



FCC 47 CFR PART 15 SUBPART E

CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

WIRELESS ACCESSORY RADIO

MODEL NUMBER: 1525

FCC ID: C3K1525

REPORT NUMBER: 15U22480 E2V2

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Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	3/7/16	Initial Issue	Francisco de Anda
V2	4/7/16	Updated 5.1 section	Francisco de Anda

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION	6
4.3. MEASUREMENT UNCERTAINTY	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE	8
5.3. MAXIMUM OUTPUT POWER.....	8
5.4. DESCRIPTION OF AVAILABLE ANTENNAS	8
5.5. SOFTWARE AND FIRMWARE.....	8
5.6. WORST-CASE CONFIGURATION AND MODE.....	9
5.7. DESCRIPTION OF TEST SETUP.....	10
6. TEST AND MEASUREMENT EQUIPMENT	12
7. MEASUREMENT METHODS	13
8. ANTENNA PORT TEST RESULTS	14
8.1. ON TIME AND DUTY CYCLE	14
8.2. 802.11a MODE IN THE 5.8 GHz BAND	16
8.2.1. 6 dB BANDWIDTH.....	16
8.2.2. 26 dB BANDWIDTH.....	19
8.2.3. 99% BANDWIDTH	22
8.2.4. OUTPUT POWER	25
8.2.5. Maximum Power Spectral Density (PSD)	28
8.3. 802.11n HT20 MODE IN THE 5.8 GHz BAND	31
8.3.1. 6 dB BANDWIDTH.....	31
8.3.2. 26 dB BANDWIDTH.....	34
8.3.3. 99% BANDWIDTH	37
8.3.4. OUTPUT POWER	40
8.3.5. Maximum Power Spectral Density (PSD)	43
9. RADIATED TEST RESULTS.....	46
9.1. LIMITS AND PROCEDURE	46
9.2. TRANSMITTER ABOVE 1 GHz	47
9.3. TX ABOVE 1 GHz 802.11a MODE IN THE 5.8 GHz BAND	47

9.4.	TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND.....	57
9.5.	WORST-CASE BELOW 1 GHz.....	67
9.6.	WORST-CASE 18-26 GHz	70
9.7.	WORST-CASE 26-40 GHz	73
10.	AC POWER LINE CONDUCTED EMISSIONS	76
11.	SETUP PHOTOS	77

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Microsoft Corporation
One Microsoft Way
Redmond, WA 98052, U.S.A.

EUT DESCRIPTION: Wireless Accessory Radio

MODEL: 1525

SERIAL NUMBER: 9CD21E98933D (Conducted), 9CD21E98E05B (Radiated)

DATE TESTED: February 25, 2016 – March 1, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	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.

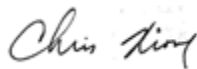
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. 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 any government.

Approved & Released For
UL Verification Services Inc. By:



Francisco de Anda
PROJECT LEAD/ PROGRAM MANAGER
UL Verification Services Inc.

Tested By:



Chirs Xiong
EMC 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, ANSI C63.10-2013, KDB 789033 D02 v01r01.

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

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>.

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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n radio.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The change filed under this application is to meet the new UNII rules per KDB 789033 D02 General UNII Test Procedures New Rules v01r01.pdf.

Unit tested as it was originally certified but under the new UNII rules.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum average conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	8.57	7.19
5745 - 5825	802.11n HT20	8.65	7.33

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an external patch antenna, with a maximum gain of 3.14 dBi.

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 14.2.201.17.

The EUT drive software installed during testing was 2.0.0.11.

The test utility software used during testing was DutApiBRIDGEETH8782.exe.

5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emission 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 in three orthogonal orientations X, Y, Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Worst-case data rates as provided by the client were:
Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	PP20L	CN-0KD882-48643-65H-9213	QDS-BRCM1020
AC/DC Adapter	Dell	LA65NS2-01	CN-0928G4-71615-06E-0D24-A00	N/A
Sheeva Plug	GlobalScale	003-SP1001	1035-002460	N/A
AC Adapter	CUI Inc.	EPAS-101W-C	DPS050200UPS-P5P-SZ	N/A
AC Adapter	CUI Inc.	KSAFE050040	DPS050400U-P5P-TK	N/A

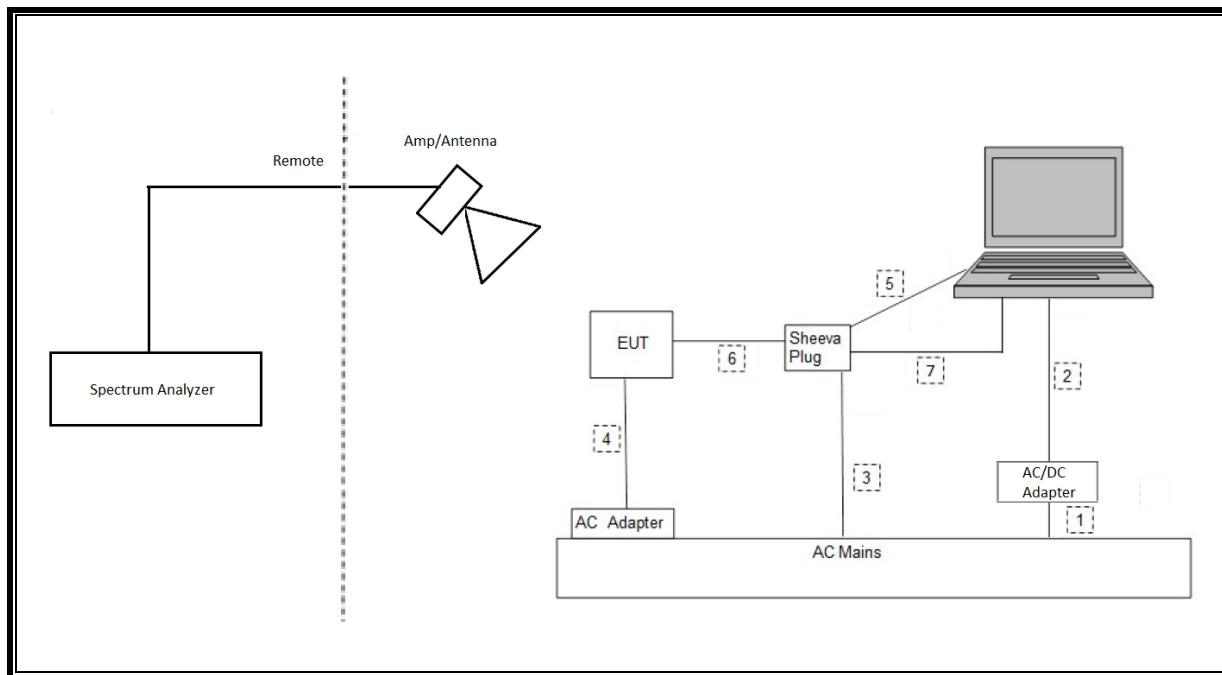
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	3-prong	Un-Shielded	0.90	
2	DC	1	DC	Un-Shielded	1.80	
3	AC	1	2-prong	Un-Shielded	1.70	
4	AC	1	2-prong	Un-Shielded	1.40	
5	USB/Micro USB	1	USB/Micro USB	Shielded	0.60	Micro USB to Sheeva
6	USB	1	USB	Shielded	1.30	
7	Ethernet	1	RJ45	Shielded	1.80	
8	Antenna	2	SMA	Shielded	1.00	
9	RF input	1	SMA	Shielded	1.00	
10	USB	1	USB	Shielded	0.90	
11	AC	1	2-prong	Un-Shielded	1.90	

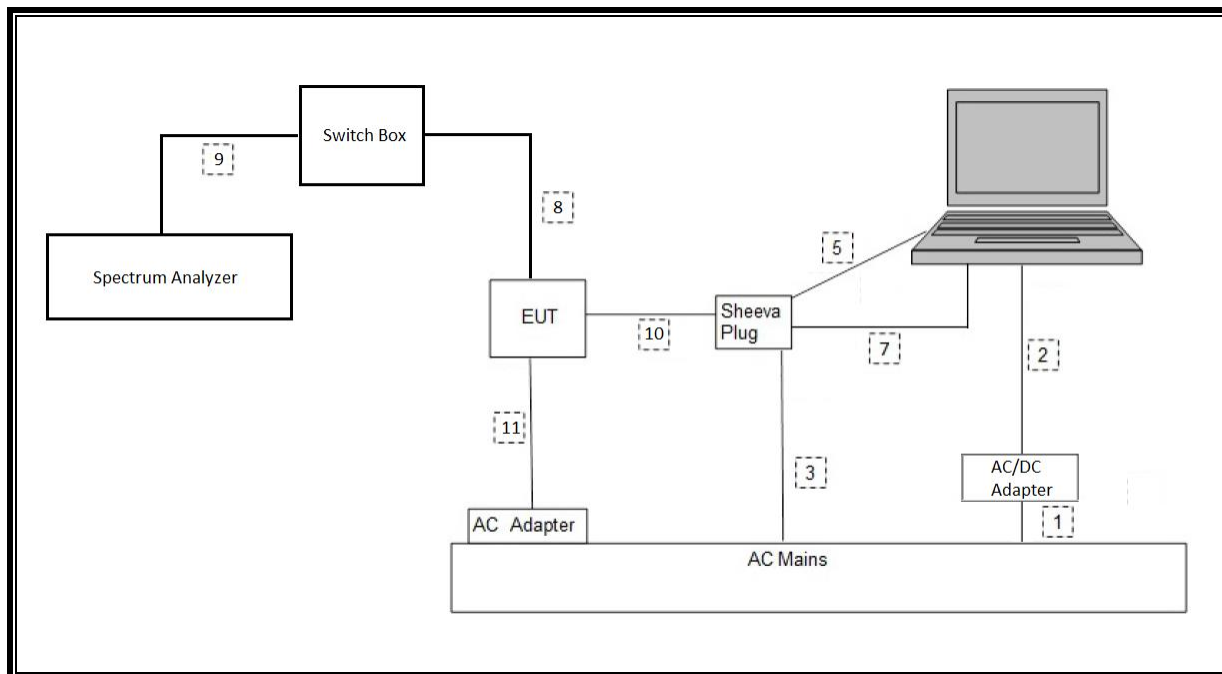
TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM FOR RADIATED TESTS



SETUP DIAGRAM FOR CONDUCTED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	T No.	Cal Due
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
Conducted Software	UL	UL EMC	Ver 4.2, February 2, 2016	
Spectrum Analyzer 9kHz - 26.5GHz	Keysight	N9030A	PRE0123763	12/09/16
Antenna, Horn 1-18GHz	ETS Lindgren	3117	863	04/10/16
Antenna, Broadband Hybrid, 30MHz - 2000MHz	Sunol Science	JB3	900	04/10/16
Amplifier, 1-18GHz	Miteq	ASF42-00101800-25-S-42	495	10/22/16
Amplifier, 10KHz-1GHz, 32dB	Sonoma	310N	835	06/06/16
Amplifier, 1-8GHz, 35dB	Miteq	AMF-4D-01000800-30-29P	782	10/22/16
Spectrum Analyzer, 40GHz	Hewlett-Packard	8564E	106	08/14/16
Antenna, Horn 18-26GHz	ARA	MWH-1826	447	05/12/16
Antenna, Horn 40GHz	ARA	MWH-2640/B	90	07/28/16
Amplifier, 1-26GHz	Keysight	8449B	404	06/29/16
Amplifier, 26-40GHz	Miteq	NSP4000-SP2	88	04/07/16
Switch, SP6T Coaxial Switch	Keysight	87106C	836	06/26/16

7. MEASUREMENT METHODS

26 dB Emission BW: KDB 789033 D02 v01r01, Section C.

99% Occupied BW: KDB 789033 D02 v01r01, Section D.

Conducted Output Power: KDB 789033 D02 v01r01, Section E.2.b (Method SA-1).

Power Spectral Density: KDB 789033 D02 v01r01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v01r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r01, Sections G.3, G.4, and G.5.

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

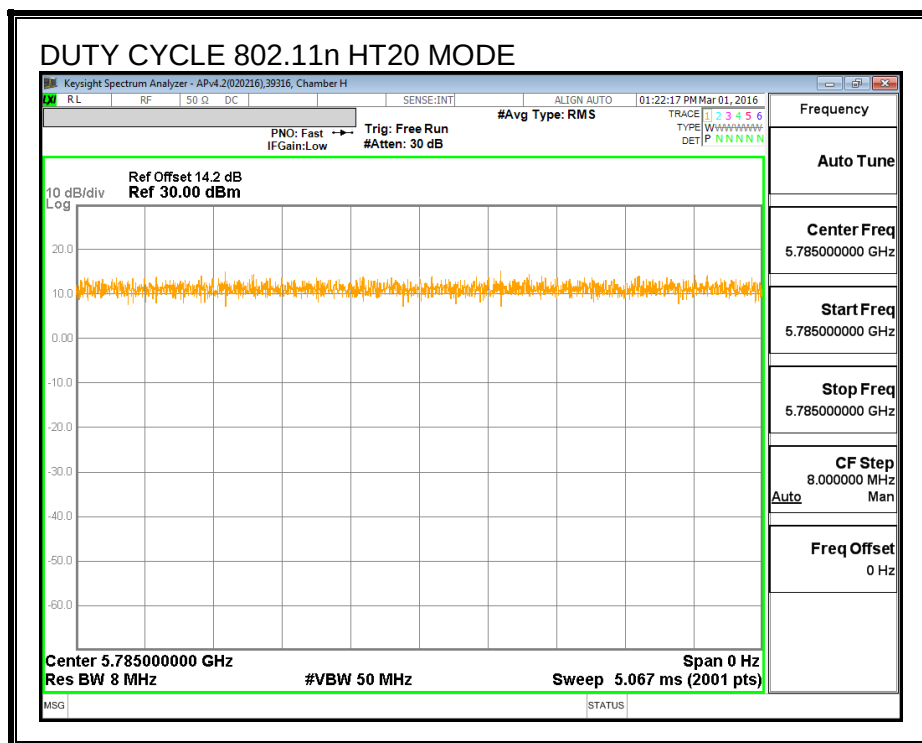
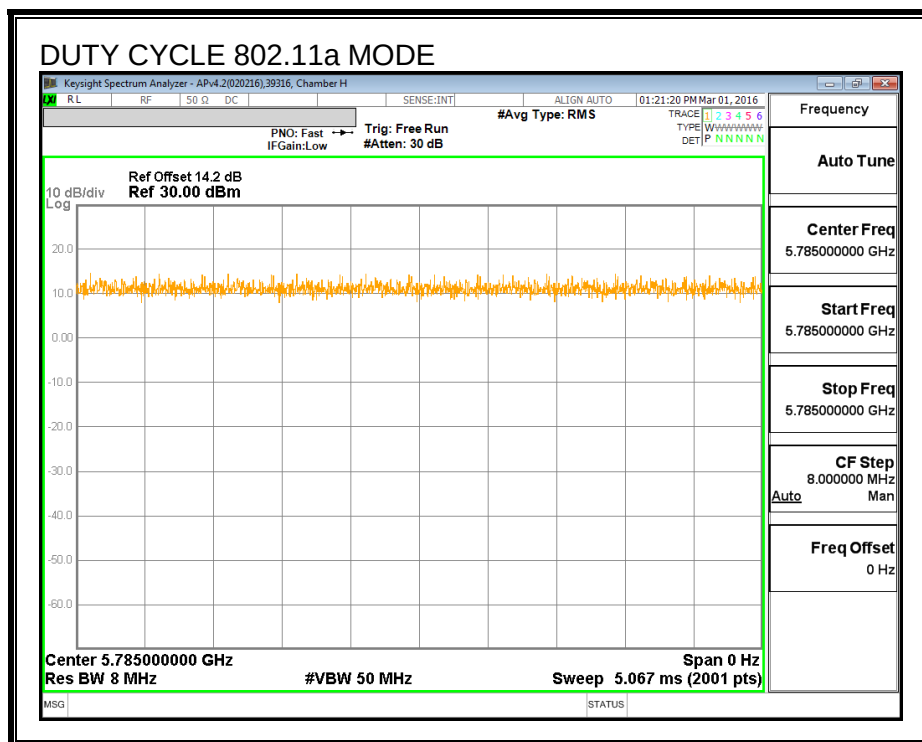
PROCEDURE

KDB 789033 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/B Minimum VBW (kHz)
802.11a	1.000	1.000	1.000	100.00%	0.00	0.010
802.11n HT20	1.000	1.000	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



8.2. 802.11a MODE IN THE 5.8 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

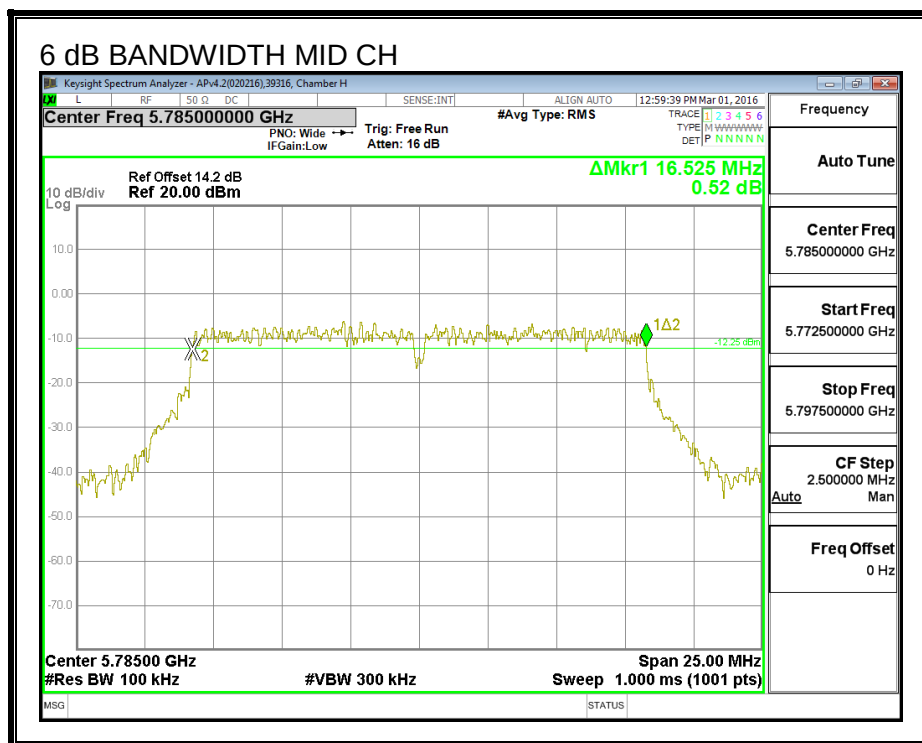
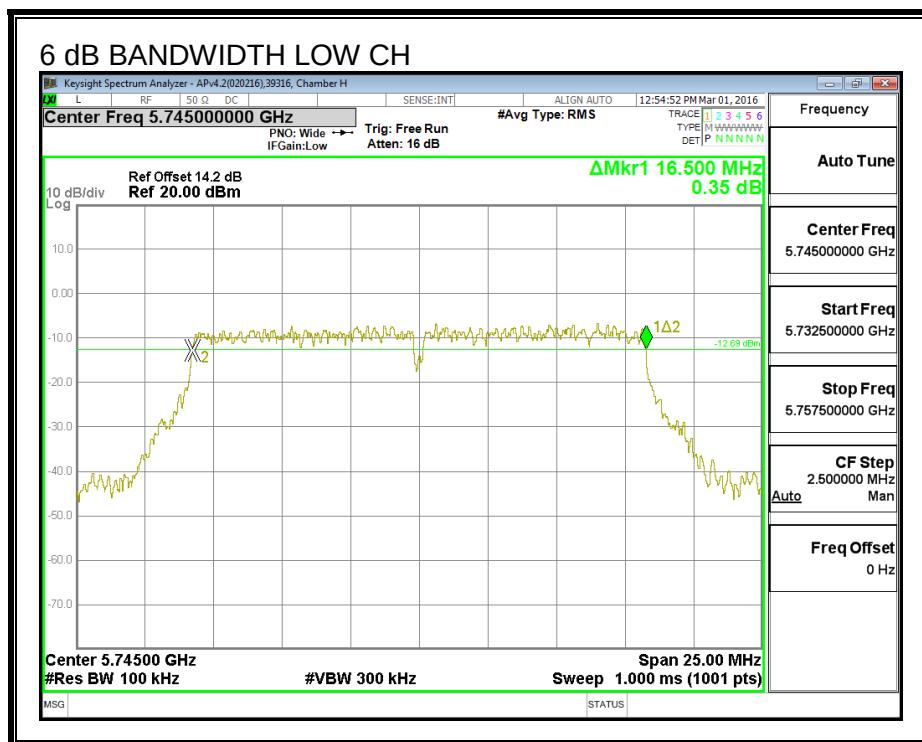
FCC §15.407 (e)

