

Honeywell

FCC / ISED Test Report

For

GRIP 7" AIO Panel

Report #: 50346-A1

FCC ID: CFS8DL-GRIPAIO7

IC ID: 573F-GRIPAIO7

Report Completion Date: 2018-06-29

Prepared by and for:

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Suite 100 PO Box 9040

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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 by 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	2018-06-21
A	M. Antola	A. Roussin	Updated configuration information; Updated above 1GHz spurious data; Added data (radiated and conducted) to support simultaneous operation conditions	2018-06-29

Report Authorization

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Applicable Test Standards/Limits		
Test Standards/Limits	Result	Dates Tested
ANSI C63.10: 2013	Compliant	04/19/2018 – 06/29/2018
RSS-247, Issue 2, Section 5	Compliant	04/19/2018 – 06/29/2018
RSS-GEN, Issue 4	Compliant	04/19/2018 – 06/29/2018
CFR 47 Pt 15 Subpart C, Section 15.207/209	Compliant	04/19/2018 – 06/29/2018
CFR 47 Pt 15 Subpart C, Section 15.247	Compliant	04/19/2018 – 06/29/2018

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
<p>The Global Residential Intrusion Platform (GRIP) 7” All-In-One (AIO) solution consists of a panel with a built-in touch screen display. The panel consists of a main PCB board that contains components (Display, camera, microphones, speaker) to support features such as video and audio, interfaces to external devices/sensors (sensors, devices, and cameras) and wireless communicators.</p> <p>There are three (3) on-board radios - Bluetooth (LE), RF6 and Wiselink. Plug-in modules can support WiFi, Z-Wave and cellular communications. This report will cover the RF6 portion of the EUT, which is a 2.4GHz Zigbee-based transmitter.</p> <p>It contains two (2) integral PCB antennas with gains of 6.6dBi & 4.7dBi.</p>

Worse-Case Configuration & Mode

Radiated emissions was performed with the EUT set to transmit at the low/mid/high channels with the highest output power as worst-case scenario. The EUT has a typical installation orientation of vertical (i.e. wall-mounted or standing upright on desktop). Therefore, all final radiated test was performed with the EUT in the vertical orientation. See setup photos for details. The AC powered configuration proved to be the worse-case configuration and was tested as such.

Test Sample Identification

Sample ID Number	Sample Serial Number	Date Received
MEL-461	Non-serialized production unit	04/02/2018
MEL-473	Non-serialized production unit	04/19/2018

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:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

[i.e.] $37 \text{ dBuV/m} = 30 \text{ dBuV} + 18.5 \text{ dB/m} + 0.5 \text{ dB} - 12 \text{ dB}$

- 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

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% Occupied Bandwidth	PASS
2	6 dB Emission Bandwidth	PASS
3	Maximum Conducted Output Power	PASS
4	Maximum Power Spectral Density	PASS
5	Out of Band Emissions	PASS
6	Radiated Emissions (Intentional)	PASS
7	Conducted Emissions (Mains)	PASS

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 (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	4/23/18	22.6	37.2	1014	P

Equipment List

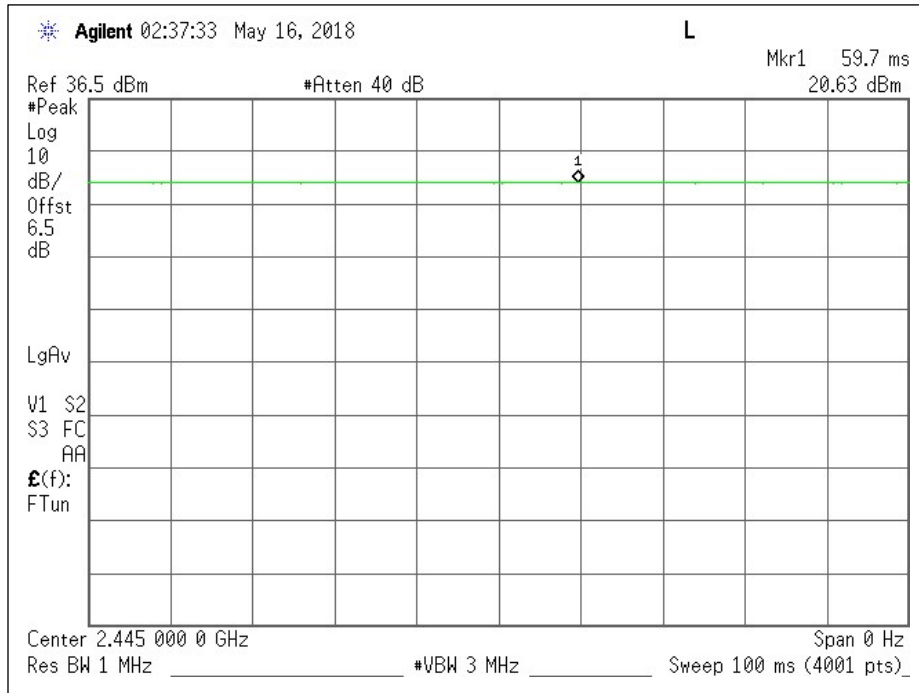
Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

Test Results

On Time (usec)	Period (usec)	Duty Cycle	Duty Cycle (%)
59.7	59.7	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 6.75% (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.

Duty Cycle Plot



6dB Emission 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 (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	4/20/18, 4/23/18	22.6	37.2	1014	P

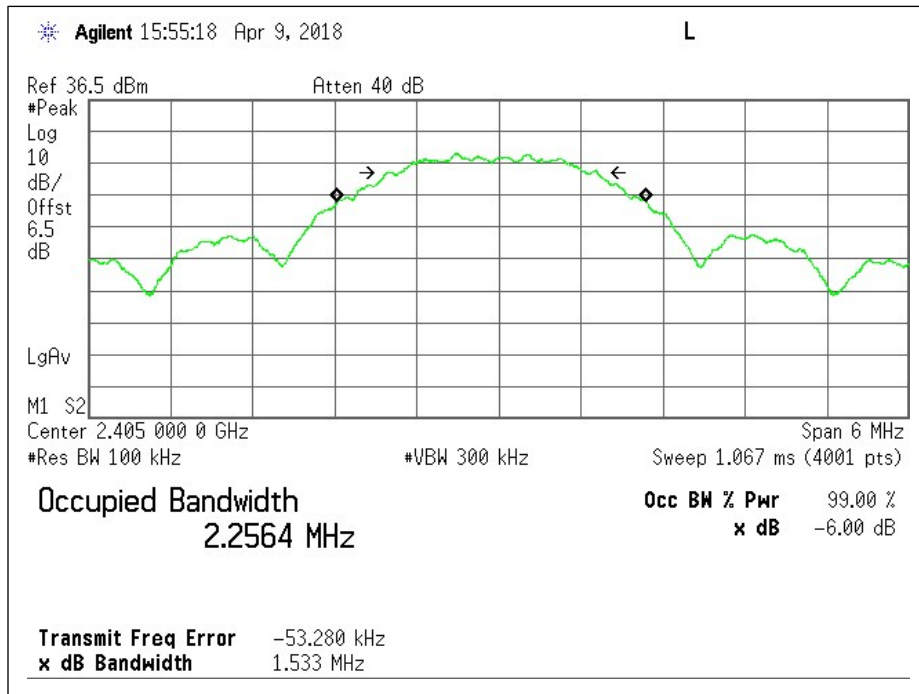
Equipment List

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	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

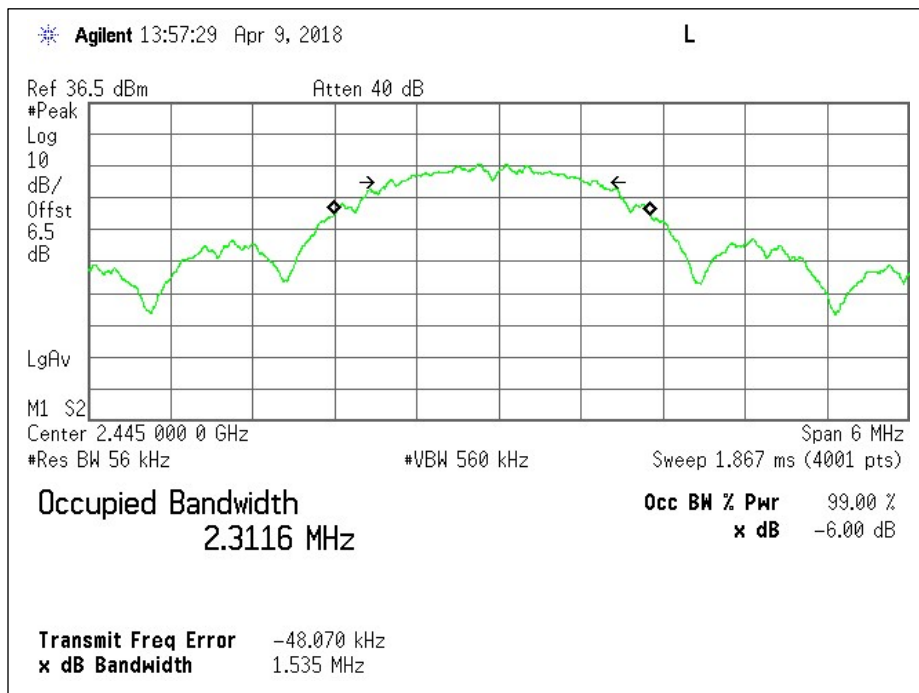
Test Results

Channel	Frequency (GHz)	6dB Bandwidth (in MHz)	
		Antenna 1	Antenna 2
Low	2.405	1.533	1.535
Mid	2.445	1.535	1.563
High	2.475	1.583	1.580

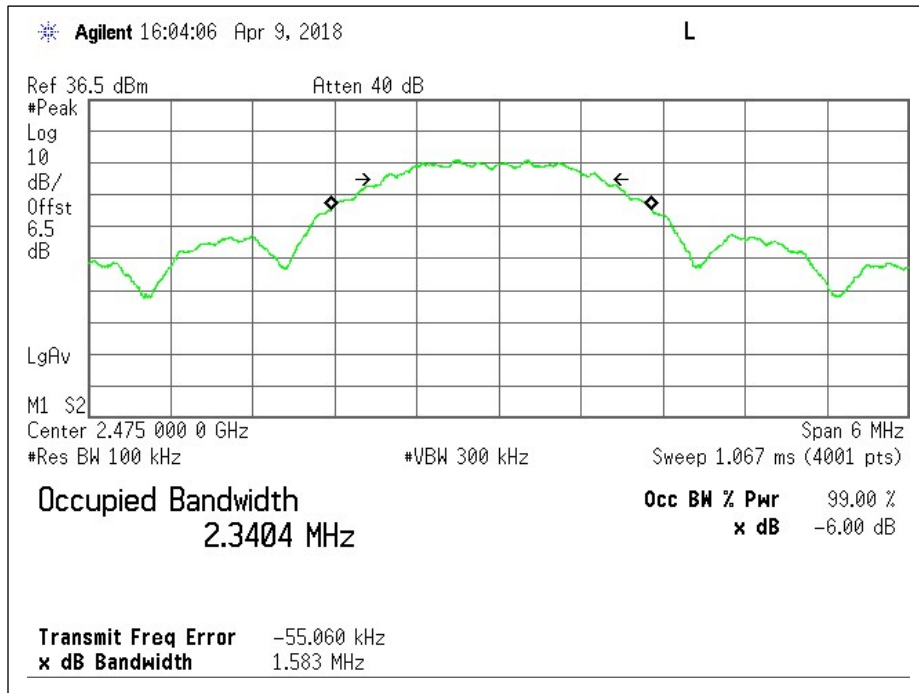
6dB Bandwidth



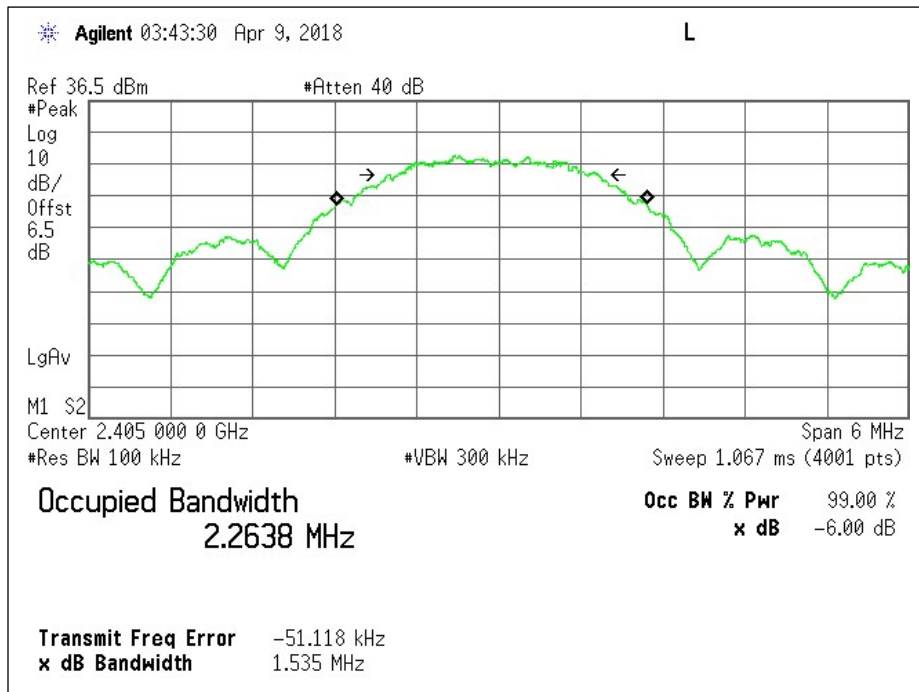
Antenna 1: Low Channel - Plot



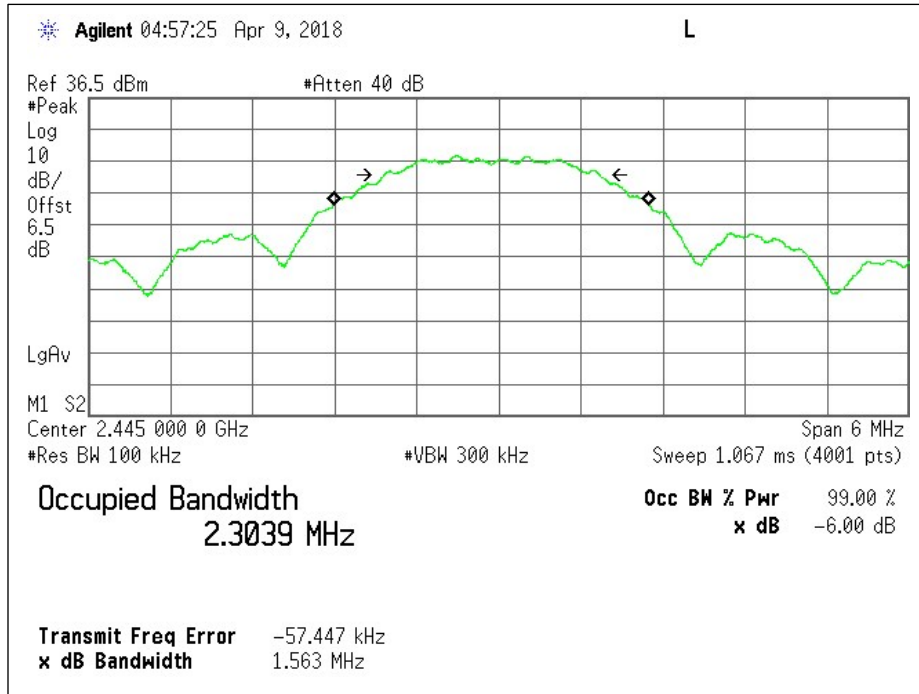
Antenna 1: Mid Channel - Plot



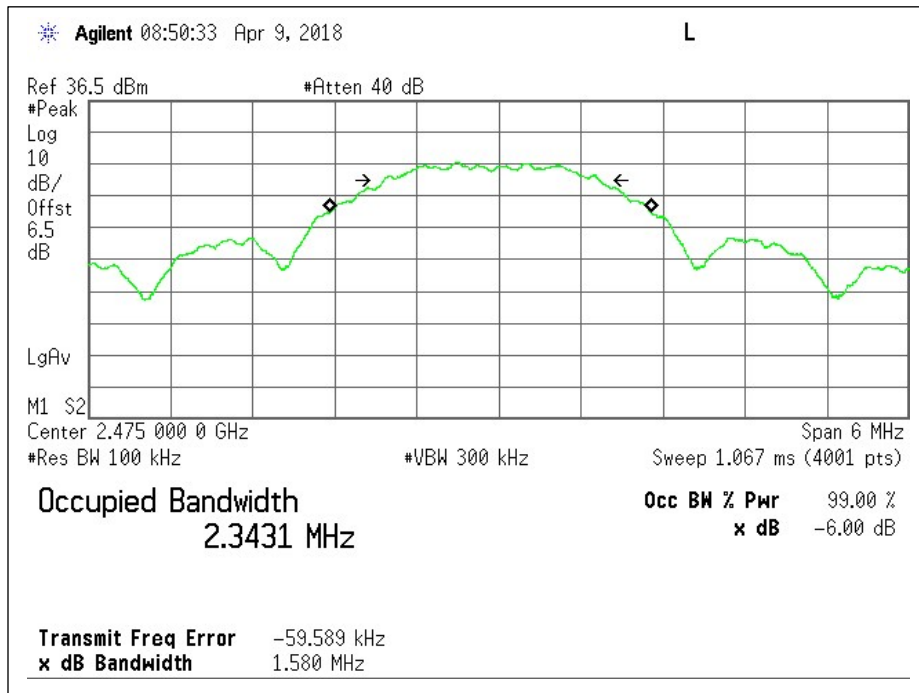
Antenna 1: High Channel – Plot



Antenna 2: Low Channel - Plot



Antenna 2: Mid Channel - Plot



Antenna 2: High Channel - Plot

99% Occupied 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 (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	04/20/18, 04/23/18	22.6	37.2	1014	P

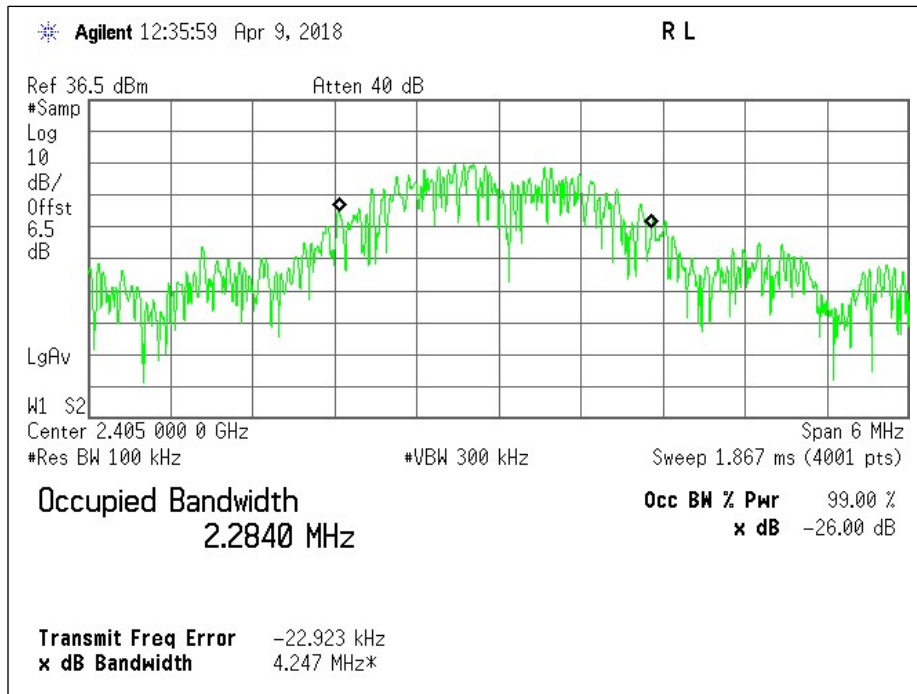
Equipment List

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	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

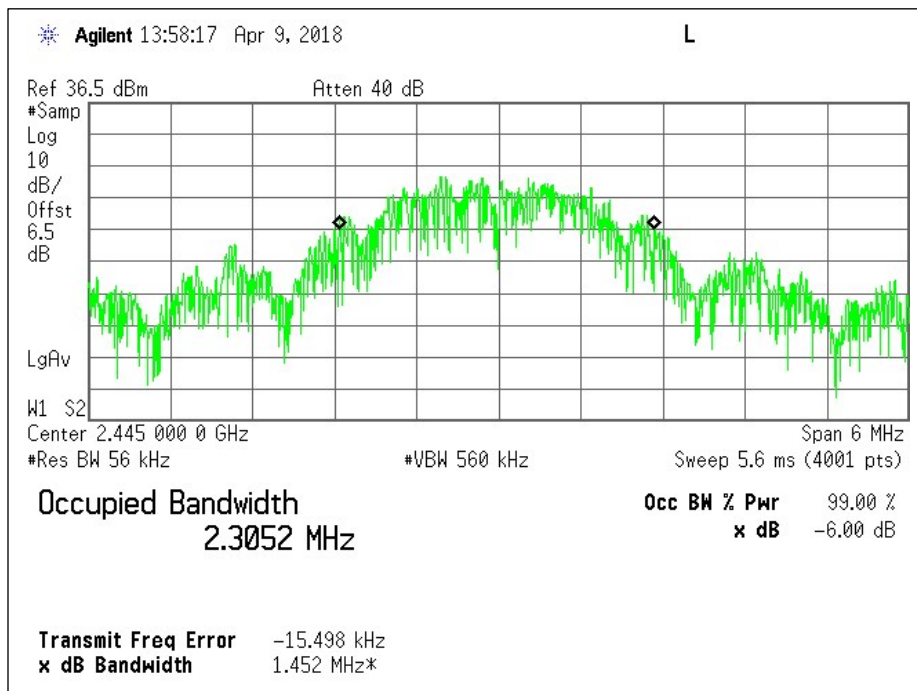
Test Results

Channel	Frequency (GHz)	99% Bandwidth (in MHz)	
		Antenna 1	Antenna 2
Low	2.405	2.2840	2.2494
Mid	2.445	2.3052	2.3222
High	2.475	2.3687	2.3499

