



FCC / ISED Test Report

For

GRIP Hybrid Panel

Report #: 50346-H1

FCC ID: CFS8DL-GRIPH

IC ID: 573F-GRIPH

Report Completion Date: 2018-06-29

Prepared by and for:
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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	2018-06-29
A	M. Antola	A. Roussin	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	05/07/2018 – 06/29/2018
RSS-247, Issue 2, Section 5	Compliant	05/07/2018 – 06/29/2018
RSS-GEN, Issue 4	Compliant	05/07/2018 – 06/29/2018
CFR 47 Pt 15 Subpart C, Section 15.207/209	Compliant	05/07/2018 – 06/29/2018
CFR 47 Pt 15 Subpart C, Section 15.247	Compliant	05/07/2018 – 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

The GRIP Hybrid consists of a panel with hardwired device support. The panel has a main PCB board that contains components to support features (hardwired zones, hardwired keypads, etc.), interfaces to external devices/sensors (sensors, devices, and cameras) and communicators.

The device contains three on-board radios: RF6, Wiselink and Bluetooth. It also has provisions for pluggable Cellular and WiFi/Zwave modules. This filing is for the device without these optional add-on modules. These will be addressed in subsequent filings. The system is powered by a 13.5Vdc, 1.8A plug-in power supply, supported by a supervised 12V (Nominal) / 13.8V (Charge) voltage, 7AH backup battery.

This report will cover the RF6 portion of the EUT, which is a 2.4GHz Zigbee-based transmitter.

It contains two (2) integral PCB antennas with gains of 6.7dBi & 4.7dBi.

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). 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. All terminals (zones) were populated with typical cabling/terminating resistors. A Wired Touchpad was used to load the terminals it would normally be connected to.

Test Sample Identification

Sample ID Number	Sample Serial Number	Date Received
MEL-462	Non-serialized production unit	04/02/2018
MEL-466	Non-serialized production unit	04/18/2018
MEL-475	Non-serialized production unit	04/27/2018

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:

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

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	Band Edge / Conducted Spurious 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	05/21/2018	23.3	38.1	1017	P

Equipment List

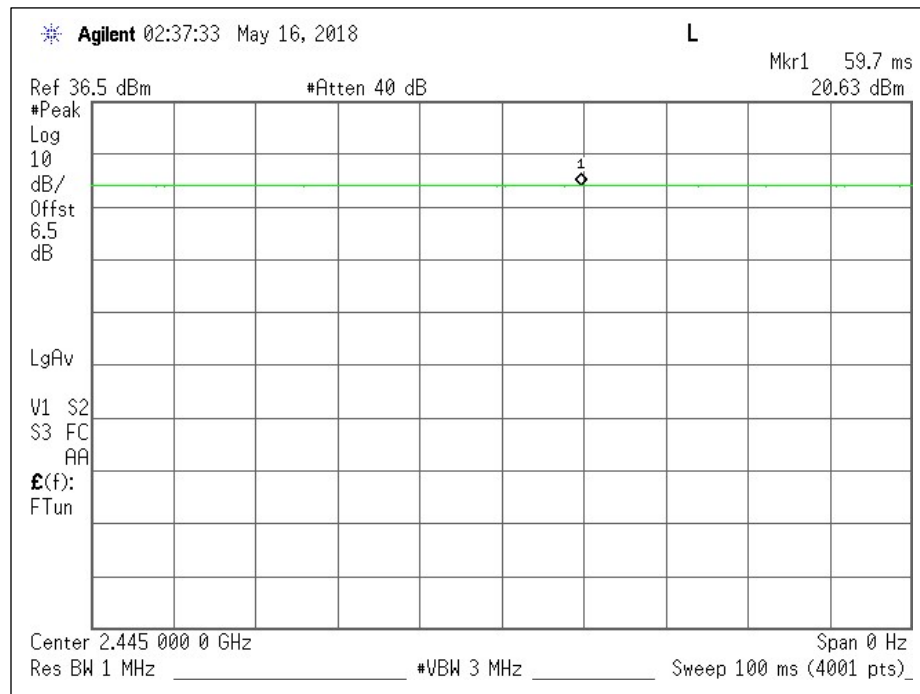
Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11548	A078188	Extech Instruments	SD700	04/24/17	04/24/18

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)	$\geq 500\text{kHz}$

Test Information

Tester	Test Location	Date	Temperature (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	05/21/2018	23.3	38.1	1017	P

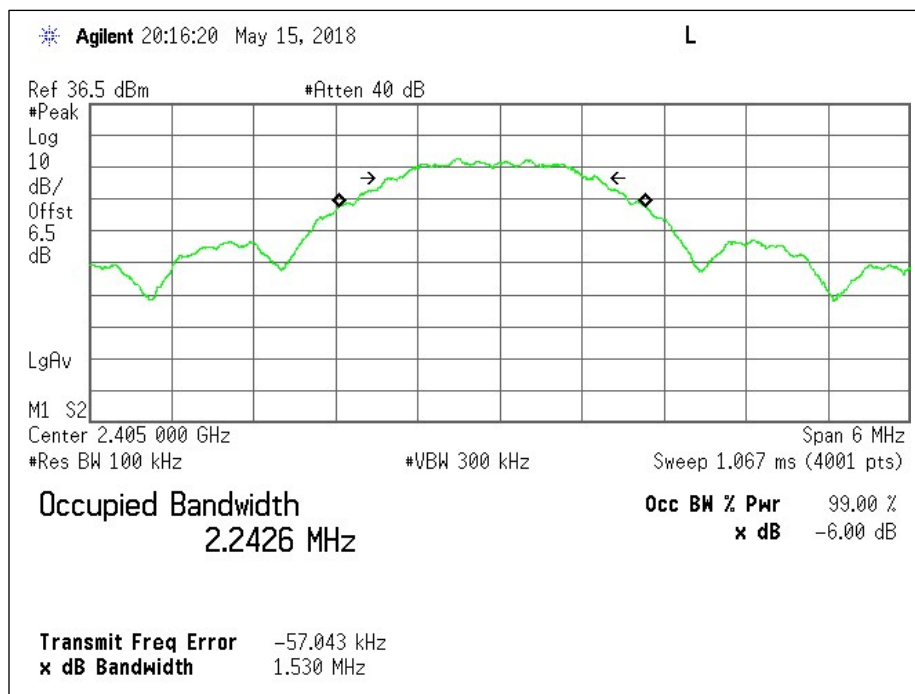
Equipment List

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

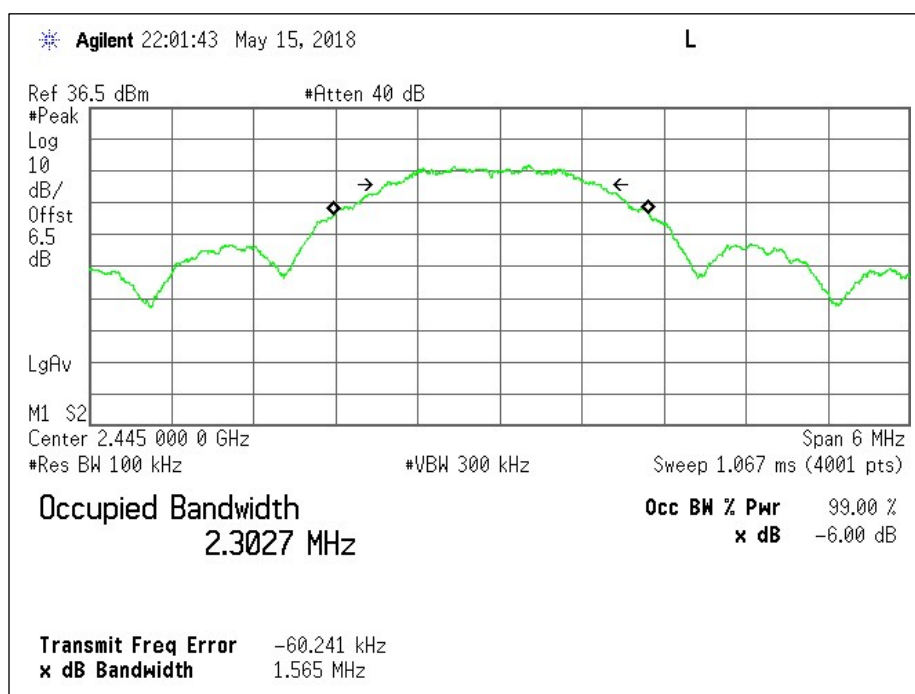
Test Results

Channel	Frequency (GHz)	6dB Bandwidth (in MHz)	
		Antenna 1	Antenna 2
Low	2.405	1.530	1.320
Mid	2.445	1.565	1.538
High	2.475	1.582	1.554

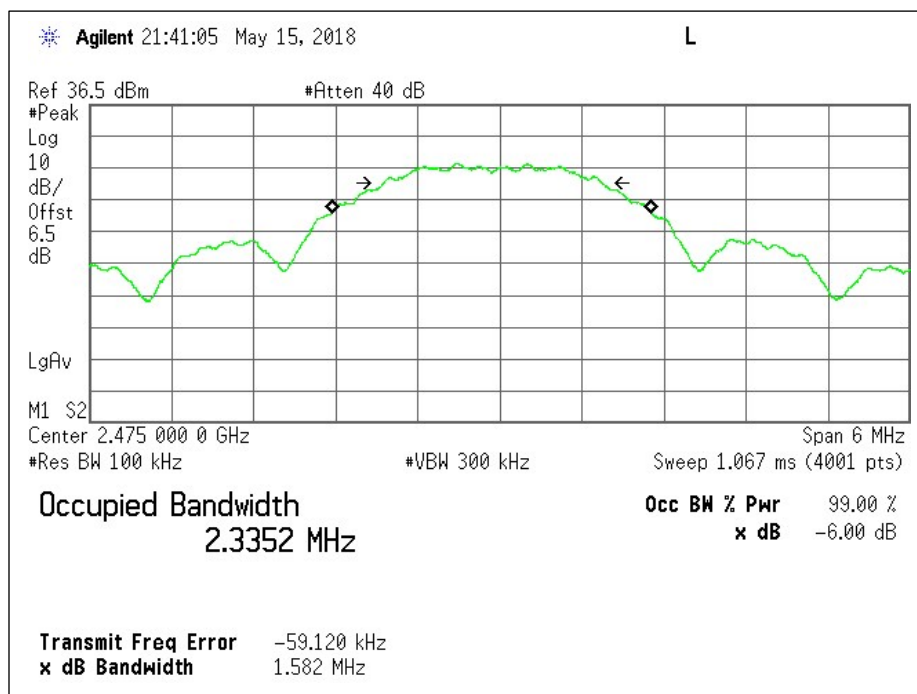
6dB Bandwidth



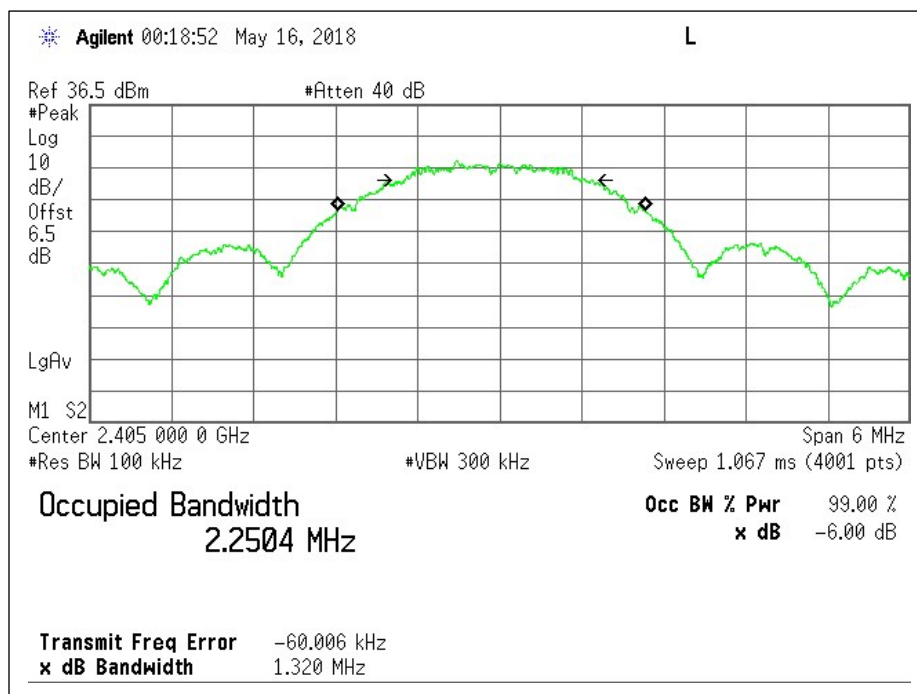
Antenna 1: Low Channel - Plot



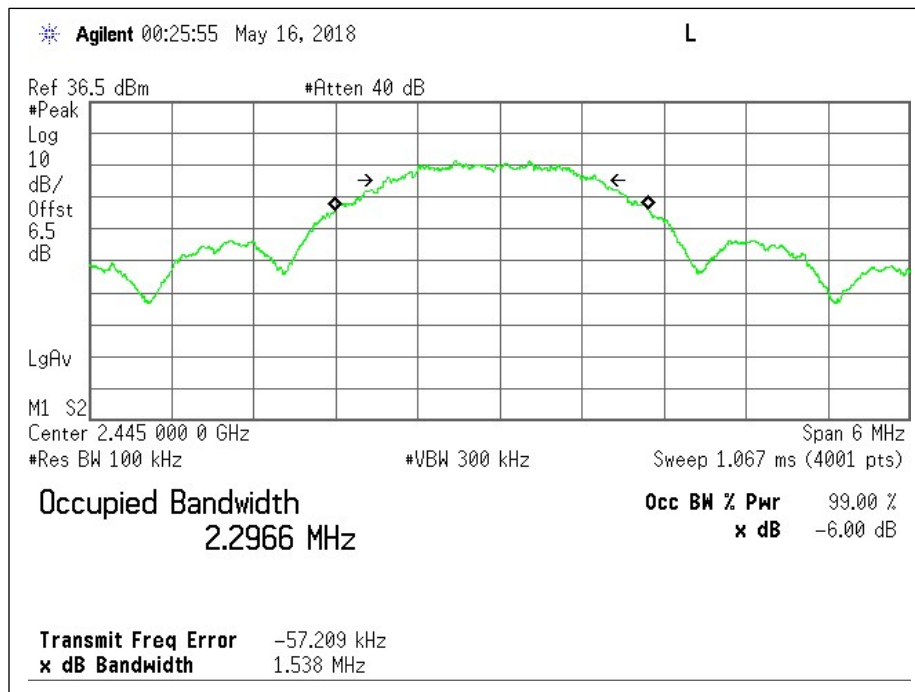
Antenna 1: Mid Channel - Plot



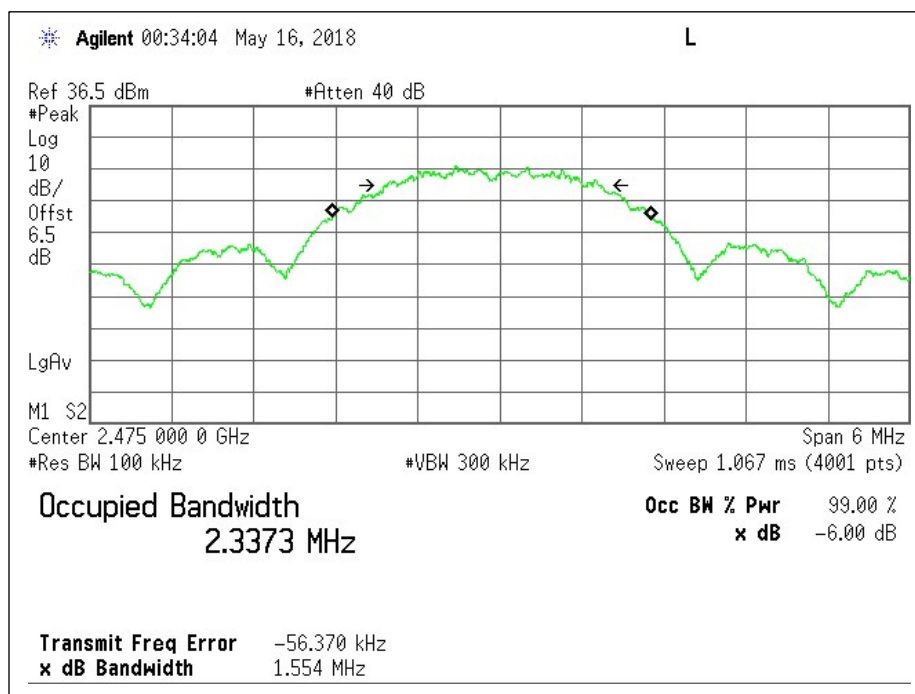
Antenna 1: High Channel – Plot



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	05/21/2018	23.3	38.1	1017	P

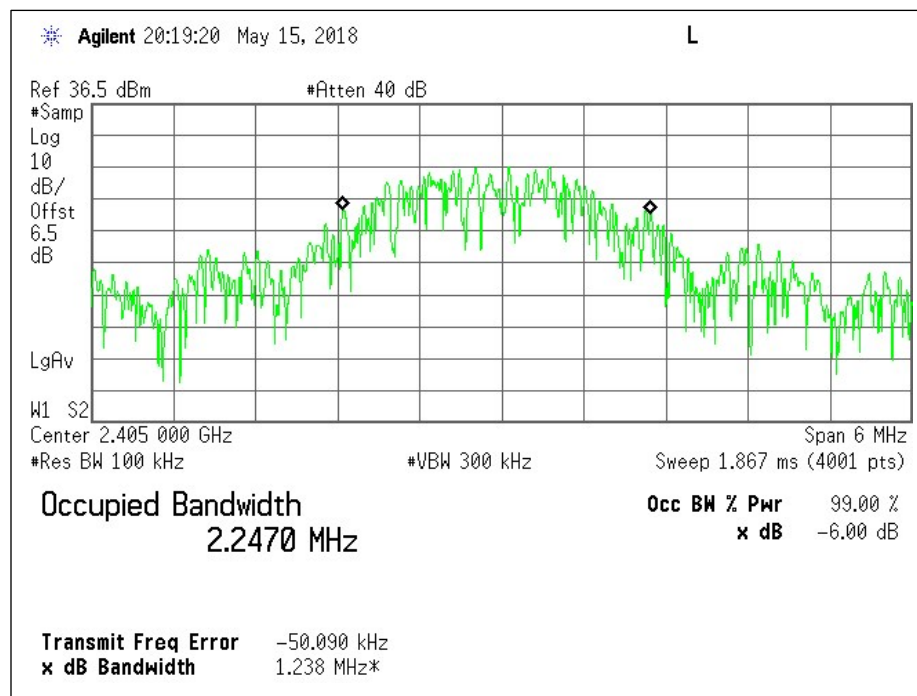
Equipment List

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

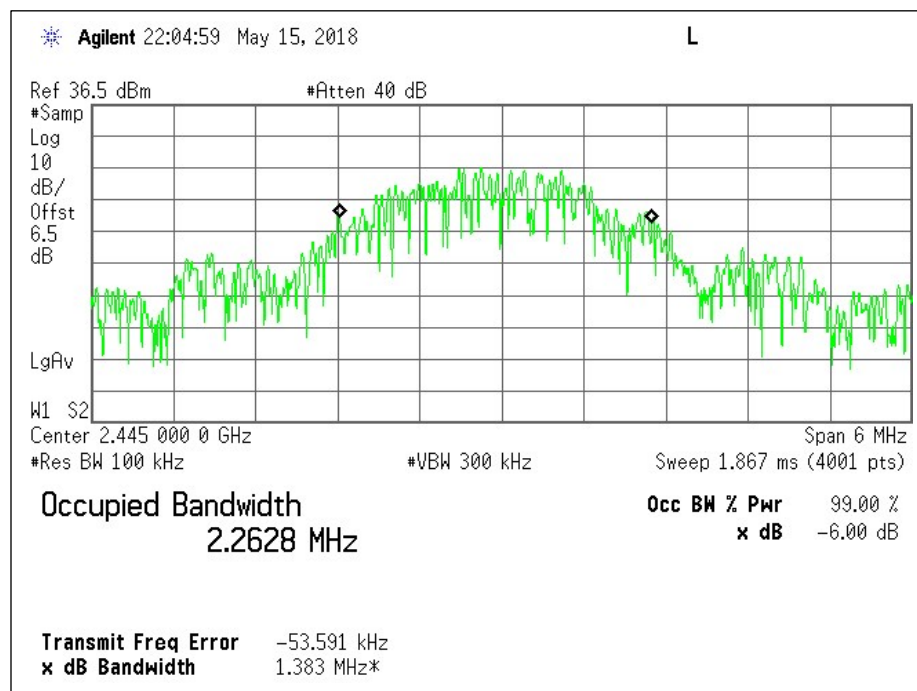
Test Results

Channel	Frequency (GHz)	99% Bandwidth (in MHz)	
		Antenna 1	Antenna 2
Low	2.405	2.247	2.244
Mid	2.445	2.263	2.266
High	2.475	2.282	2.271