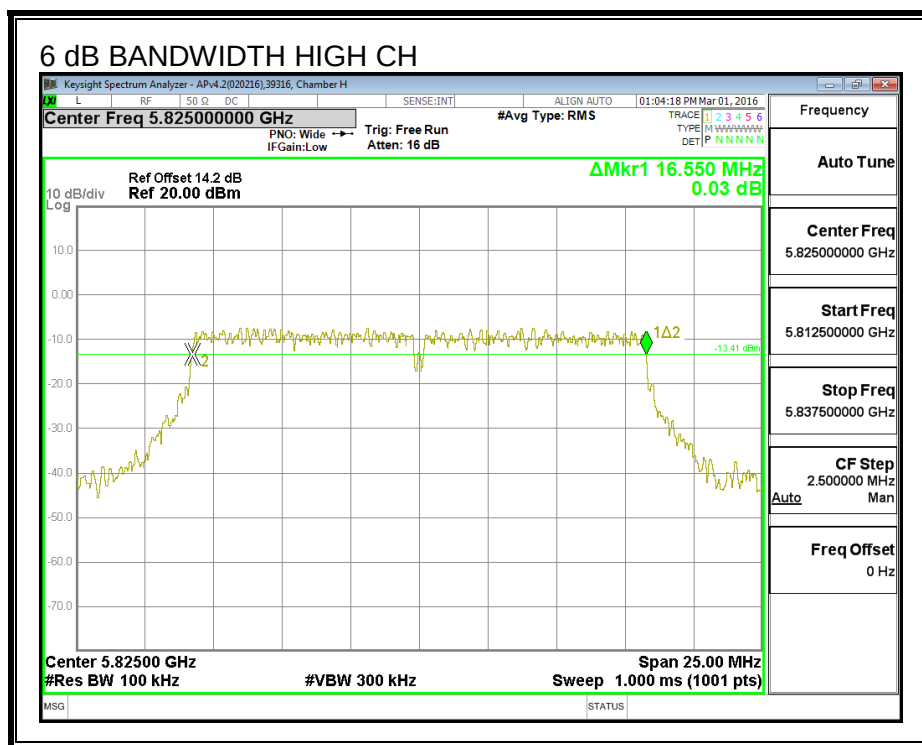
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.5000	0.5
Mid	5785	16.5250	0.5
High	5825	16.5500	0.5

6 dB BANDWIDTH





8.2.2. 26 dB BANDWIDTH

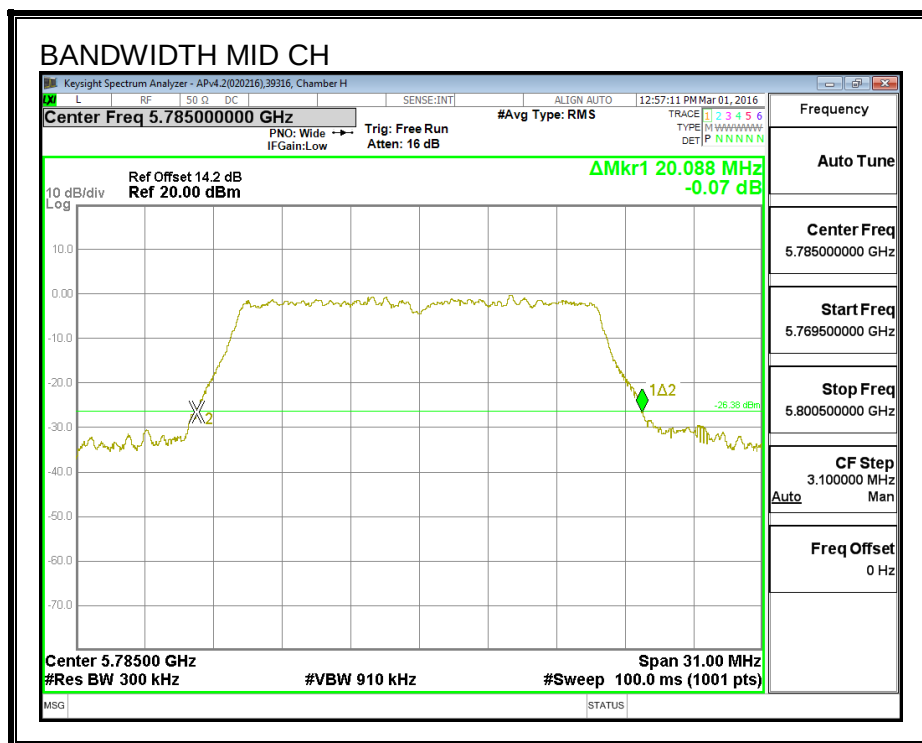
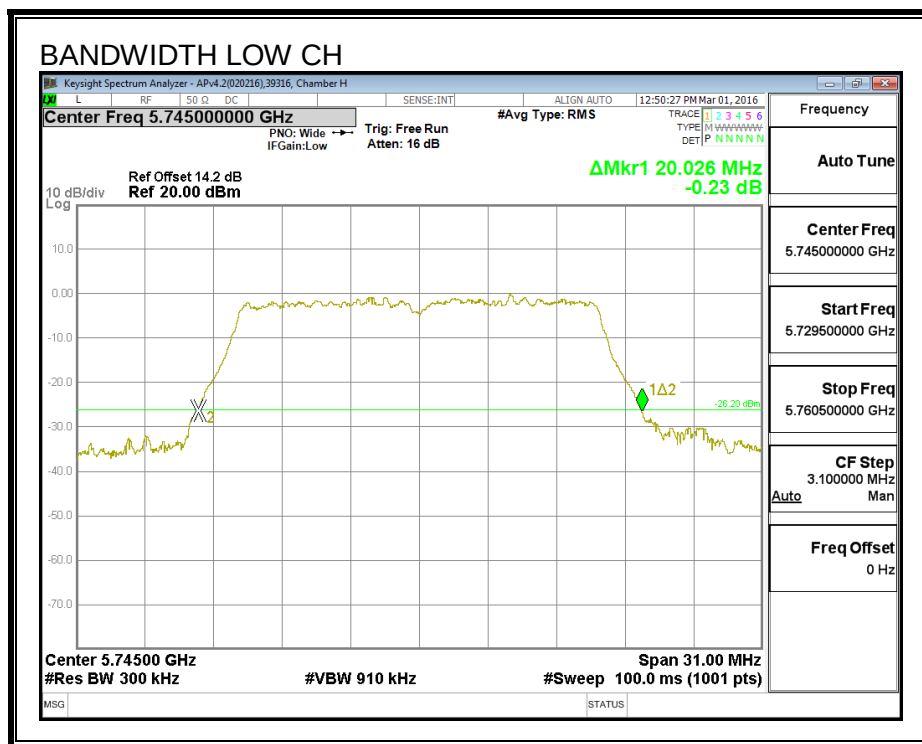
LIMITS

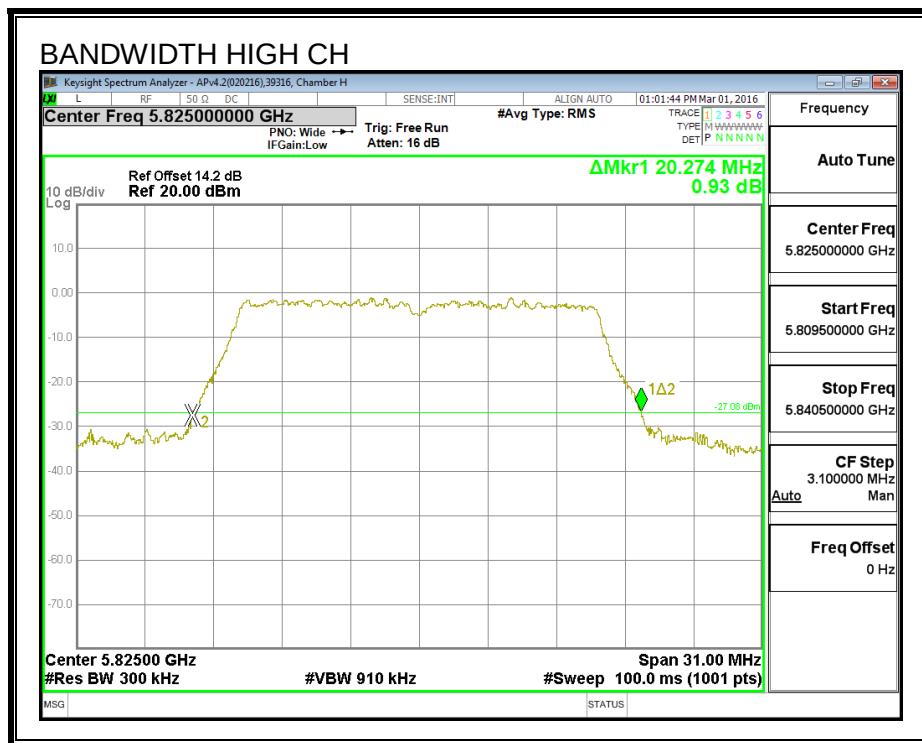
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	20.03
Mid	5785	20.09
High	5825	20.27

26 dB BANDWIDTH





8.2.3. 99% BANDWIDTH

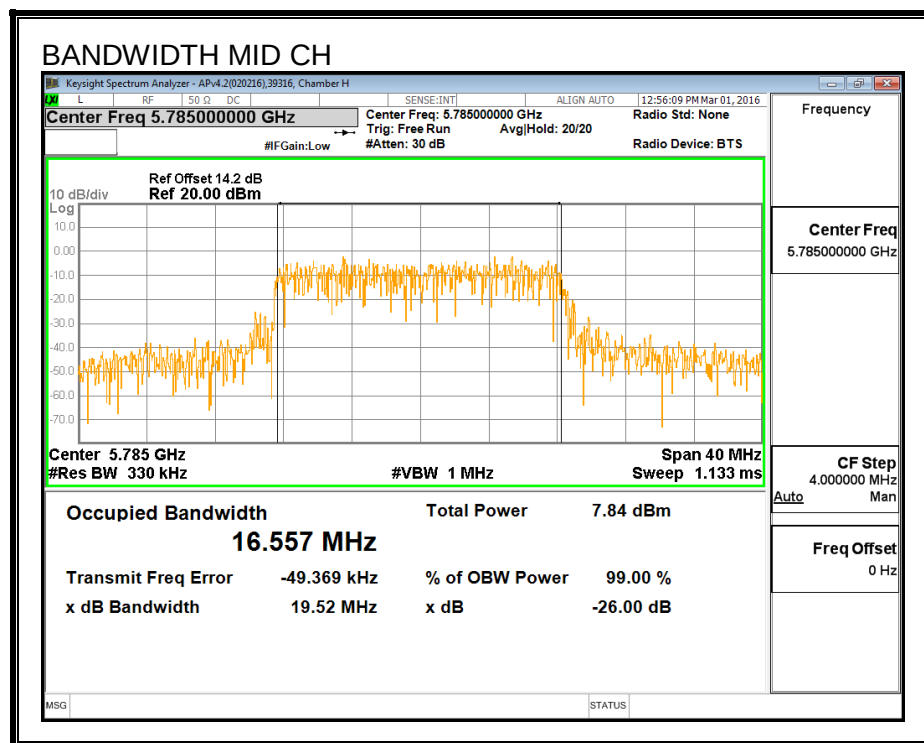
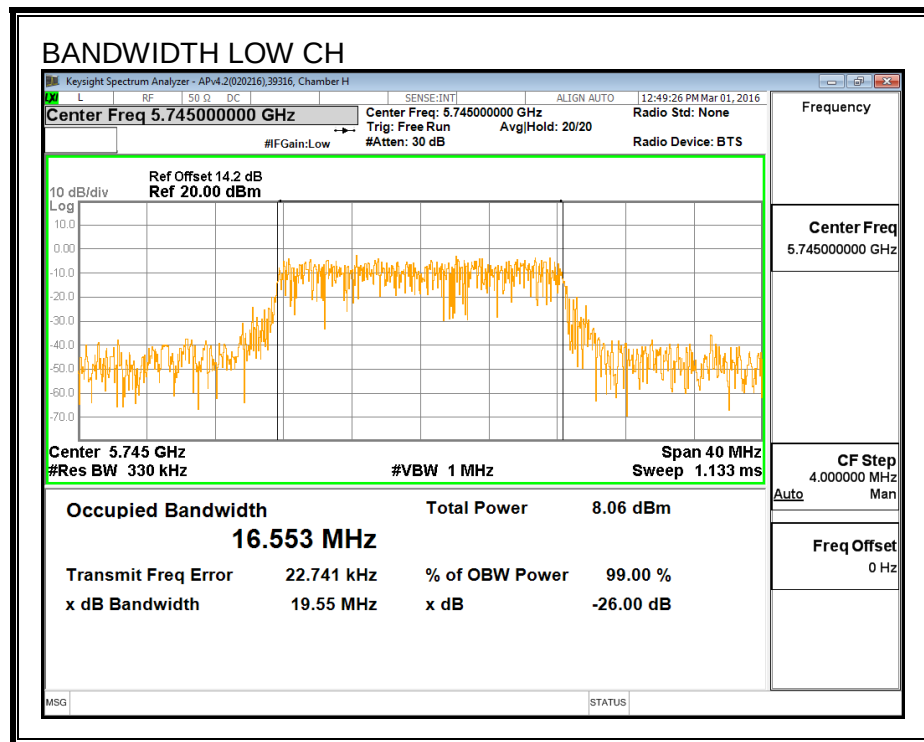
LIMITS

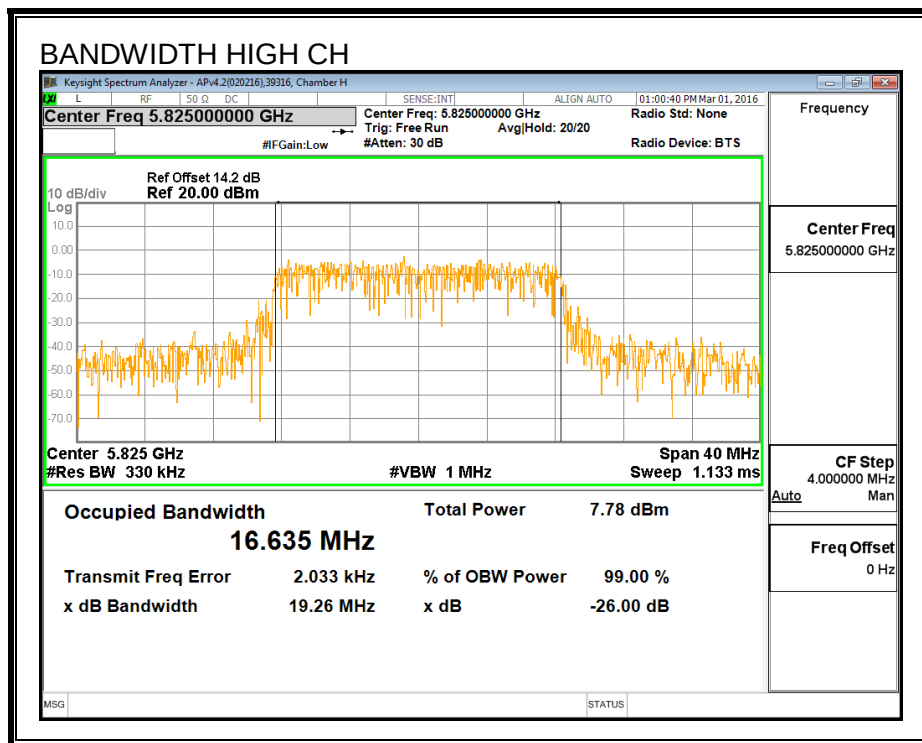
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.5530
Mid	5785	16.5570
High	5825	16.6350

99% BANDWIDTH





8.2.4. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Antenna Gain and Limit

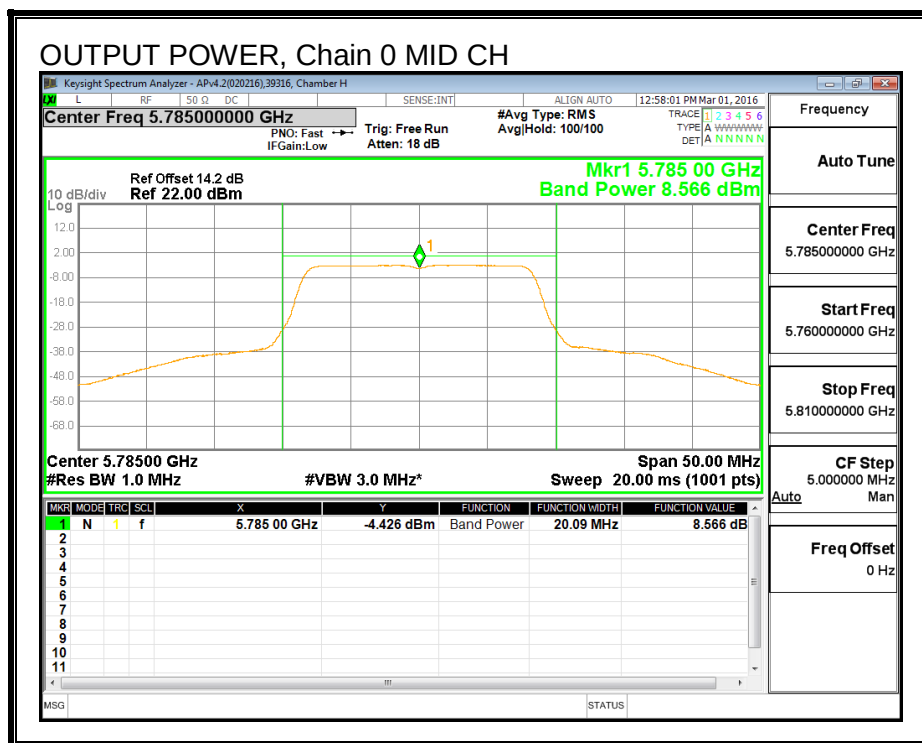
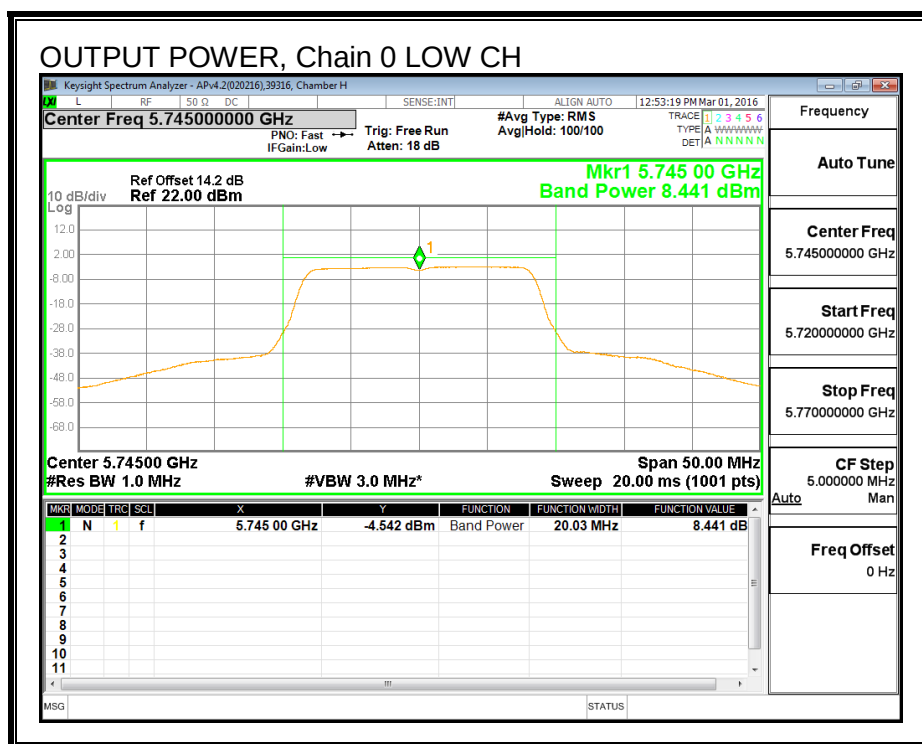
Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	3.14	30.00
Mid	5785	3.14	30.00
High	5825	3.14	30.00

