FCC / ISED Test Report

For

SiXMEDICAL

Report #: 47216

FCC ID: CFS8DL6MED
IC ID: 573F-6MED

Report Completion Date: 2018-03-28
Revision Date: 2018-04-20

Prepared by and for:
Honeywell International Inc.
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Testing
NVLAP Lab Code: 600110

Document Introduction

Honeywell tested the above equipment in accordance with the requirements set forth in the listed standards. All indications of Pass/Fail in the report are opinions expressed by Honeywell 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.

This document is a record of the FCC/ISED Test Report for Honeywell products. It demonstrates the data required to be analyzed to certify a product according to the requirements of the FCC & ISED.

The results in the report reflect only the model of the items under test unless noted otherwise. This document may not be altered or revised in any way unless done so my Honeywell and all revisions are duly noted in the revisions section. Any alterations of this document not carried out by Honeywell 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, any agency of the Federal Government, or any agency of any government.

Test Report Revision History

Revision	Prepared By	Reviewed By	Revision Detail	Release Date
---	M. Antola	A. Roussin	Original Release	2018-03-28
A	M. Antola	A. Roussin	Added clarifying comment to radiated Bandedge test section. Updated duty cycle correction factor and related test data.	2018-04-20

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Report Authorization

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Applicable Test Standards/Limits

Test Standards/Limits	Result	Dates Tested
ANSI C63.4: 2014	Compliant	3/9/18 – 3/27/18
ANSI C63.10: 2013	Compliant	3/9/18 – 3/27/18
ICES-003 Issue 6: 2016	Compliant	3/9/18 – 3/27/18
RSS-247, Issue 2, Section 5	Compliant	3/9/18 – 3/27/18
RSS-GEN, Issue 4	Compliant	3/9/18 – 3/27/18
CFR 47 Pt 15 Subpart B, Section 15.107/109	Compliant	3/9/18 – 3/27/18
CFR 47 Pt 15 Subpart C, Section 15.207/209	Compliant	3/9/18 – 3/27/18
CFR 47 Pt 15 Subpart C, Section 15.247	Compliant	3/9/18 – 3/27/18

Deviations from Test Methods

#	Deviation Description
0	None

Facilities and Accreditation

The test site and measurement facility used to collect data are located at 2 Corporate Center Dr., Melville, NY 11747, USA. Honeywell International is accredited by NVLAP, Laboratory Code 600110-0. The full scope of accreditation can be viewed at the NVLAP website.

Test Item Description

The SiXMED wireless occupancy module is a battery powered 2.4 GHz IEEE 802.15.4-compliant transceiver, intended for use with Honeywell controls that support SiX™ series devices.

The device uses the Honeywell SiX™ RF protocol to inform the alarm console of a MEDICAL condition, which can then alert the alarm system provider. The device can be worn on a lanyard, pendant, belt clip, or wristband. An alert is triggered when the user presses and holds the single button on the front of the device.

The device contains one (1) F-type printed inverted antennas, with a gain of 2dBi.

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Worse-Case Configuration & Mode

Radiated emissions was performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario. The EUT was tested in all three orthogonal planes in order to determine the worst-case emissions. It was determined that the Y axis orientation was the worst-case orientation. Therefore, all final radiated test was performed with the EUT in the Y axis orientation.

Test Sample Identification

Sample ID Number	Sample Serial Number	Date Received
MEL-447	Non-serialized production unit	03/09/18
MEL-448	Non-serialized production unit	03/09/18

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Calibration & Measurement Uncertainty

- Measuring Instrument Calibration – The measuring equipment utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

- 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)

  [i.e.] 37 dBuV/m = 30 dBuV + 18.5 dB/m + 0.5 dB – 12 dB

- Uncertainty - Figures are valid to a confidence level of 95%.

Test	Standard Uncertainty
Radiated Emissions (30-200MHz Horizontal)	+/- 5.05 dB
Radiated Emissions (30-200MHz Vertical)	+/- 5.28 dB
Radiated Emissions (200-1000MHz Horizontal)	+/- 10.21 dB
Radiated Emissions (200-1000MHz Vertical)	+/- 10.36 dB
Radiated Emissions (Above 1GHz)	+/- 9.70 dB
Conducted Emissions (150KHz-30MHz)	+/- 4.36 dB

Opinions / Interpretations

None

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Test Summary

All tests described below are required, unless otherwise noted. Notes should be described in detail in the "Additional notes" section.

#	Test Description	Status
1	99% Bandwidth	PASS
2	6 dB Occupied Bandwidth	PASS
3	Maximum Conducted Output Power	PASS
4	Maximum Power Spectral Density	PASS
5	Band Edge / Conducted Spurious Emissions	PASS
6	Radiated Emissions (Unintentional)	PASS
7	Radiated Emissions (Intentional)	PASS

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On Time and Duty Cycle

Test Description

Refer to KDB 558074 Zero-Span Analyzer Method.

Test Criteria

Reference	Limit
KDB 558074, Section 6	None, for reporting only

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	03/09/18	21.8	15.3	1012	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

Antenna	On Time (usec)	Period (usec)	Duty Cycle	Duty Cycle (%)
1	574	574	1	100

Note: The duty cycle used for testing was 100%. In normal operation, the device is limited by the protocol to a maximum operational duty factor of 7.136% (refer to additional exhibits in this filing) and this value is used to determine the average level of radiated spurious emissions related to the fundamental from the measured peak level of the spurious emission using the 20log(d) factor allowed under section 12.5.2.2 (4) of KDB 558074.

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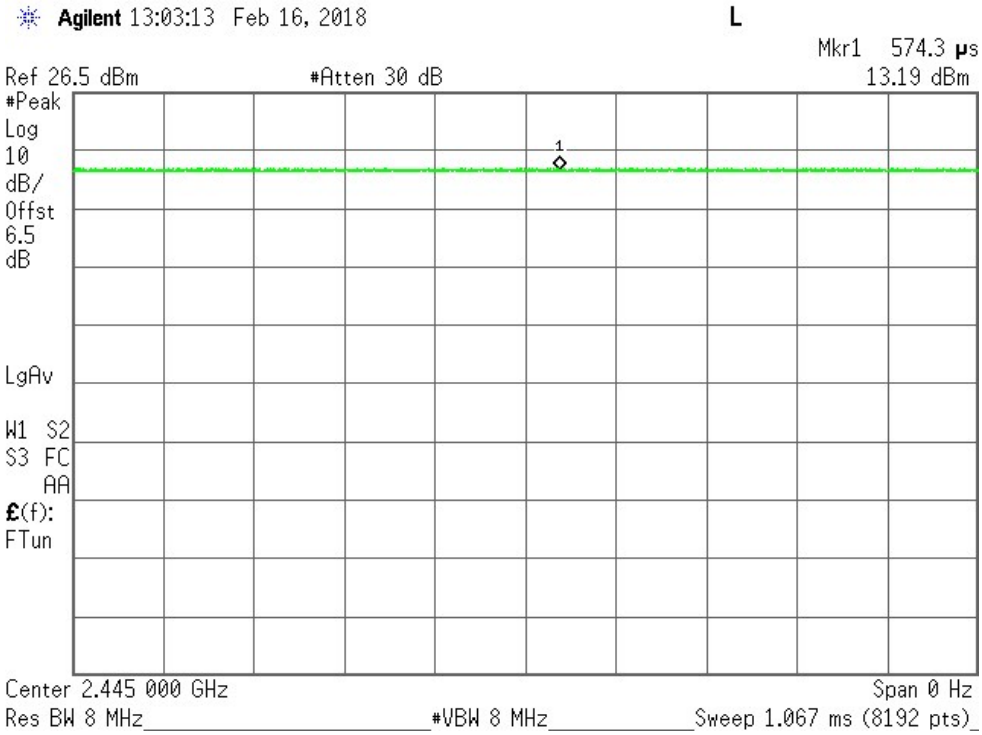
Duty Cycle Plots



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6dB Occupied Bandwidth (DTS Bandwidth)

Test Description

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 maximum level measured in the fundamental emission. Refer to KDB 558074 D01 DTS Meas Guidance v04.

Test Criteria

Reference	Limit
CFR 47 Subpart C 15.247 (a)(2) RSS-247 Section 5.2 (a)	≥ 500kHz

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	03/09/18	21.8	15.3	1012	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

Channel	Frequency (GHz)	6dB Bandwidth (in MHz)
Low	2405	1.470
Mid	2445	1.525
High	2475	1.562

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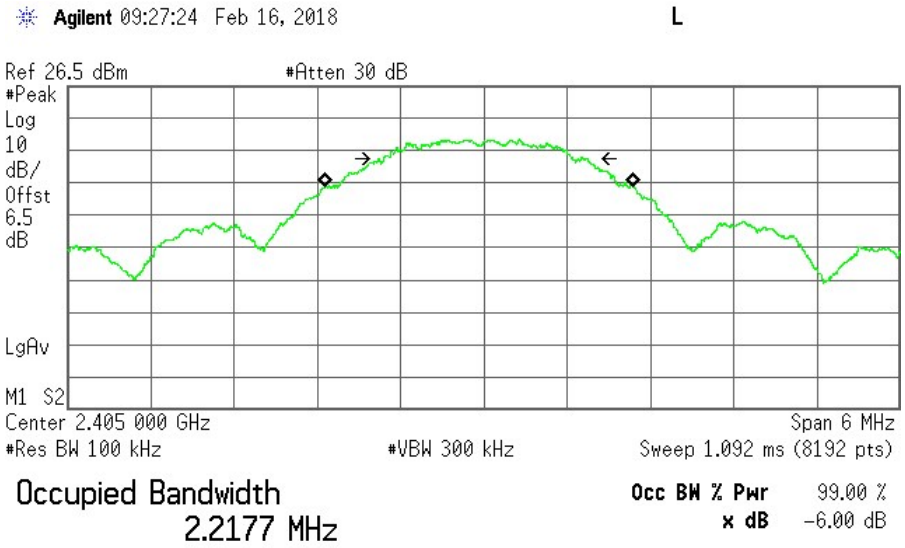
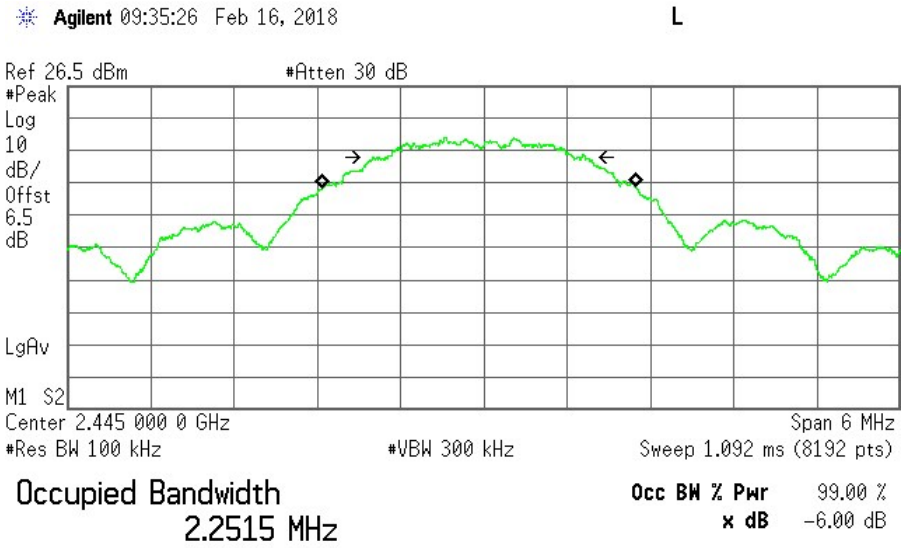
6dB Bandwidth



