

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
LG Electronics Inc.

Address:
19-1 Cheongho-ri, Jinwi-myeon, Pyeongteak-si,
Gyeonggi-do, 451-713 Korea

Date of Issue:

December 12, 2013

Test Site/Location:

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

Report No.: HCTR1312FR11-1

HCT FRN: 0005866421

IC Recognition No.: 5944A-3

FCC ID : BEJLGSWF41
IC : 2703H-LGSWF41
APPLICANT : LG Electronics Inc.

FCC/ IC Model(s): LGSWF41

EUT Type: WIFI Module

Max. RF Output Power:

Ant.0 Wi-Fi 802.11b (17.88 dBm)/ Wi-Fi 802.11g (25.65 dBm)/ Wi-Fi 802.11n (25.75 dBm)
/ Wi-Fi 802.11a (5.8 GHz) (23.42 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (23.73 dBm)
/ Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (20.60 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (23.55 dBm)
/ Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (20.49 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (17.22 dBm)
Ant.1 Wi-Fi 802.11b (17.74 dBm)/ Wi-Fi 802.11g (25.50 dBm)/ Wi-Fi 802.11n (25.69 dBm)
/ Wi-Fi 802.11a (5.8 GHz) (23.78 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (24.07 dBm)
/ Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (20.92 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (23.75 dBm)
/ Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (20.94 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (17.20 dBm)

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-210 , RSS-GEN

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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FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41	

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1312FR11	December 11, 2013	- First Approval Report
HCTR1312FR11-1	December 12, 2013	-Revision page 7 sector 6. Antenna requirements (combine antenna is calculated)

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1. GENERAL INFORMATION

Applicant: LG Electronics Inc.
Address: 19-1 Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, 451-713 Korea
FCC ID: BEJLGSWF41
IC 2703H-LGSWF41
EUT Type: WIFI Module
FCC/ IC Model name(s): LGSWF41
Date(s) of Tests: November 29, 2013 ~ December 06, 2013
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	WIFI Module		
FCC/ IC Model Name	LGSWF41		
Power Supply	DC 3.3 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	
Max. RF Output Power	Peak	Ant.0	Wi-Fi 802.11b (17.88 dBm)/ Wi-Fi 802.11g (25.65 dBm)/ Wi-Fi 802.11n (25.75 dBm) / Wi-Fi 802.11a (5.8 GHz) (23.42 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (23.73 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (20.60 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (23.55 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (20.49 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (17.22 dBm)
		Ant.1	Wi-Fi 802.11b (17.74 dBm)/ Wi-Fi 802.11g (25.50 dBm)/ Wi-Fi 802.11n (25.69 dBm) / Wi-Fi 802.11a (5.8 GHz) (23.78 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (24.07 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (20.92 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (23.75 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (20.94 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (17.20 dBm)
	Average	Ant.0	Wi-Fi 802.11b (14.09 dBm)/ Wi-Fi 802.11g (15.89 dBm)/ Wi-Fi 802.11n (15.74 dBm) / Wi-Fi 802.11a (5.8 GHz) (13.50 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (13.18 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (13.12 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (13.18 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (12.80 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (9.91 dBm)
		Ant.1	Wi-Fi 802.11b (13.86 dBm)/ Wi-Fi 802.11g (15.62 dBm)/ Wi-Fi 802.11n (15.54 dBm) / Wi-Fi 802.11a (5.8 GHz) (13.67 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (13.69 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (13.33 dBm) / Wi-Fi 802.11ac_20 MHz BW (5.8 GHz) (13.64 dBm) / Wi-Fi 802.11ac_40 MHz BW (5.8 GHz) (13.26 dBm) / Wi-Fi 802.11ac_80 MHz BW (5.8 GHz) (9.68 dBm)
Modulation Type	DSSS/CCK, OFDM(802.11a, 802.11n, 802.11ac)		
Antenna Specification	Ant.0:	Manufacturer: LG Innotek Antenna type: PCB Antenna Peak Gain : 2.26 dBi(2.4 GHz), 2.69 dBi(5.8 GHz)	
	Ant.1:	Manufacturer: LG Innotek Antenna type: PCB Antenna Peak Gain : 1.96 dBi(2.4 GHz), 3.8 dBi(5.8 GHz)	
	Directional Antenna Gain	5.122 dBi(802.11g_2.4 GHz), 6.273 dBi(802.11a_5.8 GHz) 2.113 dBi(802.11n_2.4 GHz), 3.280 dBi(802.11n/ac_5.8 GHz)	

Note : The EUT incorporates a MIMO function with 802.11g, 802.11a, 802.11n and 802.11ac.

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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 v01r01 dated April 08, 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.

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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 June 21, 2011 (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."

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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),

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

- If all transmit signals are completely uncorrelated with each other(802.11n)

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

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7. SUMMARY TEST OF RESULTS

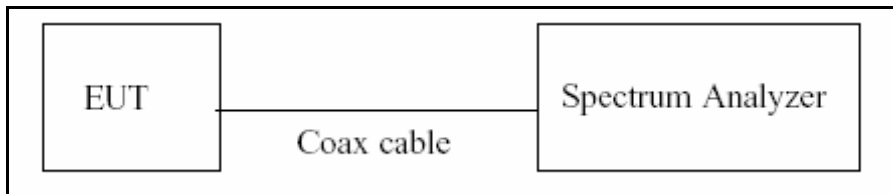
Test Description	IC Part Section(s)	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	RSS-210 [A8.2]	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	RSS-210 [A8.4]	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	RSS-210 [A8.2]	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	RSS-210 [A8.5]	§15.247(d)	Conducted < 30 dBc		PASS
AC Power line Conducted Emissions	RSS-GEN [7.2.2]	§15.207	cf. Section 8.6		NA
Radiated Spurious Emissions	RSS-210 [A8.5]	§15.205, 15.209	cf. Section 8.5.1	RADIATED	PASS
Receiver Spurious Emissions	RSS-GEN, Section 7.2.3	§15.109	cf. Section 8.5.2		PASS
Radiated Restricted Band Edge	RSS-210 [A8.5]	§15.247(d), 15.205, 15.209	cf. Section 8.5.3		PASS

8. TEST RESULT

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

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

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 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 $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

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

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

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Duty Cycle Factor _Ant.0 and Ant.1

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
2.4 GHz Band 802.11b	1	12.400	13.050	0.95019157	0.222
	2	6.200	6.540	0.94801223	0.232
	5.5	2.315	2.440	0.94877049	0.228
	11	1.203	1.266	0.95023697	0.222
2.4 GHz Band 802.11g and 5.8 GHz Band 802.11a	6	2.060	2.170	0.94930876	0.226
	9	1.375	1.450	0.94827586	0.231
	12	1.040	1.095	0.94977169	0.224
	18	0.702	0.736	0.95380435	0.205
	24	0.530	0.558	0.94982079	0.224
	36	0.363	0.386	0.94041451	0.267
	48	0.275	0.298	0.92281879	0.349
	54	0.248	0.270	0.91851852	0.369
2.4 GHz Band 802.11n_20 MHz BW and 5.8 GHz Band 802.11n_20 MHz BW	6.5	1.915	2.015	0.95037221	0.221
	13	0.975	1.026	0.95029240	0.221
	19.5	0.662	0.696	0.95114943	0.218
	26	0.507	0.530	0.95660377	0.193
	39	0.351	0.374	0.93850267	0.276
	52	0.272	0.295	0.92203390	0.353
	58.5	0.247	0.270	0.91481481	0.387
	65	0.228	0.250	0.91200000	0.400
5.8 GHz Band 802.11n_40 MHz BW	13.5	0.942	1.041	0.90489914	0.434
	27	0.491	0.540	0.90925926	0.413
	40.5	0.339	0.372	0.91129032	0.403
	54	0.264	0.286	0.92307692	0.348
	81	0.187	0.210	0.89047619	0.504
	108	0.151	0.174	0.86781609	0.616
	121.5	0.140	0.162	0.86419753	0.634
	135	0.127	0.150	0.84666667	0.723
2.4 GHz Band 802.11ac_20 MHz BW	6.5	1.925	1.955	0.98465473	0.067
	13	0.980	1.010	0.97029703	0.131
	19.5	0.670	0.698	0.95988539	0.178
	26	0.510	0.538	0.94795539	0.232
	39	0.356	0.383	0.92950392	0.317
	52	0.275	0.303	0.90759076	0.421
	58.5	0.251	0.279	0.89964158	0.459
	65	0.231	0.259	0.89189189	0.497
	78	0.198	0.227	0.87224670	0.594

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	0.947	0.978	0.96830266	0.140
	27	0.493	0.523	0.94263862	0.257
	40.5	0.342	0.371	0.92183288	0.353
	54	0.267	0.295	0.90508475	0.433
	81	0.191	0.219	0.87214612	0.594
	108	0.156	0.183	0.85245902	0.693
	121.5	0.143	0.171	0.83625731	0.777
	135	0.131	0.159	0.82389937	0.841
	162	0.115	0.143	0.80419580	0.946
	180	0.111	0.139	0.79856115	0.977
5.8 GHz Band 802.11ac_80 MHz BW	29.3	0.458	0.764	0.59947644	2.222
	58.5	0.251	0.425	0.59058824	2.287
	87.8	0.179	0.303	0.59075908	2.286
	117	0.147	0.251	0.58565737	2.324
	175.5	0.112	0.195	0.57435897	2.408
	234	0.095	0.169	0.56213018	2.502
	263.3	0.087	0.115	0.75652174	1.212
	292.5	0.084	0.111	0.75675676	1.210
	351	0.076	0.103	0.73786408	1.320
	390	0.072	0.099	0.72727273	1.383

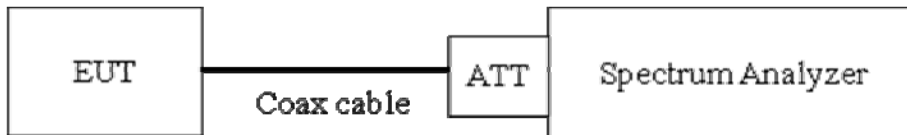
8.2 6dB BANDWIDTH (802.11a/b/g/n/ac)

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 $\geq 3 \times$ 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.

TEST RESULTS_Ant. 0

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	10.15	0.500	Pass
2437	6	10.14	0.500	Pass
2462	11	10.17	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	16.39	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.34	0.500	Pass
2437	6	17.36	0.500	Pass
2462	11	17.32	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	16.41	0.500	Pass
5785	157	16.39	0.500	Pass
5825	165	16.39	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	17.60	0.500	Pass
5785	157	17.60	0.500	Pass
5825	165	17.64	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	36.38	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_20 MHz BW

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Frequency [MHz]			
5745	149	17.59	0.500	Pass
5785	157	17.61	0.500	Pass
5825	165	17.58	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.35	0.500	Pass
5795	159	36.40	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_80 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.49	5775	Pass

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

TEST RESULTS_Ant. 1

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	10.16	0.500	Pass
2437	6	10.17	0.500	Pass
2462	11	10.17	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	16.37	0.500	Pass
2437	6	16.38	0.500	Pass
2462	11	16.36	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.60	0.500	Pass
2437	6	17.25	0.500	Pass
2462	11	17.62	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	16.37	0.500	Pass
5785	157	16.45	0.500	Pass
5825	165	16.38	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	17.58	0.500	Pass
5785	157	17.63	0.500	Pass
5825	165	17.60	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	36.35	0.500	Pass
5795	159	36.36	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_20 MHz BW

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Frequency [MHz]			
5745	149	17.33	0.500	Pass
5785	157	17.60	0.500	Pass
5825	165	17.62	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.13	0.500	Pass
5795	159	36.35	0.500	Pass

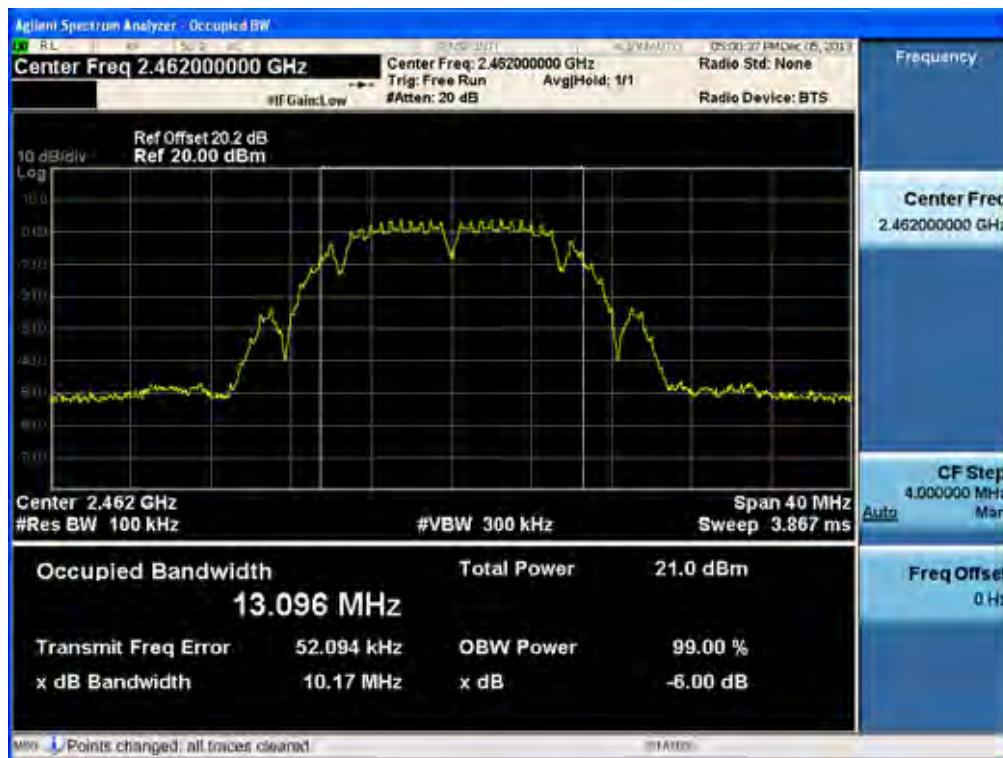
Conducted 6 dB Bandwidth Measurements for 802.11ac_80 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.33	0.500	Pass

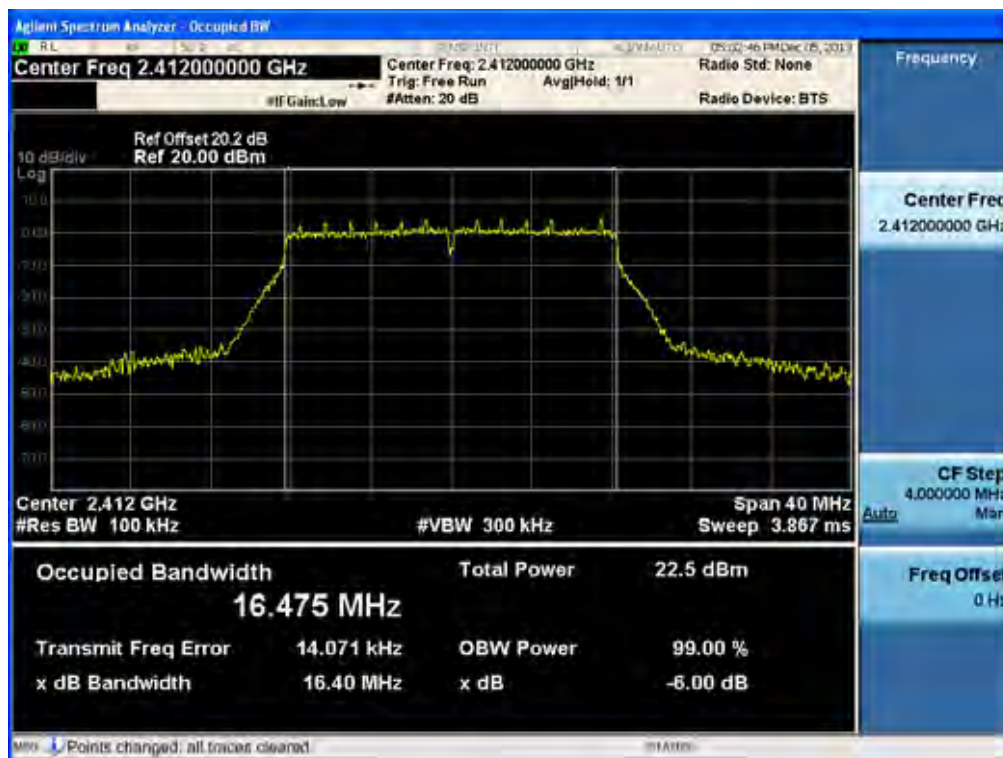
Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

2.4 GHz Band

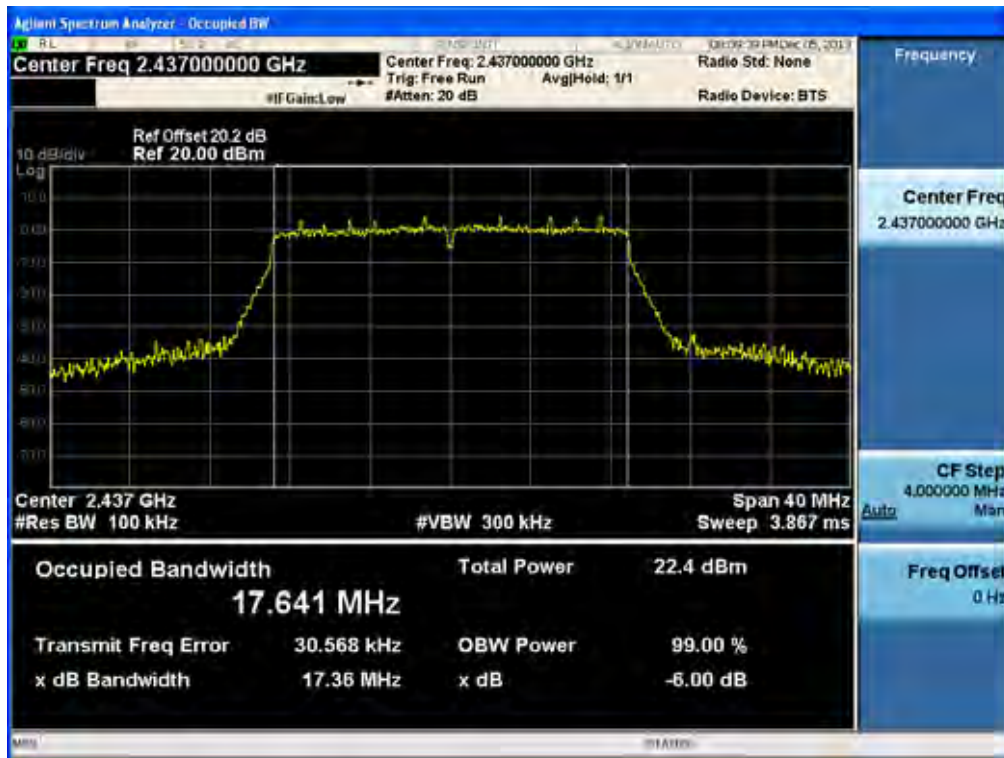
6dB Bandwidth plot (802.11b-CH 11)



6dB Bandwidth plot (802.11g-CH 1)

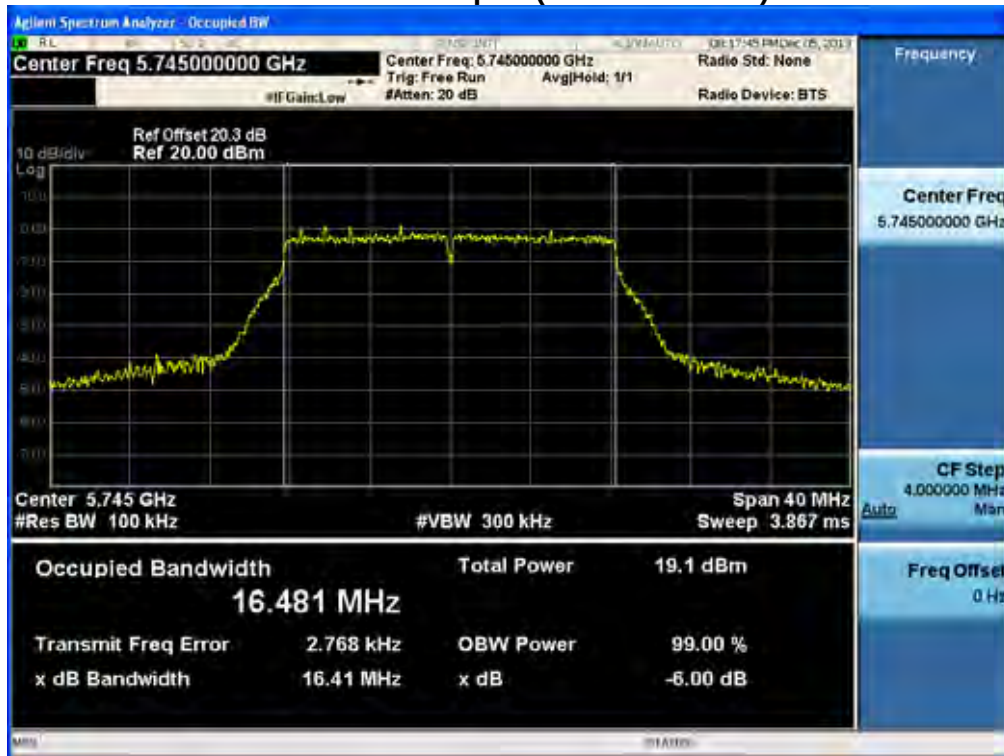


6dB Bandwidth plot (802.11n-CH 6)

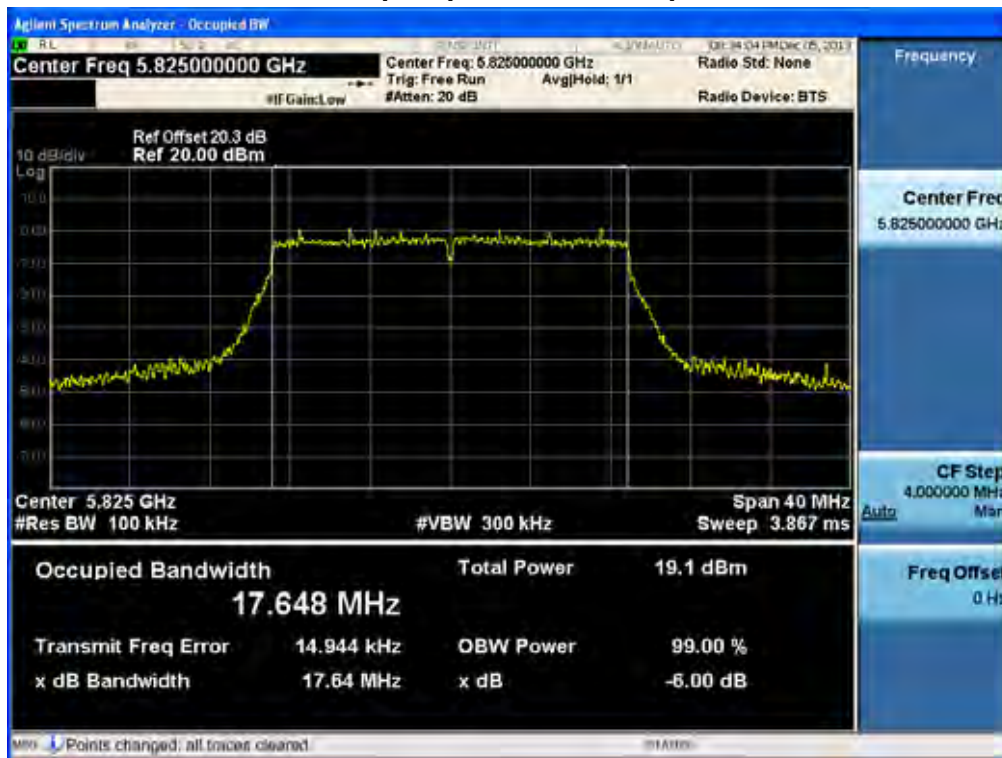


5.8 GHz Band

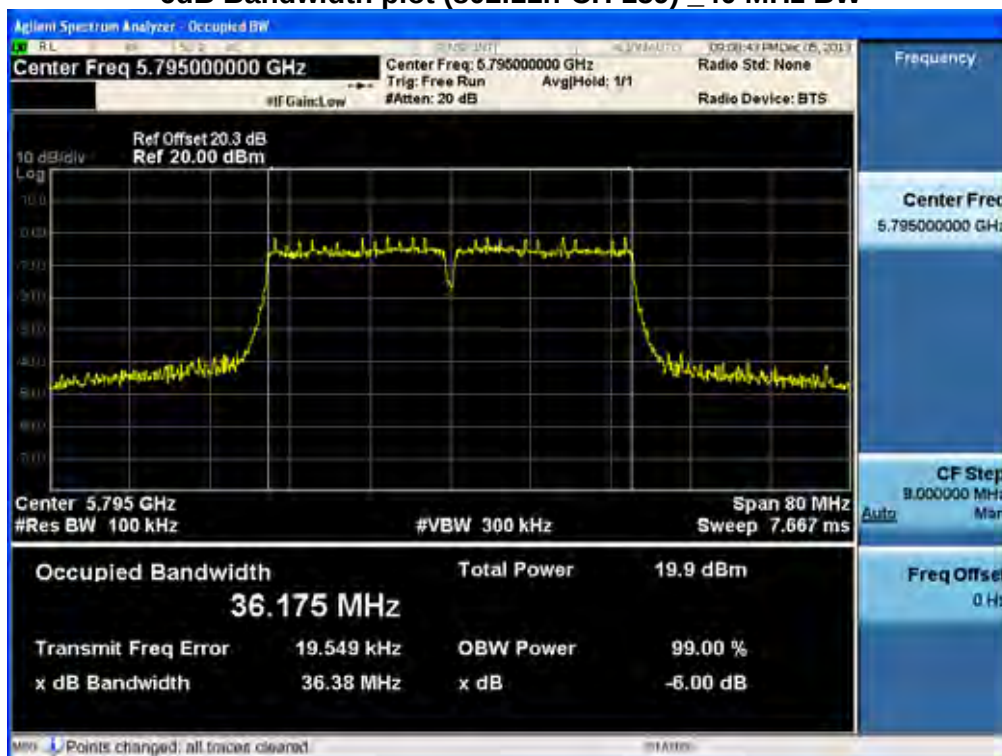
6dB Bandwidth plot (802.11a-CH 149)



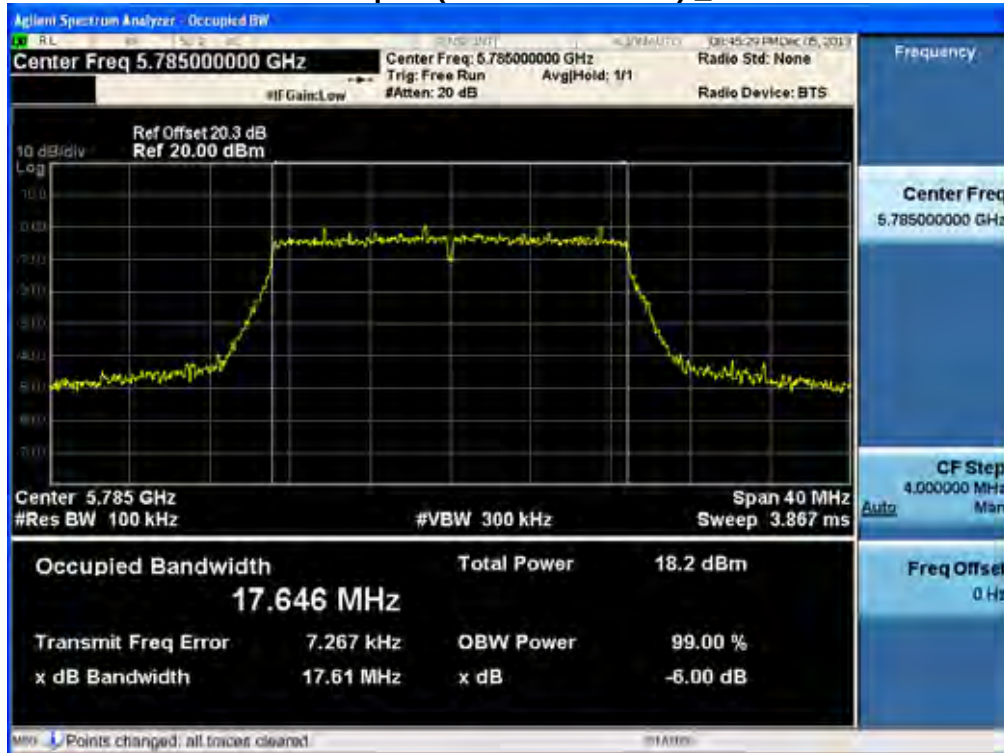
6dB Bandwidth plot (802.11n-CH 165) _20 MHz BW



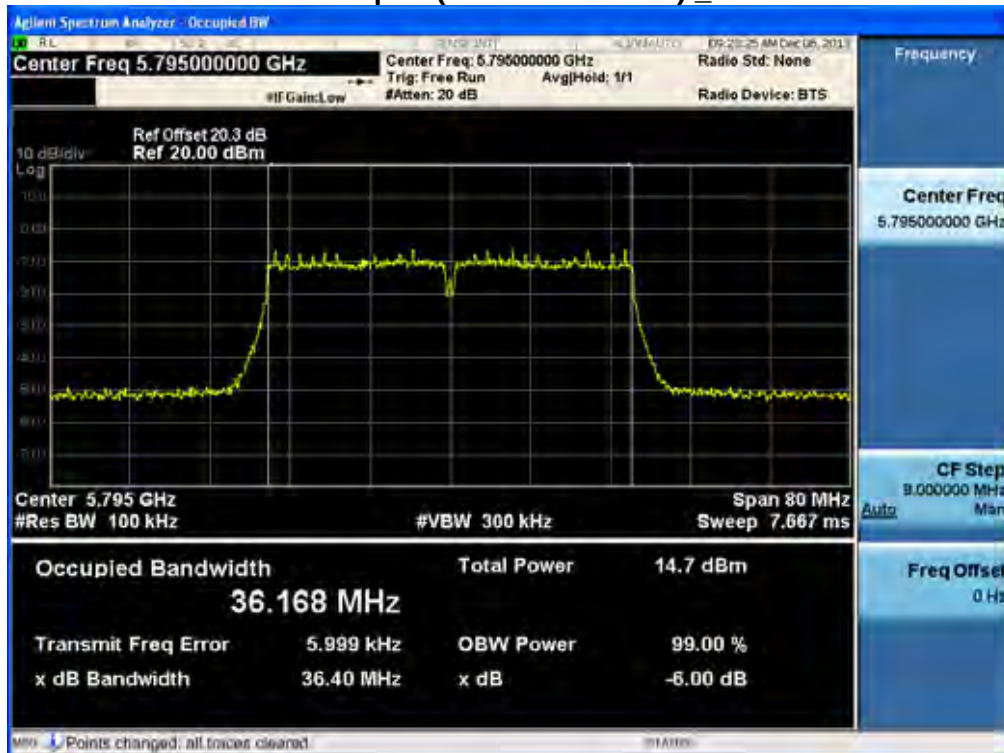
6dB Bandwidth plot (802.11n-CH 159) _40 MHz BW



6dB Bandwidth plot (802.11ac-CH 157) _20 MHz BW

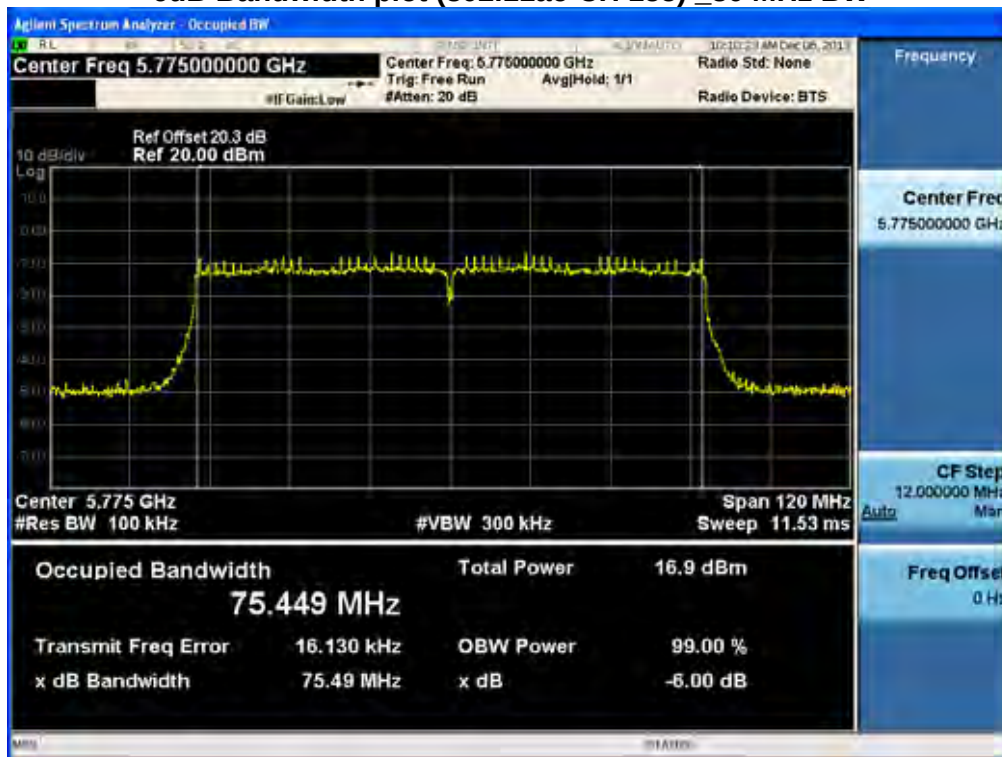


6dB Bandwidth plot (802.11ac-CH 159) _40 MHz BW



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6dB Bandwidth plot (802.11ac-CH 155) _80 MHz BW

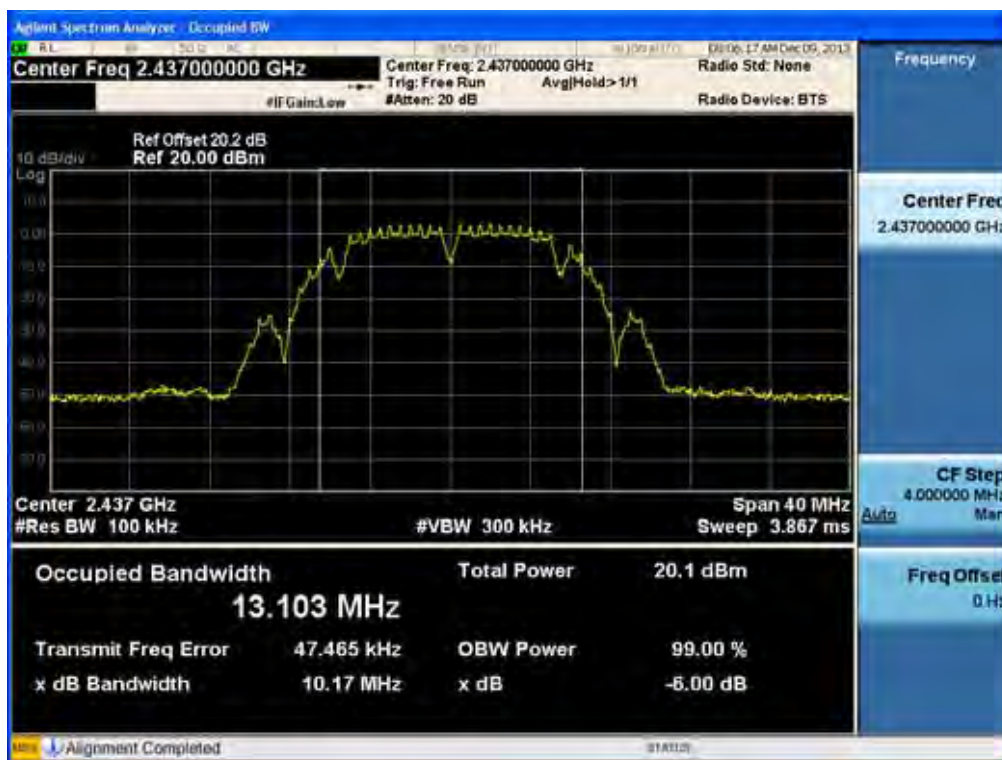


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TEST RESULTS_Ant. 1

2.4 GHz Band

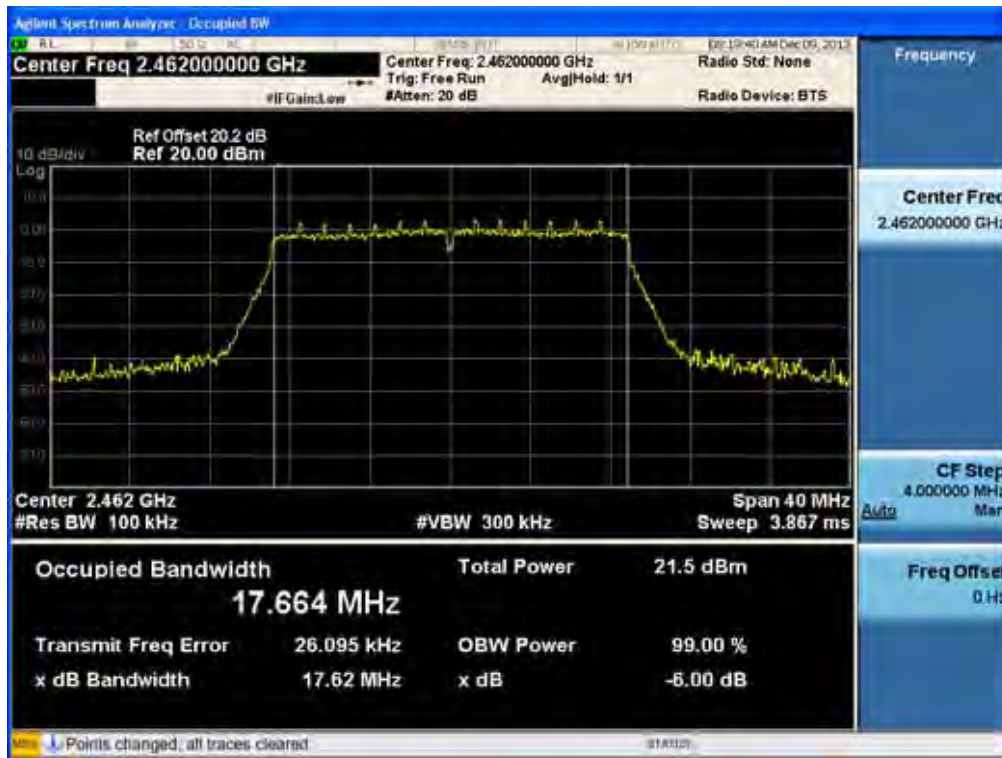
6dB Bandwidth plot (802.11b-CH 6)



6dB Bandwidth plot (802.11g-CH 6)

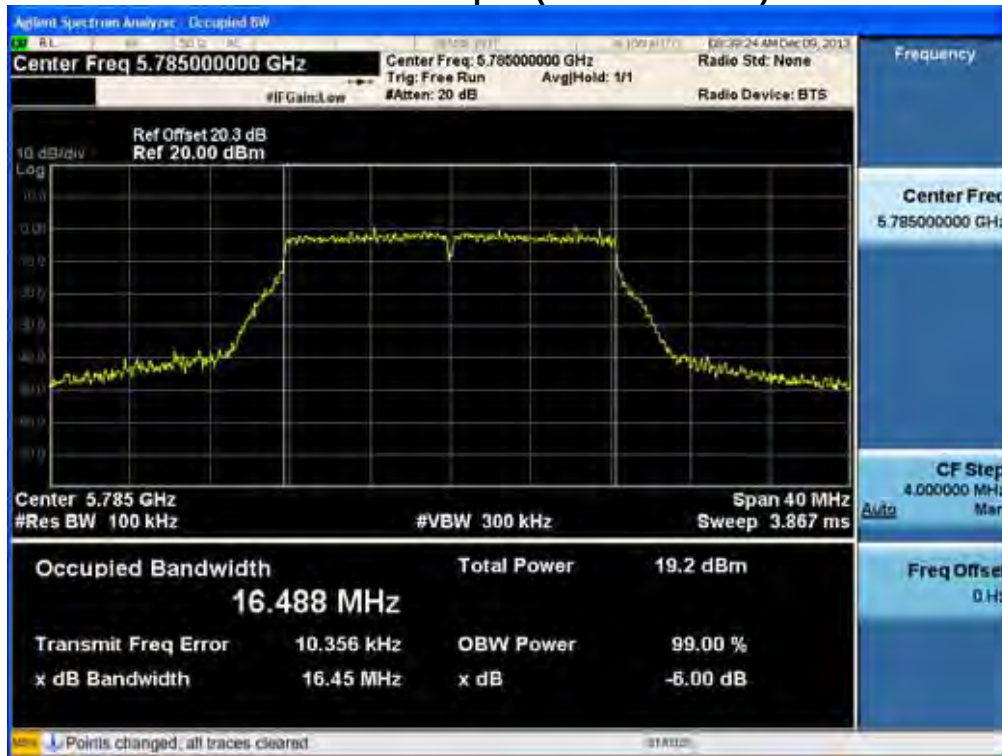


6dB Bandwidth plot (802.11n-CH 11)

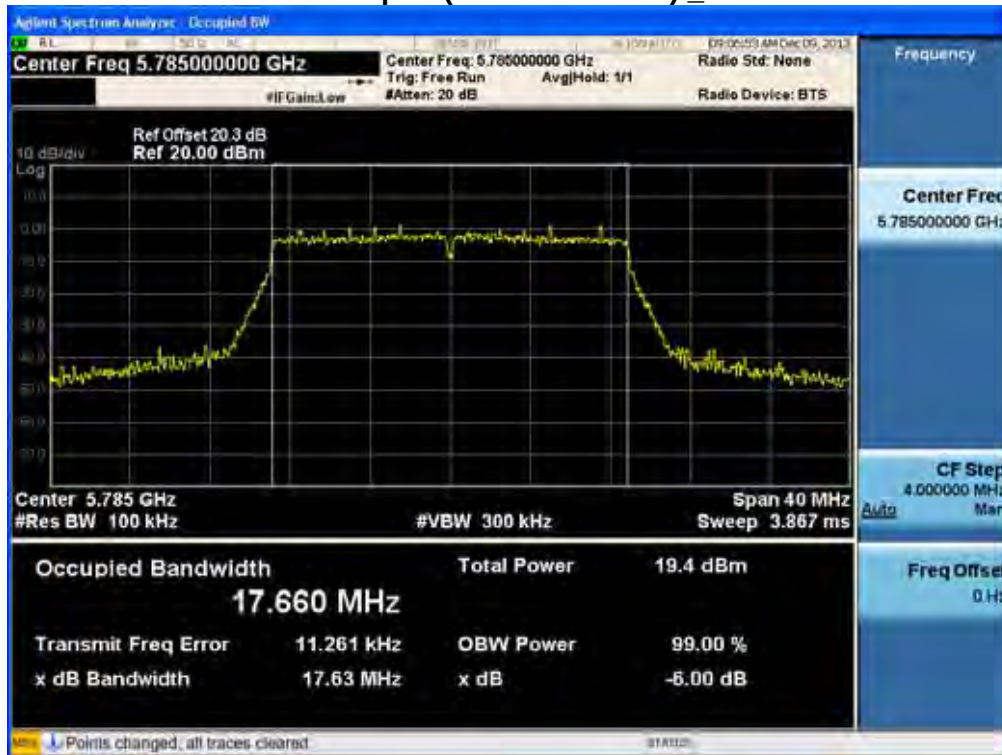


5.8 GHz Band

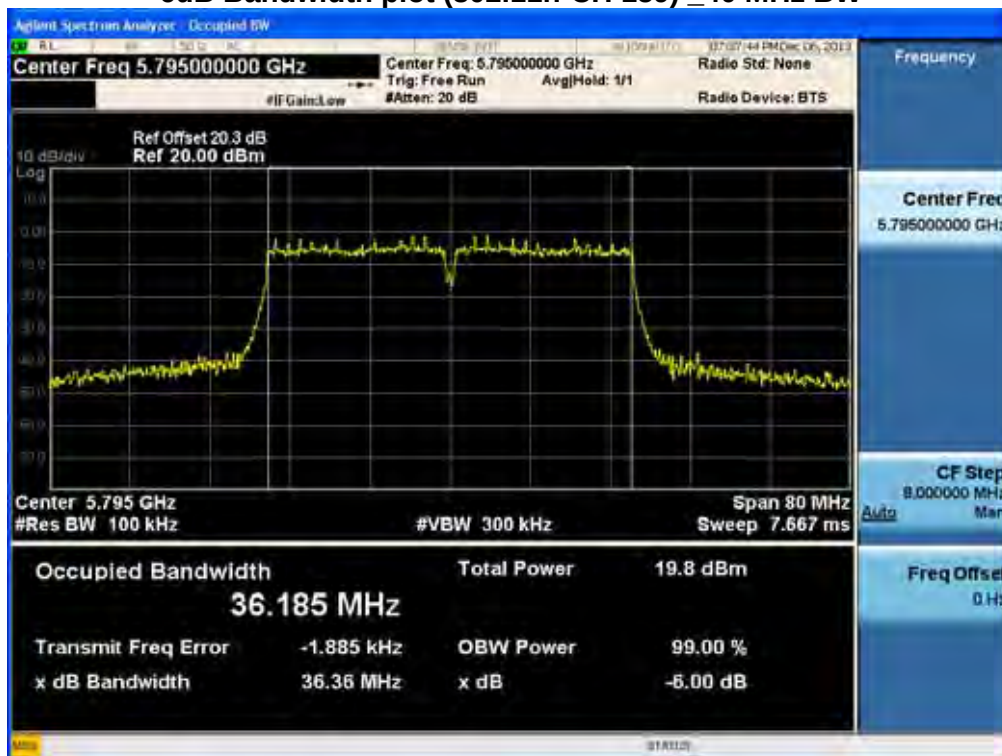
6dB Bandwidth plot (802.11a-CH 157)



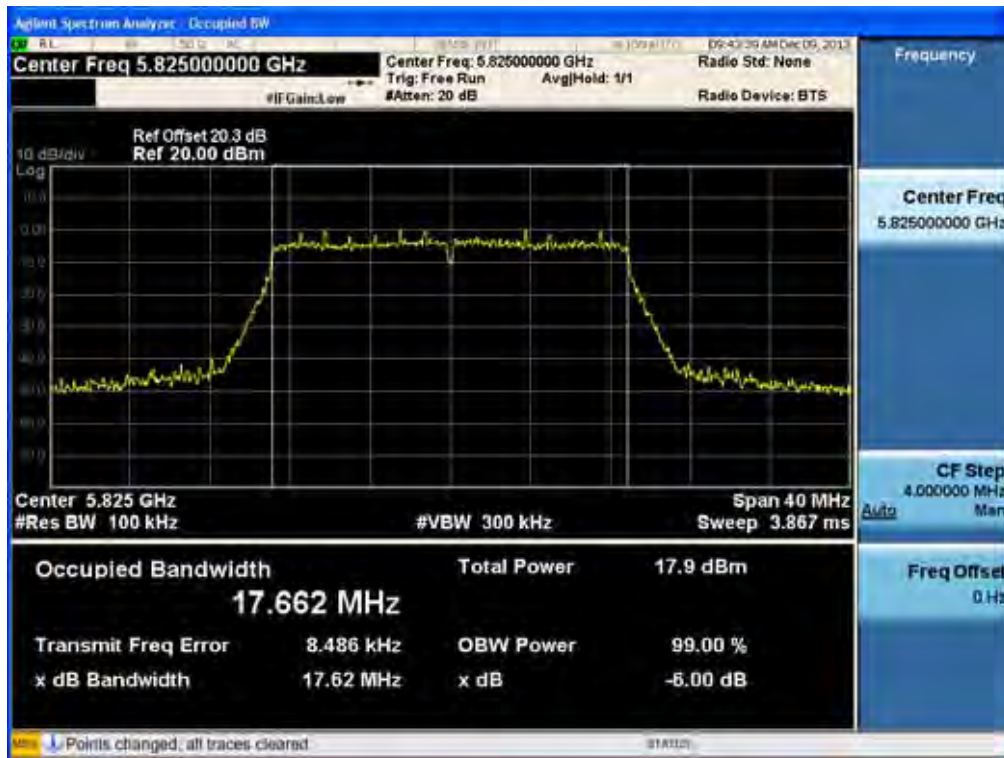
6dB Bandwidth plot (802.11n-CH 157) _20 MHz BW



