FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT
CLASS II PERMISSIVE CHANGE

FOR

GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE RADIO,
IEEE 802.11A/B/G/N AND BLUETOOTH RADIO

MODEL NUMBER: A1428 and A1429

FCC ID: BCG-E2599A

REPORT NUMBER: 15U21850-E6V2

ISSUE DATE: NOVEMBER 23, 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	11/09/2015	Initial Issue	C. Pang
V1	11/23/2015	Revised report to address TCB's questions	T. Chu

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	APPLE, INC. 1 INFINITE LOOP CUPERTINO, CA 95014, U.S.A.
EUT DESCRIPTION:	GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE RADIO, IEEE 802.11A/B/G/N AND BLUETOOTH RADIO.
MODEL:	A1428 and A1429
SERIAL NUMBER:	C39JV032FDC8 (Conducted), C39JT018F9GL (Radiated)
DATE TESTED:	SEPTEMBER 30, 2015 TO OCTOBER 5 , 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:

CHIN PANG
SENIOR ENGINEER
UL VERIFICATION SERVICES INC.

Tested By:

TRI PHAM
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

Model A1428, is a mobile phone with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA1xRTT/ EV-DO Rev 0, A, B /1xAdvanced/ LTE radio, IEEE 802.11a/b/g/n radio and Bluetooth radio. The rechargeable battery is not user accessible.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

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

5.3. 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	12.99	19.91
5745 - 5825	802.11n HT20 SISO	13.00	19.95
5755 - 5795	802.11n HT40 SISO	13.00	19.95

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna, with a maximum gain as below table.

FREQUENCY (MHZ)	ANTENNA GAIN (dBi)
5725 -- 5850	-2.85

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was WL Tool FW 6.10.56.166

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel for RF radiated emissions below 1GHz tests is channel with highest RF output power.

For the fundamental investigation, the EUT is investigated for vertical and horizontal antenna orientations and the worst case was determined to be at Y-position.

Based on the manufacturer's attestation that the nominal output power is reduced as the data rate increases, the data rates tested represent the highest power and worst-case with respect to EMC performance.

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

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Apple	A1502	C02LRLKYFH00	QDS-BRCM1061
Laptop AC/DC adapter	Apple	A1435	D39346606VMF2Y1AJ	N/A
Earphone	Apple	NA	NA	N/A
EUT AC/DC adapter	Apple	A1357	W010A051	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

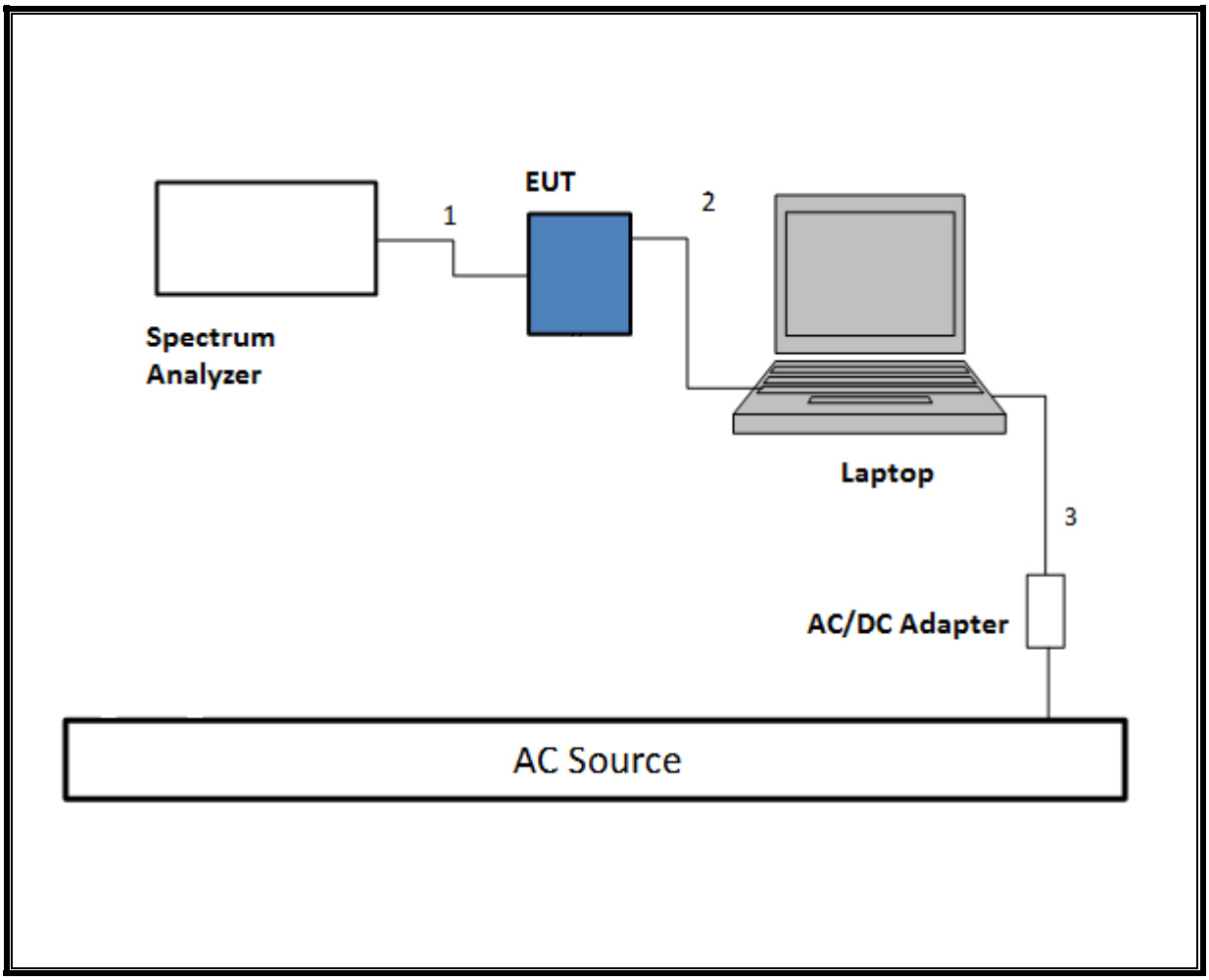
I/O CABLES (AC LINE CONDUCTED: LAPTOP CONFIGUARTION)

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.

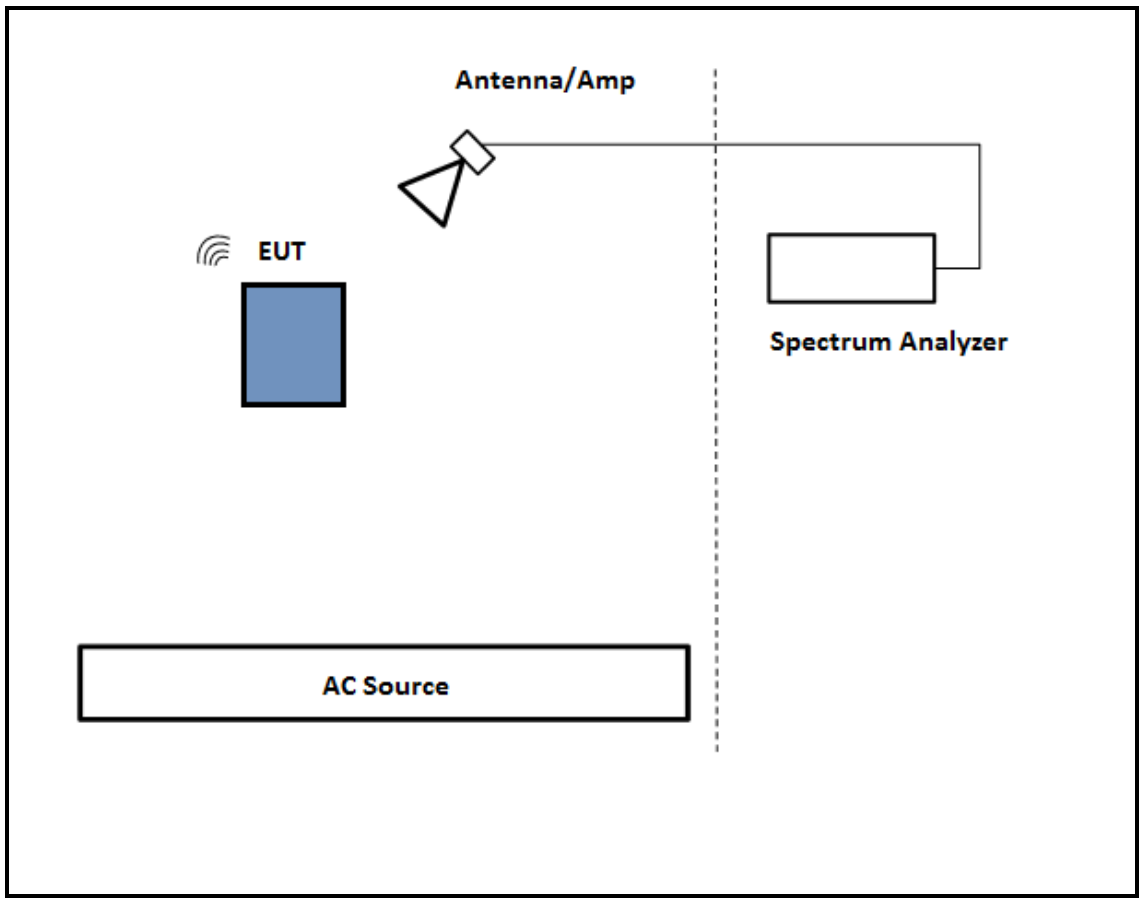
SETUP DIAGRAM



TEST SETUP- RADIATED-ABOVE 1 GHZ

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

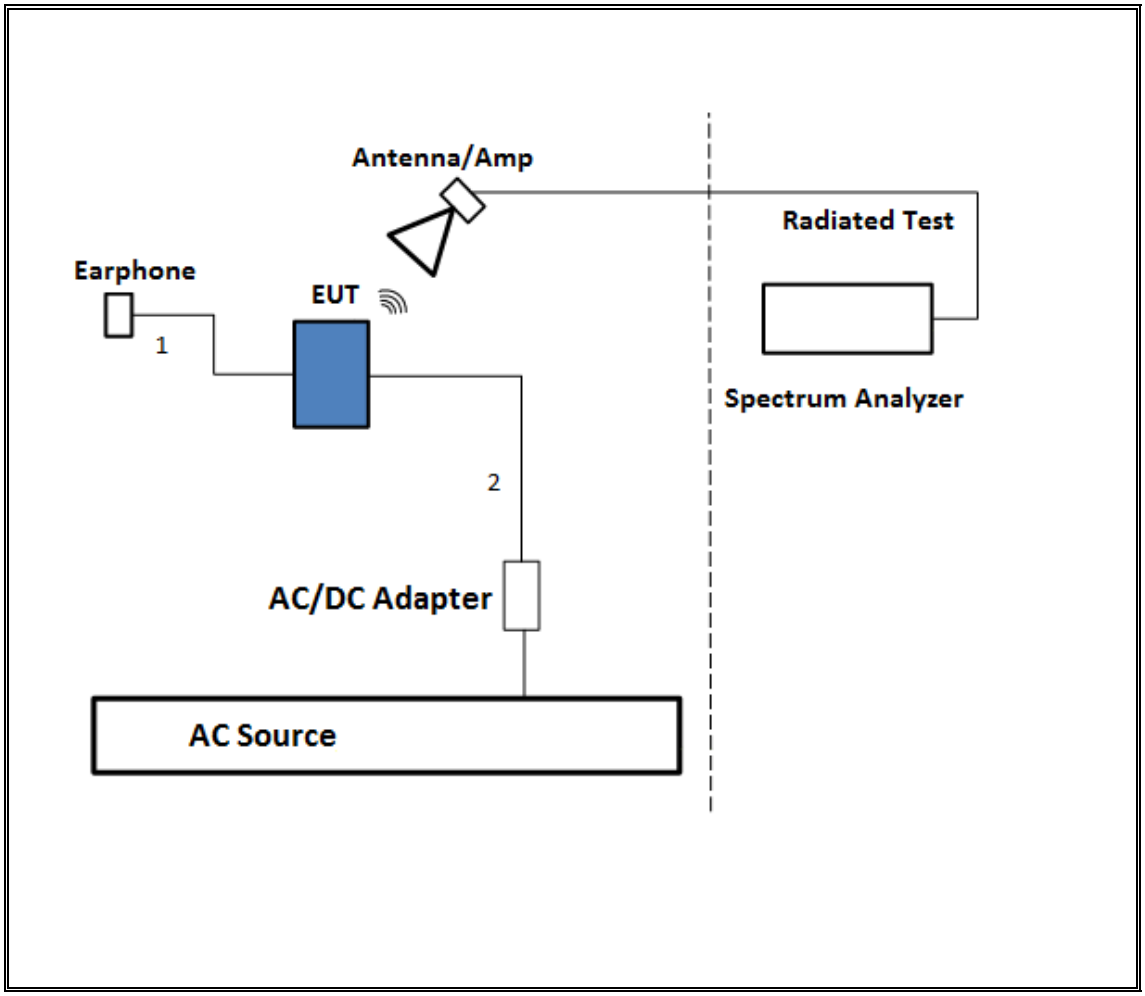
SETUP DIAGRAM



TEST SETUP- BELOW 1GHz

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

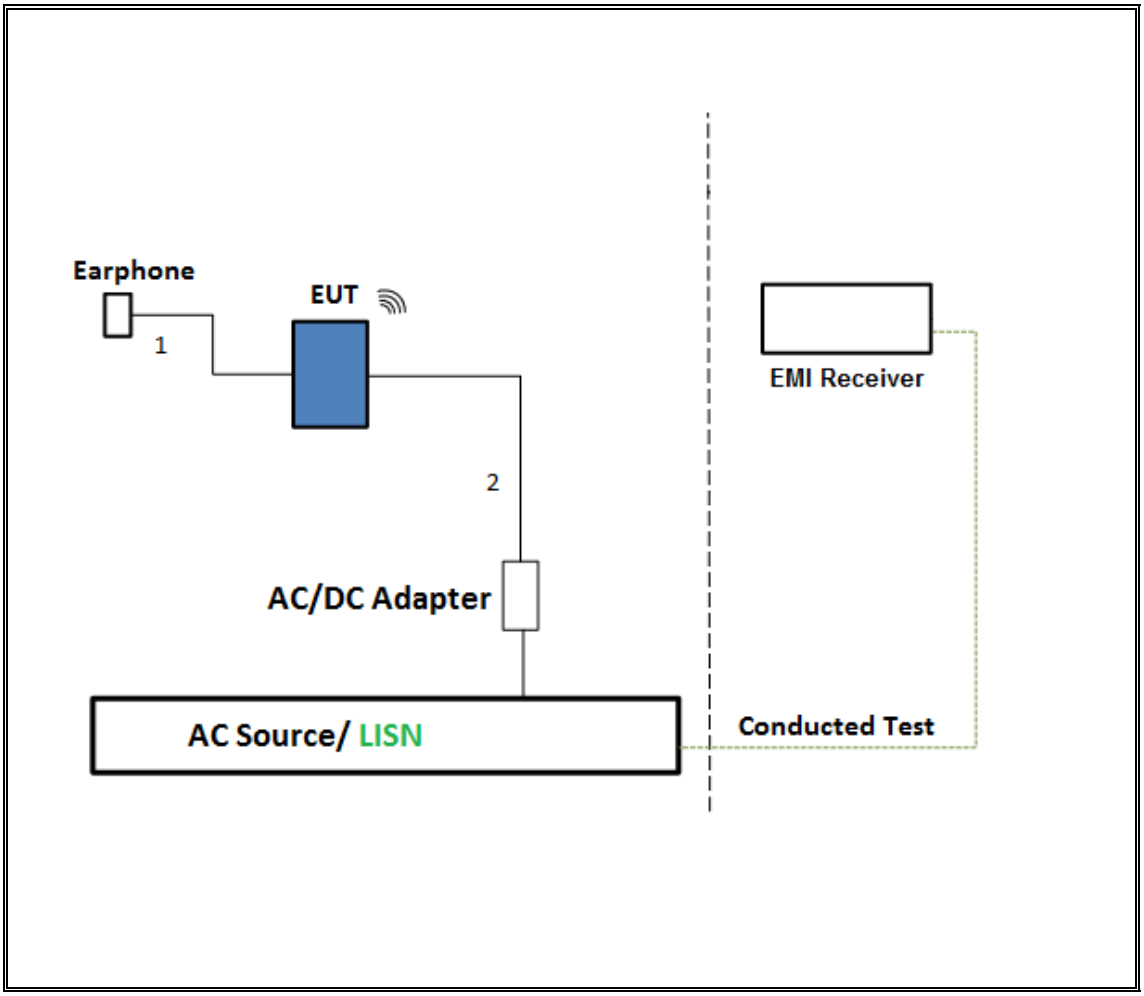
SETUP DIAGRAM



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.

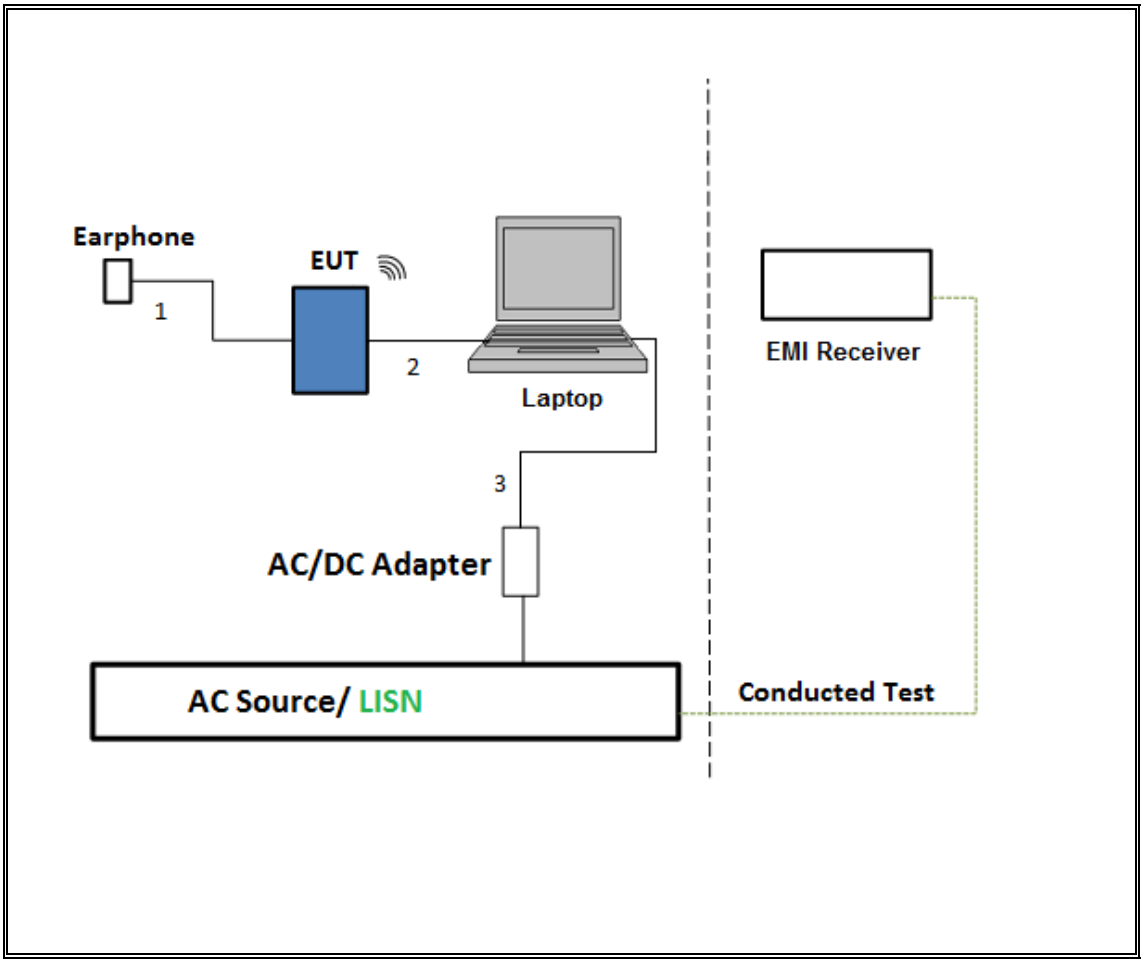
SETUP DIAGRAM



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	A022813-1	1/14/2016
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1782158	1/26/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	323561	6/8/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	325117	6/9/2016
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A-544	US51160264	12/23/2015
Power Meter, P-series single channel	Agilent	N1911A	MY53060002	4/7/2016
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	MY53260010	7/12/2016
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	1049	12/17/2015
Horn Antenna, 40GHz	ARA	MWH-2640/B	1029	7/15/2016
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2016
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Agilent	8449B	3008A04710	6/29/2016
Amplifier, 26 to 40GHz	Miteq	NSP4000-SP2	88	4/7/2016
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	100935	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

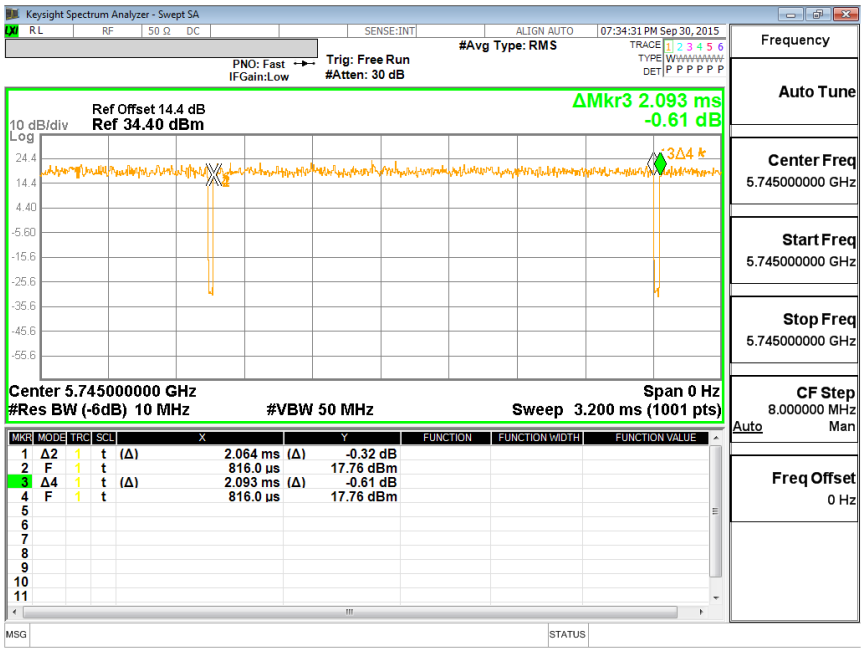
KDB 789033 Zero-Span Spectrum Analyzer Method.

