limit (dBµV/m) Peak	FCC 15B Margin (dB) AVG	FCC 15B Margin (dB) Peak	Table Azimuth (0° closest to ant)	Receiving Antenna Pol (H/V)	Receiving Antenna Height (Meters)	Notes / Mode
Lower Band Edge										
2400.000	39.30	59.60	64.0	76.6	24.7	17.0	32	V	1.3	Standard method
2400.000	39.00	47.70	64.0	76.6	25.0	28.9				Marker Delta, calculated
Upper Band Edge										
2483.500	35.40	49.80	54.0	74.0	18.6	24.2	117	H	1.3	Standard method
2483.500	35.40	37.20	54.0	74.0	18.6	36.8				Marker Delta, calculated

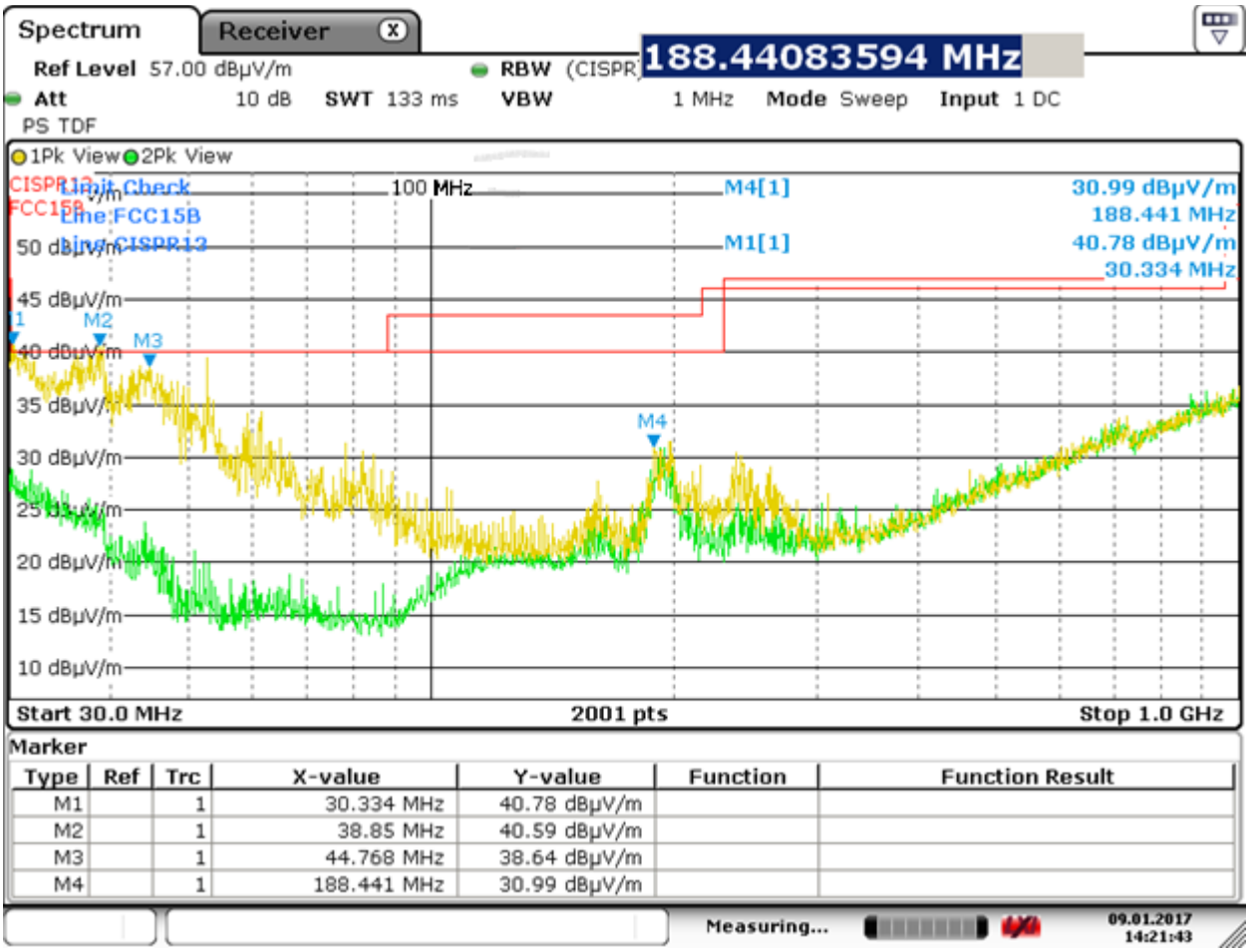
Resources Used

TN	Description	Model	S/N	Manufacturer	Most Recent Calibration	Calibration Due Date	Most Recent Verification	Verification Due Date
1663	EMI Test Receiver	ESU40	100098	Rohde & Schwarz	06-Apr-2016	06-Apr-2017	n/a	n/a
2357	RF Cable 30MHz-18GHz	TRU-300	TRU-12707-03	TRU Corporation	n/a	n/a	08-Jan-2016	07-Jan-2018
2373	RF Cable 30MHz-18GHz	TRU-300	N/A	TRU Corporation	n/a	n/a	12-Nov-2014	12-Nov-2017
2385	Marconi Manor	3 Meter Chamber	N/A	AP Americas	n/a	n/a	24-Nov-2015	24-Nov-2018
