FCC 47 CFR PART 15 SUBPART C
ISED CANADA RSS-247 ISSUE 2

BLUETOOTH LOW ENERGY CERTIFICATION TEST REPORT

FOR

SMART SENSOR

MODEL NUMBER: V1

FCC ID: 2AQVX-SS4MB01
IC: 24215-SS4MB01

REPORT NUMBER: R12141961-E1

ISSUE DATE: 26 NOVEMBER 2018

Prepared for
ABB MOTORS AND MECHANICAL INC. (BALDOR ELECTRIC COMPANY)
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NVLAP TESTING
NVLAP Lab code: 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2018-08-20	Initial Issue	Brian T. Kiewra
2	2018-11-02	Revised company name	Brian T. Kiewra
3	2018-11-26	Added calibration note to Section 6. Revised KDB 558074 reference in Section 2 and 7.	Brian T. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ABB Motors and Mechanical Inc. (Baldor Electric Company)
5711 RS Boreham Jr St.
Fort Smith, AR 72901-8301, USA

EUT DESCRIPTION: Smart Sensor

MODEL: V1

SERIAL NUMBER: 201710250000795, 201805160001207

DATE TESTED: 2018-06-11 to 2018-07-31

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Compliant
ISED CANADA RSS-247 Issue 2	Compliant
ISED CANADA RSS-GEN Issue 5	Compliant

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Approved & Released
For UL LLC By:

Jeffrey Moser
Operations Leader
UL – Consumer Technology Division

Prepared By:

Brian T. Kiewra
Project Engineer
UL – Consumer Technology Division

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01v05, ANSI C63.10-2013, RSS-GEN Issue 5, RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA.

12 Laboratory Dr., RTP, NC 27709
☐ Chamber A
☐ Chamber C

2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560
☒ Chamber NORTH
☒ Chamber SOUTH

The onsite chambers are covered under ISED Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at http://www.nist.gov/nvlap/.

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4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	2.00%
RF output power, conducted	1.3 dB (PK), 0.45 dB (AV)
RF output power, radiated (SAC)	4.52 dB
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	3.05 dB
All emissions, radiated	5.36 dB
Temperature	2.26°C
Humidity	6.79%
DC Supply voltages	1.70%
Time	3.39%

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a battery operated smart sensor for mounted bearings containing a BLE transceiver.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	-0.31	0.93

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an antenna with a maximum gain of -2.7 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was dtm_V1.1
The test utility software used during testing was nRFgo Studio, Version 1.21.2.1

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions in range of 1-18GHz, EUT was set to transmit at low, a middle, and high channels. Radiated emissions <1GHz, >18GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power and PSD as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y, and Z. It was determined that Y orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Y orientation.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	T450	PC0A2UQT	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	Serial	Data	.2	Used for test purposes only to configure EUT.

TEST SETUP

The EUT is setup as a standalone device.

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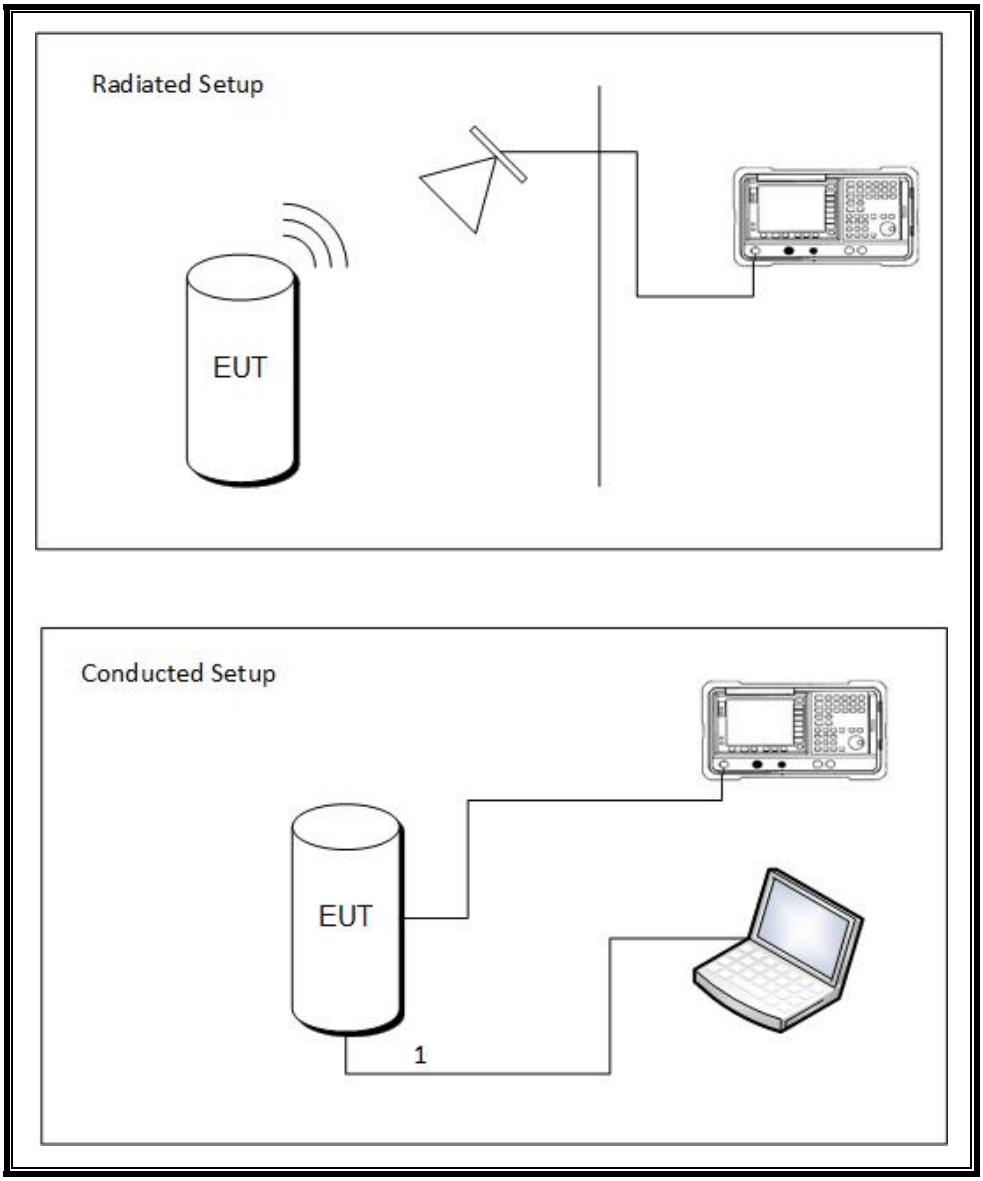
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Note: All tests performed within equipment calibration intervals. Unless test date occurred between calibration intervals, in which case both calibrations intervals were included.

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2017-07-18	2018-07-31
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2018-05-20	2019-05-20
SA0027	Spectrum Analyzer	Agilent	N9030A	2018-04-04	2019-04-04
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
s/n 161024690	Environmental Meter	Fisher Scientific	15-077-963	2016-12-21	2018-12-21

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2018-01-02	2019-01-02
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2018-04-30	2019-04-30
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2017-10-10	2018-10-10
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2017-09-15	2018-09-15
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2018-03-20	2019-03-20
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2018-04-02	2019-04-02
SA0026	Spectrum Analyzer	Agilent	N9030A	2018-03-20	2019-03-20
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
s/n 161024887	Environmental Meter	Fisher Scientific	15-077-963	2016-12-23	2018-12-23

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Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2017-11-06	2018-11-06
PWM003	RF Power Meter	Keysight Technologies	N1911A	2017-07-14	2018-07-14
PWS003	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2017-07-14	2018-07-14
SN 161016511	Environmental Meter	Fisher Scientific	15-077-963	2016-12-21	2018-12-21
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A
MM0168	MultiMeter	Agilent	U1232A	2017-09-25	2018-09-30

Note: All equipment within calibration at time of use.

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7. MEASUREMENT METHODS

Duty Cycle: KDB 558074 D01 v05 Section 6.0

6 dB BW: KDB 558074 D01 v05 Section 8.1

99% Occupied Bandwidth: ANSI C63.10-2013, Section 6.9.3

Output Power: KDB 558074 D01 v05 Section 9.1.3

Power Spectral Density: KDB 558074 D01 v05 Section 10.2

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v05 Section 11.0

Out-of-band emissions in restricted bands: KDB 558074 D01 v05 Section 12.1

General Radiated Emissions: ANSI C63.10:2013 Sections 6.3 – 6.6

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

None; for reporting purposes only.

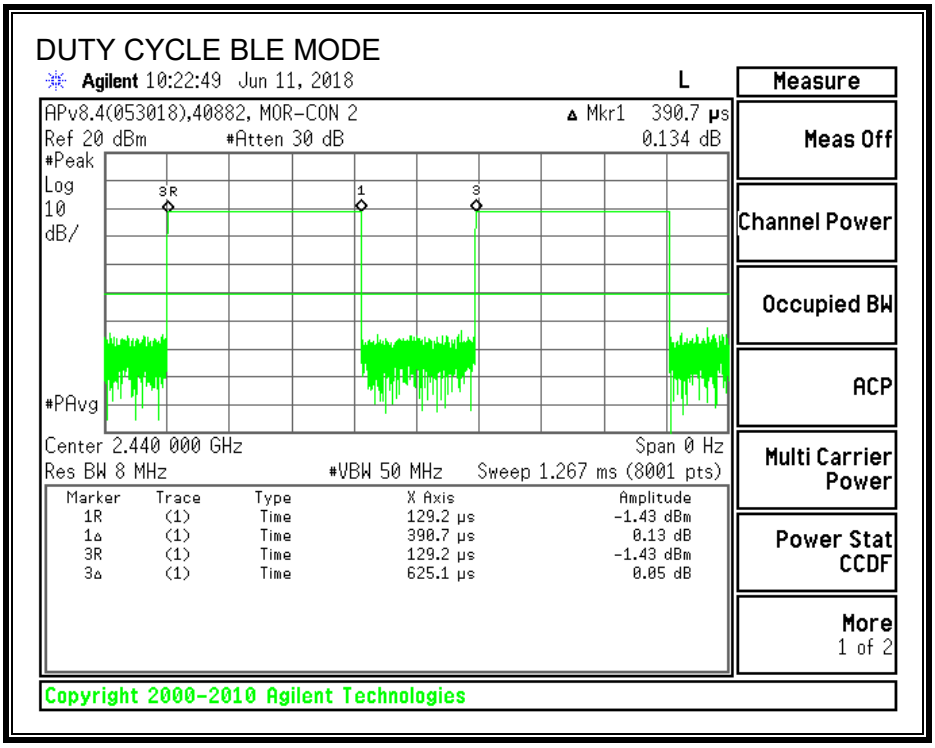
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	0.391	0.625	0.625	62.50%	2.04	2.560

DUTY CYCLE PLOTS



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8.2.6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

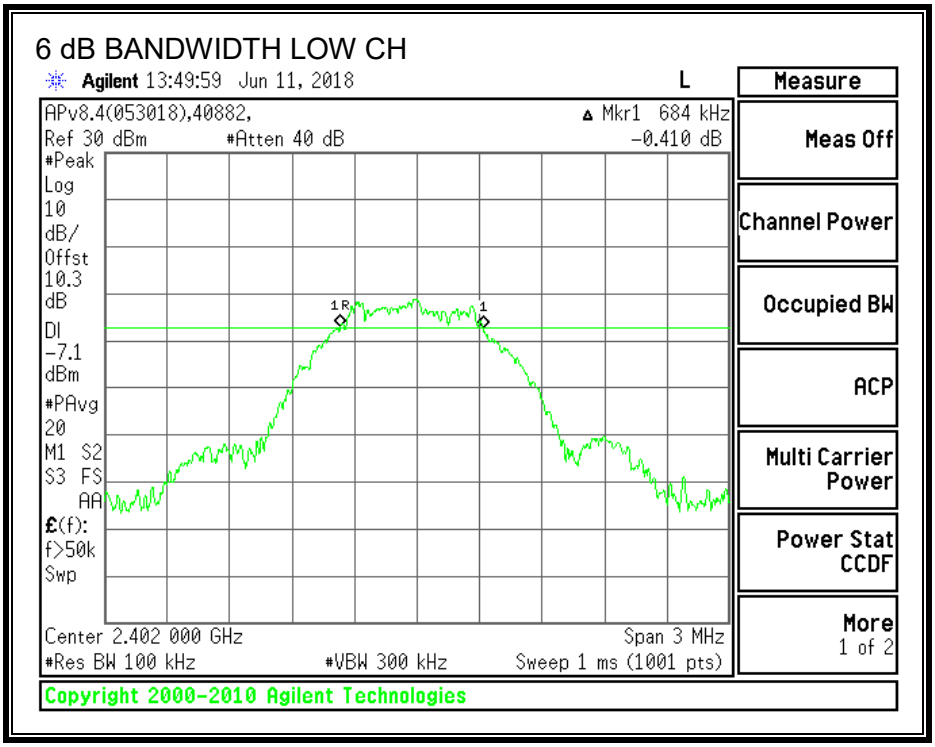
IC RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6840	0.5
Middle	2440	0.6810	0.5
High	2480	0.7410	0.5

