

TEST REPORT For FCC

FCC Standards : FCC 47CFR part 15 subpart C
Industry Canada Standards :RSS-247 Issue 1 & RSS-GEN Issue 4

Test Report No. : CTK-2015-01357
Date of Issue : 2015-10-19
FCC ID : ZKJ-WCATB001
Certification Number IC : 10229A-WCATB001
Model/Type No. : WCATB001
Kind of Product : Wi-Fi Module
Applicant : GE Appliance & Lighting
Applicant Address : Appliance Park, AP5-2N-67, Louisville, KY 40225, United States
Manufacturer : GE Appliance & Lighting
Manufacturer Address : Appliance Park, AP5-2N-67, Louisville, KY 40225, United States
Contact Person : Park Hansung / Hardware RF Engineer
Telephone : +82-31-620-6732
Received Date : 2015-09-22
Test period : Start : 2015-10-05 End : 2015-10-20

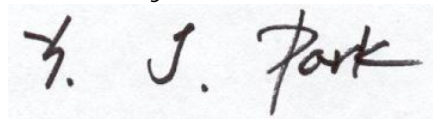
The test results presented in this report relate only to the object tested.

Tested by



Won-Jae, Hwang
Test Engineer
Date: 2015-10-20

Reviewed by



Young-Joon, Park
Technical Manager
Date: 2015-10-20



CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

REPORT REVISION HISTORY

Date	Revision	Page No
2015-10-20	Issued (CTK-2015-01357)	All

This report shall not be reproduced except in full, without the written approval of CTK Co., Ltd. This document may be altered or revised by CTK Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by CTK Co., Ltd. will constitute fraud and shall nullify the document.

TABLE OF CONTENTS

REPORT REVISION HISTORY	2
1.0 General Product Description	4
1.1 Tested Frequency	5
1.2 Device Modifications	5
1.3 Peripheral Devices	5
1.4 Calibration Details of Equipment Used for Measurement	5
1.5 Test Facility	5
1.6 Laboratory Accreditations and Listings	6
2 Summary of tests	7
2.1 Technical Characteristic Test	8
2.1.1 ON Time, Duty Cycle	8
2.1.2 6dB Bandwidth and 99% Bandwidth	9
2.1.3 OUTPUT POWER	13
2.1.4 Power Spectral Density	17
2.1.5 Band - edge	21
2.1.6 Field Strength of Emissions	25
Test Data	29
2.1.7 AC Conducted Emissions	36
APPENDIX A – Test Equipment Used For Tests	39



CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
Tel: +82-31-339-9970 Fax: +82-31-624-9501
www.e-ctk.com

1.0 General Product Description

Equipment model name	WCATB001		
Serial number	Prototype		
EUT condition	Pre-production, not damaged		
Frequency Range	802.11b/g/n_HT20 : 2412 MHz - 2462 MHz		
RF output power :			
	Mode	Channel Bandwidth (MHz)	RF output power (dBm)
	802.11b	20	14.50
	802.11g	20	15.76
	802.11n	20	15.74
		2412 - 2462	
Number of channels	11		
Transfer Rate	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n : up to 300 Mbps		
Type of Modulation	802.11b : DSSS 802.11g/n : OFDM		
Power Source	DC 5 V		
Duty Cycle	802.11b : 96.8 % 802.11g : 93.6 % 802.11n_HT20 : 93.2 %		
Antenna Type	Chip Antenna		
Antenna Gain	1.47 dBi		

* Test mode

The worst-case data rates are determined to be as follows for each mode.

802.11b mode, 1 Mb/s, CCK Modulation

802.11g mode, 6 Mb/s, OFDM Modulation

802.11n HT20 mode, MCS 0, OFDM Modulation



1.1 Tested Frequency

802.11b, 802.11g, 802.11n_HT20

	LOW	MID	HIGH
Frequency (MHz)	2412	2437	2462

1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	DELL INC.	Inspiron 6400	-
Switching Adapter	DDongguang Lite Power 2nd Plant	LA65NS0-00	-

1.4 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.5 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance





CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

1.6 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	 805871
JAPAN	VCCI	3 m & 10 m SAC and Conducted Test Site	 R-948, C-986, T-1843
KOREA	MSIP	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	 No. 51, KR0025
International	KOLAS	EMC	

2 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Maximum Output Power	< 1 Watt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.247(e)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C C
15.209	Field Strength of Harmonics	15.209(a)	Radiated	C
15.207	AC Conducted Emissions	15.207(a)	Line Conducted	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

- FCC Part 15.247, ANSI C63.4-2009

The tests were performed according to the method of measurements prescribed in

KDB No.558074



CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

CTK Co., Ltd.

2.1 Technical Characteristic Test

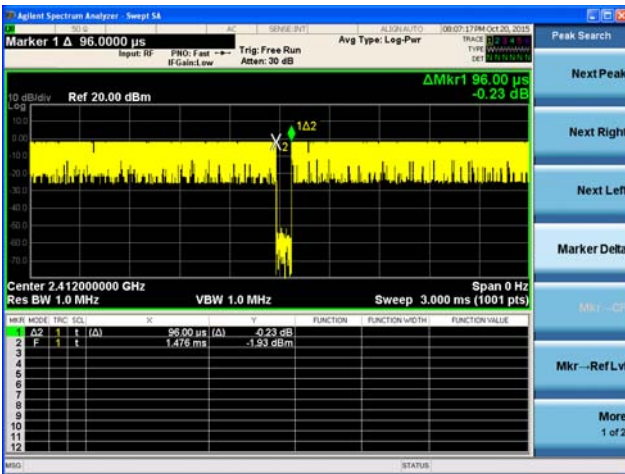
2.1.1 ON Time, Duty Cycle

Procedure:

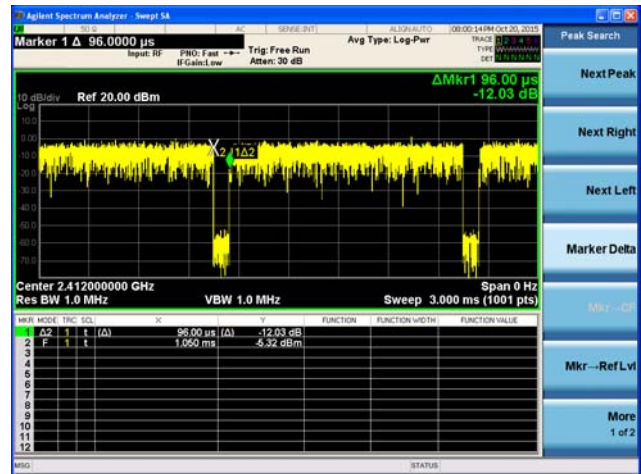
KDB 558074 Zero-Span Spectrum Analyzer Method.

Measurement Data:

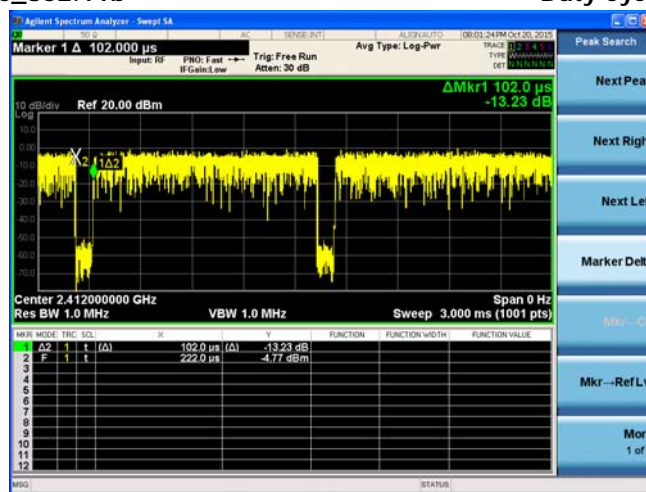
	ON Time (ms)	Period (ms)	TX OFF (ms)	Duty Cycle (linear)	Duty Cycle (%)
802.11b	2.904	3.000	0.096	0.968	96.8
802.11g	2.808	3.000	0.192	0.936	93.6
802.11n_HT20	2.796	3.000	0.204	0.932	93.2



Duty Cycle_802.11b



Duty Cycle_802.11g



Duty Cycle_802.11n_HT20

2.1.2 6dB Bandwidth and 99% Bandwidth

Procedure:

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

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 50 MHz

VBW = 300 kHz (3 x RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data:

Frequency	6 dB Bandwidth and 99% Bandwidth (MHz)					
	2412 MHz		2437 MHz		2462 MHz	
	6dB	99%	6dB	99%	6dB	99%
802.11b	8.132	13.174	8.585	13.426	8.575	13.420
802.11g	15.08	16.334	14.82	16.371	15.38	16.367
802.11n HT20	15.15	17.510	15.12	17.505	15.14	17.509
Measurement uncertainty	± 3 dB					

Minimum Standard:

6 dB Bandwidth > 500kHz

See next pages for actual measured spectrum plots.



