

FCC/ISED UNII REPORT

Certification

Applicant Name:

LG Electronics Inc.

Date of Issue:

December 13, 2016

Test Site/Location:

HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-R-1612-F009

HCT FRN: 0005866421

Address:

222, LG-ro, Jinwi-myeon, Pyeongtaek-si,

451-713 Gyeonggi-do, South Korea

ISED Registration Number: 5944A-5

FCC ID	: BEJTL3HEBN
IC	: 2703H-TL3HEBN
APPLICANT	: LG Electronics Inc.

Model(s): TL3HEB-N

EUT Type: Car Telematics Device

Modulation type: OFDM

FCC Classification: Unlicensed National Information Infrastructure(UNII)

FCC Rule Part(s): Part 15.407

ISED Rule Part(s): RSS-247 Issue 1(May 2015) , RSS-GEN Issue 4(November 2014)

Band	Mode	Channel Bandwidth (MHz)	Frequency Range (MHz)	Power (dBm)	Power (W)
UNII1	802.11a	20	5180 – 5240	11.62	0.0145
	802.11n	20	5180 – 5240	11.62	0.0145
	802.11n	40	5190 – 5230	7.29	0.0054
UNII2A	802.11a	20	5260 – 5320	11.64	0.0146
	802.11n	20	5260 – 5320	11.64	0.0146
	802.11n	40	5270 – 5310	7.51	0.0056
UNII2C	802.11a	20	5500 – 5720	8.24	0.0067
	802.11n	20	5500 – 5720	8.26	0.0067
	802.11n	40	5510 – 5710	6.28	0.0042
UNII3	802.11a	20	5745 – 5825	10.06	0.0101
	802.11n	20	5745 – 5825	10.11	0.0103
	802.11n	40	5755 – 5795	8.03	0.0064

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C.853(a)



Report prepared by
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Test Engineer of RF Team



Approved by
: Jong Seok Lee
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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1612-F009	December 13, 2016	- First Approval Report

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1. GENERAL INFORMATION

Applicant: LG Electronics, Inc
Address: 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, 451-713 Gyeonggi-do, South Korea
FCC ID: BEJTL3HEBN
IC: 2703H-TL3HEBN
EUT Type: Car Telematics Device
Model name(s): TL3HEB-N
Date(s) of Tests: October 17, 2016 ~ November 08, 2016
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model Name	TL3HEB-N	
EUT Type	Car Telematics Device	
Power Supply	DC 12.0 V	
Frequency Range	TX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5720 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	RX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2A)/ 5500 MHz - 5720 MHz (UNII 2C)/ 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2A)/ 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
Modulation Type	OFDM(802.11a, 802.11n)	
Antenna Specification	Manufacturer: Laird TECHNOLOGIES Antenna type: EXTERNAL ANTENNA Peak Gain : 5.54 dBi (5180~5240 UNII1 BAND) / 5.90 dBi (5260~5320 UNII2A BAND) 5.52 dBi (5500~5720 UNII2C BAND) / 4.92 dBi (5745~5825 UNII3 BAND)	

Note: The UNII 1 band was only tested for FCC and ISSED is excepted.

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03 dated August 22, 2016 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and ANSI C63.10 (Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’ were used in the measurement. For 802.11ac, KDB644545 D03 v01 dated August 14, 2014.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E / RSS-GEN issue 4, RSS-247 issue 1.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3.75 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033 D02 v01r03)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antenna of this E.U.T meets the unique antenna connector.

* The E.U.T Complies with the requirement of §15.203, §15.407 / RSS-GEN.

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	6.07

8. SUMMARY OF TEST RESULTS

8.1 FCC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	CONDUCTED	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW (5150-5250 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5470-5725 MHz) <1 W (5725-5850 MHz)		PASS
Peak Power Spectral Density	§15.407(a)(1),(5)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
Frequency Stability	§15.407(g)	N/A		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) <-17 dBm/MHz EIRP within 5715-5725 MHz and 5850-5860 MHz (UNII3) <-27 dBm/MHz EIRP outside 5715-5860 MHz (UNII 3)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

8.2 ISED Part

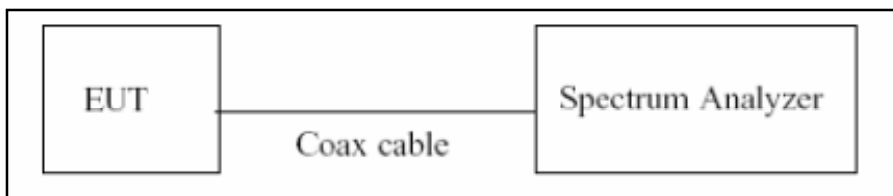
Test Description	IC Part Section(s)	Test Limit	Test Condition	Test Result
99% Bandwidth(IC)	RSS-GEN, 6.6	N/A	CONDUCTED	PASS
6 dB Bandwidth	RSS-247, 6.2.4.1)	> 500 kHz (5725~5850 MHz)		PASS
Maximum Conducted Output Power,	RSS-247, 6.2	< 250 mW or 11+10 log ₁₀ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log ₁₀ (BW) dBm (5470-5600, 5650-5725 MHz) Whichever power is less		PASS
	RSS-247, 6.2.4 1)	<1 W (5725-5850 MHz)		
Maximum e.i.r.p	RSS-247, 6.2	< 200 mW or 10+10 log ₁₀ (BW) dBm (5150-5250 MHz) < 1 W or 17+10 log ₁₀ (BW) dBm (5250-5350 MHz) < 1 W or 17+10 log ₁₀ (BW) dBm (5470-5725 MHz) Whichever power is less		
Power Spectral Density	RSS-247 6.2	<10 dBm/ MHz(e.i.r.p.) (5150-5250 MHz) <11 dBm/MHz(Conducted) (5250-5350 MHz, 5470-5600 MHz, 5650-5725 MHz)		PASS
	RSS-247, 6.2.4 1)	<30 dBm/500 kHz(Conducted) (5725-5850 MHz)		
AC Conducted Emissions 150 kHz-30 MHz	RSS-GEN, 8.8	RSS-GEN section 8.8 table 3		N/A
Undesirable Emissions	RSS-247, 6.2.1 2)	OBW does not fall within 5250~5350 MHz (5150~5350 MHz)		RADIATED
	RSS-247, 6.2	<-27 dBm/ MHz EIRP (5150-5350 MHz, 5470-5725 MHz)	PASS	
	RSS-247, 6.2.4 2)	<-17 dBm/MHz EIRP within 5715-5725 MHz and 5850-5860 MHz, <-27 dBm/MHz EIRP outside 5715-5860 MHz (5725~5850 MHz)		
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-GEN, 8.9 RSS-GEN, 8.10	RSS-GEN section 8.9 table 4, 5 section 8.10 table 6	PASS	
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.1.2	RSS-GEN section 7.1.2 table 2	PASS	

9. TEST RESULT

9.1 DUTY CYCLE

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in section B)1)a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, (B.2 in KDB 789033 D02 v01r03)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

■ Duty Cycle Factor

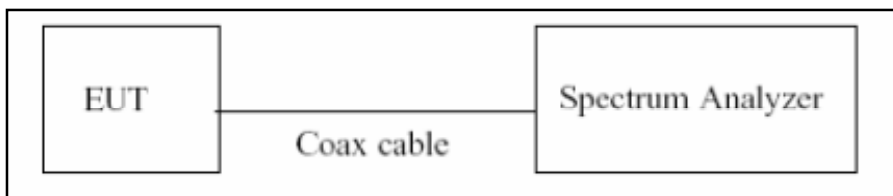
Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	2.063	2.149	0.95968046	0.179
	9	1.385	1.471	0.94152047	0.262
	12	1.043	1.135	0.91919486	0.366
	18	0.704	0.789	0.89215644	0.496
	24	0.532	0.617	0.86177152	0.646
	36	0.364	0.450	0.80924855	0.919
	48	0.276	0.363	0.76133813	1.184
	54	0.248	0.334	0.74155314	1.299
802.11n_HT20	MCS 0	1.924	2.009	0.95748981	0.189
	MCS 1	0.979	1.071	0.91326215	0.394
	MCS 2	0.668	0.753	0.88661710	0.523
	MCS 3	0.508	0.594	0.85613208	0.675
	MCS 4	0.352	0.440	0.80000000	0.969
	MCS 5	0.273	0.358	0.76116071	1.185
	MCS 6	0.248	0.334	0.74162679	1.298
	MCS 7	0.228	0.314	0.72704082	1.384
802.11n_HT40	MCS 0	0.949	1.035	0.91752250	0.374
	MCS 1	0.492	0.578	0.85055342	0.703
	MCS 2	0.339	0.426	0.79699248	0.985
	MCS 3	0.264	0.350	0.75471698	1.222
	MCS 4	0.189	0.274	0.68791857	1.625
	MCS 5	0.152	0.238	0.63899597	1.945
	MCS 6	0.140	0.226	0.62118041	2.068
	MCS 7	0.128	0.214	0.59784960	2.234

9.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033 D02 v01r03, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

■ TEST CONFIGURATION



■ TEST PROCEDURE (26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (C.1 in KDB 789033 D02 v01r03)

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Note : We tested 26 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 26 dB.

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.
3. In case of UNII channels 142 and 144, this device is satisfied with KDB644545 D03.

■ TEST PROCEDURE (for the band 5.725-5.85 GHz, 6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to(C.2 in KDB 789033 D02 v01r03)

1. RBW = 100 kHz
2. VBW $\geq$ 3*RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points(upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

■ TEST RESULTS for 802.11a

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.05	N/A	Pass
5200	40	18.90	N/A	Pass
5240	48	19.06	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	18.72	N/A	Pass
5300	60	18.69	N/A	Pass
5320	64	18.84	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	18.68	N/A	Pass
5580	116	18.37	N/A	Pass
5720	144	18.61	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	18.89	N/A	Pass
5785	157	18.99	N/A	Pass
5825	165	18.74	N/A	Pass

TEST Plot for 802.11a

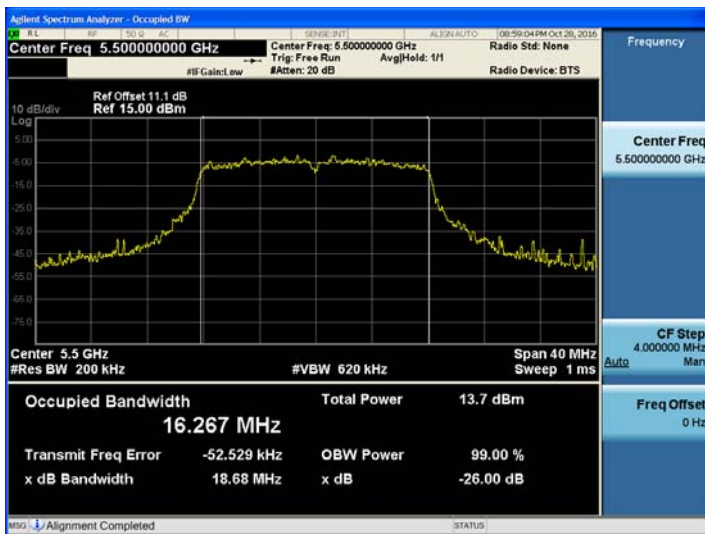
802.11a UNII 1 BAND 26dB Bandwidth (CH48)



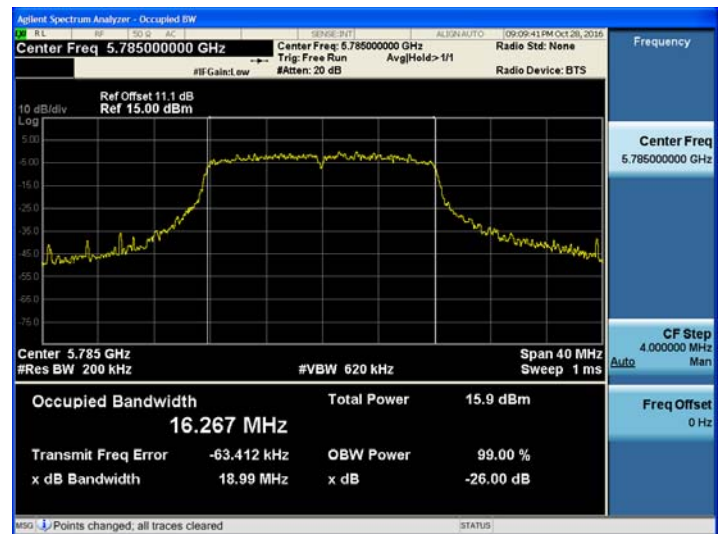
802.11a UNII 2A BAND 26dB Bandwidth (CH 64)



802.11a UNII 2C BAND 26dB Bandwidth (CH100)



802.11a UNII 3 BAND 26dB Bandwidth (CH157)



Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

TEST RESULTS for 802.11n_HT20

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.72	N/A	Pass
5200	40	19.57	N/A	Pass
5240	48	19.61	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	19.59	N/A	Pass
5300	60	19.52	N/A	Pass
5320	64	19.62	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	19.59	N/A	Pass
5580	116	19.40	N/A	Pass
5720	144	20.07	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	19.62	N/A	Pass
5785	157	20.01	N/A	Pass
5825	165	19.61	N/A	Pass

■ TEST Plot for 802.11n_HT20

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)



802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 64)



802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)



802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 157)



Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

■ TEST RESULTS for 802.11n_HT40

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	40.27	N/A	Pass
5230	46	41.10	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	40.07	N/A	Pass
5310	62	42.70	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	40.20	N/A	Pass
5550	110	40.00	N/A	Pass
5710	142	39.82	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

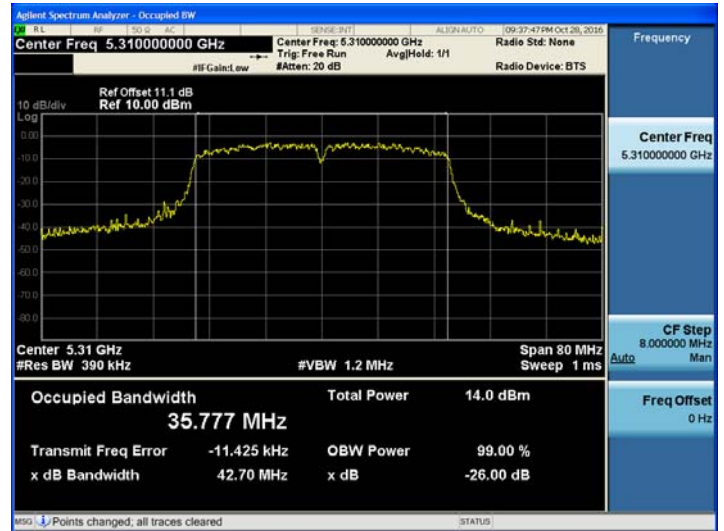
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	40.20	N/A	Pass
5795	159	39.82	N/A	Pass

■ TEST Plot for 802.11n_HT40

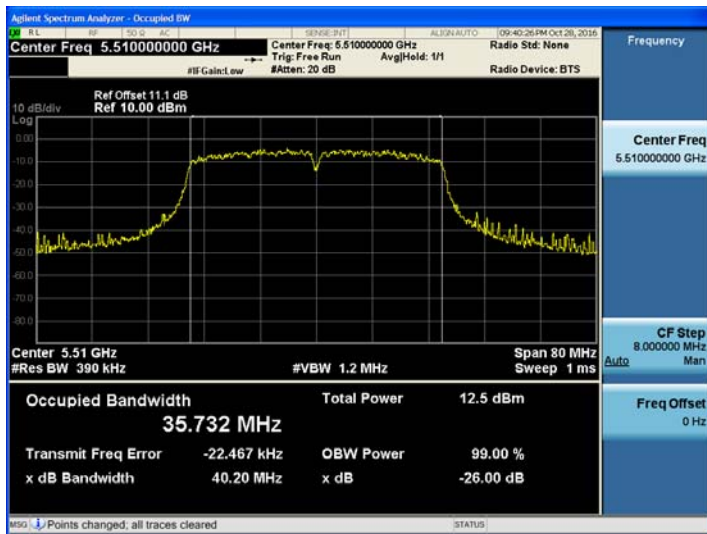
802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)



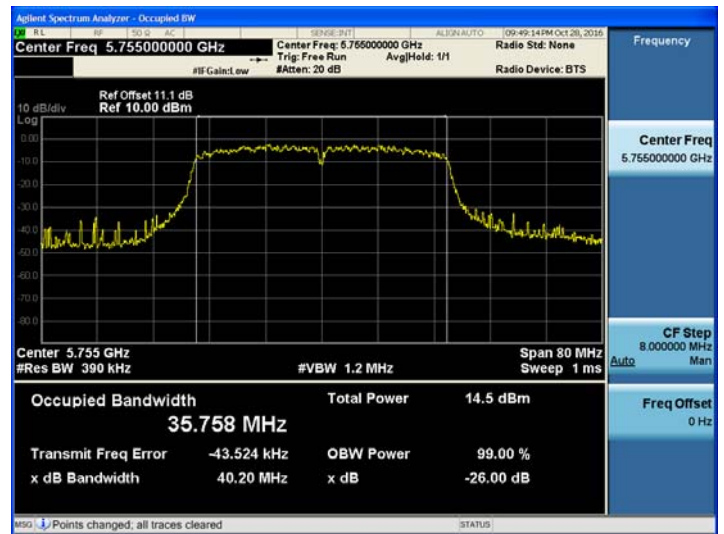
802.11n_HT40 UNII 2A BAND 26dB Bandwidth(CH 62)



802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 102)



802.11n_HT40 UNII 3 BAND 26dB Bandwidth(CH 151)



Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

Conducted 6 dB Bandwidth

■ TEST RESULTS for 802.11a /n_HT20

Conducted 6 dB Bandwidth Measurements for 802.11a

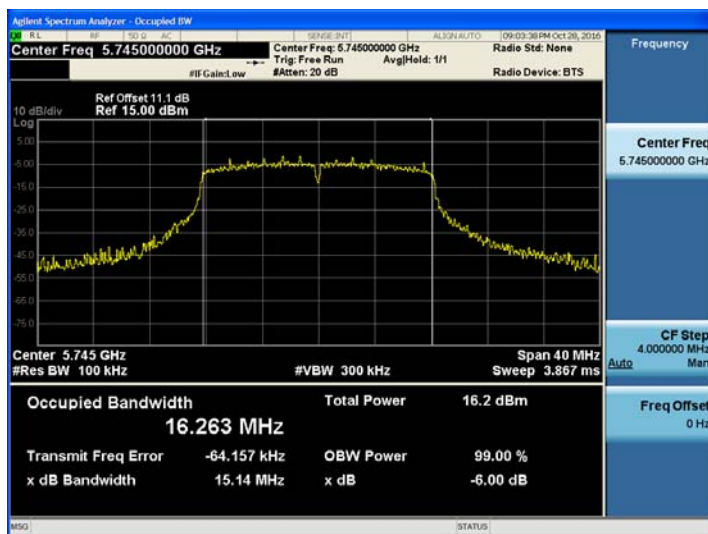
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.14	0.5	Pass
5785	157	14.53	0.5	Pass
5825	165	14.45	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_HT20

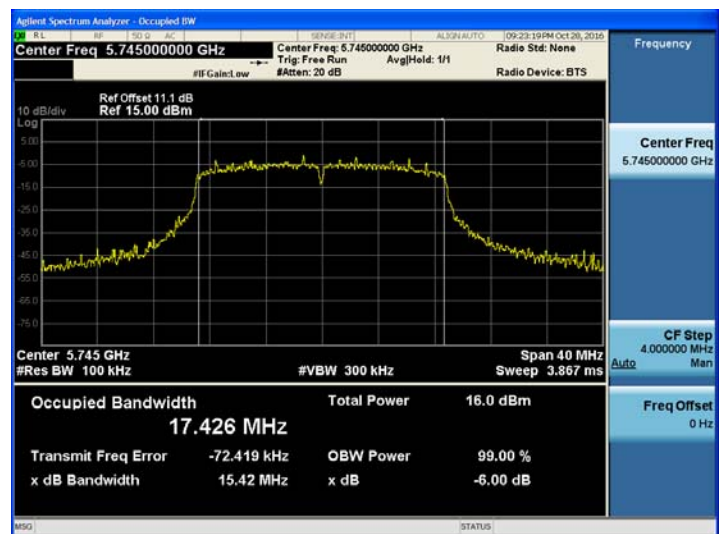
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.42	0.5	Pass
5785	157	15.40	0.5	Pass
5825	165	15.17	0.5	Pass

■ TEST PlotS for 802.11a/n_HT20

802.11a UNII 3 BAND 6dB Bandwidth (CH.149)



802.11n_HT20 UNII 3 BAND 6dB Bandwidth(CH.149)



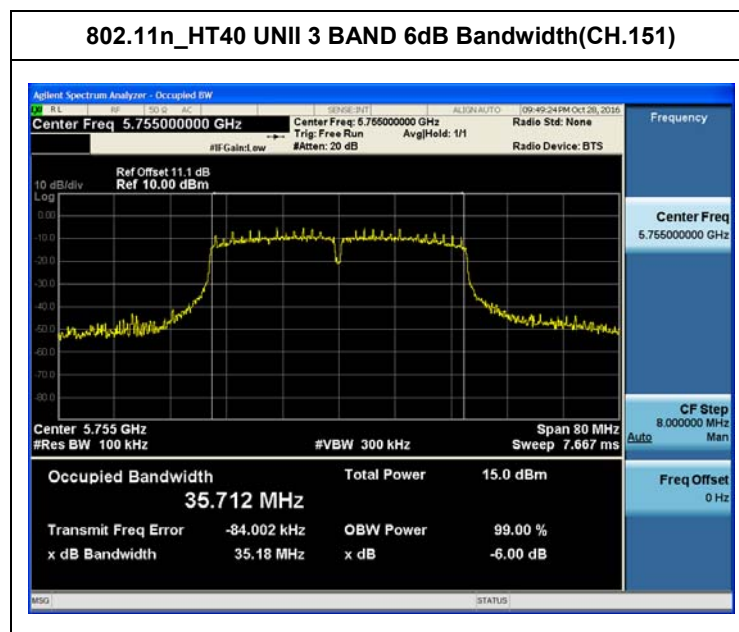
Note : In order to simplify the report, attached plots were only the most wide channel.

TEST RESULTS for 802.11n_HT40

Conducted 6 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.18	0.5	Pass
5795	159	35.13	0.5	Pass

TEST PlotS for 802.11n_HT40



Straddle channels TEST RESULTS

Conducted Bandwidth Measurements for 802.11a/n_HT20 (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11a	5720	144	14.20	N/A	Pass
802.11n			14.68	N/A	Pass

Conducted Bandwidth Measurements for 802.11a/n_HT20 (UNII 3 Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11a	5720	144	4.16	N/A	Pass
802.11n			4.64	N/A	Pass

Straddle channels TEST Plots for 802.11a/n_HT20

802.11a CH.144



802.11n_HT20 CH.144



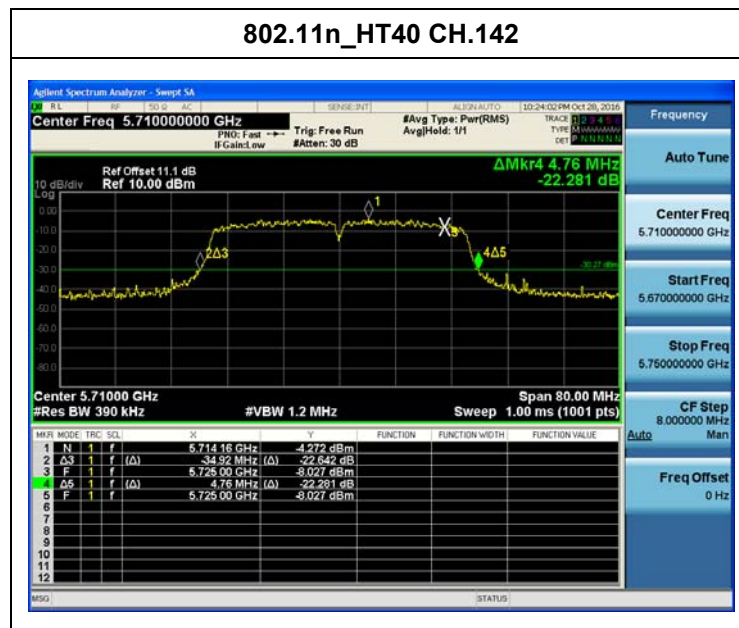
Conducted Bandwidth Measurements for 802.11n_HT40 (UNII 2C Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11n	5710	142	34.92	N/A	Pass

Conducted Bandwidth Measurements for 802.11n_HT40 (UNII 3 Band)

Mode	Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
802.11n	5710	142	4.76	N/A	Pass

Straddle channels TEST Plots for 802.11a/n_HT40

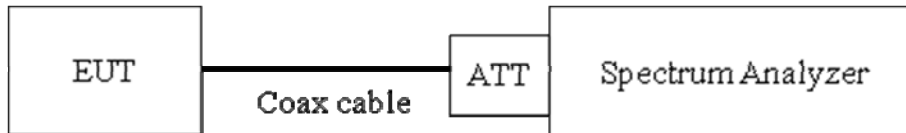


9.3 99% BANDWIDTH

Limit

The 99 % bandwidth is used to determine the conducted power limits.

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.

RBW = 1% ~ 5% of the occupied bandwidth

VBW $\approx$ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

■ TEST RESULTS for 802.11a

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	16.273	N/A	Pass
5200	40	16.272	N/A	Pass
5240	48	16.272	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	16.266	N/A	Pass
5300	60	16.288	N/A	Pass
5320	64	16.278	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	16.267	N/A	Pass
5580	116	16.260	N/A	Pass
5720	144	16.269	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.253	N/A	Pass
5785	157	16.267	N/A	Pass
5825	165	16.265	N/A	Pass

TEST Plot for 802.11a

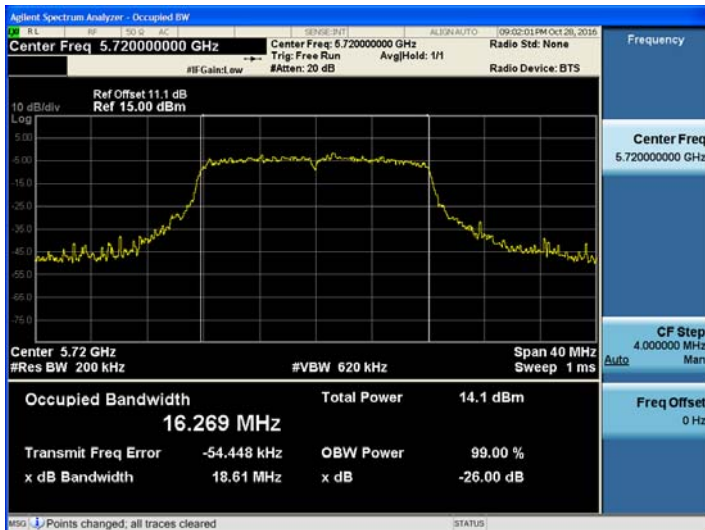
802.11a UNII 1 BAND Conducted 99% Bandwidth (CH36)



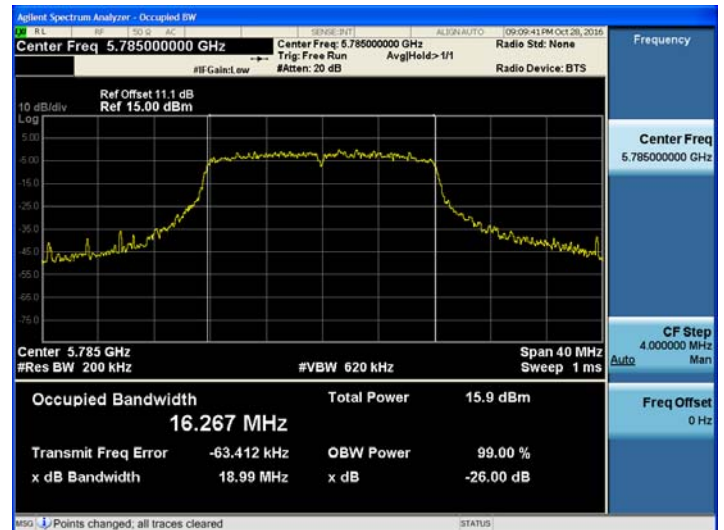
802.11a UNII 2A BAND Conducted 99% Bandwidth (CH 60)



802.11a UNII 2C BAND Conducted 99% Bandwidth (CH144)



802.11a UNII 3 BAND Conducted 99% Bandwidth (CH157)



Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

■ TEST RESULTS for 802.11n_HT20

Conducted 99% Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	17.404	N/A	Pass
5200	40	17.392	N/A	Pass
5240	48	17.402	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	17.413	N/A	Pass
5300	60	17.399	N/A	Pass
5320	64	17.417	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	17.389	N/A	Pass
5580	116	17.391	N/A	Pass
5720	144	17.376	N/A	Pass

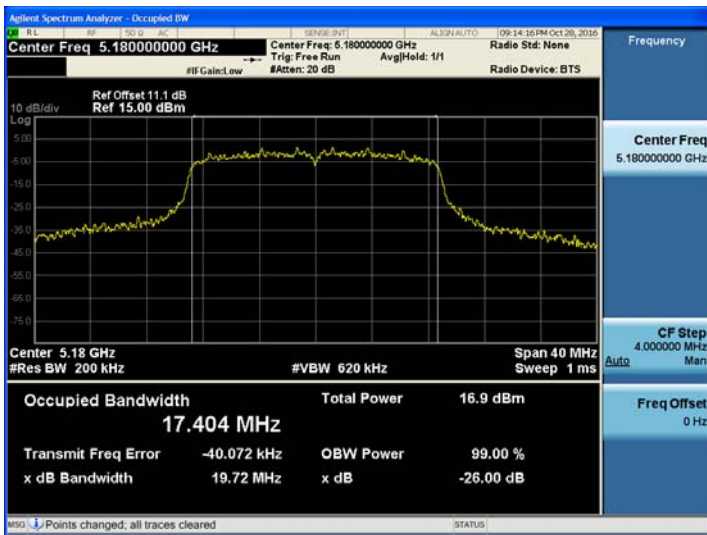
Conducted 99% Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.410	N/A	Pass
5785	157	17.404	N/A	Pass
5825	165	17.383	N/A	Pass

■ TEST Plot for 802.11n_HT20

802.11n_HT20 UNII 1 BAND

Conducted 99% Bandwidth (CH 36)



802.11n_HT20 UNII 2A BAND

Conducted 99% Bandwidth (CH 64)



802.11n_HT20 UNII 2C BAND

Conducted 99% Bandwidth (CH 116)



802.11n_HT20 UNII 3 BAND

Conducted 99% Bandwidth (CH 149)



Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

■ TEST RESULTS for 802.11n_HT40

Conducted 99% Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	35.761	N/A	Pass
5230	46	35.774	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	35.853	N/A	Pass
5310	62	35.777	N/A	Pass

Conducted 99% Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	35.732	N/A	Pass
5550	110	35.806	N/A	Pass
5710	142	35.757	N/A	Pass

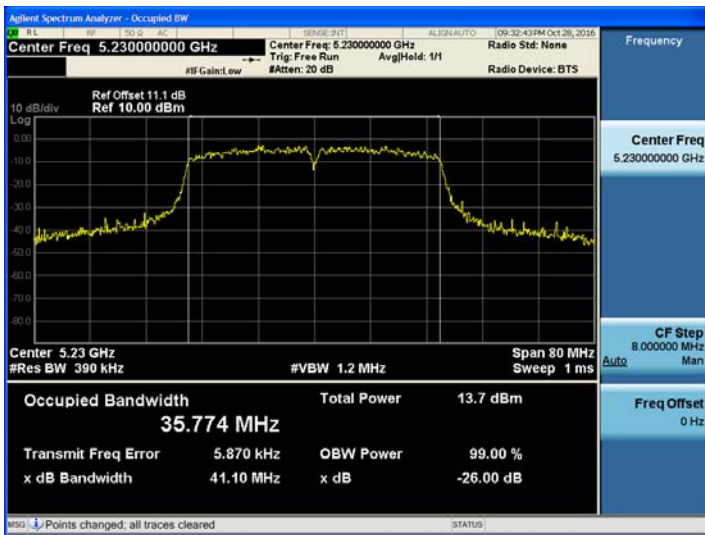
Conducted 99% Bandwidth Measurements for 802.11n_HT40

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.758	N/A	Pass
5795	159	35.786	N/A	Pass

■ TEST Plot for 802.11n_HT40

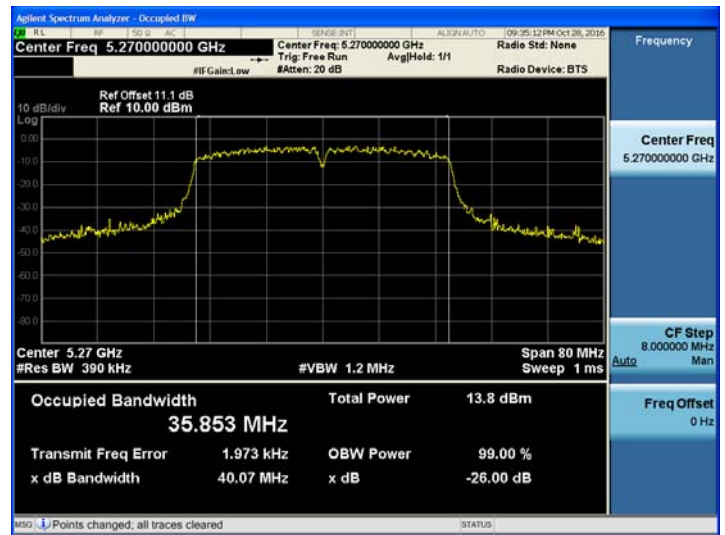
802.11n_HT40 UNII 1 BAND

Conducted 99% Bandwidth (CH 46)



802.11n_HT40 UNII 2A BAND

Conducted 99% Bandwidth (CH 54)



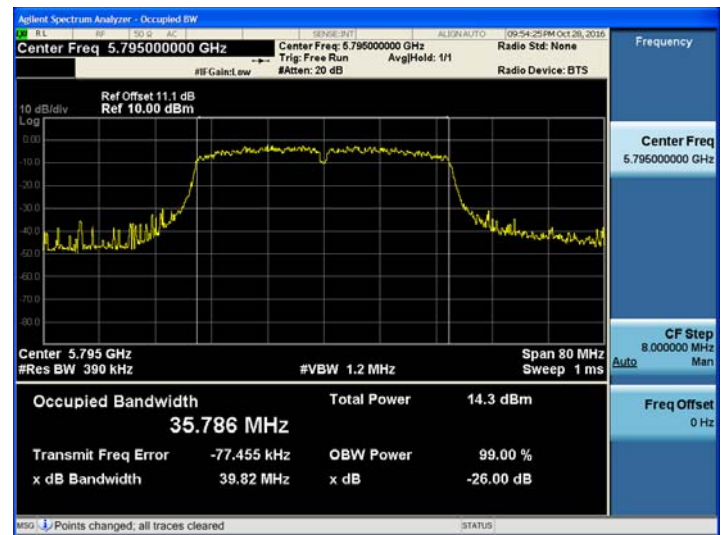
802.11n_HT40 UNII 2C BAND

Conducted 99% Bandwidth (CH 110)



802.11n_HT40 UNII 3 BAND

Conducted 99% Bandwidth (CH 159)



Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

9.4 OUTPUT POWER MEASUREMENT

Test Requirements and limit, §15.407(a)(1) / RSS-247(Issue 1) Section 6.2

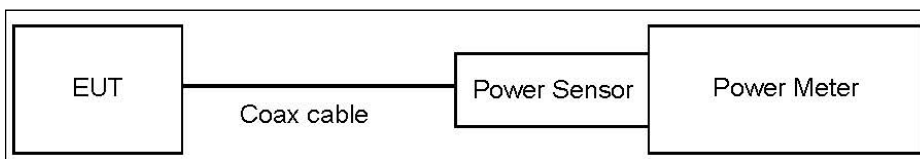
A transmitter antenna terminal of EUT is connected to the input of a Power meter or Spectrum Analyzer .Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

■ Limit

Band	Mode	Limit (dBm)
UNII 1, 2A, 2C	802.11a,n	23.98
UNII 3	802.11a,n	30.00

Note : According to KDB644545 D03 v01, the limit on maximum conducted output power in each U-NII band for straddle channel is computed based on the portion of the emission bandwidth contained within that band.

