CERTIFICATION TEST REPORT

Report Number. : 11789904-E2V3

Applicant	:	MICROSOFT CORP ONE MICROSOFT WAY REDMOND, WA 98052, U.S.A.
Model	:	1782
FCC ID	:	C3K1782
IC	:	3048A-1782
EUT Description	:	PORTABLE COMPUTING DEVICE
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA RSS - 247 ISSUE 2

Date Of Issue:
December 20, 2017

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538, U.S.A.
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	07/07/17	Initial Issue	---
V2	12/13/17	Updated section 2, 5.5 and 7.	C. Susa
V3	12/20/17	Updated section 5.5, added section 10.5	C. Susa

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MICROSOFT CORP
ONE MICROSOFT WAY
REDMOND, WA 98052, U.S.A.

EUT DESCRIPTION: PORTABLE COMPUTING DEVICE

MODEL: 1782

SERIAL NUMBER: 158395400000226

DATE TESTED: June 16th, 2017 – December 20th, 2017

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 2	Pass
INDUSTRY CANADA RSS-GEN Issue 4	Pass

UL Verification Services Inc. 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 Verification Services 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.

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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services 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 the U.S. government.

Approved & Released For
UL Verification Services Inc. By:

Francisco de Anda
Program Manager
UL Verification Services Inc.

Prepared By:

Clifford Susa
Project Engineer
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01 v03r04, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A	☐ Chamber D
☐ Chamber B	☐ Chamber E
☐ Chamber C	☒ Chamber F
	☐ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

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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

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)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

Parameter	Uncertainty
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a portable computing device with 802.11 2x2, a/b/g/n/ac WLAN, Bluetooth, Bluetooth LE.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Average		Peak	
		Output Power (dBm)	Output Power (mW)	Output Power (dBm)	Output Power (mW)
2412 - 2472	802.11b 2TX	14.19	26.24	17.31	53.83
2412 - 2472	802.11g 2TX	16.09	40.64	23.66	232.27
2412 - 2472	802.11n HT20 2TX	15.87	38.64	22.05	160.32

List of test reduction

Antenna Port Testing		
Band	**Mode**	**Covered by**
2.4 GHz band	802.11b 1TX	802.11b 2TX
2.4 GHz band	802.11g 1TX	802.11g 2TX
2.4 GHz band	802.11n HT20 1TX	802.11n HT20 2TX

Note: 802.11n VHT20 mode is leveraged from 802.11n HT20.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes integrated antennas, with a maximum gain as follows:

Frequency Band (GHz)	Antenna Gain (dBi)	
	Chain 0 (A)	Chain 1 (B)
2.4	3.40	3.10

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v14.201.151

The test utility software used during testing was WiFi tool v2.7.6.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were 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 with the display in 90° and 45° orientations, it was determined that 90° orientation was the worst-case orientation. Therefore, all final radiated testing was performed with the display EUT at 90° orientation.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0

For MIMO modes, the 2TX emission testing was considered as a worst case scenario and was performed at power levels, per transmit chain, greater than or equal to the maximum power in any 1TX mode.

For simultaneous transmission of multiple channels in the BT/BLE and 2.4GHz bands, tests were conducted for various configurations having the highest power. No noticeable new emission was found.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop AC/DC adapter	Lenovo	ADLX45NCC2A	11S36200281ZZ20059W0H5	NA
Laptop	Lenovo	11e	LR-04N7BL	NA
USB-Internet Adapter	linksys	USB3GIGV1	15710S08406242	NA

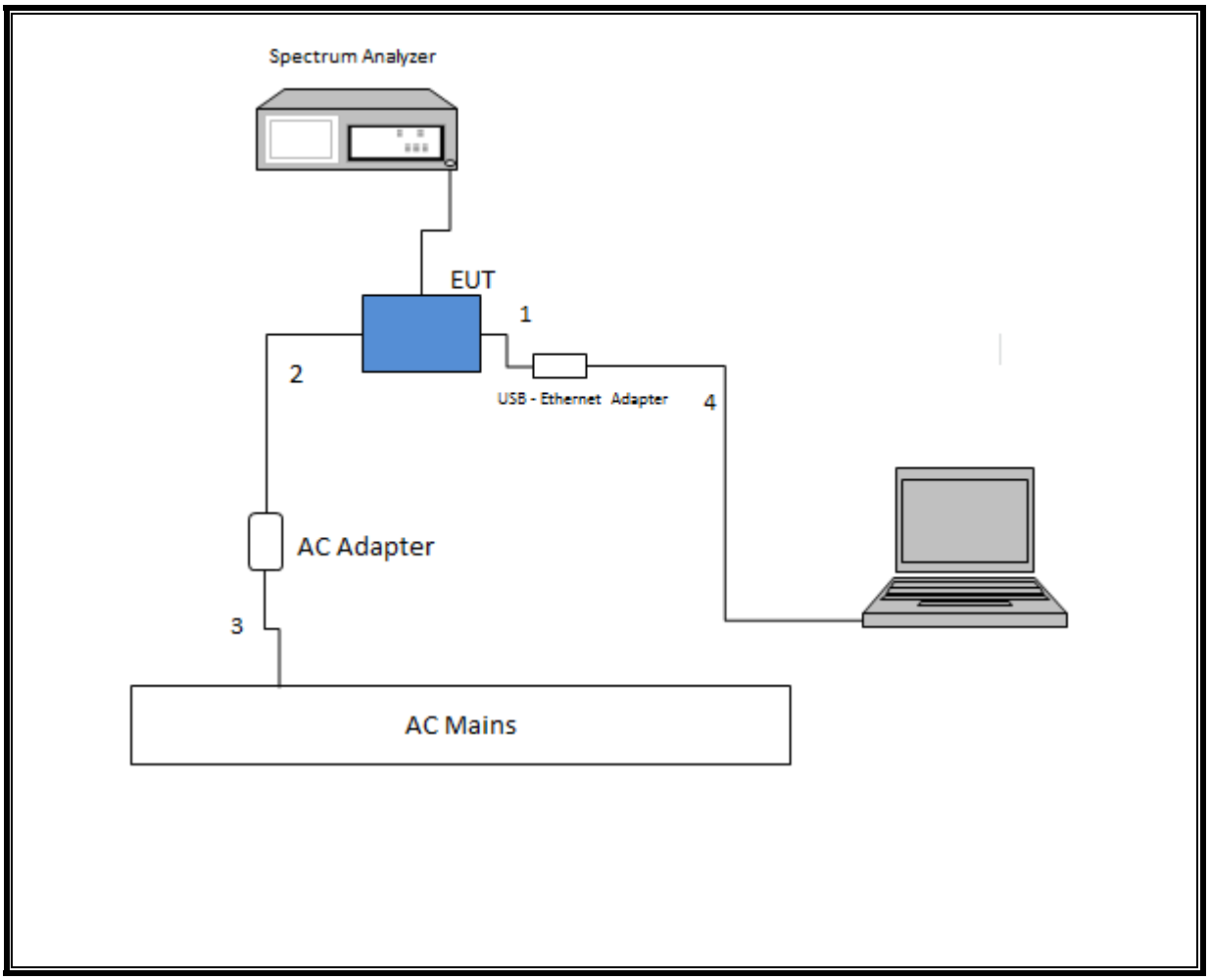
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	Un-Shielded	0.17	
2	DC	1	Proprietary	Un-Shielded	1.75	
3	AC	1	2-prong	Un-Shielded	0.5	
4	Ethernet	1	RJ45	Un-Shielded	2	

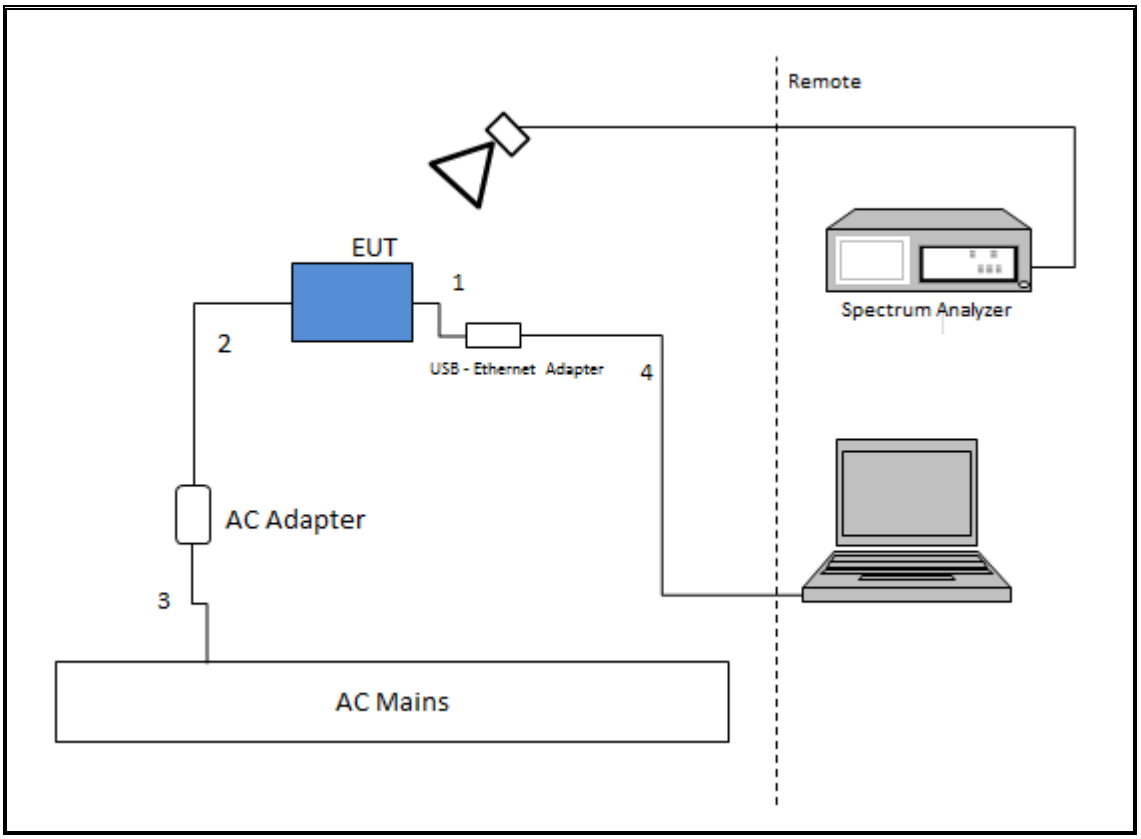
TEST SETUP

The EUT was tested connected to a support Laptop via RJ45/USB adapter. Test software exercised the radio.

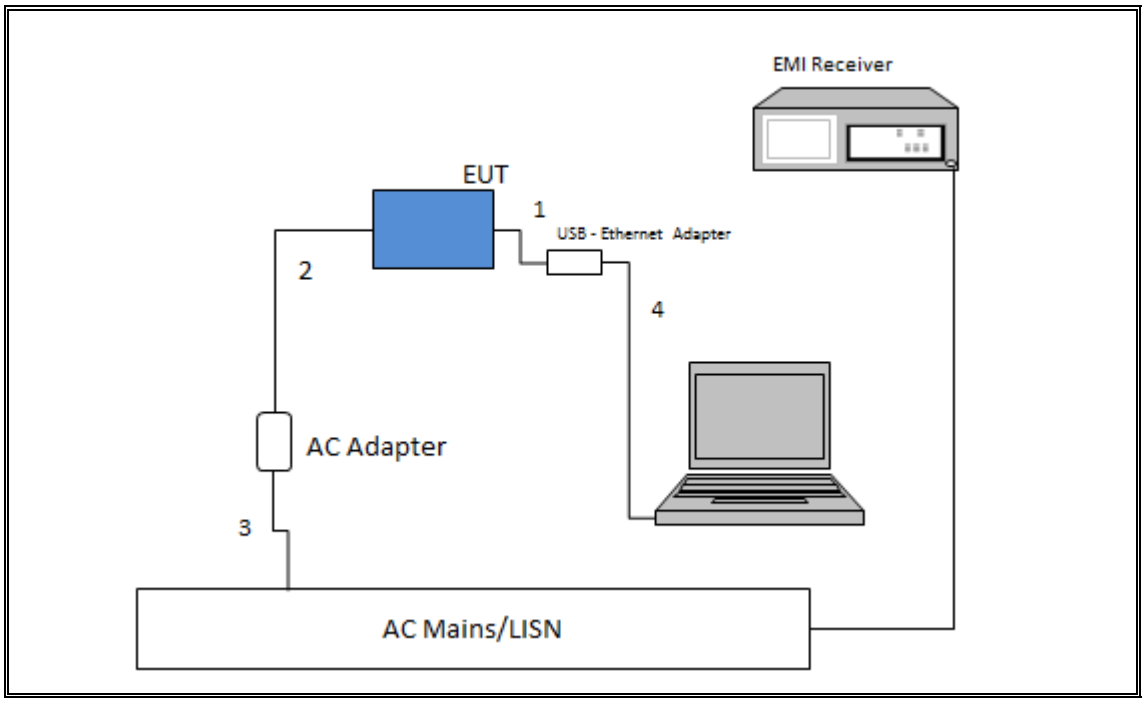
SETUP DIAGRAM FOR ANTENNA PORT CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS



SETUP DIAGRAM FOR AC LINE CONDUCTED TESTS



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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**	**Asset**	**Cal Due**
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences Corp.	JB1	T130	09/23/17
Antenna, Horn, 1-18GHz	ETS Lindgren	3117	T711	01/30/18
High Pass Filter 3GHz	Micro-Tronics	HPM17543	T486	8/1/2017
RF Preamplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T1165	08/01/17
RF Preamplifier, 1 - 7GHz	Amplical	AMP1G6-10-27	T1370	05/15/18
RF Preamplifier, 10kHz - 1GHz	Sonoma	310N	T300	11/10/17
Spectrum Analyzer	Agilent (Keysight) Technologies	E4440A	T199	07/27/17
Spectrum Analyzer	Agilent (Keysight) Technologies	E4446A	T146	07/13/17
Spectrum Analyzer	Keysight	N9030A	T1466	04/11/18
LISN	Fischer Custom Communications	FCC-LISN-50/250-25-2	T24	03/01/18
EMI Receiver	Rohde & Schwarz	ESR	T1436	01/06/18
Antenna, Horn, 18-26 GHz	ARA	MWH-1826/B	T447	06/30/17
RF Preamplifier, 1 - 26GHz	Agilent	8449B	T404	07/05/17
Spectrum Analyzer	HP	8564E	T106	09/07/17
Power Meter	Keysight	N1911A	T1269	03/29/18
Power Sensor	Keysight	N1921A	T1224	03/29/18
Antenna, Horn, 1-18GHz	ETS Lindgren	3117	T119	03/29/18
Low Pass Filter 3GHz	Micro-Tronics	HPM17543	T487	01/25/18
Spectrum Analyzer	Keysight	N9030A	T340	12/15/18
RF Preamplifier, 1 – 18GHz	Miteq	AFS42-00101800-25-S-42	T742	01/25/18

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	9.5, 12/01/16
Antenna Port Software	UL	UL RF	6.9, 6/15/17
Conducted Emissions Software	UL	UL EMC	9.5, 5/26/15

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7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 558074 D01 v03r04, Section 6.

6 dB BW: KDB 558074 D01 v03r04, Section 8.1.

Output Power: KDB 558074 D01 v03r04, Section 9.2.3.2.

Power Spectral Density: KDB 558074 D01 v03r04, Section 10.3.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r04, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r04, Section 12.1.

Band-edge: KDB 558074 D01 v03r04, Section 12.1.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

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8. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
802.11b 2Tx	5.000	5.000	1.000	100.0%	0.00	0.010
802.11g 2Tx	3.145	3.170	0.992	99.2%	0.00	0.010
802.11n HT20 2Tx	9.900	9.930	0.997	99.7%	0.00	0.010

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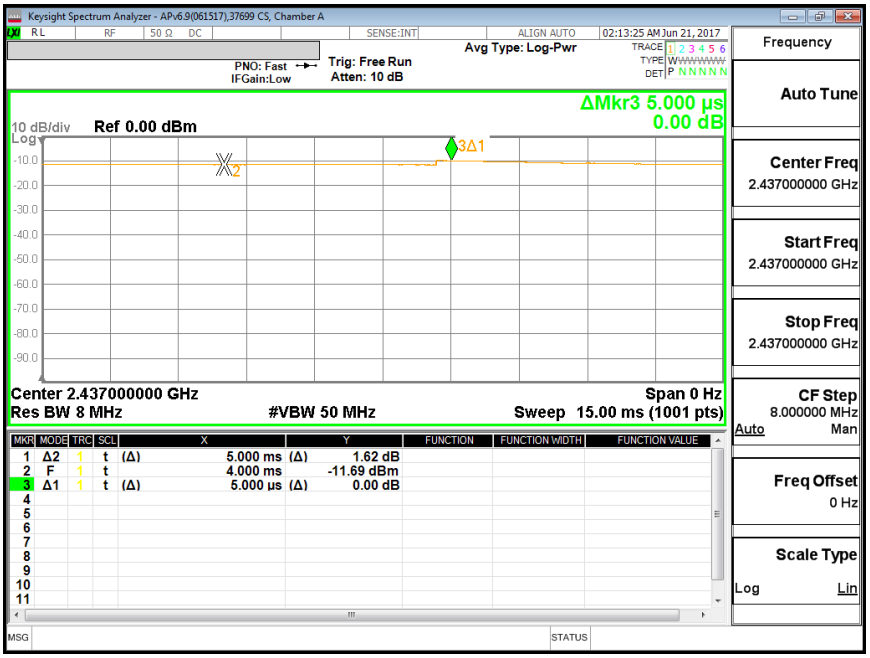
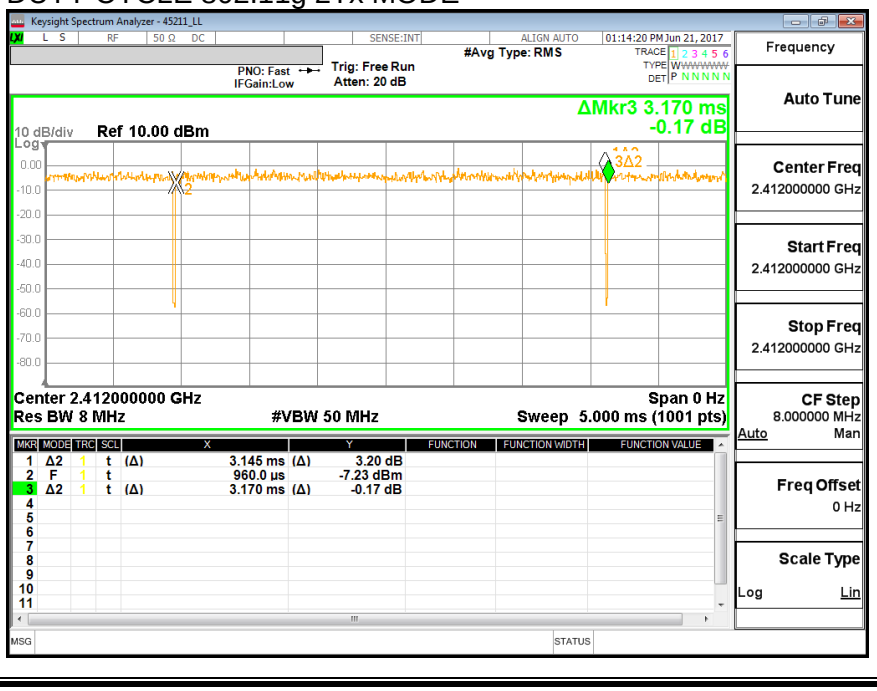
DUTY CYCLE PLOTS

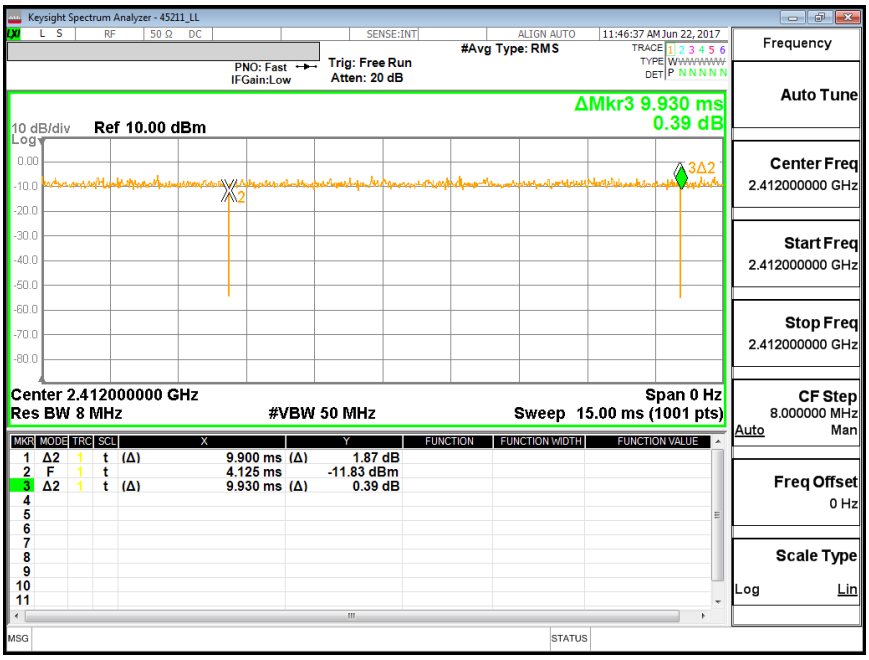
DUTY CYCLE 802.11b 2Tx MODE



DUTY CYCLE 802.11g 2Tx MODE



DUTY CYCLE 802.11n HT20 2Tx MODE



9. ANTENNA PORT TEST RESULTS

9.1. 11b 2TX MIMO MODE IN THE 2.4GHz BAND

9.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

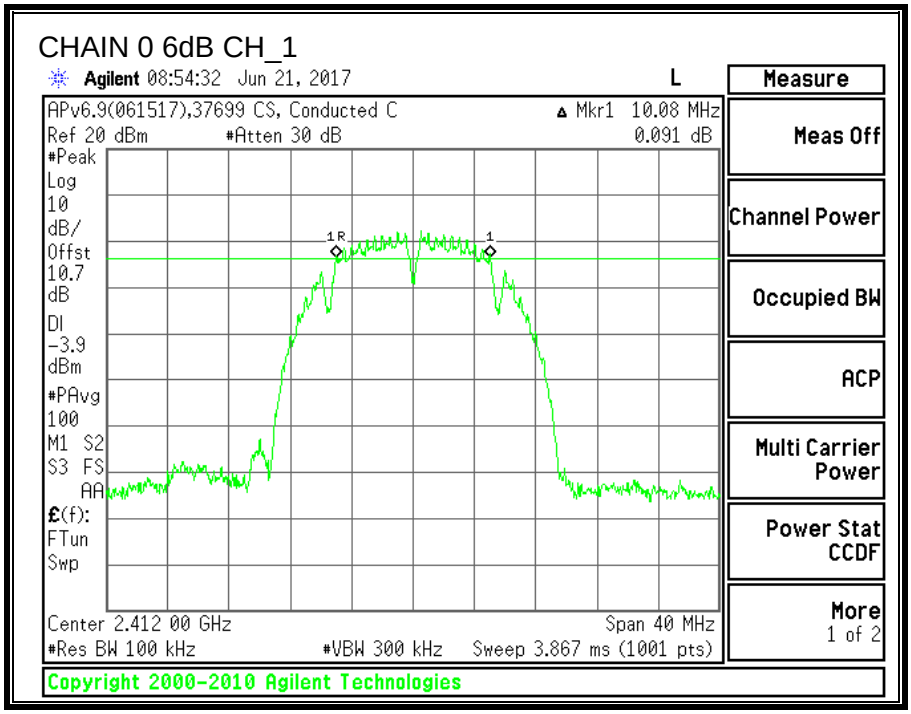
IC RSS-247 (5.2) (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

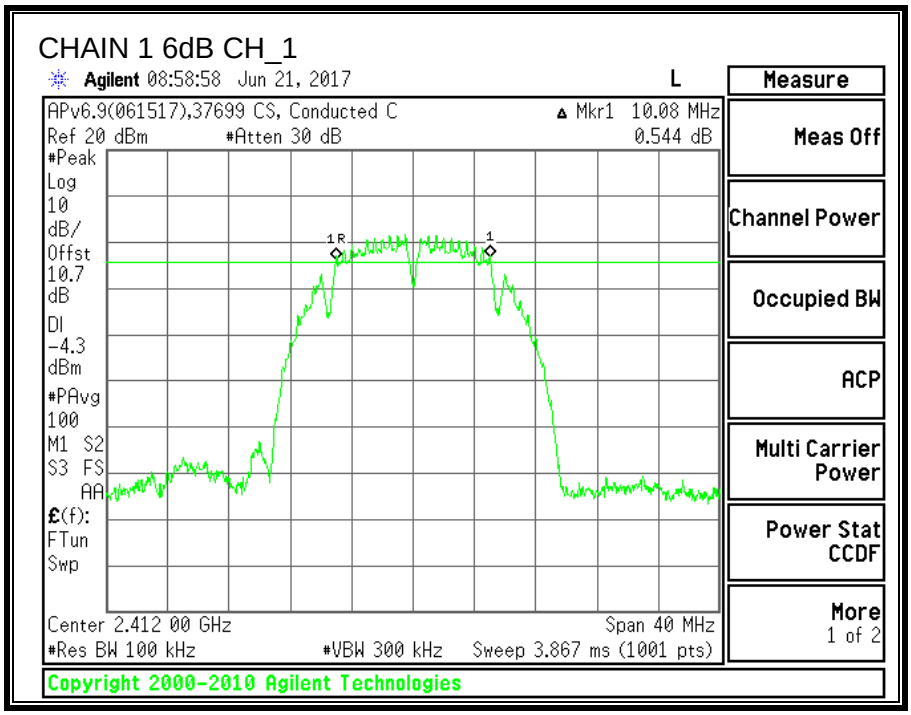
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low_1	2412	10.08	10.08	0.5
Middle_6	2437	10.08	10.08	0.5
High_11	2462	10.04	10.08	0.5
High_12	2467	10.08	10.08	0.5
High_13	2472	10.04	10.08	0.5

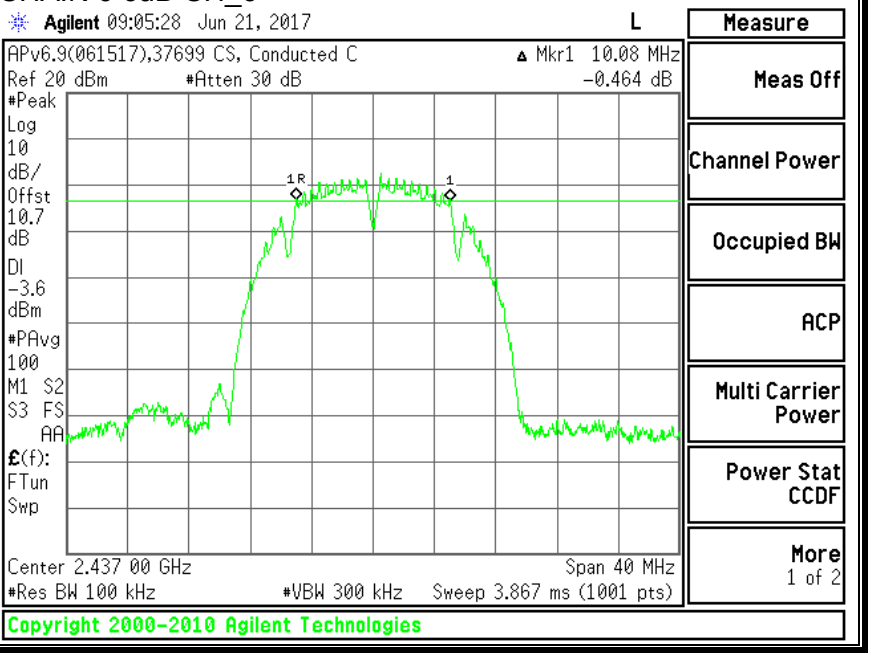
CHAIN 0 6dB CH_1



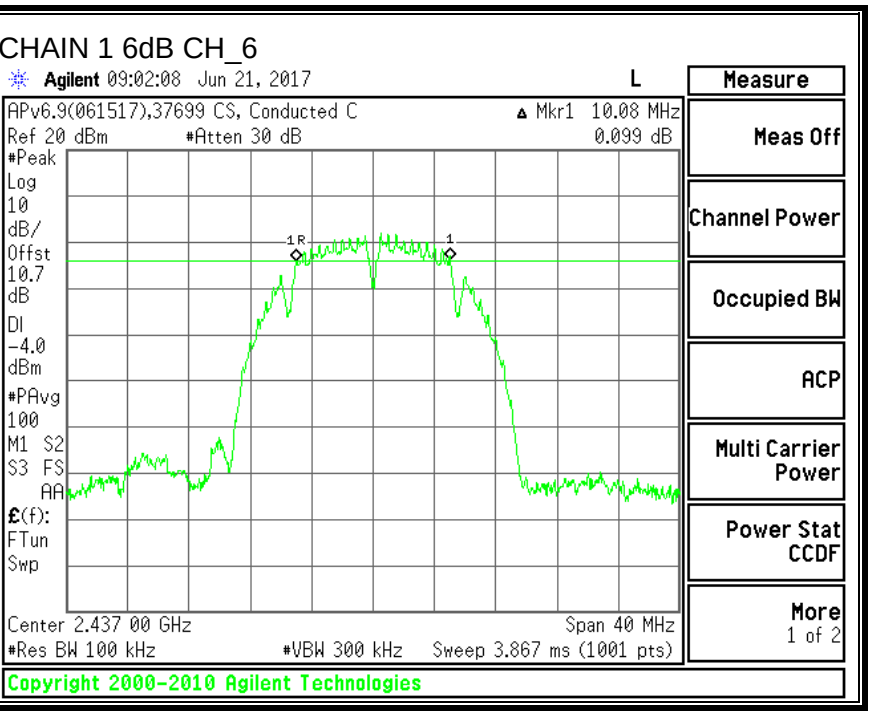
CHAIN 1 6dB CH_1



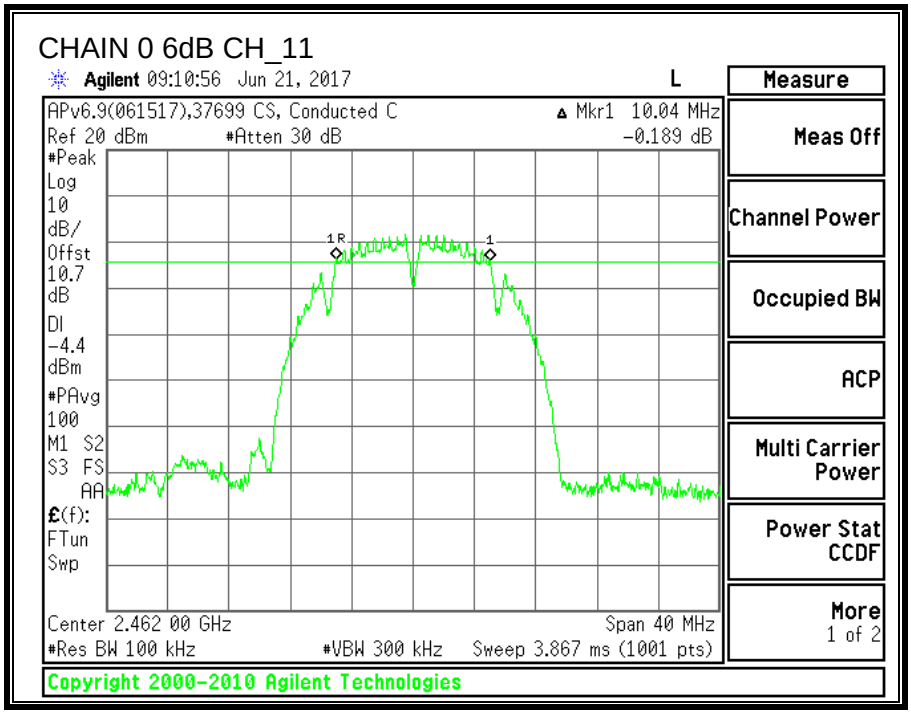
CHAIN 0 6dB CH_6



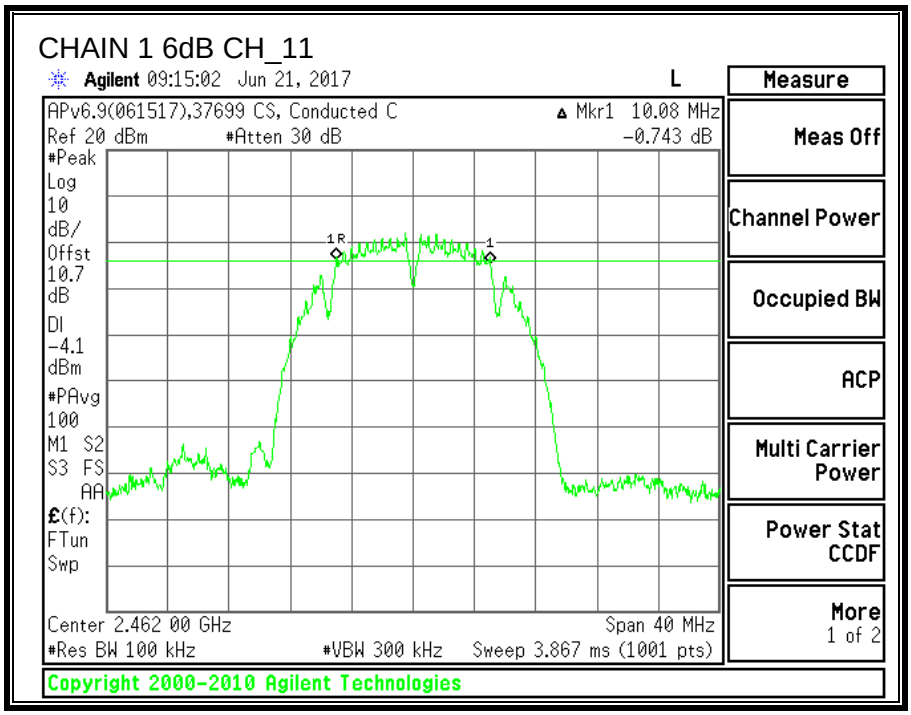
CHAIN 1 6dB CH_6



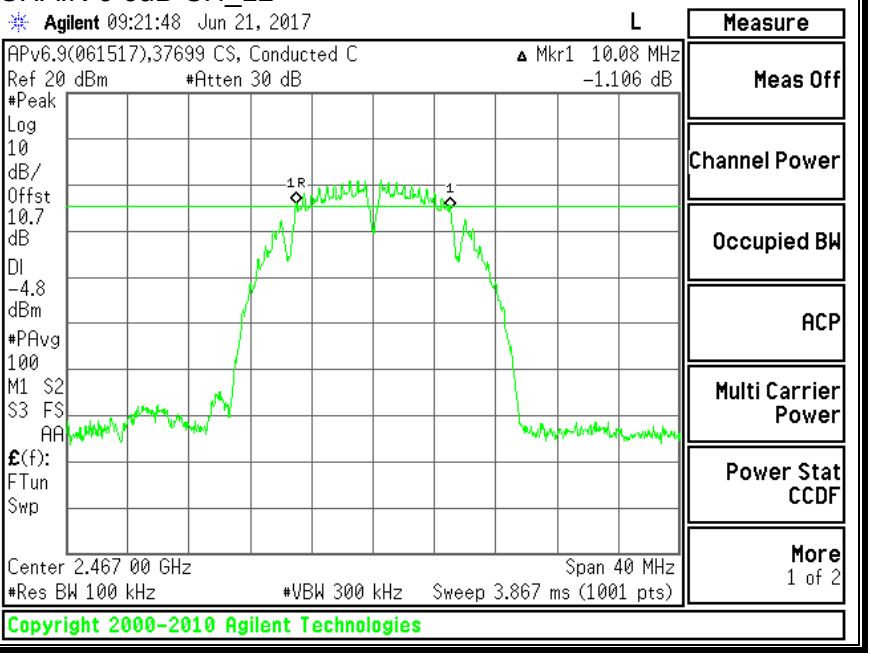
CHAIN 0 6dB CH_11



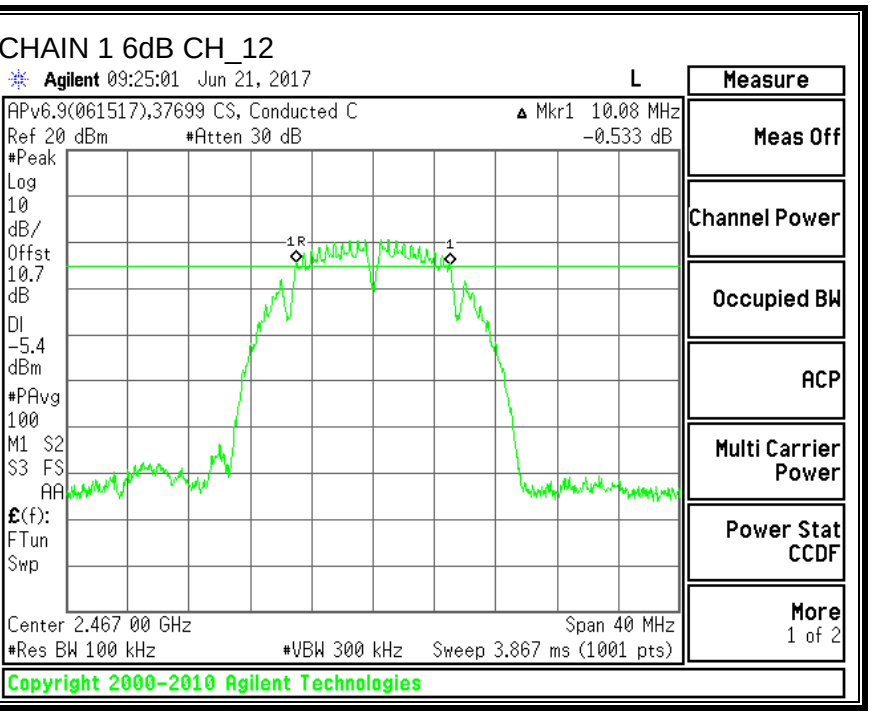
CHAIN 1 6dB CH_11



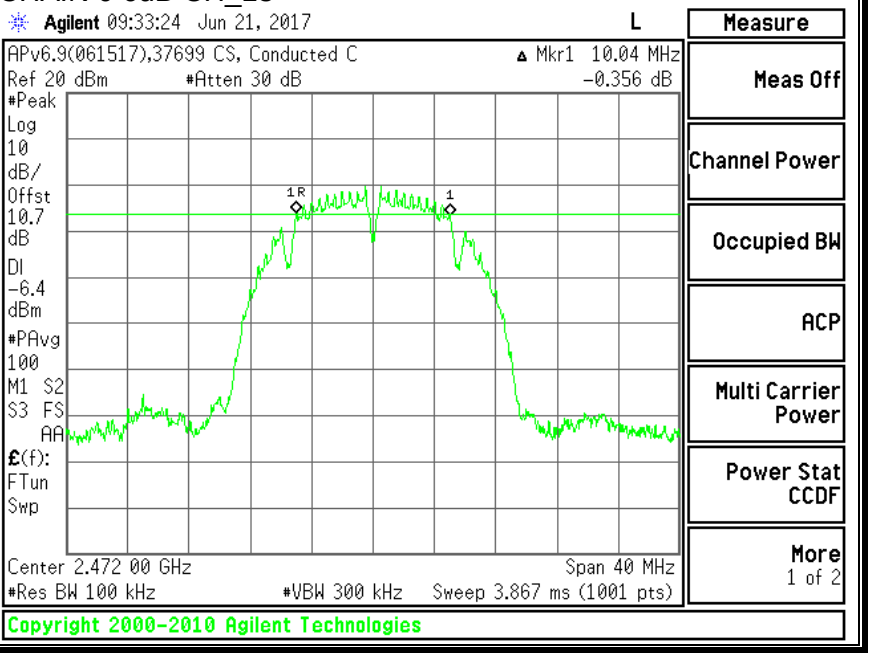
CHAIN 0 6dB CH_12



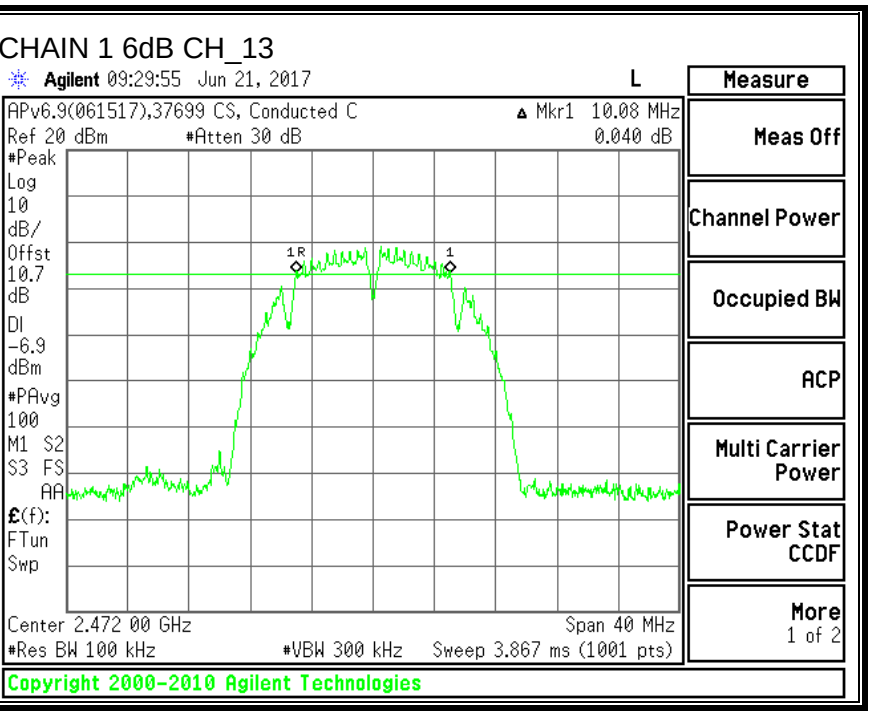
CHAIN 1 6dB CH_12



CHAIN 0 6dB CH_13



CHAIN 1 6dB CH_13



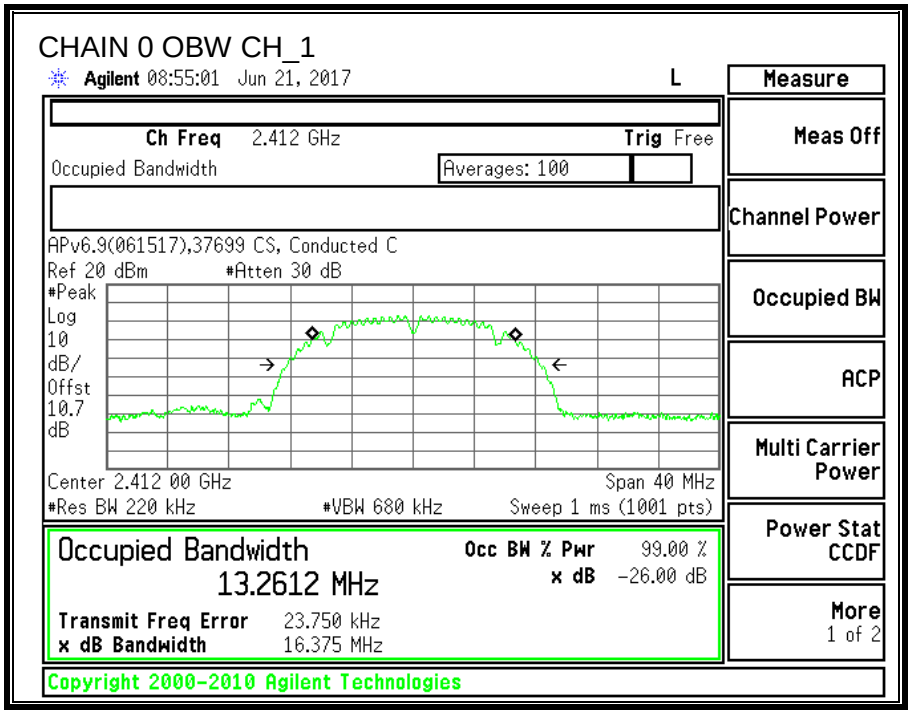
9.1.2. 99% BANDWIDTH

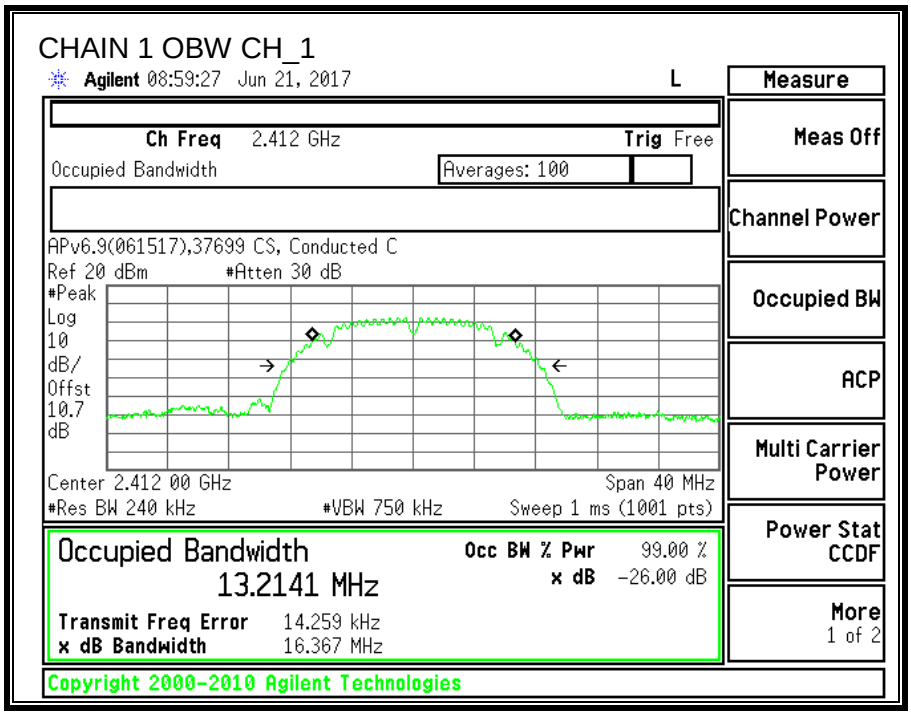
LIMITS

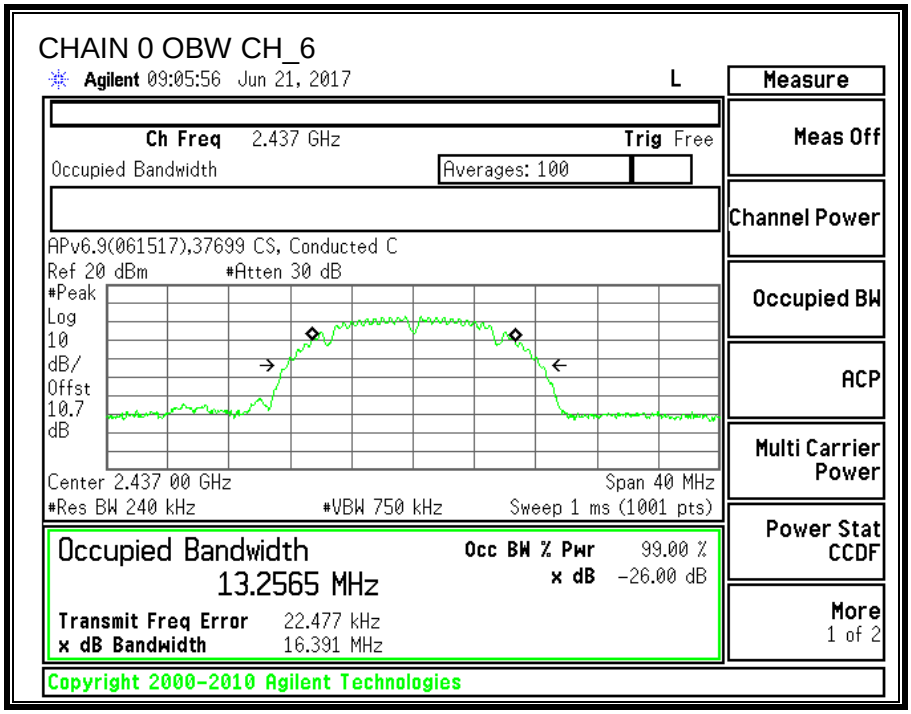
None; for reporting purposes only.

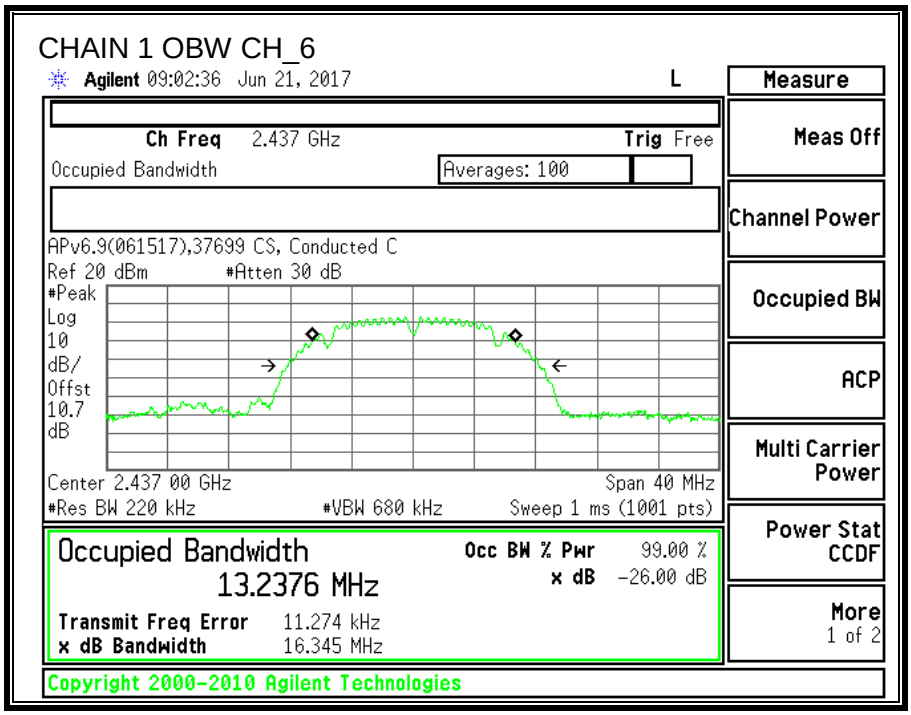
RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low_1	2412	13.2612	13.2141
Middle_6	2437	13.2565	13.2376
High_11	2462	13.2813	13.1915
High_12	2467	13.2932	13.2165
High_13	2472	13.3839	13.2660

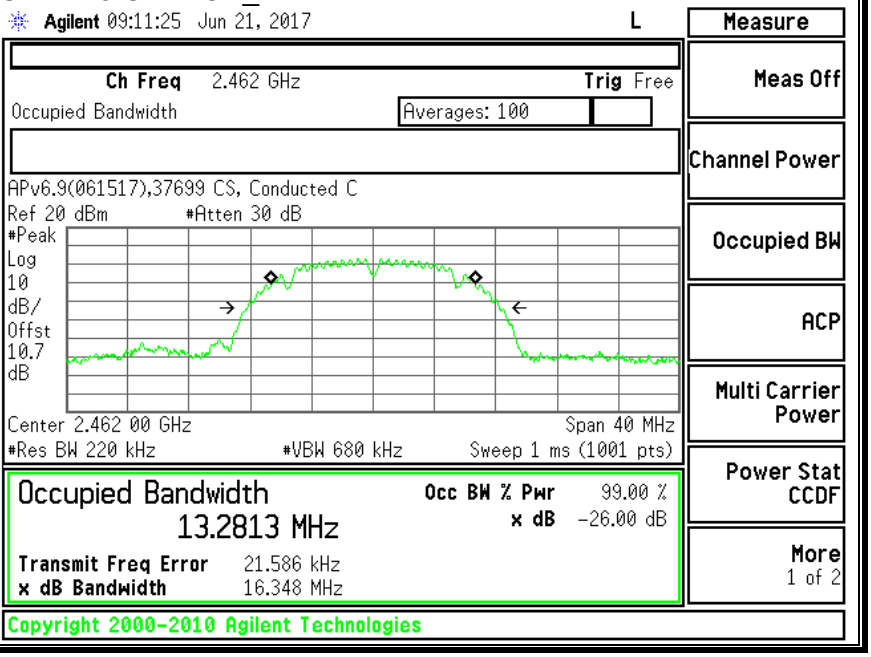




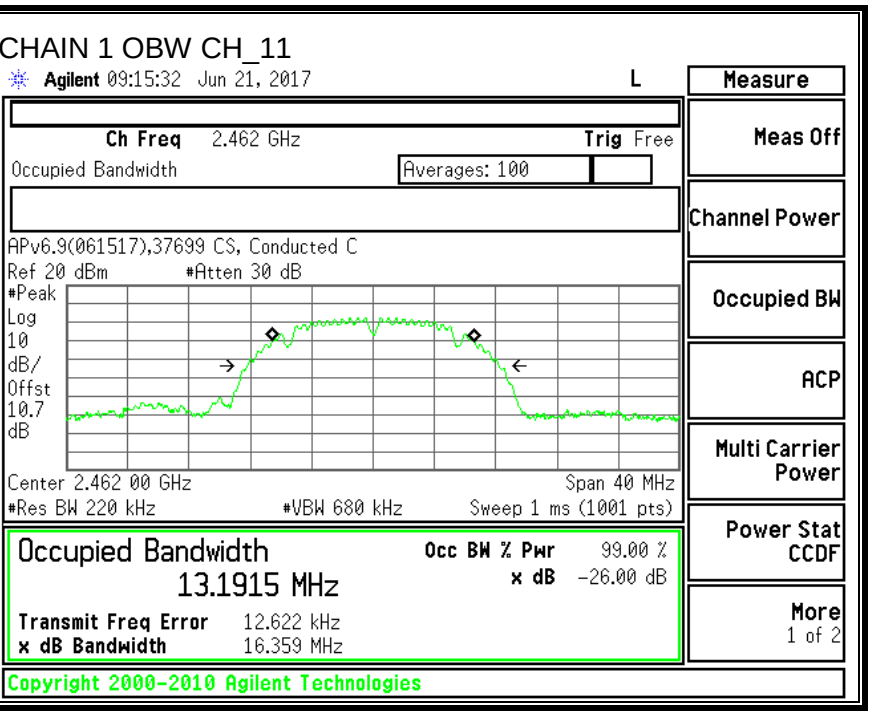


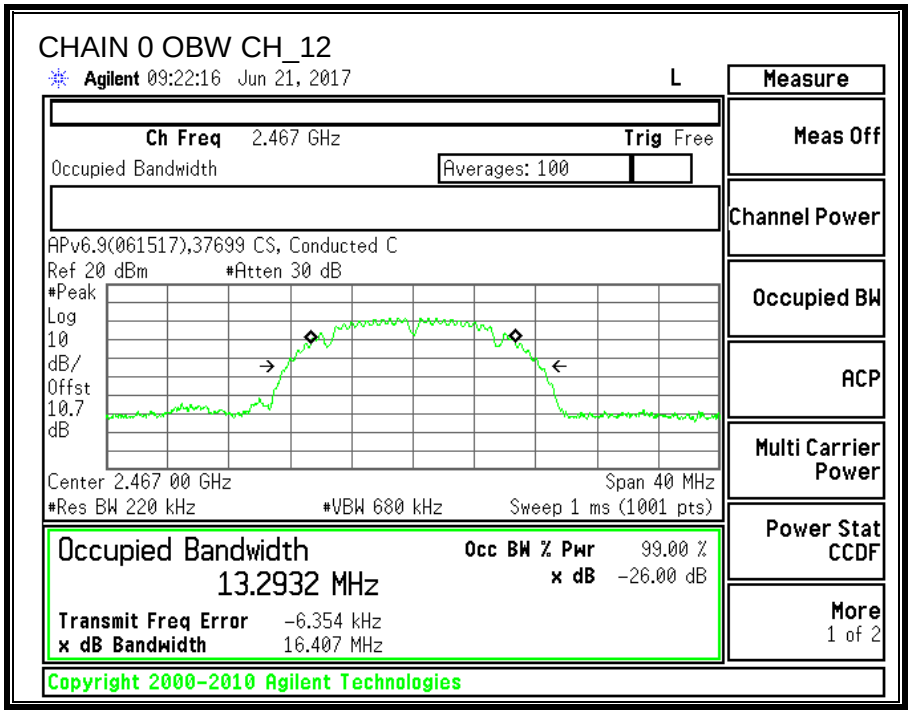


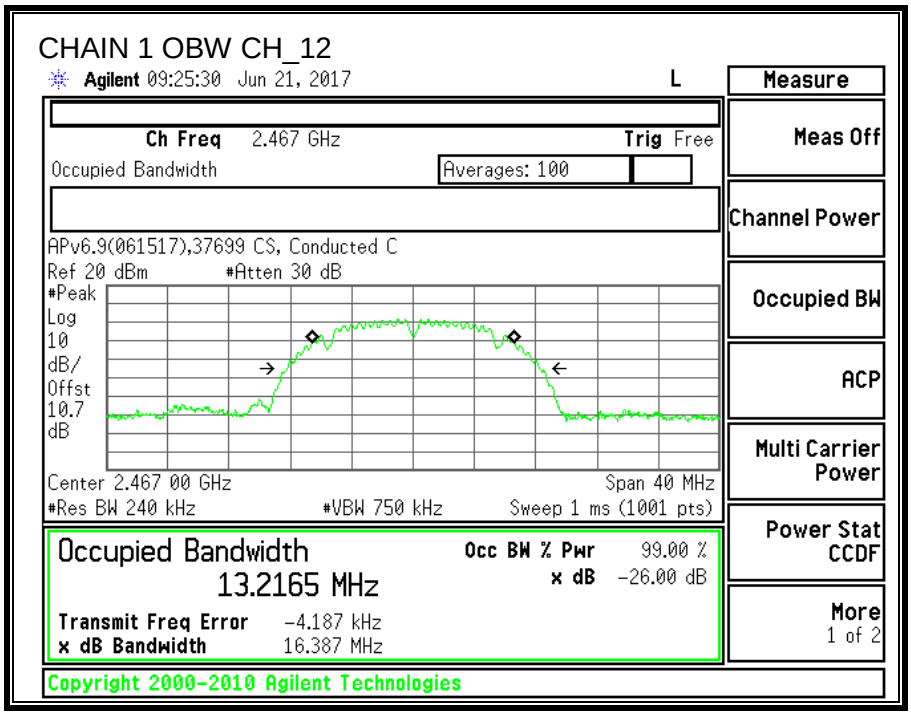
CHAIN 0 OBW CH_11

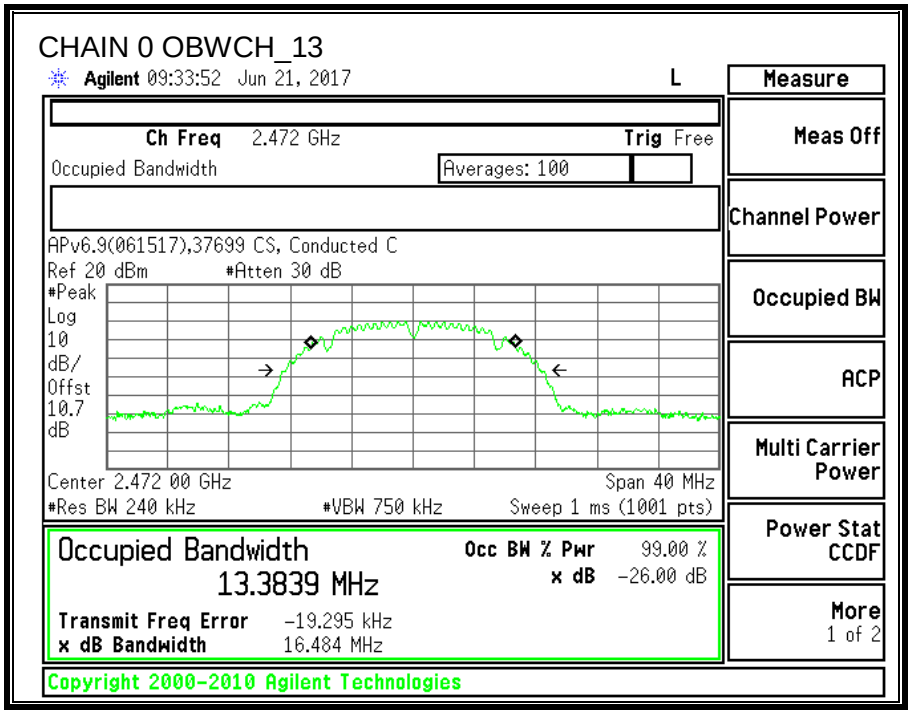


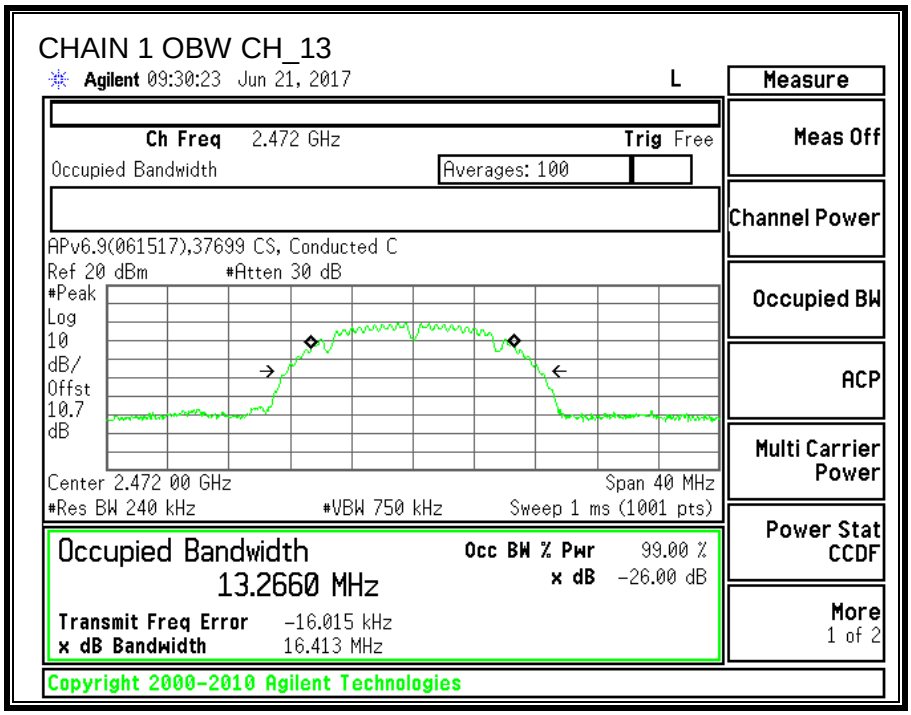
CHAIN 1 OBW CH_11











9.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Tested By:	37699 CS
Date:	06/26/17

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)
Low_1	2412	11.35	10.66	14.03
Middle_6	2437	11.32	11.03	14.19
High_11	2462	11.23	10.65	13.96
High_12	2467	10.67	9.32	13.06
High_13	2472	8.82	7.97	11.43

9.1.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

For systems using digital modulation in the 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, 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.

