Extron Electronics
INTERFACING, SWITCHING AND CONTROL

FCC AND IC RF TEST REPORT

Product Tested
ShareLink 250 W

Report Number
2051-2

Prepared for:
Extron Electronics
1025 E. Ball Road
Anaheim, CA 92805
714.491.1500

Prepared by:
Extron Electronics – Compliance Lab

A2LA ACCREDITED
Testing Cert # 3429.01

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REVISION PAGE

Issue Date	Revision	Changes	By
3/15/2016	A	Initial Release	Boni Baniqued
3/29/2016	B	Updated product name and corrected typo errors	Boni Baniqued
4/11/2016	C	Updated KDB 789033 D02 reference to the latest version	Boni Baniqued

CERTIFICATION

PRODUCT NAME:	Wireless Collaboration Gateway
BRAND NAME:	Extron
MODEL NUMBER:	ShareLink 250 W
FCC ID:	2AE3WEXTSL250W
IC:	10862A-EXTSL250W
APPLICANT NAME:	Extron Electronics, 1025 E, Ball Road, Anaheim, CA 92805
DATE OF TESTING:	February 19, 2016 to March 7, 2016
STANDARDS:	FCC Part 15 Subpart E (Section 15.407)
	IC RSS-247 Issue 1 (License-Exempt Local Area Network Devices)
	IC RSS-GEN Issue 4
OPERATING BANDS:	5150 MHz – 5250 MHz
	5725 MHz – 5850 MHz

The above equipment was found to be in compliance with the limits and levels of the standards listed in this report based on the testing results. Unless otherwise stated, the results of this report relate only to the items tested as described in the General Information section of this test report. If any significant changes are made to the EUT, the changes shall be evaluated and a retest may be required.

Test reports shall not be reproduced except in full, without the written approval of the Extron Director of Compliance Engineering, or his designee.

Approved & Released for
Extron Electronics Compliance Engineering By:

Homi Ahmadi
Director of Compliance Engineering
Extron Electronics

Tested By:

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DN: cn=Boni Baniqued, o=Extron Electronics, ou=Compliance Engineering, email=bbaniqued@extron.com, c=US
Date: 2016.04.12 16:20:08 -07'00'

Boni Baniqued
Regulatory Compliance Engineer
Extron Electronics

1 GENERAL INFORMATION

1.1 Applicant Information

Extron Electronics, 1025 E. Ball Road, Anaheim, CA 92805, USA

1.2 Application Type

FCC Part 15 Subpart E Section 15.407 and IC RSS-247 Issue 1 (License-Exempt Local Area Network) Certification

1.3 Related Submittal(s)/Grant(s) / Technical Acceptance Certificate(s)

N/A

1.4 Test Methodology

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 789033 D02 General UNII Test Procedures New Rules v01r02, RSS-Gen Issue 4, and IC RSS-247 Issue 1.

1.5 Test Facilities and Accreditations

- All testing was performed at Extron Electronics – Compliance Laboratory, 1001 E. Ball Road, Anaheim, CA 92805, USA
- American Association for Laboratory Accreditation: 3429.01, Valid Through June 30, 2017
- FCC Designation Number: US1143, Valid Through 06/30/2016
- VCCI Registration Number: A-0186, Valid Through 06/30/2017
- Industry Canada Site Number: 10862A-1, Valid Through 07/15/2016

NOTE

This report cannot be used to claim product endorsement by any of the agencies listed above.

NOTE

The Extron Electronics – Compliance Laboratory operates as an independent test lab within Extron Electronics with no organizational or financial relationship.

1.6 Measurement Uncertainty

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4-2. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

Radiated Emissions

Test Method	Lab	Uncertainty	Units
Radiated Emissions 30-1000MHz (Vertical Polarity)	B	±4.88	dB
Radiated Emissions 30-1000MHz (Horizontal Polarity)	B	±4.88	dB
Radiated Emissions 1-18GHz	B	±5.01	dB
Radiated Emissions 18-40GHz	B	±5.02	dB

Conducted Emissions

Test Method	Lab	Uncertainty	Units
Conducted Emissions with LISN	E	±3.79	dB
Conducted Emissions with T-ISN	E	±3.75	dB

2 PRODUCT INFORMATION

2.1 Description of the EUT

The Equipment Under Test (EUT) is a Wireless Collaboration Gateway (P/N: 60-1558-01) with support for 2.4/5.5 GHz IEEE 802.11 a/b/g/n.

** The test data gathered are from Production samples, serial number EXTN2500151700016, received from the manufacturer on February 19, 2016.*

2.2 Description of the Antenna

WLAN External Antenna with SMA Male Reverse connector

Product Number	Manufacturer	Type	Peak Gain (dBi)	
			2400 ~ 2500 MHz	5150 ~ 5850 MHz
AN2450-4828RS	Cortec	Dipole	≤ 2.0	≤ 2.0

2.3 Description of Power Supply

Item	Type	Manufacturer	Model	Input	Output	Power Line
1	Adapter	ENG	6A-161WP05	100~240Vac, 50~60Hz, 0.6A	5.0Vdc, 2.6A	1.5m unshielded cable with one ferrite
2*	PoE	EXTRON	XTP PI 100	100~240Vac, 50~60Hz, 0.4A	+48Vdc, 0.35A	-

** PoE is an alternate power supply and provided as support only.*

2.4 Description of Test Setup

Support Equipment List

Description	Manufacturer	Model/Part Number	Serial Number	Quantity
Laptop PC	Dell	D630	N/A	1
Laptop PC	Dell	E6400	N/A	1
24” LED-LCD HDTV	Vizio	VX240M	VX24120109027	1
24” LED-LCD HDTV	Vizio	VX240M	LSMFAAK3604939	1
Gigabit Switch HUB	Allied Telesis	AT-GS950/16	A04374R121500007 A1	1
USB Mouse	Dell	M-BAC-DEL5	N/A	1
USB Keyboard	Dell	L100	N/A	1
USB Flash Drive	Sony	USM4GL	N/A	1

I/O Cable List

Description	Manufacturer	Model/Part Number	Serial Number	Quantity
CAT-5e UTP 10’ cable	Extron Electronics	26-640-10	N/A	2
CAT-5e UTP 35’ cable	Extron Electronics	26-640-35	N/A	1
HDMI PRO 25’ cable	Extron Electronics	26-650-25	N/A	1
HDMI ULTRA 15’ cable	Extron Electronics	26-663-15	N/A	1
VGA M-M 35’ cable	Extron Electronics	26-238-17	N/A	1
Audio Mini 25’ cable	Extron Electronics	26-571-01	N/A	1

2.5 Worst Test Modes and Channel Details

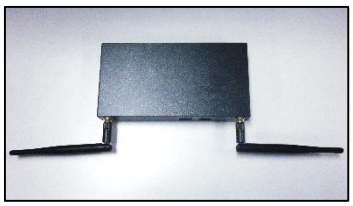
Test Condition	Test Item	Modulation Mode	Data Rate (Mbps / MCS)	Test Frequency (MHz)	Application	
					Mode 1	Mode2
RF Conducted	6dB EBW and 99% OBW 26dB EBW and 99% OBW Maximum Conducted Output Power Maximum Power Spectral Density	802.11a	6 Mbps	5180 / 5200 / 5240 5745 / 5785 / 5825	√	-
		802.11n (HT20)	MCS0/6.5 Mbps	5180 / 5200 / 5240 5745 / 5785 / 5825	√	-
		802.11n (HT40)	MCS0/13.5 Mbps	5190 / 5230 5755 / 5795	√	-
	Frequency Stability	802.11a	6 Mbps	5180 5825	√	-
Radiated	Radiated Emissions < 1GHz	802.11a	6 Mbps	5200	√	√
	Radiated Spurious Emissions > 1GHz	802.11a	6 Mbps	5180 / 5200 / 5240 5745 / 5785 / 5825	√	-
	Radiated Restricted-band band-edge	802.11a	6 Mbps	5180 / 5240 5745 / 5825	√	-
		802.11n (HT20)	MCS0/6.5 Mbps	5180 / 5240 5745 / 5825	√	-
		802.11n (HT40)	MCS0/13.5 Mbps	5190 / 5230 5755 / 5795	√	-
Line Conducted	AC Power-line Conducted Emissions	802.11a	6 Mbps	5200	√	√

NOTE:

(1) The fundamental frequency of the EUT was investigated in three orthogonal orientations of the antenna, vertical (V), horizontal 1 (H1), and horizontal 2 (H2) as shown below. It was determined that the vertical antenna orientation was the worst-case orientation; therefore, a final radiated emissions testing was performed with the antenna in the vertical orientation.

1. Vertical (V)

2. Horizontal 1 (H1)



3. Horizontal 2 (H2)

(2) Per manufacturer, only Antenna 1 is active and Antenna 2 is disabled due to Hardware limitation.
(3) Mode 1- Power from AC adapter
(4) Mode 2- Power from PoE

2.6 Worst Case Power Setting parameter

U-NII-1: 5150 ~ 5250 MHz Band

Modulation Mode	Test Channel	Test Frequency (MHz)	Power Setting
802.11a	36	5180	15
	40	5200	15
	48	5240	15
802.11n (HT20)	36	5180	15
	40	5200	15
	48	5240	15
802.11n (HT40)	38	5190	4
	46	5230	4

U-NII-3: 5725 ~ 5850 MHz Band

Modulation Mode	Test Channel	Test Frequency (MHz)	Power Setting
802.11a	149	5745	15
	157	5785	15
	165	5825	15
802.11n (HT20)	149	5745	15
	157	5785	15
	165	5825	15
802.11n (HT40)	151	5755	6
	159	5795	6

Note: The power setting was tuned using RF Test (ver 0.1) provided by the manufacturer.

2.7 Equipment Modifications

None

2.8 Testing Condition

Test Item	Test Site	Environmental Condition			Tested By
		Temperature	Relative Humidity	Atmospheric Pressure	
RF Conducted Emissions	Lab M	22-25°C	40-60%	1002-1018mbar	Boni Baniqued
Radiated Spurious Emissions	Lab B	22-25°C	40-60%	1002-1018mbar	Boni Baniqued
AC Power-Line Conducted Emissions	Lab E	22-25°C	40-60%	1002-1018mbar	Boni Baniqued
Frequency Stability	Lab J	22°C	59%	1011mbar	Boni Baniqued

2.9 Software

• RF Test (Ver0.1) – for Wi-Fi Module control
• R&S Power Viewer Plus – for maximum conducted output power measurement
• R&S EMC32 V8.54.0 - AC power line conducted emissions and radiated spurious emissions measurements
• R&S RSCommander V1.5.9 – for Spectrum Analyzer /Receiver plot capture

3 TEST AND MEASUREMENT EQUIPMENT

Equipment Type	Manufacturer	Model Number	Asset/Serial Number	Calibration Due Date
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	101447	08/03/2016
EMI Receiver, 40 GHz	Rohde & Schwarz	ESU40	100161	08/27/2016
EMI Receiver, 26 GHz	Rohde & Schwarz	ESU26	100189	12/01/2016
AVG Power Sensor	Rohde & Schwarz	NRP-Z31	101721	07/20/2016
Antenna – Bilog, 30MHz-1GHz	ETS-Lingren	3142D	13988	04/13/2016
Antenna, Horn, 1-18 GHz	ETS-Lingren	3117	00108478	03/31/2016
Antenna, Horn, 18- 40 GHz	ATM	180-442-KF/CAL	L488008-01	05/18/2016
Pre-Amplifier, 1-18 GHz	Rohde & Schwarz	TS-PR18	100066	04/01/2016
Pre-Amplifier, 18-40 GHz	Rohde & Schwarz	TS-PR18-40	10001	05/18/2016
RF Cable, 0.30-18 GHz	SEMFLEX	N130SFBN10360	N/A	08/25/2016
RF Cable, 1-18 GHz	Huber-Suhner	Sucoflex 104E	232648 003	04/01/2016
RF Cable, 1-40 GHz	SEMFLEX	60637-59957	N/A	05/05/2016
RF Cable, 30 MHz -40 GHz	Pasternack	PE3CA1058-12	N/A	04/21/2016
Notch Filter, 2400-2500 MHz	Micro-Tronics	BRM50702-02	019	04/20/2016
Notch Filter, 5150-5880 MHz	Micro-Tronics	BRM50716-02	005	05/11/2016
Attenuator, 10dB	Bracke	BM10060.10	N/A	CNR
LISN	Rohde & Schwarz	ENV216	13724	4/1/2016
LISN	Com-Power	LI115	13725	CNR
Cable BNC	Pasternak	BNC-2	N/A	3/25/2016
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	115740	9/21/2017
Hygro-Thermometer/Barometer	VWR	89094-760	29221	4/14/2016
Environmental Chamber	Thermotron	SM-8-8200	40991	9/21/2017
Digital Power Meter	Yokogawa	WT210	29115	4/23/2016
Variable Autotransformer	WAV	HY-215	N/A	CNR

Note: CNR – Calibration Not Required

4 TEST RESULTS SUMMARY

FCC Rule Section	IC Rule Section	Test Item Description		Limits	Test Condition	Test Results
N/A	NA	26 dB EBW & 99% OBW	5150-5250 MHz	N/A	Conducted	PASS
§ 15.407 (e)	247 §6.2.4 (1)	6 dB EBW & 99% OBW	5725-5850 MHz	≥ 500 kHz		PASS
§ 15.407 (a)(1) § 15.407 (a)(3)	247 §6.2.1 (1) 247 §6.2.4 (1)	Maximum Conducted Output Power / e.i.r.p	5150-5250 MHz	< 30dBm (FCC)/ < 23dBm e.i.r.p. (IC)		PASS
			5725-5850 MHz	< 30dBm		PASS
§ 15.407 (a)(1) § 15.407 (a)(3)	247 §6.2.1 (1) 247 §6.2.4 (1)	Maximum Power Spectral Density / e.i.r.p. Spectral Density	5150-5250 MHz	<17dBm/MHz (FCC) / <10dBm/MHz (IC)		PASS
			5725-5850 MHz	<30dBm/500kHz		PASS
§ 15.407 (g)	N/A	Transmitter Frequency Stability		FCC Part 15.407 (g)		PASS
§ 15.407 (h)	247 §6.3	Dynamic Frequency Selection (DFS)		N/A		See Note 1
§ 15.407 (b)(1) § 15.407 (b)(4) § 15.407 (b)(5)	247 §6.2.1 (2) 247 §6.2.4 (2)	Unwanted Emissions	5150-5250 MHz	< -27dBm/MHz	Radiated	PASS
			5725-5850 MHz	< -17dBm/MHz w/in 10MHz of the band-edge		PASS
				< -27dBm/MHz		PASS
§ 15.407 (b)(5) § 15.407 (b)(6) § 15.407 (b)(7)	Gen §8.10	Unwanted Emissions in the restricted bands		FCC Part 15.209 (a) Gen 8.9 Table 4		PASS
§ 15.407 (b)(6)	Gen §8.8	AC Power-line Conducted Emissions		FCC Part 15.207 (a) Gen 8.8 Table 3	Line Conducted	PASS
§ 15.407 (f)	102 (4)	RF Exposure Requirements		FCC 1.1310 (e) 102 (4) Table 4	MPE Calculation	PASS

Note: 1. Not Applicable, the EUT does not operate in the frequency bands 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz

5 DUTY CYCLE

The duty cycles for all modes were determined based on measurements per KDB 789033 D02 v01r02 section II.B.2 b) using spectrum analyzer in zero-span mode with RBW = 10 MHz, VBW = 10 MHz, and detector = Peak. The RBW and VBW are > than 50/T and the number of sweep points across duration T exceeds 100.

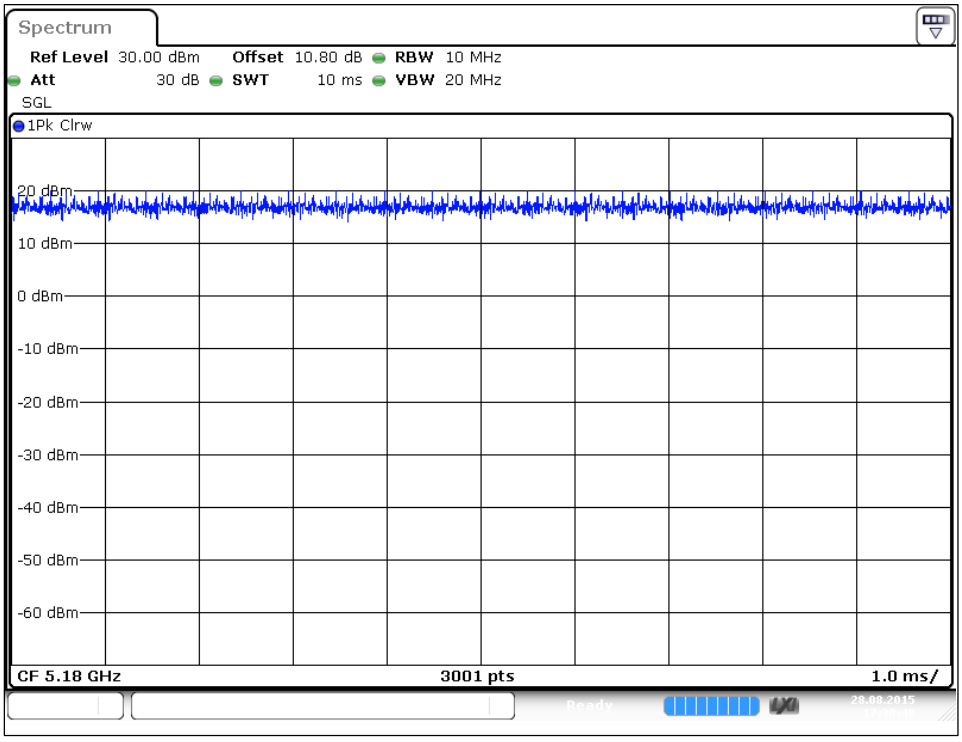
802.11 Mode	Data Rate	T_{OFF} (usec)	T_{ON} (usec)	Duty Cycle [DC]	Duty Cycle (%)	DC Factor (dB)
802.11a	6 Mbps	0	10000	1	100	0
802.11n (HT20)	MCS0/ 6.5 Mbps	0	10000	1	100	0
802.11n (HT20)	MCS0/13.5 Mbps	0	10000	1	100	0

Note:

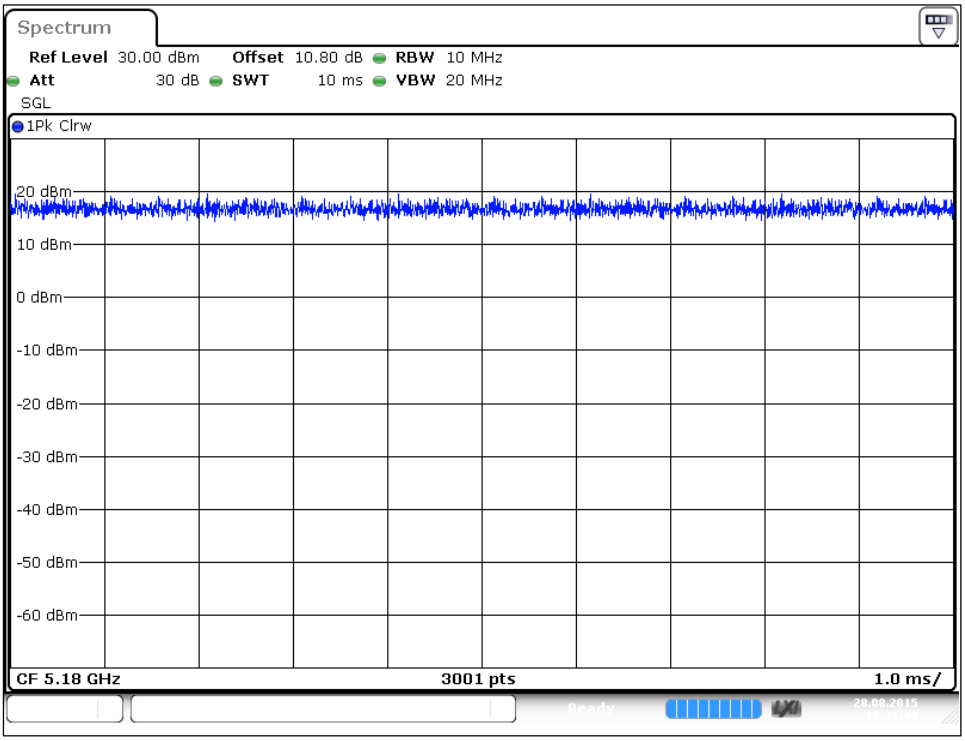
- No DC factor if the duty cycle is > 98%
- T_{OFF} – Transmission OFF time
- T_{ON} – Transmission ON time (Sweep Time)

DUTY CYCLE PLOTS

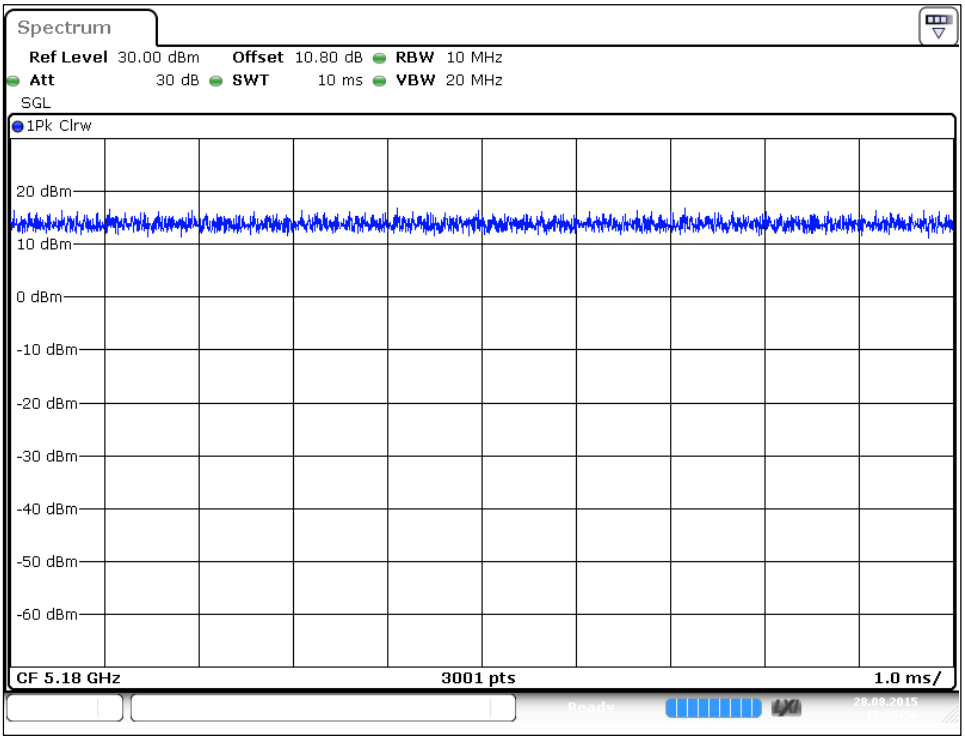
1. 802.11a: 6 Mbps



2. 802.11n (HT20): MCS0 / 6.5 Mbps



3. 802.11n (HT40): MCS0 / 13.5 Mbps



6 TEST RESULTS

6.1 26dB Emission Bandwidth (EBW) and 99% Occupied Bandwidth (OBW)

Limits

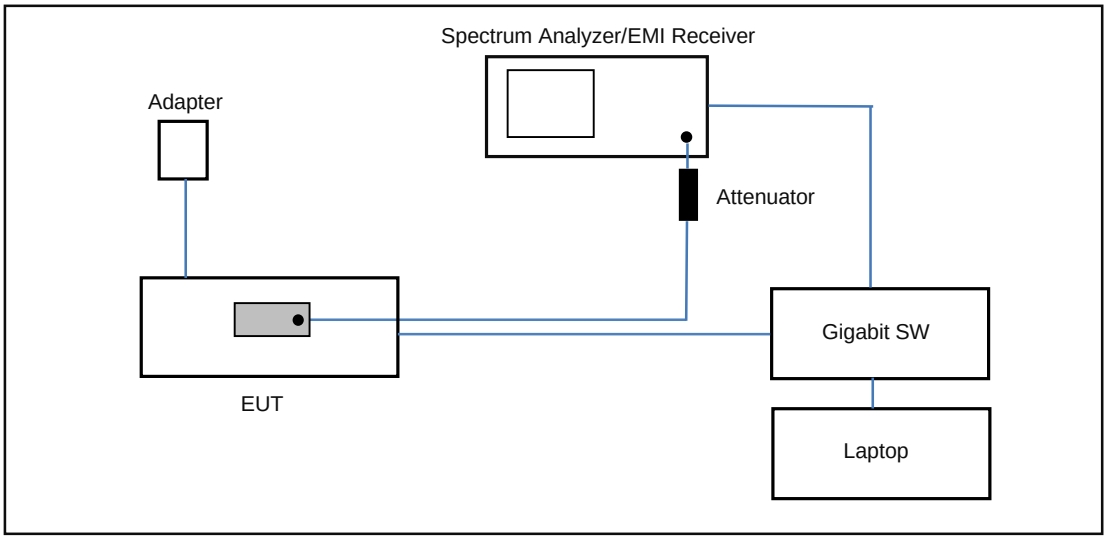
None; the 26dB EBW and 99% OBW are used to determine the conducted power and/or e.i.r.p limits

Test Procedures

• KDB 789033 D02 v01r02 Section C.1 and ANSI C63.10-2013 Section 12.4.1 – for 26 dB Emissions Bandwidth:
• KDB 789033 D02 v01r02 Section D and ANSI C63.10-2013 Section 12.4.2 – for 99% Occupied Bandwidth

Note: EMI Receiver (Spectrum Analyzer) Reference Level Offset = 10.8 dB (10 dB Attenuator Pad + 0.8 cable loss)

Test Setup



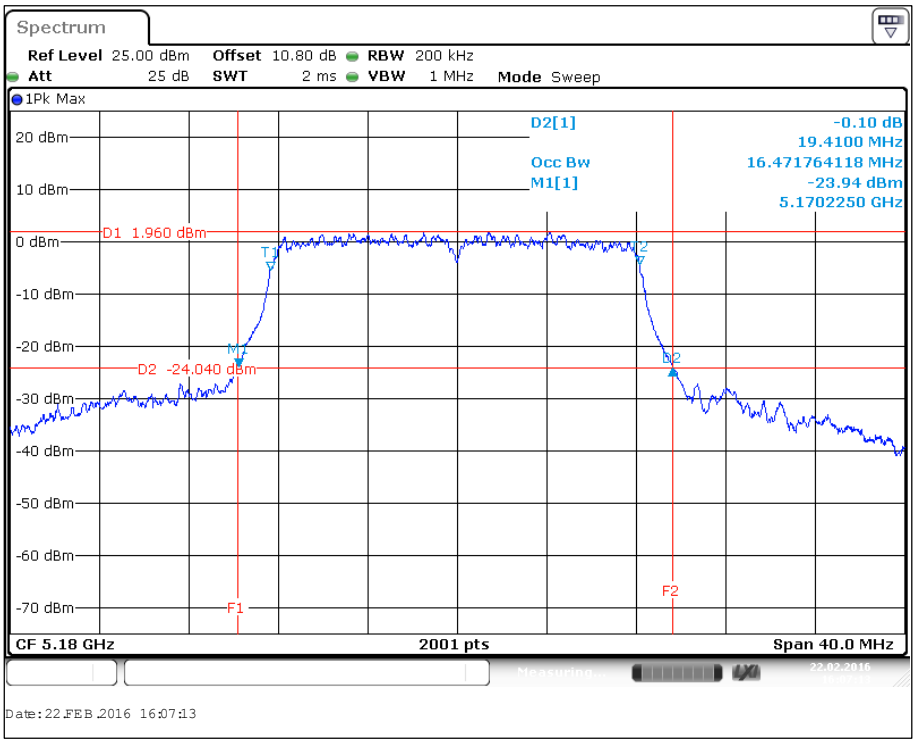
Test Results

6.1.1 26dB EBW and 99% OBW in the 5.15-5.25 GHz Band

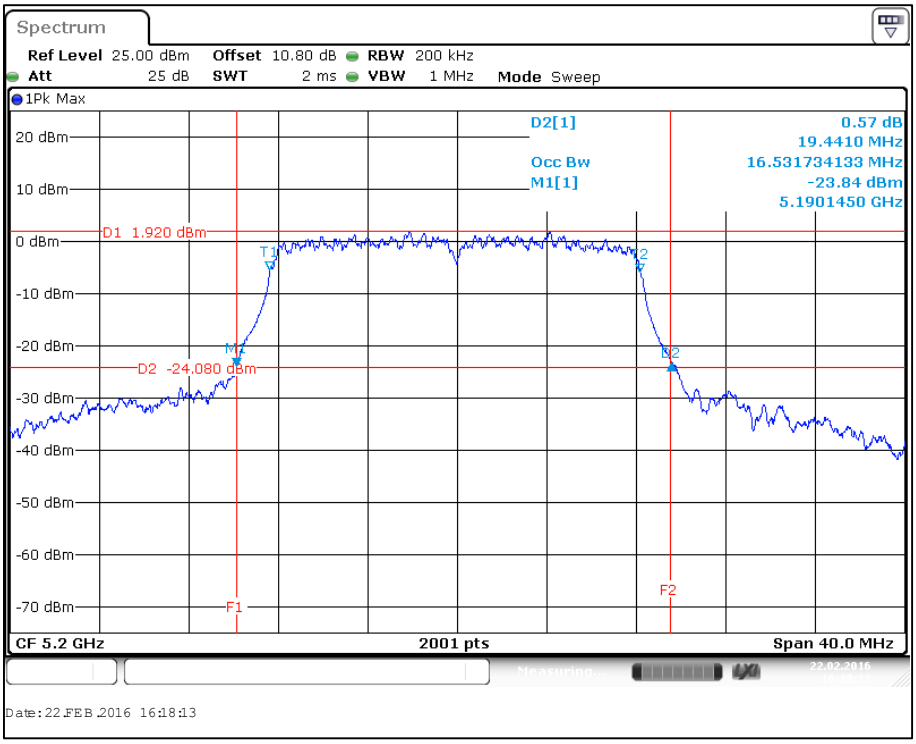
802.11 Mode	Data Rate	Channel	Frequency (MHz)	26dB EBW (MHz)	99% OBW (MHz)
a	6 Mbps	36	5180	19.4	16.5
		40	5200	19.4	16.5
		48	5240	19.4	16.5
n (HT20)	MCS0/ 6.5Mbps	36	5180	19.9	17.5
		40	5200	19.9	17.5
		48	5240	19.9	17.5
n (HT40)	MCS0/ 13.5Mbps	38	5190	39.4	35.9
		46	5230	39.4	35.9

Refer to the following plots

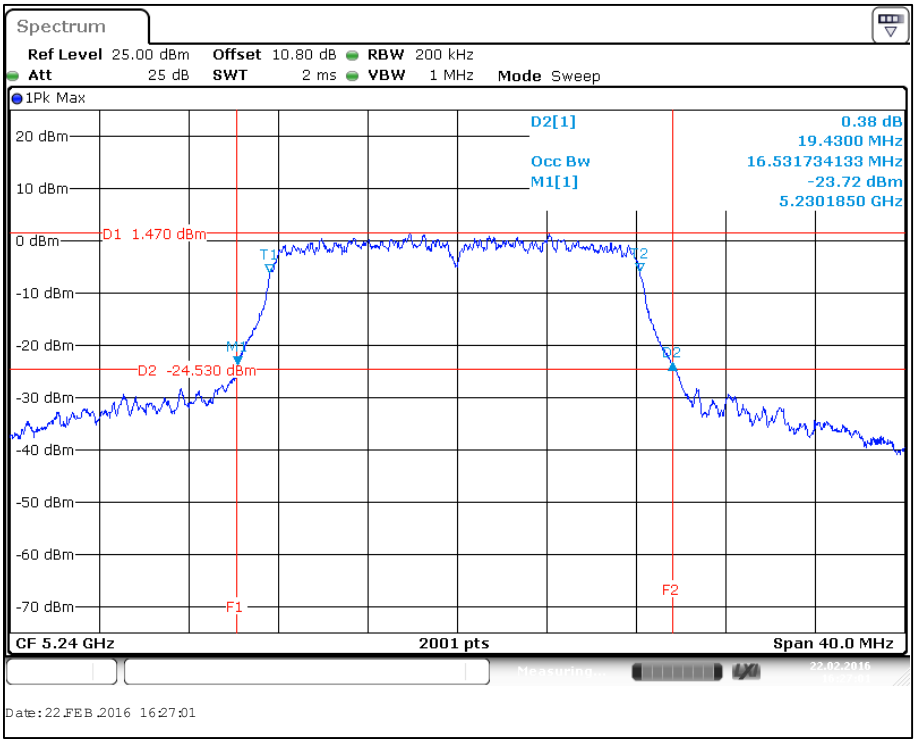
802.11a: 6Mbps



802.11a: 6Mbps – Channel 36 (5180 MHz) 26dB BW and 99% OBW

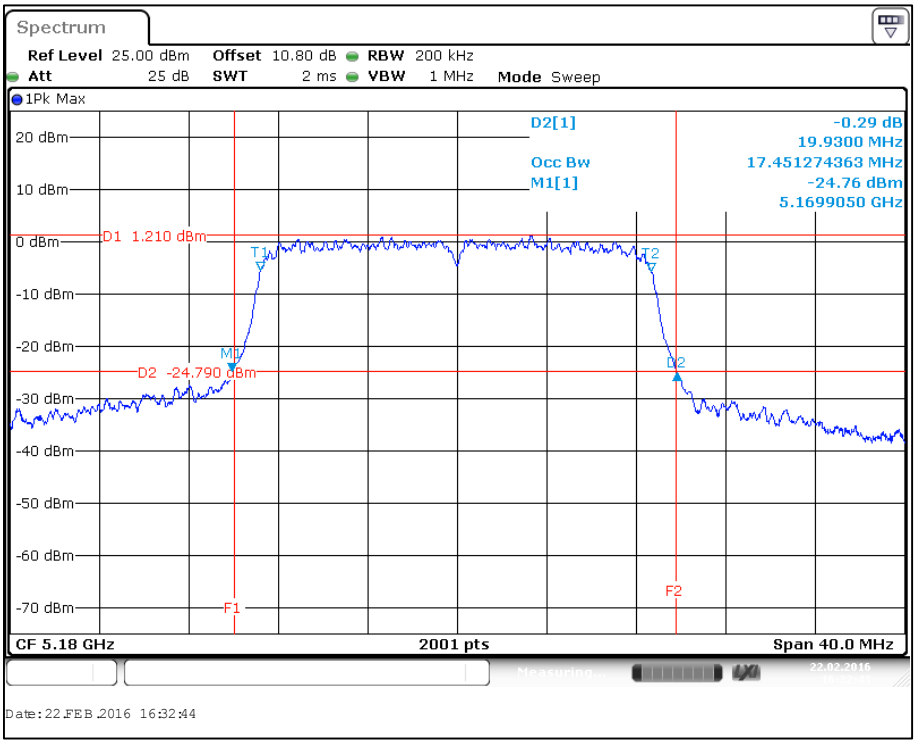


802.11a: 6Mbps – Channel 40 (5200 MHz) 26dB BW and 99% OBW

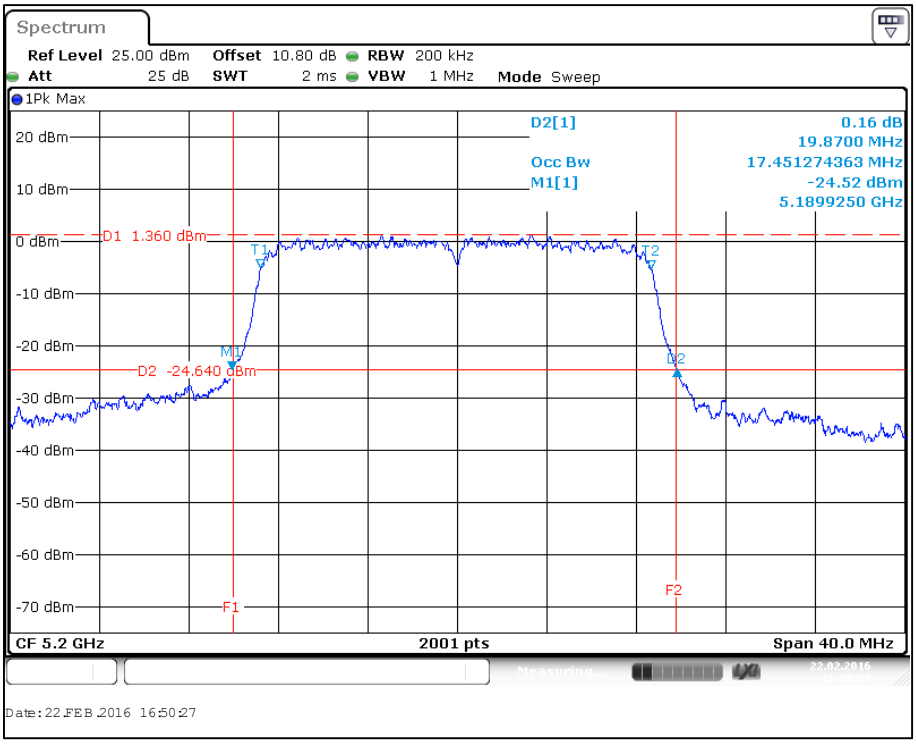


802.11a: 6Mbps – Channel 48 (5240 MHz) 26dB BW and 99% OBW

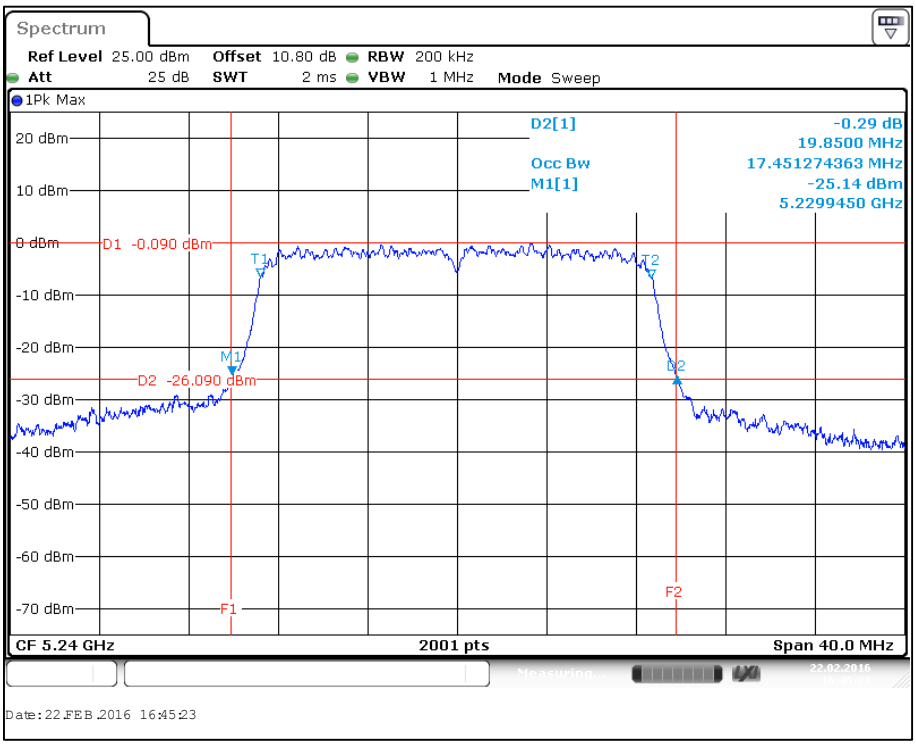
802.11n (HT20): MCS0/6.5 Mbps



802.11n (HT20): MCS0/6.5 Mbps – Channel 36 (5180 MHz) 26dB BW and 99% OBW

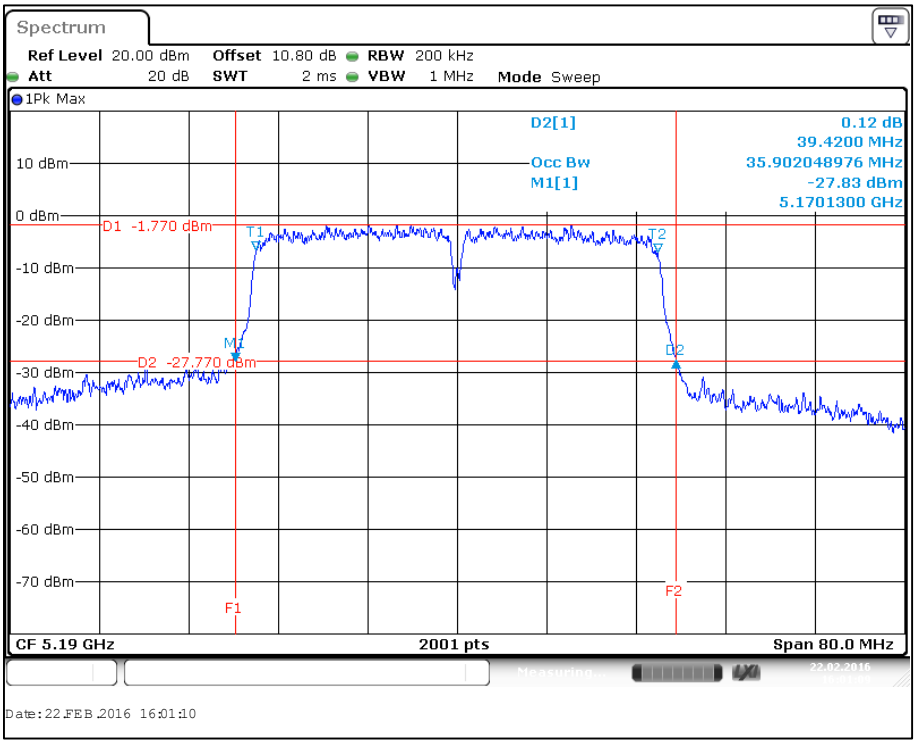


802.11n (HT20): MCS0/6.5 Mbps – Channel 40 (5200 MHz) 26dB BW and 99% OBW

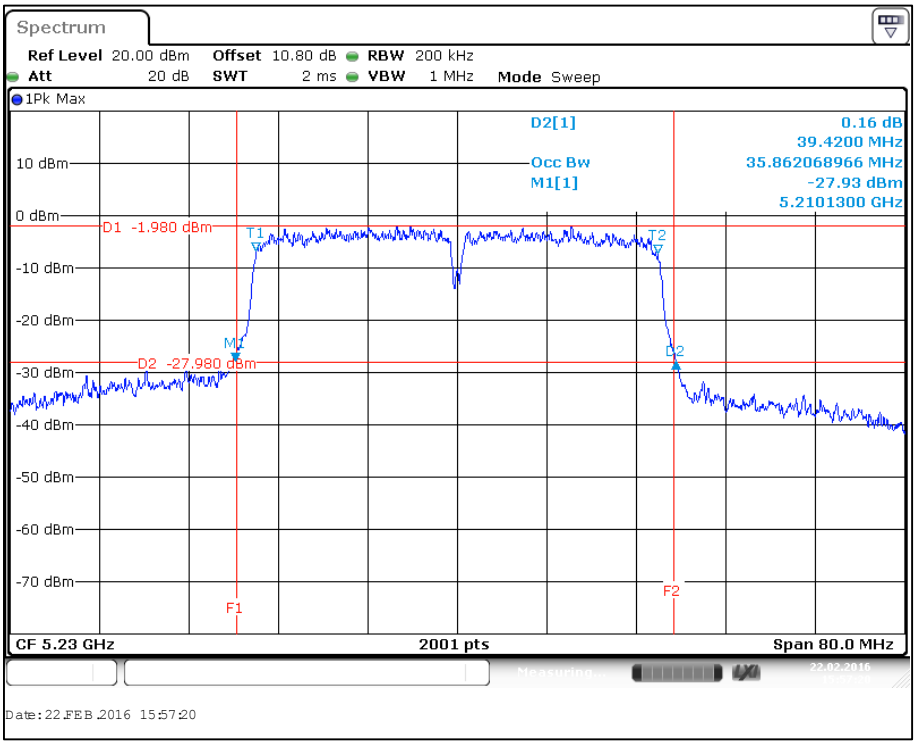


802.11n (HT20): MCS0/6.5 Mbps – Channel 48 (5240 MHz) 26dB BW and 99% OBW

802.11n (HT40): MCS0/13.5 Mbps



802.11n (HT40): MCS0/13.5 Mbps – Channel 38 (5190 MHz) 26dB BW and 99% OBW



802.11n (HT40): MCS0/13.5 Mbps – Channel 46 (5230 MHz) 26dB BW and 99% OBW

6.2 6dB Emission Bandwidth (EBW) and 99% Occupied Bandwidth (OBW)