■ TEST CONFIGURATION(20 MHz BW)



■ TEST PROCEDURE(20 MHz BW)

- Average Power (Procedure E.3.a in KDB 789033 D02 v01r03).
 1. Measure the duty cycle.
 2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
 3. Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Note :

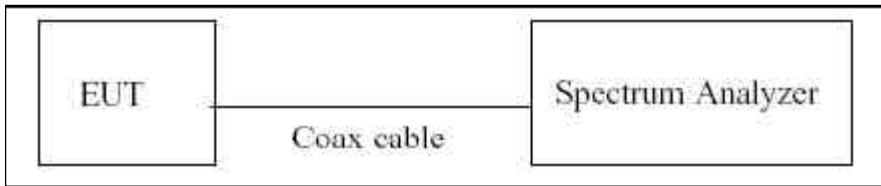
1. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A, 2C, 3	11.1

(Actual value of loss for the attenuator and cable combination)

2. In case of UNII channels 142 and 144, this device is satisfied with KDB644545 D03.

■ TEST CONFIGURATION(40 MHz BW & 80 MHz BW)



■ TEST PROCEDURE(40 MHz BW & 80 MHz BW)

▪ Average Power

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function. We tested according to Method SA-2 in KDB 789033 D02 v01r03.

The Spectrum Analyzer is set to

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW ≥ 3 MHz.
5. Number of points in sweep ≥ 2*span/RBW.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add $10\log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

■ Sample Calculation (Conducted)

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Note: 1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset = Attenuator loss + Cable loss

3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A, 2C, 3	11.1

(Actual value of loss for the attenuator and cable combination)

4. In case of UNII channels 142 and 144, this device is satisfied with KDB644545 D03.

802.11a (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6	11.06	0.18	11.24	23.98
		9	10.97	0.26	11.23	23.98
		12	10.86	0.37	11.23	23.98
		18	10.84	0.50	11.34	23.98
		24	10.85	0.65	11.50	23.98
		36	10.59	0.92	11.51	23.98
		48	10.38	1.18	11.56	23.98
		54	10.22	1.30	11.52	23.98
5200	40	6	11.07	0.18	11.25	23.98
		9	10.98	0.26	11.24	23.98
		12	10.86	0.37	11.23	23.98
		18	10.84	0.50	11.34	23.98
		24	10.88	0.65	11.53	23.98
		36	10.57	0.92	11.49	23.98
		48	10.40	1.18	11.58	23.98
		54	10.24	1.30	11.54	23.98
5240	48	6	11.10	0.18	11.28	23.98
		9	10.98	0.26	11.24	23.98
		12	10.87	0.37	11.24	23.98
		18	10.88	0.50	11.38	23.98
		24	10.88	0.65	11.53	23.98
		36	10.61	0.92	11.53	23.98
		48	10.44	1.18	11.62	23.98
		54	10.26	1.30	11.56	23.98

802.11a (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a Mode: 5260~5320)

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6	11.10	0.18	11.28	23.98
		9	11.01	0.26	11.27	23.98
		12	10.90	0.37	11.27	23.98
		18	10.86	0.50	11.36	23.98
		24	10.91	0.65	11.56	23.98
		36	10.64	0.92	11.56	23.98
		48	10.43	1.18	11.61	23.98
		54	10.26	1.30	11.56	23.98
5300	60	6	11.13	0.18	11.31	23.98
		9	11.06	0.26	11.32	23.98
		12	10.91	0.37	11.28	23.98
		18	10.93	0.50	11.43	23.98
		24	10.94	0.65	11.59	23.98
		36	10.63	0.92	11.55	23.98
		48	10.44	1.18	11.62	23.98
		54	10.30	1.30	11.60	23.98
5320	64	6	11.14	0.18	11.32	23.98
		9	11.03	0.26	11.29	23.98
		12	10.93	0.37	11.30	23.98
		18	10.89	0.50	11.39	23.98
		24	10.93	0.65	11.58	23.98
		36	10.66	0.92	11.58	23.98
		48	10.46	1.18	11.64	23.98
		54	10.30	1.30	11.60	23.98

802.11a (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a Mode: 5500~5720)

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6	7.02	0.18	7.20	23.98
		9	6.92	0.26	7.18	23.98
		12	6.79	0.37	7.16	23.98
		18	6.80	0.50	7.30	23.98
		24	6.93	0.65	7.58	23.98
		36	6.60	0.92	7.52	23.98
		48	6.40	1.18	7.58	23.98
		54	6.23	1.30	7.53	23.98
5580	116	6	7.23	0.18	7.41	23.98
		9	7.11	0.26	7.37	23.98
		12	7.00	0.37	7.37	23.98
		18	6.97	0.50	7.47	23.98
		24	7.11	0.65	7.76	23.98
		36	6.80	0.92	7.72	23.98
		48	6.59	1.18	7.77	23.98
		54	6.44	1.30	7.74	23.98
5720	144	6	7.69	0.18	7.87	23.98
		9	7.58	0.26	7.84	23.98
		12	7.47	0.37	7.84	23.98
		18	7.44	0.50	7.94	23.98
		24	7.53	0.65	8.18	23.98
		36	7.27	0.92	8.19	23.98
		48	7.06	1.18	8.24	23.98
		54	6.89	1.30	8.19	23.98

802.11a (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11a Mode: 5745~5825)

802.11a Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6	9.57	0.18	9.75	30
		9	9.51	0.26	9.77	30
		12	9.38	0.37	9.75	30
		18	9.38	0.50	9.88	30
		24	9.40	0.65	10.05	30
		36	9.14	0.92	10.06	30
		48	8.88	1.18	10.06	30
		54	8.76	1.30	10.06	30
5785	157	6	9.42	0.18	9.60	30
		9	9.30	0.26	9.56	30
		12	9.20	0.37	9.57	30
		18	9.20	0.50	9.70	30
		24	9.23	0.65	9.88	30
		36	8.90	0.92	9.82	30
		48	8.70	1.18	9.88	30
		54	8.60	1.30	9.90	30
5825	165	6	9.40	0.18	9.58	30
		9	9.30	0.26	9.56	30
		12	9.22	0.37	9.59	30
		18	9.19	0.50	9.69	30
		24	9.24	0.65	9.89	30
		36	8.94	0.92	9.86	30
		48	8.73	1.18	9.91	30
		54	8.57	1.30	9.87	30

802.11n_HT20 (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT20 Mode: 5180~5240)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	0	10.83	0.19	11.02	23.98
		1	10.53	0.39	10.92	23.98
		2	10.55	0.52	11.07	23.98
		3	10.85	0.67	11.52	23.98
		4	10.57	0.97	11.54	23.98
		5	10.36	1.19	11.55	23.98
		6	10.29	1.30	11.59	23.98
		7	10.11	1.38	11.49	23.98
5200	40	0	10.85	0.19	11.04	23.98
		1	10.55	0.39	10.94	23.98
		2	10.56	0.52	11.08	23.98
		3	10.86	0.67	11.53	23.98
		4	10.61	0.97	11.58	23.98
		5	10.37	1.19	11.56	23.98
		6	10.32	1.30	11.62	23.98
		7	10.16	1.38	11.54	23.98
5240	48	0	10.87	0.19	11.06	23.98
		1	10.56	0.39	10.95	23.98
		2	10.57	0.52	11.09	23.98
		3	10.87	0.67	11.54	23.98
		4	10.62	0.97	11.59	23.98
		5	10.39	1.19	11.58	23.98
		6	10.31	1.30	11.61	23.98
		7	10.18	1.38	11.56	23.98

802.11n_HT20 (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT20 Mode: 5260~5320)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	0	10.86	0.19	11.05	23.98
		1	10.59	0.39	10.98	23.98
		2	10.63	0.52	11.15	23.98
		3	10.93	0.67	11.60	23.98
		4	10.65	0.97	11.62	23.98
		5	10.38	1.19	11.57	23.98
		6	10.33	1.30	11.63	23.98
		7	10.19	1.38	11.57	23.98
5300	60	0	10.92	0.19	11.11	23.98
		1	10.62	0.39	11.01	23.98
		2	10.64	0.52	11.16	23.98
		3	10.96	0.67	11.63	23.98
		4	10.66	0.97	11.63	23.98
		5	10.41	1.19	11.60	23.98
		6	10.34	1.30	11.64	23.98
		7	10.23	1.38	11.61	23.98
5320	64	0	10.90	0.19	11.09	23.98
		1	10.63	0.39	11.02	23.98
		2	10.62	0.52	11.14	23.98
		3	10.93	0.67	11.60	23.98
		4	10.67	0.97	11.64	23.98
		5	10.41	1.19	11.60	23.98
		6	10.33	1.30	11.63	23.98
		7	10.21	1.38	11.59	23.98

802.11n_HT20 (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT20 Mode: 5500~5720)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	0	6.78	0.19	6.97	23.98
		1	6.47	0.39	6.86	23.98
		2	6.50	0.52	7.02	23.98
		3	6.88	0.67	7.55	23.98
		4	6.59	0.97	7.56	23.98
		5	6.37	1.19	7.56	23.98
		6	6.32	1.30	7.62	23.98
		7	6.16	1.38	7.54	23.98
5580	116	0	6.98	0.19	7.17	23.98
		1	6.65	0.39	7.04	23.98
		2	6.70	0.52	7.22	23.98
		3	7.08	0.67	7.75	23.98
		4	6.80	0.97	7.77	23.98
		5	6.56	1.19	7.75	23.98
		6	6.46	1.30	7.76	23.98
		7	6.33	1.38	7.71	23.98
5720	144	0	7.47	0.19	7.66	23.98
		1	7.13	0.39	7.52	23.98
		2	7.16	0.52	7.68	23.98
		3	7.49	0.67	8.16	23.98
		4	7.25	0.97	8.22	23.98
		5	7.00	1.19	8.19	23.98
		6	6.96	1.30	8.26	23.98
		7	6.80	1.38	8.18	23.98

802.11n_HT20 (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT20 Mode: 5745~5825)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	0	9.36	0.19	9.55	30
		1	9.06	0.39	9.45	30
		2	9.10	0.52	9.62	30
		3	9.38	0.67	10.05	30
		4	9.10	0.97	10.07	30
		5	8.86	1.19	10.05	30
		6	8.81	1.30	10.11	30
		7	8.66	1.38	10.04	30
5785	157	0	9.17	0.19	9.36	30
		1	8.86	0.39	9.25	30
		2	8.88	0.52	9.40	30
		3	9.21	0.67	9.88	30
		4	8.93	0.97	9.90	30
		5	8.69	1.19	9.88	30
		6	8.61	1.30	9.91	30
		7	8.49	1.38	9.87	30
5825	165	0	9.20	0.19	9.39	30
		1	8.88	0.39	9.27	30
		2	8.89	0.52	9.41	30
		3	9.26	0.67	9.93	30
		4	8.94	0.97	9.91	30
		5	8.72	1.19	9.91	30
		6	8.66	1.30	9.96	30
		7	8.51	1.38	9.89	30

802.11n_HT40 (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT40 Mode: 5190~5230)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	0	6.56	0.37	6.93	23.98
		1	6.32	0.70	7.02	23.98
		2	6.05	0.99	7.03	23.98
		3	5.75	1.22	6.97	23.98
		4	5.35	1.62	6.97	23.98
		5	5.11	1.95	7.06	23.98
		6	4.96	2.07	7.03	23.98
		7	4.81	2.23	7.05	23.98
5230	46	0	6.86	0.37	7.24	23.98
		1	6.55	0.70	7.25	23.98
		2	6.27	0.99	7.26	23.98
		3	6.01	1.22	7.23	23.98
		4	5.66	1.62	7.29	23.98
		5	5.31	1.95	7.26	23.98
		6	5.18	2.07	7.25	23.98
		7	4.99	2.23	7.23	23.98

802.11n _HT40 (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT40 Mode: 5270~5310)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	0	6.99	0.37	7.37	23.98
		1	6.71	0.70	7.42	23.98
		2	6.41	0.99	7.40	23.98
		3	6.18	1.22	7.40	23.98
		4	5.82	1.62	7.45	23.98
		5	5.45	1.95	7.40	23.98
		6	5.34	2.07	7.41	23.98
		7	5.17	2.23	7.41	23.98
5310	62	0	7.02	0.37	7.40	23.98
		1	6.81	0.70	7.51	23.98
		2	6.50	0.99	7.49	23.98
		3	6.27	1.22	7.49	23.98
		4	5.83	1.62	7.45	23.98
		5	5.51	1.95	7.46	23.98
		6	5.37	2.07	7.44	23.98
		7	5.23	2.23	7.46	23.98

802.11n _HT40 (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT40 Mode: 5510~5710)

802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	0	5.52	0.37	5.89	23.98
		1	5.33	0.70	6.03	23.98
		2	5.01	0.99	6.00	23.98
		3	4.73	1.22	5.95	23.98
		4	4.29	1.62	5.91	23.98
		5	4.06	1.95	6.01	23.98
		6	3.97	2.07	6.03	23.98
		7	3.75	2.23	5.99	23.98
5550	110	0	5.74	0.37	6.12	23.98
		1	5.47	0.70	6.17	23.98
		2	5.20	0.99	6.18	23.98
		3	4.97	1.22	6.19	23.98
		4	4.57	1.62	6.19	23.98
		5	4.27	1.95	6.21	23.98
		6	4.16	2.07	6.23	23.98
		7	3.97	2.23	6.20	23.98
5710	142	0	5.86	0.37	6.23	23.98
		1	5.58	0.70	6.28	23.98
		2	5.27	0.99	6.25	23.98
		3	5.04	1.22	6.26	23.98
		4	4.66	1.62	6.28	23.98
		5	4.31	1.95	6.26	23.98
		6	4.18	2.07	6.25	23.98
		7	4.01	2.23	6.24	23.98

802.11n _HT40 (UNII 3)

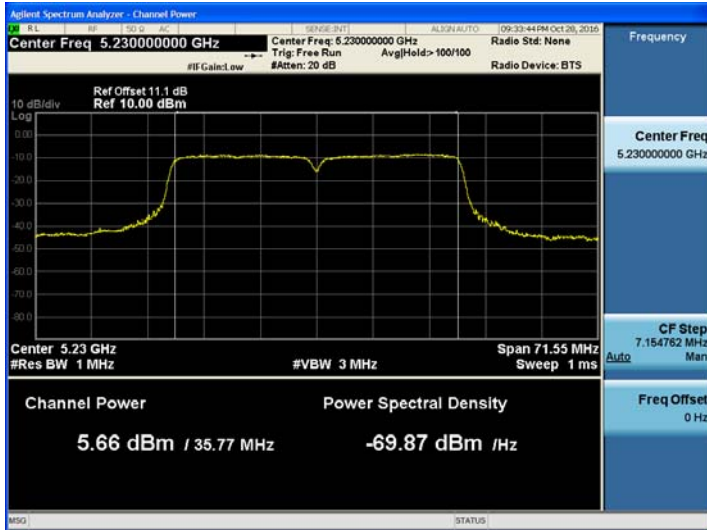
■ TEST RESULTS

Conducted Output Power Measurements (802.11n_HT40 Mode: 5755~5795)

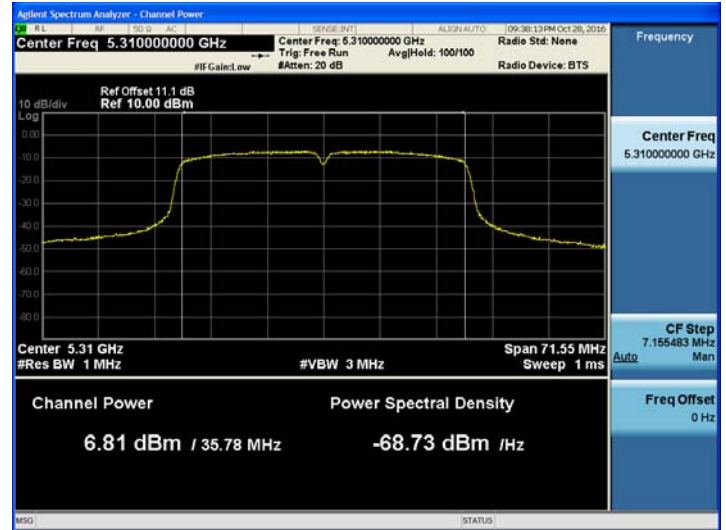
802.11n_HT20 Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	0	7.63	0.37	8.01	30
		1	7.20	0.70	7.91	30
		2	6.98	0.99	7.97	30
		3	6.74	1.22	7.96	30
		4	6.41	1.62	8.03	30
		5	6.00	1.95	7.94	30
		6	5.84	2.07	7.91	30
		7	5.64	2.23	7.88	30
5795	159	0	7.41	0.37	7.79	30
		1	7.14	0.70	7.84	30
		2	6.77	0.99	7.76	30
		3	6.51	1.22	7.74	30
		4	6.14	1.62	7.77	30
		5	5.79	1.95	7.73	30
		6	5.69	2.07	7.76	30
		7	5.53	2.23	7.76	30