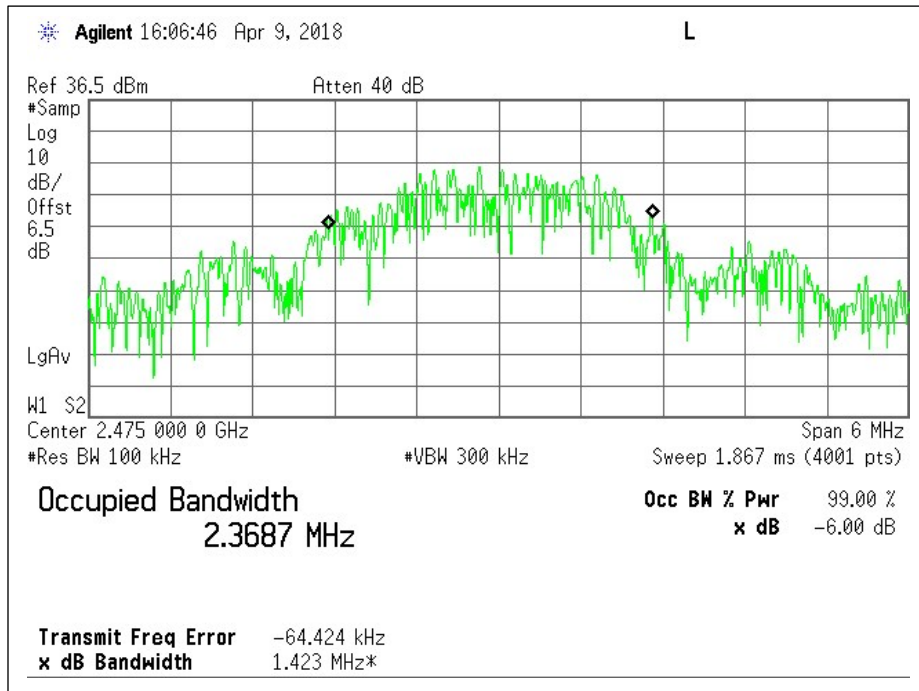
99% Occupied Bandwidth



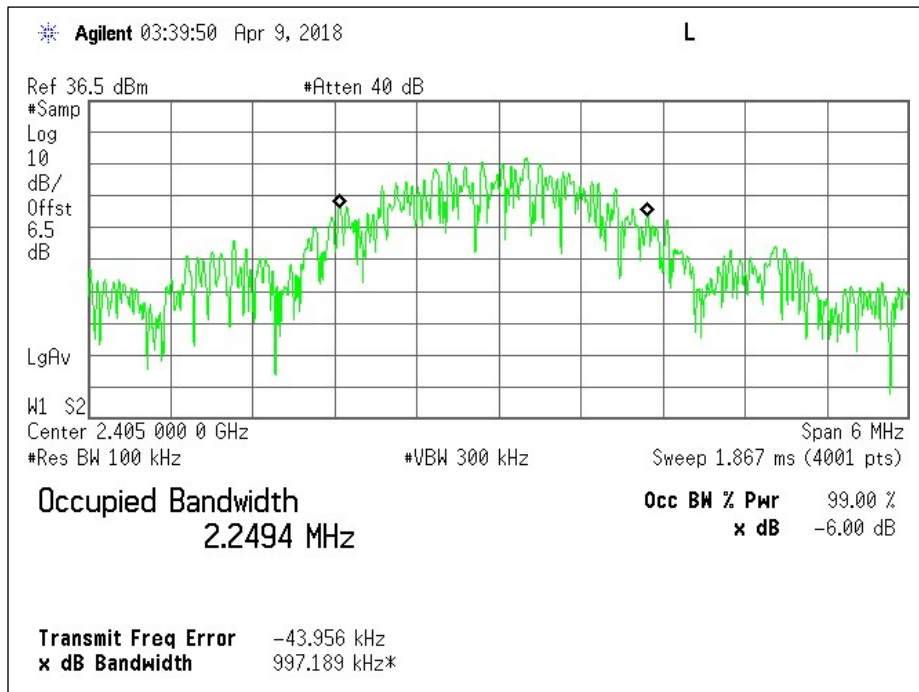
Antenna 1: Low Channel - Plot



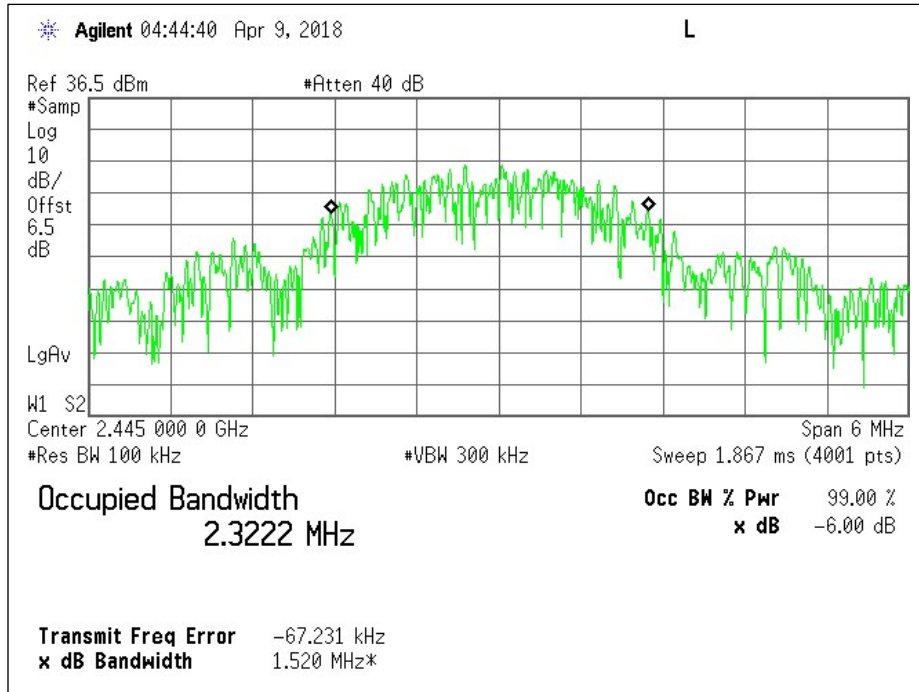
Antenna 1: Mid Channel - Plot



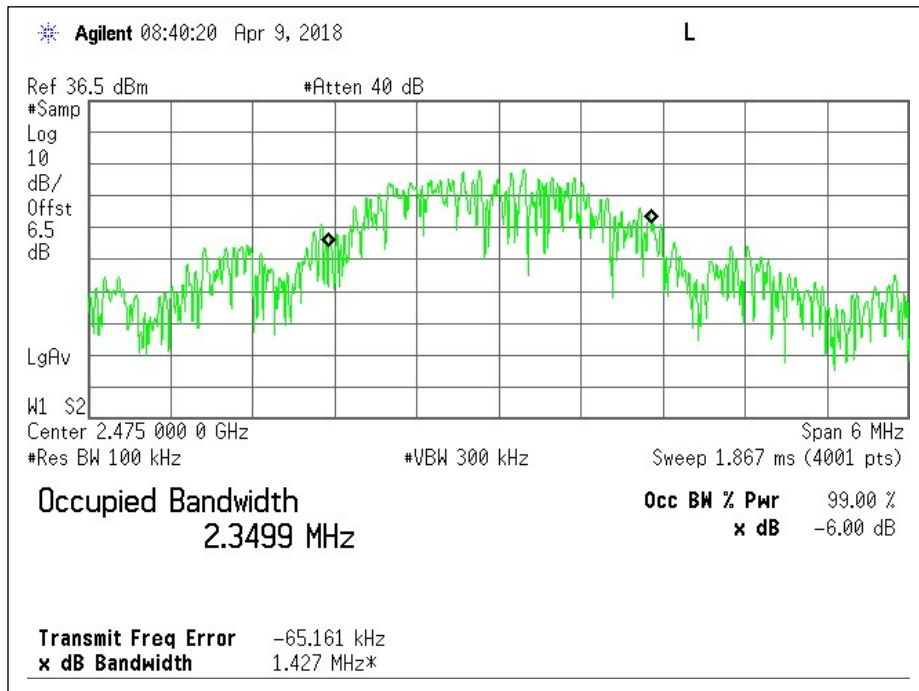
Antenna 1: High Channel – Plot



Antenna 2: Low Channel - Plot



Antenna 2: Mid Channel - Plot



Antenna 2: High Channel - Plot

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)	0.85W (29.4dBm)

*-The highest gain of antenna used with the radio is 6.6dBi. Thus per 15.247 (b)(4), the limit was reduced accordingly.

Test Information

Tester	Test Location	Date	Temperature (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	04/20/18, 04/23/18	22.6	37.2	1014	P

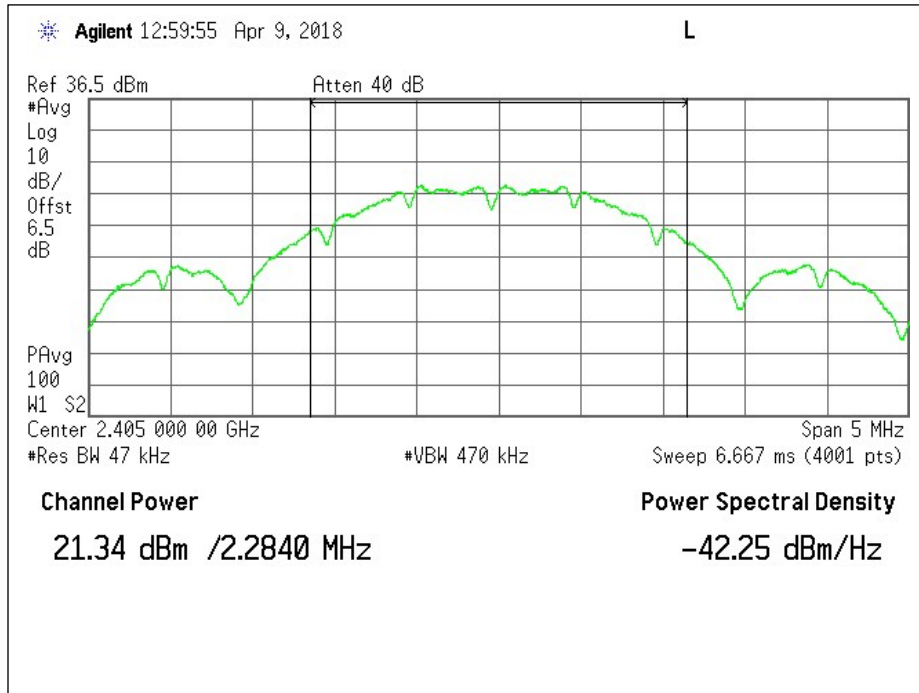
Equipment List

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	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

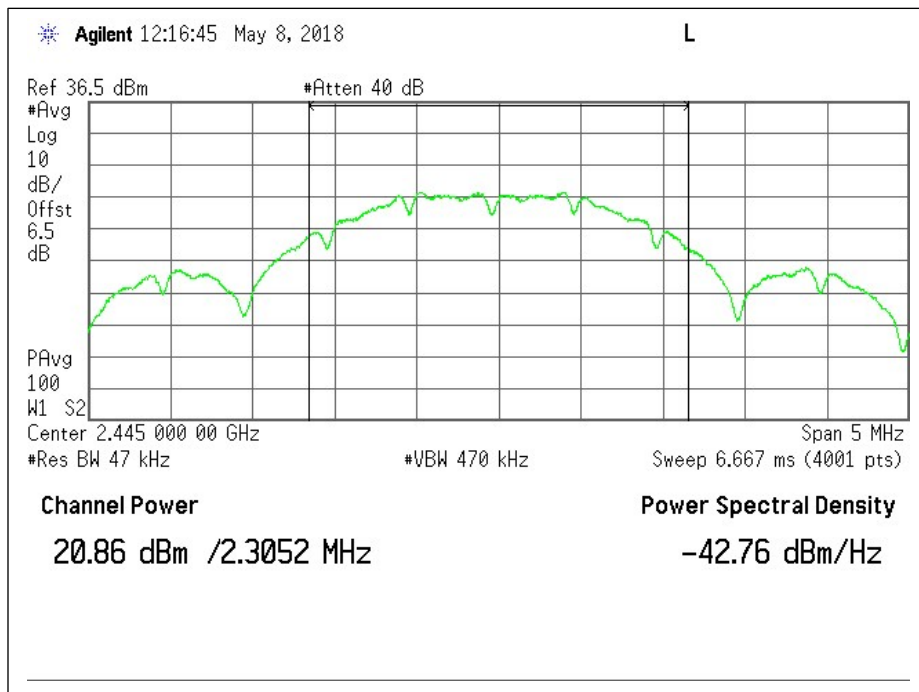
Test Results

Channel	Frequency (GHz)	Tx Channel BW Power (dBm)			
		Antenna 1	Margin	Antenna 2	Margin
Low	2.405	21.34	-7.97	22.37	-6.94
Mid	2.445	20.86	-8.45	21.02	-8.29
High	2.475	20.20	-9.2	20.16	-9.15

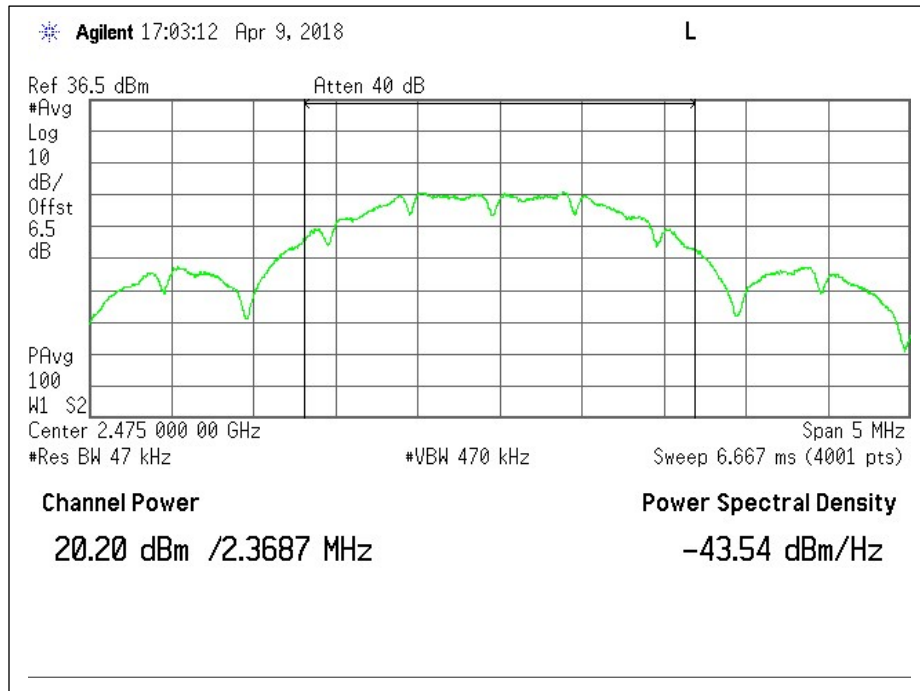
Output Power



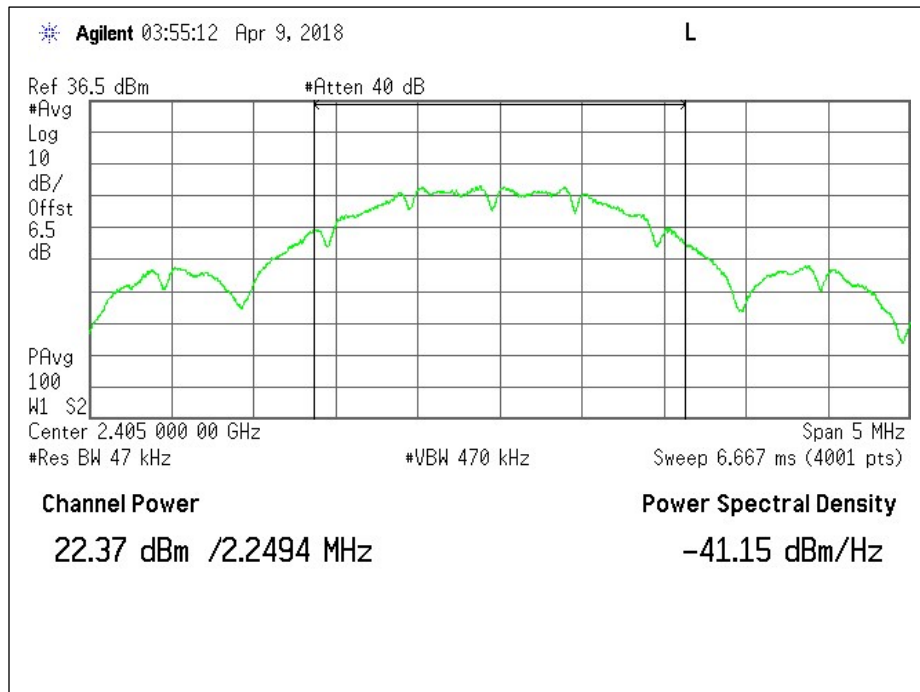
Antenna 1: Low Channel - Plot



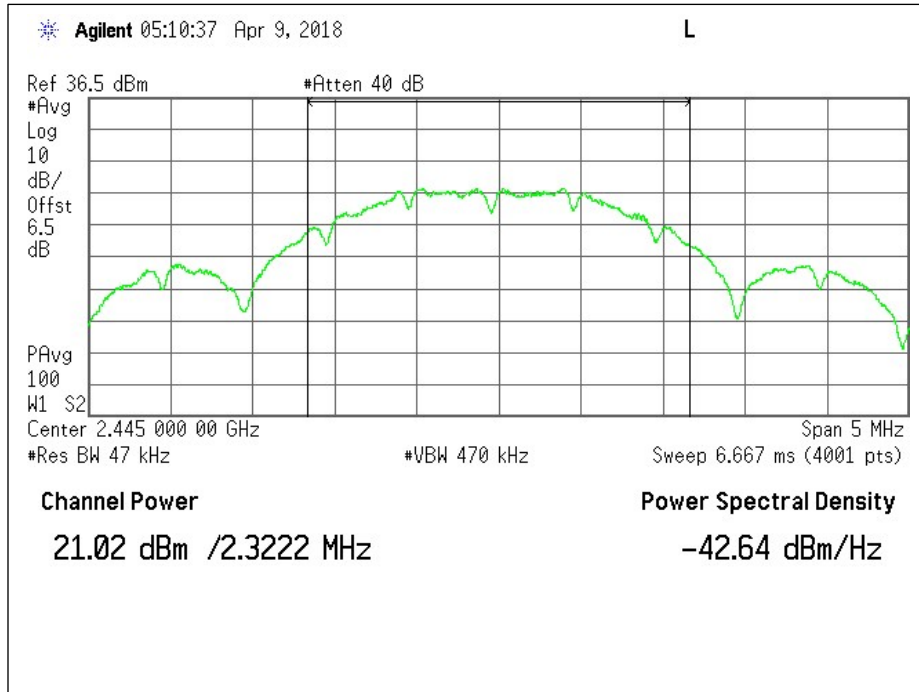
Antenna 1: Mid Channel - Plot



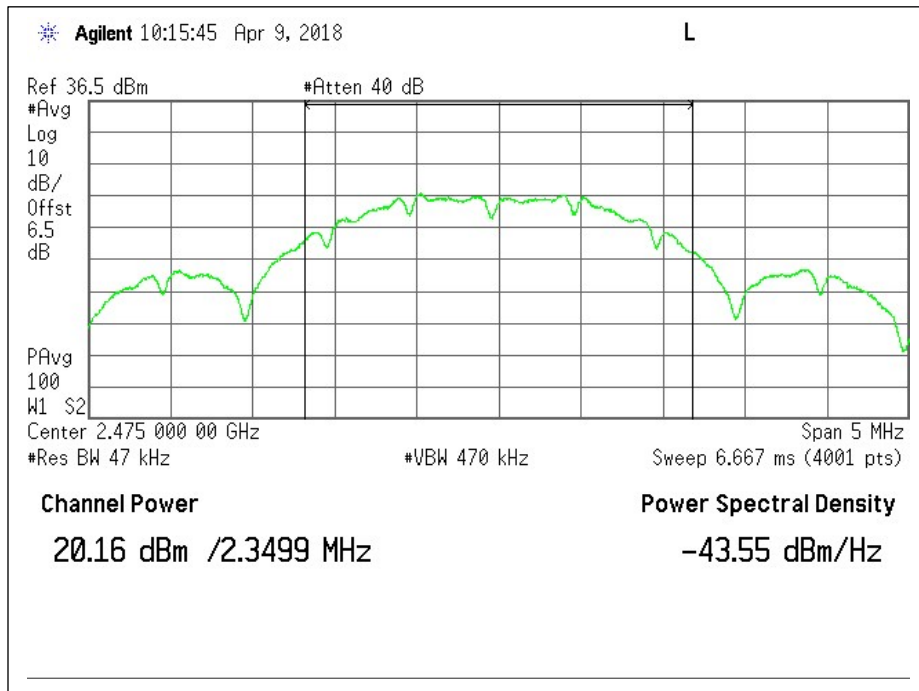
Antenna 1: High Channel – Plot



Antenna 2: Low Channel - Plot



Antenna 2: Mid Channel - Plot



Antenna 2: High Channel - Plot

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 average power spectral density method was utilized.