Limits

FCC Part 15 Subpart E §15.407 (e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

IC RSS-247 Issue 1 §6.2.4 (1)

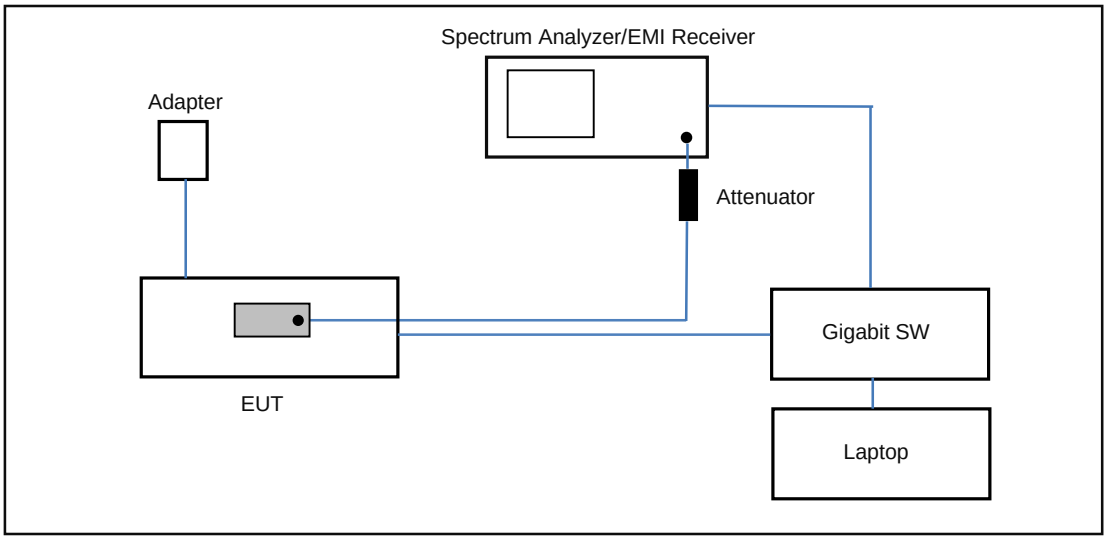
For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedures

KDB 789033 D02 v01r02 Section C.2

Note: EMI Receiver (Spectrum Analyzer) Reference Level Offset = 10.8 dB (10 dB Attenuator Pad + 0.8 cable loss)

Test Setup



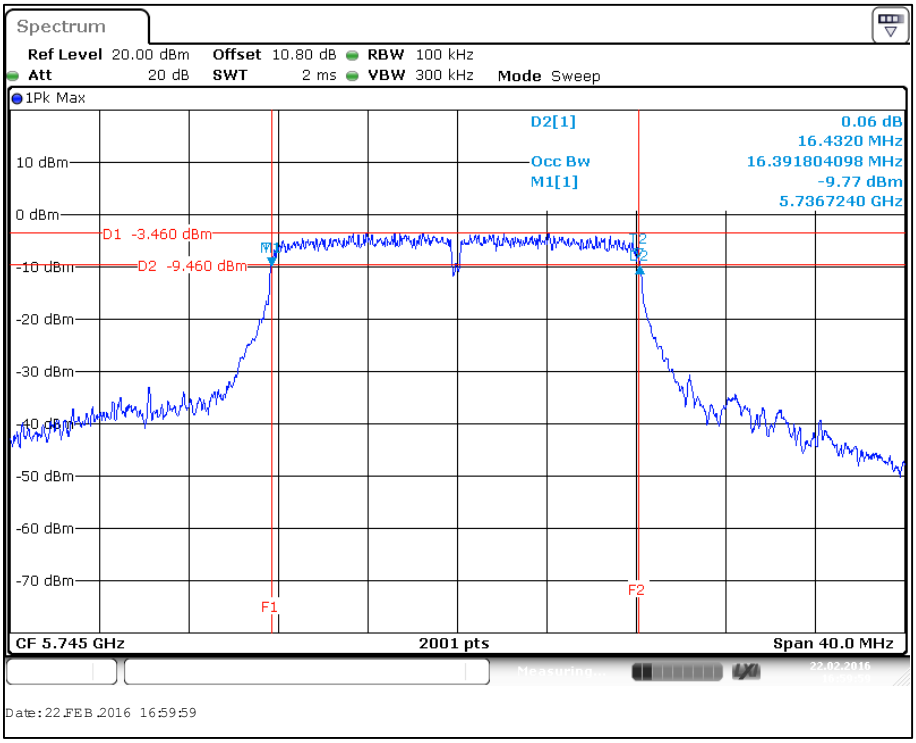
Test Results

6.2.1 6dB EBW and 99% OBW in the 5.725-5.85 GHz Band

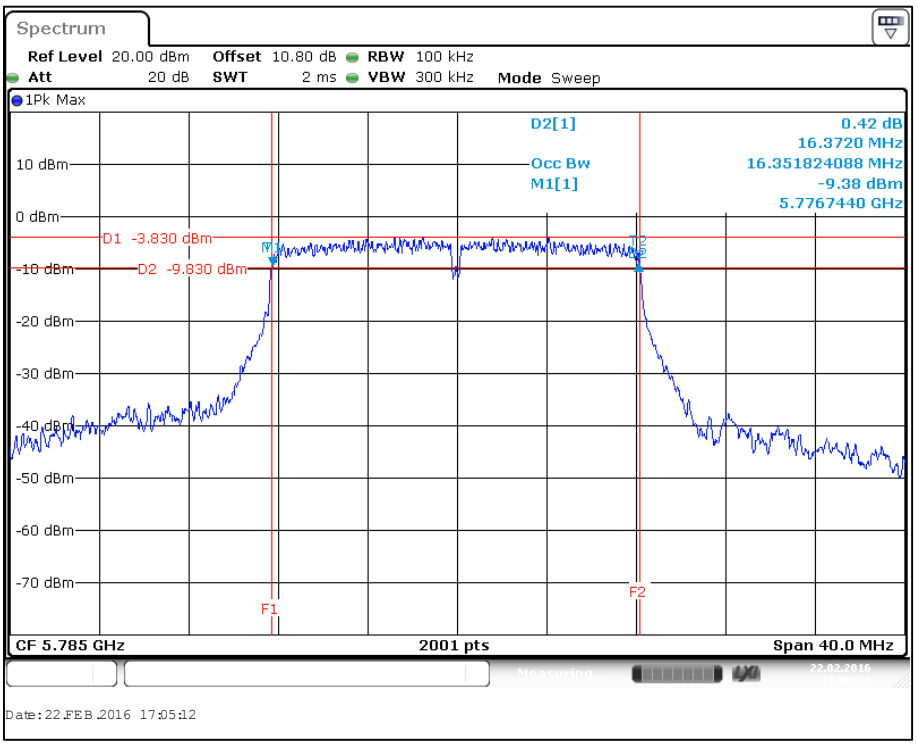
802.11 Mode	Data Rates	Channel	Frequency (MHz)	6dB EBW (MHz)	99% OBW (MHz)	6dB EBW Limit (kHz)
a	6 Mbps	149	5745	16.4	16.4	> 500
		157	5785	16.4	16.4	> 500
		165	5825	16.4	16.4	> 500
n HT20	MCS0/ 6.5 Mbps	149	5745	17.5	17.5	> 500
		157	5785	17.5	17.5	> 500
		165	5825	17.5	17.5	> 500
802.11n HT40	MCS0/ 13.5 Mbps	151	5755	36.2	35.9	> 500
		159	5795	36.2	35.9	> 500

Refer to the following plots

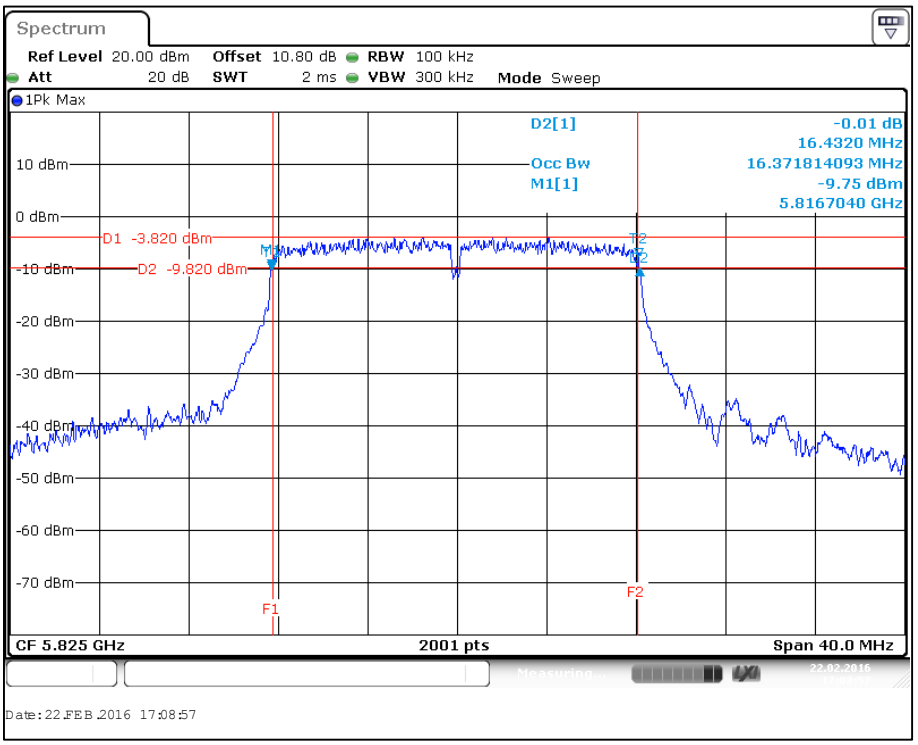
802.11a: 6 Mbps



802.11a: 6 Mbps – Channel 149 (5745 MHz) 6dB DTS BW and 99% OBW

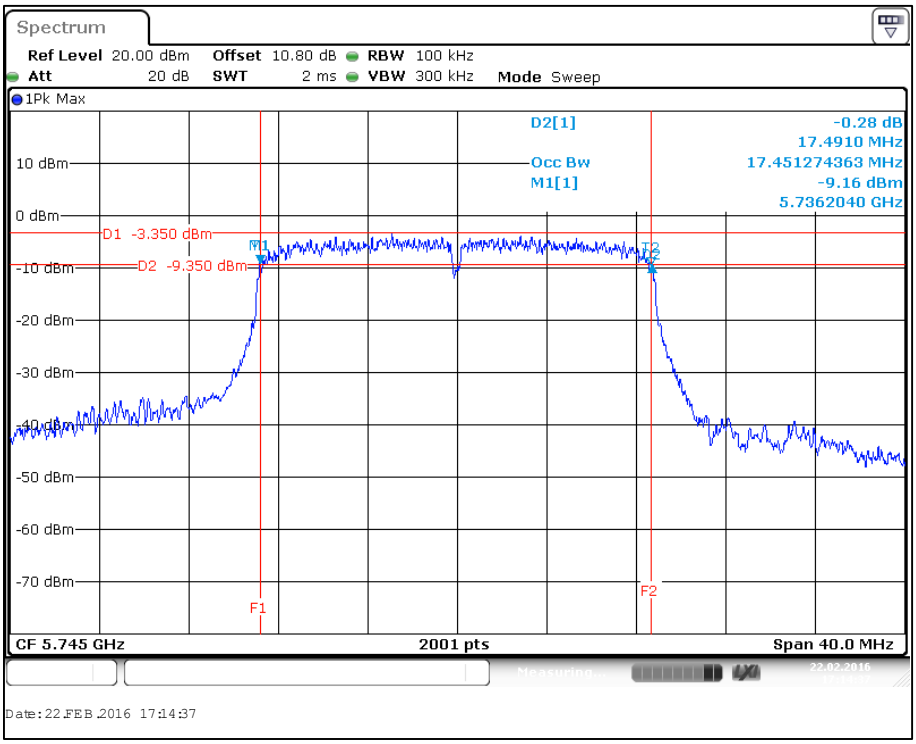


802.11a: 6 Mbps – Channel 157 (5785 MHz) 6dB DTS BW and 99% OBW

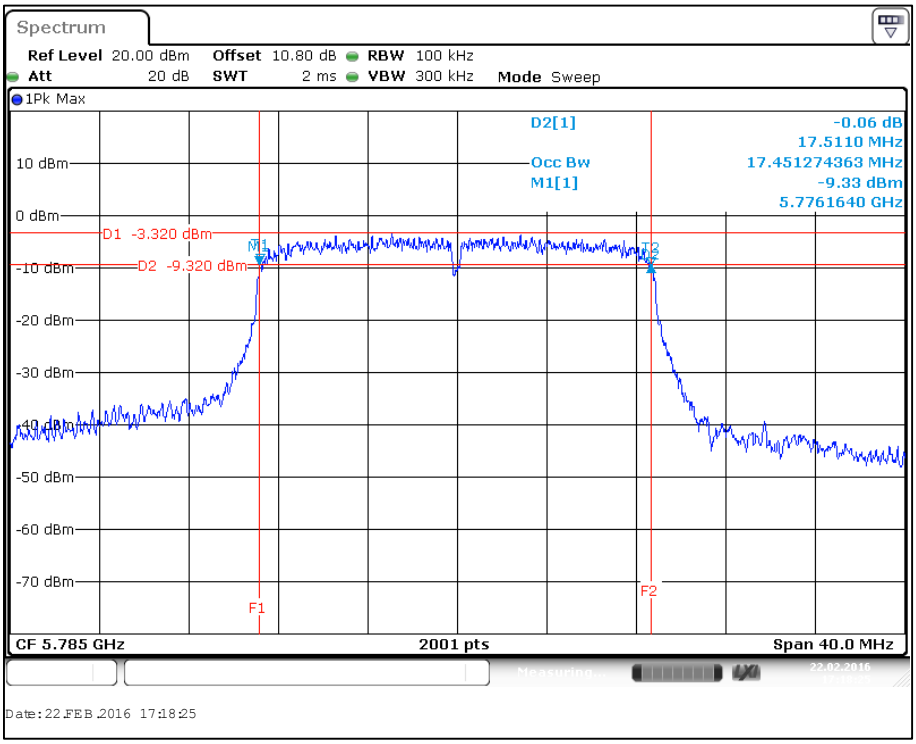


802.11a: 6 Mbps – Channel 165 (5825 MHz) 6dB DTS BW and 99% OBW

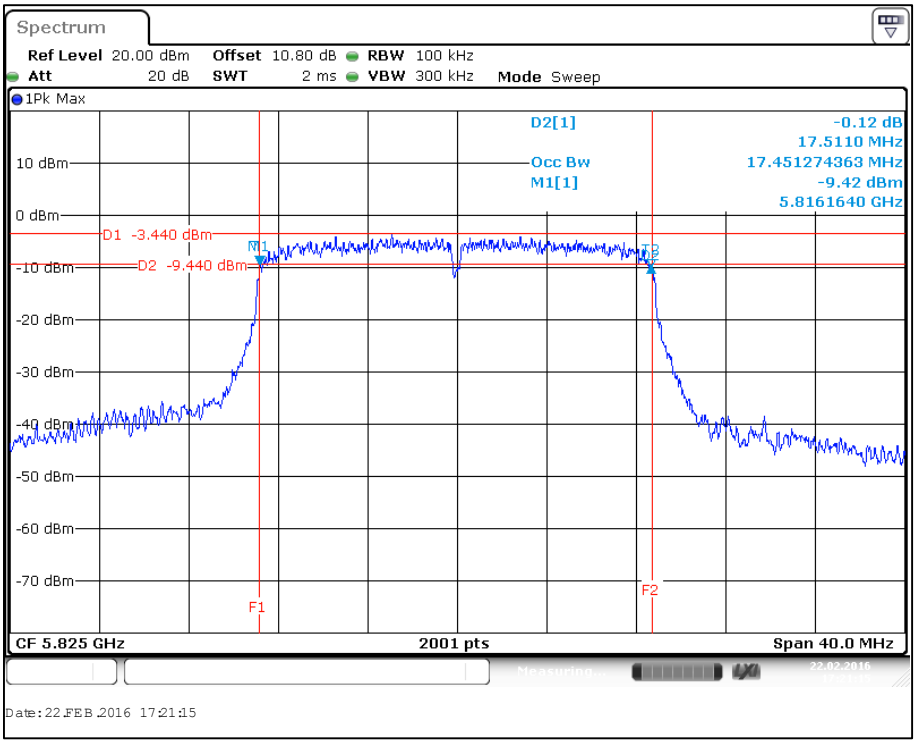
802.11n (HT20): MCS0/6.5 Mbps



802.11n (HT20): MCS0/6.5 Mbps – Channel 149 (5745 MHz) 6dB DTS BW and 99% OBW

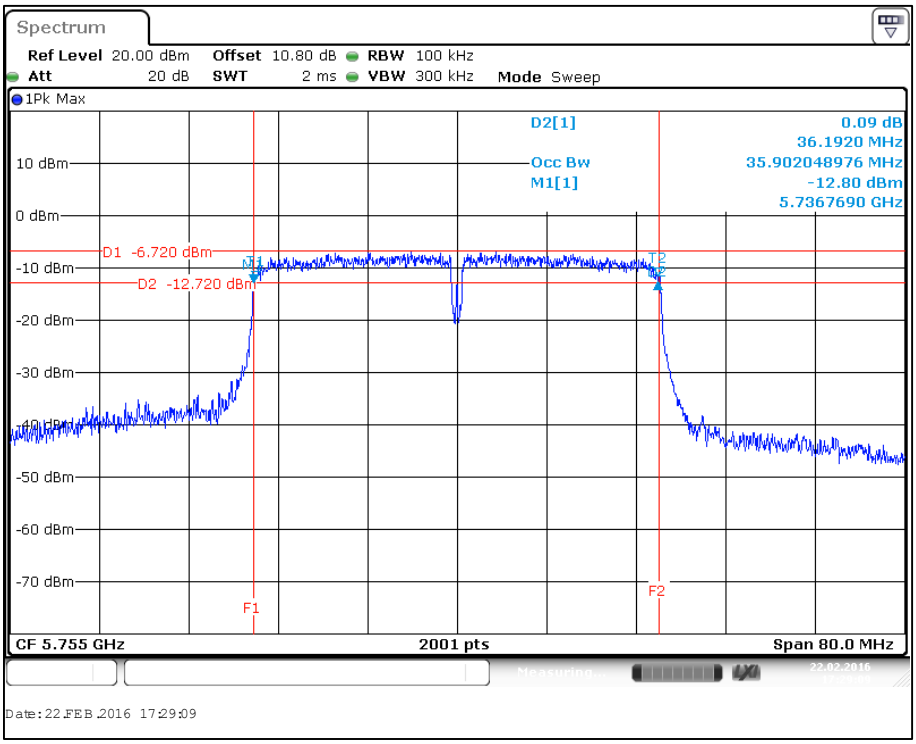


802.11n (HT20): MCS0/6.5 Mbps – Channel 157 (5785 MHz) 6dB DTS BW and 99% OBW

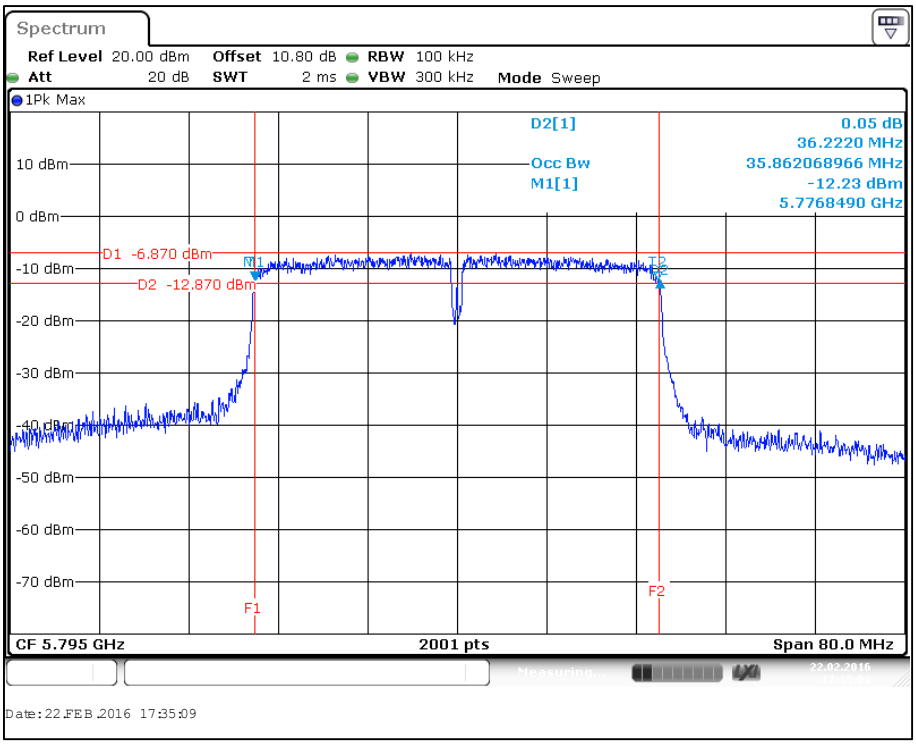


802.11n (HT20): MCS0/6.5 Mbps – Channel 165 (5825 MHz) 6dB DTS BW and 99% OBW

802.11n (HT40): MCS0/13.5 Mbps



802.11n (HT40): MCS0/13.5 Mbps – Channel 151 (5755 MHz) 6dB EBW and 99% OBW



802.11n (HT40): MCS0/13.5 Mbps – Channel 159 (5795 MHz) 6dB EBW and 99% OBW

6.3 Maximum Conducted Output Power and e.i.r.p.

Limits

FCC Part 15 Subpart E §15.407 (a)

§15.407 (a)(1)(ii) - For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

§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 (30dBm)

IC RSS-247 Issue 1 §6.2

§6.2.1 (1) - Frequency Band 5150-5250 MHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz.

§6.2.4 (1) - Frequency Band 5725-5850 MHz; the maximum conducted output power shall not exceed 1 W

Test Procedures

KDB 789033 D02 v01r02 Section E.3.a) – Method PM (Measurement using RF average power meter)
ANSI C63.10-2013 Section 12.3.3.1 – Method PM

Notes:

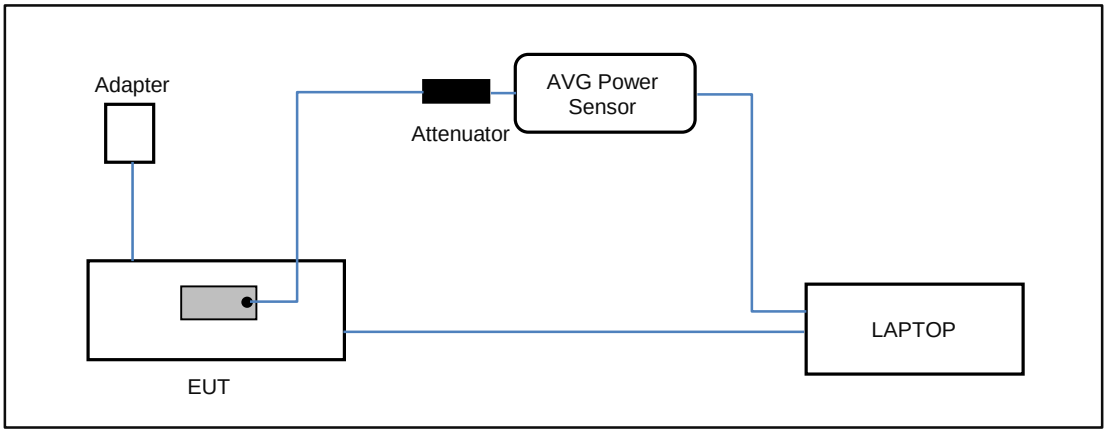
AVG Power Meter Offset level Calculation:

OFFSET $_{(dB)}$ = 10.8 dB (10 dB Attenuator Pad + 0.8 dB cable loss)

Directional Antenna Gain: There is only one transmitter output therefore the directional gain is equal to the antenna gain

e.i.r.p $_{(dBm)}$ = Maximum Conducted Output Power $_{(dBm)}$ + Directional Gain $_{(dBi)}$
Margin $_{(dB)}$ = Results (e.i.r.p. or Maximum conducted output power) $_{(dBm)}$ – Limit $_{(dBm)}$

Test Setup



Test Results

6.3.1 Maximum Conducted Output Power and e.i.r.p. in the 5.15-5.25 GHz Band

802.11 Mode	Data Rate	Channel	Frequency (MHz)	Maximum Conducted Output Power			e.i.r.p.			
				Results (dBm)	FCC Limit (dBm)	Margin (dB)	Directional Gain (dBi)	Results (dBm)	IC Limit (dBm)	Margin (dB)
a	6 Mbps	36	5180	13.3	30.0	-16.7	2.0	15.3	22.2	-6.9
		40	5200	12.8	30.0	-17.2	2.0	14.8	22.2	-7.4
		48	5240	12.1	30.0	-17.9	2.0	14.1	22.2	-8.1
n (HT20)	MCS0/ 6.5Mbps	36	5180	13.2	30.0	-16.8	2.0	15.2	22.4	-7.2
		40	5200	12.7	30.0	-17.3	2.0	14.7	22.4	-7.7
		48	5240	12.0	30.0	-18.0	2.0	14.0	22.4	-8.4
n (HT40)	MCS0/ 13.5Mbps	38	5190	7.4	30.0	-22.6	2.0	9.4	23.0	-13.6
		46	5230	6.7	30.0	-23.3	2.0	8.7	23.0	-14.3

6.3.2 Maximum Conducted Output Power in the 5.725-5.85 GHz Band

802.11 Mode	Data Rate	Channel	Frequency (MHz)	Maximum Conducted Output Power		
				Results (dBm)	FCC and IC Limit (dBm)	Margin (dB)
a	6 Mbps	149	5745	11.5	30.0	-18.5
		157	5785	11.4	30.0	-18.6
		165	5825	11.1	30.0	-18.9
n (HT20)	MCS0/ 6.5Mbps	149	5745	11.4	30.0	-18.6
		157	5785	11.2	30.0	-18.8
		165	5825	11.0	30.0	-19.0
n (HT40)	MCS0/ 13.5Mbps	151	5755	6.3	30.0	-23.7
		159	5795	6.2	30.0	-23.8

6.4 Maximum Power Spectral Density (PSD) and e.i.r.p. Spectral Density

Limits

FCC Part 15 Subpart E §15.407

§15.407 (a) (1)(ii) – For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.

§15.407 (a) (3) – For the band 5.725-5.85 GHz band, the maximum power spectral density shall not exceed 30dBm/500kHz

IC RSS-247 Issue 1 §6.2

§16.2.1 (1) - Frequency Band 5150-5250 MHz, The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band

§16.2.4 (1) - Frequency Band 5725-5850 MHz; The power spectral density shall not exceed 30 dBm in any 500 kHz band.

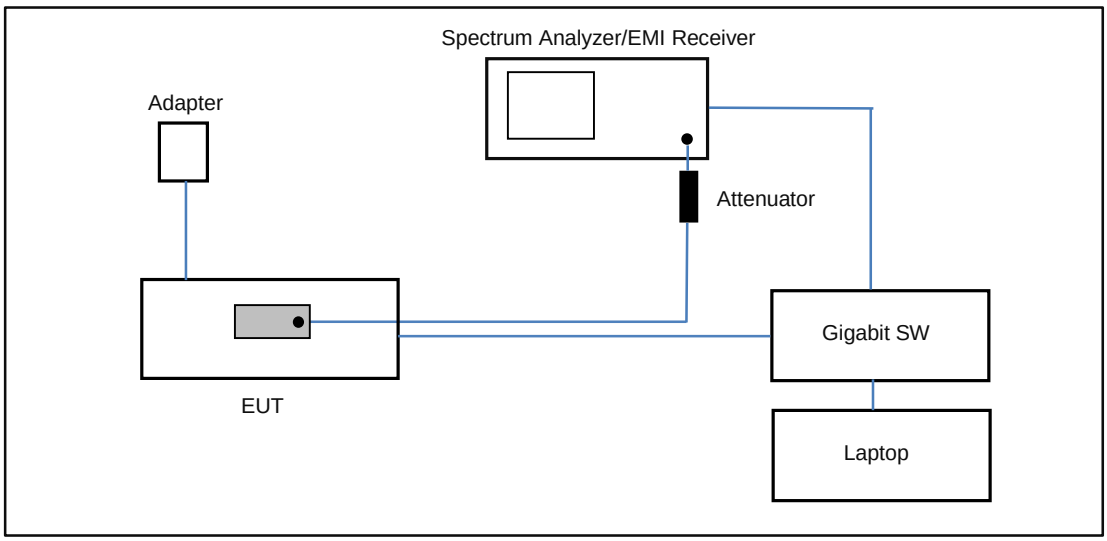
Test Procedures

• KDB 789033 D02 v01r02 Section F
• ANSI C63.10-2013 Section 12.5

Note: Spectrum Analyzer Offset level Calculation:

OFFSET (dB) = 10.8 dB (10 dB Attenuator Pad + 0.8 dB cable loss)

Test Setup



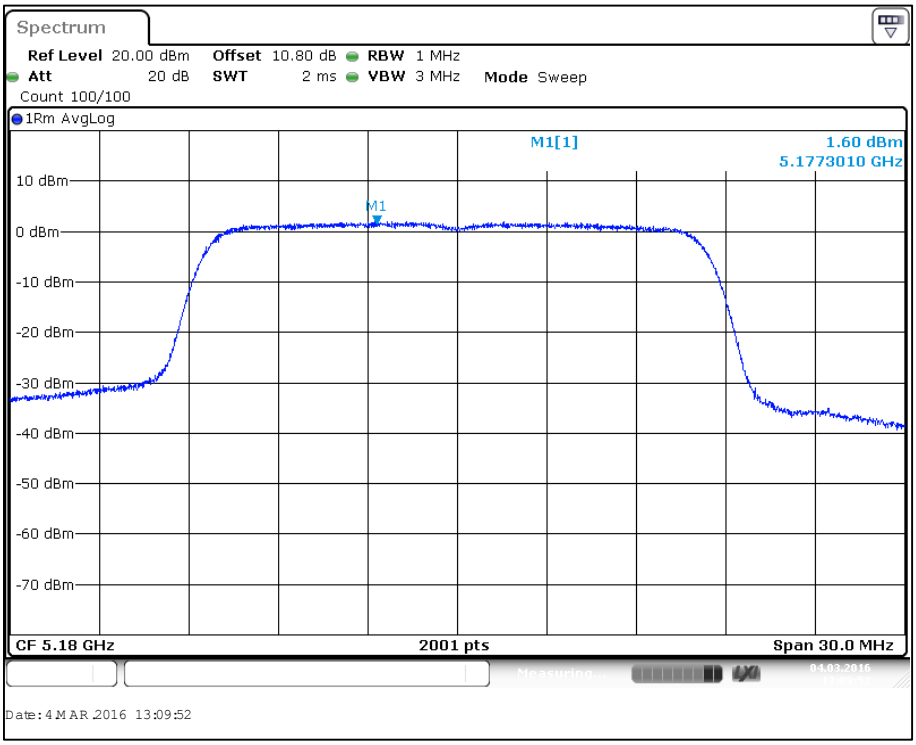
Test Results

6.4.1 Maximum Power Spectral Density and e.i.r.p. Spectral Density in the 5.15-5.25 GHz Band

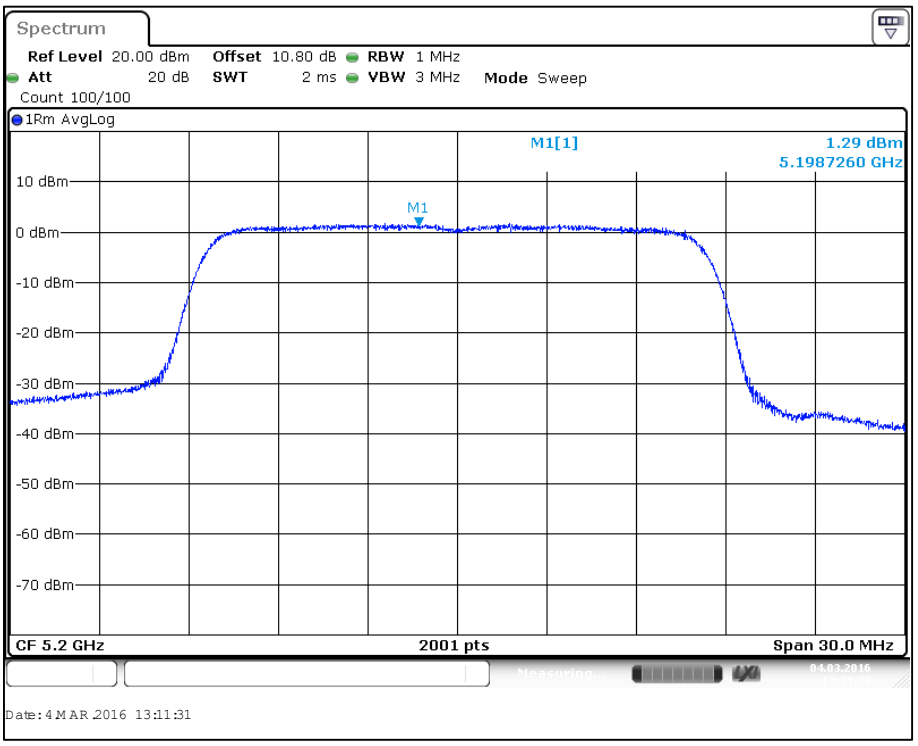
802.11 Mode	Data Rate	Channel	Frequency (MHz)	Maximum Power Spectral Density (PSD)			e.i.r.p. Spectral Density			
				Results (dBm/MHz)	FCC Limit (dBm/MHz)	Margin (dB)	Directional Gain (dBi)	Results (dBm/MHz)	IC Limit (dBm/MHz)	Margin (dB)
a	6 Mbps	36	5180	1.60	17.0	-15.4	2.0	3.6	10	-6.4
		40	5200	1.29	17.0	-15.7	2.0	3.3	10	-6.7
		48	5240	0.40	17.0	-16.6	2.0	2.4	10	-7.6
n (HT20)	MCS0/ 6.5Mbps	36	5180	1.11	17.0	-15.9	2.0	3.1	10	-6.9
		40	5200	0.31	17.0	-16.7	2.0	2.3	10	-7.7
		48	5240	0.00	17.0	-17.0	2.0	2.0	10	-8.0
n (HT40)	MCS0/ 13.5Mbps	38	5190	-8.17	17.0	-25.2	2.0	-6.2	10	-16.2
		46	5230	-8.76	17.0	-25.8	2.0	-6.8	10	-16.8