■ TEST Plot_802.11n_HT40

**802.11n_HT40 UNII 1 BAND Average Power
(5190 MHz ~5230 MHz) CH 46 MCS4**



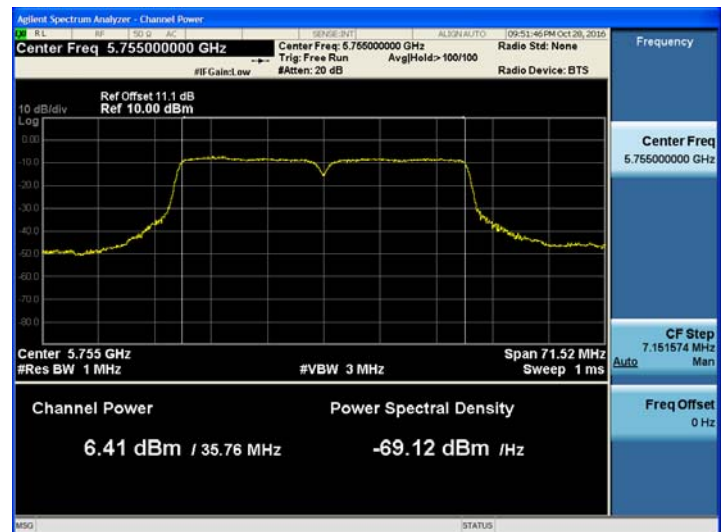
**802.11n_HT40 UNII 2A BAND Average Power
(5270 MHz ~5310 MHz) CH 62 MCS1**



**802.11n_HT40 UNII 2C BAND Average Power
(5510 MHz ~5710 MHz) CH 142 MCS4**



**802.11n_HT40 UNII 3 BAND Average Power
(5755 MHz ~5795 MHz) CH 151 MCS4**



■ Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11a/n_HT20 Mode: UNII 2C Band 5720MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	5.91	1.184	7.09	22.86
802.11n			5.68	1.298	6.98	22.86

Conducted Output Power Measurements (802.11a/n_HT20 Mode: UNII 3 Band 5720MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	-0.11	1.184	1.07	23.55
802.11n			0.10	1.298	1.40	23.55

☐ Straddle channels TEST Plots for 802.11a/n_HT20

802.11a UNII 2C Band Average Power CH.144



802.11a UNII 3 Band Average Power CH.144



802.11n_HT20 UNII 2C Band Average Power CH.144



802.11n_HT20 UNII 3 Band Average Power CH.144



■ Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11n_HT40 Mode: UNII 2C Band 5710MHz)

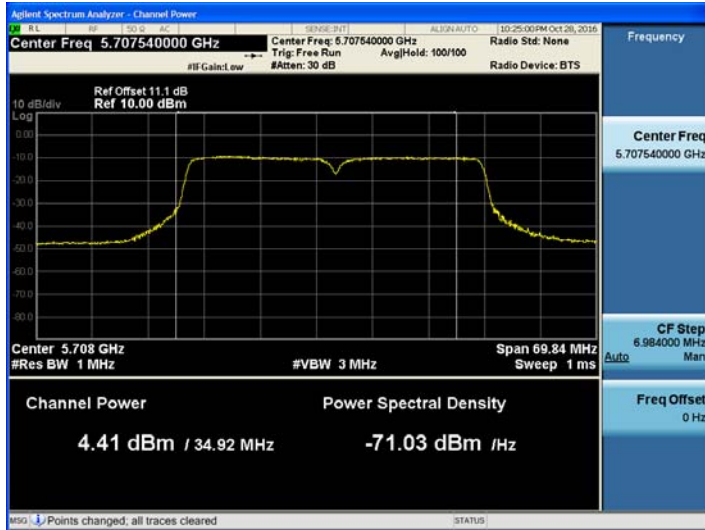
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	4.41	1.625	6.03	22.86

Conducted Output Power Measurements (802.11n_HT40 Mode: UNII 3 Band 5710MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	-5.84	1.625	-4.22	23.55

■ Straddle channels TEST Plots for 802.11n_HT40

802.11n_HT40 UNII 2C Band Average Power CH.142



802.11n_HT40 UNII 3 Band Average Power CH.142



9.5 POWER SPECTRAL DENSITY

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 11 dBm/ MHz for UNII 1,2A, 2C and 30 dBm/500 kHz for UNII 3.

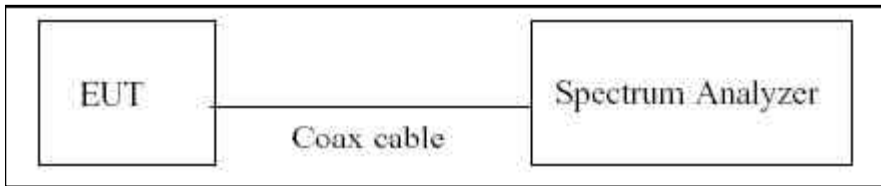
■ Limit(CDD)

Power Spectral Density

Band	Mode	Limit
UNII 1	802.11a,n	11 dBm/MHz
UNII 2A	802.11a,n	11 dBm/MHz
UNII 2C	802.11a,n	11 dBm/MHz
UNII 3	802.11a,n	30 dBm/500 kHz

Note : According to KDB644545 D03 v01, emission for band straddle channels in each shall comply with the PSD limits applicable to that band under the appropriate rule section.

■ TEST CONFIGURATION



■ TEST PROCEDURE

We tested according to Method in KDB 789033 D02 v01r03.

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz(510 kHz for UNII 3)
3. VBW $\geq$ 3 MHz
4. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.

■ Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = -5 dBm + 10 dB + 0.8 dB + 0.21 dB = 16.01 dBm

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 5.2 GHz, 5.3 GHz and 5.6 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A , 2C, 3	11.1

(Actual value of loss for the attenuator and cable combination)

802.11a

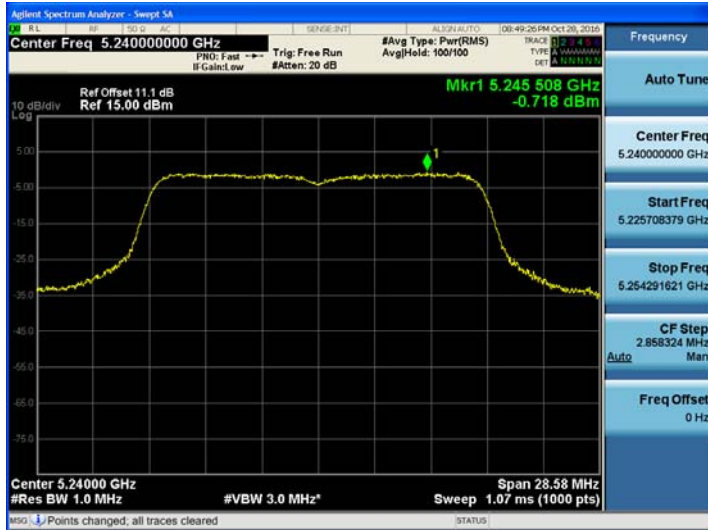
TEST RESULTS

Conducted Power Density Measurements

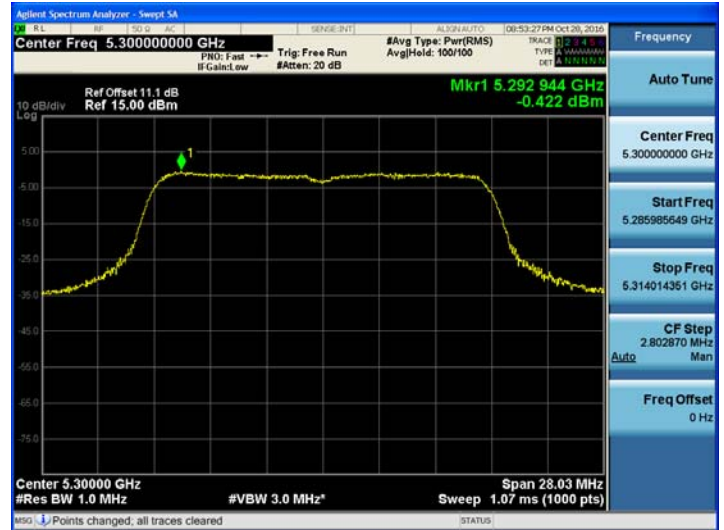
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	-0.836	1.184	0.348	11	Pass
5200	40		-0.981	1.184	0.203		Pass
5240	48		-0.718	1.184	0.466		Pass
5260	52		-0.962	1.184	0.222	11	Pass
5300	60		-0.422	1.184	0.762		Pass
5320	64		-0.618	1.184	0.566		Pass
5500	100		-4.306	1.184	-3.122	11	Pass
5580	116		-4.359	1.184	-3.175		Pass
5720	144		-3.953	1.184	-2.769		Pass
5745	149		-4.622	1.184	-3.438	30	Pass
5785	157		-4.638	1.299	-3.339		Pass
5825	165		-4.938	1.184	-3.754		Pass

■ TEST Plot for 802.11a

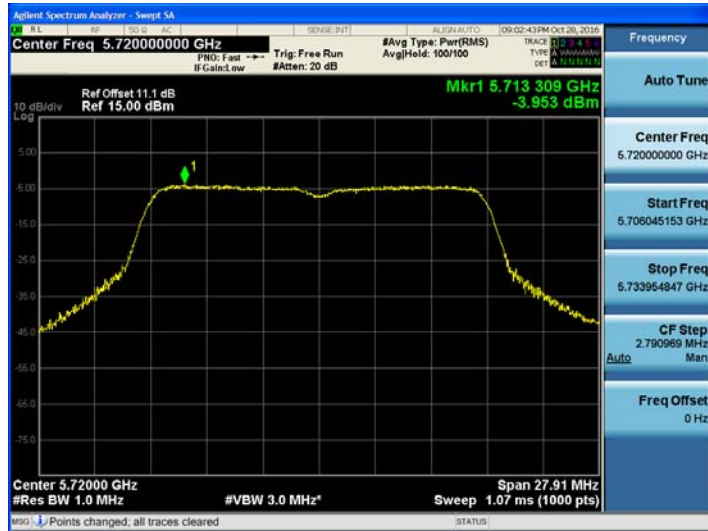
802.11a UNII 1 BAND PSD CH 48



802.11a UNII 2A BAND PSD CH 60



802.11a UNII 2C BAND PSD CH 144



802.1a UNII 3 BAND PSD CH 157



802.11n_HT20

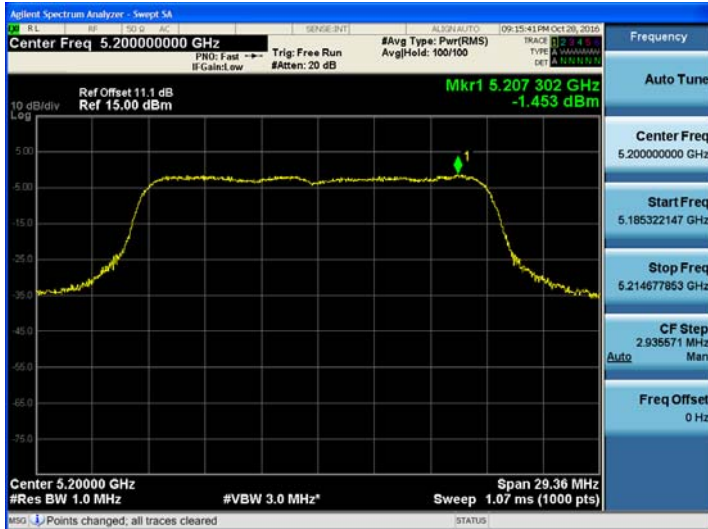
TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n _HT20	-1.603	1.298	-0.305	11	Pass
5200	40		-1.453	1.298	-0.155		Pass
5240	48		-1.516	1.298	-0.218		Pass
5260	52		-1.024	1.298	0.274	11	Pass
5300	60		-0.859	1.298	0.439		Pass
5320	64		-0.795	0.969	0.174		Pass
5500	100		-4.507	1.298	-3.209	11	Pass
5580	116		-4.219	0.969	-3.250		Pass
5720	144		-4.238	1.298	-2.940		Pass
5745	149		-5.129	1.298	-3.831	30	Pass
5785	157		-5.189	1.298	-3.891		Pass
5825	165		-5.308	1.298	-4.010		Pass

■ TEST Plot for 802.11n_HT20

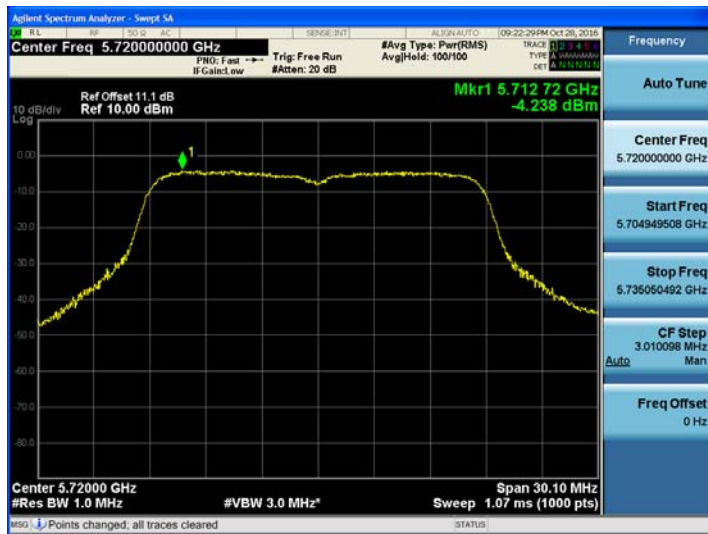
802.11n_HT20 UNII 1 BAND PSD CH 40



802.11n_HT20 UNII 2A BAND PSD CH 60



802.11n_HT20 UNII 2C BAND PSD CH 144



802.11n_HT20 UNII 3 BAND PSD CH 149



802.11n_HT40

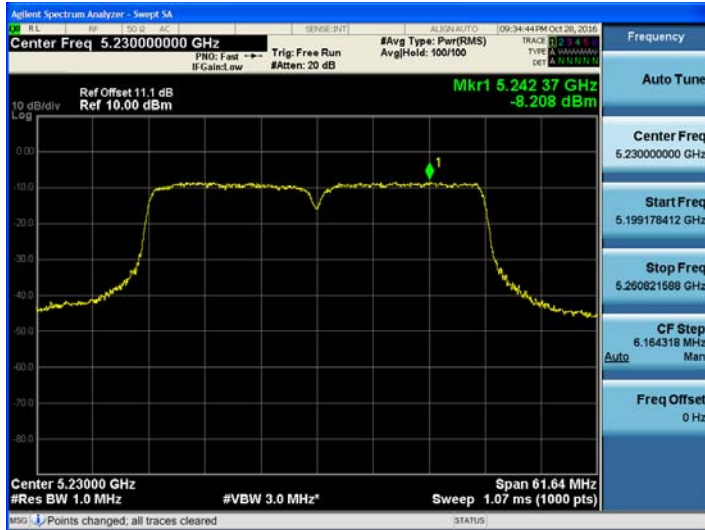
TEST RESULTS

Conducted Power Density Measurements

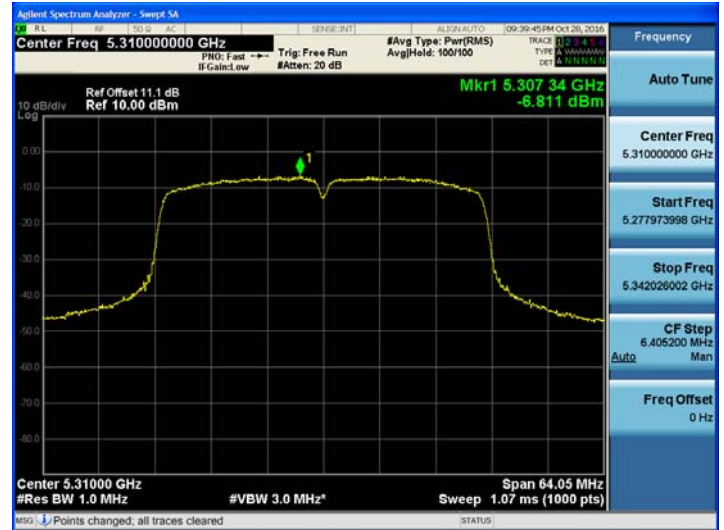
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11n _HT40	-8.762	1.945	-6.817	11	Pass
5230	46		-8.208	1.625	-6.583		Pass
5270	54		-8.026	1.625	-6.401		Pass
5310	62		-6.811	0.703	-6.108		Pass
5510	102		-10.089	2.068	-8.021		Pass
5550	110		-9.265	2.068	-7.197		Pass
5710	142		-9.411	1.625	-7.786		Pass
5755	151		-9.837	1.625	-8.212	30	Pass
5795	159		-9.655	0.703	-8.952		Pass