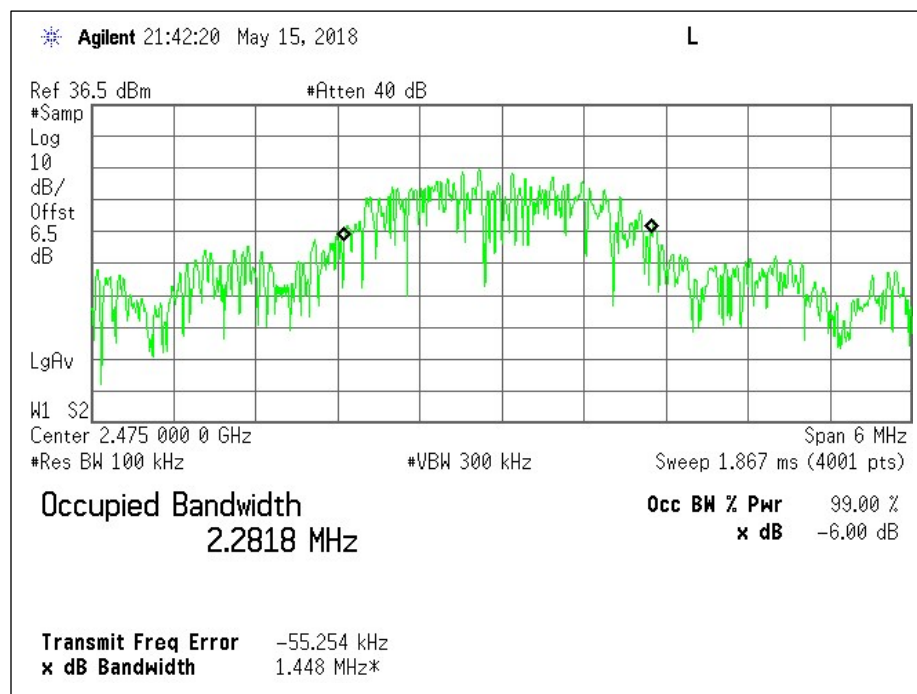
99% Occupied Bandwidth



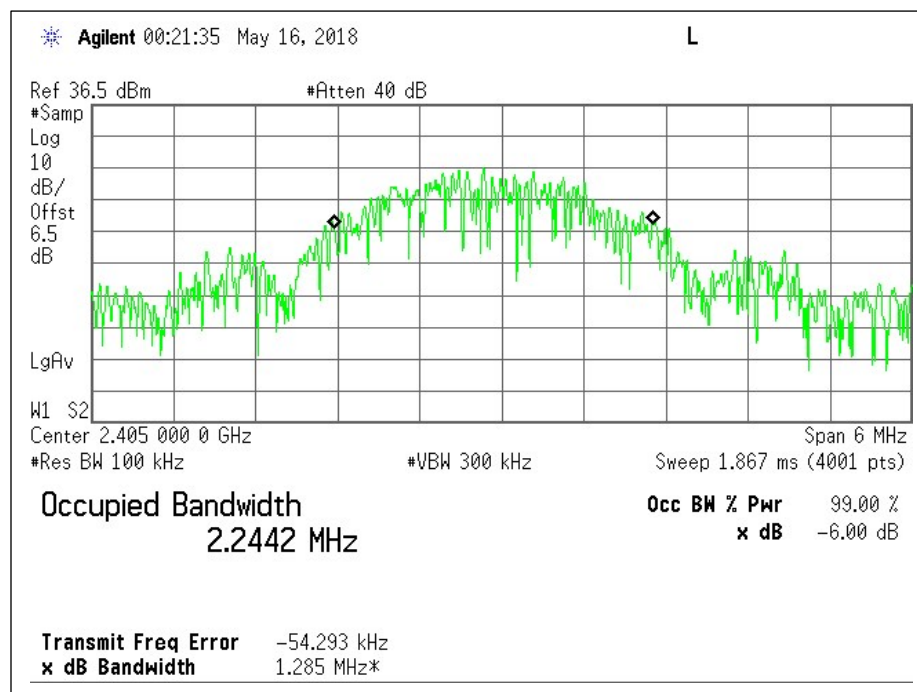
Antenna 1: Low Channel - Plot



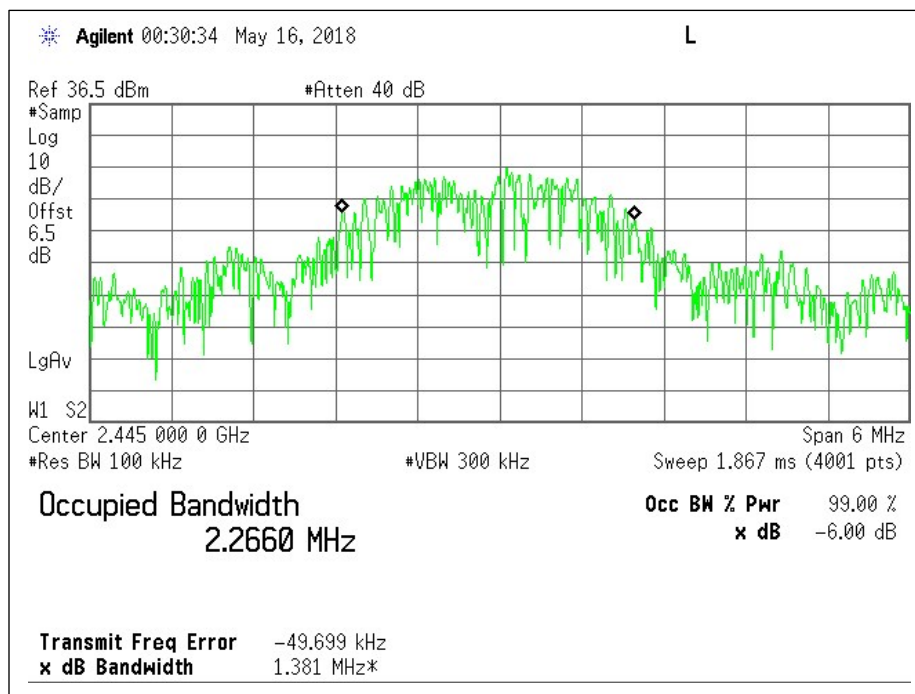
Antenna 1: Mid Channel - Plot



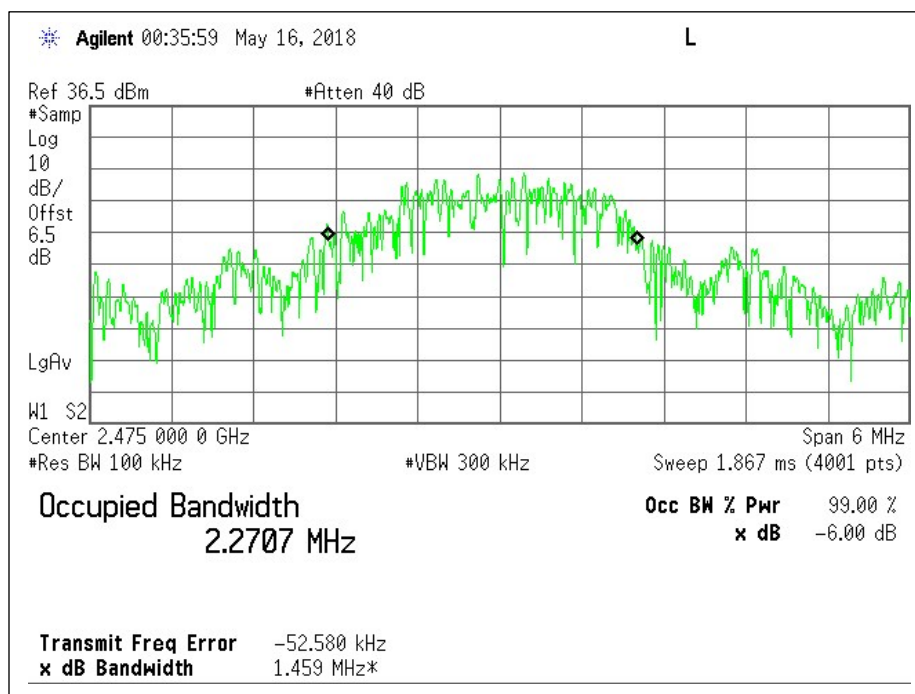
Antenna 1: High Channel – Plot



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 (29.3dBm)

*-The highest gain of antenna used with the radio is 6.7dBi. 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	05/21/2018	23.3	38.1	1017	P

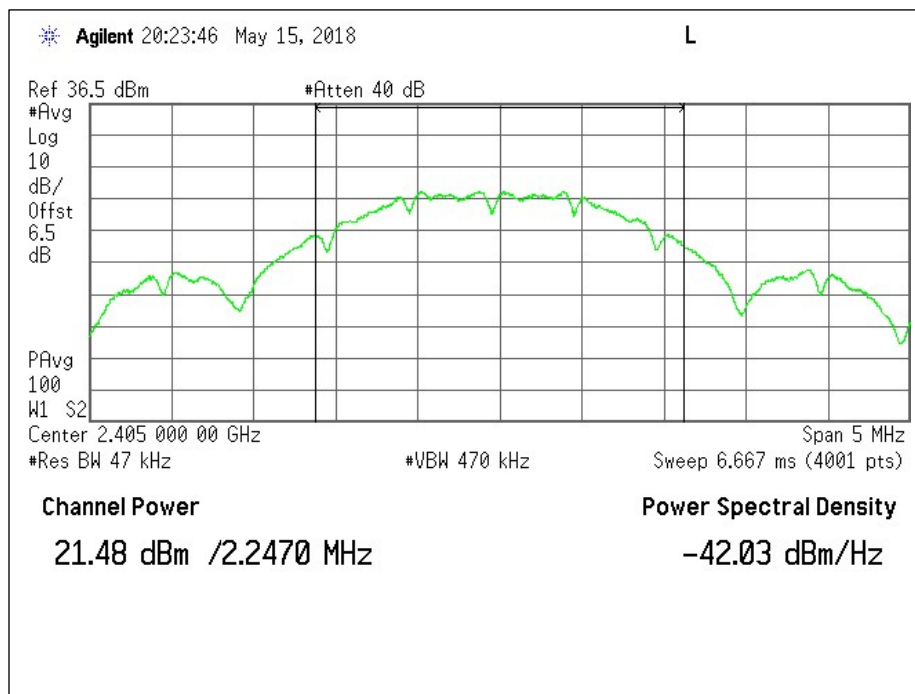
Equipment List

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

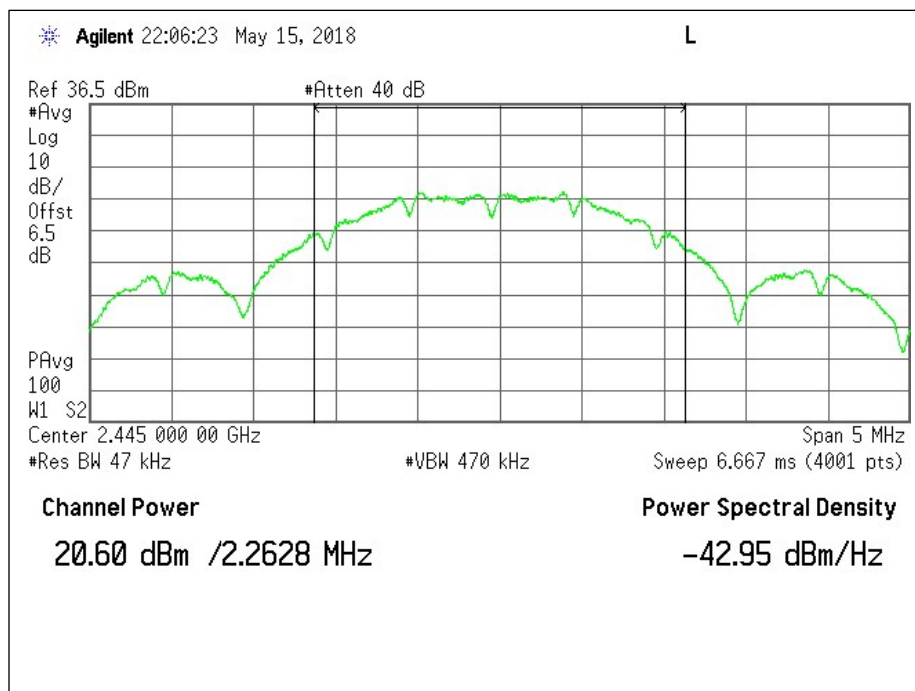
Test Results

Channel	Frequency (GHz)	Tx Channel BW Power (dBm)			
		Antenna 1	Margin	Antenna 2	Margin
Low	2.405	21.48	-7.82	21.59	-7.71
Mid	2.445	20.60	-8.7	21.08	-8.22
High	2.475	20.20	-9.1	20.57	-8.73

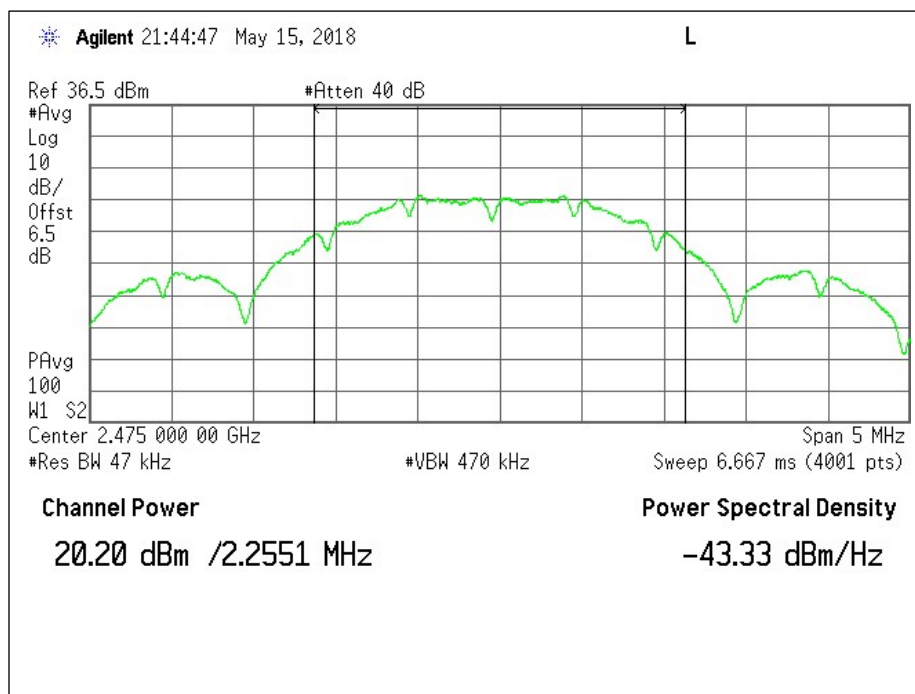
Output Power



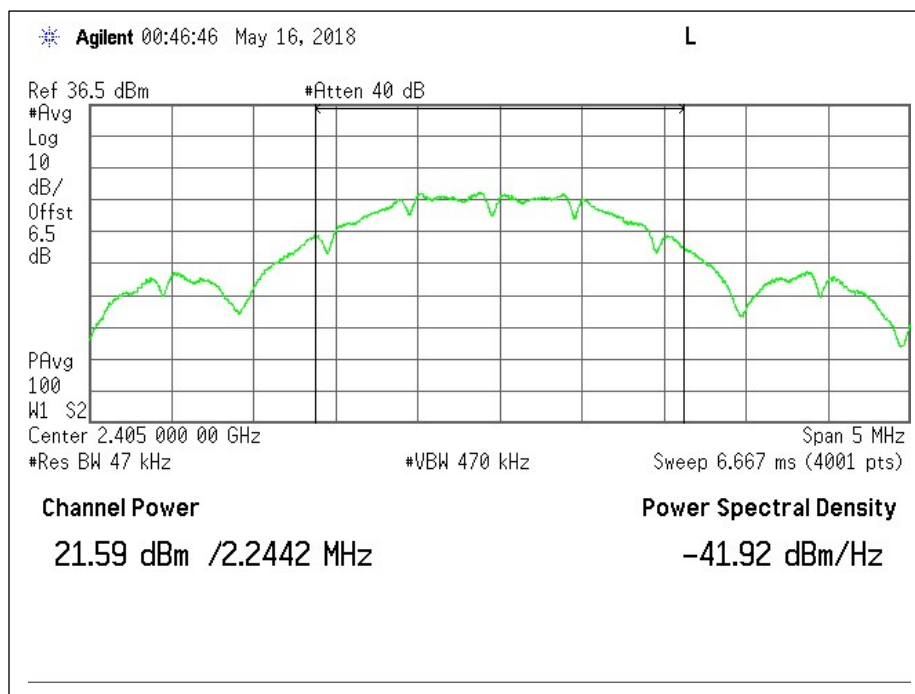
Antenna 1: Low Channel - Plot



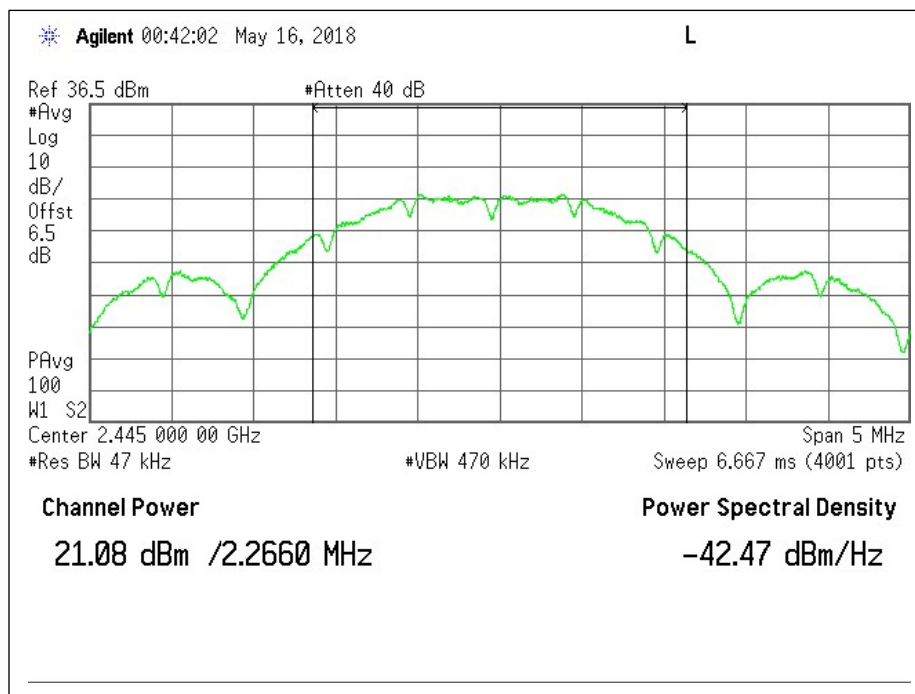
Antenna 1: Mid Channel - Plot



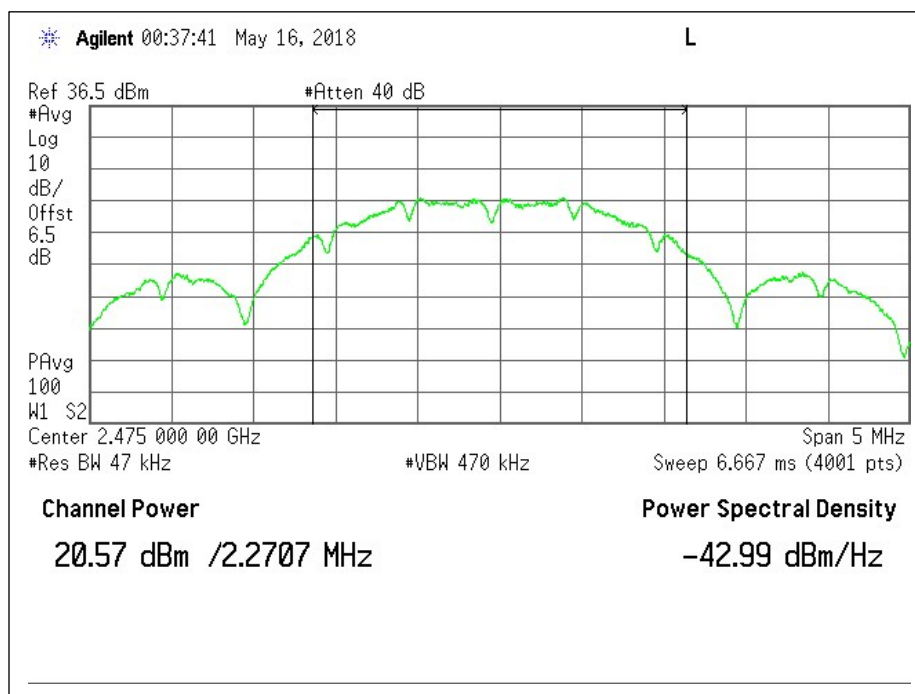
Antenna 1: High Channel – Plot



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	05/21/2018	23.3	38.1	1017	P

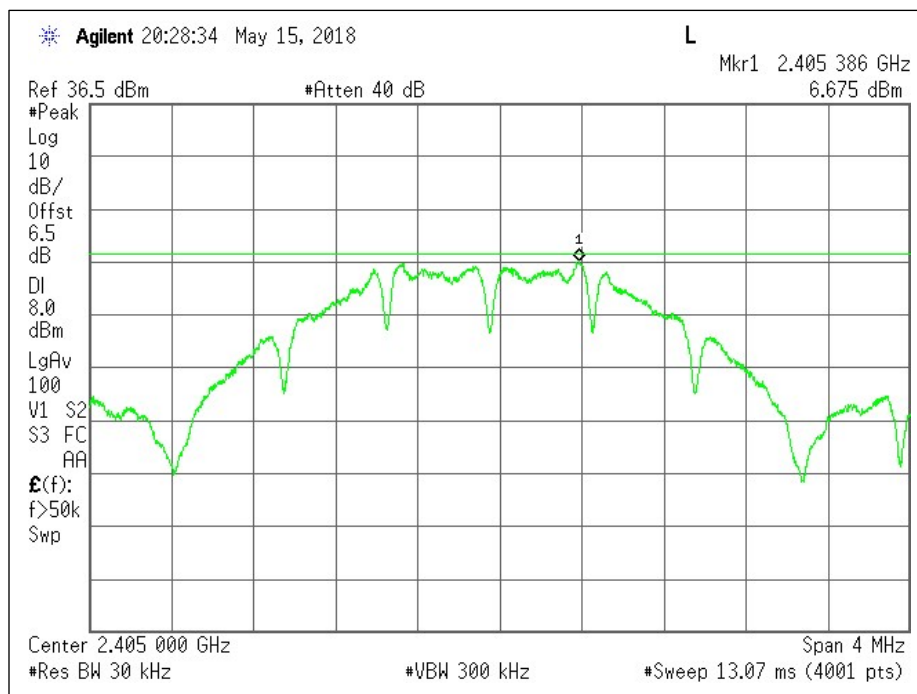
Equipment List

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

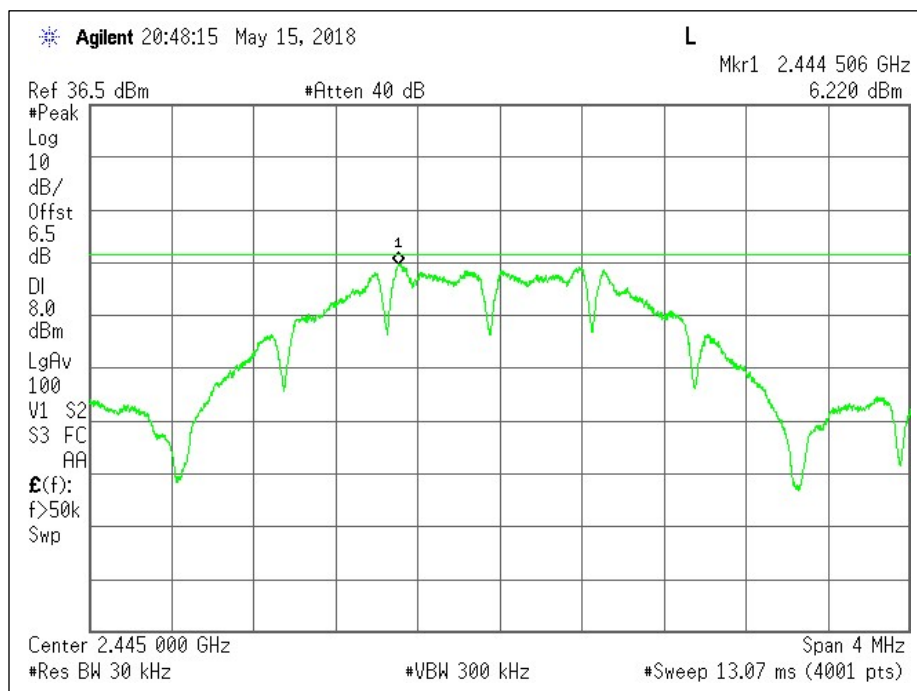
Test Results

Channel	Frequency (GHz)	Max PSD (dBm)	
		Antenna 1	Antenna 2
Low	2.405	6.675	7.685
Mid	2.445	6.220	7.220
High	2.475	5.831	6.344

