FCC RF Test Report

APPLICANT	:	BungBungame Technology Co.,Ltd.
EQUIPMENT	:	BungBungame Tablet
BRAND NAME	:	BungBungame
MODEL NAME	:	KALOS 2
FCC ID	:	2ADNC-KA2TB115
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Oct. 12, 2016 and testing was completed on Jan. 06, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

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APPENDIX A. CONDUCTED TEST RESULTS

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5O1213F	Rev. 01	Initial issue of report	Jan. 29, 2016
FR5O1213F	Rev. 02	Revising test data of Appendix A.	Feb. 01, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm/MHz &15.209(a)	Pass	Under limit 3.25 dB at 5696.760 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 3.40 dB at 0.542 MHz
3.6	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

BungBungame Technology Co.,Ltd.
15F., No. 19-11, Sanchong Rd., Nangang Dist., Taipei City 11501, Taiwan (R.O.C)

1.2 Manufacturer

Inventec Appliances（Jiangning）Corporation
No. 133, Jiang-Jun Road, Jiangning District, Nanjing

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	BungBungame Tablet
Brand Name	BungBungame
Model Name	KALOS 2
FCC ID	2ADNC-KA2TB115
EUT supports Radios application	NFC WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v4.1 EDR/LE
HW Version	PVT
SW Version	1
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	**<5745 MHz ~ 5825 MHz>** **<Ant. 1>** 802.11a : 8.69 dBm / 0.0074 W **SISO <Ant. Port 1>** 802.11n HT20 : 8.64 dBm / 0.0073 W 802.11n HT40 : 8.56 dBm / 0.0072 W 802.11ac VHT20: 8.57 dBm / 0.0072 W 802.11ac VHT40: 8.51 dBm / 0.0071 W 802.11ac VHT80: 8.62 dBm / 0.0073 W **<Ant. 2>** 802.11a : 8.89 dBm / 0.0077 W **SISO <Ant. Port 2>** 802.11n HT20 : 8.84 dBm / 0.0077 W 802.11n HT40 : 8.66 dBm / 0.0073 W 802.11ac VHT20: 8.78 dBm / 0.0076 W 802.11ac VHT40: 8.56 dBm / 0.0072 W 802.11ac VHT80: 8.81 dBm / 0.0076 W **MIMO <Ant. Port 1 + 2>** 802.11n HT20 : 11.86 dBm / 0.0153 W 802.11n HT40 : 11.73 dBm / 0.0149 W 802.11ac VHT20: 11.82 dBm / 0.0152 W 802.11ac VHT40: 11.64 dBm / 0.0146 W 802.11ac VHT80: 11.85 dBm / 0.0153 W
99% Occupied Bandwidth	802.11a : 18.35 MHz 802.11n HT20 : 19.15 MHz 802.11n HT40 : 36.80 MHz 802.11ac VHT20 : 19.15 MHz 802.11ac VHT40 : 36.70 MHz 802.11ac VHT80 : 76.08 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type	Main Antenna : Chip Antenna Aux. Antenna : Monopole Antenna
Antenna Gain	Main Antenna : 2.86 dBi Aux. Antenna : -0.78 dBi
Antenna Function Description	

	Ant. Port 1	Ant. Port 2
802.11 a	V	V
802.11 n/ac SISO	V	V
802.11 n/ac MIMO	V	V

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH02-HY	CO05-HY

Note: The test site complies with ANSI C63.10 2009 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH11-HY

Note: The test site complies with ANSI C63.10 2009 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ANSI C63.10-2009

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151	**5755**	**159**	**5795**
	153	5765	161	5805
	155	5775	165	5825

Note: The above Frequency and Channel in boldface were 802.11n HT40.

