

Honeywell

FCC / ISED Test Report

For

GRIP Defender Panel

Report #: 50346-D2

FCC ID: CFS8DL-GRIPDF

IC ID: 573F-GRIPDF

Report Completion Date: 2018-10-25

Prepared by and for:

Ademco Inc.

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Testing

NVLAP Lab Code: 600110

Document Introduction

Ademco Inc. 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 Ademco Inc. 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 Ademco Inc. 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 Ademco Inc. and all revisions are duly noted in the revisions section. Any alterations of this document not carried out by Ademco Inc. 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	2018-10-19
A	M. Antola	A. Roussin	Updated radiated spurious data; added clarification to equipment list	2018-10-25

Report Authorization

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Applicable Test Standards/Limits

Test Standards/Limits	Result	Dates Tested
ANSI C63.10: 2013	Compliant	09/25/2018 – 10/25/2018
RSS-247, Issue 2, Section 5	Compliant	09/25/2018 – 10/25/2018
RSS-GEN, Issue 4	Compliant	09/25/2018 – 10/25/2018
CFR 47 Pt 15 Subpart C, Section 15.207/209	Compliant	09/25/2018 – 10/25/2018
CFR 47 Pt 15 Subpart C, Section 15.247	Compliant	09/25/2018 – 10/25/2018

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. Ademco Inc. 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 Global Residential Intrusion Platform (GRIP) Defender solution consists of a panel with a push-button interface and small LED 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. The EUT is AC powered with a battery back-up.

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 Wiselink portion of the EUT. This report contains only radiated data. Conducted data is being leveraged from a previous certification (FCC ID: CFS8DL-GRIPAIO7, IC: 573F-GRIPAIO7) based on similarities. See test report exhibit titled "AIO 7-INCH EXHIBIT 5-3A FCC_ISED Test Report Wiselink" for details.

The Wiselink circuitry contains a single integral PCB antenna with a gain of 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 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-549	Non-serialized production unit	09/14/2018
MEL-550	Non-serialized production unit	09/14/2018

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	Radiated Emissions (Intentional)	PASS
2	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	05/04//2018-05/07/2018	23	14.6	1010	P

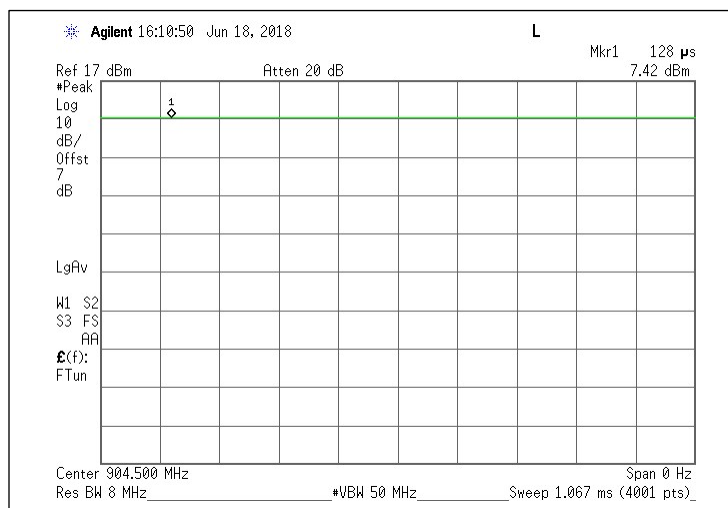
Equipment List

Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
Spectrum Analyzer	11549	MY46187211	Agilent	E4440A	06/06/17	06/06/19

Test Results

On Time (usec)	Period (usec)	Duty Cycle	Duty Cycle (%)
128	128	1	100

Duty Cycle Plot



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 10 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	09/25/18-10/18/18	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. 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

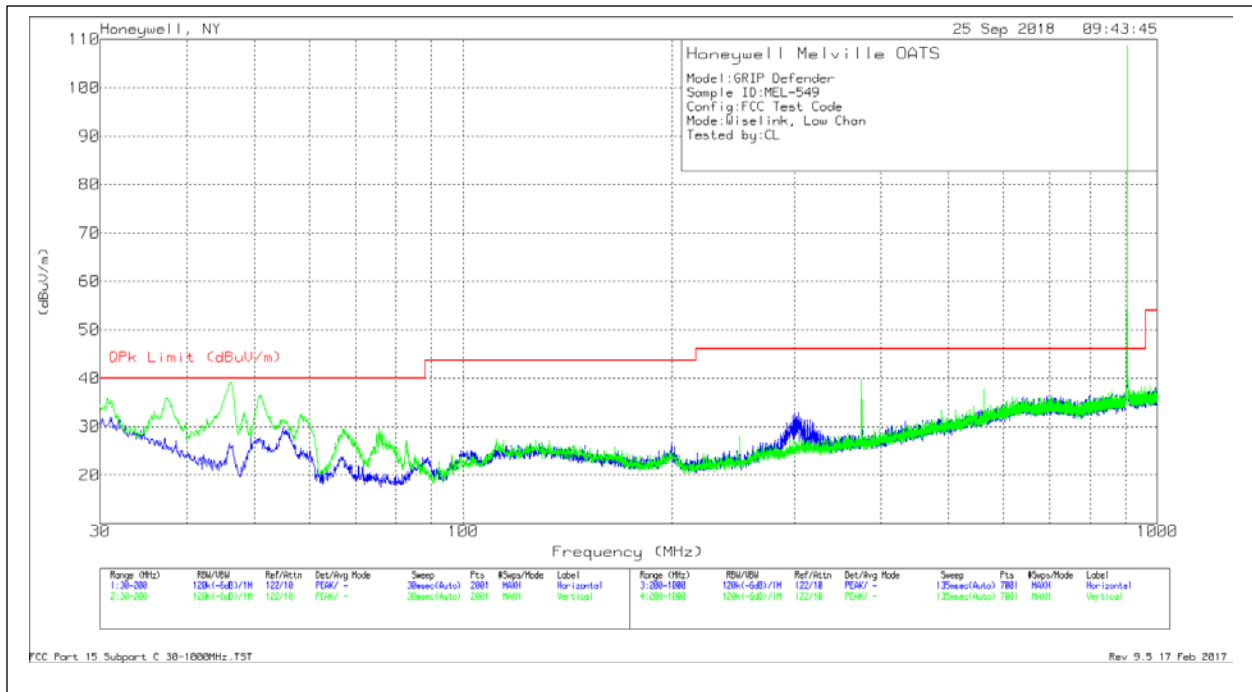
Instrument Type	ID #	Serial #	Manufacturer	Model	Cal Date	Cal Due Date
RF Chamber						
Spectrum Analyzer	11496	100303	Rohde & Schwarz	FSU26	04/11/18	04/11/19
Loop Antenna (9kHz-30MHz)	11535	121080	Com-Power	AL-130R	10/17/18	10/17/19
Bilog Antenna (30MHz-5GHz)	11311	A022406	Sunol	JB5	02/01/18	02/01/19
Horn Antenna (1-18GHz)	2319	2317	EMCO	3115	01/10/18	01/10/19
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
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
OATS						
Spectrum Analyzer	11545	103125	Rohde & Schwarz	FSW26	02/21/18	02/21/19
Bilog Antenna (30MHz-6GHz)	11534	A012816	Sunol	JB6	03/27/18	03/27/19
Horn Antenna (1-18GHz)	2973	3127	EMCO	RGA-60	01/22/18	01/22/19
Preamp (800MHz-21GHz)	11538	233701631	Mini Circuits	ZVA-213-S+	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