RESULTS

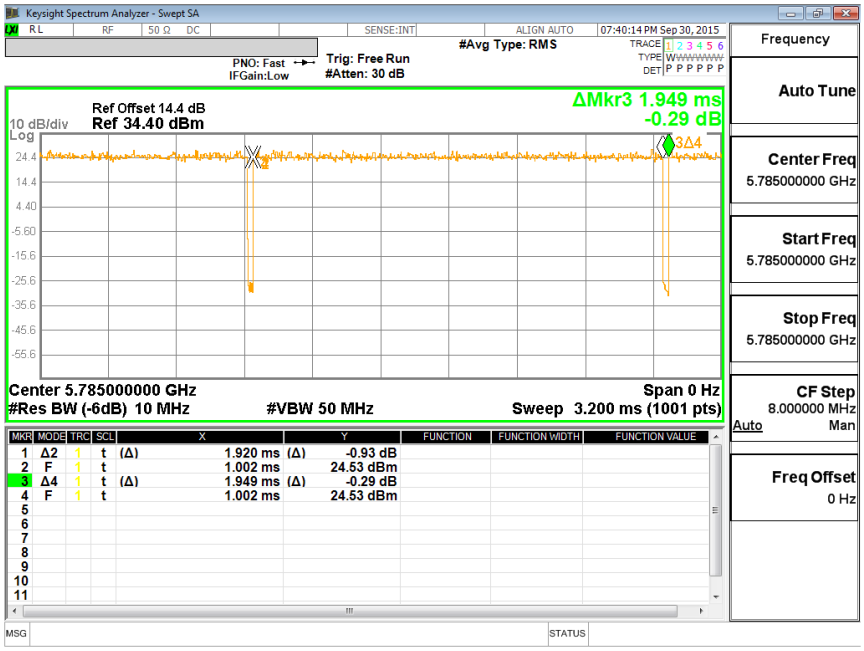
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a 1TX	2.064	2.093	0.986	98.61%	0.00	0.010
802.11n HT20 1TX	1.920	1.949	0.985	98.51%	0.00	0.010
802.11n HT40 1TX	0.945	0.972	0.972	97.16%	0.13	1.059

DUTY CYCLE PLOTS

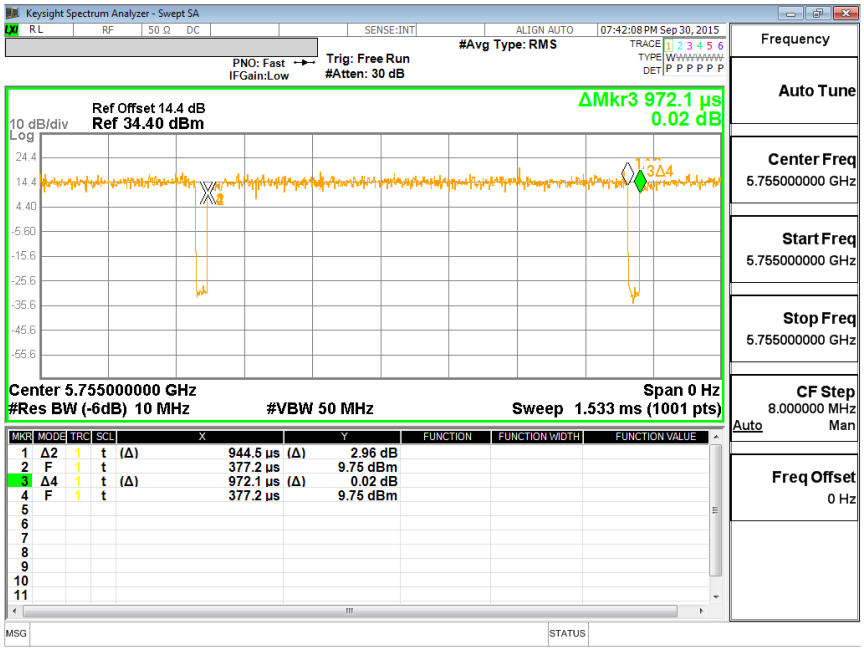
DUTY CYCLE 802.11a 1TX MODE



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)

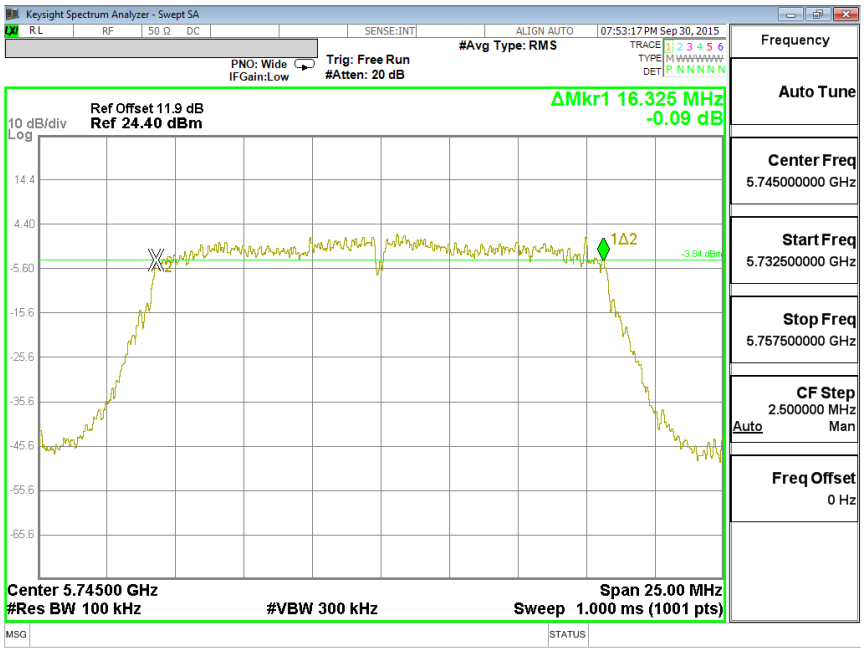
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

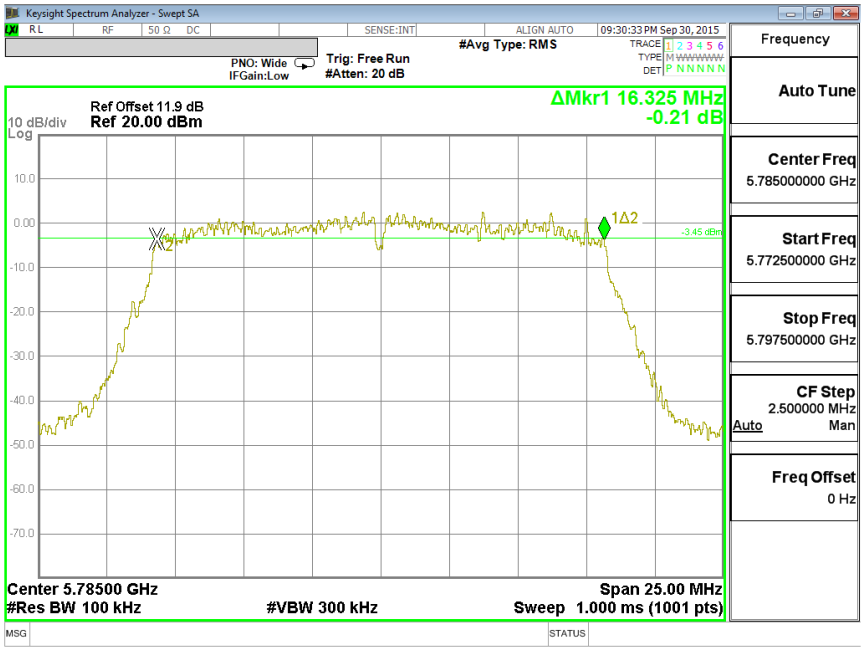
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.33	0.5
Mid	5785	16.33	0.5
High	5825	16.30	0.5

6 dB BANDWIDTH

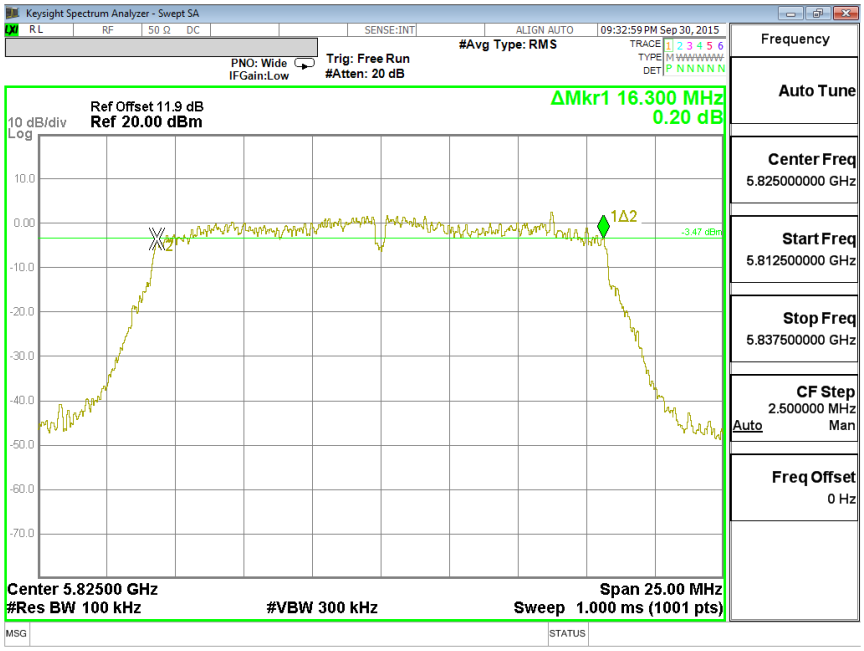
6 dB BANDWIDTH, LOW CH



6 dB BANDWIDTH, MID CH



6 dB BANDWIDTH, HIGH CH



8.1.2. 26 dB BANDWIDTH

LIMITS

None, for reporting purposes only

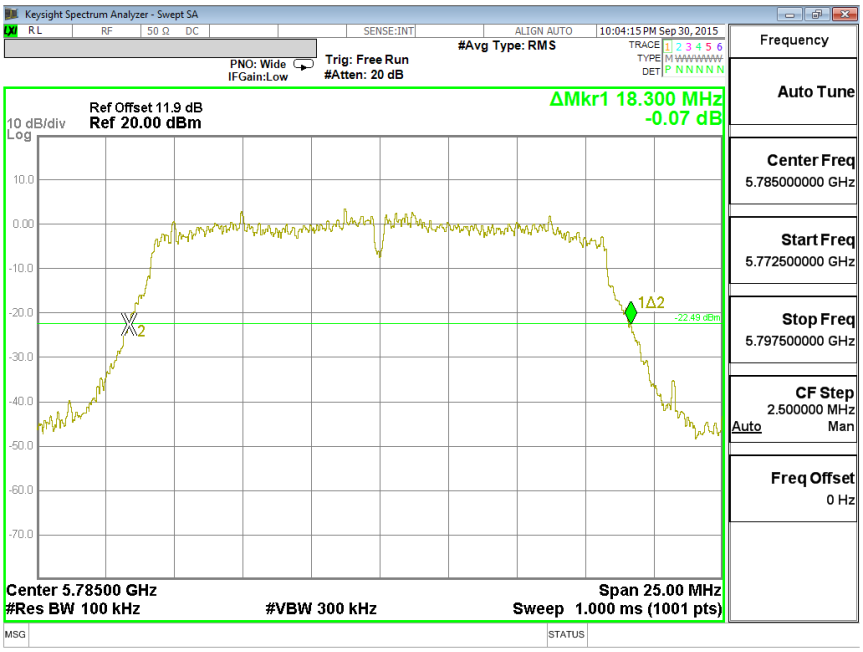
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	18.30
Mid	5785	18.30
High	5825	18.15

26 dB BANDWIDTH

26 dB BANDWIDTH, LOW CH

26 dB BANDWIDTH, MID CH



26 dB BANDWIDTH, HIGH CH

8.1.3. 99% BANDWIDTH

LIMITS

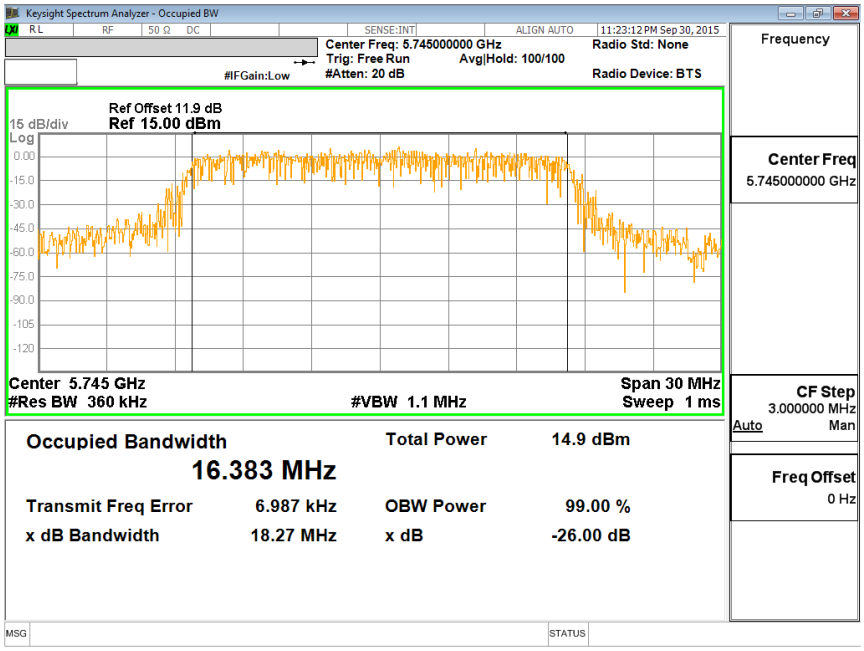
None; for reporting purposes only.

RESULTS

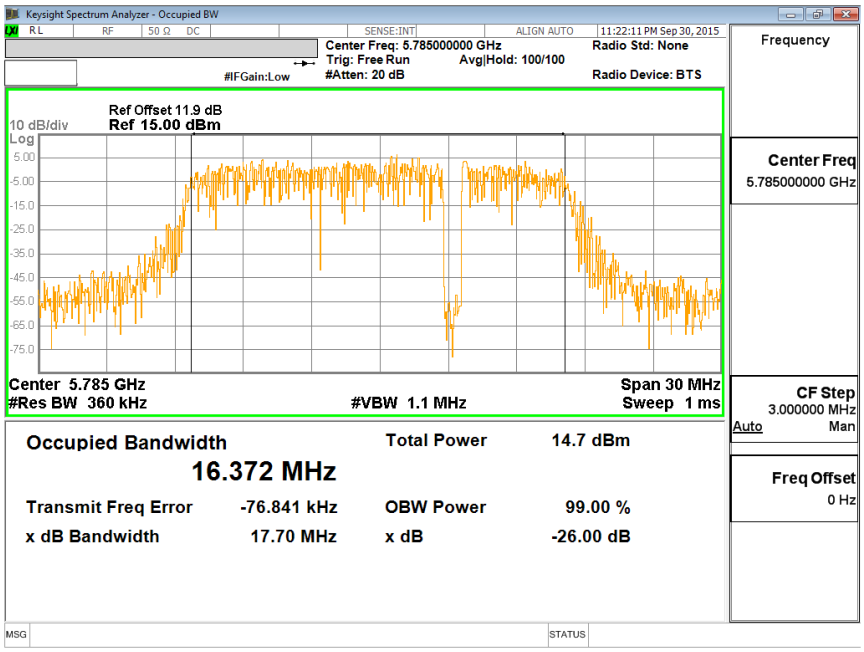
Frequency (MHz)	99% Bandwidth (MHz)
5745	16.383
5785	16.372
5825	16.368

99% BANDWIDTH

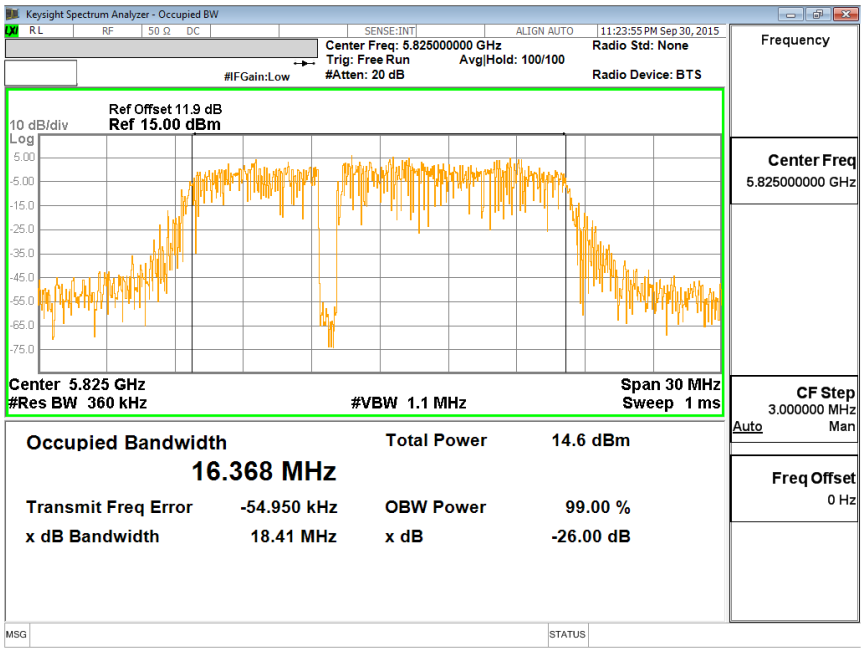
BANDWIDTH, LOW CH



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	12.98
Mid	5785	12.99
High	5825	12.93

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	-2.85	30.00
Mid	5785	-2.85	30.00
High	5825	-2.85	30.00

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	12.98	12.98	30.00	-17.02
Mid	5785	12.99	12.99	30.00	-17.01
High	5825	12.93	12.93	30.00	-17.07

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	-2.85	30.00
Mid	5785	-2.85	30.00
High	5825	-2.85	30.00

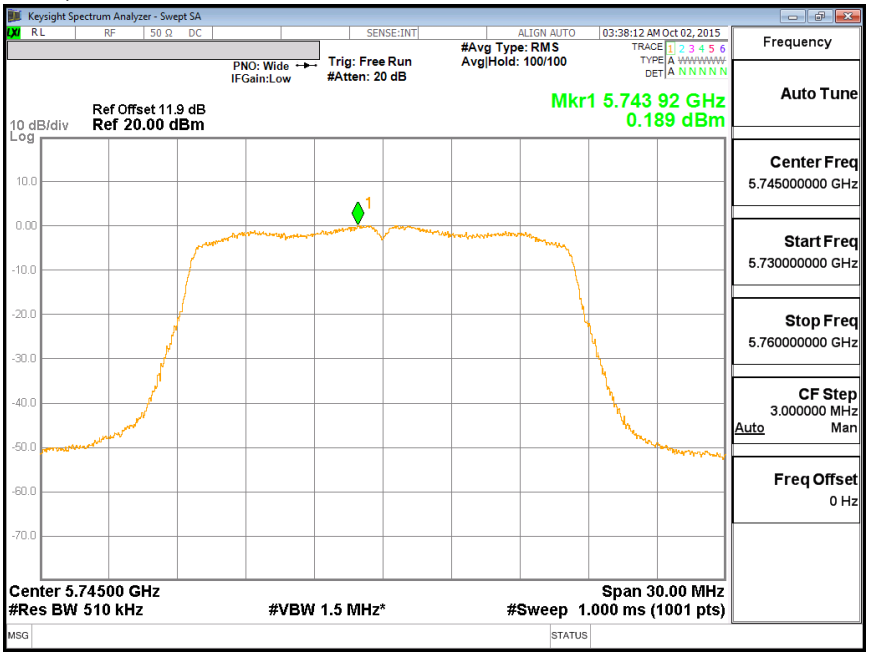
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

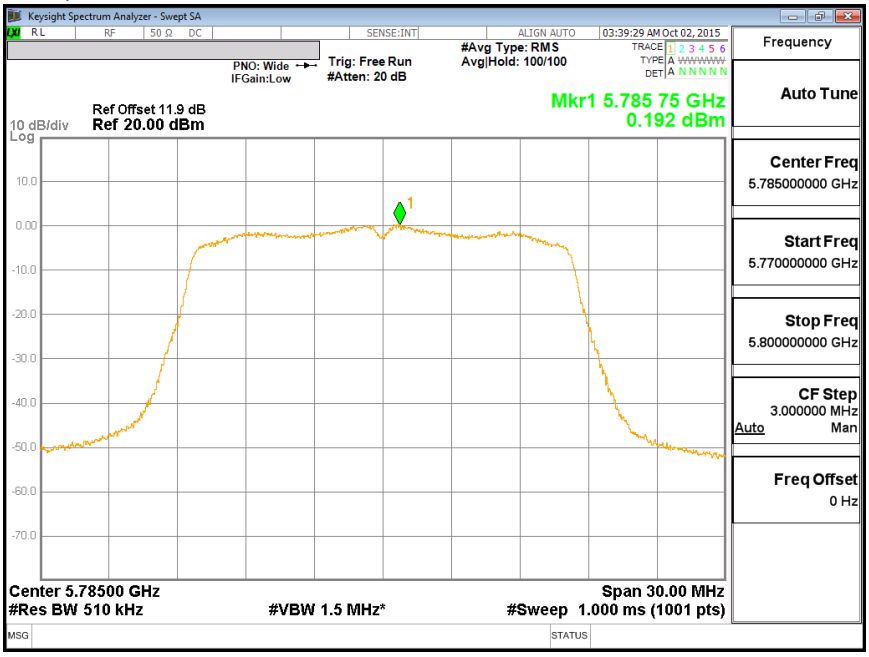
Channel	Frequency (MHz)	Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	0.189	0.19	30.00	-29.81
Mid	5785	0.192	0.19	30.00	-29.81
High	5825	0.226	0.23	30.00	-29.77

PSD,

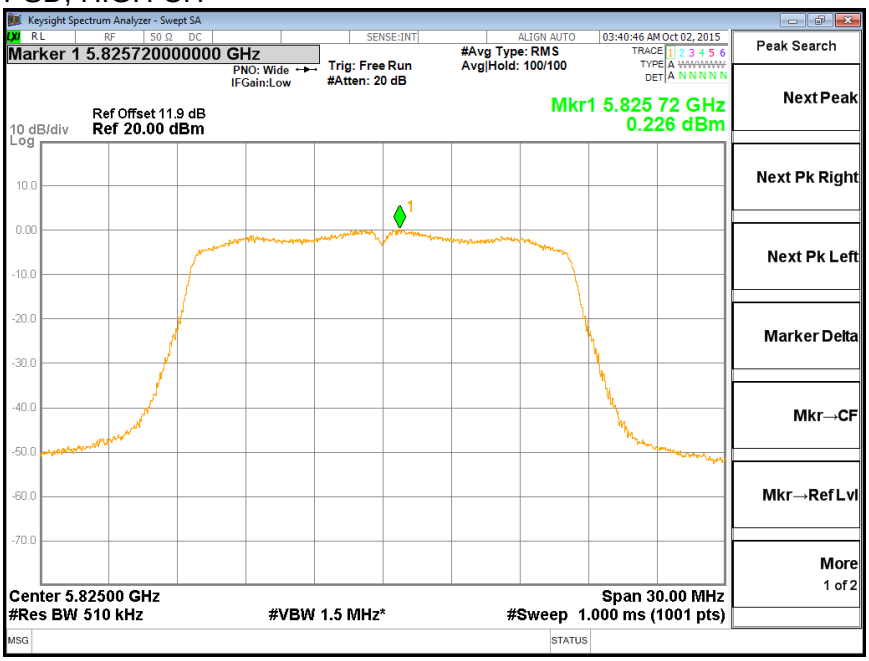
PSD, LOW CH



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)

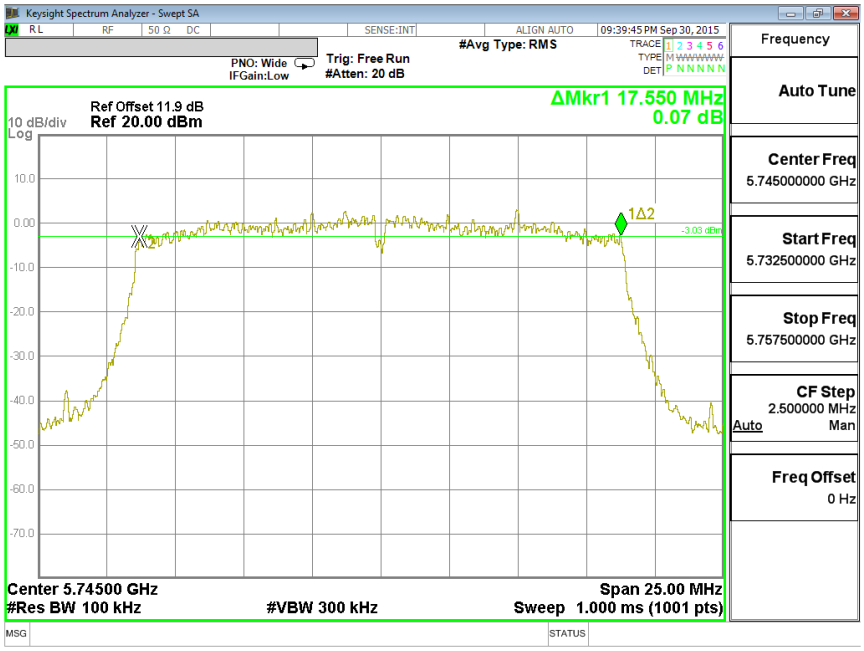
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