DIRECTIONAL ANTENNA GAIN

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
3.40	3.10	3.25	6.26

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RESULTS

Tested By:	37699 CS
Date:	06/26/17

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low_1	2412	3.25	30.00	30	36	30.00
Middle_6	2437	3.25	30.00	30	36	30.00
High_11	2462	3.25	30.00	30	36	30.00
High_12	2467	3.25	30.00	30	36	30.00
High_13	2472	3.25	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low_1	2412	14.51	14.07	17.31	30.00	-12.69
Middle_6	2437	14.65	13.89	17.30	30.00	-12.70
High_11	2462	14.32	14.03	17.19	30.00	-12.81
High_12	2467	13.87	12.89	16.42	30.00	-13.58
High_13	2472	11.78	11.28	14.55	30.00	-15.45

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9.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (b)

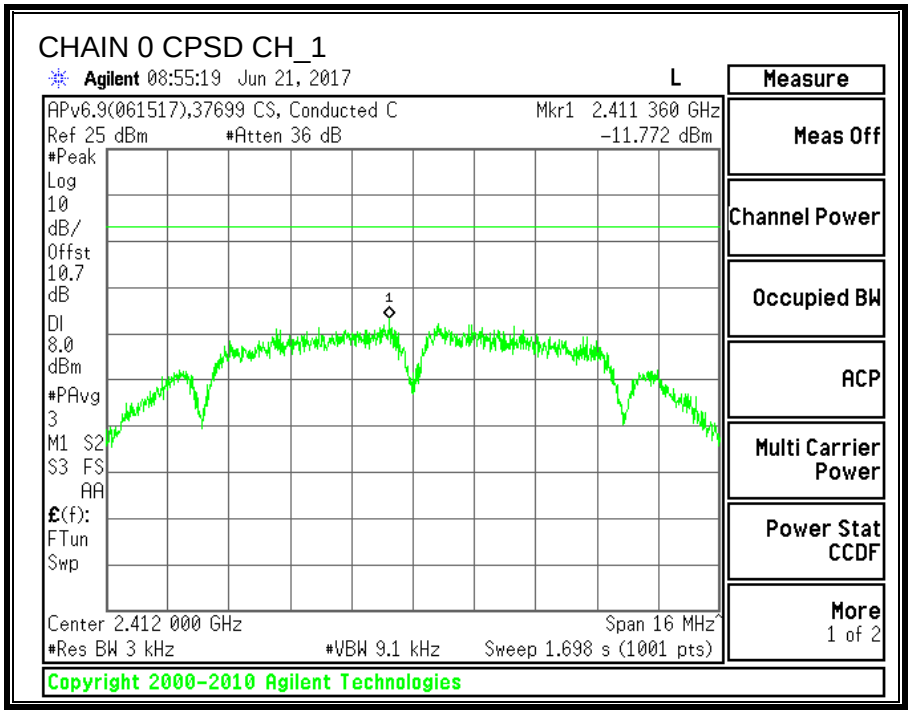
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

RESULTS

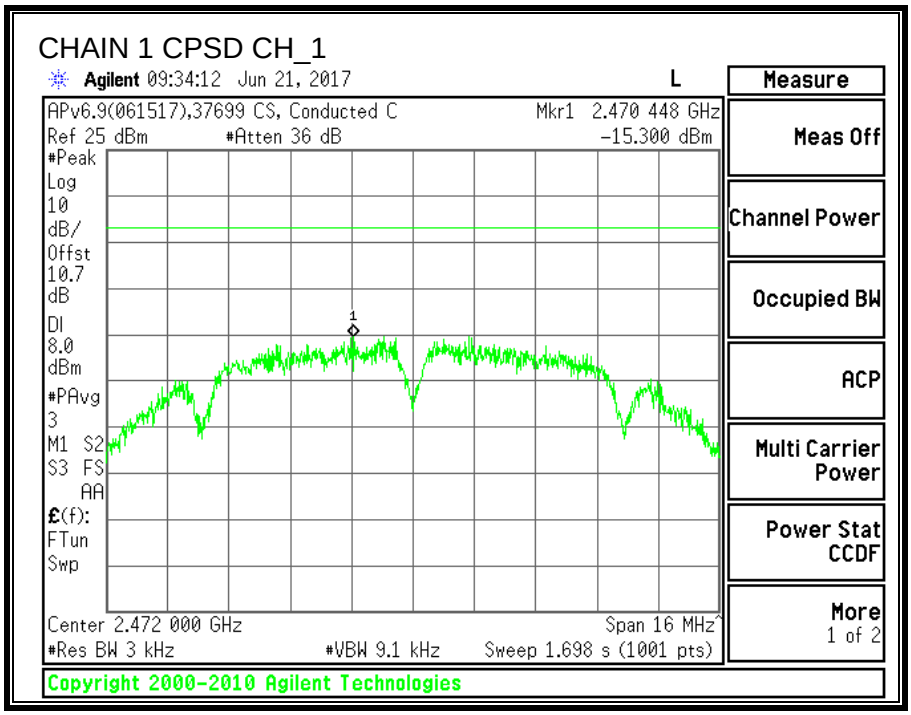
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low_1	2412	-11.77	-15.30	-10.18	8.0	-18.2
Middle_6	2437	-12.29	-12.59	-9.43	8.0	-17.4
High_11	2462	-12.98	-13.02	-9.99	8.0	-18.0
High_12	2467	-14.11	-13.51	-10.79	8.0	-18.8
High_13	2472	-15.30	-15.68	-12.47	8.0	-20.5

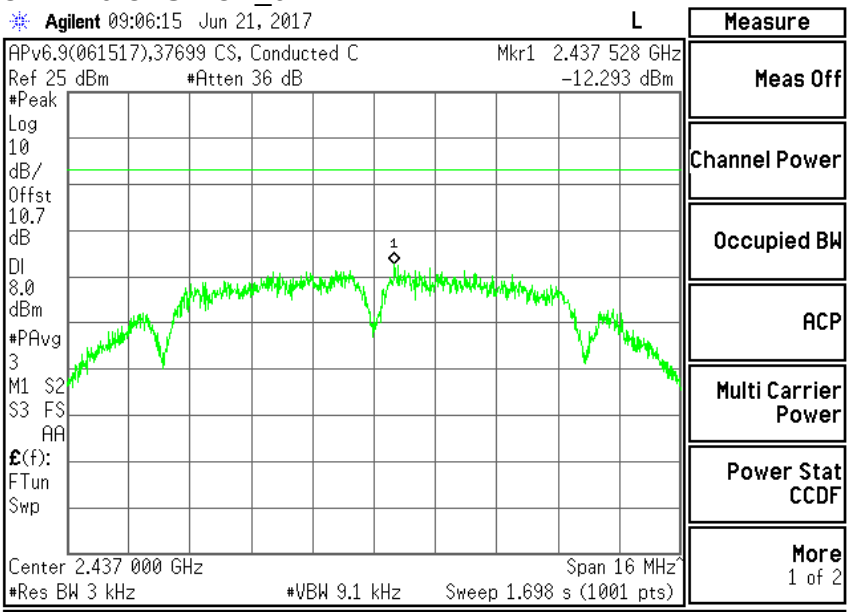
CHAIN 0 CPSD CH_1



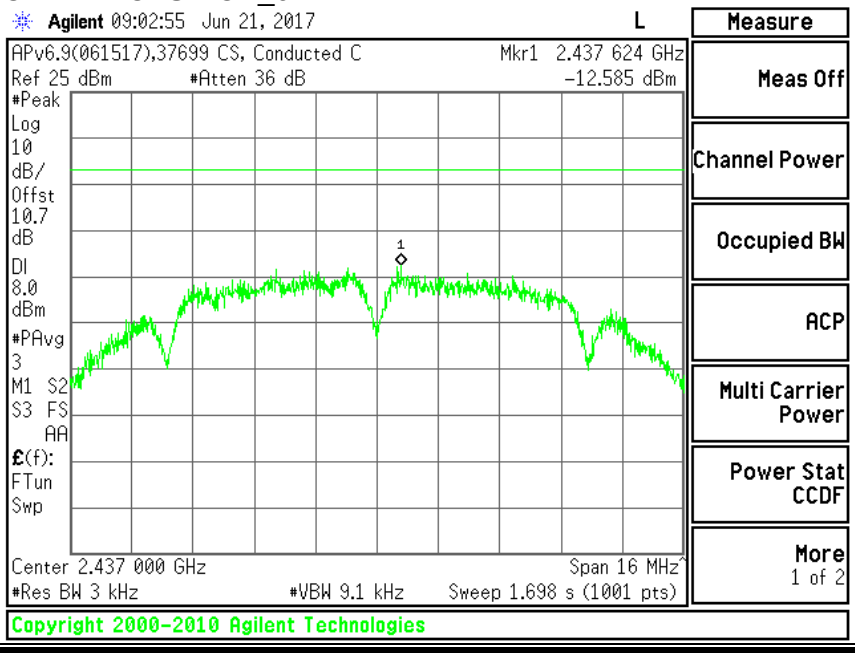
CHAIN 1 CPSD CH_1



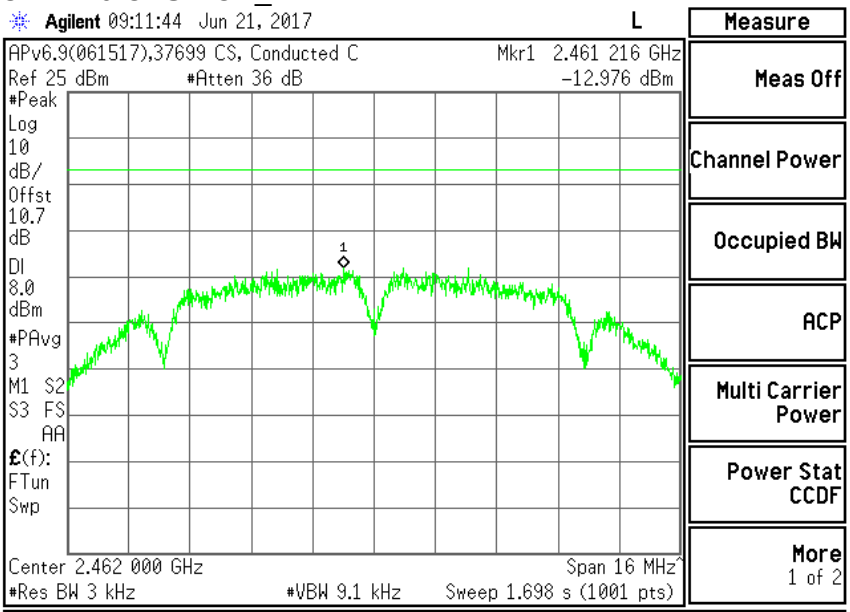
CHAIN 0 CPSD CH_6



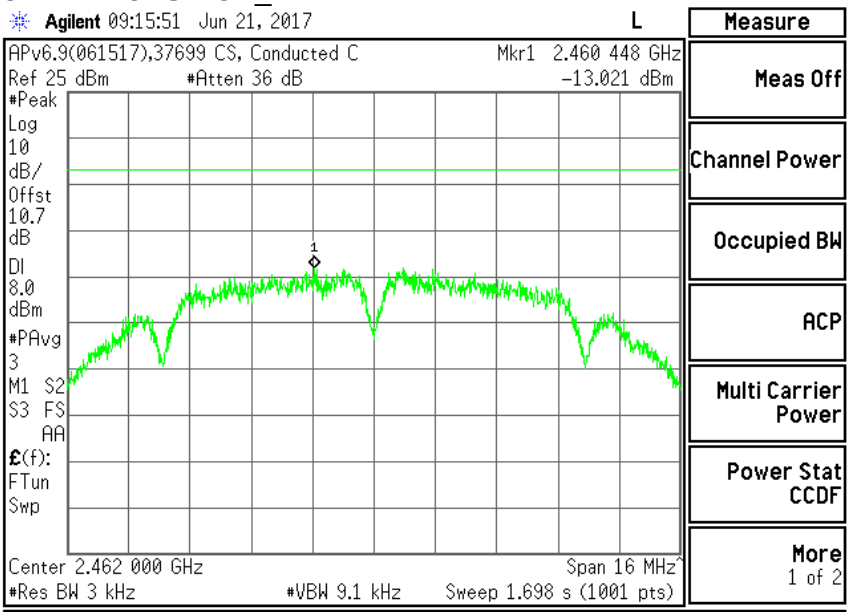
CHAIN 1 CPSD CH_6



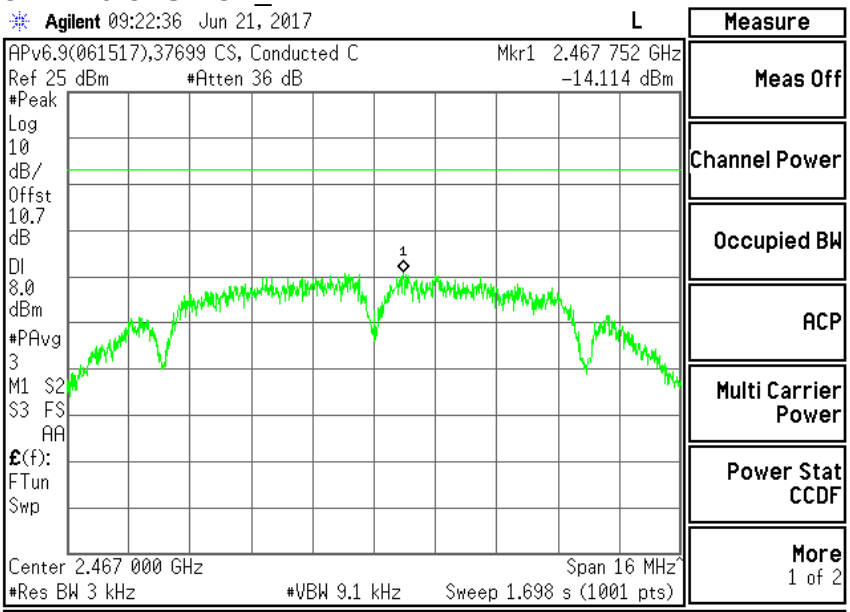
CHAIN 0 CPSD CH_11



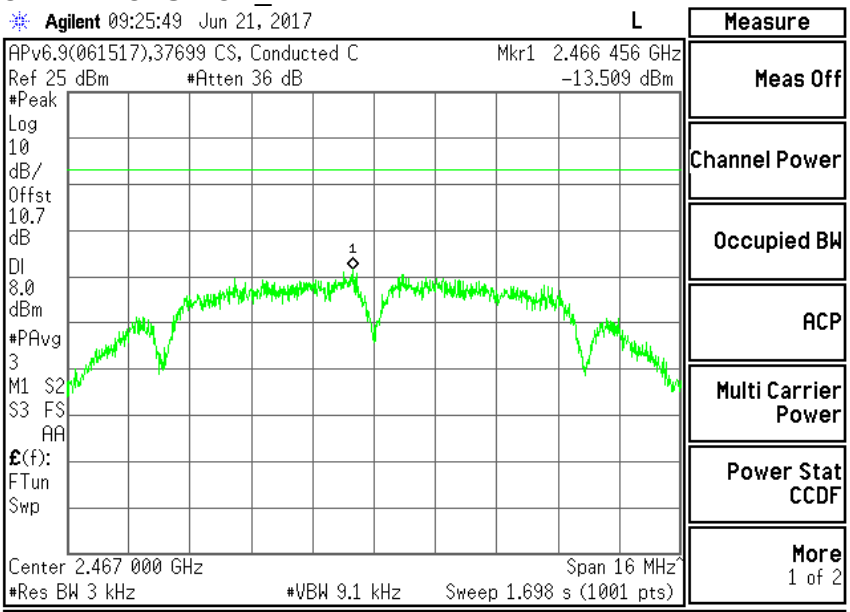
CHAIN 1 CPSD CH_11



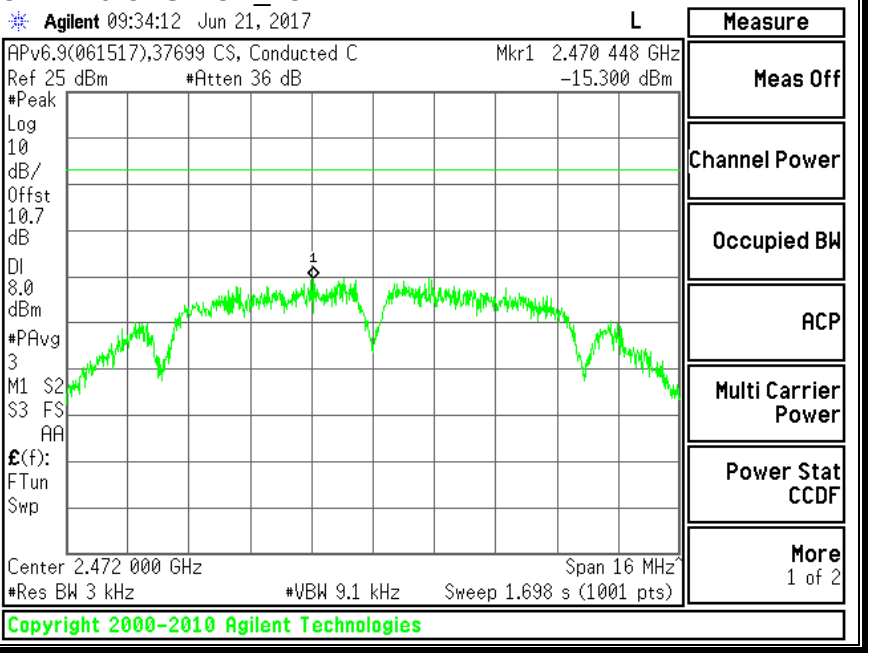
CHAIN 0 CPSD CH_12



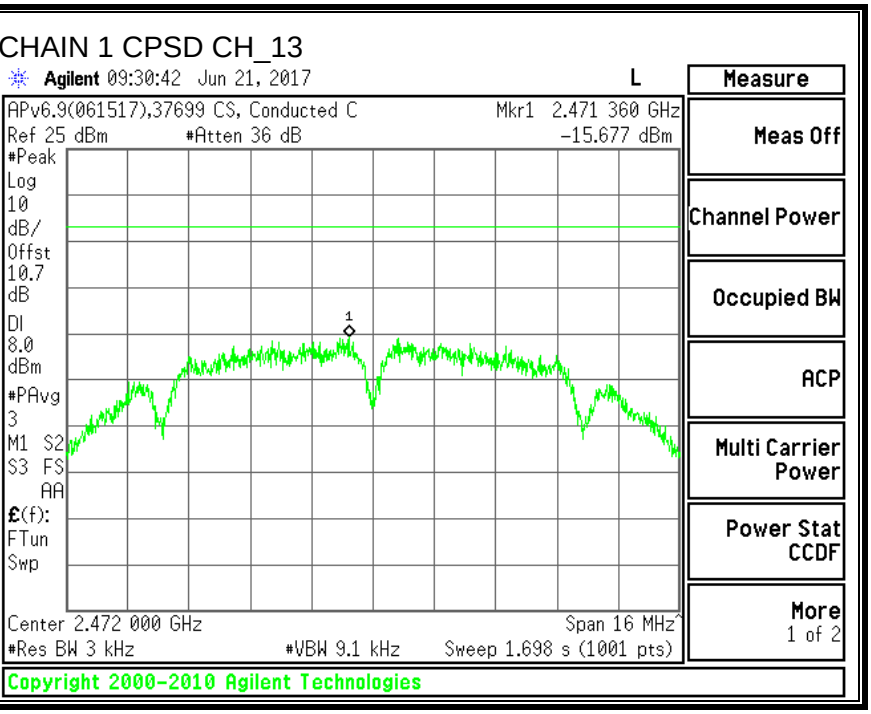
CHAIN 1 CPSD CH_12



CHAIN 0 CPSD CH_13



CHAIN 1 CPSD CH_13



9.1.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

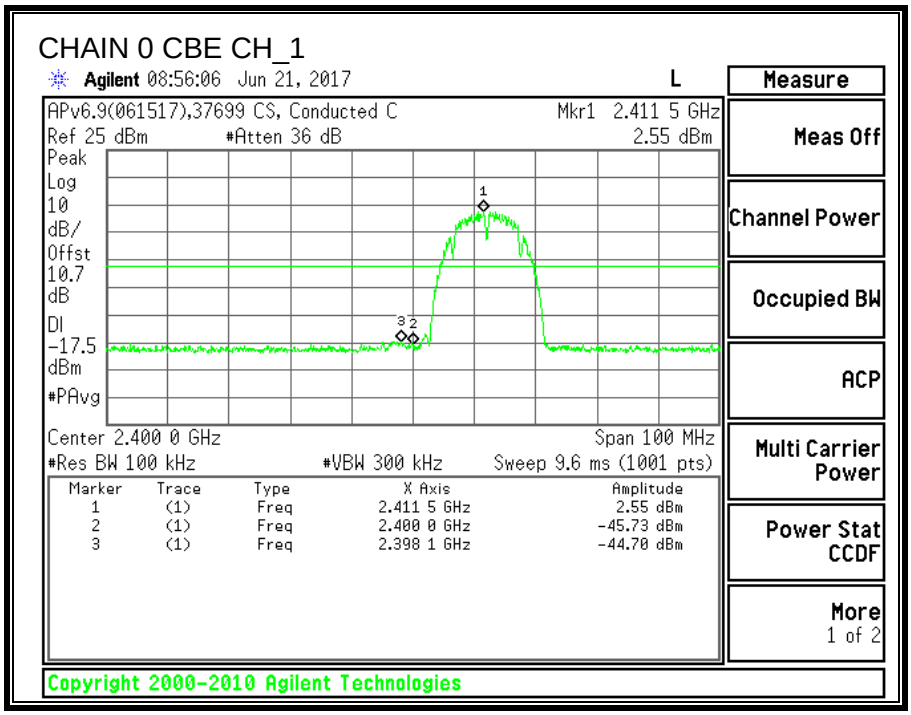
FCC §15.247 (d)

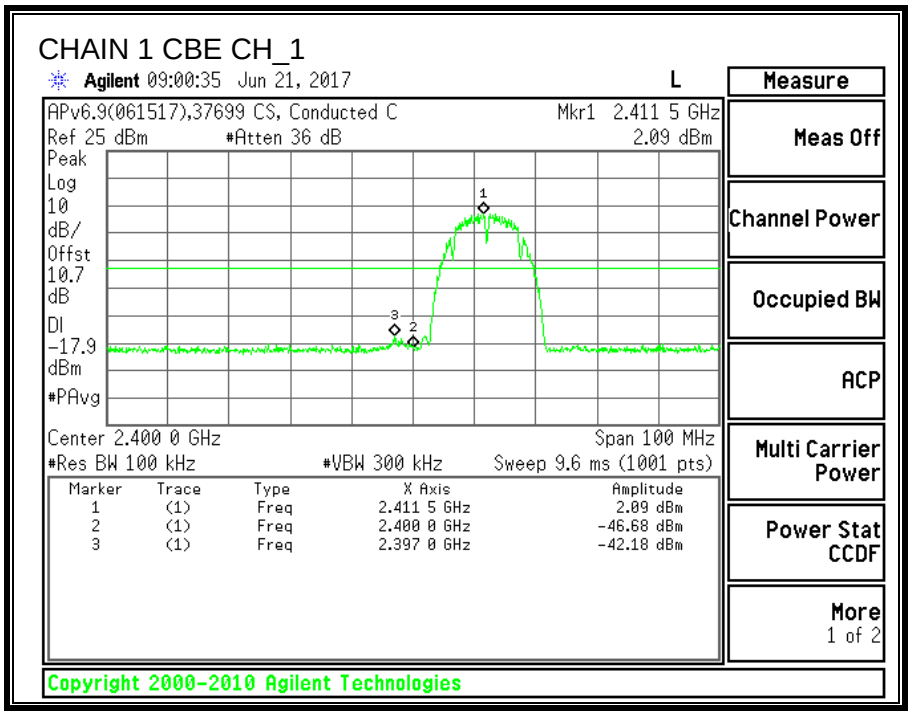
IC RSS-247 5.5

Output power was measured based on the use of Pk measurement, therefore the required attenuation is 20 dB.

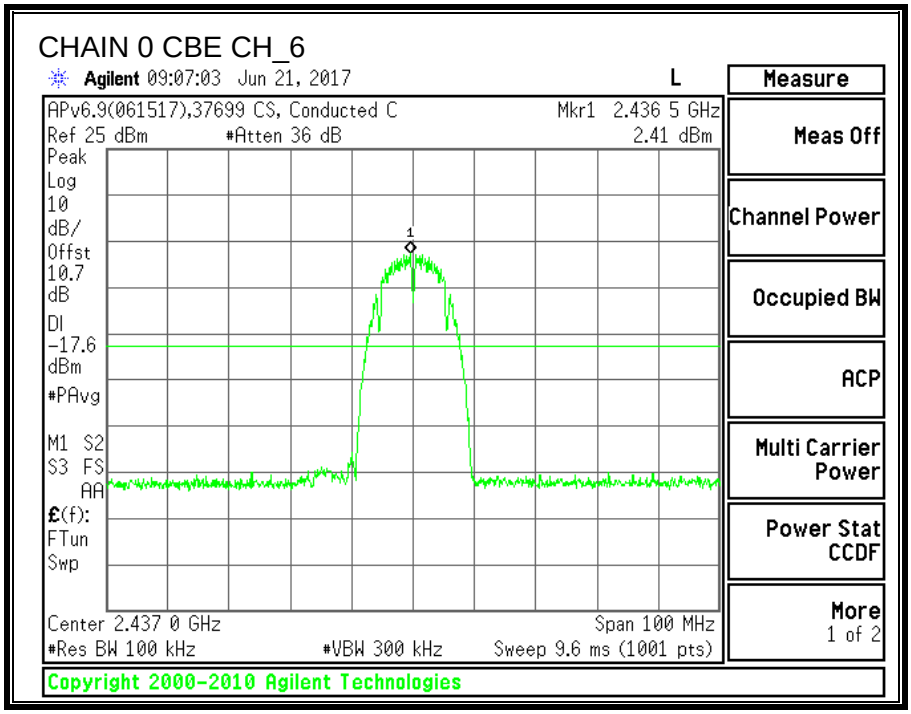
RESULTS

BANDEDGE

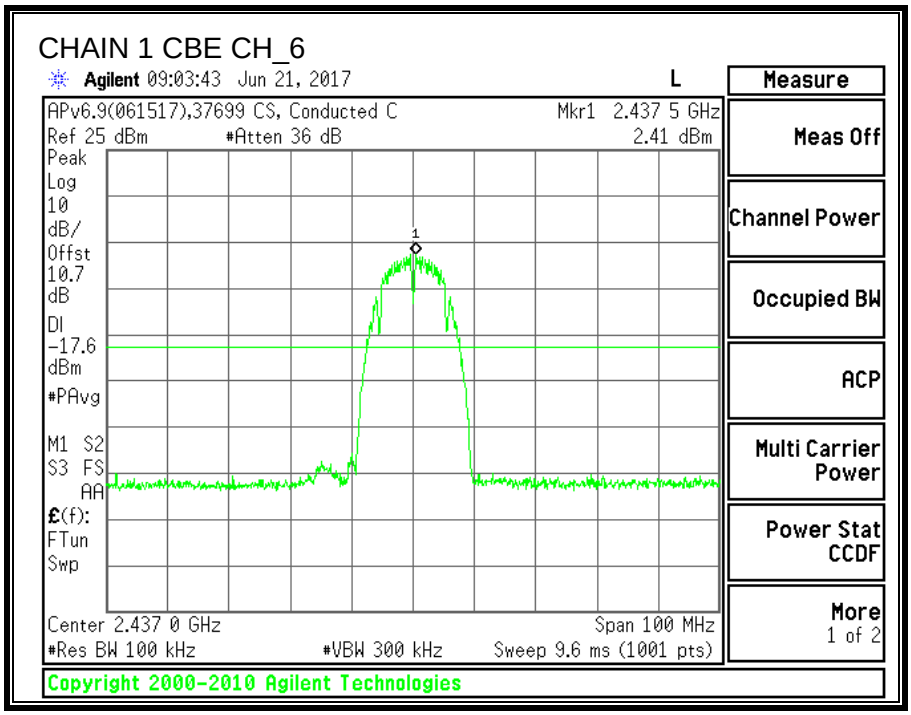




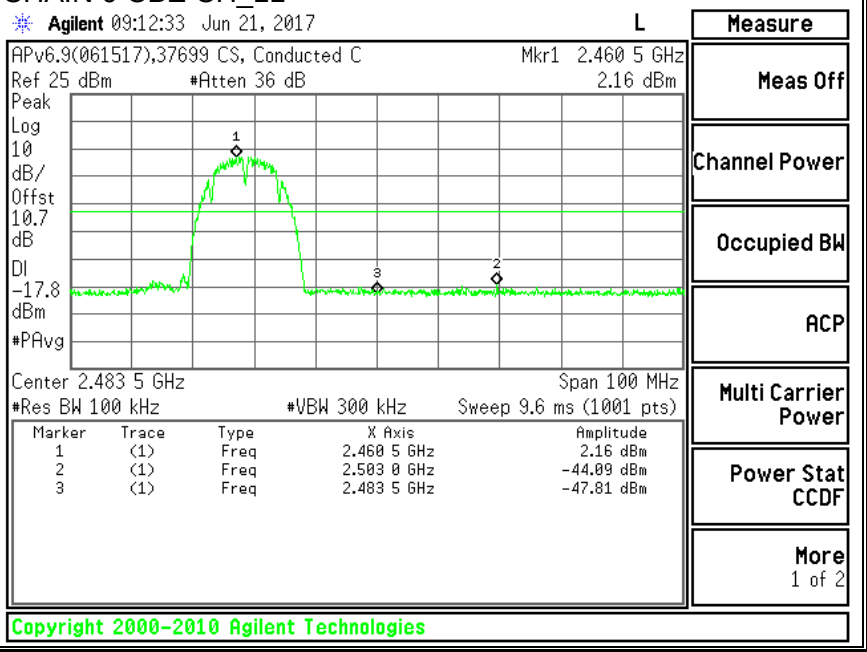
CHAIN 0 CBE CH_6



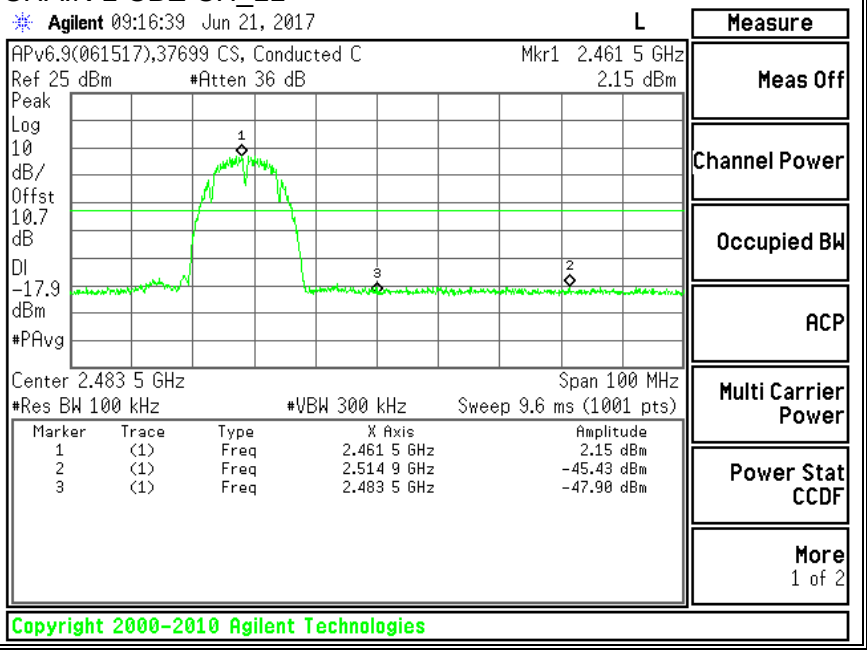
CHAIN 1 CBE CH_6



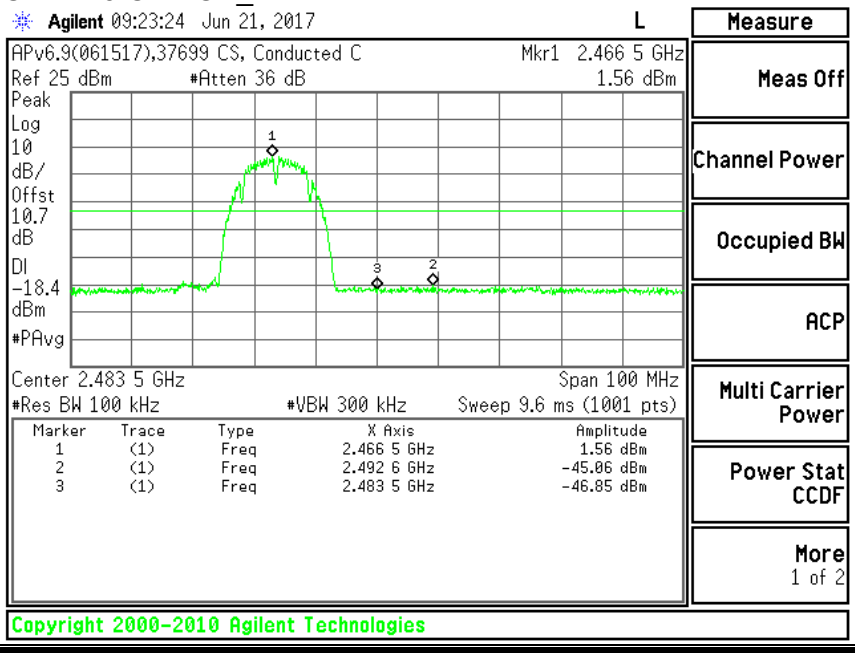
CHAIN 0 CBE CH_11



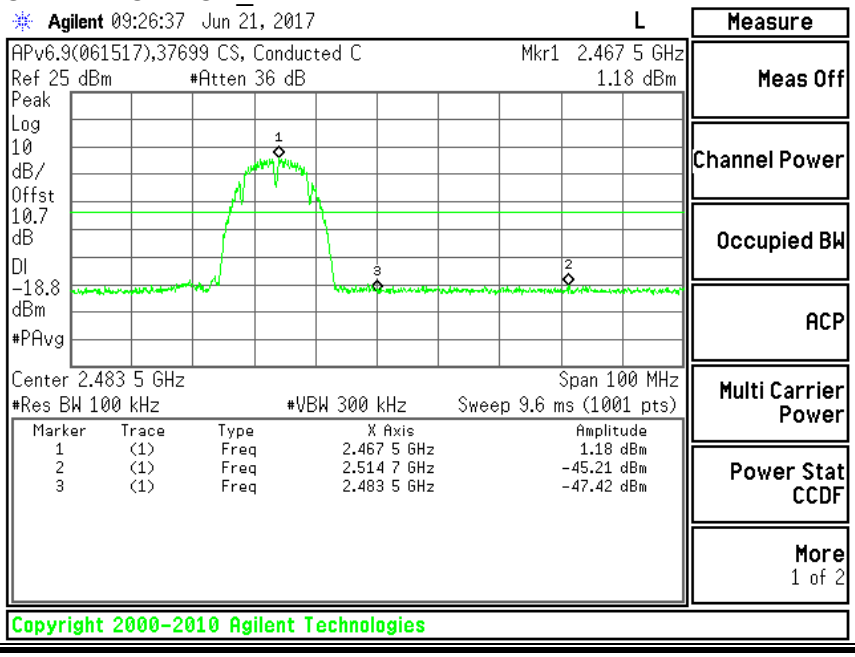
CHAIN 1 CBE CH_11



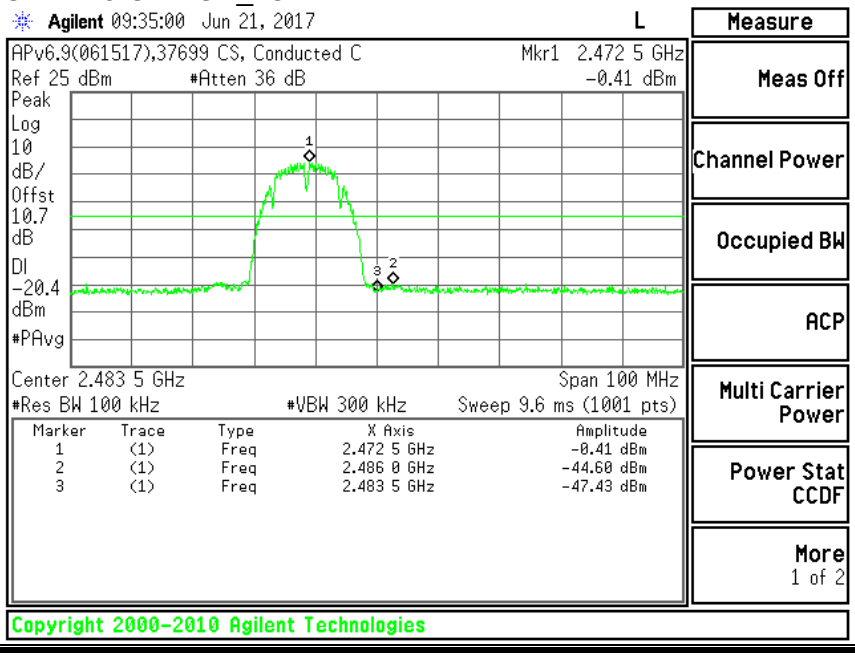
CHAIN 0 CBE CH_12



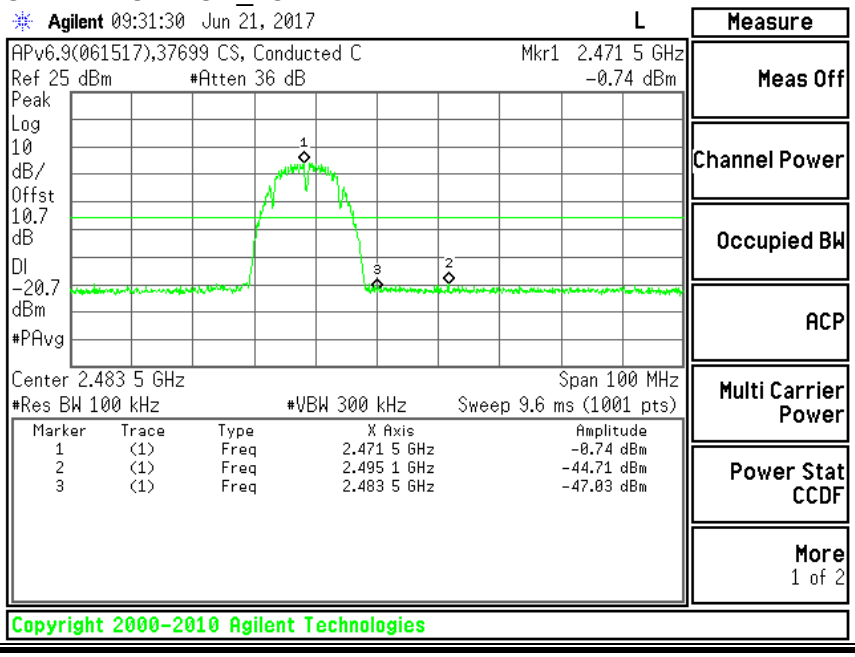
CHAIN 1 CBE CH_12



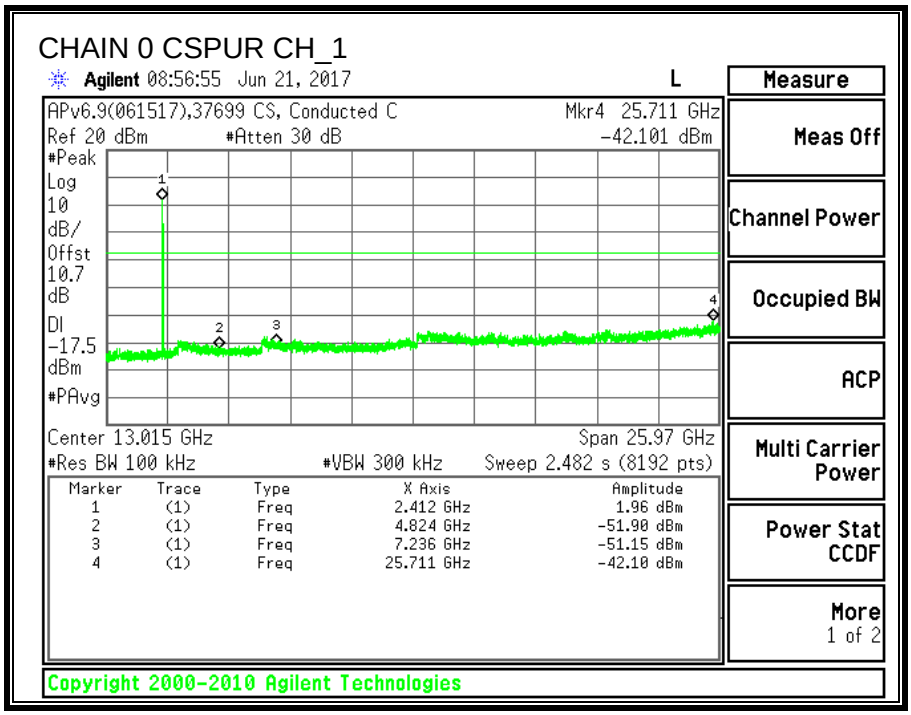
CHAIN 0 CBE CH_13

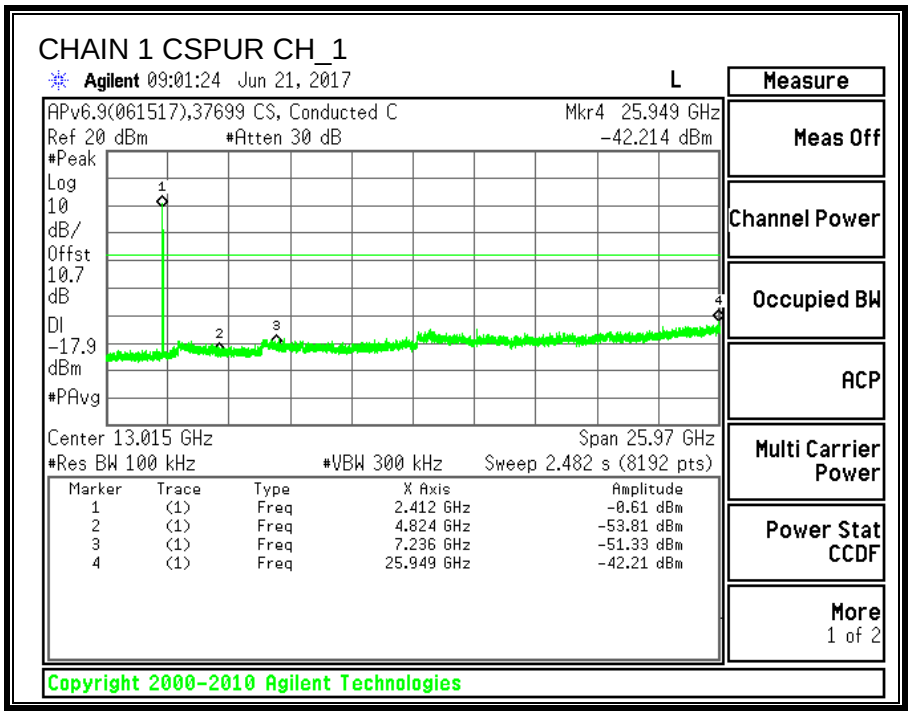


CHAIN 1 CBE CH_13

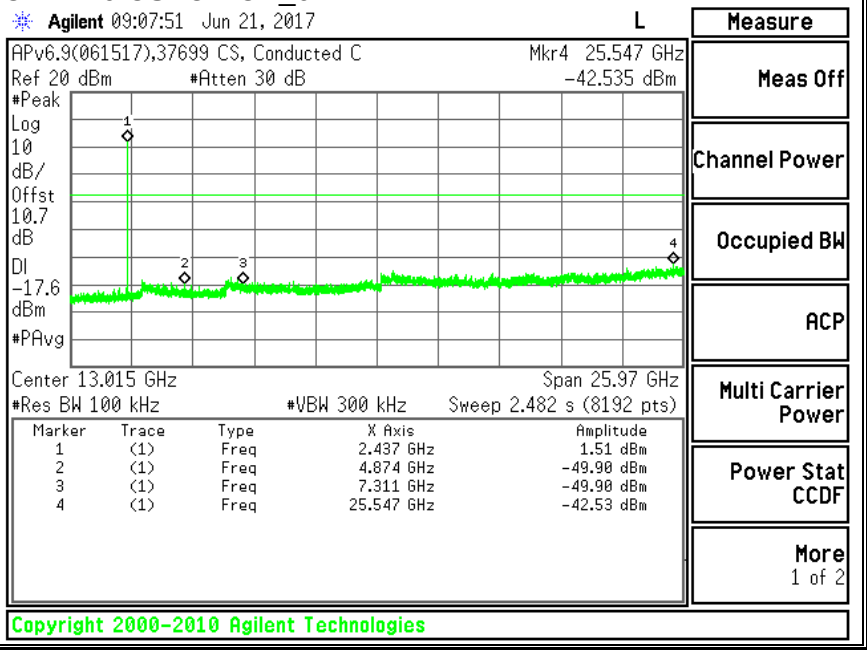


SPURIOUS EMISSIONS

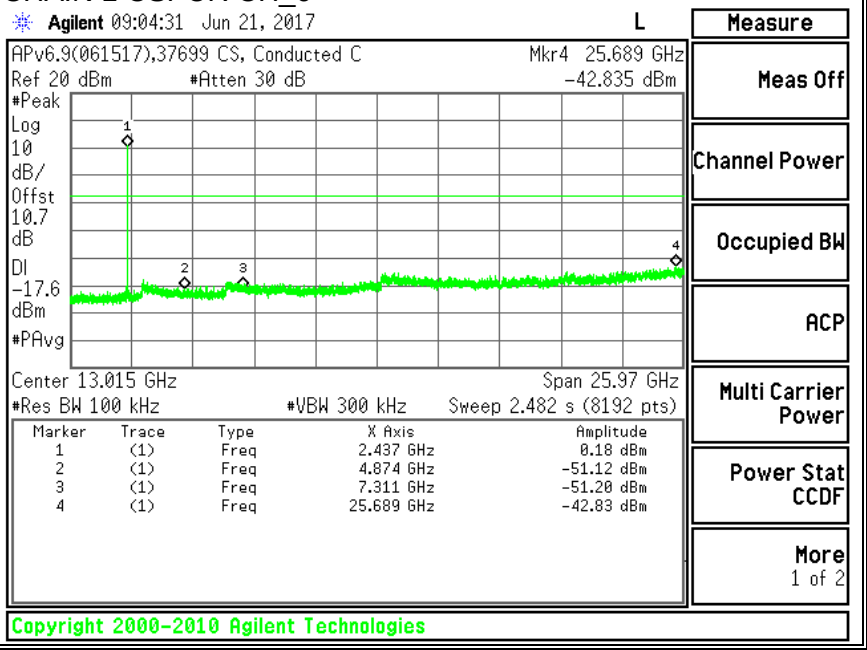




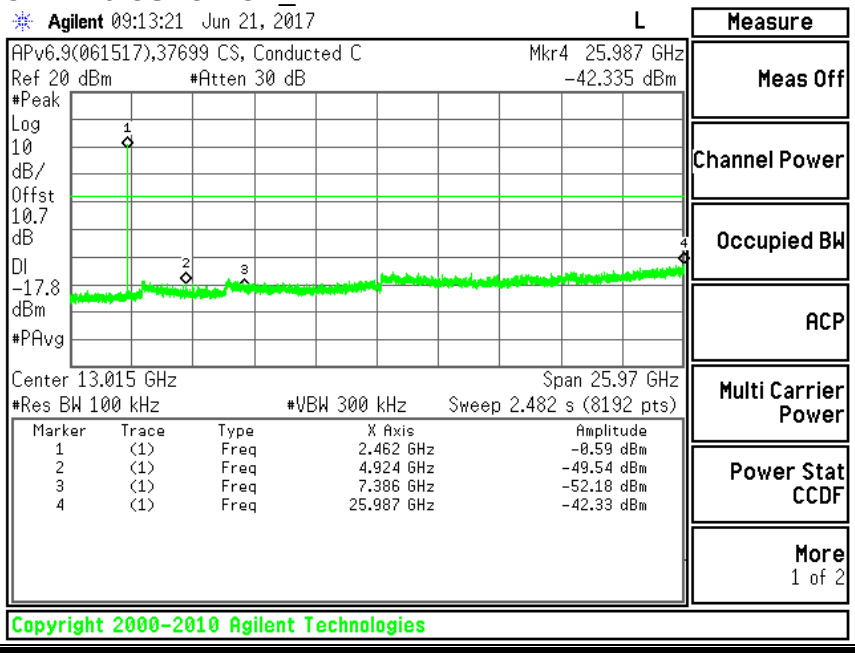
CHAIN 0 CSPUR CH_6



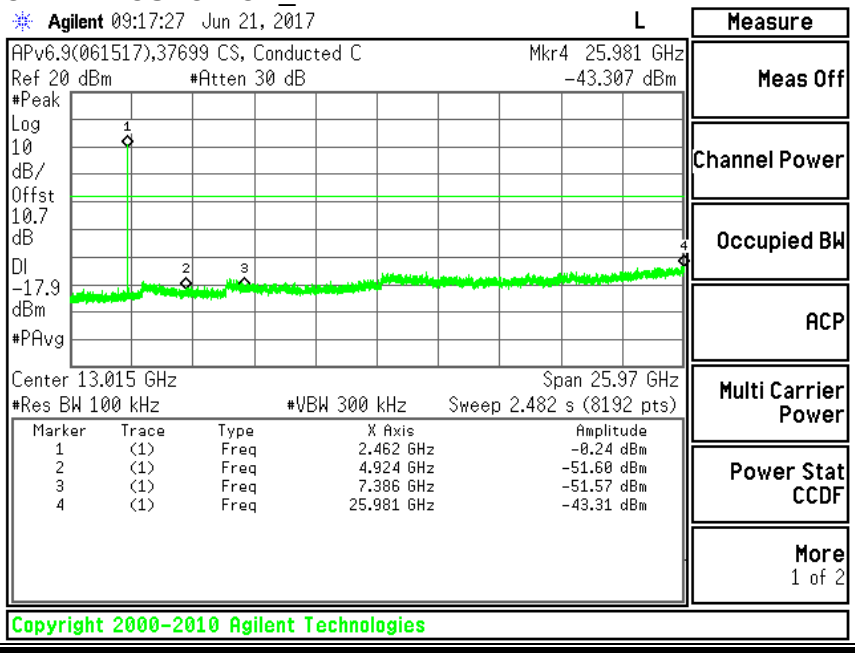
CHAIN 1 CSPUR CH_6



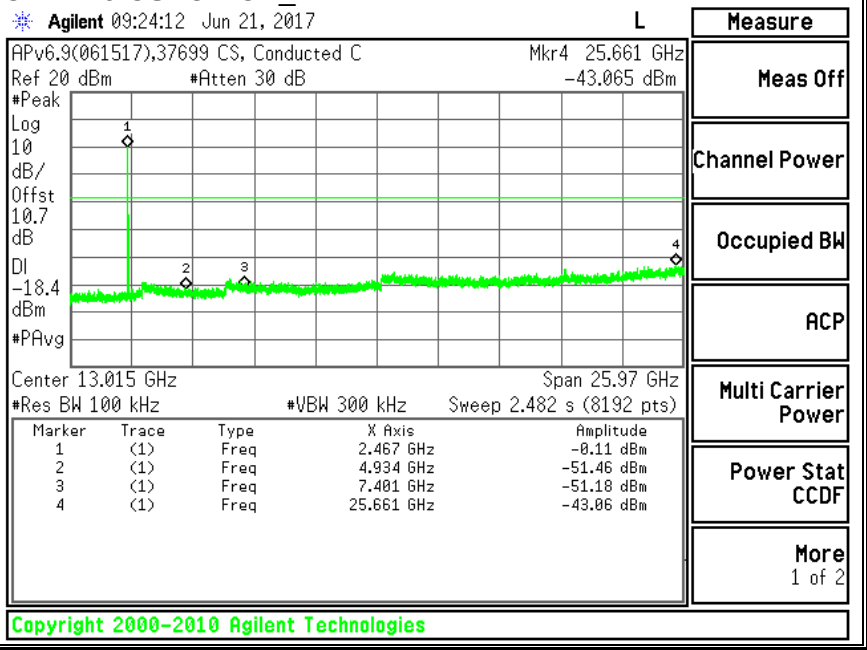
CHAIN 0 CSPUR CH_11



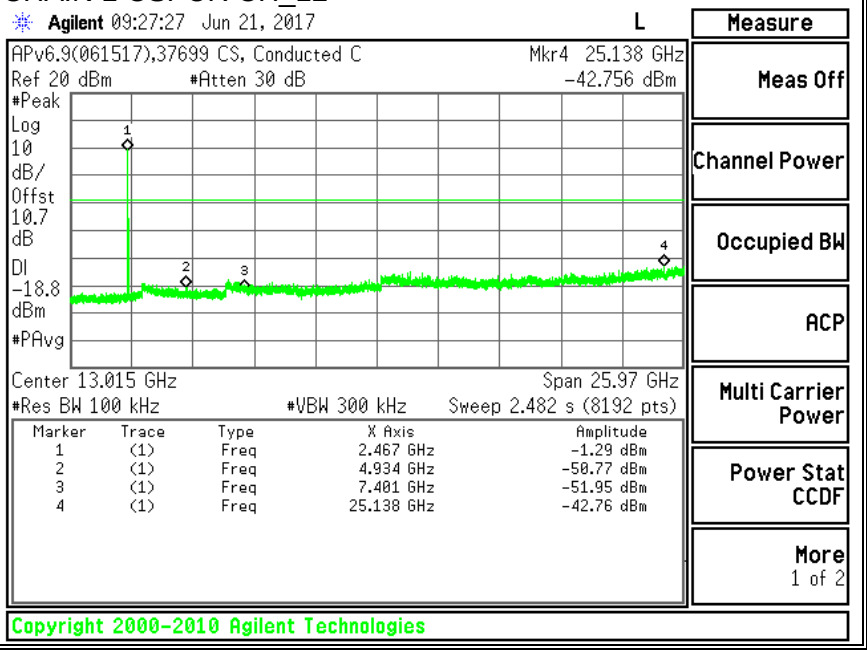
CHAIN 1 CSPUR CH_11



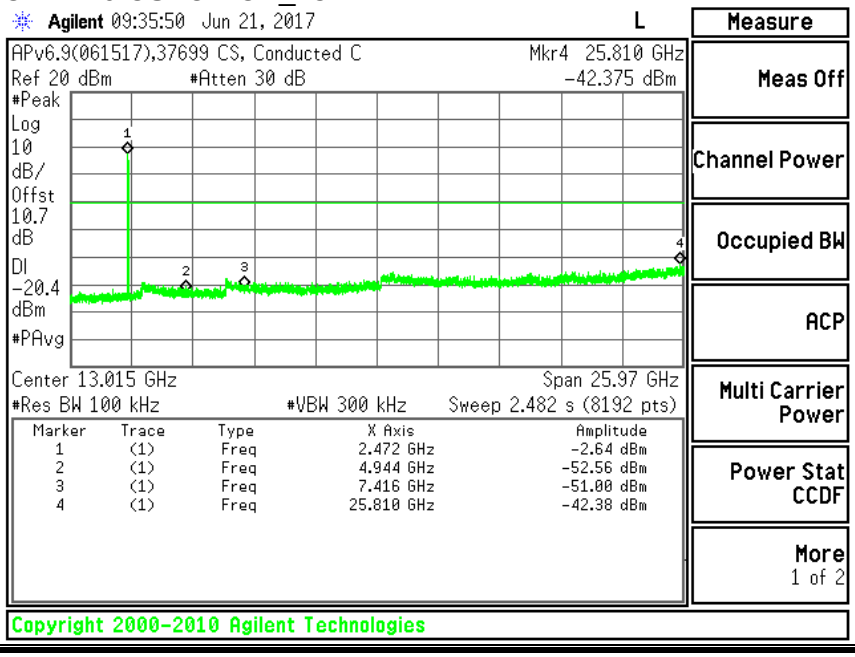
CHAIN 0 CSPUR CH_12



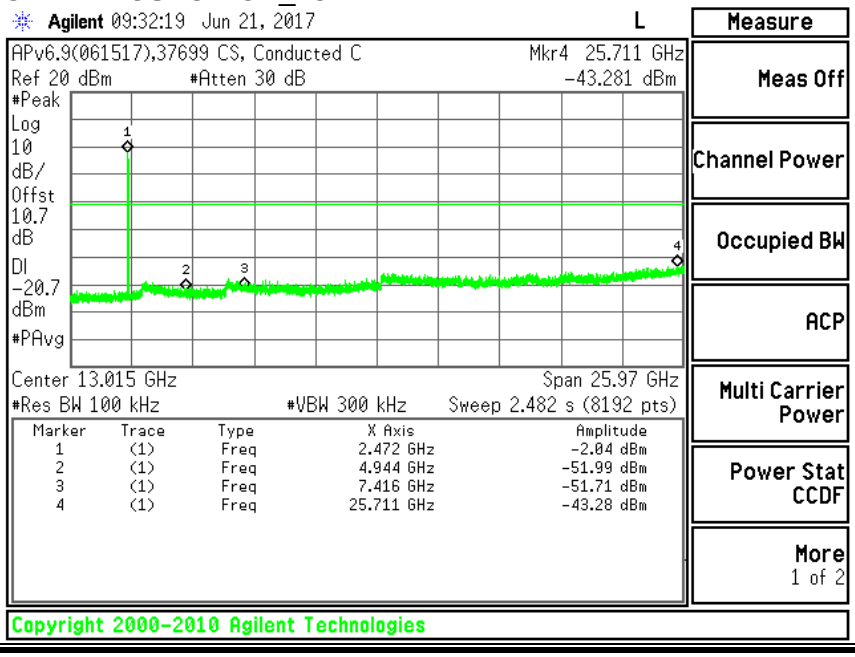
CHAIN 1 CSPUR CH_12



CHAIN 0 CSPUR CH_13



CHAIN 1 CSPUR CH_13



9.2. 11g 2TX MIMO MODE IN THE 2.4GHz BAND

9.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 (5.2) (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low_1	2412	16.40	16.40	0.5
Middle_6	2437	16.40	16.40	0.5
High_11	2462	16.40	16.40	0.5
High_12	2467	16.48	16.40	0.5
High_13	2472	16.40	16.40	0.5