All testing performed using equipment that remained within the calibration cycle at the time of testing.

Test Results

Spurious Emissions

Below 1GHz



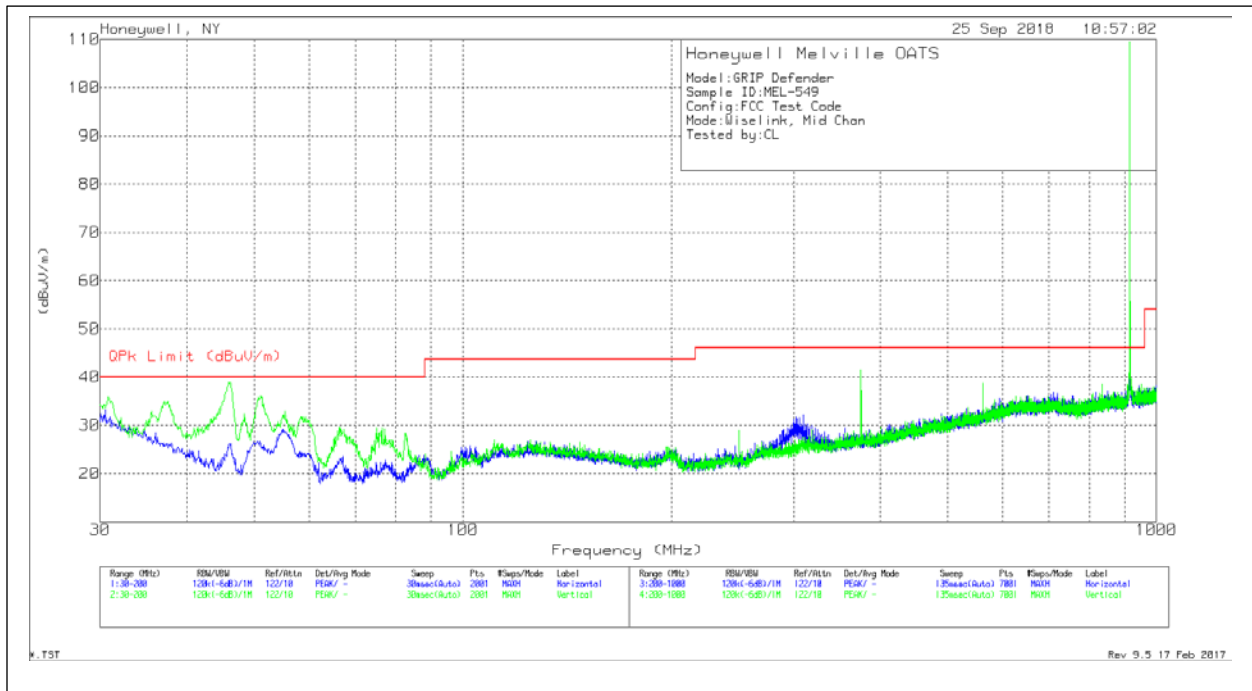
Low Channel - Plot

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
30.8021	11.03	Qp	24.3	.9	36.23	40	-3.77	263	385	H
54.3162	18.43	Qp	12.1	1.1	31.63	40	-8.37	308	391	H
30.8092	11.37	Qp	24.3	.9	36.57	40	-3.43	244	326	V
* 37.557	10.78	Qp	19.5	1	31.28	40	-8.72	254	149	V
46.2247	15.91	Qp	14.3	1	31.21	40	-8.79	139	261	V
299.6372	4.55	Qp	18	3.2	25.75	46.02	-20.27	113	282	H

