

Conducted Output Power (802.11n-CH 6) 121.5 Mbps



Conducted Output Power (802.11n-CH 6) 135 Mbps



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Output Power (802.11n-CH 9) 13.5Mbps

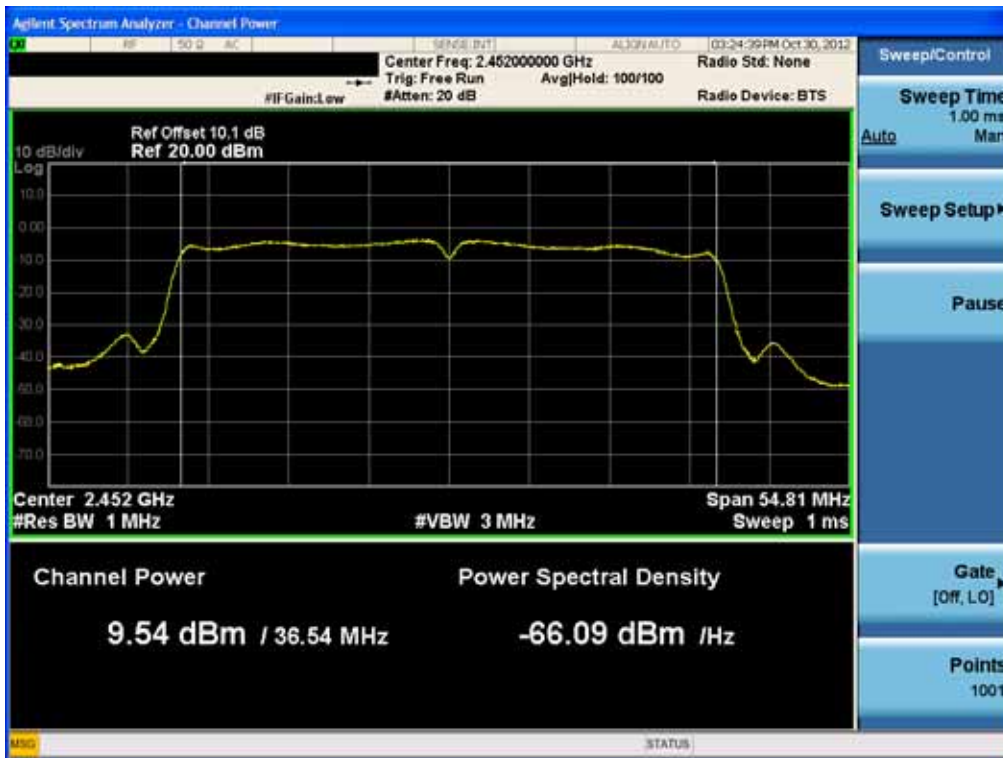


Conducted Output Power (802.11n-CH 9) 27 Mbps



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Conducted Output Power (802.11n-CH 9) 40.5 Mbps



Conducted Output Power (802.11n-CH 9) 54 Mbps



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Conducted Output Power (802.11n-CH 9) 81 Mbps

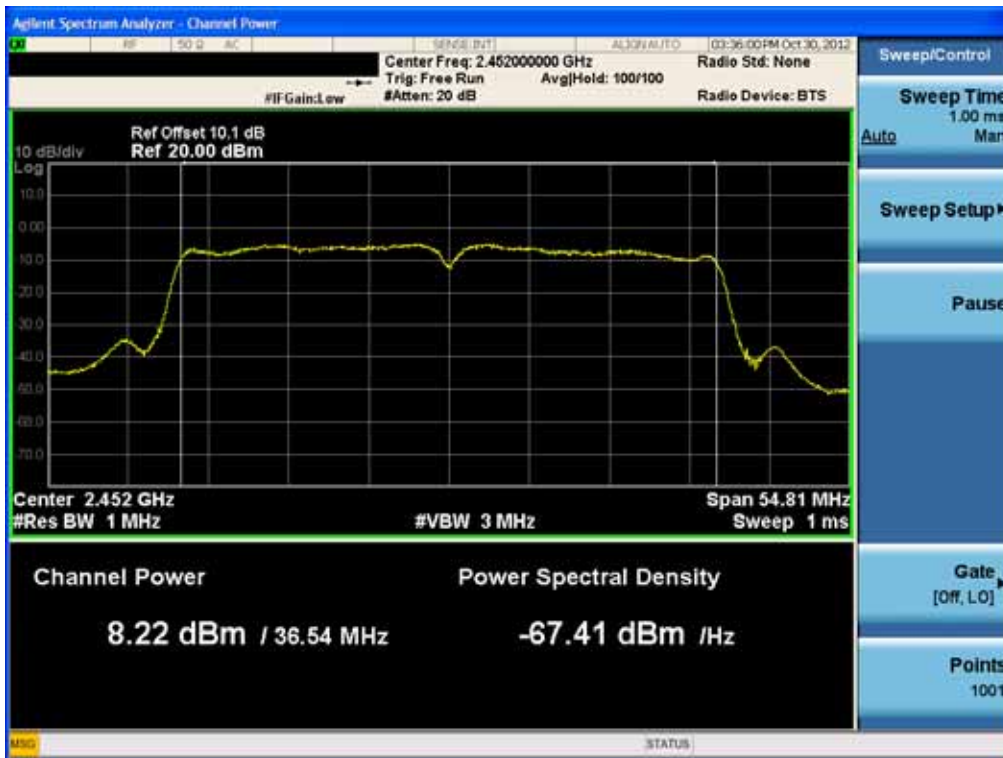


Conducted Output Power (802.11n-CH 9) 108 Mbps



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Conducted Output Power (802.11n-CH 9) 135 Mbps



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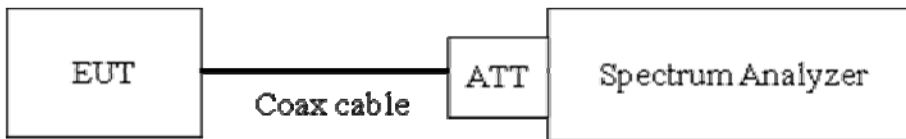
8.3 POWER SPECTRAL DENSITY (802.11b/g/n)

Test Requirements and limit, §15.247(e)

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

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

TEST CONFIGURATION



TEST PROCEDURE

We tested according to KDB 558074(issued 10/04/2012).

The spectrum analyzer is set to :

1. Span = 1.5 times the DTS channel bandwidth
2. RBW = 3 kHz
3. VBW ≥ 3 * RBW
4. Sweep = Auto couple
5. Detector Mode = Peak
6. Trace Mode = Max hold
7. Search peak

Sample Calculation

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

Output Power = -5 dBm + 10 dB + 0.8 dB = 5.8 dBm

Note :

1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is 10.11 dB at 2412 MHz , 10.10 dB at 2437 MHz and is 10.12 dB at 2462 MHz. So, the offset is 10.1 dB. And the offset gap in the 2.4 GHz range do not affect the output power final result.

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TEST RESULTS_Ant.0

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-12.108	8	Pass
2437	6		-11.192	8	Pass
2462	11		-11.322	8	Pass
2412	1	802.11g	-12.295	8	Pass
2437	6		-13.304	8	Pass
2462	11		-13.199	8	Pass
2412	1	802.11n (20 MHz BW)	-12.433	8	Pass
2437	6		-13.342	8	Pass
2462	11		-13.172	8	Pass
2422	3	802.11n (40 MHz BW)	-16.119	8	Pass
2437	6		-16.156	8	Pass
2452	9		-16.282	8	Pass

MIMO

TEST RESULTS_Ant.1

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11n (20 MHz BW)	-14.379	8	Pass
2437	6		-14.644	8	Pass
2462	11		-14.481	8	Pass
2422	3	802.11n (40 MHz BW)	-16.061	8	Pass
2437	6		-17.472	8	Pass
2452	9		-16.794	8	Pass



TEST RESULTS_Sum Data of Ant.0 and Ant.1

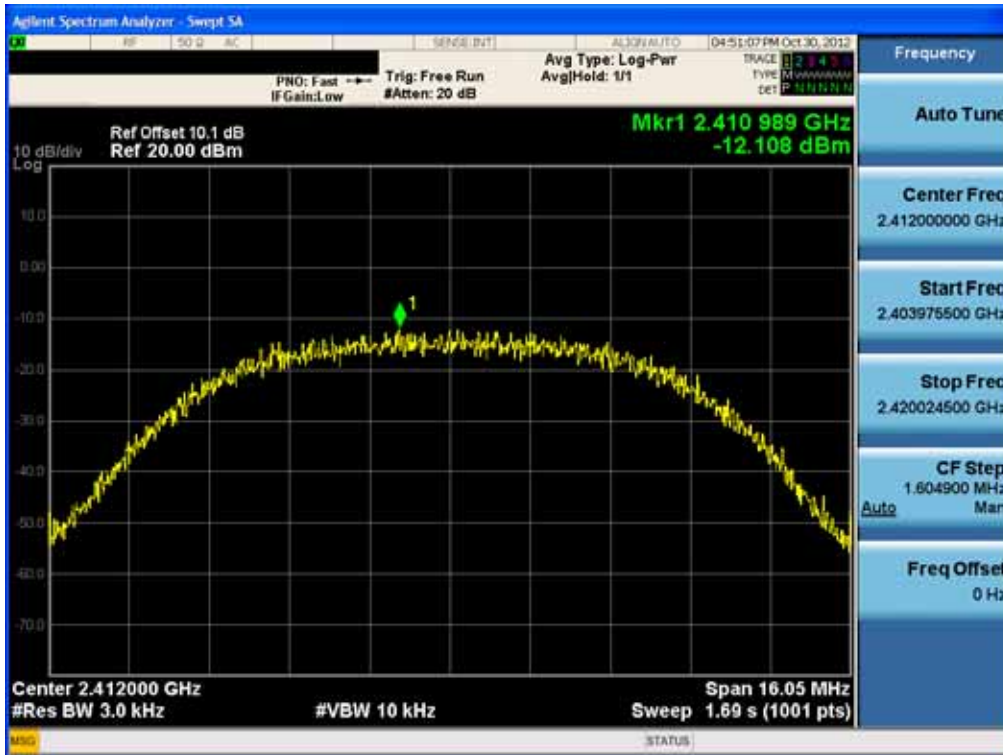
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11n (20 MHz BW)	-10.288	8	Pass
2437	6		-10.934	8	Pass
2462	11		-10.767	8	Pass
2422	3	802.11n (40 MHz BW)	-13.080	8	Pass
2437	6		-13.754	8	Pass
2452	9		-13.520	8	Pass

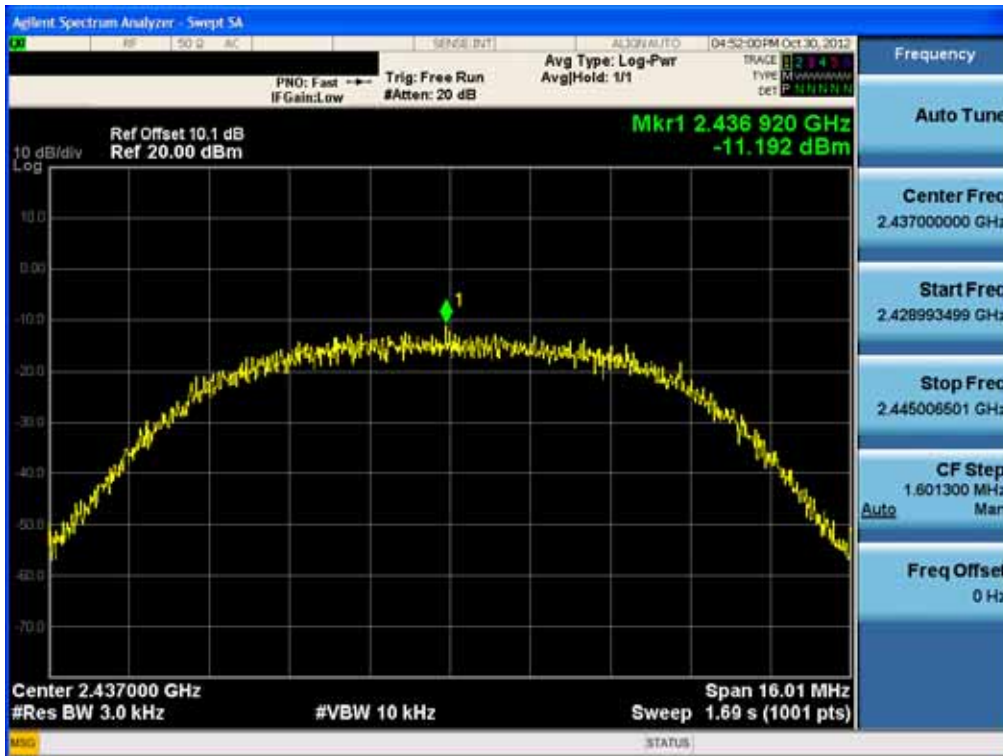
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RESULT PLOTS_Ant.0

Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11b-CH 6)

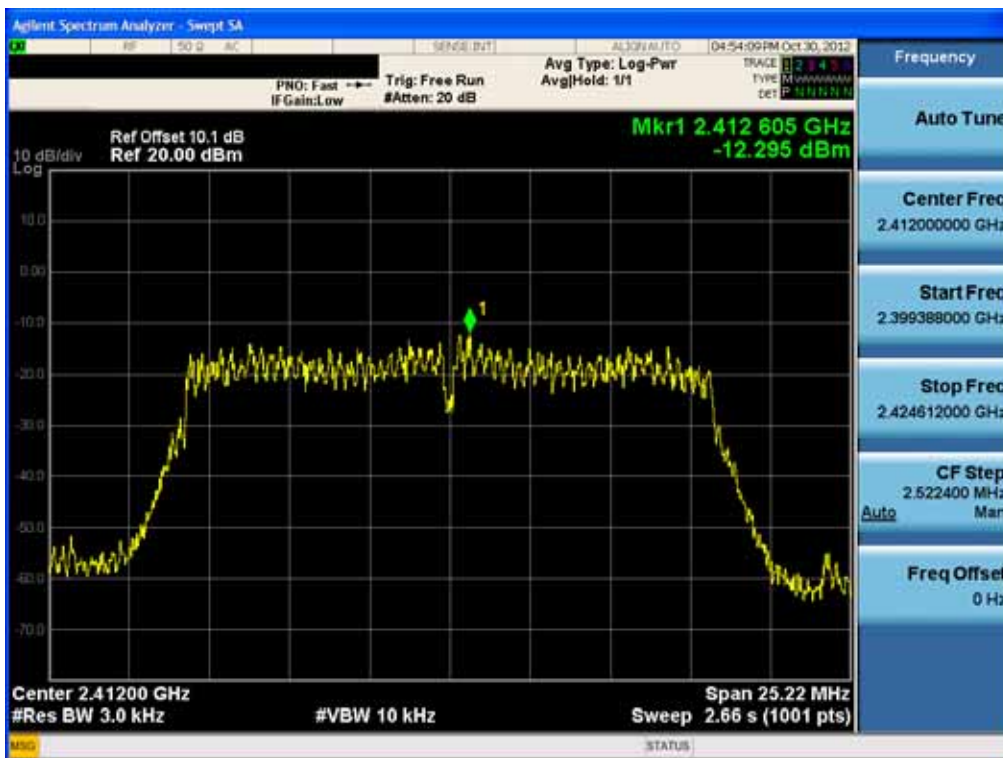


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Power Spectral Density (802.11b-CH 11)



Power Spectral Density (802.11g-CH 1)