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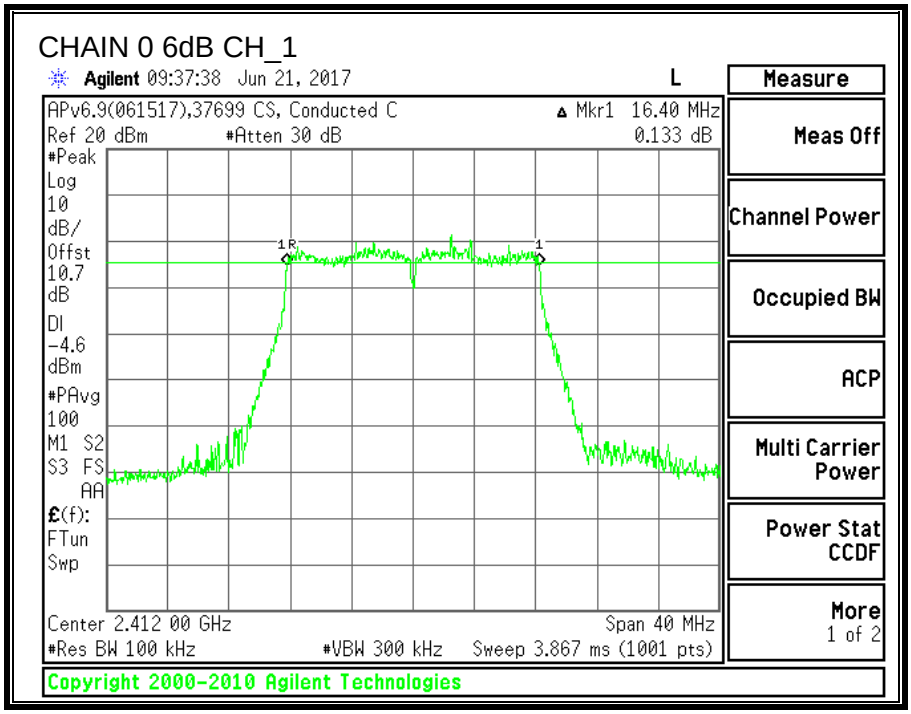
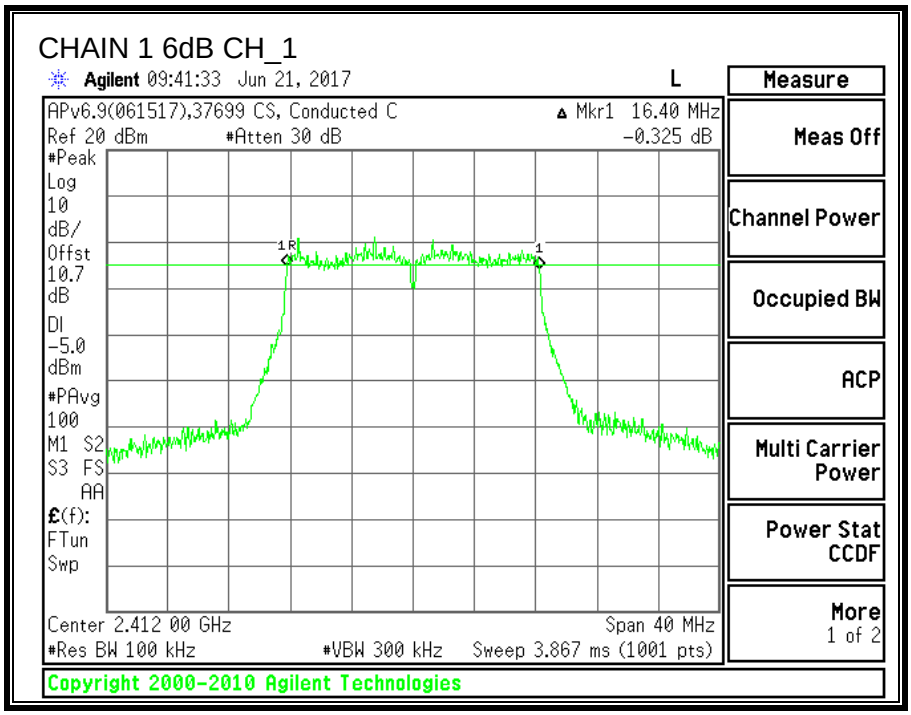
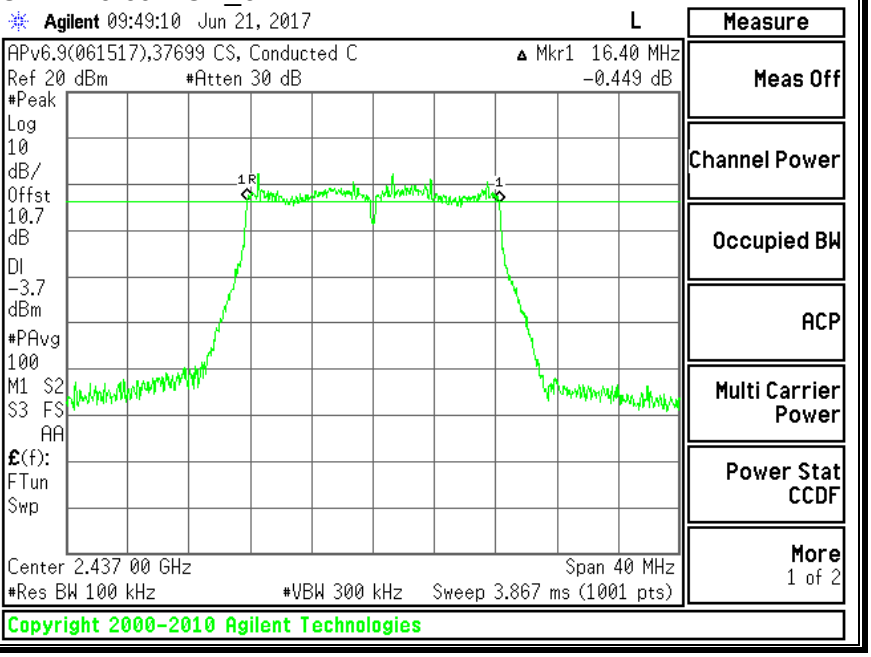
CHAIN 0 6dB CH_1



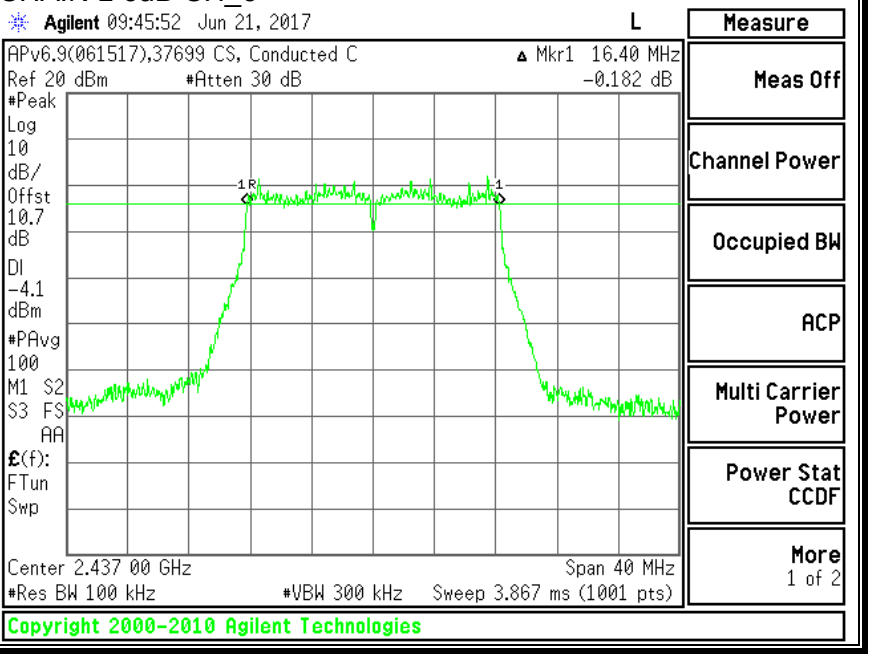
CHAIN 1 6dB CH_1



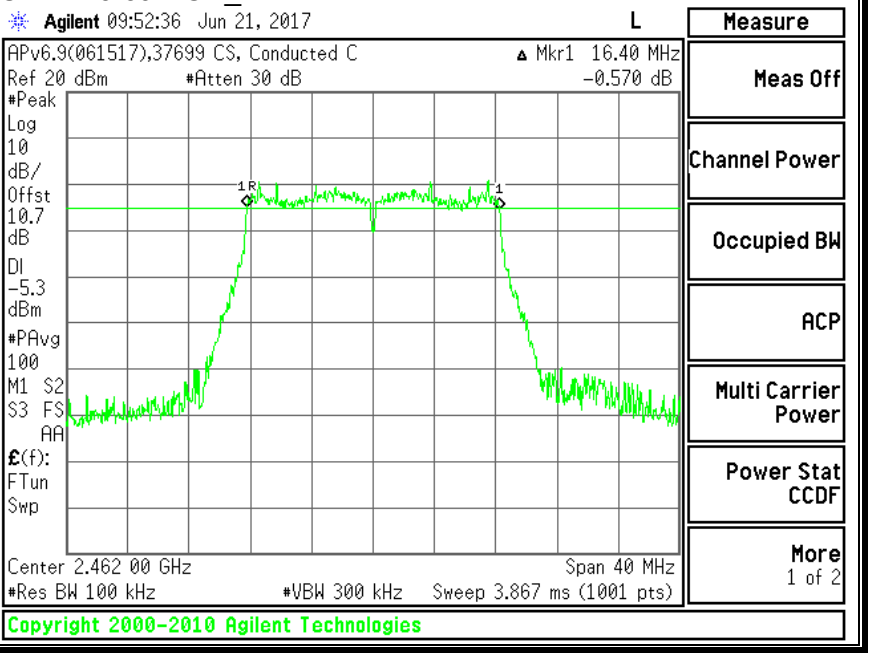
CHAIN 0 6dB CH_6



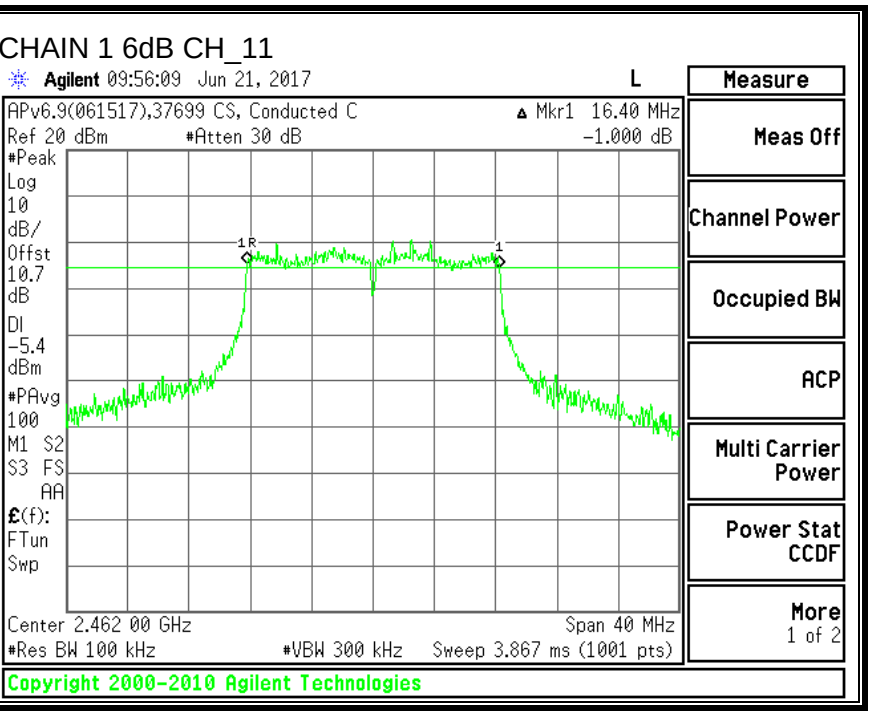
CHAIN 1 6dB CH_6



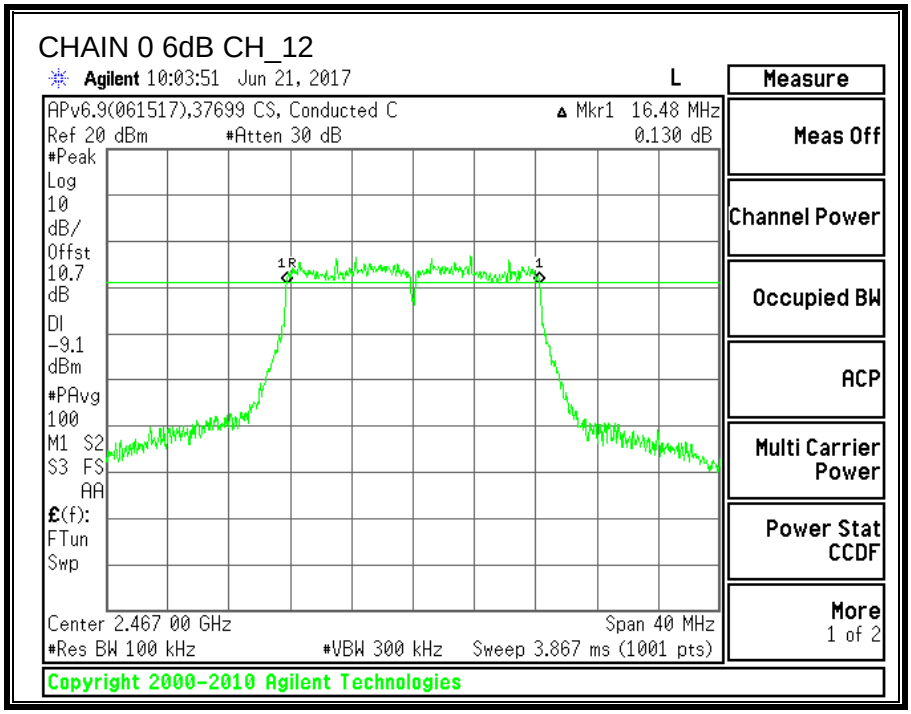
CHAIN 0 6dB CH_11



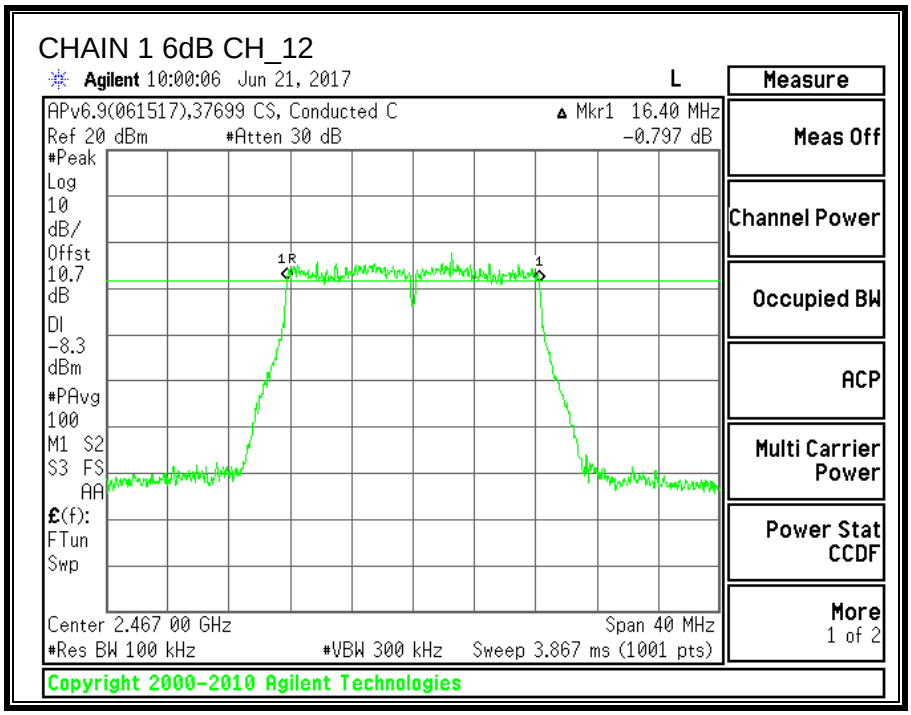
CHAIN 1 6dB CH_11



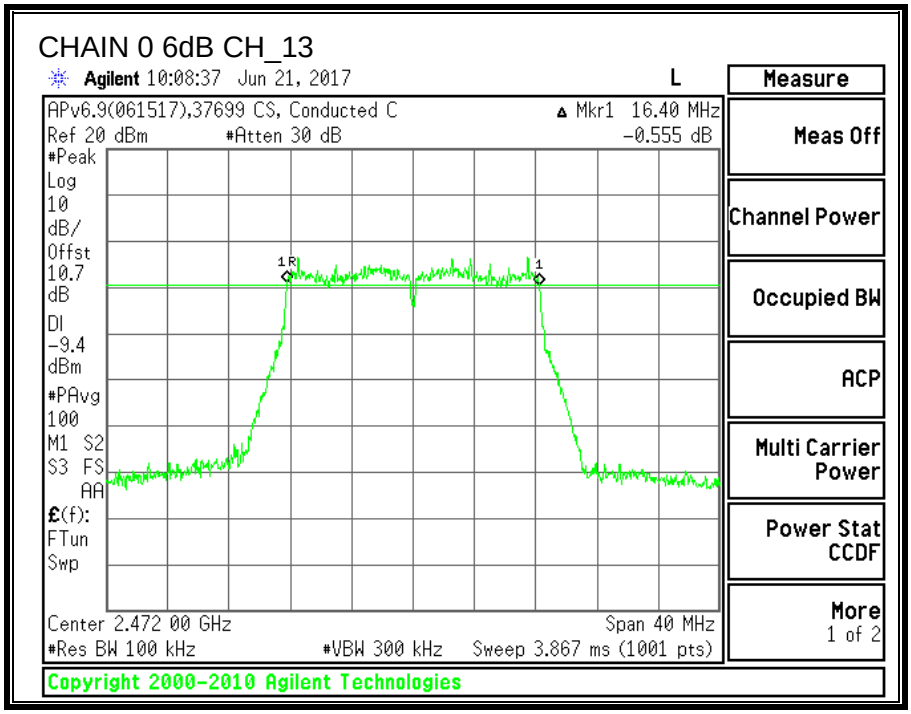
CHAIN 0 6dB CH_12



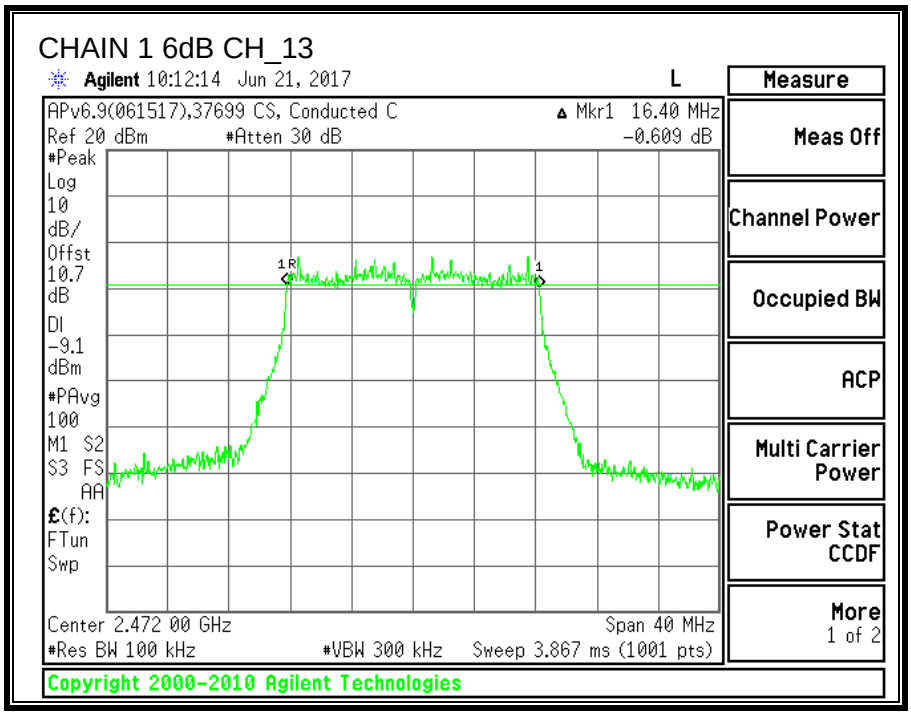
CHAIN 1 6dB CH_12



CHAIN 0 6dB CH_13



CHAIN 1 6dB CH_13



9.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low_1	2412	16.6332	16.6034
Middle_6	2437	16.6892	16.6039
High_11	2462	16.6159	16.7016
High_12	2467	16.6902	16.6202
High_13	2472	16.6540	16.6345

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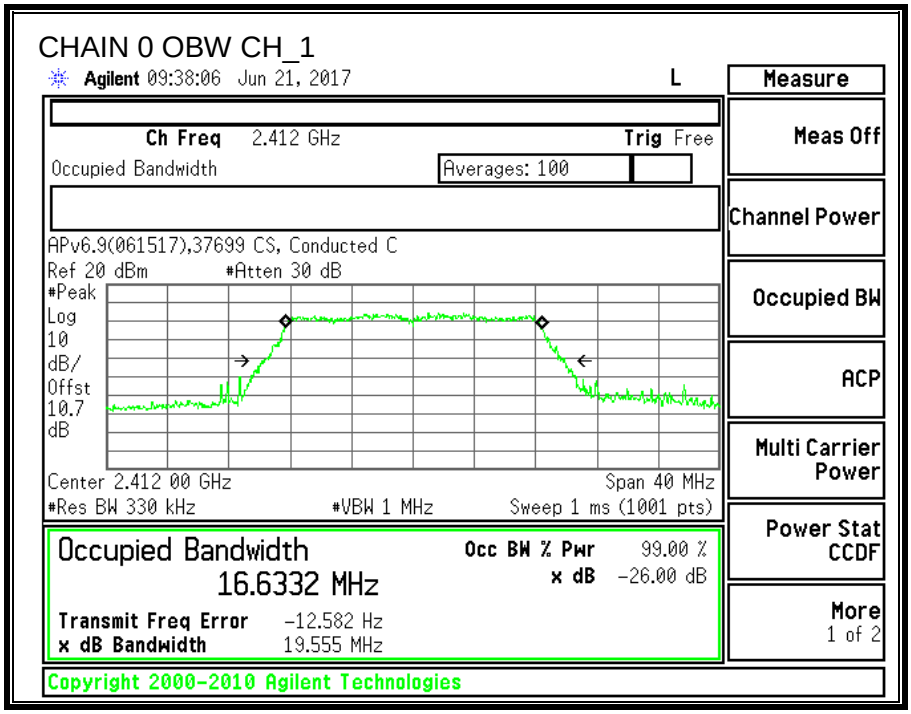
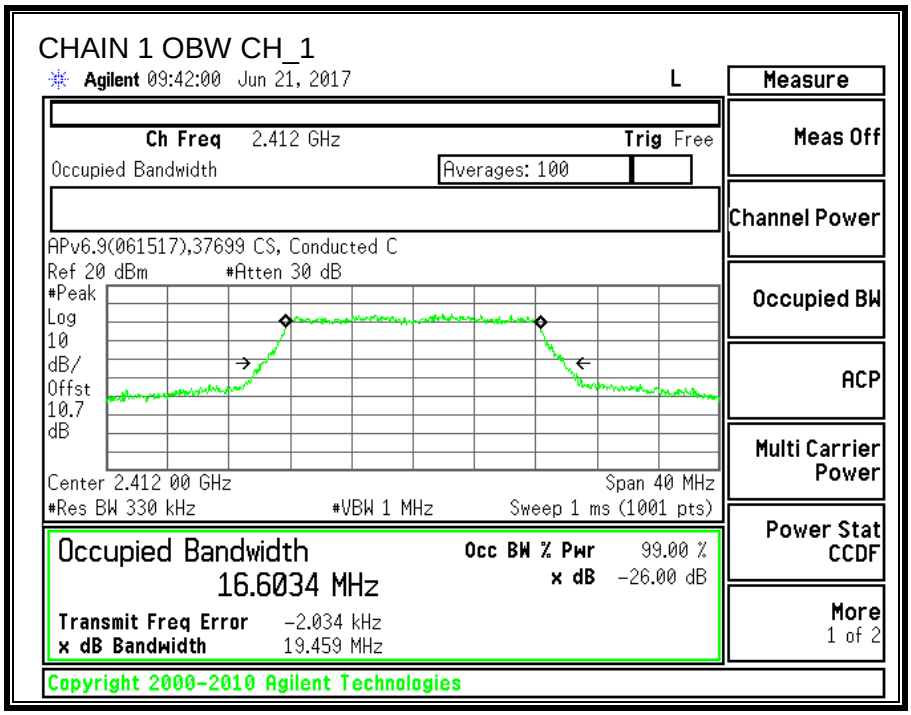
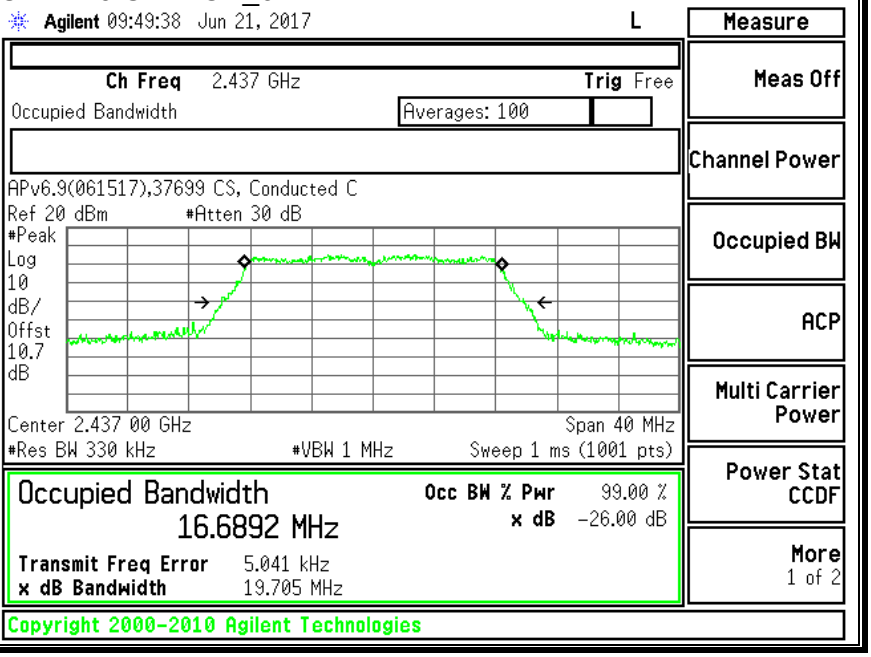
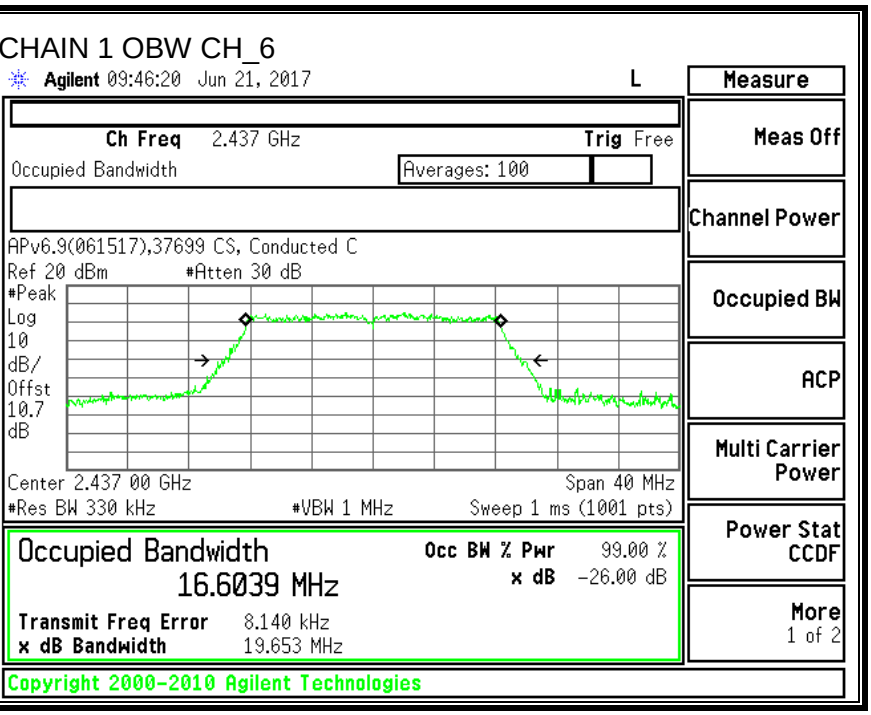




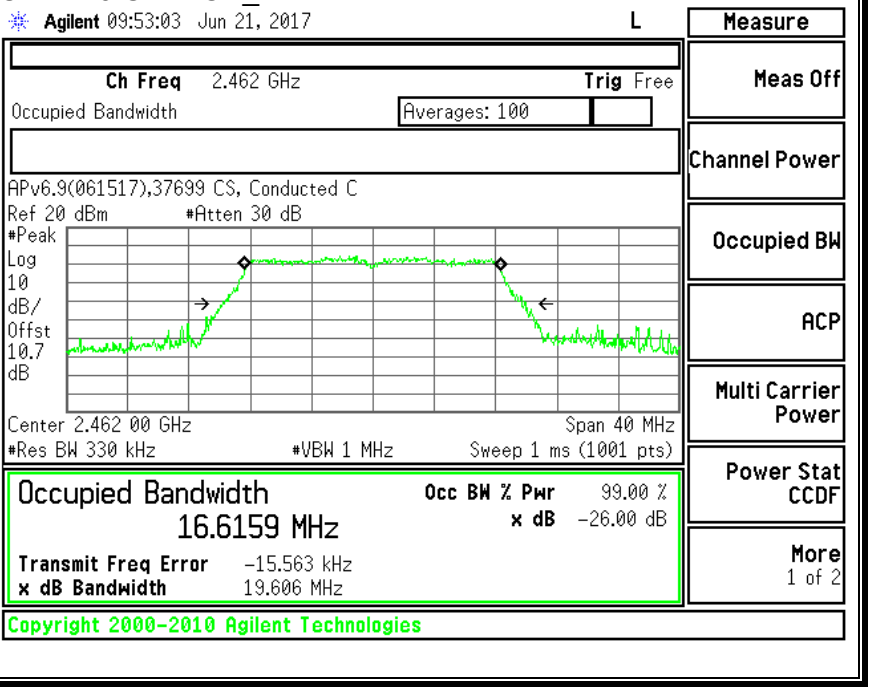
CHAIN 0 OBW CH_6



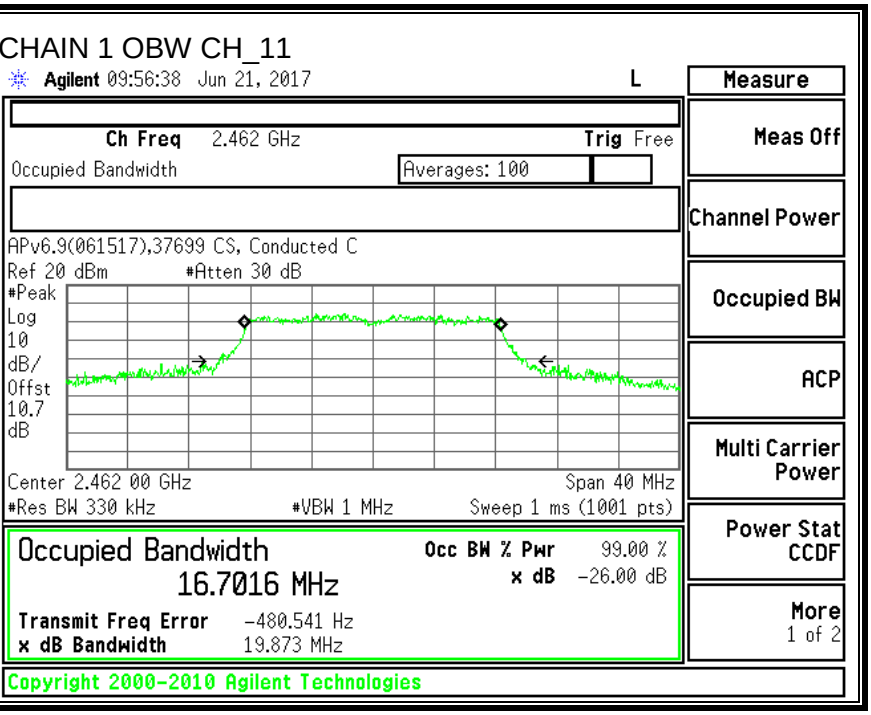
CHAIN 1 OBW CH_6

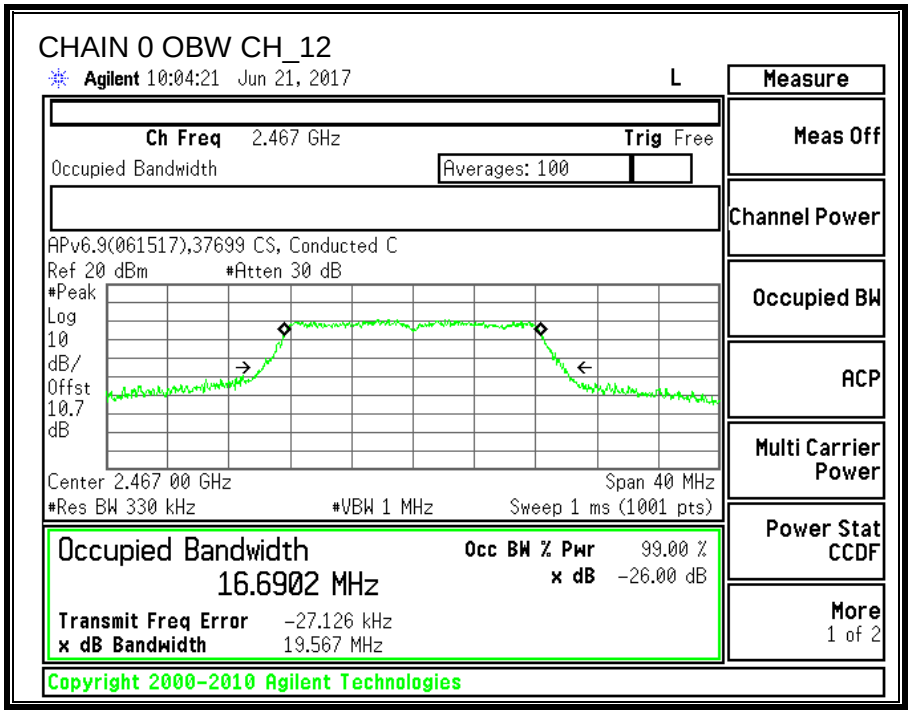


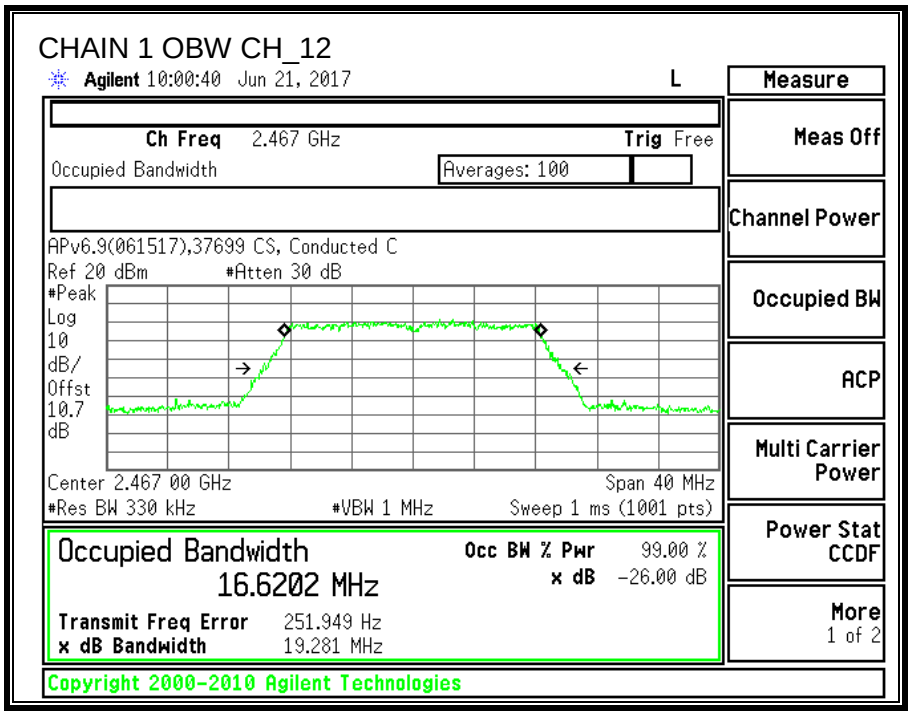
CHAIN 0 OBW CH_11



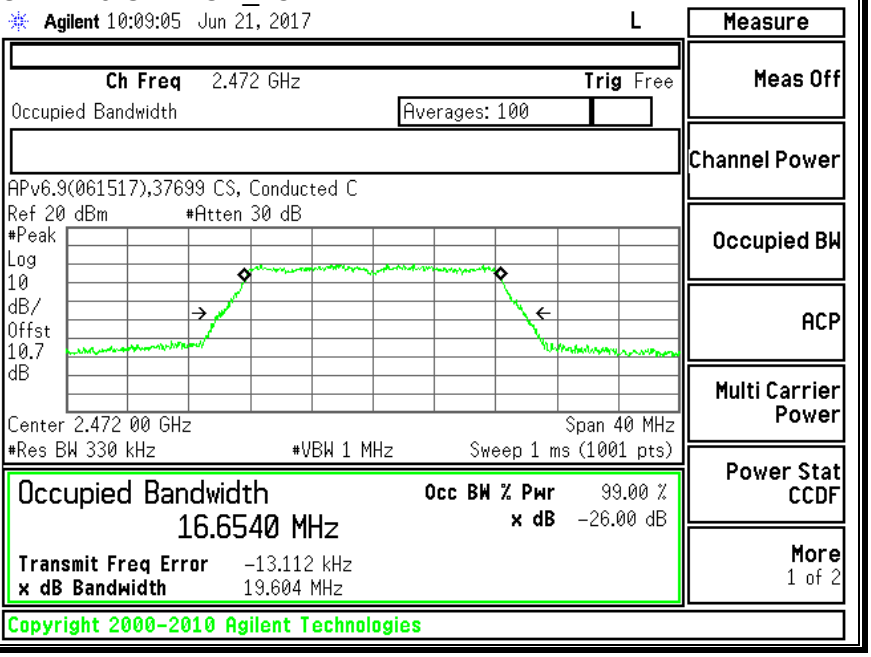
CHAIN 1 OBW CH_11



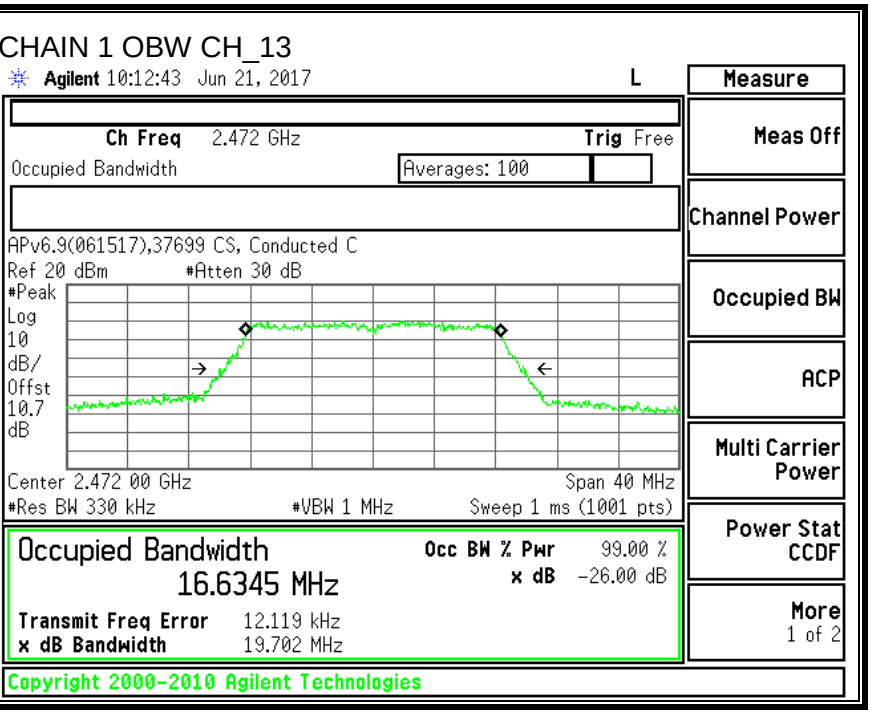




CHAIN 0 OBW CH_13



CHAIN 1 OBW CH_13



9.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Tested By:	37699 CS
Date:	06/26/17

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)
Low_1	2412	12.28	11.78	15.05
Middle_6	2437	13.39	12.74	16.09
High_11	2462	8.72	8.61	11.68
High_12	2467	8.72	8.61	11.68
High_13	2472	7.84	7.81	10.84

9.2.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

For systems using digital modulation in the 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, 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.

DIRECTIONAL ANTENNA GAIN

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
3.40	3.10	3.25	6.26

UL VERIFICATION SERVICES INC.
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RESULTS

Tested By:	37699 CS
Date:	06/26/17

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low_1	2412	3.25	30.00	30	36	30.00
Middle_6	2437	3.25	30.00	30	36	30.00
High_11	2462	3.25	30.00	30	36	30.00
High_12	2467	3.25	30.00	30	36	30.00
High_13	2472	3.25	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low_1	2412	19.23	18.93	22.09	30.00	-7.91
Middle_6	2437	20.61	20.68	23.66	30.00	-6.34
High_11	2462	17.87	18.89	21.42	30.00	-8.58
High_12	2467	15.55	14.31	17.98	30.00	-12.02
High_13	2472	13.96	14.52	17.26	30.00	-12.74

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9.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (b)

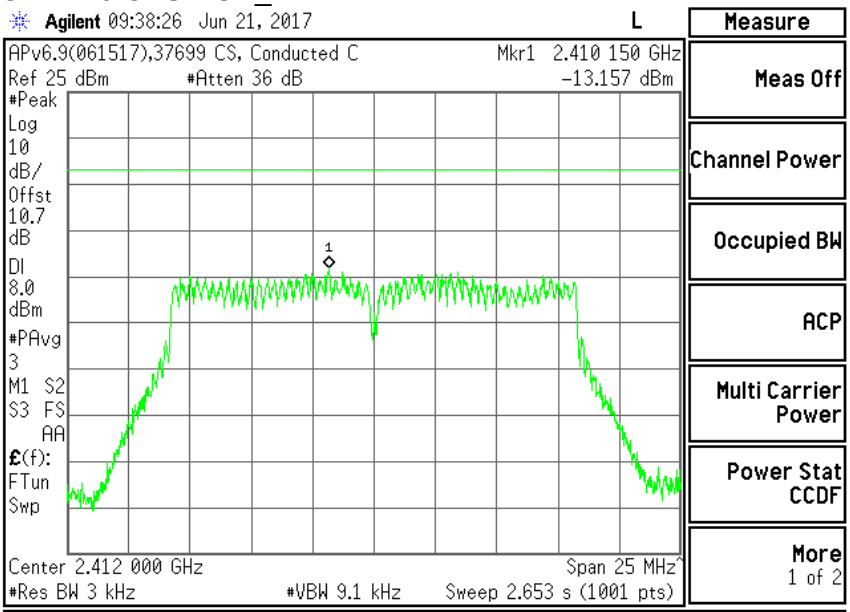
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

RESULTS

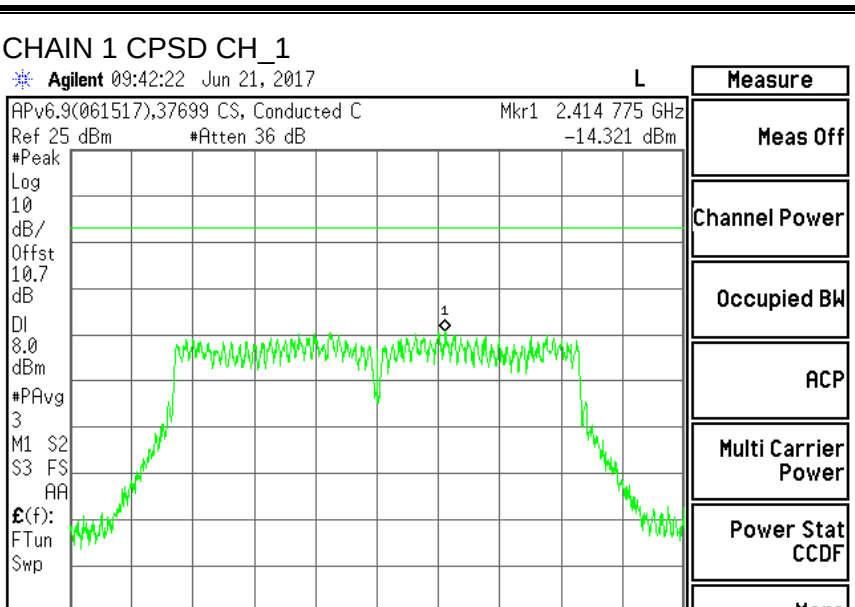
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low_1	2412	-13.16	-14.32	-10.69	8.0	-18.7
Middle_6	2437	-13.33	-13.00	-10.15	8.0	-18.1
High_11	2462	-13.98	-14.19	-11.07	8.0	-19.1
High_12	2467	-17.10	-17.31	-14.19	8.0	-22.2
High_13	2472	-18.35	-18.61	-15.47	8.0	-23.5

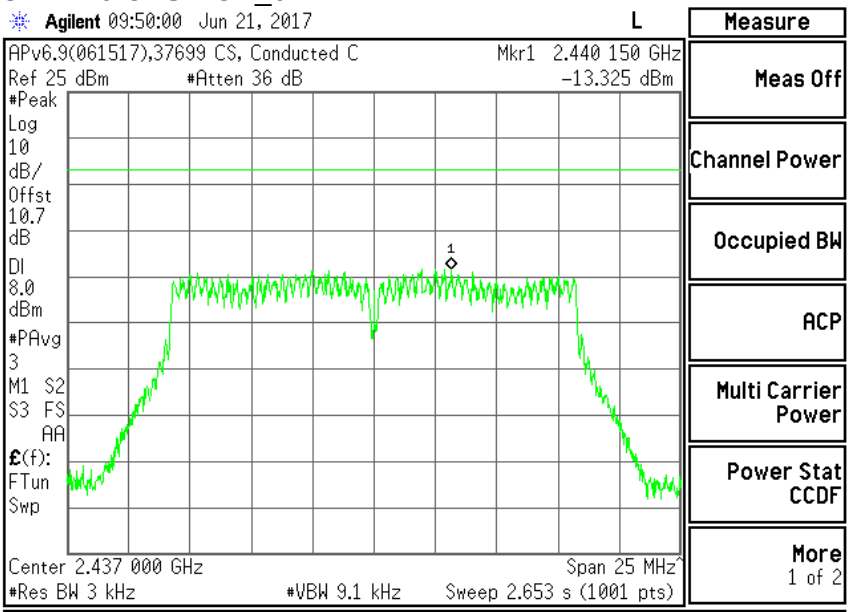
CHAIN 0 CPSD CH_1



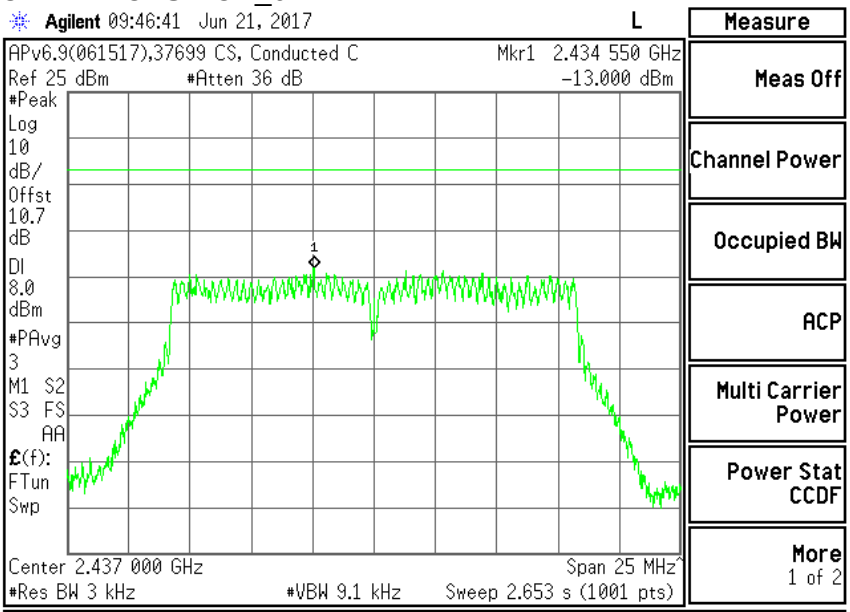
CHAIN 1 CPSD CH_1



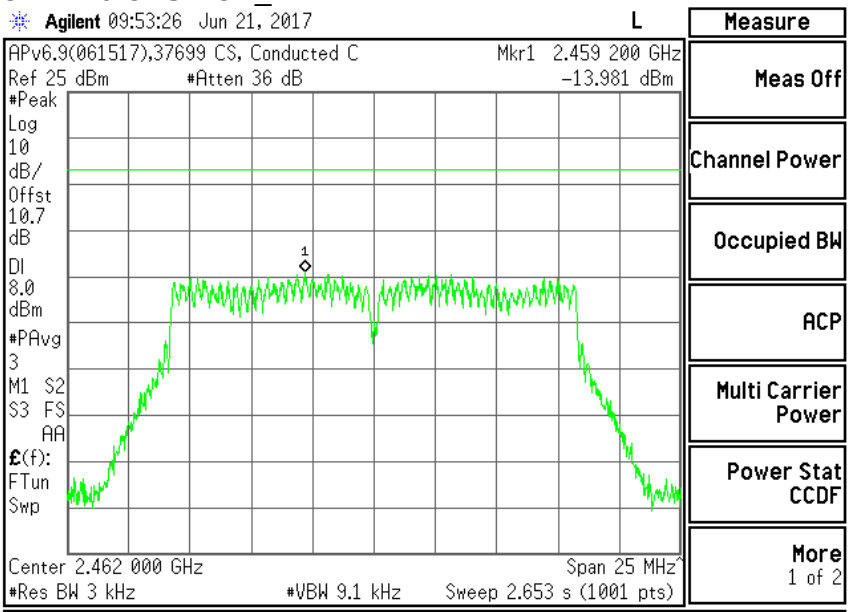
CHAIN 0 CPSD CH_6



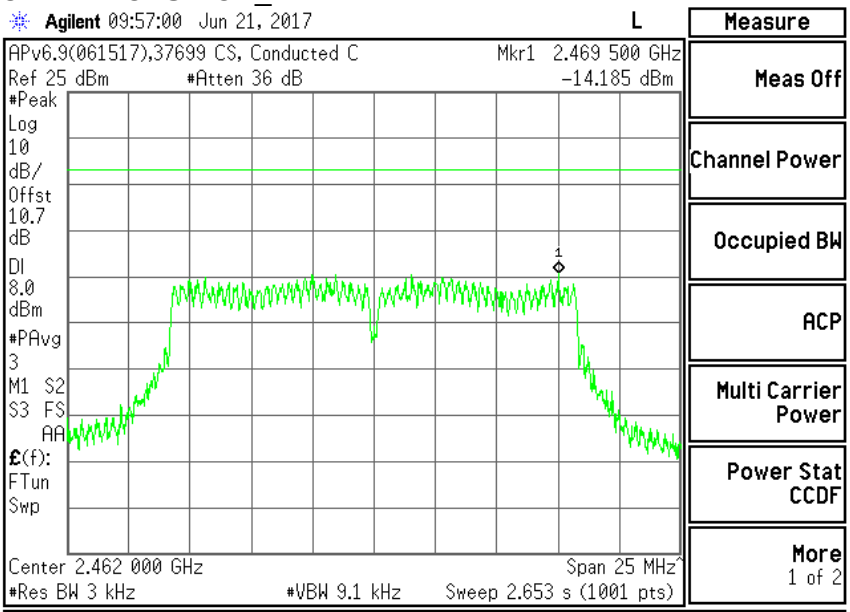
CHAIN 1 CPSD CH_6



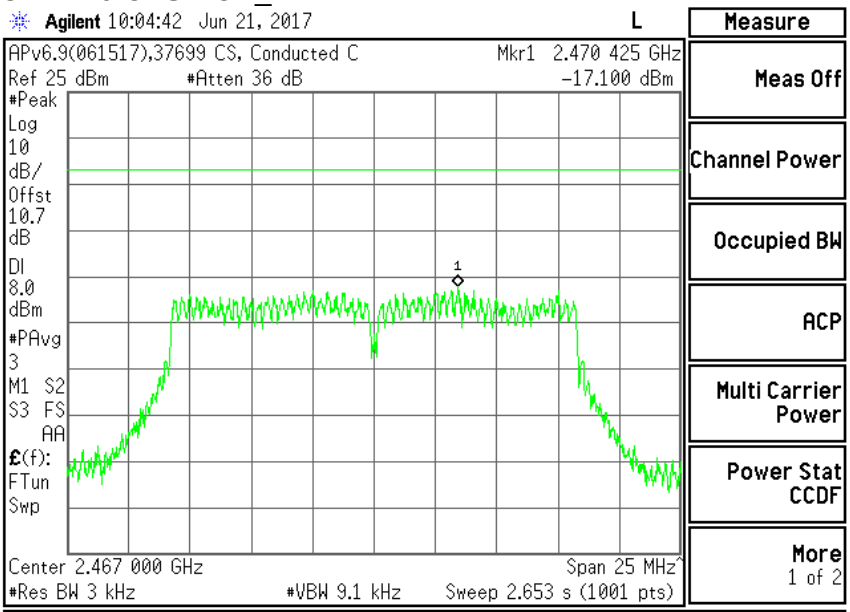
CHAIN 0 CPSD CH_11



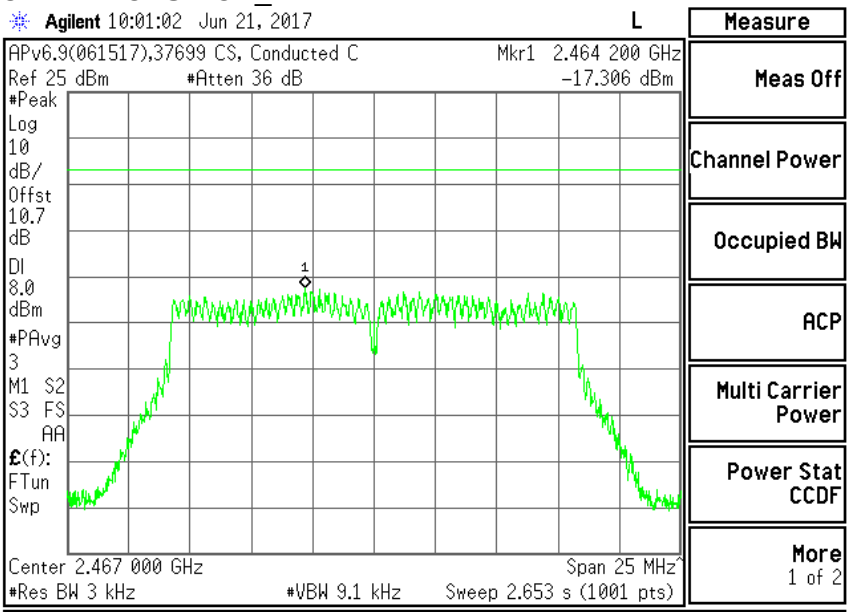
CHAIN 1 CPSD CH_11



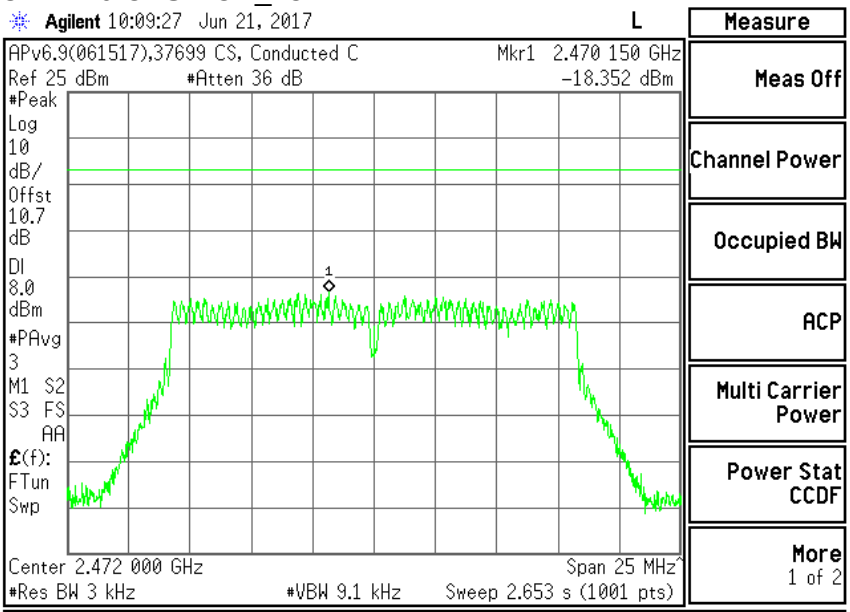
CHAIN 0 CPSD CH_12



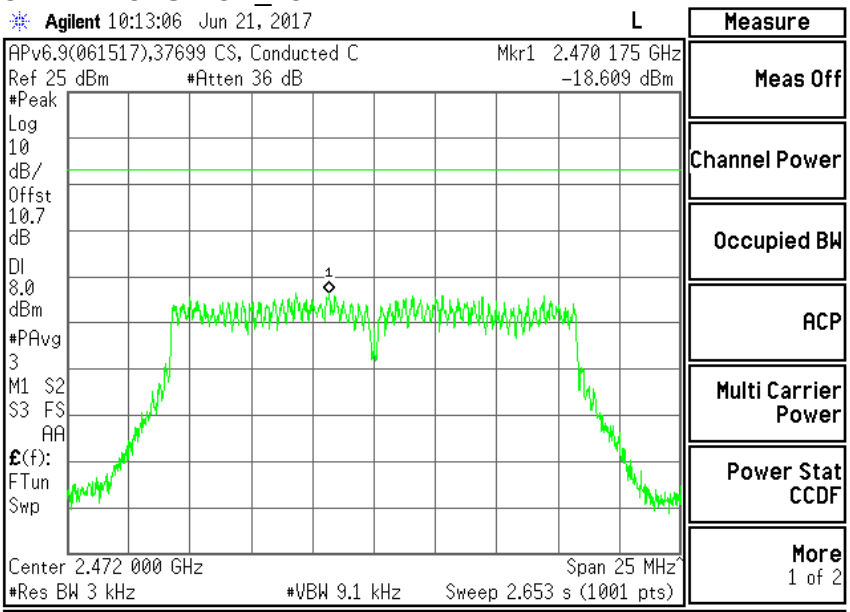
CHAIN 1 CPSD CH_12



CHAIN 0 CPSD CH_13



CHAIN 1 CPSD CH_13



9.2.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

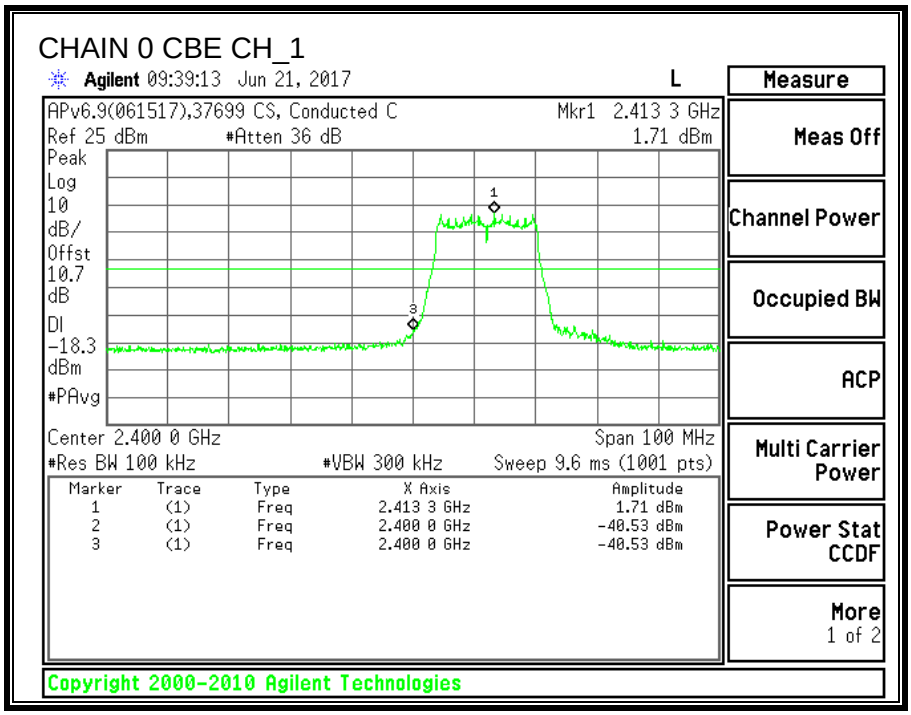
FCC §15.247 (d)

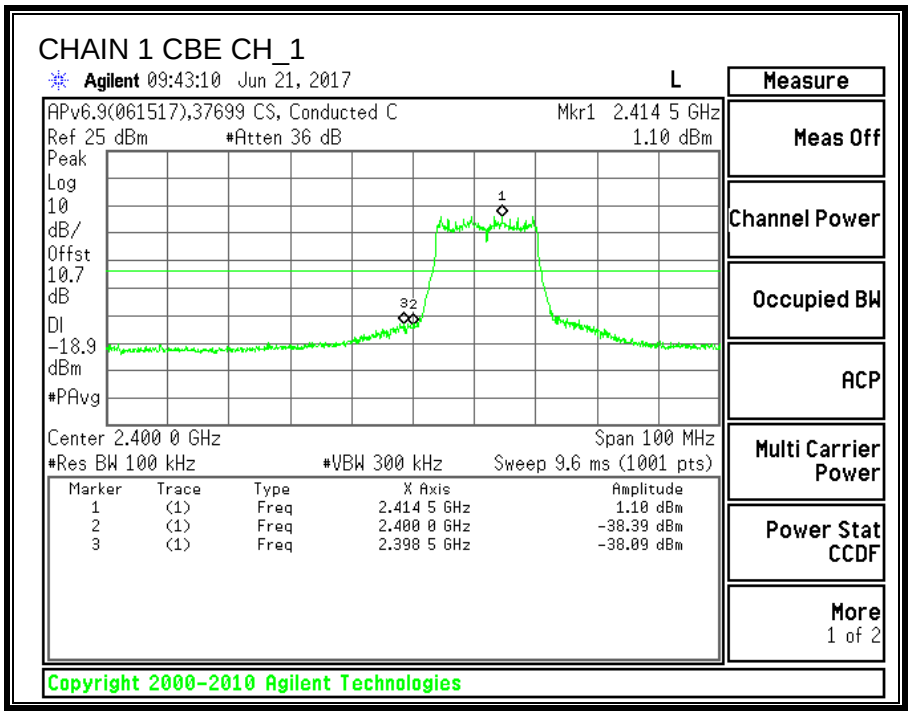
IC RSS-247 5.5

Output power was measured based on the use of Pk measurement, therefore the required attenuation is 20 dB.