Low Channel - Plot



Mid Channel - Plot

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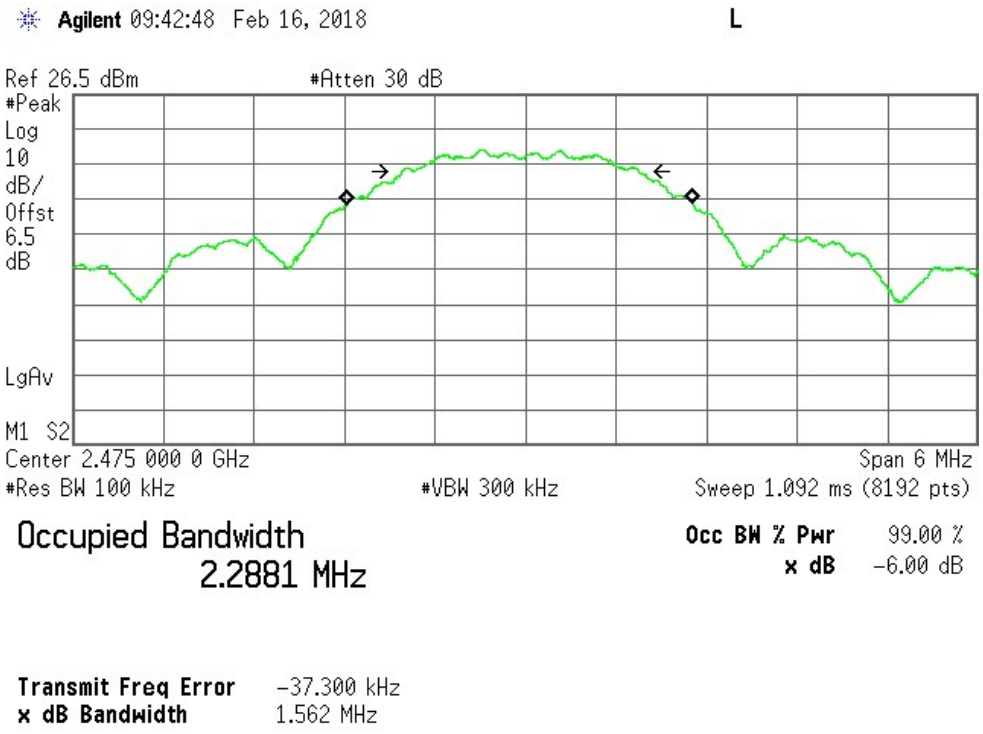

High Channel – Plot

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99% Bandwidth

Test Description

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.
When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

Test Criteria

Reference	Limit
RSS-GEN, Section 6.6	N/A

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	03/09/18	21.8	15.3	1012	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

Channel	Frequency (GHz)	99% Bandwidth (in MHz)
Low	2045	2.1955
Mid	2445	2.2625
High	2475	2.2728

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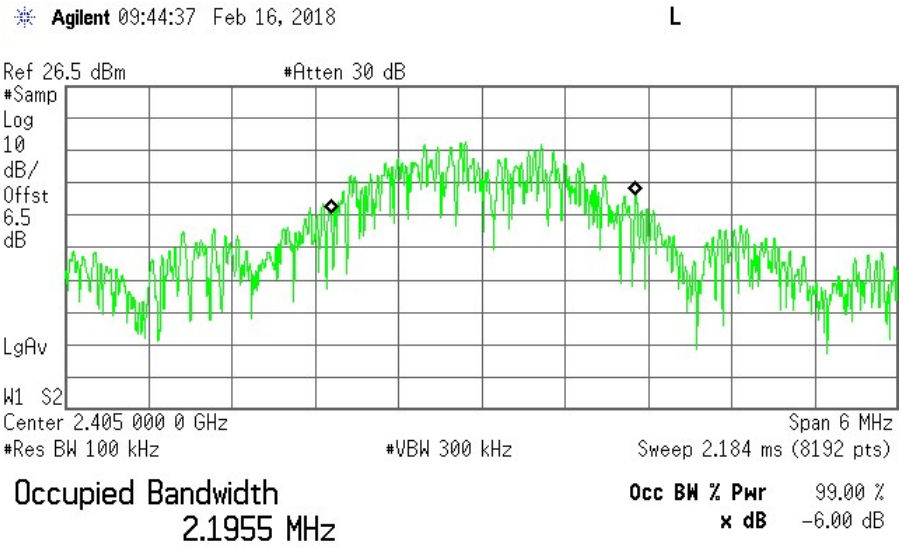
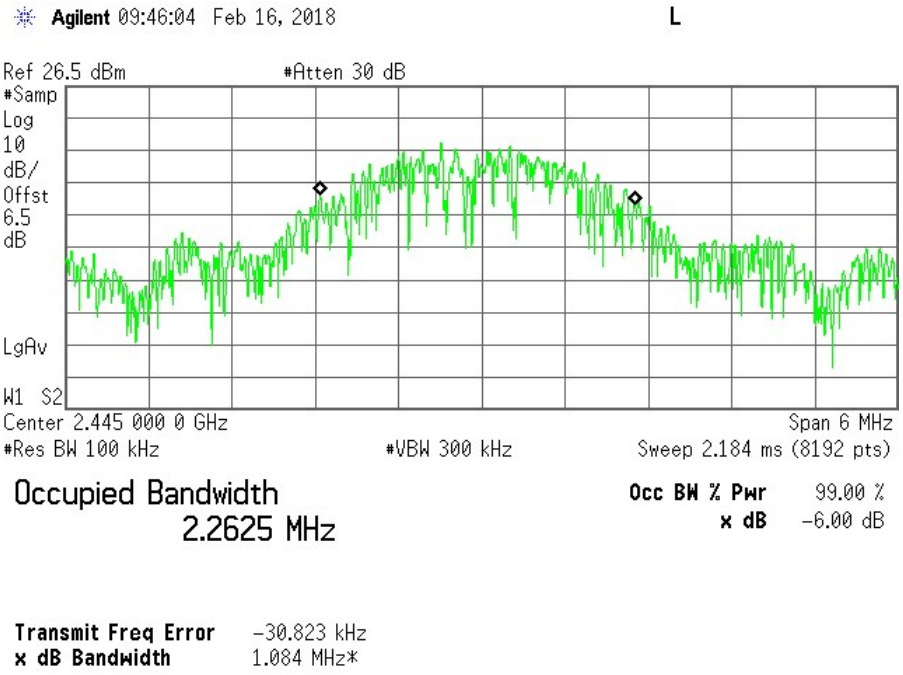
99% Bandwidth



Low Channel - Plot



Mid Channel - Plot

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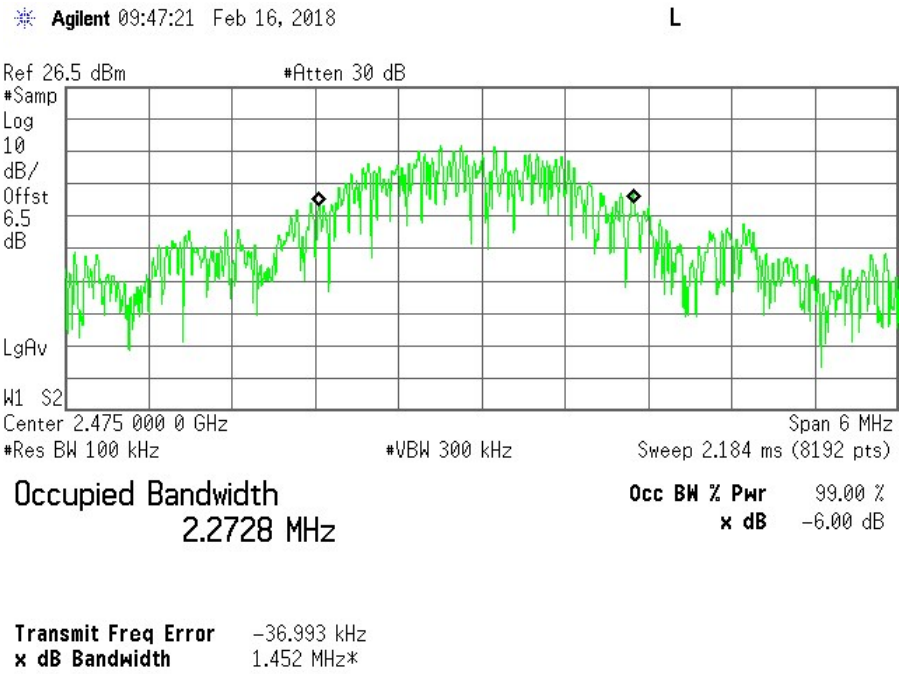

High Channel – Plot

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Maximum Conducted Output Power

Test Description

For systems using digital modulation in the 902-928MHz, 2400-2483,5MHz and 5725-5850MHz bands, the conducted output power limit (specified below) is 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.

Maximum conducted (average) output power was the method employed to determine fundamental emission output power.

Method AVGSA-1 per C63.10 and KDB 558074 was utilized for this test program.

Test Criteria

Reference	Limit
CFR 47 Subpart C 15.247 (b)(3) RSS-247 Section 5.4 (d)	1W (30dBm)

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	03/09/18	21.8	15.3	1012	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

Channel	Frequency (GHz)	Tx Channel BW Power (dBm)
Low	2405	12.90
Mid	2445	12.94
High	2475	12.98

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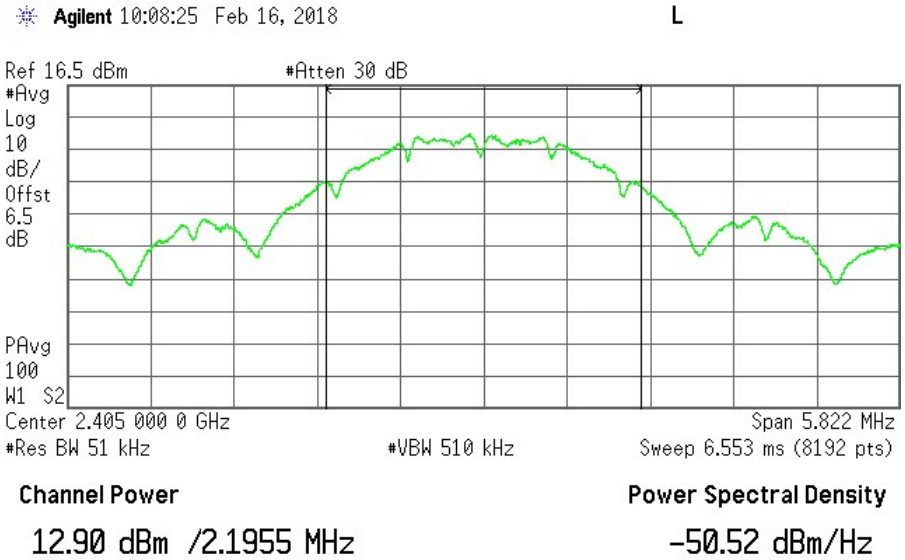
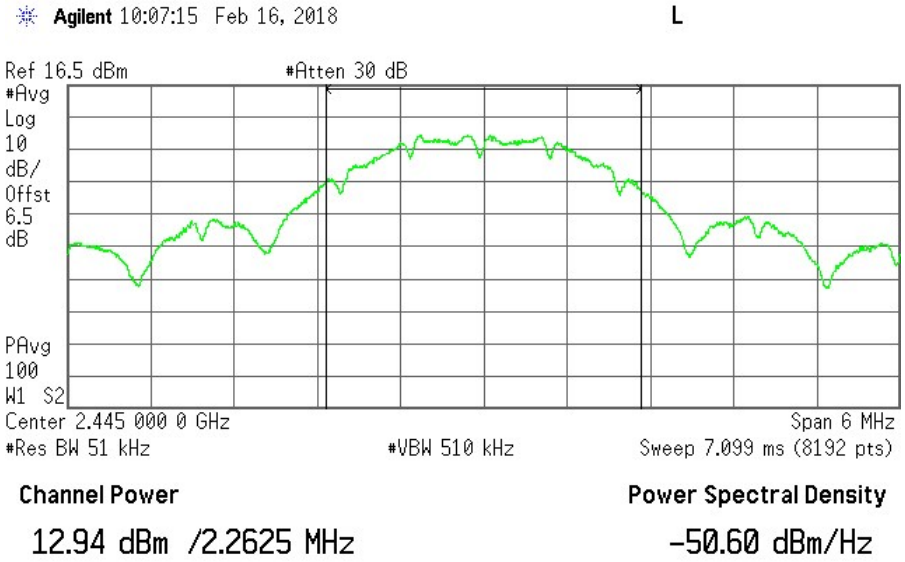
Output Power



Low Channel - Plot



Mid Channel - Plot

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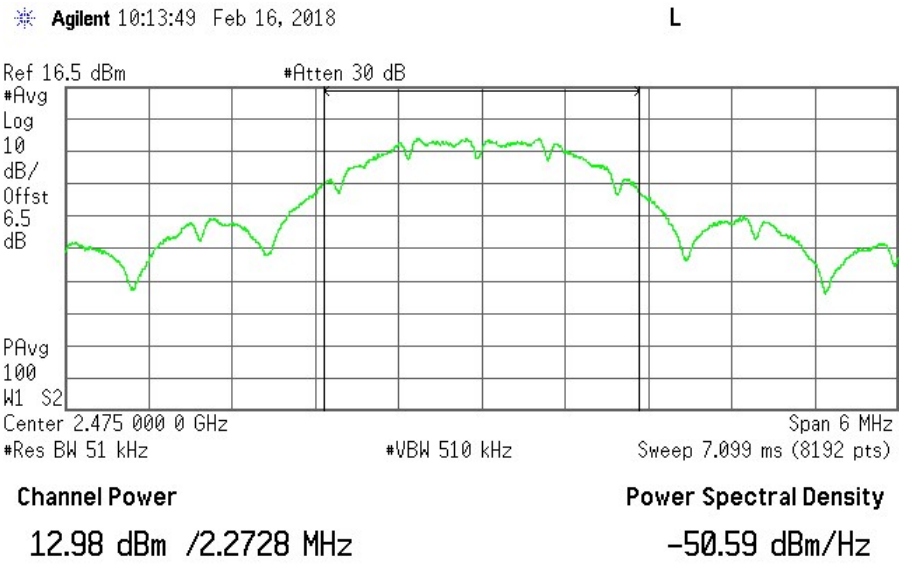

High Channel – Plot

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Maximum Power Spectral Density

Test Description

The DTS rules specify a conducted PSD limit within the *DTS bandwidth* during any time interval of continuous transmission. Such specifications require that the same method as used to determine the conducted output power shall also be used to determine the power spectral density. Therefore, if maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used.

