FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT
CLASS II PERMISSIVE CHANGE

FOR

THE APPLE IPAD IS A TABLET DEVICE WITH MULTIMEDIA FUNCTIONS (MUSIC, APPLICATION SUPPORT, AND VIDEO), 802.11A/B/G/N RADIO, AND BLUETOOTH RADIO FUNCTIONS

MODEL NUMBER: A1432, A1454, & A1455*

FCC ID: BCGA1432 (A1432)
FCC ID: BCGA1454 (A1454)
FCC ID: BCGA1455 (A1455)

REPORT NUMBER: 15U21850-E14V2

ISSUE DATE: DECEMBER 02, 2015

Prepared for
APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	11/16/2015	Initial Issue	M. Mekuria
V2	12/02/2015	Inserting Additional FCC IDs to cover page & header.	M. Mekuria

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: The Apple iPad is a tablet device with iPod functions (music, application support, and video), 802.11a/b/g/n radio, and Bluetooth radio functions.

MODEL: A1432, A1454, A1455

SERIAL NUMBER: C8TJ501EF1PR (Conducted); C8TJ900NF1KF (Radiated)

DATE TESTED: OCTOBER 8 – 22, 2015

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:

MENGISTU MEKURIA
SENIOR ENGINEER
UL VERIFICATION SERVICES INC.

Tested By:

ERIC YU
EMC LAB 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, FCC 14-30, FCC KDB 789033 D02 v01 ANSI C63.10-2013.

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 H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, 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.

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
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 Apple iPad is a tablet device with iPod functions (music, application support, and video), 802.11a/b/g/n radio, and Bluetooth radio functions.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

Upgrade 5.8GHz band to new rule per KDB 789033 D02 v01.

5.3. DESCRIPTION OF MODELS DIFFERENCES

FCC ID: BCGA1432
Model #: A1432

Model A1432, is a tablet with multimedia functions (music, application support, and video)IEEE 802.11a/b/g/n radio and Bluetooth radio. The rechargeable battery is not user accessible.

FCC ID: BCGA1454
Model #: A1454

Model A1454 is a tablet with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n and Bluetooth radio. The rechargeable battery is not user accessible.

FCC ID: BCGA1455
Model #: A1455

Model A1455, is a tablet with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA1xRTT/ EV-DO Rev 0, A, B / LTE radio, IEEE 802.11a/b/g/n radio and Bluetooth radio. The rechargeable battery is not user accessible.

5.4. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.8GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	15.95	39.36
5745 - 5825	802.11n HT20 SISO	15.89	38.82
5755 - 5795	802.11n HT40 SISO	15.92	39.08

5.5. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain (dBi)
5.725-5.85	5.27

5.6. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 10A378

The EUT driver software installed during testing was Broadcom_Rel_6_10_56_166

5.7. 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 (Flatbed), Y (Landscape), Z (Portrait), it was determined that Y (Landscape) was worst-case orientations. Therefore, all final radiated testing was performed with the EUT in Y (Landscape) orientation.

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

802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

The following configurations were investigated on AC line conducted test.

Configuration	Descriptions
1	EUT powered by AC/DC adapter via USB cable
2	EUT powered by host PC via USB cable

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop AC/DC adapter	Lenovo	92P1160	11S92P1160Z1ZBGH798B12	N/A
Laptop	Lenovo	7659	L3-AL664 08/03	N/A
Earphone	Apple	N/A	N/A	N/A
EUT AC/CD adapter	Apple	A1385	D293062F3WVDHLHCF	N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	3	N/A

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
None Used						

I/O CABLES (RADAITED BELOW 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	AC	1	AC	Un-shielded	3	N/A

I/O CABLES (AC LINE CONDUCTED: AC/DC ADAPTER)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	AC	1	AC	Un-shielded	3	N/A

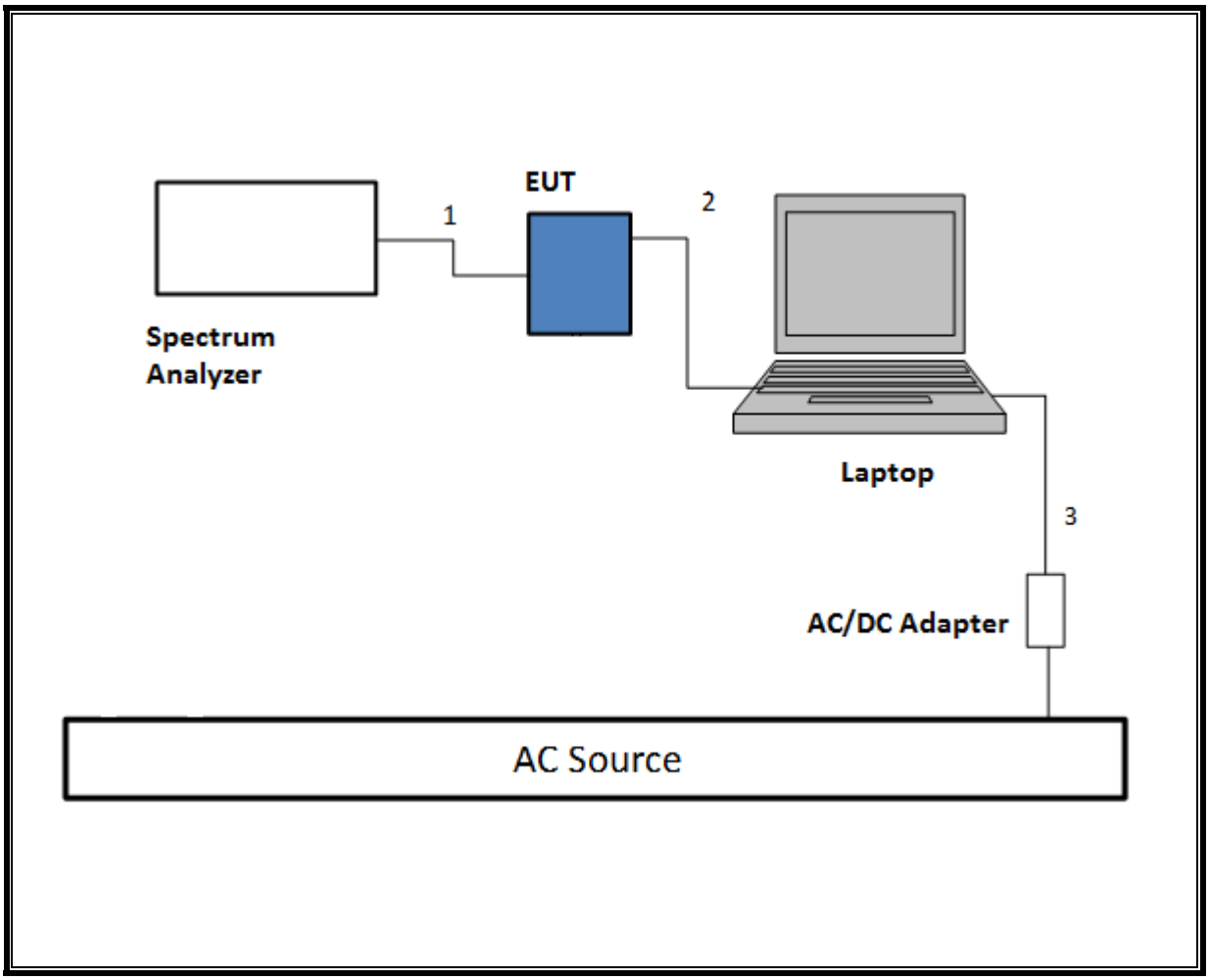
I/O CABLES (AC LINE CONDUCTED: LAPTOP CONFIGUARTION)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	3	N/A

TEST SETUP - CONDUCTED TESTS

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

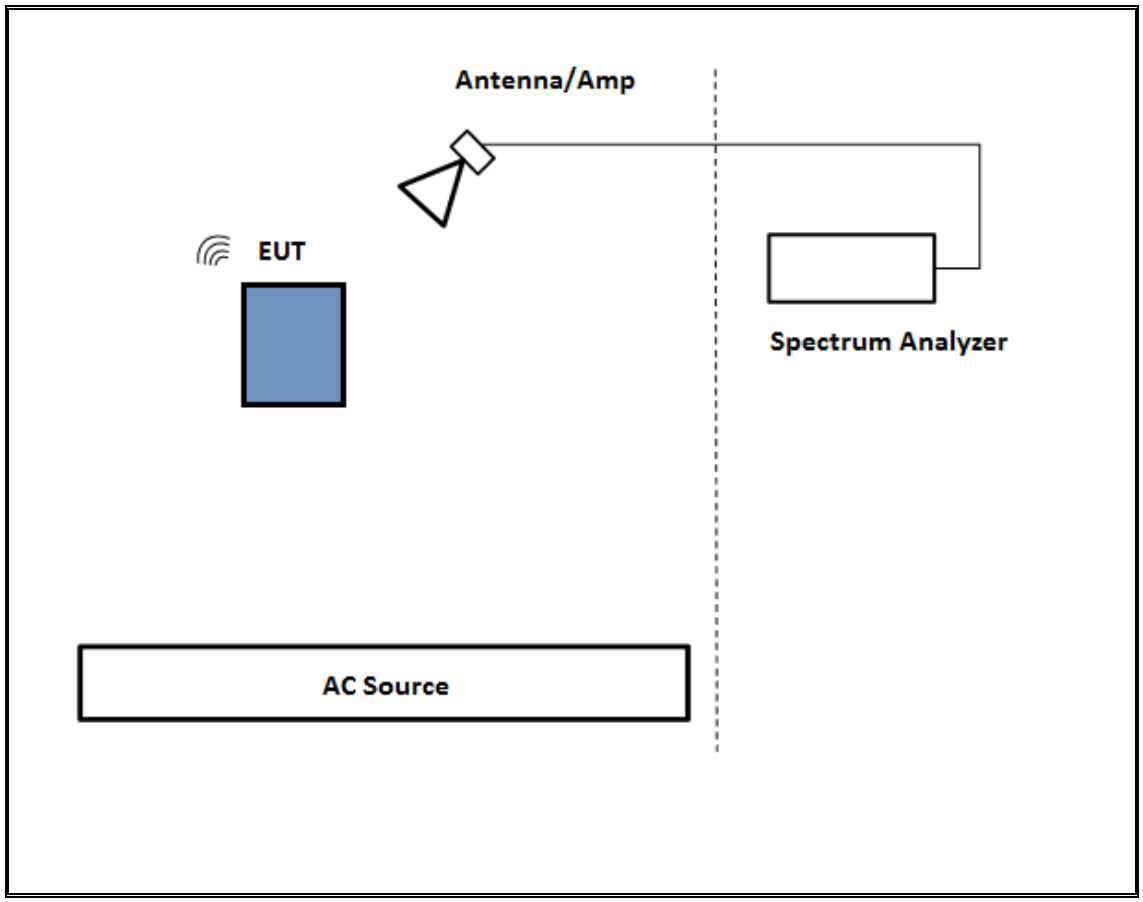
SETUP DIAGRAM



TEST SETUP- RADIATED-ABOVE 1 GHZ

The EUT was tested battery powered. Test software exercised the EUT.

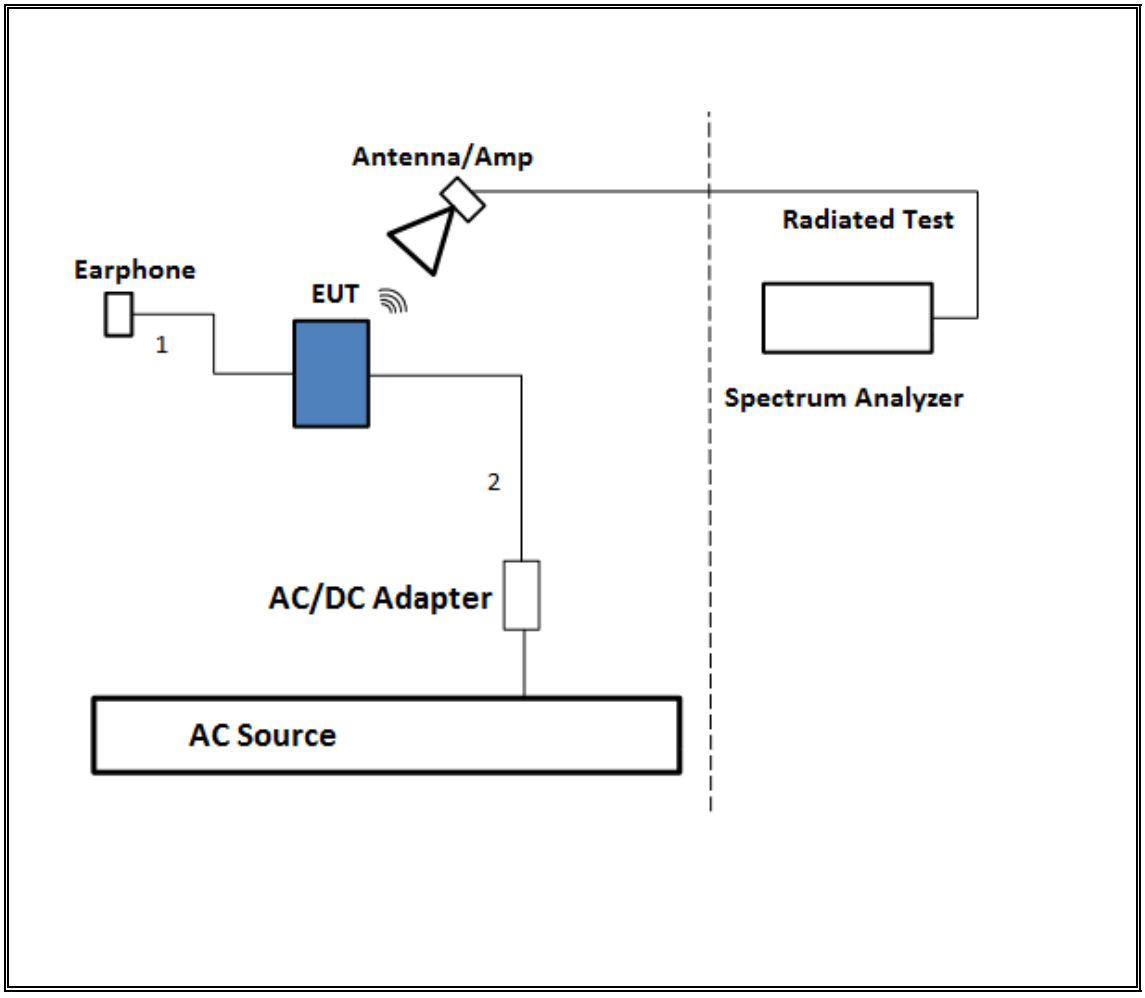
SETUP DIAGRAM



TEST SETUP- BELOW 1GHz

The EUT was tested with earphone connected and powered by AC adapter. Test software exercised the EUT.

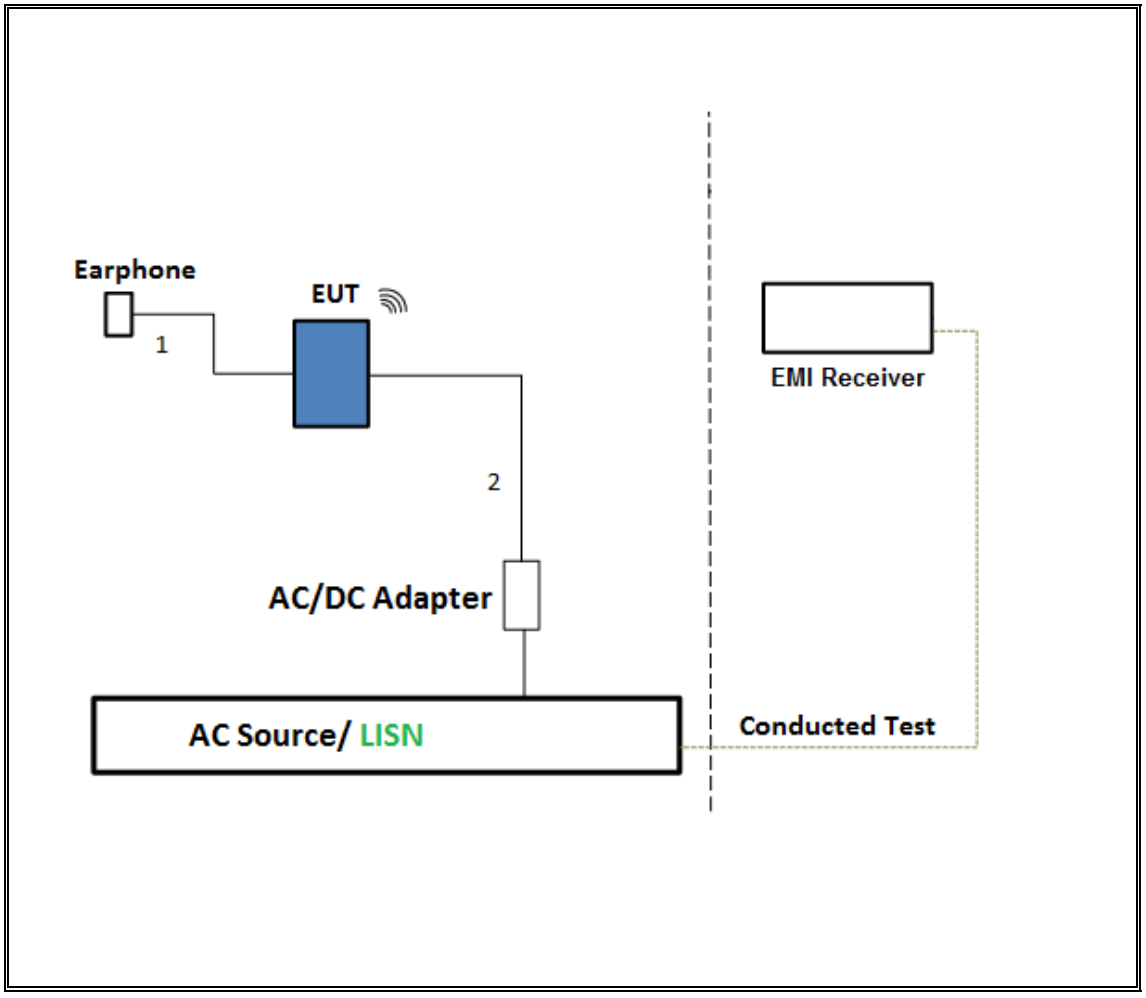
SETUP DIAGRAM



TEST SETUP- AC LINE CONDUCTED: AC/DC ADAPTER

The EUT was tested with earphone connected and powered by AC/DC adapter via USB cable. Test software exercised the EUT.

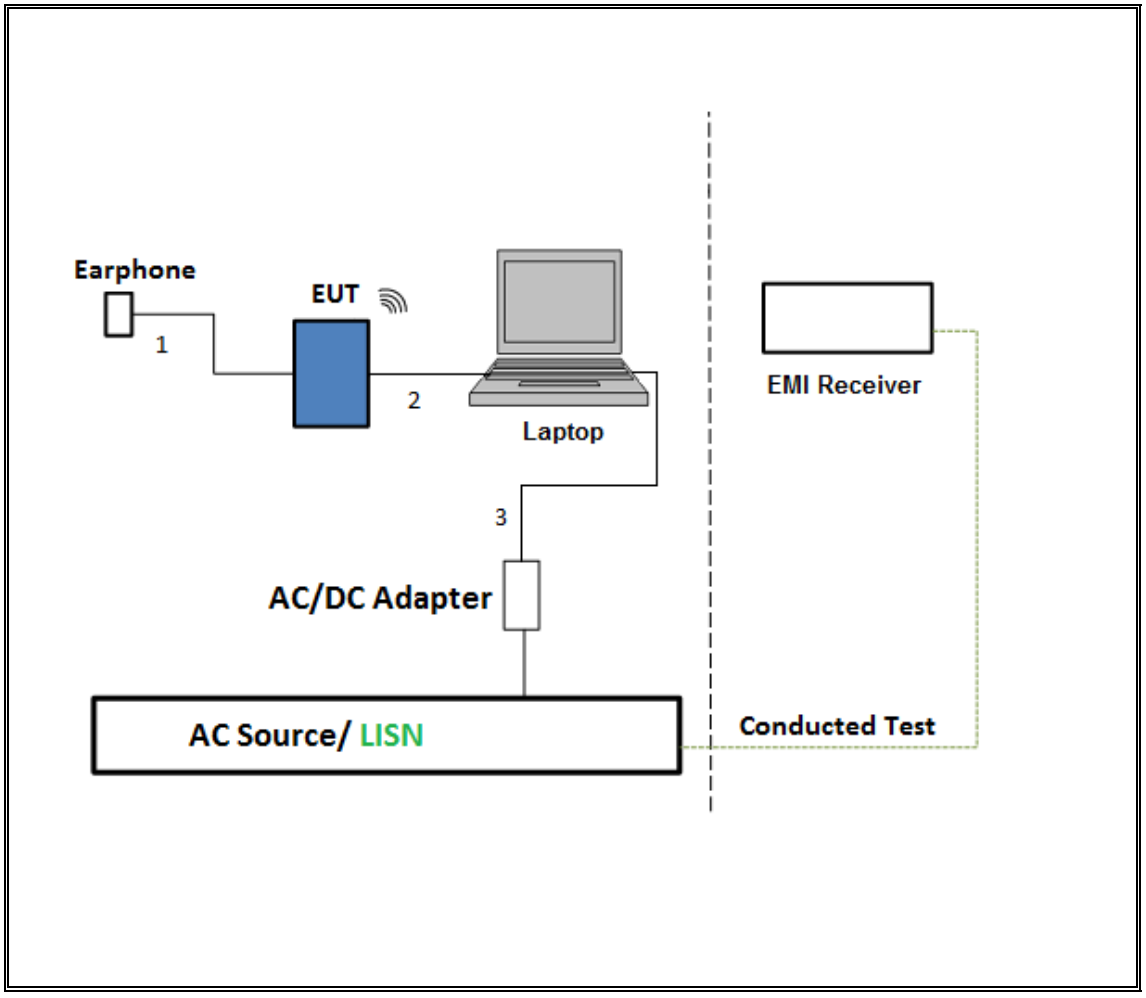
SETUP DIAGRAM



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION

The EUT was tested with earphone connected and powered by host PC via USB cable. Test software exercised the EUT.

SETUP DIAGRAM



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, Horn 1-18GHz	ETS Lindgren	3117	00143448	2/10/2016
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A022813-2	3/5/2016
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1782158	1/26/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	323562	5/7/2016
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	MY52350675	11/12/2015
Antenna, Horn 1-18GHz	ETS Lindgren	3117	00143449	2/10/2016
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A022813-1	1/14/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	323561	6/8/2016
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	MY54490254	12/10/2015
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	MY55200002	3/6/2016
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	MY55200004	5/6/2016
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	1049	12/17/2015
Horn Antenna, 40GHz	ARA	MWH-2640/B	1029	7/28/2016
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2016
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	3008A04710	6/29/2016
Amplifier, 26 - 40GHz	Miteq	NSP4000-SP2	924343	4/7/2016
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	100773	8/7/2016
LISN for Conducted Emissions CISPR-16	FCC	50/250-25-2	114	1/16/2016
Power Cable, Line Conducted Emissions ANSI 63.4	UL	PG1	N/A	7/28/2016
UL SOFTWARE				
*Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
*Conducted Software	UL	UL EMC	Ver 2.2, March 31, 2015	
*AC Line Conducted Software	UL	UL EMC	Ver 9.5, April 3, 2015	

Note: * indicates automation software version used in the compliance certification testing

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

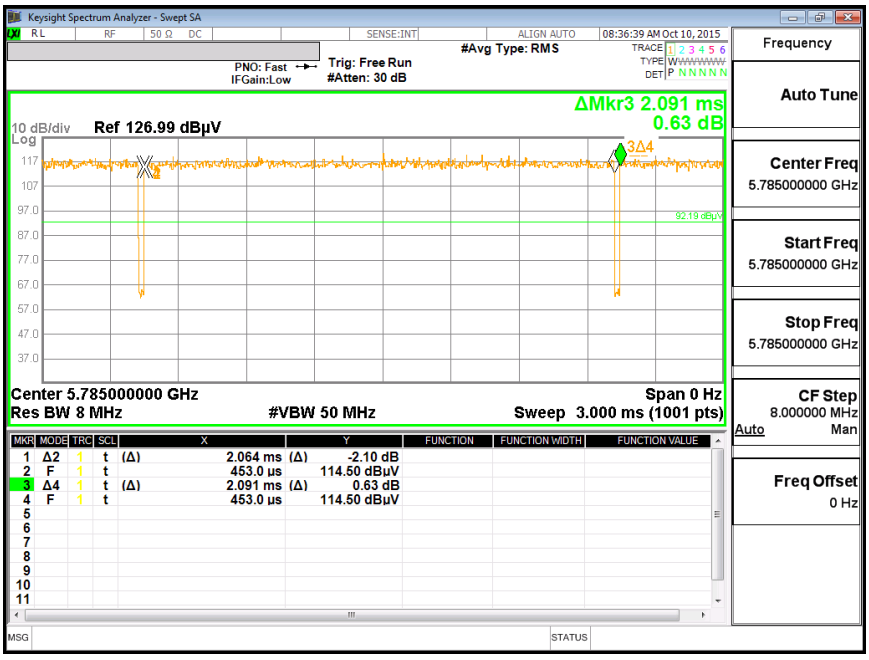
KDB 789033 Zero-Span Spectrum Analyzer Method.