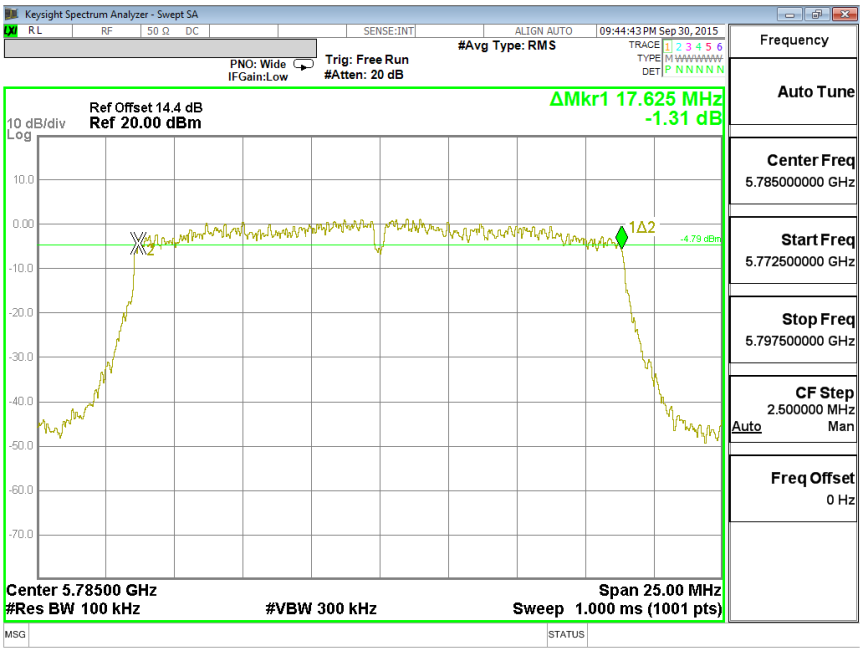
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.55	0.5
Mid	5785	17.63	0.5
High	5825	17.60	0.5

6 dB BANDWIDTH

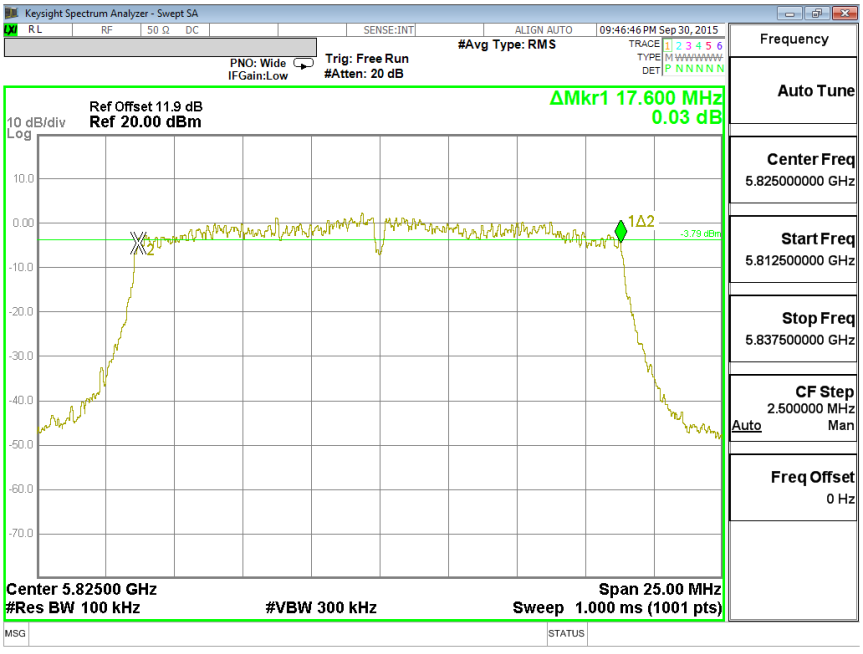
6 dB BANDWIDTH, LOW CH



6 dB BANDWIDTH, MID CH



6 dB BANDWIDTH, HIGH CH



8.2.2. 26 dB BANDWIDTH

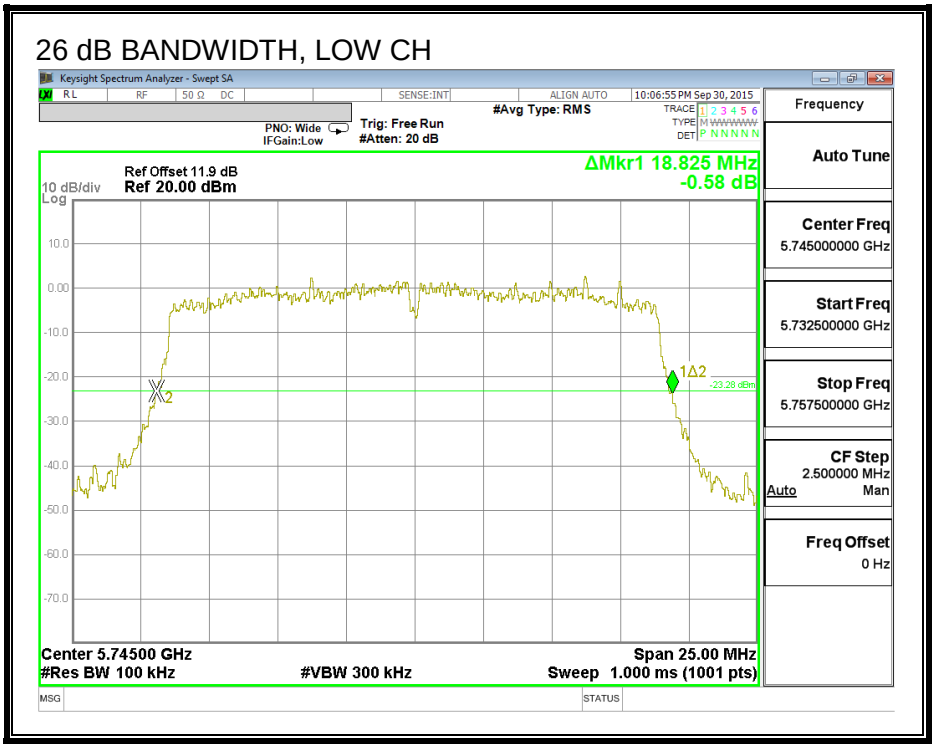
LIMITS

None, for reporting purposes only

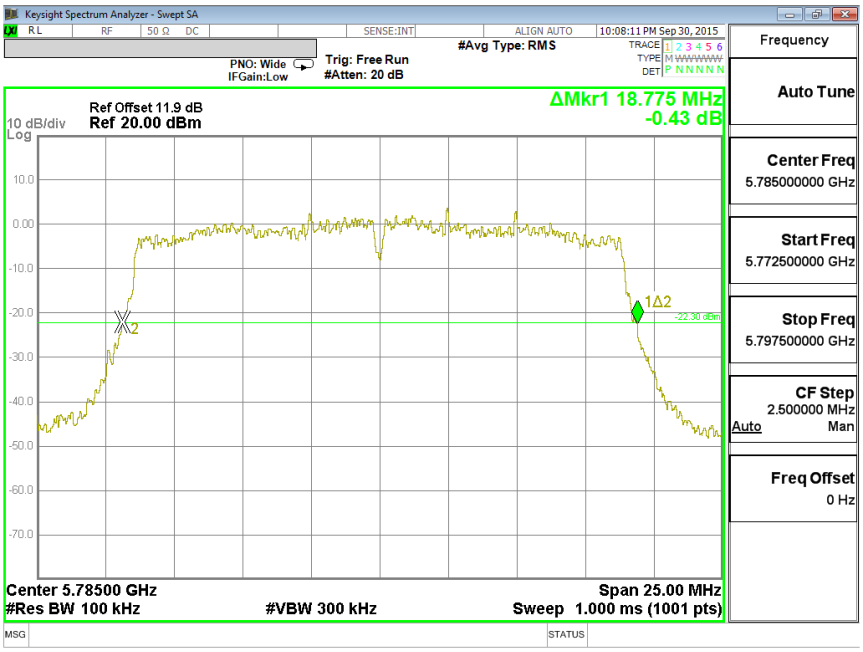
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	18.825
Mid	5785	18.775
High	5825	18.700

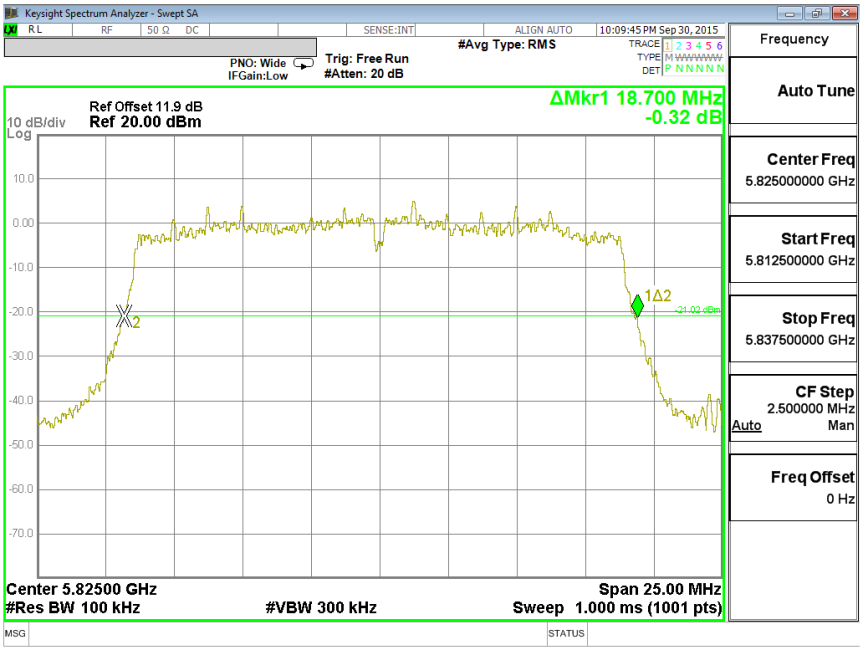
26 dB BANDWIDTH



26 dB BANDWIDTH, MID CH



26 dB BANDWIDTH, HIGH CH



8.2.3. 99% BANDWIDTH

LIMITS

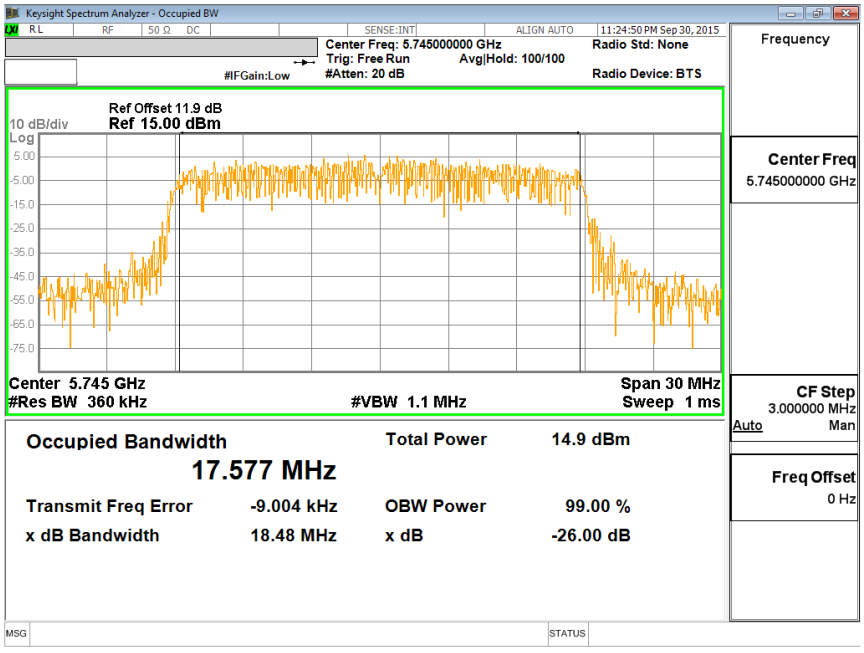
None; for reporting purposes only.

RESULTS

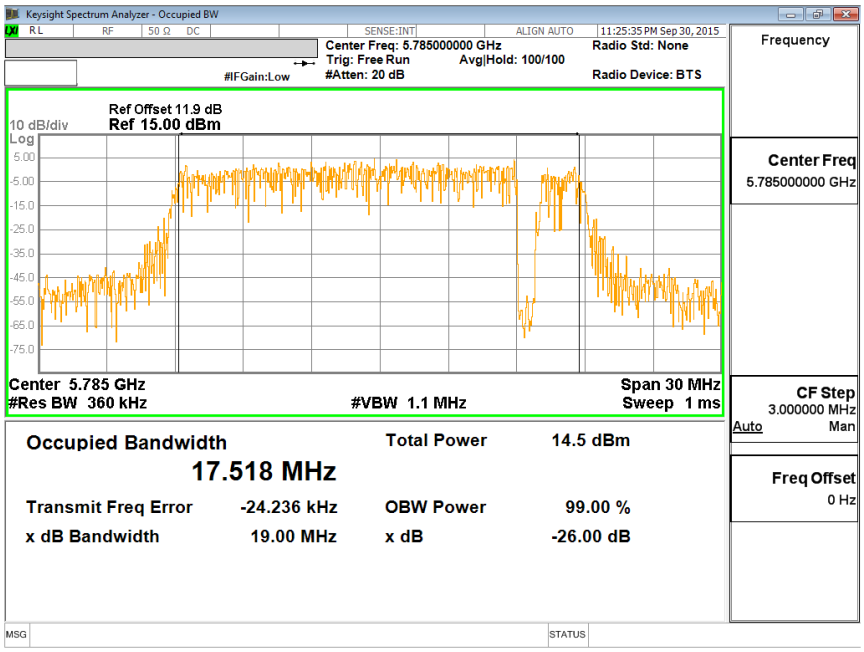
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.577
Mid	5785	17.518
High	5825	17.532

99% BANDWIDTH

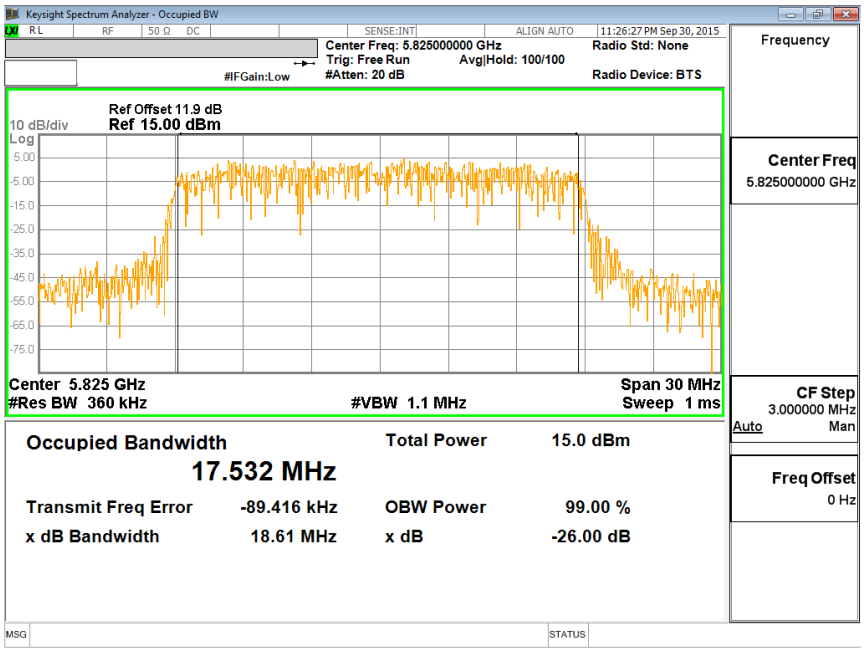
BANDWIDTH, LOW CH



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	12.97
Mid	5785	12.93
High	5825	13.00

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	-2.85	30.00
Mid	5785	-2.85	30.00
High	5825	-2.85	30.00

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	12.97	12.97	30.00	-17.03
Mid	5785	12.93	12.93	30.00	-17.07
High	5825	13.00	13.00	30.00	-17.00

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	-2.85	30.00
Mid	5785	-2.85	30.00
High	5825	-2.85	30.00

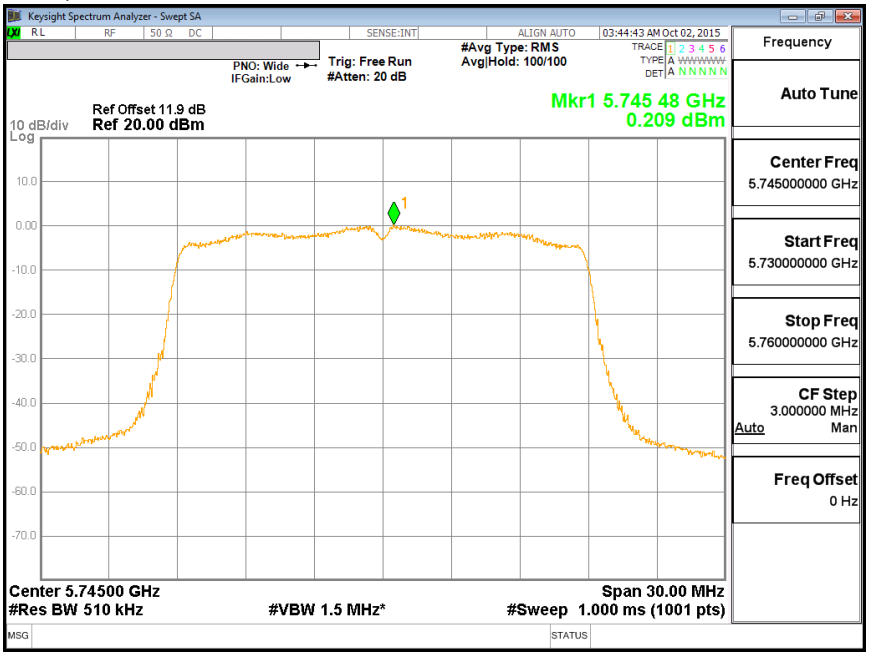
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

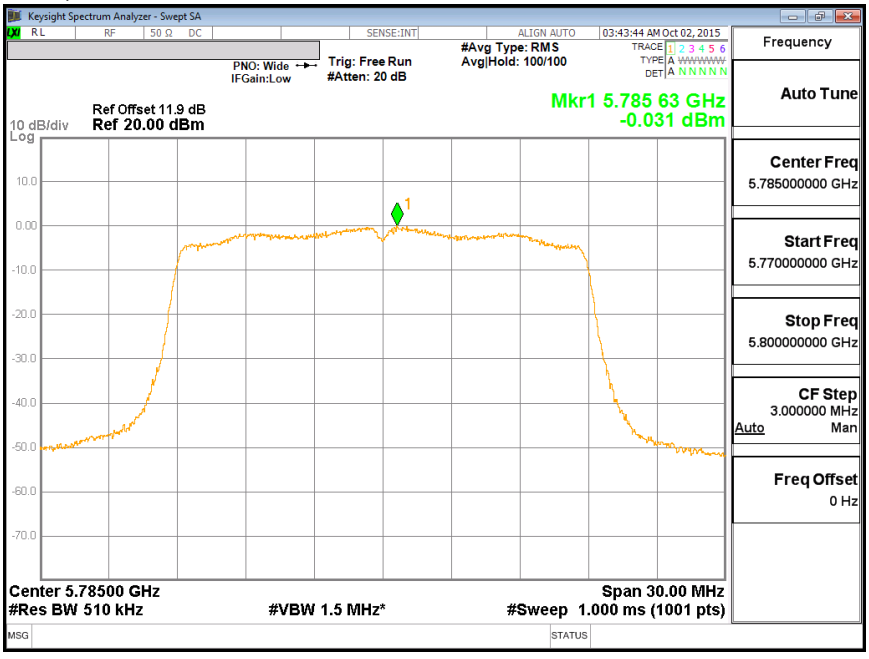
Channel	Frequency (MHz)	Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	0.209	0.21	30.00	-29.79
Mid	5785	-0.031	-0.03	30.00	-30.03
High	5825	0.081	0.08	30.00	-29.92

PSD,

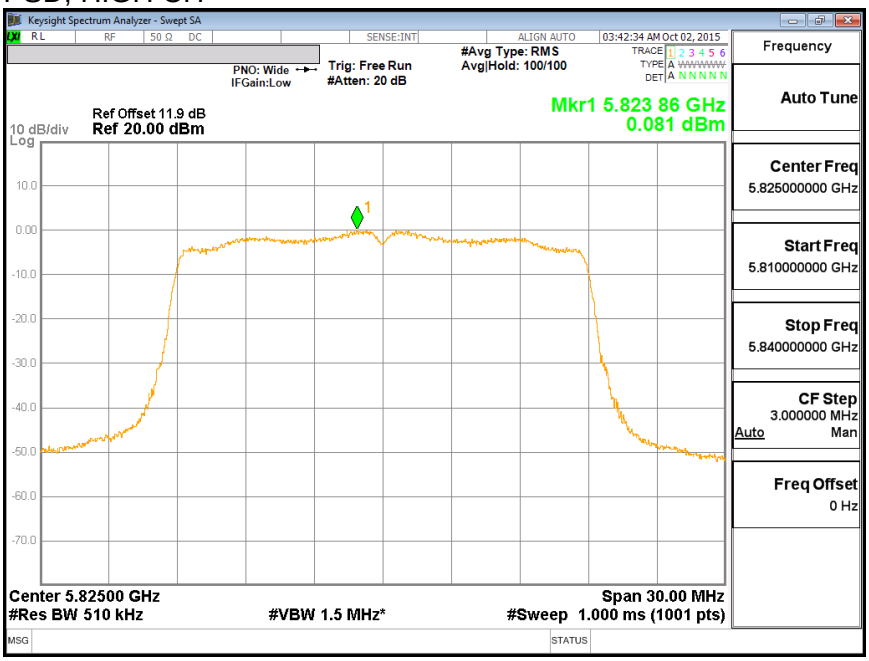
PSD, LOW CH



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	35.15	0.5
High	5795	33.90	0.5

6 dB BANDWIDTH

6 dB BANDWIDTH, LOW CH

6 dB BANDWIDTH, HIGH CH

8.3.2. 26 dB BANDWIDTH

LIMITS

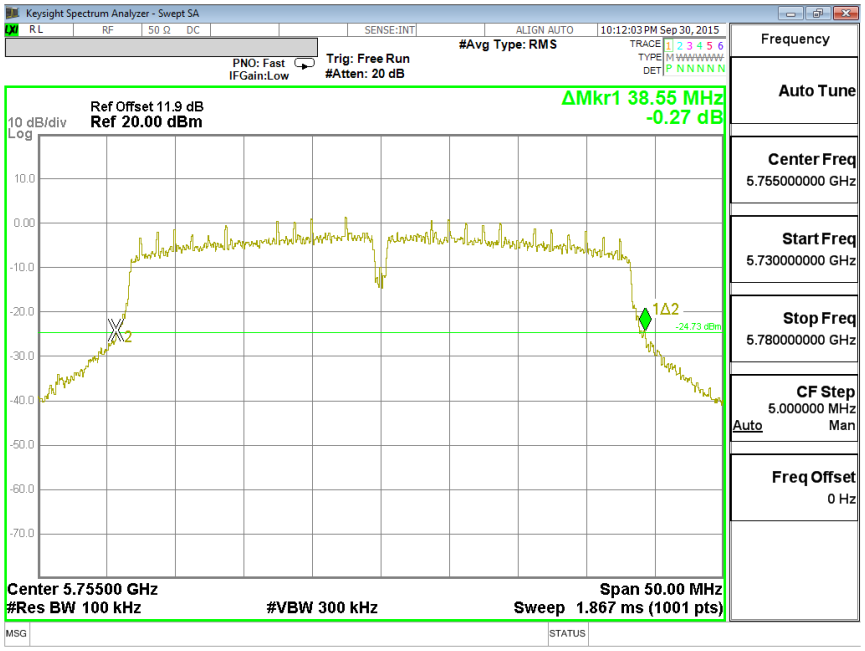
None, for reporting purposes only.