■ TEST Plot for 802.11n_HT40

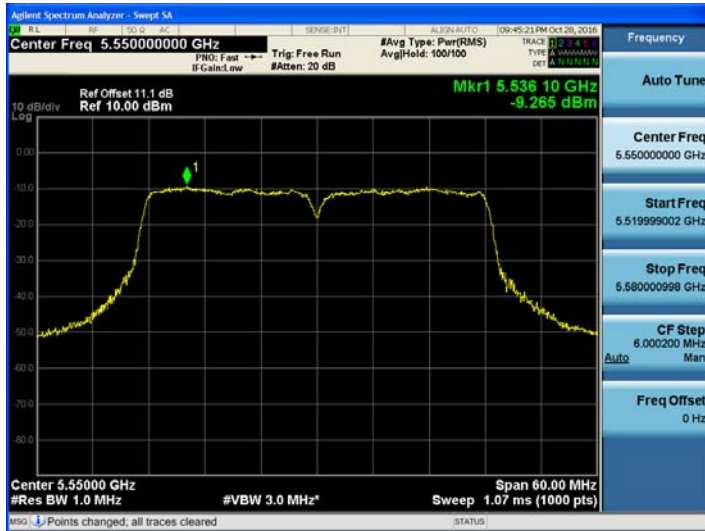
802.11n_HT40 UNII 1 BAND PSD CH 46



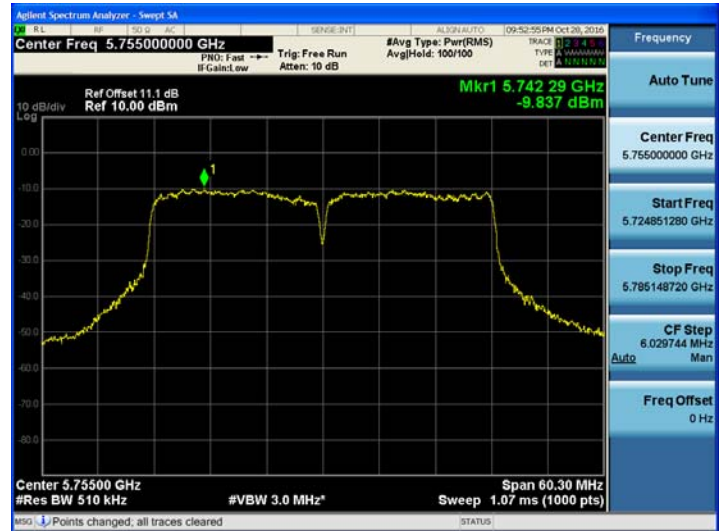
802.11n_HT40 UNII 2A BAND PSD CH 62



802.11n_HT40 UNII 2C BAND PSD CH 110



802.11n_HT40 UNII 3 BAND PSD CH 151



■ Straddle channels TEST RESULTS for 802.11a/n_HT20

Conducted Power Density Measurements (UNII 2C Band 5720MHz)

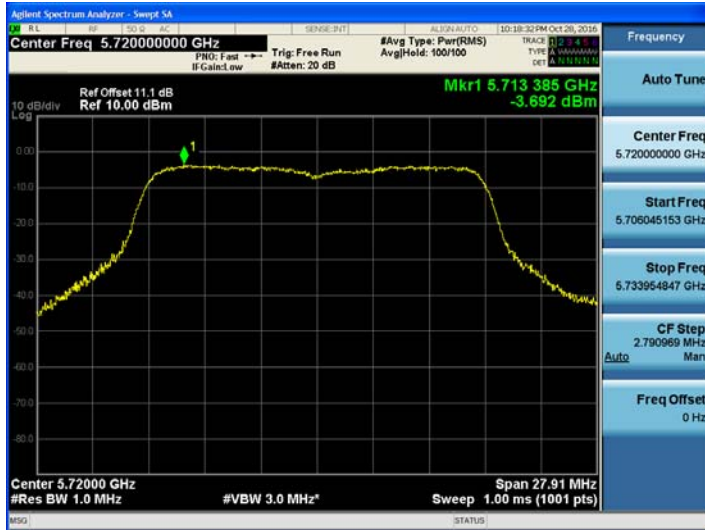
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	-3.692	1.184	-2.508	11	Pass
		802.11n	-4.437	1.298	-3.139		Pass

Conducted Power Density Measurements (UNII 3 Band 5720MHz)

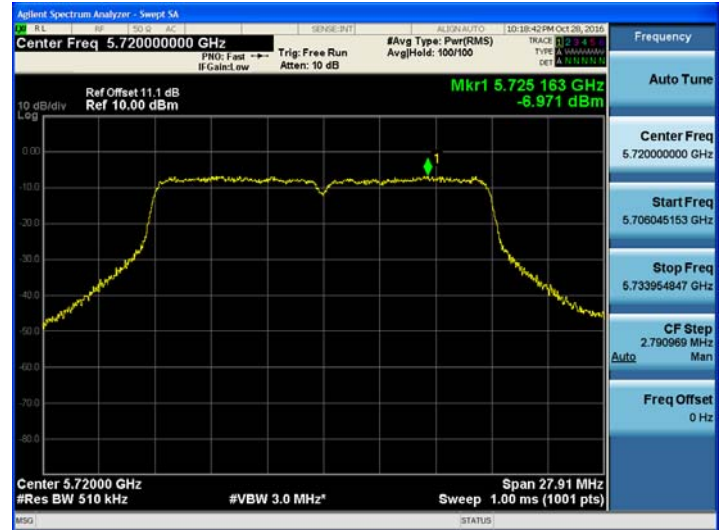
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	-6.971	1.184	-5.787	30	Pass
		802.11n	-7.457	1.298	-6.159		Pass

▣ Straddle channels TEST Plots for 802.11a/n_HT20

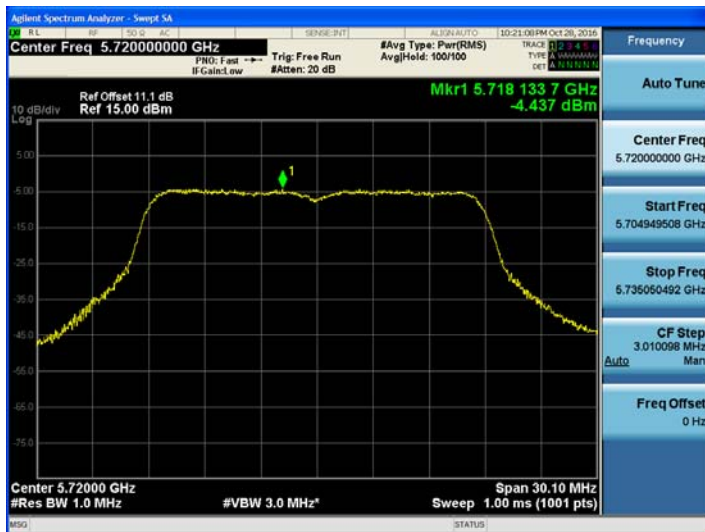
802.11a UNII 2C Band PSD CH.144



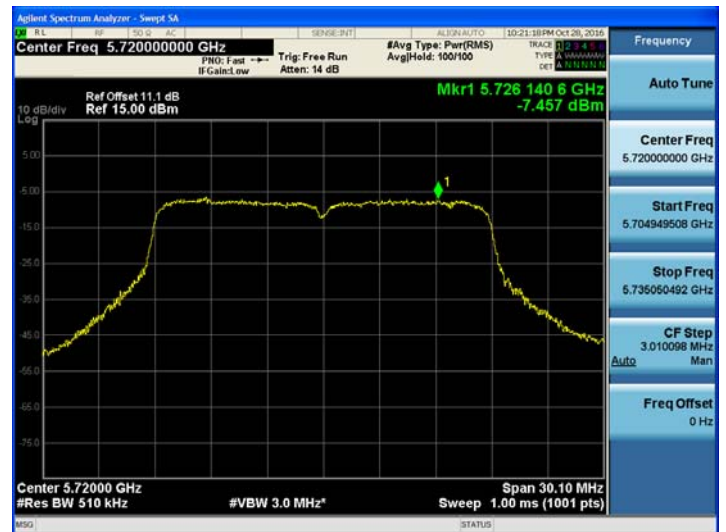
802.11a UNII 3 Band PSD CH.144



802.11n_HT20 UNII 2C Band PSD CH.144



802.11n_HT20 UNII 3 Band PSD CH.144



Straddle channels TEST RESULTS for 802.11n_HT40

Conducted Power Density Measurements (UNII 2C Band 5710MHz)

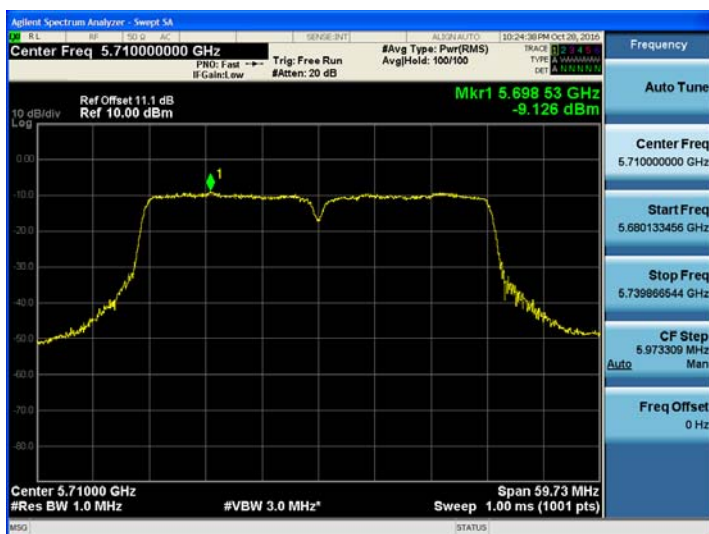
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-9.126	1.625	-7.501	11	Pass

Conducted Power Density Measurements (UNII 3 Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-12.756	1.625	-11.131	30	Pass

Straddle channels TEST Plots for 802.11n_HT40

802.11n_HT40 UNII 2C Band PSD CH.142



802.11n_HT40 UNII 3 Band PSD CH.142



9.6 FREQUENCY STABILITY

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

20 MHz BW

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.00	+20(Ref)	5179940.45	-59.55
100%		-30	5179929.50	-70.50
100%		-20	5179931.60	-68.40
100%		-10	5179937.00	-63.00
100%		0	5179938.50	-61.50
100%		+10	5179939.70	-60.30
100%		+30	5179942.08	-57.92
100%		+40	5179945.74	-54.26
100%		+50	5179946.15	-53.85
115%	13.80	+20	5179943.06	-56.94
Batt. Endpoint	10.20	+20	5179942.78	-57.22

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,260,000,000 Hz
 CHANNEL: 52
 REFERENCE VOLTAGE: 12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.00	+20(Ref)	5259937.18	-62.82
100%		-30	5259924.06	-75.94
100%		-20	5259927.49	-72.51
100%		-10	5259930.43	-69.57
100%		0	5259932.51	-67.49
100%		+10	5259935.62	-64.38
100%		+30	5259939.78	-60.22
100%		+40	5259941.81	-58.19
100%		+50	5259944.37	-55.63
115%	13.80	+20	5259940.54	-59.46
Batt. Endpoint	10.20	+20	5259939.66	-60.34

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,500,000,000 Hz
CHANNEL:	100
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.00	+20(Ref)	5499933.68	-66.32
100%		-30	5499919.38	-80.62
100%		-20	5499922.55	-77.45
100%		-10	5499926.71	-73.29
100%		0	5499928.49	-71.51
100%		+10	5499931.51	-68.49
100%		+30	5499936.78	-63.22
100%		+40	5499939.72	-60.28
100%		+50	5499941.05	-58.95
115%	13.80	+20	5499935.52	-64.48
Batt. Endpoint	10.20	+20	5499936.51	-63.49

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,745,000,000 Hz
CHANNEL:	149
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.00	+20(Ref)	5744930.55	-69.45
100%		-30	5744915.49	-84.51
100%		-20	5744919.74	-80.26
100%		-10	5744922.09	-77.91
100%		0	5744924.38	-75.62
100%		+10	5744926.67	-73.33
100%		+30	5744932.51	-67.49
100%		+40	5744935.75	-64.25
100%		+50	5744938.43	-61.57
115%	13.80	+20	5744931.55	-68.45
Batt. Endpoint	10.20	+20	5744929.88	-70.12

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

40 MHz BW

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,190,000,000 Hz
 CHANNEL: 38
 REFERENCE VOLTAGE: 12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12	+20(Ref)	5189937.77	-62.23
100%		-30	5189920.85	-79.15
100%		-20	5189923.49	-76.51
100%		-10	5189925.38	-74.62
100%		0	5189930.52	-69.48
100%		+10	5189933.75	-66.25
100%		+30	5189941.54	-58.46
100%		+40	5189945.26	-54.74
100%		+50	5189948.65	-51.35
115%	13.8	+20	5189939.42	-60.58
Batt. Endpoint	10.2	+20	5189938.83	-61.17

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,270,000,000 Hz
 CHANNEL: 54
 REFERENCE VOLTAGE: 12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12	+20(Ref)	5269935.44	-64.56
100%		-30	5269919.66	-80.34
100%		-20	5269922.06	-77.94
100%		-10	5269925.44	-74.56
100%		0	5269929.51	-70.49
100%		+10	5269931.48	-68.52
100%		+30	5269938.53	-61.47
100%		+40	5269942.14	-57.86
100%		+50	5269944.04	-55.96
115%	13.8	+20	5269936.75	-63.25
Batt. Endpoint	10.2	+20	5269935.81	-64.19

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,510,000,000 Hz
 CHANNEL: 102
 REFERENCE VOLTAGE: 12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12	+20(Ref)	5509932.28	-67.72
100%		-30	5509918.85	-81.15
100%		-20	5509922.15	-77.85
100%		-10	5509925.41	-74.59
100%		0	5509928.74	-71.26
100%		+10	5509931.56	-68.44
100%		+30	5509934.51	-65.49
100%		+40	5509938.82	-61.18
100%		+50	5509941.48	-58.52
115%	13.8	+20	5509933.52	-66.48
Batt. Endpoint	10.2	+20	5509931.59	-68.41

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,755,000,000 Hz
 CHANNEL: 151
 REFERENCE VOLTAGE: 12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12	+20(Ref)	5754929.88	-70.12
100%		-30	5754915.85	-84.15
100%		-20	5754918.36	-81.64
100%		-10	5754922.42	-77.58
100%		0	5754924.88	-75.12
100%		+10	5754928.48	-71.52
100%		+30	5754932.52	-67.48
100%		+40	5754934.72	-65.28
100%		+50	5754936.98	-63.02
115%	13.8	+20	5754932.92	-67.08
Batt. Endpoint	10.2	+20	5754930.49	-69.51

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

9.7 RADIATED MEASUREMENT**9.7.1 RADIATED SPURIOUS EMISSIONS.**

Test Requirements and limit, §15.205, §15.209, §15.407 / RSS-GEN(Issue 4) Section 8.9.

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

■ §15.407, KDB 789033 D02

All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBµV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dBµV/m.

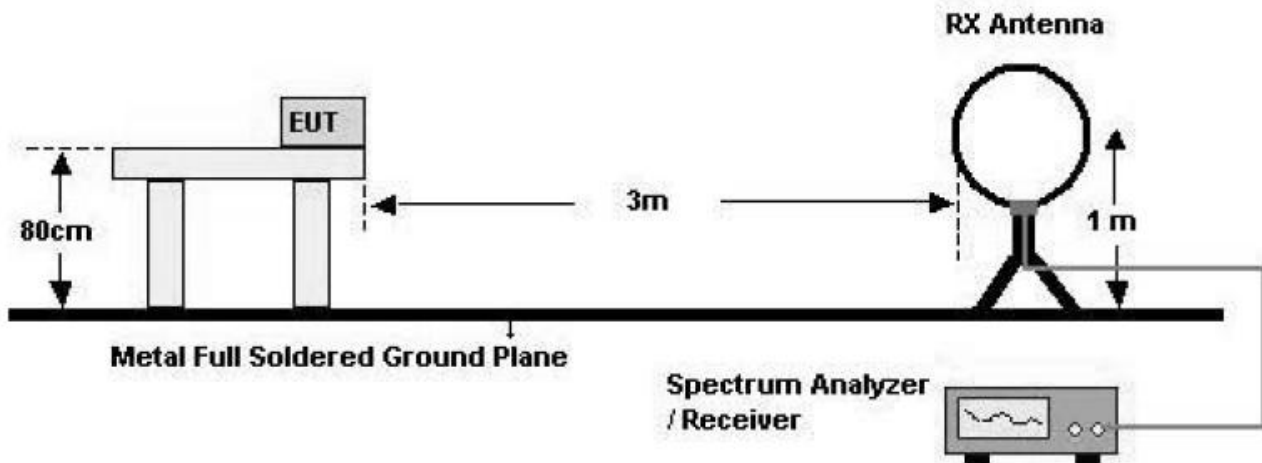
§15.407 (b)(4)(i)

(4) For transmitters operating in the 5.725-5.85 GHz band:

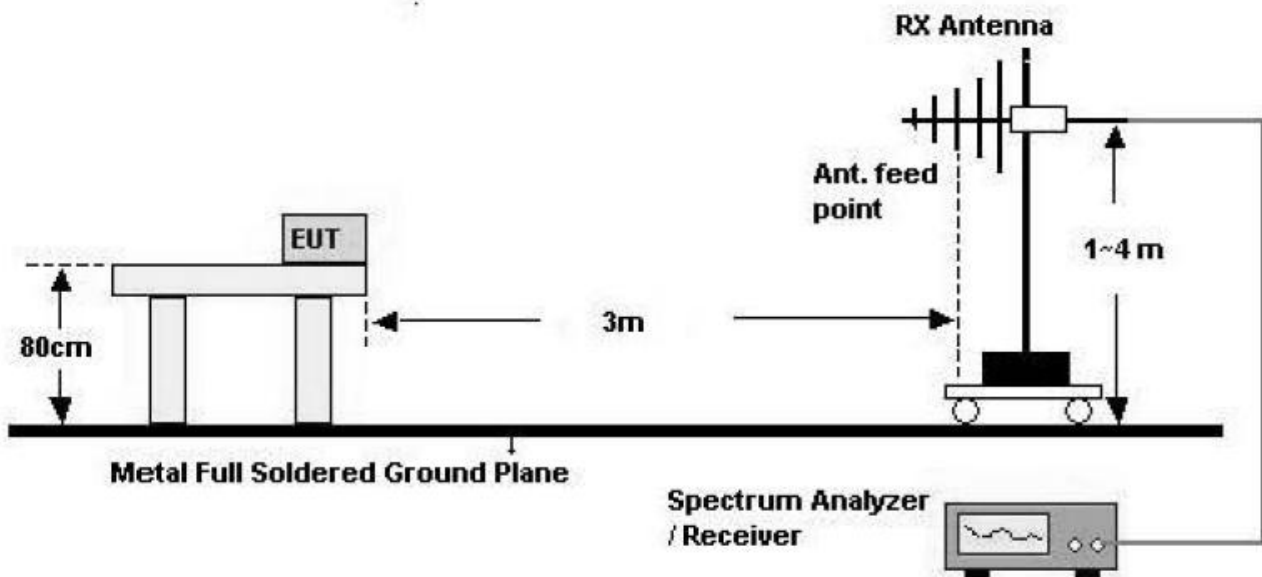
(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