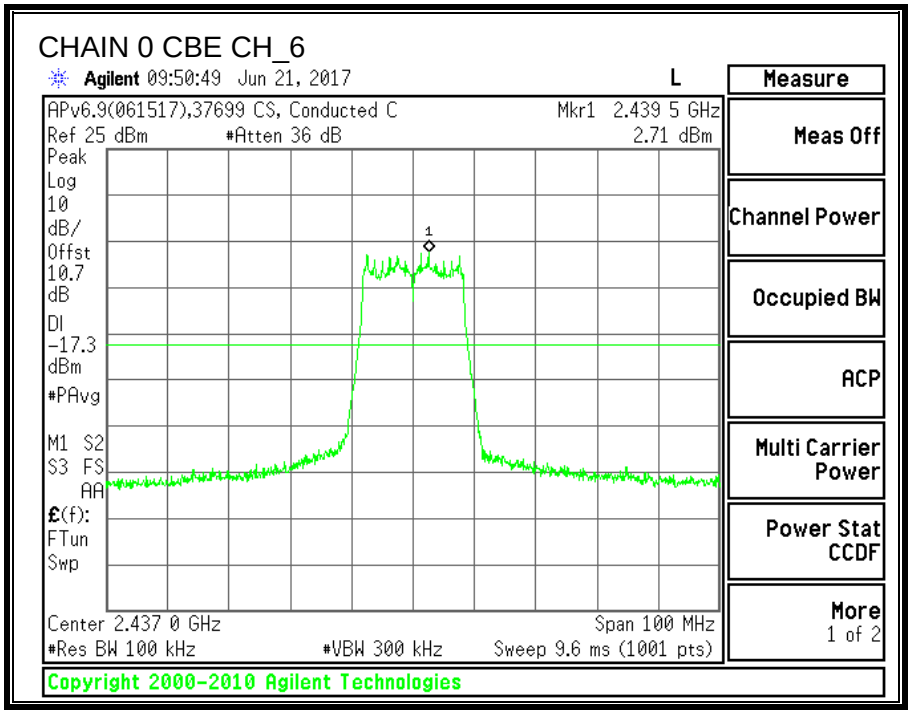
RESULTS

BANDEDGE

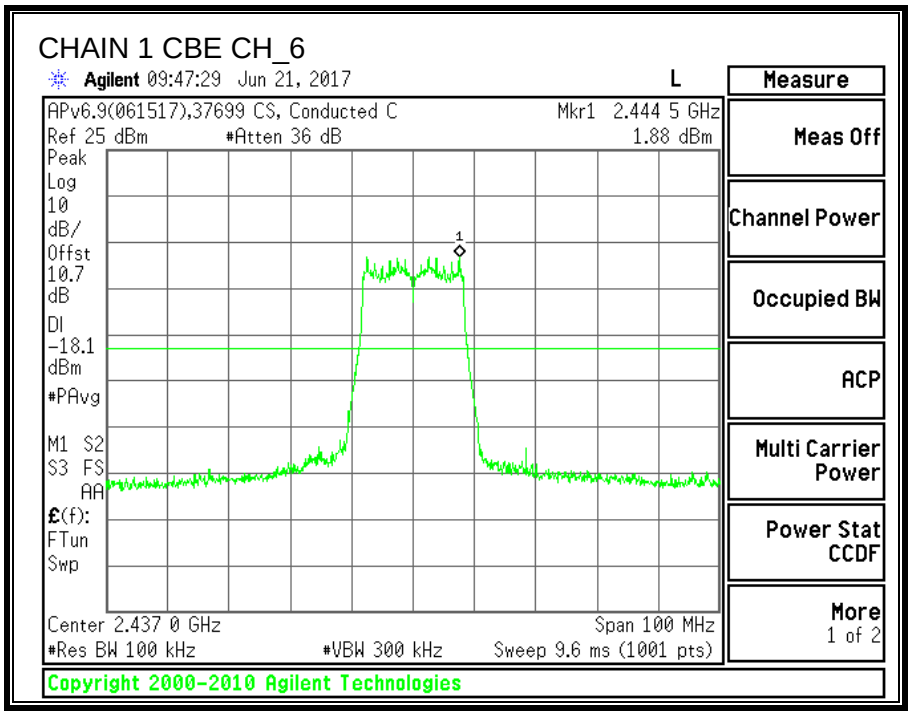




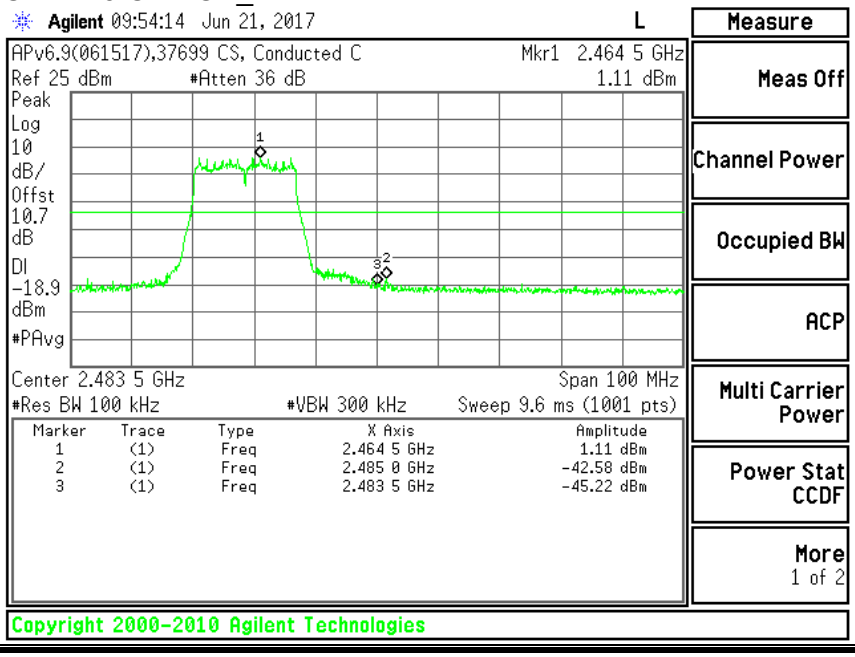
CHAIN 0 CBE CH_6



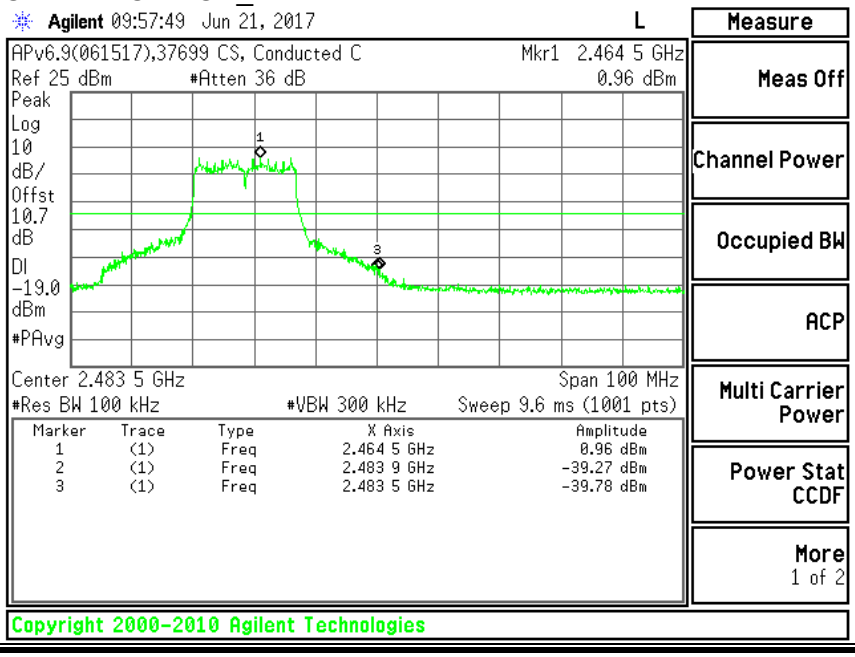
CHAIN 1 CBE CH_6



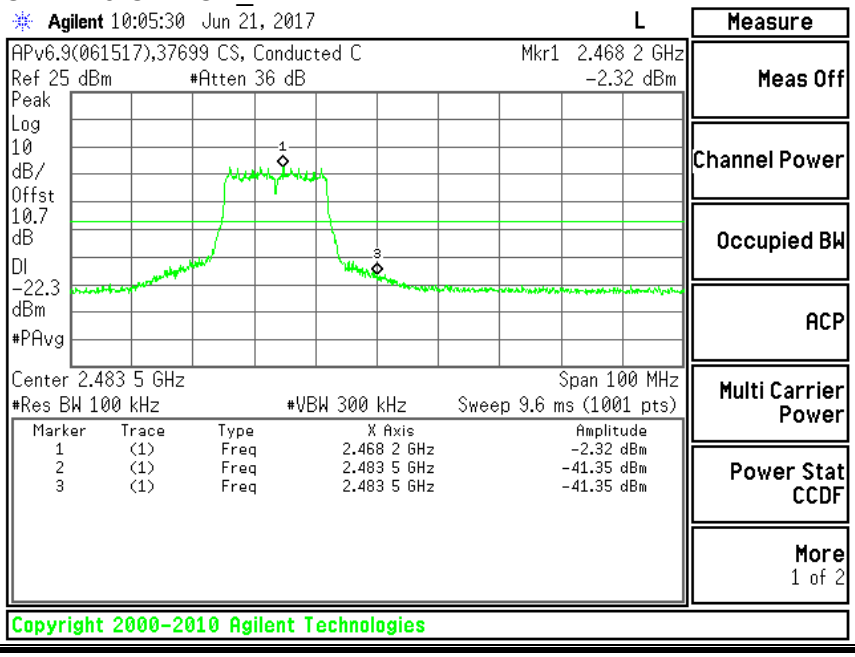
CHAIN 0 CBE CH_11



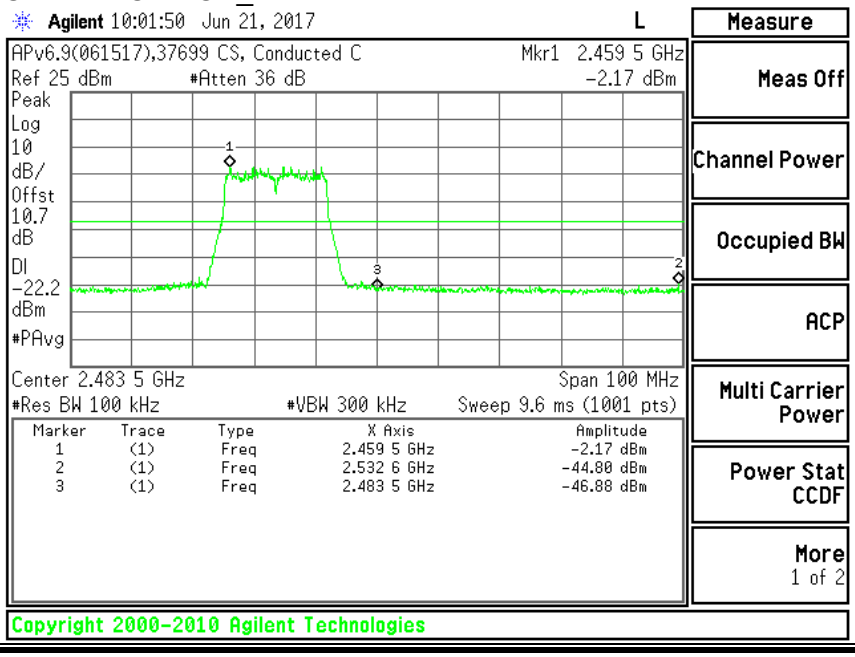
CHAIN 1 CBE CH_11



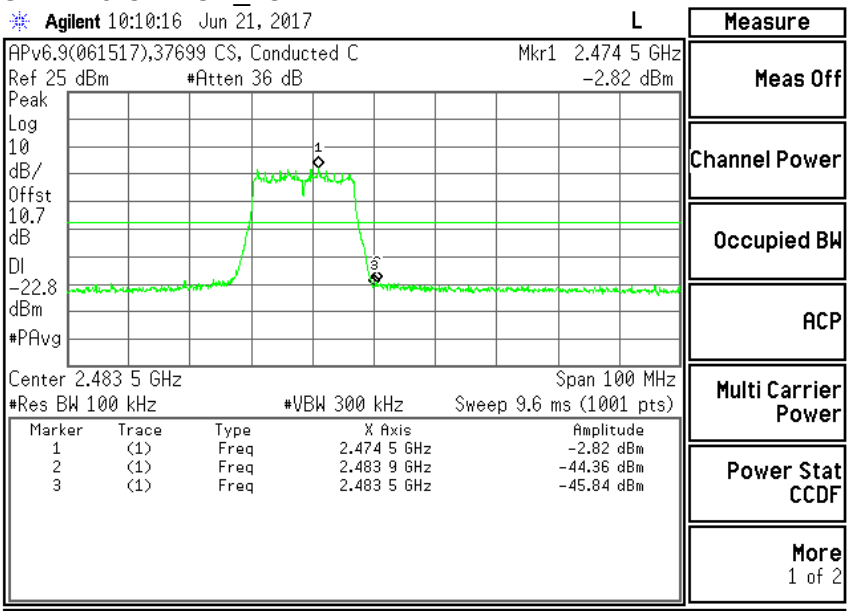
CHAIN 0 CBE CH_12



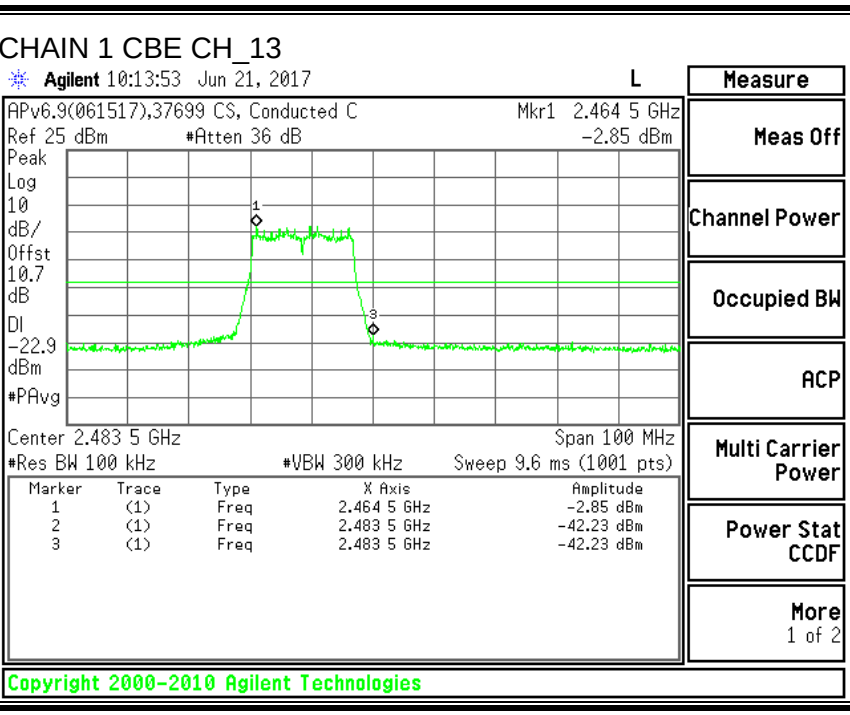
CHAIN 1 CBE CH_12



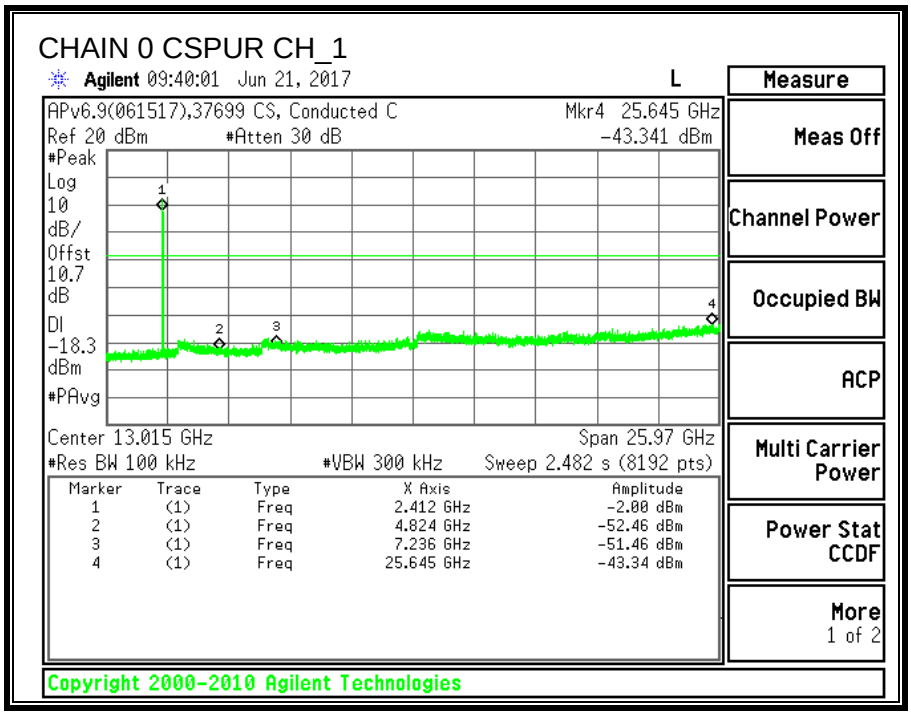
CHAIN 0 CBE CH_13

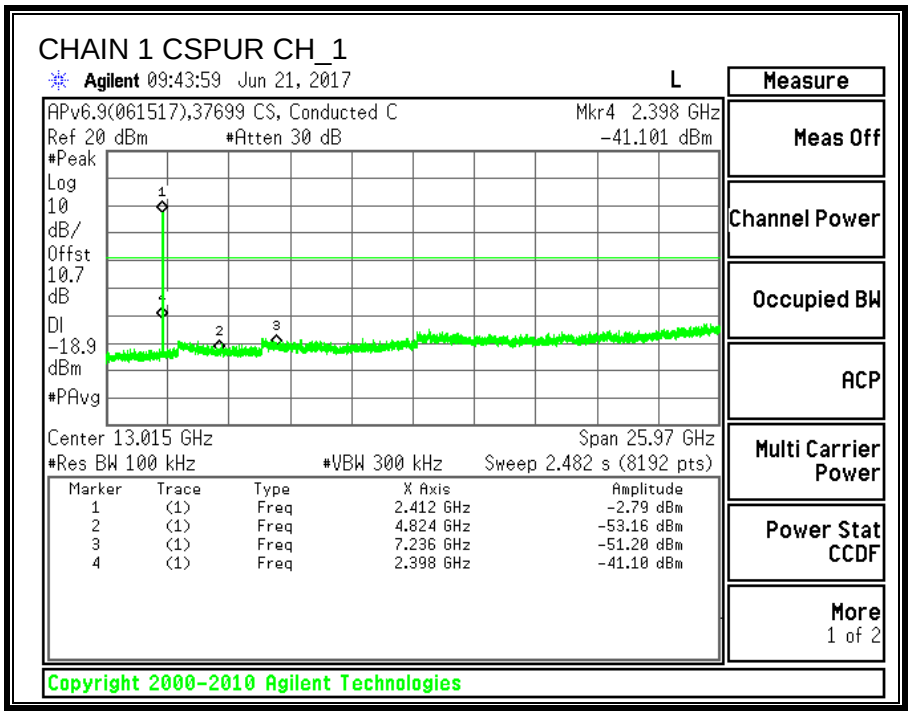


CHAIN 1 CBE CH_13

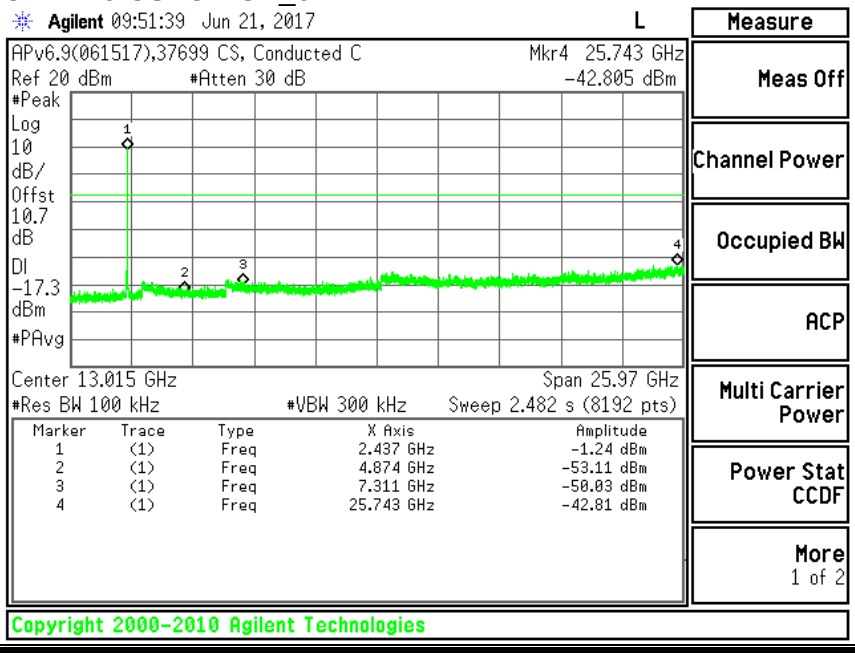


SPURIOUS EMISSIONS

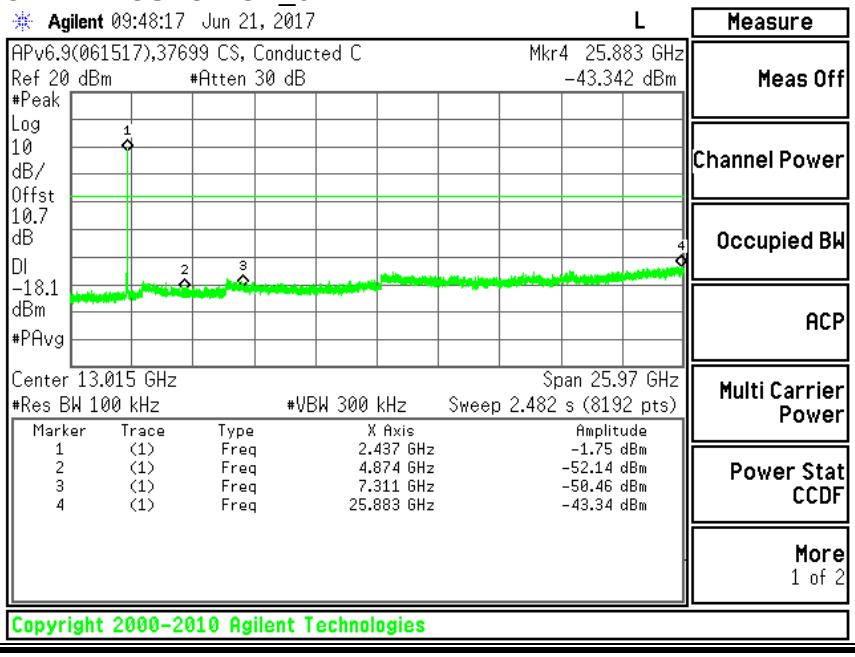




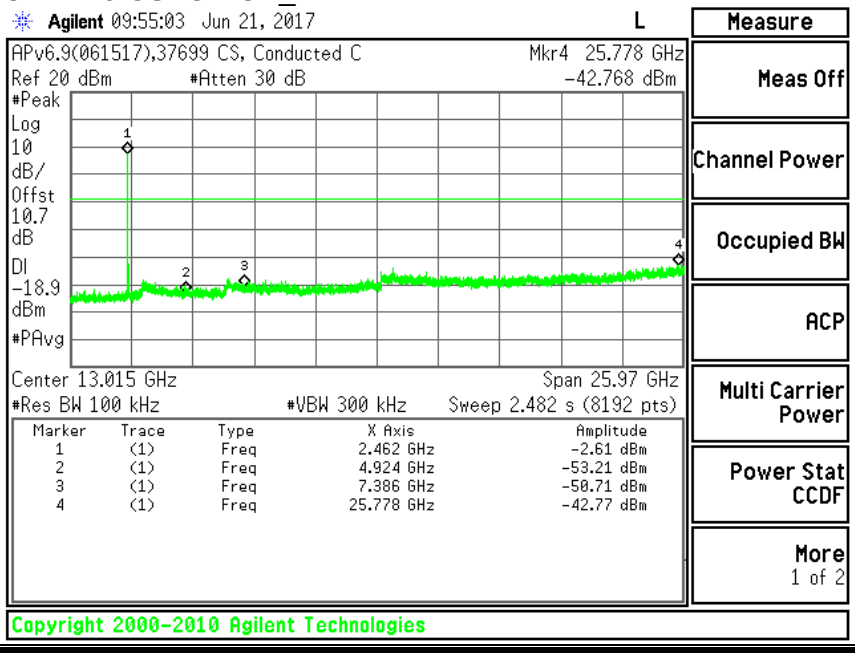
CHAIN 0 CSPUR CH_6



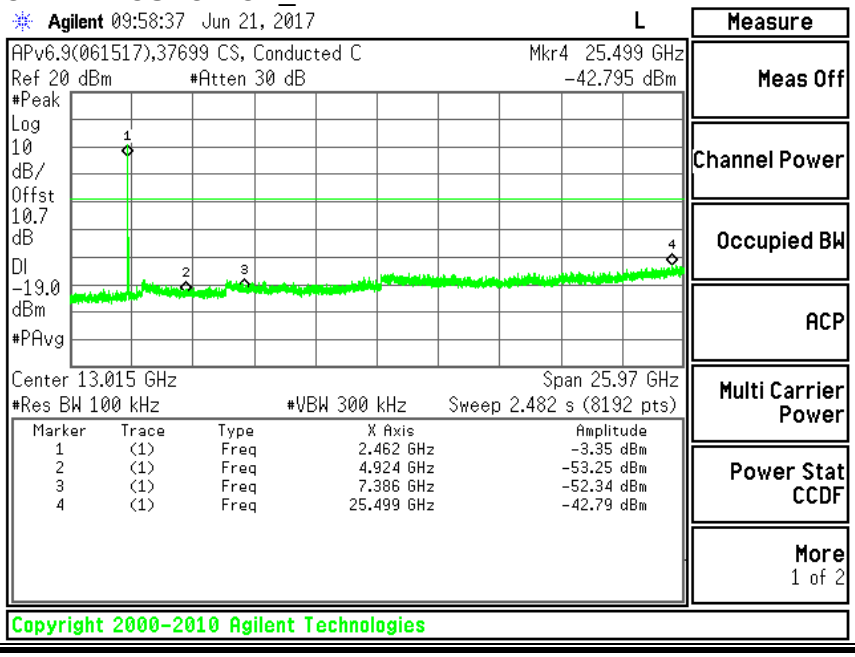
CHAIN 1 CSPUR CH_6



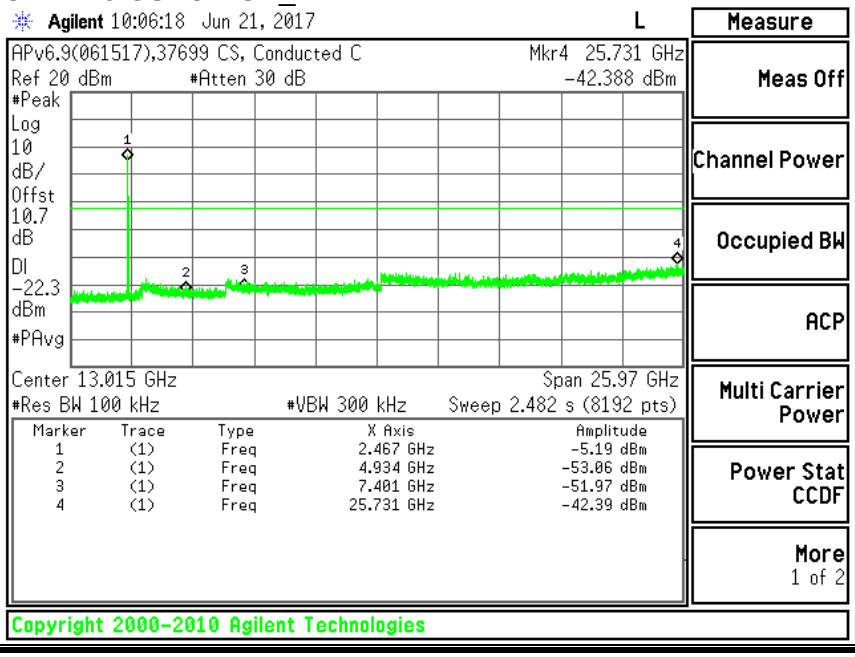
CHAIN 0 CSPUR CH_11



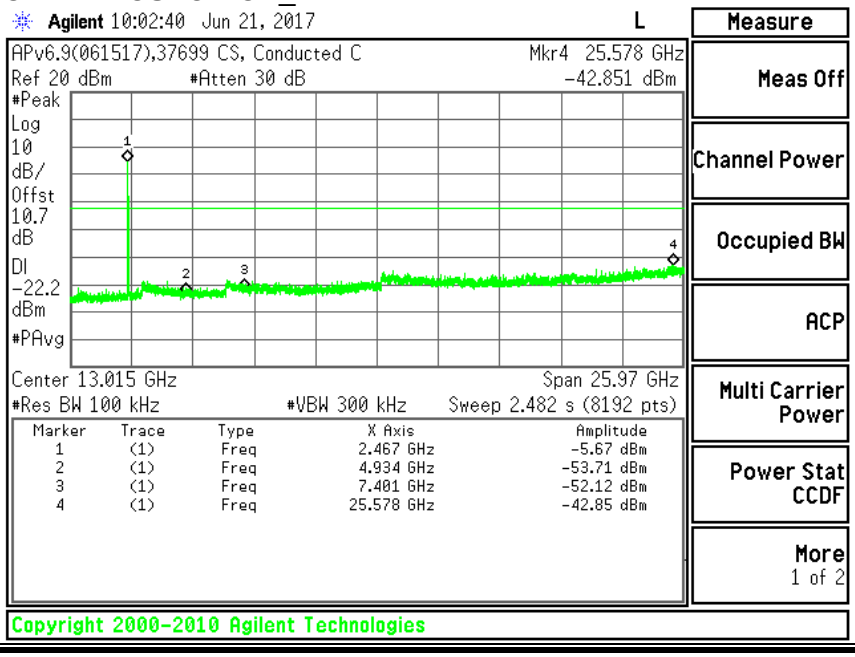
CHAIN 1 CSPUR CH_11



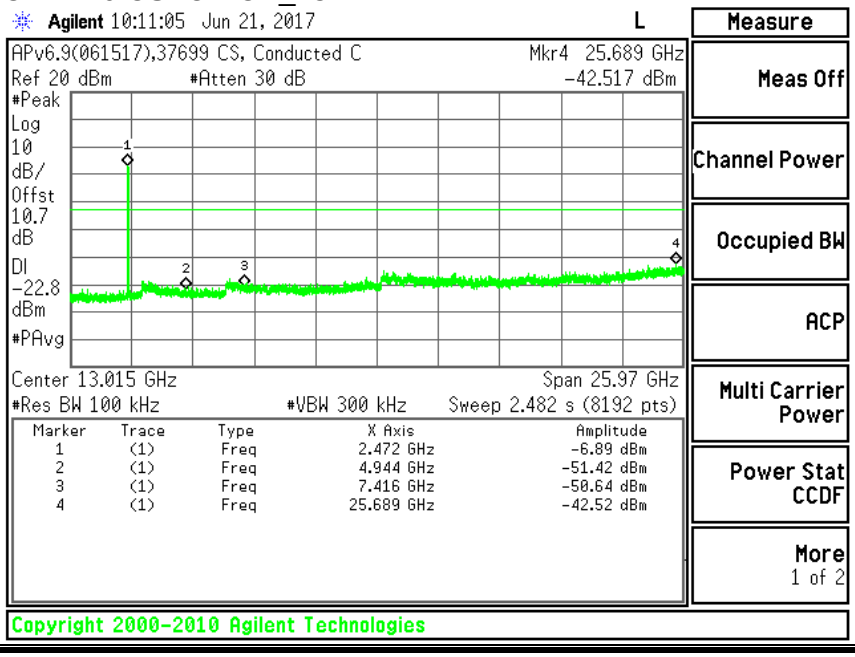
CHAIN 0 CSPUR CH_12



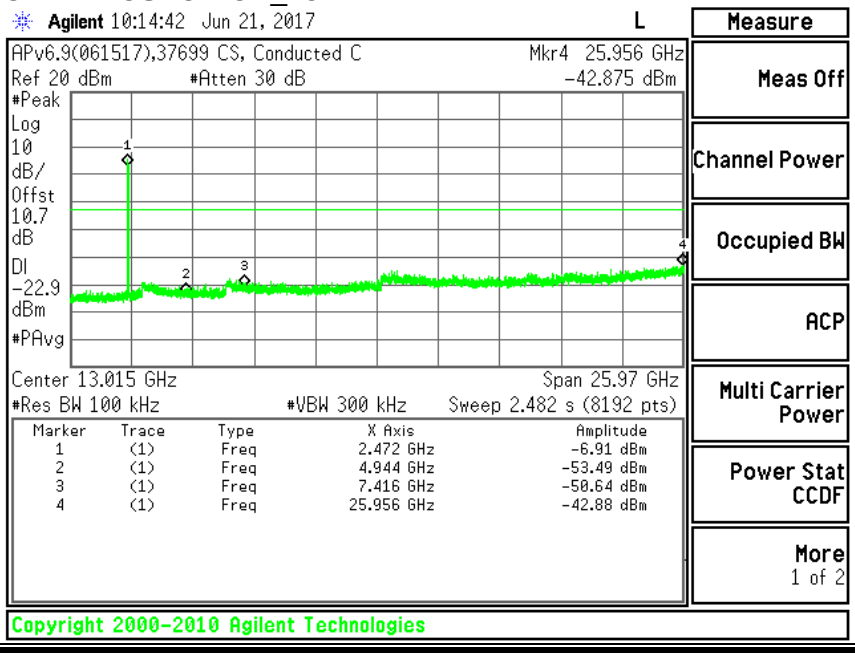
CHAIN 1 CSPUR CH_12



CHAIN 0 CSPUR CH_13



CHAIN 1CSPUR CH_13



9.3. 11n HT20 2TX MIMO MODE IN THE 2.4GHz BAND

9.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 (5.2) (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low_1	2412	17.60	17.64	0.5
Middle_6	2437	17.64	17.68	0.5
High_11	2462	17.60	17.60	0.5
High_12	2467	17.68	17.56	0.5
High_13	2472	17.72	17.64	0.5

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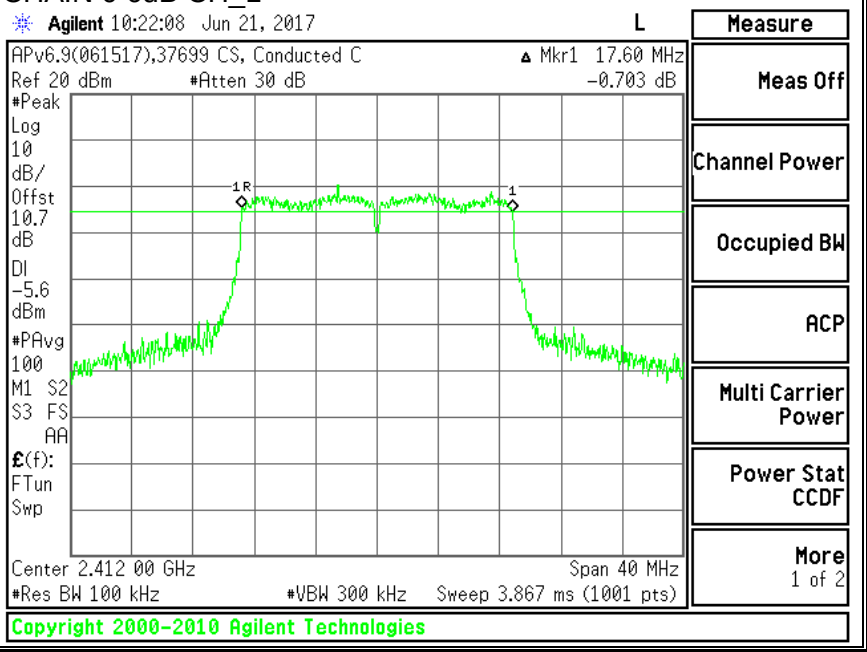
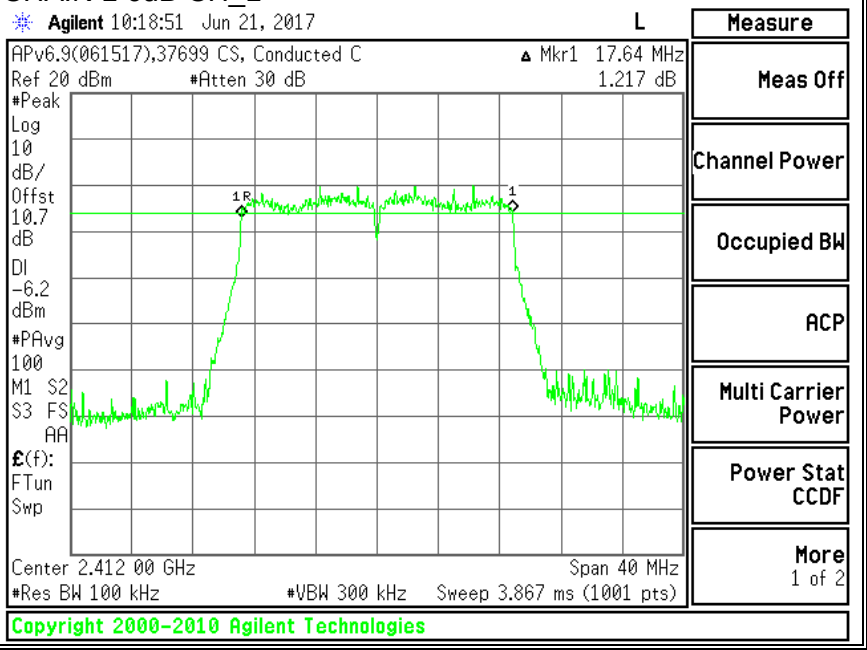
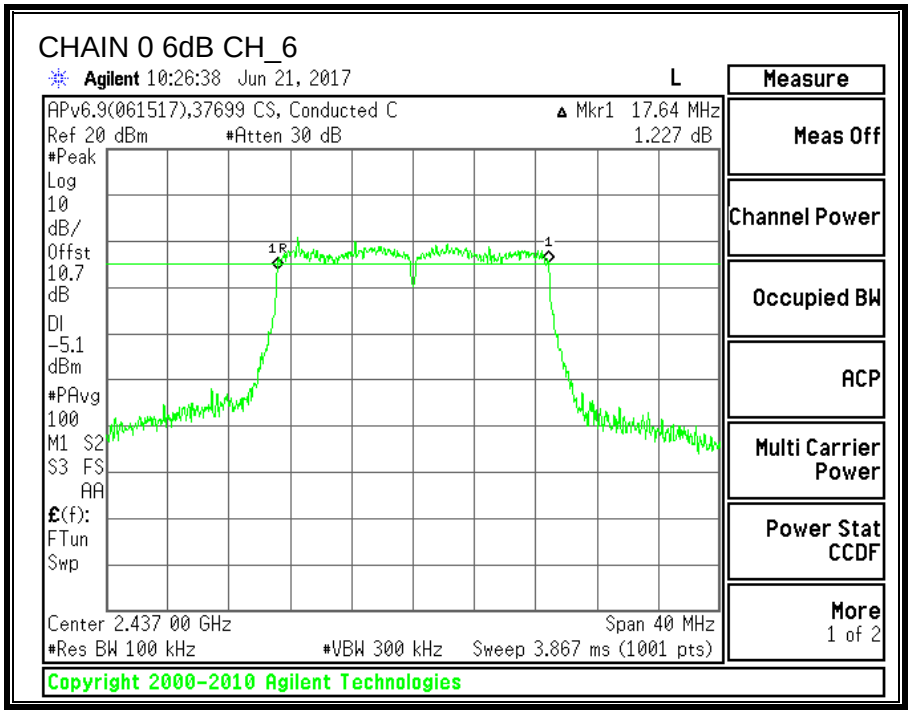
CHAIN 0 6dB CH_1



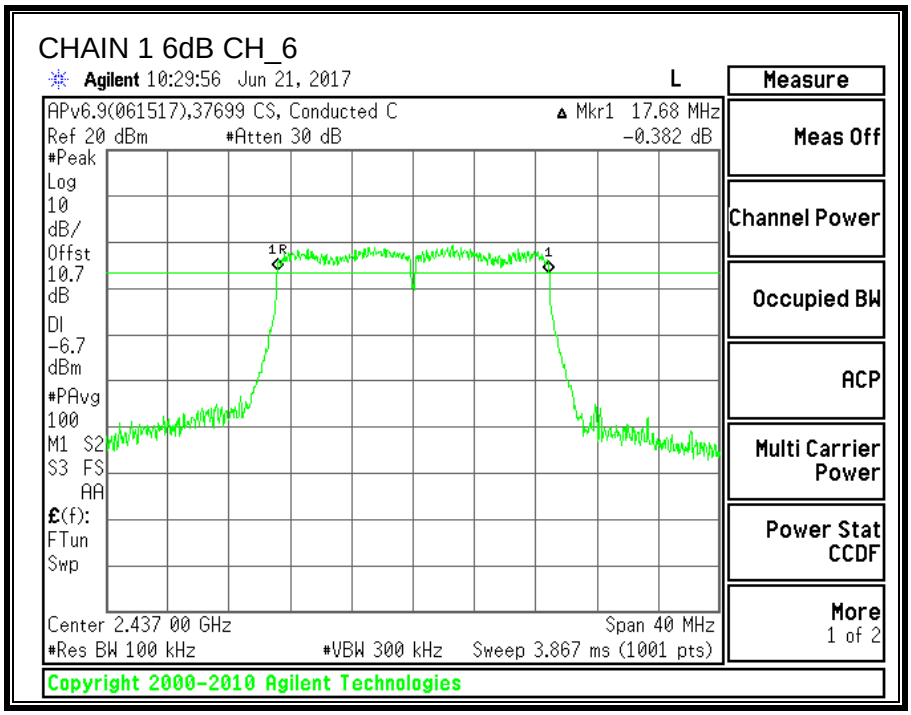
CHAIN 1 6dB CH_1



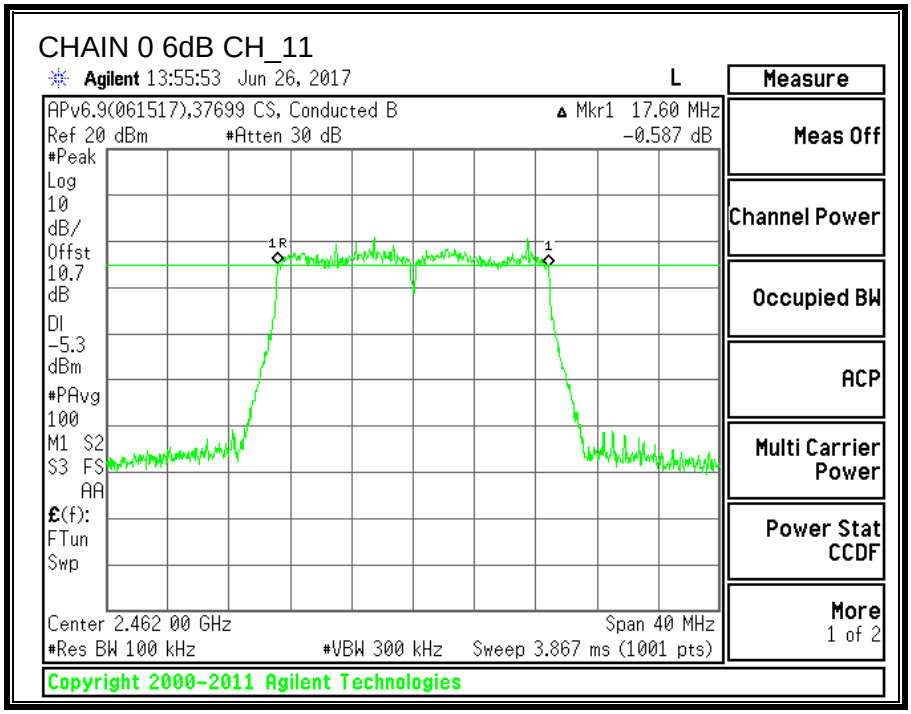
CHAIN 0 6dB CH_6



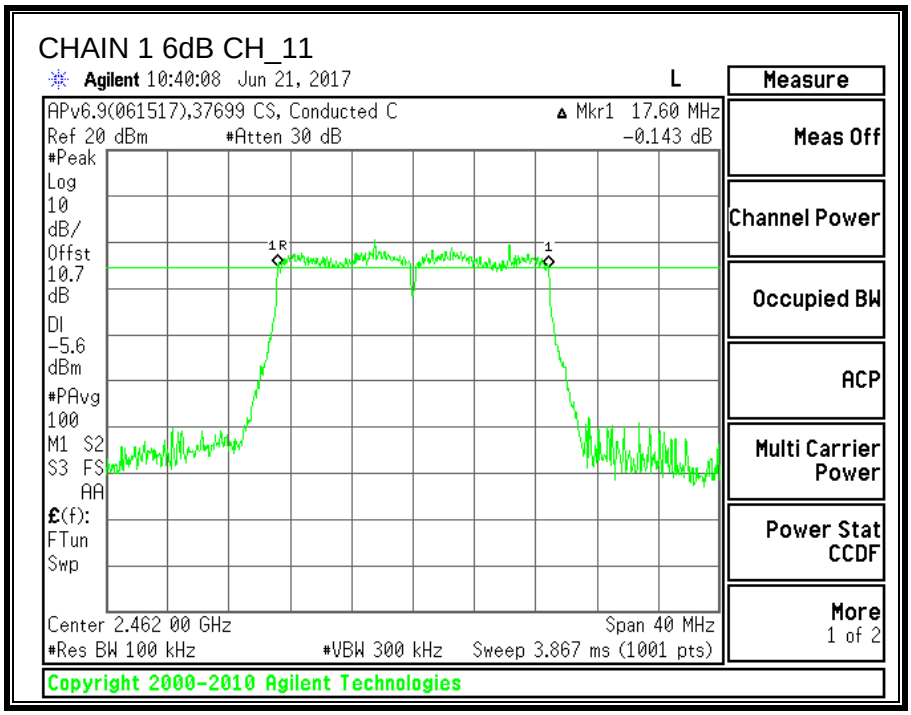
CHAIN 1 6dB CH_6



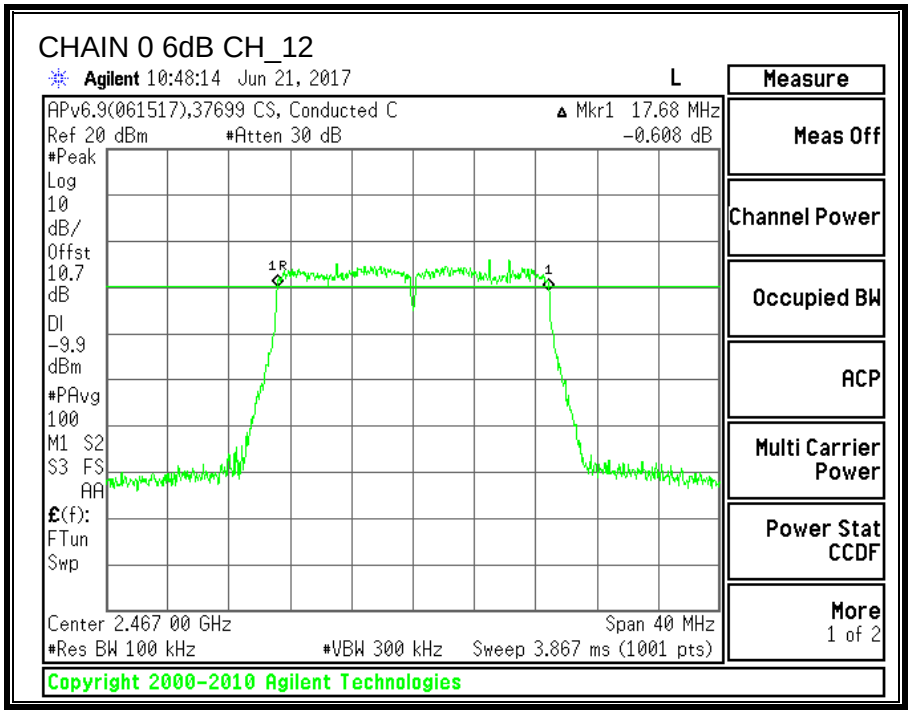
CHAIN 0 6dB CH_11



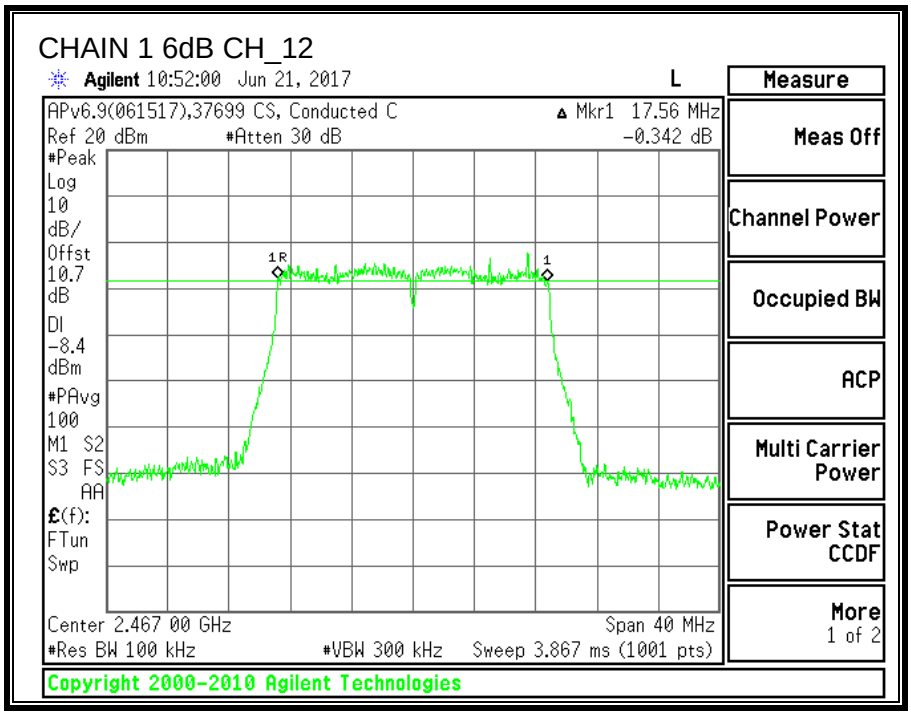
CHAIN 1 6dB CH_11



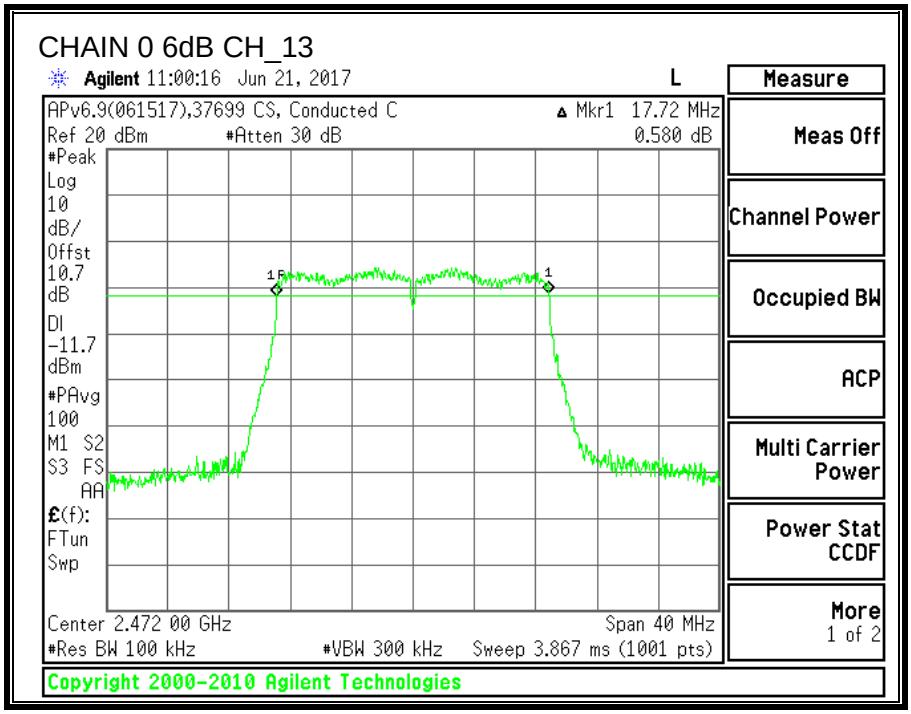
CHAIN 0 6dB CH_12



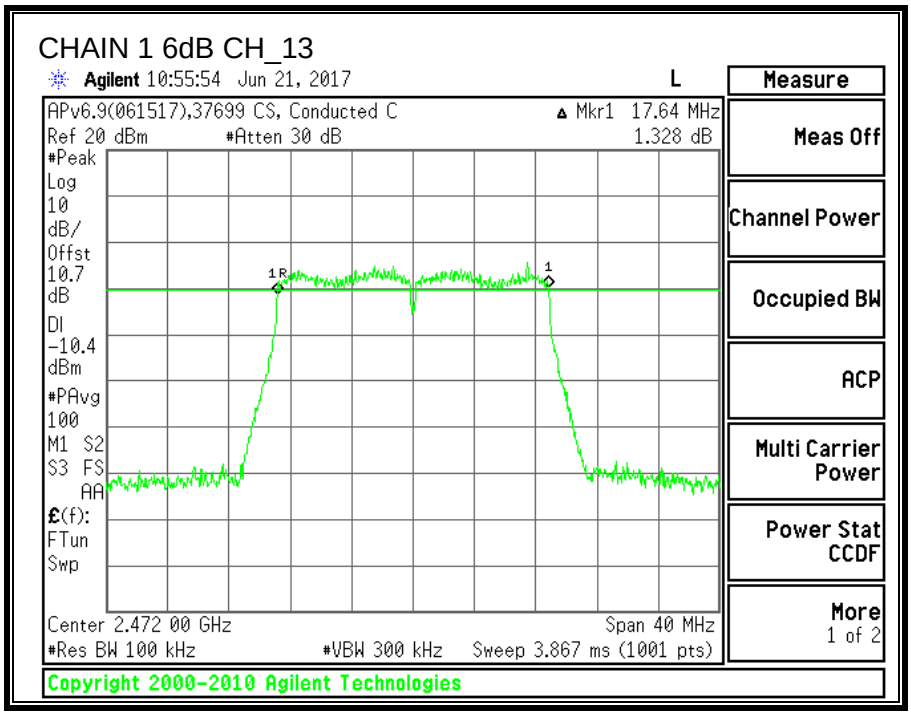
CHAIN 1 6dB CH_12



CHAIN 0 6dB CH_13



CHAIN 1 6dB CH_13



9.3.2. 99% BANDWIDTH

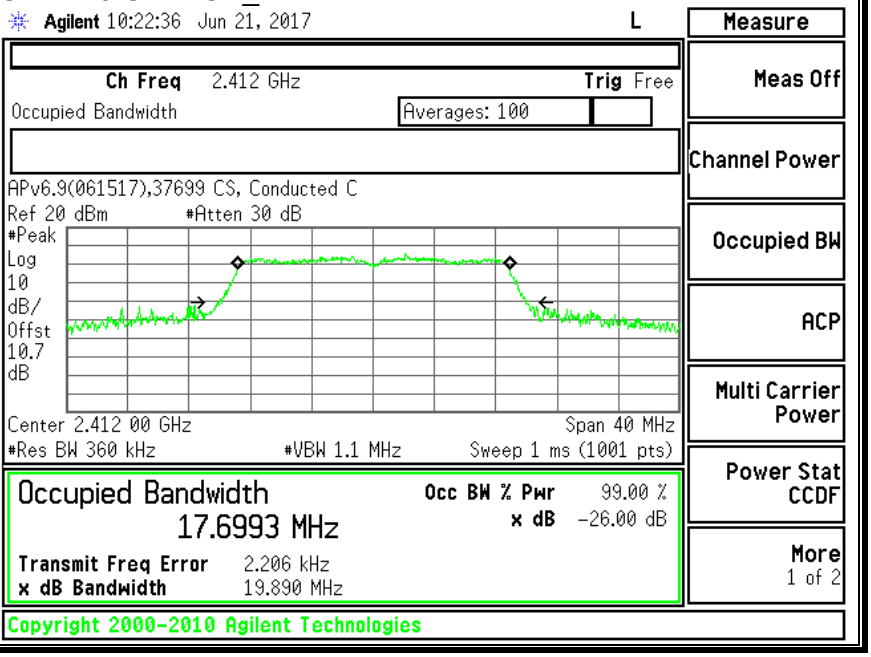
LIMITS

None; for reporting purposes only.