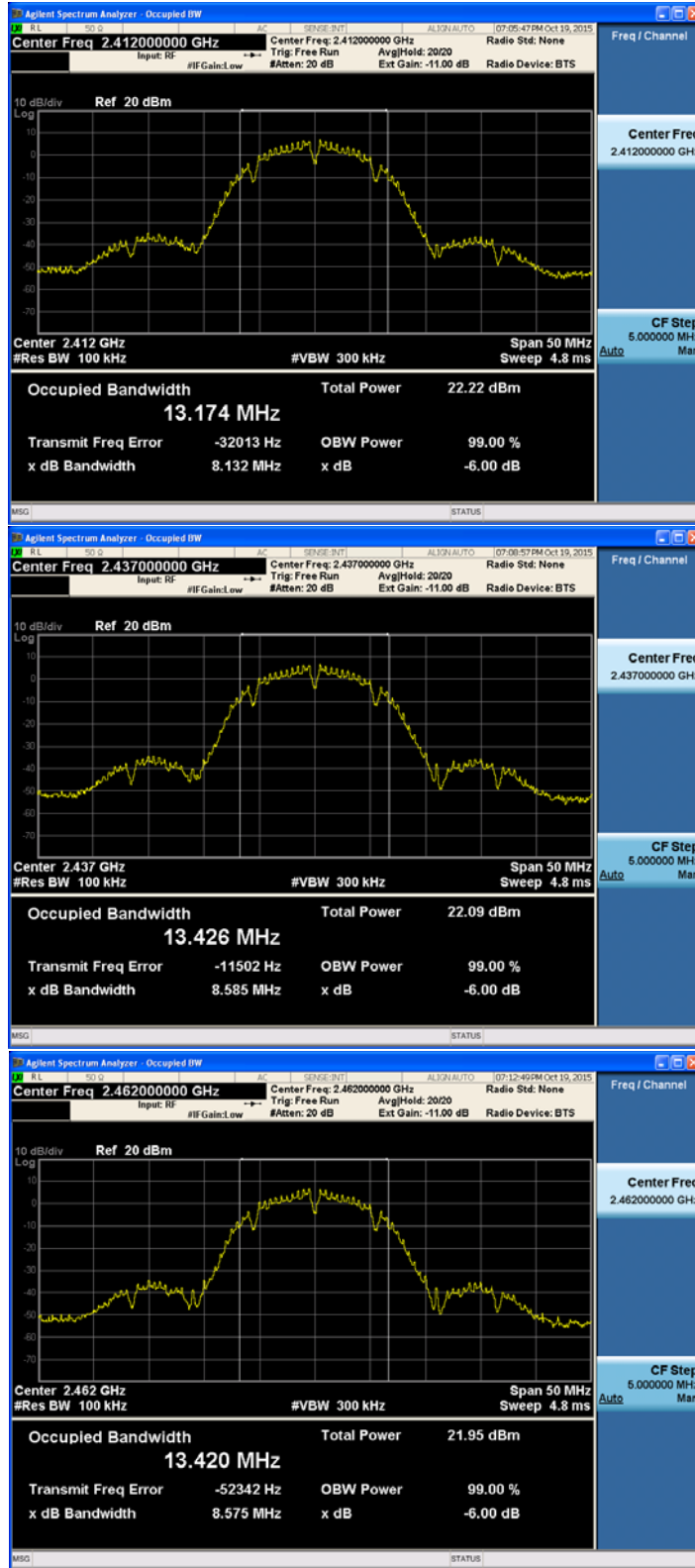
CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com



802.11b



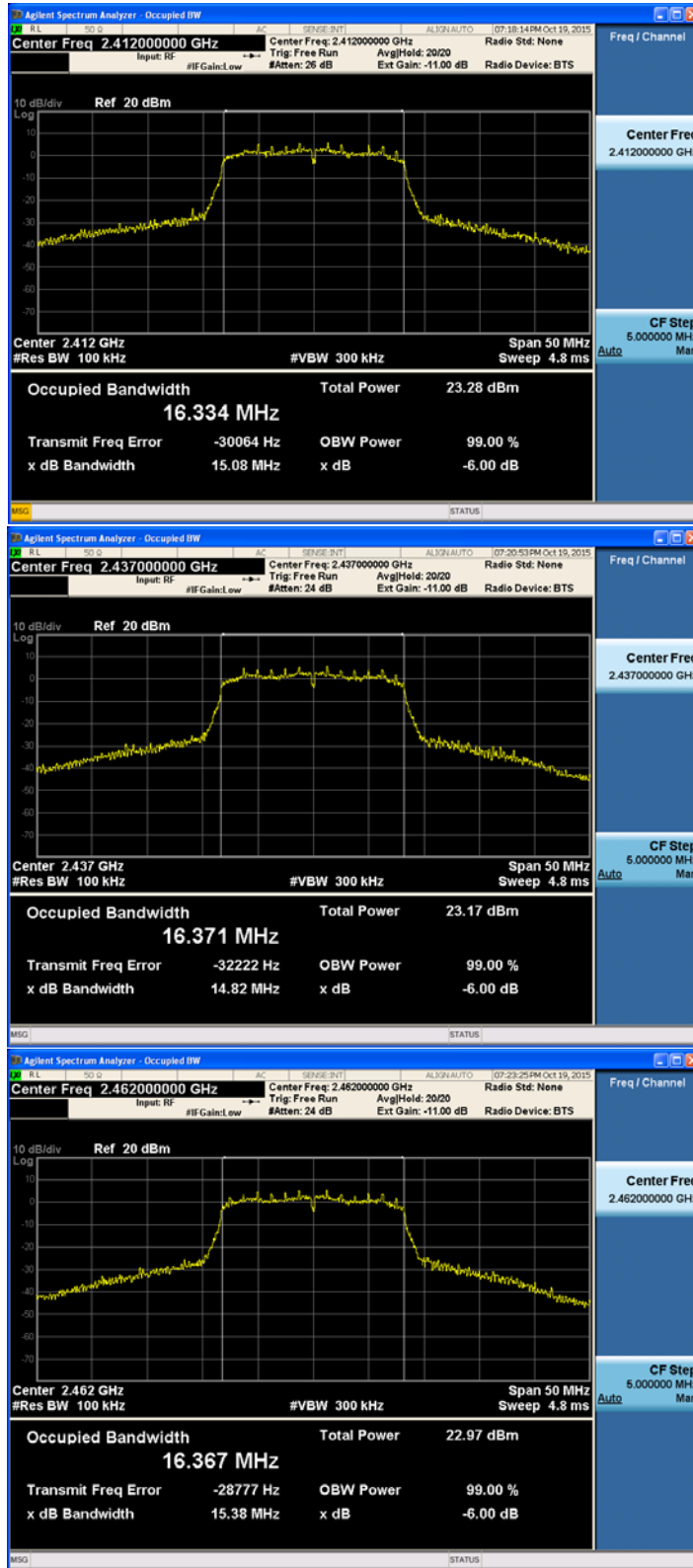
CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

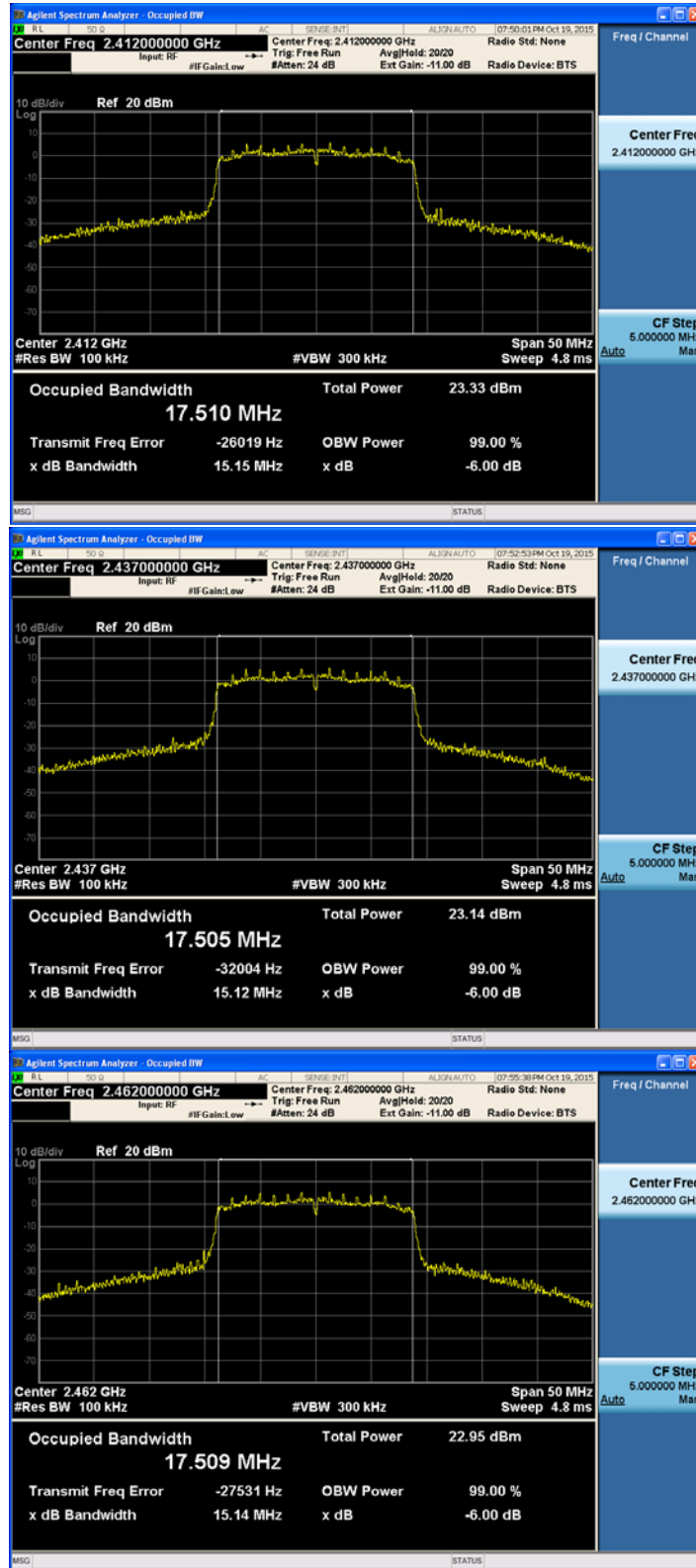
Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance



802.11g



802.11n_HT20

2.1.3 OUTPUT POWER

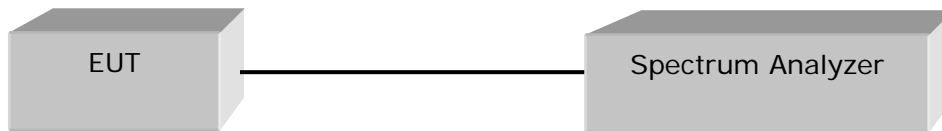
Test Location

RF Test Room

Test Procedures

Average Power(Procedure 9.2.2.2 in KDB 558074, Method AVGSA-1)

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 1 MHz

Span = about 36 MHz, 50 MHz

VBW = 3 MHz (3 x RBW)

Sweep = auto

Trace = average at least 100

Detector function = RMS

Limit

< 1 W

Test Results

Mode	Measured Output Power (dBm)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	14.50	14.44	14.40
802.11g	15.76	15.64	15.33
802.11n HT20	15.74	15.36	15.29
Measurement uncertainty	± 3 dB		



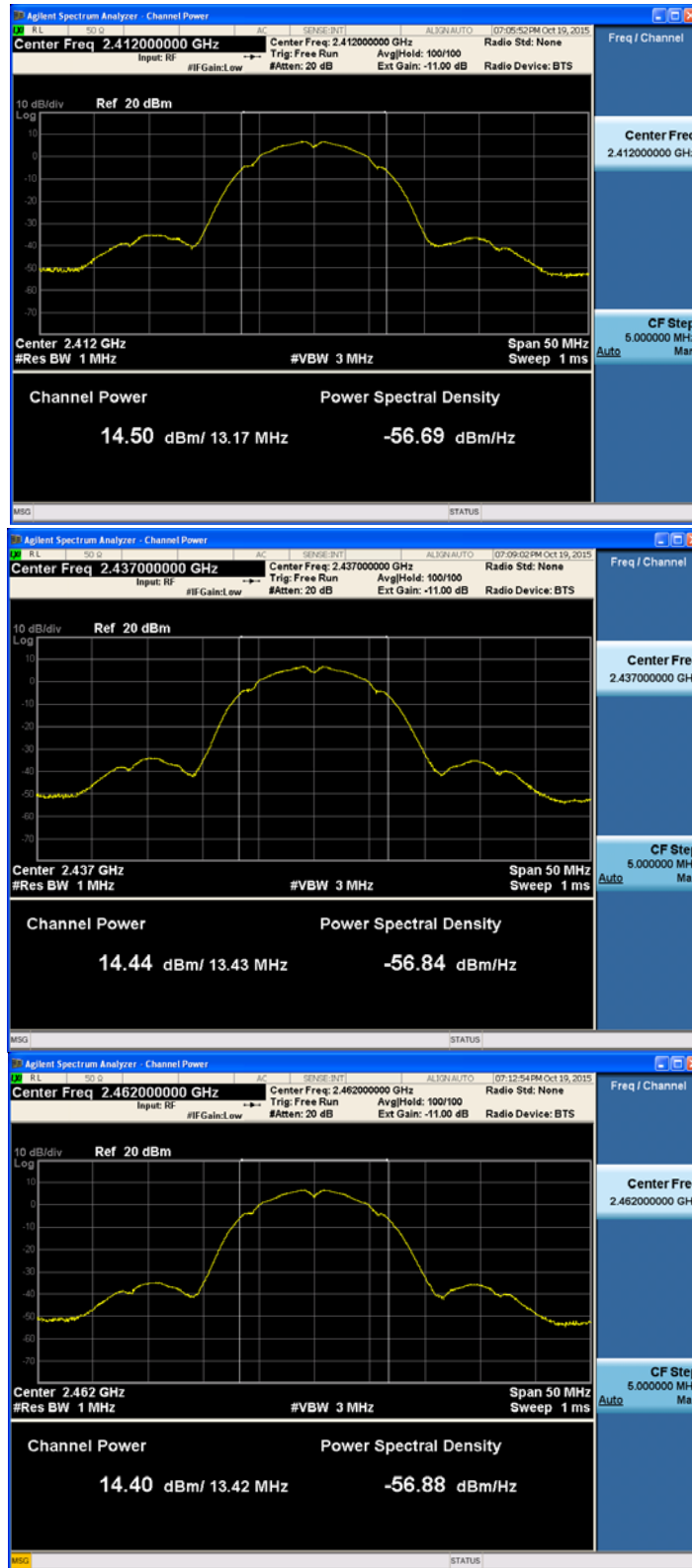
CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com



802.11b



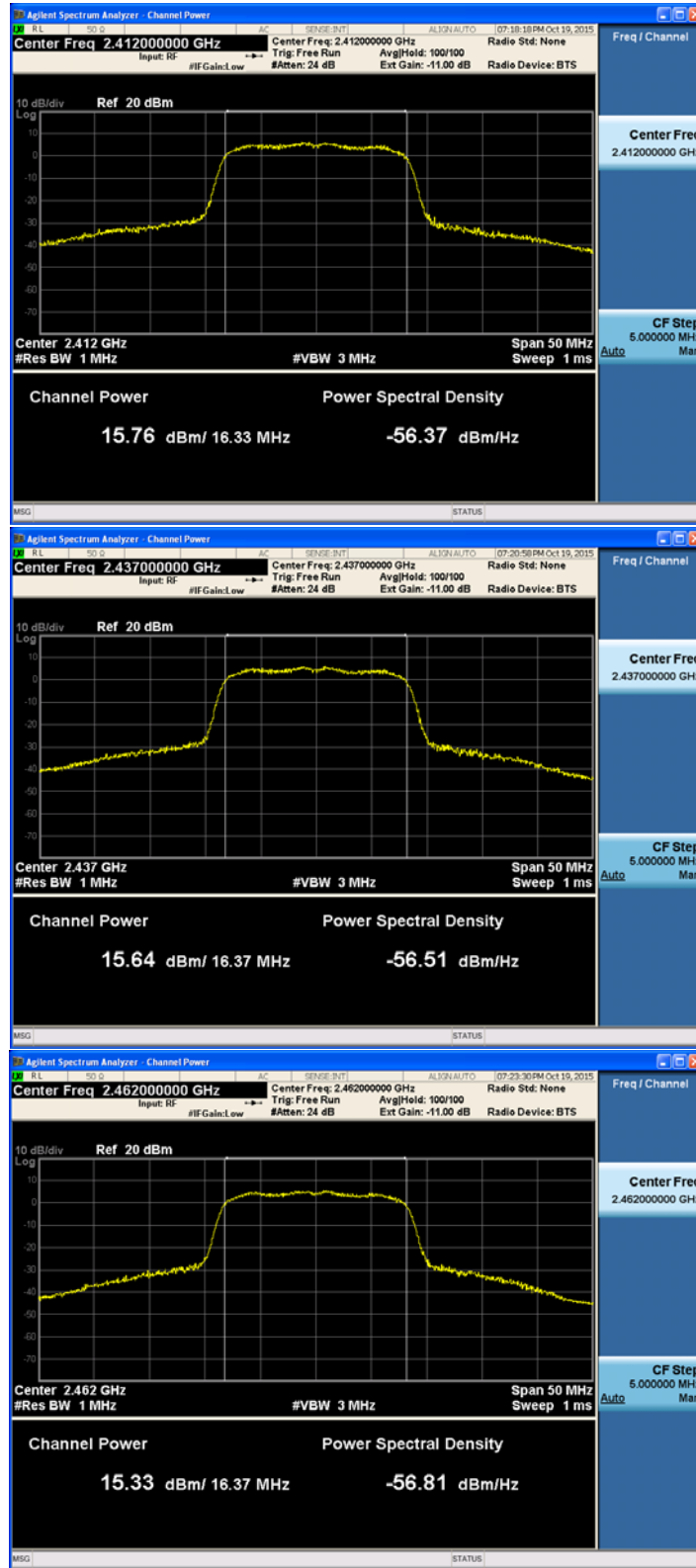
CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com



802.11g



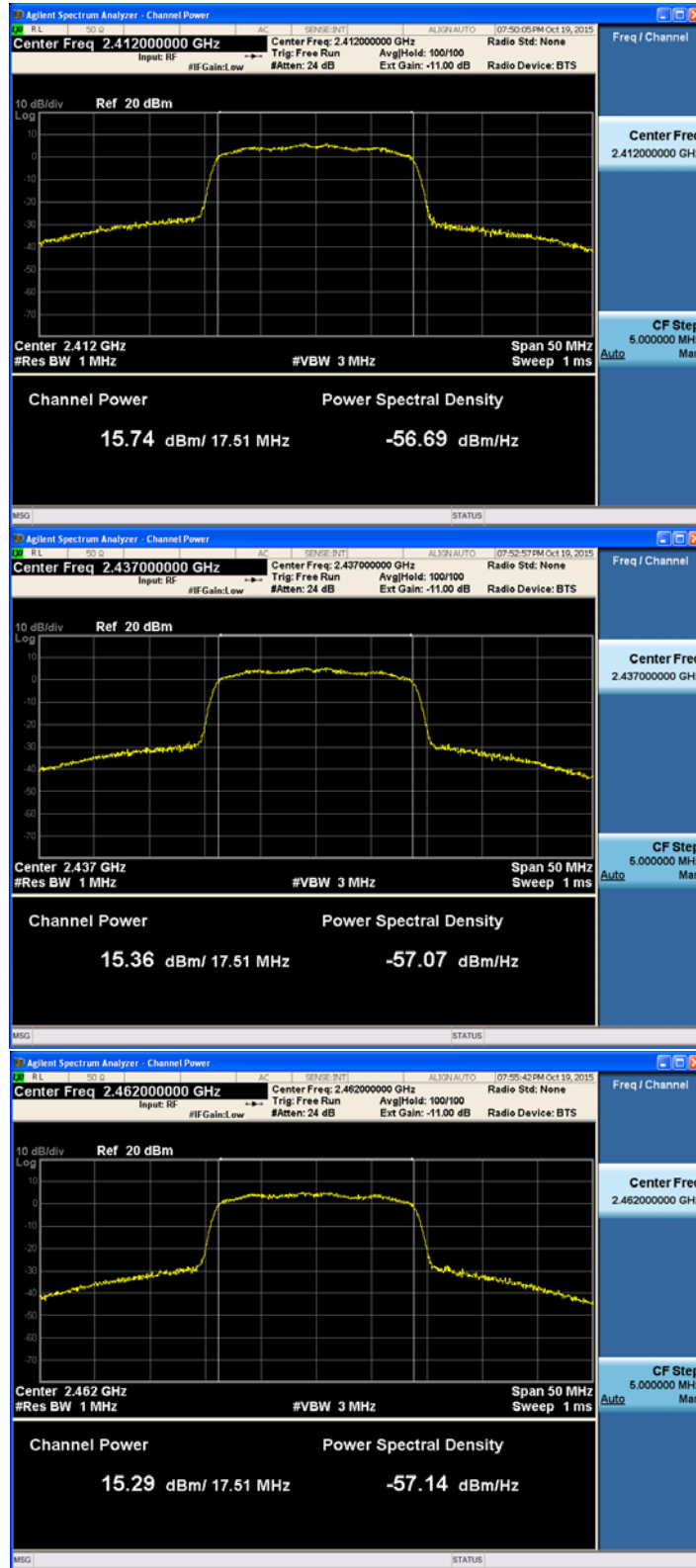
CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com