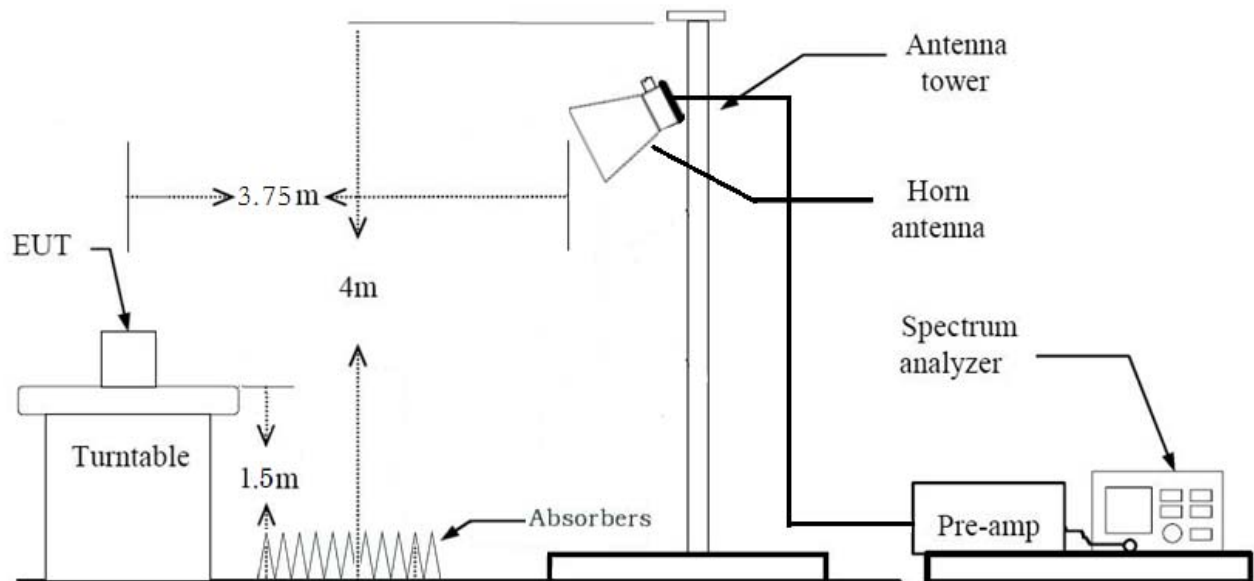
Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz**TEST PROCEDURE USED**

ANSI C63.10:2013

Method G)5) in KDB 789033 D02 v01r03 (Peak)

Method G)6)d) in KDB 789033 D02 v01r03 (Average)

. Spectrum setting:**- Peak.**

1. RBW = 1 MHz

2. VBW $\geq$ 3 MHz

3. Detector = Peak

4. Sweep Time = auto

5. Trace mode = max hold

6. Allow sweeps to continue until the trace stabilizes.

7. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle.

- Average (Method VB :Averaging using reduced video bandwidth)

1. RBW = 1 MHz

2. VBW

2.1. If the EUT is configured to transmit with duty cycle ≥ 98 percent, set $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.

2.2. If the EUT duty cycle is < 98 percent, set $VBW \geq 1/T$, where T is the minimum transmission duration.

3. The analyzer is set to linear detector mode.

4. Detector = Peak.

5. Sweep time = auto.

6. Trace mode = max hold.

7. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of $1/x$, where x is the duty cycle.

Note :

1. We used the Method VB for 802.11a/n_HT20,40 mode to perform the average filed strength measurements.

2. The actual setting value of VBW for 802.11a/n_HT20,40

3. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor (reference distance : 3 m).

4. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
a	6	2.063	2.149	95.96	485	1000
n_HT20	MCS 0	1.924	2.009	95.74	520	1000
n_HT40	MCS 0	0.949	1.035	91.75	1053	3000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
4. Limit line = specific Limits (dB μ V) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	$\text{dB}_{\mu\text{V}}$	dB /m	dB	(H/V)	$\text{dB}_{\mu\text{V/m}}$	$\text{dB}_{\mu\text{V/m}}$	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	64.01	0.31	V	64.32	68.20	3.88	PK
15540	49.91	0.63	V	50.54	73.98	23.44	PK
15540	36.14	0.63	V	36.77	53.98	17.21	AV
10360	57.56	0.31	H	57.87	68.20	10.33	PK
15540	49.73	0.63	H	50.36	73.98	23.62	PK
15540	35.85	0.63	H	36.48	53.98	17.50	AV

* A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	64.17	0.28	V	64.45	68.20	3.75	PK
15600	50.18	-0.93	V	49.25	73.98	24.73	PK
15600	35.41	-0.93	V	34.48	53.98	19.50	AV
10400	56.82	0.28	H	57.10	68.20	11.10	PK
15600	48.45	-0.93	H	47.52	73.98	26.46	PK
15600	34.79	-0.93	H	33.86	53.98	20.12	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	63.66	-0.68	V	62.98	68.20	5.22	PK
15720	48.96	-1.18	V	47.78	73.98	26.20	PK
15720	35.39	-1.18	V	34.21	53.98	19.77	AV
10480	57.20	-0.68	H	56.52	68.20	11.68	PK
15720	49.44	-1.18	H	48.26	73.98	25.72	PK
15720	35.84	-1.18	H	34.66	53.98	19.32	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	63.01	0.31	V	63.32	68.20	4.88	PK
15540	48.98	0.63	V	49.61	73.98	24.37	PK
15540	36.04	0.63	V	36.67	53.98	17.31	AV
10360	58.03	0.31	H	58.34	68.20	9.86	PK
15540	49.15	0.63	H	49.78	73.98	24.20	PK
15540	36.29	0.63	H	36.92	53.98	17.06	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	64.53	0.28	V	64.81	68.20	3.39	PK
15600	49.03	-0.93	V	48.10	73.98	25.88	PK
15600	35.29	-0.93	V	34.36	53.98	19.62	AV
10400	56.10	0.28	H	56.38	68.20	11.82	PK
15600	49.08	-0.93	H	48.15	73.98	25.83	PK
15600	34.92	-0.93	H	33.99	53.98	19.99	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	63.11	-0.68	V	62.43	68.20	5.77	PK
15720	49.71	-1.18	V	48.53	73.98	25.45	PK
15720	36.13	-1.18	V	34.95	53.98	19.03	AV
10480	57.12	-0.68	H	56.44	68.20	11.76	PK
15720	49.90	-1.18	H	48.72	73.98	25.26	PK
15720	35.86	-1.18	H	34.68	53.98	19.30	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10380	57.09	0.42	V	57.51	68.20	10.69	PK
15570	49.61	-0.68	V	48.93	73.98	25.05	PK
15570	36.58	-0.68	V	35.90	53.98	18.08	AV
10380	54.21	0.42	H	54.63	68.20	13.57	PK
15570	49.36	-0.68	H	48.68	73.98	25.30	PK
15570	36.48	-0.68	H	35.80	53.98	18.18	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5230 MHz
Channel No.	46 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10460	57.71	0.00	V	57.71	68.20	10.49	PK
15690	49.92	0.38	V	50.30	73.98	23.68	PK
15690	37.06	0.38	V	37.44	53.98	16.54	AV
10460	53.22	0.00	H	53.22	68.20	14.98	PK
15690	49.58	0.38	H	49.96	73.98	24.02	PK
15690	36.72	0.38	H	37.10	53.98	16.88	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	64.60	-1.25	V	63.35	68.20	4.85	PK
15780	47.96	-0.77	V	47.19	73.98	26.79	PK
15780	34.12	-0.77	V	33.35	53.98	20.63	AV
10520	60.02	-1.25	H	58.77	68.20	9.43	PK
15780	48.58	-0.77	H	47.81	73.98	26.17	PK
15780	34.13	-0.77	H	33.36	53.98	20.62	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	61.14	-1.25	V	59.89	73.98	14.09	PK
10600	48.39	-1.25	V	47.14	53.98	6.84	AV
15900	49.05	-0.90	V	48.15	73.98	25.83	PK
15900	35.94	-0.90	V	35.04	53.98	18.94	AV
10600	58.12	-1.25	H	56.87	73.98	17.11	PK
10600	45.45	-1.25	H	44.20	53.98	9.78	AV
15900	48.86	-0.90	H	47.96	73.98	26.02	PK
15900	35.44	-0.90	H	34.54	53.98	19.44	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	61.14	-1.10	V	60.04	73.98	13.94	PK
10640	48.75	-1.10	V	47.65	53.98	6.33	AV
15960	48.71	-1.45	V	47.26	73.98	26.72	PK
15960	34.87	-1.45	V	33.42	53.98	20.56	AV
10640	59.21	-1.10	H	58.11	73.98	15.87	PK
10640	46.04	-1.10	H	44.94	53.98	9.04	AV
15960	48.61	-1.45	H	47.16	73.98	26.82	PK
15960	34.82	-1.45	H	33.37	53.98	20.61	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	64.76	-1.25	V	63.51	68.20	4.69	PK
15780	48.08	-0.77	V	47.31	73.98	26.67	PK
15780	34.12	-0.77	V	33.35	53.98	20.63	AV
10520	59.95	-1.25	H	58.70	68.20	9.50	PK
15780	48.08	-0.77	H	47.31	73.98	26.67	PK
15780	34.20	-0.77	H	33.43	53.98	20.55	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	61.74	-1.25	V	60.49	73.98	13.49	PK
10600	48.11	-1.25	V	46.86	53.98	7.12	AV
15900	49.35	-0.90	V	48.45	73.98	25.53	PK
15900	35.72	-0.90	V	34.82	53.98	19.16	AV
10600	58.98	-1.25	H	57.73	73.98	16.25	PK
10600	45.17	-1.25	H	43.92	53.98	10.06	AV
15900	49.80	-0.90	H	48.90	73.98	25.08	PK
15900	35.83	-0.90	H	34.93	53.98	19.05	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	62.00	-1.10	V	60.90	73.98	13.08	PK
10640	48.85	-1.10	V	47.75	53.98	6.23	AV
15960	48.56	-1.45	V	47.11	73.98	26.87	PK
15960	34.75	-1.45	V	33.30	53.98	20.68	AV
10640	59.48	-1.10	H	58.38	73.98	15.60	PK
10640	45.95	-1.10	H	44.85	53.98	9.13	AV
15960	48.20	-1.45	H	46.75	73.98	27.23	PK
15960	34.96	-1.45	H	33.51	53.98	20.47	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)

Band :	UNII 2A
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5270 MHz
Channel No.	54 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10540	58.68	-1.48	V	57.20	68.20	11.00	PK
15810	48.36	-0.78	V	47.58	73.98	26.40	PK
15810	34.96	-0.78	V	34.18	53.98	19.80	AV
10540	56.56	-1.48	H	55.08	68.20	13.12	PK
15810	48.32	-0.78	H	47.54	73.98	26.44	PK
15810	34.98	-0.78	H	34.20	53.98	19.78	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2A
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10620	57.57	-1.29	V	56.28	73.98	17.70	PK
10620	45.51	-1.29	V	44.22	53.98	9.76	AV
15930	48.88	-1.19	V	47.69	73.98	26.29	PK
15930	36.60	-1.19	V	35.41	53.98	18.57	AV
10620	56.20	-1.29	H	54.91	73.98	19.07	PK
10620	43.51	-1.29	H	42.22	53.98	11.76	AV
15930	48.45	-1.19	H	47.26	73.98	26.72	PK
15930	35.56	-1.19	H	34.37	53.98	19.61	AV

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	54.02	-0.08	V	53.94	73.98	20.04	PK
11000	41.08	-0.08	V	41.00	53.98	12.98	AV
16500	48.59	1.48	V	50.07	68.20	18.13	PK
11000	52.56	-0.08	H	52.48	73.98	21.50	PK
11000	39.74	-0.08	H	39.66	53.98	14.32	AV
16500	49.02	1.48	H	50.50	68.20	17.70	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5580 MHz
Channel No.	116 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11160	53.41	-0.31	V	53.10	73.98	20.88	PK
11160	40.34	-0.31	V	40.03	53.98	13.95	AV
16740	47.63	3.43	V	51.06	68.20	17.14	PK
11160	51.68	-0.31	H	51.37	73.98	22.61	PK
11160	39.54	-0.31	H	39.23	53.98	14.75	AV
16740	47.59	3.43	H	51.02	68.20	17.18	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5720 MHz
Channel No.	144 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11440	56.40	1.18	V	57.58	73.98	16.40	PK
11440	43.95	1.18	V	45.13	53.98	8.85	AV
17160	48.49	7.01	V	55.50	68.20	12.70	PK
11440	55.82	1.18	H	57.00	73.98	16.98	PK
11440	42.68	1.18	H	43.86	53.98	10.12	AV
17160	48.66	7.01	H	55.67	68.20	12.53	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	54.76	-0.08	V	54.68	73.98	19.30	PK
11000	40.63	-0.08	V	40.55	53.98	13.43	AV
16500	48.84	1.48	V	50.32	68.20	17.88	PK
11000	52.32	-0.08	H	52.24	73.98	21.74	PK
11000	39.71	-0.08	H	39.63	53.98	14.35	AV
16500	48.90	1.48	H	50.38	68.20	17.82	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5580 MHz
Channel No.	116 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11160	53.04	-0.31	V	52.73	73.98	21.25	PK
11160	40.10	-0.31	V	39.79	53.98	14.19	AV
16740	47.94	3.43	V	51.37	68.20	16.83	PK
11160	51.55	-0.31	H	51.24	73.98	22.74	PK
11160	39.12	-0.31	H	38.81	53.98	15.17	AV
16740	47.79	3.43	H	51.22	68.20	16.98	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5720 MHz
Channel No.	144 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11440	56.21	1.18	V	57.39	73.98	16.59	PK
11440	43.70	1.18	V	44.88	53.98	9.10	AV
17160	48.62	7.01	V	55.63	68.20	12.57	PK
11440	56.01	1.18	H	57.19	73.98	16.79	PK
11440	42.95	1.18	H	44.13	53.98	9.85	AV
17160	48.83	7.01	H	55.84	68.20	12.36	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11020	51.11	-0.23	V	50.88	73.98	23.10	PK
11020	39.83	-0.23	V	39.60	53.98	14.38	AV
16530	49.00	0.72	V	49.72	68.20	18.48	PK
11020	50.68	-0.23	H	50.45	73.98	23.53	PK
11020	39.25	-0.23	H	39.02	53.98	14.96	AV
16530	49.71	0.72	H	50.43	68.20	17.77	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5550 MHz
Channel No.	110 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11100	52.10	-0.58	V	51.52	73.98	22.46	PK
11100	39.56	-0.58	V	38.98	53.98	15.00	AV
16650	49.06	2.05	V	51.11	68.20	17.09	PK
11100	51.20	-0.58	H	50.62	73.98	23.36	PK
11100	39.20	-0.58	H	38.62	53.98	15.36	AV
16650	49.38	2.05	H	51.43	68.20	16.77	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5710 MHz
Channel No.	142 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11420	55.10	0.68	V	55.78	73.98	18.20	PK
11420	42.97	0.68	V	43.65	53.98	10.33	AV
17130	48.98	4.19	V	53.17	68.20	15.03	PK
11420	54.30	0.68	H	54.98	73.98	19.00	PK
11420	42.85	0.68	H	43.53	53.98	10.45	AV
17130	49.46	4.19	H	53.65	68.20	14.55	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5745MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	58.11	0.32	V	58.43	73.98	15.55	PK
11490	44.54	0.32	V	44.86	53.98	9.12	AV
17235	49.26	5.06	V	54.32	68.20	13.88	PK
11490	58.84	0.32	H	59.16	73.98	14.82	PK
11490	44.94	0.32	H	45.26	53.98	8.72	AV
17235	48.74	5.06	H	53.80	68.20	14.40	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	55.83	0.01	V	55.84	73.98	18.14	PK
11570	42.75	0.01	V	42.76	53.98	11.22	AV
17355	48.10	4.18	V	52.28	68.20	15.92	PK
11570	54.44	0.01	H	54.45	73.98	19.53	PK
11570	41.56	0.01	H	41.57	53.98	12.41	AV
17355	48.02	4.18	H	52.20	68.20	16.00	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	54.88	-0.57	V	54.31	73.98	19.67	PK
11650	42.69	-0.57	V	42.12	53.98	11.86	AV
17475	48.97	4.04	V	53.01	68.20	15.19	PK
11650	55.80	-0.57	H	55.23	73.98	18.75	PK
11650	44.09	-0.57	H	43.52	53.98	10.46	AV
17475	49.51	4.04	H	53.55	68.20	14.65	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	58.20	0.32	V	58.52	73.98	15.46	PK
11490	43.63	0.32	V	43.95	53.98	10.03	AV
17235	48.61	5.06	V	53.67	68.20	14.53	PK
11490	59.33	0.32	H	59.65	73.98	14.33	PK
11490	44.17	0.32	H	44.49	53.98	9.49	AV
17235	48.73	5.06	H	53.79	68.20	14.41	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	55.62	0.01	V	55.63	73.98	18.35	PK
11570	42.39	0.01	V	42.40	53.98	11.58	AV
17355	49.08	4.18	V	53.26	68.20	14.94	PK
11570	54.38	0.01	H	54.39	73.98	19.59	PK
11570	41.38	0.01	H	41.39	53.98	12.59	AV
17355	48.00	4.18	H	52.18	68.20	16.02	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	55.29	-0.57	V	54.72	73.98	19.26	PK
11650	42.35	-0.57	V	41.78	53.98	12.20	AV
17475	49.81	4.04	V	53.85	68.20	14.35	PK
11650	55.69	-0.57	H	55.12	73.98	18.86	PK
11650	44.11	-0.57	H	43.54	53.98	10.44	AV
17475	49.18	4.04	H	53.22	68.20	14.98	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT20. Worst case is MCS 0 in 802.11n_HT20.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11510	51.85	0.27	V	52.12	73.98	21.86	PK
11510	39.91	0.27	V	40.18	53.98	13.80	AV
17265	49.02	4.21	V	53.23	68.20	14.97	PK
11510	52.20	0.27	H	52.47	73.98	21.51	PK
11510	39.66	0.27	H	39.93	53.98	14.05	AV
17265	49.20	4.21	H	53.41	68.20	14.79	PK