Method AVGPS-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 (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	04/20/18, 04/23/18	22.6	37.2	1014	P

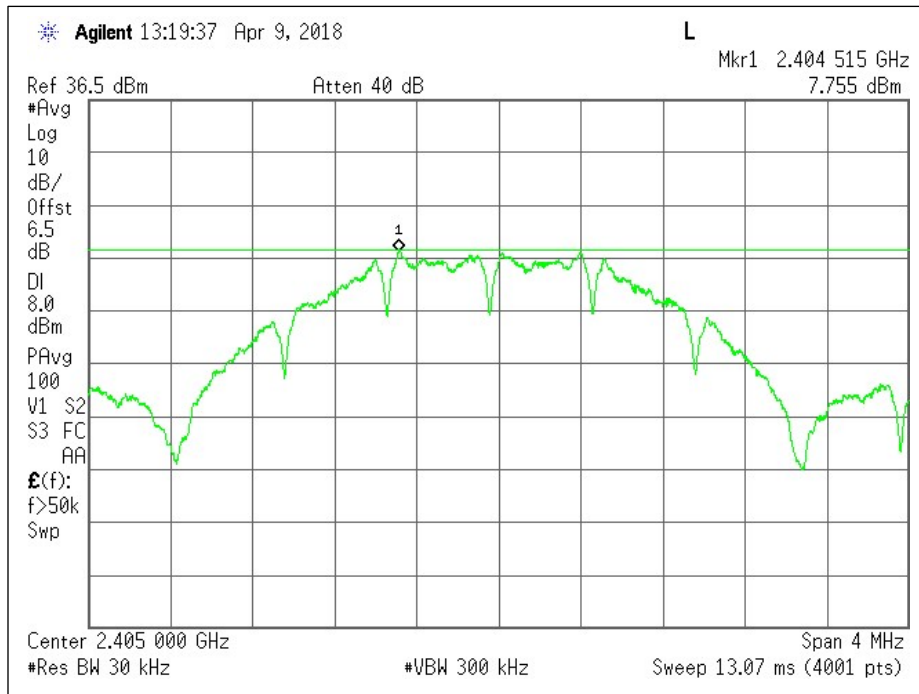
Equipment List

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	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

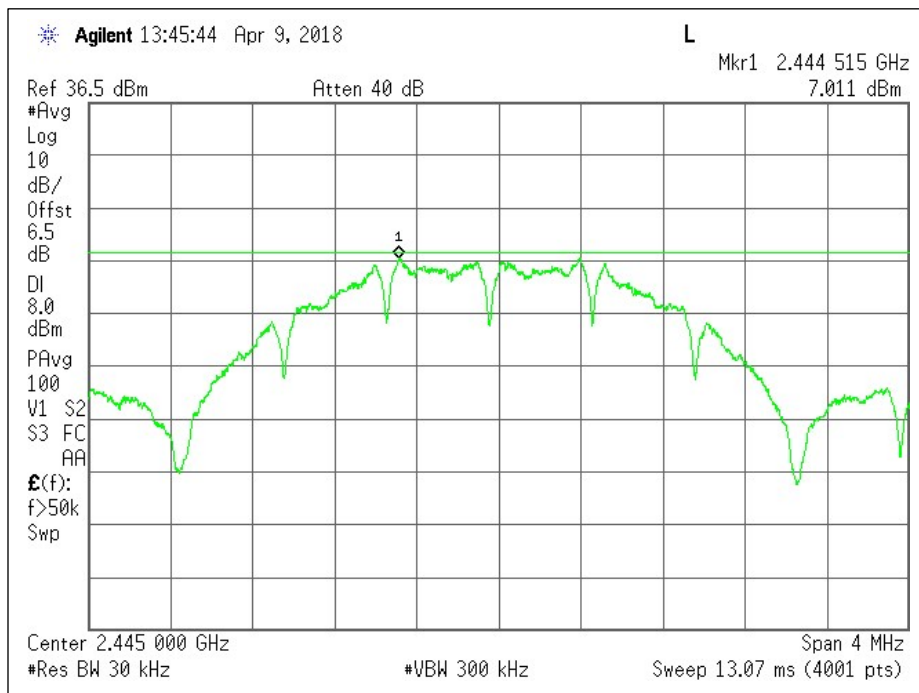
Test Results

Channel	Frequency (GHz)	Max PSD (dBm)	
		Antenna 1	Antenna 2
Low	2.405	7.755	7.890
Mid	2.445	7.011	7.025
High	2.475	4.901	5.869

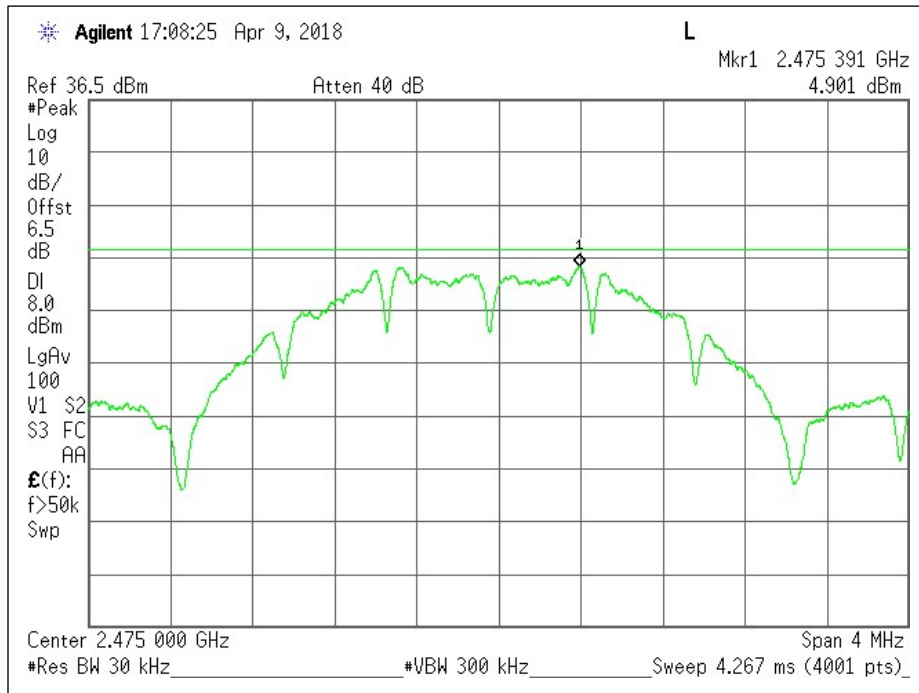
PSD



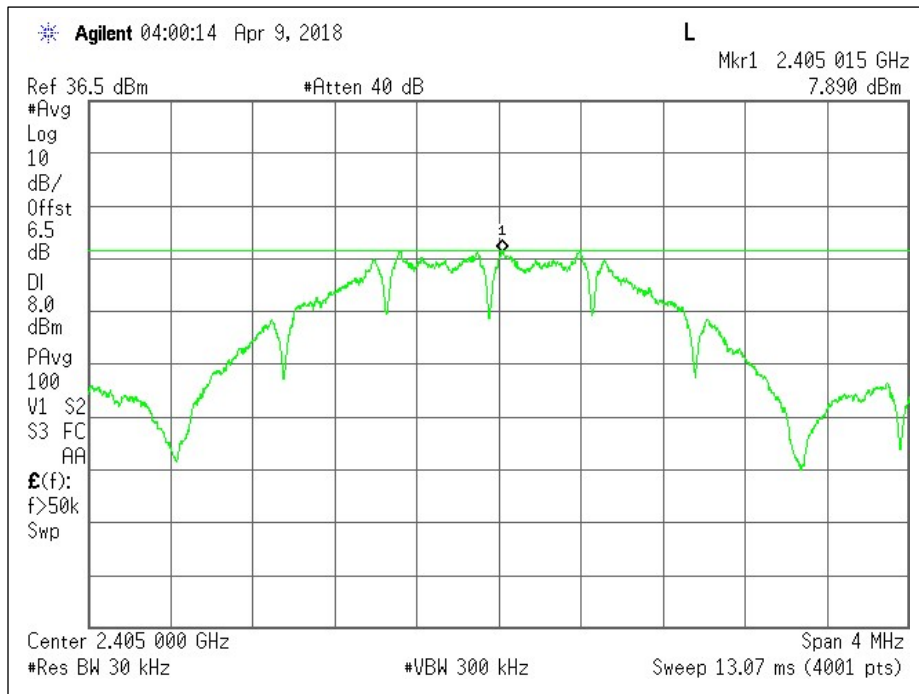
Antenna 1: Low Channel - Plot



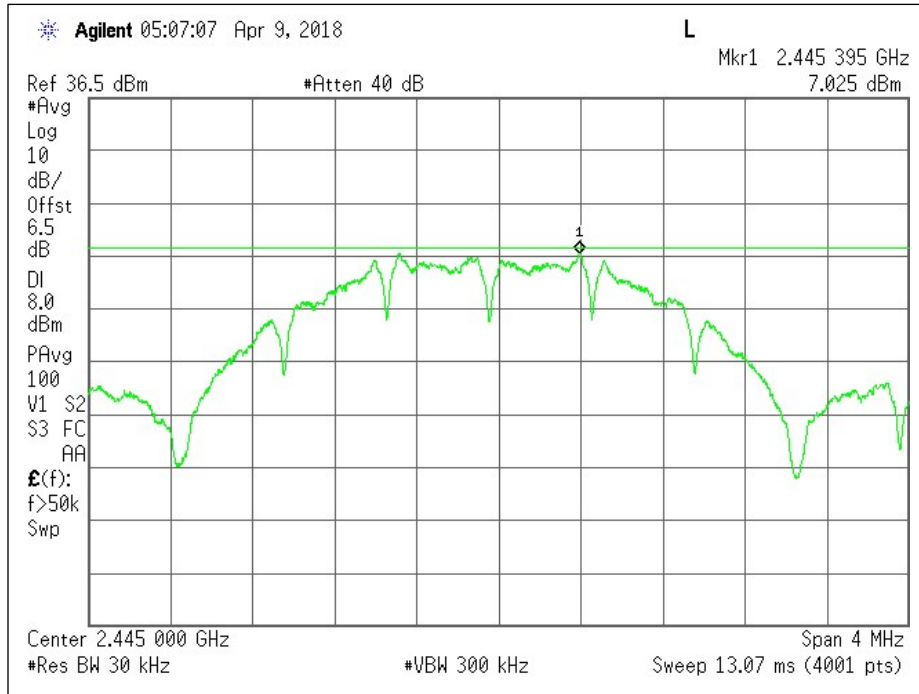
Antenna 1: Mid Channel - Plot



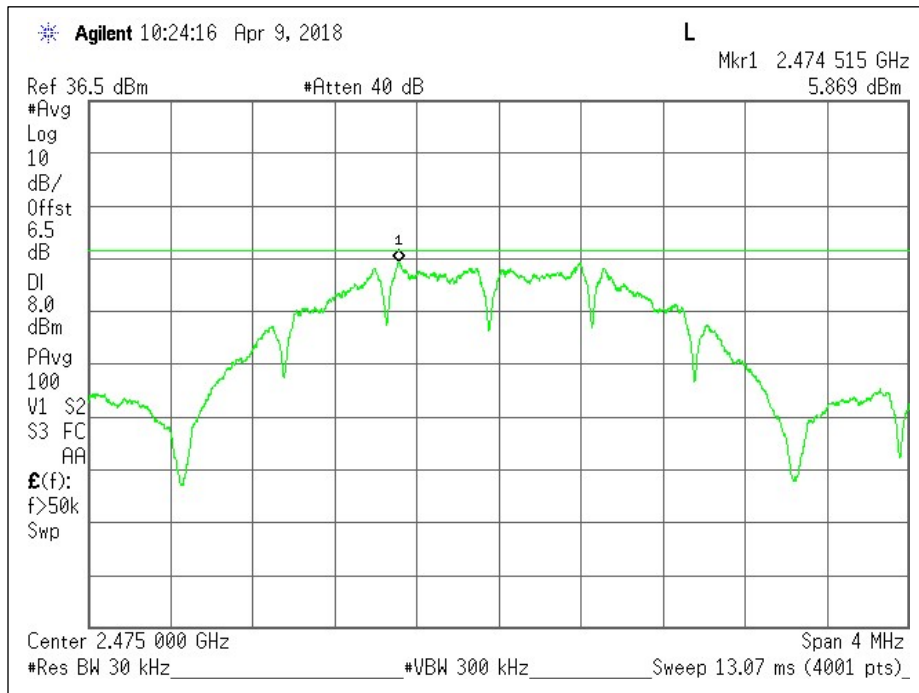
Antenna 1: High Channel – Plot



Antenna 2: Low Channel - Plot



Antenna 2: Mid Channel - Plot



Antenna 2: High Channel - Plot

Out of Band 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	20 or 30dB Below the Fundamental

Test Information

Tester	Test Location	Date	Temperature (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	04/20/18, 04/23/18	22.6	37.2	1014	P

Equipment List

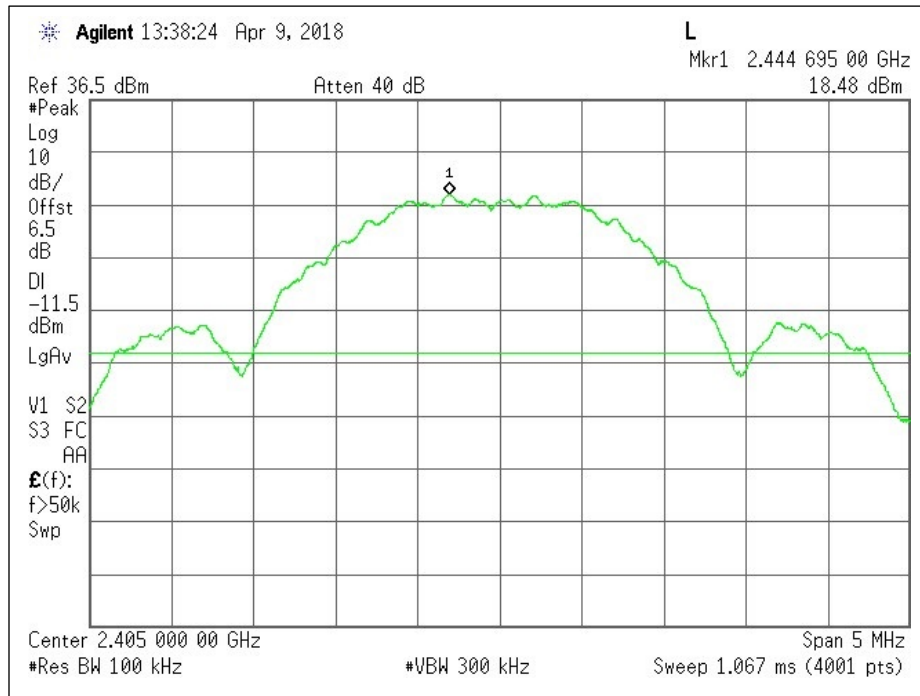
Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

Test Results

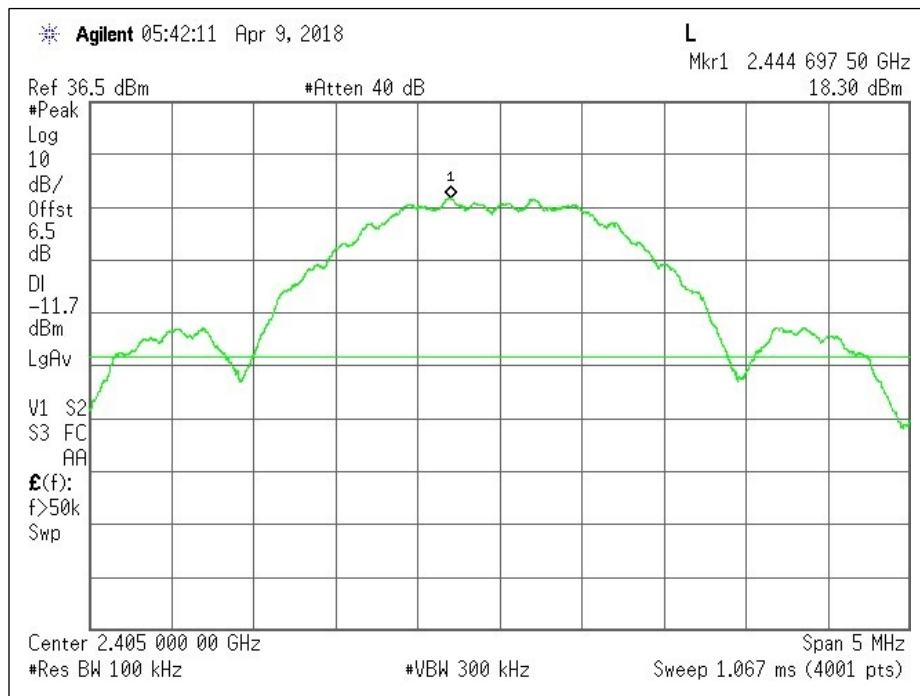
Authorized Band Edge					
Antenna	Channel	Frequency (GHz)	Delta from Peak to Bandedge (dB)	Limit (dB)	Margin (dB)
1	Low	2.405	43.62	30	-13.62
	High	2.475	60.77	30	-30.77
2	Low	2.405	44.33	30	-14.33
	High	2.475	62.01	30	-32.01

Conducted Spurious			
Channel	Frequency (GHz)	Highest Spurious Emission from -30dB down point (dB)	
		Antenna 1	Antenna 2
Low	2.405	-38.72	-38.94
Mid	2.445	-38.34	-38.55
High	2.475	-36.66	-37.73