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

Qp - Quasi-Peak detector

Low Channel - Data



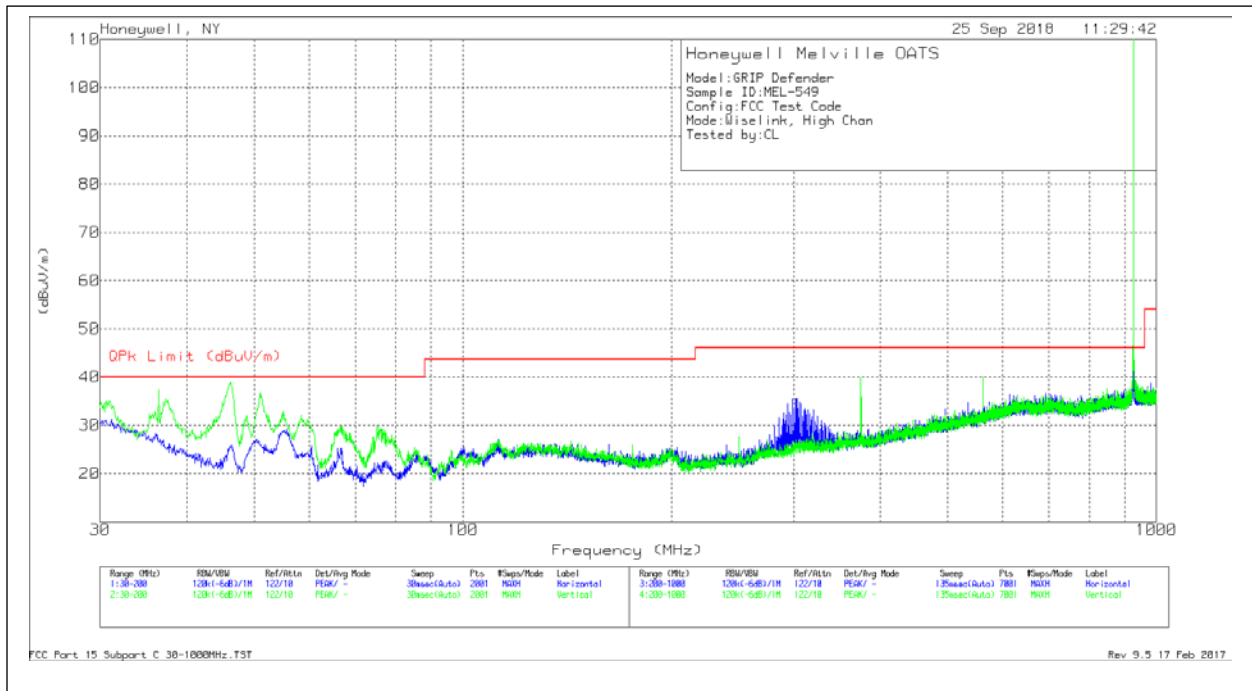
Mid Channel - Plot

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
30.4101	11.01	Qp	24.5	.9	36.41	40	-3.59	238	168	H
55.1195	15.6	Qp	12	1.1	28.7	40	-11.3	135	356	H
46.1025	13.11	Qp	14.4	1	28.51	40	-11.49	173	104	V
50.5677	19.29	Qp	12.3	1.1	32.69	40	-7.31	14	165	V
310.0973	4.71	Qp	18.2	3.4	26.31	46.02	-19.71	175	336	H
375.3304	4.35	Qp	19.1	3.8	27.25	46.02	-18.77	315	175	V

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

Qp - Quasi-Peak detector

Mid Channel - Data



High Channel - Plot

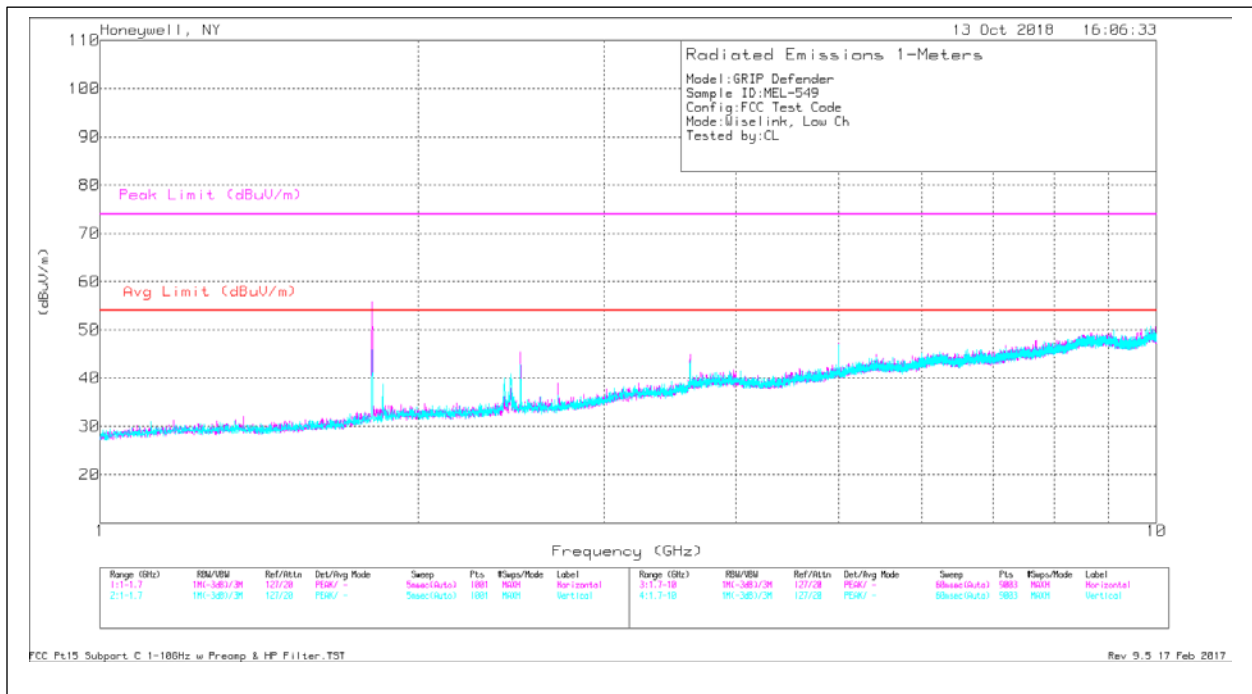
Frequency (MHz)	Meter Reading (dBuV)	Det	AF_JB6 [dB/m]	Cable 1 [dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
30.8475	10.94	Qp	24.2	.9	36.04	40	-3.96	218	354	H
55.9286	14.08	Qp	12	1.1	27.18	40	-12.82	333	326	H
36.0251	10.95	Qp	20.5	1	32.45	40	-7.55	39	168	V
50.7801	20.89	Qp	12.2	1	34.09	40	-5.91	104	325	V
46.4463	16.98	Qp	14.2	1	32.18	40	-7.82	348	113	V
302.859	6.85	Qp	18	3.3	28.15	46.02	-17.87	18	139	H