*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Band :	UNII 3
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp. G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	51.05	-0.34	V	50.71	73.98	23.27	PK
11590	39.70	-0.34	V	39.36	53.98	14.62	AV
17385	48.19	4.36	V	52.55	68.20	15.65	PK
11590	51.25	-0.34	H	50.91	73.98	23.07	PK
11590	39.31	-0.34	H	38.97	53.98	15.01	AV
17385	48.41	4.36	H	52.77	68.20	15.43	PK

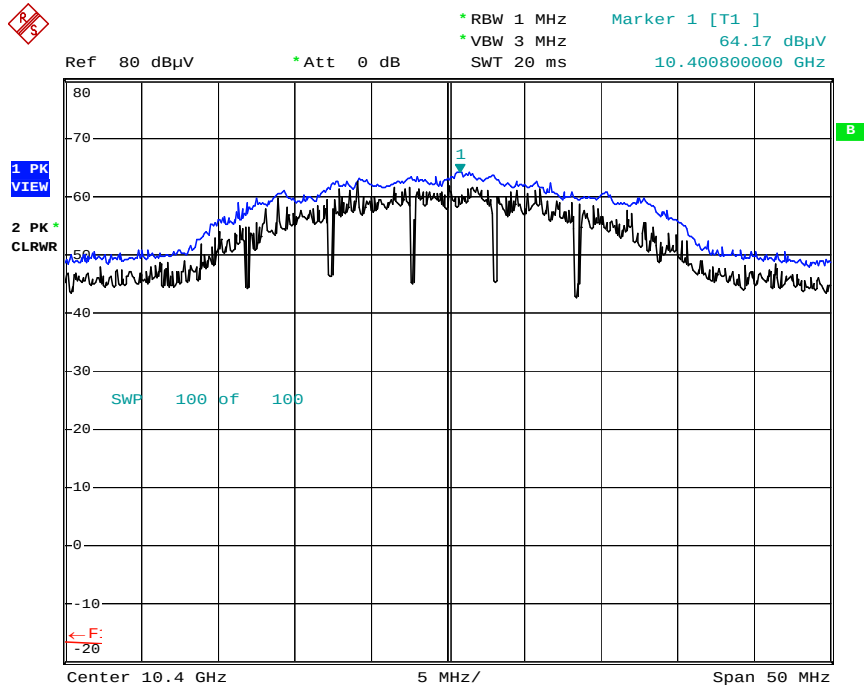
*A.G.: Ant. Gain / C.L.: Cable Loss / Amp. G: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
5. We have done all data rate in 802.11n_HT40. Worst case is MCS 0 in 802.11n_HT40.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

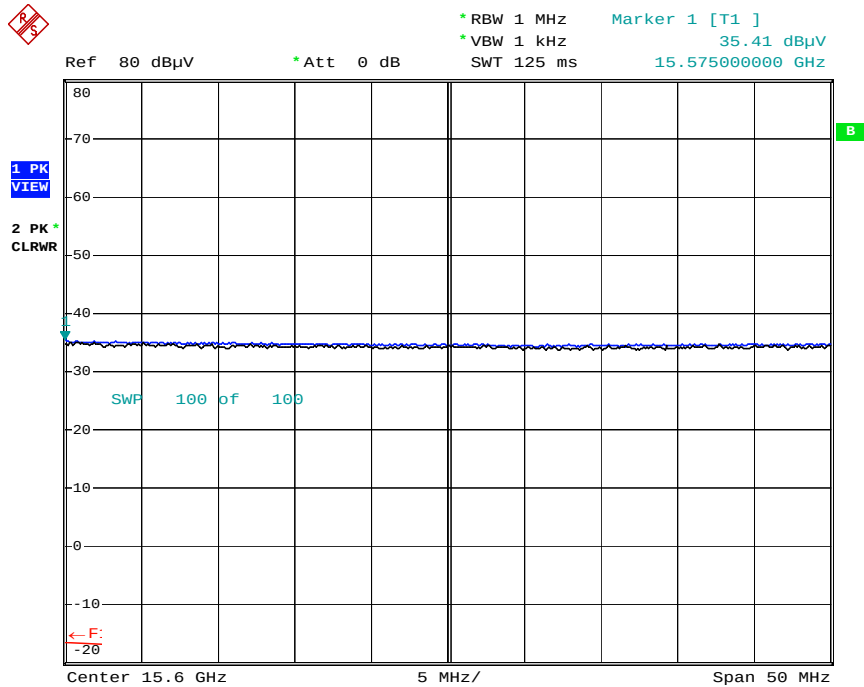
■ RESULT PLOTS (Y-V)

Radiated Spurious Emissions plot – Peak Reading (802.11a, Ch.40 2nd Harmonic)



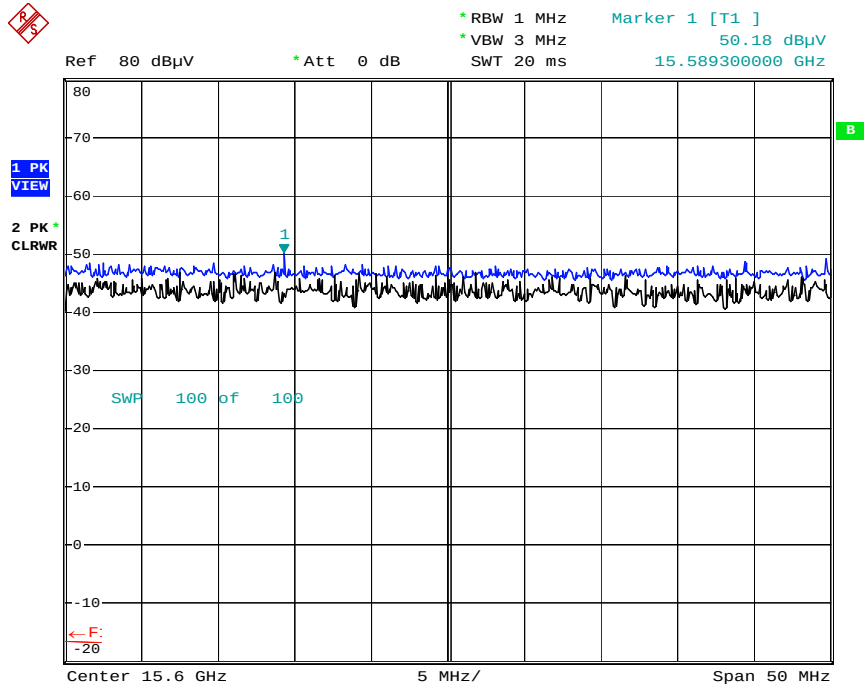
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Radiated Spurious Emissions plot – Average Reading (802.11a, Ch.40 3rd Harmonic)



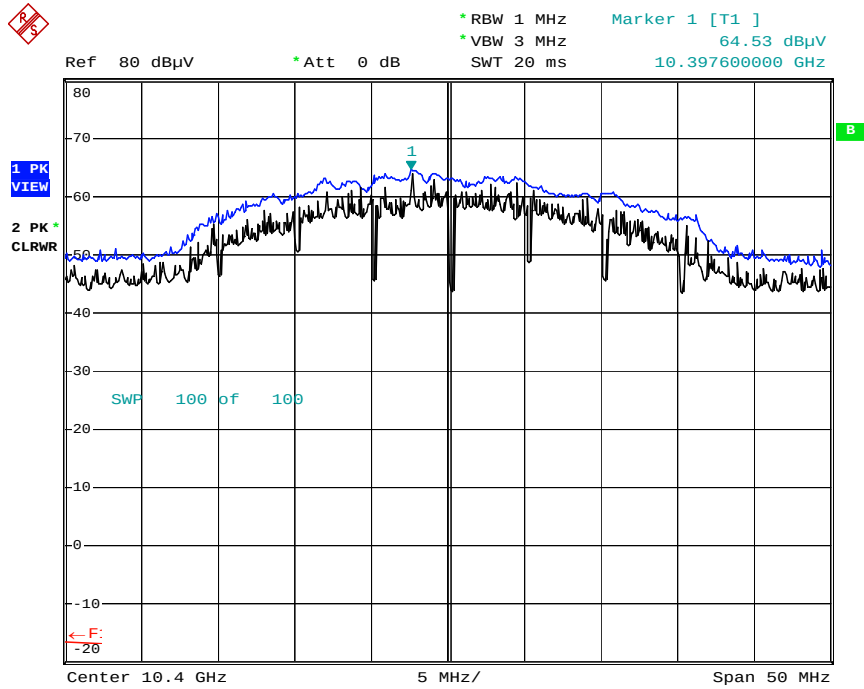
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Radiated Spurious Emissions plot – Peak Reading (802.11a, Ch.40 3rd Harmonic)



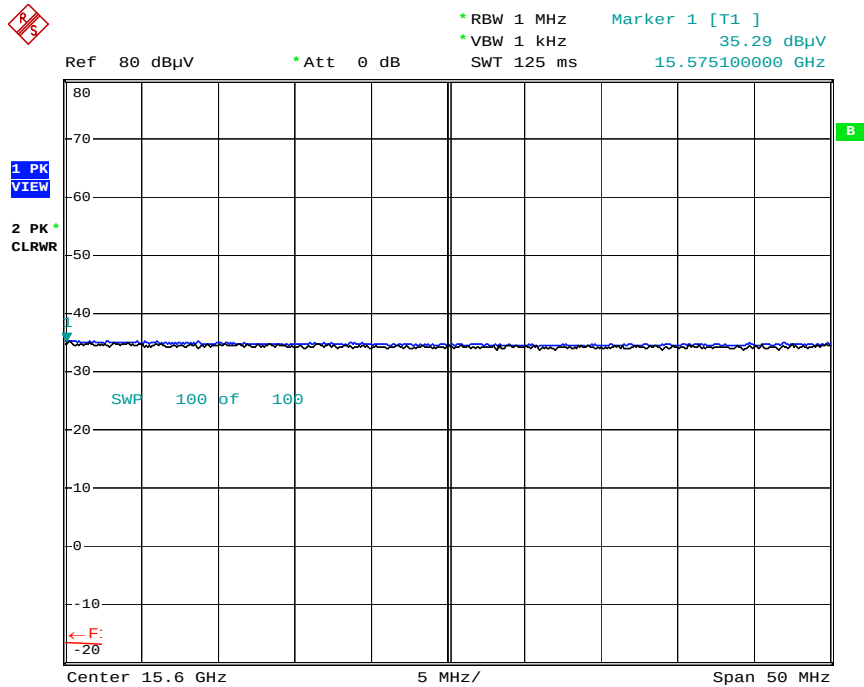
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Radiated Spurious Emissions plot – Peak Reading (802.11n_HT20, Ch.40 2nd Harmonic)



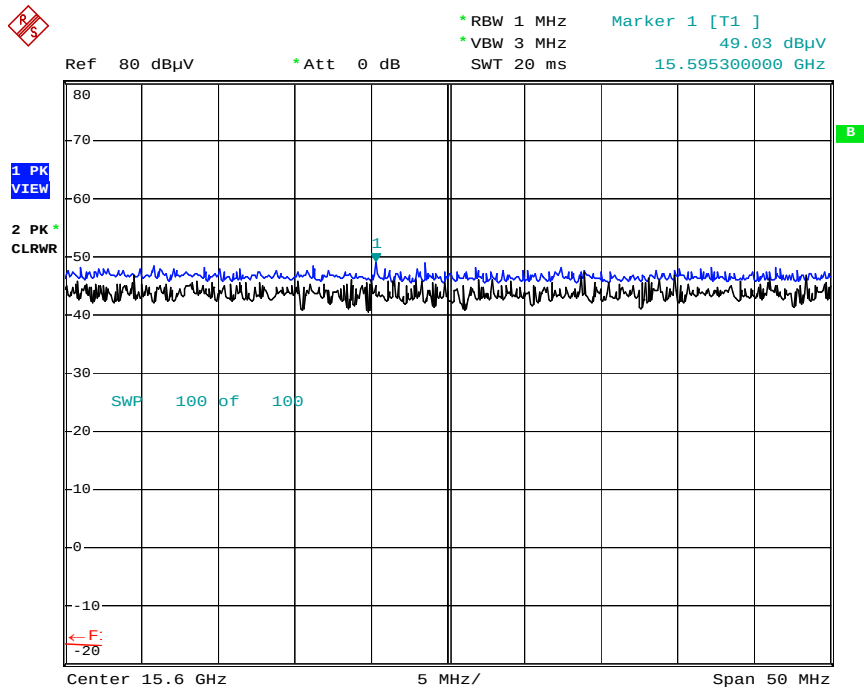
Date: 27.OCT.2016 08:22:25

Radiated Spurious Emissions plot – Average Reading (802.11n_HT20, Ch.40 3rd Harmonic)



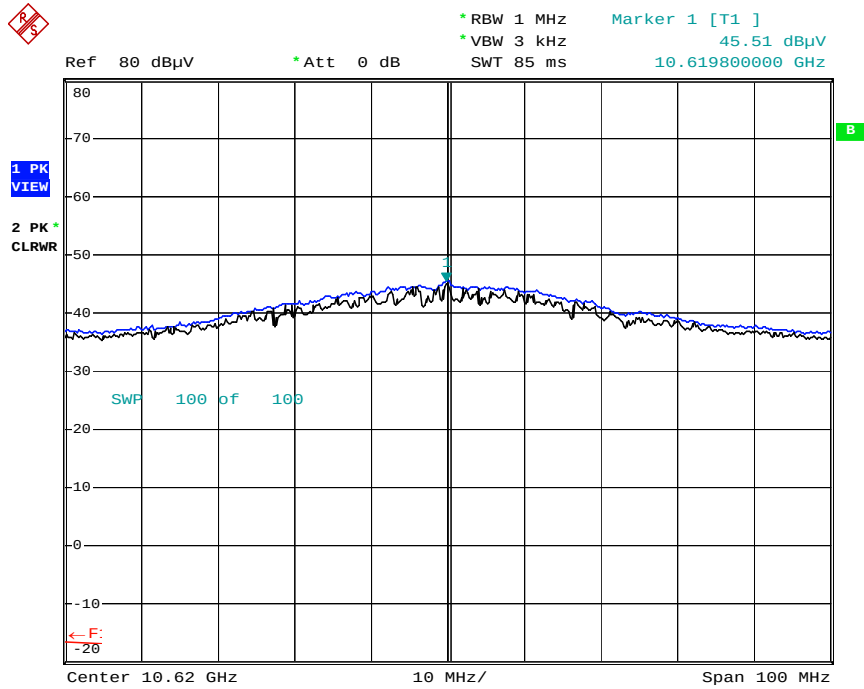
Date: 27.OCT.2016 08:23:28

Radiated Spurious Emissions plot – Peak Reading (802.11n_HT20, Ch.40 3rd Harmonic)



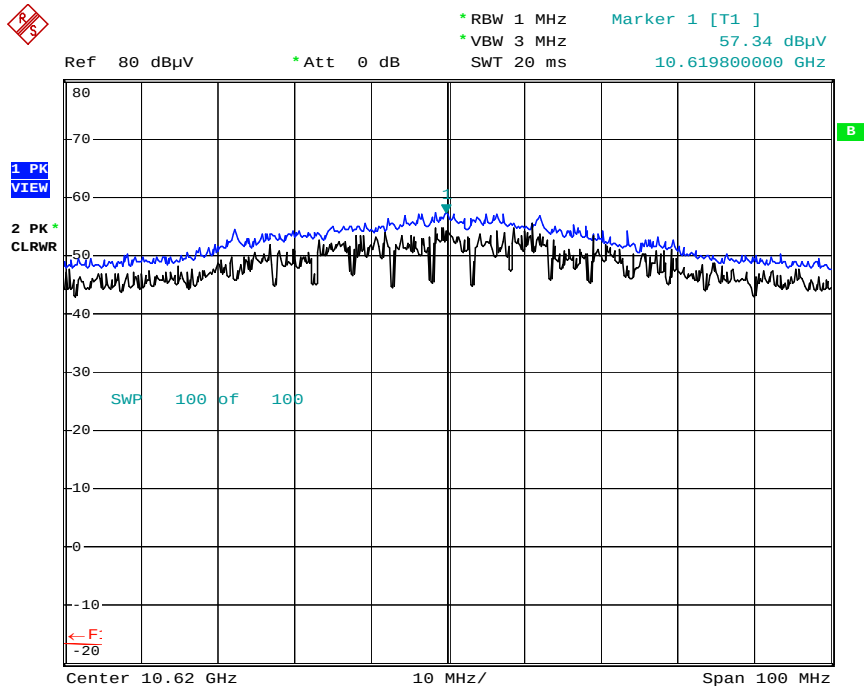
Date: 27.OCT.2016 08:22:52

Radiated Spurious Emissions plot – Average Reading (802.11n_HT40, Ch.62 2nd Harmonic)