Since maximum conducted (average) output power was the method employed to determine fundamental emission output power, then the peak / average power spectral density method was utilized.

Method AVGPSD-1 per C63.10 and KDB 558074 was utilized for this test program.

Test Criteria

Reference	Limit
CFR 47 Subpart C 15.247 (e) RSS-247 Section 5.2 (b)	< 8 dBm in any 3 kHz Band

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	03/09/18	21.8	15.3	1012	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

Channel	Frequency (GHz)	Max Power (dBm)
Low	2405	-0.51
Mid	2445	-0.66
High	2475	-0.75

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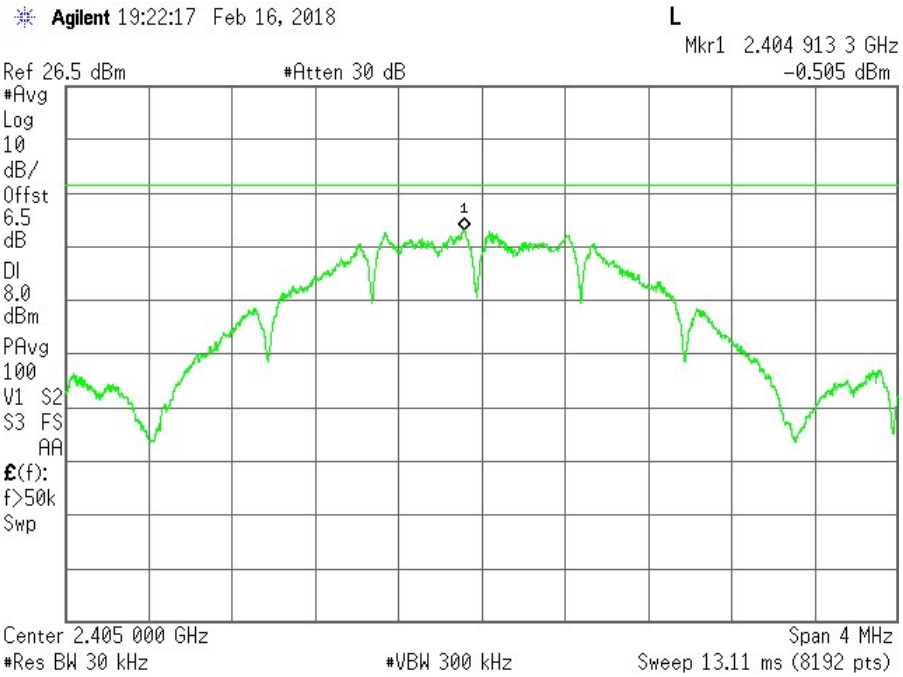
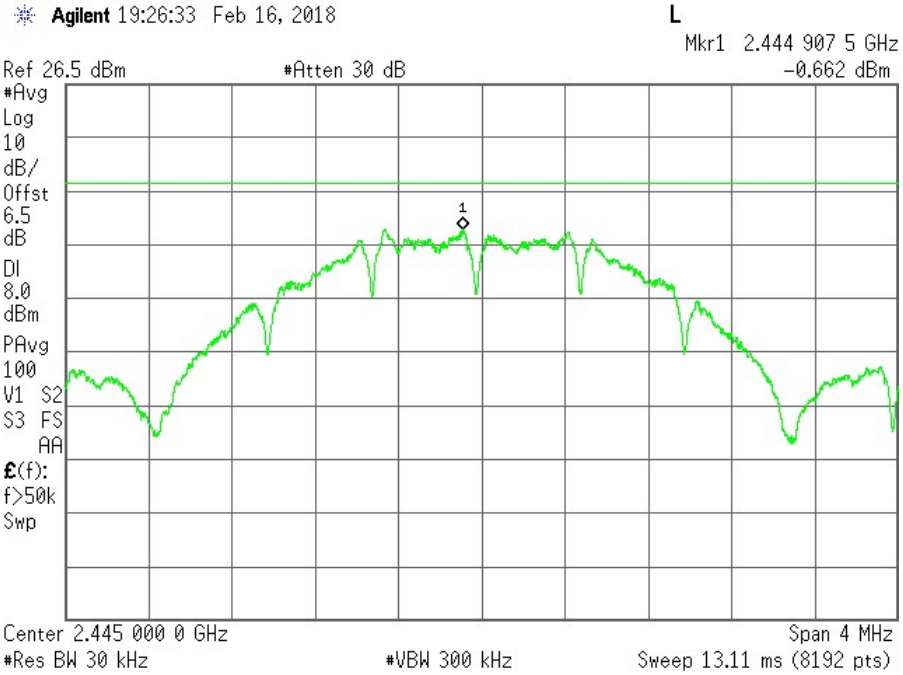
PSD



Low Channel - Plot



Mid Channel - Plot

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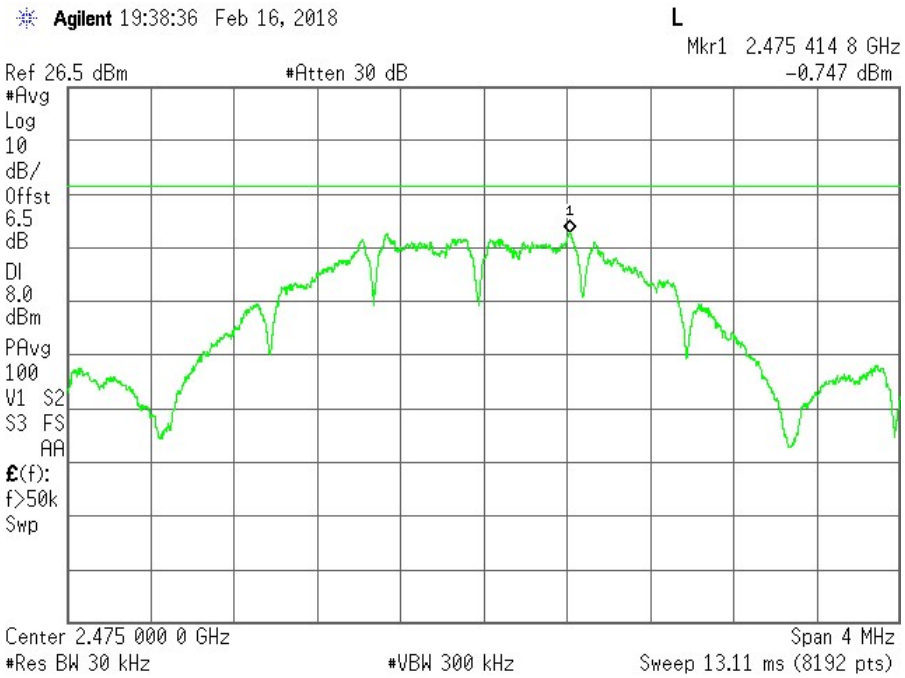

High Channel – Plot

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Authorized Band Edge / Conducted Spurious Emissions

Test Description

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)

Test Criteria

Reference	Limit
CFR 47 Subpart C 15.247 (d) RSS-247, Section 5.5	30dB Below the Fundamental

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
JB	RF Lab	02/08/18	21.8	15.3	1012	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

Authorized Band Edge				
Channel	**Frequency (GHz)**	**Delta from Peak to Bandedge (dB)**	**Limit (dB)**	**Margin (dB)**
Low	2405	45.29	30	-15.29
High	2475	63.26	30	-33.26

Conducted Spurious		
Channel	**Frequency (GHz)**	**Highest Spurious Emission from -30dB Down Limit (dB)**
Low	2405	-2.97
Mid	2445	-3.9
High	2475	-5.72

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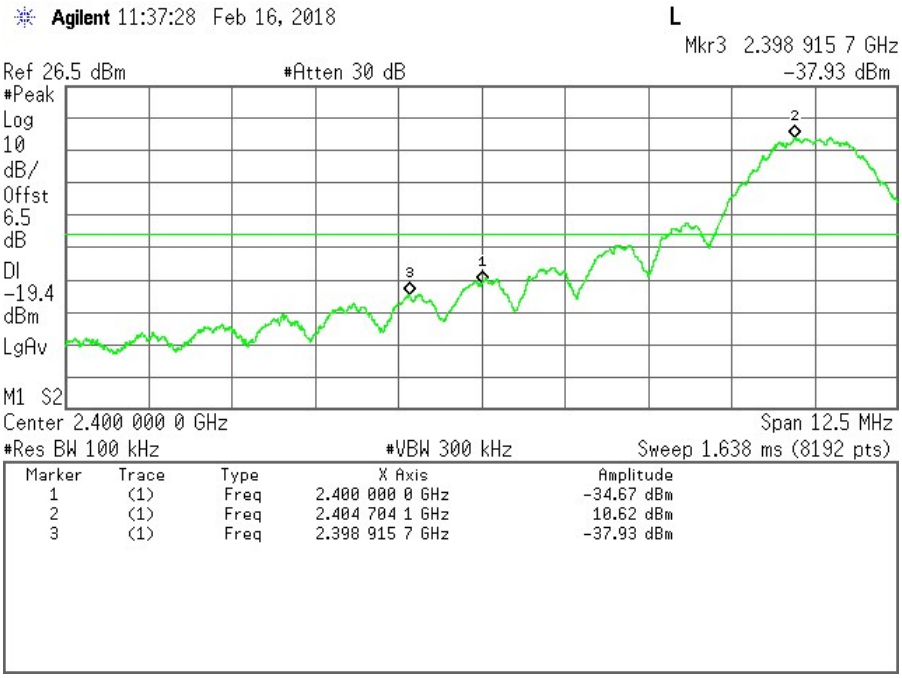
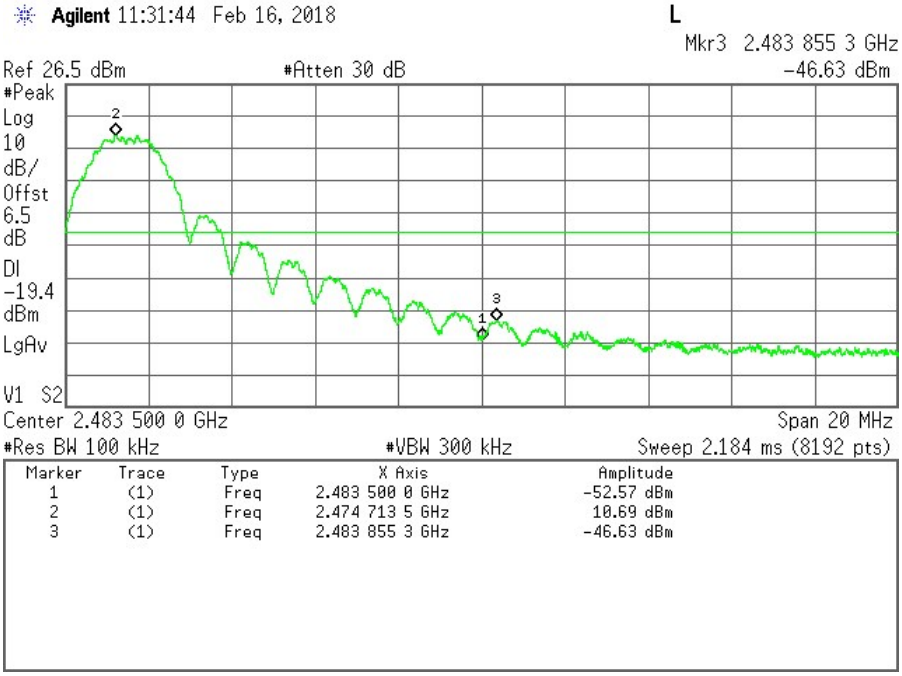
Band Edge