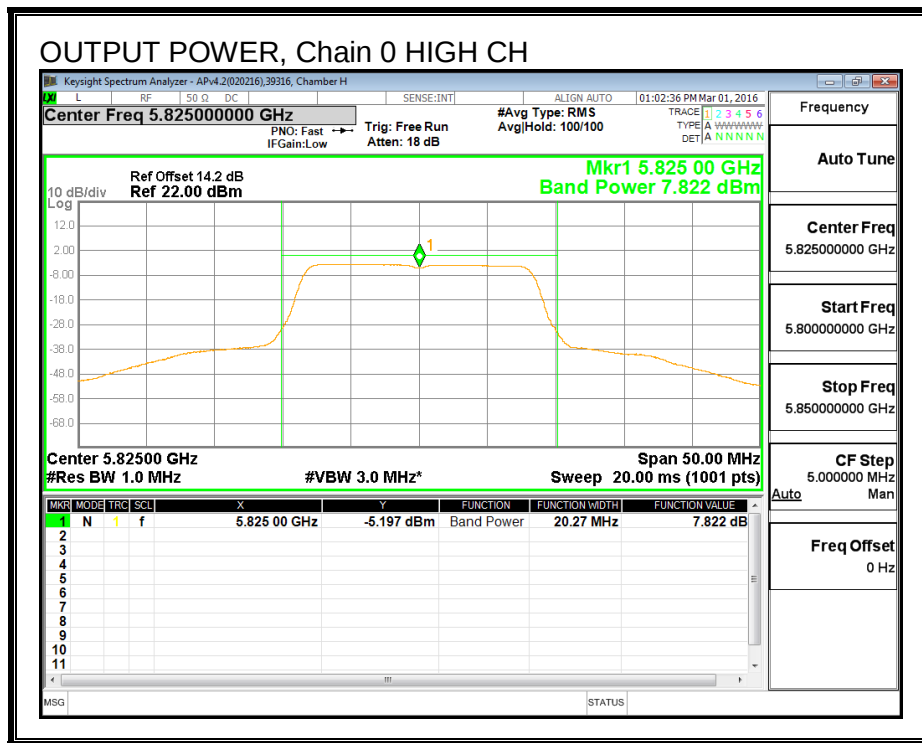
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	8.44	8.44	30.00	-21.56
Mid	5785	8.57	8.57	30.00	-21.43
High	5825	7.82	7.82	30.00	-22.18

OUTPUT POWER, Chain 0





8.2.5. Maximum Power Spectral Density (PSD)

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Antenna Gain and Limits

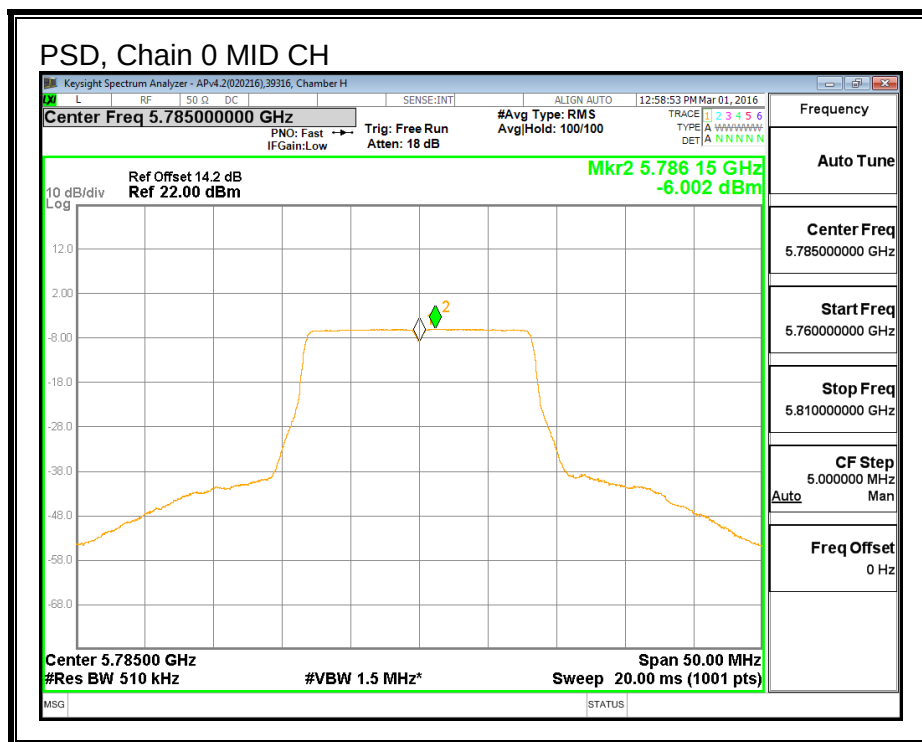
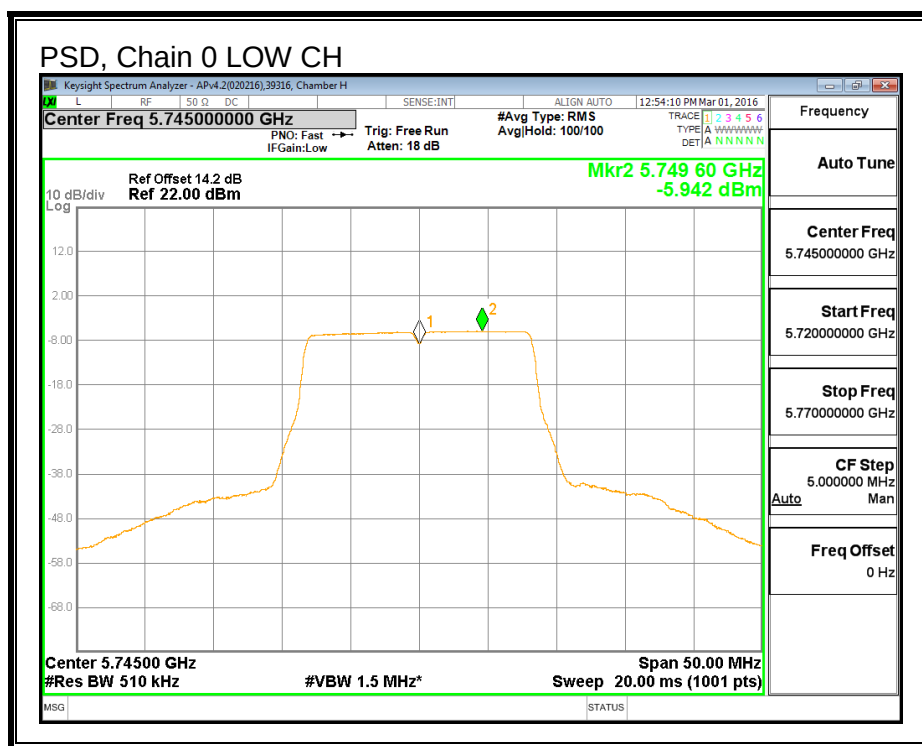
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	3.14	30.00
Mid	5785	3.14	30.00
High	5825	3.14	30.00

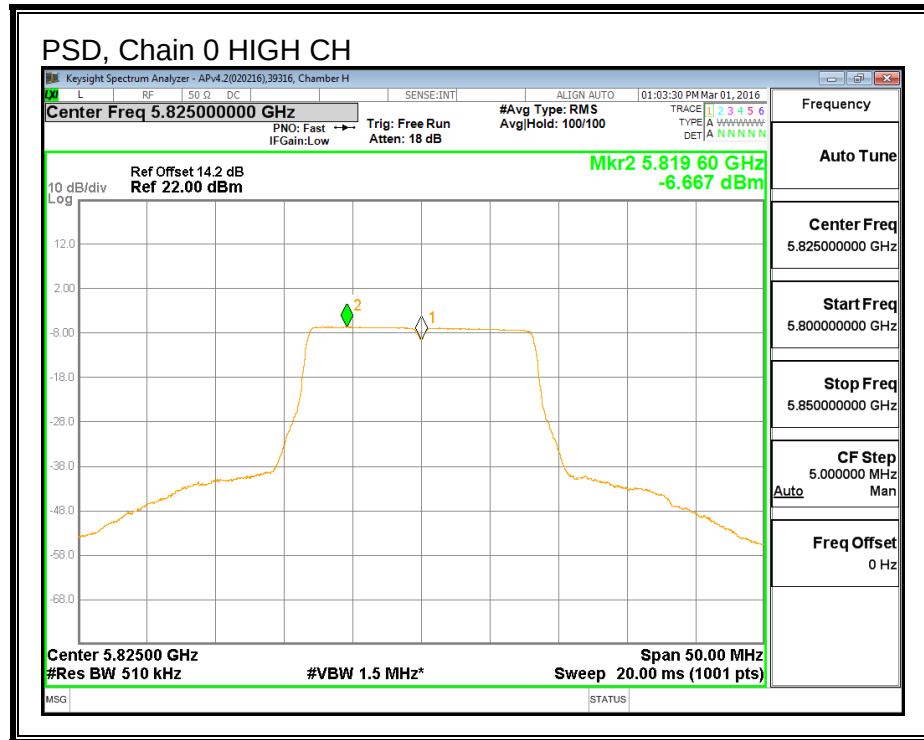
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
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PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	-5.94	-5.94	30.00	-35.94
Mid	5785	-6.00	-6.00	30.00	-36.00
High	5825	-6.67	-6.67	30.00	-36.67

PSD, Chain 0





8.3. 802.11n HT20 MODE IN THE 5.8 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

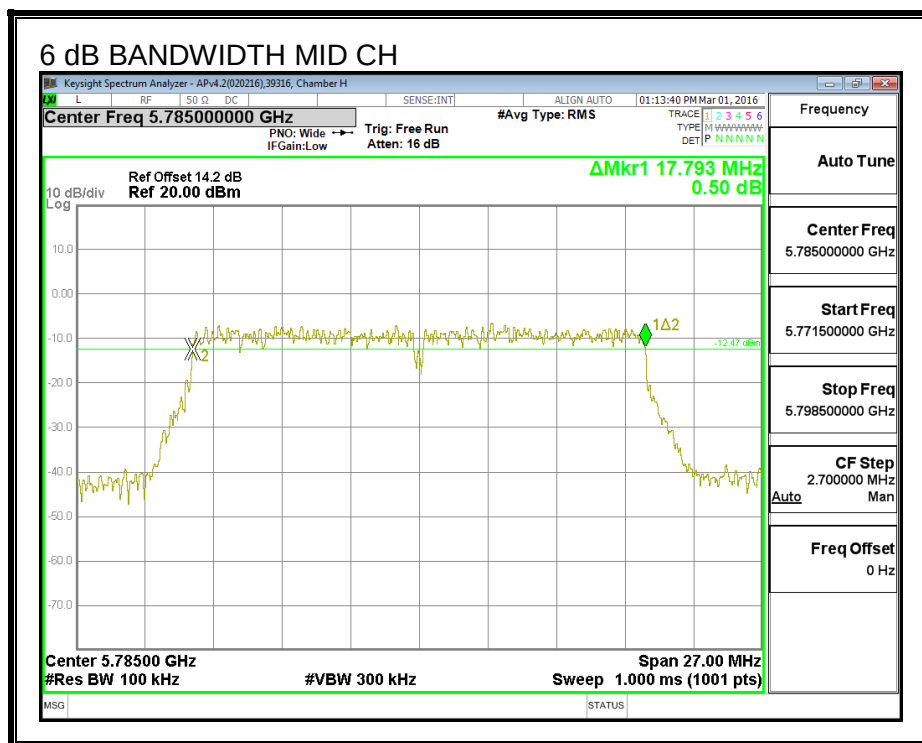
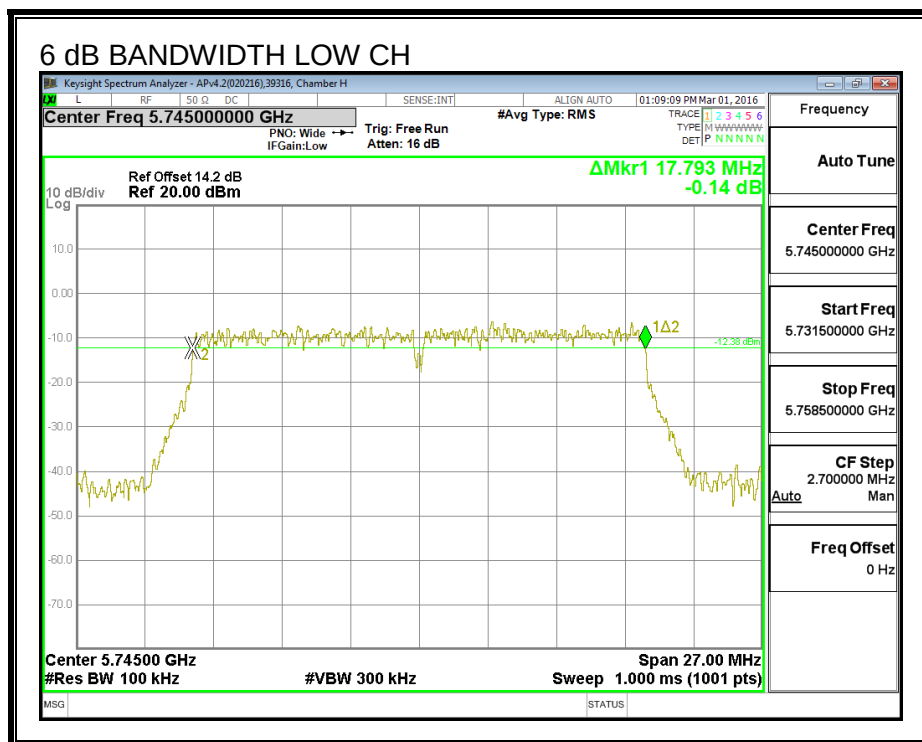
FCC §15.407 (e)

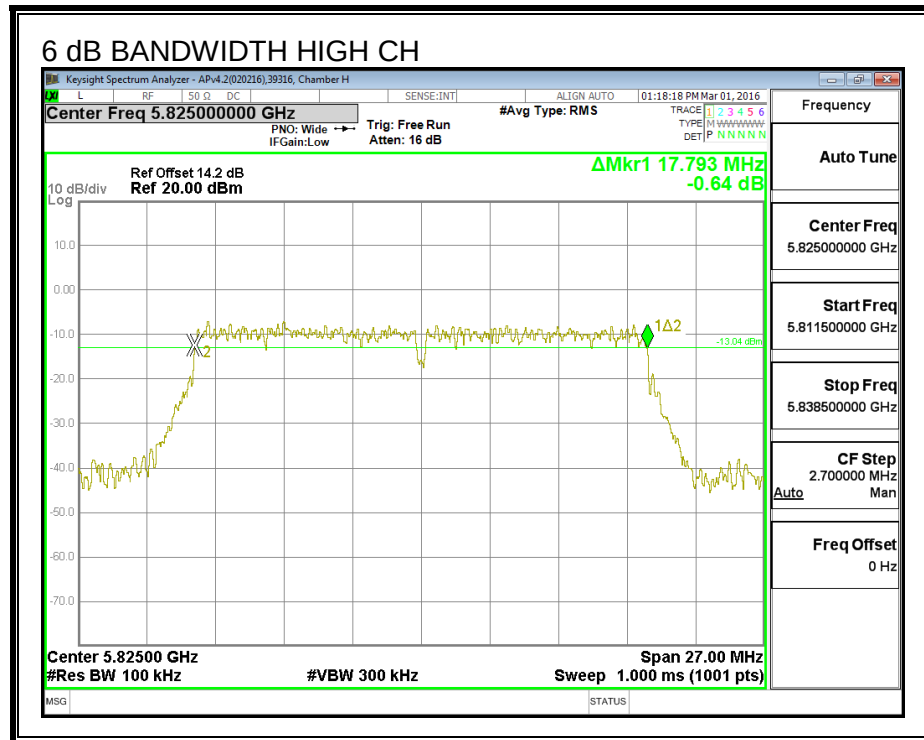
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.7930	0.5
Mid	5785	17.7930	0.5
High	5825	17.7930	0.5

6 dB BANDWIDTH





8.3.2. 26 dB BANDWIDTH

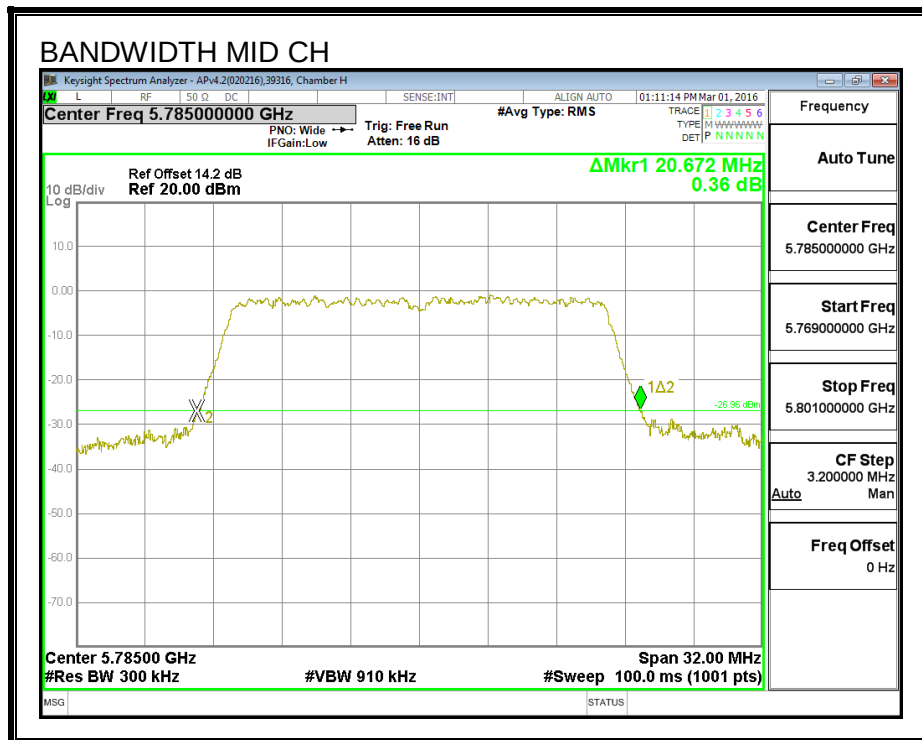
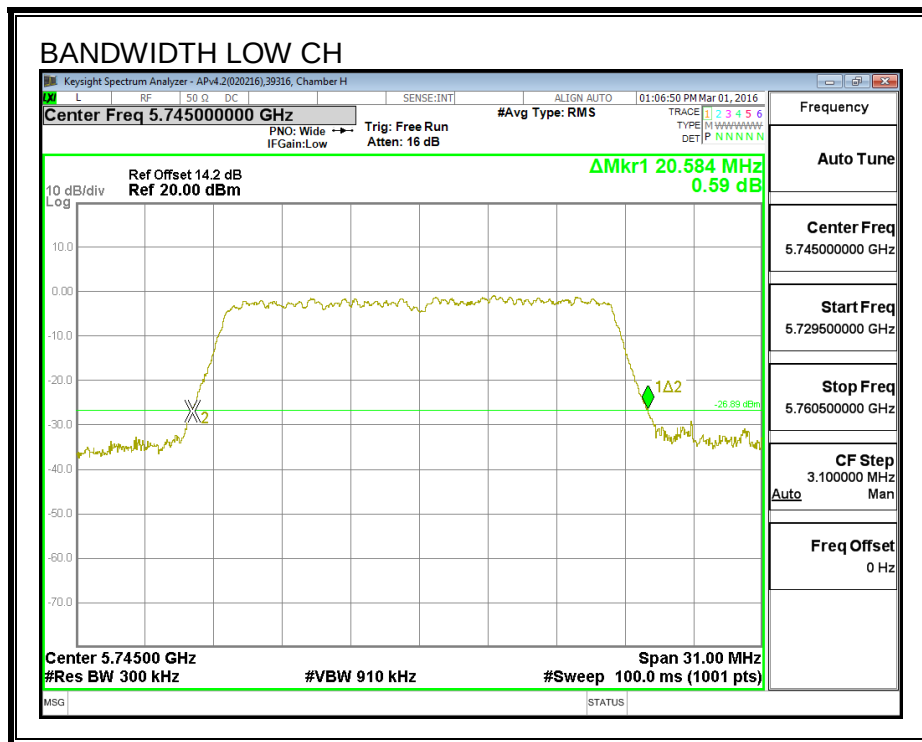
LIMITS

