FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 9

LIMITED MODULAR CERTIFICATION TEST REPORT

FOR

Remote Transceiver for Rangehoods

MODEL NUMBER: 105330

FCC ID: ZQG-HPBRX
IC: 9762A-HPB

REPORT NUMBER: 12214720A

ISSUE DATE: 2018-05-15

Prepared for
Fisher & Paykel Appliances Ltd
78 Springs Rd
EAST TAMAKI
Auckland 2013, New Zealand

Prepared by
UL LLC
333 Pfingsten Rd.
Northbrook, IL 60062
TEL: (847) 272-8800

NVLAP TESTING
NVLAB LAB CODE: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--		Initial Issue	

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Fisher & Paykel Appliances Ltd 78 Springs Rd EAST TAMAKI Auckland 2013, New Zealand
EUT DESCRIPTION:	Remote Transceiver in rangehood
MODEL:	105330
SERIAL NUMBER:	Non-Serialized
DATE TESTED:	2018/04/05 – 2018/05/14

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 9	Pass
INDUSTRY CANADA RSS-GEN Issue 5	Pass

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

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

Approved & Released For
UL LLC By:

Bart Mucha
Staff Engineer
UL LLC

Tested By:

Vincent Sabalvaro
EMC Project ENGINEER
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 5, RSS-210 Issue 9.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at https://www.nist.gov/

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:
Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

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

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Occupied Channel Bandwidth	30MHz-26GHz	Spectrum Analyzer	± 0.39 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, model 105330 Range Hood Transceiver, is a limited modular transceiver radio operating between 2400-2483.5MHz, intended to be used within a series of range Hood models.

The Range Hood transceiver cannot be directly activated by the user. However, it is activated when an external remote control transceiver is used.

When the user presses a button on the remote device the transmitter sends a “button event” message and then waits for the Range Hood to return an acknowledge message.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Peak E-Field Strength (dBuV/m)
2400 - 2483.5	TX	87.8

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PCB Trace antenna, with a maximum gain of 2.5 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation. The limited module is intended to be installed into the range hoods in this orientation.
All of the host models in the range hood series were considered based on the physical differences. Of all the host models, it was determined that at least three versions should be investigated to determine if any degradation of the limited modular radio occurs while installed in the host device. Since no degradation was found, the remaining host models are considered equivalent.

5.5. DESCRIPTION OF TEST SETUP

SETUP FOR Limited Modular Transmitter (Only)

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
DC Supply	TENMA	72-6610	601283	n/a

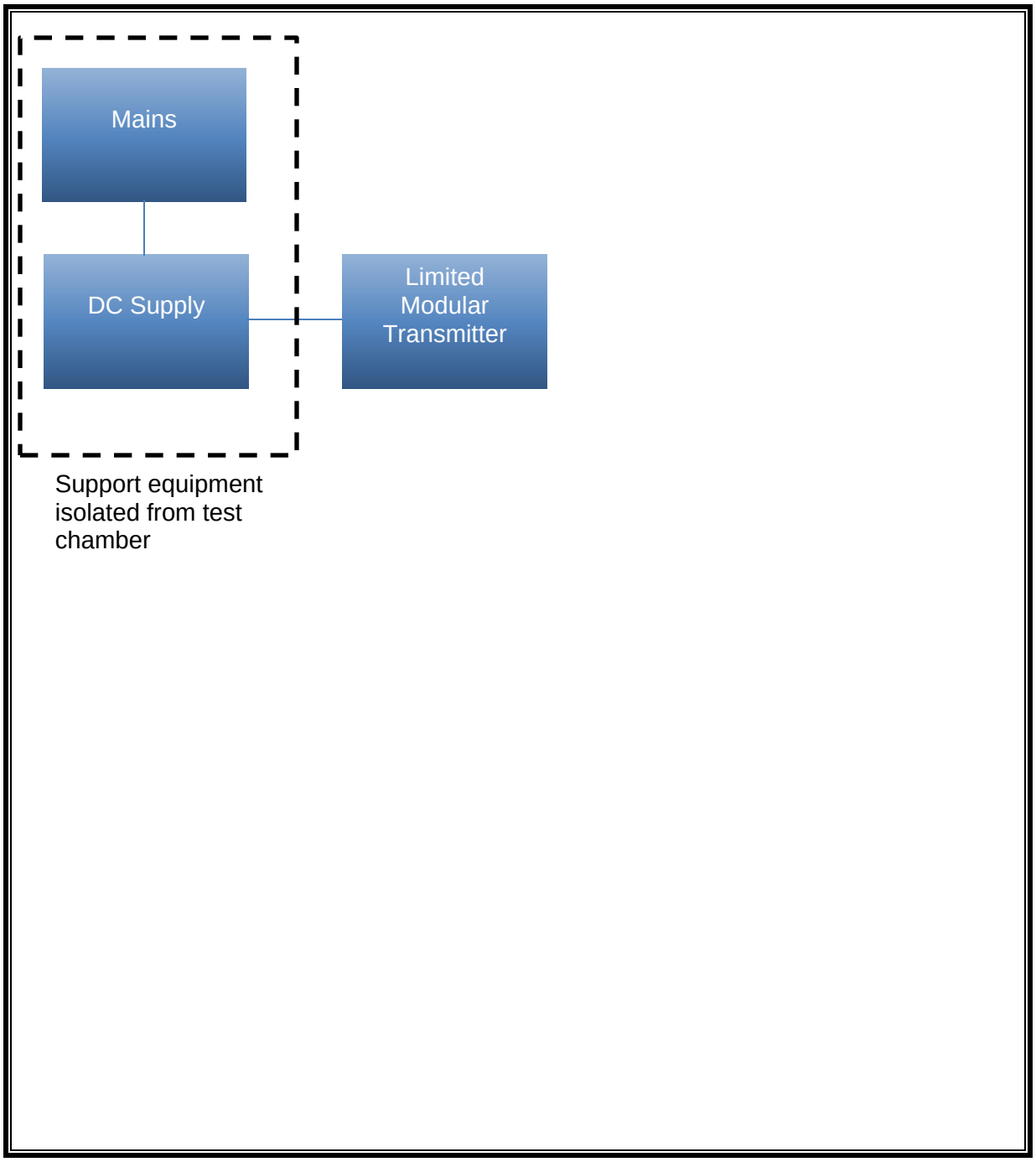
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC	2	Molex	Wire	>1m	5VDC

TEST SETUP

The EUT is preprogrammed to transmit at the lowest, middle, and highest operating channel.

SETUP DIAGRAM FOR TESTS



SETUP FOR TRANSMITTER WITH HOST

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
11" Hood with Blower	Fisher & Paykel	HPB3011	-	-
19" Hood with Blower	Fisher & Paykel	HPB3619-6	-	-
19" Hood	Fisher & Paykel	HP3619	-	-

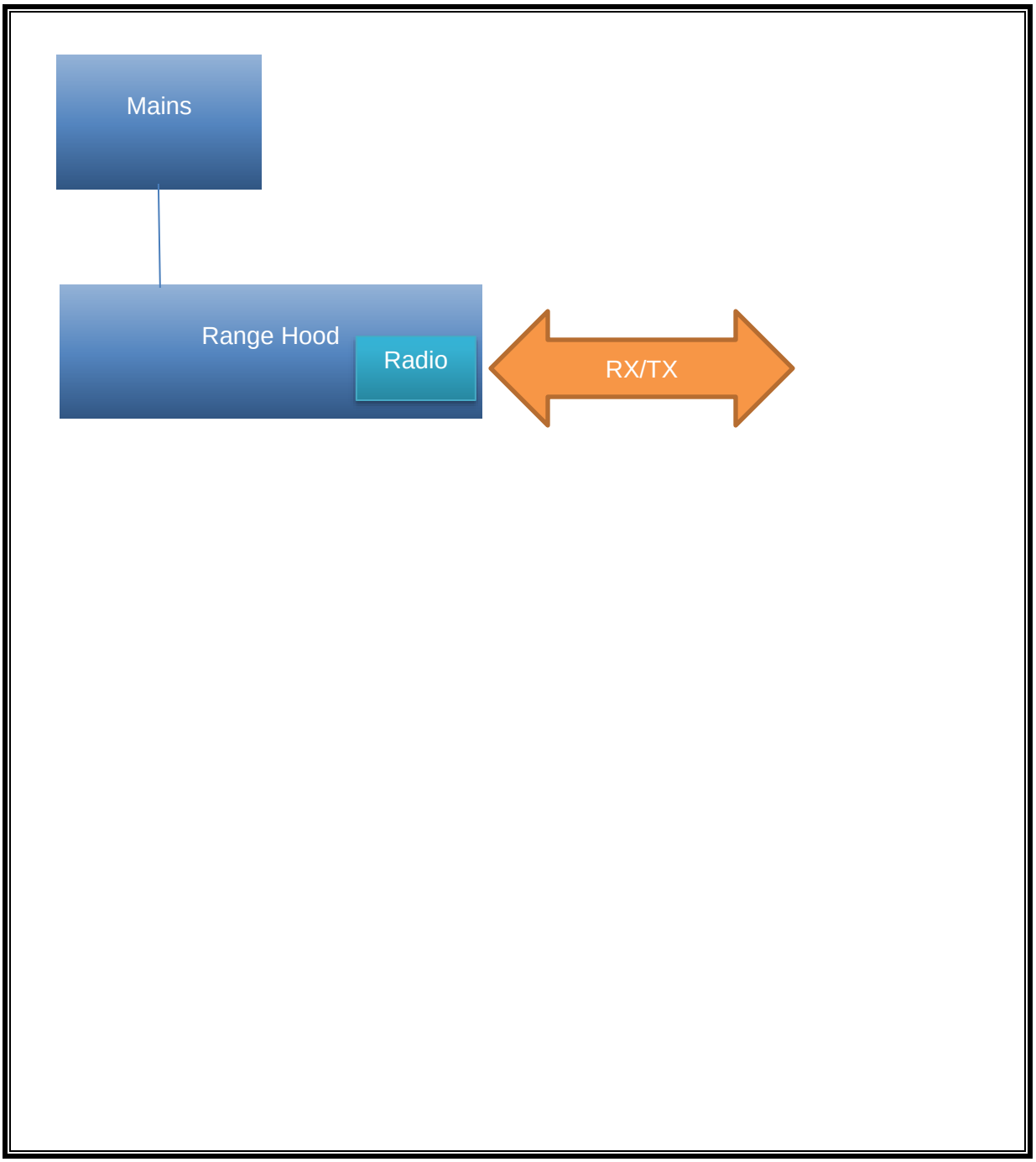
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Mains AC	1	-	Wire	>3m	None

TEST SETUP

The EUT is preprogrammed and installed in a host range hood

SETUP DIAGRAM FOR TRANSMITTER WITH HOST



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**T No.**	**Cal Date**	**Cal Due**
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014		
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012		
Test Receiver	Rhode & Schwarz	ESCI	EMC4328	12/21/2017	12/31/2018
Log-P Antenna	Chase	VBA6106A	EMC4078	2/14/2018	2/28/2019
Bicon Antenna	Chase	UPA6109	EMC4313	2/13/2018	2/28/2019
Antenna Array	UL	BOMS	EMC4276	1/10/2018	1/31/2019
Test Receiver	Rhode & Schwarz	ESU	EMC4323	12/20/2017	12/31/2018
EMI Test Receiver	Rohde & Schwarz	ESR	EMC4377	12/23/2017	12/31/2018
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224	N/A	N/A
HighPass Filter	Solar Electronics	2803-150	EMC4327	N/A	N/A
Attenuator	HP	8494B	2831A0083	N/A	N/A
LISN - L1	Solar	8602-50-TS-50-	EMC4066	12/29/2017	12/31/2018
LISN - L2	Solar	8602-50-TS-50-	EMC4064	12/29/2017	12/31/2018

7. MEASUREMENT METHODS

ANSI C63.10:2013 for the following tests:

Section 6.9 – 20dB and 99% Bandwidth
Section 6.4, 6.5, & 6.6 – Radiated Spurious Emissions
Section 6.10 – Band edge
Section 6.2 – Power Line Conducted Emissions

8. 20dB Bandwidth and 99% Bandwidth

LIMITS

For reporting purpose only and needed to establish minimum required number of hopping channels.

MEASUREMENT METHOD

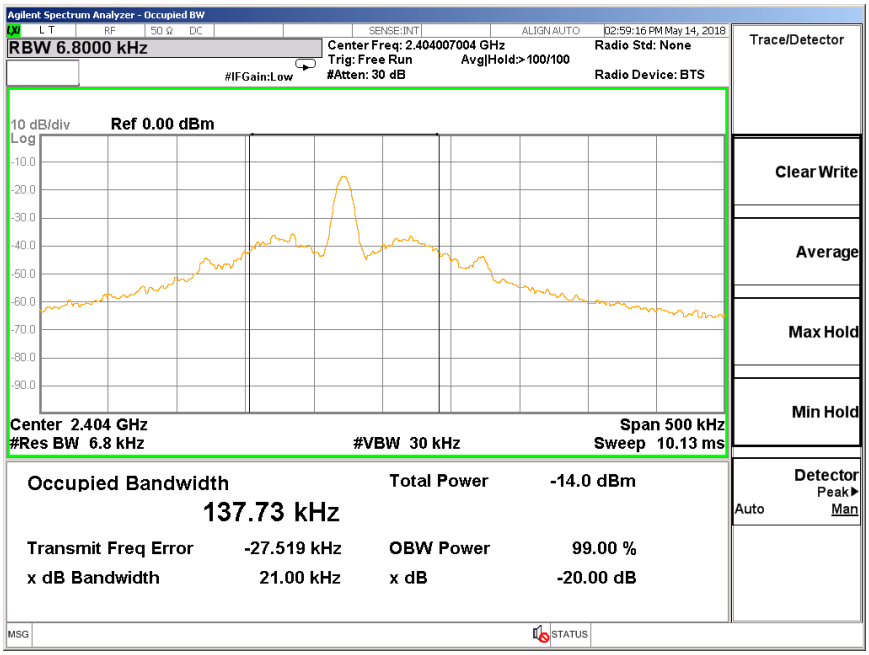
ANSI C63.10:2013, section 6.9.3

RESULTS

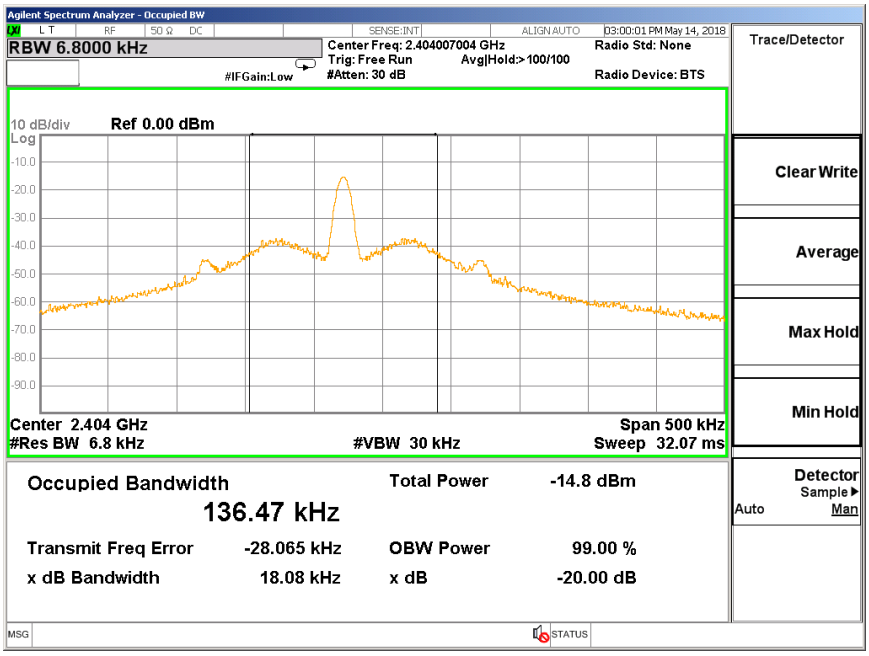
Channel	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2404	21.000	136.5
Mid	2442	21.110	137.2
High	2477	21.300	141.6

Low Channel

20dB Bandwidth

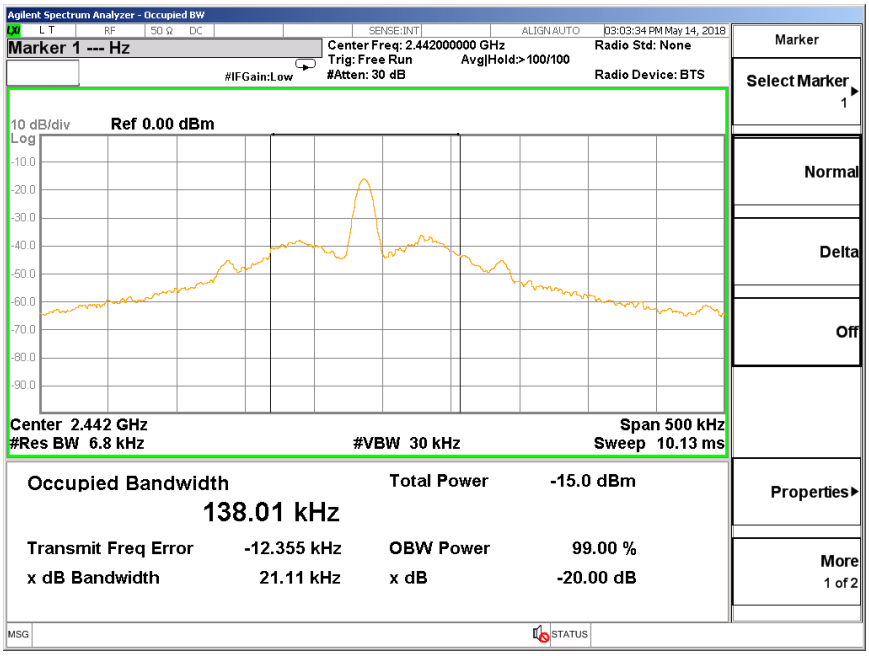


99% Bandwidth

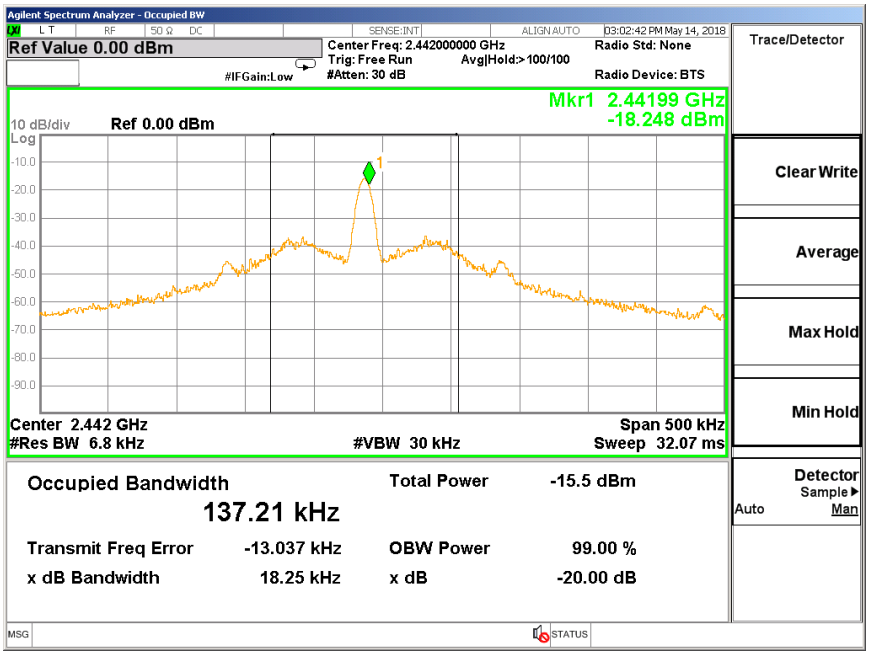


Middle Channel

20dB Bandwidth

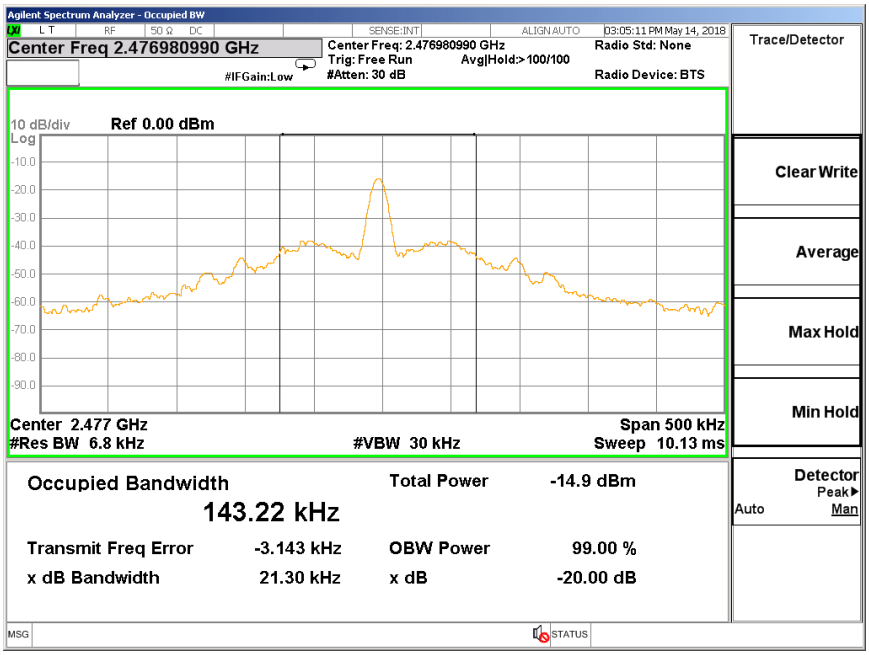


99% Bandwidth

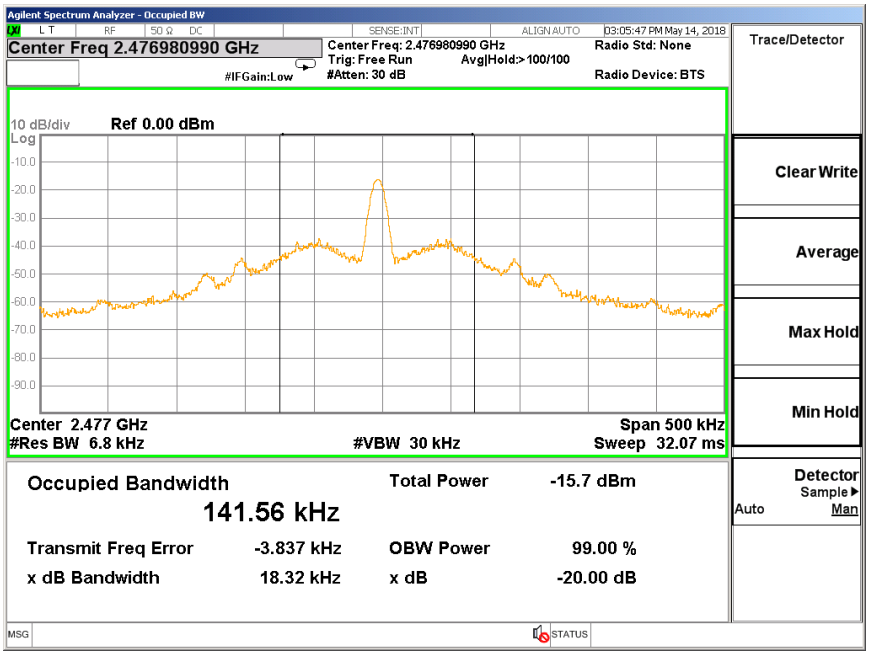


High Channel

20dB Bandwidth



99% Bandwidth



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.249

IC RSS-210 Clause B.10

Intentional radiator Field Strength Limits

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

§15.209
Field Strength Limits Outside of the fundamental frequency bands

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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

PROCEDURES

ANSI C63.10:2013, Section 11.12

Note – Since the results for the Limited Modular Transmitter alone did not show any significant emissions above the noise floor, only select channels were chosen to be measured while the Limited Modular Transmitter was installed in the select range hoods.
All of the host models in the range hood series were considered based on the physical differences. Of all the host models, it was determined that at least three select versions should be investigated to determine if any degradation of the limited modular radio occurs while installed in the host device.
Of the range hood models in the series, the three selected models were:

- HPB3011 (Range hood with blower and 11” Bracket)
- HPB3619-6 (Range hood with blower and 19” Bracket)
- HP3619 (Range hood shell and 19” Bracket)

Since no degradation was found, the remaining host models are considered equivalent by the manufacturer.