Low Channel - Plot



High Channel – Plot

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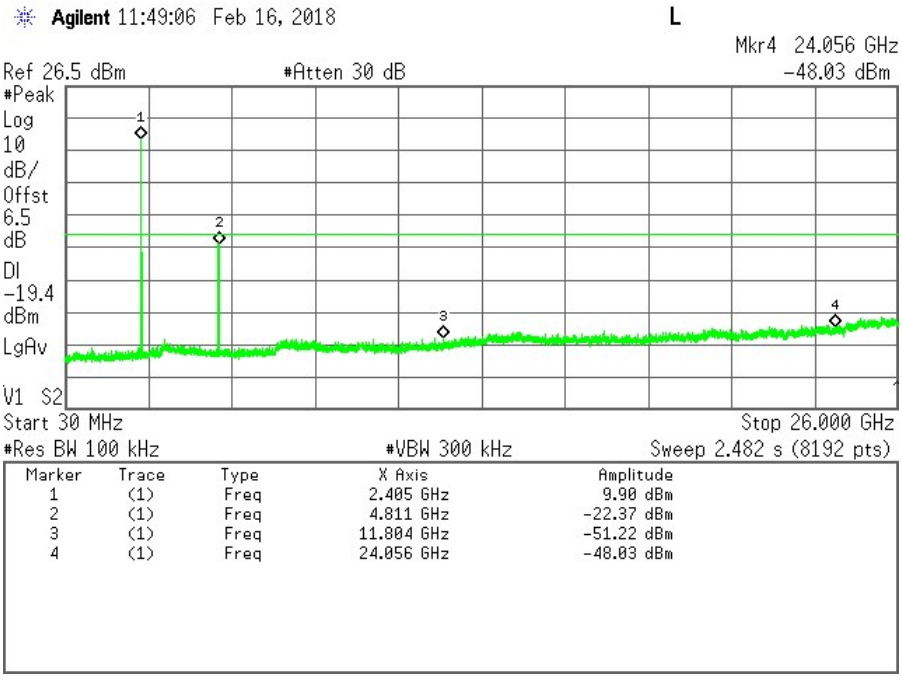
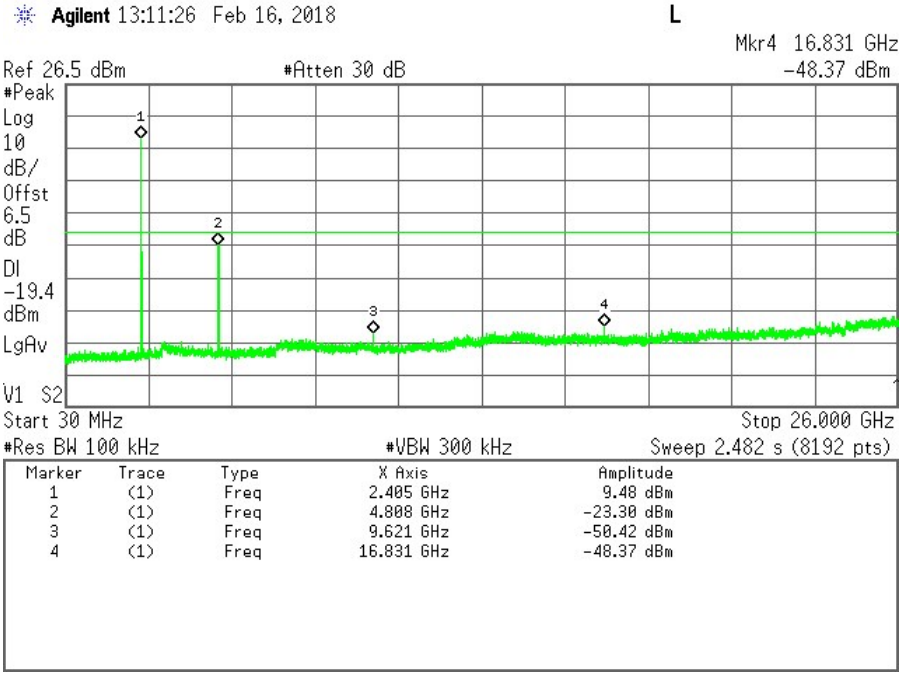
Conducted Spurious



Low Channel - Plot



Mid Channel - Plot

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2 Corporate Center Dr., Melville, NY 11747 **TEL: (516) 577-2000**
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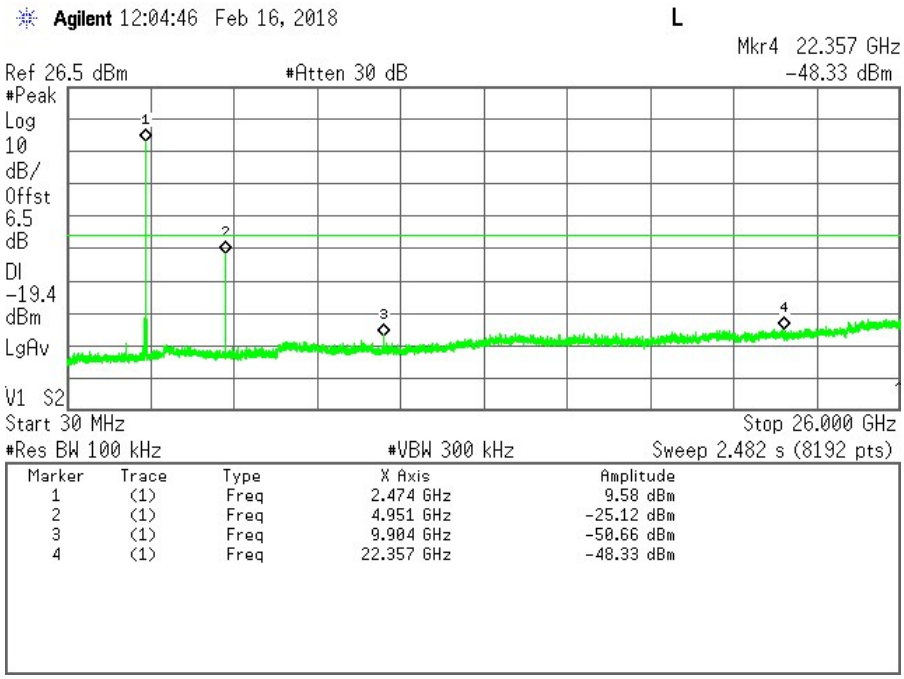

High Channel – Plot

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Radiated Emissions (Unintentional)

Test Description

The Radiated Emissions (Unintentional) measurement is a test of the whole EUT during normal operation. It is a Radiated Emissions measurement performed from 30 MHz to 5x the highest operating frequency of the device. Prescans are done in a 3 meter anechoic chamber, while final measurements are made on the OATS. The EUT is positioned on a turntable in the manner for which the device will be normally used, with all peripherals connected in idle, with all cables typically used with the EUT dressed appropriately.

Test Criteria

Reference	Limit		
CFR 47 Subpart B, 15.109 ICES-003	Frequency Range	Field Strength Limit (uV/m) at 3M	Field Strength Limit (dBuV/m) at 3M
	30-88	100	40
	88-216	150	43.5
	216-960	200	46
	Above 960	500	54

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL/JB	RF Chamber/OATS	3/29/18-4/10/18	4.4	85	1021	P

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Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
RF Chamber						
Spectrum Analyzer	11496	100303	Rohde & Schwarz	FSU26	04/10/17	04/10/18
Bilog Antenna (30MHz-5GHz)	11311	A022406	Sunol	JB5	02/01/18	02/01/19
Horn Antenna (1-18GHz)	2319	2317	EMCO	3115	01/10/18	01/10/19
Preamp (1-18GHz)	11539	160362	Amplical	AMP1G18-35	N/A	N/A
Measurement Software	11543	Version 9.5	UL	UL EMC	N/A	N/A
Environmental Meter	11548	A.078188	Extech Instruments	SD700	04/24/17	04/14/18
OATS						
Spectrum Analyzer	11545	103125	Rohde & Schwarz	FSW26	02/21/18	02/21/19
Bilog Antenna (30MHz-6GHz)	11534	A012816	Sunol	JB6	03/27/18	03/27/19
Horn Antenna (1-18GHz)	2973	3127	EMCO	RGA-60	01/22/18	01/22/19
Preamp (1-18GHz)	11539	160362	Amplical	AMP1G18-35	N/A	N/A
Measurement Software	11543	Version 9.5	UL	UL EMC	N/A	N/A
Environmental Meter	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

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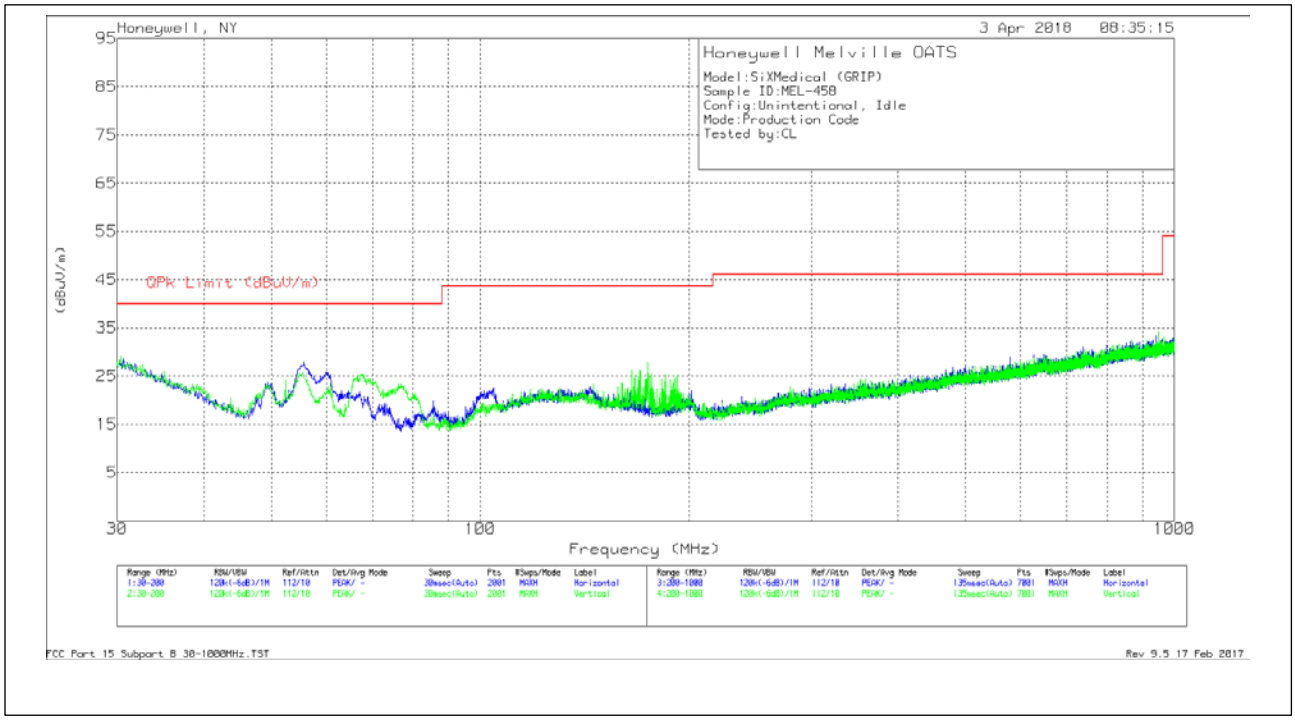
Test Results

Below 1GHz



Plot

Frequency (MHz)	Meter Reading (dBuV)	Det	AF_JB6 [dB/m]	Cable 1 [dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
30.7191	11.15	Qp	24.3	.9	36.35	40	-3.65	119	126	H
55.9397	14.49	Qp	12	1.1	27.59	40	-12.41	281	282	H
174.3255	18.9	Qp	15.7	2.2	36.8	43.52	-6.72	48	251	V
30.77	11.86	Qp	24.3	.9	37.06	40	-2.94	231	322	V
949.7277	4.37	Qp	27.7	9.2	41.27	46.02	-4.75	285	154	H
947.8582	4.32	Qp	27.7	9.2	41.22	46.02	-4.8	257	339	V