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 1TX	2.064	2.091	0.987	98.71%	0.00	0.010
802.11n HT20 1TX	1.920	1.947	0.986	98.61%	0.00	0.010
802.11n HT40 1TX	0.944	0.972	0.971	97.12%	0.13	1.059

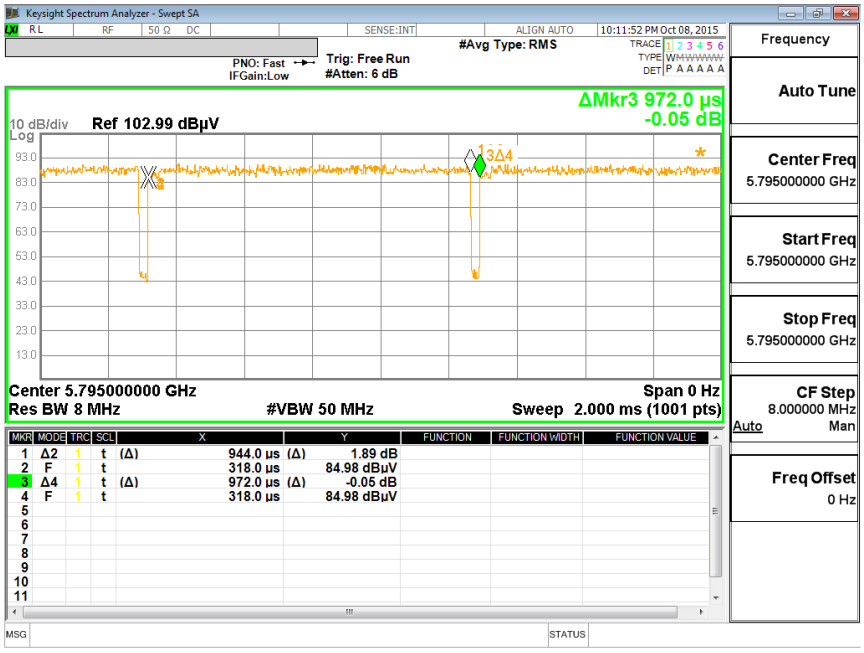
DUTY CYCLE PLOTS

DUTY CYCLE 802.11a1TX MODE



DUTY CYCLE 802.11n HT20 1TX MODE

DUTY CYCLE 802.11n HT40 1TX MODE



7.2. MEASUREMENT METHODS

26 dB Emission BW & 6 dB Emission BW: KDB 789033 D02 v01, Section C.

99% Occupied BW: KDB 789033 D02 v01, Section D.

Conducted Output Power: KDB 789033 D02 v01, Section E.3.b (Method PM-G).

Power Spectral Density: KDB 789033 D02 v01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, and G.5.

8. ANTENNA PORT TEST RESULTS

8.1. 802.11a MODE IN THE 5.8 GHz BAND

8.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

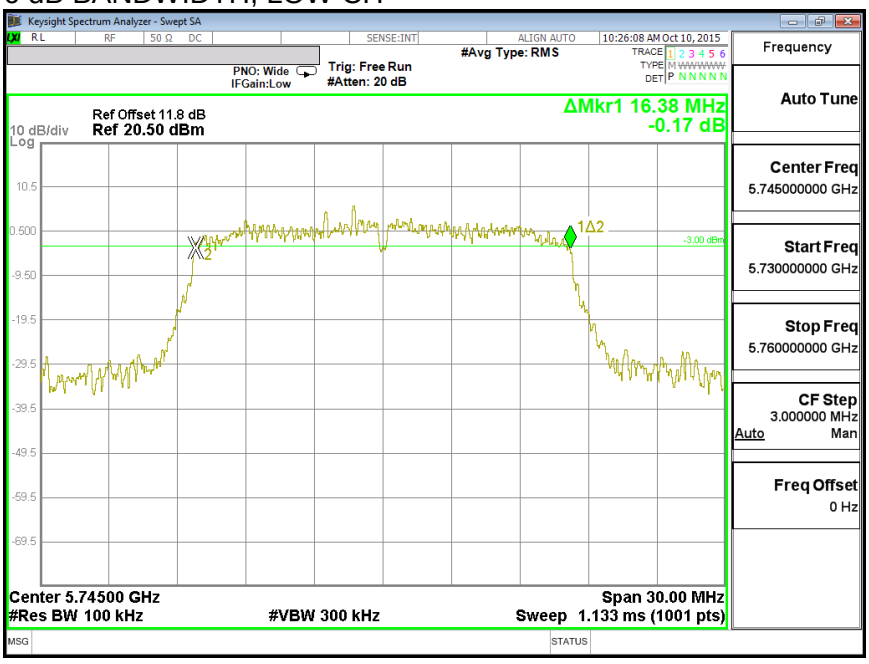
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

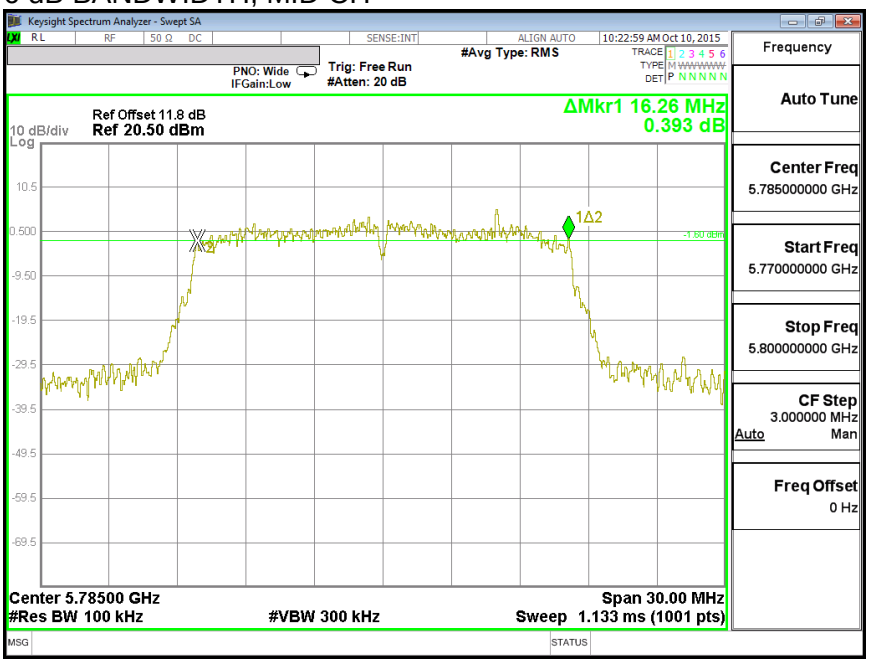
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.38	0.5
Mid	5785	16.26	0.5
High	5825	16.29	0.5

6 dB BANDWIDTH

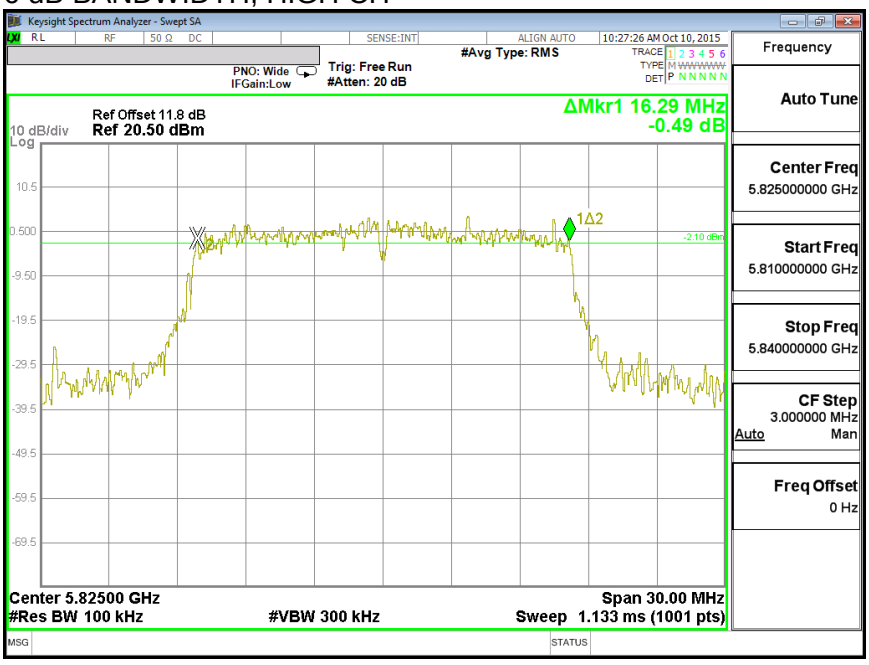
6 dB BANDWIDTH, LOW CH



6 dB BANDWIDTH, MID CH



6 dB BANDWIDTH, HIGH CH



8.1.2. 26 dB BANDWIDTH

LIMITS

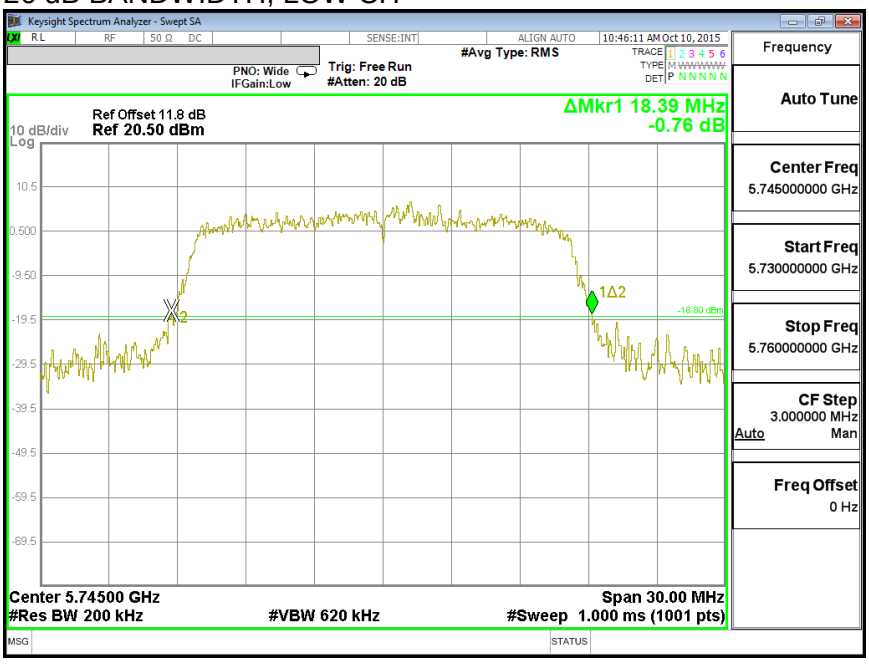
None, for reporting purposes only

RESULTS

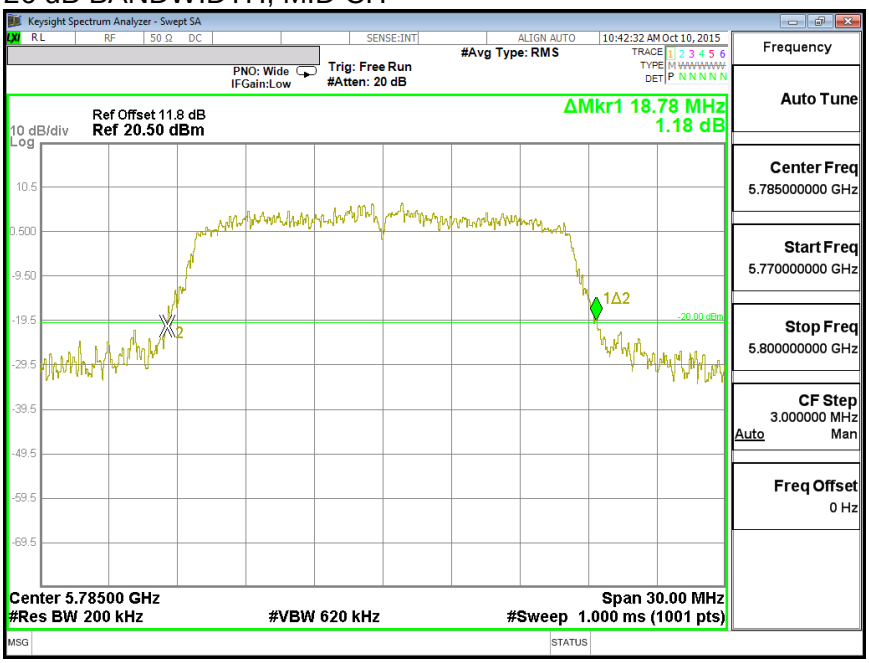
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	18.39
Mid	5785	18.78
High	5825	18.75

26 dB BANDWIDTH

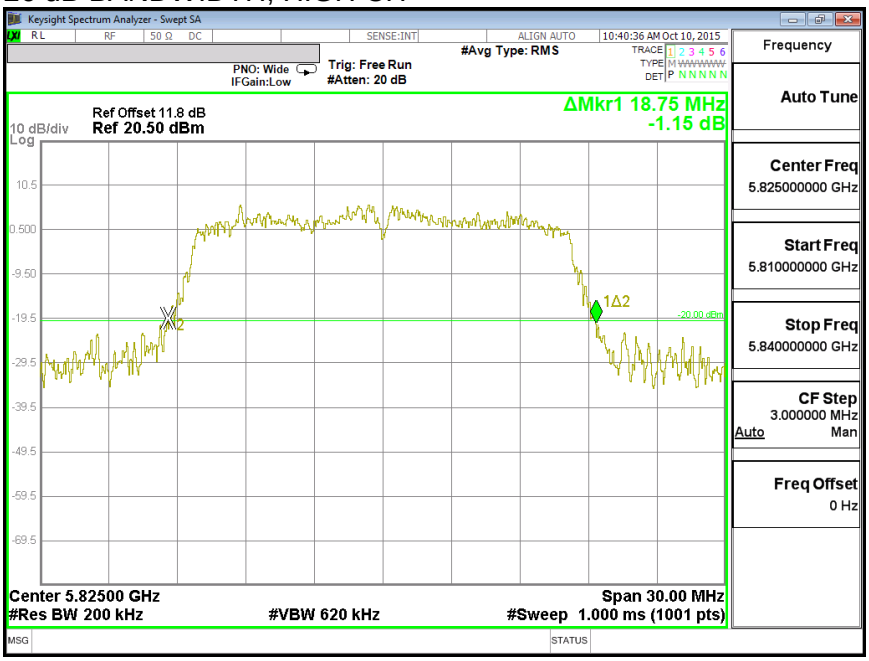
26 dB BANDWIDTH, LOW CH



26 dB BANDWIDTH, MID CH



26 dB BANDWIDTH, HIGH CH



8.1.3. 99% BANDWIDTH

LIMITS

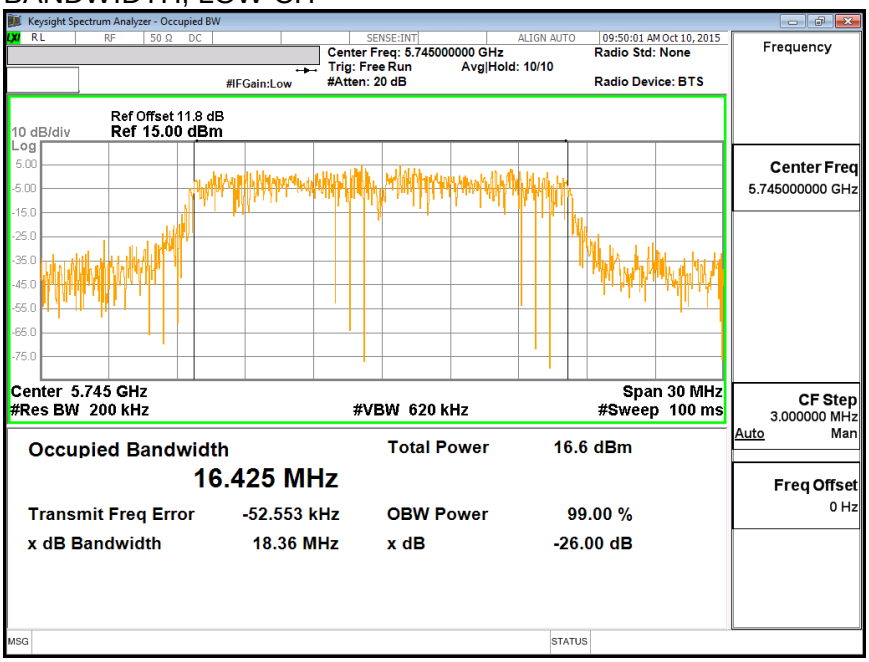
None; for reporting purposes only.

RESULTS

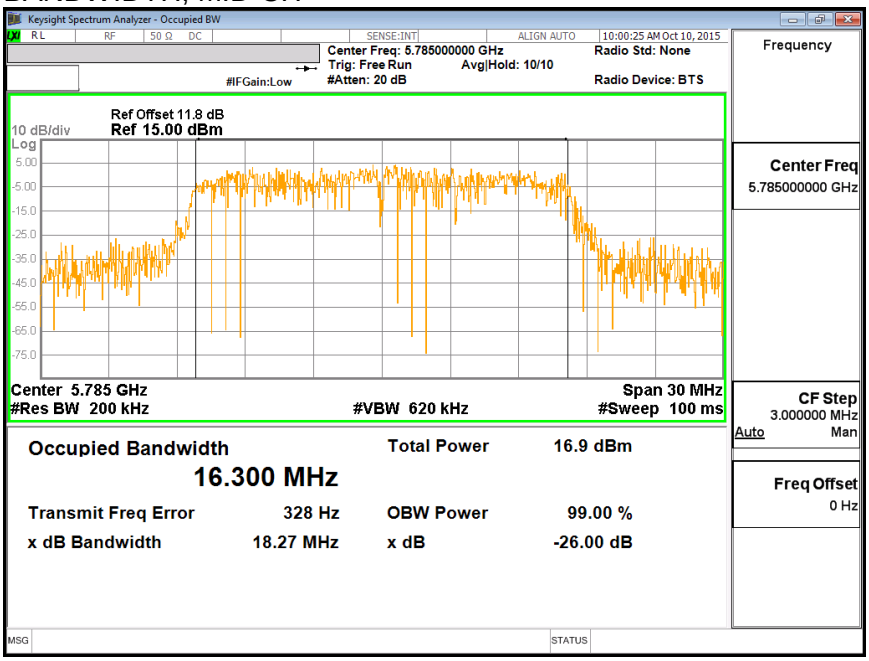
Frequency (MHz)	99% Bandwidth (MHz)
5745	16.425
5785	16.300
5825	16.299

99% BANDWIDTH

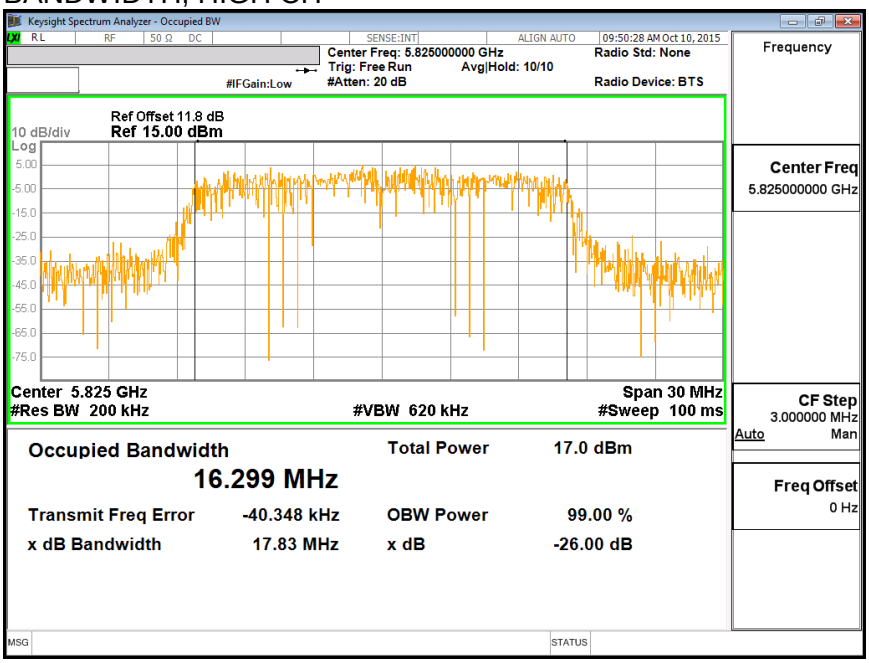
BANDWIDTH, LOW CH



BANDWIDTH, MID CH



BANDWIDTH, HIGH CH



8.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

Test Procedure

Measurements perform using a wideband gated RF power meter.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5745	15.00
Mid	5785	15.95
High	5825	15.70

8.1.5. 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.

Test Procedure

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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	5.27	30.00
Mid	5785	5.27	30.00
High	5825	5.27	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.00	15.00	30.00	-15.00
Mid	5785	15.95	15.95	30.00	-14.05
High	5825	15.70	15.70	30.00	-14.30

8.1.6. 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	5.27	30.00
Mid	5785	5.27	30.00
High	5825	5.27	30.00

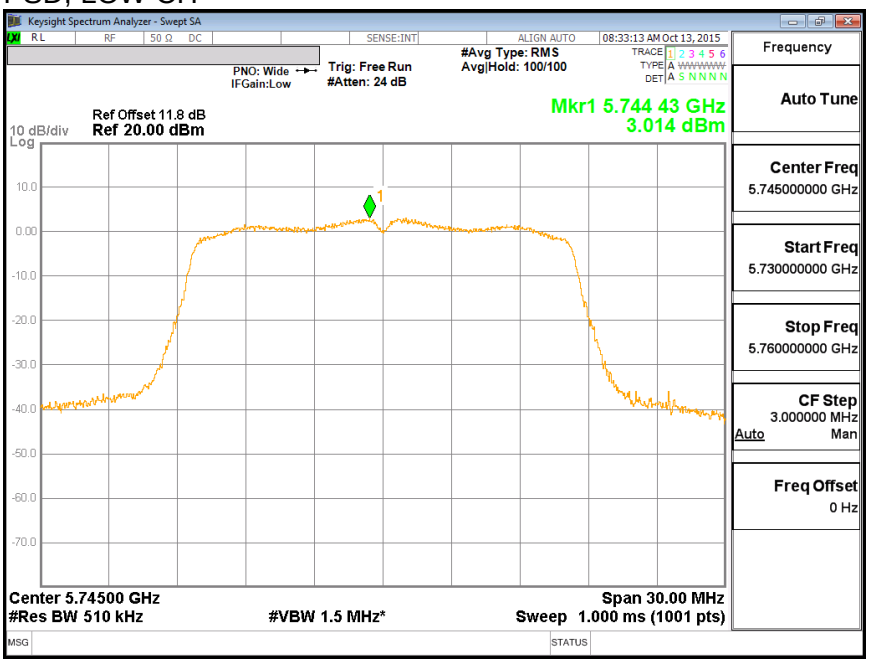
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

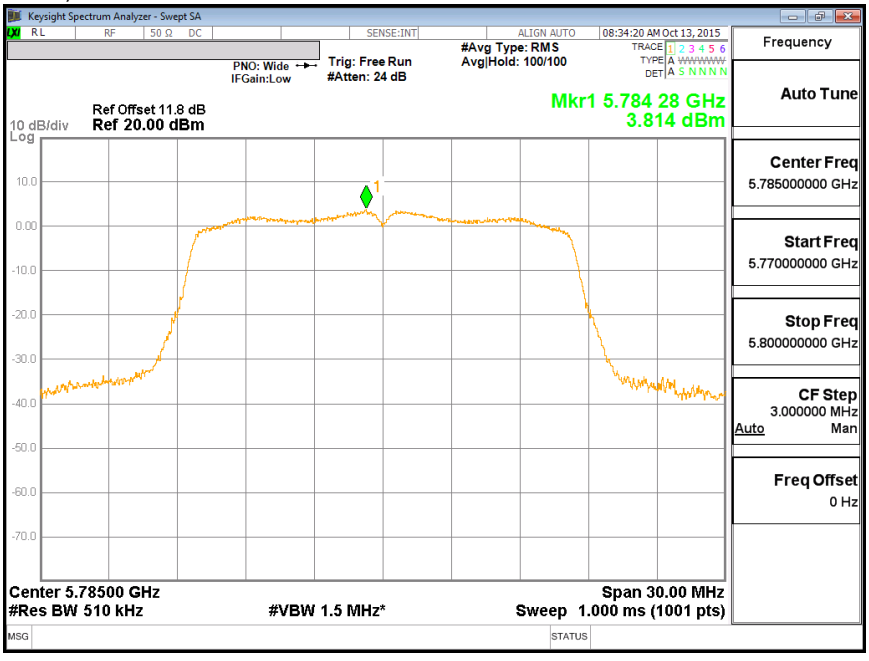
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	3.01	3.01	30.00	-26.99
Mid	5785	3.81	3.81	30.00	-26.19
High	5825	3.52	3.52	30.00	-26.49