9.2. LIMITED MODULAR TRANSMITTER RADIATED SPUROUS EMSSIONS

9.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSIONS

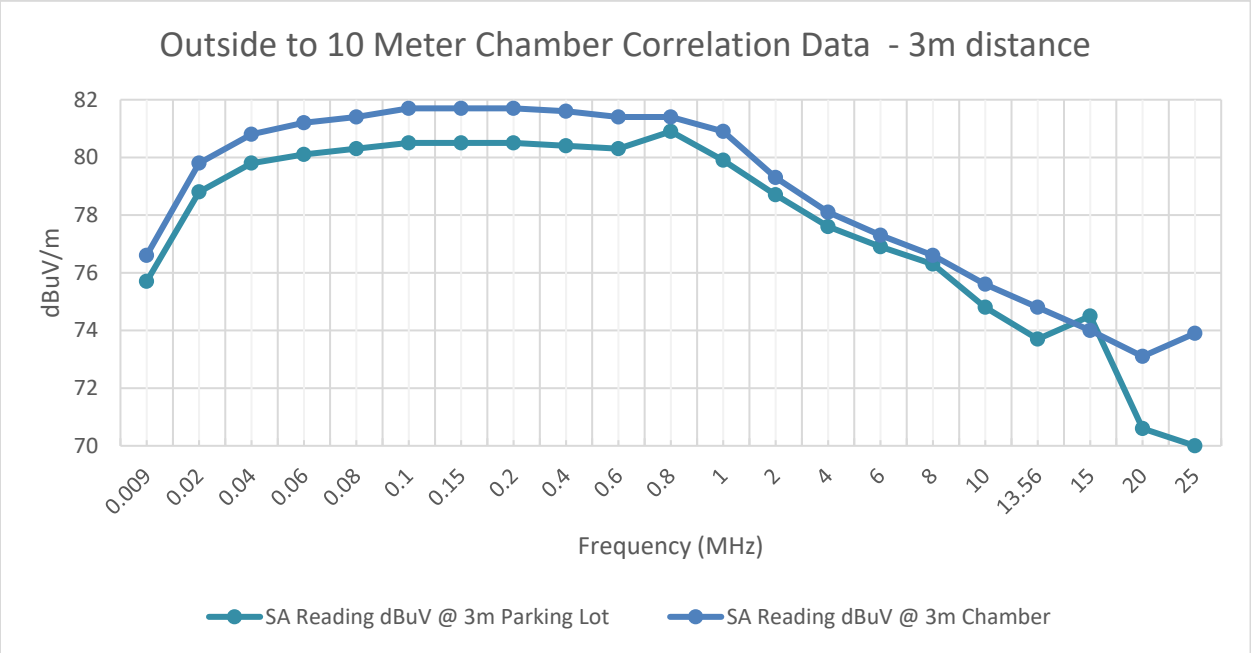
Data

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
Low Channel												
2.4039	115.66	Pk	21.8	-51.1	86.36	114	-27.64	-	-	111	140	H
2.404	115.56	Av	21.8	-51.1	86.26	-	-	94	-7.74	111	140	H
2.404	111.17	Pk	21.8	-51.1	81.87	114	-32.13	-	-	202	100	V
2.404	111.06	Av	21.8	-51.1	81.76	-	-	94	-12.24	202	100	V
Mid Channel												
2.442	117.51	Pk	21.9	-51.5	87.91	114	-26.09	-	-	178	144	V
2.442	117.4	Av	21.9	-51.5	87.8	-	-	94	-6.2	178	144	V
2.442	109.59	Pk	21.9	-51.5	79.99	114	-34.01	-	-	253	109	H
2.442	109.48	Av	21.9	-51.5	79.88	-	-	94	-14.12	253	109	H
High Channel												
2.477	116.8	Pk	22	-51.41	87.39	114	-26.61	-	-	113	124	H
2.477	116.7	Av	22	-51.41	87.29	-	-	94	-6.71	113	124	H
2.477	112.16	Pk	22	-51.41	82.75	114	-31.25	-	-	188	110	V
2.477	112.06	Av	22	-51.41	82.65	-	-	94	-11.35	188	110	V

Pk - Peak detector
Av - Average detection

9.2.2. SPURIOUS EMISSIONS 9kHz-30MHz Open Field to 10 Meter Chamber Correlation Data

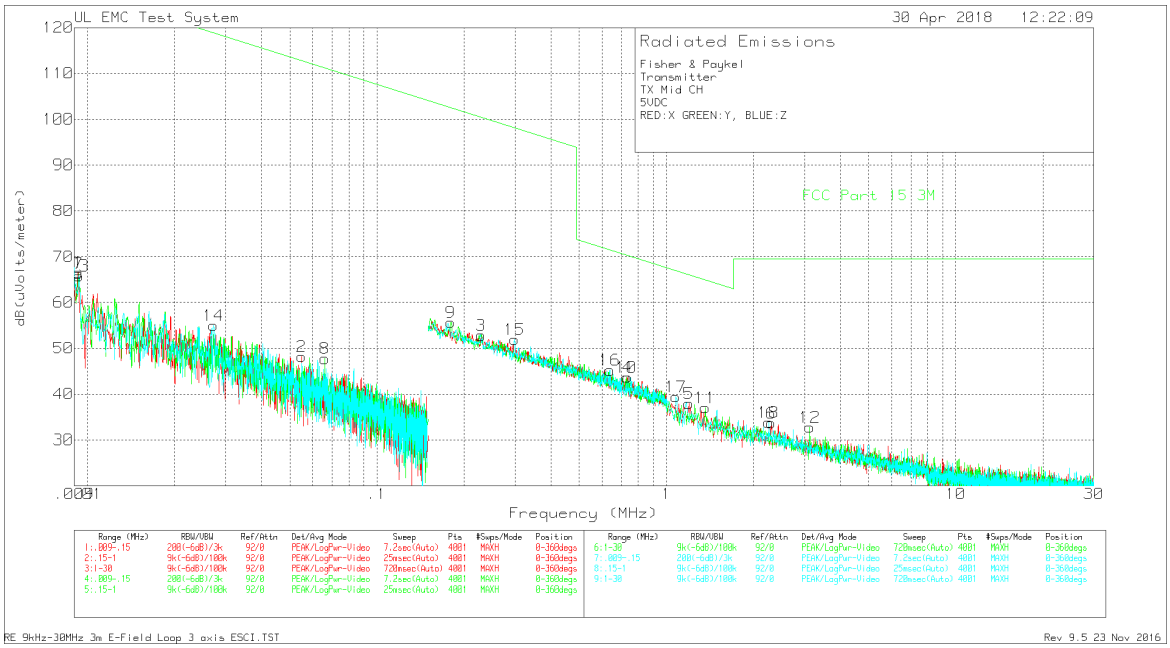
Correlation Data for measurements 9kHz-30MHz between Outside and 10m semi-anechoic chamber in at Underwriter Laboratories in Northbrook, IL.



Correlation measurements were conducted using a signal source with an antenna outside in open area (parking lot). Immediately following the measurements the same setup was moved inside the 10 meter semi-anechoic chamber and the measurements were repeated. The above plot shows the difference in levels measured between outside and the 10 meter semi anechoic chamber.

9.2.3. Spurious Emissions 9kHz – 30MHz

Plot



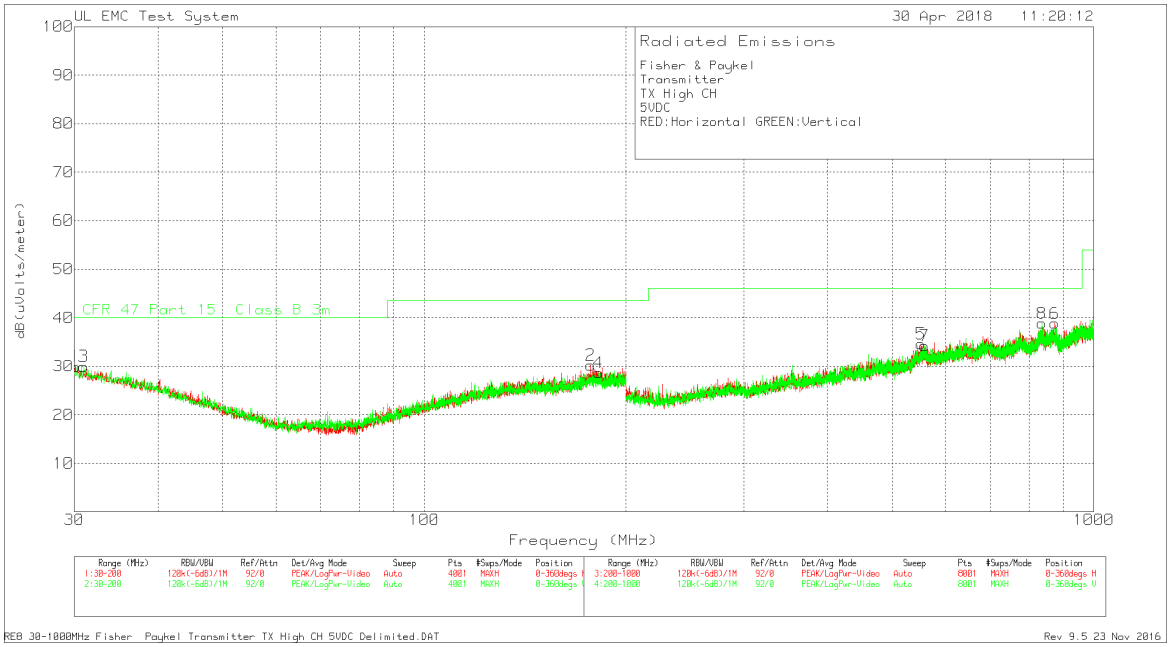
Data

Trace Markers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dB(uVolts/ meter)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Polarity
1	0.00928	43.49	Pk	23.1	0	66.59	128.23	-61.64	0-360	X
2	0.055025	34.8	Pk	13.4	0	48.2	112.78	-64.58	0-360	X
3	0.22924	40.91	Pk	11.8	0.1	52.81	100.39	-47.58	0-360	X
4	0.73405	31.67	Pk	11.9	0.1	43.67	70.29	-26.62	0-360	X
5	1.19575	25.57	Pk	12.3	0.1	37.97	66.05	-28.08	0-360	X
6	2.305	21.31	Pk	12.2	0.2	33.71	69.54	-35.83	0-360	X
7	0.009315	43.18	Pk	23.1	0	66.28	128.2	-61.92	0-360	Y
8	0.066085	34.65	Pk	13	0.1	47.75	111.19	-63.44	0-360	Y
9	0.18003	43.65	Pk	11.9	0.1	55.65	102.49	-46.84	0-360	Y
10	0.72851	31.65	Pk	11.9	0.1	43.65	70.36	-26.71	0-360	Y
11	1.3625	24.6	Pk	12.3	0.1	37	64.92	-27.92	0-360	Y
12	3.1315	20.32	Pk	12.2	0.2	32.72	69.54	-36.82	0-360	Y
13	0.00935	42.73	Pk	23.1	0	65.83	128.17	-62.34	0-360	Z
14	0.027235	38.06	Pk	16.9	0	54.96	118.89	-63.93	0-360	Z
15	0.29867	40.1	Pk	11.7	0.1	51.9	98.1	-46.2	0-360	Z
16	0.63756	33.22	Pk	11.9	0.1	45.22	71.51	-26.29	0-360	Z
17	1.07975	27.04	Pk	12.3	0.1	39.44	66.94	-27.5	0-360	Z
18	2.25425	21.44	Pk	12.2	0.2	33.84	69.54	-35.7	0-360	Z

Pk - Peak detector

9.2.4. SPURIOUS EMISSIONS 30 TO 1000 MHz

Low Channel Plot

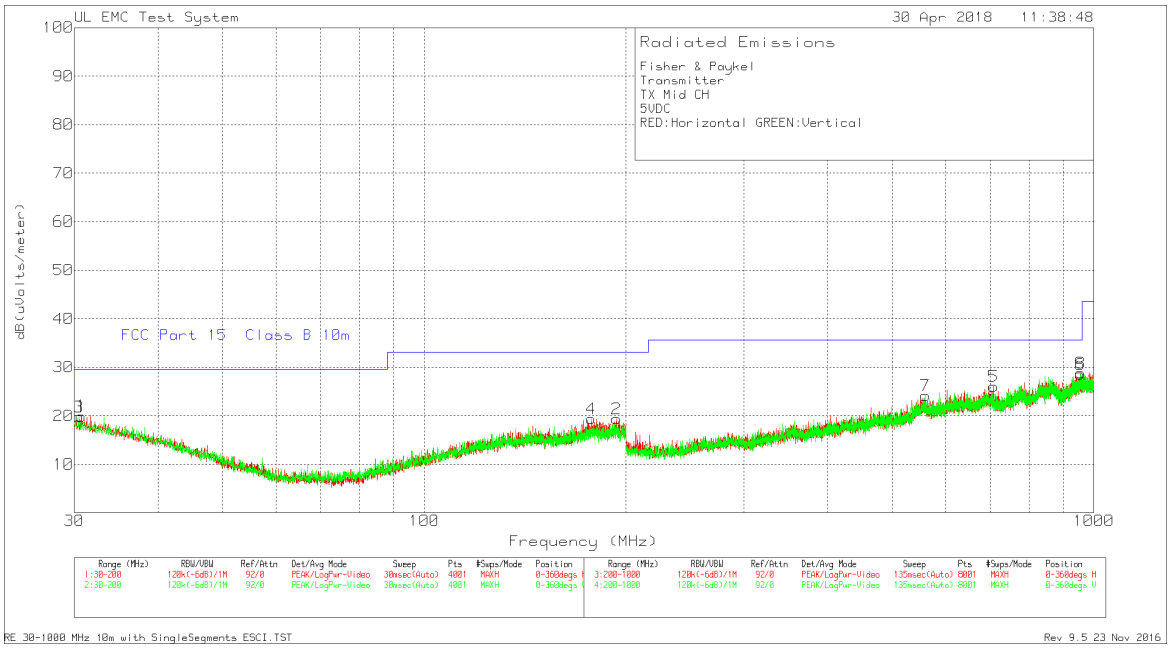


Data

Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	10m to 3m Factor (dB)	Corrected Reading dB(uVolts/meter)	QP Limit (dBuV/m)	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	31.1475	31.49	Pk	17.8	-30.2	10.5	29.59	40	-10.41	0-360	102	H
2	182.575	33.73	Pk	15.7	-29.4	10.5	30.53	43.52	-12.99	0-360	102	H
3	32.55	33.09	Pk	17.2	-30.1	10.5	30.69	40	-9.31	0-360	251	V
4	179.94	32.04	Pk	15.6	-29.4	10.5	28.74	46.02	-17.28	0-360	398	V
5	557.8	31.68	Pk	20.1	-27.3	10.5	34.98	46.02	-11.04	0-360	299	H
6	865.2	32.19	Pk	23.4	-27.5	10.5	38.59	46.02	-7.43	0-360	399	H
7	557.2	30.88	Pk	20.1	-27.1	10.5	34.38	46.02	-11.64	0-360	102	V
8	827.4	32.31	Pk	23	-27.6	10.5	38.21	46.02	-7.81	0-360	199	V

Pk - Peak detector

Middle Channel Plot

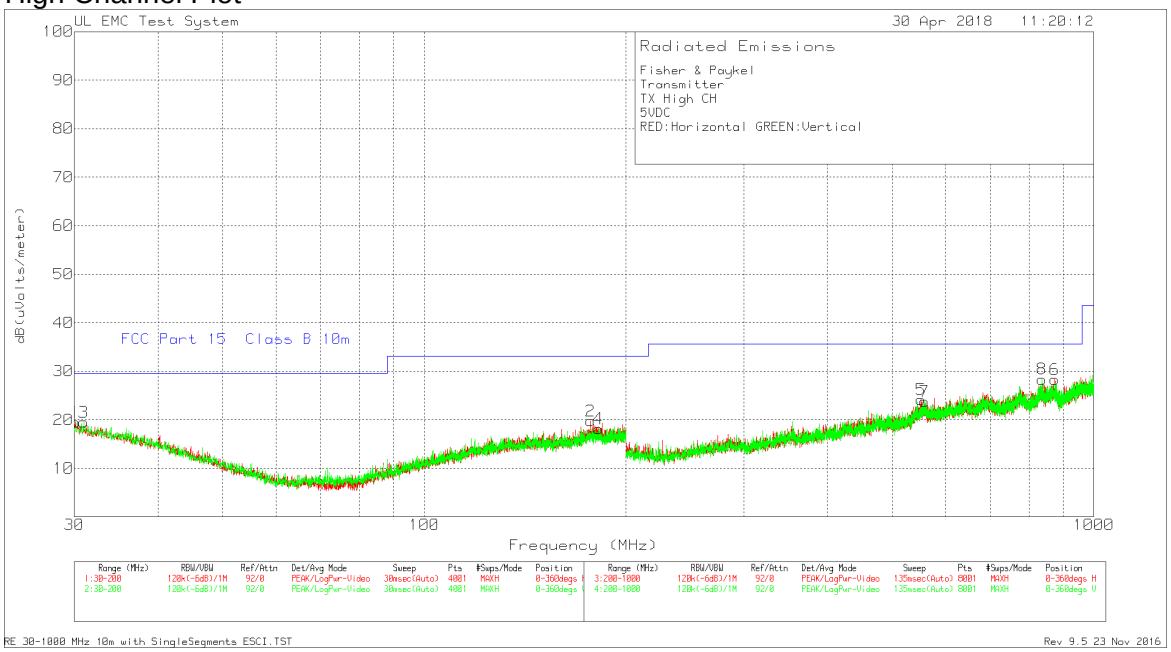


Data

Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	10m to 3m Factor (dB)	Corrected Reading dB(uVolts/meter)	QP Limit (dBuV/m)	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.7225	32.35	Pk	18	-30.4	10.5	30.45	40	-9.55	0-360	398	H
2	193.625	32.02	Pk	16.1	-28.7	10.5	29.92	43.52	-13.6	0-360	249	H
3	30.4675	32.2	Pk	18.1	-30.5	10.5	30.3	40	-9.7	0-360	102	V
4	177.39	32.88	Pk	15.5	-29	10.5	29.88	46.02	-16.14	0-360	398	V
5	708.2	32.44	Pk	20.5	-26.9	10.5	36.54	46.02	-9.48	0-360	98	H
6	953.6	31.69	Pk	23.7	-26.8	10.5	39.09	46.02	-6.93	0-360	98	H
7	560.3	31.97	Pk	19.9	-27.7	10.5	34.67	46.02	-11.35	0-360	102	V
8	955.3	31.85	Pk	23.8	-26.8	10.5	39.35	46.02	-6.67	0-360	102	V

Pk - Peak detector

High Channel Plot



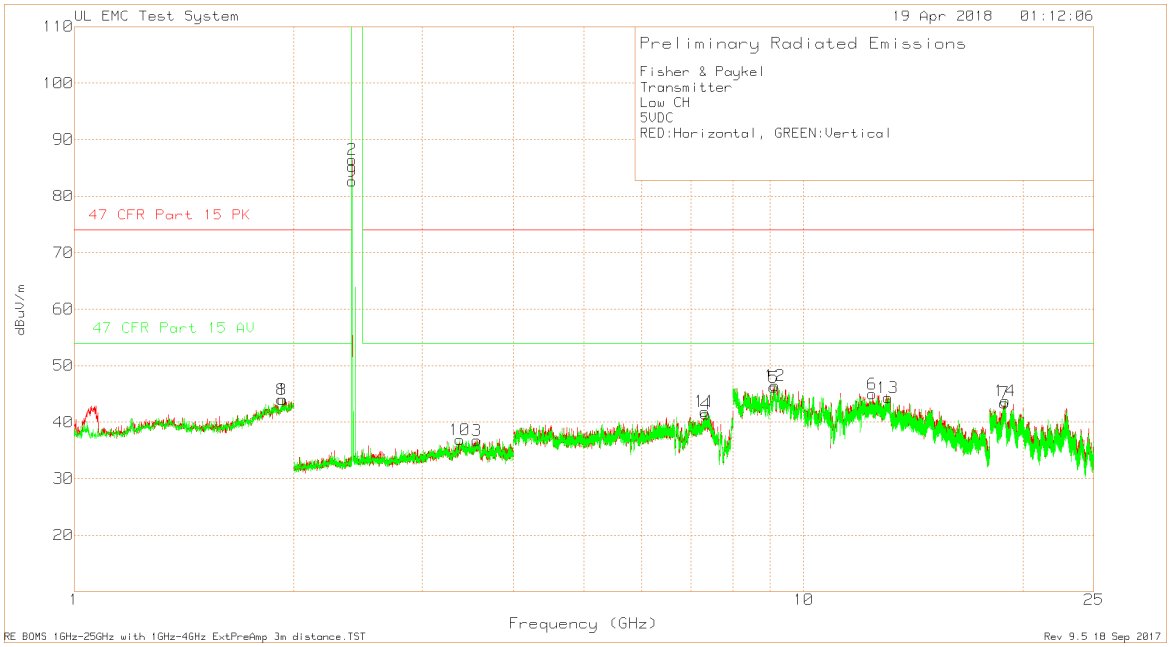
Data

Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	10m to 3m Factor (dB)	Corrected Reading dB(uVolts/meter)	QP Limit (dBuV/m)	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.1275	31.72	Pk	18.2	-30.4	10.5	30.02	40	-9.98	0-360	248	H
2	177.0075	33.65	Pk	15.5	-29.4	10.5	30.25	43.52	-13.27	0-360	248	H
3	30.9775	31.81	Pk	17.9	-30.2	10.5	30.01	40	-9.99	0-360	251	V
4	182.15	32.08	Pk	15.7	-29.6	10.5	28.68	46.02	-17.34	0-360	102	V
5	551.5	31.54	Pk	19.9	-27.3	10.5	34.64	46.02	-11.38	0-360	399	H
6	873.7	32.74	Pk	23.5	-27.9	10.5	38.84	46.02	-7.18	0-360	299	H
7	558.6	31.16	Pk	20	-27.4	10.5	34.26	46.02	-11.76	0-360	202	V
8	836.3	32.69	Pk	23.2	-27.5	10.5	38.89	46.02	-7.13	0-360	98	V