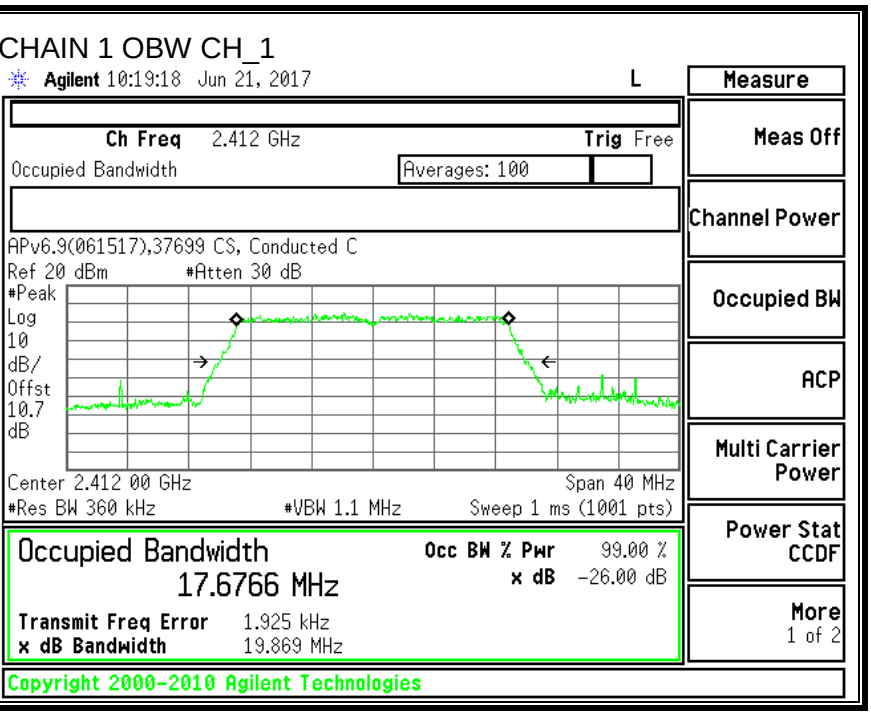
RESULTS

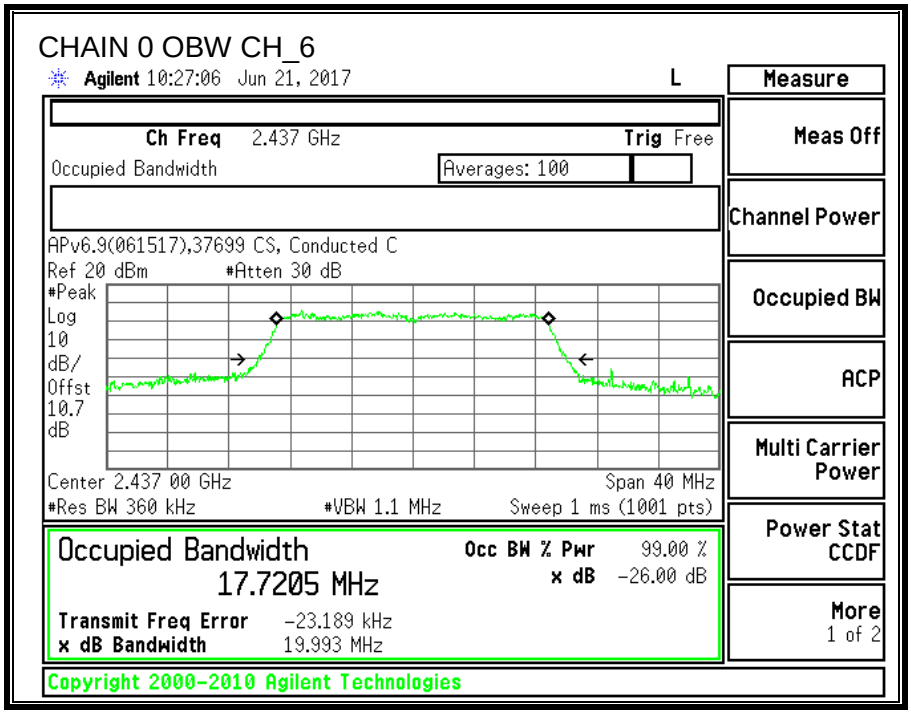
Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low_1	2412	17.6993	17.6766
Middle_6	2437	17.7205	17.6868
High_11	2462	17.6941	17.7108
High_12	2467	17.6827	17.6777
High_13	2472	17.7132	17.6513

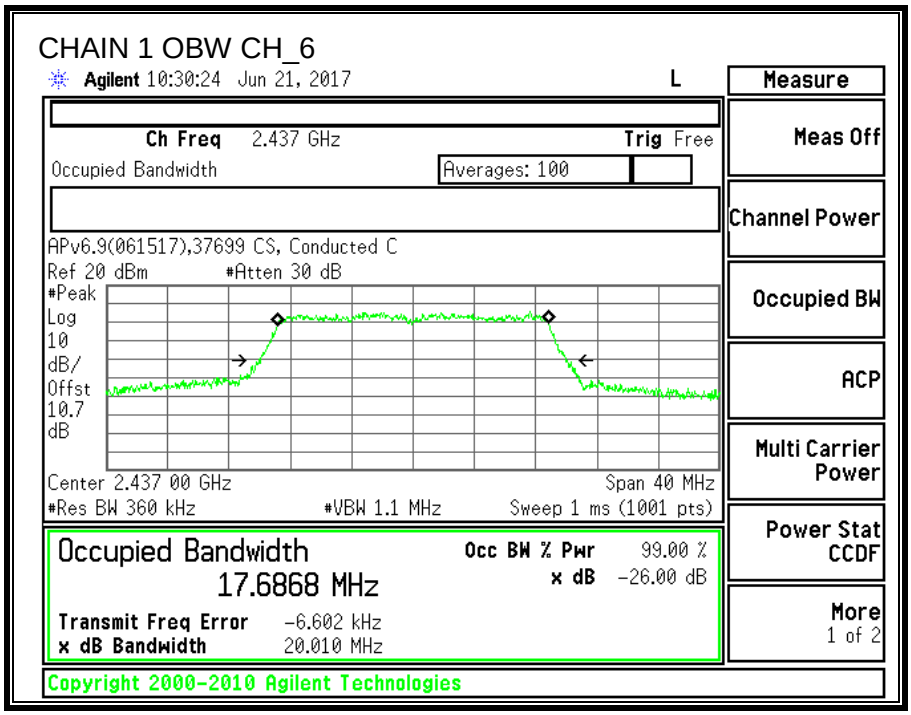
CHAIN 0 OBW CH_1



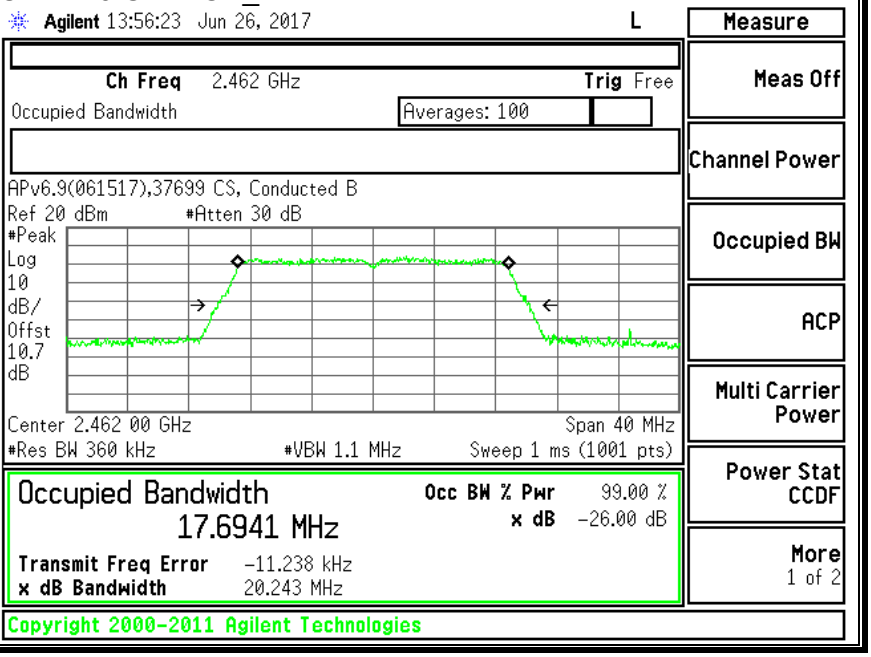
CHAIN 1 OBW CH_1



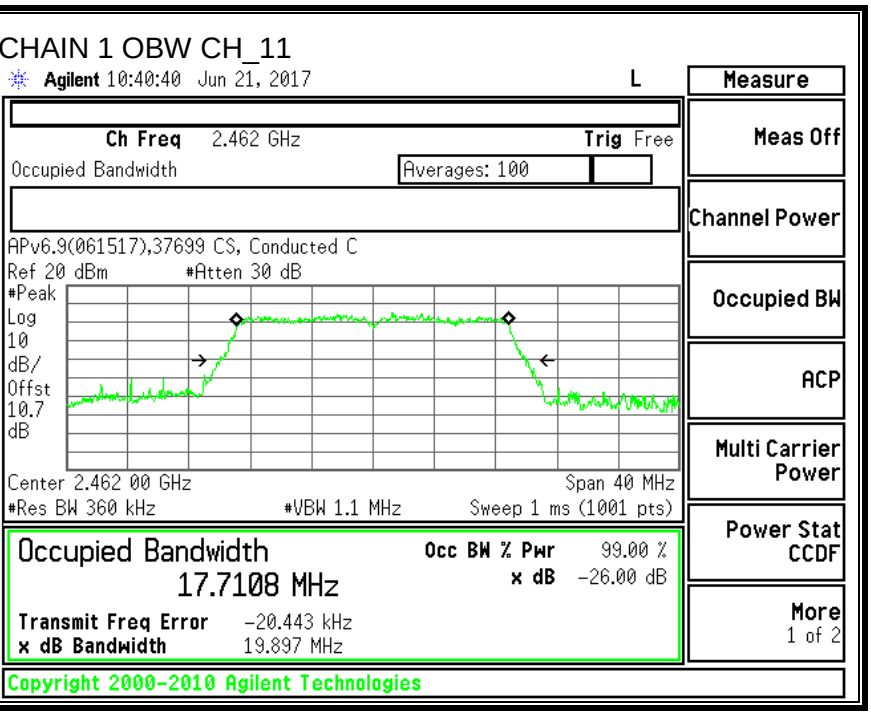




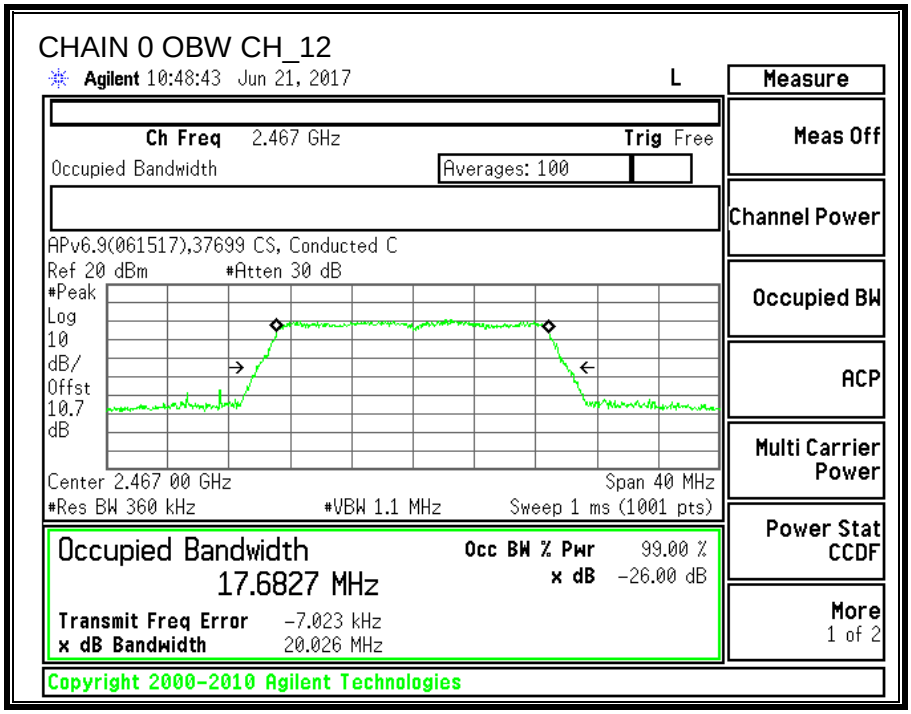
CHAIN 0 OBW CH_11



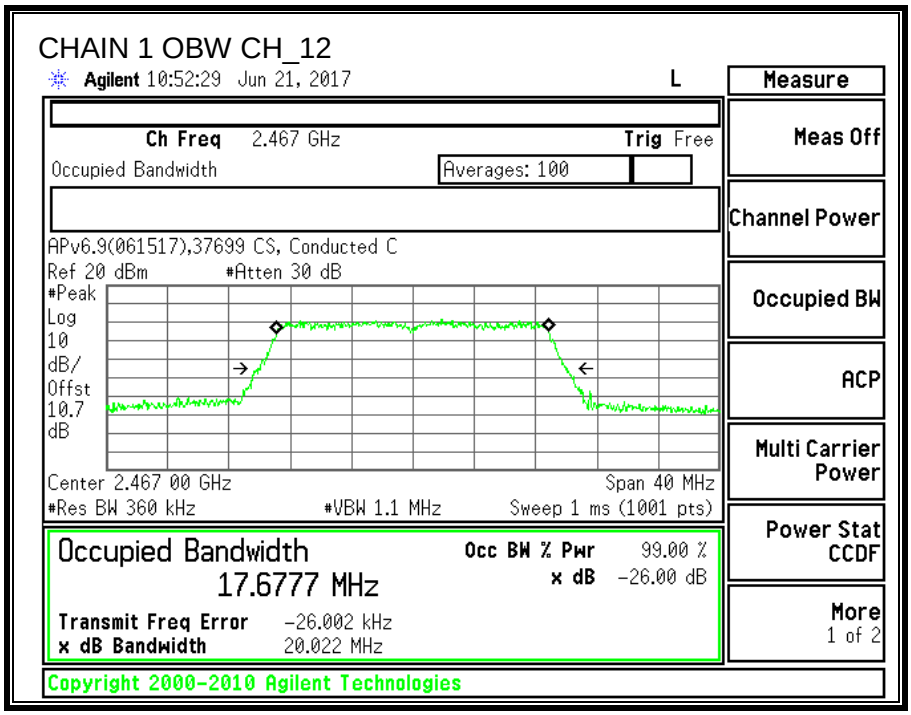
CHAIN 1 OBW CH_11



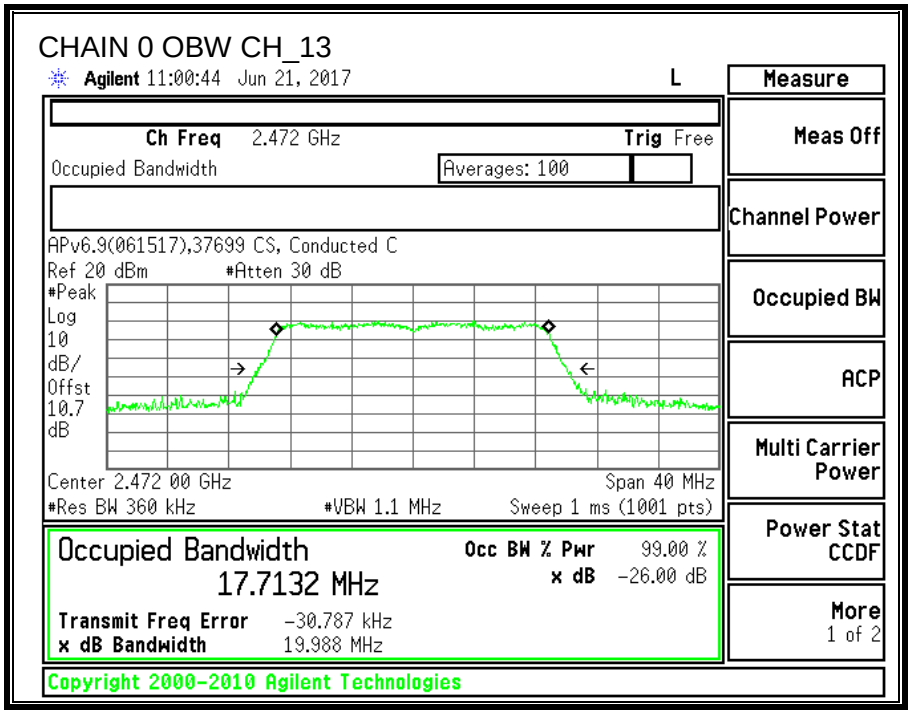
CHAIN 0 OBW CH_12



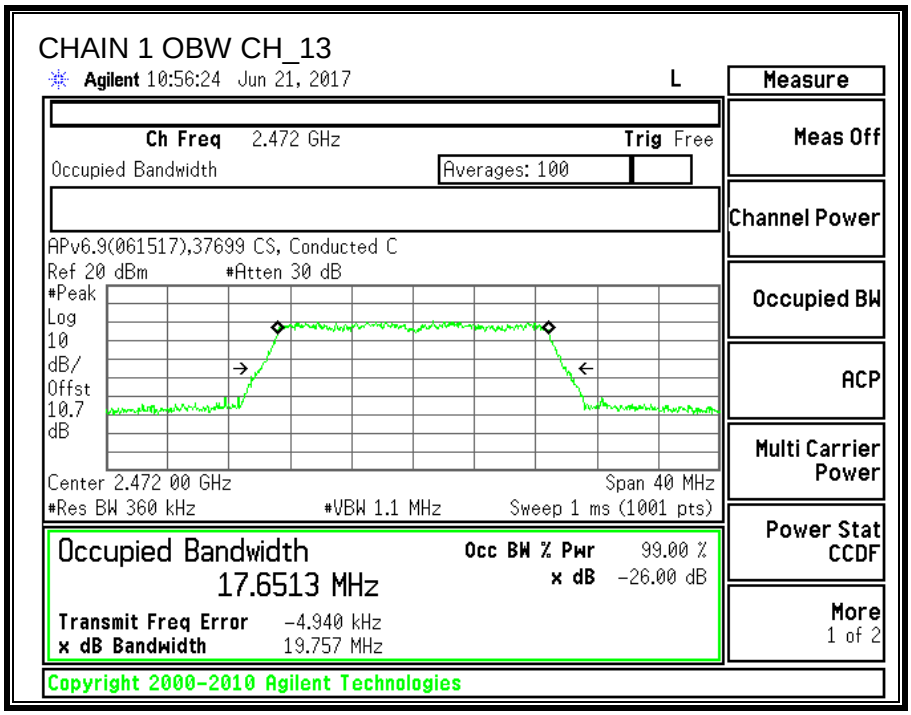
CHAIN 1 OBW CH_12



CHAIN 0 OBW CH_13



CHAIN 1 OBW CH_13



9.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Tested By:	37699 CS
Date:	06/26/17

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)
Low_1	2412	12.36	11.93	15.16
Middle_6	2437	13.27	12.41	15.87
High_11	2462	10.22	10.33	13.29
High_12	2467	8.61	8.73	11.68
High_13	2472	7.78	7.49	10.65

9.3.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

For systems using digital modulation in the 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, 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.

DIRECTIONAL ANTENNA GAIN

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
3.40	3.10	3.25	6.26

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

RESULTS

Tested By:	37699 CS
Date:	06/26/17

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low_1	2412	3.25	30.00	30	36	30.00
Middle_6	2437	3.25	30.00	30	36	30.00
High_11	2462	3.25	30.00	30	36	30.00
High_12	2467	3.25	30.00	30	36	30.00
High_13	2472	3.25	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low_1	2412	19.38	18.59	22.01	30.00	-7.99
Middle_6	2437	19.36	18.69	22.05	30.00	-7.95
High_11	2462	18.78	18.83	21.82	30.00	-8.18
High_12	2467	15.59	16.58	19.12	30.00	-10.88
High_13	2472	13.71	13.87	16.80	30.00	-13.20

9.3.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (b)

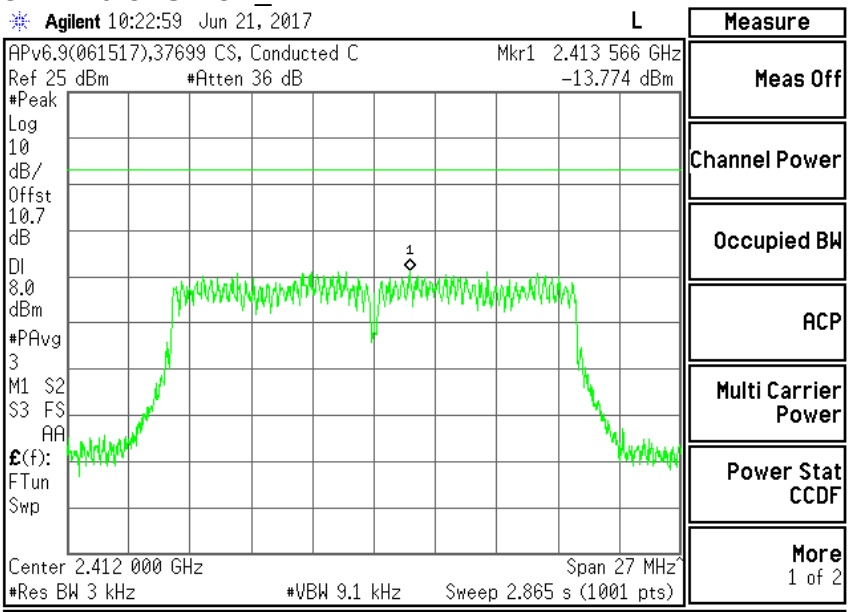
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

RESULTS

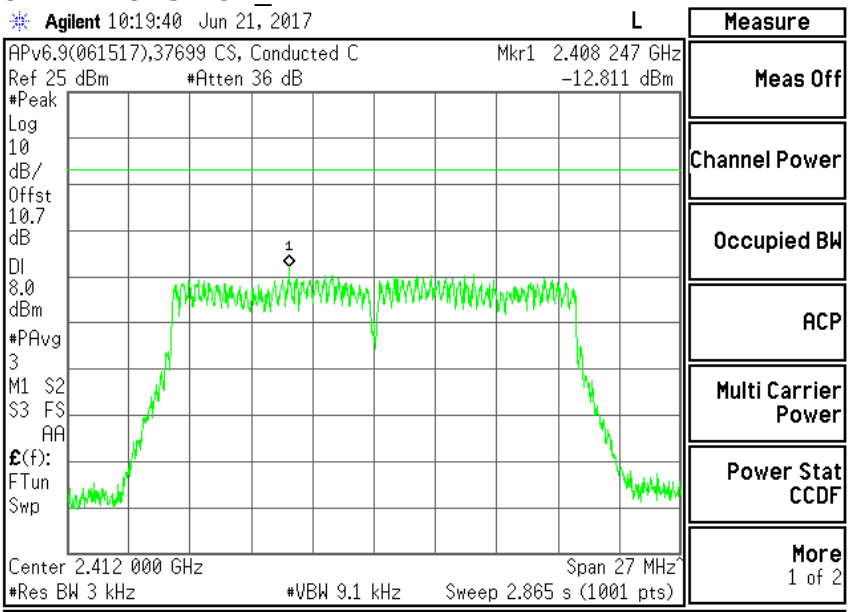
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low_1	2412	-13.77	-12.81	-10.26	8.0	-18.3
Middle_6	2437	-13.30	-12.52	-9.88	8.0	-17.9
High_11	2462	-13.55	-14.29	-10.90	8.0	-18.9
High_12	2467	-17.00	-16.27	-13.61	8.0	-21.6
High_13	2472	-17.41	-17.42	-14.40	8.0	-22.4

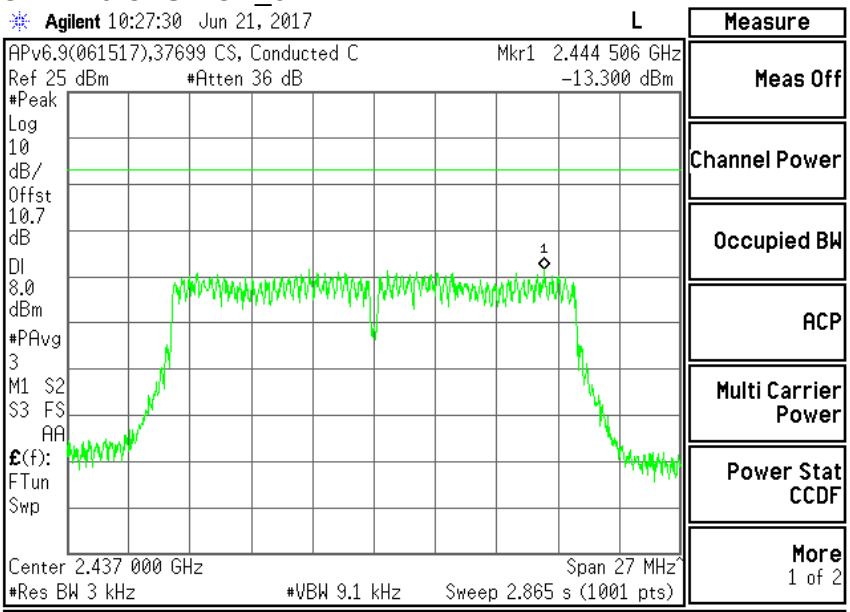
CHAIN 0 CPSD CH_1



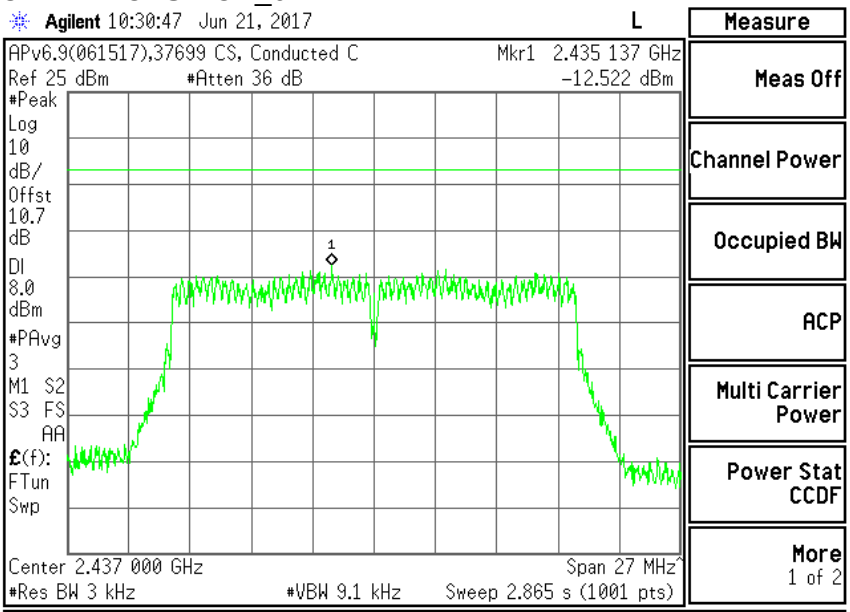
CHAIN 1 CPSD CH_1



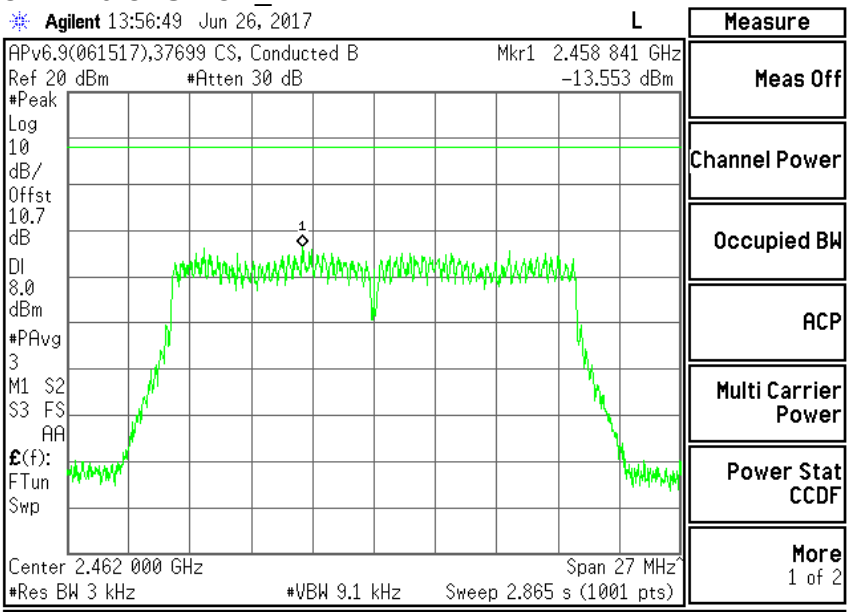
CHAIN 0 CPSD CH_6



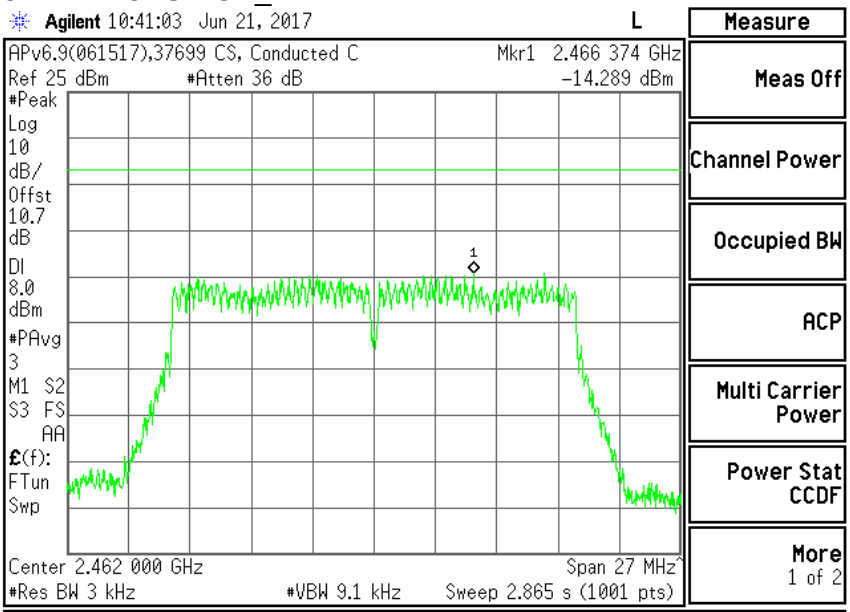
CHAIN 1 CPSD CH_6



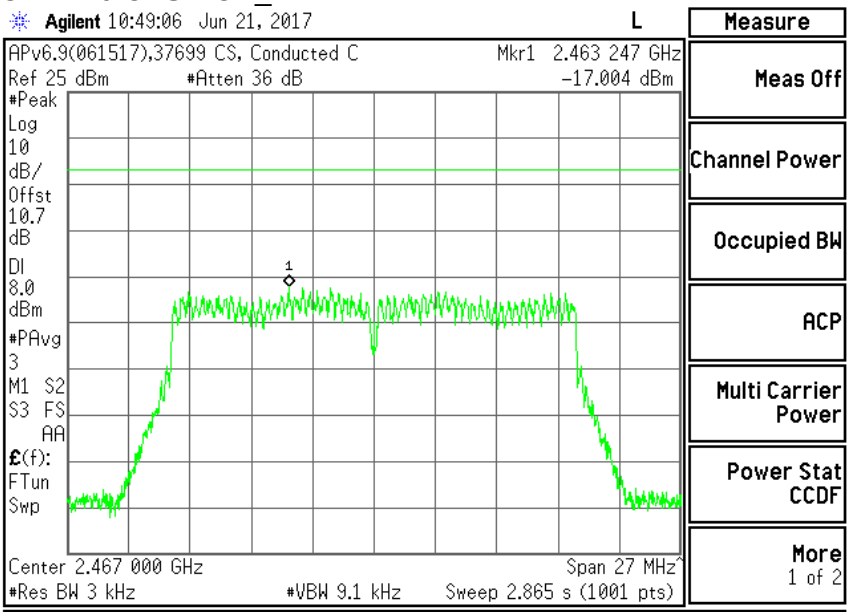
CHAIN 0 CPSD CH_11



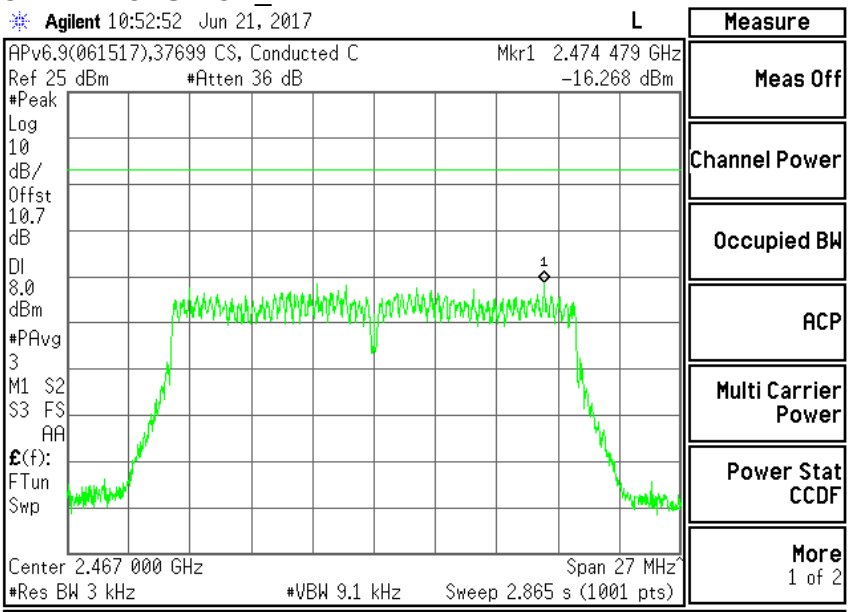
CHAIN 1 CPSD CH_11



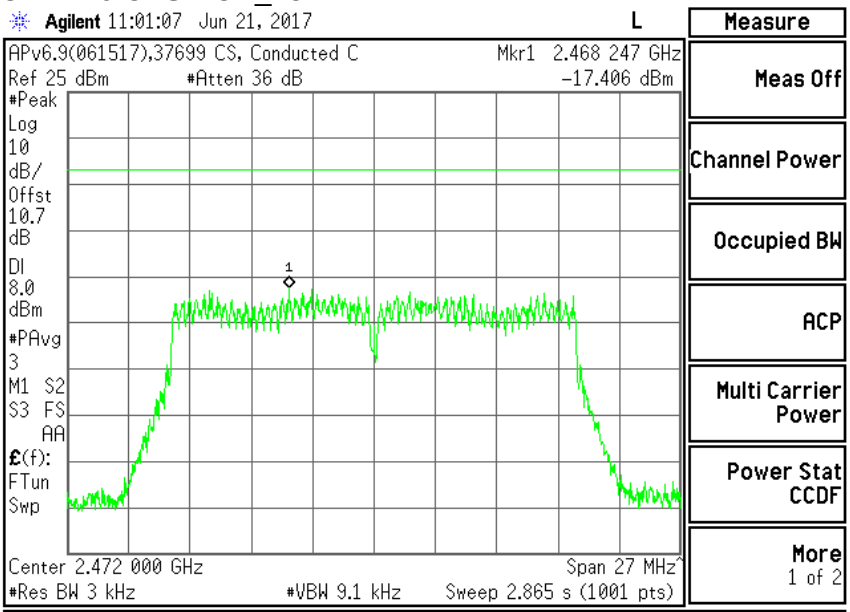
CHAIN 0 CPSD CH_12



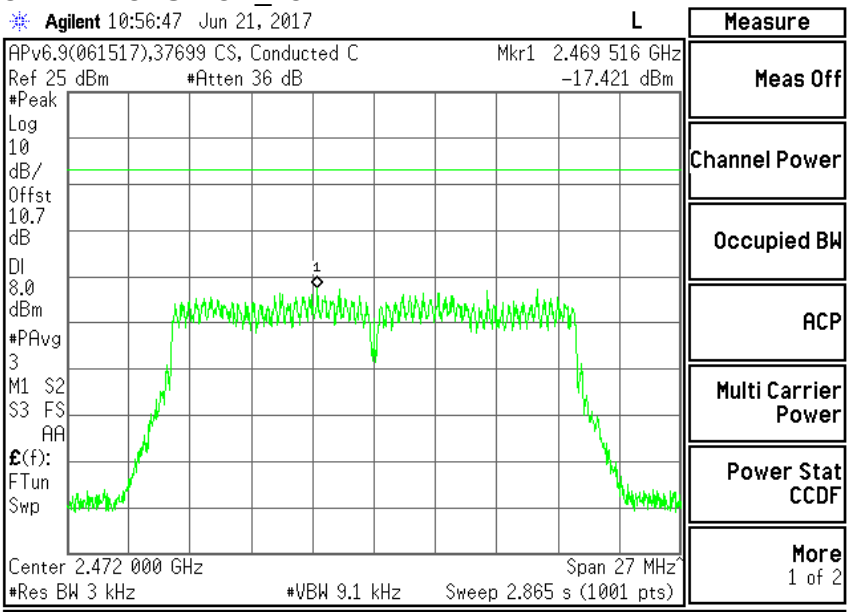
CHAIN 1 CPSD CH_12



CHAIN 0 CPSD CH_13



CHAIN 1 CPSD CH_13



9.3.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

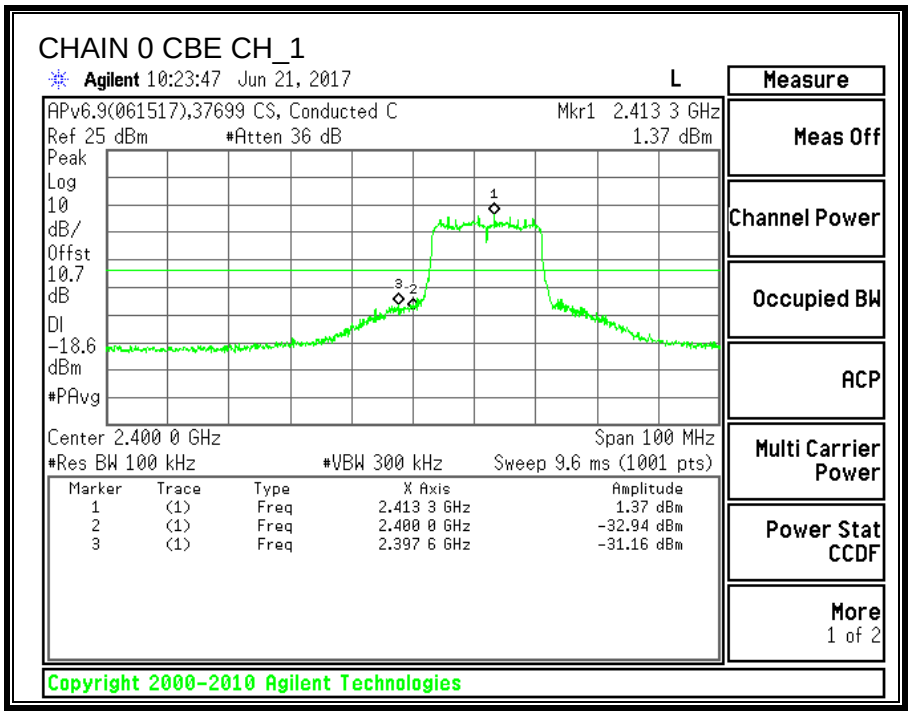
FCC §15.247 (d)

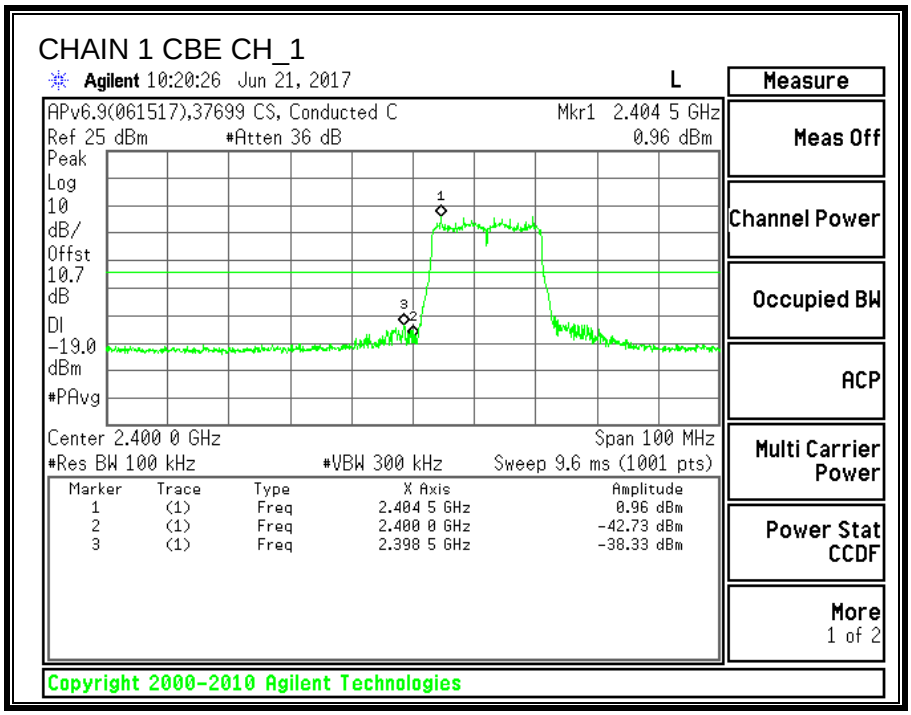
IC RSS-247 5.5

Output power was measured based on the use of Pk measurement, therefore the required attenuation is 20 dB.

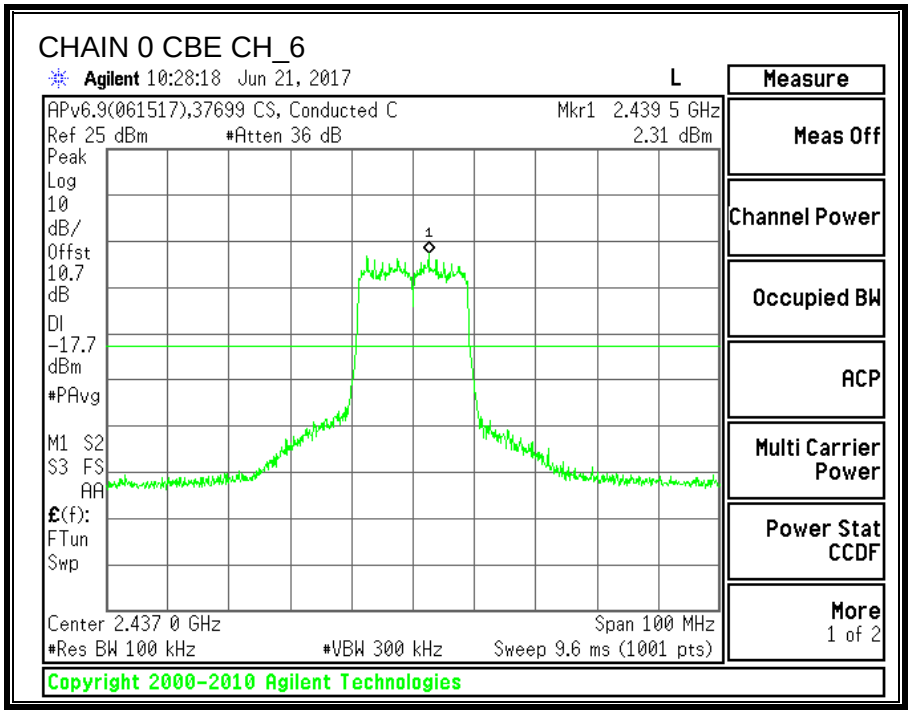
RESULTS

BANDEDGE

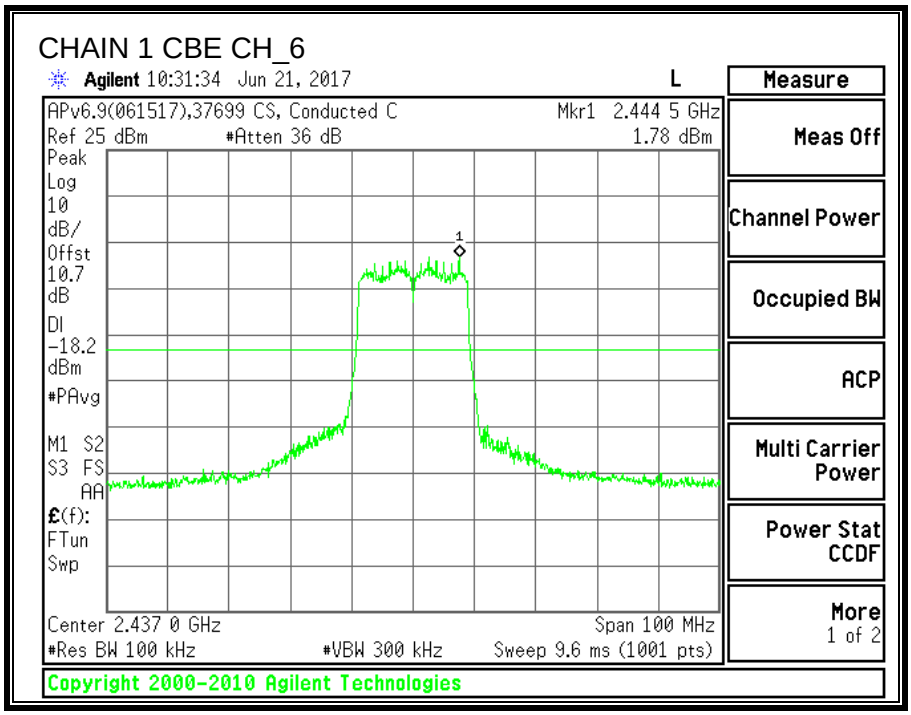




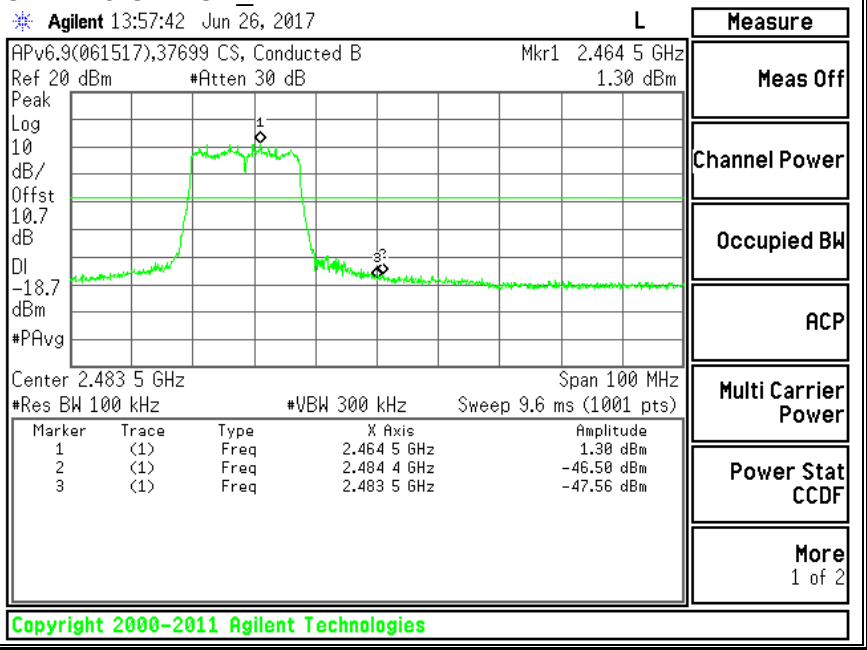
CHAIN 0 CBE CH_6



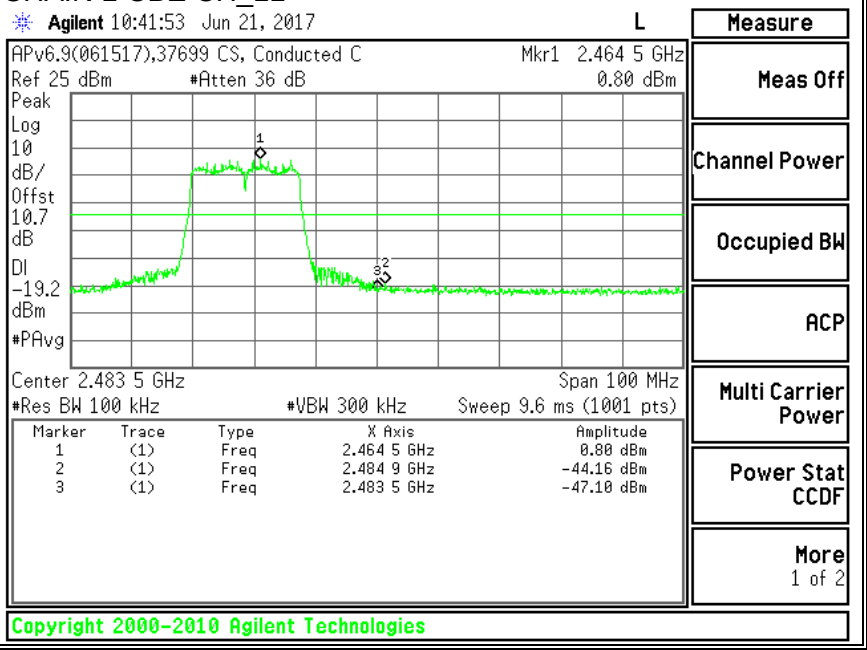
CHAIN 1 CBE CH_6



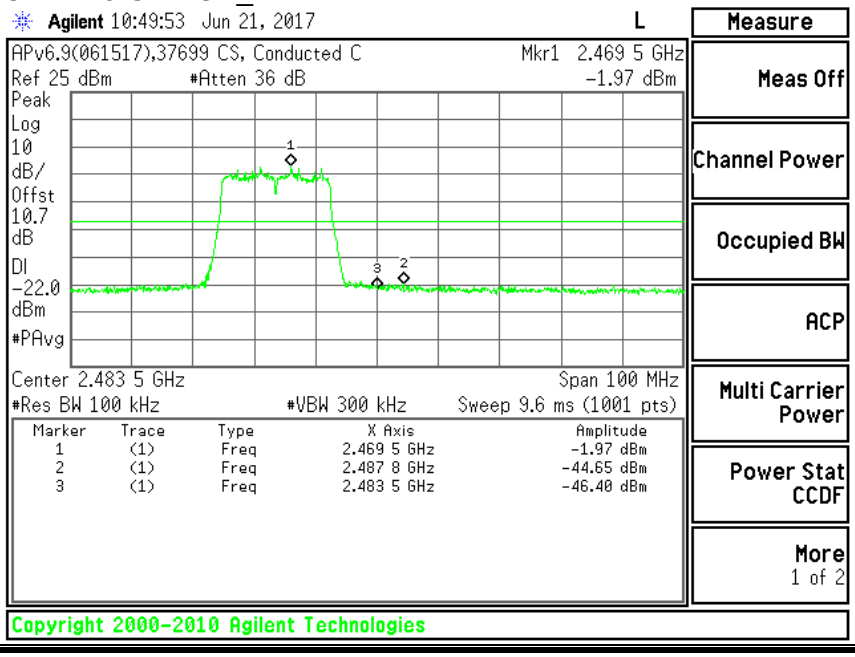
CHAIN 0 CBE CH_11



CHAIN 1 CBE CH_11



CHAIN 0 CBE CH_12



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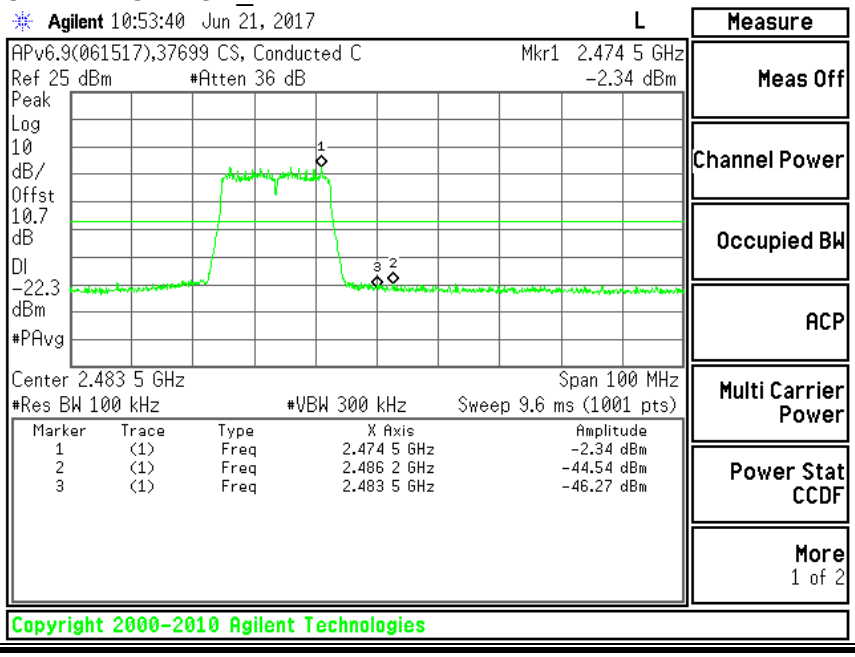

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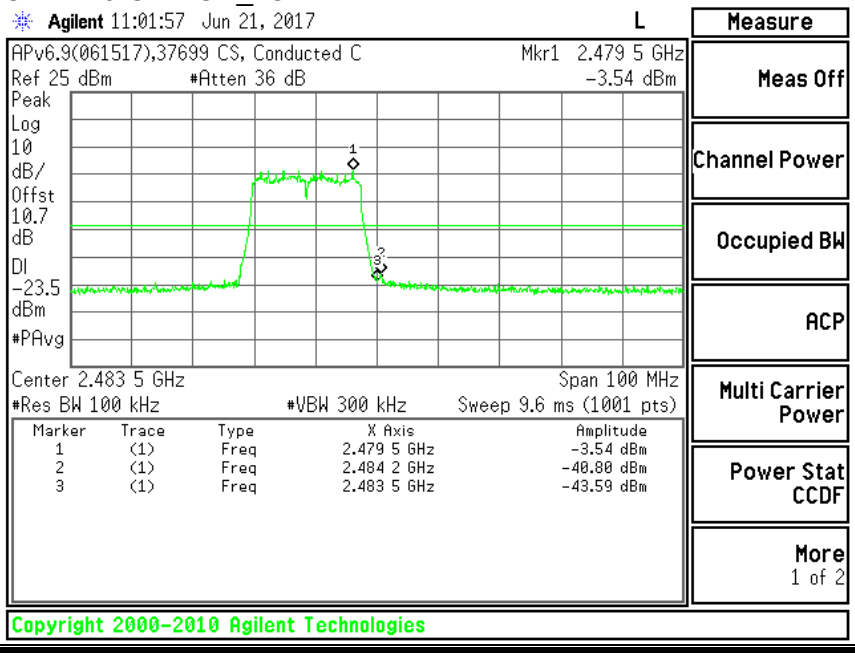
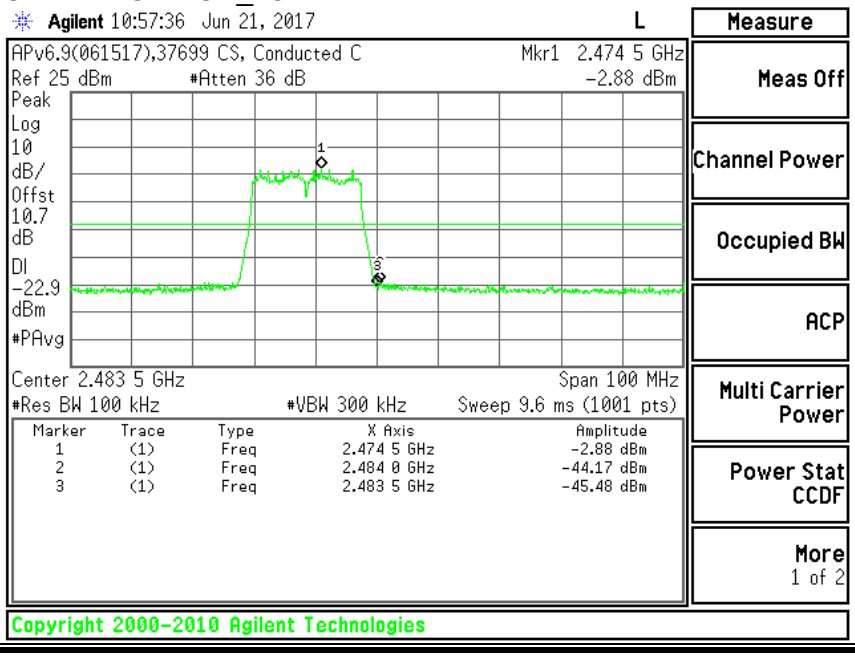
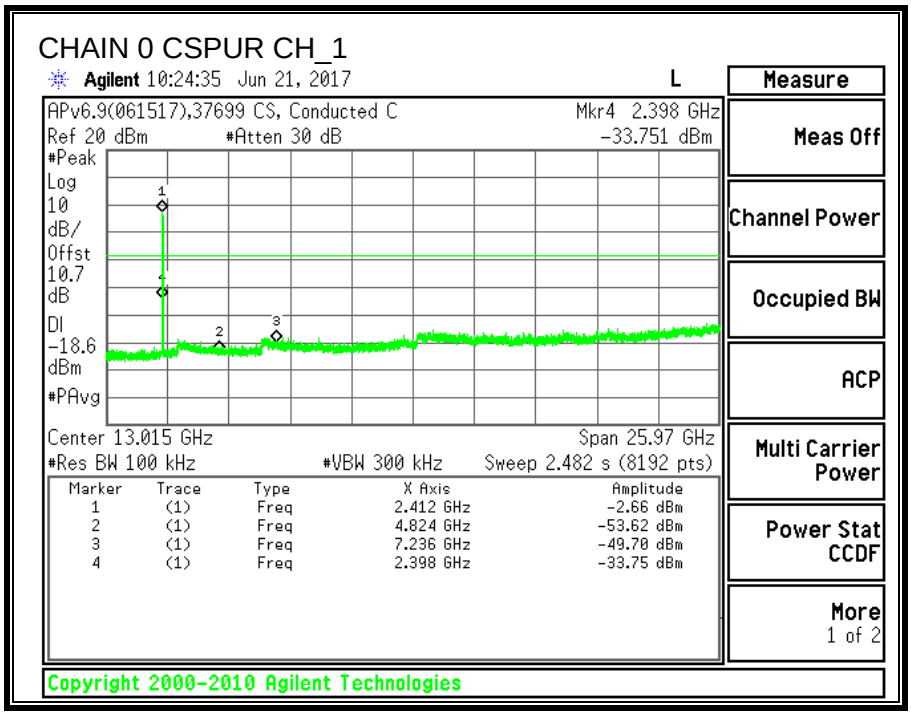
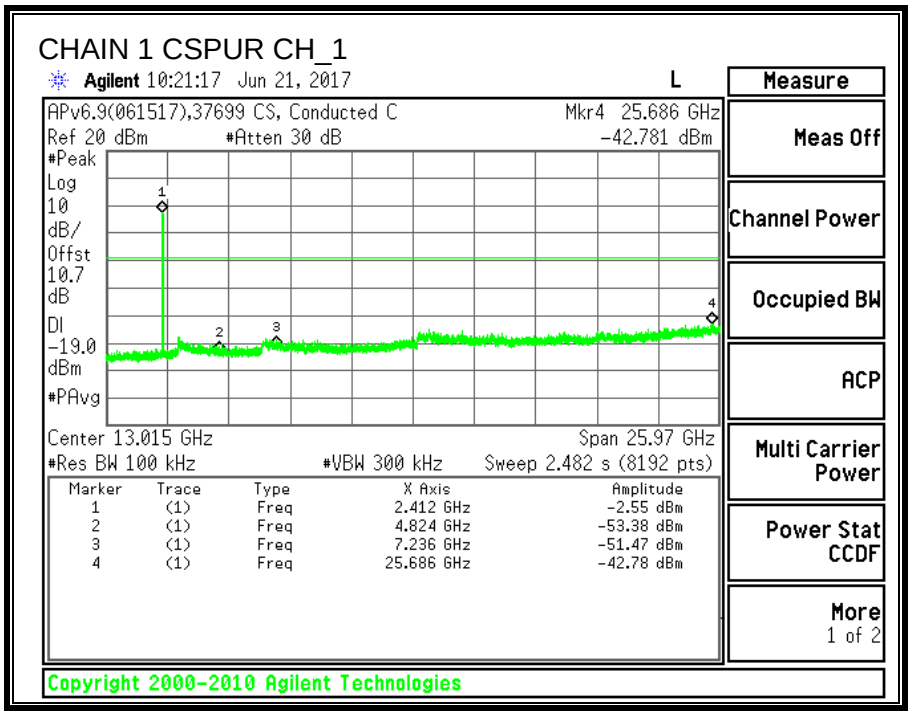