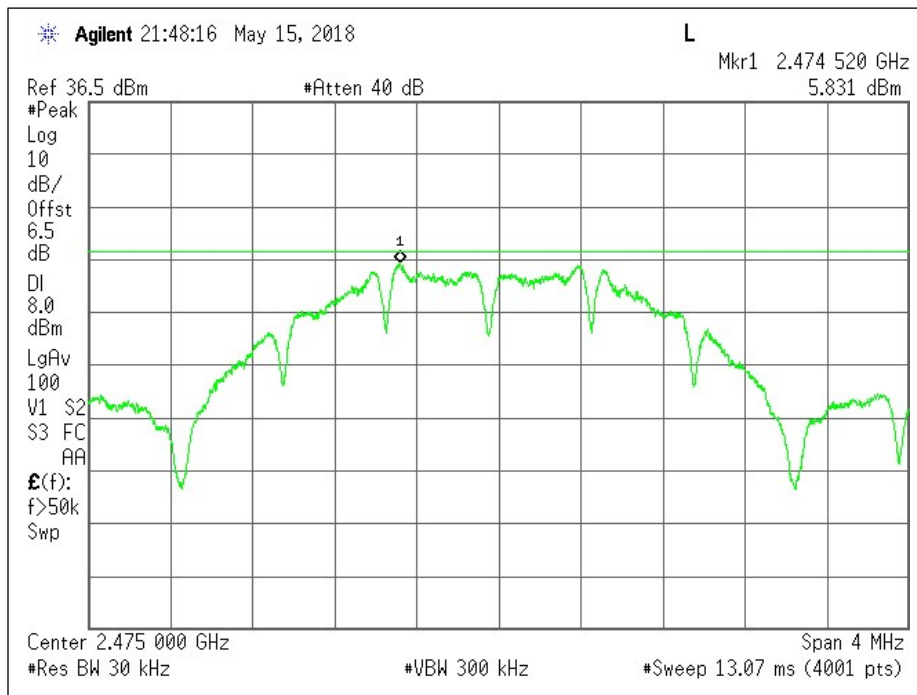
PSD



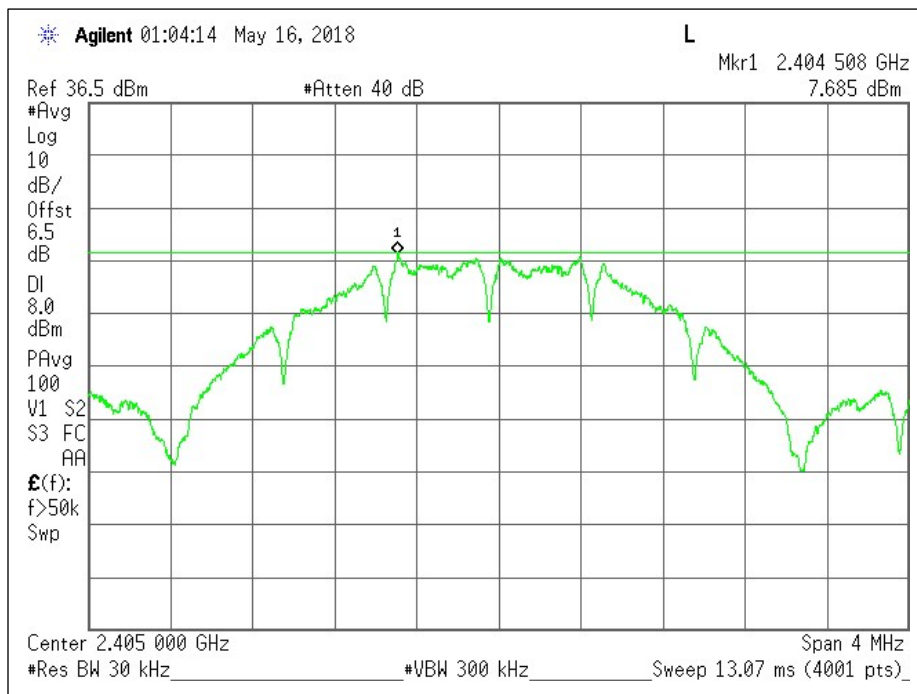
Antenna 1: Low Channel - Plot



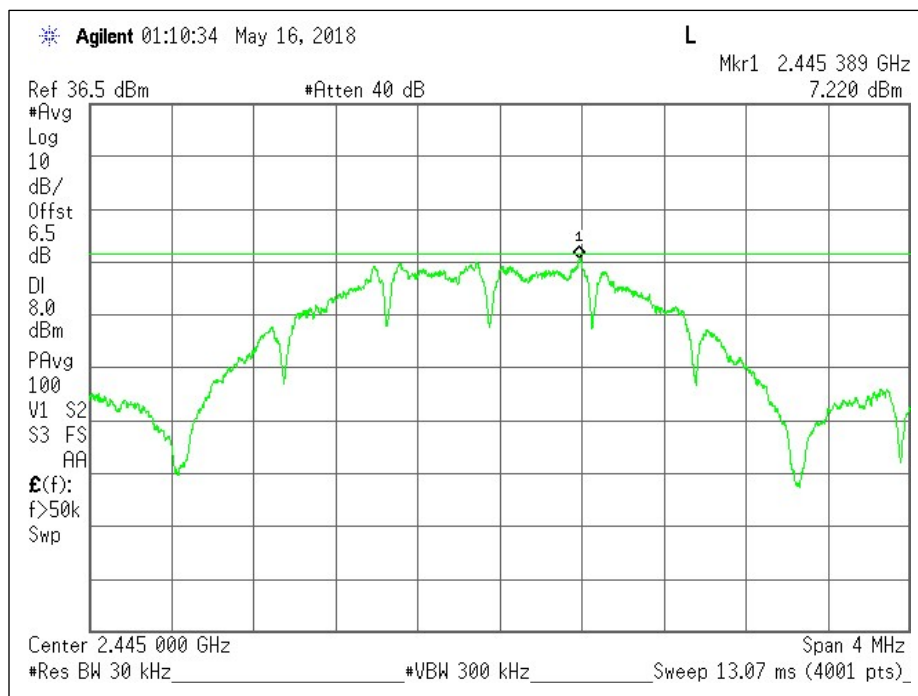
Antenna 1: Mid Channel - Plot



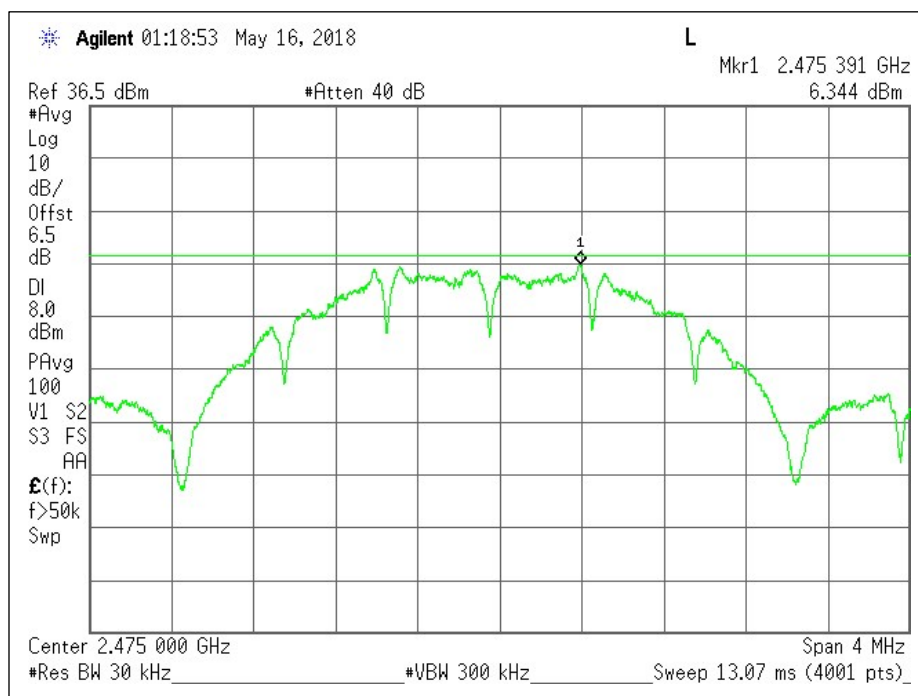
Antenna 1: High Channel – Plot



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	05/21/2018	23.3	38.1	1017	P

Equipment List

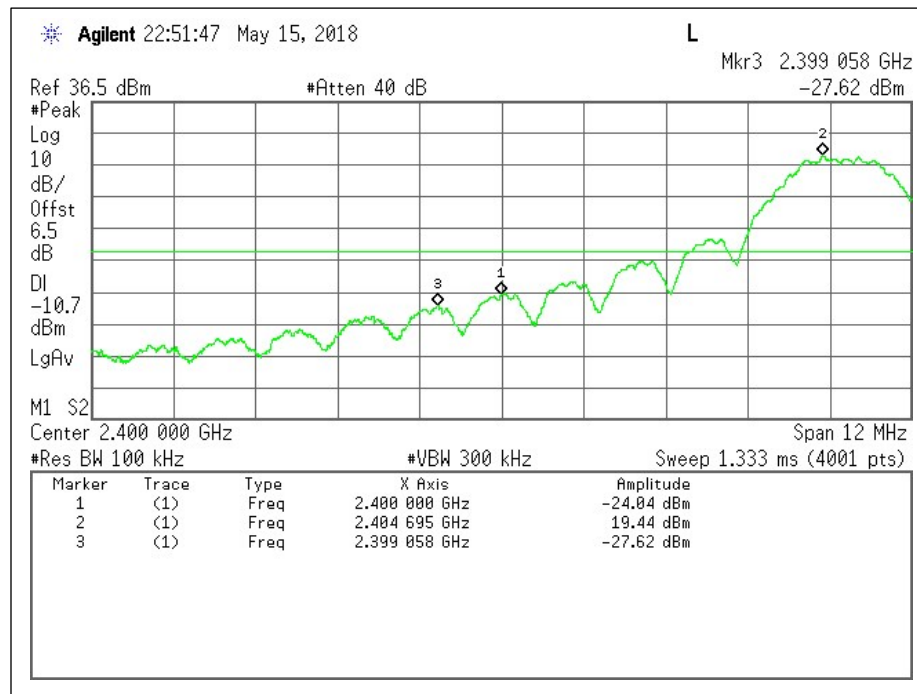
Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19
Environmental Meter	11533	A070144	Extech Instruments	SD700	08/21/17	08/21/20

Test Results

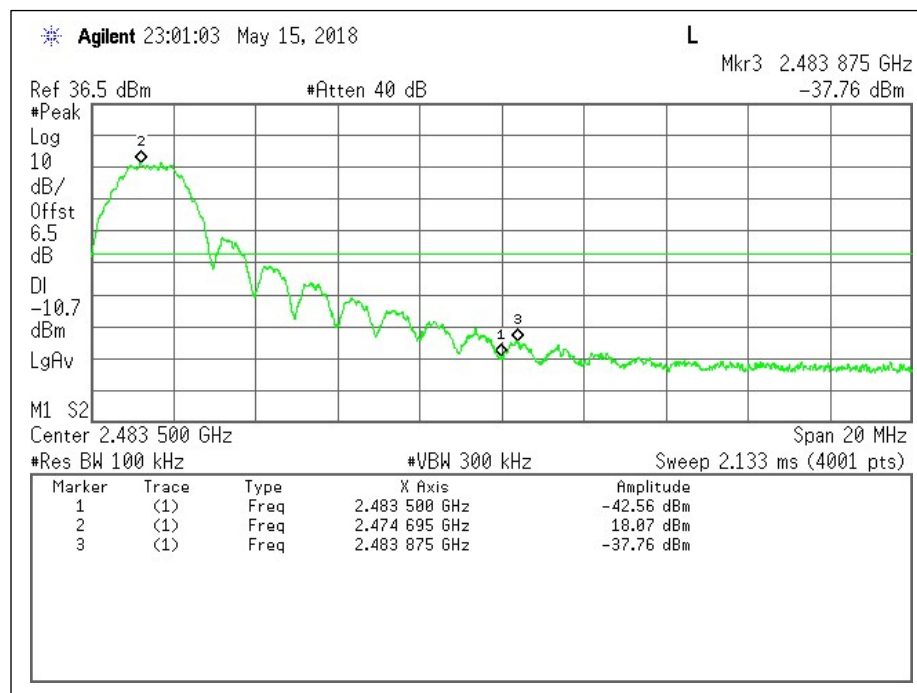
Authorized Band Edge					
Antenna	Channel	Frequency (GHz)	Delta from Peak to Bandedge (dB)	Limit (dB)	Margin (dB)
1	Low	2.405	43.48	30	-13.48
	High	2.475	60.63	30	-30.63
2	Low	2.405	43.34	30	-13.34
	High	2.475	60.63	30	-30.63

Conducted Spurious			
Channel	Frequency (GHz)	Highest Spurious Emission from -30dB down point (dB)	
		Antenna 1	Antenna 2
Low	2.405	-38.05	-38.06
Mid	2.445	-37.72	-37.49
High	2.475	-38.21	-37.72