Pk - Peak detector

9.2.5. SPURIOUS EMISSIONS 1GHz TO 25GHz

Low Channel Plot



Low Channel Data

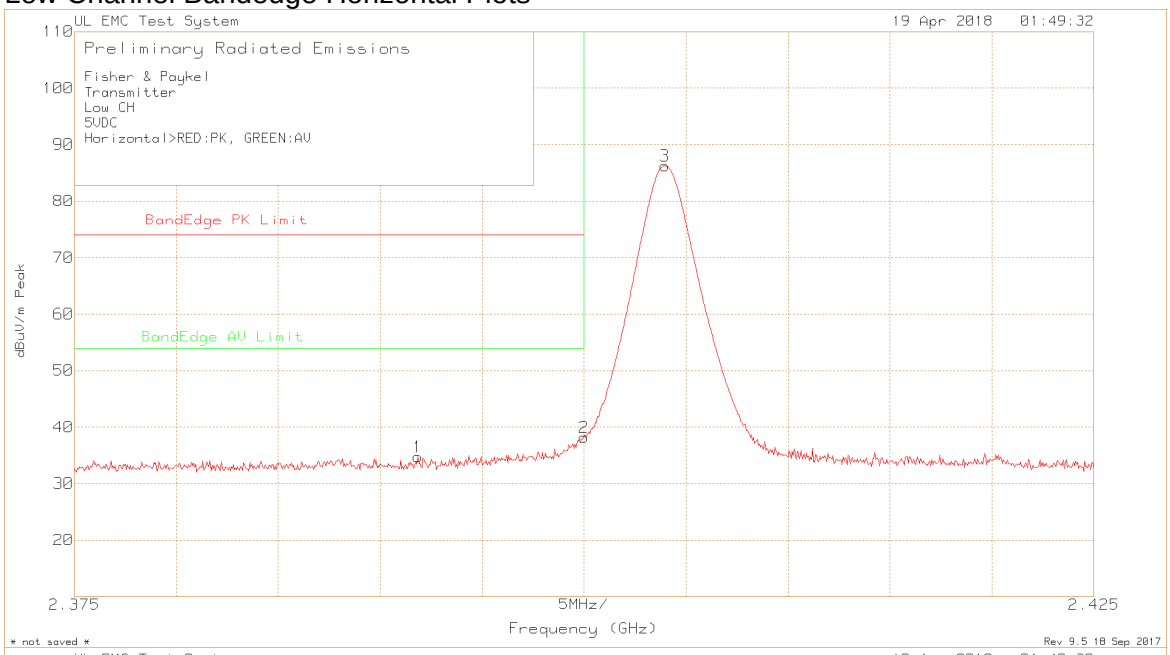
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.93	65.76	Pk	31.4	-53.12	44.04	74	-29.96	54	-9.96	0-360	150	H
2	2.404	115.79	Pk	21.8	-51.11	86.48	-	-	-	-	0-360	150	H
3	3.563	63.85	Pk	23.3	-50.34	36.81	74	-37.19	54	-17.19	0-360	100	H
4	7.345	56.82	Pk	30.8	-46.23	41.39	74	-32.61	54	-12.61	0-360	102	H
5	9.107	57.5	Pk	36.2	-47.51	46.19	74	-27.81	54	-7.81	0-360	100	H
6	12.413	51.56	Pk	39.4	-45.95	45.01	74	-28.99	54	-8.99	0-360	100	H
7	18.858	54.85	Pk	40.1	-51.54	43.41	74	-30.59	54	-10.59	0-360	100	H
8	1.926	65.7	Pk	31.4	-53.1	44	74	-30	54	-10	0-360	149	V
9	2.404	111.96	Pk	21.8	-51.11	82.65	-	-	-	-	0-360	100	V
10	3.377	63.63	Pk	23.3	-50.03	36.9	74	-37.1	54	-17.1	0-360	150	V
11	7.323	57.3	Pk	30.6	-46.01	41.89	74	-32.11	54	-12.11	0-360	99	V
12	9.133	57.84	Pk	36.3	-47.64	46.5	74	-27.5	54	-7.5	0-360	149	V
13	13.044	48.98	Pk	39.8	-44.47	44.31	74	-29.69	54	-9.69	0-360	100	V
14	18.896	54.91	Pk	40.2	-51.35	43.76	74	-30.24	54	-10.24	0-360	100	V

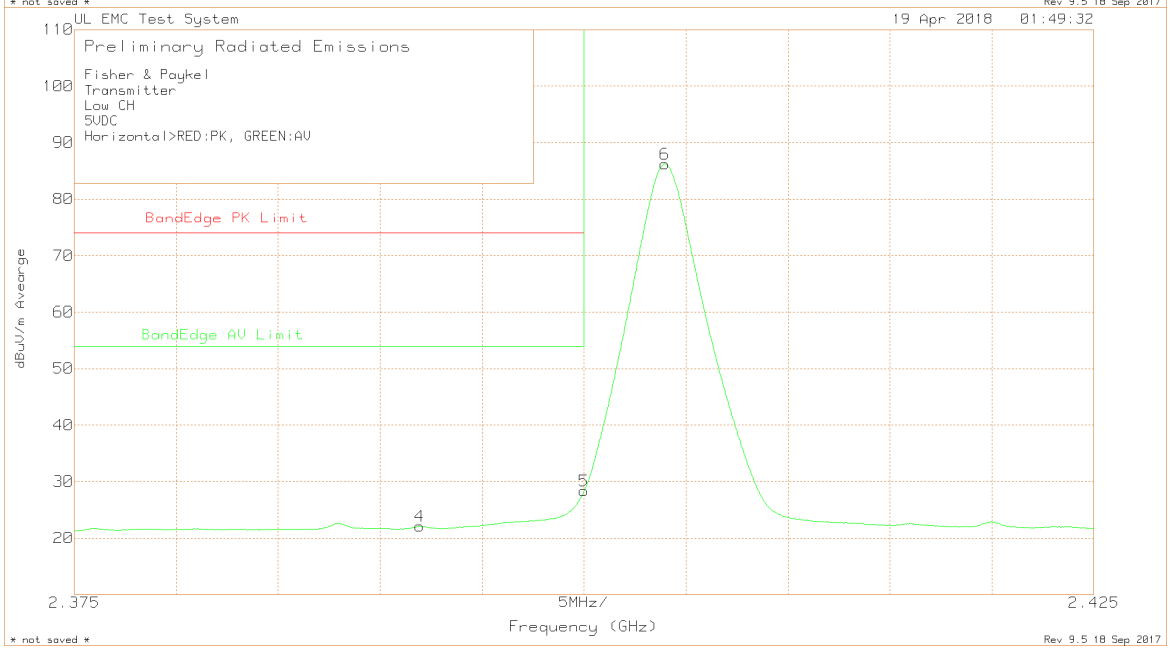
Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.4039	115.66	Pk	21.8	-51.1	86.36	114	-27.64	-	-	111	140	H
2.404	115.56	Av	21.8	-51.1	86.26	-	-	94	-7.74	111	140	H
2.404	111.17	Pk	21.8	-51.1	81.87	114	-32.13	-	-	202	100	V
2.404	111.06	Av	21.8	-51.1	81.76	-	-	94	-12.24	202	100	V

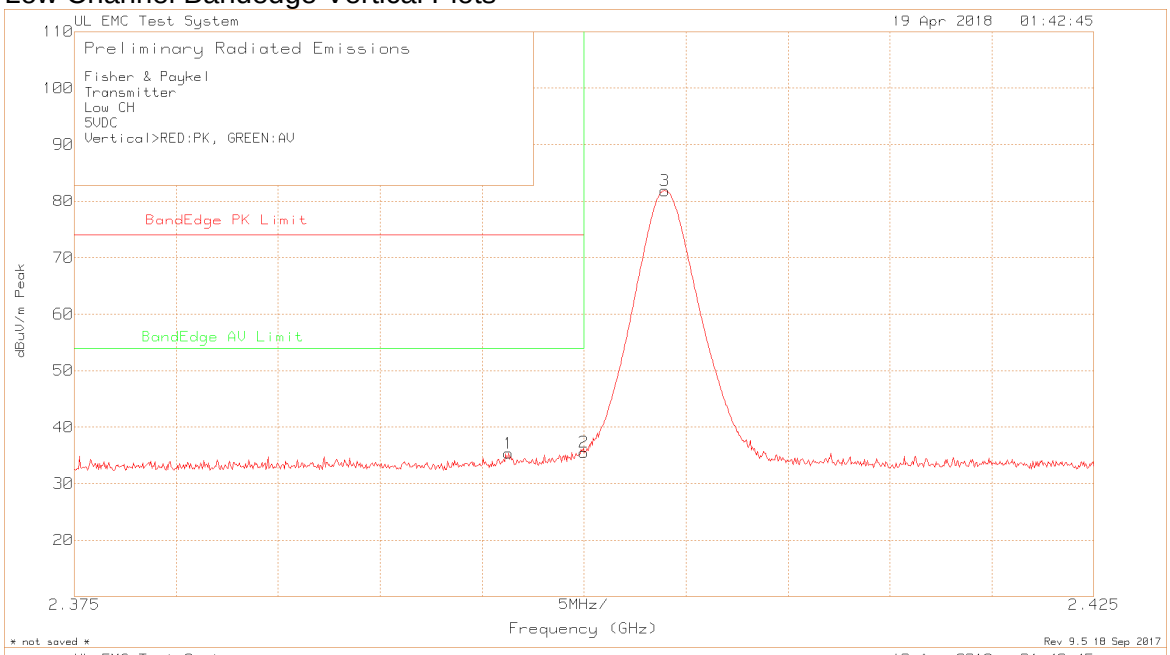
Pk - Peak detector
Av - Average detection

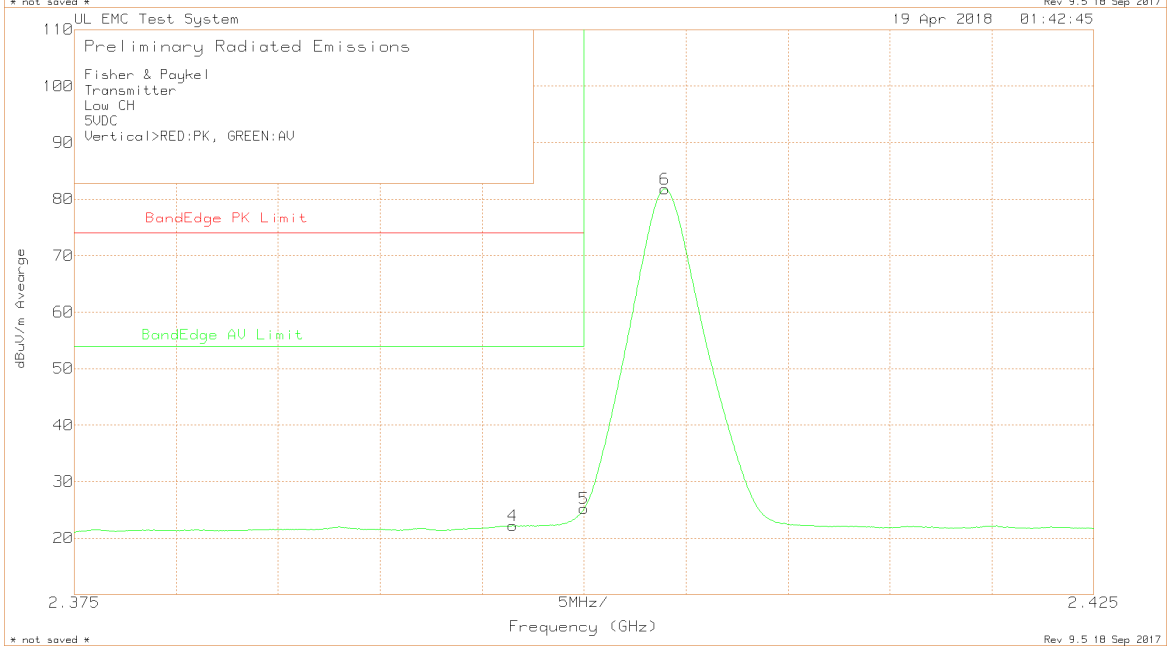
Low Channel Bandedge Horizontal Plots





Low Channel Bandedge Vertical Plots



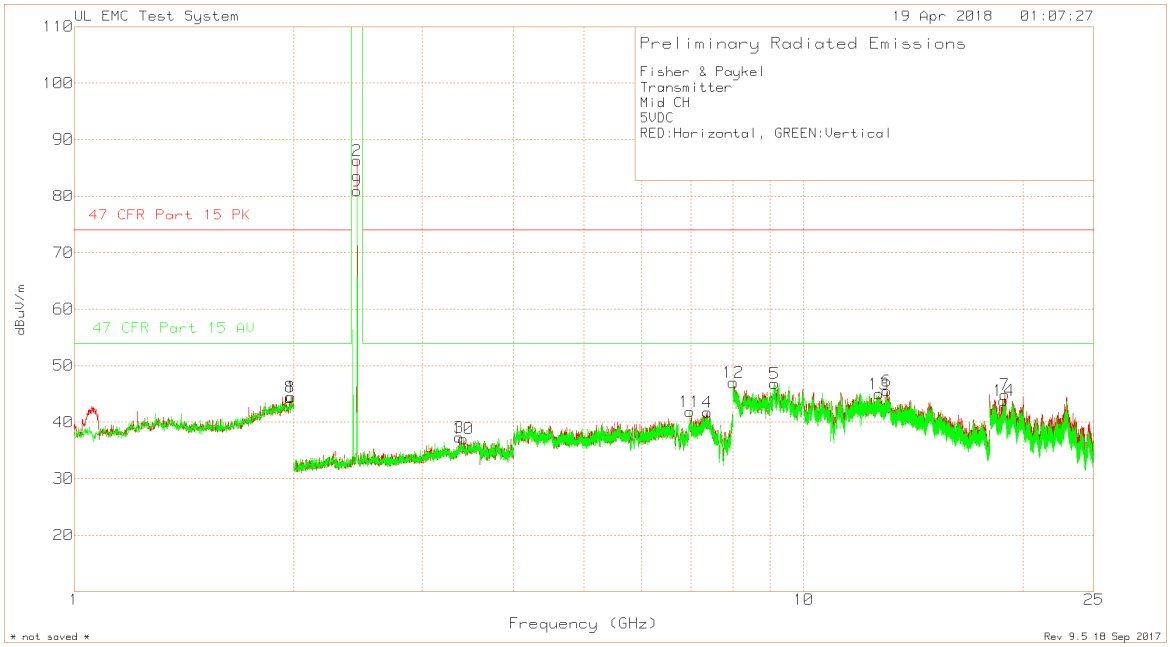


Low Channel Bandedge Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3919	64.09	Pk	21.8	-51.15	34.74	74	-39.26	54	-19.26	110	140	H
2	2.4	67.39	Pk	21.8	-51.02	38.17	74	-35.83	54	-15.83	110	140	H
3	2.404	115.55	Pk	21.8	-51.1	86.25	-	-	-	-	110	140	H
4	2.392	51.42	Pk	21.8	-51.14	22.08	74	-51.92	54	-31.92	110	140	H
5	2.4	57.56	Pk	21.8	-51.02	28.34	74	-45.66	54	-25.66	110	140	H
6	2.404	115.5	Pk	21.8	-51.1	86.2	-	-	-	-	110	140	H
1	2.3963	64.46	Pk	21.8	-50.88	35.38	74	-38.62	54	-18.62	202	100	V
2	2.4	64.76	Pk	21.8	-51.02	35.54	74	-38.46	54	-18.46	202	100	V
3	2.404	111.15	Pk	21.8	-51.1	81.85	-	-	-	-	202	100	V
4	2.3965	51.31	Av	21.8	-50.9	22.21	74	-51.79	54	-31.79	202	100	V
5	2.4	54.42	Av	21.8	-51.02	25.2	74	-48.8	54	-28.8	202	100	V
6	2.404	111.11	Av	21.8	-51.1	81.81	-	-	-	-	202	100	V

Pk - Peak detector
Av - Average detector

Middle Channel Plot



Middle Channel Data

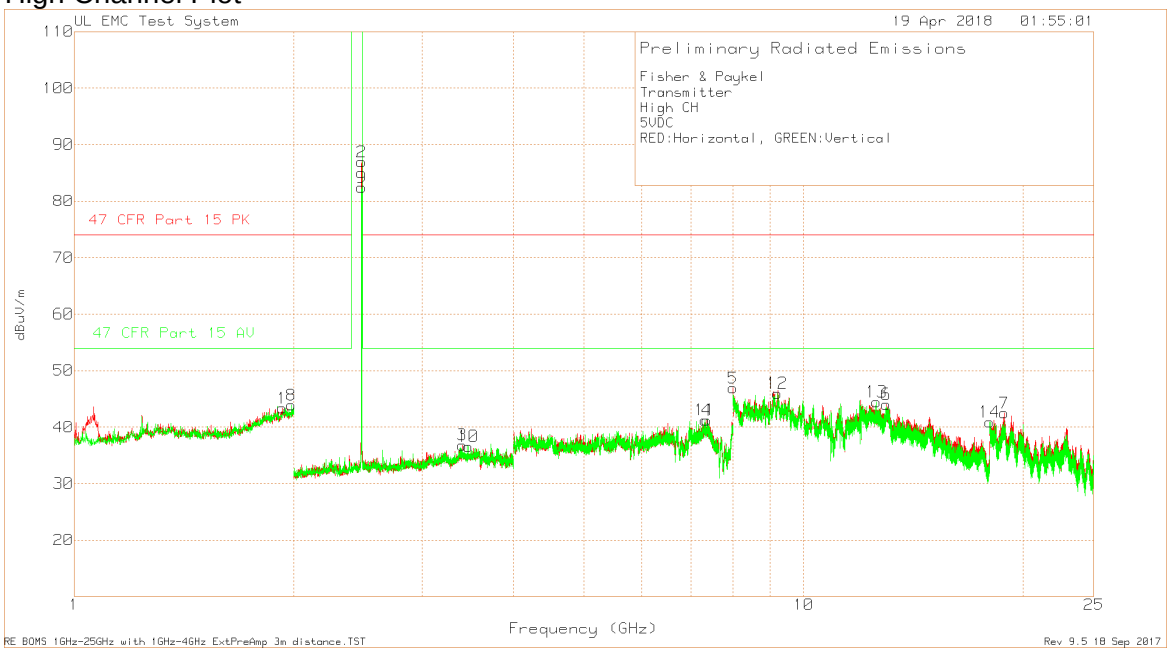
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.983	65.41	Pk	31.7	-52.66	44.45	74	-29.55	54	-9.55	0-360	149	H
2	2.442	115.93	Pk	21.9	-51.51	86.32	-	-	-	-	0-360	150	H
3	3.373	63.79	Pk	23.3	-49.8	37.29	74	-36.71	54	-16.71	0-360	100	H
4	7.377	57.33	Pk	31	-46.58	41.75	74	-32.25	54	-12.25	0-360	102	H
5	9.123	58.06	Pk	36.2	-47.45	46.81	74	-27.19	54	-7.19	0-360	150	H
6	12.998	50.49	Pk	39.8	-44.74	45.55	74	-28.45	54	-8.45	0-360	150	H
7	18.861	56.33	Pk	40.1	-51.53	44.9	74	-29.1	54	-9.1	0-360	100	H
8	1.977	65.35	Pk	31.7	-52.65	44.4	74	-29.6	54	-9.6	0-360	150	V
9	2.442	110.58	Pk	21.9	-51.51	80.97	-	-	-	-	0-360	100	V
10	3.414	63.84	Pk	23.5	-50.29	37.05	74	-36.95	54	-16.95	0-360	150	V
11	6.976	58.68	Pk	29.3	-46.13	41.85	74	-32.15	54	-12.15	0-360	100	V
12	8.007	57.65	Pk	36.1	-46.76	46.99	74	-27.01	54	-7.01	0-360	149	V
13	12.69	51.14	Pk	39.6	-45.78	44.96	74	-29.04	54	-9.04	0-360	100	V
14	18.816	55.22	Pk	40.1	-51.49	43.83	74	-30.17	54	-10.17	0-360	100	V

Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.442	117.51	Pk	21.9	-51.5	87.91	114	-26.09	-	-	178	144	V
2.442	117.4	Av	21.9	-51.5	87.8	-	-	94	-6.2	178	144	V
2.442	109.59	Pk	21.9	-51.5	79.99	114	-34.01	-	-	253	109	H
2.442	109.48	Av	21.9	-51.5	79.88	-	-	94	-14.12	253	109	H

Pk - Peak detector
Av - Average detection

High Channel Plot



High Channel Data

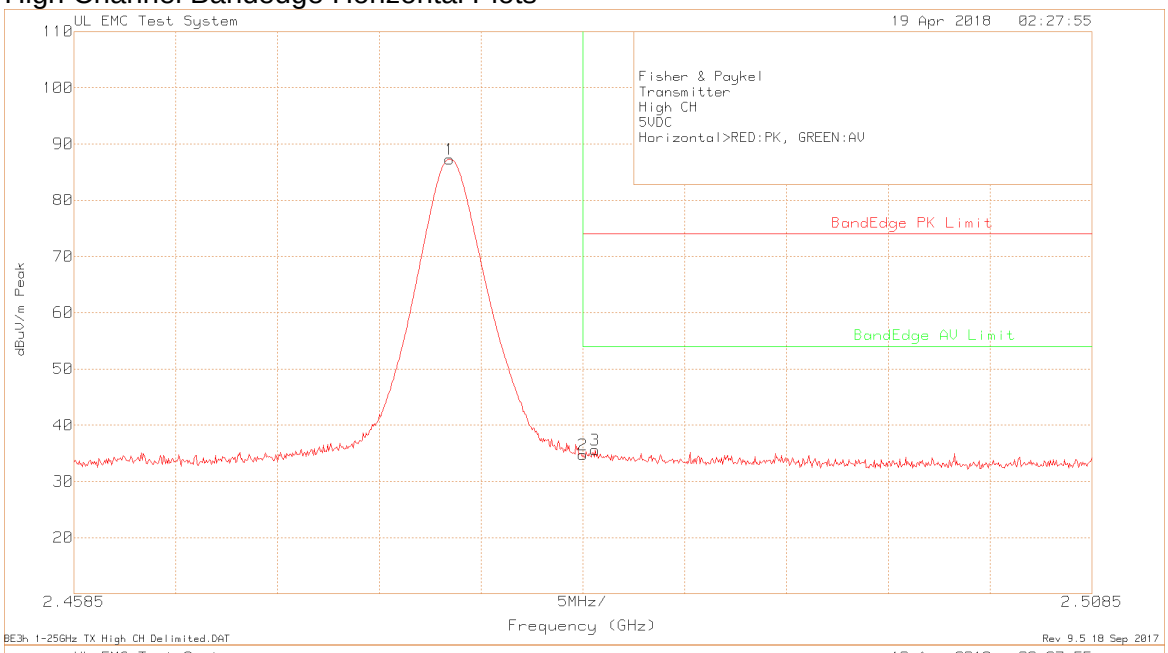
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.929	65.09	Pk	31.4	-53.15	43.34	74	-30.66	54	-10.66	0-360	100	H
2	2.477	116.36	Pk	22	-51.41	86.95	-	-	-	-	0-360	100	H
3	3.404	63.38	Pk	23.5	-50.04	36.84	74	-37.16	54	-17.16	0-360	100	H
4	7.369	56.66	Pk	31	-46.41	41.25	74	-32.75	54	-12.75	0-360	148	H
5	8.006	57.55	Pk	36.1	-46.71	46.94	74	-27.06	54	-7.06	0-360	150	H
6	12.986	48.87	Pk	39.8	-44.61	44.06	74	-29.94	54	-9.94	0-360	100	H
7	18.843	53.92	Pk	40.1	-51.5	42.52	74	-31.48	54	-11.48	0-360	100	H
8	1.985	64.85	Pk	31.7	-52.64	43.91	74	-30.09	54	-10.09	0-360	150	V
9	2.477	111.86	Pk	22	-51.41	82.45	-	-	-	-	0-360	100	V
10	3.471	63.52	Pk	23.5	-50.41	36.61	74	-37.39	54	-17.39	0-360	100	V
11	7.323	56.67	Pk	30.6	-46.01	41.26	74	-32.74	54	-12.74	0-360	150	V
12	9.206	56.91	Pk	36.3	-47.21	46	74	-28	54	-8	0-360	100	V
13	12.596	50.81	Pk	39.5	-45.83	44.48	74	-29.52	54	-9.52	0-360	100	V
14	18	51.61	Pk	40	-50.69	40.92	74	-33.08	54	-13.08	0-360	100	V