Reference Level Measurement

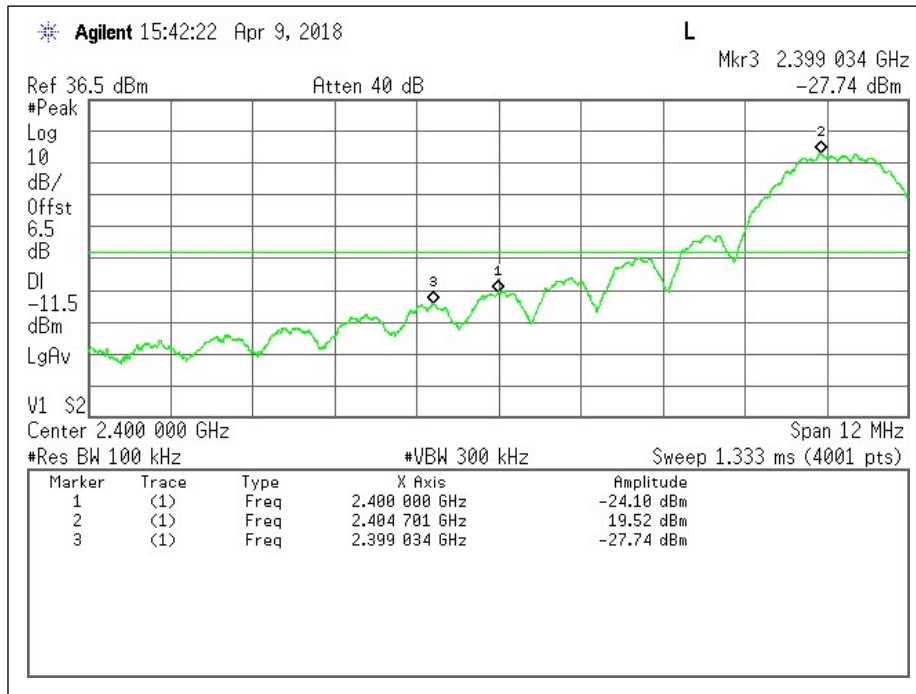


Antenna 1: Low Channel - Plot

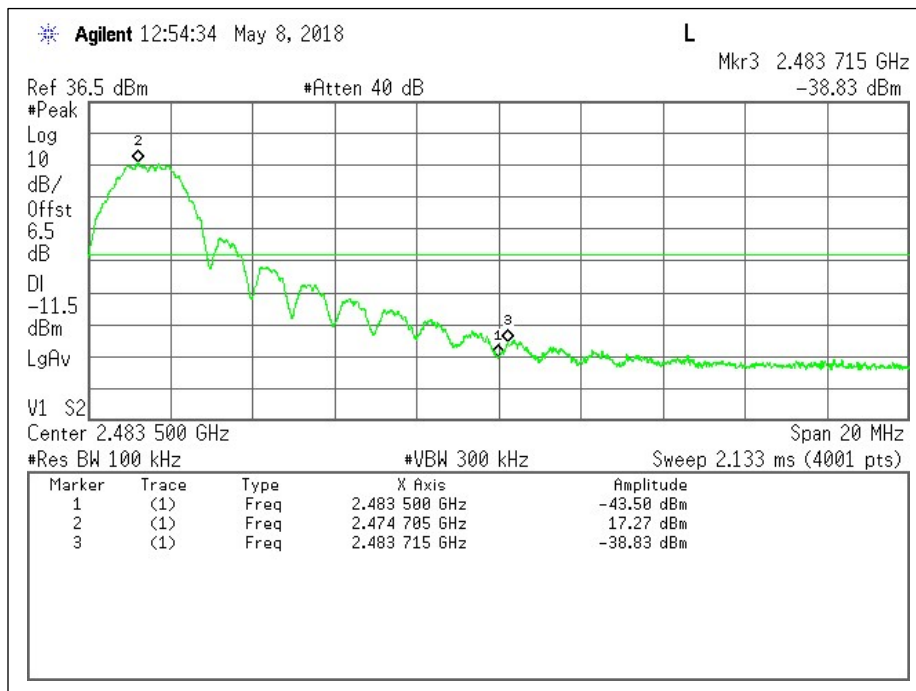


Antenna 2: Low Channel - Plot

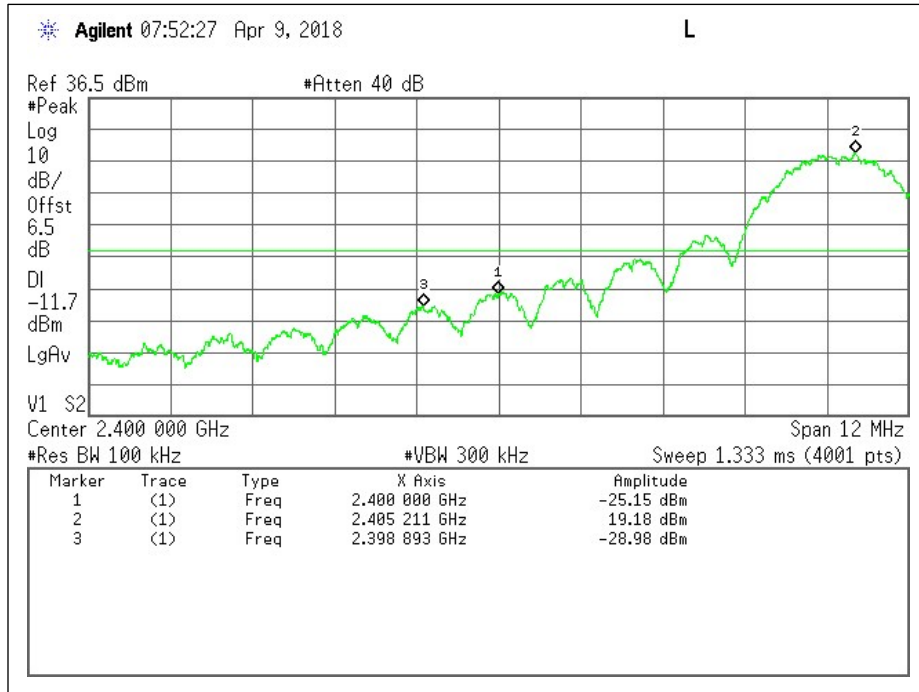
Band Edge



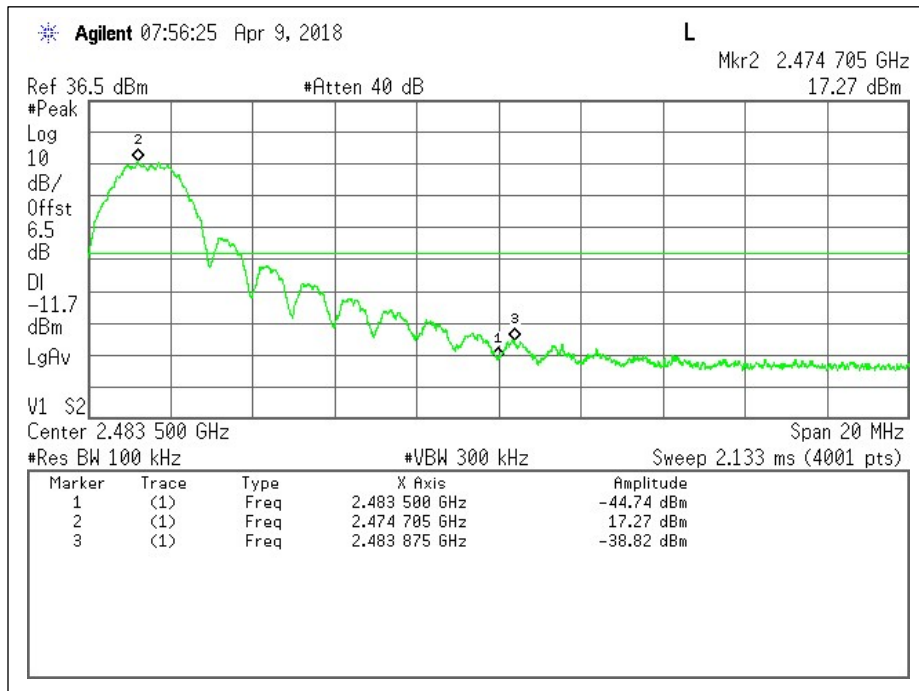
Antenna 1: Low Channel - Plot



Antenna 1: High Channel - Plot

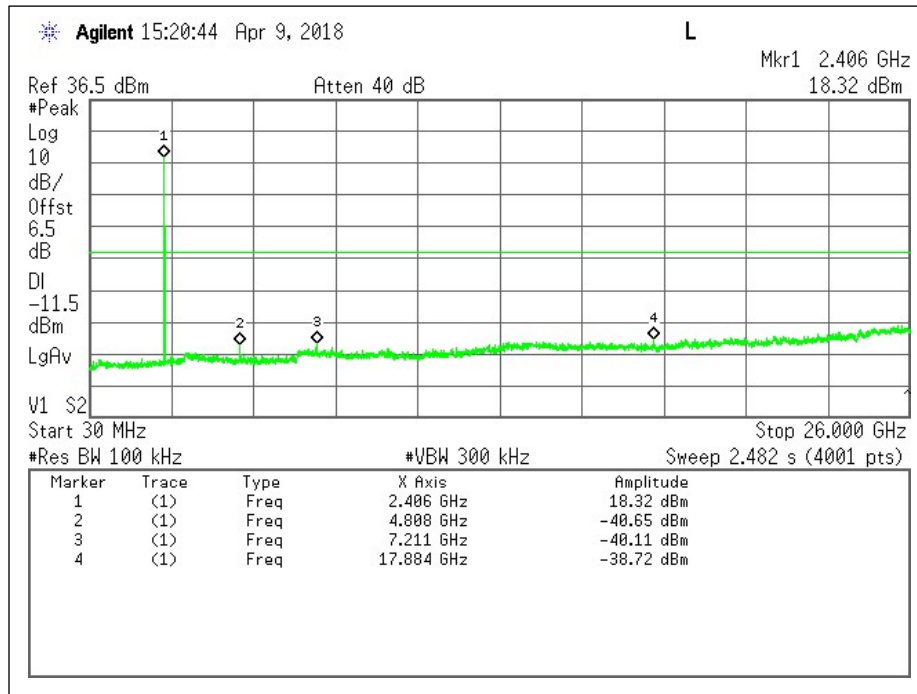


Antenna 2: Low Channel - Plot

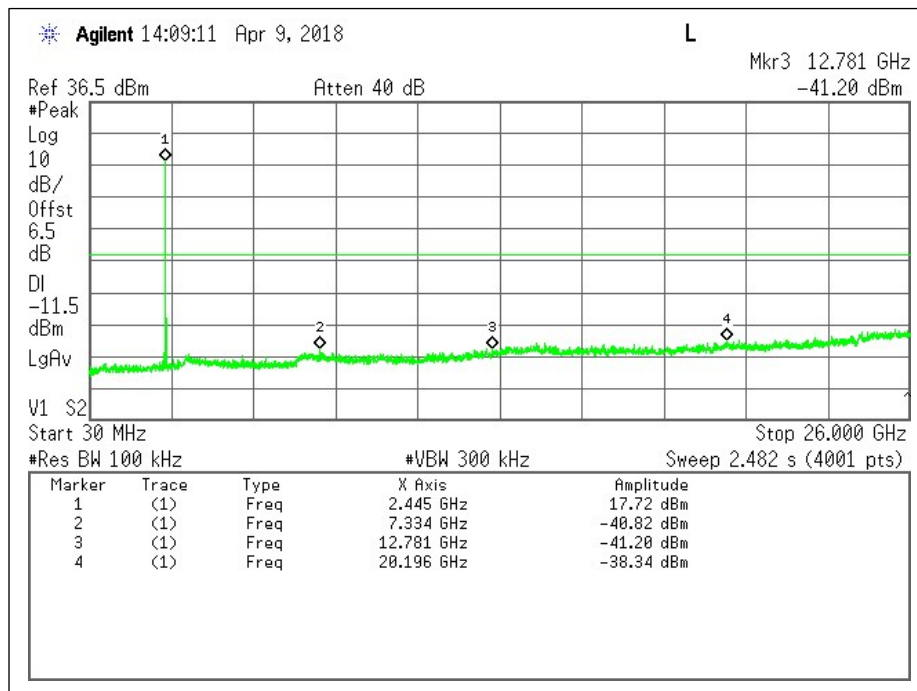


Antenna 2: High Channel - Plot

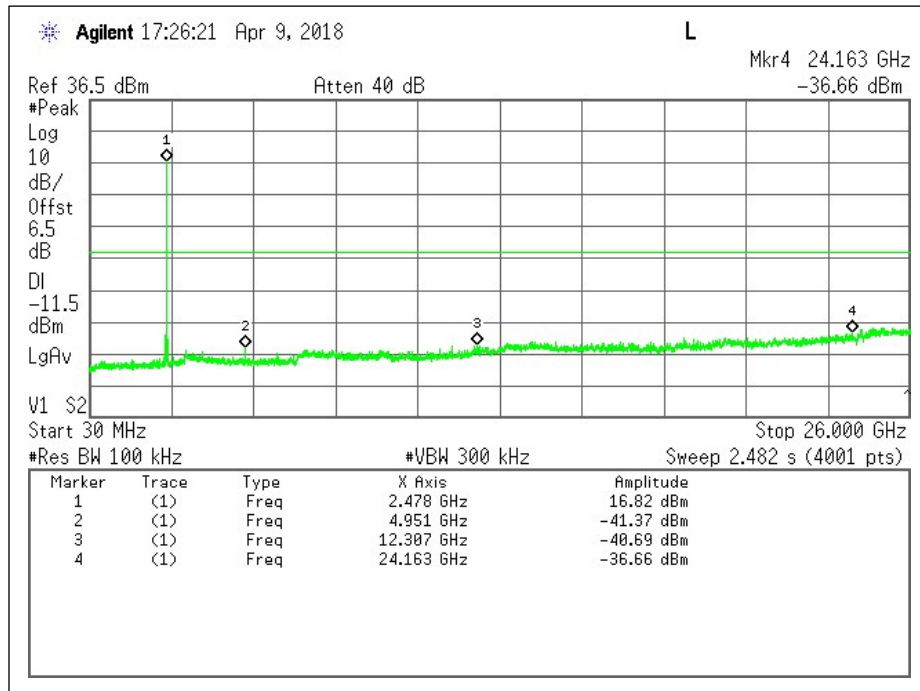
Conducted Spurious



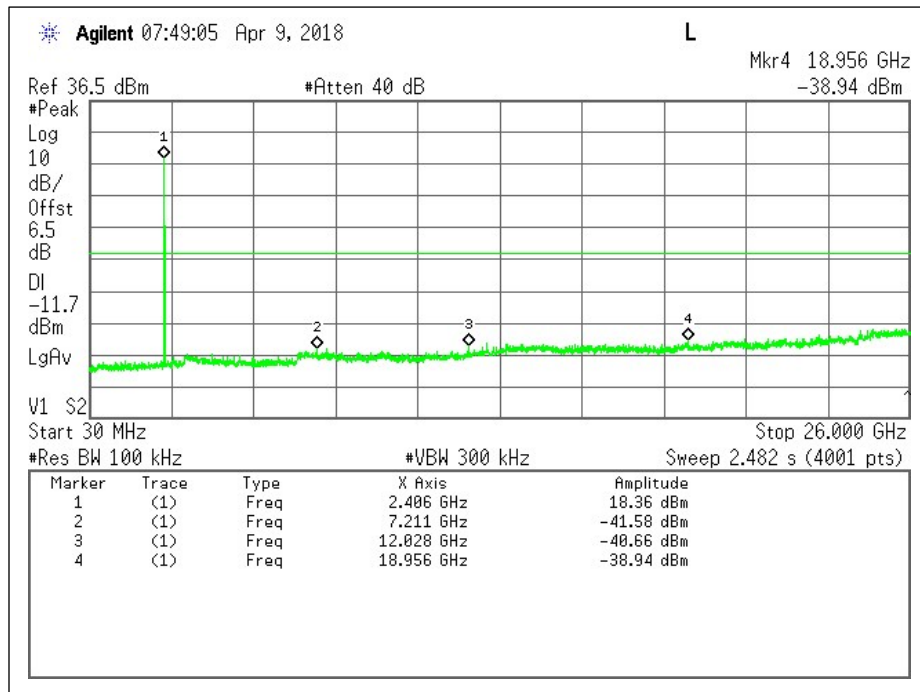
Antenna 1: Low Channel - Plot



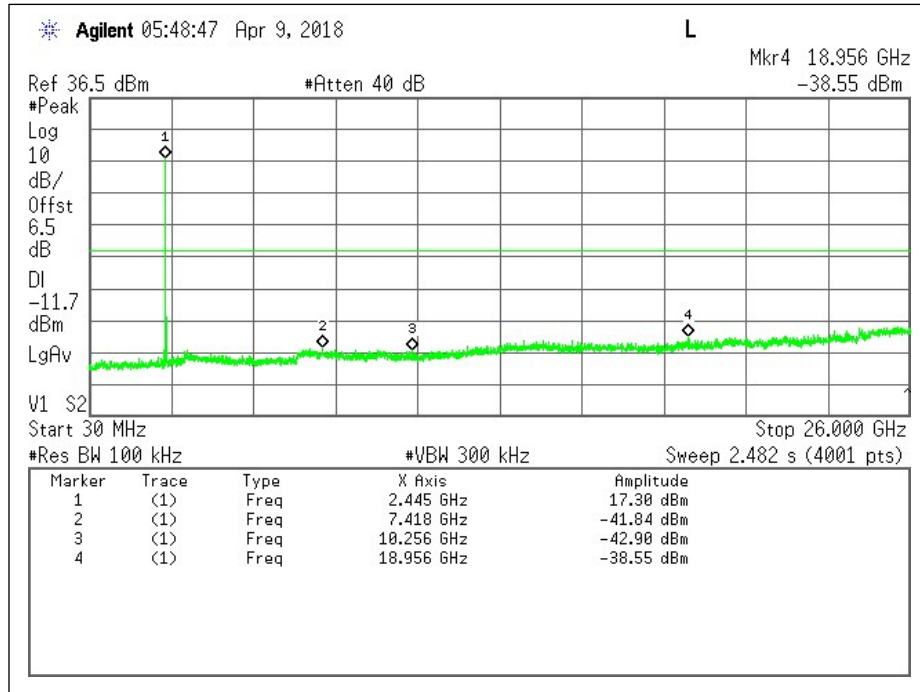
Antenna 1: Mid Channel - Plot



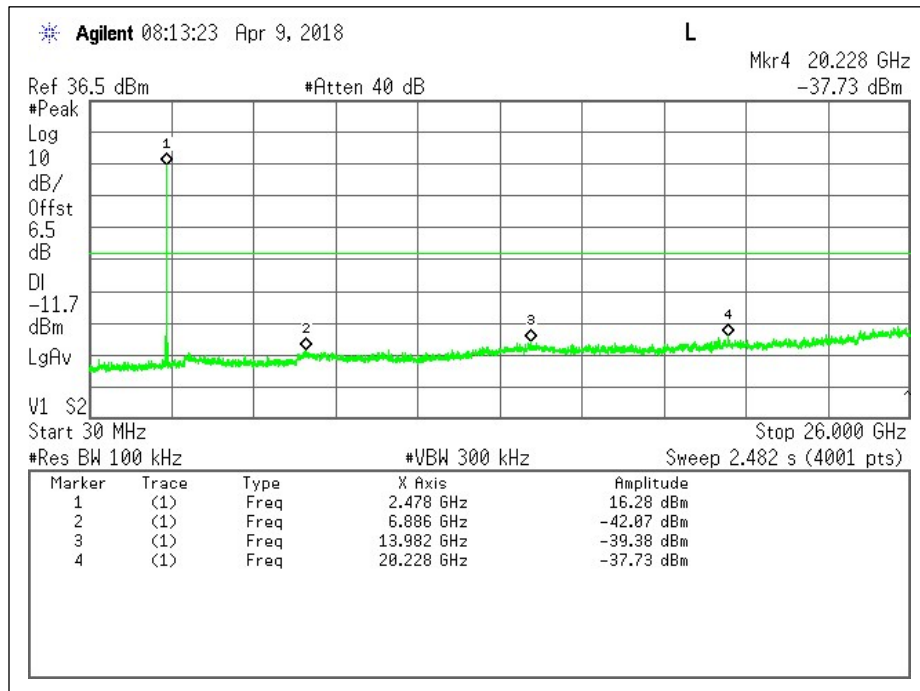
Antenna 1: High Channel – Plot



Antenna 2: Low Channel - Plot



Antenna 2: Mid Channel - Plot



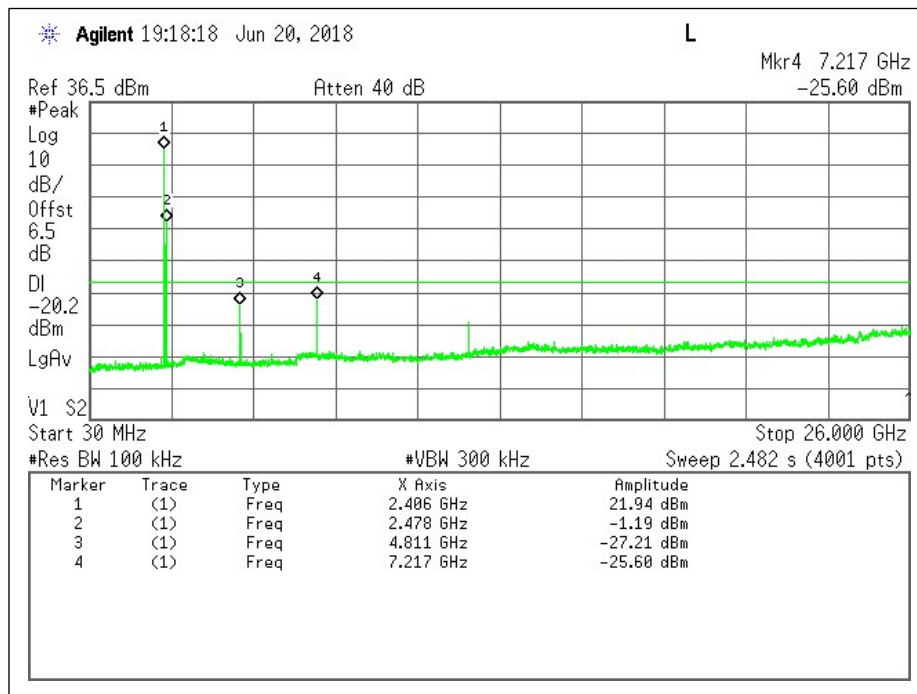
Antenna 2: High Channel - Plot

Conducted Spurious – Simultaneous Transmission, Shared Antenna, with Bluetooth Radio

Configuration (Worse-case):

RF6 – Low Channel

Bluetooth (LE) – High Channel



Note: Display line shows the limit used for Bluetooth testing as this is the worse-case limit.

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 (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL/JB	RF Chamber/OATS	04/23/18-05/23/18	28.3	54	1002	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 and above 18GHz. Prescans performed in an anechoic chamber, final measurements performed on an OATS.