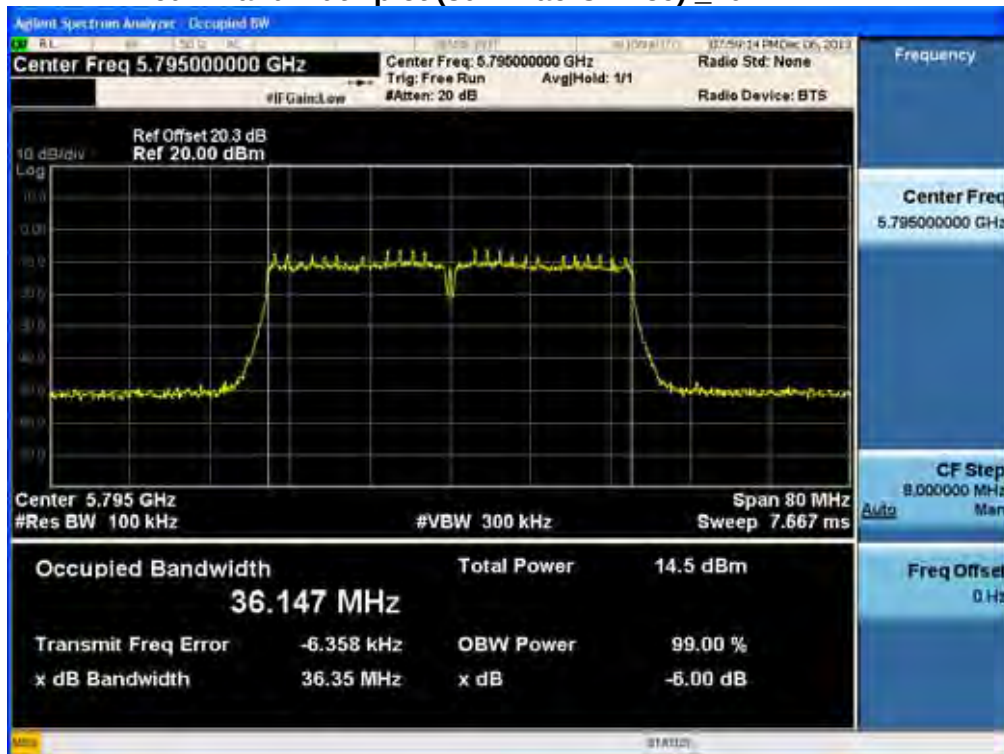
6dB Bandwidth plot (802.11n-CH 159) _40 MHz BW



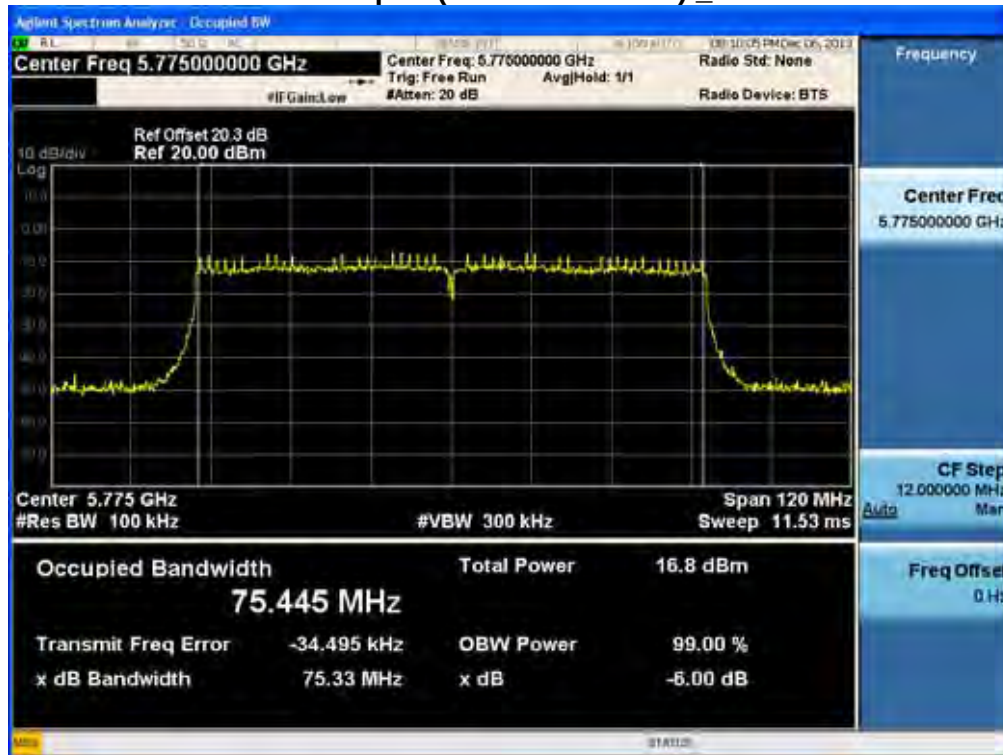
6dB Bandwidth plot (802.11ac-CH 165) _20 MHz BW



6dB Bandwidth plot (802.11ac-CH 159) _40 MHz BW



6dB Bandwidth plot (802.11ac-CH 155) _80 MHz BW



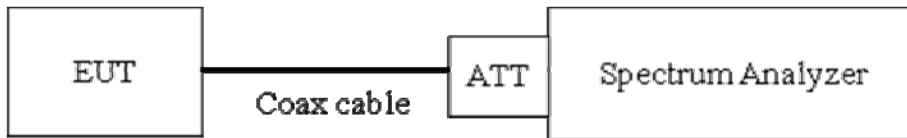
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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8.3 99% BANDWIDTH (802.11a/b/g/n)

limit

None; for reporting purposes only

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. 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 $\geq 3 \times$ RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

TEST RESULTS_Ant. 0

2.4 GHz Band

Conducted 99% Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	13.169
2437	6	13.145
2462	11	13.173

Conducted 99% Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	16.864
2437	6	16.863
2462	11	16.861

Conducted 99% Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	17.930
2437	6	17.910
2462	11	17.901

5.8 GHz Band

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	16.828
5785	157	16.825
5825	165	16.877

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.856
5785	157	17.873
5825	165	17.913

Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.535
5795	159	36.517

Conducted 99% Bandwidth Measurements for 802.11ac_20 MHz BW

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.891
5785	157	17.903
5825	165	17.884

Conducted 99% Bandwidth Measurements for 802.11ac_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.513
5795	159	36.515

Conducted 99% Bandwidth Measurements for 802.11ac_80 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5775	155	75.993

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

TEST RESULTS_Ant. 1

2.4 GHz Band

Conducted 99% Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	13.154
2437	6	13.166
2462	11	13.153

Conducted 99% Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	16.870
2437	6	16.883
2462	11	16.854

Conducted 99% Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
2412	1	17.922
2437	6	17.926
2462	11	17.934

5.8 GHz Band

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	16.830
5785	157	16.912
5825	165	16.865

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.858
5785	157	17.906
5825	165	17.857

Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.576
5795	159	36.538

Conducted 99% Bandwidth Measurements for 802.11ac_20 MHz BW

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5745	149	17.876
5785	157	17.872
5825	165	17.866

Conducted 99% Bandwidth Measurements for 802.11ac_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5755	151	36.574
5795	159	36.498

Conducted 99% Bandwidth Measurements for 802.11ac_80 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5775	155	75.736

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

99% Bandwidth plot (802.11b-CH11)



99% Bandwidth plot (802.11g-CH1)



99% Bandwidth plot (802.11n-CH1)



5.8 GHz Band

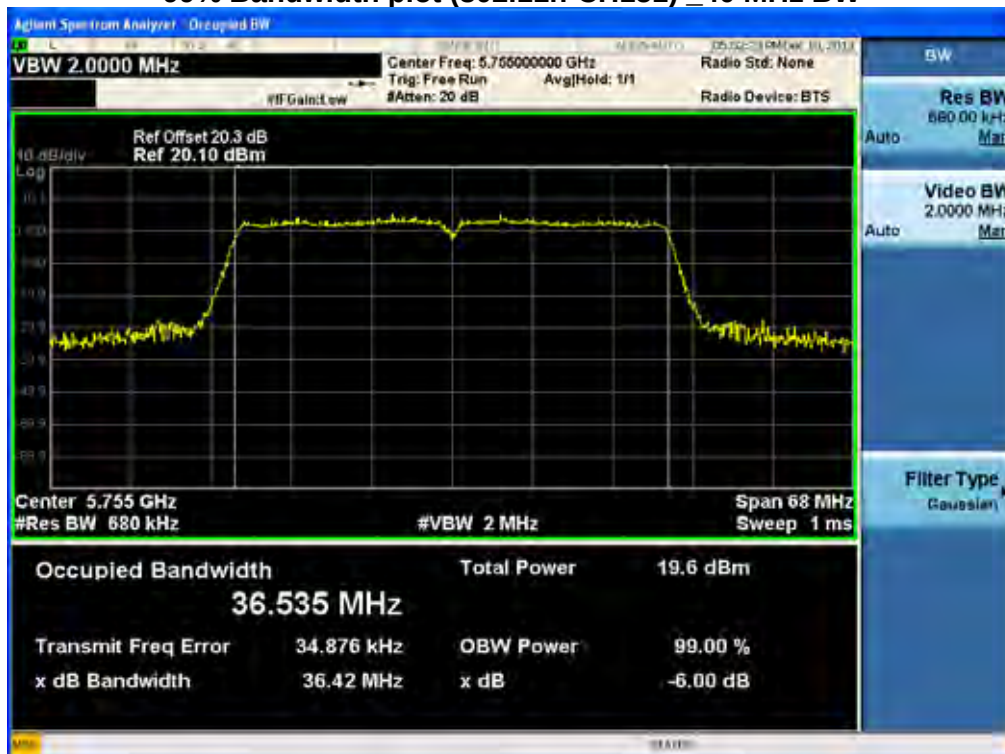
99% Bandwidth plot (802.11a-CH165)



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

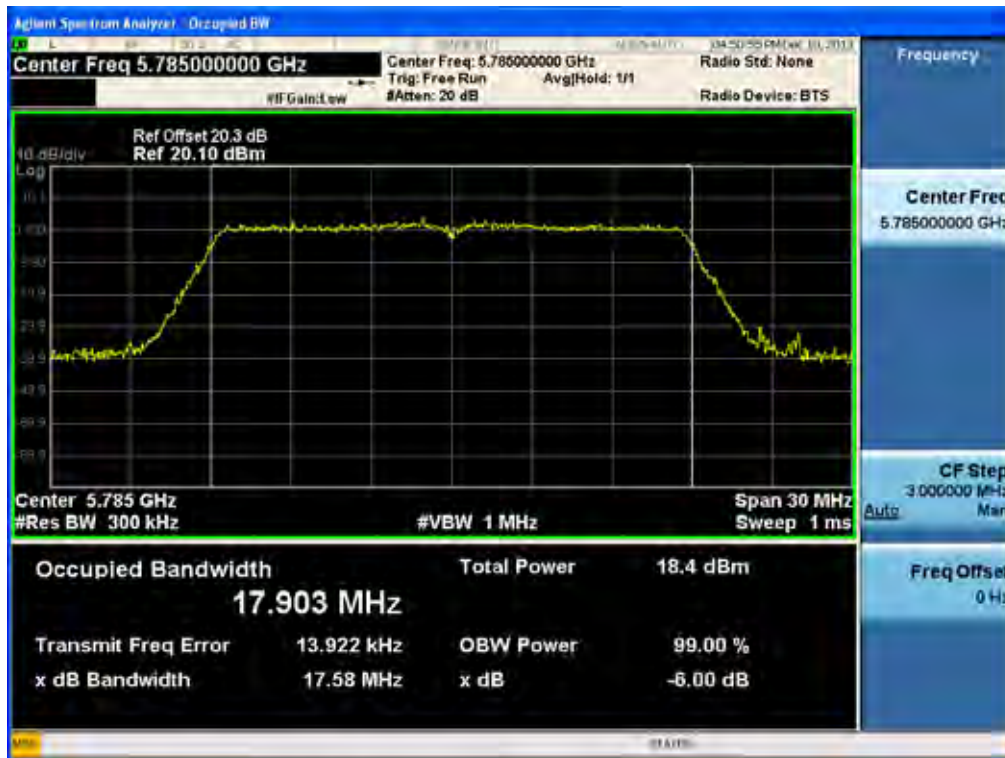


99% Bandwidth plot (802.11n-CH151) _40 MHz BW



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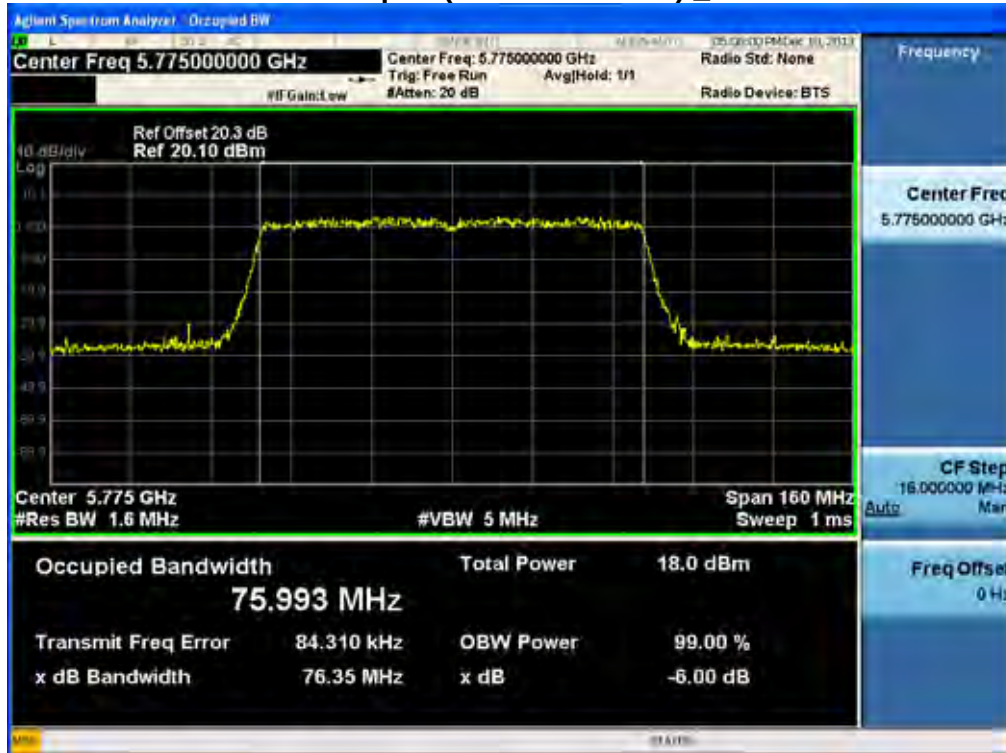
99% Bandwidth plot (802.11ac-CH157)_20 MHz BW



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



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



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RESULT PLOTS_Ant.1

2.4 GHz Band

99% Bandwidth plot (802.11b-CH6)



99% Bandwidth plot (802.11g-CH6)



99% Bandwidth plot (802.11n-CH1)



5.8 GHz Band

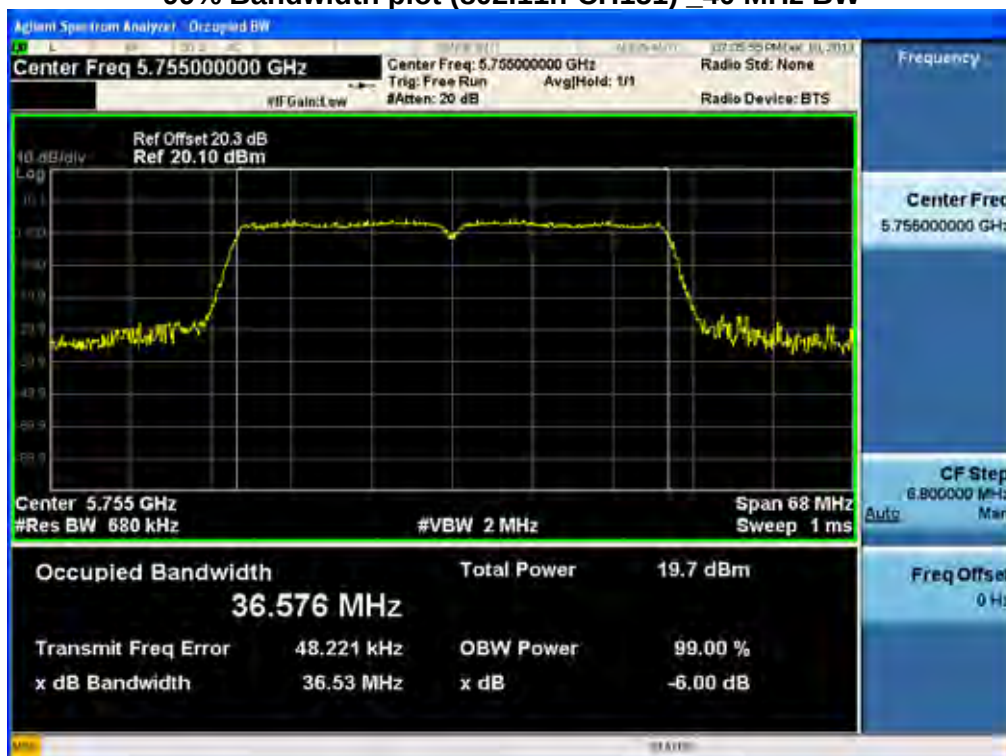
99% Bandwidth plot (802.11a-CH157)



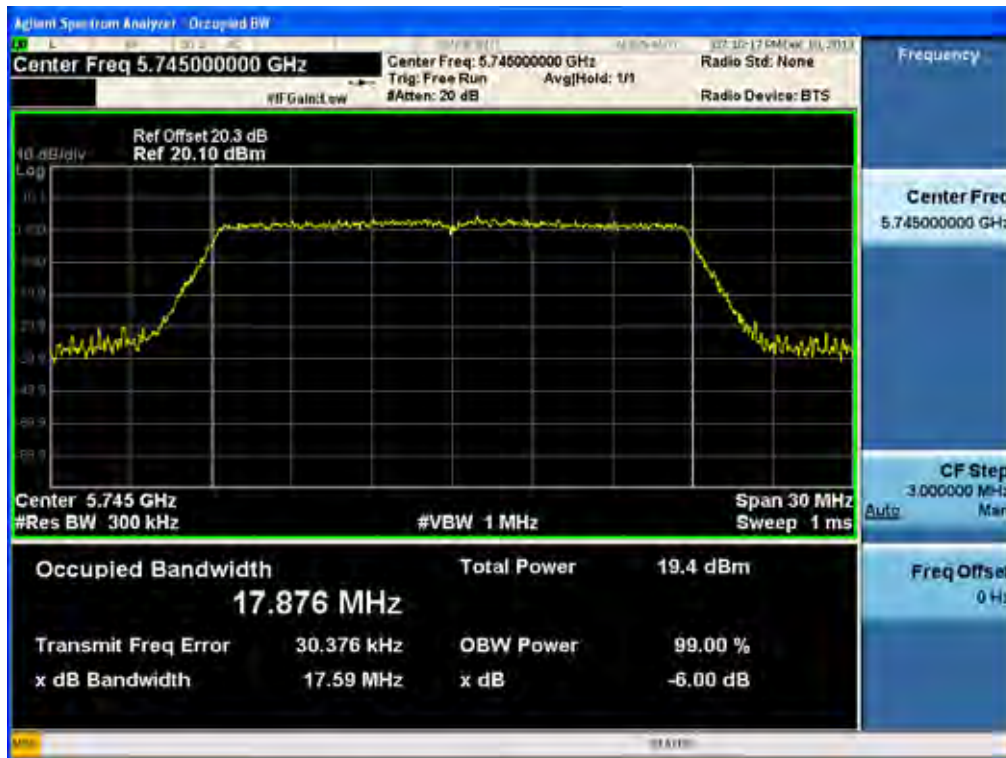
99% Bandwidth plot (802.11n-CH157) _20 MHz BW



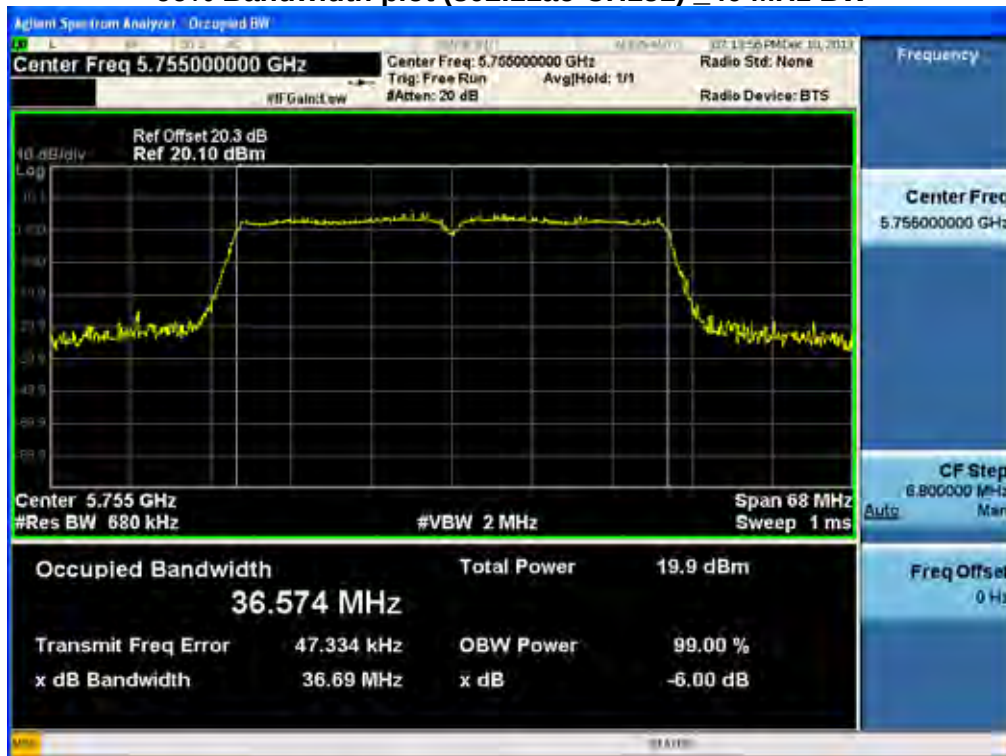
99% Bandwidth plot (802.11n-CH151) _40 MHz BW



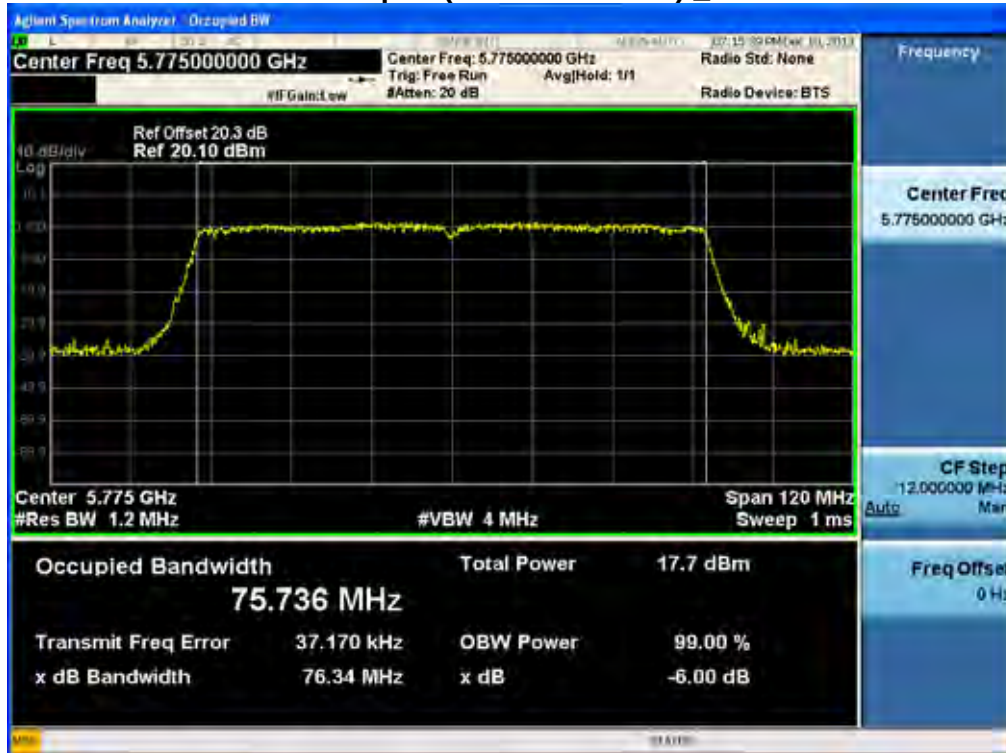
99% Bandwidth plot (802.11ac-CH149)_20 MHz BW



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



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



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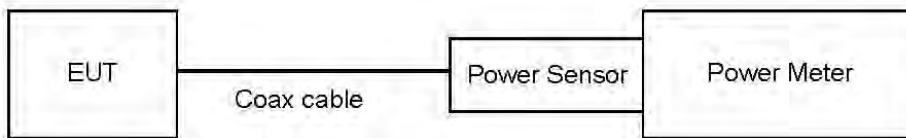
8.4 OUTPUT POWER (802.11a/b/g/n/ac)

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.

The maximum permissible conducted output power is 1 Watt.

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 :

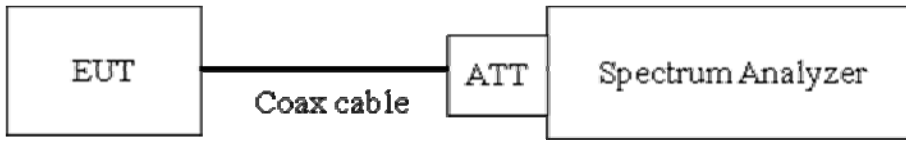
1. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. So, 20.2 dB is offset for 2.4 GHz Band and 20.3 dB is offset for 5.8 GHz Band.

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

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	20.21
	2437	20.24
	2462	20.24
5.8 GHz	5745	20.31
	5755	20.30
	5785	20.29
	5795	20.26
	5825	20.28

(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 $\geq 3 \times$ RBW

SPAN $\geq 1.5 \times$ 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 $\geq 3 \times$ RBW.

Number of points in sweep $\geq 2 \times$ span / RBW. (This gives bin-to-bin spacing $\leq$ 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.

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Sample Calculation

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

Output Power = 10 dBm + 20 dB + 0.8 dB + 0.2 dB = 31.0 dBm

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. So, 10.2 dB is offset for 2.4 GHz Band and 10.3 dB is offset for 5.8 GHz Band.
Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	20.21
	2437	20.24
	2462	20.24
5.8 GHz	5745	20.31
	5755	20.30
	5785	20.29
	5795	20.26
	5825	20.28

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

TEST RESULTS-Peak

2.4 GHz Band

TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	15.63	30
		2 Mbps	15.81	30
		5.5 Mbps	15.81	30
		11 Mbps	15.80	30
2437	6	1 Mbps	16.61	30
		2 Mbps	16.87	30
		5.5 Mbps	16.92	30
		11 Mbps	16.99	30
2462	11	1 Mbps	17.60	30
		2 Mbps	17.74	30
		5.5 Mbps	17.79	30
		11 Mbps	17.88	30

TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	15.40	30
		2 Mbps	15.81	30
		5.5 Mbps	15.77	30
		11 Mbps	15.81	30
2437	6	1 Mbps	16.33	30
		2 Mbps	16.55	30
		5.5 Mbps	16.52	30
		11 Mbps	16.60	30
2462	11	1 Mbps	17.30	30
		2 Mbps	17.67	30
		5.5 Mbps	17.68	30
		11 Mbps	17.74	30

TEST RESULTS Ant 0

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	25.12	30
		9 Mbps	25.19	30
		12 Mbps	25.31	30
		18 Mbps	25.12	30
		24 Mbps	24.73	30
		36 Mbps	24.70	30
		48 Mbps	25.54	30
		54 Mbps	24.48	30
2437	6	6 Mbps	25.22	30
		9 Mbps	25.23	30
		12 Mbps	25.34	30
		18 Mbps	25.12	30
		24 Mbps	24.74	30
		36 Mbps	24.72	30
		48 Mbps	25.65	30
		54 Mbps	25.05	30
2462	11	6 Mbps	25.27	30
		9 Mbps	25.39	30
		12 Mbps	25.42	30
		18 Mbps	25.49	30
		24 Mbps	24.86	30
		36 Mbps	24.81	30
		48 Mbps	25.64	30
		54 Mbps	25.06	30

TEST RESULTS Ant 1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	25.05	30
		9 Mbps	25.01	30
		12 Mbps	25.14	30
		18 Mbps	24.88	30
		24 Mbps	24.42	30
		36 Mbps	24.44	30
		48 Mbps	25.36	30
		54 Mbps	25.12	30
2437	6	6 Mbps	25.27	30
		9 Mbps	25.12	30
		12 Mbps	25.23	30
		18 Mbps	25.02	30
		24 Mbps	24.84	30
		36 Mbps	24.61	30
		48 Mbps	25.46	30
		54 Mbps	24.69	30
2462	11	6 Mbps	25.16	30
		9 Mbps	25.16	30
		12 Mbps	25.20	30
		18 Mbps	25.06	30
		24 Mbps	24.62	30
		36 Mbps	24.62	30
		48 Mbps	25.50	30
		54 Mbps	24.51	30

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	28.10	30
		9 Mbps	28.12	30
		12 Mbps	28.24	30
		18 Mbps	28.01	30
		24 Mbps	27.59	30
		36 Mbps	27.58	30
		48 Mbps	28.46	30
		54 Mbps	27.82	30
2437	6	6 Mbps	28.25	30
		9 Mbps	28.18	30
		12 Mbps	28.30	30
		18 Mbps	28.08	30
		24 Mbps	27.80	30
		36 Mbps	27.68	30
		48 Mbps	28.57	30
		54 Mbps	27.88	30
2462	11	6 Mbps	28.22	30
		9 Mbps	28.28	30
		12 Mbps	28.32	30
		18 Mbps	28.29	30
		24 Mbps	27.75	30
		36 Mbps	27.73	30
		48 Mbps	28.58	30
		54 Mbps	27.80	30

TEST RESULTS Ant 0

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	24.85	30
		13 Mbps	24.77	30
		19.5 Mbps	24.95	30
		26 Mbps	25.04	30
		39 Mbps	25.06	30
		52 Mbps	25.30	30
		58.5 Mbps	24.70	30
		65 Mbps	24.89	30
2437	6	6.5 Mbps	25.57	30
		13 Mbps	25.45	30
		19.5 Mbps	25.50	30
		26 Mbps	25.65	30
		39 Mbps	25.63	30
		52 Mbps	25.75	30
		58.5 Mbps	25.31	30
		65 Mbps	25.73	30
2462	11	6.5 Mbps	24.83	30
		13 Mbps	25.00	30
		19.5 Mbps	25.07	30
		26 Mbps	25.00	30
		39 Mbps	25.09	30
		52 Mbps	25.52	30
		58.5 Mbps	24.79	30
		65 Mbps	25.16	30

TEST RESULTS Ant 1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	24.92	30
		13 Mbps	24.72	30
		19.5 Mbps	24.85	30
		26 Mbps	24.80	30
		39 Mbps	24.95	30
		52 Mbps	25.22	30
		58.5 Mbps	24.75	30
		65 Mbps	25.04	30
2437	6	6.5 Mbps	25.32	30
		13 Mbps	25.27	30
		19.5 Mbps	25.51	30
		26 Mbps	25.29	30
		39 Mbps	25.49	30
		52 Mbps	25.69	30
		58.5 Mbps	25.29	30
		65 Mbps	25.64	30
2462	11	6.5 Mbps	24.91	30
		13 Mbps	24.67	30
		19.5 Mbps	24.96	30
		26 Mbps	24.95	30
		39 Mbps	25.19	30
		52 Mbps	25.35	30
		58.5 Mbps	24.94	30
		65 Mbps	25.20	30

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	27.90	30
		13 Mbps	27.75	30
		19.5 Mbps	27.91	30
		26 Mbps	27.93	30
		39 Mbps	28.02	30
		52 Mbps	28.27	30
		58.5 Mbps	27.73	30
		65 Mbps	27.97	30
2437	6	6.5 Mbps	28.45	30
		13 Mbps	28.37	30
		19.5 Mbps	28.51	30
		26 Mbps	28.48	30
		39 Mbps	28.57	30
		52 Mbps	28.73	30
		58.5 Mbps	28.31	30
		65 Mbps	28.70	30
2462	11	6.5 Mbps	27.88	30
		13 Mbps	27.85	30
		19.5 Mbps	28.03	30
		26 Mbps	27.99	30
		39 Mbps	28.15	30
		52 Mbps	28.45	30
		58.5 Mbps	27.88	30
		65 Mbps	28.19	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)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6	23.27	30
		9	23.02	30
		12	23.03	30
		18	22.99	30
		24	22.56	30
		36	22.36	30
		48	23.38	30
		54	22.51	30
5785	157	6	23.08	30
		9	23.19	30
		12	23.09	30
		18	23.06	30
		24	22.66	30
		36	22.48	30
		48	23.31	30
		54	22.70	30
5825	165	6	23.27	30
		9	23.24	30
		12	23.17	30
		18	23.09	30
		24	22.66	30
		36	22.50	30
		48	23.42	30
		54	22.46	30

TEST RESULTS _Ant.1

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6	23.75	30
		9	23.49	30
		12	23.68	30
		18	23.37	30
		24	23.12	30
		36	22.69	30
		48	23.78	30
		54	23.08	30
5785	157	6	23.76	30
		9	23.47	30
		12	23.59	30
		18	23.46	30
		24	22.86	30
		36	22.85	30
		48	23.68	30
		54	23.47	30
5825	165	6	23.74	30
		9	23.48	30
		12	23.53	30
		18	23.37	30
		24	22.87	30
		36	22.64	30
		48	23.56	30
		54	22.52	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6	26.53	29.727
		9	26.27	29.727
		12	26.38	29.727
		18	26.20	29.727
		24	25.86	29.727
		36	25.54	29.727
		48	26.59	29.727
		54	25.82	29.727
5785	157	6	26.44	29.727
		9	26.34	29.727
		12	26.36	29.727
		18	26.27	29.727
		24	25.77	29.727
		36	25.68	29.727
		48	26.51	29.727
		54	26.11	29.727
5825	165	6	26.52	29.727
		9	26.37	29.727
		12	26.37	29.727
		18	26.24	29.727
		24	25.78	29.727
		36	25.58	29.727
		48	26.50	29.727
		54	25.50	29.727

Note :

1. Limit is 29.727 dBm. Because directional antenna gain is 6.273 dBi for 802.11a.
2. Sample Calculation

$$30 \text{ dBm} - (6.273 \text{ dB} - 6 \text{ dB}) = 29.727 \text{ dBm}$$

TEST RESULTS _Ant.0

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	23.04	30
		13	23.10	30
		19.5	22.92	30
		26	23.27	30
		39	23.26	30
		52	23.38	30
		58.5	22.87	30
		65	23.32	30
5785	157	6.5	23.14	30
		13	23.16	30
		19.5	23.26	30
		26	23.23	30
		39	23.17	30
		52	23.50	30
		58.5	23.11	30
		65	23.46	30
5825	165	6.5	23.10	30
		13	23.11	30
		19.5	23.27	30
		26	23.39	30
		39	23.46	30
		52	23.73	30
		58.5	23.05	30
		65	23.20	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)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	23.39	30
		13	23.54	30
		19.5	23.65	30
		26	23.62	30
		39	23.47	30
		52	23.89	30
		58.5	23.49	30
		65	23.76	30
5785	157	6.5	23.47	30
		13	23.50	30
		19.5	23.30	30
		26	23.42	30
		39	23.69	30
		52	23.92	30
		58.5	23.46	30
		65	23.87	30
5825	165	6.5	23.87	30
		13	23.96	30
		19.5	23.92	30
		26	23.73	30
		39	23.86	30
		52	24.07	30
		58.5	23.76	30
		65	23.46	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 (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	26.23	30
		13	26.34	30
		19.5	26.31	30
		26	26.46	30
		39	26.38	30
		52	26.65	30
		58.5	26.20	30
		65	26.55	30
5785	157	6.5	26.32	30
		13	26.35	30
		19.5	26.29	30
		26	26.34	30
		39	26.45	30
		52	26.73	30
		58.5	26.30	30
		65	26.68	30
5825	165	6.5	26.52	30
		13	26.57	30
		19.5	26.62	30
		26	26.57	30
		39	26.68	30
		52	26.91	30
		58.5	26.43	30
		65	26.34	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11n Mode: 5755~5795) _40 MHz BW

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	20.32	30
		27	19.85	30
		40.5	19.93	30
		54	20.50	30
		81	20.41	30
		108	20.46	30
		121.5	20.46	30
		135	20.40	30
5795	159	13.5	20.53	30
		27	20.03	30
		40.5	19.96	30
		54	20.51	30
		81	20.43	30
		108	20.52	30
		121.5	20.60	30
		135	20.54	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11n Mode: 5755~5795) _40 MHz BW

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	20.77	30
		27	20.45	30
		40.5	20.29	30
		54	20.92	30
		81	20.83	30
		108	20.85	30
		121.5	20.91	30
		135	20.89	30
5795	159	13.5	20.59	30
		27	20.25	30
		40.5	20.10	30
		54	20.76	30
		81	20.63	30
		108	20.91	30
		121.5	20.73	30
		135	20.61	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode: 5755~5795) _40 MHz BW

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	23.56	30
		27	23.17	30
		40.5	23.12	30
		54	23.72	30
		81	23.64	30
		108	23.67	30
		121.5	23.70	30
		135	23.66	30
5795	159	13.5	23.57	30
		27	23.15	30
		40.5	23.04	30
		54	23.65	30
		81	23.54	30
		108	23.73	30
		121.5	23.68	30
		135	23.59	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11ac Mode: 5745~5825) _20 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	23.35	30
		13	23.39	30
		19.5	23.31	30
		26	23.38	30
		39	23.18	30
		52	23.47	30
		58.5	23.03	30
		65	23.55	30
		78	23.41	30
5785	157	6.5	23.07	30
		13	23.43	30
		19.5	22.81	30
		26	23.40	30
		39	22.76	30
		52	22.92	30
		58.5	22.71	30
		65	22.69	30
		78	22.83	30
5825	165	6.5	22.36	30
		13	23.03	30
		19.5	22.26	30
		26	22.73	30
		39	22.65	30
		52	22.78	30
		58.5	22.45	30
		65	22.48	30
		78	22.67	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5745~5825) _20 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	23.48	30
		13	23.75	30
		19.5	23.67	30
		26	23.67	30
		39	23.41	30
		52	23.73	30
		58.5	23.49	30
		65	23.33	30
		78	23.25	30
5785	157	6.5	23.15	30
		13	23.36	30
		19.5	22.90	30
		26	22.80	30
		39	23.22	30
		52	22.97	30
		58.5	23.15	30
		65	23.26	30
		78	23.30	30
5825	165	6.5	22.48	30
		13	22.50	30
		19.5	22.52	30
		26	22.65	30
		39	22.43	30
		52	23.19	30
		58.5	22.55	30
		65	22.86	30
		78	22.69	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5745~5825) _20 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	26.43	30
		13	26.59	30
		19.5	26.51	30
		26	26.54	30
		39	26.31	30
		52	26.61	30
		58.5	26.28	30
		65	26.45	30
		78	26.34	30
5785	157	6.5	26.12	30
		13	26.41	30
		19.5	25.86	30
		26	26.12	30
		39	26.00	30
		52	25.96	30
		58.5	25.95	30
		65	25.99	30
		78	26.08	30
5825	165	6.5	25.43	30
		13	25.79	30
		19.5	25.40	30
		26	25.70	30
		39	25.55	30
		52	26.00	30
		58.5	25.51	30
		65	25.68	30
		78	25.69	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11ac Mode: 5755~5795) _40 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	20.08	30
		27	19.71	30
		40.5	19.83	30
		54	20.38	30
		81	20.36	30
		108	20.44	30
		121.5	20.46	30
		135	20.42	30
		162	20.49	30
		180	20.21	30
5795	159	13.5	15.10	30
		27	15.04	30
		40.5	15.09	30
		54	15.21	30
		81	15.54	30
		108	15.64	30
		121.5	15.38	30
		135	15.24	30
		162	15.33	30
		180	15.38	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5755~5795) _40 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	20.58	30
		27	20.34	30
		40.5	20.38	30
		54	20.76	30
		81	20.65	30
		108	20.85	30
		121.5	20.94	30
		135	20.84	30
		162	20.89	30
		180	20.80	30
5795	159	13.5	14.91	30
		27	14.84	30
		40.5	15.02	30
		54	15.20	30
		81	15.46	30
		108	15.47	30
		121.5	15.53	30
		135	15.22	30
		162	15.26	30
		180	15.51	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5755~5795) _40 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	23.34	30
		27	23.05	30
		40.5	23.13	30
		54	23.58	30
		81	23.52	30
		108	23.66	30
		121.5	23.72	30
		135	23.65	30
		162	23.70	30
		180	23.52	30
5795	159	13.5	18.02	30
		27	17.95	30
		40.5	18.07	30
		54	18.21	30
		81	18.52	30
		108	18.56	30
		121.5	18.46	30
		135	18.24	30
		162	18.31	30
		180	18.46	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11ac Mode: 5775) _80 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5775	155	29.3	17.04	30
		58.5	16.78	30
		87.8	16.77	30
		117	17.12	30
		175.5	17.07	30
		234	17.22	30
		263.3	17.06	30
		292.5	17.04	30
		351	17.20	30
		390	17.13	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5775) _80 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5775	155	29.3	16.95	30
		58.5	16.83	30
		87.8	16.65	30
		117	17.17	30
		175.5	17.02	30
		234	17.05	30
		263.3	17.20	30
		292.5	17.11	30
		351	17.20	30
		390	17.02	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5775) _80 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5775	155	29.3	20.00	30
		58.5	19.82	30
		87.8	19.72	30
		117	20.16	30
		175.5	20.05	30
		234	20.14	30
		263.3	20.14	30
		292.5	20.08	30
		351	20.21	30
		390	20.09	30

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	11.77	0.222	11.99	30
		2 Mbps	11.91	0.232	12.14	30
		5.5 Mbps	11.79	0.228	12.02	30
		11 Mbps	11.76	0.222	11.98	30
2437	6	1 Mbps	12.78	0.222	13.00	30
		2 Mbps	13.01	0.232	13.24	30
		5.5 Mbps	12.91	0.228	13.14	30
		11 Mbps	12.82	0.222	13.04	30
2462	11	1 Mbps	13.74	0.222	13.97	30
		2 Mbps	13.86	0.232	14.09	30
		5.5 Mbps	13.79	0.228	14.02	30
		11 Mbps	13.67	0.222	13.89	30

TEST RESULTS_Ant.1

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	11.52	0.222	11.74	30
		2 Mbps	11.71	0.232	11.94	30
		5.5 Mbps	11.69	0.228	11.92	30
		11 Mbps	11.63	0.222	11.85	30
2437	6	1 Mbps	12.43	0.222	12.65	30
		2 Mbps	12.66	0.232	12.89	30
		5.5 Mbps	12.49	0.228	12.72	30
		11 Mbps	12.55	0.222	12.77	30
2462	11	1 Mbps	13.46	0.222	13.68	30
		2 Mbps	13.62	0.232	13.86	30
		5.5 Mbps	13.49	0.228	13.72	30
		11 Mbps	13.54	0.222	13.76	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	15.35	0.226	15.58	30
		9 Mbps	15.46	0.231	15.69	30
		12 Mbps	15.53	0.224	15.76	30
		18 Mbps	15.48	0.205	15.68	30
		24 Mbps	15.50	0.224	15.72	30
		36 Mbps	15.47	0.267	15.73	30
		48 Mbps	15.54	0.349	15.89	30
		54 Mbps	15.32	0.369	15.68	30
2437	6	6 Mbps	15.42	0.226	15.64	30
		9 Mbps	15.47	0.231	15.70	30
		12 Mbps	15.51	0.224	15.73	30
		18 Mbps	15.47	0.205	15.68	30
		24 Mbps	15.45	0.224	15.68	30
		36 Mbps	15.45	0.267	15.71	30
		48 Mbps	15.50	0.349	15.85	30
		54 Mbps	15.34	0.369	15.71	30
2462	11	6 Mbps	15.44	0.226	15.67	30
		9 Mbps	15.57	0.231	15.80	30
		12 Mbps	15.44	0.224	15.66	30
		18 Mbps	15.53	0.205	15.74	30
		24 Mbps	15.51	0.224	15.73	30
		36 Mbps	15.50	0.267	15.76	30
		48 Mbps	15.42	0.349	15.76	30
		54 Mbps	15.33	0.369	15.70	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	15.10	0.226	15.33	30
		9 Mbps	15.10	0.231	15.33	30
		12 Mbps	15.22	0.224	15.44	30
		18 Mbps	15.18	0.205	15.38	30
		24 Mbps	15.09	0.224	15.31	30
		36 Mbps	15.06	0.267	15.33	30
		48 Mbps	15.13	0.349	15.48	30
		54 Mbps	14.97	0.369	15.34	30
2437	6	6 Mbps	15.24	0.226	15.47	30
		9 Mbps	15.23	0.231	15.46	30
		12 Mbps	15.18	0.224	15.41	30
		18 Mbps	15.30	0.205	15.50	30
		24 Mbps	15.13	0.224	15.35	30
		36 Mbps	15.07	0.267	15.33	30
		48 Mbps	15.09	0.349	15.44	30
		54 Mbps	14.98	0.369	15.35	30
2462	11	6 Mbps	15.20	0.226	15.43	30
		9 Mbps	15.34	0.231	15.57	30
		12 Mbps	15.30	0.224	15.53	30
		18 Mbps	15.30	0.205	15.51	30
		24 Mbps	15.28	0.224	15.50	30
		36 Mbps	15.22	0.267	15.48	30
		48 Mbps	15.28	0.349	15.62	30
		54 Mbps	14.94	0.369	15.31	30

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	18.46	30
		9 Mbps	18.53	30
		12 Mbps	18.61	30
		18 Mbps	18.55	30
		24 Mbps	18.53	30
		36 Mbps	18.55	30
		48 Mbps	18.70	30
		54 Mbps	18.53	30
2437	6	6 Mbps	18.57	30
		9 Mbps	18.59	30
		12 Mbps	18.58	30
		18 Mbps	18.60	30
		24 Mbps	18.53	30
		36 Mbps	18.54	30
		48 Mbps	18.66	30
		54 Mbps	18.54	30
2462	11	6 Mbps	18.56	30
		9 Mbps	18.70	30
		12 Mbps	18.61	30
		18 Mbps	18.64	30
		24 Mbps	18.63	30
		36 Mbps	18.64	30
		48 Mbps	18.71	30
		54 Mbps	18.52	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	14.48	0.221	14.70	30
		13 Mbps	14.33	0.221	14.55	30
		19.5 Mbps	14.35	0.218	14.56	30
		26 Mbps	14.33	0.193	14.52	30
		39 Mbps	14.30	0.276	14.58	30
		52 Mbps	14.24	0.353	14.59	30
		58.5 Mbps	14.28	0.387	14.67	30
		65 Mbps	14.22	0.400	14.62	30
2437	6	6.5 Mbps	15.43	0.221	15.65	30
		13 Mbps	15.46	0.221	15.68	30
		19.5 Mbps	15.42	0.218	15.63	30
		26 Mbps	15.52	0.193	15.71	30
		39 Mbps	15.36	0.276	15.64	30
		52 Mbps	15.35	0.353	15.71	30
		58.5 Mbps	15.26	0.387	15.65	30
		65 Mbps	15.34	0.400	15.74	30
2462	11	6.5 Mbps	14.36	0.221	14.58	30
		13 Mbps	14.28	0.221	14.50	30
		19.5 Mbps	14.34	0.218	14.56	30
		26 Mbps	14.41	0.193	14.60	30
		39 Mbps	14.31	0.276	14.59	30
		52 Mbps	14.32	0.353	14.68	30
		58.5 Mbps	14.24	0.387	14.63	30
		65 Mbps	14.31	0.400	14.71	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	14.27	0.221	14.49	30
		13 Mbps	14.17	0.221	14.40	30
		19.5 Mbps	14.18	0.218	14.40	30
		26 Mbps	14.25	0.193	14.44	30
		39 Mbps	14.12	0.276	14.39	30
		52 Mbps	14.14	0.353	14.49	30
		58.5 Mbps	14.20	0.387	14.59	30
		65 Mbps	14.09	0.400	14.49	30
2437	6	6.5 Mbps	15.17	0.221	15.39	30
		13 Mbps	15.18	0.221	15.40	30
		19.5 Mbps	15.21	0.218	15.43	30
		26 Mbps	15.23	0.193	15.42	30
		39 Mbps	15.16	0.276	15.44	30
		52 Mbps	15.19	0.353	15.54	30
		58.5 Mbps	15.15	0.387	15.54	30
		65 Mbps	15.14	0.400	15.54	30
2462	11	6.5 Mbps	14.26	0.221	14.48	30
		13 Mbps	14.22	0.221	14.44	30
		19.5 Mbps	14.23	0.218	14.45	30
		26 Mbps	14.27	0.193	14.46	30
		39 Mbps	14.21	0.276	14.49	30
		52 Mbps	14.16	0.353	14.51	30
		58.5 Mbps	14.12	0.387	14.51	30
		65 Mbps	14.13	0.400	14.53	30