Refer to the following plots

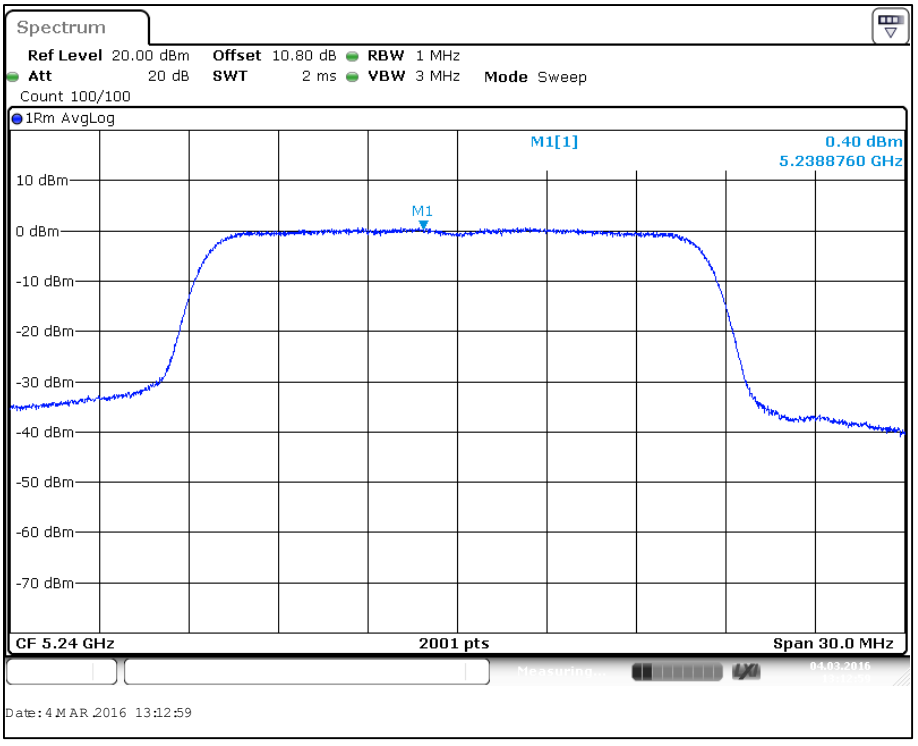
802.11a: 6 Mbps



802.11a: 6 Mbps - Channel 36 (5180 MHz) Maximum PSD

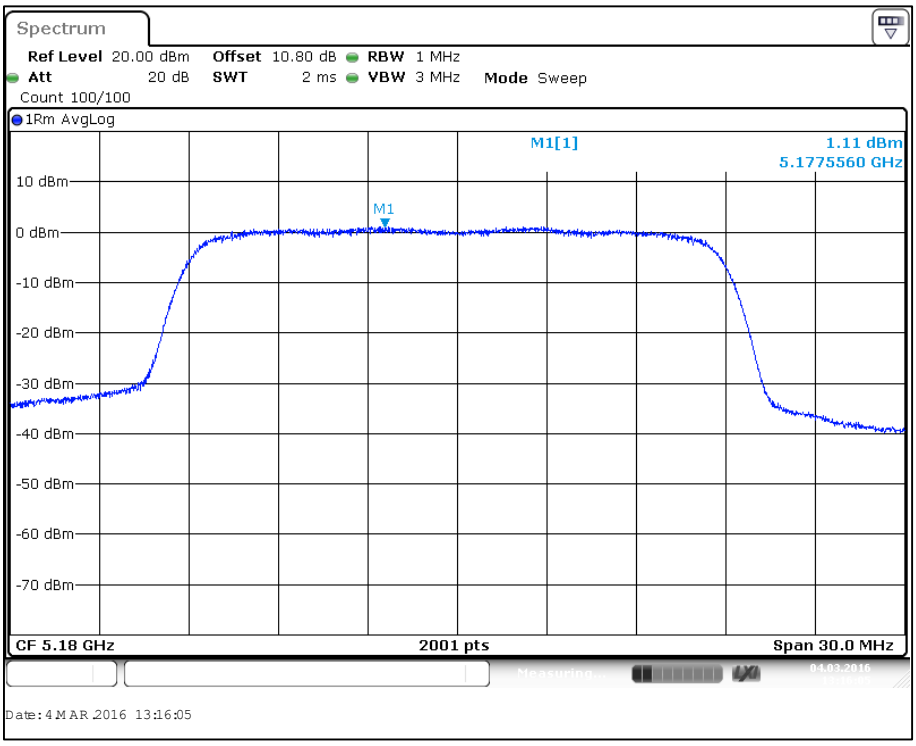


802.11a: 6 Mbps - Channel 40 (5200 MHz) Maximum PSD

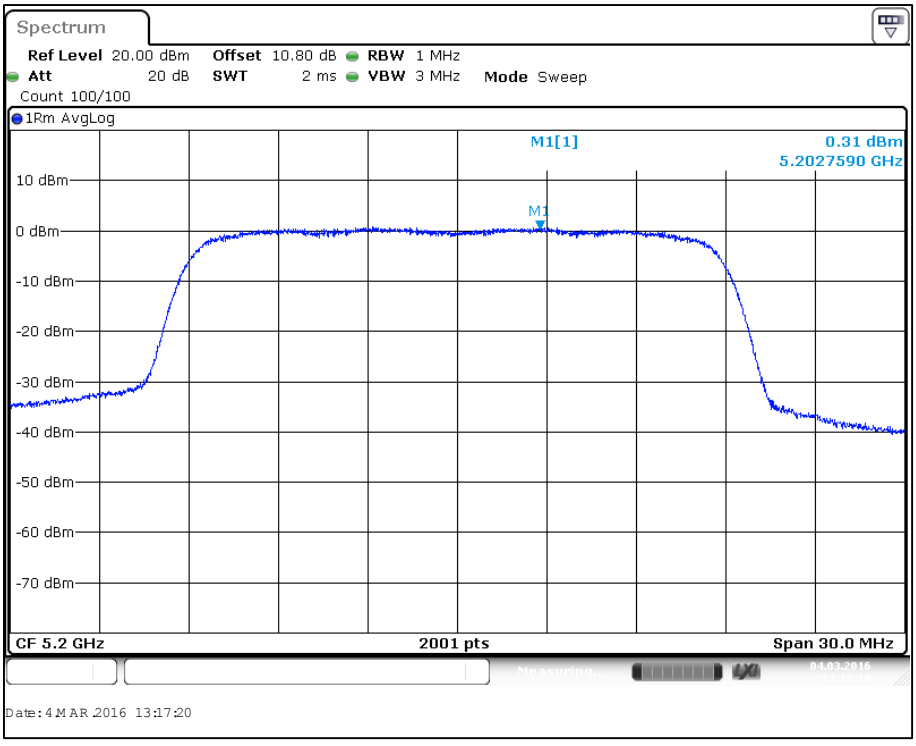


802.11a: 6 Mbps - Channel 48 (5240 MHz) Maximum PSD

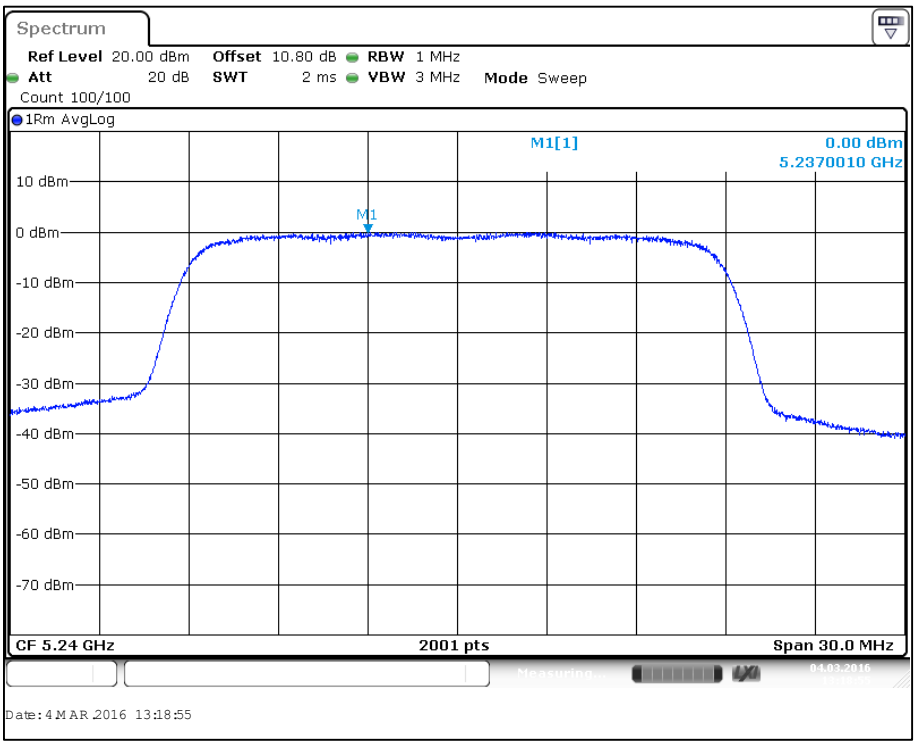
802.11n (HT20): MCS0/6.5 Mbps



802.11n (HT20): MCS0/6.5 Mbps - Channel 36 (5180 MHz) Maximum PSD

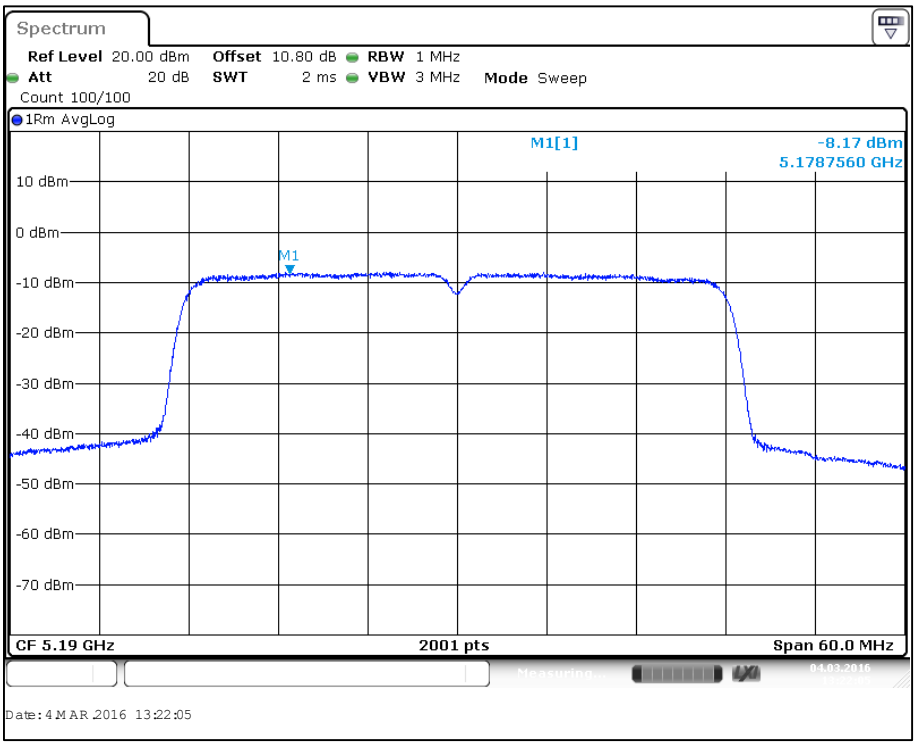


802.11n (HT20): MCS0/6.5 Mbps - Channel 40 (5200 MHz) Maximum PSD

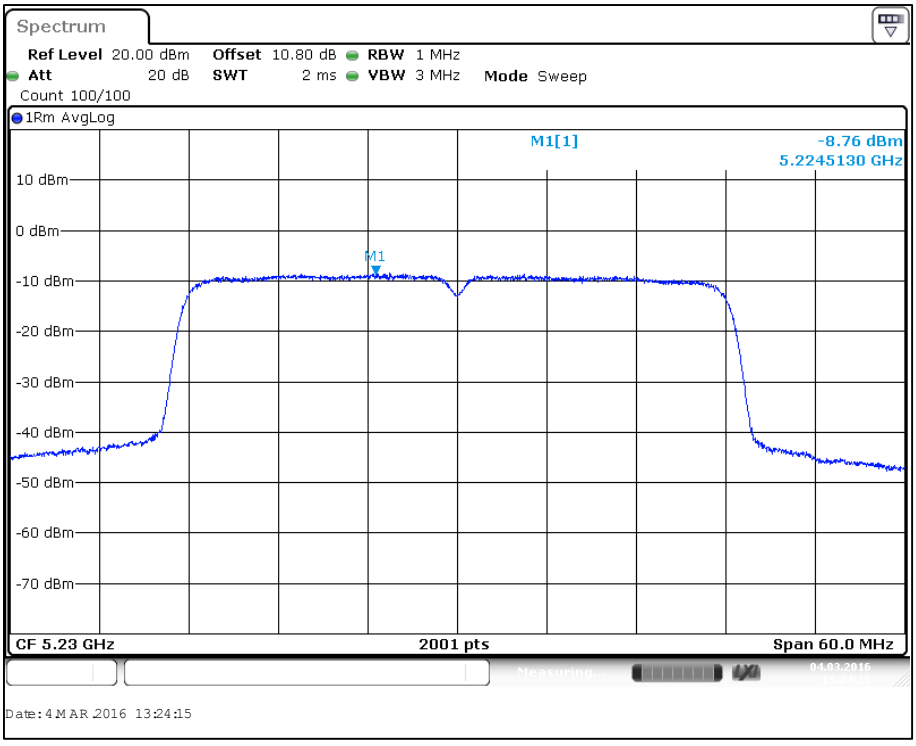


802.11n (HT20): MCS0/6.5 Mbps - Channel 48 (5240 MHz) Maximum PSD

802.11n (HT40): MCS0/13.5 Mbps



802.11n (HT40): MCS0/13.5 Mbps - Channel 38 (5190 MHz) Maximum PSD



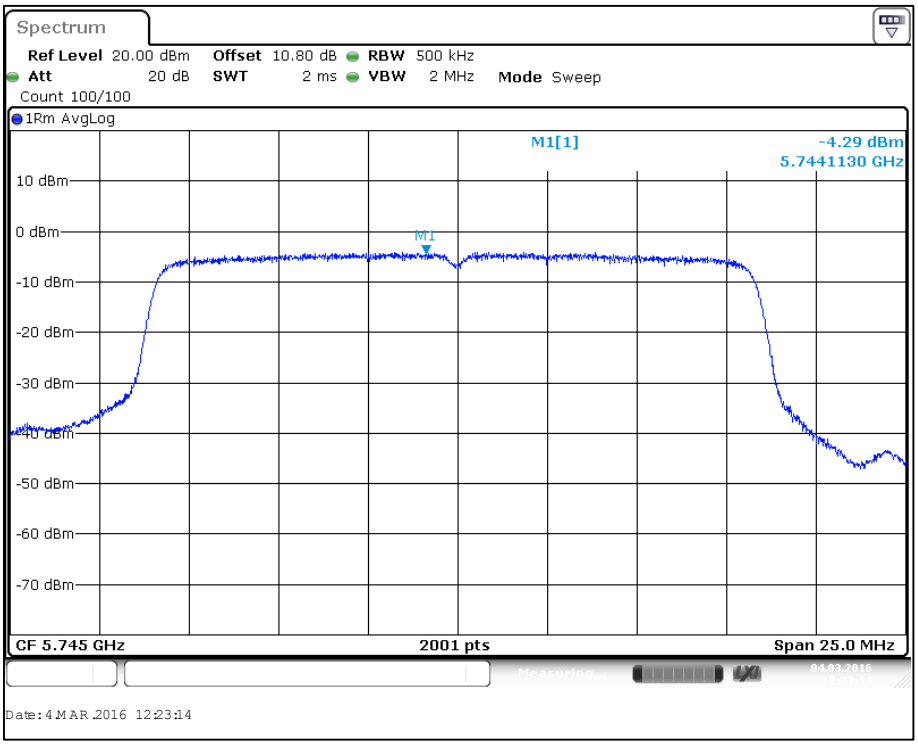
802.11n (HT40): MCS0/13.5 Mbps - Channel 46(5230 MHz) Maximum PSD

6.4.2 Maximum Power Spectral Density in the 5.725-5.85 GHz Band

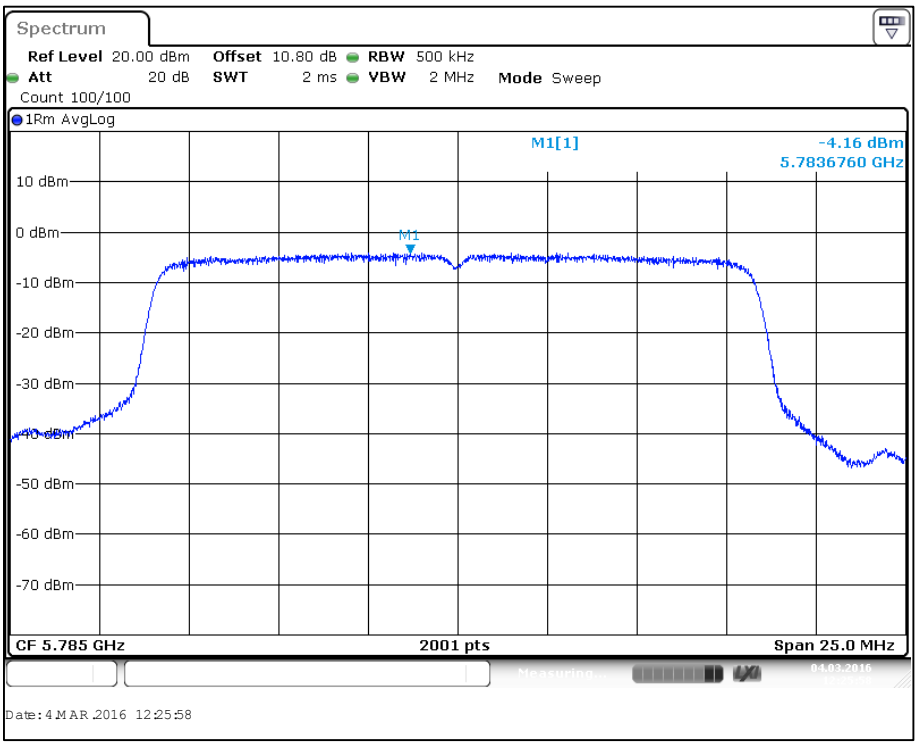
802.11 Mode	Data Rate	Channel	Frequency (MHz)	Maximum PSD (dBm/500kHz)	FCC and IC PSD Limit (dBm/500kHz)	Margin (dB)
a	6 Mbps	149	5745	-4.29	30.0	-34.3
		157	5785	-4.16	30.0	-34.2
		165	5825	-4.59	30.0	-34.6
n (HT20)	MCS0/ 6.5Mbps	149	5745	-4.86	30.0	-34.9
		157	5785	-4.70	30.0	-34.7
		165	5825	-4.88	30.0	-34.9
n (HT40) a	MCS0/ 13.5Mbps	151	5755	-12.77	30.0	-42.8
		159	5795	-12.65	30.0	-42.7

Refer to the following plots

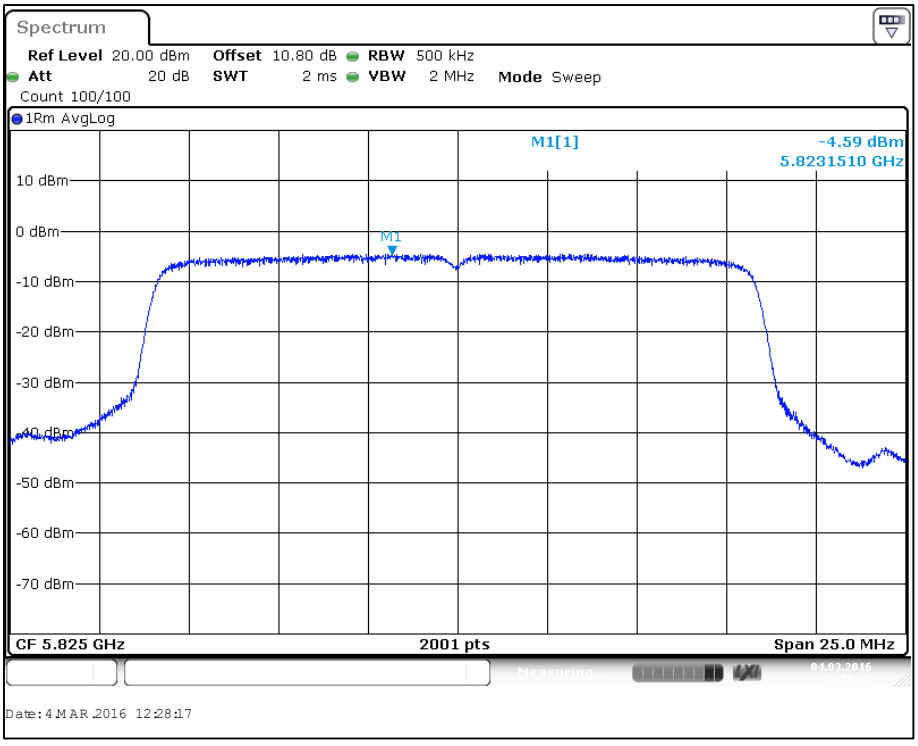
802.11a: 6 Mbps



802.11a: 6 Mbps - Channel 149 (5745 MHz) Maximum PSD

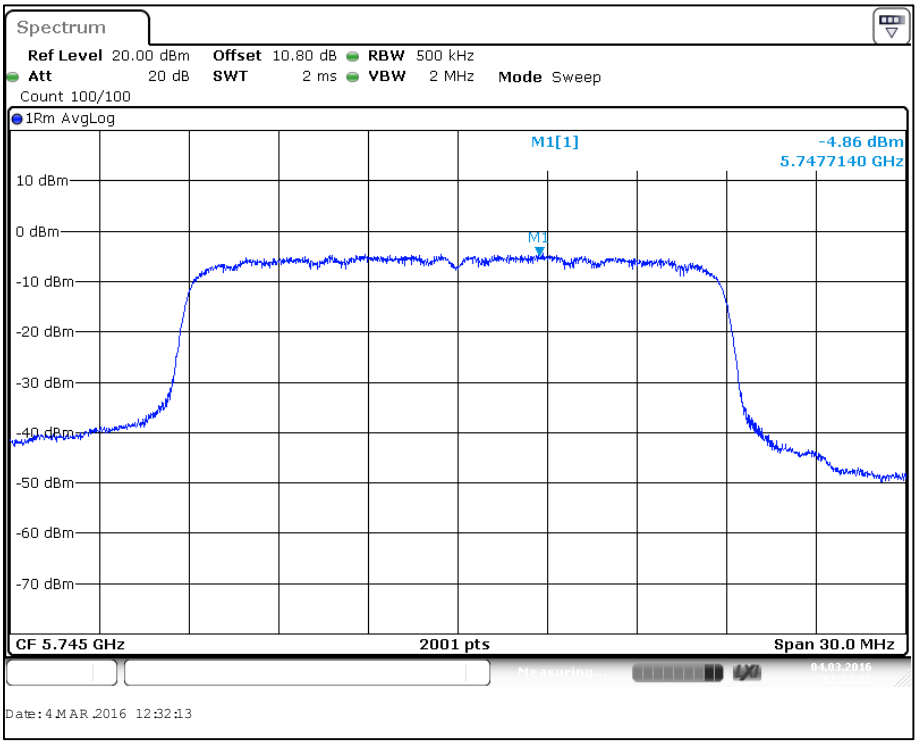


802.11a: 6 Mbps - Channel 157 (5785 MHz) Maximum PSD

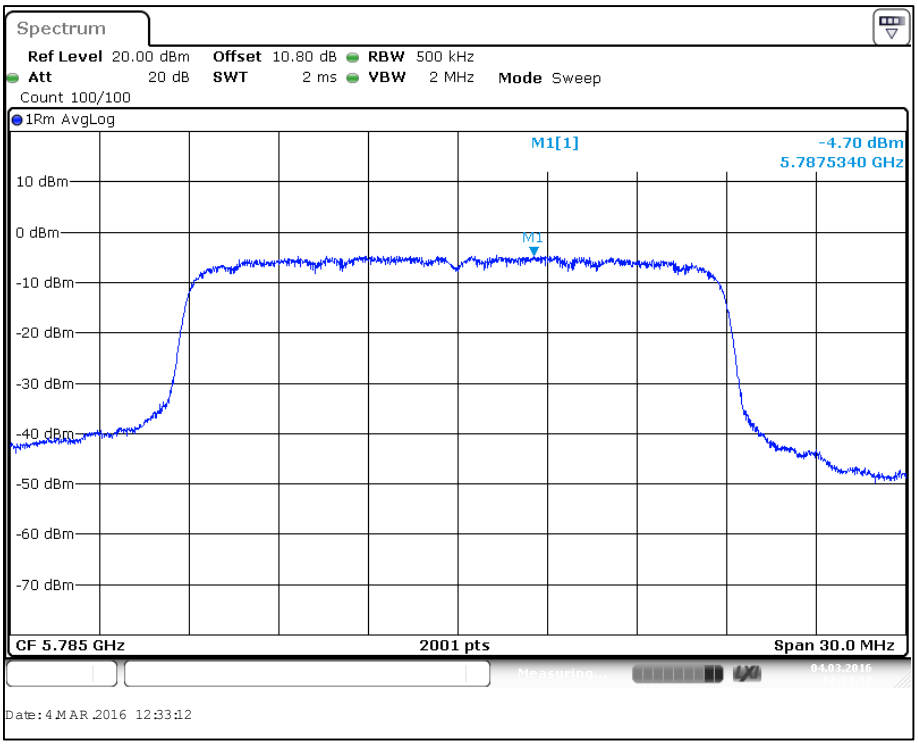


802.11a: 6 Mbps - Channel 165 (5825 MHz) Maximum PSD

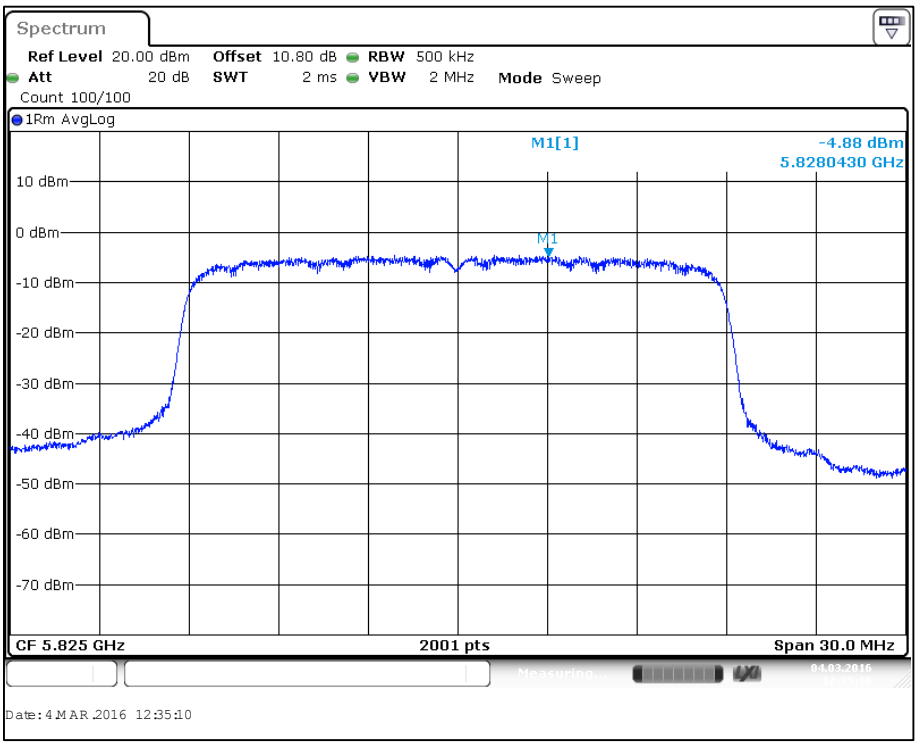
802.11n (HT20): MCS0/6.5 Mbps



802.11n (HT20): MCS0/6.5 Mbps - Channel 149 (5745 MHz) Maximum PSD

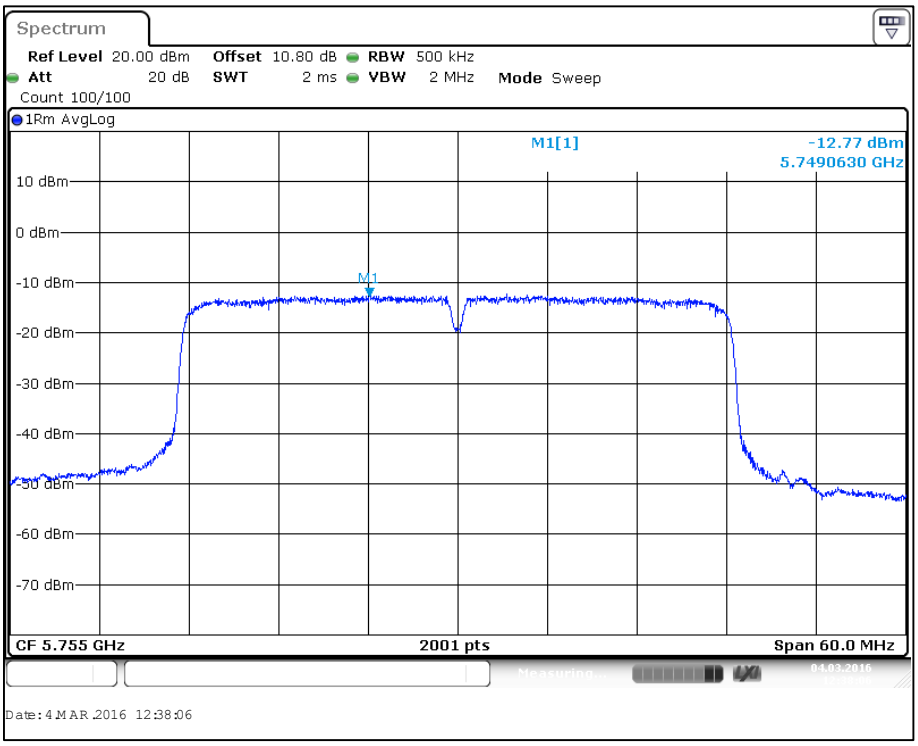


802.11n (HT20): MCS0/6.5 Mbps - Channel 157 (5785 MHz) Maximum PSD

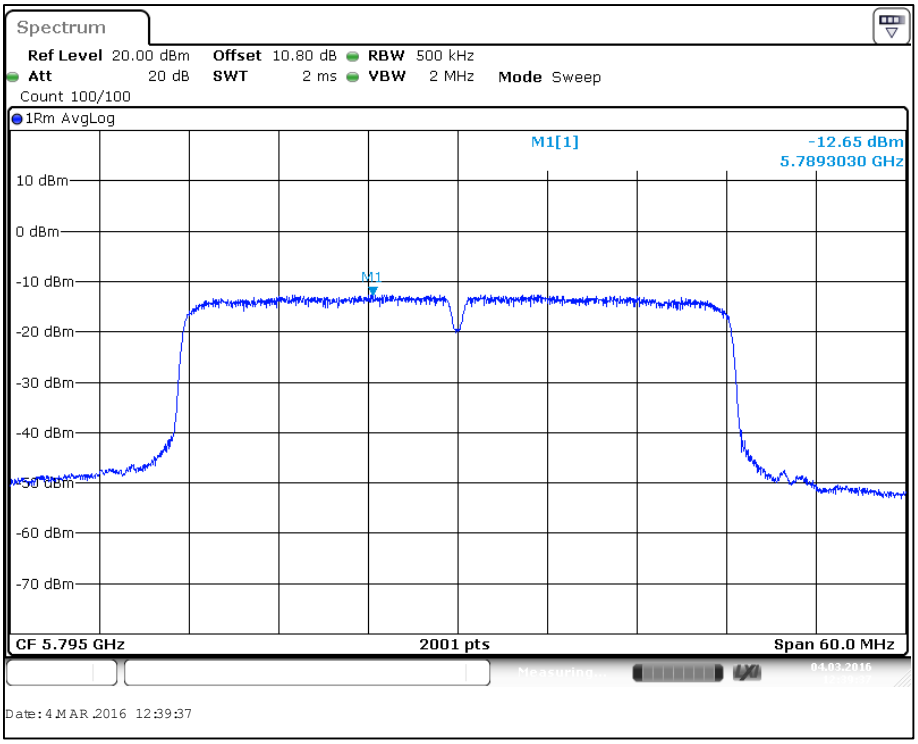


802.11n (HT20): MCS0/6.5 Mbps - Channel 165 (5825 MHz) Maximum PSD

802.11n (HT40): MCS0/13.5 Mbps



802.11n (HT40): MCS0/13.5 Mbps - Channel 151 (5755 MHz) Maximum PSD



802.11n (HT40): MCS0/13.5 Mbps - Channel 159 (5795 MHz) Maximum PSD

6.5 Unwanted Emissions

Limits

FCC Part 15 Subpart E §15.407 (b)

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

All field strength of emissions appearing within the restricted frequency bands as specified in §15.205 shall not exceed the limits shown in the following table (§15.209 Radiated Emission limits)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

§15.209 Radiated Emission limits

IC RSS-247 Issue 1 §6.2

6.2.1 (2) - For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz.

6.2.4 (2) - For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p.

For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz.

Test Procedure used

• KDB 789033 D02 v01r02 Section II.G.1 and ANSI C63.10-2013 Section 12.7.2: for unwanted emissions in restricted frequency bands

• KDB 789033 D02 v01r02 Section II.G.2 and ANSI C63.10-2013 Section 12.7.3: for unwanted emissions that fall outside of the restricted frequency bands

Sample Calculations

For Radiated Band-edge Measurement

• Corrected Level (dBµV/m) = Spectrum Analyzer (SA) Reading (dBµV/m) + Duty Cycle Factor (dB)

• Spectrum Analyzer (SA) Reading (dBµV/m) = Amplitude (Raw) (dBµV/m) + Transducer Factor (dB/m) + Offset (dB)

• Transducer Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – Pre-amplifier Gain (dB)

• Offset (dB) = 10 dB Attenuator

• Margin (dB) = Corrected Level (dBµV/m) – Limit (dBµV/m)

For Spurious Emissions Levels above 1GHz

• Corrected Level (dBµV/m) = Spectrum Analyzer (SA) Reading (dBµV/m) + Correction Factor (dB) + Duty Cycle Factor (dB)

• Correction Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB) + Filter Insertion Loss (dB)

• Margin (dB) = Corrected Level (dBµV/m) – Limit (dBµV/m)

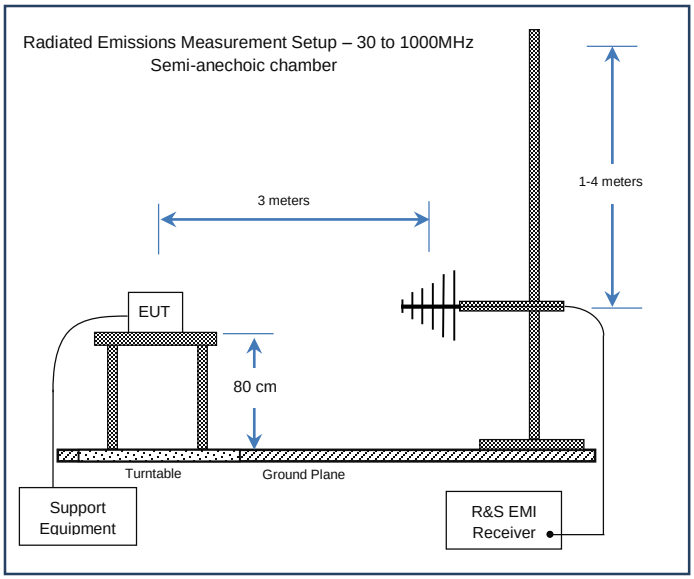
For Spurious Emissions Levels below 1GHz

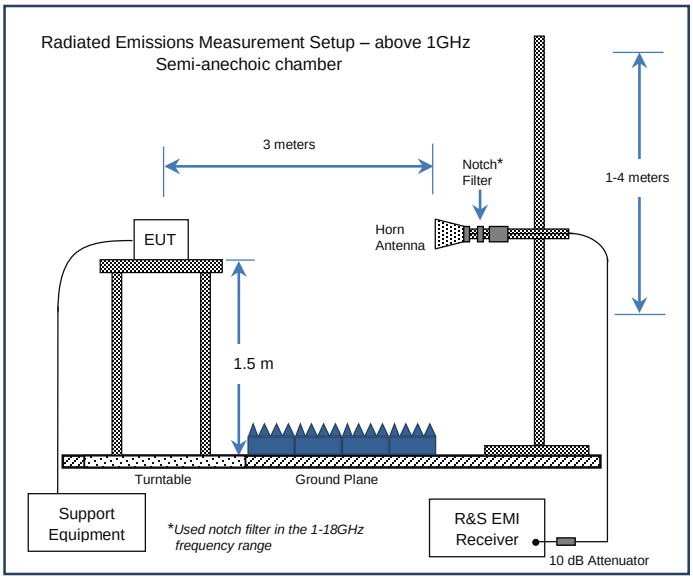
• Amplitude (dBµV/m) = Receiver Reading (dBµV/m) + Correction Factor (dB) + Duty Cycle Factor (dB)

• Correction Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB)

• Margin (dB) = Amplitude (dBµV/m) – Limit (dBµV/m)

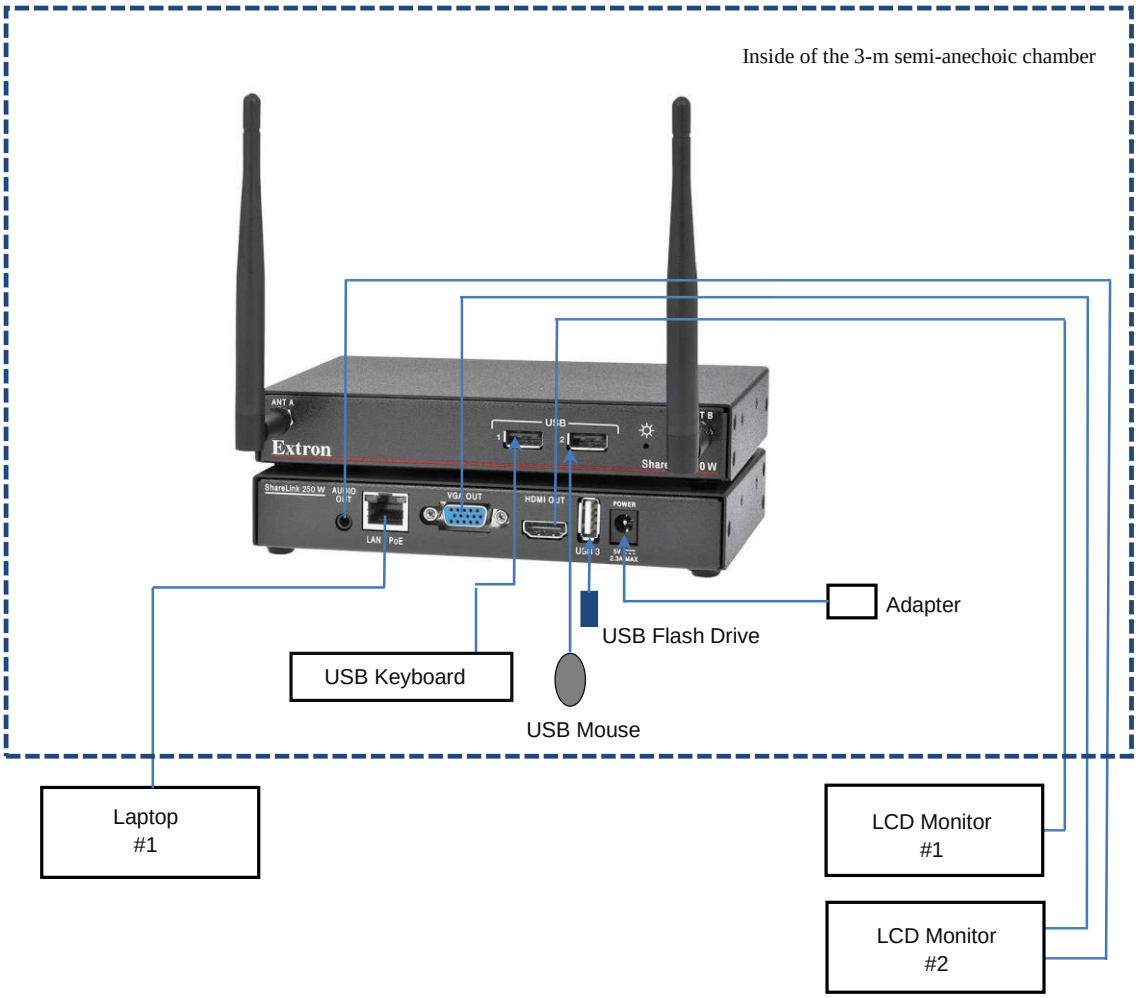
Test Setup


Radiated Emissions Measurement Setup – 30 to 1000MHz
Semi-anechoic chamber
3 meters
1-4 meters
EUT
80 cm
Turntable
Ground Plane
Support Equipment
R&S EMI Receiver


Radiated Emissions Measurement Setup – above 1GHz
Semi-anechoic chamber
3 meters
Notch* Filter
1-4 meters
Horn Antenna
EUT
1.5 m
Turntable
Ground Plane
Support Equipment
*Used notch filter in the 1-18GHz frequency range
R&S EMI Receiver
10 dB Attenuator

EUT Connection Diagram:

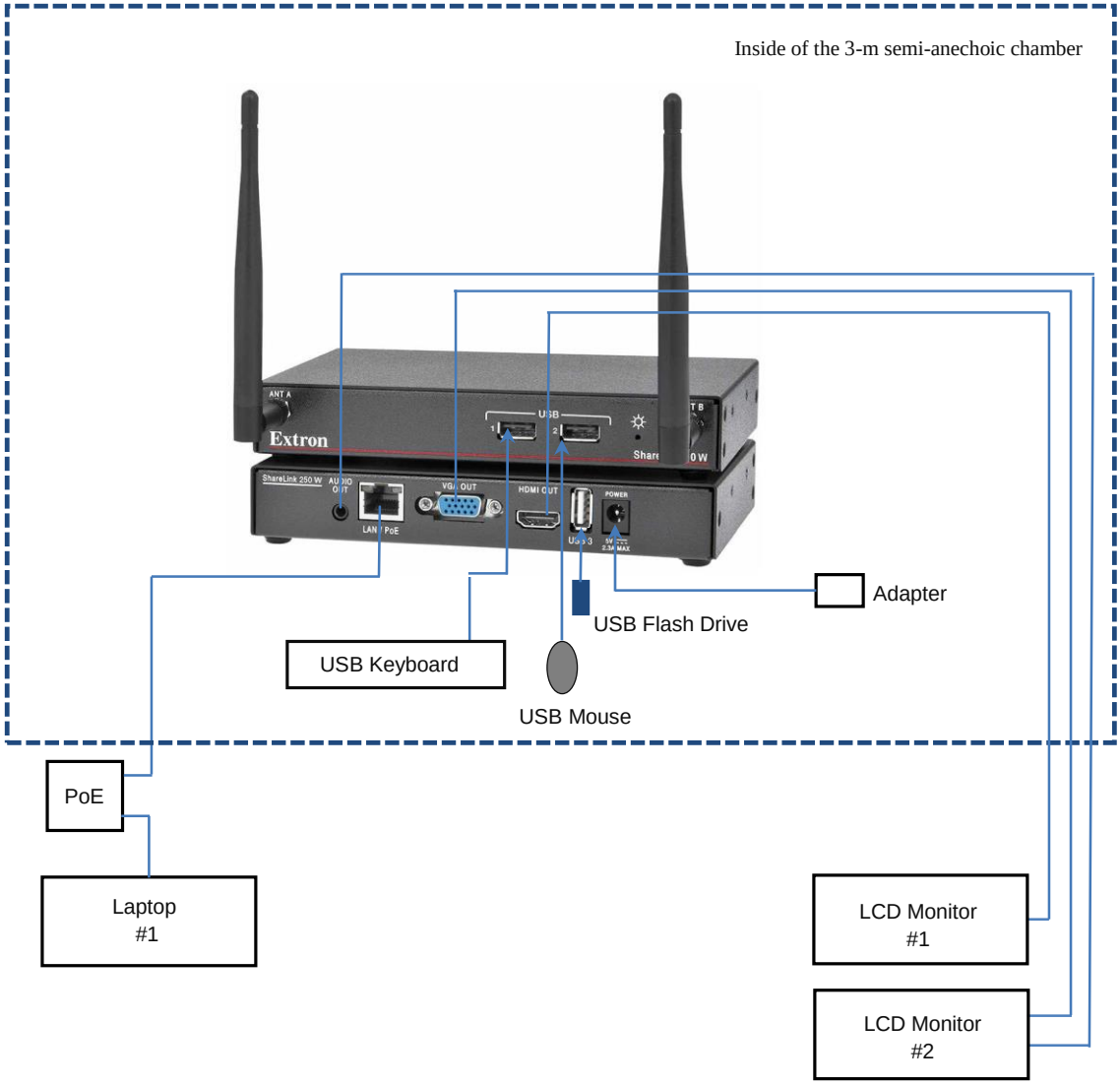
a. Using Adapter 6A-161WP05, 5Vdc



- HDMI OUT connected to LCD monitor #1 with 25' HDMI PRO cable.
- VGA OUT connected to LCD monitor #2 with 35' VGA cable.
- Audio OUT connected to LCD monitor #2 (PC Audio IN) with 25' Audio mini cable
- USB 1 with USB keyboard
- USB 2 with USB mouse
- USB 3 with USB Flash Drive
- LAN/POE connected to Laptop #1 with 35' CAT-53 UTP cable
- Power connected to AC Adapter

Note: EUT at Full Screen Display with 1080p, 60Hz resolution; W-Fi Transmitter ON; LAN at 1GB Connection

b. Using PoE XTP PI 100, +48Vdc



- HDMI OUT connected to LCD monitor #1 with 25’ HDMI PRO cable.
- VGA OUT connected to LCD monitor #2 with 35’ VGA cable.
- Audio OUT connected to LCD monitor #2 (PC Audio IN) with 25’ Audio mini cable
- USB 1 with USB keyboard
- USB 2 with USB mouse
- USB 3 with USB Flash Drive
- LAN/POE connected to PoE Power Supply with 35’ CAT-5e UTP cable
- PoE Power Supply connected to Laptop #1 with 10’ CAT-5e UTP cable

Note: EUT at Full Screen Display with 1080p, 60Hz resolution; W-Fi Transmitter ON; LAN at 1GB Connection

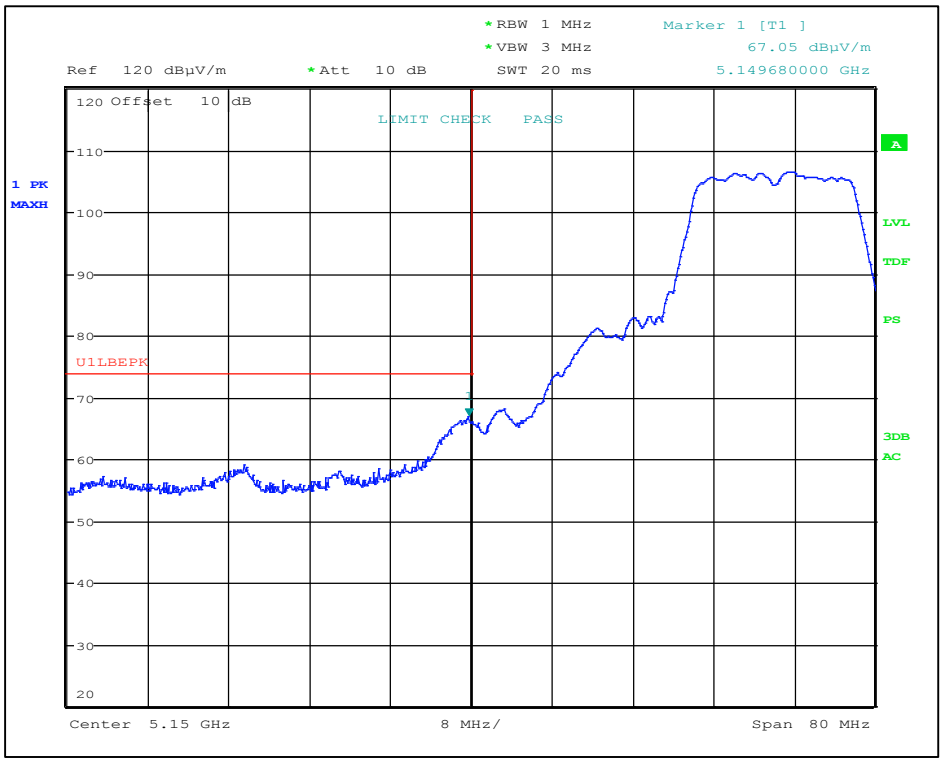
Test Results

6.5.1 Radiated Restricted-band band-edge at 5150 MHz (802.11a, 6Mbps)

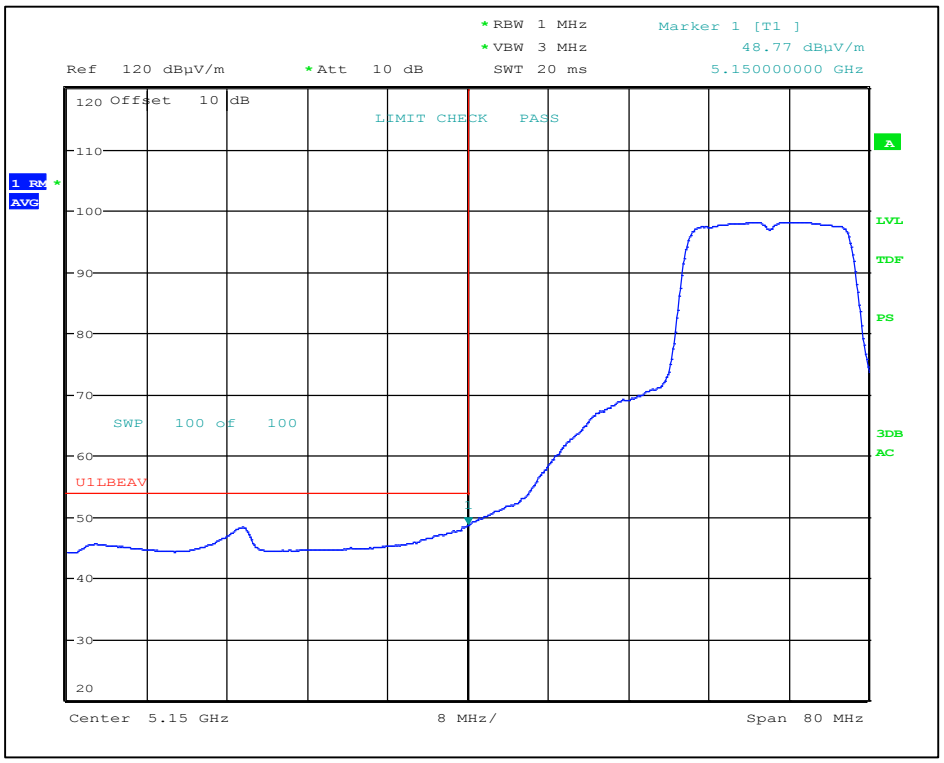
802.11a: 6Mbps, Channel 36 (5180 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5149.7	67.1	PK	170	V	200	V	0.00	3.9	67.1	74.0	-6.9
5150.0	48.8	AV	170	V	200	V	0.00	3.9	48.8	54.0	-5.2
5149.9	60.6	PK	150	H	295	H1	0.00	3.9	60.6	74.0	-13.4
5150.0	47.0	AV	150	H	295	H1	0.00	3.9	47.0	54.0	-7.0

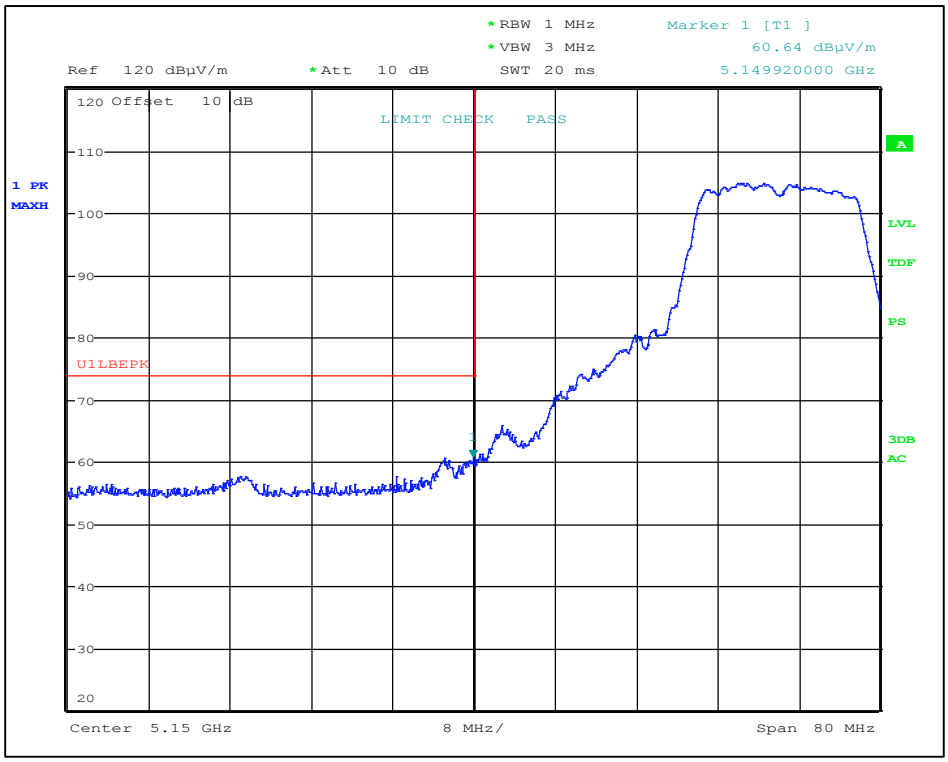
Refer to the following Plots



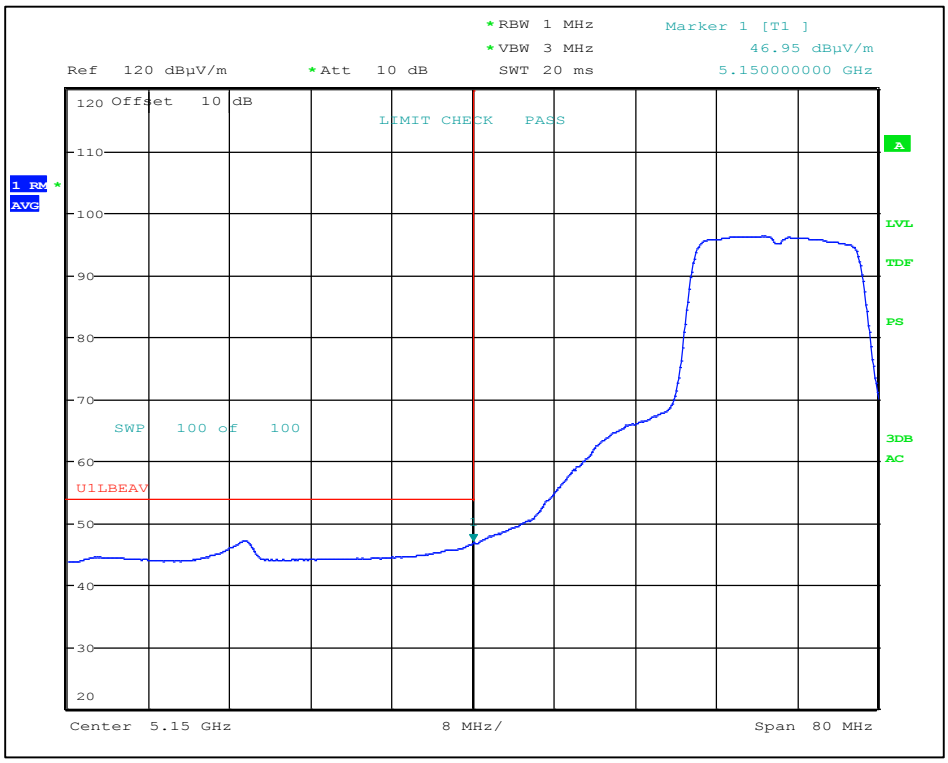
802.11a: 6Mbps, Channel 36 – Restricted-band band-edge, Vertical Peak Plot



802.11a: 6Mbps, Channel - Restricted-band band-edge, Vertical Average Plot



802.11a: 6Mbps, Channel 36 - Restricted-band band-edge, Horizontal Peak Plot



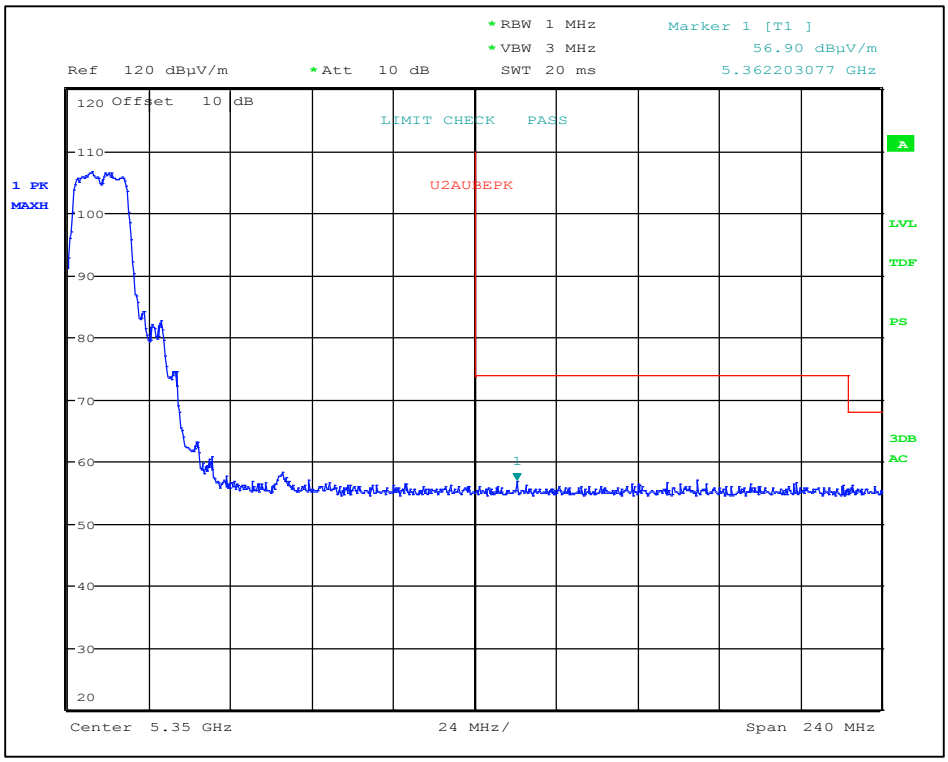
802.11a: 6Mbps, Channel 36 - Restricted-band band-edge, Horizontal Average Plot

6.5.2 Radiated Restricted-band band-edge at 5350 MHz (802.11a, 6Mbps)

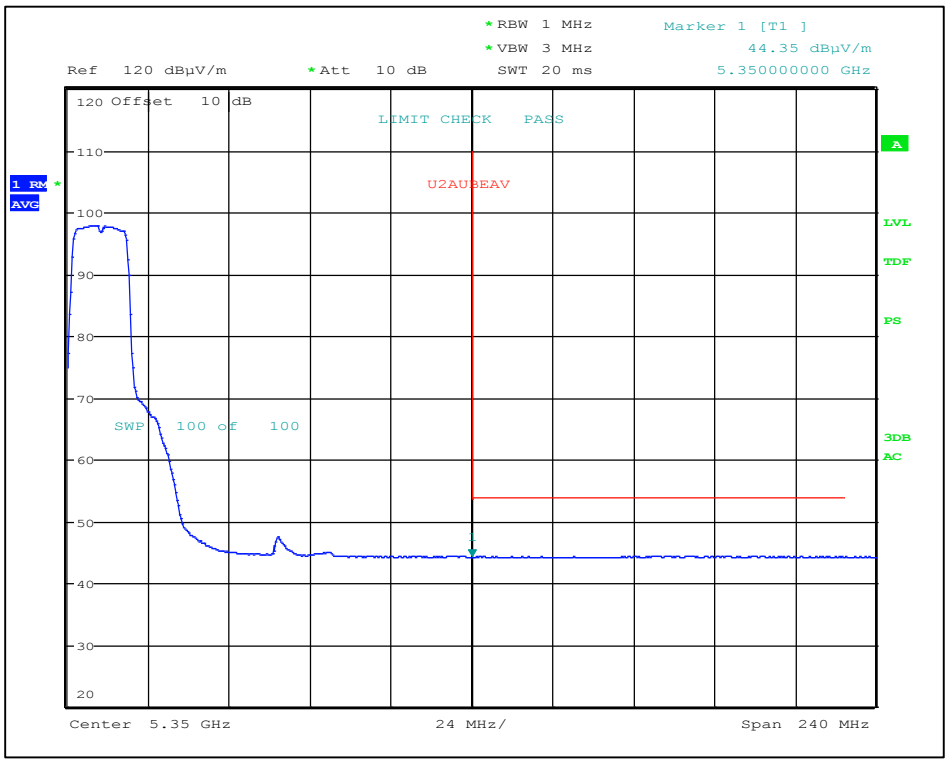
802.11a: 6 Mbps, Channel 48 (5240 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5362.2	56.9	PK	170	V	200	V	0.00	3.5	56.9	74.0	-17.1
5350.0	44.4	AV	170	V	200	V	0.00	3.5	44.4	54.0	-9.6
5404.5	56.3	PK	150	H	295	H1	0.00	3.4	56.3	74.0	-17.7
5350.0	44.1	AV	150	H	295	H1	0.00	3.4	44.1	54.0	-9.9

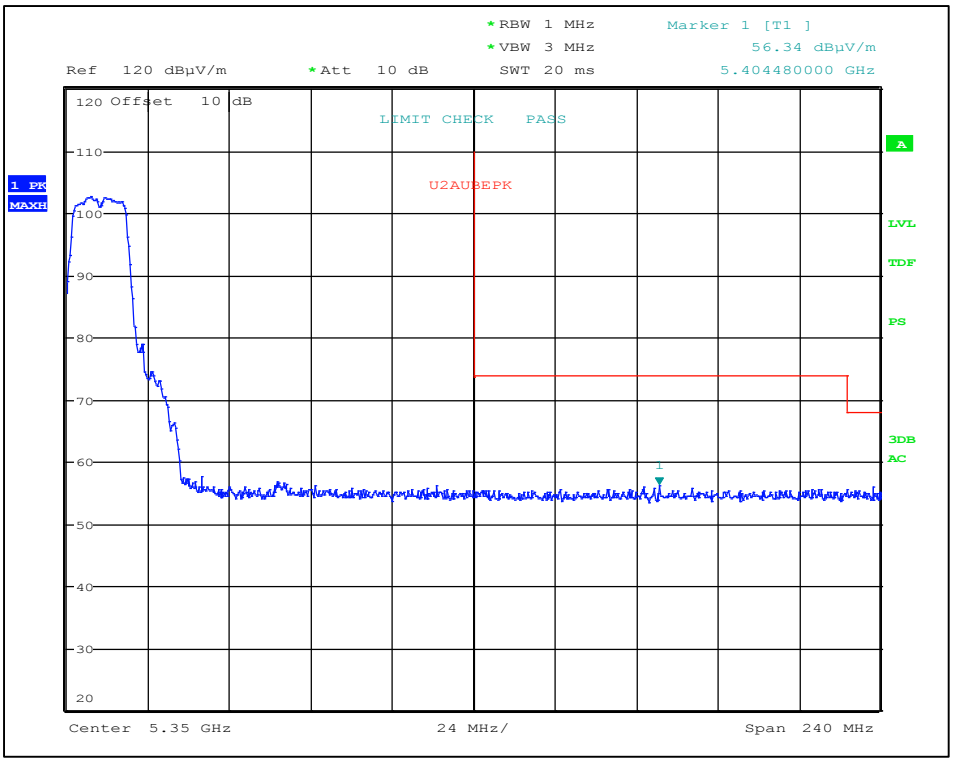
Refer to the following Plots



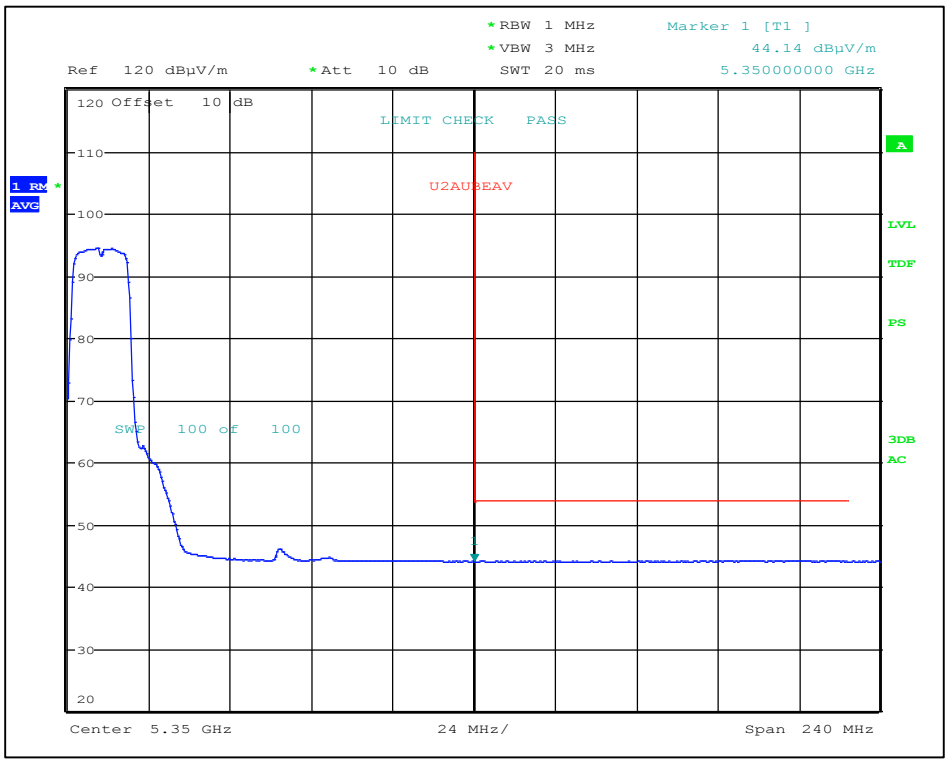
802.11a at 6Mbps, Channel 48 - Restricted-band band-edge, Vertical Peak Plot



802.11a at 6Mbps, Channel 48 - Restricted-band band-edge, Vertical Average Plot



802.11a at 6Mbps, Channel 48 - Restricted-band band-edge, Horizontal Peak Plot



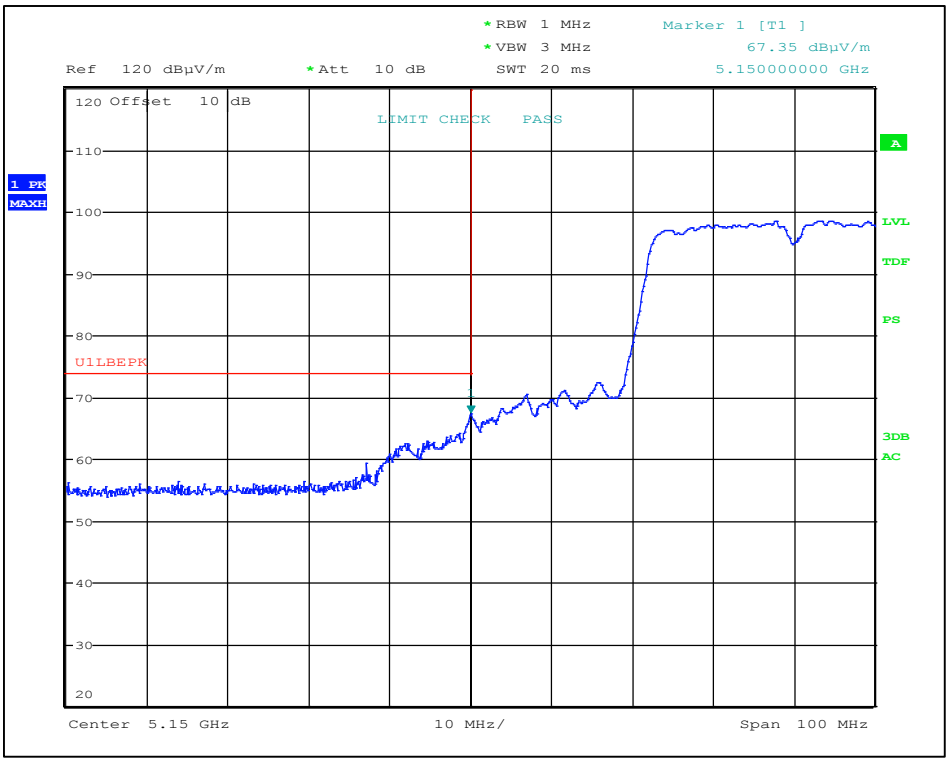
802.11a at 6Mbps, Channel 48 - Restricted-band band-edge, Horizontal Average Plot

6.5.3 Radiated Restricted-band band-edge at 5150 MHz [802.11n (HT20), MCS0/6.5 Mbps]

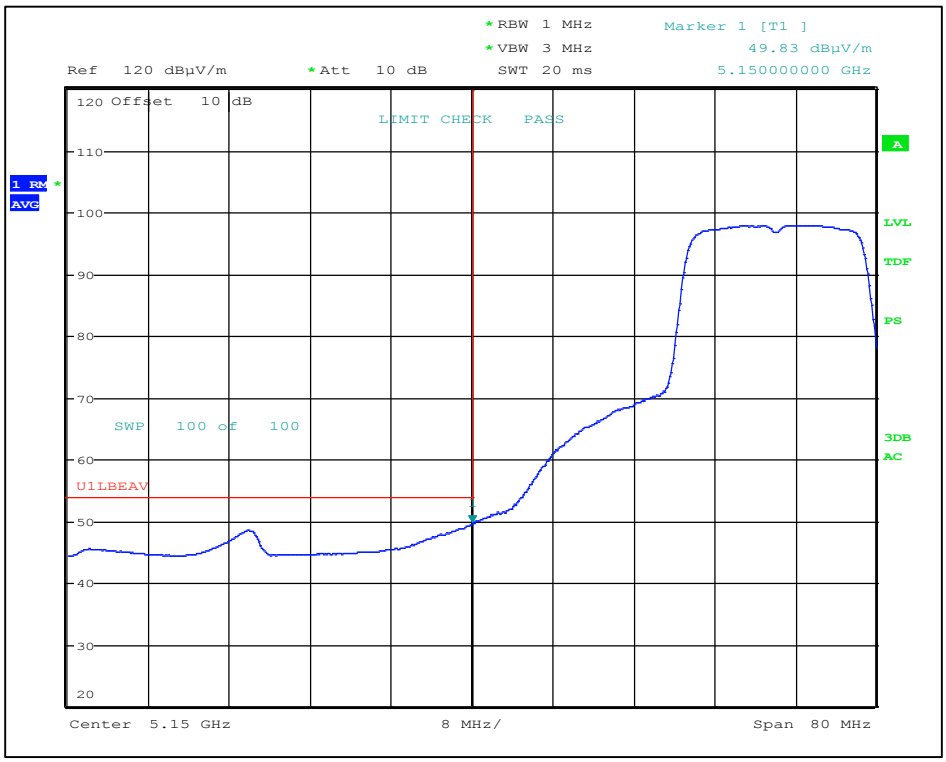
802.11n (HT20): MCS0/6.5 Mbps, Channel 36 (5180 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5150.0	67.4	PK	170	V	200	V	0.00	3.9	67.4	74.0	-6.6
5150.0	49.8	AV	170	V	200	V	0.00	3.9	49.8	54.0	-4.2
5149.9	63.1	PK	150	H	295	H1	0.00	3.9	63.1	74.0	-10.9
5150.0	46.9	AV	150	H	295	H1	0.00	3.9	46.9	54.0	-7.1

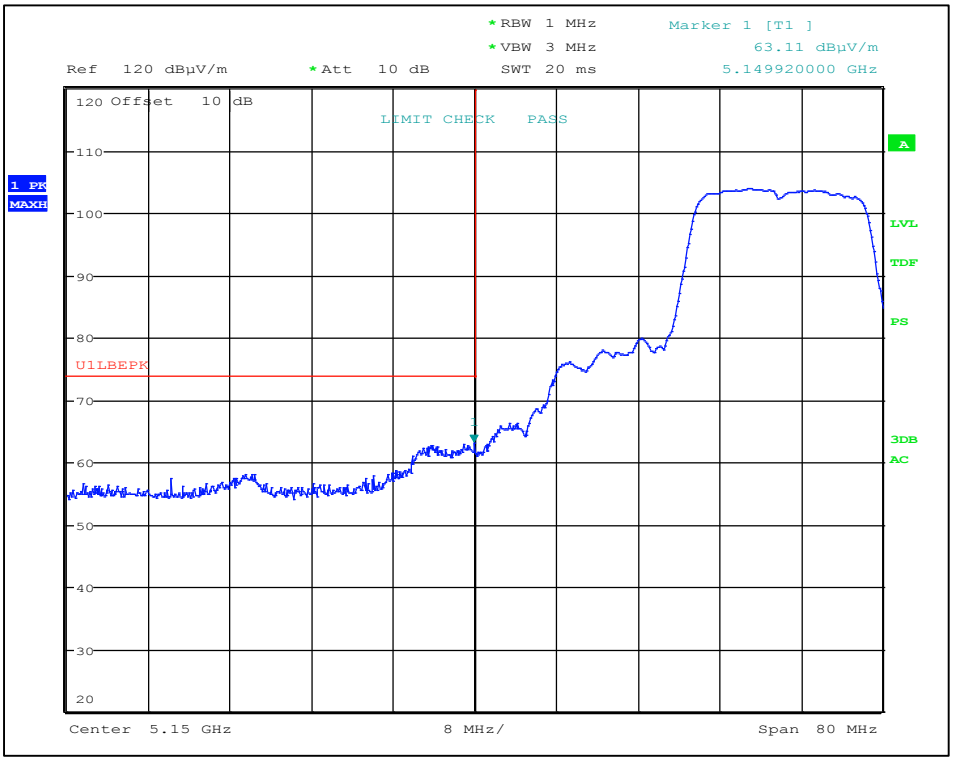
Refer to the following Plots



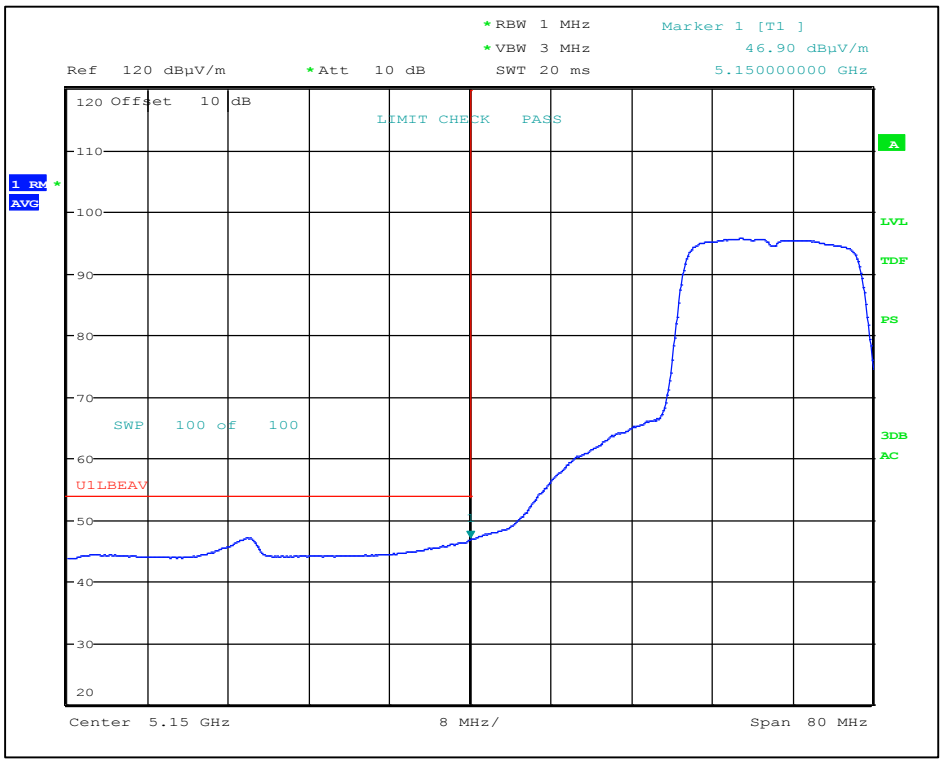
802.11n (HT20): MCS0/6.5 Mbps, Channel 36 - Restricted-band band-edge, Vertical Peak Plot



802.11n (HT20): MCS0/6.5 Mbps, Channel 36 - Restricted-band band-edge, Vertical Average Plot



802.11n (HT20): MCS0/6.5 Mbps, Channel 36 - Restricted-band band-edge, Horizontal Peak Plot



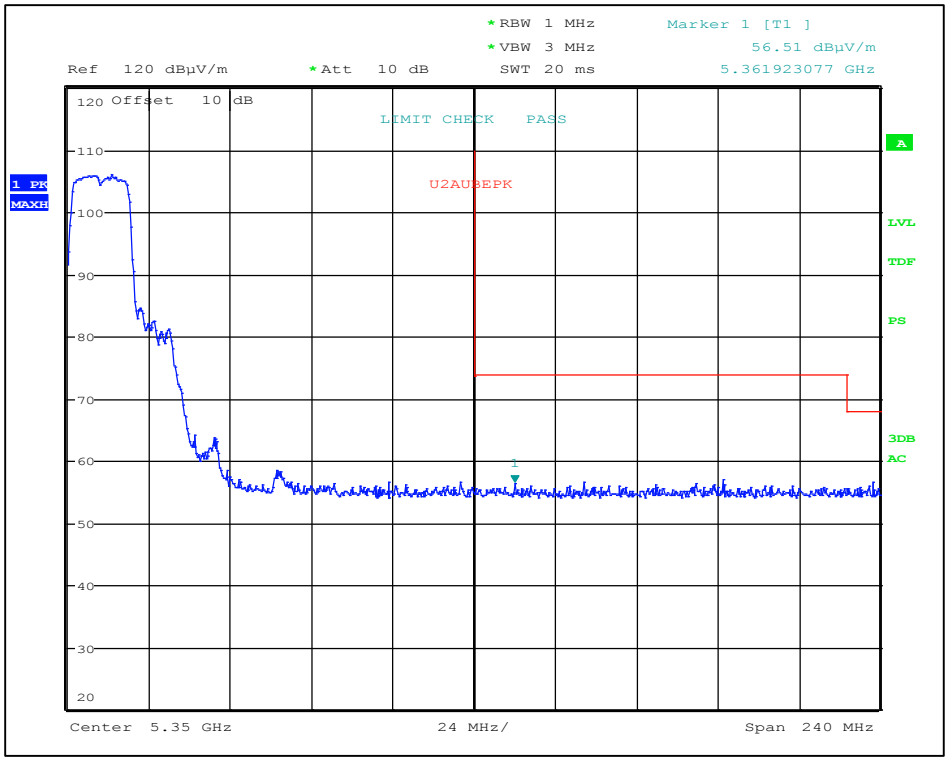
802.11n (HT20): MCS0/6.5 Mbps, Channel 36 - Restricted-band band-edge, Horizontal Average Plot

6.5.4 Radiated Restricted-band band-edge at 5350 MHz [802.11n (HT20), MCS0/6.5 Mbps]

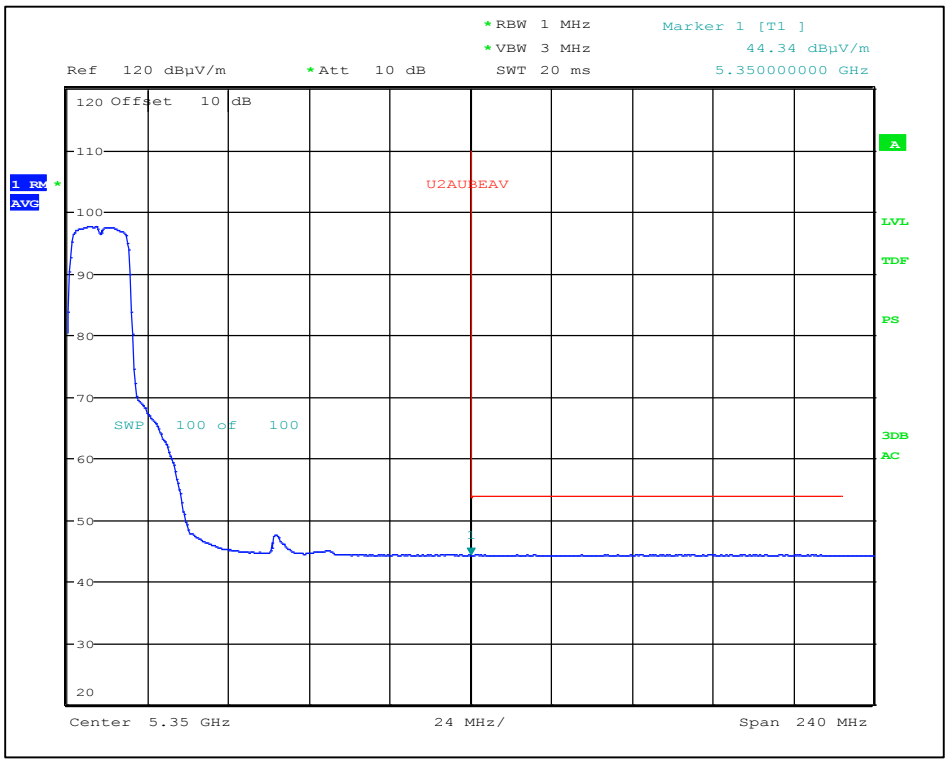
802.11n (HT20): MCS0/6.5 Mbps, Channel 48 (5240 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5361.9	56.5	PK	170	V	200	V	0.00	3.5	56.5	74.0	-17.5
5350.0	44.3	AV	170	V	200	V	0.00	3.5	44.3	54.0	-9.7
5367.9	55.8	PK	150	H	295	H1	0.00	3.4	55.8	74.0	-18.2
5350.0	44.1	AV	150	H	295	H1	0.00	3.4	44.1	54.0	-9.9