802.11n_HT20

2.1.4 Power Spectral Density

Procedure:

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 spectrum analyzer is set to:

RBW = 3 kHz	VBW = 10 kHz
Sweep = Auto	Span = 20 MHz
Detector function = peak	Trace = max hold

Limit

Minimum Standard:

Power Spectral Density	< 8dBm @ 3 kHz BW
---------------------------	-------------------

See next pages for actual measured spectrum plots.

Test Results

Mode	Measured Power Density (dBm)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	-10.555	-10.828	-10.923
802.11g	-10.877	-11.880	-11.569
802.11n HT20	-11.273	-11.869	-12.082
Measurement uncertainty	± 3 dB		



802.11b



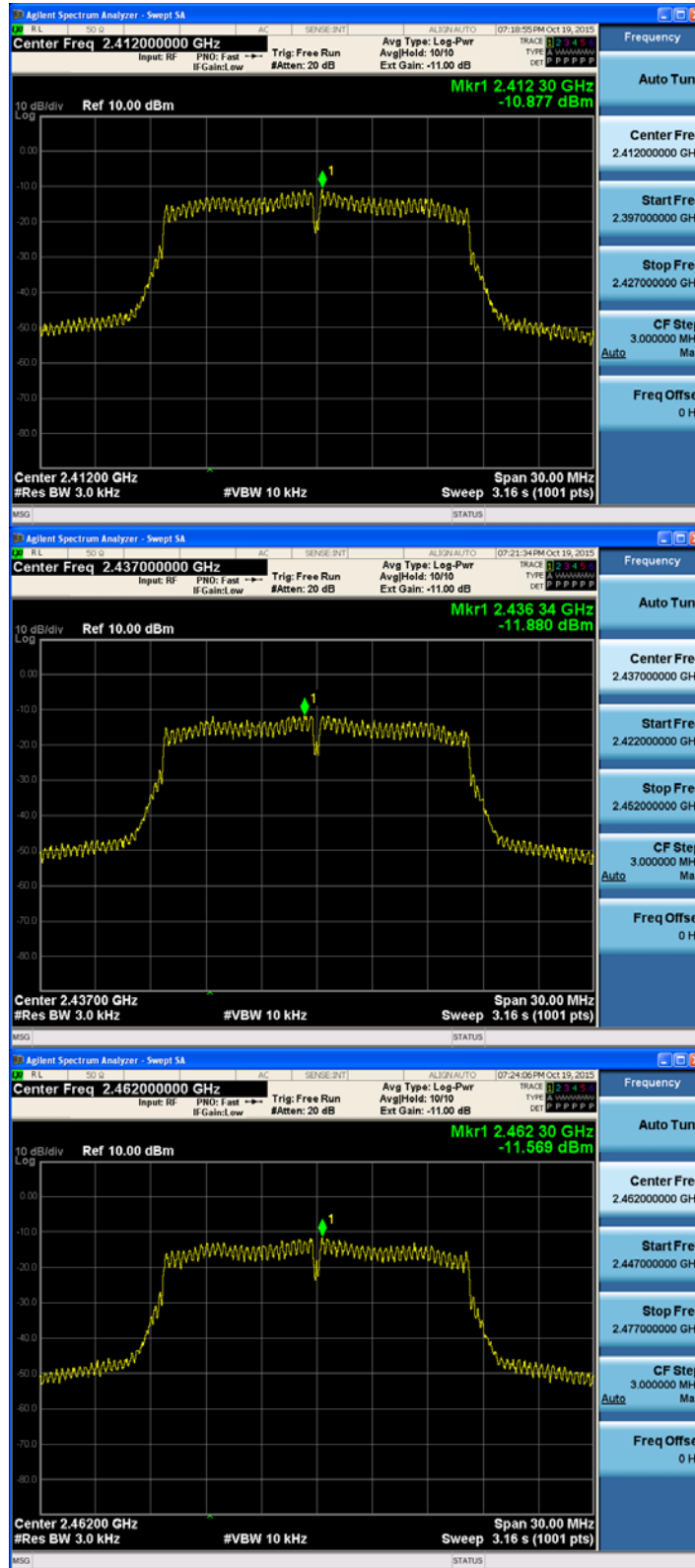
CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

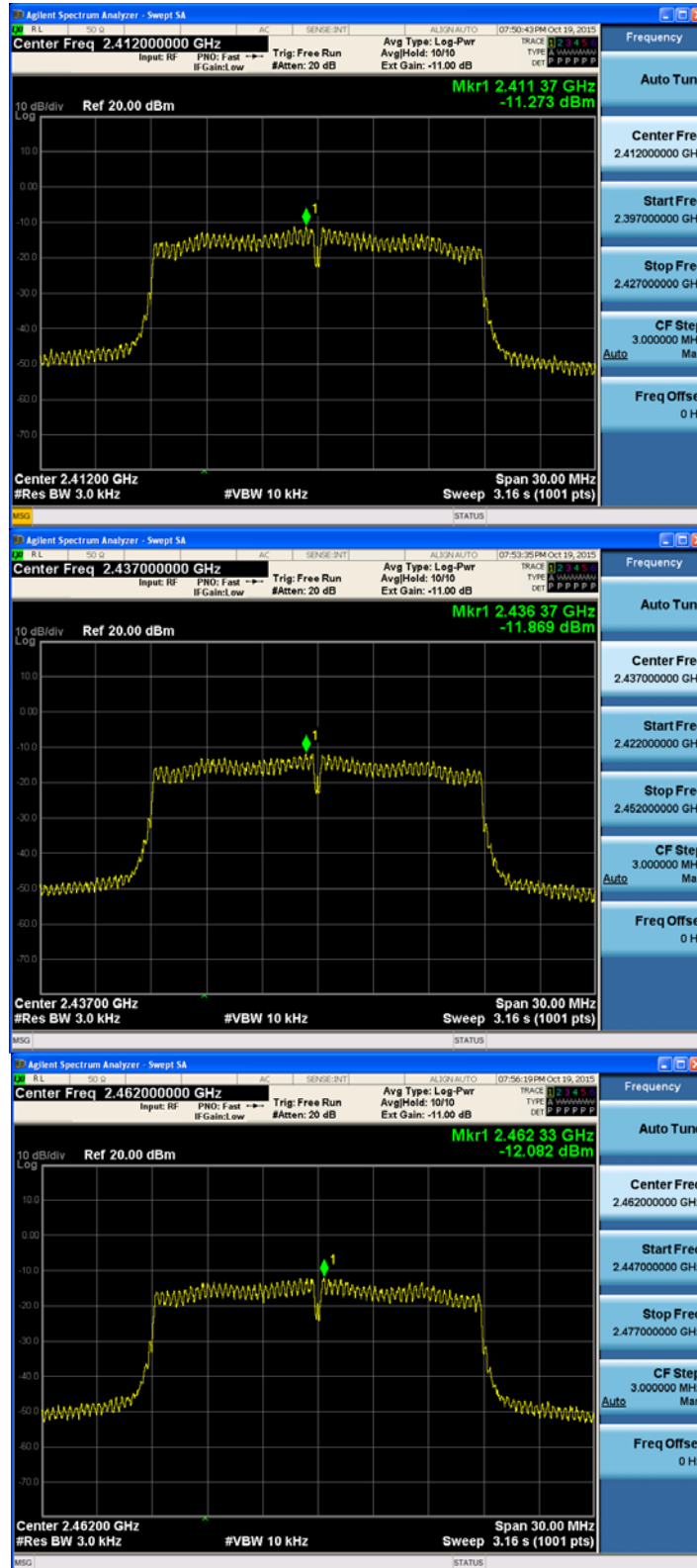
(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com



802.11g



802.11n_HT20

2.1.5 Band - edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 300 kHz

Span = 50 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: **Complies**

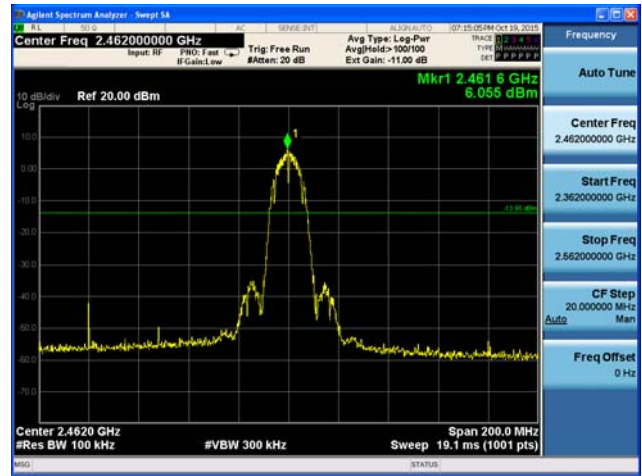
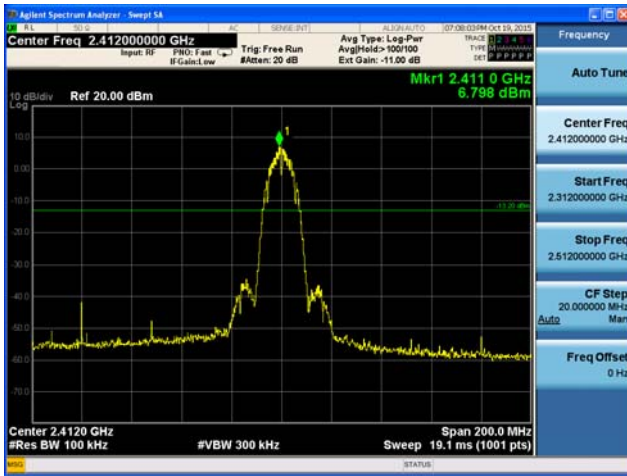
- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.