PSD,

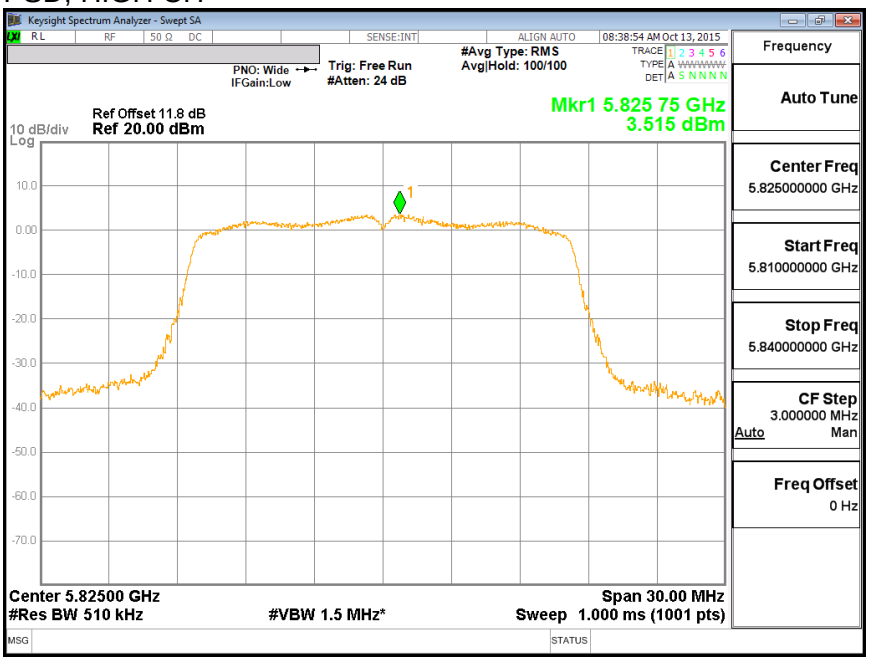
PSD, LOW CH



PSD, MID CH



PSD, HIGH CH



8.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

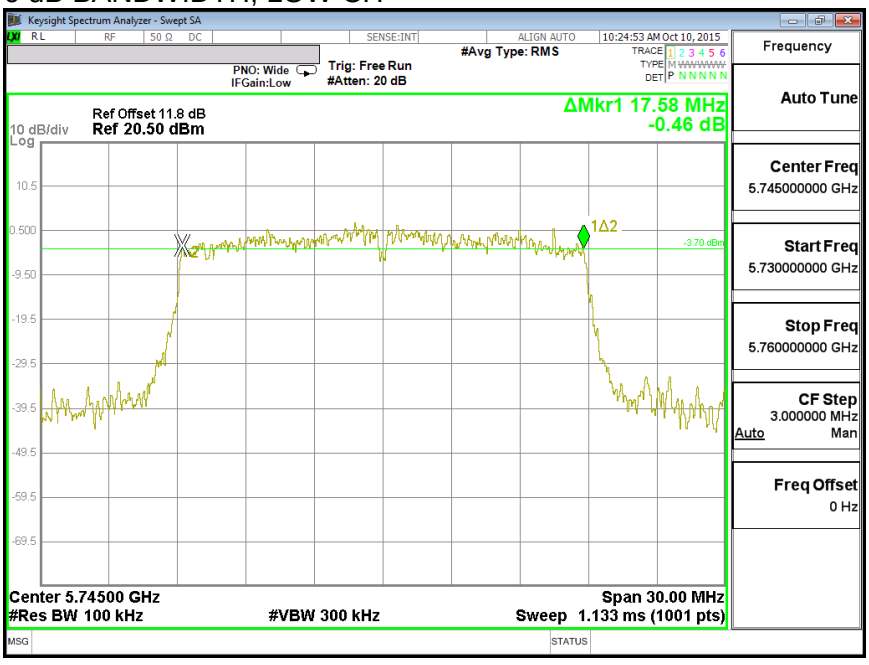
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

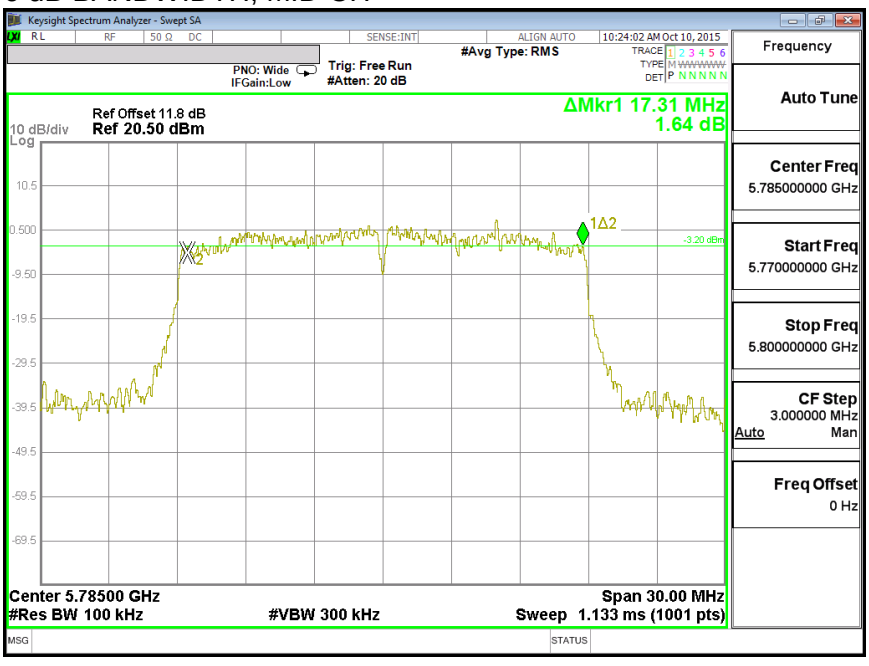
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.58	0.5
Mid	5785	17.31	0.5
High	5825	17.34	0.5

6 dB BANDWIDTH

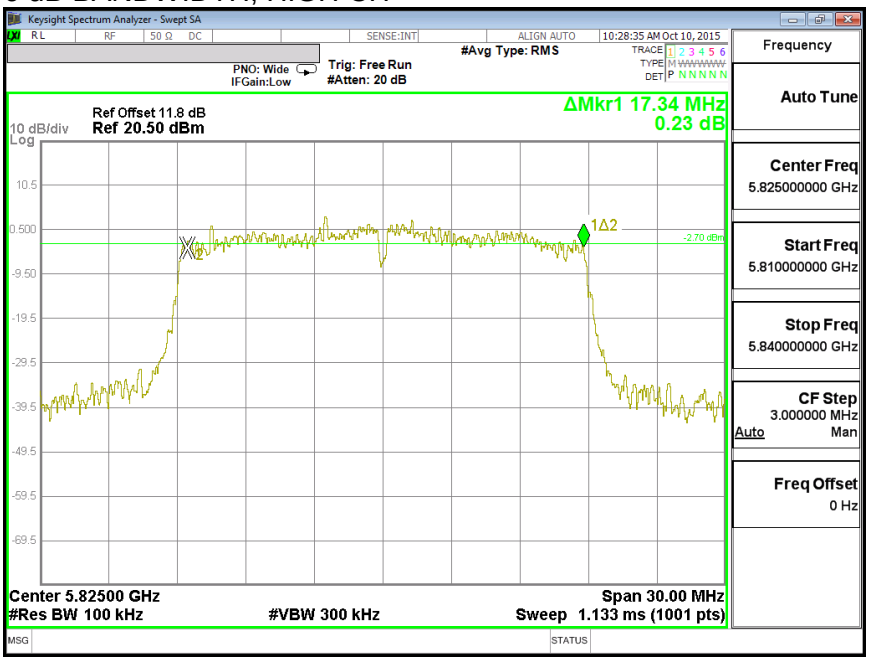
6 dB BANDWIDTH, LOW CH



6 dB BANDWIDTH, MID CH



6 dB BANDWIDTH, HIGH CH



8.2.2. 26 dB BANDWIDTH

LIMITS

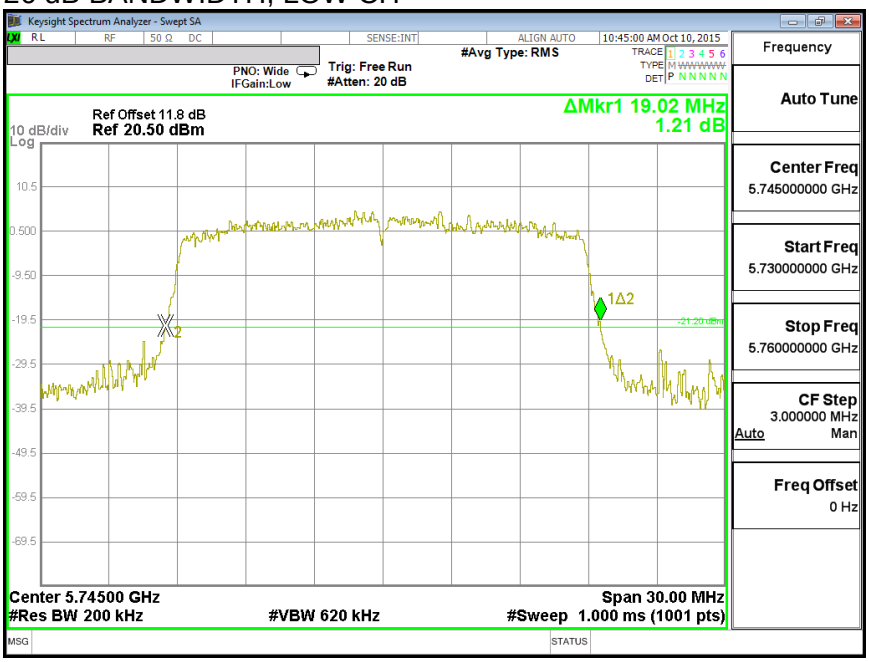
None, for reporting purposes only

RESULTS

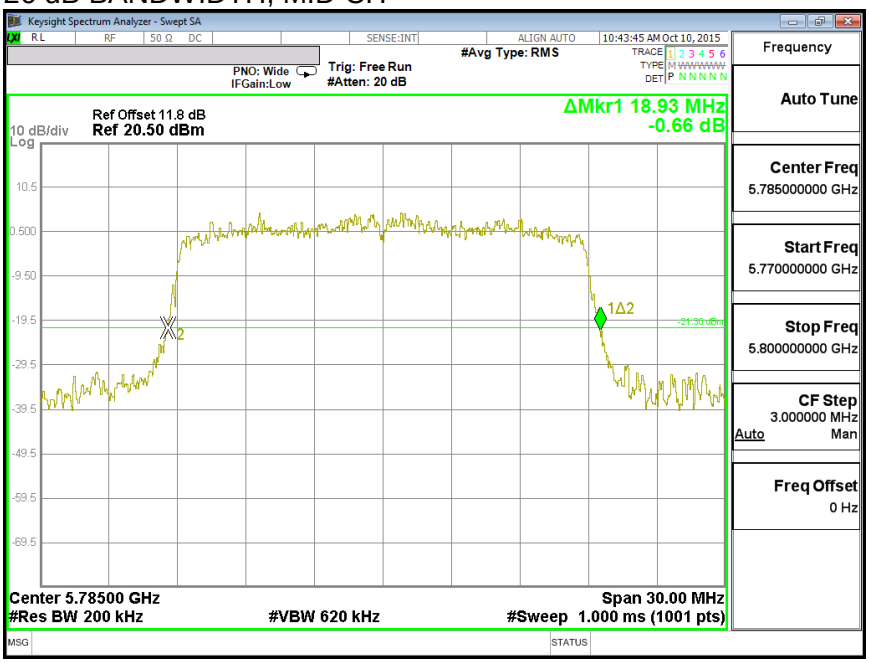
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	19.02
Mid	5785	18.93
High	5825	19.11

26 dB BANDWIDTH

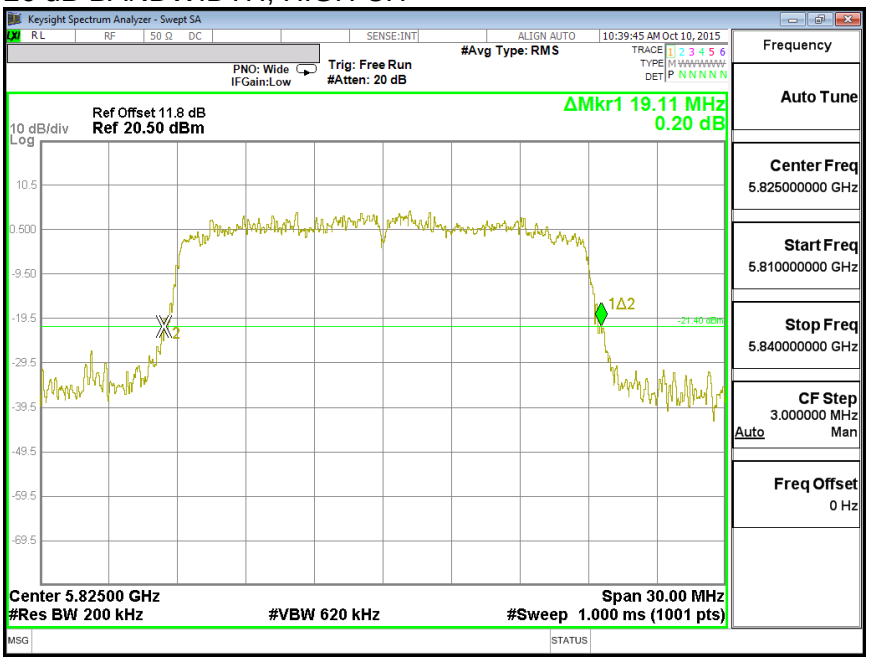
26 dB BANDWIDTH, LOW CH



26 dB BANDWIDTH, MID CH



26 dB BANDWIDTH, HIGH CH



8.2.3. 99% BANDWIDTH

LIMITS

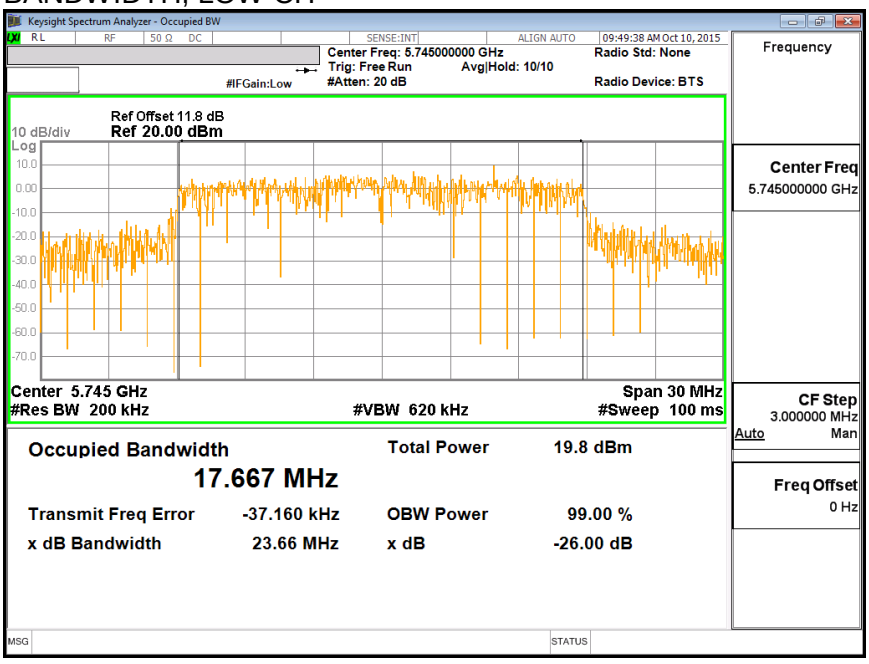
None; for reporting purposes only.

RESULTS

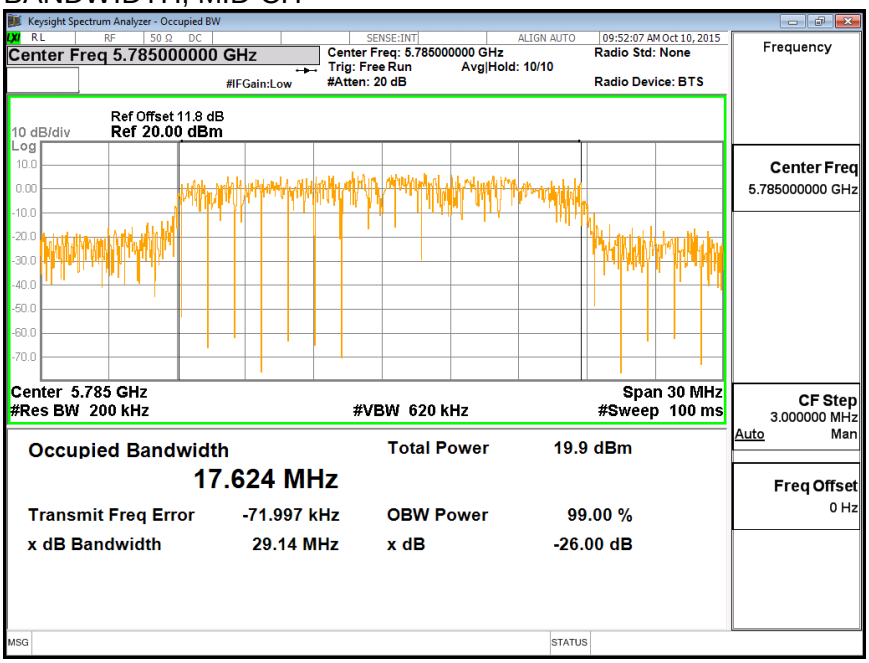
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.667
Mid	5785	17.624
High	5825	17.579

99% BANDWIDTH

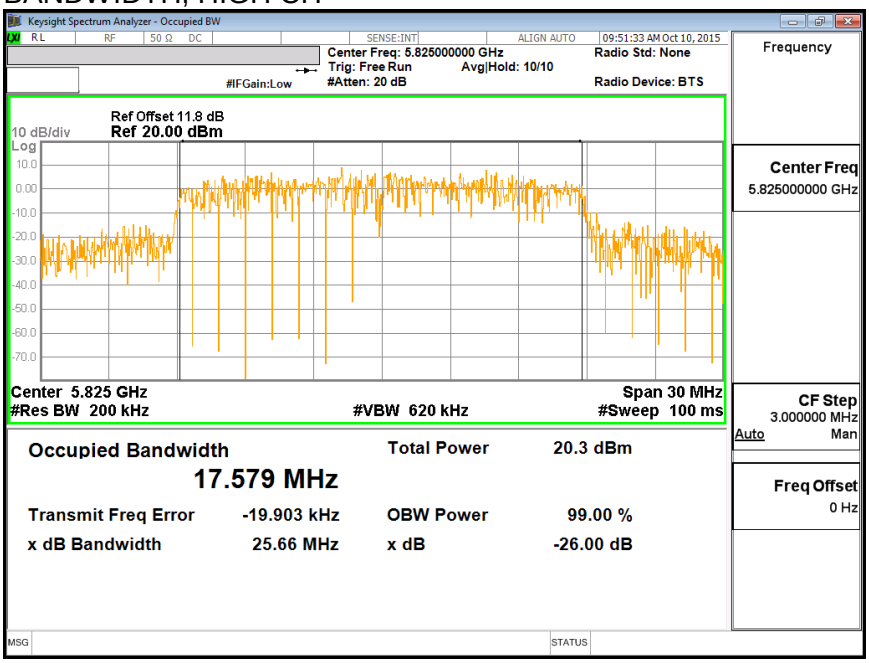
BANDWIDTH, LOW CH



BANDWIDTH, MID CH



BANDWIDTH, HIGH CH



8.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

Test Procedure

Measurements perform using a wideband gated RF power meter.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5745	14.67
Mid	5785	15.89
High	5825	15.81

8.2.5. 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.

Test Procedure

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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	5.27	30.00
Mid	5785	5.27	30.00
High	5825	5.27	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	14.67	14.67	30.00	-15.33
Mid	5785	15.89	15.89	30.00	-14.11
High	5825	15.81	15.81	30.00	-14.19

8.2.6. 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	5.27	30.00
Mid	5785	5.27	30.00
High	5825	5.27	30.00

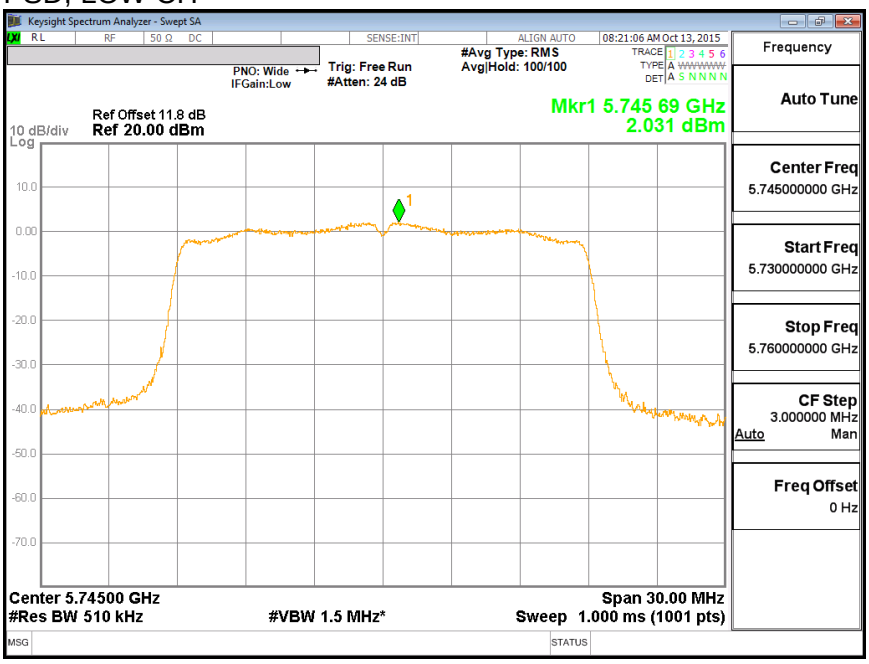
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

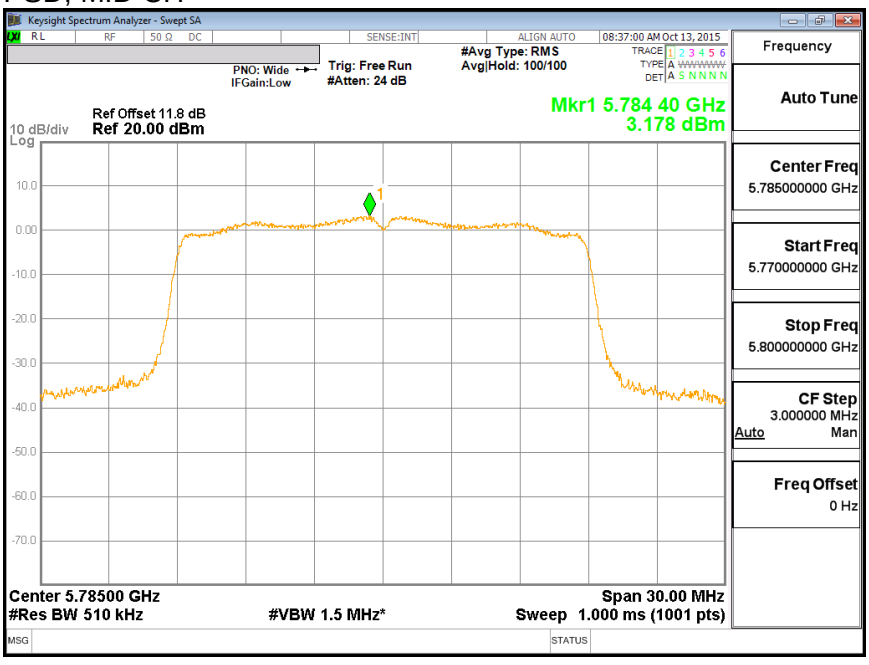
Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	2.03	2.03	30.00	-27.97
Mid	5785	3.18	3.18	30.00	-26.82
High	5825	3.30	3.30	30.00	-26.70