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

<Ant. 1>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	8.69	8.37	8.36	8.34	8.34	8.40	8.53	8.52

SISO <Ant. Port 1>

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	8.64	8.17	8.17	8.41	8.58	8.45	8.54	8.43

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	8.56	8.25	8.22	8.30	8.35	8.28	8.26	8.30

5GHz 802.11ac VHT20 mode									
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Average Power (dBm)	8.57	8.18	8.23	8.39	8.45	8.54	8.34	8.49	8.36

5GHz 802.11ac VHT40 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	8.51	8.17	8.15	8.32	8.37	8.30	8.32	8.14	8.11	8.24

5GHz 802.11ac VHT80 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	8.62	8.45	8.51	8.54	8.61	8.55	8.60	8.58	8.56	8.49

<Ant. 2>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	8.89	8.77	8.73	8.89	8.81	8.87	8.88	8.85

SISO <Ant. Port 2>

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	8.84	8.74	8.77	8.75	8.78	8.80	8.82	8.82

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	8.66	8.43	8.35	8.47	8.53	8.26	8.63	8.43

5GHz 802.11ac VHT20 mode									
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Average Power (dBm)	8.78	8.64	8.60	8.75	8.76	8.77	8.71	8.75	8.75

5GHz 802.11ac VHT40 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	8.56	8.29	8.25	8.38	8.51	8.32	8.49	8.33	8.26	8.48

5GHz 802.11ac VHT80 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	8.81	8.65	8.69	8.80	8.80	8.80	8.80	8.78	8.80	8.79

MIMO <Ant. 1+2>

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Average Power (dBm)	11.86	11.46	11.37	11.66	11.70	11.74	11.76	11.64

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Average Power (dBm)	11.73	11.41	11.35	11.23	11.19	11.19	11.39	11.25

5GHz 802.11ac VHT20 mode									
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Average Power (dBm)	11.82	11.42	11.42	11.61	11.72	11.71	11.76	11.67	11.66

5GHz 802.11ac VHT40 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	11.64	11.26	11.24	11.39	11.50	11.43	11.36	11.33	11.39	11.54

5GHz 802.11ac VHT80 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	11.85	11.44	11.58	11.81	11.83	11.83	11.81	11.81	11.80	11.81

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

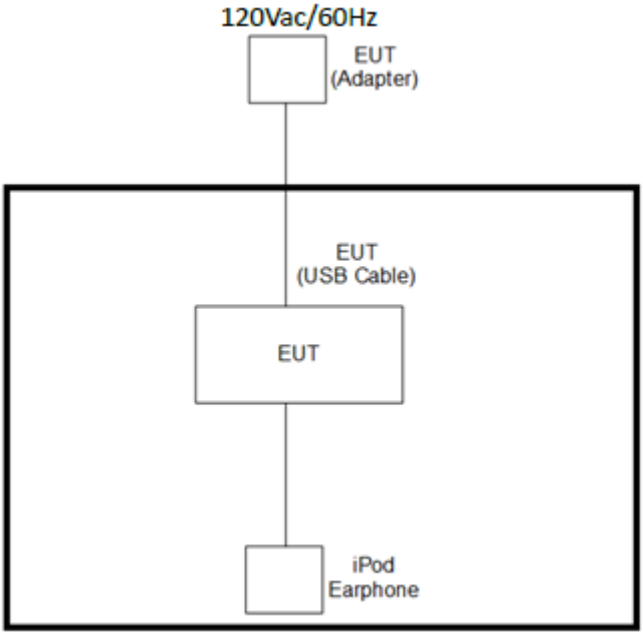
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)

Ch. #		Band IV：5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

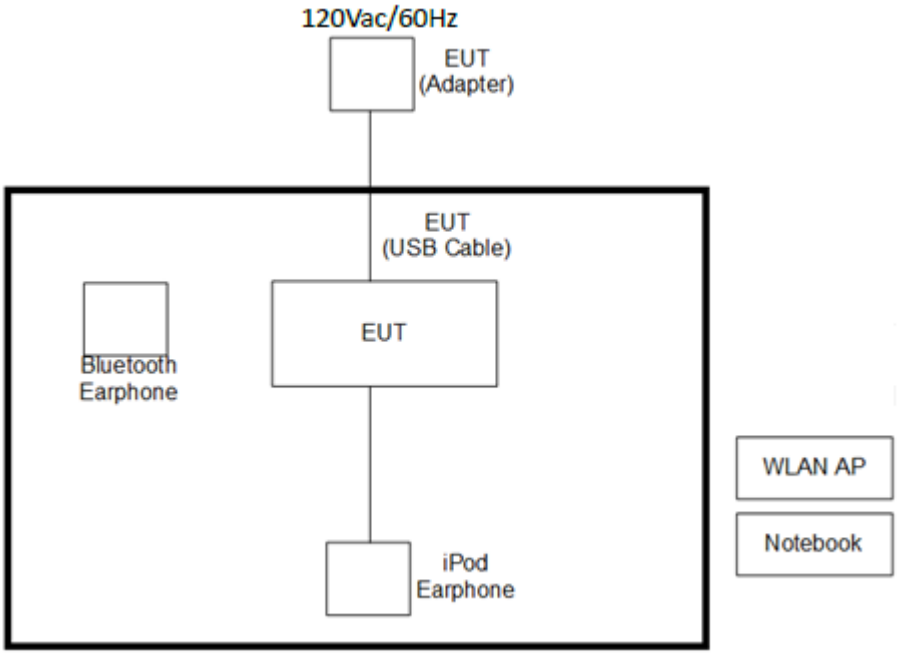
Ch. #		Band IV：5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	D-Link	DIR-865L	KA2IR865LA1	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “k2_wifi_controler.exe” installed in the notebook makes the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

