



HCT CO., LTD.

CERTIFICATE OF COMPLIANCE FCC Certification

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.

Address:
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue:
December 06, 2013

Test Site/Location:
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil,
Majang-myeon, Icheon-si, Gyeonggi-do, Korea

Report No.: HCTR1311FR18-1

HCT FRN: 0005866421

FCC ID : ZNFD955

APPLICANT : LG Electronics MobileComm U.S.A., Inc.

FCC Model(s): LG-D955

Additional FCC Model(s): LGD955, D955

EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID

Max. RF Output Power:
Wi-Fi 802.11a (5180~5240) (12.51 dBm)/ Wi-Fi 802.11a (5260~5320) (12.70 dBm)/
Wi-Fi 802.11a (5500~5720) (12.35 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (11.66 dBm)/
Wi-Fi 802.11n_20 MHz BW(5260~5320)(11.78 dBm)/ Wi-Fi 802.11n_20 MHz BW(5500~5720)(11.41 dBm)/
Wi-Fi 802.11n_40 MHz BW(5190~5230) (11.09 dBm)/ Wi-Fi 802.11n_40 MHz BW (5270~5310) (11.48 dBm)/
Wi-Fi 802.11n_40 MHz BW (5510~5710) (10.78 dBm)/ Wi-Fi 802.11ac (5180~5240) (10.50 dBm)/
Wi-Fi 802.11ac (5260~5320) (10.77 dBm)/ Wi-Fi 802.11ac (5500~5720) (10.54 dBm)/
Wi-Fi 802.11ac (5190~5230) (10.29 dBm)/ Wi-Fi 802.11ac (5270~5310) (10.38 dBm)/
Wi-Fi 802.11ac (5510~5710) (9.53 dBm)/ Wi-Fi 802.11ac (5210) (9.45 dBm)/
Wi-Fi 802.11ac (5290) (9.50 dBm)/ Wi-Fi 802.11ac (5530~5690) (8.78 dBm)

Frequency Range:
20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/
5500 MHz - 5720 MHz (UNII 2e)
40 MHz BW: 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/
5510 MHz - 5710 MHz (UNII 2e)
80 MHz BW: 5210 MHz(UNII 1)/ 5290 MHz(UNII 2)/ 5530 MHz - 5690 MHz(UNII 2e)

Modulation type OFDM

FCC Classification: Unlicensed National Information Infrastructure(UNII)

FCC Rule Part(s): Part 15.407

Engineering Statement:

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

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

Report prepared by
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Test engineer of RF Team

Approved by
: Chang Seok Choi
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FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1311FR18	November 28, 2013	- First Approval Report
HCTR1311FR18-1	December 06, 2013	- Revised the Max. RF Output Power of 802.11ac(5270 – 5310) on Page 1 and 4

Table of Contents

1. GENERAL INFORMATION	4
2. EUT DESCRIPTION	4
3. TEST METHODOLOGY	5
3.1 EUT CONFIGURATION	5
3.2 EUT EXERCISE	5
3.3 GENERAL TEST PROCEDURES	5
3.4 DESCRIPTION OF TEST MODES	5
4. INSTRUMENT CALIBRATION.....	6
5. FACILITIES AND ACCREDITATIONS	6
5.1 FACILITIES	6
5.2 EQUIPMENT	6
6. ANTENNA REQUIREMENTS	6
7. SUMMARY OF TEST RESULTS	7
8. TEST RESULT	8
8.1 DUTY CYCLE.....	8
8.2 26 dB BANDWIDTH MEASUREMENT	1 1
8.3 OUTPUT POWER MEASUREMENT.....	3 4
8.4 POWER SPECTRAL DENSITY	6 0
8.5 PEAK EXCURSION RATIO.....	7 5
8.6 FREQUENCY STABILITY	1 0 0
8.7 RADIATED MEASUREMENT.....	1 0 9
8.7.1 RADIATED SPURIOUS EMISSIONS.....	1 0 9
8.7.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS	1 4 9
8.8 POWERLINE CONDUCTED EMISSIONS	1 5 9
9. LIST OF TEST EQUIPMENT	1 6 4

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955



1. GENERAL INFORMATION

Applicant: LG Electronics MobileComm U.S.A., Inc.
Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID: ZNFD955
EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Model name(s): LG-D955
Additional Model name(s): LGD955, D955
Date(s) of Tests: November 11, 2013 ~ November 25, 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	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	
FCC Model Name	LG-D955	
Additional FCC Model Name	LGD955, D955	
Power Supply	DC 3.8 V	
Battery type	Li-ion Battery(Standard)	
Frequency Range	TX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5720 MHz (UNII 2e) where) Not supported 5600 MHz – 5640 MHz
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5710 MHz (UNII 2e) where) Not supported 5590 MHz – 5630 MHz
	80 MHz BW:	5210 MHz(UNII 1)/ 5290 MHz(UNII 2)/ 5530 MHz - 5690 MHz(UNII 2e) where) Not supported 5610 MHz
	RX_20 MHz BW:	5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5720 MHz (UNII 2e) where) Not supported 5600 MHz – 5640 MHz
	40 MHz BW:	5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5710 MHz (UNII 2e) where) Not supported 5590 MHz – 5630 MHz
	80 MHz BW:	5210 MHz(UNII 1)/ 5290 MHz(UNII 2)/ 5530 MHz - 5690 MHz(UNII 2e) where) Not supported 5610 MHz
Max. RF Output Power:	Wi-Fi 802.11a (5180~5240) (12.51 dBm)/ Wi-Fi 802.11a (5260~5320) (12.70 dBm)/ Wi-Fi 802.11a (5500~5720) (12.35 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (11.66 dBm)/ Wi-Fi 802.11n_20 MHz BW(5260~5320)(11.78 dBm)/ Wi-Fi 802.11n_20 MHz BW(5500~5720)(11.41 dBm)/ Wi-Fi 802.11n_40 MHz BW(5190~5230) (11.09 dBm)/ Wi-Fi 802.11n_40 MHz BW (5270~5310) (11.48 dBm)/ Wi-Fi 802.11n_40 MHz BW (5510~5710) (10.78 dBm)/ Wi-Fi 802.11ac (5180~5240) (10.50 dBm)/ Wi-Fi 802.11ac (5260~5320) (10.77 dBm)/ Wi-Fi 802.11ac (5500~5720) (10.54 dBm)/ Wi-Fi 802.11ac (5190~5230) (10.29 dBm)/ Wi-Fi 802.11ac (5270~5310) (10.38 dBm)/ Wi-Fi 802.11ac (5510~5710) (9.53 dBm)/ Wi-Fi 802.11ac (5210) (9.45 dBm)/ Wi-Fi 802.11ac (5290) (9.50 dBm)/ Wi-Fi 802.11ac (5530~5690) (8.78 dBm)	
Modulation Type	OFDM(802.11a, 802.11n, 802.11ac)	
Antenna Specification	Manufacturer: KOMATECH Co., Ltd. Antenna type: PIFA Antenna Peak Gain : 4.977 dBi	

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955



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. For 802.11ac, KDB644545 D01 v01r01 dated April 08, 2013.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955



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 March 02, 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."

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

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

7. SUMMARY OF TEST RESULTS

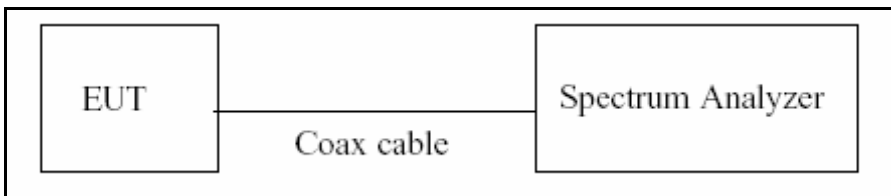
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
<u>TRANSMITTER MODE(TX)</u>				
26dB Bandwidth	NA	NA	CONDUCTED	PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 4+10 log ₁₀ (BW) dBm (5150-5250 MHz) < 11+10 log ₁₀ (BW) dBm (5250-5350 MHz) < 11+10 log ₁₀ (BW) dBm (5470-5725 MHz)		PASS
Peak Power Spectral Density	§15.407(a)(1), (5)	<4 dBm/ MHz (5150-5250) <11 dBm/ MHz (5250-5350) <11 dBm/ MHz (5470-5725)		PASS
Peak Excursion	§15.407(a)(6)	<13 dB/ MHz maximum difference		PASS
Frequency Stability	§15.407(g)	NA		PASS
Undesirable Emissions	§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)	15.205, 5.407(b)(1), (5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207	<FCC 15.207 limits	LINE CONDUCTED	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 = $10 \cdot \log(1/\text{Duty Cycle})$

FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955

Duty Cycle Factor

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor
802.11a	6	2.060	2.165	0.95150115	0.216
	9	1.380	1.485	0.92929293	0.318
	12	1.041	1.146	0.90837696	0.417
	18	0.702	0.806	0.87096774	0.600
	24	0.530	0.632	0.83860759	0.764
	36	0.363	0.465	0.78064516	1.075
	48	0.275	0.376	0.73138298	1.359
	54	0.247	0.349	0.70773639	1.501
802.11n_20 MHz BW	6.5	1.925	2.030	0.94827586	0.231
	13	0.975	1.080	0.90277778	0.444
	19.5	0.662	0.766	0.86422977	0.634
	26	0.507	0.610	0.83114754	0.803
	39	0.351	0.453	0.77483444	1.108
	52	0.271	0.374	0.72459893	1.399
	58.5	0.246	0.348	0.70689655	1.506
	65	0.227	0.329	0.68996960	1.612
802.11n_40 MHz BW	13.5	0.942	1.044	0.90229885	0.446
	27	0.491	0.592	0.82939189	0.812
	40.5	0.339	0.440	0.77045455	1.133
	54	0.263	0.364	0.72252747	1.411
	81	0.188	0.288	0.65277778	1.852
	108	0.151	0.252	0.59920635	2.224
	121.5	0.139	0.240	0.57916667	2.372
	135	0.128	0.228	0.56140351	2.507

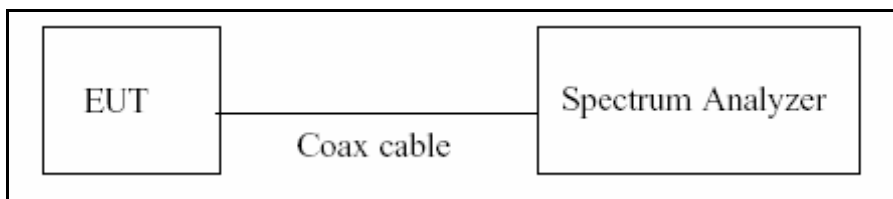
Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ac_20 MHz BW	6.5	1.925	2.030	0.94827586	0.231
	13	0.986	1.088	0.90625000	0.428
	19.5	0.670	0.772	0.86787565	0.615
	26	0.516	0.616	0.83766234	0.769
	39	0.355	0.456	0.77850877	1.087
	52	0.280	0.380	0.73684211	1.326
	58.5	0.251	0.352	0.71306818	1.469
	65	0.231	0.332	0.69578313	1.575
	78	0.199	0.300	0.66333333	1.783
5.8 GHz Band 802.11ac_40 MHz BW	13.5	0.950	1.052	0.90304183	0.443
	27	0.494	0.596	0.82885906	0.815
	40.5	0.343	0.444	0.77252252	1.121
	54	0.267	0.368	0.72554348	1.393
	81	0.192	0.292	0.65753425	1.821
	108	0.156	0.256	0.60937500	2.151
	121.5	0.143	0.244	0.58606557	2.321
	135	0.131	0.232	0.56465517	2.482
	162	0.115	0.216	0.53240741	2.738
5.8 GHz Band 802.11ac_80 MHz BW	29.3	0.458	0.560	0.81785714	0.873
	58.5	0.251	0.352	0.71306818	1.469
	87.8	0.179	0.280	0.63928571	1.943
	117	0.148	0.248	0.59677419	2.242
	175.5	0.112	0.212	0.52830189	2.771
	234	0.096	0.196	0.48979592	3.100
	263.3	0.087	0.188	0.46276596	3.346
	292.5	0.084	0.184	0.45652174	3.405
	351	0.075	0.176	0.42613636	3.705
390	0.072	0.172	0.41860465	3.782	

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 %.

FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955



TEST RESULTS

20 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	20.34	N/A	Pass
5200	40	20.38	N/A	Pass
5240	48	20.26	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	20.34	N/A	Pass
5300	60	20.35	N/A	Pass
5320	64	20.34	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	20.38	N/A	Pass
5580	116	20.44	N/A	Pass
5720	144	20.27	N/A	Pass



Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	20.73	N/A	Pass
5200	40	20.69	N/A	Pass
5240	48	21.02	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	20.77	N/A	Pass
5300	60	20.54	N/A	Pass
5320	64	20.72	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	20.61	N/A	Pass
5580	116	20.86	N/A	Pass
5720	144	20.66	N/A	Pass



Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	20.55	N/A	Pass
5200	40	20.76	N/A	Pass
5240	48	20.69	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	20.63	N/A	Pass
5300	60	20.64	N/A	Pass
5320	64	20.69	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	20.82	N/A	Pass
5580	116	20.49	N/A	Pass
5720	144	20.62	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.39	N/A	Pass
5230	46	39.36	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.42	N/A	Pass
5310	62	39.41	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.48	N/A	Pass
5550	110	39.48	N/A	Pass
5710	142	39.45	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.35	N/A	Pass
5230	46	39.82	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.82	N/A	Pass
5310	62	39.73	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.82	N/A	Pass
5550	110	39.63	N/A	Pass
5710	142	39.52	N/A	Pass

80 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5210	42	81.68	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5290	58	82.23	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5530	106	82.74	N/A	Pass
5690	138	81.92	N/A	Pass

Note :

1. In order to simplify the report, attached plots were only the most wide channel.
2. We applied the 15.407 for Ch.144, 142 and 138 in 802.11ac according to KDB 644545 D01 v01r01.

20 dB BW TEST RESULTS(Additional Test)

Conducted 20 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	19.26	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	19.69	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11ac_20 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	19.67	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	38.54	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11ac_40 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	38.55	N/A	Pass

Conducted 20 dB Bandwidth Measurements for 802.11ac_80 MHz BW

802.11ac Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5290	58	79.75	N/A	Pass

Note : We performed the 20 dB BW test to prove that no part of the fundamental emissions of any UNII2 band signal lies within the UNII band 1.



Conducted 20 dB Bandwidth Measurements for 802.11ac_80 MHz BW

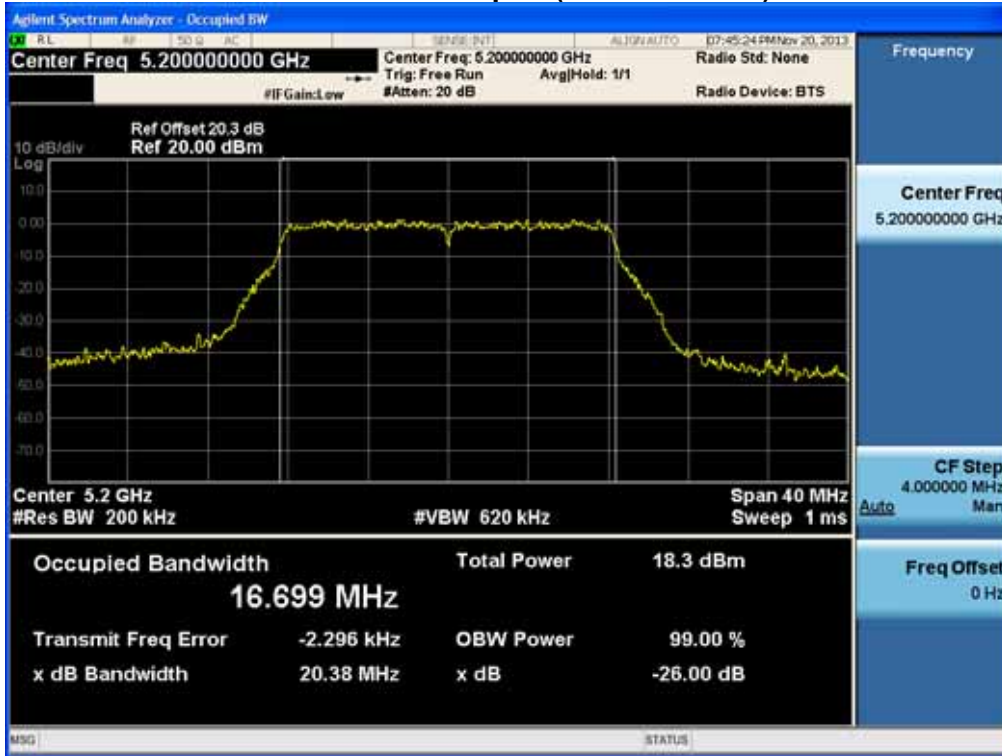
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5690	138	79.60	N/A	Pass

Note : We performed the 20 dB BW test to prove that no part of the fundamental emissions of any UNII 2C band signal lies within the frequency range 5600-5650 MHz(Terminal Doppler Weather Radars (TDWRs)) according to KDB 443999 D01 v01 and KDB 644545 D01 v01r01

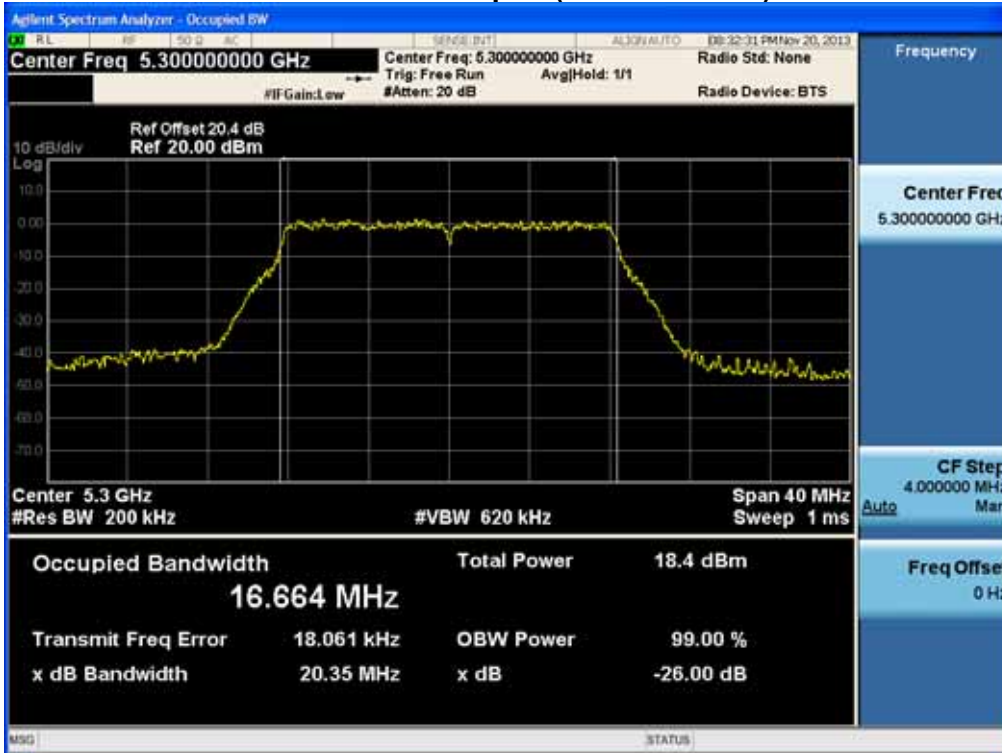
FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