PSD

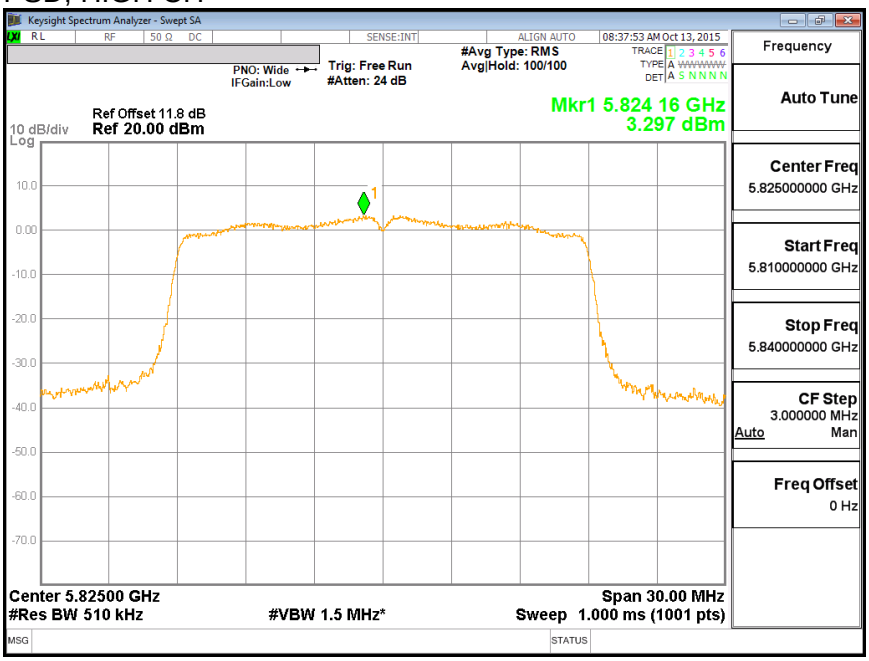
PSD, LOW CH



PSD, MID CH



PSD, HIGH CH



8.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

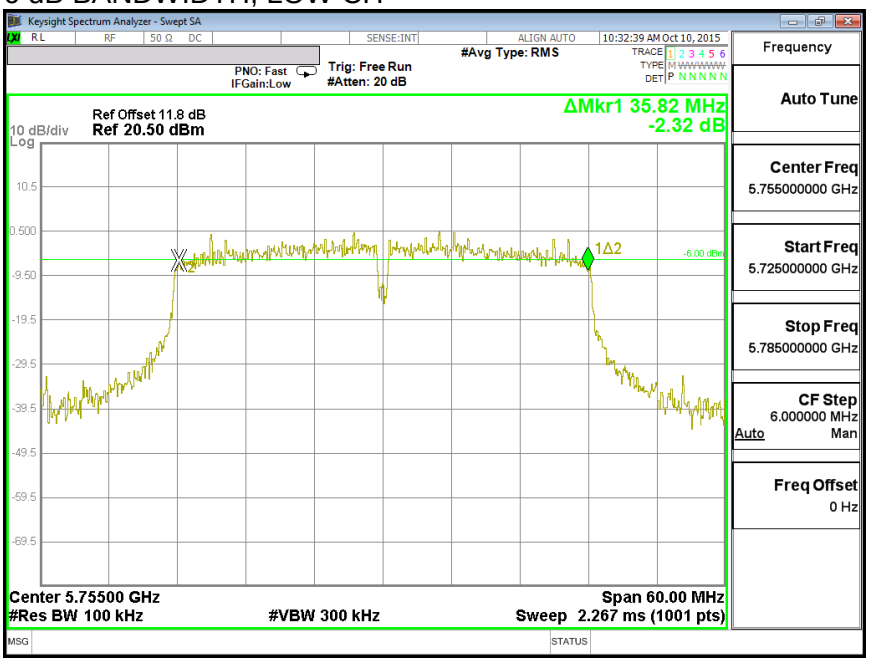
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

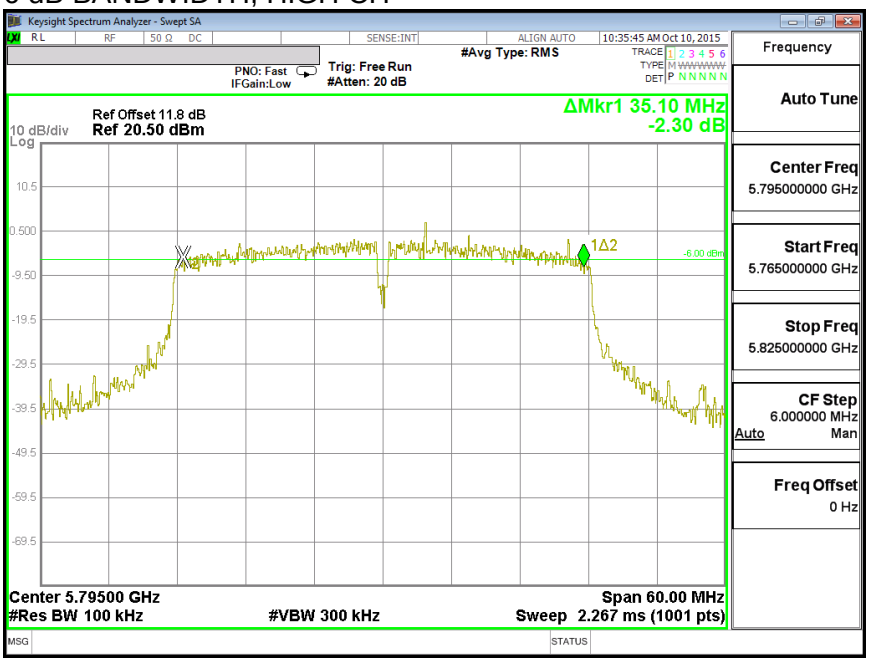
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	35.82	0.5
High	5795	35.10	0.5

6 dB BANDWIDTH

6 dB BANDWIDTH, LOW CH



6 dB BANDWIDTH, HIGH CH



8.3.2. 26 dB BANDWIDTH

LIMITS

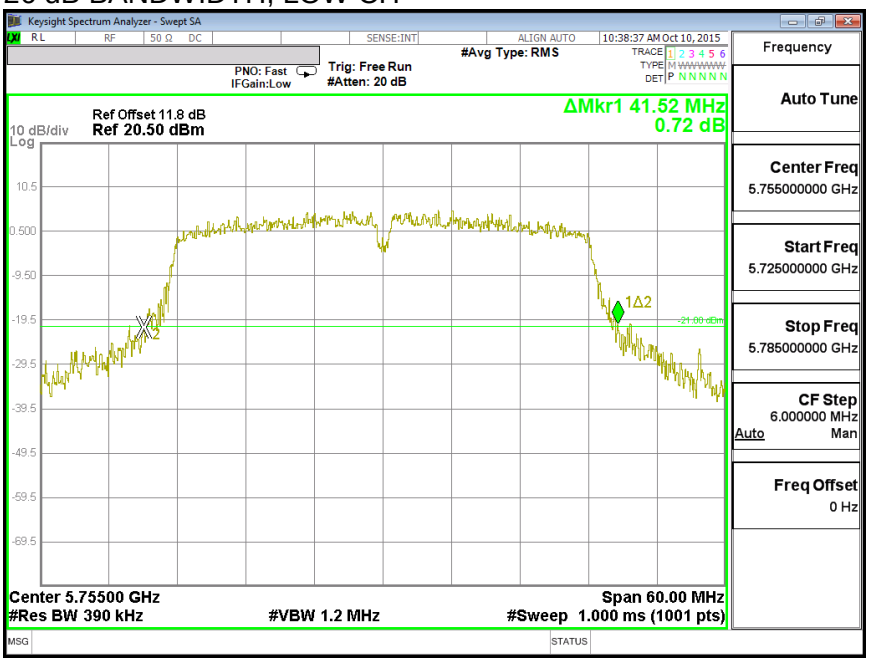
None, for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5755	41.52
High	5795	42.24

26 dB BANDWIDTH

26 dB BANDWIDTH, LOW CH



26 dB BANDWIDTH, HIGH CH

8.3.3. 99% BANDWIDTH

LIMITS

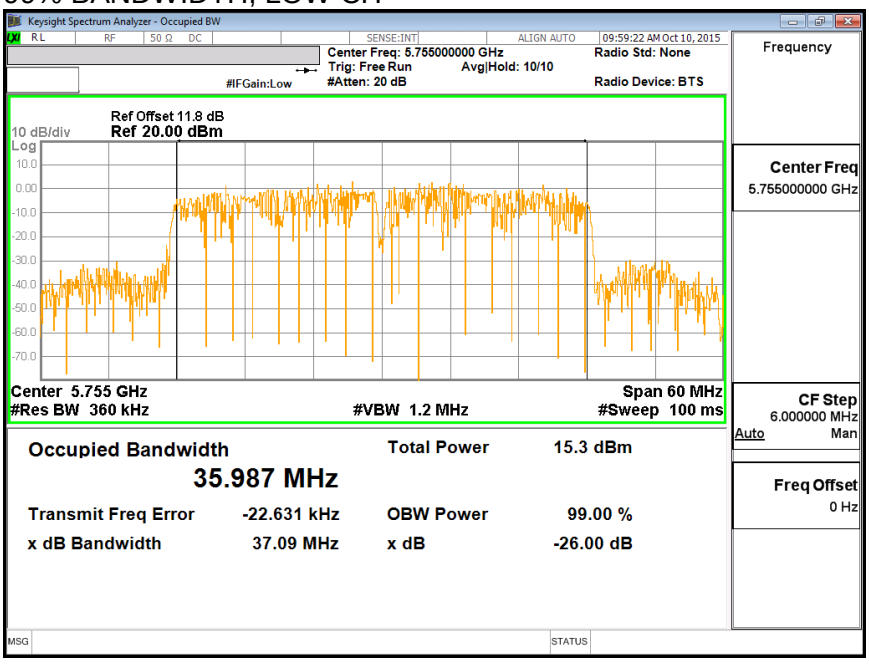
None; for reporting purposes only.

RESULTS

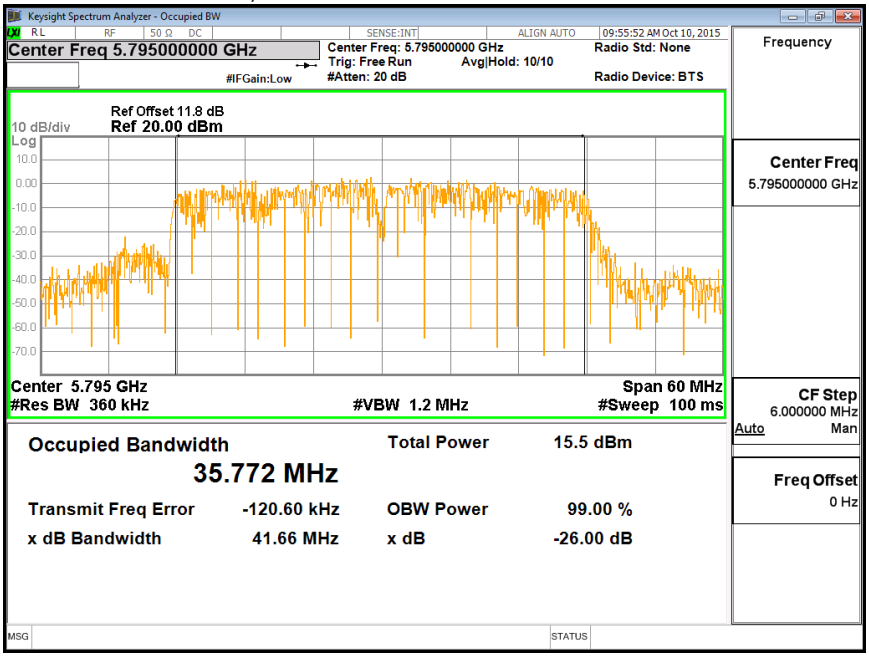
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	35.987
High	5795	35.772

99% BANDWIDTH

99% BANDWIDTH, LOW CH



99% BANDWIDTH, HIGH CH



8.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

Test Procedure

Measurements perform using a wideband gated RF power meter.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5755	14.42
High	5795	15.92

8.3.5. 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.

Test Procedure

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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 (dBi)	Power Limit (dBm)
Low	5755	5.27	30.00
High	5795	5.27	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	14.42	14.42	30.00	-15.58
High	5795	15.92	15.92	30.00	-14.08

8.3.6. 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	5755	5.27	30.00
High	5795	5.27	30.00

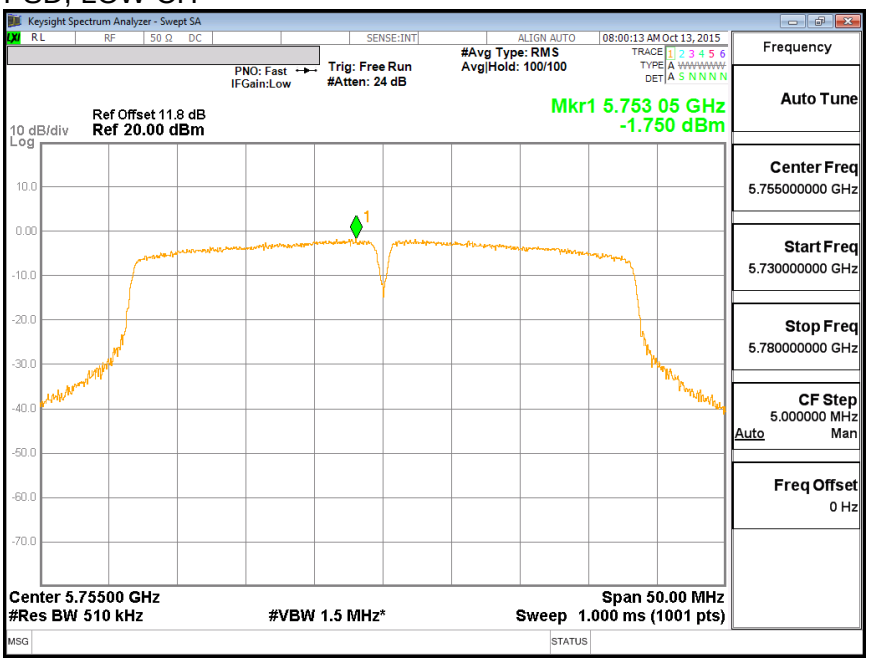
Duty Cycle CF (dB)	0.13	**Included in Calculations of Corr'd PSD**

PSD Results

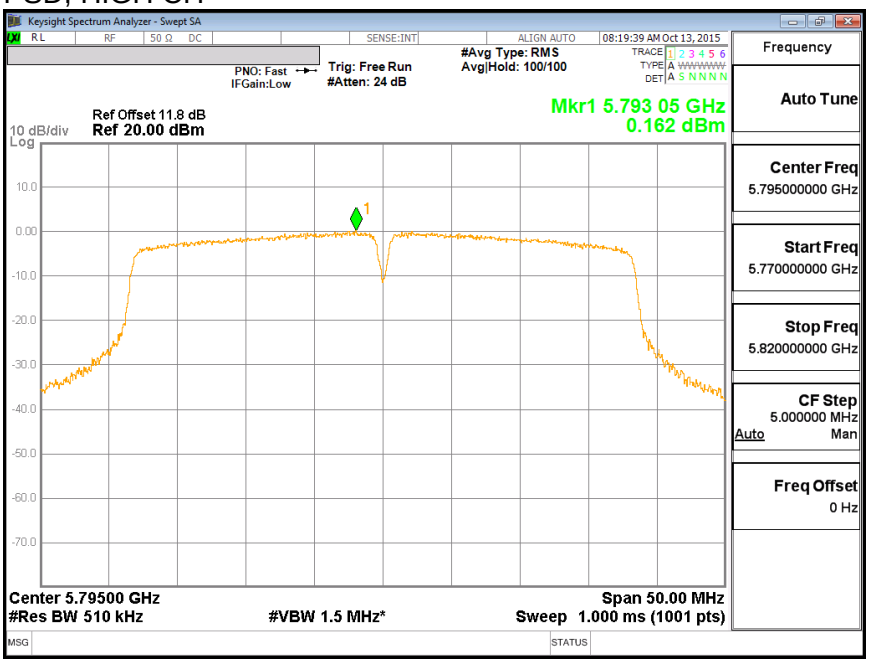
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-1.75	-1.62	30.00	-31.62
High	5795	0.16	0.29	30.00	-29.71

PSD,

PSD, LOW CH



PSD, HIGH CH



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 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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 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.

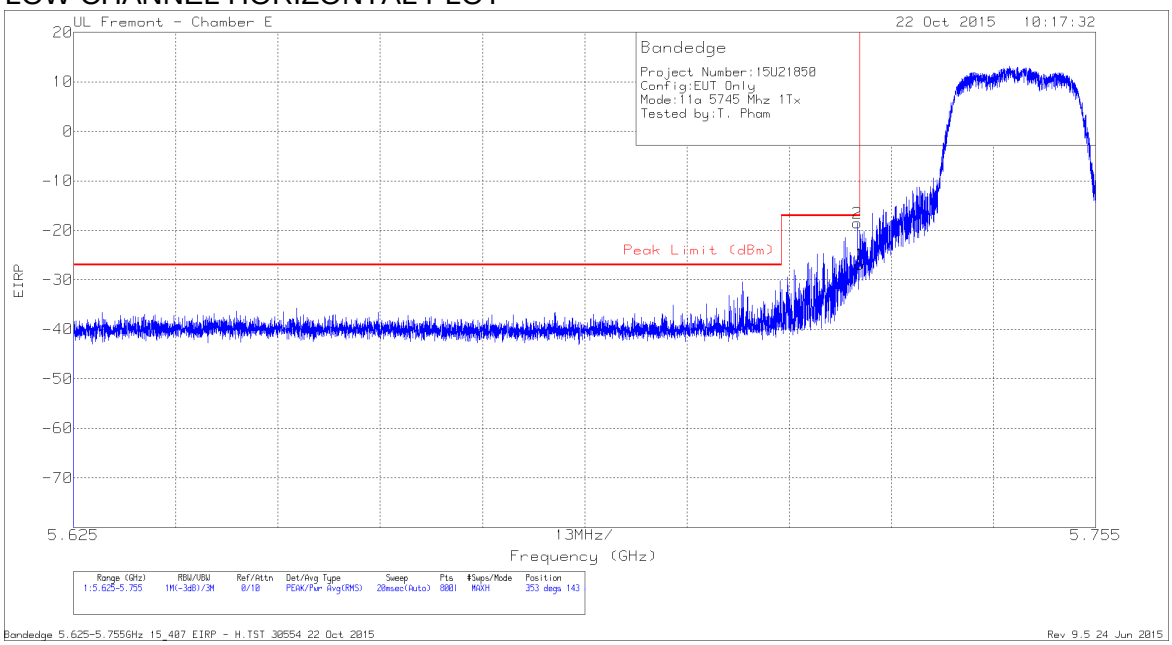
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

9.2. 802.11a 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

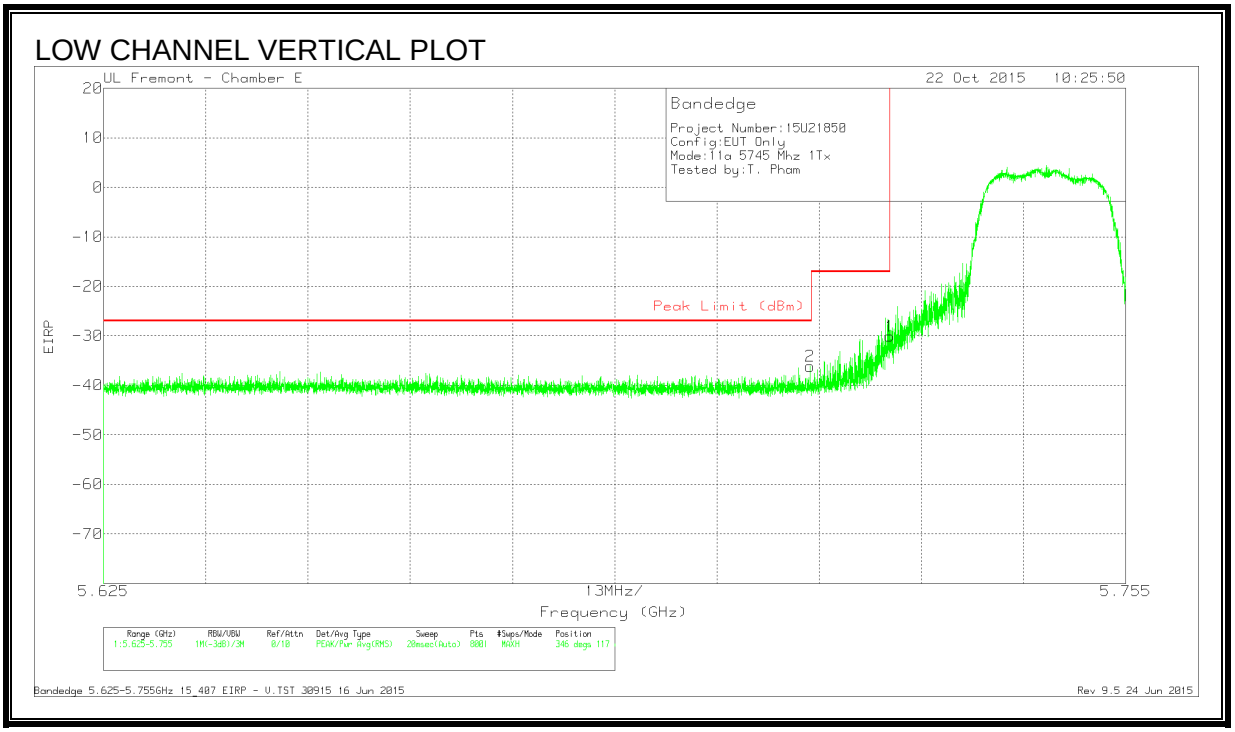


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-53.23	Pk	34.7	-20.1	11.8	-26.83	-17	-9.83	353	143	H
2	5.725	-44.94	Pk	34.7	-20.1	11.8	-18.54	-17	-1.54	353	143	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



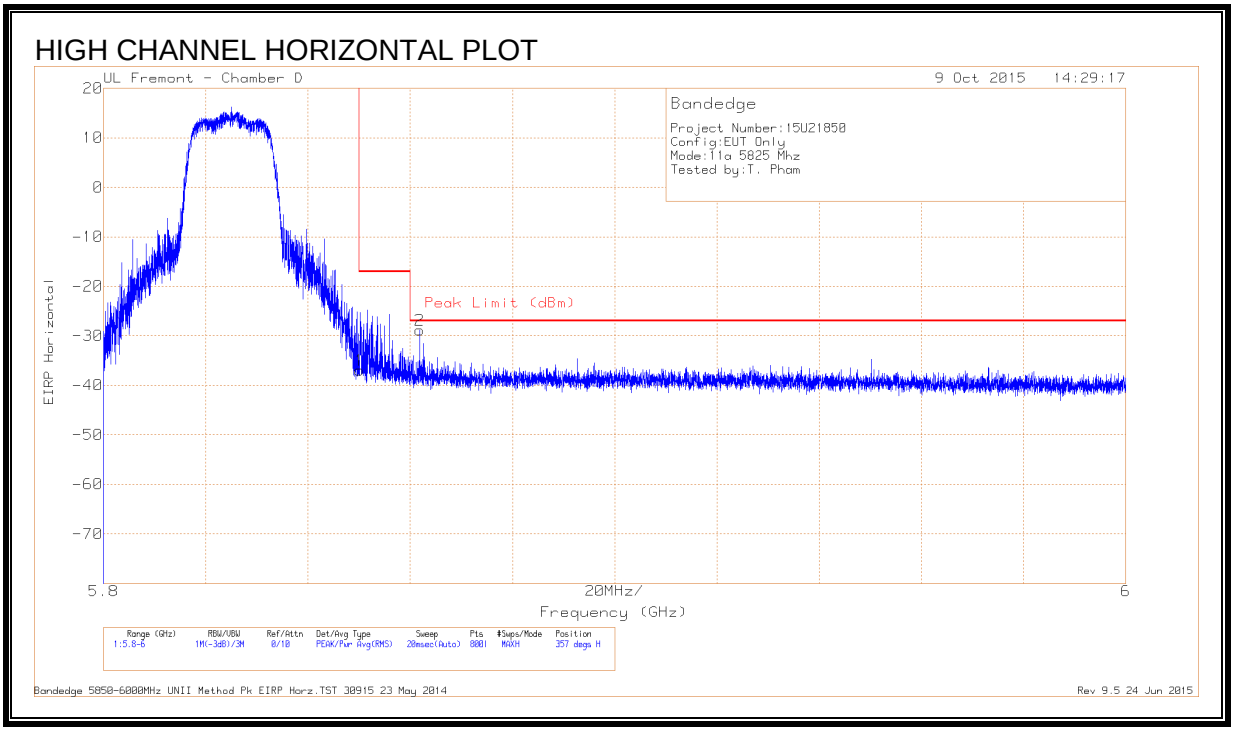
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-62.55	Pk	34.7	-20.1	11.8	-36.15	-27	-9.15	346	117	V
1	5.725	-56.53	Pk	34.7	-20.1	11.8	-30.13	-17	-13.13	346	117	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

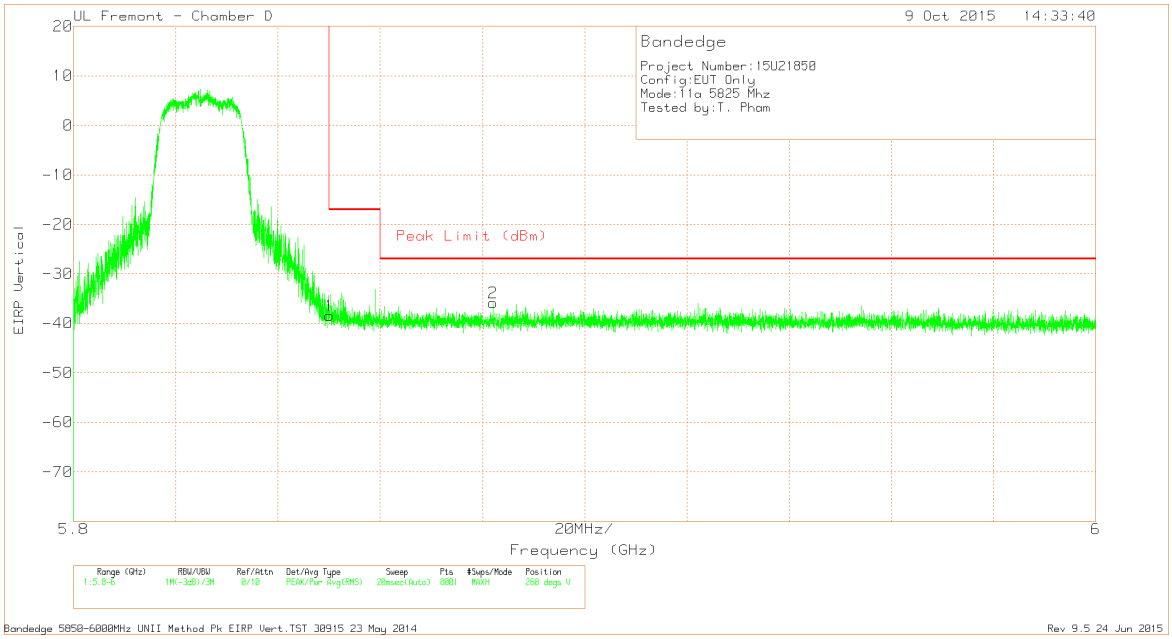


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-65.96	Pk	34.9	-17.7	11.8	-36.96	-17	-19.96	357	119	H
2	5.862	-58.09	Pk	35	-17.6	11.8	-28.89	-27	-1.89	357	119	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