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	17.61	30
		13 Mbps	17.48	30
		19.5 Mbps	17.49	30
		26 Mbps	17.49	30
		39 Mbps	17.50	30
		52 Mbps	17.55	30
		58.5 Mbps	17.64	30
		65 Mbps	17.57	30
2437	6	6.5 Mbps	18.53	30
		13 Mbps	18.55	30
		19.5 Mbps	18.54	30
		26 Mbps	18.58	30
		39 Mbps	18.55	30
		52 Mbps	18.63	30
		58.5 Mbps	18.61	30
		65 Mbps	18.65	30
2462	11	6.5 Mbps	17.54	30
		13 Mbps	17.48	30
		19.5 Mbps	17.51	30
		26 Mbps	17.54	30
		39 Mbps	17.55	30
		52 Mbps	17.61	30
		58.5 Mbps	17.58	30
		65 Mbps	17.63	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	12.95	0.226	13.18	30
		9	12.93	0.231	13.17	30
		12	12.93	0.224	13.16	30
		18	12.98	0.205	13.19	30
		24	12.95	0.224	13.17	30
		36	12.84	0.267	13.11	30
		48	12.92	0.349	13.27	30
		54	12.81	0.369	13.18	30
5785	157	6	13.06	0.226	13.28	30
		9	12.98	0.231	13.21	30
		12	13.00	0.224	13.22	30
		18	13.07	0.205	13.28	30
		24	13.06	0.224	13.29	30
		36	13.00	0.267	13.27	30
		48	13.01	0.349	13.36	30
		54	12.85	0.369	13.22	30
5825	165	6	13.28	0.226	13.50	30
		9	13.22	0.231	13.45	30
		12	13.13	0.224	13.35	30
		18	13.12	0.205	13.32	30
		24	13.10	0.224	13.33	30
		36	13.01	0.267	13.28	30
		48	13.06	0.349	13.41	30
		54	12.93	0.369	13.29	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	13.33	0.226	13.55	30
		9	13.33	0.231	13.56	30
		12	13.36	0.224	13.59	30
		18	13.36	0.205	13.57	30
		24	13.16	0.224	13.38	30
		36	13.17	0.267	13.44	30
		48	13.29	0.349	13.64	30
		54	13.21	0.369	13.58	30
5785	157	6	13.43	0.226	13.66	30
		9	13.44	0.231	13.67	30
		12	13.39	0.224	13.61	30
		18	13.43	0.205	13.64	30
		24	13.39	0.224	13.62	30
		36	13.29	0.267	13.56	30
		48	13.27	0.349	13.62	30
		54	13.28	0.369	13.65	30
5825	165	6	13.42	0.226	13.65	30
		9	13.32	0.231	13.55	30
		12	13.30	0.224	13.52	30
		18	13.37	0.205	13.58	30
		24	13.36	0.224	13.58	30
		36	13.20	0.267	13.46	30
		48	13.31	0.349	13.66	30
		54	13.15	0.369	13.52	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6	16.38	29.727
		9	16.38	29.727
		12	16.39	29.727
		18	16.39	29.727
		24	16.29	29.727
		36	16.28	29.727
		48	16.47	29.727
		54	16.39	29.727
5785	157	6	16.49	29.727
		9	16.46	29.727
		12	16.43	29.727
		18	16.47	29.727
		24	16.47	29.727
		36	16.43	29.727
		48	16.50	29.727
		54	16.45	29.727
5825	165	6	16.59	29.727
		9	16.51	29.727
		12	16.45	29.727
		18	16.46	29.727
		24	16.47	29.727
		36	16.38	29.727
		48	16.54	29.727
		54	16.42	29.727

Note :

1. Limit is 29.727 dBm. Because directional antenna gain is 6.273 dBi for 802.11a.
2. Sample Calculation

$$30 \text{ dBm} - (6.273 \text{ dB} - 6 \text{ dB}) = 29.727 \text{ dBm}$$

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	12.78	0.221	13.00	30
		13	12.81	0.221	13.03	30
		19.5	12.66	0.218	12.87	30
		26	12.72	0.193	12.92	30
		39	12.72	0.276	12.99	30
		52	12.72	0.353	13.07	30
		58.5	12.71	0.387	13.10	30
		65	12.58	0.400	12.98	30
5785	157	6.5	12.82	0.221	13.04	30
		13	12.93	0.221	13.15	30
		19.5	12.70	0.218	12.92	30
		26	12.68	0.193	12.87	30
		39	12.63	0.276	12.91	30
		52	12.66	0.353	13.01	30
		58.5	12.65	0.387	13.04	30
		65	12.63	0.400	13.03	30
5825	165	6.5	12.87	0.221	13.09	30
		13	12.81	0.221	13.03	30
		19.5	12.80	0.218	13.02	30
		26	12.86	0.193	13.05	30
		39	12.77	0.276	13.04	30
		52	12.65	0.353	13.00	30
		58.5	12.80	0.387	13.18	30
		65	12.68	0.400	13.08	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	13.25	0.221	13.47	30
		13	13.34	0.221	13.56	30
		19.5	13.34	0.218	13.56	30
		26	13.16	0.193	13.35	30
		39	13.27	0.276	13.55	30
		52	13.23	0.353	13.58	30
		58.5	13.21	0.387	13.60	30
		65	12.99	0.400	13.39	30
5785	157	6.5	13.28	0.221	13.50	30
		13	13.36	0.221	13.58	30
		19.5	13.33	0.218	13.55	30
		26	13.36	0.193	13.56	30
		39	13.34	0.276	13.61	30
		52	13.28	0.353	13.64	30
		58.5	13.26	0.387	13.65	30
		65	13.09	0.400	13.49	30
5825	165	6.5	13.38	0.221	13.60	30
		13	13.39	0.221	13.62	30
		19.5	13.41	0.218	13.63	30
		26	13.44	0.193	13.63	30
		39	13.37	0.276	13.65	30
		52	13.33	0.353	13.69	30
		58.5	13.17	0.387	13.55	30
		65	13.09	0.400	13.49	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 (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	16.25	30
		13	16.31	30
		19.5	16.24	30
		26	16.15	30
		39	16.29	30
		52	16.34	30
		58.5	16.36	30
		65	16.20	30
5785	157	6.5	16.29	30
		13	16.38	30
		19.5	16.25	30
		26	16.24	30
		39	16.28	30
		52	16.34	30
		58.5	16.37	30
		65	16.28	30
5825	165	6.5	16.36	30
		13	16.34	30
		19.5	16.34	30
		26	16.36	30
		39	16.37	30
		52	16.37	30
		58.5	16.38	30
		65	16.30	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11n Mode: 5755~5795) _40 MHz BW

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	12.38	0.434	12.81	30
		27	12.35	0.413	12.77	30
		40.5	12.38	0.403	12.78	30
		54	12.48	0.348	12.82	30
		81	12.34	0.504	12.84	30
		108	12.32	0.616	12.93	30
		121.5	12.16	0.634	12.80	30
		135	12.17	0.723	12.90	30
5795	159	13.5	12.56	0.434	13.00	30
		27	12.38	0.413	12.79	30
		40.5	12.56	0.403	12.97	30
		54	12.46	0.348	12.81	30
		81	12.51	0.504	13.01	30
		108	12.48	0.616	13.09	30
		121.5	12.45	0.634	13.08	30
		135	12.39	0.723	13.12	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11n Mode: 5755~5795) _40 MHz BW

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	12.74	0.434	13.17	30
		27	12.62	0.413	13.03	30
		40.5	12.59	0.403	13.00	30
		54	12.83	0.348	13.17	30
		81	12.70	0.504	13.20	30
		108	12.51	0.616	13.12	30
		121.5	12.55	0.634	13.18	30
		135	12.60	0.723	13.33	30
5795	159	13.5	12.62	0.434	13.05	30
		27	12.66	0.413	13.08	30
		40.5	12.41	0.403	12.81	30
		54	12.47	0.348	12.82	30
		81	12.37	0.504	12.87	30
		108	12.54	0.616	13.15	30
		121.5	12.35	0.634	12.98	30
		135	12.37	0.723	13.09	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n Mode: 5755~5795) _40 MHz BW

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	16.01	30
		27	15.91	30
		40.5	15.90	30
		54	16.01	30
		81	16.04	30
		108	16.04	30
		121.5	16.00	30
		135	16.13	30
5795	159	13.5	16.03	30
		27	15.95	30
		40.5	15.90	30
		54	15.82	30
		81	15.95	30
		108	16.13	30
		121.5	16.04	30
		135	16.12	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11ac Mode: 5745~5825) _20 MHz BW

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	13.02	0.067	13.09	30
		13	12.87	0.131	13.00	30
		19.5	13.01	0.178	13.18	30
		26	12.80	0.232	13.03	30
		39	12.73	0.317	13.04	30
		52	12.76	0.421	13.18	30
		58.5	12.63	0.459	13.09	30
		65	12.65	0.497	13.15	30
		78	12.56	0.594	13.15	30
5785	157	6.5	12.20	0.067	12.27	30
		13	12.17	0.131	12.30	30
		19.5	12.17	0.178	12.35	30
		26	12.16	0.232	12.40	30
		39	12.01	0.317	12.32	30
		52	11.95	0.421	12.37	30
		58.5	11.93	0.459	12.39	30
		65	11.93	0.497	12.43	30
		78	11.74	0.594	12.34	30
5825	165	6.5	11.89	0.067	11.96	30
		13	11.83	0.131	11.96	30
		19.5	11.80	0.178	11.98	30
		26	11.80	0.232	12.03	30
		39	11.66	0.317	11.98	30
		52	11.64	0.421	12.06	30
		58.5	11.65	0.459	12.11	30
		65	11.63	0.497	12.13	30
		78	11.52	0.594	12.12	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5745~5825) _20 MHz BW

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	13.41	0.067	13.48	30
		13	13.22	0.131	13.35	30
		19.5	13.26	0.178	13.44	30
		26	13.32	0.232	13.55	30
		39	13.07	0.317	13.39	30
		52	13.22	0.421	13.64	30
		58.5	12.97	0.459	13.42	30
		65	12.95	0.497	13.45	30
		78	12.97	0.594	13.56	30
5785	157	6.5	12.44	0.067	12.50	30
		13	12.41	0.131	12.54	30
		19.5	12.30	0.178	12.48	30
		26	12.24	0.232	12.47	30
		39	12.31	0.317	12.63	30
		52	12.04	0.421	12.46	30
		58.5	12.20	0.459	12.66	30
		65	12.15	0.497	12.65	30
		78	12.11	0.594	12.70	30
5825	165	6.5	11.87	0.067	11.94	30
		13	11.85	0.131	11.98	30
		19.5	11.81	0.178	11.99	30
		26	11.78	0.232	12.01	30
		39	11.67	0.317	11.98	30
		52	11.77	0.421	12.19	30
		58.5	11.71	0.459	12.17	30
		65	11.63	0.497	12.13	30
		78	11.52	0.594	12.11	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5745~5825) _20 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5	16.30	30
		13	16.19	30
		19.5	16.32	30
		26	16.31	30
		39	16.23	30
		52	16.43	30
		58.5	16.27	30
		65	16.31	30
		78	16.37	30
5785	157	6.5	15.40	30
		13	15.43	30
		19.5	15.42	30
		26	15.44	30
		39	15.49	30
		52	15.42	30
		58.5	15.54	30
		65	15.55	30
		78	15.53	30
5825	165	6.5	14.96	30
		13	14.98	30
		19.5	15.00	30
		26	15.03	30
		39	14.99	30
		52	15.13	30
		58.5	15.15	30
		65	15.14	30
		78	15.12	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11ac Mode: 5755~5795) _40 MHz BW

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	12.40	0.140	12.54	30
		27	12.24	0.257	12.50	30
		40.5	12.29	0.353	12.65	30
		54	12.25	0.433	12.69	30
		81	12.14	0.594	12.74	30
		108	12.04	0.693	12.74	30
		121.5	12.00	0.777	12.78	30
		135	11.94	0.841	12.78	30
		162	11.86	0.946	12.80	30
		180	11.80	0.977	12.77	30
5795	159	13.5	7.41	0.140	7.55	30
		27	7.58	0.257	7.84	30
		40.5	7.47	0.353	7.82	30
		54	7.12	0.433	7.55	30
		81	7.21	0.594	7.80	30
		108	7.21	0.693	7.90	30
		121.5	6.99	0.777	7.77	30
		135	6.86	0.841	7.70	30
		162	6.91	0.946	7.86	30
		180	6.85	0.977	7.83	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5755~5795) _40 MHz BW

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	12.77	0.140	12.91	30
		27	12.83	0.257	13.09	30
		40.5	12.71	0.353	13.07	30
		54	12.65	0.433	13.08	30
		81	12.57	0.594	13.16	30
		108	12.43	0.693	13.13	30
		121.5	12.44	0.777	13.21	30
		135	12.40	0.841	13.24	30
		162	12.10	0.946	13.04	30
		180	12.28	0.977	13.26	30
5795	159	13.5	7.38	0.140	7.52	30
		27	7.06	0.257	7.32	30
		40.5	7.25	0.353	7.60	30
		54	7.15	0.433	7.58	30
		81	7.04	0.594	7.63	30
		108	6.97	0.693	7.66	30
		121.5	6.90	0.777	7.68	30
		135	6.87	0.841	7.72	30
		162	6.72	0.946	7.67	30
		180	6.77	0.977	7.74	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5755~5795) _40 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5755	151	13.5	15.74	30
		27	15.81	30
		40.5	15.87	30
		54	15.90	30
		81	15.96	30
		108	15.95	30
		121.5	16.01	30
		135	16.03	30
		162	15.94	30
		180	16.03	30
5795	159	13.5	10.54	30
		27	10.60	30
		40.5	10.72	30
		54	10.58	30
		81	10.73	30
		108	10.79	30
		121.5	10.73	30
		135	10.72	30
		162	10.77	30
		180	10.80	30

TEST RESULTS _Ant.0

Conducted Output Power Measurements (802.11ac Mode: 5775) _80 MHz BW

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	7.61	2.222	9.83	30
		58.5	7.35	2.287	9.64	30
		87.8	7.51	2.286	9.80	30
		117	7.59	2.324	9.91	30
		175.5	7.42	2.408	9.83	30
		234	7.38	2.502	9.88	30
		263.3	8.51	1.212	9.72	30
		292.5	8.48	1.210	9.69	30
		351	8.49	1.320	9.81	30
		390	8.44	1.383	9.82	30

TEST RESULTS _Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5775) _80 MHz BW

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	7.20	2.222	9.42	30
		58.5	7.30	2.287	9.59	30
		87.8	7.34	2.286	9.62	30
		117	7.31	2.324	9.63	30
		175.5	7.18	2.408	9.59	30
		234	7.18	2.502	9.68	30
		263.3	8.43	1.212	9.64	30
		292.5	8.39	1.210	9.60	30
		351	8.26	1.320	9.58	30
		390	8.19	1.383	9.57	30

TEST RESULTS _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11ac Mode: 5775) _80 MHz BW

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5775	155	29.3	12.64	30
		58.5	12.62	30
		87.8	12.72	30
		117	12.79	30
		175.5	12.72	30
		234	12.79	30
		263.3	12.69	30
		292.5	12.65	30
		351	12.71	30
		390	12.71	30

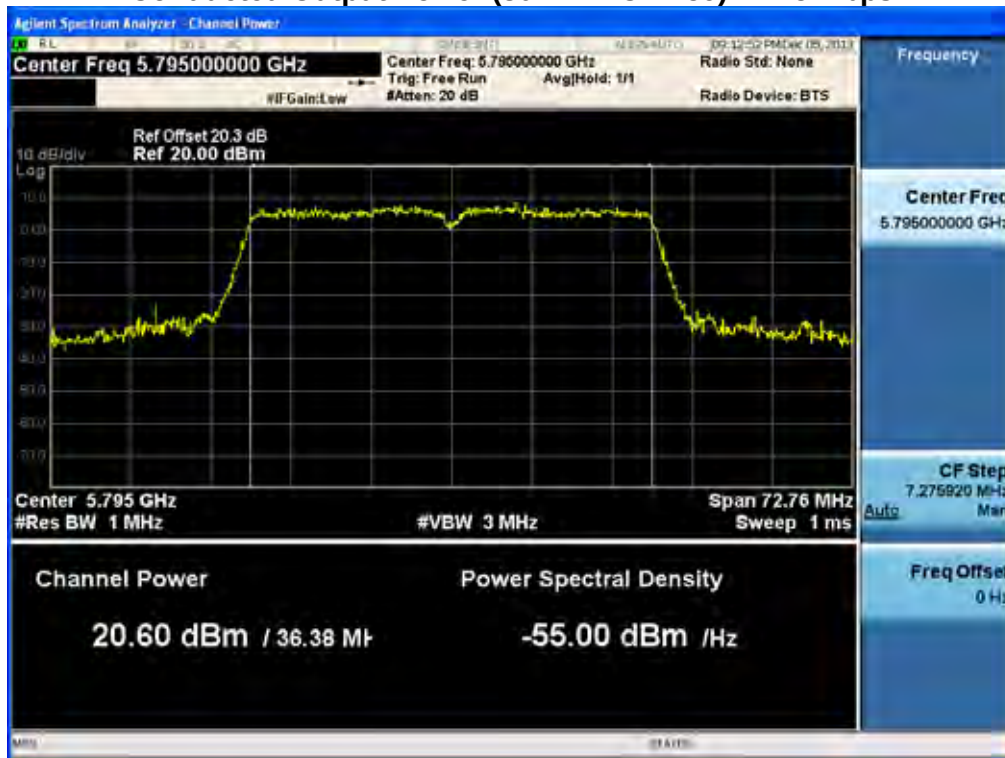
Ant.0

RESULT PLOTS-Peak

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



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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80 MHz BW

(5755 MHz)

Conducted Output Power (802.11ac-CH 155) 351 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

RESULT PLOTS-Average

40 MHz BW

(5755 MHz ~5795 MHz)

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



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

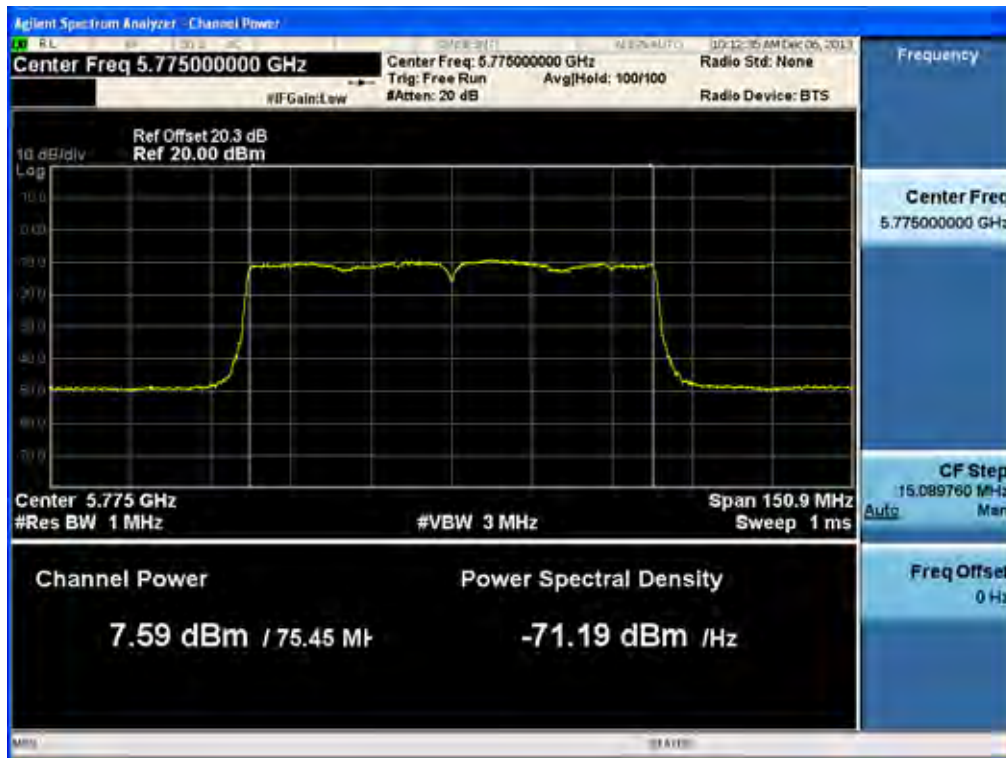


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

80 MHz BW

(5755 MHz)

Conducted Output Power (802.11ac-CH 155) 117 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Ant.1

RESULT PLOTS-Peak

40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 151) 54 Mbps



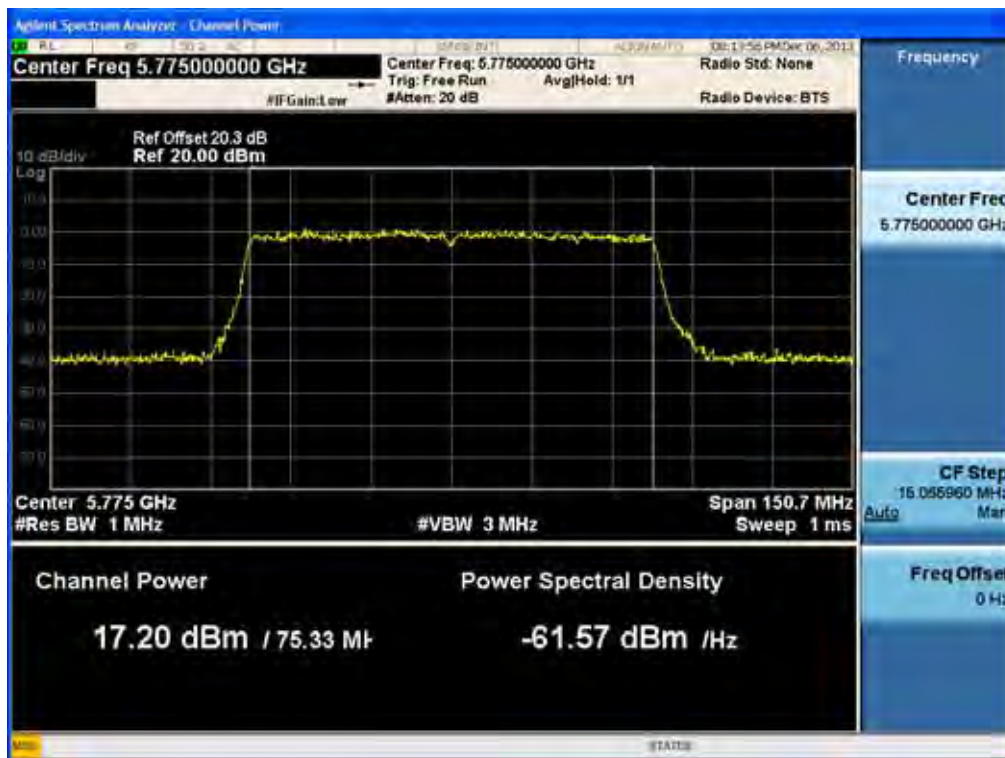
Conducted Output Power (802.11ac-CH 151) 121.5 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

80 MHz BW
(5755 MHz)

Conducted Output Power (802.11ac-CH 155) 263.3 Mbps



RESULT PLOTS-Average

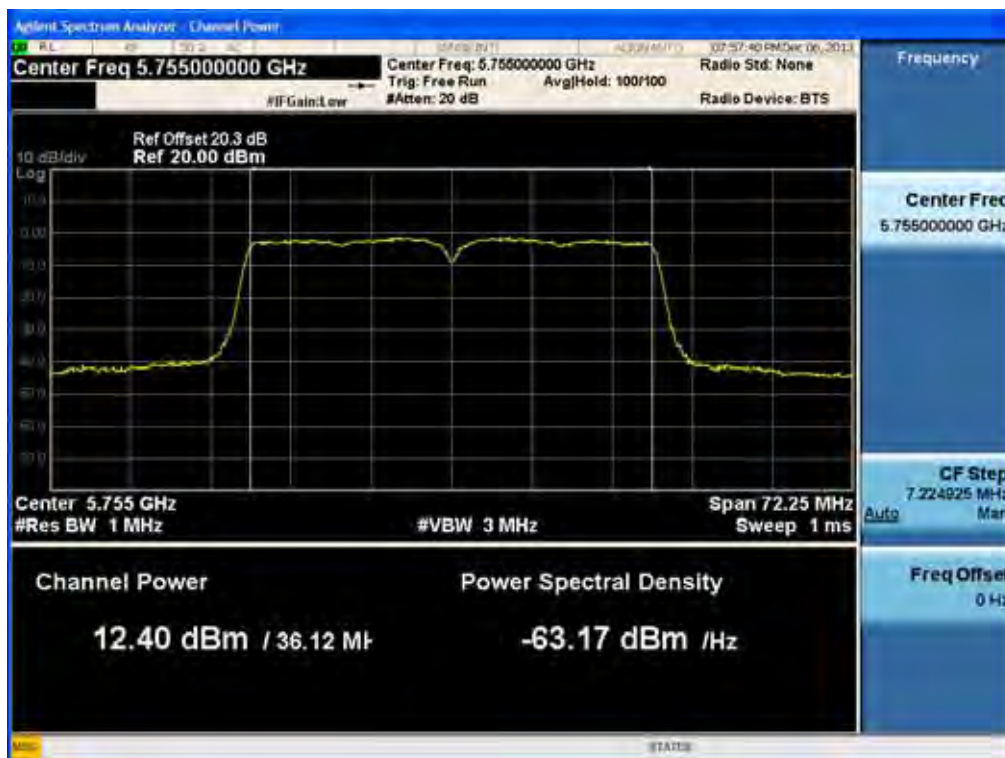
40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 151) 135 Mbps



Conducted Output Power (802.11ac-CH 151) 135 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

80 MHz BW

(5755 MHz)

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



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

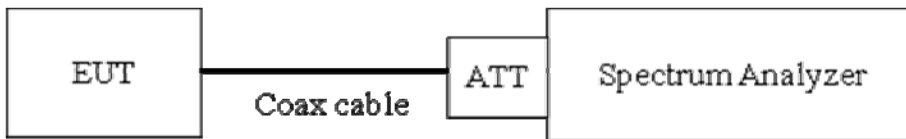
8.5 POWER SPECTRAL DENSITY (802.11a/b/g/n/ac)

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.

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 × 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

$$\begin{aligned} \text{PSD} &= \text{Reading Value} + \text{ATT loss} + \text{Cable loss}(1 \text{ ea}) \\ &= -5 \text{ dBm} + 10 \text{ dB} + 0.8 \text{ dB} = 5.8 \text{ dBm} \end{aligned}$$

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. So, 10.2 dB is offset for 2.4 GHz Band and 10.3 dB is offset for 5.8 GHz Band.
Actual value of loss for the attenuator and cable combination is below table.

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Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.21
	2437	10.24
	2462	10.24
5.8 GHz	5745	10.31
	5755	10.30
	5785	10.29
	5795	10.26
	5825	10.28

(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	-12.076	8	Pass
2437	6		-10.810		Pass
2462	11		-9.492		Pass
2412	1	802.11g	-10.133		Pass
2437	6		-9.894		Pass
2462	11		-10.184		Pass
2412	1	802.11n 2.4 GHz Band	-9.777		Pass
2437	6		-9.727		Pass
2462	11		-10.974		Pass
5745	149	802.11a	-13.352		Pass
5785	157		-12.631		Pass
5825	165		-12.366		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-11.265		Pass
5785	157		-12.752		Pass
5825	165		-12.354		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-14.442		Pass
5795	159		-14.378		Pass
5745	149	802.11ac_20 MHz BW 5.8 GHz Band	-12.459		Pass
5785	157		-13.658		Pass
5825	165		-13.718		Pass
5755	151	802.11ac_40 MHz BW 5.8 GHz Band	-14.874		Pass
5795	159		-20.091		Pass
5775	155	802.11ac_80MHz BW 5.8 GHz Band	-20.748		Pass

Note : 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	802.11b	-11.827	8	Pass
2437	6		-10.296		Pass
2462	11		-9.503		Pass
2412	1	802.11g	-10.242		Pass
2437	6		-10.231		Pass
2462	11		-10.429		Pass
2412	1	802.11n 2.4 GHz Band	-10.436		Pass
2437	6		-10.030		Pass
2462	11		-11.090		Pass
5745	149	802.11a	-12.423		Pass
5785	157		-12.019		Pass
5825	165		-11.483		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-11.762		Pass
5785	157		-11.414		Pass
5825	165		-12.680		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-14.446		Pass
5795	159		-14.169		Pass
5745	149	802.11ac_20 MHz BW 5.8 GHz Band	-12.472		Pass
5785	157		-13.455		Pass
5825	165		-13.455		Pass
5755	151	802.11ac_40 MHz BW 5.8 GHz Band	-13.844		Pass
5795	159		-17.208		Pass
5775	155	802.11ac_80MHz BW 5.8 GHz Band	-19.412		Pass

Note : In order to simplify the report, attached plots were only the highest PSD channel.

TEST RESULTS _Sum Data of Ant.0 and Ant.1

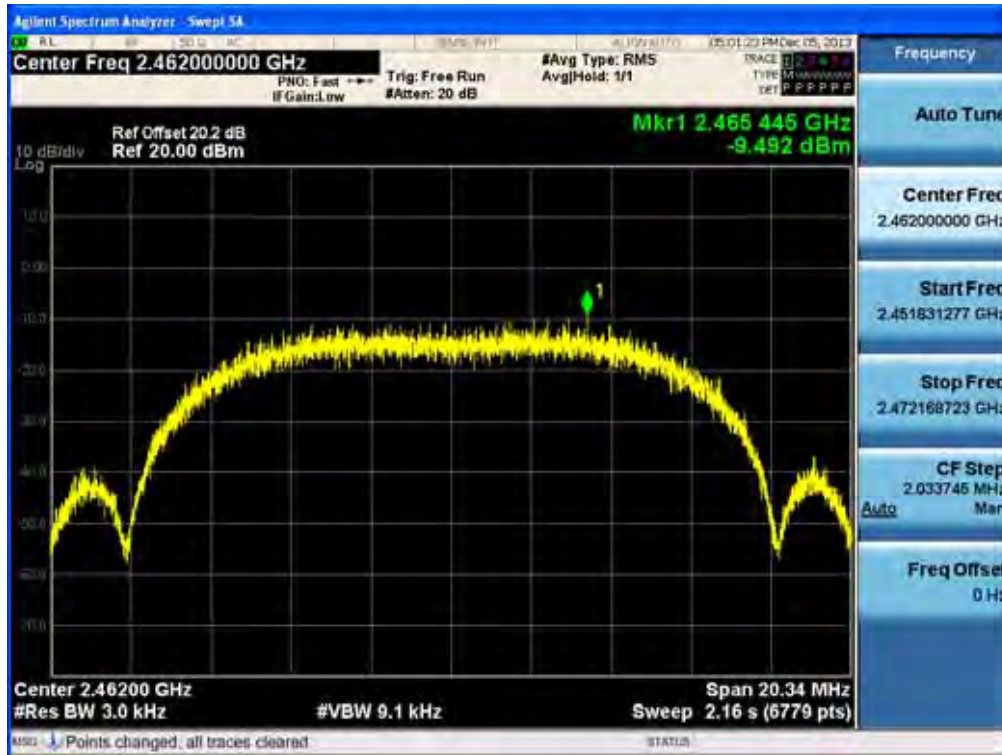
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-8.94	8	Pass
2437	6		-7.54		Pass
2462	11		-6.49		Pass
2412	1	802.11g	-7.18		Pass
2437	6		-7.05		Pass
2462	11		-7.29		Pass
2412	1	802.11n(20M) 2.4 GHz Band	-7.08		Pass
2437	6		-6.87		Pass
2462	11		-8.02		Pass
5745	149	802.11a	-9.85	7.727	Pass
5785	157		-9.30		Pass
5825	165		-8.89		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-8.50	8	Pass
5785	157		-9.02		Pass
5825	165		-9.50		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-11.43		Pass
5795	159		-11.26		Pass
5745	149	802.11ac_20 MHz BW 5.8 GHz Band	-9.46		Pass
5785	157		-10.55		Pass
5825	165		-10.57		Pass
5755	151	802.11ac_40 MHz BW 5.8 GHz Band	-11.32		Pass
5795	159		-15.40		Pass
5775	155	802.11ac_80MHz BW 5.8 GHz Band	-17.02		Pass

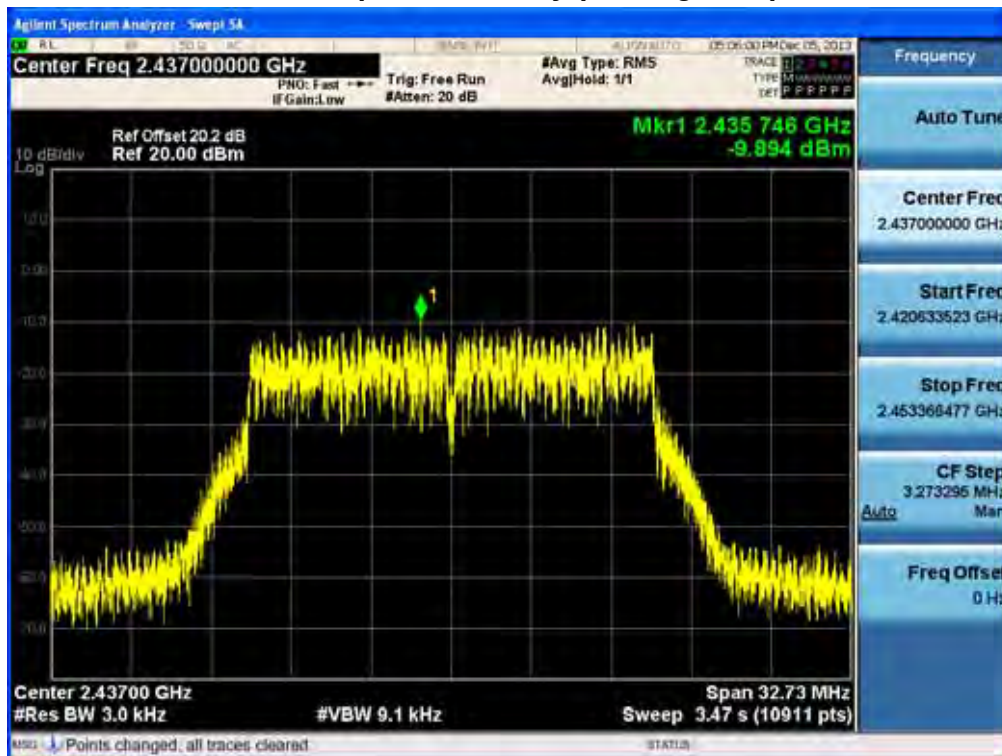
RESULT PLOTS_Ant.0

2.4 GHz Band

Power Spectral Density (802.11b-CH 11)

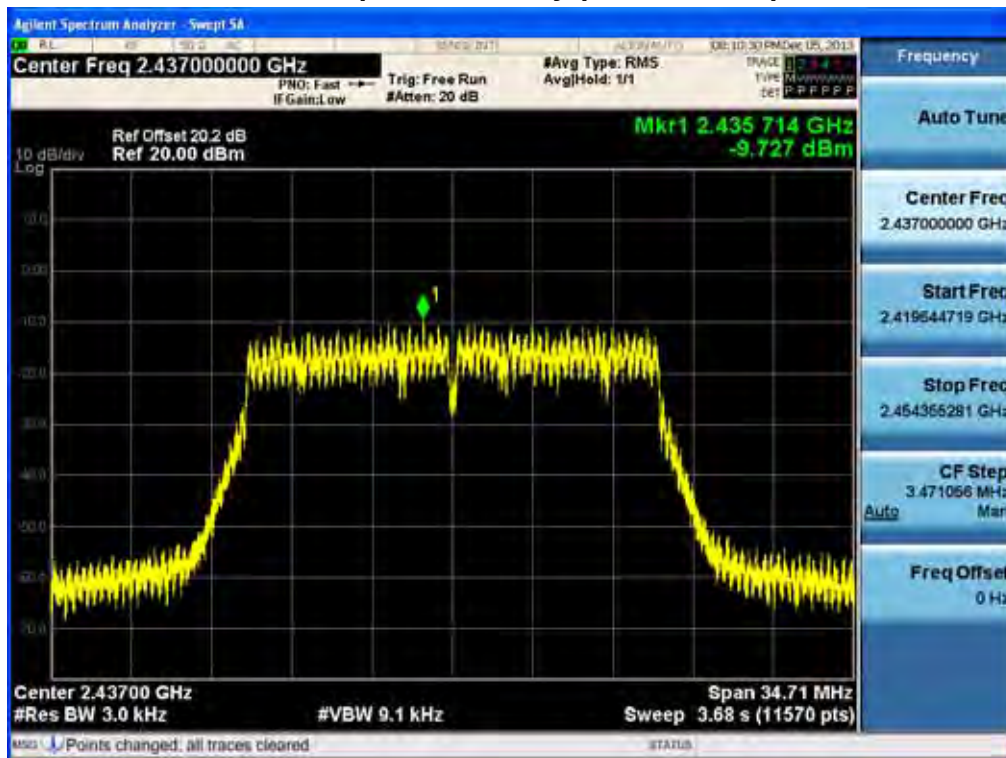


Power Spectral Density (802.11g-CH 6)



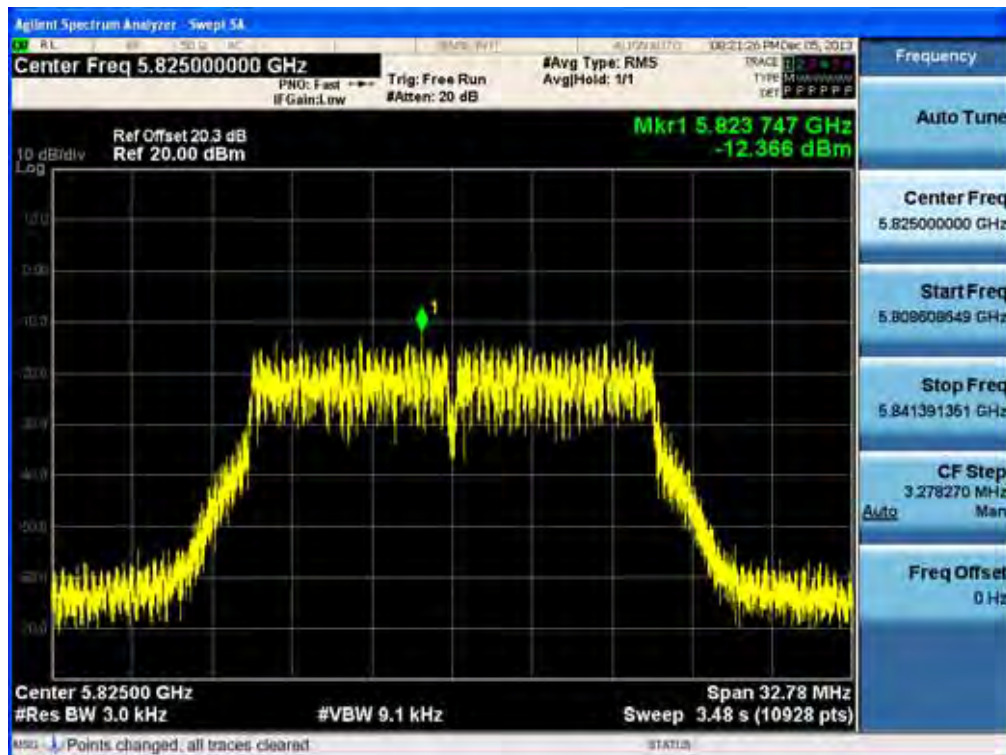
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11n-CH 6)



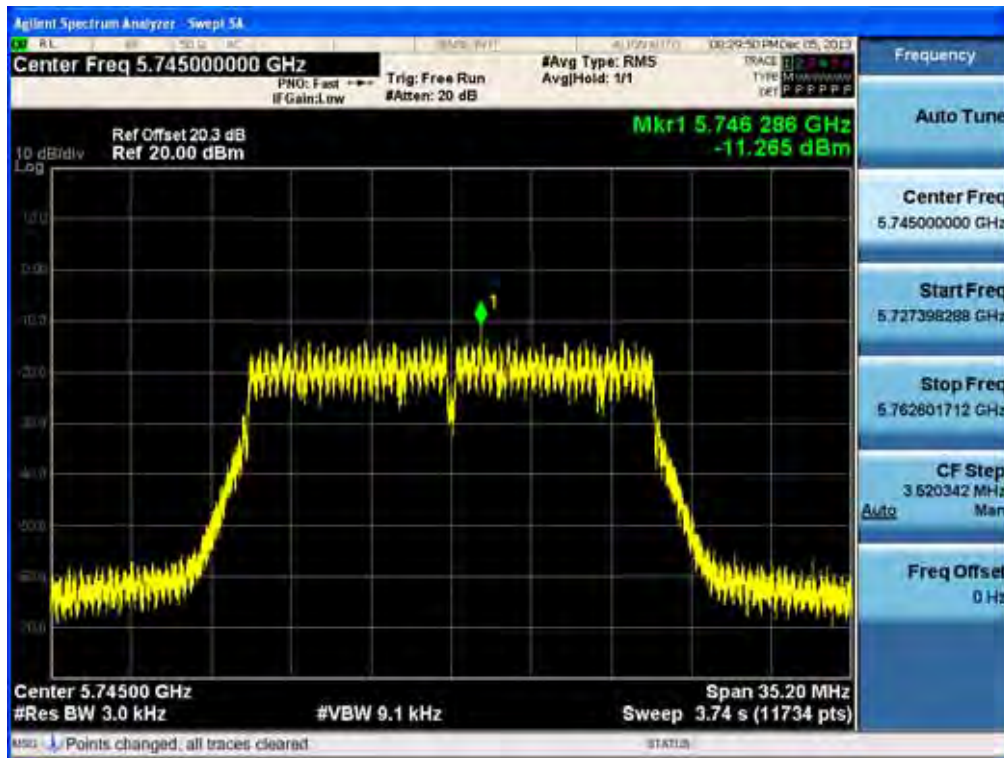
5.8 GHz Band

Power Spectral Density (802.11a-CH1165)

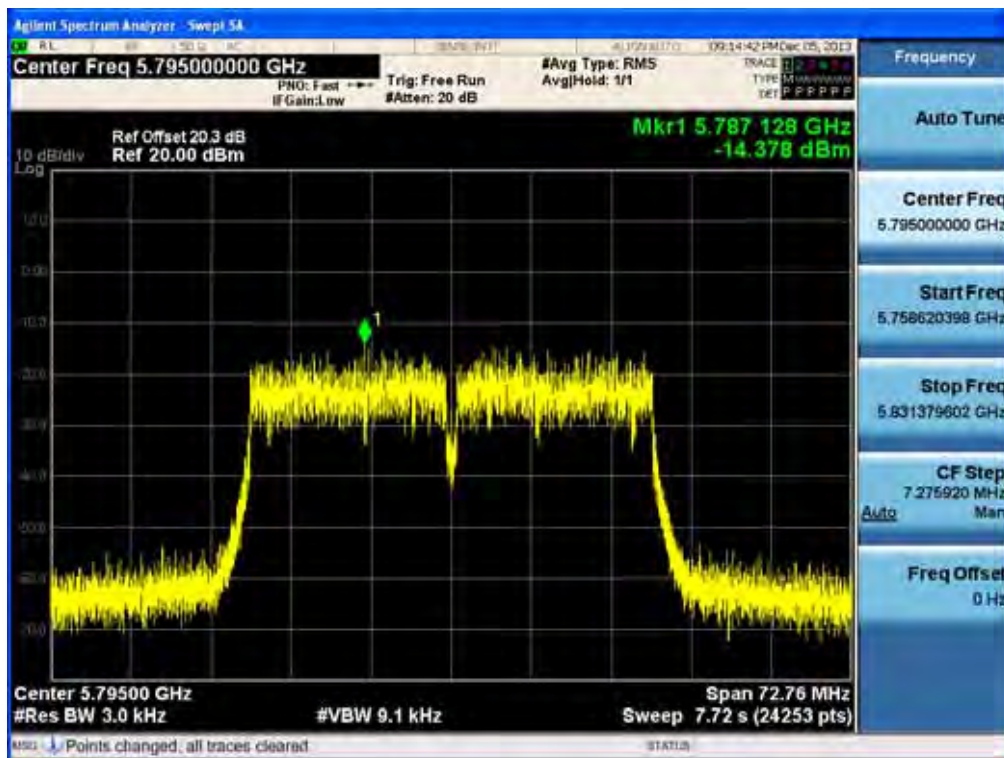


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11n-CH 149) _20 MHz BW

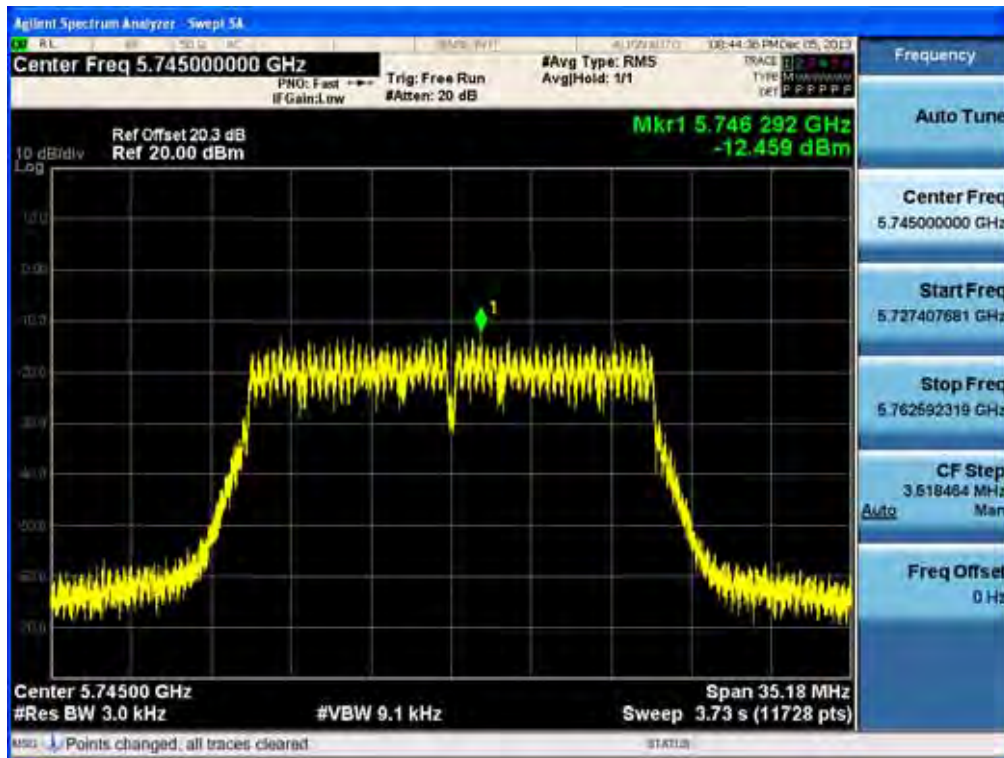


Power Spectral Density (802.11n-CH 159)_40 MHz BW

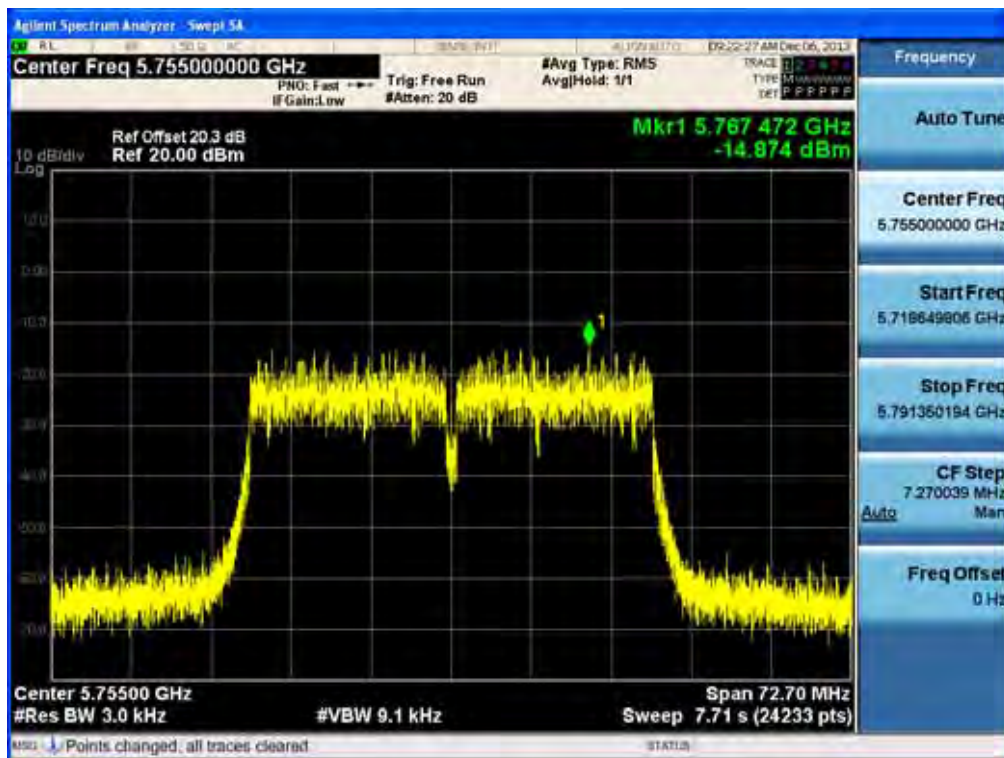


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11ac-CH 149) _20 MHz BW

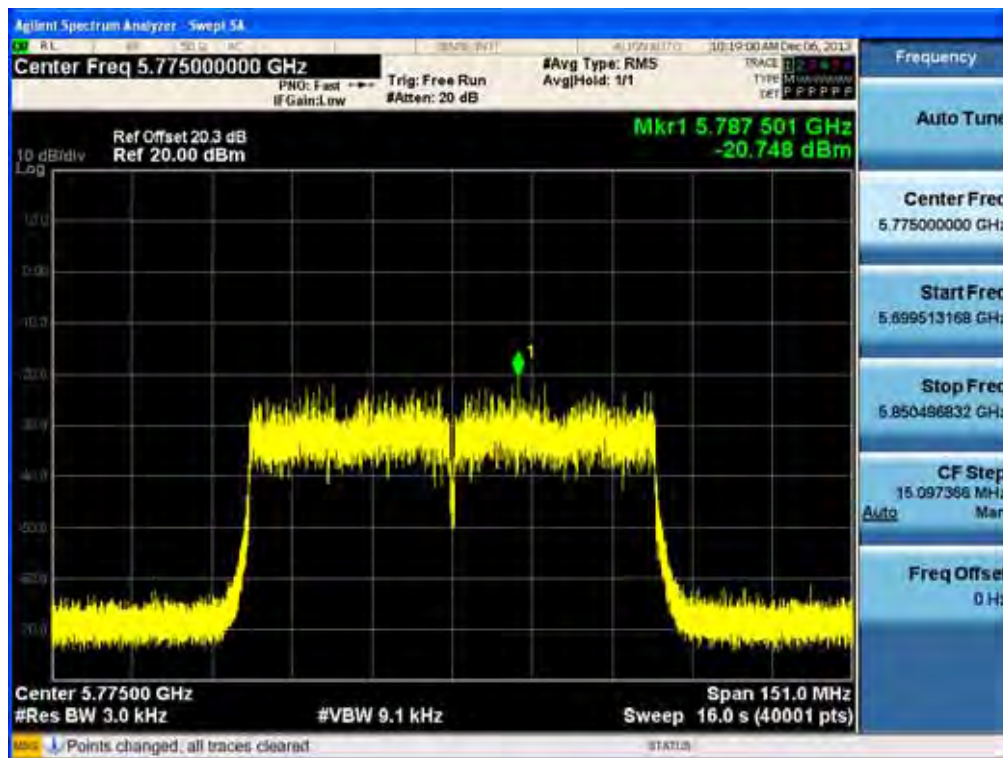


Power Spectral Density (802.11ac-CH 151) _40 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11ac-CH155) _80 MHz BW