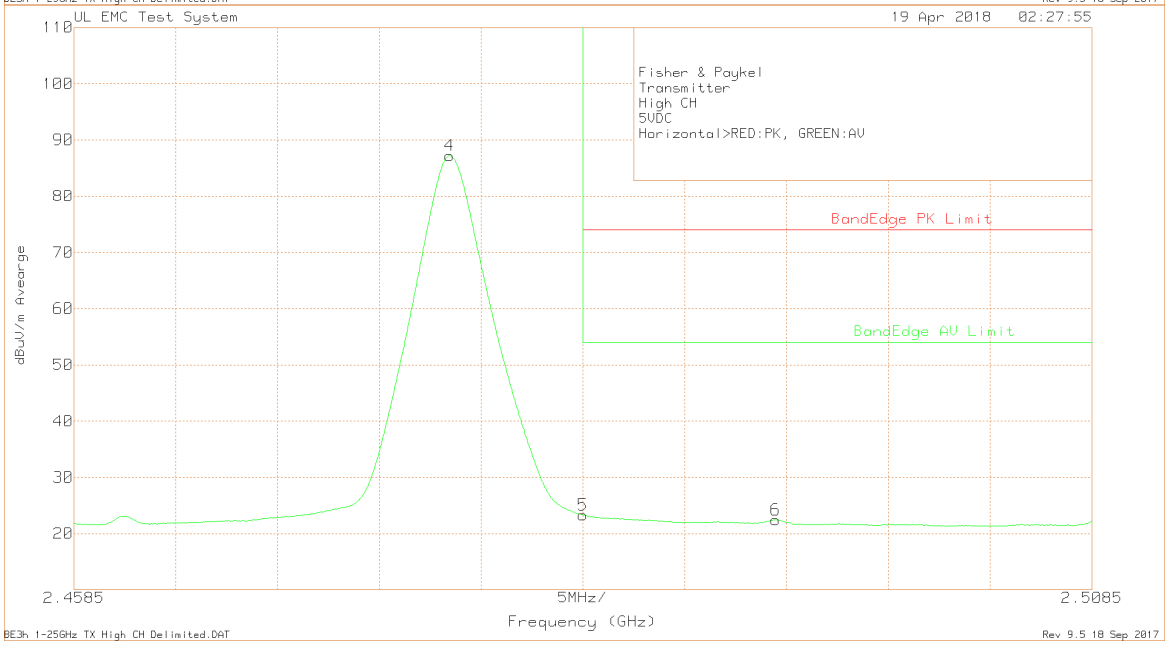
Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.477	116.8	Pk	22	-51.41	87.39	114	-26.61	-	-	113	124	H
2.477	116.7	Av	22	-51.41	87.29	-	-	94	-6.71	113	124	H
2.477	112.16	Pk	22	-51.41	82.75	114	-31.25	-	-	188	110	V
2.477	112.06	Av	22	-51.41	82.65	-	-	94	-11.35	188	110	V

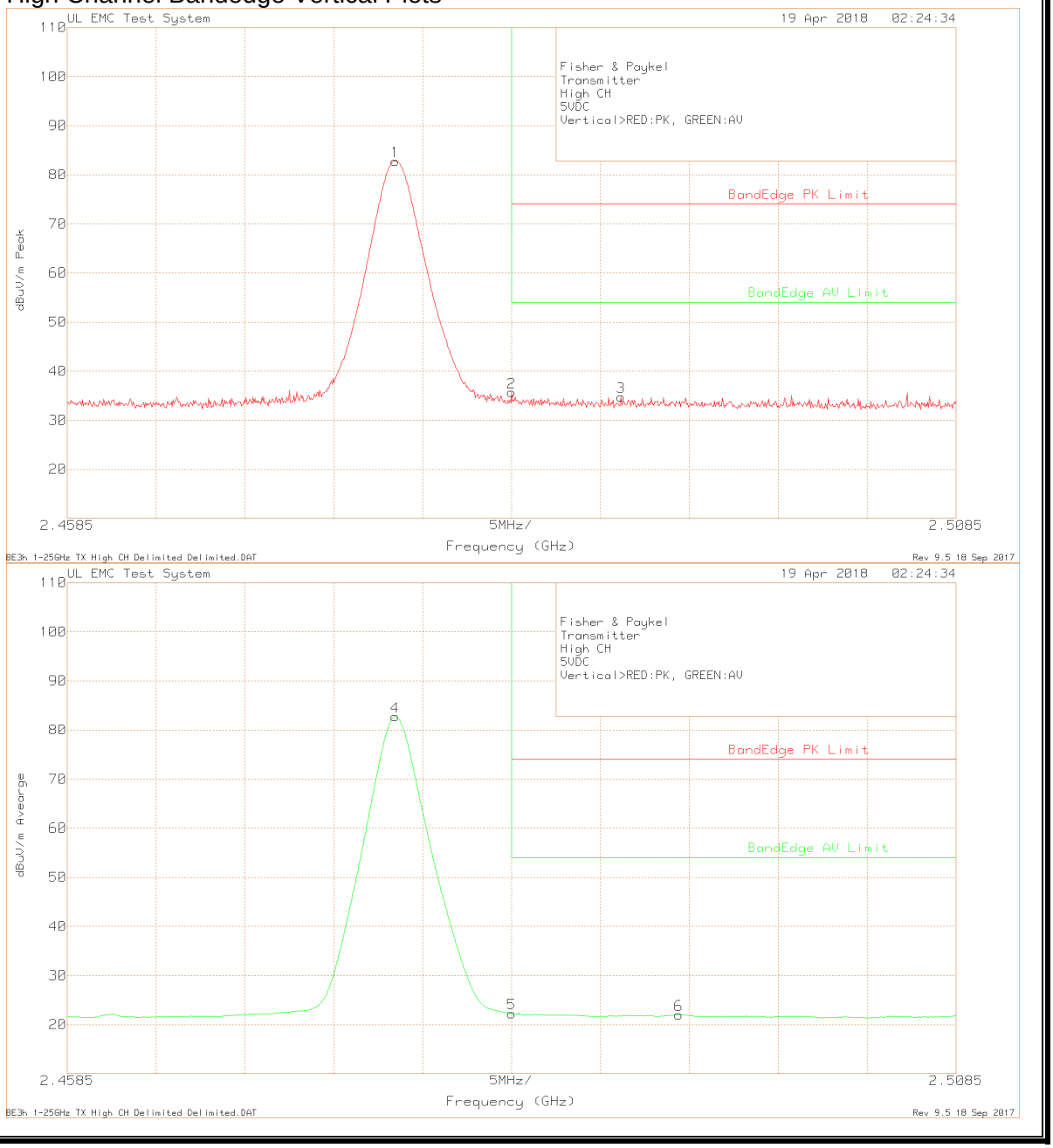
Pk - Peak detector
Av - Average detection

High Channel Bandedge Horizontal Plots





High Channel Bandedge Vertical Plots



High Channel Bandedge Data

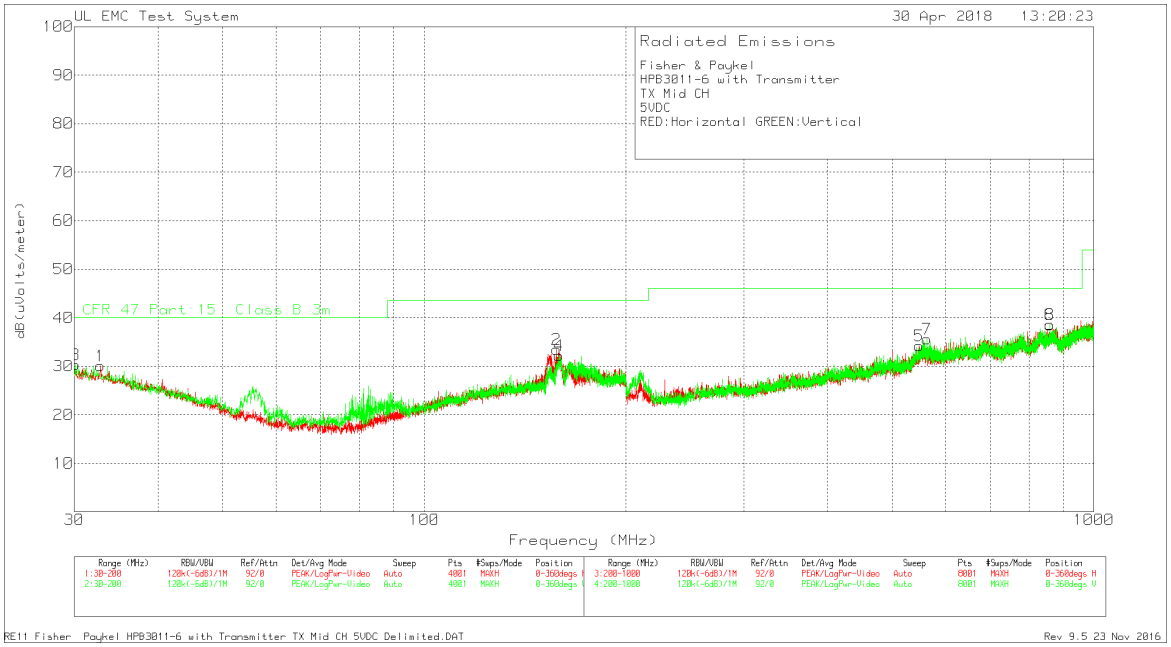
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.477	116.71	Pk	22	-51.41	87.3	-	-	-	-	112	124	H
2	2.4835	64.06	Pk	22.1	-51.42	34.74	74	-39.26	54	-19.26	112	124	H
3	2.4841	64.98	Pk	22.1	-51.48	35.6	74	-38.4	54	-18.4	112	124	H
4	2.477	116.65	Pk	22	-51.41	87.24	-	-	-	-	112	124	H
5	2.4835	52.65	Pk	22.1	-51.42	23.33	74	-50.67	54	-30.67	112	124	H
6	2.493	51.58	Pk	22.1	-51.2	22.48	74	-51.52	54	-31.52	112	124	H
1	2.477	112.21	Pk	22	-51.41	82.8	-	-	-	-	188	110	V
2	2.4835	65.04	Pk	22.1	-51.42	35.72	74	-38.28	54	-18.28	188	110	V
3	2.4897	64.01	Pk	22.1	-51.32	34.79	74	-39.21	54	-19.21	188	110	V
4	2.477	112.14	Pk	22	-51.41	82.73	-	-	-	-	188	110	V
5	2.4835	51.59	Pk	22.1	-51.42	22.27	74	-51.73	54	-31.73	188	110	V
6	2.4929	51.13	Pk	22.1	-51.2	22.03	74	-51.97	54	-31.97	188	110	V

Pk - Peak detector
Av - Average detector

9.3. LIMITED MODULAR TRANSMITTER WITH HOST DEVICE RADIATED SPUROUS EMSSIONS

9.3.1. SPURIOUS EMISSIONS 30 TO 1000 MHz

Model HPB3011 Plot

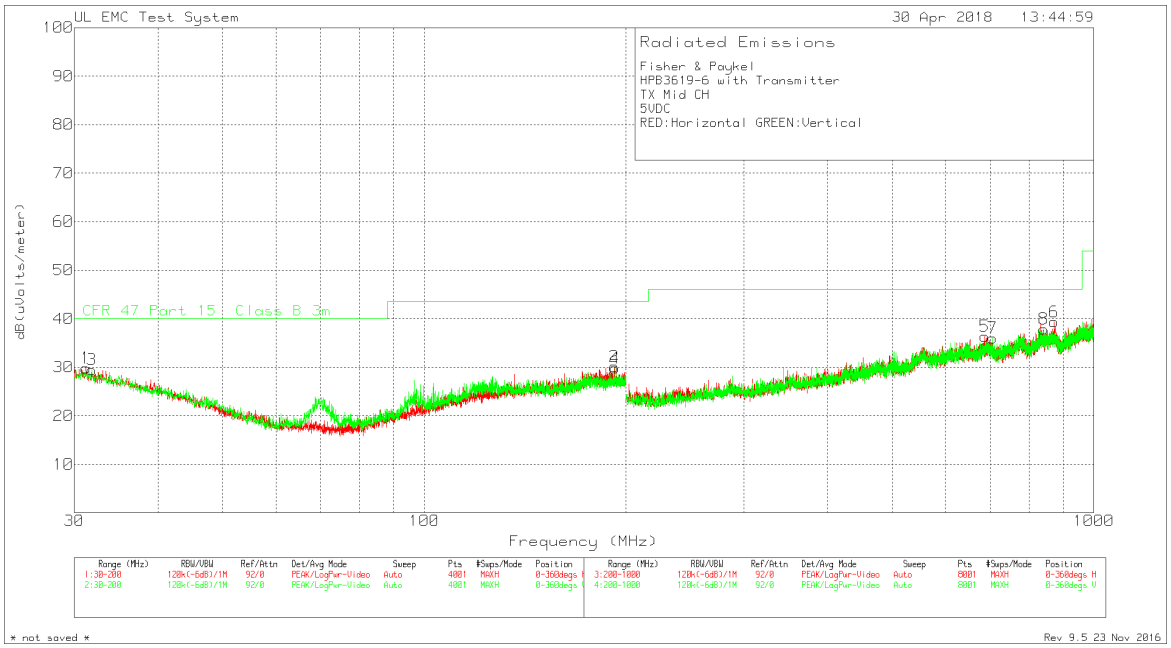


Data

Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	10m to 3m Factor (dB)	Corrected Reading dB(uVolts/meter)	QP Limit (dBuV/m)	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	32.805	32.48	Pk	17.1	-30	10.5	30.08	40	-9.92	0-360	101	H
2	157.415	37.88	Pk	14.9	-29.8	10.5	33.48	43.52	-10.04	0-360	398	H
3	30.085	31.83	Pk	18.3	-30.3	10.5	30.33	40	-9.67	0-360	251	V
4	158.945	36.3	Pk	15	-29.6	10.5	32.2	46.02	-13.82	0-360	101	V
5	547.8	31.6	Pk	19.6	-27.5	10.5	34.2	46.02	-11.82	0-360	399	H
6	859.1	33.03	Pk	23	-27.9	10.5	38.63	46.02	-7.39	0-360	299	H
7	563.6	32.9	Pk	19.6	-27.4	10.5	35.6	46.02	-10.42	0-360	302	V
8	859.6	32.77	Pk	23.1	-27.8	10.5	38.57	46.02	-7.45	0-360	198	V

Pk - Peak detector

Model HPB3619-6 Plot

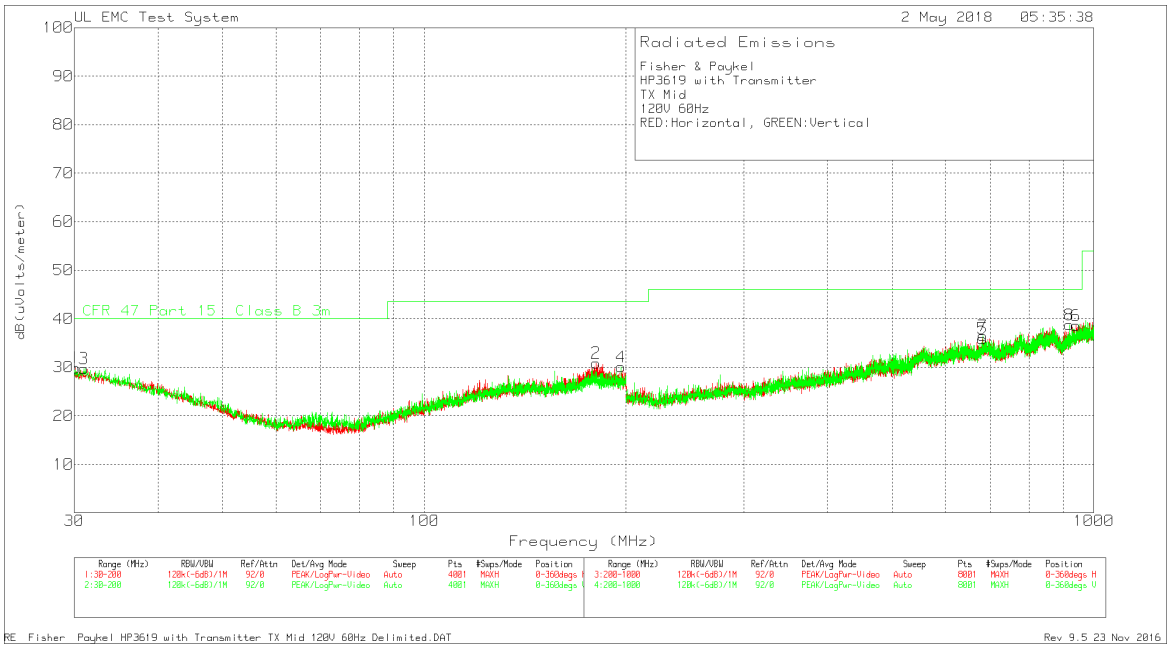


Data

Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	10m to 3m Factor (dB)	Corrected Reading dB(uVolts/meter)	QP Limit (dBuV/m)	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	31.2325	31.78	Pk	17.8	-30.2	10.5	29.88	40	-10.12	0-360	398	H
2	192.095	32.45	Pk	16.1	-28.9	10.5	30.15	43.52	-13.37	0-360	248	H
3	31.87	31.92	Pk	17.5	-30.4	10.5	29.52	40	-10.48	0-360	251	V
4	192.4775	32.32	Pk	16.1	-29.1	10.5	29.82	46.02	-16.2	0-360	251	V
5	687.5	31.1	Pk	21.3	-26.5	10.5	36.4	46.02	-9.62	0-360	199	H
6	872.7	33.29	Pk	23.5	-27.9	10.5	39.39	46.02	-6.63	0-360	299	H
7	705.9	31.94	Pk	20.7	-27.1	10.5	36.04	46.02	-9.98	0-360	399	V
8	842.3	32.42	Pk	22.8	-27.8	10.5	37.92	46.02	-8.1	0-360	102	V

Pk - Peak detector

Model HP3619 Plot



Data

Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	10m to 3m Factor (dB)	Corrected Reading dB(uVolts/meter)	QP Limit (dBuV/m)	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.1275	31.6	Pk	18.2	-30.4	10.5	29.9	40	-10.1	0-360	100	H
2	180.4925	34.28	Pk	15.6	-29.5	10.5	30.88	43.52	-12.64	0-360	248	H
3	31.02	31.55	Pk	17.9	-30.2	10.5	29.75	40	-10.25	0-360	251	V
4	196.77	32.34	Pk	16.2	-29	10.5	30.04	46.02	-15.98	0-360	101	V
5	682	30.82	Pk	21.2	-26.6	10.5	35.92	46.02	-10.1	0-360	199	H
6	940.1	31.61	Pk	23.5	-27	10.5	38.61	46.02	-7.41	0-360	100	H
7	682.3	31.91	Pk	21.2	-27.1	10.5	36.51	46.02	-9.51	0-360	299	V
8	919.2	33.31	Pk	22.4	-27.5	10.5	38.71	46.02	-7.31	0-360	199	V

Pk - Peak detector

9.3.2. SPURIOUS EMISSIONS 1GHz TO 25GHz

Host HPB3011

Host HPB3011 Low Channel Spurious Plot

Host HPB3011 Low Channel Data

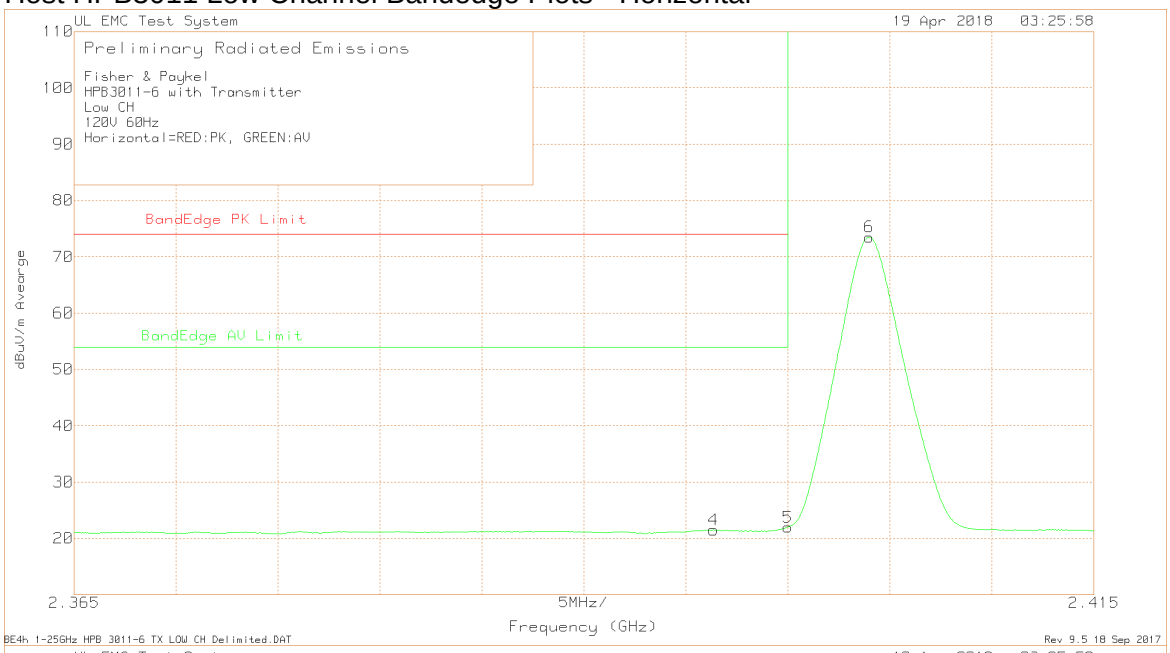
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.975	64.22	Pk	31.7	-52.67	43.25	74	-30.75	54	-10.75	0-360	150	H
2	2.404	98.02	Pk	21.8	-51.11	68.71	-	-	-	-	0-360	150	H
3	3.573	63.6	Pk	23.3	-50.5	36.4	74	-37.6	54	-17.6	0-360	150	H
4	7.384	57.03	Pk	31.1	-46.73	41.4	74	-32.6	54	-12.6	0-360	101	H
5	9.128	57.13	Pk	36.3	-47.53	45.9	74	-28.1	54	-8.1	0-360	100	H
6	13.006	48.14	Pk	39.8	-44.41	43.53	74	-30.47	54	-10.47	0-360	149	H
7	18.057	52.11	Pk	40	-50.77	41.34	74	-32.66	54	-12.66	0-360	100	H
8	1.939	64.86	Pk	31.5	-53.14	43.22	74	-30.78	54	-10.78	0-360	150	V
9	2.404	113.05	Pk	21.8	-51.11	83.74	-	-	-	-	0-360	149	V
10	3.802	63.28	Pk	24.1	-50.07	37.31	74	-36.69	54	-16.69	0-360	149	V
11	7.38	56.7	Pk	31.1	-46.64	41.16	74	-32.84	54	-12.84	0-360	150	V
12	8.822	58.12	Pk	36.2	-48.74	45.58	74	-28.42	54	-8.42	0-360	149	V
13	12.306	49.96	Pk	39.4	-45.79	43.57	74	-30.43	54	-10.43	0-360	150	V
14	18.008	51.5	Pk	40	-50.69	40.81	74	-33.19	54	-13.19	0-360	100	V