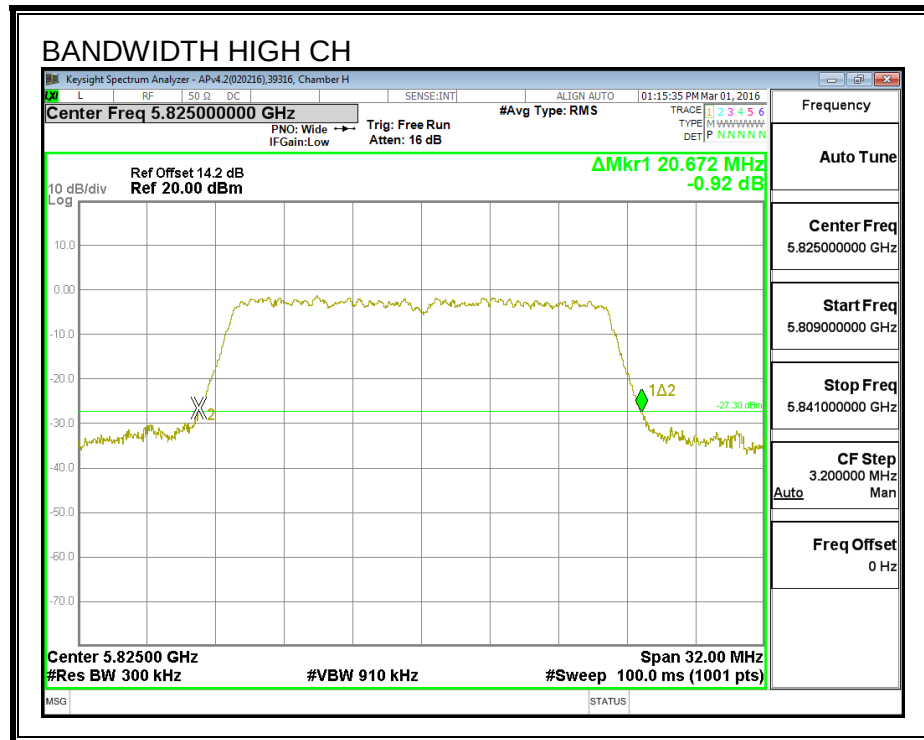
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	20.58
Mid	5785	20.67
High	5825	20.67

26 dB BANDWIDTH





8.3.3. 99% BANDWIDTH

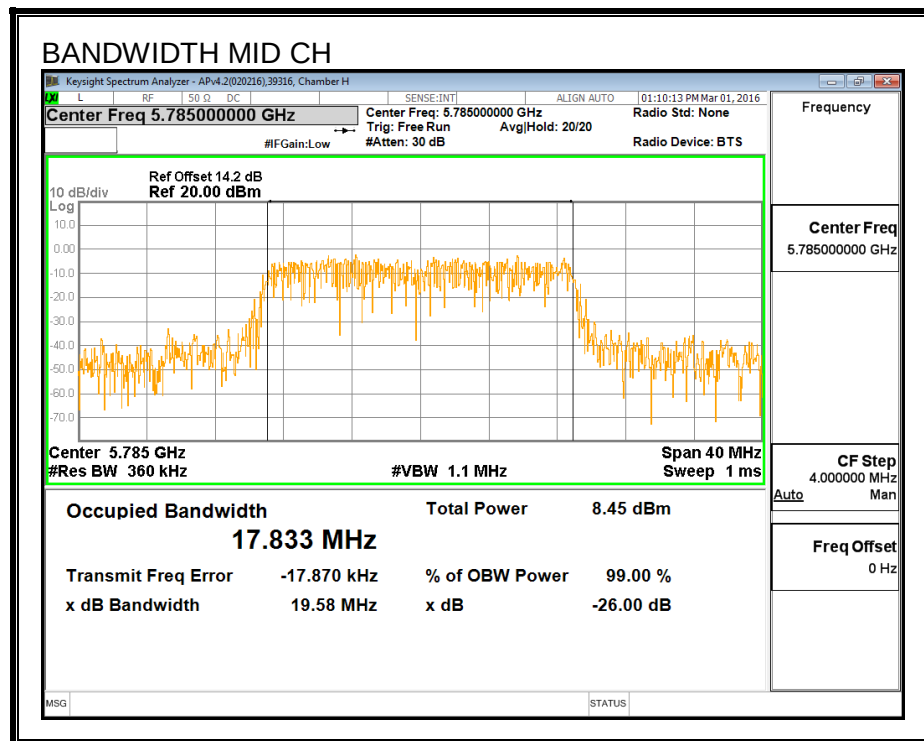
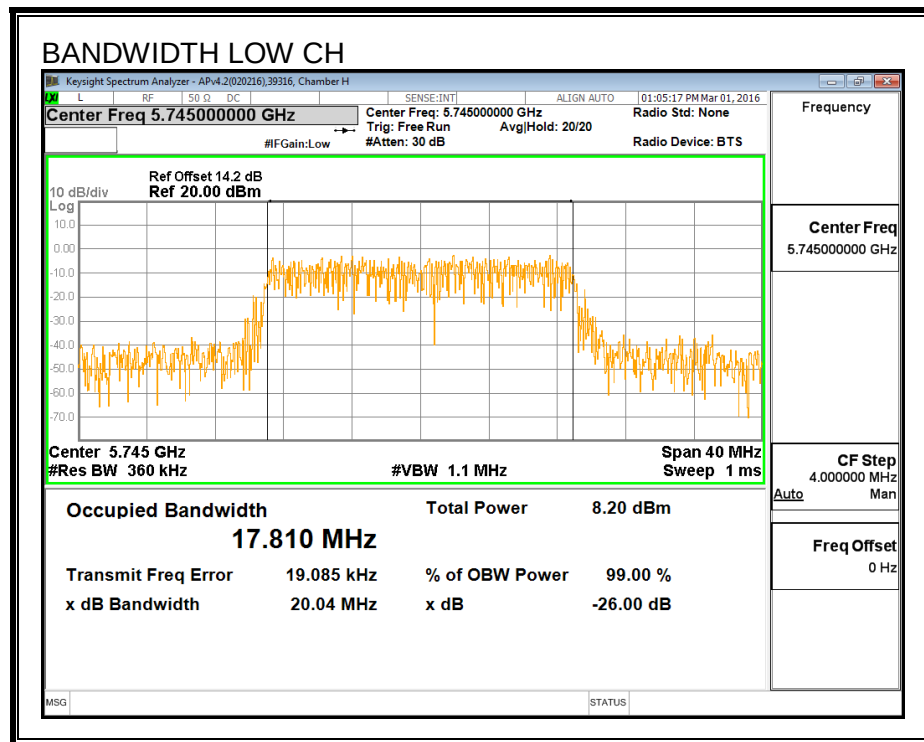
LIMITS

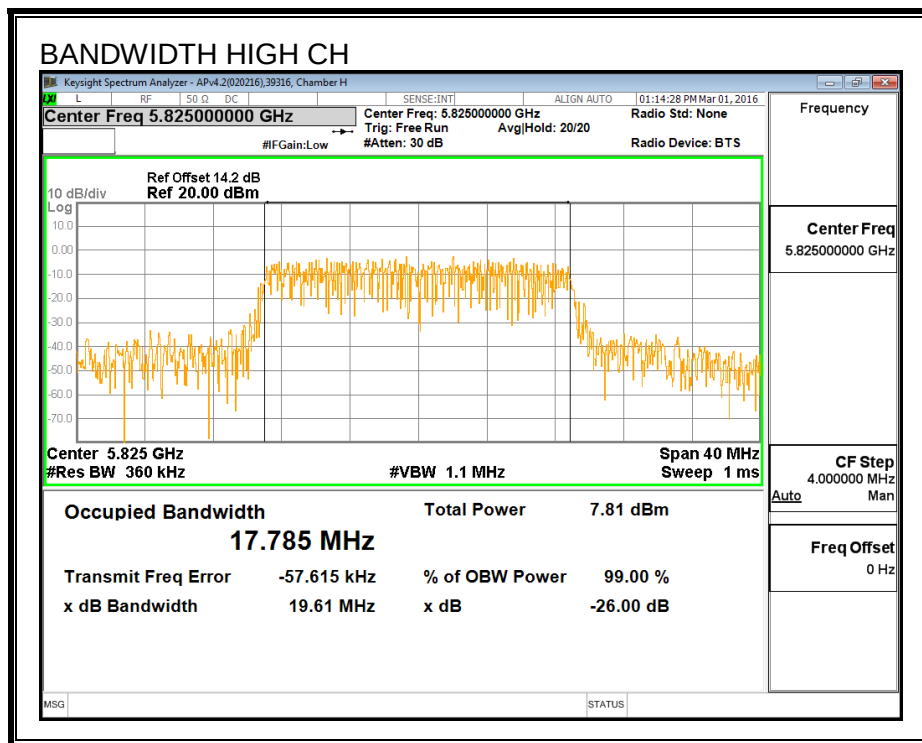
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.8100
Mid	5785	17.8330
High	5825	17.7850

99% BANDWIDTH





8.3.4. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Antenna Gain and Limit

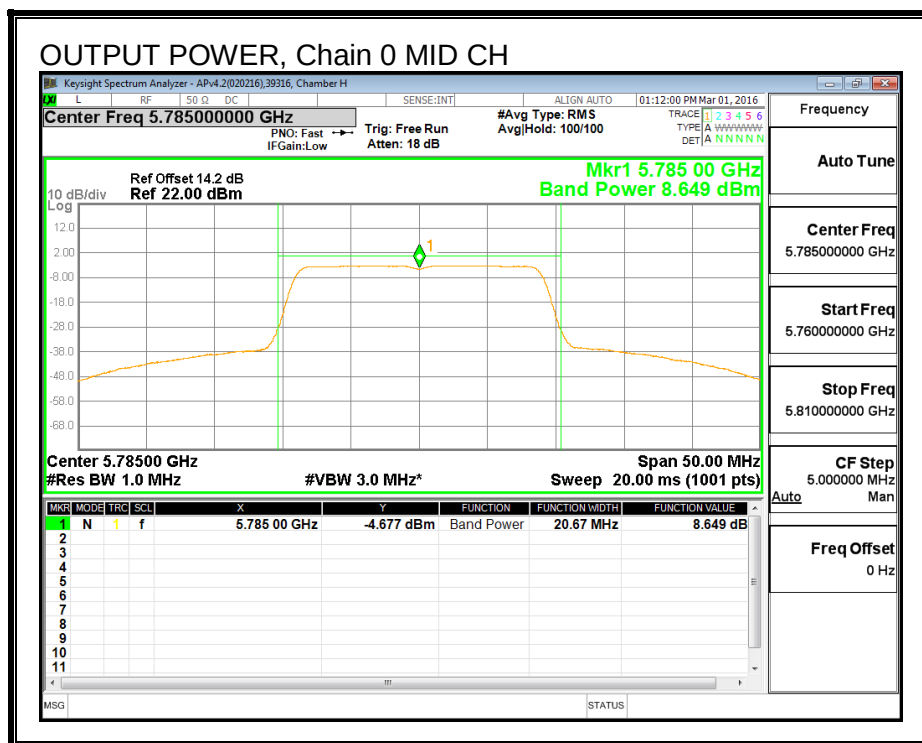
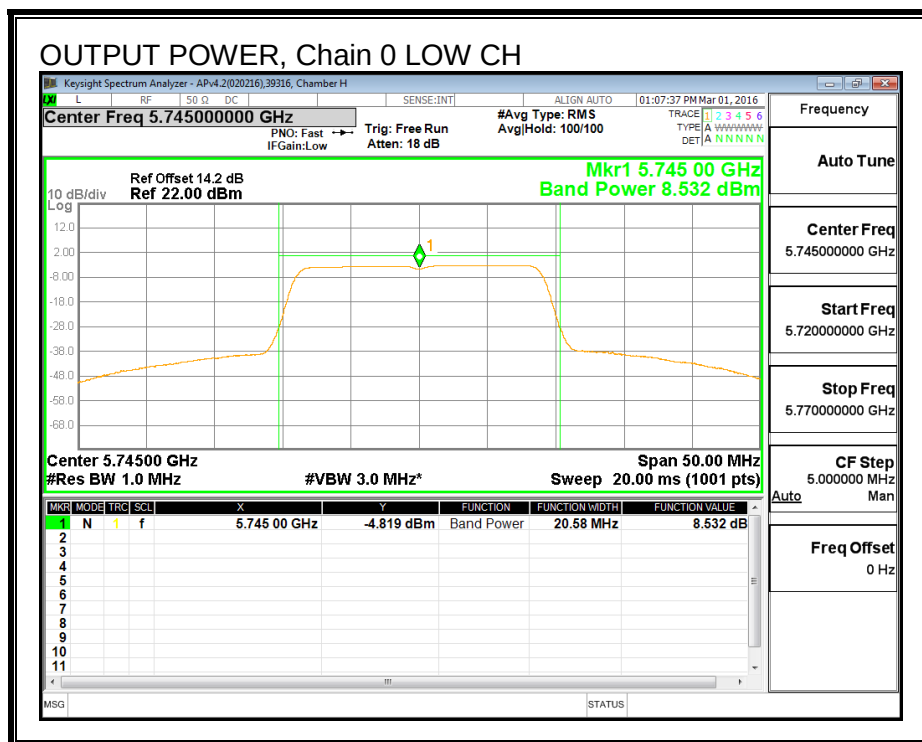
Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	3.14	30.00
Mid	5785	3.14	30.00
High	5825	3.14	30.00

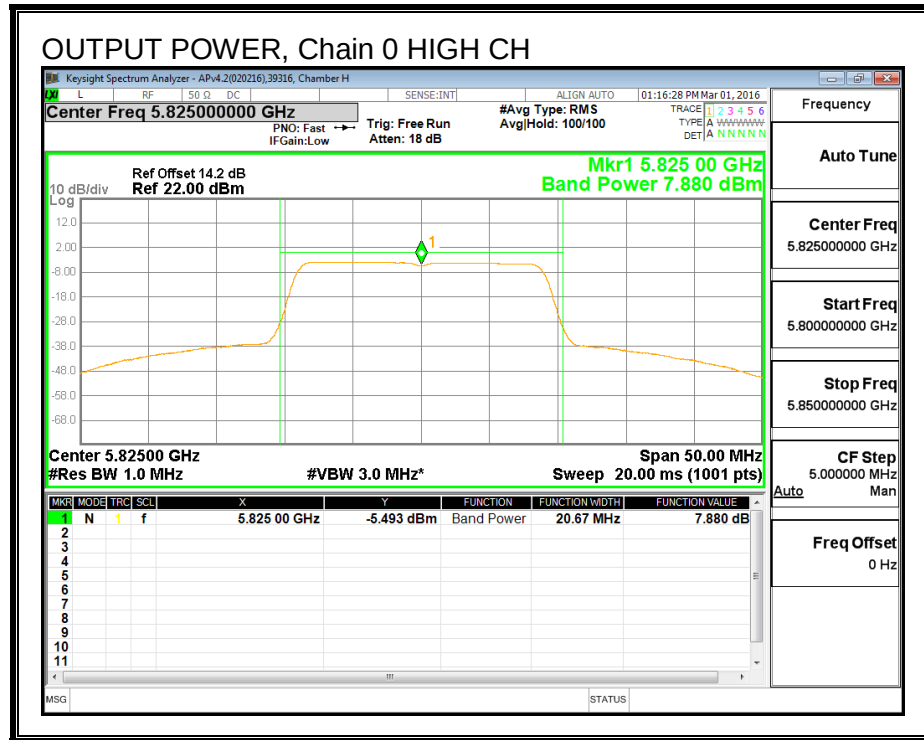
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	8.53	8.53	30.00	-21.47
Mid	5785	8.65	8.65	30.00	-21.35
High	5825	7.88	7.88	30.00	-22.12

OUTPUT POWER, Chain 0





8.3.5. Maximum Power Spectral Density (PSD)

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Antenna Gain and Limits

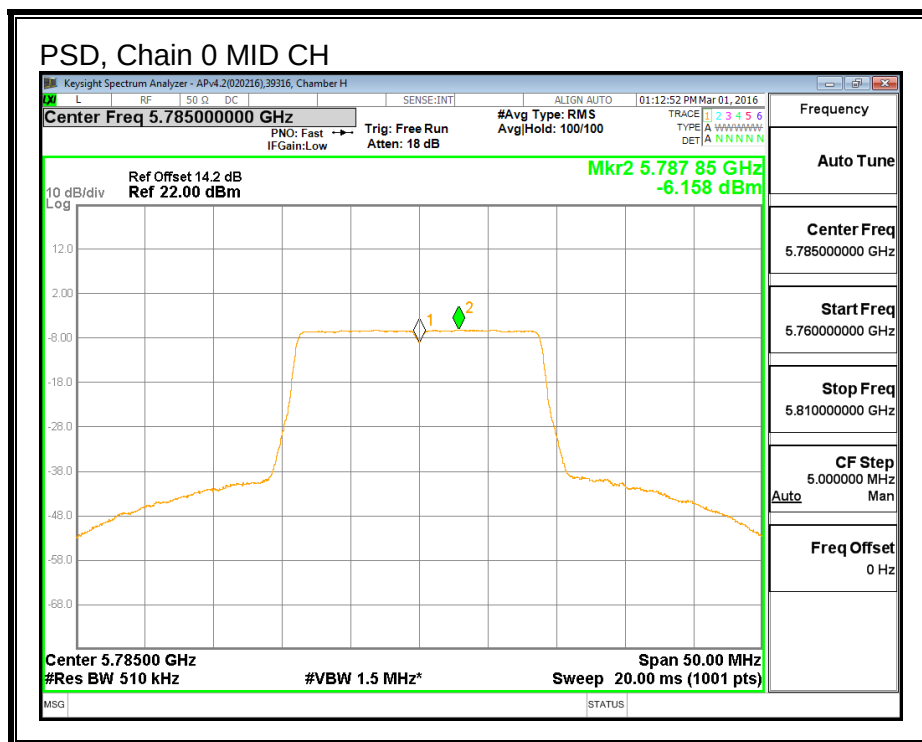
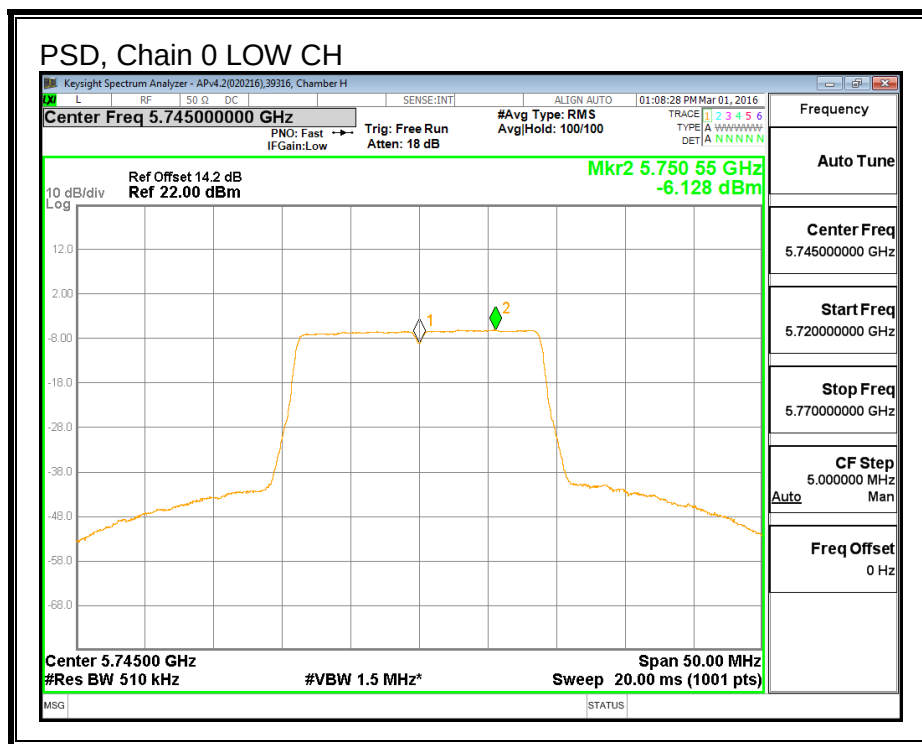
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	3.14	30.00
Mid	5785	3.14	30.00
High	5825	3.14	30.00