6 dB BANDWIDTH



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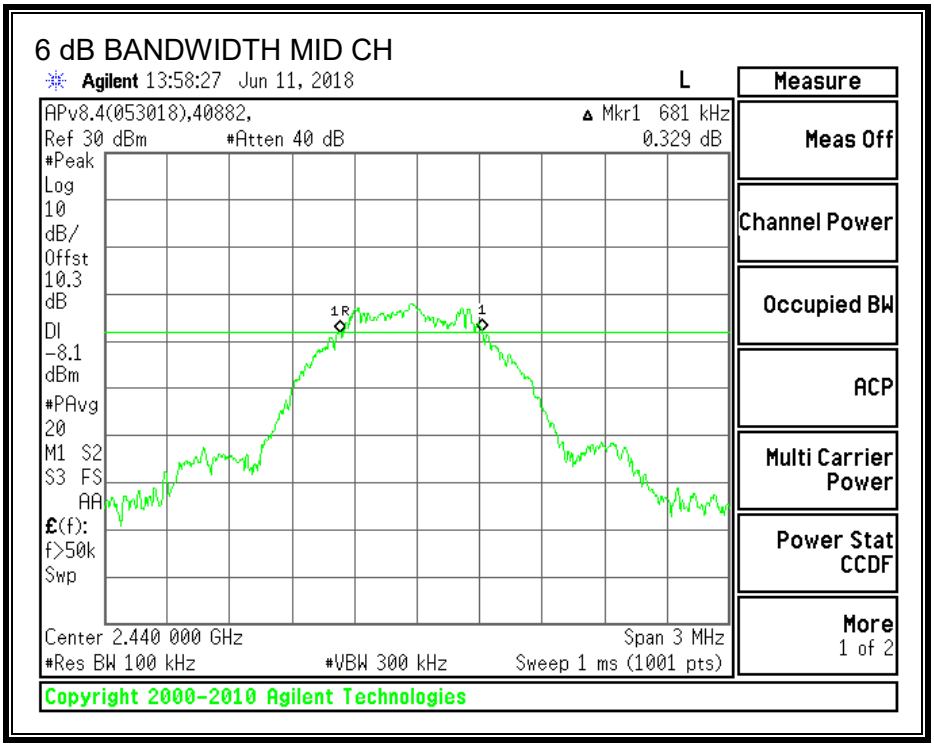
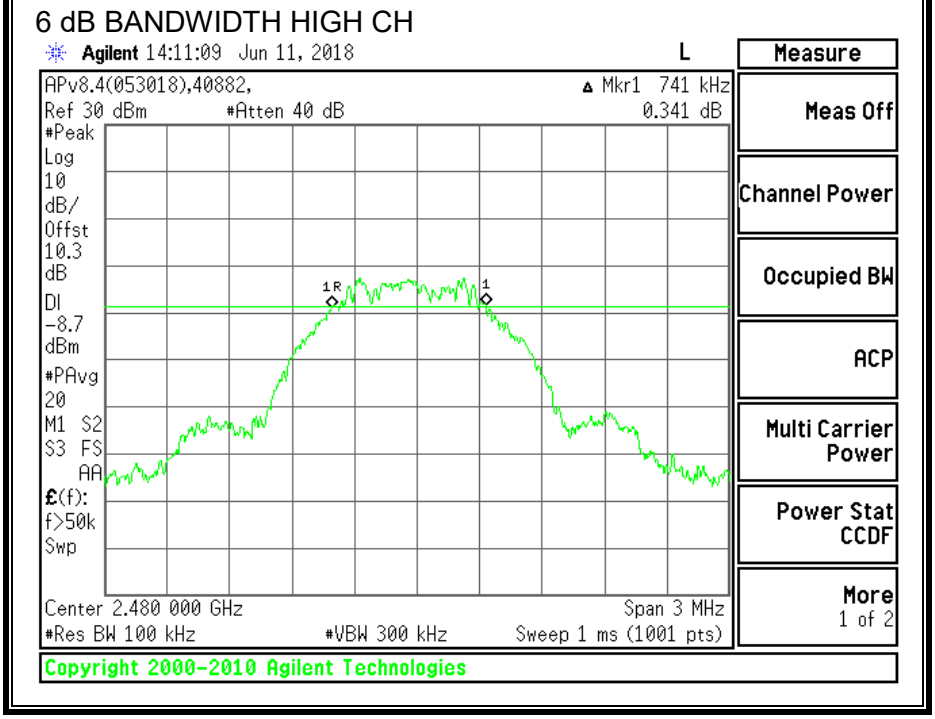
6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



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8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

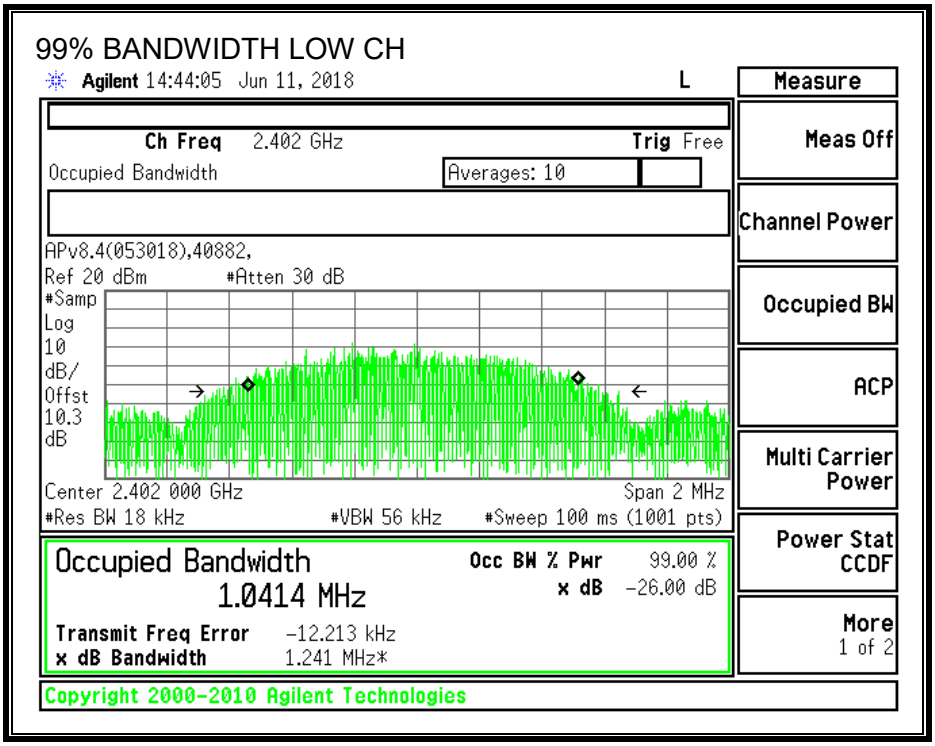
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 5% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0414
Middle	2440	1.0369
High	2480	1.0438

99% BANDWIDTH



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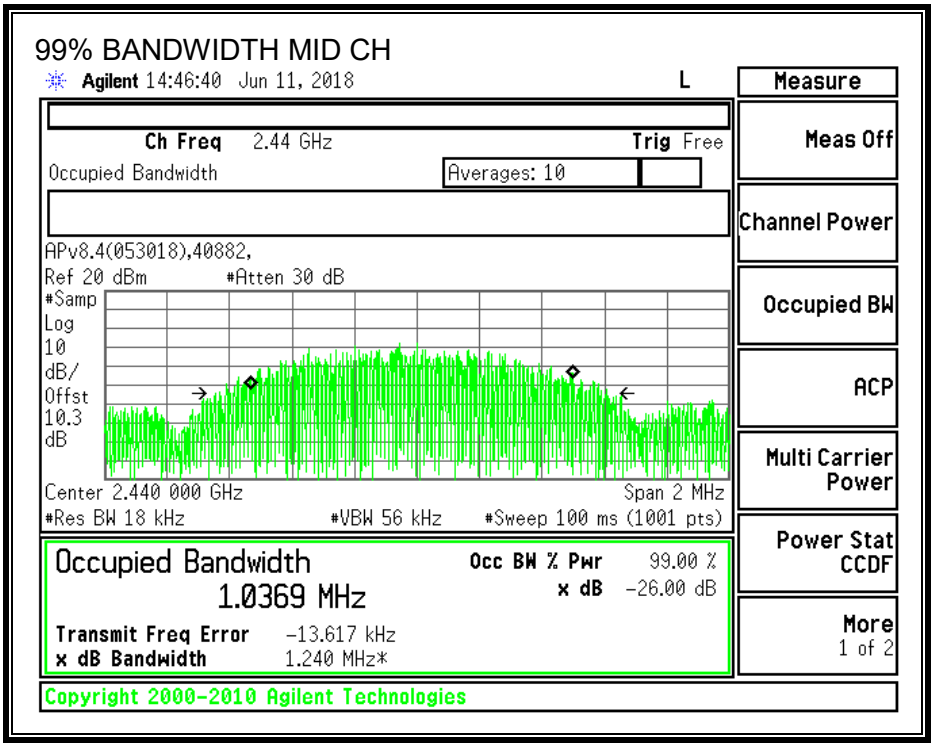

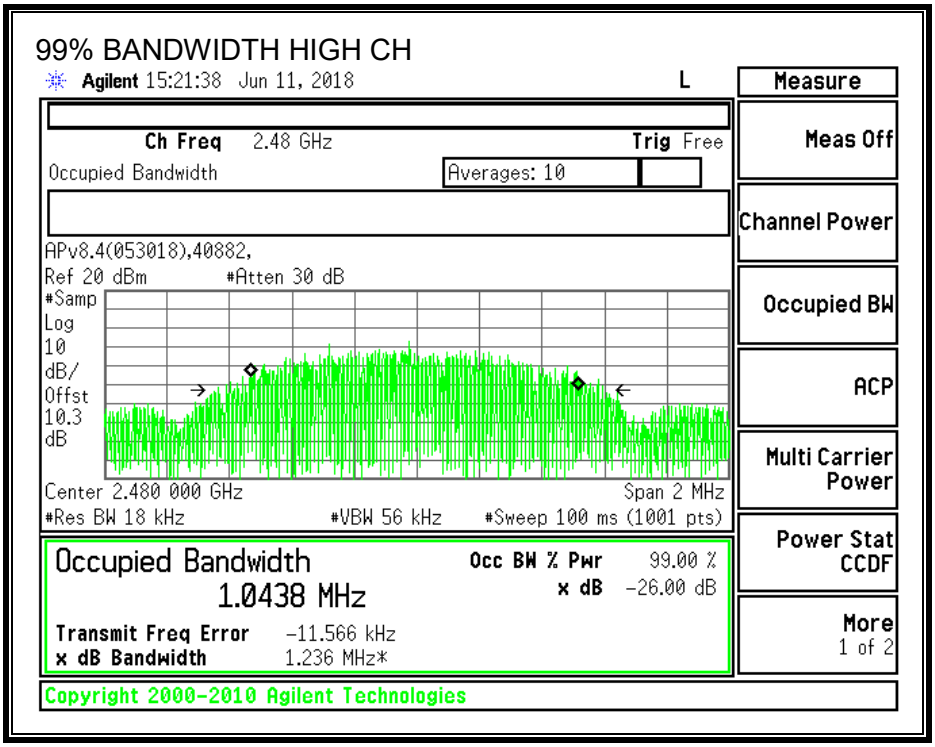

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8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-247 5.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-0.520	30	-30.520
Middle	2440	-0.420	30	-30.420
High	2480	-0.310	30	-30.310

