

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:

November 08, 2013

Test Site/Location:

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

Korea **Report No.:** HCTR1310FR26-2

HCT FRN: 0005866421

IC Recognition No.: 5944A-3

FCC ID	: BEJLGSBW41
IC	: 2703H-LGSBW41
APPLICANT	: LG Electronics Inc.

FCC/ IC Model(s): LGSBW41

EUT Type: WIFI/BT Combo module

Max. RF Output Power:

Ant.0: Wi-Fi 802.11a (5180~5240) (12.34 dBm)/ Wi-Fi 802.11n_20 MHz (5180~5240) (13.14 dBm)/ Wi-Fi 802.11n_40 MHz (5190~5230) (10.91 dBm)

Ant.1: Wi-Fi 802.11a (5180~5240) (12.19 dBm)/ Wi-Fi 802.11n_20 MHz (5180~5240) (13.13 dBm)/ Wi-Fi 802.11n_40 MHz (5190~5230) (10.74 dBm)

Frequency Range: 20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)

40 MHz BW: 5190 MHz - 5230 MHz (UNII 1)

Modulation type OFDM

FCC Classification: Unlicensed National Information Infrastructure(UNII)

FCC Rule Part(s): Part 15.407

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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1310FR26	October 29, 2013	- First Approval Report
HCTR1310FR26-1	November 07, 2013	- Added the note about MIMO function in page 4 - Added 99% Bandwidth and the maximum e.i.r.p
HCTR1310FR26-2	November 08, 2013	- Revised Section 8.9 Powerline Conducted Emissions

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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: BEJLGSBW41
IC: 2703H-LGSBW41
EUT Type: WIFI/BT Combo module
FCC/ IC Model name(s): LGSBW41
Date(s) of Tests: September 15, 2013 ~ November 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/BT Combo module	
FCC/ IC Model Name	LGSBW41	
Power Supply	DC 3.5 V	
Frequency Range	TX_20 MHz BW 40 MHz BW	5180 MHz - 5240 MHz (UNII 1) 5190 MHz - 5230 MHz (UNII 1)
	RX_20 MHz BW 40 MHz BW	5180 MHz - 5240 MHz (UNII 1) 5190 MHz - 5230 MHz (UNII 1)
Max. RF Output Power	Ant.0:	Wi-Fi 802.11a (5180~5240) (12.34 dBm)/ Wi-Fi 802.11n_20 MHz (5180~5240) (13.14 dBm)/ Wi-Fi 802.11n_40 MHz (5190~5230) (10.91 dBm)
	Ant.1:	Wi-Fi 802.11a (5180~5240) (12.19 dBm)/ Wi-Fi 802.11n_20 MHz (5180~5240) (13.13 dBm)/ Wi-Fi 802.11n_40 MHz (5190~5230) (10.74 dBm)
Modulation Type	OFDM(802.11a, 802.11n)	
Antenna Specification	Ant.0:	Manufacturer: LG Innotek Antenna type: PCB Antenna Peak Gain : 2.50 dBi
	Ant.1:	Manufacturer: LG Innotek Antenna type: PCB Antenna Peak Gain : 2.05 dBi
	Directional Antenna Gain	5.29 dBi(802.11a_5.2 GHz) 2.28 dBi(802.11n_5.2 GHz)

Note :

1. The EUT incorporates a MIMO function with 802.11a and 802.11n

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3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D01 General UNII Test Procedures v01r03 dated April 08, 2013 entitled “ Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices, the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) – Part 15, Subpart E” were used in the measurement.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

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 8.1 to 8.4.(KDB 789033)

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/g),

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

- 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 OF TEST RESULTS

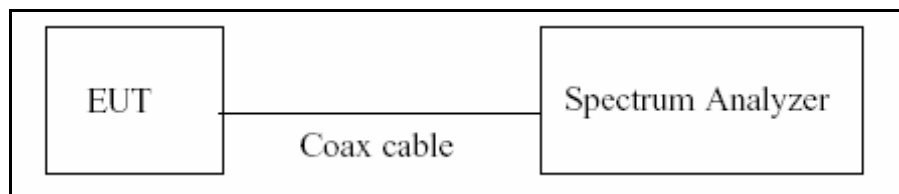
Test Description	IC Part Section(s)	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth, 99% Bandwidth	RSS-210 [A9.2]	NA	NA	CONDUCTED	NA
Maximum Conducted Output Power, Maximum e.i.r.p (IC)	RSS-210 [A9.2]	§15.407(a)(1)	< 4+10 log ₁₀ (BW) dBm (5150-5250 MHz)(FCC) < 10+10 log ₁₀ (BW) dBm (5150-5250 MHz)(IC)		PASS
Peak Power Spectral Density	RSS-210 [A9.2]	§15.407(a)(1), (5)	<4 dBm/ MHz (5150-5250)(FCC) <4 dBm/ MHz (5150-5250)(IC)		PASS
Peak Excursion	NA	§15.407(a)(6)	<13 dB/ MHz maximum difference		PASS
Frequency Stability	NA	§15.407(g)	NA		NA
AC Conducted Emissions 150 kHz-30 MHz	RSS-GEN, Section 7.2.2	15.207	<FCC 15.207 limits		NA
Undesirable Emissions	RSS-210 [A8.5]	§15.407(b)(1), (2), (3)	<-27 dBm/ MHz EIRP (5150-5350 MHz, 5470-5725 MHz)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-GEN, Section 7.2.3	15.205, 5.407(b)(1), (5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS
Receiver Spurious Emissions	RSS-GEN, Section 7.2.3	§15.109	cf. Section 8.7.3		PASS

8. TEST RESULT

8.1 DUTY CYCLE

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

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, B)2) in KDB 789033(issued 04/08/2013)

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

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor
802.11a Mode	6	2.064	2.088	0.98850575	0.050
	9	1.385	1.409	0.98296664	0.075
	12	1.044	1.066	0.97936210	0.091
	18	0.703	0.728	0.96565934	0.152
	24	0.532	0.556	0.95683453	0.192
	36	0.364	0.388	0.93814433	0.277
	48	0.276	0.300	0.92000000	0.362
	54	0.248	0.272	0.91176471	0.401
802.11n Mode 20 MHz BW	6.5	1.908	1.932	0.98757764	0.054
	13	0.965	0.989	0.97573306	0.107
	19.5	0.652	0.676	0.96449704	0.157
	26	0.496	0.519	0.95568401	0.197
	39	0.340	0.364	0.93406593	0.296
	52	0.260	0.284	0.91549296	0.383
	58.5	0.236	0.260	0.90769231	0.421
	65	0.216	0.239	0.90376569	0.439
802.11n Mode 40 MHz BW	13.5	0.932	0.955	0.97591623	0.106
	27	0.480	0.503	0.95427435	0.203
	40.5	0.327	0.350	0.93428571	0.295
	54	0.252	0.275	0.91636364	0.379
	81	0.175	0.198	0.88383838	0.536
	108	0.140	0.163	0.85889571	0.661
	121.5	0.128	0.151	0.84768212	0.718
	135	0.116	0.139	0.83453237	0.786

Duty Cycle Factor_Ant.1

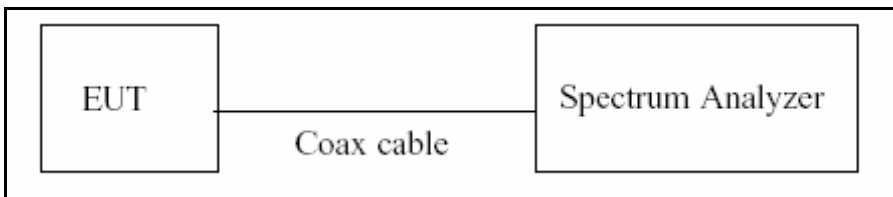
Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor
802.11a Mode	6	2.064	2.088	0.98850575	0.050
	9	1.385	1.409	0.98296664	0.075
	12	1.044	1.066	0.97936210	0.091
	18	0.703	0.728	0.96565934	0.152
	24	0.532	0.556	0.95683453	0.192
	36	0.364	0.388	0.93814433	0.277
	48	0.276	0.300	0.92000000	0.362
	54	0.248	0.272	0.91176471	0.401
802.11n Mode 20 MHz BW	6.5	1.908	1.932	0.98757764	0.054
	13	0.965	0.989	0.97573306	0.107
	19.5	0.652	0.676	0.96449704	0.157
	26	0.496	0.519	0.95568401	0.197
	39	0.340	0.364	0.93406593	0.296
	52	0.260	0.284	0.91549296	0.383
	58.5	0.236	0.260	0.90769231	0.421
	65	0.216	0.239	0.90376569	0.439
802.11n Mode 40 MHz BW	13.5	0.932	0.955	0.97591623	0.106
	27	0.480	0.503	0.95427435	0.203
	40.5	0.327	0.350	0.93428571	0.295
	54	0.252	0.275	0.91636364	0.379
	81	0.175	0.198	0.88383838	0.536
	108	0.140	0.163	0.85889571	0.661
	121.5	0.128	0.151	0.84768212	0.718
	135	0.116	0.139	0.83453237	0.786

8.2 26 dB BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033(issued 04/08/2013), at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

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

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to(Page 3 in KDB 789033, issued 04/08/2013)

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

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TEST RESULTS_Ant.0

Conducted 26dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.40	N/A	Pass
5200	40	19.40	N/A	Pass
5240	48	19.25	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.92	N/A	Pass
5200	40	19.77	N/A	Pass
5240	48	19.90	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.58	N/A	Pass
5230	46	39.26	N/A	Pass

TEST RESULTS_Ant.1

Conducted 26dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.25	N/A	Pass
5200	40	19.10	N/A	Pass
5240	48	19.33	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.84	N/A	Pass
5200	40	19.83	N/A	Pass
5240	48	19.72	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_40 MHz BW

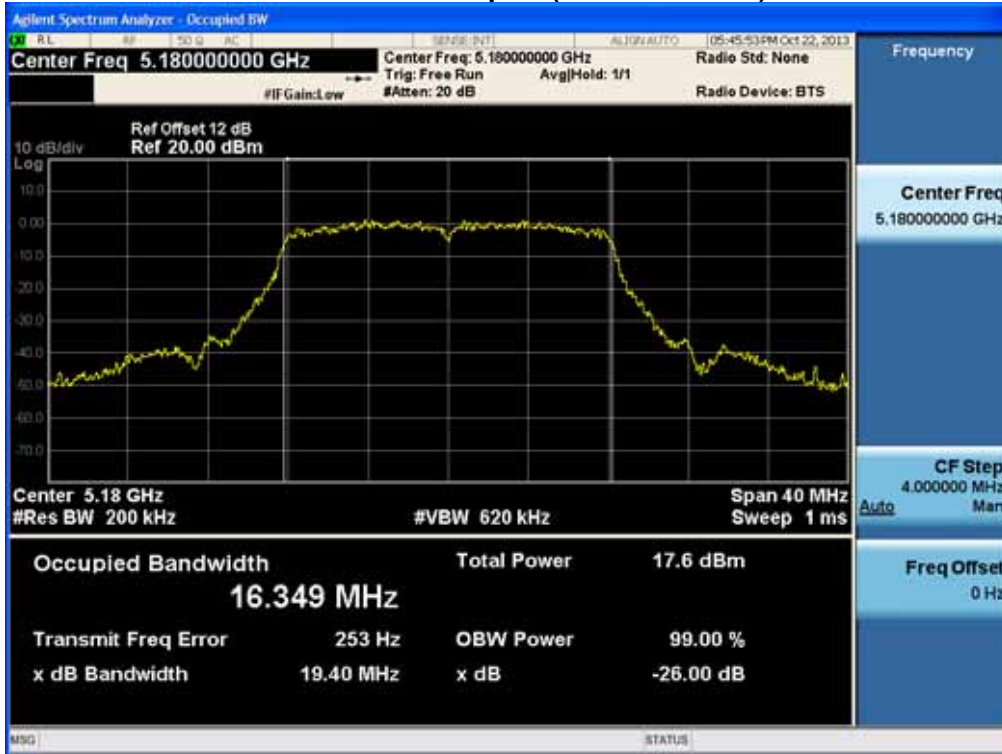
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.60	N/A	Pass
5230	46	39.50	N/A	Pass

Note :

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

RESULT PLOTS_Ant.0

26dB Bandwidth plot (802.11a-CH 36)

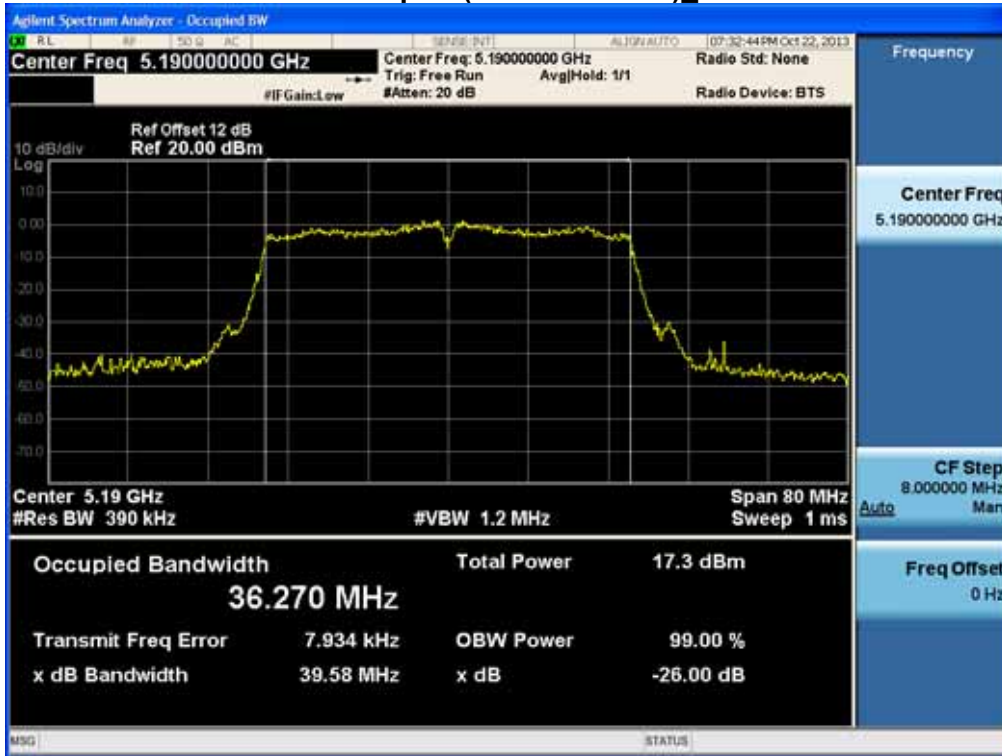


26dB Bandwidth plot (802.11n-CH 36)_20 MHz BW



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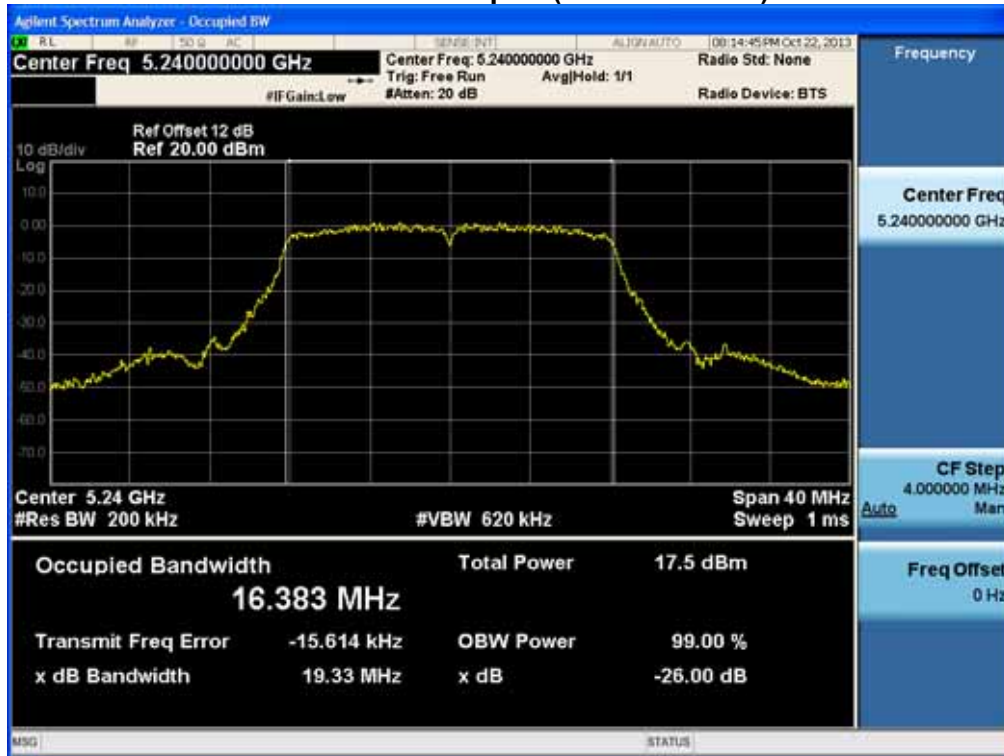
26dB Bandwidth plot (802.11n-CH 38)_40 MHz BW