Qp - Quasi-Peak detector

Data

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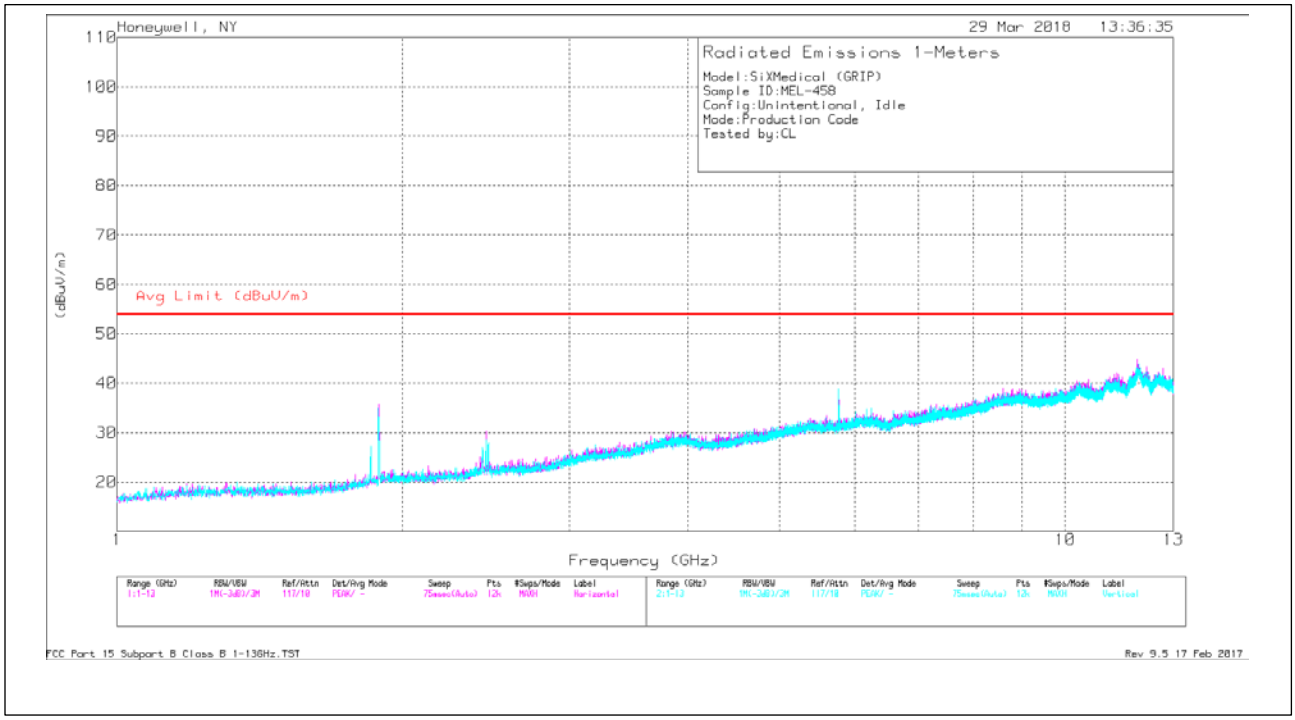
Above 1GHz



Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	3115 Antenna [dB/m]	SMA 8 [dB]	CP Preamp [dB]	Distance Corr Factor [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3.838	44.34	Pk	32.7	3.1	-40.4	-9.5	30.24	54	-23.76	0-360
5.767	48.39	Pk	34.2	4	-39.3	-9.5	37.79	54	-16.21	0-360
11.952	43.8	Pk	39.6	6	-36.7	-9.5	43.2	54	-10.8	0-360
3.94	43.44	Pk	32.7	3.3	-40.4	-9.5	29.54	54	-24.46	0-360
5.766	49.44	Pk	34.2	4	-39.3	-9.5	38.84	54	-15.16	0-360
11.94	44.6	Pk	39.6	6.1	-36.9	-9.5	43.9	54	-10.1	0-360

Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX1 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3.839	20.85	Av	32.7	-41.2	3.3	3.2	18.85	54	-35.15	96	324	H
5.768	22.21	Av	34.2	-40.6	4	4	23.81	54	-30.19	57	210	H
11.952	22.56	Av	39.5	-38.1	6.8	5.8	36.56	54	-17.44	165	268	H
3.941	21.29	Av	32.9	-41.2	3.4	3.3	19.69	54	-34.31	281	330	V
5.767	20.54	Av	34.2	-40.6	4	4	22.14	54	-31.86	71	370	V
11.943	22.68	Av	39.5	-38.1	6.8	5.8	36.68	54	-17.32	22	143	V

Av - Average detection

Data

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Radiated Emissions (Intentional)

Test Description

Intentional Radiator Radiated Emissions are a test of the emissions, and harmonics on the EUT. The EUT is positioned to get the maximum emissions after a series of prescan measurements.
The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1 GHz measurements and 1.5 m above the ground plane for above 1 GHz 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. Peak detection is used unless otherwise noted as quasi-peak.
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
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.

Test Criteria

Reference	Limit		
	Frequency Range (MHz)	Field Strength Limit (uV/m)	Measurement distance (meters)
CFR 47 Subpart C, 15.205 CFR 47 Subpart C, 15.209 RSS-GEN	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

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

Test Information

Tester	Test Location	Date	Temperature (ºC)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL/JB/MA	RF Chamber/OATS	3/11/18-3/27/18	0	47	1012	P

NOTE: Below 30MHz, pretesting showed that no emissions as a product of the EUT were detected within 20dB of the regulatory limit. Worse-case plot/data reported from 30MHz - 1GHz. Prescans performed in an anechoic chamber, final measurements performed on an OATS.

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Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
RF Chamber						
Spectrum Analyzer	11496	100303	Rohde & Schwarz	FSU26	04/10/17	04/10/18
Loop Antenna (9kHz-30MHz)	11535	121080	Com-Power	AL-130R	10/17/17	10/17/18
Bilog Antenna (30MHz-6GHz)	11311	A022406	Sunol	JB5	02/01/18	02/01/19
Horn Antenna (1-18GHz)	2319	2317	EMCO	3115	01/10/18	01/10/19
Horn Antenna (18-40GHz)	11472	151	EMCO	EM-6963	02/14/18	02/14/19
Preamp (10-4200MHz)	11537	1603006	Mini Circuits	TVA-11-422	N/A	N/A
Preamp (1-18GHz)	11539	160362	Amplical	AMP1G18-35	N/A	N/A
Preamp (18-40GHz)	11541	160911	Amplical	AMP18G40-35	N/A	N/A
Band Reject Filter	11553	G041	Micro-tronics	BRM50702-01	N/A	N/A
Measurement Software	11543	Version 9.5	UL	UL EMC	N/A	N/A
Environmental Meter	11548	A.078188	Extech Instruments	SD700	04/24/17	04/14/18
OATS						
Spectrum Analyzer	11545	103125	Rohde & Schwarz	FSW26	02/21/18	02/21/19
Bilog Antenna (30MHz-6GHz)	11311	A022406	Sunol	JB5	02/01/18	02/01/19
Horn Antenna (1-18GHz)	2973	3127	EMCO	RGA-60	01/22/18	01/22/19
Preamp (1-18GHz)	11539	160362	Amplical	AMP1G18-35	N/A	N/A
High Pass Filter	11552	G018	Micro-tronics	HPM50111-01	N/A	N/A
Measurement Software	11543	Version 9.5	UL	UL EMC	N/A	N/A
Environmental Meter	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

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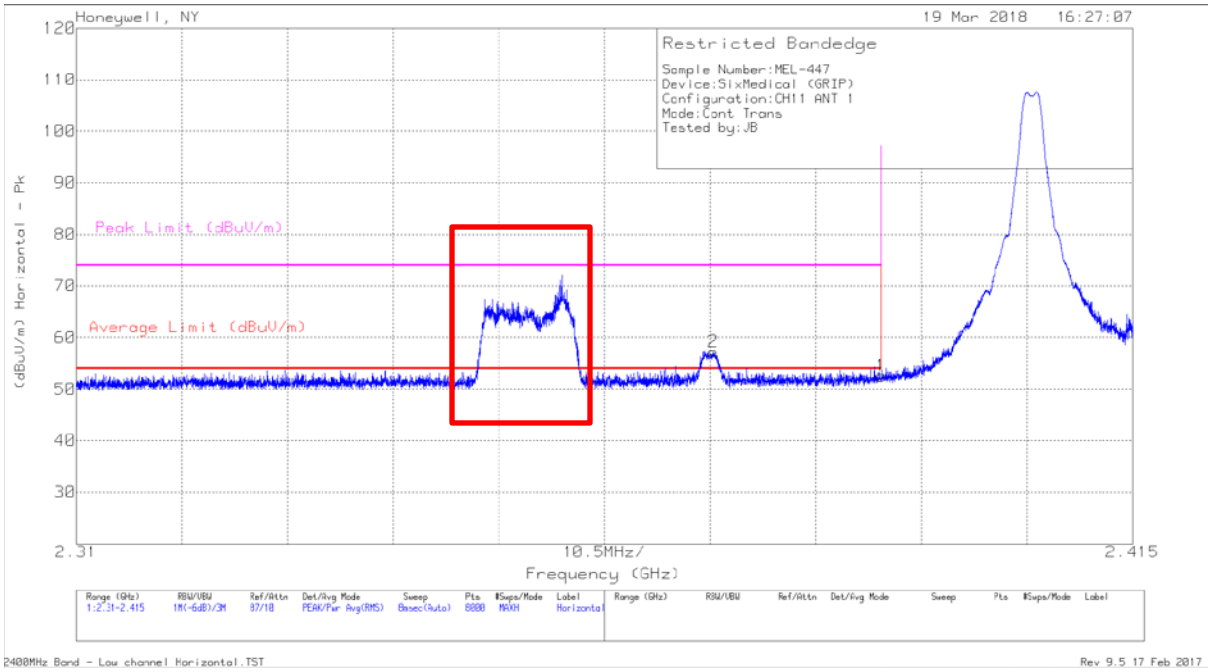
Test Results

Restricted Band Edge



Low Channel Horizontal – Plot

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX3 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	18.23	Pk	28.5	.7	2.6	2.5	-	52.53	74	-21.47	325	142	H
2	* 2.373	23.07	Pk	28.4	.7	2.6	2.5	-	57.27	74	-16.73	325	142	H
Marker	**Frequency (GHz)**	**Meter Reading (dBuV)**	**Det**	**AF [dB/m]**	**SWBOX3 [dB]**	**SMA7 [dB]**	**SMA5 [dB]**	**DC Corr (dB)**	**Corrected Reading (dBuV/m)**	**Average Limit (dBuV/m)**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
1	* 2.39	18.23	Av	28.5	.7	2.6	2.5	-22.9	29.63	54	-24.37	325	142	H
2	* 2.373	23.07	Av	28.4	.7	2.6	2.5	-22.9	34.37	54	-19.63	325	142	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Peak + DC Corr (Duty Cycle Correction Factor)

Low Channel Horizontal – Data

NOTE: Emissions highlighted in the plot above is OATS ambient and not a product of the transmitter

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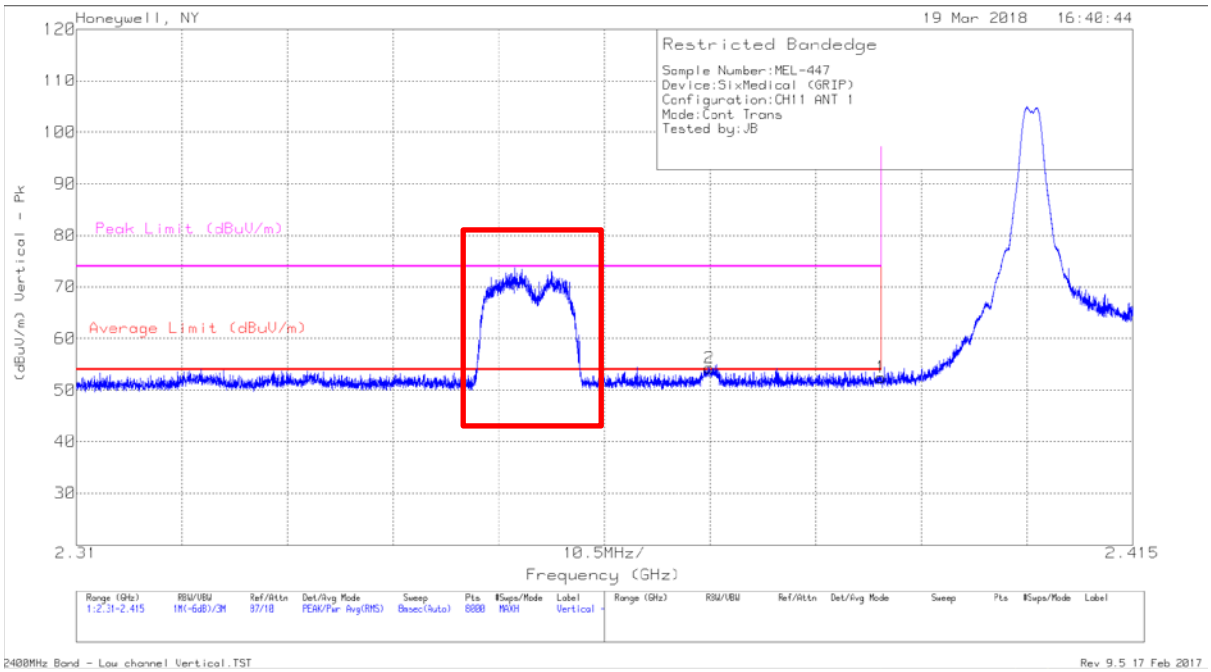