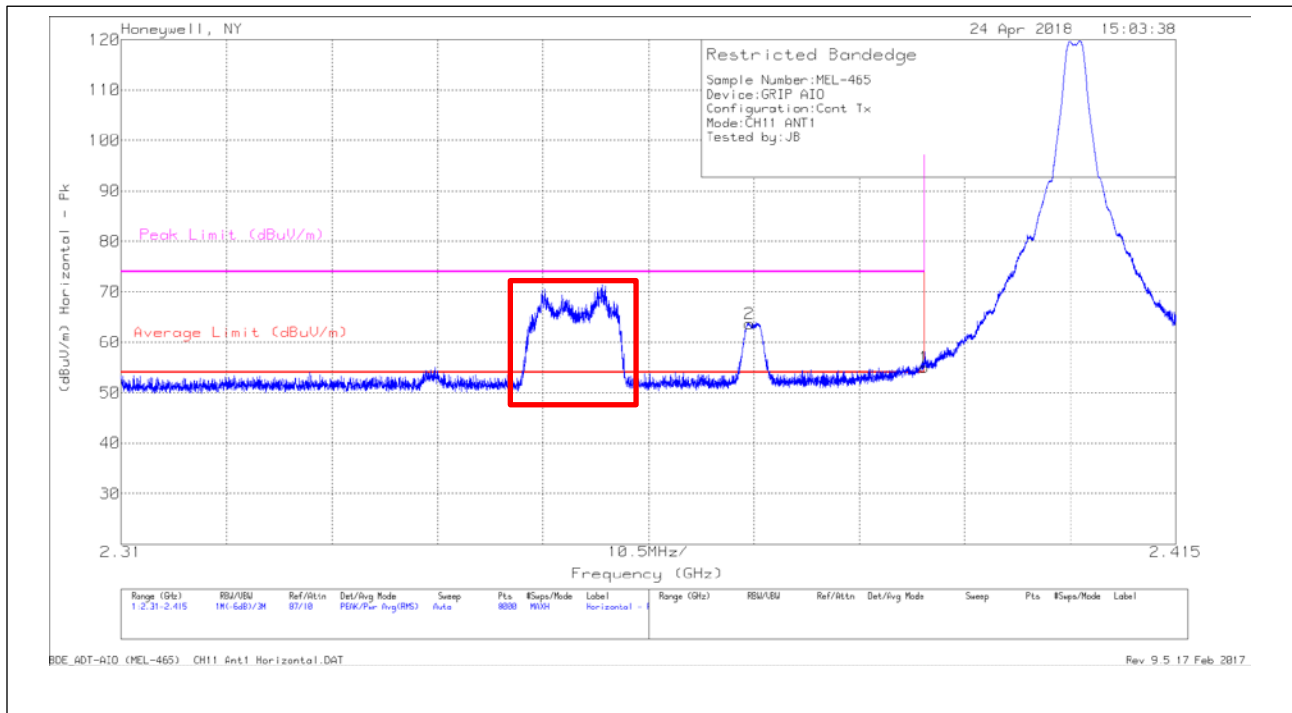
Since Wiselink/RF6/Bluetooth radios can transmit simultaneously, additional spurious scans are provided with all radios on and transmitting in their worse-case state.

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
RF Chamber						
Spectrum Analyzer	11496	100303	Rohde & Schwarz	FSU26	04/11/18	04/11/19
Loop Antenna (9kHz-30MHz)	11535	121080	Com-Power	AL-130R	10/17/18	10/17/19
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
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)	11557	18040034	Com-Power	PAM-118A	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	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20
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
Horn Antenna (18-40GHz)	11472	151	EMCO	EM-6963	02/14/18	02/14/19
Preamp (800MHz-21GHz)	11538	233701631	Mini Circuits	ZVA-213-S+	N/A	N/A
Preamp (18-40GHz)	11541	160911	Amplical	AMP18G40-35	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

Test Results

Restricted Band Edge



Antenna 1: 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	20.69	Pk	28.5	.7	2.6	2.5	-	54.99	74	-19.01	175	117	H
2	* 2.373	29.47	Pk	28.4	.7	2.6	2.5	-	63.67	74	-10.33	175	117	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	20.69	Av	28.5	.7	2.6	2.5	-23.4	31.59	54	-22.41	175	117	H
2	* 2.373	29.47	Av	28.4	.7	2.6	2.5	-23.4	40.27	54	-13.73	175	117	H

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

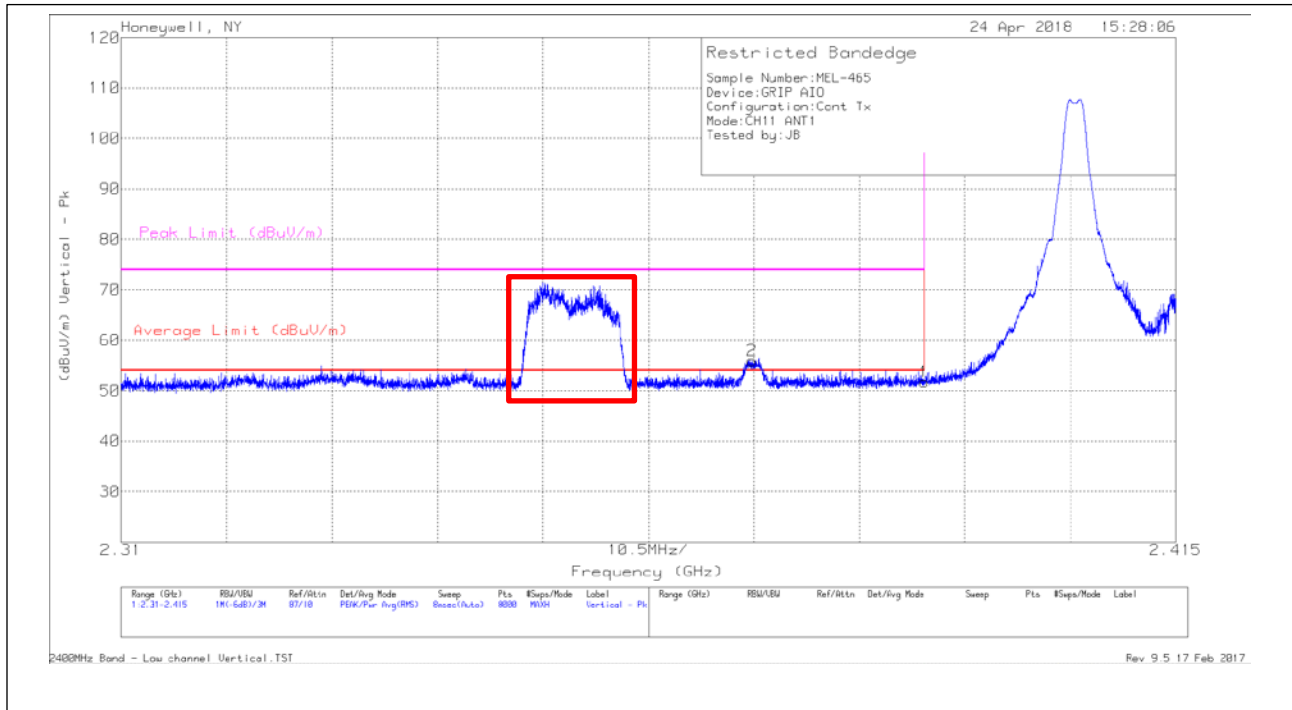
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

NOTE: Emissions highlighted in the plot above is OATS ambient and not a product of the transmitter. Worse-case emissions are reported and all other peak emissions, once corrected by the DC Corr, would be below the average limit.

Antenna 1: Low Channel Horizontal - Data



Antenna 1: 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	17.43	Pk	28.5	.7	2.6	2.5	-	51.73	74	-22.27	36	116	V
2	* 2.373	21.73	Pk	28.4	.7	2.6	2.5	-	55.93	74	-18.07	36	116	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	17.43	Av	28.5	.7	2.6	2.5	-23.4	28.33	54	-25.67	36	116	V
2	* 2.373	21.73	Av	28.4	.7	2.6	2.5	-23.4	32.53	54	-21.47	36	116	V

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

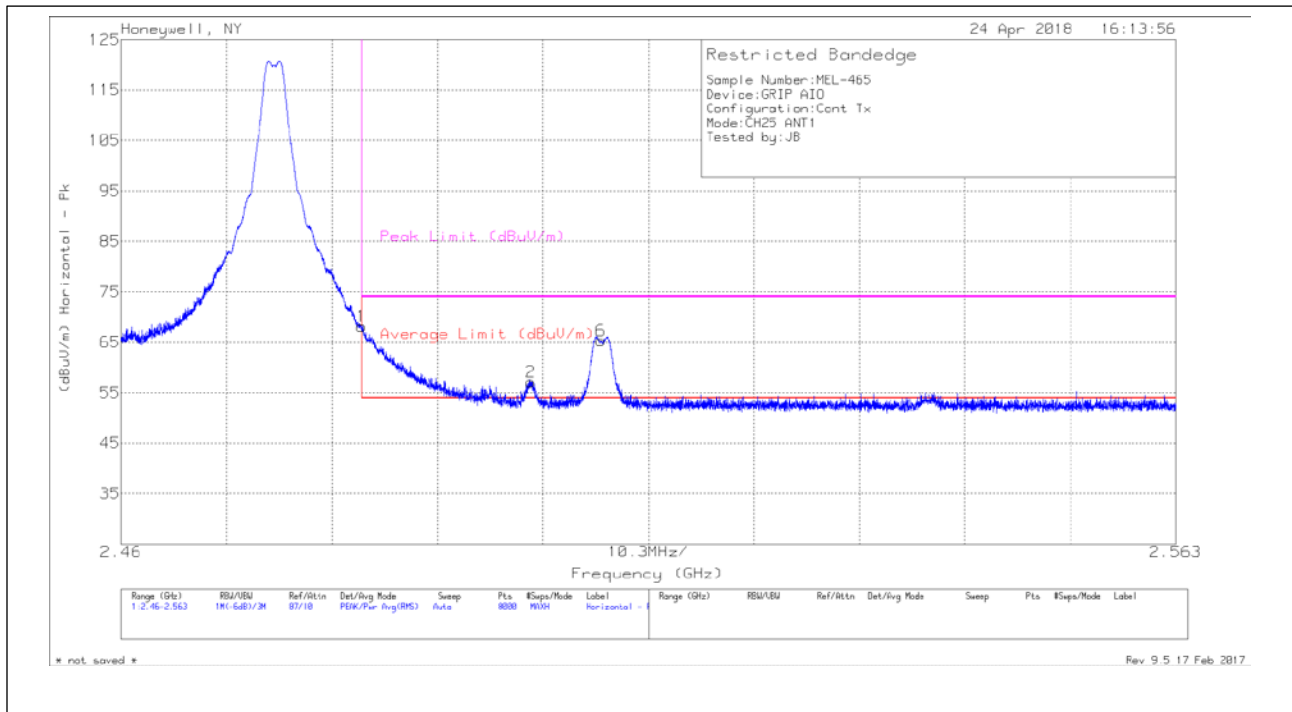
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

NOTE: Emissions highlighted in the plot above is OATS ambient and not a product of the transmitter. Worse-case emissions are reported and all other peak emissions, once corrected by the DC Corr, would be below the average limit.

Antenna 1: Low Channel Vertical - Data



Antenna 1: 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	33.59	Pk	28.7	.7	2.6	2.6	-	68.19	74	-5.81	171	112	H
2	2.5	22.45	Pk	28.7	.7	2.7	2.6	-	57.15	74	-16.85	171	112	H
6	2.507	30.49	Pk	28.8	.7	2.7	2.6	-	65.29	74	-8.71	171	112	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	33.59	Av	28.7	.7	2.6	2.6	-23.4	44.79	54	-9.21	171	112	H
2	2.5	22.45	Av	28.7	.7	2.7	2.6	-23.4	33.75	54	-20.25	171	112	H
6	2.507	30.49	Av	28.8	.7	2.7	2.6	-23.4	41.89	54	-12.11	171	112	H

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

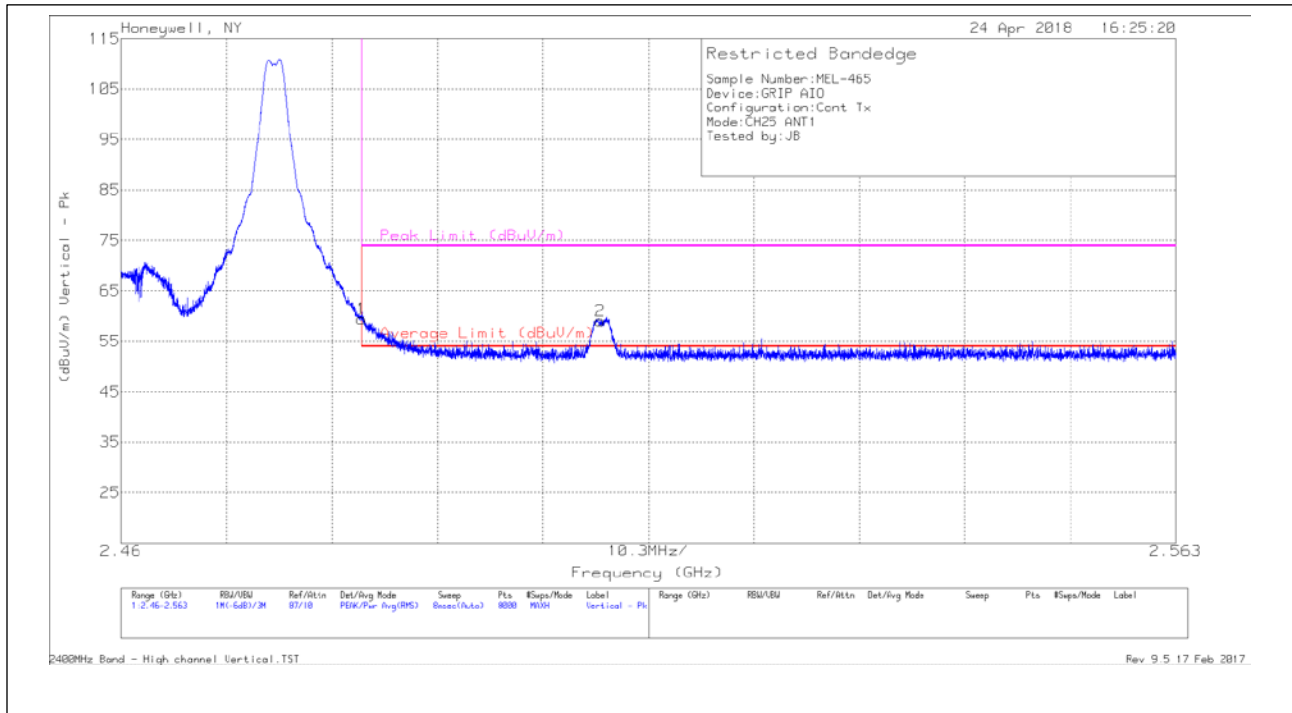
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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

Antenna 1: High Channel Horizontal - Data



Antenna 1: 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	24.82	Pk	28.7	.7	2.6	2.6	-	59.42	74	-14.58	48	110	V
2	2.507	24.22	Pk	28.8	.7	2.7	2.6	-	59.02	74	-14.98	48	110	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	24.82	Av	28.7	.7	2.6	2.6	-23.4	36.02	54	-17.98	48	110	V
2	2.507	24.22	Av	28.8	.7	2.7	2.6	-23.4	35.62	54	-18.38	48	110	V

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

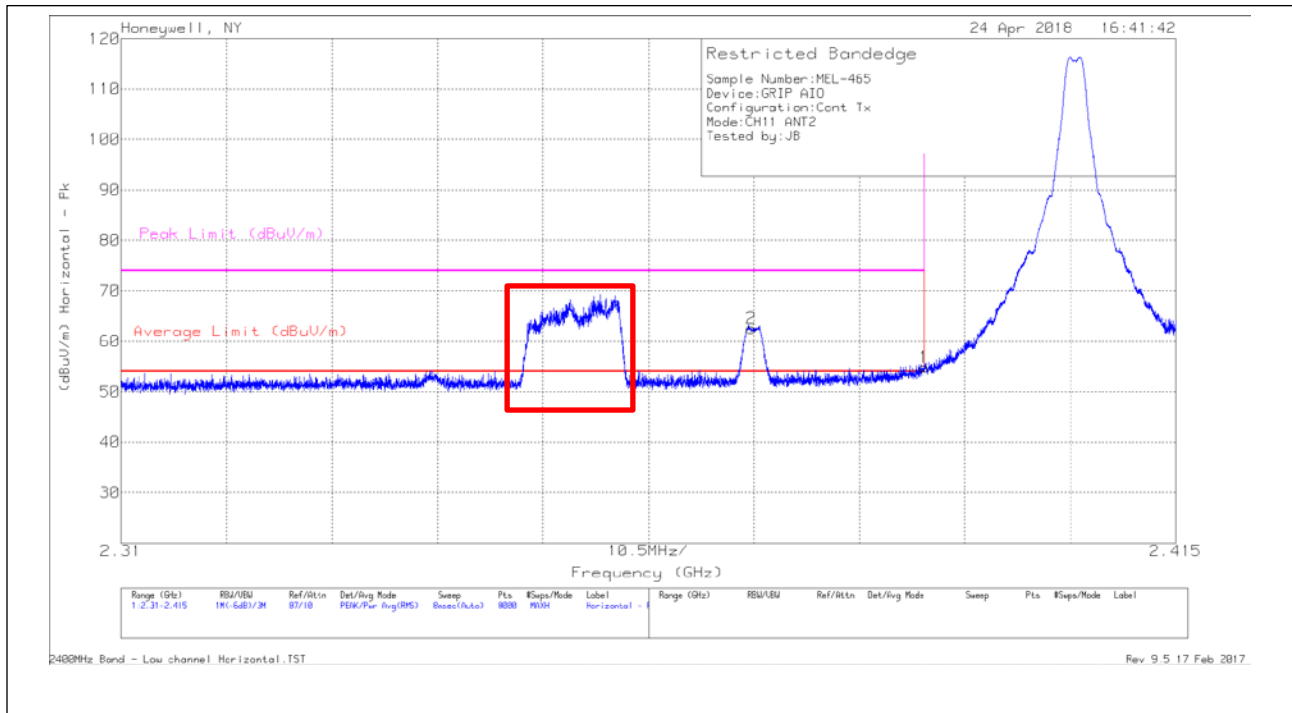
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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

Antenna 1: High Channel Vertical - Data



Antenna 2: 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	20.54	Pk	28.5	.7	2.6	2.5	-	54.84	74	-19.16	134	154	H
2	* 2.373	28.36	Pk	28.4	.7	2.6	2.5	-	62.56	74	-11.44	134	154	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	20.54	Av	28.5	.7	2.6	2.5	-23.4	31.44	54	-22.56	134	154	H
2	* 2.373	28.36	Av	28.4	.7	2.6	2.5	-23.4	39.16	54	-14.84	134	154	H

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

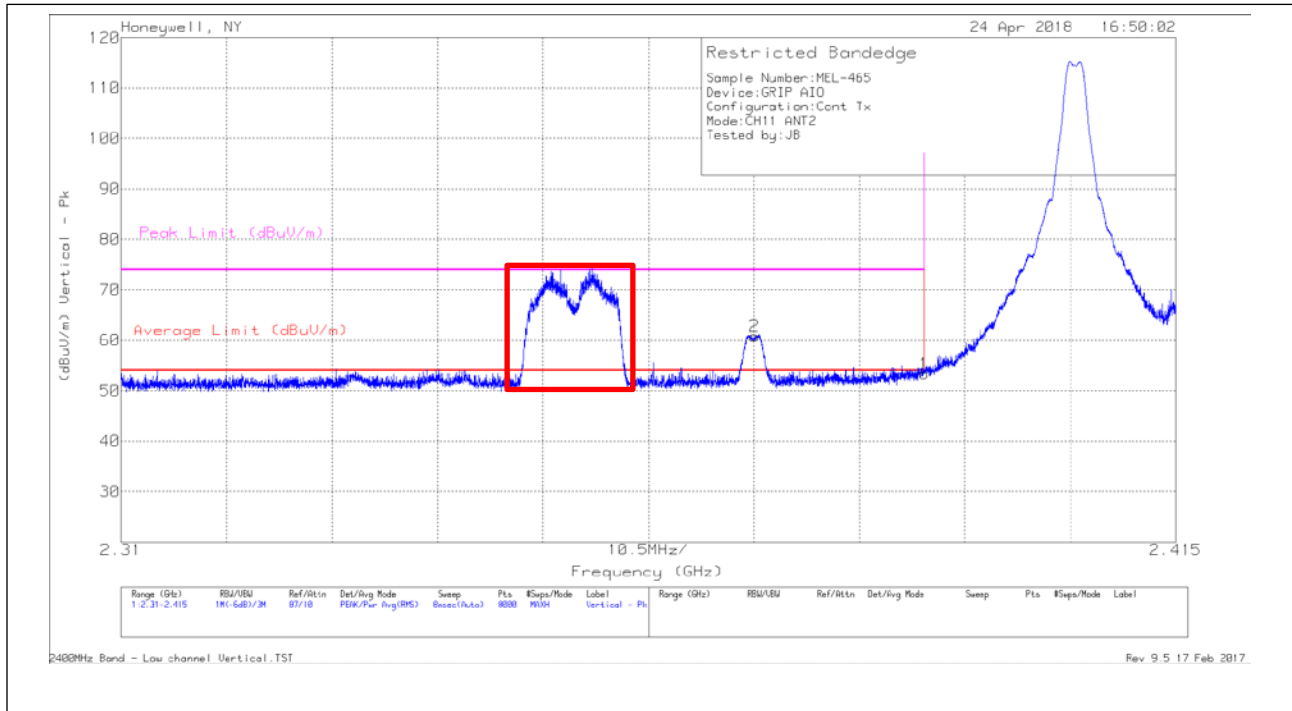
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

NOTE: Emissions highlighted in the plot above is OATS ambient and not a product of the transmitter. Worse-case emissions are reported and all other peak emissions, once corrected by the DC Corr, would be below the average limit.

