HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu Suwon-si,
Gyeonggi-do, 443-742 Rep. of Korea

Date of Issue:
June 20, 2014
Test Site/Location:
HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, Korea
Report No.: HCT-R-1406-F026-1
HCT FRN: 0005866421
IC Recognition No.: 5944A-3

FCC ID : A3LWEA412I
IC : 649E-WEA412I
APPLICANT : SAMSUNG Electronics Co., Ltd.

FCC/ IC Model(s): WEA412i

EUT Type: WLAN Access Point

Max RF Output Power

Antenna	Mode	Peak(dBm)	Average(dBm)
Ant.0	802.11b	26.86	20.75
	802.11g	25.84	18.21
	802.11n(2.4 GHz)	26.54	18.20
	802.11a	24.52	17.24
	802.11n(5.8 GHz) HT20	24.23	16.60
	802.11n(5.8 GHz) HT40	24.04	16.37
	802.11ac(5.8 GHz) VHT20	24.22	16.69
	802.11ac(5.8 GHz) VHT40	23.92	16.41
	802.11ac(5.8 GHz) VHT80	17.12	9.62
Ant.1	802.11g	25.08	17.42
	802.11n(2.4 GHz)	25.91	17.49
	802.11ª	24.32	16.91
	802.11n(5.8 GHz) HT20	23.96	16.36
	802.11n(5.8 GHz) HT40	23.61	15.88
	802.11ac(5.8 GHz) VHT20	23.99	16.38
	802.11ac(5.8 GHz) VHT40	23.52	15.92
	802.11ac(5.8 GHz) VHT80	16.74	9.16

Frequency Range: 2412 MHz - 2462 MHz (2.4 GHz Band)
5745 MHz - 5825 MHz (5.8 GHz Band)_20 MHz BW,
5755 MHz - 5795 MHz (5.8 GHz Band)_40 MHz BW
5775 MHz (5.8 GHz Band)_80 MHz BW

Modulation type CCK/DSSS/OFDM

FCC Classification: Digital Transmission System(DTS)

FCC Rule Part(s): Part 15.247

IC Rule : RSS-GEN Issue 3(December 2010), RSS-210 Issue 8(December 2010)

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 **: Jong Seok Lee** **Test engineer of RF Team**	**Approved by** **: Chang Seok Choi** **Manager of RF Team**

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1406-F026	June 18, 2014	- First Approval Report
HCT-R-1406-F026-1	June 20, 2014	- Updated the KDB version for 802.11ac

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1. GENERAL INFORMATION

Applicant:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Rep. of Korea
FCC ID:	A3LWEA412I
IC:	649E-WEA412I
EUT Type:	WLAN Access Point
FCC/ IC Model name(s):	WEA412i
Date(s) of Tests:	May 15, 2014 ~ June 14, 2014
Place of Tests:	HCT Co., Ltd. 74,Seoicheon-ro 578beon-gil,Majang-myeon, Icheon-si, Gyeonggi-do, Korea. (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	WLAN Access Point	
FCC/ IC Model Name	WEA412i	
Power Supply	AC adaptor : 100 V ~ 240 V, POE : DC 48 V	
Frequency Range	TX	: 2412 MHz~2462 MHz, 5745 MHz~5825 MHz_20 MHz, 5755 MHz~5795 MHz_40 MHz 5775 MHz_80 MHz
	RX	: 2412 MHz~2462 MHz, 5745 MHz~5825 MHz_20 MHz, 5755 MHz~5795 MHz_40 MHz 5775 MHz_80 MHz
Ant.0 Max. RF Output Power	Peak	Wi-Fi 802.11b (26.86 dBm) / Wi-Fi 802.11g (25.84 dBm)/ Wi-Fi 802.11n (2.4 GHz) (26.54 dBm) / Wi-Fi 802.11a (5.8 GHz) (24.52 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (24.23 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (24.04 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (24.22 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (23.92 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (17.12 dBm)
	Average	Wi-Fi 802.11b (20.75 dBm) / Wi-Fi 802.11g (18.21 dBm)/ Wi-Fi 802.11n (2.4 GHz) (18.20 dBm) / Wi-Fi 802.11a (5.8 GHz) (17.24 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (16.60 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (16.37 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (16.69 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (16.41 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (9.62 dBm)
Ant.1 Max. RF Output Power	Peak	Wi-Fi 802.11g (25.08 dBm)/ Wi-Fi 802.11n (2.4 GHz) (25.91 dBm) / Wi-Fi 802.11a (5.8 GHz) (24.32 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (23.96 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (23.61 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (23.99 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (23.52 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (16.74 dBm)
	Average	Wi-Fi 802.11g (17.42 dBm)/ Wi-Fi 802.11n (2.4 GHz) (17.49 dBm) / Wi-Fi 802.11a (5.8 GHz) (16.91 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (16.36 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (15.88 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (16.38 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (15.92 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (9.16 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11a, 802.11g, 802.11n, 802.11ac)	
Antenna Specification	Manufacturer: ACE Technologyacetechnology Antenna type: Internal Antenna Peak Gain : cf. Section 6	

2.1 EUT OPERATING MODE

▣ Operating mode

2.4 GHz Band

Mode	Operating Mode	Operating Ant.
802.11b/g/n	SISO	Ant 0
802.11g/n	SISO	Ant 1
802.11g/n	MIMO	Ant 0 & 1

5.8 GHz Band

Mode	Operating Mode	Operating Ant.
802.11a/n/ac	SISO	Ant 0
		Ant 1
	MIMO	Ant 0 & 1

Note :

1. This EUT is supported the AC adaptor and POE. Because worst case is AC adaptor, so we attached only the results for AC adaptor.
2. In case of radiation test, we have done all test case. Worst case is Ant 0 & 1 for 802.11a/g/n/ac. And in case of 802.11b, worst case is only Ant 0. So, we attached the results of only worst case.

3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v03r01 dated April 09, 2013 entitled “Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) Operating Under §15.247” were used in the measurement. For 802.11ac, KDB644545 D01 v01r02 dated October 31, 2013.

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 15.247 under the FCC Rules Part 15 Subpart C.

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 13.1.4.1 of ANSI C63.4. (Version :2003) 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. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 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 13.1.4.1 of ANSI C63.4. (Version: 2003)

Conducted Antenna Terminal

See Section from 9.1 to 9.2.(KDB 558074)

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.

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 :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated February 28, 2014 (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

According to FCC 47 CFR §15.203:

"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 antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

▣ Directional Gain Calculations

▪ **If any transmit signals are correlated with each other(802.11a,g,n,ac),**

Directional gain = $10*\log[(10^{G1/20} + 10^{G2/20}+\ldots+10^{GN/20})^2/N]$ dBi

▪ **If all transmit signals are completely uncorrelated with each other(802.11n,ac)**

Directional gain = $10*\log[(10^{G1/10} + 10^{G2/10}+\ldots+10^{GN/10})/N]$ dBi

▣ Antenna Gain

2.4 GHz Band(CDD mode)

Antenna Gaine	802.11b/g/n	Ant 0	2.47 dBi
	802.11g/n	Ant 1	3.3 dBi
Directional Antenna Gain	802.11g/n	Ant 0 & 1	5.91 dB

5.8 GHz Band(CDD mode)

Antenna Gaine	802.11a/n/ac	Ant 0	4.58 dBi
		Ant 1	4.32 dBi
Directional Antenna Gain	802.11a/n/ac	Ant 0 & 1	7.46 dB

7. SUMMARY TEST OF RESULTS

7.1 FCC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.8		NA
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.7.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.7.3		PASS

7.2 IC Part

Test Description	IC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth 99% Bandwidth	RSS-210 [A8.2] RSS-GEN 4.6.1	NA	CONDUCTED	PASS
Conducted Maximum Peak Output Power , e.i.r.p.	RSS-210 [A8.4]	< 1 Watt < 4 Watt(e.i.r.p.)		PASS
Power Spectral Density	RSS-210 [A8.2]	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	RSS-210 [A8.5]	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	RSS-GEN [7.2.2]	cf. Section 8.8		NA
Radiated Spurious Emissions	RSS-210 [A8.5]	cf. Section 8.7.1	RADIATED	PASS
Receiver Spurious Emissions	RSS-GEN, Section 7.2.3	cf. Section 8.7.2		PASS
Radiated Restricted Band Edge	RSS-210 [A8.5]	cf. Section 8.7.3		PASS

8. TEST RESULT

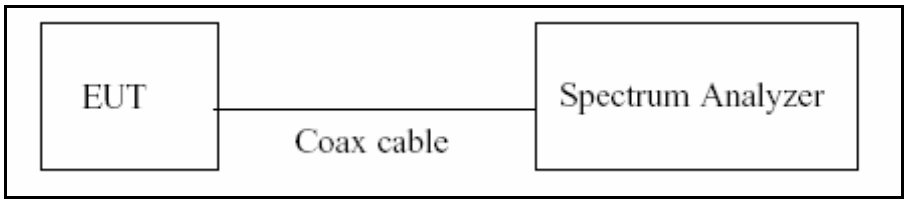
8.1 DUTY CYCLE (802.11a/b/g/n/ac)

▣ TEST PROCEDURE

According to KDB558074)6)b), issued 04/09/2013)

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 ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T 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 ≤ 16.7 microseconds.)

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested accroding to the zero-span measurement method, 6.0)b) in KDB 558074(issued 04/09/2013)

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 ≤ 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 (≥ 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*log(1/Duty Cycle)

▣ Duty Cycle Factor

Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
2.4 GHz Band 802.11b	1	12.400	13.060	0.94946401	0.225
	2	6.211	6.528	0.95143995	0.216
	5.5	2.320	2.441	0.95043015	0.221
	11	1.209	1.266	0.95497630	0.200
2.4 GHz Band 802.11g and 5.8 GHz Band 802.11a	6	2.060	2.170	0.94930876	0.226
	9	1.360	1.450	0.93793103	0.278
	12	1.025	1.095	0.93607306	0.287
	18	0.680	0.730	0.93150685	0.308
	24	0.524	0.558	0.93906810	0.273
	36	0.354	0.386	0.91709845	0.376
	48	0.272	0.302	0.90066225	0.454
	54	0.238	0.270	0.88148148	0.548
2.4 GHz Band 802.11n_20 MHz BW and 5.8 GHz Band 802.11n_20 MHz BW	6.5	1.920	2.015	0.95285360	0.210
	13	0.981	1.026	0.95614035	0.195
	19.5	0.664	0.698	0.95155511	0.216
	26	0.508	0.532	0.95488722	0.200
	39	0.352	0.376	0.93613624	0.287
	52	0.272	0.296	0.92047377	0.360
	58.5	0.248	0.272	0.91381215	0.391
	65	0.228	0.252	0.90461049	0.435
5.8 GHz Band 802.11n_40 MHz BW	13.5	0.944	1.042	0.90595010	0.429
	27	0.492	0.540	0.91111111	0.404
	40.5	0.339	0.373	0.90987124	0.410
	54	0.264	0.288	0.91826087	0.370
	81	0.188	0.212	0.88747045	0.518
	108	0.152	0.175	0.86643836	0.623
	121.5	0.140	0.163	0.85661765	0.672
	135	0.128	0.152	0.84356436	0.739
5.8 GHz Band 802.11ac_20 MHz BW	6.5	1.920	2.015	0.95285360	0.210
	13	0.981	1.026	0.95614035	0.195
	19.5	0.664	0.698	0.95155511	0.216
	26	0.508	0.532	0.95488722	0.200
	39	0.352	0.376	0.93613624	0.287
	52	0.272	0.296	0.92047377	0.360
	58.5	0.248	0.272	0.91381215	0.391
	65	0.228	0.252	0.90461049	0.435
	78	0.200	0.228	0.87478109	0.581

Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
5.8 GHz Band 802.11ac_40 MHz BW	13.5	0.944	1.042	0.90595010	0.429
	27	0.492	0.540	0.91111111	0.404
	40.5	0.339	0.373	0.90987124	0.410
	54	0.264	0.288	0.91826087	0.370
	81	0.188	0.212	0.88747045	0.518
	108	0.152	0.175	0.86643836	0.623
	121.5	0.140	0.163	0.85661765	0.672
	135	0.128	0.152	0.84356436	0.739
	162	0.116	0.144	0.80416667	0.947
	180	0.112	0.140	0.79928571	0.973
5.8 GHz Band 802.11ac_80 MHz BW	29.3	0.459	0.488	0.94057377	0.266
	58.5	0.251	0.280	0.89767442	0.469
	87.8	0.180	0.209	0.86330935	0.638
	117	0.148	0.176	0.83863636	0.764
	175.5	0.112	0.140	0.79871060	0.976
	234	0.096	0.124	0.76975060	1.136
	263.3	0.088	0.116	0.75537403	1.218
	292.5	0.084	0.113	0.74742451	1.264
	351	0.076	0.104	0.72974013	1.368
	390	0.072	0.100	0.71740000	1.442

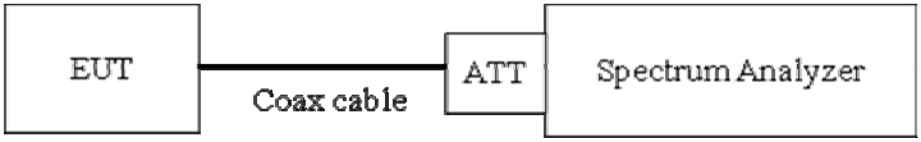
8.2 6dB BANDWIDTH (802.11a/b/g/n/ac)

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Page 5 in KDB 558074, issued 04/09/2013)

RBW = 100 kHz

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

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

Ant.0

▣ TEST RESULTS

2.4 GHz Band

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	9.094	0.500	Pass
2437	6	9.089	0.500	Pass
2462	11	9.053	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.40	0.500	Pass
2437	6	16.37	0.500	Pass
2462	11	15.80	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.40	0.500	Pass
2437	6	17.35	0.500	Pass
2462	11	17.63	0.500	Pass

5.8 GHz Band

Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Frequency [MHz]			
5745	149	16.35	0.500	Pass
5785	157	16.36	0.500	Pass
5825	165	16.36	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.64	0.500	Pass
5785	157	17.60	0.500	Pass
5825	165	17.57	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.36	0.500	Pass
5795	159	36.37	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_20 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.63	0.500	Pass
5785	157	17.57	0.500	Pass
5825	165	17.61	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_40 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.37	0.500	Pass
5795	159	36.38	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_80 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.47	0.500	Pass

Ant.1

▣ TEST RESULTS

2.4 GHz Band

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.13	0.500	Pass
2437	6	16.40	0.500	Pass
2462	11	15.76	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.19	0.500	Pass
2437	6	17.64	0.500	Pass
2462	11	16.37	0.500	Pass

5.8 GHz Band

Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Frequency [MHz]			
5745	149	16.34	0.500	Pass
5785	157	16.39	0.500	Pass
5825	165	16.40	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.56	0.500	Pass
5785	157	17.59	0.500	Pass
5825	165	17.62	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.39	0.500	Pass
5795	159	36.37	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_20 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.64	0.500	Pass
5785	157	17.63	0.500	Pass
5825	165	17.57	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_40 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.12	0.500	Pass
5795	159	36.36	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_80 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.98	0.500	Pass

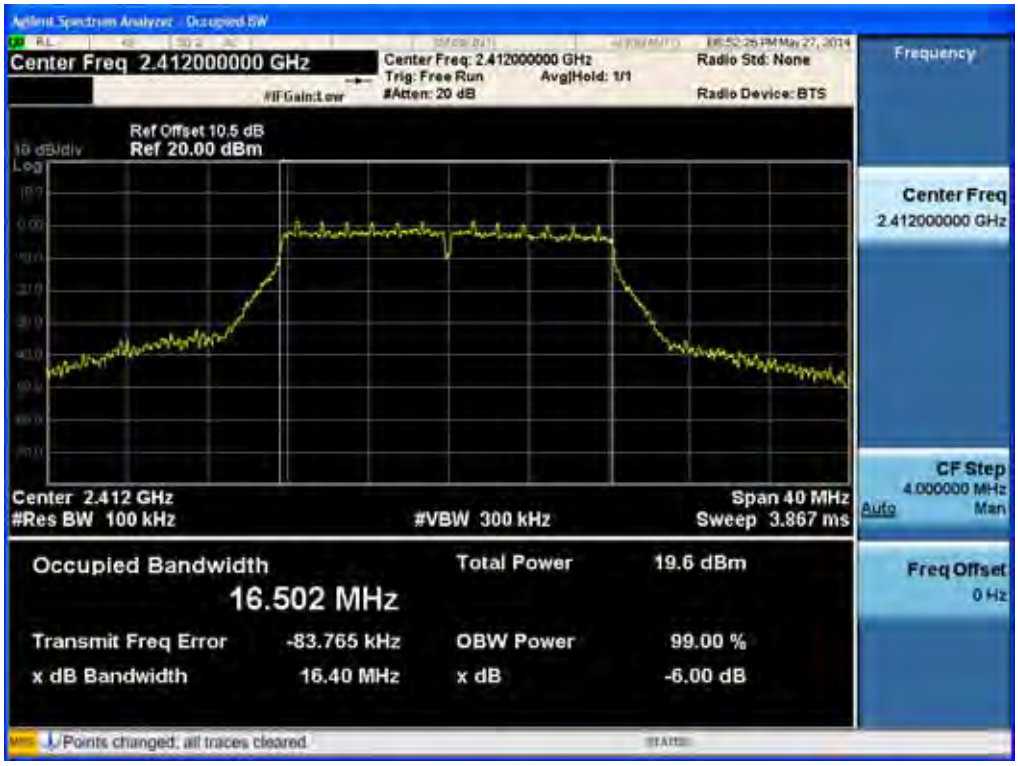
Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

▣ RESULT PLOTS Ant.0

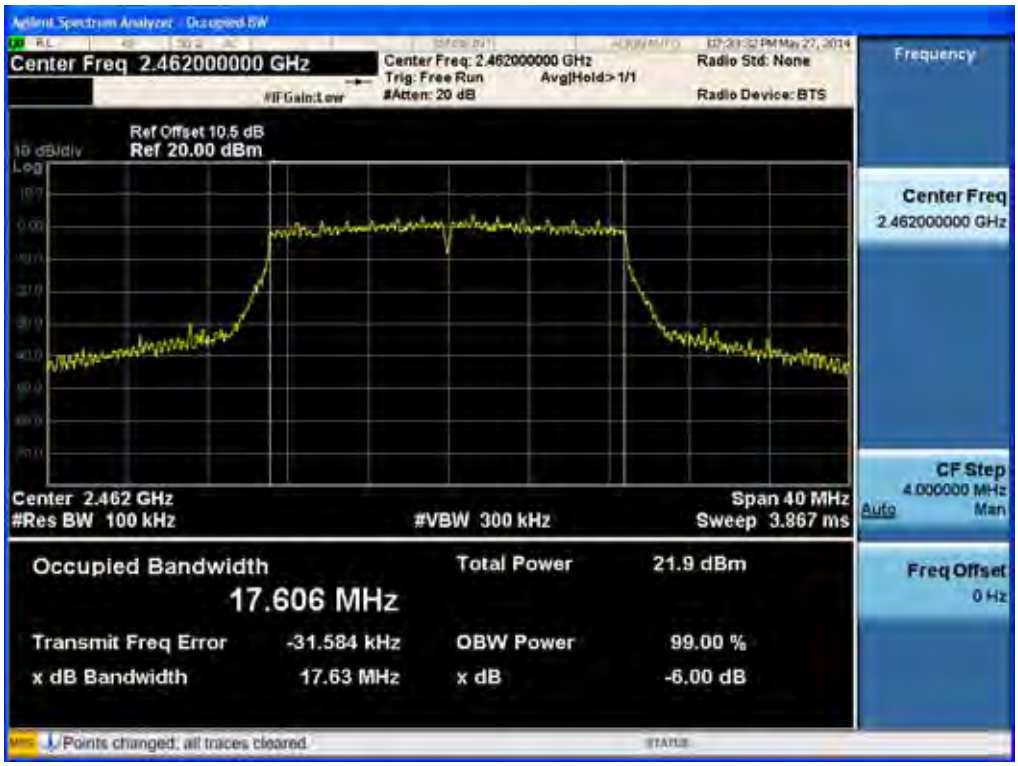
2.4 GHz Band

6dB Bandwidth plot (802.11b-CH 1)

6dB Bandwidth plot (802.11g-CH 1)

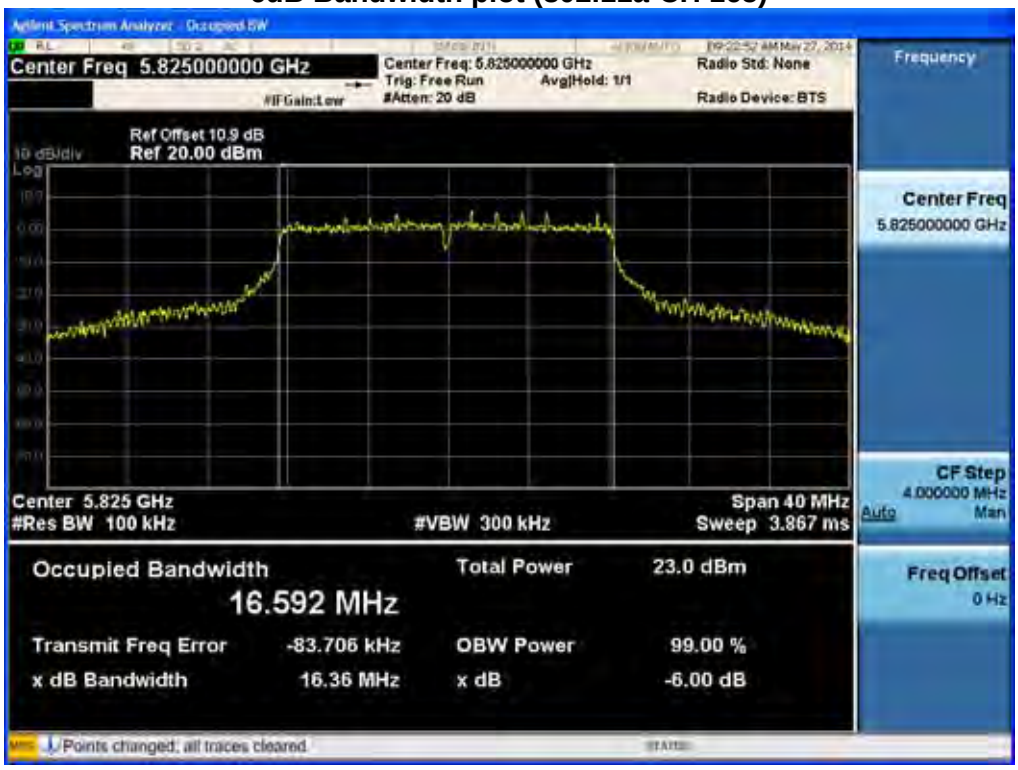


6dB Bandwidth plot (802.11n-CH 11)

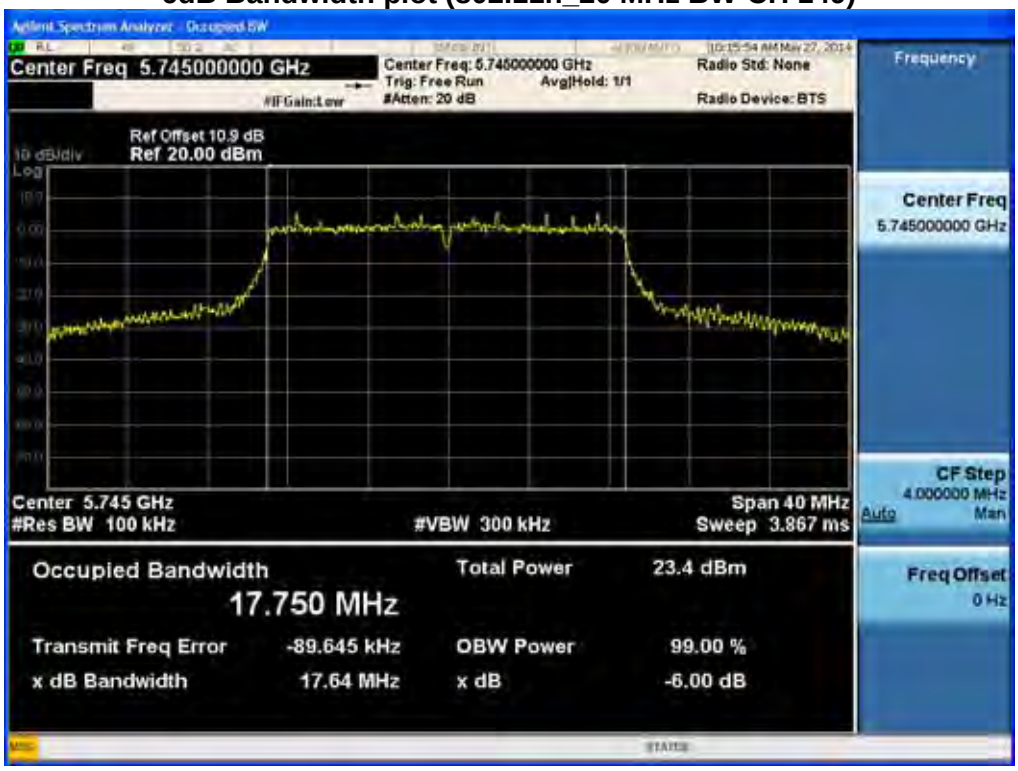


5.8 GHz Band

6dB Bandwidth plot (802.11a-CH 165)

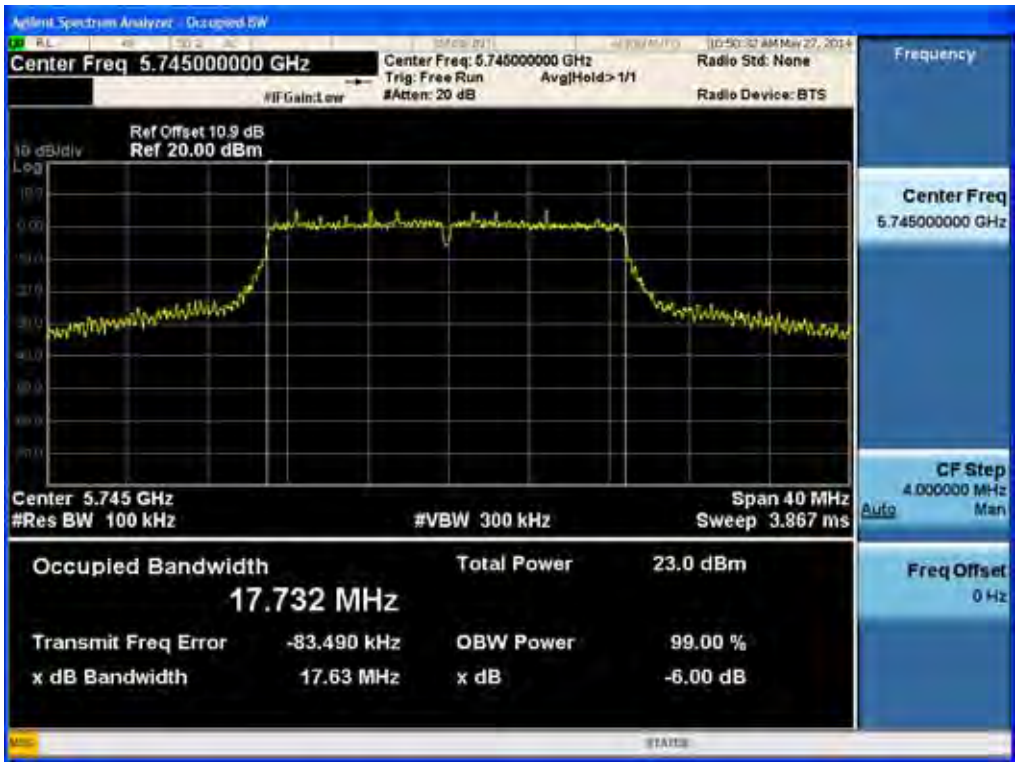


6dB Bandwidth plot (802.11n_20 MHz BW-CH 149)

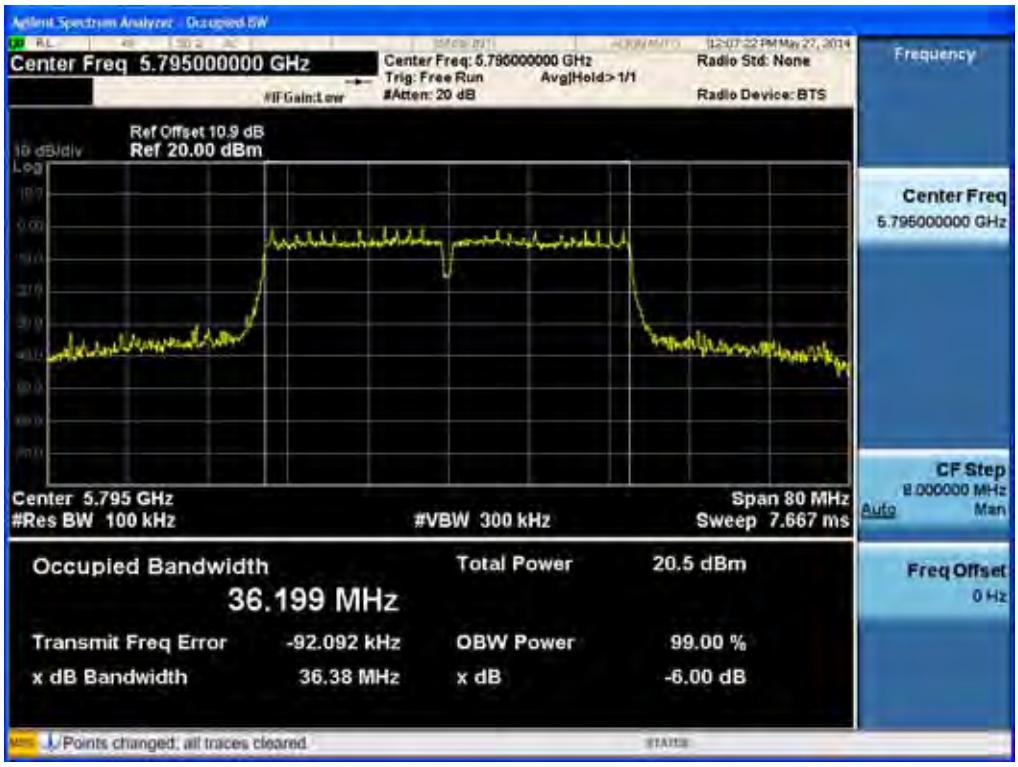


6dB Bandwidth plot (802.11n_40 MHz BW-CH 159)

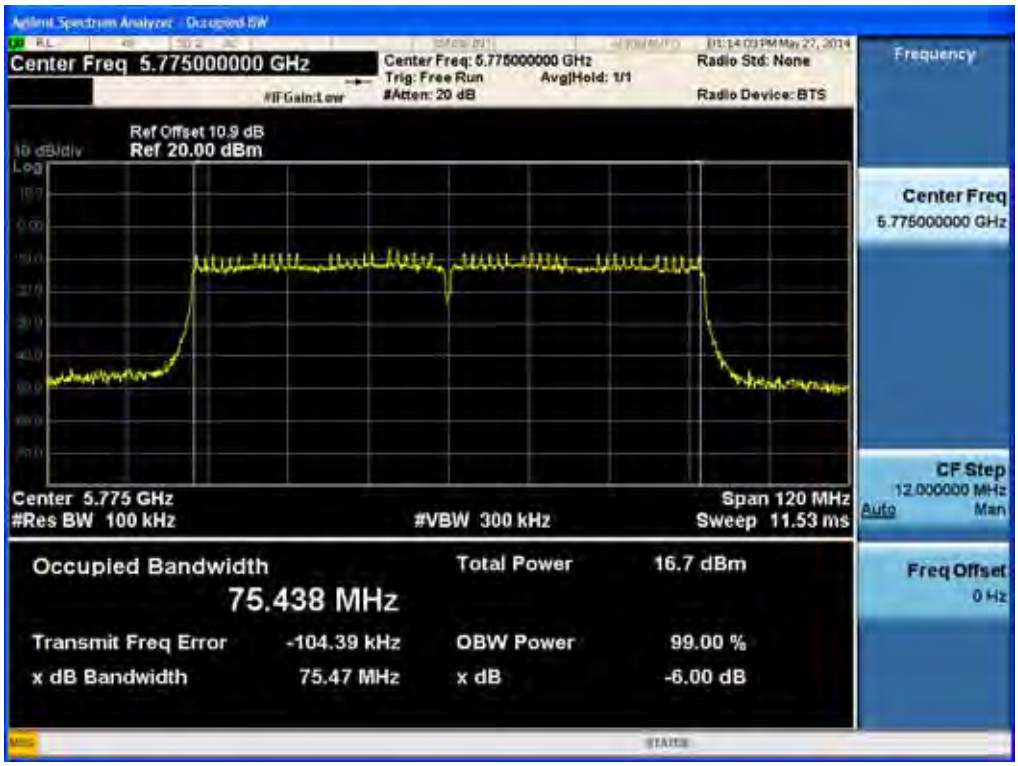
6dB Bandwidth plot (802.11ac_20 MHz BW-CH 149)



6dB Bandwidth plot (802.11ac_40 MHz BW-CH 159)



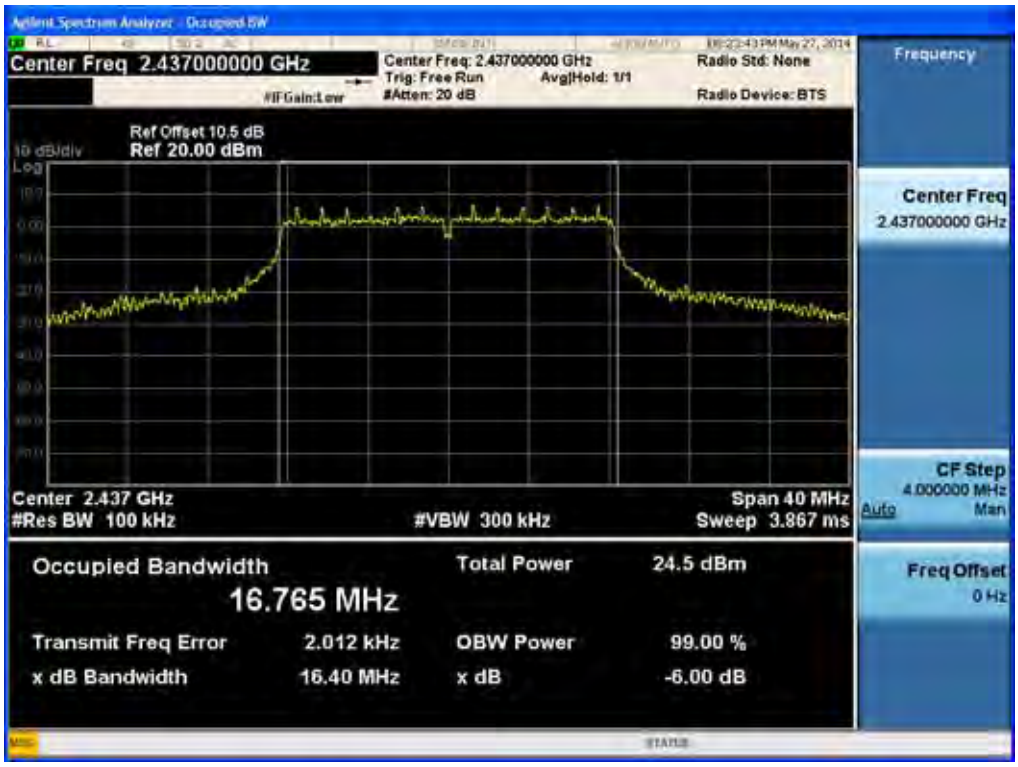
6dB Bandwidth plot (802.11ac_80 MHz BW-CH 155)



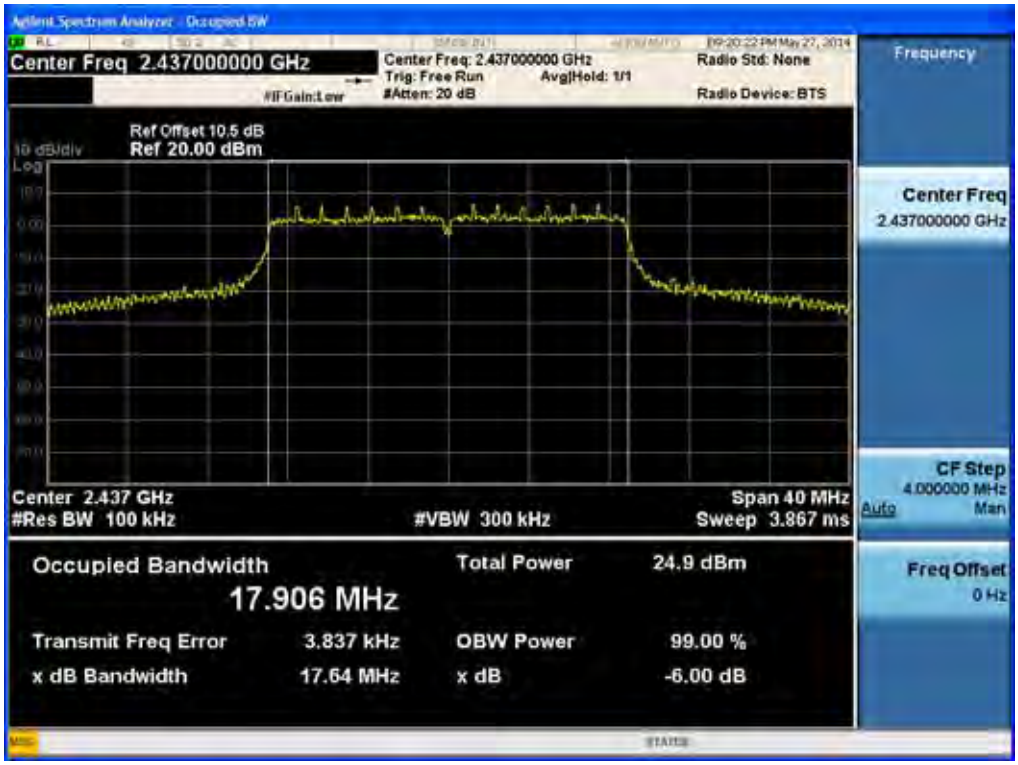
▣ RESULT PLOTS Ant.1

2.4 GHz Band

6dB Bandwidth plot (802.11g-CH 6)

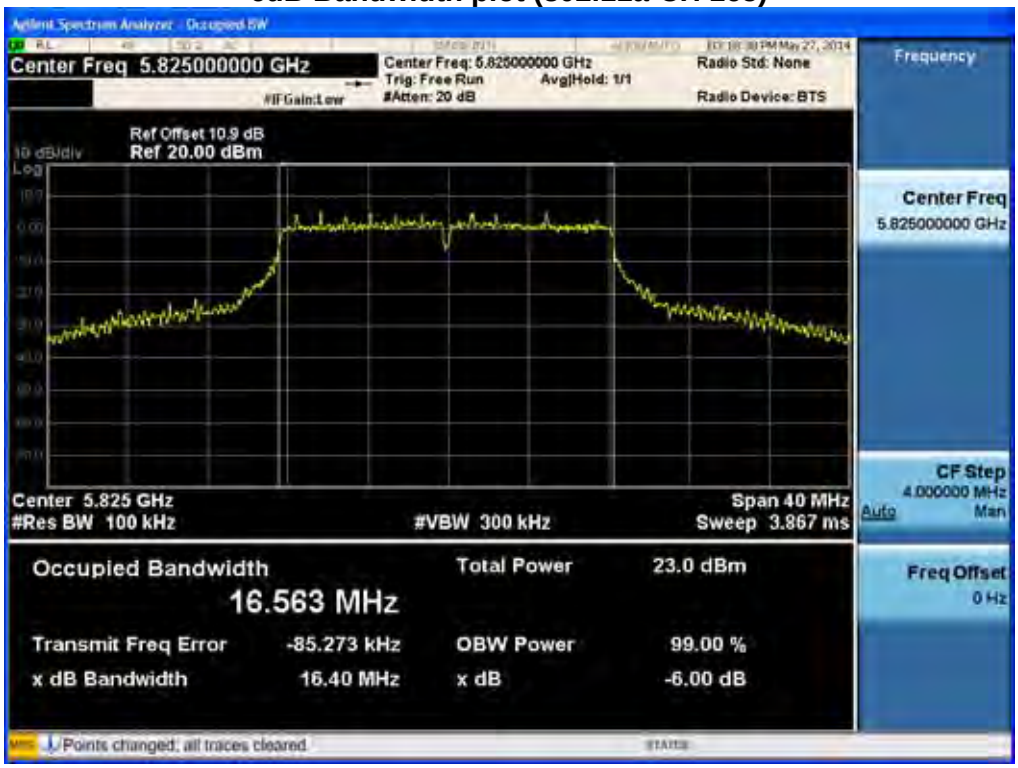


6dB Bandwidth plot (802.11n-CH 6)



5.8 GHz Band

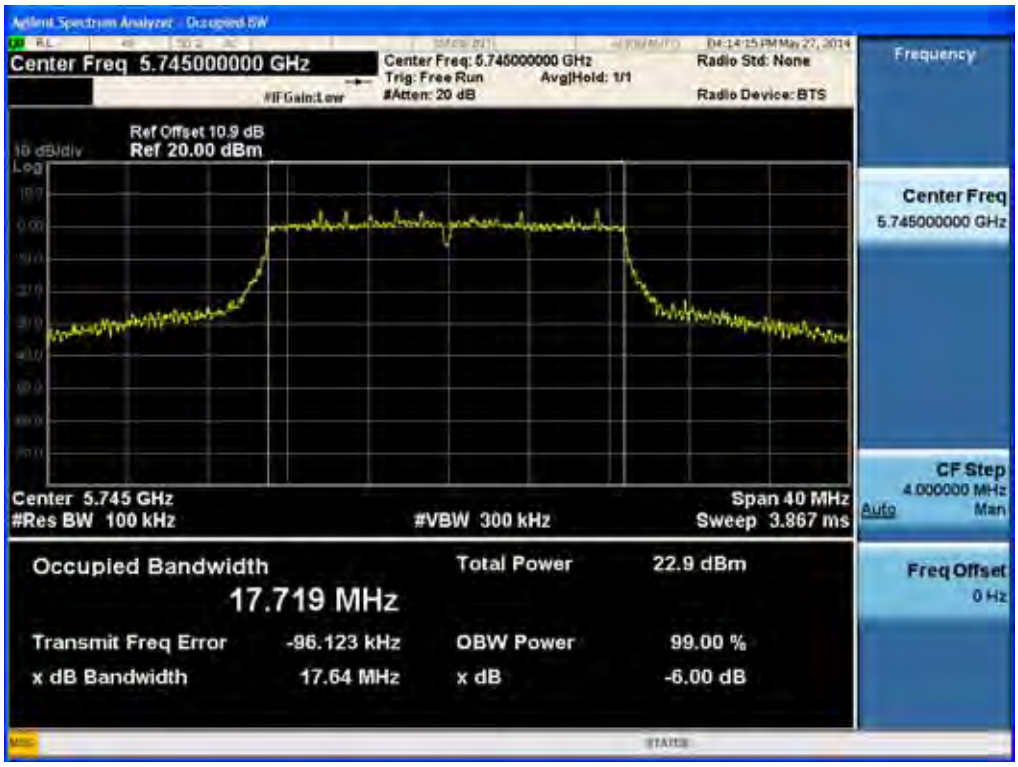
6dB Bandwidth plot (802.11a-CH 165)



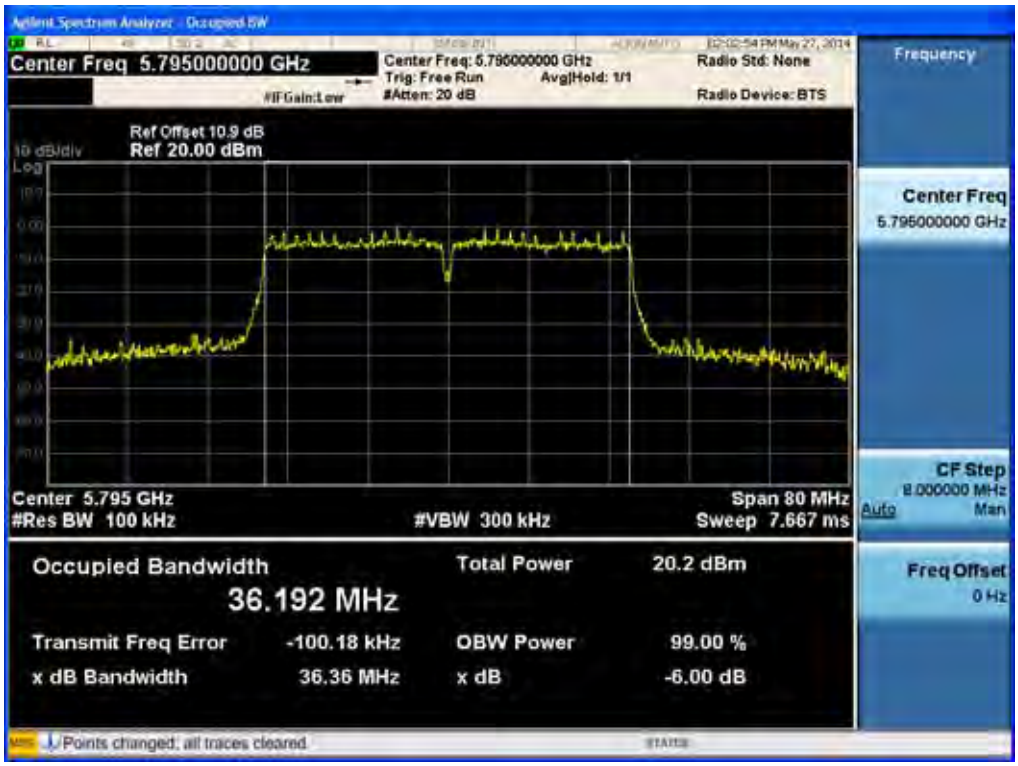
6dB Bandwidth plot (802.11n_20 MHz BW-CH 165)

6dB Bandwidth plot (802.11n_40 MHz BW-CH 151)

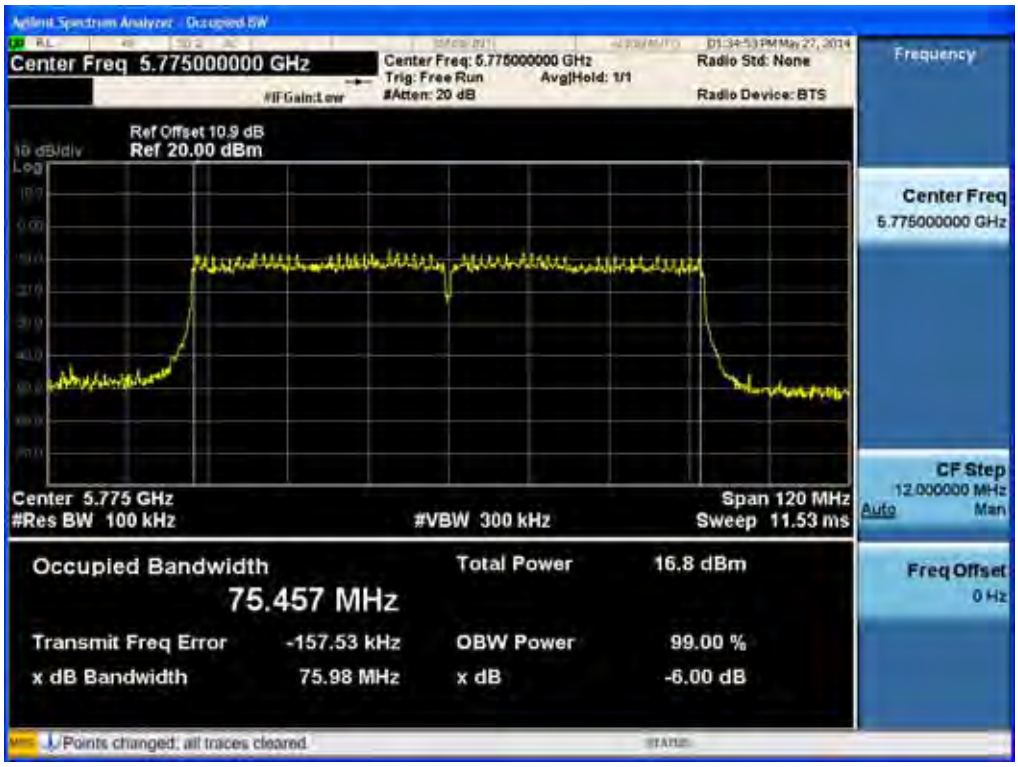
6dB Bandwidth plot (802.11ac_20 MHz BW-CH 149)



6dB Bandwidth plot (802.11ac_40 MHz BW-CH 159)



6dB Bandwidth plot (802.11ac_80 MHz BW-CH 155)

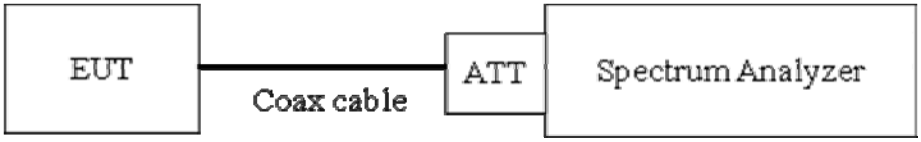


8.3 99% BANDWIDTH (802.11a/b/g/n/ac)

limit

None; for IC reporting purposes only

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to as close to 1% of the selected span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RBW = 1% of the total span

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Ant.0

▣ TEST RESULTS

2.4 GHz Band

Conducted 99% Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	11.370
2437	6	11.565
2462	11	10.886

Conducted 99% Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	16.540
2437	6	16.547
2462	11	16.496

Conducted 99% Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	17.700
2437	6	17.757
2462	11	17.654

5.8 GHz Band

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	16.504
5785	157	16.521
5825	165	16.556

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.712
5785	157	17.726
5825	165	17.731

Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.465
5795	159	36.425

Conducted 99% Bandwidth Measurements for 802.11ac_20 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.728
5785	157	17.740
5825	165	17.747

Conducted 99% Bandwidth Measurements for 802.11ac_40 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.405
5795	159	36.435

Conducted 99% Bandwidth Measurements for 802.11ac_80 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5775	155	75.858

Ant.1

▣ TEST RESULTS

2.4 GHz Band

Conducted 99% Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	16.489
2437	6	16.576
2462	11	16.488

Conducted 99% Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	17.691
2437	6	17.722
2462	11	17.606

5.8 GHz Band

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	16.557
5785	157	16.539
5825	165	16.573

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.708
5785	157	17.736
5825	165	17.758

Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.409
5795	159	36.362

Conducted 99% Bandwidth Measurements for 802.11ac_20 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.734
5785	157	17.733
5825	165	17.716

Conducted 99% Bandwidth Measurements for 802.11ac_40 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.449
5795	159	36.406

Conducted 99% Bandwidth Measurements for 802.11ac_80 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5775	155	76.059

Note : In order to simplify the report, attached plots were only the most wide 99 % BW channel.