Low Channel Vertical – Plot

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX3 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	18.16	Pk	28.5	.7	2.6	2.5	-	52.46	74	-21.54	274	133	V
2	* 2.373	20.1	Pk	28.4	.7	2.6	2.5	-	54.3	74	-19.7	274	133	V
Marker	**Frequency (GHz)**	**Meter Reading (dBuV)**	**Det**	**AF [dB/m]**	**SWBOX3 [dB]**	**SMA7 [dB]**	**SMA5 [dB]**	**DC Corr (dB)**	**Corrected Reading (dBuV/m)**	**Average Limit (dBuV/m)**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
1	* 2.39	18.16	Av	28.5	.7	2.6	2.5	-22.9	29.56	54	-24.44	274	133	V
2	* 2.373	20.1	Av	28.4	.7	2.6	2.5	-22.9	31.4	54	-22.6	274	133	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Peak + DC Corr (Duty Cycle Correction Factor)

Low Channel Vertical – Data

NOTE: Emissions highlighted in the plot above is OATS ambient and not a product of the transmitter

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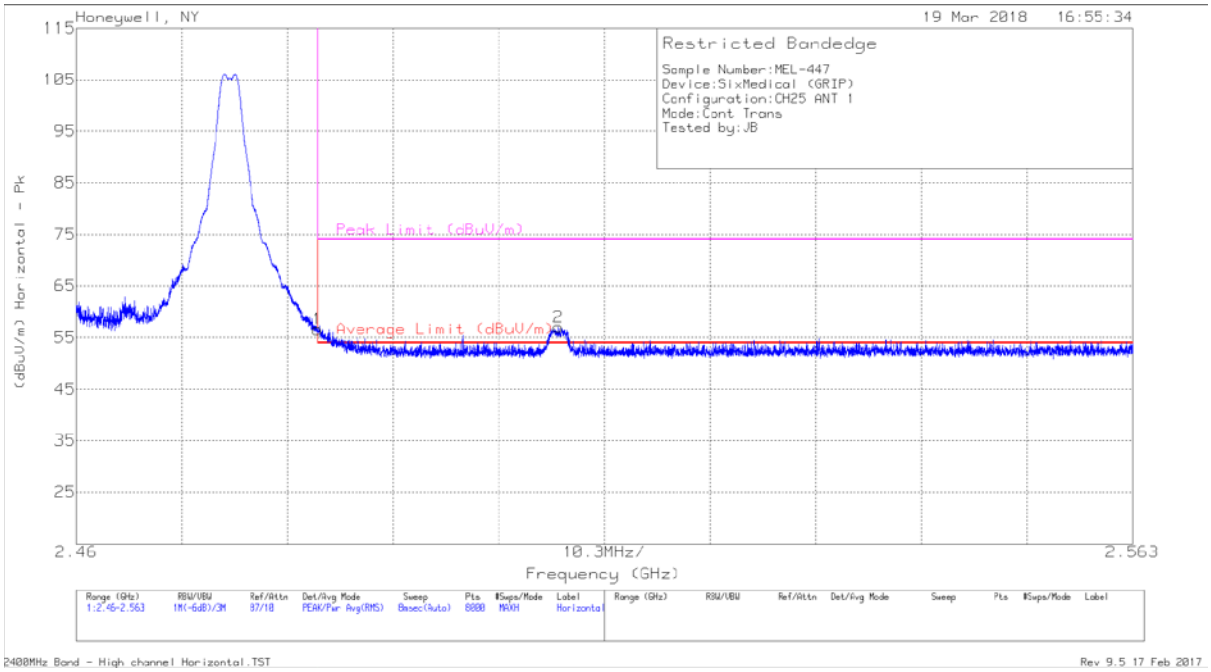

High Channel Horizontal - Plot

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX3 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	21.98	Pk	28.7	.7	2.6	2.6	-	56.58	74	-17.42	203	158	H
2	2.507	22.18	Pk	28.8	.7	2.7	2.6	-	56.98	74	-17.02	203	158	H
Marker	**Frequency (GHz)**	**Meter Reading (dBuV)**	**Det**	**AF [dB/m]**	**SWBOX3 [dB]**	**SMA7 [dB]**	**SMA5 [dB]**	**DC Corr (dB)**	**Corrected Reading (dBuV/m)**	**Average Limit (dBuV/m)**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
1	* 2.484	21.98	Av	28.7	.7	2.6	2.6	-22.9	33.68	54	-20.32	203	158	H
2	2.507	22.18	Av	28.8	.7	2.7	2.6	-22.9	34.08	54	-19.92	203	158	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Peak + DC Corr (Duty Cycle Correction Factor)

High Channel Horizontal – Data

NOTE: Worse-case emissions are report and all other peak emissions, once corrected by the DC Corr, would be below the average limit.

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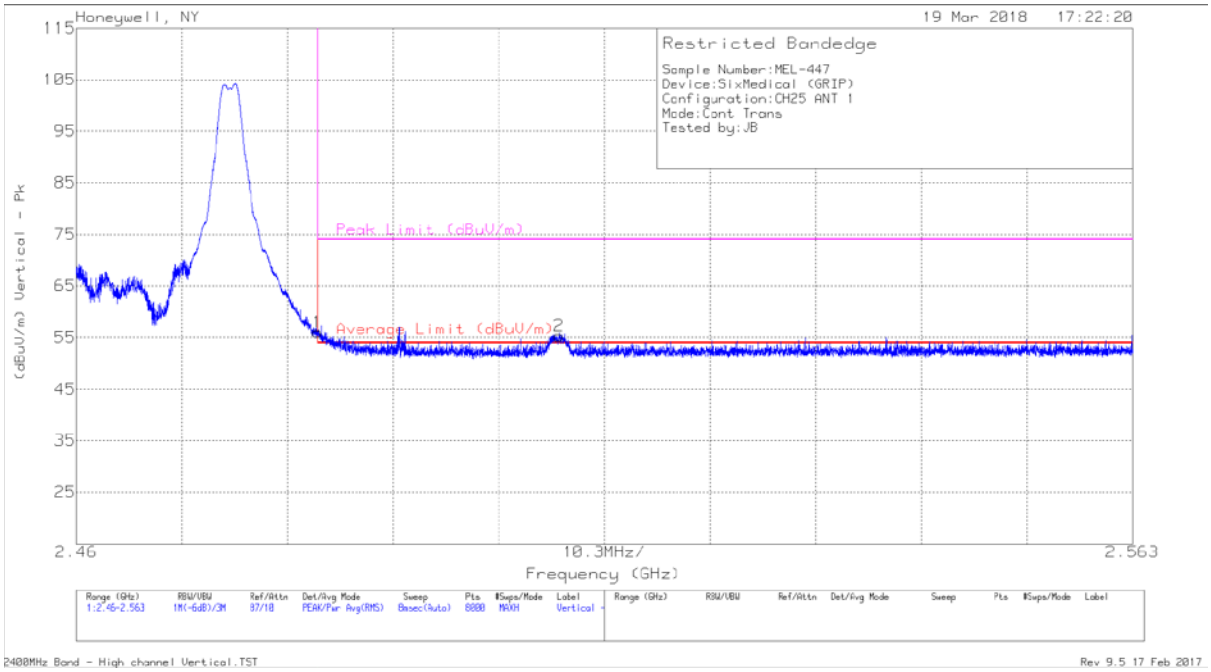

High Channel Vertical - Plot

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX3 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	21.42	Pk	28.7	.7	2.6	2.6	-	56.02	74	-17.98	271	398	V
2	2.507	20.48	Pk	28.8	.7	2.7	2.6	-	55.28	74	-18.72	271	398	V
Marker	**Frequency (GHz)**	**Meter Reading (dBuV)**	**Det**	**AF [dB/m]**	**SWBOX3 [dB]**	**SMA7 [dB]**	**SMA5 [dB]**	**DC Corr (dB)**	**Corrected Reading (dBuV/m)**	**Average Limit (dBuV/m)**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
1	* 2.484	21.42	Av	28.7	.7	2.6	2.6	-22.9	33.12	54	-20.88	271	398	V
2	2.507	20.48	Av	28.8	.7	2.7	2.6	-22.9	32.38	54	-21.62	271	398	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Peak + DC Corr (Duty Cycle Correction Factor)

High Channel Vertical – Data

NOTE: Worse-case emissions are report and all other peak emissions, once corrected by the DC Corr, would be below the average limit.

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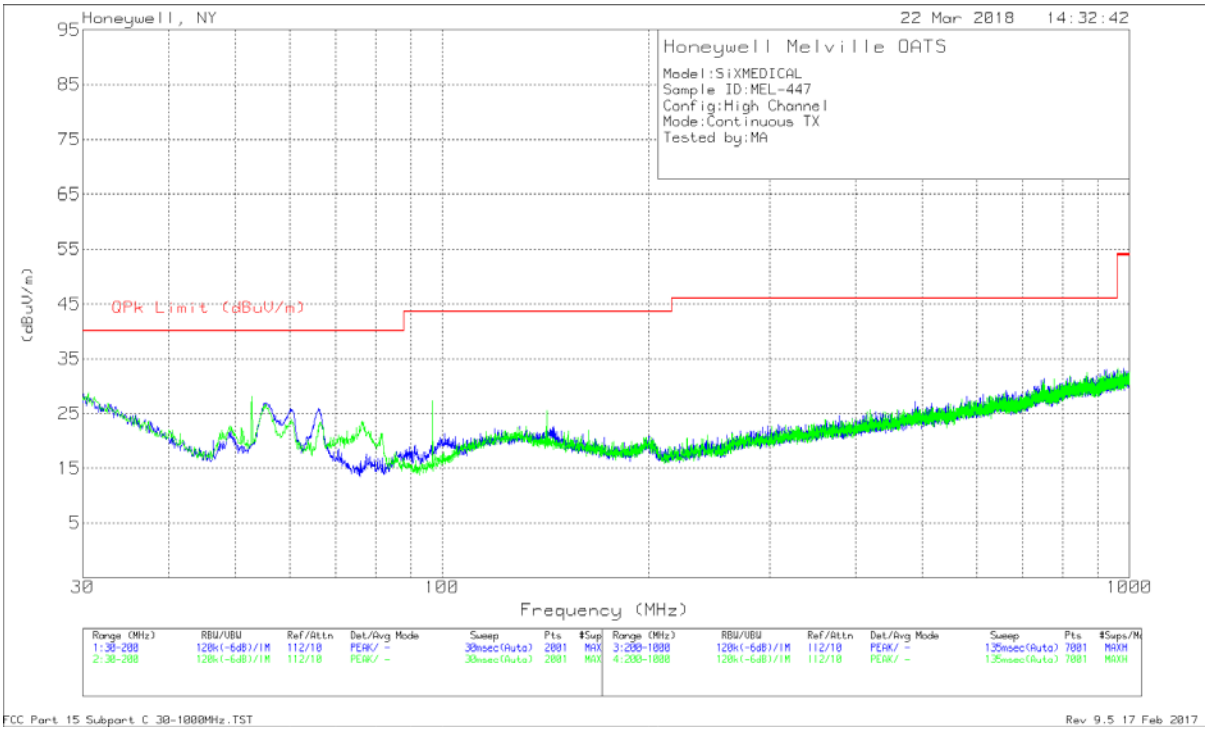
Spurious Emissions

Below 1GHz (Worse-case)



Frequency (MHz)	Meter Reading (dBuV)	Det	AF JB5 [dB]	Preamp [dB]	RDE #2 Cable [dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
55.415	54.6	Pk	12.8	-41.5	1	26.9	40	-13.1	0-360	100	H
60.175	53.46	Pk	12.8	-41.4	1.1	25.96	40	-14.04	0-360	100	H
66.125	52.93	Pk	13.2	-41.3	1.1	25.93	40	-14.07	0-360	100	H
52.865	55.57	Pk	13.1	-41.6	1	28.07	40	-11.93	0-360	100	V
96.81	52.68	Pk	14.4	-41	1.3	27.38	43.52	-16.14	0-360	100	V
142.03	46.26	Pk	18.4	-40.7	1.5	25.46	43.52	-18.06	0-360	100	V