TEST INFORMATION

Date: 2018-06-11
Project No: 12141961
Tester: 40882

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8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

The cable assembly insertion loss of 10.3 dB (including 10 dB pad and 0.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	-0.66
Middle	2440	-2.04
High	2480	-0.45

TEST INFORMATION

Date: 2018-06-11
Project No: 12141961
Tester: 40882

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8.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

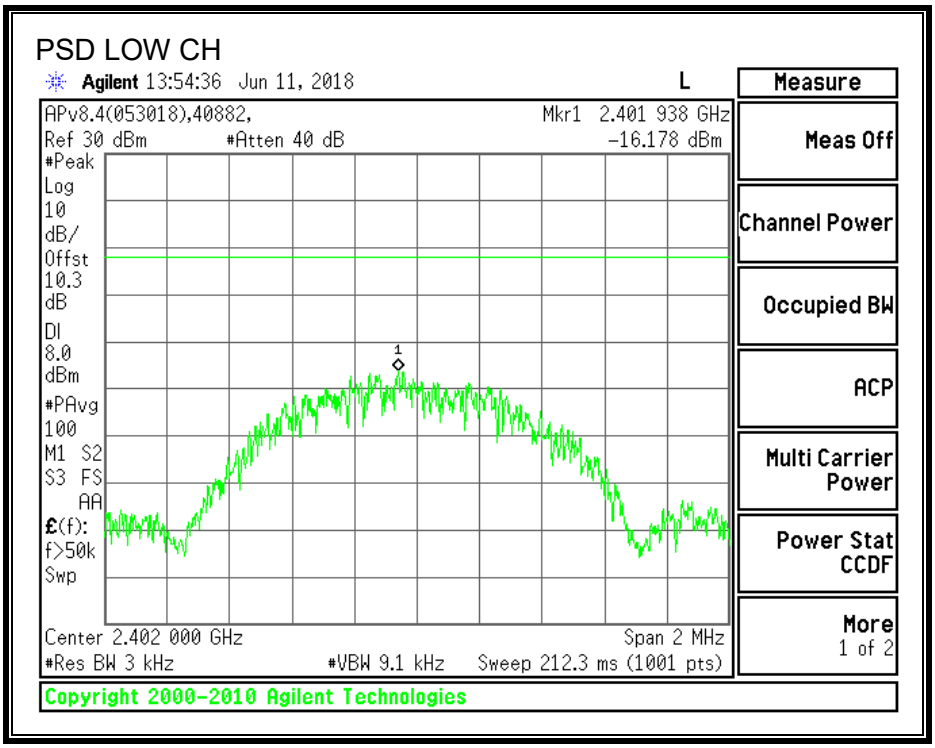
IC RSS-247 5.2 (b)

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.

RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-16.18	8	-24.18
Middle	2440	-17.09	8	-25.09
High	2480	-15.75	8	-23.75

POWER SPECTRAL DENSITY



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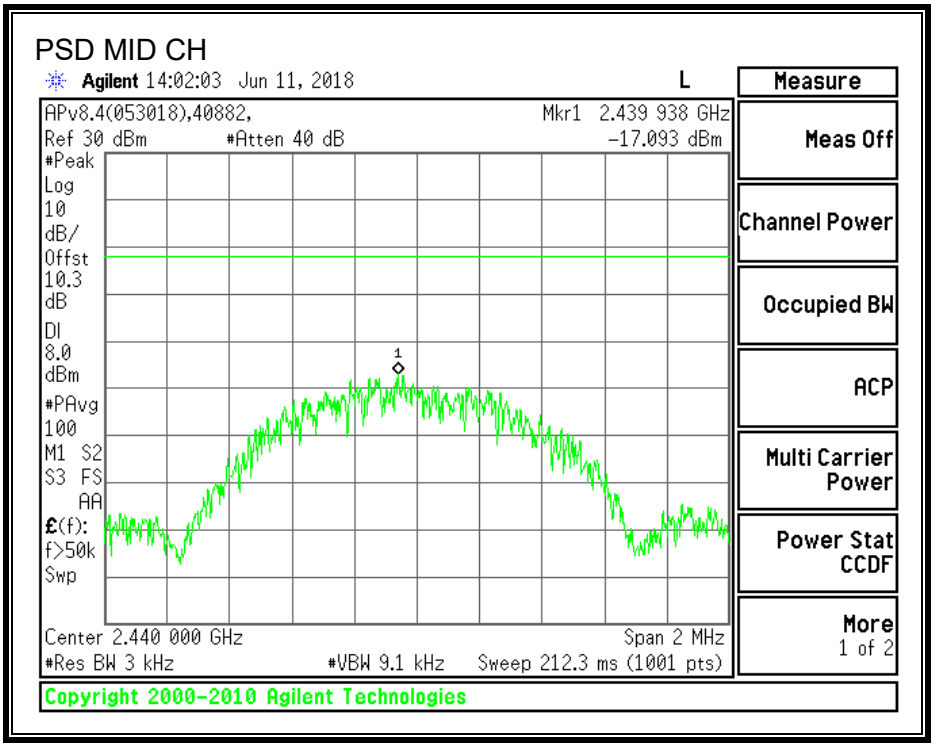
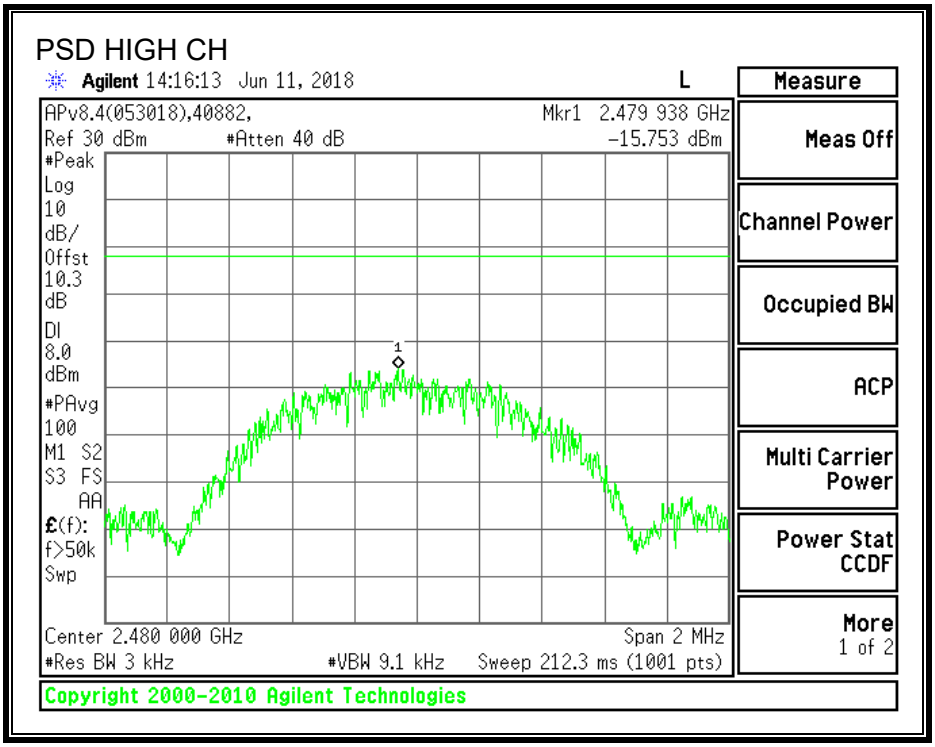
PSD MID CH



PSD HIGH CH



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8.7. CONDUCTED SPURIOUS EMISSIONS

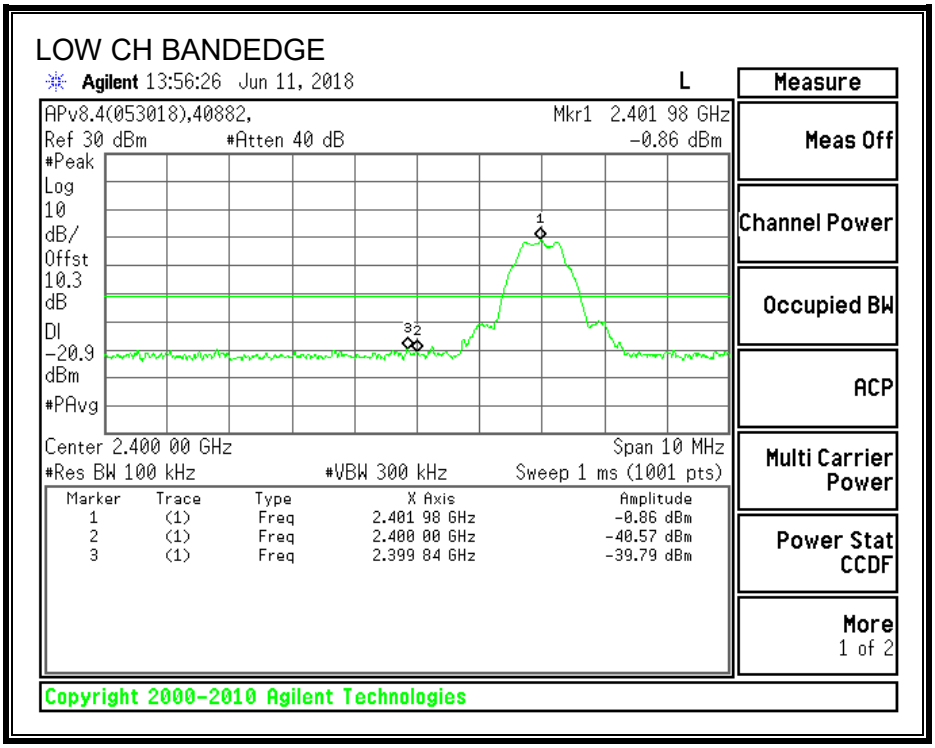
LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

SPURIOUS EMISSIONS, LOW CHANNEL



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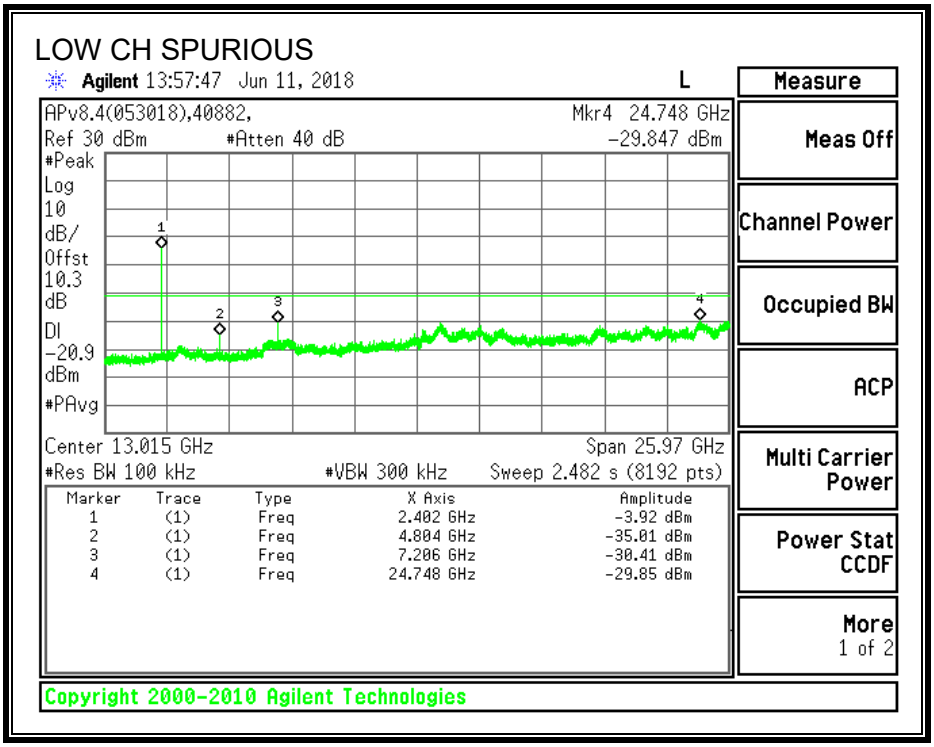
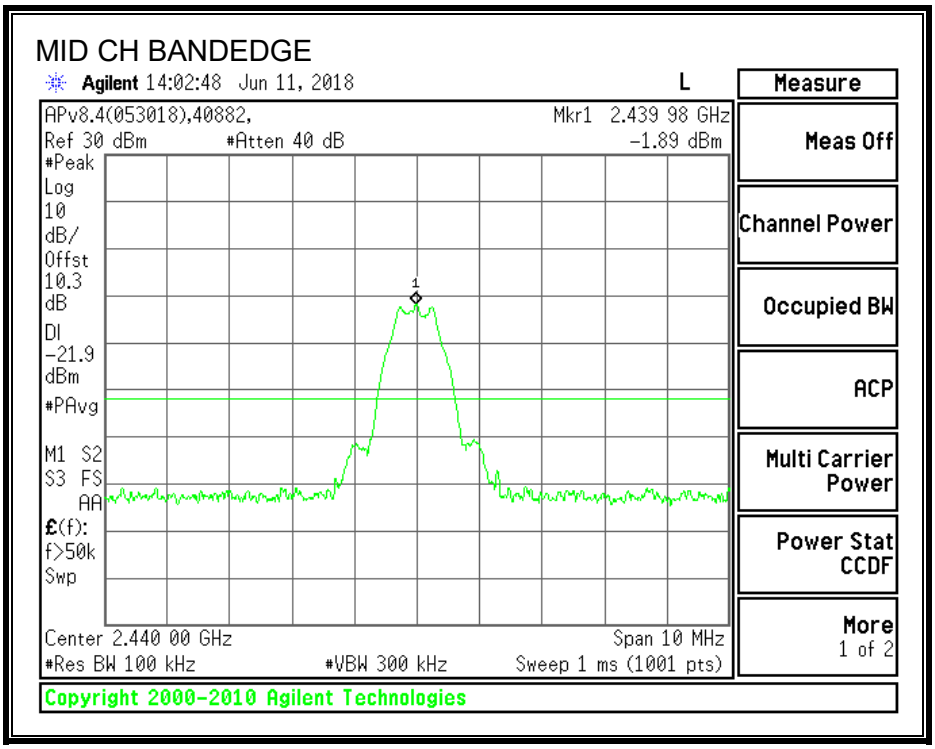