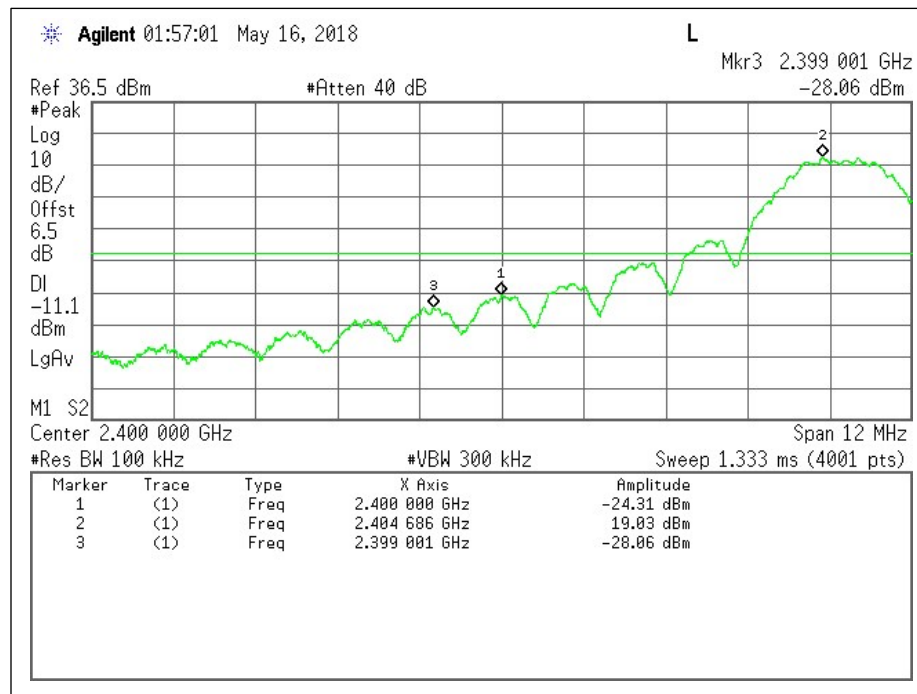
Band Edge



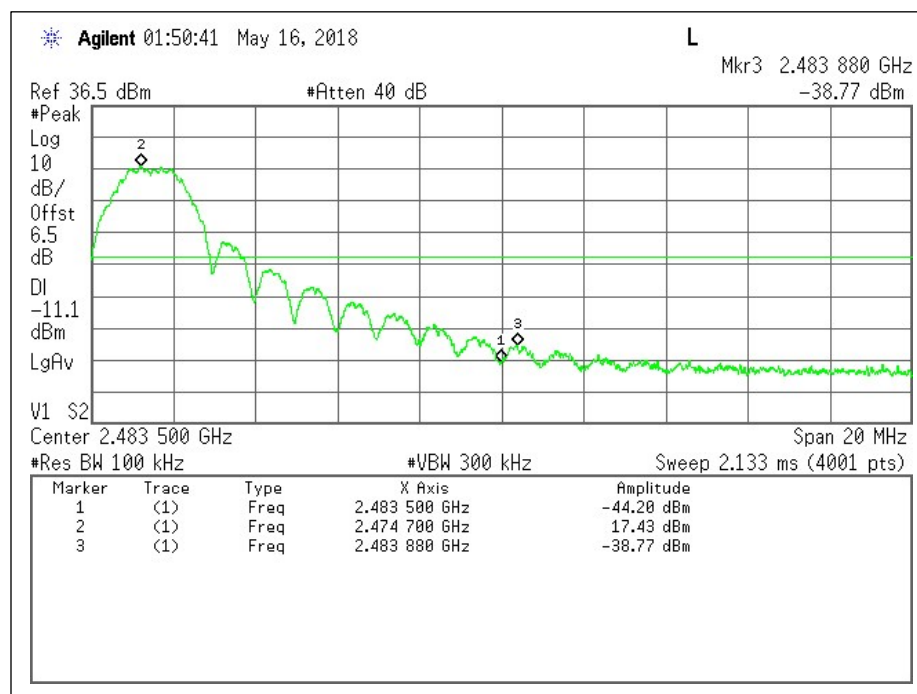
Antenna 1: Low Channel - Plot



Antenna 1: High Channel – Plot

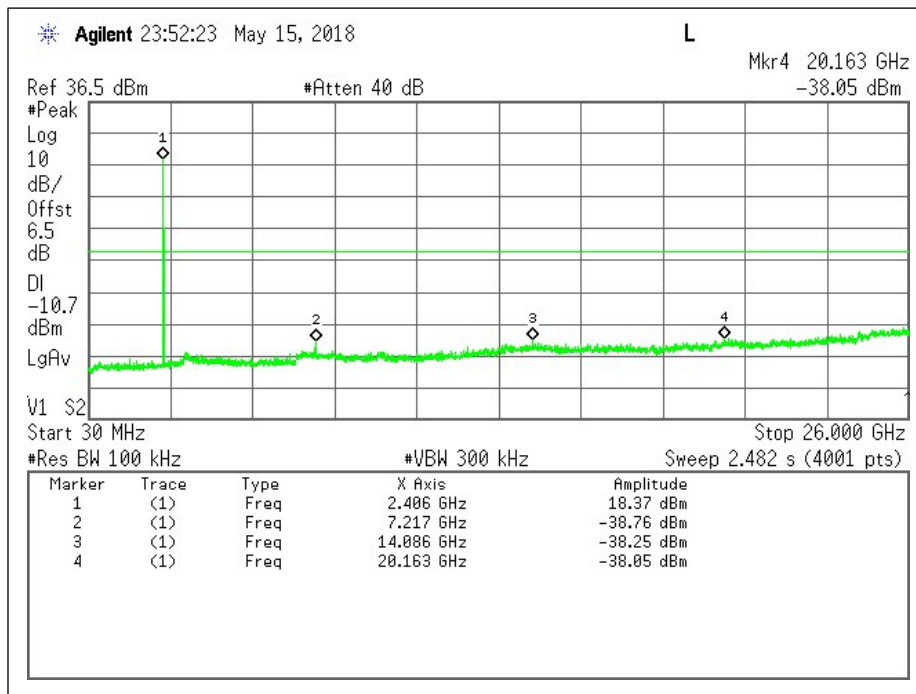


Antenna 2: Low Channel - Plot

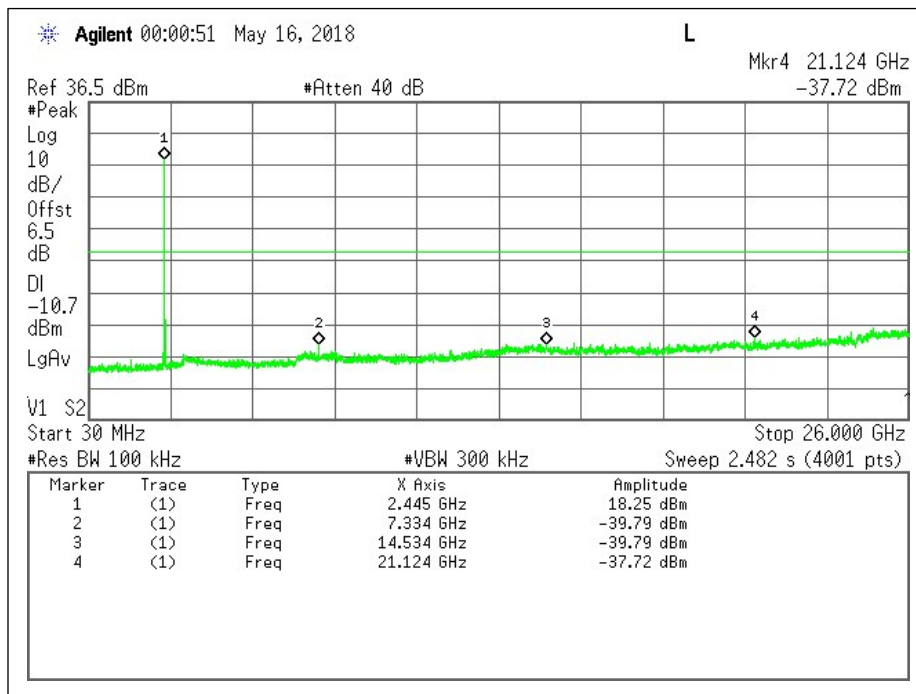


Antenna 2: High Channel - Plot

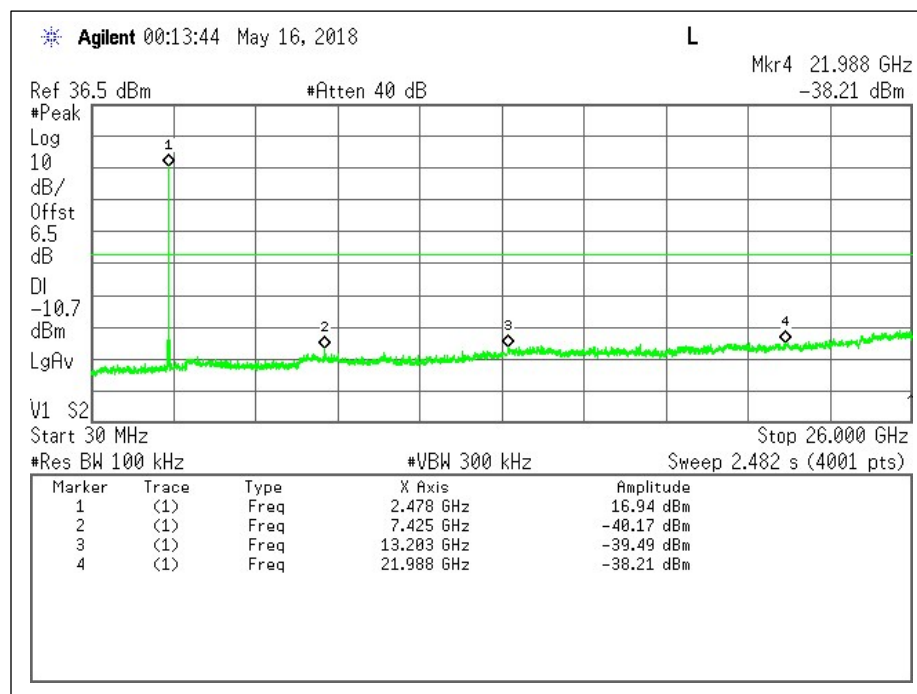
Conducted Spurious



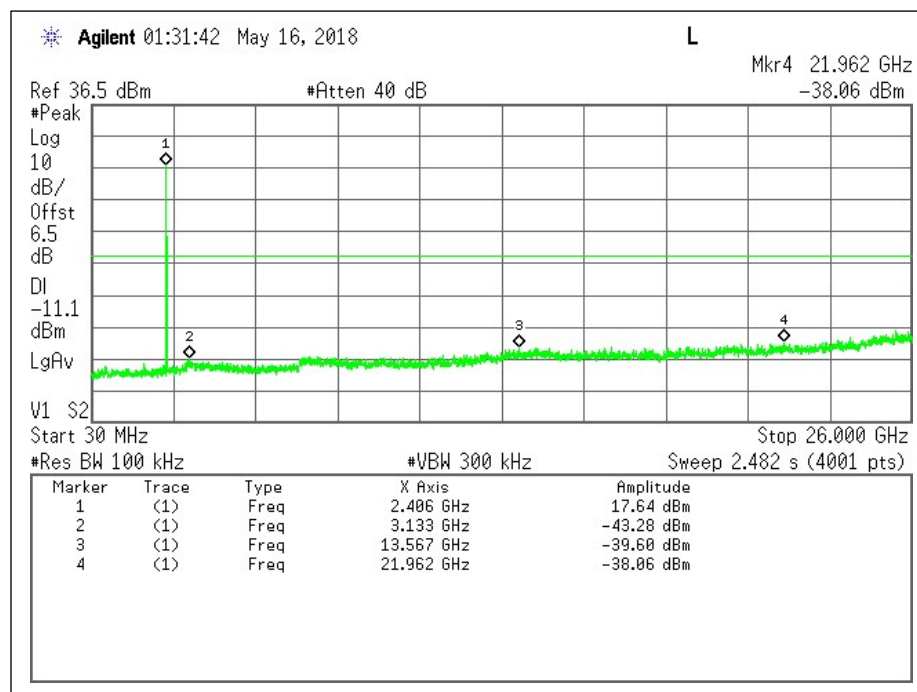
Antenna 1: Low Channel - Plot



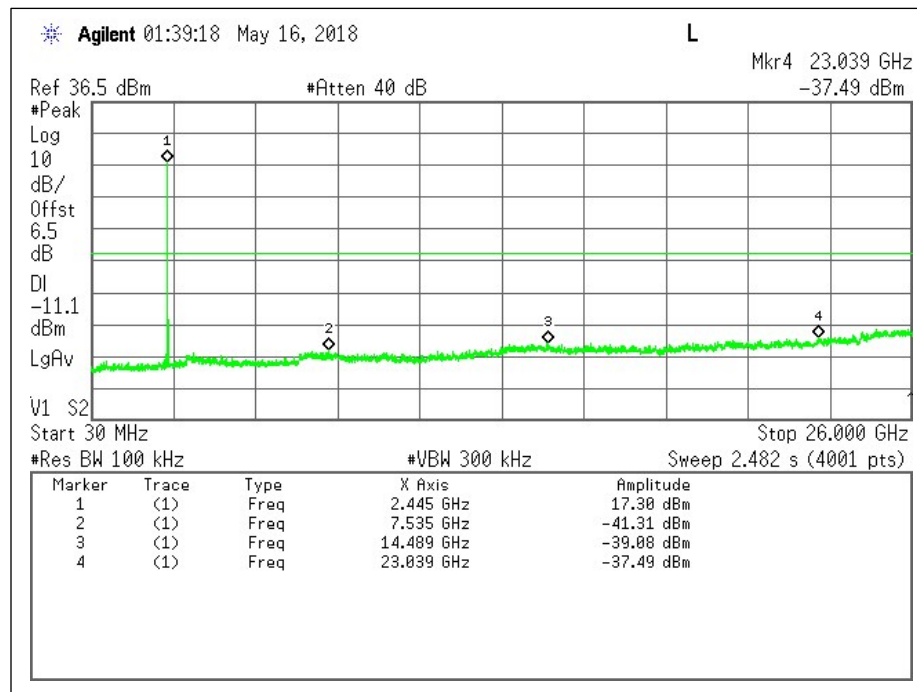
Antenna 1: Mid Channel - Plot



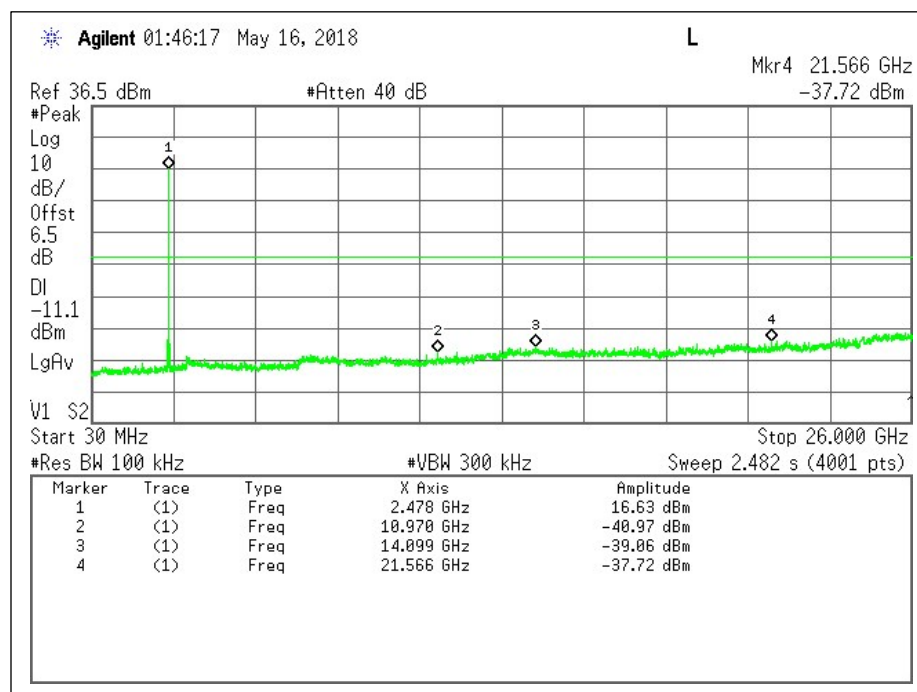
Antenna 1: High Channel – Plot



Antenna 2: Low Channel - Plot



Antenna 2: Mid Channel - Plot



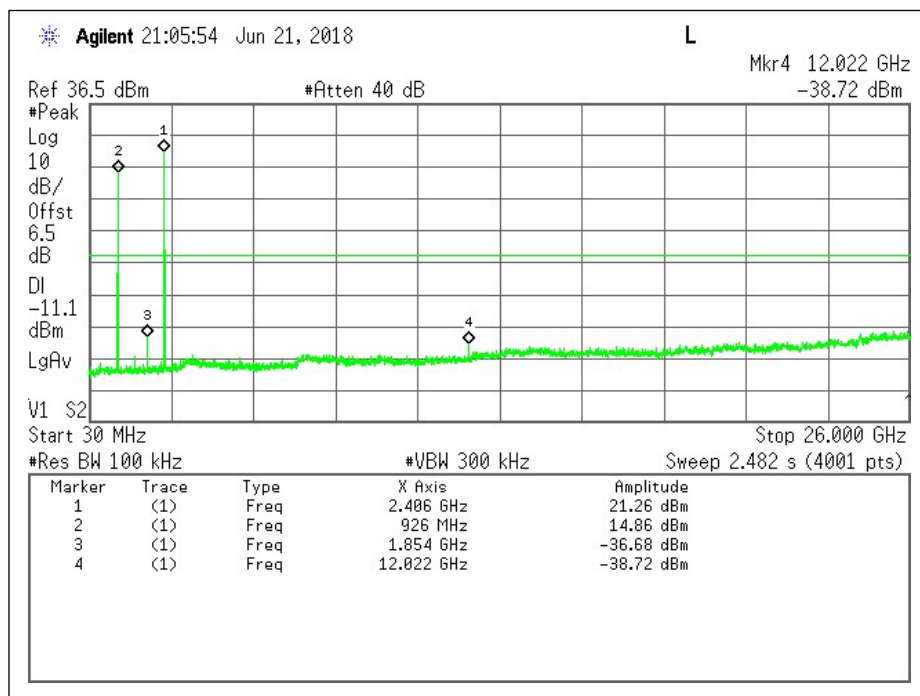
Antenna 2: High Channel - Plot

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

Configuration (Worse-case):

RF6 – Low Channel

Wiselink – High Channel



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	05/07/18-05/23/18	28.3	54	1002	P

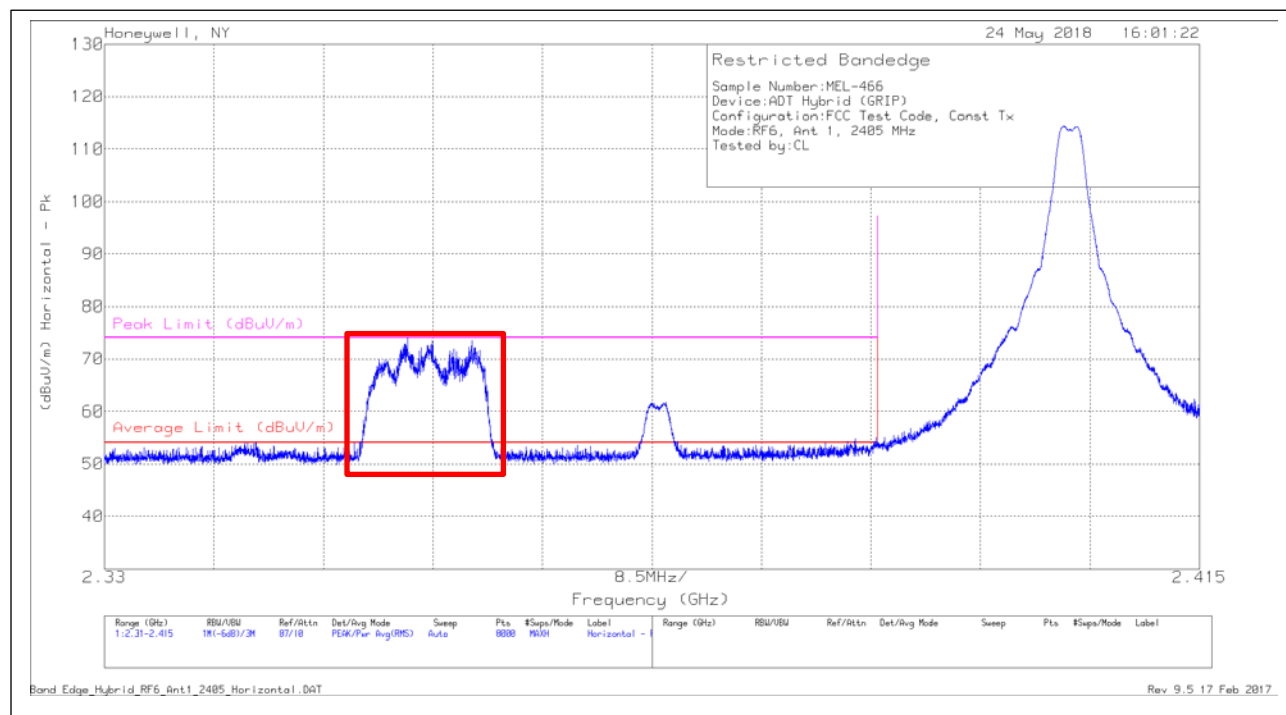
NOTE: Below 30MHz, pretesting showed that no emissions as a product of the EUT were detected within 20dB of the regulatory limit. Worse-case plot/data reported from 30MHz - 1GHz, per antenna. Prescans performed in an anechoic chamber, final measurements performed on an OATS.

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 (1-18GHz)	11539	160362	Amplical	AMP1G18-35	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	19.95	Pk	28.5	.7	2.6	2.5	-	54.25	74	-19.75	136	125	H
2	* 2.373	27.29	Pk	28.4	.7	2.6	2.5	-	61.49	74	-12.51	136	125	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	19.95	Av	28.5	.7	2.6	2.5	-23.4	30.85	54	-23.15	136	125	H
2	* 2.373	27.29	Av	28.4	.7	2.6	2.5	-23.4	38.09	54	-15.91	136	125	H

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

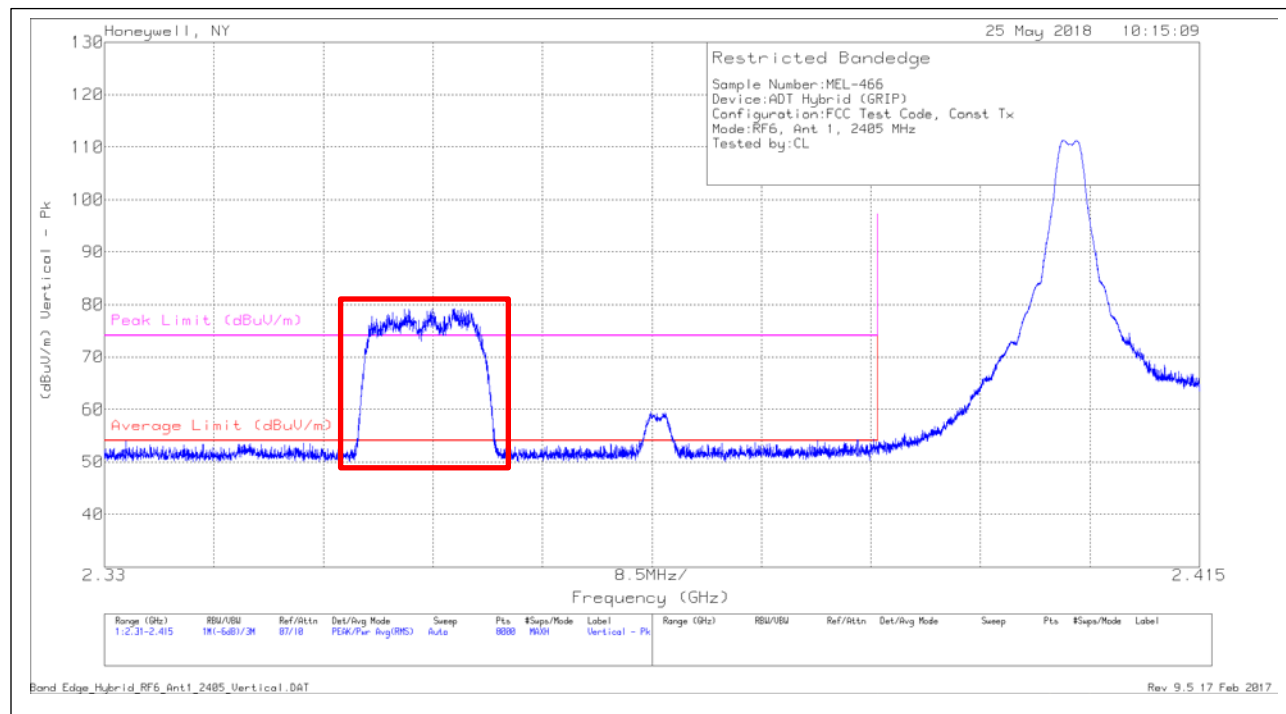
Pk - Peak detector

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

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

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	17.92	Pk	28.5	.7	2.6	2.5	-	52.22	74	-21.78	8	319	V
2	* 2.373	25.1	Pk	28.4	.7	2.6	2.5	-	59.3	74	-14.7	8	319	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	17.92	Av	28.5	.7	2.6	2.5	-23.4	28.82	54	-25.18	8	319	V
2	* 2.373	25.1	Av	28.4	.7	2.6	2.5	-23.4	35.9	54	-18.1	8	319	V

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

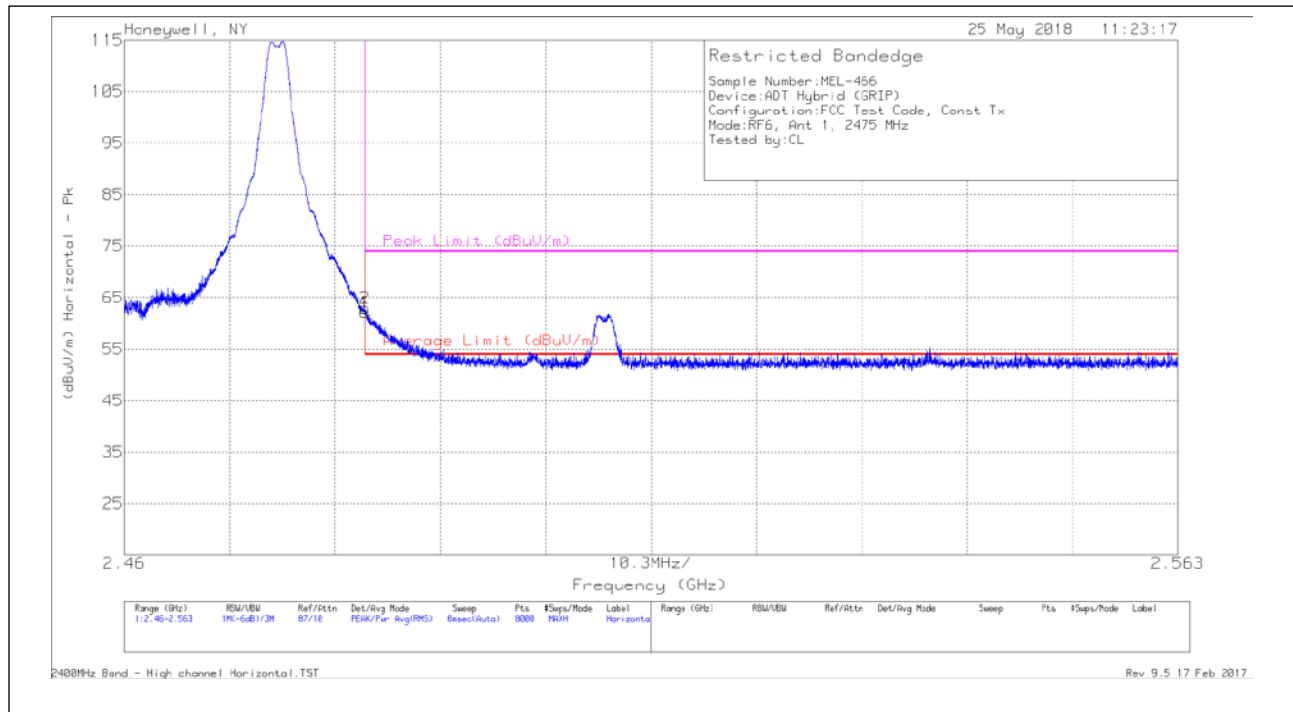
Pk - Peak detector

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

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

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	27.5	Pk	28.7	.7	2.6	2.6	-	62.1	74	-11.9	174	325	H
2	* 2.484	28.34	Pk	28.7	.7	2.6	2.6	-	62.94	74	-11.06	174	325	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	27.5	Av	28.7	.7	2.6	2.6	-23.4	38.7	54	-15.3	174	325	H
2	* 2.484	28.34	Av	28.7	.7	2.6	2.6	-23.4	39.54	54	-14.46	174	325	H