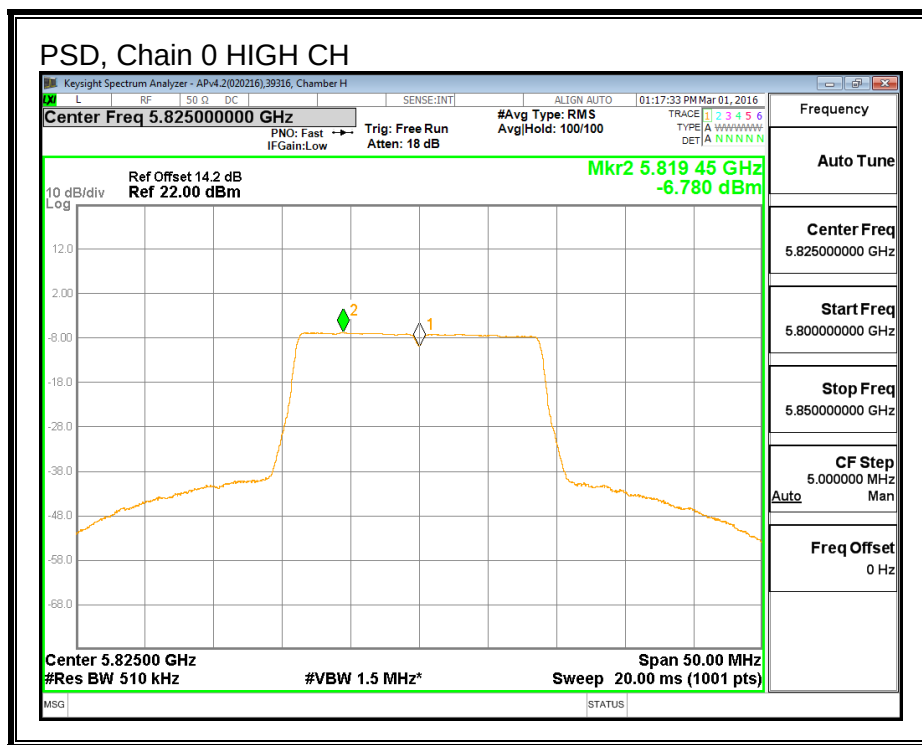
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
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PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	-6.13	-6.13	30.00	-36.13
Mid	5785	-6.16	-6.16	30.00	-36.16
High	5825	-6.78	-6.78	30.00	-36.78

PSD, Chain 0





9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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 below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

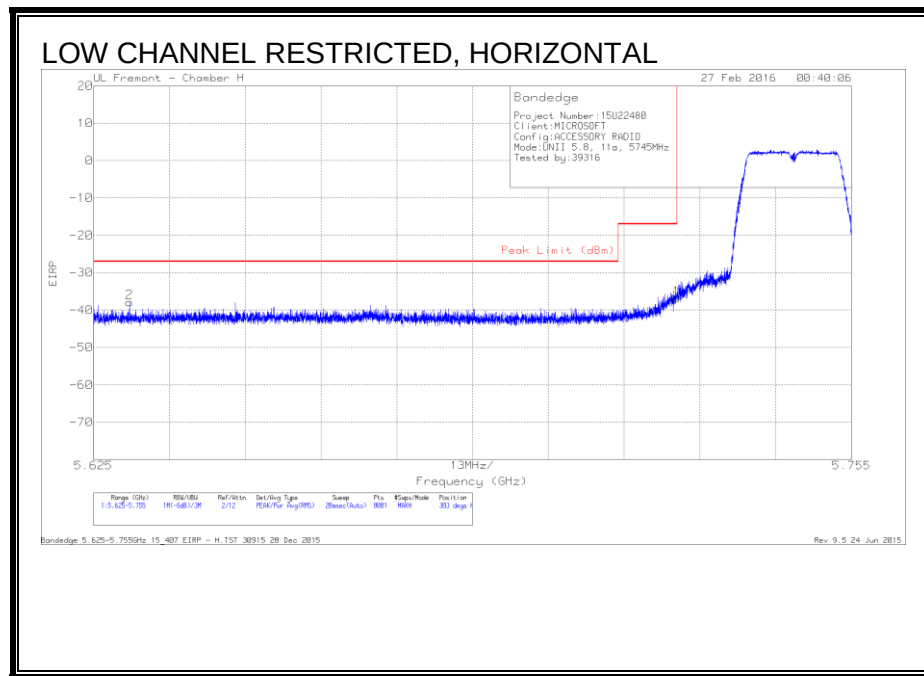
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

9.2. TRANSMITTER ABOVE 1 GHz

9.3. TX ABOVE 1 GHz 802.11a MODE IN THE 5.8 GHz BAND

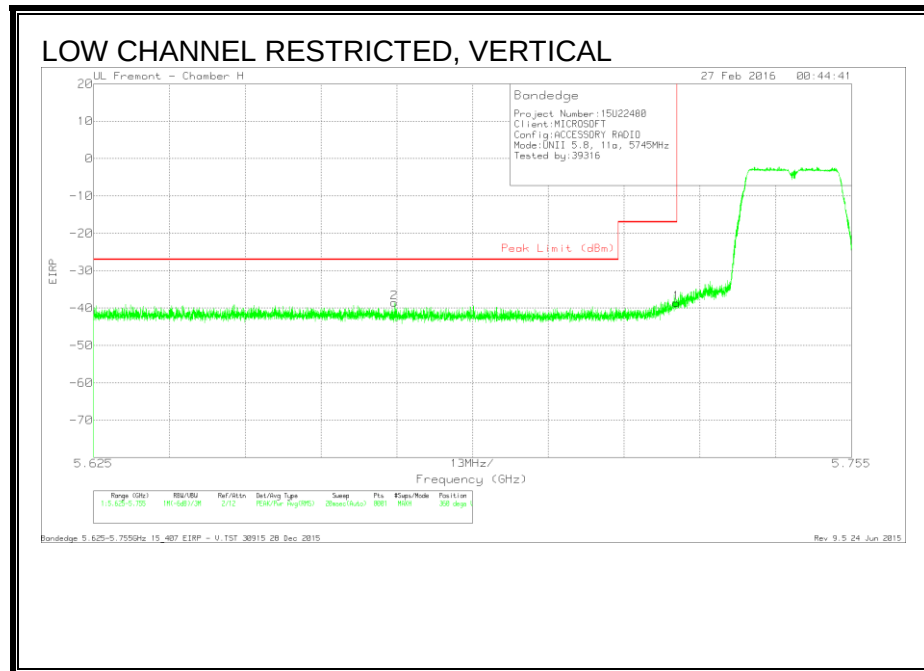
RESTRICTED BANDEDGE (LOW CHANNEL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.631	-65.98	Pk	34.9	-18.6	11.8	-37.88	-27	-10.88	303	172	H
1	5.725	-64.96	Pk	34.8	-18.5	11.8	-36.86	-17	-19.86	303	172	H

Pk - Peak detector

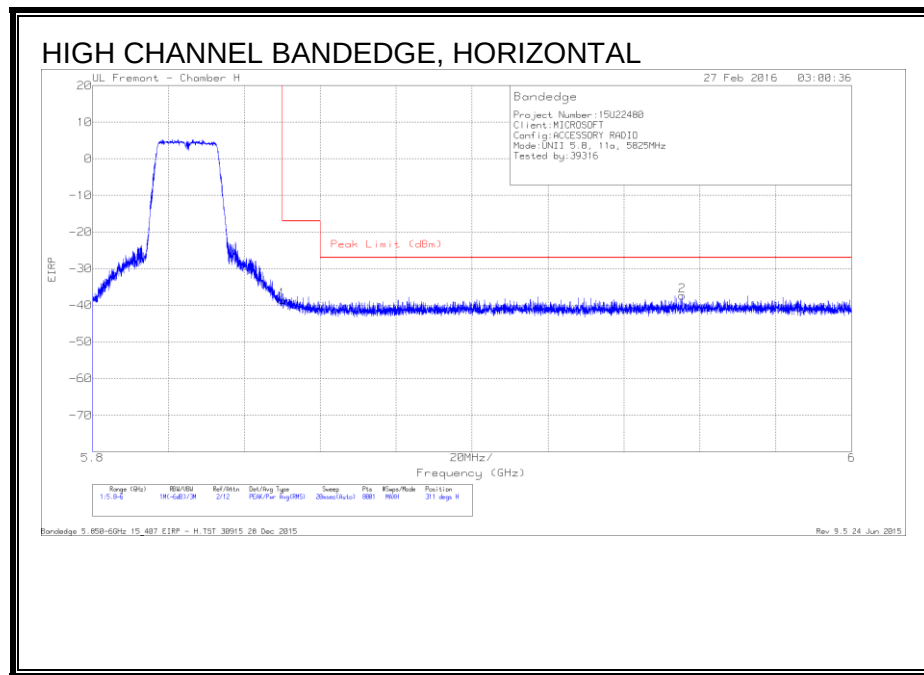


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.677	-66.64	Pk	34.8	-18.5	11.8	-38.54	-27	-11.54	360	237	V
1	5.725	-66.74	Pk	34.8	-18.5	11.8	-38.64	-17	-21.64	360	237	V

Pk - Peak detector

AUTHORIZED BANDEDGE (HIGH CHANNEL)

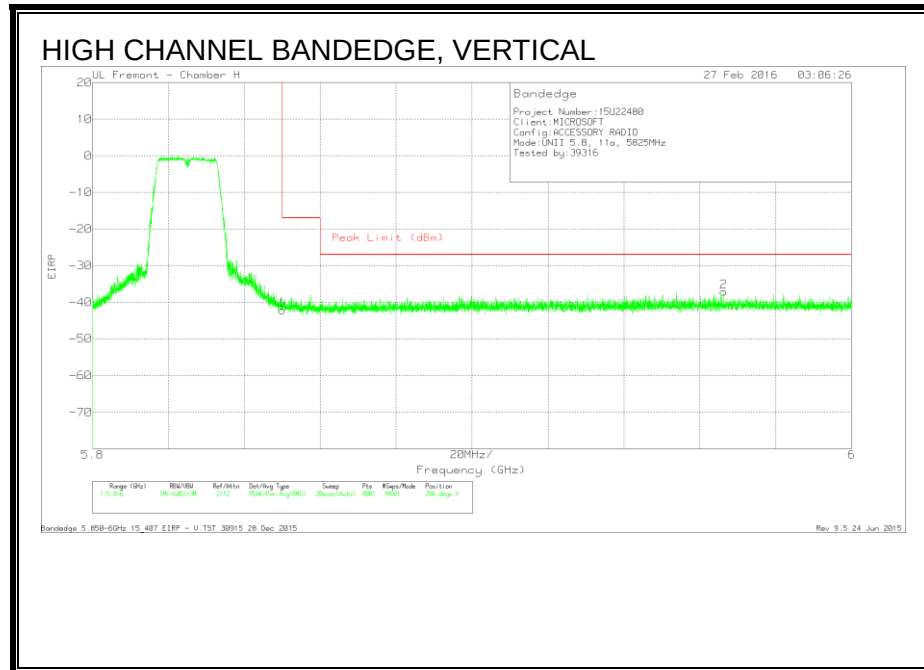


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-66.73	Pk	34.9	-18.5	11.8	-38.53	-17	-21.53	311	149	H
2	5.955	-66.24	Pk	35.1	-18	11.8	-37.34	-27	-10.34	311	149	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector



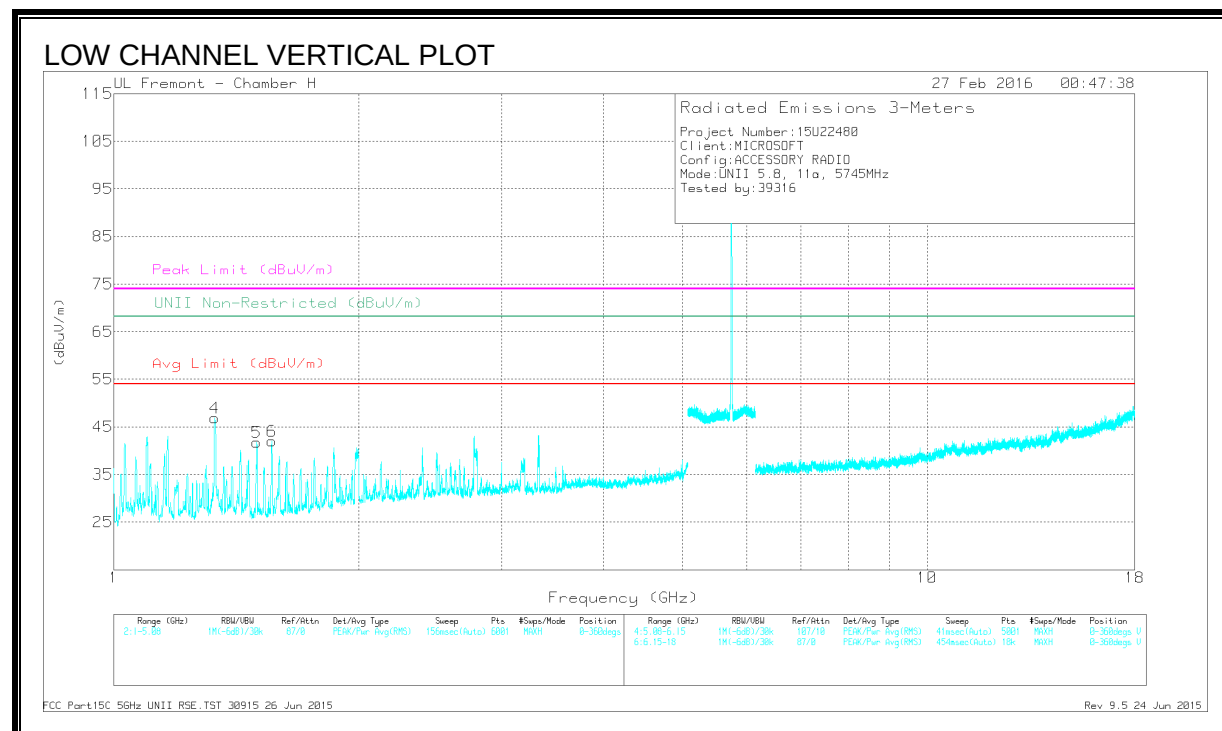
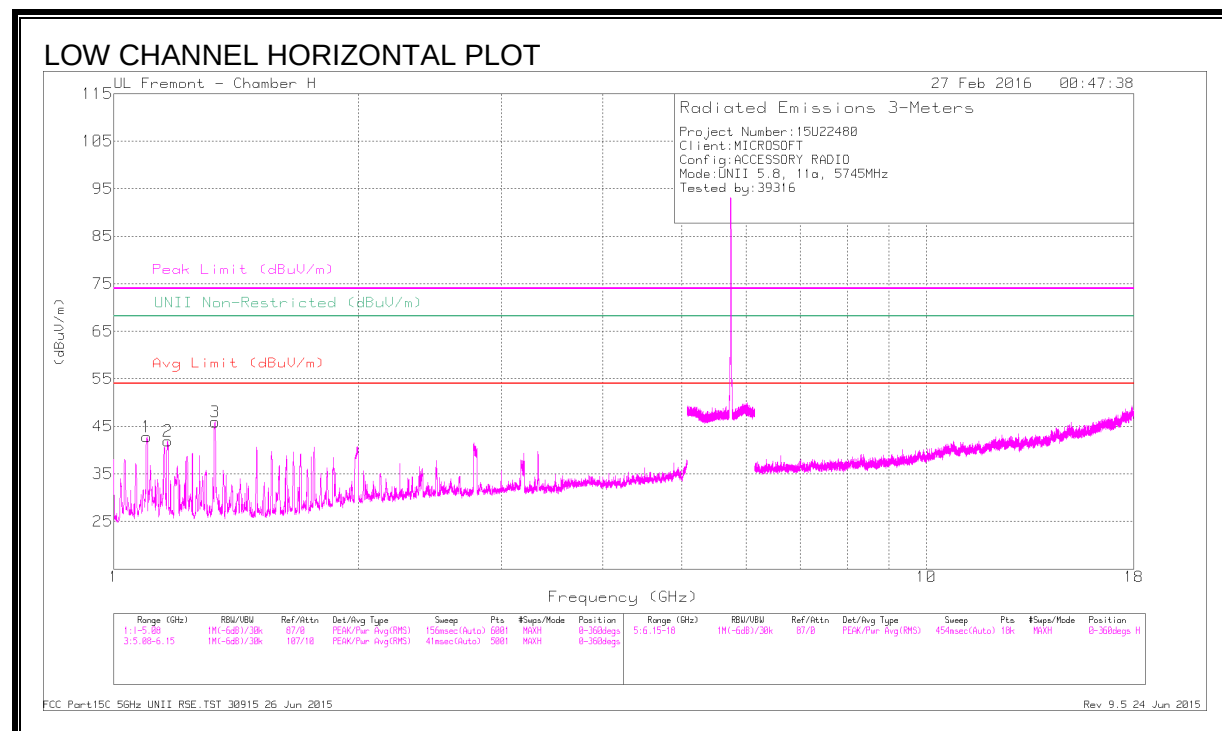
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-70.32	Pk	34.9	-18.5	11.8	-42.12	-17	-25.12	286	177	V
2	5.966	-66.21	Pk	35.2	-17.9	11.8	-37.11	-27	-10.11	286	177	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS



DATA

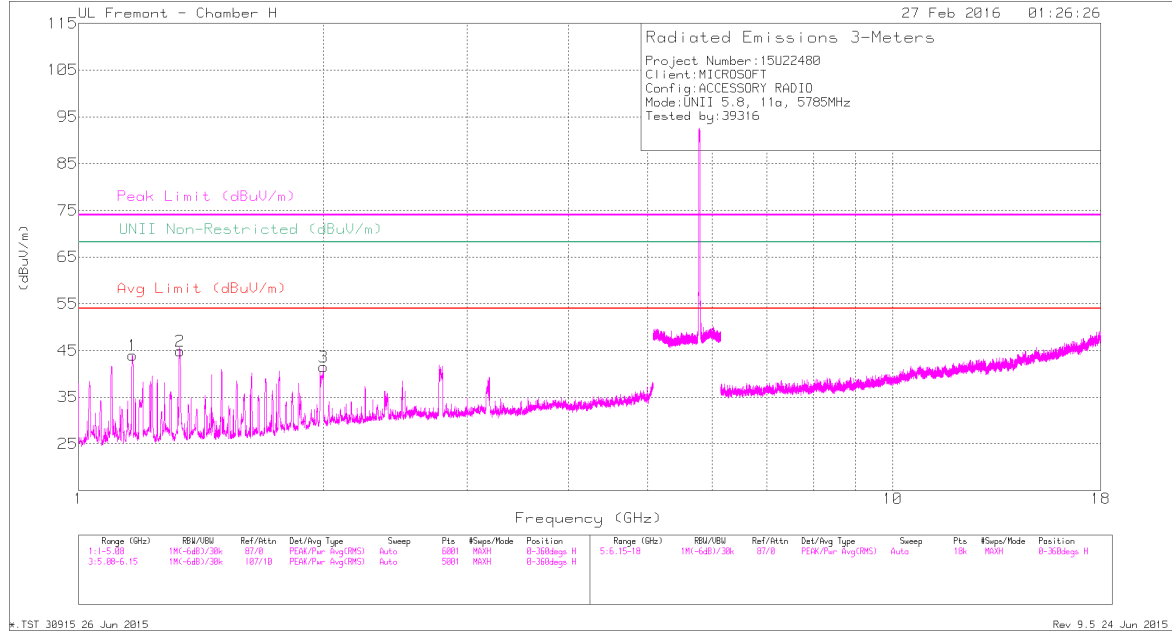
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/FI tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.1	53.76	PK-U	27.1	-34.4	46.46	-	-	74	-27.54	-	-	219	186	H
	* 1.099	46.2	ADR	27.1	-34.4	38.9	54	-15.1	-	-	-	-	219	186	H
2	* 1.164	57.37	PK-U	27.7	-34.5	50.57	-	-	74	-23.43	-	-	195	203	H
	* 1.165	48.12	ADR	27.8	-34.5	41.42	54	-12.58	-	-	-	-	195	203	H
4	* 1.333	57.33	PK-U	28.8	-34.6	51.53	-	-	74	-22.47	-	-	228	201	H
	* 1.332	48.99	ADR	28.8	-34.6	43.19	54	-10.81	-	-	-	-	228	201	H
3	* 1.334	57.87	PK-U	28.8	-34.6	52.07	-	-	74	-21.93	-	-	304	121	V
	* 1.331	49.77	ADR	28.8	-34.6	43.97	54	-10.03	-	-	-	-	304	121	V
5	* 1.5	54.63	PK-U	28.1	-34.3	48.43	-	-	74	-25.57	-	-	39	341	V
	* 1.5	47	ADR	28.1	-34.3	40.8	54	-13.2	-	-	-	-	39	341	V
6	* 1.564	55.22	PK-U	28.3	-34.4	49.12	-	-	74	-24.88	-	-	64	350	V
	* 1.565	48.04	ADR	28.3	-34.4	41.94	54	-12.06	-	-	-	-	64	350	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

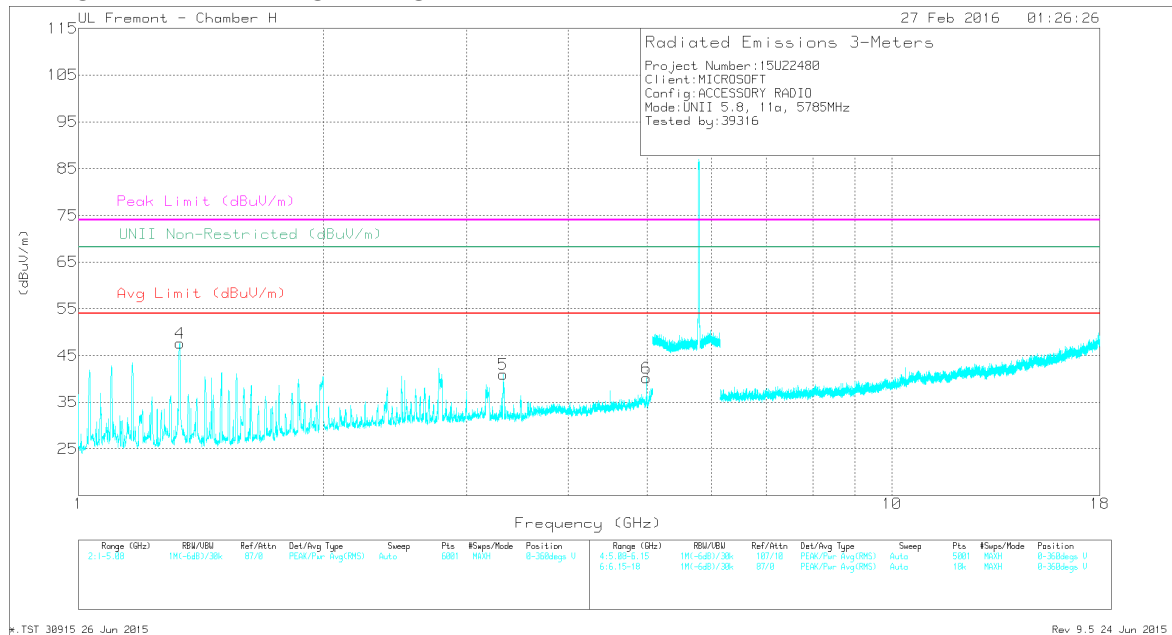
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

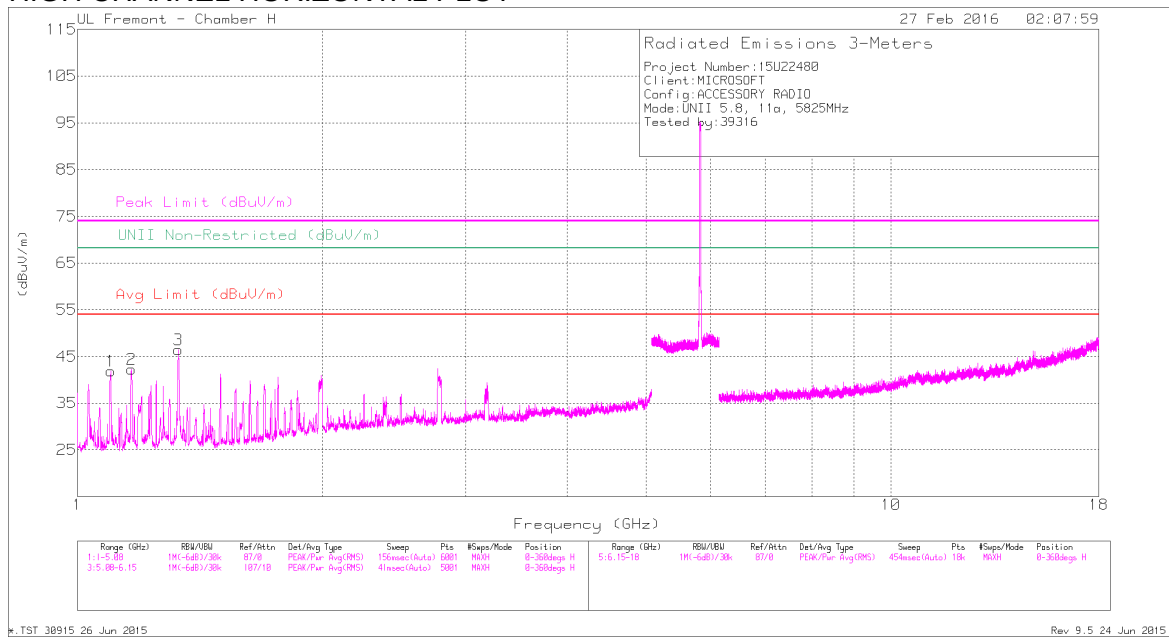
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/FI tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.165	58.51	PK-U	27.7	-34.5	51.71	-	-	74	-22.29	-	-	186	196	H
	* 1.165	46.78	ADR	27.8	-34.5	40.08	54	-13.92	-	-	-	-	186	196	H
2	* 1.334	57.92	PK-U	28.8	-34.6	52.12	-	-	74	-21.88	-	-	231	200	H
	* 1.331	49.18	ADR	28.8	-34.6	43.38	54	-10.62	-	-	-	-	231	200	H
4	* 1.333	57.91	PK-U	28.8	-34.6	52.11	-	-	74	-21.89	-	-	302	120	V
	* 1.332	49.86	ADR	28.8	-34.6	44.06	54	-9.94	-	-	-	-	302	120	V
6	* 4.99	44.64	PK-U	34.3	-29.1	49.84	-	-	74	-24.16	-	-	218	202	V
	* 4.99	29.51	ADR	34.3	-29.1	34.71	54	-19.29	-	-	-	-	218	202	V
3	2	48.64	PK-U	31.2	-33.8	46.04	-	-	-	-	68.2	-22.16	113	209	H
5	3.329	49.75	PK-U	32.8	-31	51.55	-	-	-	-	68.2	-16.65	65	164	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

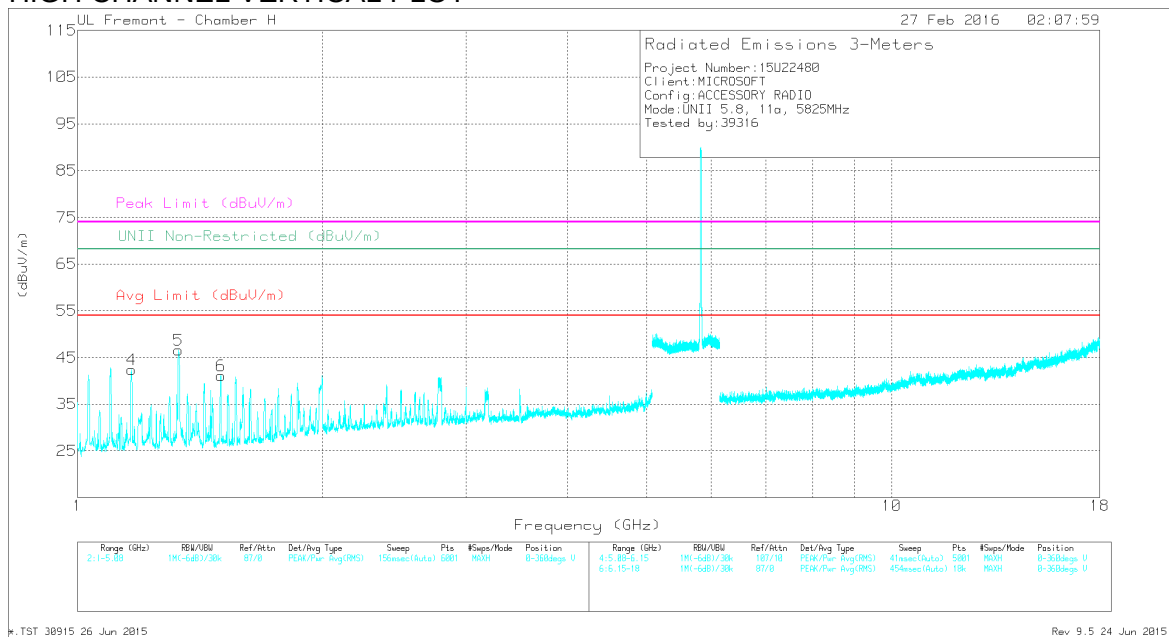
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/FI tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.1	54.52	PK-U	27.1	-34.4	47.22	-	-	74	-26.78	-	-	219	184	H
	* 1.098	47.24	ADR	27.1	-34.4	39.94	54	-14.06	-	-	-	-	219	184	H
2	* 1.164	56.93	PK-U	27.7	-34.5	50.13	-	-	74	-23.87	-	-	193	218	H
	* 1.165	47.94	ADR	27.8	-34.5	41.24	54	-12.76	-	-	-	-	193	218	H
3	* 1.331	57.93	PK-U	28.8	-34.6	52.13	-	-	74	-21.87	-	-	228	199	H
	* 1.332	49.58	ADR	28.8	-34.6	43.78	54	-10.22	-	-	-	-	228	199	H
4	* 1.164	56.89	PK-U	27.7	-34.5	50.09	-	-	74	-23.91	-	-	15	197	V
	* 1.165	46.92	ADR	27.8	-34.5	40.22	54	-13.78	-	-	-	-	15	197	V
5	* 1.332	58.49	PK-U	28.8	-34.6	52.69	-	-	74	-21.31	-	-	307	115	V
	* 1.331	49.84	ADR	28.8	-34.6	44.04	54	-9.96	-	-	-	-	307	115	V
6	* 1.5	55	PK-U	28.1	-34.3	48.8	-	-	74	-25.2	-	-	39	176	V
	* 1.5	47.85	ADR	28.1	-34.3	41.65	54	-12.35	-	-	-	-	39	176	V

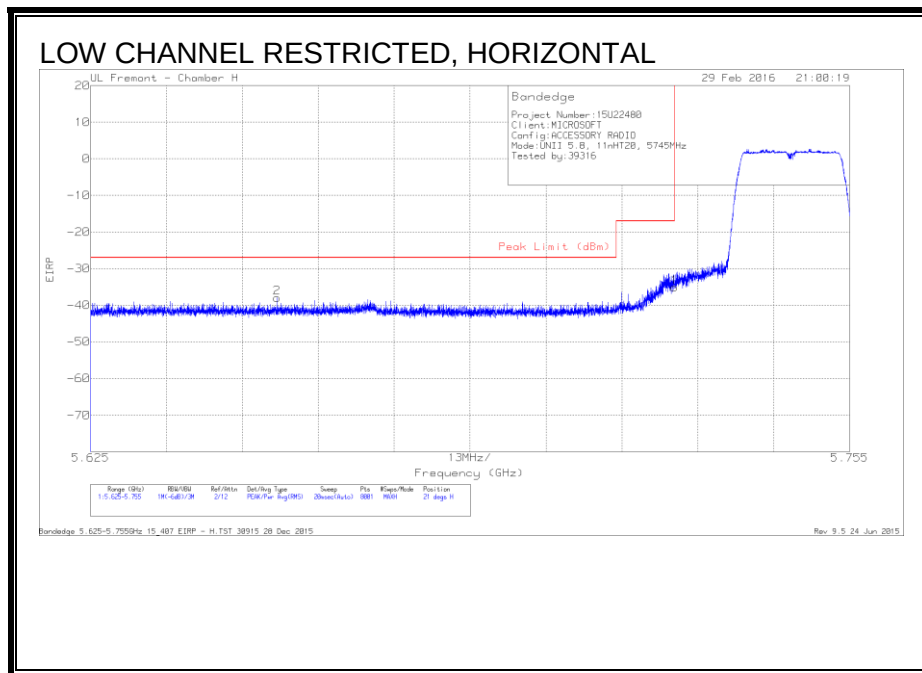
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.4. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND

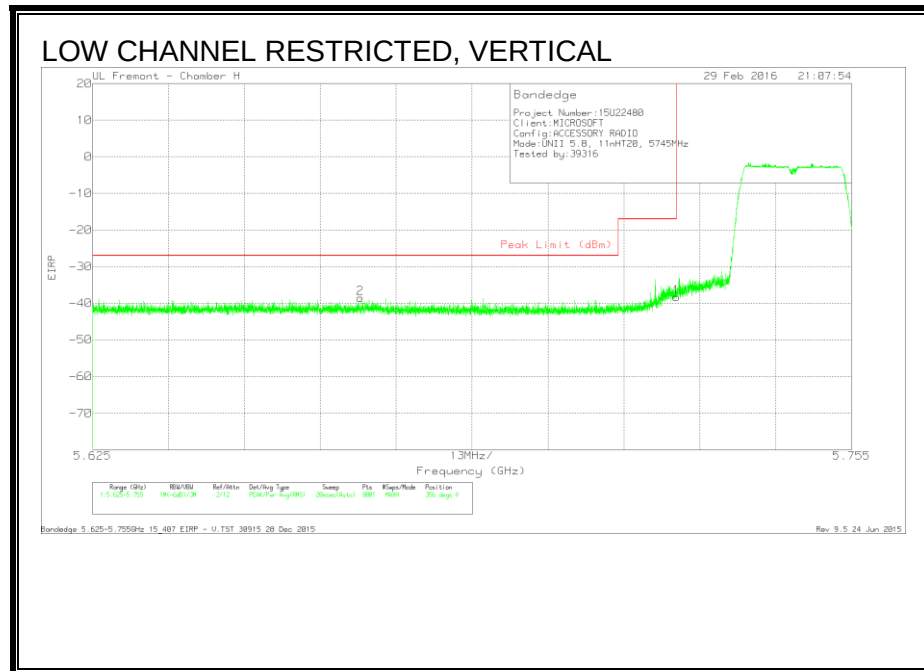
RESTRICTED BANDEDGE (LOW CHANNEL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.657	-66.18	Pk	34.9	-18.4	11.8	-37.88	-27	-10.88	21	181	H
1	5.725	-63.17	Pk	34.8	-18.5	11.8	-35.07	-17	-18.07	21	181	H

Pk - Peak detector

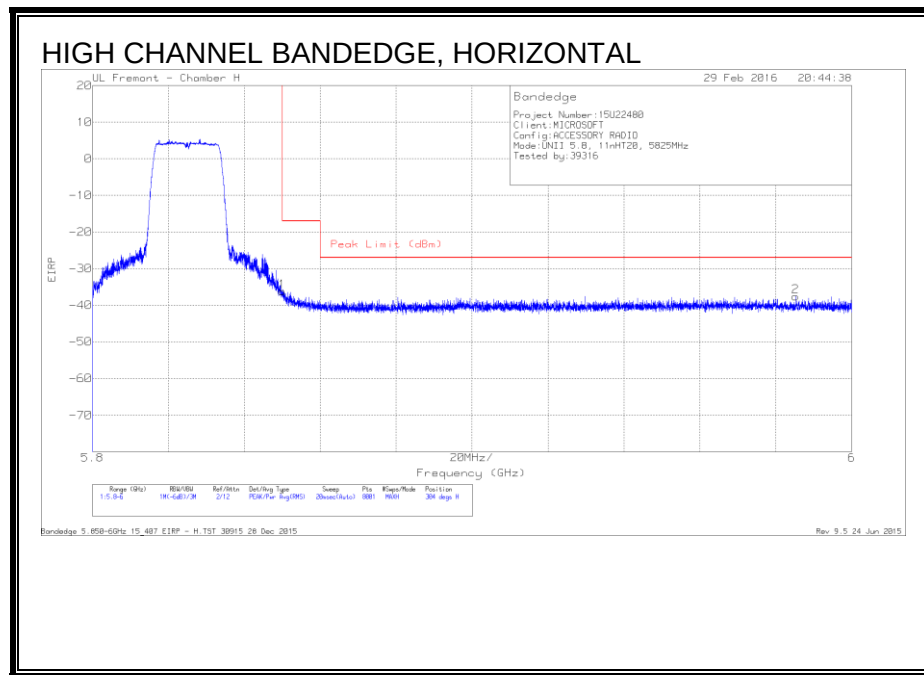


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.671	-66.71	Pk	34.8	-18.4	11.8	-38.51	-27	-11.51	356	256	V
1	5.725	-66.38	Pk	34.8	-18.5	11.8	-38.28	-17	-21.28	356	256	V

Pk - Peak detector

AUTHORIZED BANDEDGE (HIGH CHANNEL)

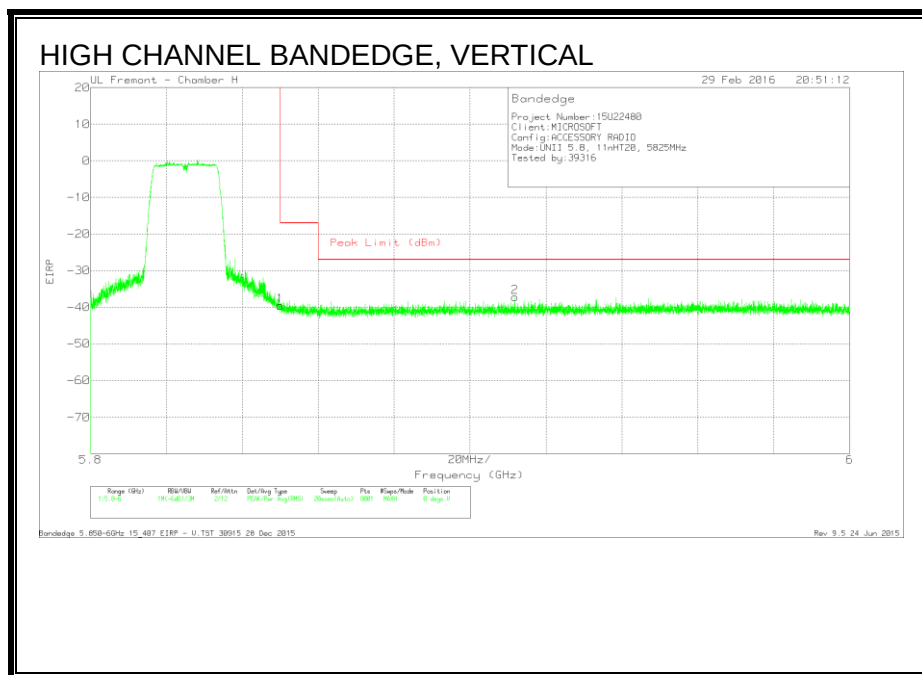


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-64.44	Pk	34.9	-18.5	11.8	-36.24	-17	-19.24	304	161	H
2	5.985	-66.52	Pk	35.2	-18	11.8	-37.52	-27	-10.52	304	161	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