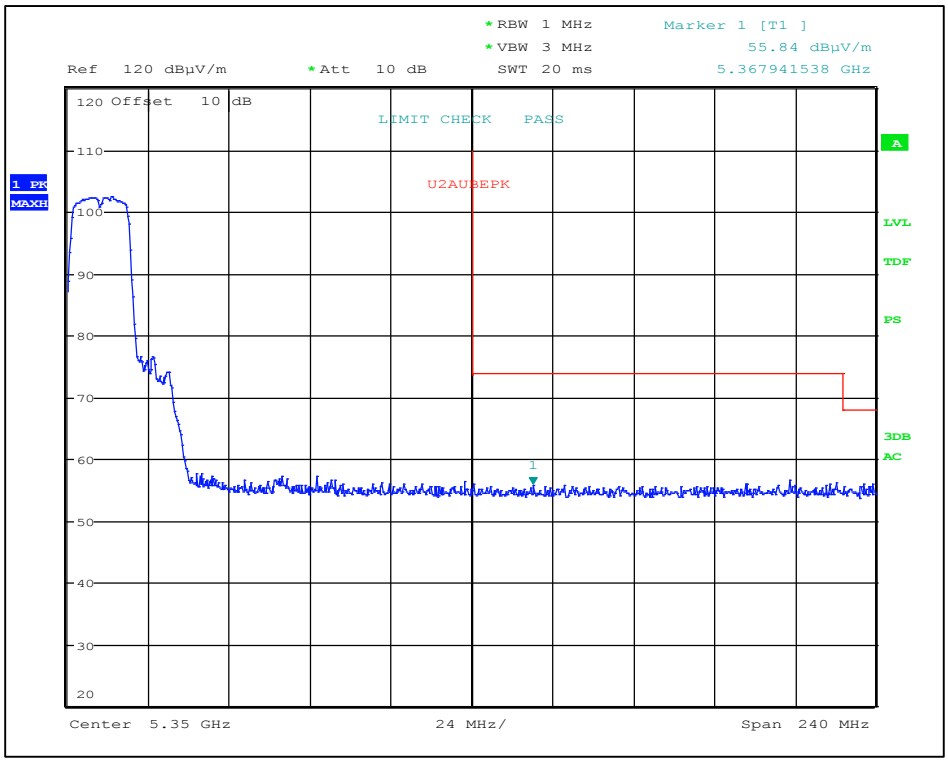
Refer to the following Plots



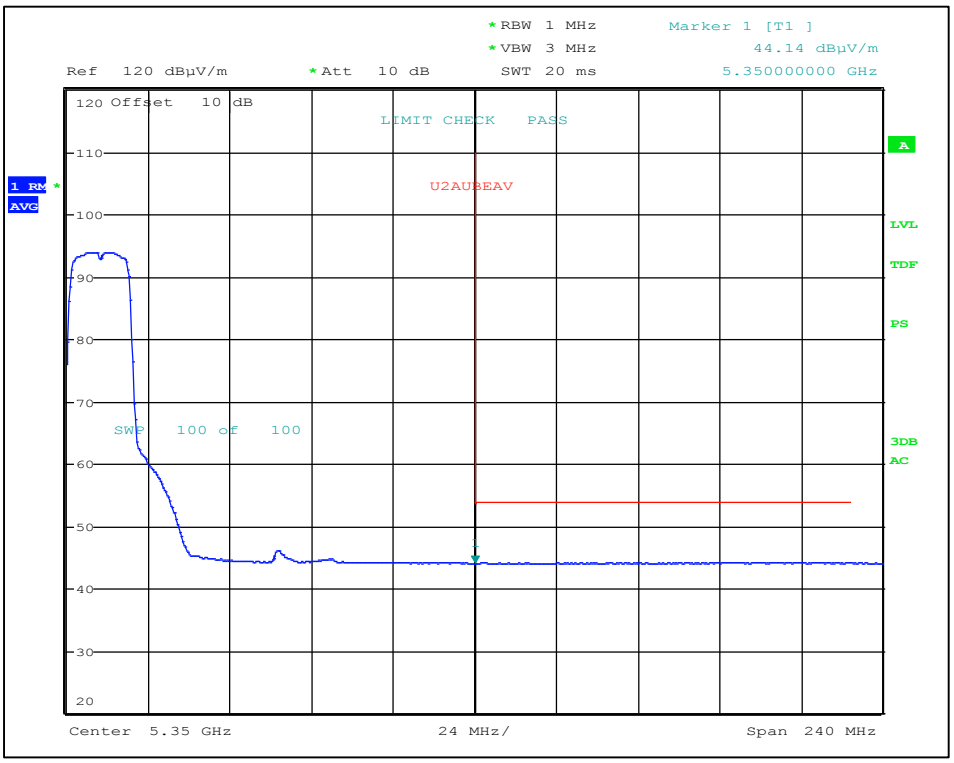
802.11n (HT20) at MCS0/6.5 Mbps, Channel 48 - Restricted-band band-edge, Vertical Peak Plot



802.11n (HT20) at MCS0/6.5 Mbps, Channel 48 - Restricted-band band-edge, Vertical Average Plot



802.11n (HT20) at MCS0/6.5 Mbps, Channel 48 - Restricted-band band-edge, Horizontal Peak Plot



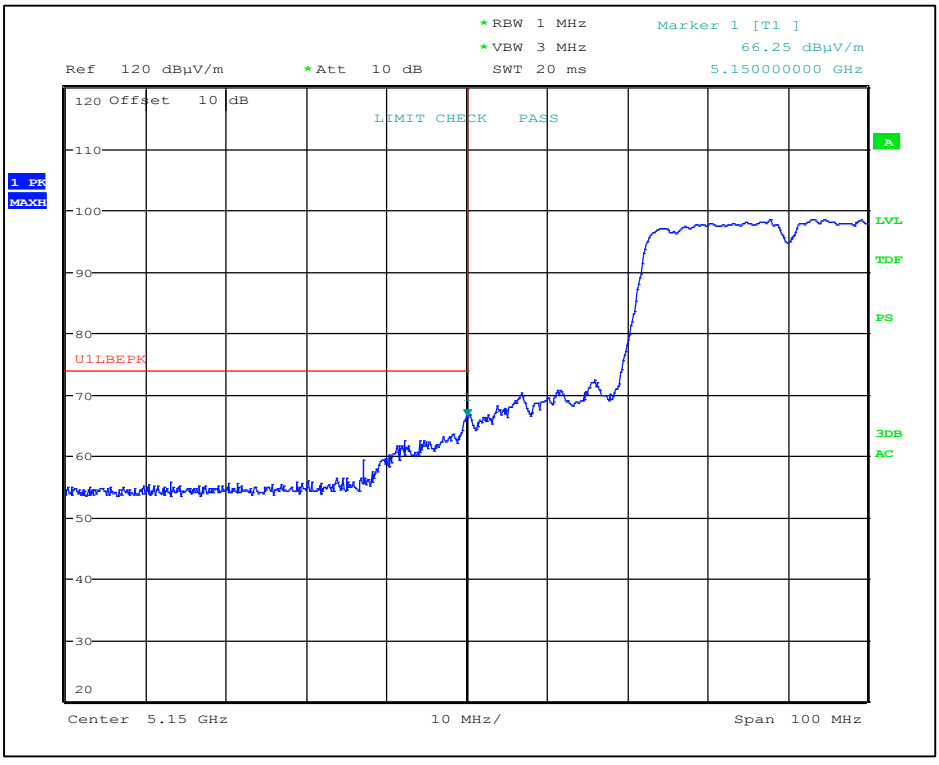
802.11n (HT20) at MCS0/6.5 Mbps, Channel 48 - Restricted-band band-edge, Horizontal Average Plot

6.5.5 Radiated Restricted-band band-edge at 5150 MHz [802.11n (HT40), MCS0/13.5 Mbps]

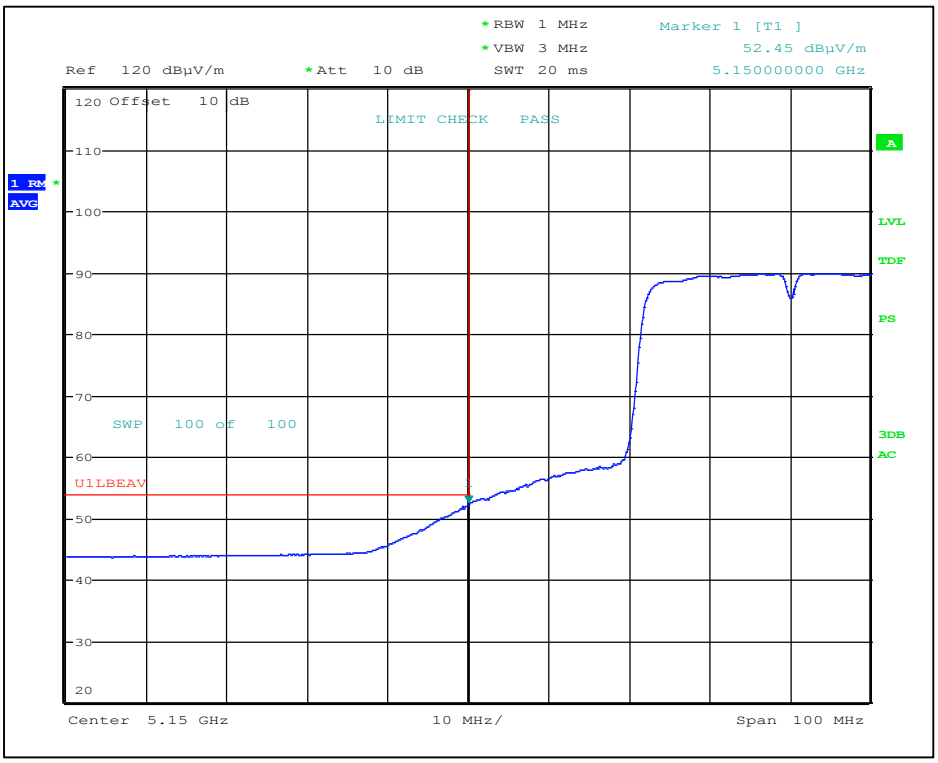
802.11n (HT40): MCS0/13.5 Mbps, Channel 38 (5190 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5150.0	66.3	PK	170	V	200	V	0.00	3.9	66.3	74.0	-7.7
5150.0	52.5	AV	170	V	200	V	0.00	3.9	52.5	54.0	-1.5
5150.0	63.4	PK	150	H	295	H1	0.00	3.9	63.4	74.0	-10.6
5150.0	49.6	AV	150	H	295	H1	0.00	3.9	49.6	54.0	-4.4

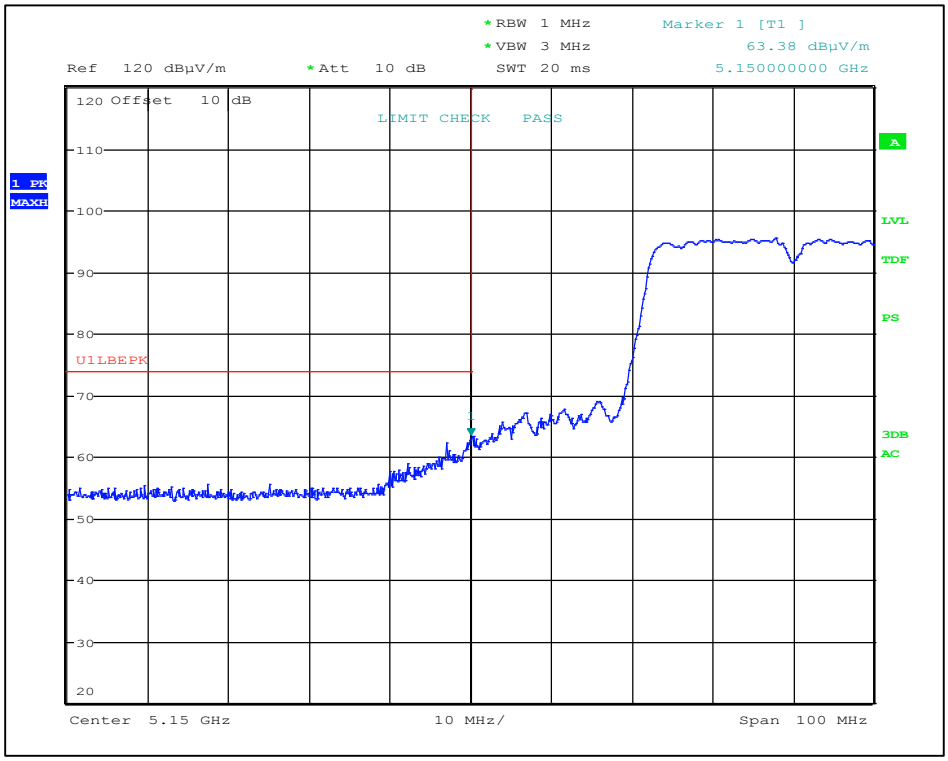
Refer to the following Plots



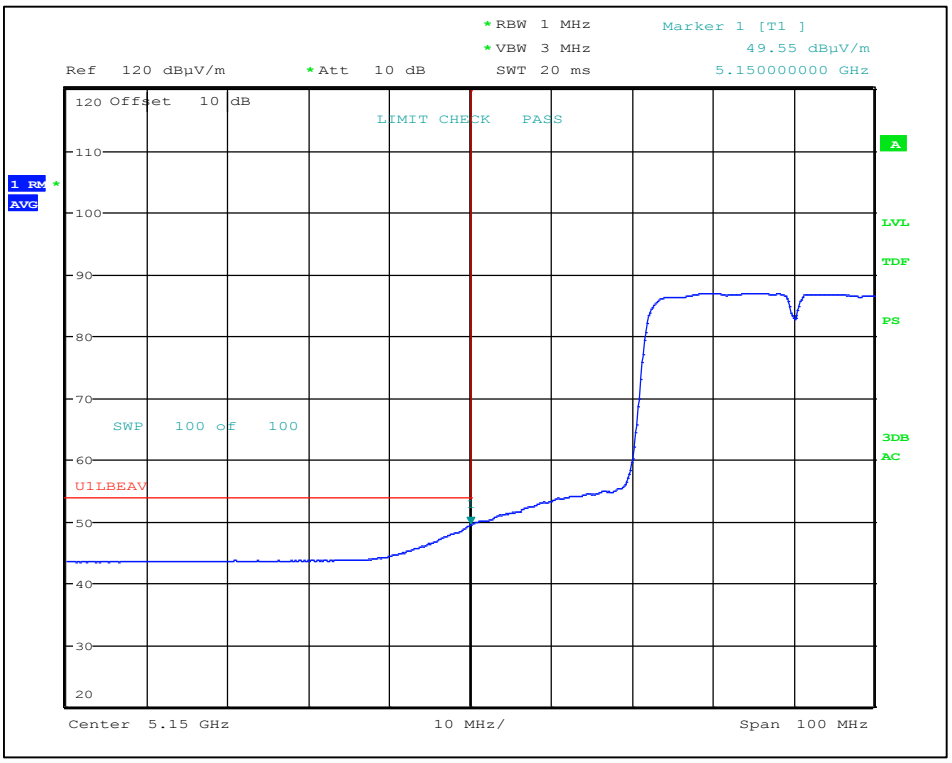
802.11n (HT40): MCS0/13.5 Mbps, Channel 38 - Restricted-band band-edge, Vertical Peak Plot



802.11n (HT40): MCS0/13.5 Mbps, Channel 38 - Restricted-band band-edge, Vertical Average Plot



802.11n (HT40): MCS0/13.5 Mbps, Channel 38 - Restricted-band band-edge, Horizontal Peak Plot



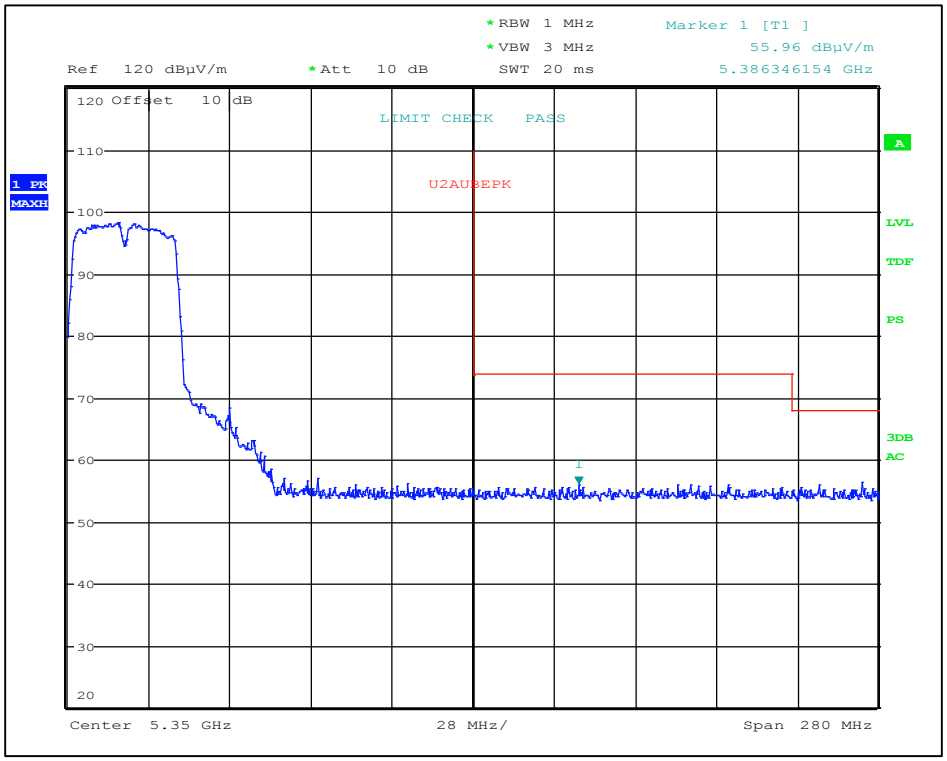
802.11n (HT40): MCS0/13.5 Mbps, Channel 38 - Restricted-band band-edge, Horizontal Average Plot

6.5.6 Radiated Restricted-band band-edge at 5350 MHz [802.11n (HT40), MCS0/13.5 Mbps]

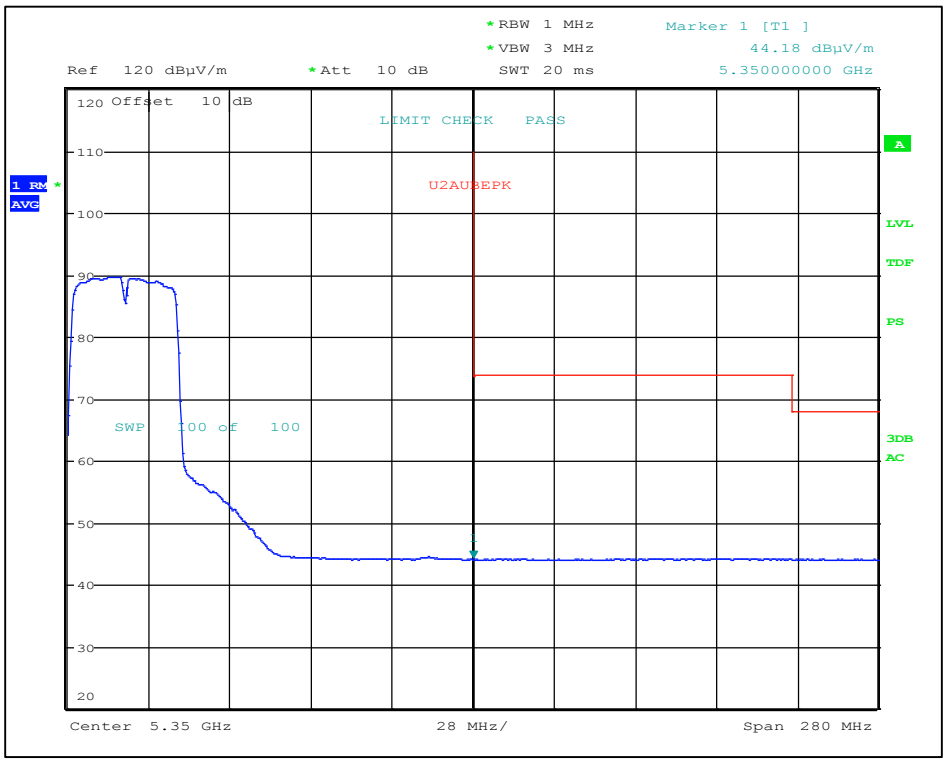
802.11n (HT40): MCS0/13.5 Mbps, Channel 46 (5230 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5386.3	56.0	PK	170	V	200	V	0.00	3.5	56.0	74.0	-18.0
5350.0	44.2	AV	170	V	200	V	0.00	3.5	44.2	54.0	-9.8
5368.4	56.6	PK	150	H	295	H1	0.00	3.4	56.6	74.0	-17.4
5350.0	44.1	AV	150	H	295	H1	0.00	3.4	44.1	54.0	-9.9

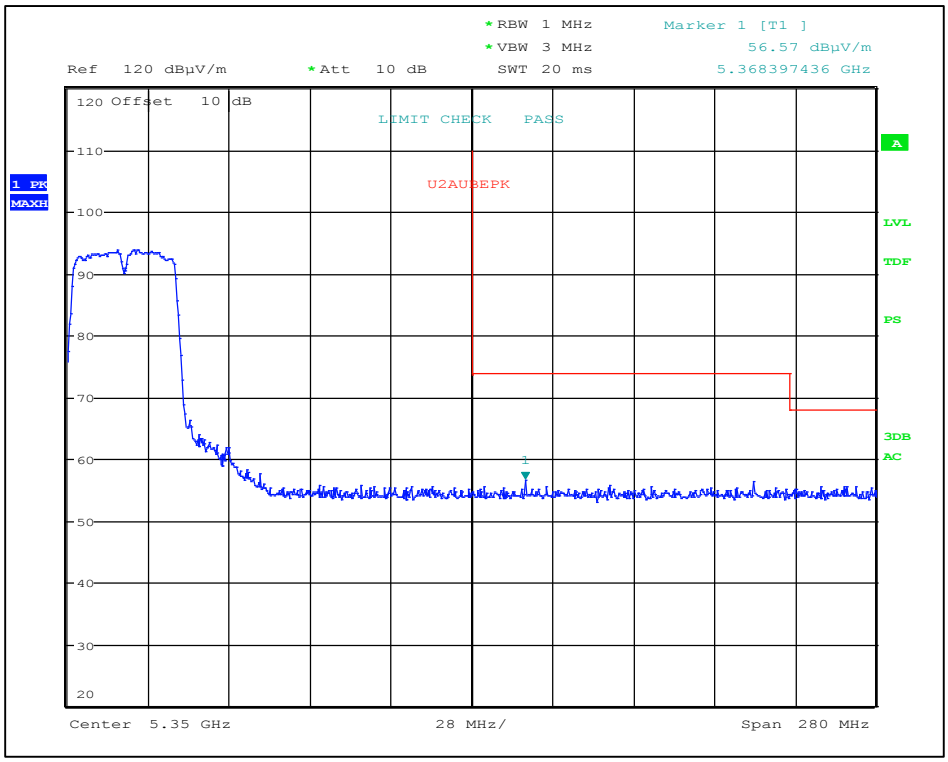
Refer to the following Plots



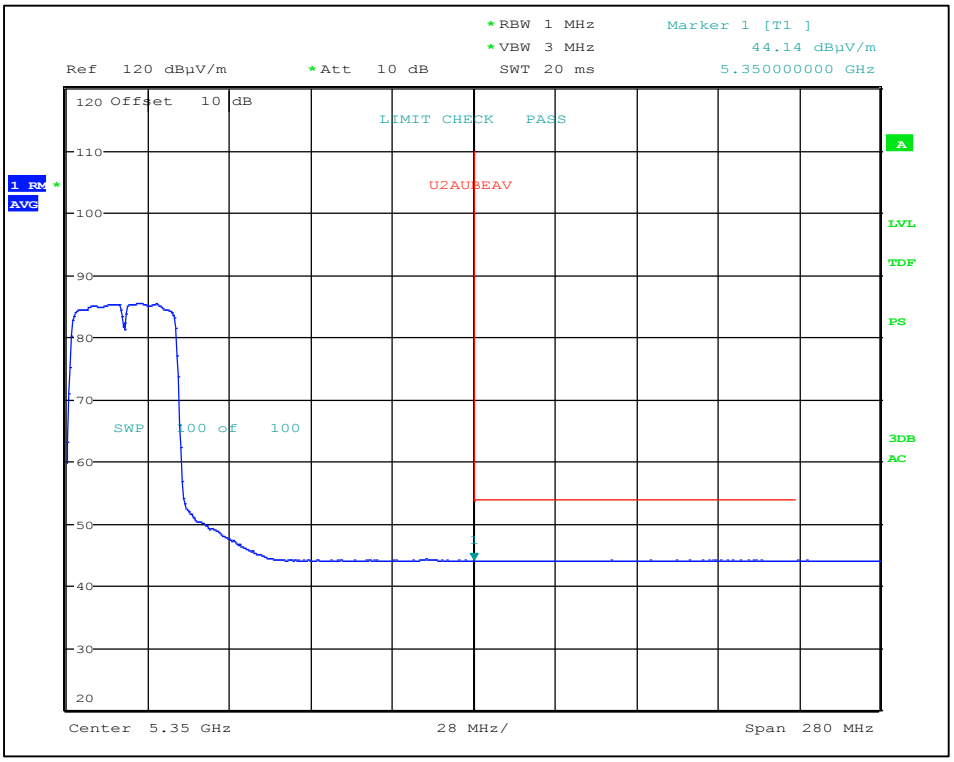
802.11n (HT40): MCS0/13.5 Mbps, Channel 46 - Restricted-band band-edge, Vertical Peak Plot



802.11n (HT40): MCS0/13.5 Mbps, Channel 46 - Restricted-band band-edge, Vertical Average Plot



802.11n (HT40): MCS0/13.5 Mbps, Channel 46 - Restricted-band band-edge, Horizontal Peak Plot



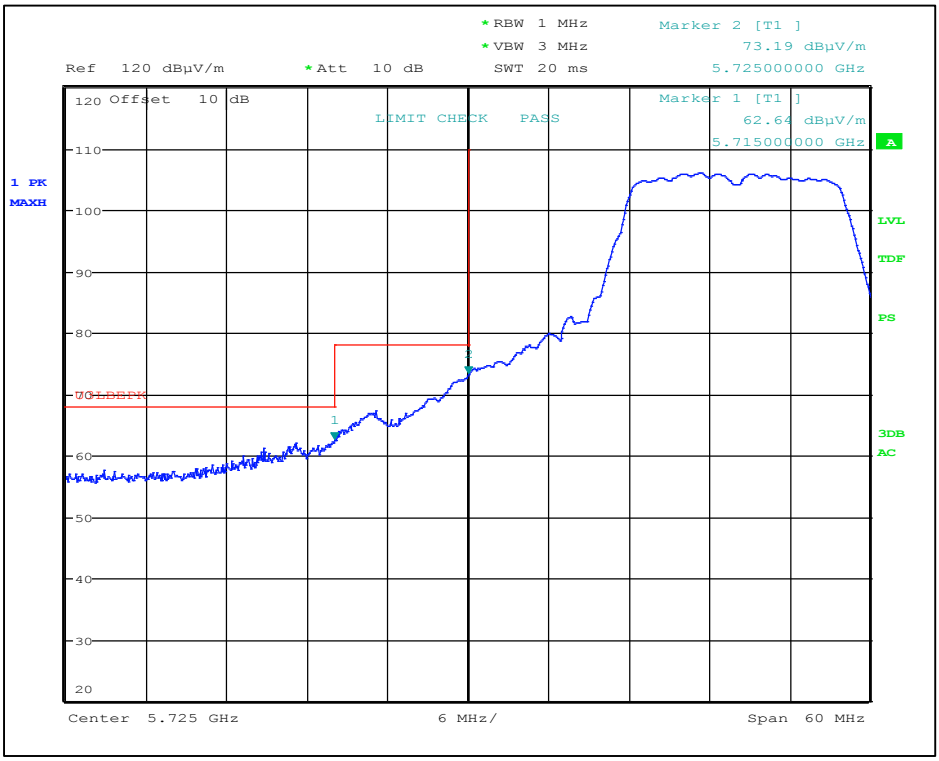
802.11n (HT40): MCS0/13.5 Mbps, Channel 46 - Restricted-band band-edge, Horizontal Average Plot

6.5.7 Radiated Authorized-band band-edge at 5725 MHz [802.11a, 6 Mbps]

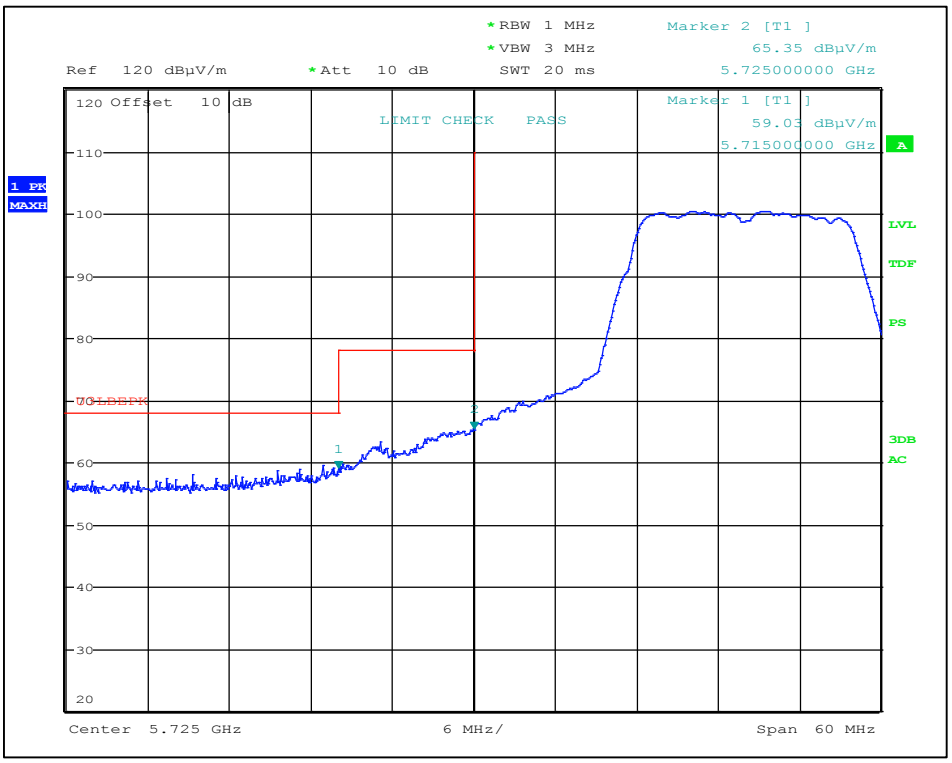
802.11a: 6 Mbps, Channel 149 (5745 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5725.0	73.2	PK	150	V	195.0	V	0.00	3.8	73.2	78.2	-5.0
5715.0	62.6	PK	150	V	195.0	V	0.00	3.8	62.6	68.2	-5.6
5725.0	65.4	PK	155	H	305.0	H1	0.00	3.6	65.4	78.2	-12.8
5715.0	59.0	PK	155	H	305.0	H1	0.00	3.6	59.0	68.2	-9.2

Refer to the following Plots



802.11a: 6Mbps, Channel 149 – Authorized-band band-edge, Vertical Peak Plot



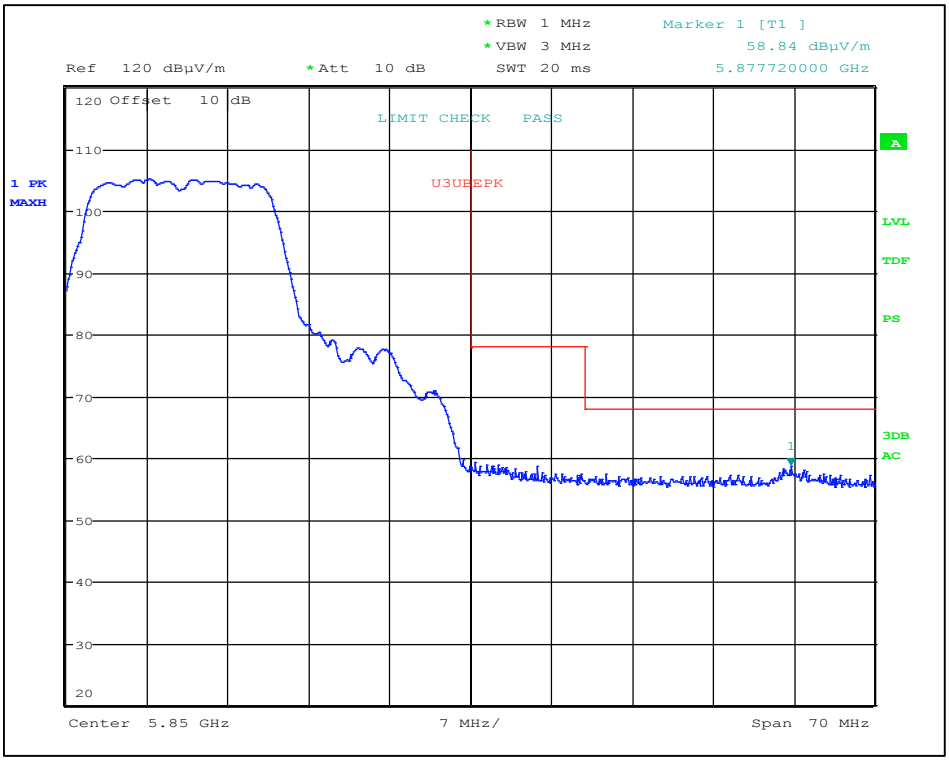
802.11a: 6Mbps, Channel 149 – Authorized-band band-edge, Horizontal Peak Plot

6.5.8 Radiated Authorized-band band-edge at 5850 MHz [802.11a, 6 Mbps]

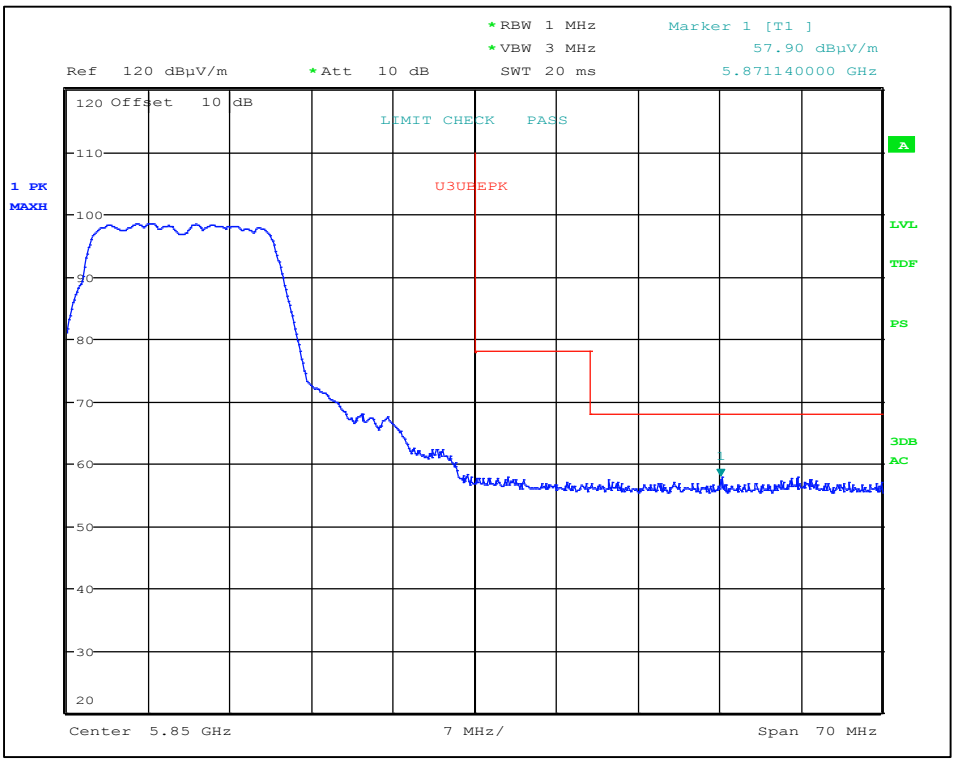
802.11a: 6 Mbps, Channel 165 (5825 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5877.7	58.8	PK	150	V	195	V	0.00	3.80	58.8	68.2	-9.4
5871.1	57.9	PK	155	H	305	H1	0.00	3.60	57.9	68.2	-10.3

Refer to the following Plots



802.11a at 6Mbps, Channel 165 – Authorized-band band-edge, Vertical Peak Plot



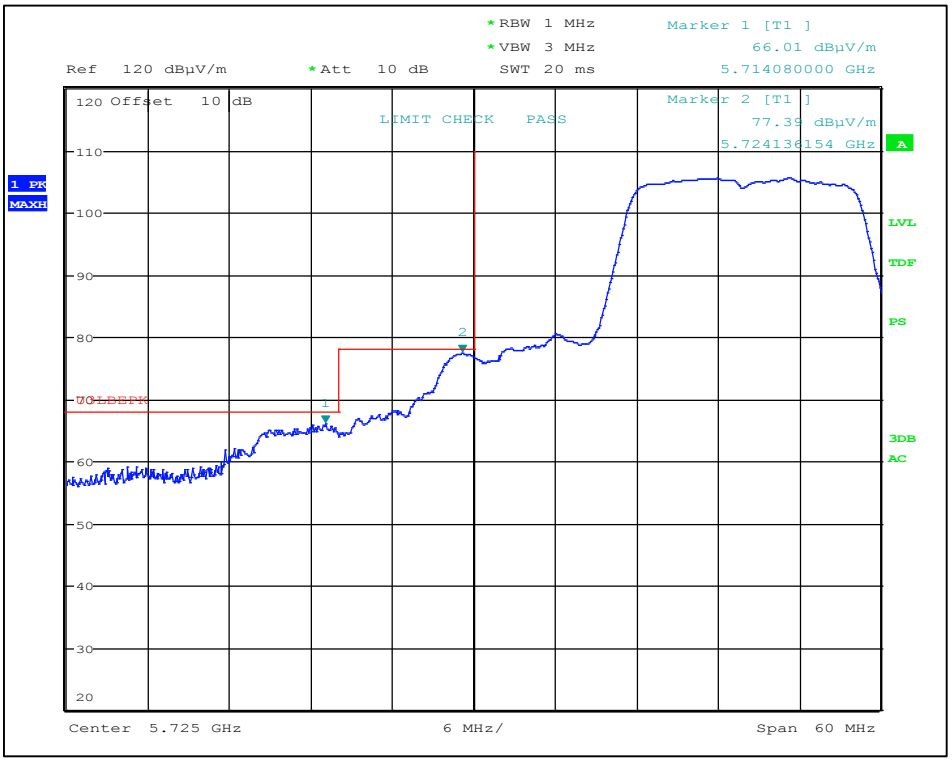
802.11a at 6Mbps, Channel 165 – Authorized-band band-edge, Horizontal Peak Plot

6.5.9 Radiated Authorized-band band-edge at 5725 MHz [802.11n (HT20), MCS0/6.5 Mbps]

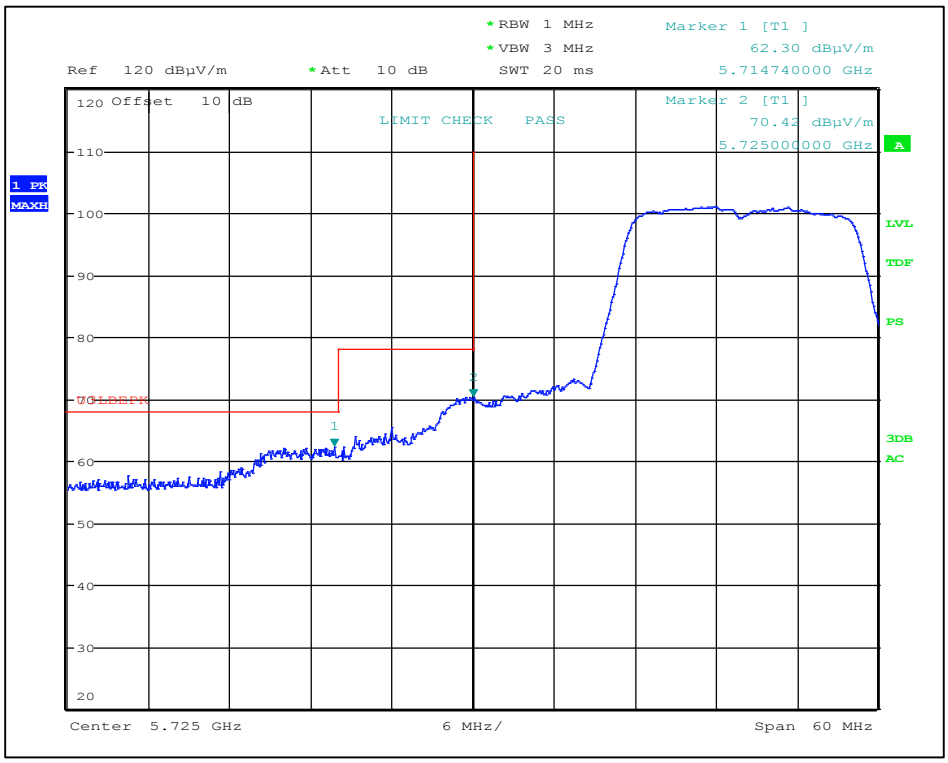
802.11n (HT20): MCS0/6.5 Mbps, Channel 149 (5745 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5724.1	77.4	PK	150	V	195.0	V	0.00	3.8	77.4	78.2	-0.8
5714.1	66.0	PK	150	V	195.0	V	0.00	3.8	66.0	68.2	-2.2
5725.0	70.4	PK	155	H	305.0	H1	0.00	3.6	70.4	78.2	-7.8
5714.7	62.3	PK	155	H	305.0	H1	0.00	3.6	62.3	68.2	-5.9