2478	RF cable 30MHz-18GHz	257-257-3052640	N/A	SRC Haverhill	n/a	n/a	06-Jan-2016	05-Jan-2018
2342	Band Reject Filter	BRM50702-07	001	Micro-Tronics	n/a	n/a	29-Mar-2016	29-Mar-2017
2602	Miteq pre-amp 1-18GHz 35dB	AFS42-01001800-28-10P-42	N/A	Miteq	n/a	n/a	08-Jan-2016	07-Jan-2018
1757	18GHz-40GHz Preamp	JS4018004000-30-8P-A1	1406279	Miteq	n/a	n/a	08-Jan-2016	07-Jan-2018
1596	Standard Gain Horn Antenna 18GHz - 26.5GHz	AT4640	309234	Amplifier Research	n/a	n/a	n/a	n/a
2368	RF Cable 30MHz-26.5GHz	TRU-210	TRU-12767-35	TRU Corporation	n/a	n/a	08-Jan-2016	07-Jan-2018
2349	Double Ridged Guide Horn Antenna 1-18GHz	3117	00152406	ETS Lindgren	23-Nov-2016	23-Nov-2017	n/a	n/a

30-1000MHz radiated emissions:



Max-Hold Peak Pre-scan, 30 MHz to 1 GHz – transmitting BLE, **battery powered,** Yellow trace is Vertical, Green trace is Horizontal. There were not any emissions close enough to the limit to maximize.



Max-Hold Peak Pre-scan, 30 MHz to 1 GHz – max volume pink noise in BT mode, 120V AC Mains
Yellow trace is VERT, Green trace is HORZ