RESULTS

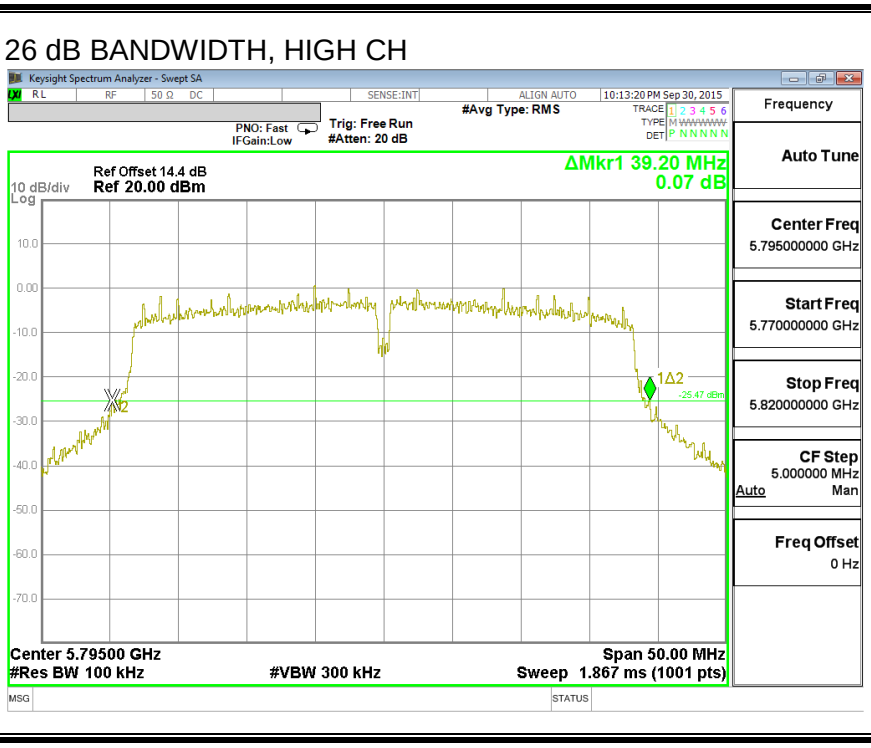
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5755	38.55
High	5795	39.20

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	35.898

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	12.87
High	5795	13.00

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	-2.85	30.00
High	5795	-2.85	30.00

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	12.87	12.87	30.00	-17.13
High	5795	13.00	13.00	30.00	-17.00

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	-2.85	30.00
High	5795	-2.85	30.00

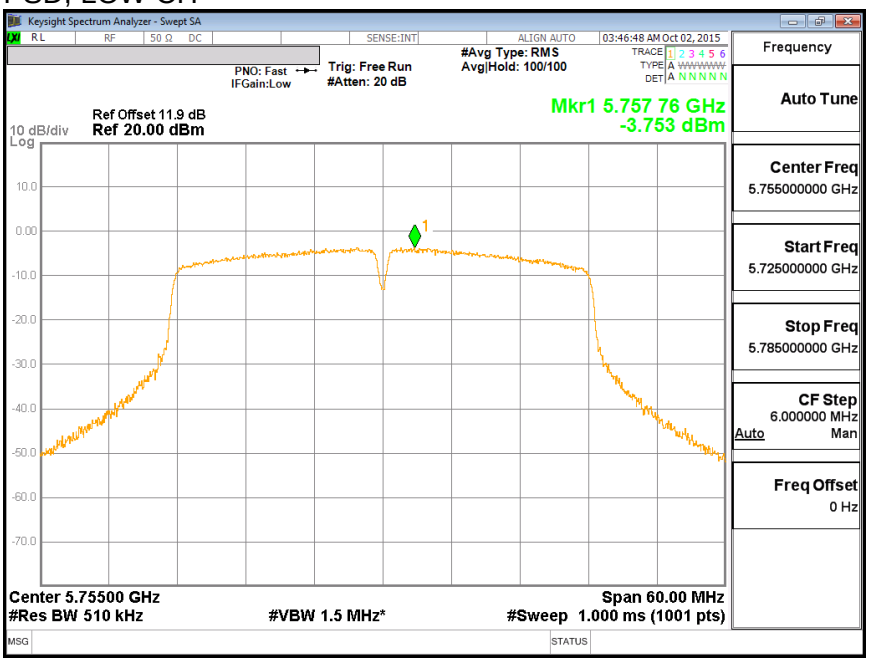
Duty Cycle CF (dB)	0.13	Included in Calculations of Corr'd PSD

PSD Results

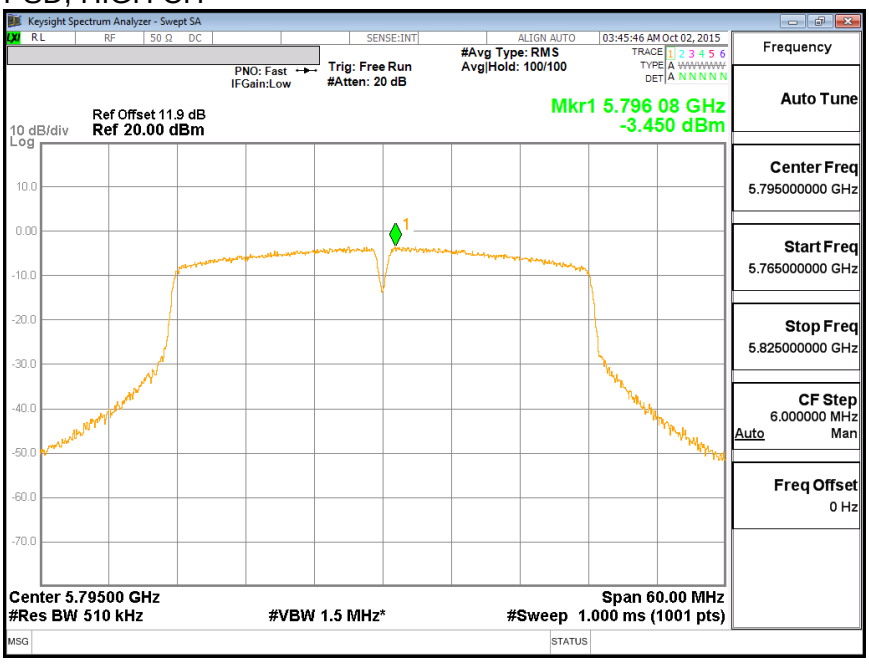
Channel	Frequency (MHz)	Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-3.75	-3.62	30.00	-33.62
High	5795	-3.45	-3.32	30.00	-33.32

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.

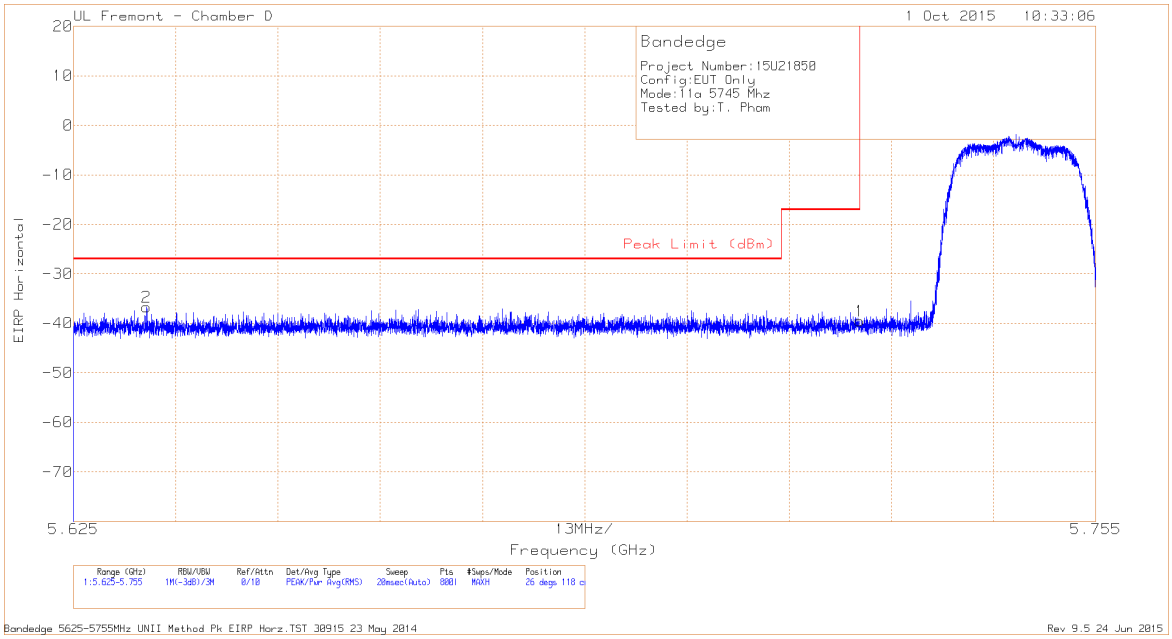
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.1. 802.11a MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

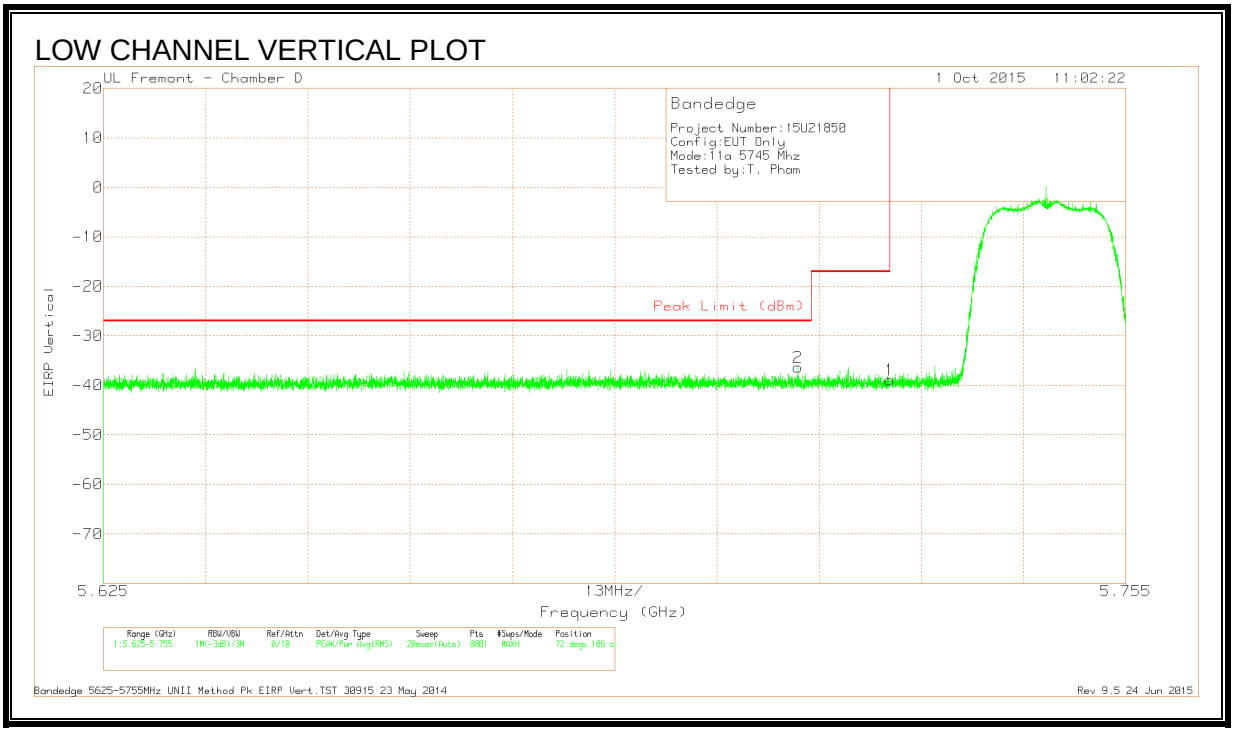


DATA

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
2	5.634	-65.27	Pk	34.4	-17.6	11.8	-36.67	-27	-9.67	26	118	H
1	5.725	-68.33	Pk	34.6	-17.6	11.8	-39.53	-17	-22.53	26	118	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT

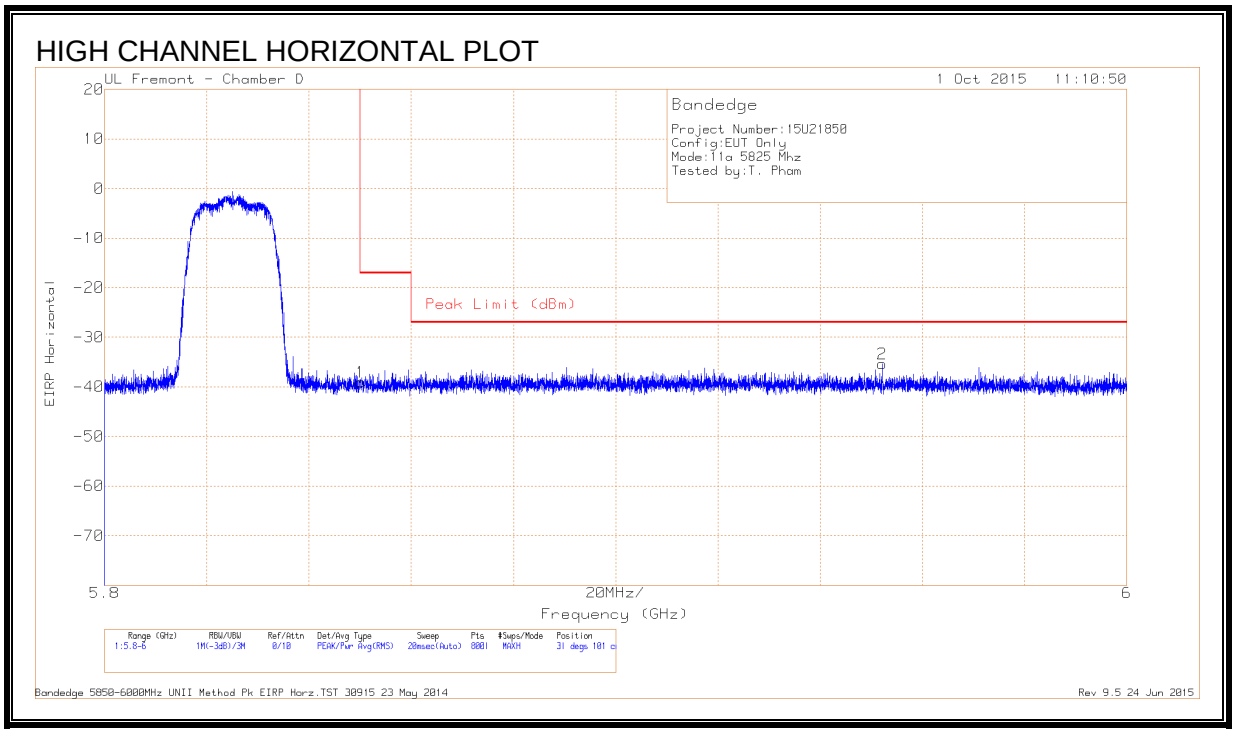


DATA

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
2	5.713	-65.23	Pk	34.6	-17.5	11.8	-36.33	-27	-9.33	72	106	V
1	5.725	-67.66	Pk	34.6	-17.6	11.8	-38.86	-17	-21.86	72	106	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

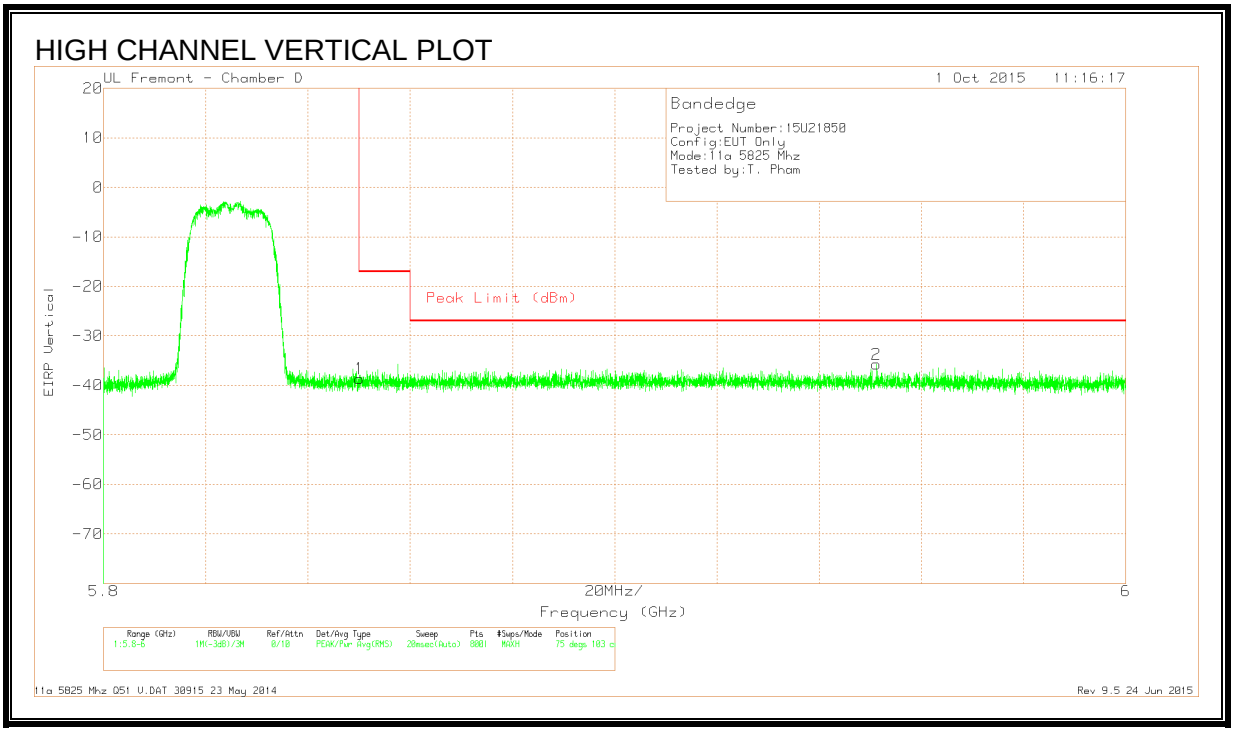


DATA

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	-68.03	Pk	34.9	-17.7	11.8	-39.03	-17	-22.03	31	101	H
2	5.952	-65.17	Pk	35.3	-17.3	11.8	-35.37	-27	-8.37	31	101	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



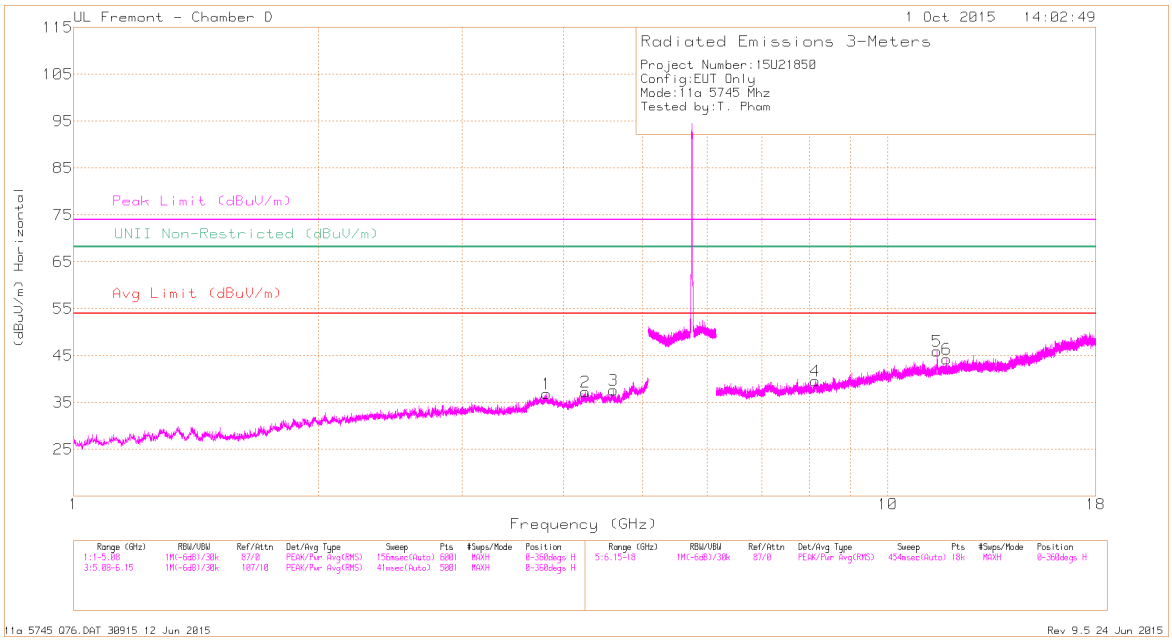
DATA

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	-67.61	Pk	34.9	-17.7	11.8	-38.61	-17	-21.61	75	103	V
2	5.951	-65.53	Pk	35.3	-17.3	11.8	-35.73	-27	-8.73	75	103	V

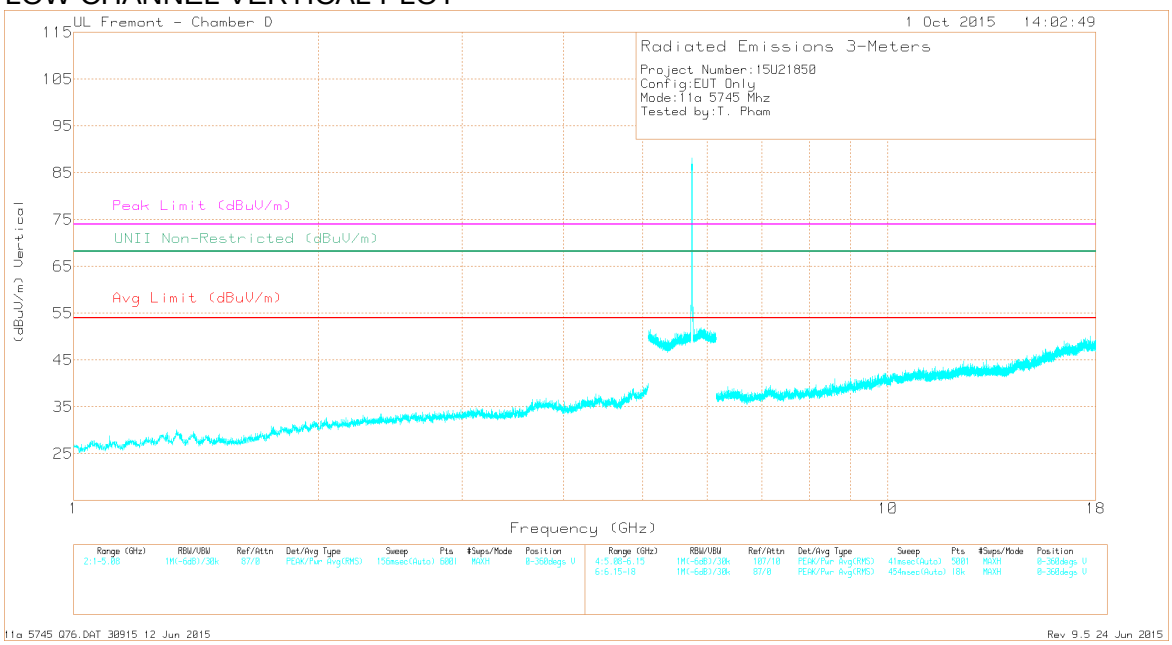
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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
* 3.806	38.82	PK-U	33.4	-28.6	43.62	-	-	74	-30.38	-	-	332	116	H
* 3.809	27.32	ADR	33.4	-28.7	32.02	54	-21.98	-	-	-	-	332	116	H
* 4.255	37.86	PK-U	33.5	-27.7	43.66	-	-	74	-30.34	-	-	293	148	H
* 4.254	26.19	ADR	33.5	-27.7	31.99	54	-22.01	-	-	-	-	293	148	H
* 4.601	37.35	PK-U	34.1	-27	44.45	-	-	74	-29.55	-	-	274	195	H
* 4.599	26.33	ADR	34.1	-27	33.43	54	-20.57	-	-	-	-	274	195	H
* 8.147	35.34	PK-U	35.6	-23.8	47.14	-	-	74	-26.86	-	-	237	115	H
* 8.147	23.67	ADR	35.6	-23.8	35.47	54	-18.53	-	-	-	-	237	115	H
* 11.493	38.97	PK-U	38.1	-21.8	55.27	-	-	74	-18.73	-	-	139	368	H
* 11.49	27.8	ADR	38.1	-21.8	44.1	54	-9.9	-	-	-	-	139	368	H
* 11.806	34.93	PK-U	38.3	-21.9	51.33	-	-	74	-22.67	-	-	168	337	H
* 11.805	23.24	ADR	38.3	-21.9	39.64	54	-14.36	-	-	-	-	168	337	H