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RESULT PLOTS_Ant.1

26dB Bandwidth plot (802.11a-CH 48)

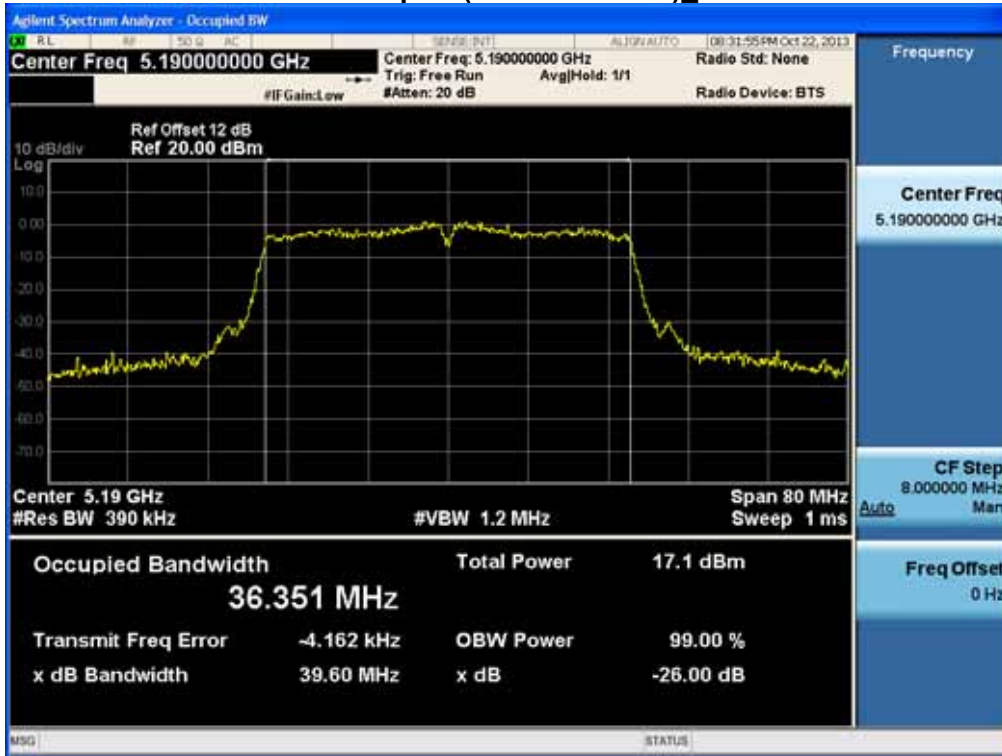


26dB Bandwidth plot (802.11n-CH 36)_20 MHz BW



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26dB Bandwidth plot (802.11n-CH 38)_40 MHz BW



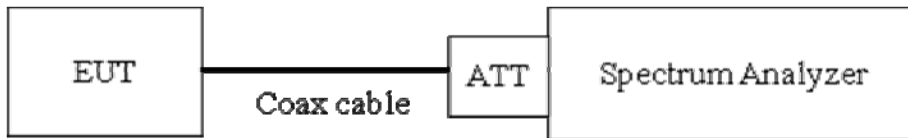
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8.3 99% BANDWIDTH MEASUREMENT

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% to 3% of the total span

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

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TEST RESULTS_Ant.0

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	16.410
5200	40	16.401
5240	48	16.436

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	17.435
5200	40	17.434
5240	48	17.448

Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5190	38	36.483
5230	46	36.529

TEST RESULTS_Ant.1

Conducted 99% Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	16.447
5200	40	16.441
5240	48	16.454

Conducted 99% Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	17.442
5200	40	17.455
5240	48	17.448

Conducted 99% Bandwidth Measurements for 802.11n_40 MHz BW

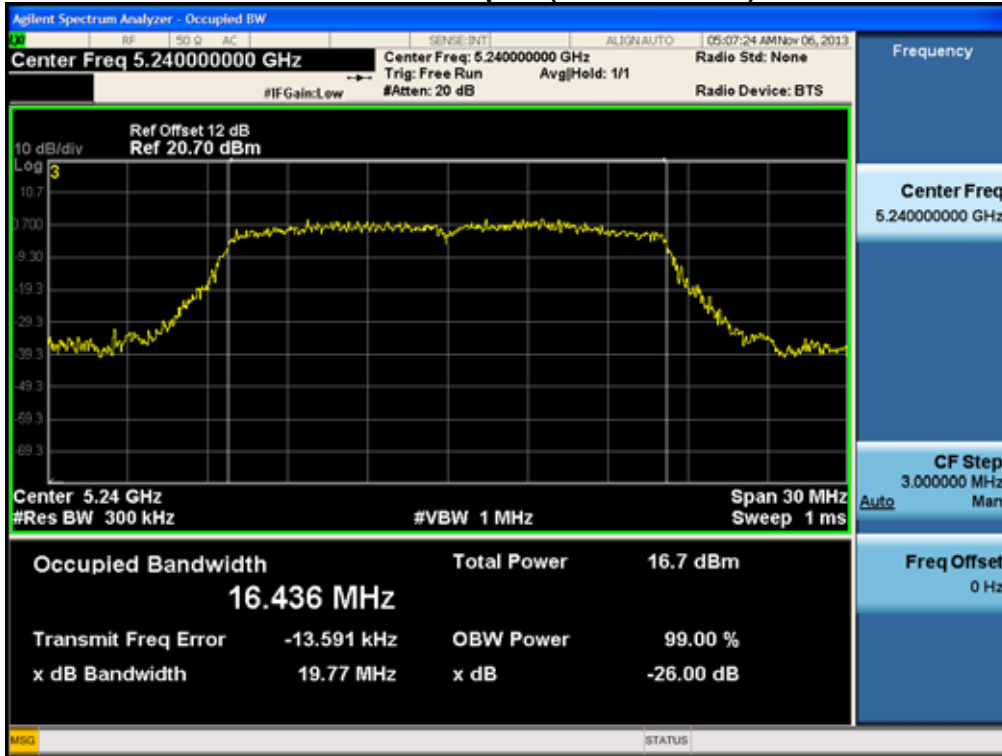
802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5190	38	36.481
5230	46	36.500

Note :

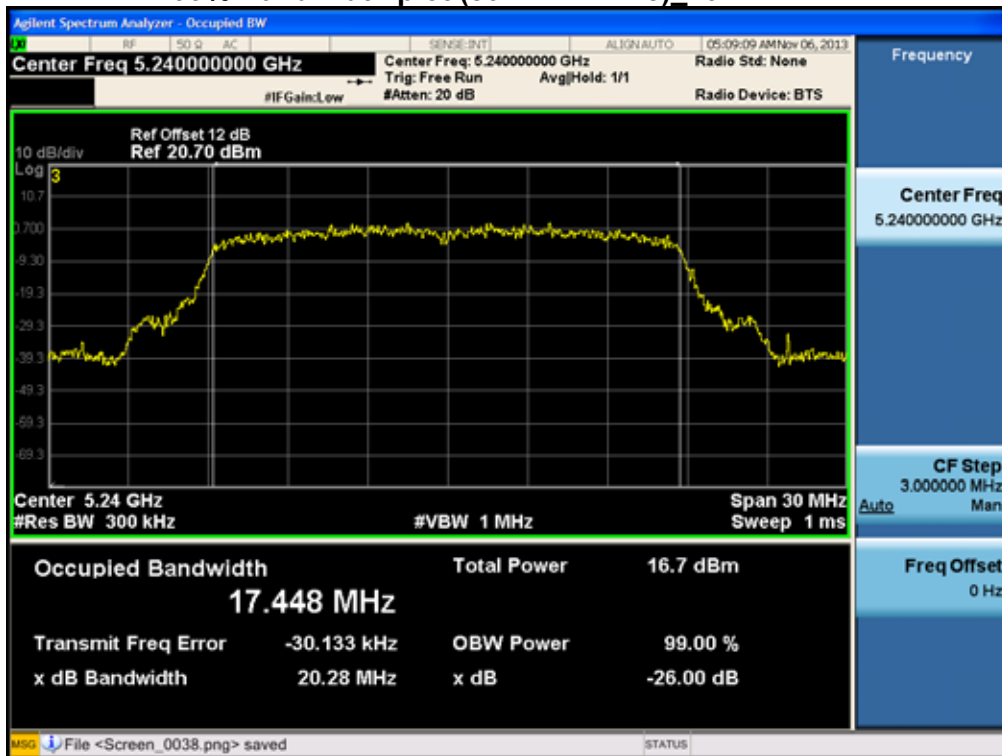
1. In order to simplify the report, attached plots were only the most wide channel.

RESULT PLOTS_Ant.0

99% Bandwidth plot (802.11a-CH48)

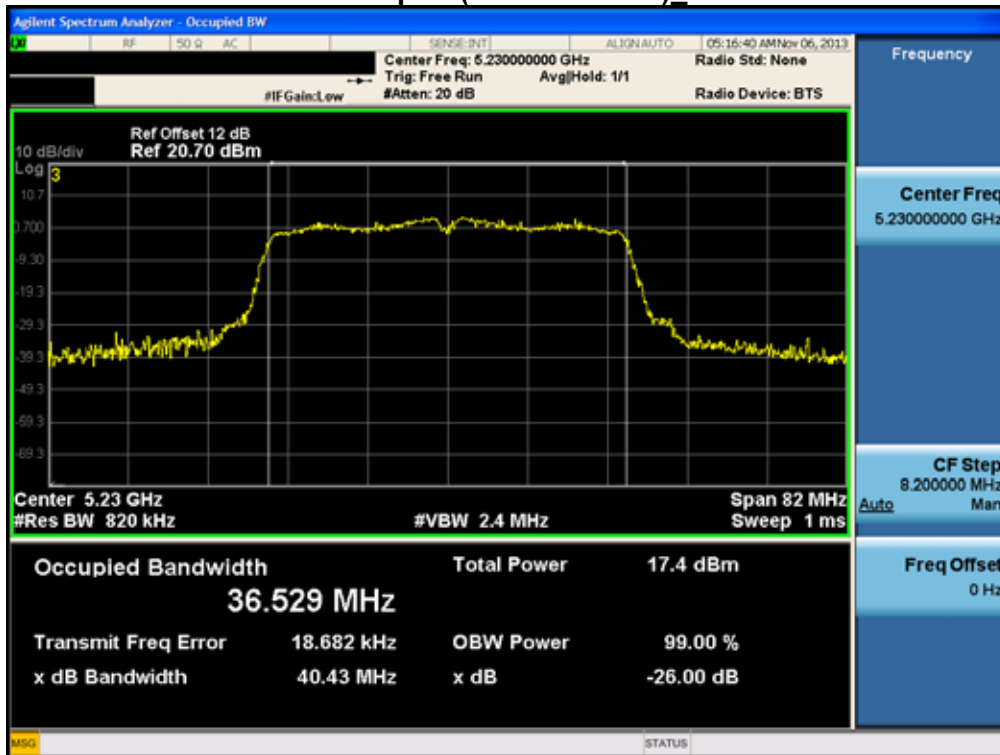


99% Bandwidth plot (802.11n-CH48) 20 MHz BW



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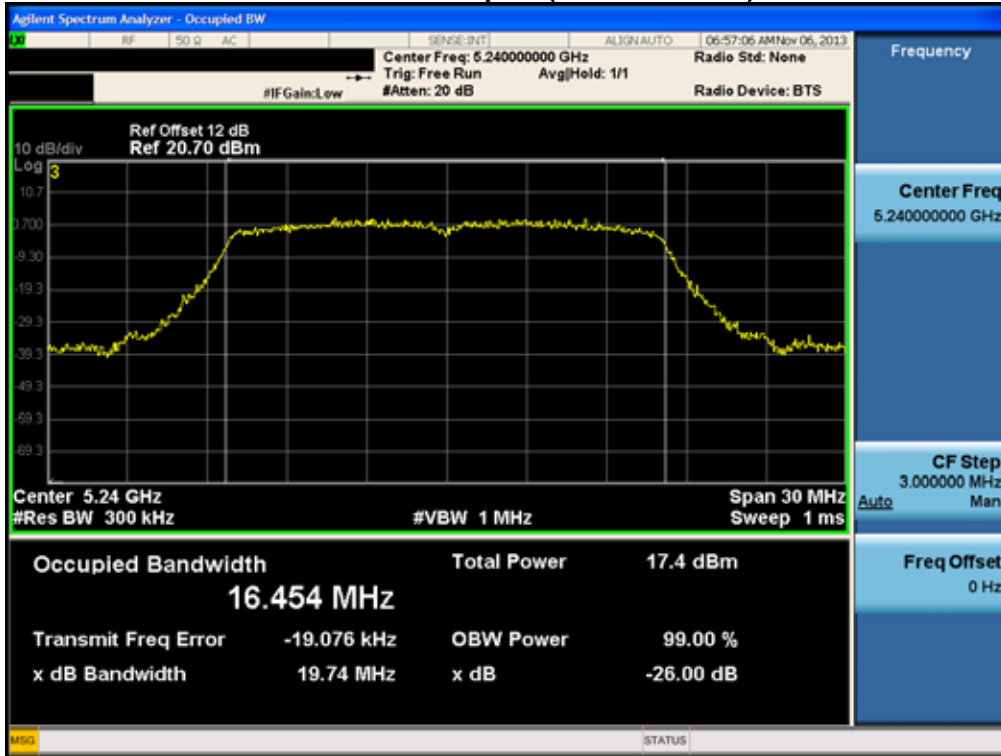
99% Bandwidth plot (802.11n-CH46) 40 MHz BW