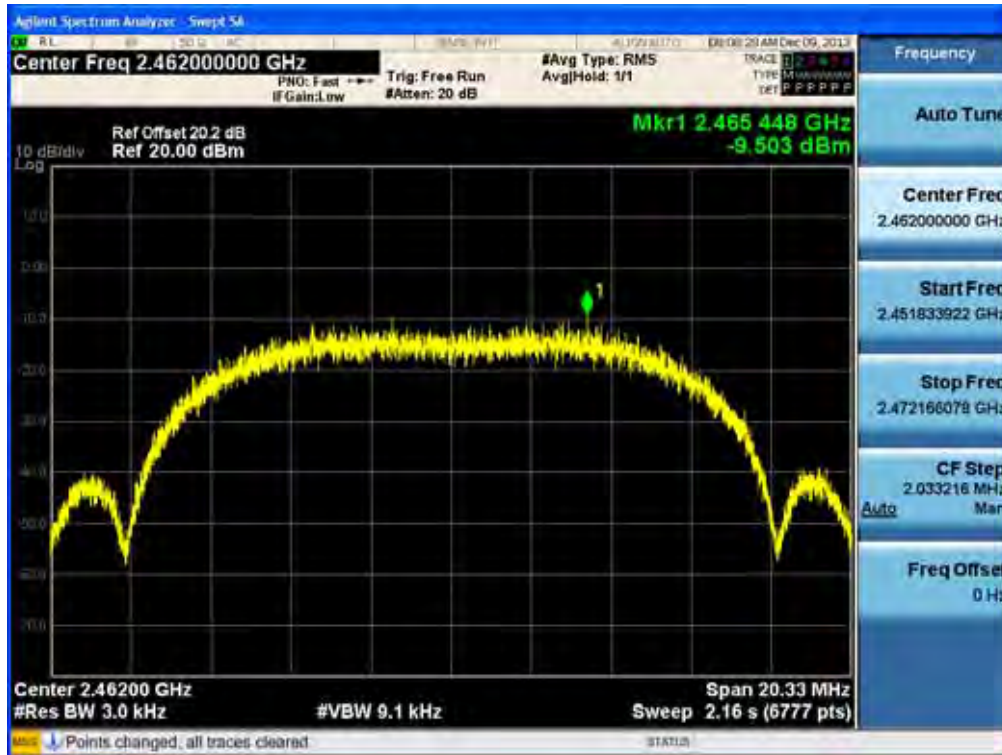


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

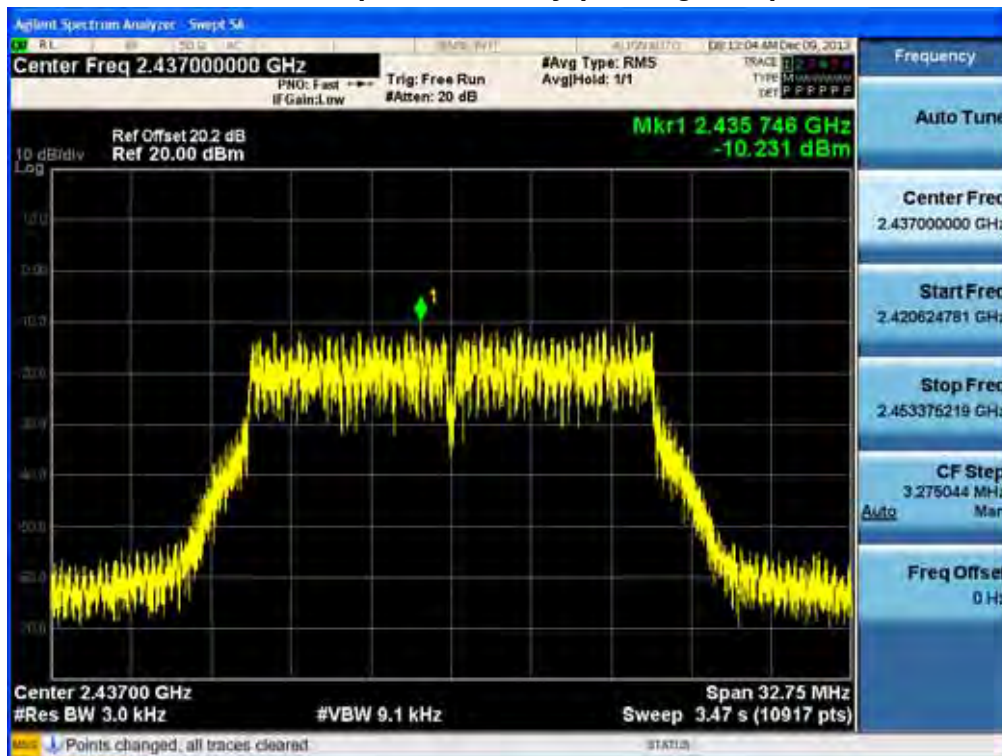
RESULT PLOTS_Ant.1

2.4 GHz Band

Power Spectral Density (802.11b-CH 11)

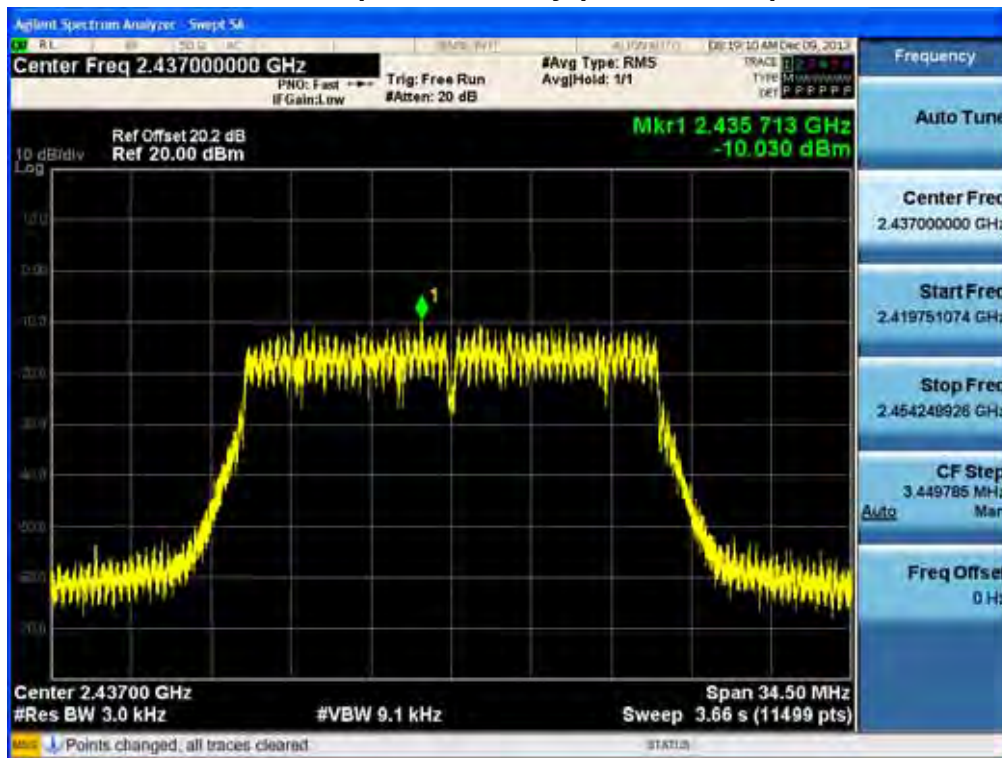


Power Spectral Density (802.11g-CH 6)



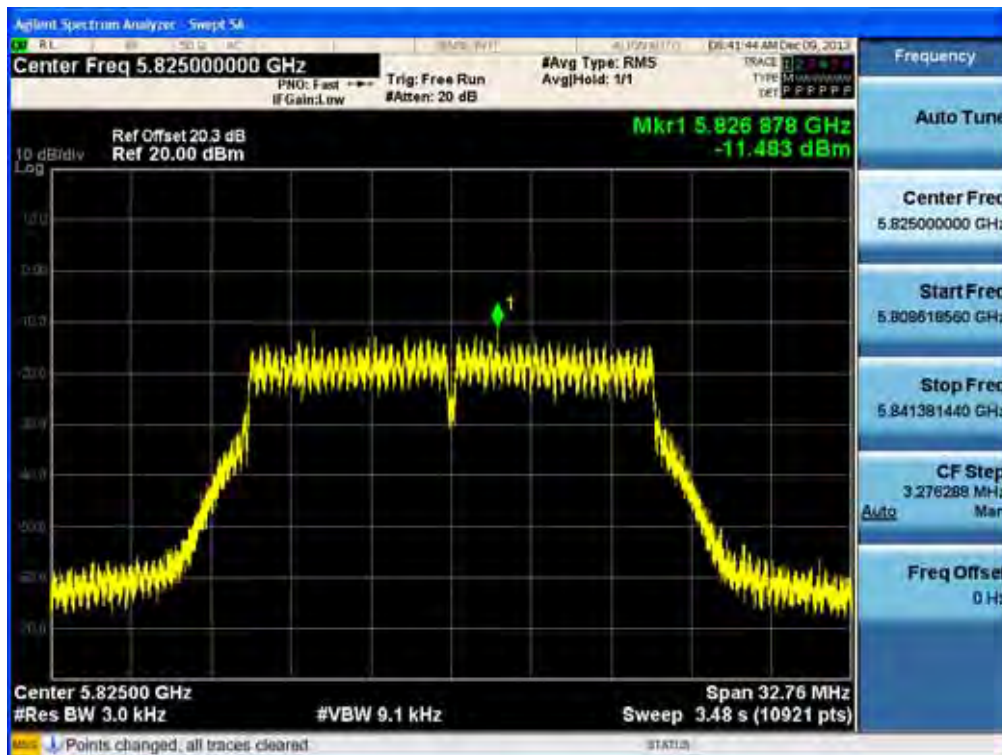
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11n-CH 6)



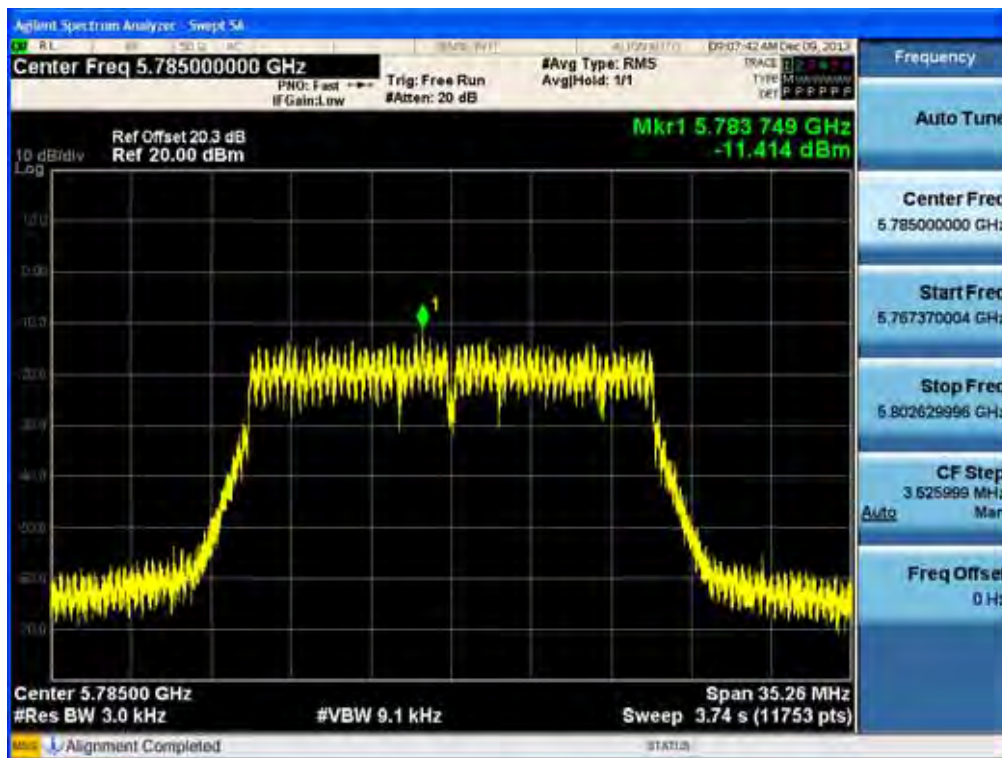
5.8 GHz Band

Power Spectral Density (802.11a-CH165)

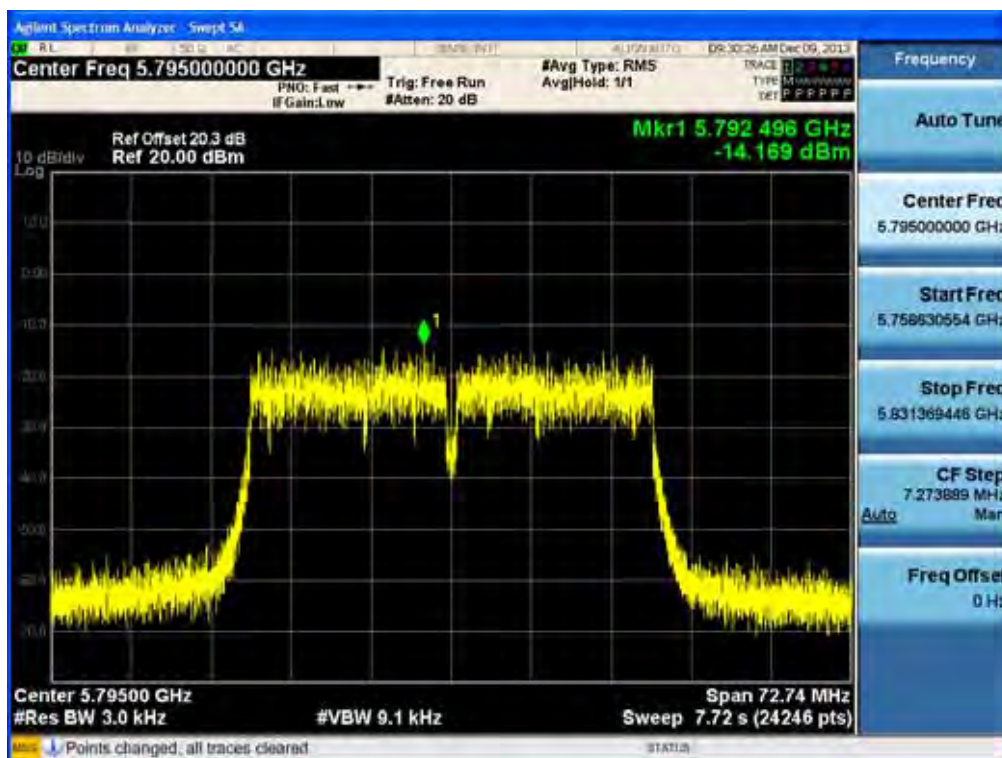


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11n-CH 157) _20 MHz BW

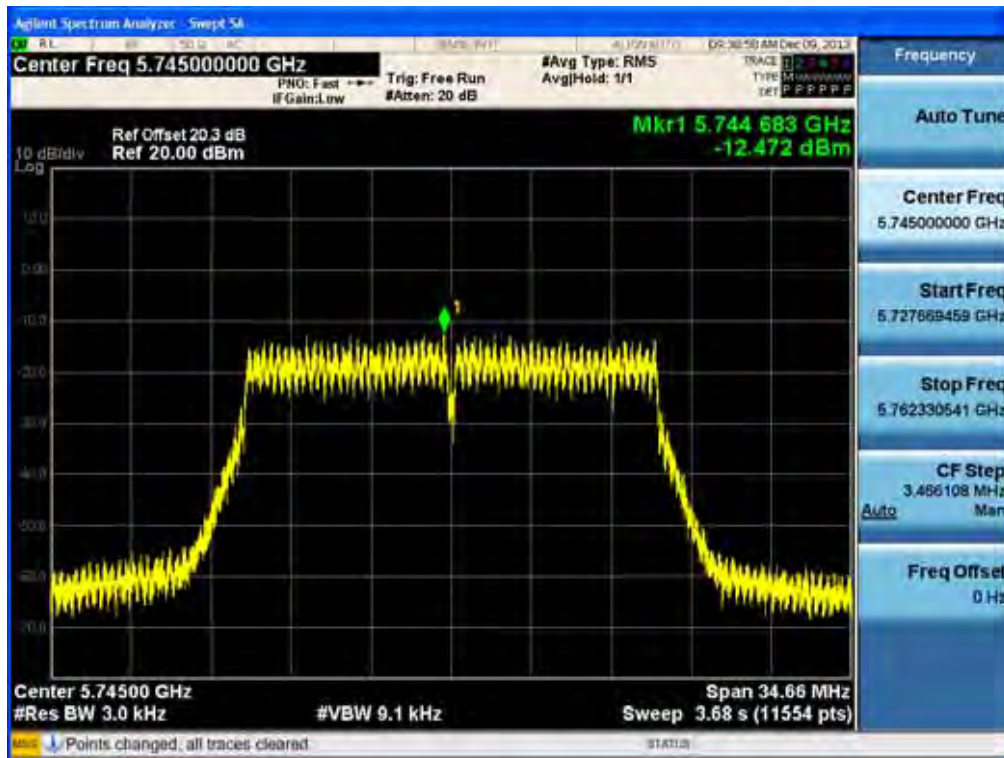


Power Spectral Density (802.11n-CH 159)_40 MHz BW

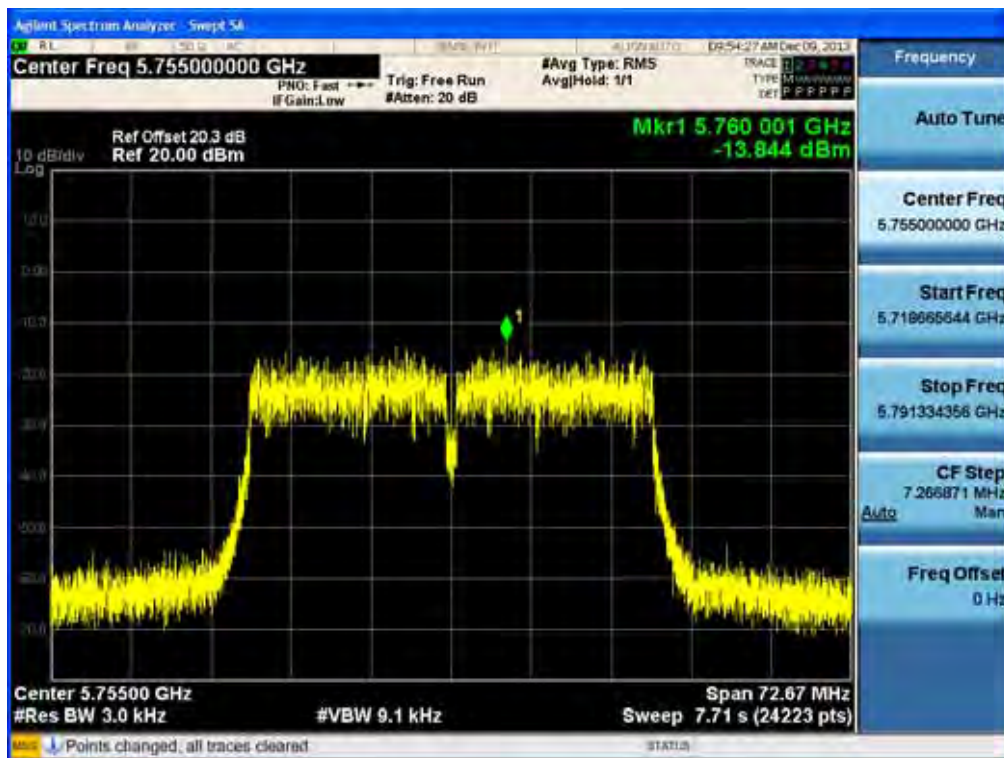


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11ac-CH 149) _20 MHz BW

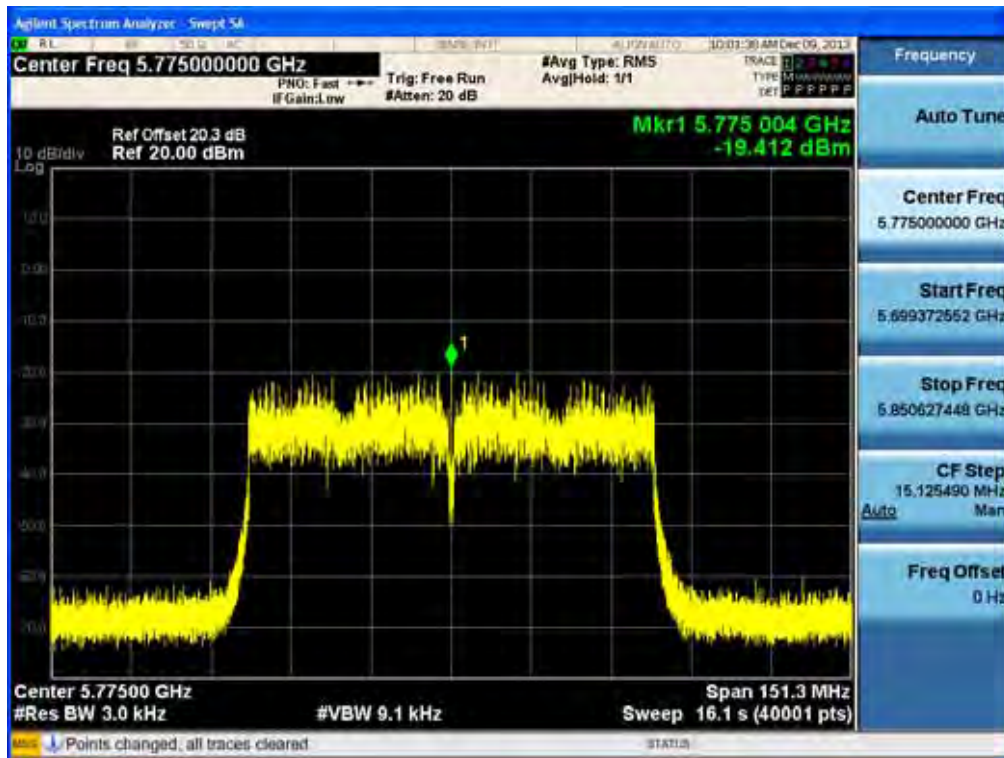


Power Spectral Density (802.11ac-CH 151) _40 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Power Spectral Density (802.11ac-CH155) _80 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

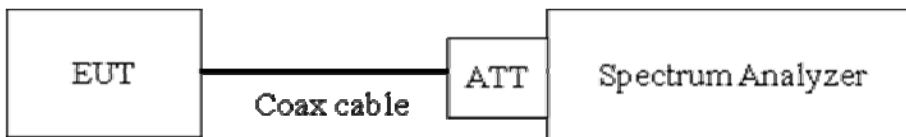
8.6 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

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 $\geq 3 \times$ 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 $\geq$ 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. So,

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10.2 dB is offset for 2.4 GHz Band and 10.3 dB is offset for 5.8 GHz Band.

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

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.21
	2437	10.24
	2462	10.24
5.8 GHz	5745	10.31
	5755	10.30
	5785	10.29
	5795	10.26
	5825	10.28

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

4. In case of conducted spurious emissions test, please check factors blow table.

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

FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	9.95
100	10.01
200	10.03
300	10.04
400	10.05
500	10.04
600	10.03
700	10.09
800	10.10
900	10.08
1000	10.11
2000	10.25
2400*	10.19
2500*	10.26
3000	10.27
4000	10.22
5000	10.48
5700*	10.42
5800*	10.48

6000	10.48
7000	10.57
8000	10.45
9000	10.50
10000	10.64
11000	10.69
12000	10.75
13000	10.92
14000	11.90
15000	11.00
16000	11.03
17000	10.93
18000	10.96
19000	10.85
20000	12.11
21000	11.17
22000	10.99
23000	11.12
24000	11.10
25000	11.42
26000	11.28
27000	10.83
28000	11.03
29000	10.99
30000	12.08
31000	10.99
32000	11.32
33000	11.33
34000	12.62
35000	14.85
36000	14.78
37000	15.73
38000	15.81
39000	13.47
40000	14.89

Note : 1. '*' is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss

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Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

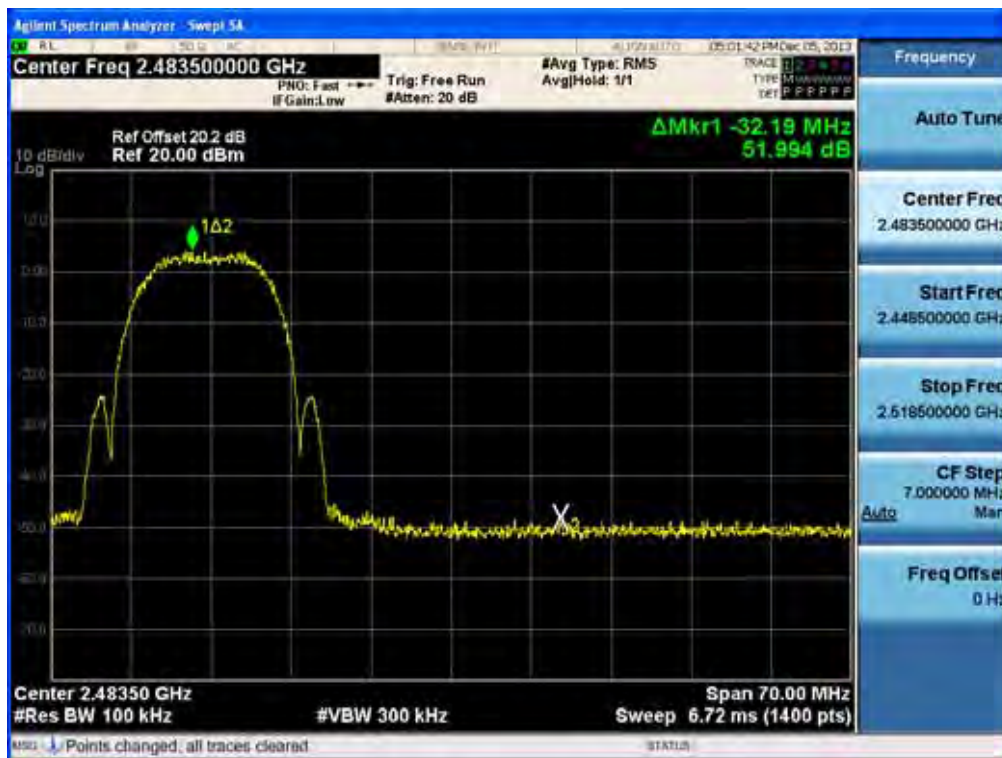
RESULT PLOTS_Ant.0

2.4 GHz Band

BandEdge (802.11b-CH1)

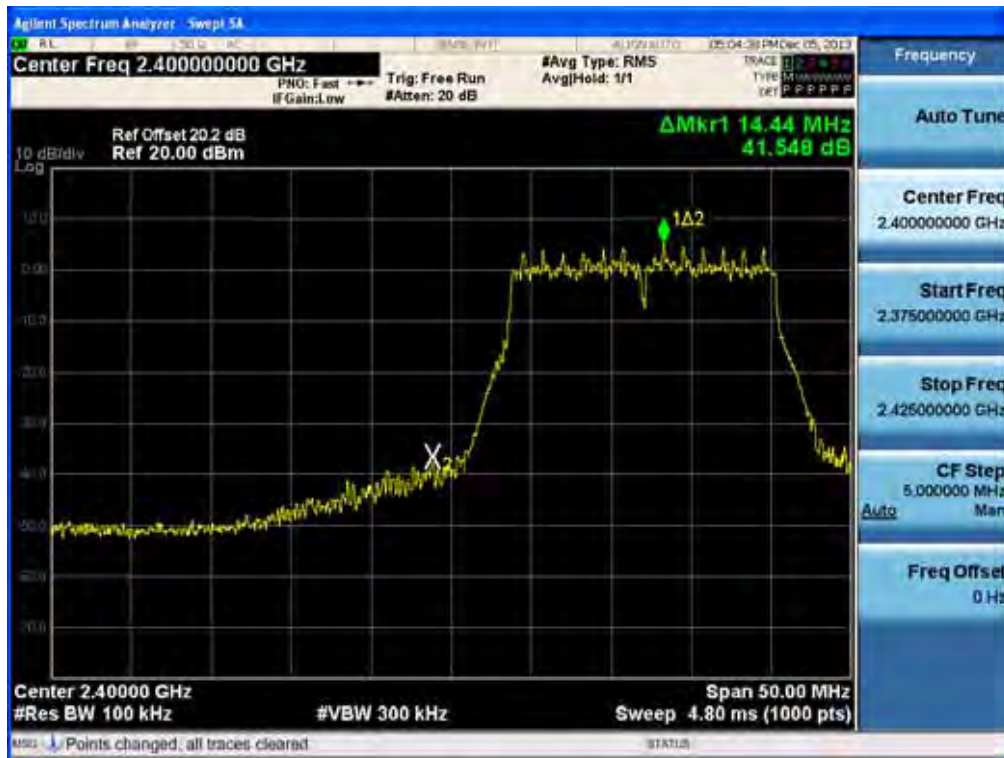


BandEdge (802.11b-CH11)

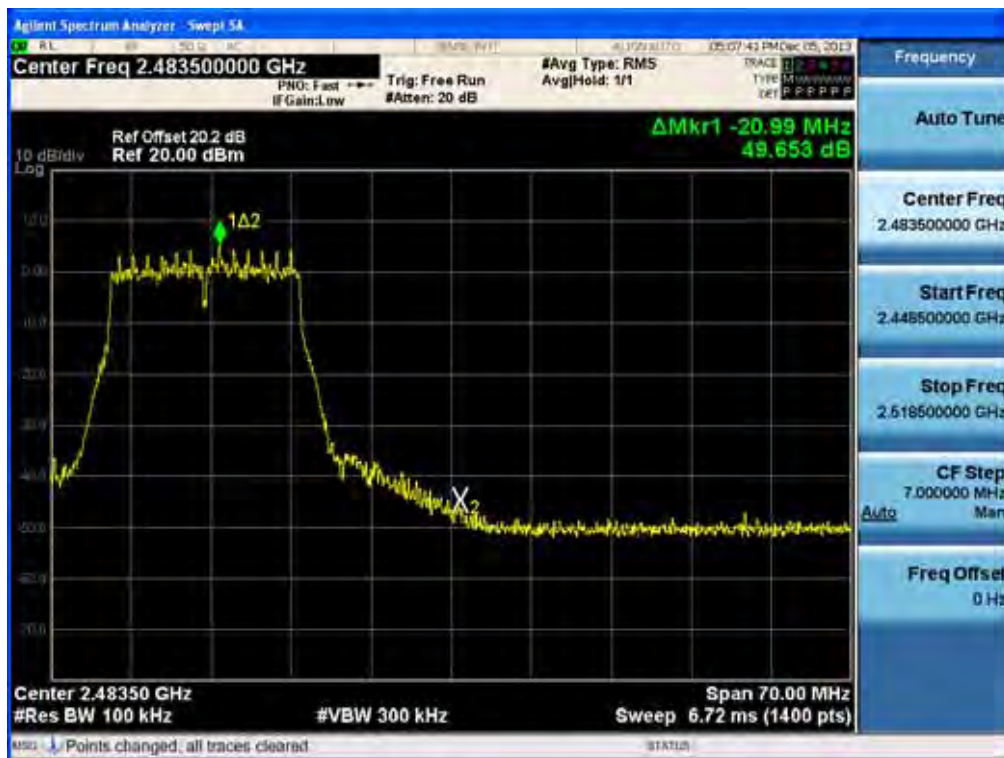


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

BandEdge (802.11g-CH1)



BandEdge (802.11g-CH11)

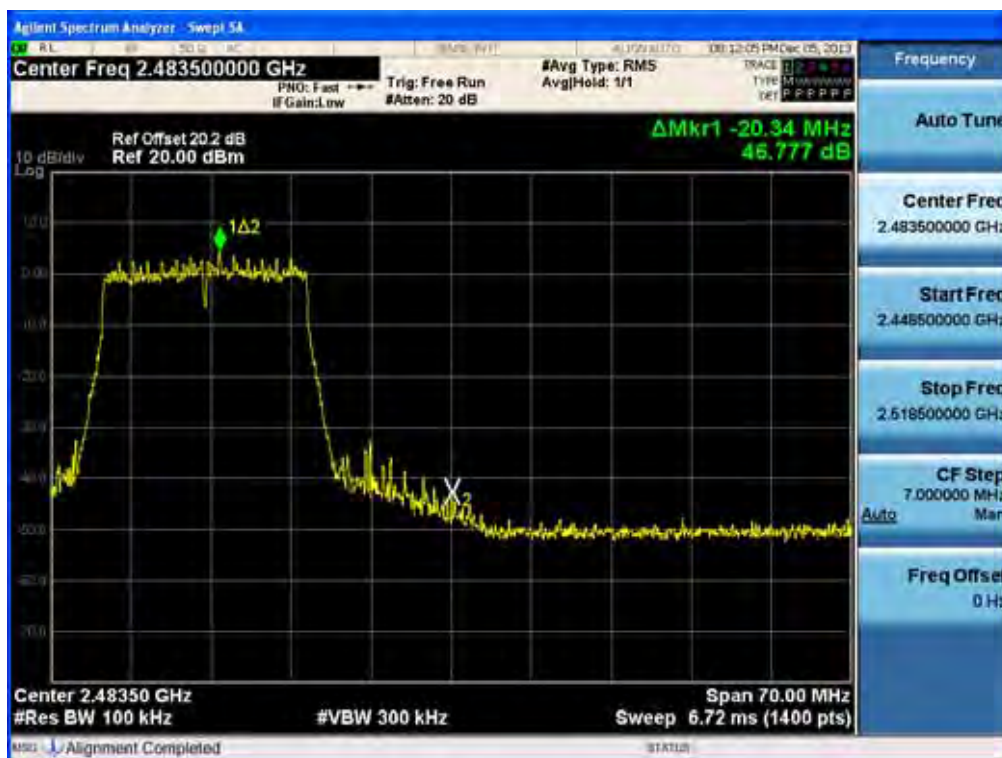


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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BandEdge (802.11n-CH1)



BandEdge (802.11n-CH11)



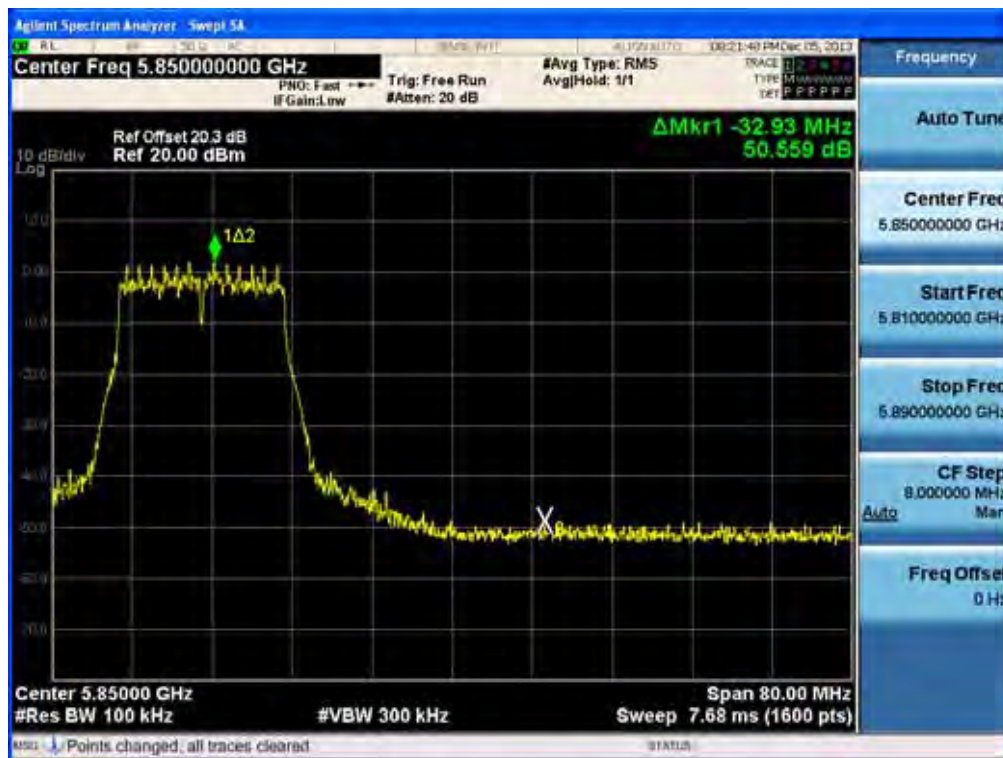
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

5.8 GHz Band

Band Edge (802.11a-CH149)

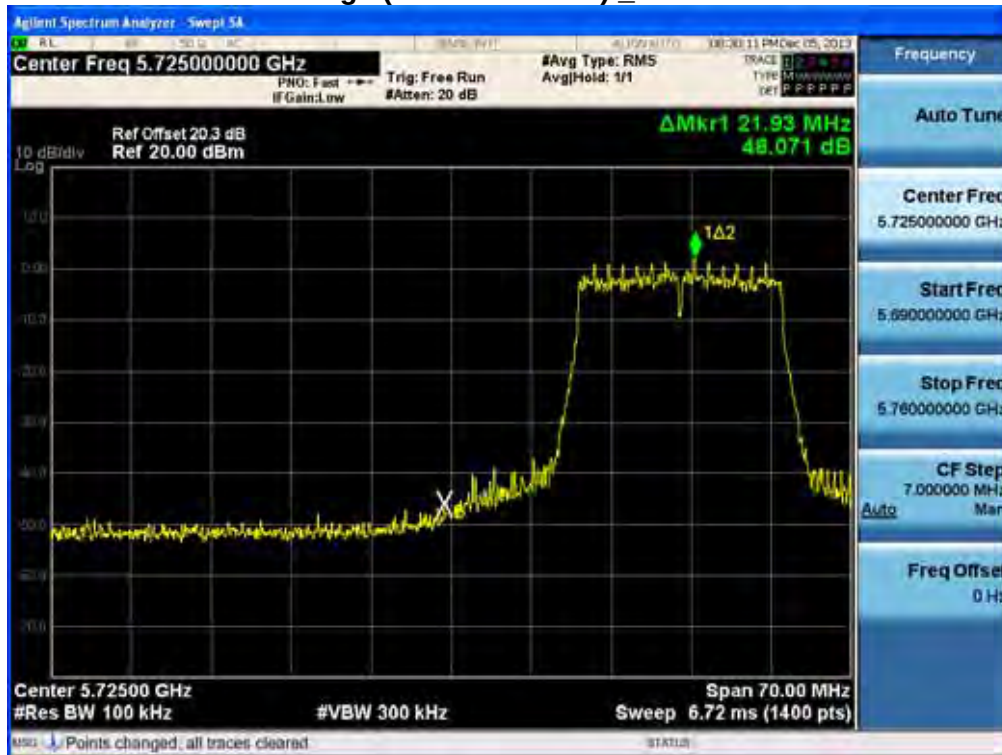


Band Edge (802.11a-CH165)

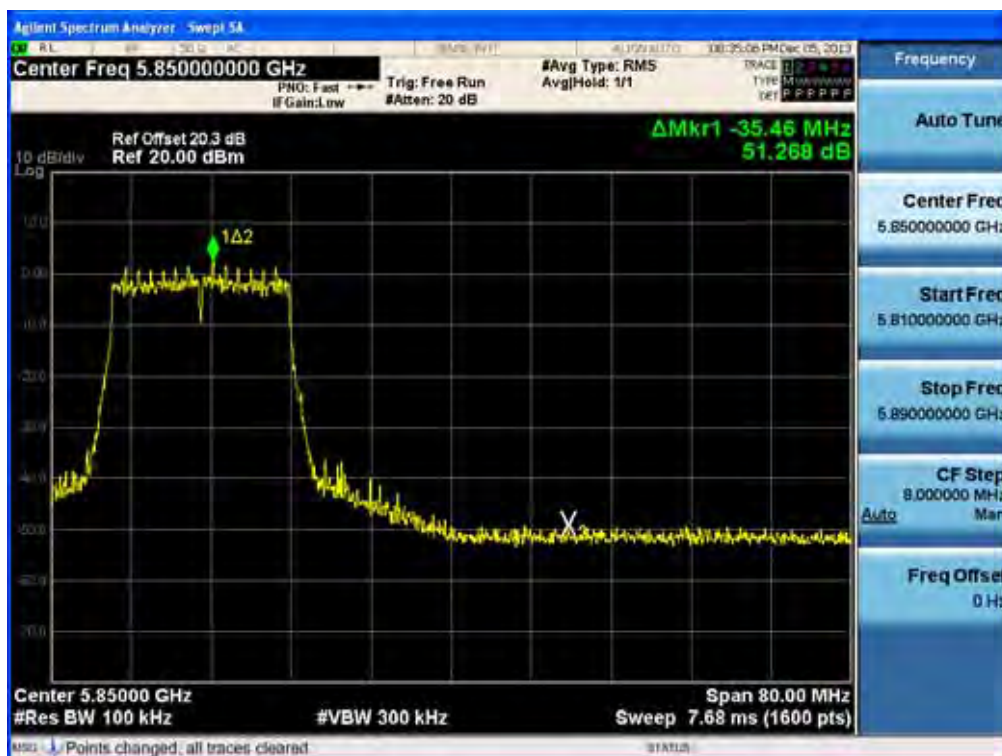


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

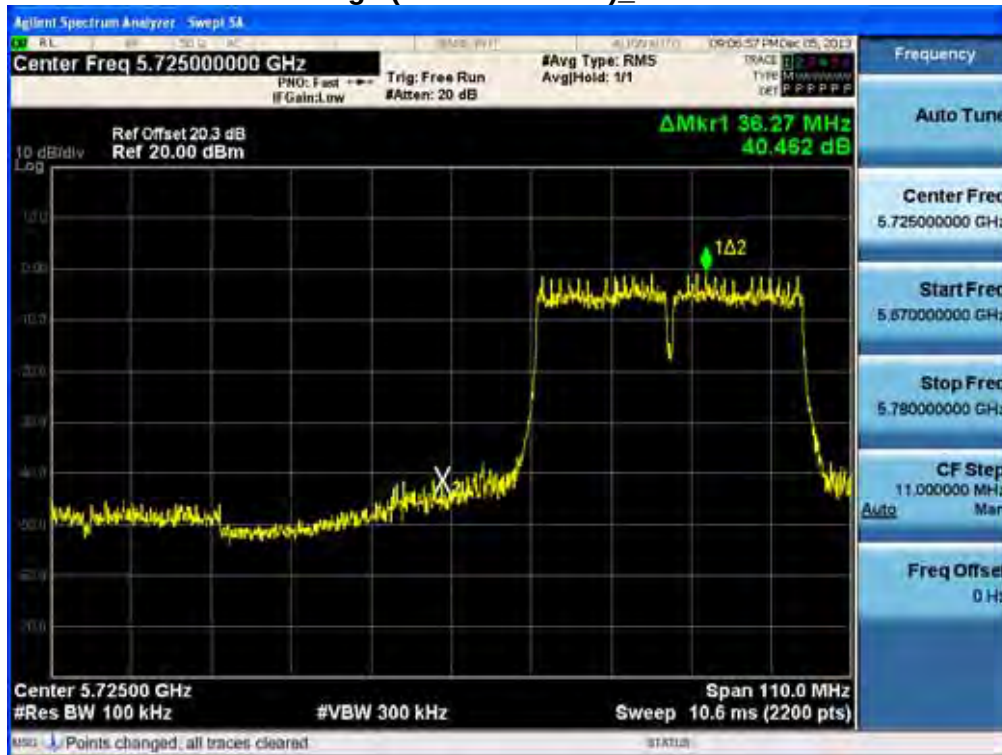
Band Edge (802.11n-CH149) _ 20 MHz BW



Band Edge (802.11n-CH165) _ 20 MHz BW



Band Edge (802.11n-CH151)_40 MHz BW



Band Edge (802.11n-CH159)_40 MHz BW

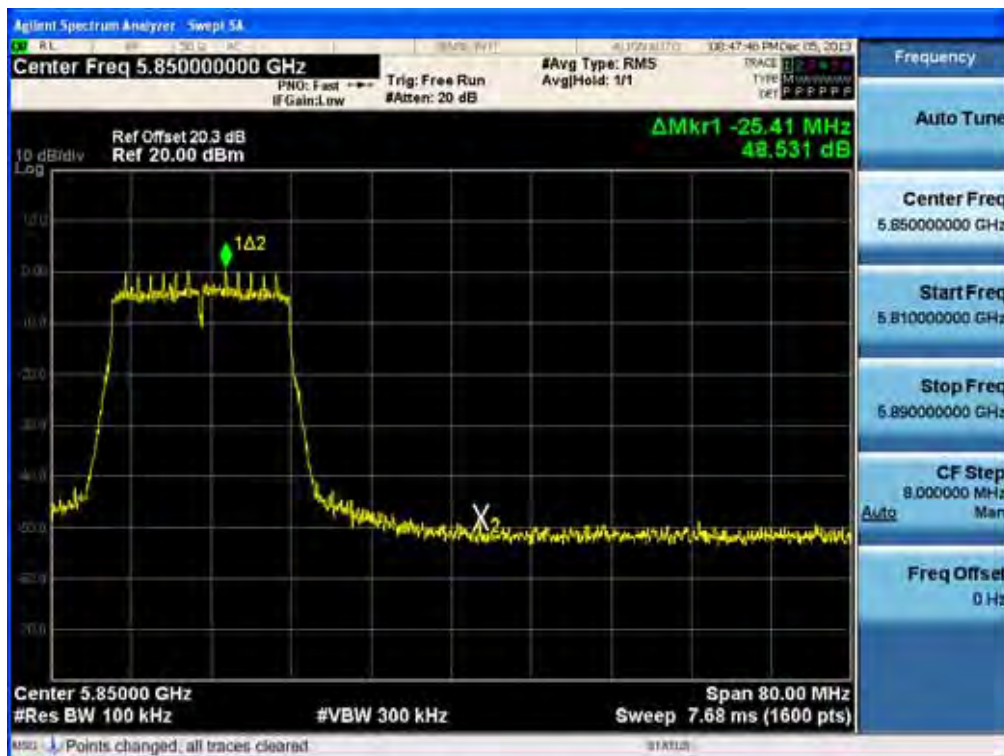


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Band Edge (802.11ac-CH149) _ 20 MHz BW



Band Edge (802.11ac-CH165) _ 20 MHz BW



Band Edge (802.11ac-CH151)_40 MHz BW



Band Edge (802.11ac-CH159)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

Band Edge (802.11ac-CH151) _80 MHz BW



Band Edge (802.11ac-CH151) _80 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