Antenna 2: Low Channel Horizontal - Data



Antenna 2: 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	19.05	Pk	28.5	.7	2.6	2.5	-	53.35	74	-20.65	84	326	V
2	* 2.373	26.56	Pk	28.4	.7	2.6	2.5	-	60.76	74	-13.24	84	326	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	19.05	Av	28.5	.7	2.6	2.5	-23.4	29.95	54	-24.05	84	326	V
2	* 2.373	26.56	Av	28.4	.7	2.6	2.5	-23.4	37.36	54	-16.64	84	326	V

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

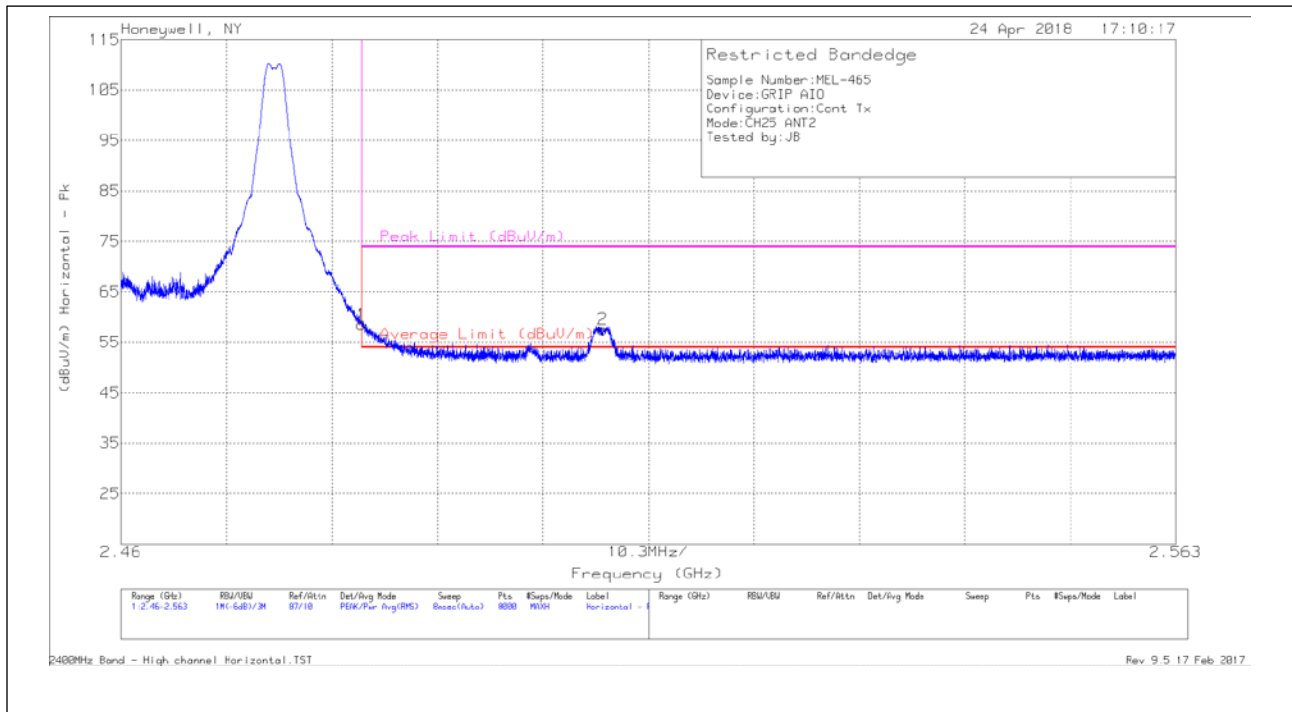
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

NOTE: Emissions highlighted in the plot above is OATS ambient and not a product of the transmitter. Worse-case emissions are reported and all other peak emissions, once corrected by the DC Corr, would be below the average limit.

Antenna 2: Low Channel Vertical - Data



Antenna 2: 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	23.98	Pk	28.7	.7	2.6	2.6	-	58.58	74	-15.42	202	292	H
2	2.507	22.79	Pk	28.8	.7	2.7	2.6	-	57.59	74	-16.41	202	292	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	23.98	Av	28.7	.7	2.6	2.6	-23.4	35.18	54	-18.82	202	292	H
2	2.507	22.79	Av	28.8	.7	2.7	2.6	-23.4	34.19	54	-19.81	202	292	H

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

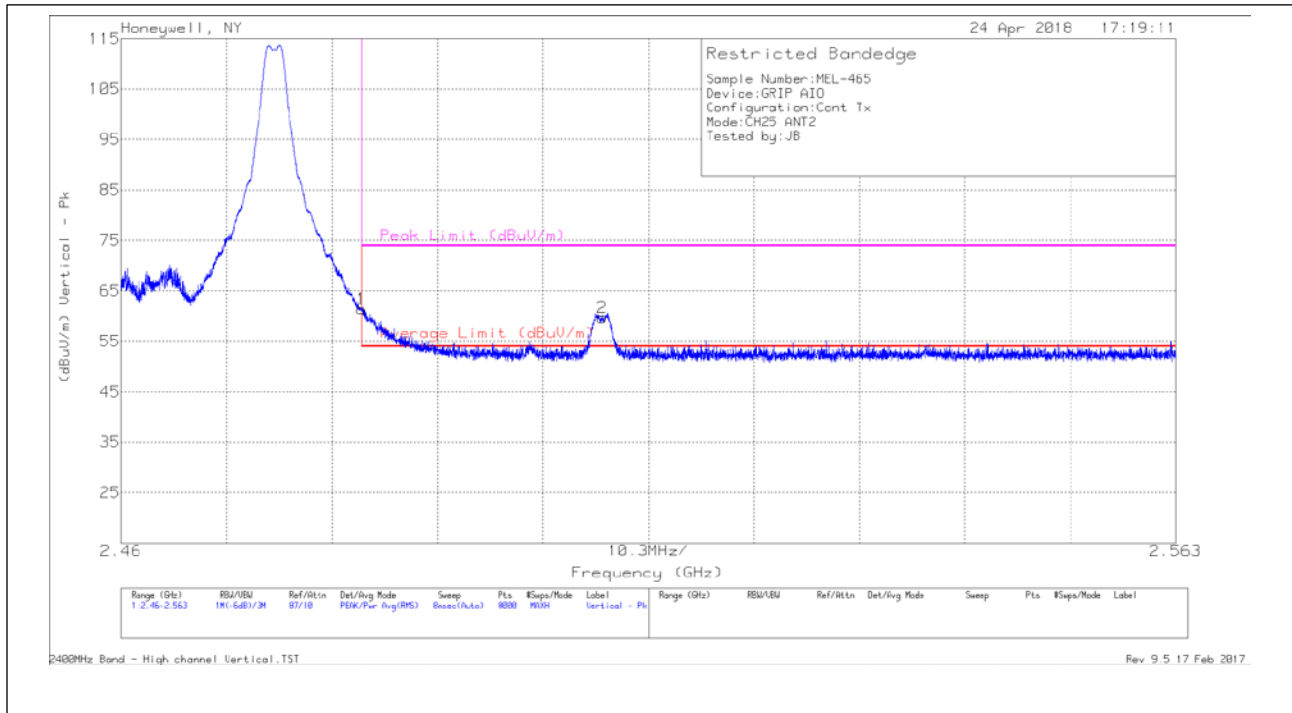
Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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

Antenna 2: High Channel Horizontal - Data



Antenna 2: 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	26.76	Pk	28.7	.7	2.6	2.6	-	61.36	74	-12.64	86	214	V
2	2.507	24.9	Pk	28.8	.7	2.7	2.6	-	59.7	74	-14.3	86	214	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	26.76	Av	28.7	.7	2.6	2.6	-23.4	37.96	54	-16.04	86	214	V
2	2.507	24.9	Av	28.8	.7	2.7	2.6	-23.4	36.3	54	-17.7	86	214	V

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

Pk - Peak detector

Av - Peak + DC Corr (Duty Cycle Correction Factor)

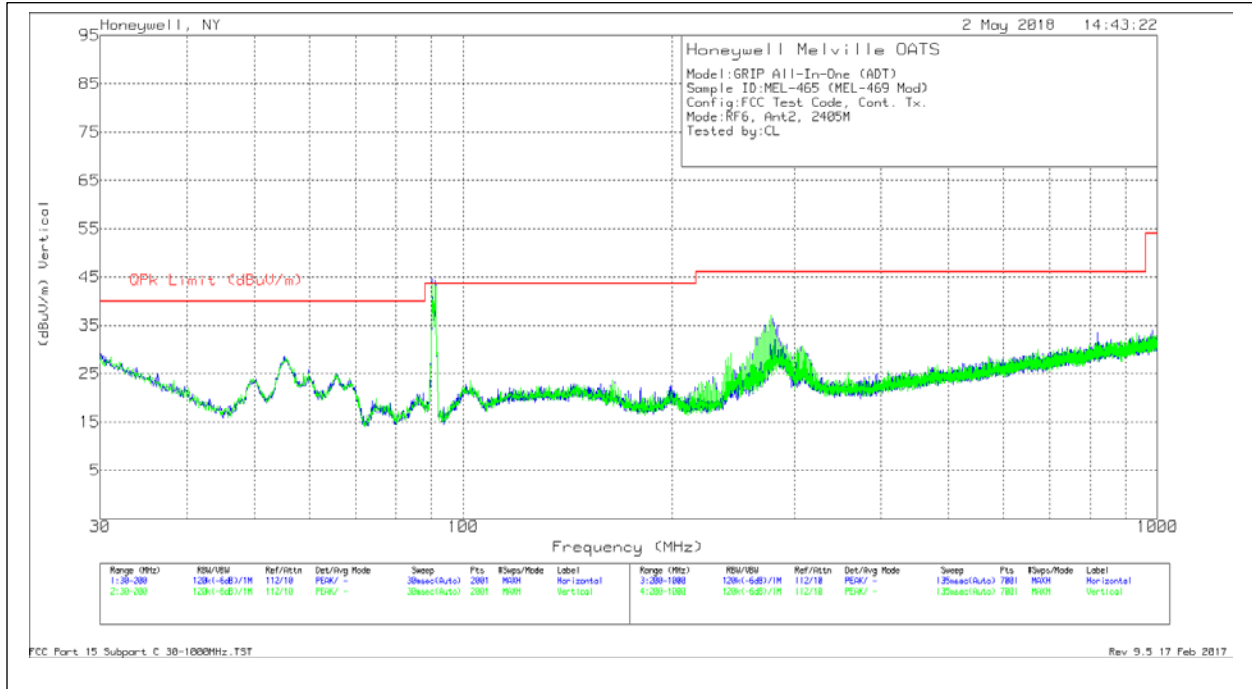
Duty Cycle = 6.75%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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

Antenna 2: High Channel Vertical - Data

Spurious Emissions

Below 1GHz (Worse-case)



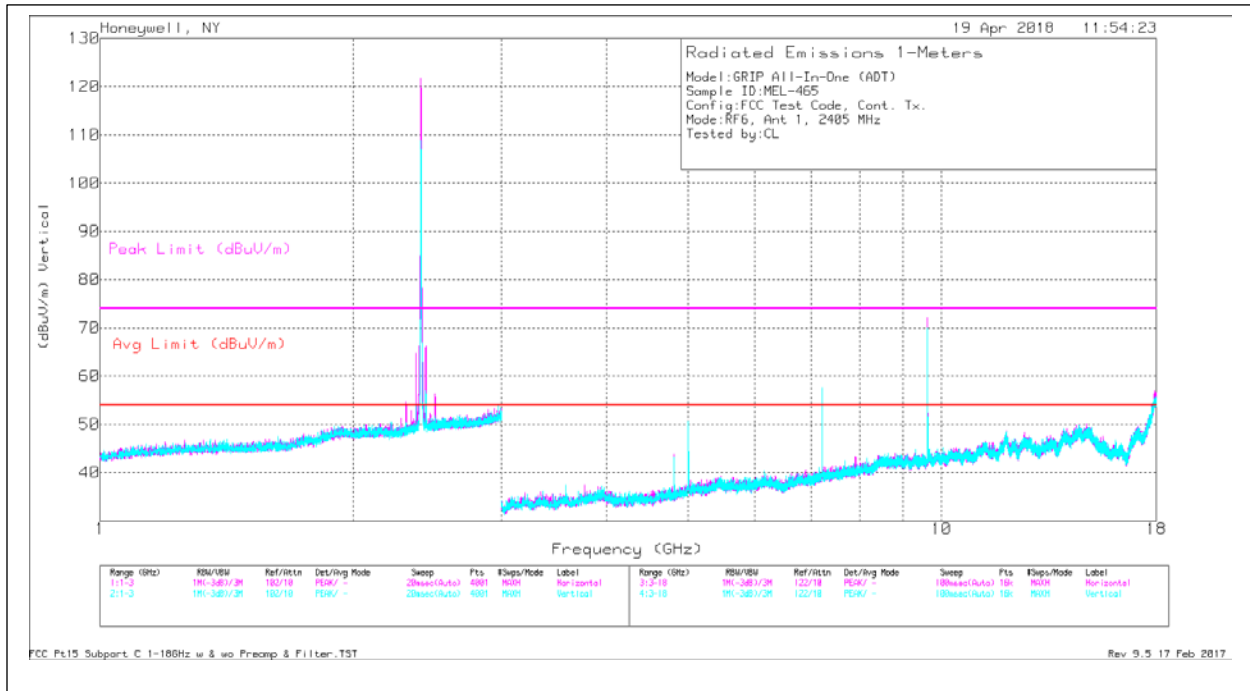
Antenna 2 Low Channel - Plot

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
55.1175	15.73	Qp	12	1.1	28.83	40	-11.17	340	309	H
91.0177	11.7	Qp	12.2	1.5	25.4	43.52	-18.12	95	301	H
55.3505	19.28	Qp	12	1.1	32.38	40	-7.62	12	358	V
91.0071	8.78	Qp	12.2	1.5	22.48	43.52	-21.04	236	126	V
* 277.6216	10.39	Qp	17.5	3.1	30.99	46.02	-15.03	100	130	H
* 273.3077	14.52	Qp	17.5	3	35.02	46.02	-11	230	158	V

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

Antenna 2 Low Channel - Data

1-18GHz



Antenna 1: Low Channel - Plot

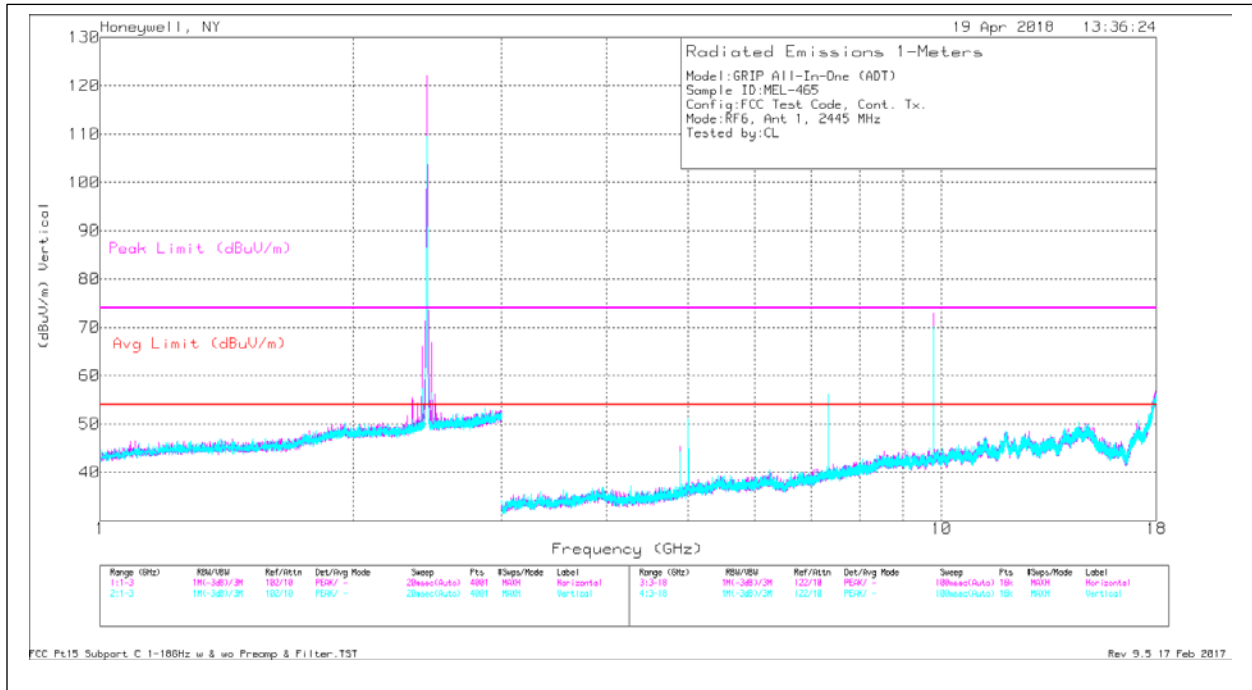
Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5	52.09	PK	33.3	-41.6	3.8	3.7	51.29	74	-22.71	236	287	H
7.213	54.79	PK	36.2	-39.5	4.7	4.5	60.69	74	-13.31	314	298	H
9.622	59.38	PK	38	-39	5.6	5.2	69.18	74	-4.82	205	291	H
* 18	38.95	PK	47.9	-38.4	7.7	7.3	63.45	74	-10.55	174	106	H
* 5	56.89	PK	33.3	-41.6	3.8	3.7	56.09	74	-17.91	352	181	V
7.214	56.42	PK	36.2	-39.5	4.7	4.5	62.32	74	-11.68	37	356	V
9.622	61.84	PK	38	-39	5.6	5.2	71.64	74	-2.36	10	326	V
* 17.998	38.92	PK	47.9	-38.4	7.7	7.3	63.42	74	-10.58	242	220	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DCF [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5	52.09	Av	33.3	-41.6	3.8	3.7	-23.4	27.89	54	-26.11	236	287	H
7.213	54.79	Av	36.2	-39.5	4.7	4.5	-23.4	37.29	54	-16.71	314	298	H
9.622	59.38	Av	38	-39	5.6	5.2	-23.4	45.78	54	-8.22	205	291	H
* 18	38.95	Av	47.9	-38.4	7.7	7.3	-23.4	40.05	54	-13.95	174	106	H
* 5	56.89	Av	33.3	-41.6	3.8	3.7	-23.4	32.69	54	-21.31	352	181	V
7.214	56.42	Av	36.2	-39.5	4.7	4.5	-23.4	38.92	54	-15.08	37	356	V
9.622	61.84	Av	38	-39	5.6	5.2	-23.4	48.24	54	-5.76	10	326	V
* 17.998	38.92	Av	47.9	-38.4	7.7	7.3	-23.4	40.02	54	-13.98	242	220	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 = 6.75%, thus DC Corr = 20log(0.0675) = -23.4dB

Antenna 1: Low Channel - Data



Antenna 1: Mid Channel - Plot

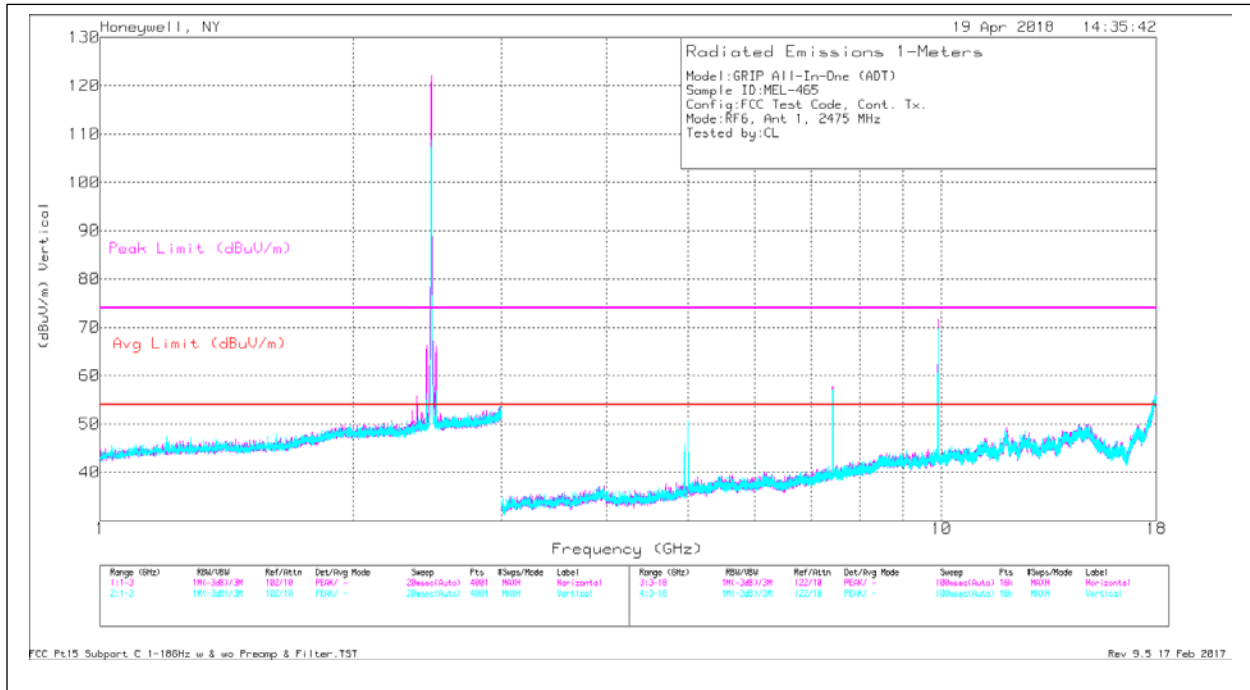
Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5	51.63	PK	33.3	-41.6	3.8	3.7	50.83	74	-23.17	239	104	H
* 7.333	50.18	PK	36.6	-39.7	4.6	4.5	56.18	74	-17.82	192	105	H
9.782	61.13	PK	38.1	-39.1	5.5	5.3	70.93	74	-3.07	225	157	H
* 18	38.95	PK	47.9	-38.4	7.7	7.3	63.45	74	-10.55	174	106	H
* 5	54.58	PK	33.3	-41.6	3.8	3.7	53.78	74	-20.22	355	182	V
* 7.333	54.39	PK	36.6	-39.7	4.6	4.5	60.39	74	-13.61	48	171	V
9.782	60.49	PK	38.1	-39.1	5.5	5.3	70.29	74	-3.71	121	174	V
* 17.998	38.92	PK	47.9	-38.4	7.7	7.3	63.42	74	-10.58	242	220	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DCF [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5	51.63	Av	33.3	-41.6	3.8	3.7	-23.4	27.43	54	-26.57	239	104	H
* 7.333	50.18	Av	36.6	-39.7	4.6	4.5	-23.4	32.78	54	-21.22	192	105	H
9.782	61.13	Av	38.1	-39.1	5.5	5.3	-23.4	47.53	54	-6.47	225	157	H
* 18	38.95	Av	47.9	-38.4	7.7	7.3	-23.4	40.05	54	-13.95	174	106	H
* 5	54.58	Av	33.3	-41.6	3.8	3.7	-23.4	30.38	54	-23.62	355	182	V
* 7.333	54.39	Av	36.6	-39.7	4.6	4.5	-23.4	36.99	54	-17.01	48	171	V
9.782	60.49	Av	38.1	-39.1	5.5	5.3	-23.4	46.89	54	-7.11	121	174	V
* 17.998	38.92	Av	47.9	-38.4	7.7	7.3	-23.4	40.02	54	-13.98	242	220	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 = 6.75%, thus DC Corr = 20log(0.0675) = -23.4dB