Ant.0

▣ RESULT PLOTS

2.4 GHz Band

99% Bandwidth plot (802.11b-CH6)

99% Bandwidth plot (802.11g-CH6)

99% Bandwidth plot (802.11n-CH6)

5.8 GHz Band

99% Bandwidth plot (802.11a-CH165)

99% Bandwidth plot (802.11n-CH165) _20 MHz BW

99% Bandwidth plot (802.11n-CH151) _40 MHz BW

99% Bandwidth plot (802.11ac-CH165) _20 MHz BW

99% Bandwidth plot (802.11ac-CH159) _40 MHz BW

99% Bandwidth plot (802.11ac-CH155) _80 MHz BW

Ant.1

▣ RESULT PLOTS

2.4 GHz Band

99% Bandwidth plot (802.11g-CH6)

99% Bandwidth plot (802.11n-CH6)

5.8 GHz Band

99% Bandwidth plot (802.11a-CH165)

99% Bandwidth plot (802.11n-CH165) _20 MHz BW

99% Bandwidth plot (802.11n-CH151) _40 MHz BW

99% Bandwidth plot (802.11ac-CH149) _20 MHz BW

99% Bandwidth plot (802.11ac-CH159) _40 MHz BW

99% Bandwidth plot (802.11ac-CH155) _80 MHz BW

8.4 OUTPUT POWER (802.11a/b/g/n/ac)

Test Requirements and limit, §15.247(b)(3)

The transmitter output is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

▣ Limit(CDD)

1. Maximum Conducted Output Power(for FCC & IC)

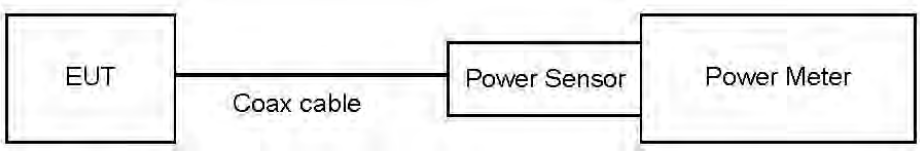
Operating Mode	Band	Mode	Ant. Port	Ant. Gain (dBi)	Limit (dBm)
SISO	2.4 GHz	802.11b/g/n	0	2.47	30
		802.11g/n	1	3.3	30
MIMO(2 TX)		802.11g/n	0 & 1	5.91	30
SISO	5.8 GHz	802.11a/n/ac	0	4.58	30
			1	4.32	30
MIMO(2 TX)		802.11a/n/ac	0 & 1	7.46	28.54

Note : Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

2. Maximum EIRP(for & IC) : 4 W

Note : The limits of conducted power were applied the antenna gain. Therefore, if conducted power is pass, EIRP is also pass. So, we attached only conducted power table.

▣ TEST CONFIGURATION(20 MHz BW)



▣ TEST PROCEDURE(20 MHz BW)

- Peak Power (Procedure 9.1.3 in KDB 558074, issued 04/09/2013)
  1. Measure the peak power of the transmitter.
- Average Power (Procedure 9.2.3.1 in KDB 558074, issued 04/09/2013)
  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.

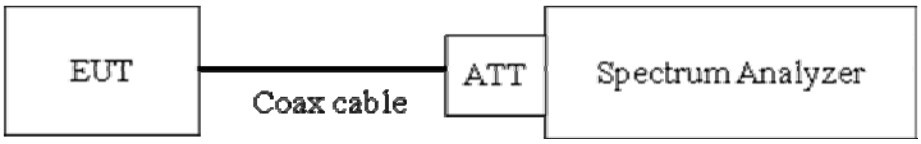
Note :

1. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

Band	Loss(dB)
2.4 GHz	10.5
5.8 GHz	10.9

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

▣ TEST CONFIGURATION(40 MHz & 80 MHz BW)



▣ TEST PROCEDURE(40 MHz & 80 MHz BW)

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function.

The Spectrum Analyzer is set to

- Peak Power (Procedure 9.1.2 in KDB 558074, issued 04/09/2013)

  RBW = 1 MHz

  VBW ≥ 3 x RBW

  SPAN ≥ 1.5 x DTS bandwidth

  Detector Mode = Peak

  Sweep = auto couple

Trace Mode = max hold

Allow trace to fully stabilize.

Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector).

▪ Average Power (Procedure 9.2.2.4 in KDB 558074, issued 04/09/2013)

Measure the duty cycle

Set span to at least 1.5 times the OBW

RBW = 1-5 % of the OBW, not to exceed 1 MHz.

VBW ≥ 3 x RBW.

Number of points in sweep ≥ 2 x span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

Sweep time = auto.

Detector = RMS(i.e., power averaging)

Do not use sweep triggering. Allow the sweep to "free run".

Trace average at least 100 traces in power averaging(RMS) mode.

Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.

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. 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. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

Band	Loss(dB)
2.4 GHz	10.5
5.8 GHz	10.9

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

▣ Sample Calculation (Conducted)

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

▣ Sample Calculation (EIRP)

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

2.4 GHz Band

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	22.65	30
		2 Mbps	23.20	30
		5.5 Mbps	25.20	30
		11 Mbps	26.86	30
2437	6	1 Mbps	21.17	30
		2 Mbps	21.54	30
		5.5 Mbps	23.23	30
		11 Mbps	25.00	30
2462	11	1 Mbps	21.90	30
		2 Mbps	22.65	30
		5.5 Mbps	24.47	30
		11 Mbps	26.17	30

▣ TEST RESULTS Ant 0

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	20.12	30
		9 Mbps	20.06	30
		12 Mbps	19.92	30
		18 Mbps	20.03	30
		24 Mbps	20.15	30
		36 Mbps	20.21	30
		48 Mbps	20.24	30
		54 Mbps	20.20	30
2437	6	6 Mbps	25.84	30
		9 Mbps	25.81	30
		12 Mbps	25.51	30
		18 Mbps	25.46	30
		24 Mbps	25.71	30
		36 Mbps	25.74	30
		48 Mbps	25.76	30
		54 Mbps	25.73	30
2462	11	6 Mbps	21.88	30
		9 Mbps	21.84	30
		12 Mbps	21.74	30
		18 Mbps	21.76	30
		24 Mbps	21.93	30
		36 Mbps	22.05	30
		48 Mbps	22.07	30
		54 Mbps	22.01	30

▣ TEST RESULTS Ant 1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	19.64	30
		9 Mbps	19.81	30
		12 Mbps	19.58	30
		18 Mbps	19.62	30
		24 Mbps	19.76	30
		36 Mbps	19.82	30
		48 Mbps	19.82	30
		54 Mbps	19.82	30
2437	6	6 Mbps	25.06	30
		9 Mbps	25.00	30
		12 Mbps	24.84	30
		18 Mbps	24.76	30
		24 Mbps	25.01	30
		36 Mbps	25.06	30
		48 Mbps	25.08	30
		54 Mbps	25.03	30
2462	11	6 Mbps	21.63	30
		9 Mbps	21.59	30
		12 Mbps	21.47	30
		18 Mbps	21.54	30
		24 Mbps	21.70	30
		36 Mbps	21.82	30
		48 Mbps	21.81	30
		54 Mbps	21.79	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	22.90	30
		9 Mbps	22.95	30
		12 Mbps	22.76	30
		18 Mbps	22.84	30
		24 Mbps	22.97	30
		36 Mbps	23.03	30
		48 Mbps	23.05	30
		54 Mbps	23.02	30
2437	6	6 Mbps	28.48	30
		9 Mbps	28.43	30
		12 Mbps	28.20	30
		18 Mbps	28.13	30
		24 Mbps	28.38	30
		36 Mbps	28.42	30
		48 Mbps	28.44	30
		54 Mbps	28.40	30
2462	11	6 Mbps	24.77	30
		9 Mbps	24.73	30
		12 Mbps	24.62	30
		18 Mbps	24.66	30
		24 Mbps	24.83	30
		36 Mbps	24.95	30
		48 Mbps	24.95	30
		54 Mbps	24.91	30

▣ TEST RESULTS Ant 0

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	20.33	30
		13 Mbps	20.39	30
		19.5 Mbps	20.29	30
		26 Mbps	20.69	30
		39 Mbps	20.81	30
		52 Mbps	20.82	30
		58.5 Mbps	20.86	30
		65 Mbps	20.79	30
2437	6	6.5 Mbps	25.93	30
		13 Mbps	25.94	30
		19.5 Mbps	25.96	30
		26 Mbps	26.42	30
		39 Mbps	26.23	30
		52 Mbps	26.42	30
		58.5 Mbps	26.54	30
		65 Mbps	26.46	30
2462	11	6.5 Mbps	21.43	30
		13 Mbps	21.45	30
		19.5 Mbps	21.41	30
		26 Mbps	21.85	30
		39 Mbps	21.74	30
		52 Mbps	21.88	30
		58.5 Mbps	21.87	30
		65 Mbps	21.86	30

▣ TEST RESULTS Ant 1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	19.92	30
		13 Mbps	19.83	30
		19.5 Mbps	20.01	30
		26 Mbps	20.28	30
		39 Mbps	20.29	30
		52 Mbps	20.39	30
		58.5 Mbps	20.41	30
		65 Mbps	20.62	30
2437	6	6.5 Mbps	25.33	30
		13 Mbps	25.35	30
		19.5 Mbps	25.38	30
		26 Mbps	25.87	30
		39 Mbps	25.88	30
		52 Mbps	25.89	30
		58.5 Mbps	25.91	30
		65 Mbps	25.90	30
2462	11	6.5 Mbps	20.99	30
		13 Mbps	21.10	30
		19.5 Mbps	21.12	30
		26 Mbps	21.60	30
		39 Mbps	21.57	30
		52 Mbps	21.67	30
		58.5 Mbps	21.65	30
		65 Mbps	21.67	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	23.14	30
		13 Mbps	23.13	30
		19.5 Mbps	23.16	30
		26 Mbps	23.50	30
		39 Mbps	23.57	30
		52 Mbps	23.62	30
		58.5 Mbps	23.65	30
		65 Mbps	23.72	30
2437	6	6.5 Mbps	28.65	30
		13 Mbps	28.67	30
		19.5 Mbps	28.69	30
		26 Mbps	29.16	30
		39 Mbps	29.07	30
		52 Mbps	29.17	30
		58.5 Mbps	29.25	30
		65 Mbps	29.20	30
2462	11	6.5 Mbps	24.23	30
		13 Mbps	24.29	30
		19.5 Mbps	24.28	30
		26 Mbps	24.74	30
		39 Mbps	24.67	30
		52 Mbps	24.79	30
		58.5 Mbps	24.77	30
		65 Mbps	24.78	30

5.8 GHz Band

▣ TEST RESULTS_Ant.0

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

802.11a Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6 Mbps	24.51	30
		9 Mbps	24.39	30
		12 Mbps	24.01	30
		18 Mbps	24.10	30
		24 Mbps	24.22	30
		36 Mbps	24.38	30
		48 Mbps	24.46	30
		54 Mbps	24.52	30
5785	157	6 Mbps	23.47	30
		9 Mbps	23.44	30
		12 Mbps	23.24	30
		18 Mbps	23.16	30
		24 Mbps	23.41	30
		36 Mbps	23.55	30
		48 Mbps	23.62	30
		54 Mbps	23.55	30
5825	165	6 Mbps	23.91	30
		9 Mbps	23.87	30
		12 Mbps	23.40	30
		18 Mbps	23.45	30
		24 Mbps	23.71	30
		36 Mbps	23.75	30
		48 Mbps	23.91	30
		54 Mbps	23.93	30

▣ TEST RESULTS_Ant.1

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

802.11a Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6 Mbps	24.19	30
		9 Mbps	24.09	30
		12 Mbps	23.83	30
		18 Mbps	23.81	30
		24 Mbps	24.02	30
		36 Mbps	24.10	30
		48 Mbps	24.16	30
		54 Mbps	24.32	30
5785	157	6 Mbps	23.33	30
		9 Mbps	23.33	30
		12 Mbps	22.95	30
		18 Mbps	23.05	30
		24 Mbps	23.29	30
		36 Mbps	23.27	30
		48 Mbps	23.48	30
		54 Mbps	23.52	30
5825	165	6 Mbps	23.74	30
		9 Mbps	23.62	30
		12 Mbps	23.34	30
		18 Mbps	23.39	30
		24 Mbps	23.64	30
		36 Mbps	23.65	30
		48 Mbps	23.84	30
		54 Mbps	23.76	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

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

802.11a Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6 Mbps	27.36	28.54
		9 Mbps	27.25	28.54
		12 Mbps	26.93	28.54
		18 Mbps	26.97	28.54
		24 Mbps	27.13	28.54
		36 Mbps	27.25	28.54
		48 Mbps	27.32	28.54
		54 Mbps	27.43	28.54
5785	157	6 Mbps	26.41	28.54
		9 Mbps	26.40	28.54
		12 Mbps	26.11	28.54
		18 Mbps	26.12	28.54
		24 Mbps	26.36	28.54
		36 Mbps	26.42	28.54
		48 Mbps	26.56	28.54
		54 Mbps	26.55	28.54
5825	165	6 Mbps	26.84	28.54
		9 Mbps	26.76	28.54
		12 Mbps	26.38	28.54
		18 Mbps	26.43	28.54
		24 Mbps	26.69	28.54
		36 Mbps	26.71	28.54
		48 Mbps	26.89	28.54
		54 Mbps	26.86	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5 Mbps	24.04	30
		13 Mbps	23.53	30
		19.5 Mbps	23.77	30
		26 Mbps	24.06	30
		39 Mbps	23.87	30
		52 Mbps	24.01	30
		58.5 Mbps	24.22	30
		65 Mbps	24.23	30
5785	157	6.5 Mbps	22.96	30
		13 Mbps	22.59	30
		19.5 Mbps	22.48	30
		26 Mbps	22.93	30
		39 Mbps	23.24	30
		52 Mbps	23.13	30
		58.5 Mbps	23.04	30
		65 Mbps	23.07	30
5825	165	6.5 Mbps	23.28	30
		13 Mbps	23.00	30
		19.5 Mbps	23.03	30
		26 Mbps	23.43	30
		39 Mbps	23.38	30
		52 Mbps	23.42	30
		58.5 Mbps	23.46	30
		65 Mbps	23.48	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5 Mbps	23.74	30
		13 Mbps	23.51	30
		19.5 Mbps	23.49	30
		26 Mbps	23.89	30
		39 Mbps	23.90	30
		52 Mbps	23.96	30
		58.5 Mbps	23.95	30
		65 Mbps	23.95	30
5785	157	6.5 Mbps	22.72	30
		13 Mbps	22.49	30
		19.5 Mbps	22.51	30
		26 Mbps	22.88	30
		39 Mbps	22.95	30
		52 Mbps	23.05	30
		58.5 Mbps	22.93	30
		65 Mbps	22.96	30
5825	165	6.5 Mbps	23.41	30
		13 Mbps	23.03	30
		19.5 Mbps	23.06	30
		26 Mbps	23.39	30
		39 Mbps	23.39	30
		52 Mbps	23.57	30
		58.5 Mbps	23.51	30
		65 Mbps	23.53	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5 Mbps	26.90	28.54
		13 Mbps	26.53	28.54
		19.5 Mbps	26.64	28.54
		26 Mbps	26.99	28.54
		39 Mbps	26.90	28.54
		52 Mbps	27.00	28.54
		58.5 Mbps	27.10	28.54
		65 Mbps	27.10	28.54
5785	157	6.5 Mbps	25.85	28.54
		13 Mbps	25.55	28.54
		19.5 Mbps	25.51	28.54
		26 Mbps	25.92	28.54
		39 Mbps	26.11	28.54
		52 Mbps	26.10	28.54
		58.5 Mbps	26.00	28.54
		65 Mbps	26.03	28.54
5825	165	6.5 Mbps	26.36	28.54
		13 Mbps	26.03	28.54
		19.5 Mbps	26.06	28.54
		26 Mbps	26.42	28.54
		39 Mbps	26.40	28.54
		52 Mbps	26.51	28.54
		58.5 Mbps	26.50	28.54
		65 Mbps	26.52	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5 Mbps	23.68	30
		27 Mbps	23.40	30
		40.5 Mbps	23.31	30
		54 Mbps	23.88	30
		81 Mbps	23.69	30
		108 Mbps	23.92	30
		121.5 Mbps	23.84	30
		135 Mbps	23.64	30
5795	159	13.5 Mbps	23.77	30
		27 Mbps	23.58	30
		40.5 Mbps	23.43	30
		54 Mbps	24.01	30
		81 Mbps	23.94	30
		108 Mbps	24.00	30
		121.5 Mbps	24.04	30
		135 Mbps	24.02	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5 Mbps	23.26	30
		27 Mbps	22.95	30
		40.5 Mbps	22.81	30
		54 Mbps	23.31	30
		81 Mbps	23.24	30
		108 Mbps	23.35	30
		121.5 Mbps	23.51	30
		135 Mbps	23.32	30
5795	159	13.5 Mbps	23.32	30
		27 Mbps	23.07	30
		40.5 Mbps	22.99	30
		54 Mbps	23.60	30
		81 Mbps	23.50	30
		108 Mbps	23.61	30
		121.5 Mbps	23.53	30
		135 Mbps	23.60	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5 Mbps	26.49	28.54
		27 Mbps	26.19	28.54
		40.5 Mbps	26.08	28.54
		54 Mbps	26.61	28.54
		81 Mbps	26.48	28.54
		108 Mbps	26.65	28.54
		121.5 Mbps	26.69	28.54
		135 Mbps	26.49	28.54
5795	159	13.5 Mbps	26.56	28.54
		27 Mbps	26.34	28.54
		40.5 Mbps	26.23	28.54
		54 Mbps	26.82	28.54
		81 Mbps	26.74	28.54
		108 Mbps	26.82	28.54
		121.5 Mbps	26.80	28.54
		135 Mbps	26.83	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11ac_20 MHz BW Mode: 5745~5825)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5	23.69	30
		13	23.39	30
		19.5	23.46	30
		26	23.89	30
		39	23.96	30
		52	24.22	30
		58.5	24.10	30
		65	23.93	30
		78	24.18	30
5785	157	6.5	19.95	30
		13	19.63	30
		19.5	19.56	30
		26	19.99	30
		39	20.03	30
		52	20.17	30
		58.5	20.18	30
		65	20.15	30
		78	20.06	30
5825	165	6.5	19.69	30
		13	19.42	30
		19.5	19.48	30
		26	19.85	30
		39	19.88	30
		52	19.95	30
		58.5	19.97	30
		65	19.91	30
		78	19.92	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11ac_20 MHz BW Mode: 5745~5825)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5	23.59	30
		13	23.33	30
		19.5	23.25	30
		26	23.85	30
		39	23.92	30
		52	23.96	30
		58.5	23.99	30
		65	23.94	30
		78	23.99	30
5785	157	6.5	19.75	30
		13	19.48	30
		19.5	19.50	30
		26	19.98	30
		39	19.94	30
		52	20.06	30
		58.5	20.05	30
		65	20.01	30
		78	20.04	30
5825	165	6.5	19.79	30
		13	19.53	30
		19.5	19.48	30
		26	19.93	30
		39	19.89	30
		52	20.02	30
		58.5	19.86	30
		65	19.95	30
		78	20.05	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac_20 MHz BW Mode: 5745~5825)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5	26.65	28.54
		13	26.37	28.54
		19.5	26.37	28.54
		26	26.88	28.54
		39	26.95	28.54
		52	27.10	28.54
		58.5	27.06	28.54
		65	26.95	28.54
		78	27.10	28.54
5785	157	6.5	22.86	28.54
		13	22.57	28.54
		19.5	22.54	28.54
		26	23.00	28.54
		39	23.00	28.54
		52	23.13	28.54
		58.5	23.13	28.54
		65	23.09	28.54
		78	23.06	28.54
5825	165	6.5	22.75	28.54
		13	22.49	28.54
		19.5	22.49	28.54
		26	22.90	28.54
		39	22.90	28.54
		52	23.00	28.54
		58.5	22.93	28.54
		65	22.94	28.54
		78	23.00	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11ac_40 MHz BW Mode: 5755~5795)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5	23.69	30
		27	23.33	30
		40.5	23.42	30
		54	23.84	30
		81	23.76	30
		108	23.90	30
		121.5	23.77	30
		135	23.79	30
		162	23.92	30
		180	23.74	30
5795	159	13.5	21.21	30
		27	21.14	30
		40.5	21.00	30
		54	21.38	30
		81	21.60	30
		108	21.73	30
		121.5	21.45	30
		135	21.50	30
		162	21.64	30
		180	21.62	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11ac_40 MHz BW Mode: 5755~5795)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5	23.15	30
		27	22.88	30
		40.5	22.83	30
		54	23.29	30
		81	23.28	30
		108	23.44	30
		121.5	23.27	30
		135	23.36	30
		162	23.52	30
		180	23.31	30
5795	159	13.5	20.98	30
		27	20.57	30
		40.5	20.52	30
		54	21.00	30
		81	21.12	30
		108	21.27	30
		121.5	21.12	30
		135	21.14	30
		162	21.16	30
		180	21.18	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac_40 MHz BW Mode: 5755~5795)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5	26.44	28.54
		27	26.12	28.54
		40.5	26.15	28.54
		54	26.58	28.54
		81	26.54	28.54
		108	26.69	28.54
		121.5	26.54	28.54
		135	26.59	28.54
		162	26.73	28.54
		180	26.54	28.54
5795	159	13.5	24.11	28.54
		27	23.87	28.54
		40.5	23.78	28.54
		54	24.20	28.54
		81	24.38	28.54
		108	24.52	28.54
		121.5	24.30	28.54
		135	24.33	28.54
		162	24.42	28.54
		180	24.42	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11ac_80 MHz BW Mode: 5775)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5775	155	29.3	16.95	30
		58.5	16.82	30
		87.8	16.64	30
		117	17.07	30
		175.5	17.12	30
		234	17.12	30
		263.3	17.06	30
		292.5	17.05	30
		351	17.09	30
		390	16.88	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11ac_80 MHz BW Mode: 5775)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5775	155	29.3	16.52	30
		58.5	16.53	30
		87.8	16.43	30
		117	16.68	30
		175.5	16.68	30
		234	16.74	30
		263.3	16.57	30
		292.5	16.61	30
		351	16.62	30
		390	16.64	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac_80 MHz BW Mode: 5775)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5775	155	29.3	19.75	28.54
		58.5	19.69	28.54
		87.8	19.55	28.54
		117	19.89	28.54
		175.5	19.92	28.54
		234	19.94	28.54
		263.3	19.83	28.54
		292.5	19.85	28.54
		351	19.87	28.54
		390	19.77	28.54

▣ TEST RESULTS-Average

2.4 GHz Band

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	19.89	0.225	20.12	30
		2 Mbps	19.85	0.216	20.07	30
		5.5 Mbps	20.53	0.221	20.75	30
		11 Mbps	20.26	0.200	20.46	30
2437	6	1 Mbps	18.37	0.225	18.60	30
		2 Mbps	18.19	0.216	18.40	30
		5.5 Mbps	18.58	0.221	18.81	30
		11 Mbps	18.46	0.200	18.66	30
2462	11	1 Mbps	18.84	0.225	19.07	30
		2 Mbps	19.06	0.216	19.28	30
		5.5 Mbps	19.74	0.221	19.96	30
		11 Mbps	19.58	0.200	19.78	30

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	12.06	0.226	12.29	30
		9 Mbps	12.06	0.278	12.33	30
		12 Mbps	12.18	0.287	12.47	30
		18 Mbps	12.09	0.308	12.40	30
		24 Mbps	11.98	0.273	12.25	30
		36 Mbps	11.94	0.376	12.32	30
		48 Mbps	11.99	0.454	12.44	30
		54 Mbps	11.86	0.548	12.41	30
2437	6	6 Mbps	17.71	0.226	17.94	30
		9 Mbps	17.70	0.278	17.98	30
		12 Mbps	17.68	0.287	17.97	30
		18 Mbps	17.79	0.308	18.10	30
		24 Mbps	17.77	0.273	18.04	30
		36 Mbps	17.70	0.376	18.08	30
		48 Mbps	17.72	0.454	18.17	30
		54 Mbps	17.66	0.548	18.21	30
2462	11	6 Mbps	13.66	0.226	13.88	30
		9 Mbps	13.83	0.278	14.11	30
		12 Mbps	13.87	0.287	14.15	30
		18 Mbps	13.88	0.308	14.19	30
		24 Mbps	13.85	0.273	14.12	30
		36 Mbps	13.84	0.376	14.21	30
		48 Mbps	13.88	0.454	14.33	30
		54 Mbps	13.75	0.548	14.30	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	11.66	0.226	11.89	30
		9 Mbps	11.69	0.278	11.97	30
		12 Mbps	11.58	0.287	11.86	30
		18 Mbps	11.66	0.308	11.97	30
		24 Mbps	11.59	0.273	11.86	30
		36 Mbps	11.55	0.376	11.93	30
		48 Mbps	11.60	0.454	12.06	30
		54 Mbps	11.44	0.548	11.99	30
2437	6	6 Mbps	16.96	0.226	17.19	30
		9 Mbps	16.87	0.278	17.15	30
		12 Mbps	16.97	0.287	17.26	30
		18 Mbps	17.00	0.308	17.30	30
		24 Mbps	16.95	0.273	17.22	30
		36 Mbps	16.92	0.376	17.29	30
		48 Mbps	16.97	0.454	17.42	30
		54 Mbps	16.85	0.548	17.39	30
2462	11	6 Mbps	13.70	0.226	13.93	30
		9 Mbps	13.60	0.278	13.88	30
		12 Mbps	13.65	0.287	13.93	30
		18 Mbps	13.65	0.308	13.96	30
		24 Mbps	13.63	0.273	13.90	30
		36 Mbps	13.58	0.376	13.96	30
		48 Mbps	13.62	0.454	14.08	30
		54 Mbps	13.50	0.548	14.05	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	15.10	30
		9 Mbps	15.16	30
		12 Mbps	15.19	30
		18 Mbps	15.20	30
		24 Mbps	15.07	30
		36 Mbps	15.14	30
		48 Mbps	15.26	30
		54 Mbps	15.22	30
2437	6	6 Mbps	20.59	30
		9 Mbps	20.60	30
		12 Mbps	20.64	30
		18 Mbps	20.73	30
		24 Mbps	20.66	30
		36 Mbps	20.71	30
		48 Mbps	20.82	30
		54 Mbps	20.83	30
2462	11	6 Mbps	16.92	30
		9 Mbps	17.01	30
		12 Mbps	17.05	30
		18 Mbps	17.09	30
		24 Mbps	17.02	30
		36 Mbps	17.10	30
		48 Mbps	17.22	30
		54 Mbps	17.19	30

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6.5 Mbps	12.15	0.210	12.36	30
		13 Mbps	12.14	0.195	12.33	30
		19.5 Mbps	11.97	0.216	12.18	30
		26 Mbps	12.00	0.200	12.20	30
		39 Mbps	11.96	0.287	12.25	30
		52 Mbps	12.06	0.360	12.42	30
		58.5 Mbps	11.88	0.391	12.27	30
		65 Mbps	11.86	0.435	12.30	30
2437	6	6.5 Mbps	17.81	0.210	18.02	30
		13 Mbps	17.82	0.195	18.02	30
		19.5 Mbps	17.86	0.216	18.08	30
		26 Mbps	17.89	0.200	18.09	30
		39 Mbps	17.85	0.287	18.14	30
		52 Mbps	17.81	0.360	18.17	30
		58.5 Mbps	17.77	0.391	18.16	30
		65 Mbps	17.76	0.435	18.20	30
2462	11	6.5 Mbps	13.38	0.210	13.59	30
		13 Mbps	13.32	0.195	13.52	30
		19.5 Mbps	13.27	0.216	13.48	30
		26 Mbps	13.38	0.200	13.59	30
		39 Mbps	13.17	0.287	13.45	30
		52 Mbps	13.23	0.360	13.59	30
		58.5 Mbps	13.24	0.391	13.63	30
		65 Mbps	13.09	0.435	13.52	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6.5 Mbps	11.76	0.210	11.97	30
		13 Mbps	11.52	0.195	11.71	30
		19.5 Mbps	11.81	0.216	12.02	30
		26 Mbps	11.86	0.200	12.06	30
		39 Mbps	11.81	0.287	12.10	30
		52 Mbps	11.78	0.360	12.14	30
		58.5 Mbps	11.75	0.391	12.14	30
		65 Mbps	11.70	0.435	12.14	30
2437	6	6.5 Mbps	17.08	0.210	17.29	30
		13 Mbps	17.17	0.195	17.36	30
		19.5 Mbps	17.18	0.216	17.40	30
		26 Mbps	17.20	0.200	17.40	30
		39 Mbps	17.16	0.287	17.45	30
		52 Mbps	17.12	0.360	17.48	30
		58.5 Mbps	17.06	0.391	17.46	30
		65 Mbps	17.06	0.435	17.49	30
2462	11	6.5 Mbps	12.91	0.210	13.12	30
		13 Mbps	12.95	0.195	13.15	30
		19.5 Mbps	12.97	0.216	13.18	30
		26 Mbps	13.01	0.200	13.21	30
		39 Mbps	12.95	0.287	13.23	30
		52 Mbps	12.89	0.360	13.25	30
		58.5 Mbps	12.85	0.391	13.25	30
		65 Mbps	12.89	0.435	13.33	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	15.18	30
		13 Mbps	15.04	30
		19.5 Mbps	15.11	30
		26 Mbps	15.14	30
		39 Mbps	15.19	30
		52 Mbps	15.29	30
		58.5 Mbps	15.22	30
		65 Mbps	15.23	30
2437	6	6.5 Mbps	20.68	30
		13 Mbps	20.71	30
		19.5 Mbps	20.76	30
		26 Mbps	20.77	30
		39 Mbps	20.82	30
		52 Mbps	20.85	30
		58.5 Mbps	20.83	30
		65 Mbps	20.87	30
2462	11	6.5 Mbps	16.37	30
		13 Mbps	16.35	30
		19.5 Mbps	16.34	30
		26 Mbps	16.41	30
		39 Mbps	16.35	30
		52 Mbps	16.43	30
		58.5 Mbps	16.45	30
		65 Mbps	16.44	30

5.8 GHz Band

▣ TEST RESULTS_Ant.0

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6 Mbps	16.86	0.226	17.08	30
		9 Mbps	16.79	0.278	17.07	30
		12 Mbps	16.68	0.287	16.96	30
		18 Mbps	16.78	0.308	17.09	30
		24 Mbps	16.83	0.273	17.11	30
		36 Mbps	16.76	0.376	17.14	30
		48 Mbps	16.79	0.454	17.24	30
		54 Mbps	16.60	0.548	17.15	30
5785	157	6 Mbps	15.78	0.226	16.01	30
		9 Mbps	15.76	0.278	16.04	30
		12 Mbps	15.91	0.287	16.20	30
		18 Mbps	15.80	0.308	16.11	30
		24 Mbps	15.73	0.273	16.00	30
		36 Mbps	15.73	0.376	16.11	30
		48 Mbps	15.74	0.454	16.19	30
		54 Mbps	15.62	0.548	16.16	30
5825	165	6 Mbps	16.21	0.226	16.44	30
		9 Mbps	16.15	0.278	16.42	30
		12 Mbps	16.17	0.287	16.45	30
		18 Mbps	16.13	0.308	16.44	30
		24 Mbps	16.07	0.273	16.34	30
		36 Mbps	16.04	0.376	16.41	30
		48 Mbps	16.07	0.454	16.52	30
		54 Mbps	16.03	0.548	16.58	30

▣ TEST RESULTS_Ant.1

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6 Mbps	16.55	0.226	16.77	30
		9 Mbps	16.44	0.278	16.71	30
		12 Mbps	16.53	0.287	16.82	30
		18 Mbps	16.59	0.308	16.90	30
		24 Mbps	16.53	0.273	16.80	30
		36 Mbps	16.36	0.376	16.74	30
		48 Mbps	16.42	0.454	16.87	30
		54 Mbps	16.36	0.548	16.91	30
5785	157	6 Mbps	15.67	0.226	15.89	30
		9 Mbps	15.68	0.278	15.95	30
		12 Mbps	15.66	0.287	15.94	30
		18 Mbps	15.71	0.308	16.02	30
		24 Mbps	15.69	0.273	15.97	30
		36 Mbps	15.64	0.376	16.01	30
		48 Mbps	15.69	0.454	16.15	30
		54 Mbps	15.55	0.548	16.10	30
5825	165	6 Mbps	16.11	0.226	16.33	30
		9 Mbps	16.01	0.278	16.29	30
		12 Mbps	16.01	0.287	16.30	30
		18 Mbps	16.02	0.308	16.33	30
		24 Mbps	15.95	0.273	16.23	30
		36 Mbps	15.86	0.376	16.23	30
		48 Mbps	15.92	0.454	16.37	30
		54 Mbps	15.79	0.548	16.34	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

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

802.11a Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6 Mbps	19.94	28.54
		9 Mbps	19.90	28.54
		12 Mbps	19.90	28.54
		18 Mbps	20.01	28.54
		24 Mbps	19.97	28.54
		36 Mbps	19.95	28.54
		48 Mbps	20.07	28.54
		54 Mbps	20.04	28.54
5785	157	6 Mbps	18.96	28.54
		9 Mbps	19.01	28.54
		12 Mbps	19.08	28.54
		18 Mbps	19.08	28.54
		24 Mbps	19.00	28.54
		36 Mbps	19.07	28.54
		48 Mbps	19.18	28.54
		54 Mbps	19.14	28.54
5825	165	6 Mbps	19.40	28.54
		9 Mbps	19.37	28.54
		12 Mbps	19.39	28.54
		18 Mbps	19.40	28.54
		24 Mbps	19.30	28.54
		36 Mbps	19.33	28.54
		48 Mbps	19.46	28.54
		54 Mbps	19.47	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5 Mbps	16.30	0.210	16.51	30
		13 Mbps	16.16	0.195	16.35	30
		19.5 Mbps	16.37	0.216	16.58	30
		26 Mbps	16.34	0.200	16.54	30
		39 Mbps	16.29	0.287	16.58	30
		52 Mbps	16.01	0.360	16.37	30
		58.5 Mbps	16.17	0.391	16.56	30
		65 Mbps	16.17	0.435	16.60	30
5785	157	6.5 Mbps	15.22	0.210	15.43	30
		13 Mbps	15.19	0.195	15.38	30
		19.5 Mbps	15.10	0.216	15.31	30
		26 Mbps	15.35	0.200	15.55	30
		39 Mbps	15.40	0.287	15.68	30
		52 Mbps	15.27	0.360	15.62	30
		58.5 Mbps	15.14	0.391	15.53	30
		65 Mbps	15.10	0.435	15.54	30
5825	165	6.5 Mbps	15.57	0.210	15.78	30
		13 Mbps	15.62	0.195	15.82	30
		19.5 Mbps	15.64	0.216	15.86	30
		26 Mbps	15.60	0.200	15.80	30
		39 Mbps	15.55	0.287	15.83	30
		52 Mbps	15.53	0.360	15.89	30
		58.5 Mbps	15.46	0.391	15.85	30
		65 Mbps	15.46	0.435	15.90	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5 Mbps	16.07	0.210	16.28	30
		13 Mbps	16.10	0.195	16.29	30
		19.5 Mbps	16.04	0.216	16.26	30
		26 Mbps	16.04	0.200	16.24	30
		39 Mbps	15.95	0.287	16.24	30
		52 Mbps	15.92	0.360	16.28	30
		58.5 Mbps	15.91	0.391	16.30	30
		65 Mbps	15.92	0.435	16.36	30
5785	157	6.5 Mbps	15.10	0.210	15.31	30
		13 Mbps	15.08	0.195	15.28	30
		19.5 Mbps	15.07	0.216	15.28	30
		26 Mbps	15.09	0.200	15.29	30
		39 Mbps	15.09	0.287	15.38	30
		52 Mbps	15.05	0.360	15.41	30
		58.5 Mbps	14.85	0.391	15.24	30
		65 Mbps	14.87	0.435	15.31	30
5825	165	6.5 Mbps	15.74	0.210	15.95	30
		13 Mbps	15.61	0.195	15.80	30
		19.5 Mbps	15.61	0.216	15.83	30
		26 Mbps	15.67	0.200	15.87	30
		39 Mbps	15.44	0.287	15.73	30
		52 Mbps	15.50	0.360	15.86	30
		58.5 Mbps	15.50	0.391	15.90	30
		65 Mbps	15.45	0.435	15.88	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5 Mbps	19.41	28.54
		13 Mbps	19.33	28.54
		19.5 Mbps	19.43	28.54
		26 Mbps	19.40	28.54
		39 Mbps	19.42	28.54
		52 Mbps	19.34	28.54
		58.5 Mbps	19.44	28.54
		65 Mbps	19.49	28.54
5785	157	6.5 Mbps	18.38	28.54
		13 Mbps	18.34	28.54
		19.5 Mbps	18.31	28.54
		26 Mbps	18.43	28.54
		39 Mbps	18.54	28.54
		52 Mbps	18.53	28.54
		58.5 Mbps	18.40	28.54
		65 Mbps	18.44	28.54
5825	165	6.5 Mbps	18.88	28.54
		13 Mbps	18.82	28.54
		19.5 Mbps	18.86	28.54
		26 Mbps	18.85	28.54
		39 Mbps	18.79	28.54
		52 Mbps	18.89	28.54
		58.5 Mbps	18.89	28.54
		65 Mbps	18.90	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5 Mbps	15.68	0.429	16.11	30
		27 Mbps	15.72	0.404	16.12	30
		40.5 Mbps	15.72	0.410	16.13	30
		54 Mbps	15.77	0.370	16.14	30
		81 Mbps	15.54	0.518	16.06	30
		108 Mbps	15.53	0.623	16.15	30
		121.5 Mbps	15.48	0.672	16.15	30
		135 Mbps	15.33	0.739	16.07	30
5795	159	13.5 Mbps	15.80	0.429	16.23	30
		27 Mbps	15.83	0.404	16.23	30
		40.5 Mbps	15.96	0.410	16.37	30
		54 Mbps	15.90	0.370	16.27	30
		81 Mbps	15.80	0.518	16.32	30
		108 Mbps	15.67	0.623	16.29	30
		121.5 Mbps	15.68	0.672	16.35	30
		135 Mbps	15.55	0.739	16.29	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5 Mbps	15.26	0.429	15.69	30
		27 Mbps	15.30	0.404	15.71	30
		40.5 Mbps	15.30	0.410	15.71	30
		54 Mbps	15.12	0.370	15.49	30
		81 Mbps	14.98	0.518	15.50	30
		108 Mbps	14.88	0.623	15.50	30
		121.5 Mbps	15.01	0.672	15.68	30
		135 Mbps	14.82	0.739	15.56	30
5795	159	13.5 Mbps	15.44	0.429	15.87	30
		27 Mbps	15.39	0.404	15.79	30
		40.5 Mbps	15.41	0.410	15.82	30
		54 Mbps	15.46	0.370	15.83	30
		81 Mbps	15.34	0.518	15.85	30
		108 Mbps	15.24	0.623	15.87	30
		121.5 Mbps	15.20	0.672	15.87	30
		135 Mbps	15.15	0.739	15.88	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5 Mbps	18.92	28.54
		27 Mbps	18.93	28.54
		40.5 Mbps	18.94	28.54
		54 Mbps	18.84	28.54
		81 Mbps	18.80	28.54
		108 Mbps	18.85	28.54
		121.5 Mbps	18.93	28.54
		135 Mbps	18.83	28.54
5795	159	13.5 Mbps	19.06	28.54
		27 Mbps	19.03	28.54
		40.5 Mbps	19.11	28.54
		54 Mbps	19.07	28.54
		81 Mbps	19.10	28.54
		108 Mbps	19.10	28.54
		121.5 Mbps	19.13	28.54
		135 Mbps	19.10	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11ac_20 MHz BW Mode: 5745~5825)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5	16.48	0.210	16.69	30
		13	16.43	0.195	16.63	30
		19.5	16.09	0.216	16.31	30
		26	16.00	0.200	16.21	30
		39	15.95	0.287	16.24	30
		52	16.12	0.360	16.48	30
		58.5	15.94	0.391	16.33	30
		65	16.13	0.435	16.57	30
		78	16.02	0.581	16.61	30
5785	157	6.5	12.34	0.210	12.55	30
		13	12.21	0.195	12.40	30
		19.5	12.26	0.216	12.48	30
		26	12.08	0.200	12.28	30
		39	12.01	0.287	12.30	30
		52	11.93	0.360	12.29	30
		58.5	11.93	0.391	12.32	30
		65	11.98	0.435	12.41	30
		78	11.81	0.581	12.39	30
5825	165	6.5	12.14	0.210	12.35	30
		13	12.16	0.195	12.36	30
		19.5	12.03	0.216	12.24	30
		26	12.03	0.200	12.24	30
		39	11.91	0.287	12.20	30
		52	11.85	0.360	12.21	30
		58.5	11.78	0.391	12.17	30
		65	11.76	0.435	12.19	30
		78	11.64	0.581	12.23	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11ac_20 MHz BW Mode: 5745~5825)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5	16.12	0.210	16.33	30
		13	16.19	0.195	16.38	30
		19.5	15.92	0.216	16.14	30
		26	15.95	0.200	16.15	30
		39	15.92	0.287	16.21	30
		52	15.93	0.360	16.29	30
		58.5	15.82	0.391	16.21	30
		65	15.74	0.435	16.17	30
		78	15.69	0.581	16.28	30
5785	157	6.5	12.15	0.210	12.36	30
		13	12.14	0.195	12.34	30
		19.5	12.05	0.216	12.27	30
		26	12.01	0.200	12.21	30
		39	11.99	0.287	12.27	30
		52	11.90	0.360	12.26	30
		58.5	11.86	0.391	12.25	30
		65	11.79	0.435	12.22	30
		78	11.79	0.581	12.37	30
5825	165	6.5	12.04	0.210	12.25	30
		13	12.01	0.195	12.20	30
		19.5	11.93	0.216	12.14	30
		26	11.90	0.200	12.10	30
		39	11.80	0.287	12.09	30
		52	11.72	0.360	12.08	30
		58.5	11.75	0.391	12.14	30
		65	11.68	0.435	12.11	30
		78	11.65	0.581	12.23	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac_20 MHz BW Mode: 5745~5825)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5	19.52	28.54
		13	19.52	28.54
		19.5	19.24	28.54
		26	19.19	28.54
		39	19.24	28.54
		52	19.40	28.54
		58.5	19.28	28.54
		65	19.38	28.54
		78	19.46	28.54
5785	157	6.5	15.47	28.54
		13	15.38	28.54
		19.5	15.39	28.54
		26	15.26	28.54
		39	15.30	28.54
		52	15.29	28.54
		58.5	15.30	28.54
		65	15.33	28.54
		78	15.39	28.54
5825	165	6.5	15.31	28.54
		13	15.29	28.54
		19.5	15.20	28.54
		26	15.18	28.54
		39	15.16	28.54
		52	15.16	28.54
		58.5	15.17	28.54
		65	15.16	28.54
		78	15.24	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11ac_40 MHz BW Mode: 5755~5795)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5	15.98	0.429	16.41	30
		27	15.87	0.404	16.27	30
		40.5	15.77	0.410	16.18	30
		54	15.68	0.370	16.05	30
		81	15.40	0.518	15.92	30
		108	15.44	0.623	16.07	30
		121.5	15.34	0.672	16.01	30
		135	15.28	0.739	16.02	30
		162	15.17	0.947	16.11	30
		180	14.99	0.973	15.96	30
5795	159	13.5	13.52	0.429	13.95	30
		27	13.51	0.404	13.91	30
		40.5	13.29	0.410	13.70	30
		54	13.30	0.370	13.67	30
		81	13.19	0.518	13.71	30
		108	13.22	0.623	13.85	30
		121.5	13.10	0.672	13.77	30
		135	12.91	0.739	13.65	30
		162	12.87	0.947	13.82	30
		180	12.94	0.973	13.91	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11ac_40 MHz BW Mode: 5755~5795)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5	15.49	0.429	15.92	30
		27	15.38	0.404	15.78	30
		40.5	15.28	0.410	15.69	30
		54	15.19	0.370	15.56	30
		81	15.00	0.518	15.52	30
		108	15.00	0.623	15.63	30
		121.5	14.84	0.672	15.51	30
		135	14.94	0.739	15.68	30
		162	14.80	0.947	15.75	30
		180	14.64	0.973	15.61	30
5795	159	13.5	13.16	0.429	13.59	30
		27	13.05	0.404	13.45	30
		40.5	12.85	0.410	13.26	30
		54	12.86	0.370	13.23	30
		81	12.77	0.518	13.29	30
		108	12.62	0.623	13.24	30
		121.5	12.56	0.672	13.23	30
		135	12.50	0.739	13.23	30
		162	12.42	0.947	13.37	30
		180	12.30	0.973	13.28	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac_40 MHz BW Mode: 5755~5795)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5755	151	13.5	19.18	28.54
		27	19.04	28.54
		40.5	18.95	28.54
		54	18.82	28.54
		81	18.73	28.54
		108	18.87	28.54
		121.5	18.78	28.54
		135	18.86	28.54
		162	18.94	28.54
		180	18.80	28.54
5795	159	13.5	16.78	28.54
		27	16.70	28.54
		40.5	16.50	28.54
		54	16.47	28.54
		81	16.52	28.54
		108	16.57	28.54
		121.5	16.52	28.54
		135	16.46	28.54
		162	16.61	28.54
		180	16.62	28.54

▣ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11ac_80 MHz BW Mode: 5775)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5775	155	29.3	9.10	0.266	9.37	30
		58.5	8.98	0.469	9.45	30
		87.8	8.84	0.638	9.48	30
		117	8.75	0.764	9.51	30
		175.5	8.57	0.976	9.55	30
		234	8.49	1.136	9.62	30
		263.3	8.32	1.218	9.54	30
		292.5	8.30	1.264	9.56	30
		351	8.17	1.368	9.54	30
		390	8.07	1.442	9.51	30

▣ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11ac_80 MHz BW Mode: 5775)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5775	155	29.3	8.70	0.266	8.97	30
		58.5	8.63	0.469	9.10	30
		87.8	8.46	0.638	9.10	30
		117	8.34	0.764	9.10	30
		175.5	8.13	0.976	9.10	30
		234	8.02	1.136	9.16	30
		263.3	7.92	1.218	9.14	30
		292.5	7.85	1.264	9.12	30
		351	7.75	1.368	9.12	30
		390	7.71	1.442	9.15	30

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac_80 MHz BW Mode: 5775)

802.11ac Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5775	155	29.3	12.18	28.54
		58.5	12.29	28.54
		87.8	12.30	28.54
		117	12.32	28.54
		175.5	12.34	28.54
		234	12.41	28.54
		263.3	12.35	28.54
		292.5	12.36	28.54
		351	12.35	28.54
		390	12.34	28.54

Note : In order to simplify the report, attached plots were only the highest conducted power channel and data rate.

▣ RESULT PLOTS-Peak Ant.0

40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 159) 121.5 Mbps

Conducted Output Power (802.11ac-CH 151) 162 Mbps

80 MHz BW

(5775 MHz)

Conducted Output Power (802.11ac-CH 155) 175.5 Mbps

▣ RESULT PLOTS-Peak Ant.1

40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 159) 108 Mbps

Conducted Output Power (802.11ac-CH 151) 162 Mbps

80 MHz BW

(5775 MHz)

Conducted Output Power (802.11ac-CH 155) 234 Mbps

▣ RESULT PLOTS-Average Ant.0

40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 159) 40.5 Mbps

Conducted Output Power (802.11ac-CH 151) 13.5 Mbps

80 MHz BW

(5775 MHz)

Conducted Output Power (802.11ac-CH 155) 234 Mbps

▣ RESULT PLOTS-Average Ant.1

40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 159) 135 Mbps

Conducted Output Power (802.11ac-CH 151) 13.5 Mbps

80 MHz BW

(5775 MHz)

Conducted Output Power (802.11ac-CH 155) 234 Mbps

8.5 POWER SPECTRAL DENSITY (802.11a/b/g/n/ac)

Test Requirements and limit, §15.247(e)

The peak power spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

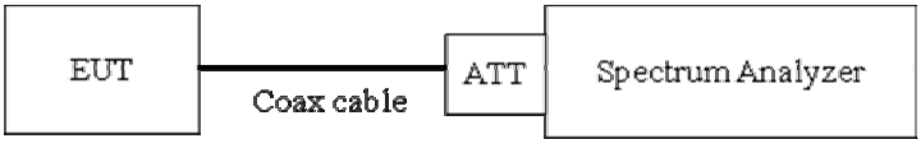
Minimum Standard – the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

▣ Limit(CDD)

Operating Mode	Band	Mode	Ant. Port	Ant. Gain (dBi)	Limit (dBm)
SISO	2.4 GHz	802.11b/g/n	0	2.47	8
		802.11g/n	1	3.3	8
MIMO(2 TX)		802.11g/n	0 & 1	5.91	8
SISO	5.8 GHz	802.11a/n/ac	0	4.58	8
			1	4.32	8
MIMO(2 TX)		802.11a/n/ac	0 & 1	7.46	6.54

Note : Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

We tested according to Procedure 10.2 in KDB 558074, issued 04/09/2013

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

RBW = 3 kHz ≤ RBW ≤ 100 kHz.