RESULT PLOTS
20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)

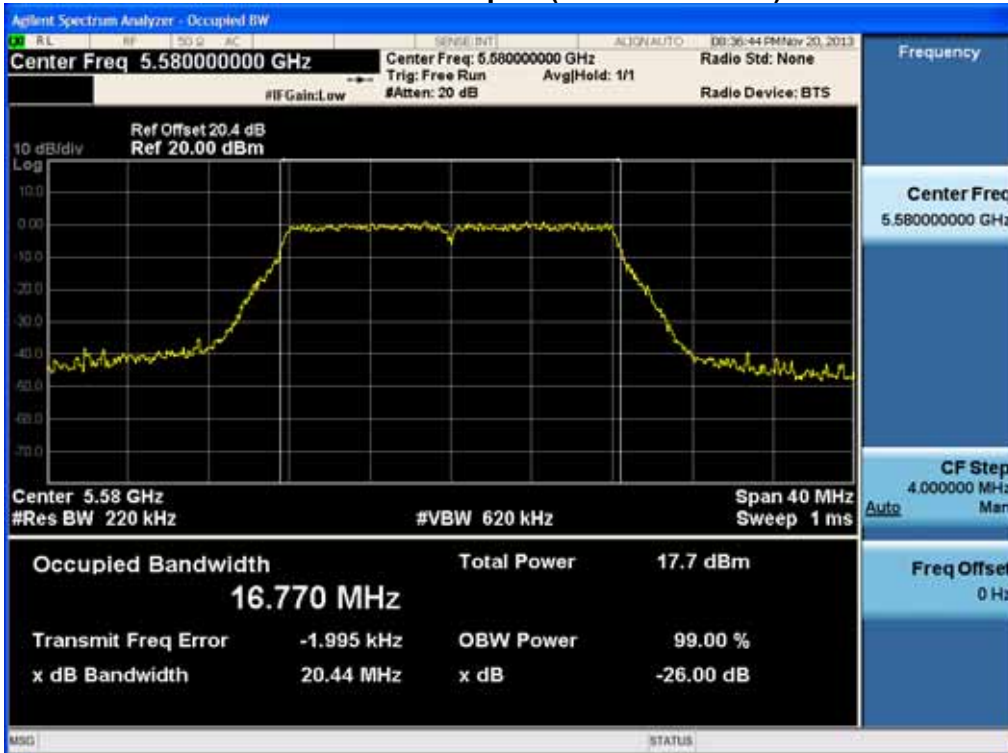


26 dB Bandwidth plot (802.11a-CH 60)

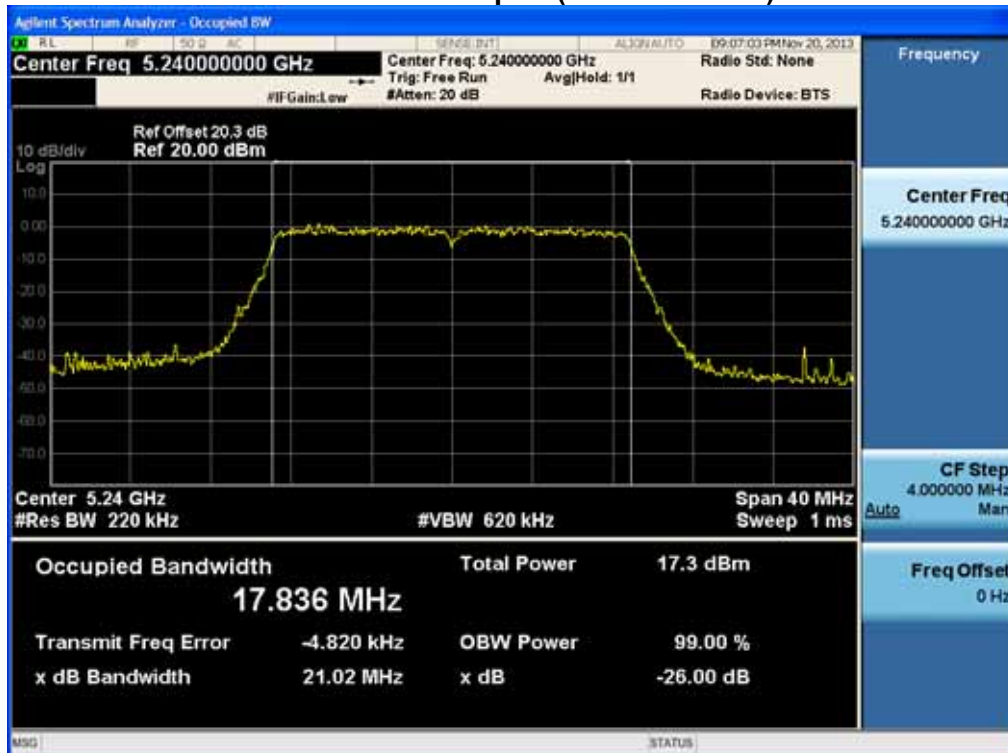


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

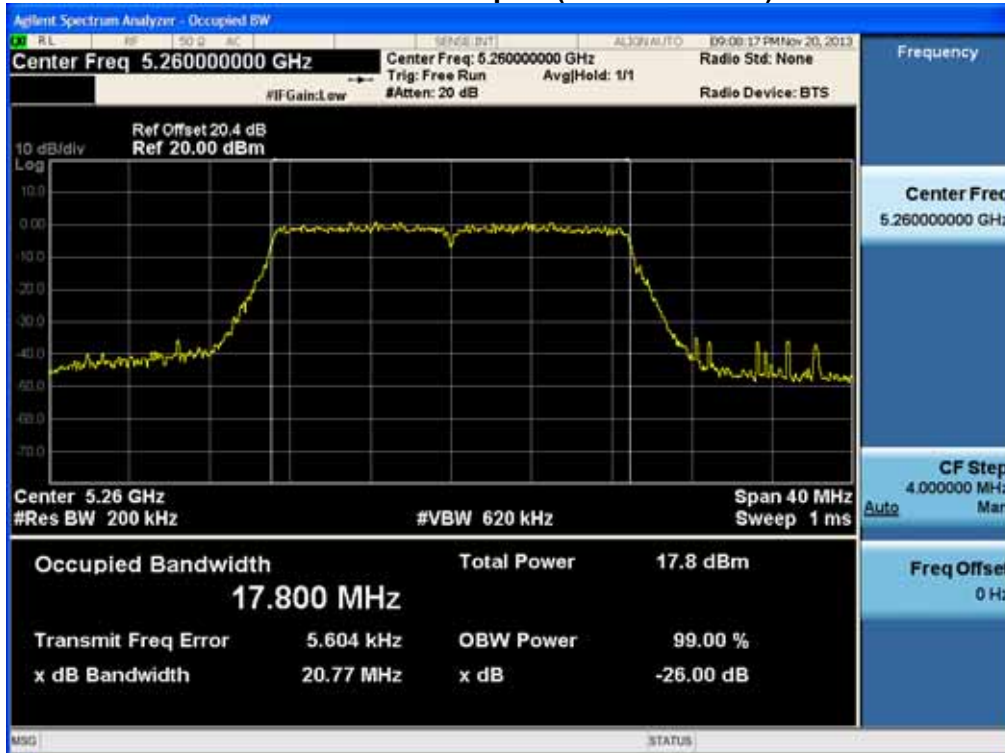
26 dB Bandwidth plot (802.11a-CH 116)



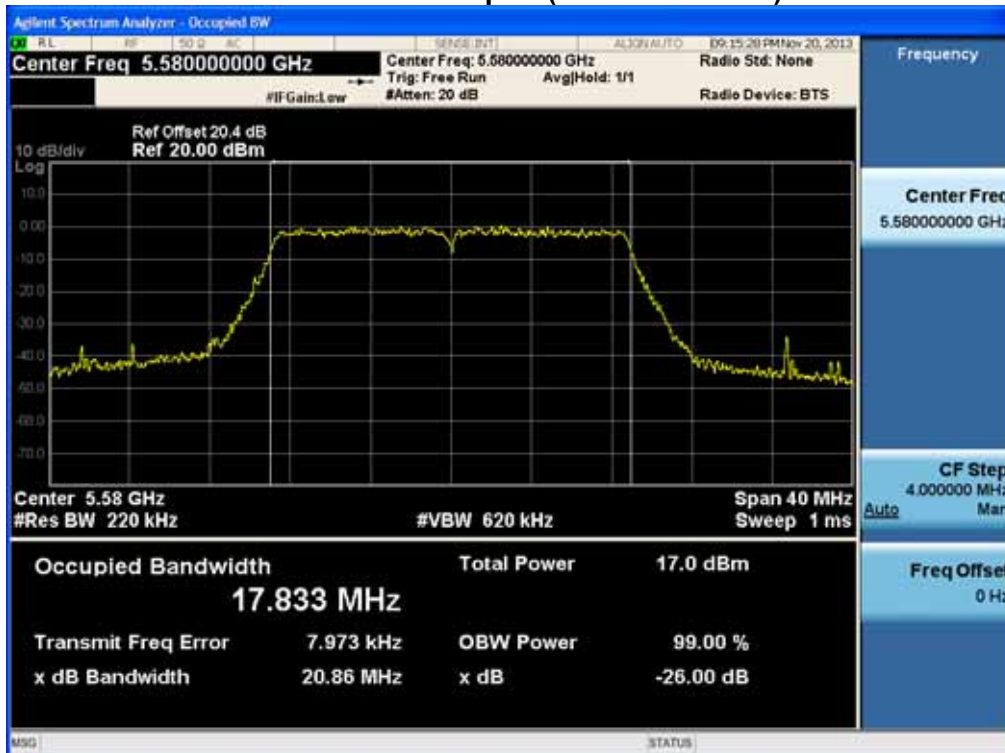
26 dB Bandwidth plot (802.11n-CH 48)



26 dB Bandwidth plot (802.11n-CH 52)

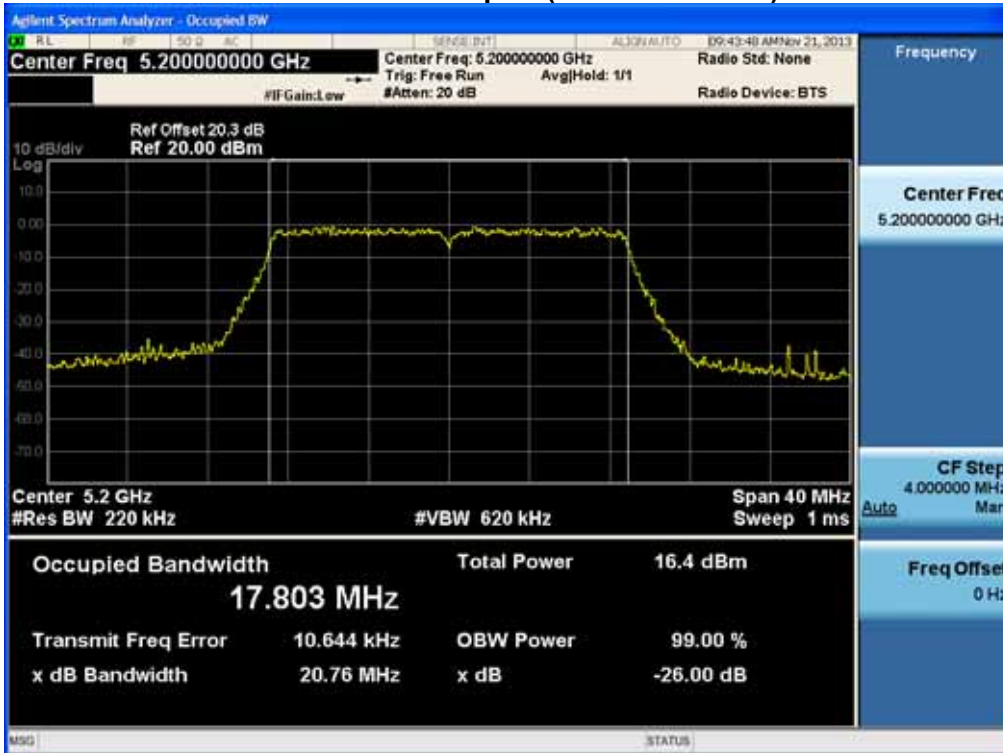


26 dB Bandwidth plot (802.11n-CH 116)

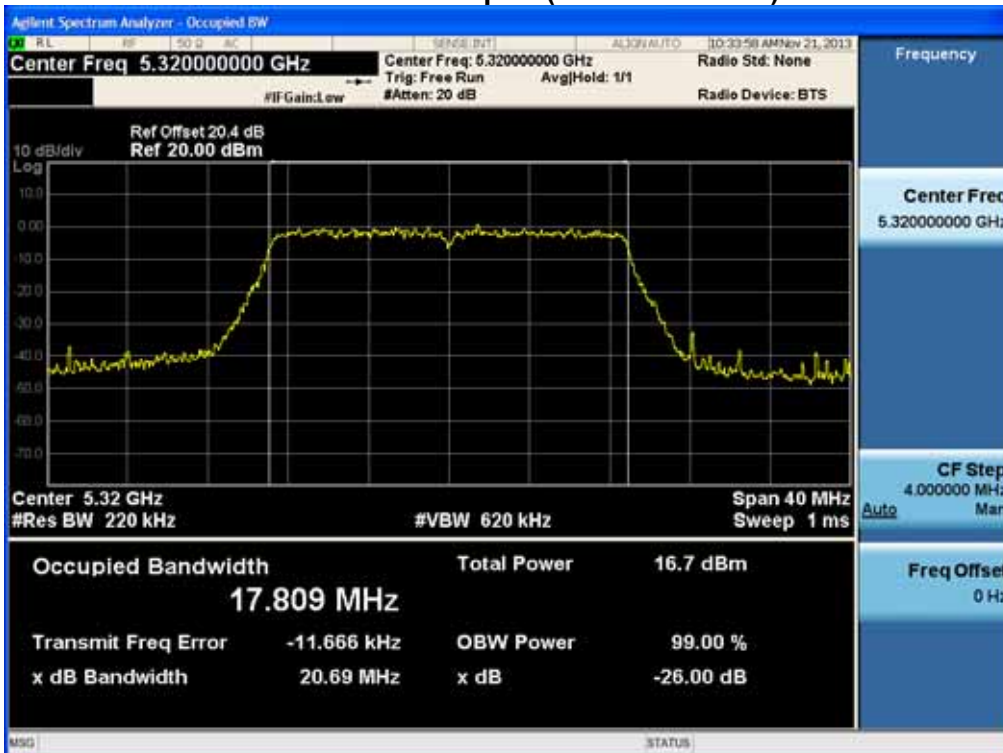


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

26 dB Bandwidth plot (802.11ac-CH 40)

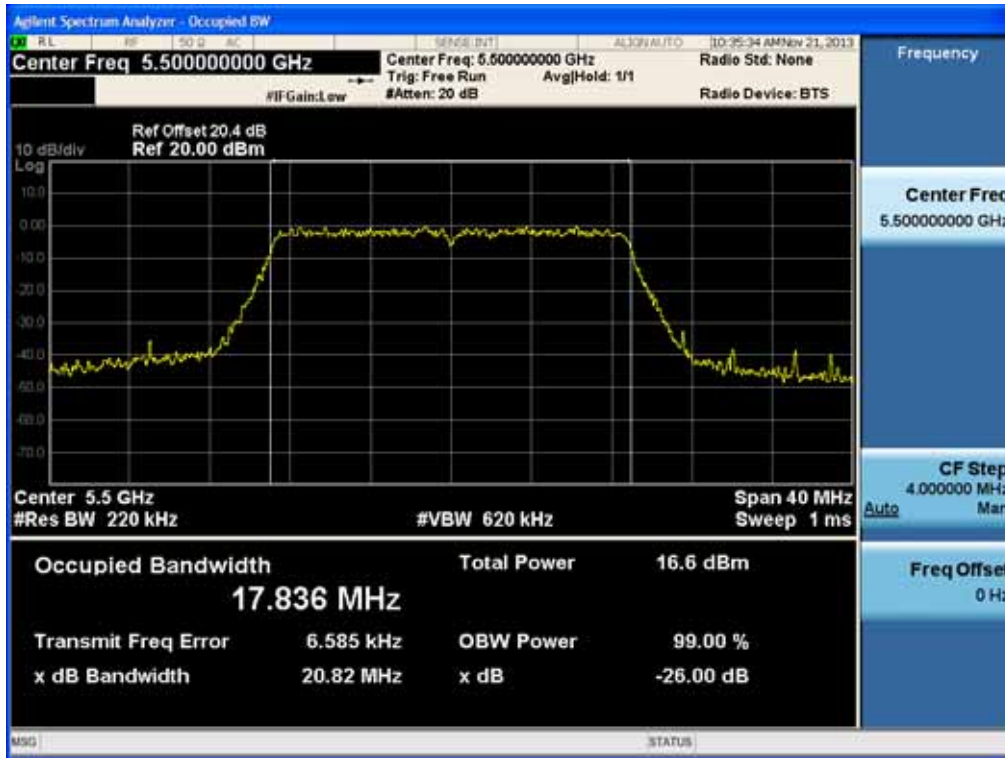


26 dB Bandwidth plot (802.11ac-CH 64)



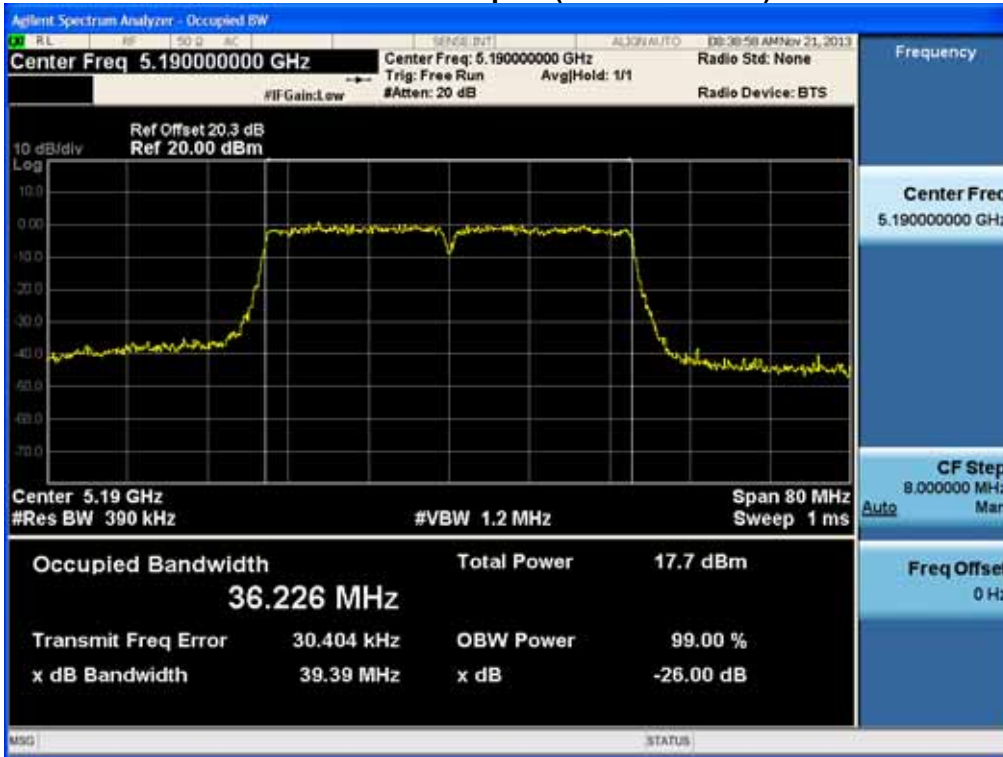
FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