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

Qp - Quasi-Peak detector

High Channel - Data

Above 1GHz

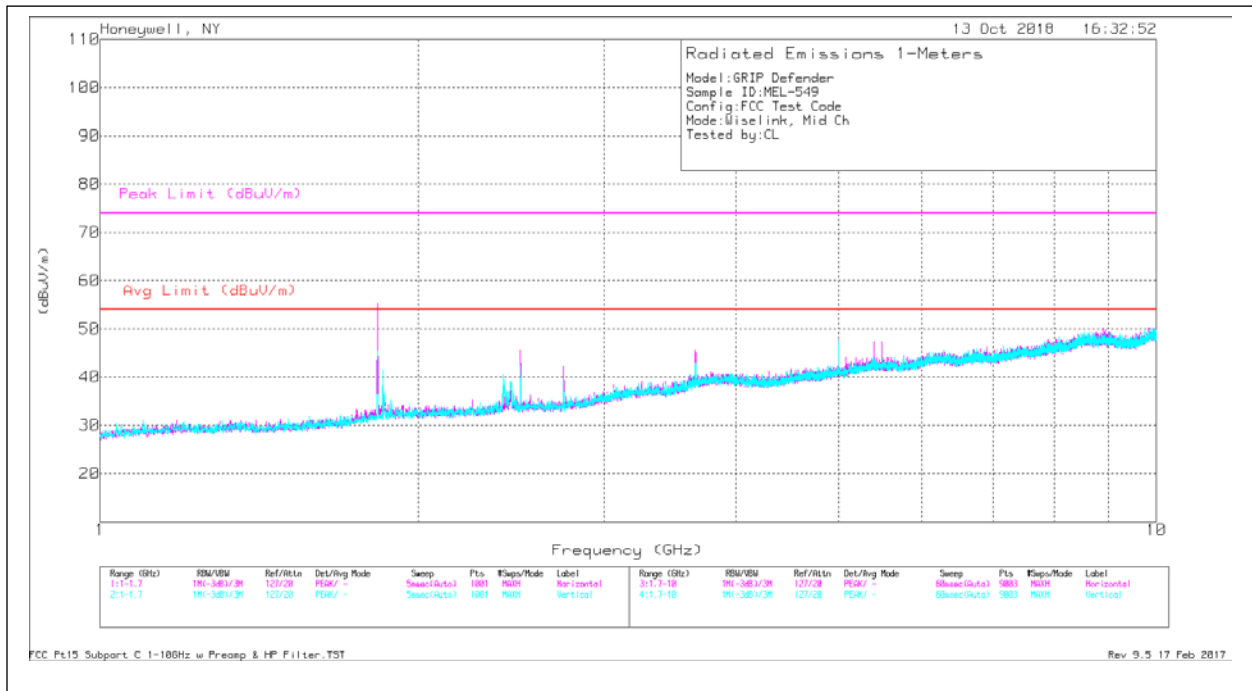


Low Channel – Plot

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
1.809	23.98	PKFH	26.8	.3	2.3	2.2	55.58	-	-	74	-18.42	165	369	H
1.809	17.79	VA1T	26.8	.3	2.3	2.2	49.39	54	-4.61	-	-	165	369	H
* 2.711	22.31	PKFH	29	.7	2.8	2.7	57.51	-	-	74	-16.49	13	182	H
* 2.713	13.04	VA1T	29	.7	2.8	2.7	48.24	54	-5.76	-	-	13	182	H
* 3.62	21.35	PKFH	31.8	1	3.2	3.1	60.45	-	-	74	-13.55	341	289	H
* 3.618	11.24	VA1T	31.8	1	3.2	3.1	50.34	54	-3.66	-	-	341	289	H
* 5	9.5	PKFH	33.3	1.2	3.8	3.7	51.5	-	-	74	-22.5	188	343	H
* 5	-25	VA1T	33.3	1.2	3.8	3.7	41.75	54	-12.25	-	-	188	343	H
* 2.5	23.83	PKFH	28.7	.7	2.7	2.6	58.53	-	-	74	-15.47	200	296	H
* 2.5	14.16	VA1T	28.7	.7	2.7	2.6	48.86	54	-5.14	-	-	200	296	H
1.809	24.55	PKFH	26.8	.3	2.3	2.2	56.15	-	-	74	-17.85	188	269	V
1.809	18.99	VA1T	26.8	.3	2.3	2.2	50.59	54	-3.41	-	-	188	269	V
* 2.499	19.51	PKFH	28.7	.7	2.7	2.6	54.21	-	-	74	-19.79	280	358	V
* 2.499	9.82	VA1T	28.7	.7	2.7	2.6	44.52	54	-9.48	-	-	280	358	V
* 3.618	20.13	PKFH	31.8	1	3.2	3.1	59.23	-	-	74	-14.77	170	194	V
* 3.617	10.42	VA1T	31.8	1	3.2	3.1	49.52	54	-4.48	-	-	170	194	V
* 4.999	20.77	PKFH	33.3	1.2	3.8	3.7	62.77	-	-	74	-11.23	147	299	V
* 5.002	10.23	VA1T	33.4	1.2	3.8	3.7	52.33	54	-1.67	-	-	147	299	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=10Hz