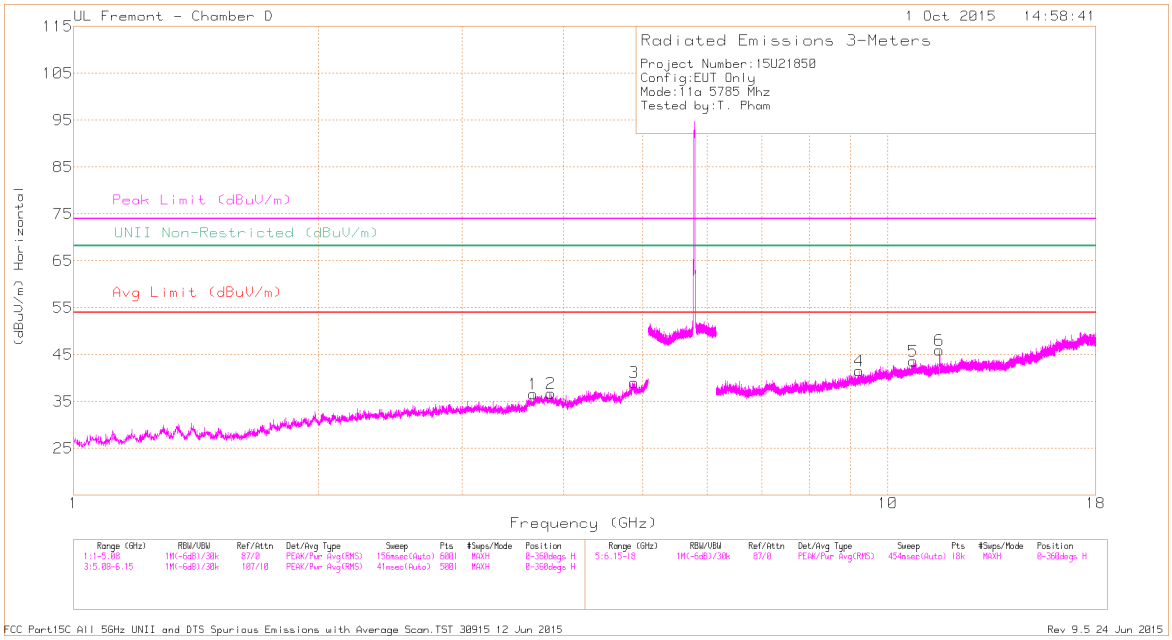
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

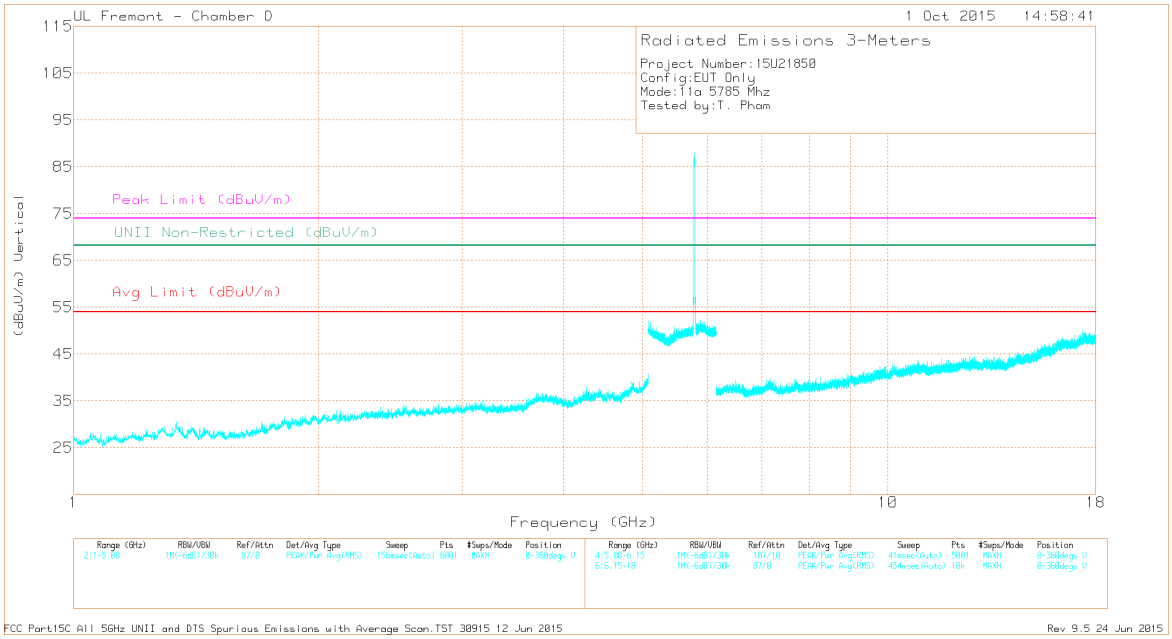
ADR - U-NII AD primary method, RMS average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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
* 3.667	39.32	PK-U	33.1	-29.2	43.22	-	-	74	-30.78	-	-	59	133	H
* 3.668	26.97	ADR	33.1	-29.2	30.87	54	-23.13	-	-	-	-	59	133	H
* 3.855	39.56	PK-U	33.4	-28.9	44.06	-	-	74	-29.94	-	-	89	159	H
* 3.856	27.88	ADR	33.4	-28.9	32.38	54	-21.62	-	-	-	-	89	159	H
* 4.877	37.42	PK-U	34.1	-25.2	46.32	-	-	74	-27.68	-	-	124	145	H
* 4.877	25.17	ADR	34.1	-25.2	34.07	54	-19.93	-	-	-	-	124	145	H
* 10.752	34.6	PK-U	37.9	-21.1	51.4	-	-	74	-22.6	-	-	331	358	H
* 10.751	22.17	ADR	37.9	-21.2	38.87	54	-15.13	-	-	-	-	331	358	H
* 11.569	40.61	PK-U	38.1	-22	56.71	-	-	74	-17.29	-	-	294	327	H
* 11.569	28.88	ADR	38.1	-22	44.98	54	-9.02	-	-	-	-	294	327	H
9.211	34.53	PK-U	36.3	-22.1	48.73	-	-	-	-	68.2	-19.47	146	135	H

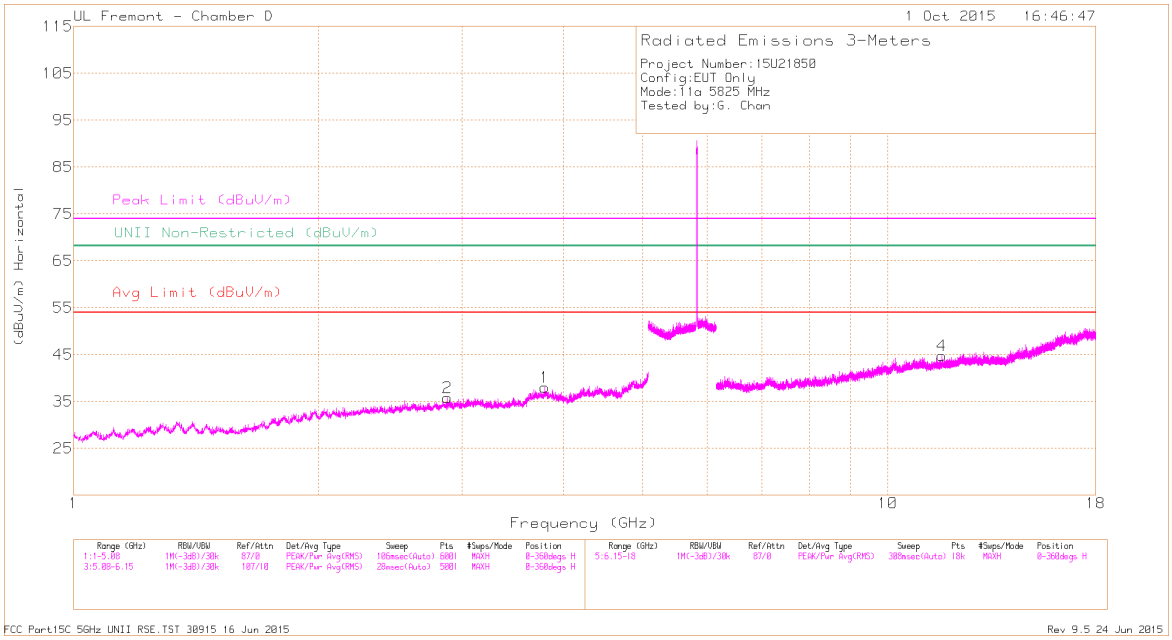
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

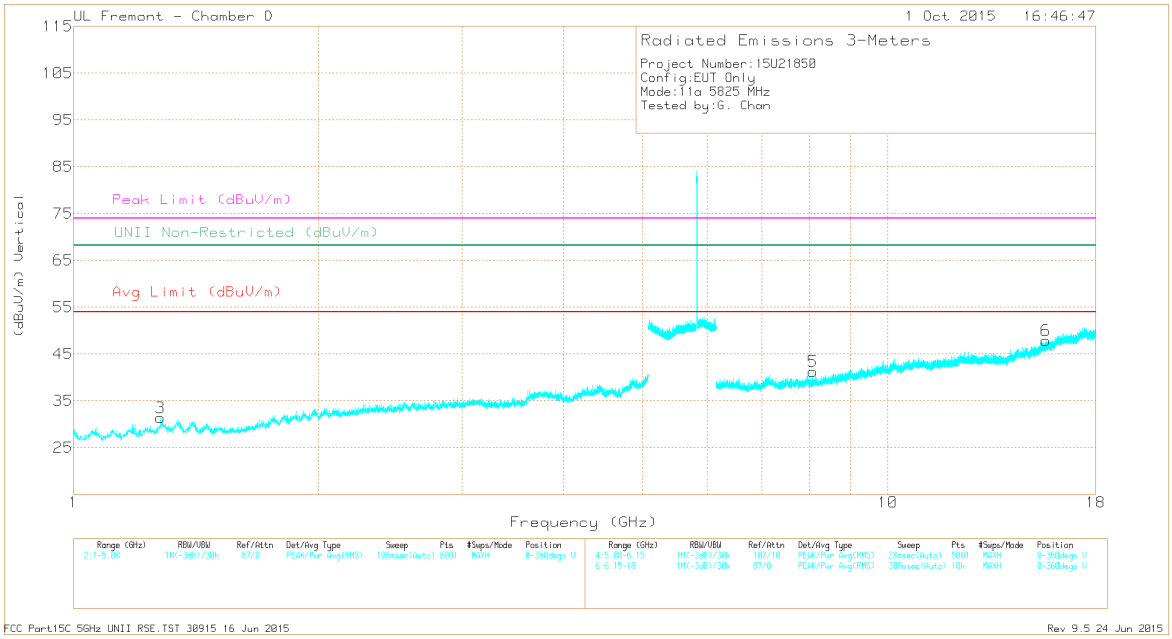
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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	* 3.787	38.95	PK-U	33.3	-28.8	43.45	-	-	74	-30.55	-	-	223	295	H
	* 3.789	26.86	ADR	33.3	-28.8	31.36	54	-22.64	-	-	-	-	223	295	H
2	* 2.876	38.95	PK-U	32.6	-29.3	42.25	-	-	74	-31.75	-	-	45	187	H
	* 2.875	26.86	ADR	32.6	-29.3	30.16	54	-23.84	-	-	-	-	45	187	H
3	* 1.281	40.77	PK-U	28.8	-31.9	37.67	-	-	74	-36.33	-	-	267	368	V
	* 1.281	29.07	ADR	28.8	-31.9	25.97	54	-28.03	-	-	-	-	267	368	V
4	* 11.651	34.24	PK-U	38.1	-21.4	50.94	-	-	74	-23.06	-	-	80	137	H
	* 11.652	22.7	ADR	38.1	-21.4	39.4	54	-14.6	-	-	-	-	80	137	H
5	* 8.085	35.69	PK-U	35.6	-24.4	46.89	-	-	74	-27.11	-	-	91	280	V
	* 8.084	23.9	ADR	35.6	-24.4	35.1	54	-18.9	-	-	-	-	91	280	V
6	* 15.62	34.9	PK-U	40.8	-20.8	54.9	-	-	74	-19.1	-	-	309	244	V
	* 15.619	23.24	ADR	40.8	-20.8	43.24	54	-10.76	-	-	-	-	309	244	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

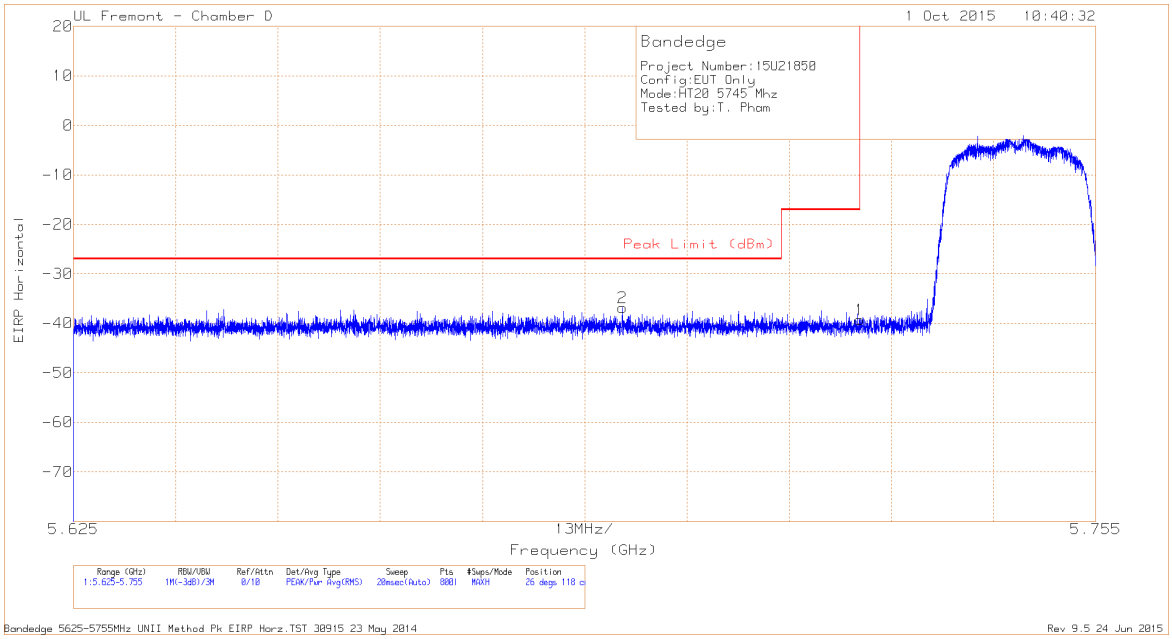
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

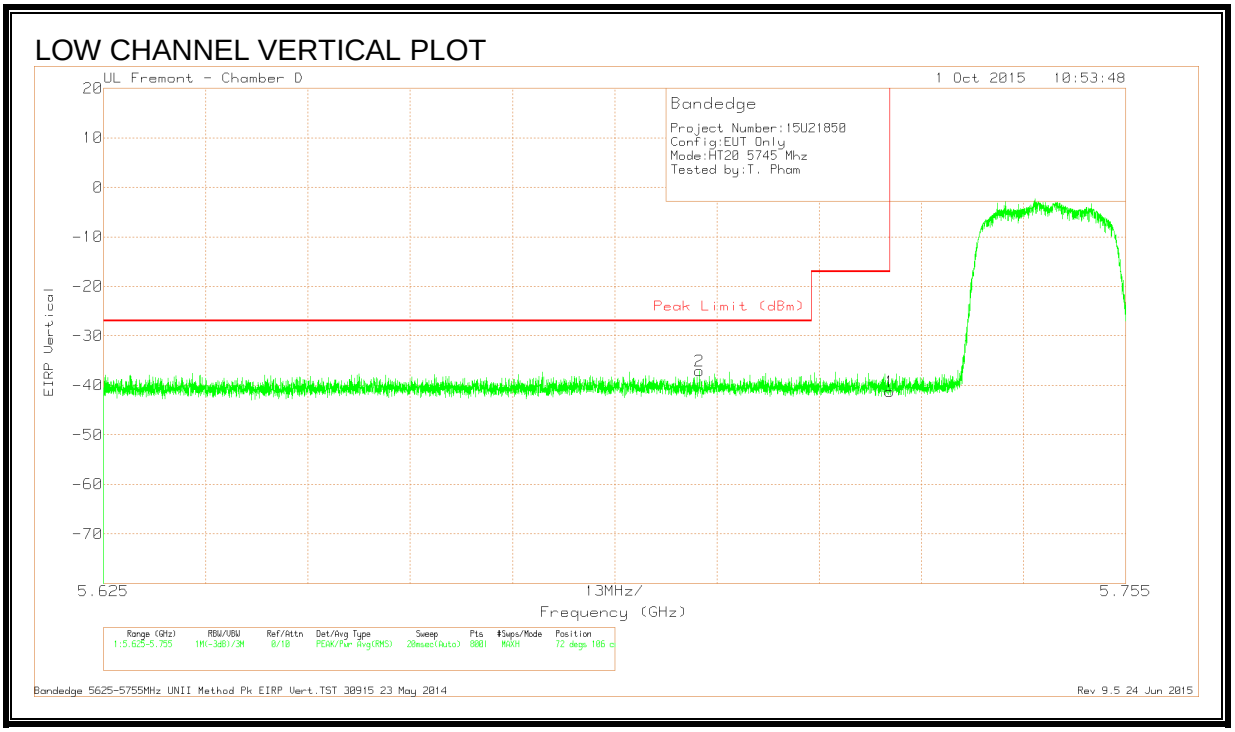


DATA

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
2	5.695	-65.78	Pk	34.5	-17.3	11.8	-36.78	-27	-9.78	26	118	H
1	5.725	-68.14	Pk	34.6	-17.6	11.8	-39.34	-17	-22.34	26	118	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



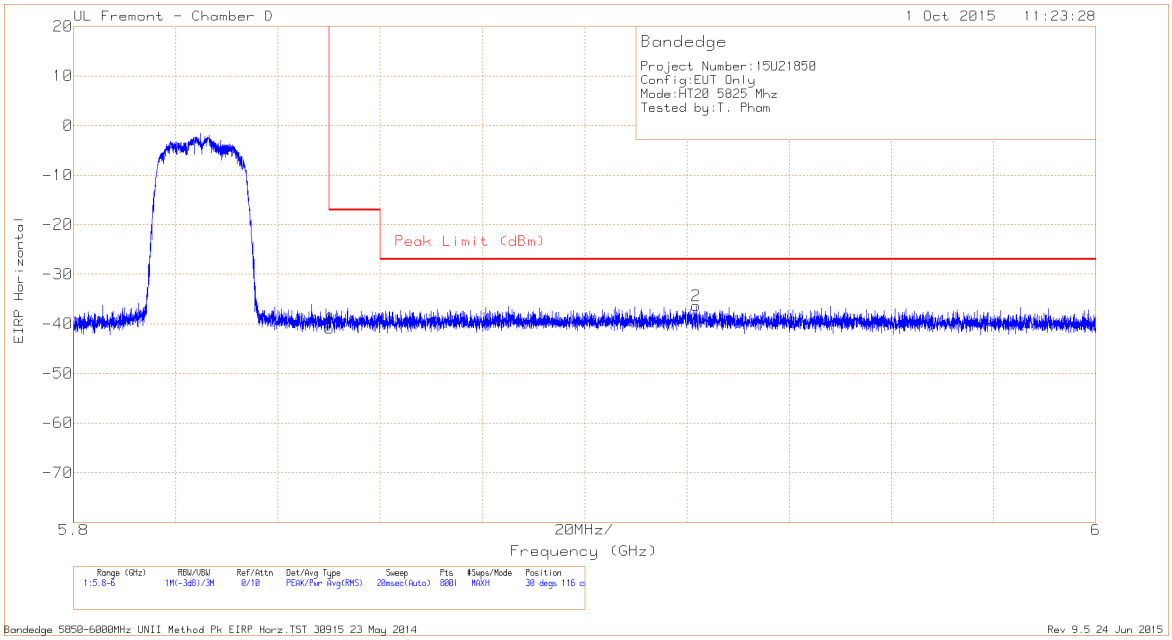
DATA

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
2	5.701	-65.99	Pk	34.5	-17.4	11.8	-37.09	-27	-10.09	72	106	V
1	5.725	-70.06	Pk	34.6	-17.6	11.8	-41.26	-17	-24.26	72	106	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

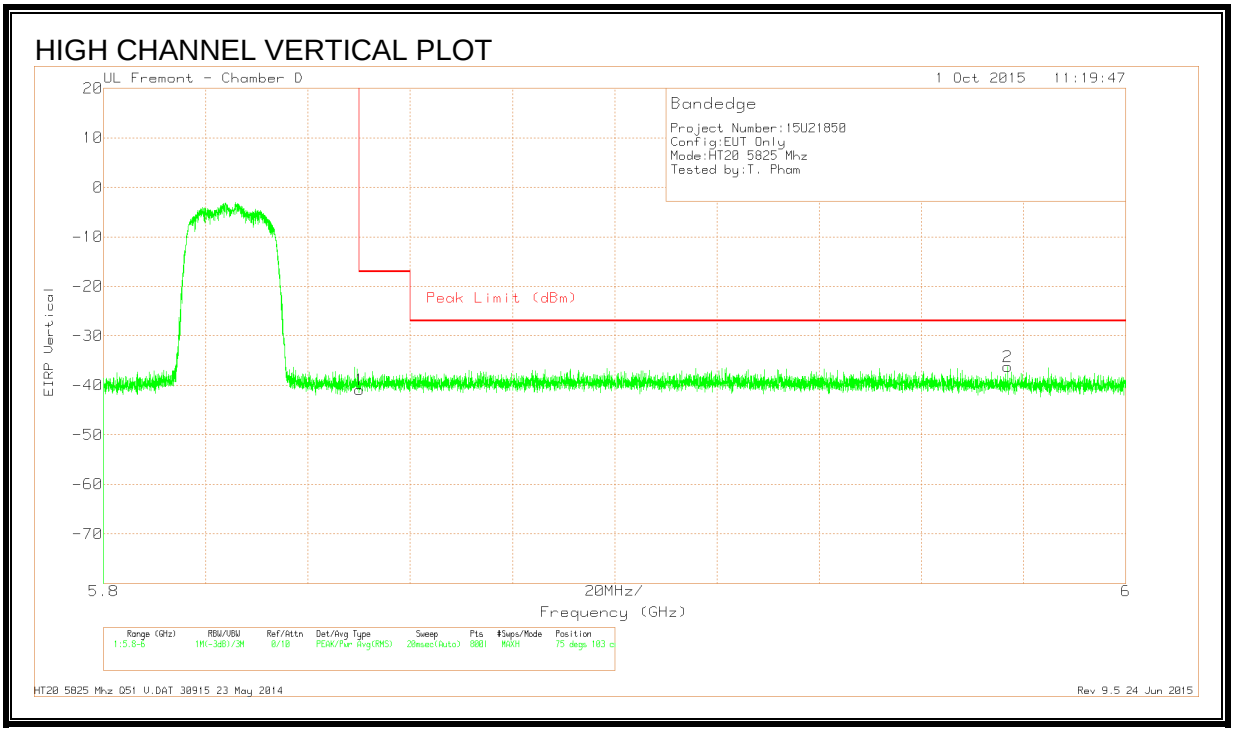


DATA

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	-69.85	Pk	34.9	-17.7	11.8	-40.85	-17	-23.85	30	116	H
2	5.922	-65.95	Pk	35.1	-17.3	11.8	-36.35	-27	-9.35	30	116	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