VBW ≥ 3 x RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

▣ Sample Calculation

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

Output Power = -5 dBm + 10 dB + 0.8 dB = 5.8 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 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

Band	Loss(dB)
2.4 GHz	10.5
5.8 GHz	10.9

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

▣ TEST RESULTS_Ant.0

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-1.643	8	Pass
2437	6		-3.927		Pass
2462	11		-2.276		Pass
2412	1	802.11g	-13.337		Pass
2437	6		-6.651		Pass
2462	11		-11.400		Pass
2412	1	802.11n 2.4 GHz Band	-12.568		Pass
2437	6		-6.268		Pass
2462	11		-10.796		Pass
5745	149	802.11a	-9.457		Pass
5785	157		-9.662		Pass
5825	165		-9.815		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-7.636		Pass
5785	157		-8.659		Pass
5825	165		-8.661		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-12.270		Pass
5795	159		-10.802		Pass
5745	149	802.11ac_20 MHz BW 5.8 GHz Band	-8.214		Pass
5785	157		-12.764		Pass
5825	165		-11.935		Pass
5755	151	802.11ac_40 MHz BW 5.8 GHz Band	-11.027		Pass
5795	159		-14.346		Pass
5775	155	802.11ac_80 MHz BW 5.8 GHz Band	-20.025		Pass

Note :

1. **In order to simplify the report, attached plots were only the highest PSD channel.**

▣ TEST RESULTS_Ant.1

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11g	-13.963	8	Pass
2437	6		-8.971		Pass
2462	11		-10.870		Pass
2412	1	802.11n 2.4 GHz Band	-12.430		Pass
2437	6		-7.970		Pass
2462	11		-10.878		Pass
5745	149	802.11a	-9.284		Pass
5785	157		-10.114		Pass
5825	165		-9.602		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-8.227		Pass
5785	157		-8.513		Pass
5825	165		-9.090		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-11.482		Pass
5795	159		-11.049		Pass
5745	149	802.11ac_20 MHz BW 5.8 GHz Band	-8.089		Pass
5785	157		-12.851		Pass
5825	165		-12.189		Pass
5755	151	802.11ac_40 MHz BW 5.8 GHz Band	-10.937		Pass
5795	159		-14.103		Pass
5775	155	802.11ac_80 MHz BW 5.8 GHz Band	-19.935		Pass

Note :

1. **In order to simplify the report, attached plots were only the highest PSD channel.**

▣ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Power Density Measurements

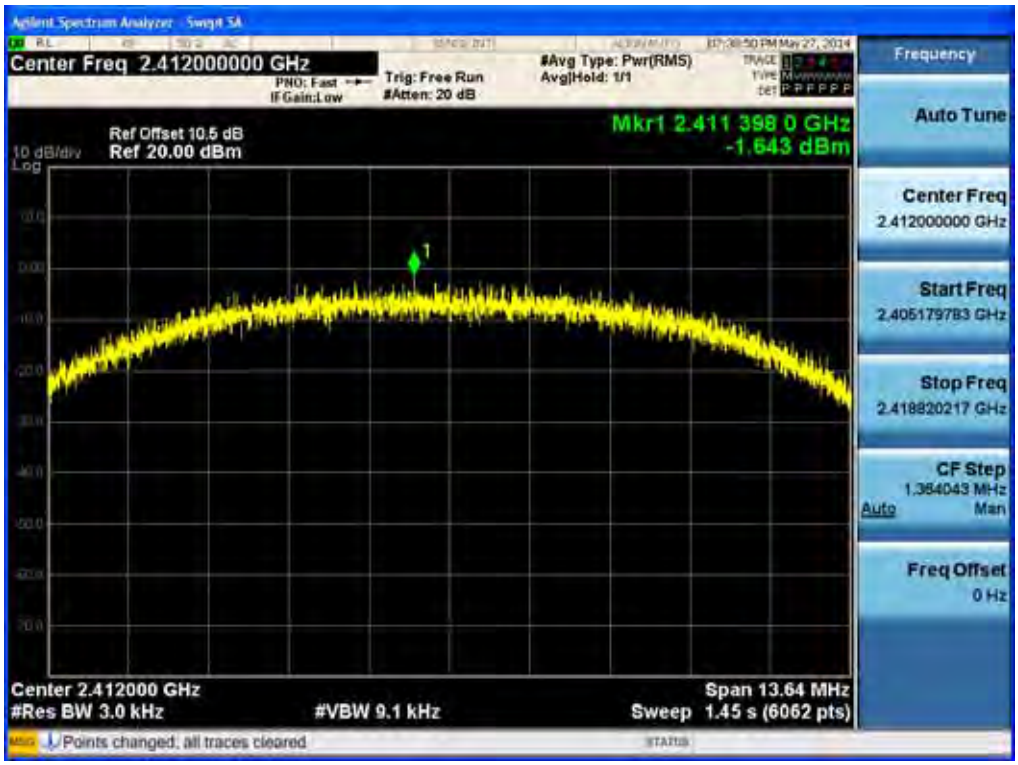
Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11g	-10.63	6.54	Pass
2437	6		-4.65		Pass
2462	11		-8.12		Pass
2412	1	802.11n(20M) 2.4 GHz Band	-9.49		Pass
2437	6		-4.03		Pass
2462	11		-7.83		Pass
5745	149	802.11a	-6.36		Pass
5785	157		-6.87		Pass
5825	165		-6.70		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-4.91		Pass
5785	157		-5.58		Pass
5825	165		-5.86		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-8.85		Pass
5795	159		-7.91		Pass
5745	149	802.11ac_20 MHz BW 5.8 GHz Band	-5.14		Pass
5785	157		-9.80		Pass
5825	165		-9.05		Pass
5755	151	802.11ac_40 MHz BW 5.8 GHz Band	-7.97		Pass
5795	159		-11.21		Pass
5775	155	802.11ac_80 MHz BW 5.8 GHz Band	-16.97		Pass

Ant.0

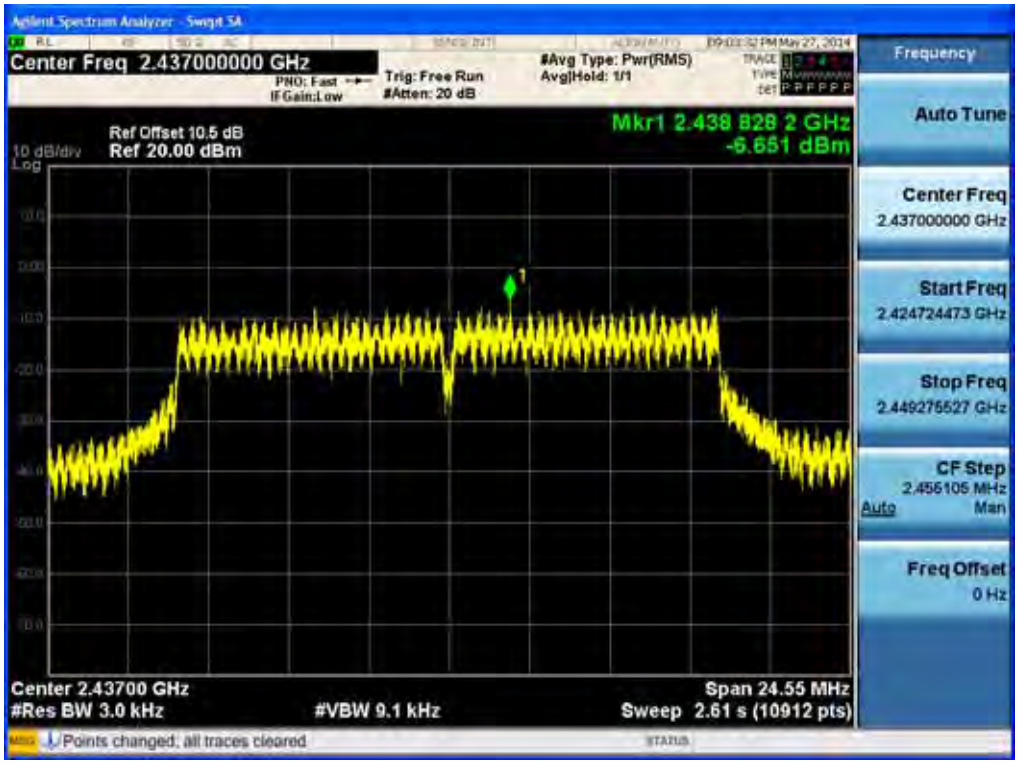
▣ RESULT PLOTS

2.4 GHz Band

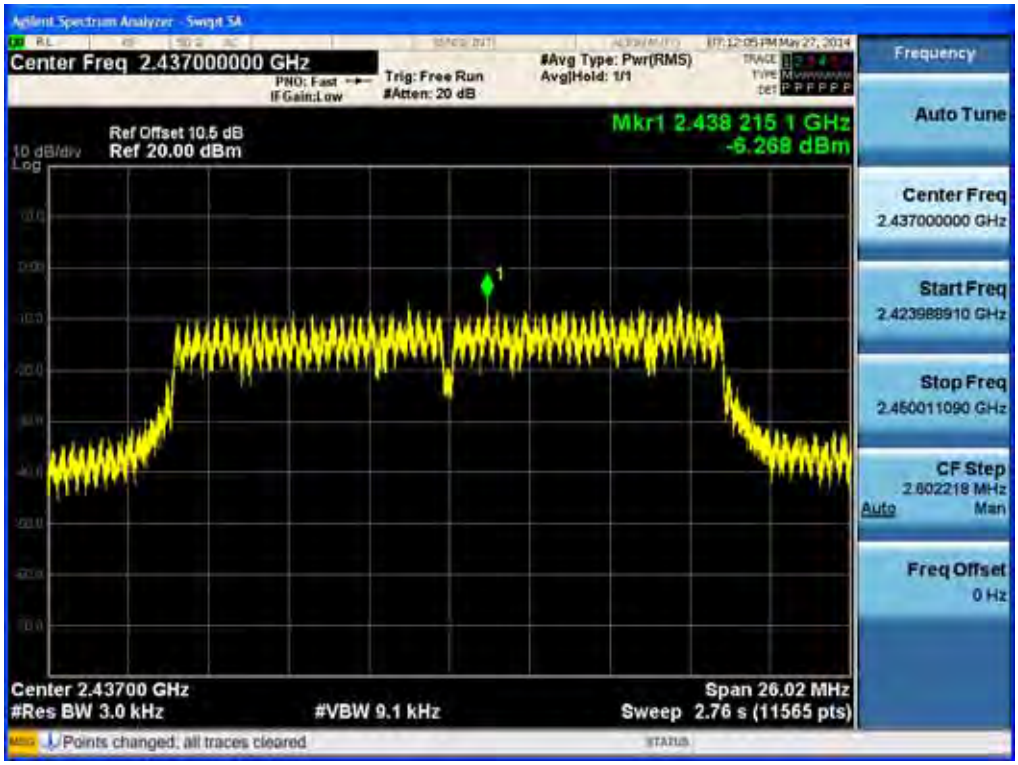
Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11g-CH 6)

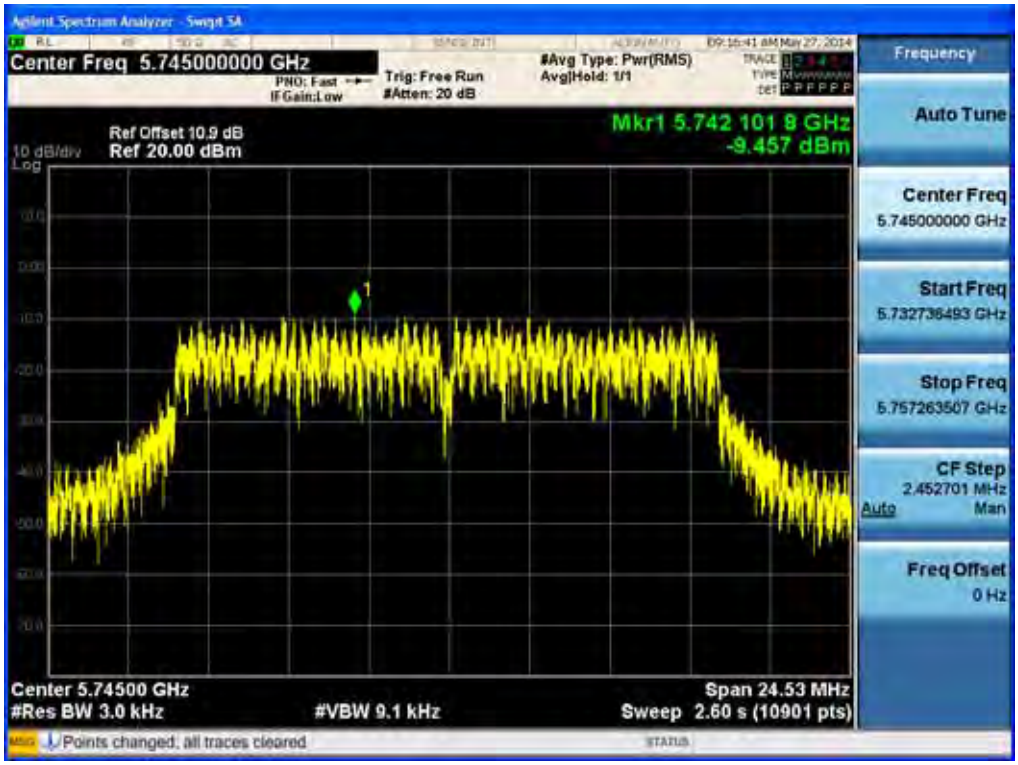


Power Spectral Density (802.11n-CH 6)

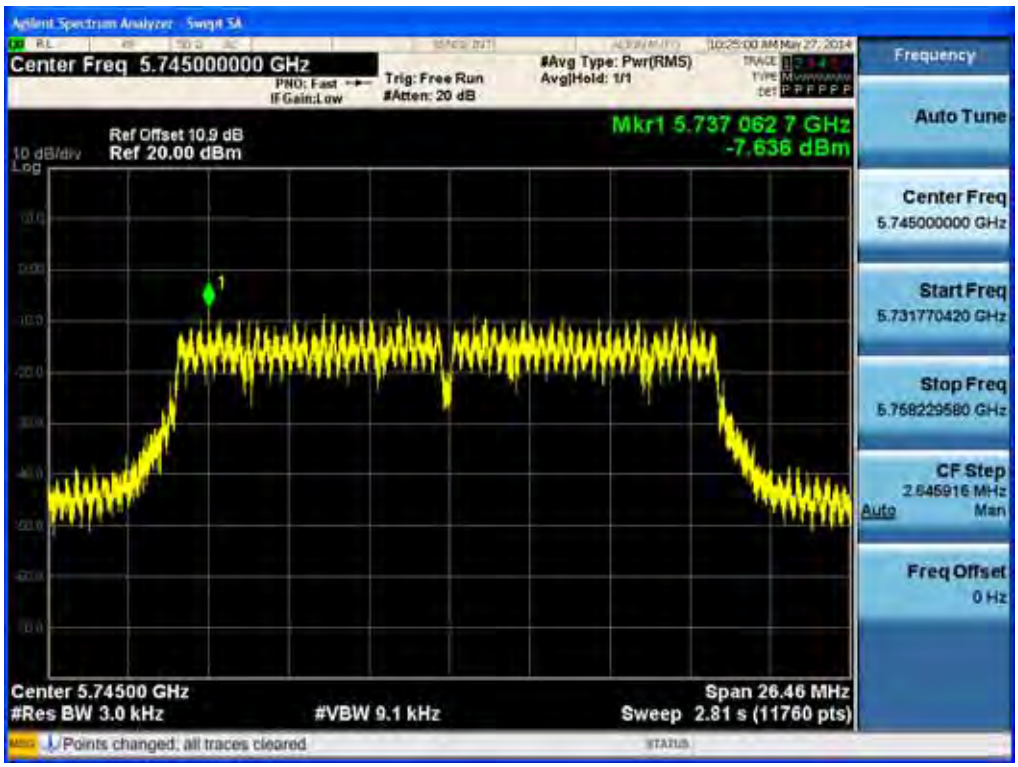


5.8 GHz Band

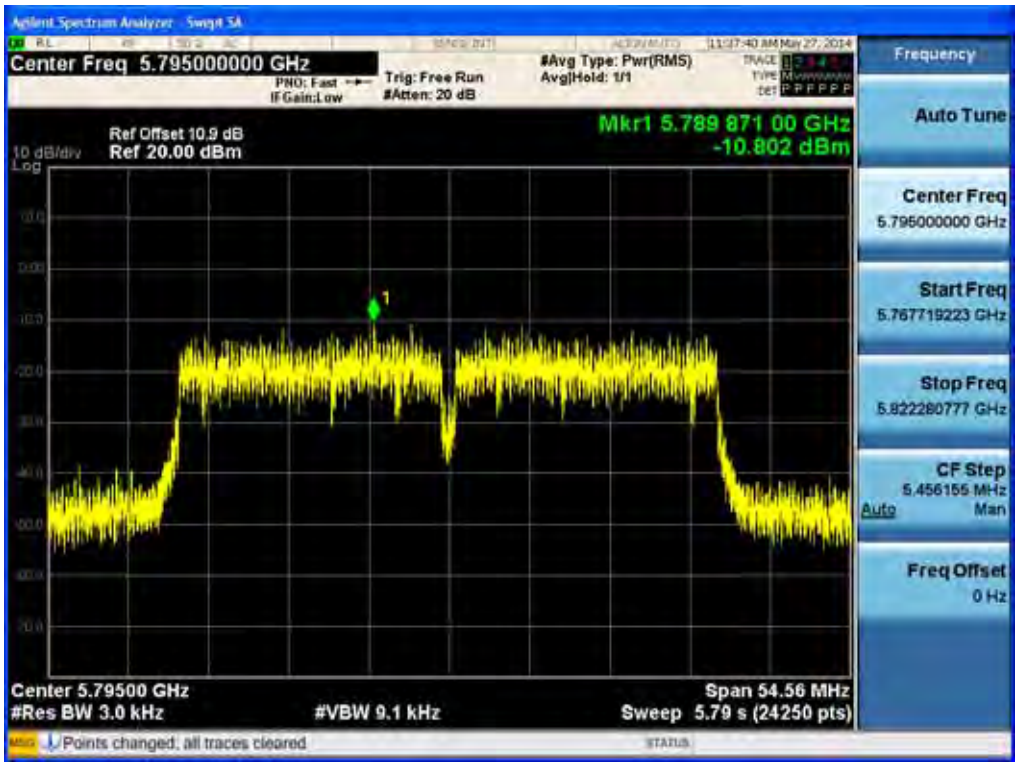
Power Spectral Density (802.11a-CH 149)



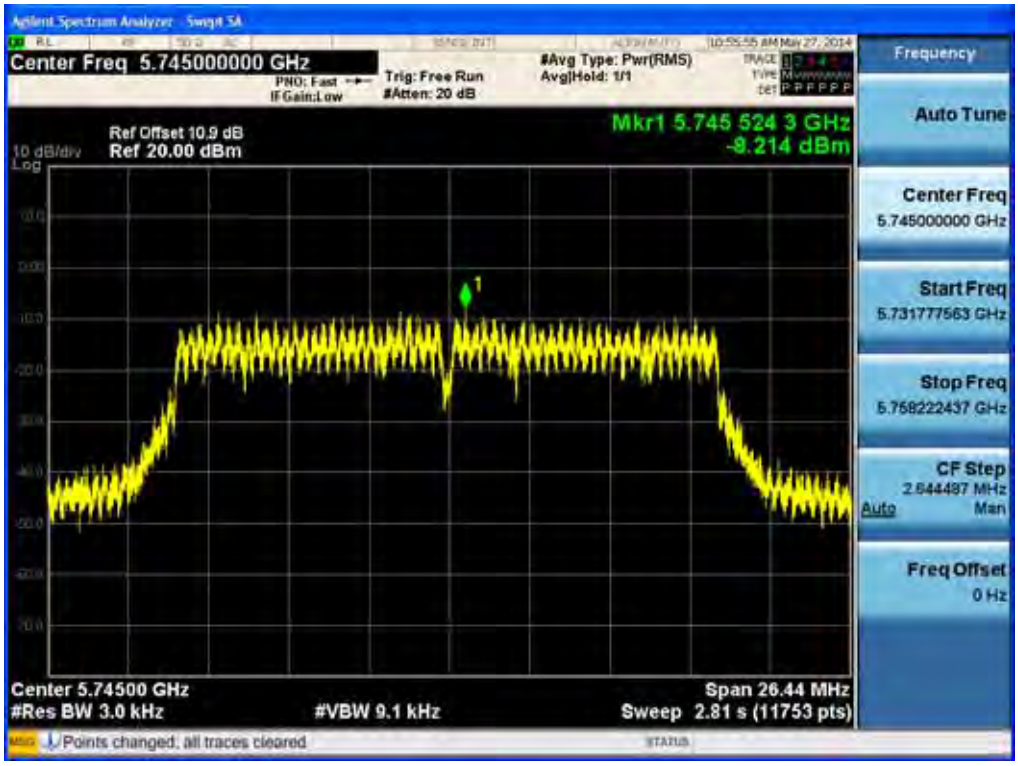
Power Spectral Density (802.11n_20 MHz BW -CH 149)



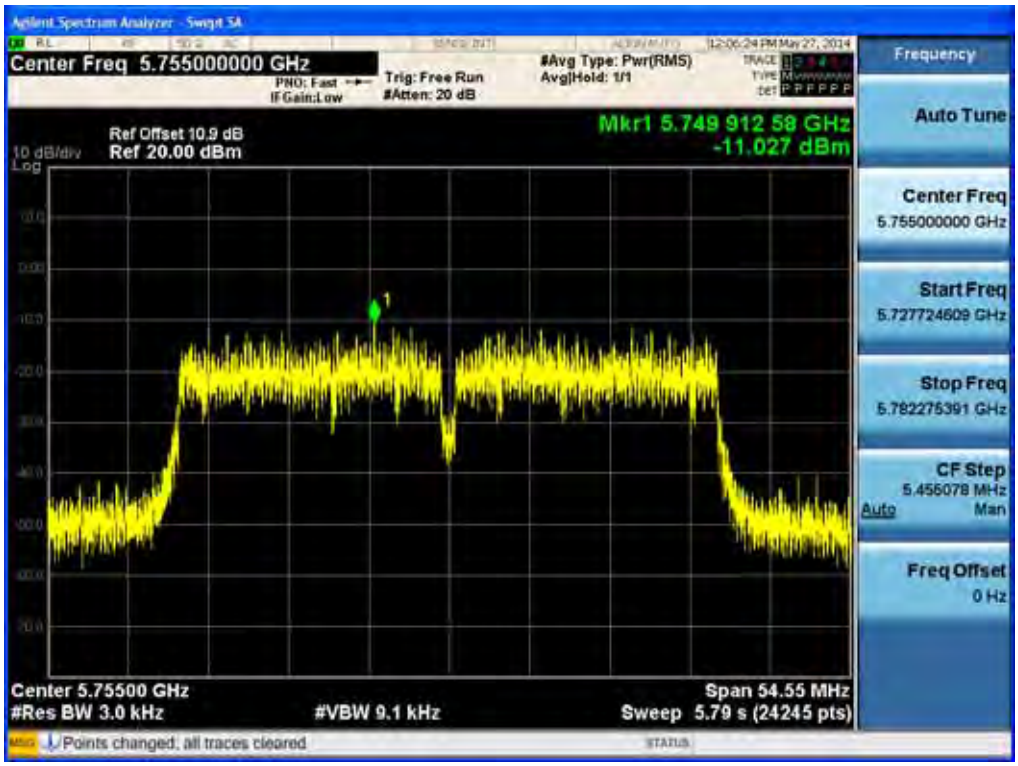
Power Spectral Density (802.11n_40 MHz BW -CH 159)



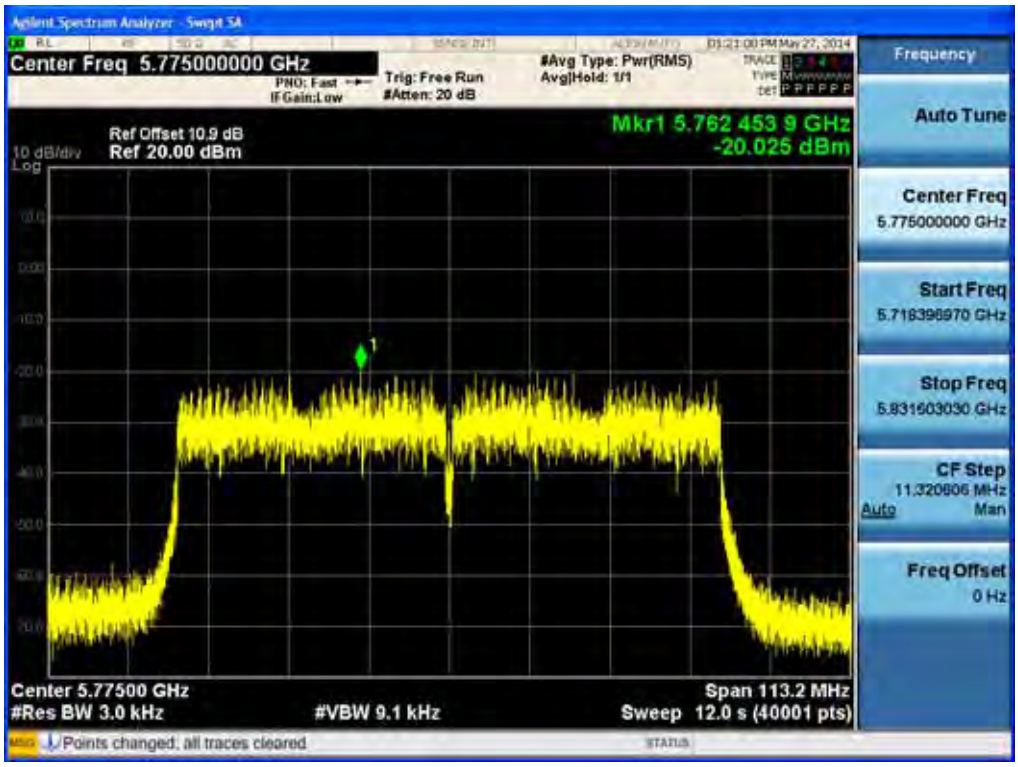
Power Spectral Density (802.11ac_20 MHz BW _CH 149)



Power Spectral Density (802.11ac_40 MHz BW _CH 151)



Power Spectral Density (802.11ac_80 MHz BW _CH 155)

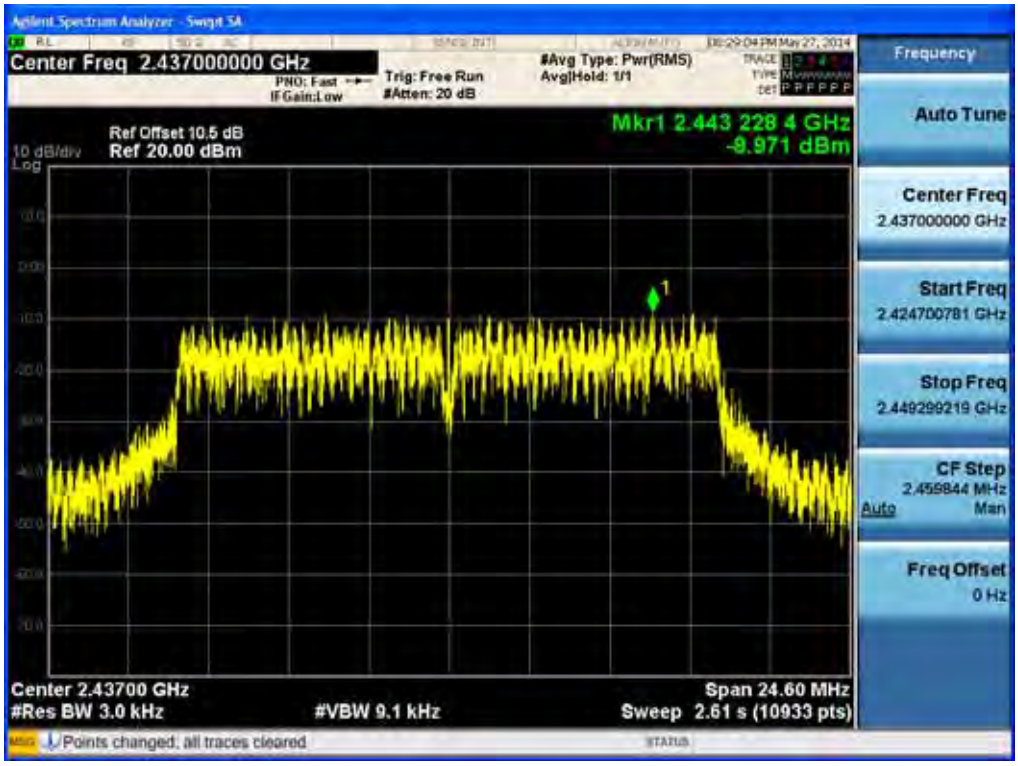


Ant.1

▣ RESULT PLOTS

2.4 GHz Band

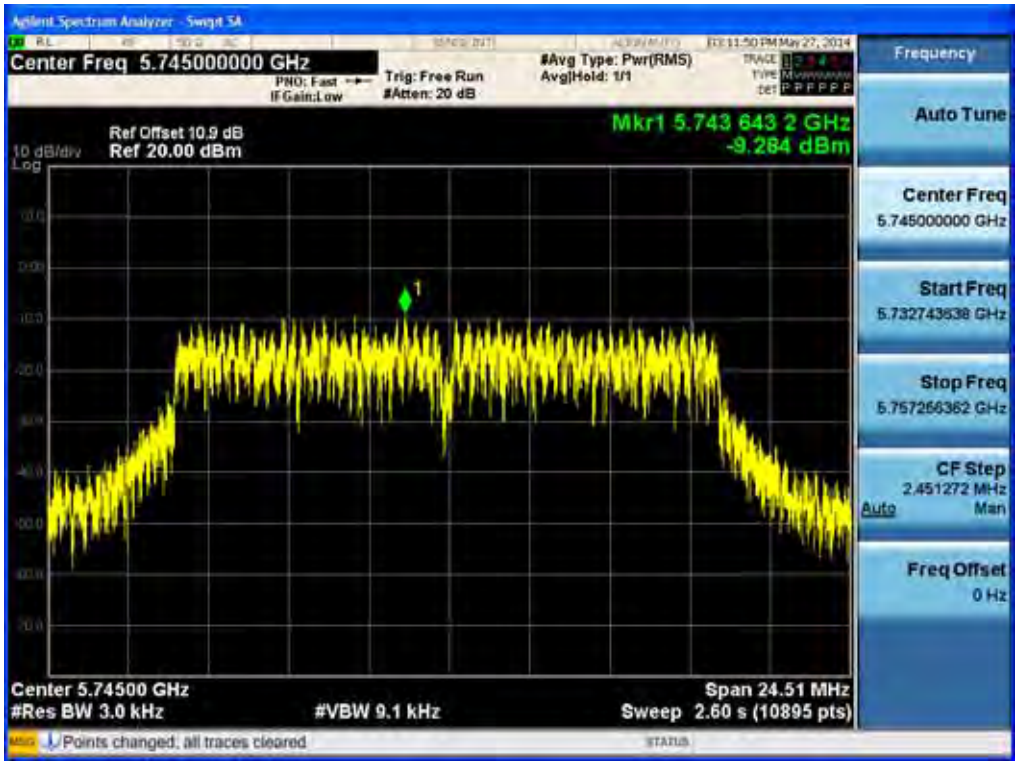
Power Spectral Density (802.11g-CH 6)



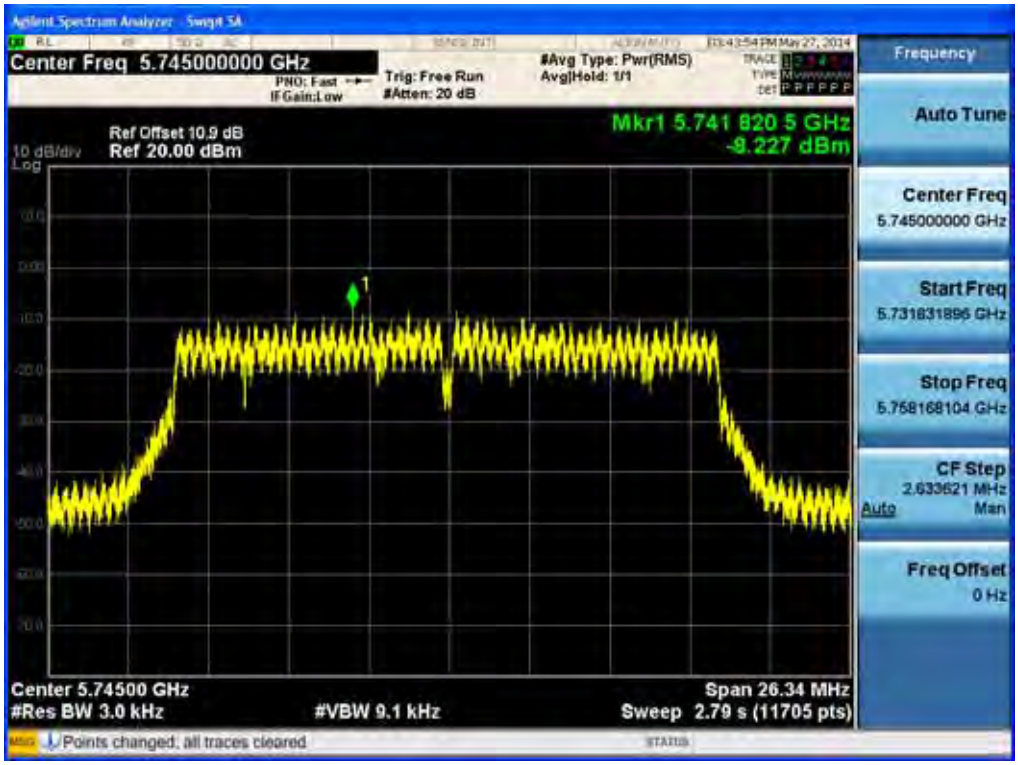
Power Spectral Density (802.11n-CH 6)

5.8 GHz Band

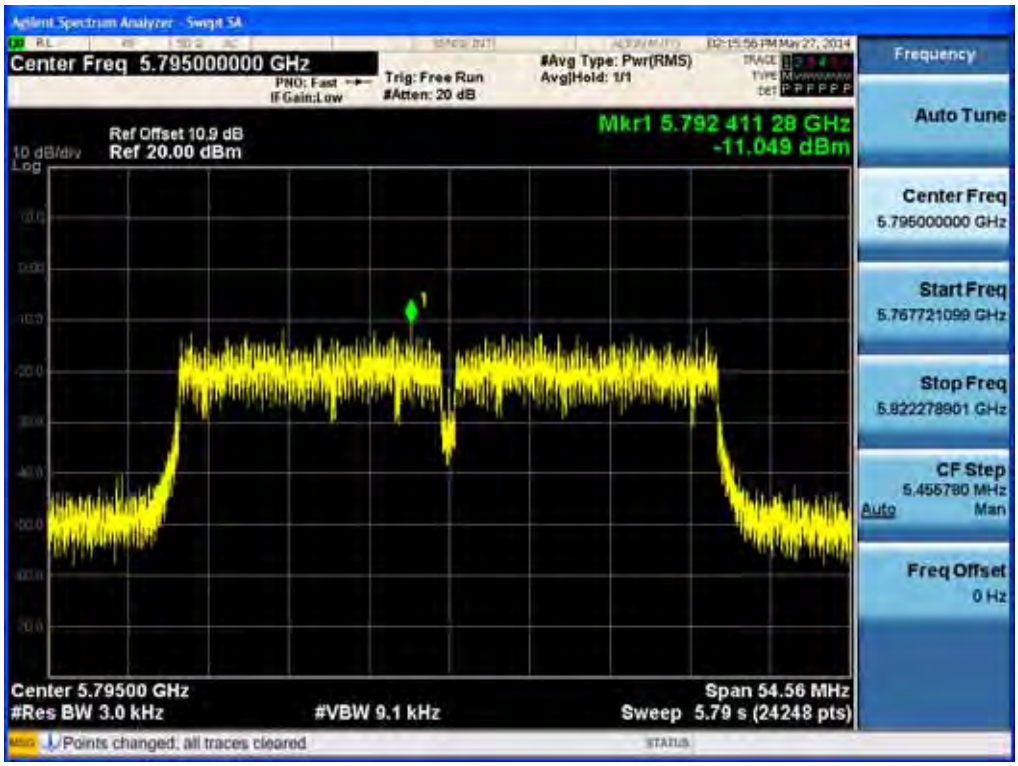
Power Spectral Density (802.11a-CH 149)



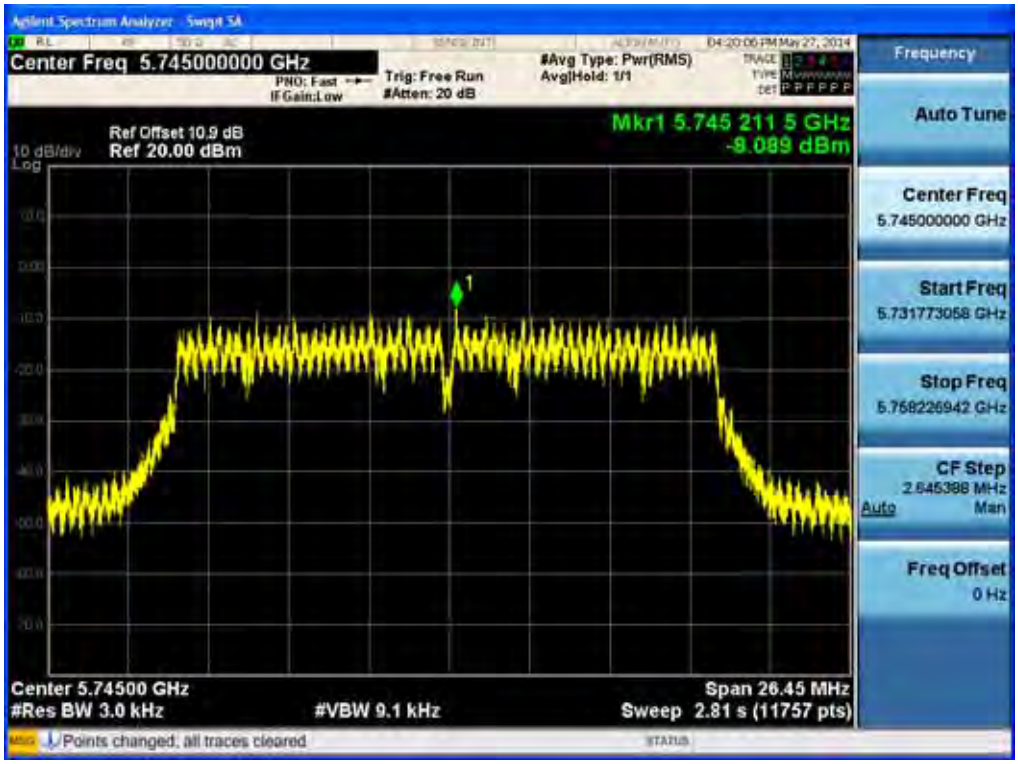
Power Spectral Density (802.11n_20 MHz BW -CH 149)



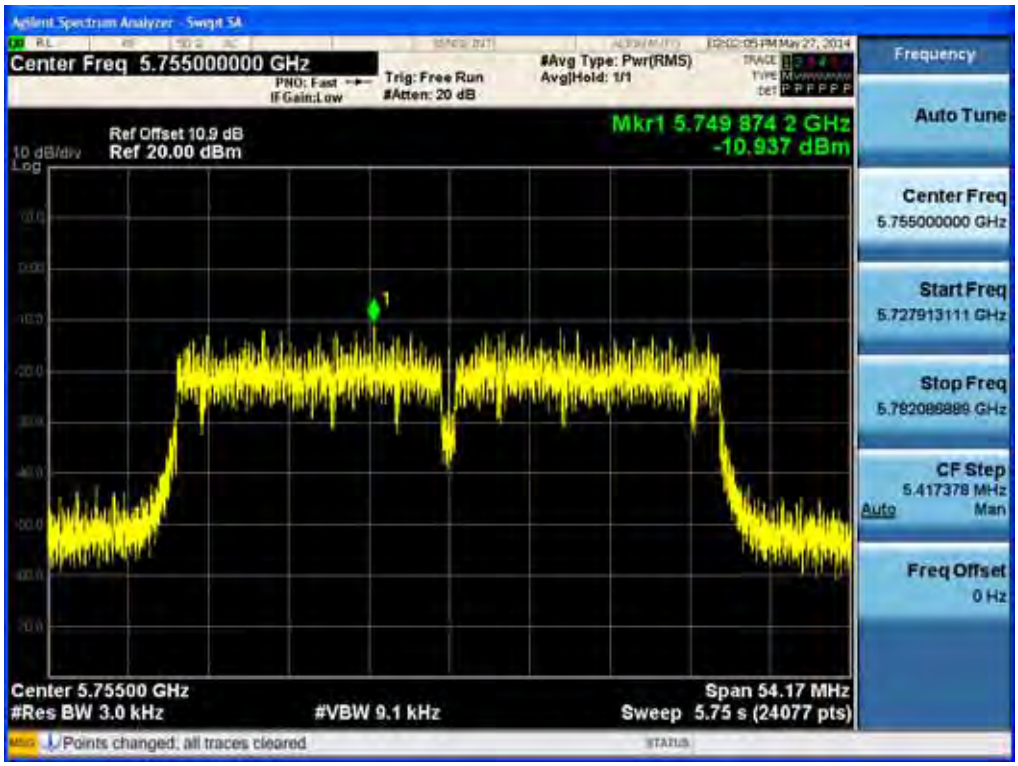
Power Spectral Density (802.11n_40 MHz BW -CH 159)



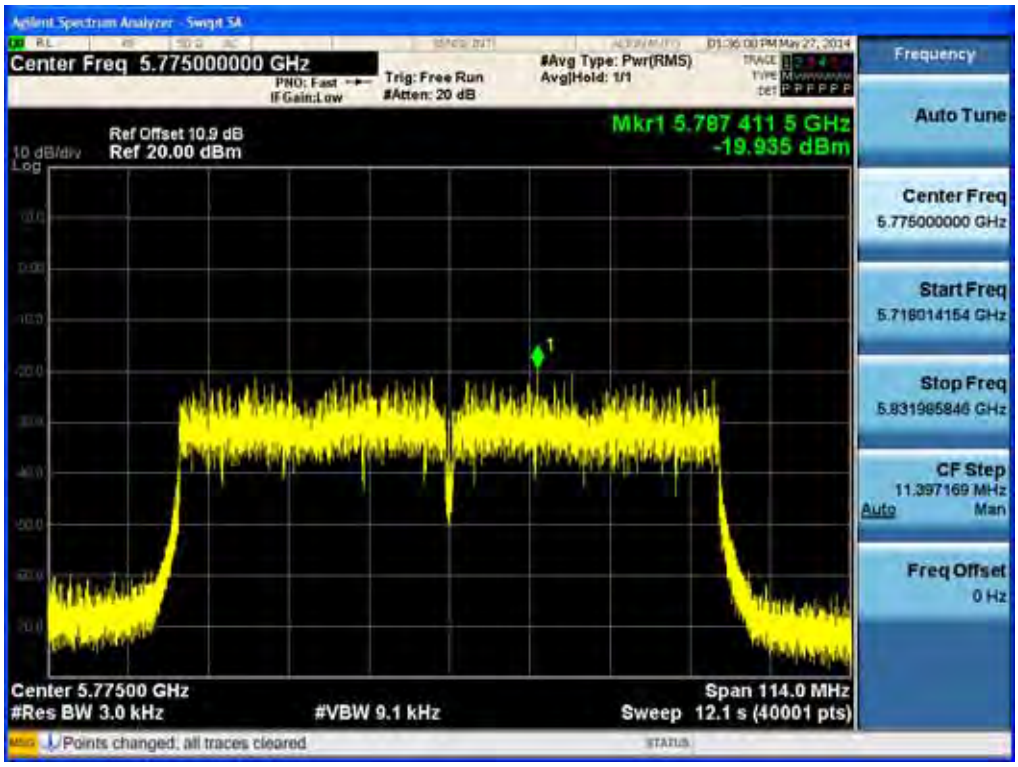
Power Spectral Density (802.11ac_20 MHz BW _CH 149)



Power Spectral Density (802.11ac_40 MHz BW _CH 151)



Power Spectral Density (802.11ac_80 MHz BW _CH 155)



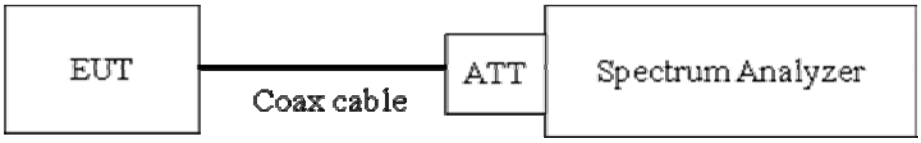
8.6 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074, issued 04/09/2013)

RBW = 100 kHz

VBW ≥ 3 x RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points ≥ Span/RBW

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The band edge 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 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB.

Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

Band	Loss(dB)
2.4 GHz	10.5
5.8 GHz	10.9

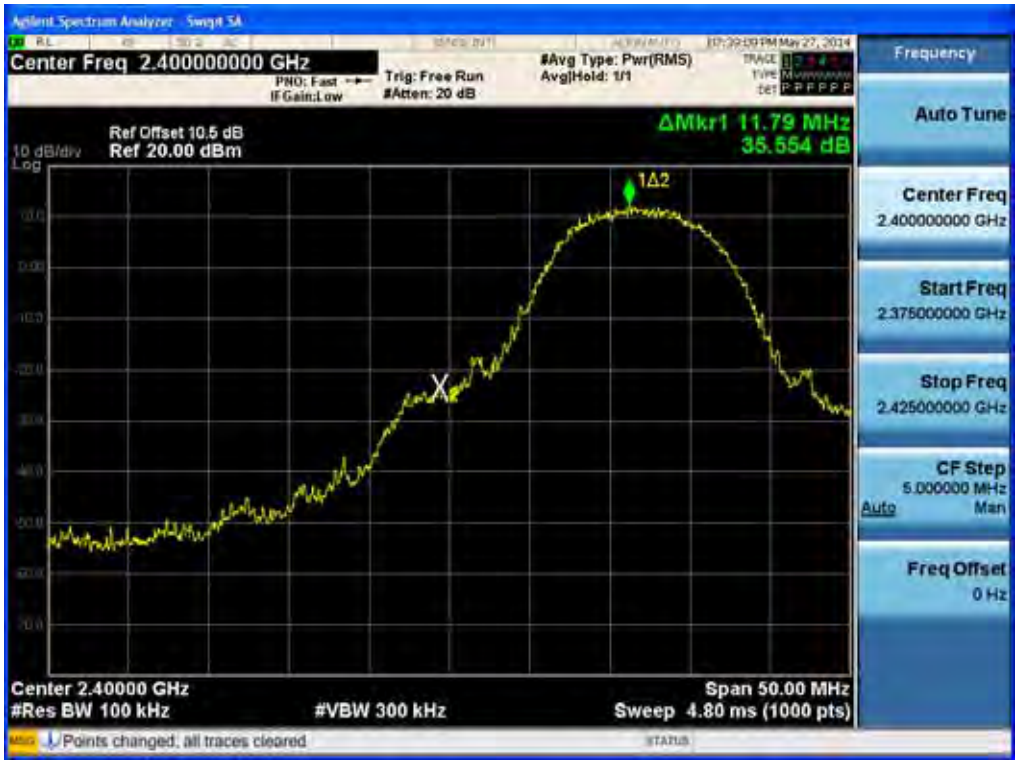
(Actual value of loss for the attenuator and cable combination)

4. In order to simplify the report, attached plots were only the worst case channel and data rate.

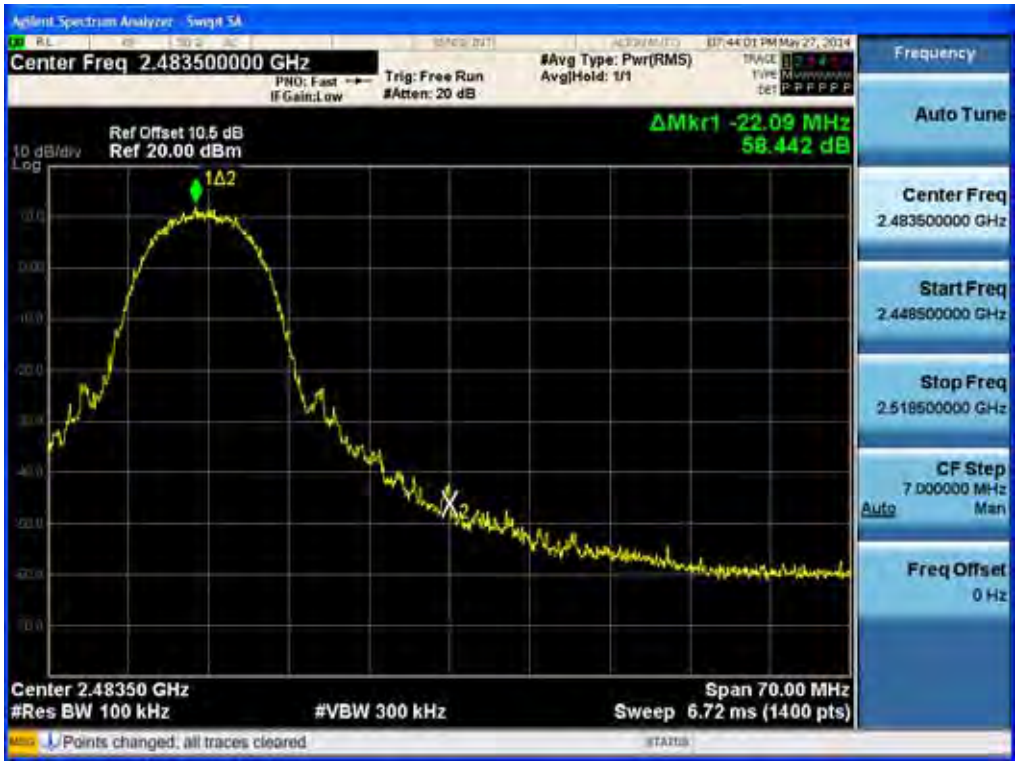
▣ RESULT PLOTS Ant.0

2.4 GHz Band

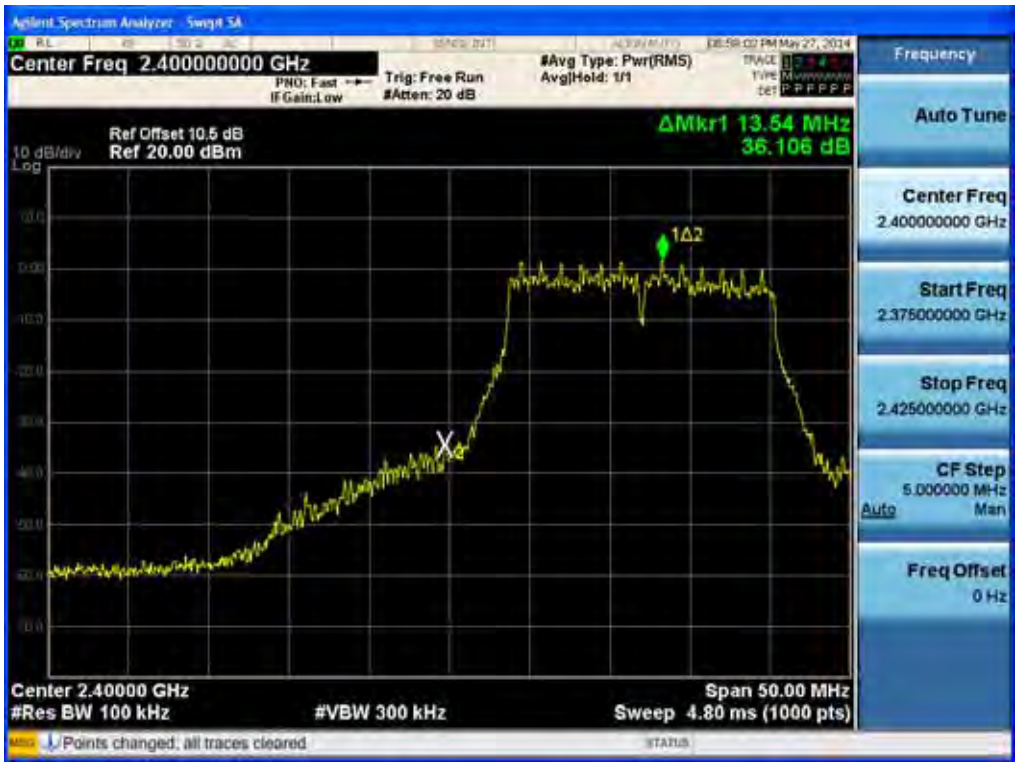
BandEdge (802.11b-CH1)



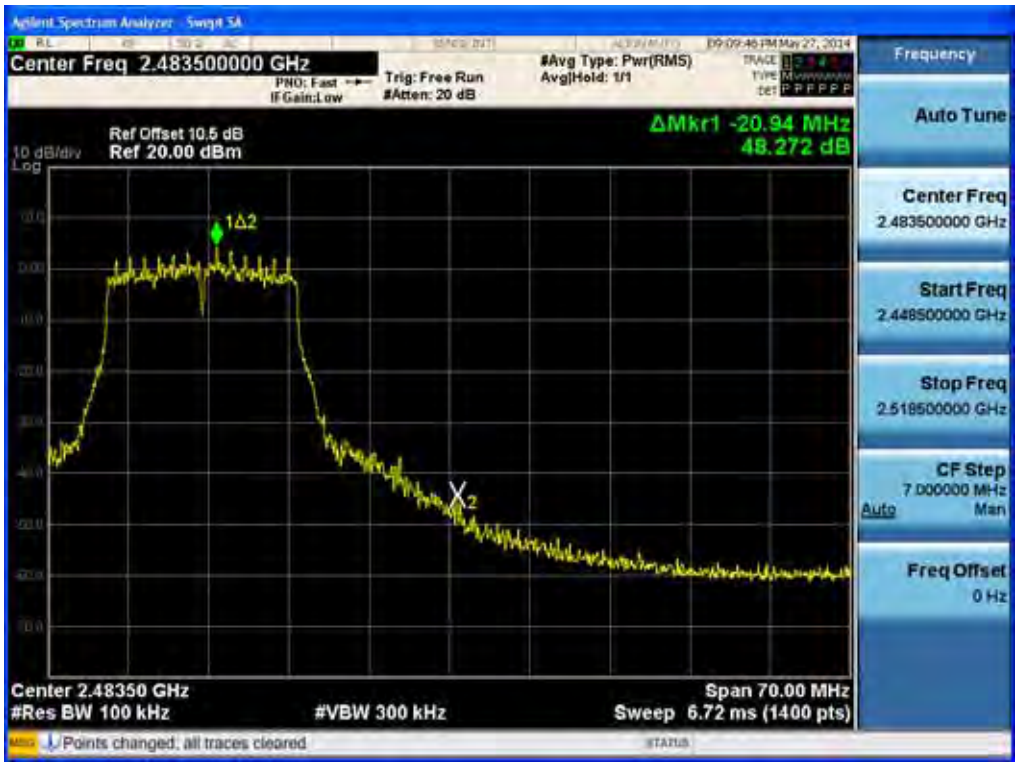
BandEdge (802.11b-CH11)



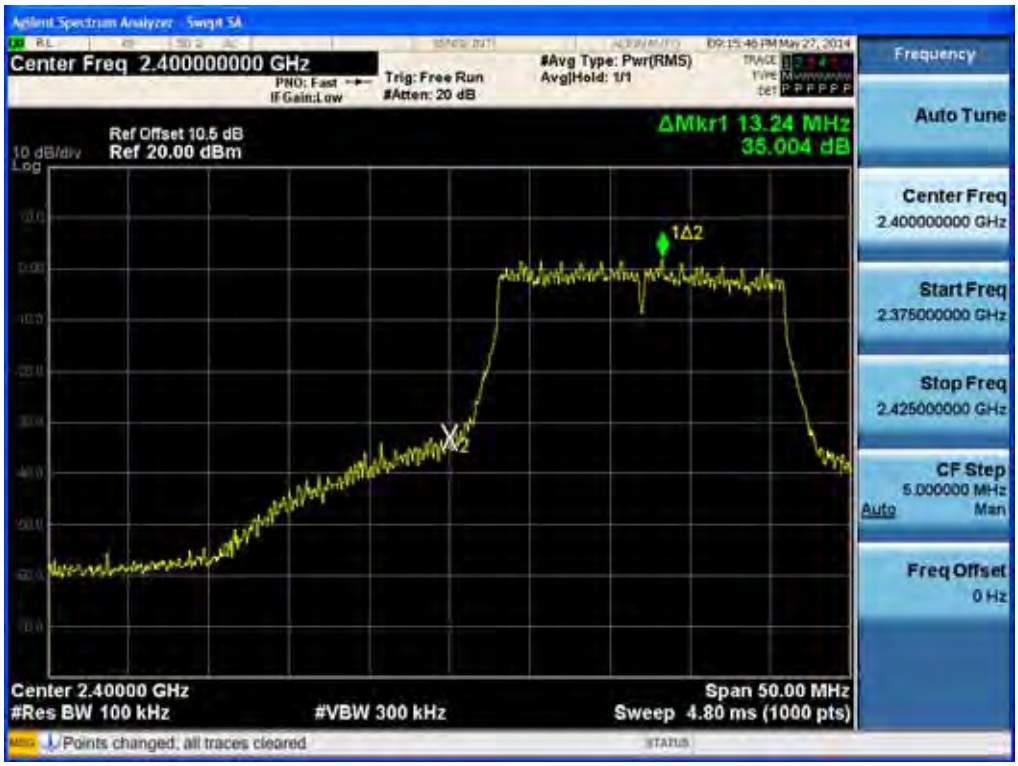
BandEdge (802.11g-CH1)



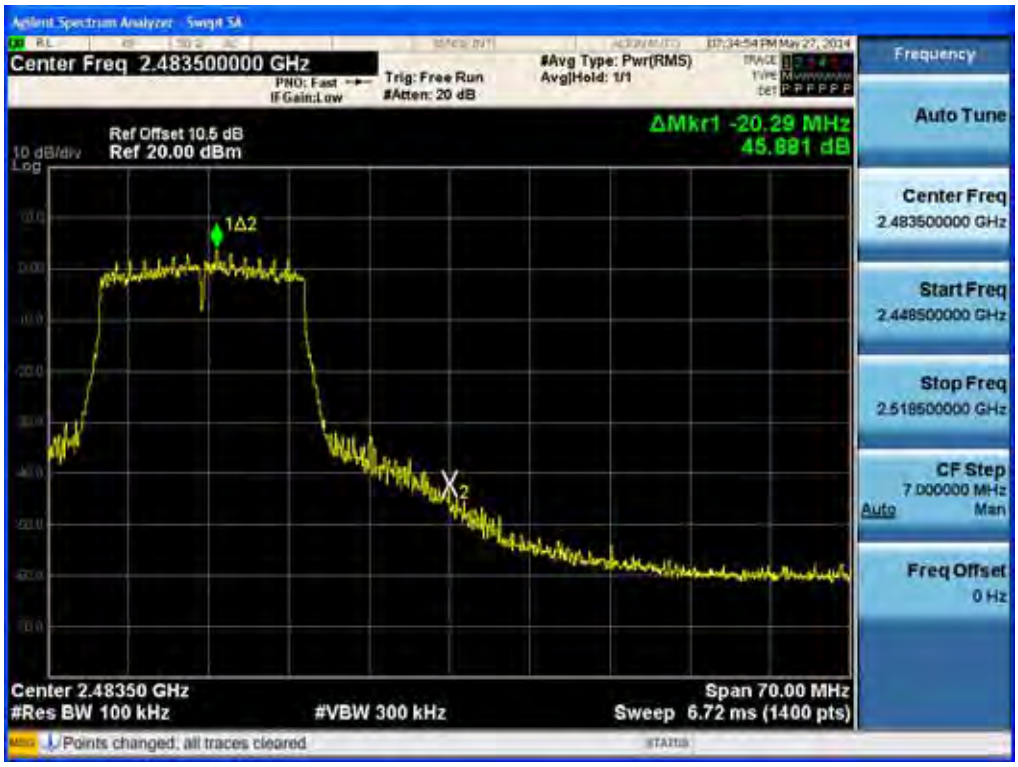
BandEdge (802.11g-CH11)



BandEdge (802.11n-CH1)



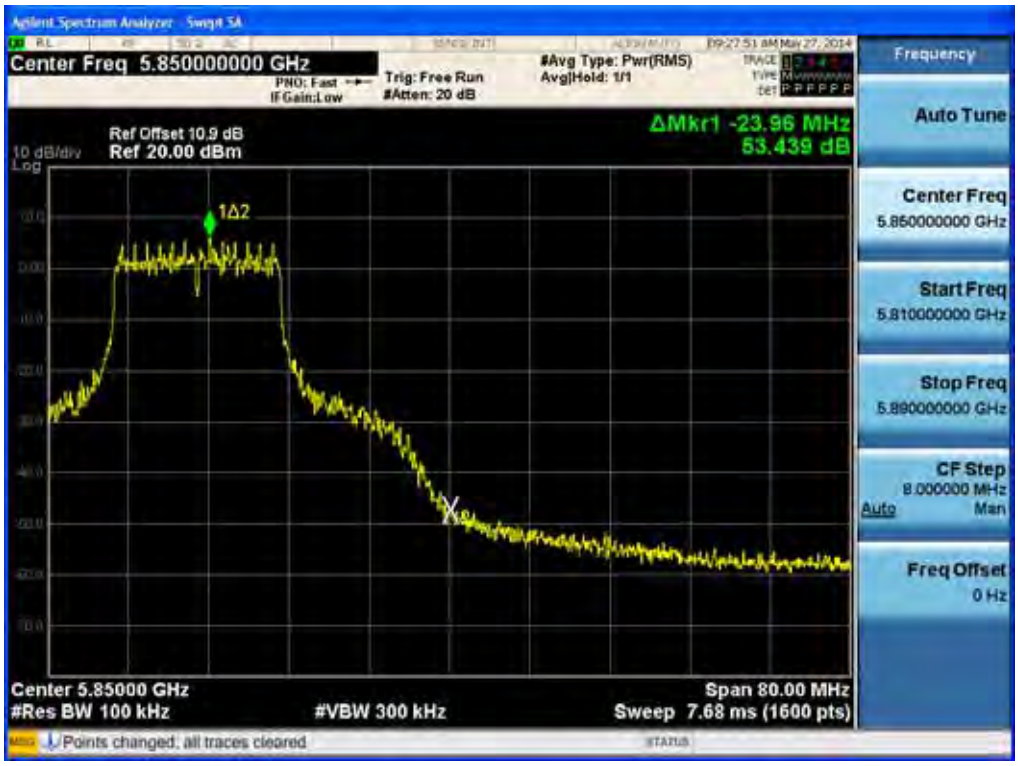
BandEdge (802.11n-CH11)



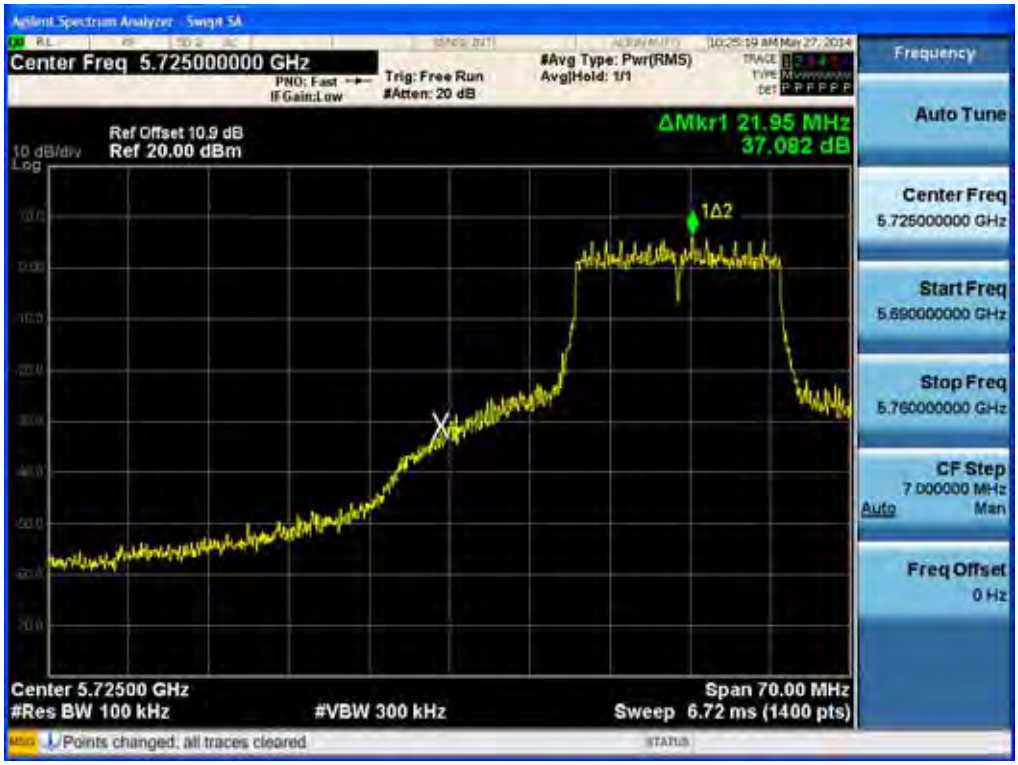
5.8 GHz Band

BandEdge (802.11a-CH 149)

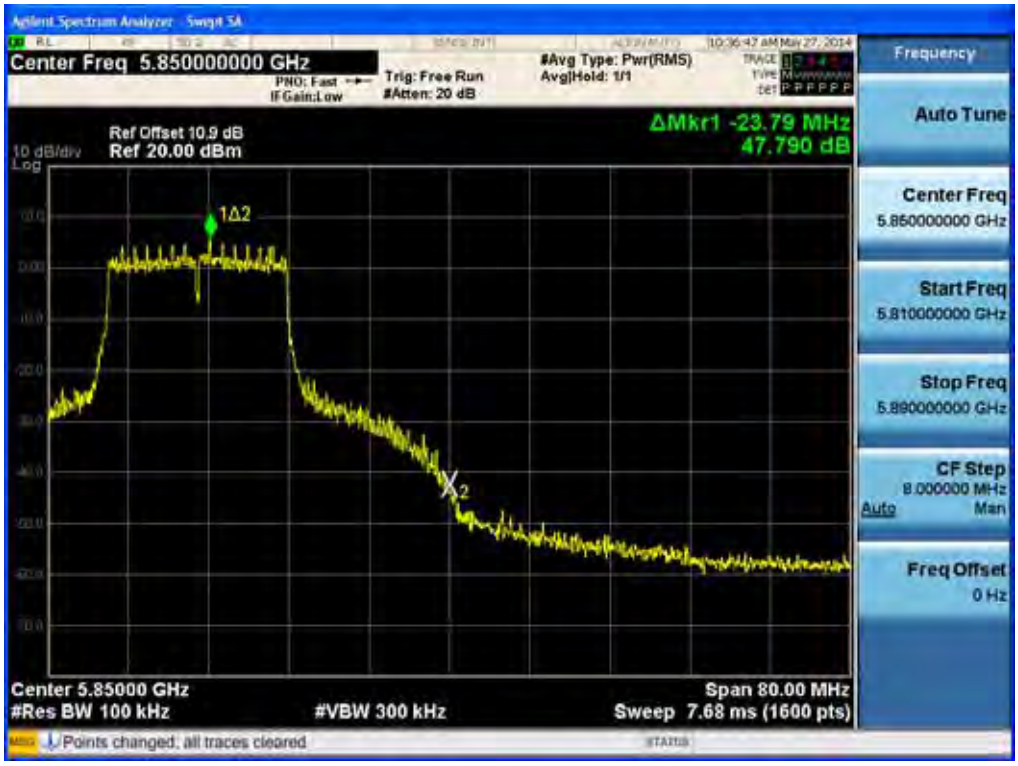
BandEdge (802.11a-CH 165)



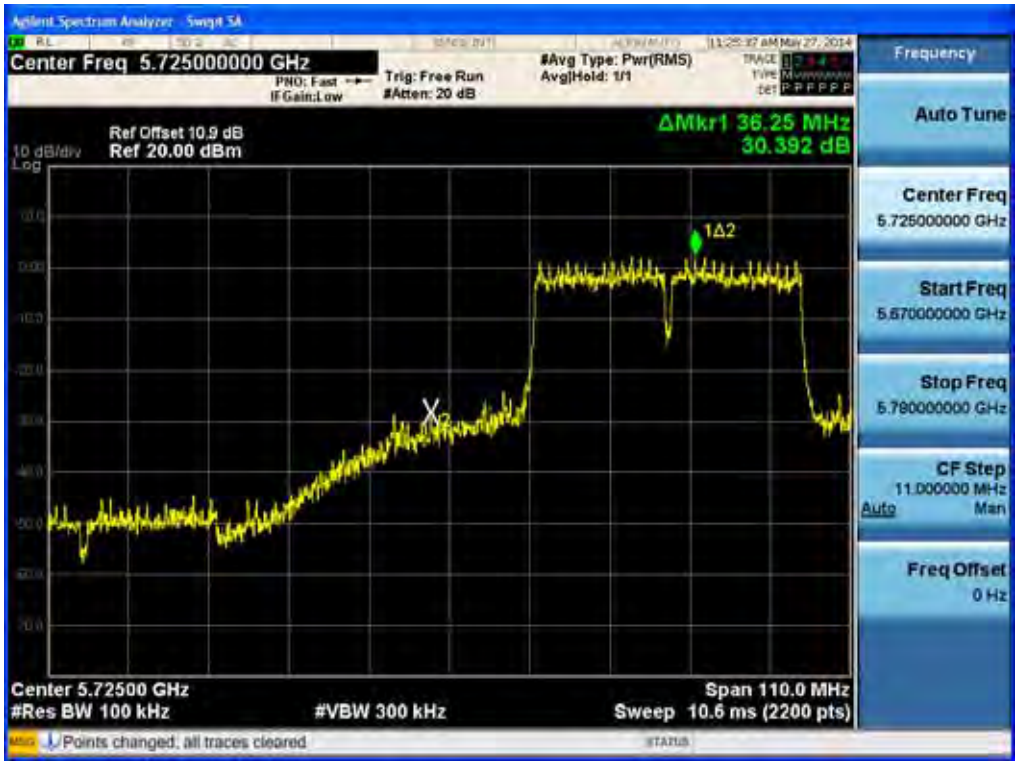
BandEdge (802.11n_20 MHz BW -CH 149)



BandEdge (802.11n_20 MHz BW -CH 165)

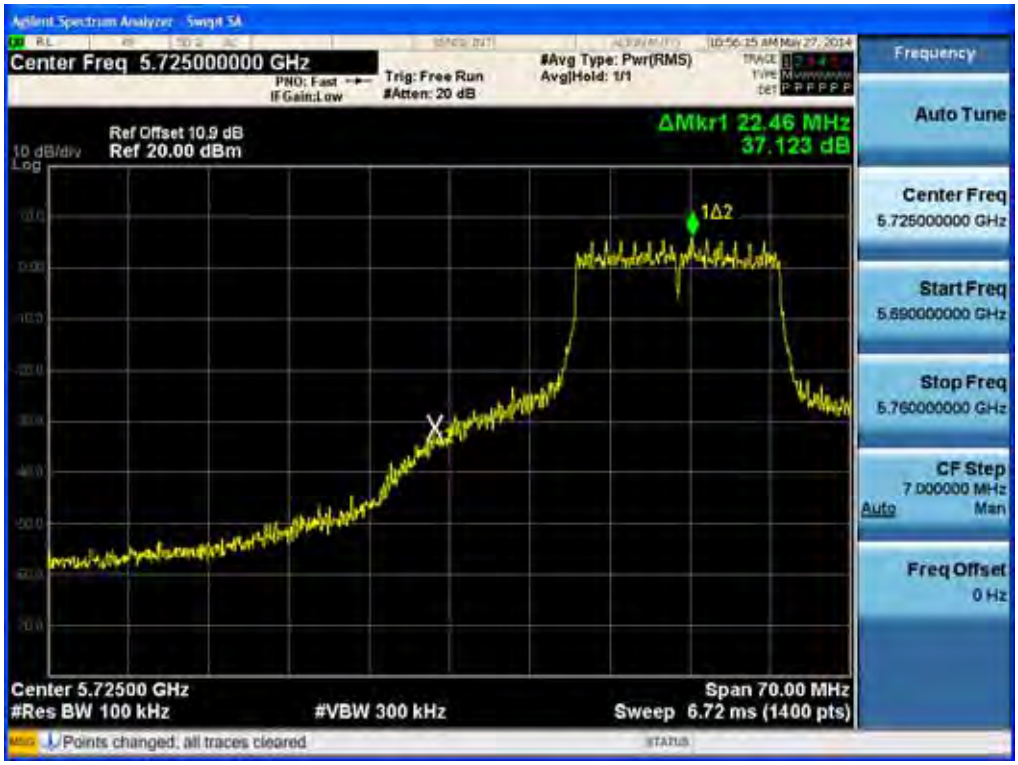


BandEdge (802.11n_40 MHz BW -CH 151)

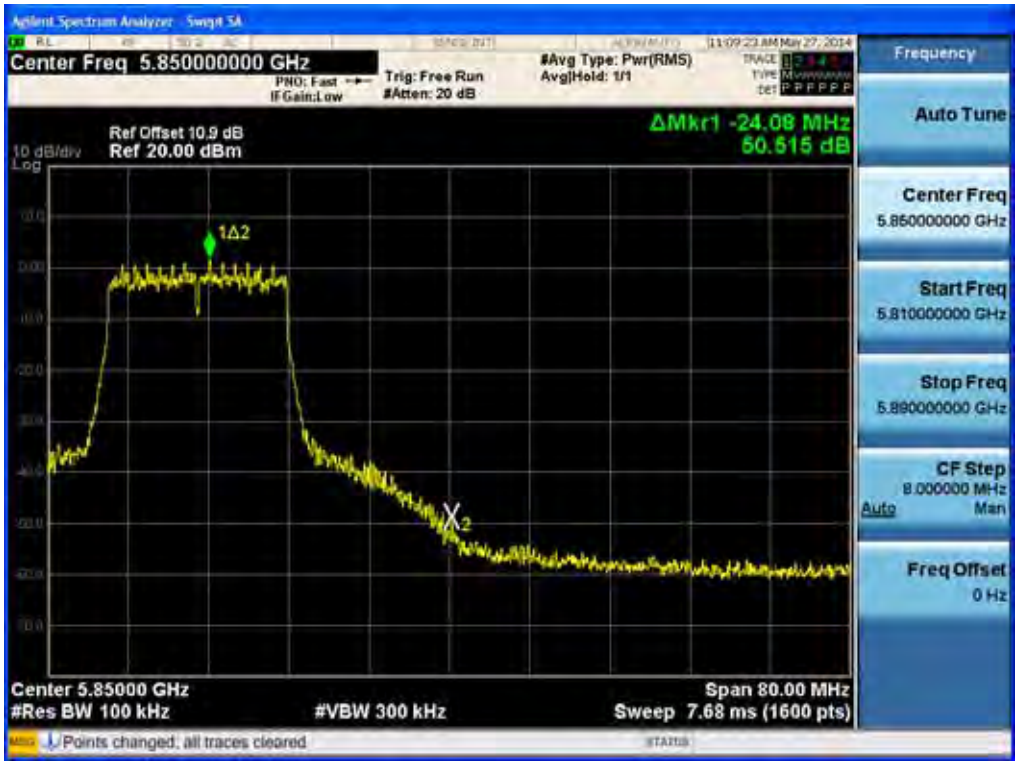


BandEdge (802.11n_40 MHz BW -CH 159)

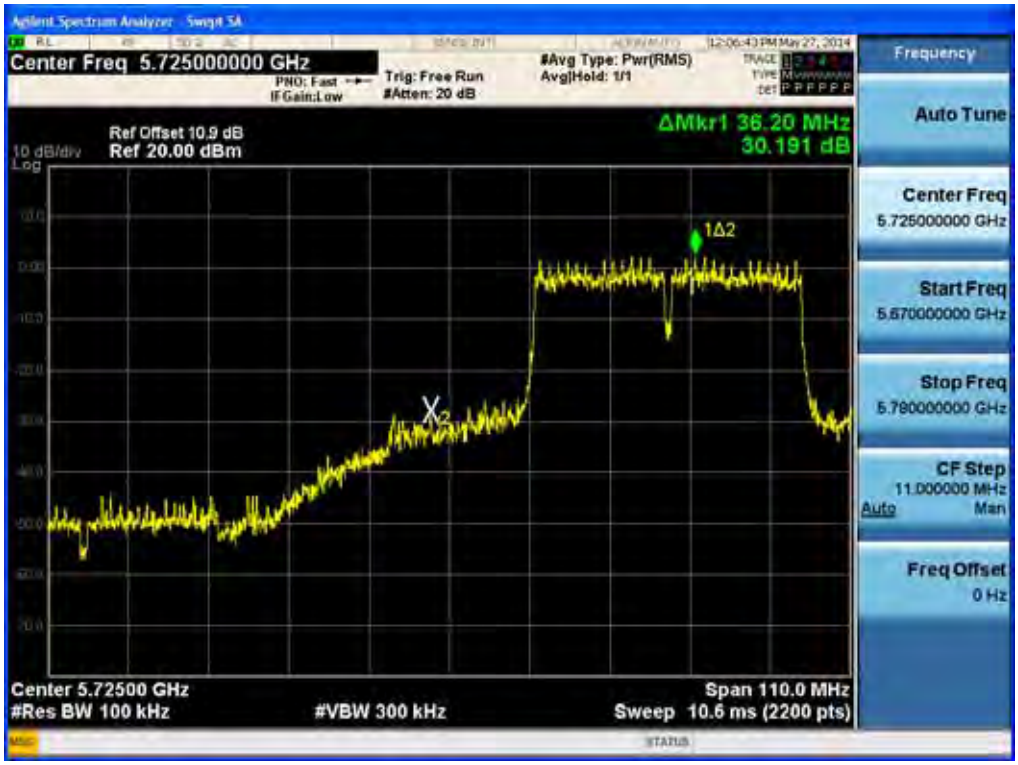
BandEdge (802.11ac_20 MHz BW -CH 149)



BandEdge (802.11ac_20 MHz BW -CH 165)



BandEdge (802.11ac_40 MHz BW -CH 151)



BandEdge (802.11ac_40 MHz BW -CH 159)

BandEdge (802.11ac_80 MHz BW -CH 155)

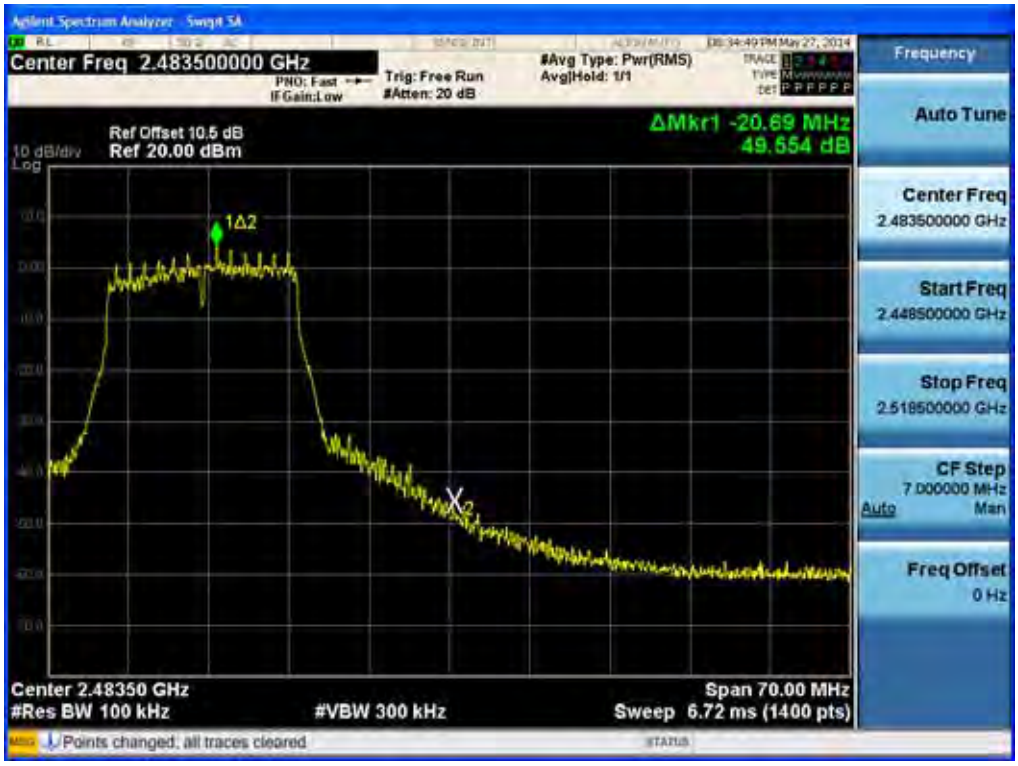
BandEdge (802.11ac_80 MHz BW -CH 155)

▣ RESULT PLOTS Ant.1

2.4 GHz Band

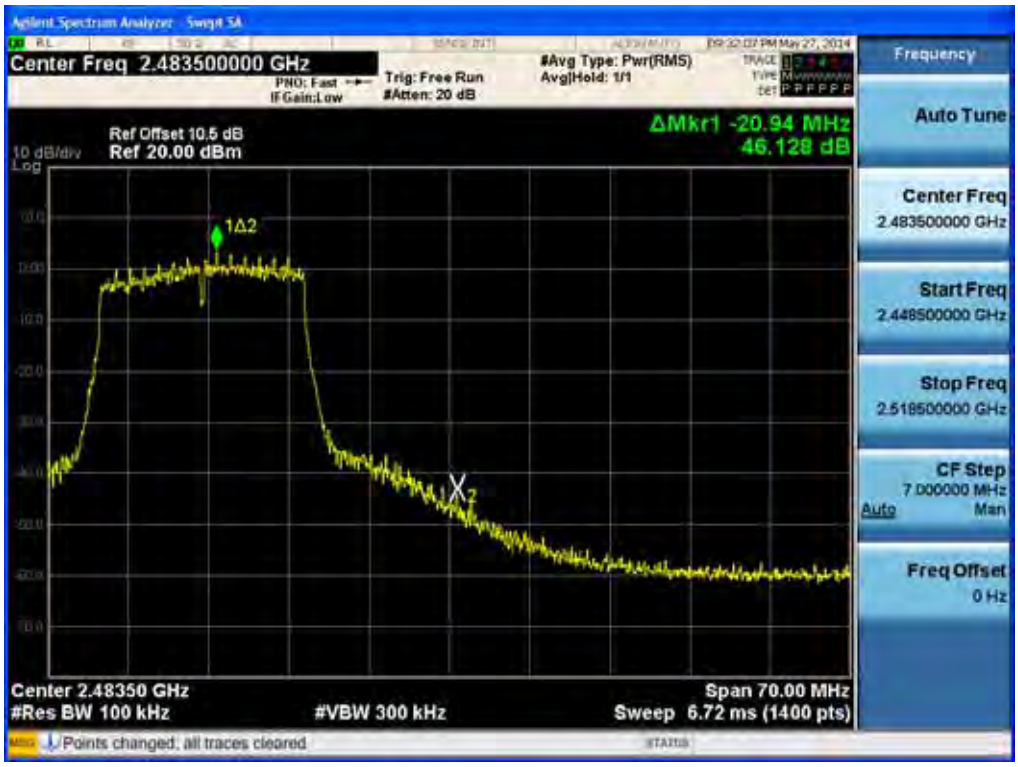
BandEdge (802.11g-CH1)

BandEdge (802.11g-CH11)



BandEdge (802.11n-CH1)

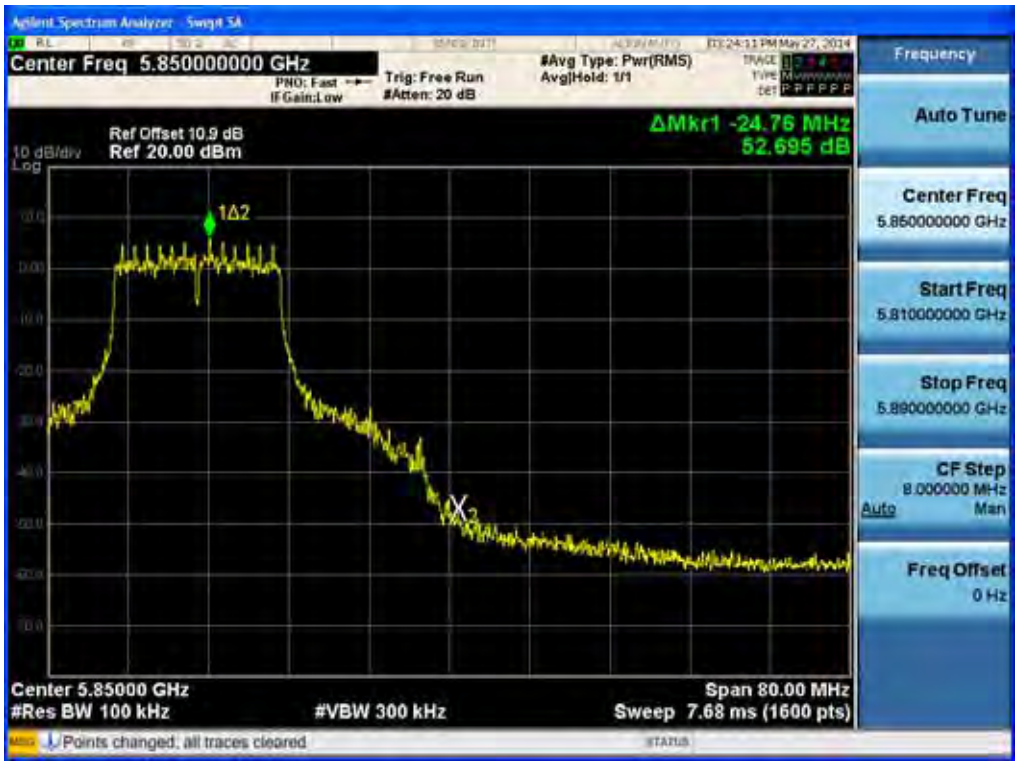
BandEdge (802.11n-CH11)



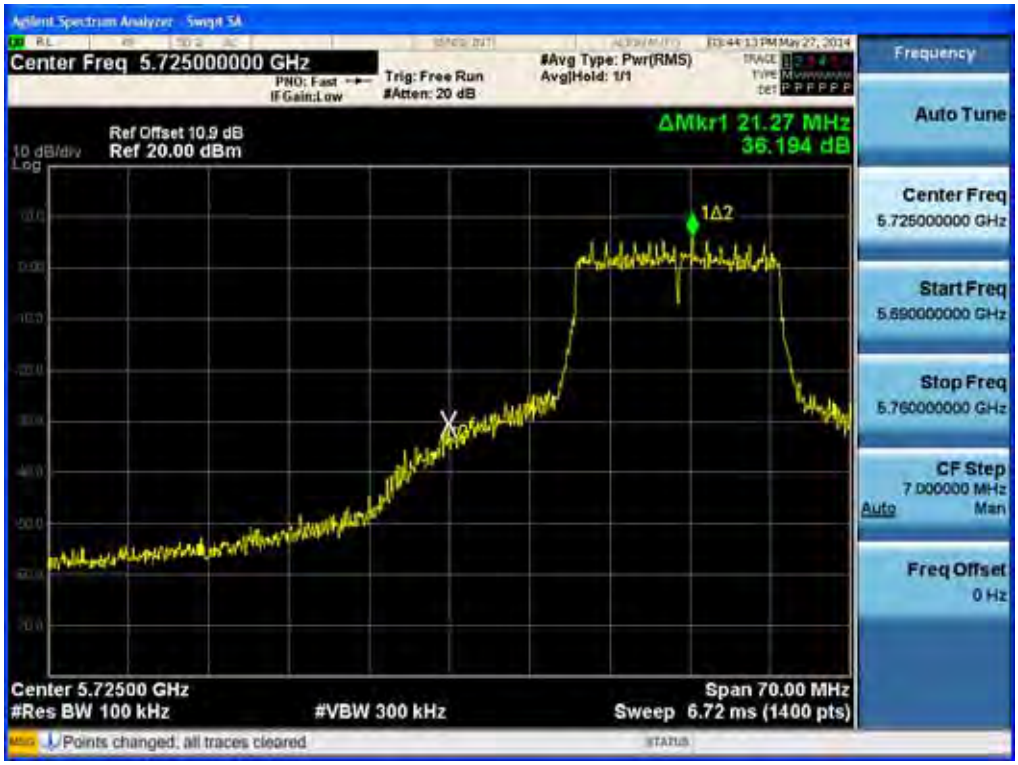
5.8 GHz Band

BandEdge (802.11a-CH 149)

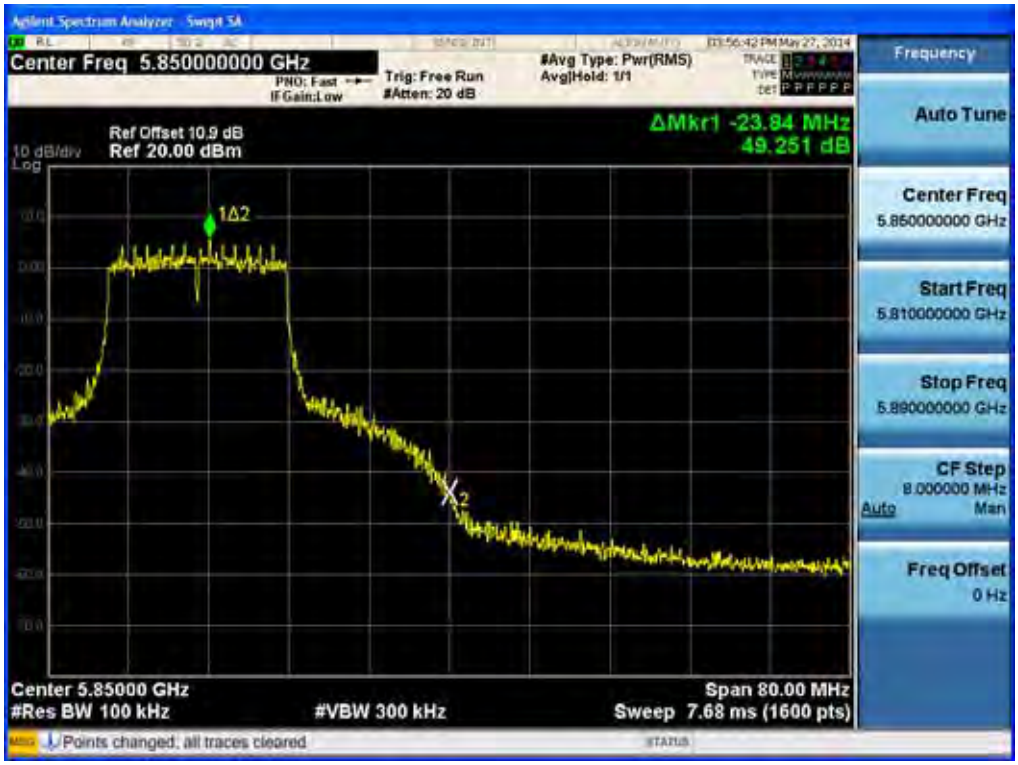
BandEdge (802.11a-CH 165)



BandEdge (802.11n_20 MHz BW -CH 149)



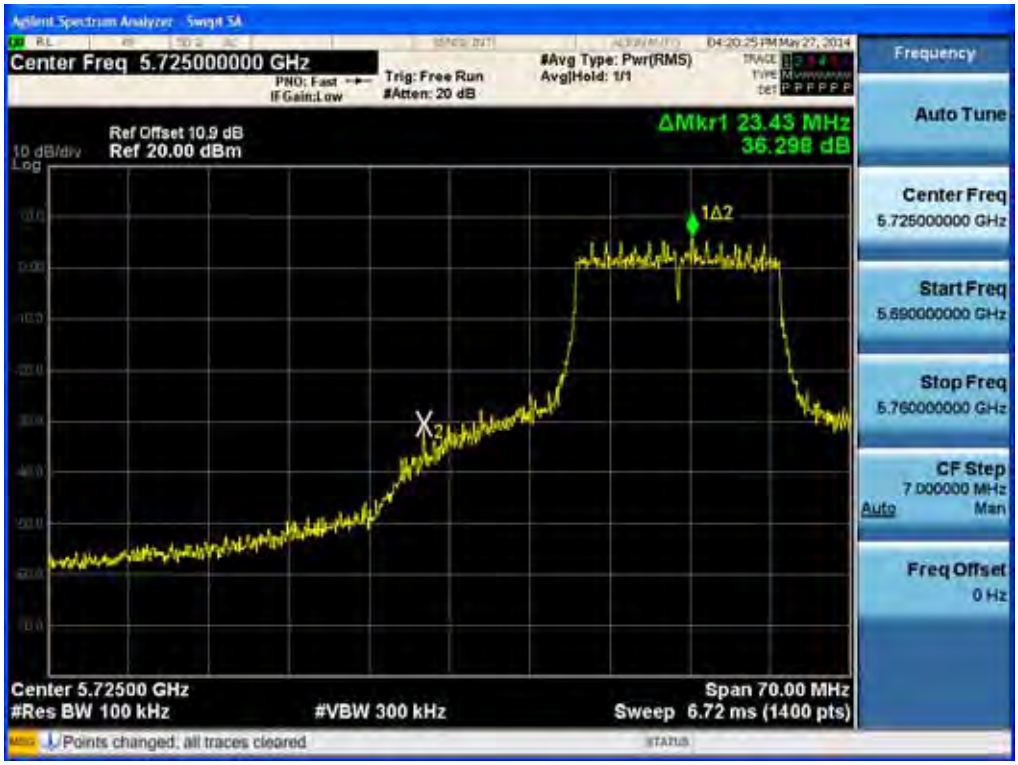
BandEdge (802.11n_20 MHz BW -CH 165)



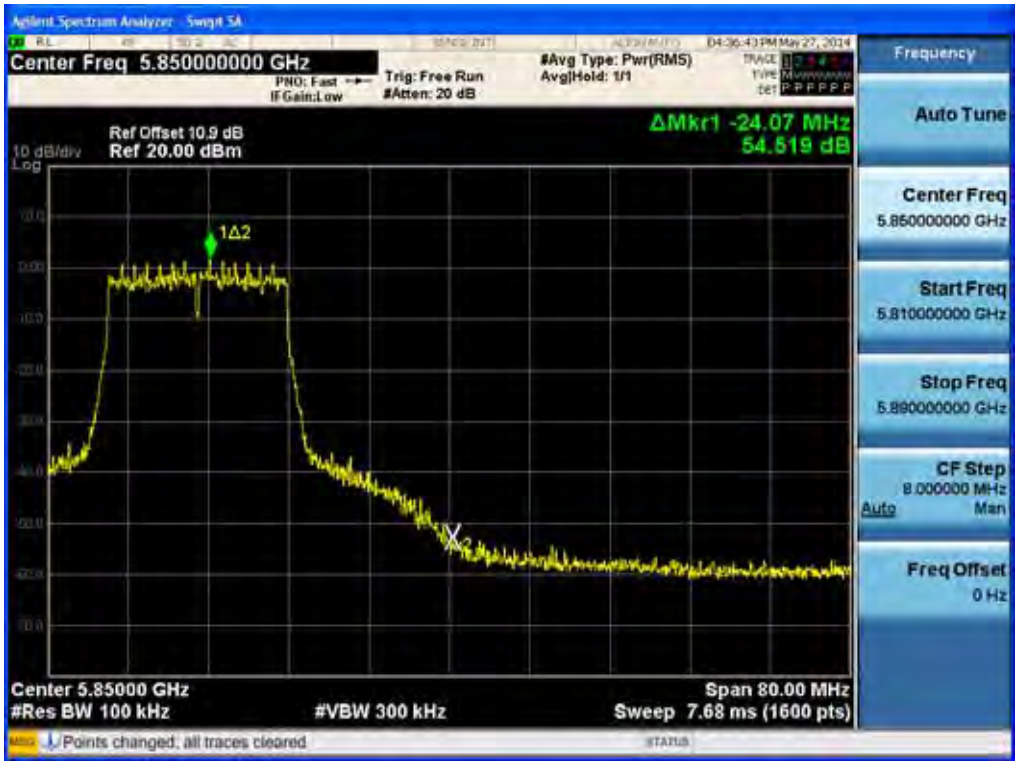
BandEdge (802.11n_40 MHz BW -CH 151)

BandEdge (802.11n_40 MHz BW -CH 159)

BandEdge (802.11ac_20 MHz BW -CH 149)



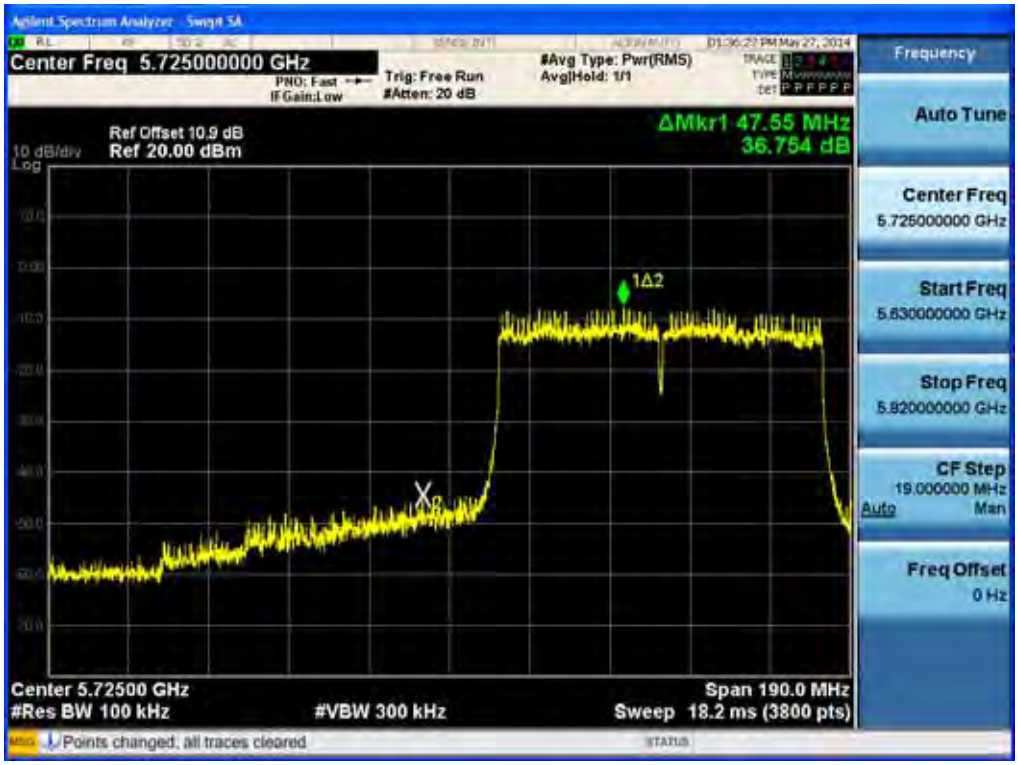
BandEdge (802.11ac_20 MHz BW -CH 165)



BandEdge (802.11ac_40 MHz BW -CH 151)

BandEdge (802.11ac_40 MHz BW -CH 159)

BandEdge (802.11ac_80 MHz BW -CH 155)

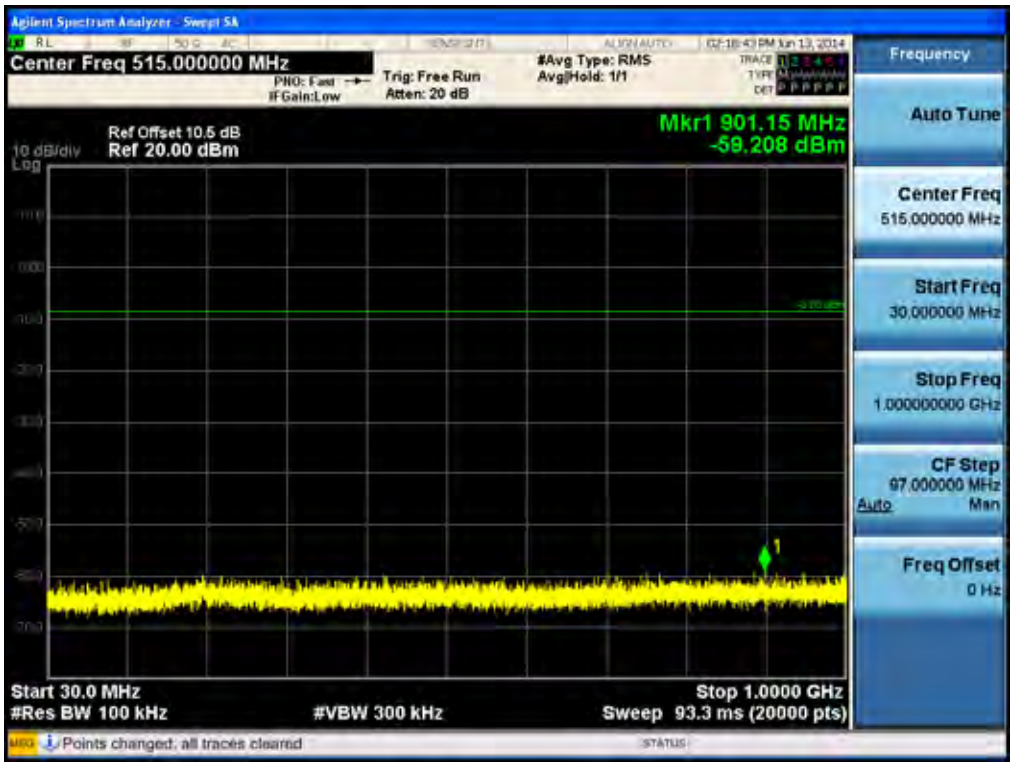


BandEdge (802.11ac_80 MHz BW -CH 155)