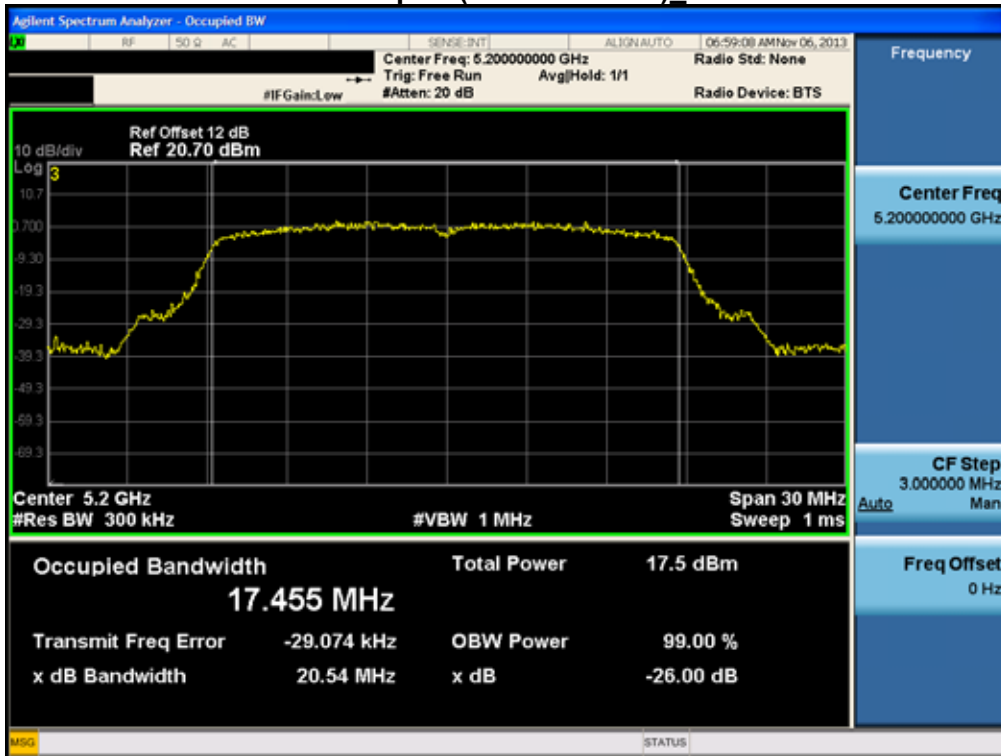
FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr	
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

RESULT PLOTS_Ant.1

99% Bandwidth plot (802.11a-CH48)

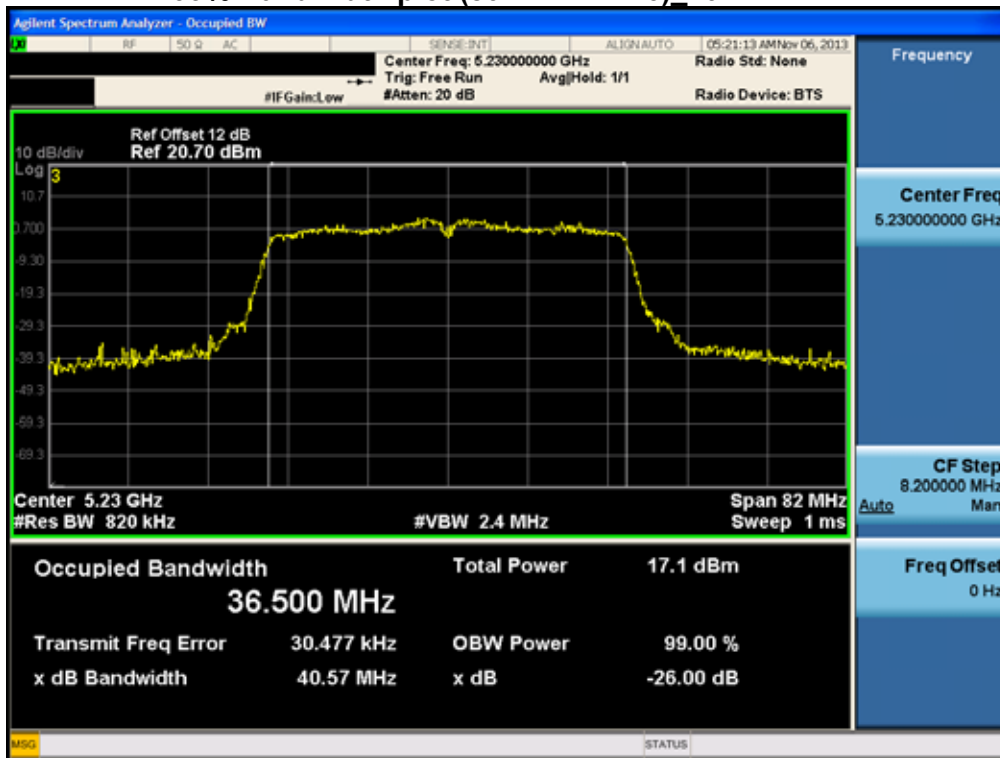


99% Bandwidth plot (802.11n-CH40) 20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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99% Bandwidth plot (802.11n-CH46) 40 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
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8.4 OUTPUT POWER MEASUREMENT AND E.I.R.P

Test Requirements and limit,

§15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. In the 5.15 – 5.25 GHz band, the maximum permissible conducted output power is the lesser of 50 mW ((16.99 dBm) and $4 \text{ dBm} + 10 \log_{10}(26 \text{ dB BW})$.

Limit : 802.11a_UNII-1 = 16.81 dBm

802.11n_UNII-1_20 MHz BW = 16.95 dBm

802.11n_UNII-1_40 MHz BW = 16.99 dBm

RSS-210 [A9.2]

For band 5150-5250 MHz, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

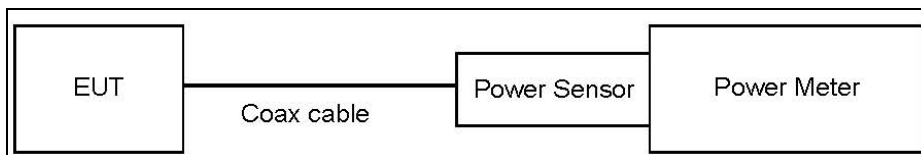
For band 5250-5350 MHz, 5470-5600 MHz and 5650-5725 MHz. the maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever power is less.

Limit : 802.11a_UNII-1 = 22.14 dBm (e.i.r.p)

802.11n_UNII-1_20 MHz BW = 23.41 dBm

802.11n_UNII-1_40 MHz BW = 24.00 dBm

TEST CONFIGURATION



TEST PROCEDURE

We tested according to Method E)3a) in KDB 789033(issued 04/08/2013).

- Average Power
 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.

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Note :

1. We apply to the offset in the 5.2 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.
2. The maximum e.i.r.p = the maximum conducted output power (dBm) + antenna gain (dBi)
3. In order to simplify the report, the maximum e.i.r.p is listed.

Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34

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

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

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TEST RESULTS_Ant.0

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6	10.86	0.050	10.91	16.81
		9	10.95	0.075	11.03	16.81
		12	10.78	0.091	10.87	16.81
		18	10.85	0.152	11.00	16.81
		24	10.91	0.192	11.10	16.81
		36	10.78	0.277	11.06	16.81
		48	10.75	0.362	11.11	16.81
		54	10.76	0.401	11.16	16.81
5200	40	6	11.95	0.050	12.00	16.81
		9	11.94	0.075	12.02	16.81
		12	12.02	0.091	12.11	16.81
		18	11.92	0.152	12.07	16.81
		24	12.04	0.192	12.23	16.81
		36	11.91	0.277	12.19	16.81
		48	11.98	0.362	12.34	16.81
		54	11.69	0.401	12.09	16.81
5240	48	6	10.65	0.050	10.70	16.81
		9	10.78	0.075	10.86	16.81
		12	10.70	0.091	10.79	16.81
		18	10.68	0.152	10.83	16.81
		24	10.66	0.192	10.85	16.81
		36	10.55	0.277	10.83	16.81
		48	10.58	0.362	10.94	16.81
		54	10.55	0.401	10.95	16.81

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TEST RESULTS_Ant.1

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6	10.80	0.050	10.85	16.81
		9	10.98	0.075	11.06	16.81
		12	10.75	0.091	10.84	16.81
		18	10.85	0.152	11.00	16.81
		24	10.82	0.192	11.01	16.81
		36	10.96	0.277	11.24	16.81
		48	10.64	0.362	11.00	16.81
		54	10.71	0.401	11.11	16.81
5200	40	6	11.93	0.050	11.98	16.81
		9	11.78	0.075	11.86	16.81
		12	11.94	0.091	12.03	16.81
		18	11.89	0.152	12.04	16.81
		24	11.94	0.192	12.13	16.81
		36	11.88	0.277	12.16	16.81
		48	11.76	0.362	12.12	16.81
		54	11.79	0.401	12.19	16.81
5240	48	6	10.93	0.050	10.98	16.81
		9	10.80	0.075	10.88	16.81
		12	10.81	0.091	10.90	16.81
		18	10.80	0.152	10.95	16.81
		24	10.88	0.192	11.07	16.81
		36	10.72	0.277	11.00	16.81
		48	10.76	0.362	11.12	16.81
		54	10.67	0.401	11.07	16.81



TEST RESULTS_Sum Data of Ant.0 and Ant.1

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6	13.89	16.81
		9	14.05	16.81
		12	13.87	16.81
		18	14.01	16.81
		24	14.07	16.81
		36	14.16	16.81
		48	14.07	16.81
		54	14.15	16.81
5200	40	6	15.00	16.81
		9	14.95	16.81
		12	15.08	16.81
		18	15.07	16.81
		24	15.19	16.81
		36	15.18	16.81
		48	15.24	16.81
		54	15.15	16.81
5240	48	6	13.85	16.81
		9	13.88	16.81
		12	13.86	16.81
		18	13.90	16.81
		24	13.97	16.81
		36	13.92	16.81
		48	14.04	16.81
		54	14.02	16.81

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TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6.5	12.46	0.054	12.51	16.95
		13	12.50	0.107	12.61	16.95
		19.5	12.53	0.157	12.69	16.95
		26	12.54	0.197	12.74	16.95
		39	12.49	0.296	12.79	16.95
		52	12.32	0.383	12.70	16.95
		58.5	12.33	0.421	12.75	16.95
		65	12.29	0.439	12.73	16.95
5200	40	6.5	12.94	0.054	12.99	16.95
		13	12.95	0.107	13.06	16.95
		19.5	12.86	0.157	13.02	16.95
		26	12.90	0.197	13.10	16.95
		39	12.81	0.296	13.11	16.95
		52	12.76	0.383	13.14	16.95
		58.5	12.68	0.421	13.10	16.95
		65	12.66	0.439	13.10	16.95
5240	48	6.5	12.74	0.054	12.79	16.95
		13	12.75	0.107	12.86	16.95
		19.5	12.86	0.157	13.02	16.95
		26	12.81	0.197	13.01	16.95
		39	12.77	0.296	13.07	16.95
		52	12.61	0.383	12.99	16.95
		58.5	12.55	0.421	12.97	16.95
		65	12.52	0.439	12.96	16.95

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TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n _20 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	6.5	12.33	0.054	12.38	16.95
		13	12.40	0.107	12.51	16.95
		19.5	12.42	0.157	12.58	16.95
		26	12.31	0.197	12.51	16.95
		39	12.33	0.296	12.63	16.95
		52	12.16	0.383	12.54	16.95
		58.5	12.21	0.421	12.63	16.95
		65	12.10	0.439	12.54	16.95
5200	40	6.5	12.92	0.054	12.97	16.95
		13	12.83	0.107	12.94	16.95
		19.5	12.95	0.157	13.11	16.95
		26	12.83	0.197	13.03	16.95
		39	12.77	0.296	13.07	16.95
		52	12.70	0.383	13.08	16.95
		58.5	12.63	0.421	13.05	16.95
		65	12.60	0.439	13.04	16.95
5240	48	6.5	12.91	0.054	12.96	16.95
		13	12.83	0.107	12.94	16.95
		19.5	12.87	0.157	13.03	16.95
		26	12.86	0.197	13.06	16.95
		39	12.79	0.296	13.09	16.95
		52	12.70	0.383	13.08	16.95
		58.5	12.71	0.421	13.13	16.95
		65	12.67	0.439	13.11	16.95

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TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n _20 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6.5	15.46	16.95
		13	15.57	16.95
		19.5	15.64	16.95
		26	15.63	16.95
		39	15.72	16.95
		52	15.63	16.95
		58.5	15.70	16.95
		65	15.65	16.95
5200	40	6.5	15.99	16.95
		13	16.01	16.95
		19.5	16.07	16.95
		26	16.07	16.95
		39	16.10	16.95
		52	16.12	16.95
		58.5	16.09	16.95
		65	16.08	16.95
5240	48	6.5	15.89	16.95
		13	15.91	16.95
		19.5	16.03	16.95
		26	16.04	16.95
		39	16.09	16.95
		52	16.05	16.95
		58.5	16.06	16.95
		65	16.04	16.95

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TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5190~5230)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	10.26	0.106	10.37	16.99
		27	10.47	0.203	10.67	16.99
		40.5	10.36	0.295	10.66	16.99
		54	10.31	0.379	10.69	16.99
		81	10.37	0.536	10.91	16.99
		108	10.19	0.661	10.85	16.99
		121.5	10.13	0.718	10.85	16.99
		135	10.01	0.786	10.80	16.99
5230	46	13.5	10.08	0.106	10.19	16.99
		27	10.18	0.203	10.38	16.99
		40.5	10.24	0.295	10.54	16.99
		54	10.21	0.379	10.59	16.99
		81	9.98	0.536	10.52	16.99
		108	9.80	0.661	10.46	16.99
		121.5	9.87	0.718	10.59	16.99
		135	9.73	0.786	10.52	16.99

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TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode:5190~5230)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	13.5	10.28	0.106	10.39	16.99
		27	10.24	0.203	10.44	16.99
		40.5	10.39	0.295	10.69	16.99
		54	10.30	0.379	10.68	16.99
		81	10.05	0.536	10.59	16.99
		108	9.93	0.661	10.59	16.99
		121.5	9.94	0.718	10.66	16.99
		135	9.85	0.786	10.64	16.99
5230	46	13.5	10.27	0.106	10.38	16.99
		27	10.12	0.203	10.32	16.99
		40.5	10.21	0.295	10.51	16.99
		54	10.36	0.379	10.74	16.99
		81	10.11	0.536	10.65	16.99
		108	10.00	0.661	10.66	16.99
		121.5	9.74	0.718	10.46	16.99
		135	9.89	0.786	10.68	16.99

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TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode:5190~5230)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5190	38	13.5	13.39	16.99
		27	13.57	16.99
		40.5	13.68	16.99
		54	13.69	16.99
		81	13.76	16.99
		108	13.73	16.99
		121.5	13.76	16.99
		135	13.73	16.99
5230	46	13.5	13.29	16.99
		27	13.36	16.99
		40.5	13.53	16.99
		54	13.67	16.99
		81	13.59	16.99
		108	13.57	16.99
		121.5	13.53	16.99
		135	13.61	16.99

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TEST RESULTS_Ant.0

Maximum e.i.r.p Measurements (802.11a Mode: 5180~5240)

802.11a Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	54	11.16	2.50	13.66	22.14
5200	40	48	12.34		14.84	22.14
5240	48	54	10.95		13.45	22.14

TEST RESULTS_Ant.1

Maximum e.i.r.p Measurements (802.11a Mode: 5180~5240)

802.11a Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	36	11.24	2.05	13.29	22.14
5200	40	54	12.19		14.24	22.14
5240	48	48	11.12		13.17	22.14

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Maximum e.i.r.p Measurements (802.11a Mode: 5180~5240)

802.11a Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	36	14.16	5.29	19.45	22.14
5200	40	48	15.24		20.53	22.14
5240	48	48	14.04		19.33	22.14

TEST RESULTS_Ant.0

Maximum e.i.r.p Measurements (802.11n Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	58.5	12.75	2.50	15.25	23.41
5200	40	52	13.14		15.64	23.41
5240	48	39	13.07		15.57	23.41

TEST RESULTS_Ant.1

Maximum e.i.r.p Measurements (802.11n Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	58.5	12.63	2.05	14.68	23.41
5200	40	19.5	13.11		15.16	23.41
5240	48	58.5	13.13		15.18	23.41

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Maximum e.i.r.p Measurements (802.11n Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	39	15.72	2.28	18.00	23.41
5200	40	52	16.12		18.40	23.41
5240	48	39	16.09		18.37	23.41



TEST RESULTS_Ant.0

Maximum e.i.r.p Measurements (802.11n_40M Mode: 5180~5240)

802.11n_40M Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	81	10.91	2.50	13.41	24.00
5230	46	121.5	10.59		13.09	24.00

TEST RESULTS_Ant.1

Maximum e.i.r.p Measurements (802.11n_40M Mode: 5180~5240)

802.11n_40M Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	40.5	10.69	2.05	12.74	24.00
5230	46	54	10.74		12.79	24.00

TEST RESULTS_Sum Data of Ant.0 and Ant.1

Maximum e.i.r.p Measurements (802.11n_40M Mode: 5180~5240)

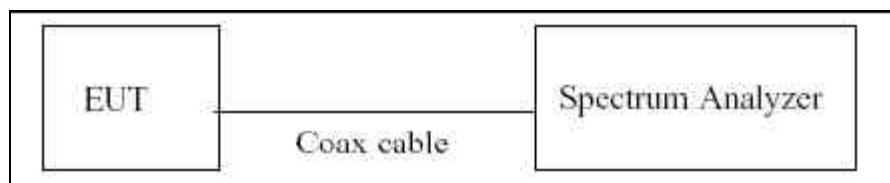
802.11n_40M Mode		Rate (Mbps)	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	121.5	13.76	2.28	16.04	24.00
5230	46	54	13.67		15.95	24.00

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr	
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	

8.5 POWER SPECTRAL DENSITY

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 4 dBm/ MHz in the 5.15 GHz – 5.25 GHz band.