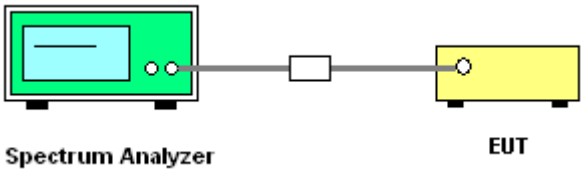
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

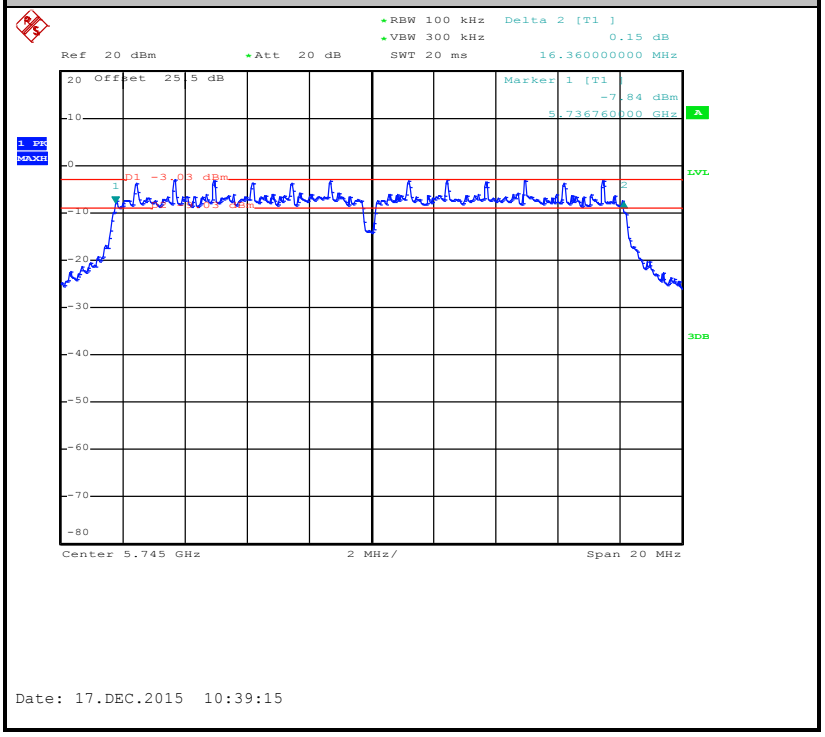
3.1.4 Test Setup



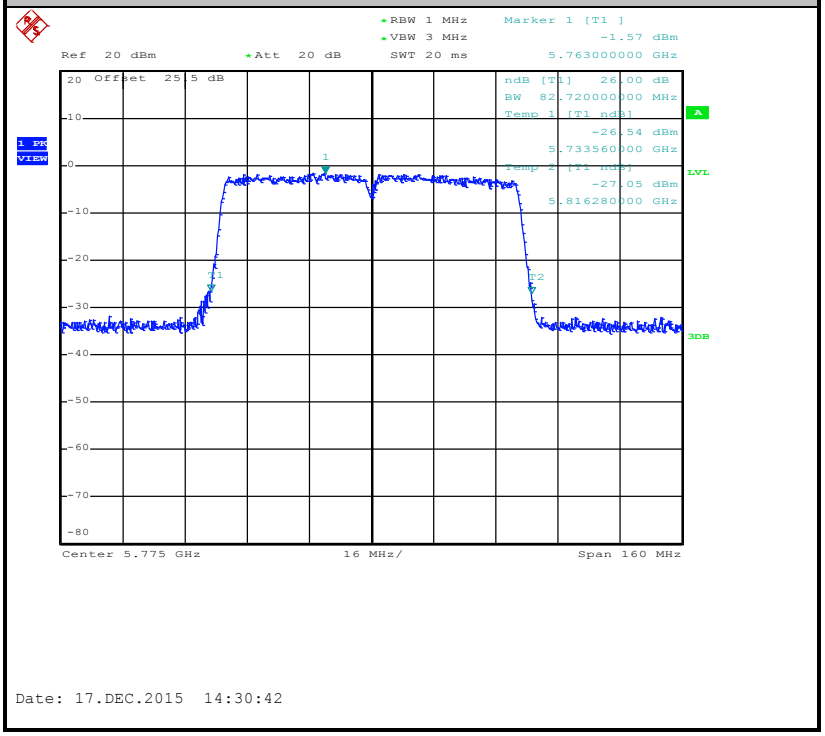
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

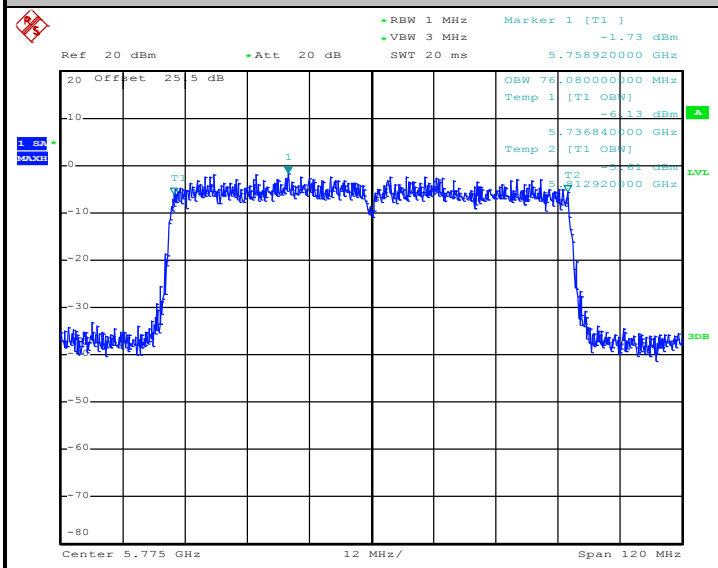
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



Date: 17.DEC.2015 14:33:58

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

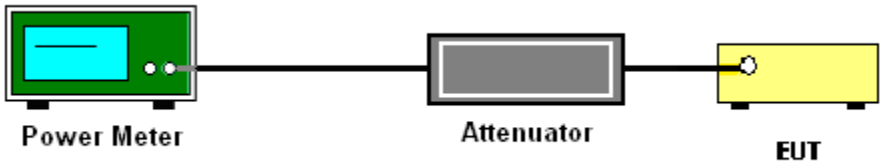
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01. Section F) Maximum power spectral density.

 # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

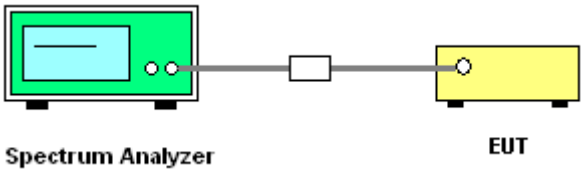
1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 300 kHz.
   - Set VBW ≥ 1 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep time = auto.
   - Detector = RMS
   - Trace average at least 100 traces in power averaging mode.
   - Add 10 log(500kHz/RBW) to the test result.
   - 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. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (a): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