2.4 GHz Band Ant.0

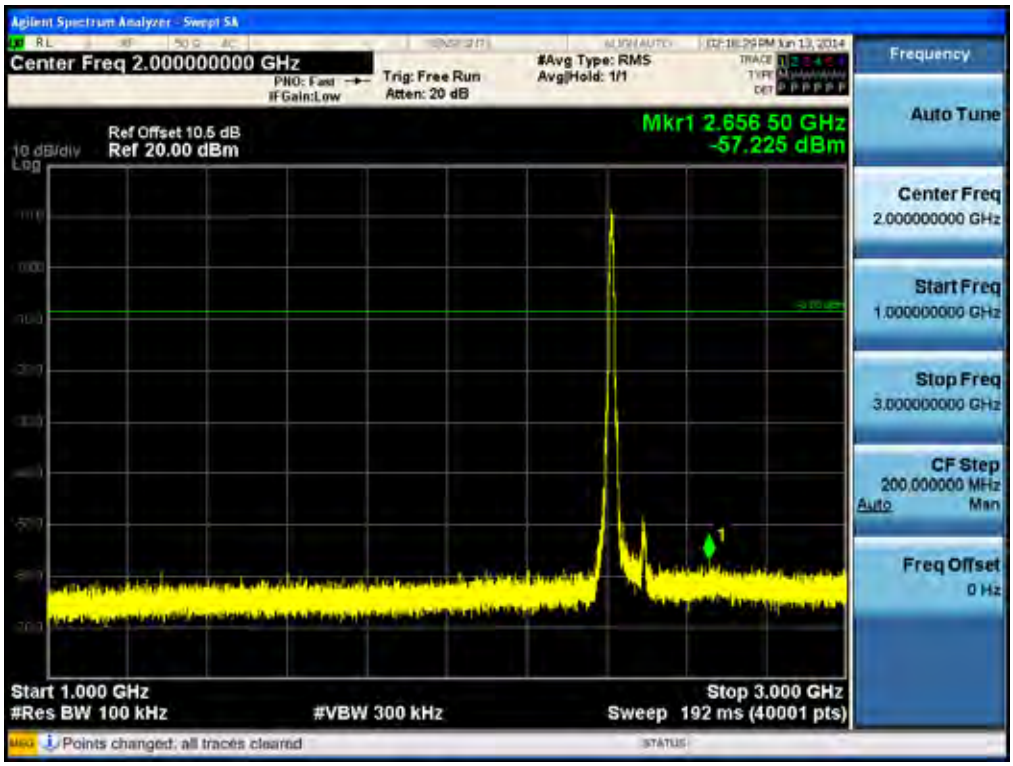
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b-CH1)



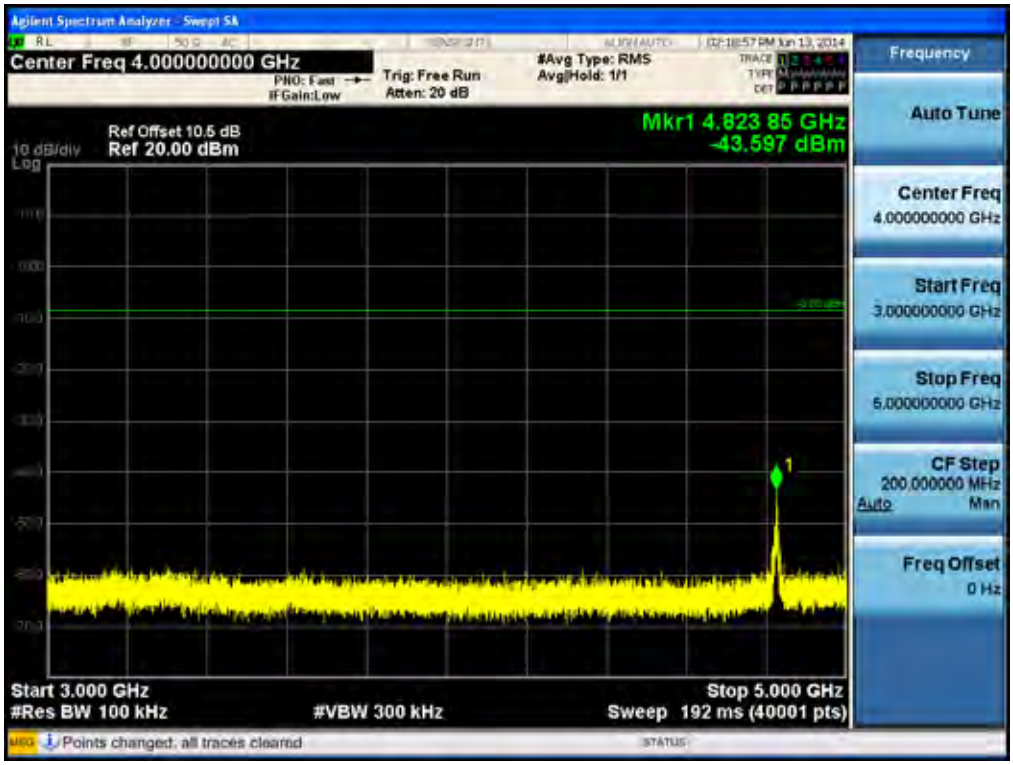
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b-CH1)



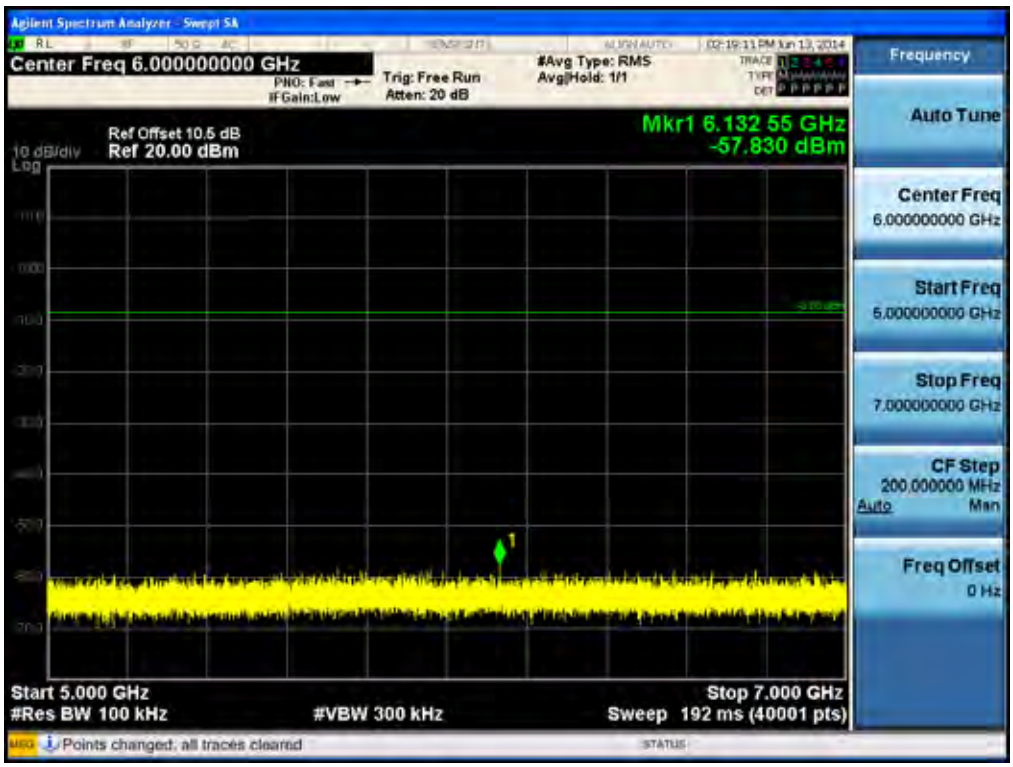
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b-CH1)



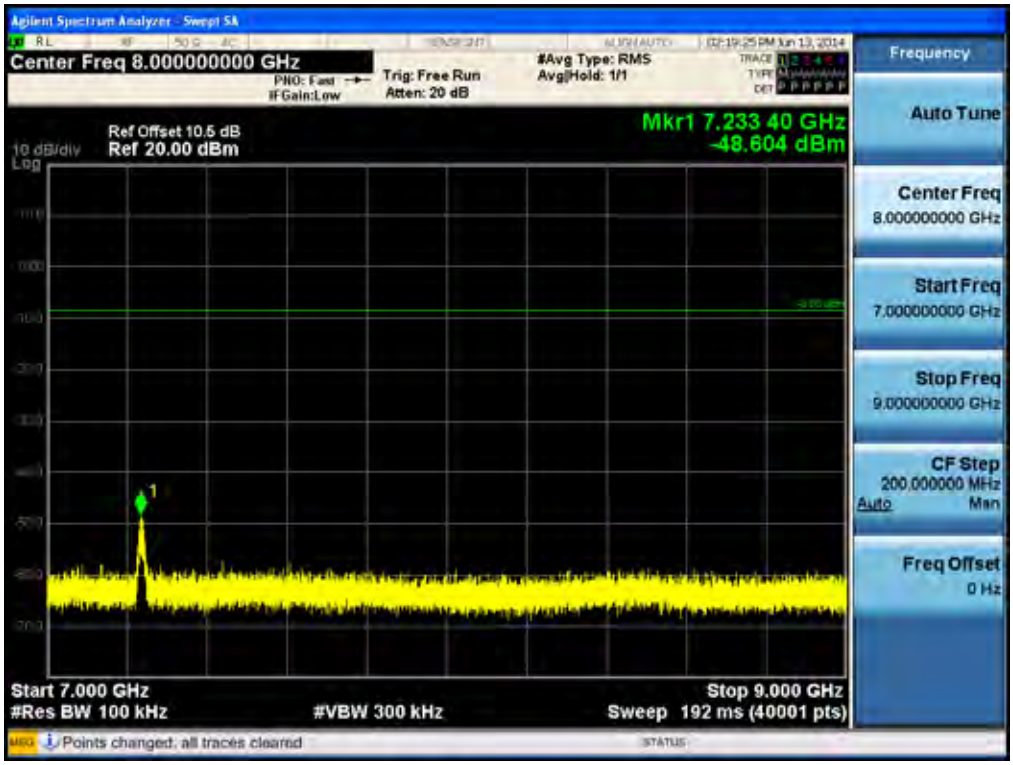
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b-CH1)



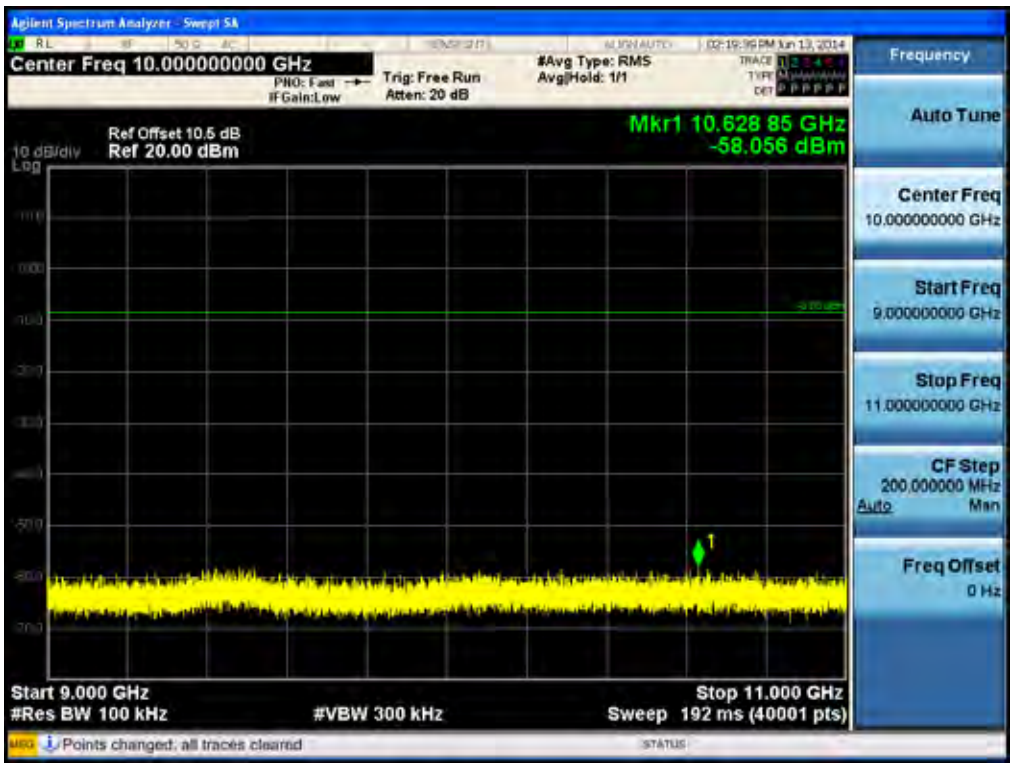
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b-CH1)



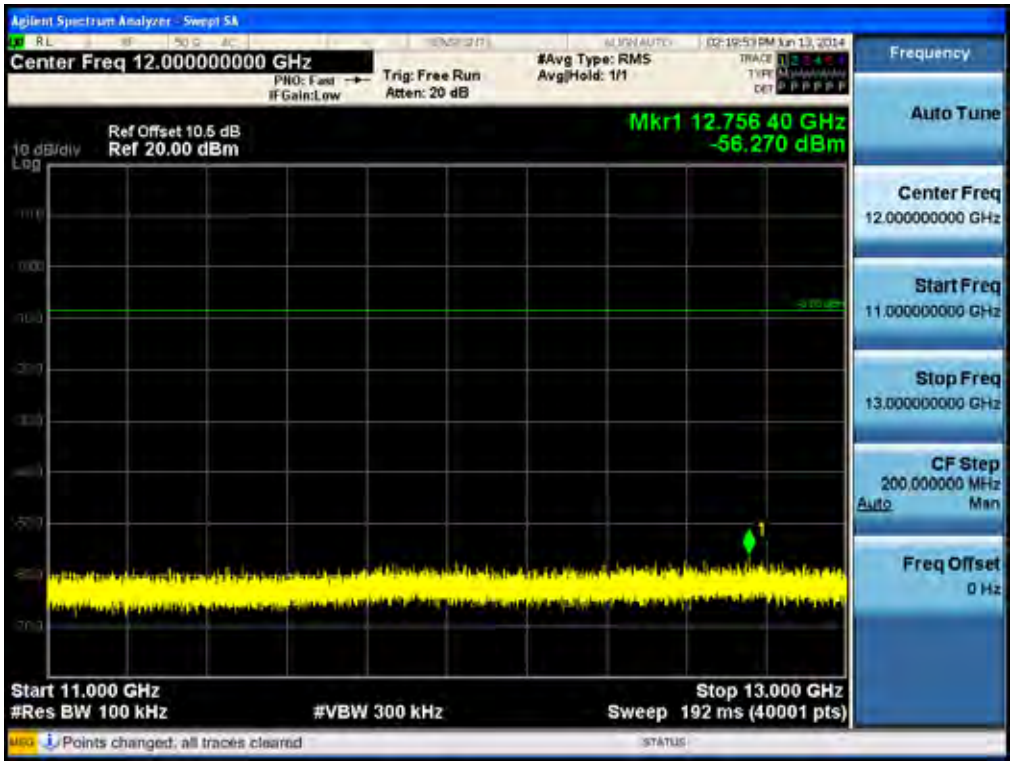
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b-CH1)



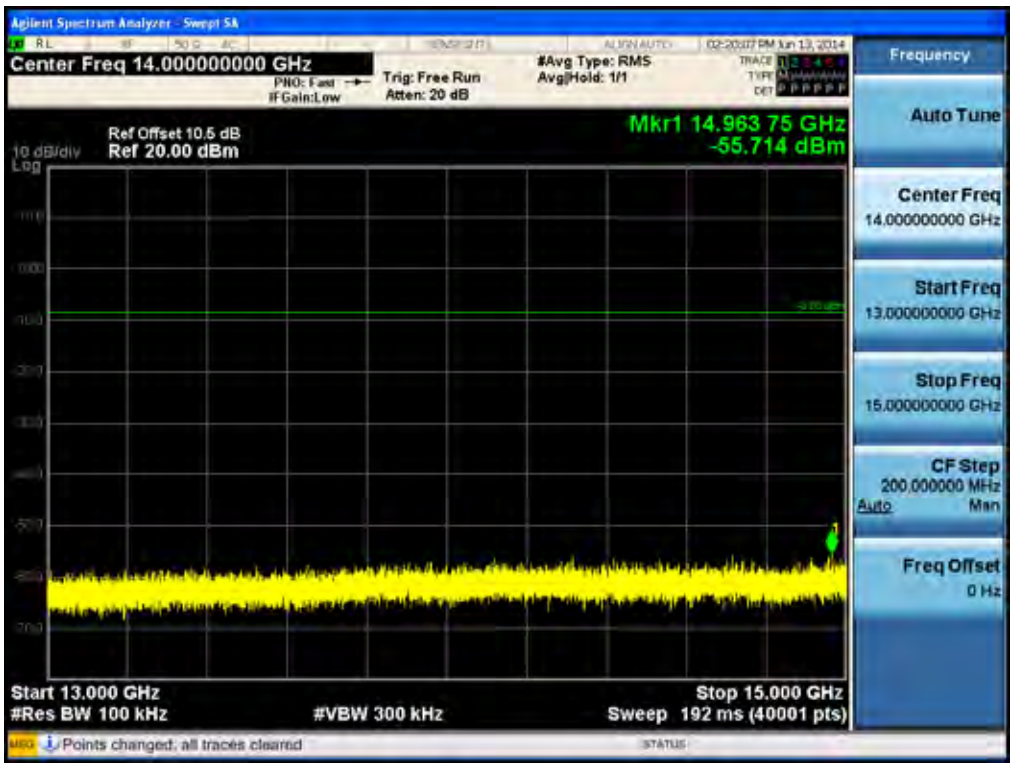
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b-CH1)



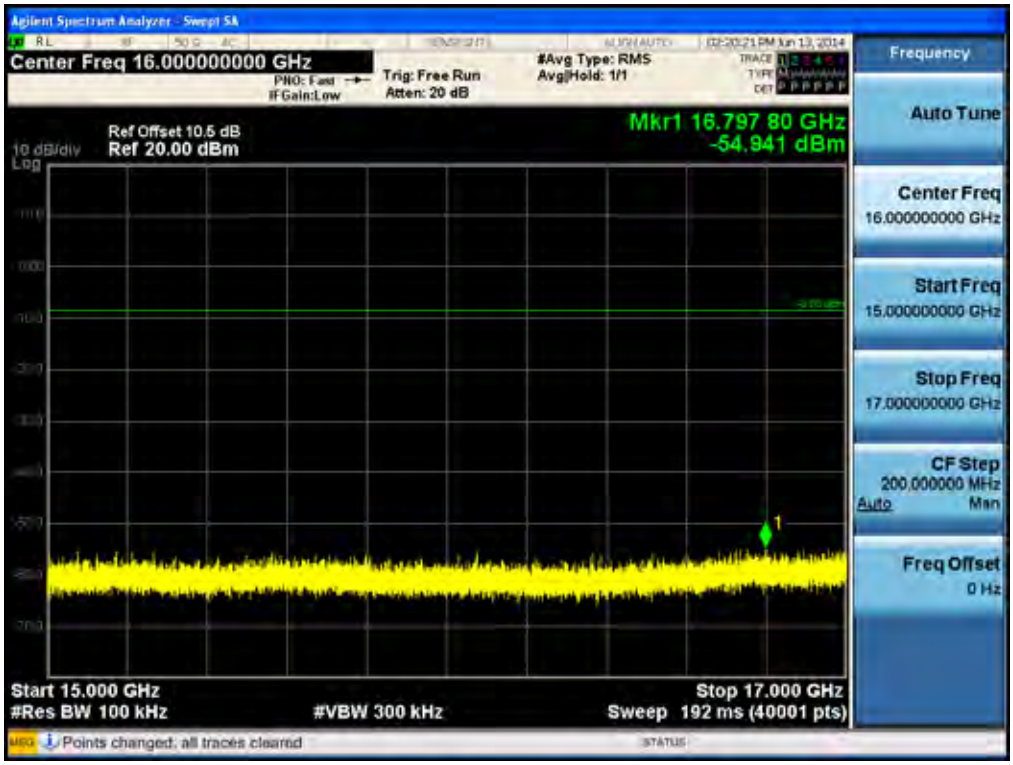
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b-CH1)



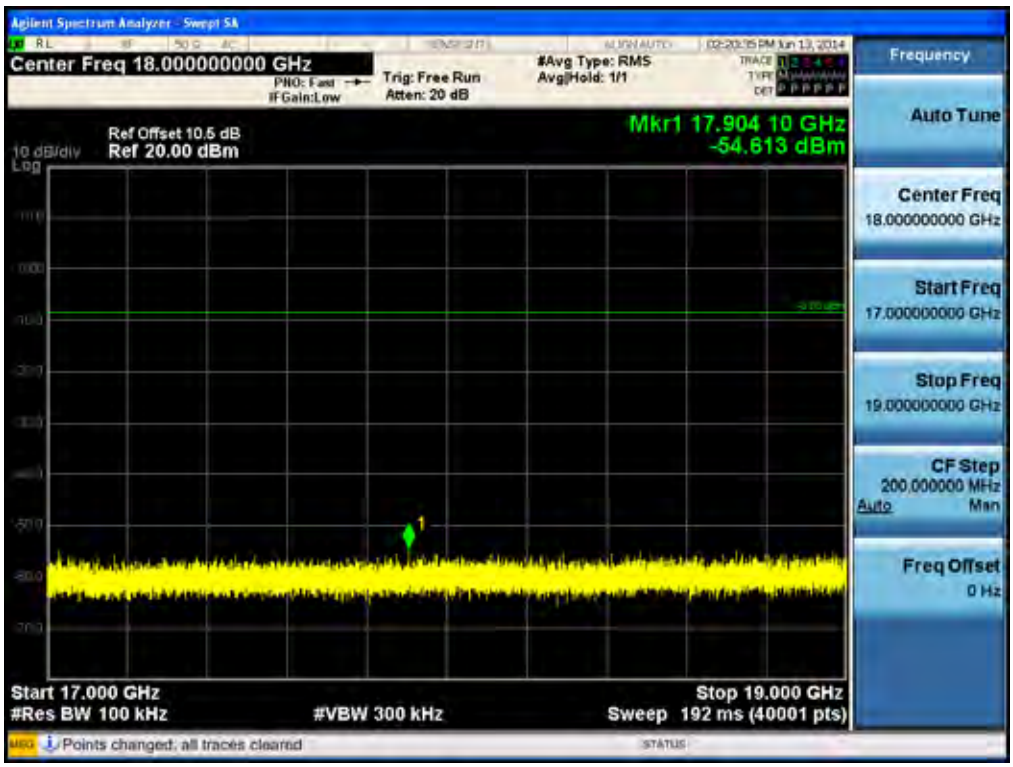
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b-CH1)



17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b-CH1)

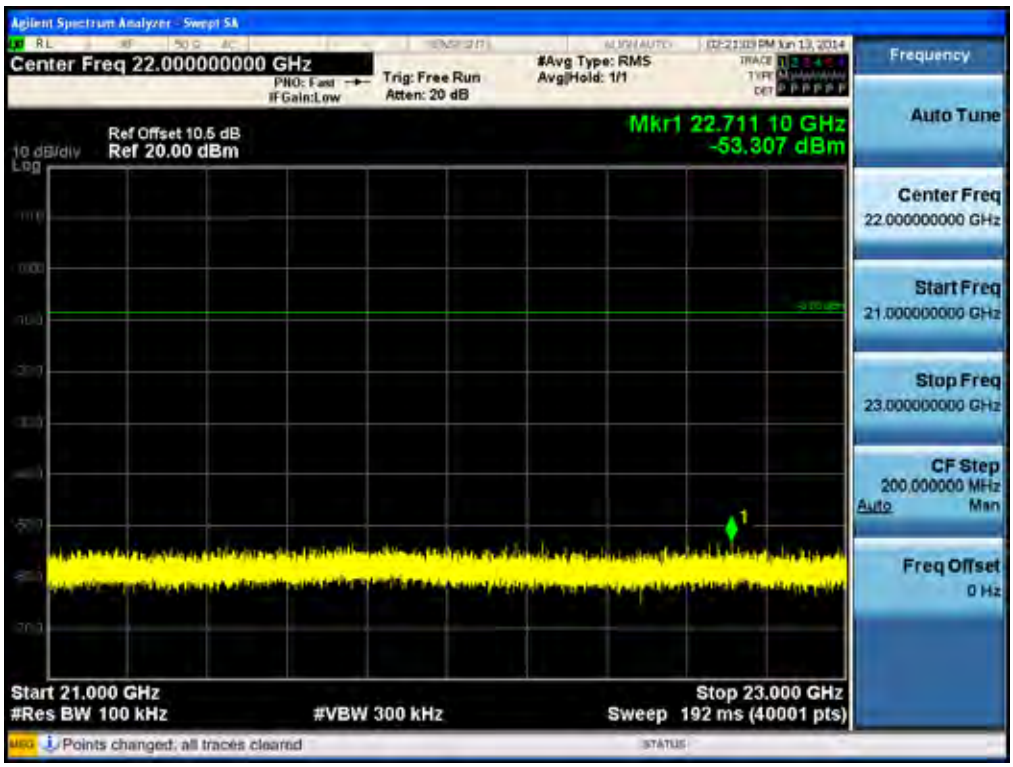


19 GHz ~ 21 GHz

19nducted Spurious Emission (802.11b-CH1)

21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b-CH1)



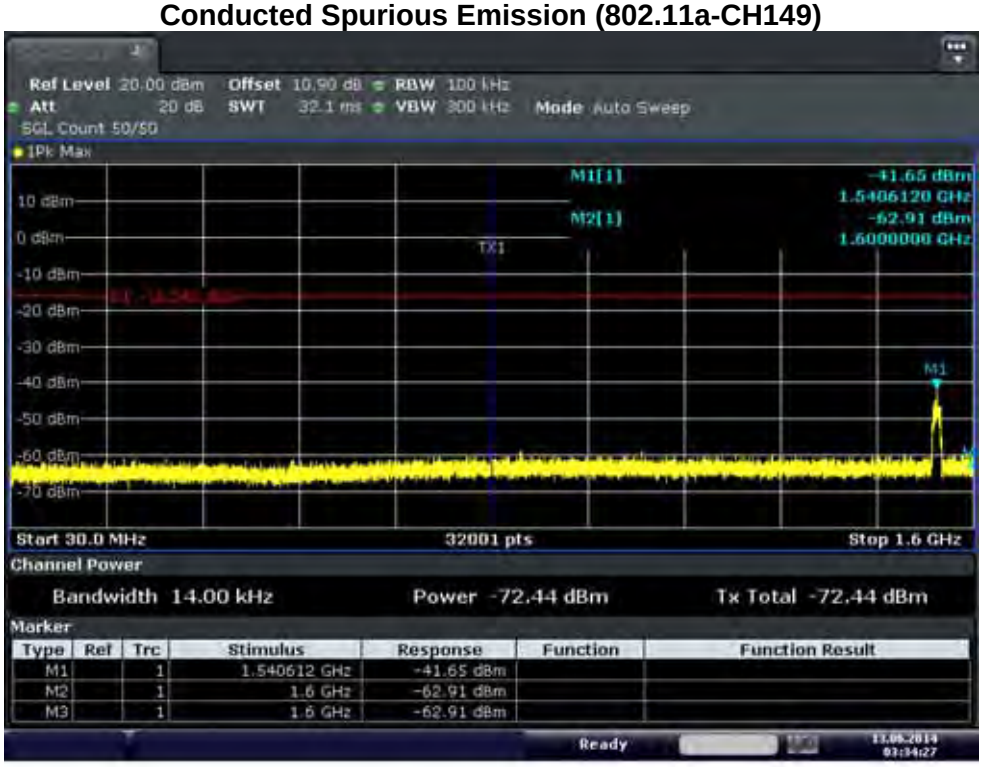
23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b-CH1)

5.8 GHz Band Ant.0

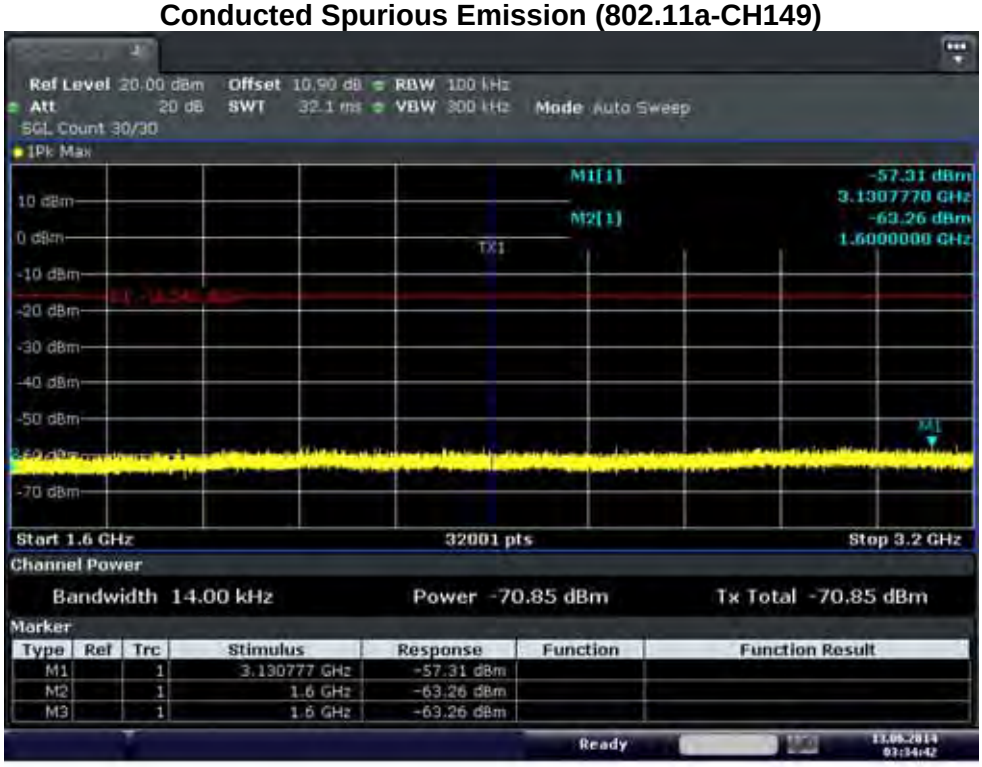
30 MHz ~ 1.6 GHz

Conducted Spurious Emission (802.11a-CH149)



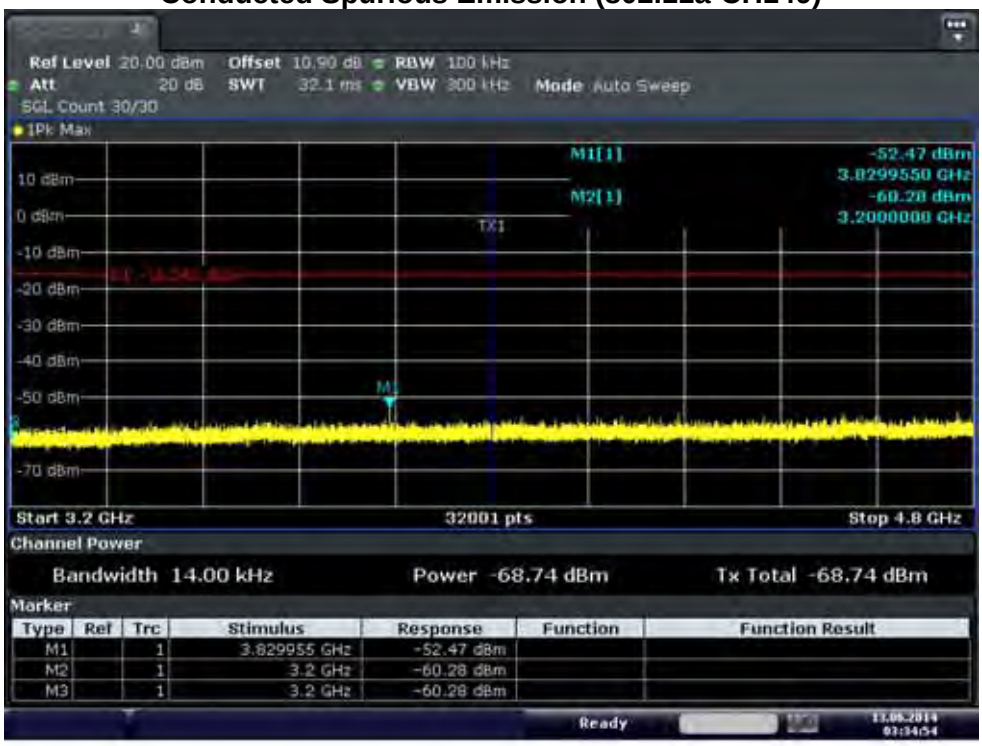
1.6 GHz ~ 3.2 GHz

Conducted Spurious Emission (802.11a-CH149)



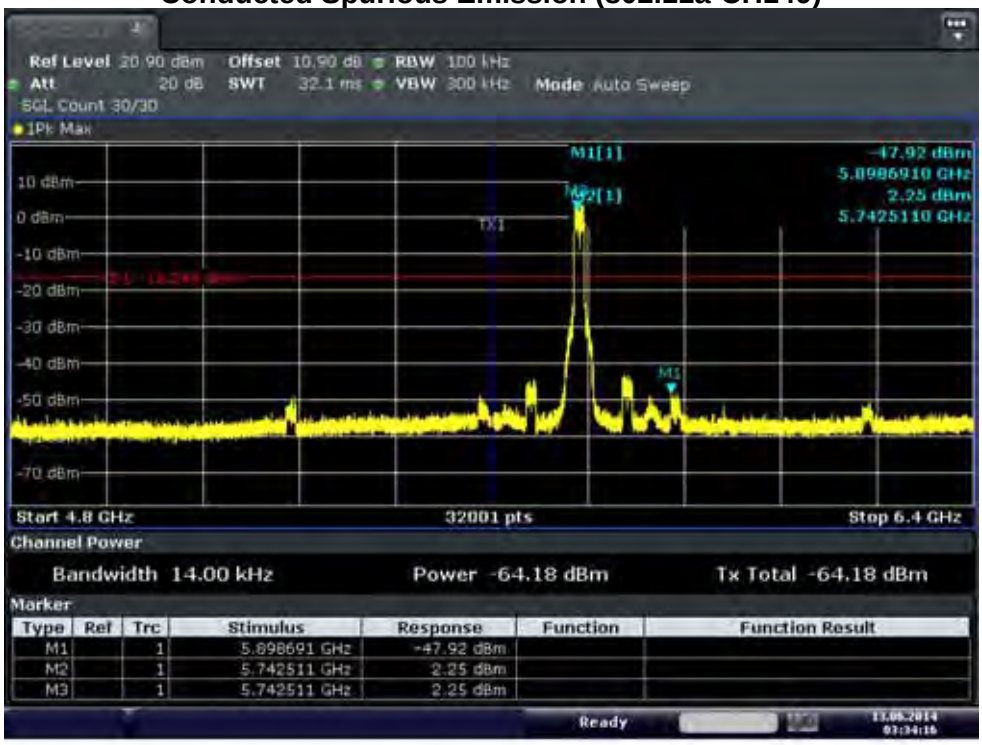
3.2 GHz ~ 4.8 GHz

Conducted Spurious Emission (802.11a-CH149)



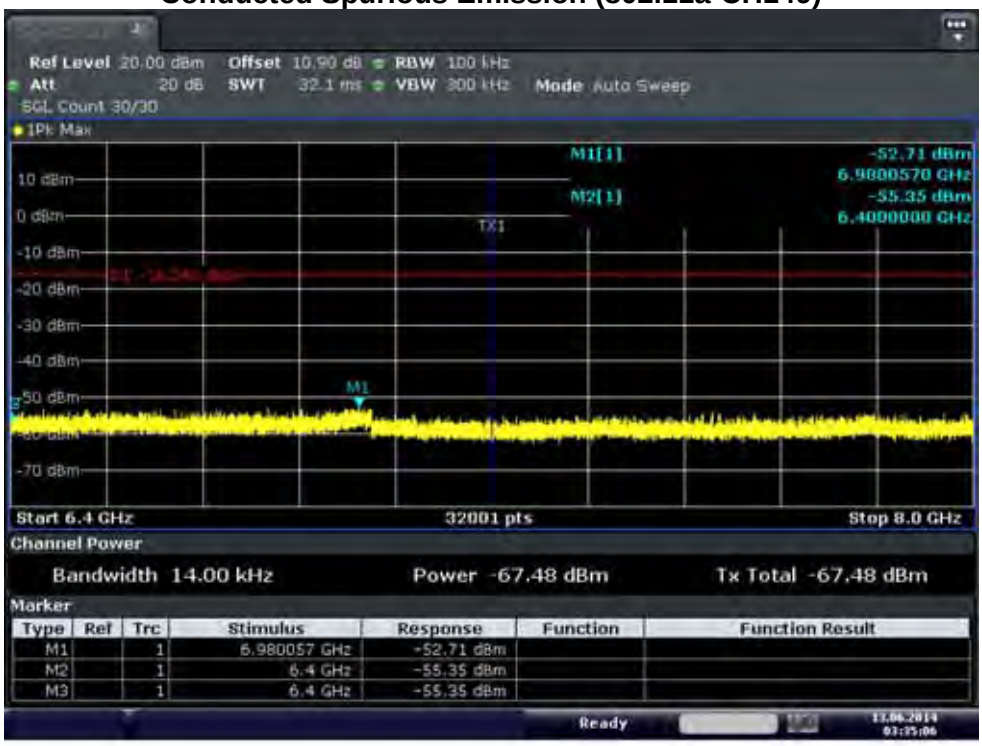
4.8 GHz ~ 6.4 GHz

Conducted Spurious Emission (802.11a-CH149)



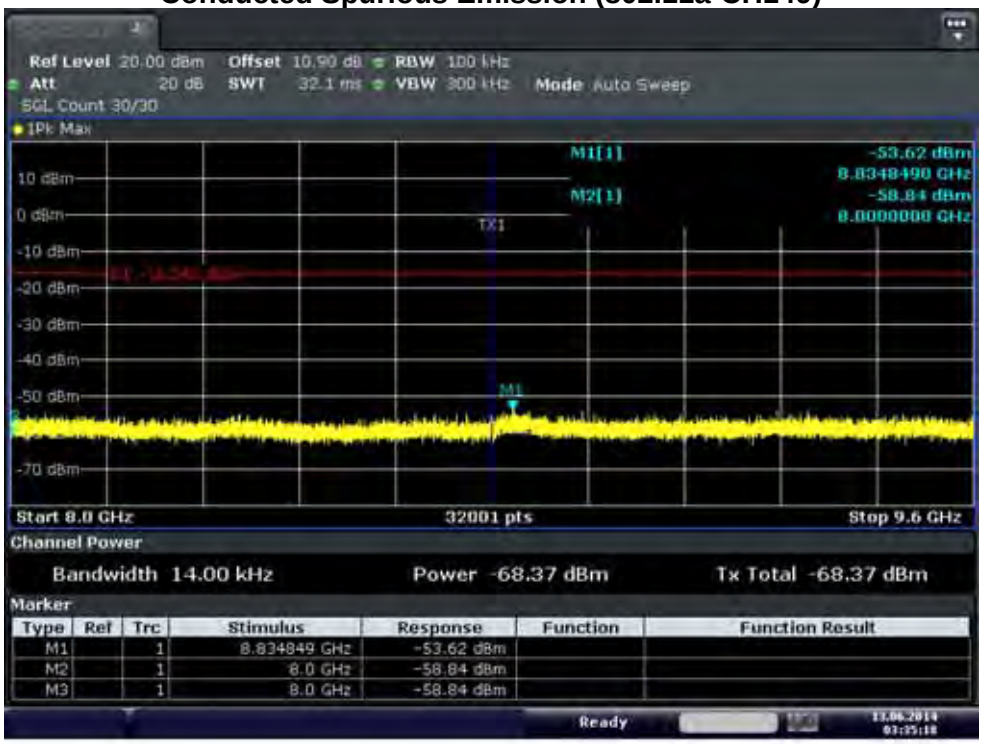
6.4 GHz ~ 8 GHz

Conducted Spurious Emission (802.11a-CH149)



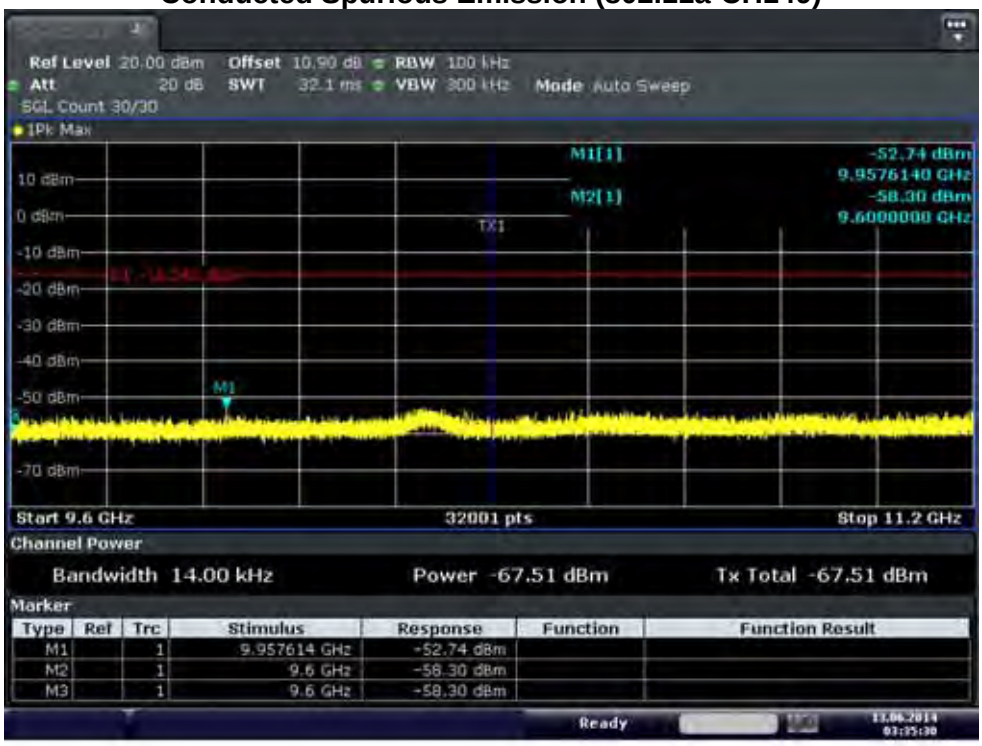
8 GHz ~ 9.6 GHz

Conducted Spurious Emission (802.11a-CH149)



9.6 GHz ~ 11.2 GHz

Conducted Spurious Emission (802.11a-CH149)

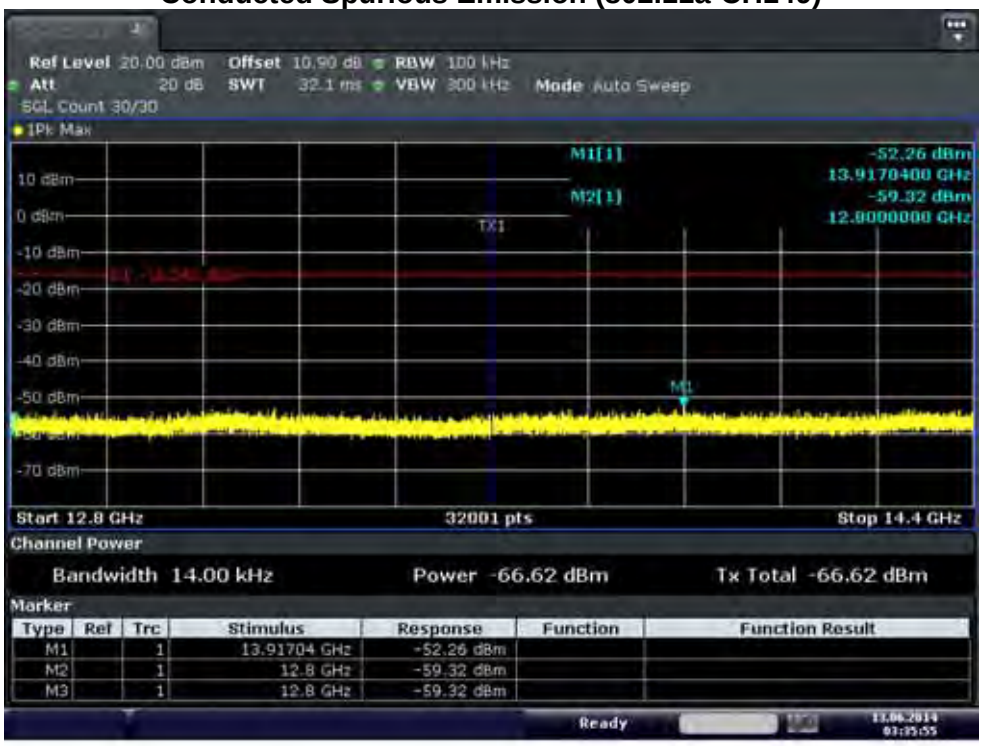


11.2 GHz ~ 12.8 GHz

Conducted Spurious Emission (802.11a-CH149)

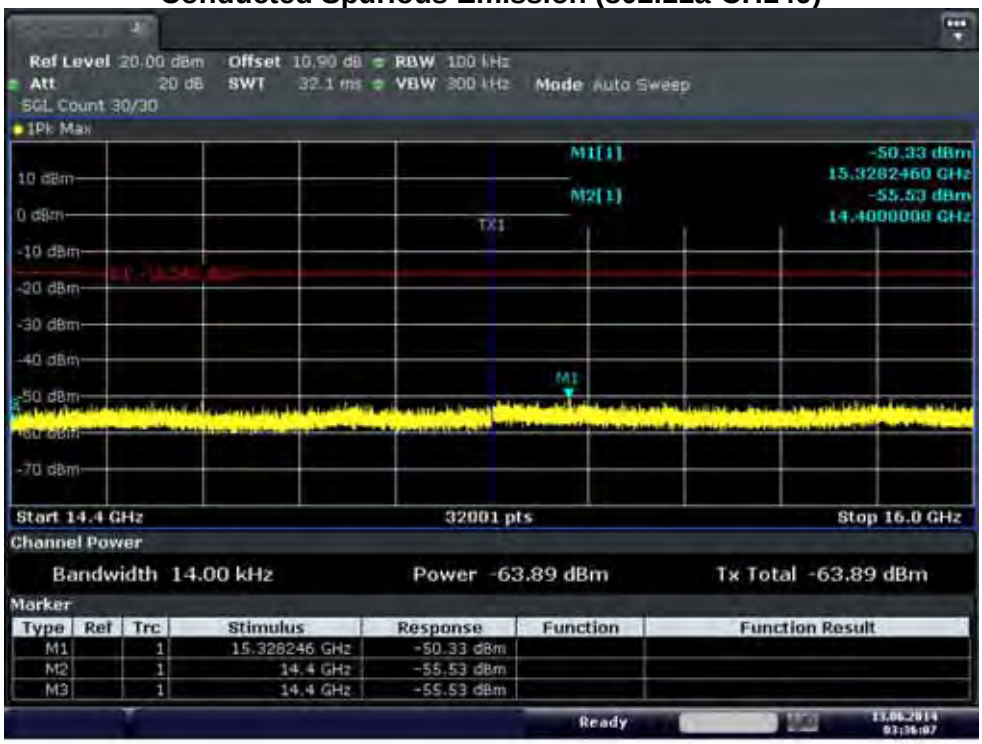
12.8 GHz ~ 12.8 GHz

Conducted Spurious Emission (802.11a-CH149)



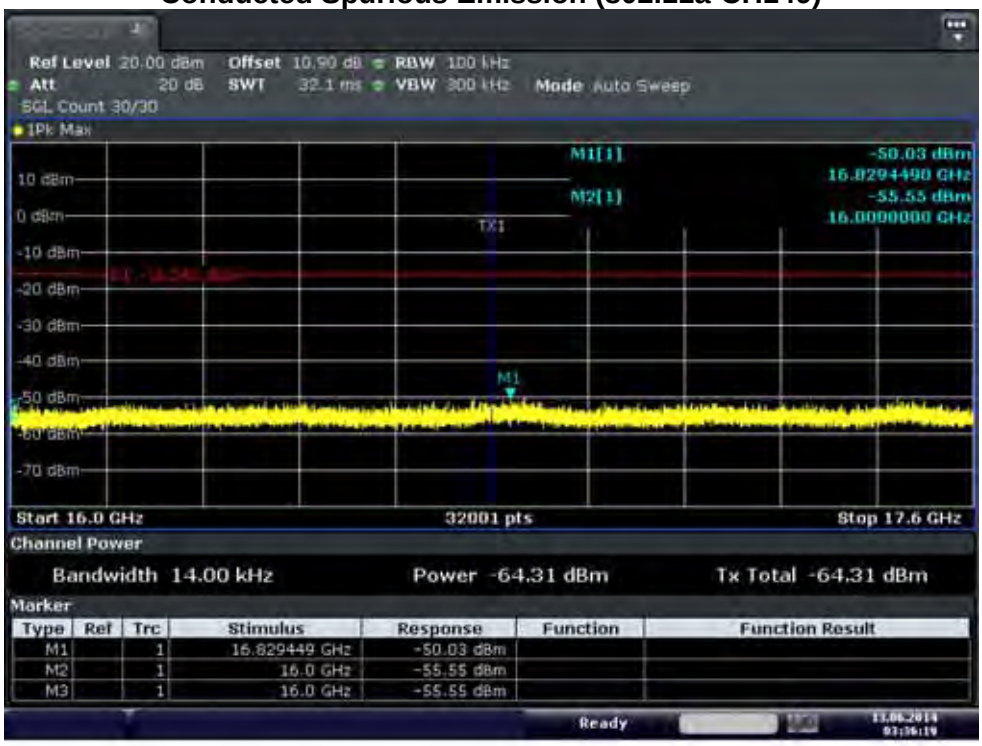
14.4 GHz ~ 16 GHz

Conducted Spurious Emission (802.11a-CH149)