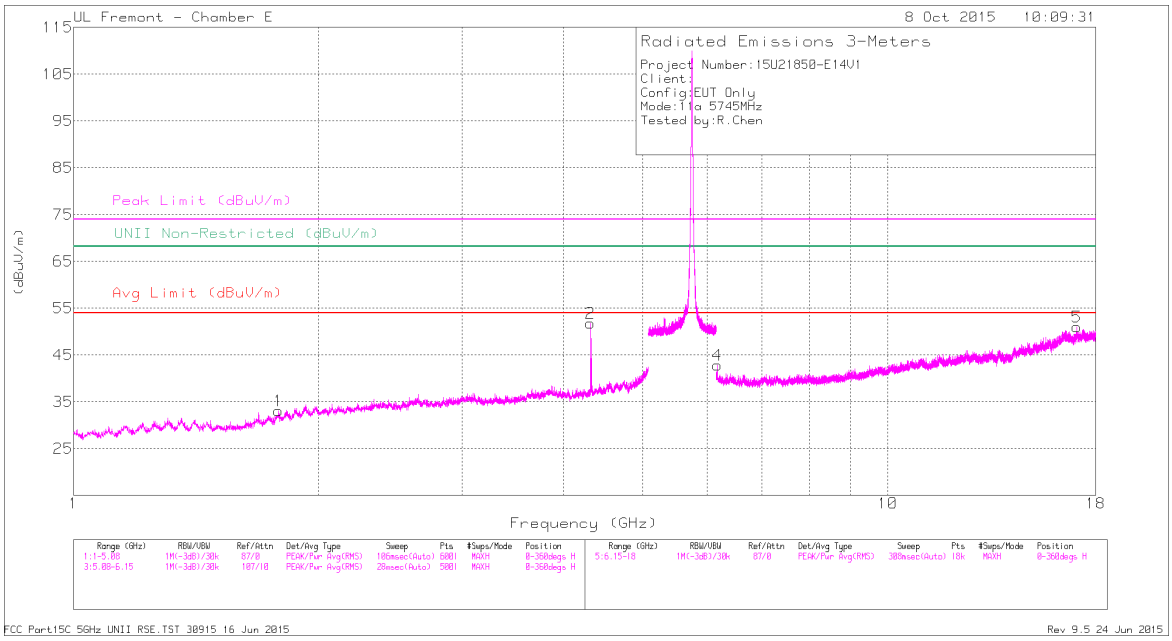
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-67.39	Pk	34.9	-17.7	11.8	-38.39	-17	-21.39	260	110	V
2	5.882	-65.17	Pk	35	-17.5	11.8	-35.87	-27	-8.87	260	110	V

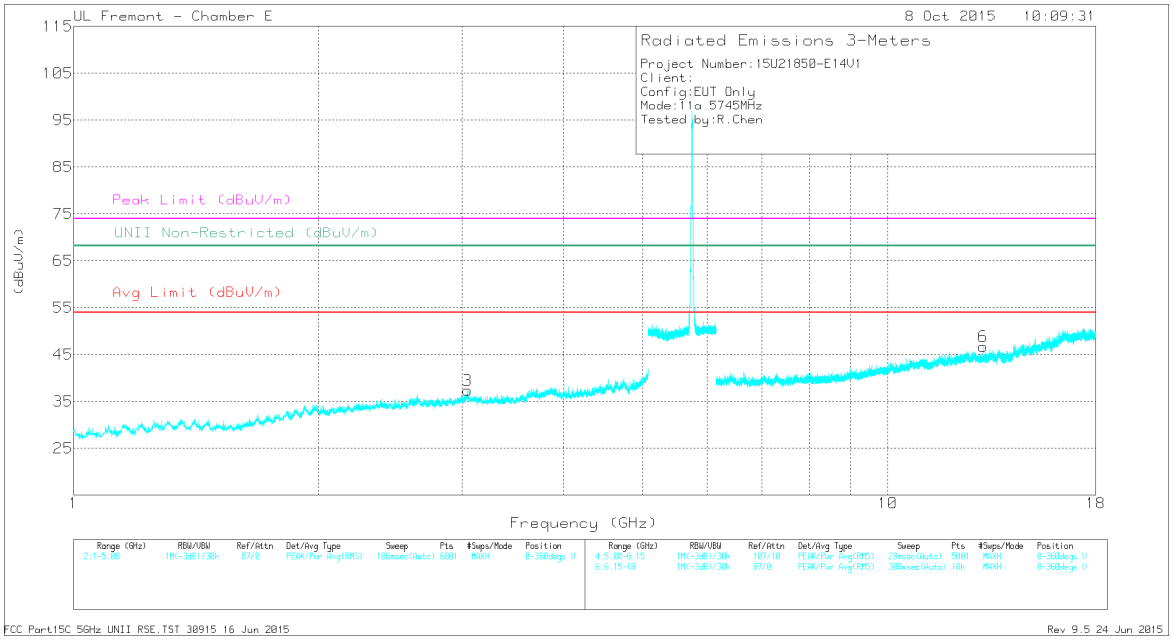
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/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
2	* 4.313	42.06	PK-U	33.5	-30.7	44.86	-	-	74	-29.14	-	-	90	225	H
	* 4.315	30.11	ADR	33.5	-30.7	32.91	54	-21.09	-	-	-	-	90	225	H
1	1.785	44.57	PK-U	30.1	-34.5	40.17	-	-	-	-	68.2	-28.03	360	200	H
3	3.046	41.5	PK-U	32.9	-30.7	43.7	-	-	-	-	68.2	-24.5	90	100	V
4	6.176	43.39	PK-U	35.3	-28.2	50.49	-	-	-	-	68.2	-17.71	170	100	H
6	13.09	37.97	PK-U	38.9	-24.5	52.37	-	-	-	-	68.2	-15.83	8	288	V
5	17.067	35.98	PK-U	41.2	-20.9	56.28	-	-	-	-	68.2	-11.92	170	100	H

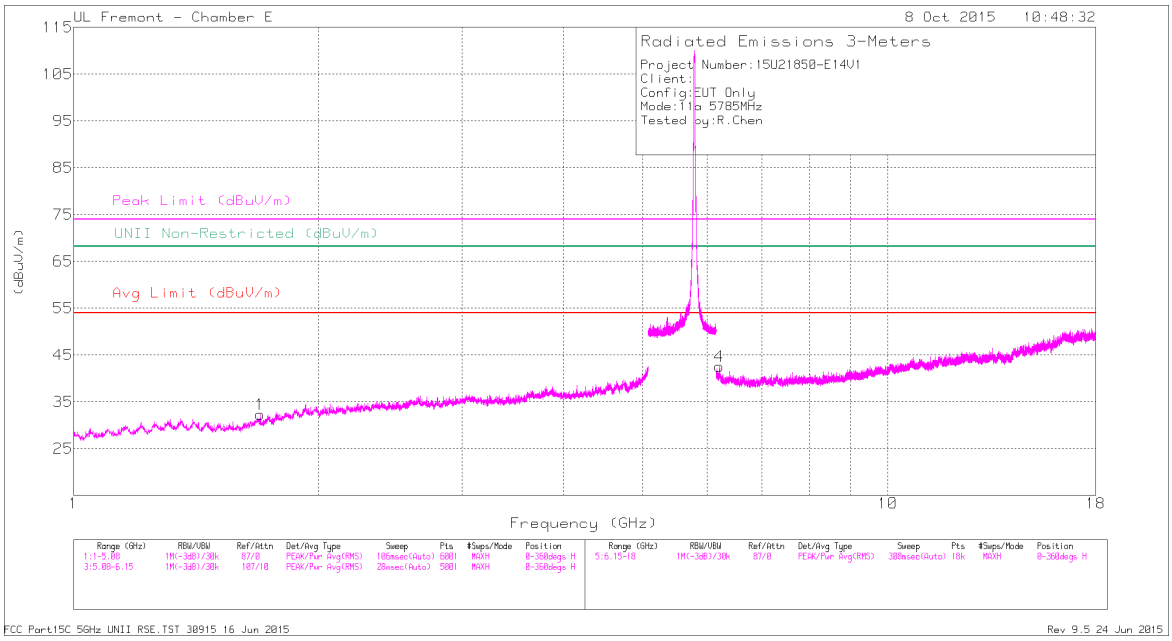
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

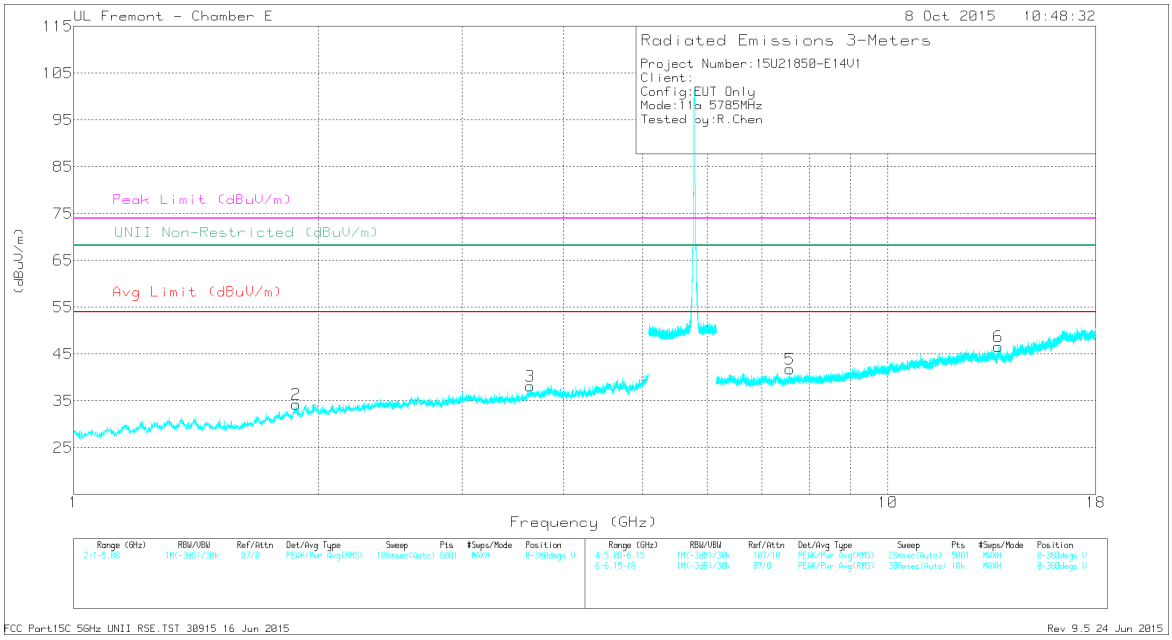
ADR - U-NII AD primary method, RMS average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/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	* 1.696	43.48	PK-U	28.9	-33.5	38.88	-	-	74	-35.12	-	-	0	101	H
	* 1.696	31.74	ADR	28.9	-33.5	27.14	54	-26.86	-	-	-	-	0	101	H
3	* 3.634	41.47	PK-U	33.1	-30.8	43.77	-	-	74	-30.23	-	-	0	101	V
	* 3.637	30.07	ADR	33.1	-30.8	32.37	54	-21.63	-	-	-	-	0	101	V
5	* 7.573	38.2	PK-U	35.7	-26.3	47.6	-	-	74	-26.4	-	-	0	200	V
	* 7.572	27.03	ADR	35.7	-26.3	36.43	54	-17.57	-	-	-	-	0	200	V
2	1.877	44.37	PK-U	30.7	-33.7	41.37	-	-	-	-	68.2	-26.83	0	101	V
4	6.208	42.37	PK-U	35.4	-28.1	49.67	-	-	-	-	68.2	-18.53	0	101	H
6	13.671	37.74	PK-U	38.6	-23.6	52.74	-	-	-	-	68.2	-15.46	0	200	V

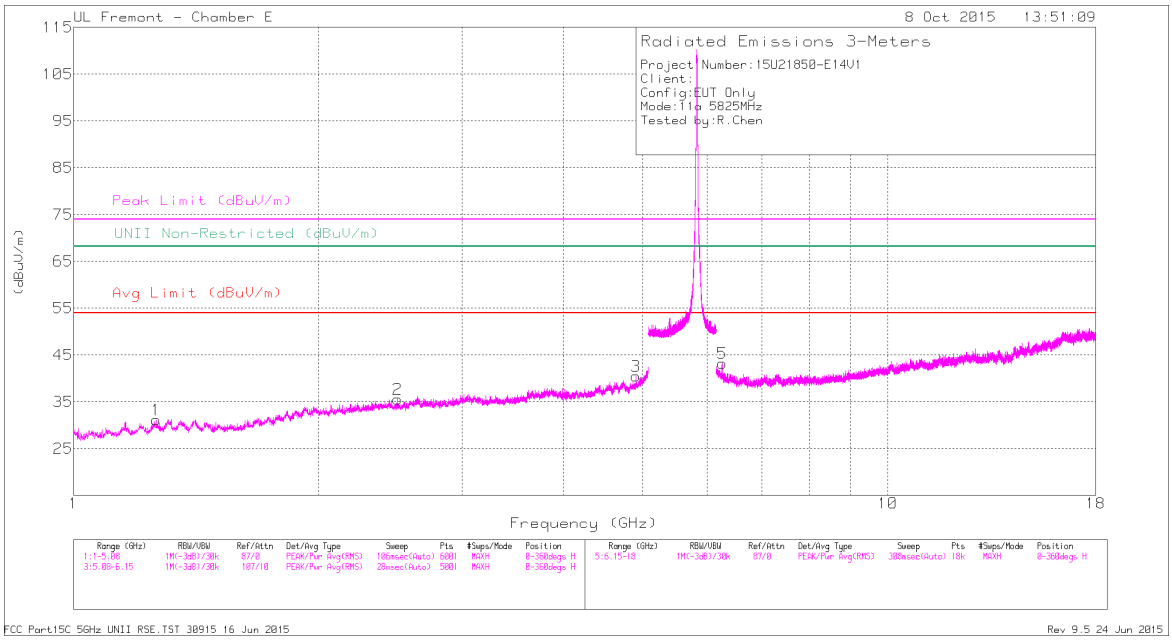
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

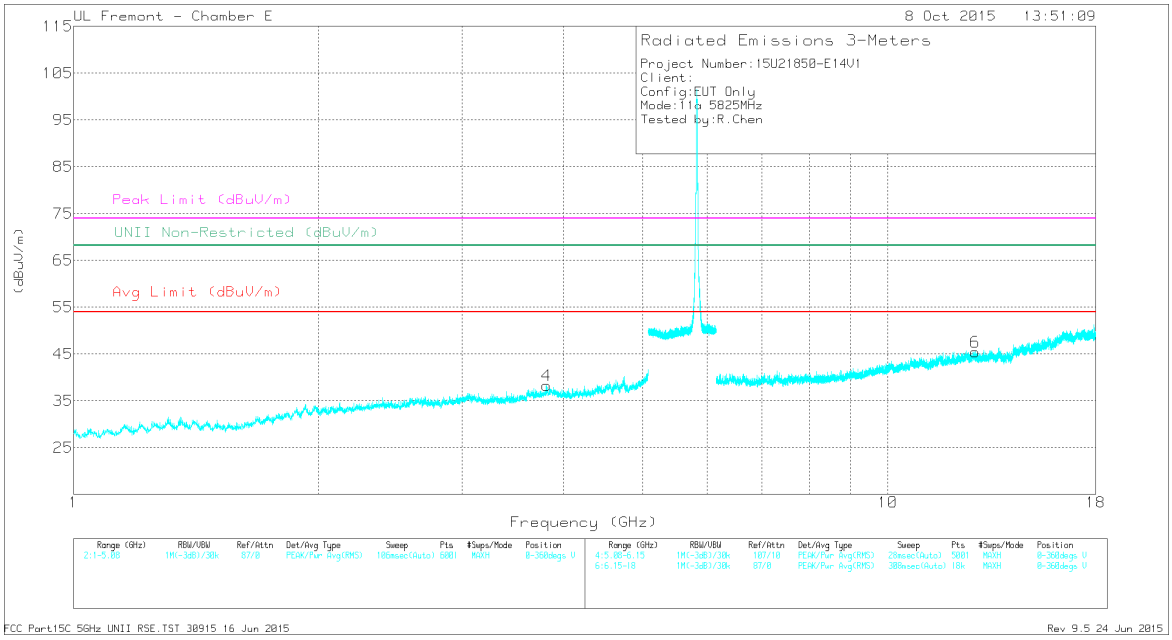
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/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	* 1.264	44.88	PK-U	28.7	-35.7	37.88	-	-	74	-36.12	-	-	0	200	H
	* 1.262	33.53	ADR	28.7	-35.7	26.53	54	-27.47	-	-	-	-	0	200	H
3	* 4.907	41.77	PK-U	34.1	-29.5	46.37	-	-	74	-27.63	-	-	0	102	H
	* 4.909	30.36	ADR	34.1	-29.5	34.96	54	-19.04	-	-	-	-	0	102	H
4	* 3.806	41.7	PK-U	33.5	-30.1	45.1	-	-	74	-28.9	-	-	0	200	V
	* 3.807	30.44	ADR	33.5	-30.1	33.84	54	-20.16	-	-	-	-	0	200	V
2	2.51	42.38	PK-U	32.2	-32.9	41.68	-	-	-	-	68.2	-32.32	148	249	H
5	6.262	42.96	PK-U	35.4	-28.3	50.06	-	-	-	-	68.2	-18.14	355	101	H
6	12.79	36.87	PK-U	39	-23.9	51.97	-	-	-	-	68.2	-16.23	0-360	100	V

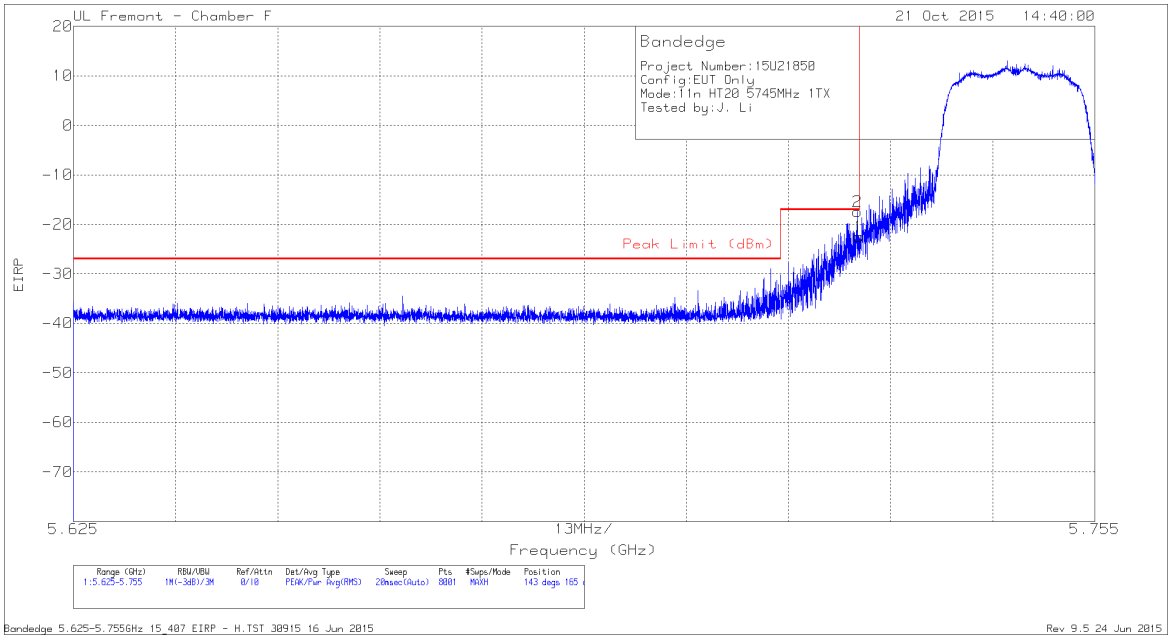
* - indicates frequency in CFR15.205/IC7.2.2 Restricted BandPK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.3. 802.11n HT20 1Tx CDD MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

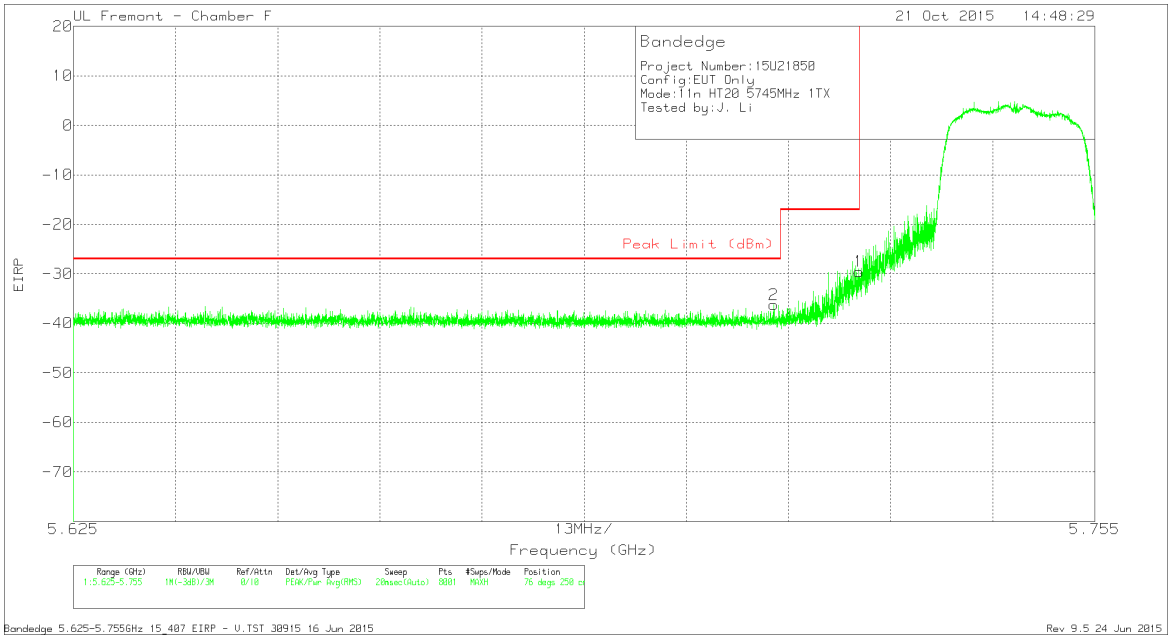


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-50.76	Pk	34.9	-18.4	11.8	-22.46	-17	-5.46	143	165	H
2	5.725	-45.72	Pk	34.9	-18.4	11.8	-17.42	-17	-.42	143	165	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



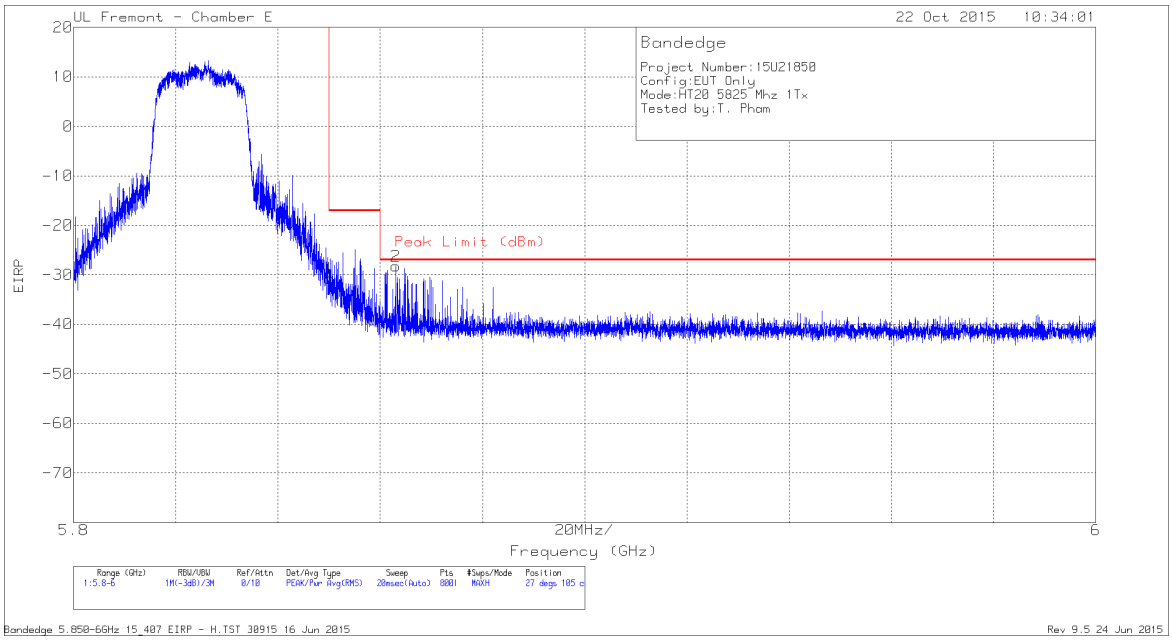
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-57.82	Pk	34.9	-18.4	11.8	-29.52	-17	-12.52	76	250	V
2	5.714	-64.57	Pk	34.8	-18.3	11.8	-36.27	-27	-9.27	76	250	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