Refer to the following Plots



802.11n (HT20): MCS0/6.5 Mbps, Channel 149 – Authorized-band band-edge, Vertical Peak Plot



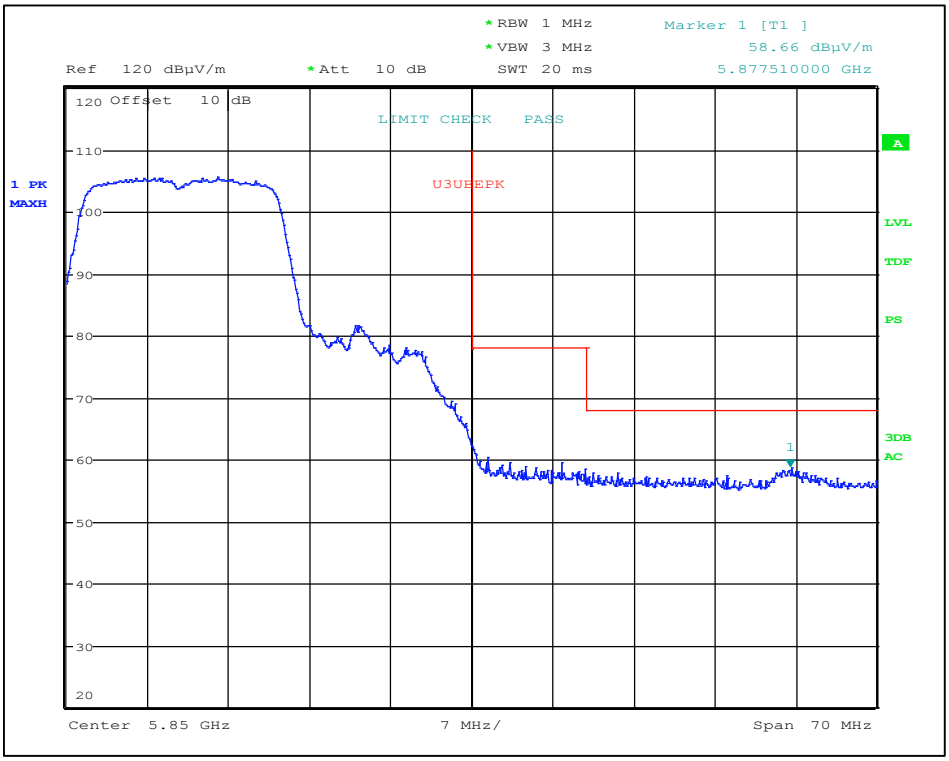
802.11n (HT20): MCS0/6.5 Mbps, Channel 149 – Authorized-band band-edge, Horizontal Peak Plot

6.5.10 Radiated Authorized-band band-edge at 5850 MHz [802.11n (HT20), MCS0/6.5 Mbps]

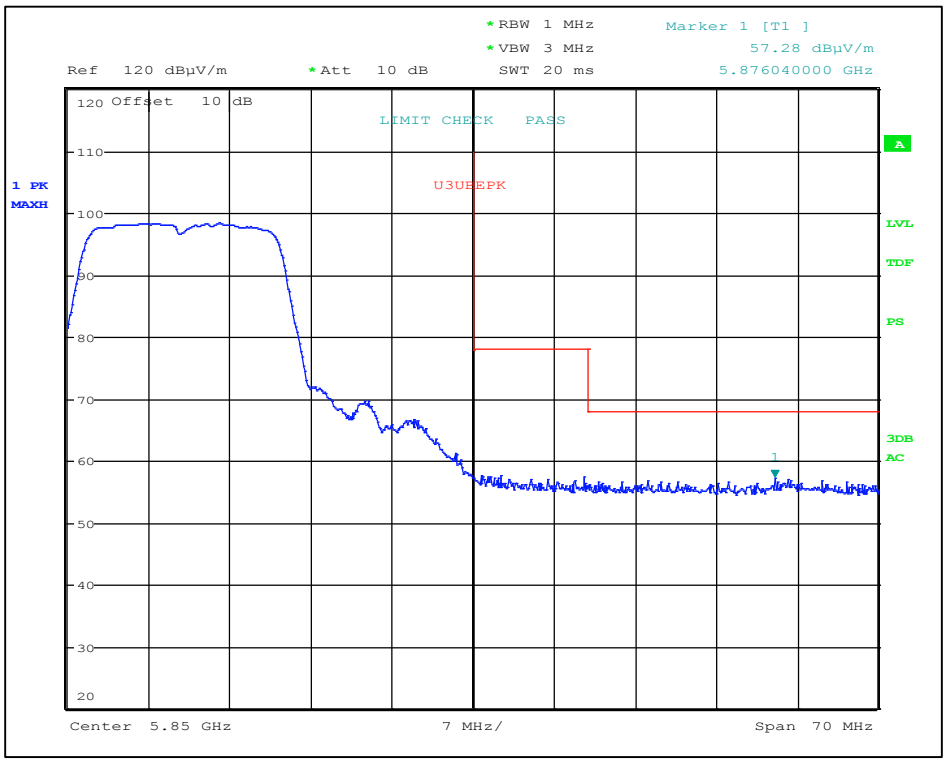
802.11n (HT20): MCS0/6.5 Mbps, Channel 165 (5825 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5877.5	58.7	PK	150	V	195	V	0.00	3.80	58.7	68.2	-9.5
5876.0	57.3	PK	155	H	305	H1	0.00	3.60	57.3	68.2	-10.9

Refer to the following Plots



802.11n (HT20): MCS0/6.5 Mbps, Channel 165 – Authorized-band band-edge, Vertical Peak Plot



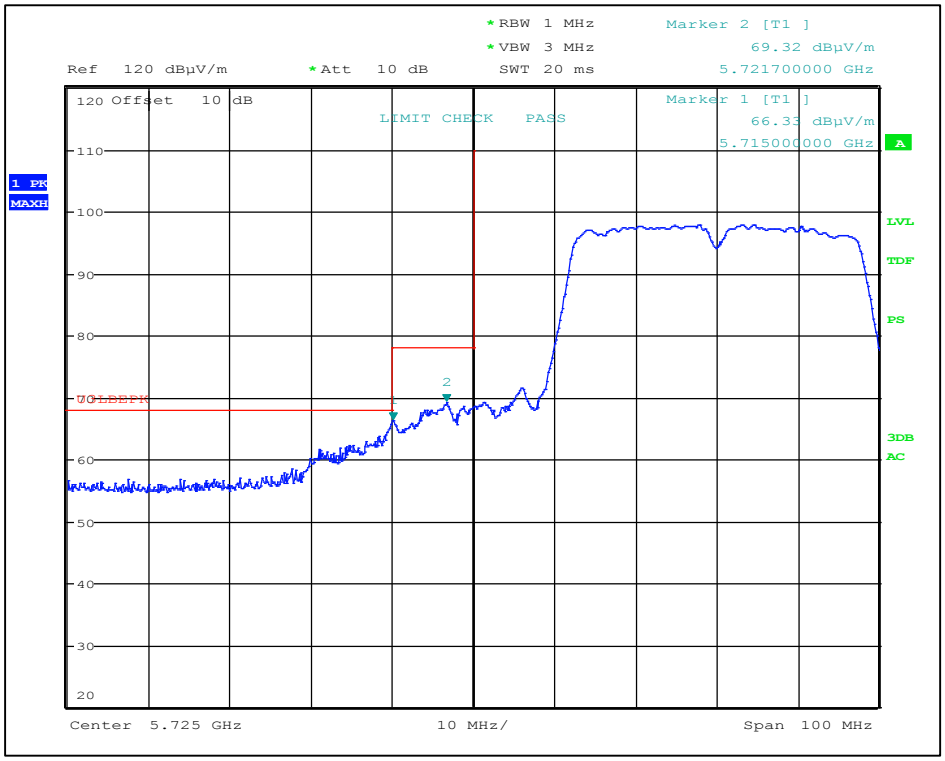
802.11n (HT20): MCS0/6.5 Mbps, Channel 165 – Authorized-band band-edge, Horizontal Peak Plot

6.5.11 Radiated Authorized-band band-edge at 5725 MHz [802.11n (HT40), MCS0/13.5 Mbps]

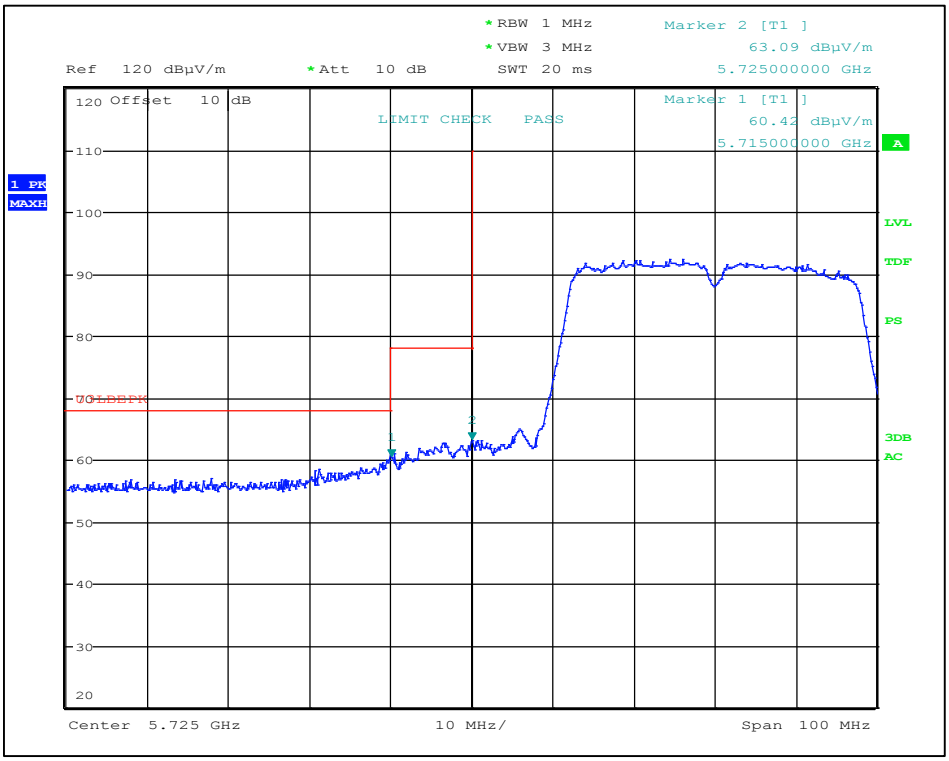
802.11n (HT40): MCS0/13.5 Mbps, Channel 151 (5755 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5721.7	69.3	PK	150	V	195.0	V	0.00	3.8	69.3	78.2	-8.9
5715.0	66.3	PK	150	V	195.0	V	0.00	3.8	66.3	68.2	-1.9
5725.0	63.1	PK	155	H	305.0	H1	0.00	3.6	63.1	78.2	-15.1
5715.0	60.4	PK	155	H	305.0	H1	0.00	3.6	60.4	68.2	-7.8

Refer to the following Plots



802.11n (HT40): MCS0/13.5 Mbps, Channel 151 – Authorized-band band-edge, Vertical Peak Plot



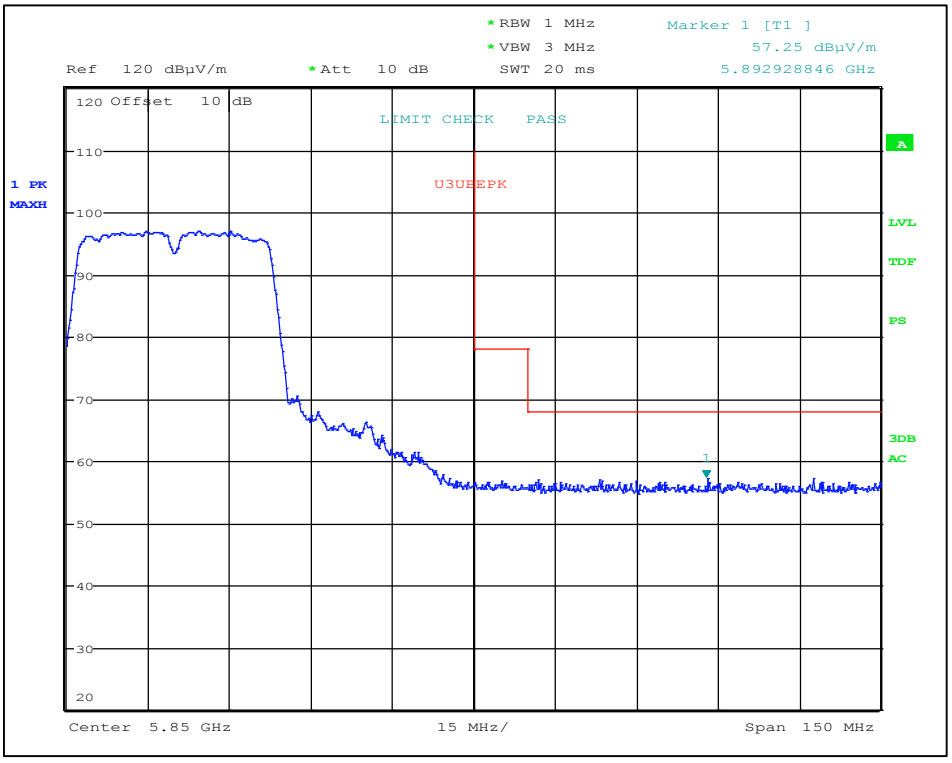
802.11n (HT40): MCS0/13.5 Mbps, Channel 151 – Authorized-band band-edge, Horizontal Peak Plot

6.5.12 Radiated Authorized-band band-edge at 5850 MHz [802.11n (HT40), MCS0/13.5 Mbps]

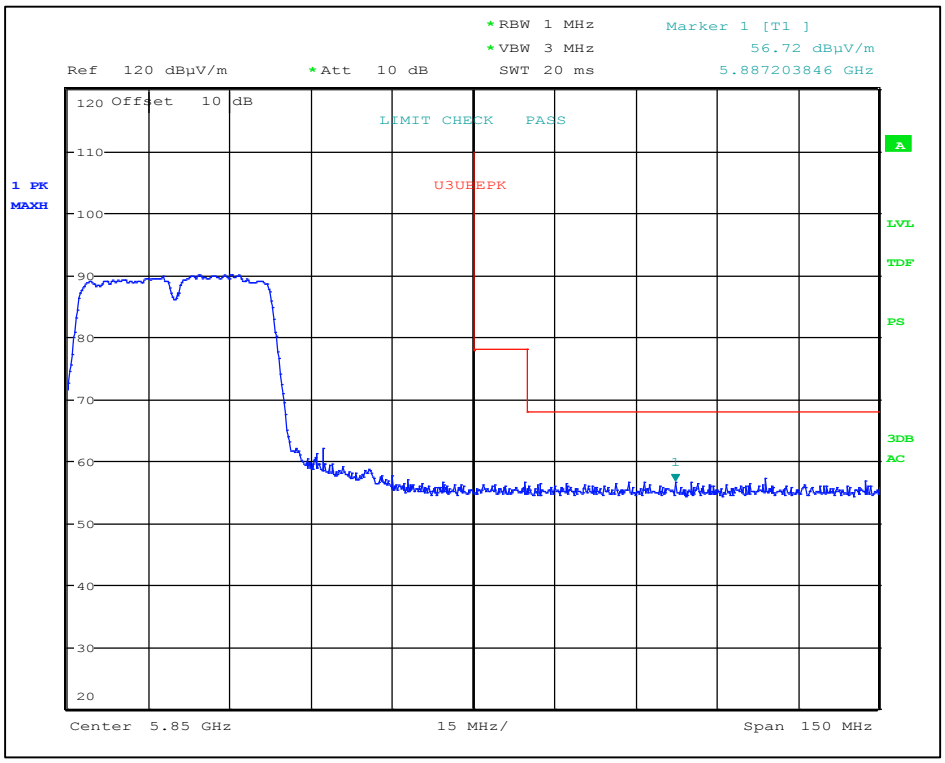
802.11n (HT40): MCS0/13.5 Mbps, Channel 159 (5795 MHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Transducer Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)						
5892.9	57.3	PK	150	V	195	V	0.00	3.80	57.3	68.2	-10.9
5887.2	56.7	PK	155	H	305	H1	0.00	3.60	56.7	68.2	-11.5

Refer to the following Plots



802.11n (HT40): MCS0/13.5 Mbps, Channel 159 – Authorized-band band-edge, Vertical Peak Plot



802.11n (HT40): MCS0/13.5 Mbps, Channel 159 – Authorized-band band-edge, Horizontal Peak Plot

6.5.13 Transmitter Radiated Emissions above 1 GHz (5.15-5.25 GHz Band)

Worst Case Mode:	802.11a
Data Rate:	6 Mbps
Measurement Distance:	3 meters
Operating Mode:	Continuous Transmit
Frequency Range:	1 GHz – 40 GHz
Note: The pre-scan plots do not show the maximized amplitude, only included for the purpose of identifying spurious emissions requiring final measurements.	

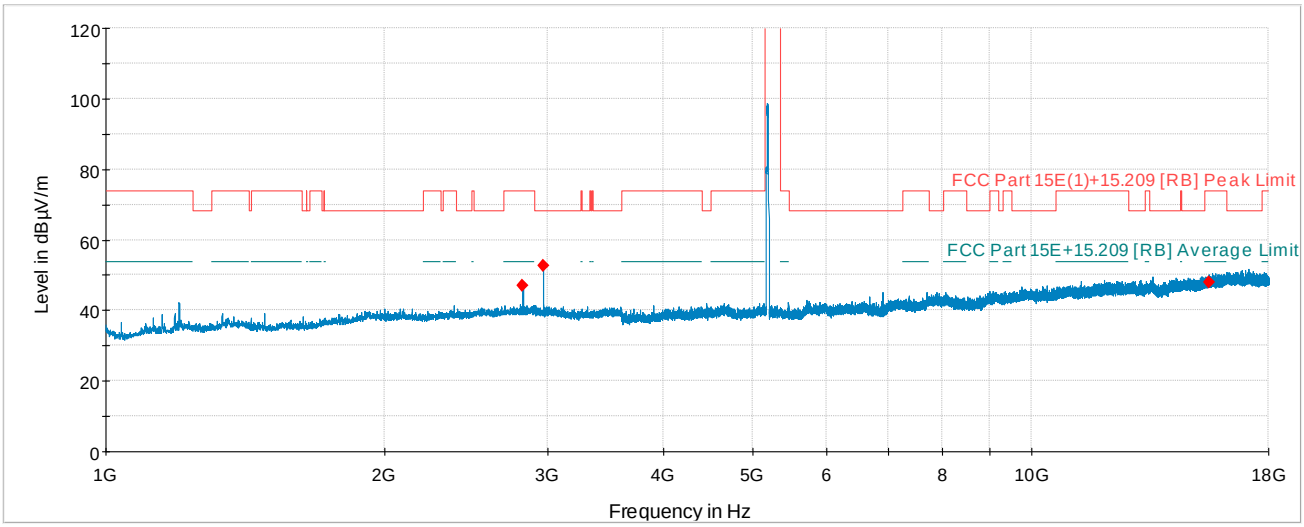
Channel 36 (5.18 GHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Correction Factor (dB)	Corrected Level (dBuV/m)	Limit [RB] (dBuV/m)	Limit [NRB] (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)							
*2820.5	43.8	PK	140.0	V	95.0	V	0.0	1.6	45.4	74.0	-	-28.6
*2820.5	31.2	AV	140.0	V	95.0	V	0.0	1.6	32.8	54.0	-	-21.2
2968.6	50.7	PK	140.0	V	0.0	V	0.0	1.9	52.6	-	68.2	-15.6
*15540.0	#	PK	-	V	-	V	0.0	16.2	#	74.0	-	-
*20720.0	#	PK	-	V	-	V	0.0	-4.6	#	74.0	-	-

*Note: * - indicates frequency in FCC §15.205 Restricted bands of operation; RB - Restricted Band; NRB – Non-Restricted Band*
 # - the maximized peak measured value was greater than 20 dB below the limit and/or complies with the average limit, thus both peak and average readings were not reported.

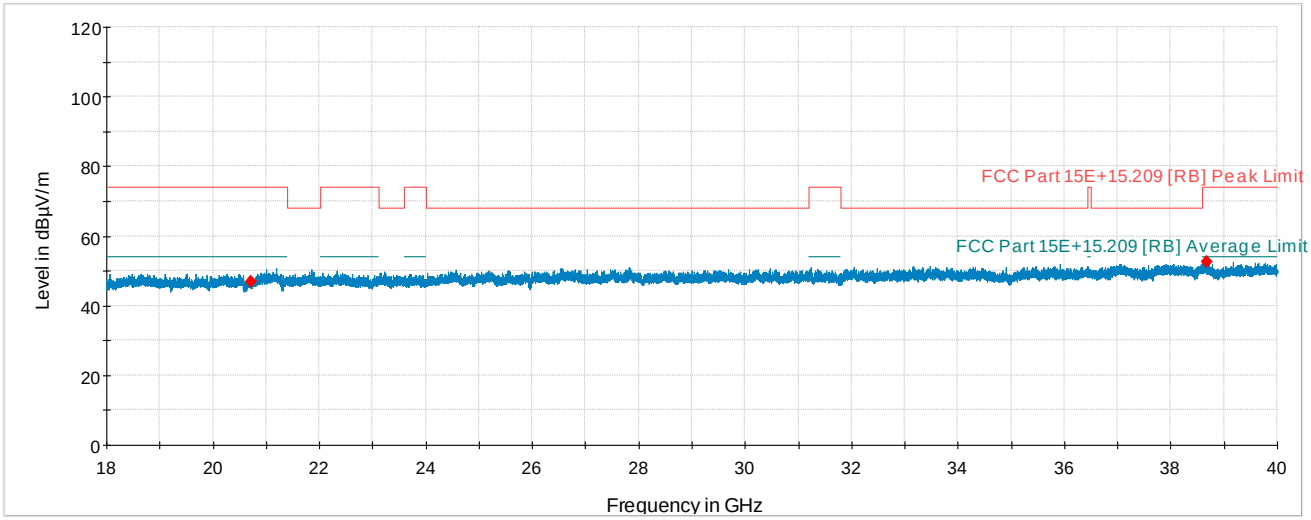
Radiated Spurious Emissions Pre-scan Vertical and Horizontal Plots

Channel 36 (5.18 GHz): 1-18 GHz Vertical Plot



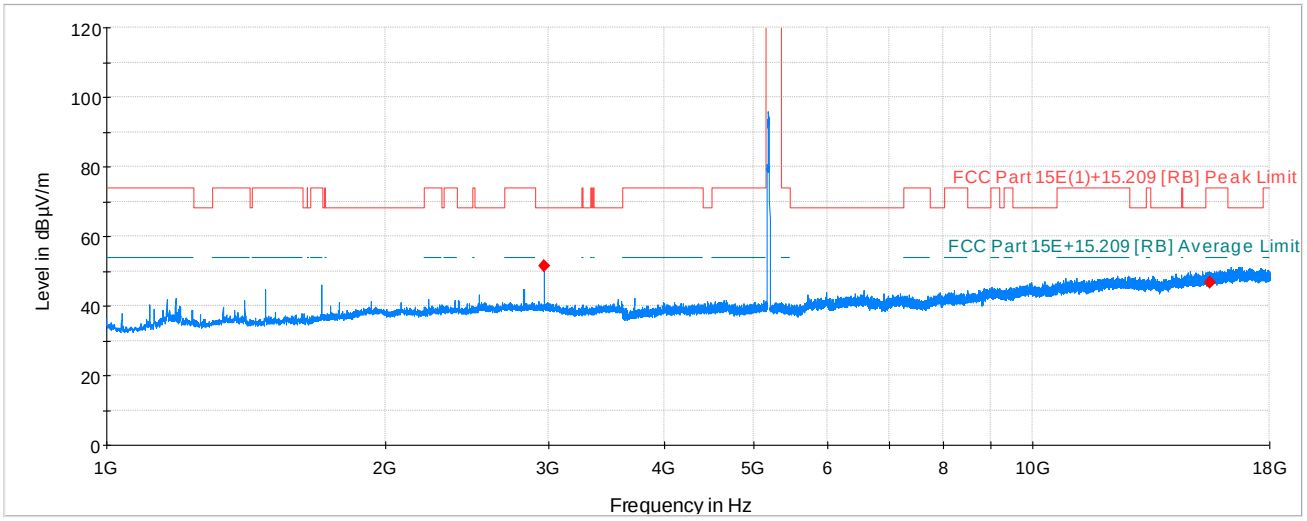
802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 36 (Vertical)

Channel 36 (5.18 GHz): 18-40 GHz Vertical Plot



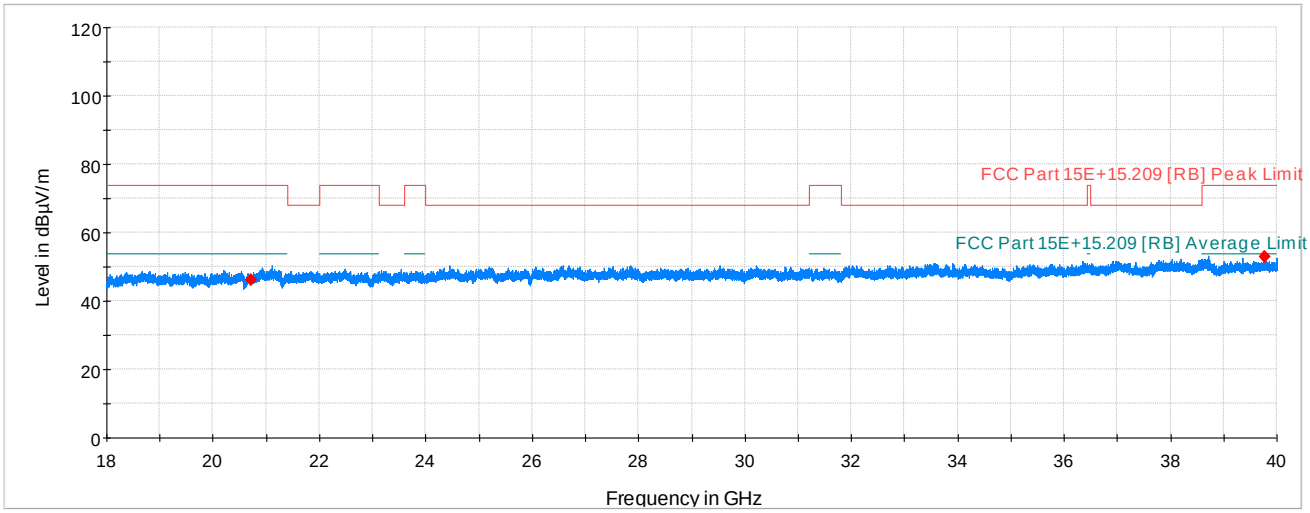
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 36 (Vertical)

Channel 36 (5.18 GHz): 1-18 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 36 (Horizontal)

Channel 36 (5.18 GHz): 18-40 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 36 (Horizontal)

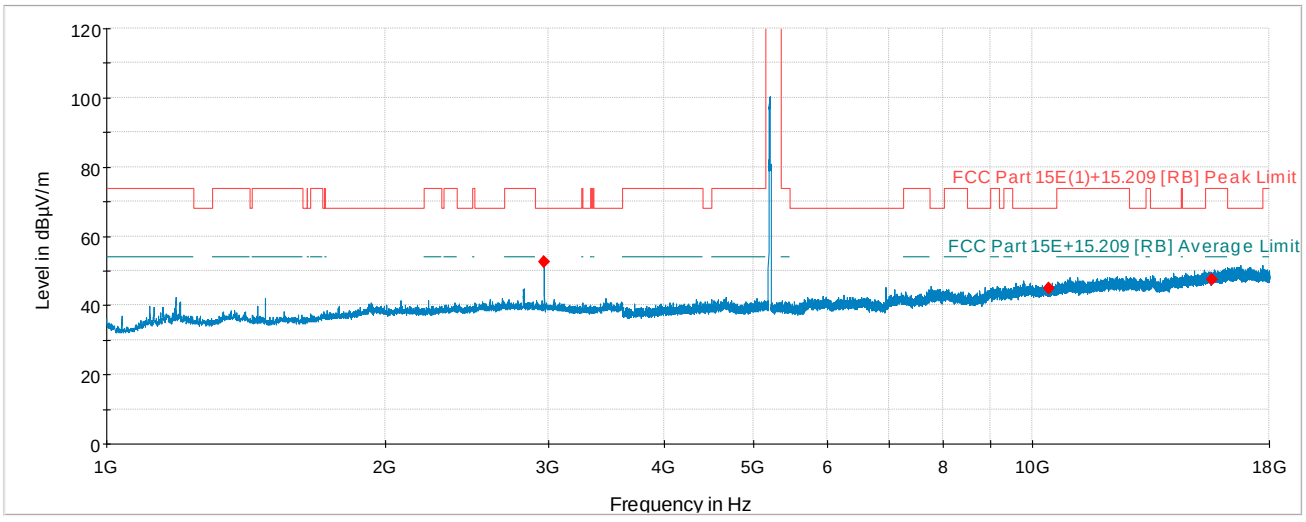
Channel 40 (5.2 GHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Correction Factor (dB)	Corrected Level (dBuV/m)	Limit [RB] (dBuV/m)	Limit [NRB] (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)							
2968.6	50.6	PK	150.0	V	0.0	V	0.0	1.9	52.5	-	68.2	-15.7
*15600.0	#	PK	-	V	-	V	0.0	16.4	#	74.0	-	-
*20800.0	#	PK	-	V	-	V	0.0	-4.5	#	74.0	-	-
*31200.0	#	PK	-	V	-	V	0.0	1.1	#	74.0	-	-

*Note: * - indicates frequency in FCC §15.205 Restricted bands of operation; RB - Restricted Band; NRB – Non-Restricted Band*
 # - the maximized peak measured value was greater than 20 dB below the limit and/or complies with the average limit, thus both peak and average readings were not reported.

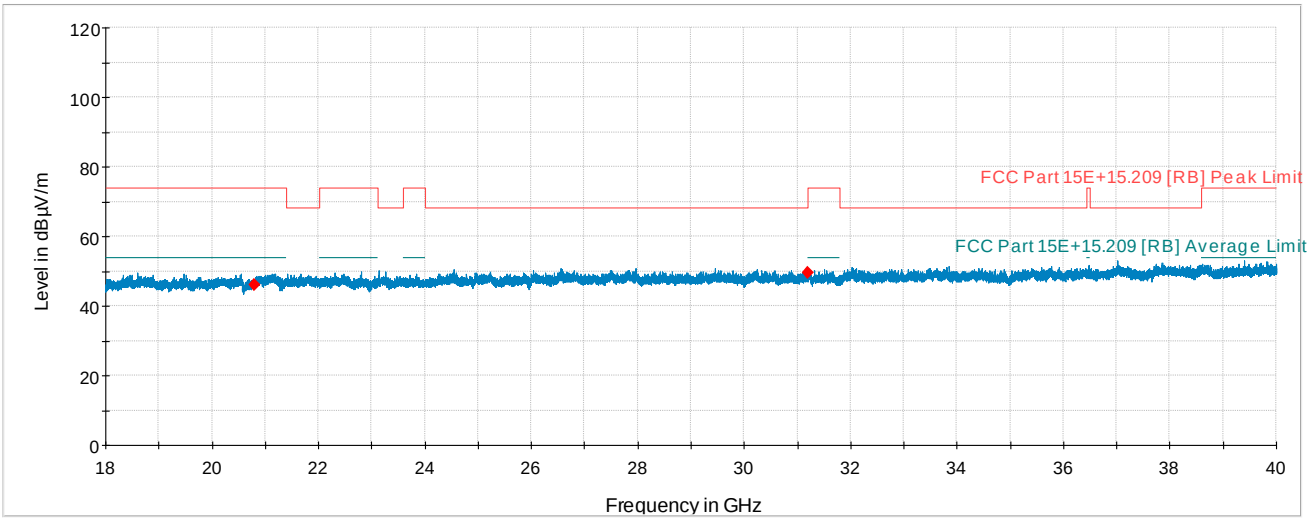
Radiated Spurious Emissions Pre-scan Vertical and Horizontal Plots

Channel 40 (5.2 GHz): 1-18 GHz Vertical Plot



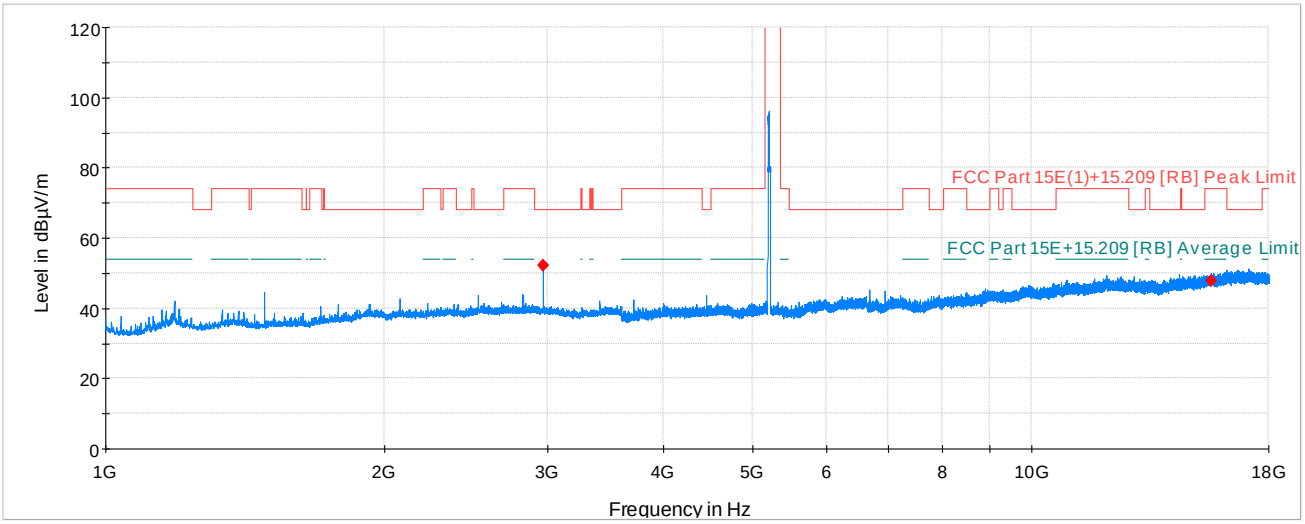
802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 40 (Vertical)

Channel 40 (5.2 GHz): 18-40 GHz Vertical Plot



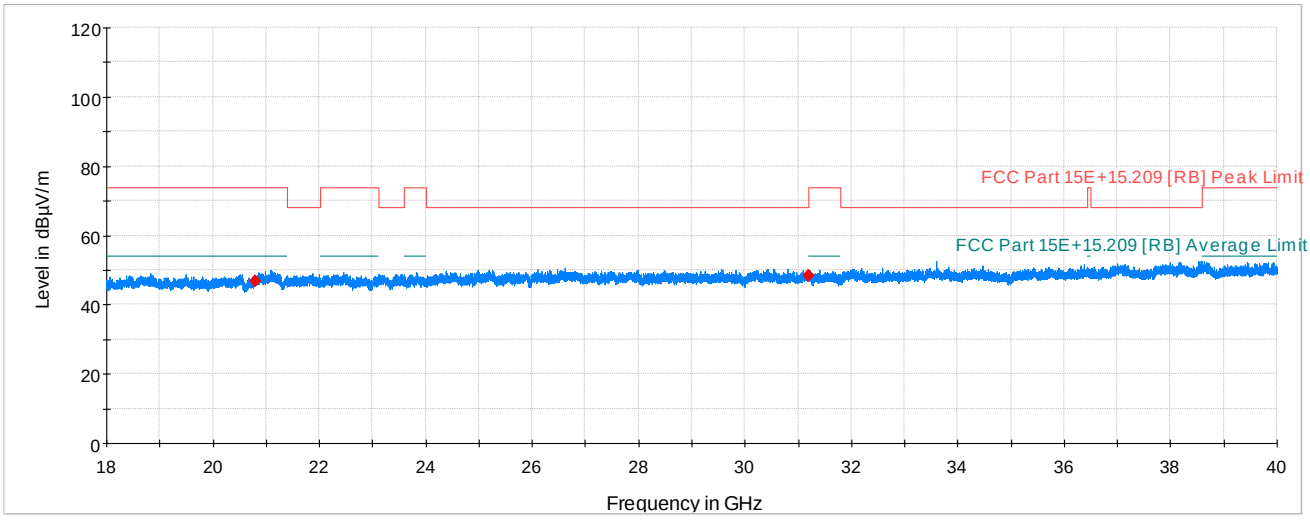
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 40 (Vertical)

Channel 40 (5.2 GHz): 1-18 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 40 (Horizontal)

Channel 40 (5.2 GHz): 18-40 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 40 (Horizontal)

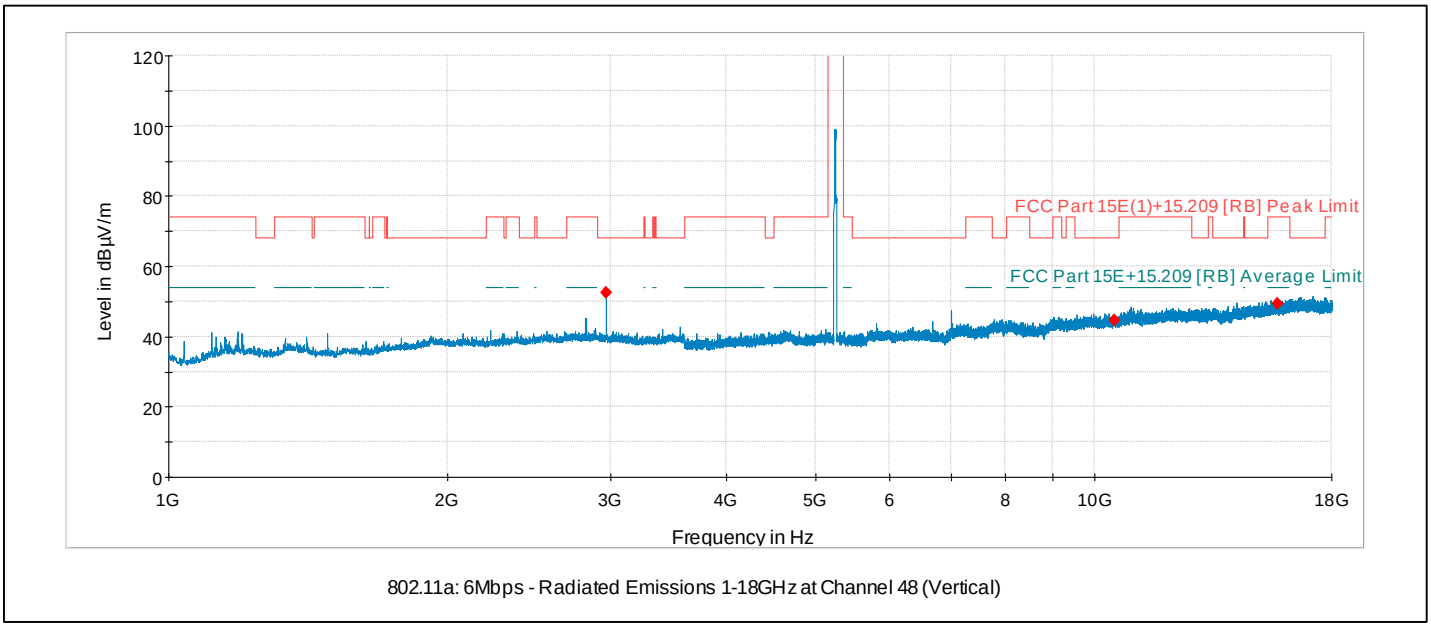
Channel 48 (5.24 GHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Correction Factor (dB)	Corrected Level (dBuV/m)	Limit [RB] (dBuV/m)	Limit [NRB] (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)							
2969.2	50.4	PK	150.0	V	0.0	V	0.0	1.9	52.3	-	68.2	-15.9
*15720.0	#	PK	-	V	-	V	0.0	16.4	#	74.0	-	-
*20960.0	#	PK	-	V	-	V	0.0	-4.5	#	74.0	-	-
*31440.0	#	PK	-	V	-	V	0.0	1.4	#	74.0	-	-

*Note: * - indicates frequency in FCC §15.205 Restricted bands of operation; RB - Restricted Band; NRB – Non-Restricted Band*
 # - the maximized peak measured value was greater than 20 dB below the limit and/or complies with the average limit, thus both peak and average readings were not reported.