16 GHz ~ 17.6 GHz

Conducted Spurious Emission (802.11a-CH149)

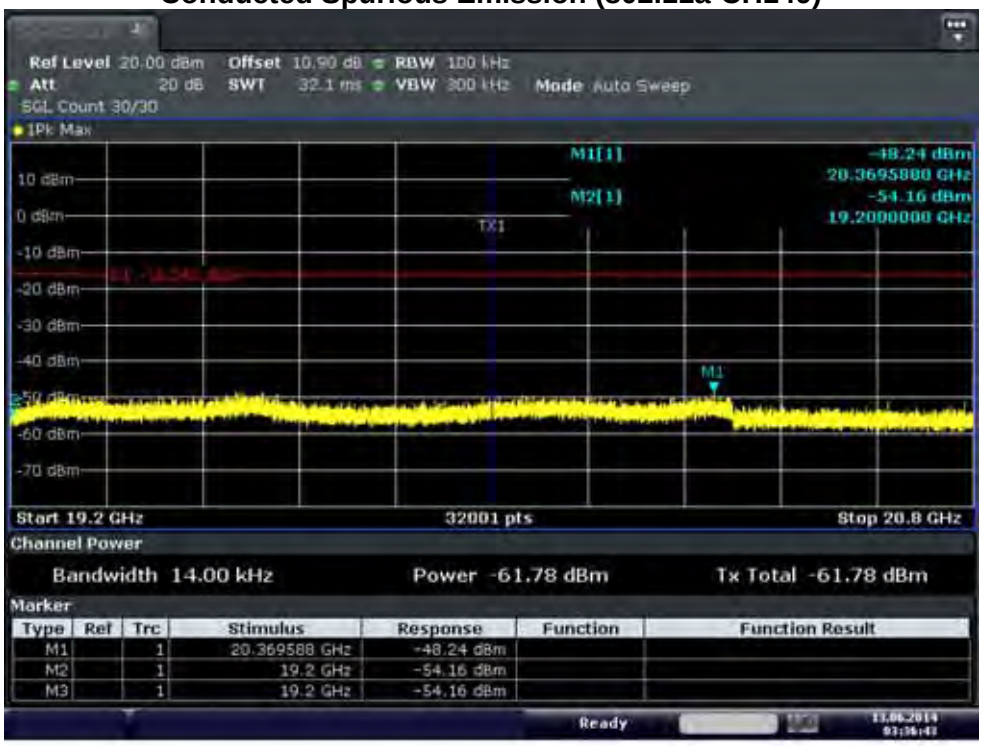


17.6 GHz ~ 19.2 GHz

Conducted Spurious Emission (802.11a-CH149)

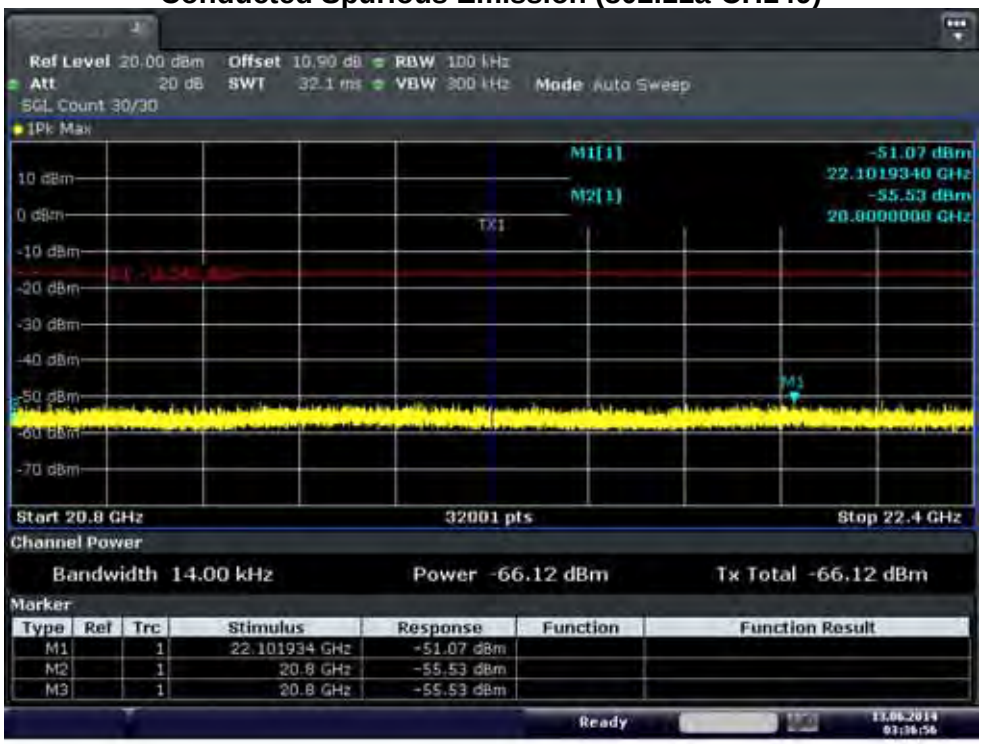
19.2 GHz ~ 20.8 GHz

Conducted Spurious Emission (802.11a-CH149)



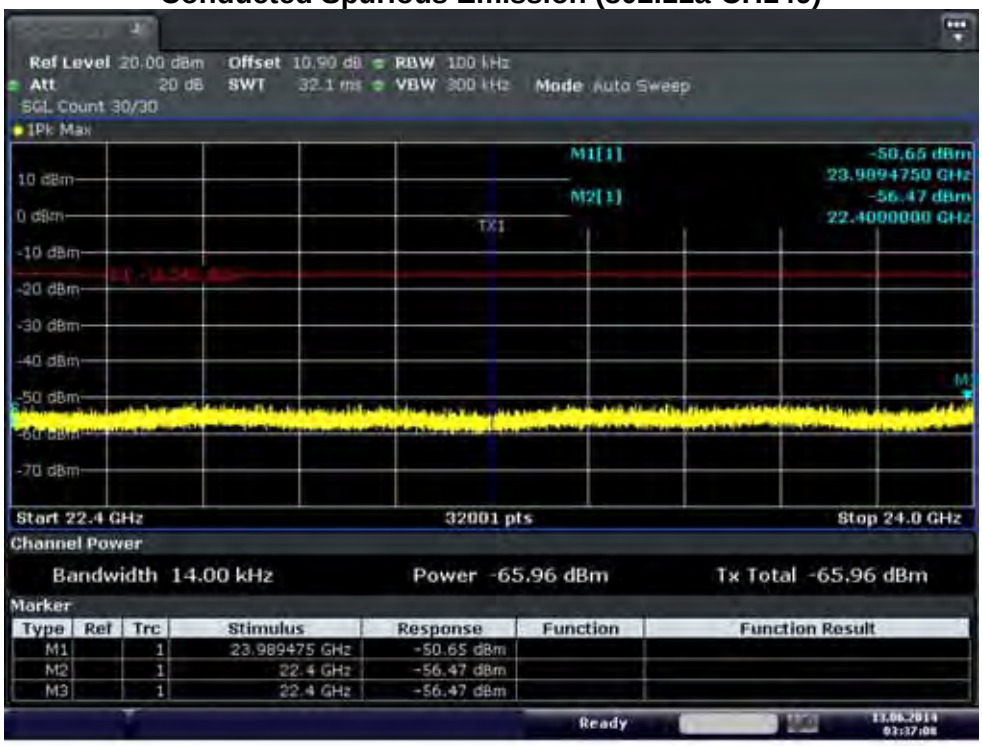
20.8 GHz ~ 22.4 GHz

Conducted Spurious Emission (802.11a-CH149)



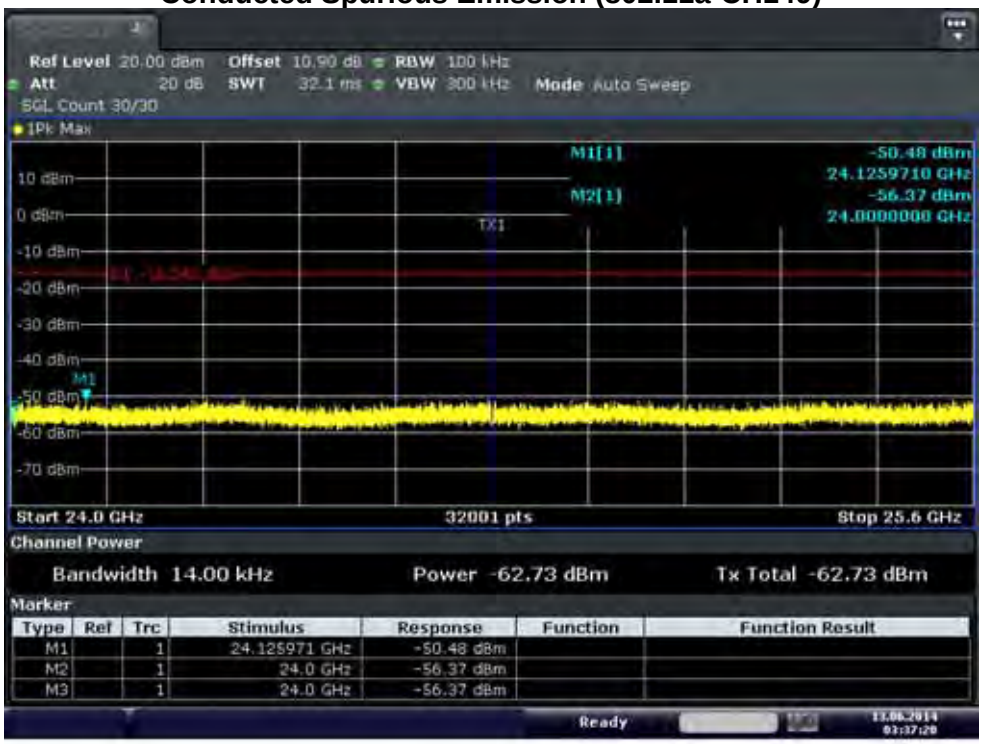
22.4 GHz ~ 24 GHz

Conducted Spurious Emission (802.11a-CH149)



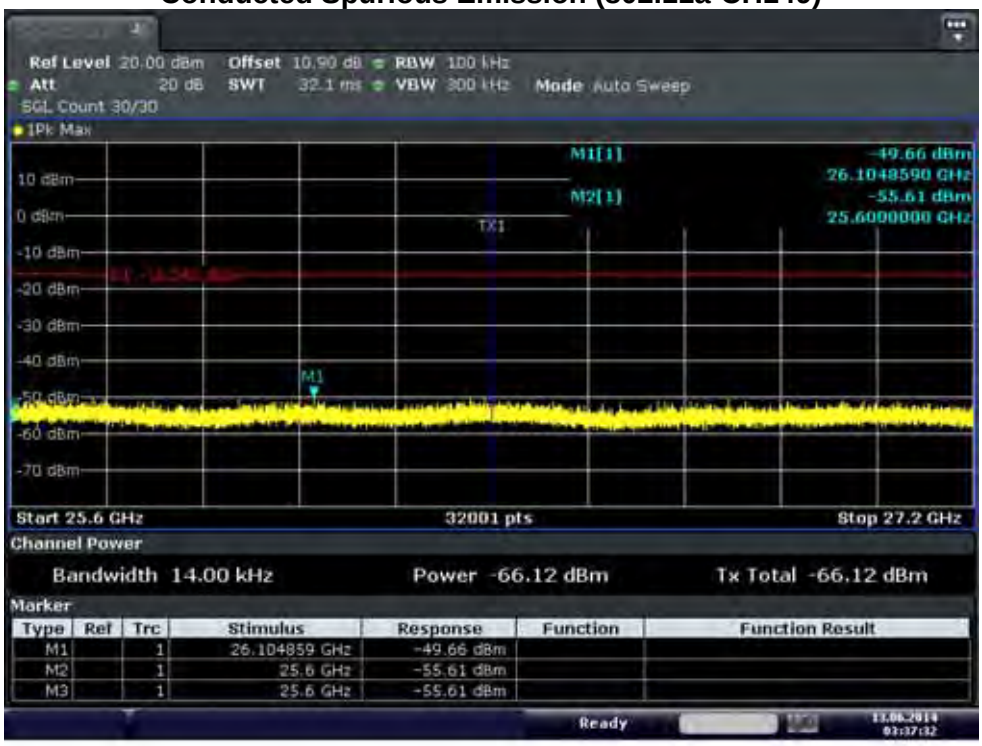
24 GHz ~ 25.6 GHz

Conducted Spurious Emission (802.11a-CH149)



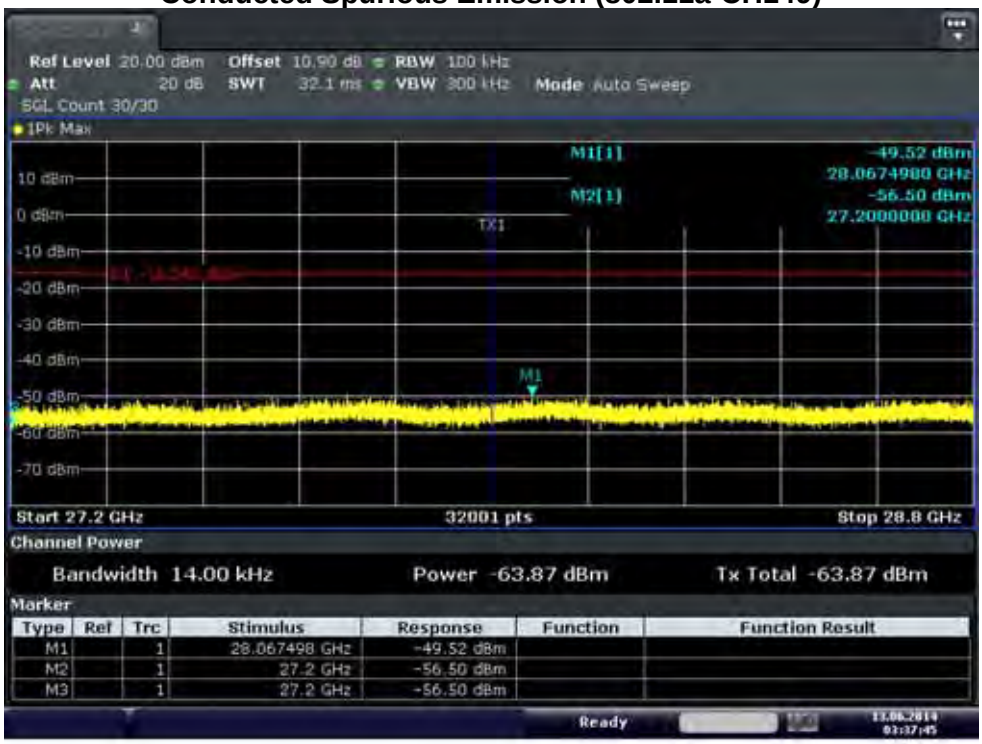
25.6 GHz ~ 27.2 GHz

Conducted Spurious Emission (802.11a-CH149)



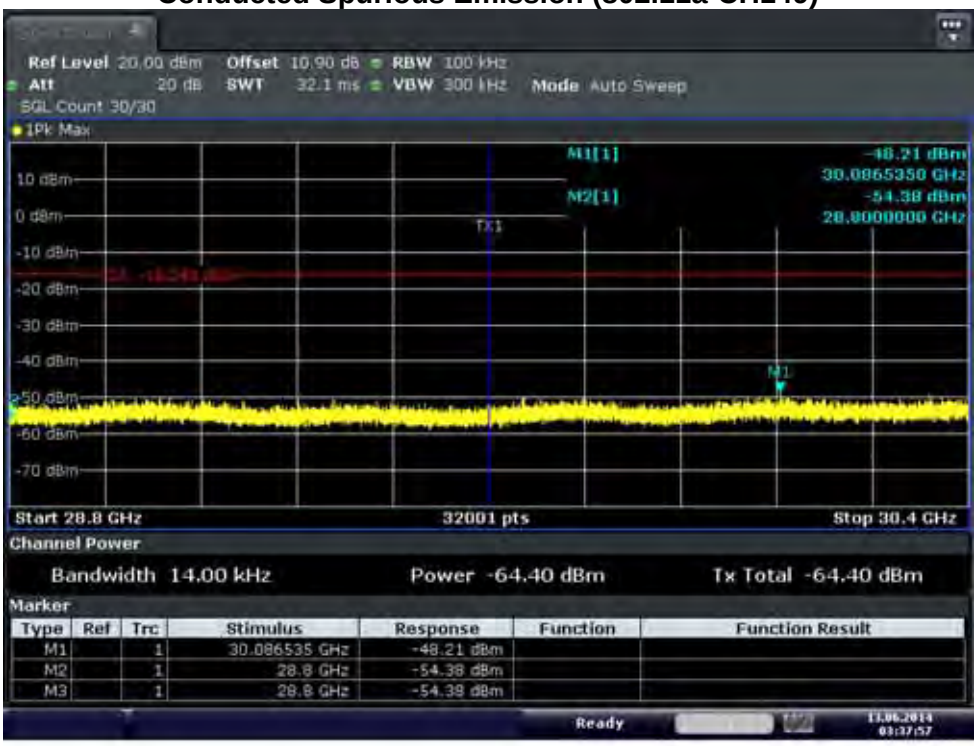
27.2 GHz ~ 28.8 GHz

Conducted Spurious Emission (802.11a-CH149)



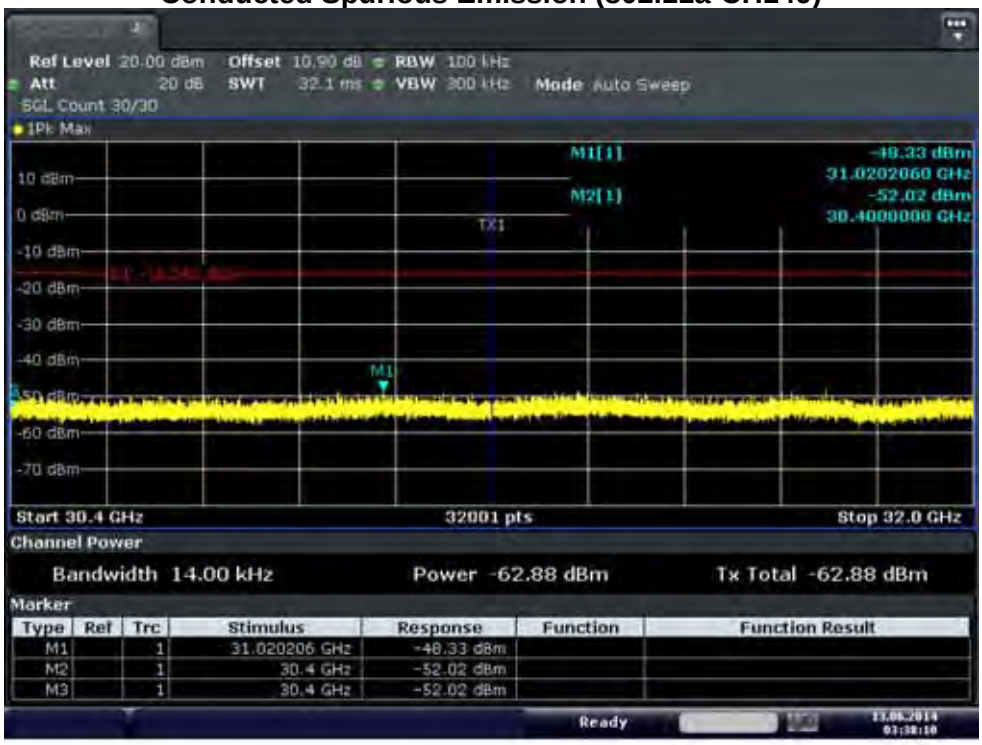
28.8 GHz ~ 30.4 GHz

Conducted Spurious Emission (802.11a-CH149)



30.4 GHz ~ 32 GHz

Conducted Spurious Emission (802.11a-CH149)

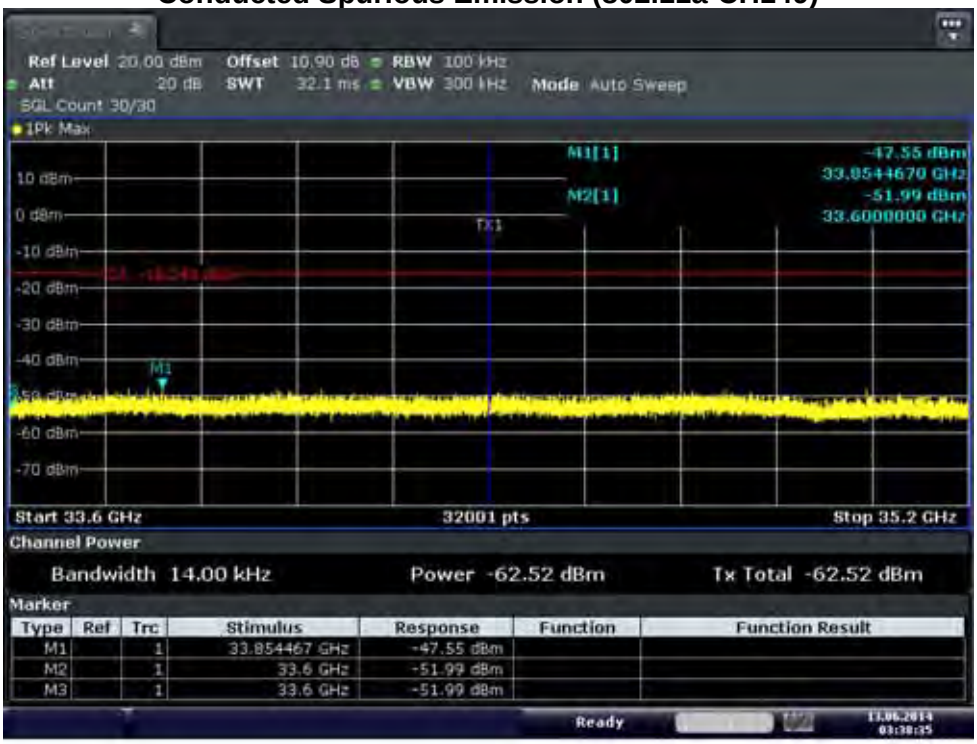


32 GHz ~ 33.6 GHz

Conducted Spurious Emission (802.11a-CH149)

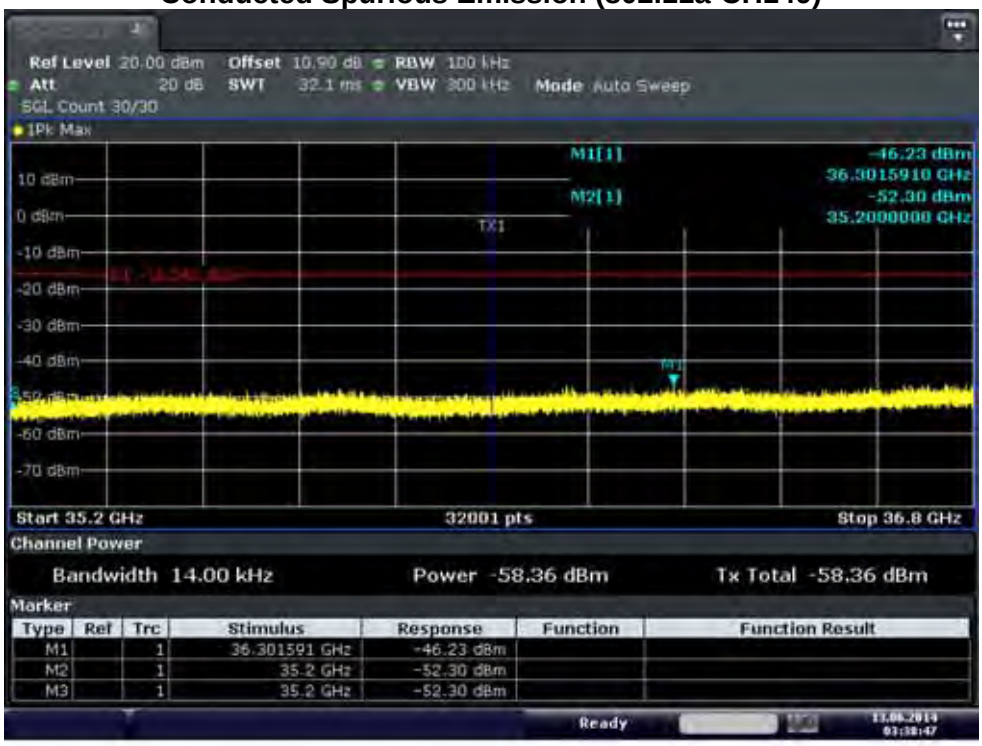
33.6 GHz ~ 35.2 GHz

Conducted Spurious Emission (802.11a-CH149)



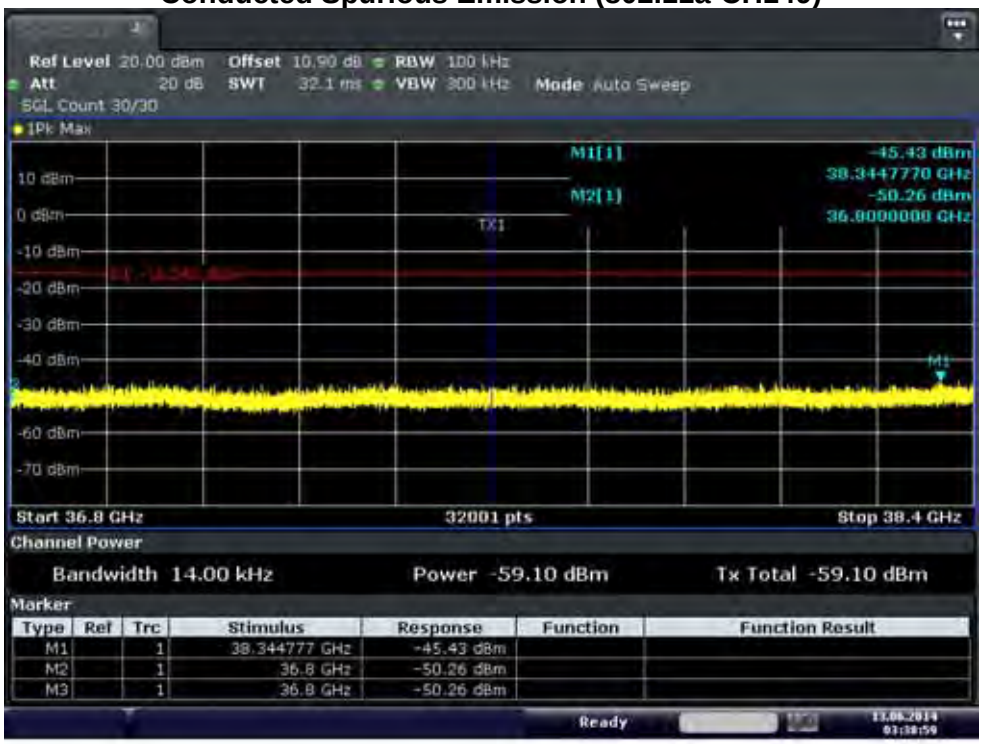
35.2 GHz ~ 36.8 GHz

Conducted Spurious Emission (802.11a-CH149)



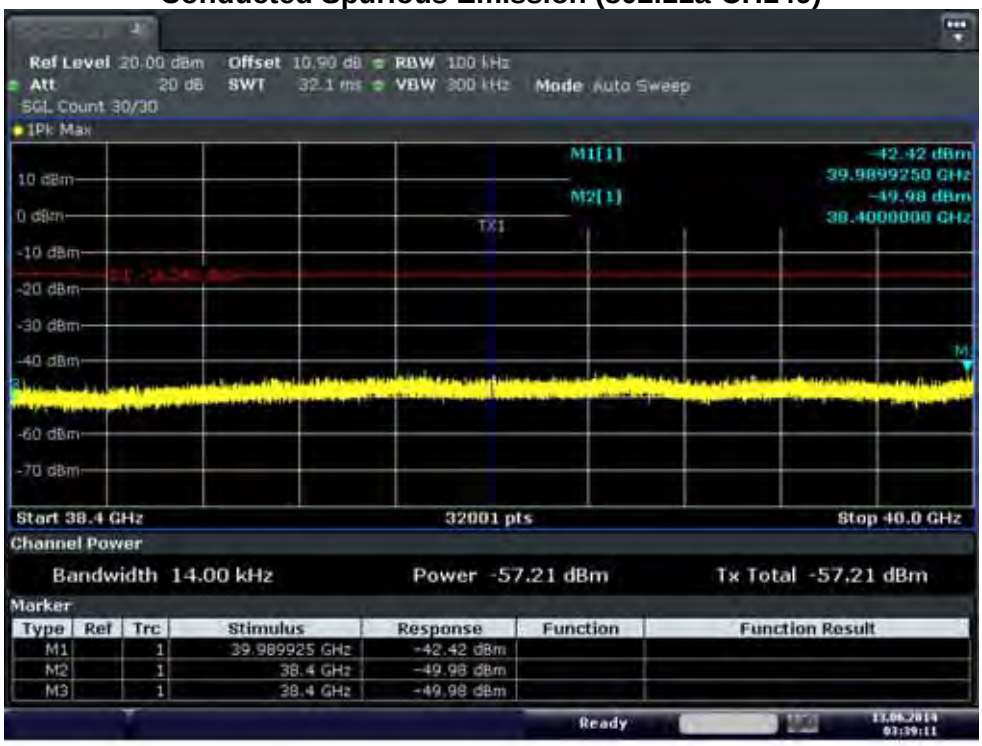
36.8 GHz ~ 38.4 GHz

Conducted Spurious Emission (802.11a-CH149)



38.4 GHz ~ 40 GHz

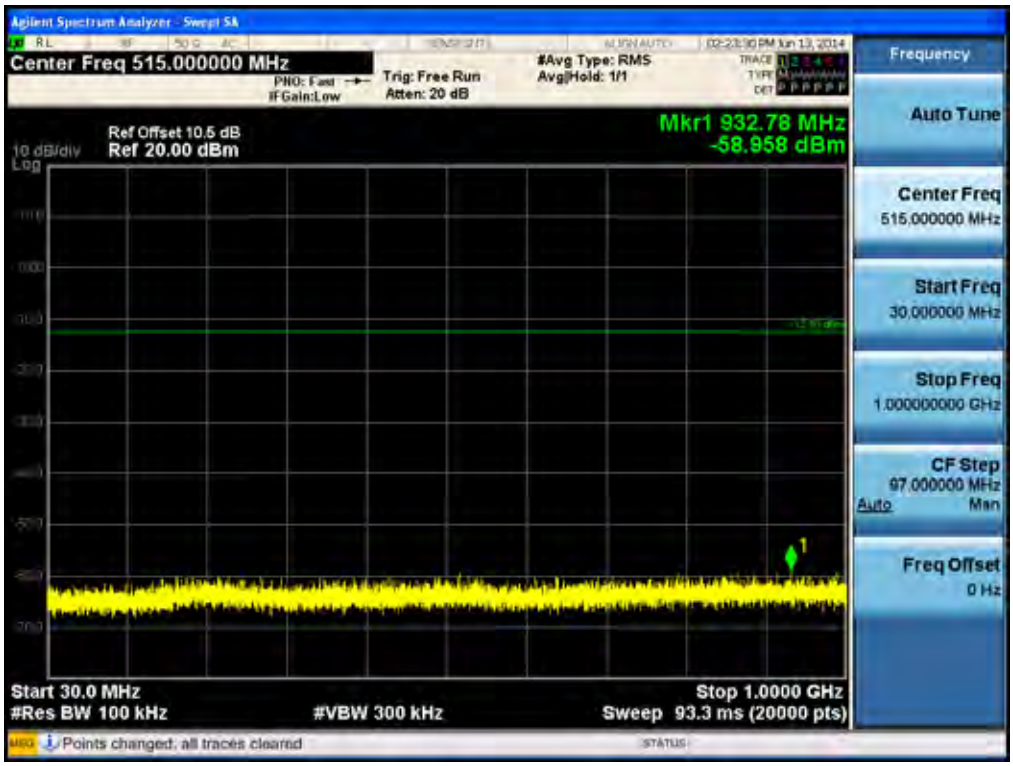
Conducted Spurious Emission (802.11a-CH149)



2.4 GHz Band Ant.1

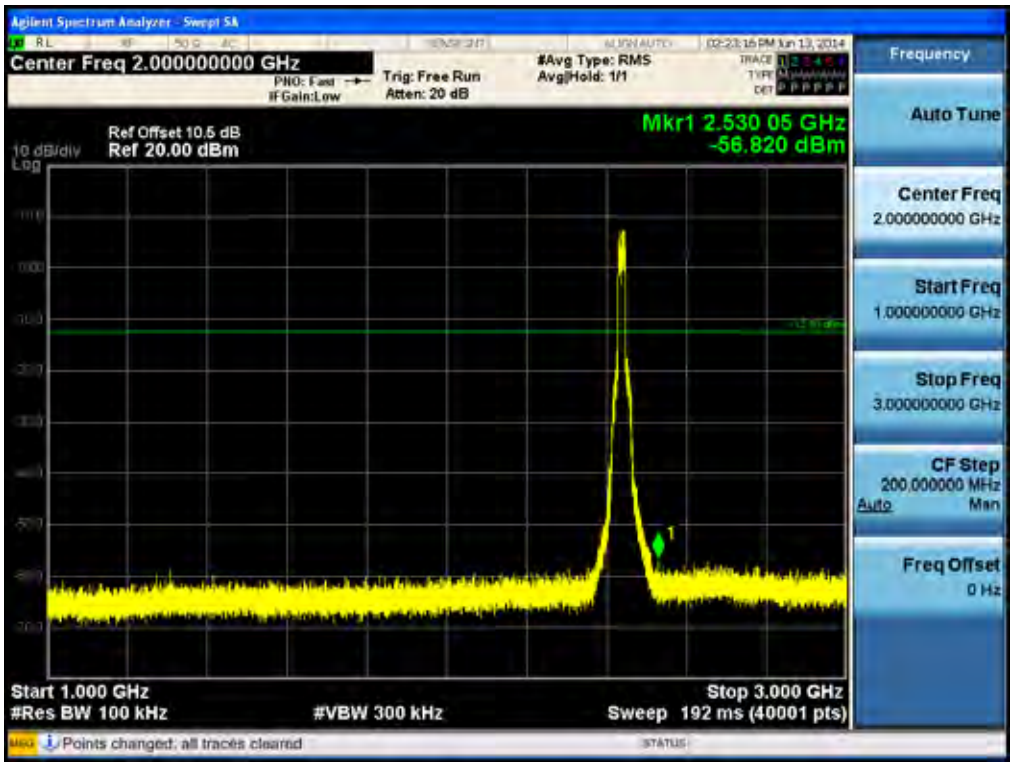
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n-CH6)



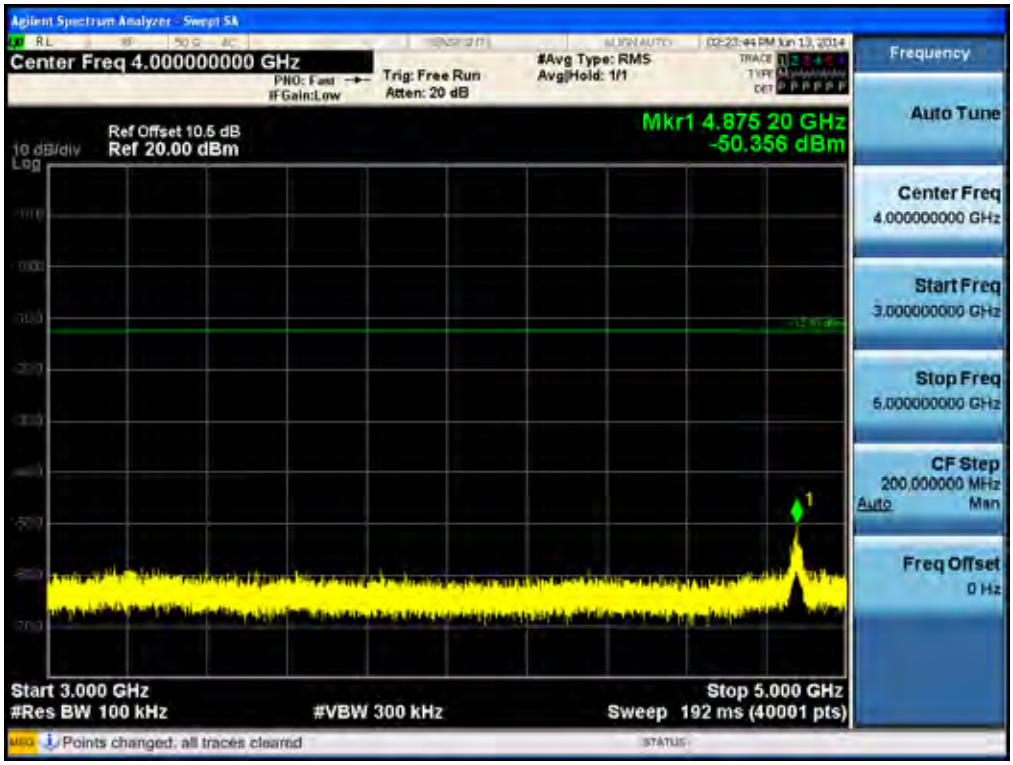
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n-CH6)



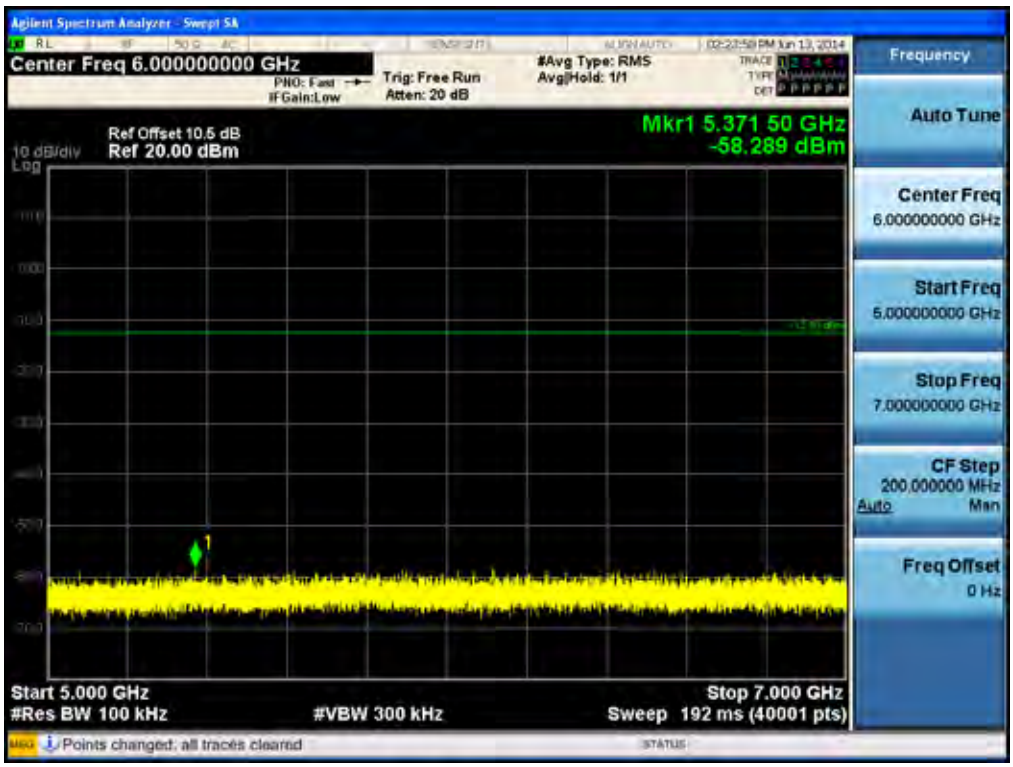
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n-CH6)



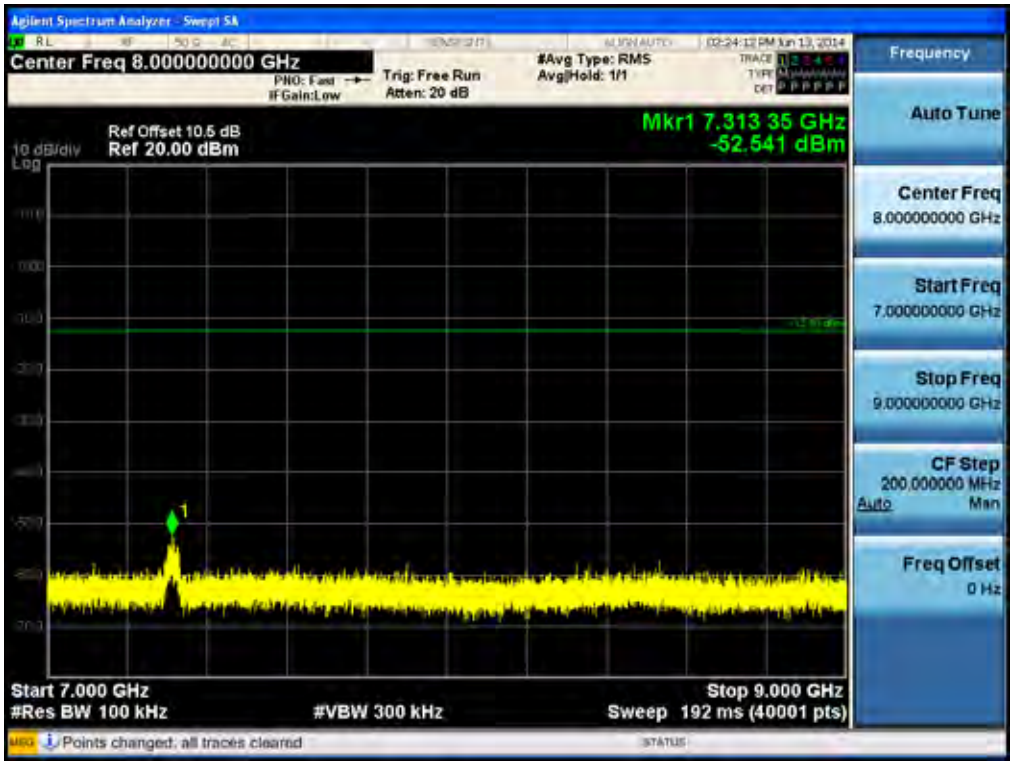
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11n-CH6)



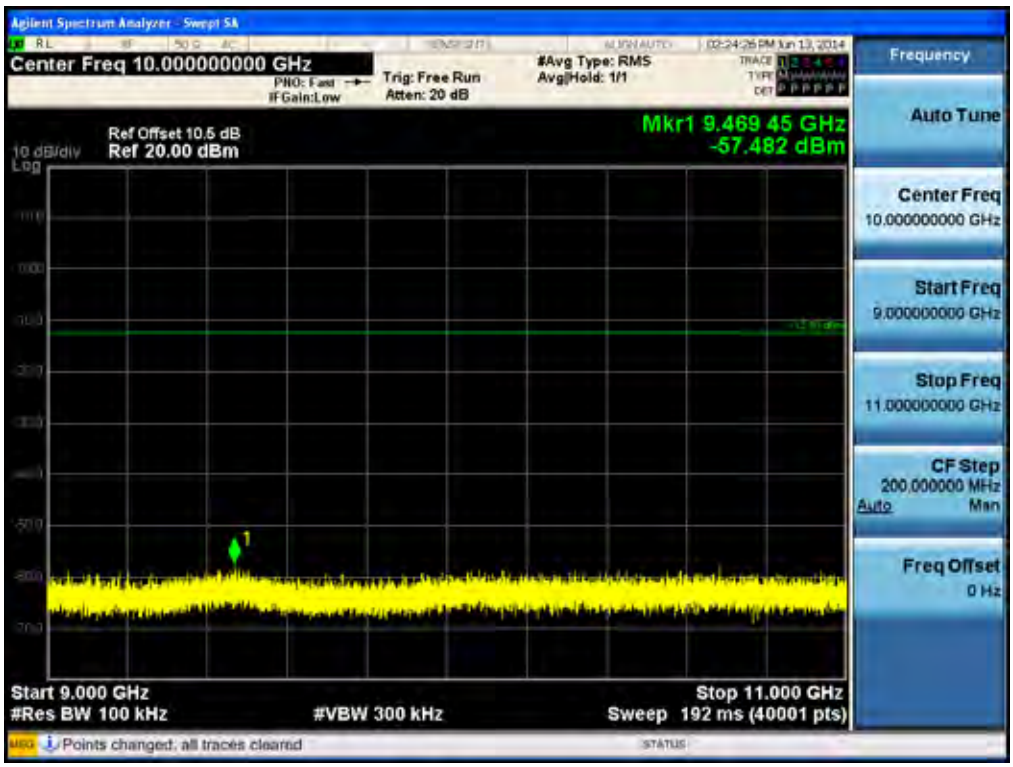
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n-CH6)



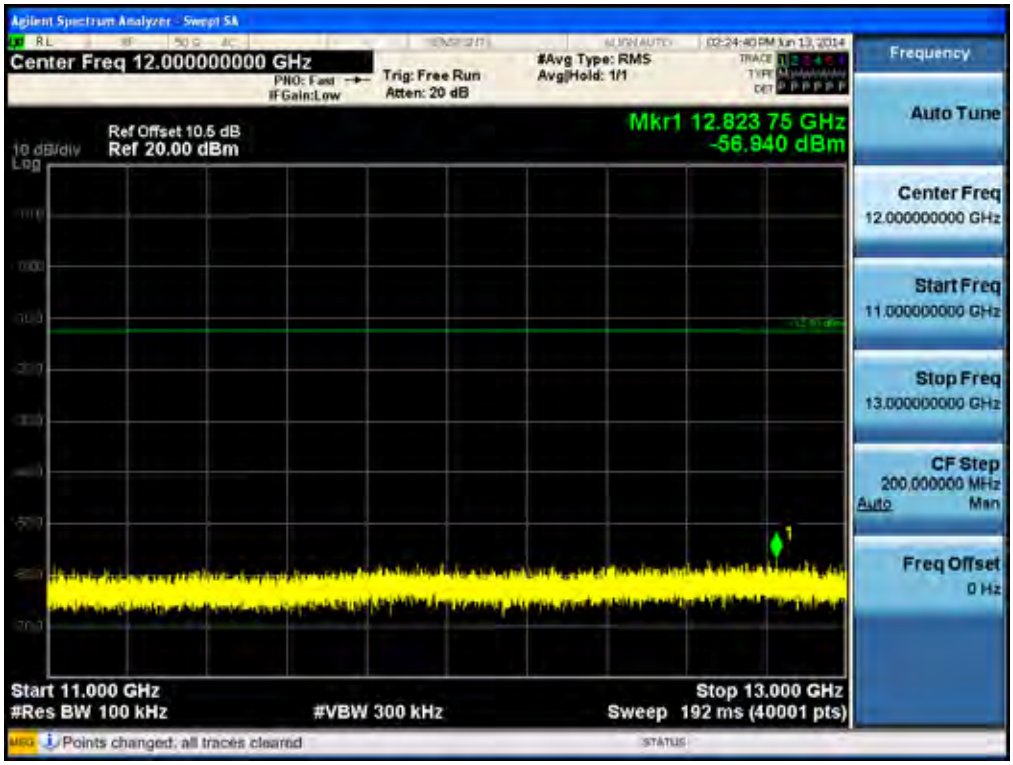
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11n-CH6)



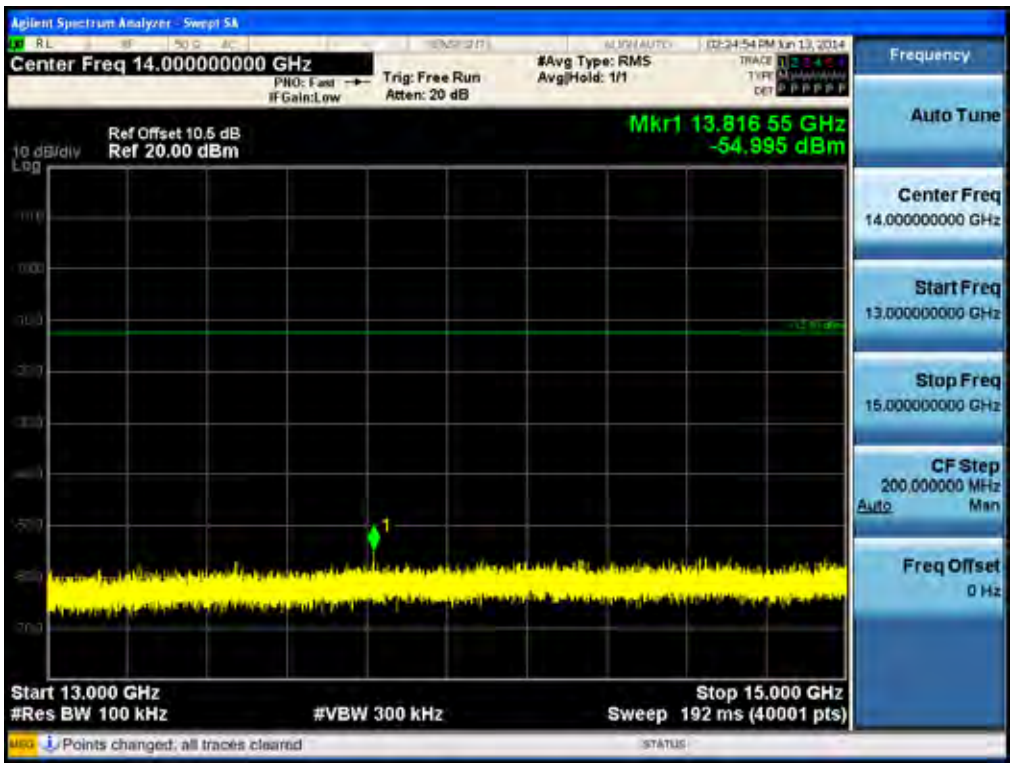
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n-CH6)