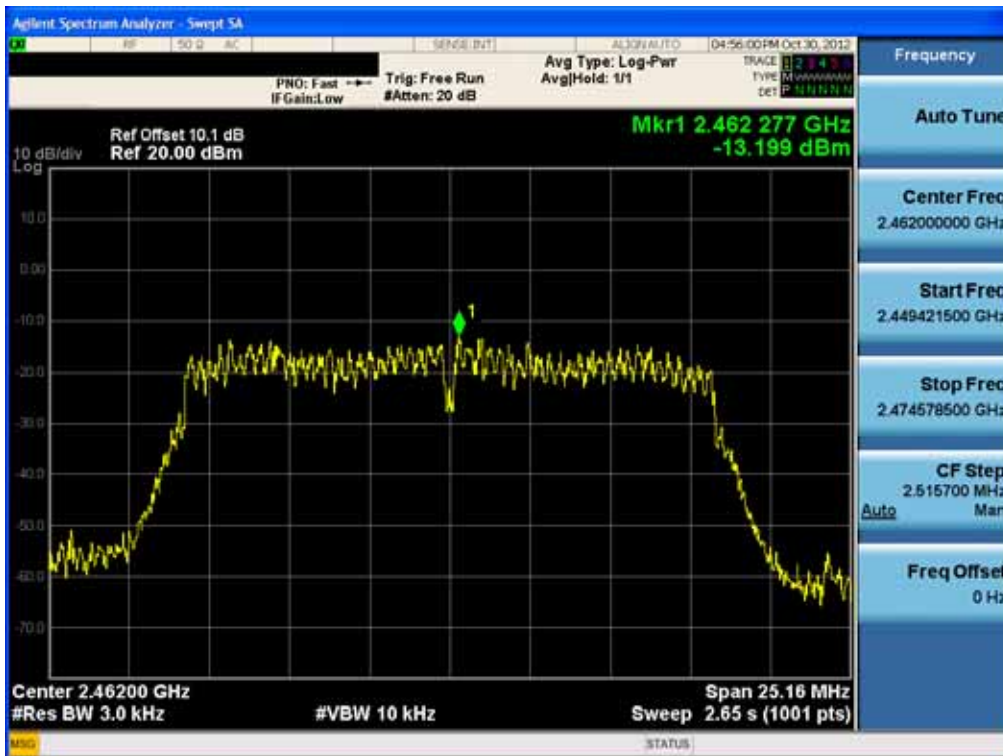


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Power Spectral Density (802.11g-CH 6)

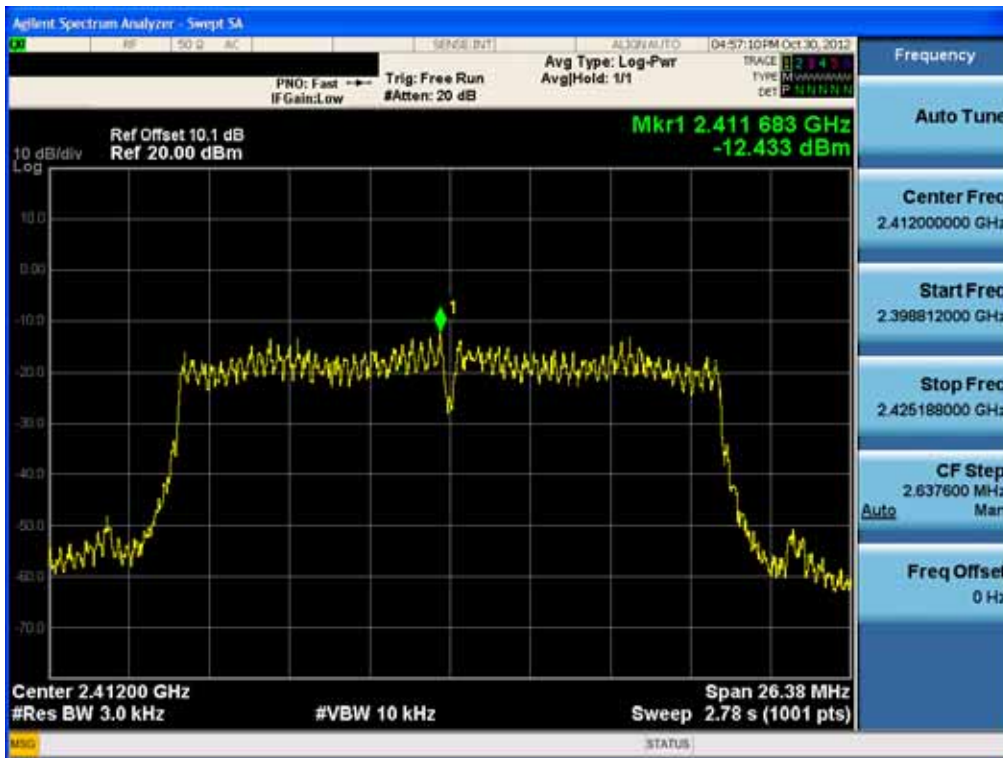


Power Spectral Density (802.11g-CH11)

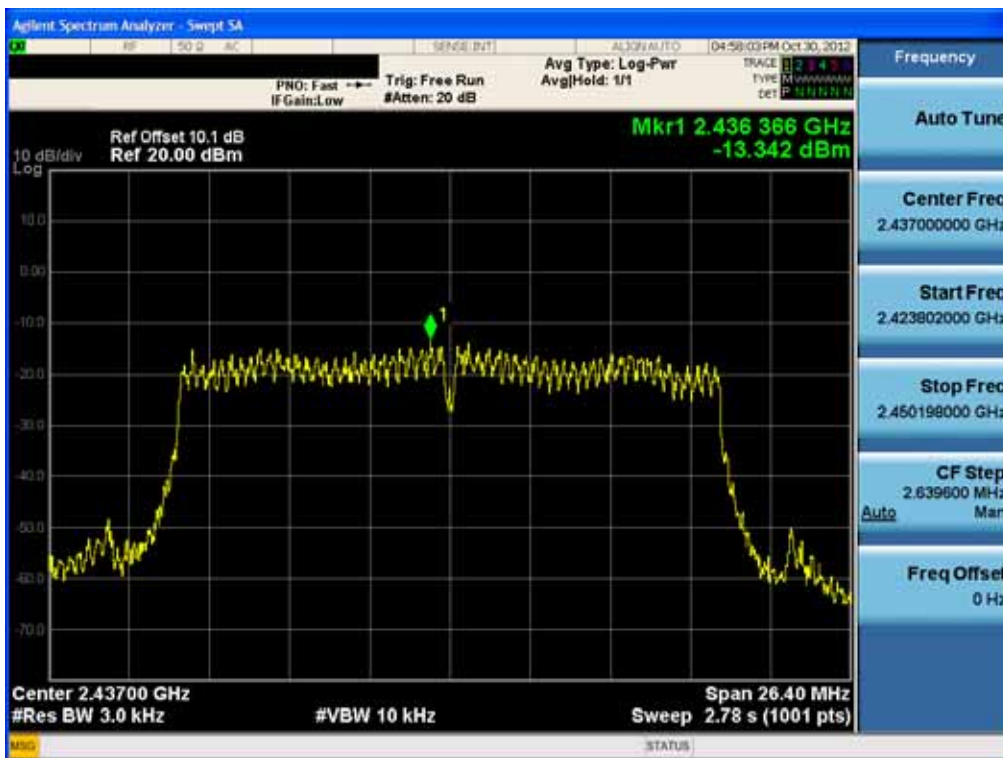


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Power Spectral Density (802.11n-CH 1) _ 20 MHz BW

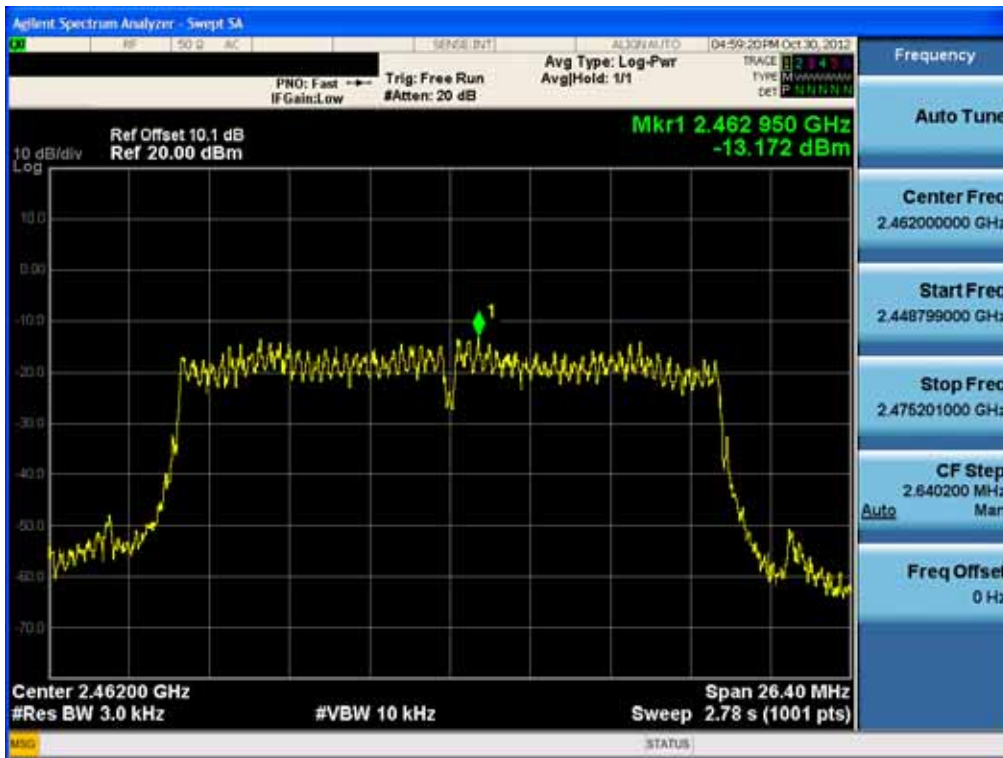


Power Spectral Density (802.11n-CH 6) _ 20 MHz BW

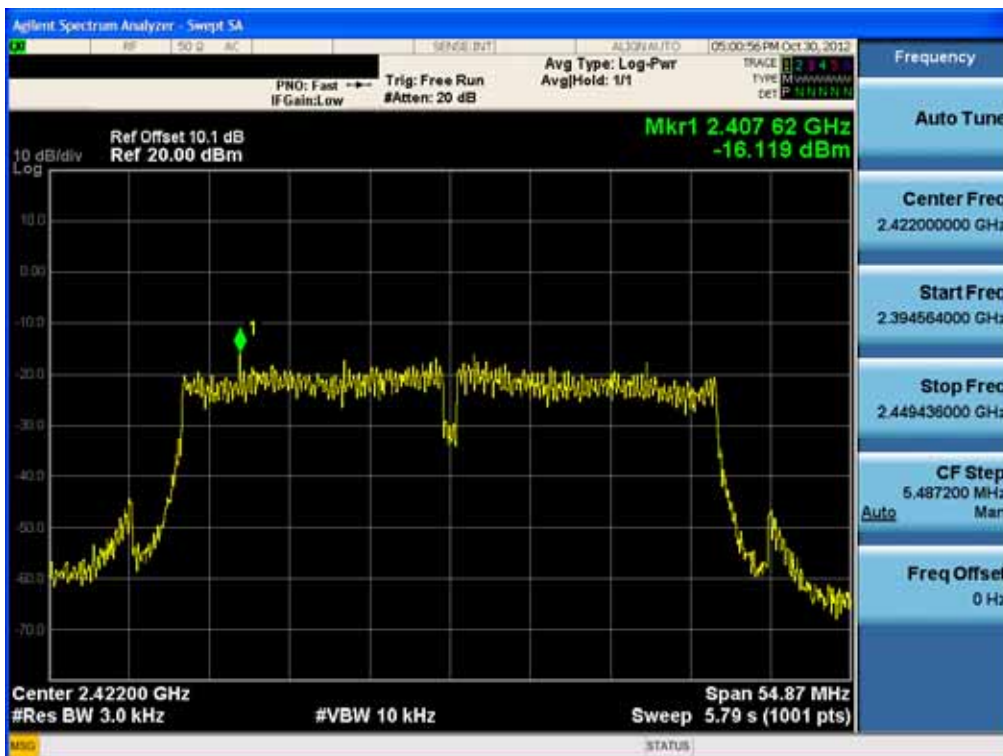


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Power Spectral Density (802.11n-CH11) _ 20 MHz BW

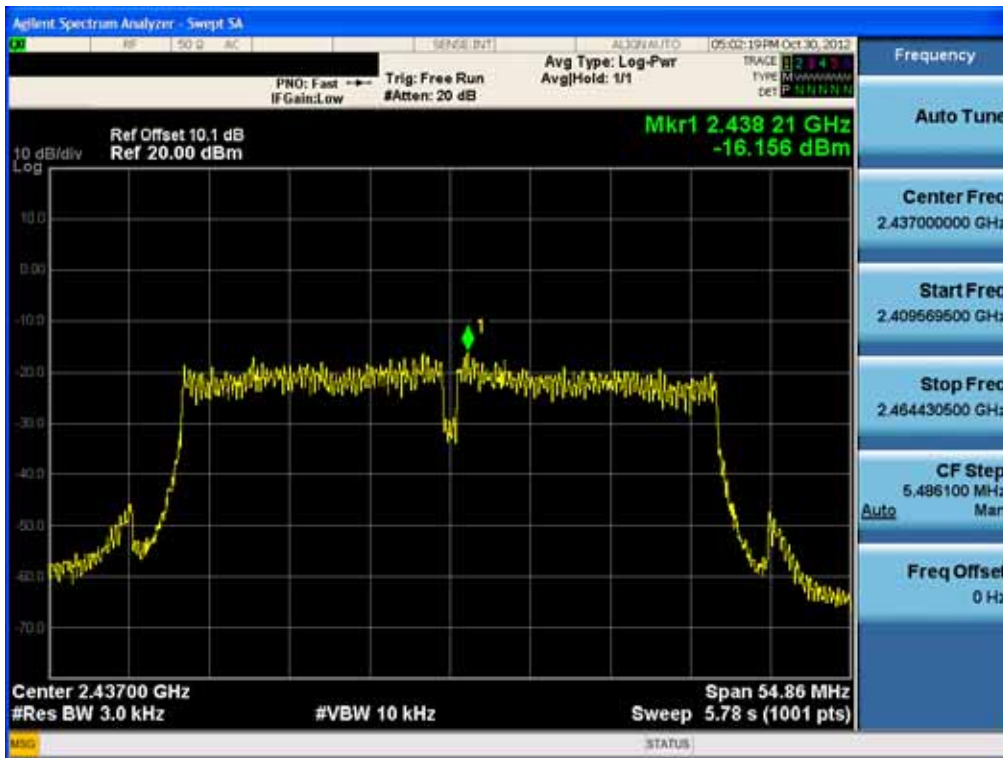


Power Spectral Density (802.11n-CH 3)_ 40 MHz BW

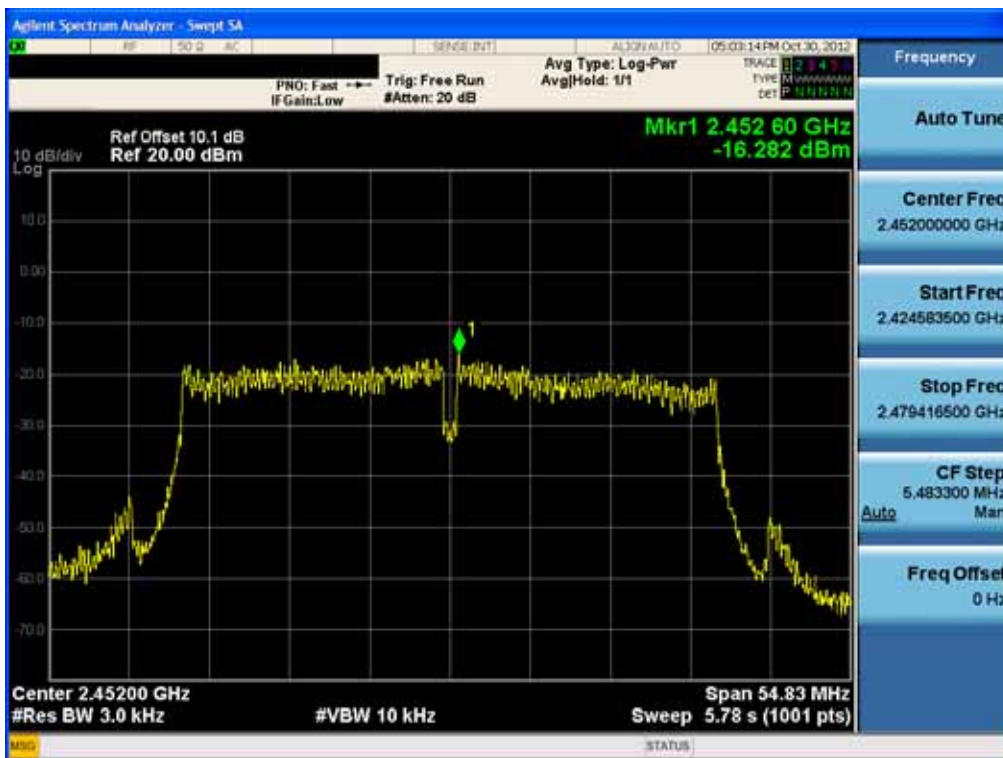


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Power Spectral Density (802.11n-CH 6) _ 40 MHz BW