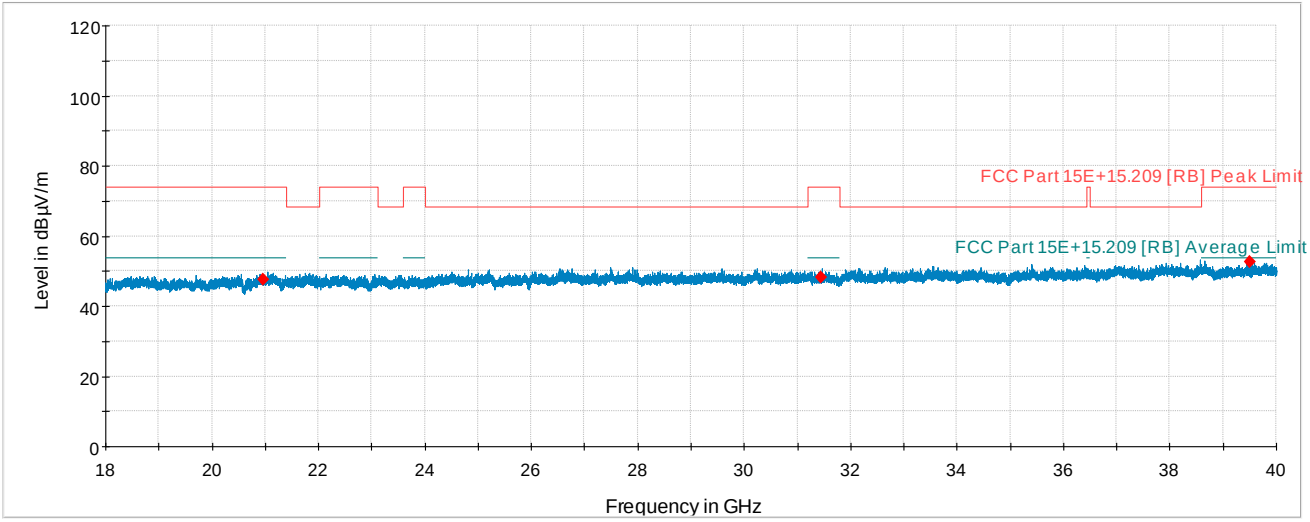
Radiated Spurious Emissions Pre-scan Vertical and Horizontal Plots

Channel 48 (5.24 GHz): 1-18 GHz Vertical Plot



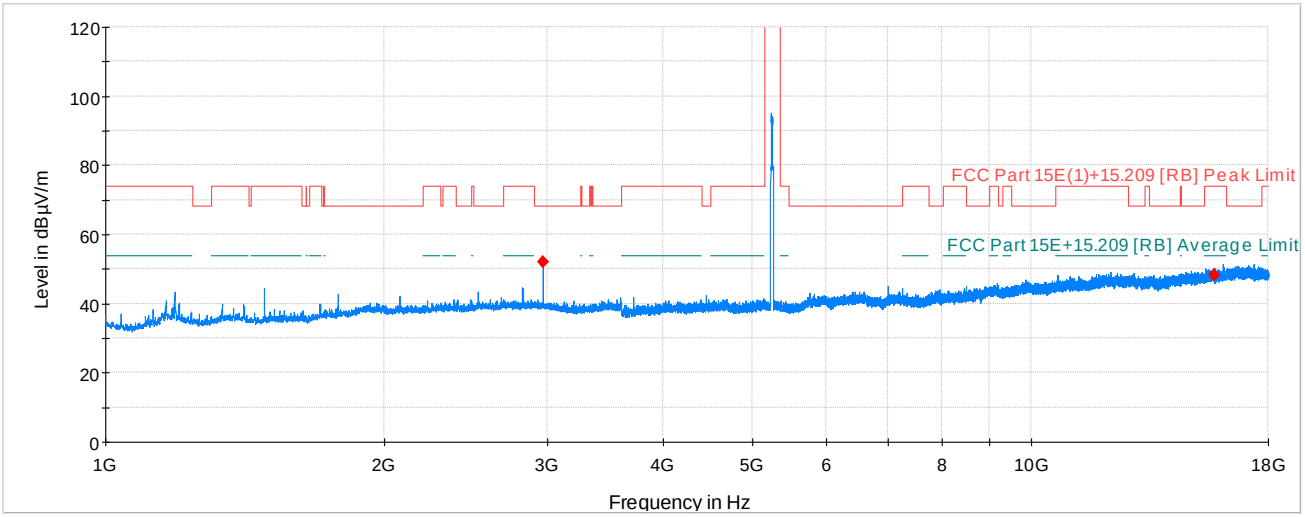
802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 48 (Vertical)

Channel 48 (5.24 GHz): 18-40 GHz Vertical Plot



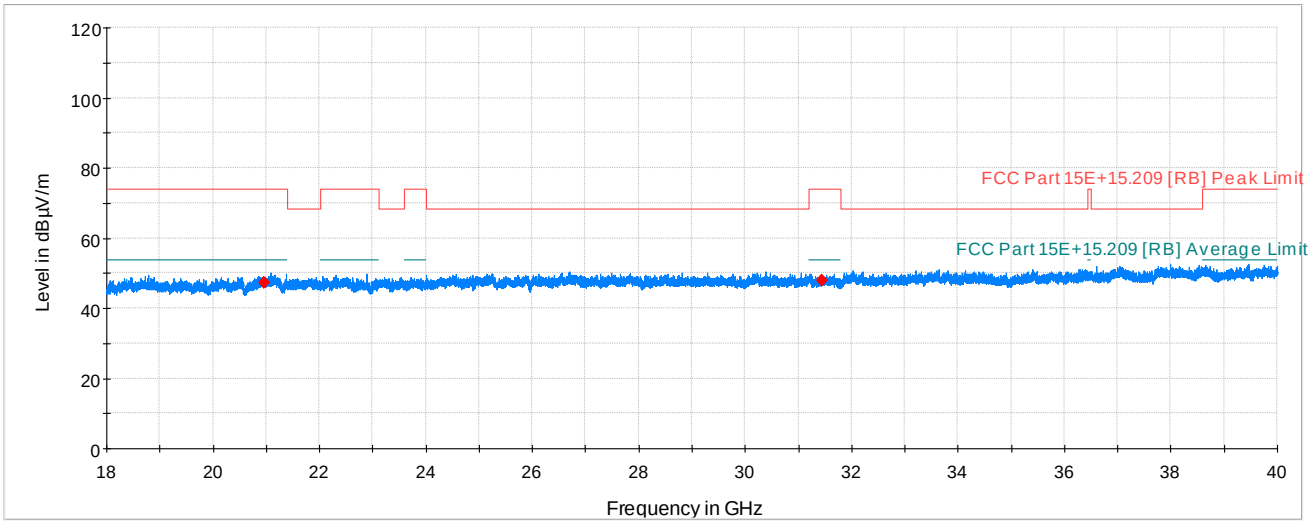
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 48 (Vertical)

Channel 48 (5.24 GHz): 1-18 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 48 (Horizontal)

Channel 48 (5.24 GHz): 18-40 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 48 (Horizontal)

6.5.14 Transmitter Radiated Emissions above 1 GHz (5.725-5.850 GHz Band)

Worst Case Mode:	802.11a
Data Rate:	6 Mbps
Measurement Distance:	3 meters
Operating Mode:	Continuous Transmit
Frequency Range:	1 GHz – 40 GHz
Note: The pre-scan plots do not show the maximized amplitude, only included for the purpose of identifying spurious emissions requiring final measurements.	

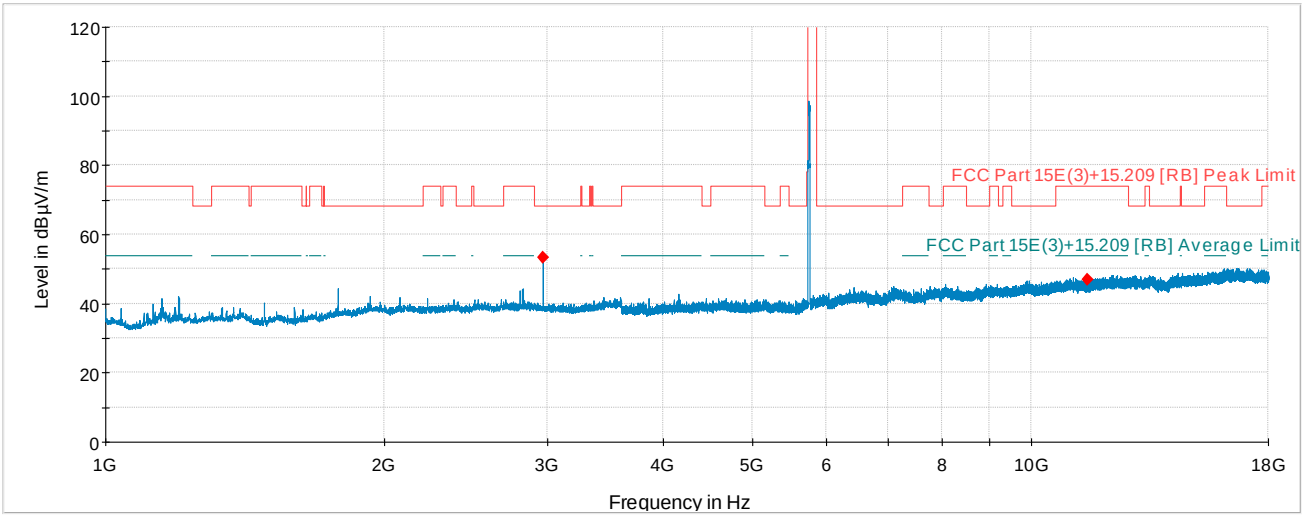
Channel 149 (5.745 GHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Correction Factor (dB)	Corrected Level (dBuV/m)	Limit [RB] (dBuV/m)	Limit [NRB] (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)							
2968.6	52.1	PK	150.0	V	0.0	V	0.0	1.9	54.0	-	68.2	-14.2
*11490.0	37.9	PK	145.0	V	18.0	V	0.0	12.4	50.3	74.0	-	-23.7
*11490.0	25.5	AV	145.0	V	18.0	V	0.0	12.4	37.9	54.0	-	-16.1
*22980.0	51.1	PK	160.0	V	20.0	V	0.0	-3.4	47.7	74.0	-	-26.3
*22980.0	38.9	AV	160.0	V	20.0	V	0.0	-3.4	35.5	54.0	-	-18.5

*Note: * - indicates frequency in FCC §15.205 Restricted bands of operation; RB - Restricted Band; NRB – Non-Restricted Band*

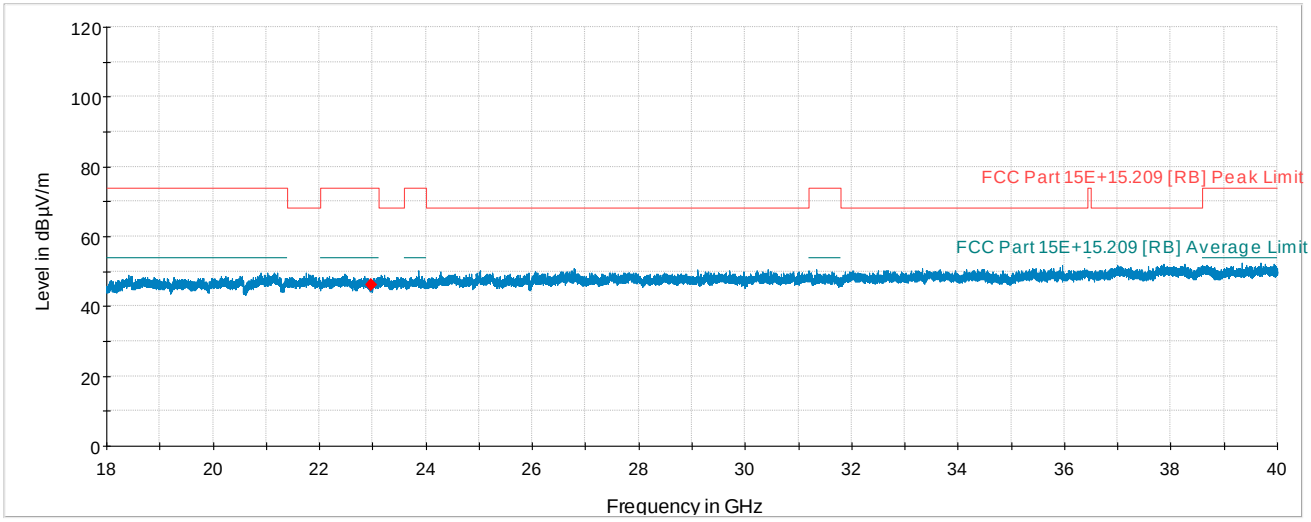
Radiated Spurious Emissions Pre-scan Vertical and Horizontal Plots

Channel 149 (5.745 GHz): 1-18 GHz Vertical Plot



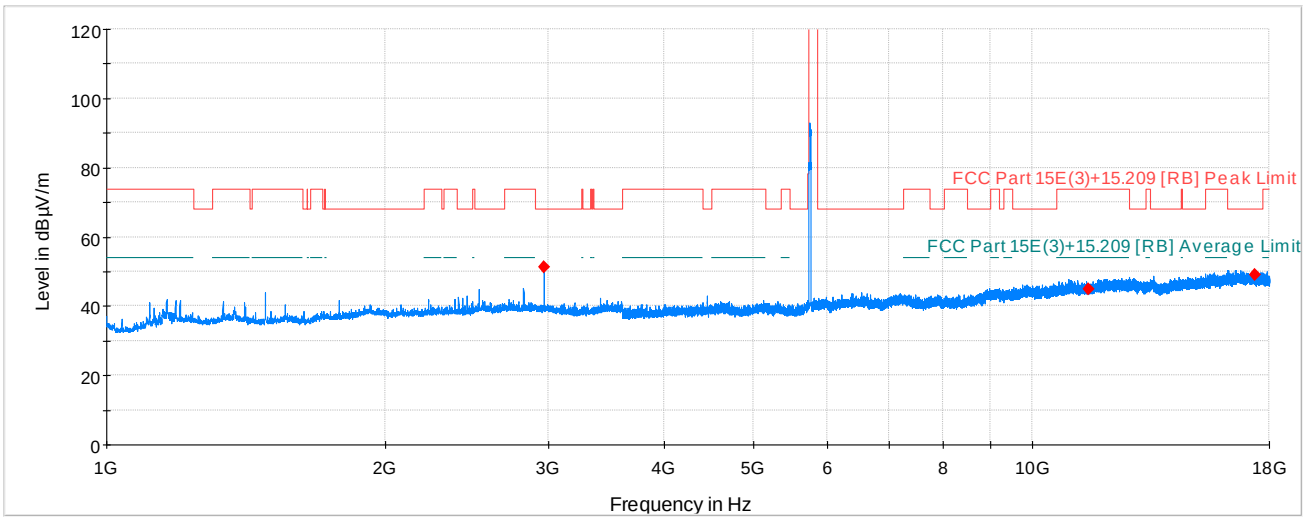
802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 149 (Vertical)

Channel 149 (5.745 GHz): 18-40 GHz Vertical Plot



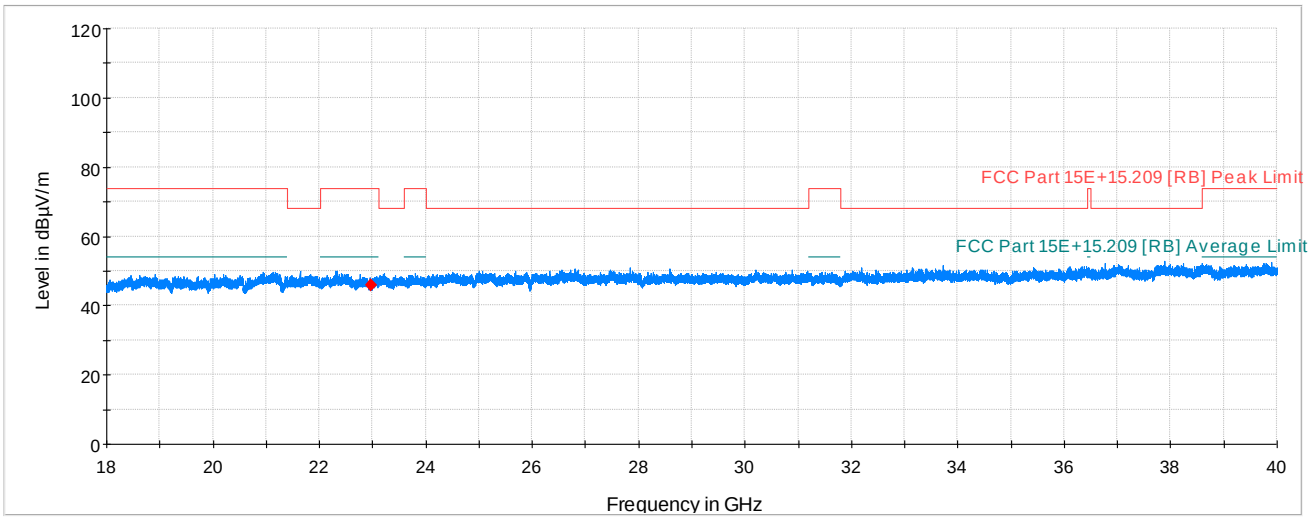
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 149 (Vertical)

Channel 149 (5.745 GHz): 1-18 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 149 (Horizontal)

Channel 149 (5.745 GHz): 18-40 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 149 (Horizontal)

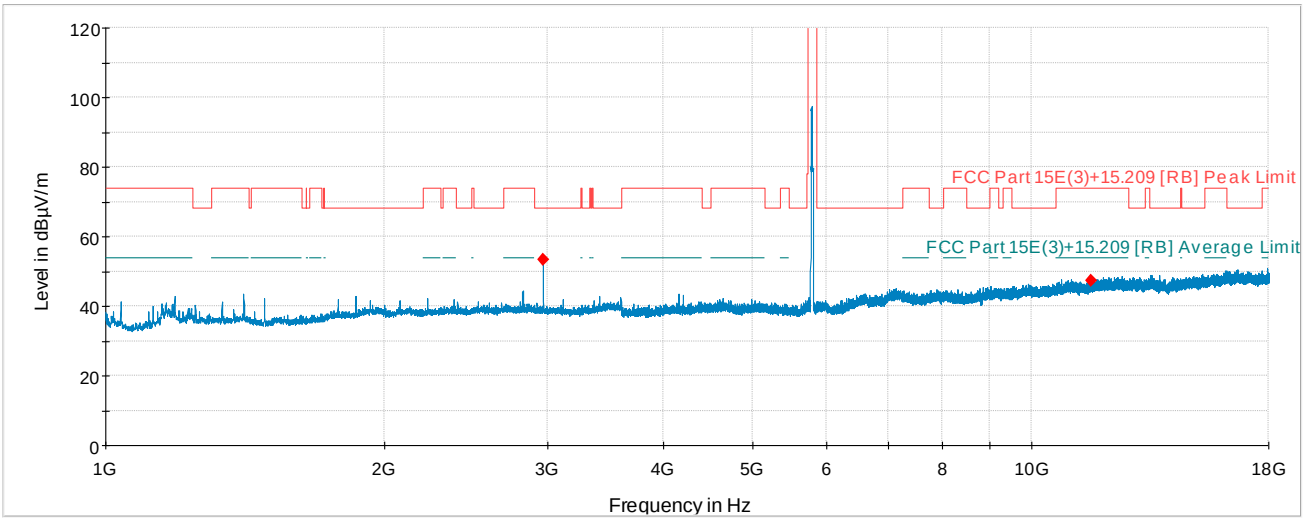
Channel 157 (5.785 GHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Correction Factor (dB)	Corrected Level (dBuV/m)	Limit [RB] (dBuV/m)	Limit [NRB] (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)							
2968.6	51.5	PK	150.0	V	0.0	V	0.0	1.9	53.4		68.2	-14.8
*11570.0	37.2	PK	145.0	V	18.0	V	0.0	12.4	49.6	74.0		-24.4
*11570.0	24.9	AV	145.0	V	18.0	V	0.0	12.4	37.3	54.0		-16.7

*Note: * - indicates frequency in FCC §15.205 Restricted bands of operation; RB - Restricted Band; NRB – Non-Restricted Band*

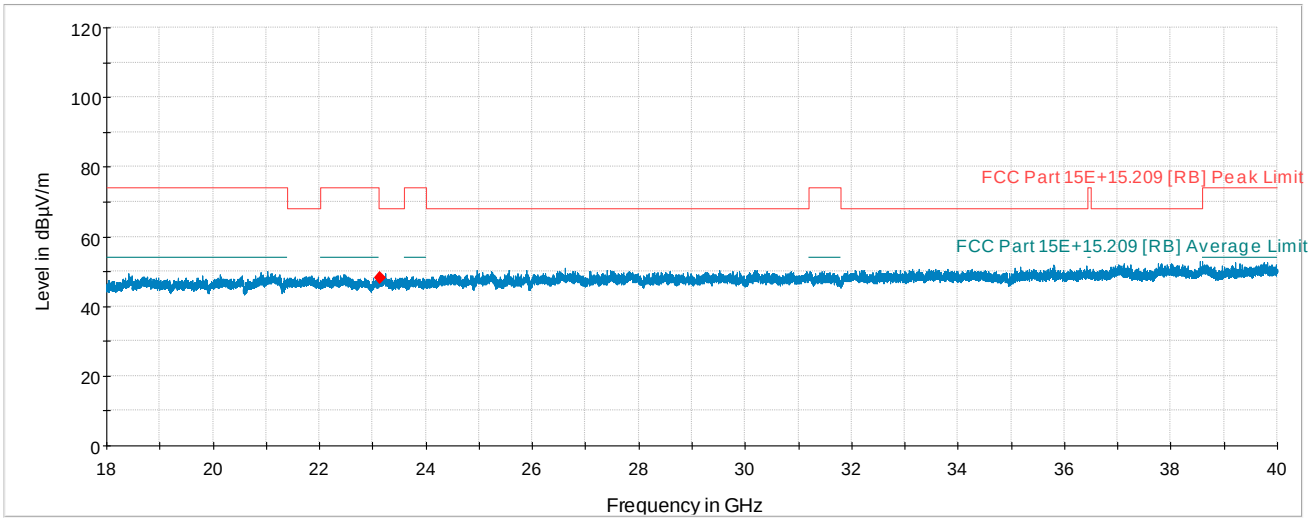
Radiated Spurious Emissions Pre-scan Vertical and Horizontal Plots

Channel 157 (5.785 GHz): 1-18 GHz Vertical Plot



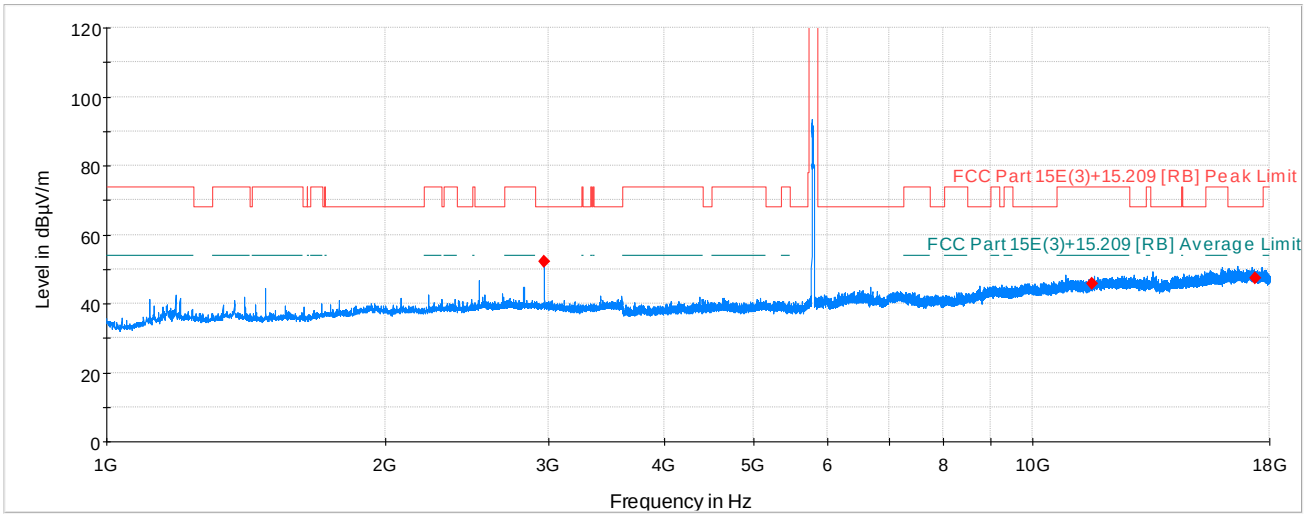
802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 157 (Vertical)

Channel 157 (5.785 GHz): 18-40 GHz (Vertical Plot)



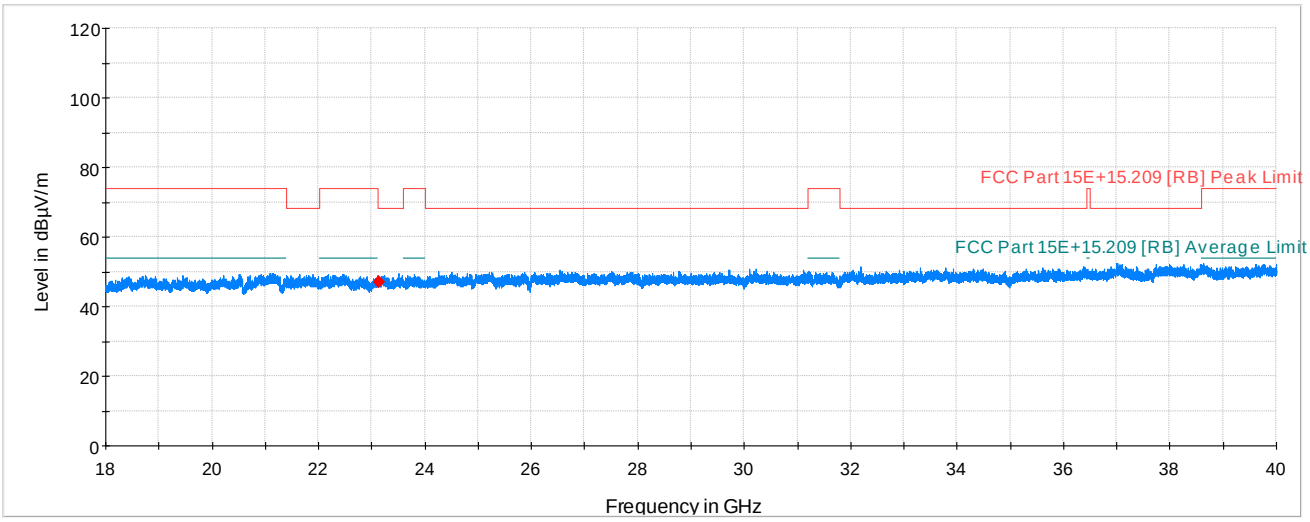
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 157 (Vertical)

Channel 157 (5.785 GHz): 1-18 GHz (Horizontal Plot)



802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 157 (Horizontal)

Channel 157 (5.785 GHz): 18-40 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 157 (Horizontal)

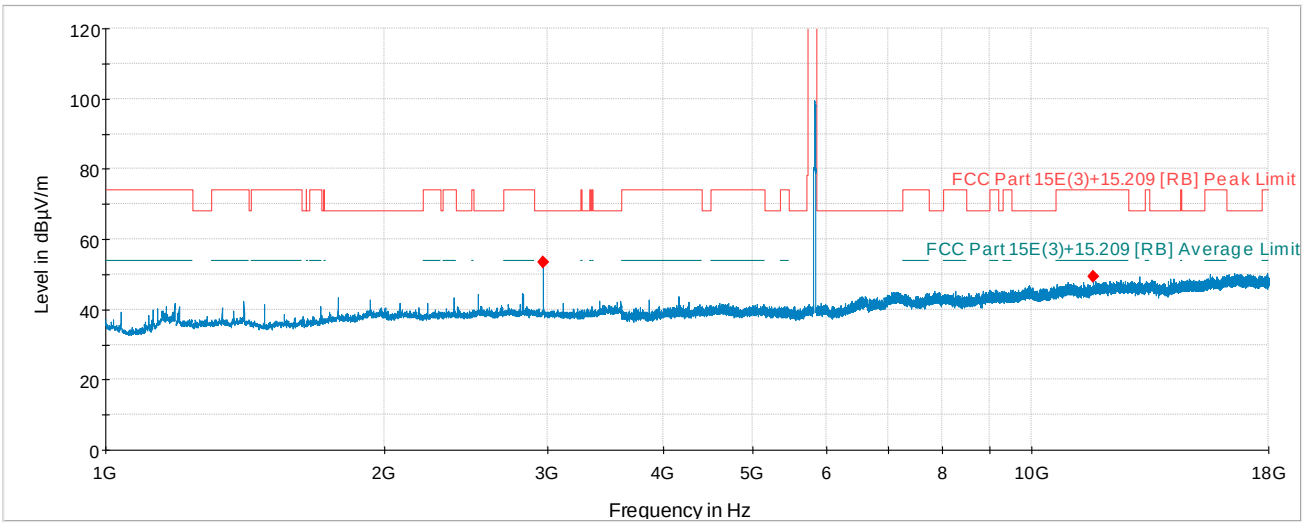
Channel 165 (5.825 GHz)

Frequency (MHz)	SA Reading (dBuV/m)	Detector PK/AV	Antenna		Turntable	EUT Antenna Polarity (V/H1/H2)	DC Factor (dB)	Correction Factor (dB)	Corrected Level (dBuV/m))	Limit [RB] (dBuV/m)	Limit [NRB] (dBuV/m)	Margin (dB)
			Height (cm)	Polarity (V/H)	Azimuth (Deg)							
2968.6	51.6	PK	150.0	V	0.0	V	0.0	1.9	53.5	-	68.2	-14.7
*11650.0	37.7	PK	145.0	V	18.0	V	0.0	12.4	50.1	74.0	-	-23.9
*11650.0	25.0	AV	145.0	V	18.0	V	0.0	12.4	37.4	54.0	-	-16.6

*Note: * - indicates frequency in FCC §15.205 Restricted bands of operation; RB - Restricted Band; NRB – Non-Restricted Band*

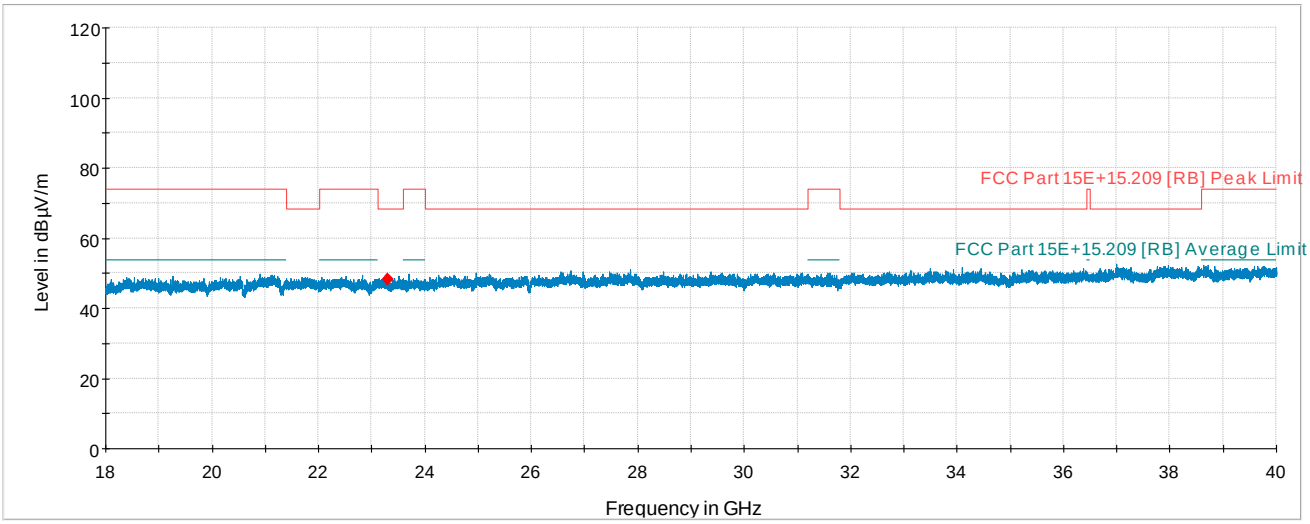
Radiated Spurious Emissions Pre-scan Vertical and Horizontal Plots

Channel 165 (5.825 GHz): 1-18 GHz Vertical Plot



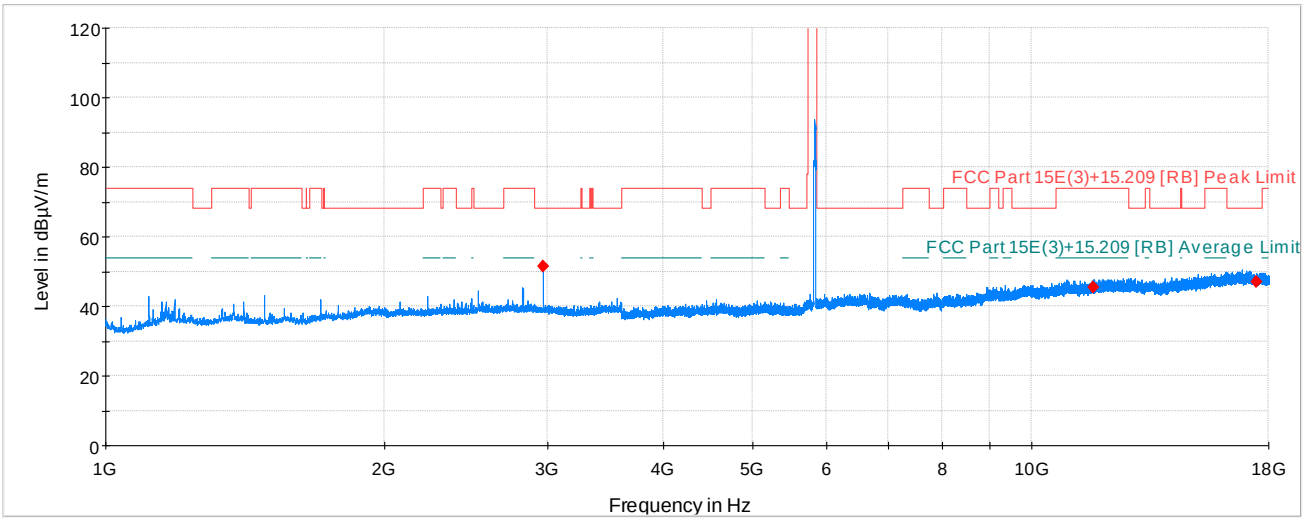
802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 165 (Vertical)

Channel 165 (5.825 GHz): 18-40 GHz Vertical Plot



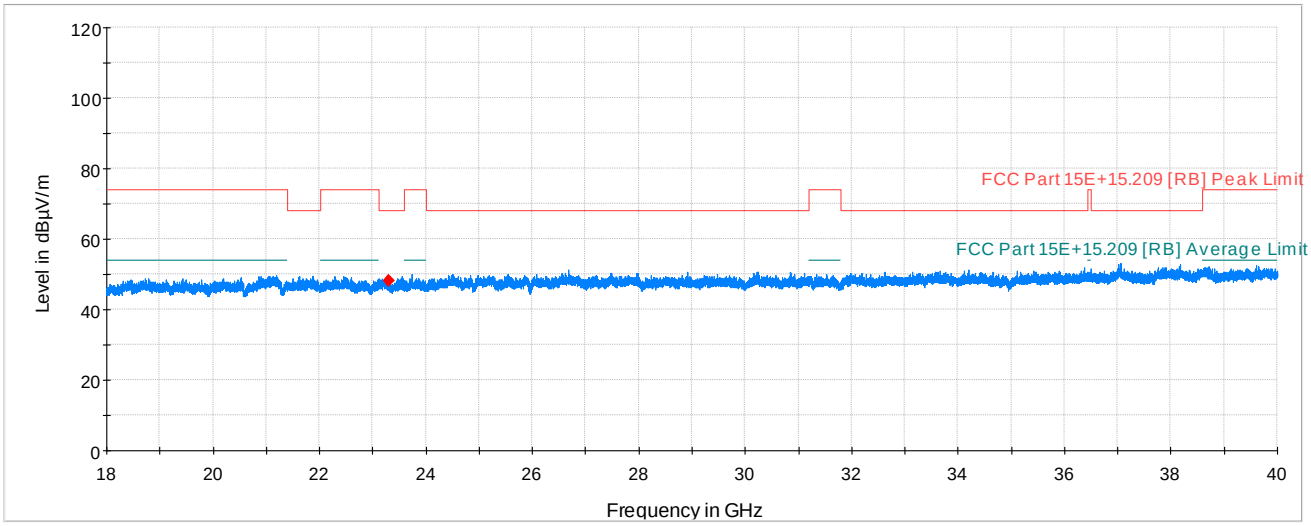
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 165 (Vertical)

Channel 165 (5.825 GHz): 1-18 GHz Horizontal Plot



802.11a: 6Mbps - Radiated Emissions 1-18GHz at Channel 165 (Horizontal)

Channel 165 (5.825 GHz): 18-40 GHz Horizontal Plot



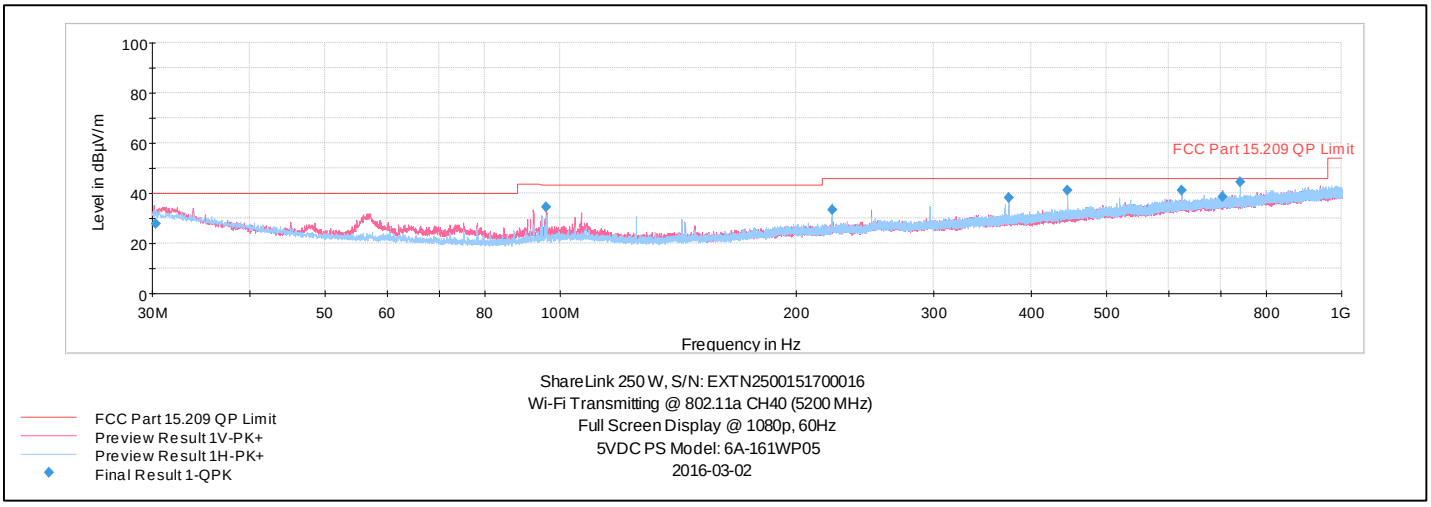
802.11a: 6Mbps - Radiated Emissions 18-40GHz at Channel 165 (Horizontal)