TEST CONFIGURATION



TEST PROCEDURE

We tested according to Method in KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

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

Sample Calculation

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

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

Note :

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

FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41



Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34

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

FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

TEST RESULTS_Ant.0

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	0.232	0.4012	0.633	4	Pass
5200	40		0.356	0.3621	0.718	4	Pass
5240	48		0.037	0.4012	0.438	4	Pass
5180	36	802.11n (20 MHz BW)	0.605	0.2962	0.901	4	Pass
5200	40		0.156	0.3834	0.539	4	Pass
5240	48		0.505	0.2962	0.801	4	Pass
5190	38	802.11n (40 MHz BW)	-2.854	0.5363	-2.318	4	Pass
5230	46		-2.955	0.3793	-2.576	4	Pass

TEST RESULTS_Ant.1

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	0.087	0.2773	0.364	4	Pass
5200	40		0.033	0.4012	0.434	4	Pass
5240	48		0.161	0.3621	0.523	4	Pass
5180	36	802.11n (20 MHz BW)	0.264	0.4206	0.685	4	Pass
5200	40		0.590	0.1570	0.747	4	Pass
5240	48		0.046	0.4206	0.467	4	Pass
5190	38	802.11n (40 MHz BW)	-2.667	0.2952	-2.372	4	Pass
5230	46		-2.800	0.3793	-2.421	4	Pass



TEST RESULTS_Sum Data of Ant.0 and Ant.1

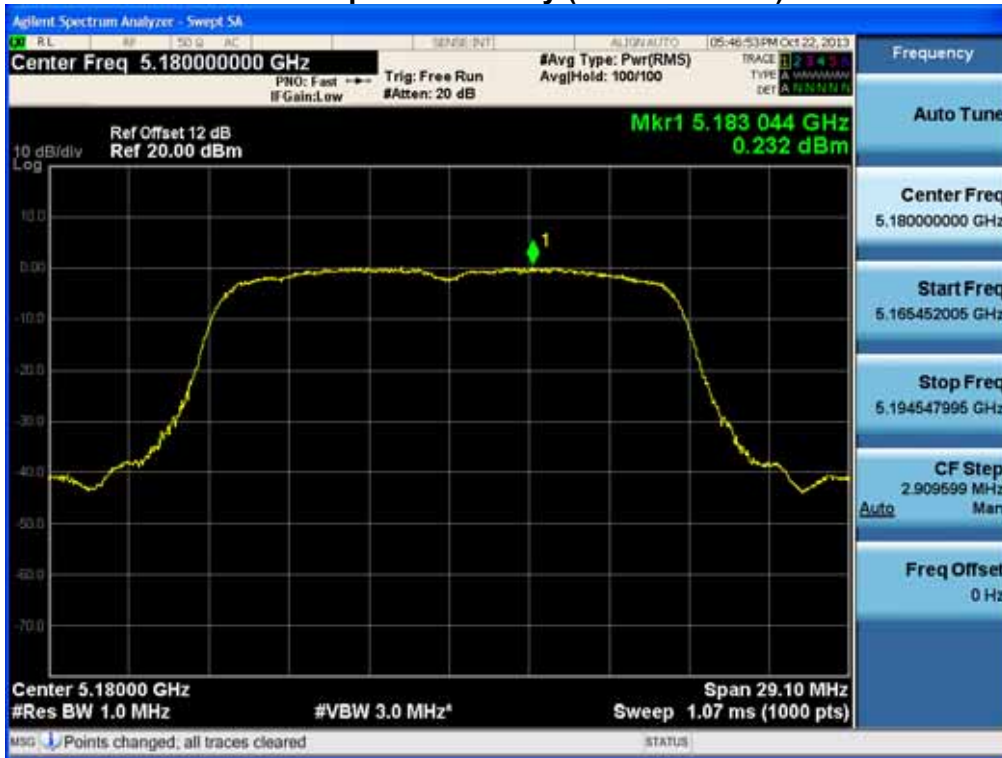
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			Power Density (dBm)	Limit (dBm)	Pass/Fail
5180	36	802.11a	3.511	4	Pass
5200	40		3.589	4	Pass
5240	48		3.491	4	Pass
5180	36	802.11n (20 MHz BW)	3.805	4	Pass
5200	40		3.655	4	Pass
5240	48		3.647	4	Pass
5190	38	802.11n (40 MHz BW)	0.666	4	Pass
5230	46		0.513	4	Pass

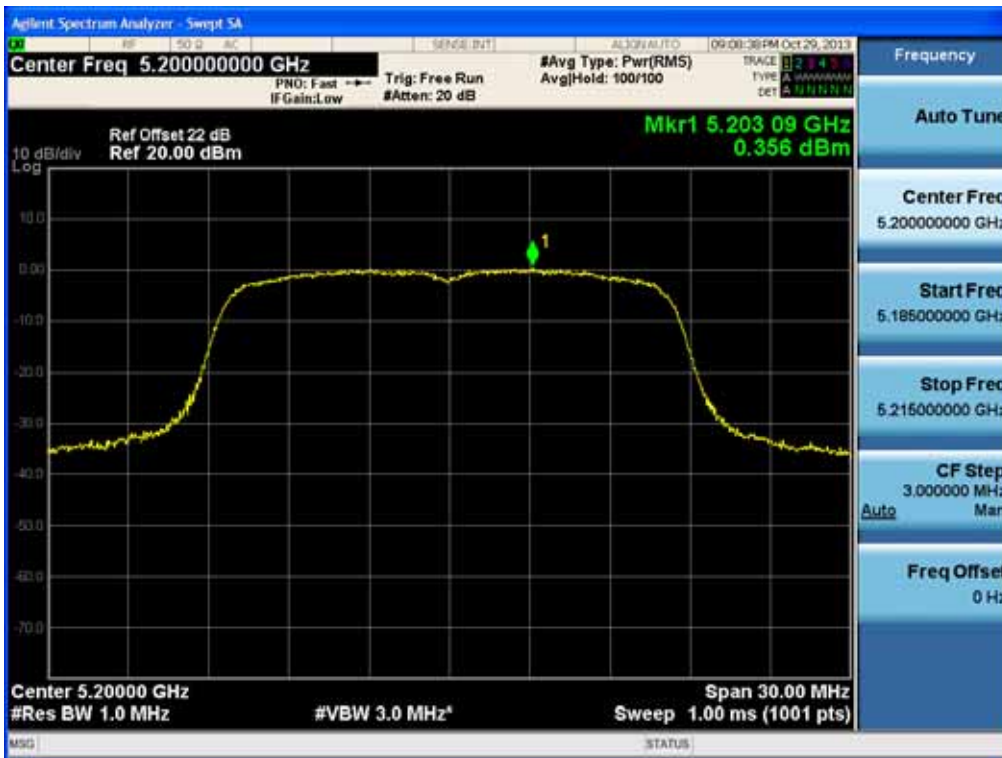
FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr	
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

RESULT PLOTS_Ant.0

Power Spectral Density (802.11a-CH 36)

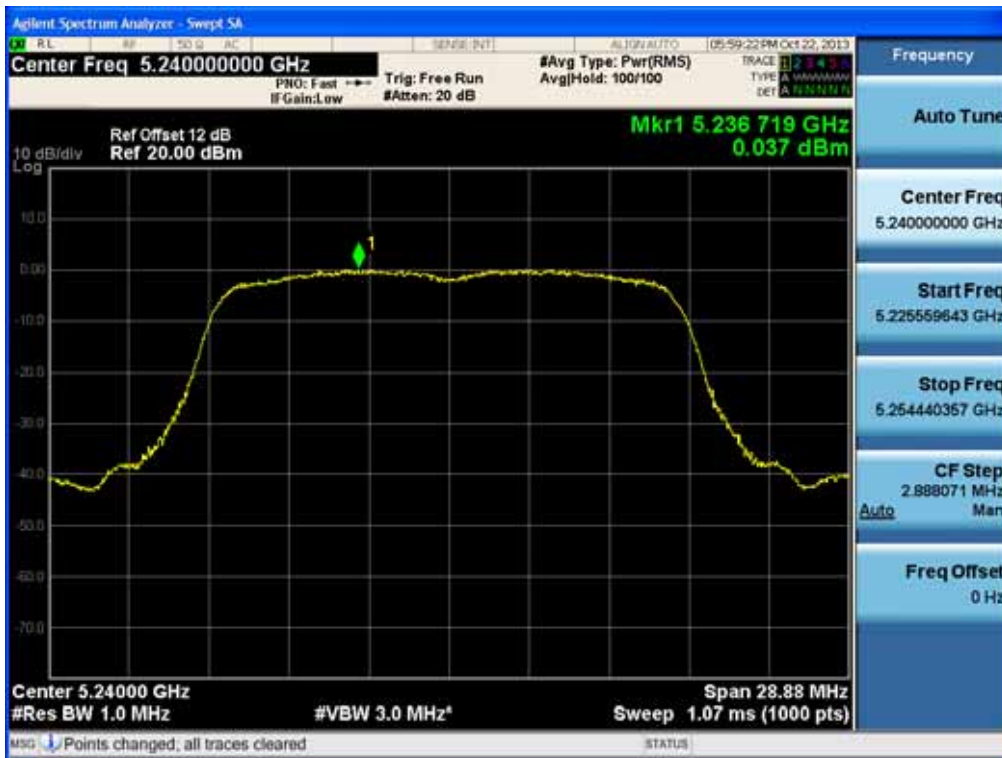


Power Spectral Density (802.11a-CH 40)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Power Spectral Density (802.11a-CH 48)



Power Spectral Density (802.11n-CH 36)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Power Spectral Density (802.11n-CH 40) _20 MHz BW



Power Spectral Density (802.11n-CH48) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Power Spectral Density (802.11n-CH 38)_40 MHz BW



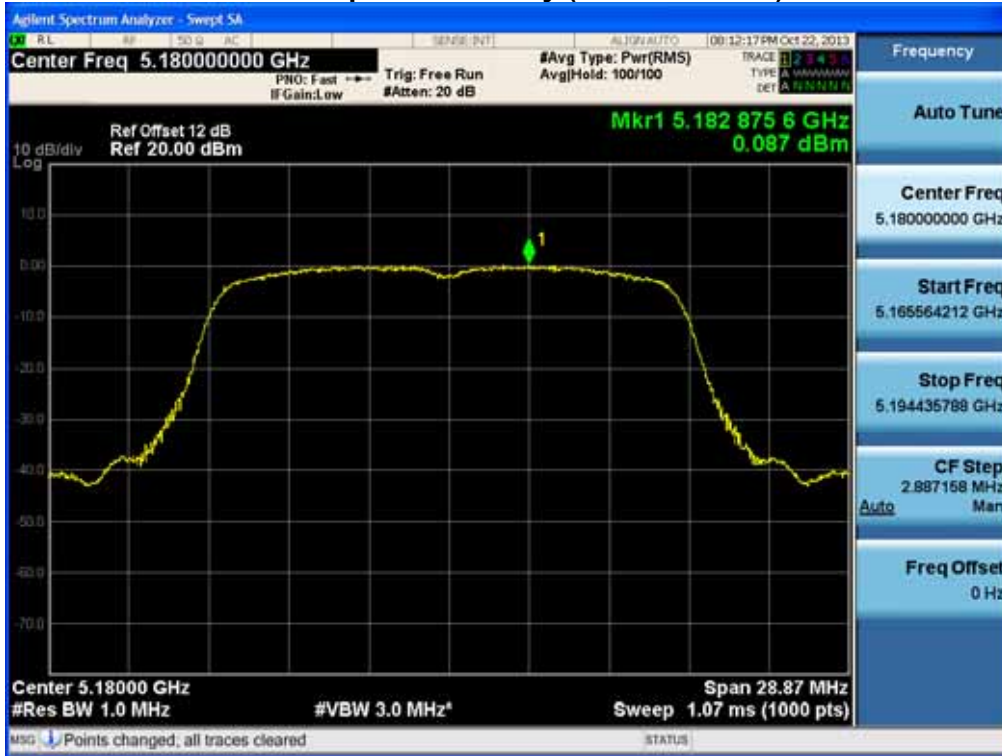
Power Spectral Density (802.11n-CH 46)_40 MHz BW



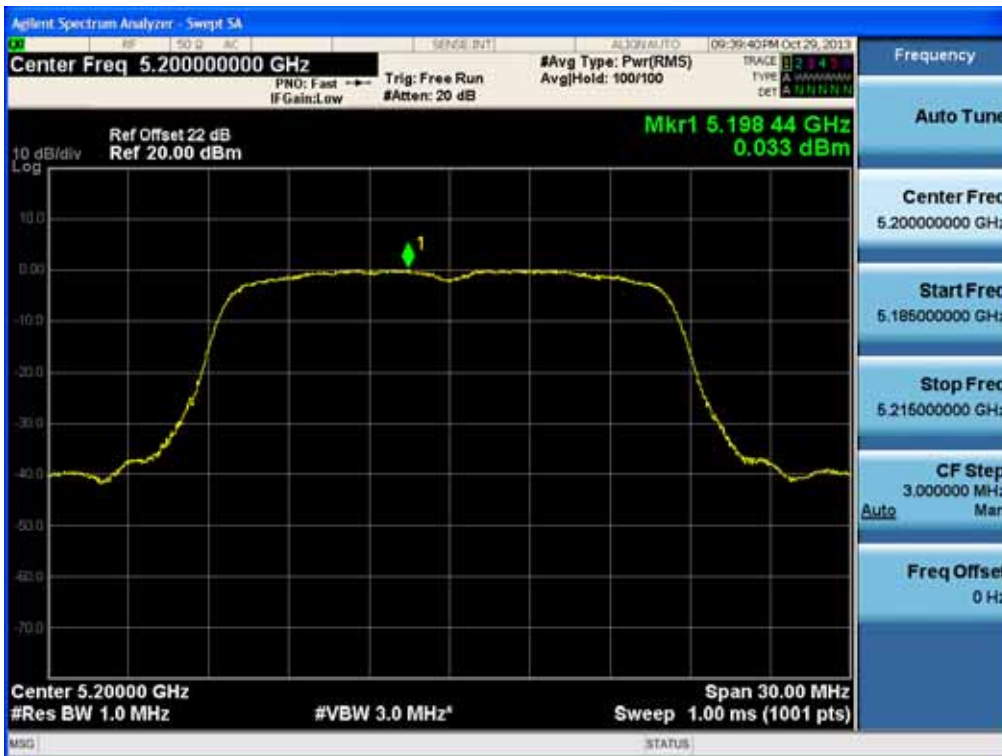
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