Pk - Peak detector (Prescan)

Frequency (MHz)	Meter Reading (dBuV)	Det	AF JB5 [dB]	Cable 1 [dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
54.8989	11.11	Qp	12.8	1.1	25.01	40	-14.99	133	127	H
66.3215	13.12	Qp	13.2	1.3	27.62	40	-12.38	58	375	H
52.4412	20.6	Qp	13.2	1.1	34.9	40	-5.1	260	267	V
141.7183	6.07	Qp	18.4	1.9	26.37	43.52	-17.15	131	121	V

Qp - Quasi-Peak detector (Final Detection)

High Channel – Plot/Data

Note: Highlighted prescan points were found to be masked in the ambient at the OATS site

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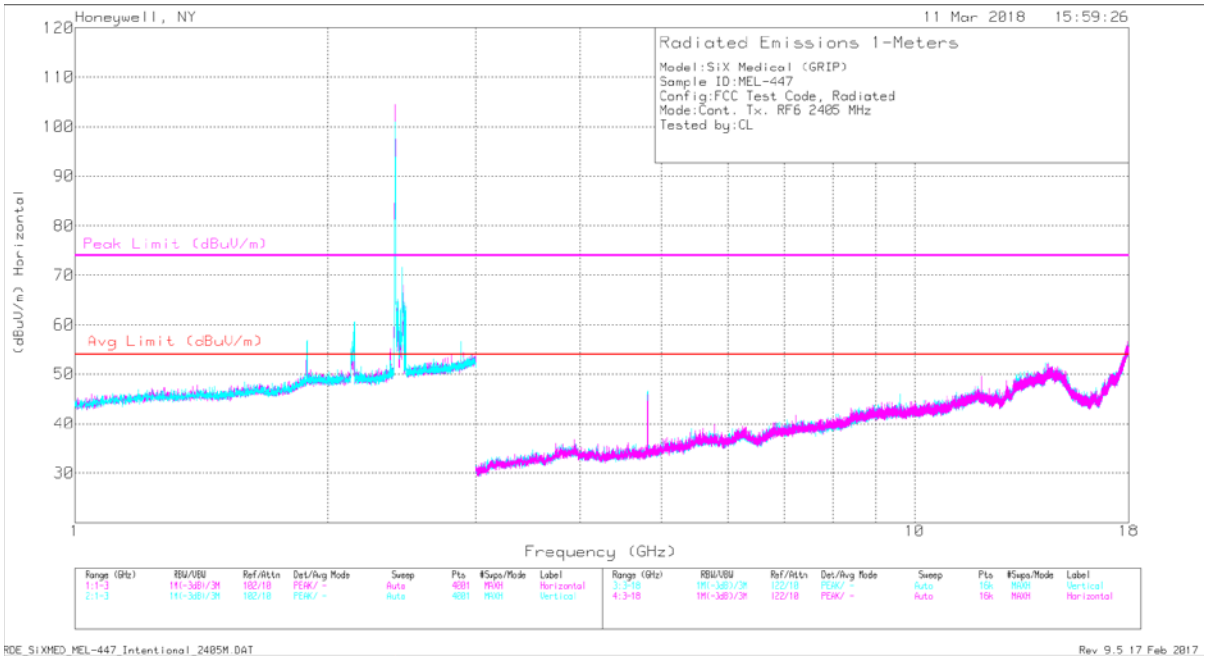
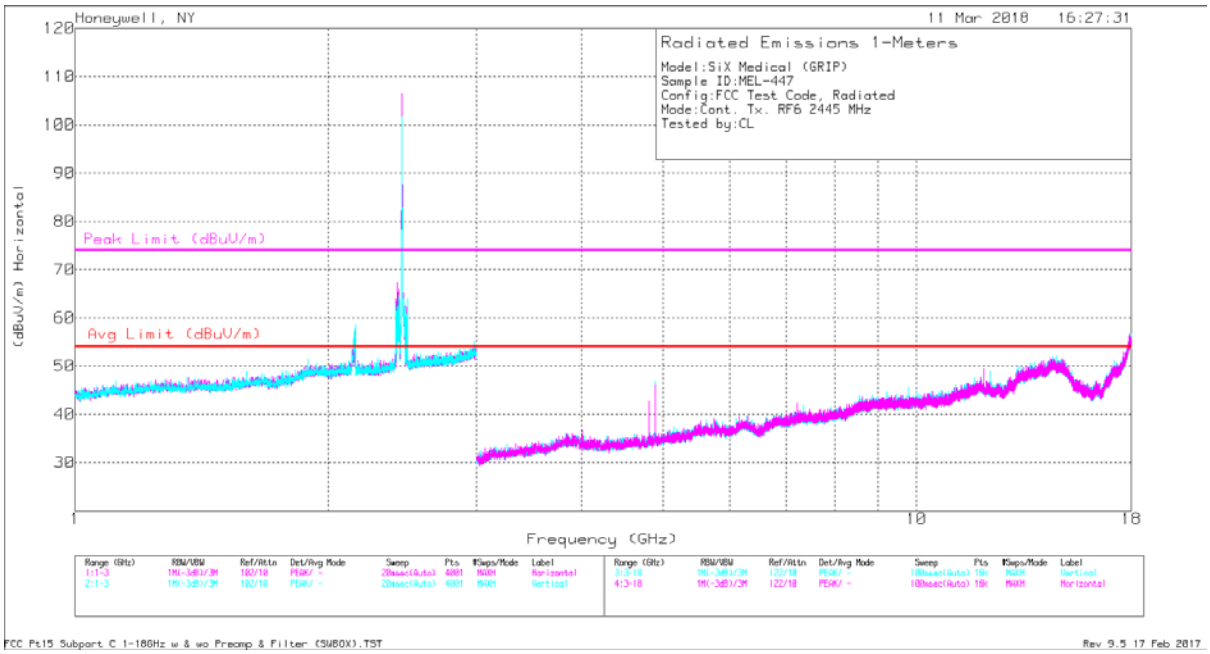
1-18GHz

Note: Emissions detected below the fundamental frequency during prescans are attributed to chamber ambient and not a product of the transmitter.



Low Channel – Plot



Mid Channel – Plot

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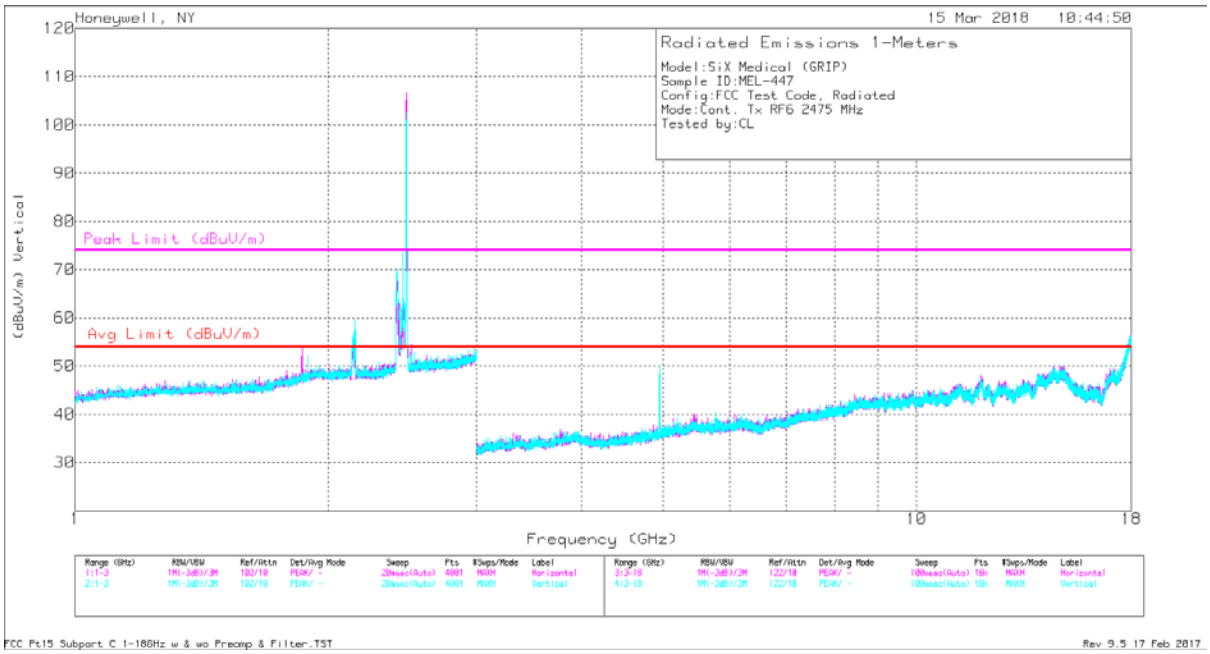

High Channel – Plot

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Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.811	58.29	PK	33.1	-41.2	3.7	3.7	57.59	74	-16.41	83	125	H
* 4.809	53.06	PK	33.1	-41.2	3.7	3.7	52.36	74	-21.64	273	186	V
* 2.885	48.64	PK	29.5	-41.7	2.9	2.8	42.14	74	-31.86	281	177	V
* 17.967	36.96	PK	47.9	-37.8	7.7	7.3	62.06	74	-11.94	68	219	V
* 12.027	36.7	PK	39.4	-37.3	6.5	5.6	50.9	74	-23.1	170	326	V
* 17.92	37.06	PK	47.8	-37.9	7.8	7.3	62.06	74	-11.94	252	317	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.811	58.29	Av	33.1	-41.2	3.7	3.7	-22.9	34.69	54	-19.31	83	125	H
* 4.809	53.06	Av	33.1	-41.2	3.7	3.7	-22.9	29.46	54	-24.54	273	186	V
* 2.885	48.64	Av	29.5	-41.7	2.9	2.8	-22.9	19.24	54	-34.76	281	177	V
* 17.967	36.96	Av	47.9	-37.8	7.7	7.3	-22.9	39.16	54	-14.84	68	219	V
* 12.027	36.7	Av	39.4	-37.3	6.5	5.6	-22.9	28	54	-26	170	326	V
* 17.92	37.06	Av	47.8	-37.9	7.8	7.3	-22.9	39.16	54	-14.84	252	317	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - KDB558074 Method: Maximum Peak
Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 7.136%, thus DC Corr = 20log(0.07136) = -22.9dB

Low Channel - Data

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Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.889	43.5	PK2	33.2	-41.4	3.7	3.6	42.6	74	-31.4	113	171	H
* 17.992	40.01	PK2	47.9	-37.8	7.7	7.3	65.11	74	-8.89	224	317	H
* 4.886	40.1	PK2	33.2	-41.4	3.7	3.6	39.2	74	-34.8	113	101	V
* 17.936	39.62	PK2	47.9	-37.9	7.7	7.3	64.62	74	-9.38	51	198	V
* 4.815	37.7	PK2	33.1	-41.2	3.7	3.7	37	74	-37	115	234	H
* 12.024	36.09	PK2	39.4	-37.3	6.5	5.6	50.29	74	-23.71	51	198	H
* 12.227	34.6	PK2	39.2	-37.2	6.5	5.9	49	74	-25	336	132	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.889	43.5	Av	33.2	-41.4	3.7	3.6	-22.9	19.7	54	-34.3	113	171	H
* 17.992	40.01	Av	47.9	-37.8	7.7	7.3	-22.9	42.21	54	-11.79	224	317	H
* 4.886	40.1	Av	33.2	-41.4	3.7	3.6	-22.9	16.3	54	-37.7	113	101	V
* 17.936	39.62	Av	47.9	-37.9	7.7	7.3	-22.9	41.72	54	-12.28	51	198	V
* 4.815	37.7	Av	33.1	-41.2	3.7	3.7	-22.9	14.1	54	-39.9	115	234	H
* 12.024	36.09	Av	39.4	-37.3	6.5	5.6	-22.9	27.39	54	-26.61	51	198	H
* 12.227	34.6	Av	39.2	-37.2	6.5	5.9	-22.9	26.1	54	-27.9	336	132	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - KDB558074 Method: Maximum Peak
Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 7.136%, thus DC Corr = 20log(0.07136) = -22.9dB