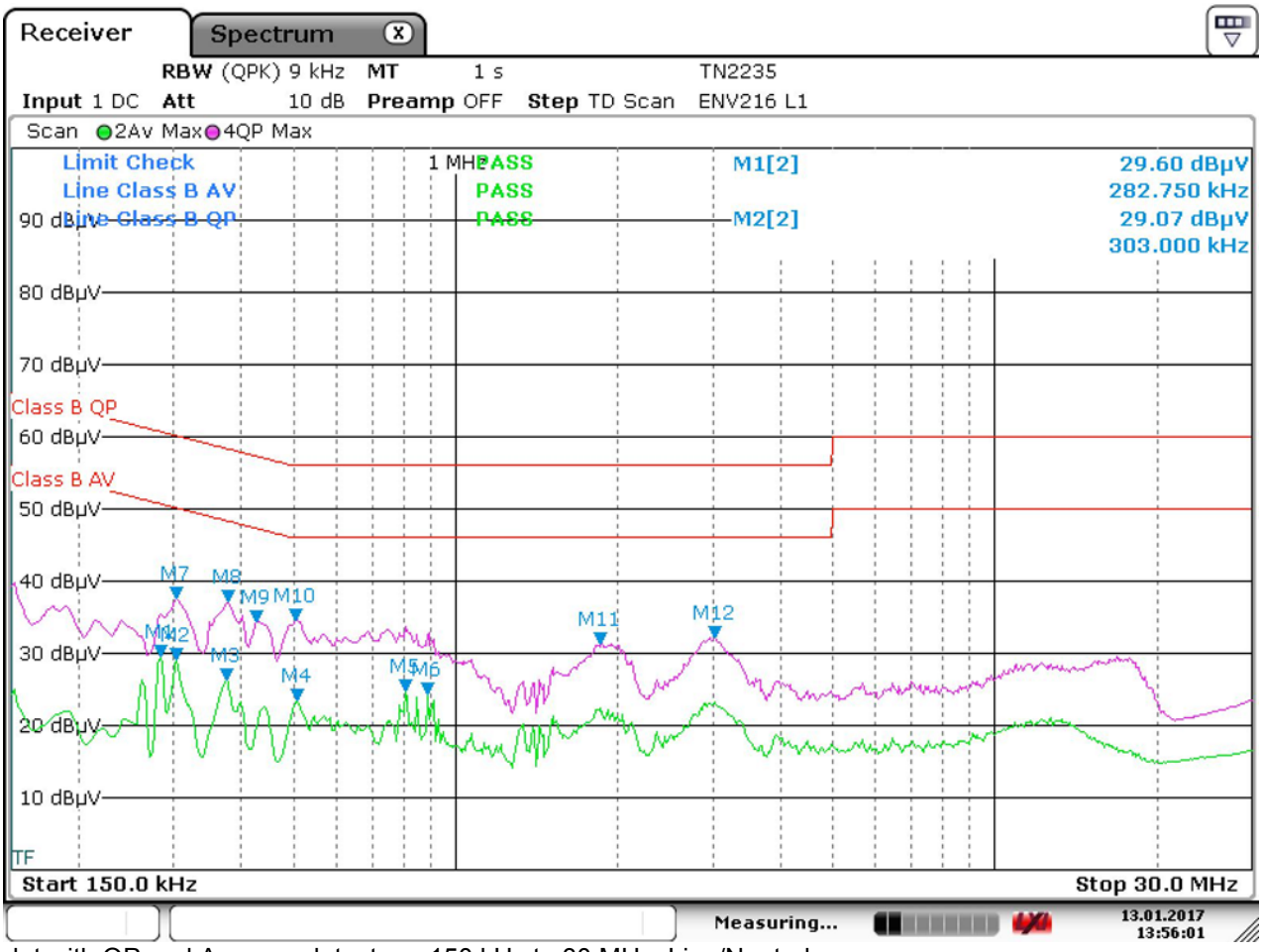
FCC 15B Class B Product (Residential) @ 3 Meters										
Emission Frequency (MHz)	Measured Amplitude (dBµV/m) QP/AVG*	Measured Amplitude (dBµV/m) Peak	FCC 15B Limit (dBµV/m) QP/AVG*	FCC 15B Limit (dBµV/m) Peak	FCC 15B Margin (dB) QP/AVG*	FCC 15B Margin (dB) Peak	Table Azimuth (0° closest to ant)	Receiving Antenna Pol (H/V)	Receiving Antenna Height (Meters)	*Average detector used for frequencies Notes / Mode
30.334	35.60	42.10	40.0	N/A	4.4	N/A	0	V	1.0	
38.850	34.40	42.20	40.0	N/A	5.6	N/A	200	V	1.0	
44.768	31.40	40.40	40.0	N/A	8.6	N/A	0	V	1.0	
52.802	26.40	38.20	40.0	N/A	13.6	N/A	0	V	1.0	
188.626	26.20	33.80	43.5	N/A	17.3	N/A	158	V	1.0	
197.425	25.90	33.50	43.5	N/A	17.6	N/A	187	V	1.0	

Model 423816 in Bluetooth mode powered at 120V passes FCC Class B by 4.4 dB at 30.3 MHz.