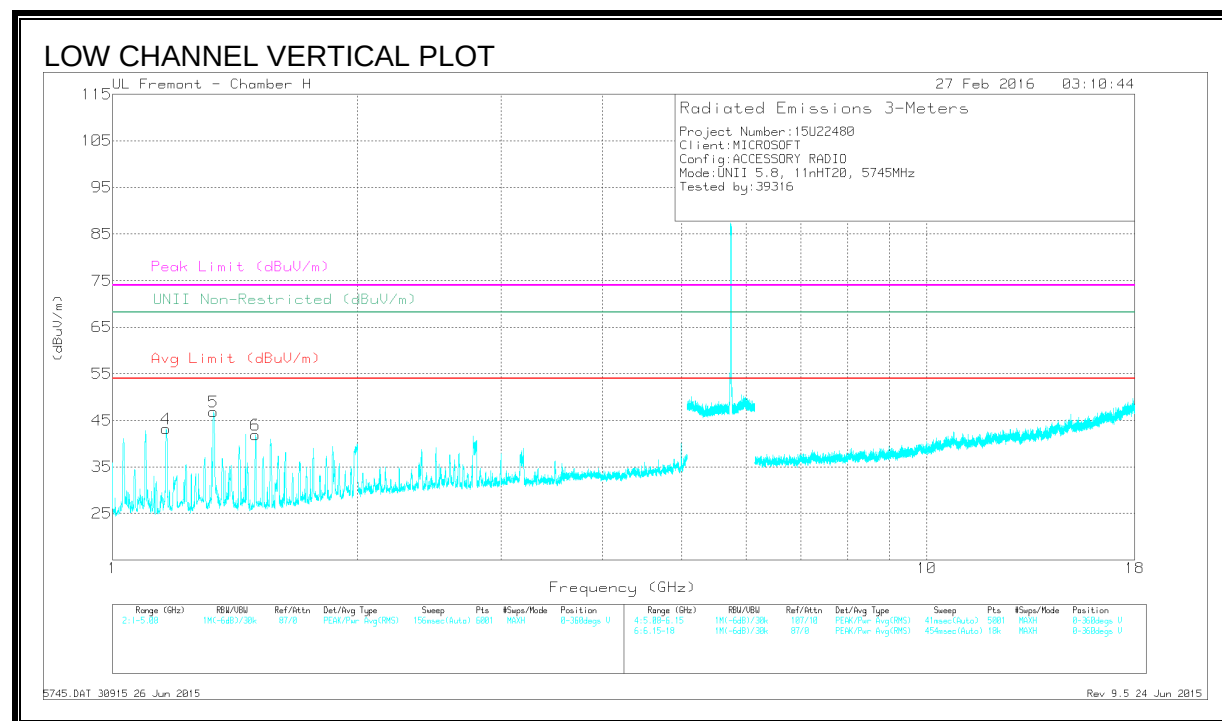
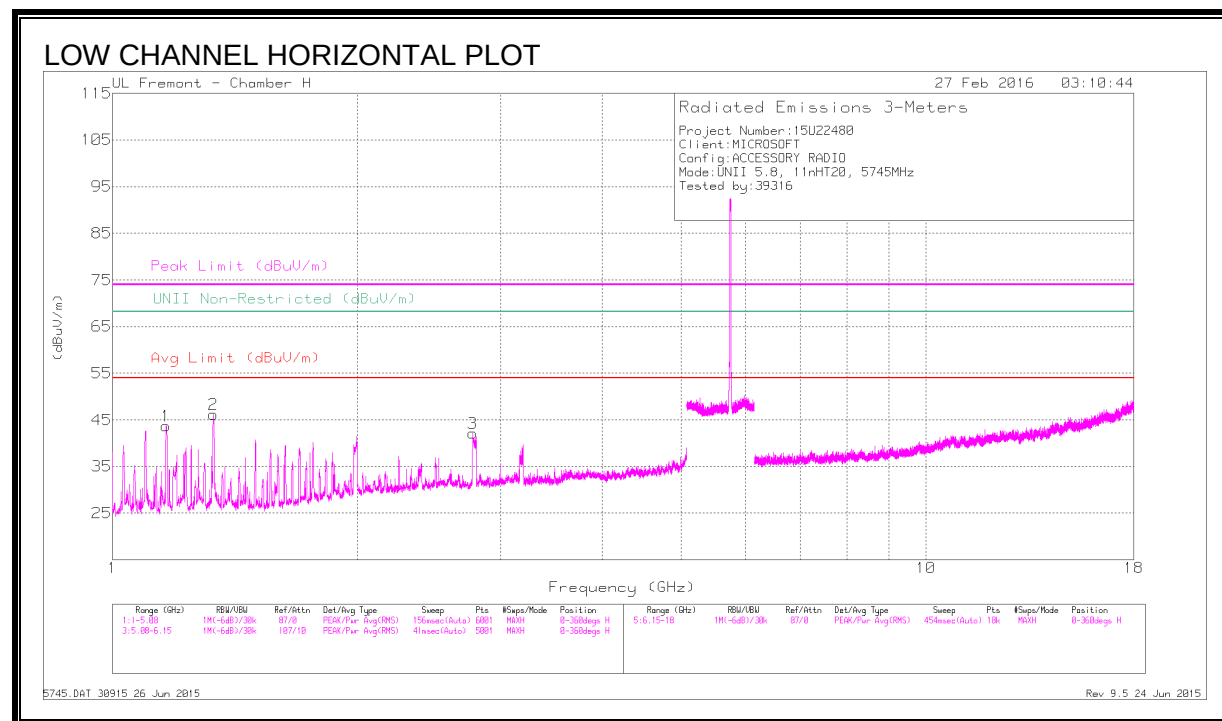


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T863 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-67.76	Pk	34.9	-18.5	11.8	-39.56	-17	-22.56	0	159	V
2	5.912	-65.94	Pk	35	-18.1	11.8	-37.24	-27	-10.24	0	159	V

Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS



DATA

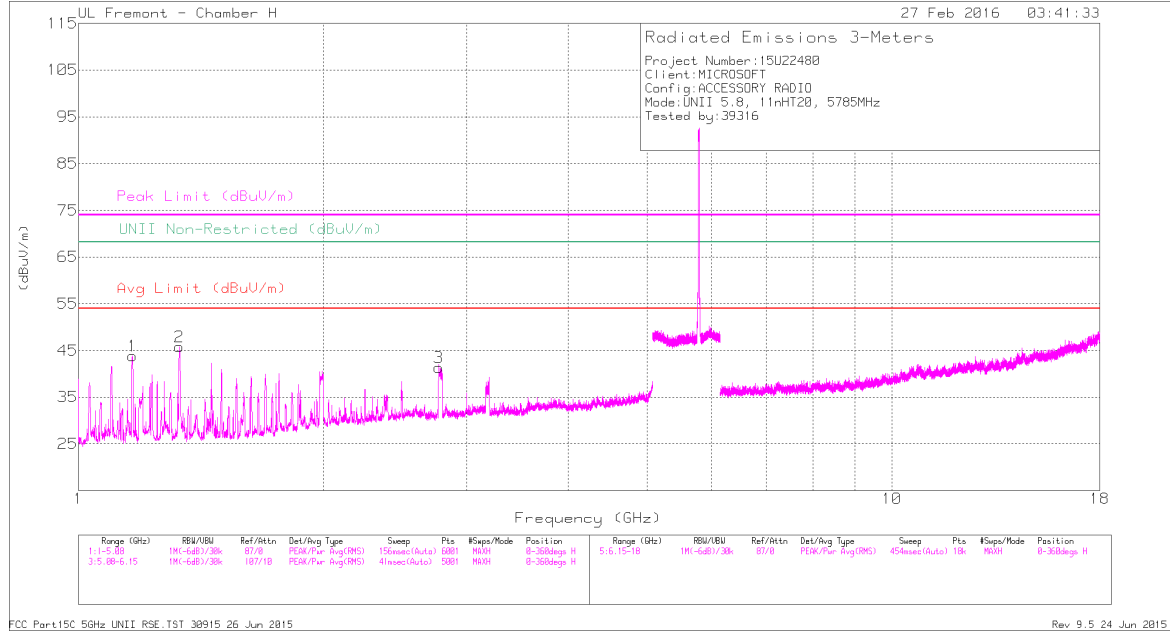
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/FI tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.164	58.46	PK-U	27.7	-34.5	51.66	-	-	74	-22.34	-	-	195	217	H
	* 1.165	48.64	ADR	27.8	-34.5	41.94	54	-12.06	-	-	-	-	195	217	H
2	* 1.332	58.56	PK-U	28.8	-34.6	52.76	-	-	74	-21.24	-	-	229	203	H
	* 1.332	49.98	ADR	28.8	-34.6	44.18	54	-9.82	-	-	-	-	229	203	H
3	* 2.773	42.95	PK-U	32.4	-32.4	42.95	-	-	74	-31.05	-	-	149	186	H
	* 2.773	30.01	ADR	32.4	-32.4	30.01	54	-23.99	-	-	-	-	149	186	H
4	* 1.164	57.97	PK-U	27.7	-34.5	51.17	-	-	74	-22.83	-	-	20	197	V
	* 1.165	47.09	ADR	27.8	-34.5	40.39	54	-13.61	-	-	-	-	20	197	V
5	* 1.331	58.44	PK-U	28.8	-34.6	52.64	-	-	74	-21.36	-	-	303	121	V
	* 1.331	51.57	ADR	28.8	-34.6	45.77	54	-8.23	-	-	-	-	303	121	V
6	* 1.5	55.22	PK-U	28.1	-34.3	49.02	-	-	74	-24.98	-	-	41	179	V
	* 1.5	48.12	ADR	28.1	-34.3	41.92	54	-12.08	-	-	-	-	41	179	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

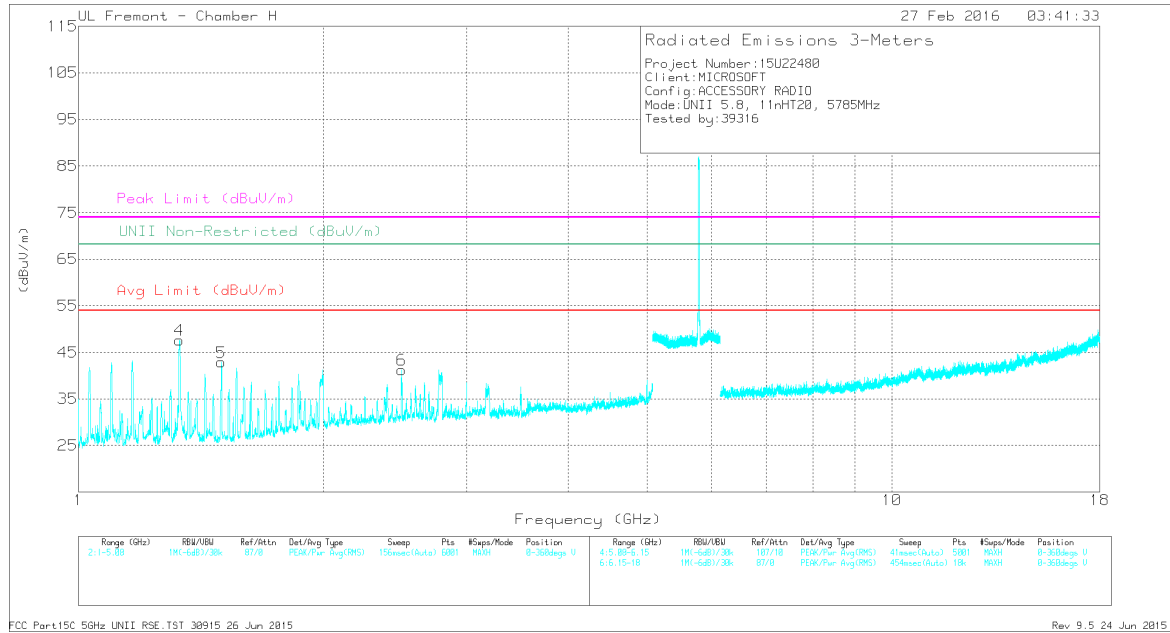
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

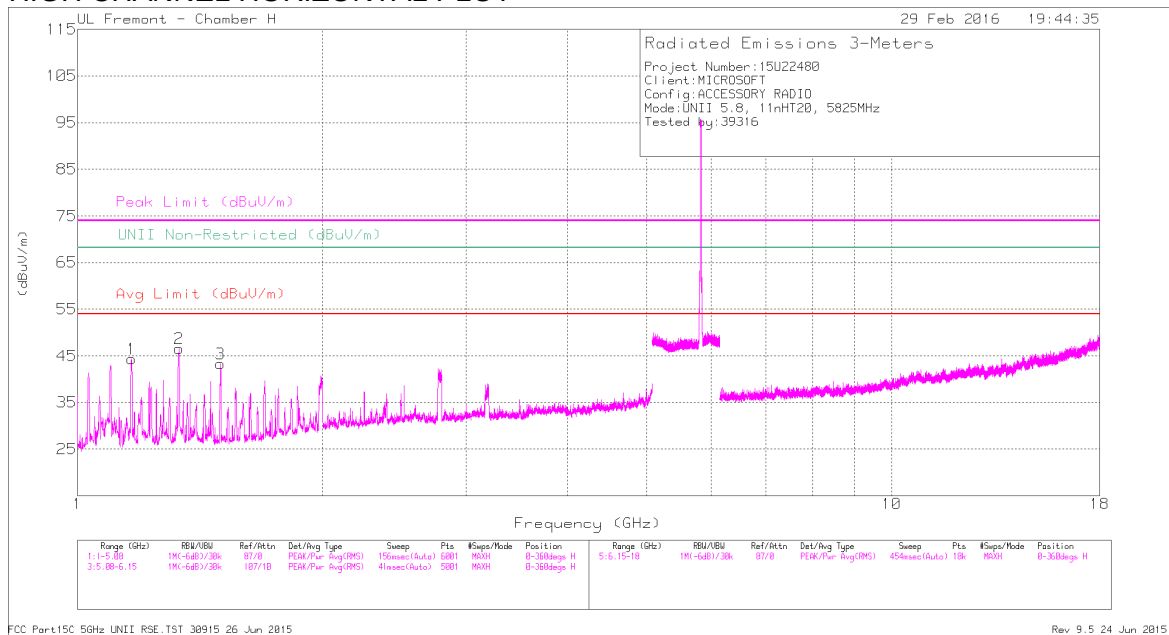
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/FI tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.165	58.29	PK-U	27.8	-34.5	51.59	-	-	74	-22.41	-	-	184	216	H
	* 1.165	46.6	ADR	27.8	-34.5	39.9	54	-14.1	-	-	-	-	184	216	H
2	* 1.332	57.76	PK-U	28.8	-34.6	51.96	-	-	74	-22.04	-	-	230	201	H
	* 1.332	50.11	ADR	28.8	-34.6	44.31	54	-9.69	-	-	-	-	230	201	H
3	* 2.775	43.08	PK-U	32.4	-32.4	43.08	-	-	74	-30.92	-	-	149	186	H
	* 2.773	30.01	ADR	32.4	-32.4	30.01	54	-23.99	-	-	-	-	149	186	H
4	* 1.333	59.01	PK-U	28.8	-34.6	53.21	-	-	74	-20.79	-	-	304	113	V
	* 1.332	50.46	ADR	28.8	-34.6	44.66	54	-9.34	-	-	-	-	304	113	V
5	* 1.5	54.49	PK-U	28.1	-34.3	48.29	-	-	74	-25.71	-	-	42	175	V
	* 1.5	47.88	ADR	28.1	-34.3	41.68	54	-12.32	-	-	-	-	42	175	V
6	* 2.498	48.93	PK-U	32.5	-33.3	48.13	-	-	74	-25.87	-	-	7	240	V
	* 2.496	34.55	ADR	32.4	-33.3	33.65	54	-20.35	-	-	-	-	7	240	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

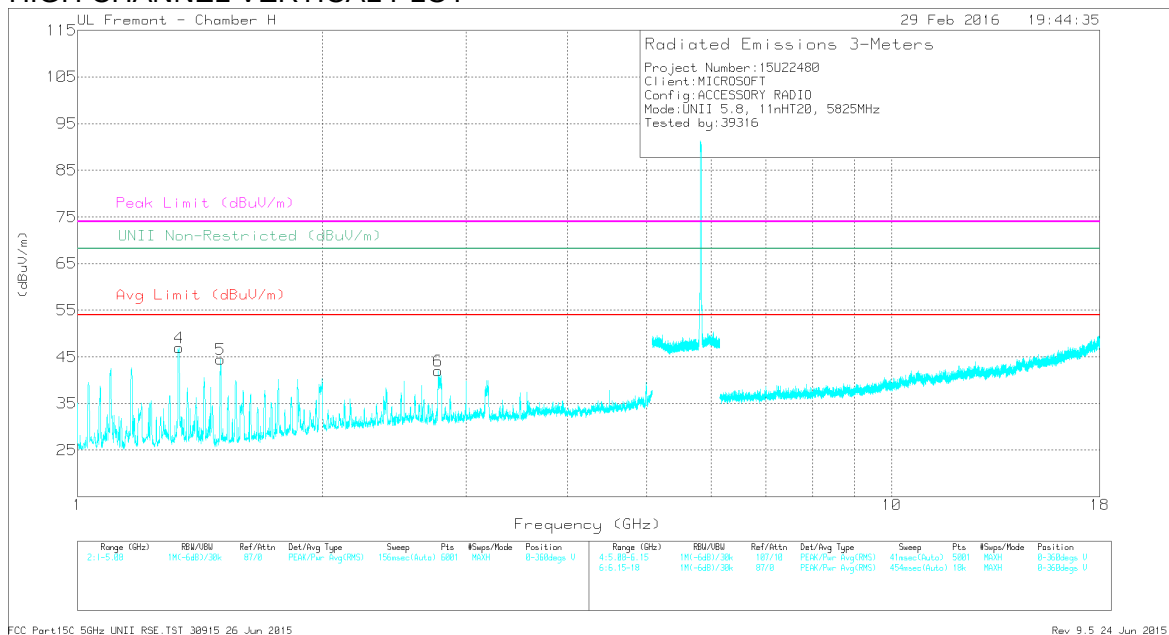
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/FI tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.164	58.98	PK-U	27.7	-34.5	52.18	-	-	74	-21.82	-	-	188	196	H
	* 1.165	48.59	ADR	27.8	-34.5	41.89	54	-12.11	-	-	-	-	188	196	H
2	* 1.333	57.17	PK-U	28.8	-34.6	51.37	-	-	74	-22.63	-	-	177	206	H
	* 1.331	49.71	ADR	28.8	-34.6	43.91	54	-10.09	-	-	-	-	177	206	H
3	* 1.5	59.34	PK-U	28.1	-34.3	53.14	-	-	74	-20.86	-	-	113	100	H
	* 1.5	47.38	ADR	28.1	-34.3	41.18	54	-12.82	-	-	-	-	113	100	H
4	* 1.334	59.78	PK-U	28.8	-34.6	53.98	-	-	74	-20.02	-	-	91	102	V
	* 1.331	52.86	ADR	28.8	-34.6	47.06	54	-6.94	-	-	-	-	91	102	V
5	* 1.5	56.84	PK-U	28.1	-34.3	50.64	-	-	74	-23.36	-	-	31	277	V
	* 1.5	48.03	ADR	28.1	-34.3	41.83	54	-12.17	-	-	-	-	31	277	V
6	* 2.775	50.35	PK-U	32.4	-32.4	50.35	-	-	74	-23.65	-	-	80	223	V
	* 2.775	35.5	ADR	32.4	-32.4	35.5	54	-18.5	-	-	-	-	80	223	V