RESULT PLOTS_Ant.1

Power Spectral Density (802.11a-CH 36)

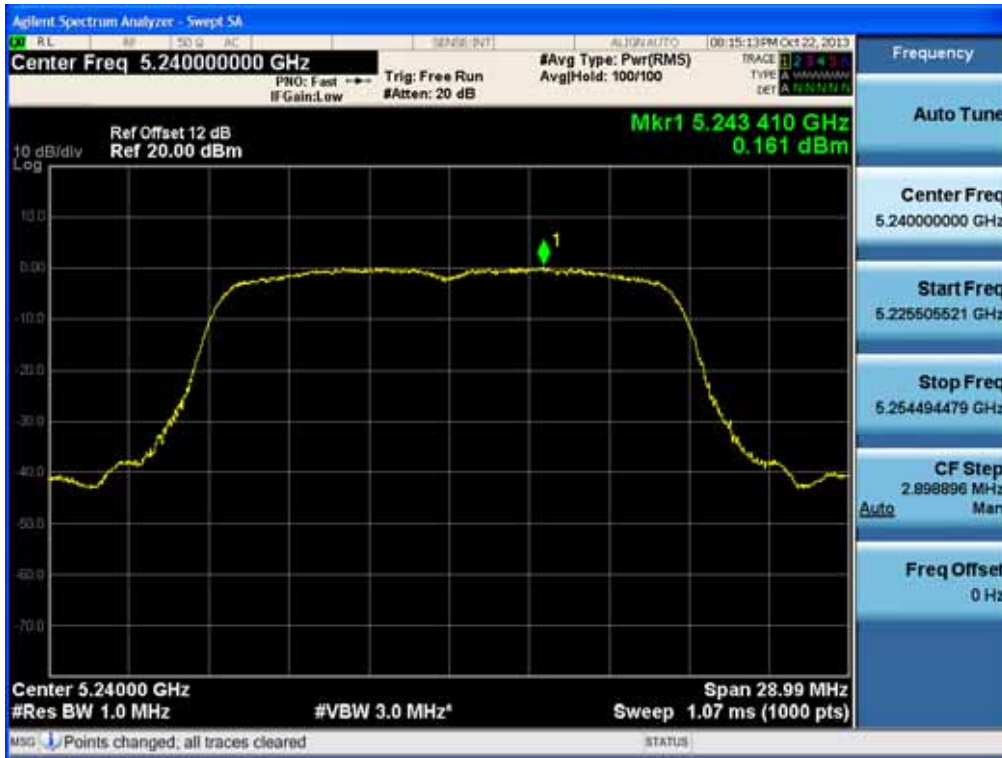


Power Spectral Density (802.11a-CH 40)



FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr	
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Power Spectral Density (802.11a-CH 48)



Power Spectral Density (802.11n-CH 36)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Power Spectral Density (802.11n-CH 40) _20 MHz BW



Power Spectral Density (802.11n-CH48) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Power Spectral Density (802.11n-CH 38)_40 MHz BW



Power Spectral Density (802.11n-CH 46)_40 MHz BW

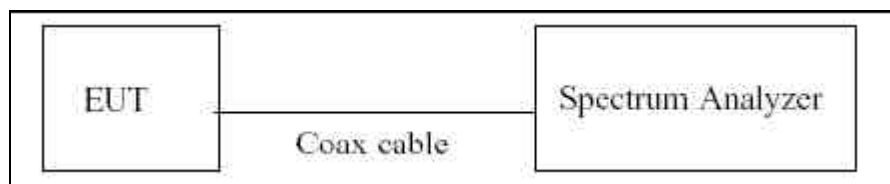


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

8.6 PEAK EXCURSION RATIO

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in the continuous transmission mode at the appropriate center frequencies. The largest permissible difference between the modulation envelope(measured using a peak hold function) and the maximum conducted output power 13 dB/MHz.

TEST CONFIGURATION



TEST PROCEDURE

We tested according to KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Span = Set the span to view the entire emission bandwidth.
2. RBW = 1 MHz
3. VBW \geq 3 MHz
4. Detector Mode = Peak
5. Trace Mode = Max hold
6. Allow the sweeps to continue until the trace stabilizes.
7. Use the peak search function to find the peak of the spectrum.
8. Use the procedure to measure the PPSD
9. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

Note :

1. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 5.2 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.

FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41



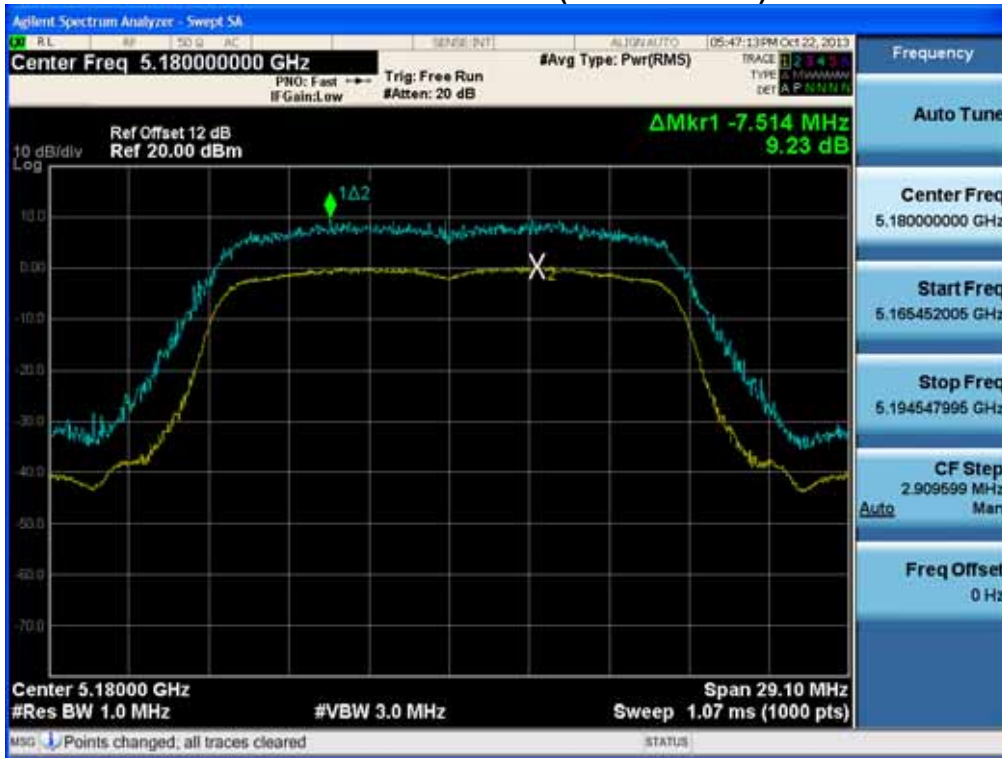
Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	10.30
	5190	10.29
	5200	10.28
	5230	10.29
	5240	10.34

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

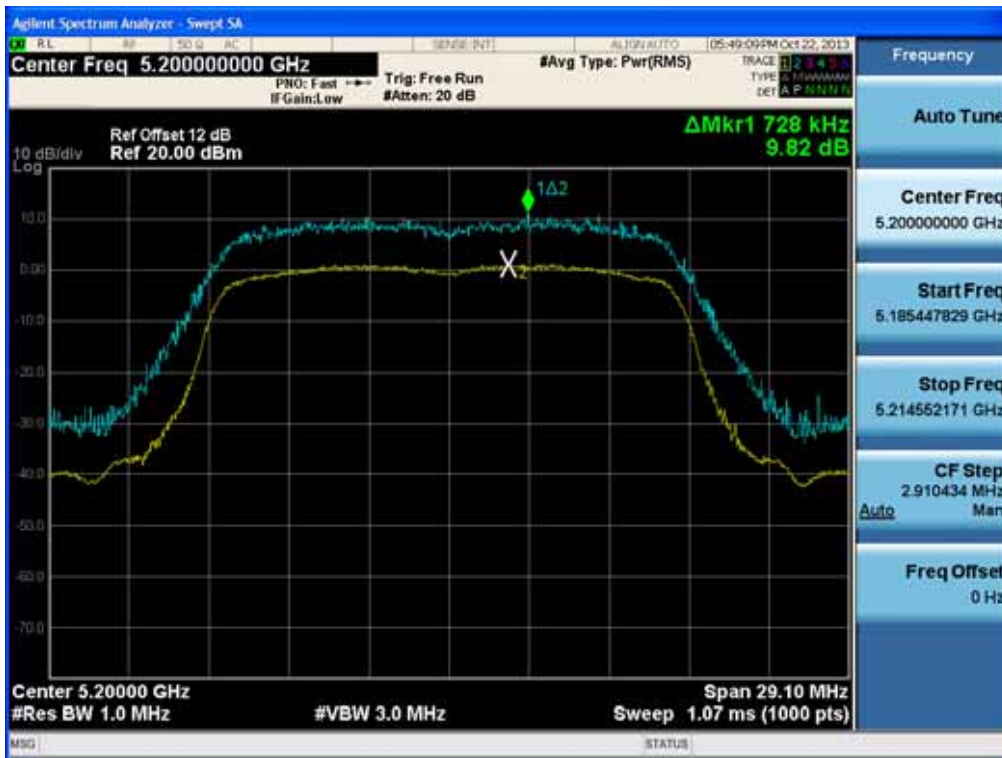
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

RESULT PLOTS_Ant.0

Peak Excursion Ratio (802.11a-CH36)

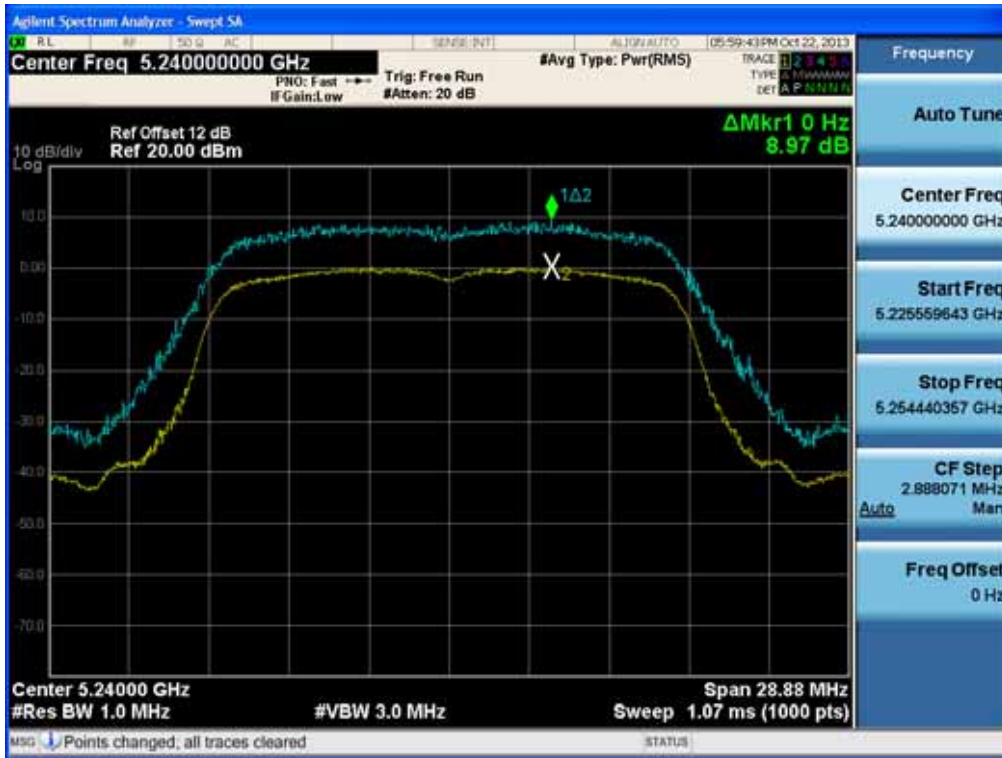


Peak Excursion Ratio (802.11a-CH40)

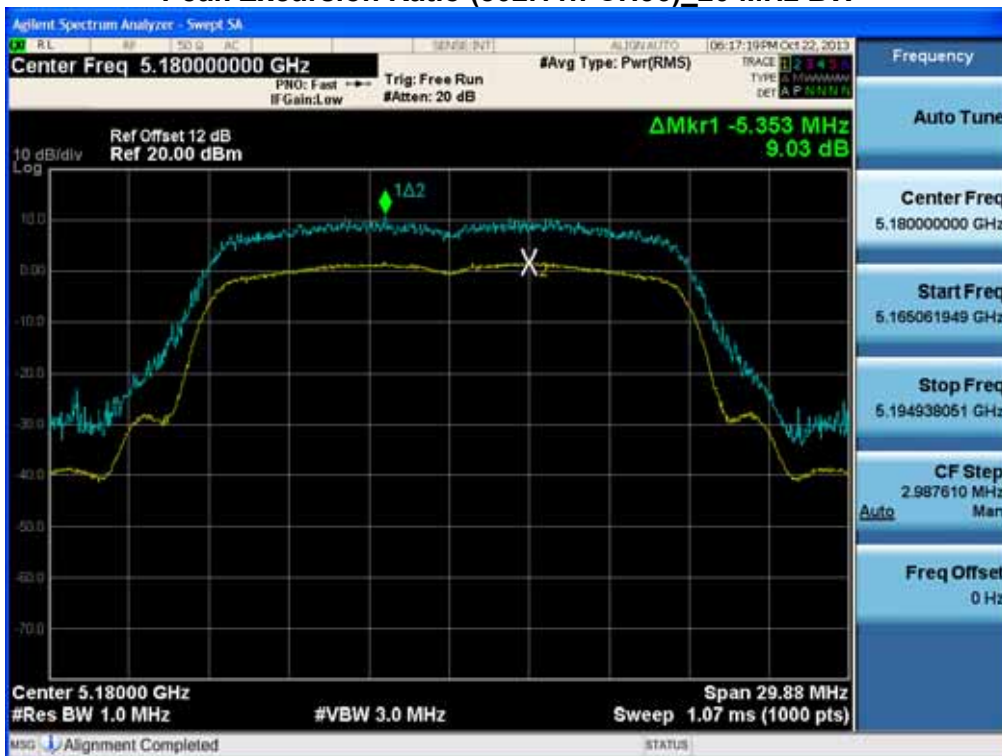


FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr	
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Peak Excursion Ratio (802.11a-CH48)