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

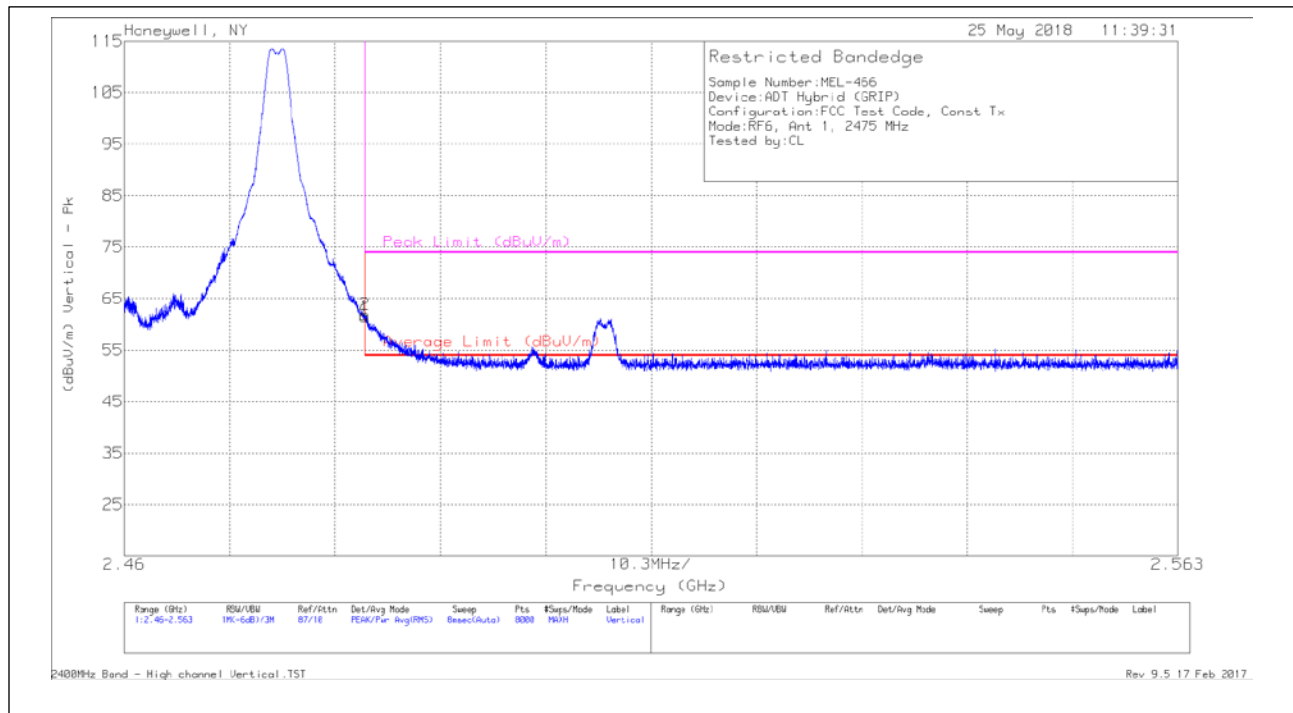
Pk - Peak detector

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

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

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	26.91	Pk	28.7	.7	2.6	2.6	-	61.51	74	-12.49	161	291	V
2	* 2.484	27.32	Pk	28.7	.7	2.6	2.6	-	61.92	74	-12.08	161	291	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	26.91	Av	28.7	.7	2.6	2.6	-23.4	38.11	54	-15.89	161	291	V
2	* 2.484	27.32	Av	28.7	.7	2.6	2.6	-23.4	38.52	54	-15.48	161	291	V

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

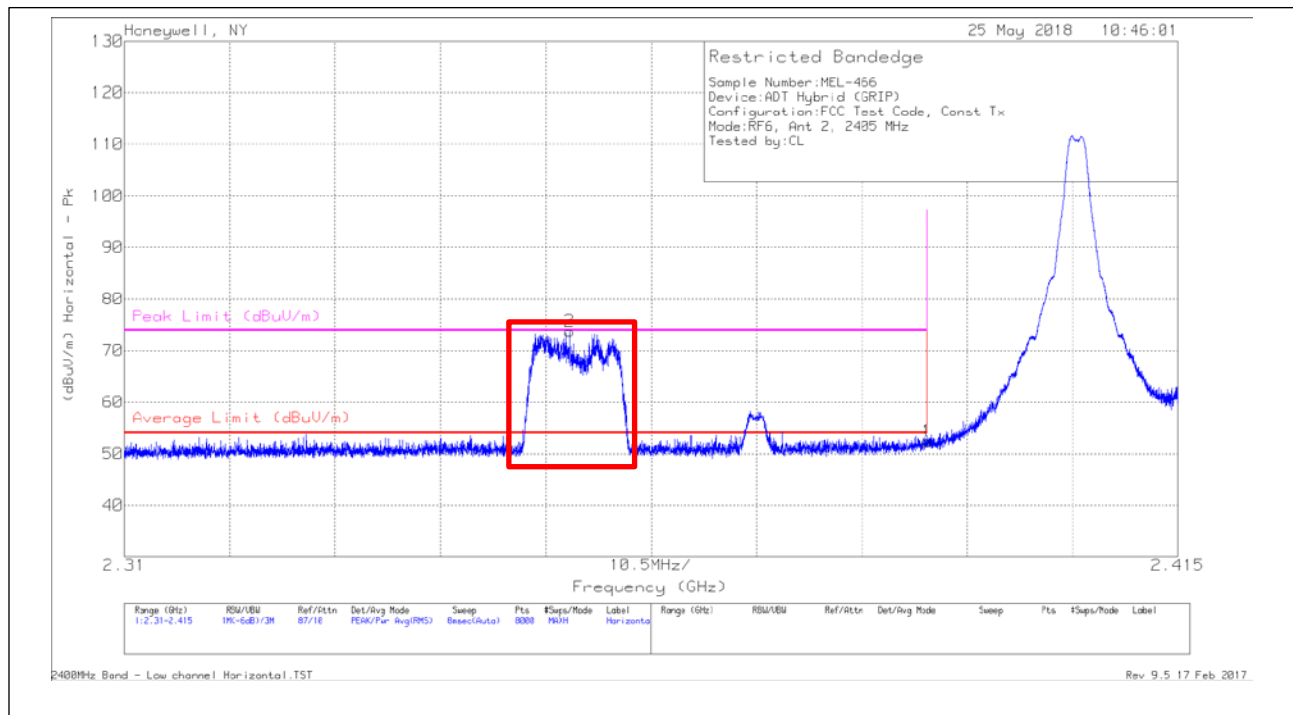
Pk - Peak detector

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

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

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	18.12	Pk	28.5	.7	2.6	2.5	-	52.42	74	-21.58	188	272	H
2	* 2.373	23.06	Pk	28.4	.7	2.6	2.5	-	57.26	74	-16.74	188	272	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	18.12	Av	28.5	.7	2.6	2.5	-23.4	29.02	54	-24.98	188	272	H
2	* 2.373	23.06	Av	28.4	.7	2.6	2.5	-23.4	33.86	54	-20.14	188	272	H

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

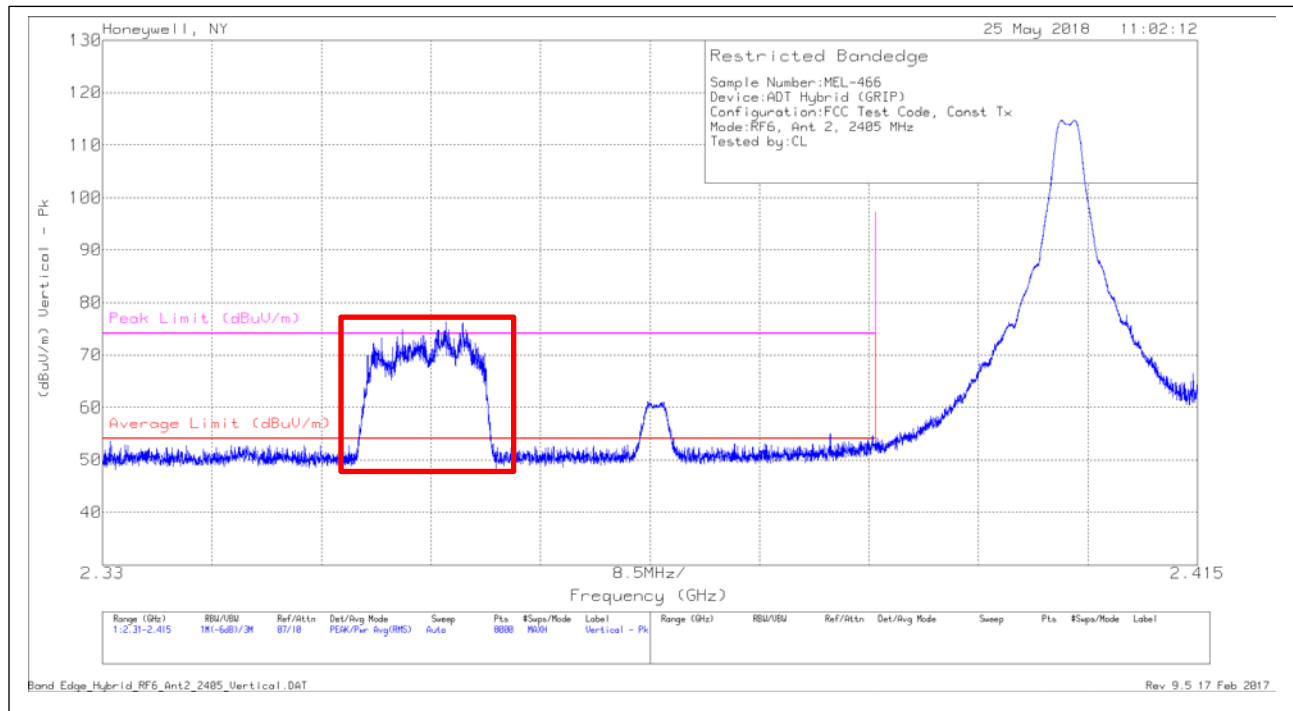
Pk - Peak detector

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

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

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	17.72	Pk	28.5	.7	2.6	2.5	-	52.02	74	-21.98	197	300	V
2	* 2.373	26.22	Pk	28.4	.7	2.6	2.5	-	60.42	74	-13.58	197	300	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	17.72	Av	28.5	.7	2.6	2.5	-23.4	28.62	54	-25.38	197	300	V
2	* 2.373	26.22	Av	28.4	.7	2.6	2.5	-23.4	37.02	54	-16.98	197	300	H

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

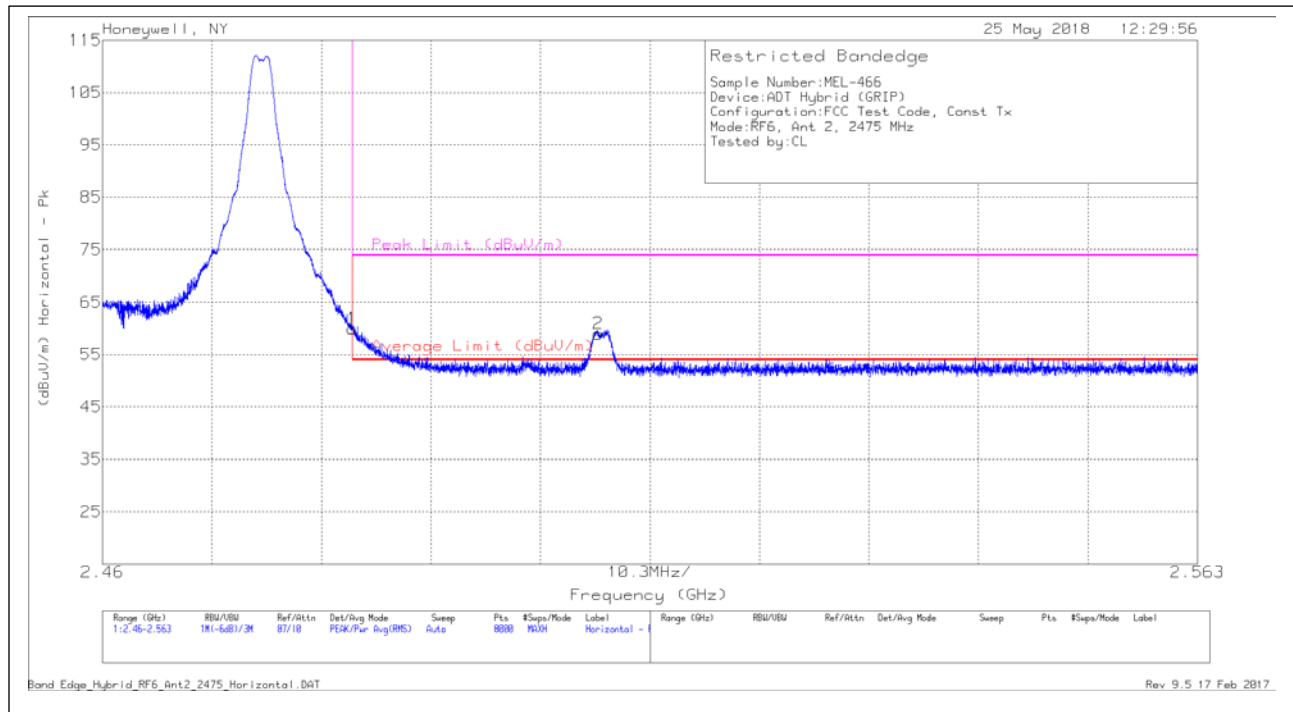
Pk - Peak detector

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

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

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	25.36	Pk	28.7	.7	2.6	2.6	-	59.96	74	-14.04	41	261	H
2	2.507	24.11	Pk	28.8	.7	2.7	2.6	-	58.91	74	-15.09	41	261	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	25.36	Av	28.7	.7	2.6	2.6	-23.4	36.56	54	-17.44	41	261	H
2	2.507	24.11	Av	28.8	.7	2.7	2.6	-23.4	35.51	54	-18.49	41	261	H

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

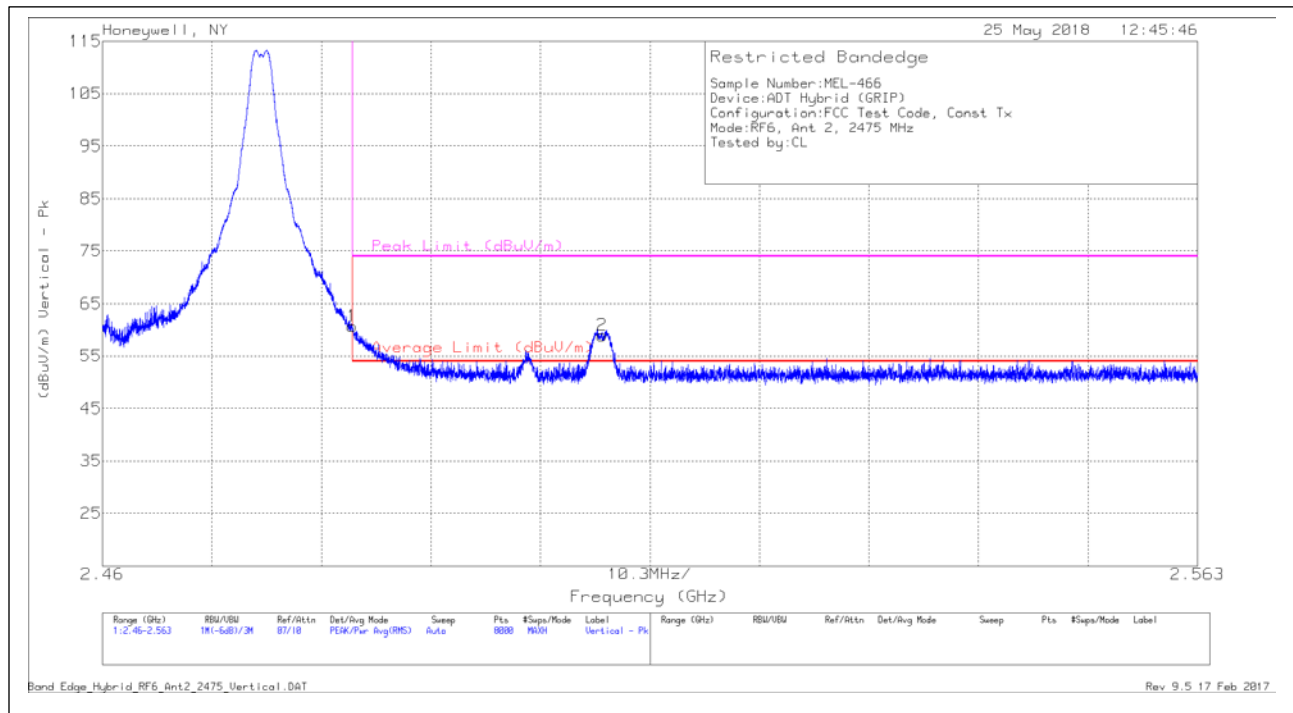
Pk - Peak detector

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

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

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	26.08	Pk	28.7	.7	2.6	2.6	-	60.68	74	-13.32	191	238	V
2	2.507	24.06	Pk	28.8	.7	2.7	2.6	-	58.86	74	-15.14	191	238	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	26.08	Av	28.7	.7	2.6	2.6	-23.4	37.28	54	-16.72	191	238	V
2	2.507	24.06	Av	28.8	.7	2.7	2.6	-23.4	35.46	54	-18.54	191	238	V

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

Pk - Peak detector

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

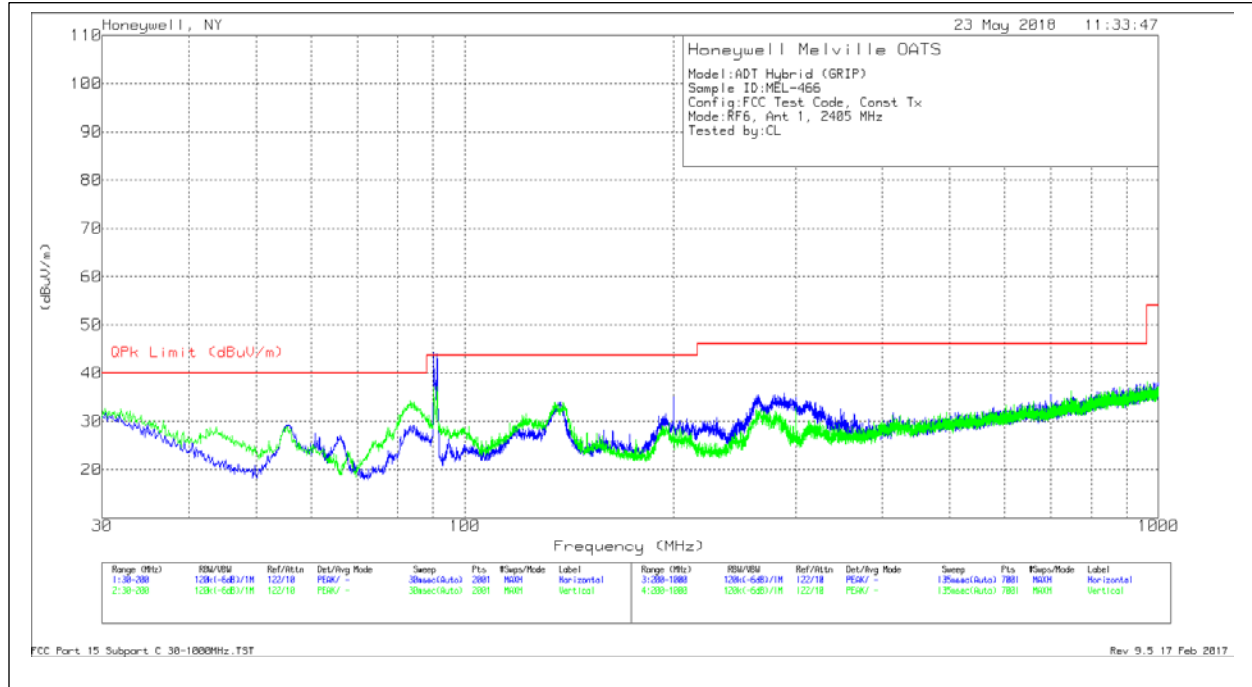
Duty Cycle = 6.75%, thus DC Corr = $20\log(0.0675) = -23.4\text{dB}$

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 1)



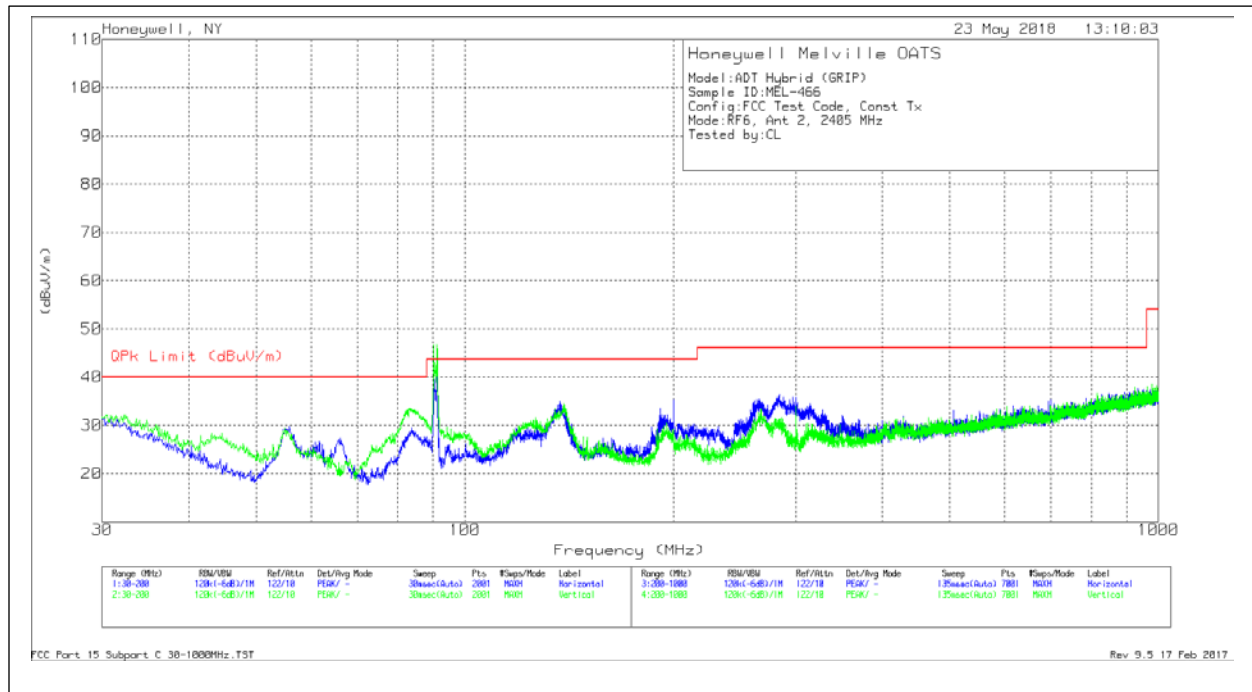
Antenna 1 Low Channel - Plot

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
30.2866	10.89	Qp	24.6	.9	36.39	40	-3.61	146	355	H
90.186	14	Qp	12	1.5	27.5	43.52	-16.02	216	392	H
199.7971	24.08	Qp	16.6	2.4	43.08	43.52	-.44	82	377	H
30.3436	11.04	Qp	24.6	.9	36.54	40	-3.46	242	254	V
83.2858	14.46	Qp	11.8	1.4	27.66	40	-12.34	201	107	V
91	11.44	Qp	12.2	1.5	25.14	43.52	-18.38	245	387	V

Qp - Quasi-Peak detector

Antenna 1 Low Channel - Data

Below 1GHz (Worse-case, Antenna 2)