SPURIOUS EMISSIONS, MID CHANNEL



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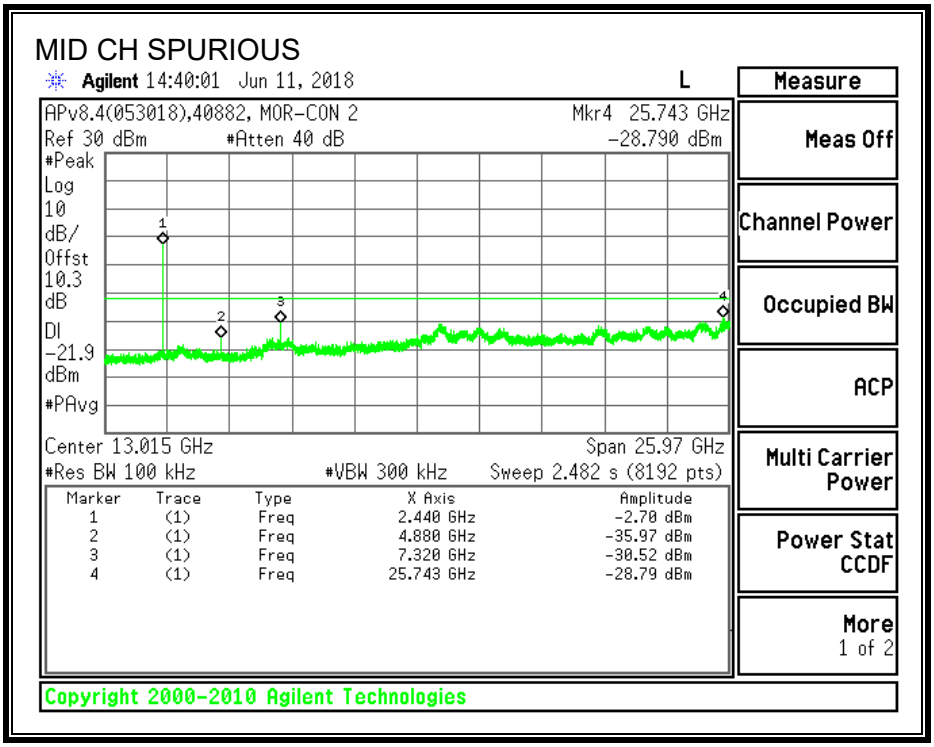
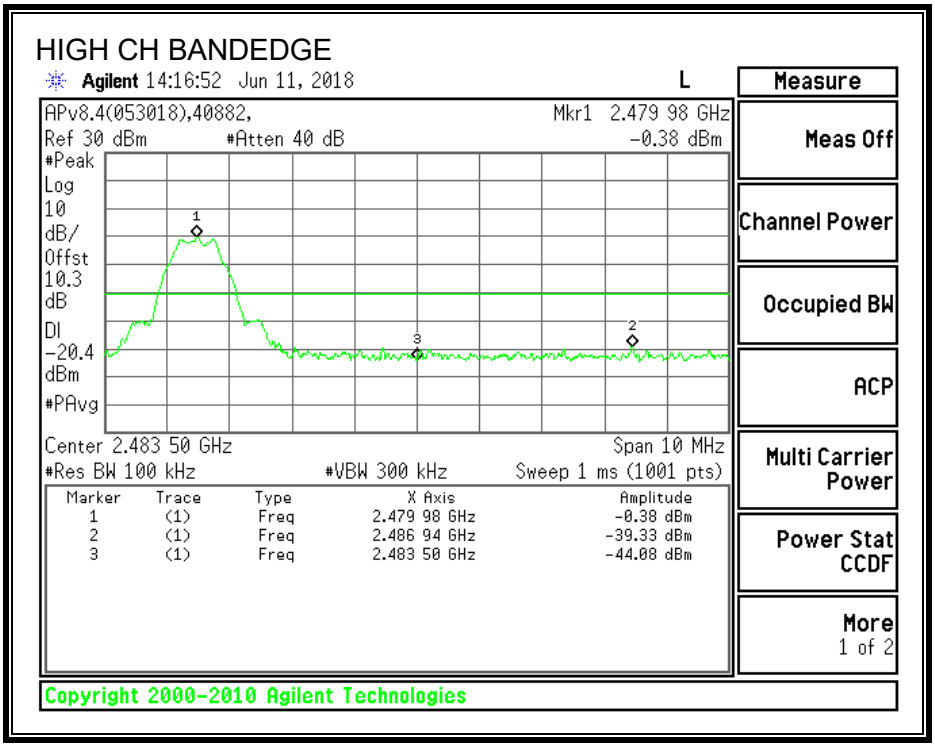


SPURIOUS EMISSIONS, HIGH CHANNEL



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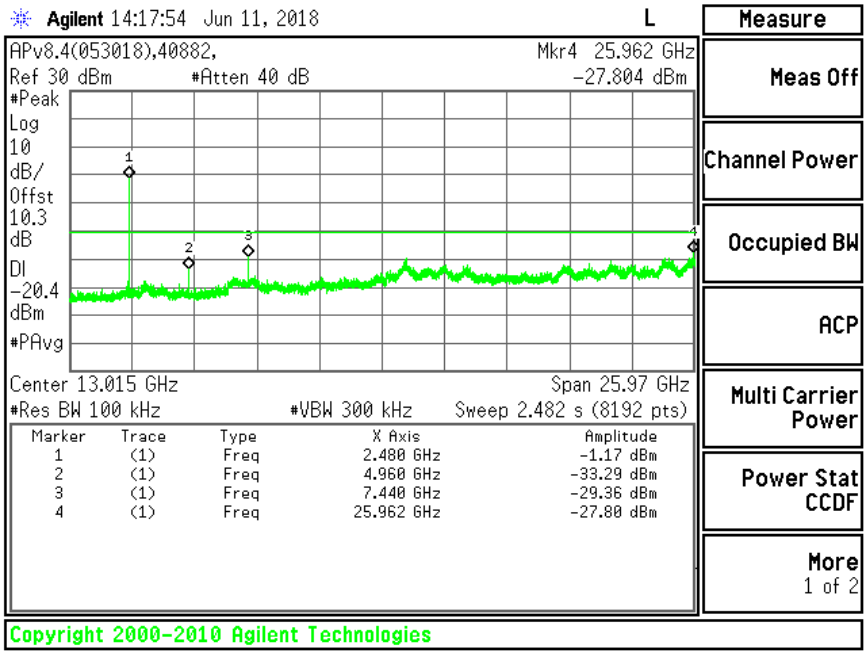
HIGH CH SPURIOUS



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9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209
IC RSS-GEN Clause 8.9, 8.10 (Transmitter)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

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 antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was RMS.