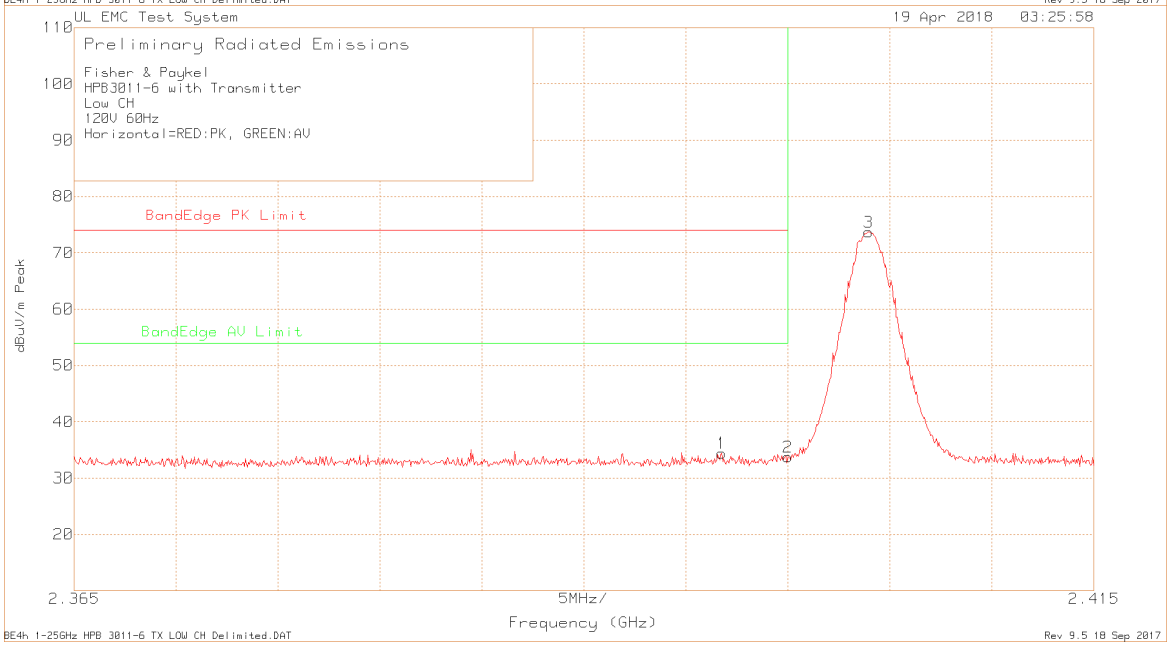
Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.404	102.85	Pk	21.8	-51.1	73.55	114	-40.45	-	-	256	254	H
2.404	102.68	Av	21.8	-51.1	73.38	-	-	94	-20.62	256	254	H
2.404	112.81	Pk	21.8	-51.1	83.51	114	-30.49	-	-	205	150	V
2.404	112.69	Av	21.8	-51.1	83.39	-	-	94	-10.61	205	150	V

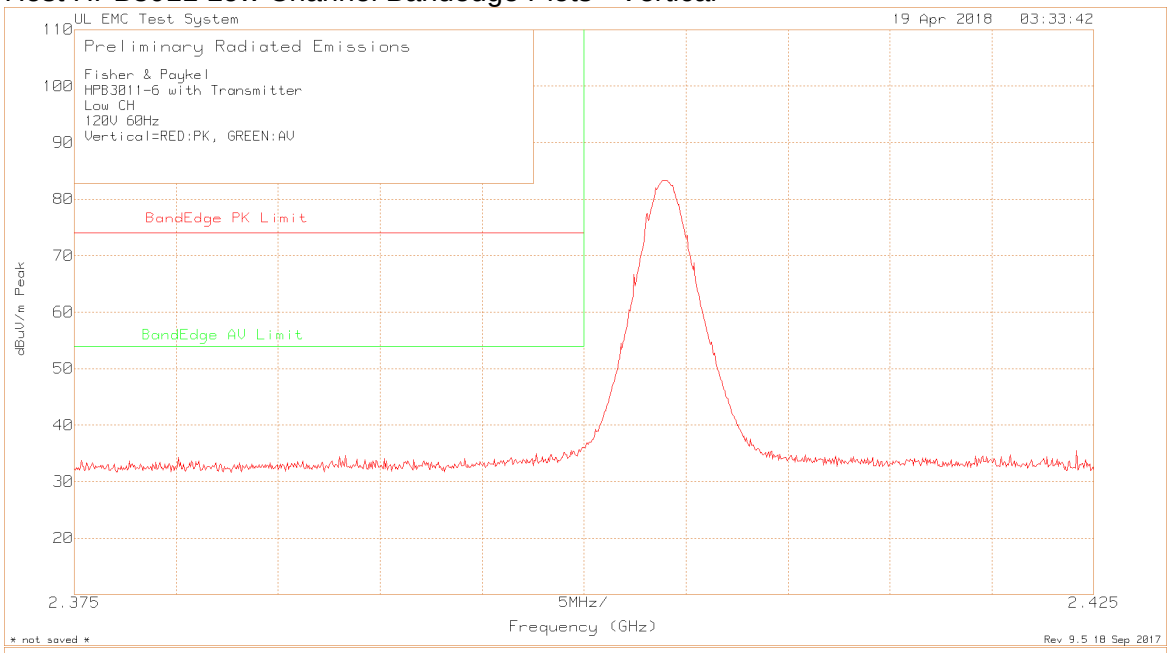
Pk - Peak detector
Av - Average detection

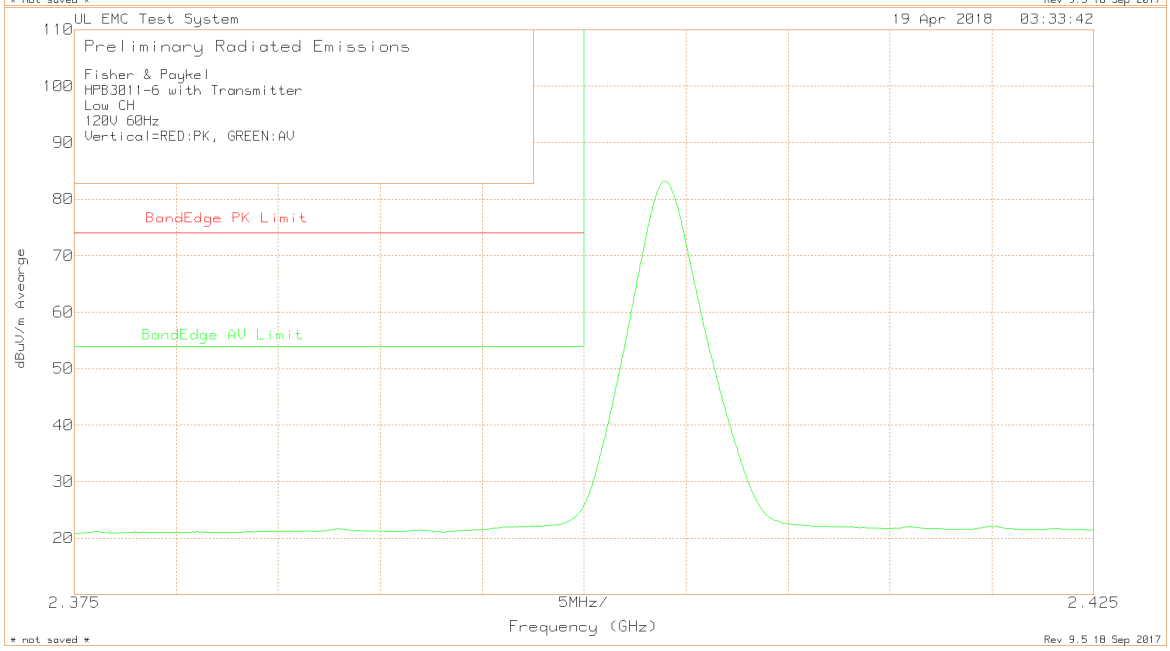
Host HPB3011 Low Channel Bandedge Plots - Horizontal





Host HPB3011 Low Channel Bandedge Plots - Vertical



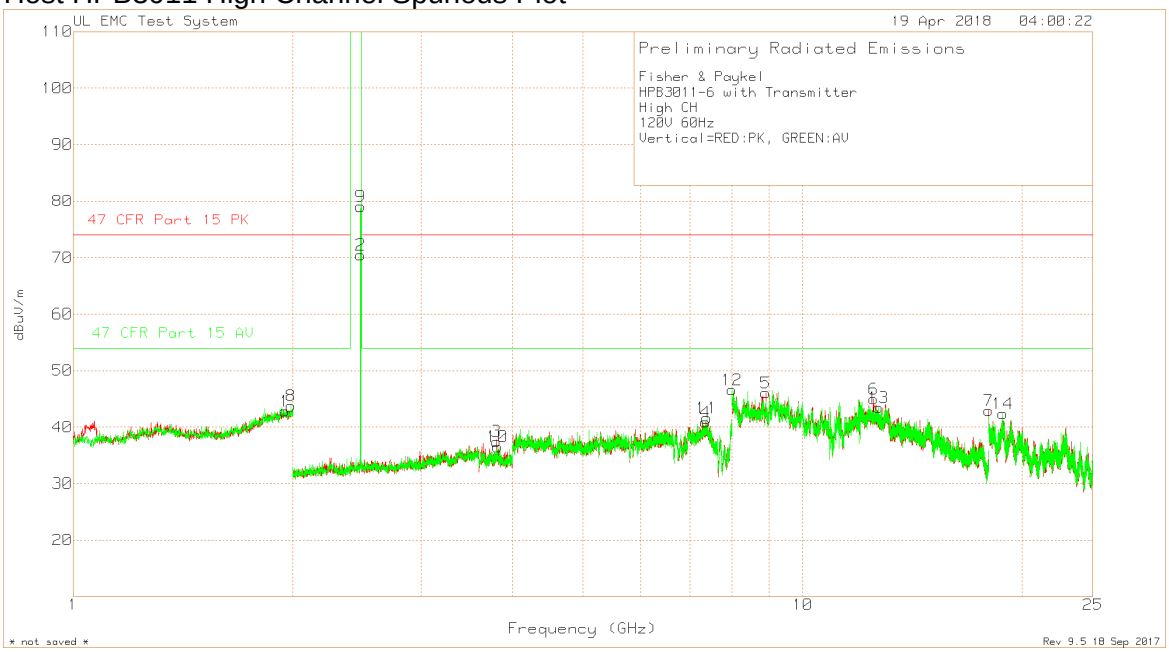


Host HPB3011 Low Channel Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3968	63.57	Pk	21.8	-50.93	34.44	74	-39.56	54	-19.56	256	254	H
2	2.4	62.95	Pk	21.8	-51.02	33.73	74	-40.27	54	-20.27	256	254	H
3	2.404	102.97	Pk	21.8	-51.1	73.67	-	-	-	-	256	254	H
4	2.3964	50.62	Pk	21.8	-50.89	21.53	74	-52.47	54	-32.47	256	254	H
5	2.4	51.2	Pk	21.8	-51.02	21.98	74	-52.02	54	-32.02	256	254	H
6	2.404	102.83	Pk	21.8	-51.1	73.53	-	-	-	-	256	254	H
1	2.3977	64.26	Pk	21.8	-51.06	35	74	-39	54	-19	207	150	V
2	2.4	65.25	Pk	21.8	-51.02	36.03	74	-37.97	54	-17.97	207	150	V
3	2.404	112.62	Pk	21.8	-51.1	83.32	-	-	-	-	207	150	V
4	2.3984	51.62	Pk	21.8	-51.12	22.3	74	-51.7	54	-31.7	207	150	V
5	2.4	55.08	Pk	21.8	-51.02	25.86	74	-48.14	54	-28.14	207	150	V
6	2.404	112.54	Pk	21.8	-51.1	83.24	-	-	-	-	207	150	V

Pk - Peak detector

Host HPB3011 High Channel Spurious Plot



Host HPB3011 High Channel Data

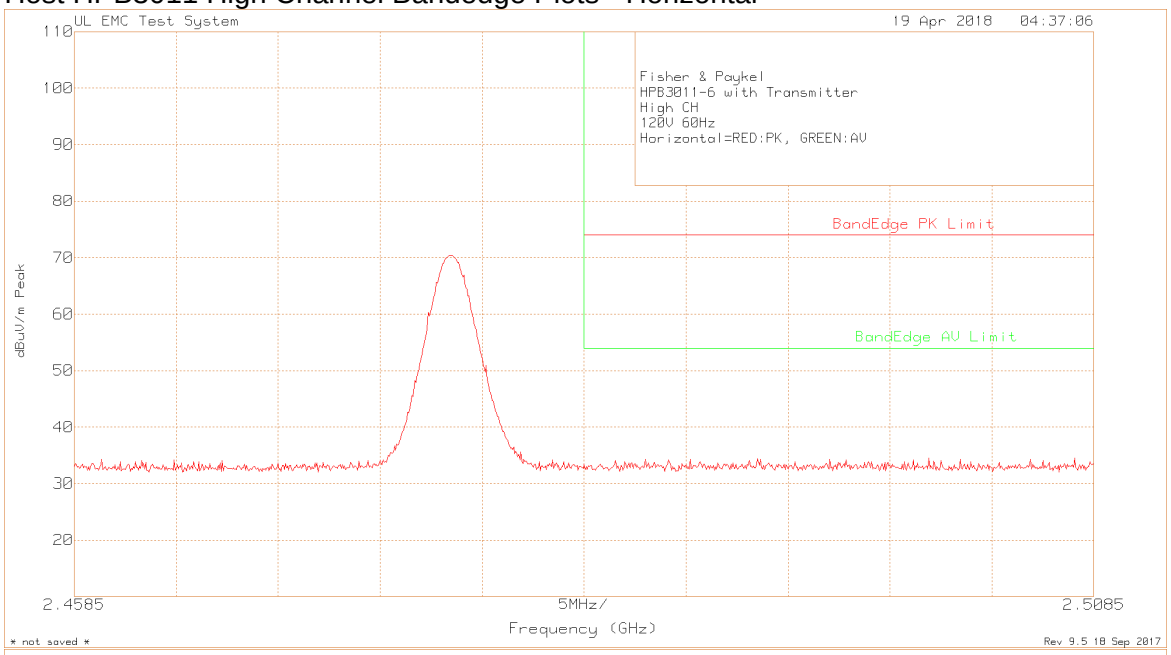
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.949	64.12	Pk	31.6	-52.87	42.85	74	-31.15	54	-11.15	0-360	100	H
2	2.477	99.9	Pk	22	-51.41	70.49	-	-	-	-	0-360	100	H
3	3.803	63.45	Pk	24.1	-50.08	37.47	74	-36.53	54	-16.53	0-360	150	H
4	7.359	56.29	Pk	30.9	-46.31	40.88	74	-33.12	54	-13.12	0-360	101	H
5	8.9	58.87	Pk	36.1	-48.94	46.03	74	-27.97	54	-7.97	0-360	100	H
6	12.52	51.86	Pk	39.4	-46.31	44.95	74	-29.05	54	-9.05	0-360	100	H
7	18	53.59	Pk	40	-50.69	42.9	74	-31.1	54	-11.1	0-360	100	H
8	1.987	64.8	Pk	31.7	-52.74	43.76	74	-30.24	54	-10.24	0-360	150	V
9	2.477	108.46	Pk	22	-51.41	79.05	-	-	-	-	0-360	149	V
10	3.816	62.37	Pk	24.1	-49.94	36.53	74	-37.47	54	-17.47	0-360	149	V
11	7.387	57.32	Pk	31.1	-46.82	41.6	74	-32.4	54	-12.4	0-360	100	V
12	8.002	57.4	Pk	36.1	-46.87	46.63	74	-27.37	54	-7.37	0-360	100	V
13	12.712	49.59	Pk	39.6	-45.75	43.44	74	-30.56	54	-10.56	0-360	100	V
14	18.818	53.91	Pk	40.1	-51.64	42.37	74	-31.63	54	-11.63	0-360	100	V

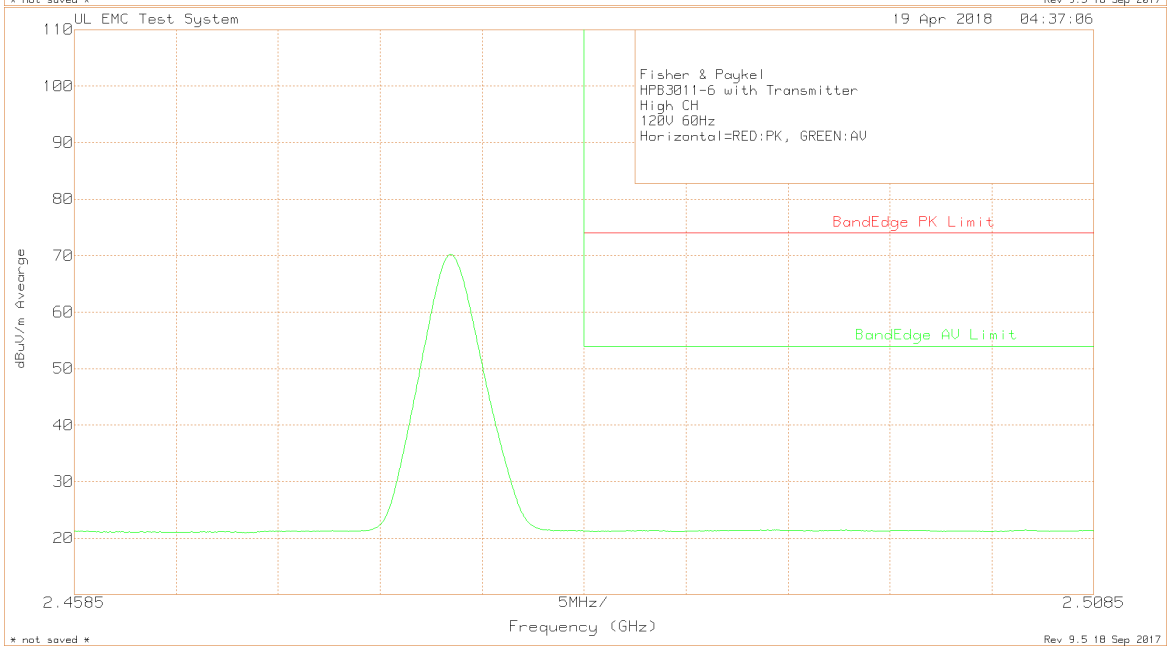
Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.477	99.68	Pk	22	-51.41	70.27	114	-43.73	-	-	293	100	H
2.477	99.45	Av	22	-51.41	70.04	-	-	94	-23.96	293	100	H
2.477	108.62	Pk	22	-51.41	79.21	114	-34.79	-	-	173	206	V
2.477	108.46	Av	22	-51.41	79.05	-	-	94	-14.95	173	206	V

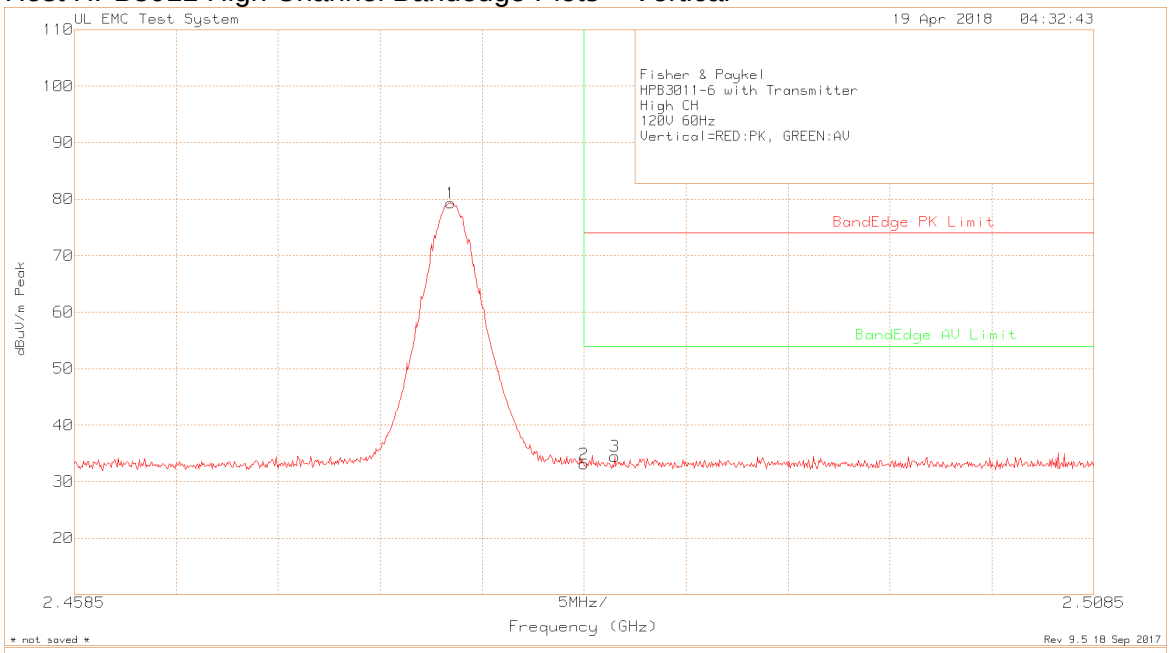
Pk - Peak detector
Av - Average detection

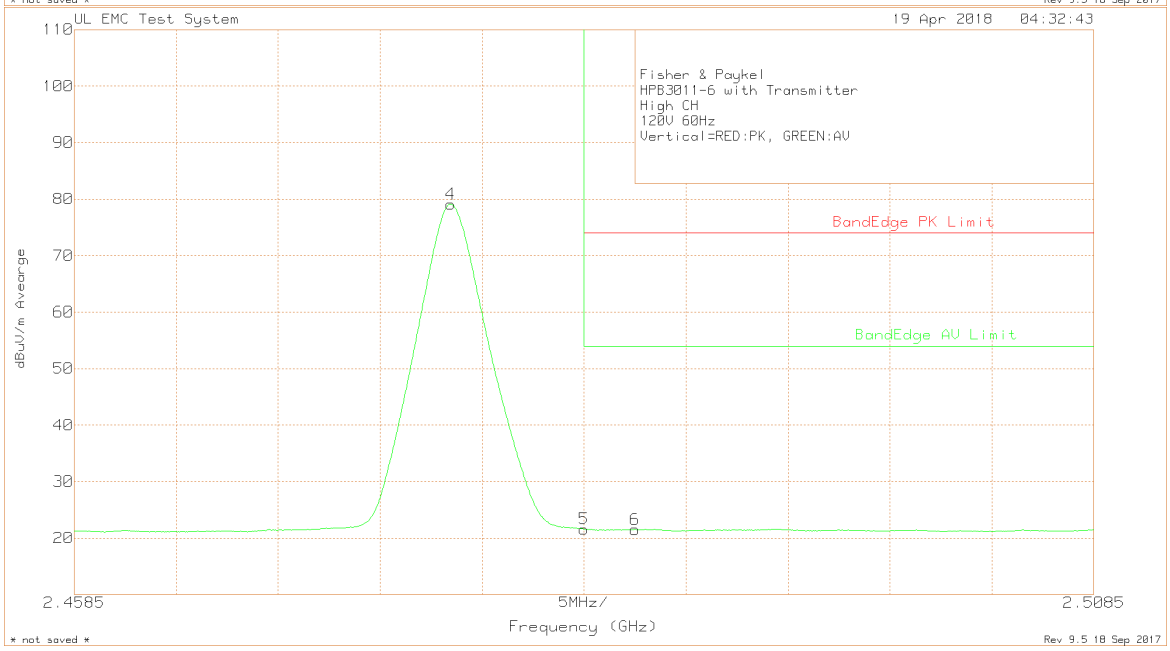
Host HPB3011 High Channel Bandedge Plots - Horizontal