26 dB Bandwidth plot (802.11ac-CH 100)

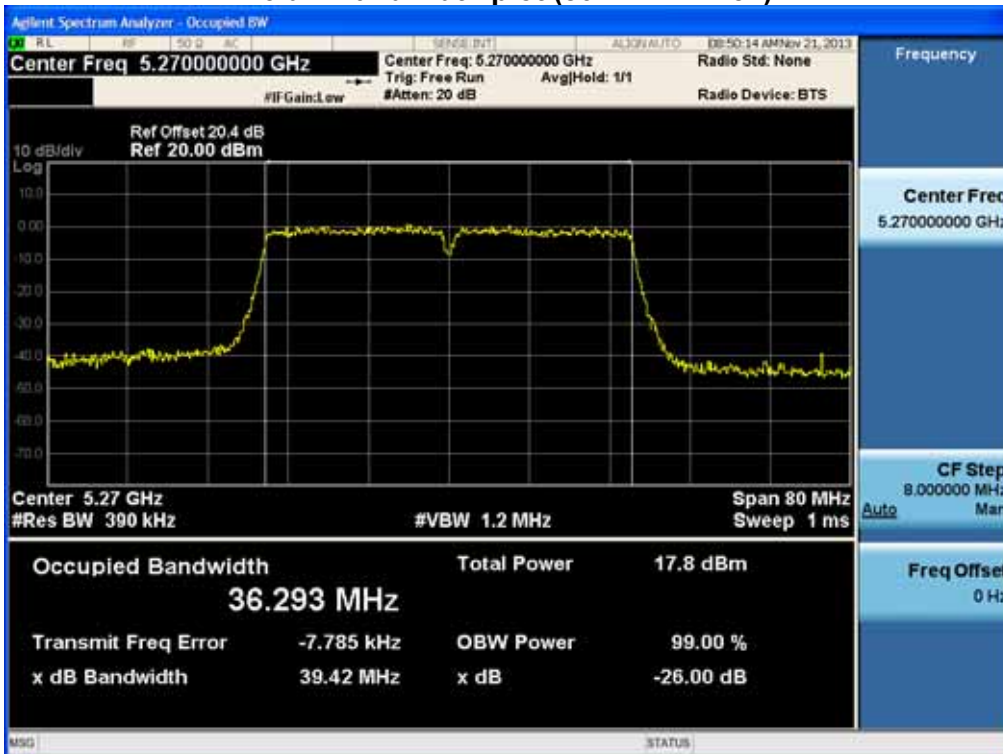


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

26 dB Bandwidth plot (802.11n-CH 38)

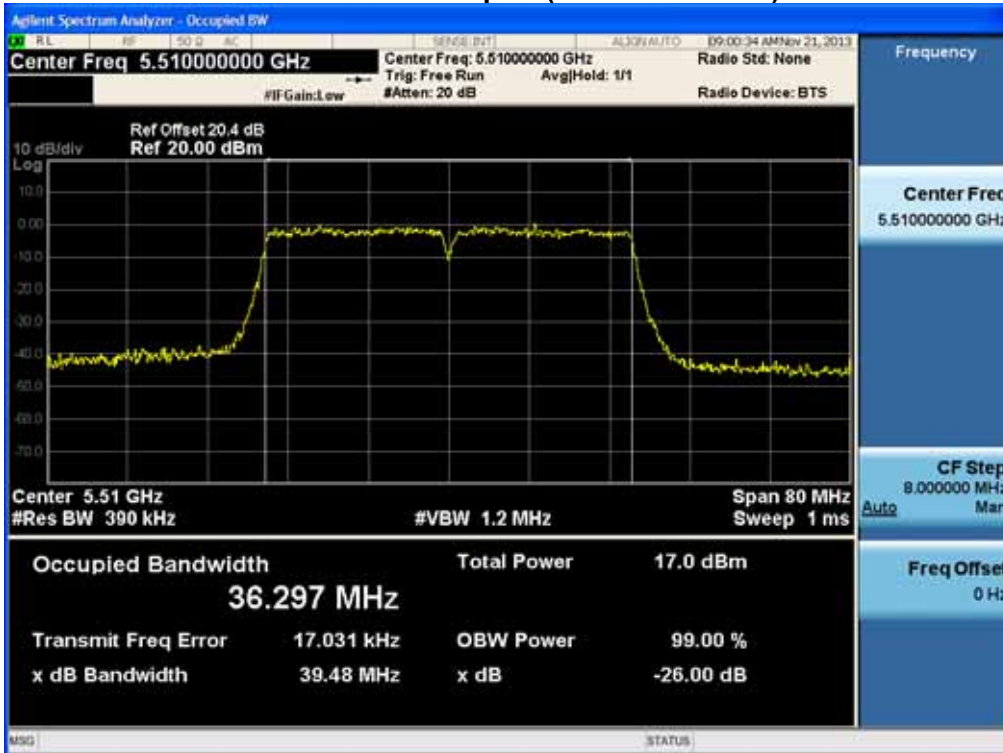


26 dB Bandwidth plot (802.11n-CH 54)

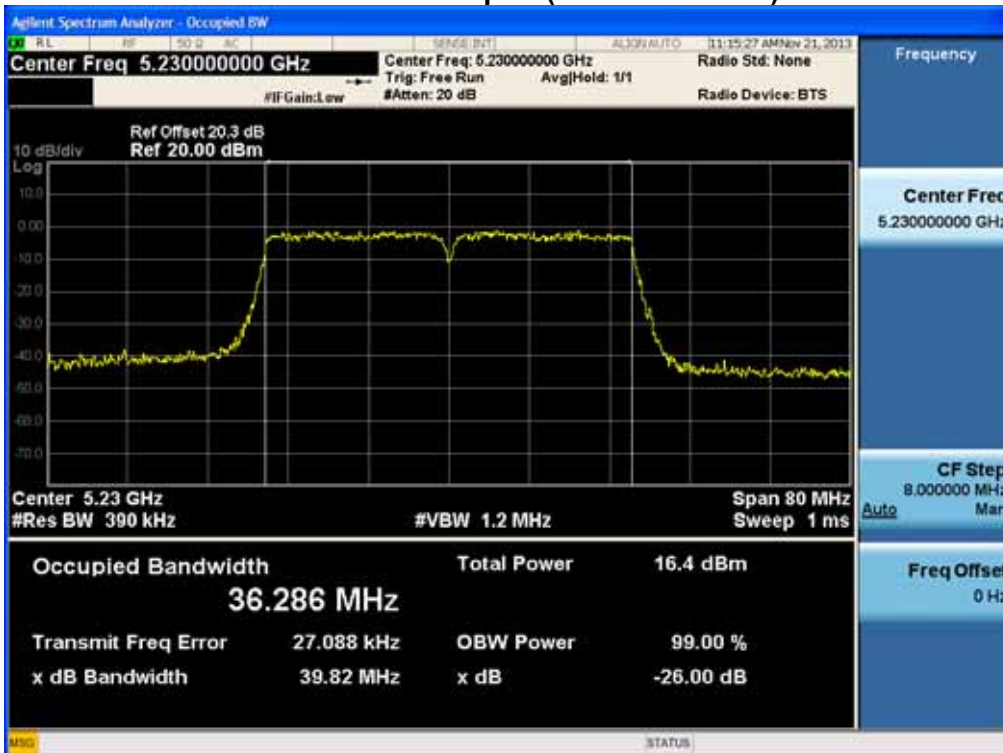


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

26 dB Bandwidth plot (802.11n-CH 102)

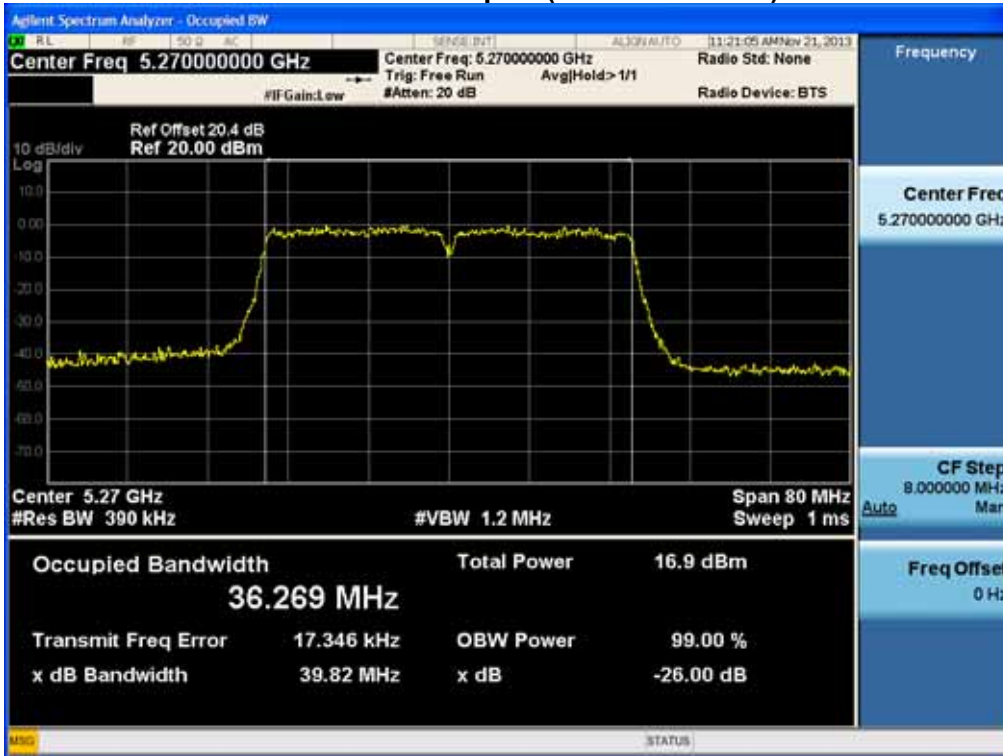


26 dB Bandwidth plot (802.11ac-CH 46)

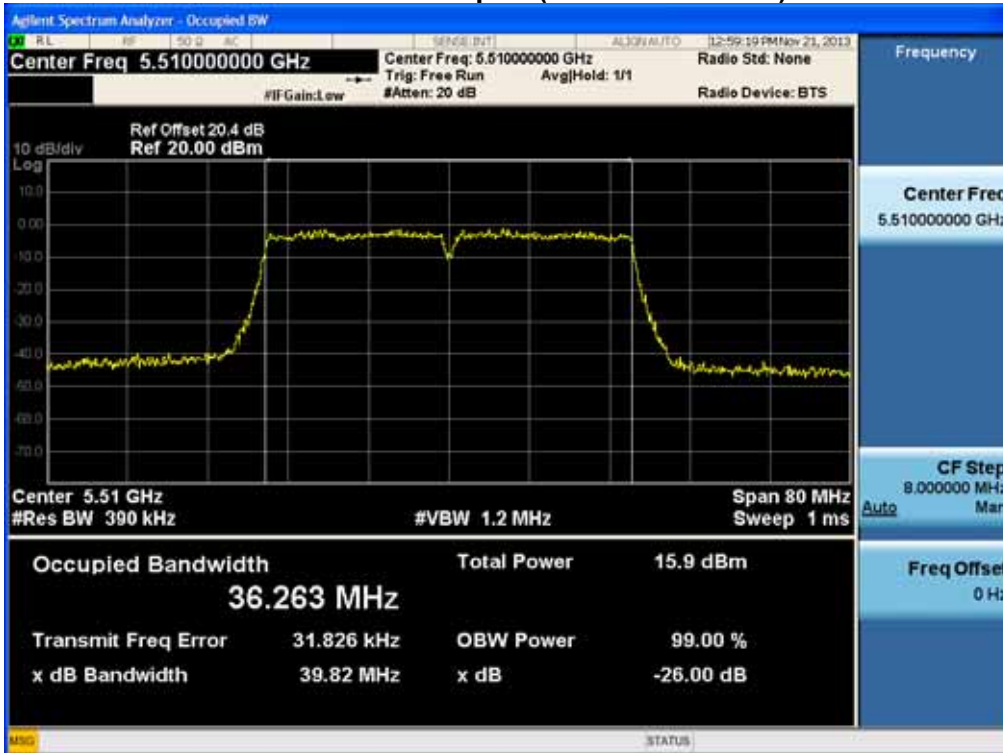


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

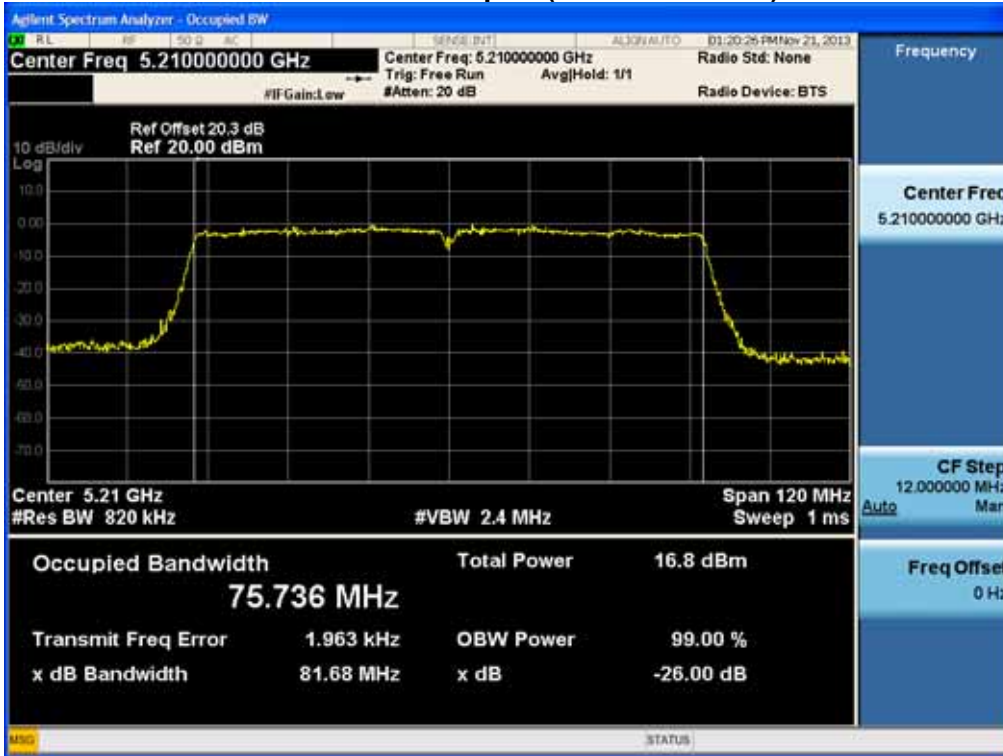
26 dB Bandwidth plot (802.11ac-CH 54)



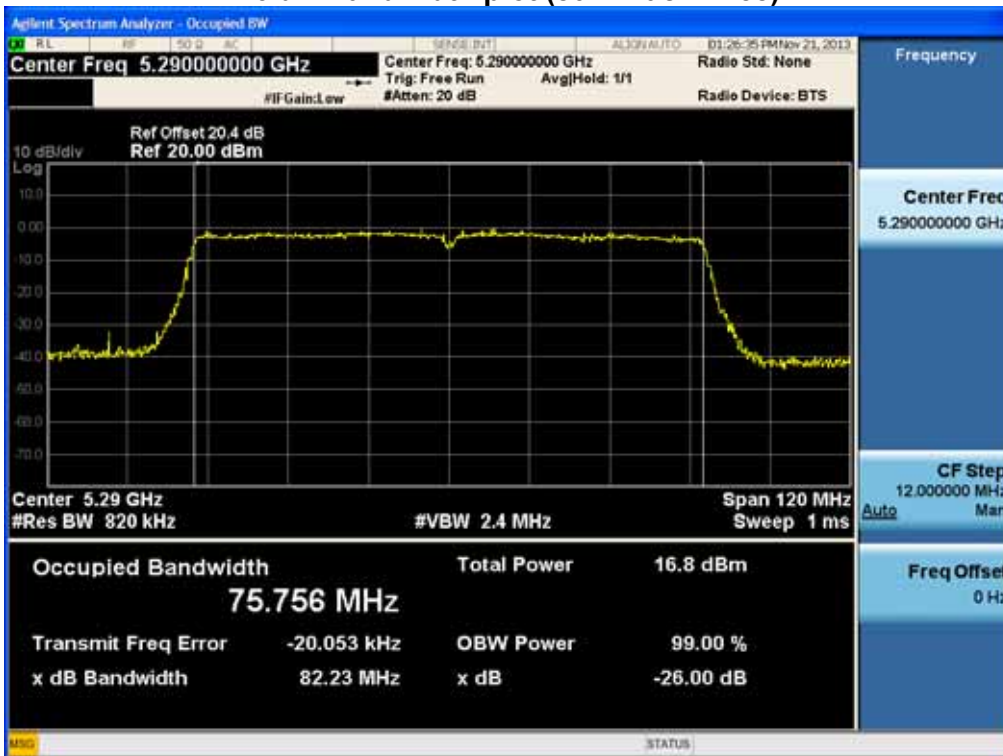
26 dB Bandwidth plot (802.11ac-CH 102)



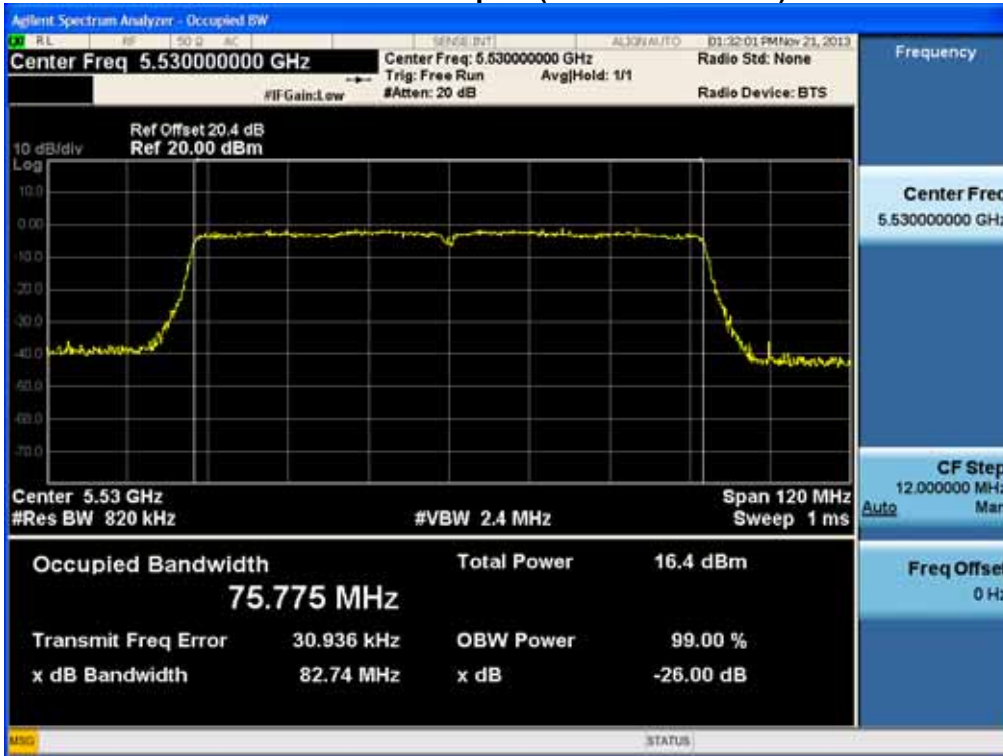
26 dB Bandwidth plot (802.11ac-CH 42)