The spectrum from 1 to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. The spectrum from 9kHz to 1000MHz and 18 to 26GHz was investigated on the worst-case channel.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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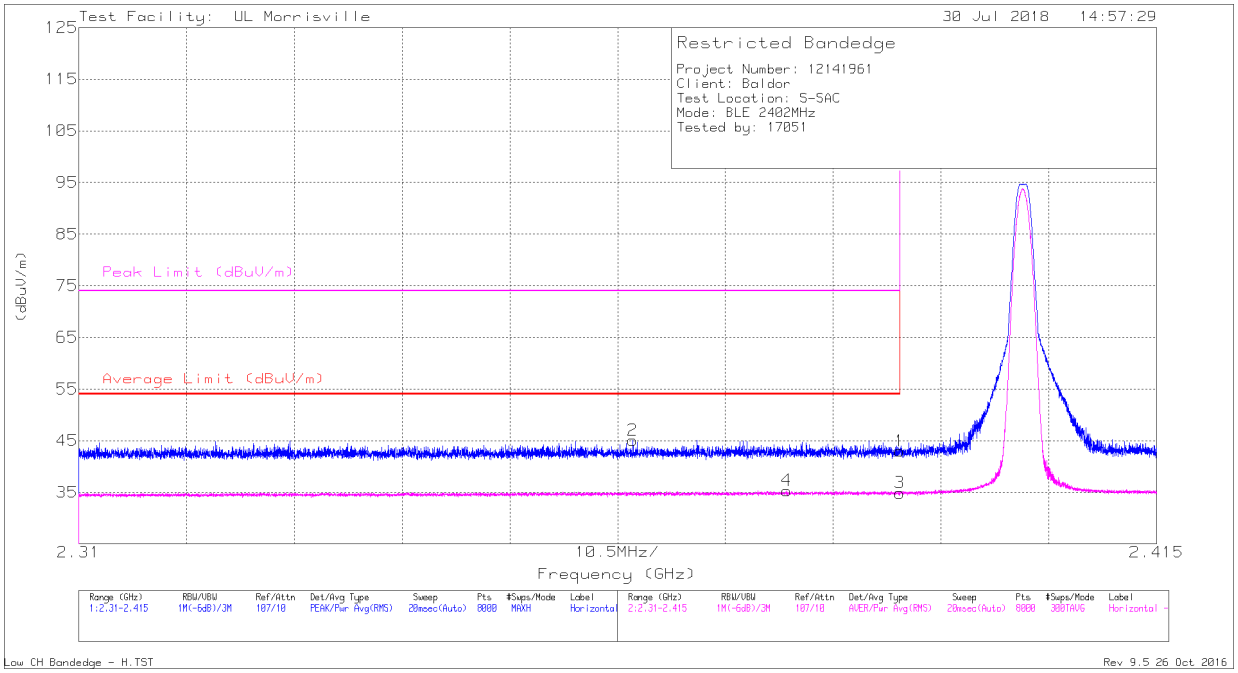
9.2. TX ABOVE 1 GHz FOR BLUETOOTH LOW ENERGY MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.09	Pk	32	-24.1	0	42.99	-	-	74	-31.01	126	114	H
2	* 2.364	37.24	Pk	31.8	-24	0	45.04	-	-	74	-28.96	126	114	H
3	* 2.39	24.94	RMS	32	-24.1	2.04	34.88	54	-19.12	-	-	126	114	H
4	* 2.379	25.4	RMS	32	-24.1	2.04	35.34	54	-18.66	-	-	126	114	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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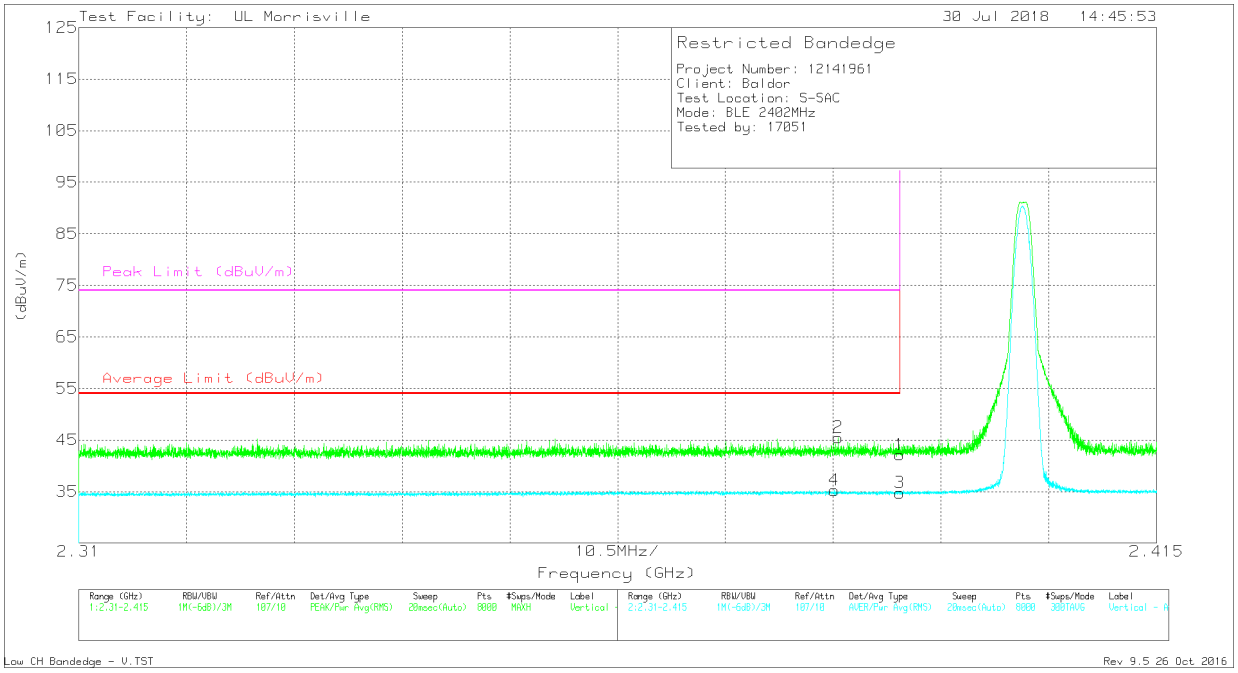
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	34.22	Pk	32	-24.1	0	42.12	-	-	74	-31.88	178	399	V
2	* 2.384	37.58	Pk	32	-24.1	0	45.48	-	-	74	-28.52	178	399	V
3	* 2.39	24.82	RMS	32	-24.1	2.04	34.76	54	-19.24	-	-	178	399	V
4	* 2.384	25.31	RMS	32	-24.1	2.04	35.25	54	-18.75	-	-	178	399	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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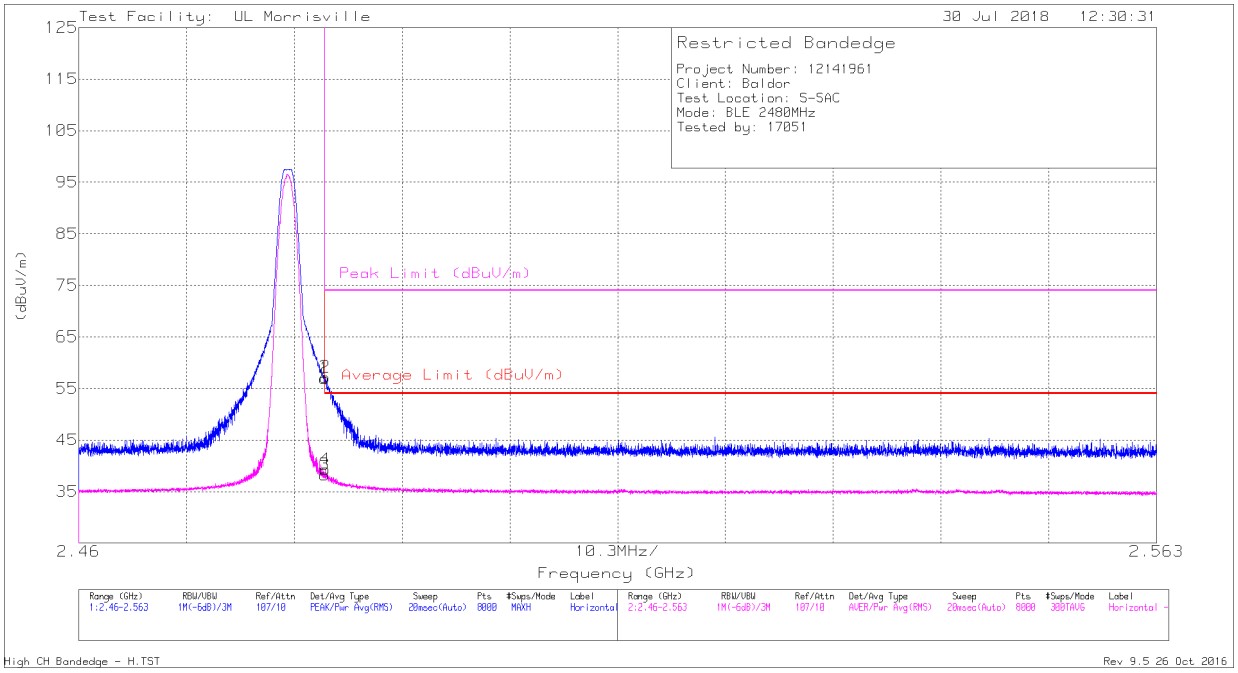
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	49.17	Pk	32.4	-24.6	0	56.97	-	-	74	-17.03	124	111	H
2	* 2.484	49.39	Pk	32.4	-24.6	0	57.19	-	-	74	-16.81	124	111	H
3	* 2.484	28.46	RMS	32.4	-24.6	2.04	38.3	54	-15.7	-	-	124	111	H
4	* 2.484	29.46	RMS	32.4	-24.6	2.04	39.3	54	-14.7	-	-	124	111	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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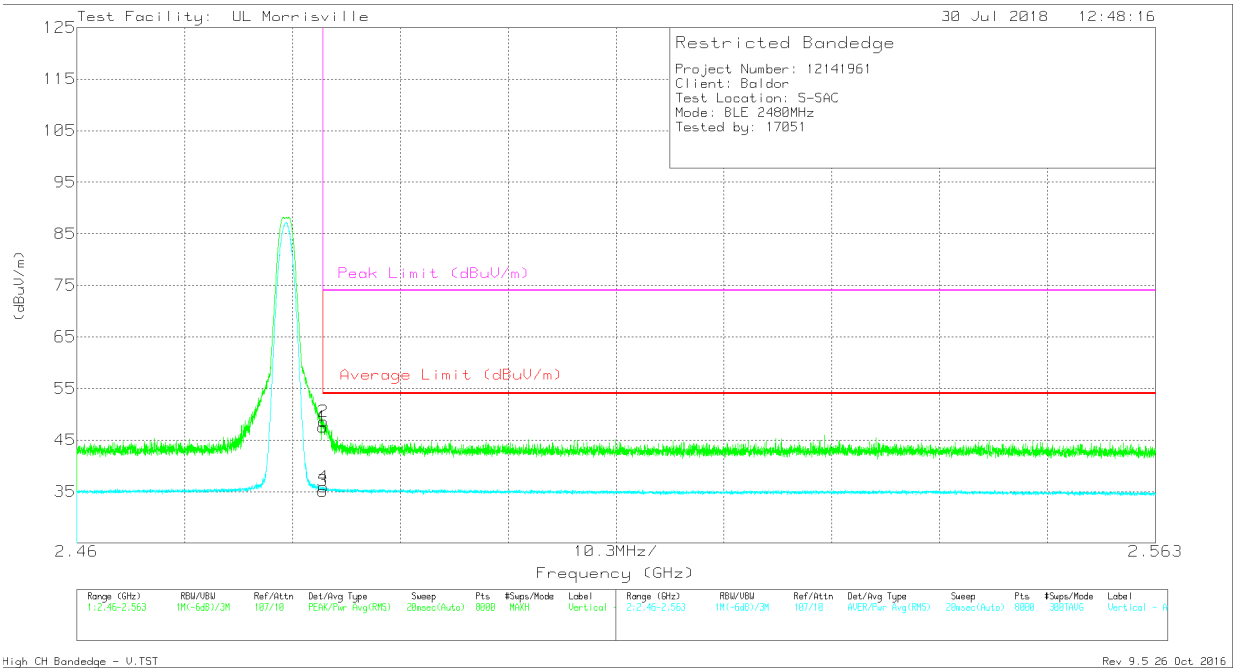
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.71	Pk	32.4	-24.6	0	47.51	-	-	74	-26.49	124	170	V
2	* 2.484	40.79	Pk	32.4	-24.6	0	48.59	-	-	74	-25.41	124	170	V
3	* 2.484	25.29	RMS	32.4	-24.6	2.04	35.13	54	-18.87	-	-	124	170	V
4	* 2.484	26.06	RMS	32.4	-24.6	2.04	35.9	54	-18.1	-	-	124	170	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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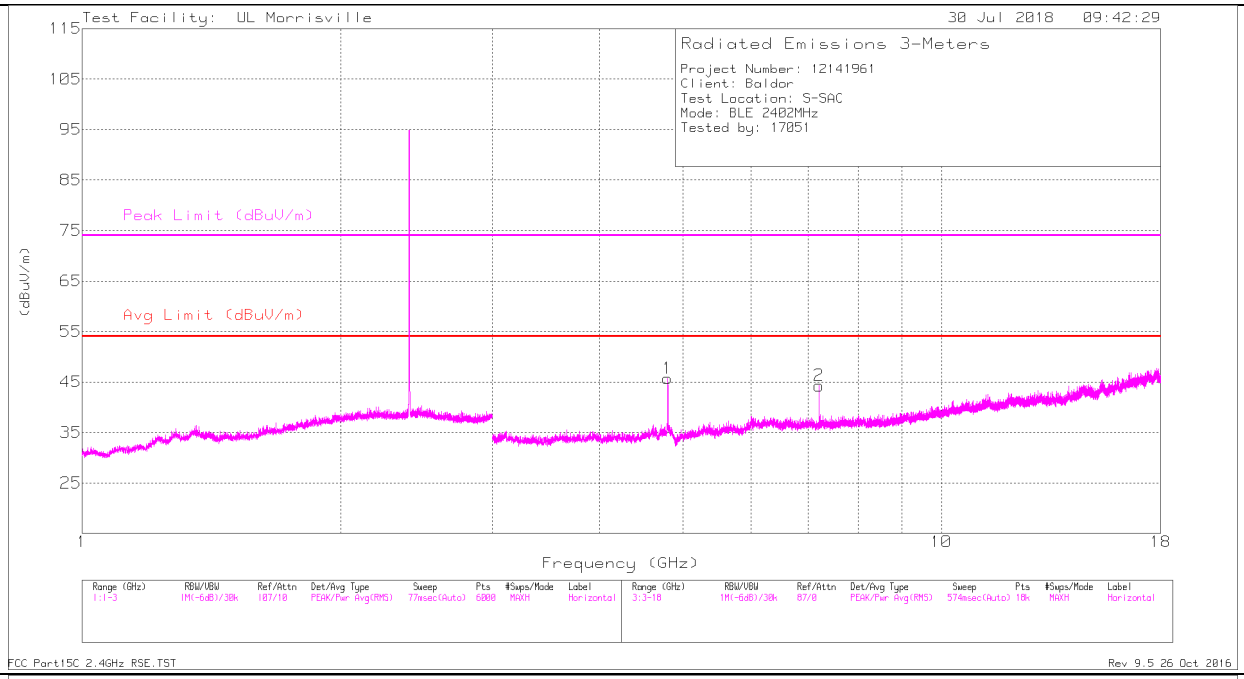
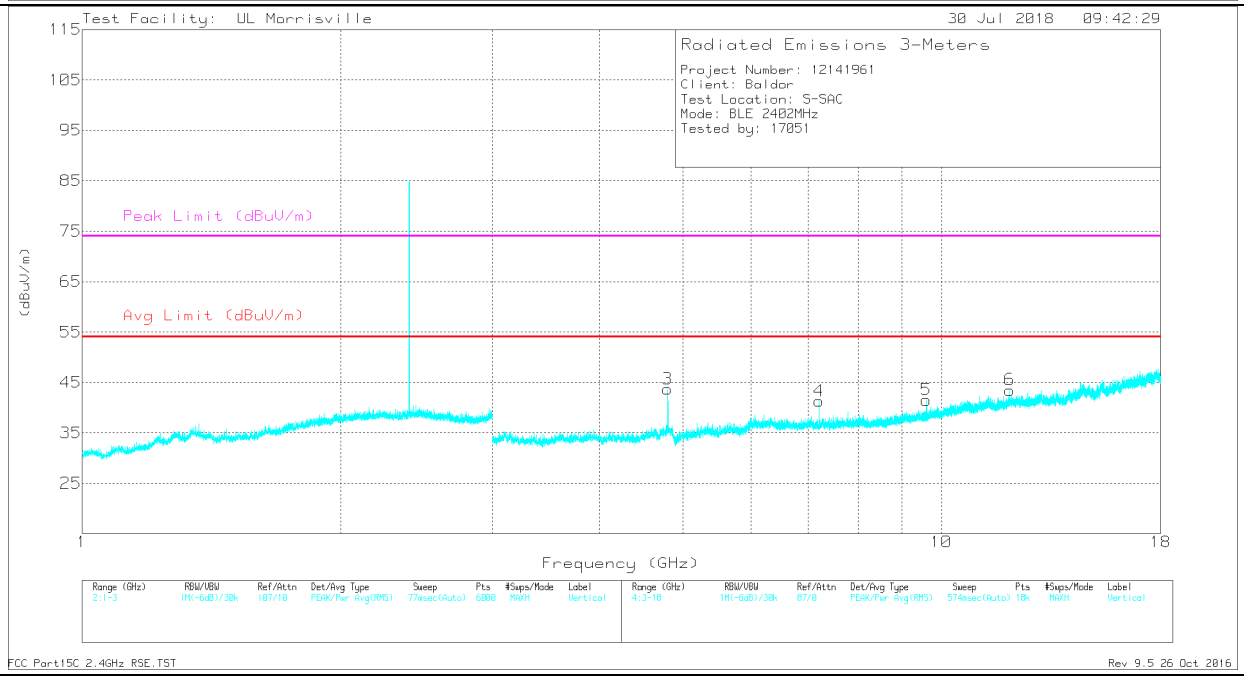
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