Host HPB3011 High Channel Bandedge Plots – Vertical





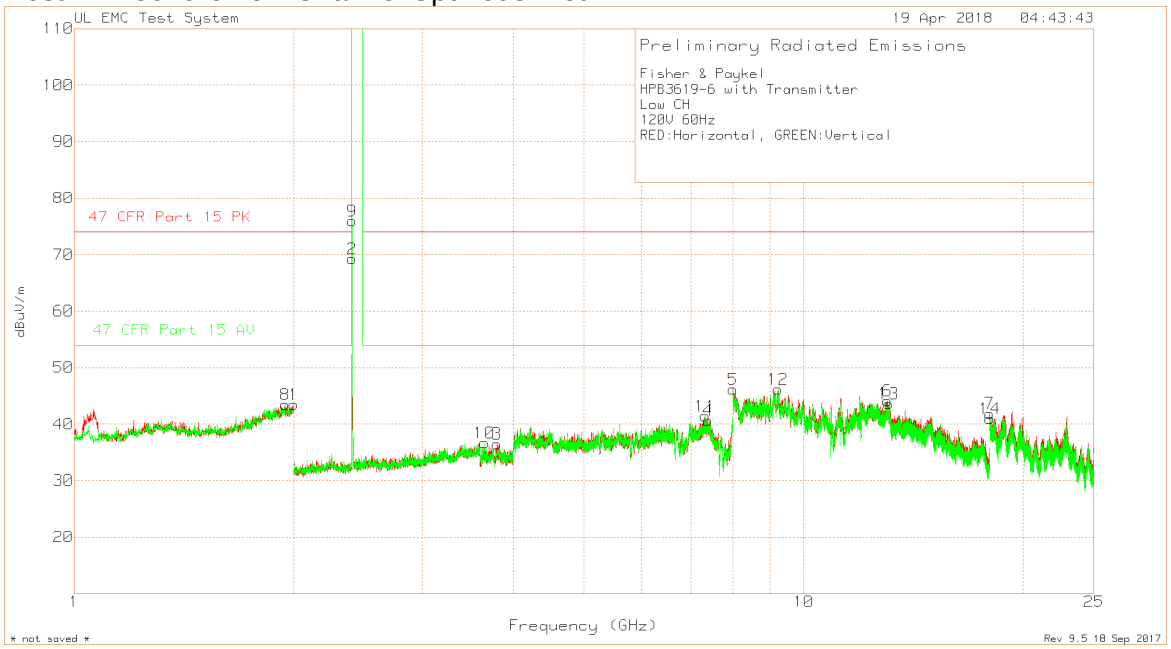
Host HPB3011 High Channel Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.477	99.79	Pk	22	-51.41	70.38	-	-	-	-	293	100	H
2	2.4835	62.8	Pk	22.1	-51.42	33.48	74	-40.52	54	-20.52	293	100	H
3	2.4887	63.64	Pk	22.1	-51.4	34.34	74	-39.66	54	-19.66	293	100	H
4	2.477	99.62	Pk	22	-51.41	70.21	-	-	-	-	293	100	H
5	2.4835	50.54	Pk	22.1	-51.42	21.22	74	-52.78	54	-32.78	293	100	H
6	2.4861	50.62	Pk	22.1	-51.33	21.39	74	-52.61	54	-32.61	293	100	H
1	2.477	108.68	Pk	22	-51.41	79.27	-	-	-	-	173	206	V
2	2.4835	62.46	Pk	22.1	-51.42	33.14	74	-40.86	54	-20.86	173	206	V
3	2.485	63.77	Pk	22.1	-51.4	34.47	74	-39.53	54	-19.53	173	206	V
4	2.477	108.54	Pk	22	-51.41	79.13	-	-	-	-	173	206	V
5	2.4835	50.94	Pk	22.1	-51.42	21.62	74	-52.38	54	-32.38	173	206	V
6	2.486	50.75	Pk	22.1	-51.33	21.52	74	-52.48	54	-32.48	173	206	V

Pk - Peak detector

Host HPB3619

Host HPB3619-6 Low Channel Spurious Plot



Host HPB3619-6 Low Channel Data

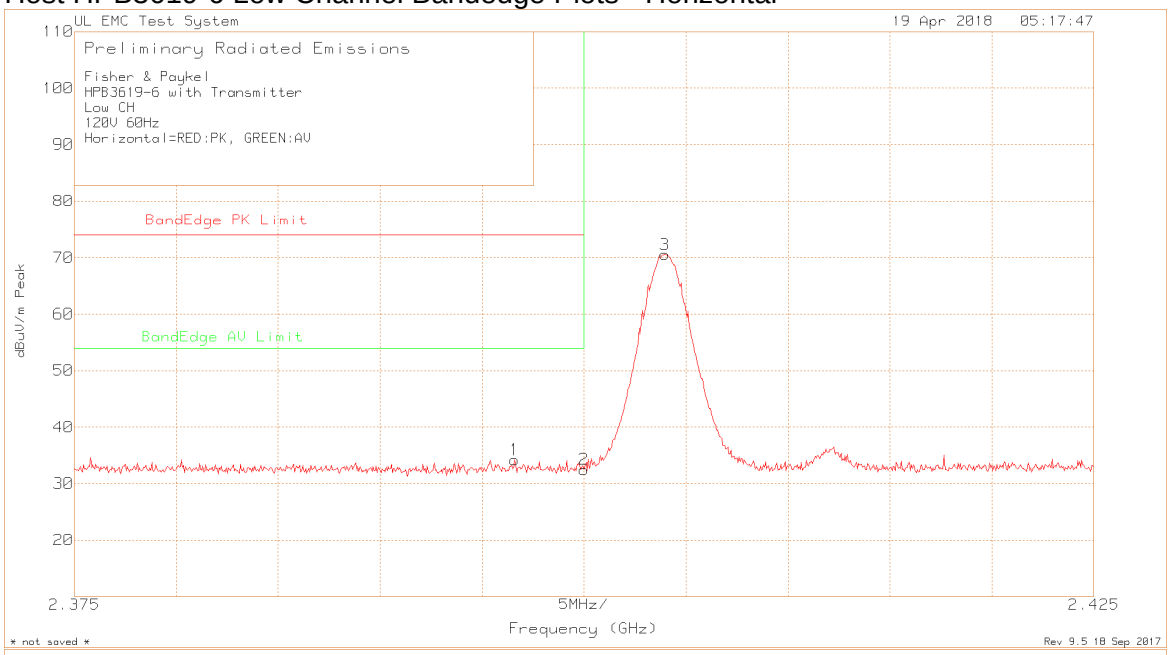
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.999	64.46	Pk	31.7	-52.72	43.44	74	-30.56	54	-10.56	0-360	150	H
2	2.404	98.57	Pk	21.8	-51.11	69.26	-	-	-	-	0-360	100	H
3	3.799	62.54	Pk	24.1	-50.13	36.51	74	-37.49	54	-17.49	0-360	150	H
4	7.392	56.55	Pk	31.1	-46.98	40.67	74	-33.33	54	-13.33	0-360	102	H
5	8.002	56.94	Pk	36.1	-46.87	46.17	74	-27.83	54	-7.83	0-360	150	H
6	13.03	48.89	Pk	39.8	-44.54	44.15	74	-29.85	54	-9.85	0-360	100	H
7	18	52.59	Pk	40	-50.69	41.9	74	-32.1	54	-12.1	0-360	100	H
8	1.945	64.7	Pk	31.6	-52.83	43.47	74	-30.53	54	-10.53	0-360	150	V
9	2.404	105.24	Pk	21.8	-51.11	75.93	-	-	-	-	0-360	149	V
10	3.651	62.61	Pk	23.4	-49.36	36.65	74	-37.35	54	-17.35	0-360	100	V
11	7.33	56.78	Pk	30.7	-46.07	41.41	74	-32.59	54	-12.59	0-360	150	V
12	9.225	56.84	Pk	36.4	-47.08	46.16	74	-27.84	54	-7.84	0-360	150	V
13	13.082	48.16	Pk	39.8	-44.34	43.62	74	-30.38	54	-10.38	0-360	100	V
14	18.007	51.7	Pk	40	-50.69	41.01	74	-32.99	54	-12.99	0-360	100	V

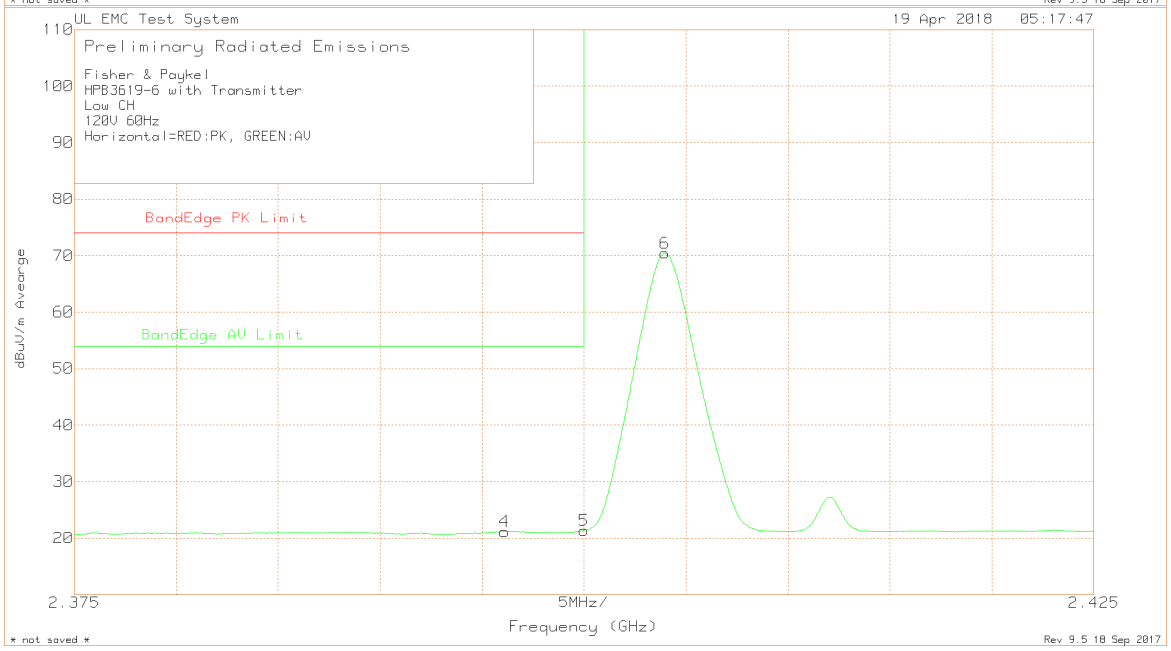
Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.404	98.15	Pk	21.8	-51.11	68.84	114	-45.16	-	-	210	188	H
2.404	97.92	Av	21.8	-51.1	68.62	-	-	94	-25.38	210	188	H
2.404	106.8	Pk	21.8	-51.1	77.5	114	-36.5	-	-	69	255	V
2.404	106.66	Av	21.8	-51.1	77.36	-	-	94	-16.64	69	255	V

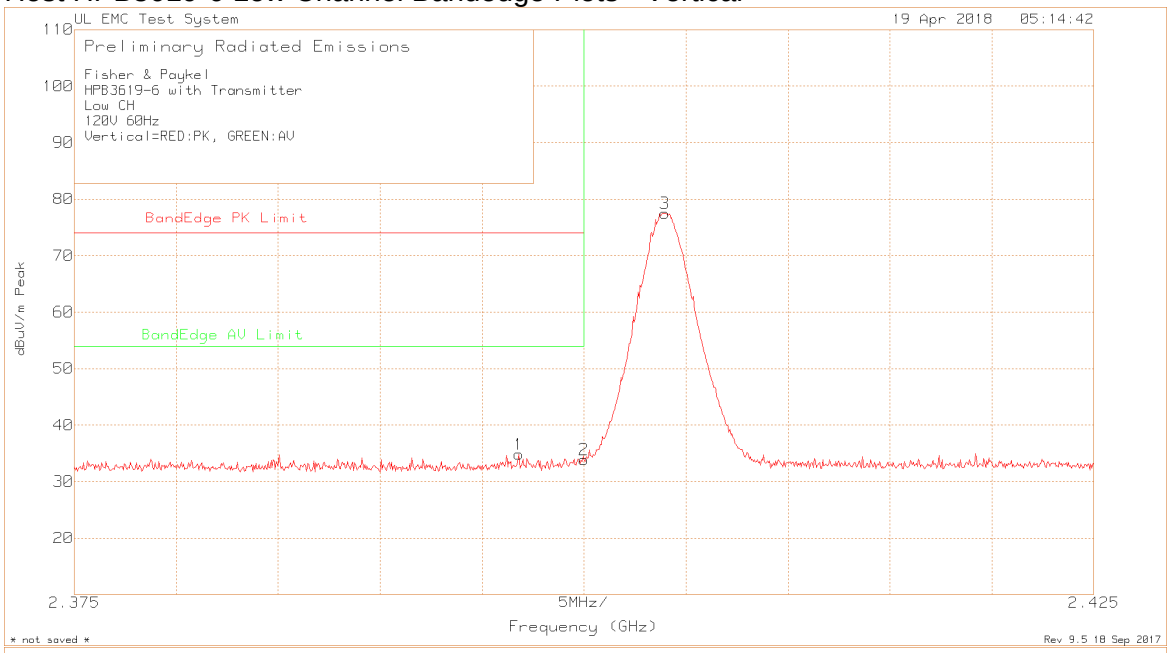
Pk - Peak detector
Av - Average detection

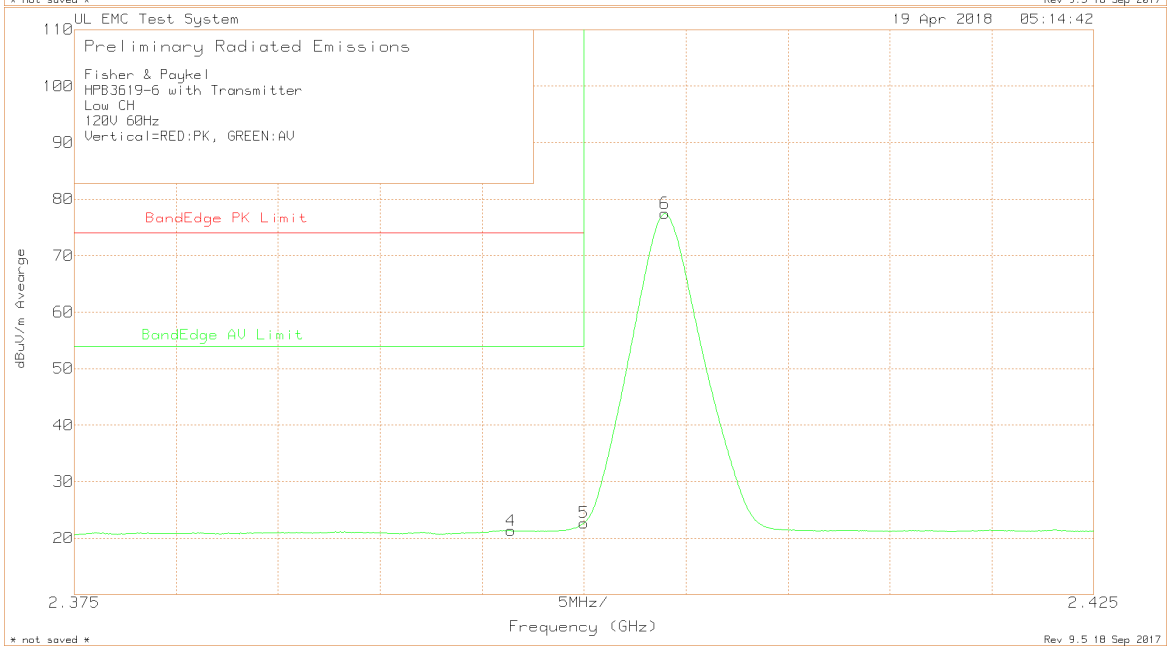
Host HPB3619-6 Low Channel Bandedge Plots - Horizontal





Host HPB3619-6 Low Channel Bandedge Plots - Vertical





Host HPB3619-6 Low Channel Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3966	63.36	Pk	21.8	-50.92	34.24	74	-39.76	54	-19.76	69	255	H
2	2.4	61.74	Pk	21.8	-51.02	32.52	74	-41.48	54	-21.48	69	255	H
3	2.404	99.85	Pk	21.8	-51.1	70.55	-	-	-	-	69	255	H
4	2.3961	50.24	Pk	21.8	-50.86	21.18	74	-52.82	54	-32.82	69	255	H
5	2.4	50.58	Pk	21.8	-51.02	21.36	74	-52.64	54	-32.64	69	255	H
6	2.404	99.72	Pk	21.8	-51.1	70.42	-	-	-	-	69	255	H
1	2.3968	63.95	Pk	21.8	-50.94	34.81	74	-39.19	54	-19.19	69	255	V
2	2.4	63.13	Pk	21.8	-51.02	33.91	74	-40.09	54	-20.09	69	255	V
3	2.404	106.8	Pk	21.8	-51.1	77.5	-	-	-	-	69	255	V
4	2.3964	50.46	Pk	21.8	-50.89	21.37	74	-52.63	54	-32.63	69	255	V
5	2.4	51.92	Pk	21.8	-51.02	22.7	74	-51.3	54	-31.3	69	255	V
6	2.404	106.8	Pk	21.8	-51.1	77.5	-	-	-	-	69	255	V

Pk - Peak detector
Av - Average detector

Host HPB3619-6 High Channel Spurious Plot

Host HPB3619-6 High Channel Data

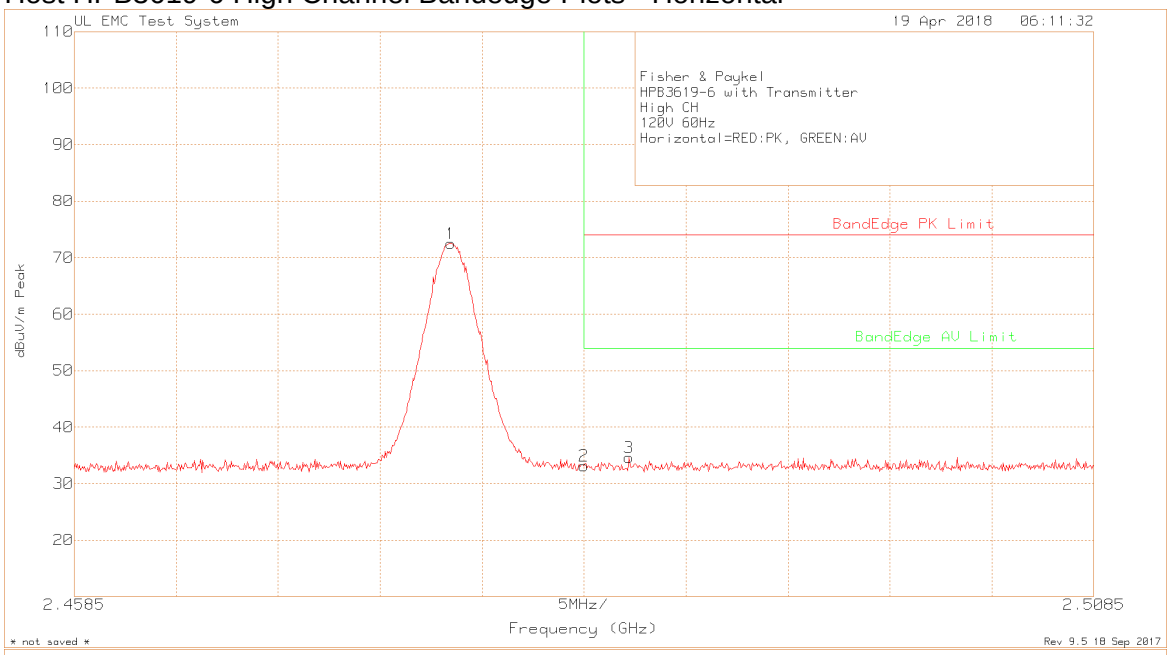
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.99	64.87	Pk	31.7	-52.45	44.12	74	-29.88	54	-9.88	0-360	100	H
2	2.477	102.72	Pk	22	-51.41	73.31	-	-	-	-	0-360	100	H
3	3.469	63.83	Pk	23.5	-50.51	36.82	74	-37.18	54	-17.18	0-360	100	H
4	7.342	56.91	Pk	30.8	-46.21	41.5	74	-32.5	54	-12.5	0-360	148	H
5	8.035	57.04	Pk	36.1	-46.85	46.29	74	-27.71	54	-7.71	0-360	100	H
6	12.419	51.53	Pk	39.4	-45.96	44.97	74	-29.03	54	-9.03	0-360	150	H
7	18.882	52.88	Pk	40.2	-51.47	41.61	74	-32.39	54	-12.39	0-360	100	H
8	1.988	64.73	Pk	31.7	-52.68	43.75	74	-30.25	54	-10.25	0-360	100	V
9	2.477	106.66	Pk	22	-51.41	77.25	-	-	-	-	0-360	150	V
10	3.644	62.86	Pk	23.3	-49.52	36.64	74	-37.36	54	-17.36	0-360	100	V
11	7.366	56.1	Pk	30.9	-46.36	40.64	74	-33.36	54	-13.36	0-360	100	V
12	9.128	57.49	Pk	36.3	-47.53	46.26	74	-27.74	54	-7.74	0-360	150	V
13	12.188	50.79	Pk	39.4	-46.38	43.81	74	-30.19	54	-10.19	0-360	100	V
14	18.001	53.39	Pk	40	-50.63	42.76	74	-31.24	54	-11.24	0-360	100	V

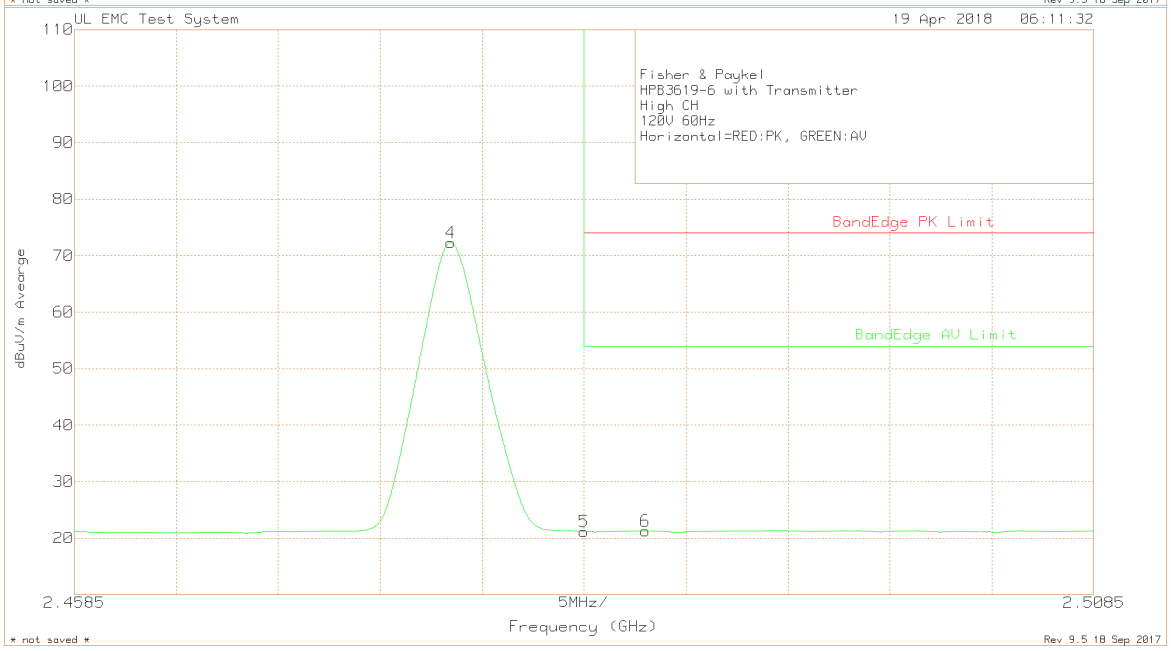
Pk - Peak detector

Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.477	102.83	Pk	22	-51.41	73.42	114	-40.58	-	-	205	192	H
2.477	102.6	Av	22	-51.41	73.19	-	-	94	-20.81	205	192	H
2.4769	106.43	Pk	22	-51.41	77.02	114	-36.98	-	-	59	183	V
2.477	106.27	Av	22	-51.41	76.86	-	-	94	-17.14	59	183	V