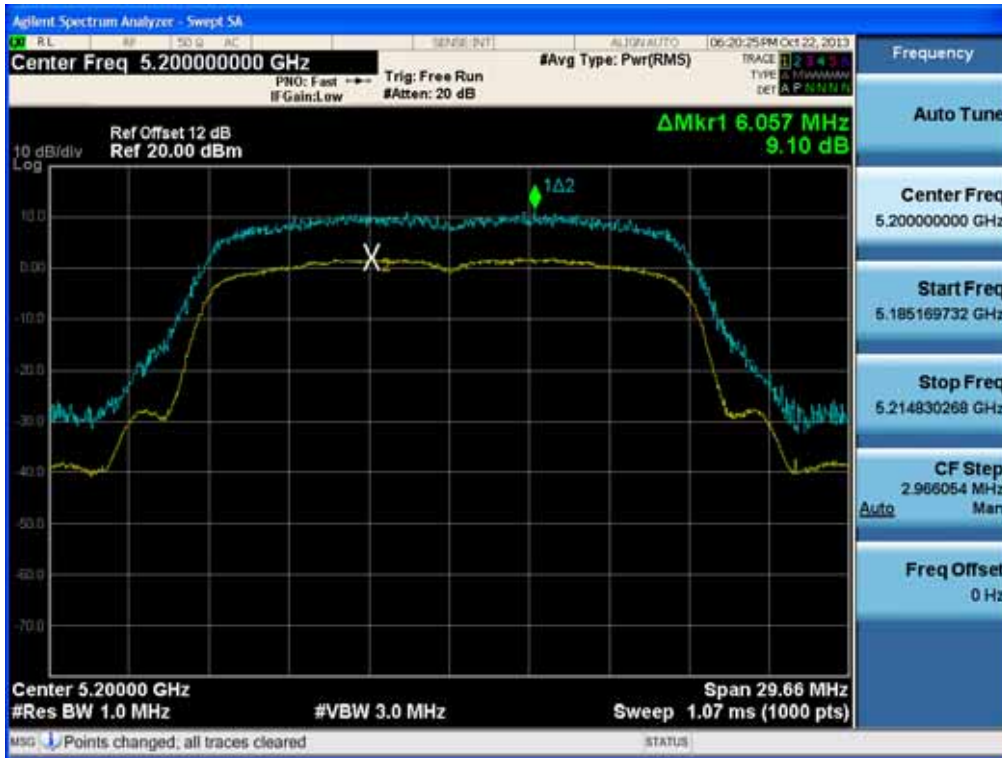


Peak Excursion Ratio (802.11n-CH36)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Peak Excursion Ratio (802.11n-CH40) _20 MHz BW



Peak Excursion Ratio (802.11n-CH48) _20 MHz BW

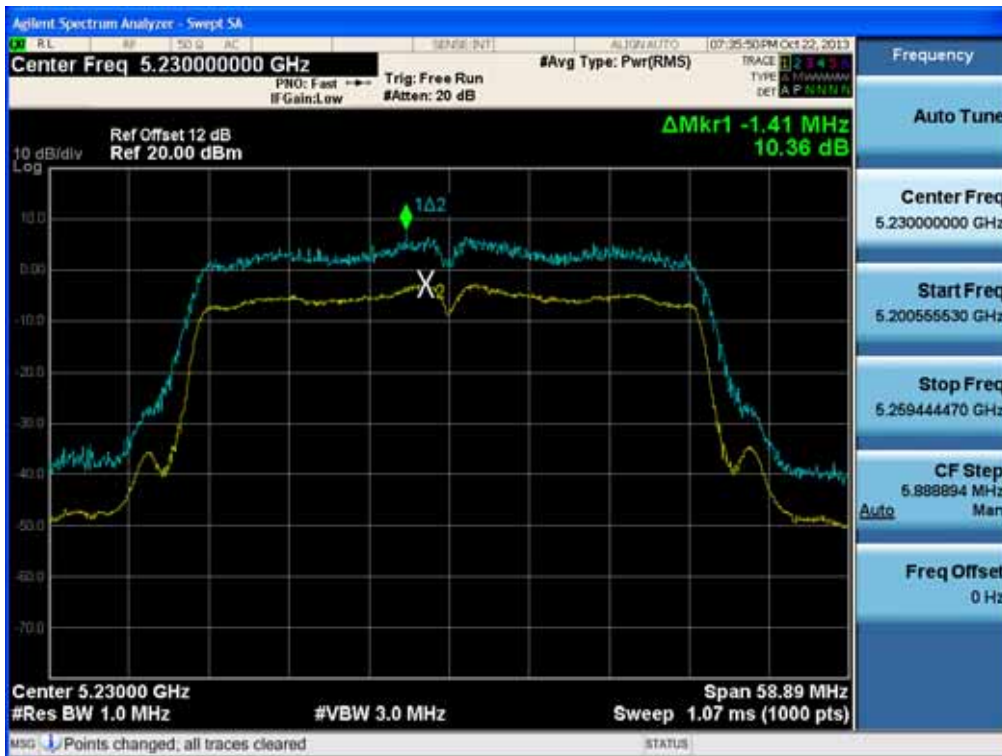


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Peak Excursion Ratio (802.11n-CH38) _40 MHz BW



Peak Excursion Ratio (802.11n-CH46) _40 MHz BW



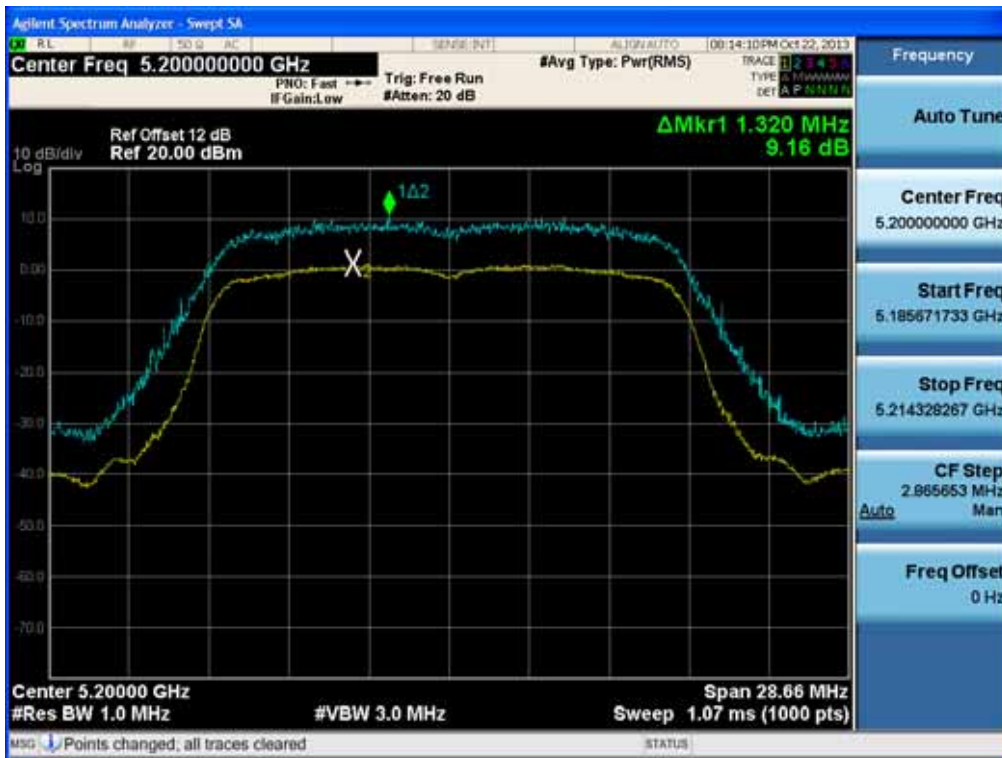
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

RESULT PLOTS_Ant.1

Peak Excursion Ratio (802.11a-CH36)

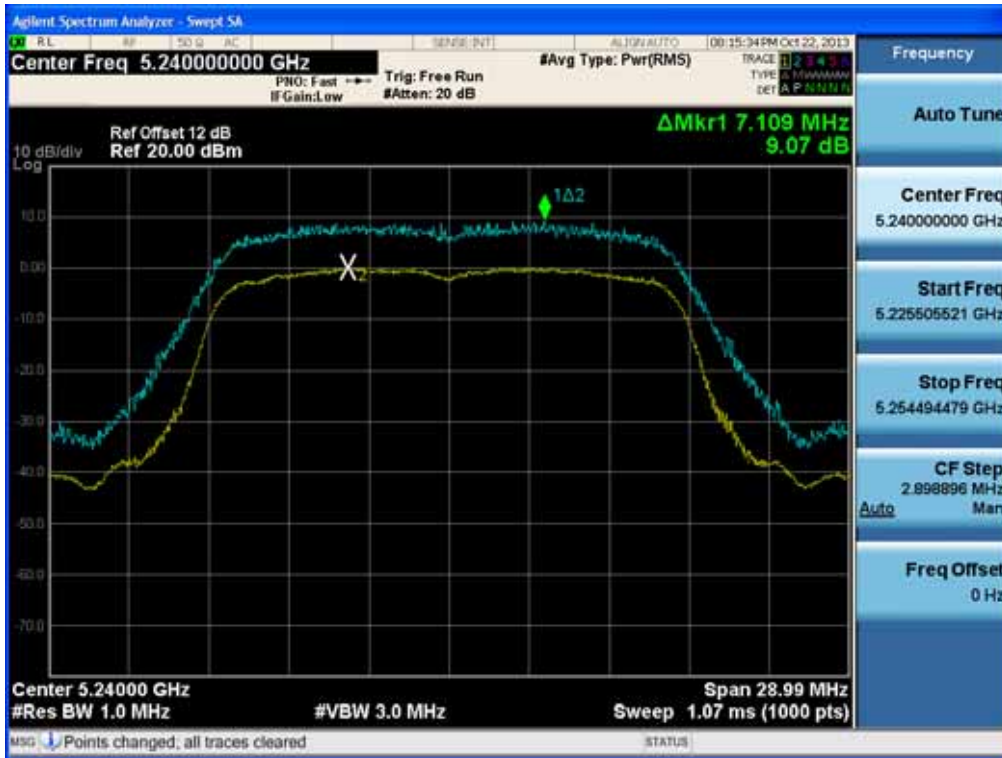


Peak Excursion Ratio (802.11a-CH40)

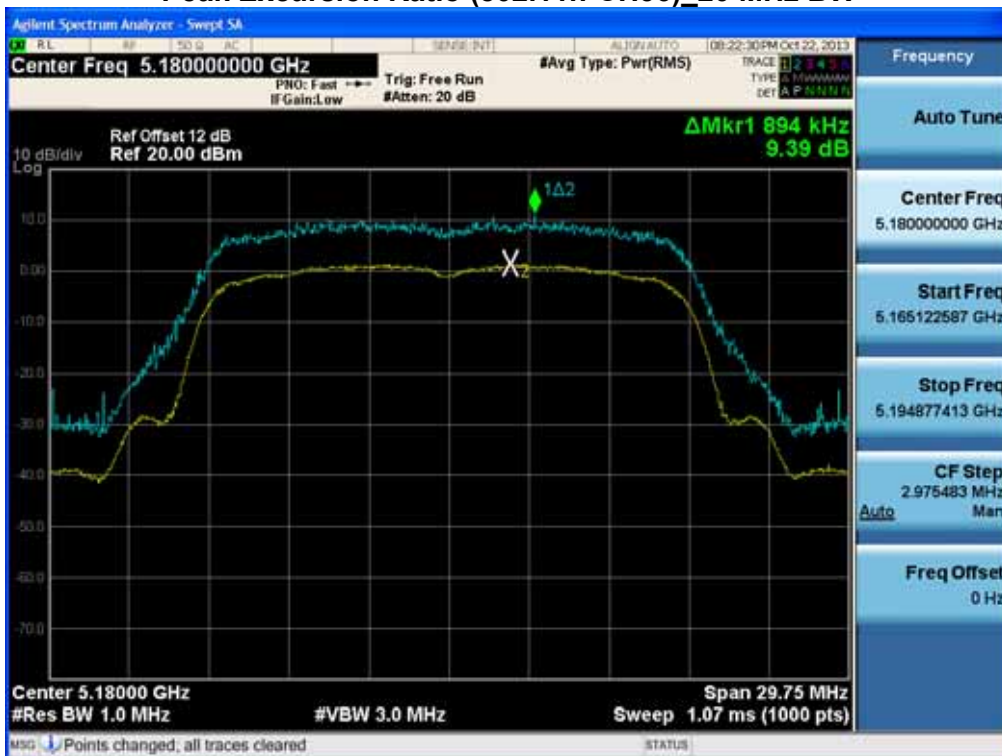


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Peak Excursion Ratio (802.11a-CH48)

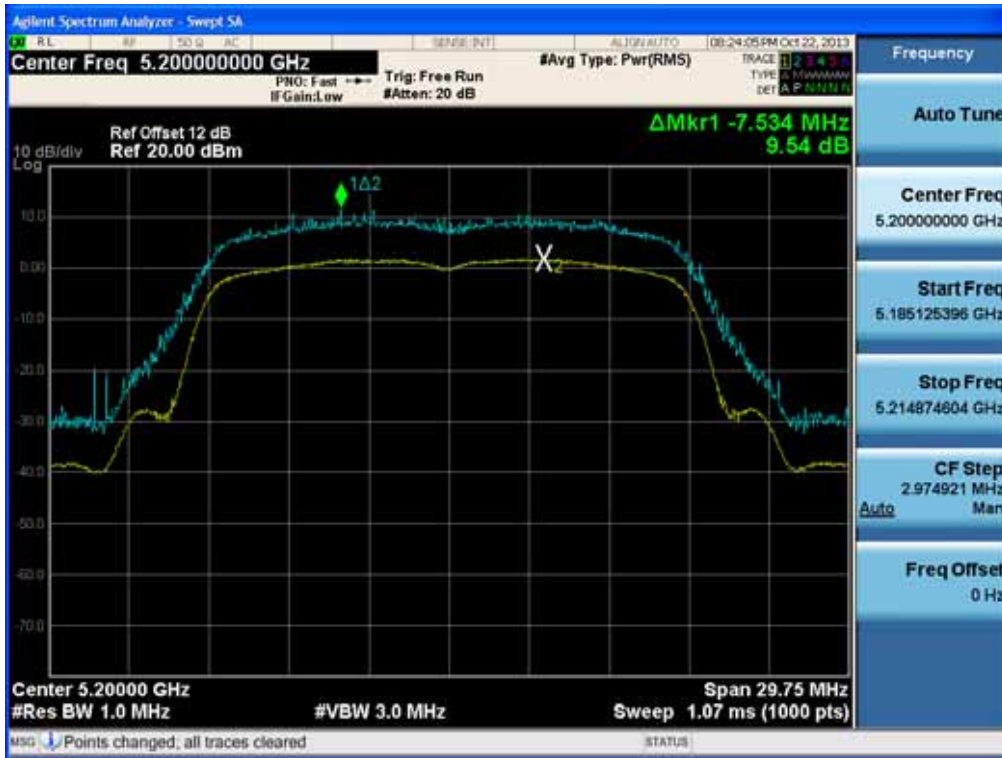


Peak Excursion Ratio (802.11n-CH36)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Peak Excursion Ratio (802.11n-CH40) _20 MHz BW



Peak Excursion Ratio (802.11n-CH48) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

Peak Excursion Ratio (802.11n-CH38) _40 MHz BW



Peak Excursion Ratio (802.11n-CH46) _40 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41

8.7 FREQUENCY STABILITY.

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

20 MHz BW

OPERATING BAND:	<u>UNII Band 1</u>
OPERATING FREQUENCY:	<u>5,180,000,000 Hz</u>
CHANNEL:	<u>36</u>
REFERENCE VOLTAGE:	<u>3.8 VDC</u>

Voltage (%)	Power (VDC)	Temp. ()	Frequency (kHz)	Frequency Error (kHz)
100%	3.500	+20(Ref)	5 179 960.30	-39.7
100%		-30	5 180 032.60	32.6
100%		-20	5 180 034.20	34.2
100%		-10	5 180 030.00	30.0
100%		0	5 179 974.60	-25.4
100%		10	5 179 963.20	-36.8
100%		30	5 179 966.60	-33.4
100%		40	5 179 964.00	-36.0
100%		50	5 179 964.20	-35.8
115%		3.675	20	5 179 960.60
Batt. Endpoint	3.325	20	5 179 960.50	-39.5