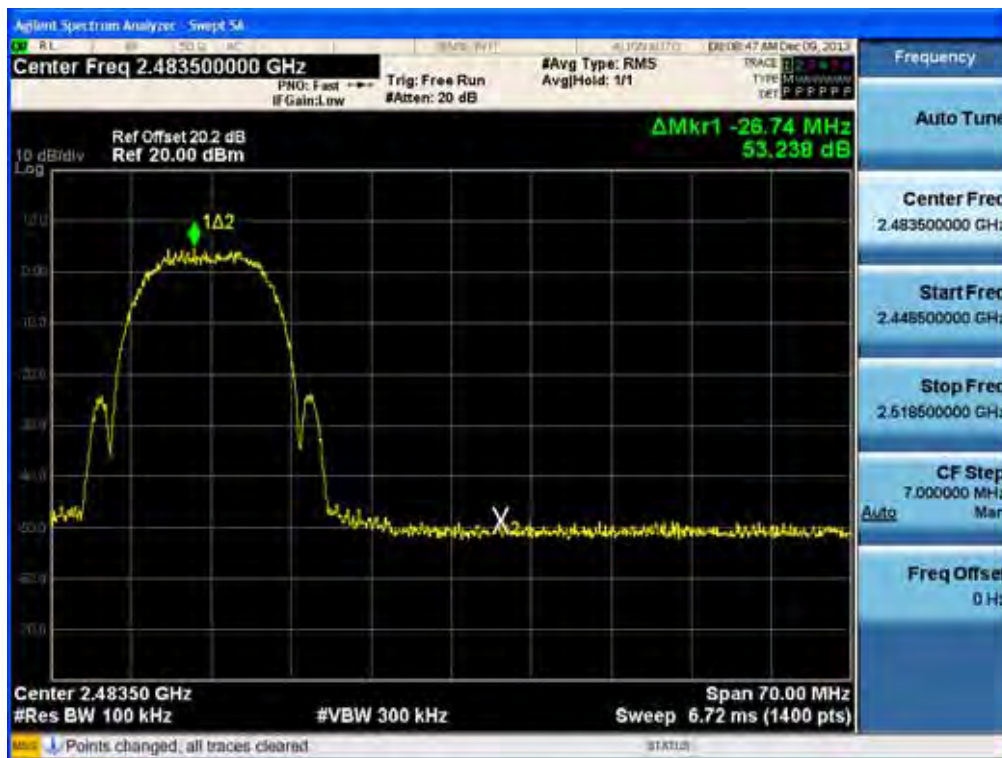
RESULT PLOTS_Ant.1

2.4 GHz Band

BandEdge (802.11b-CH1)



BandEdge (802.11b-CH11)

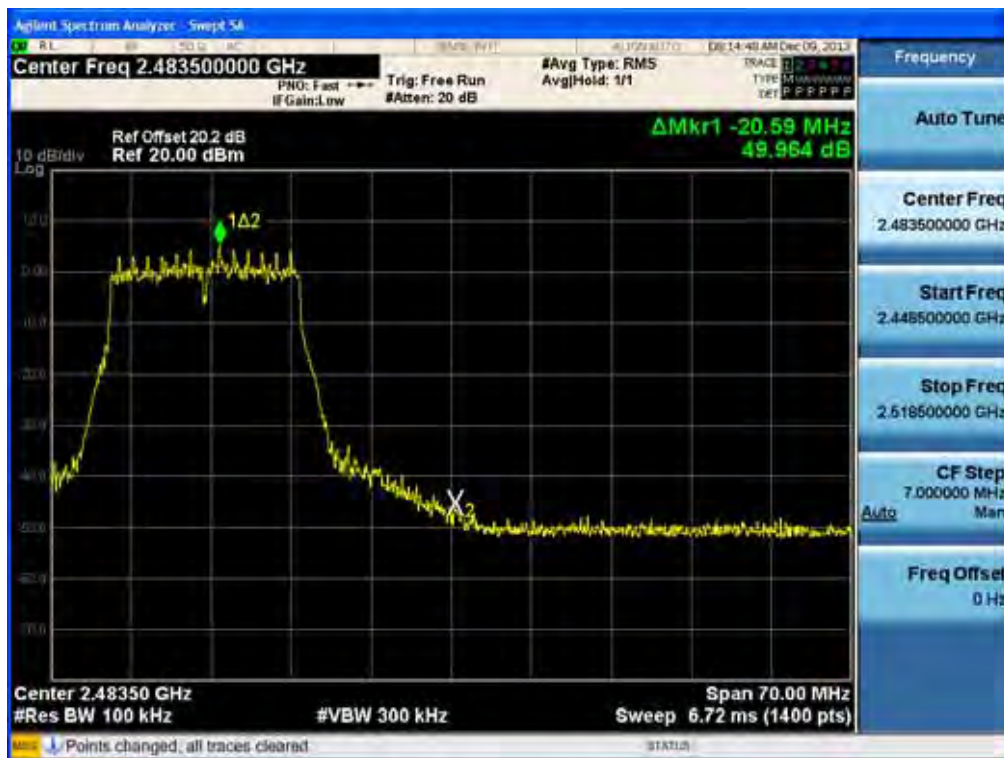


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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BandEdge (802.11g-CH1)



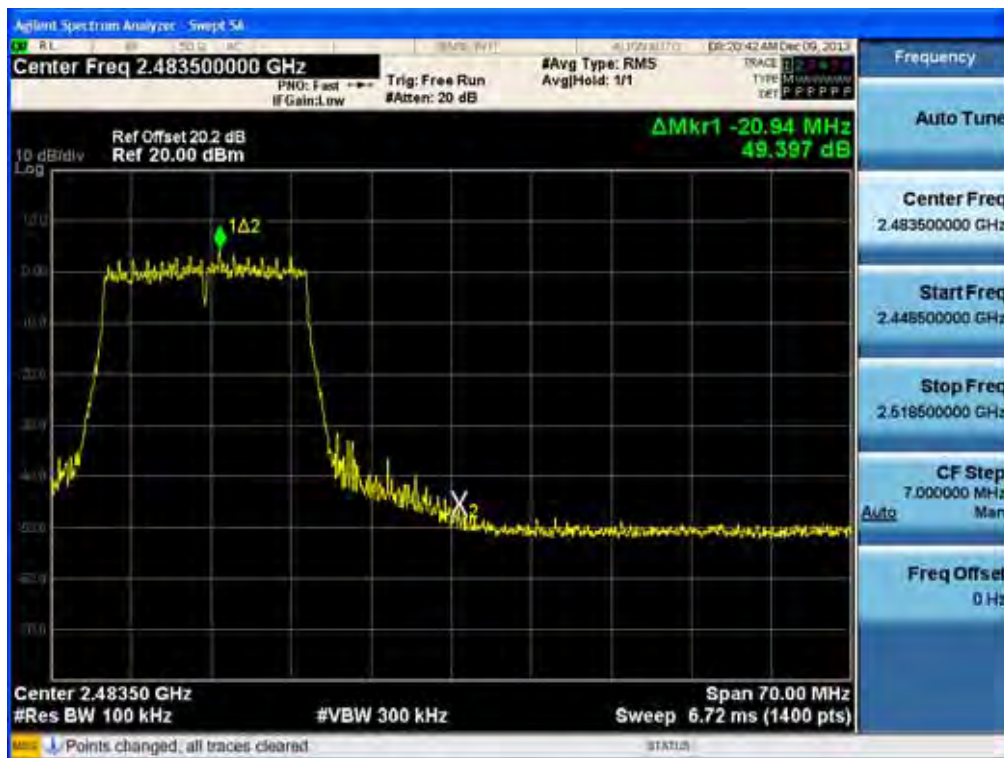
BandEdge (802.11g-CH11)



BandEdge (802.11n-CH1)



BandEdge (802.11n-CH11)

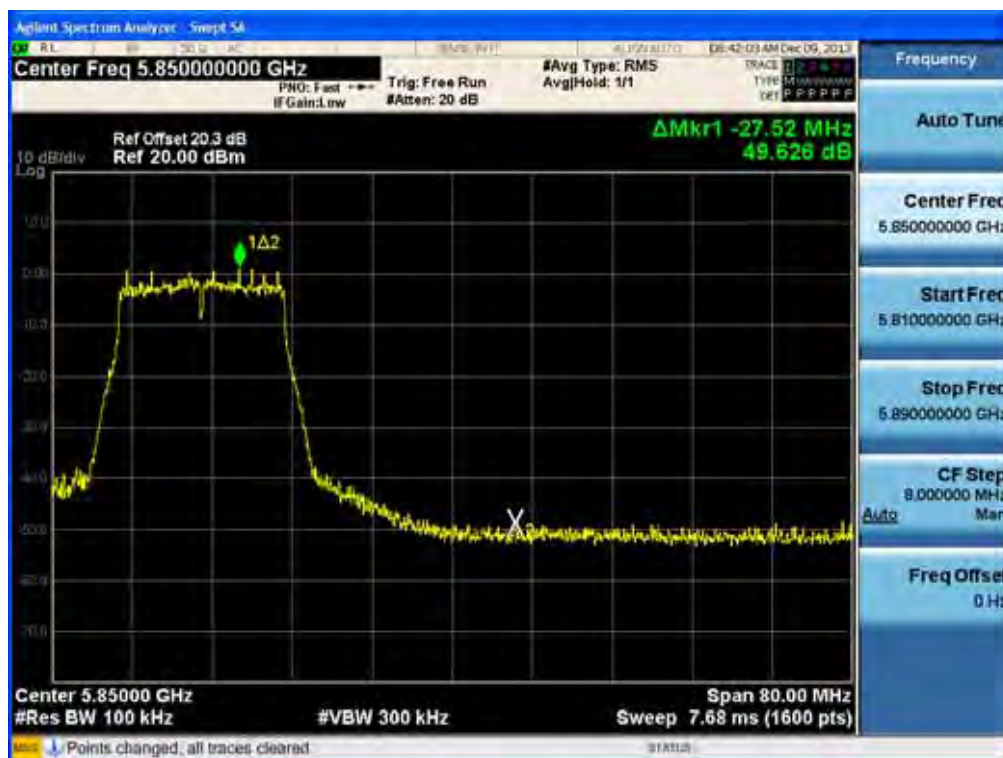


5.8 GHz Band

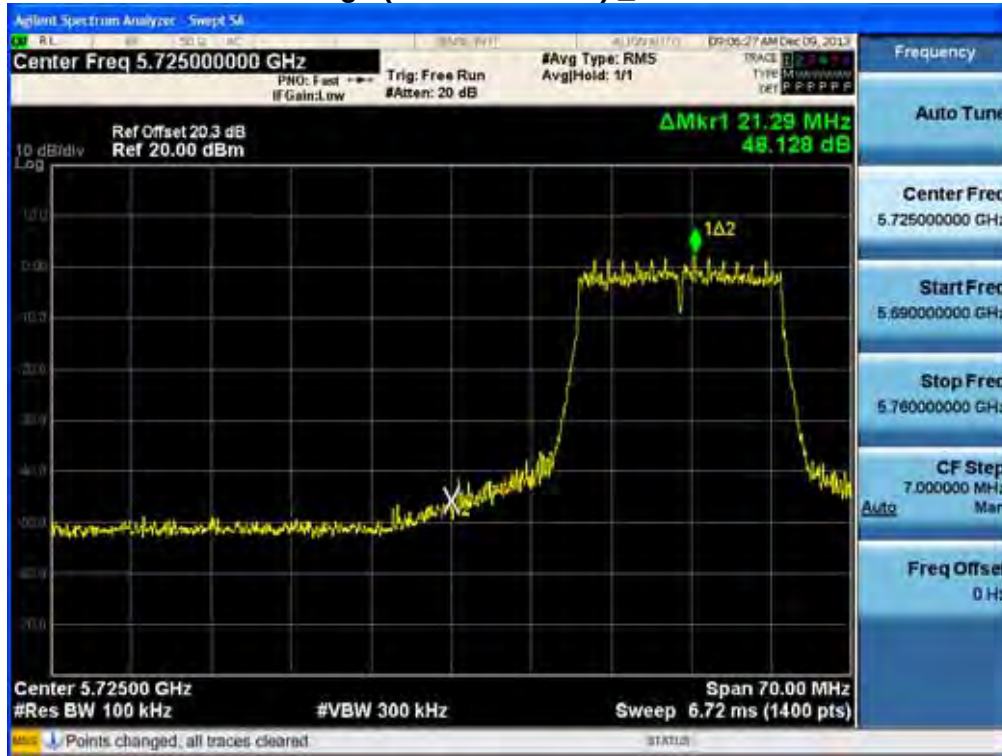
Band Edge (802.11a-CH149)



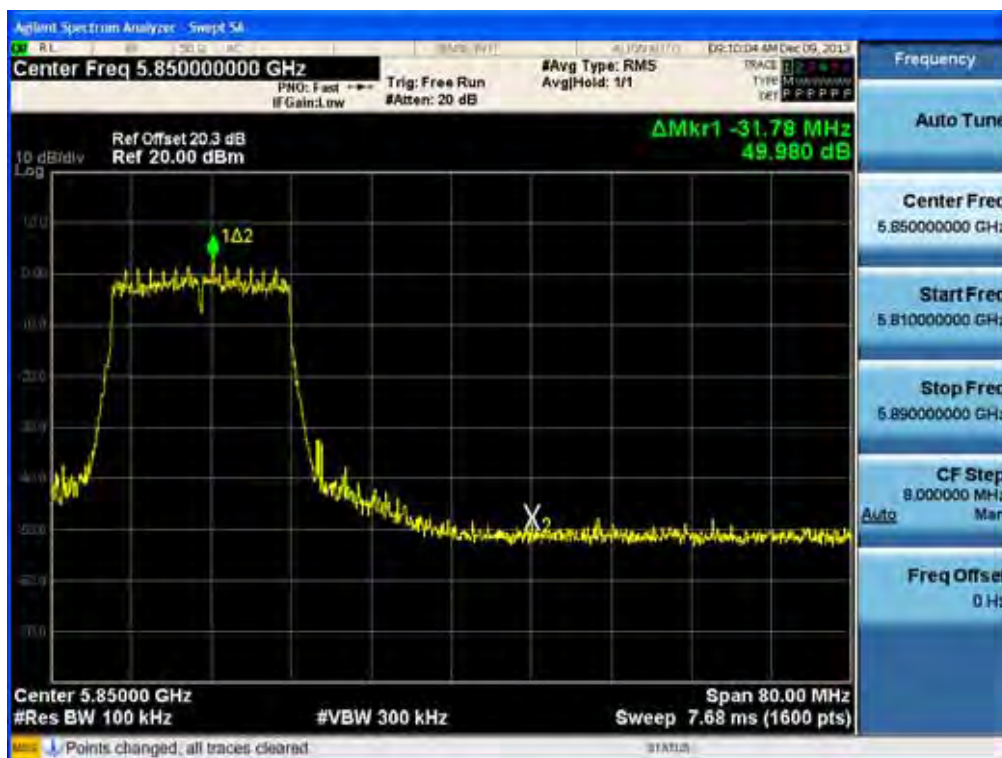
Band Edge (802.11a-CH165)



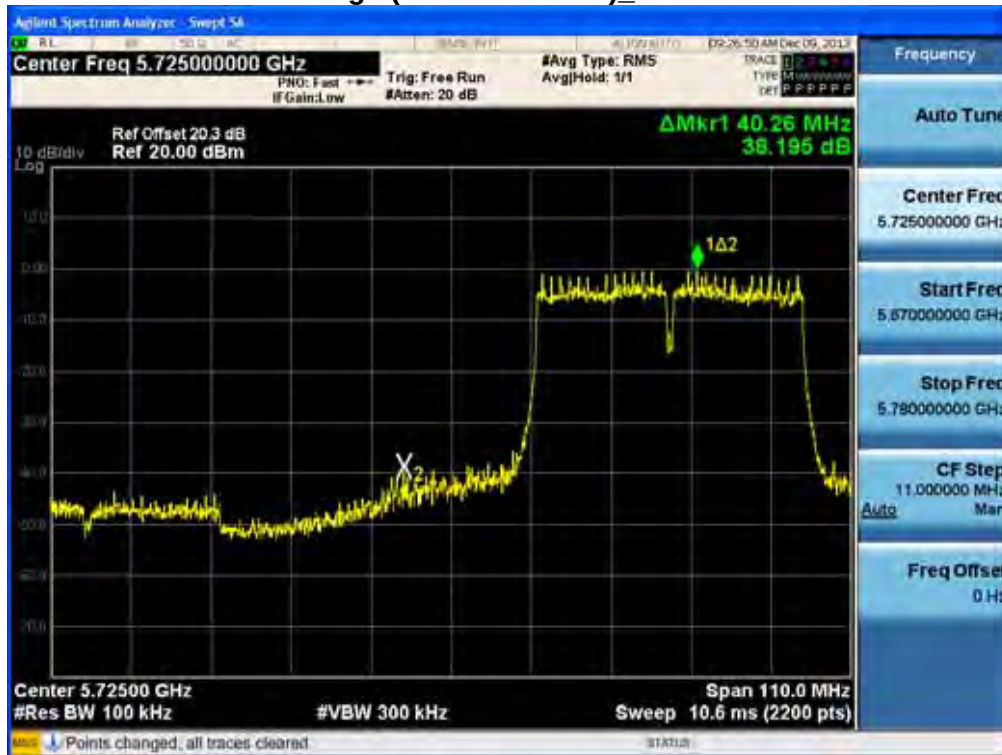
Band Edge (802.11n-CH149) _ 20 MHz BW



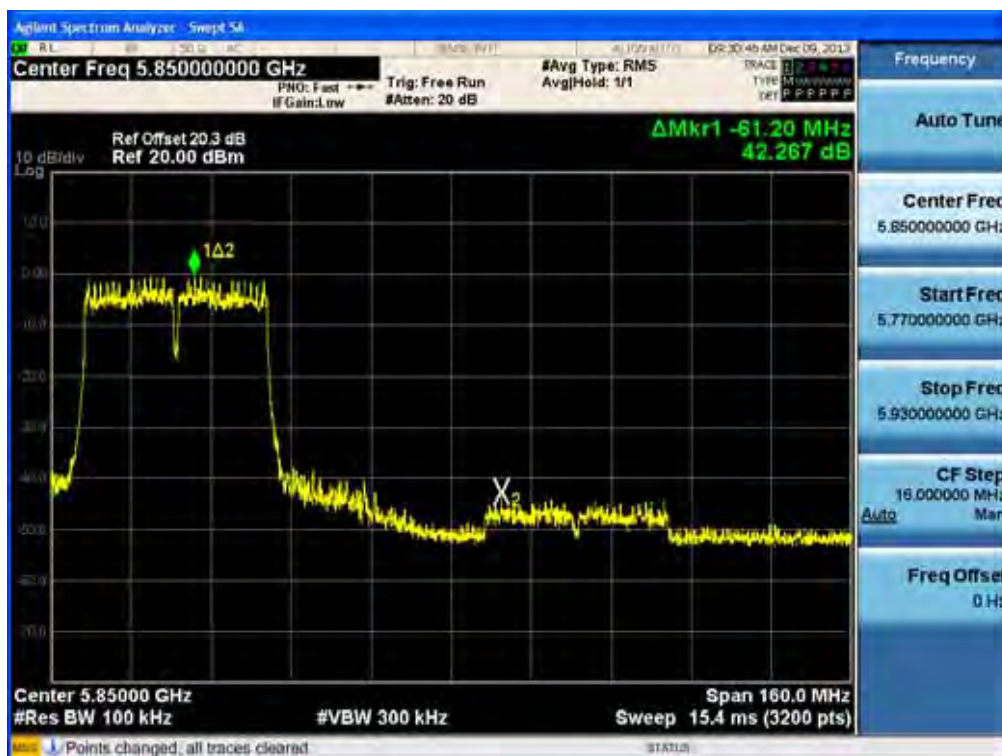
Band Edge (802.11n-CH165) _ 20 MHz BW



Band Edge (802.11n-CH151)_40 MHz BW



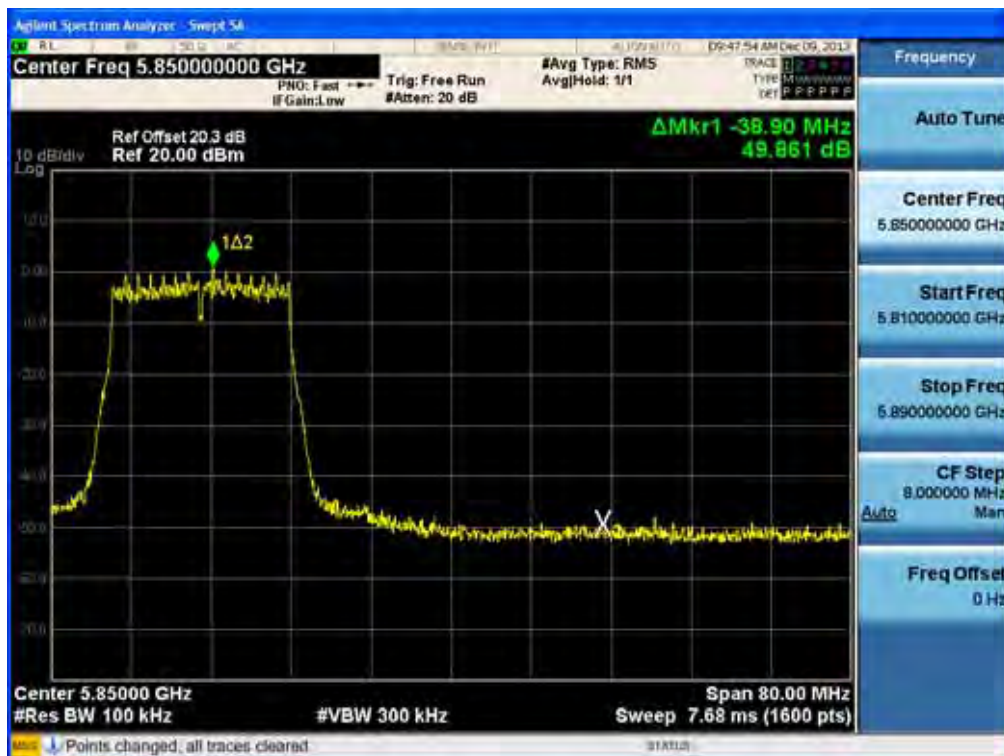
Band Edge (802.11n-CH159)_40 MHz BW



Band Edge (802.11ac-CH149) _ 20 MHz BW



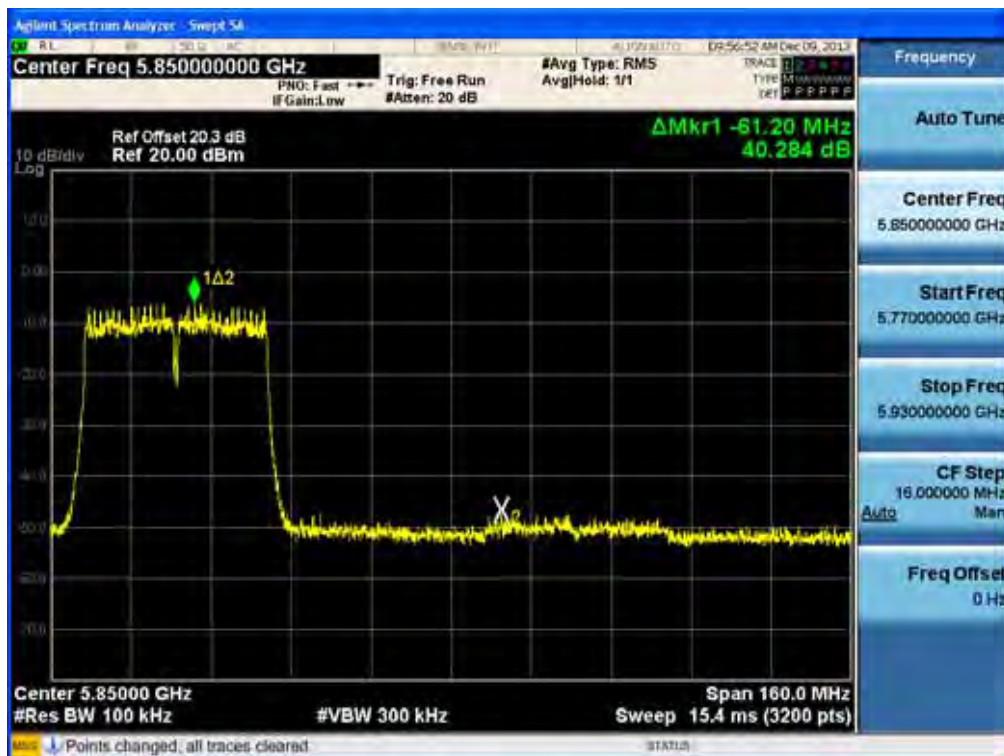
Band Edge (802.11ac-CH165) _ 20 MHz BW



Band Edge (802.11ac-CH151)_40 MHz BW



Band Edge (802.11ac-CH159)_40 MHz BW



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Band Edge (802.11ac-CH151) _80 MHz BW



Band Edge (802.11ac-CH151) _80 MHz BW

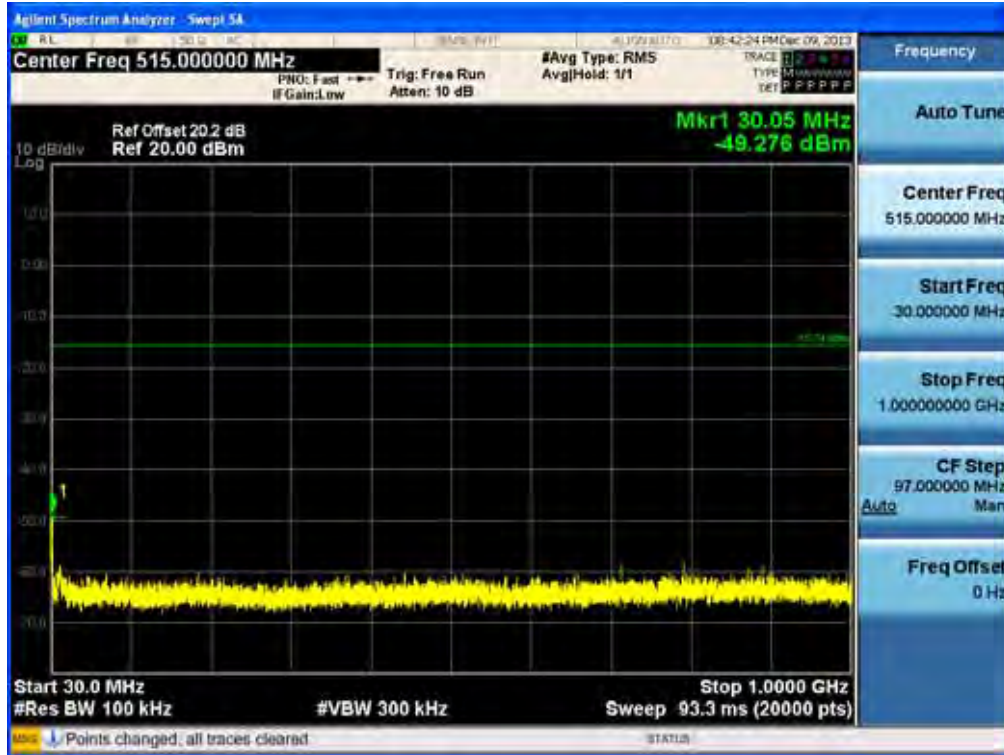


RESULT PLOTS_ Ant.0

2.4 GHz Band

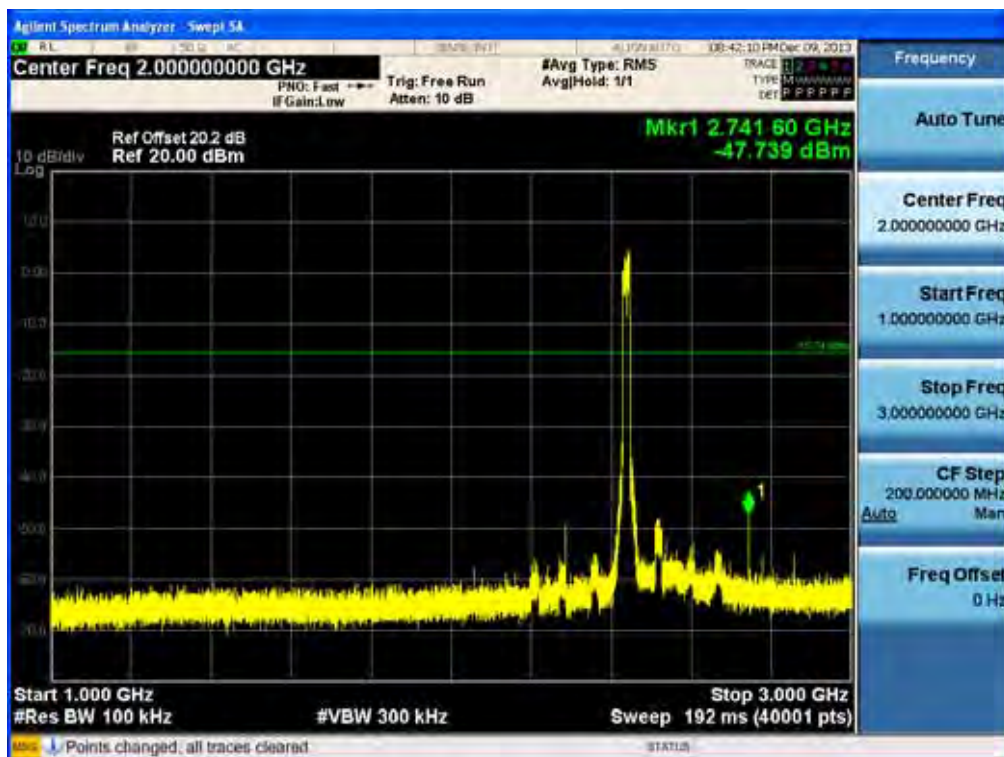
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n-CH6)



1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n-CH6)



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3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n-CH6)



5 GHz ~ 7 GHz

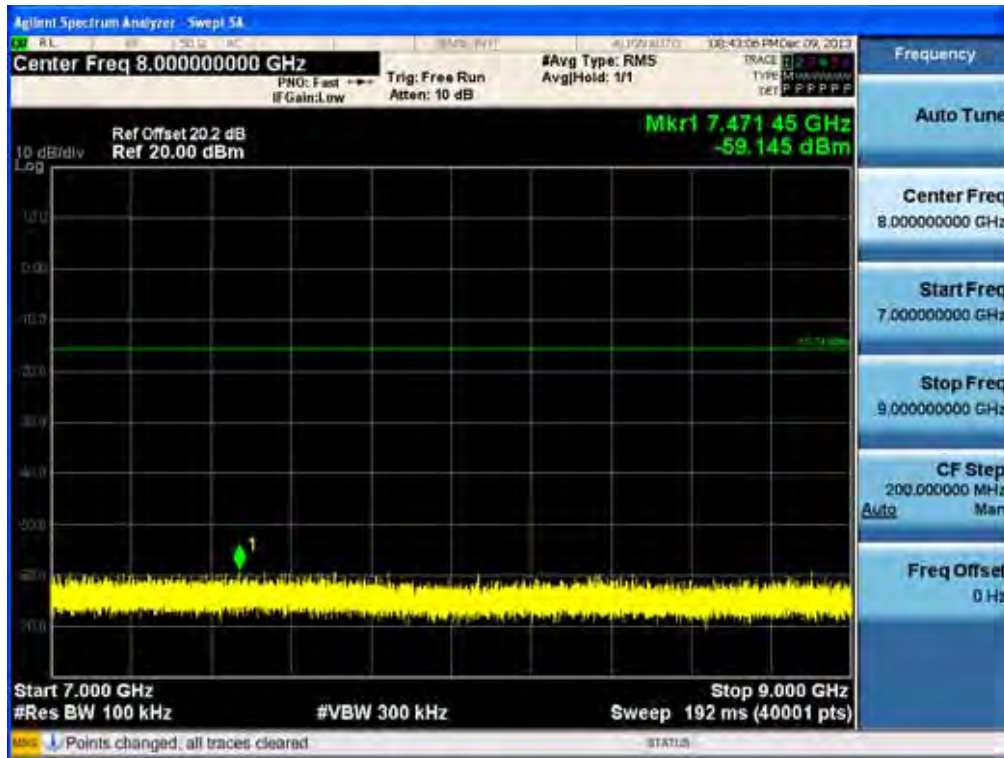
Conducted Spurious Emission (802.11n-CH6)



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7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n-CH6)



9 GHz ~ 11 GHz

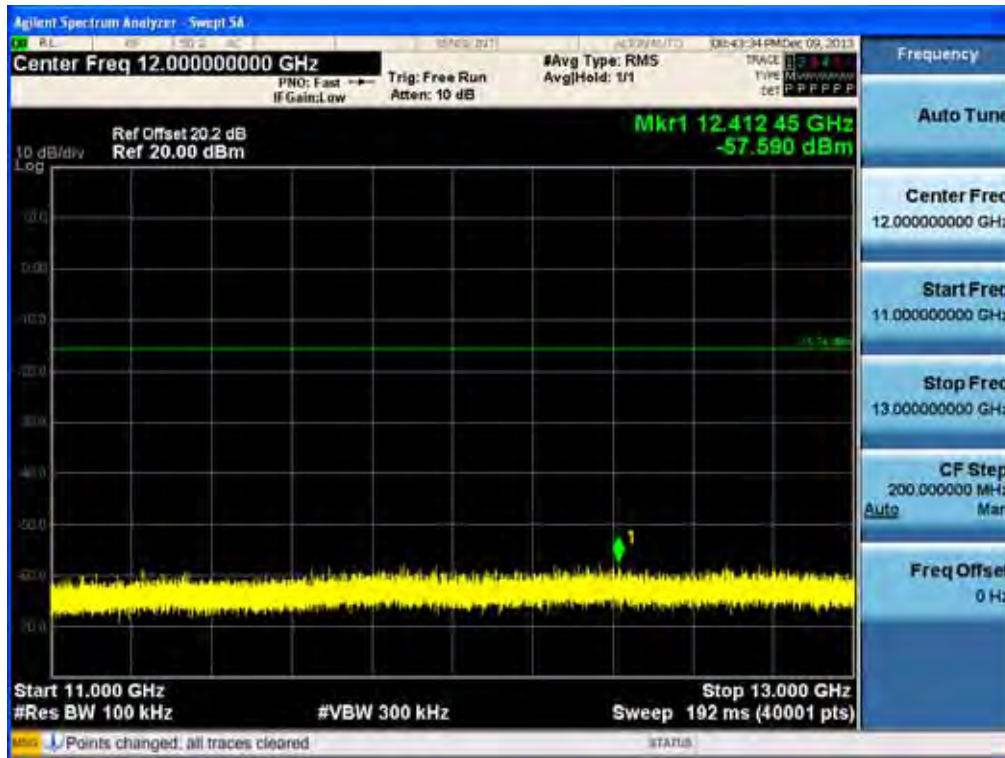
Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n-CH6)



13 GHz ~ 15 GHz

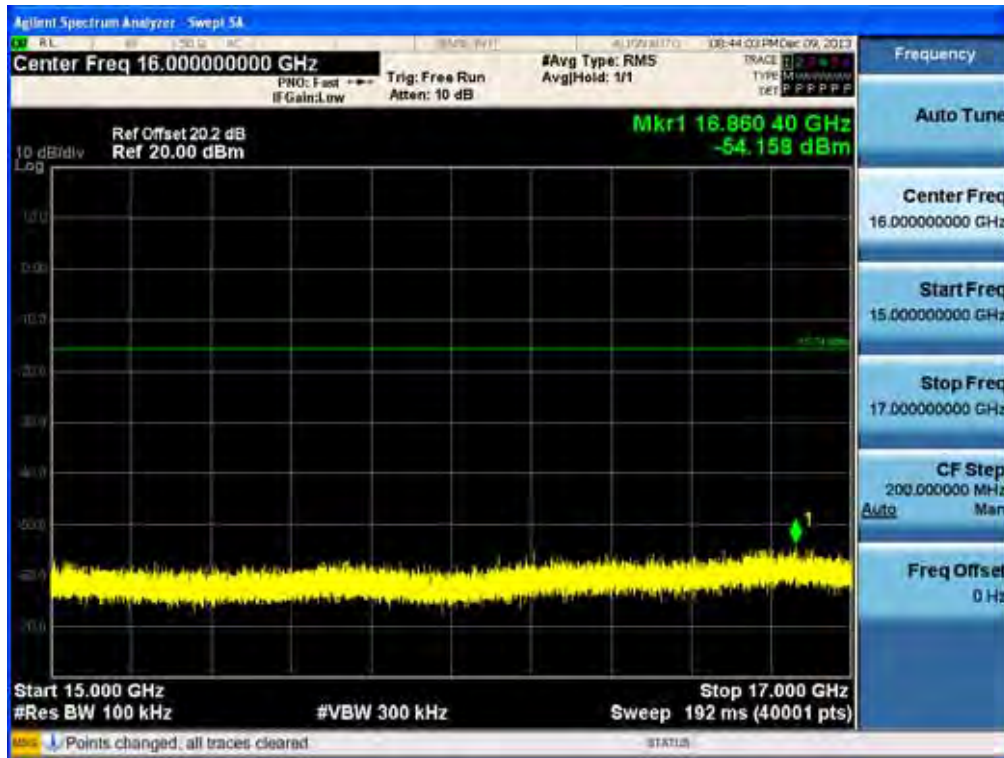
Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n-CH6)



17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n-CH6)



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19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11n-CH6)



21 GHz ~ 23 GHz

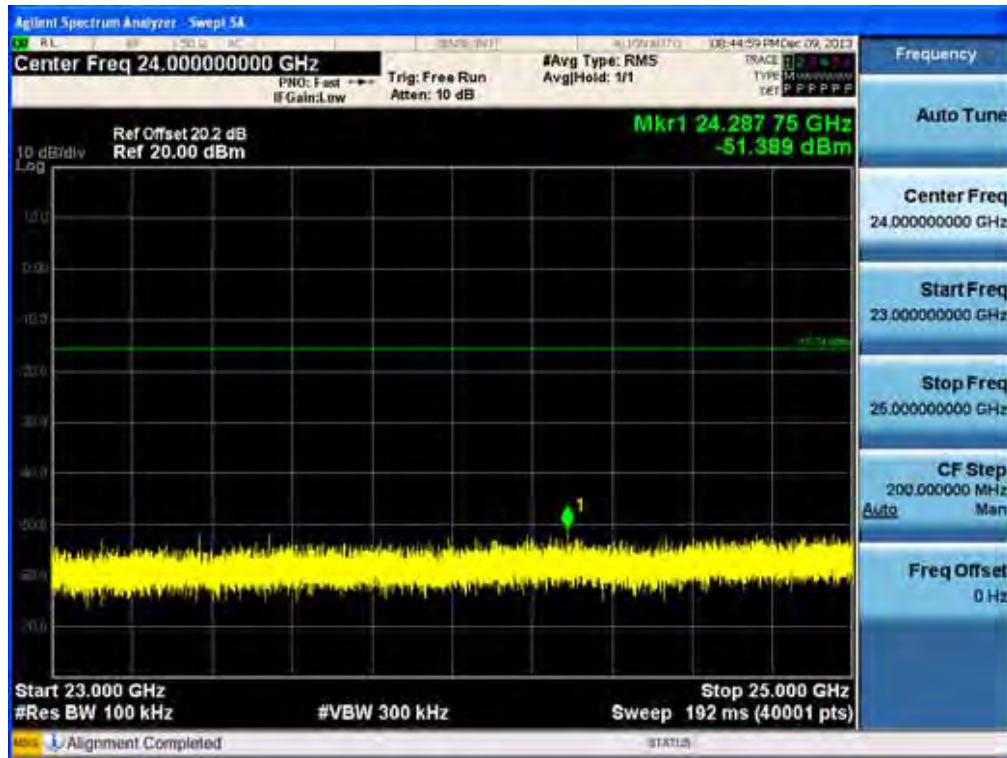
Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

23 GHz ~ 25 GHz

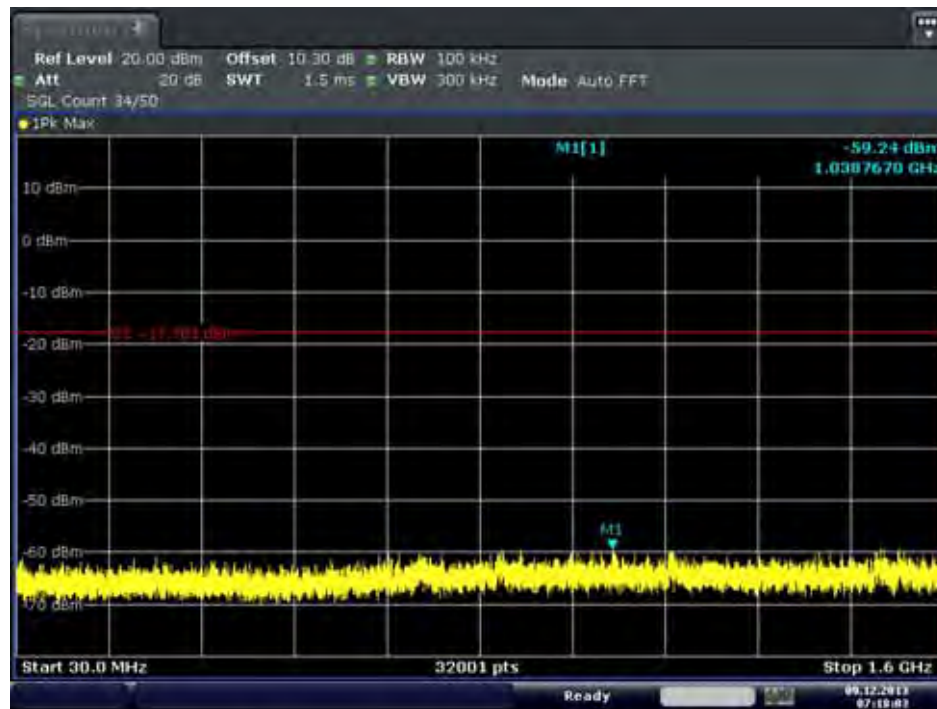
Conducted Spurious Emission (802.11n-CH6)



5.8 GHz Band

30 MHz ~ 1.6 GHz

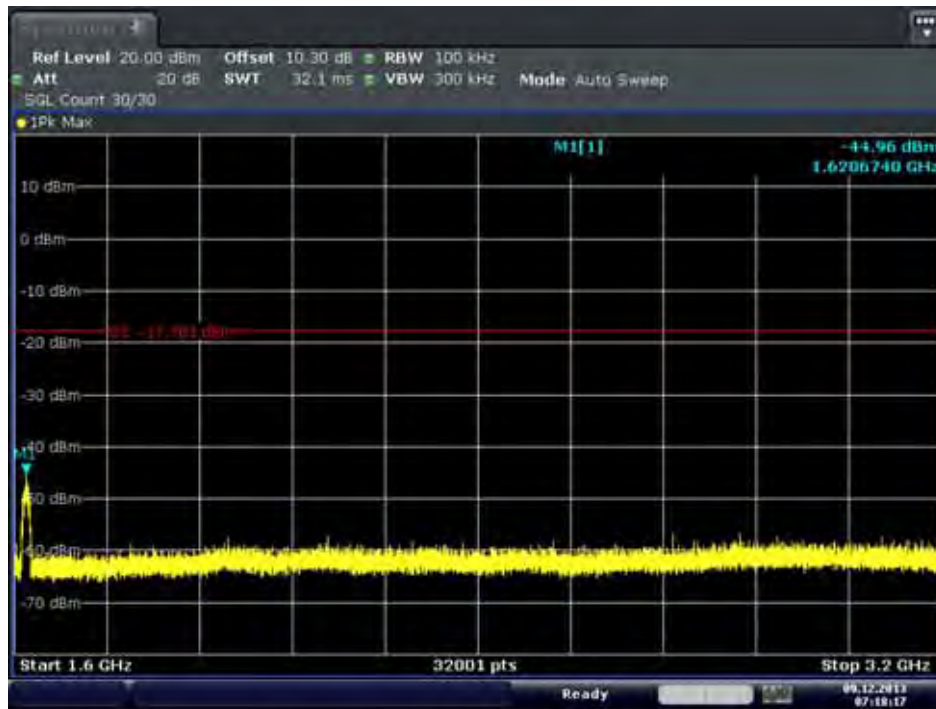
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

1.6 GHz ~ 3.2 GHz

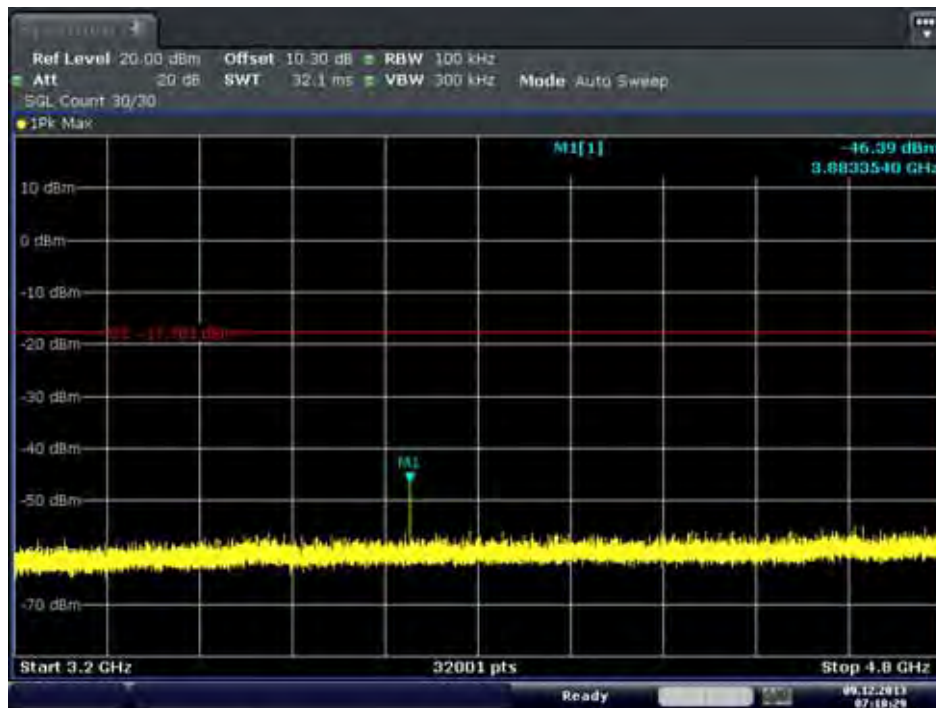
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9. DEC. 2013 07:18:18

3.2 GHz ~ 4.8 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

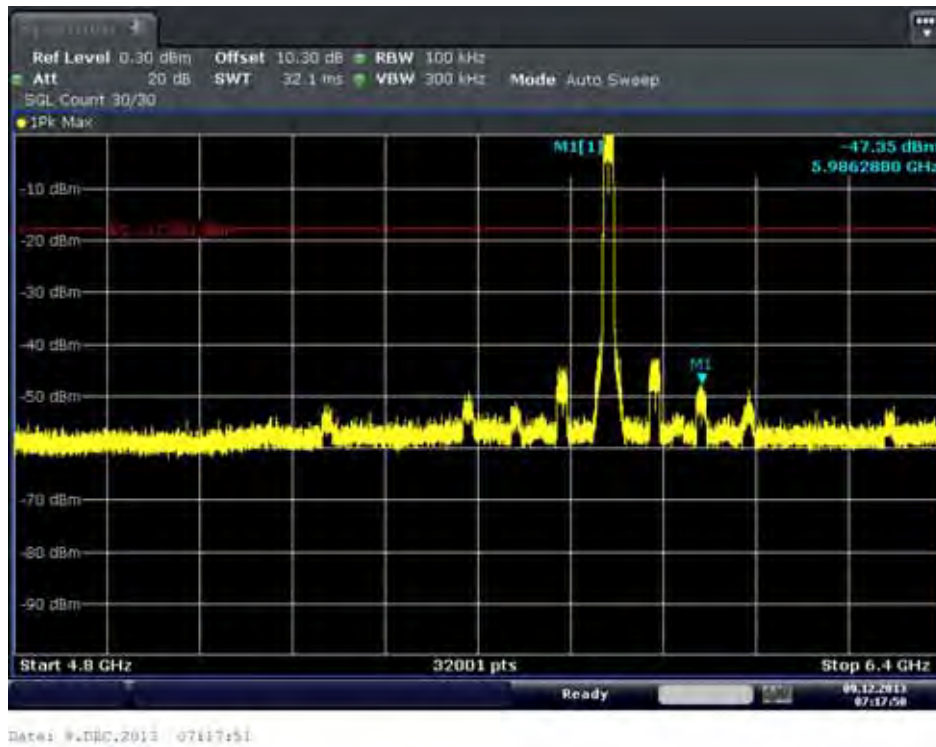


Date: 9. DEC. 2013 07:18:30

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

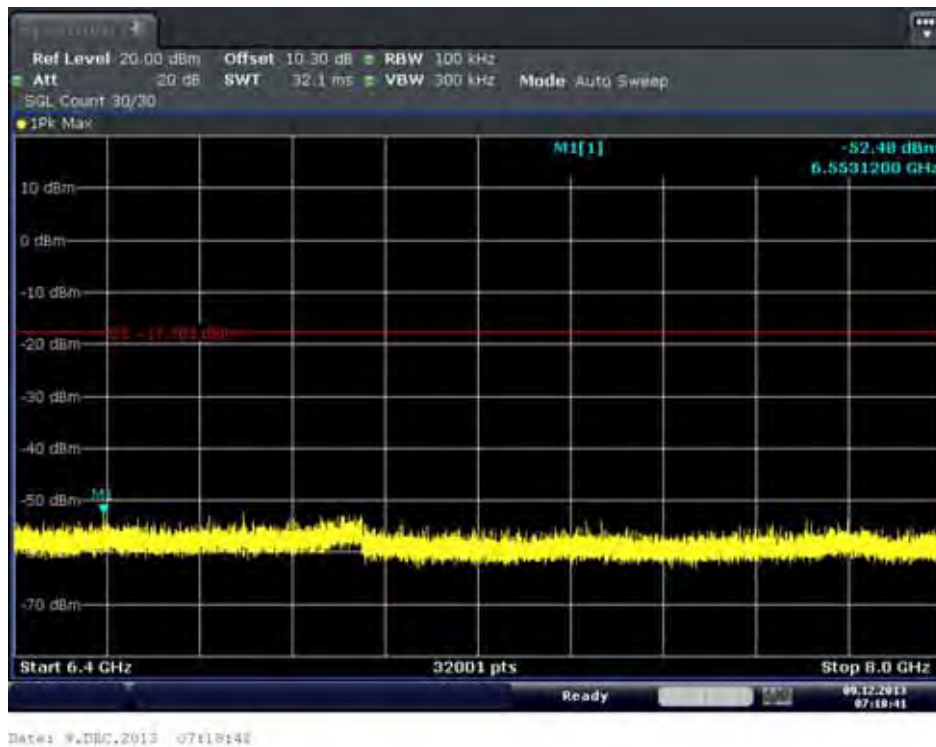
4.8 GHz ~ 6.4 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