Mid Channel - Data

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Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.953	37.53	PK2	33.3	-41.6	3.8	3.7	36.73	74	-37.27	198	236	H
* 17.999	38.42	PK2	47.9	-37.8	7.7	7.3	63.52	74	-10.48	242	259	H
* 4.953	37.26	PK2	33.2	-41.5	3.8	3.7	36.46	74	-37.54	174	346	V
* 17.941	38.93	PK2	47.9	-37.9	7.7	7.3	63.93	74	-10.07	131	168	V
9.907	35.84	PK2	38.2	-39.2	5.5	5.3	45.64	74	-28.36	198	282	H
14.809	37.77	PK2	42.2	-36.9	6.7	6.5	56.27	74	-17.73	212	226	H
9.898	32.22	PK2	38.2	-39.2	5.5	5.2	41.92	74	-32.08	291	141	V
14.842	34.69	PK2	42	-36.9	6.7	6.5	52.99	74	-21.01	287	181	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.953	37.53	Av	33.3	-41.6	3.8	3.7	-22.9	13.83	54	-40.17	198	236	H
* 17.999	38.42	Av	47.9	-37.8	7.7	7.3	-22.9	40.62	54	-13.38	242	259	H
* 4.953	37.26	Av	33.2	-41.5	3.8	3.7	-22.9	13.56	54	-40.44	174	346	V
* 17.941	38.93	Av	47.9	-37.9	7.7	7.3	-22.9	41.03	54	-12.97	131	168	V
9.907	35.84	Av	38.2	-39.2	5.5	5.3	-22.9	22.74	54	-31.26	198	282	H
14.809	37.77	Av	42.2	-36.9	6.7	6.5	-22.9	33.37	54	-20.63	212	226	H
9.898	32.22	Av	38.2	-39.2	5.5	5.2	-22.9	19.02	54	-34.98	291	141	V
14.842	34.69	Av	42	-36.9	6.7	6.5	-22.9	30.09	54	-23.91	287	181	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - KDB558074 Method: Maximum Peak
Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 7.136%, thus DC Corr = 20log(0.07136) = -22.9dB

High Channel – Data

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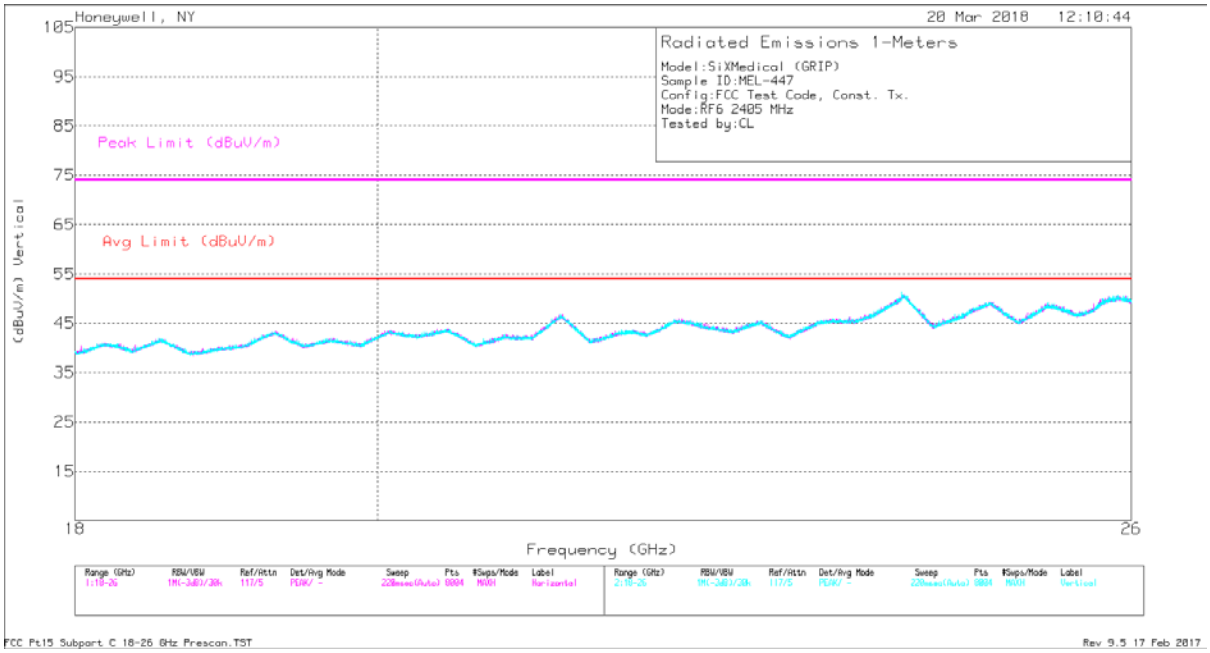
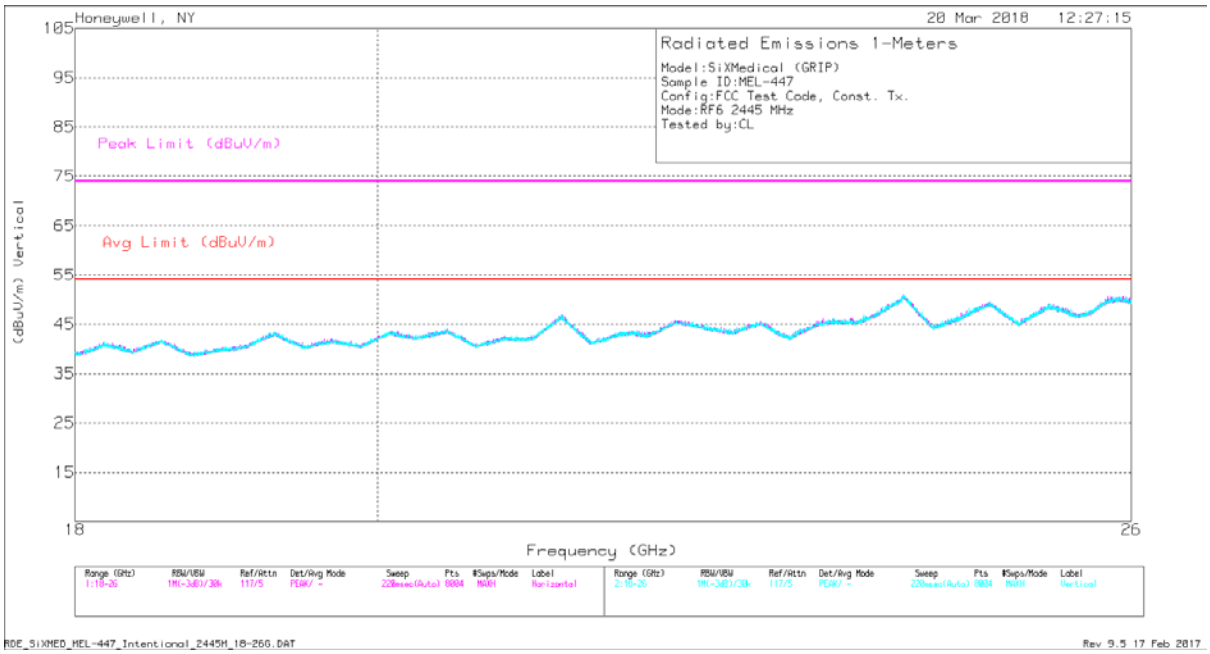
18-26GHz



Low Channel – Plot



Mid Channel – Plot

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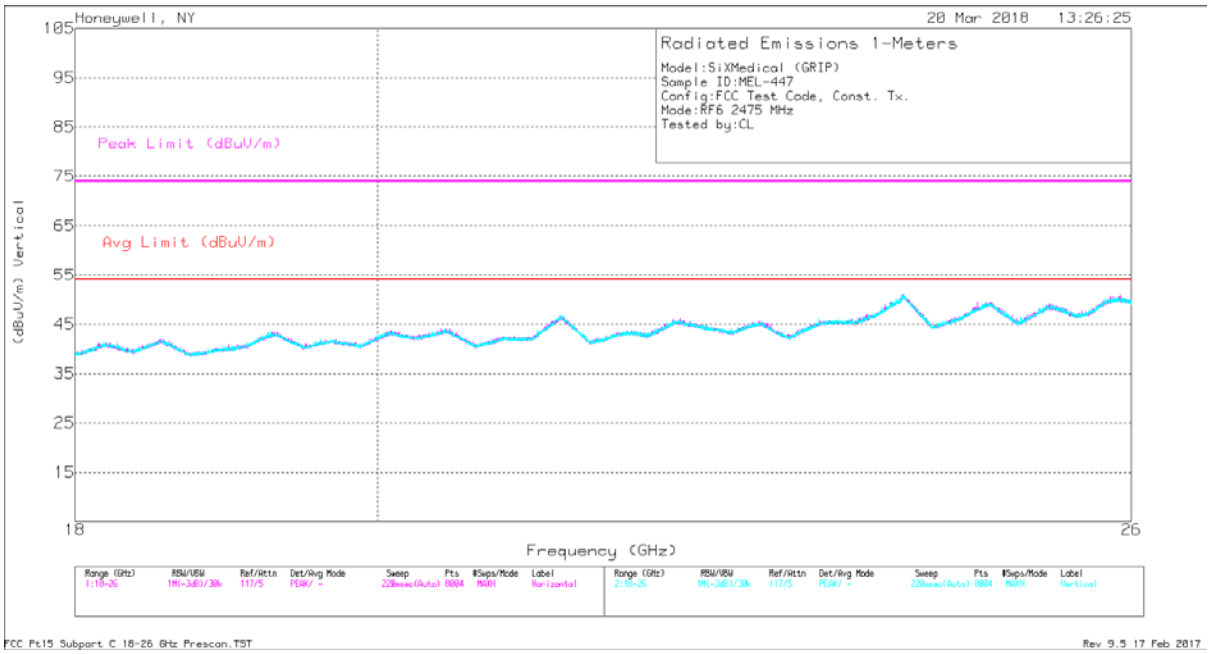

High Channel - Plot

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Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB]	SMA5 [dB]	18-26G Preamp [dB]	Distance Corr Factor [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Polarity
* 19.289	34.59	Pk	44.3	8	-34.3	-9.5	43.09	54	-10.91	74	-30.91	0-360	H
* 21.302	35.26	Pk	44.9	8.1	-32.2	-9.5	46.56	54	-7.44	74	-27.44	0-360	H
24.005	35.85	Pk	46.3	8.4	-30.5	-9.5	50.55	54	-3.45	74	-23.45	0-360	H
* 19.364	34.89	Pk	44.3	7.9	-35.2	-9.5	42.39	54	-11.61	74	-31.61	0-360	V
* 21.377	34.99	Pk	44.9	8.1	-33.2	-9.5	45.29	54	-8.71	74	-28.71	0-360	V
24.11	35.84	Pk	46.2	8.4	-32.5	-9.5	48.44	54	-5.56	74	-25.56	0-360	V

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

Low Channel – Data

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB]	SMA5 [dB]	18-26G Preamp [dB]	Distance Corr Factor [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Polarity
* 19.297	34.87	Pk	44.3	8	-34.2	-9.5	43.47	54	-10.53	74	-30.53	0-360	H
* 21.332	35.53	Pk	44.9	8.1	-32.2	-9.5	46.83	54	-7.17	74	-27.17	0-360	H
24.051	35.9	Pk	46.3	8.4	-31	-9.5	50.1	54	-3.9	74	-23.9	0-360	H
* 19.294	34.73	Pk	44.3	8	-34.3	-9.5	43.23	54	-10.77	74	-30.77	0-360	V
* 21.343	34.87	Pk	44.9	8.1	-32.5	-9.5	45.87	54	-8.13	74	-28.13	0-360	V
24.08	35.9	Pk	46.2	8.4	-31.8	-9.5	49.2	54	-4.8	74	-24.8	0-360	V

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

Mid Channel – Data

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB]	SMA5 [dB]	18-26G Preamp [dB]	Distance Corr Factor [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Polarity
* 19.313	35	Pk	44.3	8	-34.4	-9.5	43.4	54	-10.6	74	-30.6	0-360	H
* 21.341	35.04	Pk	44.9	8.1	-32.4	-9.5	46.14	54	-7.86	74	-27.86	0-360	H
24.009	36.05	Pk	46.3	8.4	-30.4	-9.5	50.85	54	-3.15	74	-23.15	0-360	H
* 19.291	34.64	Pk	44.3	8	-34.3	-9.5	43.14	54	-10.86	74	-30.86	0-360	V
* 21.322	35.39	Pk	44.9	8.1	-32	-9.5	46.89	54	-7.11	74	-27.11	0-360	V
24.02	36.08	Pk	46.3	8.4	-30.3	-9.5	50.98	54	-3.02	74	-23.02	0-360	V

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

High Channel – Data

Note: No emissions detected from the EUT above the system noise floor

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