Power Spectral Density (802.11n-CH9) _ 40 MHz BW

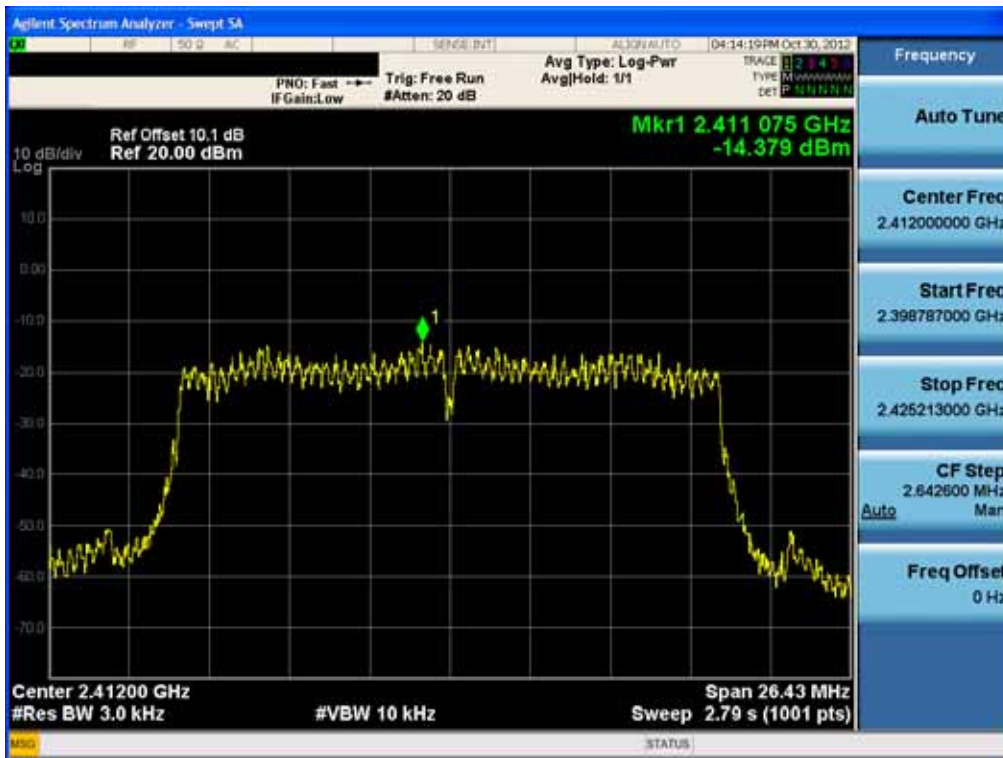


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
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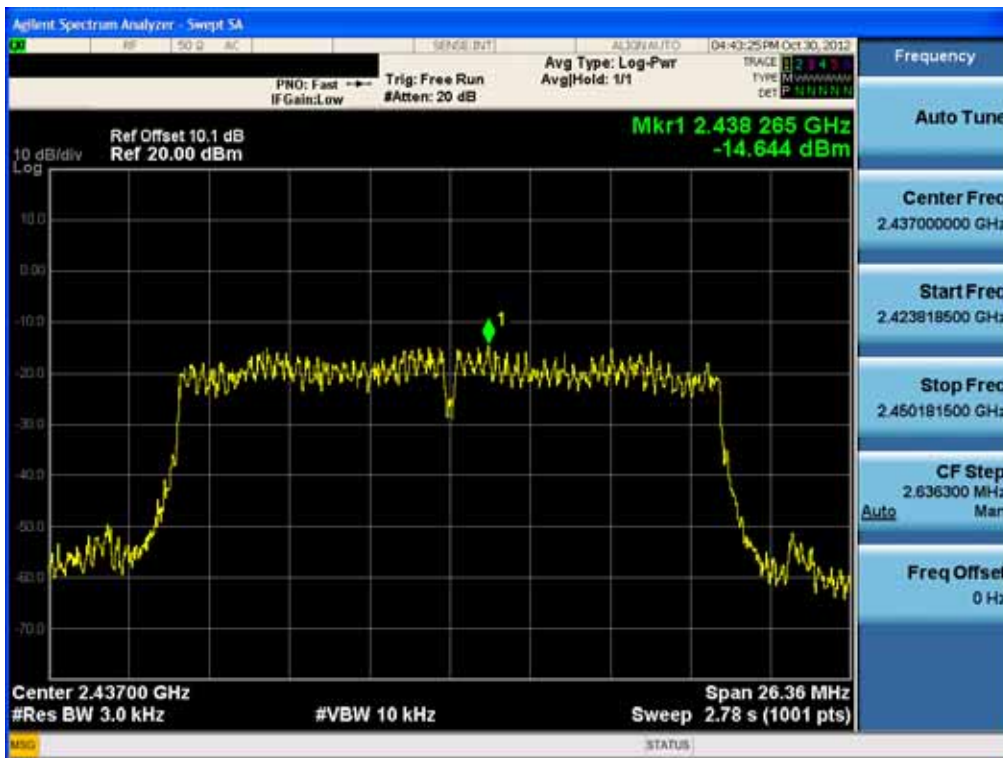
MIMO

RESULT PLOTS_Ant.1

Power Spectral Density (802.11n-CH 1) _ 20 MHz BW

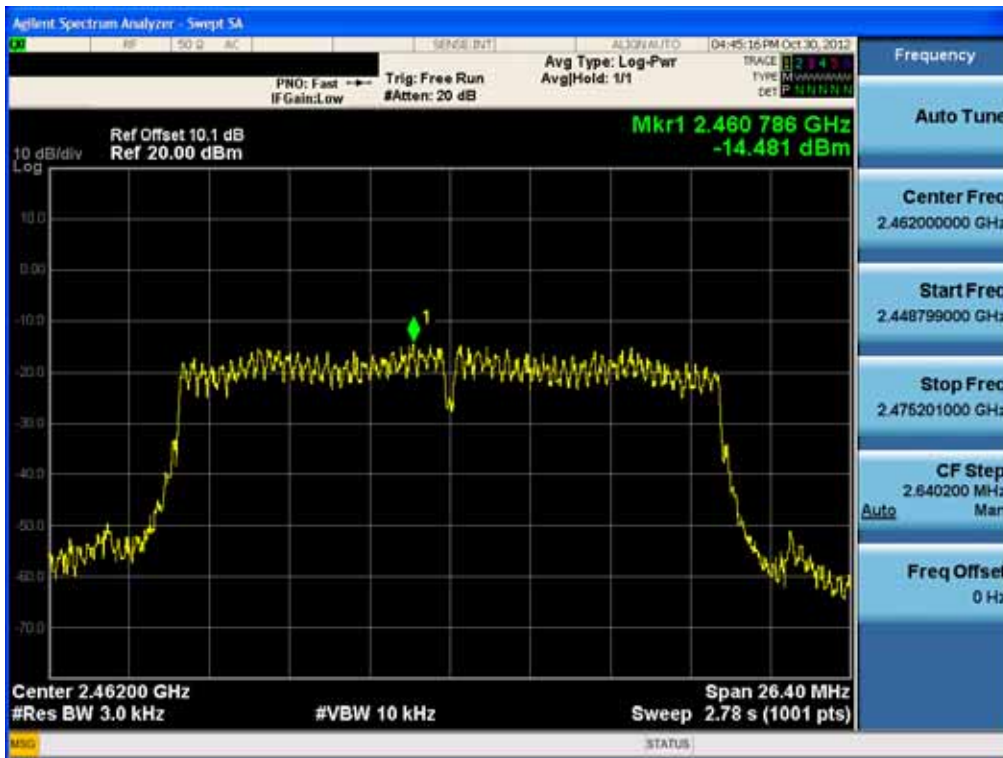


Power Spectral Density (802.11n-CH 6) _ 20 MHz BW

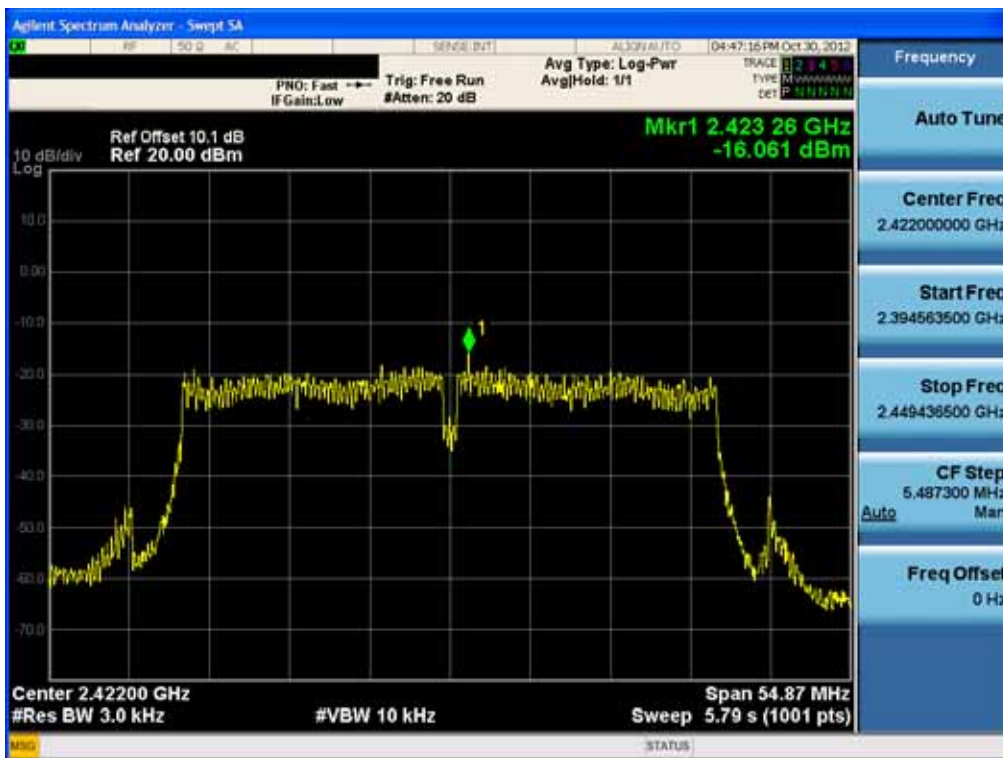


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Power Spectral Density (802.11n-CH11) _ 20 MHz BW



Power Spectral Density (802.11n-CH 3)_ 40 MHz BW

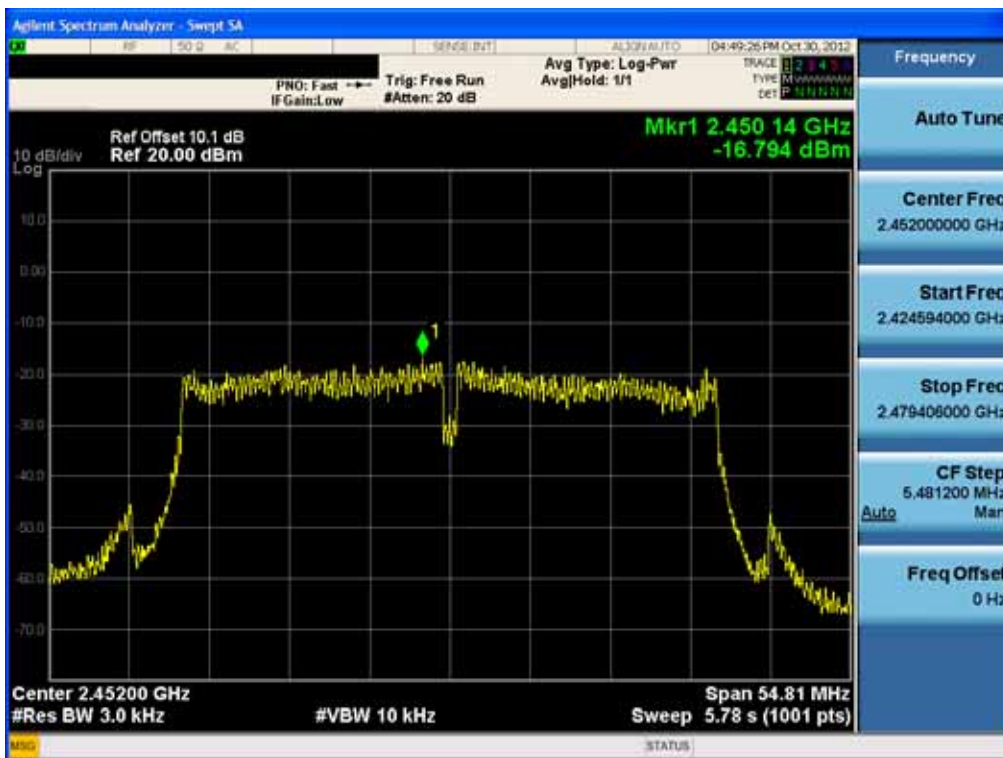


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Power Spectral Density (802.11n-CH 6) _ 40 MHz BW



Power Spectral Density (802.11n-CH9) _ 40 MHz BW



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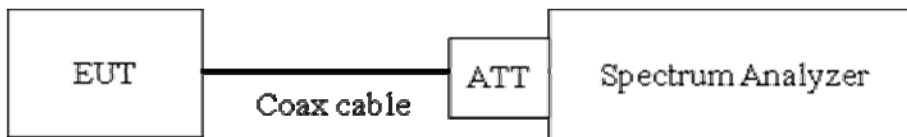
8.4 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

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

Limit : 20 dBc

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.

RBW = 100 kHz(Upon 1 GHz = 1 MHz)

VBW = 300 kHz(Upon 1 GHz = 1 MHz)

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep = auto couple

Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is 10.11 dB at 2412 MHz , 10.10 dB at 2437 MHz and is 10.12 dB at 2462 MHz. So, the offset is 10.1 dB. And the offset gap in the 2.4 GHz range do not affect the

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output power final result.