26 dB Bandwidth plot (802.11ac-CH 58)



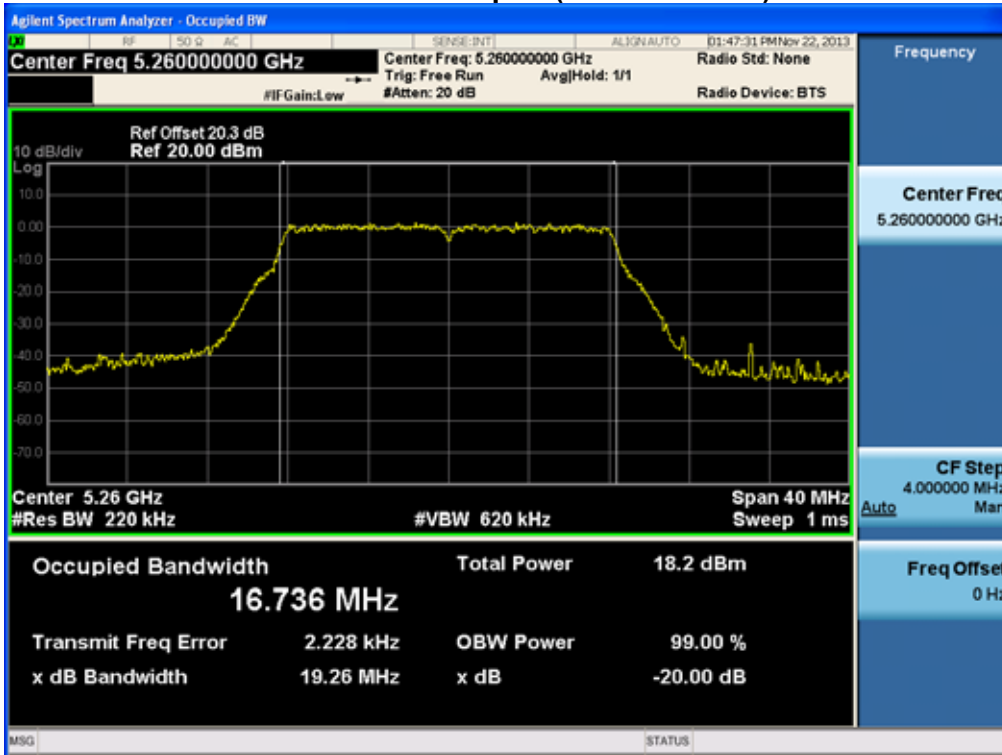
26 dB Bandwidth plot (802.11ac-CH 106)



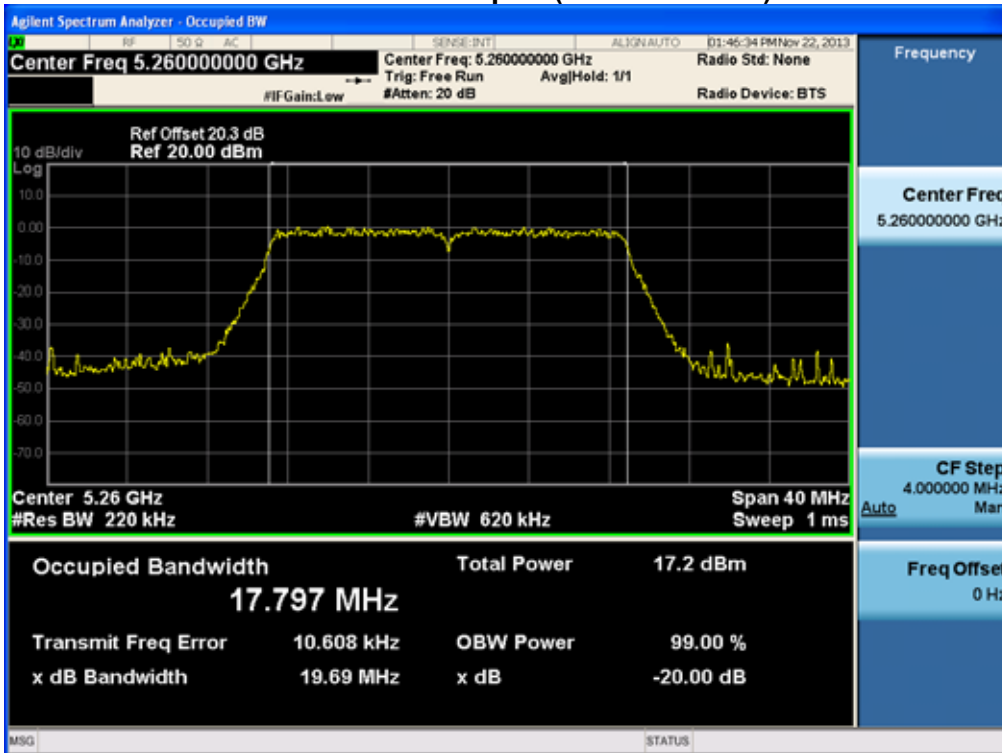
FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

RESULT PLOTS(20 dB Bandwidth)

20 dB Bandwidth plot (802.11a-CH 52)

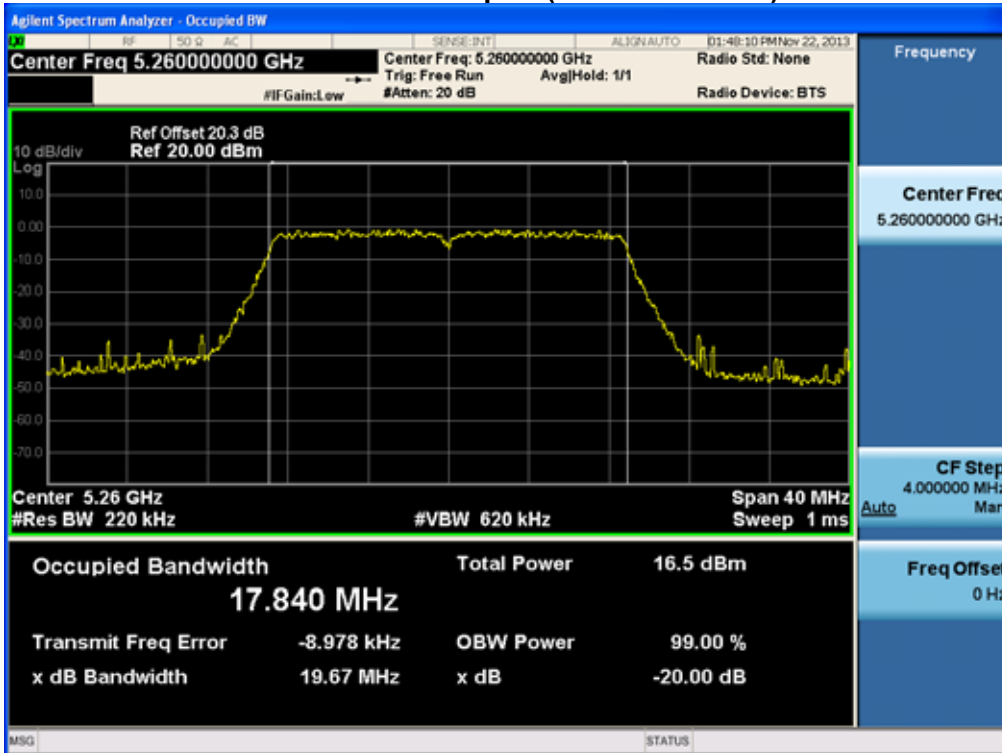


20 dB Bandwidth plot (802.11n-CH 52)

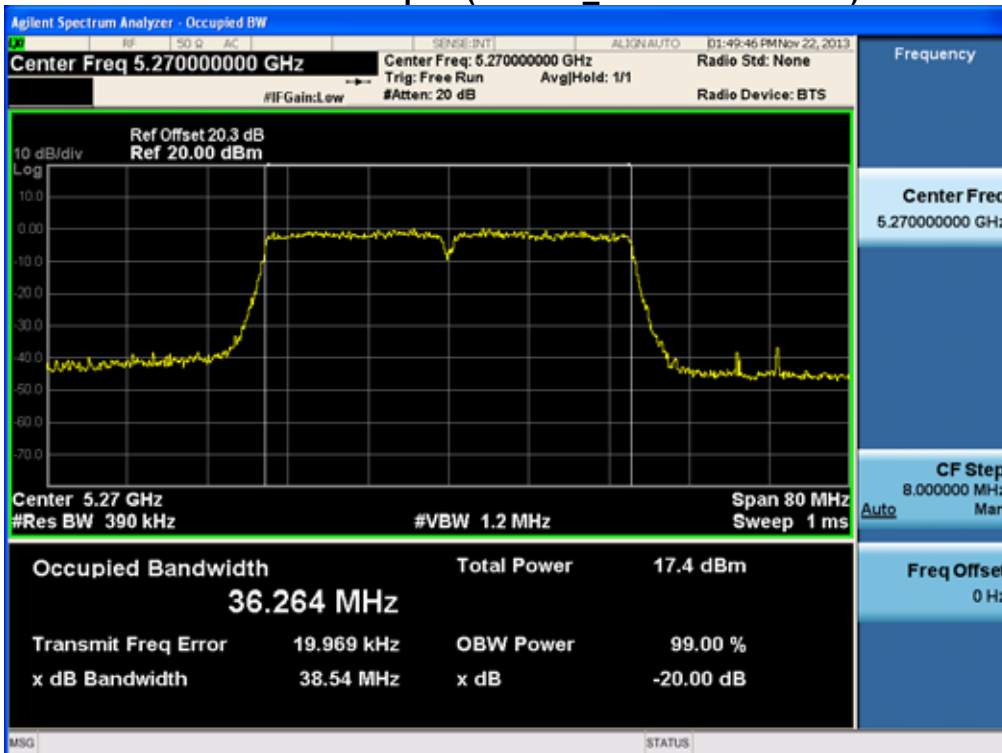


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

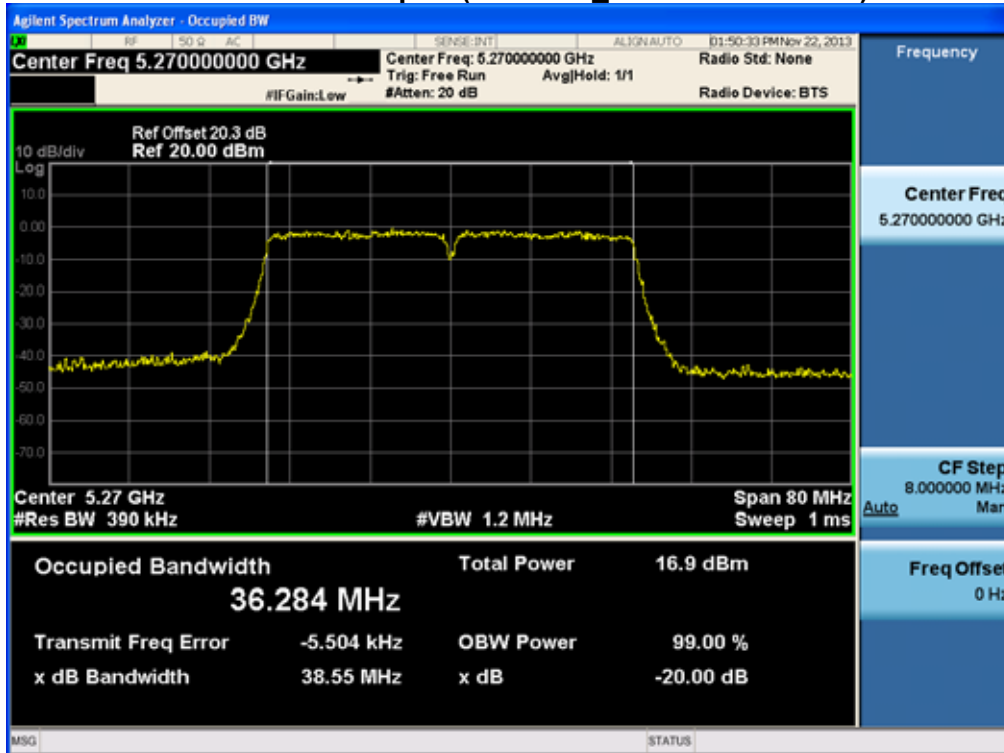
20 dB Bandwidth plot (802.11ac-CH 52)



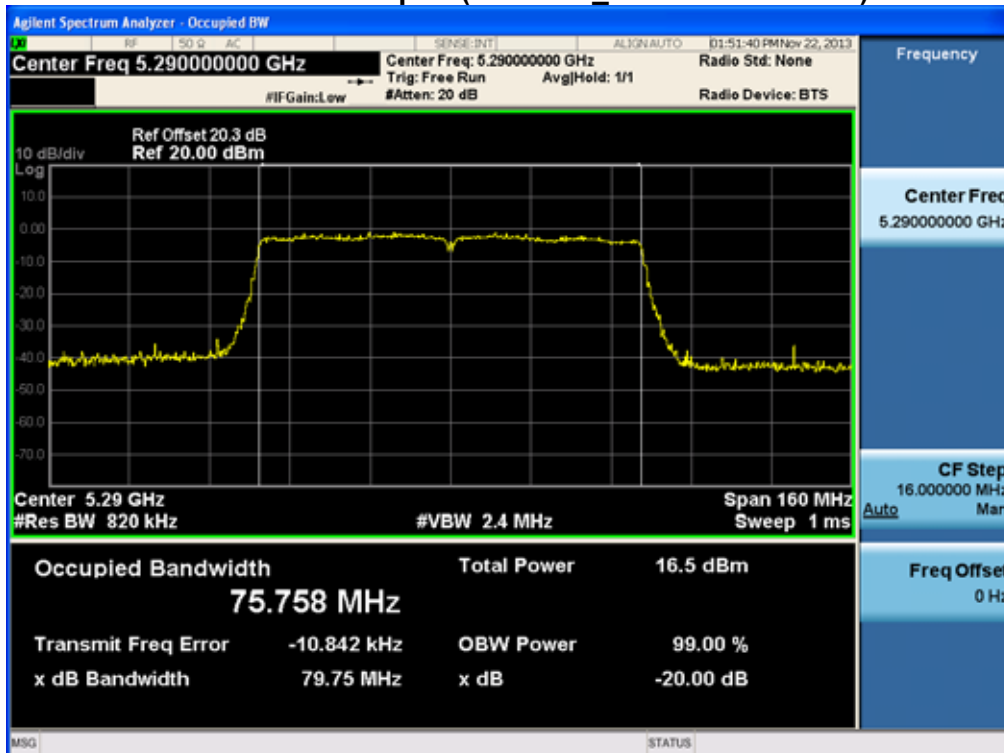
20 dB Bandwidth plot (802.11n_40 MHz BW-CH 54)



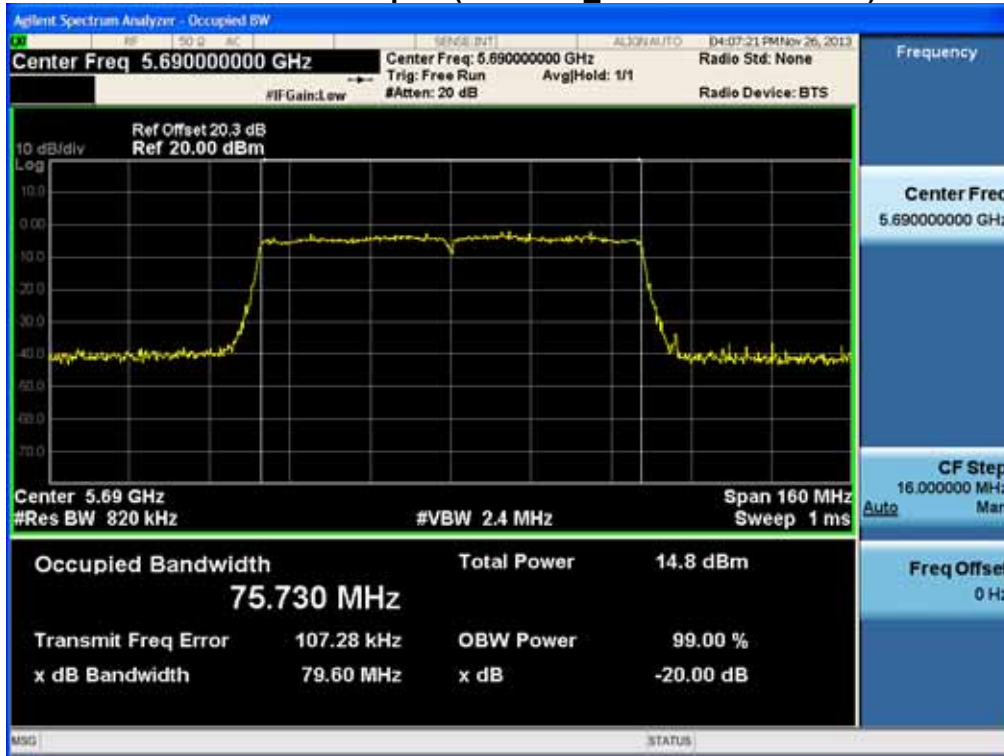
20 dB Bandwidth plot (802.11ac_40 MHz BW-CH 54)



20 dB Bandwidth plot (802.11ac_80 MHz BW-CH 58)



20 dB Bandwidth plot (802.11ac_80 MHz BW-CH 138)



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

8.3 OUTPUT POWER MEASUREMENT

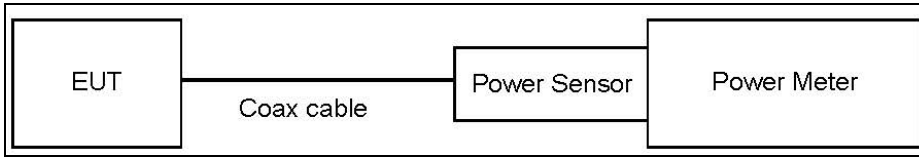
Test Requirements and limit, §15.247(b)(3)

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 $4 \text{ dBm} + 10 \log_{10} (26 \text{ dB BW})$ frequencies. In the 5.25 – 5.35 GHz band, the maximum permissible conducted output power is the lesser of 250 mW (23.98 dBm) and $11 \text{ dBm} + 10 \log_{10} (26 \text{ dB BW})$ frequencies. In the 5.47 – 5.725 GHz band, the maximum permissible conducted output power is the lesser of 250 mW (23.98 dBm) and $11 \text{ dBm} + 10 \log_{10} (26 \text{ dB BW})$

- Limit : 802.11a_UNII-1 = 16.99 dBm
- 802.11n_UNII-1_20 MHz BW = 16.99 dBm
- 802.11n_UNII-1_40 MHz BW = 16.99 dBm
- 802.11ac_UNII-1_20 MHz BW =16.99 dBm
- 802.11ac_UNII-1_40 MHz BW =16.99 dBm
- 802.11ac_UNII-1_80 MHz BW =16.99 dBm
- 802.11a_UNII-2 = 23.98 dBm
- 802.11n_UNII-2_20 MHz BW = 23.98dBm
- 802.11n_UNII-2_40 MHz BW = 23.98 dBm
- 802.11ac_UNII-2_20 MHz BW =23.98 dBm
- 802.11ac_UNII-2_40 MHz BW =23.98 dBm
- 802.11ac_UNII-2_80 MHz BW =23.98 dBm
- 802.11a_UNII-2e = 23.98dBm
- 802.11n_UNII-2e_20 MHz BW = 23.98 dBm
- 802.11n_UNII-2e_40 MHz BW = 23.98 dBm
- 802.11ac_UNII-2e_20 MHz BW =23.98 dBm
- 802.11ac_UNII-2e_40 MHz BW =23.98 dBm
- 802.11ac_UNII-2e_80 MHz BW =23.98 dBm

FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955

TEST CONFIGURATION(20 MHz BW)



TEST PROCEDURE(20 MHz BW)

We tested according to Method E)3)a) 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.