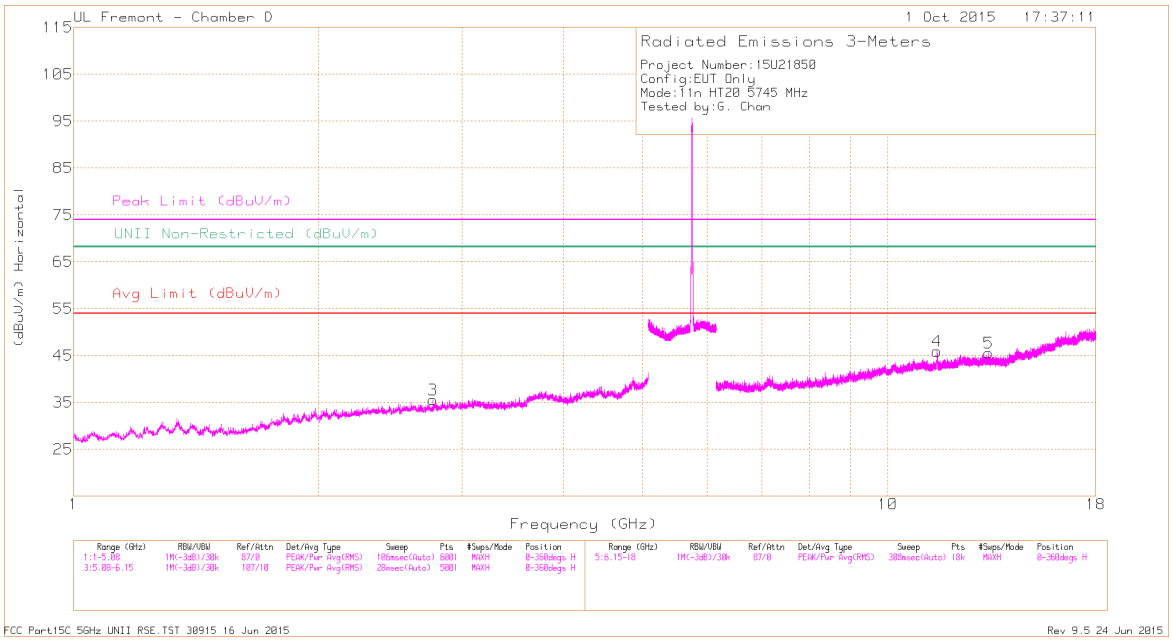
DATA

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	-69.83	Pk	34.9	-17.7	11.8	-40.83	-17	-23.83	75	103	V
2	5.977	-65.89	Pk	35.4	-17.5	11.8	-36.19	-27	-9.19	75	103	V

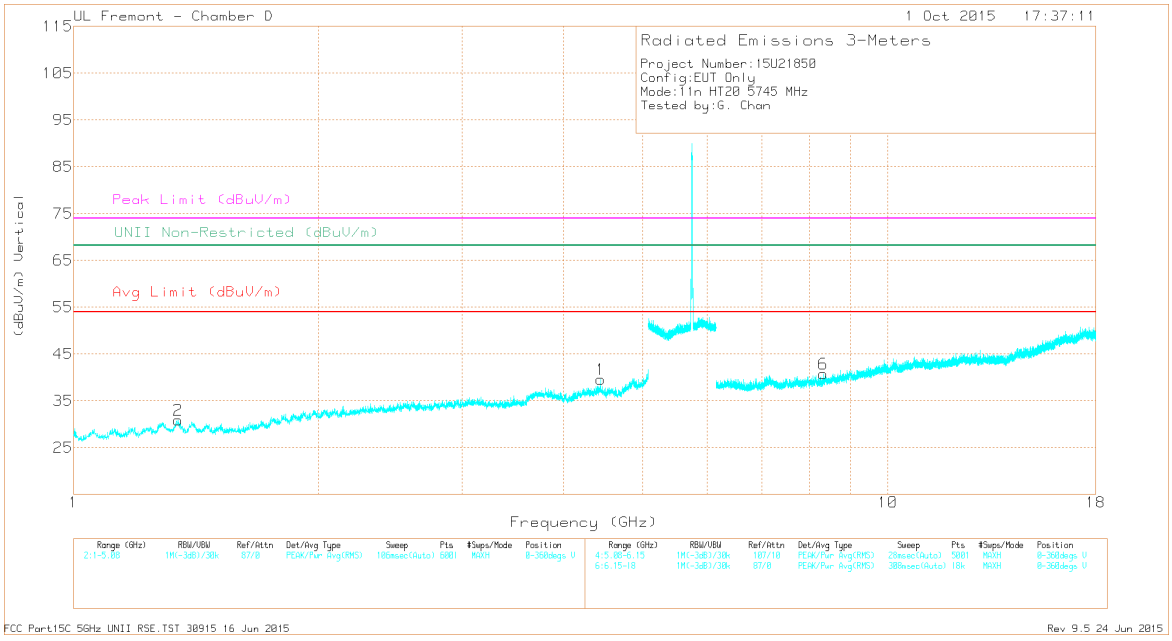
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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
3	* 2.764	39.46	PK-U	32.5	-30.1	41.86	-	-	74	-32.14	-	-	137	141	H
	* 2.766	27.47	ADR	32.5	-30.1	29.87	54	-24.13	-	-	-	-	137	141	H
2	* 1.342	40.58	PK-U	28.8	-31.5	37.88	-	-	74	-36.12	-	-	300	265	V
	* 1.342	29.07	ADR	28.8	-31.5	26.37	54	-27.63	-	-	-	-	300	265	V
4	* 11.492	38.92	PK-U	38.1	-21.8	55.22	-	-	74	-18.78	-	-	337	327	H
	* 11.492	26.88	ADR	38.1	-21.8	43.18	54	-10.82	-	-	-	-	337	327	H
5	* 13.285	35.35	PK-U	39.3	-23	51.65	-	-	74	-22.35	-	-	0	177	H
	* 13.286	23.78	ADR	39.3	-23	40.08	54	-13.92	-	-	-	-	0	177	H
6	* 8.332	35.1	PK-U	35.7	-24	46.8	-	-	74	-27.2	-	-	69	233	V
	* 8.332	23.62	ADR	35.7	-24	35.32	54	-18.68	-	-	-	-	69	233	V
1	4.438	38.6	PK-U	33.9	-27.5	45	-	-	-	-	68.2	-23.2	271	306	V
	4.438	26.31	ADR	33.9	-27.5	32.71	-	-	-	-	-	-	271	306	V

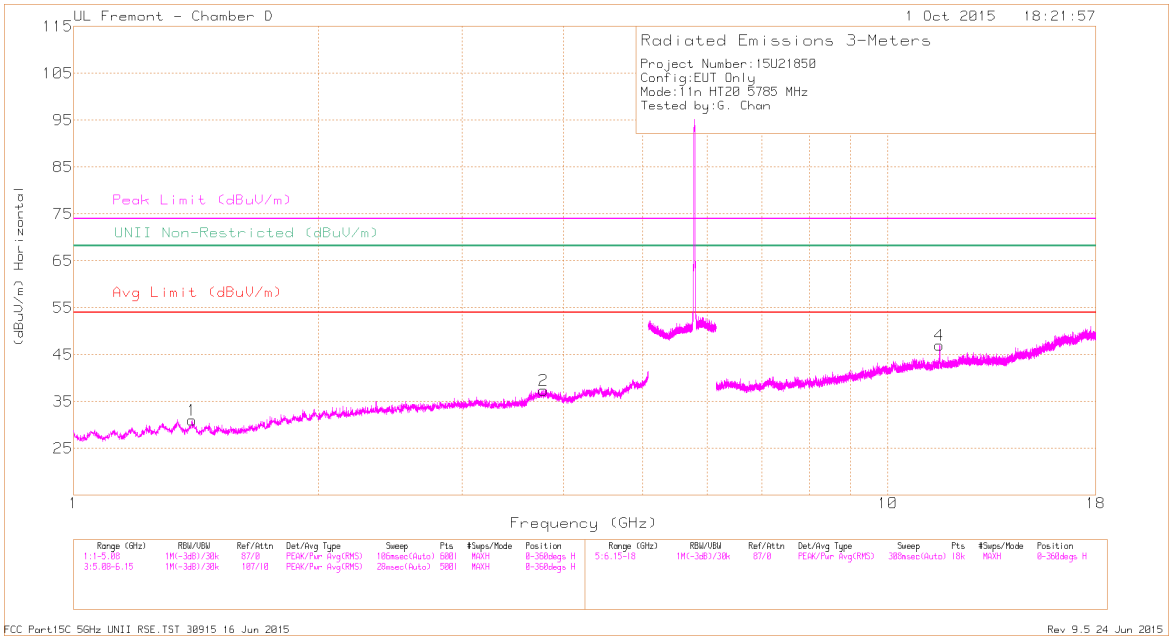
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

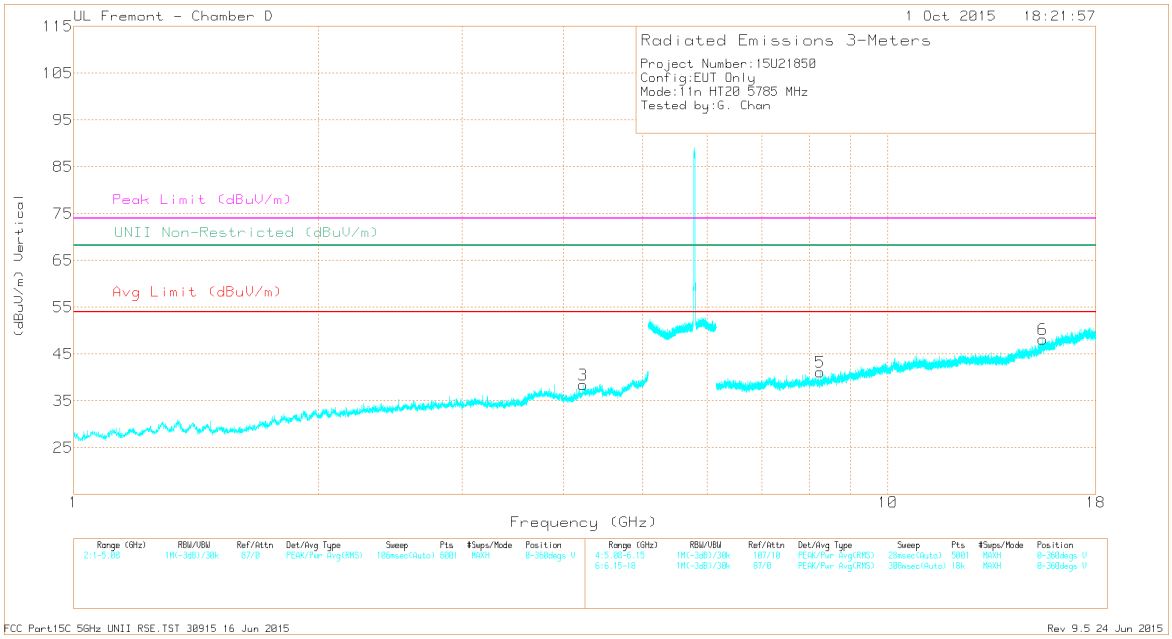
ADR - U-NII AD primary method, RMS average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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	* 1.398	41.25	PK-U	28.6	-31.4	38.45	-	-	74	-35.55	-	-	9	332	H
	* 1.398	28.97	ADR	28.6	-31.4	26.17	54	-27.83	-	-	-	-	9	332	H
2	* 3.776	38.2	PK-U	33.3	-28.9	42.6	-	-	74	-31.4	-	-	76	309	H
	* 3.778	26.83	ADR	33.3	-28.9	31.23	54	-22.77	-	-	-	-	76	309	H
3	* 4.226	38.35	PK-U	33.5	-27.7	44.15	-	-	74	-29.85	-	-	76	259	V
	* 4.226	26.29	ADR	33.5	-27.7	32.09	54	-21.91	-	-	-	-	76	259	V
4	* 11.57	39.14	PK-U	38.1	-22	55.24	-	-	74	-18.76	-	-	183	275	H
	* 11.569	27.45	ADR	38.1	-22	43.55	54	-10.45	-	-	-	-	183	275	H
5	* 8.262	35.3	PK-U	35.7	-24.3	46.7	-	-	74	-27.3	-	-	229	244	V
	* 8.262	23.86	ADR	35.7	-24.3	35.26	54	-18.74	-	-	-	-	229	244	V
6	* 15.506	35.12	PK-U	40.6	-21.1	54.62	-	-	74	-19.38	-	-	29	130	V
	* 15.506	22.78	ADR	40.6	-21.1	42.28	54	-11.72	-	-	-	-	29	130	V

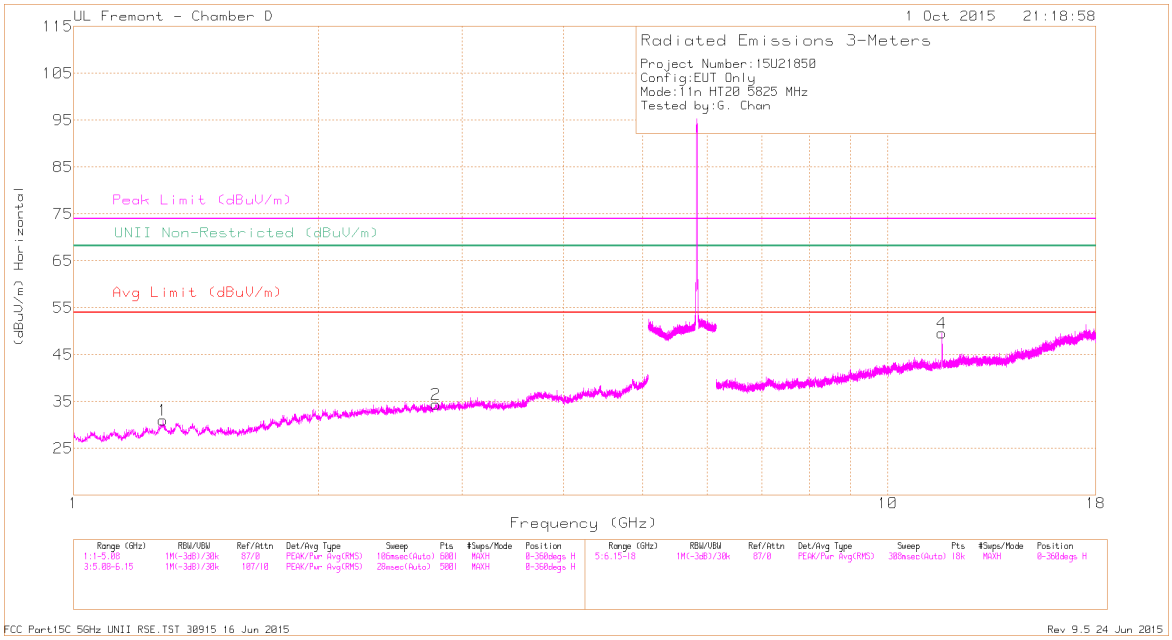
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

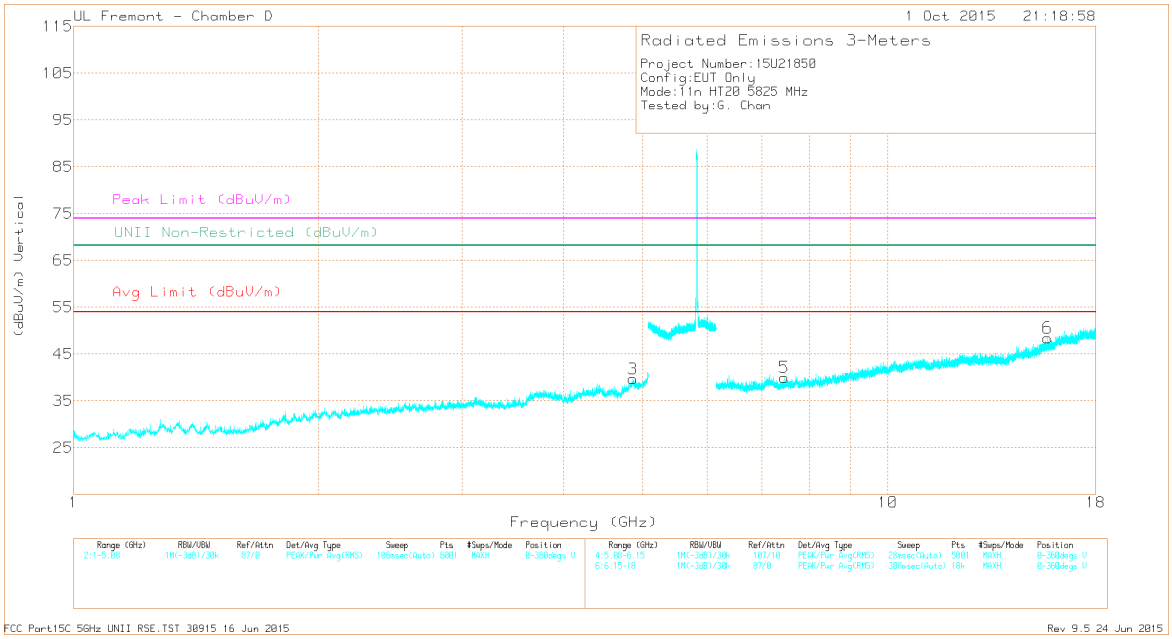
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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	* 1.289	41.1	PK-U	28.9	-31.9	38.1	-	-	74	-35.9	-	-	225	167	H
	* 1.287	29	ADR	28.9	-31.9	26	54	-28	-	-	-	-	225	167	H
2	* 2.786	39.53	PK-U	32.5	-29.8	42.23	-	-	74	-31.77	-	-	79	113	H
	* 2.784	27.46	ADR	32.5	-29.8	30.16	54	-23.84	-	-	-	-	79	113	H
3	* 4.868	36.72	PK-U	34.1	-25.2	45.62	-	-	74	-28.38	-	-	132	242	V
	* 4.866	25.29	ADR	34.1	-25.3	34.09	54	-19.91	-	-	-	-	132	242	V
4	* 11.651	40.18	PK-U	38.1	-21.4	56.88	-	-	74	-17.12	-	-	89	202	H
	* 11.651	28.45	ADR	38.1	-21.4	45.15	54	-8.85	-	-	-	-	89	202	H
5	* 7.46	35.72	PK-U	35.5	-24.9	46.32	-	-	74	-27.68	-	-	84	160	V
	* 7.458	23.86	ADR	35.5	-24.9	34.46	54	-19.54	-	-	-	-	84	160	V
6	* 15.705	35.58	PK-U	40.8	-21	55.38	-	-	74	-18.62	-	-	245	205	V
	* 15.708	23.11	ADR	40.8	-21	42.91	54	-11.09	-	-	-	-	245	205	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

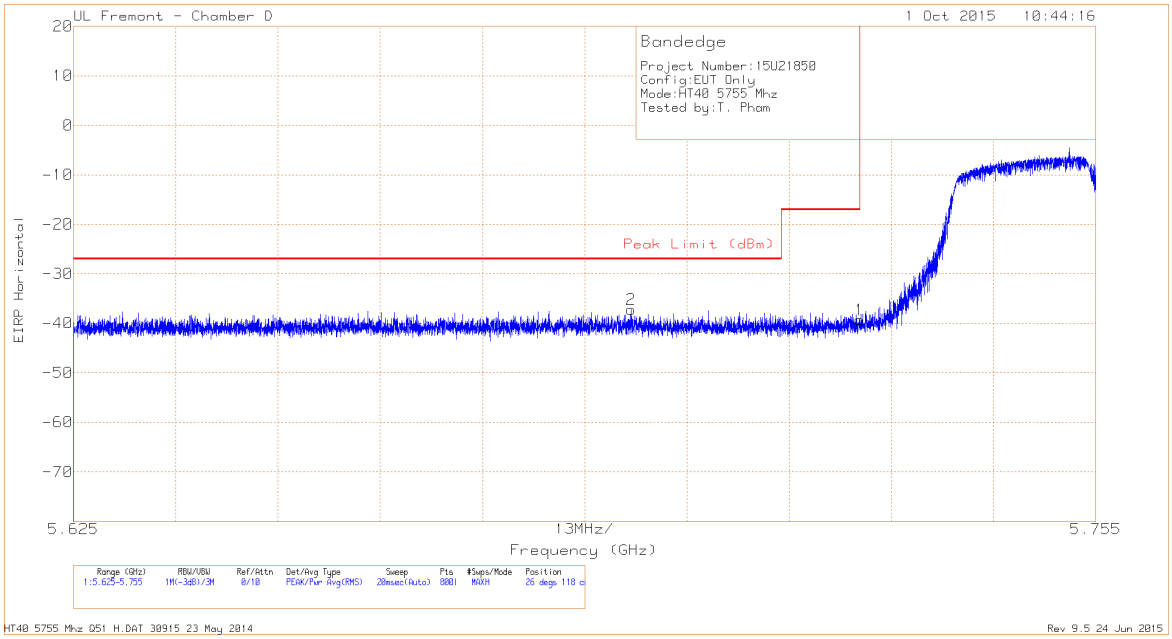
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

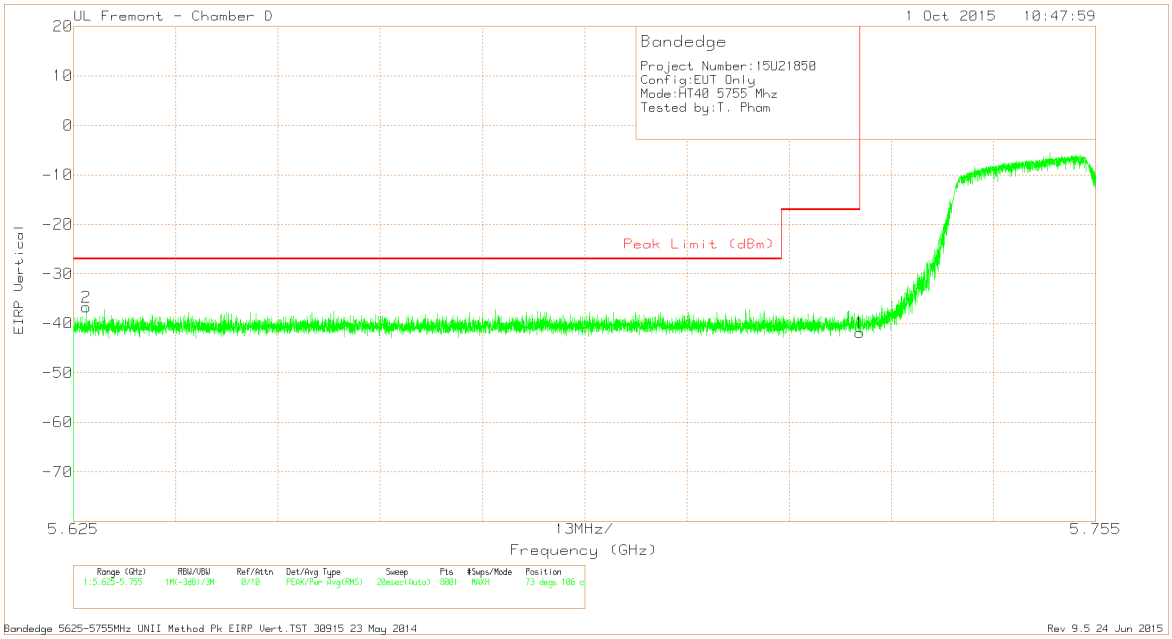


DATA

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
2	5.696	-66.21	Pk	34.5	-17.3	11.8	-37.21	-27	-10.21	26	118	H
1	5.725	-68.04	Pk	34.6	-17.6	11.8	-39.24	-17	-22.24	26	118	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