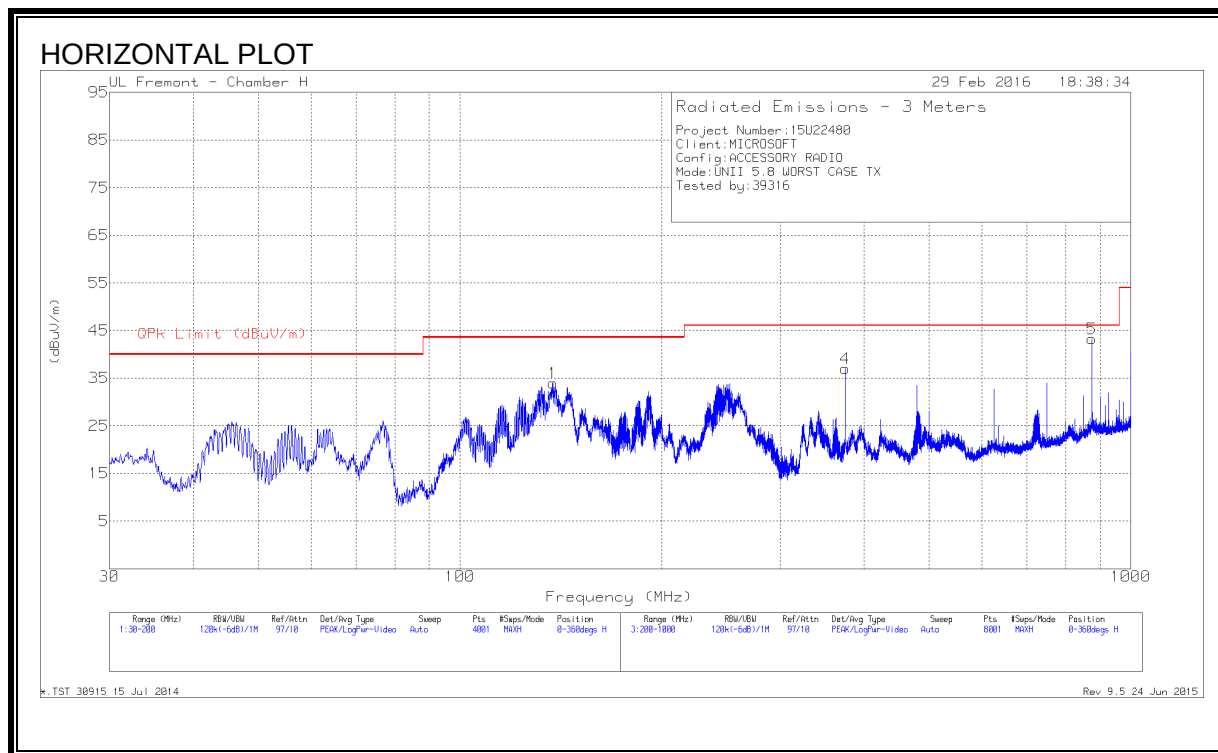
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

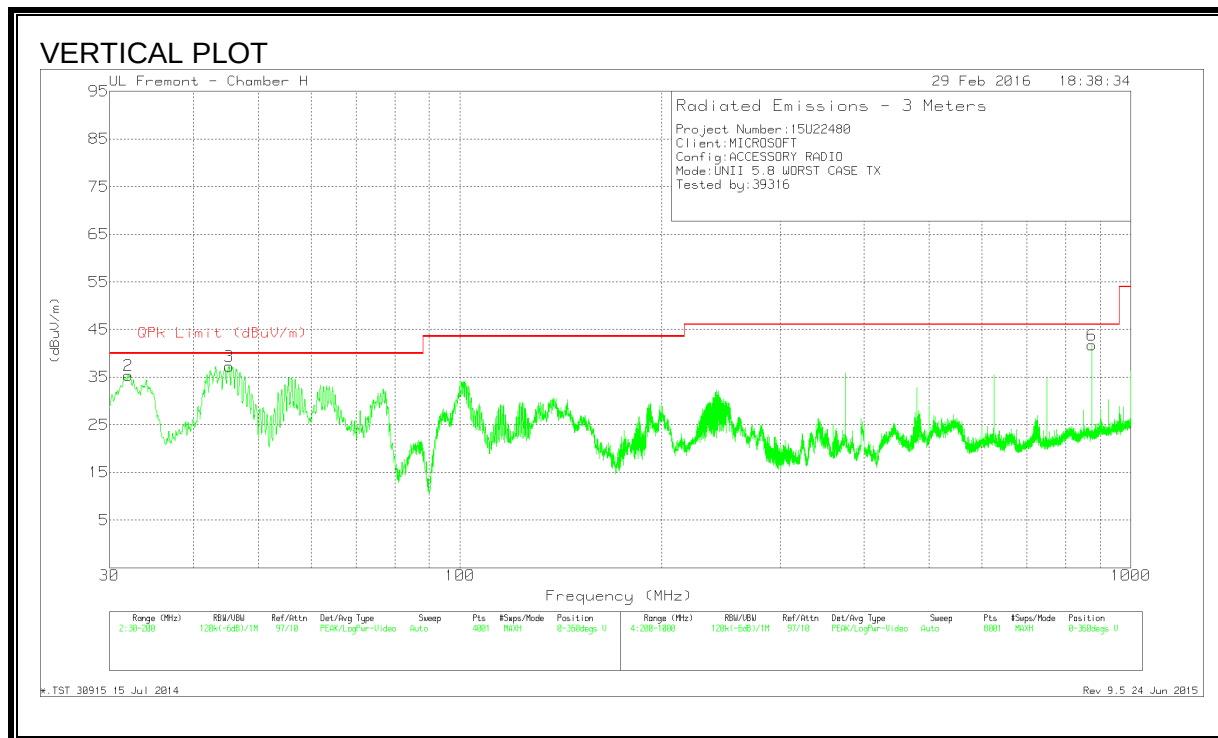
ADR - U-NII AD primary method, RMS average

9.5. WORST-CASE BELOW 1 GHz

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



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



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T900 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 137.61	50.68	Pk	13.4	-30.1	33.98	43.52	-9.54	0-360	201	H
2	31.9975	45.96	Pk	20.7	-31.3	35.36	40	-4.64	0-360	100	V
	34.2097	41.53	Qp	18.8	-31.2	29.13	40	-10.87	210	106	V
3	45.3	57.53	Pk	10.7	-31	37.23	40	-2.77	0-360	100	V
	47.02	43.57	Qp	9.5	-31	22.07	40	-17.93	247	373	V
6	875.1	47.17	Pk	21.3	-26.7	41.77	46.02	-4.25	0-360	100	V
	875.0587	47.21	Qp	21.3	-26.7	41.81	46.02	-4.21	103	108	V
5	875.1	48.64	Pk	21.3	-26.7	43.24	46.02	-2.78	0-360	100	H
	875.0645	50.1	Qp	21.3	-26.7	44.7	46.02	-1.32	354	170	H

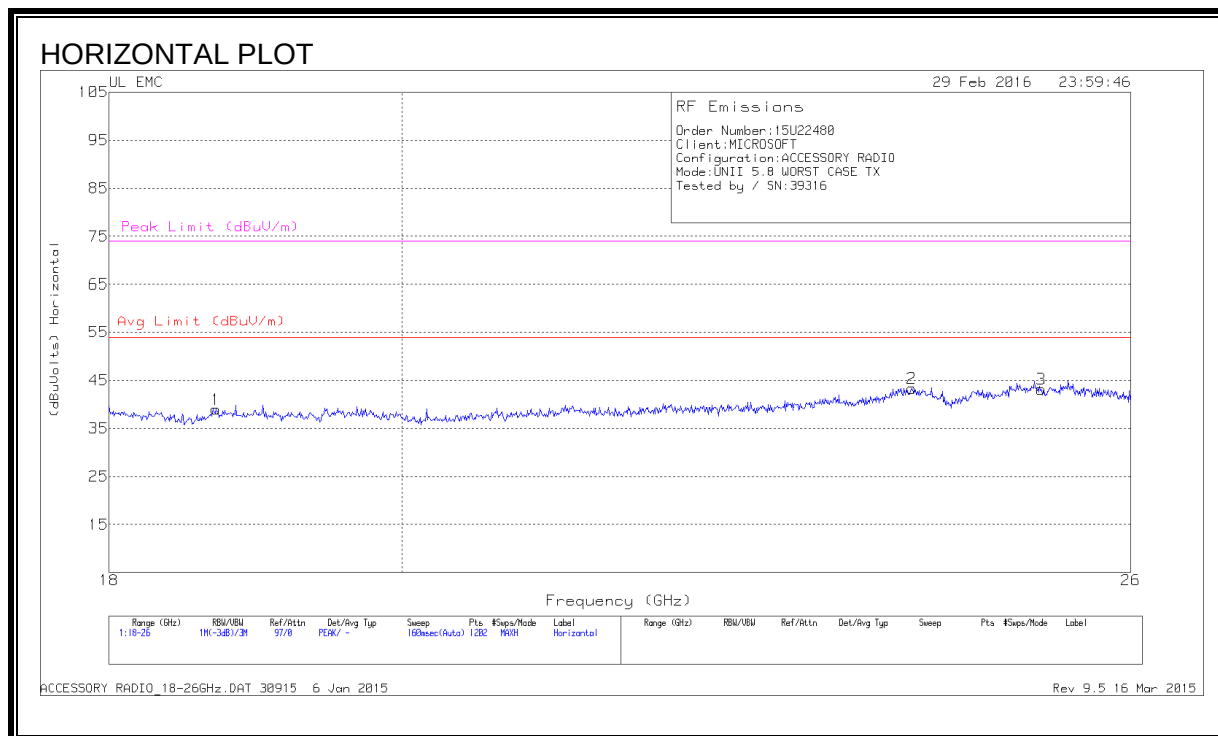
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

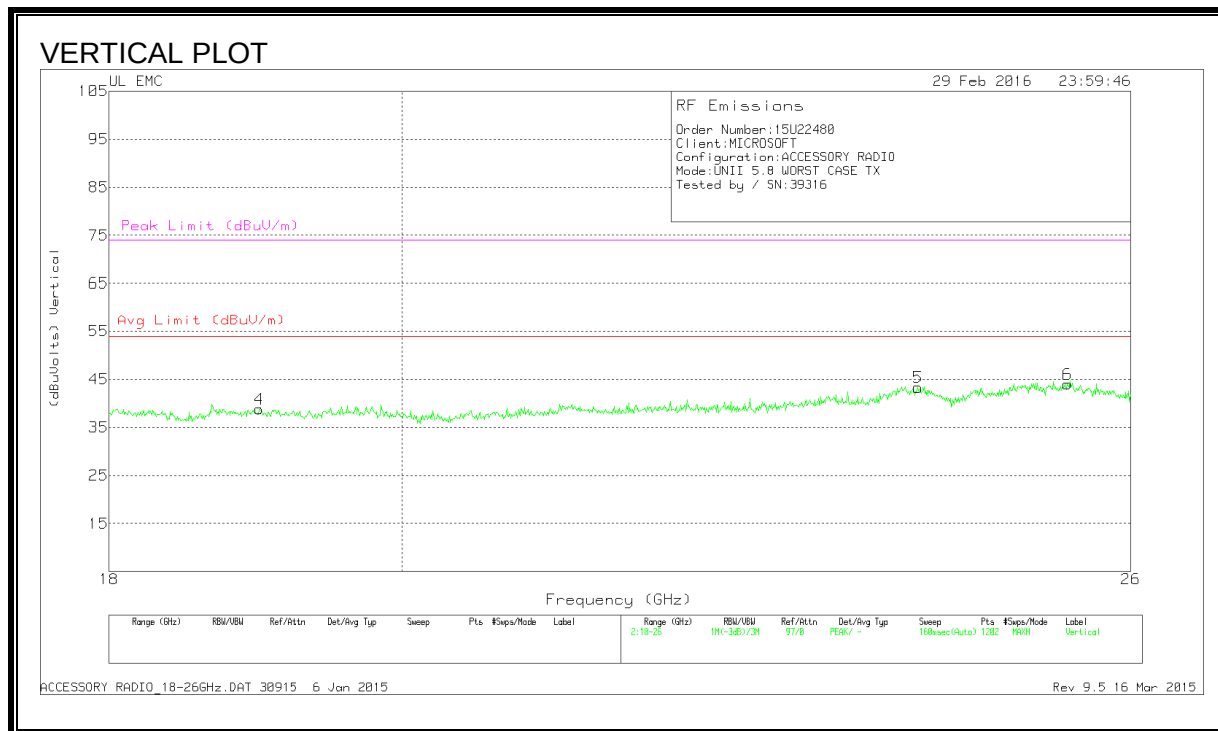
Qp - Quasi-Peak detector

9.6. WORST-CASE 18-26 GHz

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



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



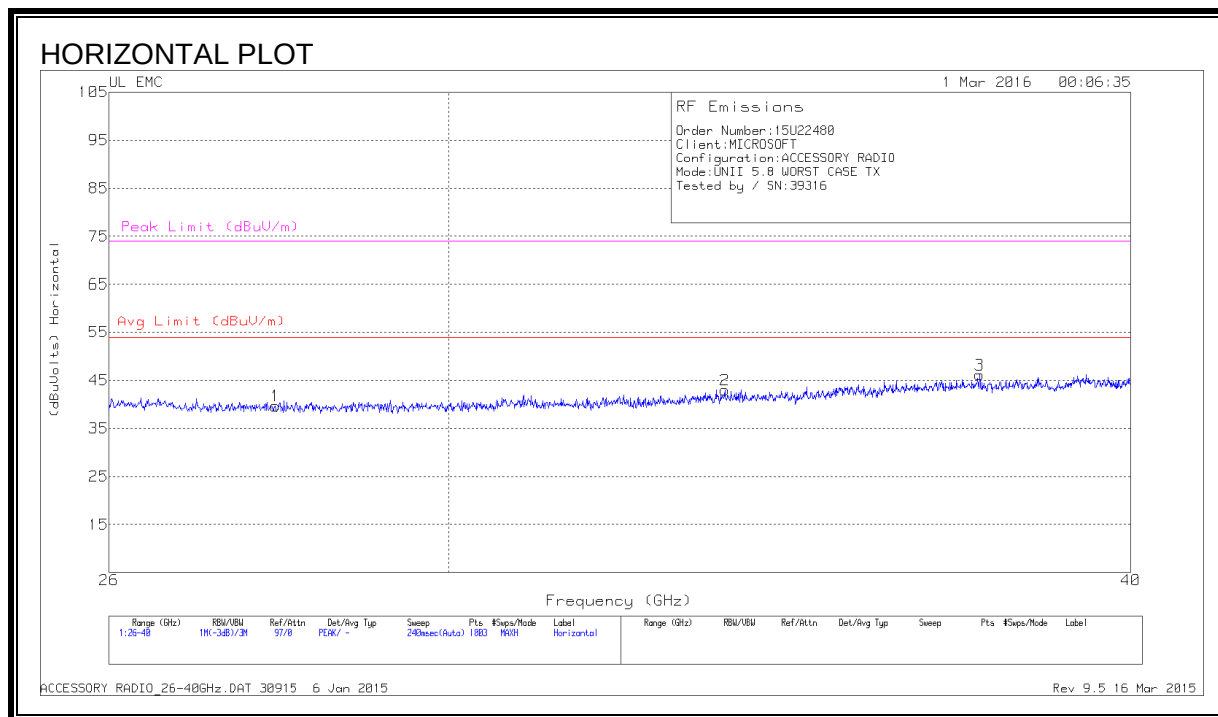
DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T477 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	18.706	40.6	Pk	32.3	-24.4	-9.5	39	54	-15	74	-35
2	24.028	43.33	Pk	33.6	-24.1	-9.5	43.33	54	-10.66	74	-30.66
3	25.174	43.27	Pk	34.2	-24.8	-9.5	43.16	54	-10.83	74	-30.83
4	18.999	40.63	Pk	32.5	-24.8	-9.5	38.83	54	-15.16	74	-35.16
5	24.082	43.43	Pk	33.7	-24.3	-9.5	43.33	54	-10.66	74	-30.66
6	25.414	43.6	Pk	34.2	-24.3	-9.5	44	54	-10	74	-30

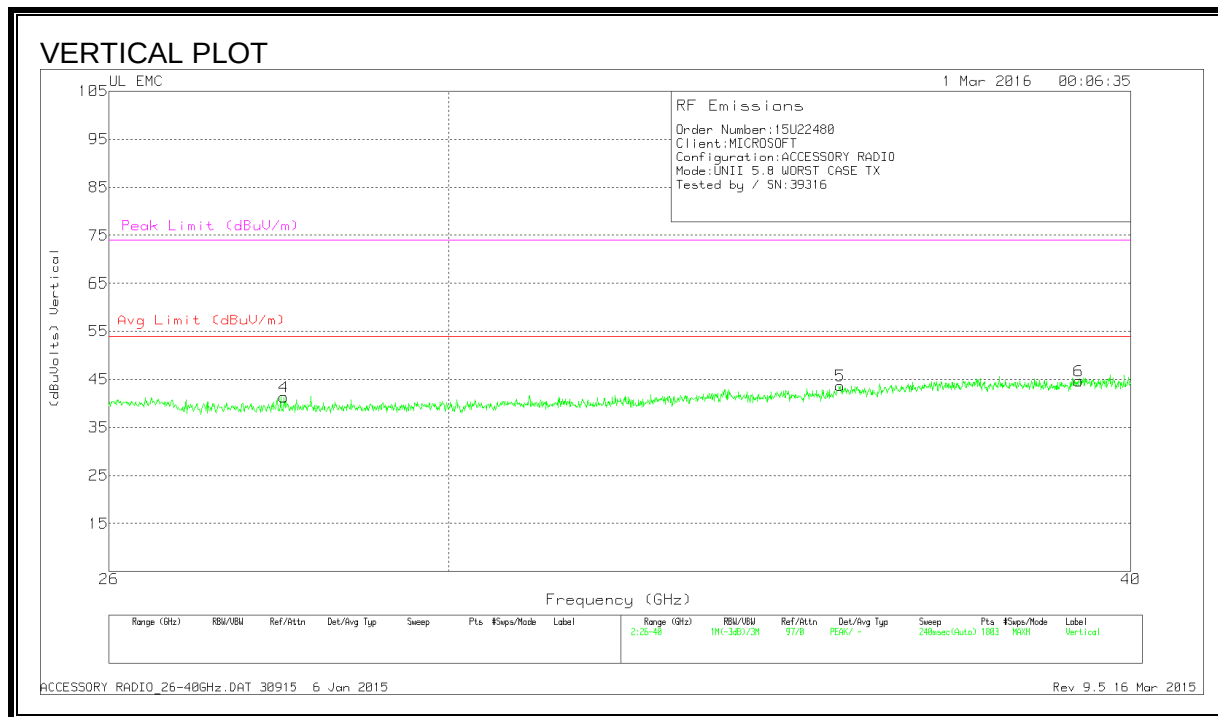
Pk - Peak detector

9.7. WORST-CASE 26-40 GHz

SPURIOUS EMISSIONS 26 TO 40 GHz (WORST-CASE CONFIGURATION, HORIZONTAL)



SPURIOUS EMISSIONS 26 TO 40 GHz (WORST-CASE CONFIGURATION, VERTICAL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 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	27.888	44.77	Pk	35.8	-31.4	-9.5	39.66	54	-14.33	74	-34.33
2	33.707	48.4	Pk	36.9	-32.8	-9.5	43	54	-11	74	-31
3	37.529	51.47	Pk	37.2	-33	-9.5	46.16	54	-7.83	74	-27.83
4	27.989	46.83	Pk	35.8	-31.8	-9.5	41.33	54	-12.66	74	-32.66
5	35.385	48.67	Pk	37.8	-33.3	-9.5	43.66	54	-10.33	74	-30.33
6	39.134	48.17	Pk	38	-32	-9.5	44.66	54	-9.33	74	-29.33

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

Please refer to Report Number 13U14860-1, Revision B, FCC ID: C3K1525, pages 169 – 172.