Note :

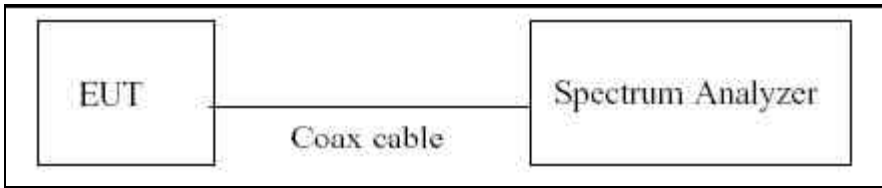
1. We apply to the offset in the 5.2 GHz, 5.3 GHz and 5.6 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	20.30
	5190	20.29
	5200	20.28
	5230	20.29
	5240	20.34
UNII 2	5260	20.37
	5270	20.38
	5300	20.40
	5310	20.39
	5320	20.39
UNII 2e	5500	20.35
	5510	20.36
	5550	20.41
	5580	20.43
	5670	20.43

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

FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955

TEST CONFIGURATION(40 MHz BW & 80 MHz BW)



TEST PROCEDURE(40 MHz BW & 80 MHz BW)

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function. We tested according to Method SA-2 in KDB 789033(issued 04/08/2013).

The Spectrum Analyzer is set to

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

FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955

Sample Calculation

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

Output Power = 10 dBm + 20 dB + 0.8 dB + 0.21 dB = 31.01 dBm

Note :

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

Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	20.30
	5190	20.29
	5200	20.28
	5230	20.29
	5240	20.34
UNII 2	5260	20.37
	5270	20.38
	5300	20.40
	5310	20.39
	5320	20.39
UNII 2e	5500	20.35
	5510	20.36
	5550	20.41
	5580	20.43
	5670	20.43

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



TEST RESULTS

20 MHz BW

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	12.27	0.216	12.48	16.99
		9	11.88	0.318	12.20	16.99
		12	11.94	0.417	12.36	16.99
		18	11.69	0.600	12.29	16.99
		24	11.43	0.764	12.19	16.99
		36	11.12	1.075	12.19	16.99
		48	11.03	1.359	12.38	16.99
		54	10.80	1.501	12.30	16.99
5200	40	6	12.30	0.216	12.51	16.99
		9	11.91	0.318	12.23	16.99
		12	11.97	0.417	12.39	16.99
		18	11.78	0.600	12.38	16.99
		24	11.49	0.764	12.26	16.99
		36	11.11	1.075	12.19	16.99
		48	10.97	1.359	12.33	16.99
		54	10.65	1.501	12.15	16.99
5240	48	6	12.17	0.216	12.39	16.99
		9	11.94	0.318	12.25	16.99
		12	11.89	0.417	12.31	16.99
		18	11.52	0.600	12.12	16.99
		24	11.45	0.764	12.22	16.99
		36	10.98	1.075	12.06	16.99
		48	10.80	1.359	12.16	16.99
		54	10.54	1.501	12.04	16.99

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6	12.49	0.216	12.70	23.98
		9	12.11	0.318	12.43	23.98
		12	12.10	0.417	12.51	23.98
		18	11.84	0.600	12.44	23.98
		24	11.66	0.764	12.43	23.98
		36	11.35	1.075	12.43	23.98
		48	11.19	1.359	12.55	23.98
		54	10.90	1.501	12.40	23.98
5300	60	6	12.28	0.216	12.49	23.98
		9	12.01	0.318	12.33	23.98
		12	12.04	0.417	12.46	23.98
		18	11.70	0.600	12.30	23.98
		24	11.56	0.764	12.33	23.98
		36	11.18	1.075	12.26	23.98
		48	11.03	1.359	12.38	23.98
		54	10.77	1.501	12.27	23.98
5320	64	6	12.22	0.216	12.44	23.98
		9	12.15	0.318	12.47	23.98
		12	11.87	0.417	12.29	23.98
		18	11.83	0.600	12.43	23.98
		24	11.51	0.764	12.28	23.98
		36	11.21	1.075	12.29	23.98
		48	11.05	1.359	12.41	23.98
		54	10.80	1.501	12.30	23.98

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

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6	12.00	0.216	12.22	23.98
		9	11.96	0.318	12.28	23.98
		12	11.71	0.417	12.12	23.98
		18	11.51	0.600	12.11	23.98
		24	11.30	0.764	12.07	23.98
		36	10.99	1.075	12.07	23.98
		48	10.99	1.359	12.35	23.98
		54	10.84	1.501	12.34	23.98
5580	116	6	11.51	0.216	11.73	23.98
		9	11.47	0.318	11.79	23.98
		12	11.37	0.417	11.79	23.98
		18	11.22	0.600	11.82	23.98
		24	10.98	0.764	11.74	23.98
		36	10.68	1.075	11.76	23.98
		48	10.48	1.359	11.84	23.98
		54	10.19	1.501	11.69	23.98
5720	144	6	11.02	0.216	11.23	23.98
		9	10.99	0.318	11.31	23.98
		12	10.93	0.417	11.35	23.98
		18	10.91	0.600	11.51	23.98
		24	10.51	0.764	11.27	23.98
		36	10.34	1.075	11.41	23.98
		48	10.21	1.359	11.57	23.98
		54	9.83	1.501	11.34	23.98

Conducted Output Power Measurements (802.11n 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	9.70	0.231	9.93	16.99
		13	10.99	0.444	11.44	16.99
		19.5	10.66	0.634	11.30	16.99
		26	10.55	0.803	11.35	16.99
		39	10.33	1.108	11.44	16.99
		52	10.04	1.399	11.43	16.99
		58.5	9.84	1.506	11.35	16.99
		65	9.78	1.612	11.39	16.99
5200	40	6.5	11.43	0.231	11.66	16.99
		13	10.93	0.444	11.37	16.99
		19.5	10.61	0.634	11.24	16.99
		26	10.57	0.803	11.38	16.99
		39	10.22	1.108	11.33	16.99
		52	10.13	1.399	11.53	16.99
		58.5	9.80	1.506	11.31	16.99
		65	9.72	1.612	11.33	16.99
5240	48	6.5	11.22	0.231	11.45	16.99
		13	10.95	0.444	11.39	16.99
		19.5	10.66	0.634	11.30	16.99
		26	10.49	0.803	11.29	16.99
		39	10.05	1.108	11.16	16.99
		52	9.74	1.399	11.14	16.99
		58.5	9.65	1.506	11.15	16.99
		65	9.59	1.612	11.20	16.99

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6.5	11.55	0.231	11.78	23.98
		13	11.21	0.444	11.65	23.98
		19.5	10.99	0.634	11.62	23.98
		26	10.76	0.803	11.56	23.98
		39	10.26	1.108	11.37	23.98
		52	10.19	1.399	11.59	23.98
		58.5	10.22	1.506	11.73	23.98
		65	9.86	1.612	11.48	23.98
5300	60	6.5	11.35	0.231	11.58	23.98
		13	11.14	0.444	11.59	23.98
		19.5	10.82	0.634	11.45	23.98
		26	10.64	0.803	11.45	23.98
		39	10.46	1.108	11.56	23.98
		52	10.17	1.399	11.57	23.98
		58.5	9.87	1.506	11.37	23.98
		65	9.91	1.612	11.52	23.98
5320	64	6.5	11.30	0.231	11.53	23.98
		13	10.98	0.444	11.42	23.98
		19.5	10.84	0.634	11.48	23.98
		26	10.66	0.803	11.46	23.98
		39	10.38	1.108	11.48	23.98
		52	9.97	1.399	11.36	23.98
		58.5	9.99	1.506	11.49	23.98
		65	9.72	1.612	11.33	23.98

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6.5	11.04	0.231	11.27	23.98
		13	10.90	0.444	11.34	23.98
		19.5	10.65	0.634	11.29	23.98
		26	10.49	0.803	11.29	23.98
		39	10.26	1.108	11.36	23.98
		52	9.90	1.399	11.30	23.98
		58.5	9.91	1.506	11.41	23.98
		65	9.79	1.612	11.41	23.98
5580	116	6.5	10.79	0.231	11.02	23.98
		13	10.59	0.444	11.03	23.98
		19.5	10.35	0.634	10.98	23.98
		26	10.32	0.803	11.12	23.98
		39	9.90	1.108	11.01	23.98
		52	9.69	1.399	11.09	23.98
		58.5	9.57	1.506	11.07	23.98
		65	9.49	1.612	11.10	23.98
5720	144	6.5	10.30	0.231	10.53	23.98
		13	10.20	0.444	10.64	23.98
		19.5	10.03	0.634	10.66	23.98
		26	9.78	0.803	10.58	23.98
		39	9.61	1.108	10.72	23.98
		52	9.15	1.399	10.55	23.98
		58.5	9.16	1.506	10.67	23.98
		65	9.03	1.612	10.64	23.98



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

802.11ac 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	10.14	0.231	10.37	16.99
		13	10.08	0.428	10.50	16.99
		19.5	9.69	0.615	10.31	16.99
		26	9.56	0.769	10.33	16.99
		39	9.29	1.087	10.38	16.99
		52	9.03	1.326	10.35	16.99
		58.5	8.95	1.469	10.42	16.99
		65	8.88	1.575	10.46	16.99
		78	8.60	1.783	10.38	16.99
5200	40	6.5	10.06	0.231	10.29	16.99
		13	9.92	0.428	10.35	16.99
		19.5	9.65	0.615	10.27	16.99
		26	9.55	0.769	10.32	16.99
		39	9.26	1.087	10.34	16.99
		52	8.87	1.326	10.20	16.99
		58.5	8.75	1.469	10.22	16.99
		65	8.71	1.575	10.29	16.99
		78	8.52	1.783	10.31	16.99
5240	48	6.5	9.93	0.231	10.16	16.99
		13	9.73	0.428	10.16	16.99
		19.5	9.62	0.615	10.24	16.99
		26	9.42	0.769	10.19	16.99
		39	9.18	1.087	10.27	16.99
		52	8.78	1.326	10.11	16.99
		58.5	8.69	1.469	10.16	16.99
		65	8.62	1.575	10.19	16.99
		78	8.34	1.783	10.12	16.99

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF955

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

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5260	52	6.5	10.41	0.231	10.64	23.98
		13	10.29	0.428	10.71	23.98
		19.5	9.95	0.615	10.56	23.98
		26	9.76	0.769	10.53	23.98
		39	9.68	1.087	10.77	23.98
		52	9.20	1.326	10.53	23.98
		58.5	9.20	1.469	10.66	23.98
		65	8.88	1.575	10.45	23.98
		78	8.78	1.783	10.56	23.98
5300	60	6.5	10.32	0.231	10.55	23.98
		13	10.17	0.428	10.60	23.98
		19.5	9.80	0.615	10.42	23.98
		26	9.82	0.769	10.59	23.98
		39	9.33	1.087	10.42	23.98
		52	9.15	1.326	10.48	23.98
		58.5	8.96	1.469	10.42	23.98
		65	8.90	1.575	10.48	23.98
		78	8.61	1.783	10.40	23.98
5320	64	6.5	10.37	0.231	10.60	23.98
		13	10.05	0.428	10.48	23.98
		19.5	9.91	0.615	10.52	23.98
		26	9.56	0.769	10.33	23.98
		39	9.39	1.087	10.48	23.98
		52	8.93	1.326	10.26	23.98
		58.5	9.01	1.469	10.48	23.98
		65	8.78	1.575	10.35	23.98
		78	8.60	1.783	10.38	23.98

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

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5500	100	6.5	10.31	0.231	10.54	23.98
		13	9.94	0.428	10.36	23.98
		19.5	9.77	0.615	10.39	23.98
		26	9.60	0.769	10.37	23.98
		39	9.20	1.087	10.28	23.98
		52	9.12	1.326	10.44	23.98
		58.5	8.95	1.469	10.42	23.98
		65	8.75	1.575	10.33	23.98
		78	8.56	1.783	10.35	23.98
5580	116	6.5	9.82	0.231	10.05	23.98
		13	9.70	0.428	10.12	23.98
		19.5	9.47	0.615	10.08	23.98
		26	9.25	0.769	10.02	23.98
		39	8.88	1.087	9.96	23.98
		52	8.90	1.326	10.23	23.98
		58.5	8.75	1.469	10.22	23.98
		65	8.57	1.575	10.14	23.98
		78	8.29	1.783	10.07	23.98
5720	144	6.5	9.48	0.231	9.71	23.98
		13	9.11	0.428	9.54	23.98
		19.5	9.10	0.615	9.72	23.98
		26	8.80	0.769	9.56	23.98
		39	8.61	1.087	9.70	23.98
		52	8.34	1.326	9.66	23.98
		58.5	8.14	1.469	9.60	23.98
		65	8.00	1.575	9.58	23.98
		78	7.77	1.783	9.55	23.98

Conducted Output Power Measurements (802.11n 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	10.65	0.446	11.09	16.99
		27	9.95	0.812	10.76	16.99
		40.5	9.95	1.133	11.08	16.99
		54	9.62	1.411	11.03	16.99
		81	8.71	1.852	10.56	16.99
		108	8.44	2.224	10.66	16.99
		121.5	8.25	2.372	10.62	16.99
		135	8.44	2.507	10.95	16.99
5230	46	13.5	10.58	0.446	11.03	16.99
		27	10.15	0.812	10.96	16.99
		40.5	9.53	1.133	10.67	16.99
		54	9.61	1.411	11.02	16.99
		81	8.70	1.852	10.56	16.99
		108	8.63	2.224	10.86	16.99
		121.5	8.26	2.372	10.63	16.99
		135	8.27	2.507	10.77	16.99

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	13.5	10.75	0.446	11.20	23.98
		27	10.67	0.812	11.48	23.98
		40.5	10.32	1.133	11.45	23.98
		54	9.59	1.411	11.00	23.98
		81	9.22	1.852	11.07	23.98
		108	9.11	2.224	11.34	23.98
		121.5	9.02	2.372	11.39	23.98
		135	8.45	2.507	10.96	23.98
5310	62	13.5	10.77	0.446	11.21	23.98
		27	9.96	0.812	10.77	23.98
		40.5	9.70	1.133	10.83	23.98
		54	9.46	1.411	10.87	23.98
		81	9.48	1.852	11.34	23.98
		108	8.44	2.224	10.67	23.98
		121.5	8.45	2.372	10.82	23.98
		135	8.62	2.507	11.13	23.98

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

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	13.5	10.09	0.446	10.54	23.98
		27	9.64	0.812	10.45	23.98
		40.5	9.38	1.133	10.51	23.98
		54	9.15	1.411	10.57	23.98
		81	8.76	1.852	10.61	23.98
		108	8.19	2.224	10.41	23.98
		121.5	8.28	2.372	10.65	23.98
		135	7.93	2.507	10.43	23.98
5550	110	13.5	10.33	0.446	10.78	23.98
		27	9.73	0.812	10.54	23.98
		40.5	9.55	1.133	10.68	23.98
		54	9.27	1.411	10.68	23.98
		81	8.78	1.852	10.63	23.98
		108	8.36	2.224	10.59	23.98
		121.5	8.30	2.372	10.67	23.98
		135	8.09	2.507	10.60	23.98
5710	142	13.5	9.59	0.446	10.04	23.98
		27	9.25	0.812	10.06	23.98
		40.5	9.06	1.133	10.19	23.98
		54	8.52	1.411	9.94	23.98
		81	8.15	1.852	10.00	23.98
		108	7.52	2.224	9.74	23.98
		121.5	7.39	2.372	9.76	23.98
		135	7.45	2.507	9.95	23.98

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

802.11ac 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	9.39	0.443	9.83	16.99
		27	9.07	0.815	9.88	16.99
		40.5	9.08	1.121	10.20	16.99
		54	8.89	1.393	10.29	16.99
		81	8.32	1.821	10.14	16.99
		108	7.59	2.151	9.74	16.99
		121.5	7.46	2.321	9.78	16.99
		135	7.63	2.482	10.11	16.99
		162	7.48	2.738	10.22	16.99
		180	7.32	2.810	10.13	16.99
5230	46	13.5	9.32	0.443	9.76	16.99
		27	9.30	0.815	10.12	16.99
		40.5	8.98	1.121	10.10	16.99
		54	8.35	1.393	9.74	16.99
		81	7.97	1.821	9.79	16.99
		108	7.61	2.151	9.76	16.99
		121.5	7.78	2.321	10.10	16.99
		135	7.23	2.482	9.72	16.99
		162	7.03	2.738	9.77	16.99
		180	7.35	2.810	10.16	16.99

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

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5270	54	13.5	9.83	0.443	10.27	23.98
		27	9.43	0.815	10.25	23.98
		40.5	8.80	1.121	9.92	23.98
		54	8.59	1.393	9.98	23.98
		81	8.10	1.821	9.92	23.98
		108	7.70	2.151	9.85	23.98
		121.5	8.00	2.321	10.32	23.98
		135	7.90	2.482	10.38	23.98
		162	7.61	2.738	10.35	23.98
		180	7.27	2.810	10.08	23.98
5310	62	13.5	9.37	0.443	9.81	23.98
		27	9.03	0.815	9.84	23.98
		40.5	9.13	1.121	10.25	23.98
		54	8.49	1.393	9.89	23.98
		81	7.90	1.821	9.73	23.98
		108	7.69	2.151	9.84	23.98
		121.5	7.88	2.321	10.20	23.98
		135	7.72	2.482	10.20	23.98
		162	7.01	2.738	9.74	23.98
		180	7.47	2.810	10.28	23.98