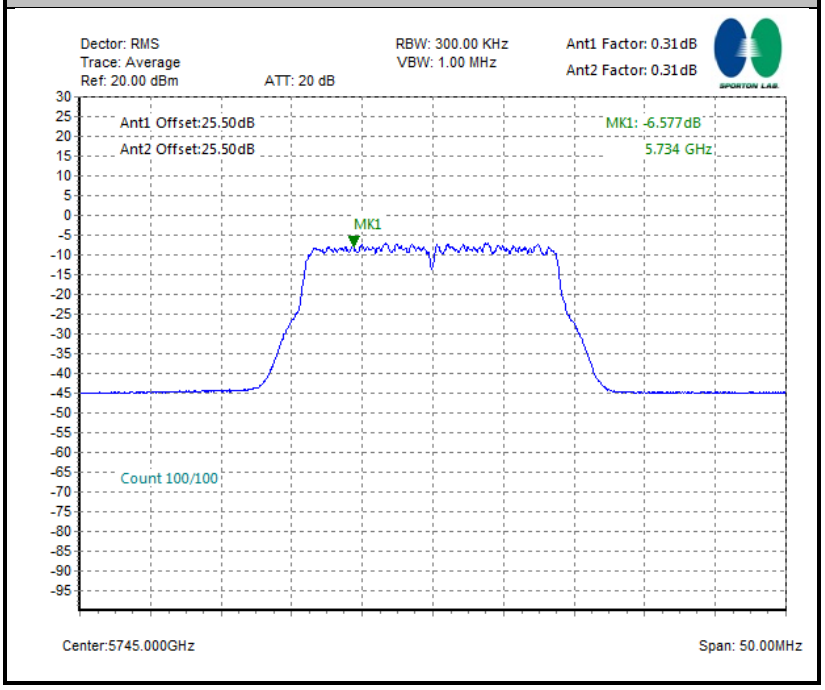
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5725-5850 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBμV/m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBμV/m).

(2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

(3) KDB 789033 D02 General UNII Test Procedures New Rules v01r01 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

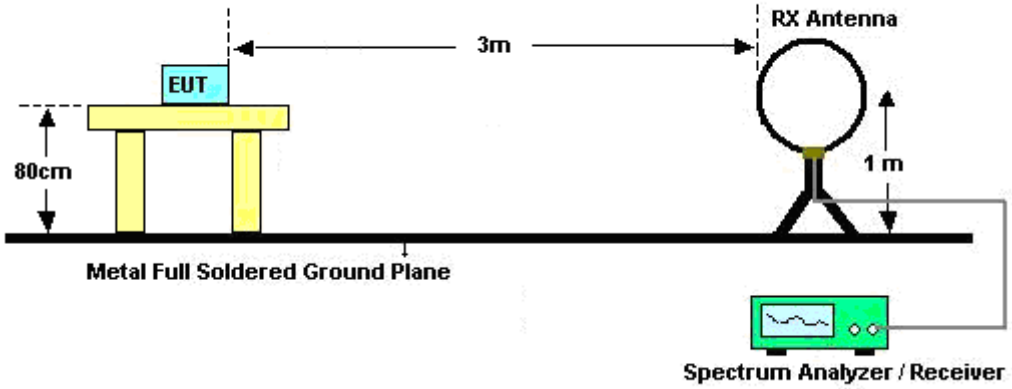
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
0	802.11a	93.51	1440	0.69	1kHz
1	802.11a	93.46	1430	0.70	
0	5 GHz 802.11n HT20	92.41	1340	0.75	
1	5 GHz 802.11n HT20	92.41	1340	0.75	
0	5 GHz 802.11n HT40	86.61	660	1.52	3kHz
1	5 GHz 802.11n HT40	86.22	657	1.52	
0	5 GHz 802.11ac VHT20	92.47	1350	0.74	1kHz
1	5 GHz 802.11ac VHT20	92.47	1350	0.74	
0	5 GHz 802.11ac VHT40	86.72	666	1.50	3kHz
1	5 GHz 802.11ac VHT40	86.72	666	1.50	
0	5 GHz 802.11ac VHT80	76.39	330	3.03	10kHz
1	5 GHz 802.11ac VHT80	76.39	330	3.03	
0+1	802.11a for Ant 1	92.86	1430	0.70	1kHz
0+1	802.11a for Ant 2	92.86	1430	0.70	
0+1	5 GHz 802.11n HT20 for Ant 1	93.06	1340	0.75	
0+1	5 GHz 802.11n HT20 for Ant 2	93.06	1340	0.75	
0+1	5 GHz 802.11n HT40 for Ant 1	86.61	660	1.52	3kHz
0+1	5 GHz 802.11n HT40 for Ant 2	86.61	660	1.52	
0+1	5 GHz 802.11ac VHT20 for Ant 1	93.10	1350	0.74	1kHz
0+1	5 GHz 802.11ac VHT20 for Ant 2	92.41	1340	0.75	
0+1	5 GHz 802.11ac VHT40 for Ant 1	85.71	660	1.52	3kHz
0+1	5 GHz 802.11ac VHT40 for Ant 2	85.71	660	1.52	
0+1	5 GHz 802.11ac VHT80 for Ant 1	76.39	330	3.03	10kHz
0+1	5 GHz 802.11ac VHT80 for Ant 2	76.39	330	3.03	