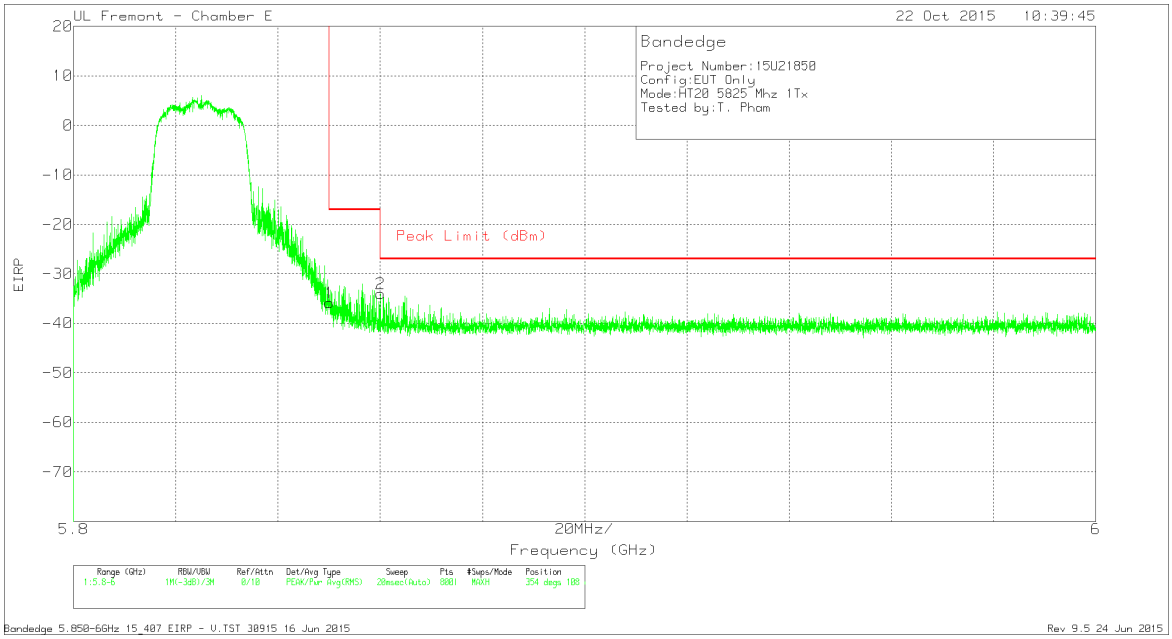


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-57.14	Pk	34.9	-20.3	11.8	-30.74	-17	-13.74	27	105	H
2	5.863	-54.57	Pk	34.9	-20.4	11.8	-28.27	-27	-1.27	27	105	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



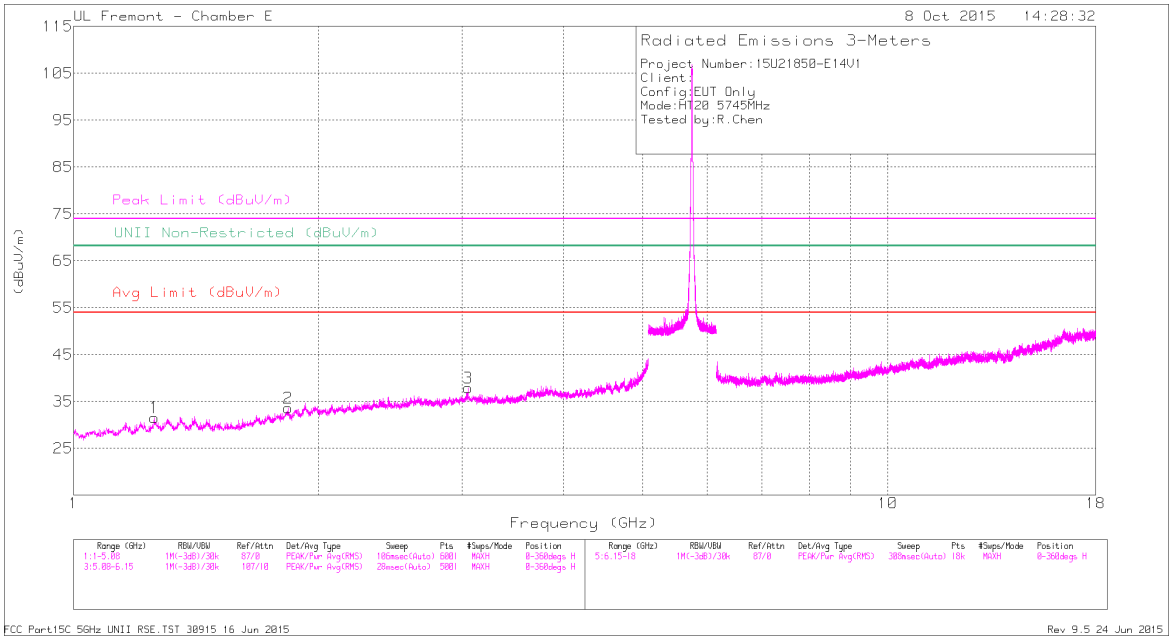
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-62.19	Pk	34.9	-20.3	11.8	-35.79	-17	-18.79	354	108	V
2	5.86	-60.33	Pk	34.9	-20.4	11.8	-34.03	-27	-7.03	354	108	V

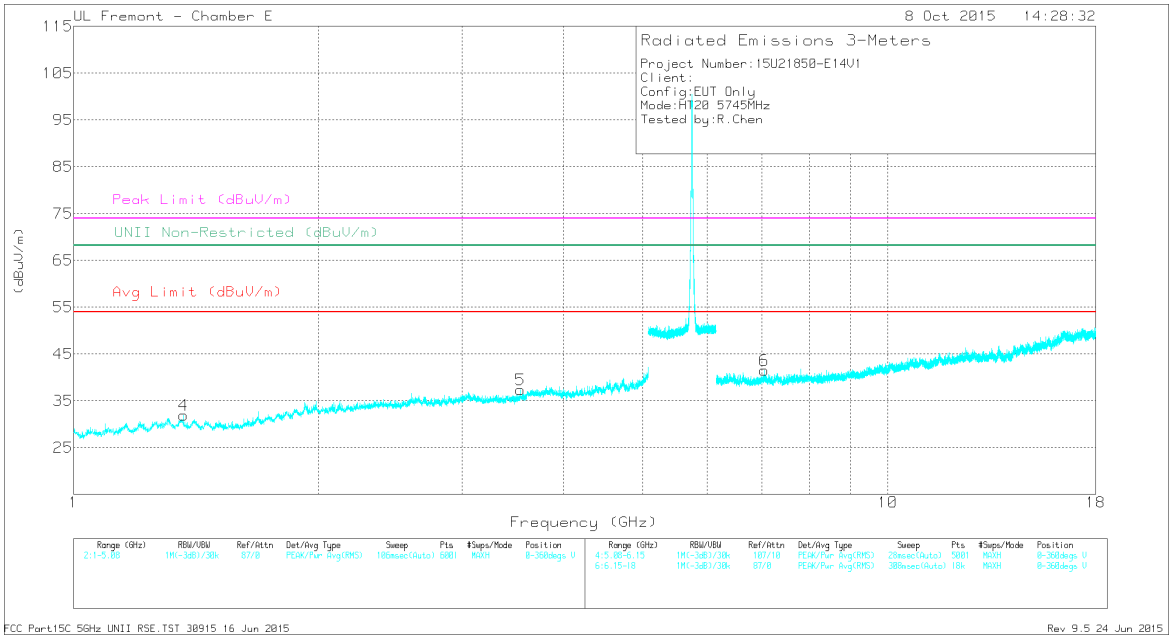
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/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	* 1.256	45.38	PK-U	28.6	-35.7	38.28	-	-	74	-35.72	-	-	360	200	H
	* 1.256	33.68	ADR	28.6	-35.7	26.58	54	-27.42	-	-	-	-	360	200	H
4	* 1.364	44.31	PK-U	28.7	-34.9	38.11	-	-	74	-35.89	-	-	360	200	V
	* 1.366	32.8	ADR	28.7	-34.8	26.7	54	-27.3	-	-	-	-	360	200	V
5	* 3.538	41.53	PK-U	32.9	-30.8	43.63	-	-	74	-30.37	-	-	360	200	V
	* 3.534	30.04	ADR	32.9	-30.9	32.04	54	-21.96	-	-	-	-	360	200	V
2	1.836	44.16	PK-U	30.5	-34.1	40.56	-	-	-	-	68.2	-27.64	360	200	H
3	3.052	41.92	PK-U	32.9	-30.7	44.12	-	-	-	-	68.2	-24.08	360	102	H
6	7.05	38.99	PK-U	35.6	-27.2	47.39	-	-	-	-	68.2	-20.81	360	100	V

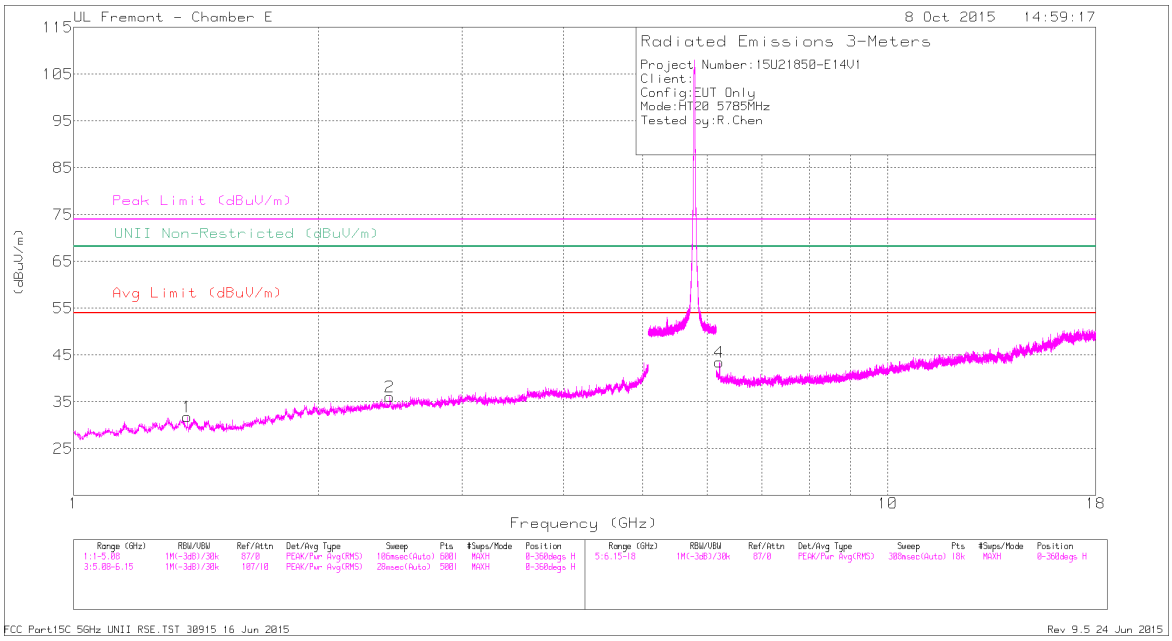
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

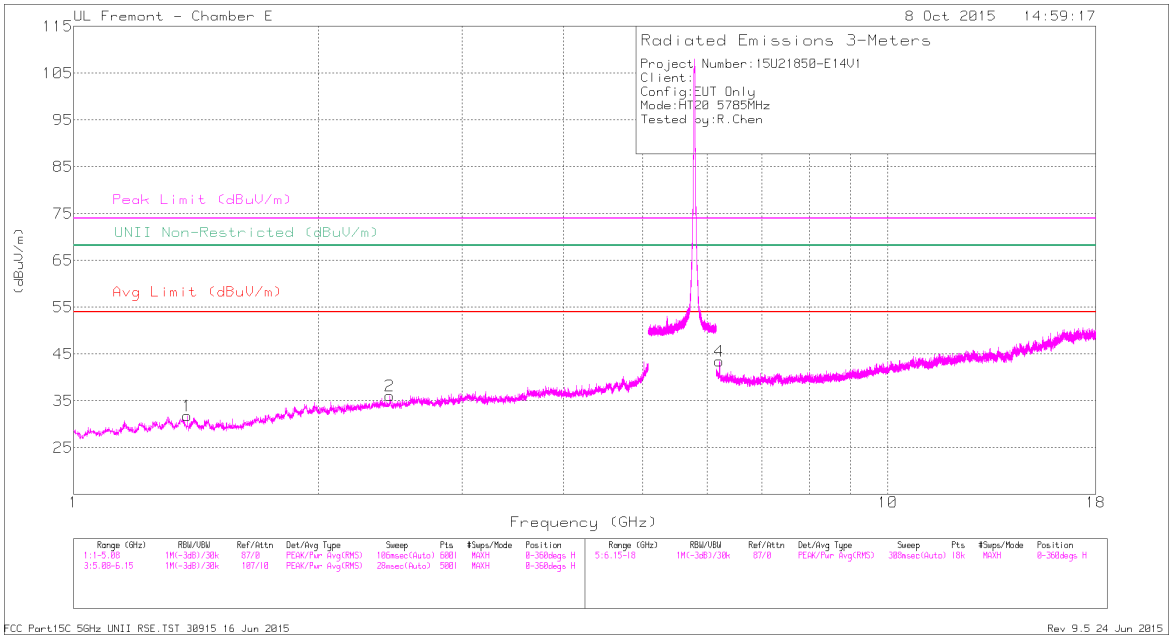
ADR - U-NII AD primary method, RMS average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/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	* 1.378	44.67	PK-U	28.6	-34.8	38.47	-	-	74	-35.53	-	-	360	200	H
	* 1.379	32.07	ADR	28.6	-34.8	25.87	54	-28.13	-	-	-	-	360	200	H
3	1.738	44.39	PK-U	29.4	-34.1	39.69	-	-	-	-	68.2	-28.51	360	200	V
2	2.443	43.28	PK-U	32.1	-32.7	42.68	-	-	-	-	68.2	-25.52	360	101	H
4	6.205	41.27	PK-U	35.4	-28.1	48.57	-	-	-	-	68.2	-19.63	360	200	H
5	8.613	37.92	PK-U	35.9	-26.2	47.62	-	-	-	-	68.2	-20.58	360	200	V
6	9.731	38.08	PK-U	37	-25.7	49.38	-	-	-	-	68.2	-18.82	360	102	V

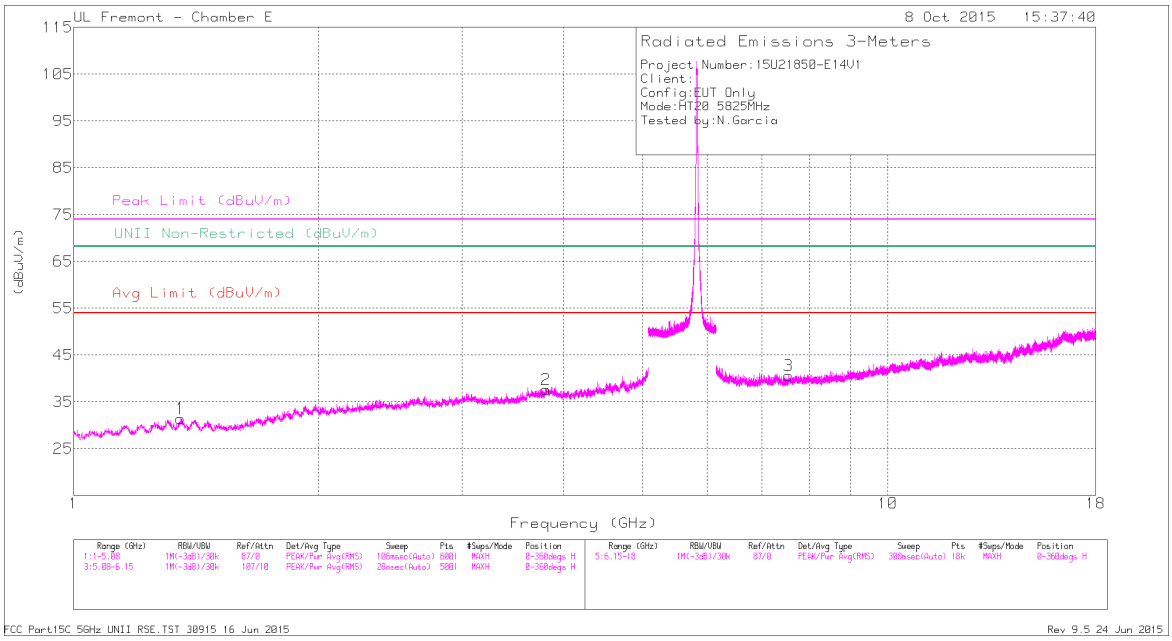
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

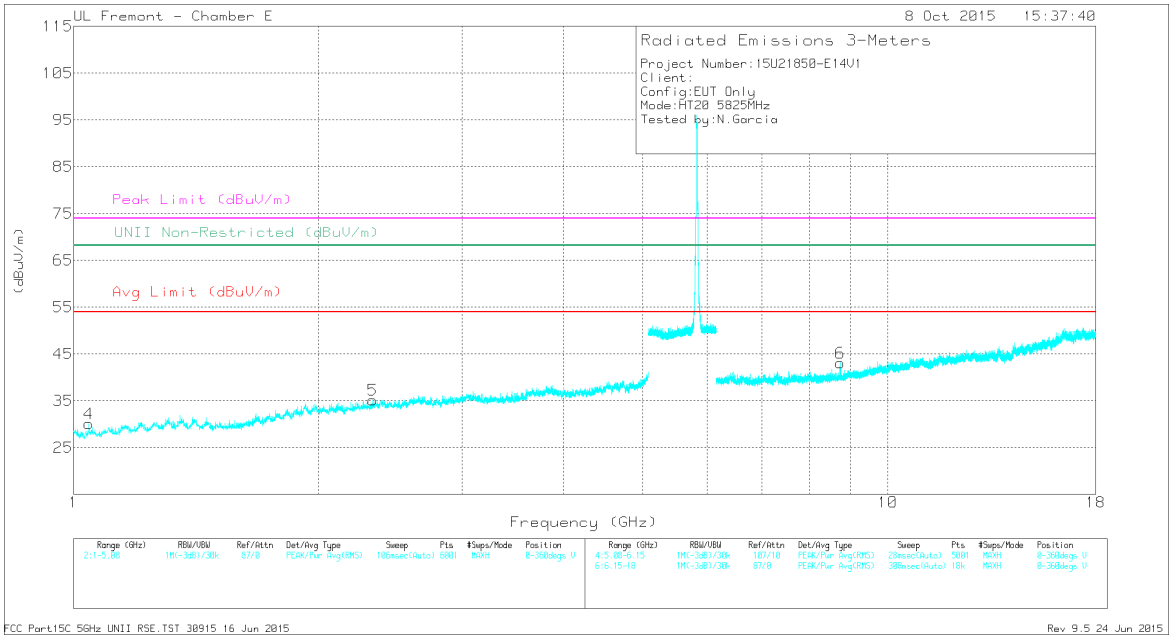
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/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	* 1.353	44.78	PK-U	28.7	-35	38.48	-	-	74	-35.52	-	-	18	112	H
	* 1.355	33.32	ADR	28.7	-35	27.02	54	-26.98	-	-	-	-	18	112	H
2	* 3.803	41.48	PK-U	33.5	-30.1	44.88	-	-	74	-29.12	-	-	22	131	H
	* 3.803	30.42	ADR	33.5	-30.1	33.82	54	-20.18	-	-	-	-	22	131	H
4	* 1.045	45.5	PK-U	27	-36.1	36.4	-	-	74	-37.6	-	-	56	154	V
	* 1.044	33.93	ADR	27	-36.1	24.83	54	-29.17	-	-	-	-	56	154	V
5	* 2.328	42.76	PK-U	32	-33.1	41.66	-	-	74	-32.34	-	-	82	175	V
	* 2.33	31.35	ADR	32	-33	30.35	54	-23.65	-	-	-	-	82	175	V
3	* 7.549	38.11	PK-U	35.7	-26.6	47.21	-	-	74	-26.79	-	-	121	182	H
	* 7.551	26.82	ADR	35.7	-26.6	35.92	54	-18.08	-	-	-	-	121	182	H
6	8.737	43.81	PK-U	36	-26.5	53.31	-	-	-	-	68.2	-14.89	8	115	V

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

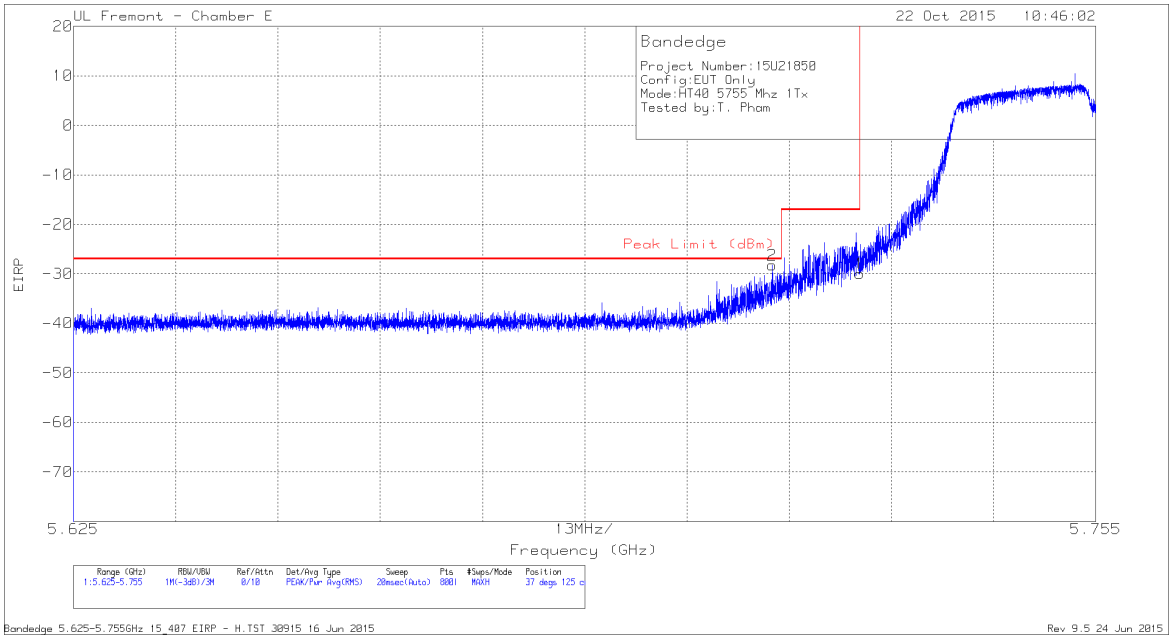
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.4. 802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

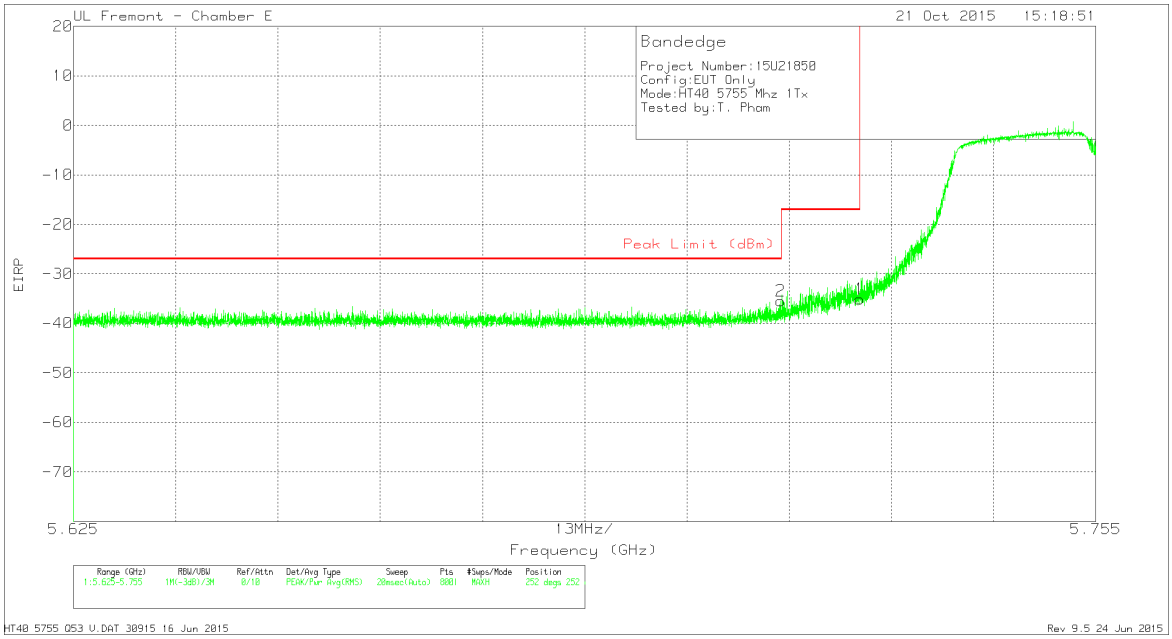


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	-54.61	Pk	34.7	-20.1	11.8	-28.21	-27	-1.21	37	125	H
1	5.725	-56.4	Pk	34.7	-20.1	11.8	-30	-17	-13	37	125	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