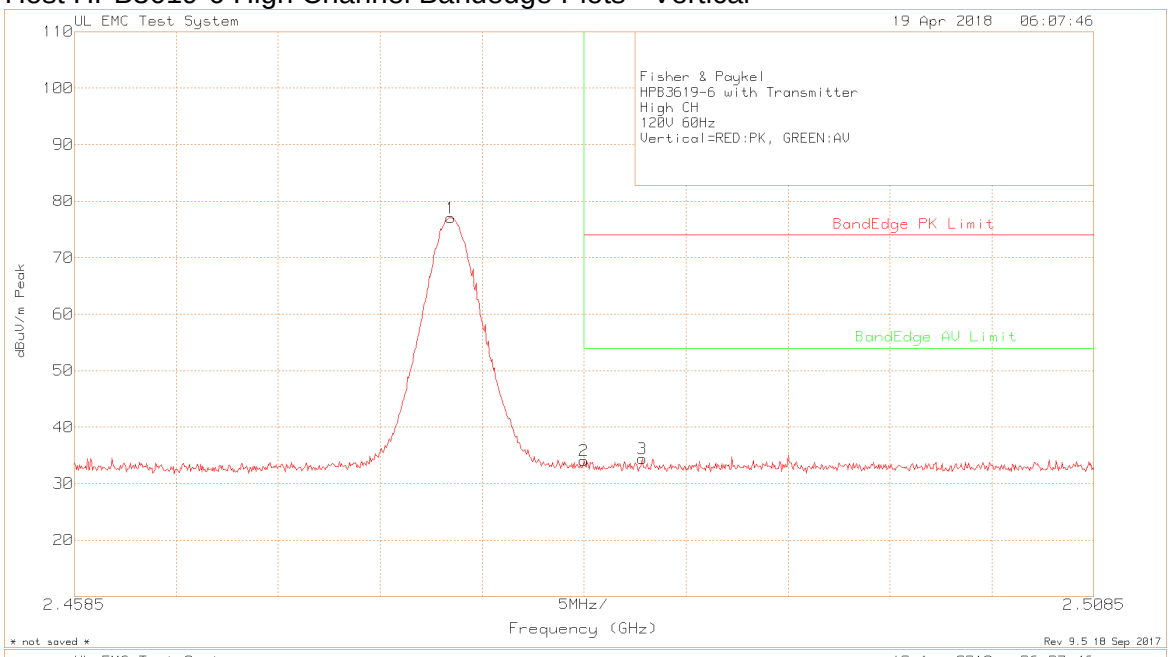
Pk - Peak detector
Av - Average detection

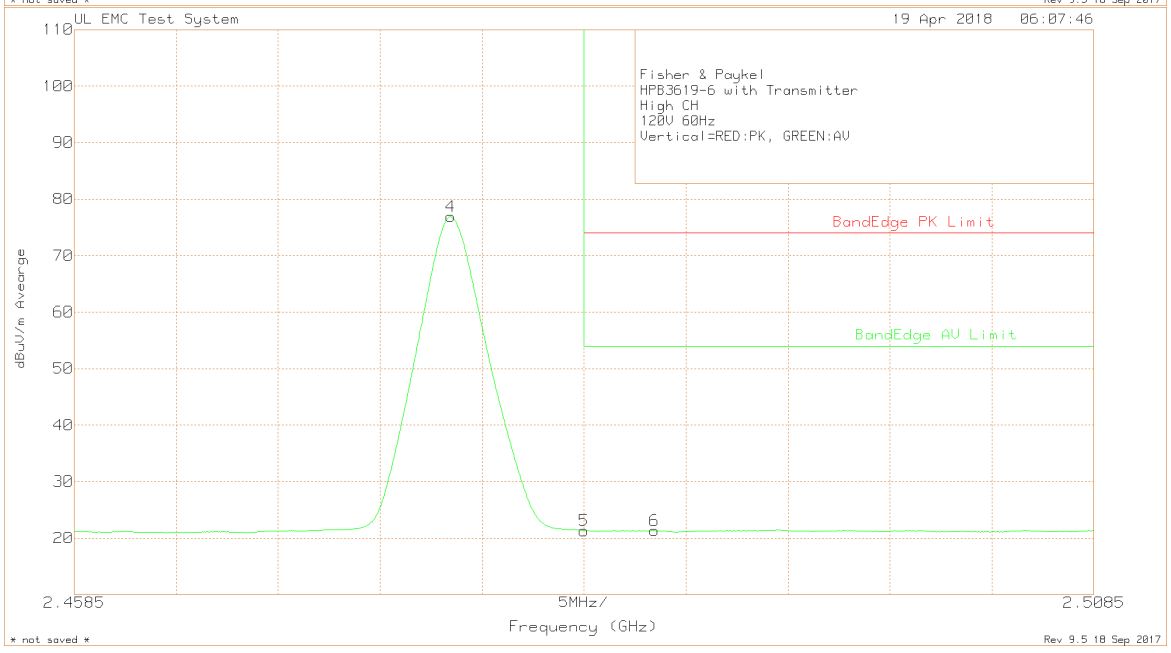
Host HPB3619-6 High Channel Bandedge Plots - Horizontal





Host HPB3619-6 High Channel Bandedge Plots - Vertical





Host HPB3619-6 High Channel Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.477	101.92	Pk	22	-51.41	72.51	-	-	-	-	203	192	H
2	2.4835	62.48	Pk	22.1	-51.42	33.16	74	-40.84	54	-20.84	203	192	H
3	2.4857	63.85	Pk	22.1	-51.35	34.6	74	-39.4	54	-19.4	203	192	H
4	2.477	101.73	Pk	22	-51.41	72.32	-	-	-	-	203	192	H
5	2.4835	50.5	Pk	22.1	-51.42	21.18	74	-52.82	54	-32.82	203	192	H
6	2.4865	50.48	Pk	22.1	-51.31	21.27	74	-52.73	54	-32.73	203	192	H
1	2.477	106.43	Pk	22	-51.41	77.02	-	-	-	-	59	183	V
2	2.4835	63.42	Pk	22.1	-51.42	34.1	74	-39.9	54	-19.9	59	183	V
3	2.4864	63.59	Pk	22.1	-51.31	34.38	74	-39.62	54	-19.62	59	183	V
4	2.477	106.31	Pk	22	-51.41	76.9	-	-	-	-	59	183	V
5	2.4835	50.63	Pk	22.1	-51.42	21.31	74	-52.69	54	-32.69	59	183	V
6	2.487	50.53	Pk	22.1	-51.28	21.35	74	-52.65	54	-32.65	59	183	V

Pk - Peak detector
Av - Average detector

Host HP3619

Host HP3619 Low Channel Spurious Plot

Host HP3619 Low Channel Data

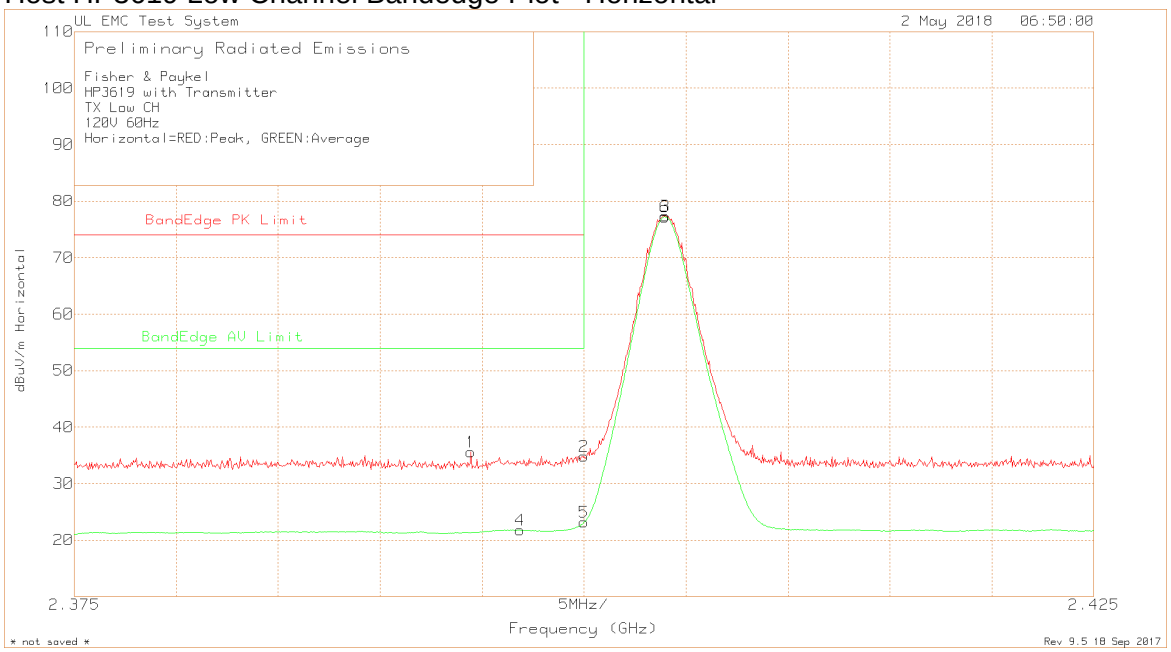
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.941	66.78	Pk	31.5	-53.06	45.22	74	-28.78	54	-8.78	0-360	150	H
2	2.404	106.02	Pk	21.8	-51.11	76.71	-	-	-	-	0-360	150	H
3	3.786	65.32	Pk	24	-50.48	38.84	74	-35.16	54	-15.16	0-360	150	H
4	7.341	59.13	Pk	30.8	-46.21	43.72	74	-30.28	54	-10.28	0-360	102	H
5	9.239	56.87	Pk	36.4	-47.22	46.05	74	-27.95	54	-7.95	0-360	100	H
6	13.9	50.49	Pk	39.9	-43.05	47.34	74	-26.66	54	-6.66	0-360	100	H
7	22.778	50.44	Pk	40.4	-43.32	47.52	74	-26.48	54	-6.48	0-360	100	H
8	1.93	66.03	Pk	31.4	-53.12	44.31	74	-29.69	54	-9.69	0-360	100	V
9	2.404	108.16	Pk	21.8	-51.11	78.85	-	-	-	-	0-360	149	V
10	3.628	63.95	Pk	23.3	-49.7	37.55	74	-36.45	54	-16.45	0-360	100	V
11	7.292	58.17	Pk	30.4	-46.03	42.54	74	-31.46	54	-11.46	0-360	100	V
12	9.54	56.65	Pk	36.4	-47.49	45.56	74	-28.44	54	-8.44	0-360	150	V
13	16.366	47.56	Pk	39.8	-40.18	47.18	74	-26.82	54	-6.82	0-360	149	V
14	22.982	48.35	Pk	40.3	-42.56	46.09	74	-27.91	54	-7.91	0-360	100	V

Pk - Peak detector

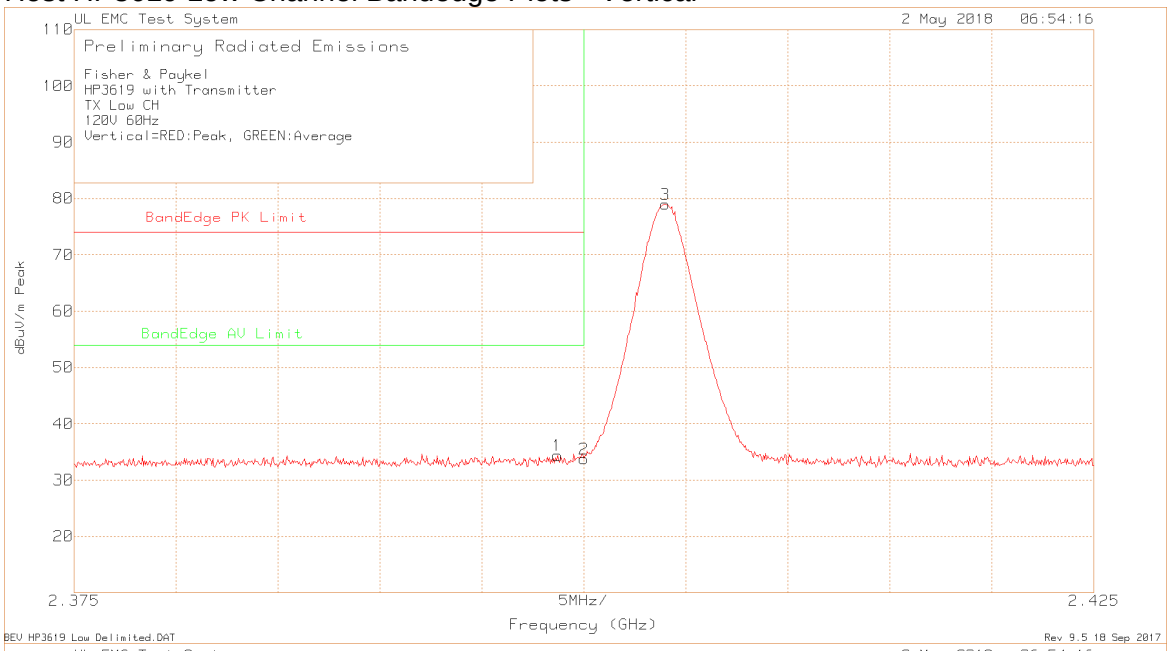
Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.404	106.76	Pk	21.8	-51.1	77.46	114	-36.54	-	-	183	215	H
2.404	106.53	Av	21.8	-51.1	77.23	-	-	94	-16.77	184	215	H
2.404	109.03	Pk	21.8	-51.1	79.73	114	-34.27	-	-	28	197	V
2.404	108.86	Av	21.8	-51.1	79.56	-	-	94	-14.44	28	197	V

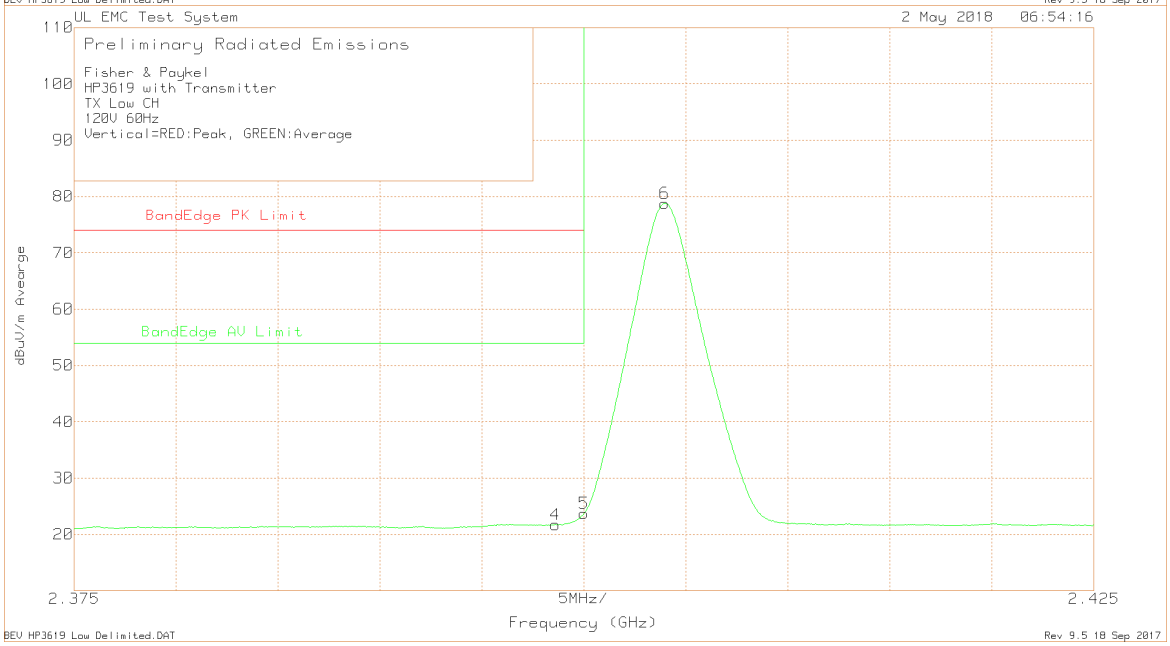
Pk - Peak detector
Av - Average detection

Host HP3619 Low Channel Bandedge Plot - Horizontal



Host HP3619 Low Channel Bandedge Plots - Vertical



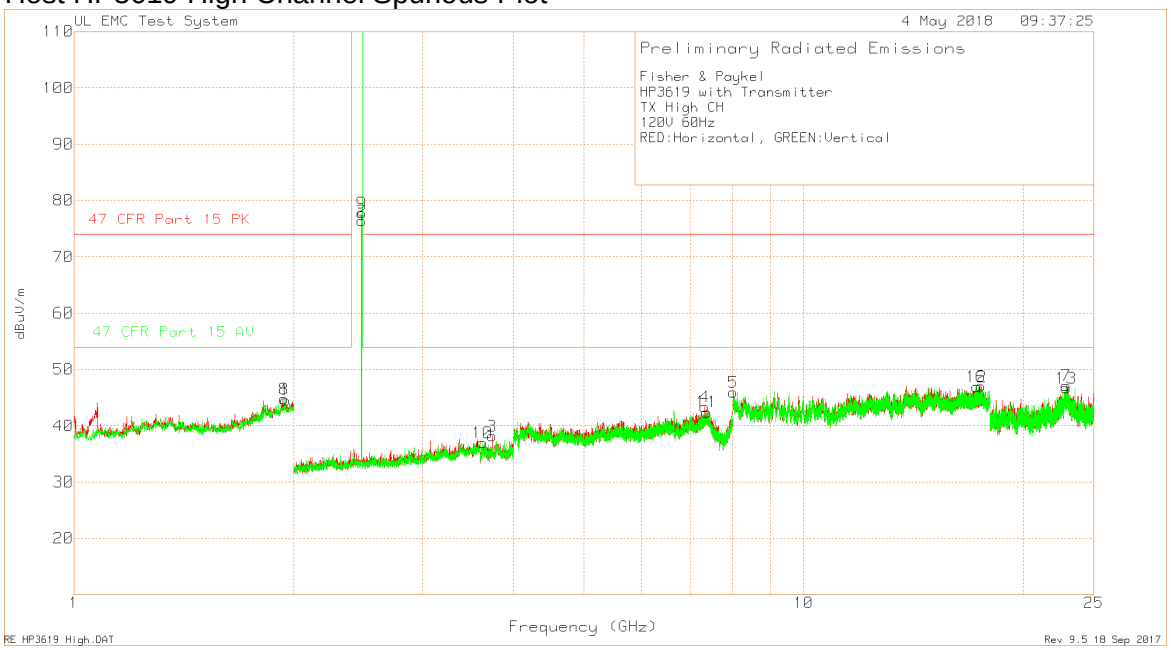


Host HP3619 Low Channel Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3945	64.98	Pk	21.8	-51.16	35.62	74	-38.38	54	-18.38	184	215	H
2	2.4	64.06	Pk	21.8	-51.02	34.84	74	-39.16	54	-19.16	184	215	H
3	2.404	106.64	Pk	21.8	-51.1	77.34	-	-	-	-	184	215	H
4	2.3969	50.93	Pk	21.8	-50.95	21.78	74	-52.22	54	-32.22	184	215	H
5	2.4	52.39	Pk	21.8	-51.02	23.17	74	-50.83	54	-30.83	184	215	H
6	2.404	106.51	Pk	21.8	-51.1	77.21	-	-	-	-	184	215	H
1	2.3987	63.71	Pk	21.8	-51.14	34.37	74	-39.63	54	-19.63	27	197	V
2	2.4	63	Pk	21.8	-51.02	33.78	74	-40.22	54	-20.22	27	197	V
3	2.404	108.26	Pk	21.8	-51.1	78.96	-	-	-	-	27	197	V
4	2.3986	51.08	Pk	21.8	-51.14	21.74	74	-52.26	54	-32.26	27	197	V
5	2.4	52.99	Pk	21.8	-51.02	23.77	74	-50.23	54	-30.23	27	197	V
6	2.404	108.11	Pk	21.8	-51.1	78.81	-	-	-	-	27	197	V

Pk - Peak detector

Host HP3619 High Channel Spurious Plot



Host HP3619 High Channel Data

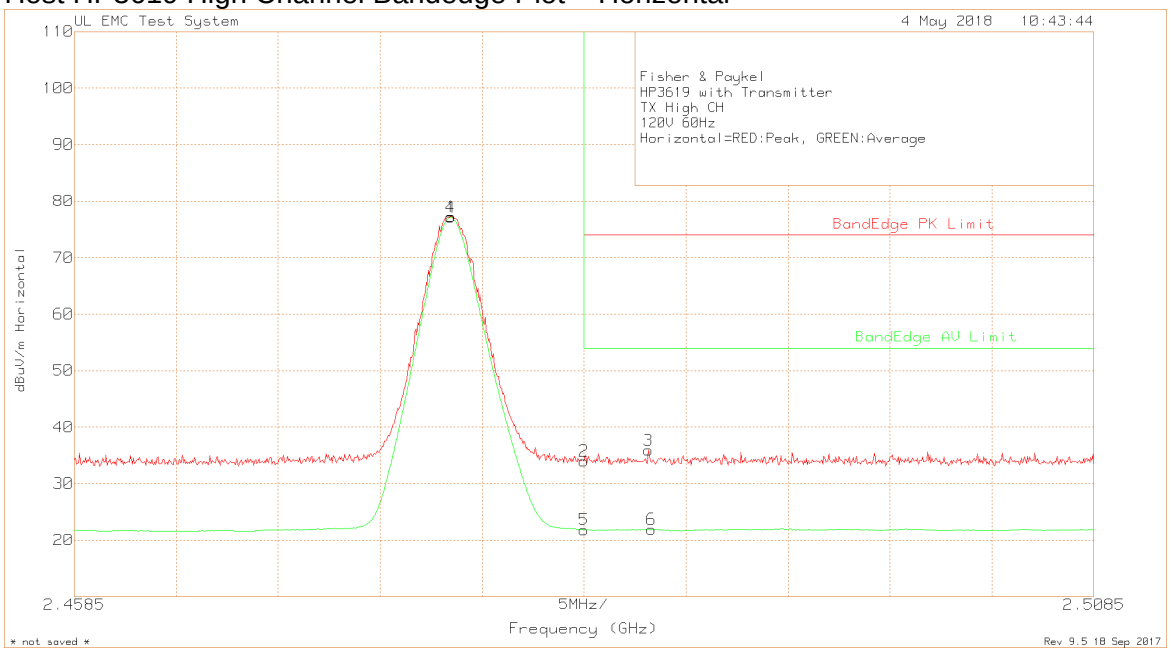
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.949	65.86	Pk	31.6	-52.87	44.59	74	-29.41	54	-9.41	0-360	150	H
2	2.477	105.78	Pk	22	-51.41	76.37	-	-	-	-	0-360	150	H
3	3.741	64.85	Pk	23.7	-50.36	38.19	74	-35.81	54	-15.81	0-360	100	H
4	7.318	58.75	Pk	30.6	-46.01	43.34	74	-30.66	54	-10.66	0-360	148	H
5	8.013	56.49	Pk	36.1	-46.62	45.97	74	-28.03	54	-8.03	0-360	149	H
6	17.505	47.45	Pk	40	-40.39	47.06	74	-26.94	54	-6.94	0-360	100	H
7	22.907	50.04	Pk	40.3	-43.17	47.17	74	-26.83	54	-6.83	0-360	100	H
8	1.94	66.48	Pk	31.5	-53.2	44.78	74	-29.22	54	-9.22	0-360	150	V
9	2.477	107.23	Pk	22	-51.41	77.82	-	-	-	-	0-360	150	V
10	3.628	63.41	Pk	23.3	-49.7	37.01	74	-36.99	54	-16.99	0-360	150	V
11	7.367	57.82	Pk	31	-46.37	42.45	74	-31.55	54	-11.55	0-360	150	V
12	17.258	47.08	Pk	40.2	-40.36	46.92	74	-27.08	54	-7.08	0-360	100	V
13	22.905	49.71	Pk	40.3	-43.29	46.72	74	-27.28	54	-7.28	0-360	100	V