Minimum Standard:	> 20 dBc
--------------------------	----------

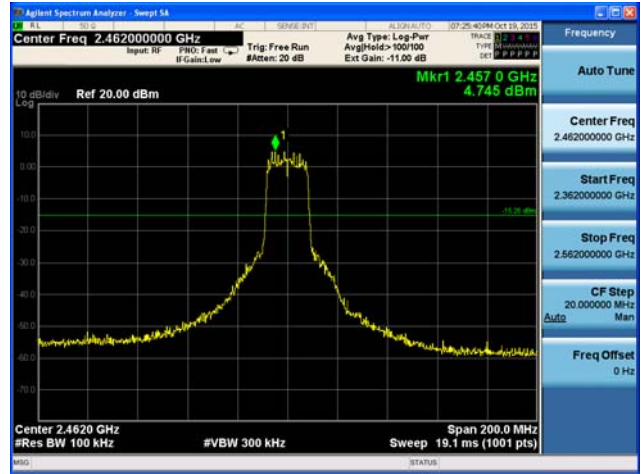
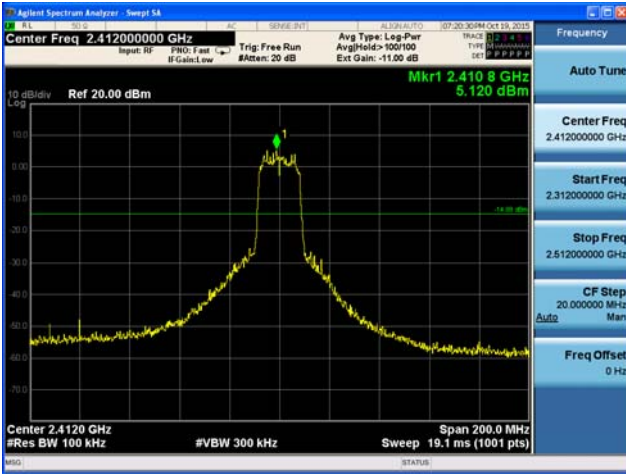
See next pages for actual measured spectrum plots.



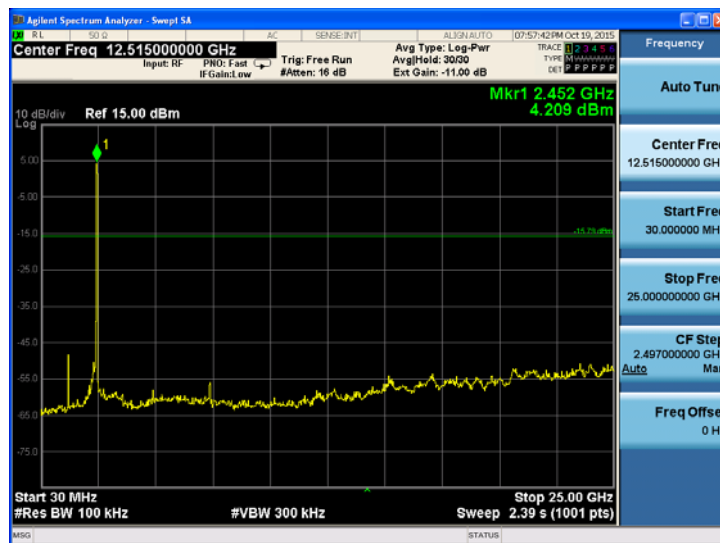
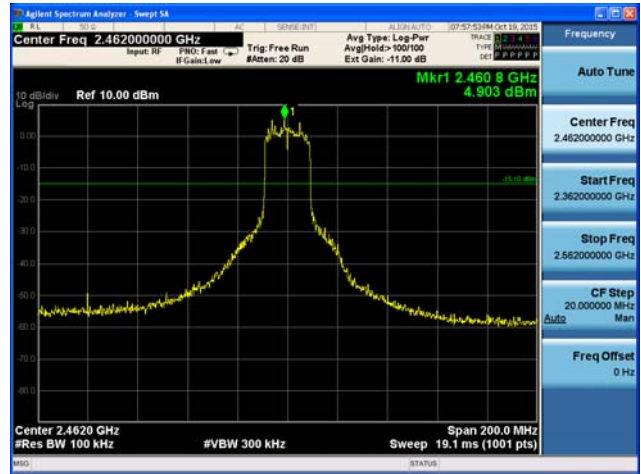
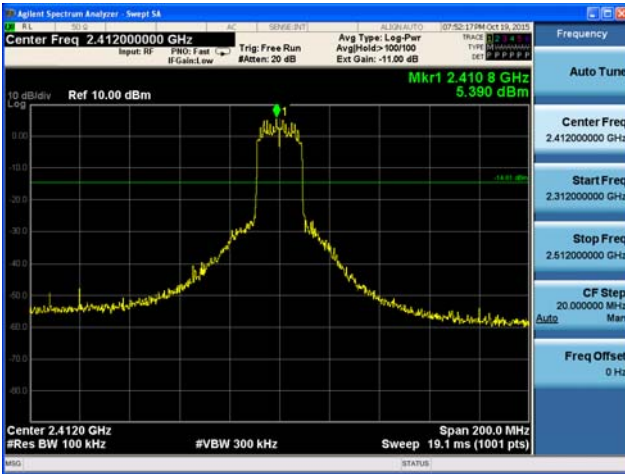
CTK Co., Ltd.
The Power Source of Global Regulatory Compliance



802.11b



802.11g



802.11n_HT20

2.1.6 Field Strength of Emissions

Test Location

- 10 m SAC (test distance : 10 m, 3 m)
 3 m SAC (test distance : 3 m)

Test Procedures

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- 2) In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 25 GHz (2.4 GHz 10th harmonic)
 RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, 9 kHz for $f < 30$ MHz
 VBW \geq RBW
 Sweep = auto

Limit

- 15.209(a)

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Deasurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

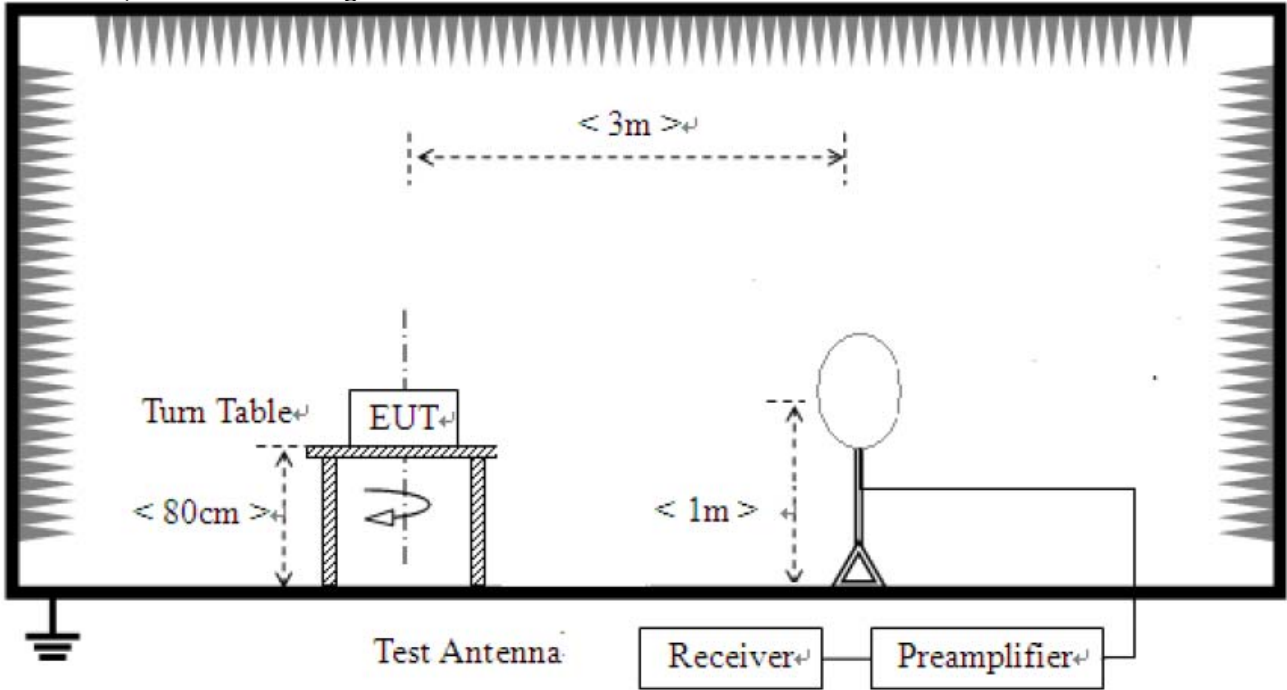
** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note :