CHAIN 1 CBE CH_13

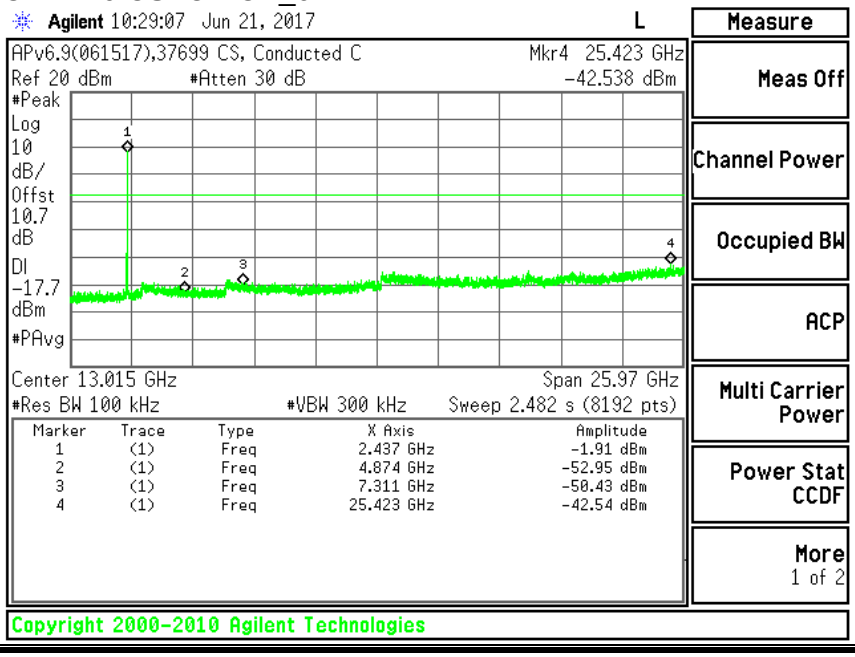


SPURIOUS EMISSIONS

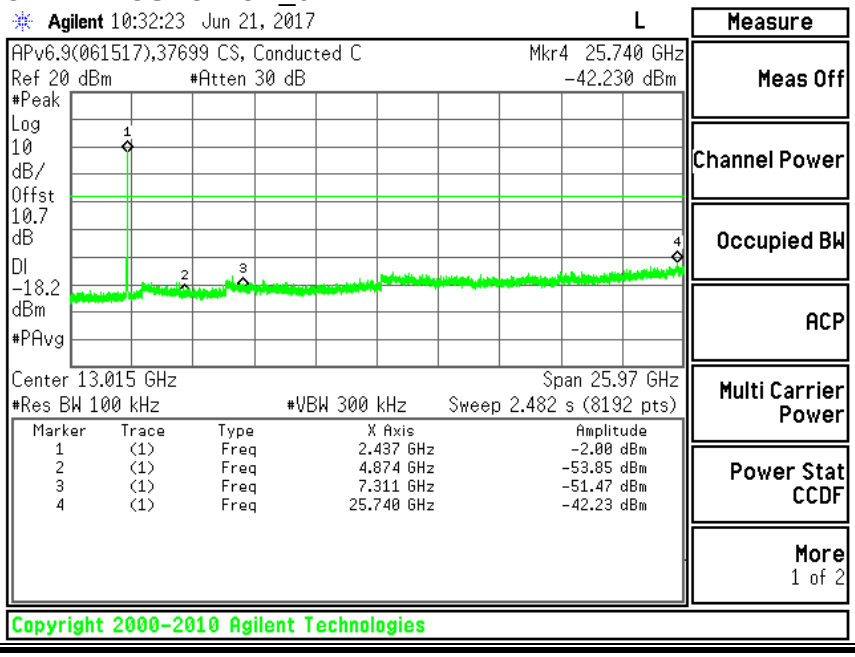




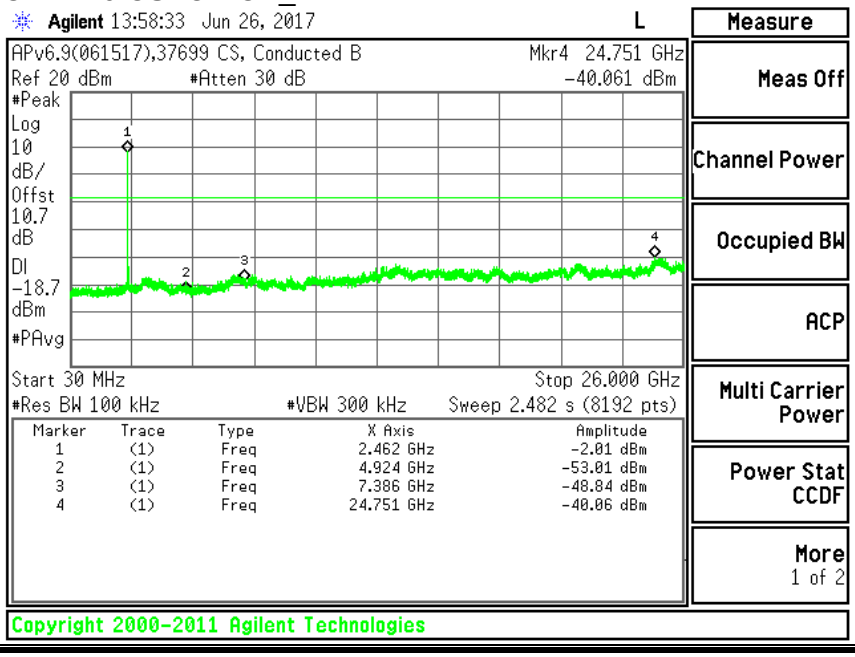
CHAIN 0 CSPUR CH_6



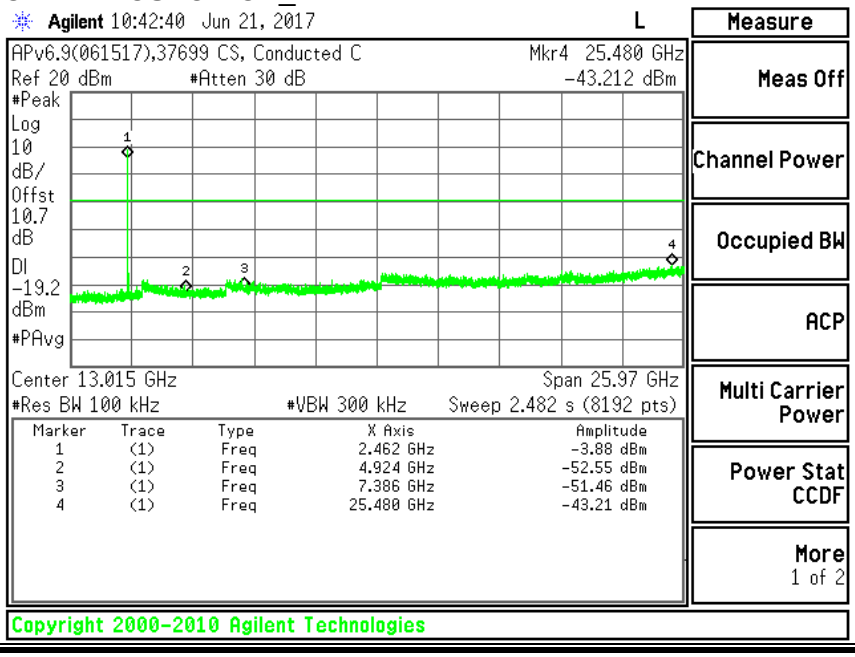
CHAIN 1 CSPUR CH_6



CHAIN 0 CSPUR CH_11



CHAIN 1 CSPUR CH_11



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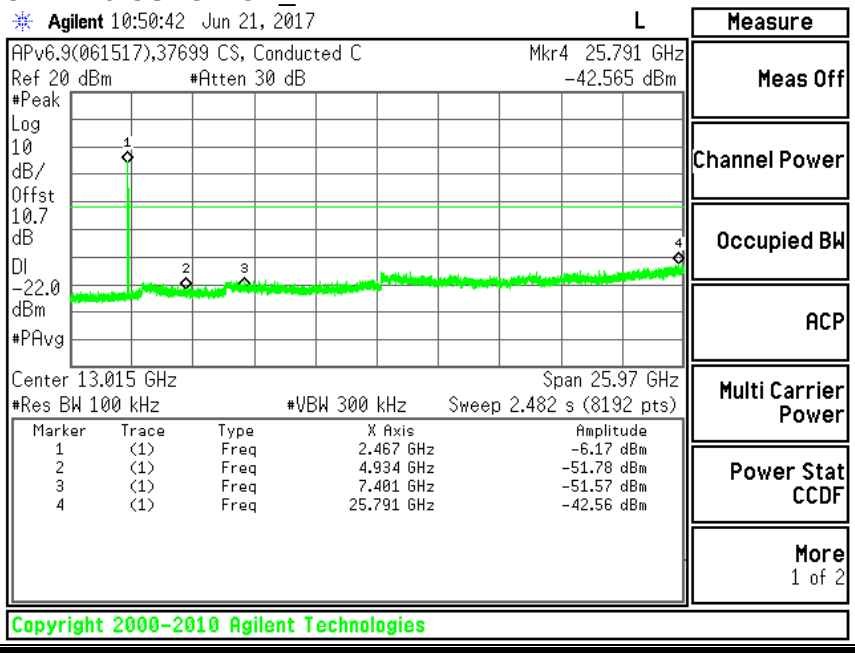
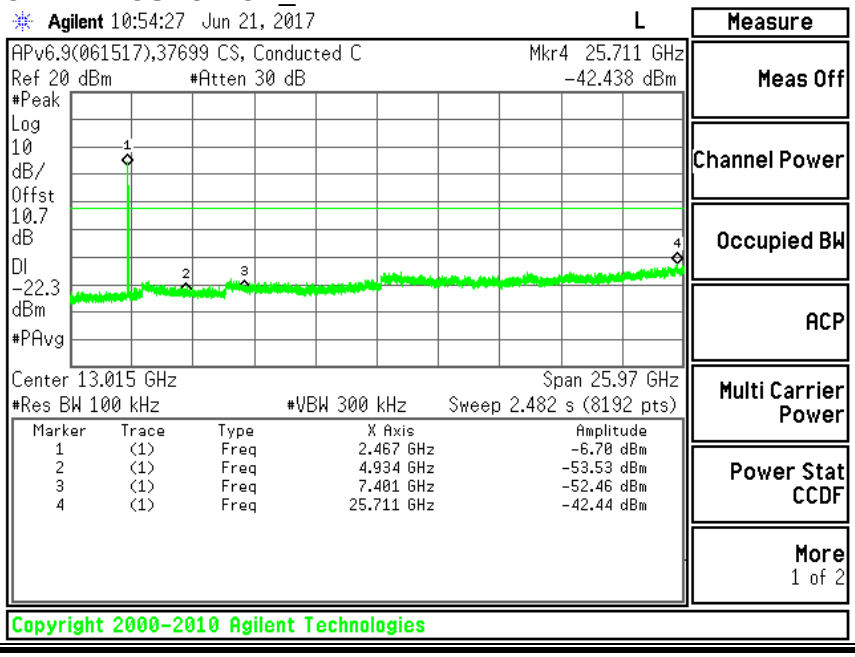
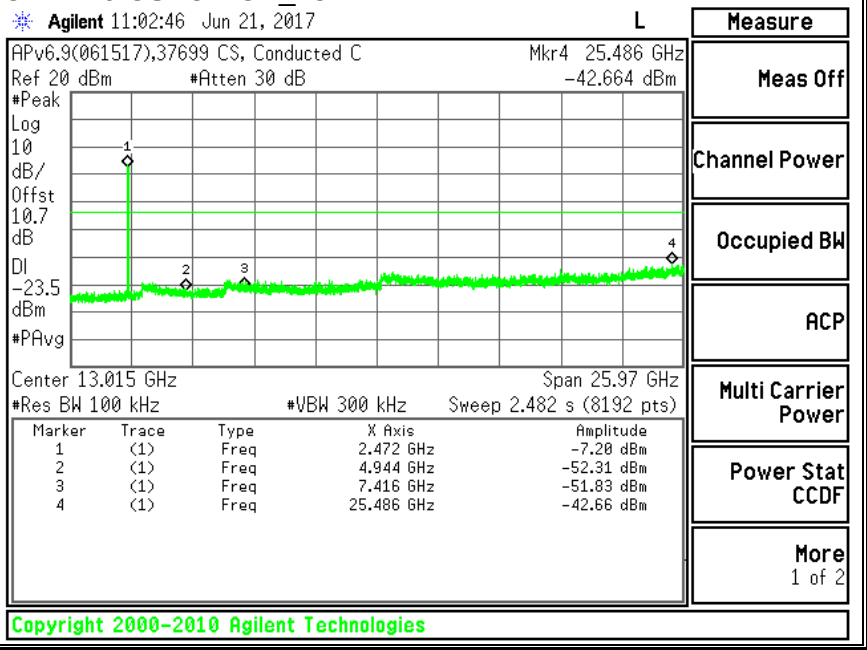


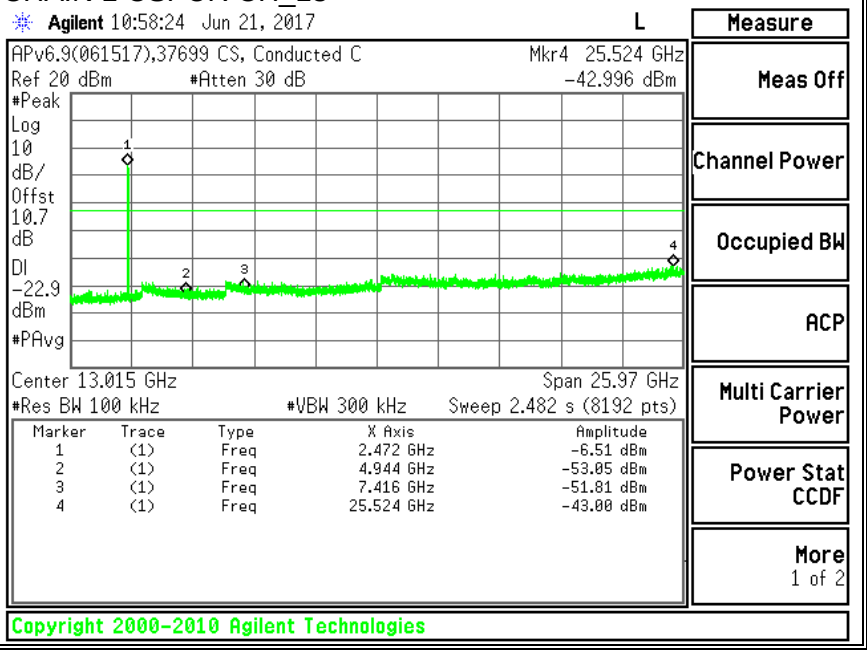
CHAIN 1 CSPUR CH_12



CHAIN 0 CSPUR CH_13



CHAIN 1 CSPUR CH_13



10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and Maximum RMS for average measurements.

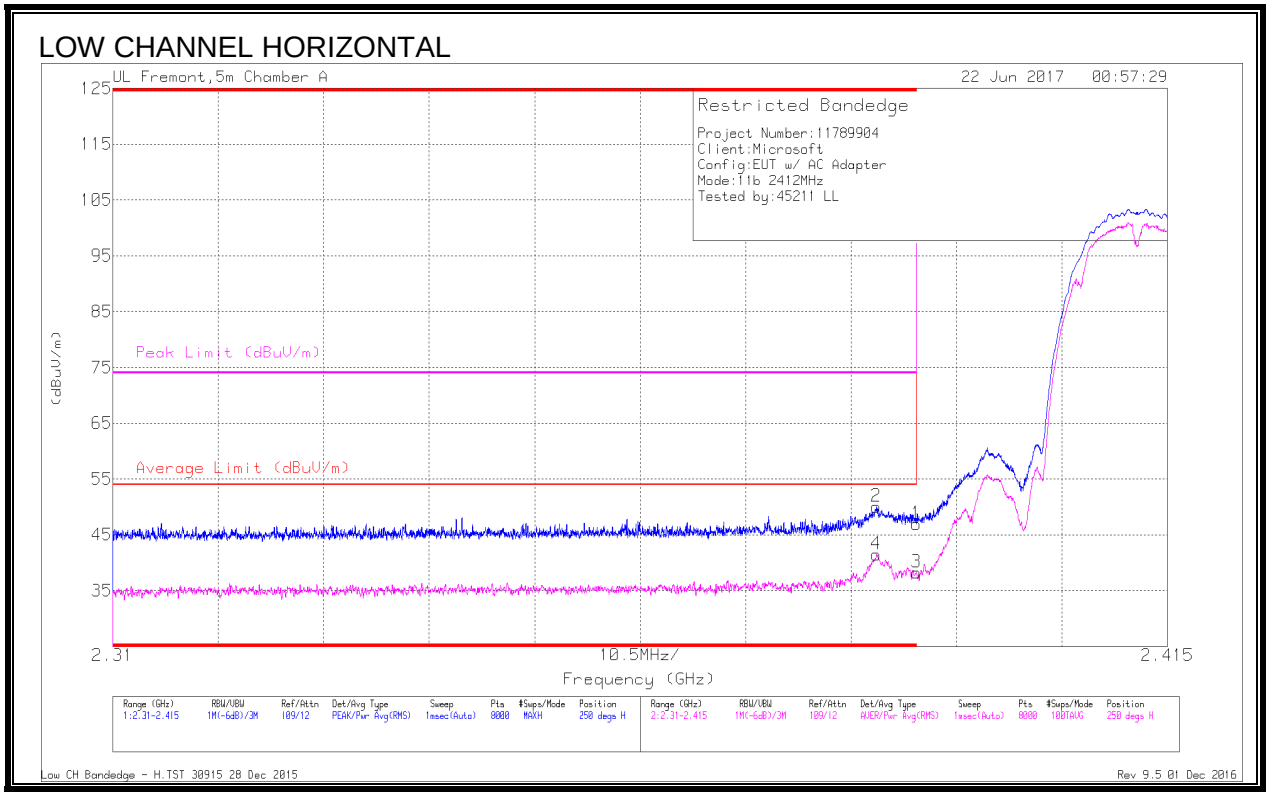
The spectrum from 30 MHz to 1GHz and 18GHz to 26 GHz is investigated with the transmitter set to transmit at the channel with highest output power as worst-case scenario. 1GHz to 18GHz was set to the lowest, middle, and highest channels in the 2.4 GHz band

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. 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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 11b 2TX MIMO MODE IN THE 2.4GHz BAND

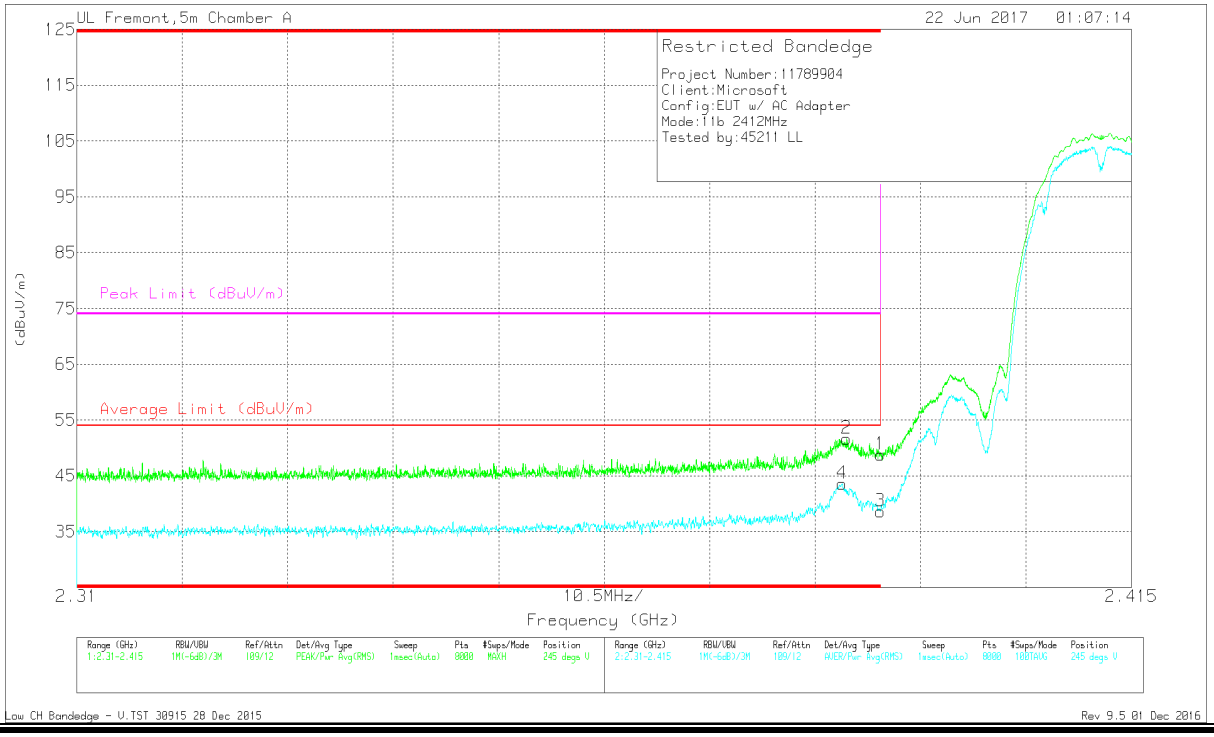
AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.52	Pk	32.1	-23.7	46.92	-	-	74	-27.08	250	176	H
2	* 2.386	41.66	Pk	32.1	-23.7	50.06	-	-	74	-23.94	250	176	H
3	* 2.39	29.8	RMS	32.1	-23.7	38.2	54	-15.8	-	-	250	176	H
4	* 2.386	33.03	RMS	32.1	-23.7	41.43	54	-12.57	-	-	250	176	H

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

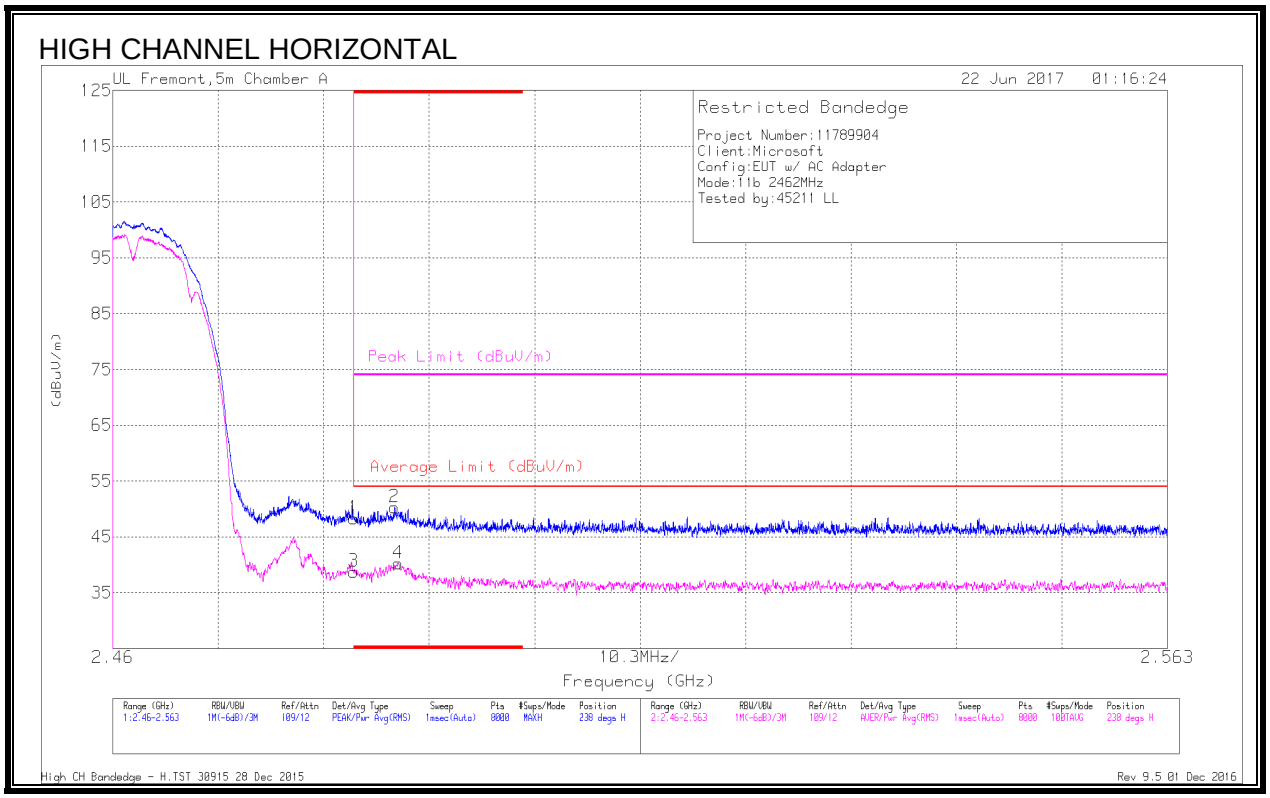
LOW CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.43	Pk	32.1	-23.7	48.83	-	-	74	-25.17	245	360	V
2	* 2.387	43.3	Pk	32.1	-23.7	51.7	-	-	74	-22.3	245	360	V
3	* 2.39	30.2	RMS	32.1	-23.7	38.6	54	-15.4	-	-	245	360	V
4	* 2.386	35.24	RMS	32.1	-23.7	43.64	54	-10.36	-	-	245	360	V

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

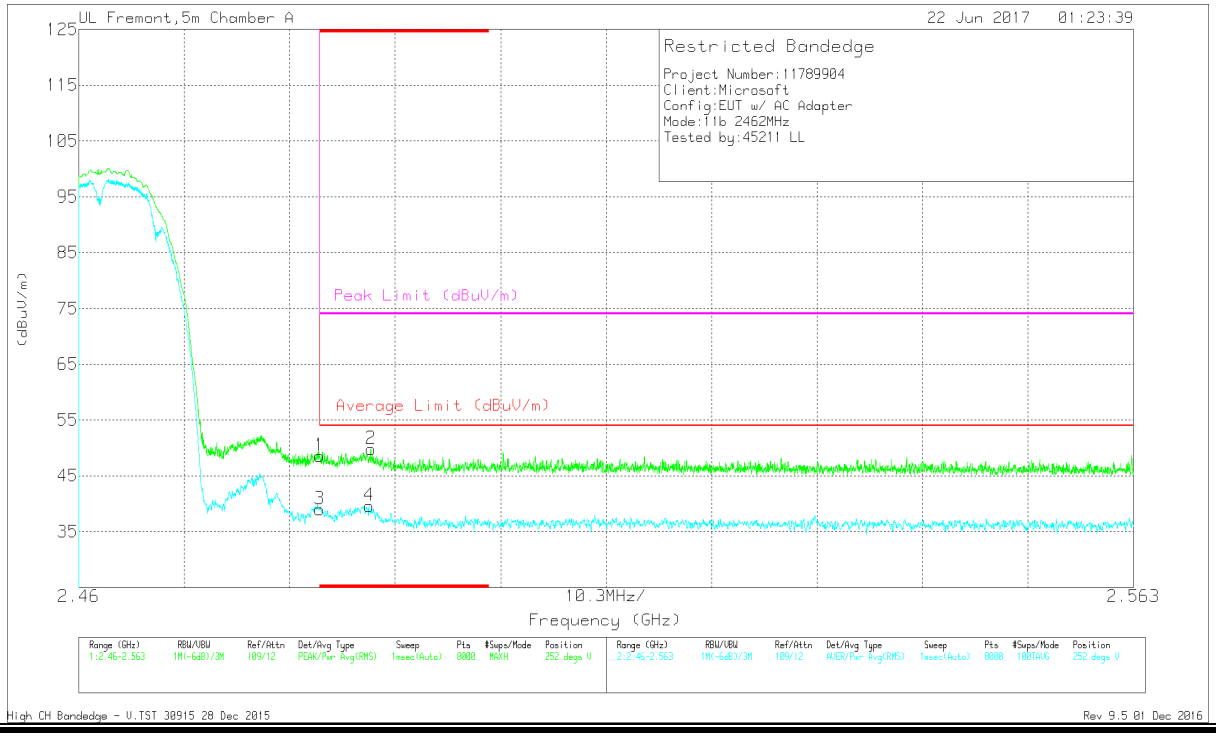
AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.44	Pk	32.5	-23.6	48.34	-	-	74	-25.66	238	146	H
2	* 2.488	41.33	Pk	32.6	-23.6	50.33	-	-	74	-23.67	238	146	H
3	* 2.484	29.79	RMS	32.5	-23.6	38.69	54	-15.31	-	-	238	146	H
4	* 2.488	31.37	RMS	32.6	-23.7	40.27	54	-13.73	-	-	238	146	H

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

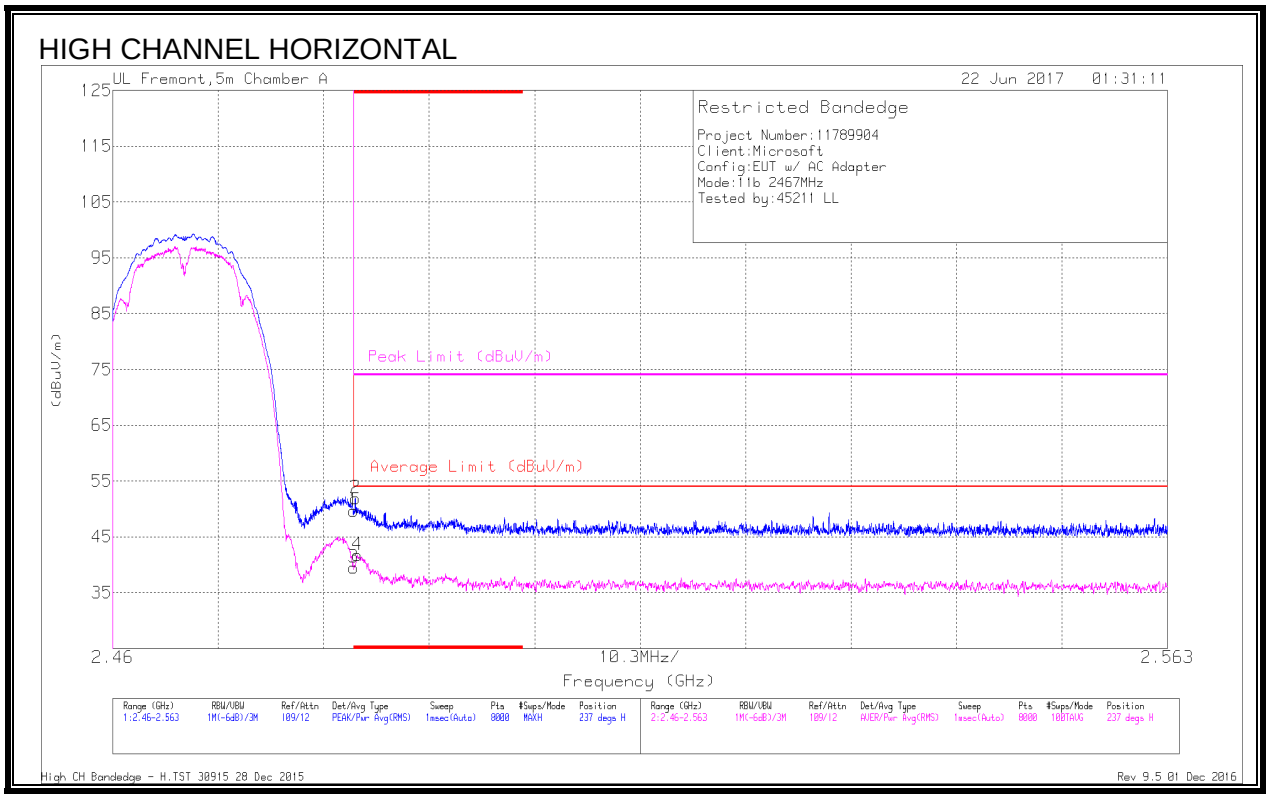
HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.68	Pk	32.5	-23.6	48.58	-	-	74	-25.42	252	239	V
2	* 2.489	40.95	Pk	32.6	-23.7	49.85	-	-	74	-24.15	252	239	V
3	* 2.484	30.1	RMS	32.5	-23.6	39	54	-15	-	-	252	239	V
4	* 2.488	30.73	RMS	32.6	-23.7	39.63	54	-14.37	-	-	252	239	V

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

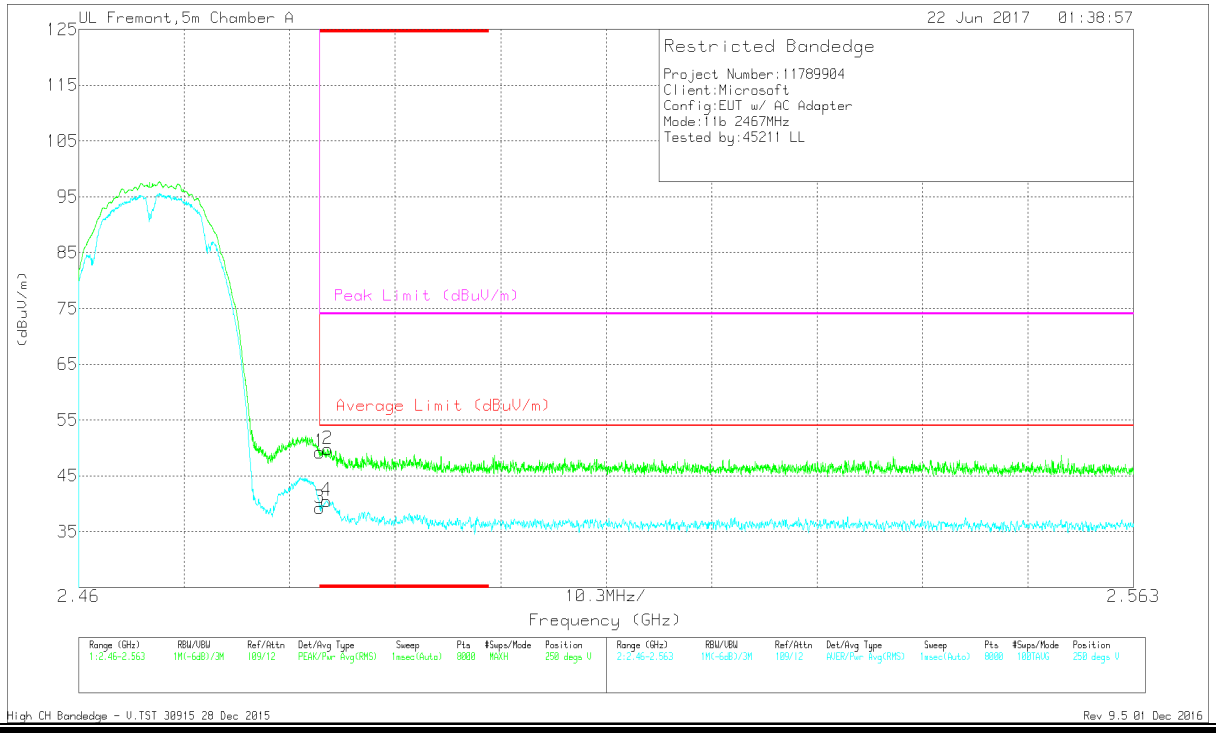
AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 12)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.77	Pk	32.5	-23.6	49.67	-	-	74	-24.33	237	141	H
2	* 2.484	43	Pk	32.5	-23.6	51.9	-	-	74	-22.1	237	141	H
3	* 2.484	30.61	RMS	32.5	-23.6	39.51	54	-14.49	-	-	237	141	H
4	* 2.484	32.77	RMS	32.5	-23.6	41.67	54	-12.33	-	-	237	141	H

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

HIGH CHANNEL VERTICAL

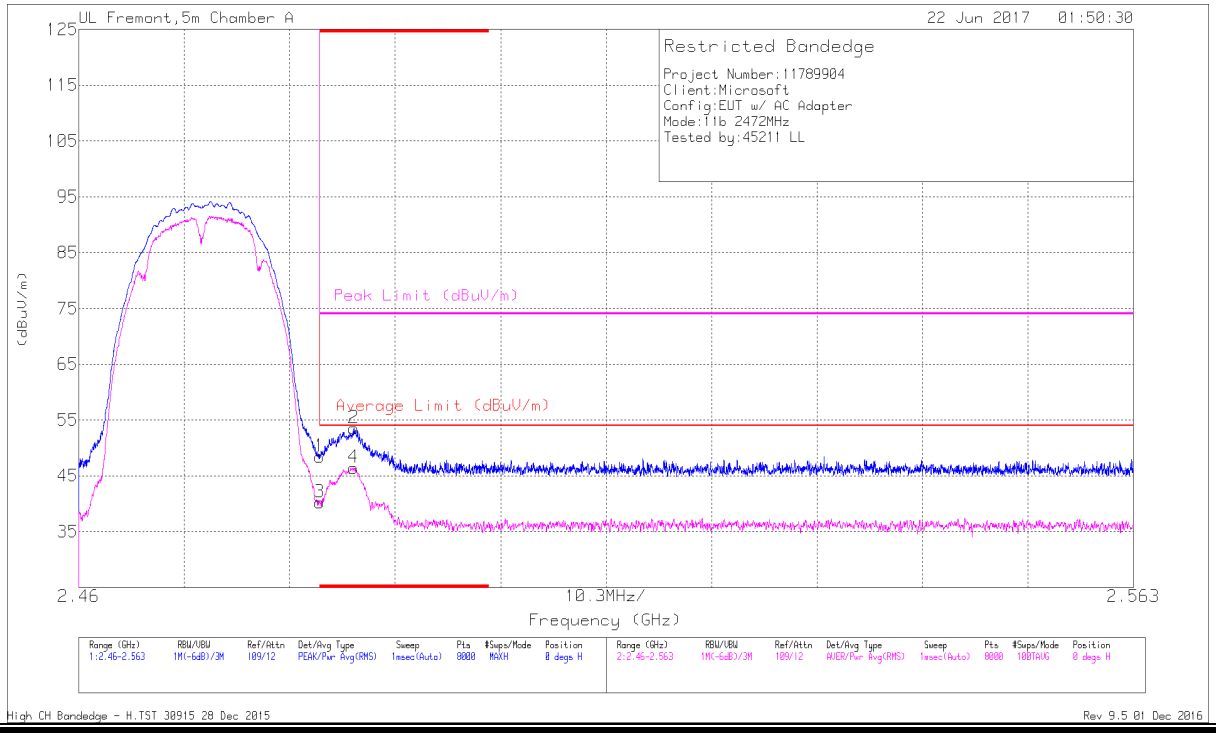


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.34	Pk	32.5	-23.6	49.24	-	-	74	-24.76	250	253	V
2	* 2.484	40.79	Pk	32.6	-23.6	49.79	-	-	74	-24.21	250	253	V
3	* 2.484	30.37	RMS	32.5	-23.6	39.27	54	-14.73	-	-	250	253	V
4	* 2.484	31.54	RMS	32.6	-23.6	40.54	54	-13.46	-	-	250	253	V

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

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 13)

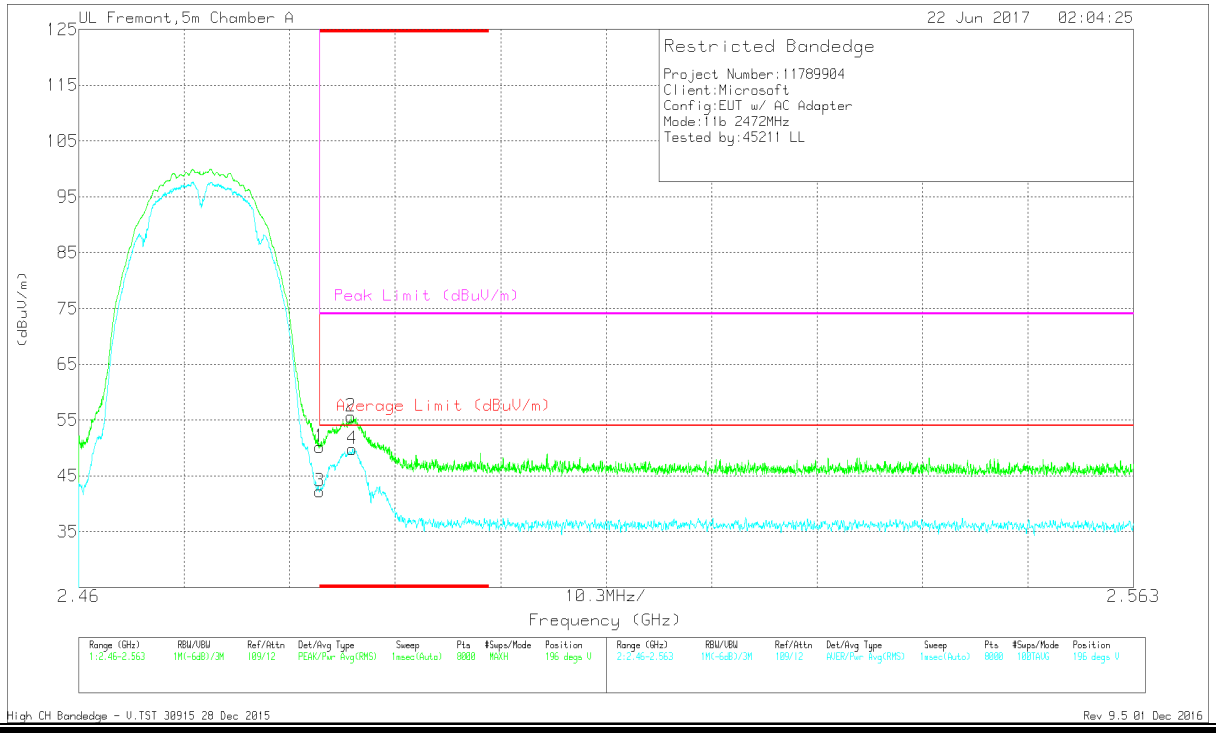
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.5	Pk	32.5	-23.6	48.4	-	-	74	-25.6	0	119	H
2	* 2.487	44.67	Pk	32.6	-23.7	53.57	-	-	74	-20.43	0	119	H
3	* 2.484	31.38	RMS	32.5	-23.6	40.28	54	-13.72	-	-	0	119	H
4	* 2.487	37.49	RMS	32.6	-23.7	46.39	54	-7.61	-	-	0	119	H

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

HIGH CHANNEL VERTICAL

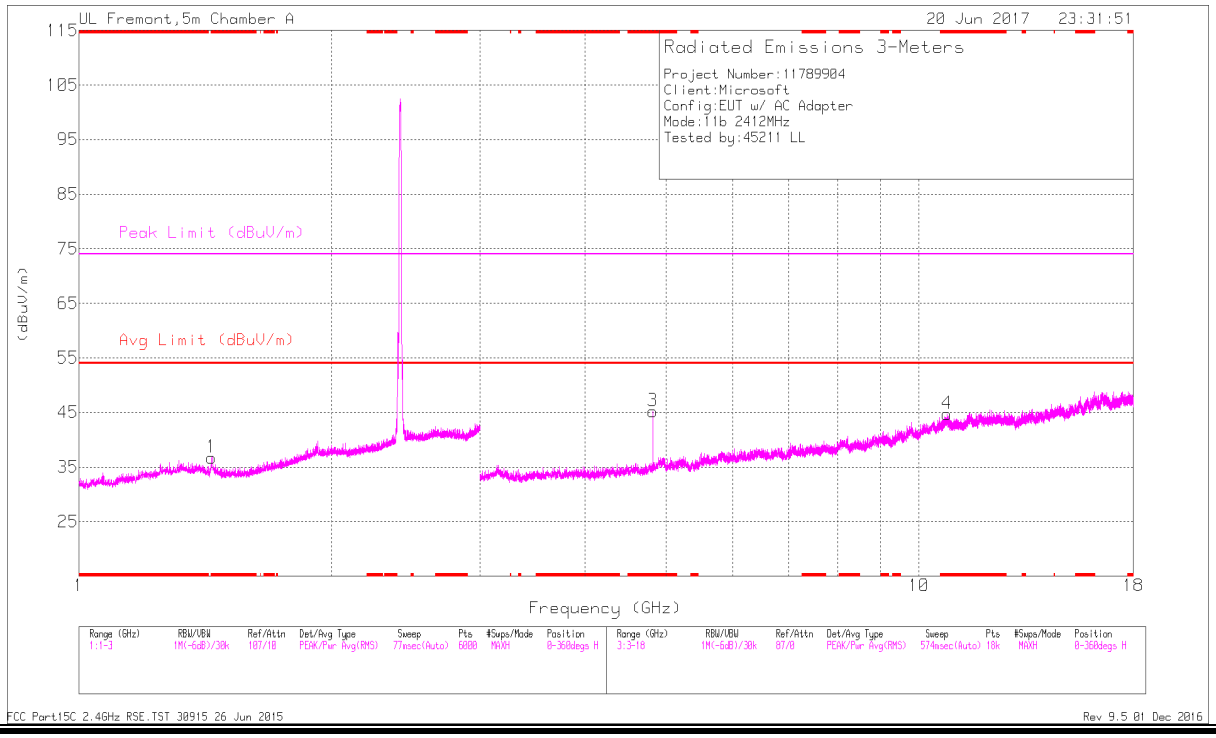


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.29	Pk	32.5	-23.6	50.19	-	-	74	-23.81	196	332	V
2	* 2.487	46.74	Pk	32.6	-23.7	55.64	-	-	74	-18.36	196	332	V
3	* 2.484	33.27	RMS	32.5	-23.6	42.17	54	-11.83	-	-	196	332	V
4	* 2.487	40.89	RMS	32.6	-23.7	49.79	54	-4.21	-	-	196	332	V

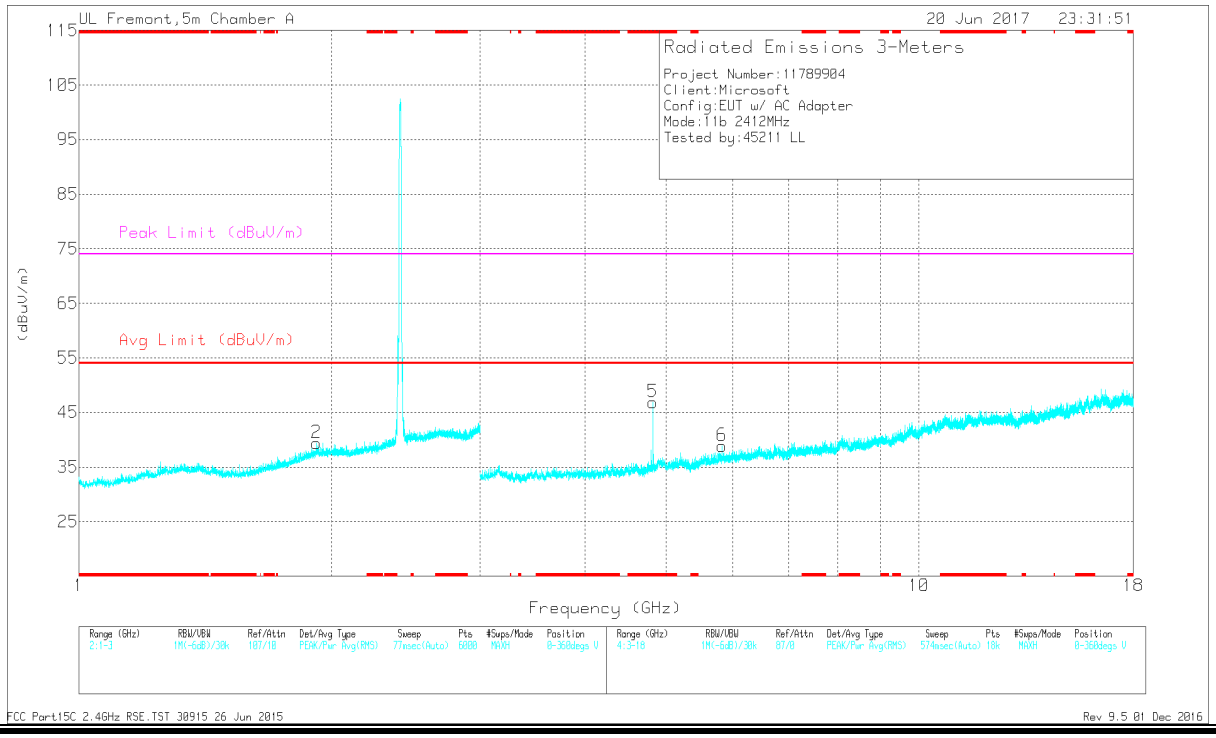
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL

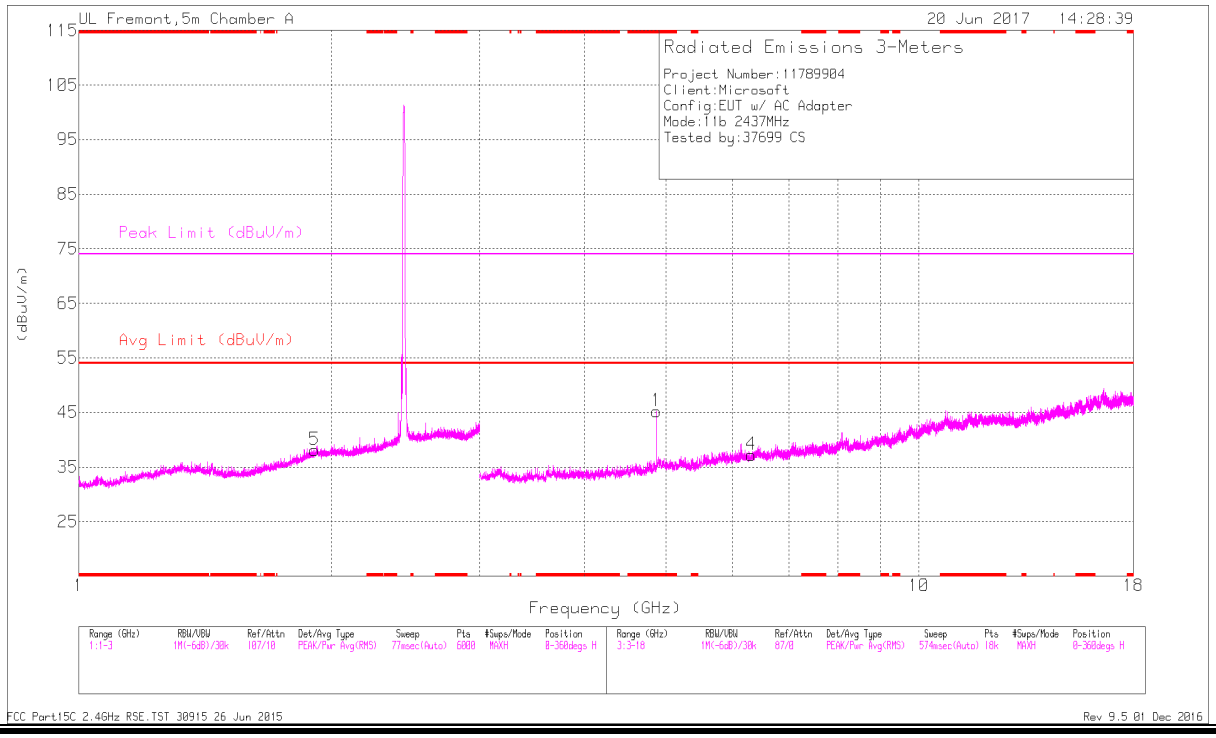


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.44	44.03	PK2	28.8	-23.8	49.03	-	-	74	-24.97	9	190	H
	* 1.44	26.42	MAv1	28.8	-23.8	31.42	54	-22.58	-	-	9	190	H
3	* 4.824	43.35	PK2	34	-28.2	49.15	-	-	74	-24.85	60	119	H
	* 4.824	39.64	MAv1	34	-28.2	45.44	54	-8.56	-	-	60	119	H
4	* 10.806	32.15	PK2	37.9	-19.5	50.55	-	-	74	-23.45	1	249	H
	* 10.805	20.39	MAv1	37.9	-19.5	38.79	54	-15.21	-	-	1	249	H
5	* 4.824	45.36	PK2	34	-28.2	51.16	-	-	74	-22.84	10	250	V
	* 4.824	41.96	MAv1	34	-28.2	47.76	54	-6.24	-	-	10	250	V
2	1.919	40.11	PK2	31.3	-23.5	47.91	-	-	-	-	14	110	V
6	5.828	35.32	PK2	34.8	-25.8	44.32	-	-	-	-	84	247	V

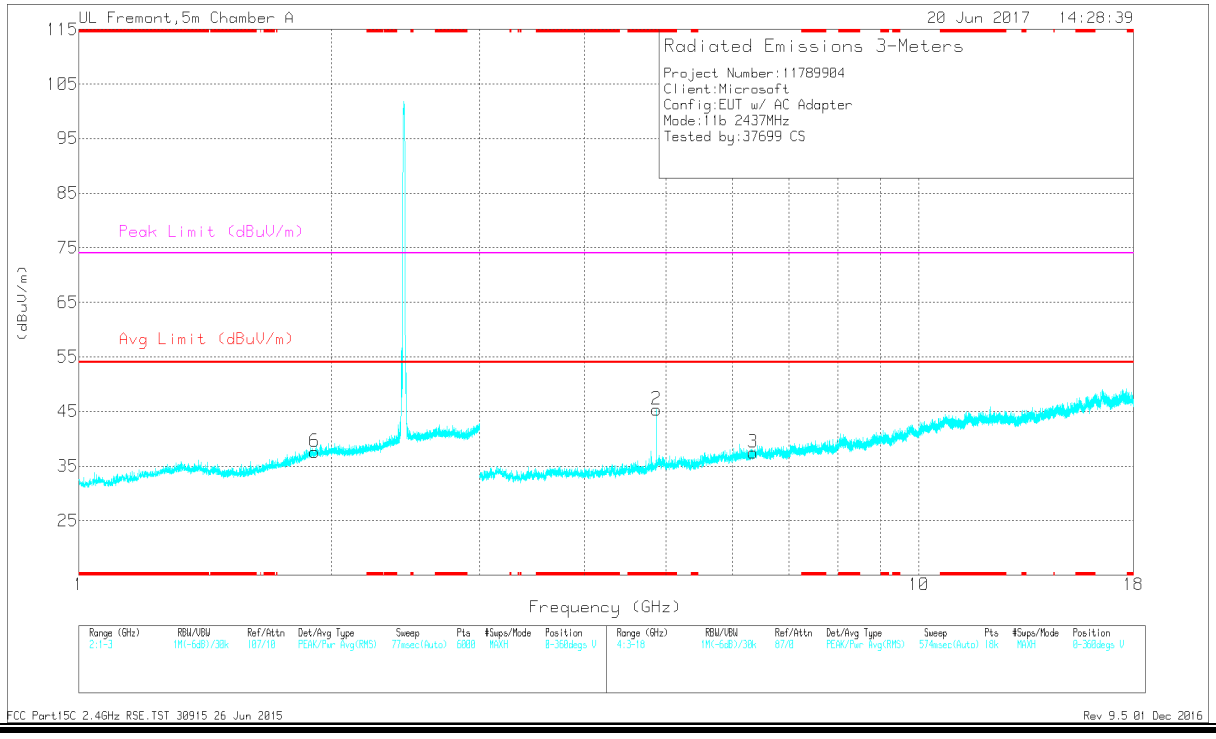
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL

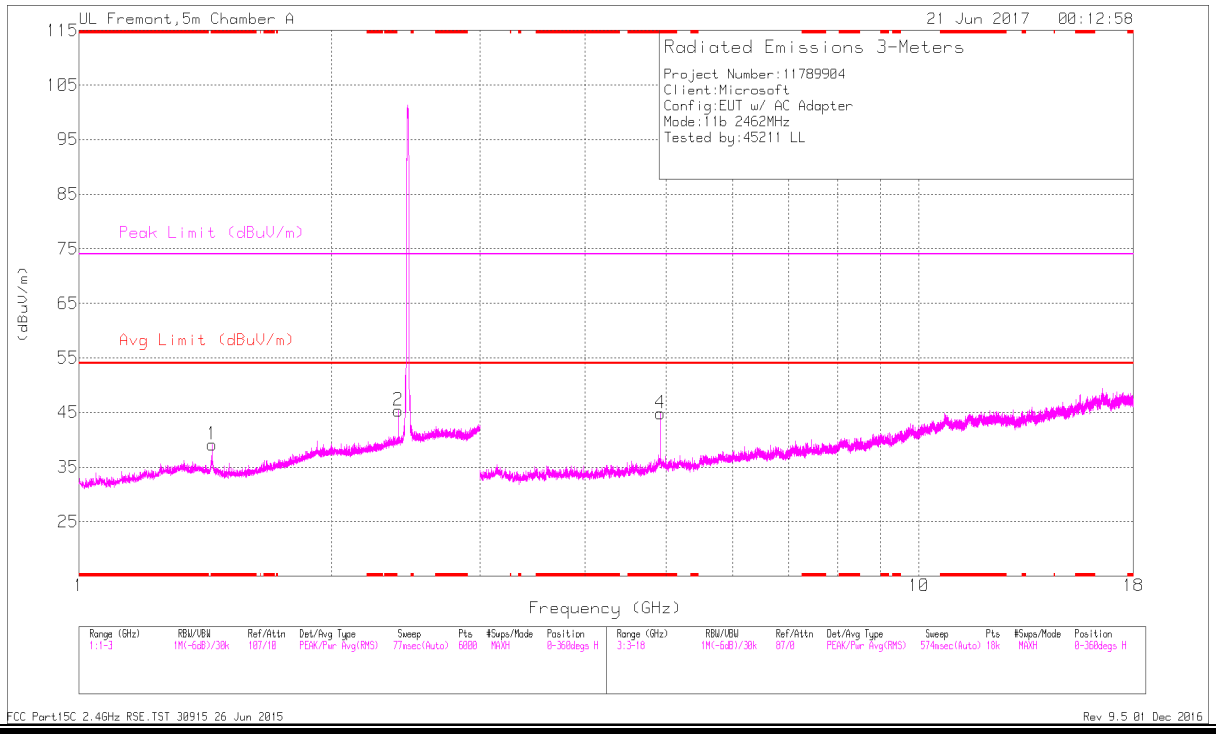


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.874	41.24	PK2	34	-27.8	47.44	-	-	74	-26.56	145	245	H
	* 4.874	36.06	MAv1	34	-27.8	42.26	54	-11.74	-	-	145	245	H
2	* 4.874	45.09	PK2	34	-27.8	51.29	-	-	74	-22.71	95	254	V
	* 4.874	41.7	MAv1	34	-27.8	47.9	54	-6.1	-	-	95	254	V
5	1.909	36.24	PK2	31.3	-23.5	44.04	-	-	-	-	0	101	H
6	1.911	36.14	PK2	31.3	-23.5	43.94	-	-	-	-	0	200	V
4	6.309	35.17	PK2	35.4	-26.5	44.07	-	-	-	-	0	200	H
3	6.351	34.94	PK2	35.4	-26.4	43.94	-	-	-	-	0	101	V

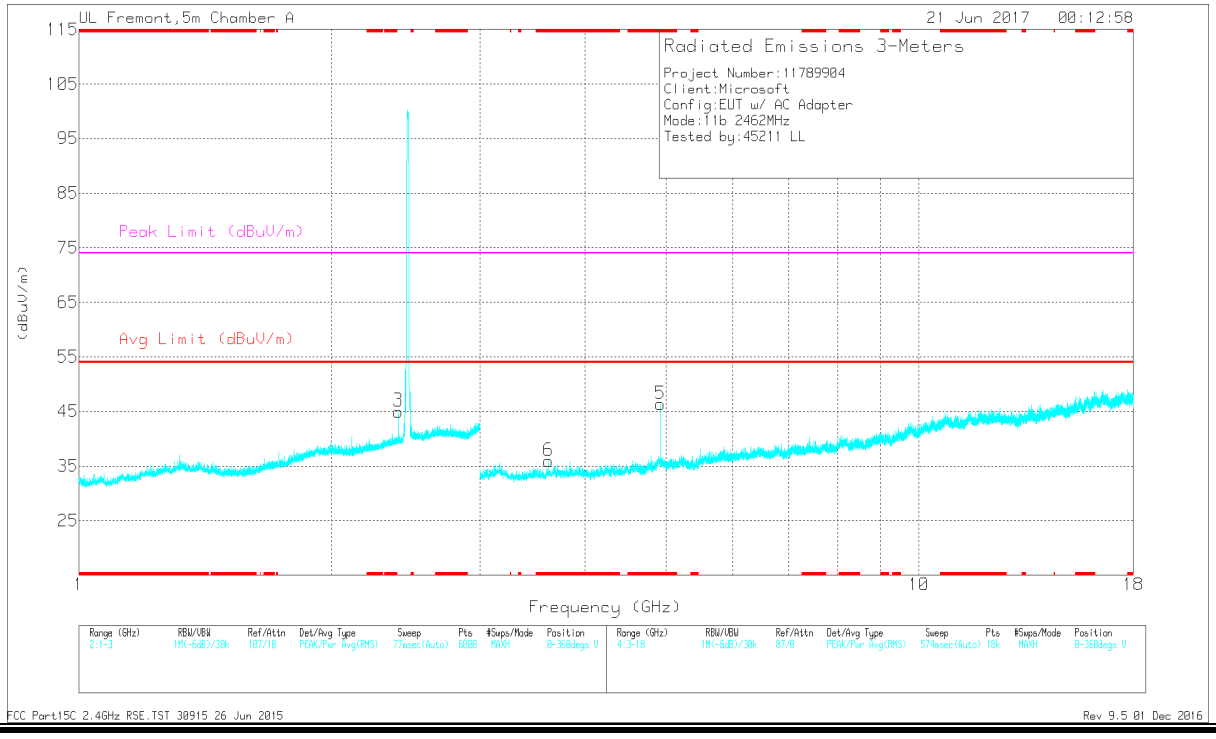
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL

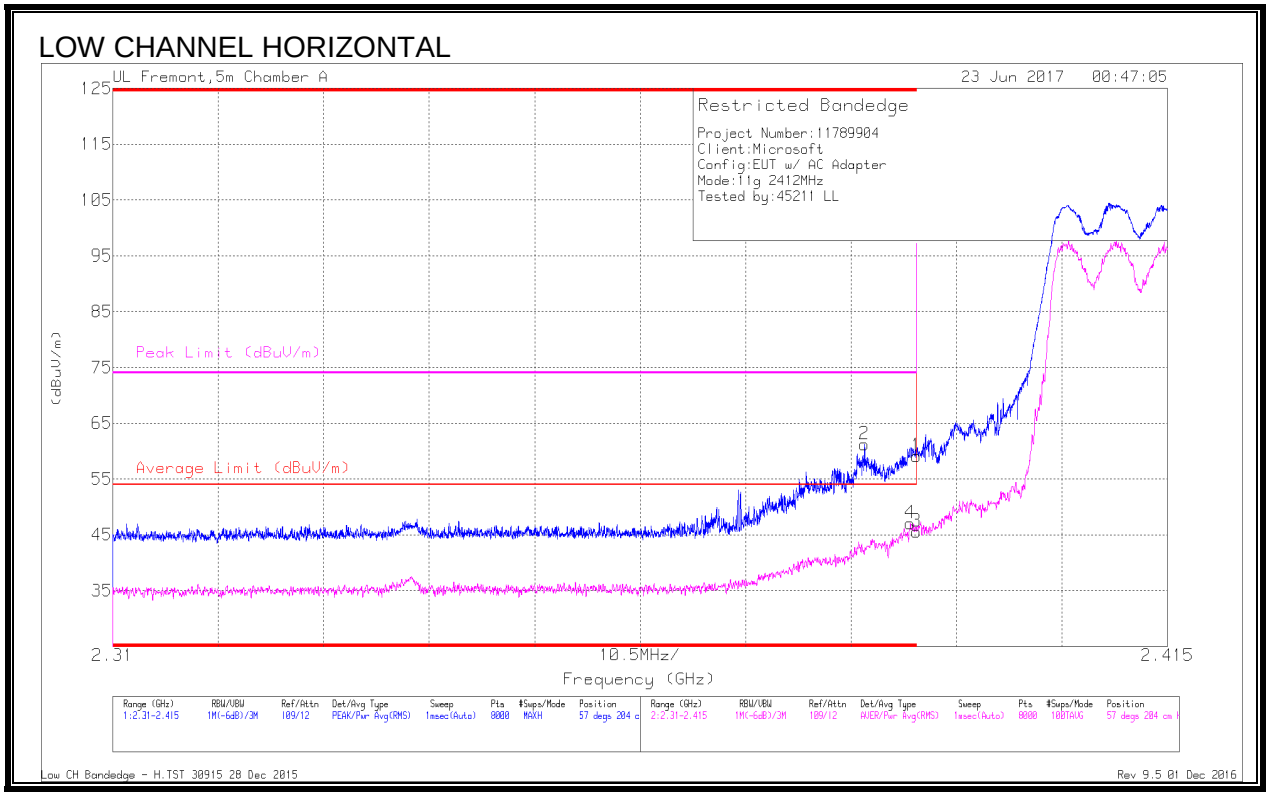


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.441	44.06	PK2	28.8	-23.7	49.16	-	-	74	-24.84	358	144	H
	* 1.44	26.34	MAv1	28.8	-23.8	31.34	54	-22.66	-	-	358	144	H
4	* 4.924	42.55	PK2	34.1	-27.8	48.85	-	-	74	-25.15	3	133	H
	* 4.924	38.43	MAv1	34.1	-27.8	44.73	54	-9.27	-	-	3	133	H
5	* 4.924	45.65	PK2	34.1	-27.8	51.95	-	-	74	-22.05	54	294	V
	* 4.924	42.91	MAv1	34.1	-27.8	49.21	54	-4.79	-	-	54	294	V
6	* 3.618	38.13	PK2	33.1	-30.6	40.63	-	-	74	-33.37	339	389	V
	* 3.619	26.41	MAv1	33.1	-30.6	28.91	54	-25.09	-	-	339	389	V
2	2.4	41.48	PK2	32.1	-23.7	49.88	-	-	-	-	0	147	H
3	2.4	41.19	PK2	32.1	-23.7	49.59	-	-	-	-	324	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2.2. 11g 2TX MIMO MODE IN THE 2.4GHz BAND

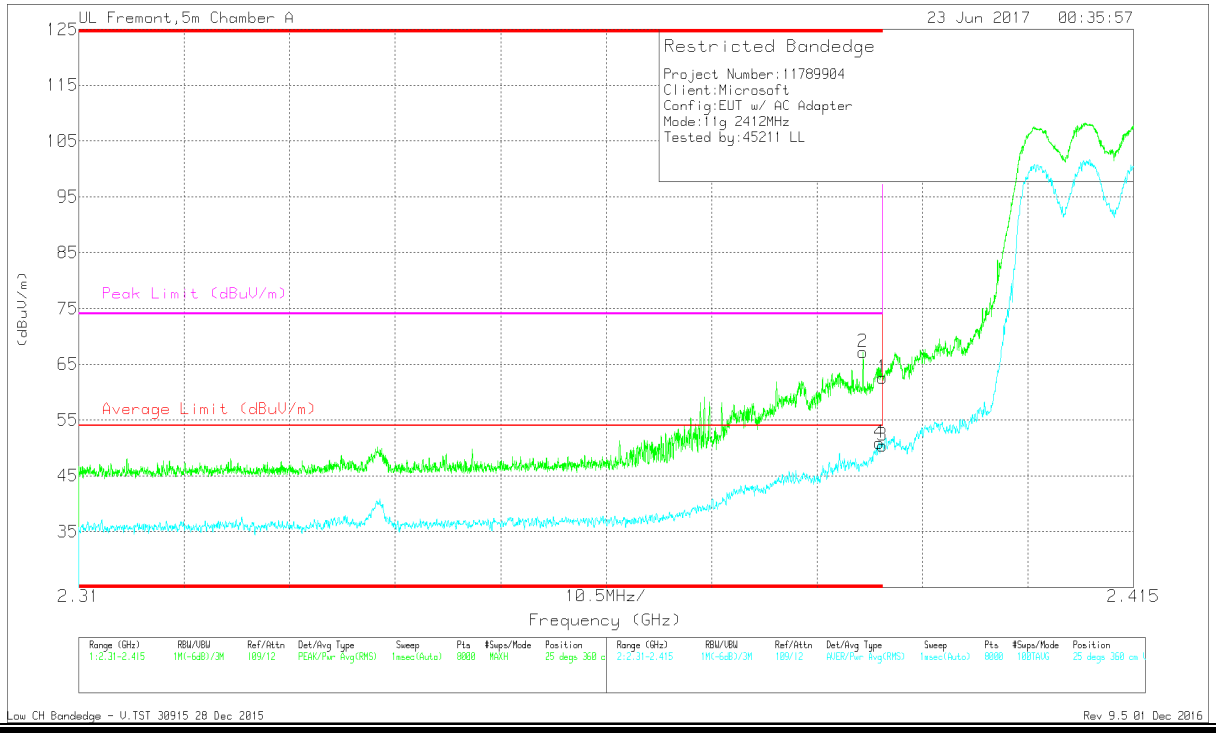
AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	50.73	Pk	32.1	-23.7	59.13	-	-	74	-14.87	57	204	H
2	* 2.385	52.86	Pk	32.1	-23.7	61.26	-	-	74	-12.74	57	204	H
3	* 2.39	37.22	RMS	32.1	-23.7	45.62	54	-8.38	-	-	57	204	H
4	* 2.389	38.61	RMS	32.1	-23.7	47.01	54	-6.99	-	-	57	204	H

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

LOW CHANNEL VERTICAL

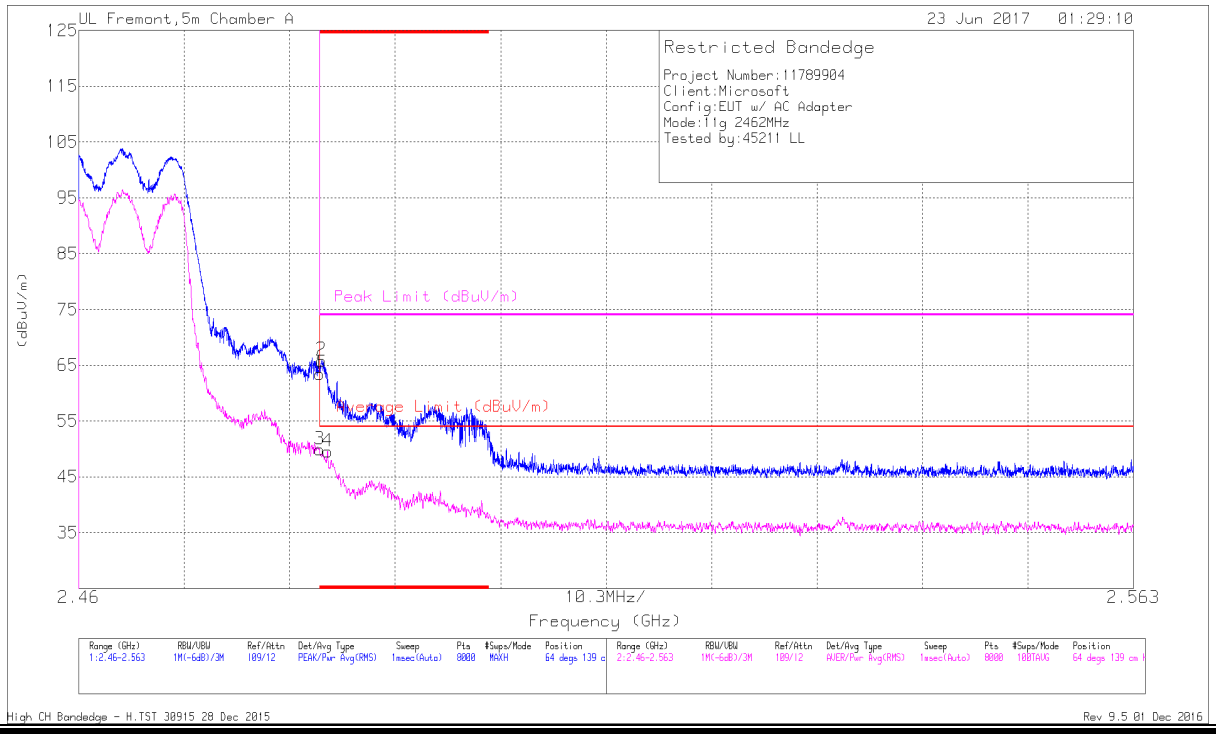


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	54.14	Pk	32.1	-23.7	62.54	-	-	74	-11.46	25	360	V
2	* 2.388	58.81	Pk	32.1	-23.7	67.21	-	-	74	-6.79	25	360	V
3	* 2.39	42.07	RMS	32.1	-23.7	50.47	54	-3.53	-	-	25	360	V
4	* 2.39	42.5	RMS	32.1	-23.7	50.9	54	-3.1	-	-	25	360	V

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

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)

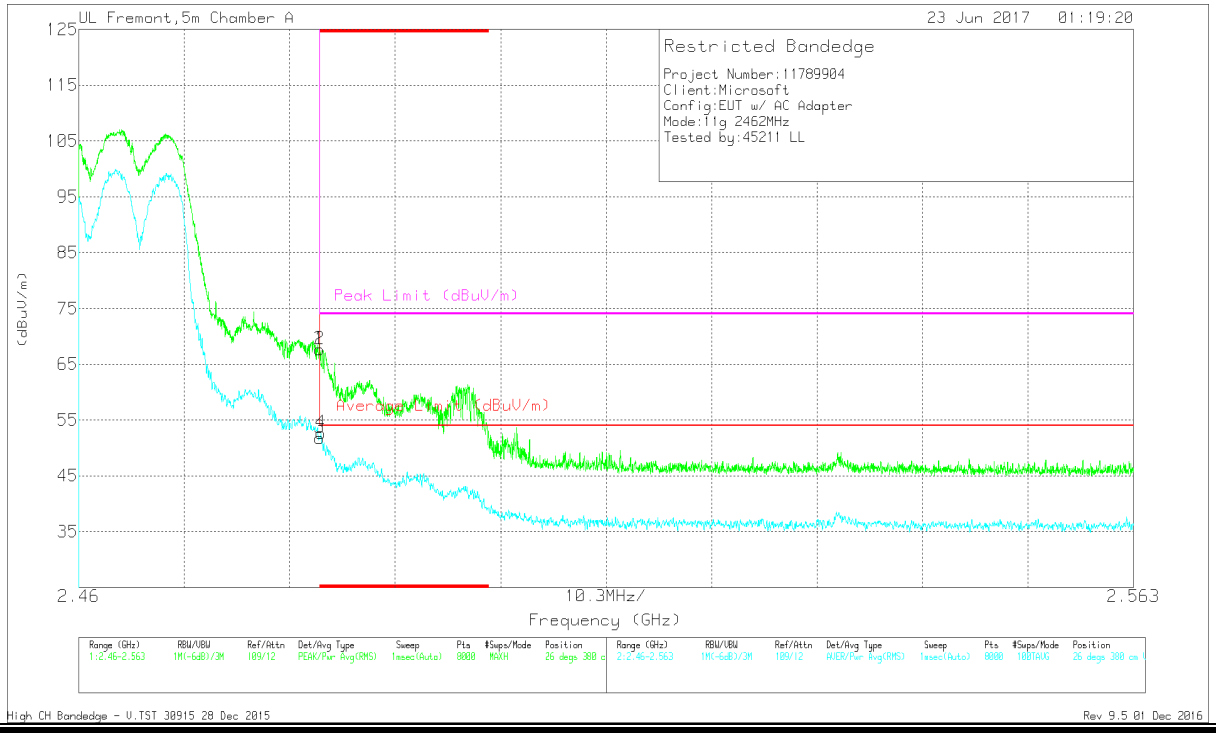
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.58	Pk	32.5	-23.6	63.48	-	-	74	-10.52	64	139	H
2	* 2.484	56.97	Pk	32.5	-23.6	65.87	-	-	74	-8.13	64	139	H
3	* 2.484	41.05	RMS	32.5	-23.6	49.95	54	-4.05	-	-	64	139	H
4	* 2.484	40.52	RMS	32.6	-23.6	49.52	54	-4.48	-	-	64	139	H

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

HIGH CHANNEL VERTICAL

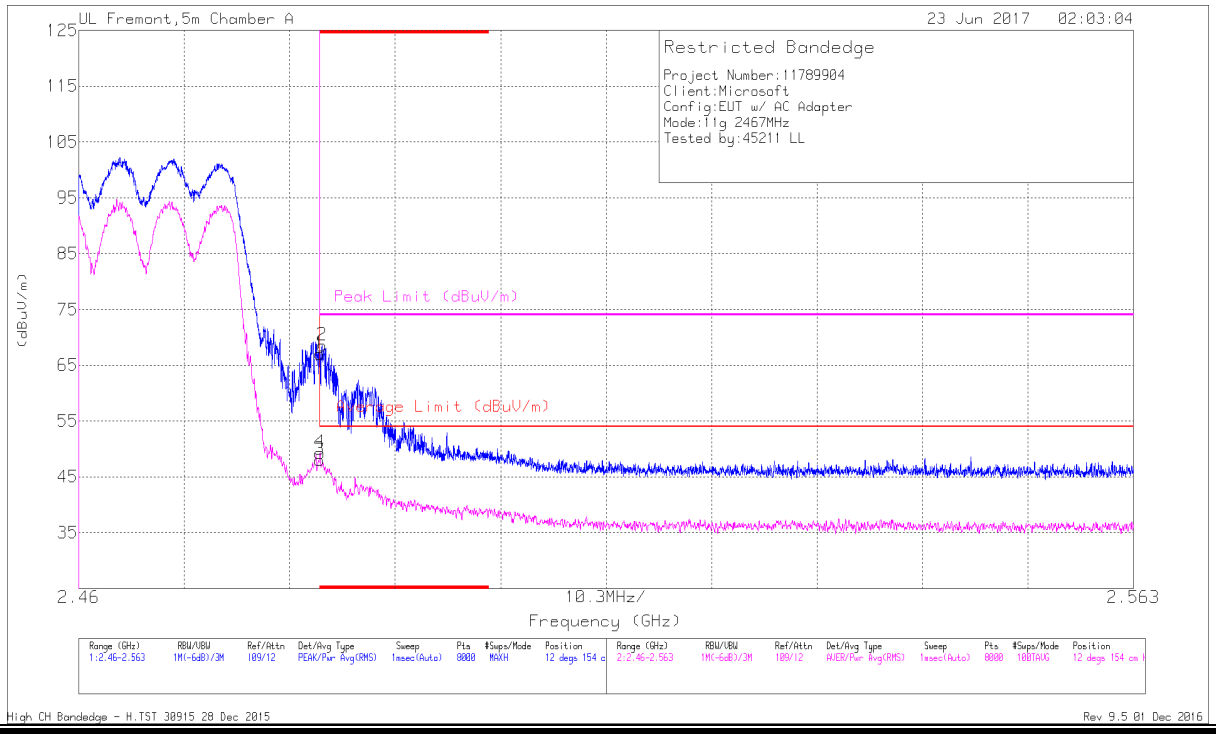


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	58.79	Pk	32.5	-23.6	67.69	-	-	74	-6.31	26	380	V
2	* 2.484	58.81	Pk	32.5	-23.6	67.71	-	-	74	-6.29	26	380	V
3	* 2.484	42.9	RMS	32.5	-23.6	51.8	54	-2.2	-	-	26	380	V
4	* 2.484	43.71	RMS	32.5	-23.6	52.61	54	-1.39	-	-	26	380	V

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

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 12)

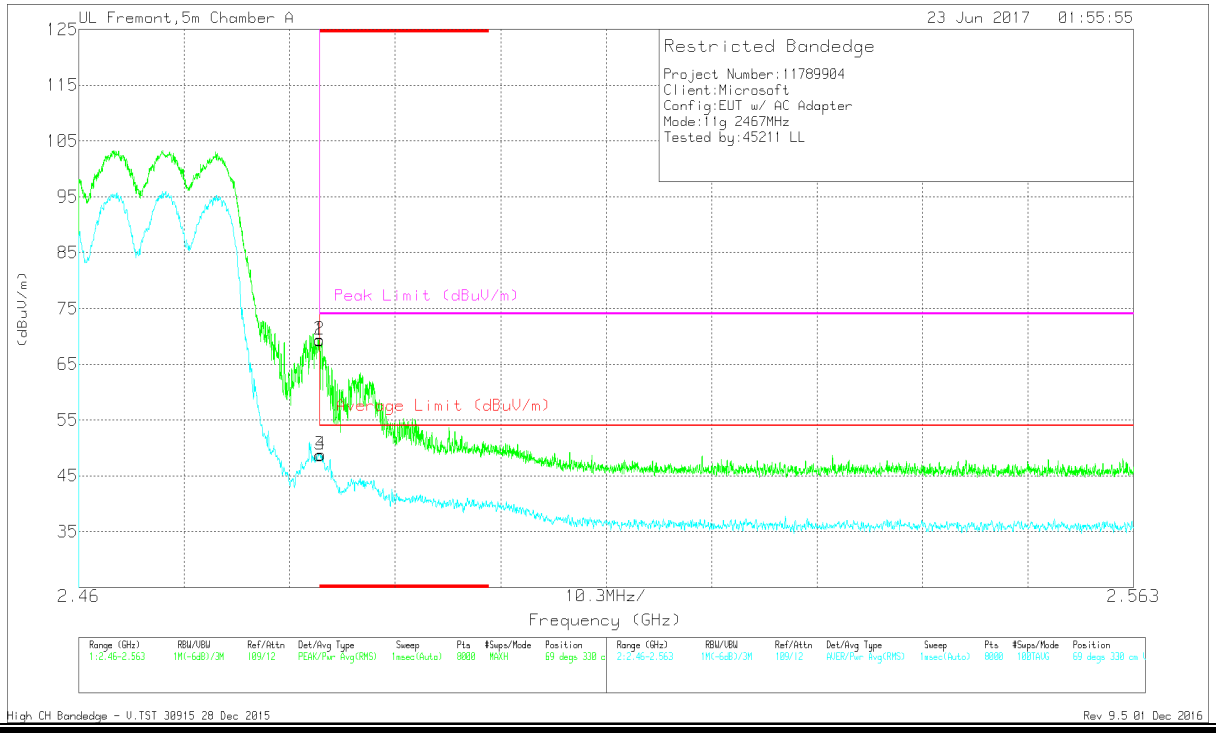
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	58.11	Pk	32.5	-23.6	67.01	-	-	74	-6.99	12	154	H
2	* 2.484	59.61	Pk	32.5	-23.6	68.51	-	-	74	-5.49	12	154	H
3	* 2.484	39.19	RMS	32.5	-23.6	48.09	54	-5.91	-	-	12	154	H
4	* 2.484	40.44	RMS	32.5	-23.6	49.34	54	-4.66	-	-	12	154	H

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

HIGH CHANNEL VERTICAL

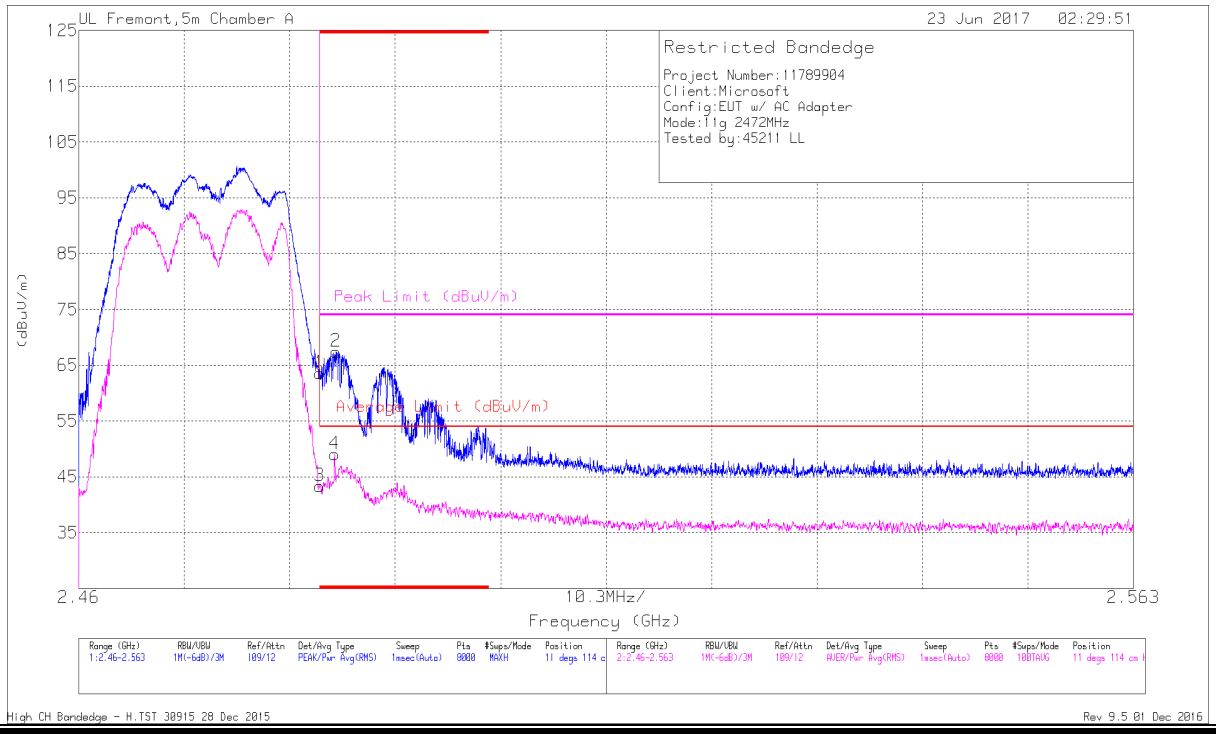


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	60.34	Pk	32.5	-23.6	69.24	-	-	74	-4.76	69	330	V
2	* 2.484	60.53	Pk	32.5	-23.6	69.43	-	-	74	-4.57	69	330	V
3	* 2.484	39.84	RMS	32.5	-23.6	48.74	54	-5.26	-	-	69	330	V
4	* 2.484	39.9	RMS	32.5	-23.6	48.8	54	-5.2	-	-	69	330	V

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

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 13)

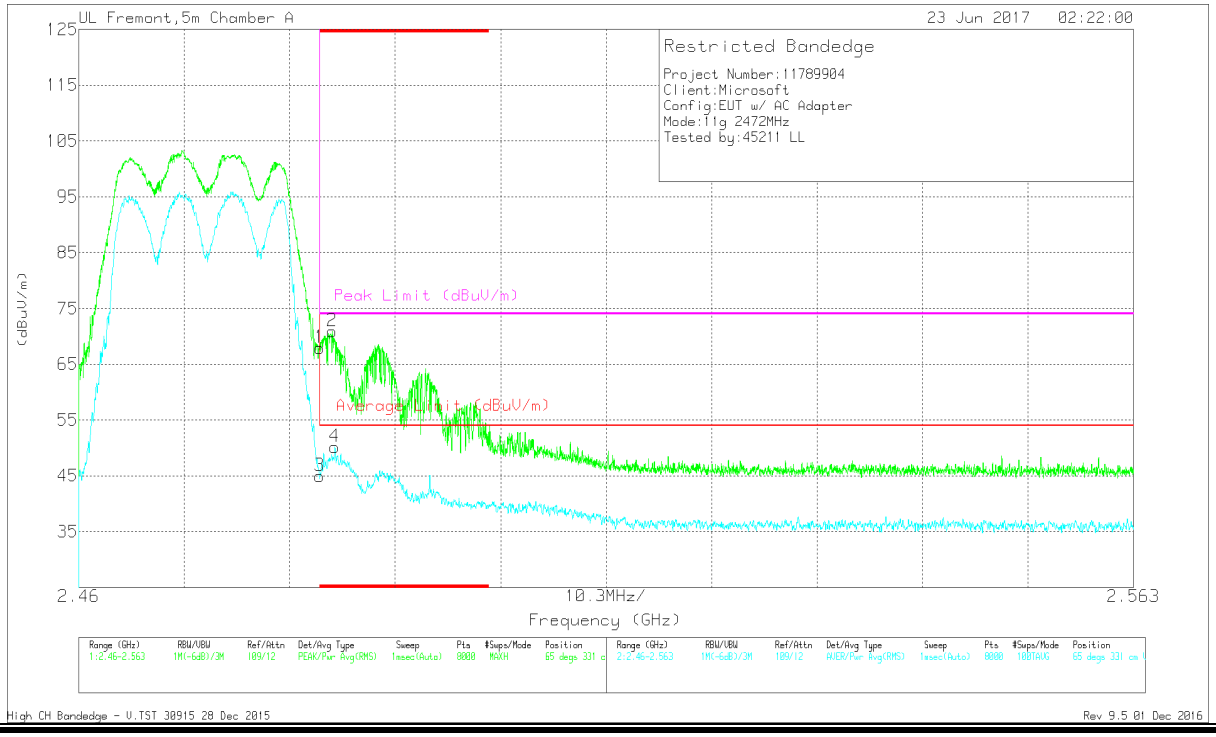
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.67	Pk	32.5	-23.6	63.57	-	-	74	-10.43	11	114	H
2	* 2.485	58.5	Pk	32.6	-23.7	67.4	-	-	74	-6.6	11	114	H
3	* 2.484	34.42	RMS	32.5	-23.6	43.32	54	-10.68	-	-	11	114	H
4	* 2.485	40.12	RMS	32.6	-23.7	49.02	54	-4.98	-	-	11	114	H

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

HIGH CHANNEL VERTICAL

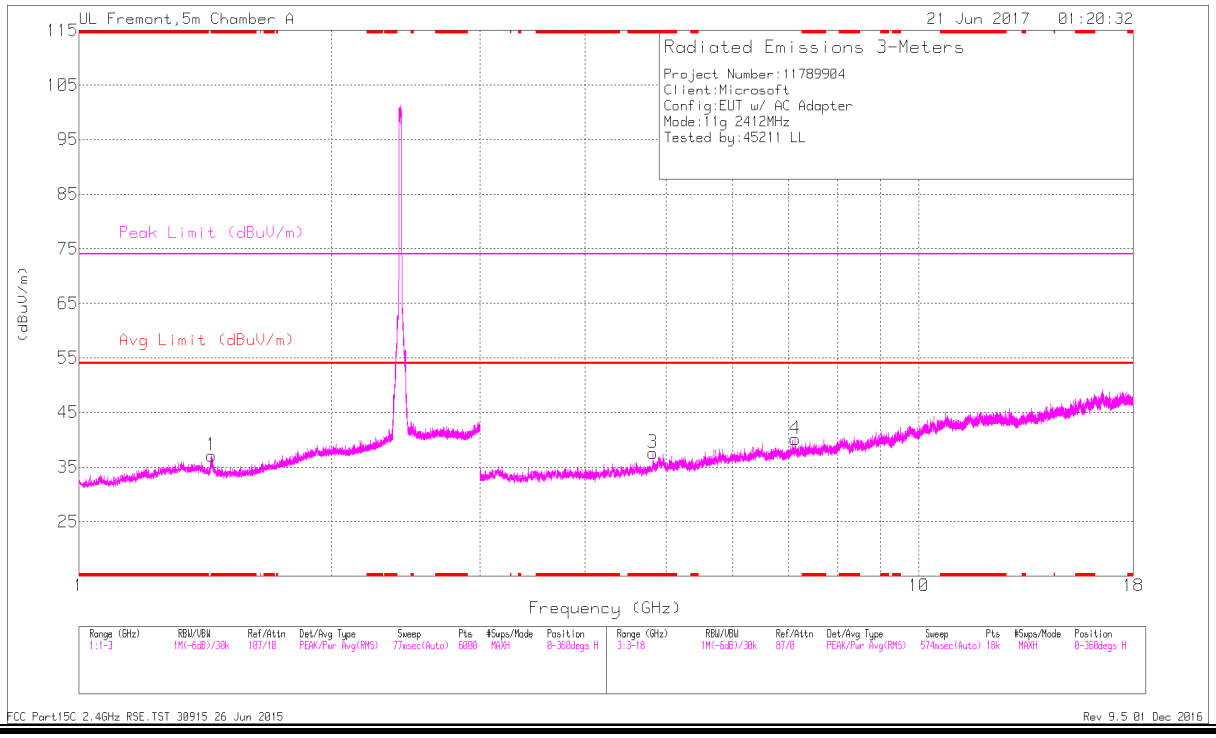


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	59	Pk	32.5	-23.6	67.9	-	-	74	-6.1	65	331	V
2	* 2.485	62.02	Pk	32.6	-23.7	70.92	-	-	74	-3.08	65	331	V
3	* 2.484	36.09	RMS	32.5	-23.6	44.99	54	-9.01	-	-	65	331	V
4	* 2.485	41.29	RMS	32.6	-23.7	50.19	54	-3.81	-	-	65	331	V

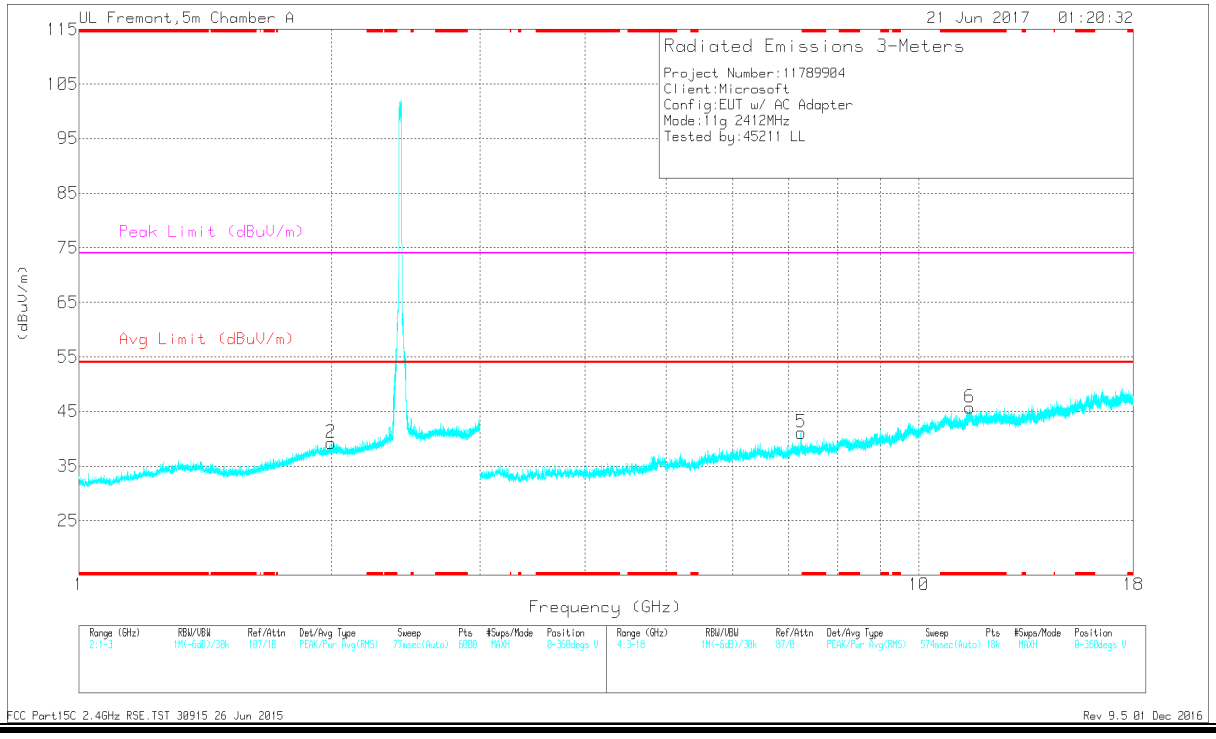
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL

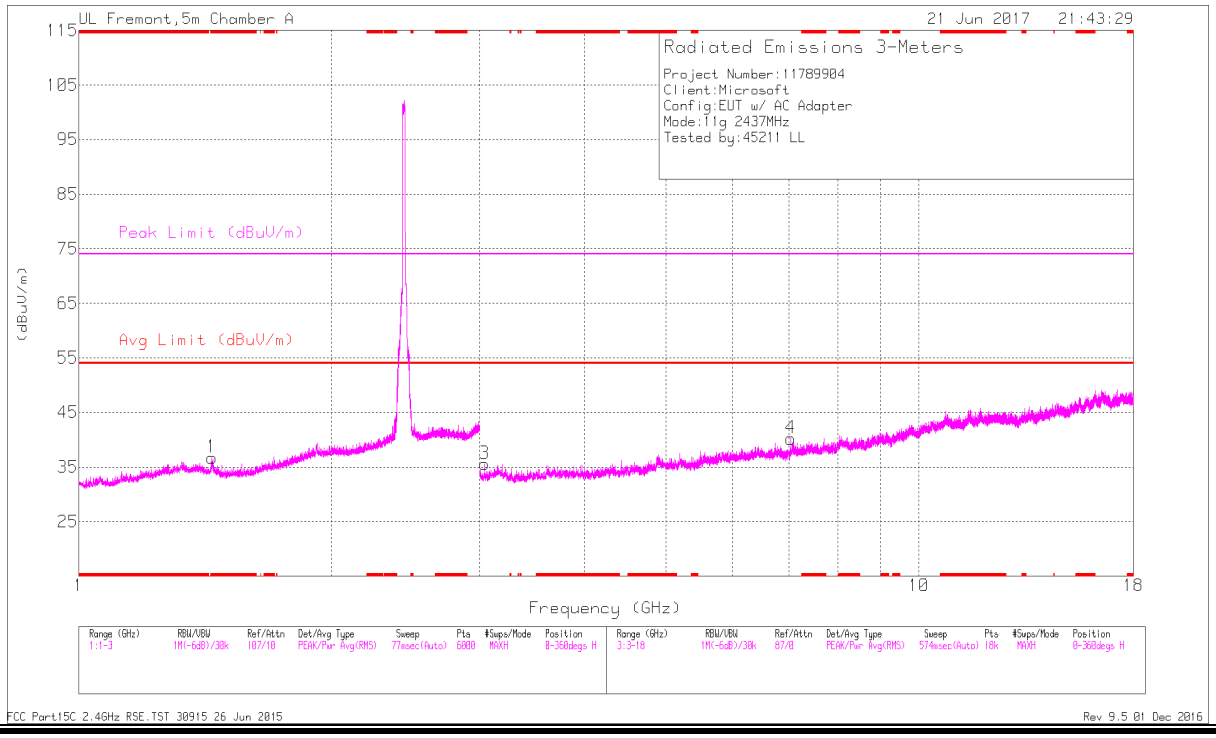


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.441	43.56	PK2	28.8	-23.7	48.66	-	-	74	-25.34	2	146	H
	* 1.44	26.37	MAv1	28.8	-23.8	31.37	54	-22.63	-	-	2	146	H
3	* 4.823	38.48	PK2	34	-28.2	44.28	-	-	74	-29.72	45	104	H
	* 4.822	26.57	MAv1	34	-28.2	32.37	54	-21.63	-	-	45	104	H
6	* 11.487	31.9	PK2	38.1	-19.3	50.7	-	-	74	-23.3	225	177	V
	* 11.486	20.45	MAv1	38.1	-19.3	39.25	54	-14.75	-	-	225	177	V
2	1.994	36.94	PK2	31.4	-23.6	44.74	-	-	-	-	176	220	V
4	7.123	33.06	PK2	35.5	-23.9	44.66	-	-	-	-	315	364	H
5	7.243	40.98	PK2	35.5	-24.9	51.58	-	-	-	-	333	190	V

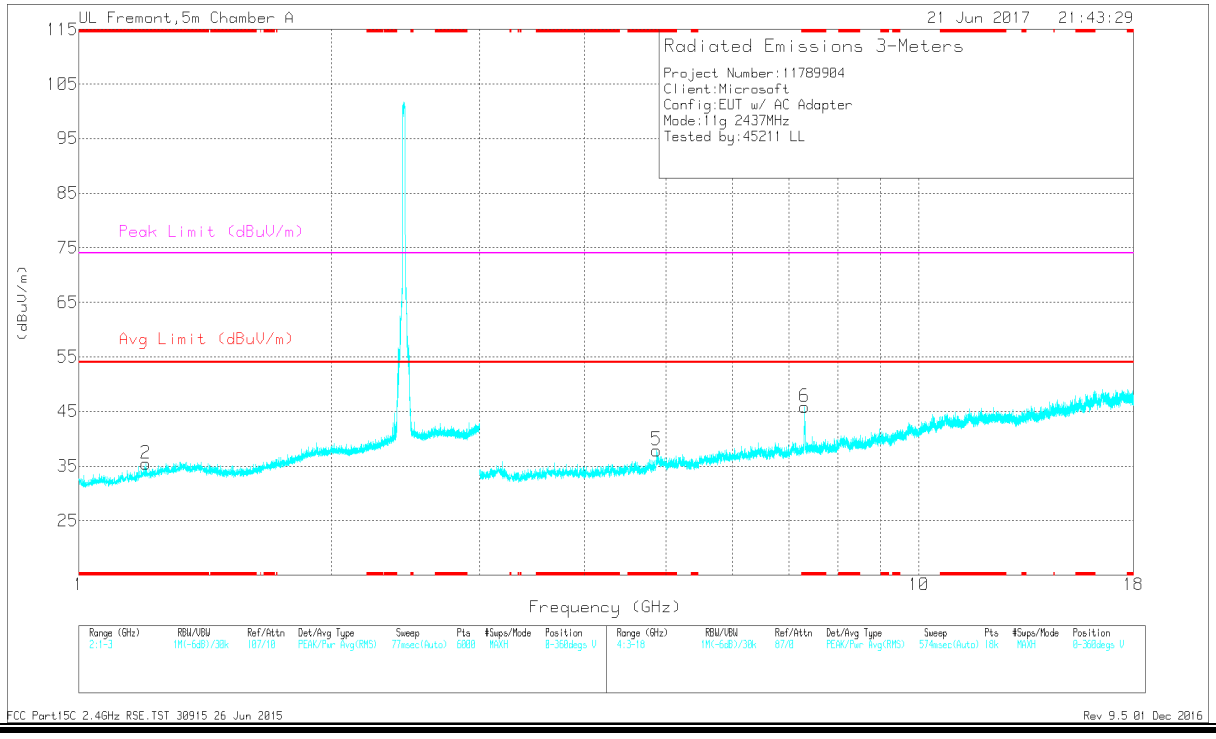
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



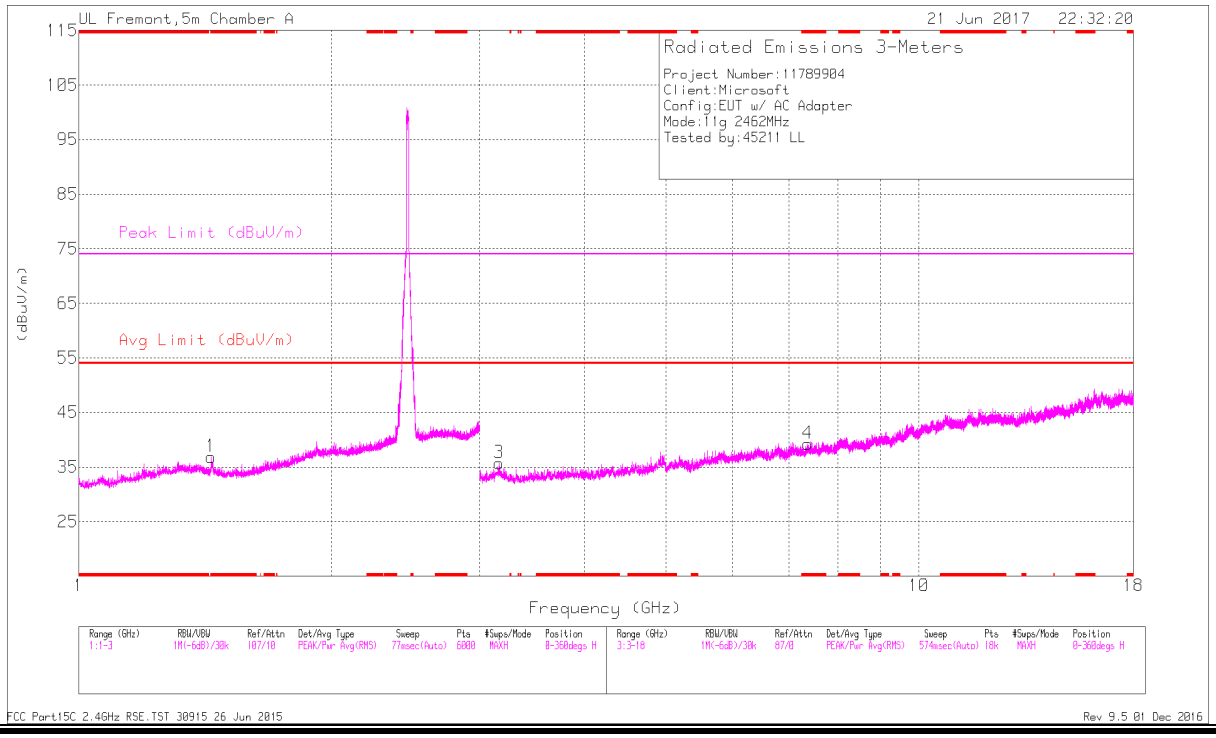
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.441	44.81	PK-U	28.8	-23.7	49.91	-	-	74	-24.09	175	116	H
	* 1.44	26.79	ADR	28.8	-23.8	31.79	54	-22.21	-	-	175	116	H
2	* 1.202	36.39	PK-U	28.6	-24	40.99	-	-	74	-33.01	136	200	V
	* 1.2	24.37	ADR	28.6	-24.1	28.87	54	-25.13	-	-	136	200	V
6	* 7.311	35.07	PK-U	35.4	-24.8	45.67	-	-	74	-28.33	296	200	V
	* 7.311	25.61	ADR	35.5	-25	36.11	54	-17.89	-	-	296	200	V
5	* 4.874	36.75	PK-U	34	-27.8	42.95	-	-	74	-31.05	270	207	V
	* 4.874	26.09	ADR	34	-27.8	32.29	54	-21.71	-	-	270	207	V
3	3.039	38.61	PK-U	32.8	-31.3	40.11	-	-	-	-	301	189	H
4	7.042	34.49	PK-U	35.4	-24.8	45.09	-	-	-	-	181	102	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

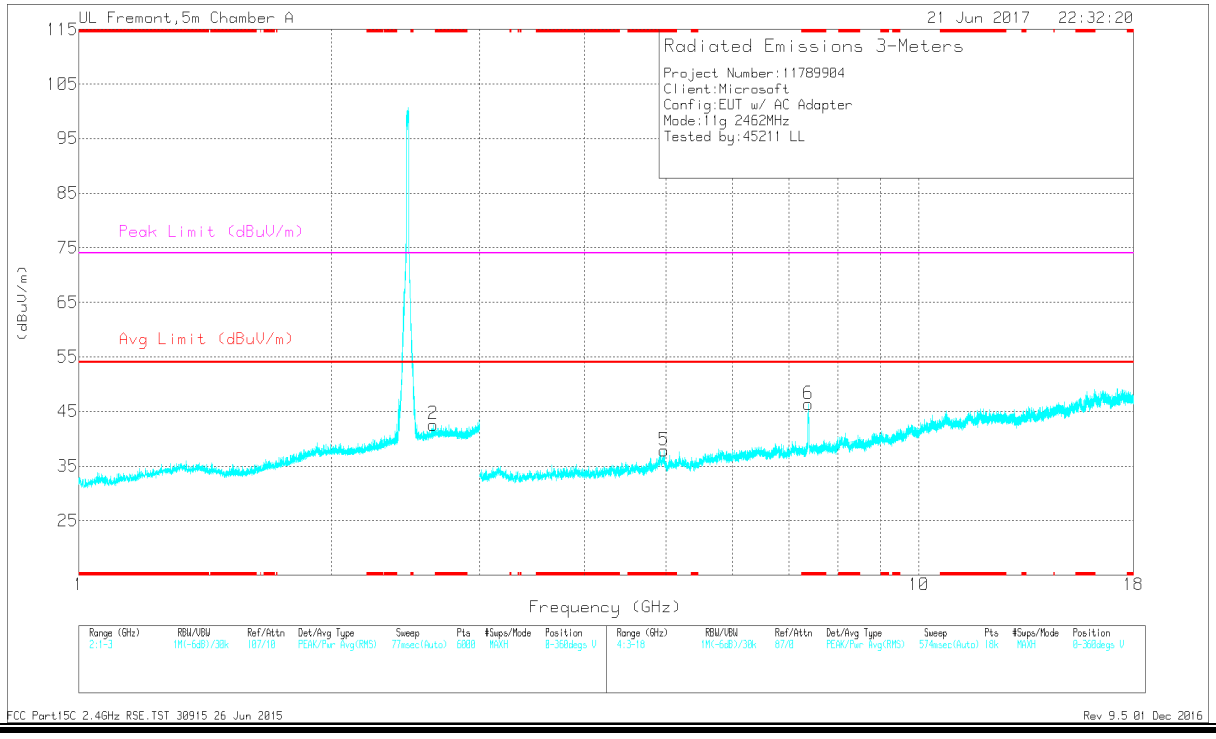
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL

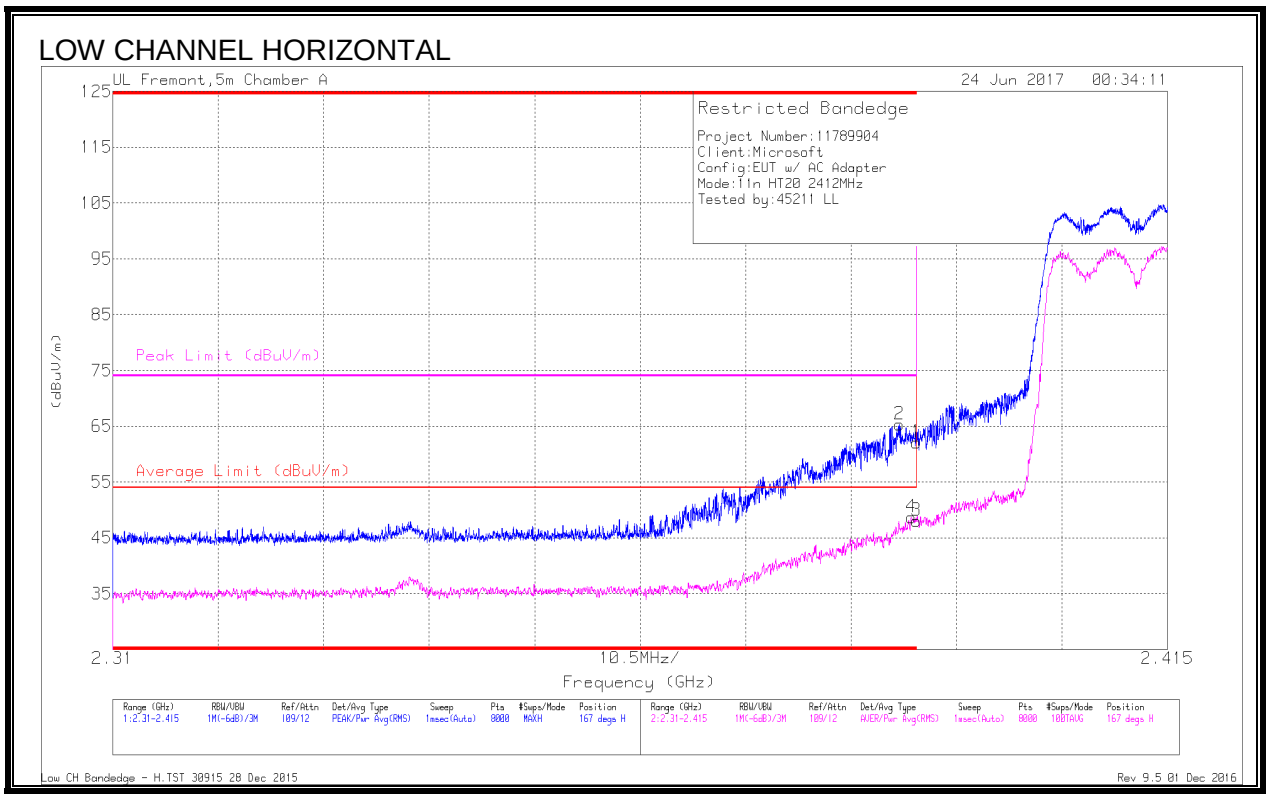


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.443	38.62	PK-U	28.8	-23.7	43.72	-	-	74	-30.28	177	190	H
	* 1.44	25.73	ADR	28.8	-23.8	30.73	54	-23.27	-	-	177	190	H
4	* 7.377	33.07	PK-U	35.5	-23.9	44.67	-	-	74	-29.33	125	102	H
	* 7.374	22.45	ADR	35.5	-24	33.95	54	-20.05	-	-	125	102	H
5	* 4.97	37.94	PK-U	34.1	-28.5	43.54	-	-	74	-30.46	178	102	V
	* 4.97	26.67	ADR	34.1	-28.5	32.27	54	-21.73	-	-	178	102	V
6	* 7.387	33.61	PK-U	35.5	-23.9	45.21	-	-	74	-28.79	127	400	V
	* 7.387	21.81	ADR	35.5	-23.9	33.41	54	-20.59	-	-	127	400	V
2	2.643	37.8	PK-U	32.7	-23.4	47.1	-	-	-	-	201	102	V
3	3.164	38.11	PK-U	33	-29.6	41.51	-	-	-	-	317	199	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

10.2.3. 11n HT20 2TX MIMO MODE IN THE 2.4GHz BAND

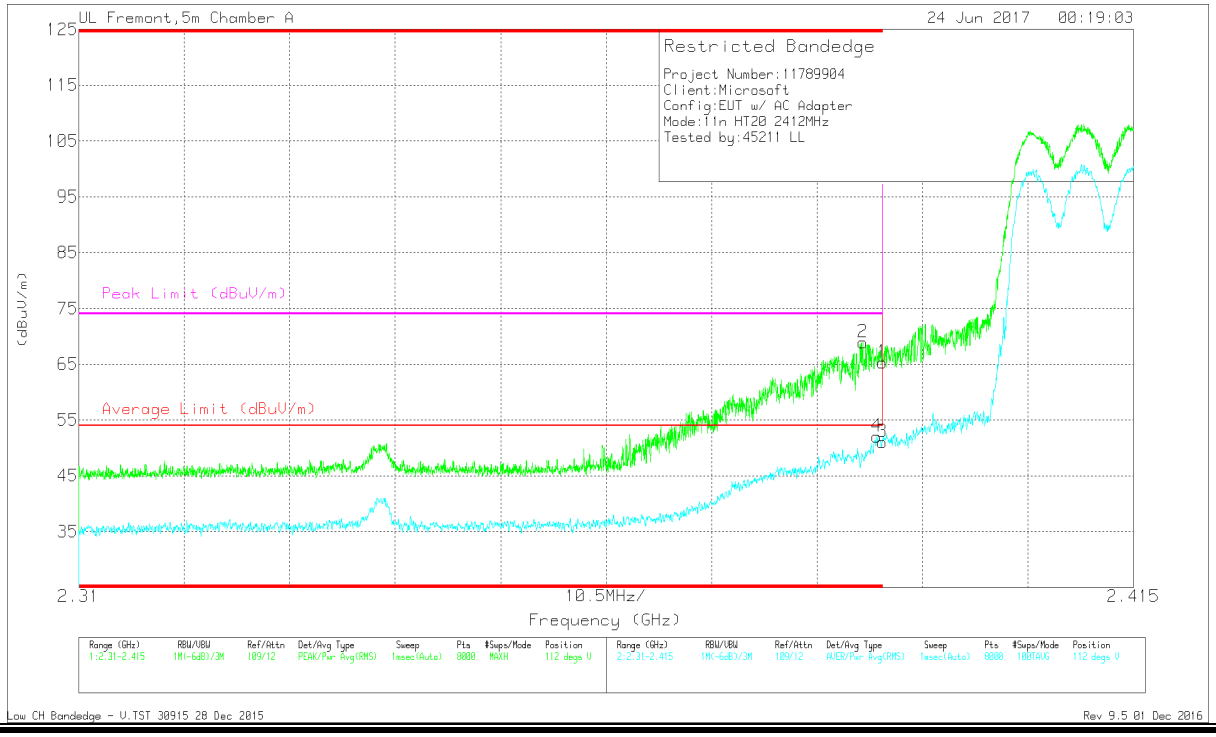
AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	53.71	Pk	32.1	-23.7	62.11	-	-	74	-11.89	167	151	H
2	* 2.388	56.88	Pk	32.1	-23.7	65.28	-	-	74	-8.72	167	151	H
3	* 2.39	39.68	RMS	32.1	-23.7	48.08	54	-5.92	-	-	167	151	H
4	* 2.39	40.28	RMS	32.1	-23.7	48.68	54	-5.32	-	-	167	151	H

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

LOW CHANNEL VERTICAL

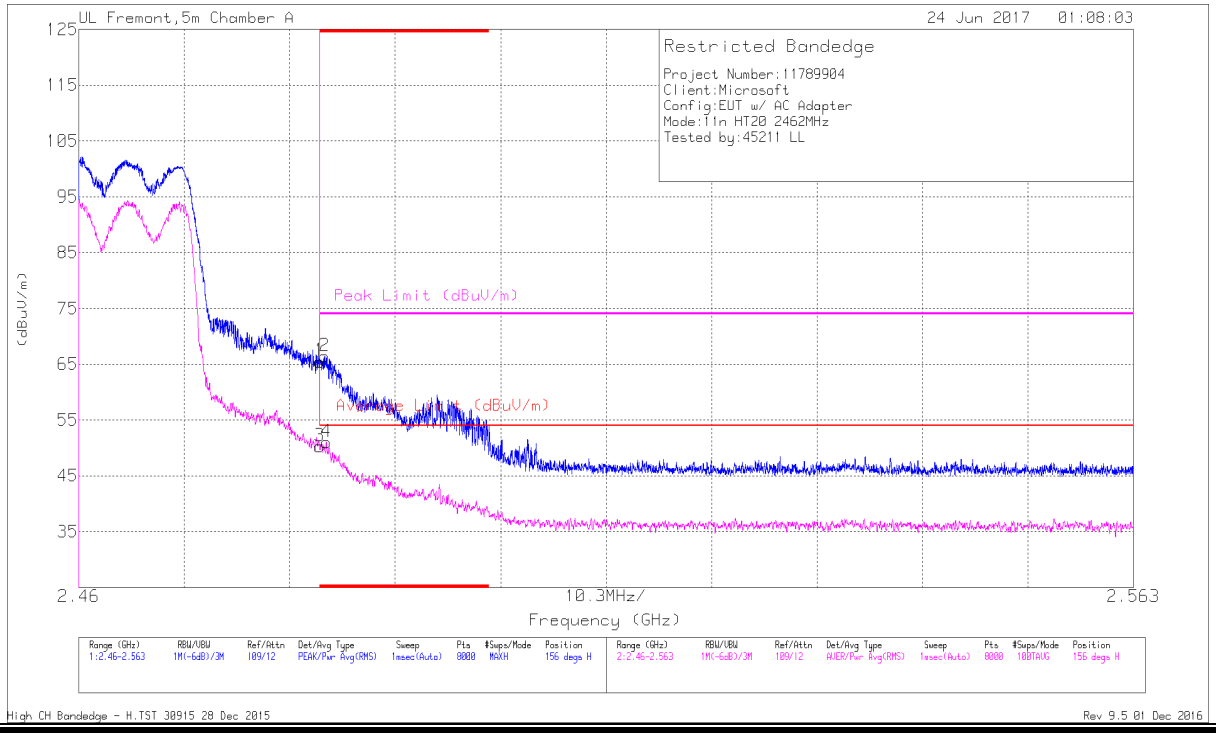


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	56.93	Pk	32.1	-23.7	65.33	-	-	74	-8.67	112	365	V
2	* 2.388	60.5	Pk	32.1	-23.7	68.9	-	-	74	-5.1	112	365	V
3	* 2.39	42.65	RMS	32.1	-23.7	51.05	54	-2.95	-	-	112	365	V
4	* 2.389	43.64	RMS	32.1	-23.7	52.04	54	-1.96	-	-	112	365	V

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

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)