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

FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	10.37
100	10.16
200	10.15
300	10.14
400	10.18
500	10.19
600	10.20
700	10.30
800	10.25
900	10.28
1000	10.29
2000	10.17
2412*	10.11
2437*	10.10
2462*	10.12
3000	10.26
4000	10.31
5000	9.85
6000	10.20
7000	10.60
8000	10.53
9000	10.23
10000	10.41
11000	10.65
12000	11.19
13000	10.97
14000	11.42
15000	12.01
16000	11.77
17000	10.78
18000	10.76
19000	11.15
20000	10.75
21000	10.82
22000	10.82
23000	11.26
24000	11.08
25000	11.18
26000	10.90

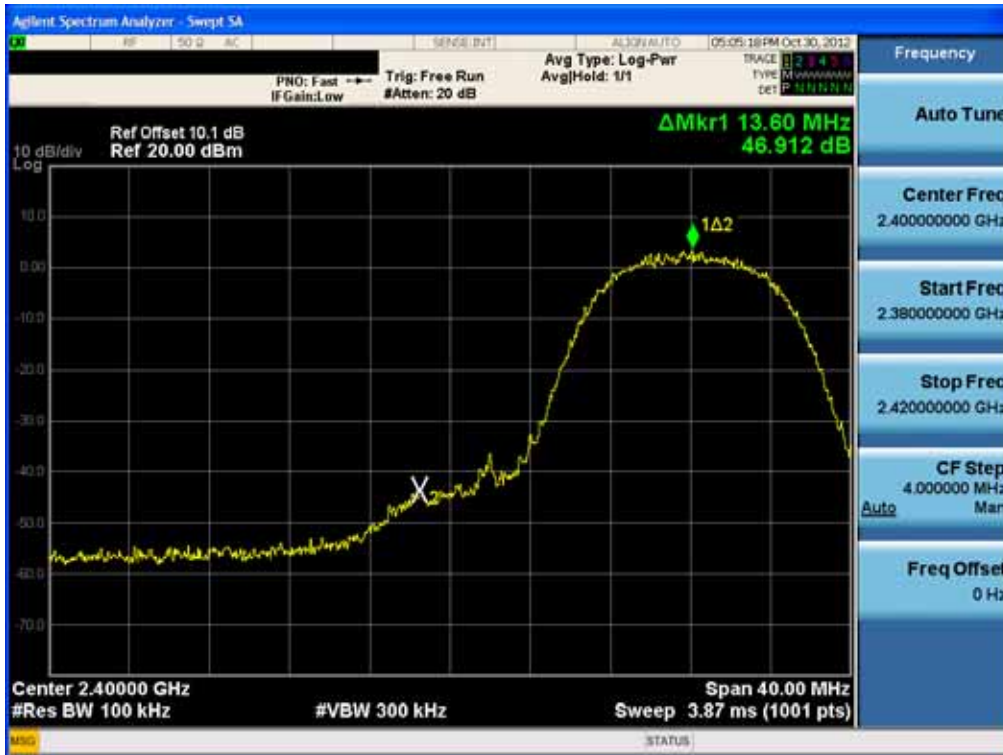
Note : 1. ** is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss

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RESULT PLOTS_Ant.0

Band Edge (802.11b-CH1)



Band Edge (802.11b-CH11)

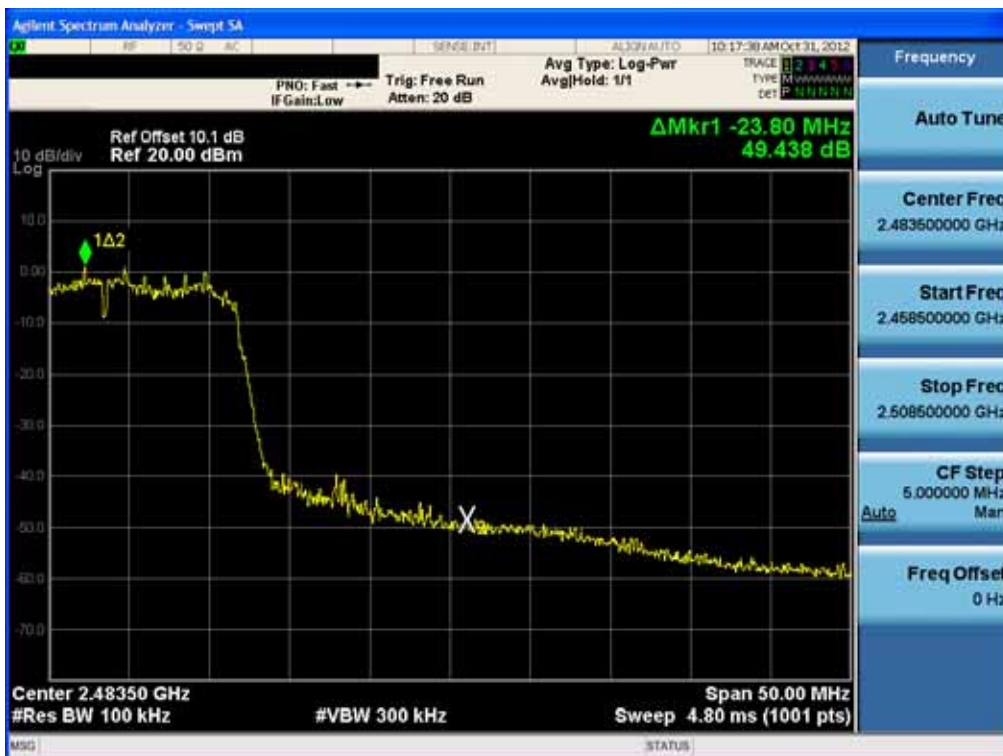


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Band Edge (802.11g-CH1)



Band Edge (802.11g-CH11)



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Band Edge (802.11n-CH1) _ 20 MHz BW

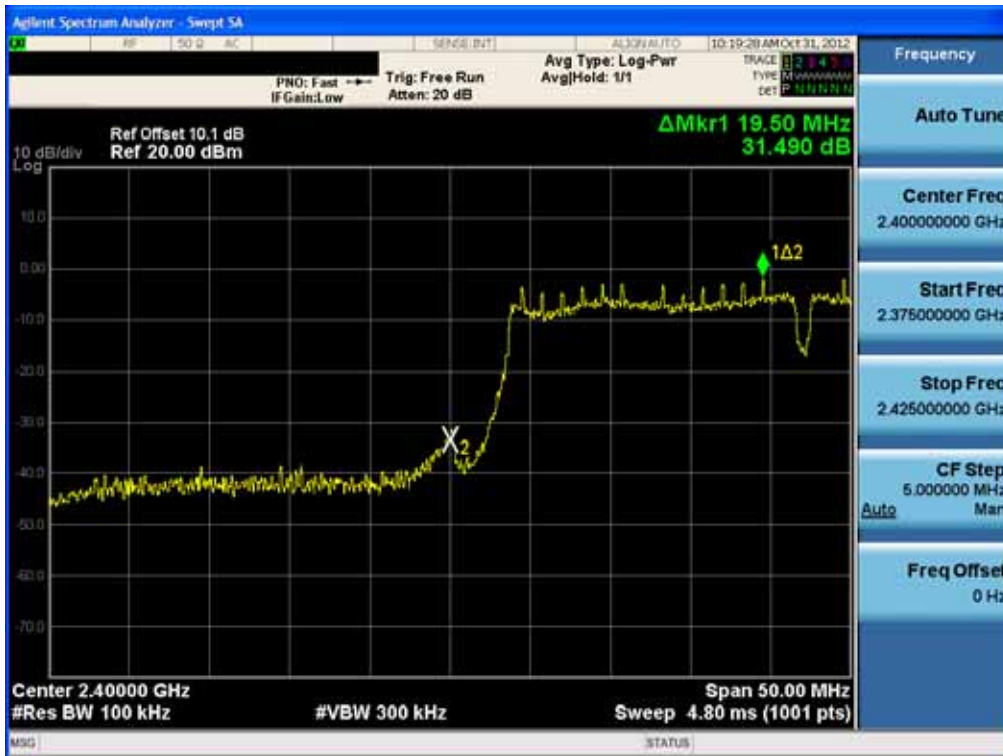


Band Edge (802.11n-CH11) _ 20 MHz BW



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Band Edge (802.11n-CH3)_40 MHz



Band Edge (802.11n-CH9)_40 MHz



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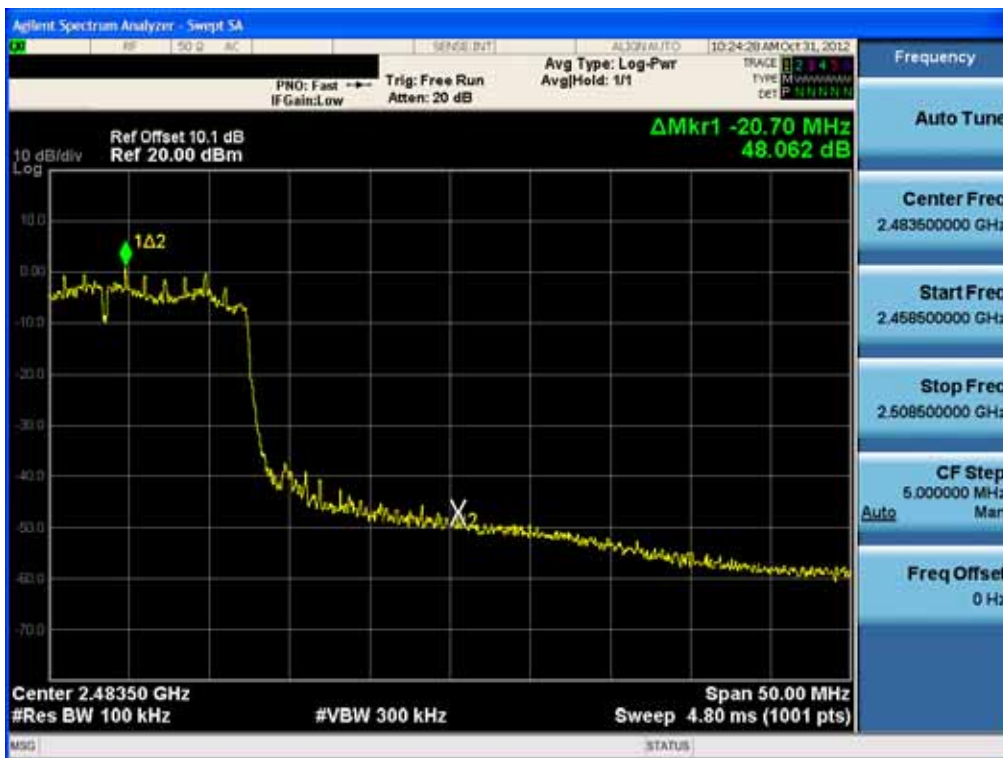
MIMO

RESULT PLOTS_Ant.1

Band Edge (802.11n-CH1) _ 20 MHz BW

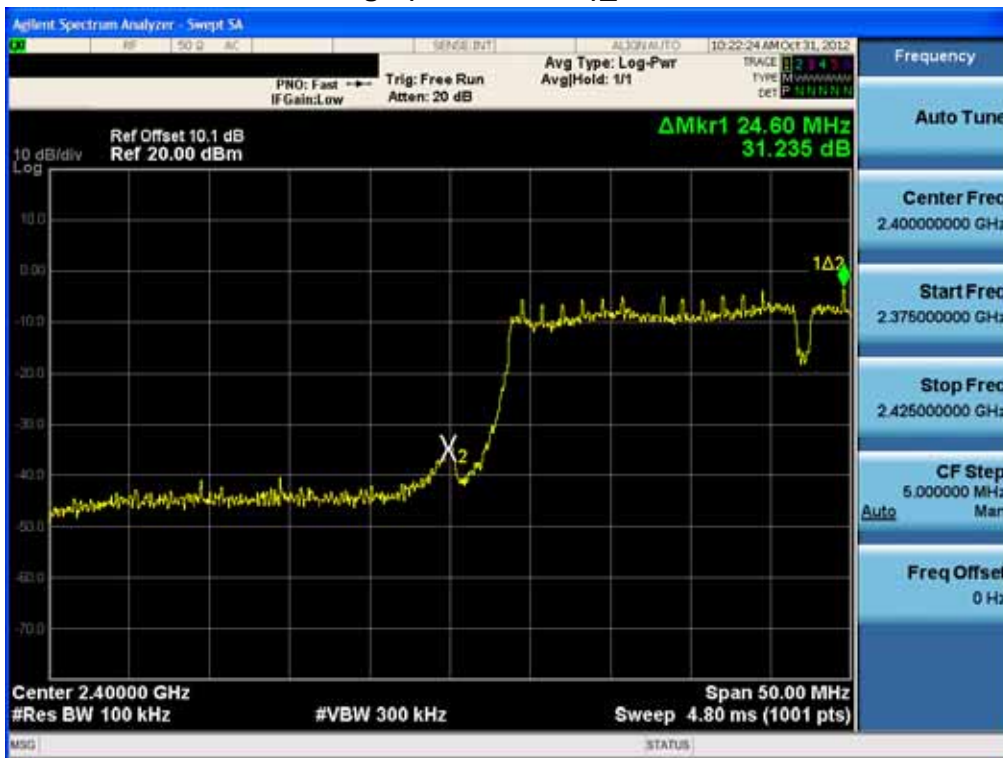


Band Edge (802.11n-CH11) _ 20 MHz BW

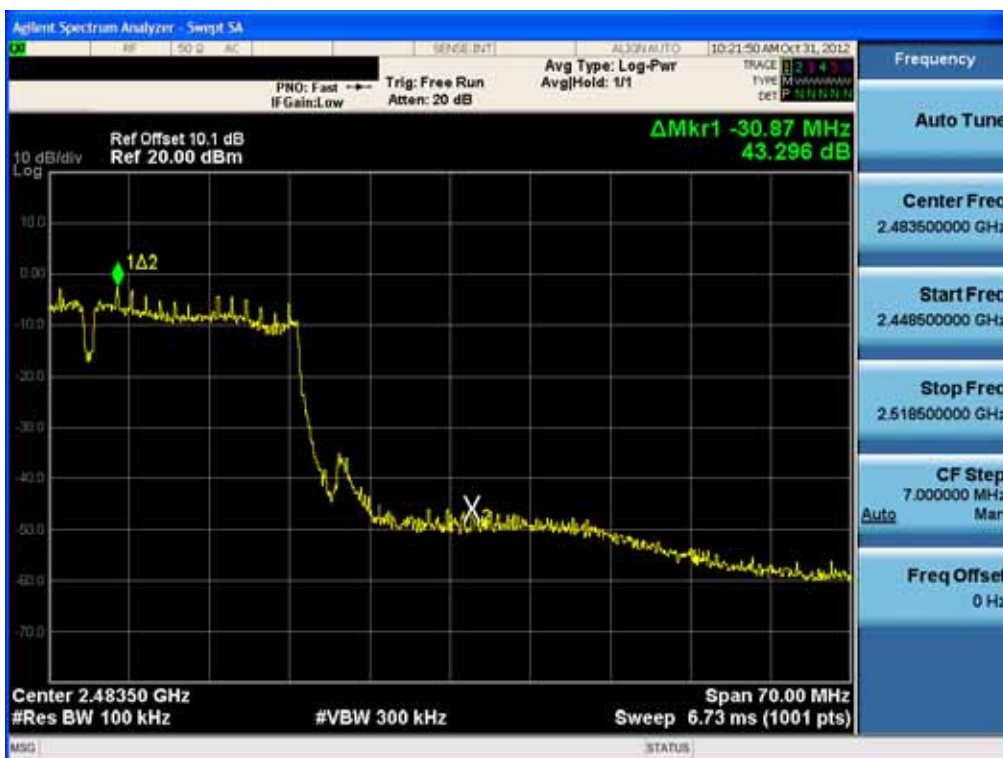


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Band Edge (802.11n-CH3)_40 MHz BW