Low Channel - Data

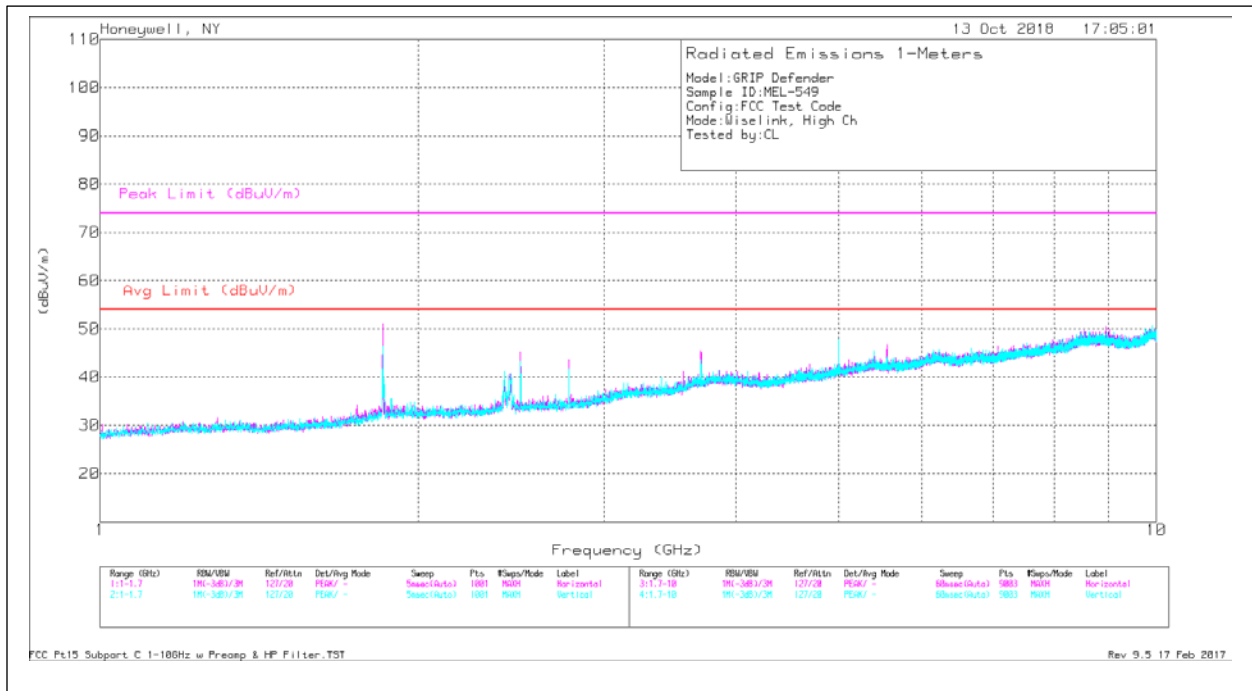


Mid Channel – Plot

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
* 2.5	16.13	PKFH	28.7	.7	2.7	2.6	50.83	-	-	74	-23.17	216	140	H
* 2.5	8.42	VA1T	28.7	.7	2.7	2.6	43.12	54	-10.88	-	-	216	140	H
* 2.744	15.33	PKFH	29	.7	2.8	2.7	50.53	-	-	74	-23.47	208	337	H
* 2.744	4.72	VA1T	29	.7	2.8	2.7	39.92	54	-14.08	-	-	208	337	H
* 3.662	14.9	PKFH	32	1	3.2	3.1	54.2	-	-	74	-19.8	114	302	H
* 3.663	4.83	VA1T	32	1	3.2	3.1	44.13	54	-9.87	-	-	114	302	H
* 4.999	15.62	PKFH	33.3	1.2	3.8	3.7	57.62	-	-	74	-16.38	14	204	H
* 5.001	5.3	VA1T	33.3	1.2	3.8	3.7	47.3	54	-6.7	-	-	14	204	H
* 5.402	14.62	PKFH	34.3	1	3.9	3.9	57.72	-	-	74	-16.28	349	280	H
* 5.402	4.82	VA1T	34.3	1	3.9	3.9	47.92	54	-6.08	-	-	349	280	H
5.493	14.38	PKFH	34.4	1.2	4	3.8	57.78	-	-	74	-16.22	248	171	H
5.491	5	VA1T	34.4	1.2	4	3.8	48.4	54	-5.6	-	-	248	171	H
1.831	25.84	PKFH	27.1	.5	2.3	2.2	57.94	-	-	74	-16.06	217	187	H
1.831	19.11	VA1T	27.1	.5	2.3	2.2	51.21	54	-2.79	-	-	217	187	H
1.83	25.34	PKFH	27.1	.5	2.3	2.2	57.44	-	-	74	-16.56	206	116	V
1.831	19.8	VA1T	27.1	.5	2.3	2.2	51.9	54	-2.1	-	-	206	116	V
* 2.5	20.7	PKFH	28.7	.7	2.7	2.6	55.4	-	-	74	-18.6	199	116	V
* 2.5	10.24	VA1T	28.7	.7	2.7	2.6	44.94	54	-9.06	-	-	199	116	V
* 2.746	19.97	PKFH	29	.7	2.8	2.7	55.17	-	-	74	-18.83	175	225	V
* 2.745	9.8	VA1T	29	.7	2.8	2.7	45	54	-9	-	-	175	225	V
* 3.661	20.05	PKFH	32	1	3.2	3.1	59.35	-	-	74	-14.65	56	165	V
* 3.66	10.65	VA1T	32	1	3.2	3.1	49.95	54	-4.05	-	-	56	165	V
* 5.001	21.25	PKFH	33.3	1.2	3.8	3.7	63.25	-	-	74	-10.75	270	283	V
* 4.998	10.79	VA1T	33.3	1.2	3.8	3.7	52.79	54	-1.21	-	-	270	283	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=10Hz