Resources Used

TN	Description	Model	S/N	Manufacturer	Most Recent Calibration	Calibration Due Date	Most Recent Verification	Verification Due Date
2319	EMI Test Receiver	ESR26	101276	Rohde & Schwarz	14-Apr-2016	14-Apr-2017	n/a	n/a
644	Maxwell House 3 Meter Chamber	N/A	1698A	EM Test	n/a	n/a	23-Mar-2016	23-Mar-2018
1445	Maxwell House Cable Set	N/A	N/A	Bose Corporation	n/a	n/a	21-Mar-2016	21-Mar-2017
2077	Preamplifier	N/A	N/A	Bose Corporation	n/a	n/a	21-Mar-2016	21-Mar-2017
1541	Antenna 30MHz - 6GHz	JB6	A050807	Sunol Sciences Corp	24-Oct-2016	24-Oct-2017	n/a	n/a
1569	Comb Generator	CG-520	451016	Com-Power Corporation	n/a	n/a	26-Jan-2016	25-Jan-2018
2281	iPod touch	16GB	CCQM2PAUFFCJ	Apple	Verification not required	Verification not required	Verification not required	Verification not required

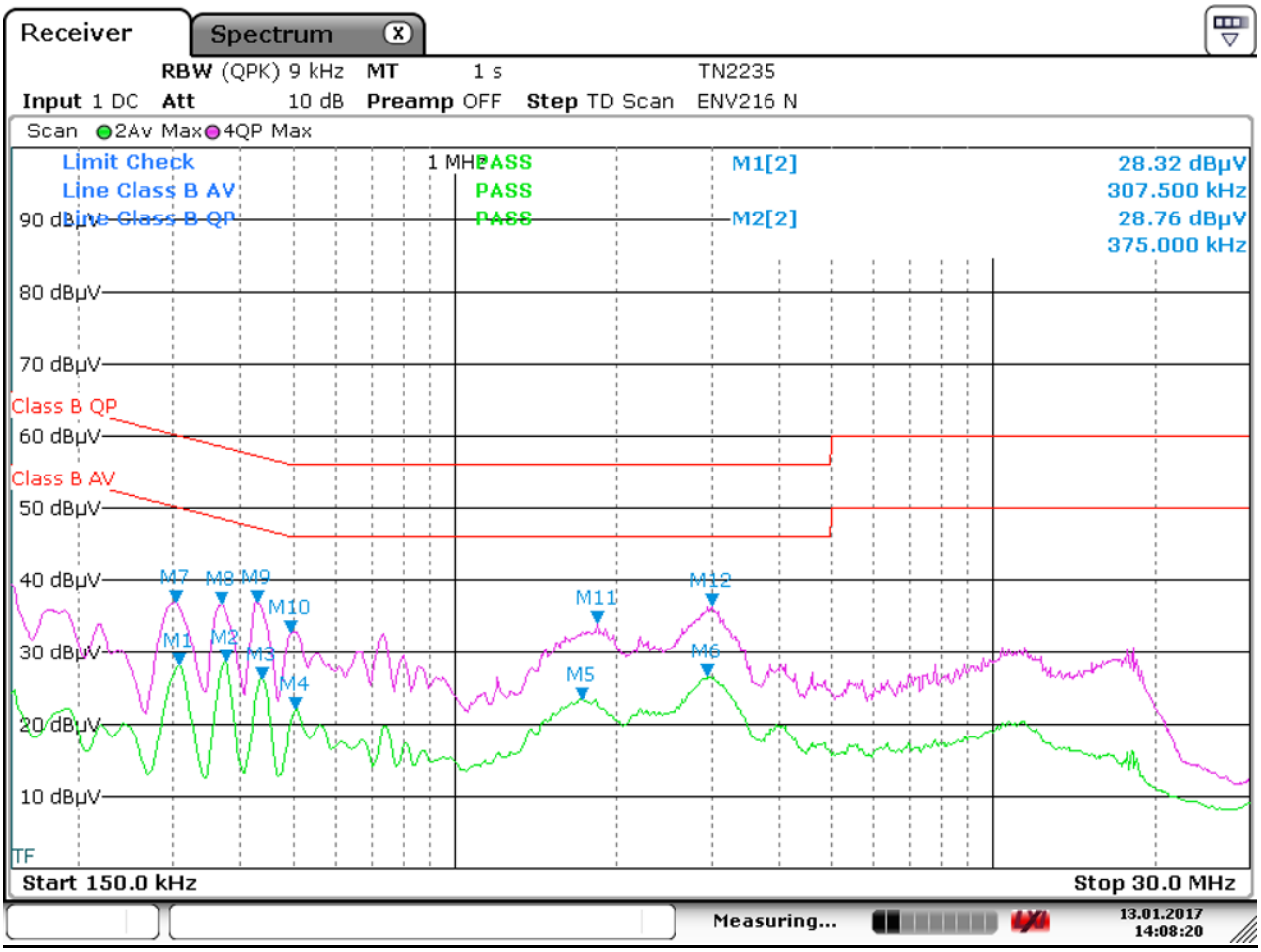
AC Power Line Conducted Emissions



Max Hold plot with QP and Average detectors: 150 kHz to 30 MHz, Line/Neutral
120 V – Max volume Pink noise via BT