Band Edge (802.11n-CH9)_40 MHz BW

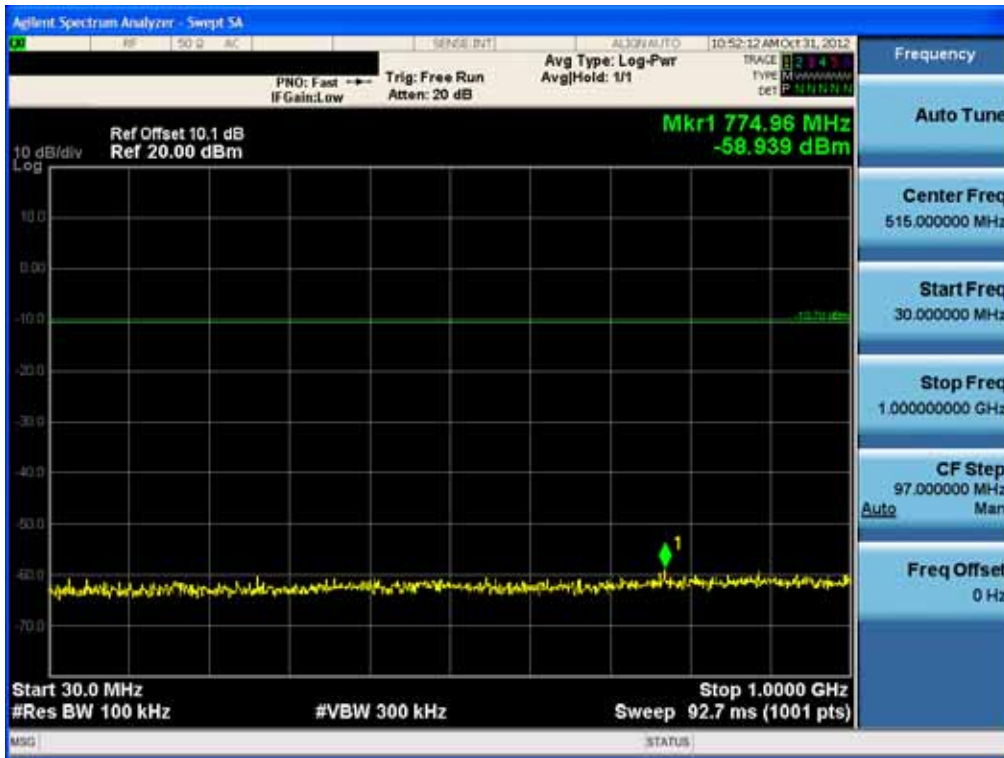


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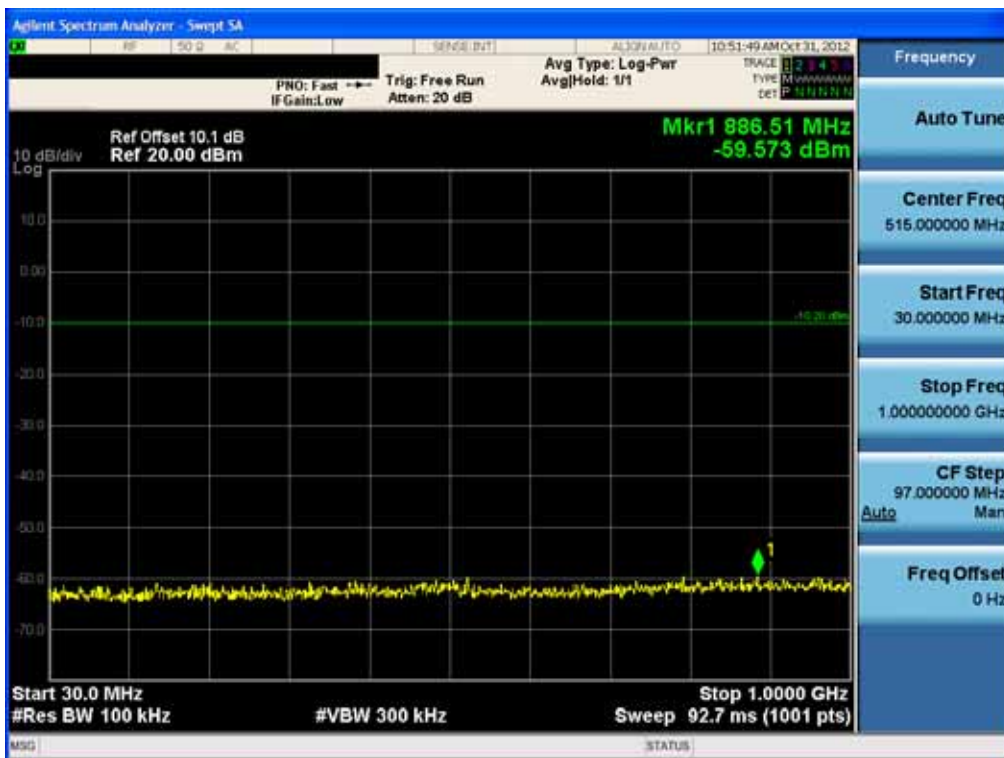
RESULT PLOTS_Ant.0

30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b-CH1)

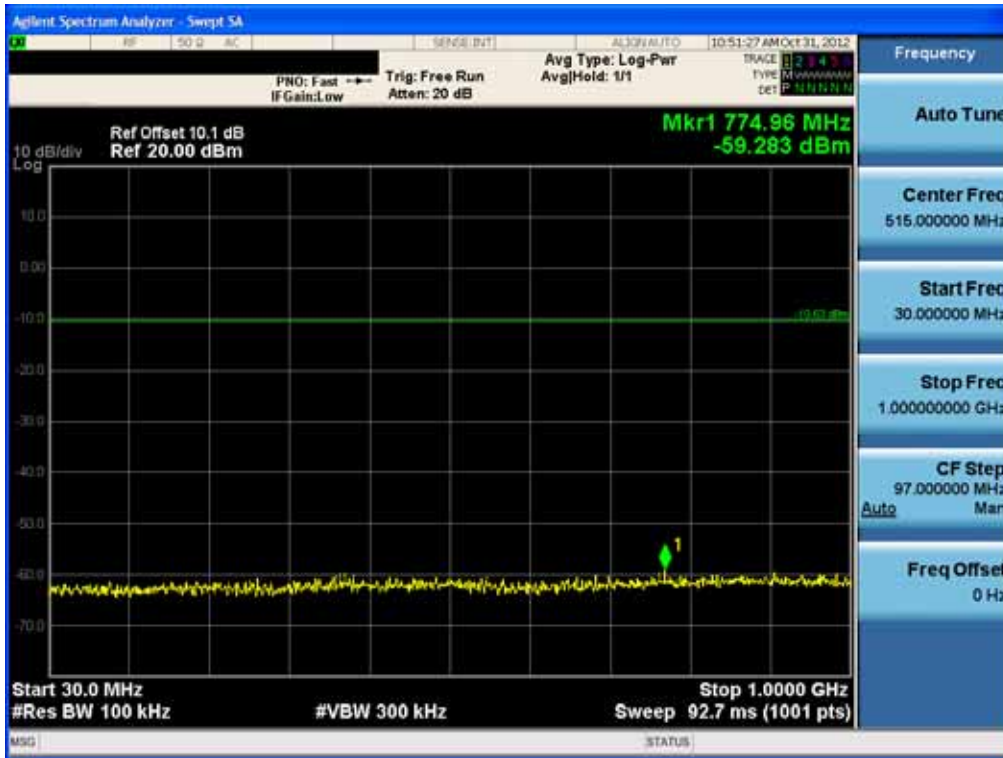


Conducted Spurious Emission (802.11b-CH6)

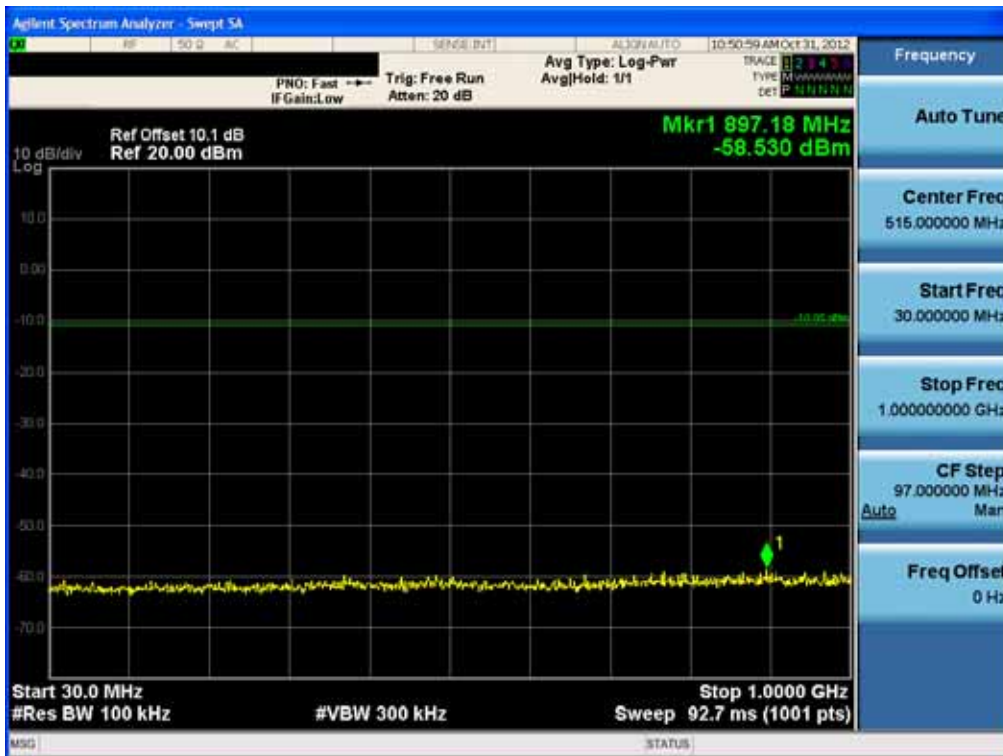


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Conducted Spurious Emission (802.11b-CH11)

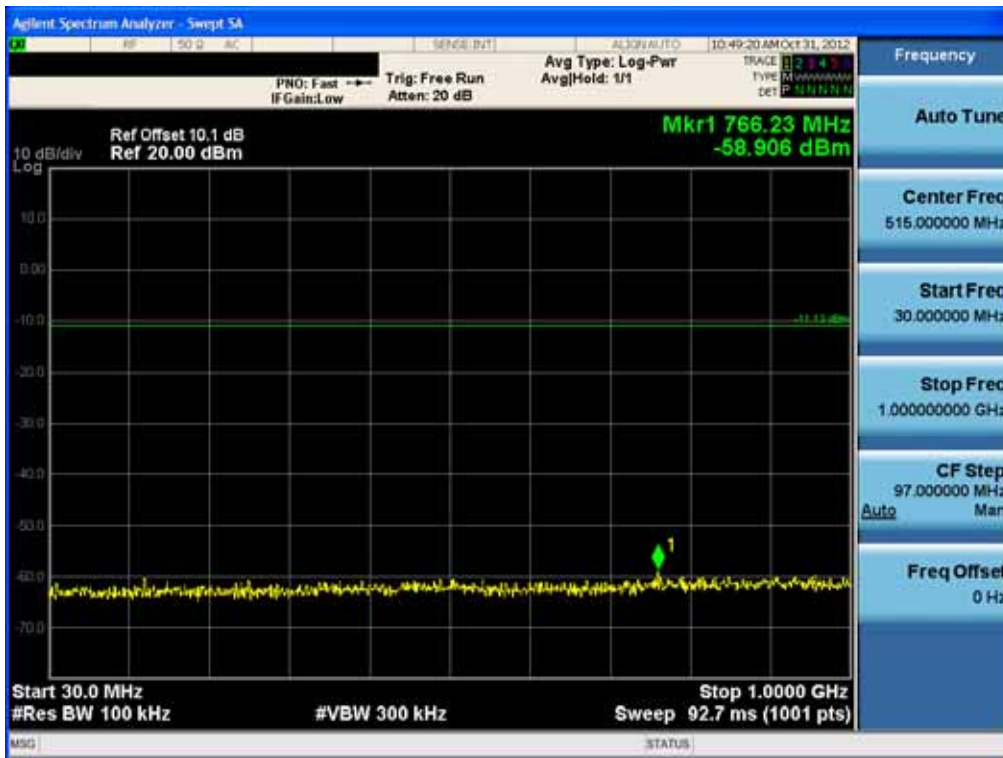


Conducted Spurious Emission (802.11g-CH1)

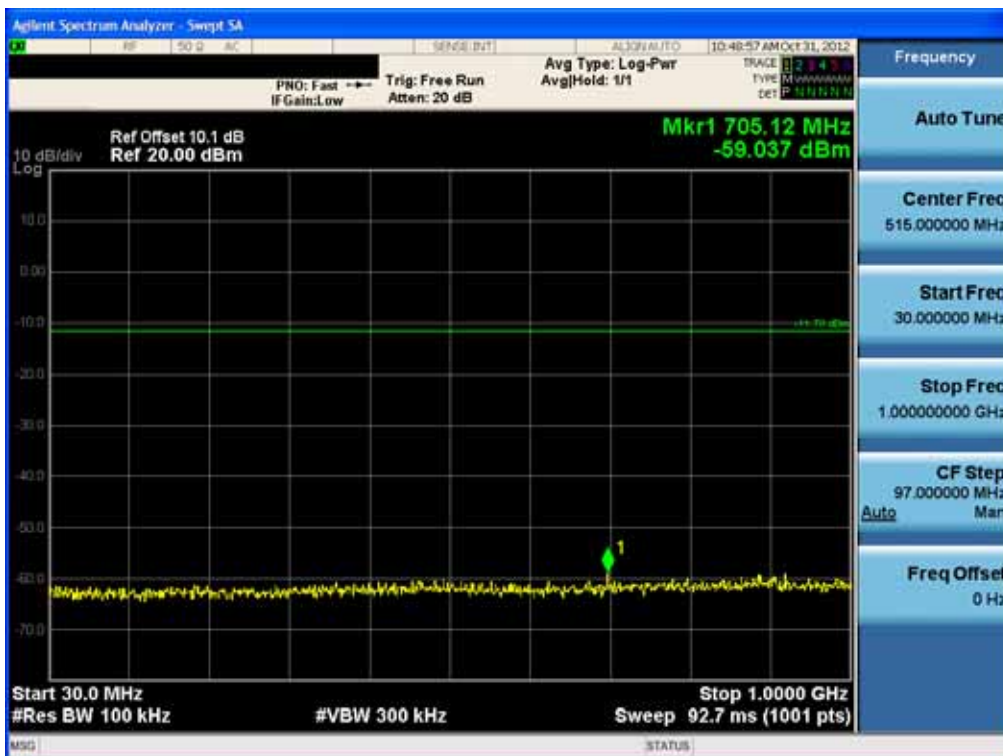


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Conducted Spurious Emission (802.11g-CH6)