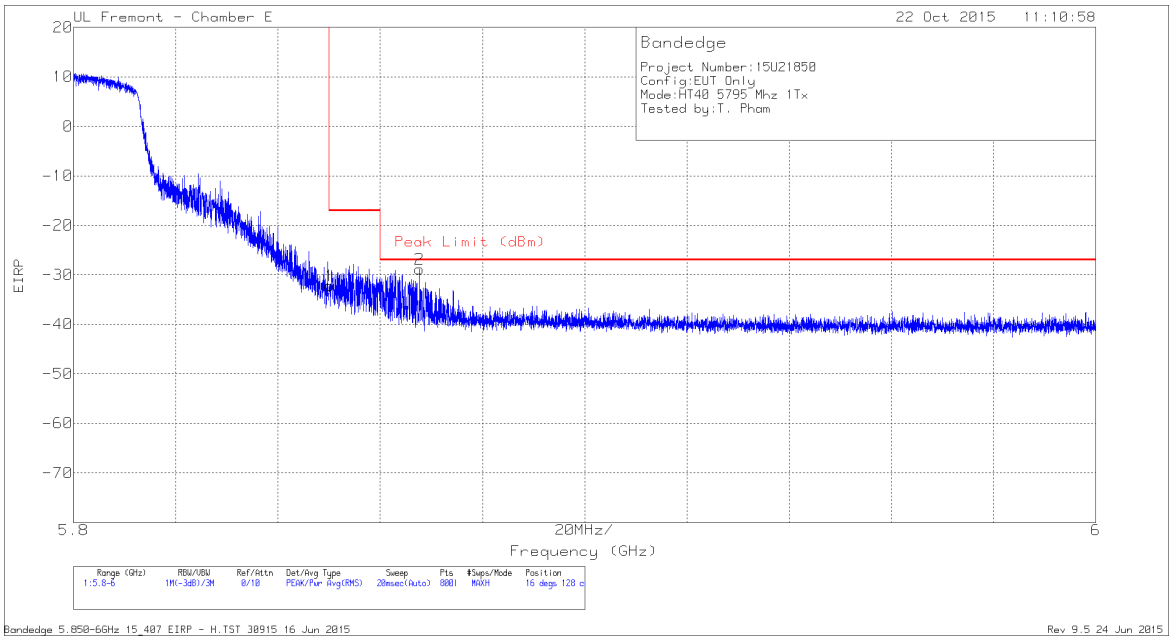
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-63.72	Pk	34.7	-20.1	11.8	-37.32	-27	-10.32	252	252	V
1	5.725	-63.35	Pk	34.7	-20.1	11.8	-38.95	-17	-21.95	252	252	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

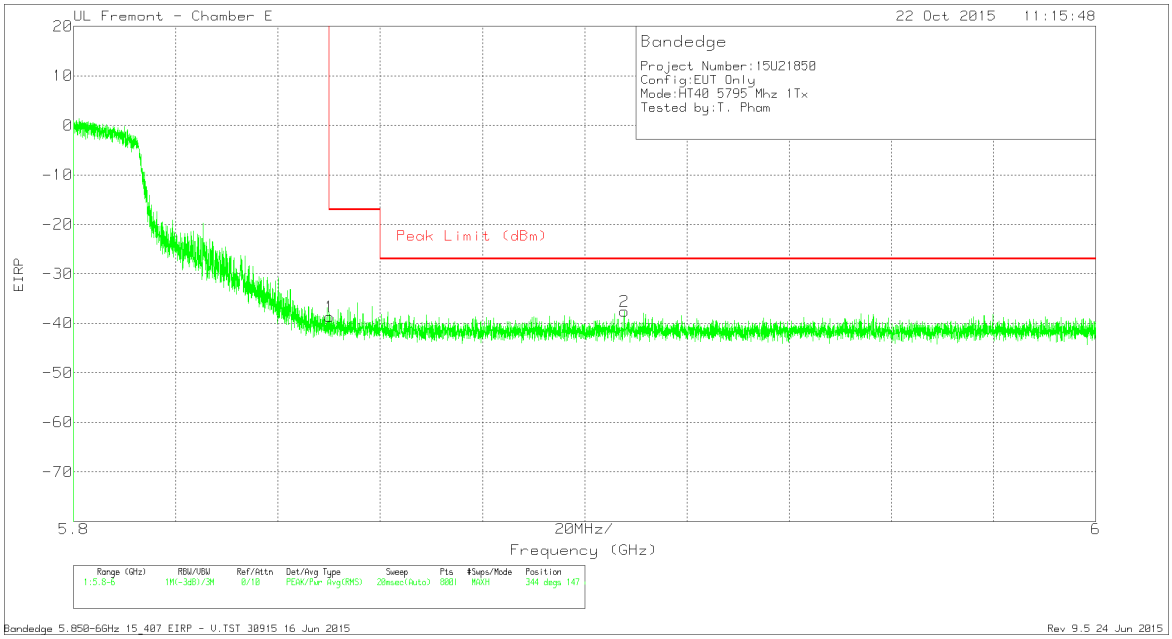


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-58.57	Pk	34.9	-20.3	11.8	-32.17	-17	-15.17	16	128	H
2	5.868	-55.18	Pk	34.9	-20.4	11.8	-28.88	-27	-1.88	16	128	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



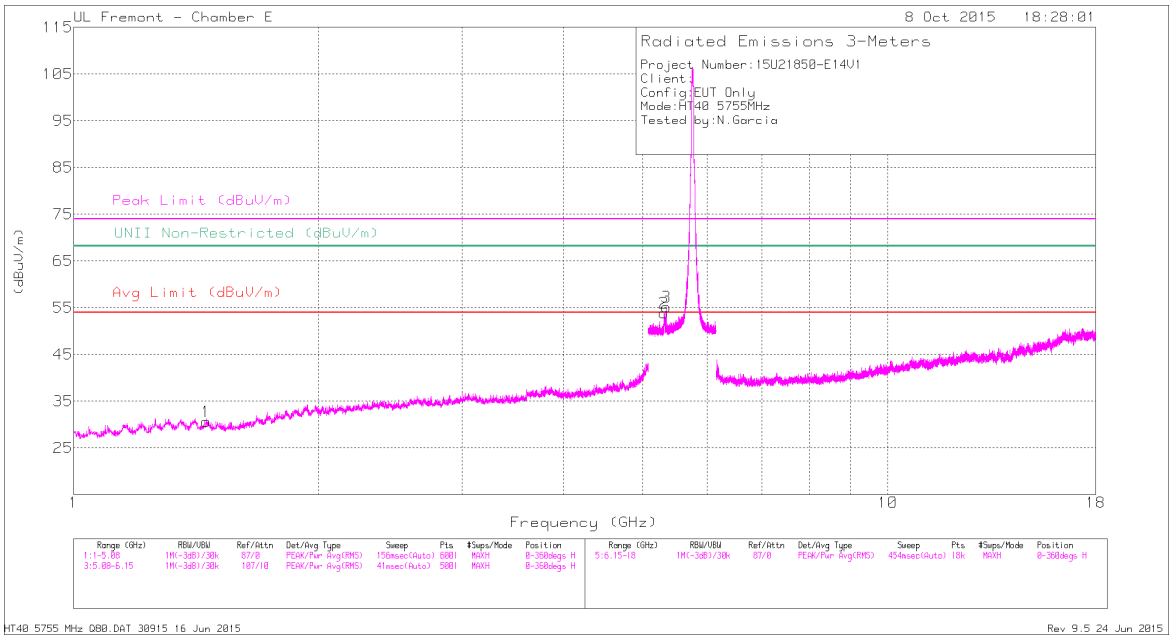
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-65.09	Pk	34.9	-20.3	11.8	-38.69	-17	-21.69	344	147	V
2	5.908	-63.98	Pk	34.9	-20.3	11.8	-37.58	-27	-10.58	344	147	V

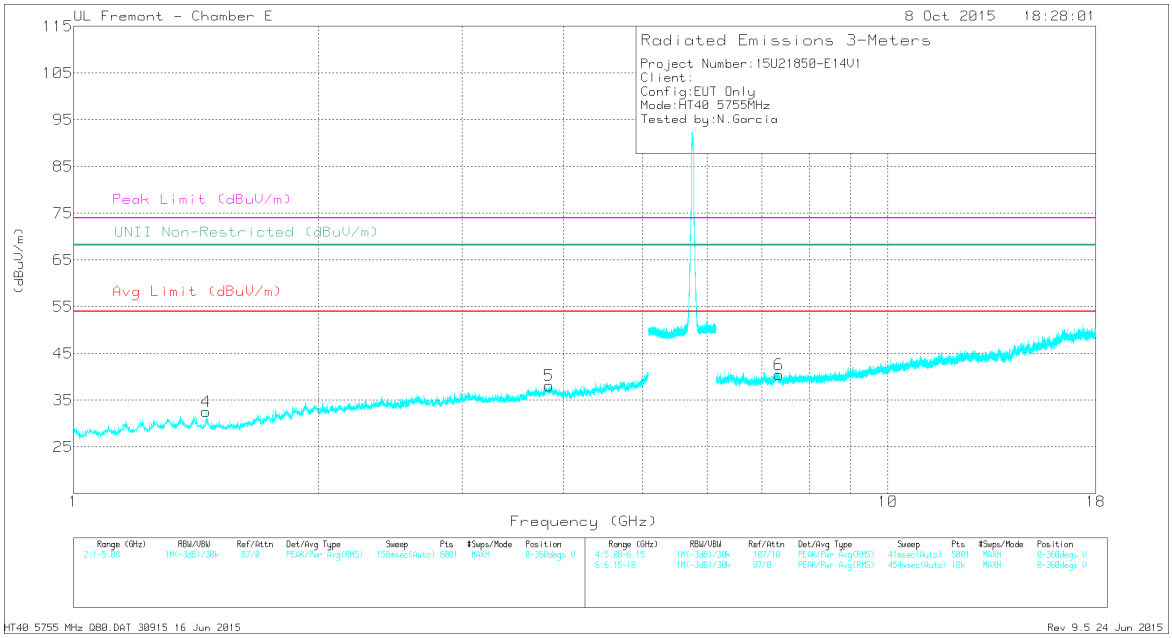
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (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	* 1.454	44.79	PK-U	28.3	-34.8	0	38.29	-	-	74	-35.71	-	-	29	101	H
	* 1.456	33.29	ADR	28.3	-34.8	.13	26.92	54	-27.08	-	-	-	-	29	101	H
4	* 1.456	44.42	PK-U	28.3	-34.8	0	37.92	-	-	74	-36.08	-	-	48	139	V
	* 1.456	33.18	ADR	28.3	-34.8	.13	26.81	54	-27.19	-	-	-	-	48	139	V
5	* 3.838	41.77	PK-U	33.5	-29.9	0	45.37	-	-	74	-28.63	-	-	89	183	V
	* 3.836	41.53	PK-U	33.5	-29.9	0	45.13	-	-	74	-28.87	-	-	201	133	V
6	* 7.344	38.47	PK-U	35.5	-27.1	0	46.87	-	-	74	-27.13	-	-	201	133	V
	* 7.346	27.66	ADR	35.5	-27.2	.13	36.09	54	-17.91	-	-	-	-	201	133	V
2	5.313	47.91	PK-U	34.5	-20.5	0	61.91	-	-	-	-	68.2	-6.29	171	200	H
3	5.344	43.91	PK-U	34.5	-20.6	0	57.81	-	-	-	-	68.2	-10.39	15	129	H

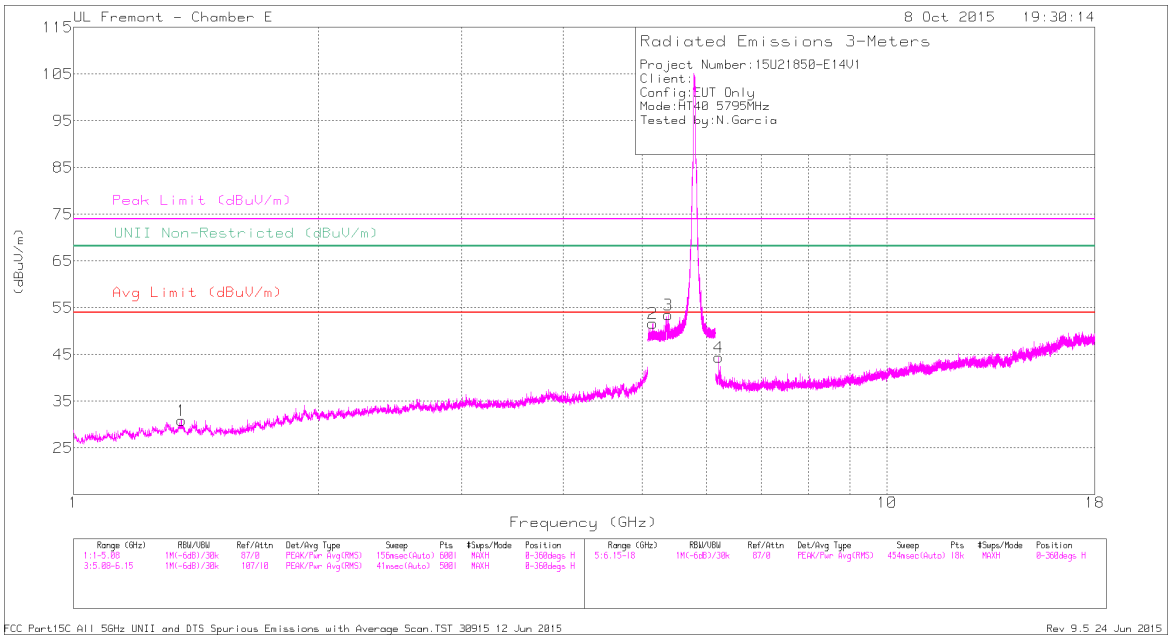
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

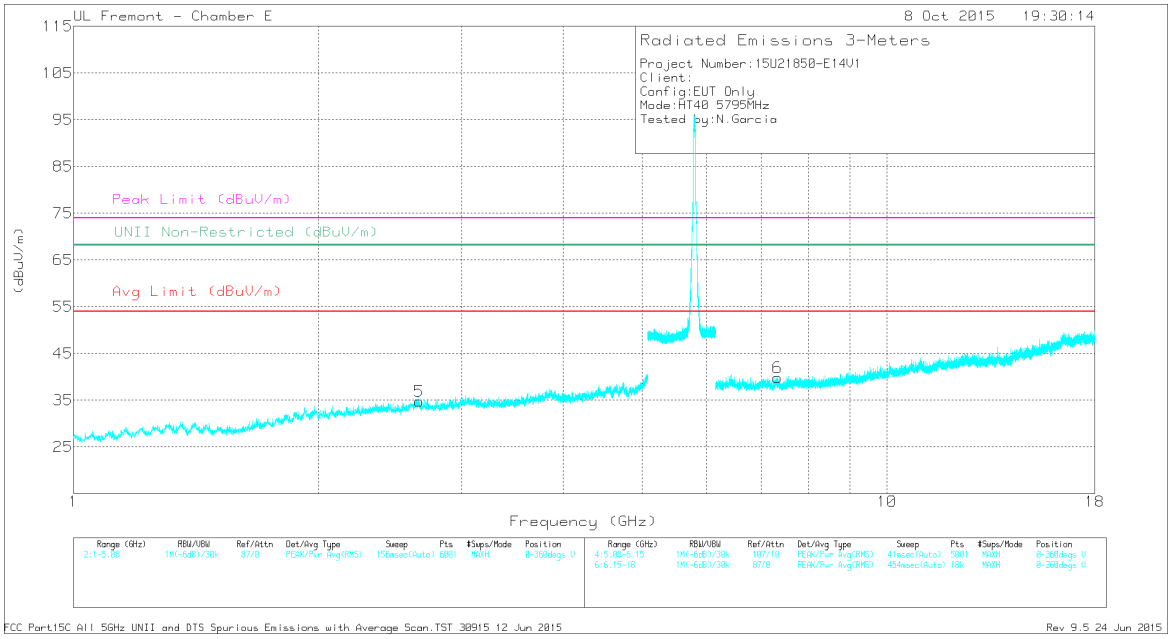
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (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	* 1.359	45.74	PK-U	28.7	-34.9	0	39.54	-	-	74	-34.46	-	-	111	140	H
	* 1.356	33.58	ADR	28.7	-35	.13	27.41	54	-26.59	-	-	-	-	111	140	H
5	* 2.66	42.38	PK-U	32.4	-31.5	0	43.28	-	-	74	-30.72	-	-	45	160	V
	* 2.662	30.67	ADR	32.4	-31.6	.13	31.6	54	-22.4	-	-	-	-	45	160	V
3	* 5.382	48.93	PK-U	34.6	-20.6	0	62.93	-	-	74	-11.07	-	-	165	151	H
	* 5.383	37.52	ADR	34.6	-20.6	.13	51.65	54	-2.35	-	-	-	-	165	151	H
6	* 7.331	38.63	PK-U	35.5	-26.6	0	47.53	-	-	74	-26.47	-	-	36	117	V
	* 7.33	27.21	ADR	35.5	-26.6	.13	36.24	54	-17.76	-	-	-	-	36	117	V
2	5.151	46.36	PK-U	34.3	-20.5	0	60.16	-	-	-	-	68.2	-8.04	166	186	H
4	6.209	44.44	PK-U	35.4	-28.1	0	51.74	-	-	-	-	68.2	-16.46	272	115	H

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

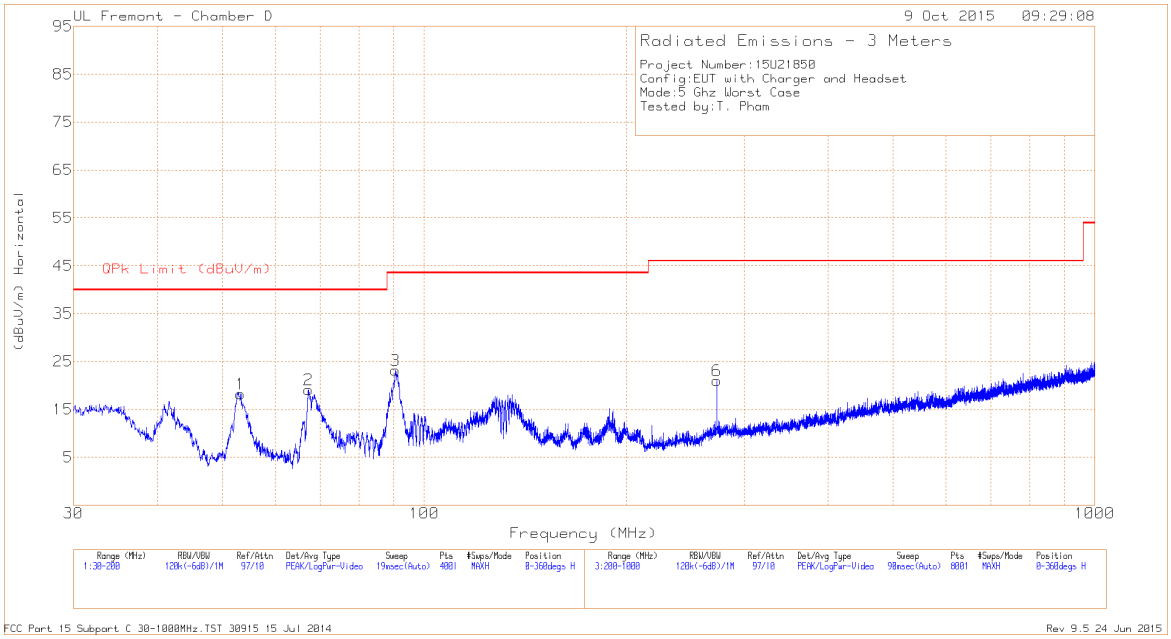
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

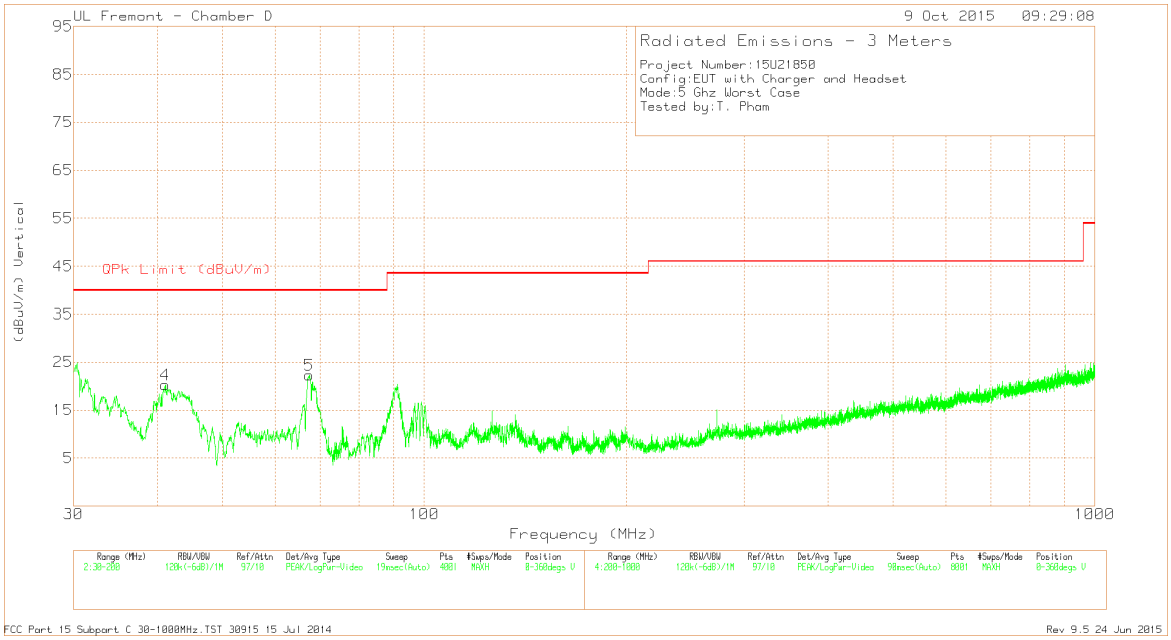
9.5. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 273.2	38.21	Pk	13.3	-30.5	21.01	46.02	-25.01	0-360	100	H
4	41.135	38.67	Pk	13.4	-31.8	20.27	40	-19.73	0-360	100	V
1	53.2475	42.54	Pk	7.4	-31.7	18.24	40	-21.76	0-360	401	H
2	67.1875	42.61	Pk	8.1	-31.6	19.11	40	-20.89	0-360	301	H
5	67.315	45.75	Pk	8.1	-31.6	22.25	40	-17.75	0-360	100	V
3	90.6475	46.68	Pk	7.9	-31.4	23.18	43.52	-20.34	0-360	201	H

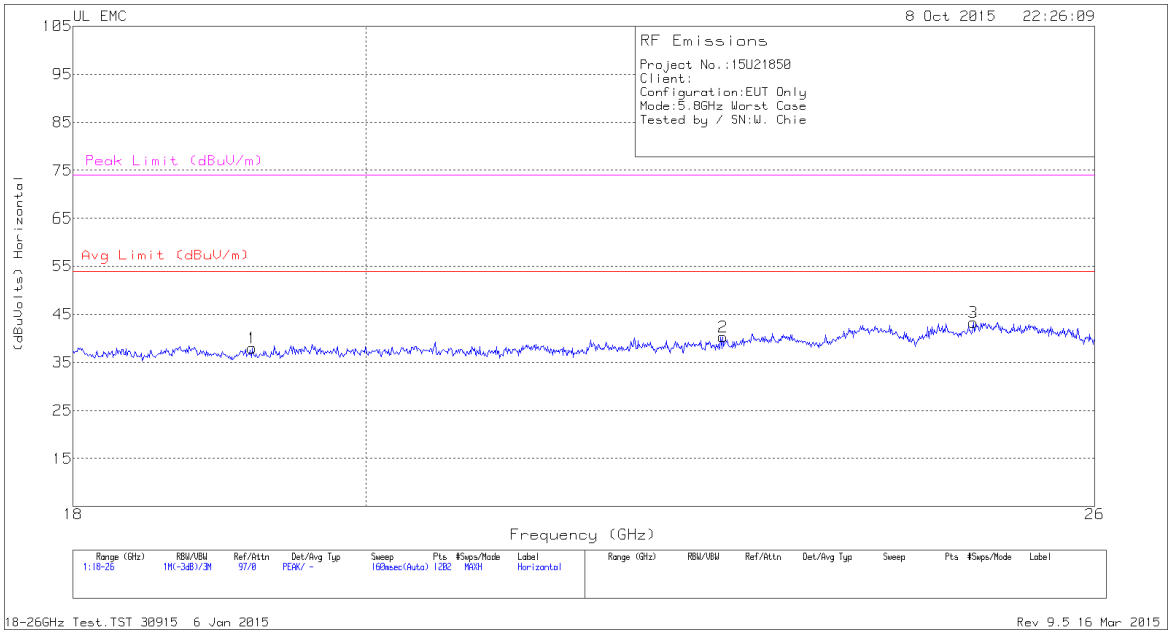
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