Horizontal



Vertical



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.804	48.25	PK2	34	-31.2	0	51.05	-	-	74	-22.95	32	101	H
	* 4.804	40.62	MAv1	34	-31.2	2.04	45.46	54	-8.54	-	-	32	101	H
3	* 4.804	46.43	PK2	34	-31.2	0	49.23	-	-	74	-24.77	126	104	V
	* 4.804	37.43	MAv1	34	-31.2	2.04	42.27	54	-11.73	-	-	126	104	V
6	* 12.009	34.75	PK2	38.7	-24.1	0	49.35	-	-	74	-24.65	129	105	V
	* 12.009	23.71	MAv1	38.7	-24	2.04	40.45	54	-13.55	-	-	129	105	V
2	7.205	36.98	Pk	35.5	-28.2	0	44.28	-	-	-	-	0-360	102	H
4	7.207	34.03	Pk	35.5	-28.2	0	41.33	-	-	-	-	0-360	101	V
5	9.606	30.91	Pk	36.8	-26.2	0	41.51	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK2 - Maximum Peak
MAv1 -Maximum RMS Average

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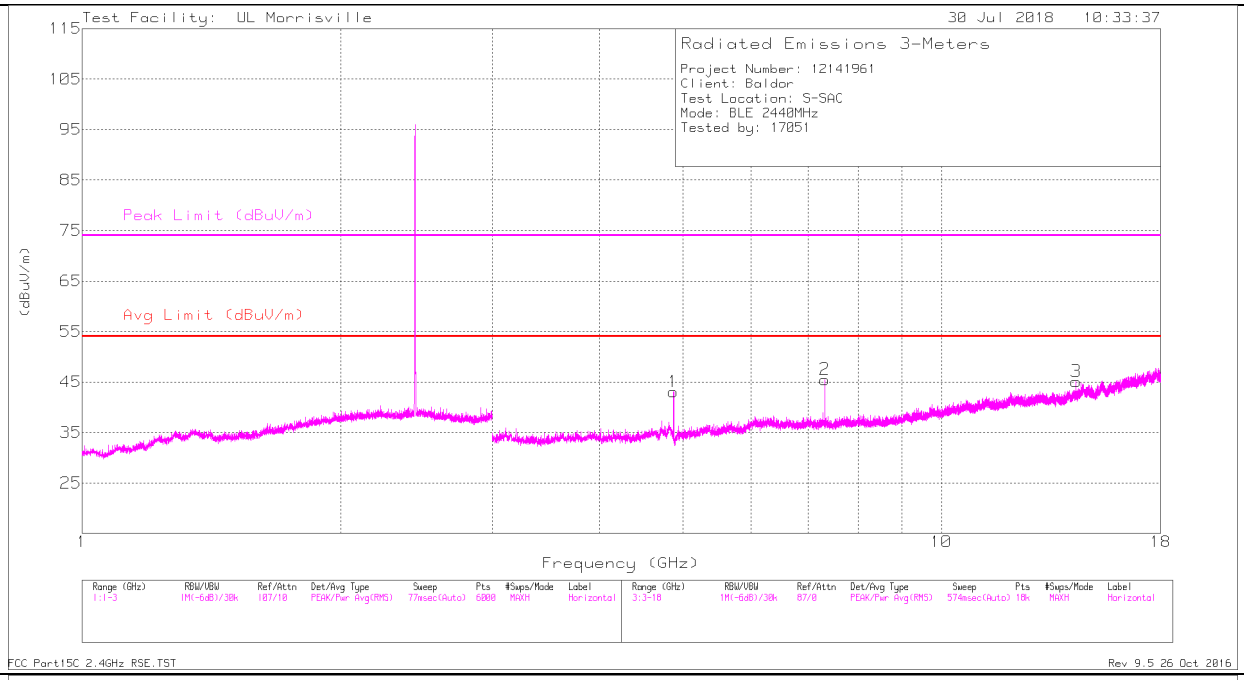
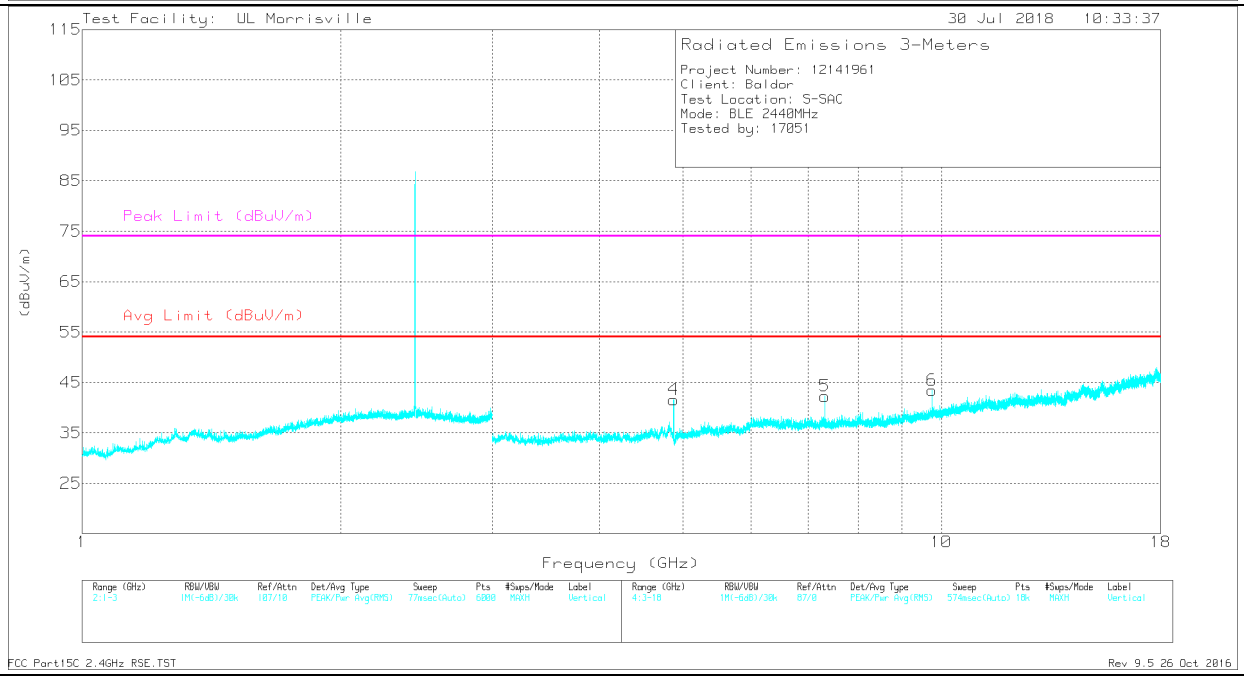
MID CHANNEL

Horizontal



Vertical



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.88	45.89	PK2	34	-30.9	0	48.99	-	-	74	-25.01	21	108	H
	* 4.88	37.56	MAv1	34	-30.9	2.04	42.7	54	-11.3	-	-	21	108	H
4	* 4.881	45.05	PK2	34	-30.9	0	48.15	-	-	74	-25.85	40	105	V
	* 4.88	36.5	MAv1	34	-30.9	2.04	41.64	54	-12.36	-	-	40	105	V
5	* 7.319	42.55	PK2	35.5	-27.6	0	50.45	-	-	74	-23.55	350	101	H
	* 7.319	33.48	MAv1	35.5	-27.6	2.04	43.42	54	-10.58	-	-	350	101	H
2	* 7.321	41.24	PK2	35.5	-27.6	0	49.14	-	-	74	-24.86	213	152	V
	* 7.319	31.39	MAv1	35.5	-27.6	2.04	41.33	54	-12.67	-	-	213	152	V
3	14.351	29.92	Pk	39.2	-24	0	45.12	-	-	-	-	0-360	199	H
6	9.759	32.21	Pk	37	-25.8	0	43.41	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK2 - Maximum Peak
MAv1 -Maximum RMS Average