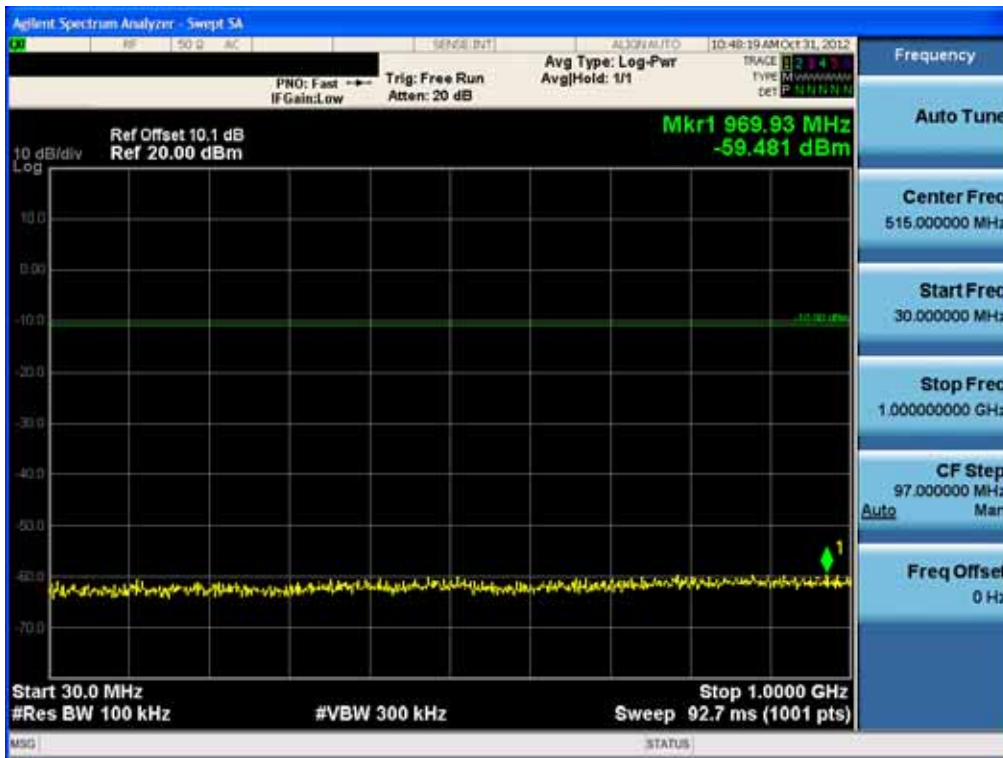


Conducted Spurious Emission (802.11g-CH11)

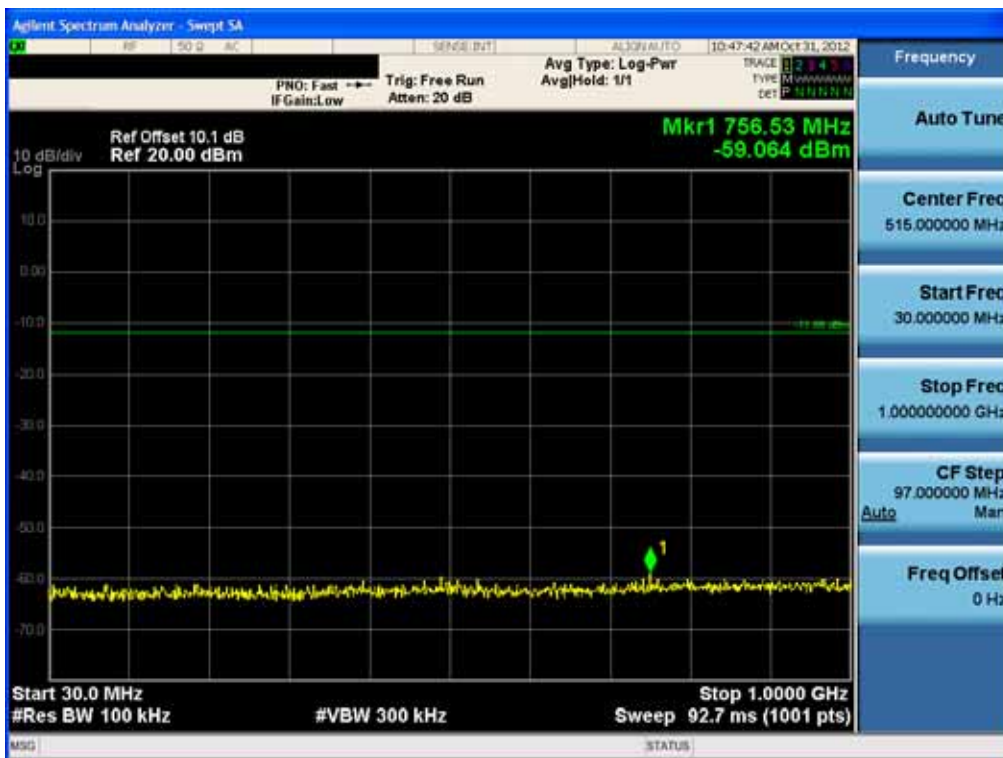


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH1)_20 MHz BW

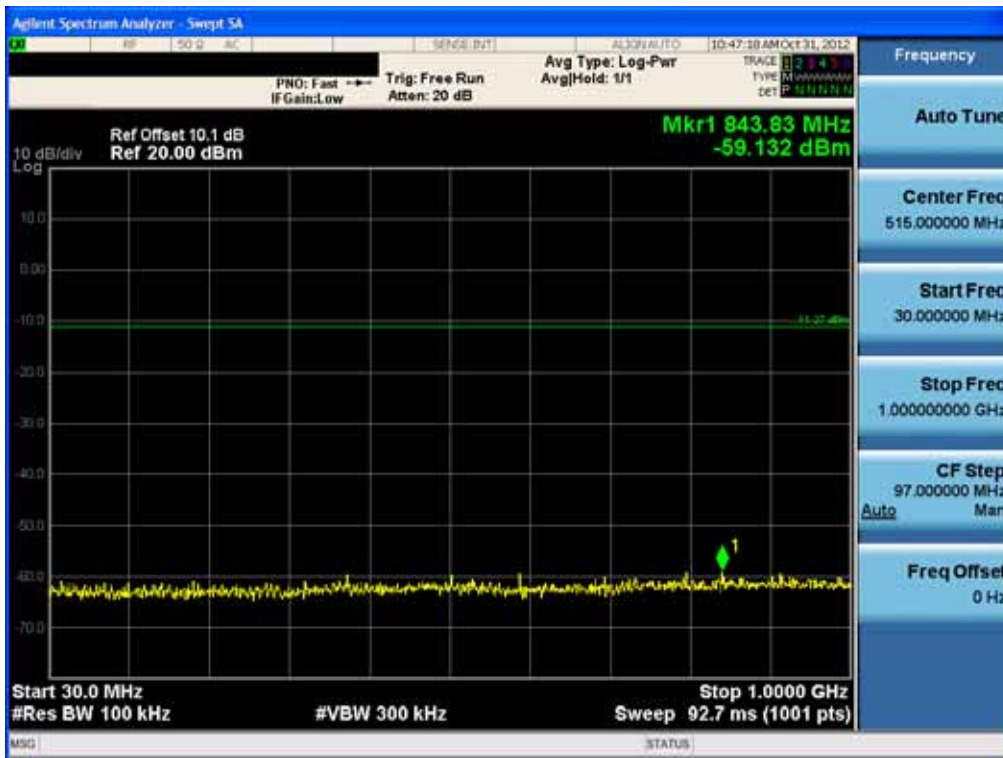


Conducted Spurious Emission (802.11n-CH6)_20 MHz BW

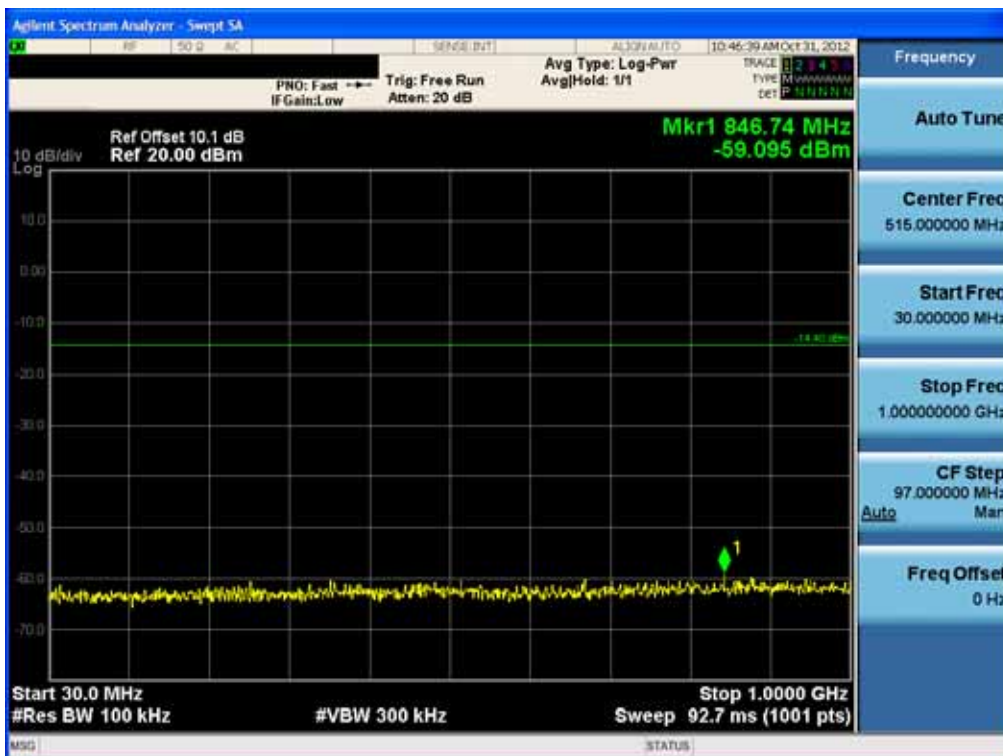


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH11) _20 MHz BW

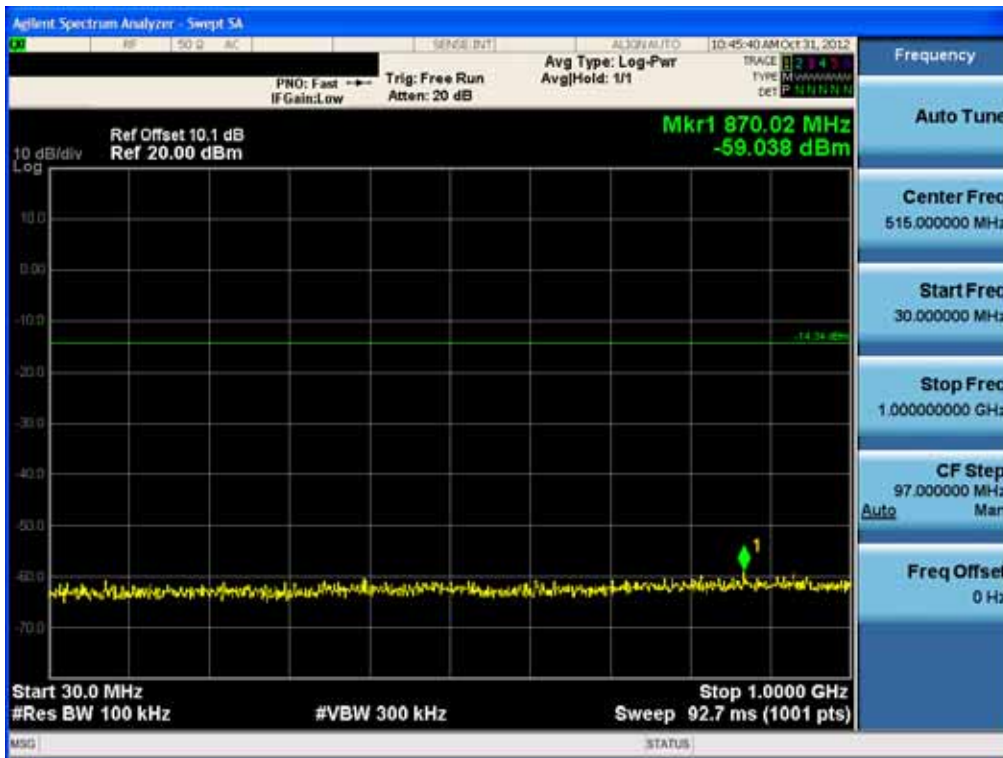


Conducted Spurious Emission (802.11n-CH3)_40 MHz BW

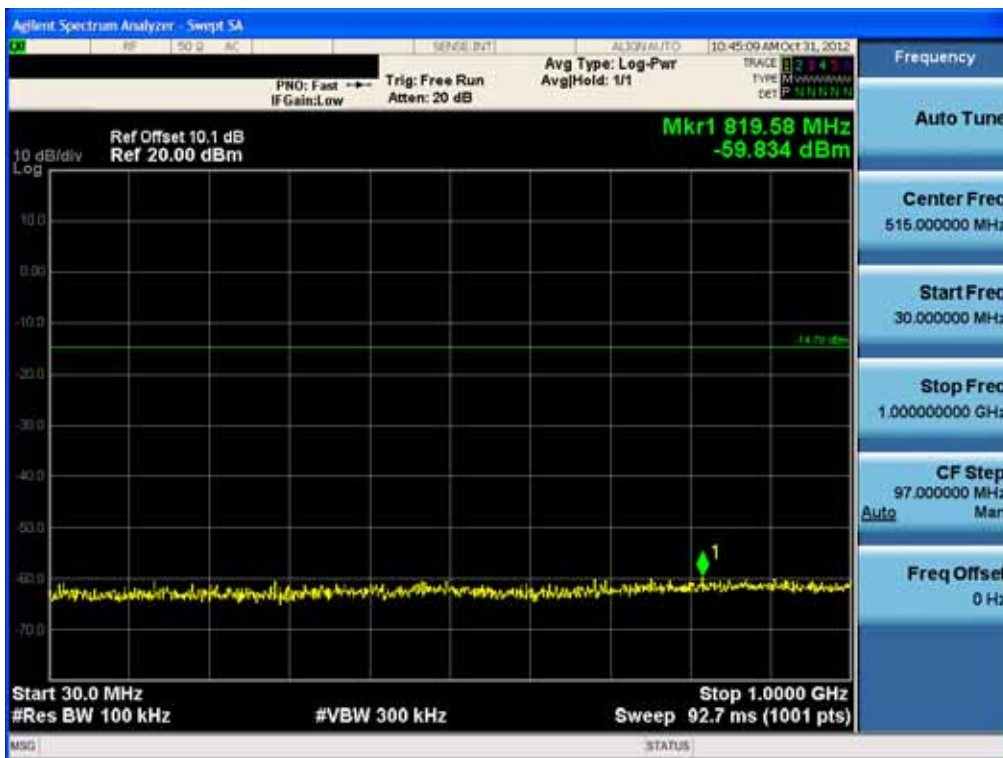


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH6)_40 MHz BW



Conducted Spurious Emission (802.11n-CH9)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