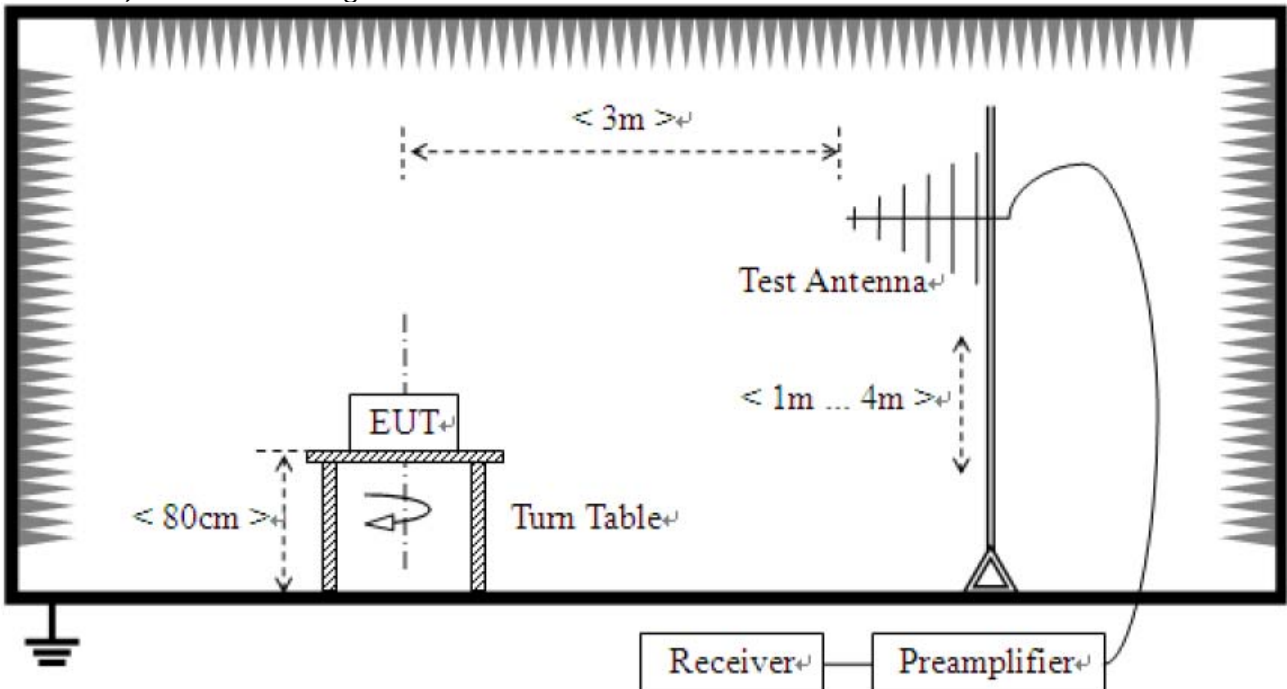
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- 2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)

Test Setup:

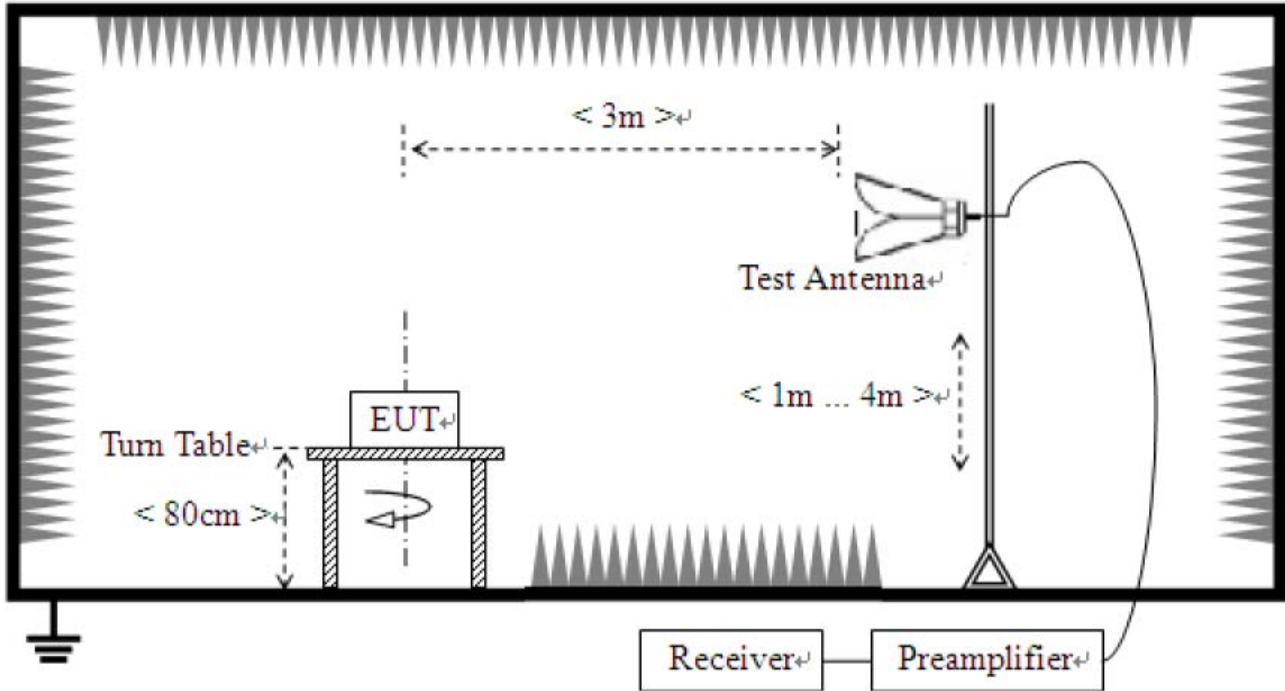
1) For field strength of emissions from 9 kHz to 30 MHz



2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz





CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

Test Results

1) 9 kHz to 30 MHz

EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	9 kHz – 30 MHz
Test mode	802.11b,802.11g, 802.11n	Detector function	Quasi-Peak

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBUV/m)	Margin (dB)	Remark
-	-	-	See note

Note :

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)



CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

2) 30 MHz to 1 GHz

Test mode : 802.11b (Worst Case)

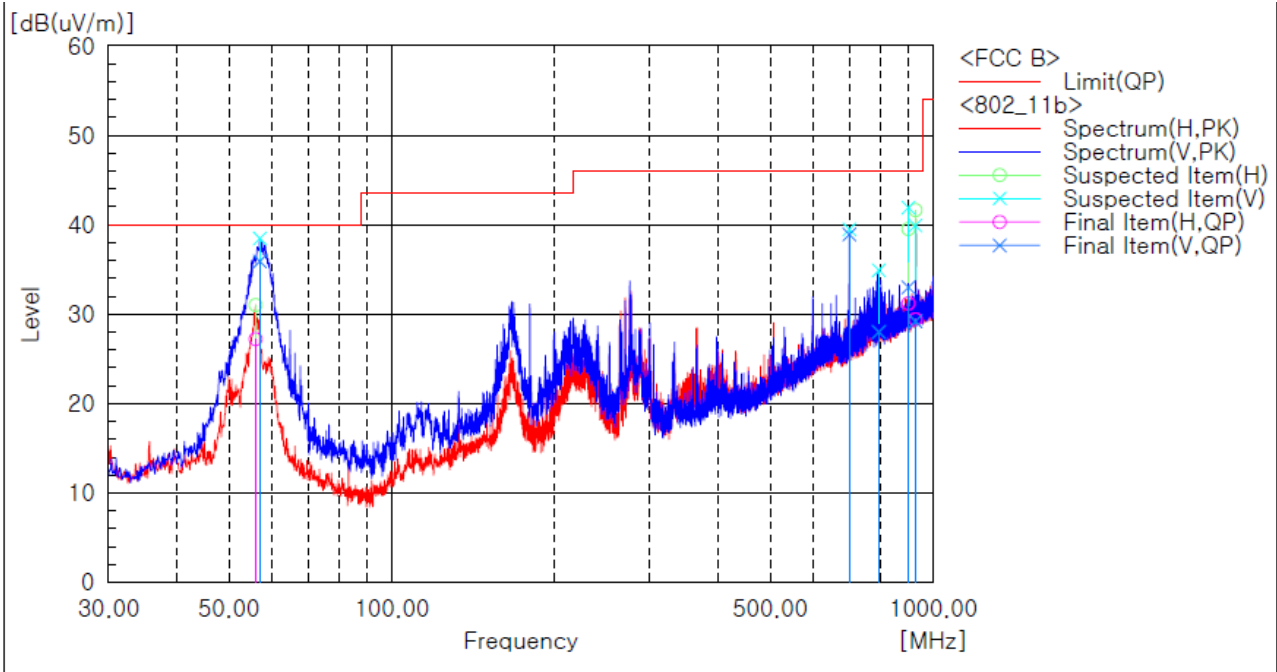
EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	Below 1000MHz
		Detector function	Quasi-Peak

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
57.039	35.9	4.1	Quasi-peak

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	56.069	H	40.4	-13.2	27.2	40.0	12.8	306.0	235.0
2	57.039	V	49.2	-13.3	35.9	40.0	4.1	100.0	312.0
3	700.028	V	36.9	2.0	38.9	46.0	7.1	100.0	237.0
4	793.754	V	24.0	4.0	28.0	46.0	18.0	100.0	51.0
5	900.090	V	26.3	6.7	33.0	46.0	13.0	100.0	237.0
6	900.090	H	24.5	6.7	31.2	46.0	14.8	207.0	235.0
7	927.614	H	22.1	7.3	29.4	46.0	16.6	207.0	235.0
8	927.614	V	21.9	7.3	29.2	46.0	16.8	100.0	237.0

Remark :

1. The field strength of spurious emission was measured in the following position: EUT and antenna stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.