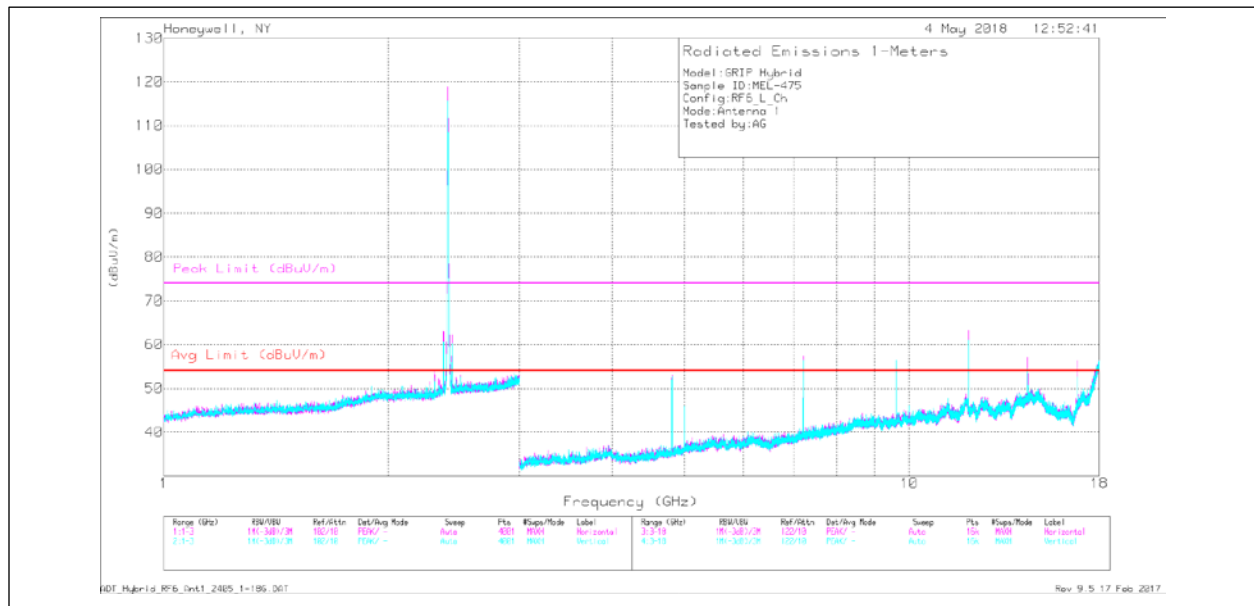
Antenna 2 Low Channel - Plot

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
31.3825	10.87	Qp	23.9	.9	35.67	40	-4.33	67	204	H
90.9157	11.64	Qp	12.2	1.5	25.34	43.52	-18.18	338	260	H
199.8005	23.96	Qp	16.6	2.4	42.96	43.52	-.56	263	367	H
30.326	11.2	Qp	24.6	.9	36.7	40	-3.3	250	347	V
83.6809	15.17	Qp	11.8	1.4	28.37	40	-11.63	155	146	V
91.0069	7.36	Qp	12.2	1.5	21.06	43.52	-22.46	173	231	V

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
* 4.811	54.78	PK	33.1	-41.2	3.7	3.7	54.08	74	-19.92	146	227	H
7.216	50.03	PK	36.2	-39.5	4.7	4.5	55.93	74	-18.07	123	387	H
9.618	42.34	PK	38	-39	5.6	5.2	52.14	74	-21.86	3	386	H
* 12.027	45.51	PK	39.4	-37.3	6.5	5.6	59.71	74	-14.29	225	371	H
14.432	41.6	PK	42.1	-36.9	6.8	6.4	60	74	-14	71	239	H
16.838	39.35	PK	39.6	-38.1	7.5	7.1	55.45	74	-18.55	277	244	H
* 4.811	55.36	PK	33.1	-41.2	3.7	3.7	54.66	74	-19.34	61	233	V
7.213	52.68	PK	36.2	-39.5	4.7	4.5	58.58	74	-15.42	22	298	V
9.622	46.07	PK	38	-39	5.6	5.2	55.87	74	-18.13	353	354	V
14.433	41.19	PK	42.1	-36.9	6.8	6.4	59.59	74	-14.41	261	396	V
* 12.027	38.3	PK	39.4	-37.3	6.5	5.6	52.5	74	-21.5	291	305	V
16.83	39.18	PK	39.6	-38.1	7.4	7.1	55.18	74	-18.82	38	258	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.811	54.78	Av	33.1	-41.2	3.7	3.7	-23.4	30.68	54	-23.32	146	227	H
* 12.027	45.51	Av	39.4	-37.3	6.5	5.6	-23.4	36.31	54	-17.69	225	371	H
* 4.811	55.36	Av	33.1	-41.2	3.7	3.7	-23.4	31.26	54	-22.74	61	233	V
* 12.027	38.3	Av	39.4	-37.3	6.5	5.6	-23.4	29.1	54	-24.9	291	305	V

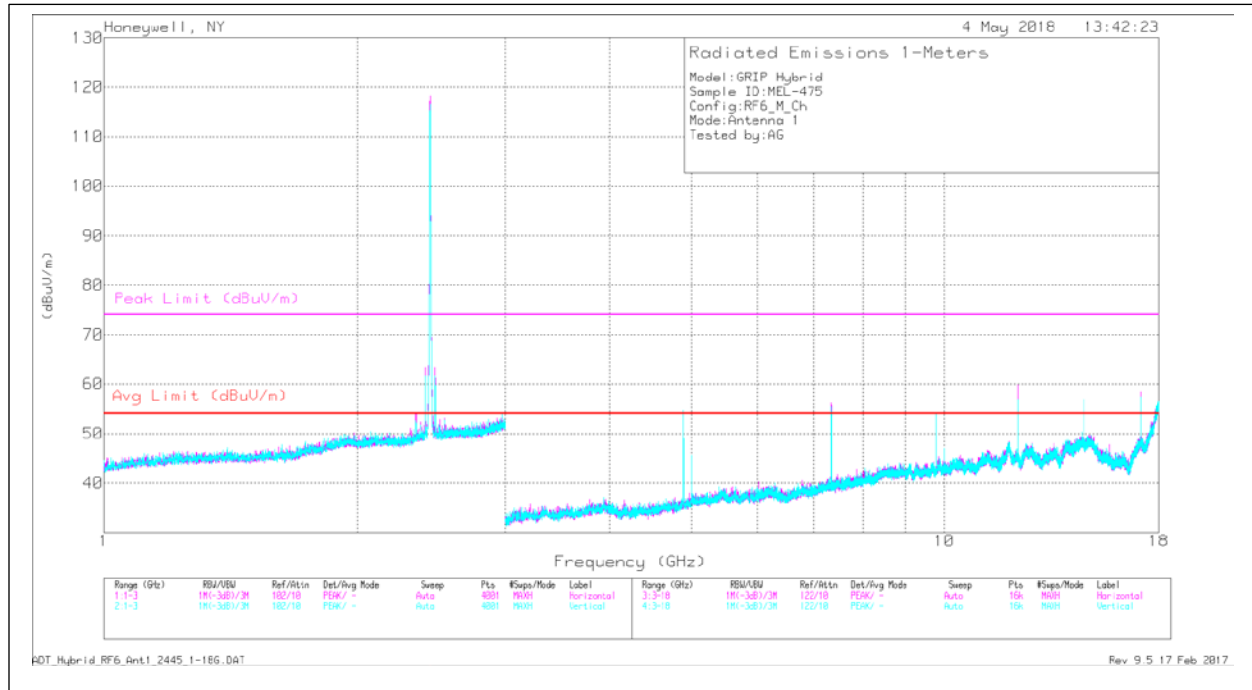
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - KDB558074 Method: Maximum Peak

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

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

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
* 4.889	55.15	PK	33.2	-41.4	3.7	3.6	54.25	74	-19.75	141	276	H
* 7.333	49.27	PK	36.6	-39.7	4.6	4.5	55.27	74	-18.73	279	307	H
9.782	42.15	PK	38.1	-39.1	5.5	5.3	51.95	74	-22.05	155	305	H
* 12.227	42.65	PK	39.2	-37.2	6.5	5.9	57.05	74	-16.95	35	280	H
14.667	39.39	PK	42.6	-36.9	6.7	6.4	58.19	74	-15.81	308	277	H
17.111	40.29	PK	41.1	-38.1	7.5	7	57.79	74	-16.21	37	363	H
* 4.891	51.2	PK	33.2	-41.4	3.7	3.6	50.3	74	-23.7	284	364	V
* 7.336	50.89	PK	36.6	-39.7	4.6	4.5	56.89	74	-17.11	26	286	V
9.778	42.49	PK	38.1	-39.1	5.5	5.3	52.29	74	-21.71	345	289	V
* 12.227	41.68	PK	39.2	-37.2	6.5	5.9	56.08	74	-17.92	158	221	V
14.673	39.28	PK	42.6	-36.9	6.6	6.4	57.98	74	-16.02	319	152	V
17.111	39.92	PK	41	-38.1	7.5	7	57.32	74	-16.68	145	119	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.889	55.15	Av	33.2	-41.4	3.7	3.6	-23.4	30.85	54	-23.15	141	276	H
* 7.333	49.27	Av	36.6	-39.7	4.6	4.5	-23.4	31.87	54	-22.13	279	307	H
* 12.227	42.65	Av	39.2	-37.2	6.5	5.9	-23.4	33.65	54	-20.35	35	280	H
* 4.891	51.2	Av	33.2	-41.4	3.7	3.6	-23.4	26.9	54	-27.1	284	364	V
* 7.336	50.89	Av	36.6	-39.7	4.6	4.5	-23.4	33.49	54	-20.51	26	286	V
* 12.227	41.68	Av	39.2	-37.2	6.5	5.9	-23.4	32.68	54	-21.32	158	221	V

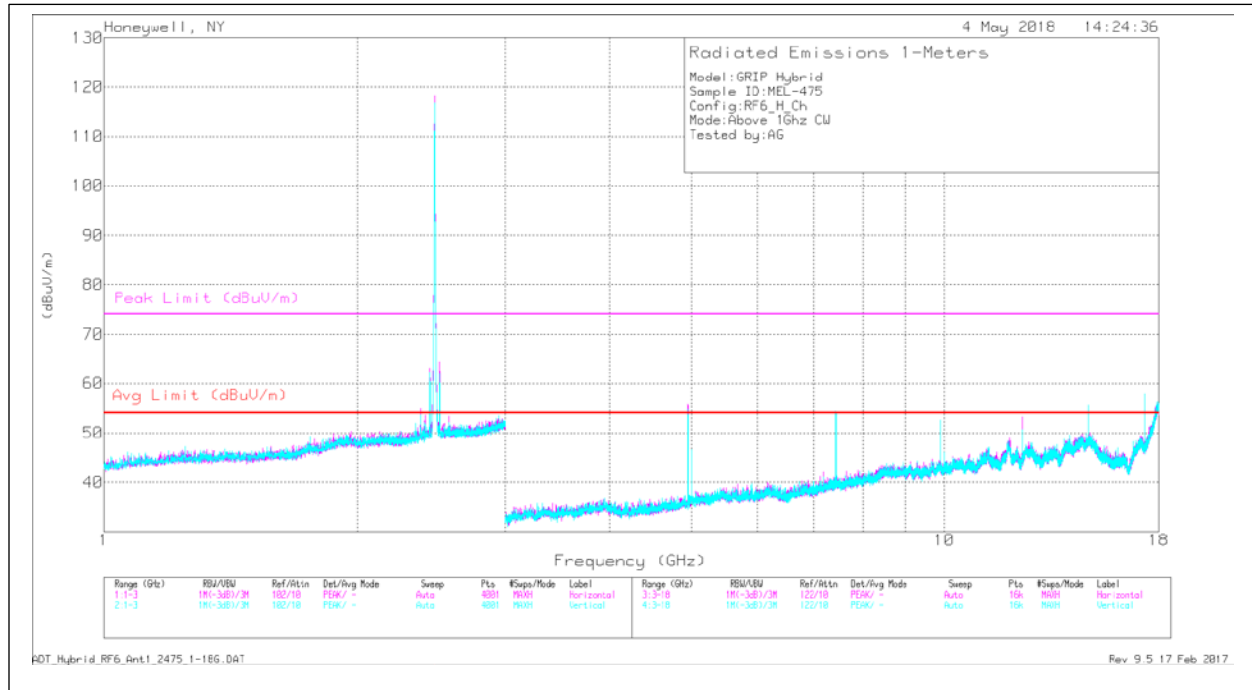
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - KDB558074 Method: Maximum Peak

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

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

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
* 4.952	43.55	PK	33.2	-41.5	3.8	3.7	42.75	74	-31.25	244	208	H
* 7.424	40.25	PK	36.7	-39.7	4.7	4.6	46.55	74	-27.45	283	183	H
9.903	38.79	PK	38.2	-39.2	5.5	5.3	48.59	74	-25.41	207	318	H
* 12.377	38.92	PK	38.9	-37.1	6.5	5.9	53.12	74	-20.88	215	194	H
14.852	30.27	PK	42	-36.9	6.8	6.5	48.67	74	-25.33	321	373	H
17.322	32.37	PK	42.4	-38.2	7.5	7.1	51.17	74	-22.83	178	352	H
* 4.954	43.45	PK	33.3	-41.6	3.8	3.7	42.65	74	-31.35	304	280	V
* 7.427	40.38	PK	36.7	-39.7	4.7	4.6	46.68	74	-27.32	252	343	V
9.899	39.07	PK	38.2	-39.2	5.5	5.2	48.77	74	-25.23	46	390	V
* 12.375	38.69	PK	38.9	-37.1	6.5	5.9	52.89	74	-21.11	333	289	V
14.846	26.78	PK	42	-36.9	6.8	6.5	45.18	74	-28.82	213	268	V
17.325	29.56	PK	42.4	-38.2	7.5	7.1	48.36	74	-25.64	295	105	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.952	43.55	Av	33.2	-41.5	3.8	3.7	-23.4	19.35	54	-34.65	244	208	H
* 7.424	40.25	Av	36.7	-39.7	4.7	4.6	-23.4	23.15	54	-30.85	283	183	H
* 12.377	38.92	Av	38.9	-37.1	6.5	5.9	-23.4	29.72	54	-24.28	215	194	H
* 4.954	43.45	Av	33.3	-41.6	3.8	3.7	-23.4	19.25	54	-34.75	304	280	V
* 7.427	40.38	Av	36.7	-39.7	4.7	4.6	-23.4	23.28	54	-30.72	252	343	V
* 12.375	38.69	Av	38.9	-37.1	6.5	5.9	-23.4	29.49	54	-24.51	333	289	V

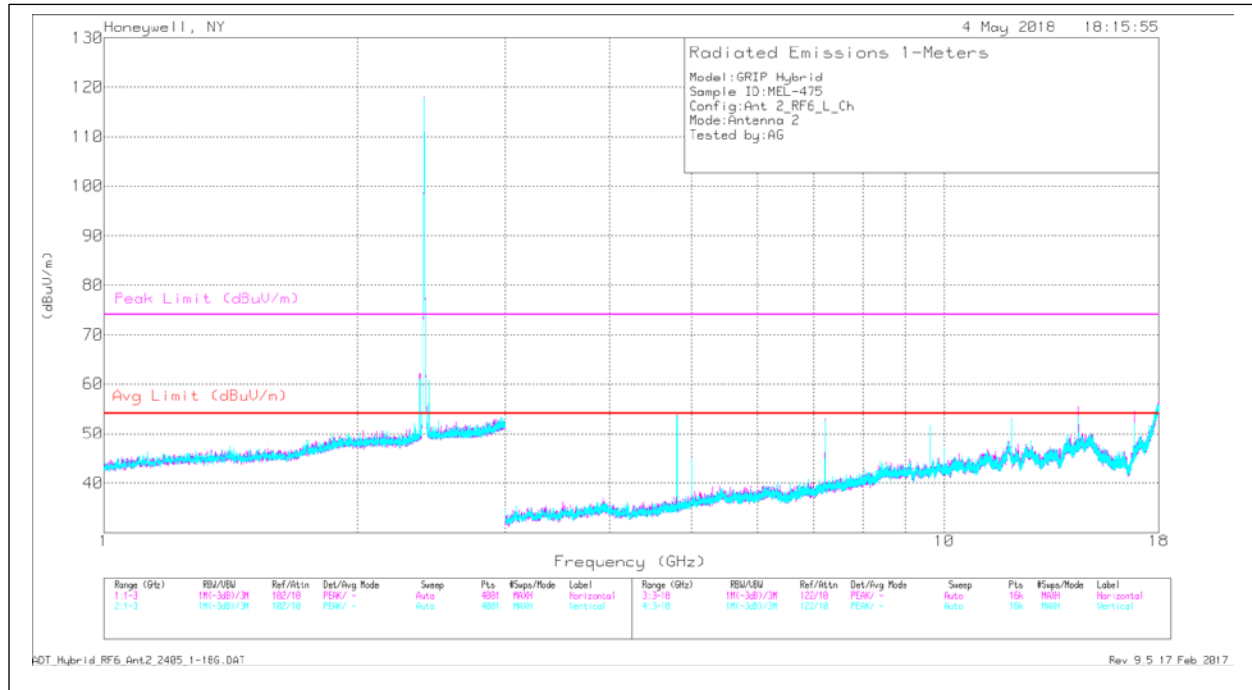
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - KDB558074 Method: Maximum Peak

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

Duty Cycle = 6.752%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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
* 4.81	42.94	PK	33.1	-41.2	3.7	3.7	42.24	74	-31.76	136	328	H
7.215	40.5	PK	36.2	-39.5	4.7	4.5	46.4	74	-27.6	20	295	H
9.616	38.69	PK	38	-39	5.6	5.2	48.49	74	-25.51	91	363	H
* 12.026	38.38	PK	39.4	-37.3	6.5	5.6	52.58	74	-21.42	335	218	H
14.433	27.9	PK	42.1	-36.9	6.8	6.4	46.3	74	-27.7	52	226	H
16.831	25.75	PK	39.6	-38.1	7.4	7.1	41.75	74	-32.25	121	203	H
* 4.814	42.98	PK	33.1	-41.2	3.7	3.7	42.28	74	-31.72	187	306	V
7.216	40.47	PK	36.2	-39.5	4.7	4.5	46.37	74	-27.63	236	190	V
9.621	38.5	PK	38	-39	5.6	5.2	48.3	74	-25.7	236	190	V
* 12.028	38.44	PK	39.4	-37.3	6.5	5.6	52.64	74	-21.36	47	374	V
14.431	26.31	PK	42.1	-36.9	6.8	6.4	44.71	74	-29.29	34	243	V
16.832	27.35	PK	39.6	-38.1	7.4	7.1	43.35	74	-30.65	287	344	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81	42.94	Av	33.1	-41.2	3.7	3.7	-23.4	18.84	54	-35.16	136	328	H
* 12.026	38.38	Av	39.4	-37.3	6.5	5.6	-23.4	29.18	54	-24.82	335	218	H
* 4.814	42.98	Av	33.1	-41.2	3.7	3.7	-23.4	18.88	54	-35.12	187	306	V
* 12.028	38.44	Av	39.4	-37.3	6.5	5.6	-23.4	29.24	54	-24.76	47	374	V

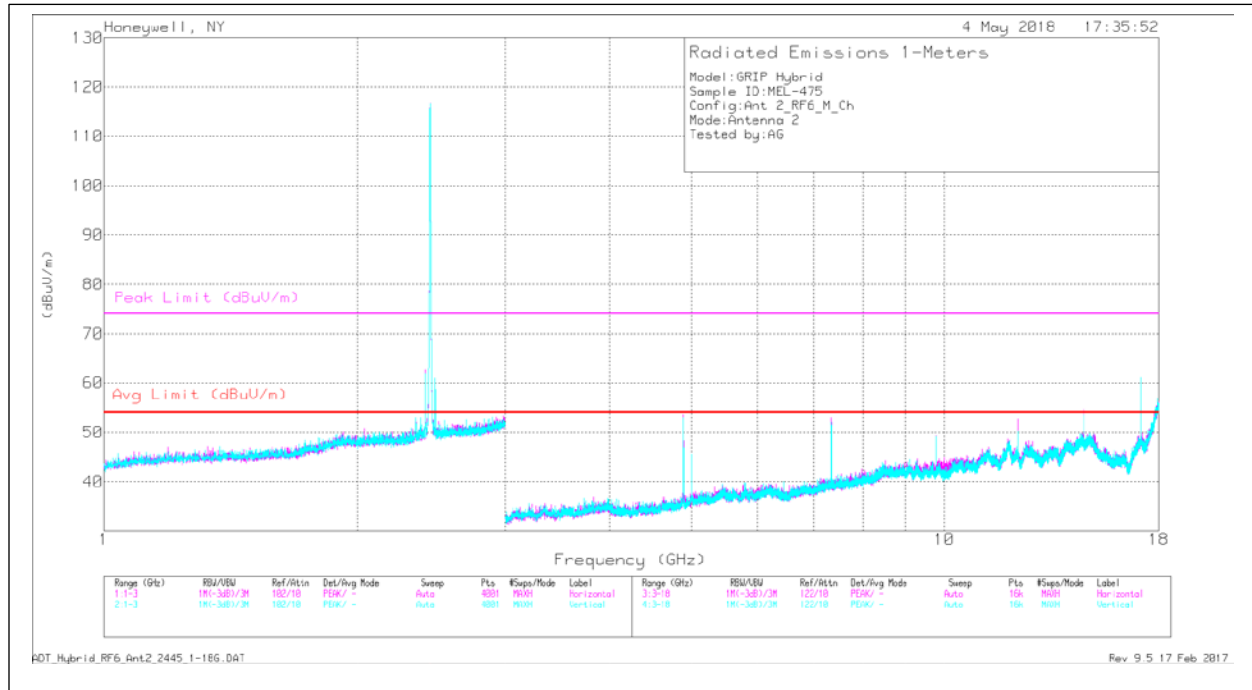
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - KDB558074 Method: Maximum Peak