Mid Channel - Data



High Channel - Plot

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
1.851	40.44	PKFH	27.4	.6	2.3	2.2	72.94	-	-	74	-1.06	113	288	H
1.852	15.1	VAIT	27.4	.6	2.3	2.2	47.6	54	-6.4	-	-	113	288	H
* 2.5	24.09	PKFH	28.7	.7	2.7	2.6	58.79	-	-	74	-15.21	162	265	H
* 2.498	13.94	VAIT	28.7	.7	2.7	2.6	48.64	54	-5.36	-	-	162	265	H
* 2.776	23.51	PKFH	29.1	.8	2.8	2.7	58.91	-	-	74	-15.09	211	162	H
* 2.778	13.45	VAIT	29.1	.8	2.8	2.7	48.85	54	-5.15	-	-	211	162	H
* 3.704	21.69	PKFH	32.2	1	3.3	3.2	61.39	-	-	74	-12.61	305	386	H
* 3.706	11.5	VAIT	32.2	1	3.3	3.2	51.2	54	-2.8	-	-	305	386	H
* 4.999	12.25	PKFH	33.3	1.2	3.8	3.7	54.25	-	-	74	-19.75	95	320	H
* 5	1.42	VAIT	33.3	1.2	3.8	3.7	43.42	54	-10.58	-	-	95	320	H
5.556	10.43	PKFH	34.4	1.3	4	3.9	54.03	-	-	74	-19.97	245	175	H
5.556	.44	VAIT	34.4	1.3	4	3.9	44.04	54	-9.96	-	-	245	175	H
1.852	23.02	PKFH	27.4	.6	2.3	2.2	55.52	-	-	74	-18.48	79	349	V
1.853	13.07	VAIT	27.4	.6	2.3	2.2	45.57	54	-8.43	-	-	79	349	V
* 2.5	23.19	PKFH	28.7	.7	2.7	2.6	57.89	-	-	74	-16.11	17	218	V
* 2.5	13.36	VAIT	28.7	.7	2.7	2.6	48.06	54	-5.94	-	-	17	218	V
* 2.778	24.31	PKFH	29.1	.8	2.8	2.7	59.71	-	-	74	-14.29	27	342	V
* 2.778	13.24	VAIT	29.1	.8	2.8	2.7	48.64	54	-5.36	-	-	27	342	V
* 3.704	23.15	PKFH	32.2	1	3.3	3.2	62.85	-	-	74	-11.15	4	356	V
* 3.705	11.9	VAIT	32.2	1	3.3	3.2	51.6	54	-2.4	-	-	4	356	V
* 4.999	10.71	PKFH	33.3	1.2	3.8	3.7	52.71	-	-	74	-21.29	145	193	V
* 5	.51	VAIT	33.3	1.2	3.8	3.7	42.51	54	-11.49	-	-	145	193	V

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

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

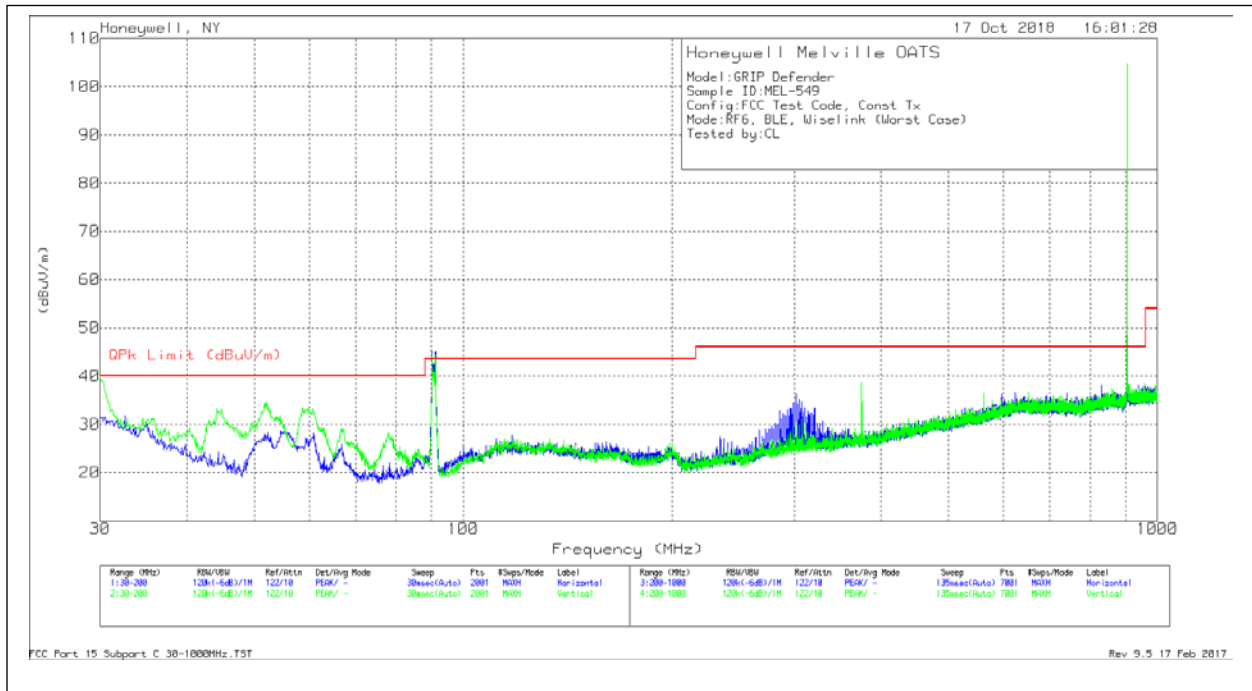
VAIT - FHSS: Linear Voltage Average VB=10Hz

High Channel - Data

Simultaneous Transmission

Configuration (Worse-case):

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



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
32.55	-7.71	Qp	23	.9	16.19	40	-23.81	36	302	H
55.6485	11.44	Qp	12	1.1	24.54	40	-15.46	74	372	H
*90.1812	36.98	Qp	12	1.5	50.48	43.52	6.96	289	372	H
**90.18	35.62	Qp	12	1.5	49.12	43.52	5.6	136	383	H
30.085	-2	Qp	24.8	.8	25.4	40	-14.6	161	314	V
52.0704	20.44	Qp	12.2	1.1	33.74	40	-6.26	55	389	V
*90.18	37.42	Qp	12	1.5	50.92	43.52	7.4	42	121	V
**90.18	34.61	Qp	12	1.5	48.11	43.52	4.59	144	119	V
374.9719	-8.77	Qp	19.1	3.8	14.13	46.02	-31.89	159	111	H
375.0164	-3.63	Qp	19.1	3.8	19.27	46.02	-26.75	199	326	V