3) above 1 GHz

Test mode : 802.11b

EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	1-25GHz
		Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
7311.0	53.07	0.93	Average

Ch.1(2412 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
4824.0	H	39.49	48.02	8.6	54.00	74.00	48.14	56.67	5.86	17.33
4824.0	V	41.51	51.56	8.6	54.00	74.00	50.16	60.21	3.84	13.79
7236.0	V	31.10	45.19	16.3	54.00	74.00	47.41	61.50	6.59	12.50

Ch.6(2437 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
4874.0	H	37.51	47.41	8.6	54.00	74.00	46.16	56.06	7.84	17.94
4874.0	V	40.91	51.55	8.6	54.00	74.00	49.56	60.20	4.44	13.80
7311.0	V	35.16	45.49	17.9	54.00	74.00	53.07	63.40	0.93	10.60

Ch.11(2462 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
4924.0	H	39.31	47.40	8.9	54.00	74.00	48.24	56.33	5.76	17.67
4924.0	V	42.68	49.11	8.9	54.00	74.00	51.61	58.04	2.39	15.96

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
2360.0	H	36.13	48.56	0.4	54.00	74.00	36.52	48.95	17.48	25.05
2360.0	V	40.36	50.36	0.4	54.00	74.00	40.75	50.75	13.25	23.25
2483.5	V	36.27	49.79	0.6	54.00	74.00	36.89	50.41	17.11	23.59

Test mode : 802.11g

EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	1-25GHz
		Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
7311.0	53.47	0.53	Average

Ch.1(2412 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV	Peak		AV	Peak	AV	Peak	AV	Peak
4824.0	H	33.32	51.11	8.6	54.00	74.00	41.97	59.76	12.03	14.24
4824.0	V	38.43	54.06	8.6	54.00	74.00	47.08	62.71	6.92	11.29
7236.0	H	30.90	48.79	16.3	54.00	74.00	47.21	65.10	6.79	8.90
7236.0	V	35.51	56.73	16.3	54.00	74.00	51.82	73.04	2.18	0.96

Ch.6(2437 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV	Peak		AV	Peak	AV	Peak	AV	Peak
4874.0	H	33.65	51.16	8.6	54.00	74.00	42.30	59.81	11.70	14.19
4874.0	V	37.60	52.83	8.6	54.00	74.00	46.25	61.48	7.75	12.52
7311.0	H	30.83	50.15	17.9	54.00	74.00	48.74	68.06	5.26	5.94
7311.0	V	35.56	54.14	17.9	54.00	74.00	53.47	72.05	0.53	1.95

Ch.11(2462 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV	Peak		AV	Peak	AV	Peak	AV	Peak
4924.0	H	34.64	49.17	8.9	54.00	74.00	43.57	58.10	10.43	15.90
4924.0	V	35.54	51.33	8.9	54.00	74.00	44.47	60.26	9.53	13.74
7386.0	H	32.14	48.82	17.9	54.00	74.00	50.05	66.73	3.95	7.27
7386.0	V	34.24	52.56	17.9	54.00	74.00	52.15	70.47	1.85	3.53

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV	Peak		AV	Peak	AV	Peak	AV	Peak
2390.0	H	48.43	69.14	0.4	54.00	74.00	48.82	69.53	5.18	4.47
2390.0	V	46.02	71.47	0.4	54.00	74.00	46.41	71.86	7.59	2.14
2483.5	H	41.21	64.07	0.6	54.00	74.00	41.83	64.69	12.17	9.31
2483.5	V	41.43	64.36	0.6	54.00	74.00	42.05	64.98	11.95	9.02



Test mode : 802.11n

EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	1-25GHz
		Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
7311.0	53.0	1.00	Average

Ch.1(2412 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
4824.0	H	33.34	50.83	8.6	54.00	74.00	41.99	59.48	12.01	14.52
4824.0	V	37.50	53.15	8.6	54.00	74.00	46.15	61.80	7.85	12.20
7236.0	H	32.36	49.38	16.3	54.00	74.00	48.67	65.69	5.33	8.31
7236.0	V	34.61	52.90	16.3	54.00	74.00	50.92	69.21	3.08	4.79

Ch.6(2437 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
4874.0	H	33.58	51.39	8.6	54.00	74.00	42.23	60.04	11.77	13.96
4874.0	V	36.33	52.98	8.6	54.00	74.00	44.98	61.63	9.02	12.37
7311.0	H	32.24	48.50	17.9	54.00	74.00	50.15	66.41	3.85	7.59
7311.0	V	35.09	53.42	17.9	54.00	74.00	53.00	71.33	1.00	2.67

Ch.11(2462 MHz)

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
4924.0	H	34.36	49.68	8.9	54.00	74.00	43.29	58.61	10.71	15.39
4924.0	V	35.16	49.90	8.9	54.00	74.00	44.09	58.83	9.91	15.17
7386.0	H	31.00	48.98	17.9	54.00	74.00	48.91	66.89	5.09	7.11
7386.0	V	32.62	49.29	17.9	54.00	74.00	50.53	67.20	3.47	6.80

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Pol.	Reading [dBuV/m]		Correction Factor [dB]	Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
		AV/Peak			AV / Peak		AV / Peak		AV / Peak	
2390.0	H	49.36	70.88	0.4	54.00	74.00	49.75	71.27	4.25	2.73
2390.0	V	47.69	71.44	0.4	54.00	74.00	48.08	71.83	5.92	2.17
2483.5	H	46.26	68.77	0.6	54.00	74.00	46.88	69.39	7.12	4.61
2483.5	V	46.39	71.40	0.6	54.00	74.00	47.01	72.02	6.99	1.98



CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

Test Results

1) 9 kHz to 30 MHz

Test mode : Receiver

EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	9 kHz – 30 MHz
		Detector function	Quasi-Peak

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
-	-	-	See note

Note :

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)

2) 30 MHz to 1 GHz

Test mode : Receiver

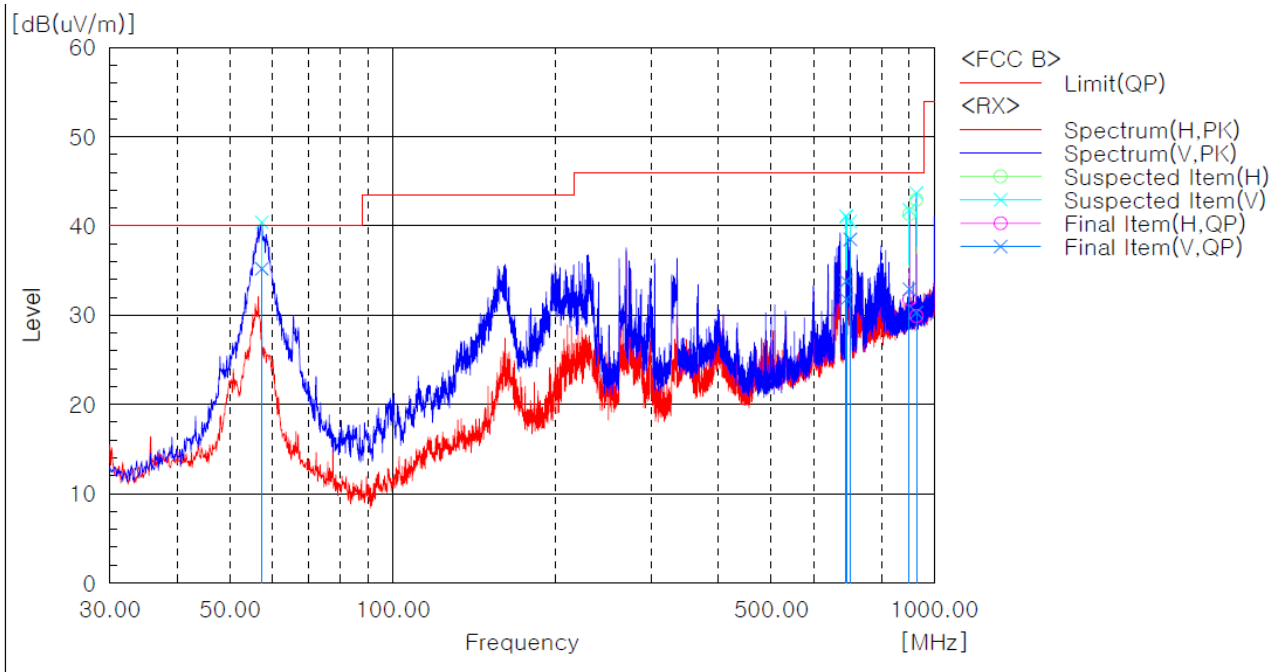
EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	Below 1000MHz
		Detector function	Quasi-Peak / Peak

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
57.281	35.2	4.8	Quasi-Peak

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	57.281	V	48.5	-13.3	35.2	40.0	4.8	100.0	311.0
2	687.660	V	32.0	1.8	33.8	46.0	12.2	100.0	88.0
3	688.145	V	30.0	1.8	31.8	46.0	14.2	100.0	88.0
4	700.028	V	36.5	2.0	38.5	46.0	7.5	100.0	51.0
5	900.090	V	26.2	6.7	32.9	46.0	13.1	100.0	274.0
6	900.090	H	25.1	6.7	31.8	46.0	14.2	207.0	349.0
7	927.614	V	23.0	7.3	30.3	46.0	15.7	100.0	200.0
8	927.614	H	22.6	7.3	29.9	46.0	16.1	207.0	51.0

Remark :

1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.



CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-624-9501

www.e-ctk.com

Test mode : Receiver

EUT	Wi-Fi Module	Measurement Detail	
Model	WCATB001	Frequency Range	1-25GHz
		Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
No emissions were detected at a level greater than 20dB below limit.			

Frequency [MHz]	Pol.	Reading [dBuV/m] AV/Peak	Correction Factor [dB]	Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
-----------------	------	--------------------------	------------------------	---------------------------	---------------------------	-----------------------

No emissions were detected at a level greater than 20dB below limit.

2.1.7 AC Conducted Emissions

Test Location

Shielded Room

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- 15.207(a)

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

Test Results

The requirements are:

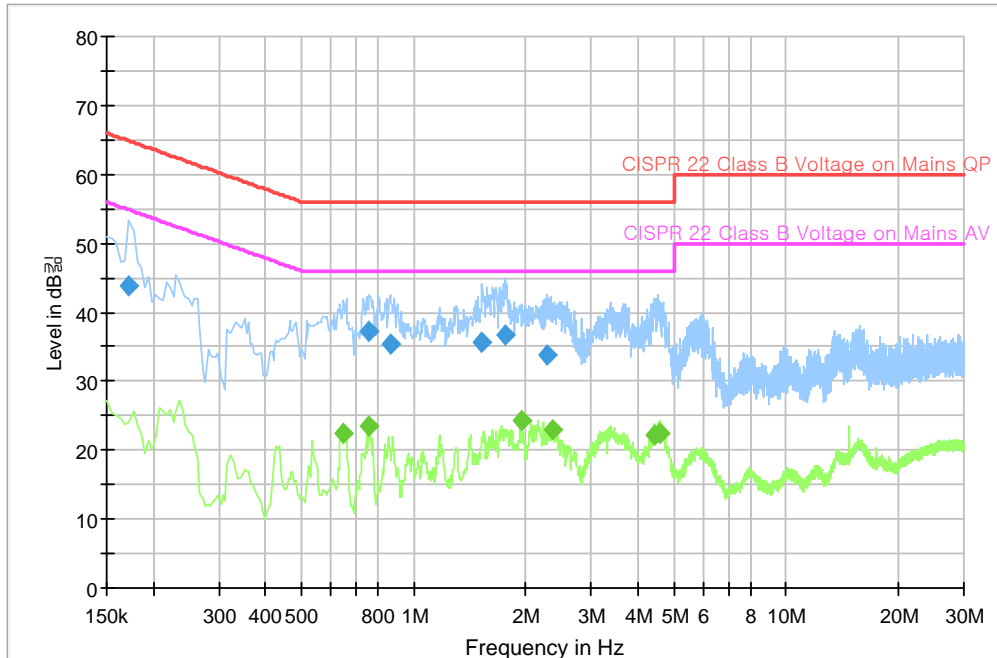
Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
0.177	46.6	18.0	Quasi-peak

Test Data

[HOT]

3CE_CISPR 22 Class B_L1



Final Result 1

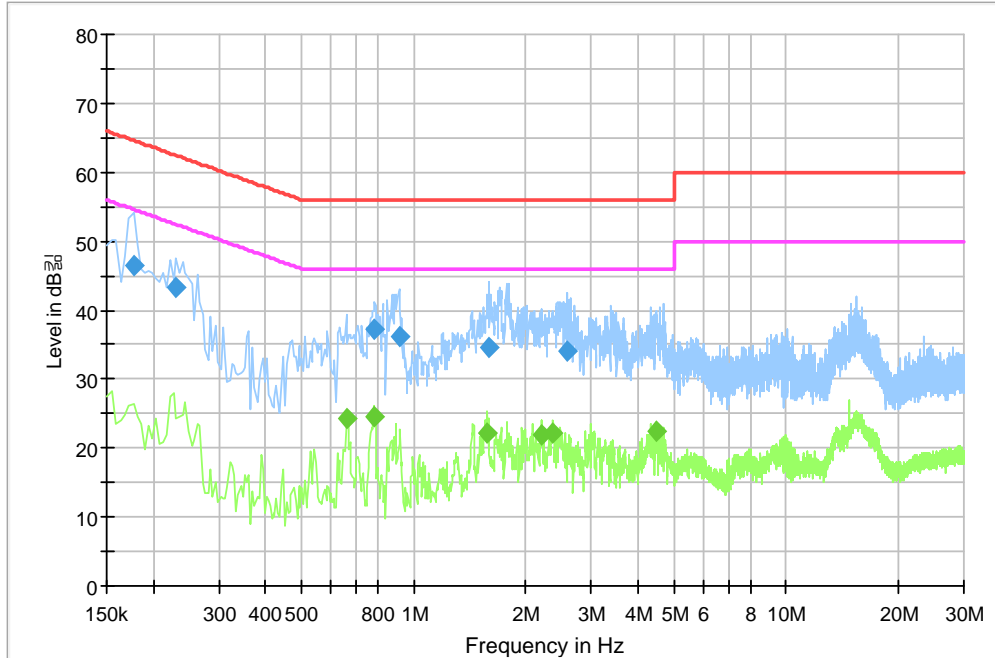
Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.172500	43.8	1000.0	9.000	On	L1	9.9	21.0	64.8
0.762000	37.2	1000.0	9.000	On	L1	10.1	18.8	56.0
0.865500	35.4	1000.0	9.000	On	L1	10.0	20.6	56.0
1.527000	35.6	1000.0	9.000	On	L1	9.9	20.4	56.0
1.756500	36.8	1000.0	9.000	On	L1	9.9	19.2	56.0
2.274000	33.9	1000.0	9.000	On	L1	9.8	22.1	56.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.645000	22.5	1000.0	9.000	On	L1	10.1	23.5	46.0
0.762000	23.6	1000.0	9.000	On	L1	10.1	22.4	46.0
1.941000	24.2	1000.0	9.000	On	L1	9.8	21.8	46.0
2.364000	22.9	1000.0	9.000	On	L1	9.8	23.1	46.0
4.443000	22.3	1000.0	9.000	On	L1	9.9	23.7	46.0
4.573500	22.6	1000.0	9.000	On	L1	9.9	23.4	46.0

[NEUTRAL]

3CE_CISPR 22 Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.177000	46.6	1000.0	9.000	On	N	9.9	18.0	64.6
0.231000	43.3	1000.0	9.000	On	N	9.8	19.1	62.4
0.784500	37.2	1000.0	9.000	On	N	9.9	18.8	56.0
0.915000	36.2	1000.0	9.000	On	N	9.9	19.8	56.0
1.590000	34.7	1000.0	9.000	On	N	9.7	21.3	56.0
2.584500	34.2	1000.0	9.000	On	N	9.8	21.8	56.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.658500	24.2	1000.0	9.000	On	N	10.0	21.8	46.0
0.780000	24.5	1000.0	9.000	On	N	9.9	21.5	46.0
1.581000	22.3	1000.0	9.000	On	N	9.7	23.7	46.0
2.202000	21.8	1000.0	9.000	On	N	9.7	24.2	46.0
2.373000	22.3	1000.0	9.000	On	N	9.7	23.7	46.0
4.492500	22.5	1000.0	9.000	On	N	9.8	23.5	46.0



APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2014-11-07	2015-11-07
2	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2014-11-07	2015-11-07
3	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2014-12-05	2015-12-05
4	EMI Test Receiver	Rohde & Schwarz	ESCI7	100816	2014-12-05	2015-12-05
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-126	2014-05-19	2016-05-19
6	Attenuator	HP	8498A	1801A06913	2014-11-11	2015-11-11
7	EPM Series Power Meter	HP	E4418A	GB38272734	2014-11-17	2015-11-17
8	Power Sensor	HP	8487A	3318A03524	2015-02-06	2016-02-06
9	Audio Analyzer	HP	8903B	2747A03432	2014-11-10	2015-11-10
10	ESG-D Series Signal Generator	Agilent	E4432B	US40054094	2014-11-12	2015-11-12
11	SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2014-11-14	2015-11-14
12	Attenuator	HP	8494A	3308A33351	2014-11-07	2015-11-07
13	Temp&Humi Chamber	Kunpoong	JT-TH-556-1	9QE5-002	2015-01-16	2016-01-16
14	Temp&Humi Chamber	Kunpoong	JT-TH-556-2	9QE5-003	2015-01-16	2016-01-16
15	Temp&Humi Chamber	ESPEC CORP.	SH-241	92000872	2015-05-13	2016-05-13
16	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2014-11-07	2015-11-07
17	Horn Antenna	ETS-Lindgren	3115	00078895	2015-05-07	2017-05-07
18	Horn Antenna	ETS-Lindgren	3116	00062916	2015-04-30	2017-04-30
19	Horn Antenna	ETS-Lindgren	3117	00154525	2015-09-02	2017-09-02
20	OPT H64 AMPLIFIER	HP	8447F	3113A06814	2015-02-06	2016-02-06
21	PREAMPLIFIER	Agilent	8449B	3008A02307	2014-10-24	2015-10-24
22	Radio Communication Tester	Rohde & Schwarz	CMU200	106765	2015-02-02	2016-02-02
23	LISN	Rohde & Schwarz	ENV216	101235	2015-05-14	2016-05-14
24	LISN	Rohde & Schwarz	ENV216	101236	2015-05-14	2016-05-14
25	LISN	Rohde & Schwarz	ENV216	101151	2014-11-07	2015-11-07
26	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2014-11-07	2015-11-07
27	EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2015-02-02	2016-02-02
28	6dB Attenuator	R&S	DNF	272.4110.50	2014-11-07	2015-11-07
29	AMPLIFIER	Sonoma Instrument Co.	310	291721	2015-02-02	2016-02-02
30	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2015-05-15	2016-05-15
31	Signal Generator	Rohde & Schwarz	SMBV100A	258008	2015-05-13	2016-05-13
32	Bilog Antenna	Schaffner	CBL6111C	2551	2014-05-08	2016-05-08