FCC 15B Class B, CISPR 13, CISPR 22 Class B Product							
Frequency	MEASURED		LIMIT		MARGIN		
MHz	dBµV QP	dBµV AVG	dBµV QP	dBµV AVG	dB QP	dB AVG	Notes
0.2828	35.50	29.60	60.7	50.7	25.2	21.1	120V, max volume pink noise via BT
0.3030	37.70	29.10	60.2	50.2	22.5	21.1	120V, max volume pink noise via BT
0.3750	36.90	26.20	58.4	48.4	21.5	22.2	120V, max volume pink noise via BT
0.3773	37.20	26.10	58.3	48.3	21.1	22.2	120V, max volume pink noise via BT
0.4268	34.40	19.70	57.3	47.3	22.9	27.6	120V, max volume pink noise via BT
0.5055	34.60	23.40	56.0	46.0	21.4	22.6	120V, max volume pink noise via BT
0.5078	34.50	23.40	56.0	46.0	21.5	22.6	120V, max volume pink noise via BT
0.8070	33.70	24.80	56.0	46.0	22.3	21.2	120V, max volume pink noise via BT
0.8880	32.90	24.30	56.0	46.0	23.1	21.7	120V, max volume pink noise via BT
1.8578	31.30	22.40	56.0	46.0	24.7	23.6	120V, max volume pink noise via BT
3.0345	32.20	23.10	56.0	46.0	23.8	22.9	120V, max volume pink noise via BT

DP1 Minnow **Passes** FCC Class B conducted emissions by 21.1 dB at 0.283 MHz when powered at 120V playing max volume pink noise via BT



Max Hold plot: 150 kHz to 30 MHz, Line/Neutral
120 V – Standby mode

FCC 15B Class B, CISPR 13, CISPR 22 Class B Product							
Frequency	MEASURED		LIMIT		MARGIN		
MHz	dBµV QP	dBµV AVG	dBµV QP	dBµV AVG	dB QP	dB AVG	Notes
2.9513	36.30	26.70	56.0	46.0	19.7	19.3	120V, standby mode
3.0165	36.40	26.50	56.0	46.0	19.6	19.5	120V, standby mode
0.3750	35.80	28.80	58.4	48.4	22.6	19.6	120V, standby mode
0.4290	36.90	24.80	57.3	47.3	20.4	22.5	120V, standby mode
0.4380	36.20	26.40	57.1	47.1	20.9	20.7	120V, standby mode
0.3683	36.70	27.70	58.5	48.5	21.8	20.8	120V, standby mode
0.3075	36.80	28.30	60.0	50.0	23.2	21.7	120V, standby mode
1.8443	34.10	22.80	56.0	46.0	21.9	23.2	120V, standby mode
0.3030	37.00	27.90	60.2	50.2	23.2	22.3	120V, standby mode
1.7250	32.90	23.50	56.0	46.0	23.1	22.5	120V, standby mode
0.5055	32.80	22.10	56.0	46.0	23.2	23.9	120V, standby mode
0.4965	32.80	21.30	56.1	46.1	23.3	24.8	120V, standby mode

DP1 Minnow **Passes** FCC Class B conducted emissions by 19.3 dB at 2.9513 MHz when powered at 120V in Standby mode

Resources Used

TN	Description	Model	S/N	Manufacturer	Most Recent Calibration	Calibration Due Date	Most Recent Verification	Verification Due Date
2247	EMI Test Receiver, 7GHZ	ESR7	101263	Rohde & Schwarz	08-Apr-2016	08-Apr-2017	n/a	n/a
1380	Conducted Comb Generator	CGC-510	311559	Com-Power Corporation	n/a	n/a	28-Mar-2016	28-Mar-2017
2235	2-LINE V-NETWORK	ENV216	101192	Rohde & Schwarz	03-Dec-2015	02-Dec-2017	n/a	n/a

End of Report