6.4 GHz ~ 8 GHz

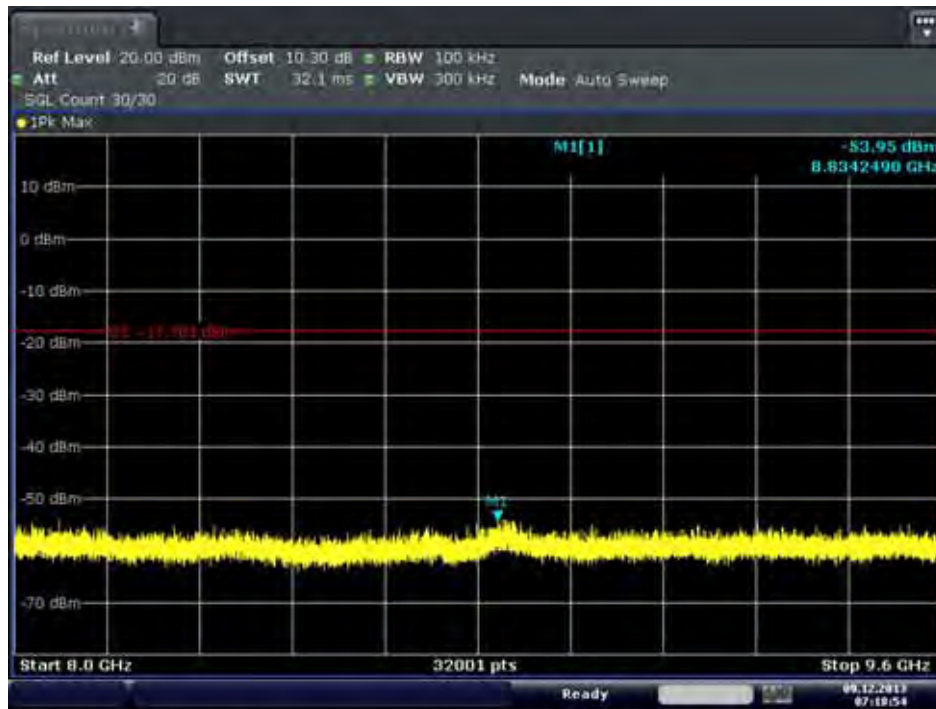
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

8 GHz ~ 9.6 GHz

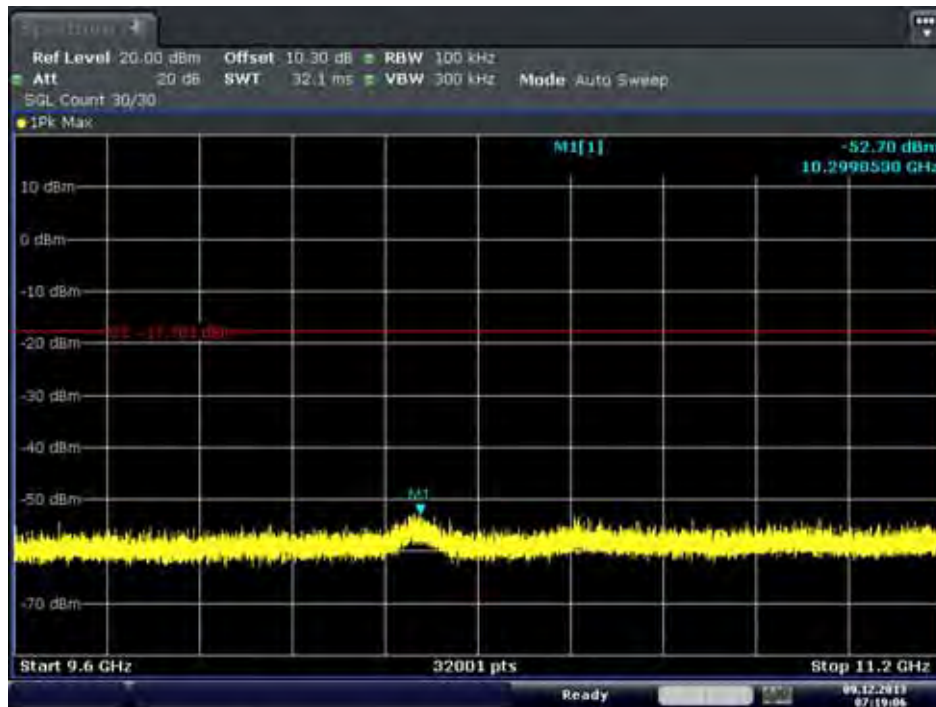
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9. DEC. 2013 07:18:54

9.6 GHz ~ 11.2 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

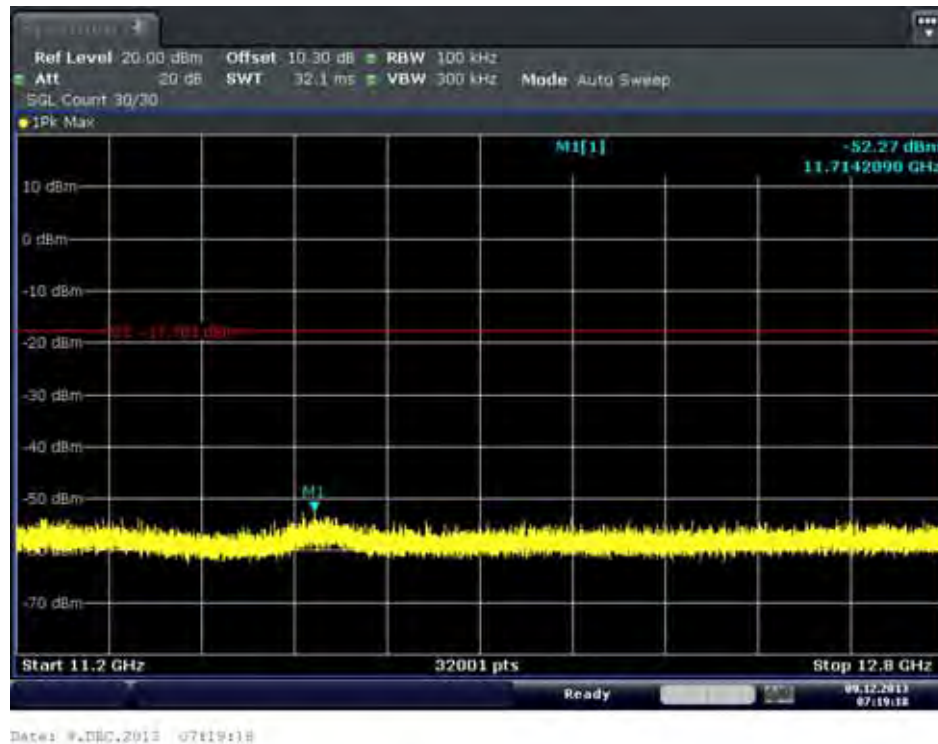


Date: 9. DEC. 2013 07:19:06

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

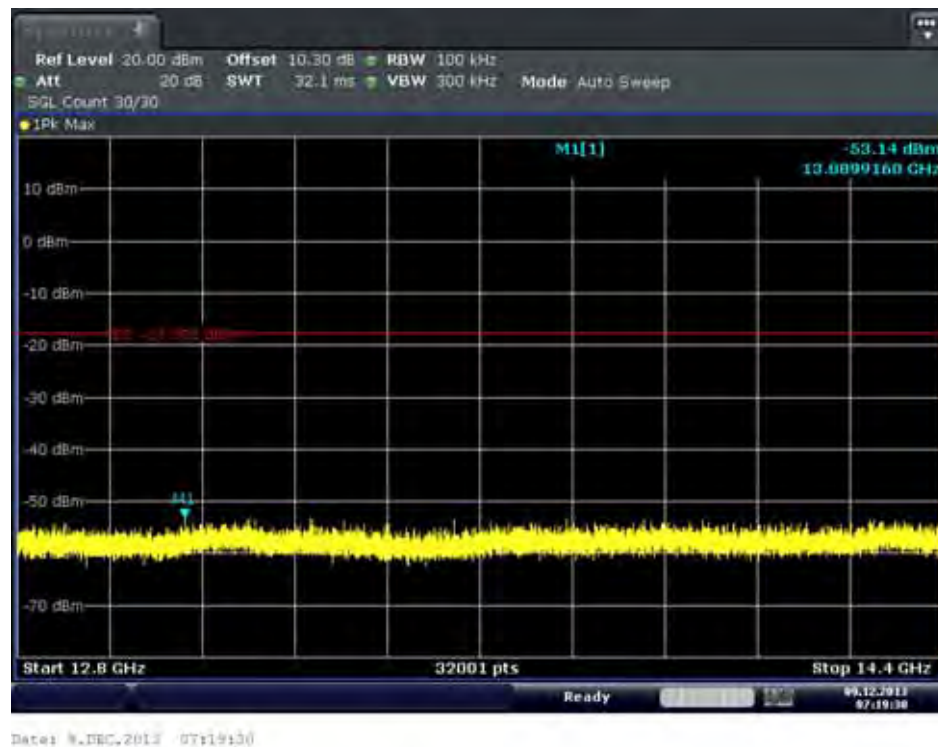
11.2 GHz ~ 12.8 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



12.8 GHz ~ 14.4 GHz

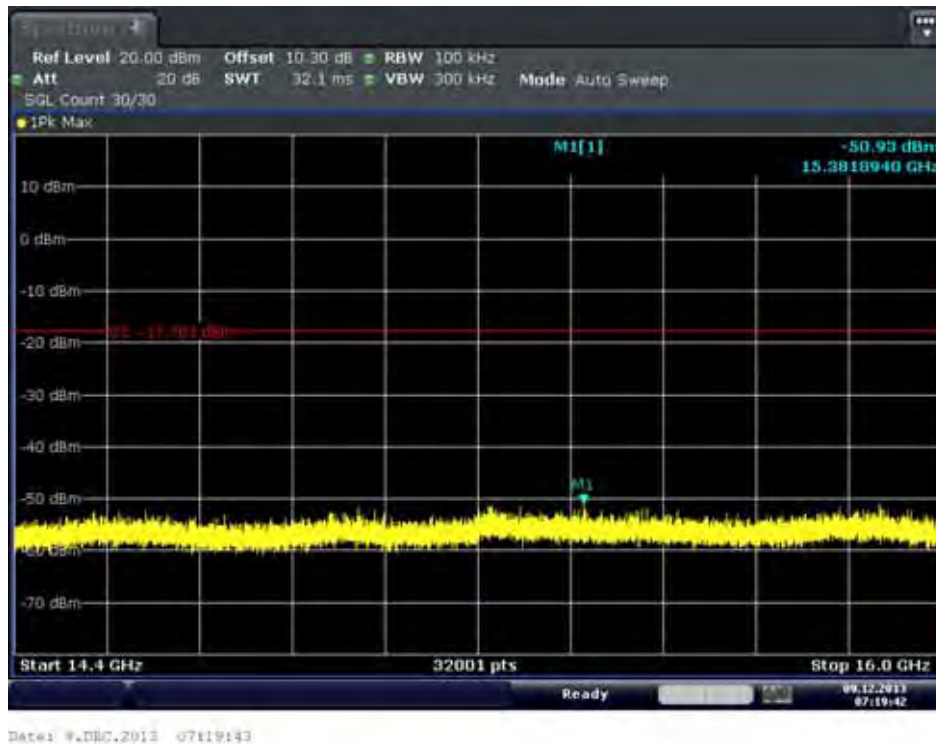
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

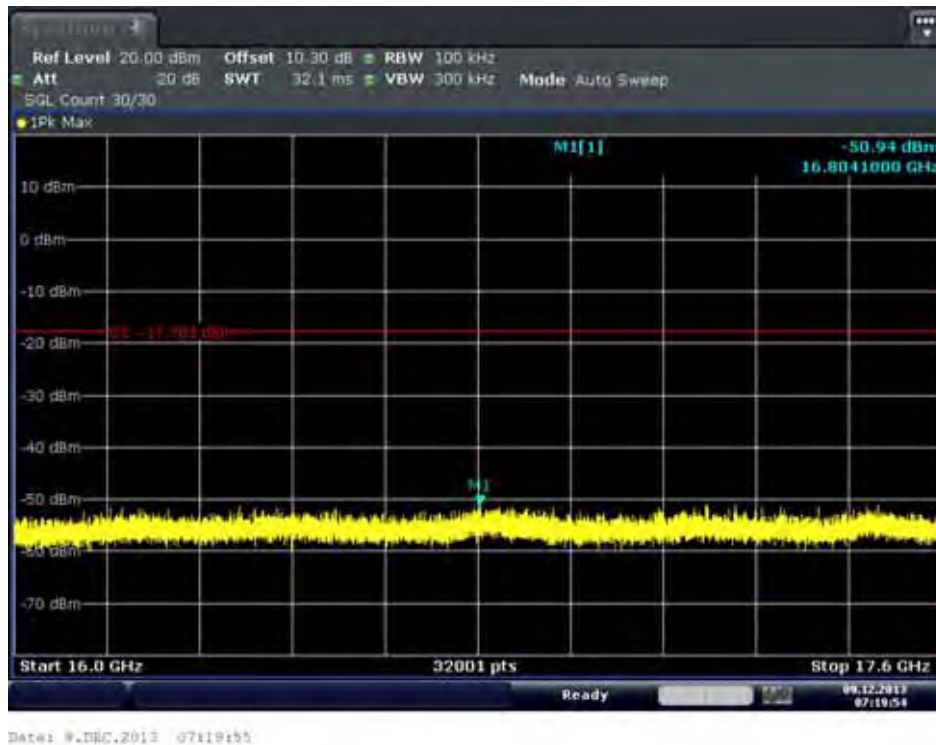
14.4 GHz ~ 16 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



16 GHz ~ 17.6 GHz

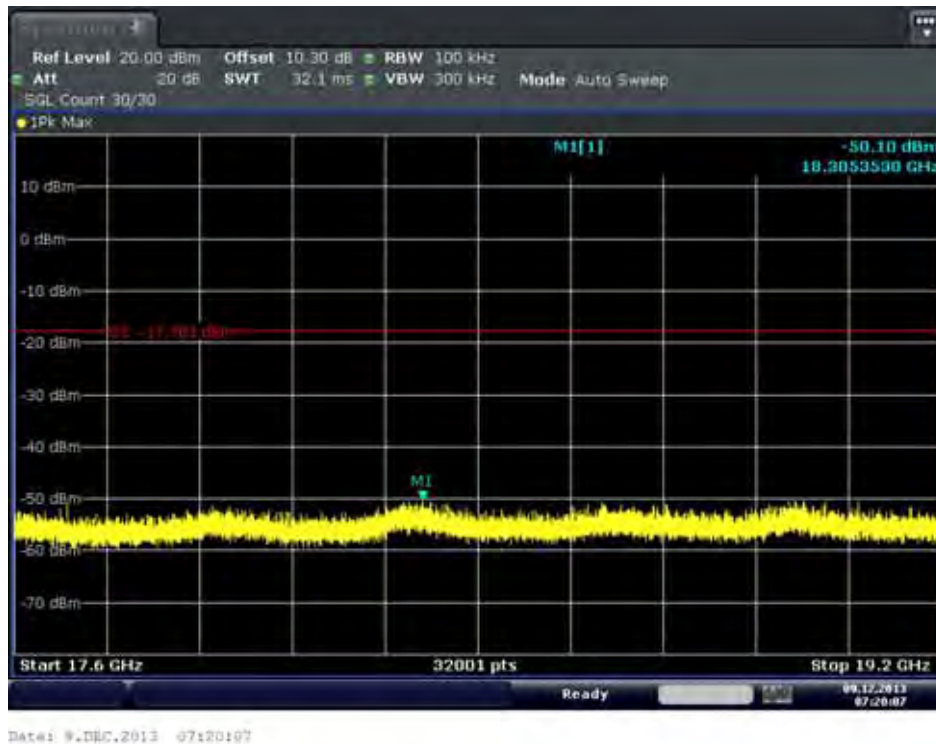
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

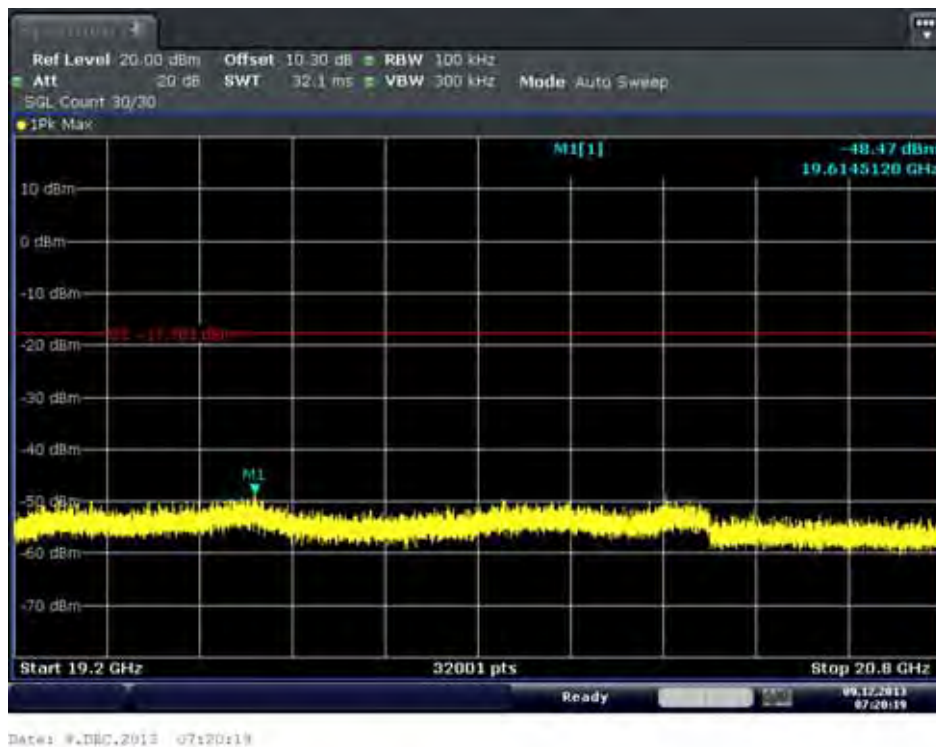
17.6 GHz ~ 19.2 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



19.2 GHz ~ 20.8 GHz

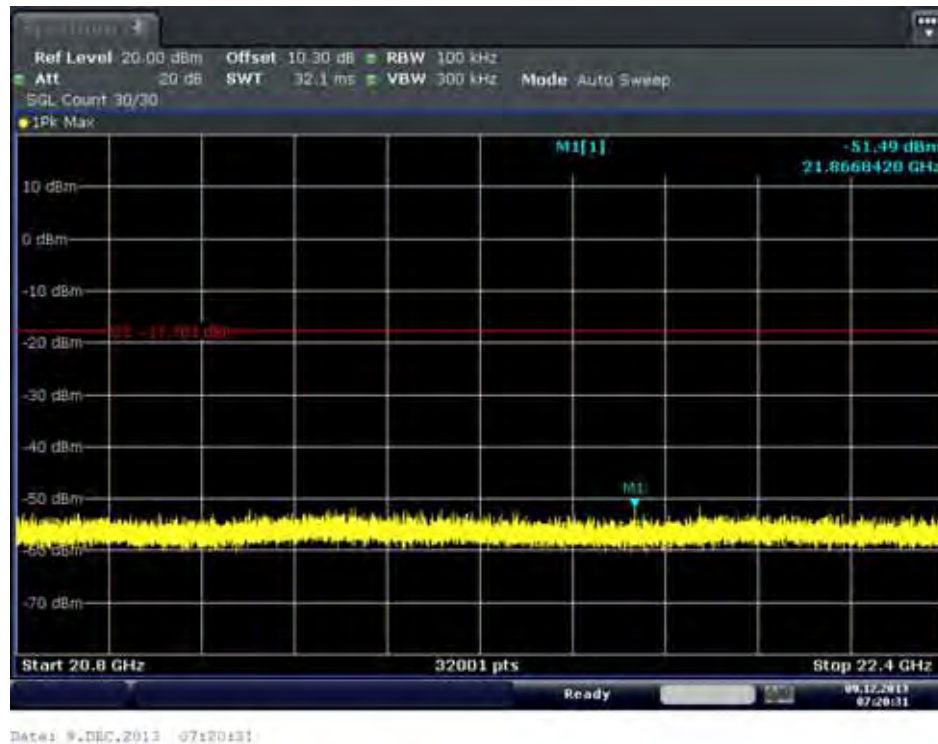
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

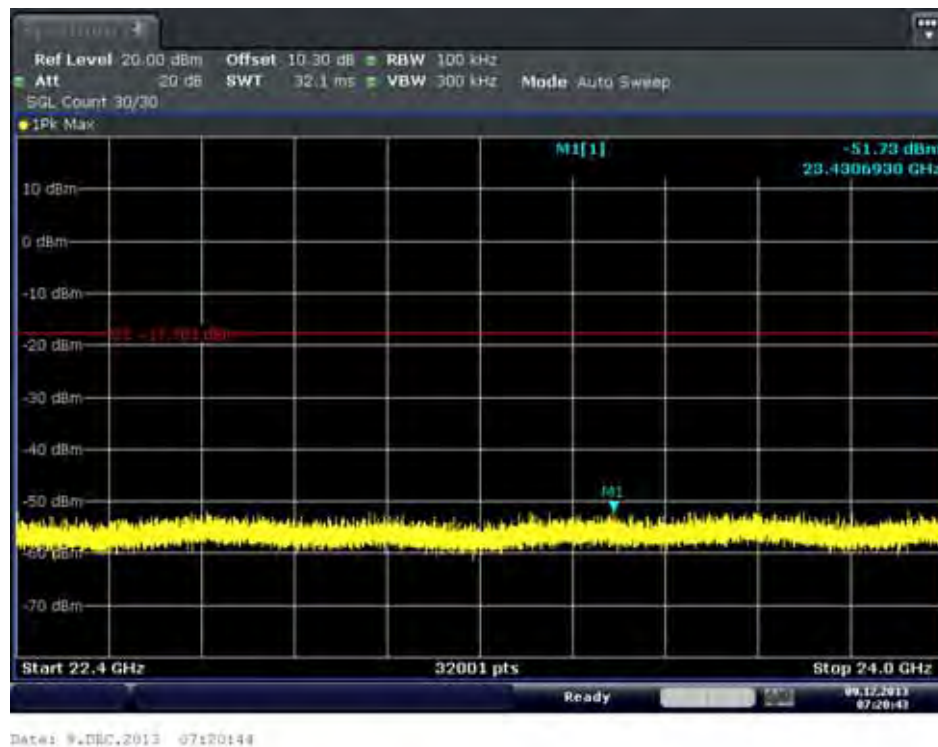
20.8 GHz ~ 22.4 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



22.4 GHz ~ 24 GHz

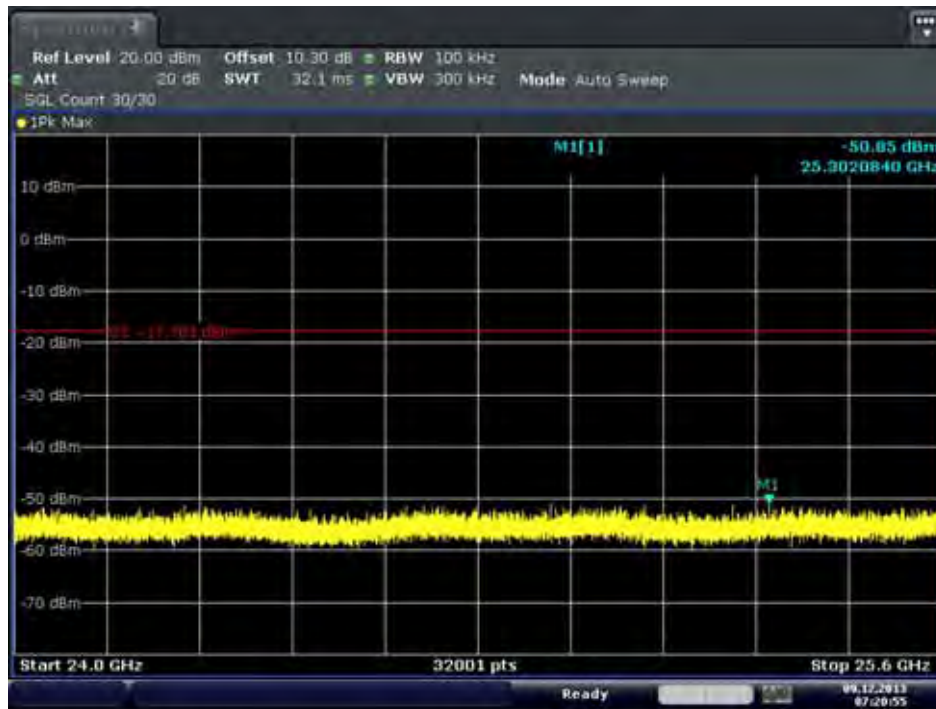
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

24 GHz ~ 25.6 GHz

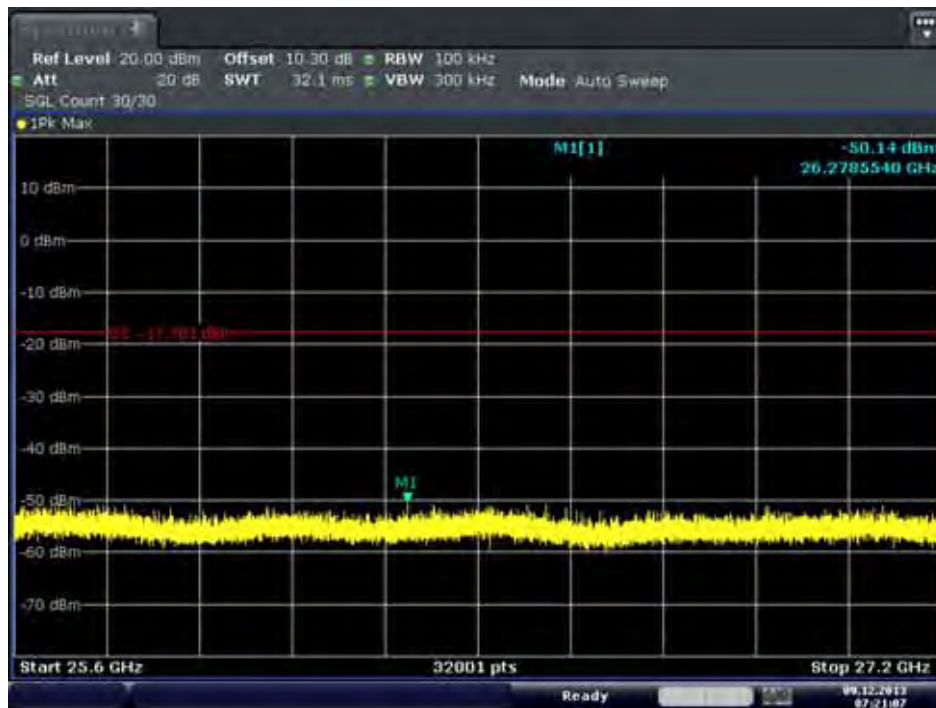
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC, 2013 07:20:56

25.6 GHz ~ 27.2 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

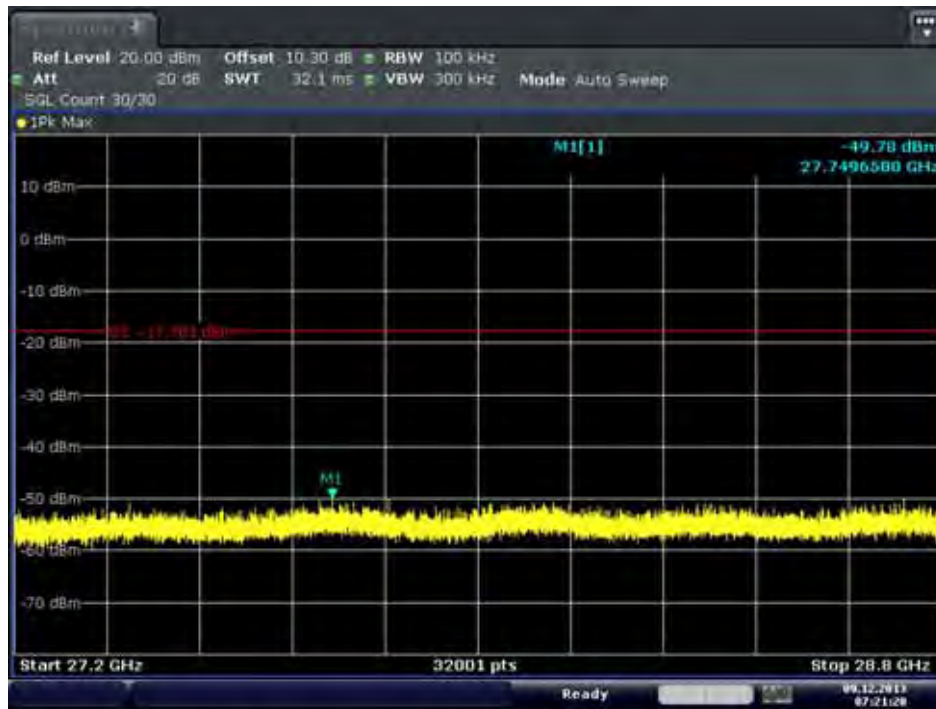


Date: 9.DEC, 2013 07:21:08

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

27.2 GHz ~ 28.8 GHz

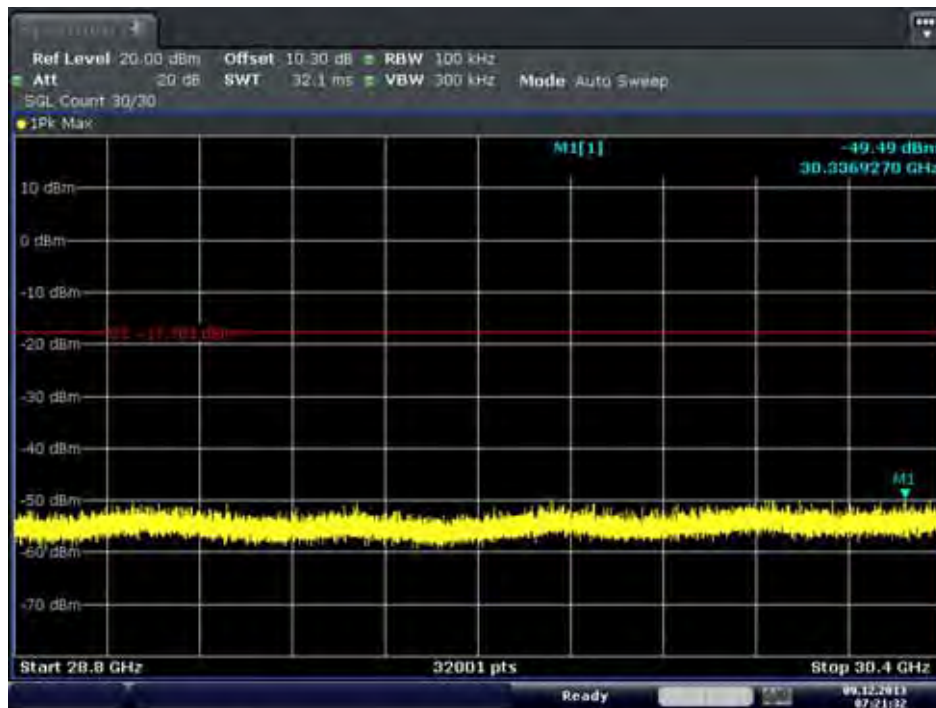
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



DATE: 9.DEC.2013 07:21:28

28.8 GHz ~ 30.4 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

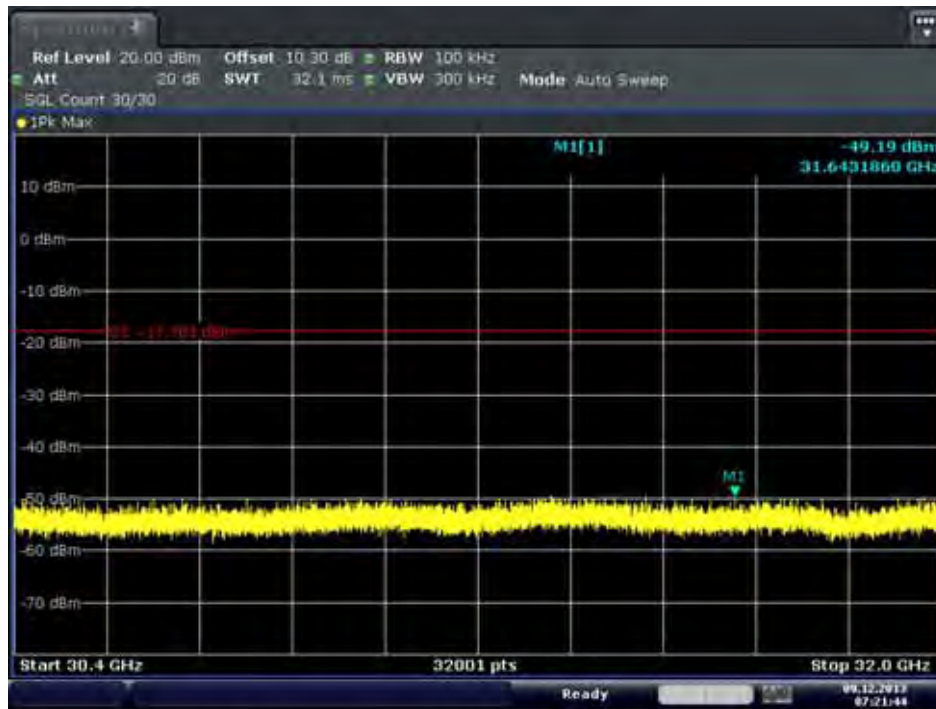


DATE: 9.DEC.2013 07:21:32

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

30.4 GHz ~ 32 GHz

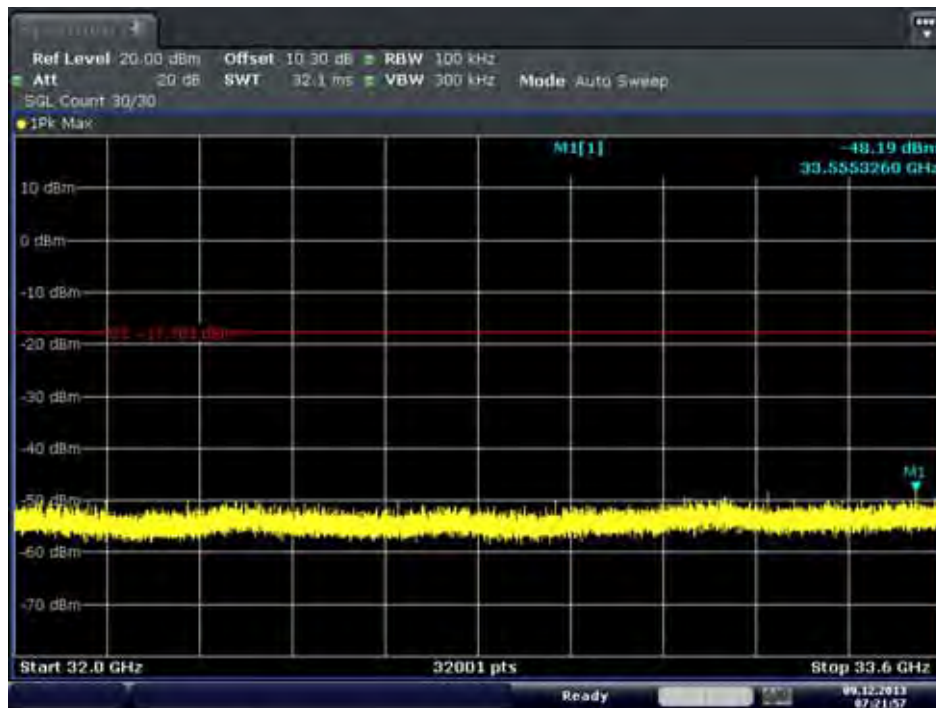
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Data: 9.DEC.2013 07:21:43

32 GHz ~ 33.6 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

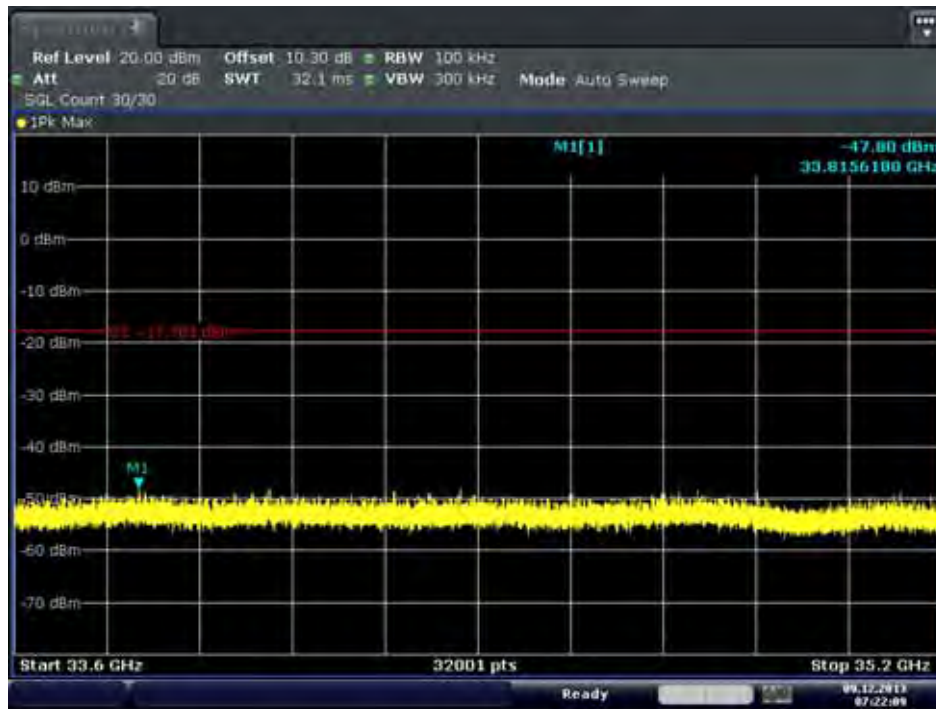


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FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

33.6 GHz ~ 35.2 GHz

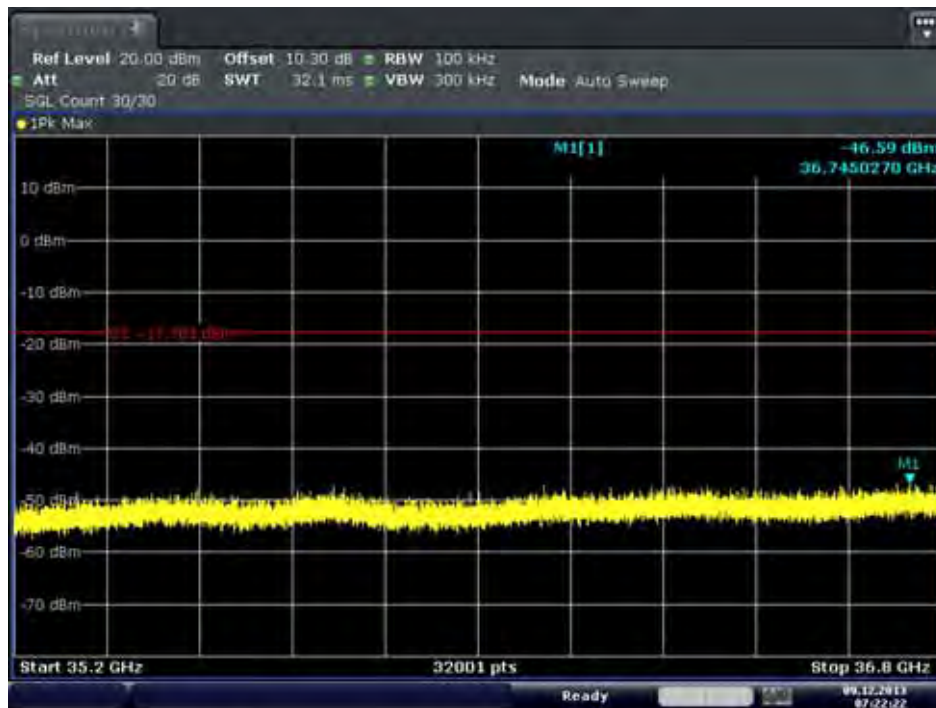
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC.2013 07:22:10

35.2 GHz ~ 36.8 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

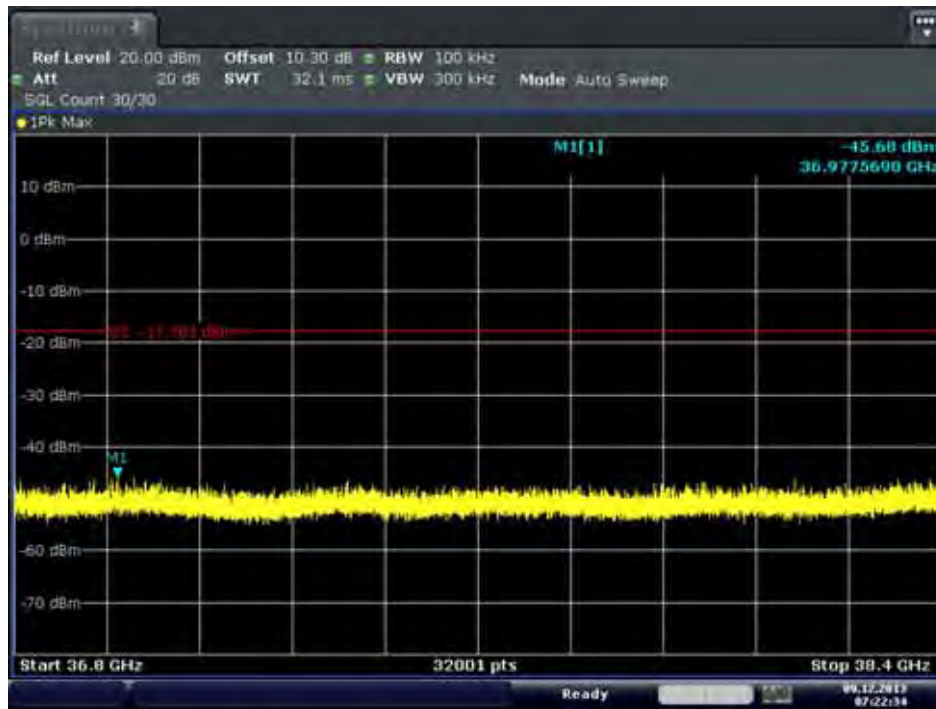


Date: 9.DEC.2013 07:22:22

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

36.8 GHz ~ 38.4 GHz

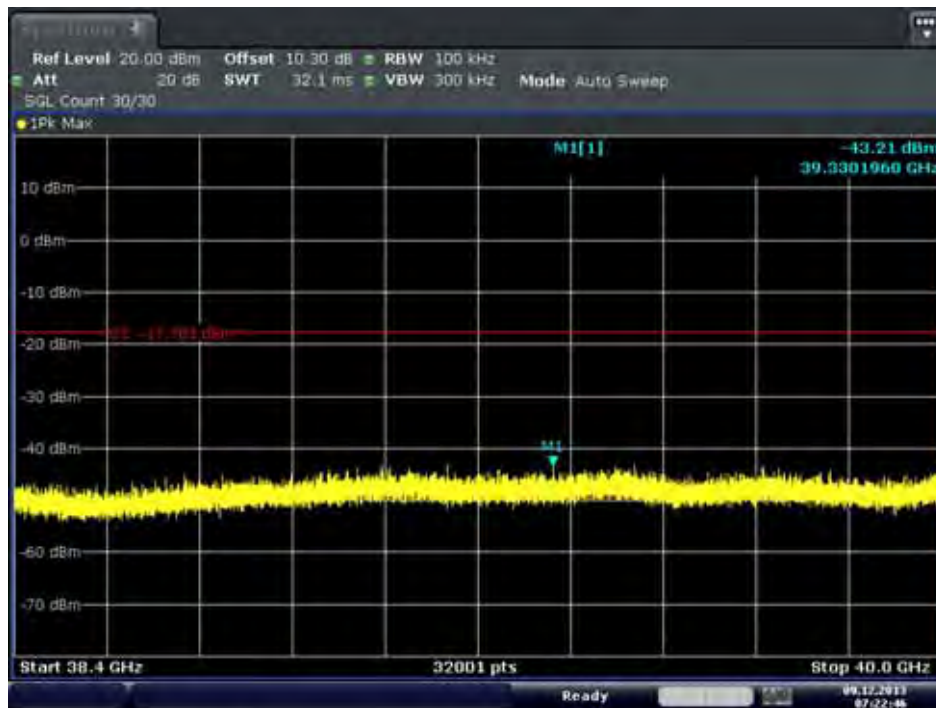
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC,2013 07:22:34

38.4 GHz ~ 40 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC,2013 07:22:47

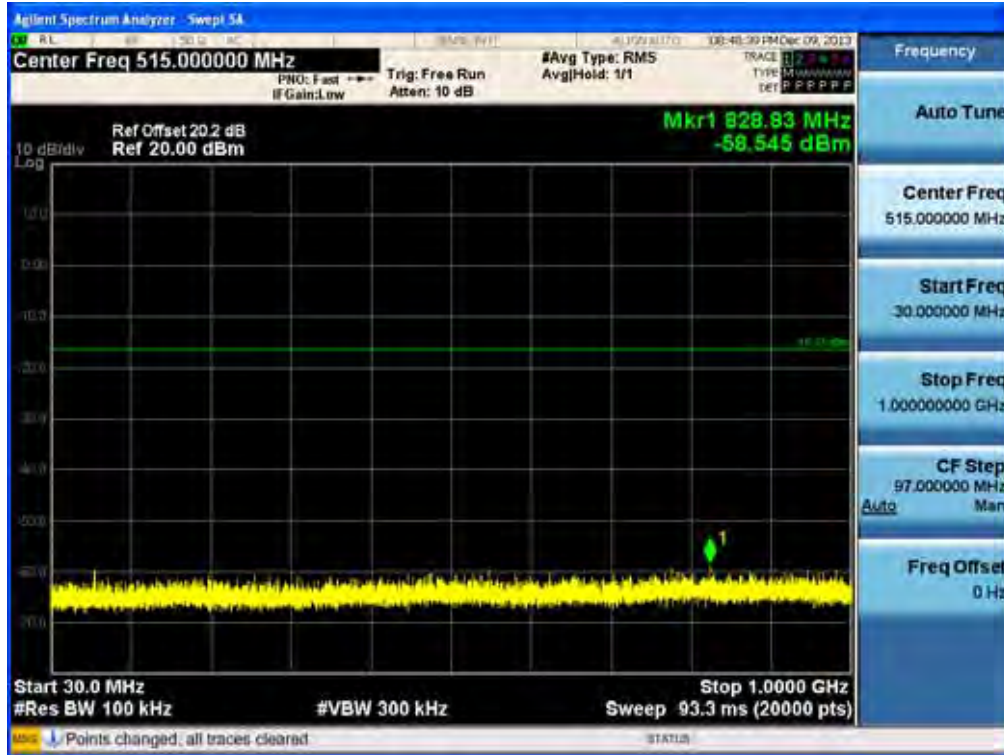
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