Antenna 1: Mid Channel - Data



Antenna 1: High Channel - Plot

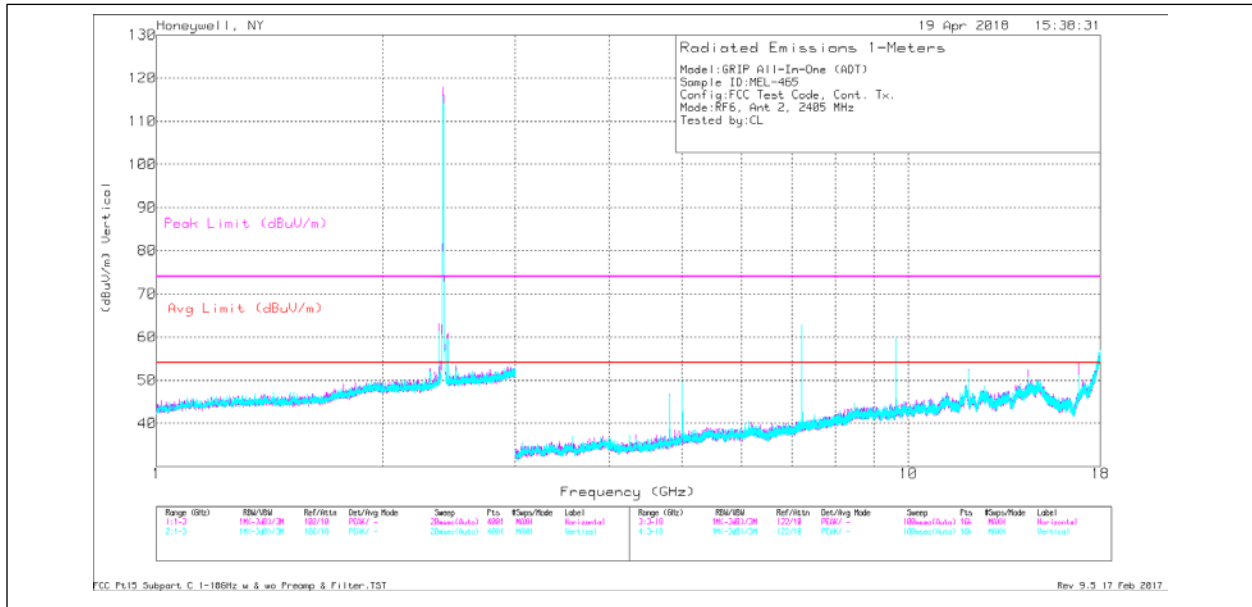
Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5	51.31	PK	33.3	-41.6	3.8	3.7	50.51	74	-23.49	97	152	H
* 7.426	53.56	PK	36.7	-39.7	4.7	4.6	59.86	74	-14.14	195	236	H
9.898	58.58	PK	38.2	-39.2	5.5	5.2	68.28	74	-5.72	209	272	H
* 18	38.95	PK	47.9	-38.4	7.7	7.3	63.45	74	-10.55	174	106	H
* 5	56.33	PK	33.3	-41.6	3.8	3.7	55.53	74	-18.47	349	193	V
* 7.426	55.69	PK	36.7	-39.7	4.7	4.6	61.99	74	-12.01	14	174	V
9.902	58.56	PK	38.2	-39.2	5.5	5.3	68.36	74	-5.64	124	180	V
* 17.998	38.92	PK	47.9	-38.4	7.7	7.3	63.42	74	-10.58	242	220	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DCF [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5	51.31	Av	33.3	-41.6	3.8	3.7	-23.4	27.11	54	-26.89	97	152	H
* 7.426	53.56	Av	36.7	-39.7	4.7	4.6	-23.4	36.46	54	-17.54	195	236	H
9.898	58.58	Av	38.2	-39.2	5.5	5.2	-23.4	44.88	54	-9.12	209	272	H
* 18	38.95	Av	47.9	-38.4	7.7	7.3	-23.4	40.05	54	-13.95	174	106	H
* 5	56.33	Av	33.3	-41.6	3.8	3.7	-23.4	32.13	54	-21.87	349	193	V
* 7.426	55.69	Av	36.7	-39.7	4.7	4.6	-23.4	38.59	54	-15.41	14	174	V
9.902	58.56	Av	38.2	-39.2	5.5	5.3	-23.4	44.96	54	-9.04	124	180	V
* 17.998	38.92	Av	47.9	-38.4	7.7	7.3	-23.4	40.02	54	-13.98	242	220	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 = 6.75%, thus DC Corr = 20log(0.0675) = -23.4dB

Antenna 1: High Channel - Data



Antenna 2: Low Channel - Plot

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
* 4.809	51.42	PK	33.1	-41.2	3.7	3.7	50.72	74	-23.28	303	167	H
7.213	59.48	PK	36.2	-39.5	4.7	4.5	65.38	74	-8.62	310	234	H
9.618	51.9	PK	38	-39	5.6	5.2	61.7	74	-12.3	190	221	H
* 12.022	45.54	PK	39.4	-37.3	6.5	5.6	59.74	74	-14.26	170	194	H
16.838	40.25	PK	39.6	-38.1	7.5	7.1	56.35	74	-17.65	232	168	H
* 18	38.95	PK	47.9	-38.4	7.7	7.3	63.45	74	-10.55	174	106	H
* 4.811	50.5	PK	33.1	-41.2	3.7	3.7	49.8	74	-24.2	39	204	V
7.213	61.45	PK	36.2	-39.5	4.7	4.5	67.35	74	-6.65	25	299	V
9.622	56.92	PK	38	-39	5.6	5.2	66.72	74	-7.28	6	274	V
* 12.022	46.86	PK	39.4	-37.3	6.5	5.6	61.06	74	-12.94	303	237	V
16.829	39.49	PK	39.5	-38.1	7.4	7.1	55.39	74	-18.61	337	340	V
* 17.998	38.92	PK	47.9	-38.4	7.7	7.3	63.42	74	-10.58	242	220	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DCF [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.809	51.42	Av	33.1	-41.2	3.7	3.7	-23.4	27.32	54	-26.68	303	167	H
7.213	59.48	Av	36.2	-39.5	4.7	4.5	-23.4	41.98	54	-12.02	310	234	H
9.618	51.9	Av	38	-39	5.6	5.2	-23.4	38.3	54	-15.7	190	221	H
* 12.022	45.54	Av	39.4	-37.3	6.5	5.6	-23.4	36.34	54	-17.66	170	194	H
16.838	40.25	Av	39.6	-38.1	7.5	7.1	-23.4	32.95	54	-21.05	232	168	H
* 18	38.95	Av	47.9	-38.4	7.7	7.3	-23.4	40.05	54	-13.95	174	106	H
* 4.811	50.5	Av	33.1	-41.2	3.7	3.7	-23.4	26.4	54	-27.6	39	204	V
7.213	61.45	Av	36.2	-39.5	4.7	4.5	-23.4	43.95	54	-10.05	25	299	V
9.622	56.92	Av	38	-39	5.6	5.2	-23.4	43.32	54	-10.68	6	274	V
* 12.022	46.86	Av	39.4	-37.3	6.5	5.6	-23.4	37.66	54	-16.34	303	237	V
16.829	39.49	Av	39.5	-38.1	7.4	7.1	-23.4	31.99	54	-22.01	337	340	V
* 17.998	38.92	Av	47.9	-38.4	7.7	7.3	-23.4	40.02	54	-13.98	242	220	V

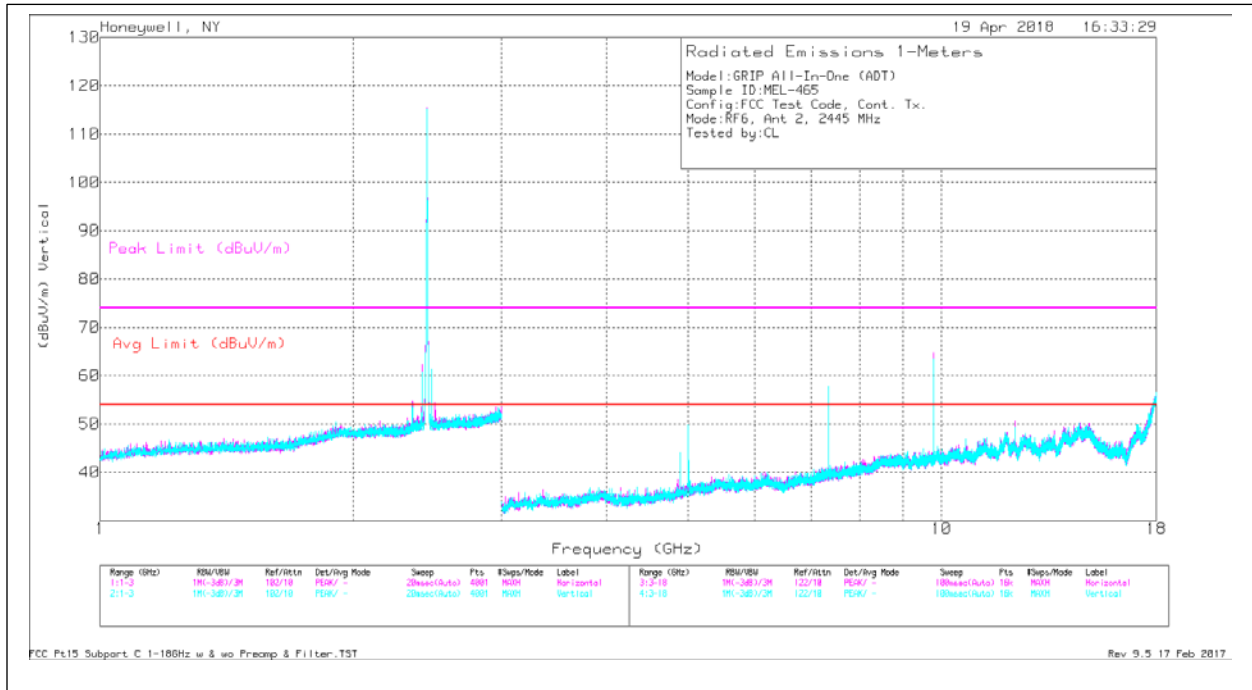
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - KDB558074 Method: Maximum Peak

Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = 20log(0.0675) = -23.4dB

Antenna 2: Low Channel - Data



Antenna 2: Mid Channel - Plot

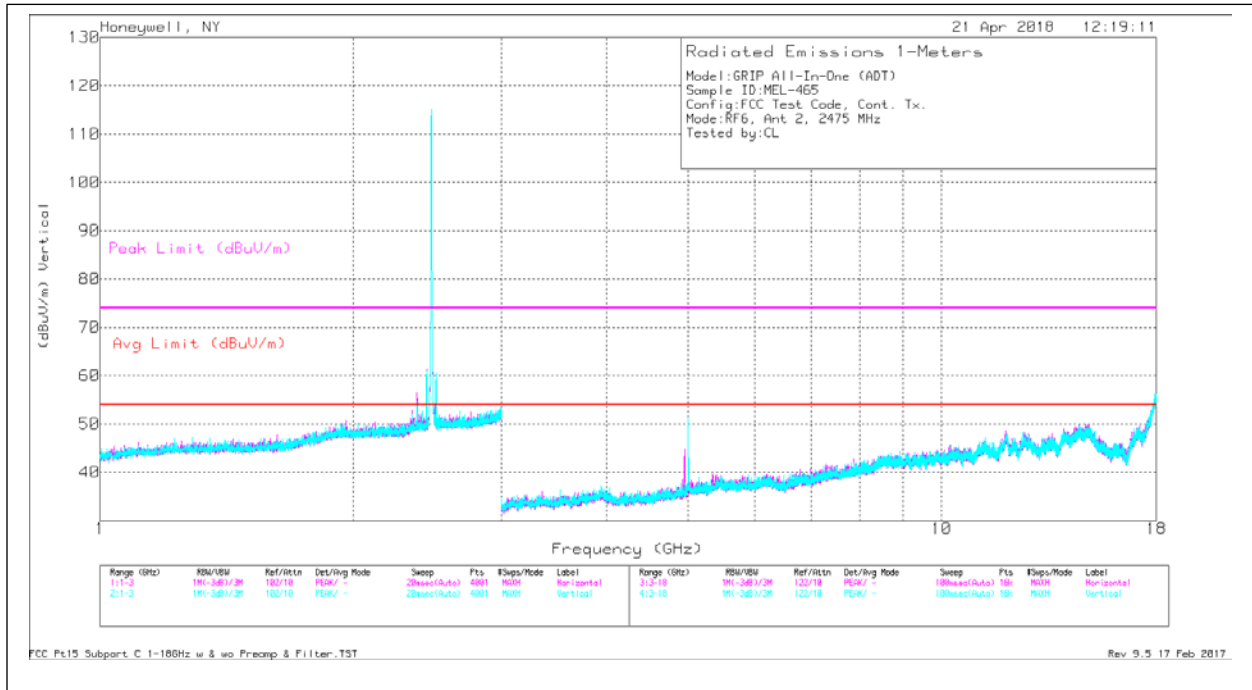
Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.891	47.81	PK	33.2	-41.4	3.7	3.6	46.91	74	-27.09	119	385	H
* 7.333	56.08	PK	36.6	-39.7	4.6	4.5	62.08	74	-11.92	306	368	H
9.778	55.41	PK	38.1	-39.1	5.5	5.3	65.21	74	-8.79	249	384	H
* 18	38.95	PK	47.9	-38.4	7.7	7.3	63.45	74	-10.55	174	106	H
* 4.889	48.02	PK	33.2	-41.4	3.7	3.6	47.12	74	-26.88	61	181	V
* 7.333	56.4	PK	36.6	-39.7	4.6	4.5	62.4	74	-11.6	23	322	V
9.782	57.05	PK	38.1	-39.1	5.5	5.3	66.85	74	-7.15	9	393	V
* 17.998	38.92	PK	47.9	-38.4	7.7	7.3	63.42	74	-10.58	242	220	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DCF [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.891	47.81	Av	33.2	-41.4	3.7	3.6	-23.4	23.51	54	-30.49	119	385	H
* 7.333	56.08	Av	36.6	-39.7	4.6	4.5	-23.4	38.68	54	-15.32	306	368	H
9.778	55.41	Av	38.1	-39.1	5.5	5.3	-23.4	41.81	54	-12.19	249	384	H
* 18	38.95	Av	47.9	-38.4	7.7	7.3	-23.4	40.05	54	-13.95	174	106	H
* 4.889	48.02	Av	33.2	-41.4	3.7	3.6	-23.4	23.72	54	-30.28	61	181	V
* 7.333	56.4	Av	36.6	-39.7	4.6	4.5	-23.4	39	54	-15	23	322	V
9.782	57.05	Av	38.1	-39.1	5.5	5.3	-23.4	43.45	54	-10.55	9	393	V
* 17.998	38.92	Av	47.9	-38.4	7.7	7.3	-23.4	40.02	54	-13.98	242	220	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 = 6.75%, thus DC Corr = 20log(0.0675) = -23.4dB

Antenna 2: Mid Channel - Data



Antenna 2: High Channel - Plot

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
* 4.951	48.35	PK	33.2	-41.5	3.8	3.7	47.55	74	-26.45	92	313	H
14.824	38.86	PK	42.1	-36.9	6.7	6.5	57.26	74	-16.74	8	306	H
* 11.938	38.08	PK	39.5	-37.4	6.8	5.8	52.78	74	-21.22	161	367	H
* 5	52.6	PK	33.3	-41.6	3.8	3.7	51.8	74	-22.2	131	391	H
* 18	38.95	PK	47.9	-38.4	7.7	7.3	63.45	74	-10.55	174	106	H
* 5	55.67	PK	33.3	-41.6	3.8	3.7	54.87	74	-19.13	18	293	V
* 11.932	38.95	PK	39.5	-37.4	6.9	5.8	53.75	74	-20.25	268	282	V
* 4.951	50.63	PK	33.2	-41.5	3.8	3.7	49.83	74	-24.17	47	208	V
14.902	39.95	PK	41.8	-36.9	6.9	6.5	58.25	74	-15.75	4	336	V
* 17.998	38.92	PK	47.9	-38.4	7.7	7.3	63.42	74	-10.58	242	220	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DCF [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.951	48.35	Av	33.2	-41.5	3.8	3.7	-23.4	24.15	54	-29.85	92	313	H
14.824	38.86	Av	42.1	-36.9	6.7	6.5	-23.4	33.86	54	-20.14	8	306	H
* 11.938	38.08	Av	39.5	-37.4	6.8	5.8	-23.4	29.38	54	-24.62	161	367	H
* 5	52.6	Av	33.3	-41.6	3.8	3.7	-23.4	28.4	54	-25.6	131	391	H
* 18	38.95	Av	47.9	-38.4	7.7	7.3	-23.4	40.05	54	-13.95	174	106	H
* 5	55.67	Av	33.3	-41.6	3.8	3.7	-23.4	31.47	54	-22.53	18	293	V
* 11.932	38.95	Av	39.5	-37.4	6.9	5.8	-23.4	30.35	54	-23.65	268	282	V
* 4.951	50.63	Av	33.2	-41.5	3.8	3.7	-23.4	26.43	54	-27.57	47	208	V
14.902	39.95	Av	41.8	-36.9	6.9	6.5	-23.4	34.85	54	-19.15	4	336	V
* 17.998	38.92	Av	47.9	-38.4	7.7	7.3	-23.4	40.02	54	-13.98	242	220	V

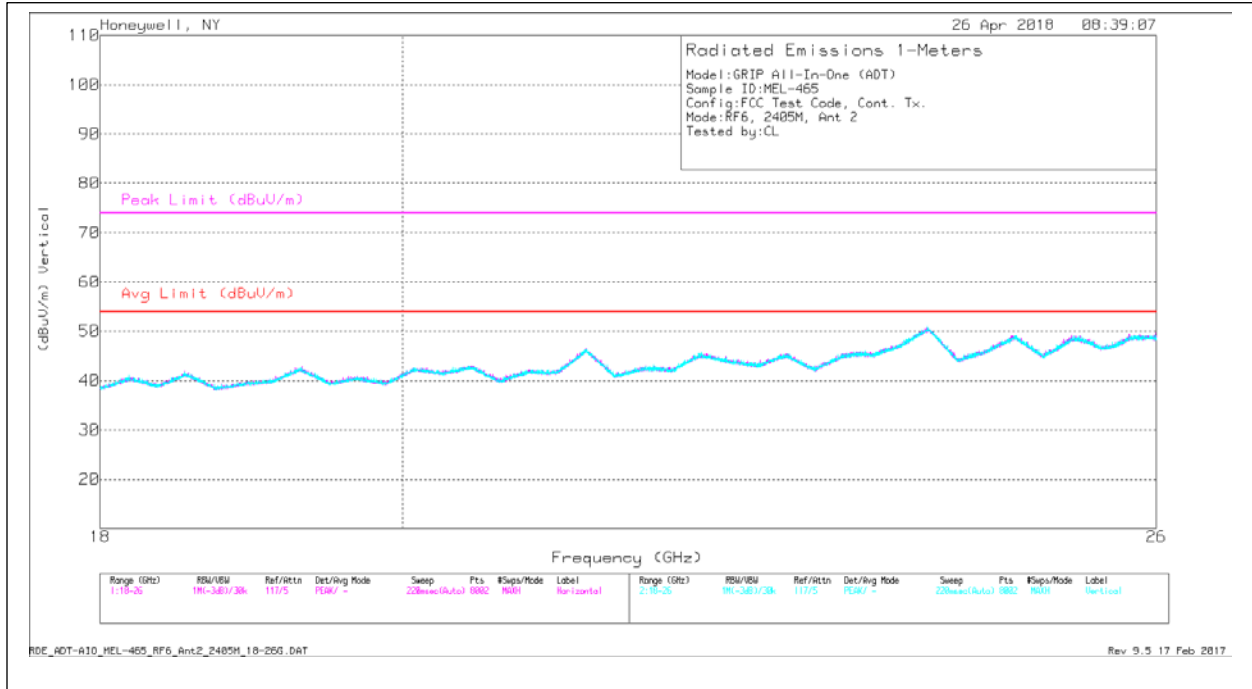
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - KDB558074 Method: Maximum Peak
 Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.75%, thus DC Corr = 20log(0.0675) = -23.4dB