6.5.15 Transmitter Radiated Emissions in the 30MHz to 1000MHz

A. Using adapter power supply (Model: 6A-161WP05)

Worst Case Mode:	802.11a	Test Date(s):	03/02/2016
Data Rate:	6 Mbps	Test Location (Lab):	Lab B
Measurement Distance:	3 meters	Temperature (°C):	23
Operating Frequency:	5200 MHz	Humidity (%):	45
Test Channel:	40	Atmospheric pressure (mbar):	1018
Note: EUT at Full Screen Display with 1080p, 60Hz resolution; W-Fi Transmitter ON; LAN at 1GB Connection			

30-1000 MHz Plot



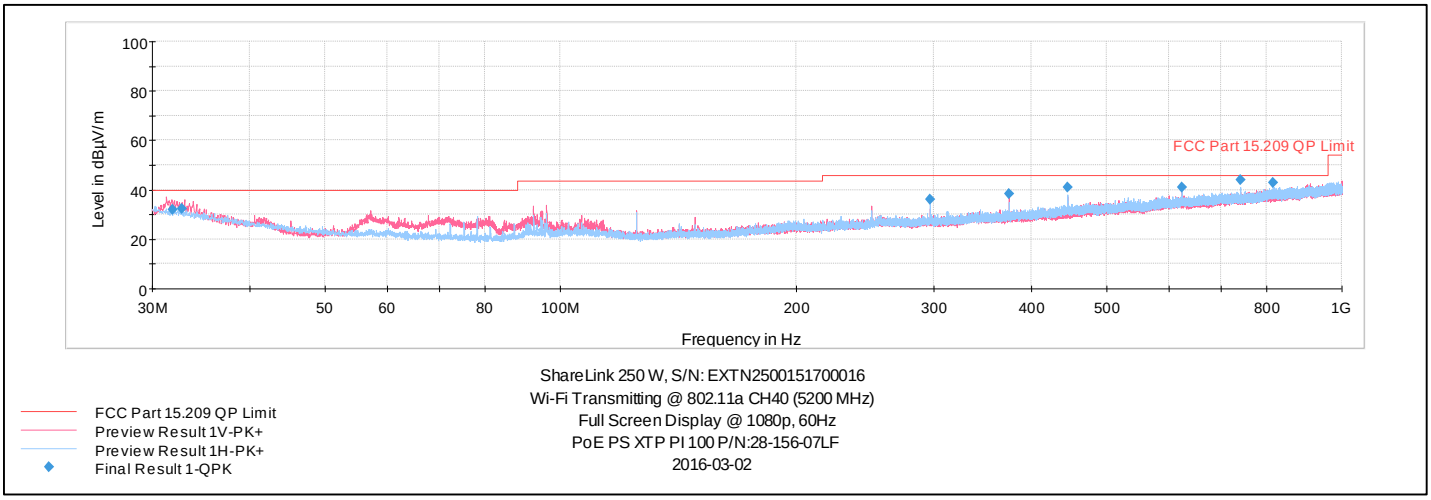
Results

Frequency (MHz)	Amplitude (dBµV)	Height (cm)	Antenna Polarization (H/V)	Azimuth (deg)	Correction Factor (dB)	Margin (dB)	Limit (dBµV/m)	Detector (QP/PK/AV)
742.180	44.4	116.0	V	278.0	23.3	-1.6	46.0	QP
445.303	41.0	110.0	H	50.0	19.0	-5.0	46.0	QP
625.005	41.0	100.0	V	97.0	22.0	-5.0	46.0	QP
705.078	38.5	119.0	V	137.0	23.1	-7.5	46.0	QP
374.862	38.0	115.0	H	169.0	17.0	-8.0	46.0	QP
95.910	34.5	110.0	V	225.0	10.2	-9.0	43.5	QP

B. Using PoE power supply (Model: XTP PI 100)

Worst Case Mode:	802.11a	Test Date(s):	03/02/2016
Data Rate:	6 Mbps	Test Location (Lab):	Lab B
Measurement Distance:	3 meters	Temperature (°C):	23
Operating Frequency:	5200 MHz	Humidity (%):	45
Test Channel:	40	Atmospheric pressure (mbar):	1018
Note: EUT at Full Screen Display with 1080p, 60Hz resolution; W-Fi Transmitter ON; LAN at 1GB Connection			

30-1000 MHz Plot



Results

Frequency (MHz)	Amplitude (dBµV)	Height (cm)	Antenna Polarization (H/V)	Azimuth (deg)	Correction Factor (dB)	Margin (dB)	Limit (dBµV/m)	Detector (QP/PK/AV)
742.211	44.1	137.0	H	284.0	23.5	-1.9	46.0	QP
816.440	42.7	100.0	H	113.0	25.3	-3.3	46.0	QP
624.996	41.1	150.0	H	78.0	22.6	-4.9	46.0	QP
445.327	41.0	100.0	H	158.0	19.0	-5.0	46.0	QP
32.771	32.3	100.0	V	141.0	15.0	-7.7	40.0	QP
375.009	38.2	122.0	V	270.0	16.6	-7.8	46.0	QP

6.6 Frequency Stability

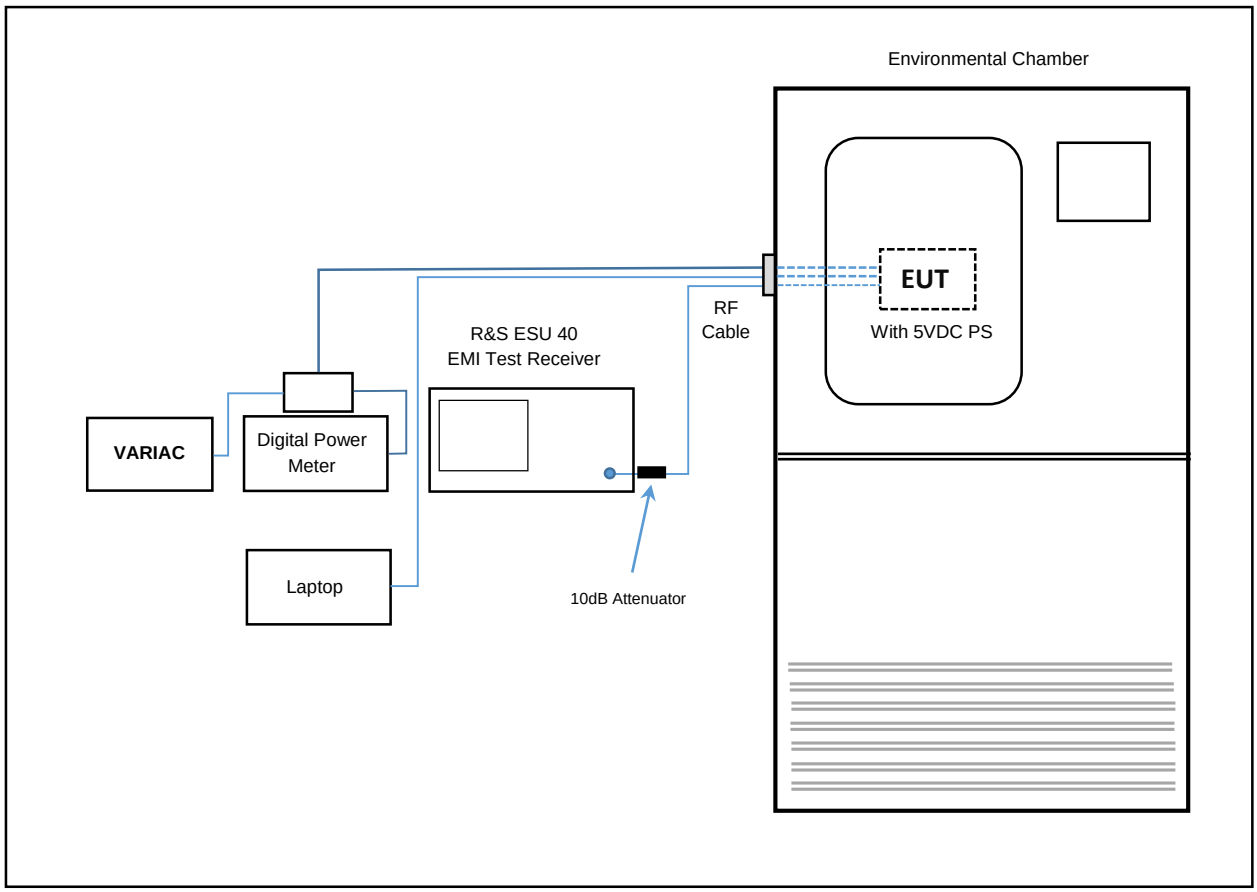
Limits

FCC § 15.407 (g) - Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation

Test Procedure

• ANSI C63.10-2013 Section 6.8.1 – for Frequency stability with respect to ambient temperature
• ANSI C63.10-2013 Section 6.8.2 – for Frequency Stability when varying supply voltage

Test Setup



Test Results

A. Frequency Stability with respect to ambient temperature

Operating Frequency: 5.18 GHz

Power Supply (Vac)	Temperature (°C)	0 minute		2 minutes		5 minutes		10 minutes	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
120 Vac (Nominal)	50	5179.9900	-0.19	5180.0539	1.04	5180.0872	1.68	5180.1150	2.22
	40	5179.9490	-0.98	5179.9702	-0.58	5180.0080	0.15	5180.0404	0.78
	30	5179.9696	-0.59	5179.9494	-0.98	5179.9697	-0.58	5179.9929	-0.14
	20	5179.9724	-0.53	5179.9474	-1.02	5179.9548	-0.87	5179.9673	-0.63
	10	5179.9760	-0.46	5179.9468	-1.03	5179.9471	-1.02	5179.9519	-0.93
	0	5180.0039	0.08	5179.9564	-0.84	5179.9490	-0.98	5179.9468	-1.03
	-10	5180.0087	0.17	5179.9744	-0.49	5179.9561	-0.85	5179.9503	-0.96
	-20	5180.0029	0.06	5179.9850	-0.29	5179.9673	-0.63	5179.9577	-0.82
	-30	5179.9830	-0.33	5180.0000	0.00	5179.9827	-0.33	5179.9737	-0.51

Operating Frequency: 5.825 GHz

Power Supply (Vac)	Temperature (°C)	0 minute		2 minutes		5 minutes		10 minutes	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
120 Vac (Nominal)	50	5824.9462	-9.24	5824.9740	-4.46	5825.0388	6.66	5825.0942	16.17
	40	5824.9487	-8.81	5824.9603	-6.82	5825.0019	0.33	5825.0378	6.49
	30	5824.9602	-6.83	5824.9446	-9.51	5824.9689	-5.34	5824.9917	-1.42
	20	5824.9506	-8.48	5824.9468	-9.13	5824.9590	-7.04	5824.9673	-5.61
	10	5824.9763	-4.07	5824.9413	-10.08	5824.9410	-10.13	5824.9452	-9.41
	0	5825.0058	1.00	5824.9650	-6.01	5824.9426	-9.85	5824.9401	-10.28
	-10	5825.0106	1.82	5824.9718	-4.84	5824.9532	-8.03	5824.9449	-9.46
	-20	5825.0067	1.15	5824.9881	-2.04	5824.9679	-5.51	5824.9571	-7.36
	-30	5824.9965	-0.60	5825.0003	0.05	5824.9833	-2.87	5824.9724	-4.74

B. Frequency Stability when varying supply voltage

Operating Frequency: 5.18 GHz

Temperature (°C)	Power Supply (Vac)	0 minute		2 minutes		5 minutes		10 minutes	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	102	5179.9542	-0.88	5179.9539	-0.89	5179.9651	-0.67	5179.9728	-0.53
	120	5179.9724	-0.53	5179.9474	-1.02	5179.9548	-0.87	5179.9673	-0.63
	138	5179.9551	-0.87	5179.9538	-0.89	5179.9657	-0.66	5179.9737	-0.51

Operating Frequency: 5.825 GHz

Temperature (°C)	Power Supply (Vac)	0 minute		2 minutes		5 minutes		10 minutes	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	102	5824.9519	-8.26	5824.9462	-9.24	5824.9580	-7.21	5824.9663	-5.79
	120	5824.9506	-8.48	5824.9468	-9.13	5824.9590	-7.04	5824.9673	-5.61
	138	5824.9522	-8.21	5824.9458	-9.30	5824.9574	-7.31	5824.9657	-5.89

6.7 AC Power-line Conducted Emissions

Limits

FCC § 15.207 (a)

Frequency of emissions (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*

RSS-Gen Issue 4 Section 8.8

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits in Table 3.

Table 3 – AC Power Line Conducted Emissions Limits

Frequency of emissions (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

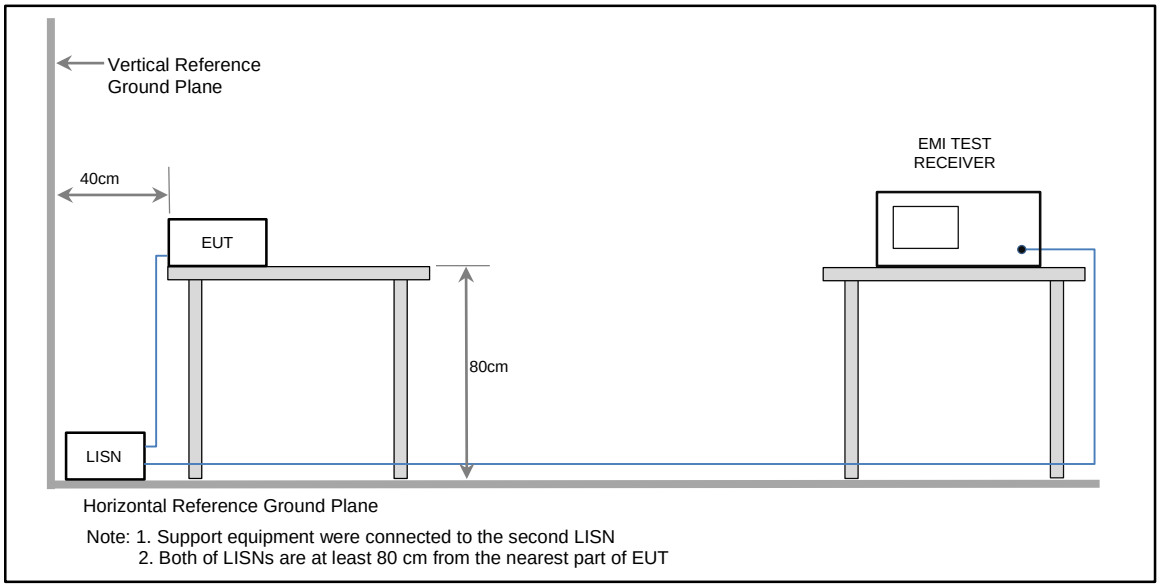
** Decreases with the logarithm of the frequency, ** A linear average detector is required*

Conducted Emissions Test Setup and Procedure

The EUT power cord was connected to a LISN and folded back and forth forming a bundle 30 to 40 cm long. All support equipment power cords were connected to an auxiliary LISN via a multiple outlet strip. The EUT LISN was kept at a distance 80 cm from the closest part of the EUT.
Using the test software, an initial PEAK pre-scan was taken. After the pre-scan was complete, a minimum of 6 highest frequencies were chosen. Quasi-Peak and Average measurements were taken at these frequencies selected. If the test software measured any signal within 3 dB of the limit, then the same signal was re-measured manually using the front keys of the EMI receiver to make sure of the software accuracy. This was performed for both “Line 1” and “Neutral” leads of the EUT power cord.

Example of Calculations:

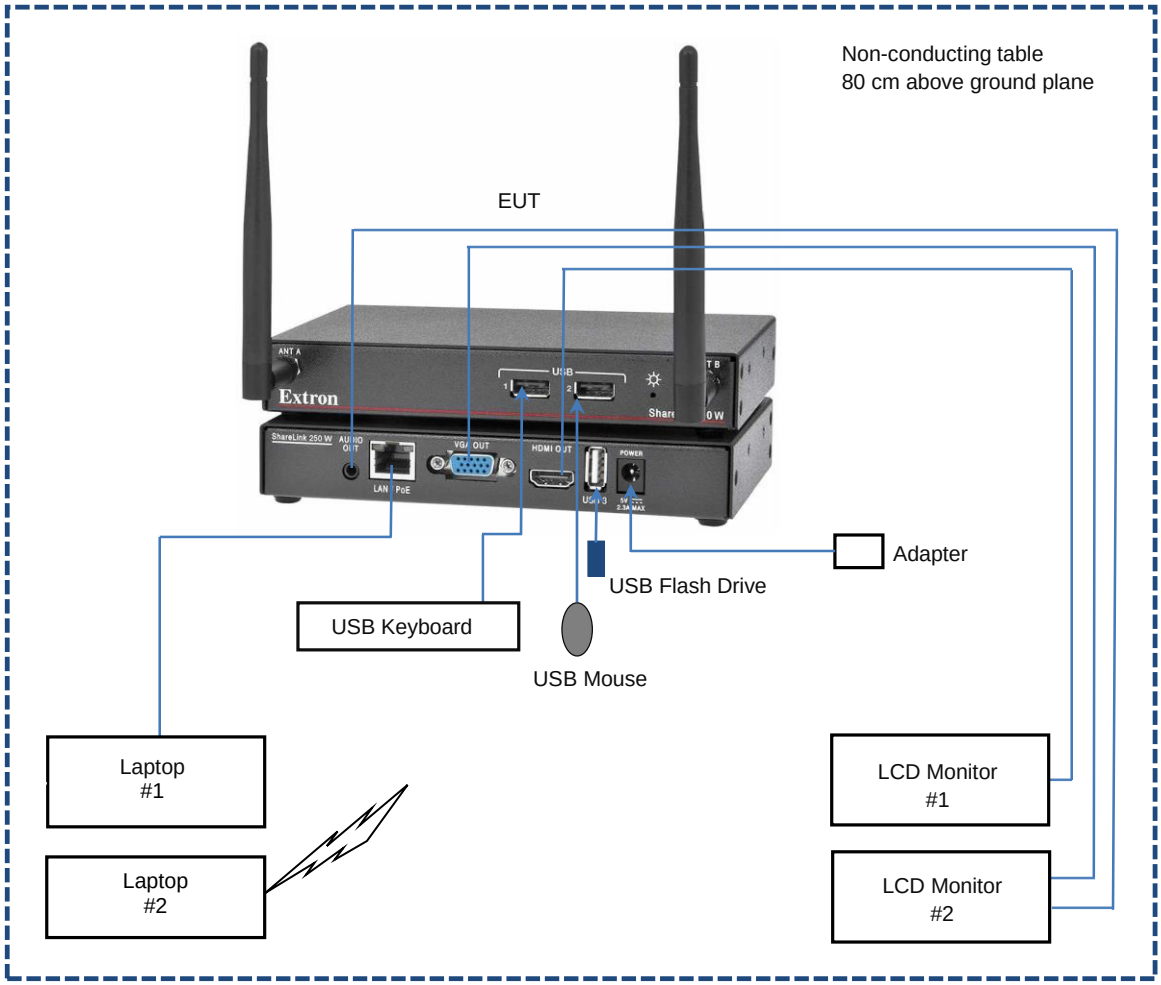
Amplitude [QP/AV] $_{(dBuV)}$ = Receiver Level $_{(dBµV)}$ + Correction Factor $_{(dB)}$
Correction Factor $_{(dB)}$ = Cable Loss $_{(dB)}$ + LISN Insertion Loss $_{(dB)}$ + 10 dB Attenuator
Margin $_{(dB)}$ = Amplitude [QP/AV] $_{(dBuV)}$ – Limit [QP/AV] $_{(dBuV)}$



Note: 1. Support equipment were connected to the second LISN
2. Both of LISNs are at least 80 cm from the nearest part of EUT

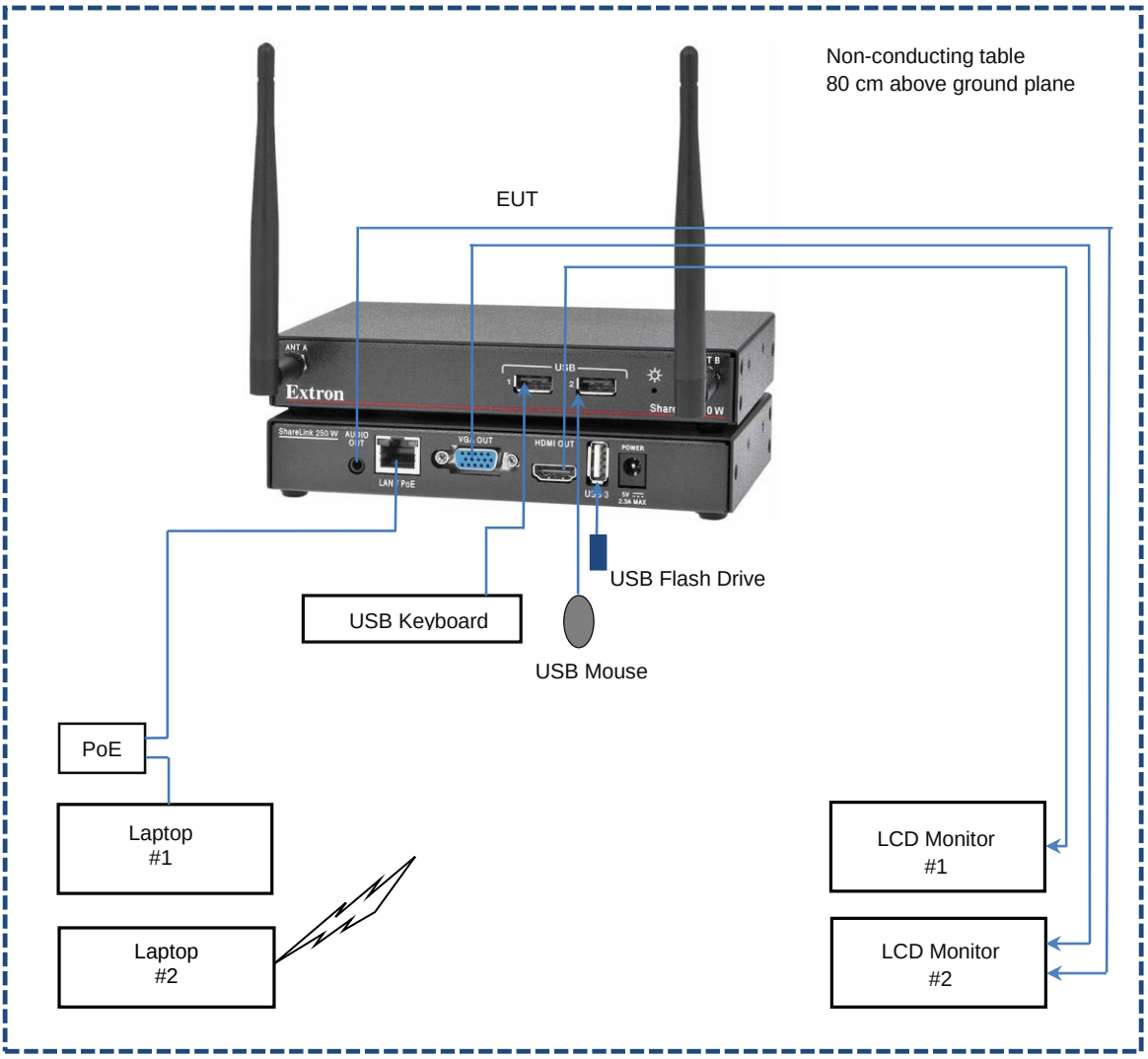
EUT Connection Diagram

a. Using Adapter 6A-161WP05, 5Vdc



- HDMI OUT connected to LCD monitor #1 with 15' HDMI Ultra cable.
- VGA OUT connected to LCD monitor #2 with 35' VGA cable.
- Audio OUT connected to LCD monitor #2 (PC Audio IN) with 25' Audio mini cable
- USB 1 with USB keyboard
- USB 2 with USB mouse
- USB 3 with USB Flash Drive
- Laptop #2 (receive mode) connected to EUT via Wi-Fi
- LAN/POE connected to Laptop #1 with 10' CAT-5e UTP cable
- Power connected to AC Adapter

b. Using PoE XTP PI 100, +48Vdc



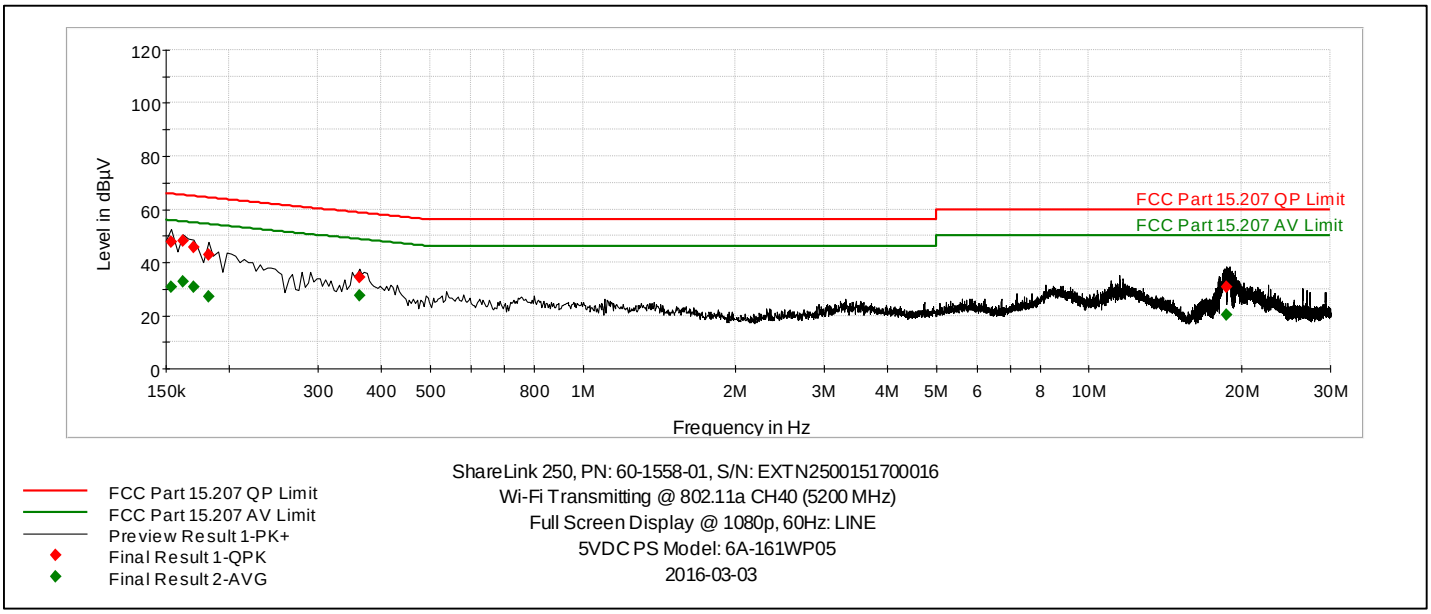
- HDMI OUT connected to LCD monitor #1 with 15’ HDMI Ultra cable.
- VGA OUT connected to LCD monitor #2 with 35’ VGA cable.
- Audio OUT connected to LCD monitor #2 (PC Audio IN) with 25’ Audio mini cable
- USB 1 with USB keyboard
- USB 2 with USB mouse
- USB 3 with USB Flash Drive
- Laptop #2 (receive mode) connected to EUT via Wi-Fi
- LAN/POE connected to PoE Power Supply with 10’ CAT-5e UTP cable
- PoE Power Supply connected to Laptop with 10’ CAT-5e UTP cable

Test Results

A. Using adapter power supply

Wi-Fi Operating Mode:	802.11a	Test Date(s):	03/03/2016
Wi-Fi Operating Frequency:	5200 MHz	Test Location (Lab):	Lab E
Wi-Fi Channel	40	Temperature (°C):	23
Test Voltage/Frequency:	120V/60Hz	Humidity (%):	46
Power Supply:	Model: 6A-161WP05	Atmospheric pressure (mbar):	1018
Note: EUT at Full Screen Display with 1080p, 60Hz resolution; W-Fi Transmitter ON; LAN at 1GB Connection			

LINE1 (L1) Plot

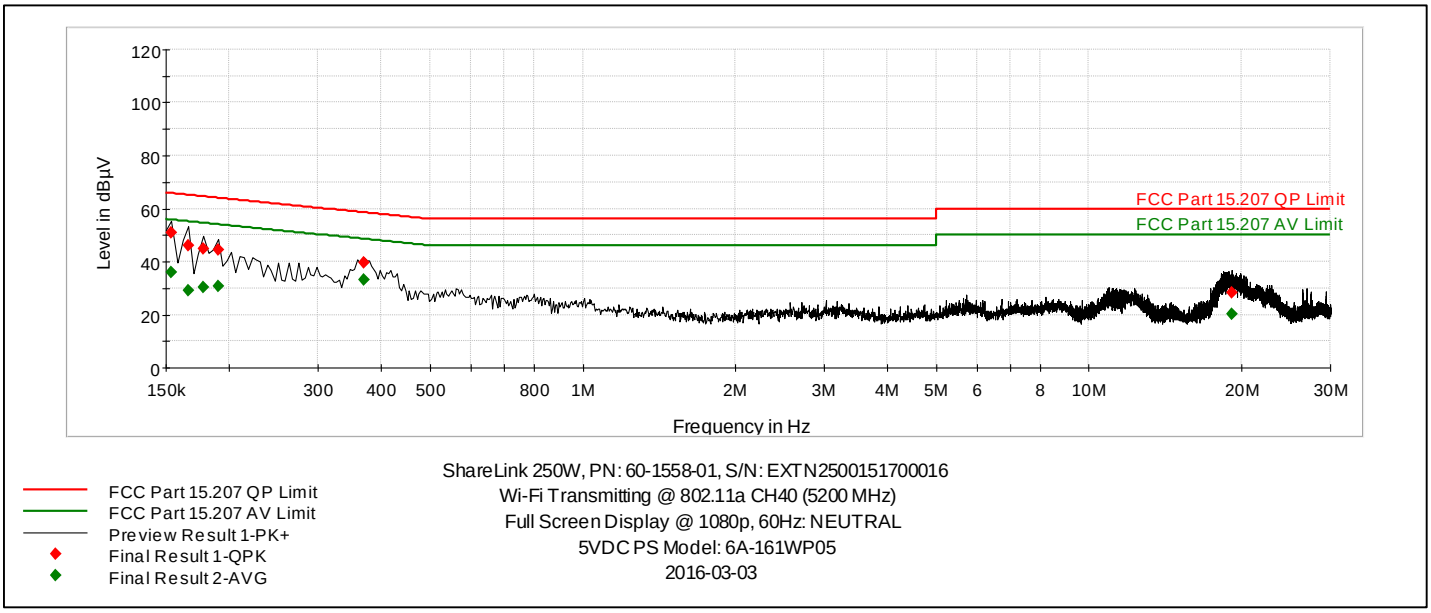


LINE1 (L1) Results

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
0.162	48.1	L1	19.9	-17.2	65.4	QP
0.154	47.8	L1	19.9	-18.0	65.8	QP
0.170	45.8	L1	19.9	-19.1	65.0	QP
0.182	42.7	L1	19.8	-21.7	64.4	QP
0.362	34.4	L1	19.8	-24.3	58.7	QP
18.706	30.8	L1	20.0	-29.2	60.0	QP

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
0.362	27.6	L1	19.8	-21.1	48.7	AV
0.162	32.8	L1	19.9	-22.6	55.4	AV
0.170	30.7	L1	19.9	-24.3	55.0	AV
0.154	30.8	L1	19.9	-25.0	55.8	AV
0.182	27.1	L1	19.8	-27.3	54.4	AV
18.706	20.4	L1	20.0	-29.6	50.0	AV

NEUTRAL Line (N) Plot



NEUTRAL Line (N) Results

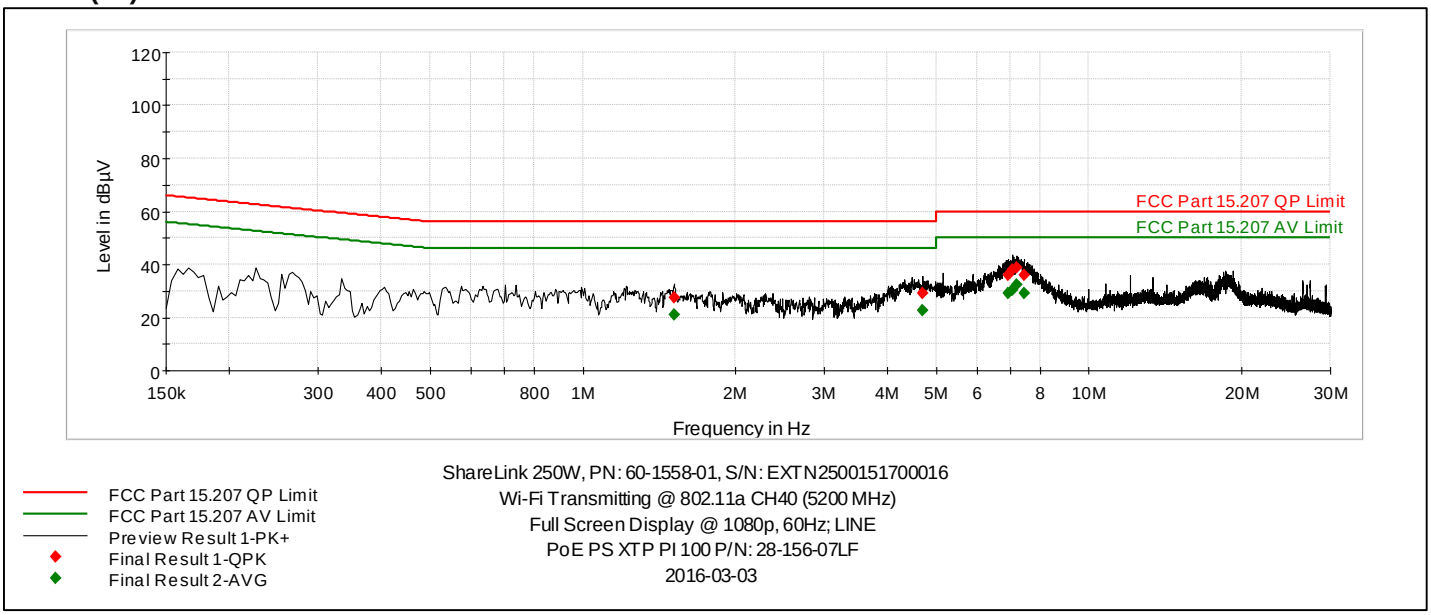
Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
0.154	51.0	N	19.8	-14.8	65.8	QP
0.370	39.6	N	19.8	-18.9	58.5	QP
0.166	46.0	N	19.8	-19.1	65.2	QP
0.178	44.9	N	19.8	-19.6	64.6	QP
0.190	44.3	N	19.8	-19.7	64.0	QP
19.182	28.2	N	20.1	-31.8	60.0	QP

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
0.370	33.0	N	19.8	-15.5	48.5	AV
0.154	36.1	N	19.8	-19.7	55.8	AV
0.190	30.7	N	19.8	-23.4	54.0	AV
0.178	30.4	N	19.8	-24.2	54.6	AV
0.166	29.2	N	19.8	-26.0	55.2	AV
19.182	20.1	N	20.1	-29.9	50.0	AV

B. Using PoE power supply

Wi-Fi Operating Mode:	802.11a	Test Date(s):	03/03/2016
Wi-Fi Operating Frequency:	5200 MHz	Test Location (Lab):	Lab E
Wi-Fi Channel	40	Temperature (°C):	23
Test Voltage/Frequency:	120V/60Hz	Humidity (%):	46
Power Supply:	PoE PS Model: XTP PI 100	Atmospheric pressure (mbar):	1018
Note: EUT at Full Screen Display with 1080p, 60Hz resolution; W-Fi Transmitter ON; LAN at 1GB Connection			

LINE1 (L1) Plot

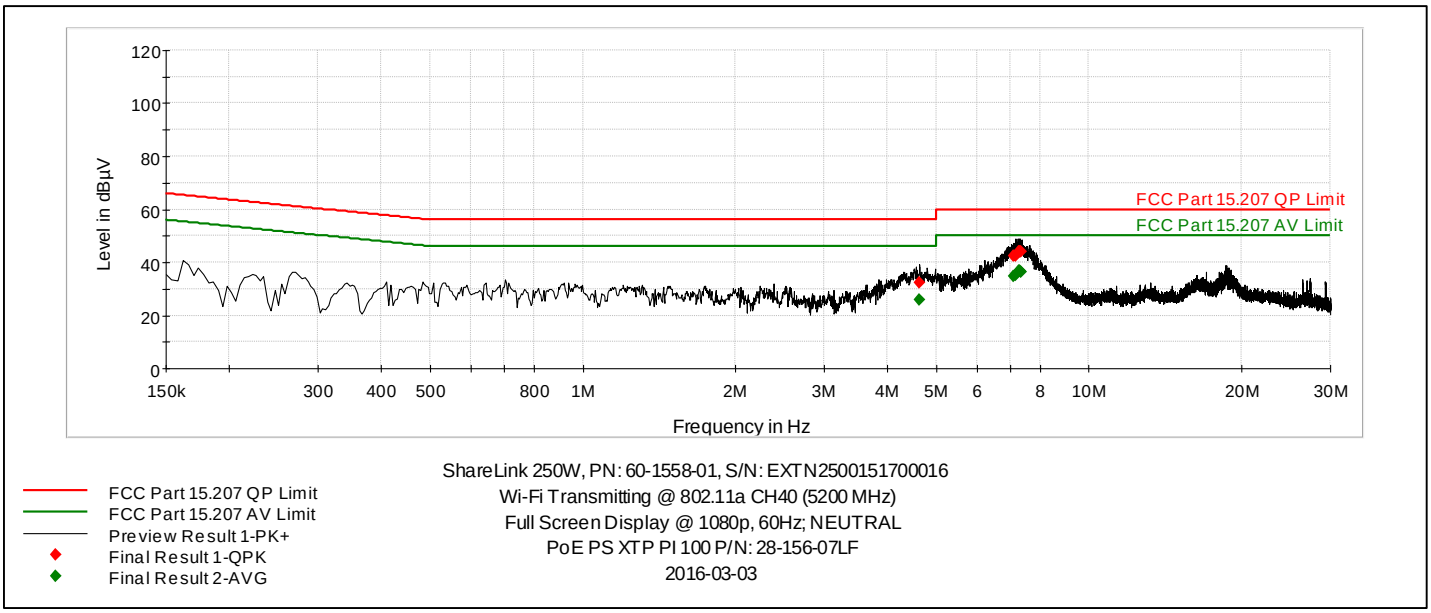


LINE1 (L1) Results

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
7.214	38.8	L1	20.0	-21.2	60.0	QP
7.066	37.8	L1	20.0	-22.2	60.0	QP
7.438	36.2	L1	20.0	-23.8	60.0	QP
6.922	36.0	L1	20.0	-24.0	60.0	QP
4.690	29.0	L1	20.1	-27.0	56.0	QP
1.514	27.6	L1	20.0	-28.4	56.0	QP

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
7.214	32.3	L1	20.0	-17.7	50.0	AV
7.066	30.1	L1	20.0	-19.9	50.0	AV
6.922	29.3	L1	20.0	-20.7	50.0	AV
7.438	29.0	L1	20.0	-21.0	50.0	AV
4.690	22.5	L1	20.1	-23.5	46.0	AV
1.514	21.0	L1	20.0	-25.0	46.0	AV

NEUTRAL Line (N) Plot



NEUTRAL Line (N) Results

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
7.270	44.2	N	20.0	-15.8	60.0	QP
7.358	44.1	N	20.0	-15.9	60.0	QP
7.318	44.1	N	20.0	-15.9	60.0	QP
7.102	42.6	N	20.0	-17.4	60.0	QP
7.178	42.5	N	20.0	-17.5	60.0	QP
4.618	32.3	N	20.1	-23.7	56.0	QP

Frequency (MHz)	Amplitude (dBµV)	Line (L1/N)	Correction Factor (dB)	Margin (dB)	Limit (dBµV)	Detector (QP/AV)
7.318	36.7	N	20.0	-13.3	50.0	AV
7.270	36.6	N	20.0	-13.4	50.0	AV
7.358	36.2	N	20.0	-13.8	50.0	AV
7.178	35.2	N	20.0	-14.8	50.0	AV
7.102	34.8	N	20.0	-15.2	50.0	AV
4.618	25.8	N	20.1	-20.2	46.0	AV

--- END OF REPORT ---