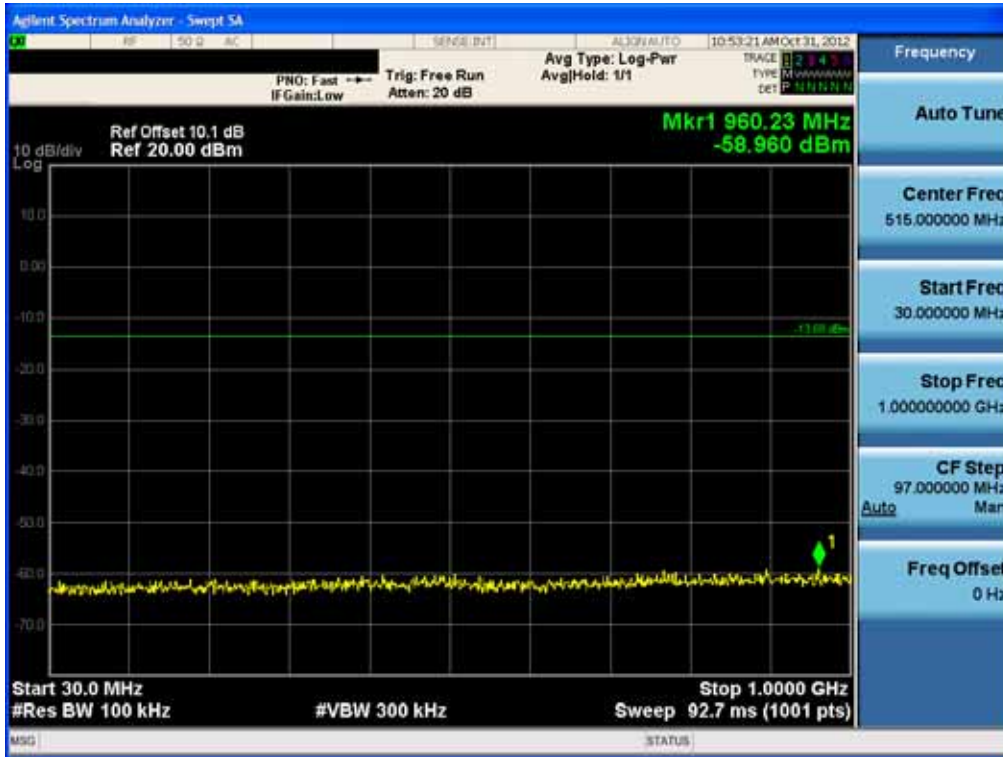


MIMO

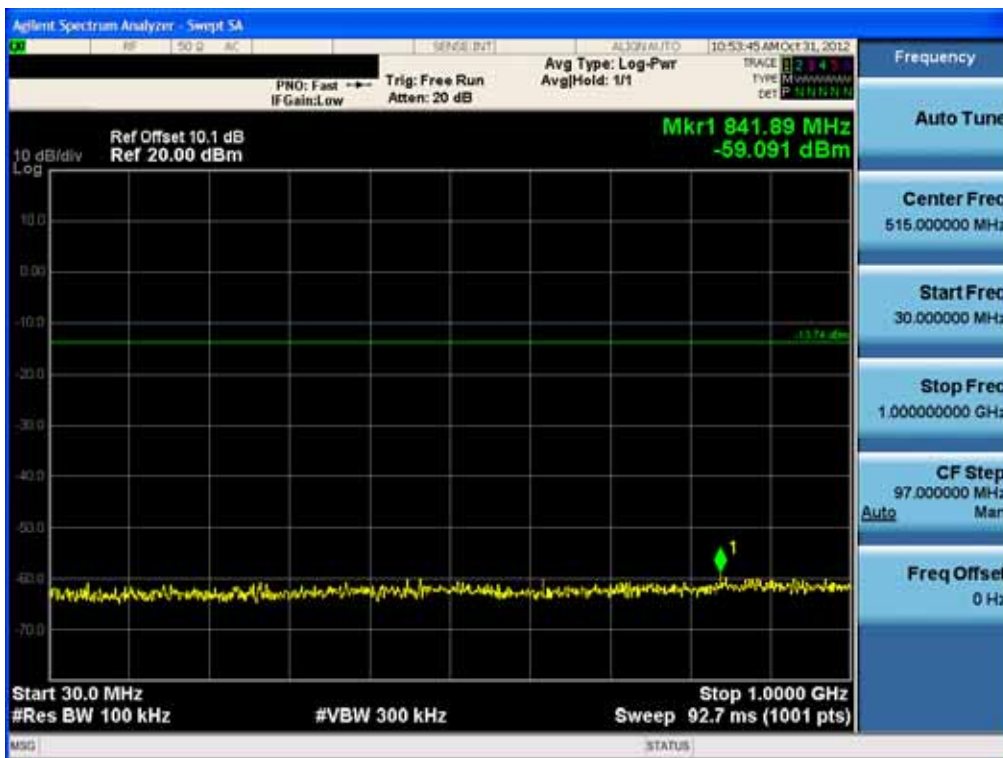
RESULT PLOTS_Ant.1

30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n-CH1)_20 MHz BW

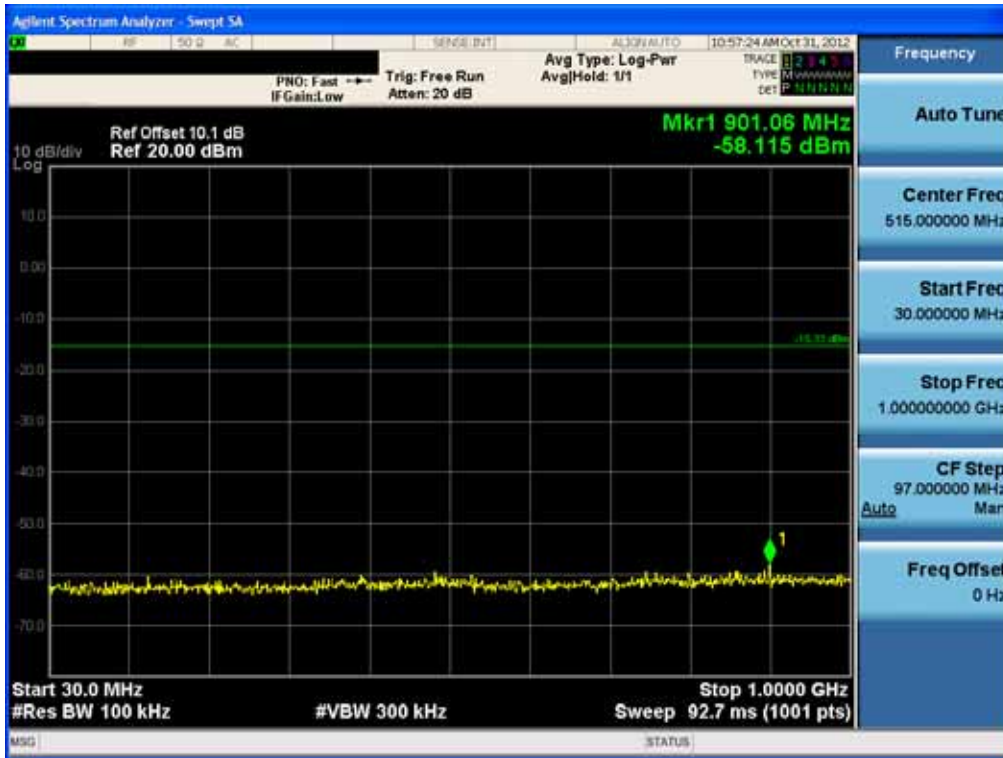


Conducted Spurious Emission (802.11n-CH6)_20 MHz BW

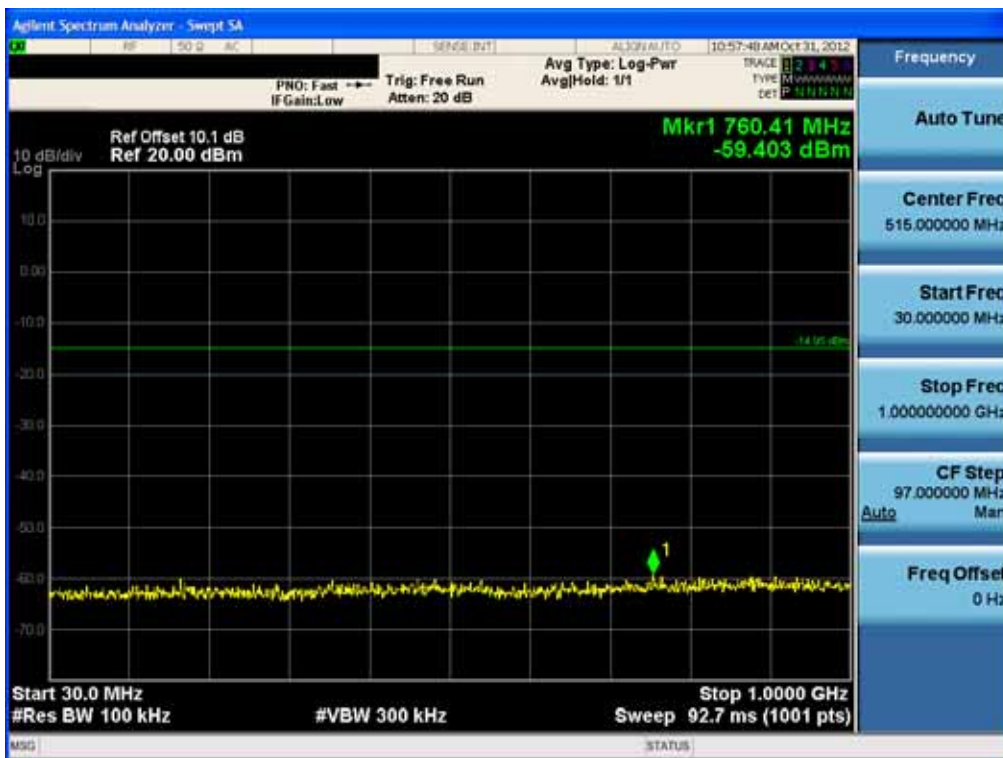


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH6)_40 MHz BW



Conducted Spurious Emission (802.11n-CH9)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

RESULT PLOTS_ Ant.0

1 GHz ~ 26 GH

Conducted Spurious Emission (802.11b-CH1)



Conducted Spurious Emission (802.11b-CH6)



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11b-CH11)



Conducted Spurious Emission (802.11g-CH1)



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFLO3E

Conducted Spurious Emission (802.11g-CH6)



Conducted Spurious Emission (802.11g-CH11)



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFLO3E

Conducted Spurious Emission (802.11n-CH1)_20 MHz BW



Conducted Spurious Emission (802.11n-CH6)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH11) _20 MHz BW



Conducted Spurious Emission (802.11n-CH3)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH6)_40 MHz BW



Conducted Spurious Emission (802.11n-CH9)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

MIMO

RESULT PLOTS_Ant.1

1 GHz ~ 26 GHz

Conducted Spurious Emission (802.11n-CH1)_20 MHz BW



Conducted Spurious Emission (802.11n-CH6)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH11) _20 MHz BW



Conducted Spurious Emission (802.11n-CH3)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Conducted Spurious Emission (802.11n-CH6)_40 MHz BW



Conducted Spurious Emission (802.11n-CH9)_40 MHz BW



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



8.5 RADIATED MEASUREMENT.

8.5.1 RADIATED SPURIOUS EMISSIONS.

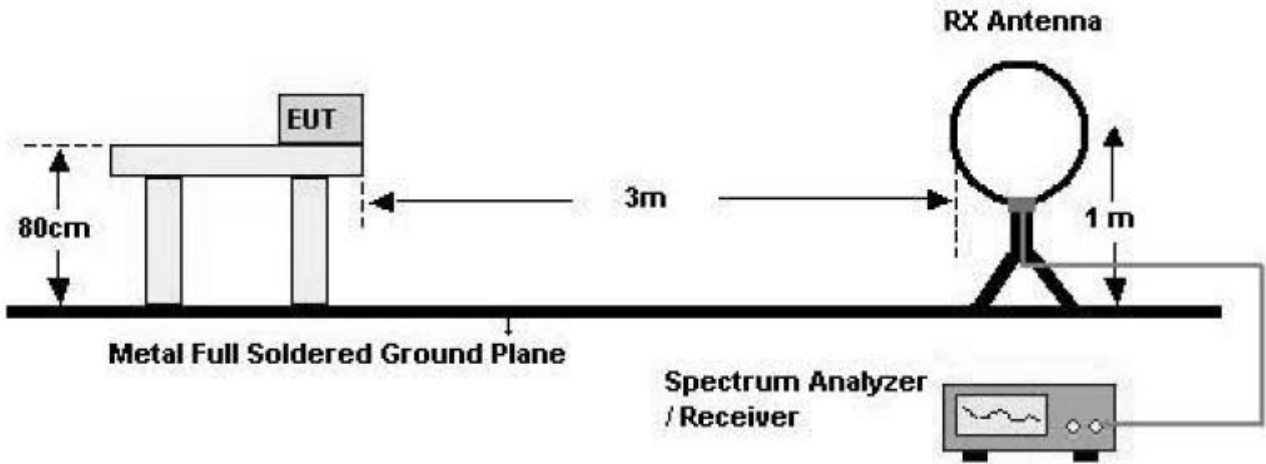
Test Requirements and limit, §15.205, §15.209

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

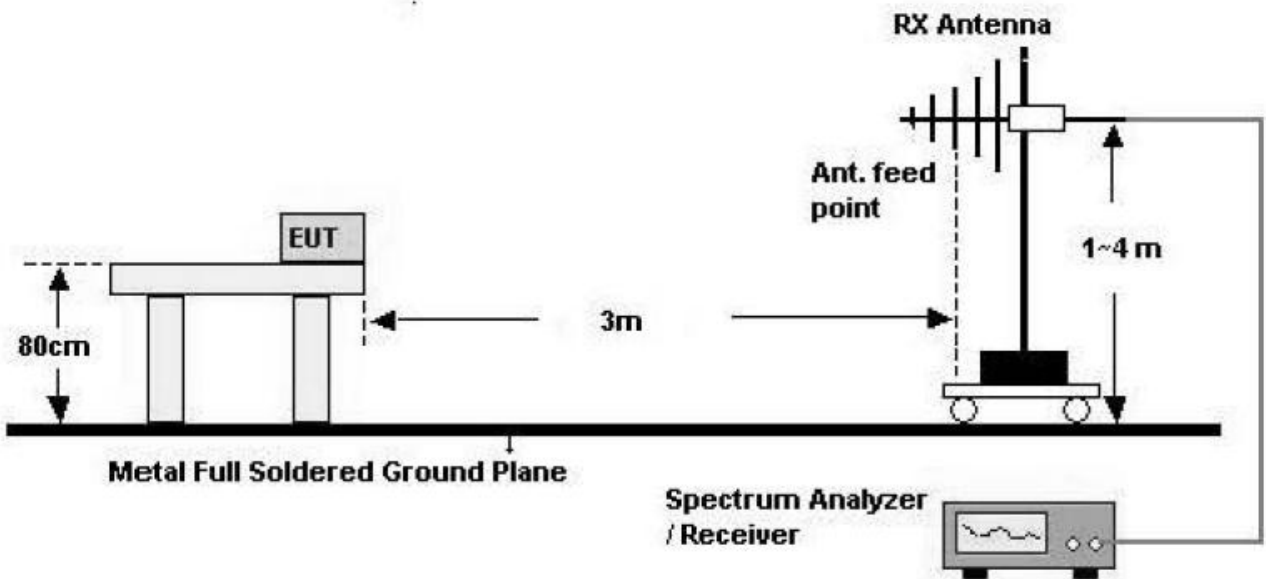
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Test Configuration

Below 30 MHz

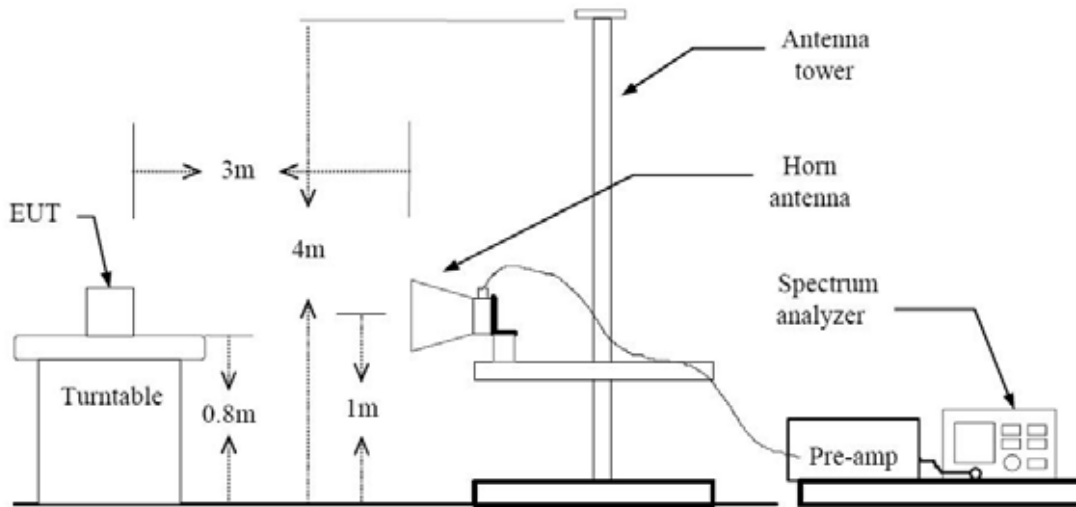


30 MHz - 1 GHz



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E	



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.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