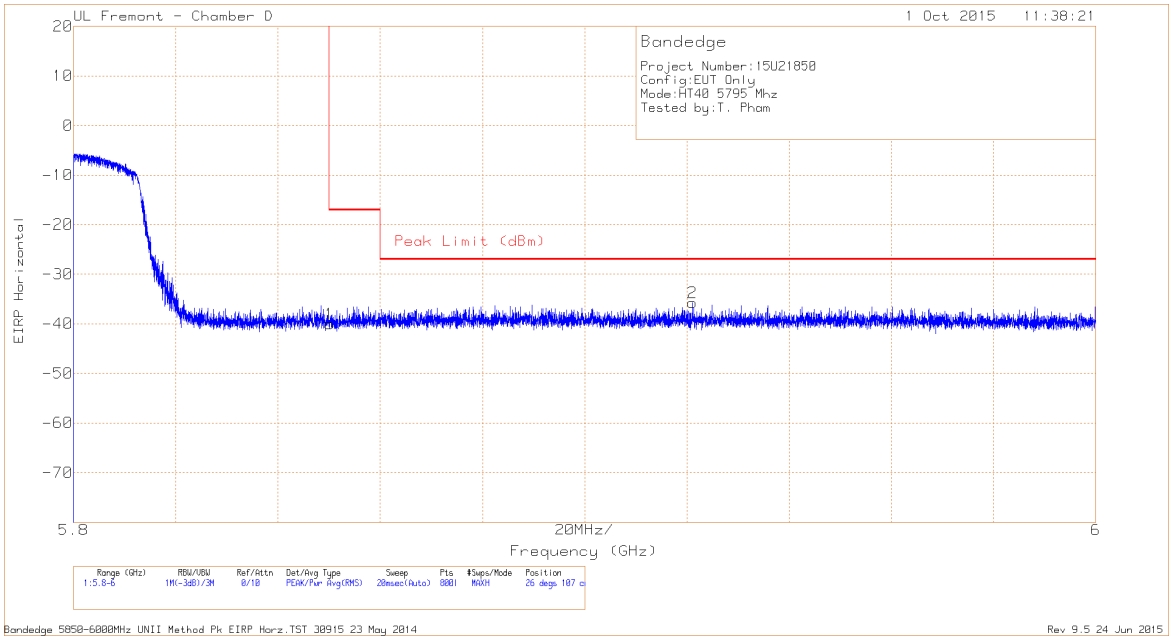
DATA

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
2	5.627	-65.2	Pk	34.4	-17.7	11.8	-36.7	-27	-9.7	73	106	V
1	5.725	-70.61	Pk	34.6	-17.6	11.8	-41.81	-17	-24.81	73	106	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

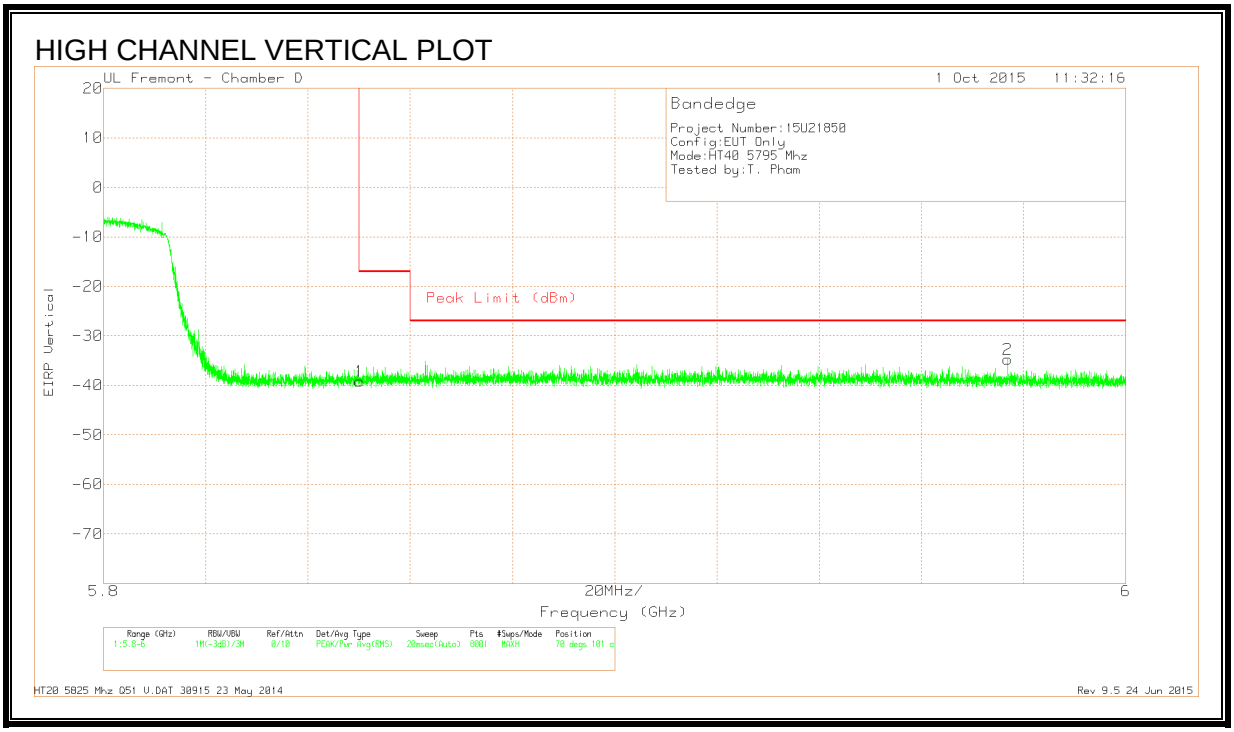


DATA

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	-68.97	Pk	34.9	-17.7	11.8	-39.97	-17	-22.97	26	107	H
2	5.921	-65.32	Pk	35.1	-17.3	11.8	-35.72	-27	-8.72	26	107	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



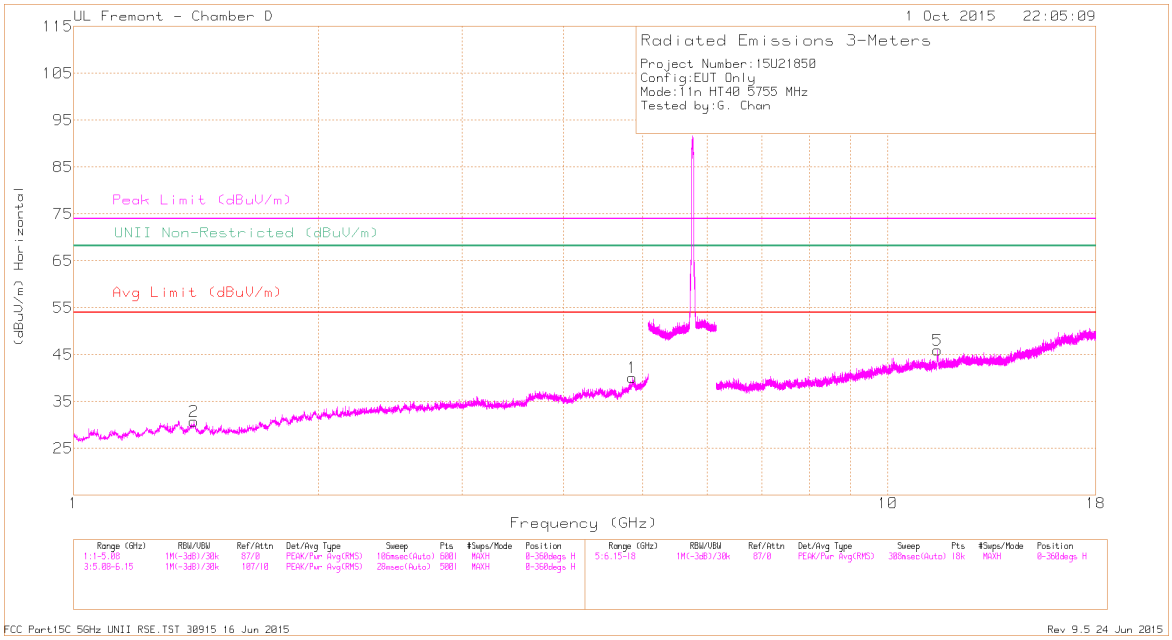
DATA

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	-68.17	Pk	34.9	-17.7	11.8	-39.17	-17	-22.17	70	101	V
2	5.977	-64.42	Pk	35.4	-17.5	11.8	-34.72	-27	-7.72	70	101	V

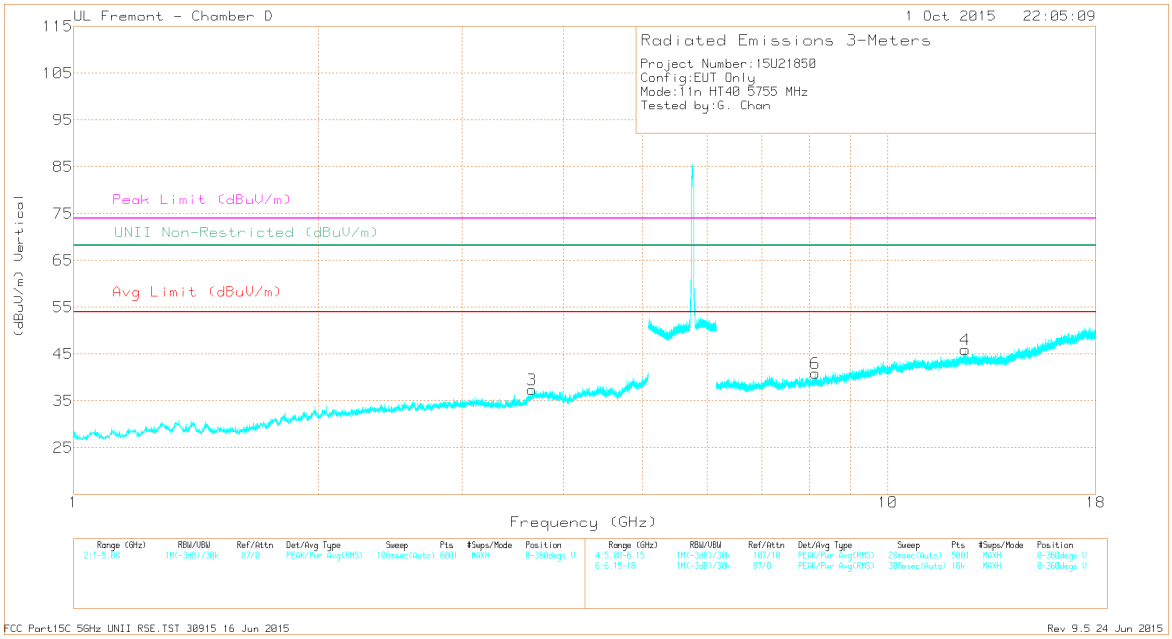
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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	* 4.859	37.23	PK-U	34.1	-25.5	0	45.83	-	-	74	-28.17	-	-	26	185	H
	* 4.857	25.37	ADR	34.1	-25.6	.13	34	54	-20	-	-	-	-	26	185	H
2	* 1.404	41.38	PK-U	28.6	-31.4	0	38.58	-	-	74	-35.42	-	-	200	203	H
	* 1.406	28.79	ADR	28.6	-31.4	.13	26.12	54	-27.88	-	-	-	-	200	203	H
3	* 3.656	38.82	PK-U	33.1	-29.2	0	42.72	-	-	74	-31.28	-	-	48	284	V
	* 3.654	26.84	ADR	33.1	-29.2	.13	30.87	54	-23.13	-	-	-	-	48	284	V
5	* 11.51	37.2	PK-U	38.1	-22	0	53.3	-	-	74	-20.7	-	-	337	234	H
	* 11.511	25.22	ADR	38.1	-22	.13	41.45	54	-12.55	-	-	-	-	337	234	H
4	* 12.444	34.87	PK-U	39	-22.1	0	51.77	-	-	74	-22.23	-	-	268	284	V
	* 12.443	22.95	ADR	39	-22.1	.13	39.98	54	-14.02	-	-	-	-	268	284	V
6	* 8.144	35.93	PK-U	35.6	-23.9	0	47.63	-	-	74	-26.37	-	-	140	143	V
	* 8.142	23.83	ADR	35.6	-23.9	.13	35.66	54	-18.34	-	-	-	-	140	143	V

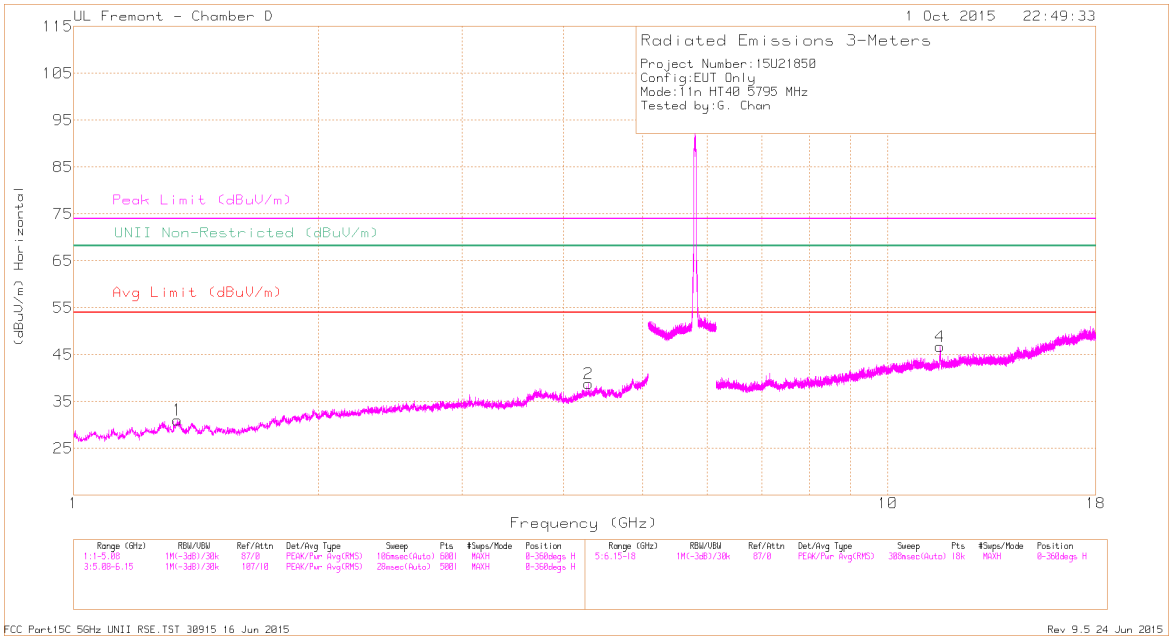
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

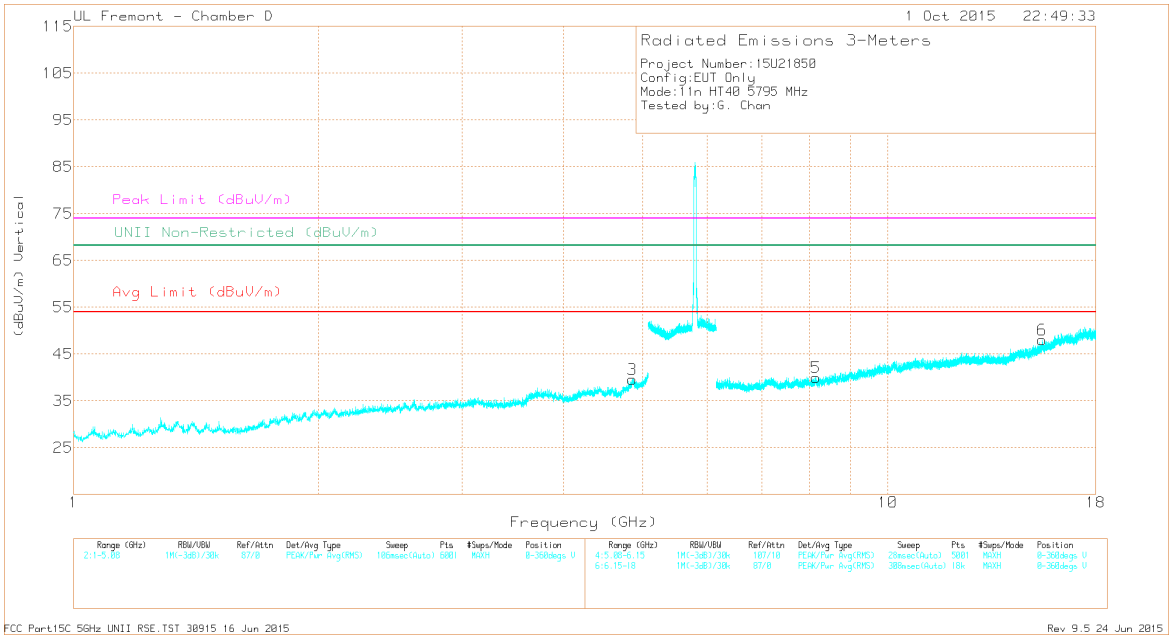
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (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	* 1.342	41.3	PK-U	28.8	-31.5	0	38.6	-	-	74	-35.4	-	-	197	211	H
	* 1.341	29	ADR	28.8	-31.5	.13	26.43	54	-27.57	-	-	-	-	197	211	H
2	* 4.29	38.03	PK-U	33.6	-28	0	43.63	-	-	74	-30.37	-	-	341	126	H
	* 4.291	26.28	ADR	33.6	-28.1	.13	31.91	54	-22.09	-	-	-	-	341	126	H
3	* 4.854	37.32	PK-U	34.1	-25.7	0	45.72	-	-	74	-28.28	-	-	147	162	V
	* 4.855	25.6	ADR	34.1	-25.7	.13	34.13	54	-19.87	-	-	-	-	147	162	V
4	* 11.586	37.72	PK-U	38.1	-22	0	53.82	-	-	74	-20.18	-	-	191	299	H
	* 11.587	26.38	ADR	38.1	-22	.13	42.61	54	-11.39	-	-	-	-	191	299	H
5	* 8.156	35.4	PK-U	35.6	-24	0	47	-	-	74	-27	-	-	133	108	V
	* 8.156	23.79	ADR	35.6	-24	.13	35.52	54	-18.48	-	-	-	-	133	108	V
6	* 15.469	34.55	PK-U	40.5	-21.1	0	53.95	-	-	74	-20.05	-	-	236	222	V
	* 15.466	23.06	ADR	40.5	-21.1	.13	42.59	54	-11.41	-	-	-	-	236	222	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

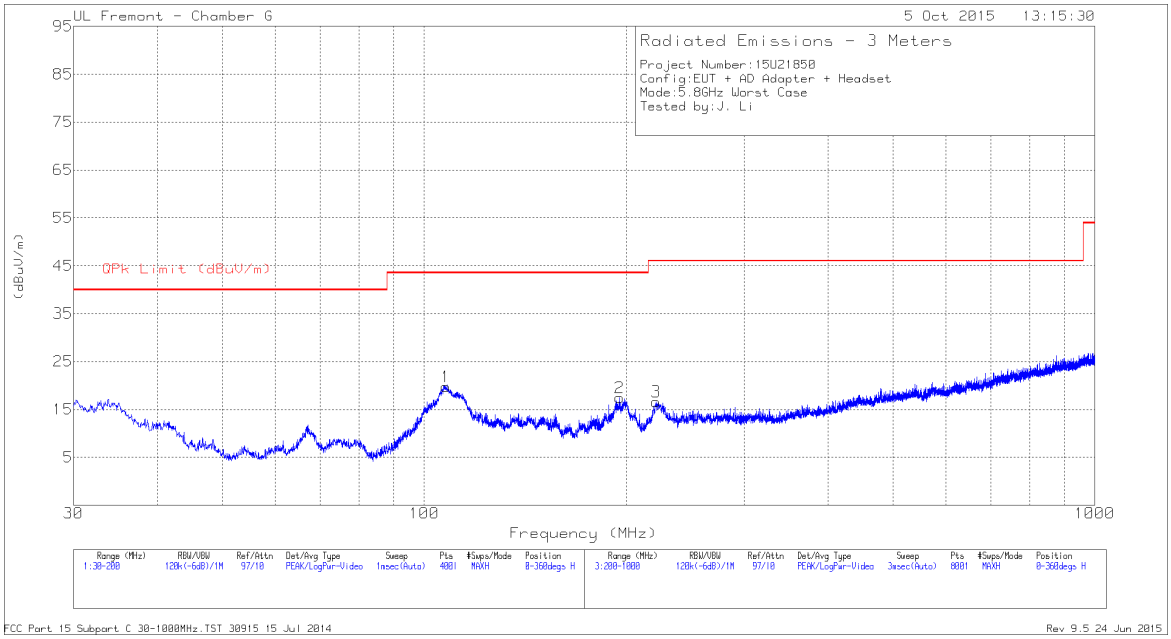
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

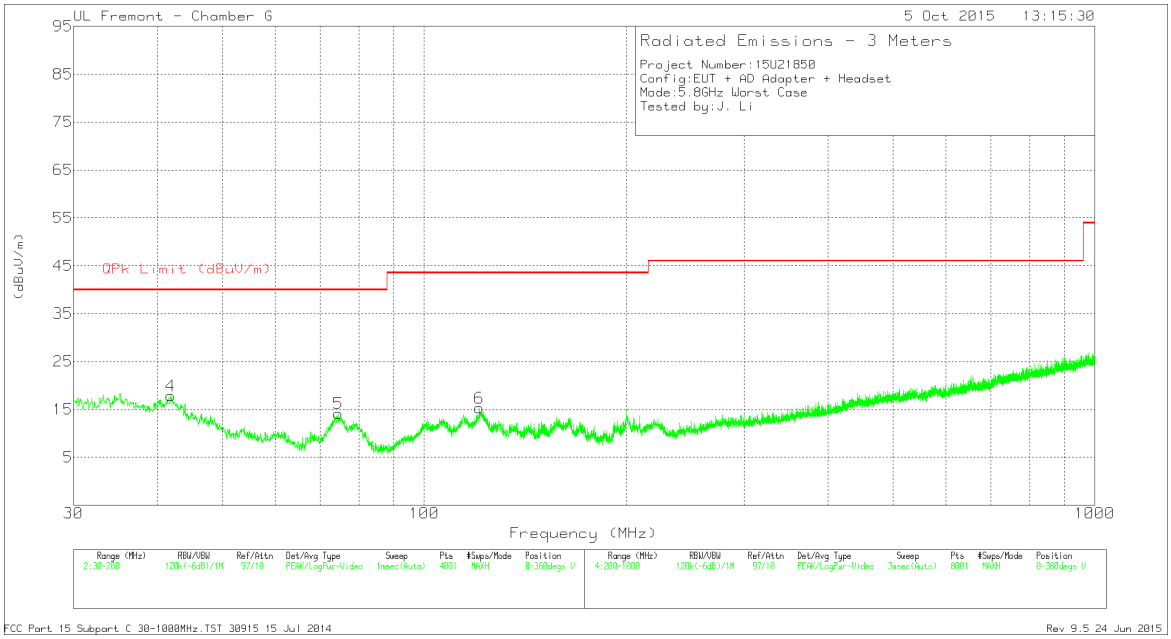
9.4. WORST-CASE BELOW 1 GHz

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 T899 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 74.455	36.63	Pk	8.2	-30.7	14.13	40	-25.87	0-360	100	V
6	* 120.865	31.82	Pk	13.7	-30.2	15.32	43.52	-28.2	0-360	100	V
4	41.8575	36	Pk	13	-31.2	17.8	40	-22.2	0-360	100	V
1	107.8175	37.87	Pk	12.3	-30.4	19.77	43.52	-23.75	0-360	301	H
2	195.665	34.65	Pk	12.4	-29.6	17.45	43.52	-26.07	0-360	100	H
3	221.8	35.45	Pk	10.6	-29.4	16.65	46.02	-29.37	0-360	100	H

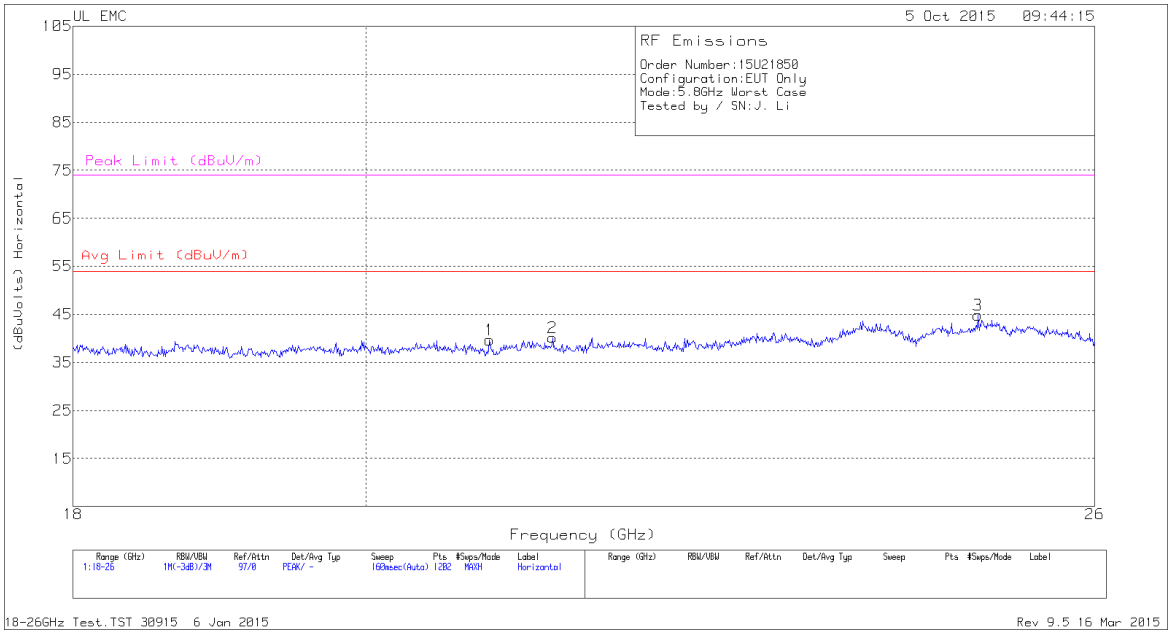
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