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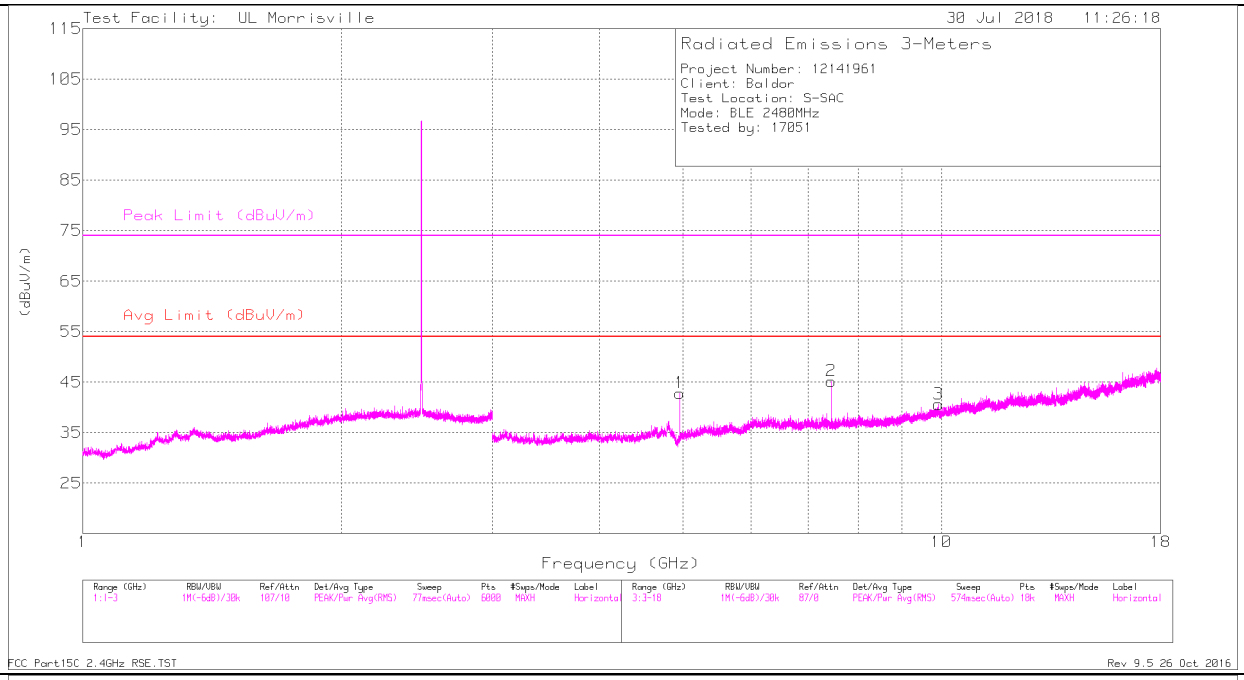
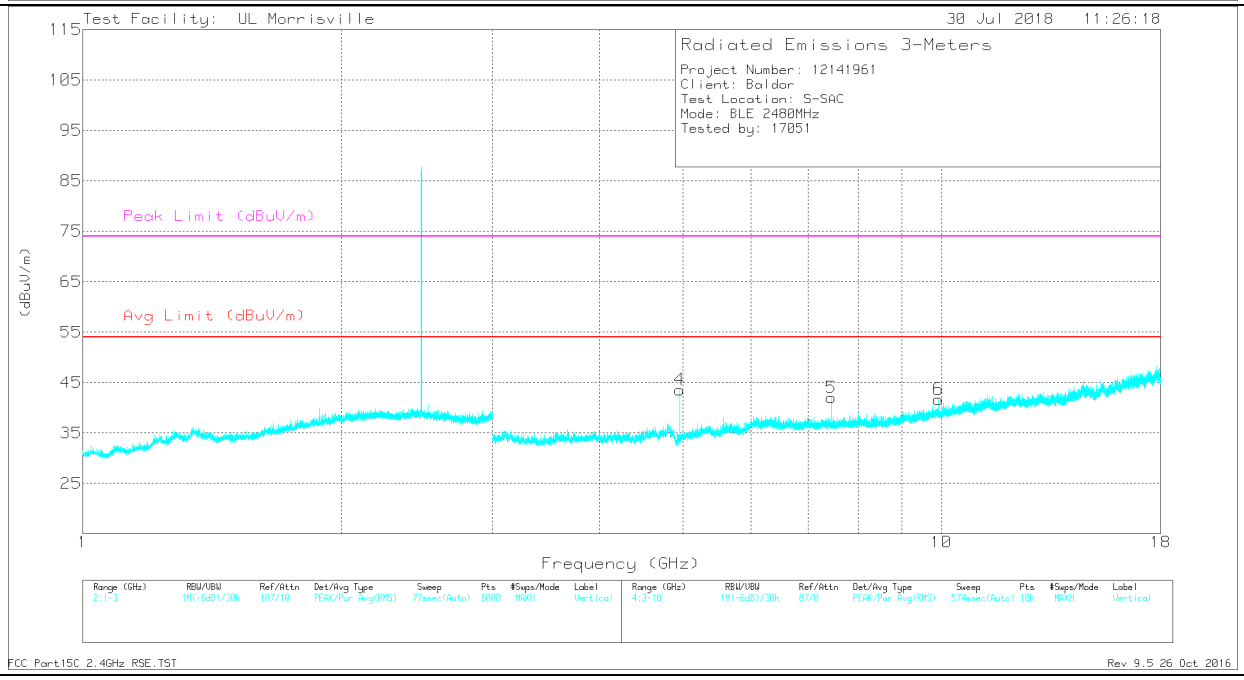
HIGH CHANNEL

Horizontal



Vertical



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.961	43.73	PK2	34	-31.1	0	46.63	-	-	74	-27.37	59	104	H
	* 4.96	35.47	MAv1	34	-31.1	2.04	40.41	54	-13.59	-	-	59	104	H
2	* 7.441	42.86	PK2	35.5	-27.9	0	50.46	-	-	74	-23.54	343	101	H
	* 7.439	33.67	MAv1	35.5	-27.9	2.04	43.31	54	-10.69	-	-	343	101	H
4	* 4.961	44.62	PK2	34	-31.1	0	47.52	-	-	74	-26.48	38	101	V
	* 4.96	35.85	MAv1	34	-31.1	2.04	40.79	54	-13.21	-	-	38	101	V
5	* 7.441	41.03	PK2	35.5	-27.9	0	48.63	-	-	74	-25.37	206	152	V
	* 7.439	30.81	MAv1	35.5	-27.9	2.04	40.45	54	-13.55	-	-	206	152	V
3	9.919	29.21	Pk	37.1	-25.7	0	40.61	-	-	-	-	0-360	101	H
6	9.919	30.3	Pk	37.1	-25.7	0	41.7	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK2 - Maximum Peak
MAv1 -Maximum RMS Average

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9.3. RADIATED WORST-CASE

SPURIOUS EMISSIONS 9kHz to 30 MHz (WORST-CASE CONFIGURATION)

Note: All measurements were made at a test distance of 3 m. The limits in the plots and tabular data are the FCC/IC limits extrapolated from the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to the measurement distance to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (specification distance / test distance).

Although these tests were performed at a test site other than an open area test site, adequate comparison measurements were confirmed against an open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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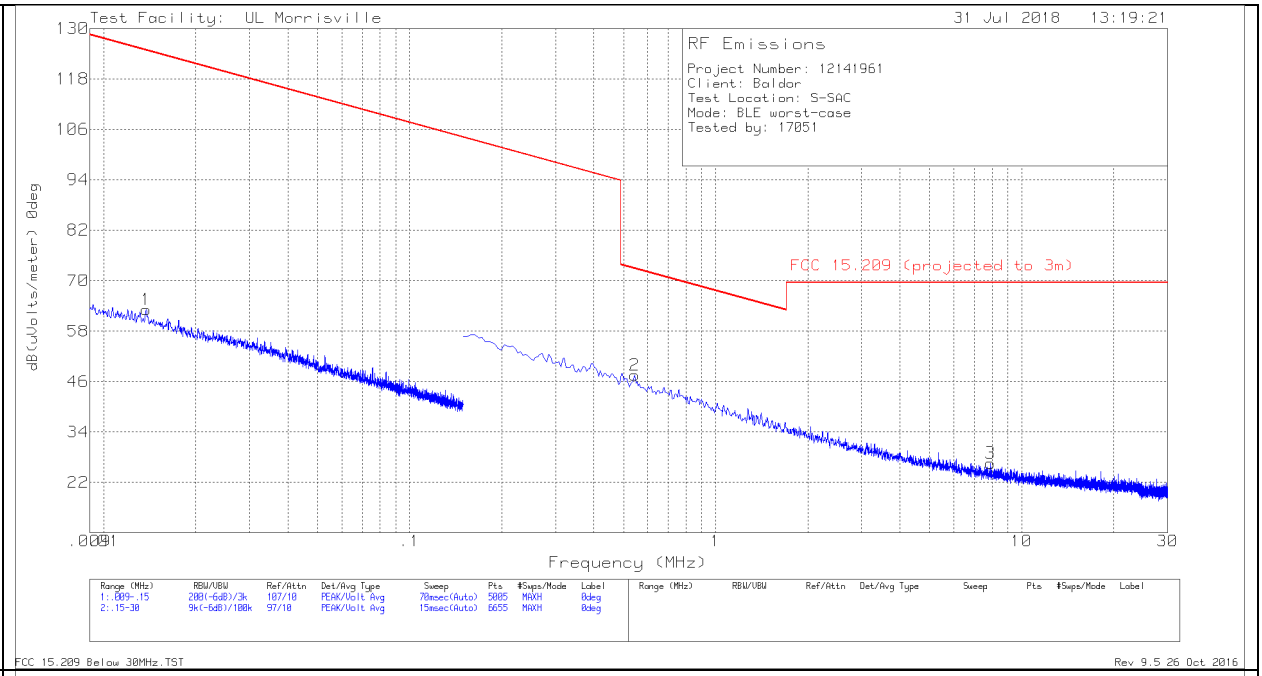
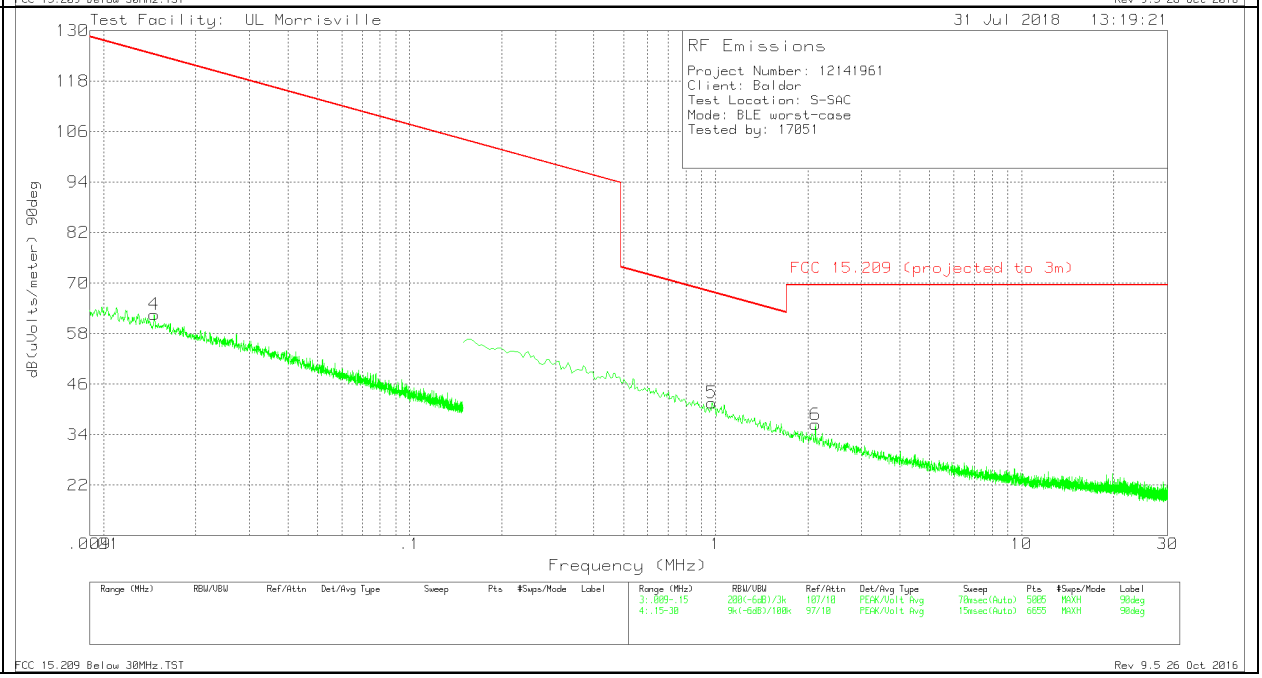
0 degrees



90 Degrees



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Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 QP (projected to 3m)	FCC 15.209 AV (projected to 3m)	FCC 15.209 PK (projected to 3m)	Worst-Case Margin (dB)	Azimuth (Degs)
1	.01379	45.89	Pk	17.1	.1	63.09	-	124.81	144.81	-61.72	0-360
2	.54477	35.89	Pk	11.5	.1	47.49	72.88	-	-	-25.39	0-360
3	7.89732	14.97	Pk	11.1	.5	26.57	69.54	-	-	-42.97	0-360
4	.01463	45.77	Pk	16.7	.1	62.57	-	124.3	144.3	-61.73	0-360
5	.97094	29.99	Pk	11.5	.1	41.59	67.86	-	-	-26.27	0-360
6	2.11935	24.63	Pk	11.6	.2	36.43	69.54	-	-	-33.11	0-360