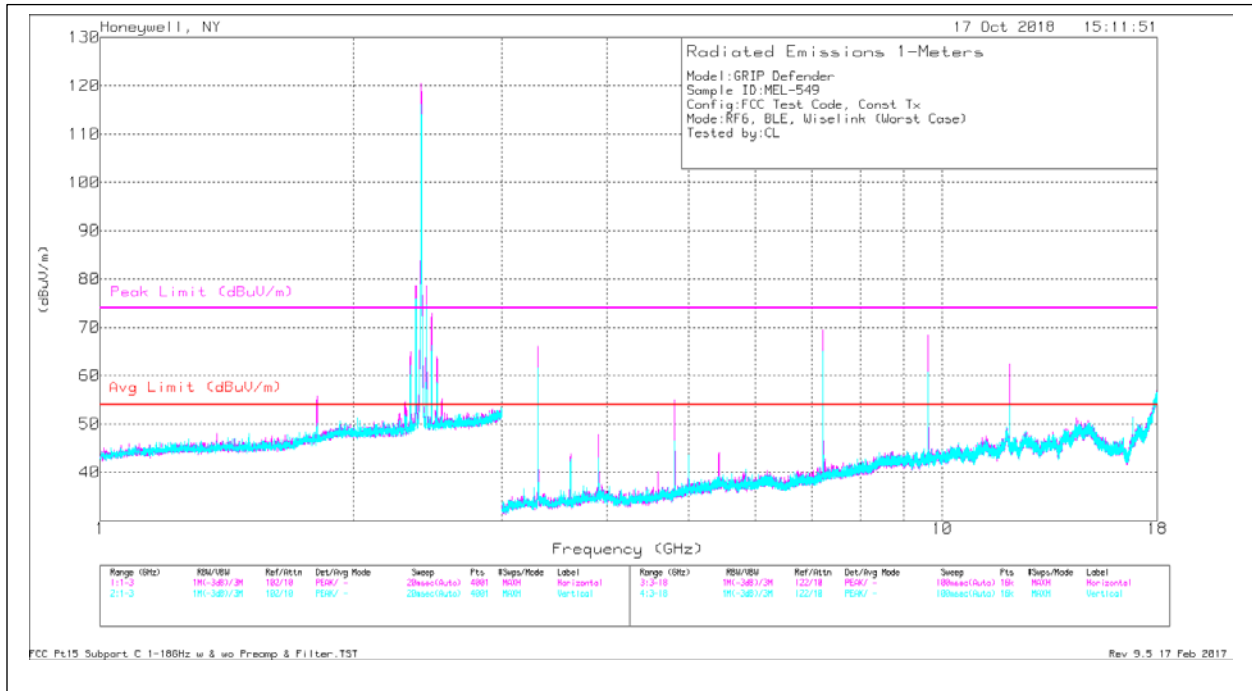
Qp - Quasi-Peak detector

*-EUT on

**-EUT off

30-1000MHz – Plot / Data

Note: 90MHz is a known RF6 transient emission. When measured on the OATS, this frequency additionally falls within the FM band. Measurements were made with the EUT on and off to show that this is an ambient emission.



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
1.809	28.6	PK2	26.8	.3	2.3	2.2	-	60.2	-	-	74	-13.8	1	358	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
* 2.33	28.34	PK2	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]	SWBOX2 [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
3.309	67.04	PK2	31.4	-41.8	3	3	-	62.64	-	-	74	-11.36	347	342	H
7.216	62.48	PK2	36.2	-39.5	4.7	4.5	-	68.38	-	-	74	-5.62	267	215	H
9.618	62.78	PK2	38	-39	5.6	5.2	-	72.58	-	-	74	-1.42	221	118	H
3.31	62.82	PK2	31.4	-41.8	3	3	-	58.42	-	-	74	-15.58	194	188	V
7.213	52.35	PK2	36.2	-39.5	4.7	4.5	-	58.25	-	-	74	-15.75	270	117	V
9.618	59.89	PK2	38	-39	5.6	5.2	-	69.69	-	-	74	-4.31	241	303	V
16.838	40.98	PK2	39.6	-38.1	7.5	7.1	-	57.08	-	-	74	-16.92	251	208	V
* 3.618	51.59	PK2	31.8	-41.5	3.2	3.1	-	48.19	-	-	74	-25.81	171	239	H
* 3.618	46.2	MAv1	31.8	-41.5	3.2	3.1	-	42.8	54	-11.2	-	-	171	239	H
* 3.904	50.3	PK2	32.9	-40.8	3.4	3.2	-	49	-	-	74	-25	130	185	H
* 3.905	42.46	MAv1	32.9	-40.8	3.4	3.2	-	41.16	54	-12.84	-	-	130	185	H
* 4.595	42.46	PK2	32.7	-41.1	3.6	3.5	-	41.16	-	-	74	-32.84	172	115	H
* 4.595	30.64	MAv1	32.7	-41.1	3.6	3.5	-	29.34	54	-24.66	-	-	172	115	H
* 4.811	51.85	PK2	33.1	-41.2	3.7	3.7	-	51.15	-	-	74	-22.85	251	167	H
* 4.809	51.85	Av	33.1	-41.2	3.7	3.7	-23.4	27.75	54	-26.25	-	-	251	167	H
* 5	47.7	PK2	33.3	-41.6	3.8	3.7	-	46.9	-	-	74	-27.1	98	177	H
* 5	41.35	MAv1	33.3	-41.6	3.8	3.7	-	40.55	54	-13.45	-	-	98	177	H
* 5.426	46.61	PK2	34.4	-41.2	4	3.9	-	47.71	-	-	74	-26.29	155	215	H
* 5.426	39.42	MAv1	34.4	-41.2	4	3.9	-	40.52	54	-13.48	-	-	155	215	H
* 12.022	45.45	PK2	39.4	-37.3	6.5	5.6	-	59.65	-	-	74	-14.35	218	126	H
* 12.022	37.23	MAv1	39.4	-37.3	6.5	5.6	-	51.43	54	-2.57	-	-	218	126	H
* 17.997	38.69	PK2	47.9	-37.8	7.7	7.3	-	63.79	-	-	74	-10.21	343	234	H
* 17.998	25.61	MAv1	47.9	-37.8	7.7	7.3	-	50.71	54	-3.29	-	-	343	234	H
* 3.618	50.32	PK2	31.8	-41.5	3.2	3.1	-	46.92	-	-	74	-27.08	173	171	V
* 3.618	44.93	MAv1	31.8	-41.5	3.2	3.1	-	41.53	54	-12.47	-	-	173	171	V
* 3.906	45.58	PK2	32.9	-40.8	3.4	3.2	-	44.28	-	-	74	-29.72	284	154	V
* 3.906	34.48	MAv1	32.9	-40.8	3.4	3.2	-	33.18	54	-20.82	-	-	284	154	V
* 4.809	67.94	PK2	33.1	-41.2	3.7	3.7	-	67.24	-	-	74	-6.76	9	171	V
* 4.809	67.94	Av	33.1	-41.2	3.7	3.7	-23.4	43.84	54	-10.16	-	-	9	171	V
* 5	49.85	PK2	33.3	-41.6	3.8	3.7	-	49.05	-	-	74	-24.95	353	181	V
* 5	45.12	MAv1	33.3	-41.6	3.8	3.7	-	44.32	54	-9.68	-	-	353	181	V
* 12.027	45.92	PK2	39.4	-37.3	6.5	5.6	-	60.12	-	-	74	-13.88	326	141	V
* 12.022	38.24	MAv1	39.4	-37.3	6.5	5.6	-	52.44	54	-1.56	-	-	326	141	V
* 17.998	39.11	PK2	47.9	-37.8	7.7	7.3	-	64.21	-	-	74	-9.79	2	148	V
* 17.999	25.59	MAv1	47.9	-37.8	7.7	7.3	-	50.69	54	-3.31	-	-	2	148	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 = 20log(0.0675) = -23.4dB