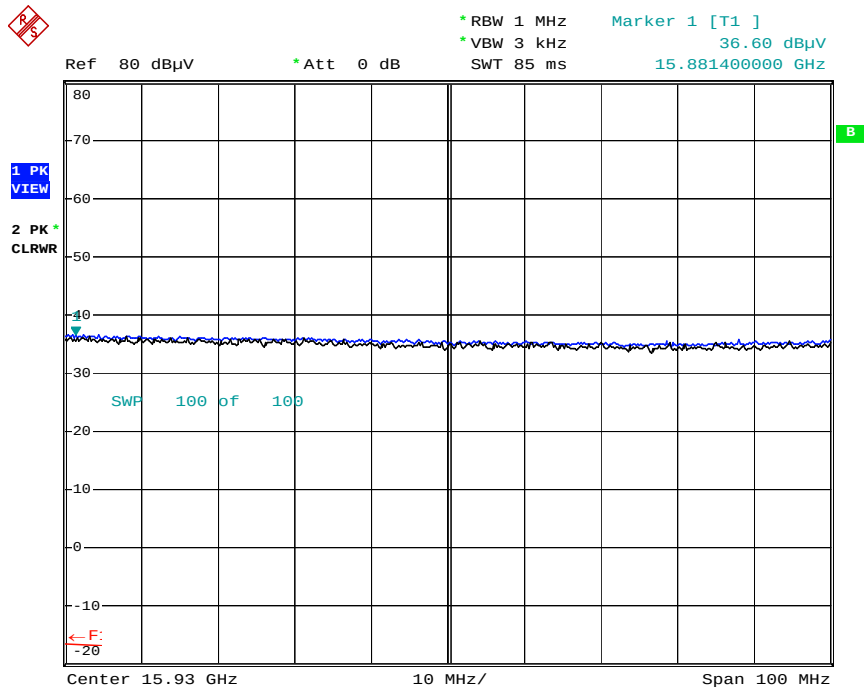
Date: 27.OCT.2016 08:58:23

Radiated Spurious Emissions plot – Peak Reading (802.11n_HT40, Ch.62 2nd Harmonic)



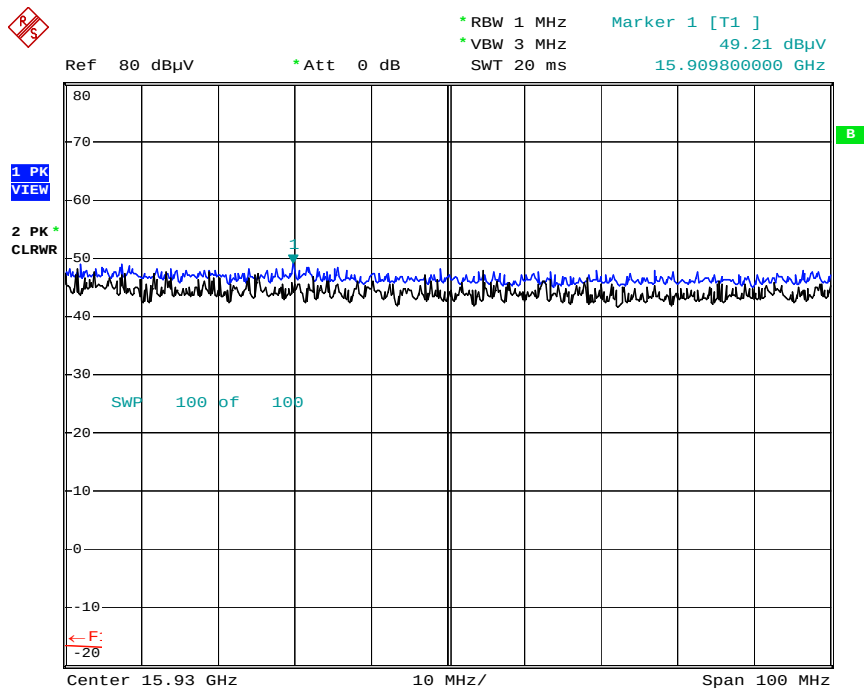
Date: 27.OCT.2016 08:59:20

Radiated Spurious Emissions plot – Average Reading (802.11n_HT40, Ch.62 3rd Harmonic)



Date: 27.OCT.2016 09:00:42

Radiated Spurious Emissions plot – Peak Reading (802.11n_HT40, Ch.62 3rd Harmonic)



Date: 27.OCT.2016 08:59:47

9.7.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

Test Requirements and limit, §15.407, §15.205, §15.209 / RSS-GEN(Issue 4) Section 8.10

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	70.35	-3.11	H	67.24	73.98	6.74	PK
5150	47.41	-3.11	H	44.3	53.98	9.68	AV
5150	69.61	-3.11	V	66.5	73.98	7.48	PK
5150	47.07	-3.11	V	43.96	53.98	10.02	AV

Band : UNII 1
 Operation Mode: 802.11 n_HT20
 Transfer MCS Index: 0
 Operating Frequency 5180 MHz
 Channel No. 36 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	70.94	-3.11	H	67.83	73.98	6.15	PK
5150	48.13	-3.11	H	45.02	53.98	8.96	AV
5150	69.18	-3.11	V	66.07	73.98	7.91	PK
5150	46.71	-3.11	V	43.6	53.98	10.38	AV

Band : UNII 1
 Operation Mode: 802.11 n_HT40
 Transfer MCS Index: 0
 Operating Frequency 5190 MHz
 Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	65.24	-3.11	H	62.13	73.98	11.85	PK
5150	51.62	-3.11	H	48.51	53.98	5.47	AV
5150	65.15	-3.11	V	62.04	73.98	11.94	PK
5150	51.05	-3.11	V	47.94	53.98	6.04	AV

Band : UNII 2A
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5320 MHz

Channel No.

64 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	70.50	-2.86	H	67.64	73.98	6.34	PK
5350	44.82	-2.86	H	41.96	53.98	12.02	AV
5350	69.94	-2.86	V	67.08	73.98	6.90	PK
5350	44.27	-2.86	V	41.41	53.98	12.57	AV

Band : UNII 2A
 Operation Mode: 802.11 n_HT20
 Transfer MCS Index: 0
 Operating Frequency 5320 MHz
 Channel No. 64 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	69.91	-2.86	H	67.05	73.98	6.93	PK
5350	44.35	-2.86	H	41.49	53.98	12.49	AV
5350	70.26	-2.86	V	67.4	73.98	6.58	PK
5350	44.23	-2.86	V	41.37	53.98	12.61	AV

Band : UNII 2A
 Operation Mode: 802.11 n_HT40
 Transfer MCS Index: 0
 Operating Frequency 5310 MHz
 Channel No. 62 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	68.29	-2.86	H	65.43	73.98	8.55	PK
5350	48.78	-2.86	H	45.92	53.98	8.06	AV
5350	67.66	-2.86	V	64.8	73.98	9.18	PK
5350	49.35	-2.86	V	46.49	53.98	7.49	AV

Band : UNII 2C
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps

Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	58.78	-2.20	H	56.58	73.98	17.40	PK
5460	41.84	-2.20	H	39.64	53.98	14.34	AV
5470	63.97	-2.10	H	61.87	68.20	6.33	PK
5460	60.00	-2.20	V	57.8	73.98	16.18	PK
5460	41.99	-2.20	V	39.79	53.98	14.19	AV
5470	64.51	-2.10	V	62.41	68.20	5.79	PK

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	58.71	-2.20	H	56.51	73.98	17.47	PK
5460	41.88	-2.20	H	39.68	53.98	14.30	AV
5470	64.08	-2.10	H	61.98	68.20	6.22	PK
5460	59.12	-2.20	V	56.92	73.98	17.06	PK
5460	41.90	-2.20	V	39.7	53.98	14.28	AV
5470	64.33	-2.10	V	62.23	68.20	5.97	PK

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	61.49	-2.20	H	59.29	73.98	14.69	PK
5460	42.74	-2.20	H	40.54	53.98	13.44	AV
5470	65.63	-2.10	H	63.53	68.20	4.67	PK
5460	60.86	-2.20	V	58.66	73.98	15.32	PK
5460	43.05	-2.20	V	40.85	53.98	13.13	AV
5470	66.25	-2.10	V	64.15	68.20	4.05	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	69.22	-1.48	H	67.74	78.20	10.46	PK
*5850	67.33	-1.48	V	65.85	78.20	12.35	PK
*5860	63.31	-1.46	H	61.85	68.20	6.35	PK
*5860	62.20	-1.46	V	60.74	68.20	7.46	PK

Band : UNII 3

Operation Mode: 802.11 n_HT20

Transfer MCS Index: 0

Operating Frequency 5825 MHz

Channel No. 165 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	67.05	-1.48	H	65.57	78.20	12.63	PK
*5850	68.62	-1.48	V	67.14	78.20	11.06	PK
*5860	61.72	-1.46	H	60.26	68.20	7.94	PK
*5860	63.12	-1.46	V	61.66	68.20	6.54	PK

Band : UNII 3

Operation Mode: 802.11 n_HT40

Transfer MCS Index: 0

Operating Frequency 5795 MHz

Channel No. 159 Ch

Frequency [MHz]	Reading dBuV	A.G.+C.L.-Amp.G.+ATT.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	62.40	-1.48	H	60.92	78.20	17.28	PK
*5850	61.18	-1.48	V	59.70	78.20	18.50	PK
*5860	58.72	-1.46	H	57.26	68.20	10.94	PK
*5860	57.30	-1.46	V	55.84	68.20	12.36	PK

- A.G.: Ant. Gain / C.L.: Cable Loss / Amp.G.: Amp. Gain / ATT.: Attenuator / D.F.: Distance Factor.

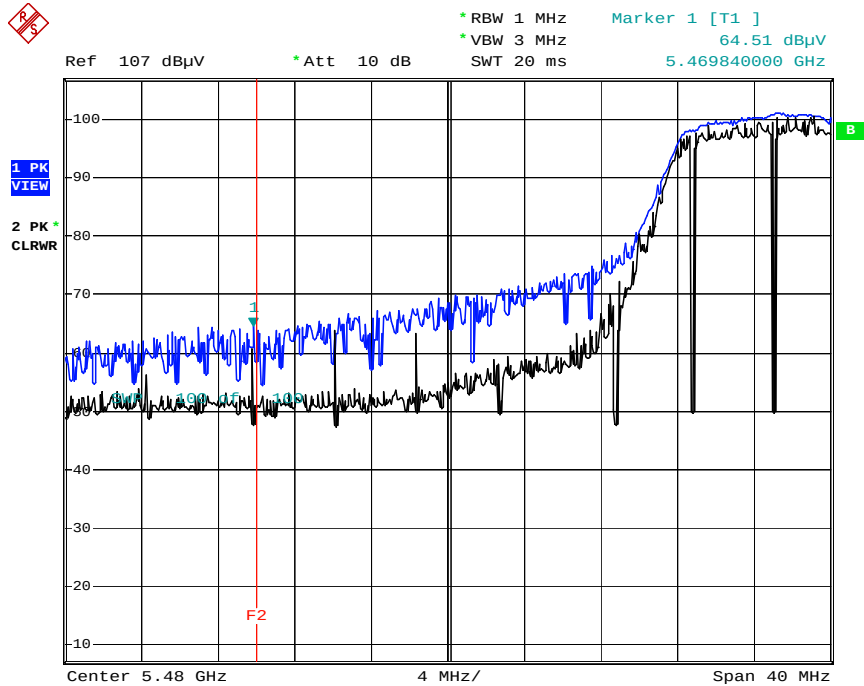
Notes:

1. Total = Reading Value + Antenna Gain + Cable Loss – Amp. Gain + ATT. + Distance Factor
2. We have done all data rate in 802.11a/n mode test. Worst case of EUT is lowest data rate in 802.11a/n.

3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. “*” is radiated band edge test frequency.(not restricted band emissions)

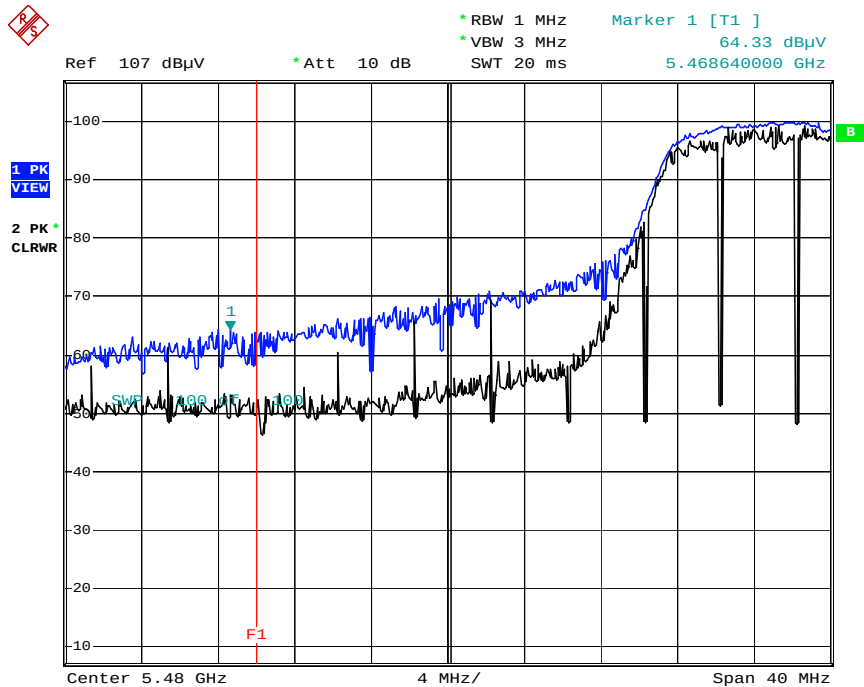
■ RESULT PLOTS (X-V)

Radiated Restricted Band Edges plot – Peak Reading (802.11a, Ch.100)



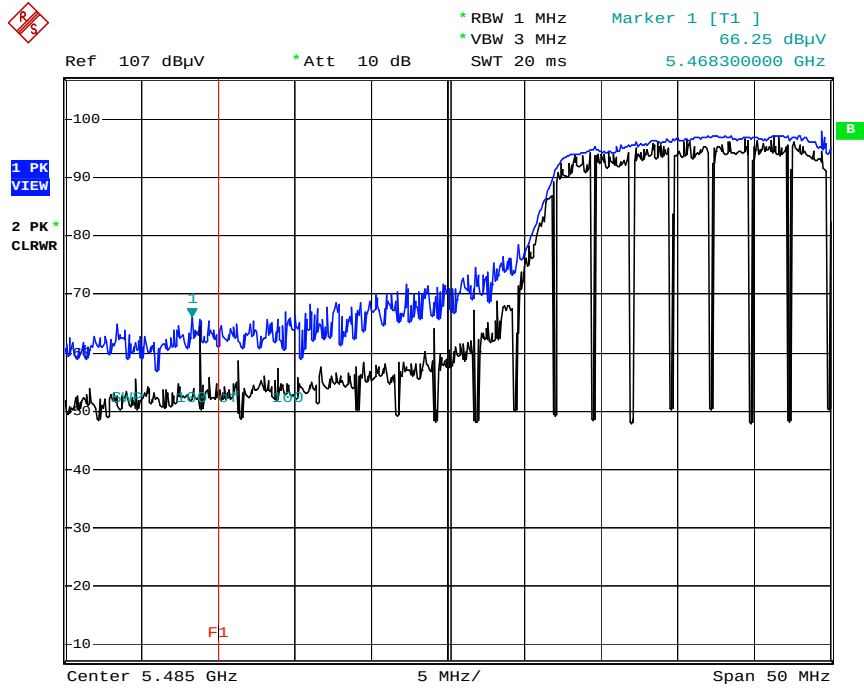
Date: 27.OCT.2016 04:30:45

Radiated Restricted Band Edges plot – Peak Reading (802.11n_HT20, Ch.100)



Date: 27.OCT.2016 04:43:24

Radiated Restricted Band Edges plot – Peak Reading (802.11n_HT40, Ch.102)



Date: 27.OCT.2016 07:26:59

9.7.3 RECEIVER SPURIOUS EMISSIONS

IC Rule(s) RSS-GEN
Test Requirements: Blow the table
Operating conditions: Under normal test conditions
Method of testing: Radiated

S/A. Settings: F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi Peak)
F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Peak)
Mode of operation: Receive

Frequency (MHz)	Field Strength (microvolts/m at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

Operation Mode: Receive:

30 MHz ~ 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Above 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

9.8 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207 / RSS-GEN(Issue 4) 8.8.

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

Note : We don't perform powerline conducted emission test. Because this EUT is used with vehicle.

10. LIST OF TEST EQUIPMENT

10.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/28/2015	Annual	100073
Rohde & Schwarz	ESCI / Test Receiver	12/28/2015	Annual	100584
Agilent	N9020A / Signal Analyzer	06/24/2016	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/24/2015	Annual	MY49431210
Agilent	N1911A / Power Meter	03/11/2016	Annual	MY45100523
Agilent	N1921A / Power Sensor	03/11/2016	Annual	MY52260025
Hewlett Packard	11667B / Power Splitter	06/14/2016	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	03/09/2016	Annual	KR75303962
Agilent	8493C / Attenuator(10 dB)	07/15/2016	Annual	07560

10.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	MA4000-EP / Antenna Position Tower	N/A	N/A	N/A
Innco system	CT0800 / Turn Table	N/A	N/A	N/A
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
ETS	2090 / Controller(Turn table)	N/A	N/A	1646
Rohde & Schwarz	Loop Antenna	02/23/2016	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/15/2015	Biennial	255
Schwarzbeck	BBHA 9120D / Horn Antenna	12/11/2015	Biennial	9120D-1191
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	09/03/2015	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	09/29/2016	Annual	836650/016
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2016	Annual	101068-SZ
Wainwright Instruments	WHKX10-2700-3000-18000-40SS / High Pass Filter	08/11/2016	Annual	4
Wainwright Instruments	WHKX8-6090-7000-18000-40SS / High Pass Filter	07/15/2016	Annual	5
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	07/06/2016	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/26/2016	Annual	2
H.P.	8491A / Attenuator(10 dB)	08/11/2016	Annual	18593
CERNEX	CBLU1183540 / Power Amplifier	02/01/2016	Annual	24614
CERNEX	CBL06185030 / Power Amplifier	02/01/2016	Annual	24615
CERNEX	CBL18265035 / Power Amplifier	07/11/2016	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	07/11/2016	Annual	25956