RESULT PLOTS_ Ant.1

2.4 GHz Band

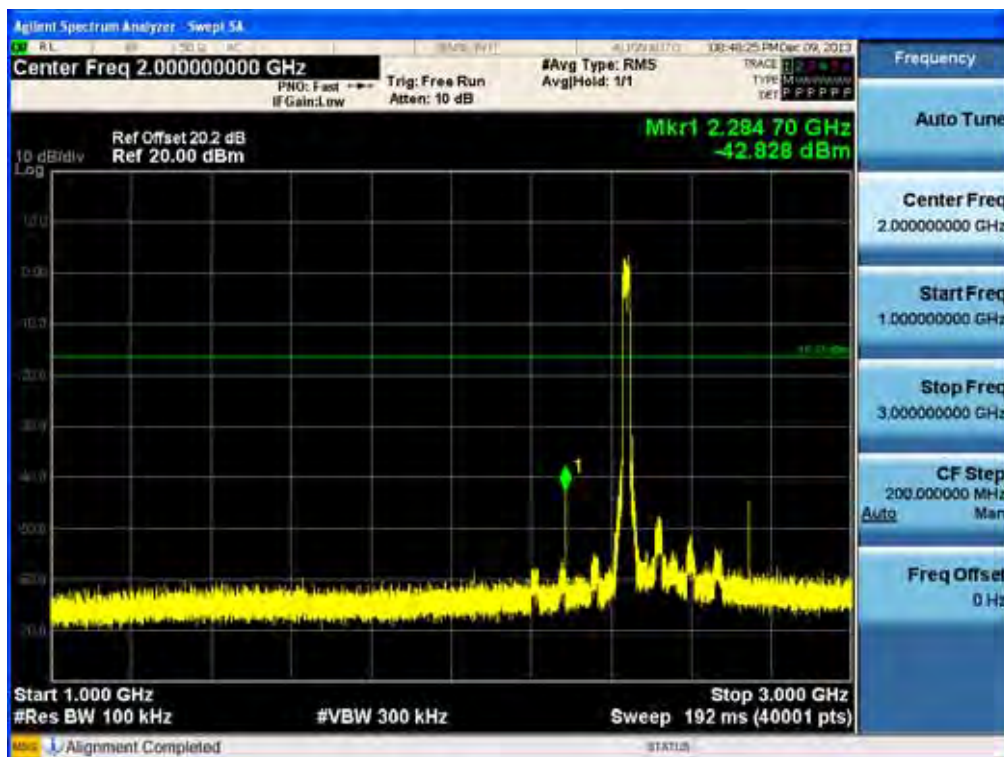
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n-CH6)



1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

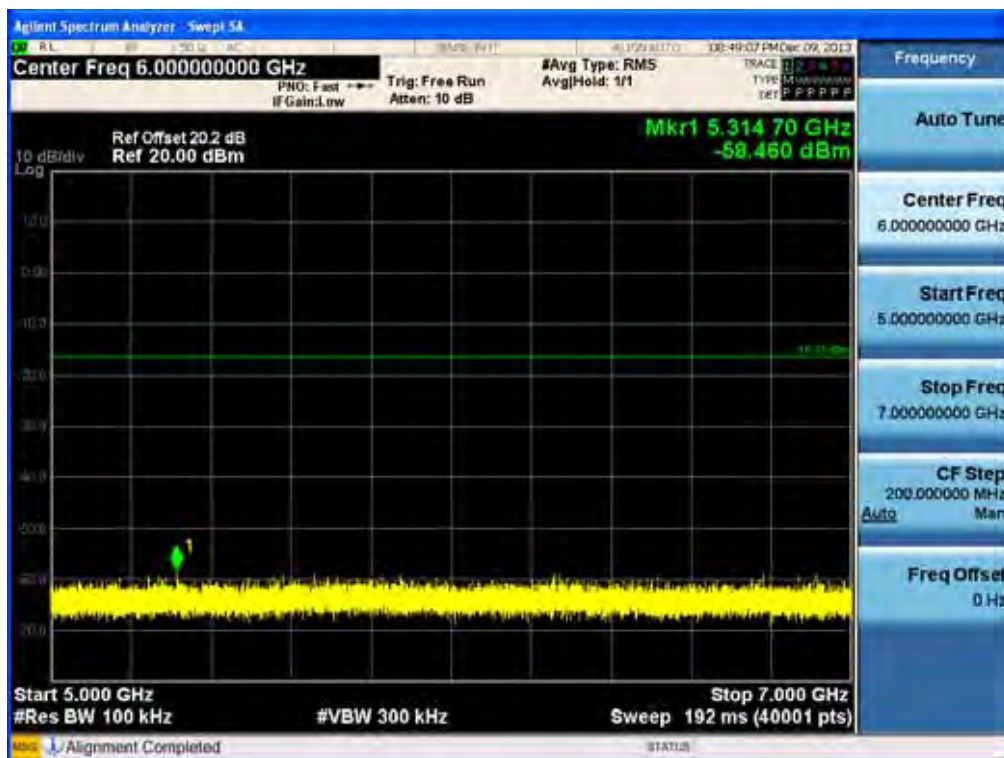
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n-CH6)



5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n-CH6)



9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n-CH6)



13 GHz ~ 15 GHz

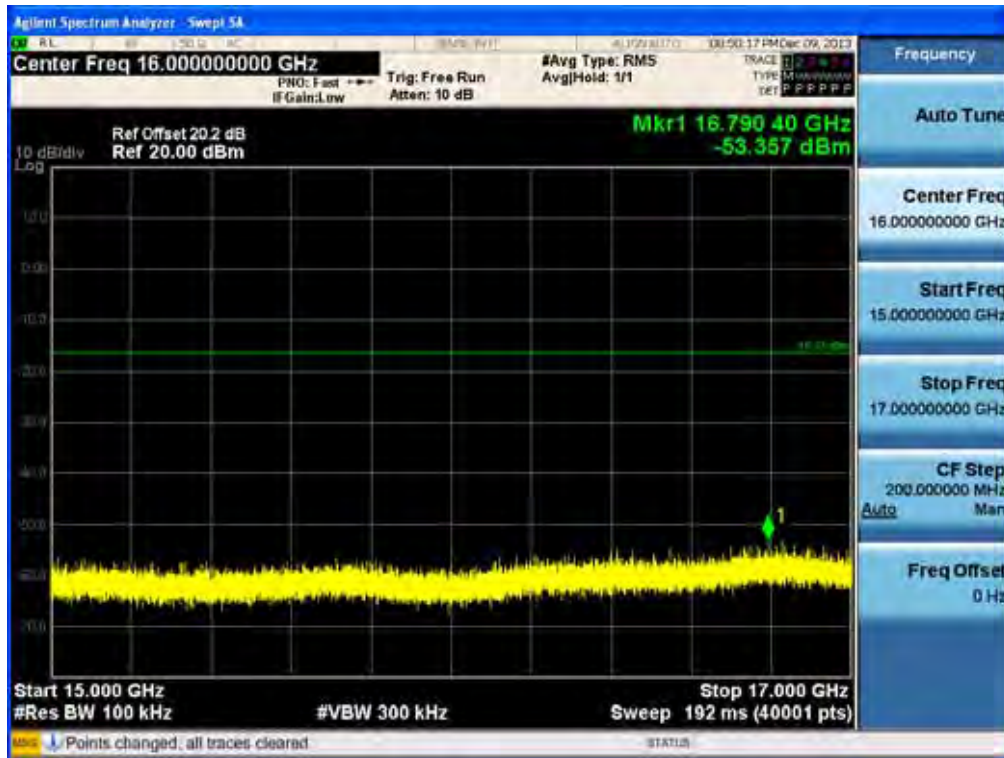
Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

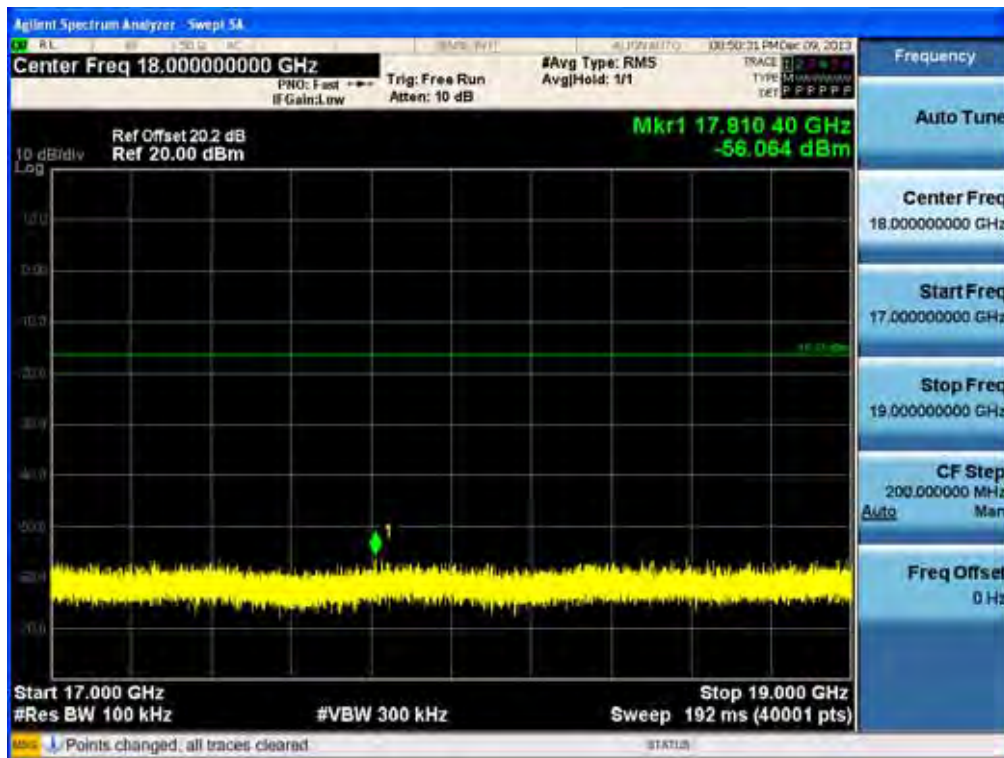
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n-CH6)



17 GHz ~ 19 GHz

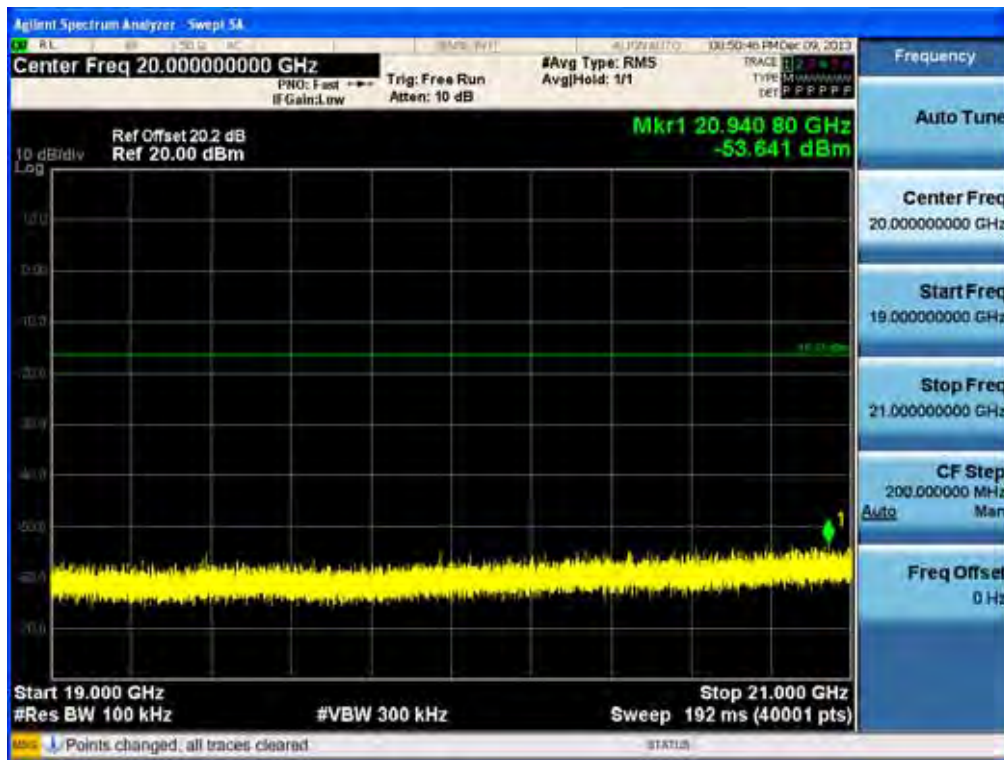
Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11n-CH6)



21 GHz ~ 23 GHz

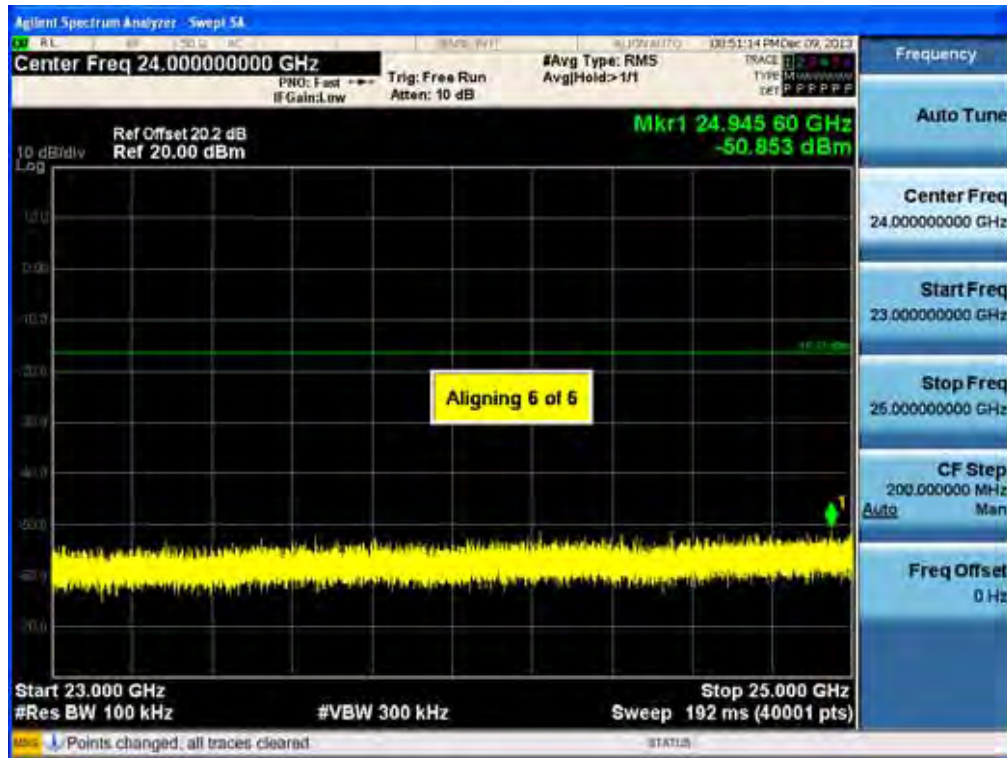
Conducted Spurious Emission (802.11n-CH6)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

23 GHz ~ 25 GHz

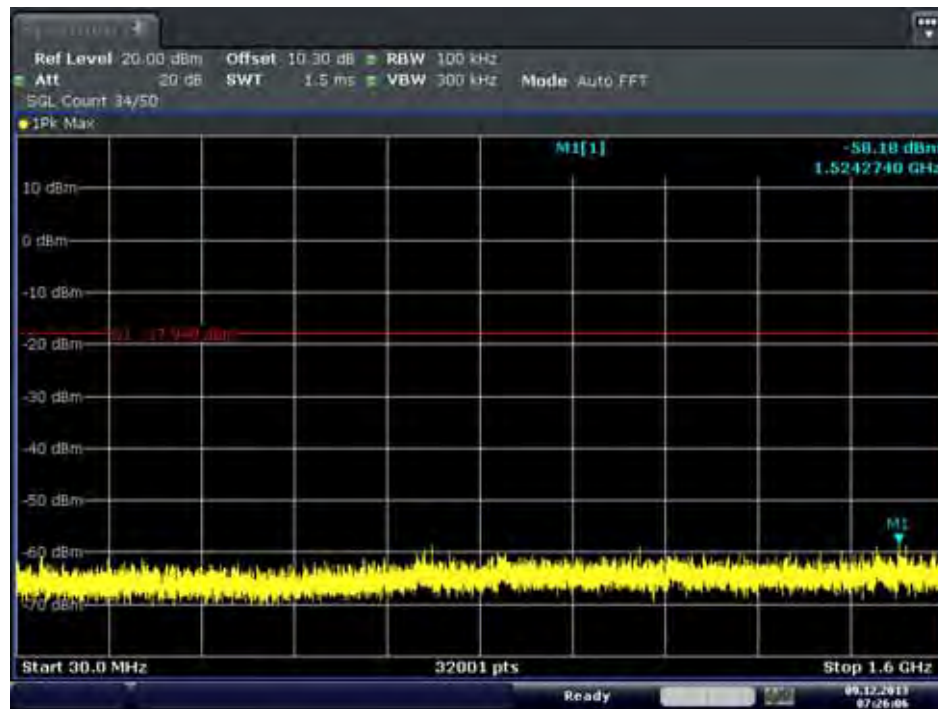
Conducted Spurious Emission (802.11n-CH6)



5.8 GHz Band

30 MHz ~ 1.6 GHz

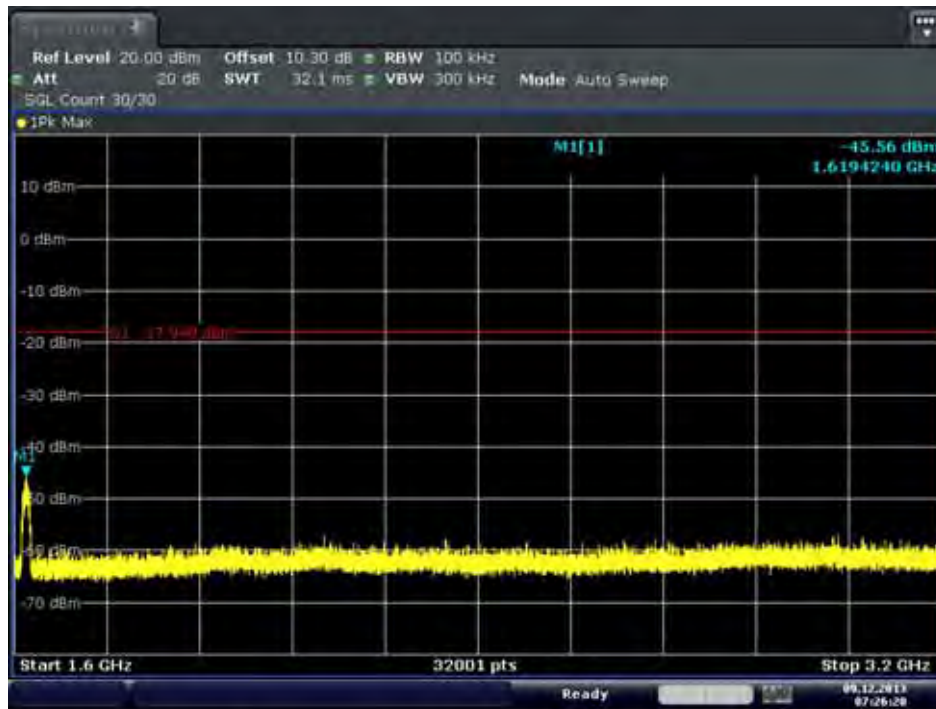
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

1.6 GHz ~ 3.2 GHz

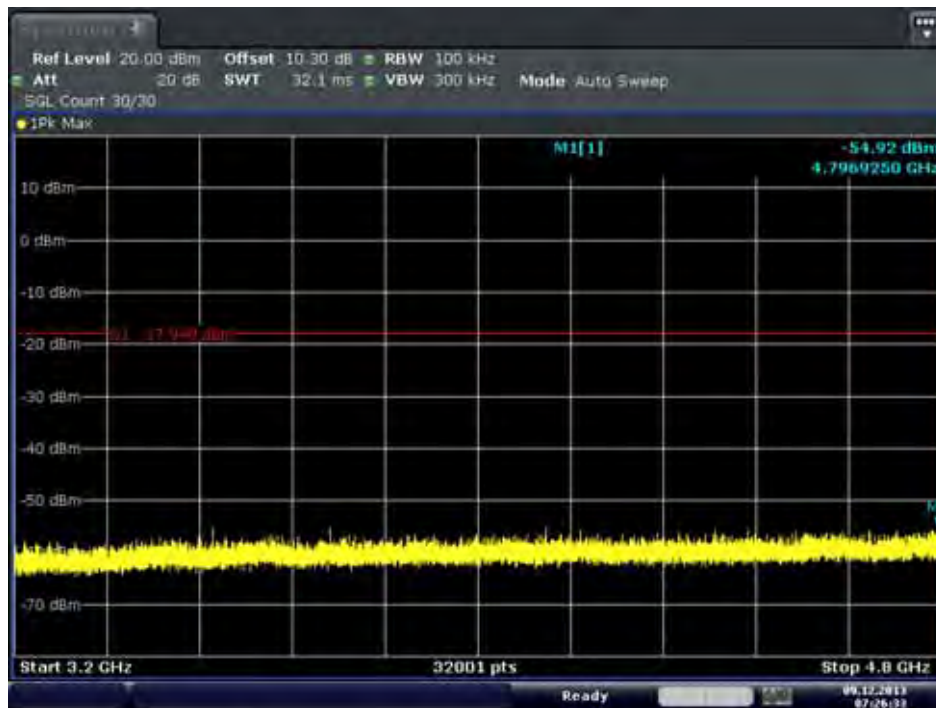
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9, DEC, 2013 07:26:21

3.2 GHz ~ 4.8 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

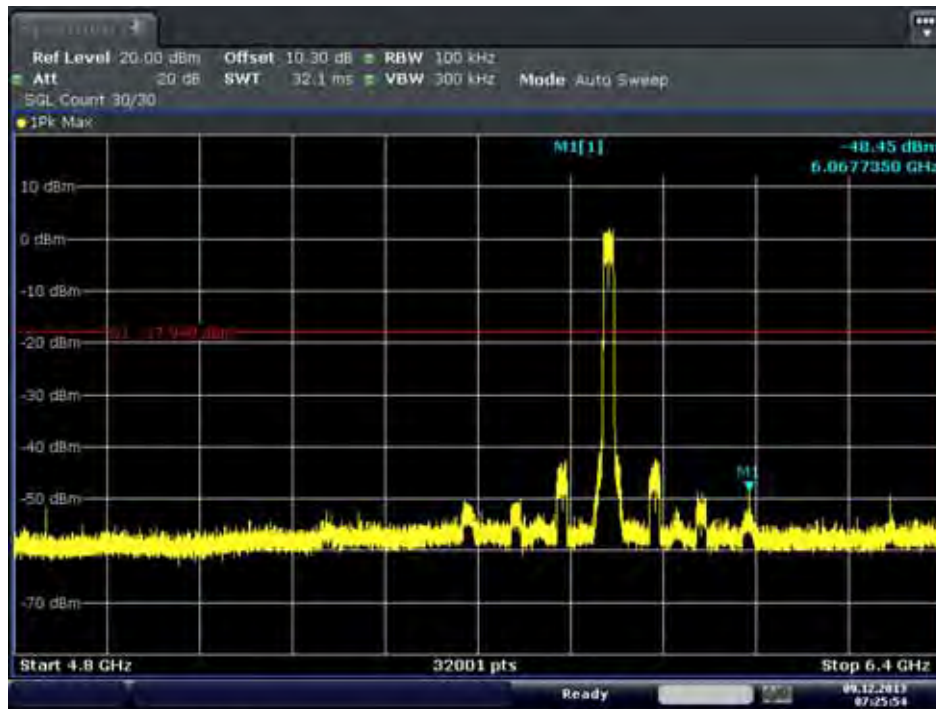


Date: 9, DEC, 2013 07:26:33

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

4.8 GHz ~ 6.4 GHz

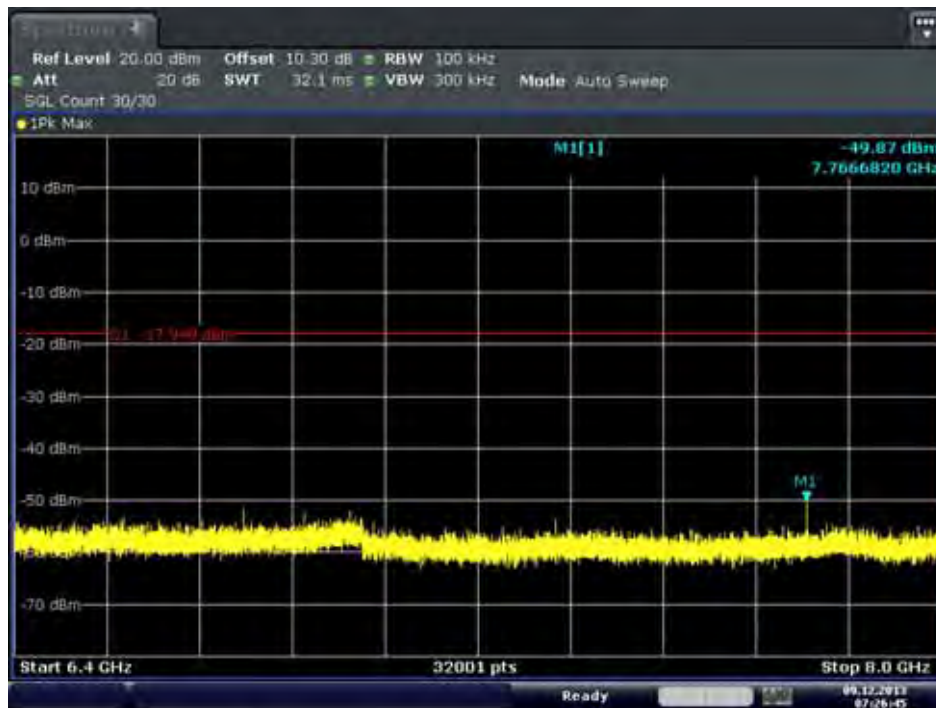
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



DATE: 9. DEC. 2013 07:25:55

6.4 GHz ~ 8 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

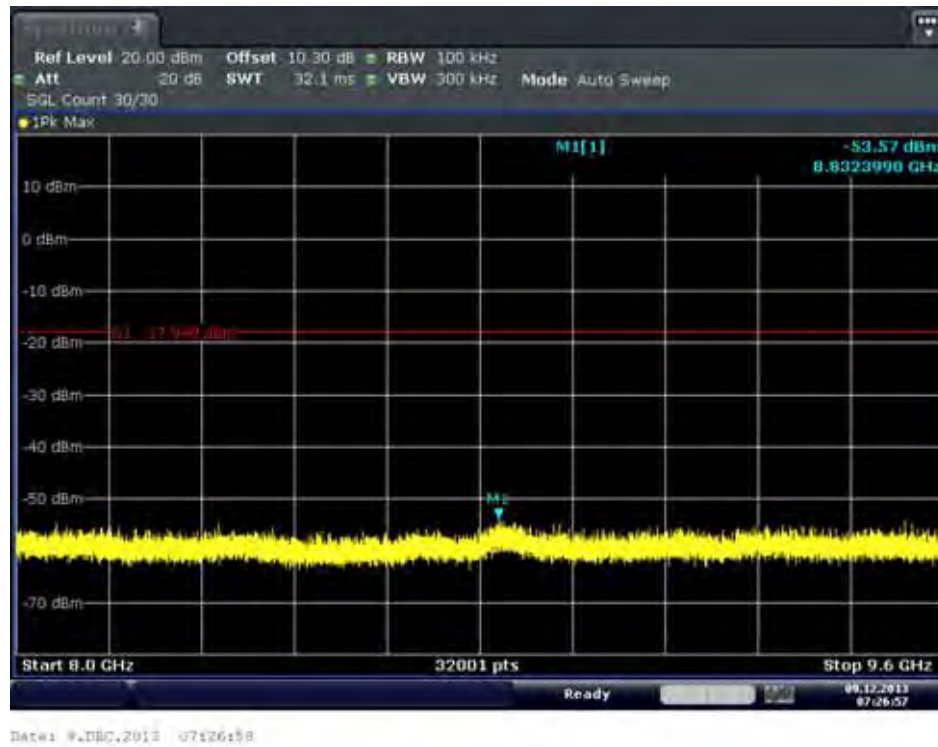


DATE: 9. DEC. 2013 07:26:46

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

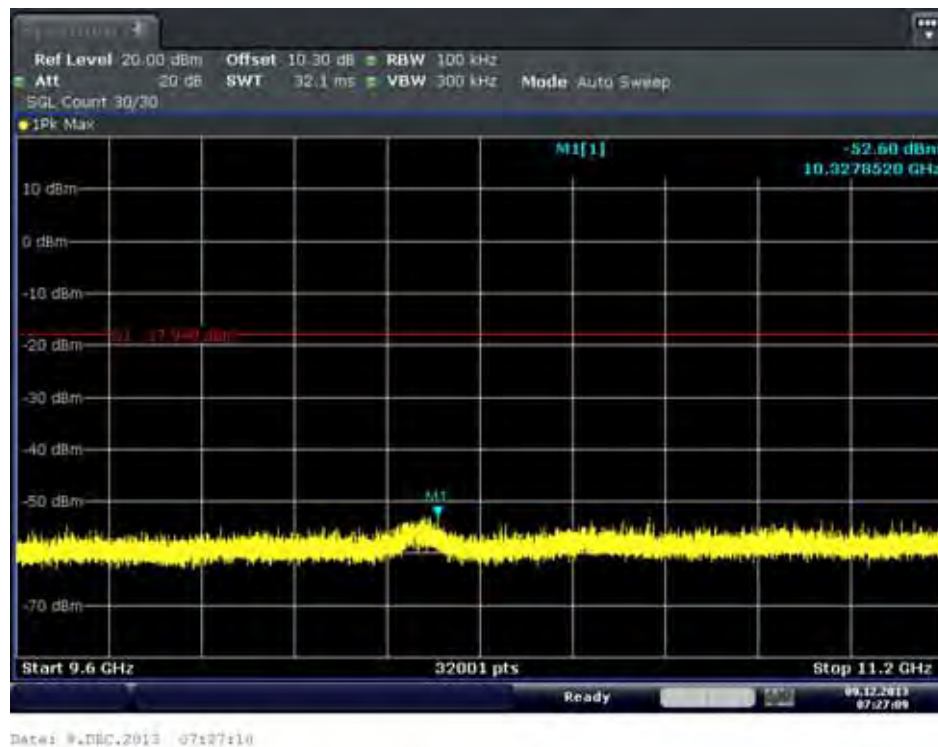
8 GHz ~ 9.6 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



9.6 GHz ~ 11.2 GHz

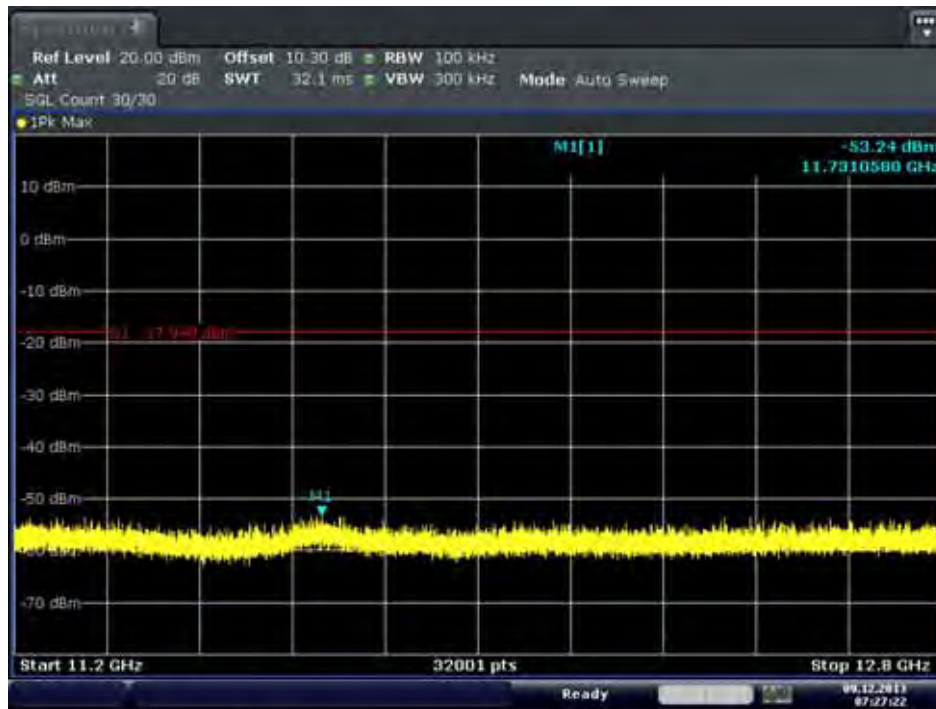
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

11.2 GHz ~ 12.8 GHz

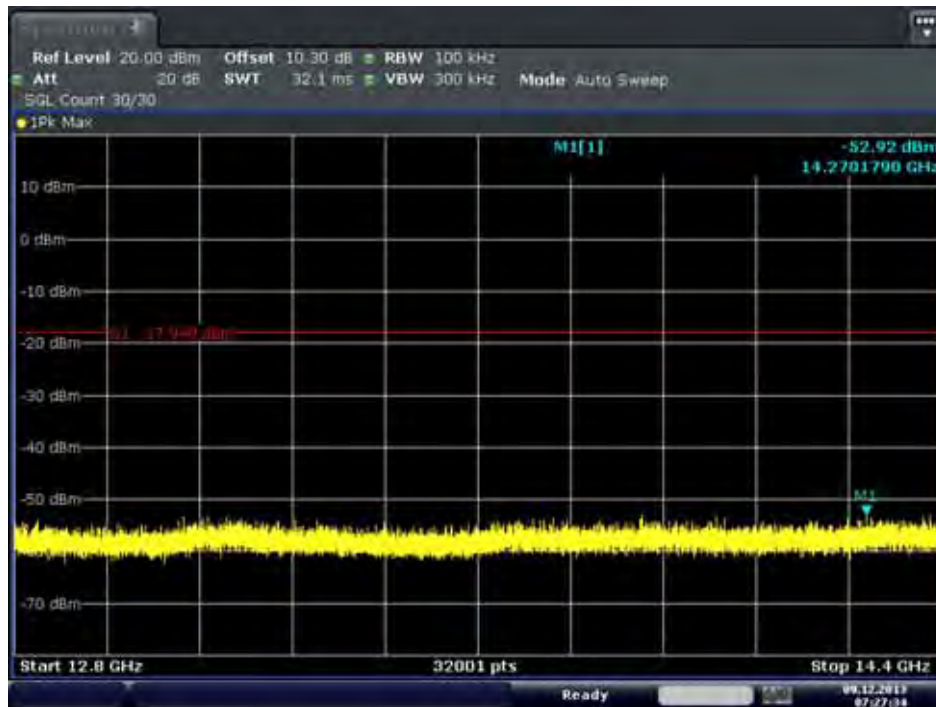
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC.2013 07:27:22

12.8 GHz ~ 14.4 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

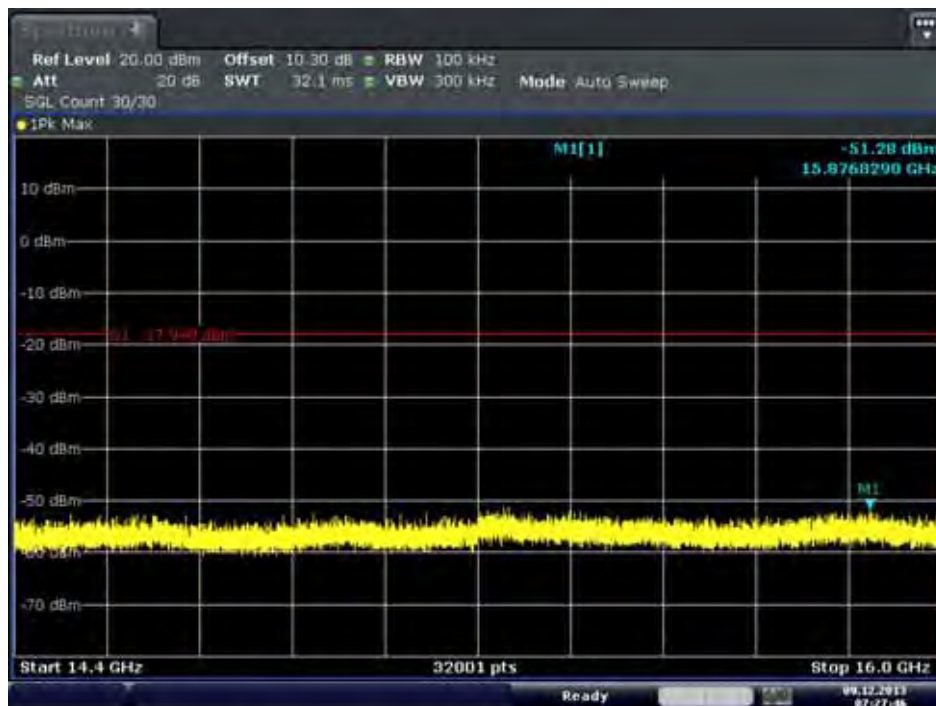


Date: 9.DEC.2013 07:27:34

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

14.4 GHz ~ 16 GHz

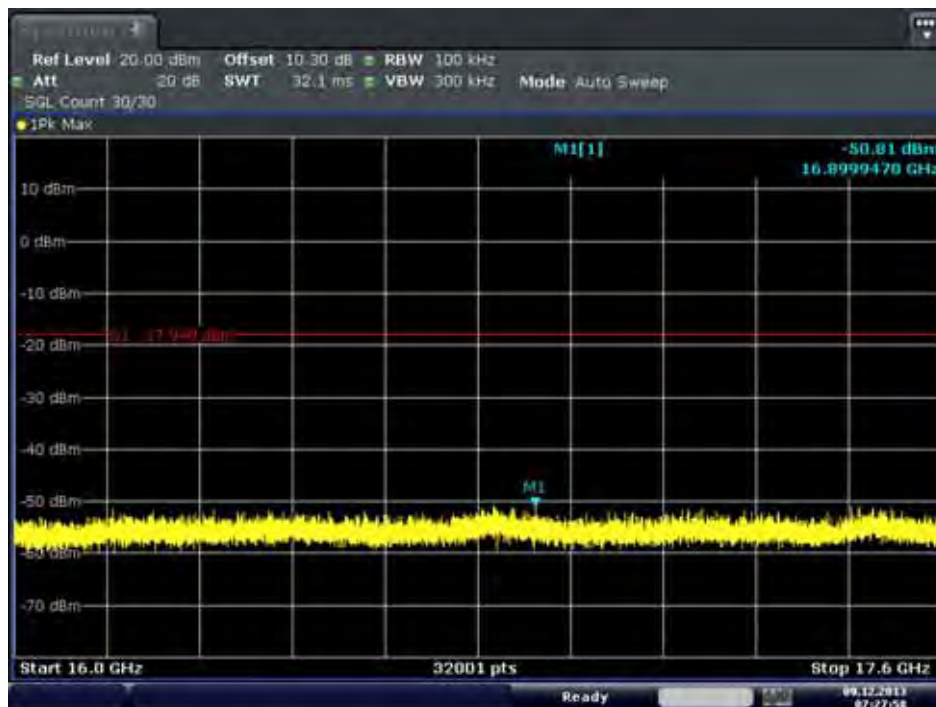
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC.2013 07:27:46

16 GHz ~ 17.6 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

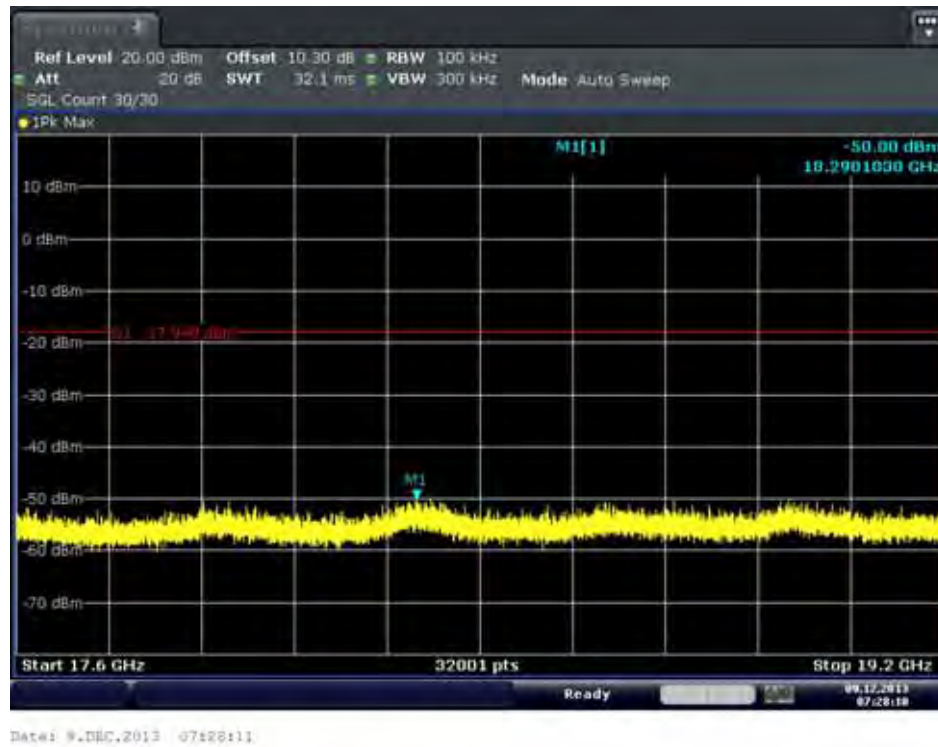


Date: 9.DEC.2013 07:27:58

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

17.6 GHz ~ 19.2 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



19.2 GHz ~ 20.8 GHz

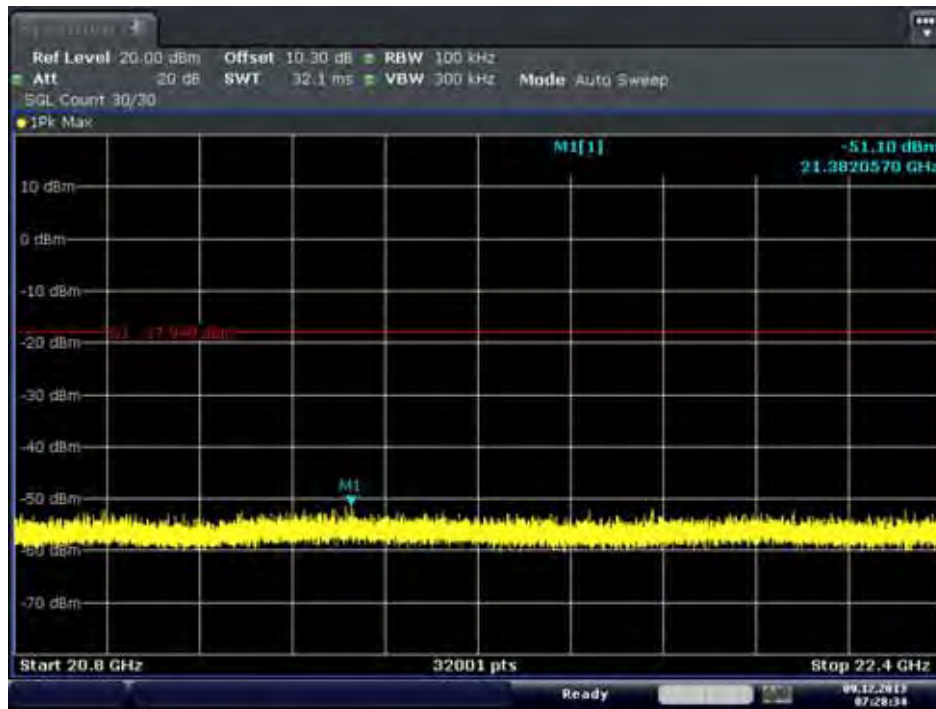
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

20.8 GHz ~ 22.4 GHz

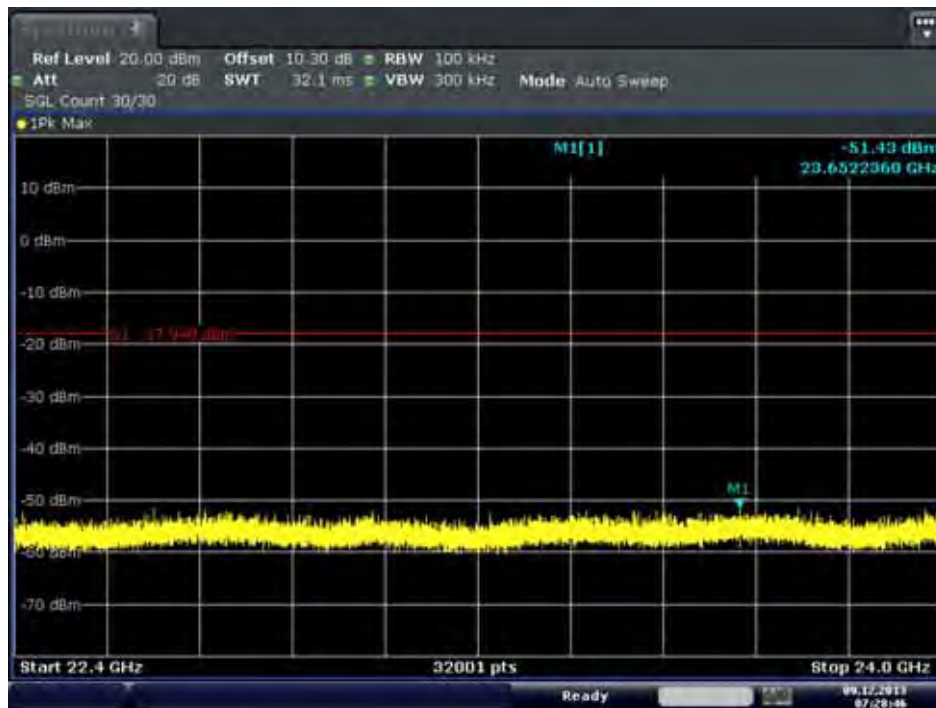
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC.2013 07:28:35

22.4 GHz ~ 24 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

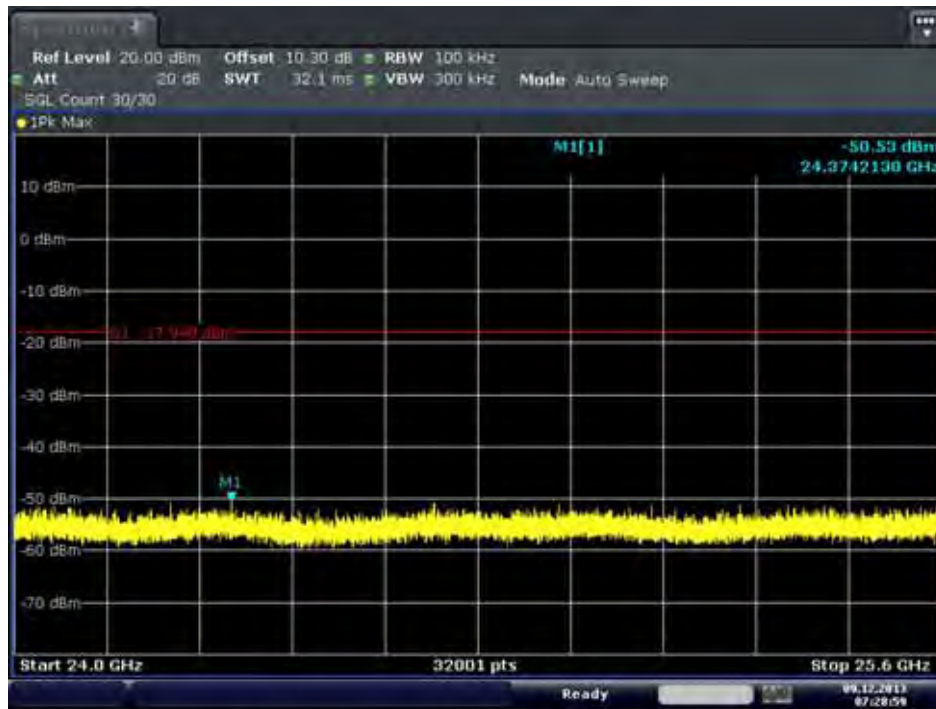


Date: 9.DEC.2013 07:28:47

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

24 GHz ~ 25.6 GHz

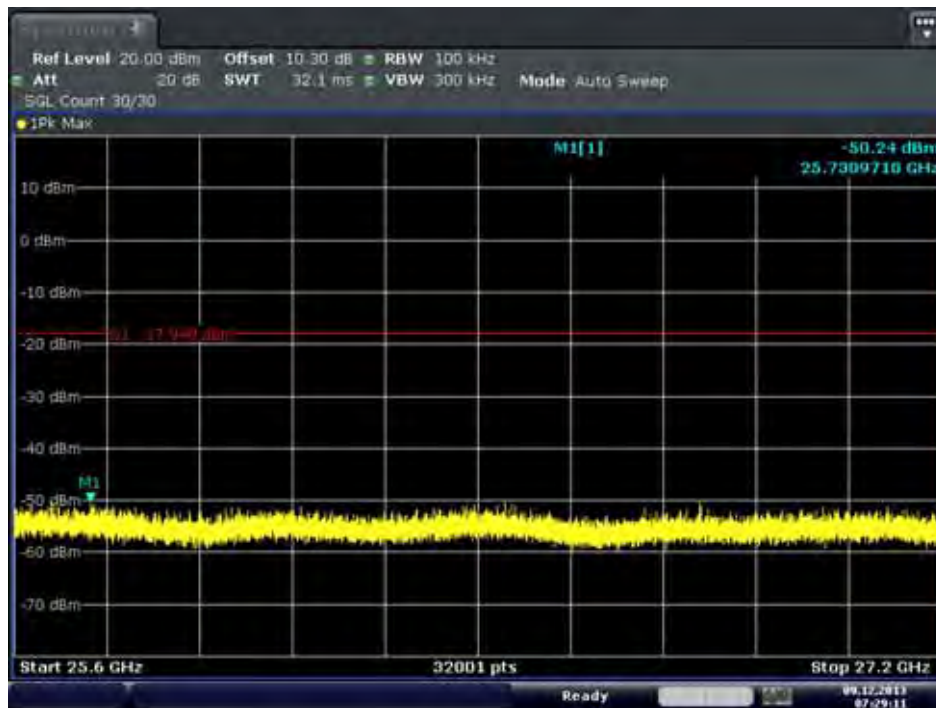
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC.2013 07:28:59