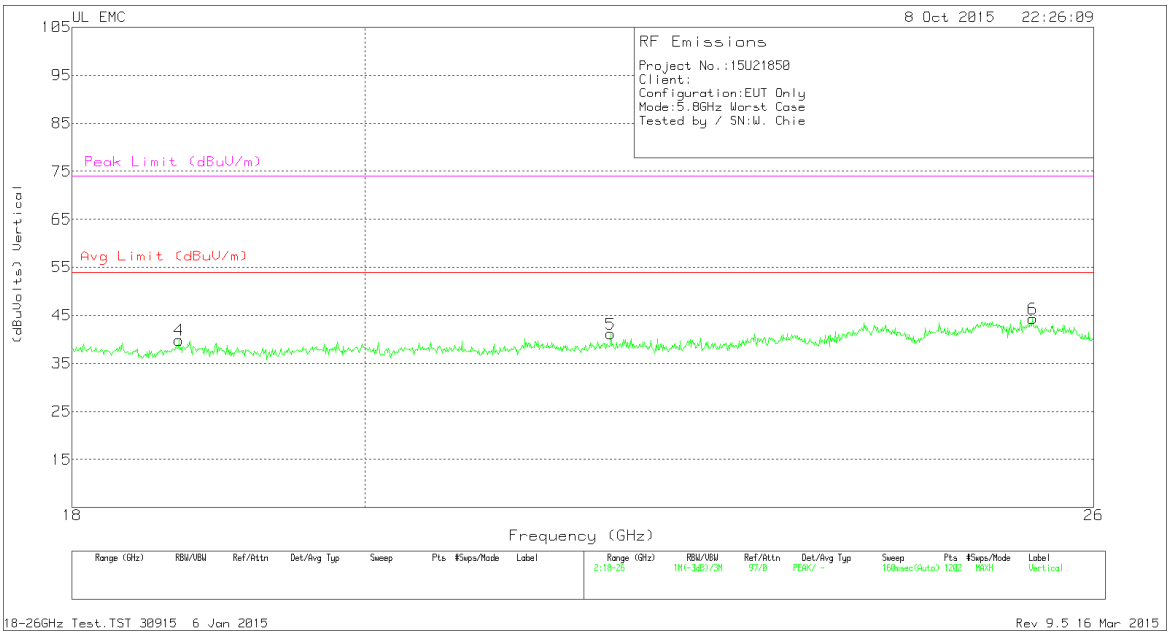
9.6. WORST-CASE ABOVE 18 GHz

SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



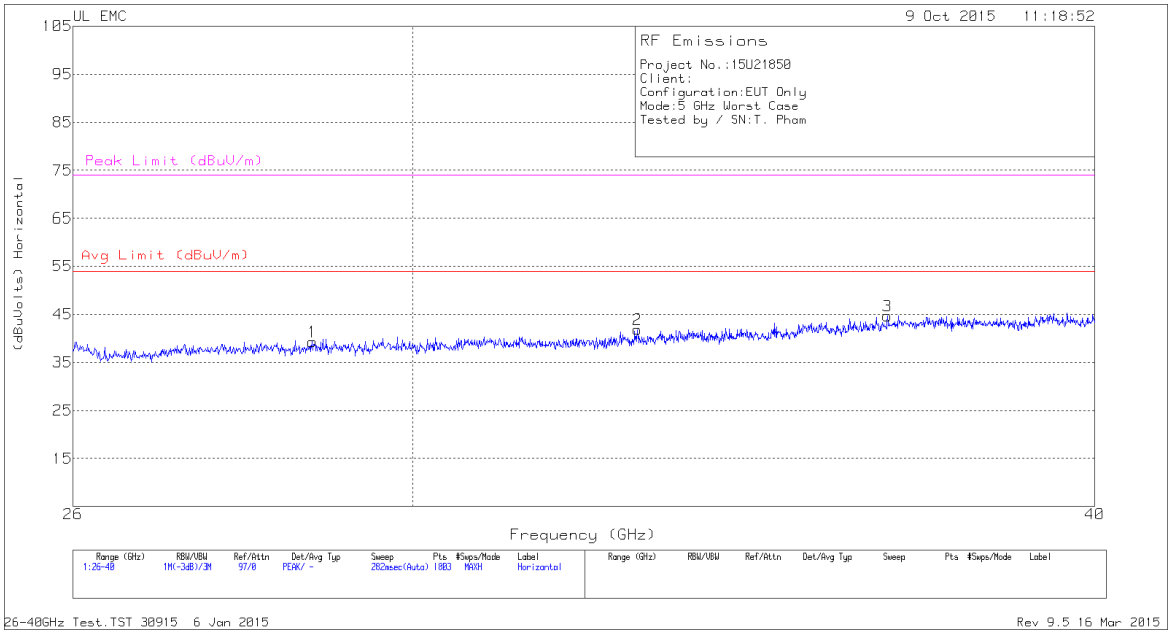
HORIZONTAL AND VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 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	19.199	40.1	Pk	32.3	-24.9	-9.5	38	54	-16	74	-36
2	22.743	41.83	Pk	33.2	-25.2	-9.5	40.33	54	-13.66	74	-33.66
3	24.888	43.33	Pk	34	-24.5	-9.5	43.33	54	-10.66	74	-30.66
4	18.706	41.23	Pk	32.5	-24.4	-9.5	39.83	54	-14.16	74	-34.16
5	21.85	42.07	Pk	33.3	-24.7	-9.5	41.16	54	-12.83	74	-32.83
6	25.434	44.33	Pk	33.8	-24.3	-9.5	44.33	54	-9.66	74	-29.66

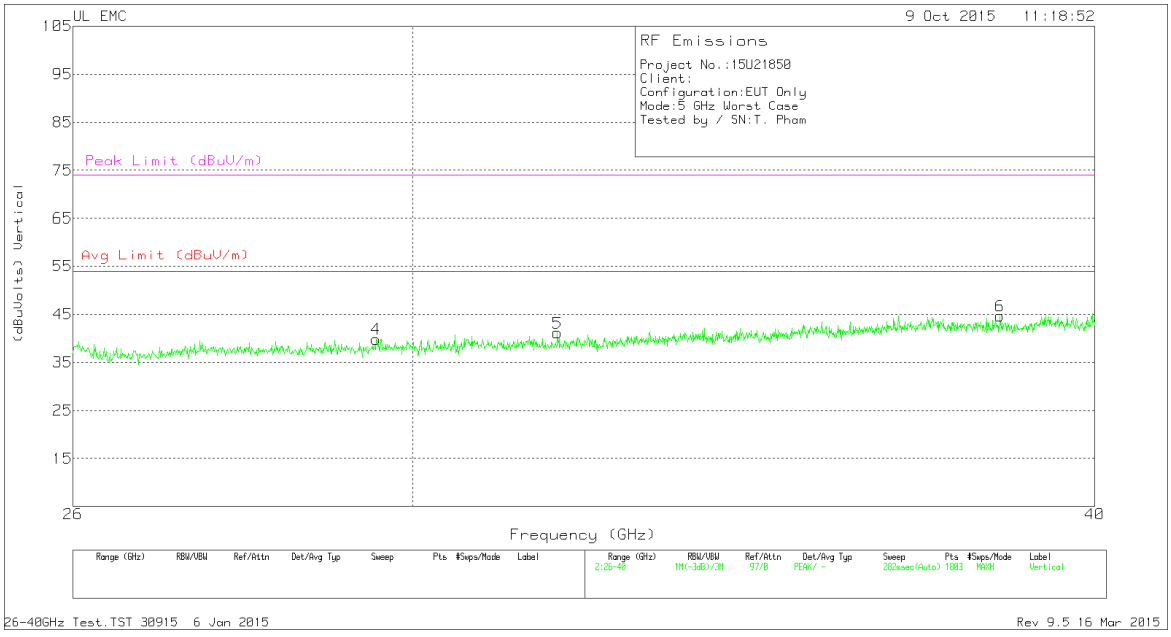
Pk - Peak detector

SPURIOUS EMISSIONS 26000 TO 40000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



HORIZONTAL AND 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	28.758	45.03	Pk	35.7	-31.9	-9.5	39.33	54	-14.66	74	-34.6
2	32.984	47.33	Pk	36.7	-32.7	-9.5	41.83	54	-12.16	74	-32.16
3	36.651	50.17	Pk	37.1	-33.1	-9.5	44.66	54	-9.33	74	-29.33
4	29.543	45.53	Pk	35.9	-32.1	-9.5	39.83	54	-14.16	74	-34.16
5	31.889	47.17	Pk	36.3	-32.8	-9.5	41.16	54	-12.83	74	-32.83
6	38.431	49.07	Pk	37.1	-32	-9.5	44.66	54	-9.33	74	-29.33

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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.

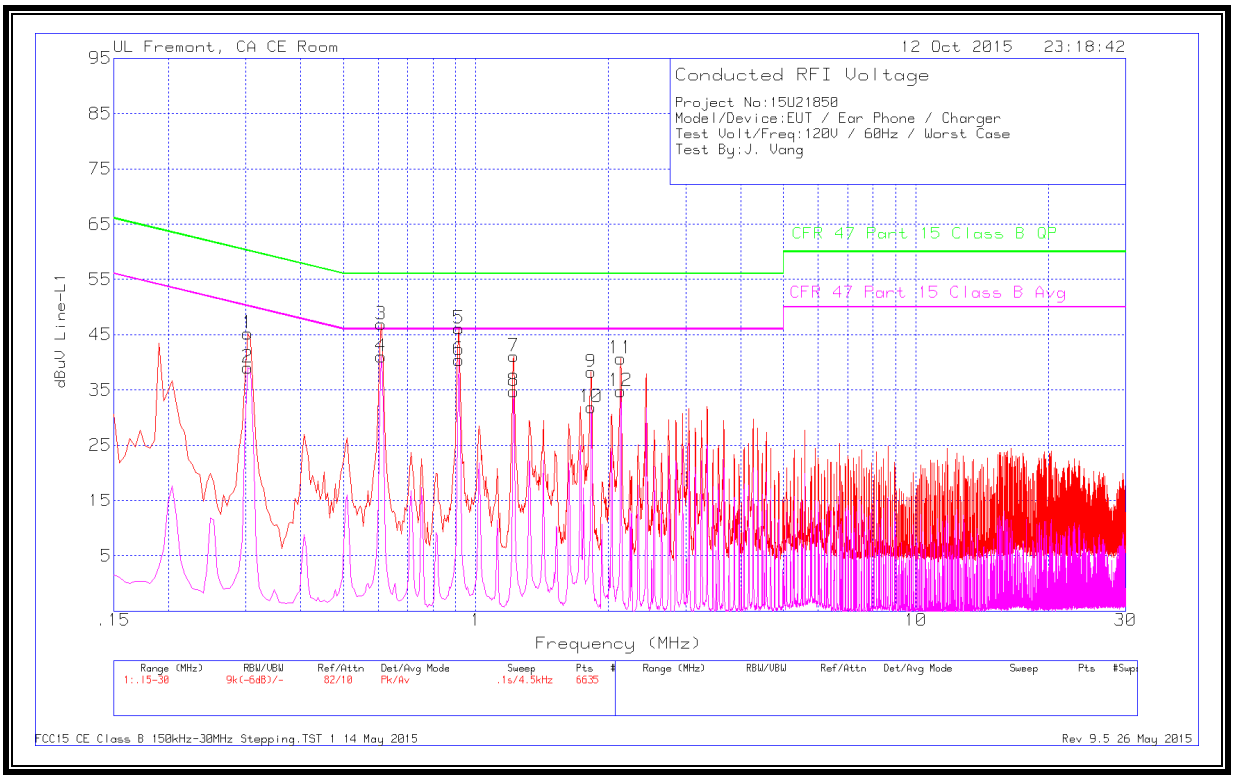
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

10.1. EUT POWERED BY AC ADAPTER

LINE 1 RESULTS



WORST EMISSIONS

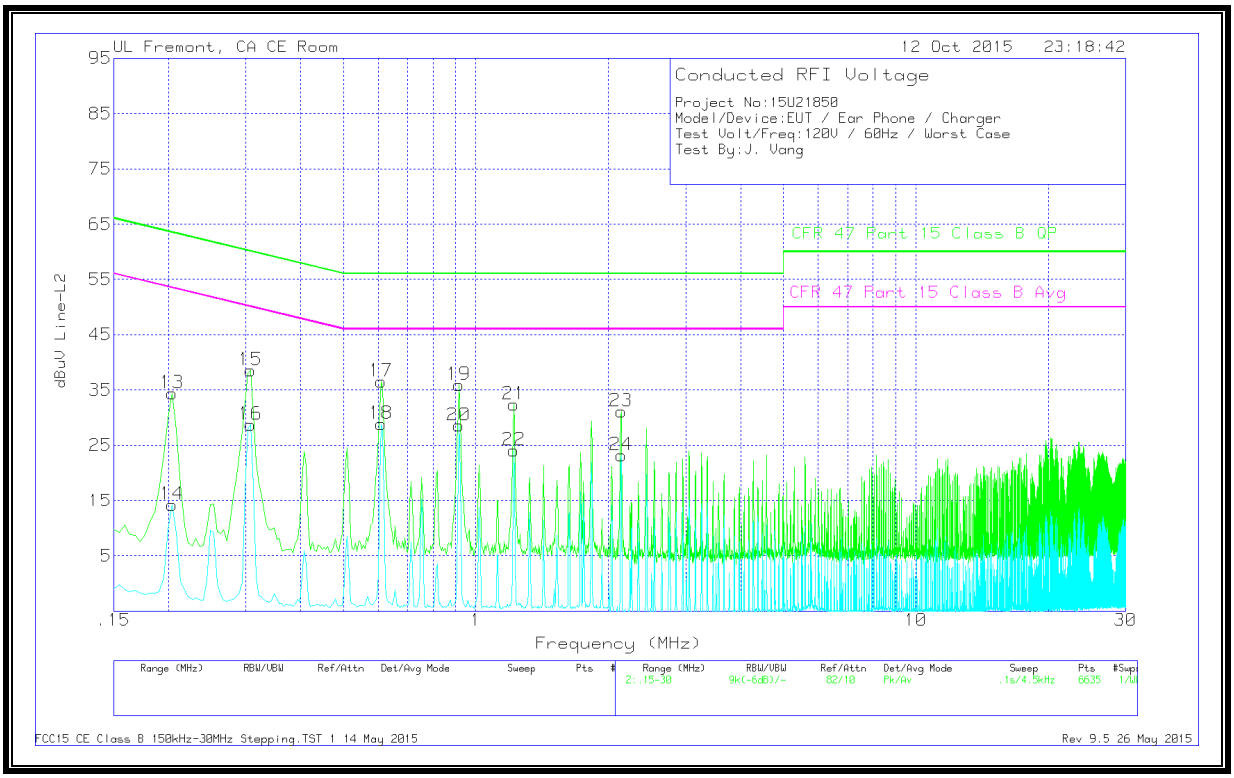
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
1	.303	44.75	Pk	.5	0	45.25	60.16	-14.91	-	-
2	.303	38.55	Av	.5	0	39.05	-	-	50.16	-11.11
3	.609	46.62	Pk	.3	0	46.92	56	-9.08	-	-
4	.609	40.74	Av	.3	0	41.04	-	-	46	-4.96
5	.915	45.86	Pk	.3	0	46.16	56	-9.84	-	-
6	.915	40.14	Av	.3	0	40.44	-	-	46	-5.56
7	1.221	40.83	Pk	.2	.1	41.13	56	-14.87	-	-
8	1.221	34.5	Av	.2	.1	34.8	-	-	46	-11.2
9	1.8285	37.96	Pk	.2	.1	38.26	56	-17.74	-	-
10	1.8285	31.59	Av	.2	.1	31.89	-	-	46	-14.11
11	2.1345	40.38	Pk	.2	.1	40.68	56	-15.32	-	-
12	2.1345	34.45	Av	.2	.1	34.75	-	-	46	-11.25

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



WORST EMISSIONS

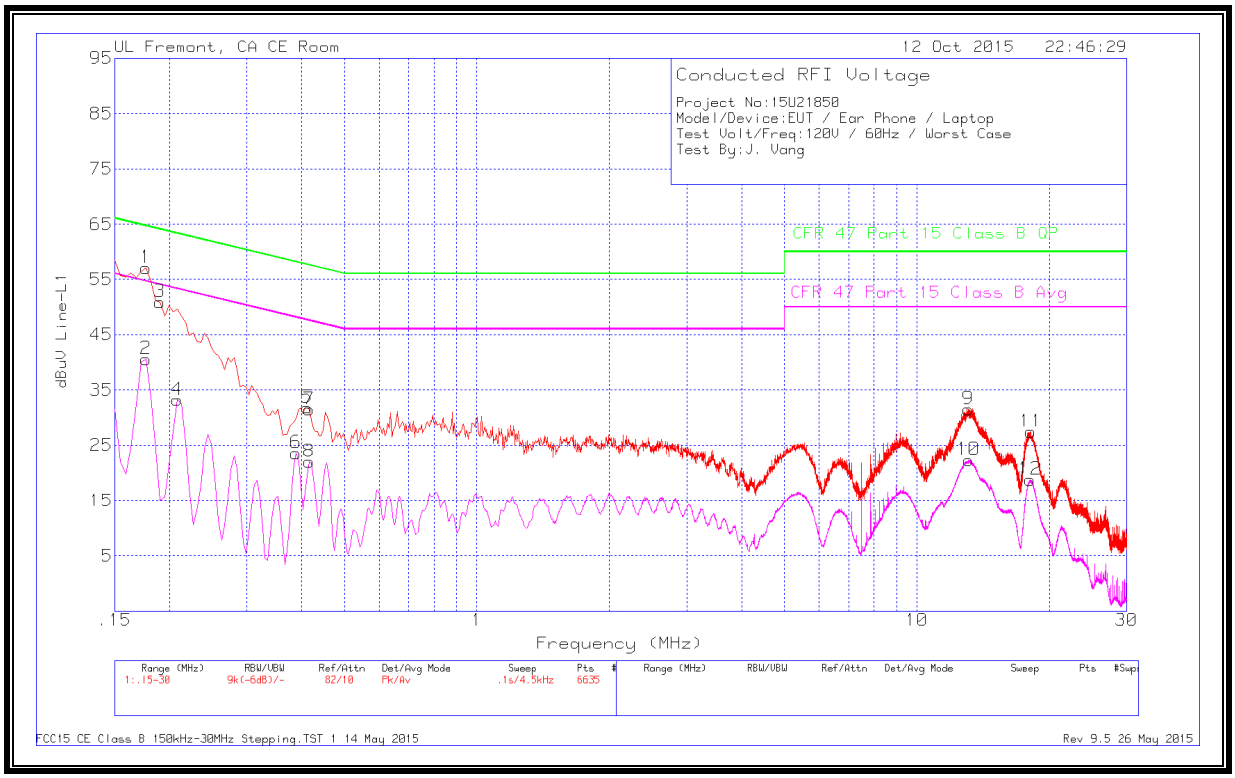
Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
13	.204	33.41	Pk	1	0	34.41	63.45	-29.04	-	-
14	.204	13.22	Av	1	0	14.22	-	-	53.45	-39.23
15	.3075	37.99	Pk	.6	0	38.59	60.04	-21.45	-	-
16	.3075	28.16	Av	.6	0	28.76	-	-	50.04	-21.28
17	.609	36.24	Pk	.3	0	36.54	56	-19.46	-	-
18	.609	28.53	Av	.3	0	28.83	-	-	46	-17.17
19	.915	35.6	Pk	.3	0	35.9	56	-20.1	-	-
20	.915	28.27	Av	.3	0	28.57	-	-	46	-17.43
21	1.221	32.13	Pk	.2	.1	32.43	56	-23.57	-	-
22	1.221	23.8	Av	.2	.1	24.1	-	-	46	-21.9
23	2.139	30.85	Pk	.2	.1	31.15	56	-24.85	-	-
24	2.139	22.9	Av	.2	.1	23.2	-	-	46	-22.8

Pk - Peak detector
Av - Average detection

10.2. EUT POWERED BY HOST PC VIA USB CABLE

LINE 1 RESULTS



WORST EMISSIONS

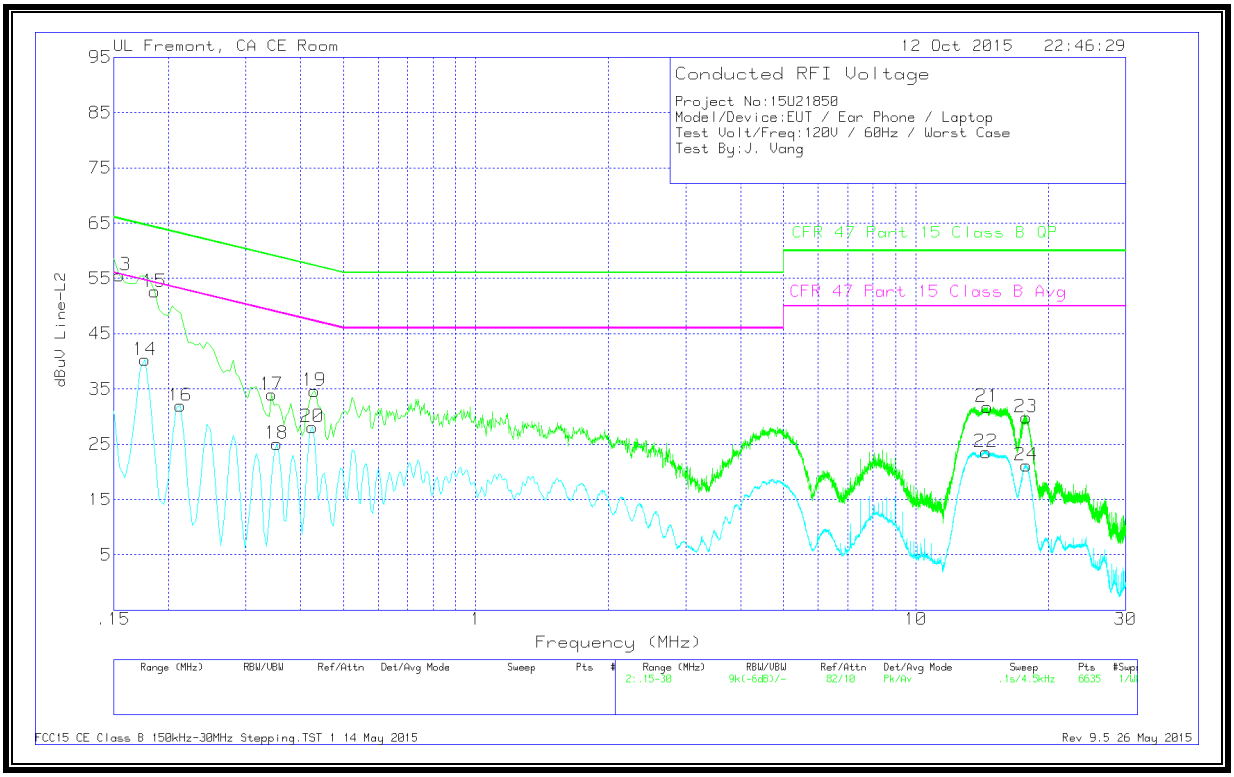
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
1	.177	56.01	Pk	1.1	0	57.11	64.63	-7.52	-	-
2	.177	39.5	Av	1.1	0	40.6	-	-	54.63	-14.03
3	.1905	49.93	Pk	1	0	50.93	64.01	-13.08	-	-
4	.2085	32.3	Av	.9	0	33.2	-	-	53.26	-20.06
5	.411	31.41	Pk	.4	0	31.81	57.63	-25.82	-	-
6	.3885	23.17	Av	.4	0	23.57	-	-	48.1	-24.53
7	.4155	31.07	Pk	.4	0	31.47	57.54	-26.07	-	-
8	.4155	21.61	Av	.4	0	22.01	-	-	47.54	-25.53
9	13.11	31.12	Pk	.2	.2	31.52	60	-28.48	-	-
10	13.1145	21.91	Av	.2	.2	22.31	-	-	50	-27.69
11	18.186	26.94	Pk	.3	.2	27.44	60	-32.56	-	-
12	18.078	18.28	Av	.3	.2	18.78	-	-	50	-31.22

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
13	.1545	54.2	Pk	1.4	0	55.6	65.75	-10.15	-	-
14	.177	39.06	Av	1.2	0	40.26	-	-	54.63	-14.37
15	.186	51.5	Pk	1.1	0	52.6	64.21	-11.61	-	-
16	.213	31.06	Av	.9	0	31.96	-	-	53.09	-21.13
17	.3435	33.46	Pk	.5	0	33.96	59.12	-25.16	-	-
18	.3525	24.59	Av	.5	0	25.09	-	-	48.9	-23.81
19	.429	34.28	Pk	.4	0	34.68	57.27	-22.59	-	-
20	.4245	27.7	Av	.4	0	28.1	-	-	47.36	-19.26
21	14.5635	31.36	Pk	.2	.2	31.76	60	-28.24	-	-
22	14.4555	23.21	Av	.2	.2	23.61	-	-	50	-26.39
23	17.808	29.35	Pk	.3	.2	29.85	60	-30.15	-	-
24	17.826	20.72	Av	.3	.2	21.22	-	-	50	-28.78

Pk - Peak detector
Av - Average detection