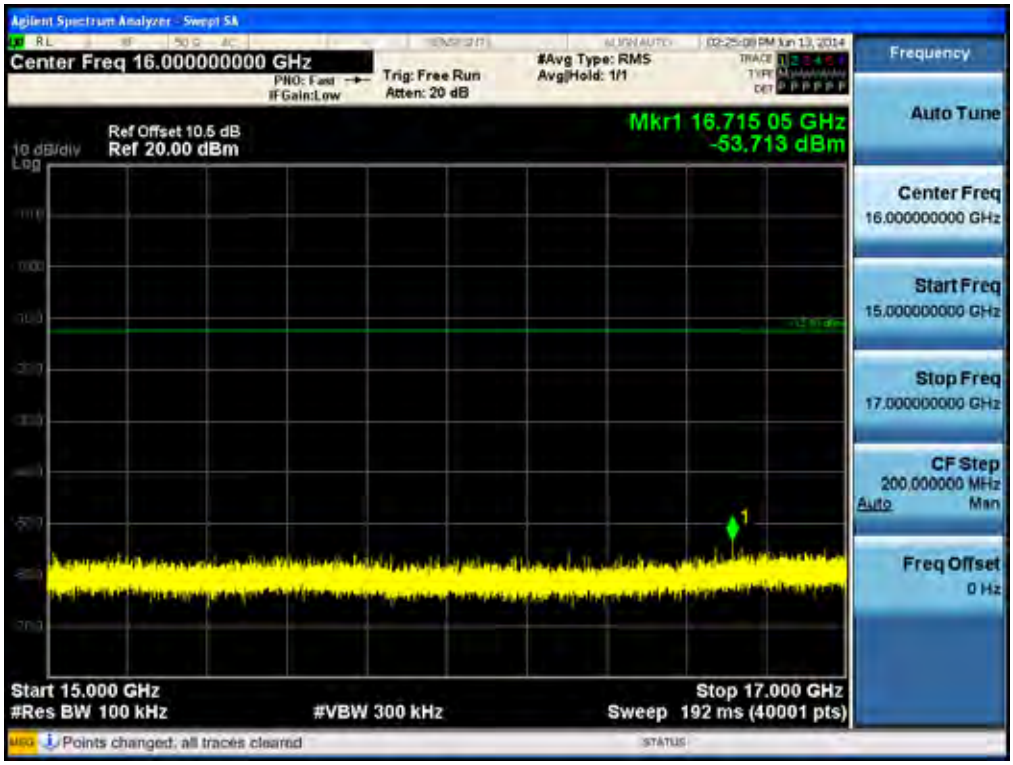
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n-CH6)



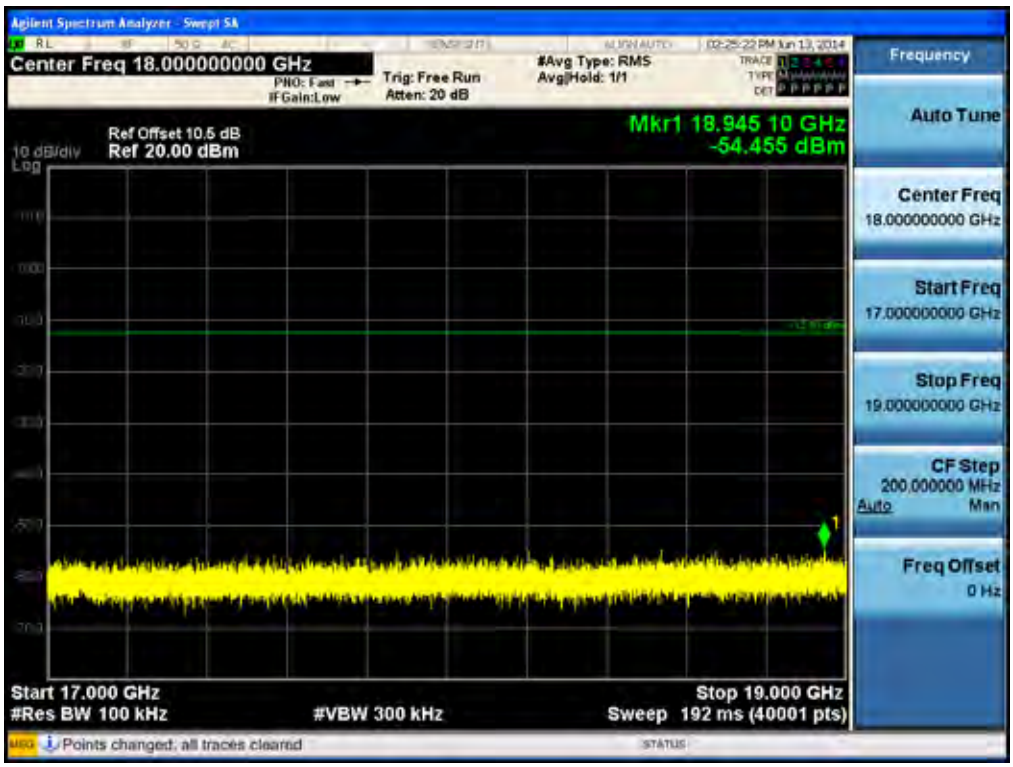
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n-CH6)



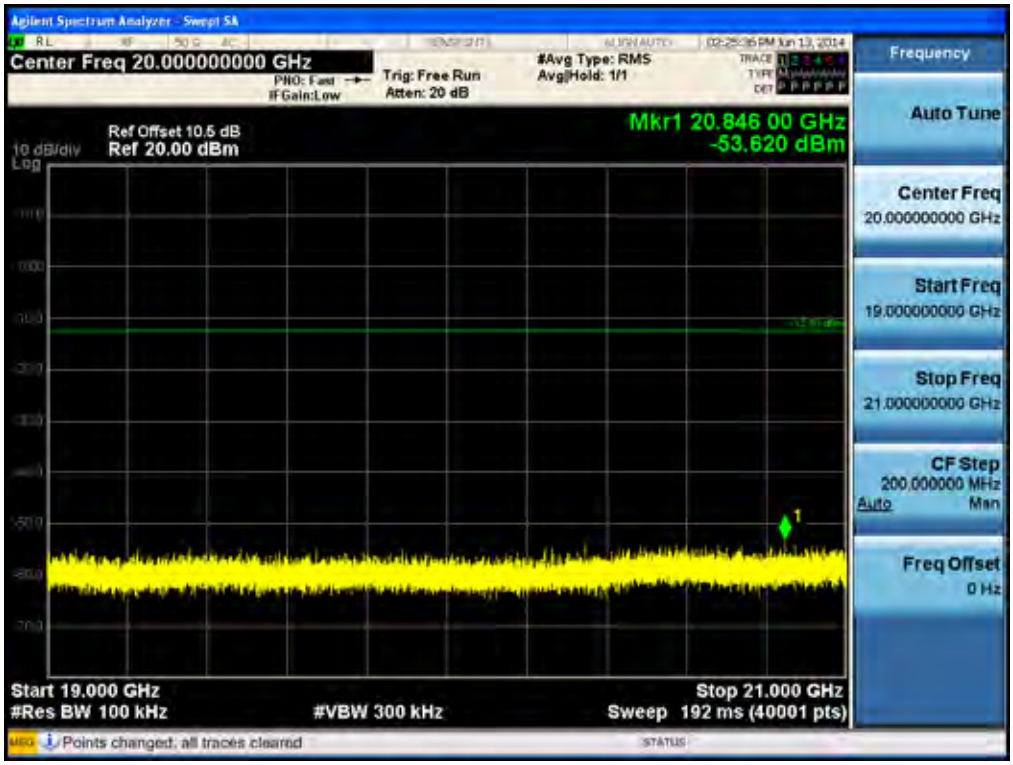
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n-CH6)



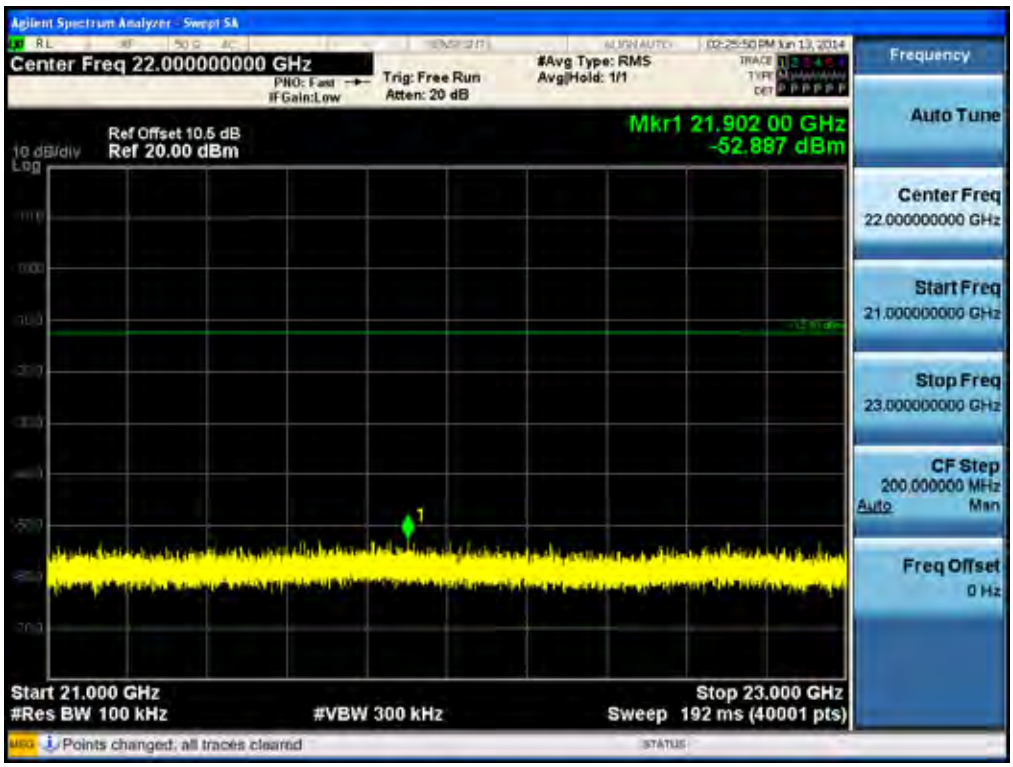
19 GHz ~ 21 GHz

19nducted Spurious Emission (802.11n-CH6)



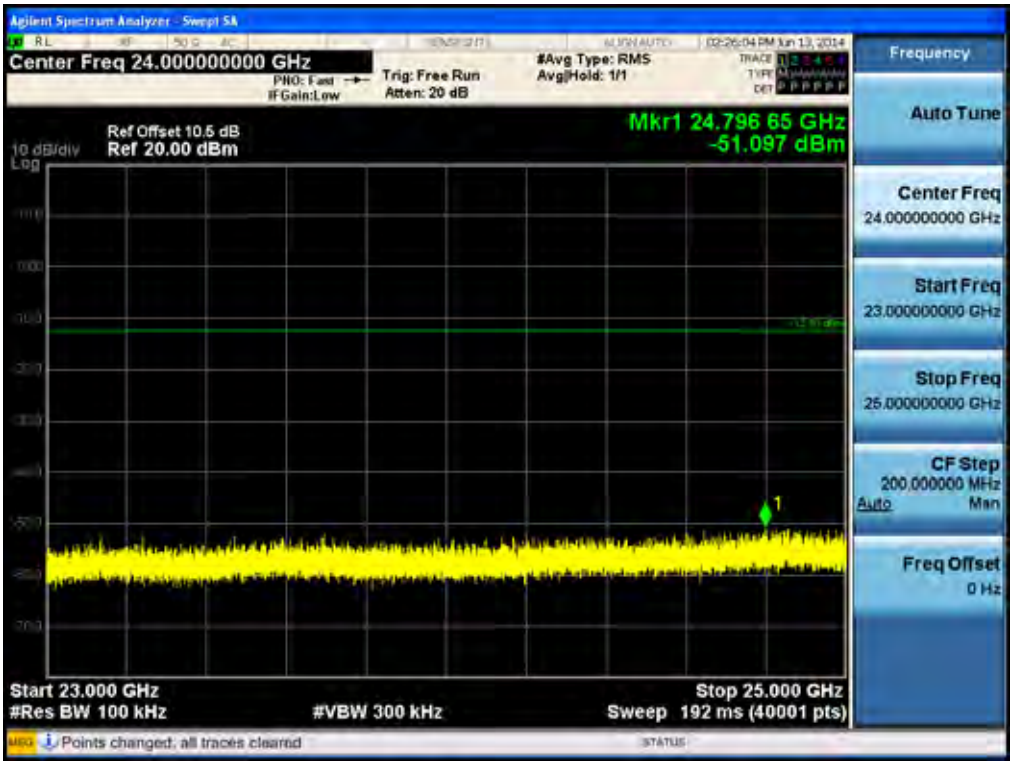
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11n-CH6)



23 GHz ~ 25 GHz

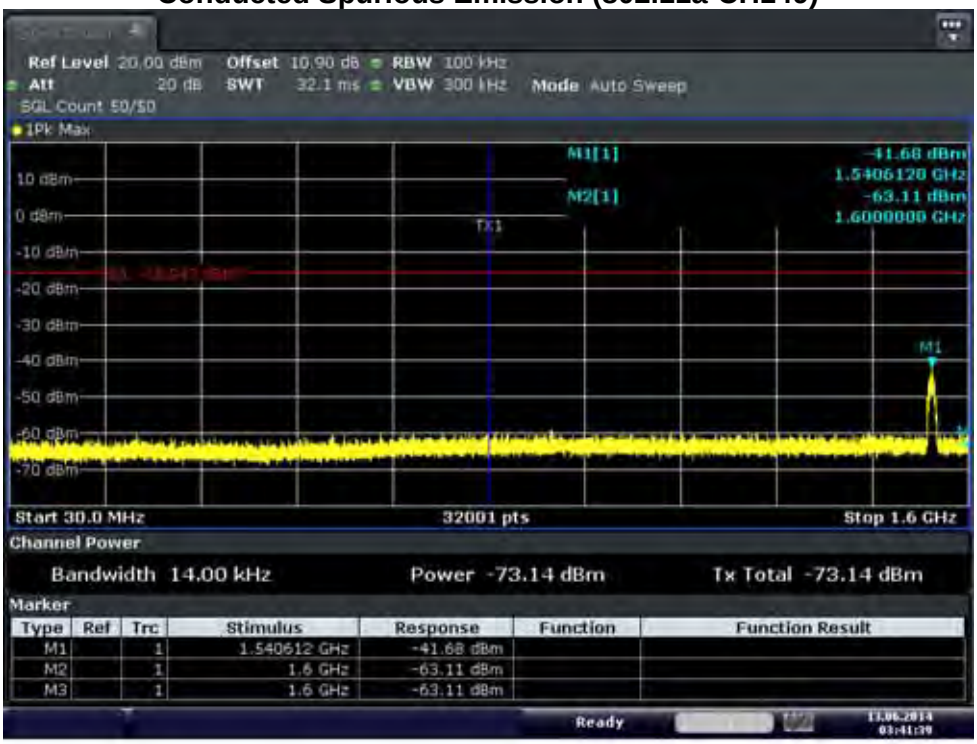
Conducted Spurious Emission (802.11n-CH6)



5.8 GHz Band Ant.1

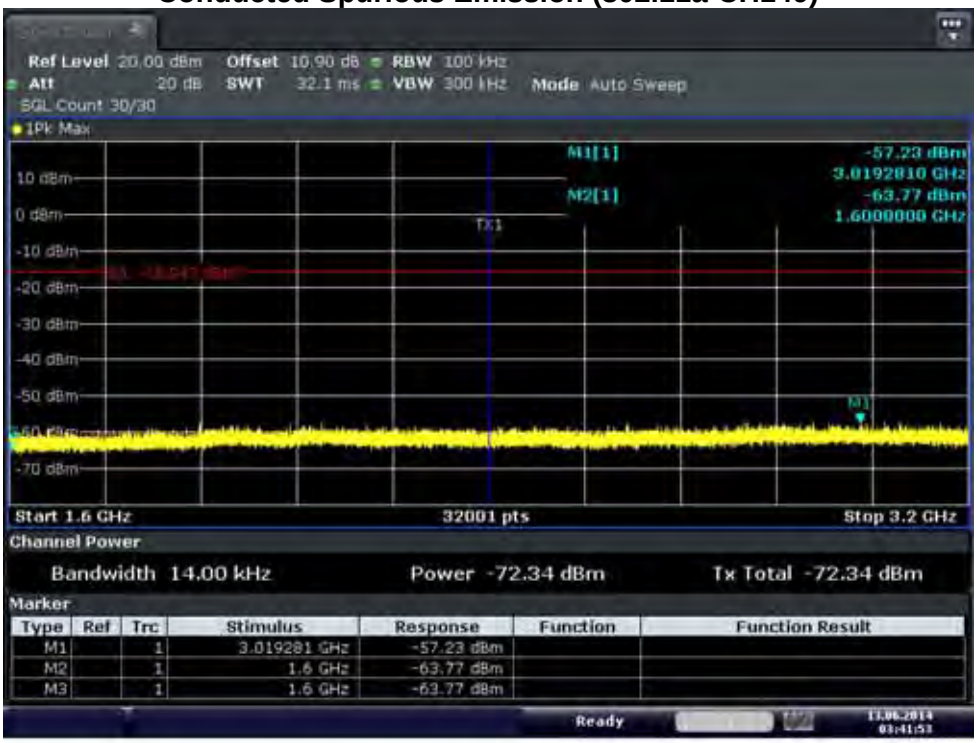
30 MHz ~ 1.6 GHz

Conducted Spurious Emission (802.11a-CH149)



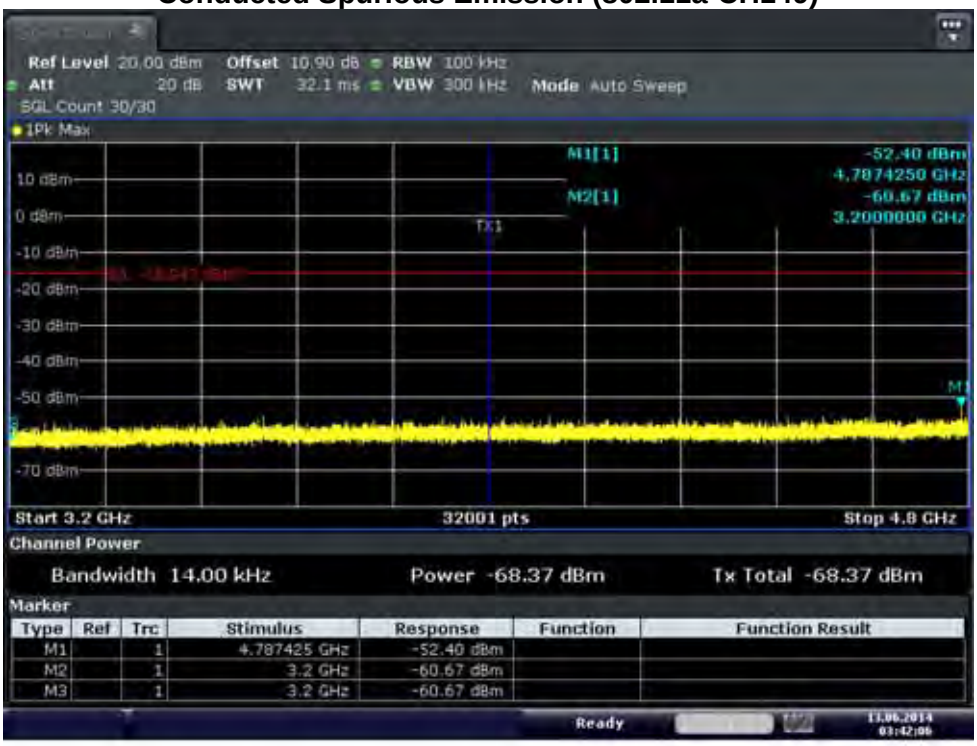
1.6 GHz ~ 3.2 GHz

Conducted Spurious Emission (802.11a-CH149)



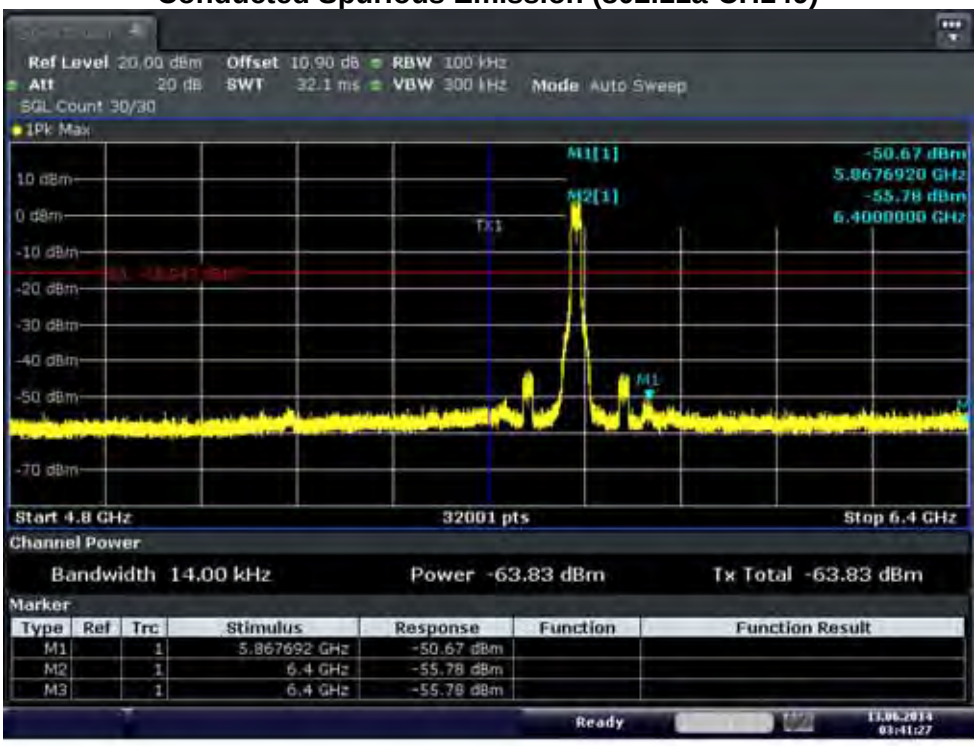
3.2 GHz ~ 4.8 GHz

Conducted Spurious Emission (802.11a-CH149)



4.8 GHz ~ 6.4 GHz

Conducted Spurious Emission (802.11a-CH149)



6.4 GHz ~ 8 GHz

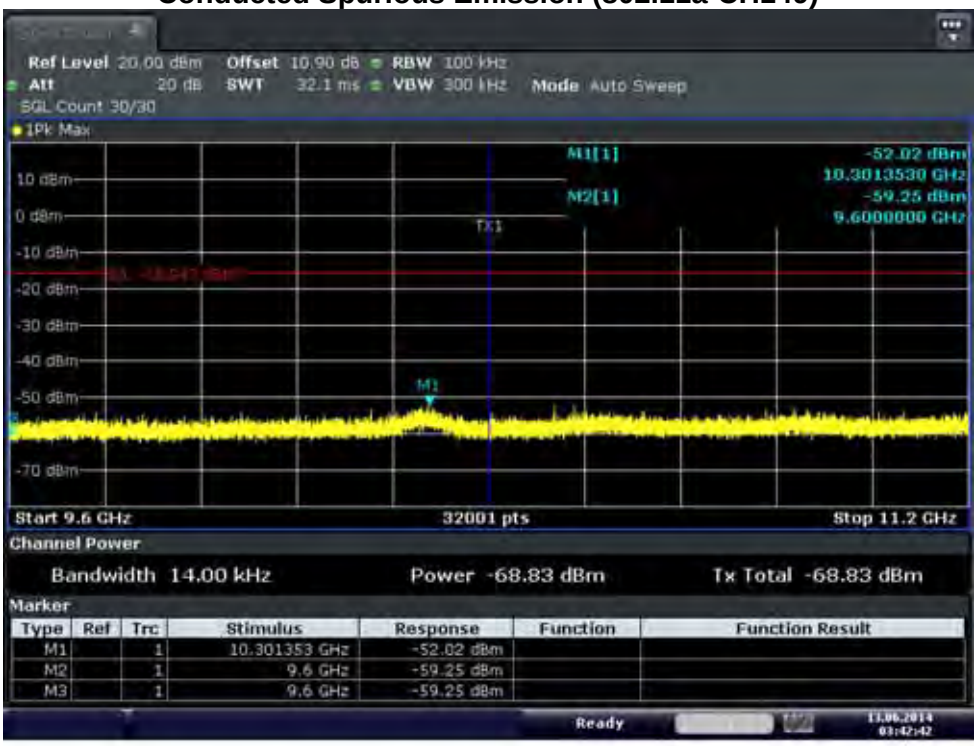
Conducted Spurious Emission (802.11a-CH149)

8 GHz ~ 9.6 GHz

Conducted Spurious Emission (802.11a-CH149)

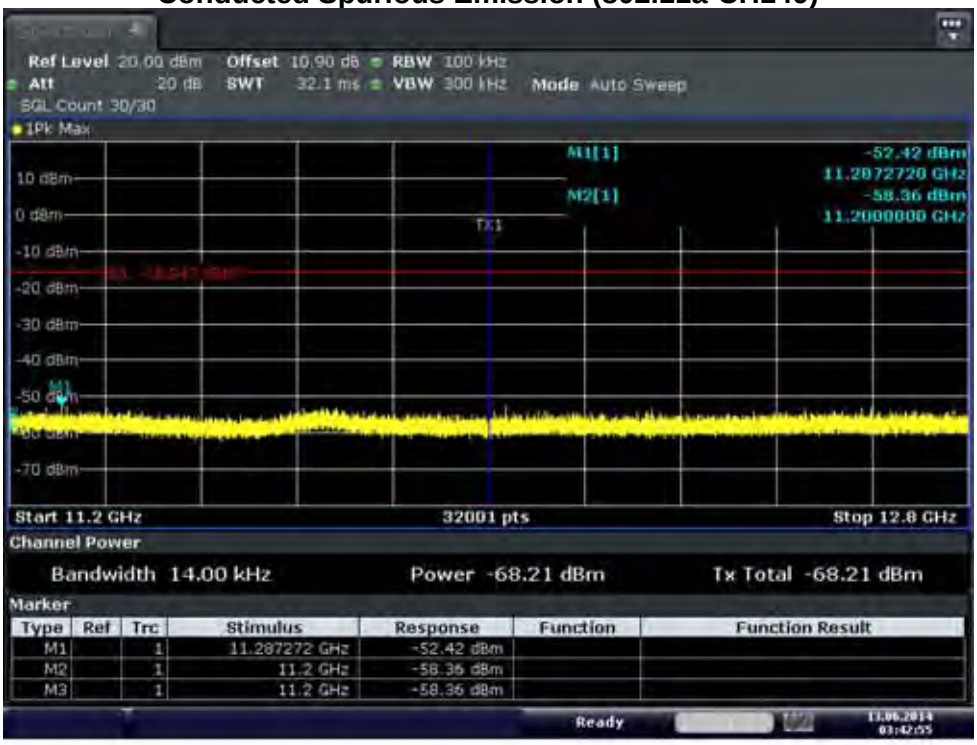
9.6 GHz ~ 11.2 GHz

Conducted Spurious Emission (802.11a-CH149)



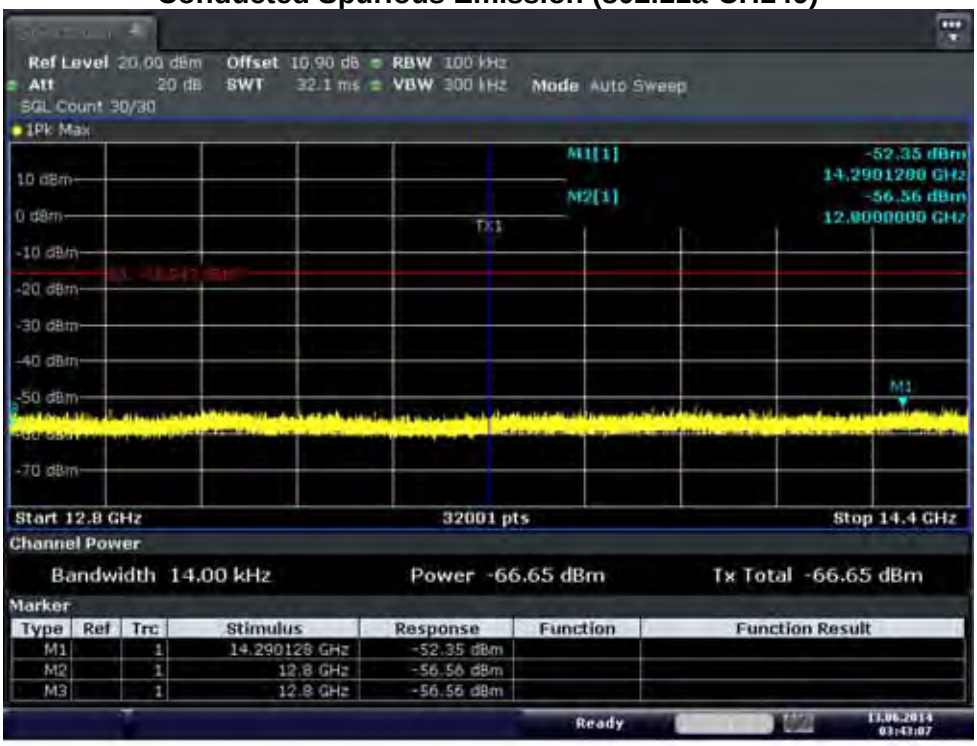
11.2 GHz ~ 12.8 GHz

Conducted Spurious Emission (802.11a-CH149)



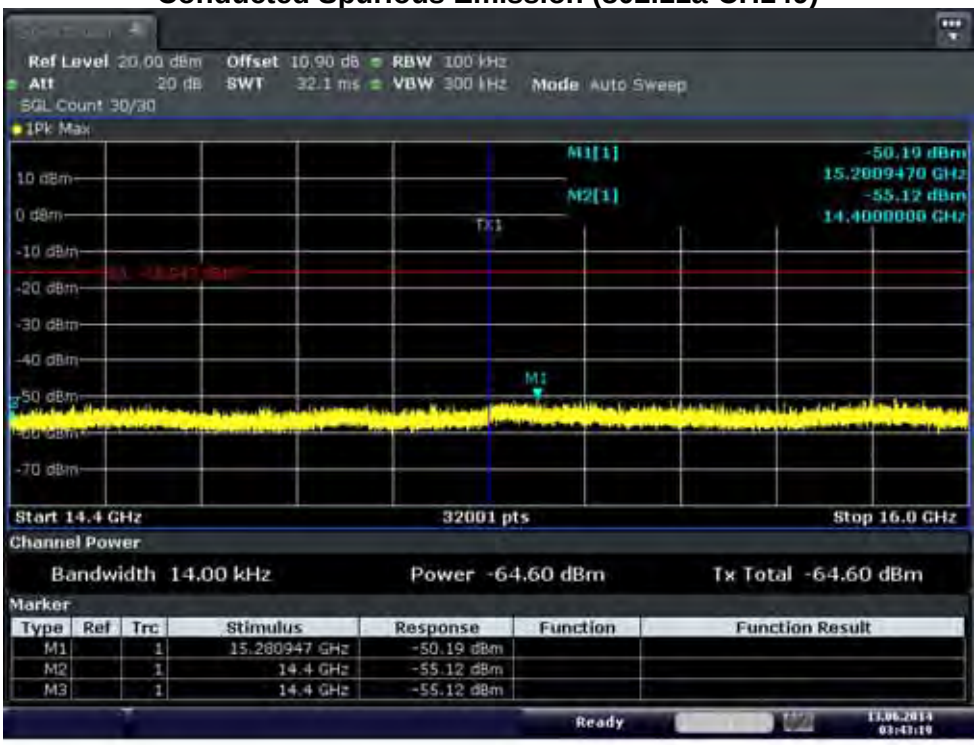
12.8 GHz ~ 12.8 GHz

Conducted Spurious Emission (802.11a-CH149)



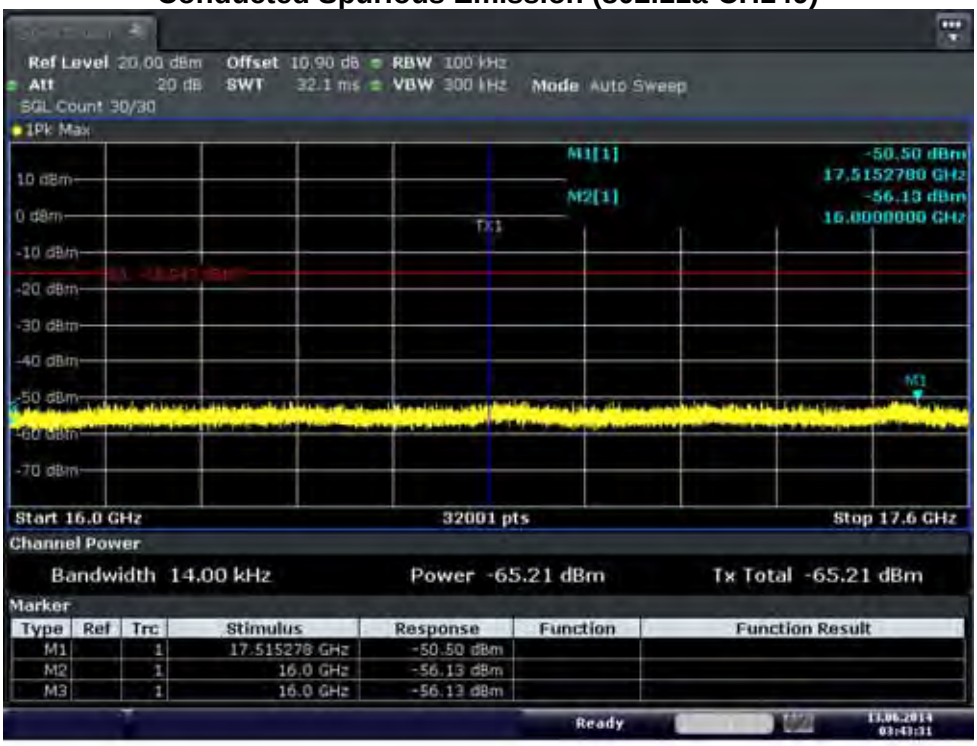
14.4 GHz ~ 16 GHz

Conducted Spurious Emission (802.11a-CH149)



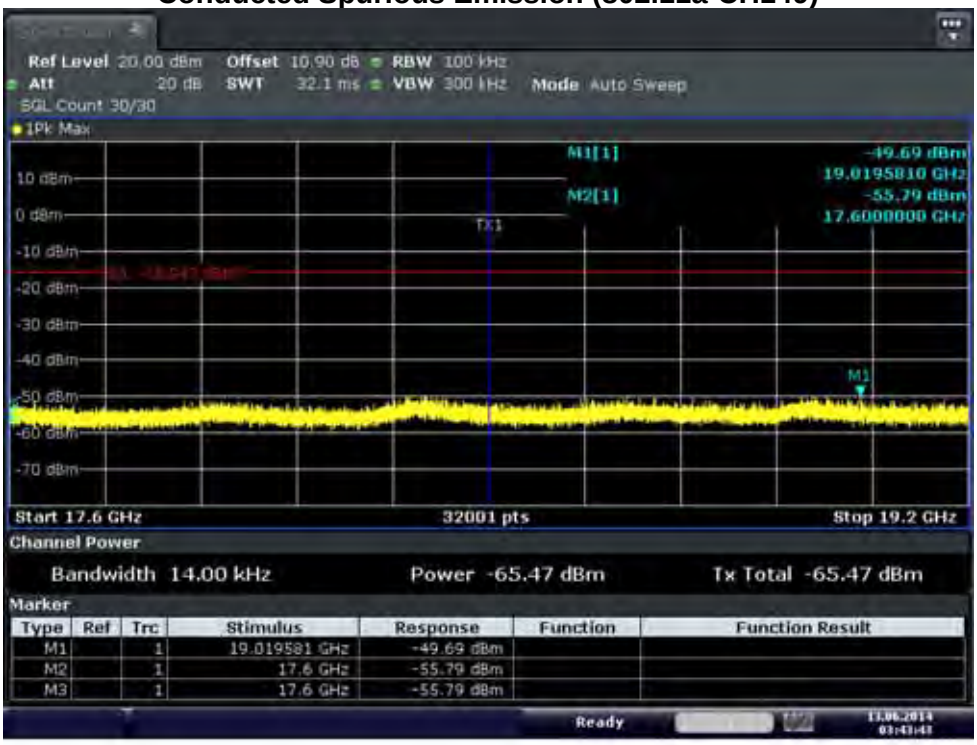
16 GHz ~ 17.6 GHz

Conducted Spurious Emission (802.11a-CH149)



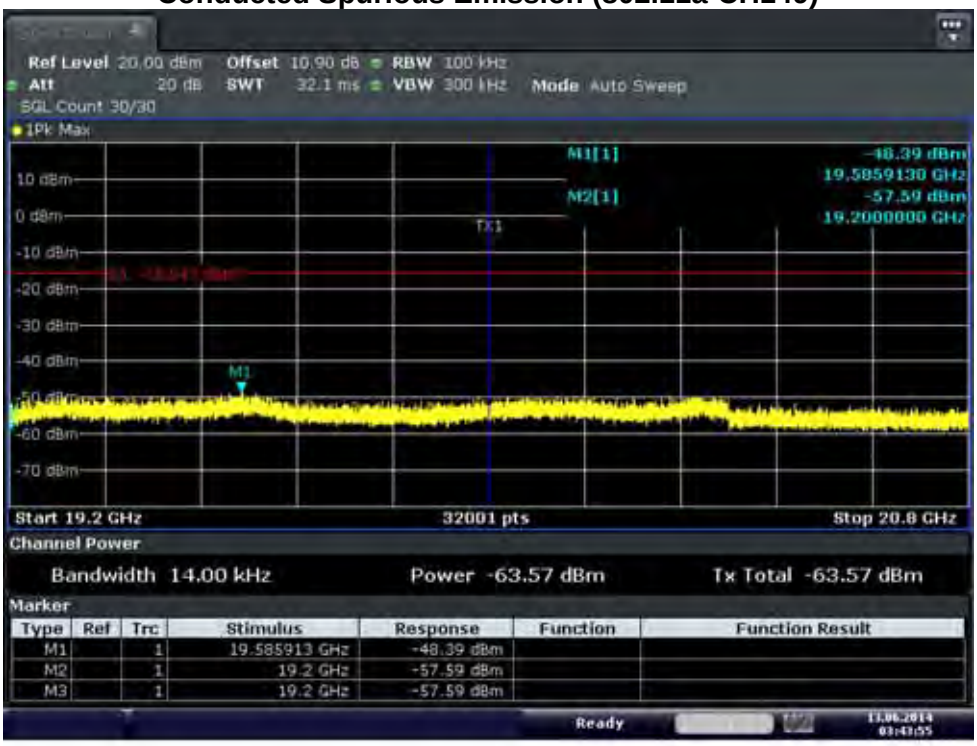
17.6 GHz ~ 19.2 GHz

Conducted Spurious Emission (802.11a-CH149)



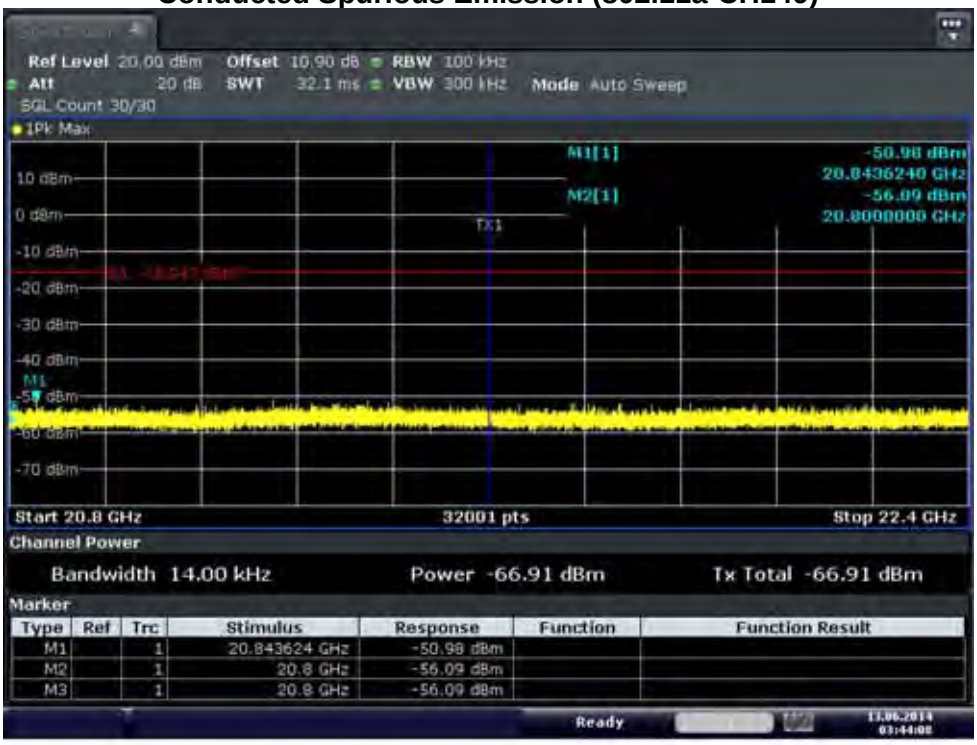
19.2 GHz ~ 20.8 GHz

Conducted Spurious Emission (802.11a-CH149)



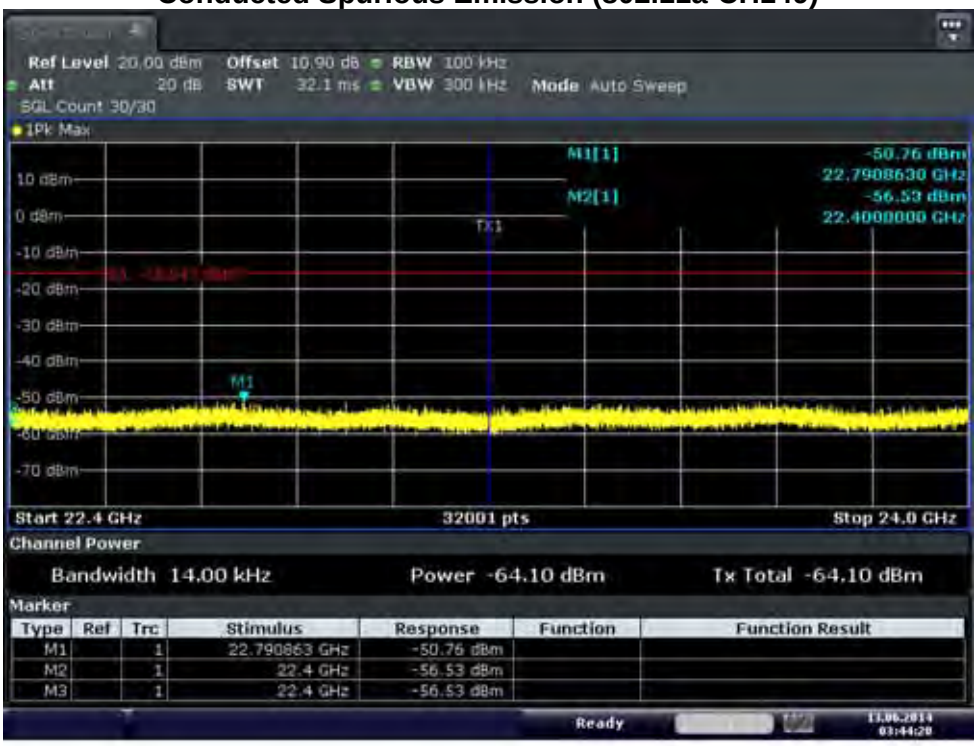
20.8 GHz ~ 22.4 GHz

Conducted Spurious Emission (802.11a-CH149)



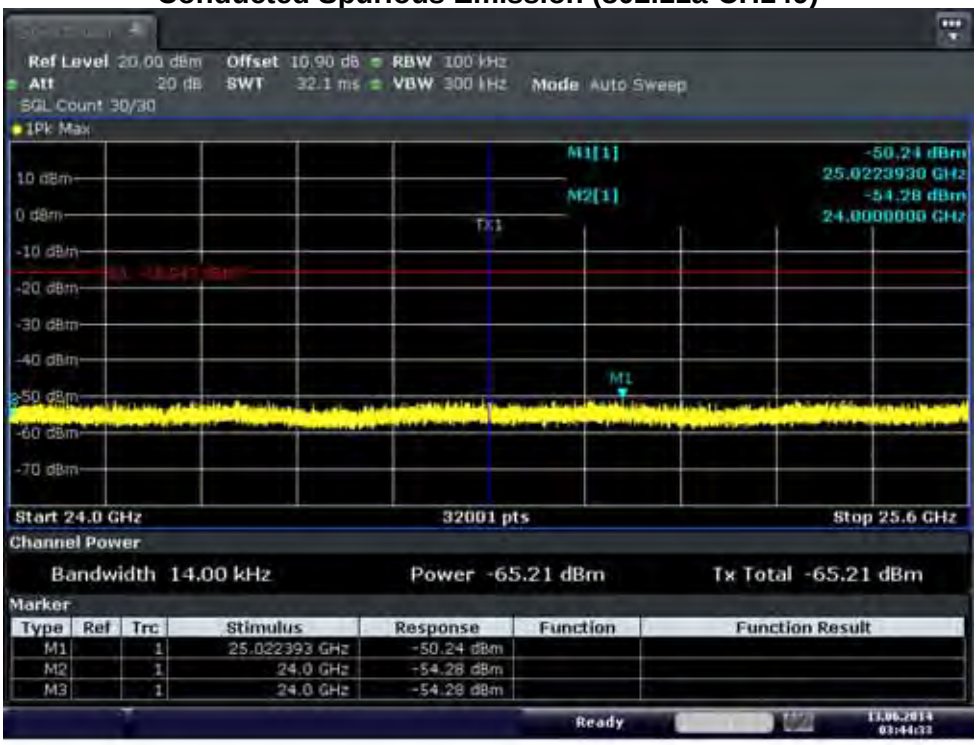
22.4 GHz ~ 24 GHz

Conducted Spurious Emission (802.11a-CH149)



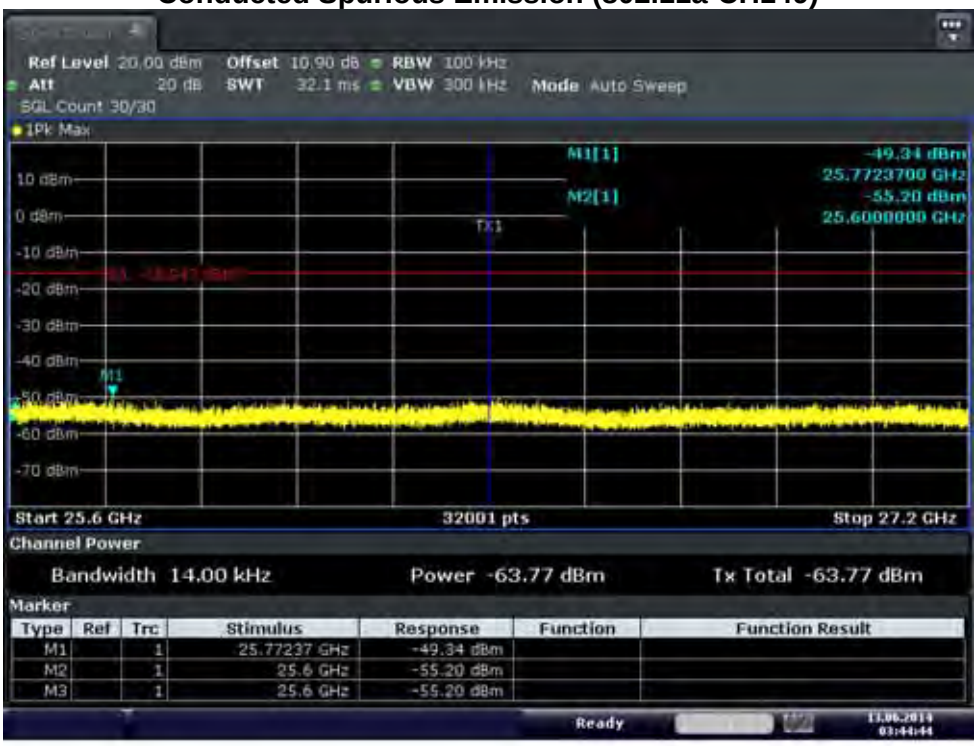
24 GHz ~ 25.6 GHz

Conducted Spurious Emission (802.11a-CH149)



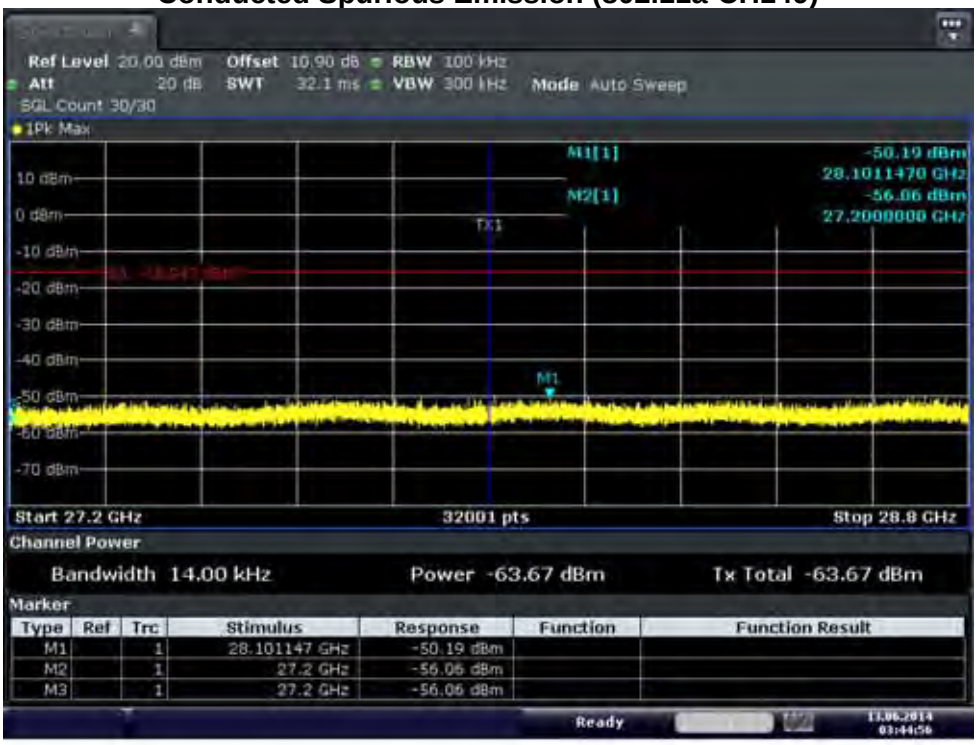
25.6 GHz ~ 27.2 GHz

Conducted Spurious Emission (802.11a-CH149)