Note:

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



40 MHz BW

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,190,000,000 Hz
 CHANNEL: 38
 REFERENCE VOLTAGE: 3.8 VDC

Voltage (%)	Power (VDC)	Temp. ()	Frequency (Hz)	Frequency Error (Hz)
100%	3.500	+20(Ref)	5 189 999 997	-3
100%		-30	5 190 000 002	2
100%		-20	5 190 000 004	4
100%		-10	5 190 000 005	5
100%		0	5 189 999 999	-1
100%		+10	5 189 999 995	-5
100%		+30	5 189 999 995	-5
100%		+40	5 189 999 993	-7
100%		+50	5 189 999 992	-8
115%		3.675	+20	5 189 999 998
Batt. Endpoint	3.325	+20	5 189 999 996	-4

Note:

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

FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41
				IC: 2703H-LGSBW41



8.8 RADIATED MEASUREMENT.

8.8.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

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

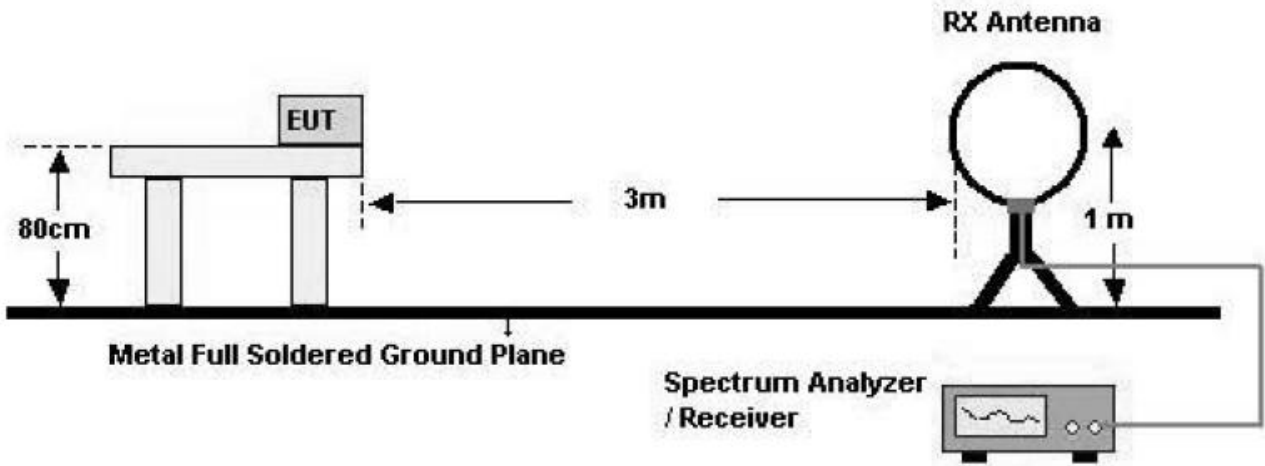
§15.407, KDB 789033

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

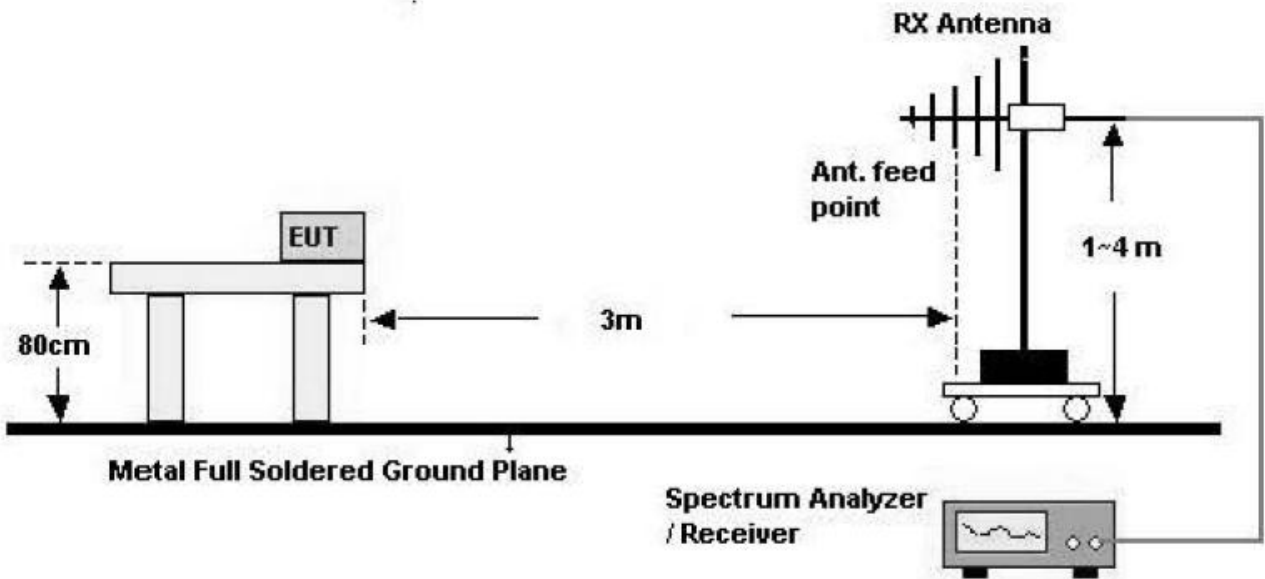
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Test Configuration

Below 30 MHz

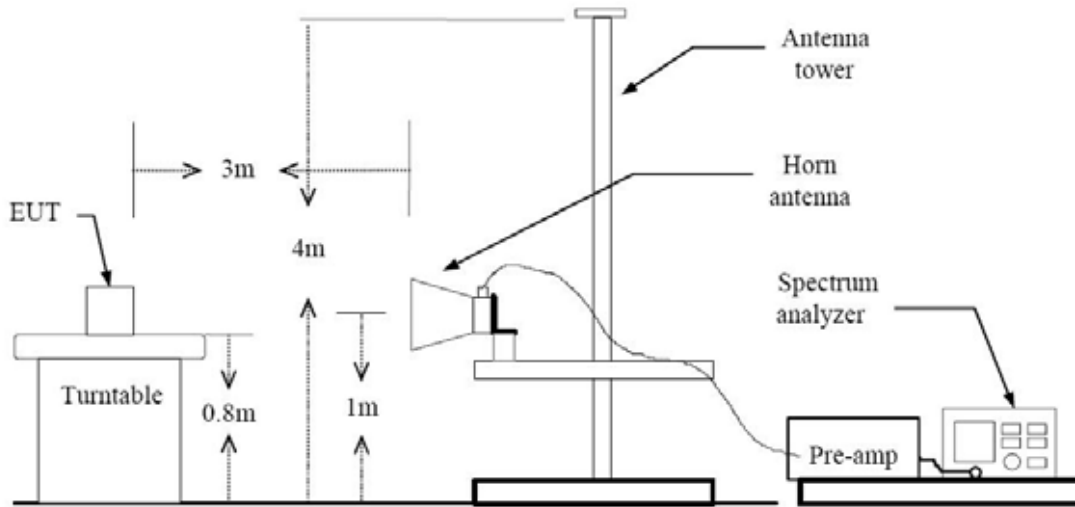


30 MHz - 1 GHz



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Above 1 GHz



TEST PROCEDURE USED

ANSI C63.4(2003)

Method H)5) in KDB 789033, issued 04/08/2013 (Peak)

Method H)6)d) in KDB 789033, issued 04/08/2013 (Average)

. Spectrum setting:

- Peak.

1. RBW = 1 MHz

2. VBW \geq 3 MHz

3. Detector = Peak

4. Sweep Time = auto

5. Trace mode = max hold

6. Allow sweeps to continue until the trace stabilizes.

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

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

1. RBW = 1 MHz

2. VBW

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

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

3. The analyzer is set to linear detector mode.

4. Detector = Peak.

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

Note :

1. We used the case 1 for 802.11a/n_20 and case 2 for 802.11n_40 to perform the average filed strength measurements for RSE and radiated band edge test.
2. The actual setting value of VBW for 802.11n_40.

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
n_40	13.5	0.932	0.955	97.6	1073	3000



TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

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

Notes:

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

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TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

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

Notes:

1. Measuring frequencies from 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.

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Above 1 GHz

Ant.0

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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	56.14	9.33	V	65.47	68.20	2.73	PK
15540	45.17	14.61	V	59.78	73.98	14.20	PK
15540	30.84	14.61	V	45.45	53.98	8.53	AV
10360	56.03	9.33	H	65.36	68.20	2.84	PK
15540	44.79	14.61	H	59.40	73.98	14.58	PK
15540	30.04	14.61	H	44.65	53.98	9.33	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 all data rate in 802.11a test at Ant.0. Worst case is 6 Mbps in 802.11a at Ant.0
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	55.92	10.13	V	66.05	68.20	2.15	PK
15600	44.37	14.60	V	58.97	73.98	15.01	PK
15600	30.97	14.60	V	45.57	53.98	8.41	AV
10400	55.17	10.13	H	65.30	68.20	2.90	PK
15600	43.89	14.60	H	58.49	73.98	15.49	PK
15600	30.07	14.60	H	44.67	53.98	9.31	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 all data rate in 802.11a test at Ant.0. Worst case is 6 Mbps in 802.11a at Ant.0
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	52.56	10.20	V	62.76	68.20	5.44	PK
15720	45.65	13.47	V	59.12	73.98	14.86	PK
15720	31.87	13.47	V	45.34	53.98	8.64	AV
10480	52.16	10.20	H	62.36	68.20	5.84	PK
15720	45.31	13.47	H	58.78	73.98	15.20	PK
15720	30.98	13.47	H	44.45	53.98	9.53	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 all data rate in 802.11a test at Ant.0. Worst case is 6 Mbps in 802.11a at Ant.0
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

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Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	55.51	9.33	V	64.84	68.20	3.36	PK
15540	45.21	14.61	V	59.82	73.98	14.16	PK
15540	31.32	14.61	V	45.93	53.98	8.05	AV
10360	55.42	9.33	H	64.75	68.20	3.45	PK
15540	44.79	14.61	H	59.40	73.98	14.58	PK
15540	30.24	14.61	H	44.85	53.98	9.13	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 all data rate in 802.11n_20 MHz BW at Ant.0. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at Ant.0.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	55.49	10.13	V	65.62	68.20	2.58	PK
15600	45.28	14.60	V	59.88	73.98	14.10	PK
15600	31.42	14.60	V	46.02	53.98	7.96	AV
10400	55.31	10.13	H	65.44	68.20	2.76	PK
15600	44.74	14.60	H	59.34	73.98	14.64	PK
15600	30.32	14.60	H	44.92	53.98	9.06	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 all data rate in 802.11n_20 MHz BW at Ant.0. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at Ant.0.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	55.12	10.20	V	65.32	68.20	2.88	PK
15720	46.21	13.47	V	59.68	73.98	14.30	PK
15720	32.29	13.47	V	45.76	53.98	8.22	AV
10480	55.01	10.20	H	65.21	68.20	2.99	PK
15720	45.76	13.47	H	59.23	73.98	14.75	PK
15720	31.42	13.47	H	44.89	53.98	9.09	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 all data rate in 802.11n_20 MHz BW at Ant.0. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at Ant.0.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10380	46.03	9.70	V	55.73	68.20	12.47	PK
15570	45.67	14.62	V	60.29	73.98	13.69	PK
15570	31.27	14.62	V	45.89	53.98	8.09	AV
10380	45.85	9.70	H	55.55	68.20	12.65	PK
15570	45.14	14.62	H	59.76	73.98	14.22	PK
15570	30.21	14.62	H	44.83	53.98	9.15	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 all data rate in 802.11n_40 MHz BW at Ant.0. Worst case is 13.5 Mbps in 802.11n_40 MHz BW at Ant.0.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5230 MHz
Channel No.	46 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10460	45.08	10.26	V	55.34	68.20	12.86	PK
15690	46.19	14.33	V	60.52	73.98	13.46	PK
15690	32.24	14.33	V	46.57	53.98	7.41	AV
10460	44.79	10.26	H	55.05	68.20	13.15	PK
15690	45.51	14.33	H	59.84	73.98	14.14	PK
15690	31.32	14.33	H	45.65	53.98	8.33	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 all data rate in 802.11n_40 MHz BW at Ant.0. Worst case is 13.5 Mbps in 802.11n_40 MHz BW at Ant.0.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Ant.1

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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	56.39	9.33	V	65.72	68.20	2.48	PK
15540	45.34	14.61	V	59.95	73.98	14.03	PK
15540	30.97	14.61	V	45.58	53.98	8.40	AV
10360	56.21	9.33	H	65.54	68.20	2.66	PK
15540	44.96	14.61	H	59.57	73.98	14.41	PK
15540	30.25	14.61	H	44.86	53.98	9.12	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 all data rate in 802.11a test at Ant.1. Worst case is 6 Mbps in 802.11a at Ant.1
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	56.01	10.13	V	66.14	68.20	2.06	PK
15600	44.55	14.60	V	59.15	73.98	14.83	PK
15600	31.14	14.60	V	45.74	53.98	8.24	AV
10400	55.39	10.13	H	65.52	68.20	2.68	PK
15600	43.97	14.60	H	58.57	73.98	15.41	PK
15600	30.28	14.60	H	44.88	53.98	9.10	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 all data rate in 802.11a test at Ant.1. Worst case is 6 Mbps in 802.11a at Ant.1
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	52.69	10.20	V	62.89	68.20	5.31	PK
15720	45.79	13.47	V	59.26	73.98	14.72	PK
15720	31.96	13.47	V	45.43	53.98	8.55	AV
10480	52.34	10.20	H	62.54	68.20	5.66	PK
15720	45.48	13.47	H	58.95	73.98	15.03	PK
15720	31.12	13.47	H	44.59	53.98	9.39	AV

Notes:

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

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Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	55.76	9.33	V	65.09	68.20	3.11	PK
15540	45.38	14.61	V	59.99	73.98	13.99	PK
15540	31.54	14.61	V	46.15	53.98	7.83	AV
10360	55.64	9.33	H	64.97	68.20	3.23	PK
15540	44.92	14.61	H	59.53	73.98	14.45	PK
15540	30.47	14.61	H	45.08	53.98	8.90	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n_20 MHz BW at Ant.1. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at Ant.1.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41



Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	55.63	10.13	V	65.76	68.20	2.44	PK
15600	45.41	14.60	V	60.01	73.98	13.97	PK
15600	31.65	14.60	V	46.25	53.98	7.73	AV
10400	55.57	10.13	H	65.70	68.20	2.50	PK
15600	44.89	14.60	H	59.49	73.98	14.49	PK
15600	30.51	14.60	H	45.11	53.98	8.87	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 all data rate in 802.11n_20 MHz BW at Ant.1. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at Ant.1.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	55.35	10.20	V	65.55	68.20	2.65	PK
15720	46.37	13.47	V	59.84	73.98	14.14	PK
15720	32.54	13.47	V	46.01	53.98	7.97	AV
10480	55.24	10.20	H	65.44	68.20	2.76	PK
15720	45.89	13.47	H	59.36	73.98	14.62	PK
15720	31.59	13.47	H	45.06	53.98	8.92	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 all data rate in 802.11n_20 MHz BW at Ant.1. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at Ant.1.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10380	46.24	9.70	V	55.94	68.20	12.26	PK
15570	45.91	14.62	V	60.53	73.98	13.45	PK
15570	31.35	14.62	V	45.97	53.98	8.01	AV
10380	45.97	9.70	H	55.67	68.20	12.53	PK
15570	45.37	14.62	H	59.99	73.98	13.99	PK
15570	30.48	14.62	H	45.10	53.98	8.88	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 all data rate in 802.11n_40 MHz BW at Ant.1. Worst case is 13.5 Mbps in 802.11n_40 MHz BW at Ant.1.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5230 MHz
Channel No.	46 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10460	45.23	10.26	V	55.49	68.20	12.71	PK
15690	46.31	14.33	V	60.64	73.98	13.34	PK
15690	32.38	14.33	V	46.71	53.98	7.27	AV
10460	44.94	10.26	H	55.20	68.20	13.00	PK
15690	45.76	14.33	H	60.09	73.98	13.89	PK
15690	31.54	14.33	H	45.87	53.98	8.11	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 all data rate in 802.11n_40 MHz BW at Ant.1. Worst case is 13.5 Mbps in 802.11n_40 MHz BW at Ant.1.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Ant 0 & 1(MIMO)