Pk - Peak detector

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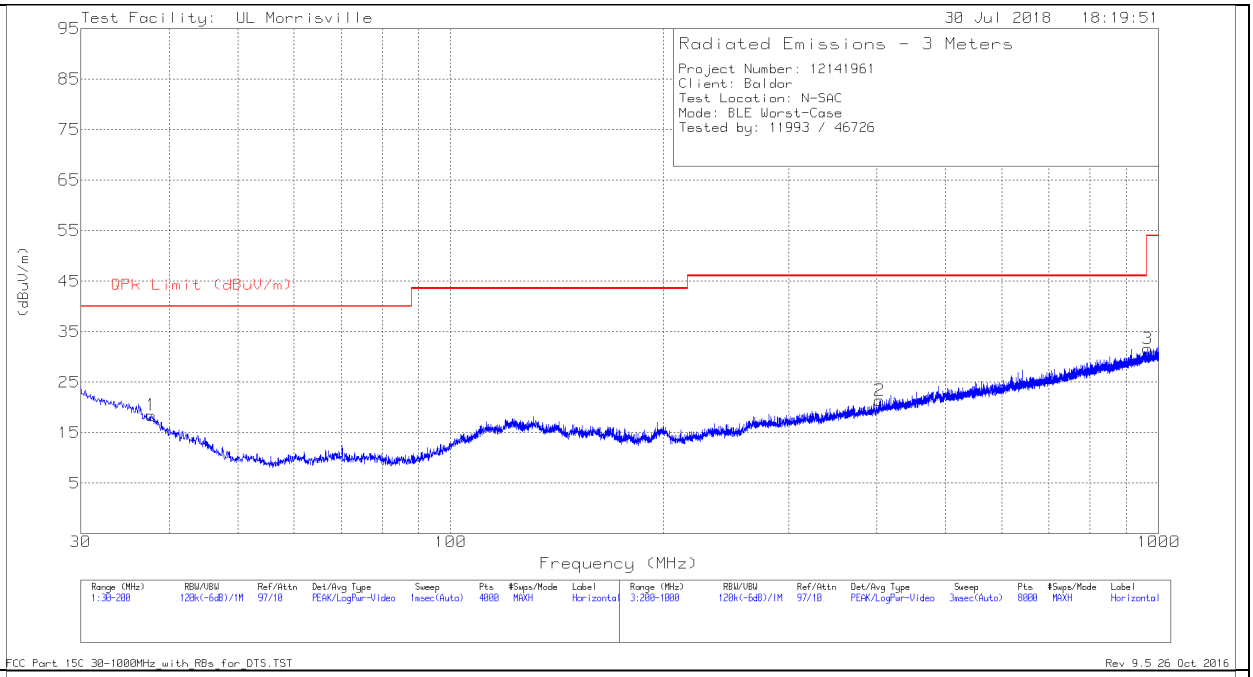
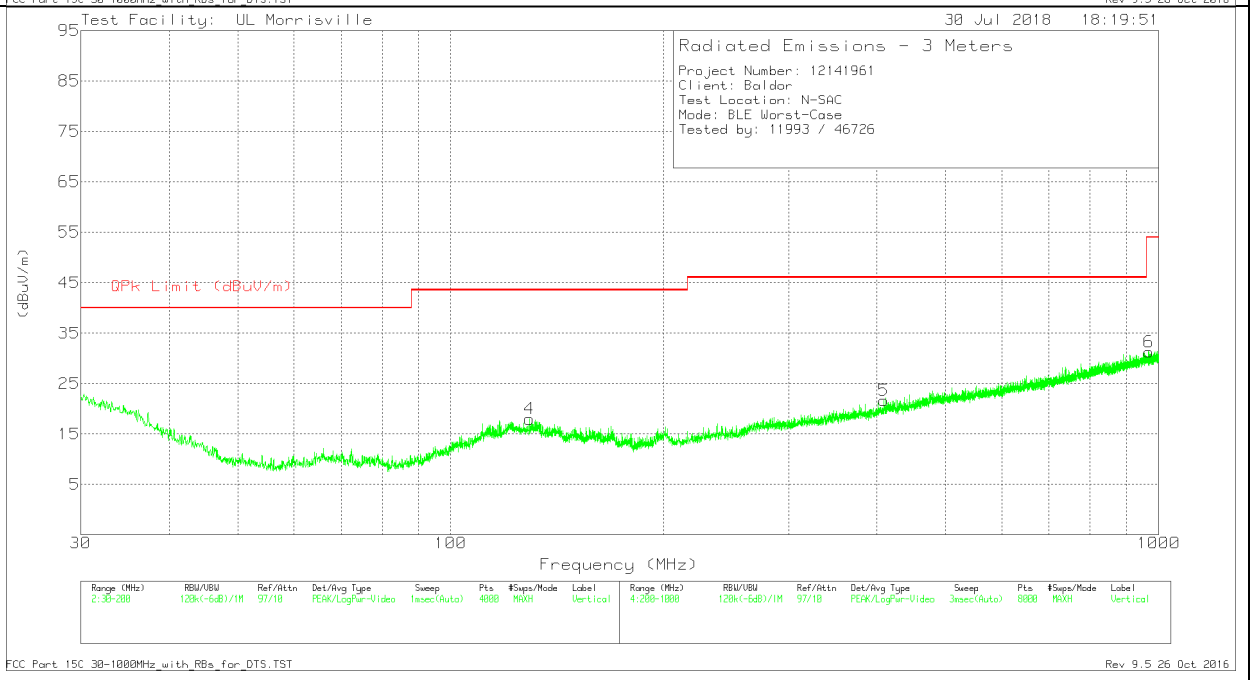
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

Horizontal



Vertical



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Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 37.737	29.25	Pk	20.9	-31.7	18.45	40	-21.55	0-360	199	H
2	* ** 403.5265	29.07	Pk	21.1	-28.8	21.37	46.02	-24.65	0-360	103	H
3	* ** 964.8994	28.76	Pk	28.4	-25.5	31.66	53.97	-22.31	0-360	198	H
4	* ** 129.1782	29.48	Pk	19.1	-30.6	17.98	43.52	-25.54	0-360	102	V
5	* ** 409.2272	29.16	Pk	21.3	-28.8	21.66	46.02	-24.36	0-360	198	V
6	* ** 969.3	28.37	Pk	28.4	-25.5	31.27	53.97	-22.7	0-360	198	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

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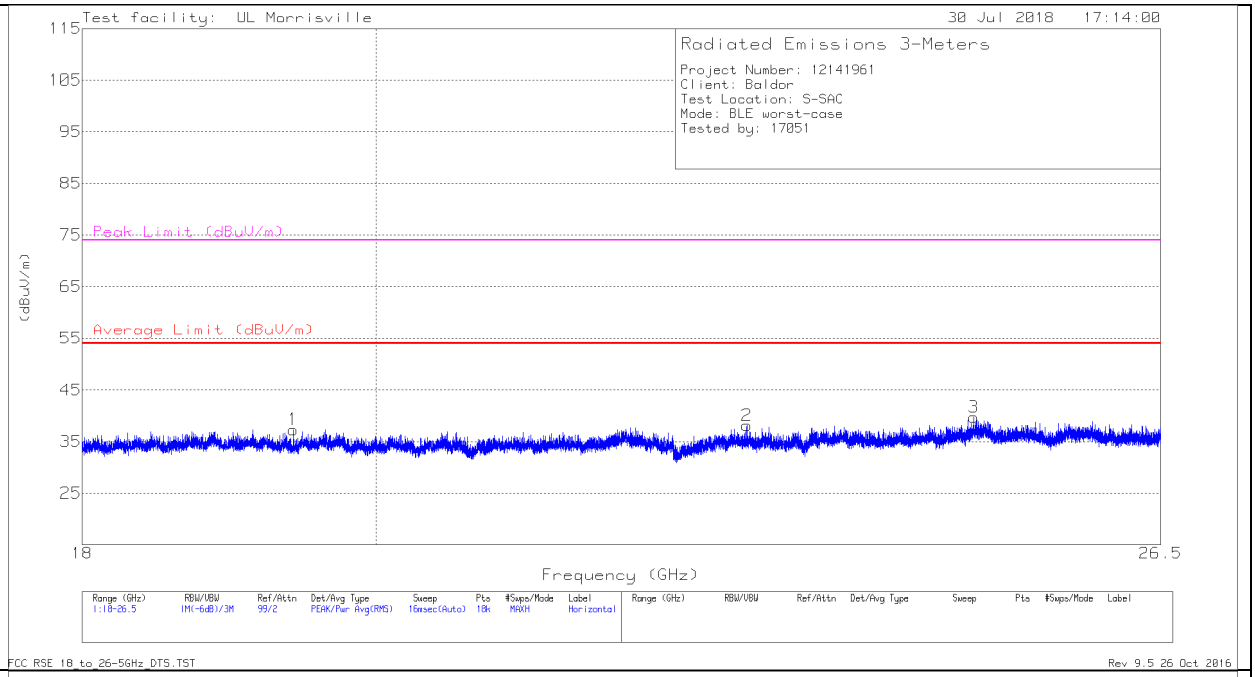
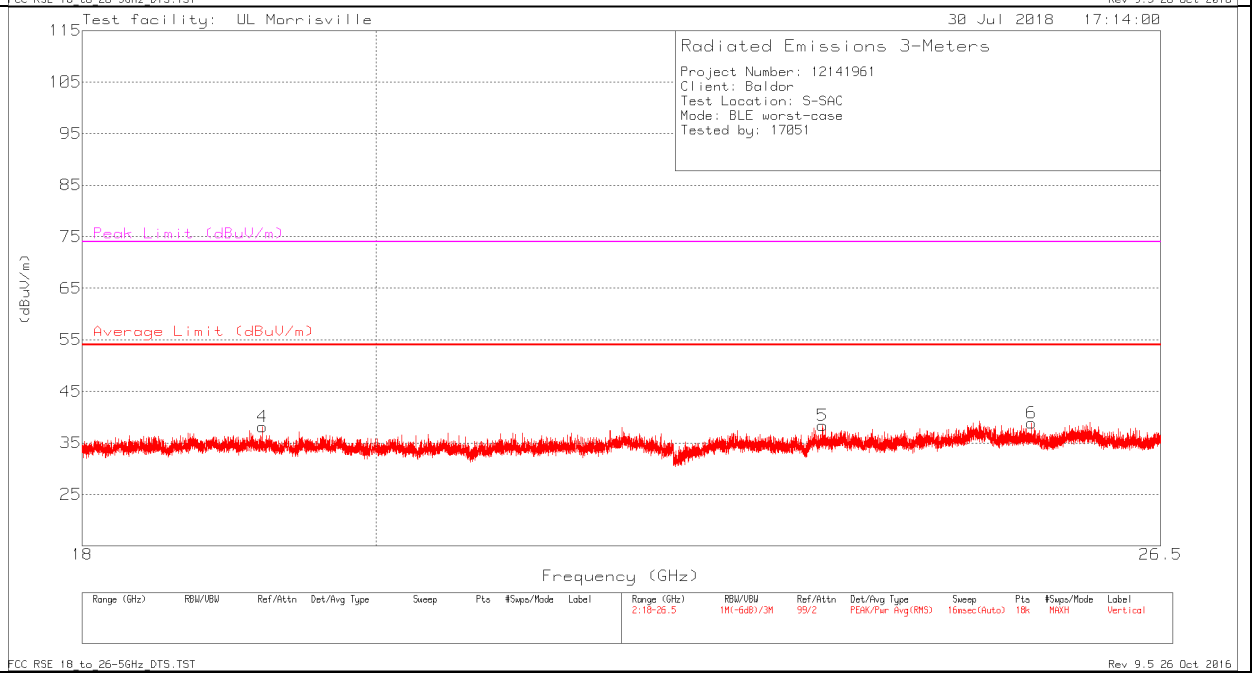
SPURIOUS EMISSIONS 18 to 26GHz (WORST-CASE CONFIGURATION)

Horizontal



Vertical



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 19.416	44.22	Pk	32.9	-39.8	37.32	54	-16.68	74	-36.68	0-360	101	H
2	* 22.845	42.9	Pk	33.8	-38.6	38.1	54	-15.9	74	-35.9	0-360	149	H
4	* 19.203	45.15	Pk	32.8	-39.8	38.15	54	-15.85	74	-35.85	0-360	101	V
5	23.474	42.39	Pk	34.1	-38.1	38.39	54	-15.61	74	-35.61	0-360	151	V
3	24.782	42.71	Pk	34.4	-37.4	39.71	54	-14.29	74	-34.29	0-360	101	H
6	25.299	41.65	Pk	34.4	-37.2	38.85	54	-15.15	74	-35.15	0-360	201	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

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