Antenna 2: High Channel – Data

18-26GHz

Note: No emissions detected above the system noise floor



Antenna 2: Low Channel - Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	AF EM-6963 [dB/m]	Preamp [dB]	SMA7 [dB]	SMA5 [dB]	Dist Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 19.274	28.65	PK2	44.1	-34.5	7.9	8	-9.5	44.65	-	-	74	-29.35	0	100	H
* 19.276	20.91	MAv1	44.1	-34.5	7.9	8	-9.5	36.91	54	-17.09	-	-	0	100	H
* 21.319	33.99	PK2	44.5	-31.9	8.3	8.1	-9.5	53.49	-	-	74	-20.51	0	100	H
* 21.319	20.79	MAv1	44.5	-31.9	8.3	8.1	-9.5	40.29	54	-13.71	-	-	0	100	H
* 21.318	31.03	PK2	44.5	-31.9	8.3	8.1	-9.5	50.53	-	-	74	-23.47	193	166	H
* 21.318	20.71	MAv1	44.5	-31.9	8.3	8.1	-9.5	40.21	54	-13.79	-	-	193	166	H
24.027	30.98	PK2	46.4	-30.4	8.9	8.4	-9.5	54.78	-	-	74	-19.22	140	354	H
24.026	20.24	MAv1	46.4	-30.4	8.9	8.4	-9.5	44.04	54	-9.96	-	-	140	354	H
* 19.29	31	PK2	44.2	-34.3	7.9	8	-9.5	47.3	-	-	74	-26.7	277	321	V
* 19.29	21.1	MAv1	44.2	-34.3	7.9	8	-9.5	37.4	54	-16.6	-	-	277	321	V
* 21.323	31.14	PK2	44.5	-32	8.3	8.1	-9.5	50.54	-	-	74	-23.46	139	366	V
* 21.324	20.5	MAv1	44.5	-32	8.3	8.1	-9.5	39.9	54	-14.1	-	-	139	366	V
24.018	30.41	PK2	46.4	-30.3	8.9	8.4	-9.5	54.31	-	-	74	-19.69	272	380	V
24.019	20.61	MAv1	46.4	-30.3	8.9	8.4	-9.5	44.51	54	-9.49	-	-	272	380	V

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

PK2 - KDB558074 Method: Maximum Peak

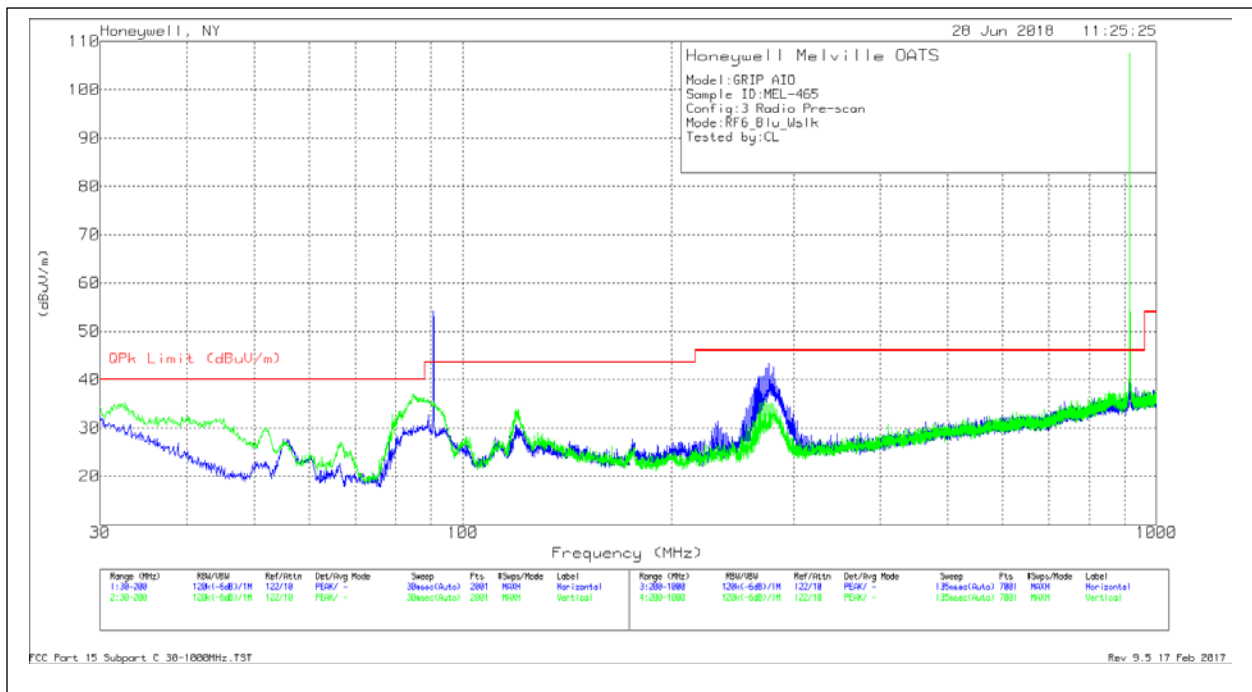
MAv1 - KDB558074 Option 1 Maximum RMS Average

Antenna 2: Low Channel - Data

Simultaneous Transmission

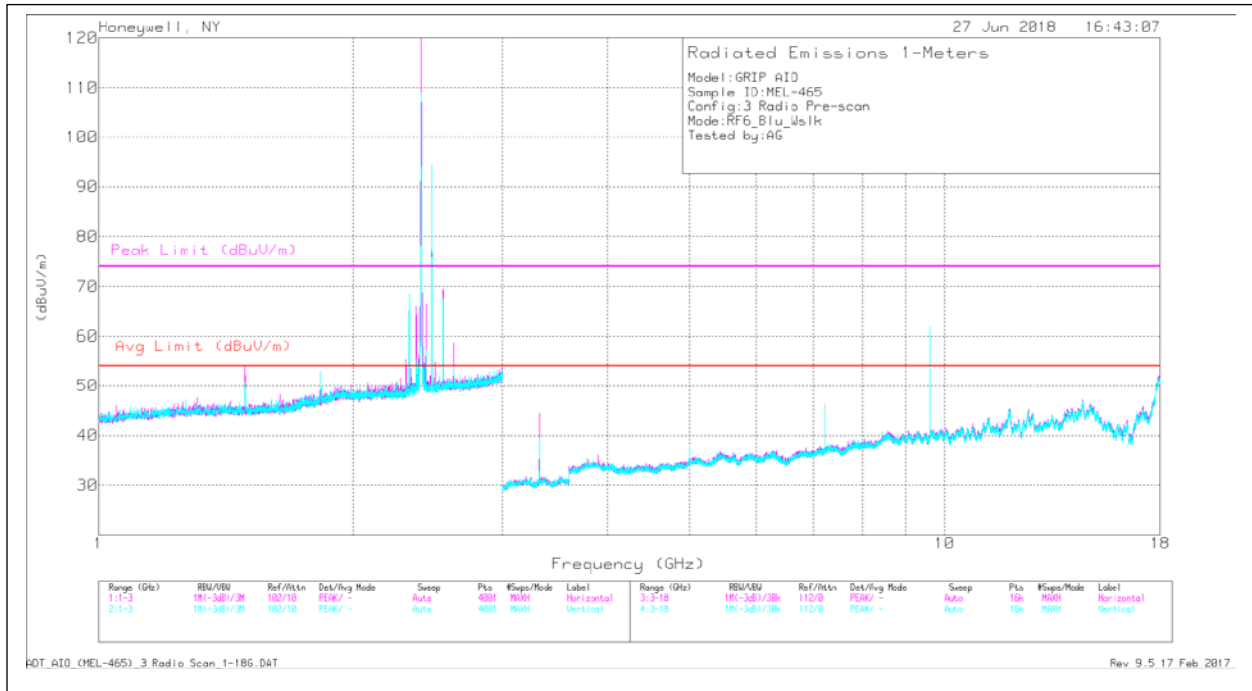
Configuration (Worse-case):

- RF6 – Antenna 1, Low Channel
- Wiselink – Low Channel
- Bluetooth (LE) – High Channel



30-1000MHz – Plot

Note: No additional emissions generated by simultaneous transmission



1-18GHz – Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX3 [dB]	SMA7 [dB]	SMA5 [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
* 1.479	22.87	Pk	25.4	.6	2.1	1.9	-	52.87	-	-	74	-21.13	165	102	H
* 1.479	18.89	MAv1	25.4	.6	2.1	1.9	-	48.89	54	-5.11	-	-	165	102	H
* 2.33	32.3	Pk	28.1	.7	2.6	2.5	-	66.2	-	-	74	-7.8	226	204	H
* 2.33	27.36	Av	28.1	.7	2.6	2.5	-23.4	37.86	54	-16.14	-	-	226	204	H
* 1.479	25.69	Pk	25.4	.6	2.1	1.9	-	55.69	-	-	74	-18.31	358	181	V
* 1.479	19.68	MAv1	25.4	.6	2.1	1.9	-	49.68	54	-4.32	-	-	358	181	V
* 2.33	28.34	Pk	28.1	.7	2.6	2.5	-	62.24	-	-	74	-11.76	193	108	V
* 2.33	22.15	Av	28.1	.7	2.6	2.5	-23.4	32.65	54	-21.35	-	-	193	108	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SMA 8 [dB]	CP Preamp	Distance Corr Factor [dB]	2.4G Notch Filter	Pad [dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.555	47.56	Pk	28.9	2.5	-	-9.5	-	-	69.46	74	-4.54	0-360	100	H
2.631	36.62	Pk	29	2.5	-	-9.5	-	-	58.62	74	-15.38	0-360	100	H
1.831	32.76	Pk	27.1	2.1	-	-9.5	-	-	52.46	74	-21.54	0-360	100	V
3.32	49.43	Pk	31.4	3	-40.6	-9.5	.8	20	54.53	74	-19.47	0-360	100	H
7.215	43.08	Pk	36.2	4.4	-39.6	-9.5	.1	20	54.68	74	-19.32	0-360	100	H
9.619	56.21	Pk	38	5.2	-39.8	-9.5	.8	20	70.91	74	-3.09	0-360	100	H
14.573	35.82	Pk	42.5	6.6	-39.8	-9.5	1	20	56.62	74	-17.38	0-360	100	H
17.171	36.14	Pk	41.4	6.9	-39.7	-9.5	.4	20	55.64	74	-18.36	0-360	100	H
7.214	44.67	Pk	36.2	4.4	-39.6	-9.5	.1	20	56.27	74	-17.73	0-360	100	V
9.619	57.22	Pk	38	5.2	-39.8	-9.5	.8	20	71.92	74	-2.08	0-360	100	V
14.584	36.31	Pk	42.5	6.6	-39.7	-9.5	.9	20	57.11	74	-16.89	0-360	100	V
17.185	35.61	Pk	41.5	6.9	-39.8	-9.5	.4	20	55.11	74	-18.89	0-360	100	V

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

Pk - Peak Detector

Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

MAv1 - KDB558074 Option 1 Maximum RMS Average

Duty Cycle (RF6) = 6.75%, thus DC Corr = $20\log(0.0675) = -23.4\text{dB}$

2.33GHz was found to be a product of the RF6 transmitter, thus Average measurement was derived by applying a duty cycle correction factor to the Peak measurement.

1-18GHz – Data

Conducted Emissions (Mains)

Test Description

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10 / C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorder for both NEUTRAL and HOT lines.

Test Criteria

Reference	Limit (dBuV)		
	Frequency Range (MHz)	Quasi-Peak	Average
CFR 47 Subpart C, 15.207 RSS-GEN	0.15-0.5	66 to 56	56 to 46
CFR 47 Subpart B, 15.107 ICES-003	0.5-5	56	46
	5-30	60	50

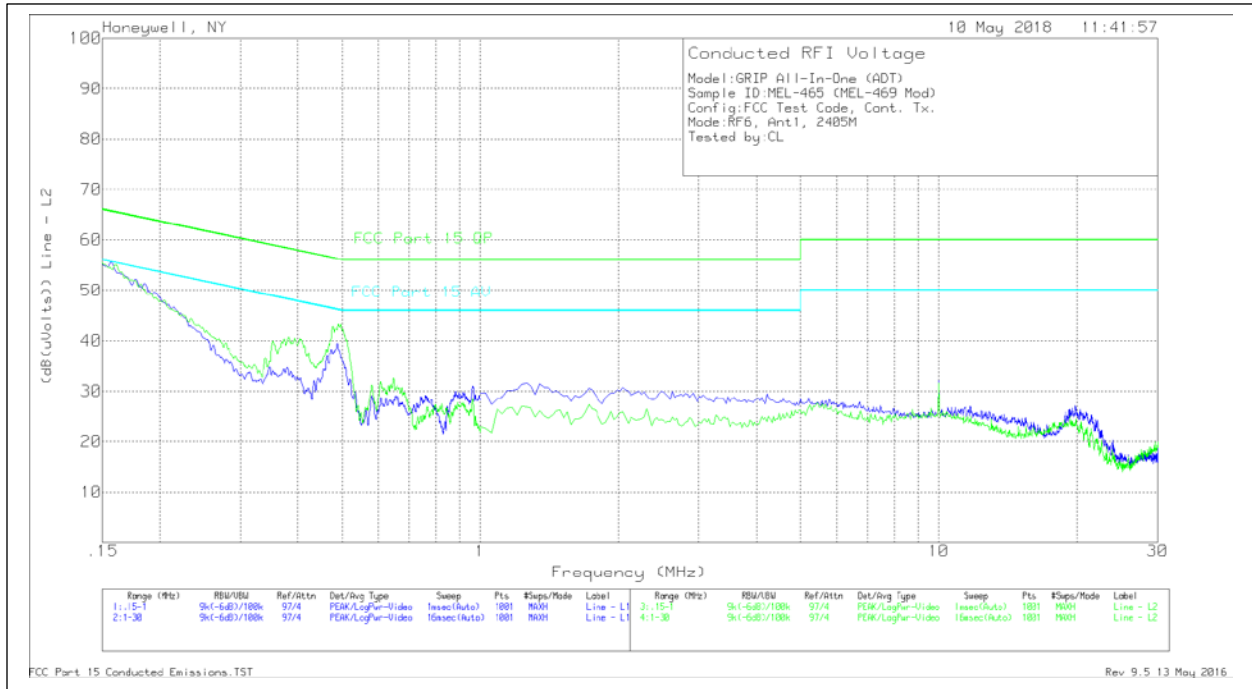
Test Information

Tester	Test Location	Date	Temperature (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	5/10/18	22.6	8.8	1014	P

Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11556	MY49430802	Keysight	N9030A (PXA)	12/19/2017	12/19/2018
LISN	11527	241259	Com-Power	LIN-120A	01/10/2018	01/10/2019
Measurement Software	11543	Version 9.5	UL	UL EMC	N/A	N/A
Environmental Meter	11533	A078144	Extech Instruments	SD700	08/21/2017	08/21/2020

Test Results (Worse-case)



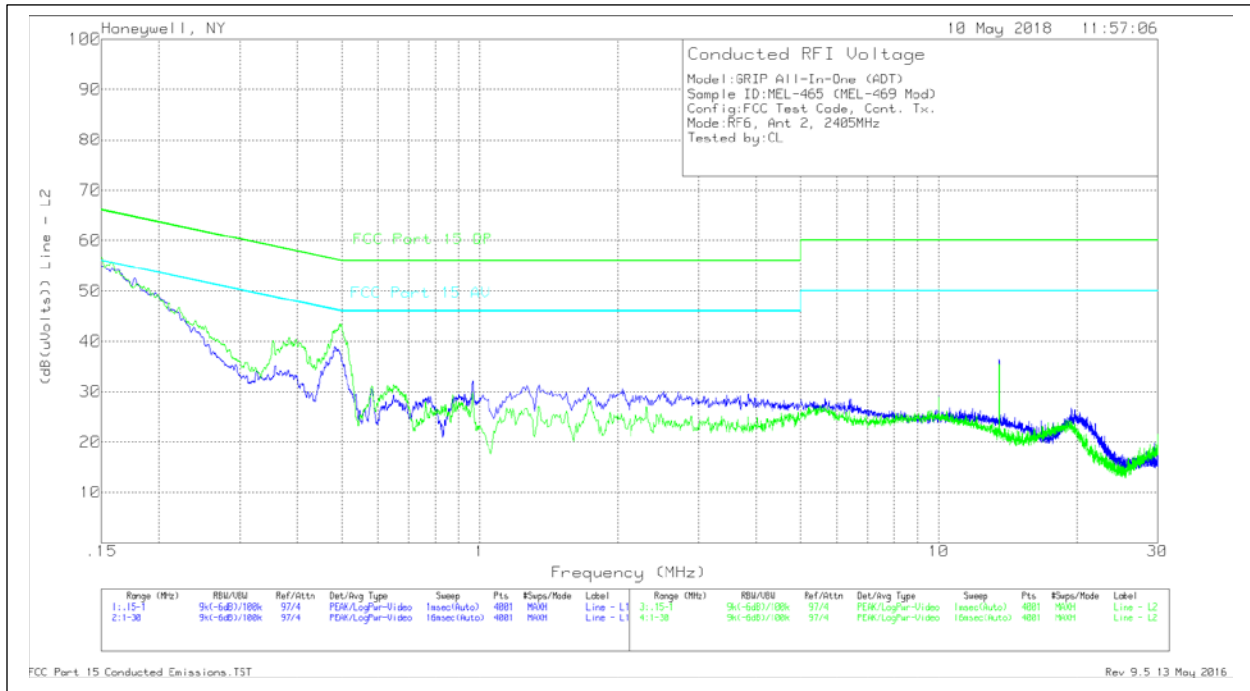
Antenna 1 Low Channel - Plot

Line - L1									
Frequency (MHz)	Meter Reading (dBuV)	Det	Gain/Loss [dB] LISN1	CDE Cable #1	Corrected Reading (dB(uVolts))	FCC Part 15 QP	Margin (dB)	FCC Part 15 AV	Margin (dB)
.15595	44.92	Pk	10.6	0	55.52	65.68	-10.16	55.68	-.16
.37865	24.66	Pk	10.1	0	34.76	58.31	-23.55	48.31	-13.55
.48788	29.49	Pk	10	0	39.49	56.2	-16.71	46.2	-6.71
1.261	21.75	Pk	9.9	0	31.65	56	-24.35	46	-14.35
9.99	21.93	Pk	10	.2	32.13	60	-27.87	50	-17.87
19.85	16.4	Pk	10.4	.3	27.1	60	-32.9	50	-22.9

Line - Neutral									
Frequency (MHz)	Meter Reading (dBuV)	Det	Gain/Loss [dB] LISN1	CDE Cable #1	Corrected Reading (dB(uVolts))	FCC Part 15 QP	Margin (dB)	FCC Part 15 AV	Margin (dB)
.1517	44.53	Pk	10.6	0	55.13	65.91	-10.78	55.91	-.78
.38205	30.69	Pk	10	0	40.69	58.23	-17.54	48.23	-7.54
.49043	33.39	Pk	10	0	43.39	56.16	-12.77	46.16	-2.77
1.725	17.49	Pk	9.9	0	27.39	56	-28.61	46	-18.61
5.437	17.53	Pk	9.9	.2	27.63	60	-32.37	50	-22.37
9.99	21.46	Pk	10	.2	31.66	60	-28.34	50	-18.34

Pk - Peak detector

Antenna 1 Low Channel - Data



Antenna 2 Low Channel - Plot

Line - L1									
Frequency (MHz)	Meter Reading (dBuV)	Det	Gain/Loss [dB] LISN1	CDE Cable #1	Corrected Reading (dB(uVolts))	FCC Part 15 QP	Margin (dB)	FCC Part 15 AV	Margin (dB)
.15138	44.27	Pk	10.6	0	54.87	65.92	-11.05	55.92	-1.05
.49069	28.44	Pk	10	0	38.44	56.16	-17.72	46.16	-7.72
.96654	22.22	Pk	9.9	0	32.12	56	-23.88	46	-13.88
1.348	21.42	Pk	9.9	0	31.32	56	-24.68	46	-14.68
13.557	26.19	Pk	10.1	.2	36.49	60	-23.51	50	-13.51
19.473	16.19	Pk	10.3	.3	26.79	60	-33.21	50	-23.21

Line - Neutral									
Frequency (MHz)	Meter Reading (dBuV)	Det	Gain/Loss [dB] LISN1	CDE Cable #1	Corrected Reading (dB(uVolts))	FCC Part 15 QP	Margin (dB)	FCC Part 15 AV	Margin (dB)
.15021	46.01	Pk	10.6	0	56.61	65.99	-9.38	55.99	.62
.15044	33.18	Av	10.6	0	43.78	65.98	-22.2	55.98	-12.2
.3843	30.72	Pk	10	0	40.72	58.19	-17.47	48.19	-7.47
.49879	33.52	Pk	10	0	43.52	56.02	-12.5	46.02	-2.5
1.725	18.54	Pk	9.9	0	28.44	56	-27.56	46	-17.56
9.99725	18.63	Pk	10	.2	28.83	60	-31.17	50	-21.17
13.557	25.22	Pk	10.1	.2	35.52	60	-24.48	50	-14.48

Pk - Peak detector
 Av - Average detection

Antenna 2 Low Channel - Data

END OF REPORT