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

Duty Cycle = 6.752%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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	55.85	PK	33.2	-41.4	3.7	3.6	54.95	74	-19.05	294	348	H
* 7.333	48.47	PK	36.6	-39.7	4.6	4.5	54.47	74	-19.53	311	368	H
9.777	38.22	PK	38.1	-39.1	5.5	5.3	48.02	74	-25.98	274	113	H
* 12.221	38.86	PK	39.2	-37.2	6.5	5.9	53.26	74	-20.74	23	394	H
14.67	39.25	PK	42.6	-36.9	6.7	6.4	58.05	74	-15.95	125	381	H
17.118	40.6	PK	41.1	-38.1	7.5	7	58.1	74	-15.9	147	171	H
* 4.891	55.19	PK	33.2	-41.4	3.7	3.6	54.29	74	-19.71	59	163	V
* 7.333	49.52	PK	36.6	-39.7	4.6	4.5	55.52	74	-18.48	29	255	V
9.782	40.39	PK	38.1	-39.1	5.5	5.3	50.19	74	-23.81	4	274	V
* 12.228	38.6	PK	39.2	-37.2	6.5	5.9	53	74	-21	308	121	V
14.675	39.08	PK	42.6	-36.9	6.6	6.4	57.78	74	-16.22	33	126	V
17.115	39.76	PK	41.1	-38.1	7.5	7	57.26	74	-16.74	357	134	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.891	55.85	Av	33.2	-41.4	3.7	3.6	-23.4	31.55	54	-22.45	294	348	H
* 7.333	48.47	Av	36.6	-39.7	4.6	4.5	-23.4	31.07	54	-22.93	311	368	H
* 12.221	38.86	Av	39.2	-37.2	6.5	5.9	-23.4	29.86	54	-24.14	23	394	H
* 4.891	55.19	Av	33.2	-41.4	3.7	3.6	-23.4	30.89	54	-23.11	59	163	V
* 7.333	49.52	Av	36.6	-39.7	4.6	4.5	-23.4	32.12	54	-21.88	29	255	V
* 12.228	38.6	Av	39.2	-37.2	6.5	5.9	-23.4	29.6	54	-24.4	308	121	V

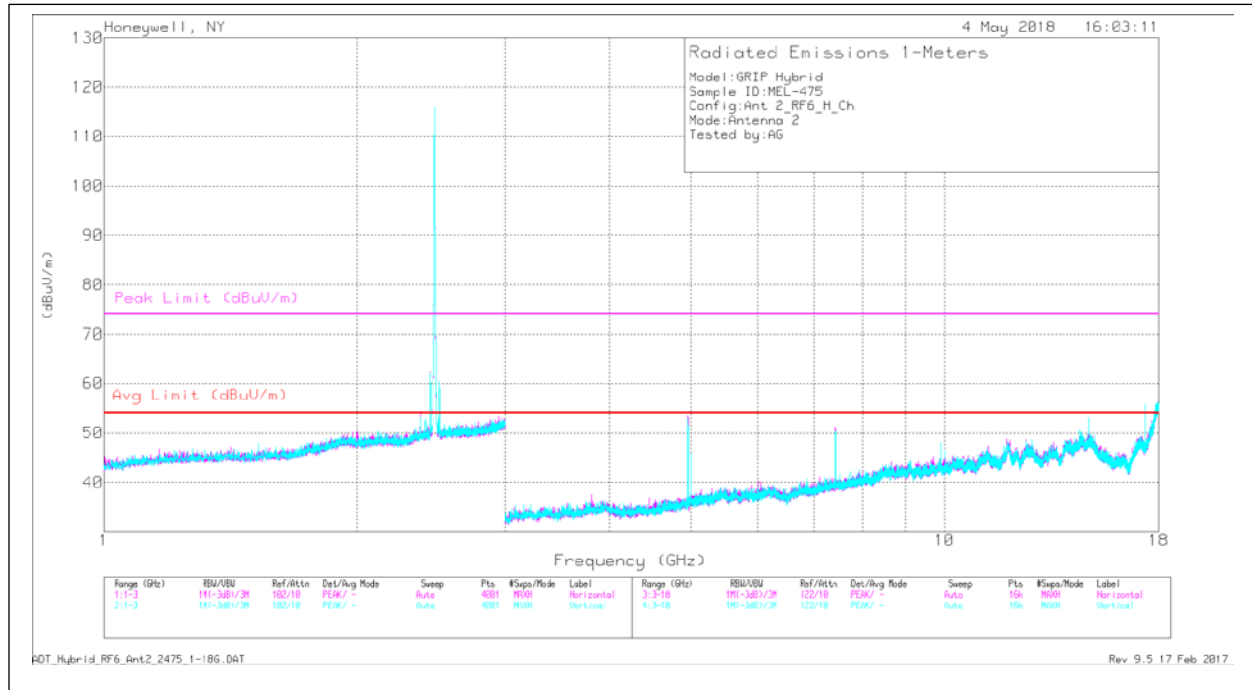
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - KDB558074 Method: Maximum Peak

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

Duty Cycle = 6.752%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

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	55.5	PK	33.2	-41.5	3.8	3.7	54.7	74	-19.3	319	127	H
* 7.426	46.13	PK	36.7	-39.7	4.7	4.6	52.43	74	-21.57	51	123	H
9.899	38.41	PK	38.2	-39.2	5.5	5.2	48.11	74	-25.89	334	183	H
* 12.377	38.48	PK	38.9	-37.1	6.5	5.9	52.68	74	-21.32	165	341	H
14.852	38.57	PK	42	-36.9	6.8	6.5	56.97	74	-17.03	57	190	H
17.324	39.72	PK	42.4	-38.2	7.5	7.1	58.52	74	-15.48	358	146	H
* 4.951	54.38	PK	33.2	-41.5	3.8	3.7	53.58	74	-20.42	60	224	V
* 7.423	47.42	PK	36.7	-39.7	4.7	4.6	53.72	74	-20.28	33	372	V
9.901	38.53	PK	38.2	-39.2	5.5	5.3	48.33	74	-25.67	237	275	V
* 12.38	38.3	PK	38.9	-37.1	6.5	5.9	52.5	74	-21.5	91	368	V
14.851	38.51	PK	42	-36.9	6.8	6.5	56.91	74	-17.09	87	198	V
17.325	40.06	PK	42.4	-38.2	7.5	7.1	58.86	74	-15.14	217	190	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX2 [dB]	SMA7 [dB]	SMA5 [dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Av Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.951	55.5	Av	33.2	-41.5	3.8	3.7	-23.4	31.3	54	-22.7	319	127	H
* 7.426	46.13	Av	36.7	-39.7	4.7	4.6	-23.4	29.03	54	-24.97	51	123	H
* 12.377	38.48	Av	38.9	-37.1	6.5	5.9	-23.4	29.28	54	-24.72	165	341	H
* 4.951	54.38	Av	33.2	-41.5	3.8	3.7	-23.4	30.18	54	-23.82	60	224	V
* 7.423	47.42	Av	36.7	-39.7	4.7	4.6	-23.4	30.32	54	-23.68	33	372	V
* 12.38	38.3	Av	38.9	-37.1	6.5	5.9	-23.4	29.1	54	-24.9	91	368	V

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

PK - KDB558074 Method: Maximum Peak

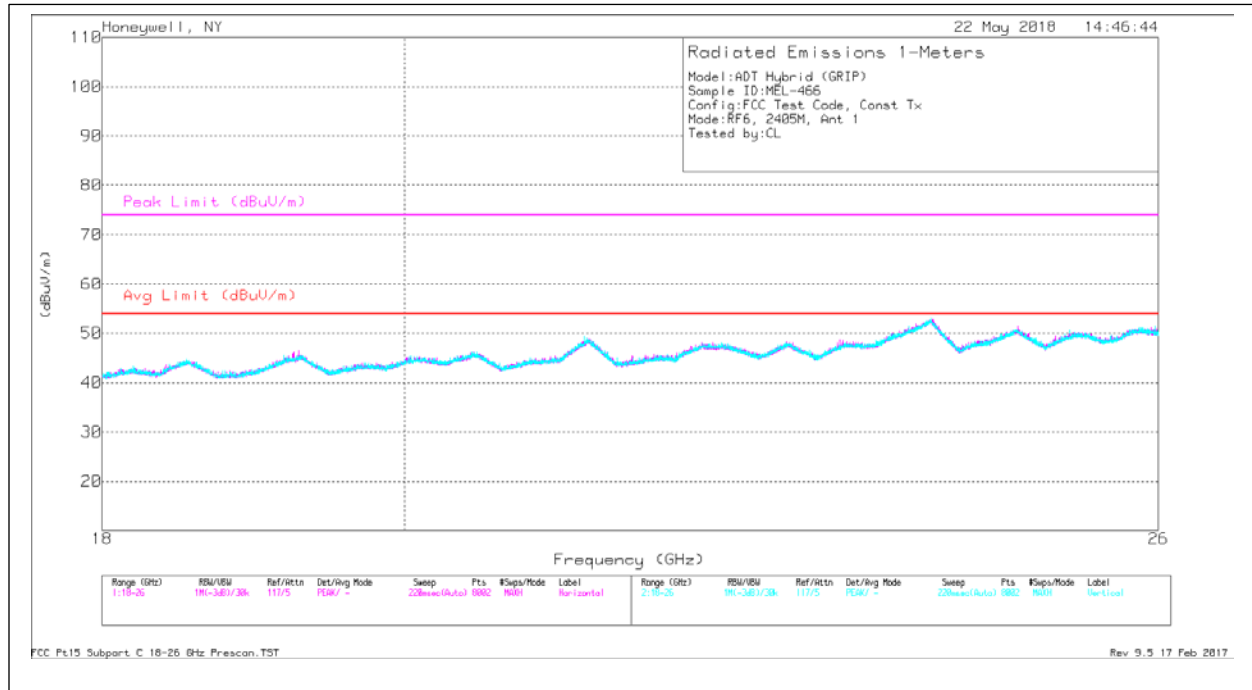
Av - KDB558074 Method: PK + DC Corr (Duty Cycle Correction Factor)

Duty Cycle = 6.752%, thus DC Corr = $20\log(0.06752) = -23.4\text{dB}$

Antenna 2: High Channel – Data

18-26GHz

Note: No emissions detected above the system noise floor



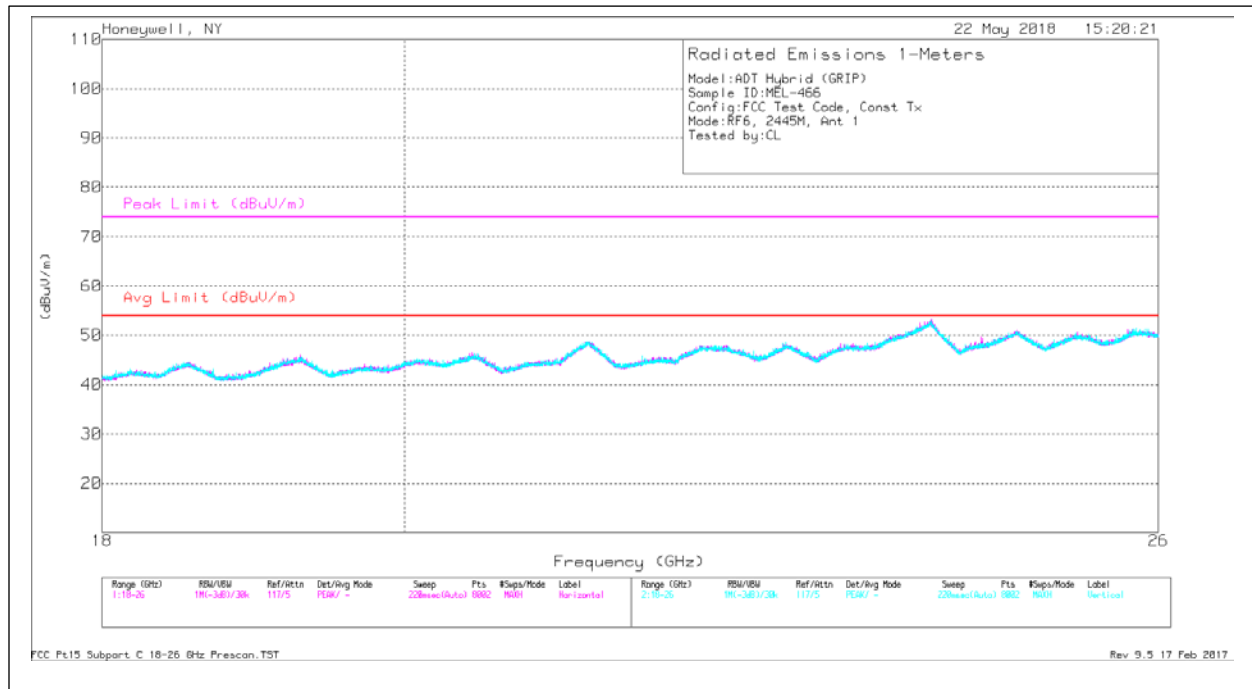
Antenna 1: Low Channel - Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB/m]	SMA 8 [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)	Height (cm)	Polarity
* 19.273	39.02	Pk	44.3	7.2	-34.5	-9.5	46.52	54	-7.48	74	-27.48	0-360	100	H
* 21.324	37.78	Pk	44.9	7.7	-32	-9.5	48.88	54	-5.12	74	-25.12	0-360	100	H
24.033	38.5	Pk	46.3	8.2	-30.6	-9.5	52.9	54	-1.1	74	-21.1	0-360	100	H
* 19.287	37.84	Pk	44.3	7.2	-34.3	-9.5	45.54	54	-8.46	74	-28.46	0-360	100	H
* 21.308	38.03	Pk	44.9	7.7	-32.1	-9.5	49.03	54	-4.97	74	-24.97	0-360	100	H
24.022	38.28	Pk	46.3	8.2	-30.3	-9.5	52.98	54	-1.02	74	-21.02	0-360	100	H

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

Pk - Peak detector

Antenna 1: Low Channel - Data



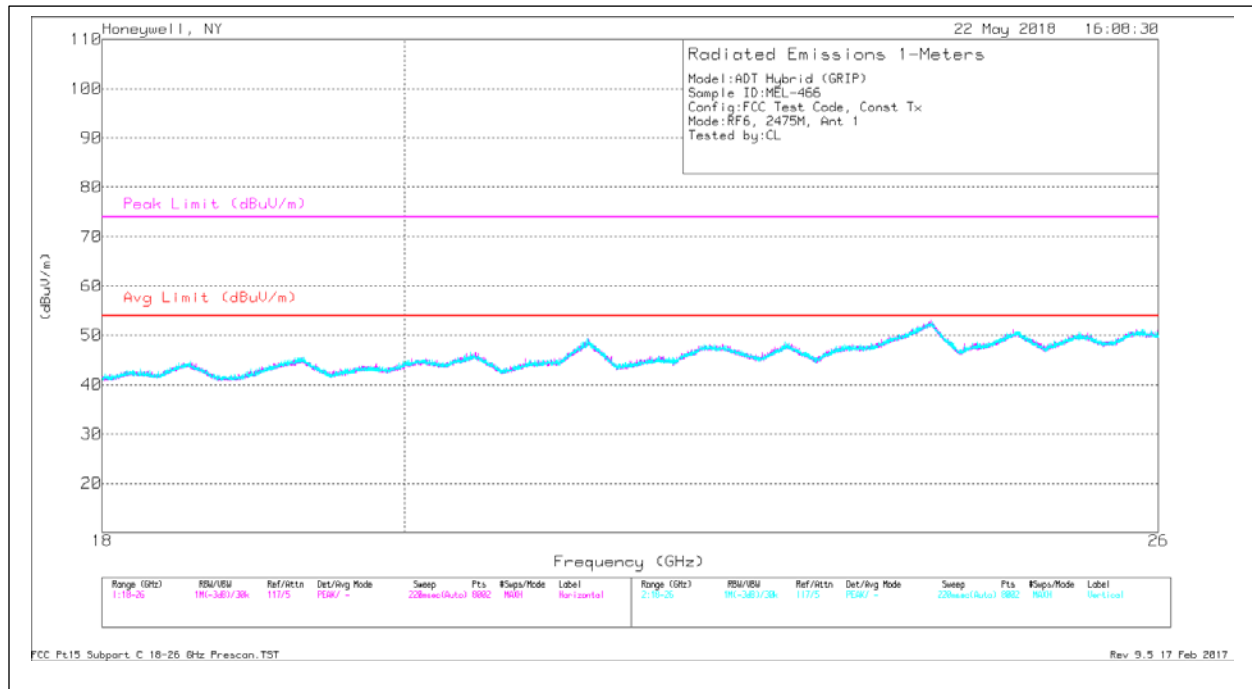
Antenna 1: Mid Channel - Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB/m]	SMA 8 [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)	Height (cm)	Polarity
* 19.283	38.41	Pk	44.3	7.2	-34.4	-9.5	46.01	54	-7.99	74	-27.99	0-360	100	H
* 21.305	37.61	Pk	44.9	7.7	-32.1	-9.5	48.61	54	-5.39	74	-25.39	0-360	100	H
24.023	38.43	Pk	46.3	8.2	-30.3	-9.5	53.13	54	-0.87	74	-20.87	0-360	100	H
* 19.282	38	Pk	44.3	7.2	-34.4	-9.5	45.6	54	-8.4	74	-28.4	0-360	100	H
* 21.327	37.77	Pk	44.9	7.7	-32.1	-9.5	48.77	54	-5.23	74	-25.23	0-360	100	H
24.022	38.26	Pk	46.3	8.2	-30.3	-9.5	52.96	54	-1.04	74	-21.04	0-360	100	H

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

Pk - Peak detector

Antenna 1: Mid Channel - Data



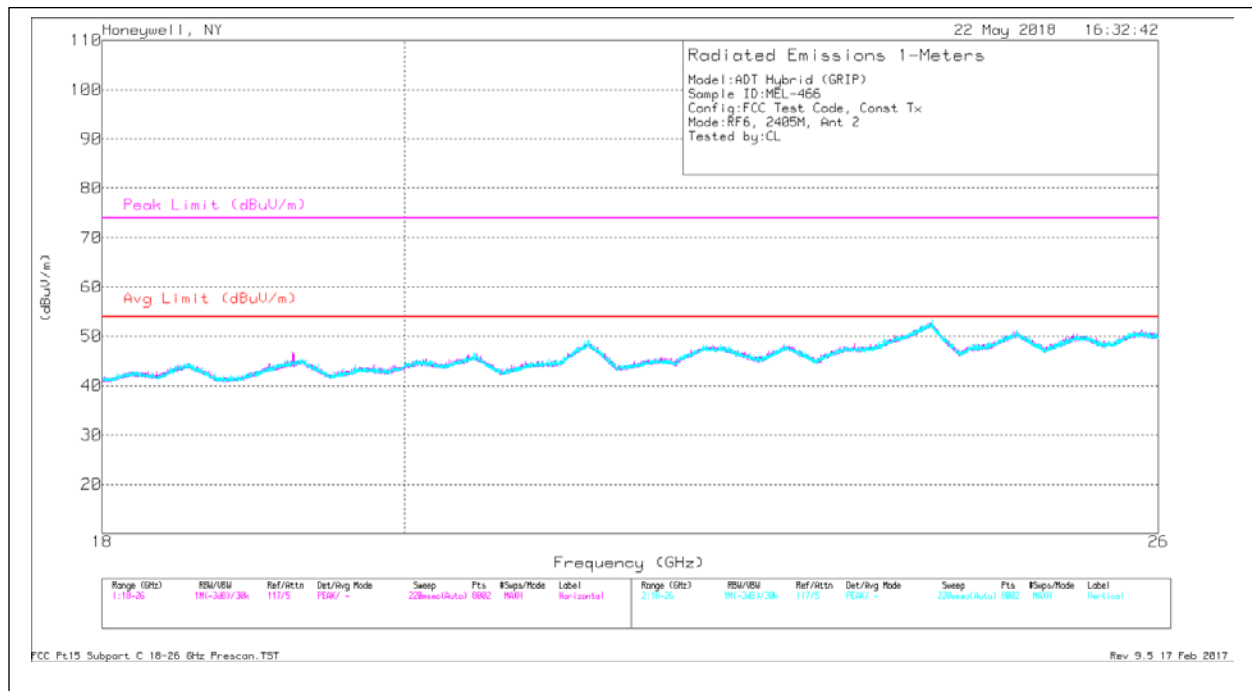
Antenna 1: High Channel - Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB/m]	SMA 8 [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)	Height (cm)	Polarity
* 19.294	37.66	Pk	44.3	7.2	-34.3	-9.5	45.36	54	-8.64	74	-28.64	0-360	100	H
* 21.321	38.3	Pk	44.9	7.7	-32	-9.5	49.4	54	-4.6	74	-24.6	0-360	100	H
24.036	38.07	Pk	46.3	8.2	-30.7	-9.5	52.37	54	-1.63	74	-21.63	0-360	100	H
* 19.301	37.73	Pk	44.3	7.2	-34.2	-9.5	45.53	54	-8.47	74	-28.47	0-360	100	H
* 21.315	38.21	Pk	44.9	7.7	-31.9	-9.5	49.41	54	-4.59	74	-24.59	0-360	100	H
24.011	37.9	Pk	46.3	8.2	-30.4	-9.5	52.5	54	-1.5	74	-21.5	0-360	100	H