25.6 GHz ~ 27.2 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

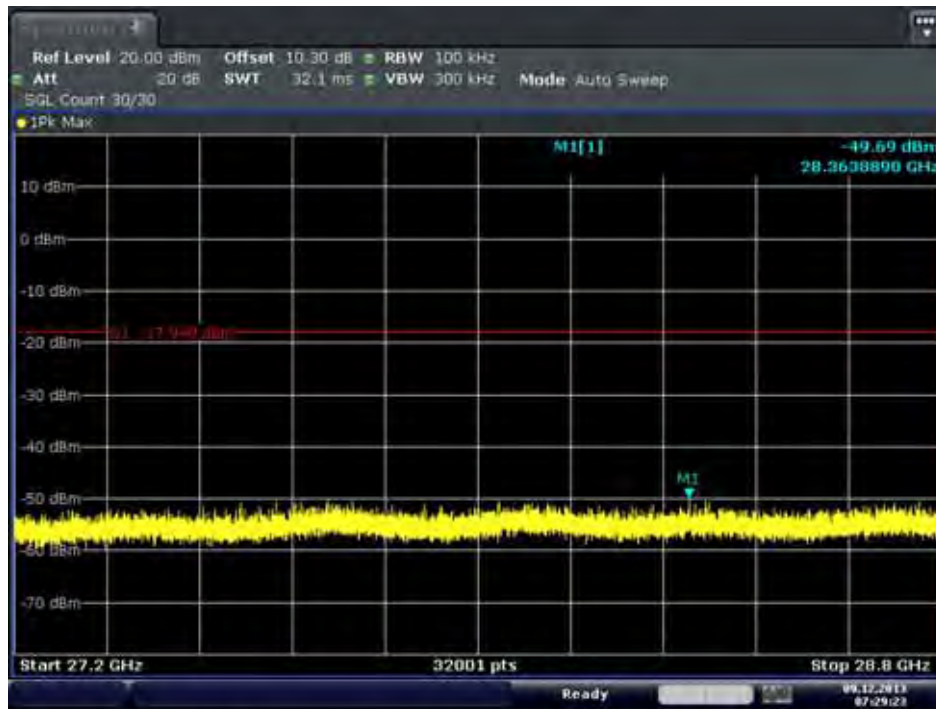


Date: 9.DEC.2013 07:29:11

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

27.2 GHz ~ 28.8 GHz

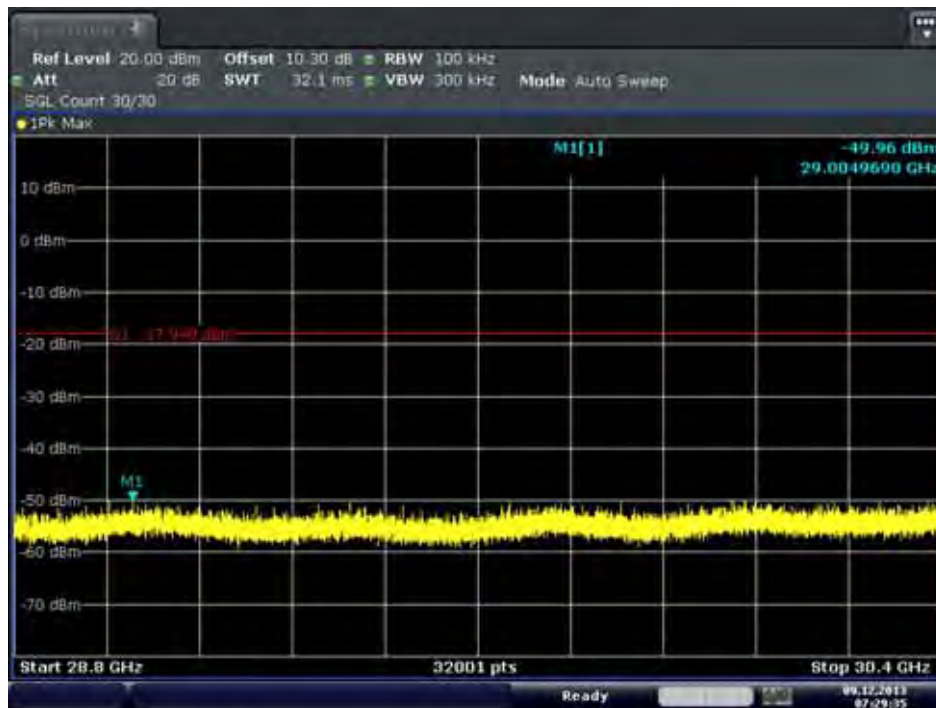
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9.DEC.2013 07:29:24

28.8 GHz ~ 30.4 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

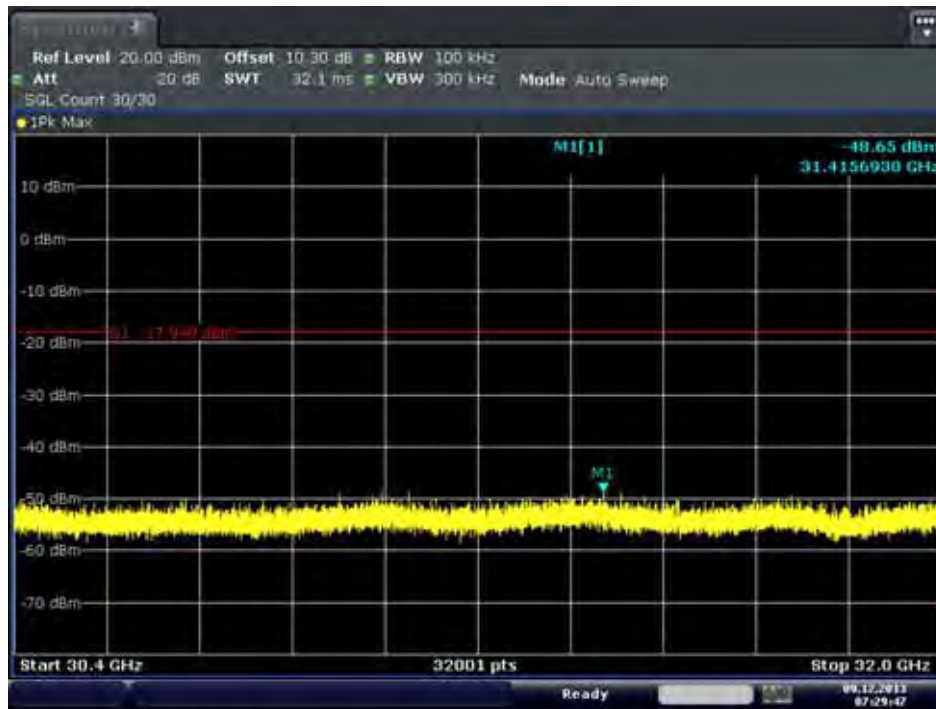


Date: 9.DEC.2013 07:29:36

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

30.4 GHz ~ 32 GHz

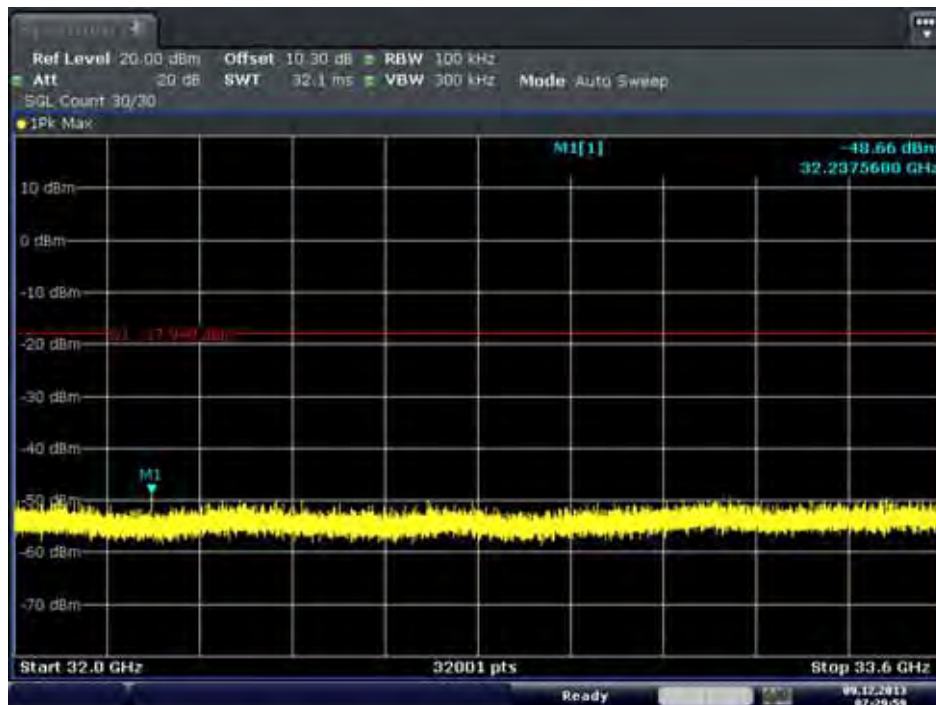
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



DATE: 10.DEC.2013 07:29:18

32 GHz ~ 33.6 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

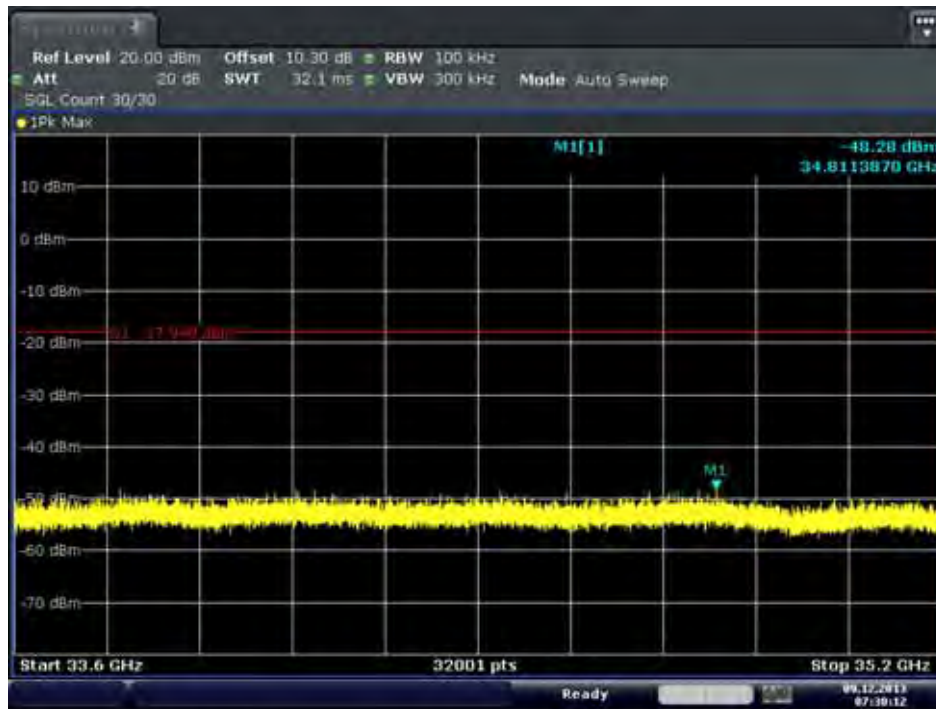


DATE: 10.DEC.2013 07:30:00

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

33.6 GHz ~ 35.2 GHz

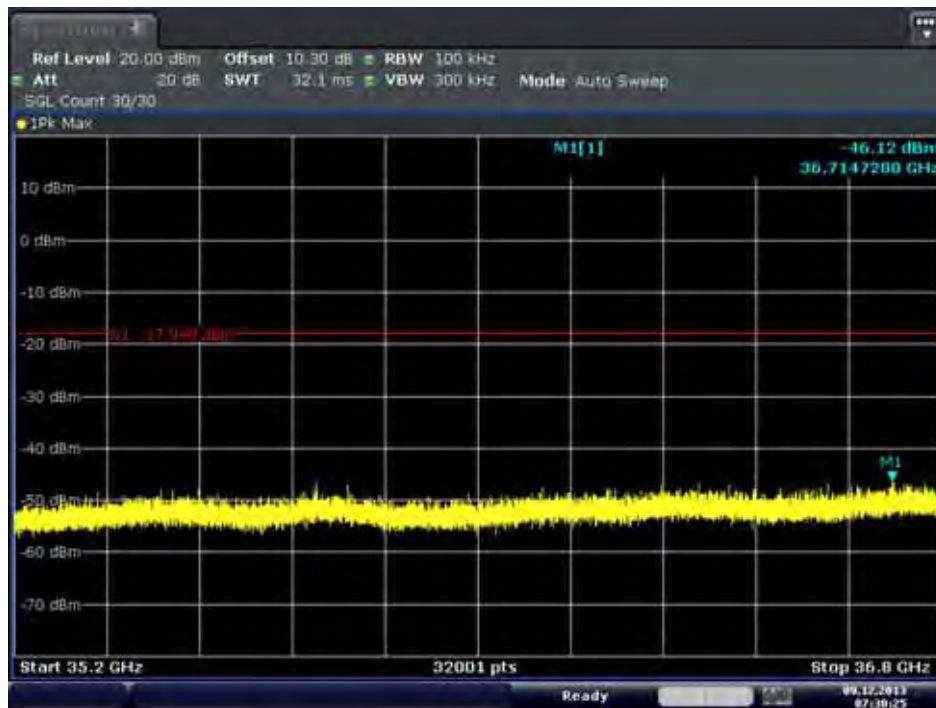
Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



Date: 9 DEC 2013 07:30:13

35.2 GHz ~ 36.8 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW

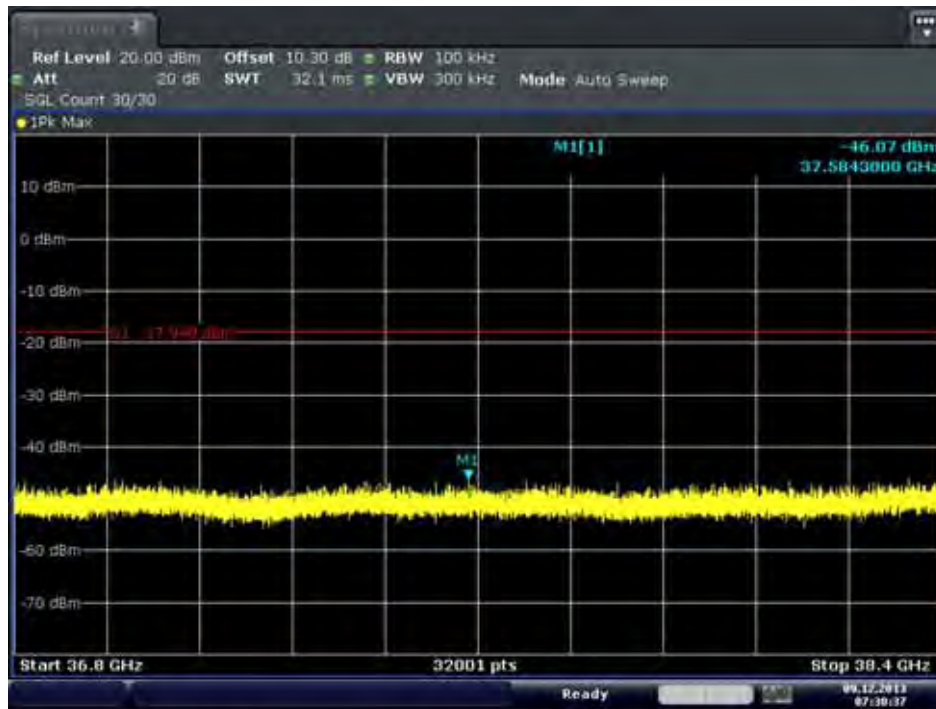


Date: 9 DEC 2013 07:30:25

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

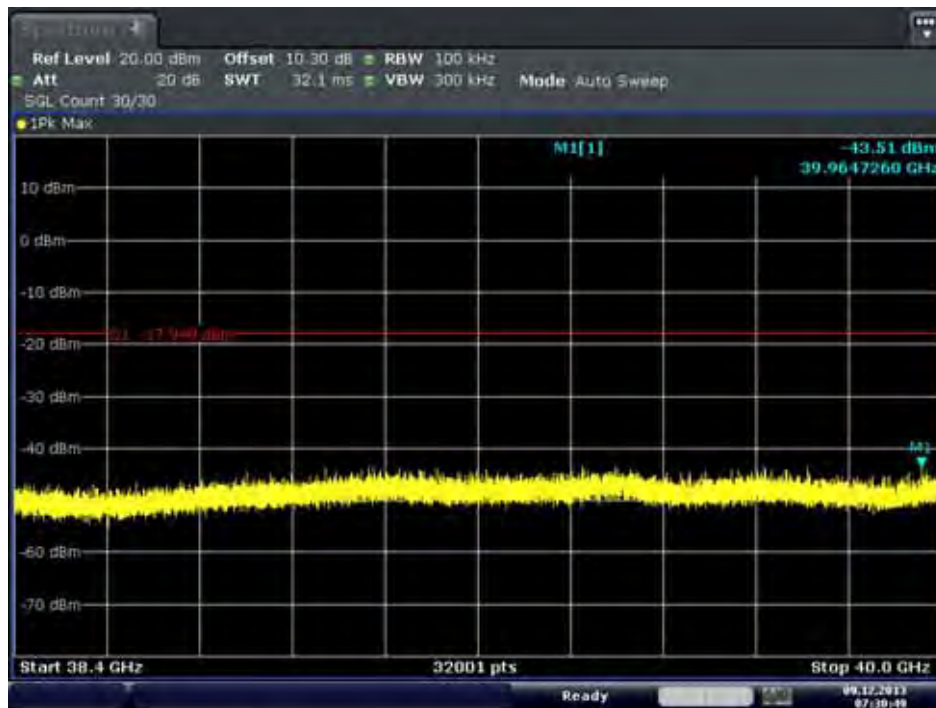
36.8 GHz ~ 38.4 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



38.4 GHz ~ 40 GHz

Conducted Spurious Emission (802.11n-CH165) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

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

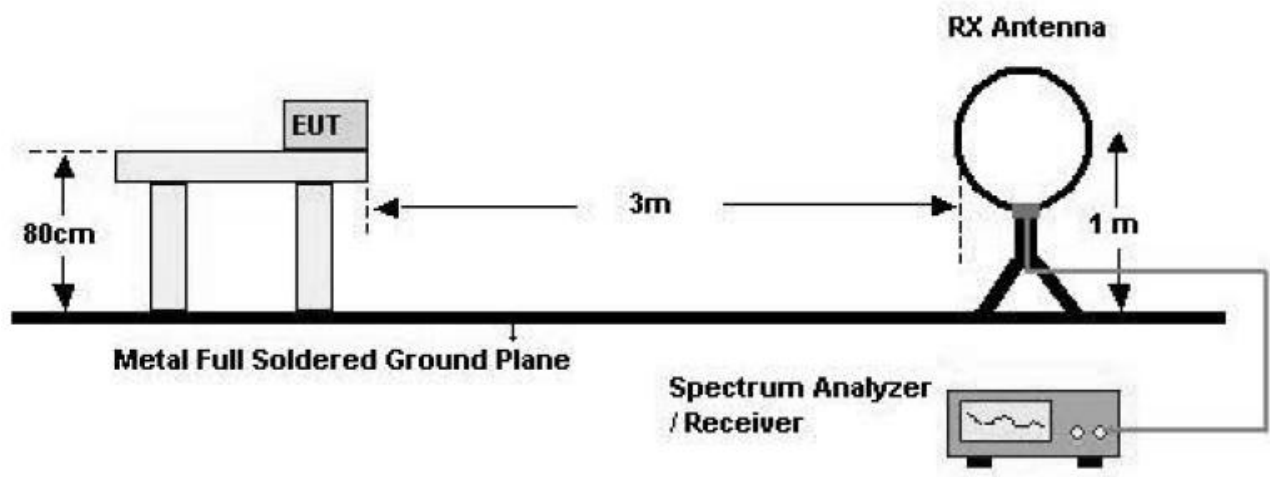
Test case

SISO	Ant 0
	Ant 1
MIMO	Ant 0 & 1

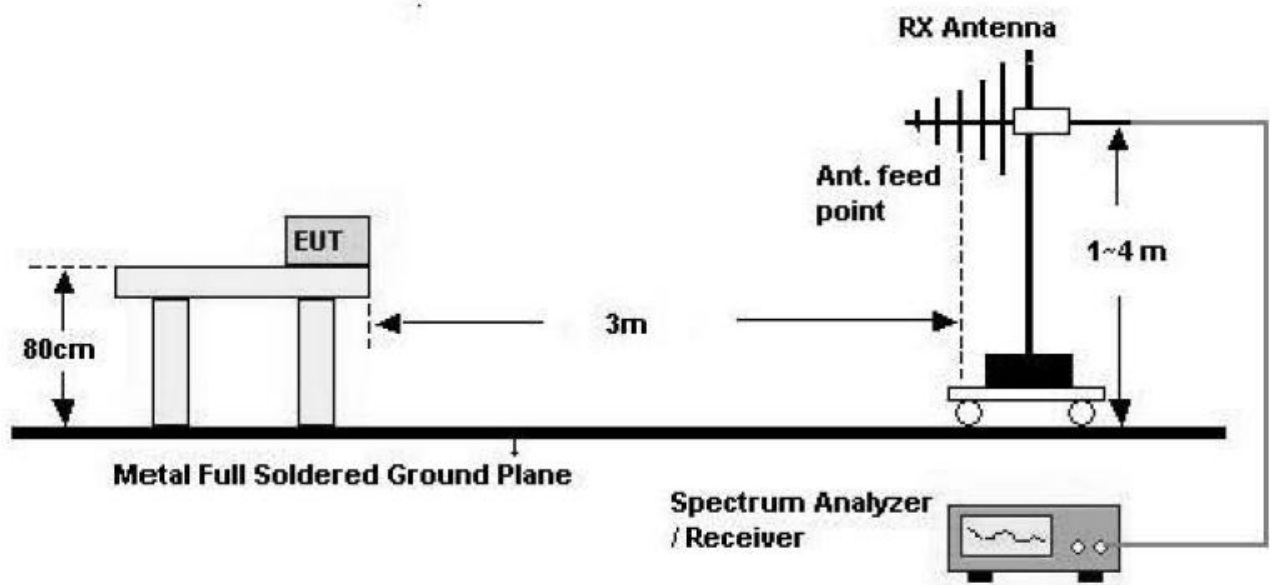
Note : We have done all test case. Worst case is Ant 0 & 1 for 802.11g/n/ac and Ant.0 for 802.11b.
So, we attached the results of only worst case.

Test Configuration

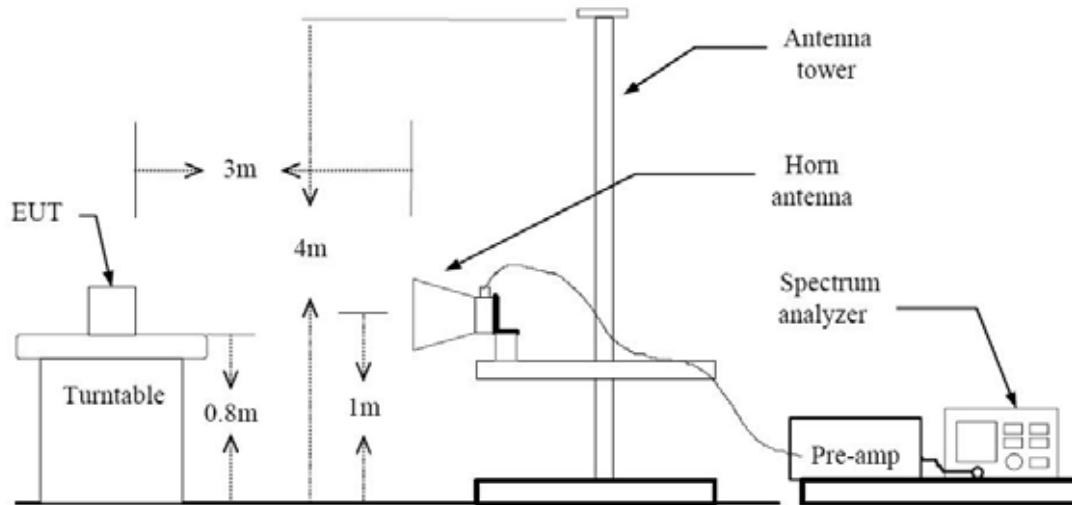
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

ANSI C63.4(2003)

Method 12.2.4 in KDB 558074, issued 04/09/2013 (Peak)

Method 12.2.5.1 in KDB 558074, issued 04/09/2013(Average Case 1)

Method 12.2.5.3 in KDB 558074, issued 04/09/2013(Average Case 2)

Spectrum Setting

- Peak

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

RBW = cf. Table 1.

VBW $\geq 3 \times$ 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

Case 1

If the EUT can be configured or modified to transmit continuously (duty cycle ≥ 98 percent) then the average emission levels shall be measured using the following method (with EUT transmitting continuously).

RBW = 1 MHz (unless otherwise specified).

VBW $\geq 3 \times$ RBW.

Detector = RMS, if span/(# of points in sweep) $\leq$ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

Averaging type = power (i.e., RMS).

- 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
- 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

Sweep time = auto.

Perform a trace average of at least 100 traces.

Case 2

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is not constant (i.e., duty cycle variations exceed ± 2 percent), then the following procedure shall be used:

Set RBW = 1 MHz.

Set VBW $\geq 1/T$.

Video bandwidth mode or display mode

- 1) The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to Power (RMS).
- 2) As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow max hold to run for at least 50 times (1/duty cycle) traces.

Note :

1. We used the case 1 for 802.11ac_20 mode and the case 2 for 802.11b/a/g/n_20/n_40/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 802.11b/a/g/n_20/n_40/ac_40/ac_80.

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

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	6	12.400	13.050	0.95019157	80.6	100
a	6	2.060	2.170	0.94930876	485.4	1000
g	6	2.060	2.170	0.94930876	485.4	1000
n_20	6.5	1.915	2.015	0.95037221	522.2	1000
n_40	13.5	0.942	1.041	0.90489914	1061.6	3000
ac_40	13.5	0.947	0.978	0.96830266	1056.0	3000
ac_80	29.3	0.458	0.764	0.59947644	2183.4	3000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

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

Notes:

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

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

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

Notes:

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

Above 1 GHz

Ant.0

Band :	2.4 GHz
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	57.02	-1.98	V	55.04	73.98	18.94	PK
4824	53.57	-1.98	V	51.59	53.98	2.39	AV
7236	46.17	7.60	V	53.77	73.98	20.21	PK
7236	31.89	7.60	V	39.49	53.98	14.49	AV
4824	57.32	-1.98	H	55.34	73.98	18.64	PK
4824	53.89	-1.98	H	51.91	53.98	2.07	AV
7236	45.88	7.60	H	53.48	73.98	20.50	PK
7236	31.70	7.60	H	39.30	53.98	14.68	AV

Band :	2.4 GHz
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	56.41	-1.92	V	54.49	73.98	19.49	PK
4874	52.81	-1.92	V	50.89	53.98	3.09	AV
7311	46.55	7.38	V	53.93	73.98	20.05	PK
7311	32.59	7.38	V	39.97	53.98	14.01	AV
4874	56.60	-1.92	H	54.68	73.98	19.30	PK
4874	53.21	-1.92	H	51.29	53.98	2.69	AV
7311	46.92	7.38	H	54.30	73.98	19.68	PK
7311	32.64	7.38	H	40.02	53.98	13.96	AV

Band : 2.4 GHz
 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	56.83	-1.93	V	54.90	73.98	19.08	PK
4924	53.40	-1.93	V	51.47	53.98	2.51	AV
7386	46.66	7.28	V	53.94	73.98	20.04	PK
7386	32.71	7.28	V	39.99	53.98	13.99	AV
4924	57.28	-1.93	H	55.35	73.98	18.63	PK
4924	53.79	-1.93	H	51.86	53.98	2.12	AV
7386	46.15	7.28	H	53.43	73.98	20.55	PK
7386	32.46	7.28	H	39.74	53.98	14.24	AV

Notes:

11. 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

Band :	2.4 GHz
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	66.34	-1.98	V	64.36	73.98	9.62	PK
4824	48.57	-1.98	V	46.59	53.98	7.39	AV
7236	45.95	7.60	V	53.55	73.98	20.43	PK
7236	32.01	7.60	V	39.61	53.98	14.37	AV
4824	66.99	-1.98	H	65.01	73.98	8.97	PK
4824	48.95	-1.98	H	46.97	53.98	7.01	AV
7236	45.99	7.60	H	53.59	73.98	20.39	PK
7236	31.96	7.60	H	39.56	53.98	14.42	AV

Band :	2.4 GHz
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	63.33	-1.92	V	61.41	73.98	12.57	PK
4874	46.22	-1.92	V	44.30	53.98	9.68	AV
7311	46.94	7.38	V	54.32	73.98	19.66	PK
7311	32.77	7.38	V	40.15	53.98	13.83	AV
4874	63.71	-1.92	H	61.79	73.98	12.19	PK
4874	46.67	-1.92	H	44.75	53.98	9.23	AV
7311	46.60	7.38	H	53.98	73.98	20.00	PK
7311	32.68	7.38	H	40.06	53.98	13.92	AV

Band :	2.4 GHz
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	61.25	-1.93	V	59.32	73.98	14.66	PK
4924	45.61	-1.93	V	43.68	53.98	10.30	AV
7386	46.25	7.28	V	53.53	73.98	20.45	PK
7386	32.99	7.28	V	40.27	53.98	13.71	AV
4924	61.83	-1.93	H	59.90	73.98	14.08	PK
4924	45.93	-1.93	H	44.00	53.98	9.98	AV
7386	46.17	7.28	H	53.45	73.98	20.53	PK
7386	32.89	7.28	H	40.17	53.98	13.81	AV

Notes:

11. 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.

MIMO

Band :	2.4 GHz
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	63.58	-1.98	V	61.60	73.98	12.38	PK
4824	46.00	-1.98	V	44.02	53.98	9.96	AV
7236	46.77	7.60	V	54.37	73.98	19.61	PK
7236	32.41	7.60	V	40.01	53.98	13.97	AV
4824	64.13	-1.98	H	62.15	73.98	11.83	PK
4824	46.36	-1.98	H	44.38	53.98	9.60	AV
7236	46.98	7.60	H	54.58	73.98	19.40	PK
7236	32.54	7.60	H	40.14	53.98	13.84	AV

Band :	2.4 GHz
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	65.01	-1.92	V	63.09	73.98	10.89	PK
4874	45.78	-1.92	V	43.86	53.98	10.12	AV
7311	47.70	7.38	V	55.08	73.98	18.90	PK
7311	32.88	7.38	V	40.26	53.98	13.72	AV
4874	65.41	-1.92	H	63.49	73.98	10.49	PK
4874	46.07	-1.92	H	44.15	53.98	9.83	AV
7311	46.49	7.38	H	53.87	73.98	20.11	PK
7311	32.85	7.38	H	40.23	53.98	13.75	AV

Band :	2.4 GHz
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	61.55	-1.93	V	59.62	73.98	14.36	PK
4924	43.43	-1.93	V	41.50	53.98	12.48	AV
7386	46.00	7.28	V	53.28	73.98	20.70	PK
7386	32.91	7.28	V	40.19	53.98	13.79	AV
4924	61.80	-1.93	H	59.87	73.98	14.11	PK
4924	43.68	-1.93	H	41.75	53.98	12.23	AV
7386	45.72	7.28	H	53.00	73.98	20.98	PK
7386	32.78	7.28	H	40.06	53.98	13.92	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.

MIMO

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	64.27	-6.10	V	58.17	73.98	15.81	PK
11490	55.36	-6.10	V	49.26	53.98	4.72	AV
11490	65.67	-6.10	H	59.57	73.98	14.41	PK
11490	58.04	-6.10	H	51.94	53.98	2.04	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	63.78	-5.57	V	58.21	73.98	15.77	PK
11570	54.66	-5.57	V	49.09	53.98	4.89	AV
11570	65.68	-5.57	H	60.11	73.98	13.87	PK
11570	57.25	-5.57	H	51.68	53.98	2.30	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	62.99	-6.63	V	56.36	73.98	17.62	PK
11650	53.68	-6.63	V	47.05	53.98	6.93	AV
11650	65.13	-6.63	H	58.50	73.98	15.48	PK
11650	56.28	-6.63	H	49.65	53.98	4.33	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.

MIMO

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	65.01	-6.10	V	58.91	73.98	15.07	PK
11490	55.62	-6.10	V	49.52	53.98	4.46	AV
11490	65.77	-6.10	H	59.67	73.98	14.31	PK
11490	57.98	-6.10	H	51.88	53.98	2.10	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	63.35	-5.57	V	57.78	73.98	16.20	PK
11570	54.62	-5.57	V	49.05	53.98	4.93	AV
11570	65.19	-5.57	H	59.62	73.98	14.36	PK
11570	57.43	-5.57	H	51.86	53.98	2.12	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	63.74	-6.63	V	57.11	73.98	16.87	PK
11650	54.12	-6.63	V	47.49	53.98	6.49	AV
11650	65.53	-6.63	H	58.90	73.98	15.08	PK
11650	56.46	-6.63	H	49.83	53.98	4.15	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

MIMO

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	64.38	-6.26	V	58.12	73.98	15.86	PK
11510	54.96	-6.26	V	48.70	53.98	5.28	AV
11510	66.05	-6.26	H	59.79	73.98	14.19	PK
11510	57.49	-6.26	H	51.23	53.98	2.75	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
11510	64.38	-6.26	V	58.12	73.98	15.86	PK
11510	54.96	-6.26	V	48.70	53.98	5.28	AV
11510	66.05	-6.26	H	59.79	73.98	14.19	PK
11510	57.49	-6.26	H	51.23	53.98	2.75	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.

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1312FR11-1	Date of Issue: December 12, 2013	EUT Type: WIFI Module	FCC ID: BEJLGSWF41	IC: 2703H-LGSWF41

MIMO

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]	Detect
11490	64.74	-6.10	V	58.64	73.98	15.34	PK
11490	55.44	-6.10	V	49.34	53.98	4.64	AV
11490	65.85	-6.10	H	59.75	73.98	14.23	PK
11490	58.08	-6.10	H	51.98	53.98	2.00	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]	Detect
11570	63.56	-5.57	V	57.99	73.98	15.99	PK
11570	54.51	-5.57	V	48.94	53.98	5.04	AV
11570	65.28	-5.57	H	59.71	73.98	14.27	PK
11570	57.09	-5.57	H	51.52	53.98	2.46	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]	Detect
11650	63.78	-6.63	V	57.15	73.98	16.83	PK
11650	53.88	-6.63	V	47.25	53.98	6.73	AV
11650	65.22	-6.63	H	58.59	73.98	15.39	PK
11650	56.30	-6.63	H	49.67	53.98	4.31	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 KDB 644545 D01 Alternative Guidance for 802.11ac v01.

MIMO

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]	Detect
11510	64.48	-6.26	V	58.22	73.98	15.76	PK
11510	55.22	-6.26	V	48.96	53.98	5.02	AV
11510	66.04	-6.26	H	59.78	73.98	14.20	PK
11510	57.96	-6.26	H	51.70	53.98	2.28	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]	Detect
11590	64.11	-5.92	V	58.19	73.98	15.79	PK
11590	54.23	-5.92	V	48.31	53.98	5.67	AV
11590	65.56	-5.92	H	59.64	73.98	14.34	PK
11590	57.06	-5.92	H	51.14	53.98	2.84	AV

MIMO

Band :	5.8 GHz
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]	Detect
11550	63.88	-5.97	V	57.91	73.98	16.07	PK
11550	54.39	-5.97	V	48.42	53.98	5.56	AV
11550	65.07	-5.97	H	59.10	73.98	14.88	PK
11550	56.82	-5.97	H	50.85	53.98	3.13	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 KDB 644545 D01 Alternative Guidance for 802.11ac v01.

8.7.2 RECEIVER SPURIOUS EMISSIONS

FCC Rule(s) §15.109 (see Table Below)
Test Requirements: Emission Level shall not exceed §15.109 limits
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 (mV/m)	Measurement Distance (m)
30 – 88	100 (40 dBuV)	3
88 - 216	150 (43.5 dBuV))	3
216 – 960	200 (46 dBuV)	3
Above 960	500 (54 dBuV)	3

Operation Mode: Receive:

30 MHz ~ 1 GHz

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

Above 1 GHz

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

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)).

Ant.0

Band :	2.4 GHz
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	25.69	31.47	H	57.16	73.98	16.82	PK
2390.0	13.66	31.47	H	45.13	53.98	8.85	AV
2390.0	25.89	31.47	V	57.36	73.98	16.62	PK
2390.0	13.74	31.47	V	45.21	53.98	8.77	AV
2483.5	25.52	31.46	H	56.98	73.98	17.00	PK
2483.5	14.40	31.46	H	45.86	53.98	8.12	AV
2483.5	25.03	31.46	V	56.49	73.98	17.49	PK
2483.5	14.24	31.46	V	45.70	53.98	8.28	AV

MIMO

Band :	2.4 GHz
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	35.87	31.47	H	67.34	73.98	6.64	PK
2390.0	14.95	31.47	H	46.42	53.98	7.56	AV
2390.0	35.02	31.47	V	66.49	73.98	7.49	PK
2390.0	14.67	31.47	V	46.14	53.98	7.84	AV
2483.5	39.51	31.46	H	70.97	73.98	3.01	PK
2483.5	16.73	31.46	H	48.19	53.98	5.79	AV
2483.5	39.11	31.46	V	70.57	73.98	3.41	PK
2483.5	16.31	31.46	V	47.77	53.98	6.21	AV

MIMO

Band :	2.4 GHz
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	39.93	31.47	H	71.40	73.98	2.58	PK
2390.0	17.80	31.47	H	49.27	53.98	4.71	AV
2390.0	39.24	31.47	V	70.71	73.98	3.27	PK
2390.0	17.40	31.47	V	48.87	53.98	5.11	AV
2483.5	40.10	31.46	H	71.56	73.98	2.42	PK
2483.5	16.50	31.46	H	47.96	53.98	6.02	AV
2483.5	39.31	31.46	V	70.77	73.98	3.21	PK
2483.5	16.12	31.46	V	47.58	53.98	6.40	AV

MIMO

Band:	5.8 GHz
Operation Mode:	802.11ac_20 MHz
Transfer Rate:	13.5 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp Gain [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
*5901	52.93	12.83	H	65.76	68.20	2.44	PK
*5901	52.77	12.83	V	65.60	68.20	2.60	AV

MIMO

Band:	5.8 GHz
Operation Mode:	802.11ac_20 MHz
Transfer Rate:	13.5 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp Gain [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
*5863	52.91	12.65	H	65.54	68.20	2.66	PK
*5863	52.63	12.65	V	65.26	68.20	2.94	AV

MIMO

Band:	5.8 GHz
Operation Mode:	802.11ac_20 MHz
Transfer Rate:	13.5 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]	Detect
*5903	53.23	12.83	H	66.06	68.20	2.14	PK
*5903	52.89	12.83	V	65.72	68.20	2.48	AV

MIMO

Band:	5.8 GHz
Operation Mode:	802.11ac_40 MHz
Transfer Rate:	13.5 Mbps
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp Gain [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
*5850	52.75	12.65	H	65.40	68.20	2.80	PK
*5850	52.48	12.65	V	65.13	68.20	3.07	AV

MIMO

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]	Detect
*5850	53.23	12.65	H	65.88	68.20	2.32	PK
*5850	52.84	12.65	V	65.49	68.20	2.71	AV

MIMO

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]	Detect
*5850	53.06	12.65	H	65.71	68.20	2.49	PK
*5850	52.77	12.65	V	65.42	68.20	2.78	AV

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 rate 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 802.11ac, we applied the limit of spurious emissions according to KDB 644545 D01 Alternative Guidance for 802.11ac v01.
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 MIMO, 52 Mbps, Ch.6 in 802.11n at 2.4 GHz Band. Because 802.11n mode is worst case.

RESULT PLOTS

Conducted Emissions (Line 1)

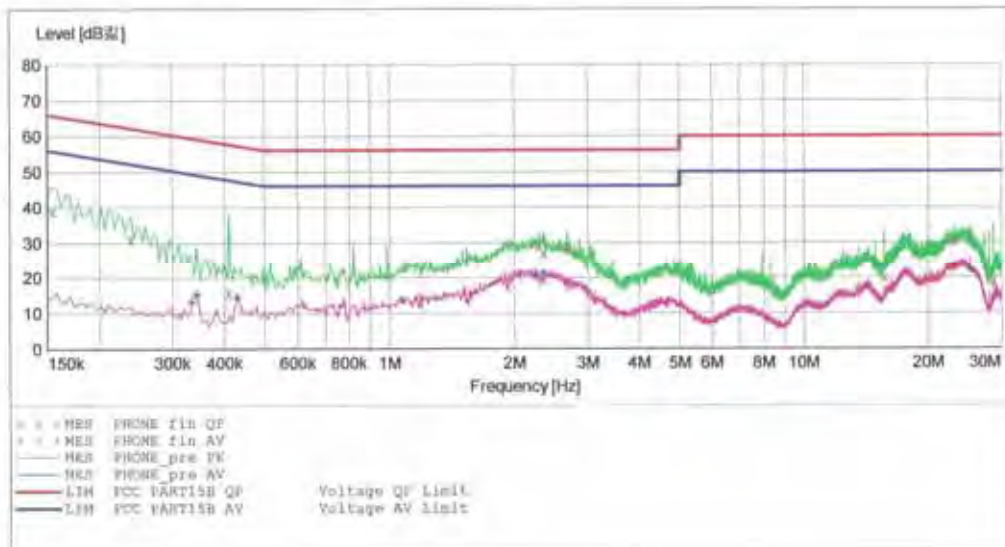
HCT

EMC

EUT: LGSWF41
 Manufacturer: LG
 Operating Condition: WLAN MODE(DTS)
 Test Site: SHIELD ROOM
 Operator: JS LEE
 Test Specification: FCC PART15B
 Comment: H
 Start of Test: 2013-12-11 / 10:58:13오전

SCAN TABLE: "FCC CLASS B(H)"

Short Description:			FCC CLASS B(H)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

2013-12-11 11:00오전

Frequency MHz	Level dBμV	Transd dB	Llimit dBμV	Margin dB	Line	PE
0.154001	39.00	9.8	66	26.8	---	---
0.238001	31.30	9.8	62	30.9	---	---
0.410001	15.70	9.8	58	41.9	---	---
2.292000	29.20	10.0	56	26.8	---	---
2.352000	27.20	10.0	56	28.8	---	---
2.684000	28.50	10.0	56	27.5	---	---
15.640000	20.10	10.8	60	39.9	---	---
23.128000	30.20	11.1	60	29.8	---	---
28.736000	19.10	11.3	60	40.9	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-12-11 11:00오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.334001	13.10	9.8	49	36.3	---	---
0.342001	15.20	9.8	49	33.9	---	---
0.430001	14.60	9.8	47	32.7	---	---
1.076000	13.80	9.8	46	32.2	---	---
2.252000	20.80	10.0	46	25.2	---	---
2.340000	21.40	10.0	46	24.6	---	---
14.272000	17.90	10.7	50	32.1	---	---
25.188000	22.30	11.2	50	27.7	---	---
28.736000	13.90	11.3	50	36.1	---	---

Conducted Emissions (Line 2)

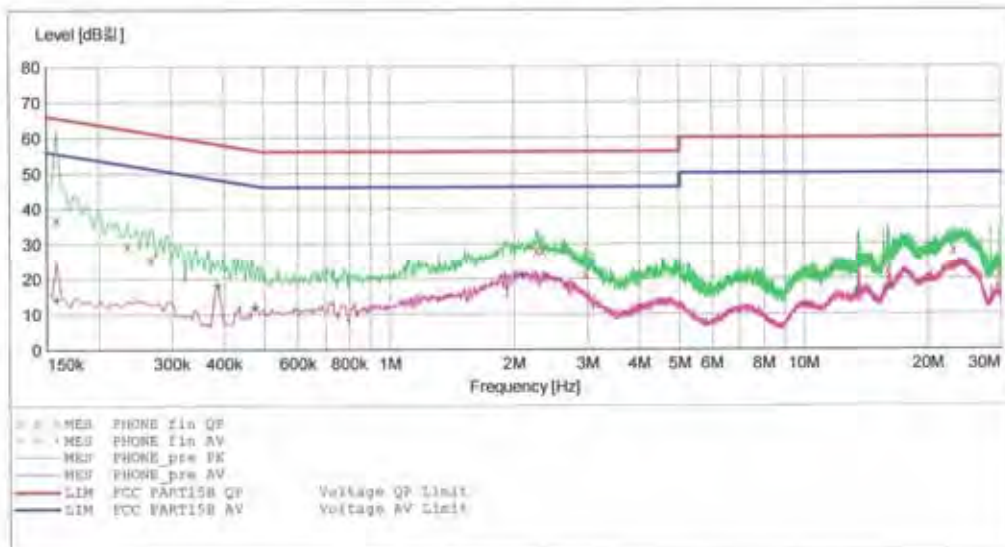
HCT

EMC

EUT: LGSWF41
 Manufacturer: LG
 Operating Condition: WLAN MODE(DTS)
 Test Site: SHIELD ROOM
 Operator: JS LEE
 Test Specification: FCC PART15B
 Comment: N
 Start of Test: 2013-12-11 / 11:02:39오전

SCAN TABLE: "FCC CLASS B(N)"

Short Description:		FCC CLASS B(N)				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	FE
0.158001	36.90	10.0	66	28.6	---	---
0.234001	29.50	10.0	62	32.8	---	---
0.266001	25.60	10.0	61	35.6	---	---
2.268000	28.10	10.2	56	27.9	---	---
2.340000	28.30	10.2	56	27.7	---	---
2.972000	21.40	10.2	56	34.6	---	---
15.972000	22.40	11.1	60	37.6	---	---
23.028000	28.20	11.4	60	31.8	---	---
29.664000	21.30	11.8	60	38.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-12-11 11:05오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.158001	14.20	10.0	56	41.3	---	---
0.386001	18.00	10.0	48	30.2	---	---
0.474001	11.90	10.0	46	34.6	---	---
1.896000	20.80	10.1	46	25.2	---	---
2.088000	21.10	10.1	46	24.9	---	---
2.384000	21.00	10.2	46	25.0	---	---
13.480000	16.40	10.9	50	33.6	---	---
16.024000	17.50	11.1	50	32.5	---	---
23.740000	24.40	11.5	50	25.6	---	---

9. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	Annual	02/06/2014	100073
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/17/2014	3150
Rohde & Schwarz	ESI 40 / EMI TEST RECEIVER	Annual	04/16/2014	831564103
Agilent	E4440A/ Spectrum Analyzer	Annual	04/25/2014	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	05/14/2014	MY51110063
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/10/2014	10094
MITEQ	AMF-6B-180265-35-10P / POWER AMP	Annual	04/16/2014	667624
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2014	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	07/05/2015	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/30/2014	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	02/08/2014	839117/011
Agilent	E4416A /Power Meter	Annual	10/16/2014	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	04/16/2014	MY4442009
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	Annual	02/08/2014	F6
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	04/16/2014	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	04/16/2014	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	03/19/2014	1
Hewlett Packard	11636B/Power Divider	Annual	10/22/2014	11377
Agilent	87300B/Directional Coupler	Annual	12/24/2013	3116A03621
Hewlett Packard	11667B / Power Splitter	Annual	05/29/2014	05001
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	10/29/2014	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/05/2014	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	04/24/2014	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	04/25/2014	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/11/2014	9009-2536
CERNEX	CBLU1183540 / POWER AMP	Annual	07/24/2014	21691
Agilent	8493C / Attenuator(10 dB)	Annual	07/24/2014	76649
WEINSCHL	2-3 / Attenuator(3 dB)	Annual	10/28/2014	BR0617