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

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5510	102	13.5	8.98	0.443	9.42	23.98
		27	8.59	0.815	9.40	23.98
		40.5	8.14	1.121	9.27	23.98
		54	7.80	1.393	9.19	23.98
		81	7.57	1.821	9.39	23.98
		108	7.07	2.151	9.22	23.98
		121.5	7.00	2.321	9.32	23.98
		135	6.78	2.482	9.27	23.98
		162	6.45	2.738	9.18	23.98
		180	6.58	2.810	9.39	23.98
5550	110	13.5	9.04	0.443	9.48	23.98
		27	8.66	0.815	9.47	23.98
		40.5	8.27	1.121	9.39	23.98
		54	8.00	1.393	9.39	23.98
		81	7.56	1.821	9.38	23.98
		108	7.16	2.151	9.31	23.98
		121.5	7.10	2.321	9.42	23.98
		135	7.05	2.482	9.53	23.98
		162	6.60	2.738	9.34	23.98
		180	6.45	2.810	9.26	23.98
5710	142	13.5	8.59	0.443	9.04	23.98
		27	8.01	0.815	8.83	23.98
		40.5	7.62	1.121	8.74	23.98
		54	7.36	1.393	8.75	23.98
		81	6.84	1.821	8.66	23.98
		108	6.55	2.151	8.70	23.98
		121.5	6.38	2.321	8.70	23.98
		135	6.17	2.482	8.65	23.98
		162	5.89	2.738	8.63	23.98
		180	5.87	2.810	8.68	23.98

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Conducted Output Power Measurements (802.11ac Mode: 5210)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	29.3	8.55	0.873	9.42	16.99
		58.5	7.93	1.469	9.40	16.99
		87.8	7.50	1.943	9.44	16.99
		117	7.07	2.242	9.31	16.99
		175.5	6.68	2.771	9.45	16.99
		234	6.29	3.100	9.39	16.99
		263.3	6.04	3.346	9.39	16.99
		292.5	5.94	3.405	9.34	16.99
		351	5.74	3.705	9.44	16.99
390	5.59	3.782	9.37	16.99		

Conducted Output Power Measurements (802.11ac Mode: 5290)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5290	58	29.3	8.62	0.873	9.49	23.98
		58.5	7.92	1.469	9.39	23.98
		87.8	7.46	1.943	9.41	23.98
		117	7.19	2.242	9.44	23.98
		175.5	6.61	2.771	9.38	23.98
		234	6.28	3.100	9.38	23.98
		263.3	6.15	3.346	9.50	23.98
		292.5	5.96	3.405	9.37	23.98
		351	5.79	3.705	9.49	23.98
390	5.61	3.782	9.39	23.98		

Conducted Output Power Measurements (802.11ac Mode: 5530~5690)

802.11ac Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5530	106	29.3	7.90	0.873	8.77	23.98
		58.5	7.27	1.469	8.73	23.98
		87.8	6.76	1.943	8.71	23.98
		117	6.54	2.242	8.78	23.98
		175.5	5.98	2.771	8.75	23.98
		234	5.54	3.100	8.64	23.98
		263.3	5.35	3.346	8.70	23.98
		292.5	5.32	3.405	8.72	23.98
		351	5.04	3.705	8.75	23.98
		390	4.89	3.782	8.68	23.98
5690	138	29.3	7.23	0.873	8.11	23.98
		58.5	6.64	1.469	8.11	23.98
		87.8	6.14	1.943	8.09	23.98
		117	5.75	2.242	7.99	23.98
		175.5	5.24	2.771	8.01	23.98
		234	4.90	3.100	8.00	23.98
		263.3	4.64	3.346	7.98	23.98
		292.5	4.57	3.405	7.98	23.98
		351	4.32	3.705	8.02	23.98
		390	4.12	3.782	7.90	23.98

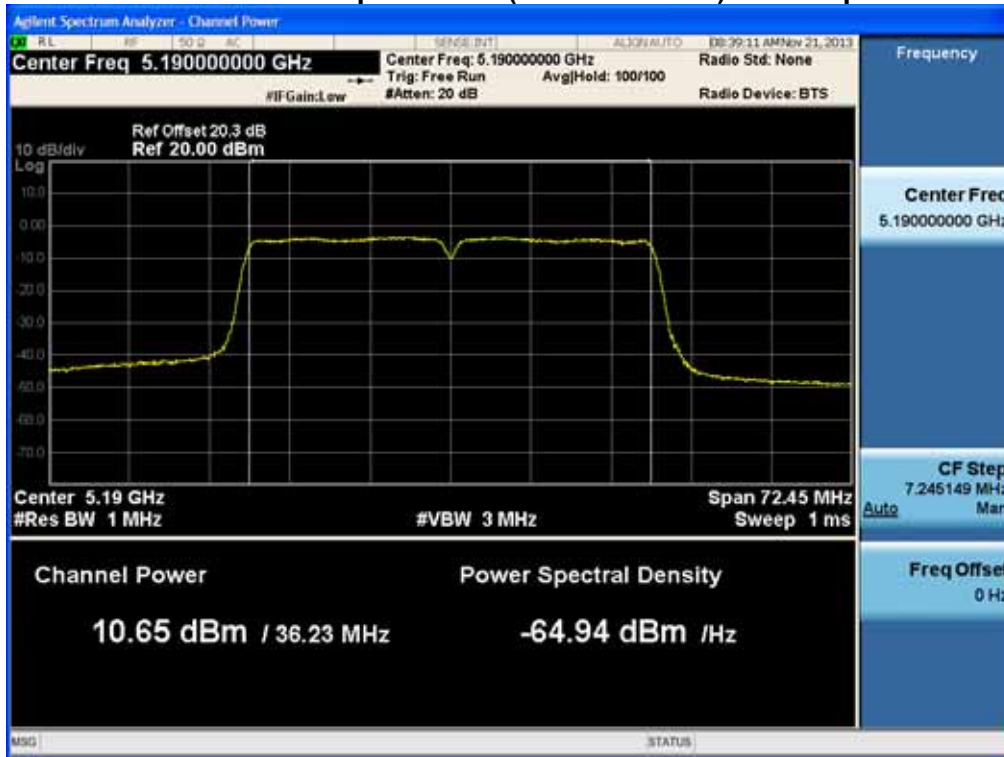
Note :

1. In order to simplify the report, attached plots were only the highest conducted power channel and data rate.
2. We applied the 15.407 for Ch.144, 142 and 138 in 802.11ac according to KDB 644545 D01 v01r01.

40 MHz BW

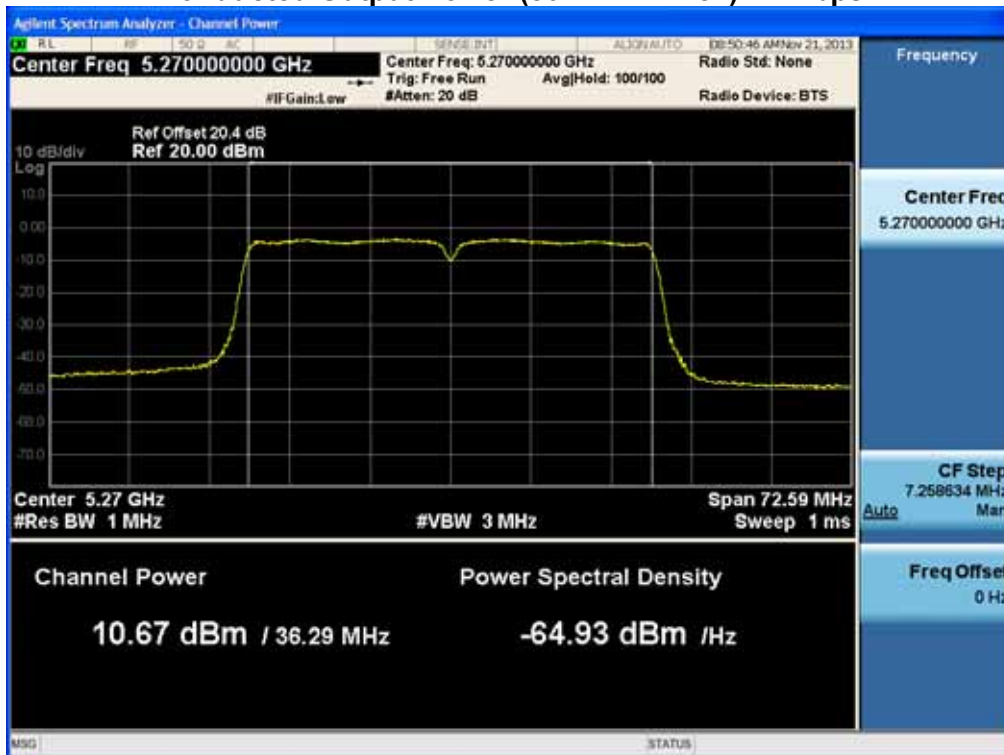
RESULT PLOTS (5190 MHz ~5230 MHz)

Conducted Output Power (802.11n-CH 38) 13.5 Mbps



RESULT PLOTS (5270 MHz ~5310 MHz)

Conducted Output Power (802.11n-CH 54) 27 Mbps



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

RESULT PLOTS (5510 MHz ~5670 MHz)

Conducted Output Power (802.11n-CH 110) 13.5 Mbps



RESULT PLOTS (5190 ~ 5230 MHz)

Conducted Output Power (802.11ac-CH 38) 54 Mbps



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

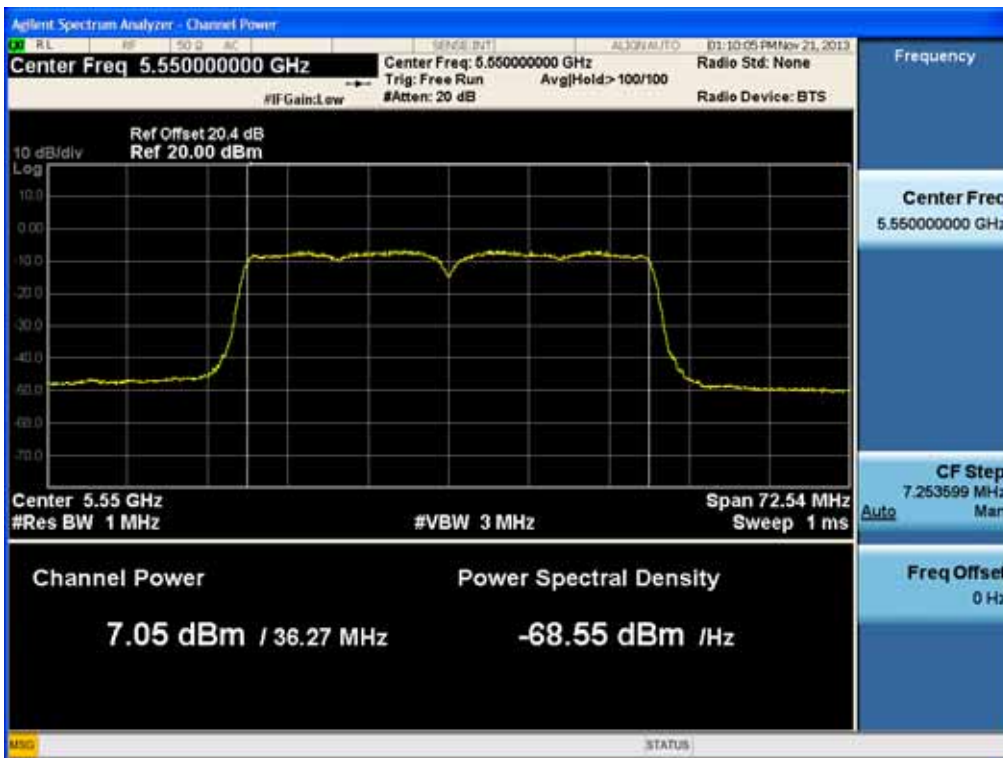
RESULT PLOTS (5270 ~ 5310 MHz)

Conducted Output Power (802.11ac-CH 54) 135 Mbps



RESULT PLOTS (5510 ~ 5710 MHz)

Conducted Output Power (802.11ac-CH 110) 135 Mbps



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955



80 MHz BW

RESULT PLOTS (5210 MHz)

Conducted Output Power (802.11ac-CH 42) 175.5 Mbps



RESULT PLOTS (5290 MHz)

Conducted Output Power (802.11ac-CH 58) 263.3 Mbps



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955



RESULT PLOTS (5530 MHz ~ 5690 MHz)

Conducted Output Power (802.11ac-CH 106) 117 Mbps

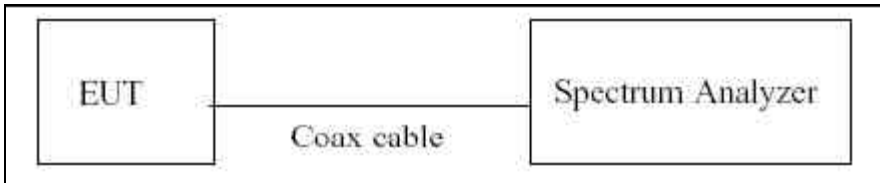


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

8.4 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 and 11 dBm/ MHz in the 5.25 GHz – 5.35 GHz and 5.47 GHz – 5.725 GHz bands

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 ≥ 3 MHz.
4. Number of points in sweep ≥ 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, 5.3 GHz and 5.6 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.

FCC PT.15.407 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID		FCC ID: ZNFD955

Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	20.30
	5190	20.29
	5200	20.28
	5230	20.29
	5240	20.34
UNII 2	5260	20.37
	5270	20.38
	5300	20.40
	5310	20.39
	5320	20.39
UNII 2e	5500	20.35
	5510	20.36
	5550	20.41
	5580	20.43
	5670	20.43
	5700	20.30

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



TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	0.749	0.215907	0.965	4	Pass
5200	40		0.569	0.215907	0.785	4	Pass
5240	48		0.483	0.215907	0.699	4	Pass
5260	52	802.11a	0.923	0.215907	1.139	11	Pass
5300	60		0.698	0.215907	0.914	11	Pass
5320	64		0.366	0.318474	0.684	11	Pass
5500	100	802.11a	-0.089	1.358552	1.270	11	Pass
5580	116		-0.272	1.358552	1.087	11	Pass
5720	144		-1.121	1.501285	0.380	11	Pass

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n	-0.902	1.107911	0.206	4	Pass
5200	40	20MHz BW	-0.684	0.230653	-0.453	4	Pass
5240	48		-0.858	0.230653	-0.627	4	Pass
5260	52	802.11n	-0.295	0.230653	-0.064	11	Pass
5300	60	20MHz	-0.861	0.444191	-0.417	11	Pass
5320	64	BW	-0.738	0.230653	-0.507	11	Pass
5500	100	802.11n	-1.756	1.506441	-0.250	11	Pass
5580	116	20MHz	-1.639	0.803219	-0.836	11	Pass
5720	144	BW	-2.602	1.6117	-0.990	11	Pass

FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11n 40MHz BW	-3.820	0.446496	-3.374	4	Pass
5230	46		-4.052	0.446496	-3.606	4	Pass
5270	54	802.11n 40MHz BW	-3.486	0.812402	-2.674	11	Pass
5310	62		-5.055	1.852346	-3.203	11	Pass
5510	102	802.11n 40MHz BW	-5.340	2.371964	-2.968	11	Pass
5550	110		-4.026	0.446496	-3.580	11	Pass
5710	142		-5.500	2.507249	-2.993	11	Pass

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	802.11ac 20MHz BW	-1.720	0.42752	-1.292	4	Pass
5200	40		-1.785	0.42752	-1.357	4	Pass
5240	48		-2.445	1.087365	-1.358	4	Pass
5260	52	802.11ac 20MHz BW	-1.790	1.087365	-0.703	11	Pass
5300	60		-1.695	0.42752	-1.267	11	Pass
5320	64		-1.631	0.230653	-1.400	11	Pass
5500	100	802.11ac 20MHz BW	-1.638	0.230653	-1.407	11	Pass
5580	116		-2.934	1.326256	-1.608	11	Pass
5720	144		-2.930	0.615425	-2.315	11	Pass

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11ac 40MHz BW	-5.015	1.393366	-3.622	4	Pass
5230	46		-6.134	2.810129	-3.324	4	Pass
5270	54	802.11ac 40MHz BW	-6.340	2.482167	-3.858	11	Pass
5310	62		-6.217	2.810129	-3.407	11	Pass
5510	102	802.11ac 40MHz BW	-5.247	0.442921	-4.804	11	Pass
5550	110		-7.031	2.482167	-4.549	11	Pass
5710	142		-5.857	0.442921	-5.414	11	Pass

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
5210	42	802.11ac 80MHz BW	-10.372	2.771178	-7.601	4	Pass
5290	58	802.11ac 80MHz BW	-10.844	3.346386	-7.498	11	Pass
5530	106	802.11ac 80MHz BW	-10.379	2.2419	-8.137	11	Pass
5690	138	802.11ac 80MHz BW	-10.242	1.468689	-8.773	11	Pass

Note :

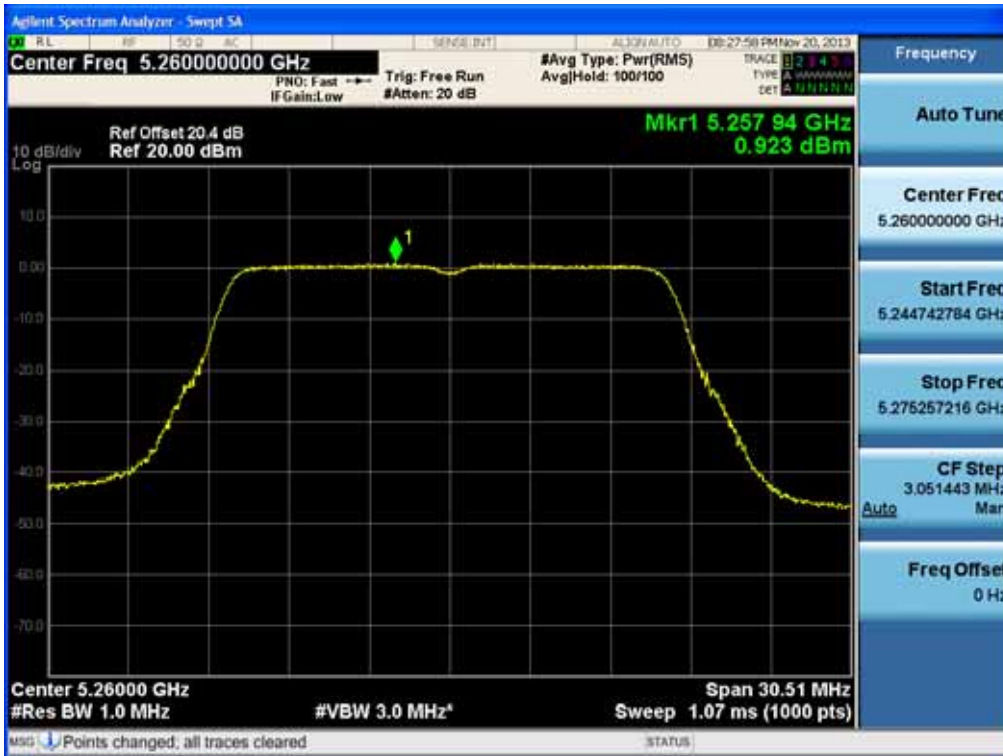
1. In order to simplify the report, attached plots were only the highest PSD channel.
2. We applied the 15.407 for Ch.144, 142 and 138 in 802.11ac according to KDB 644545 D01 v01r01.