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.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



Above 1 GHz

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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	50.19	-0.79	V	49.40	74	24.60	PK
4824	37.37	-0.79	V	36.58	54	17.42	AV
7236	48.02	9.08	V	57.1	74	16.90	PK
7236	35.49	9.08	V	44.57	54	9.43	AV
4824	49.26	-0.79	H	48.47	74	25.53	PK
4824	37.06	-0.79	H	36.27	54	17.73	AV
7236	47.86	9.08	H	56.94	74	17.06	PK
7236	35.52	9.08	H	44.6	54	9.40	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



Detector Mode = Power average (RMS) or sample detector when RMS not available

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

6. We have done 802.11b all data rate. Worst case of EUT is 1 Mbps in 802.11b.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	49.22	-0.37	V	48.85	74	25.15	PK
4874	37.32	-0.37	V	36.95	54	17.05	AV
7311	47.84	8.64	V	56.48	74	17.52	PK
7311	35.93	8.64	V	44.57	54	9.43	AV
4874	49.08	-0.37	H	48.71	74	25.29	PK
4874	37.14	-0.37	H	36.77	54	17.23	AV
7311	47.82	8.64	H	56.46	74	17.54	PK
7311	35.77	8.64	H	44.41	54	9.59	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. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz
 - Detector Mode = Power average (RMS) or sample detector when RMS not available

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



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

6. We have done 802.11b all data rate. Worst case of EUT is 1 Mbps in 802.11b.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



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

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	49.27	-0.15	V	49.12	74.00	24.88	PK
4924	36.99	-0.15	V	36.84	54.00	17.16	AV
7386	47.20	9.06	V	56.26	74	17.74	PK
7386	35.07	9.06	V	44.13	54	9.87	AV
4924	49.80	-0.15	H	49.65	74	24.35	PK
4924	36.97	-0.15	H	36.82	54	17.18	AV
7386	46.93	9.06	H	55.99	74	18.01	PK
7386	35.05	9.06	H	44.11	54	9.89	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. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz
 - Detector Mode = Power average (RMS) or sample detector when RMS not available

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



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

6. We have done 802.11b all data rate. Worst case of EUT is 1 Mbps in 802.11b.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



MIMO

Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	2422
Channel No.	03 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4844	48.99	-0.72	V	48.27	74	25.73	PK
4844	36.83	-0.72	V	36.11	54	17.89	AV
7266	47.38	9.95	V	57.33	74	16.67	PK
7266	34.91	9.95	V	44.86	54	9.14	AV
4824	49.49	-0.72	H	48.77	74	25.23	PK
4824	36.77	-0.72	H	36.05	54	17.95	AV
7236	47.19	9.95	H	57.14	74	16.86	PK
7236	34.90	9.95	H	44.85	54	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. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz
 - Detector Mode = Power average (RMS) or sample detector when RMS not available

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



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

- 6. We have done all data rate in 802.11n_40 MHz BW at MIMO. Worst case of EUT is 13.5 Mbps in 802.11n_40 MHz BW at MIMO.
- 7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E



Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	49.66	-0.37	V	49.29	74	24.71	PK
4874	37.15	-0.37	V	36.78	54	17.22	AV
7311	48.17	8.64	V	56.81	74	17.19	PK
7311	35.72	8.64	V	44.36	54	9.64	AV
4874	49.37	-0.37	H	49.00	74	25.00	PK
4874	37.18	-0.37	H	36.81	54	17.19	AV
7311	48.67	8.64	H	57.31	74	16.69	PK
7311	35.78	8.64	H	44.42	54	9.58	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. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz
 - Detector Mode = Power average (RMS) or sample detector when RMS not available

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

- 6. We have done all data rate in 802.11n_40 MHz BW at MIMO. Worst case of EUT is 13.5 Mbps in 802.11n_40 MHz BW at MIMO.
- 7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
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Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	2452
Channel No.	09 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4904	49.02	-0.10	V	48.92	74	25.08	PK
4904	37.08	-0.10	V	36.98	54	17.02	AV
7356	47.47	9.00	V	56.47	74	17.53	PK
7356	35.06	9.00	V	44.06	54	9.94	AV
4924	49.22	-0.10	H	49.12	74	24.88	PK
4924	37.16	-0.10	H	37.06	54	16.94	AV
7386	47.73	9.00	H	56.73	74	17.27	PK
7386	35.01	9.00	H	44.01	54	9.99	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. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz
 - Detector Mode = Power average (RMS) or sample detector when RMS not available

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

- 6. We have done all data rate in 802.11n_40 MHz BW at MIMO. Worst case of EUT is 13.5 Mbps in 802.11n_40 MHz BW at MIMO.
- 7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
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8.5.2 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)).

MIMO

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

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	29.17	33.90	H	63.07	74	10.93	PK
2390.0	16.28	33.90	H	50.18	54	3.82	AV
2390.0	28.79	33.90	V	62.69	74	11.31	PK
2390.0	16.11	33.90	V	50.01	54	3.99	AV
2483.5	28.85	33.99	H	62.84	74	11.16	PK
2483.5	16.55	33.99	H	50.54	54	3.46	AV
2483.5	28.56	33.99	V	62.55	74	11.45	PK
2483.5	16.28	33.99	V	50.27	54	3.73	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss
2. Spectrum setting:
 - a. Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - b. Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)

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RBW = 1 MHz

VBW = 3 MHz

Span = at least 1MHz

Detector Mode = Power average (RMS) or sample detector when RMS not available

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

3. We have done all data rate in 802.11n test. Also we have done MIMO. Worst case is 13.5 Mbps in 802.11n BW at MIMO.

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MIMO

Operation Mode:	802.11 n_40 MHz
Transfer Rate:	13.5 Mbps
Operating Frequency	2422 MHz, 2452 MHz
Channel No.	03 Ch, 09 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	30.88	33.90	H	64.78	74	9.22	PK
2390.0	16.99	33.90	H	50.89	54	3.11	AV
2390.0	30.80	33.90	V	64.70	74	9.30	PK
2390.0	16.73	33.90	V	50.63	54	3.37	AV
2483.5	30.96	33.99	H	64.95	74	9.05	PK
2483.5	16.84	33.99	H	50.83	54	3.17	AV
2483.5	29.58	33.99	V	63.57	74	10.43	PK
2483.5	16.54	33.99	V	50.53	54	3.47	AV

Notes:

- Total = Reading Value + Antenna Factor + Cable Loss
- Spectrum setting:
 - Peak (Method 10.2.3.2 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Trace = Max hold
 - Sweep = auto couple
 - Average (Method 10.2.3.3 in KDB 558074, issued 10/04/2012)
 - RBW = 1 MH
 - VBW = 3 MHz
 - Span = least 1MHz
 - Detector Mode = Power average (RMS) or sample detector when RMS not available
 - Trace average at least 100 traces in power averaging(RMS) mode
- We have done 802.11b/g/n mode test. Worst case of EUT is 13.5 Mbps in 802.11n_40 MHz BW

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1210FR30-1	Date of Issue: November 01, 2012	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Wireless Router with WLAN	FCC ID: ZNFL03E

8.6 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 ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. We are performed the AC Power Line Conducted Emission test for 11 Mbps, Ch.11 and 802.11b. Because 802.11b mode is worst case.

RESULT PLOTS

Conducted Emissions (Line 1)

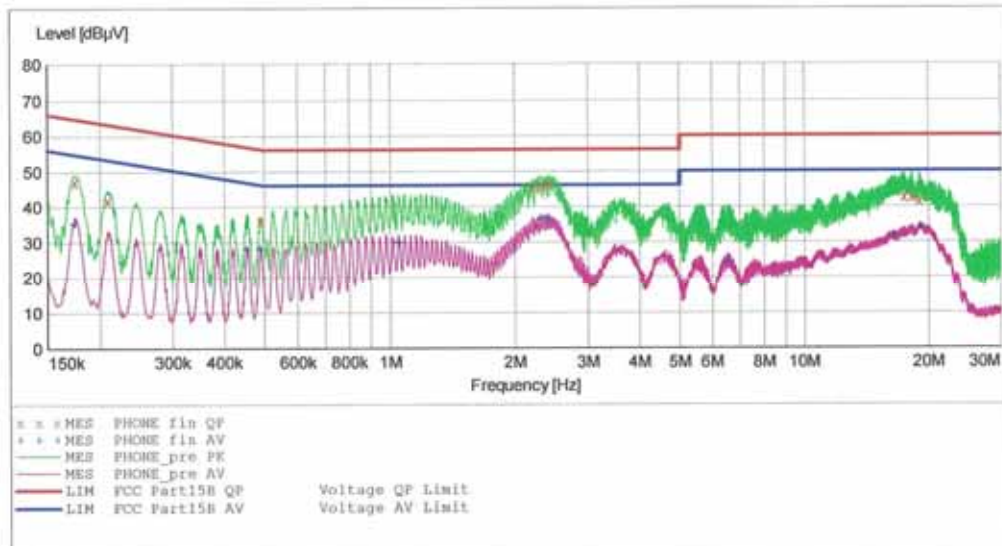
HCT

EMC

EUT: L-03E
 Manufacturer: LG
 Operating Condition: WLAN MODE
 Test Site: SHIELD ROOM
 Operator: JS LEE
 Test Specification: FCC PART 15 B
 Comment: H

SCAN TABLE: "FCC PART 15 B(H)"

Short Description:			FCC PART 15 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	1.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

10/17/2012 1:47PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.174010	46.90	9.7	65	17.9	---	---
0.209010	41.80	9.7	63	21.4	---	---
0.489010	36.00	9.8	56	20.2	---	---
2.204000	45.00	9.9	56	11.0	---	---
2.316000	46.00	10.0	56	10.0	---	---
2.416000	46.40	10.0	56	9.6	---	---
17.464000	42.40	11.4	60	17.6	---	---
18.184000	42.40	11.5	60	17.6	---	---
18.980000	41.40	11.6	60	18.6	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

10/17/2012 1:47PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.174010	35.20	9.7	55	19.6	---	---
0.454010	28.00	9.8	47	18.9	---	---
0.489010	28.10	9.8	46	18.1	---	---
1.048000	29.80	9.8	46	16.2	---	---
2.312000	36.50	10.0	46	9.5	---	---
2.416000	36.40	10.0	46	9.6	---	---
6.524000	24.60	10.3	50	25.4	---	---
16.464000	31.40	11.2	50	18.6	---	---
19.108000	34.10	11.6	50	15.9	---	---

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Conducted Emissions (Line 2)

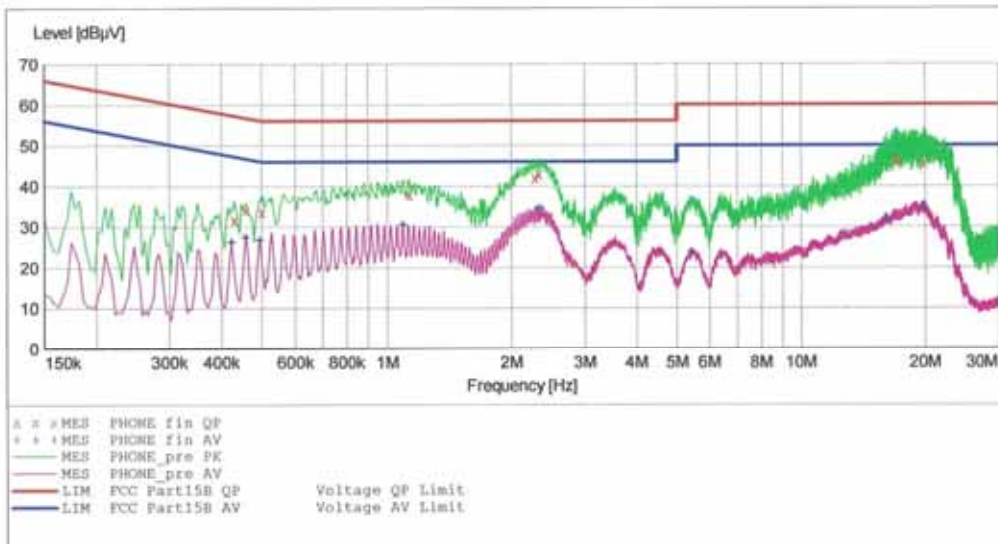
HCT

EMC

EUT: L-03E
 Manufacturer: LG
 Operating Condition: WLAN MODE
 Test Site: SHIELD ROOM
 Operator: JS LEE
 Test Specification: FCC PART 15 CLASS B
 Comment: N

SCAN TABLE: "FCC PART 15 B(N)"

Short Description:		FCC PART 15 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	
			Average				
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



MEASUREMENT RESULT: "PHONE_fin_QP"

10/17/2012 1:52PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.430010	31.80	10.0	57	25.4	---	---
0.458010	34.20	10.0	57	22.6	---	---
0.500000	33.70	10.0	56	22.3	---	---
1.132000	37.80	10.0	56	18.2	---	---
2.284000	42.10	10.2	56	13.9	---	---
2.324000	42.90	10.2	56	13.1	---	---
17.008000	46.30	11.6	60	13.7	---	---
17.076000	46.40	11.6	60	13.6	---	---
19.896000	45.60	12.1	60	14.4	---	---

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MEASUREMENT RESULT: "PHONE_fin AV"

10/17/2012 1:52PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.422010	26.30	10.0	47	21.1	---	---
0.458010	27.40	10.0	47	19.3	---	---
0.494010	26.70	10.0	46	19.4	---	---
1.092000	30.40	10.0	46	15.6	---	---
2.320000	34.40	10.2	46	11.6	---	---
2.356000	34.30	10.2	46	11.7	---	---
5.436000	23.80	10.4	50	26.2	---	---
16.132000	31.60	11.4	50	18.4	---	---
19.860000	34.60	12.1	50	15.4	---	---

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9. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	Annual	02/09/2013	100073
Schwarzbeck	VULB 9168/ TRILOG Antenna	Biennial	02/09/2013	200
Rohde & Schwarz	ESI 40 / EMI TEST RECEIVER	Annual	05/03/2013	831564103
Agilent	E4440A/ Spectrum Analyzer	Annual	05/02/2013	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	07/31/2013	MY51110020
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	09/11/2013	10094
MITEQ	AMF-6B-180265-35-10P / POWER AMP	Annual	04/16/2013	667624
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2013	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	10/17/2013	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/26/2012	BBHA9170342
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	02/09/2013	839117/011
Agilent	E4416A /Power Meter	Annual	11/07/2012	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	05/02/2013	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	05/02/2013	1
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	05/02/2013	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	05/02/2013	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	05/02/2013	1
Hewlett Packard	11636B/Power Divider	Annual	11/07/2012	11377
Hewlett Packard	11667B / Power Splitter	Annual	06/05/2013	05001
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	11/07/2012	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/07/2012	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	11/14/2012	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	05/02/2013	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/11/2014	9009-2536
MITEQ	AMF-6D-001180-35-20P/ POWER AMP	Annual	07/30/2013	990893
Agilent	8493C / Attenuator(10 dB)	Annual	07/30/2013	76649
WEINSCHHEL	2-3 / Attenuator(3 dB)	Annual	11/07/2013	BR0617
CERNEX	CBLU1183540 / POWER AMP	Annual	07/27/2013	21691

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