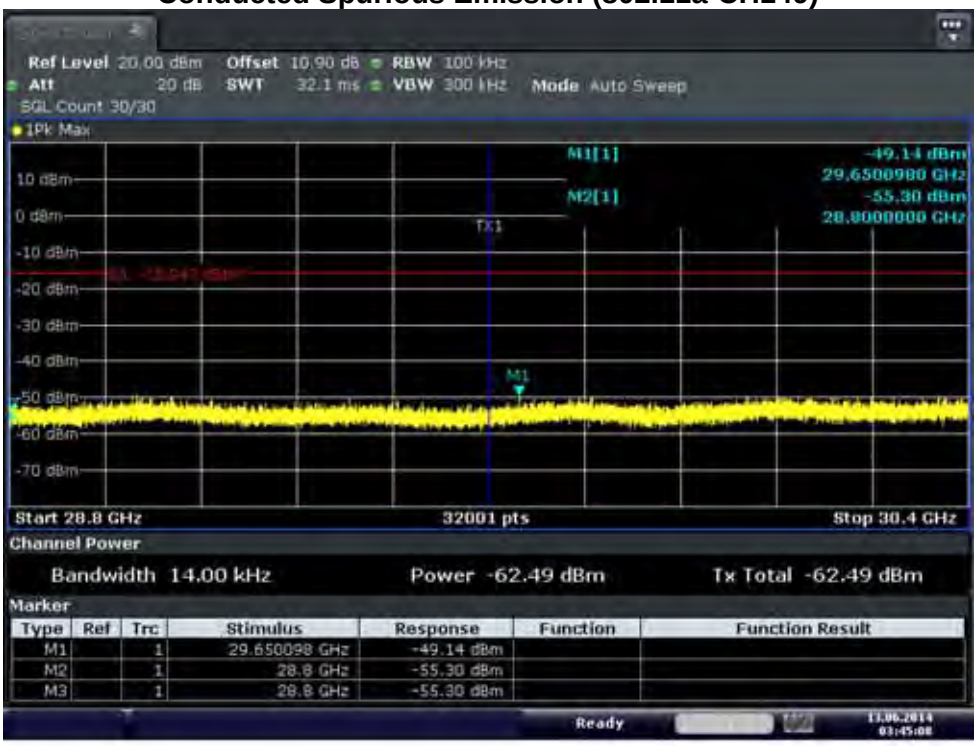
27.2 GHz ~ 28.8 GHz

Conducted Spurious Emission (802.11a-CH149)



28.8 GHz ~ 30.4 GHz

Conducted Spurious Emission (802.11a-CH149)

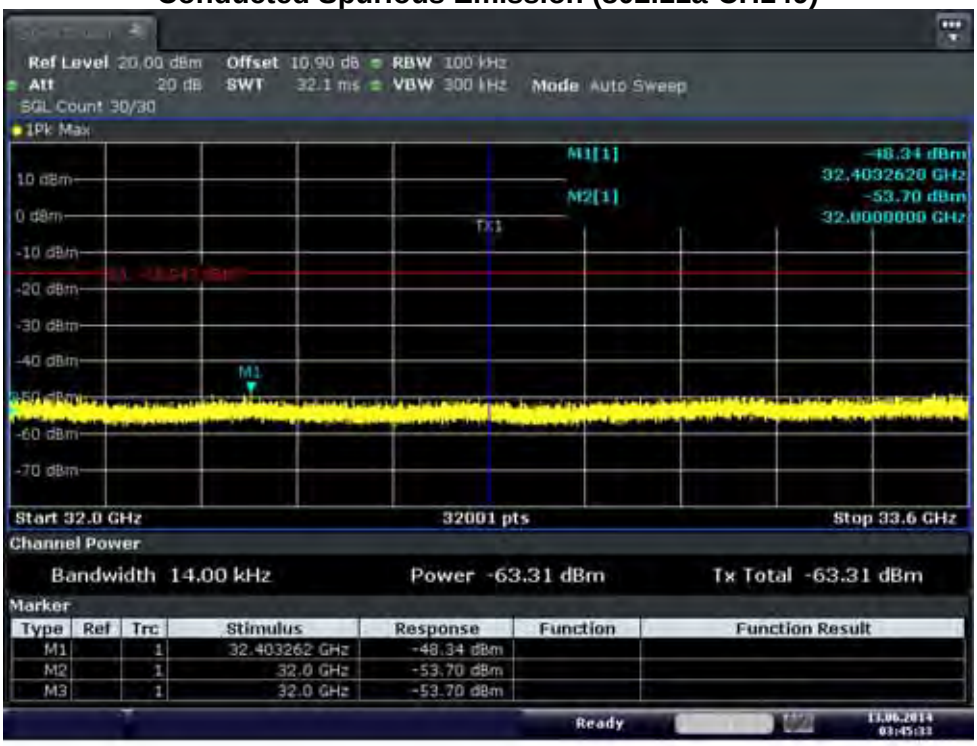


30.4 GHz ~ 32 GHz

Conducted Spurious Emission (802.11a-CH149)

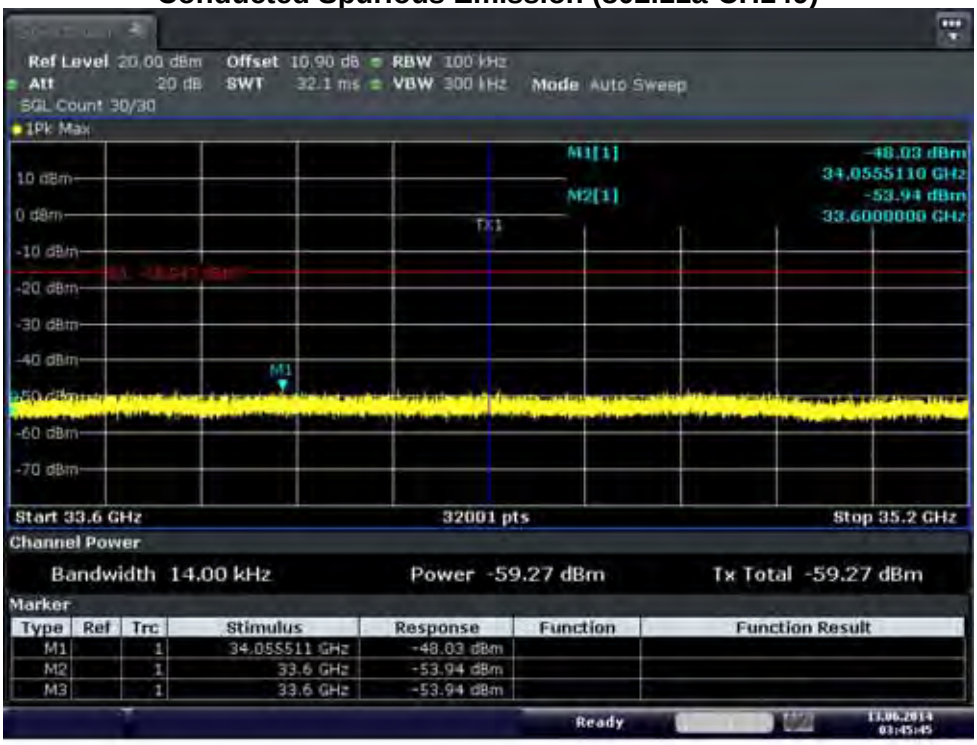
32 GHz ~ 33.6 GHz

Conducted Spurious Emission (802.11a-CH149)



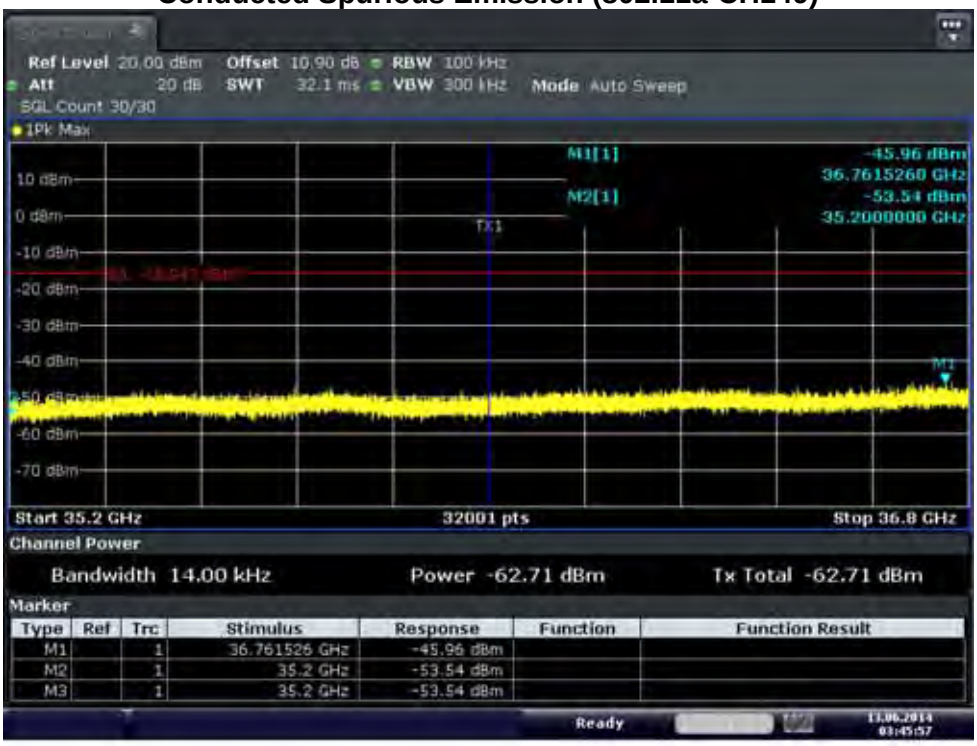
33.6 GHz ~ 35.2 GHz

Conducted Spurious Emission (802.11a-CH149)



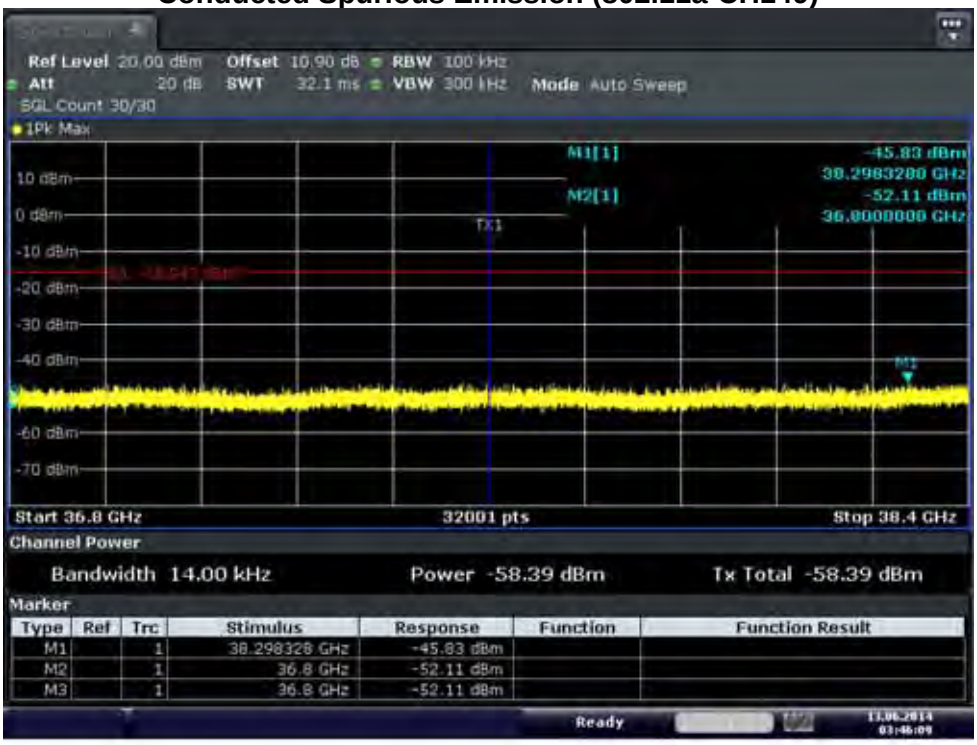
35.2 GHz ~ 36.8 GHz

Conducted Spurious Emission (802.11a-CH149)



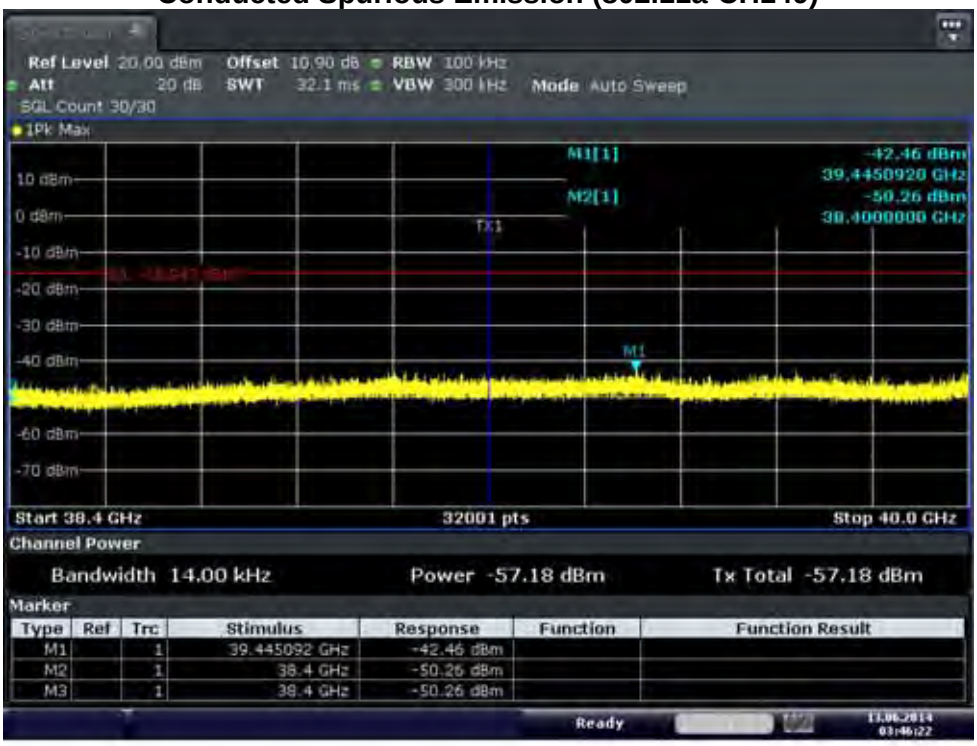
36.8 GHz ~ 38.4 GHz

Conducted Spurious Emission (802.11a-CH149)



38.4 GHz ~ 40 GHz

Conducted Spurious Emission (802.11a-CH149)



8.7 RADIATED MEASUREMENT.

8.7.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209

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

▣ Test case

2.4 GHz Band

Mode	Operating Mode	Operating Ant.
802.11b/g/n	SISO	Ant 0(Worst Case for 802.11b)
802.11g/n	SISO	Ant 1
802.11g/n	MIMO	Ant 0 & 1(Worst Case)

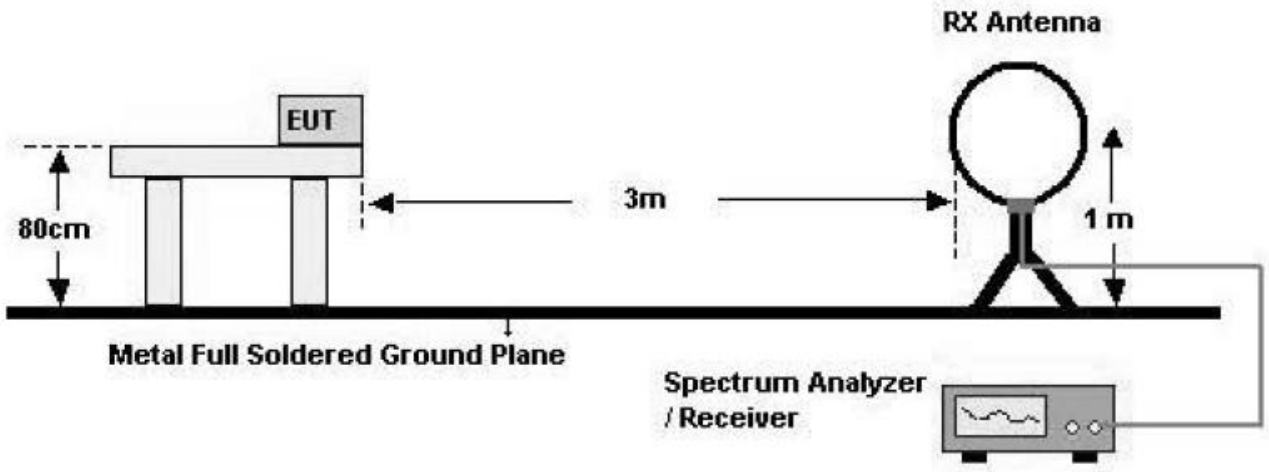
5.8 GHz Band

Mode	Operating Mode	Operating Ant.
802.11a/n/ac	SISO	Ant 0
		Ant 1
	MIMO	Ant 0 & 1(Worst Case)

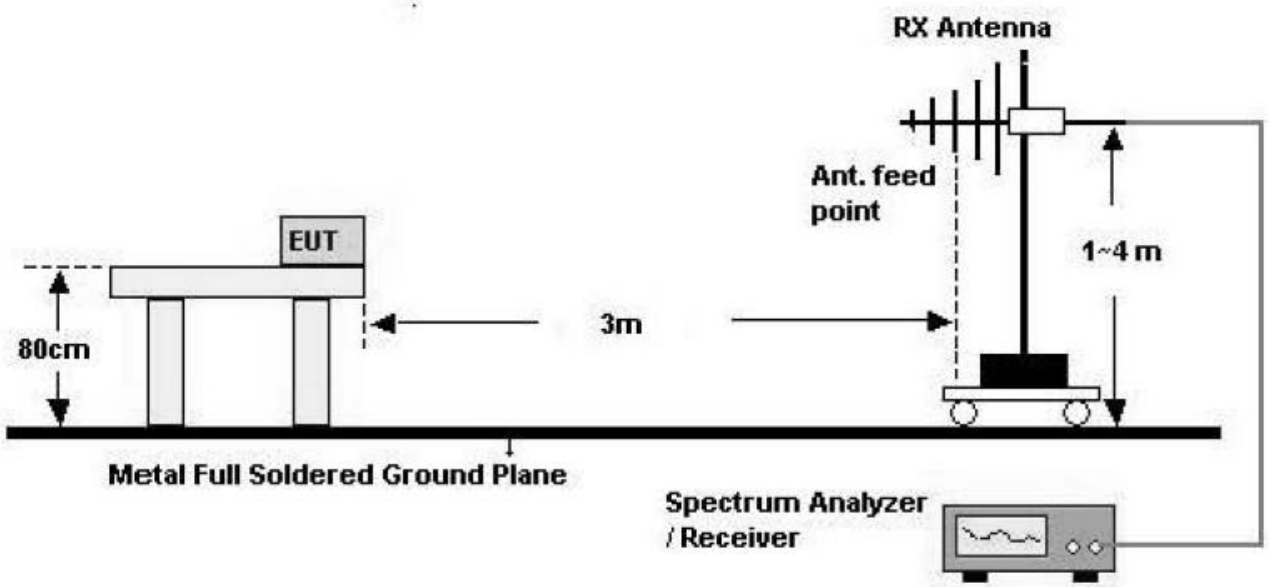
Note : In case of radiation test, we have done all test case. Worst case is Ant 0 & 1 for 802.11a/g/n/ac. And in case of 802.11b, worst case is only Ant 0. So, we attached the results of only worst case.

Test Configuration

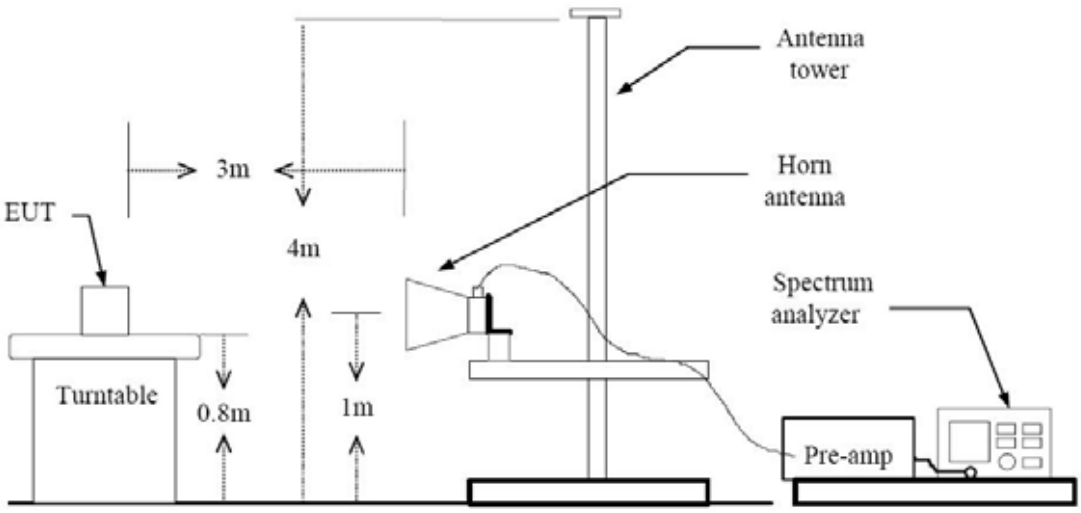
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074, issued 04/09/2013

Spectrum Setting

- Peak

Peak emission levels are measured by setting the instrument as follows:

RBW = cf. Table 1.

VBW ≥ 3 x RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

- Average

Set RBW = 1 MHz

Set VBW ≥ 1/T.(at least 100 times less than the resolution bandwidth, but no less than 10 Hz.)

Select spectrum analyzer linear display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Note :

1. We used the case 1 for 802.11b mode and the case 2 for802.11a/g/n_20/n_40/ac_20/ac_40/ac_80 to perform the average filed strength measurements for RSE and radiated band edge test.
2. The actual setting value of VBW for 802.11a/g/n_20/n_40/ac_20/ac_40/ac_80.

Mode	Worst Data rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
b	1	12.400	13.060	94.95	81	1000
a	6	2.060	2.170	94.93	485	1000
g	6	2.060	2.170	94.93	485	1000
n_20	6.5	1.920	2.015	95.29	521	1000
n_40	13.5	0.944	1.042	90.60	1059	3000
5.8 GHz band ac_20	6.5	1.920	2.015	95.29	521	1000
ac_40	13.5	0.944	1.042	90.60	1059	3000
ac_80	29.3	0.459	0.488	94.06	2179	3000

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBμV/m	dBm /m	dBm	(H/V)	dBμV/m	dBμV/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 (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + 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	dBμV/m	dBm /m	dBm	(H/V)	dBμV/m	dBμV/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

SISO (Ant 0)

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	52.42	-1.98	V	50.44	73.98	23.54	PK
4824	46.20	-1.98	V	44.22	53.98	9.76	AV
7236	51.56	7.60	V	59.16	73.98	14.82	PK
7236	43.24	7.60	V	50.84	53.98	3.14	AV
4824	51.80	-1.98	H	49.82	73.98	24.16	PK
4824	43.31	-1.98	H	41.33	53.98	12.65	AV
7236	51.39	7.60	H	58.99	73.98	14.99	PK
7236	41.95	7.60	H	49.55	53.98	4.43	AV

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	52.61	-1.92	V	50.69	73.98	23.29	PK
4874	44.81	-1.92	V	42.89	53.98	11.09	AV
7311	46.44	7.38	V	53.82	73.98	20.16	PK
7311	32.91	7.38	V	40.29	53.98	13.69	AV
4874	51.53	-1.92	H	49.61	73.98	24.37	PK
4874	42.23	-1.92	H	40.31	53.98	13.67	AV
7311	45.92	7.38	H	53.30	73.98	20.68	PK
7311	32.88	7.38	H	40.26	53.98	13.72	AV

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	50.48	-1.93	V	48.55	73.98	25.43	PK
4924	40.26	-1.93	V	38.33	53.98	15.65	AV
7386	48.16	7.28	V	55.44	73.98	18.54	PK
7386	36.37	7.28	V	43.65	53.98	10.33	AV
4924	49.89	-1.93	H	47.96	73.98	26.02	PK
4924	37.99	-1.93	H	36.06	53.98	17.92	AV
7386	47.49	7.28	H	54.77	73.98	19.21	PK
7386	34.80	7.28	H	42.08	53.98	11.90	AV

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
5. We have done 802.11b mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

MIMO (Ant 0 & 1)

Operation Mode:	802.11 g
Transfer Rate:	6 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	50.87	-1.98	V	48.89	73.98	25.09	PK
4824	36.09	-1.98	V	34.11	53.98	19.87	AV
7236	45.26	7.60	V	52.86	73.98	21.12	PK
7236	31.61	7.60	V	39.21	53.98	14.77	AV
4824	50.01	-1.98	H	48.03	73.98	25.95	PK
4824	35.03	-1.98	H	33.05	53.98	20.93	AV
7236	45.09	7.60	H	52.69	73.98	21.29	PK
7236	31.55	7.60	H	39.15	53.98	14.83	AV

Operation Mode:	802.11 g
Transfer Rate:	6 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	51.82	-1.92	V	49.90	73.98	24.08	PK
4874	37.53	-1.92	V	35.61	53.98	18.37	AV
7311	47.03	7.38	V	54.41	73.98	19.57	PK
7311	32.85	7.38	V	40.23	53.98	13.75	AV
4874	51.49	-1.92	H	49.57	73.98	24.41	PK
4874	37.50	-1.92	H	35.58	53.98	18.40	AV
7311	46.25	7.38	H	53.63	73.98	20.35	PK
7311	32.77	7.38	H	40.15	53.98	13.83	AV

Operation Mode:	802.11 g
Transfer Rate:	6 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	49.88	-1.93	V	47.95	73.98	26.03	PK
4924	34.99	-1.93	V	33.06	53.98	20.92	AV
7386	46.11	7.28	V	53.39	73.98	20.59	PK
7386	32.37	7.28	V	39.65	53.98	14.33	AV
4924	48.62	-1.93	H	46.69	73.98	27.29	PK
4924	34.93	-1.93	H	33.00	53.98	20.98	AV
7386	45.96	7.28	H	53.24	73.98	20.74	PK
7386	32.31	7.28	H	39.59	53.98	14.39	AV

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
5. We have done 802.11g mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 n

Transfer Rate: 6.5 Mbps

Operating Frequency 2412

Channel No. 01 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	50.94	-1.98	V	48.96	73.98	25.02	PK
4824	36.10	-1.98	V	34.12	53.98	19.86	AV
7236	45.85	7.60	V	53.45	73.98	20.53	PK
7236	31.65	7.60	V	39.25	53.98	14.73	AV
4824	50.26	-1.98	H	48.28	73.98	25.70	PK
4824	35.96	-1.98	H	33.98	53.98	20.00	AV
7236	45.66	7.60	H	53.26	73.98	20.72	PK
7236	31.61	7.60	H	39.21	53.98	14.77	AV

Operation Mode: 802.11 n

Transfer Rate: 6.5 Mbps

Operating Frequency 2437

Channel No. 06 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	51.54	-1.92	V	49.62	73.98	24.36	PK
4874	37.61	-1.92	V	35.69	53.98	18.29	AV
7311	47.23	7.38	V	54.61	73.98	19.37	PK
7311	32.82	7.38	V	40.20	53.98	13.78	AV
4874	51.06	-1.92	H	49.14	73.98	24.84	PK
4874	37.45	-1.92	H	35.53	53.98	18.45	AV
7311	46.62	7.38	H	54.00	73.98	19.98	PK
7311	32.76	7.38	H	40.14	53.98	13.84	AV

Operation Mode:	802.11 n
Transfer Rate:	6.5 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	49.45	-1.93	V	47.52	73.98	26.46	PK
4924	34.99	-1.93	V	33.06	53.98	20.92	AV
7386	46.56	7.28	V	53.84	73.98	20.14	PK
7386	32.35	7.28	V	39.63	53.98	14.35	AV
4924	49.24	-1.93	H	47.31	73.98	26.67	PK
4924	34.91	-1.93	H	32.98	53.98	21.00	AV
7386	46.45	7.28	H	53.73	73.98	20.25	PK
7386	32.30	7.28	H	39.58	53.98	14.40	AV

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
5. We have done 802.11n mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	5.8 GHz
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11490	65.61	-6.10	V	59.51	73.98	14.47	PK
11490	50.91	-6.10	V	44.81	53.98	9.17	AV
11490	65.70	-6.10	H	59.60	73.98	14.38	PK
11490	50.97	-6.10	H	44.87	53.98	9.11	AV

Band :	5.8 GHz
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11570	64.83	-5.57	V	59.26	73.98	14.72	PK
11570	50.79	-5.57	V	45.22	53.98	8.76	AV
11570	65.14	-5.57	H	59.57	73.98	14.41	PK
11570	50.86	-5.57	H	45.29	53.98	8.69	AV

Band :	5.8 GHz
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11650	66.87	-6.63	V	60.24	73.98	13.74	PK
11650	55.21	-6.63	V	48.58	53.98	5.40	AV
11650	67.06	-6.63	H	60.43	73.98	13.55	PK
11650	53.37	-6.63	H	46.74	53.98	7.24	AV

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
5. We have done 802.11a mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	5.8 GHz
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11490	65.27	-6.10	V	59.17	73.98	14.81	PK
11490	51.12	-6.10	V	45.02	53.98	8.96	AV
11490	65.75	-6.10	H	59.65	73.98	14.33	PK
11490	51.20	-6.10	H	45.10	53.98	8.88	AV

Band :	5.8 GHz
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11570	64.73	-5.57	V	59.16	73.98	14.82	PK
11570	50.93	-5.57	V	45.36	53.98	8.62	AV
11570	64.96	-5.57	H	59.39	73.98	14.59	PK
11570	50.98	-5.57	H	45.41	53.98	8.57	AV

Band :	5.8 GHz
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11650	67.62	-6.63	V	60.99	73.98	12.99	PK
11650	53.56	-6.63	V	46.93	53.98	7.05	AV
11650	67.72	-6.63	H	61.09	73.98	12.89	PK
11650	53.64	-6.63	H	47.01	53.98	6.97	AV

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
5. We have done 802.11n_20 MHz BW mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	5.8 GHz
Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11510	64.10	-6.26	V	57.84	73.98	16.14	PK
11510	50.82	-6.26	V	44.56	53.98	9.42	AV
11510	64.34	-6.26	H	58.08	73.98	15.90	PK
11510	50.89	-6.26	H	44.63	53.98	9.35	AV

Band :	5.8 GHz
Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11590	64.08	-5.92	V	58.16	73.98	15.82	PK
11590	50.43	-5.92	V	44.51	53.98	9.47	AV
11590	65.74	-5.92	H	59.82	73.98	14.16	PK
11590	50.48	-5.92	H	44.56	53.98	9.42	AV

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
5. We have done 802.11n_40 MHz BW mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	5.8 GHz
Operation Mode:	802.11 ac_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	67.05	-6.10	V	60.95	73.98	13.03	PK
11490	52.49	-6.10	V	46.39	53.98	7.59	AV
11490	67.24	-6.10	H	61.14	73.98	12.84	PK
11490	52.55	-6.10	H	46.45	53.98	7.53	AV

Band :	5.8 GHz
Operation Mode:	802.11 ac_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	63.50	-5.57	V	57.93	73.98	16.05	PK
11570	49.40	-5.57	V	43.83	53.98	10.15	AV
11570	63.66	-5.57	H	58.09	73.98	15.89	PK
11570	49.44	-5.57	H	43.87	53.98	10.11	AV

Band :	5.8 GHz
Operation Mode:	802.11 ac_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	66.67	-6.63	V	60.04	73.98	13.94	PK
11650	52.07	-6.63	V	45.44	53.98	8.54	AV
11650	67.09	-6.63	H	60.46	73.98	13.52	PK
11650	52.16	-6.63	H	45.53	53.98	8.45	AV

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
5. We have done 802.11ac mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
7. In case of 802.11ac, we applied the limit of spurious emissions according to KDB644545 D01 v01r02 dated October 31, 2013.

Band :	5.8 GHz
Operation Mode:	802.11 ac_40 MHz BW
Transfer Rate:	MCS0
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11510	64.00	-6.26	V	57.74	73.98	16.24	PK
11510	50.53	-6.26	V	44.27	53.98	9.71	AV
11510	64.72	-6.26	H	58.46	73.98	15.52	PK
11510	50.62	-6.26	H	44.36	53.98	9.62	AV

Band :	5.8 GHz
Operation Mode:	802.11 ac_40 MHz BW
Transfer Rate:	MCS0
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	64.20	-5.92	V	58.28	73.98	15.70	PK
11590	50.02	-5.92	V	44.10	53.98	9.88	AV
11590	64.33	-5.92	H	58.41	73.98	15.57	PK
11590	50.09	-5.92	H	44.17	53.98	9.81	AV

Band :	UNII 4
Operation Mode:	802.11 ac _80 MHz BW
Transfer Rate:	MCS0
Operating Frequency	5775 MHz
Channel No.	155 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11550	62.30	-5.97	V	56.33	73.98	17.65	PK
11550	48.47	-5.97	V	42.50	53.98	11.48	AV
11550	62.66	-5.97	H	56.69	73.98	17.29	PK
11550	48.82	-5.97	H	42.85	53.98	11.13	AV

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
5. We have done 802.11ac mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
7. In case of 802.11ac, we applied the limit of spurious emissions according to KDB644545 D01 v01r02 dated October 31, 2013.

8.7.2 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	dBμV	dB /m	dB	(H/V)	dBμV/m	dBμV/m	dB
No Critical peaks found							

Above 1 GHz

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

8.7.3 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209

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)).

SISO (Ant 0)

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	28.77	31.47	H	60.24	73.98	13.74	PK
2390.0	18.74	31.47	H	50.21	53.98	3.77	AV
2390.0	26.15	31.47	V	57.62	73.98	16.36	PK
2390.0	16.17	31.47	V	47.64	53.98	6.34	AV
2483.5	27.19	31.46	H	58.65	73.98	15.33	PK
2483.5	16.94	31.46	H	48.40	53.98	5.58	AV
2483.5	26.01	31.46	V	57.47	73.98	16.51	PK
2483.5	14.41	31.46	V	45.87	53.98	8.11	AV

MIMO (Ant 0 & 1)

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	39.49	31.47	H	70.96	73.98	3.02	PK
2390.0	18.98	31.47	H	50.45	53.98	3.53	AV
2390.0	36.86	31.47	V	68.33	73.98	5.65	PK
2390.0	16.96	31.47	V	48.43	53.98	5.55	AV
2483.5	38.97	31.46	H	70.43	73.98	3.55	PK
2483.5	18.64	31.46	H	50.10	53.98	3.88	AV
2483.5	37.92	31.46	V	69.38	73.98	4.60	PK
2483.5	16.12	31.46	V	47.58	53.98	6.40	AV

Operation Mode:	802.11n
Transfer Rate:	6.5 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	38.92	31.47	H	70.39	73.98	3.59	PK
2390.0	19.44	31.47	H	50.91	53.98	3.07	AV
2390.0	36.40	31.47	V	67.87	73.98	6.11	PK
2390.0	16.92	31.47	V	48.39	53.98	5.59	AV
2483.5	39.38	31.46	H	70.84	73.98	3.14	PK
2483.5	18.65	31.46	H	50.11	53.98	3.87	AV
2483.5	38.83	31.46	V	70.29	73.98	3.69	PK
2483.5	15.85	31.46	V	47.31	53.98	6.67	AV

Band:	5.8 GHz
Operation Mode:	802.11ac_20 MHz
Transfer Rate:	6.5 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp Gain [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	53.43	11.37	H	64.80	68.20	3.40	PK
*5850	53.26	11.37	V	64.63	68.20	3.57	PK

Band:	5.8 GHz
Operation Mode:	802.11ac_40 MHz
Transfer Rate:	13.5 Mbps
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp Gain [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	53.41	11.37	H	64.78	68.20	3.42	PK
*5850	53.62	11.37	V	64.99	68.20	3.21	PK

Band:	5.8 GHz
Operation Mode:	802.11ac_80 MHz
Transfer Rate:	29.3 Mbps
Operating Frequency	5775 MHz
Channel No.	155 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp Gain [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
*5850	53.46	11.37	H	64.83	68.20	3.37	PK
*5850	53.61	11.37	V	64.98	68.20	3.22	PK

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss
2. We have done 802.11b/g/n/ac mode and all data rate. Worst data rate is the lowest data of each mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

4. In case of 5.8 GHz band 802.11ac, we applied the limit of spurious emissions according to KDB644545 D01 v01r02 dated October 31, 2013.
5. '*' is radiated band edge test frequency(not restricted band emissions).

8.8 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

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 ground plane.
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.
5. We are performed the AC Power Line Conducted Emission test for 11 Mbps, Ch.1 and 802.11b. Because 802.11b mode is worst case.

▣ RESULT PLOTS

Conducted Emissions (Line 1)

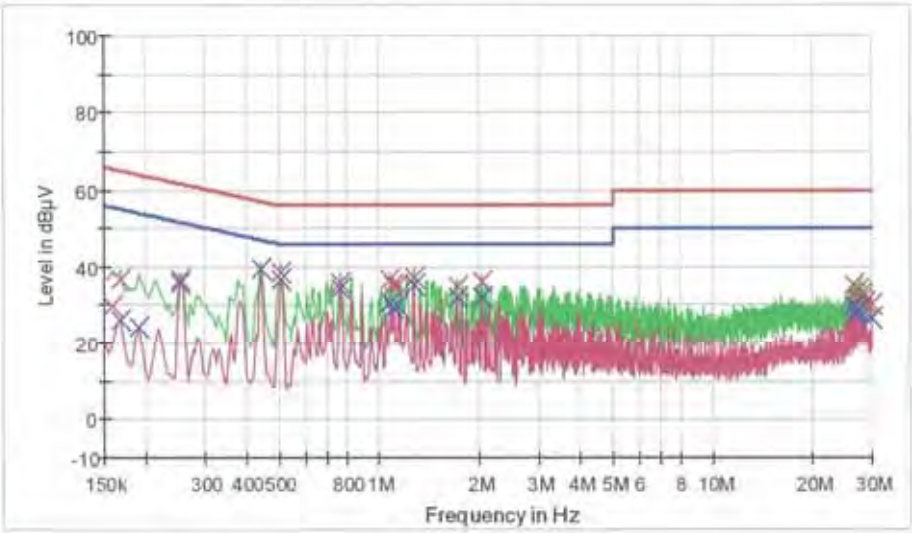
EMI Auto Test(2) 1 / 2

HCT TEST Report

Common Information

EUT:	WEA412I
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN MODE(DTS)
Operator Name:	JS LEE

FCC CLASS B



FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
Preview Result 2-AVG — Final Result 1-QPK — Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	29.9	9.000	Off	L1	9.7	35.6	65.5
0.168000	36.9	9.000	Off	L1	9.7	28.2	65.1
0.253500	36.8	9.000	Off	L1	9.7	24.8	61.6
0.442500	39.5	9.000	Off	L1	9.7	17.5	57.0
0.509000	38.4	9.000	Off	L1	9.7	17.6	56.0
0.765500	36.0	9.000	Off	L1	9.7	20.0	56.0
1.076000	36.6	9.000	Off	L1	9.7	19.4	56.0
1.107500	35.5	9.000	Off	L1	9.8	20.5	56.0
1.139000	35.4	9.000	Off	L1	9.8	20.6	56.0
1.274000	37.3	9.000	Off	L1	9.8	18.7	56.0
1.710500	34.9	9.000	Off	L1	9.8	21.1	56.0
2.043500	36.1	9.000	Off	L1	9.9	19.9	56.0
26.388500	35.1	9.000	Off	L1	11.2	24.9	60.0
27.356000	34.0	9.000	Off	L1	11.3	26.0	60.0
27.851000	31.3	9.000	Off	L1	11.3	28.7	60.0
27.873500	32.9	9.000	Off	L1	11.3	27.1	60.0

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EMI Auto Test(2) 2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
28.544000	30.9	9.000	Off	L1	11.3	29.1	60.0
30.000000	30.2	9.000	Off	L1	11.4	29.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.168000	25.9	9.000	Off	L1	9.7	29.2	55.1
0.190500	24.0	9.000	Off	L1	9.7	30.0	54.0
0.253500	35.8	9.000	Off	L1	9.7	15.8	51.6
0.442500	39.4	9.000	Off	L1	9.7	7.6	47.0
0.509000	36.8	9.000	Off	L1	9.7	9.2	46.0
0.765500	34.4	9.000	Off	L1	9.7	11.6	46.0
1.076000	30.8	9.000	Off	L1	9.7	15.2	46.0
1.107500	29.4	9.000	Off	L1	9.8	16.6	46.0
1.139000	29.6	9.000	Off	L1	9.8	16.4	46.0
1.274000	35.5	9.000	Off	L1	9.8	10.5	46.0
1.710500	31.9	9.000	Off	L1	9.8	14.1	46.0
2.043500	32.0	9.000	Off	L1	9.9	14.0	46.0
26.388500	29.9	9.000	Off	L1	11.2	20.1	50.0
26.762000	27.6	9.000	Off	L1	11.2	22.4	50.0
26.982500	27.7	9.000	Off	L1	11.3	22.3	50.0
27.356000	28.7	9.000	Off	L1	11.3	21.3	50.0
27.500000	28.3	9.000	Off	L1	11.3	21.7	50.0
30.000000	26.3	9.000	Off	L1	11.4	23.7	50.0

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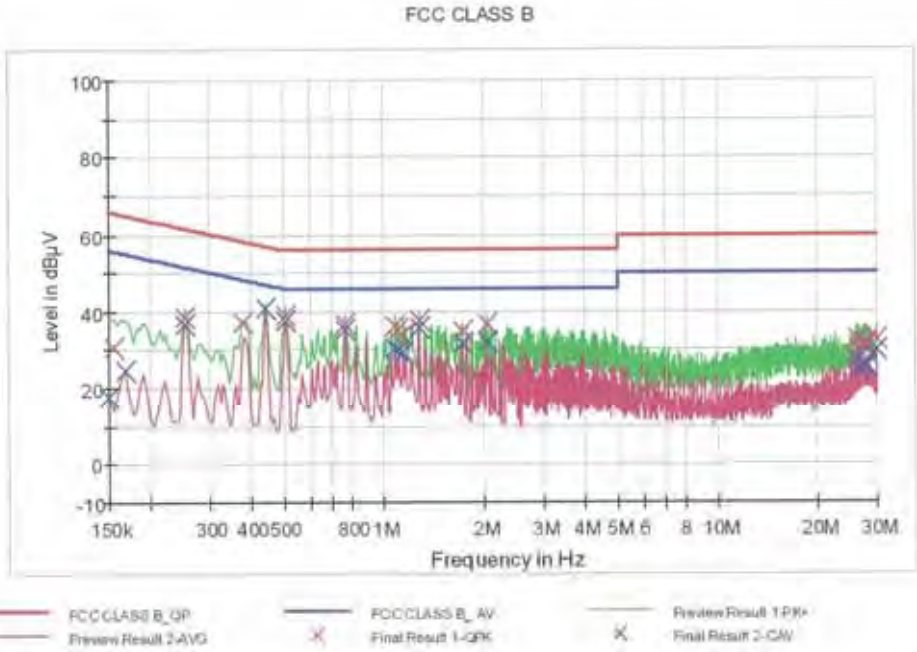
Conducted Emissions (Line 2)

EMI Auto Test(2) 1 / 2

HCT TEST Report

Common Information

EUT:	WEA412I
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	WLAN MODE(DTS)
Operator Name:	JS LEE



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	30.6	9.000	Off	N	9.7	35.2	65.8
0.253500	38.7	9.000	Off	N	9.7	22.9	61.6
0.379500	37.2	9.000	Off	N	9.7	21.1	58.3
0.442500	41.0	9.000	Off	N	9.7	16.0	57.0
0.509000	38.9	9.000	Off	N	9.7	17.1	56.0
0.765500	36.5	9.000	Off	N	9.7	19.5	56.0
1.076000	36.4	9.000	Off	N	9.8	19.6	56.0
1.107500	35.3	9.000	Off	N	9.8	20.7	56.0
1.143500	33.8	9.000	Off	N	9.8	22.2	56.0
1.274000	37.7	9.000	Off	N	9.8	18.3	56.0
1.710500	34.9	9.000	Off	N	9.8	21.1	56.0
2.043500	36.5	9.000	Off	N	9.9	19.5	56.0
26.235500	32.3	9.000	Off	N	11.0	27.7	60.0
26.609000	30.0	9.000	Off	N	11.0	30.0	60.0
27.279500	31.2	9.000	Off	N	11.1	28.8	60.0
27.576500	31.6	9.000	Off	N	11.1	28.4	60.0

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EMI Auto Test(2) 2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
27.873500	31.2	9.000	Off	N	11.1	28.8	60.0
29.997500	32.4	9.000	Off	N	11.1	27.6	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	17.7	9.000	Off	N	9.7	38.3	56.0
0.168000	24.6	9.000	Off	N	9.7	30.5	55.1
0.253500	36.7	9.000	Off	N	9.7	14.9	51.6
0.442500	41.0	9.000	Off	N	9.7	6.0	47.0
0.509000	37.5	9.000	Off	N	9.7	8.5	46.0
0.765500	35.2	9.000	Off	N	9.7	10.8	46.0
1.076000	30.4	9.000	Off	N	9.8	15.6	46.0
1.107500	29.5	9.000	Off	N	9.8	16.5	46.0
1.139000	29.1	9.000	Off	N	9.8	16.9	46.0
1.274000	36.0	9.000	Off	N	9.8	10.0	46.0
1.710500	31.8	9.000	Off	N	9.8	14.2	46.0
2.043500	32.3	9.000	Off	N	9.9	13.7	46.0
26.235500	27.5	9.000	Off	N	11.0	22.5	50.0
26.609000	24.7	9.000	Off	N	11.0	25.3	50.0
27.279500	25.5	9.000	Off	N	11.1	24.5	50.0
27.576500	25.8	9.000	Off	N	11.1	24.2	50.0
27.873500	25.7	9.000	Off	N	11.1	24.3	50.0
30.000000	29.9	9.000	Off	N	11.2	20.1	50.0

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9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	01/29/2014	Annual	01/29/2015	100073
Rohde & Schwarz	FSV40/Spectrum Analyzer	06/09/2014	Annual	06/09/2015	1307.9002K40-100931-NK
Agilent	E4440A/ Spectrum Analyzer	04/09/2014	Annual	04/09/2015	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	05/23/2014	Annual	05/23/2015	MY51110063
Agilent	N1911A/Power Meter	01/24/2014	Annual	01/24/2015	MY45100523
Agilent	N1921A /POWER SENSOR	07/11/2013	Annual	07/11/2014	MY45241059
Hewlett Packard	11636B/Power Divider	10/22/2013	Annual	10/22/2014	11377
Agilent	87300B/Directional Coupler	12/18/2013	Annual	12/18/2014	3116A03621
Hewlett Packard	11667B / Power Splitter	01/27/2014	Annual	01/27/2015	10545
DIGITAL	EP-3010 /DC POWER SUPPLY	10/29/2013	Annual	10/29/2014	3110117
ITECH	IT6720 / DC POWER SUPPLY	11/05/2013	Annual	11/05/2014	010002156287001199
Agilent	8493C / Attenuator(10 dB)	07/24/2013	Annual	07/24/2014	76649
WEINSCHEL	2-3 / Attenuator(3 dB)	10/28/2013	Annual	10/28/2014	BR0617
NAENG YEOL CO.LTD	NY-THR18750/ Temp & Humidity Chamber	10/30/2013	Annual	10/30/2014	NY-200912201A
Note: This equipment (FSV40/ SIGNAL ANALYZER) is used 05/15/2014 ~ 06/07/2014 and 06/10/2014 ~ 06/14/2014. Actual calibration date of FSV40 is 06/09/2014.					

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Calibration Due	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	12/17/2012	Biennial	12/17/2014	3150
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	01/24/2014	Annual	01/24/2015	100584
HD	MA240/ Antenna Position Tower	N/A	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	09/10/2013	Annual	09/10/2014	10094
CERNEX	CBL18265035 / POWER AMP	07/24/2013	Annual	07/24/2014	22966
CERNEX	CBL26405040 / POWER AMP	04/04/2014	Annual	04/04/2015	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	07/05/2013	Biennial	07/05/2015	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	10/30/2012	Biennial	10/30/2014	BBHA9170124
Rohde & Schwarz	FSV40/Spectrum Analyzer	06/09/2014	Annual	06/09/2015	1307.9002K40-100931-NK
Rohde & Schwarz	FSP / Spectrum Analyzer	01/24/2014	Annual	01/24/2015	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	02/03/2014	Annual	02/03/2015	F6
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	04/09/2014	Annual	04/09/2015	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	04/04/2014	Annual	04/04/2015	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS/ Band Reject Filter	06/24/2013	Annual	06/24/2014	1
Rohde & Schwarz	LOOP ANTENNA	08/14/2012	Biennial	08/14/2014	100179
CERNEX	CBL06185030 / POWER AMP	07/24/2013	Annual	07/24/2014	22965
CERNEX	CBLU1183540 / POWER AMP	07/24/2013	Annual	07/24/2014	22964
Note: This equipment (FSV40/ SIGNAL ANALYZER) is used 05/15/2014 ~ 06/07/2014 and 06/10/2014 ~ 06/14/2014. Actual calibration date of FSV40 is 06/09/2014.					