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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	56.67	9.33	V	66.00	68.20	2.20	PK
15540	45.68	14.61	V	60.29	73.98	13.69	PK
15540	31.73	14.61	V	46.34	53.98	7.64	AV
10360	56.52	9.33	H	65.85	68.20	2.35	PK
15540	45.26	14.61	H	59.87	73.98	14.11	PK
15540	30.85	14.61	H	45.46	53.98	8.52	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 all data rate in 802.11a test at MIMO. Worst case is 6 Mbps in 802.11a at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41



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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	55.92	10.13	V	66.05	68.20	2.15	PK
15600	44.95	14.60	V	59.55	73.98	14.43	PK
15600	31.89	14.60	V	46.49	53.98	7.49	AV
10400	55.69	10.13	H	65.82	68.20	2.38	PK
15600	44.49	14.60	H	59.09	73.98	14.89	PK
15600	30.92	14.60	H	45.52	53.98	8.46	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 all data rate in 802.11a test at MIMO. Worst case is 6 Mbps in 802.11a at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



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

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	53.03	10.20	V	63.23	68.20	4.97	PK
15720	46.21	13.47	V	59.68	73.98	14.30	PK
15720	32.91	13.47	V	46.38	53.98	7.60	AV
10480	52.79	10.20	H	62.99	68.20	5.21	PK
15720	45.83	13.47	H	59.30	73.98	14.68	PK
15720	31.86	13.47	H	45.33	53.98	8.65	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 all data rate in 802.11a test at MIMO. Worst case is 6 Mbps in 802.11a at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	56.02	9.33	V	65.35	68.20	2.85	PK
15540	45.82	14.61	V	60.43	73.98	13.55	PK
15540	31.88	14.61	V	46.49	53.98	7.49	AV
10360	55.97	9.33	H	65.30	68.20	2.90	PK
15540	45.34	14.61	H	59.95	73.98	14.03	PK
15540	30.79	14.61	H	45.40	53.98	8.58	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 all data rate in 802.11n_20 MHz BW at MIMO. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	56.02	10.13	V	66.15	68.20	2.05	PK
15600	45.73	14.60	V	60.33	73.98	13.65	PK
15600	31.99	14.60	V	46.59	53.98	7.39	AV
10400	55.89	10.13	H	66.02	68.20	2.18	PK
15600	45.24	14.60	H	59.84	73.98	14.14	PK
15600	30.85	14.60	H	45.45	53.98	8.53	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 all data rate in 802.11n_20 MHz BW at MIMO. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	55.67	10.20	V	65.87	68.20	2.33	PK
15720	46.68	13.47	V	60.15	73.98	13.83	PK
15720	32.85	13.47	V	46.32	53.98	7.66	AV
10480	55.57	10.20	H	65.77	68.20	2.43	PK
15720	46.27	13.47	H	59.74	73.98	14.24	PK
15720	31.96	13.47	H	45.43	53.98	8.55	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 all data rate in 802.11n_20 MHz BW at MIMO. Worst case is 6.5 Mbps in 802.11n_20 MHz BW at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10380	46.51	9.70	V	56.21	68.20	11.99	PK
15570	46.13	14.62	V	60.75	73.98	13.23	PK
15570	31.88	14.62	V	46.50	53.98	7.48	AV
10380	46.37	9.70	H	56.07	68.20	12.13	PK
15570	45.68	14.62	H	60.30	73.98	13.68	PK
15570	30.73	14.62	H	45.35	53.98	8.63	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 all data rate in 802.11n_40 MHz BW at MIMO. Worst case is 13.5 Mbps in 802.11n_40 MHz BW at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	



Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5230 MHz
Channel No.	46 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10460	45.54	10.26	V	55.80	68.20	12.40	PK
15690	46.71	14.33	V	61.04	73.98	12.94	PK
15690	32.78	14.33	V	47.11	53.98	6.87	AV
10460	45.38	10.26	H	55.64	68.20	12.56	PK
15690	46.16	14.33	H	60.49	73.98	13.49	PK
15690	31.86	14.33	H	46.19	53.98	7.79	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 all data rate in 802.11n_40 MHz BW at MIMO. Worst case is 13.5 Mbps in 802.11n_40 MHz BW at MIMO.
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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module	FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41	

8.8.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

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

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.14	-0.51	H	70.63	73.98	3.35	PK
5150	47.81	-0.51	H	47.30	53.98	6.68	AV
5150	69.63	-0.51	V	69.12	73.98	4.86	PK
5150	44.78	-0.51	V	44.27	53.98	9.71	AV



Band : UNII 1
 Operation Mode: 802.11 n_20 MHz BW
 Transfer Rate: 6.5 Mbps
 Operating Frequency 5180 MHz
 Channel No. 36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.89	-0.51	H	71.38	73.98	2.60	PK
5150	50.02	-0.51	H	49.51	53.98	4.47	AV
5150	70.32	-0.51	V	69.81	73.98	4.17	PK
5150	47.12	-0.51	V	46.61	53.98	7.37	AV

Band : UNII 1
 Operation Mode: 802.11n_40 MHz BW
 Transfer Rate: 13.5 Mbps
 Operating Frequency 5190 MHz
 Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.81	-0.51	H	71.30	73.98	2.68	PK
5150	47.74	-0.51	H	47.23	53.98	6.75	AV
5150	70.28	-0.51	V	69.77	73.98	4.21	PK
5150	44.82	-0.51	V	44.31	53.98	9.67	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW test at Ant.0 mode test. Worst case of EUT is lowest data rate in 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW at Ant.0.
3. 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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41



Ant.1

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

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.36	-0.51	H	70.85	73.98	3.13	PK
5150	47.95	-0.51	H	47.44	53.98	6.54	AV
5150	69.84	-0.51	V	69.33	73.98	4.65	PK
5150	44.91	-0.51	V	44.40	53.98	9.58	AV

Band : UNII 1
 Operation Mode: 802.11 n_20 MHz BW
 Transfer Rate: 6.5 Mbps
 Operating Frequency 5180 MHz
 Channel No. 36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.98	-0.51	H	71.47	73.98	2.51	PK
5150	50.18	-0.51	H	49.67	53.98	4.31	AV
5150	70.51	-0.51	V	70.00	73.98	3.98	PK
5150	47.35	-0.51	V	46.84	53.98	7.14	AV



Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.94	-0.51	H	71.43	73.98	2.55	PK
5150	47.92	-0.51	H	47.41	53.98	6.57	AV
5150	70.51	-0.51	V	70.00	73.98	3.98	PK
5150	44.96	-0.51	V	44.45	53.98	9.53	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW test at Ant.1 mode test. Worst case of EUT is lowest data rate in 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW at Ant.1.
3. 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	
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Ant 0 & 1(MIMO)

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

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	71.69	-0.51	H	71.18	73.98	2.80	PK
5150	48.24	-0.51	H	47.73	53.98	6.25	AV
5150	70.15	-0.51	V	69.64	73.98	4.34	PK
5150	45.29	-0.51	V	44.78	53.98	9.20	AV

Band : UNII 1
 Operation Mode: 802.11 n_20 MHz BW
 Transfer Rate: 6.5 Mbps
 Operating Frequency 5180 MHz
 Channel No. 36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	72.42	-0.51	H	71.91	73.98	2.07	PK
5150	50.59	-0.51	H	50.08	53.98	3.90	AV
5150	70.89	-0.51	V	70.38	73.98	3.60	PK
5150	47.64	-0.51	V	47.13	53.98	6.85	AV



Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	72.21	-0.51	H	71.70	73.98	2.28	PK
5150	48.31	-0.51	H	47.80	53.98	6.18	AV
5150	70.86	-0.51	V	70.35	73.98	3.63	PK
5150	45.38	-0.51	V	44.87	53.98	9.11	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW test at MIMO mode test. Worst case of EUT is lowest data rate in 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW at MIMO.
3. 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. HCTR1310FR26-2	Date of Issue: November 08, 2013	EUT Type: WIFI/BT Combo module		FCC ID: BEJLGSBW41	IC: 2703H-LGSBW41



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

Above 1 GHz

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

8.9 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 (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

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

Test Configuration

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

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. We are performed the AC Power Line Conducted Emission test for 52 Mbps, Ch.40 and 802.11n



RESULT PLOTS

Conducted Emissions (Line 1)

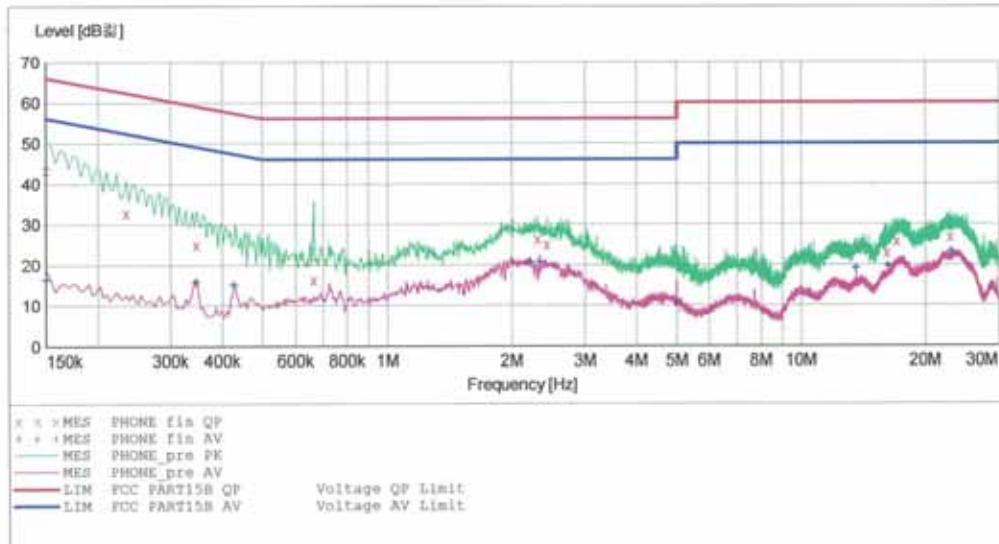
HCT

EMC

EUT: LGSBW41
 Manufacturer: LG
 Operating Condition: wifi 5.0
 Test Site: SHIELD ROOM
 Operator: JH CHOI
 Test Specification: FCC PART15 B
 Comment: H

SCAN TABLE: "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
500.0 kHz	5.0 MHz	4.0 kHz	Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150001	43.40	9.8	66	22.6	---	---
0.234001	32.70	9.8	62	29.6	---	---
0.346001	25.00	9.8	59	34.0	---	---
0.664000	16.20	9.8	56	39.8	---	---
2.304000	26.40	10.0	56	29.6	---	---
2.428000	25.10	10.0	56	30.9	---	---
16.080000	22.90	10.8	60	37.1	---	---
16.968000	25.70	10.8	60	34.3	---	---
22.904000	26.80	11.1	60	33.2	---	---

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MEASUREMENT RESULT: "PHONE_fin AV"

2013-10-08 10:57오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150001	16.30	9.8	56	39.7	---	---
0.346001	15.60	9.8	49	33.5	---	---
0.426001	15.10	9.8	47	32.3	---	---
2.208000	20.60	10.0	46	25.4	---	---
2.332000	20.80	10.0	46	25.2	---	---
4.996000	10.60	10.2	46	35.4	---	---
13.560000	19.20	10.7	50	30.8	---	---
16.228000	19.60	10.8	50	30.4	---	---
23.128000	23.20	11.1	50	26.8	---	---

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Conducted Emissions (Line 2)

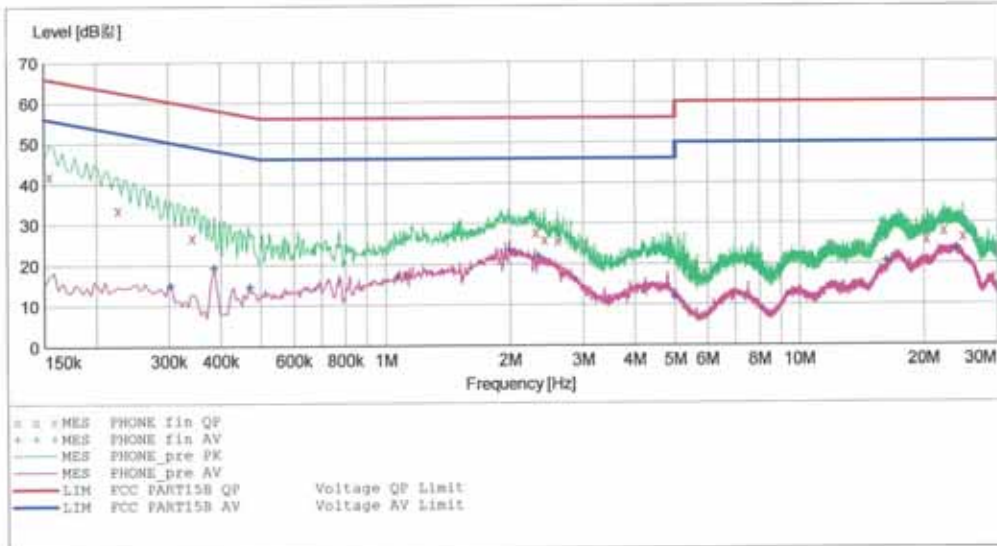
HCT

EMC

EUT: LGSBW41
 Manufacturer: LG
 Operating Condition: wifi 5.0
 Test Site: SHIELD ROOM
 Operator: JH CHOI
 Test Specification: FCC PART15 B
 Comment: N

SCAN TABLE: "FCC CLASS B(N)"

Short Description:			KN22 CLASS B			
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
500.0 kHz	5.0 MHz	4.0 kHz	Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

2013-10-08 10:52오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154001	42.00	10.0	66	23.7	---	---
0.226001	33.60	10.0	63	29.0	---	---
0.342001	26.70	10.0	59	32.4	---	---
2.304000	27.70	10.2	56	28.3	---	---
2.424000	26.00	10.2	56	30.0	---	---
2.600000	25.70	10.2	56	30.3	---	---
20.316000	25.80	11.3	60	34.2	---	---
22.312000	27.90	11.4	60	32.1	---	---
24.852000	26.50	11.5	60	33.5	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-10-08 10:52오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.302001	14.90	10.0	50	35.2	---	---
0.386001	19.30	10.0	48	28.8	---	---
0.470001	14.50	10.0	47	32.0	---	---
1.068000	16.80	10.1	46	29.2	---	---
1.988000	23.50	10.1	46	22.5	---	---
2.336000	21.90	10.2	46	24.1	---	---
5.000000	11.90	10.4	46	34.1	---	---
16.228000	20.50	11.1	50	29.5	---	---
23.792000	23.50	11.5	50	26.5	---	---

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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	11/07/2013	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	11/07/2013	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	11/07/2013	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/07/2013	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	11/07/2013	BR0617