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

Pk - Peak detector

Antenna 1: High Channel – Data



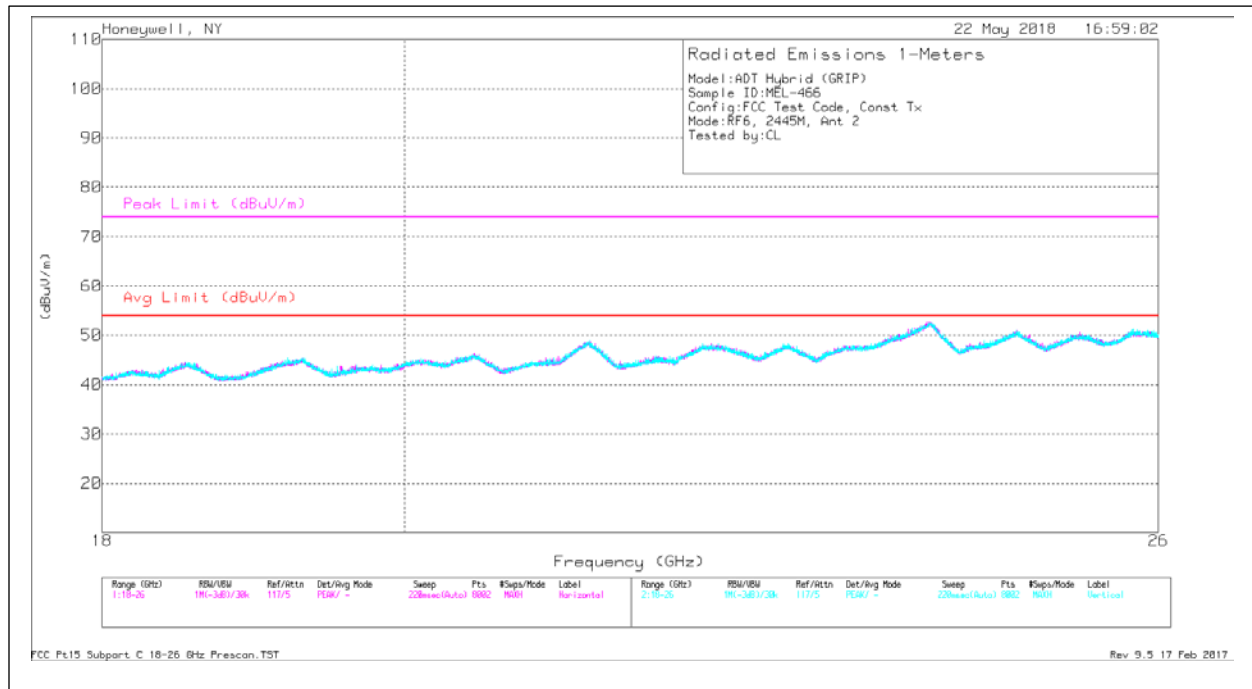
Antenna 2: Low Channel - Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB/m]	SMA 8 [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)	Height (cm)	Polarity
* 19.235	39.74	Pk	44.2	7.2	-34.9	-9.5	46.74	54	-7.26	74	-27.26	0-360	100	H
* 21.319	37.55	Pk	44.9	7.7	-31.9	-9.5	48.75	54	-5.25	74	-25.25	0-360	100	H
24.02	38.02	Pk	46.3	8.2	-30.3	-9.5	52.72	54	-1.28	74	-21.28	0-360	100	H
* 19.256	37.89	Pk	44.2	7.2	-34.7	-9.5	45.09	54	-8.91	74	-28.91	0-360	100	H
* 21.308	37.9	Pk	44.9	7.7	-32.1	-9.5	48.9	54	-5.1	74	-25.1	0-360	100	H
24.031	38.88	Pk	46.3	8.2	-30.5	-9.5	53.38	54	-0.62	74	-20.62	0-360	100	H

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

Pk - Peak detector

Antenna 2: Low Channel - Data



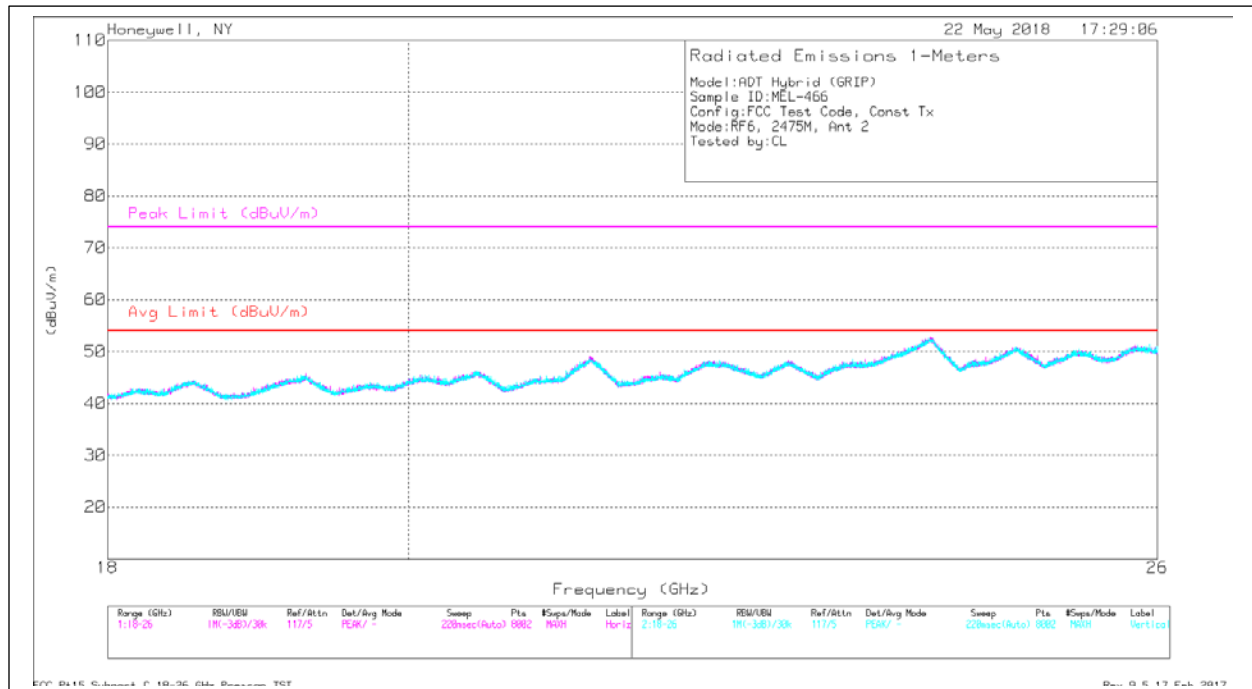
Antenna 2: Mid Channel - Plot

Frequency (GHz)	Meter Reading (dBuV)	Det	Horn ACF [dB/m]	SMA 8 [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)	Height (cm)	Polarity
* 19.302	37.56	Pk	44.3	7.2	-34.3	-9.5	45.26	54	-8.74	74	-28.74	0-360	100	H
* 21.337	37.89	Pk	44.9	7.7	-32.3	-9.5	48.69	54	-5.31	74	-25.31	0-360	100	H
24.006	38.26	Pk	46.3	8.2	-30.5	-9.5	52.76	54	-1.24	74	-21.24	0-360	100	H
* 19.258	37.87	Pk	44.2	7.2	-34.7	-9.5	45.07	54	-8.93	74	-28.93	0-360	100	H
21.427	38.07	Pk	44.9	7.7	-34.4	-9.5	46.77	54	-7.23	74	-27.23	0-360	100	H
24.746	38.5	Pk	46	8.4	-32.5	-9.5	50.9	54	-3.1	74	-23.1	0-360	100	H

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

Pk - Peak detector

Antenna 2: Mid Channel - Data



Antenna 2: High Channel - Plot

Frequency (GHz)	Meter Reading (dBUV)	Det	Horn ACF [dB/m]	SMA 8 [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)	Height (cm)	Polarity
* 19.297	37.91	Pk	44.3	7.2	-34.2	-9.5	45.71	54	-8.29	74	-28.29	0-360	100	H
* 21.316	37.89	Pk	44.9	7.7	-31.9	-9.5	49.09	54	-4.91	74	-24.91	0-360	100	H
24.012	38.16	Pk	46.3	8.2	-30.4	-9.5	52.76	54	-1.24	74	-21.24	0-360	100	H
* 19.283	37.66	Pk	44.3	7.2	-34.4	-9.5	45.26	54	-8.74	74	-28.74	0-360	100	H
* 21.319	37.59	Pk	44.9	7.7	-31.9	-9.5	48.79	54	-5.21	74	-25.21	0-360	100	H
24.031	37.93	Pk	46.3	8.2	-30.5	-9.5	52.43	54	-1.57	74	-21.57	0-360	100	H

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

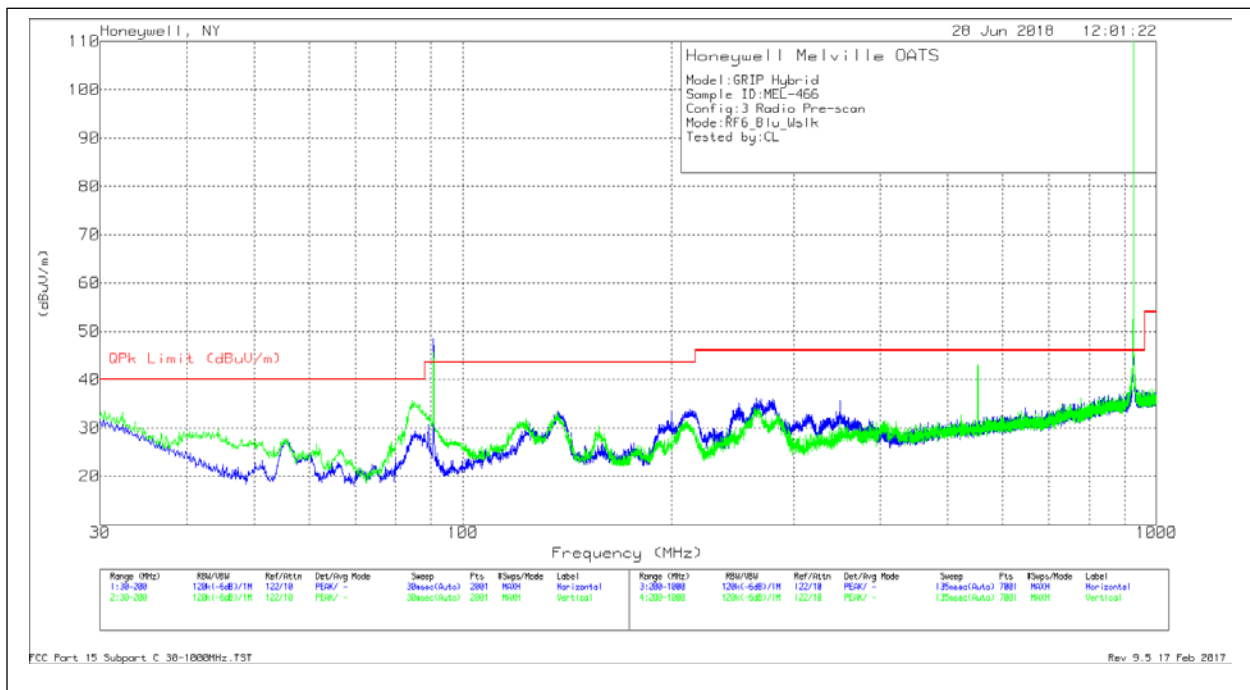
Pk - Peak detector

Antenna 2: High Channel – Data

Simultaneous Transmission

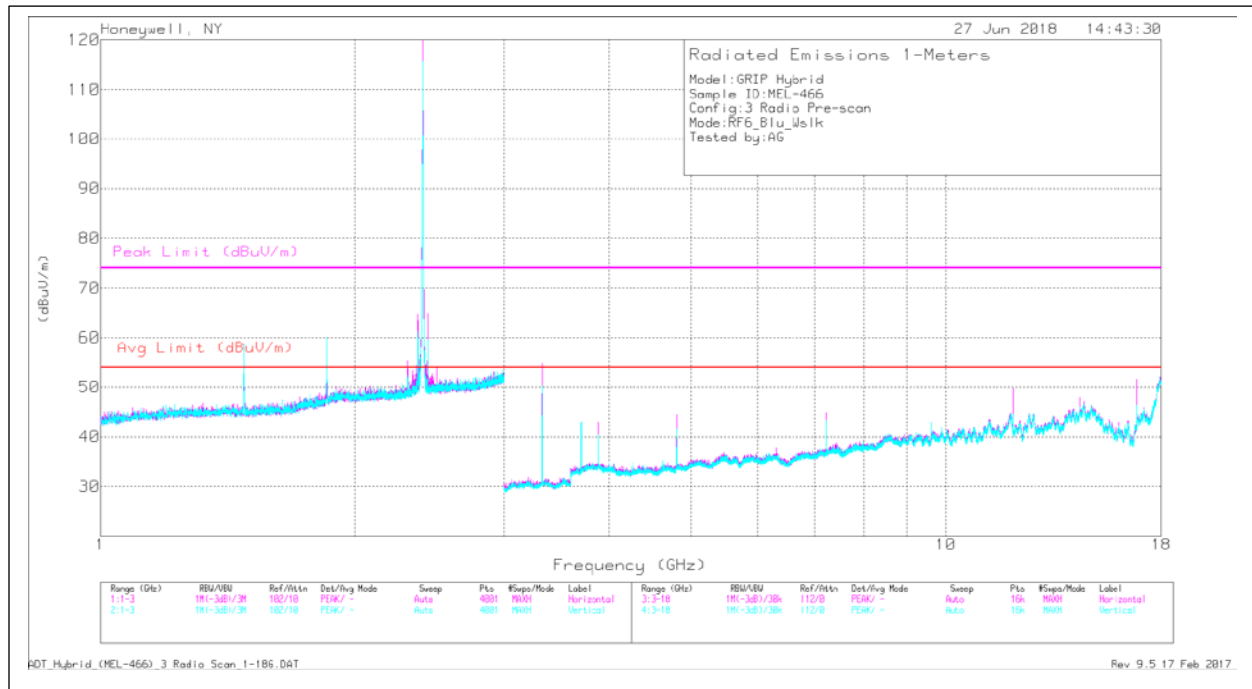
Configuration (Worse-case):

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



30-1000MHz – Plot

Note: No additional emissions generated by simultaneous transmission



1-18GHz – Plot

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
3.331	59.65	Pk	31.4	3	-40.6	-9.5	.9	20	64.85	74	-9.15	0-360	100	H
7.215	43.28	Pk	36.2	4.4	-39.6	-9.5	.1	20	54.88	74	-19.12	0-360	100	H
14.43	38.3	Pk	42.1	6.8	-40.7	-9.5	.9	20	57.9	74	-16.1	0-360	100	H
16.835	43.37	Pk	39.6	6.8	-39.6	-9.5	1	20	61.67	74	-12.33	0-360	100	H
3.331	55.07	Pk	31.4	3	-40.6	-9.5	.9	20	60.27	74	-13.73	0-360	100	V
7.214	41.82	Pk	36.2	4.4	-39.6	-9.5	.1	20	53.42	74	-20.58	0-360	100	V
14.592	36.02	Pk	42.5	6.6	-39.8	-9.5	.9	20	56.72	74	-17.28	0-360	100	V
16.835	38.14	Pk	39.6	6.8	-39.6	-9.5	1	20	56.44	74	-17.56	0-360	100	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	SWBOX3 [dB]	SMA7 [dB]	SMA5 [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	PK2	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
* 3.7	22.18	PK2	32.2	1	3.3	3.2	61.88	-	-	74	-12.12	104	257	H
* 3.705	10.64	MAv1	32.2	1	3.3	3.2	50.34	54	-3.66	-	-	104	257	H
* 1.479	25.69	PK2	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
* 3.708	22.66	PK2	32.3	1	3.3	3.2	62.46	-	-	74	-11.54	82	160	V
* 3.705	10.43	MAv1	32.2	1	3.3	3.2	50.13	54	-3.87	-	-	82	160	V

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

Pk – Peak Detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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 CFR 47 Subpart B, 15.107 ICES-003	0.15-0.5	66 to 56	56 to 46
	0.5-5	56	46
	5-30	60	50

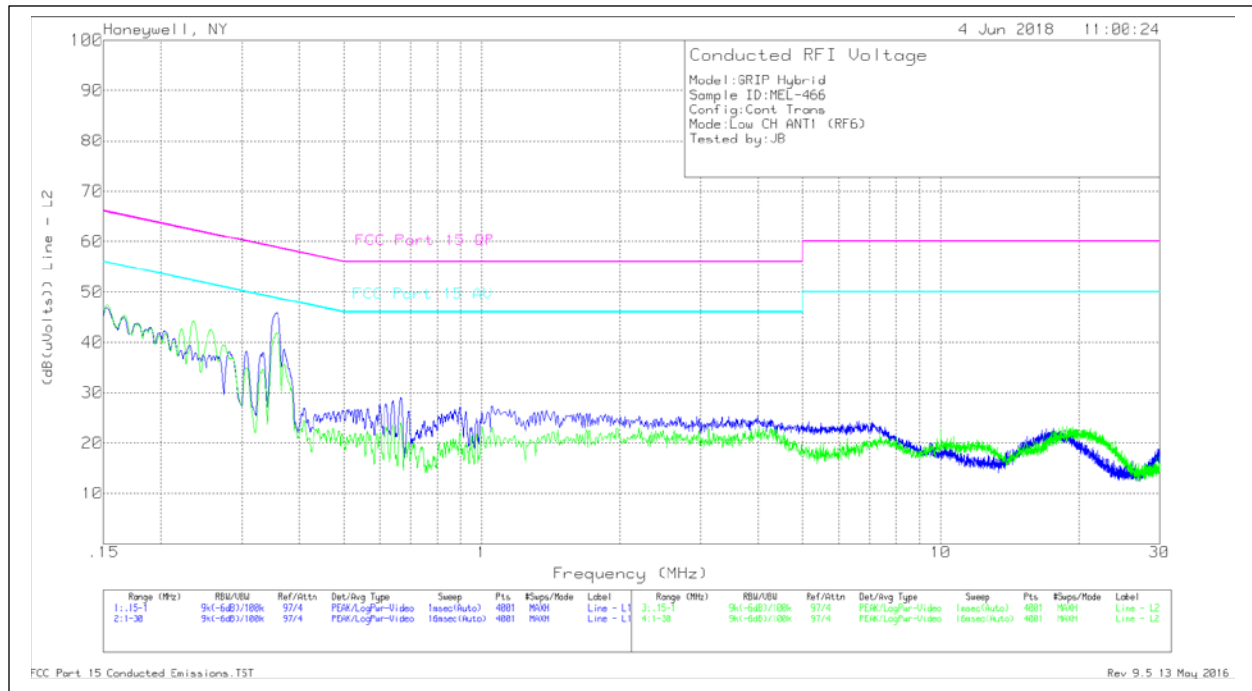
Test Information

Tester	Test Location	Date	Temperature (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	06/04/18	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)



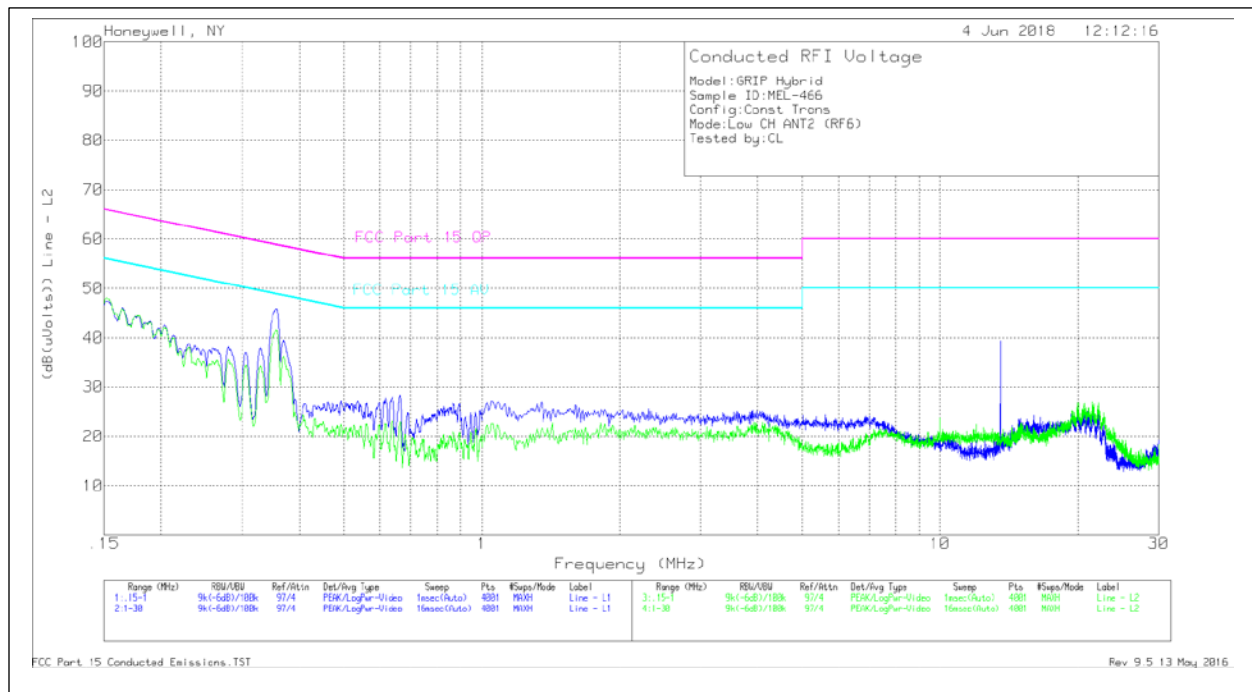
Antenna 1 Low Channel - Plot

Line - Hot									
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)
.35597	35.76	Pk	10	.1	45.86	58.82	-12.96	48.82	-2.96
.37109	28.6	Pk	10	0	38.6	58.48	-19.88	48.48	-9.88
.66589	19.05	Pk	9.9	0	28.95	56	-27.05	46	-17.05
3.99425	15.42	Pk	9.9	.1	25.42	56	-30.58	46	-20.58
16.82313	11.77	Pk	10.2	.2	22.17	60	-37.83	50	-27.83
1.05438	17.42	Pk	9.9	0	27.32	56	-28.68	46	-18.68

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)
.23552	33.83	Pk	10.3	.1	44.23	62.25	-18.02	52.25	-8.02
.25671	32.43	Pk	10.2	0	42.63	61.54	-18.91	51.54	-8.91
.35704	31.58	Pk	10.1	.1	41.78	58.8	-17.02	48.8	-7.02
.65971	10.54	Pk	10	0	20.54	56	-35.46	46	-25.46
1	13.04	Pk	10	0	23.04	56	-32.96	46	-22.96
19.0815	12.16	Pk	10.3	.3	22.76	60	-37.24	50	-27.24

Pk - Peak detector

Antenna 1 Low Channel – Data



Continuous Transmit Antenna 2 - Plot

Line - Hot									
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)
.15277	36.73	Pk	10.6	0	47.33	65.85	-18.52	55.85	-8.52
.35523	35.69	Pk	10	0	45.69	58.84	-13.15	48.84	-3.15
.66344	18.47	Pk	9.9	0	28.37	56	-27.63	46	-17.63
1.05075	17.34	Pk	9.9	0	27.24	56	-28.76	46	-18.76
13.557	29	Pk	10.1	.2	39.3	60	-20.7	50	-10.7
21.00275	14.28	Pk	10.4	.3	24.98	60	-35.02	50	-25.02

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)
.15181	37.45	Pk	10.6	0	48.05	65.9	-17.85	55.9	-7.85
.35586	31.38	Pk	10.1	.1	41.58	58.82	-17.24	48.82	-7.24
.63639	13.17	Pk	10	0	23.17	56	-32.83	46	-22.83
1.058	12.67	Pk	10	0	22.67	56	-33.33	46	-23.33
9.99725	13.58	Pk	10	.2	23.78	60	-36.22	50	-26.22
21.5175	16.22	Pk	10.5	.3	27.02	60	-32.98	50	-22.98

Pk - Peak detector

Continuous Transmit Antenna 2 - Data

END OF REPORT