RESULT PLOTS
20 MHz BW

Power Spectral Density (802.11a-CH 36)

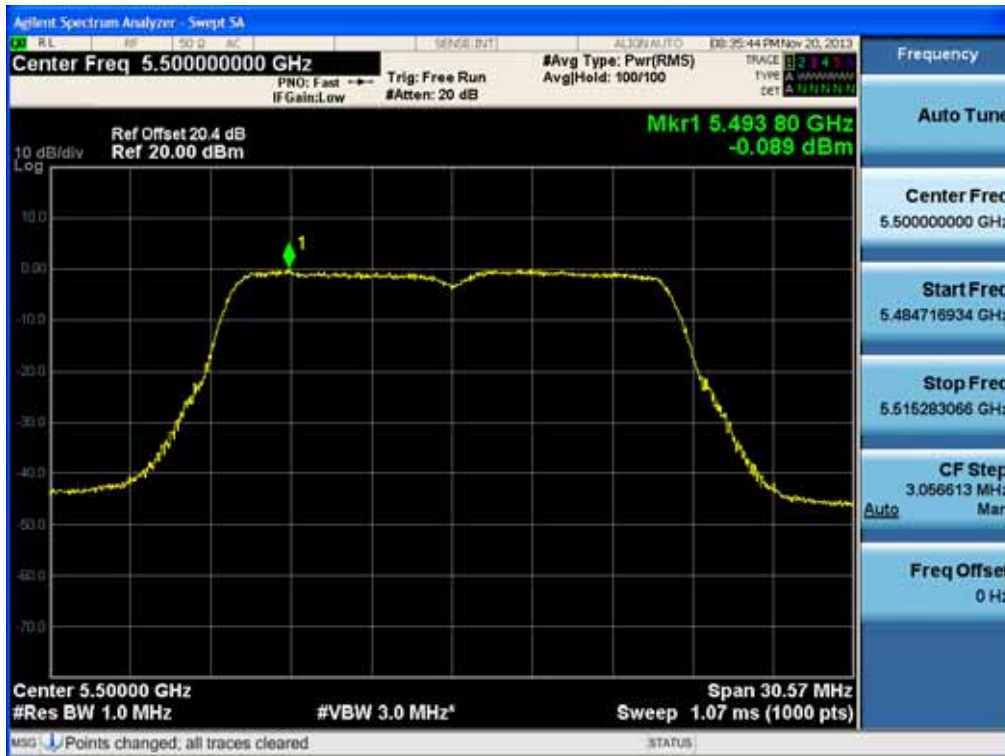


Power Spectral Density (802.11a-CH 52)

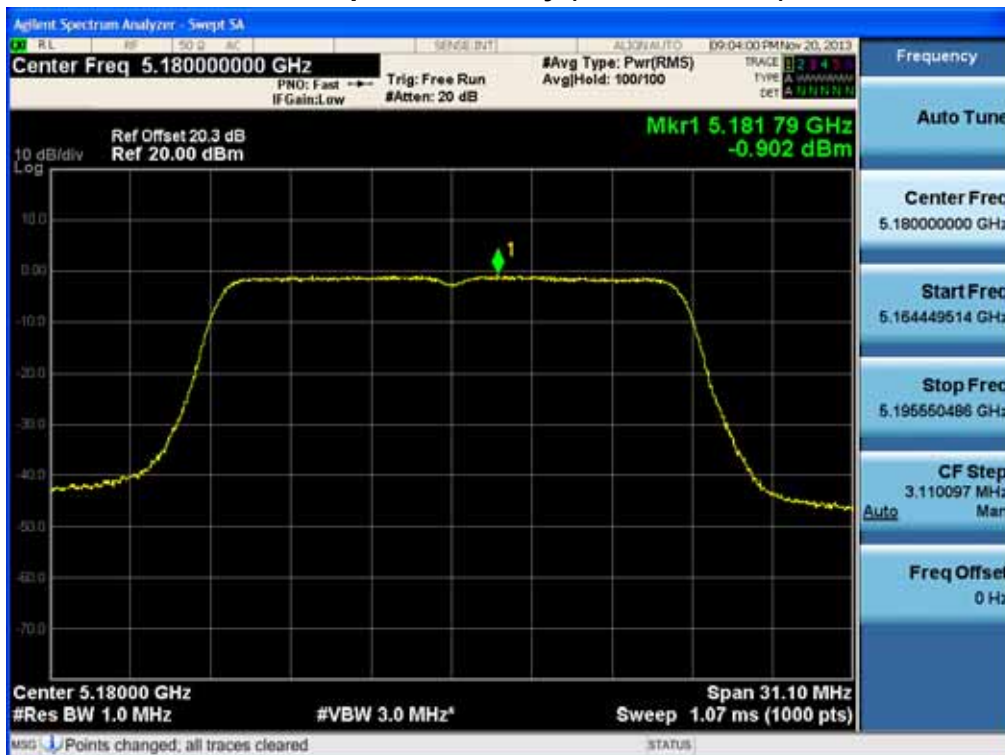


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

Power Spectral Density (802.11a-CH 100)

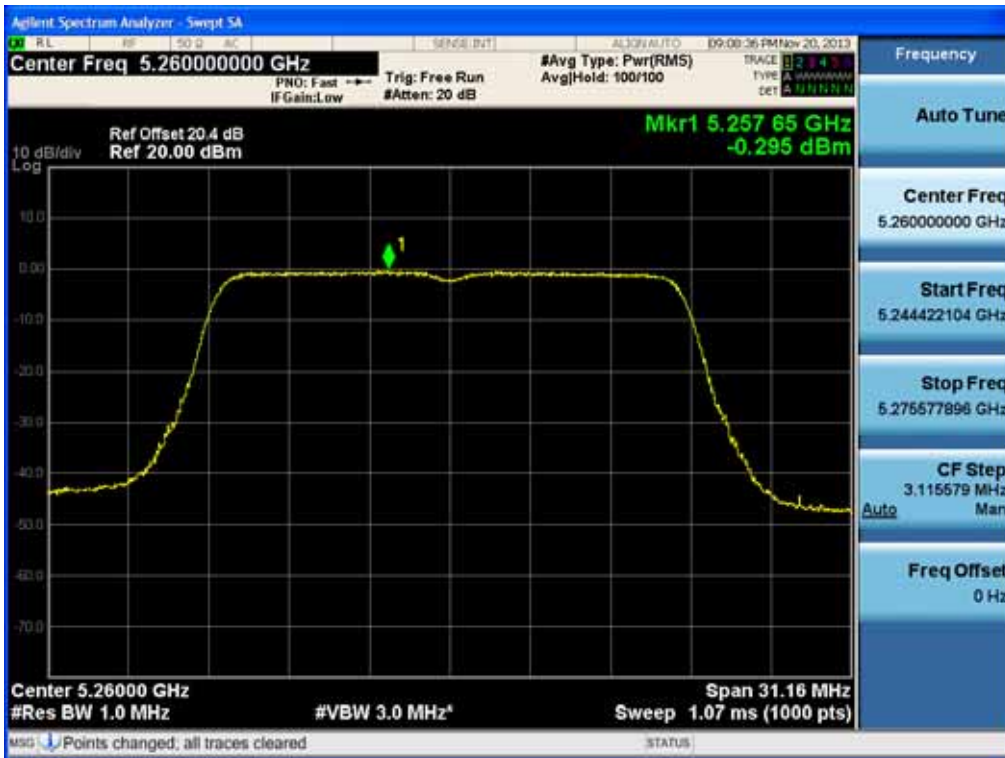


Power Spectral Density (802.11n-CH 36)

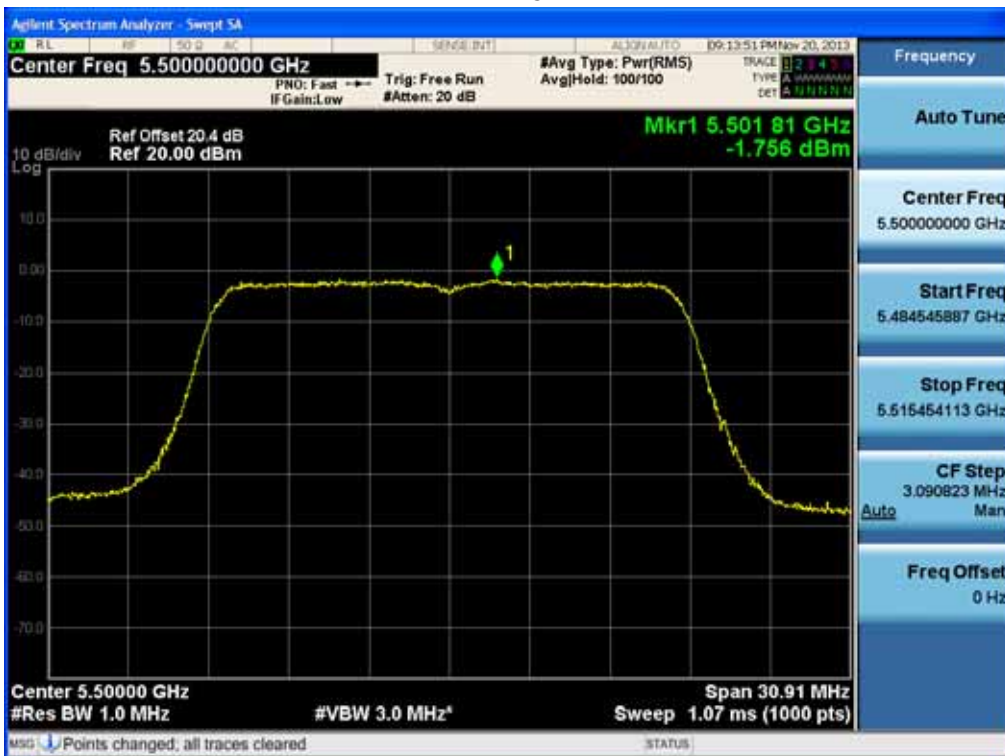


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Power Spectral Density (802.11n-CH 52)

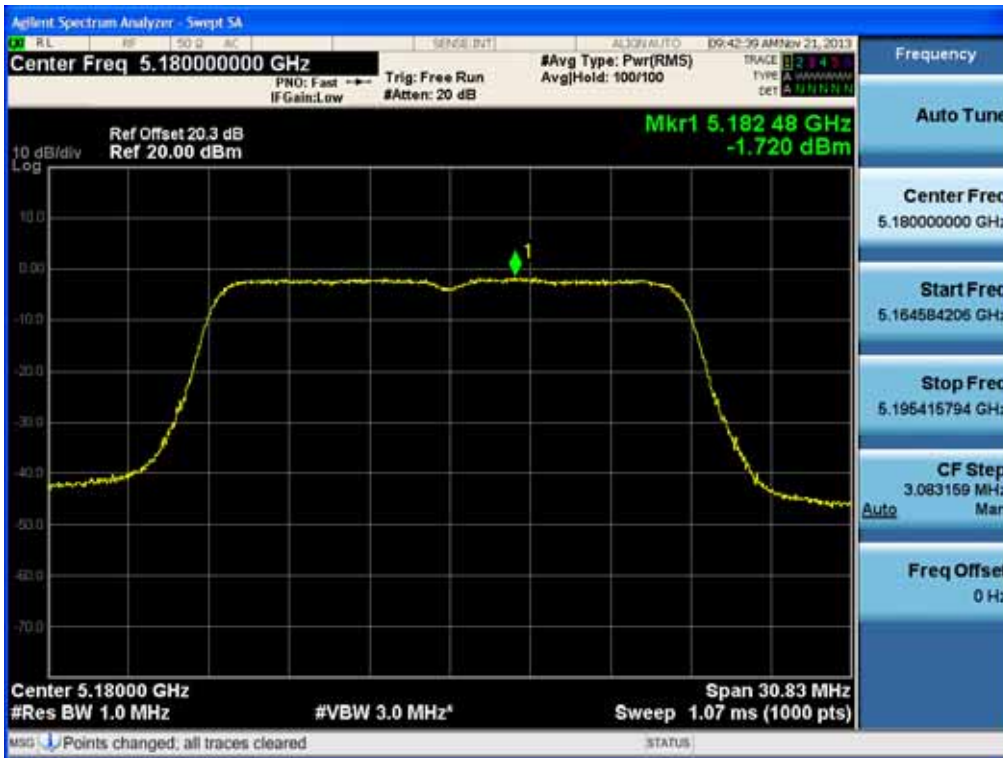


Power Spectral Density (802.11n-CH 100)

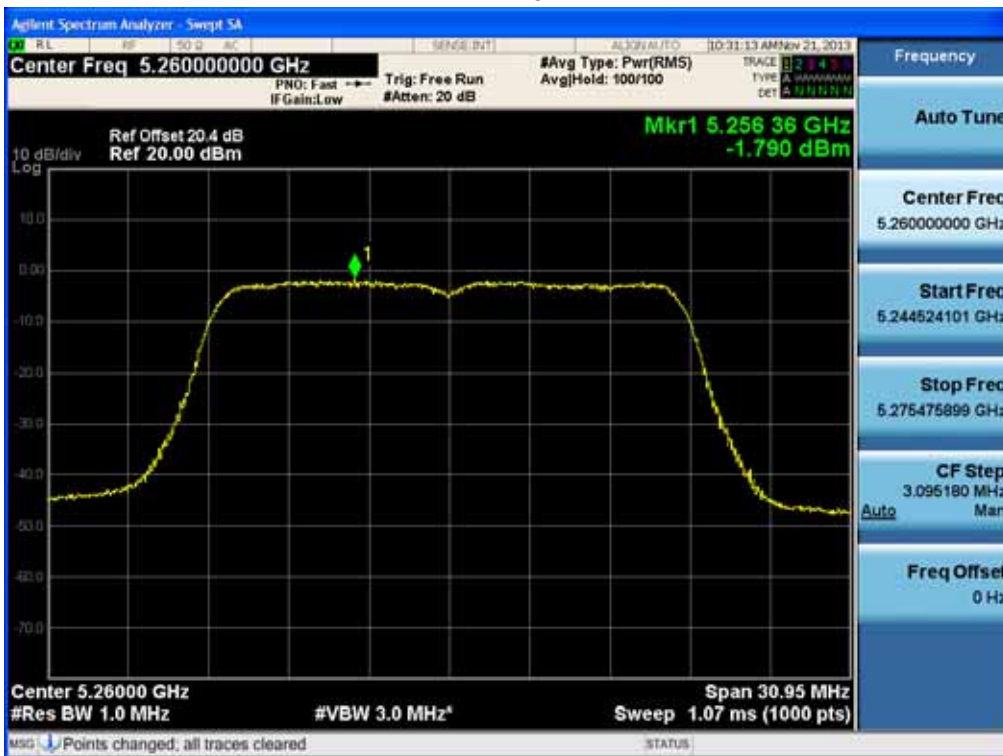


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Power Spectral Density (802.11ac-CH 36)

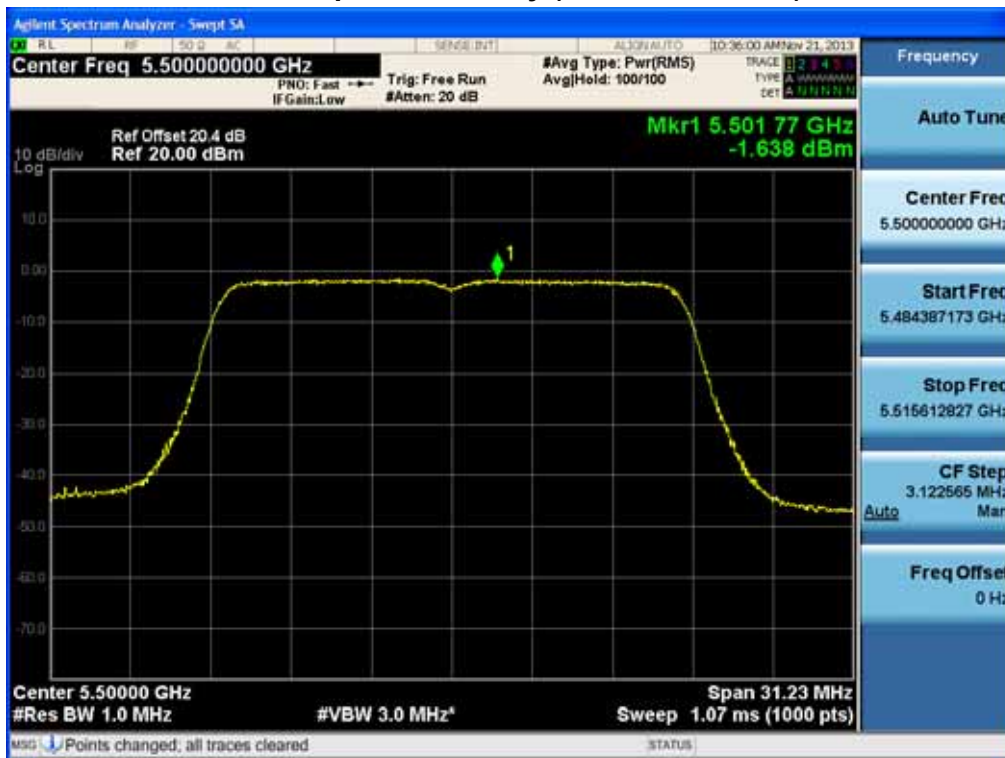


Power Spectral Density (802.11ac-CH 52)



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Power Spectral Density (802.11ac-CH 100)

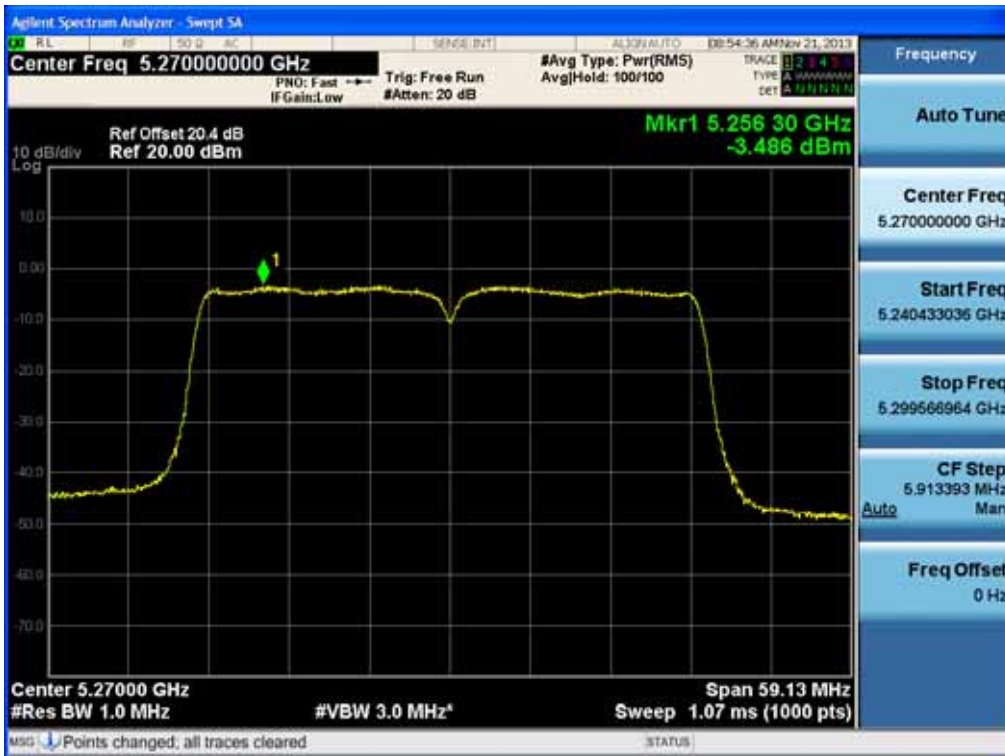


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Power Spectral Density (802.11n-CH 38)