Pk - Peak detector

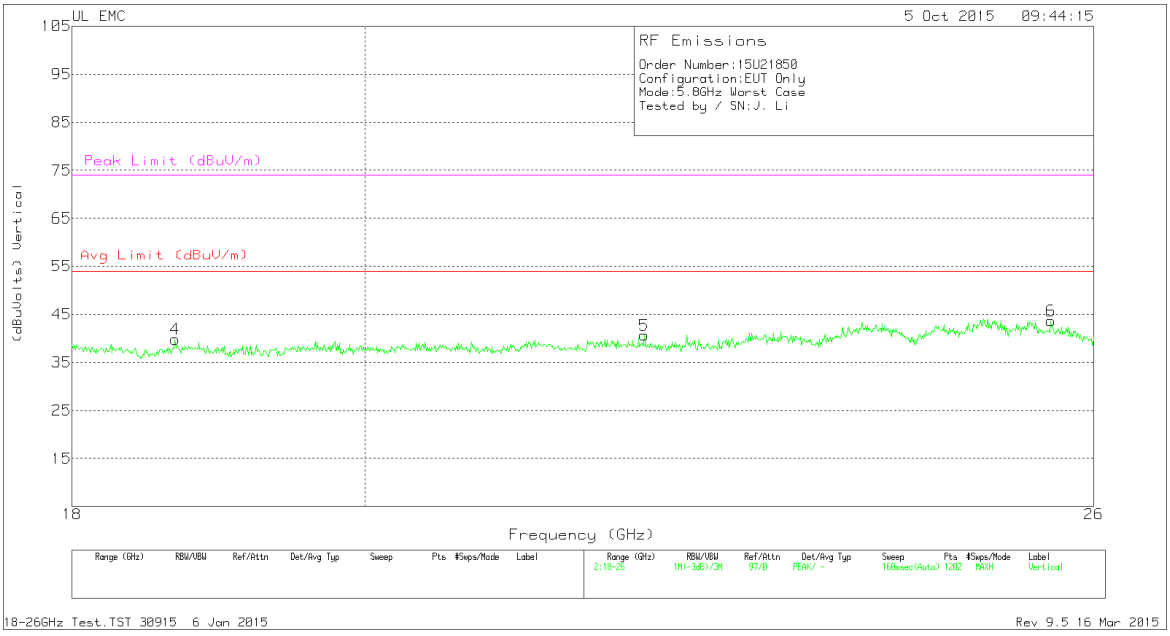
9.5. WORST-CASE ABOVE 18 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



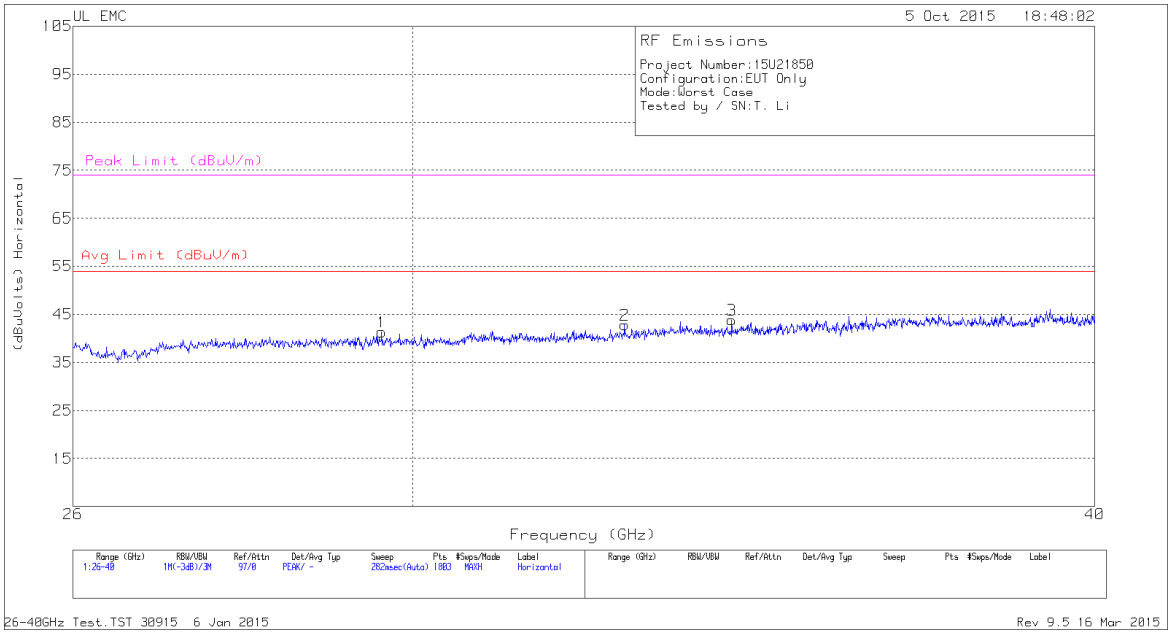
HORIZONTAL AND VERTICAL DATA

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	20.911	41.87	Pk	32.5	-25.2	-9.5	39.667	54	-14.333	74	-34.333
2	21.391	42.17	Pk	33.1	-25.6	-9.5	40.167	54	-13.833	74	-33.833
3	24.928	44.53	Pk	34.1	-24.3	-9.5	44.833	54	-9.167	74	-29.167
4	18.679	41.43	Pk	32.5	-24.6	-9.5	39.833	54	-14.167	74	-34.167
5	22.117	41.97	Pk	33	-24.8	-9.5	40.667	54	-13.33	74	-33.333
6	25.6	44.07	Pk	34	-24.9	-9.5	43.667	54	-10.333	74	-30.333

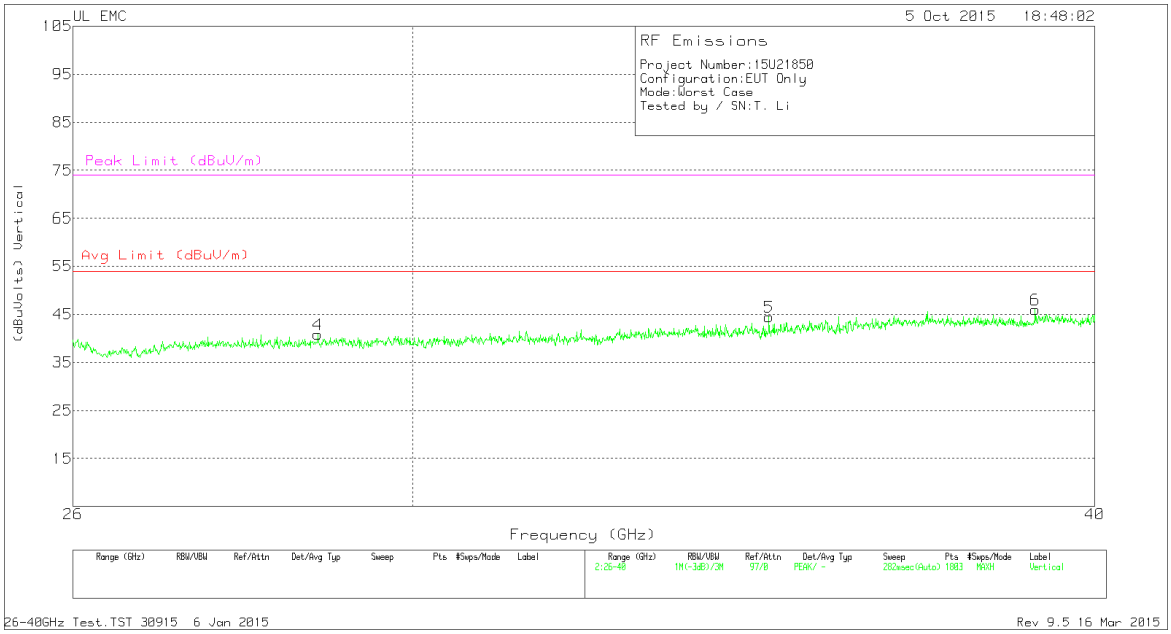
Pk - Peak detector

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	29.613	47.03	Pk	36	-32.2	-9.5	41.333	54	-12.667	74	-32.667
2	32.806	48.53	Pk	36.6	-32.8	-9.5	42.833	54	-11.167	74	-31.167
3	34.321	49.23	Pk	37.1	-33	-9.5	43.833	54	-10.1667	74	-30.167
4	28.828	46.43	Pk	35.8	-31.9	-9.5	40.833	54	-13.1667	74	-33.167
5	34.865	50.1	Pk	37.2	-33.3	-9.5	44.5	54	-9.5	74	-29.5
6	39.006	50	Pk	37.3	-31.8	-9.5	46	54	-8	74	-28

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.

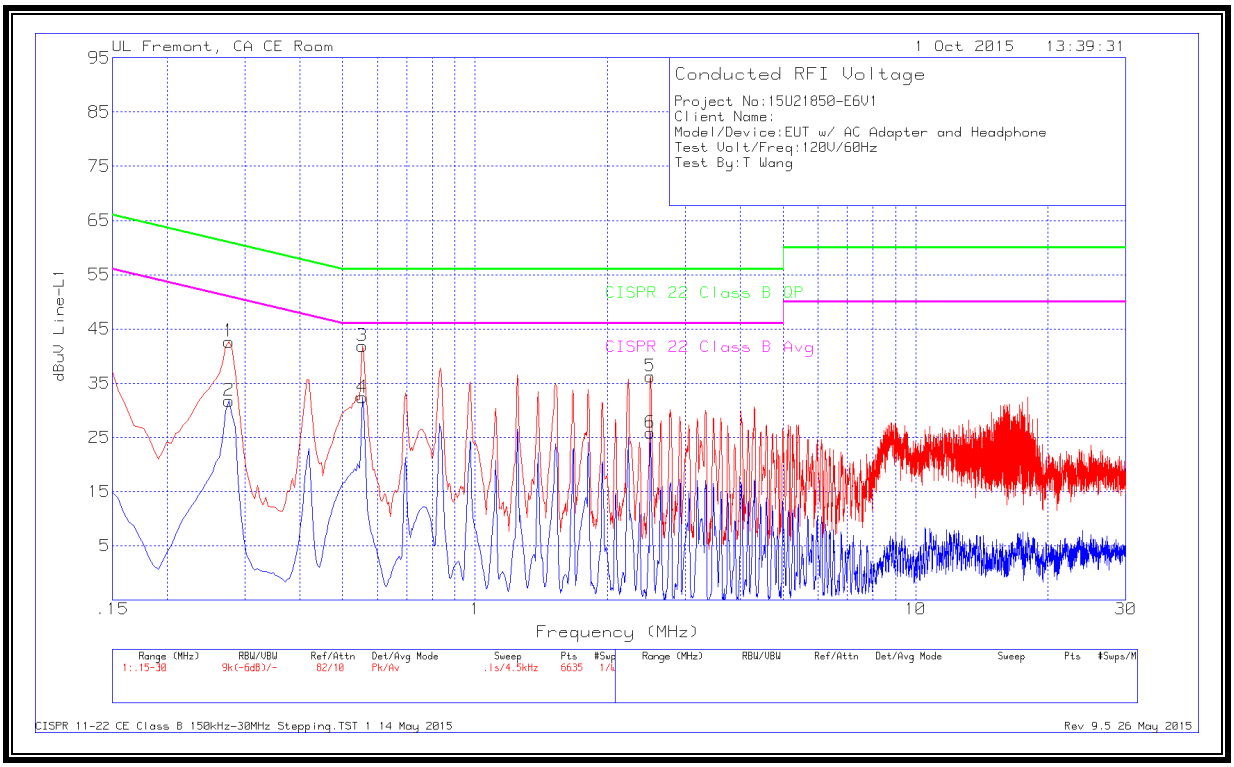
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

10.1. EUT POWERED BY AC ADAPTER

LINE 1 RESULTS



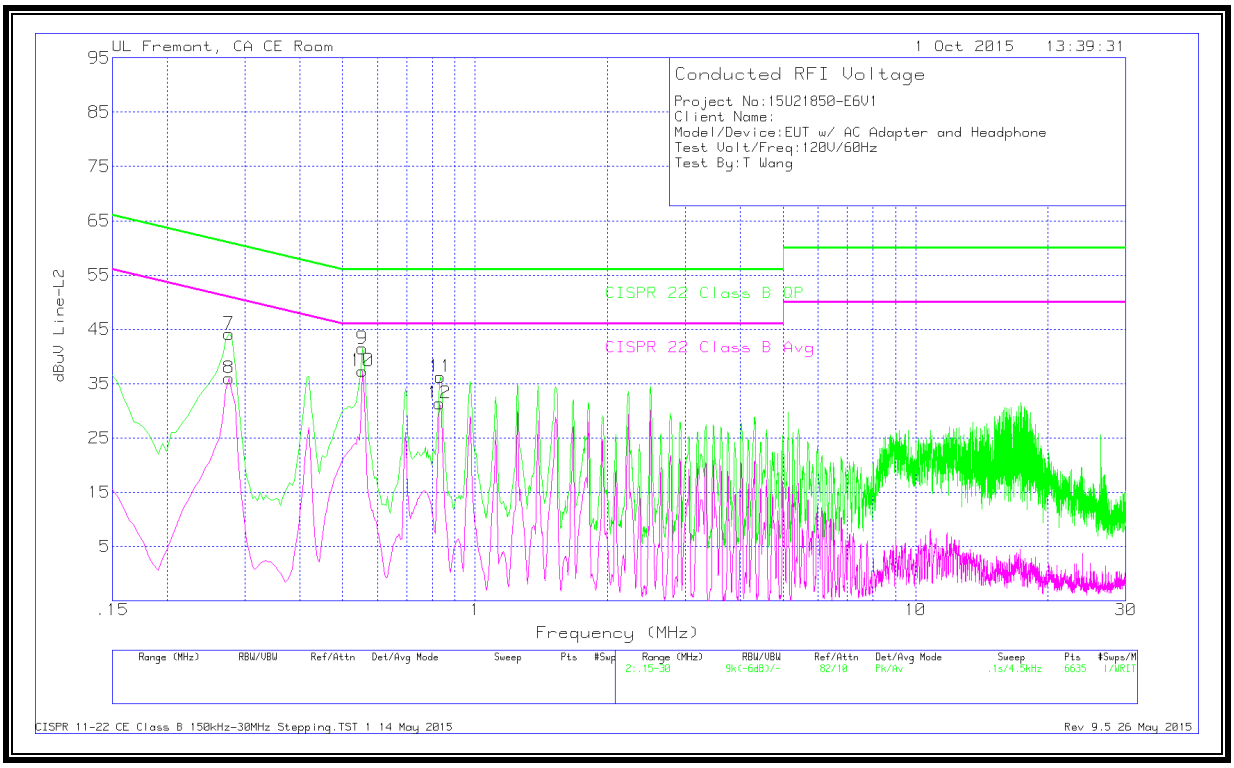
WORST EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.276	42.08	Pk	.6	0	42.68	60.94	-18.26	-	-
2	.276	31.19	Av	.6	0	31.79	-	-	50.94	-19.15
3	.555	41.57	Pk	.3	0	41.87	56	-14.13	-	-
4	.555	32.07	Av	.3	0	32.37	-	-	46	-13.63
5	2.499	35.97	Pk	.2	.1	36.27	56	-19.73	-	-
6	2.499	25.57	Av	.2	.1	25.87	-	-	46	-20.13

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



WORST EMISSIONS

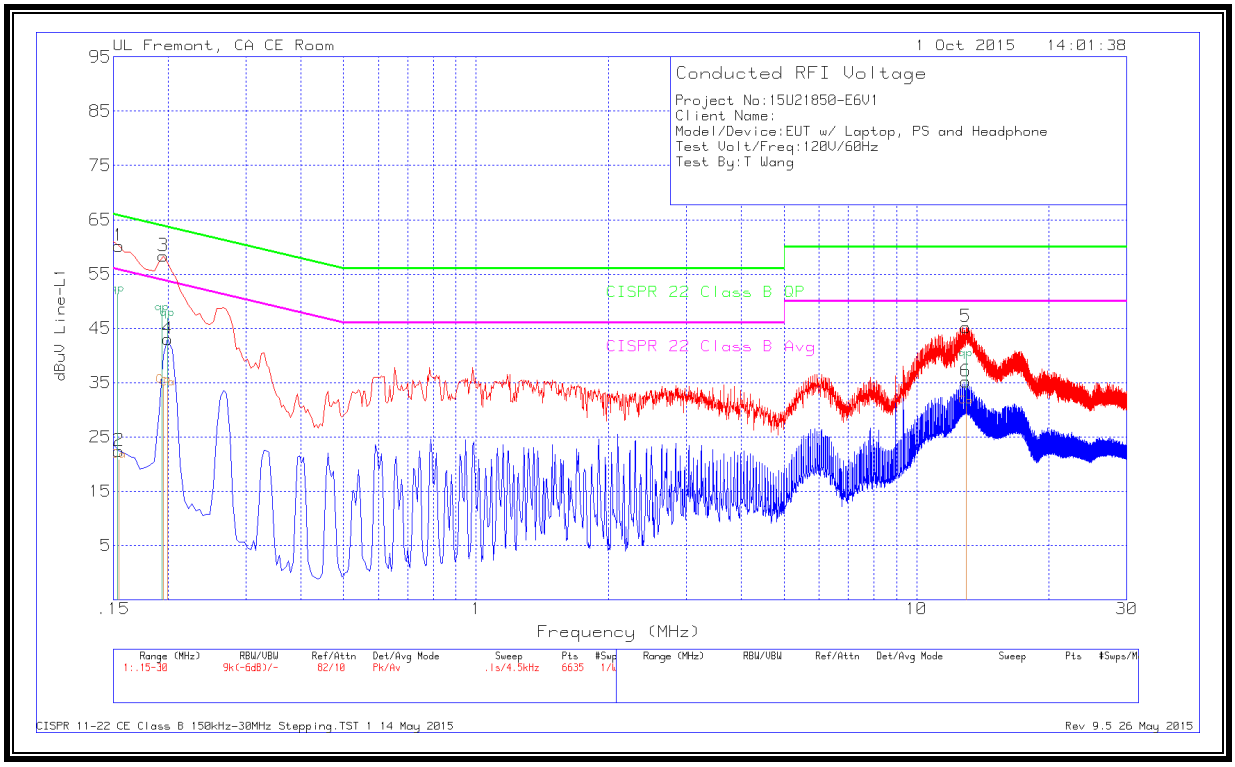
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
7	.276	43.45	Pk	.7	0	44.15	60.94	-16.79	-	-
8	.276	35.31	Av	.7	0	36.01	-	-	50.94	-14.93
9	.555	41.16	Pk	.3	0	41.46	56	-14.54	-	-
10	.555	37.04	Av	.3	0	37.34	-	-	46	-8.66
11	.834	35.95	Pk	.3	0	36.25	56	-19.75	-	-
12	.8295	31.09	Av	.3	0	31.39	-	-	46	-14.61

Pk - Peak detector

Av - Average detection

10.2. EUT POWERED BY HOST PC VIA USB CABLE

LINE 1 RESULTS



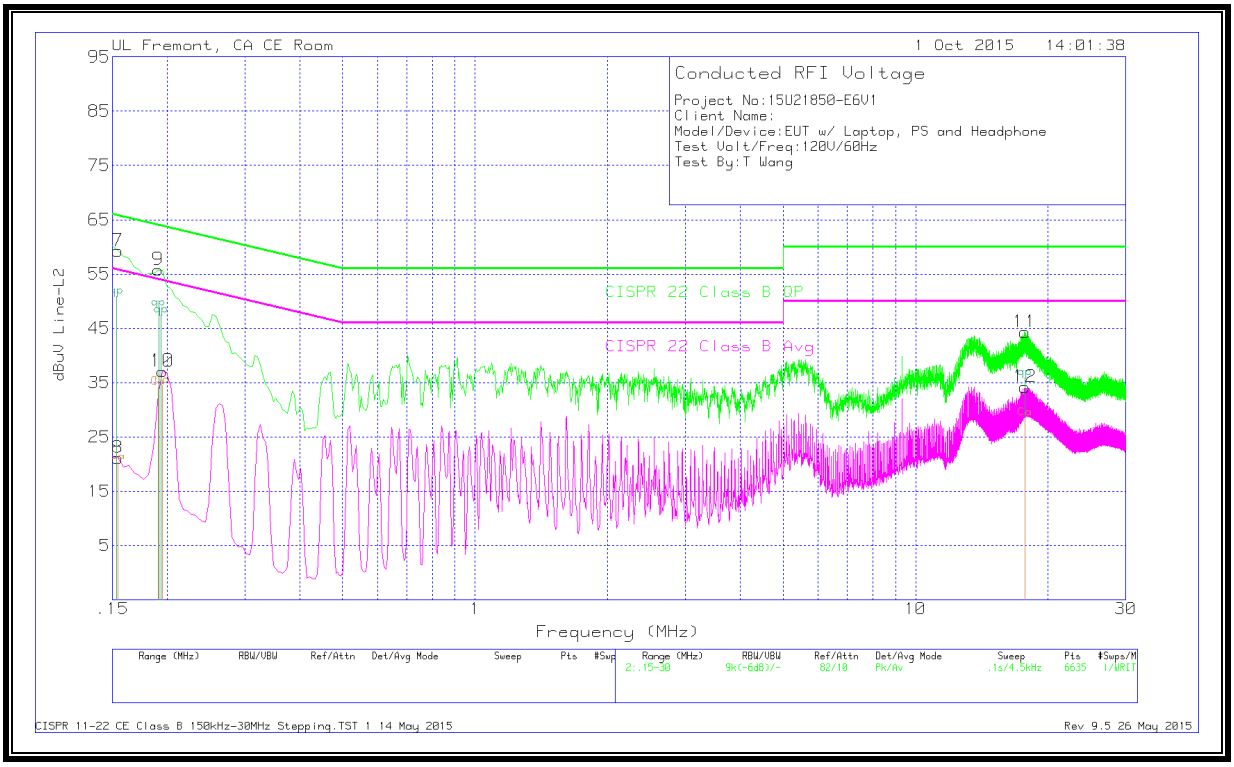
WORST EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.15338	49.91	Qp	1.4	0	51.31	65.81	-14.5	-	-
2	.15338	19.33	Ca	1.4	0	20.73	-	-	55.81	-35.08
3	.19388	46.85	Qp	1	0	47.85	63.87	-16.02	-	-
4	.19928	33.09	Ca	.9	0	33.99	-	-	53.64	-19.65
5	12.9446	39	Qp	.2	.2	39.4	60	-20.6	-	-
6	12.9446	30.2	Ca	.2	.2	30.6	-	-	50	-19.4

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
7	.15338	49.41	Qp	1.5	0	50.91	65.81	-14.9	-	-
8	.15338	18.85	Ca	1.5	0	20.35	-	-	55.81	-35.46
9	.19118	47.67	Qp	1.1	0	48.77	63.99	-15.22	-	-
10	.19388	33.38	Ca	1.1	0	34.48	-	-	53.87	-19.39
11	17.7223	35.36	Qp	.3	.2	35.86	60	-24.14	-	-
12	17.7223	27.97	Ca	.3	.2	28.47	-	-	50	-21.53

Qp - Quasi-Peak detector

Ca - CISPR average detection