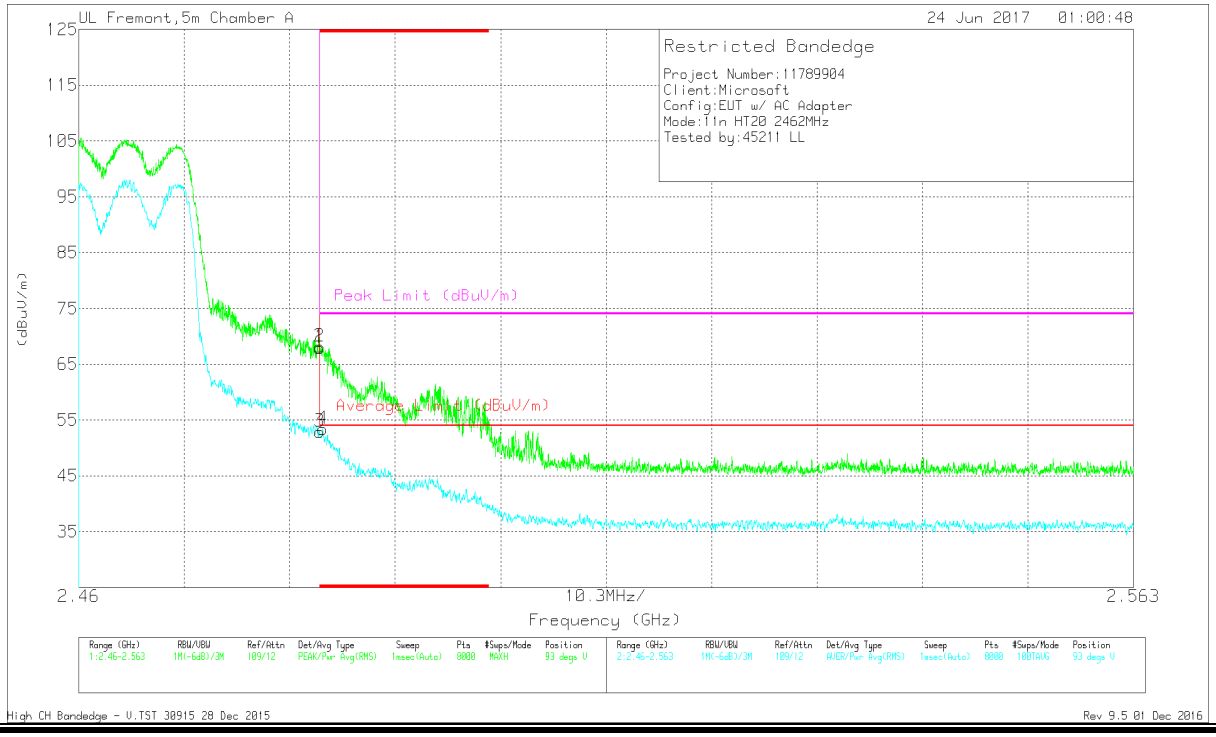
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	56.6	Pk	32.5	-23.6	65.5	-	-	74	-8.5	156	202	H
2	* 2.484	57.55	Pk	32.5	-23.6	66.45	-	-	74	-7.55	156	202	H
3	* 2.484	41.41	RMS	32.5	-23.6	50.31	54	-3.69	-	-	156	202	H
4	* 2.484	42.1	RMS	32.5	-23.6	51	54	-3	-	-	156	202	H

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

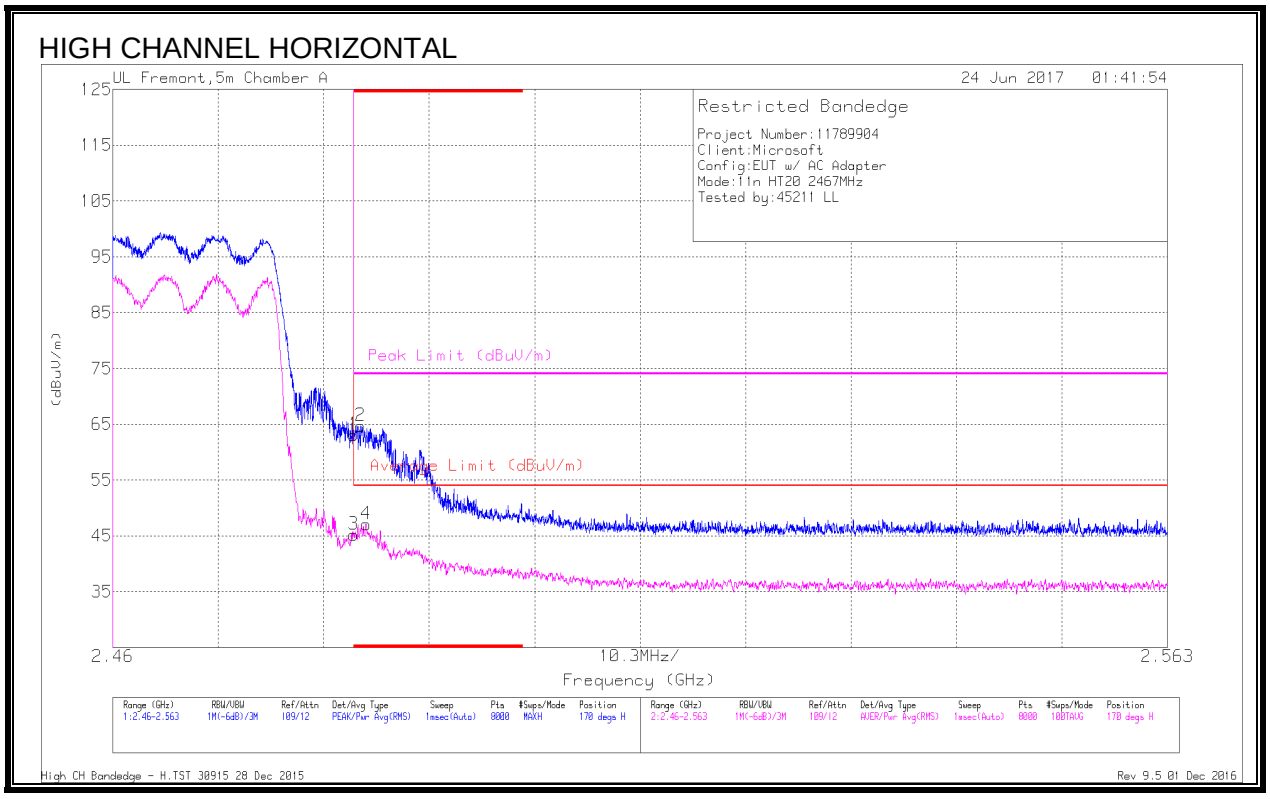
HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	59.08	Pk	32.5	-23.6	67.98	-	-	74	-6.02	93	348	V
2	* 2.484	59.3	Pk	32.5	-23.6	68.2	-	-	74	-5.8	93	348	V
3	* 2.484	44.04	RMS	32.5	-23.6	52.94	54	-1.06	-	-	93	348	V
4	* 2.484	44.54	RMS	32.5	-23.6	53.44	54	-.56	-	-	93	348	V

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

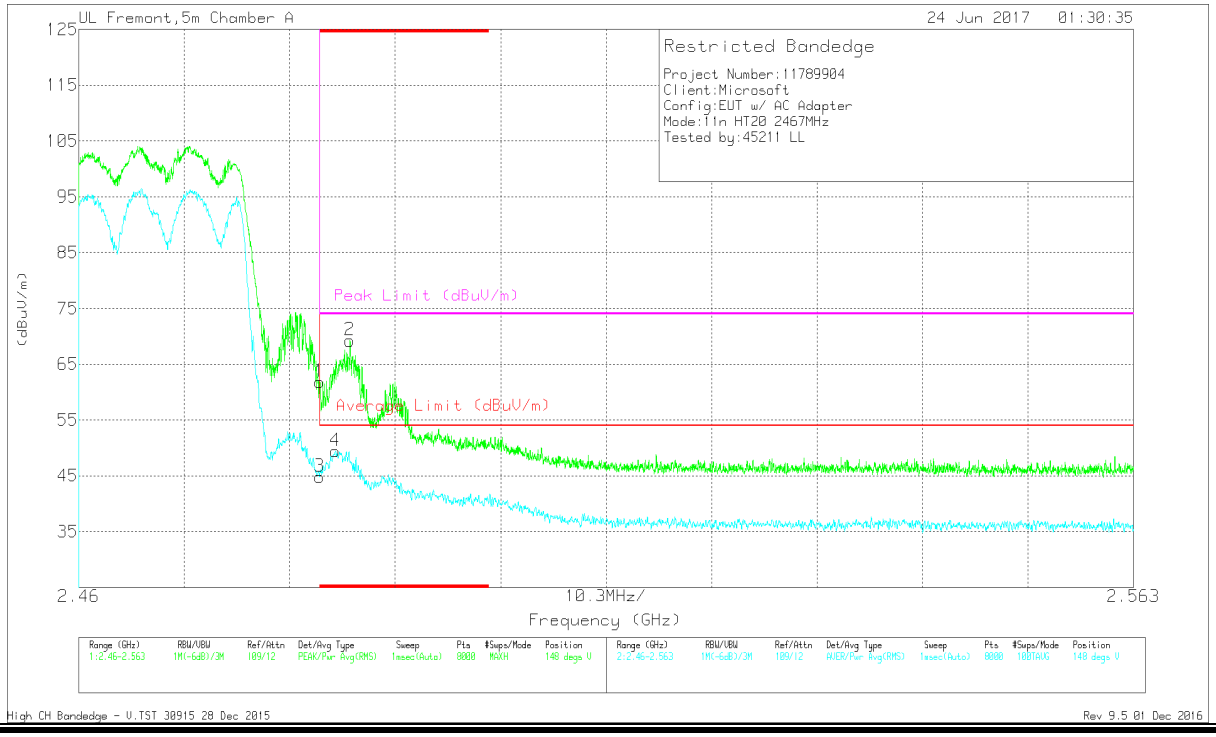
AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 12)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.23	Pk	32.5	-23.6	63.13	-	-	74	-10.87	170	115	H
2	* 2.484	55.71	Pk	32.6	-23.6	64.71	-	-	74	-9.29	170	115	H
3	* 2.484	36.32	RMS	32.5	-23.6	45.22	54	-8.78	-	-	170	115	H
4	* 2.485	38.21	RMS	32.6	-23.7	47.11	54	-6.89	-	-	170	115	H

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

HIGH CHANNEL VERTICAL

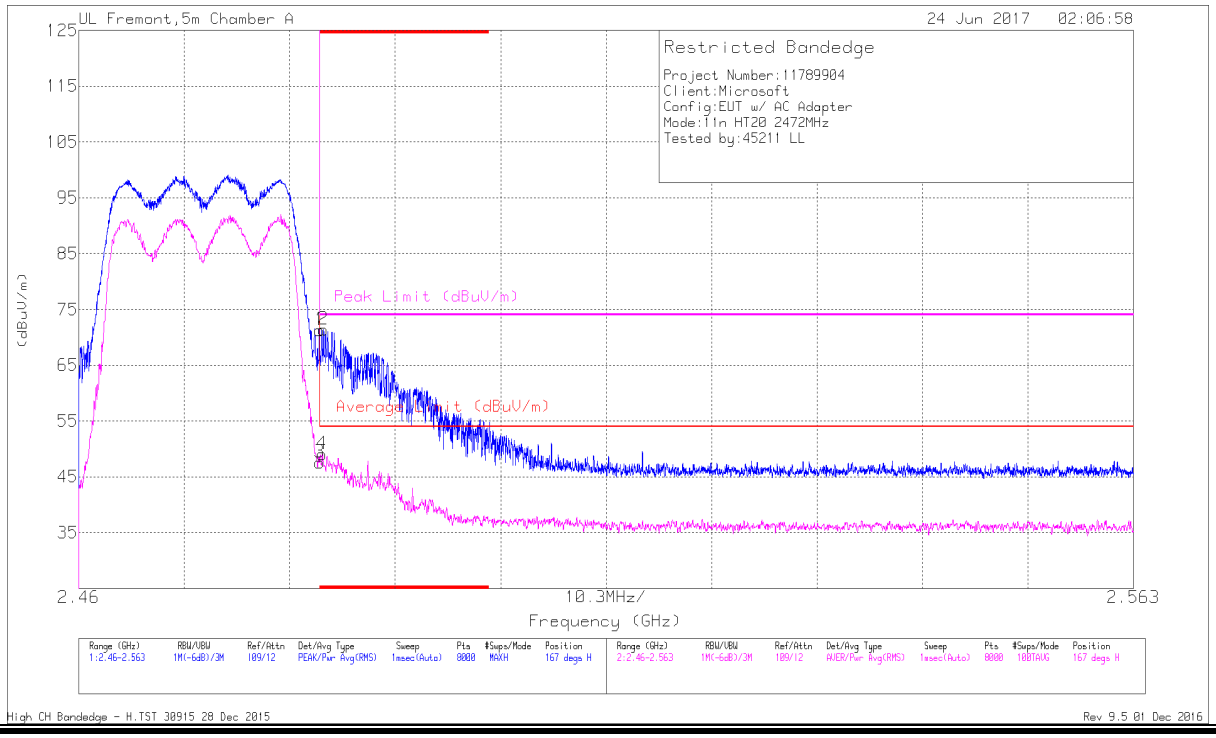


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	52.91	Pk	32.5	-23.6	61.81	-	-	74	-12.19	148	381	V
2	* 2.486	60.33	Pk	32.6	-23.7	69.23	-	-	74	-4.77	148	381	V
3	* 2.484	35.89	RMS	32.5	-23.6	44.79	54	-9.21	-	-	148	381	V
4	* 2.485	40.54	RMS	32.6	-23.7	49.44	54	-4.56	-	-	148	381	V

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

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 13)

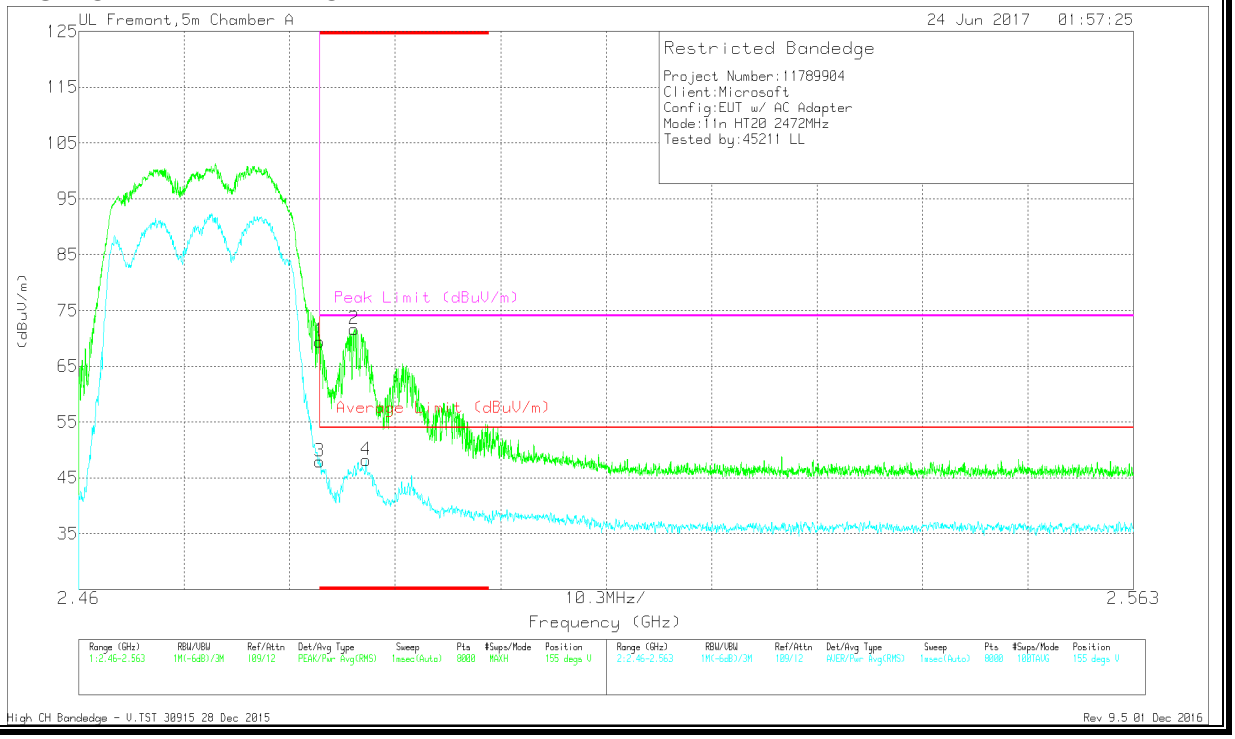
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	62.32	Pk	32.5	-23.6	71.22	-	-	74	-2.78	167	159	H
2	* 2.484	62.5	Pk	32.5	-23.6	71.4	-	-	74	-2.6	167	159	H
3	* 2.484	38.64	RMS	32.5	-23.6	47.54	54	-6.46	-	-	167	159	H
4	* 2.484	40.17	RMS	32.5	-23.6	49.07	54	-4.93	-	-	167	159	H

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

HIGH CHANNEL VERTICAL

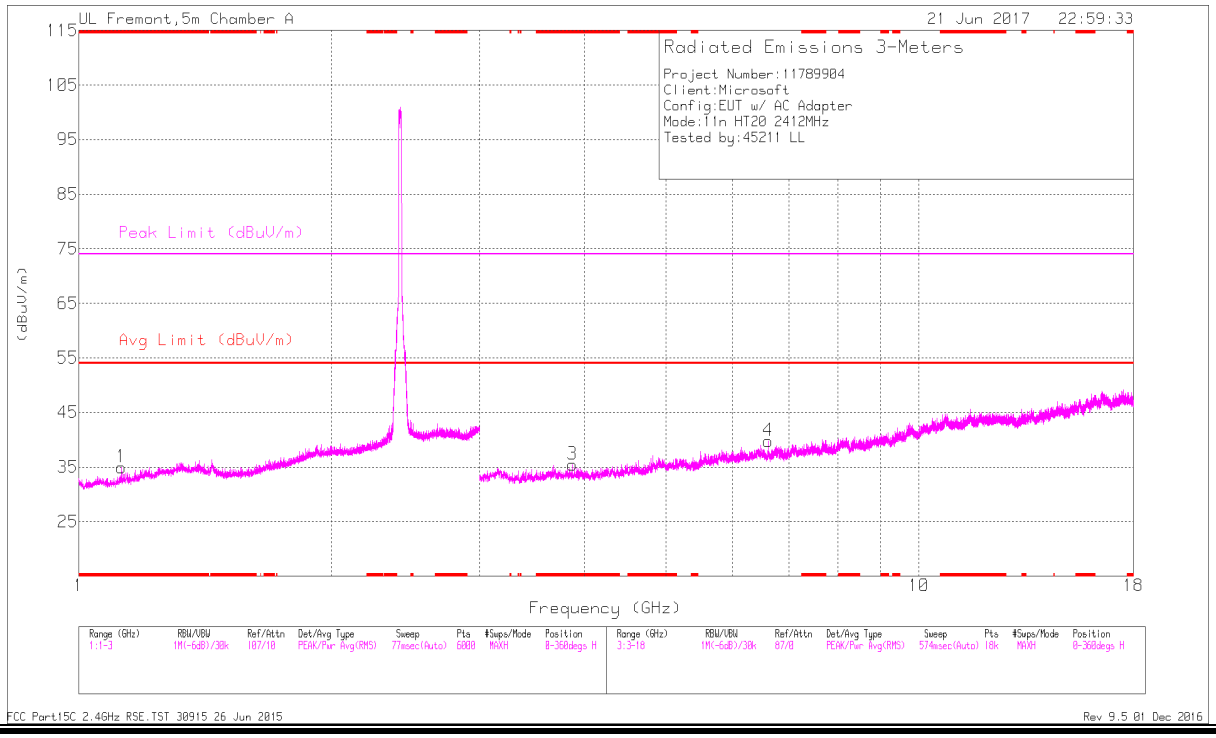


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	60.57	Pk	32.5	-23.6	69.47	-	-	74	-4.53	155	385	V
2	* 2.487	62.78	Pk	32.6	-23.7	71.68	-	-	74	-2.32	155	385	V
3	* 2.484	38.99	RMS	32.5	-23.6	47.89	54	-6.11	-	-	155	385	V
4	* 2.488	39.32	RMS	32.6	-23.7	48.22	54	-5.78	-	-	155	385	V

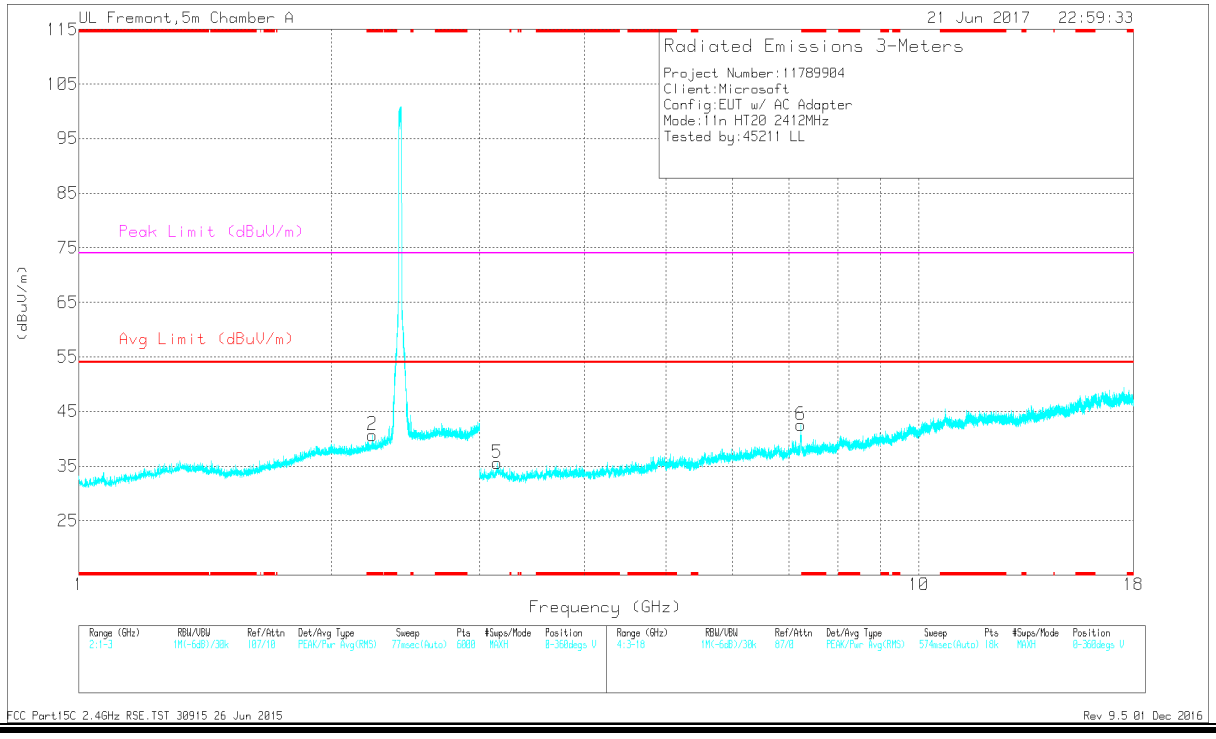
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL

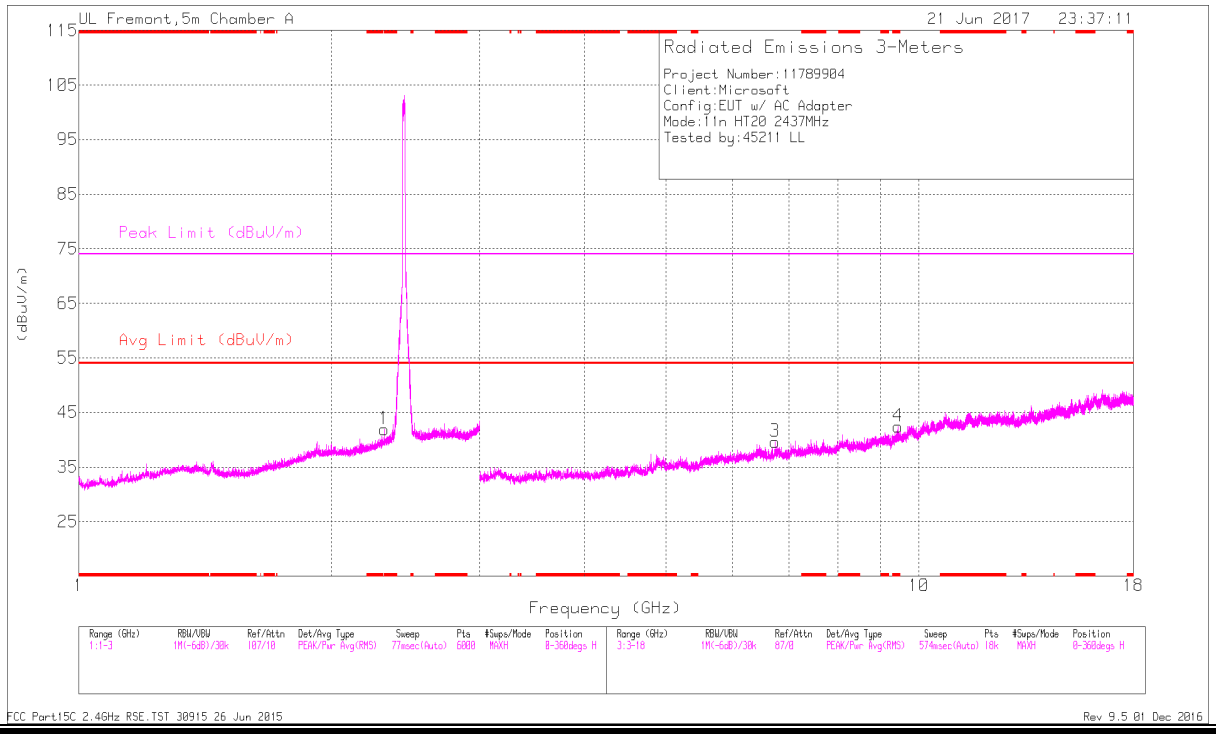


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.124	36.06	PK-U	28	-24	40.06	-	-	74	-33.94	178	100	H
	* 1.125	24.89	ADR	28	-24.1	28.79	54	-25.21	-	-	178	100	H
2	* 2.236	37.42	PK-U	31.7	-23.9	45.22	-	-	74	-28.78	205	100	V
	* 2.236	25.69	ADR	31.7	-23.9	33.49	54	-20.51	-	-	205	100	V
3	* 3.87	38.6	PK-U	33.3	-30.2	41.7	-	-	74	-32.3	161	100	H
	* 3.869	26.83	ADR	33.3	-30.1	30.03	54	-23.97	-	-	161	100	H
5	3.148	38.07	PK-U	33	-29.7	41.37	-	-	-	-	312	100	V
4	6.613	35.59	PK-U	35.6	-26	45.19	-	-	-	-	272	100	H
6	7.234	40.67	PK-U	35.5	-24.9	51.27	-	-	-	-	156	202	V

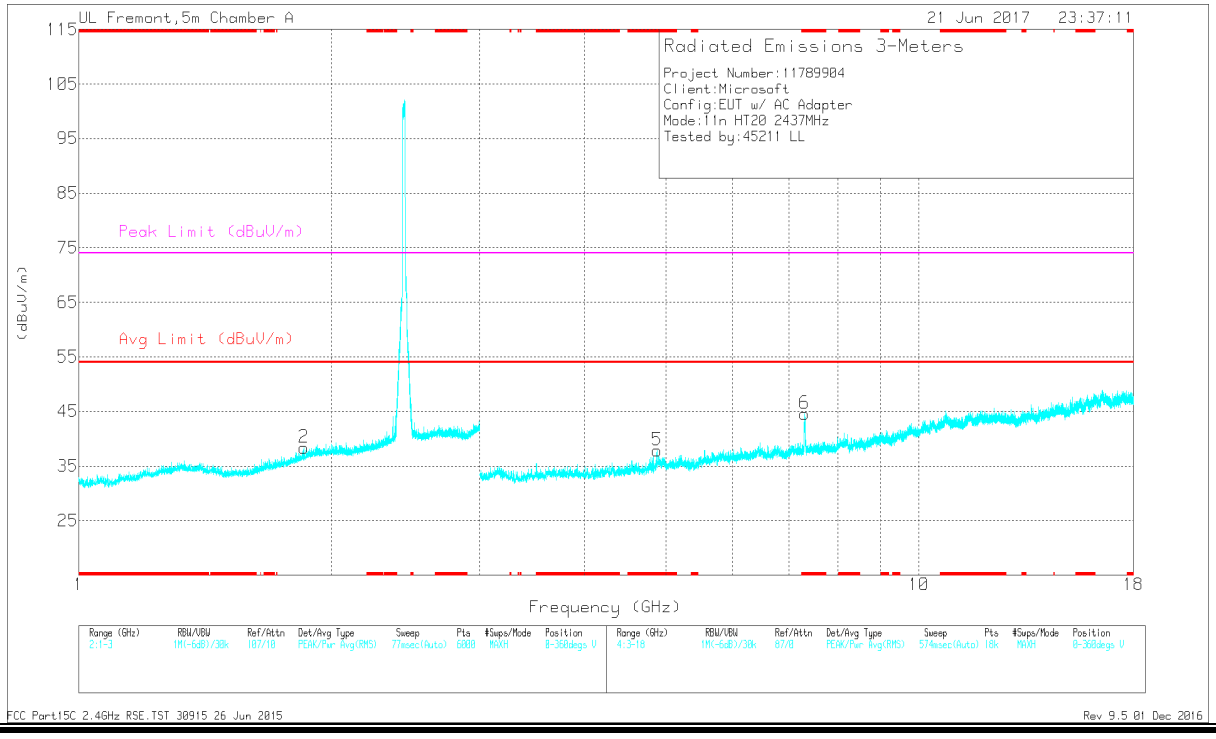
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL

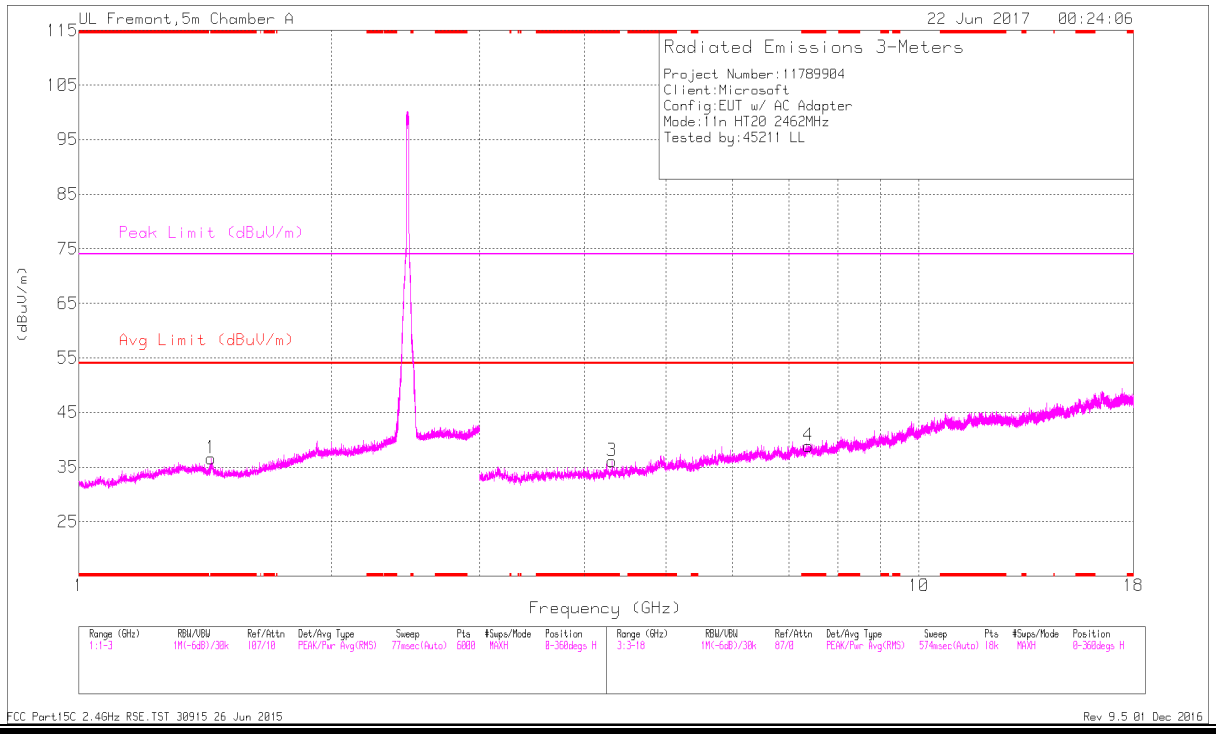


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 9.447	32.74	PK-U	36.4	-21.5	47.64	-	-	74	-26.36	214	164	H
	* 9.447	21.71	ADR	36.4	-21.5	36.61	54	-17.39	-	-	214	164	H
5	* 4.874	37.25	PK-U	34	-27.8	43.45	-	-	74	-30.55	261	210	V
	* 4.874	26.86	ADR	34	-27.8	33.06	54	-20.94	-	-	261	210	V
6	* 7.3	43.19	PK-U	35.5	-25	53.69	-	-	74	-20.31	157	187	V
	* 7.311	29.08	ADR	35.5	-25	39.58	54	-14.42	-	-	157	187	V
2	1.854	35.82	PK-U	30.8	-23.6	43.02	-	-	-	-	305	200	V
1	2.308	37.46	PK-U	31.9	-23.7	45.66	-	-	-	-	69	100	H
3	6.736	34.32	PK-U	35.6	-25.1	44.82	-	-	-	-	259	200	H

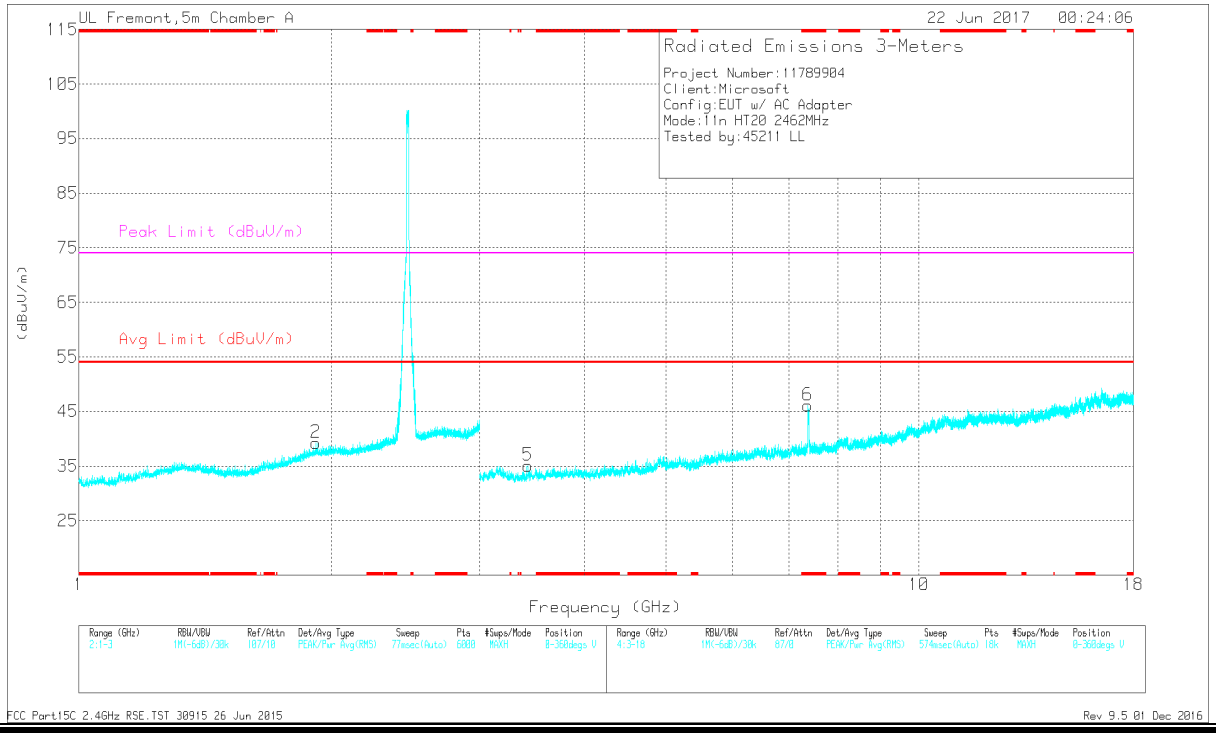
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



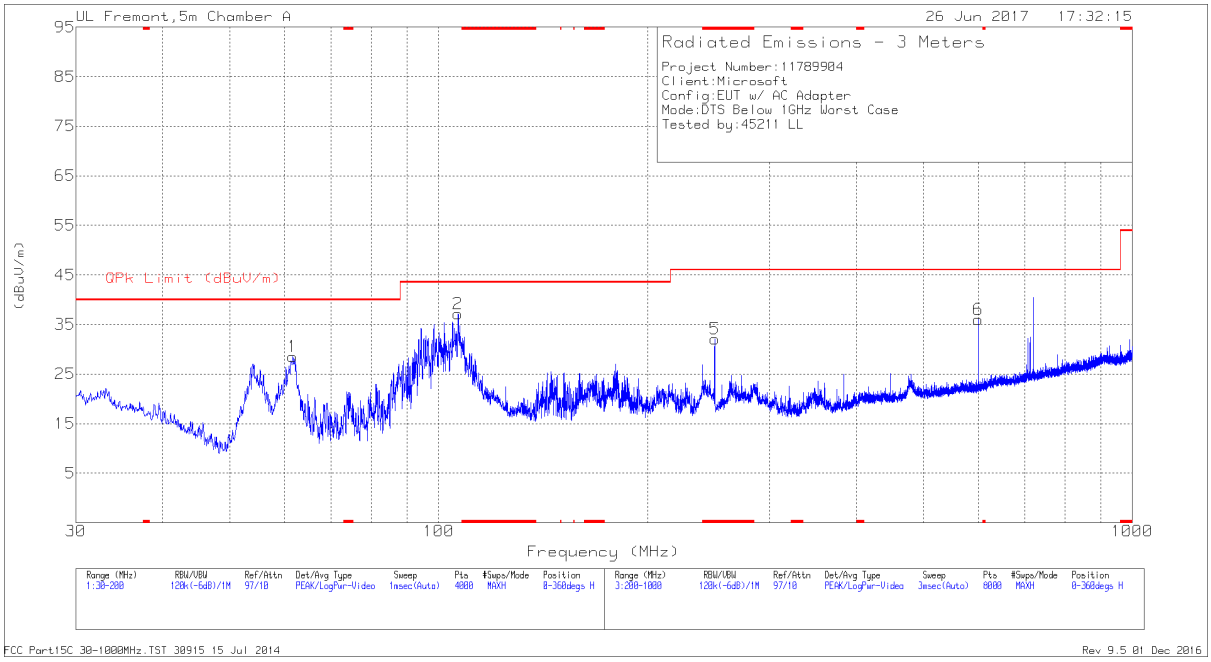
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.44	41.97	PK-U	28.8	-23.8	46.97	-	-	74	-27.03	164	112	H
	* 1.44	25.95	ADR	28.8	-23.8	30.95	54	-23.05	-	-	164	112	H
3	* 4.316	37.68	PK-U	33.4	-29.1	41.98	-	-	74	-32.02	311	135	H
	* 4.314	26.44	ADR	33.4	-29	30.84	54	-23.16	-	-	311	135	H
4	* 7.382	33.63	PK-U	35.5	-23.8	45.33	-	-	74	-28.67	277	102	H
	* 7.382	22.92	ADR	35.5	-23.8	34.62	54	-19.38	-	-	277	102	H
6	* 7.375	46.83	PK-U	35.5	-23.9	58.43	-	-	74	-15.57	159	213	V
	* 7.387	31.1	ADR	35.5	-23.9	42.7	54	-11.3	-	-	159	213	V
2	1.916	36.71	PK-U	31.3	-23.5	44.51	-	-	-	-	217	188	V
5	3.425	38.34	PK-U	32.8	-30.2	40.94	-	-	-	-	146	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

10.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT

DATA

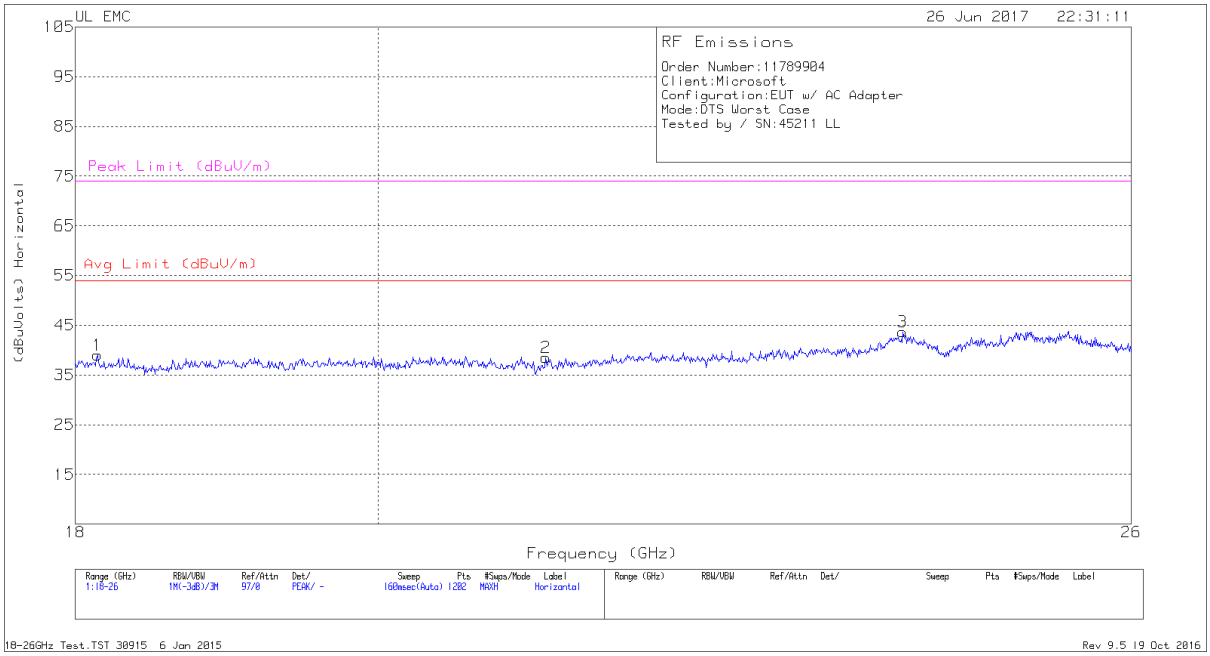
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	62.0444	48.88	Qp	12	-30.8	30.08	40	-9.92	42	103	V
4	106.7026	51.82	Qp	15.9	-30.5	37.22	43.52	-6.3	30	105	V
7	720.0158	44.35	Qp	24.5	-28.2	40.65	46.02	-5.37	122	102	V
6	600.052	42.1	Pk	22.5	-28.6	36	46.02	-10.02	0-360	101	H
2	106.6898	51.8	Pk	15.9	-30.5	37.2	43.52	-6.32	0-360	300	H
5	* 250.0065	46.23	Pk	15.5	-29.6	32.13	46.02	-13.89	0-360	101	H
1	61.6282	47.42	Pk	12	-30.9	28.52	40	-11.48	0-360	300	H

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

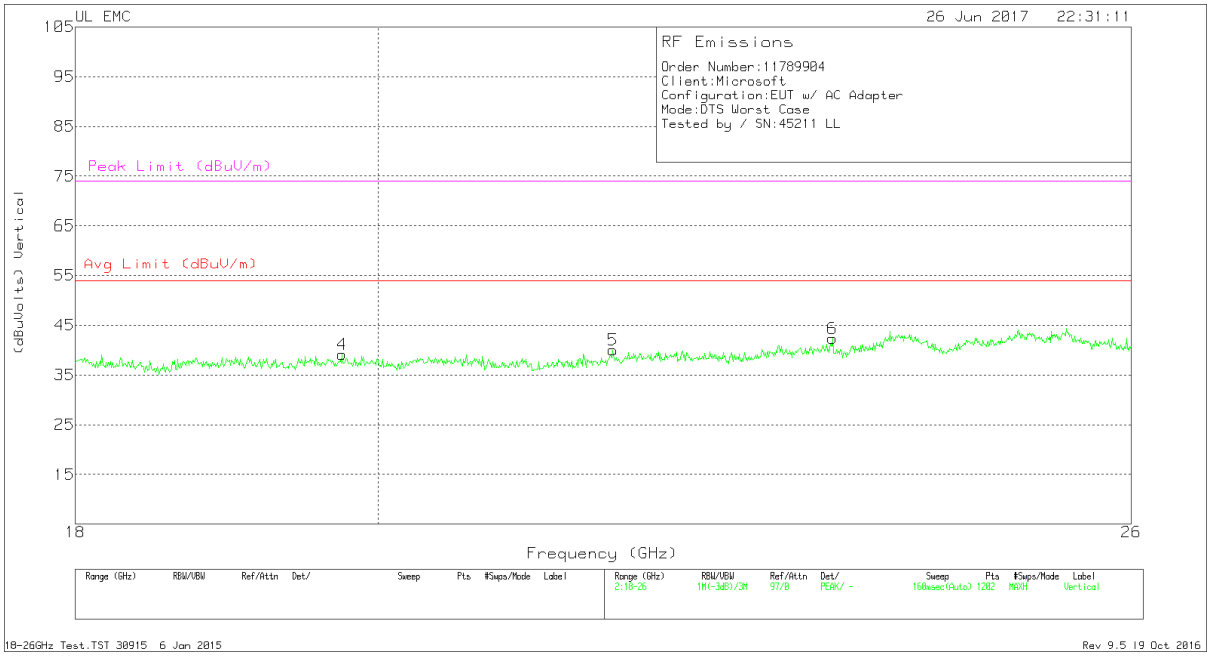
10.4. WORST-CASE 18 to 26 GHz

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT

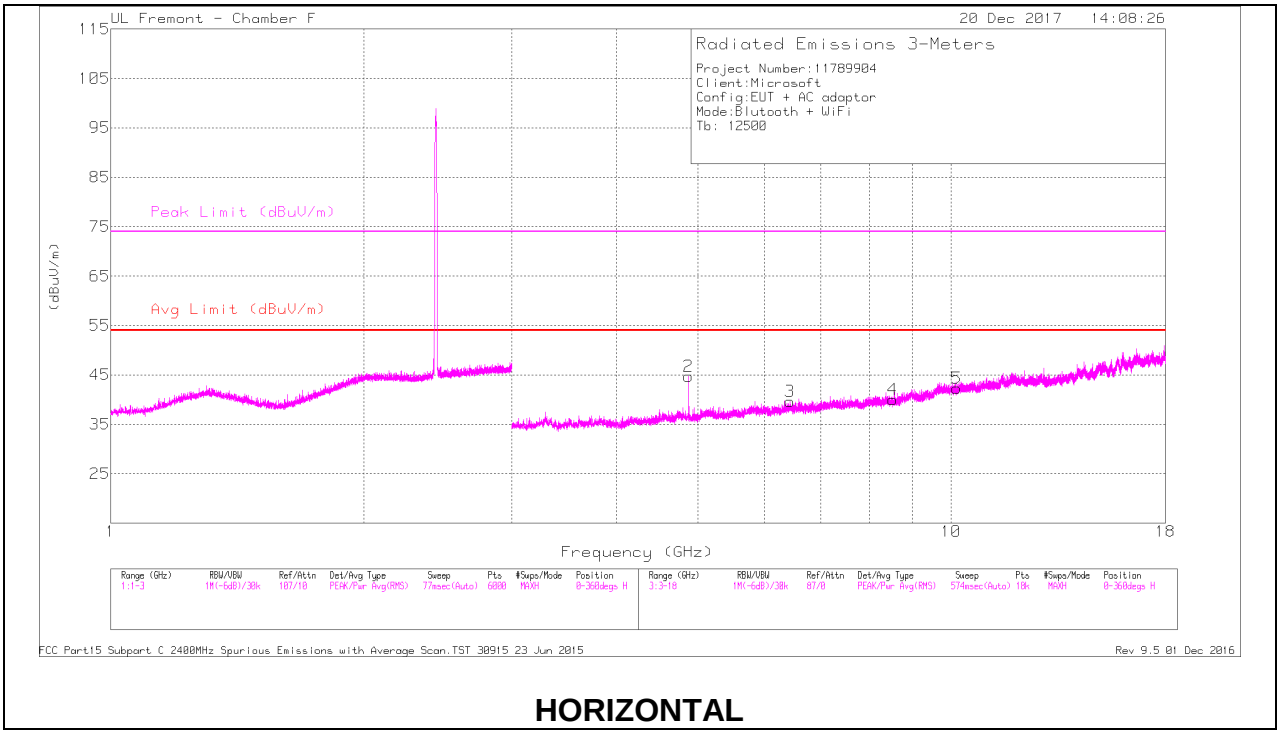


DATA

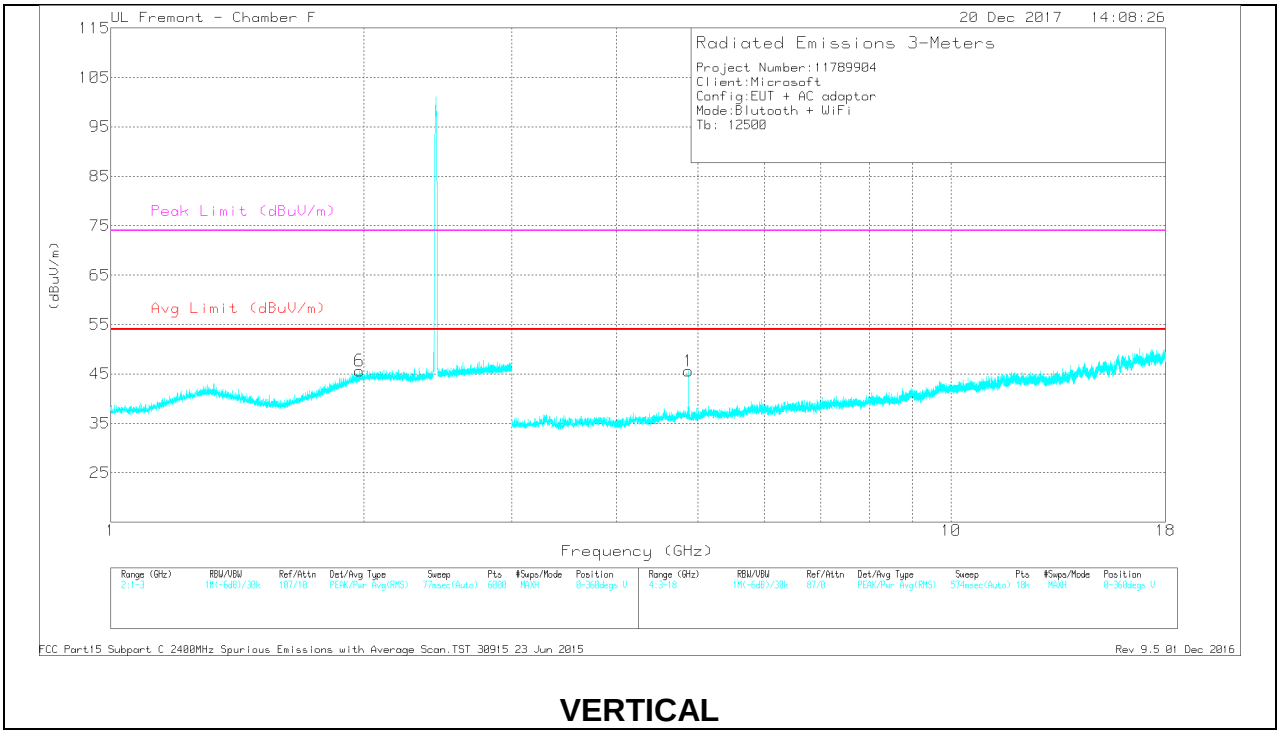
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T449 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	18.14	41.9	Pk	32.3	-25.7	-9.5	39	54	-15	74	-35
2	21.204	39.7	Pk	33	-24.7	-9.5	38.5	54	-15.5	74	-35.5
3	24.008	43.67	Pk	33.9	-24.4	-9.5	43.67	54	-10.33	74	-30.33
4	19.752	40.87	Pk	32.7	-24.9	-9.5	39.17	54	-14.83	74	-34.83
5	21.704	40.9	Pk	33.2	-24.6	-9.5	40	54	-14	74	-34
6	23.429	42.33	Pk	33.9	-24.4	-9.5	42.33	54	-11.67	74	-31.67

Pk - Peak detector

10.5. WORST-CASE SIMULTANEOUS TRANSMISSION



HORIZONTAL



VERTICAL

SIMULTANEOUS TRANSMISSION DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	1.979	40.59	PK2	32.1	-21.1	51.59	-	-	74	-22.41	116	366	V
3	6.432	37.2	PK2	35.7	-26.6	46.3	-	-	74	-27.7	1	100	H
4	8.533	35.09	PK2	35.9	-24	46.99	-	-	74	-27.01	1	202	H
5	10.163	33.11	PK2	37.4	-21.8	48.71	-	-	74	-25.29	1	100	H
2	* 4.874	40.99	PK2	34.2	-27.3	47.89	-	-	74	-26.11	244	119	H
	* 4.874	35.59	MAv1	34.2	-27.3	42.49	54	-11.51	-	-	244	119	H
1	* 4.874	44.24	PK2	34.2	-27.3	51.14	-	-	74	-22.86	215	260	V
	* 4.874	40.58	MAv1	34.2	-27.3	47.48	54	-6.52	-	-	215	260	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	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.

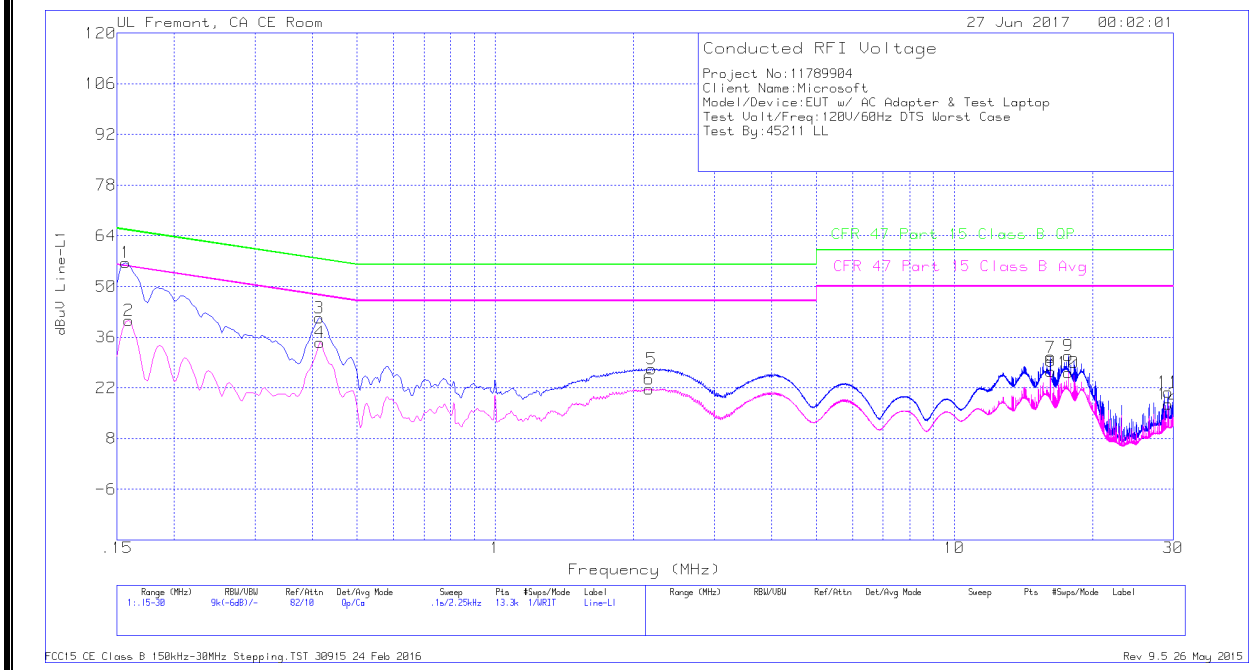
TEST PROCEDURE

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.

LINE 1 RESULTS



Trace Markers

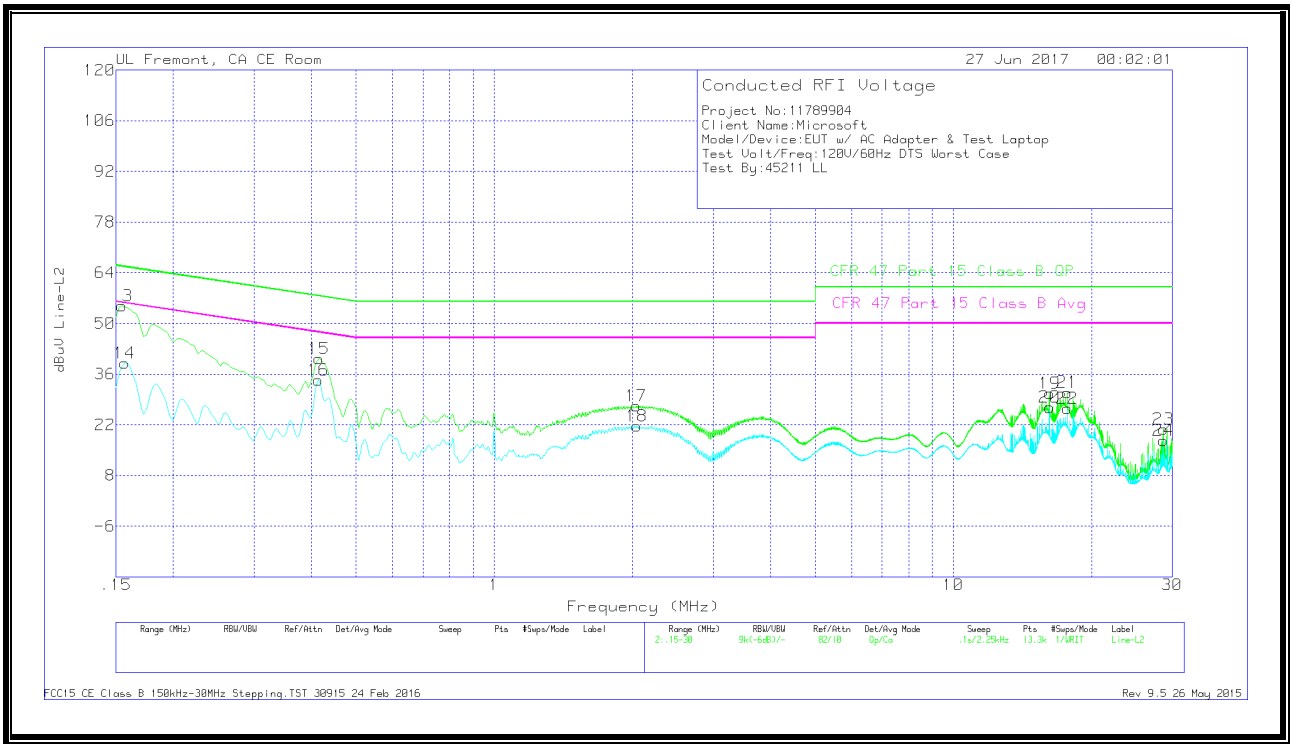
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.15675	46.26	Qp	.1	.1	10.1	56.56	65.63	-9.07	-	-
2	.159	30.27	Ca	.1	.1	10.1	40.57	-	-	55.52	-14.95
3	.41325	31.15	Qp	0	.1	10.1	41.35	57.58	-16.23	-	-
4	.4155	24.4	Ca	0	.1	10.1	34.6	-	-	47.54	-12.94
5	2.1885	17.04	Qp	0	.1	10.1	27.24	56	-28.76	-	-
6	2.166	11.51	Ca	0	.1	10.1	21.71	-	-	46	-24.29
7	16.2285	19.89	Qp	0	.2	10.3	30.39	60	-29.61	-	-
8	16.2285	16.03	Ca	0	.2	10.3	26.53	-	-	50	-23.47
9	17.69325	20.33	Qp	0	.2	10.3	30.83	60	-29.17	-	-
10	17.69325	15.76	Ca	0	.2	10.3	26.26	-	-	50	-23.74
11	29.23575	10.03	Qp	.1	.3	10.4	20.83	60	-39.17	-	-
12	29.23575	6.71	Ca	.1	.3	10.4	17.51	-	-	50	-32.49

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



Trace Markers

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.1545	44.66	Qp	0	.1	10.1	54.86	65.75	-10.89	-	-
14	.15675	28.83	Ca	0	.1	10.1	39.03	-	-	55.63	-16.6
15	.4155	30	Qp	0	.1	10.1	40.2	57.54	-17.34	-	-
16	.41325	24.09	Ca	0	.1	10.1	34.29	-	-	47.58	-13.29
17	2.04	17.02	Qp	0	.1	10.1	27.22	56	-28.78	-	-
18	2.04225	11.46	Ca	0	.1	10.1	21.66	-	-	46	-24.34
19	16.2285	20.22	Qp	0	.2	10.3	30.72	60	-29.28	-	-
20	16.2285	16.3	Ca	0	.2	10.3	26.8	-	-	50	-23.2
21	17.69325	20.46	Qp	0	.2	10.3	30.96	60	-29.04	-	-
22	17.69325	15.96	Ca	0	.2	10.3	26.46	-	-	50	-23.54
23	28.6845	9.95	Qp	.1	.3	10.5	20.85	60	-39.15	-	-
24	28.6845	6.84	Ca	.1	.3	10.5	17.74	-	-	50	-32.26

Qp - Quasi-Peak detector

Ca - CISPR average detection