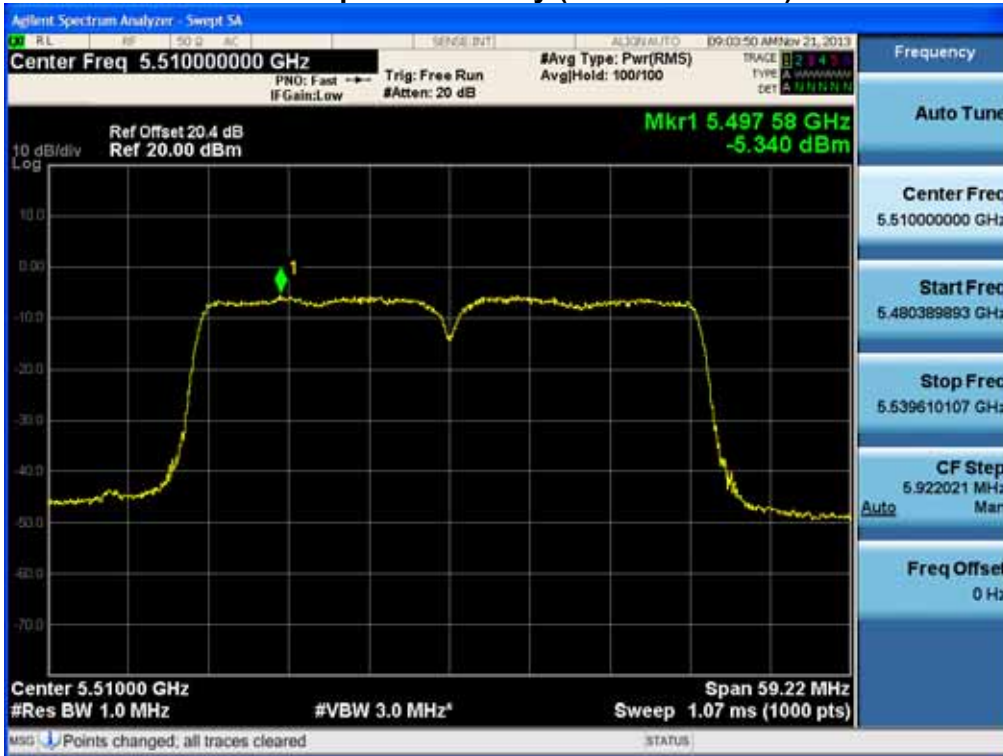


Power Spectral Density (802.11n-CH 54)

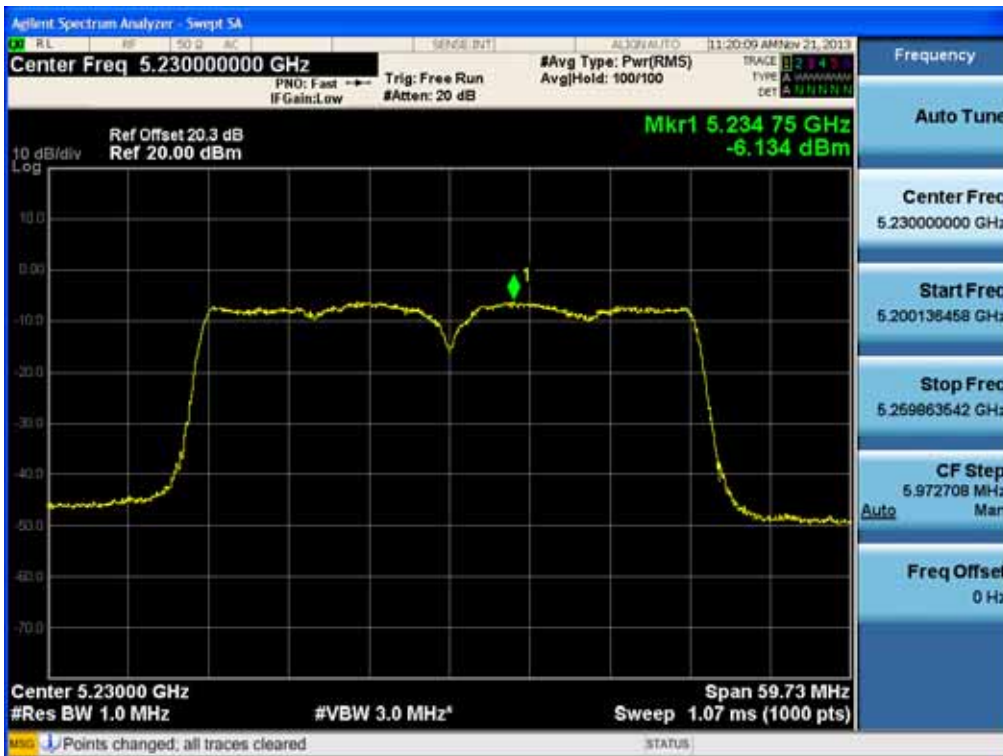


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Power Spectral Density (802.11n-CH 102)

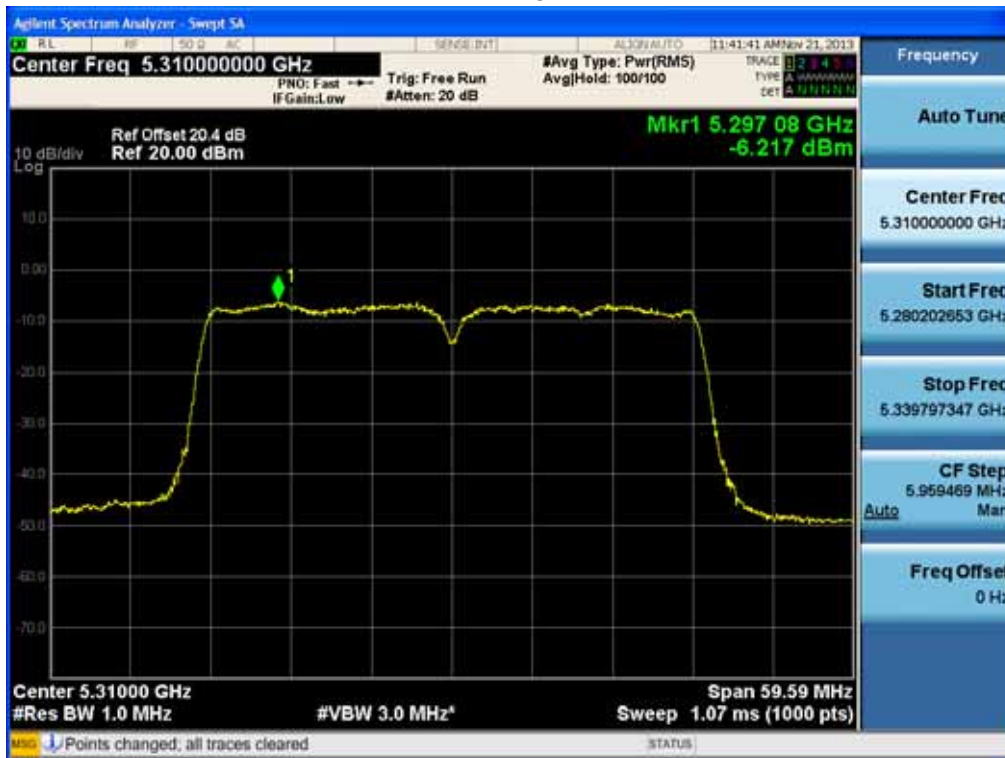


Power Spectral Density (802.11ac-CH 46)

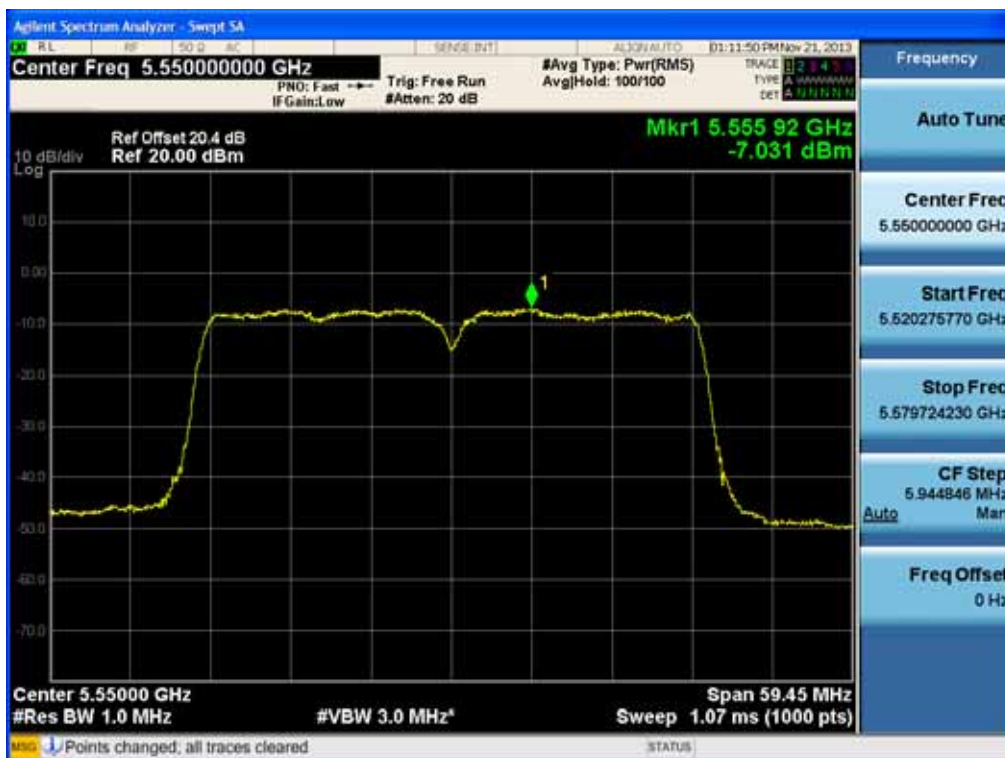


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

Power Spectral Density (802.11ac-CH 62)

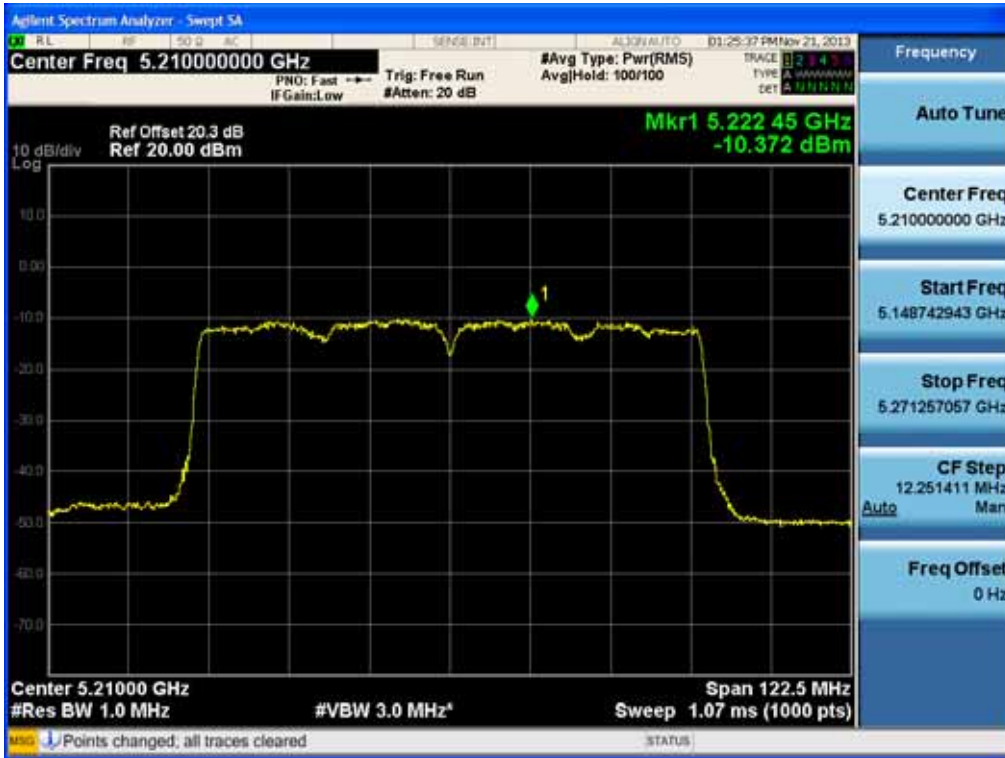


Power Spectral Density (802.11ac-CH 110)

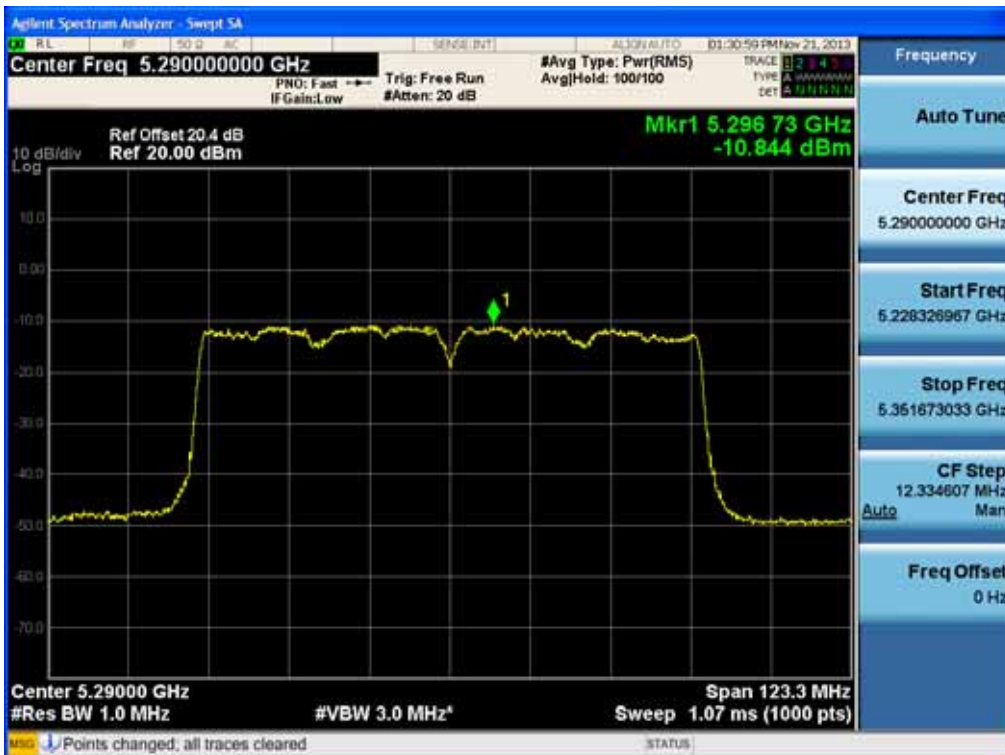


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

Power Spectral Density (802.11ac-CH 42)

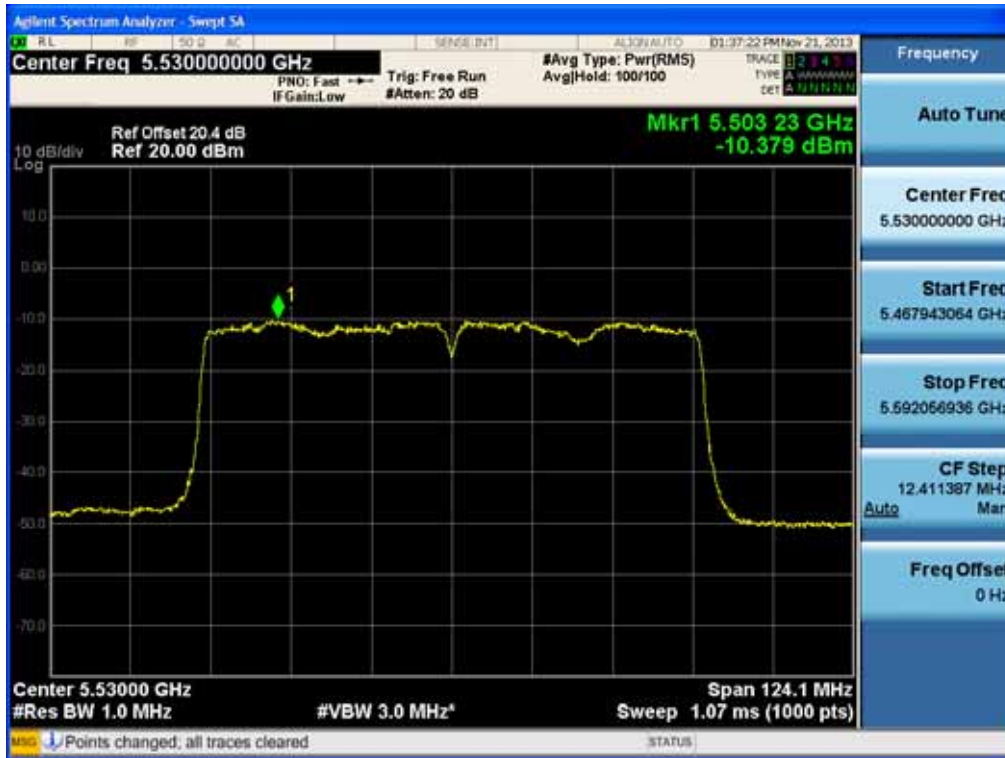


Power Spectral Density (802.11ac-CH 58)



FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNF0955

Power Spectral Density (802.11ac-CH 106)

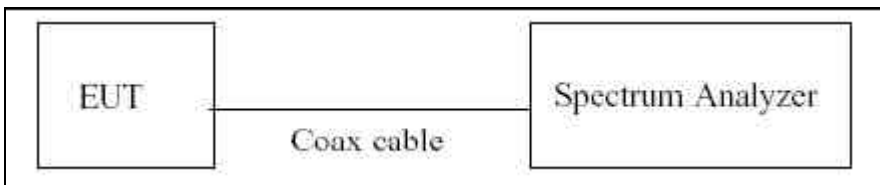


FCC PT.15.407 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1311FR18-1	Date of Issue: December 06, 2013	EUT Type: Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID	FCC ID: ZNFD955

8.5 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, 5.3 GHz and 5.6 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.
4. We applied the 15.407 for Ch.144, 142 and 138 in 802.11ac according to KDB 644545 D01 v01r01.

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Band	Frequency(MHz)	Loss(dB)
UNII 1	5180	20.30
	5190	20.29
	5200	20.28
	5230	20.29
	5240	20.34
UNII 2	5260	20.37
	5270	20.38
	5300	20.40
	5310	20.39
	5320	20.39
UNII 2e	5500	20.35
	5510	20.36
	5550	20.41
	5580	20.43
	5670	20.43
	5700	20.30

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