2.33GHz & 4.81GHz were found to be products 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

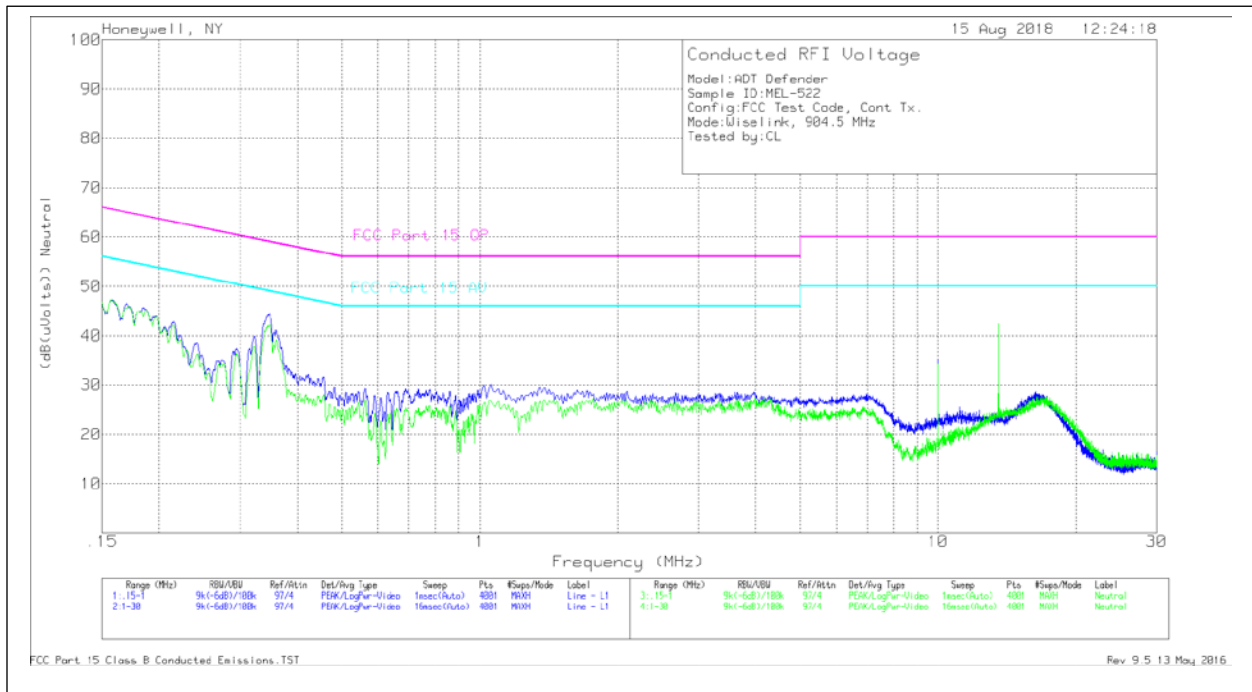
Tester	Test Location	Date	Temperature (°C)	Humidity (%RH)	Pressure (mbar)	Results (P/F)
CL	RF Lab	8/15/18	22.6	70.6	1004	P

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	A070144	Extech Instruments	SD700	08/21/2017	08/21/2020

Test Results

Intentional Mode (Worse-case)



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)
.15799	36.68	Pk	10.5	0	47.18	65.57	-18.39	55.57	-8.39
.3483	34.33	Pk	10	0	44.33	59	-14.67	49	-4.67
.77516	18.87	Pk	9.9	0	28.77	56	-27.23	46	-17.23
1.058	20.21	Pk	9.9	0	30.11	56	-25.89	46	-15.89
9.99725	24.93	Pk	10	.2	35.13	60	-24.87	50	-14.87
13.557	30.34	Pk	10.1	.2	40.64	60	-19.36	50	-9.36
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)
.15692	36.66	Pk	10.6	0	47.26	65.63	-18.37	55.63	-8.37
.34841	32.08	Pk	10.1	0	42.18	59	-16.82	49	-6.82
.56311	16.92	Pk	10	0	26.92	56	-29.08	46	-19.08
9.99725	24.13	Pk	10	.2	34.33	60	-25.67	50	-15.67
13.557	32.08	Pk	10.1	.2	42.38	60	-17.62	50	-7.62
17.1385	17.06	Pk	10.2	.3	27.56	60	-32.44	50	-22.44

Pk - Peak detector

Low Channel Data

END OF REPORT