Pk - Peak detector

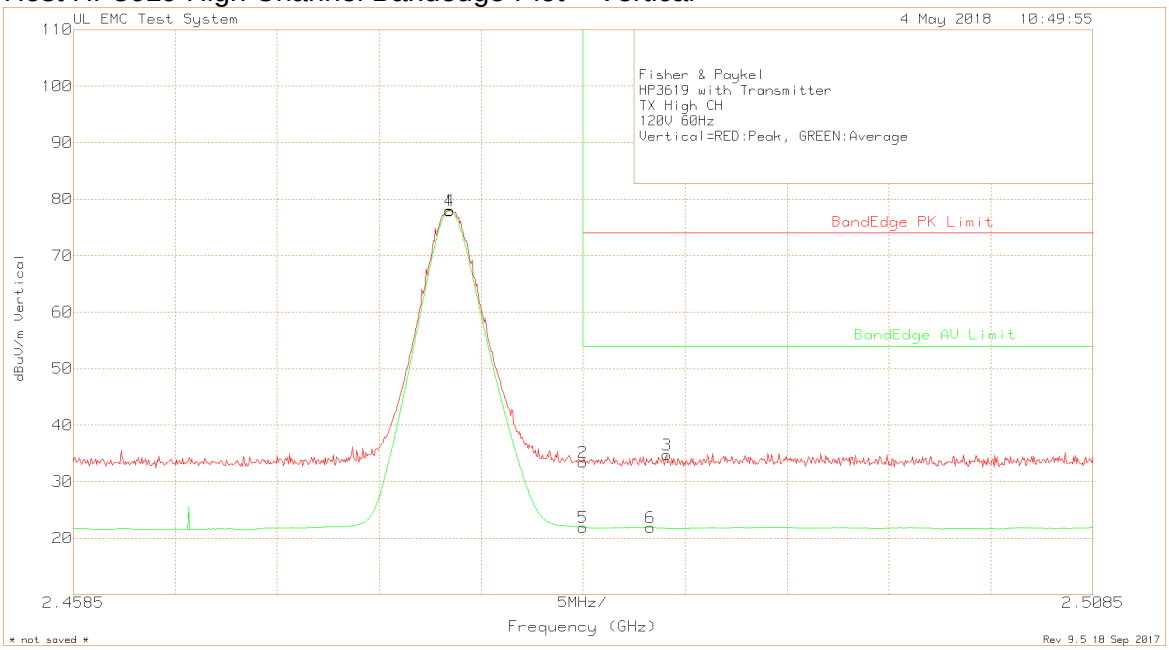
Radiated Emission Data												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2.477	106.51	Pk	22	-51.41	77.1	114	-36.9	-	-	270	197	H
2.477	106.37	Av	22	-51.41	76.96	-	-	94	-17.04	270	197	H
2.477	107.67	Pk	22	-51.41	78.26	114	-35.74	-	-	133	180	V
2.477	107.54	Av	22	-51.41	78.13	-	-	94	-15.87	133	180	V

Pk - Peak detector
Av - Average detection

Host HP3619 High Channel Bandedge Plot – Horizontal



Host HP3619 High Channel Bandedge Plot – Vertical



Host HP3619 High Channel Data

Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Path (dB)	Corrected Reading dBuV/m	PK Limit (dBuV/m)	PK Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.477	106.63	Pk	22	-51.41	77.22	-	-	-	-	269	197	H
2	2.4835	63.33	Pk	22.1	-51.42	34.01	74	-39.99	54	-19.99	269	197	H
3	2.4867	65.14	Pk	22.1	-51.3	35.94	74	-38.06	54	-18.06	269	197	H
4	2.477	106.52	Pk	22	-51.41	77.11	-	-	-	-	269	197	H
5	2.4835	51.16	Pk	22.1	-51.42	21.84	74	-52.16	54	-32.16	269	197	H
6	2.4868	51.11	Pk	22.1	-51.29	21.92	74	-52.08	54	-32.08	269	197	H
1	2.477	107.43	Pk	22	-51.41	78.02	-	-	-	-	133	180	V
2	2.4835	62.78	Pk	22.1	-51.42	33.46	74	-40.54	54	-20.54	133	180	V
3	2.4876	64.02	Pk	22.1	-51.41	34.71	74	-39.29	54	-19.29	133	180	V
4	2.477	107.34	Pk	22	-51.41	77.93	-	-	-	-	133	180	V
5	2.4835	51.22	Pk	22.1	-51.42	21.9	74	-52.1	54	-32.1	133	180	V
6	2.4868	51.09	Pk	22.1	-51.29	21.9	74	-52.1	54	-32.1	133	180	V

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.10:2013, Section 6.2

The EUT modular transmitter radio was installed into a range hood and connected to the representative control board. The control board was powered via AC mains.

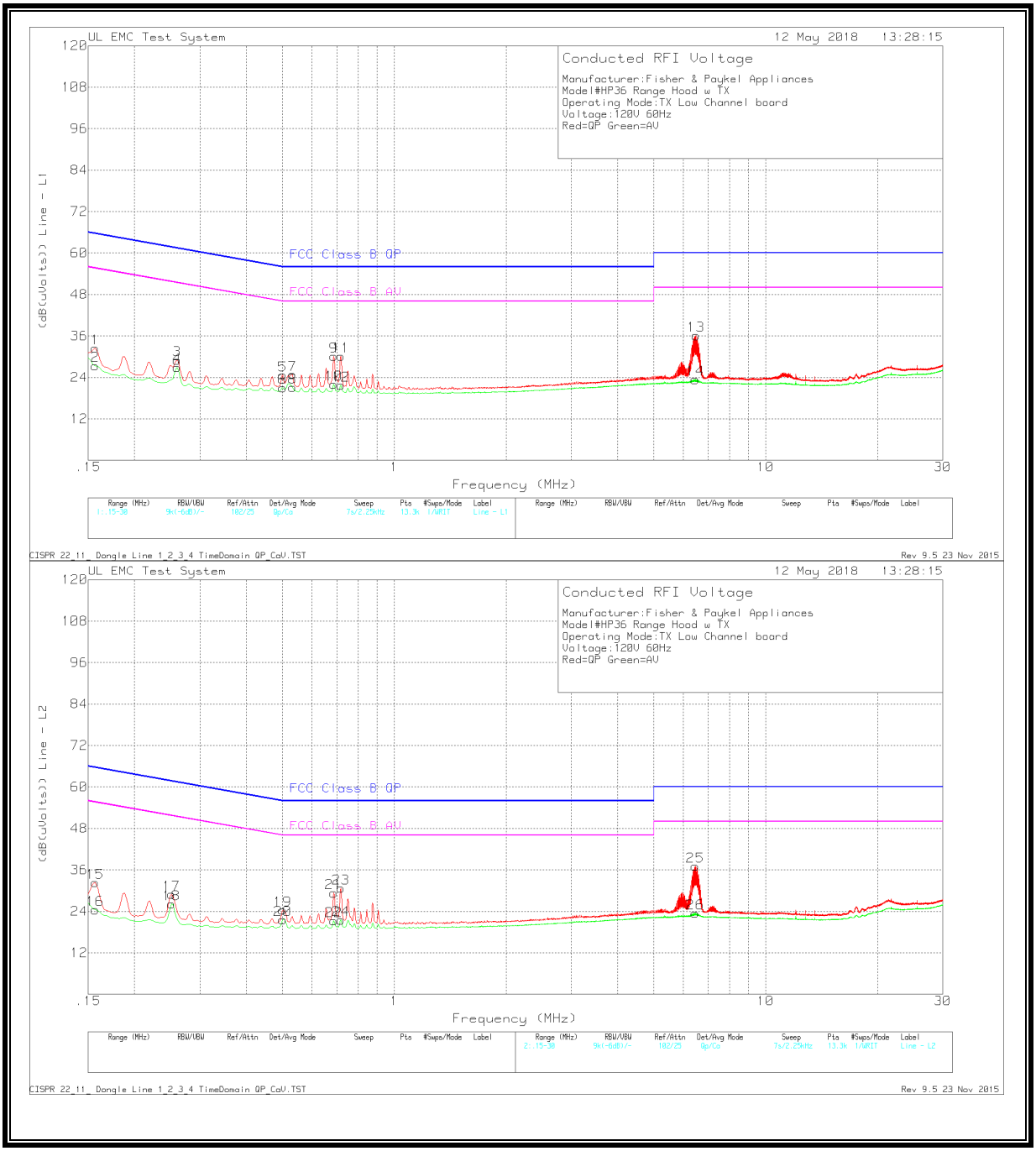
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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 recorded for both NEUTRAL and HOT lines.

RESULTS

TX – Low Channel Graph

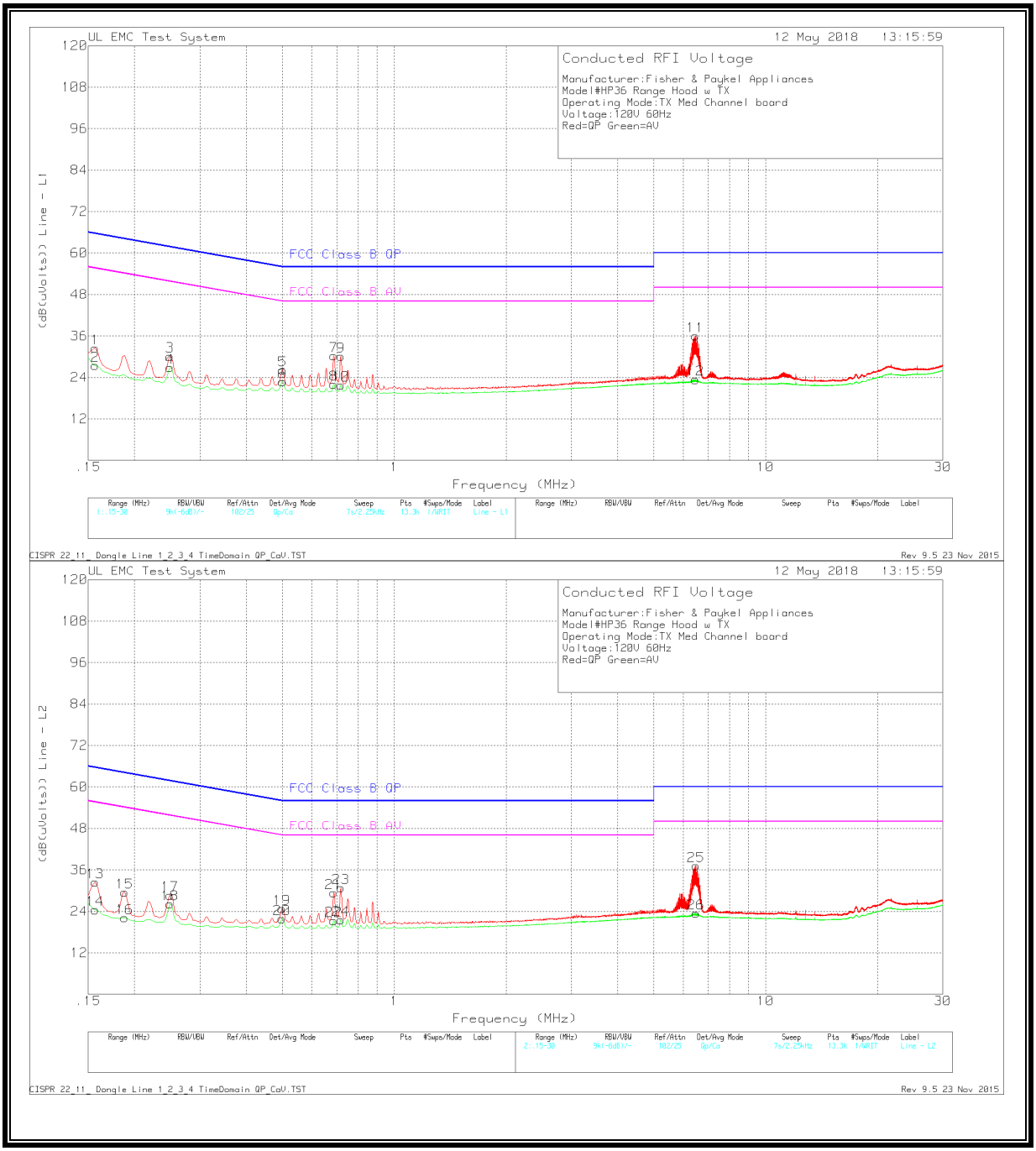


TX – Low Channel Data

Trace Markers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor (dBm)	Path (dB)	Corrected Reading (dB(uVolts))	QP Limit (dBuV/m)	QP Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)
Range 1: Line - L1 .15 - 30MHz										
1	0.15675	19.35	Qp	0.1	13	32.45	65.63	-33.18	-	-
2	0.15675	14.29	Ca	0.1	13	27.39	-	-	55.63	-28.24
3	0.26025	17.81	Qp	0	11.2	29.01	61.42	-32.41	-	-
4	0.26025	15.74	Ca	0	11.2	26.94	-	-	51.42	-24.48
5	0.501	13.93	Qp	0	10.7	24.63	56	-31.37	-	-
6	0.501	10.35	Ca	0	10.7	21.05	-	-	46	-24.95
7	0.5325	14.24	Qp	0	10.6	24.84	56	-31.16	-	-
8	0.5325	10.54	Ca	0	10.6	21.14	-	-	46	-24.86
9	0.68775	19.51	Qp	0	10.6	30.11	56	-25.89	-	-
10	0.68775	11.41	Ca	0	10.6	22.01	-	-	46	-23.99
11	0.71925	19.56	Qp	0	10.6	30.16	56	-25.84	-	-
12	0.71925	11.14	Ca	0	10.6	21.74	-	-	46	-24.26
13	6.49725	25.2	Qp	0	10.9	36.1	60	-23.9	-	-
14	6.46575	12.52	Ca	0	10.9	23.42	-	-	50	-26.58
Range 2: Line - L2 .15 - 30MHz										
15	0.15675	19.2	Qp	0.1	13	32.3	65.63	-33.33	-	-
16	0.15675	11.35	Ca	0.1	13	24.45	-	-	55.63	-31.18
17	0.25125	17.72	Qp	0	11.2	28.92	61.72	-32.8	-	-
18	0.25125	14.89	Ca	0	11.2	26.09	-	-	51.72	-25.63
19	0.501	13.7	Qp	0	10.7	24.4	56	-31.6	-	-
20	0.501	10.85	Ca	0	10.7	21.55	-	-	46	-24.45
21	0.68775	18.72	Qp	0	10.6	29.32	56	-26.68	-	-
22	0.68775	10.69	Ca	0	10.6	21.29	-	-	46	-24.71
23	0.71925	20.13	Qp	0	10.6	30.73	56	-25.27	-	-
24	0.71925	10.91	Ca	0	10.6	21.51	-	-	46	-24.49
25	6.46575	26.1	Qp	0	10.9	37	60	-23	-	-
26	6.46575	12.56	Ca	0	10.9	23.46	-	-	50	-26.54

Qp - Quasi-Peak detector
Ca - CISPR Average detection

TX – Mid Channel Graph

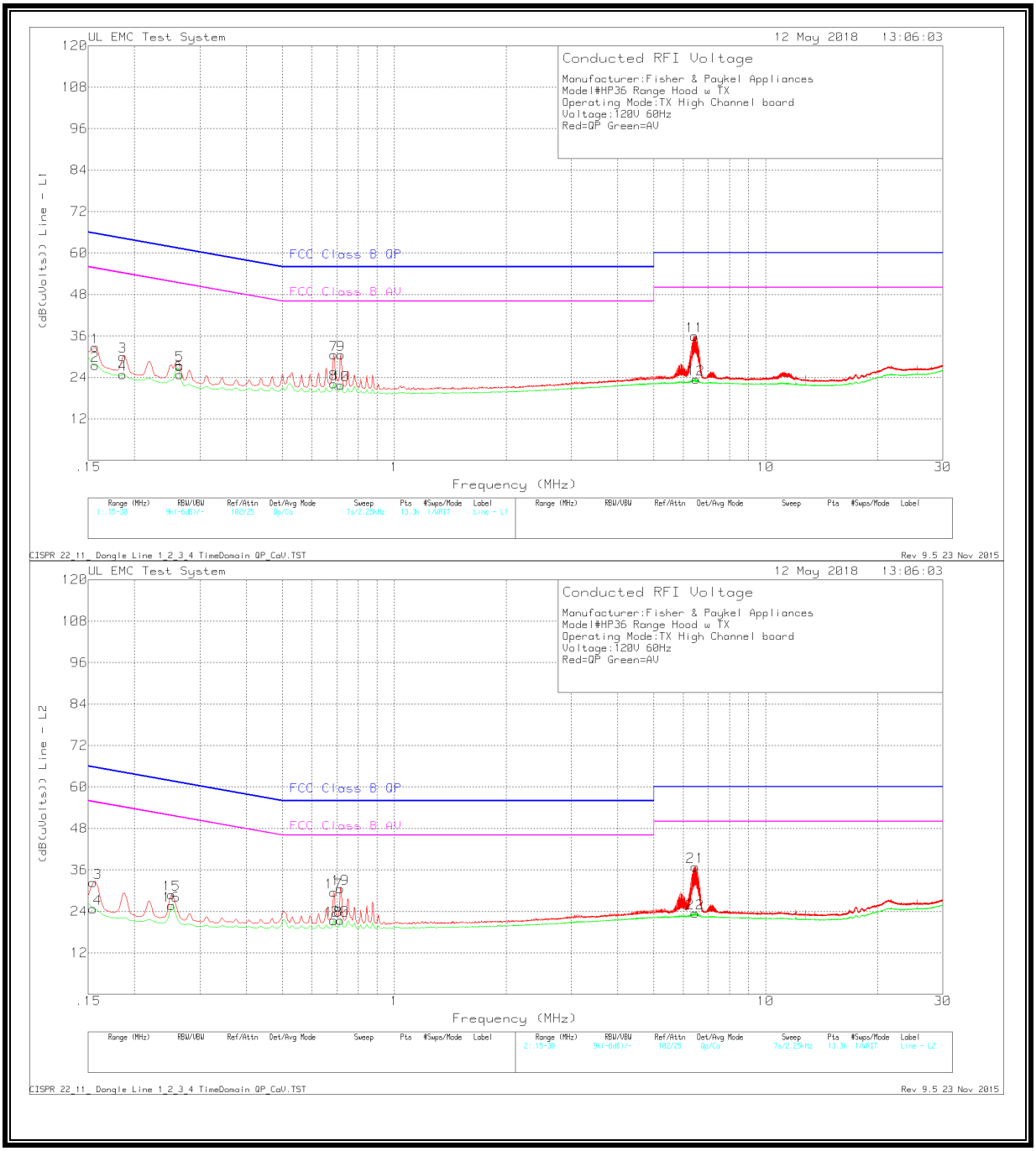


TX – Mid Channel Data

Trace Markers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor (dBm)	Path (dB)	Corrected Reading (dB(uVolts))	QP Limit (dBuV/m)	QP Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)
Range 1: Line - L1 .15 - 30MHz										
1	0.15675	19.34	Qp	0.1	13	32.44	65.63	-33.19	-	-
2	0.15675	14.36	Ca	0.1	13	27.46	-	-	55.63	-28.17
3	0.249	18.87	Qp	0	11.3	30.17	61.79	-31.62	-	-
4	0.249	15.6	Ca	0	11.3	26.9	-	-	51.79	-24.89
5	0.501	15.46	Qp	0	10.7	26.16	56	-29.84	-	-
6	0.501	12.06	Ca	0	10.7	22.76	-	-	46	-23.24
7	0.68775	19.7	Qp	0	10.6	30.3	56	-25.7	-	-
8	0.68775	11.44	Ca	0	10.6	22.04	-	-	46	-23.96
9	0.71925	19.55	Qp	0	10.6	30.15	56	-25.85	-	-
10	0.71925	11.16	Ca	0	10.6	21.76	-	-	46	-24.24
11	6.468	25.15	Qp	0	10.9	36.05	60	-23.95	-	-
12	6.468	12.52	Ca	0	10.9	23.42	-	-	50	-26.58
Range 2: Line - L2 .15 - 30MHz										
13	0.15675	19.33	Qp	0.1	13	32.43	65.63	-33.2	-	-
14	0.15675	11.36	Ca	0.1	13	24.46	-	-	55.63	-31.17
15	0.18825	17.84	Qp	0.1	11.6	29.54	64.11	-34.57	-	-
16	0.18825	10.45	Ca	0.1	11.6	22.15	-	-	54.11	-31.96
17	0.249	17.39	Qp	0	11.3	28.69	61.79	-33.1	-	-
18	0.249	14.8	Ca	0	11.3	26.1	-	-	51.79	-25.69
19	0.49875	14.08	Qp	0	10.7	24.78	56.02	-31.24	-	-
20	0.49875	11.16	Ca	0	10.7	21.86	-	-	46.02	-24.16
21	0.68775	18.74	Qp	0	10.6	29.34	56	-26.66	-	-
22	0.68775	10.72	Ca	0	10.6	21.32	-	-	46	-24.68
23	0.71925	20.21	Qp	0	10.6	30.81	56	-25.19	-	-
24	0.71925	10.97	Ca	0	10.6	21.57	-	-	46	-24.43
25	6.4995	26.32	Qp	0	10.9	37.22	60	-22.78	-	-
26	6.4995	12.55	Ca	0	10.9	23.45	-	-	50	-26.55

Qp - Quasi-Peak detector
Ca - CISPR Average detection

TX – High Channel Graph



TX – High Channel Data

Trace Markers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor (dBm)	Path (dB)	Corrected Reading (dB(uVolts))	QP Limit (dBuV/m)	QP Margin (dB)	AV Limit (dBuV/m)	AV Margin (dB)
Range 1: Line - L1 .15 - 30MHz										
1	0.15675	19.69	Qp	0.1	13	32.79	65.63	-32.84	-	-
2	0.15675	14.39	Ca	0.1	13	27.49	-	-	55.63	-28.14
3	0.186	18.34	Qp	0.1	11.6	30.04	64.21	-34.17	-	-
4	0.186	13.09	Ca	0.1	11.6	24.79	-	-	54.21	-29.42
5	0.26475	16.43	Qp	0	11.1	27.53	61.28	-33.75	-	-
6	0.26475	13.77	Ca	0	11.1	24.87	-	-	51.28	-26.41
7	0.68775	19.95	Qp	0	10.6	30.55	56	-25.45	-	-
8	0.68775	11.53	Ca	0	10.6	22.13	-	-	46	-23.87
9	0.71925	19.93	Qp	0	10.6	30.53	56	-25.47	-	-
10	0.71925	11.18	Ca	0	10.6	21.78	-	-	46	-24.22
11	6.4365	25.06	Qp	0	10.9	35.96	60	-24.04	-	-
12	6.4995	12.53	Ca	0	10.9	23.43	-	-	50	-26.57
Range 2: Line - L2 .15 - 30MHz										
13	0.1545	19.03	Qp	0.1	13.2	32.33	65.75	-33.42	-	-
14	0.1545	11.44	Ca	0.1	13.2	24.74	-	-	55.75	-31.01
15	0.25125	17.66	Qp	0	11.2	28.86	61.72	-32.86	-	-
16	0.25125	14.51	Ca	0	11.2	25.71	-	-	51.72	-26.01
17	0.68775	18.91	Qp	0	10.6	29.51	56	-26.49	-	-
18	0.68775	10.76	Ca	0	10.6	21.36	-	-	46	-24.64
19	0.717	19.91	Qp	0	10.6	30.51	56	-25.49	-	-
20	0.717	10.88	Ca	0	10.6	21.48	-	-	46	-24.52
21	6.46575	26.05	Qp	0	10.9	36.95	60	-23.05	-	-
22	6.46575	12.55	Ca	0	10.9	23.45	-	-	50	-26.55

Qp - Quasi-Peak detector
Ca - CISPR Average detection