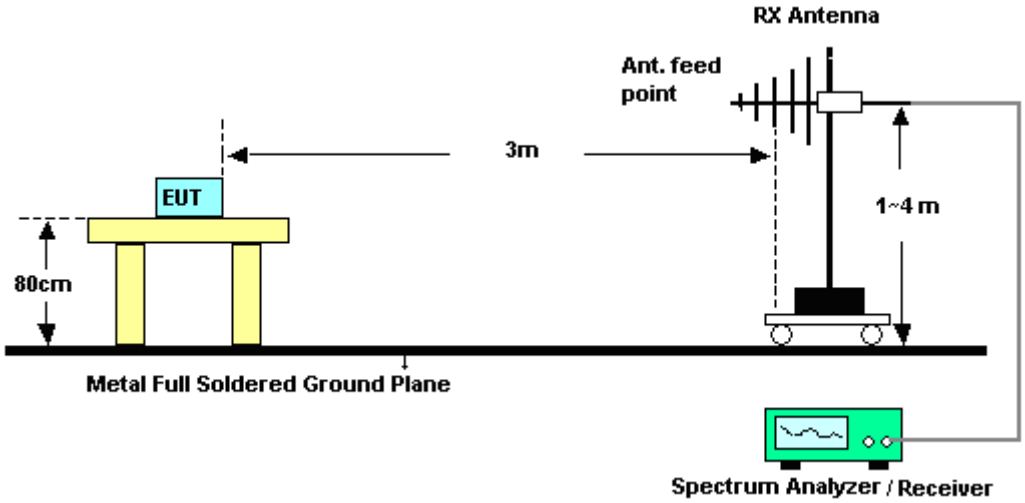
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

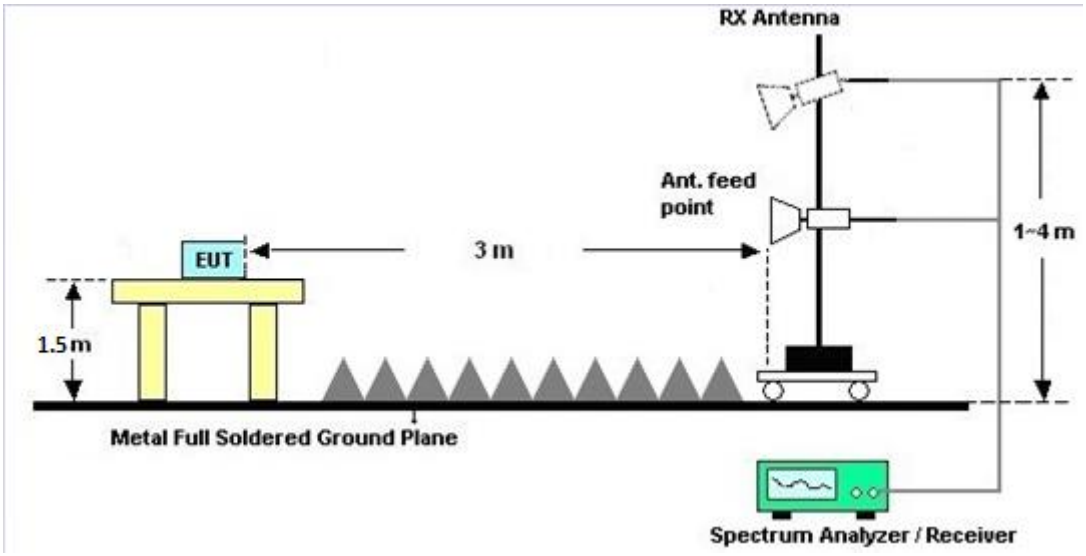
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix B and C.

3.4.7 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that 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 the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

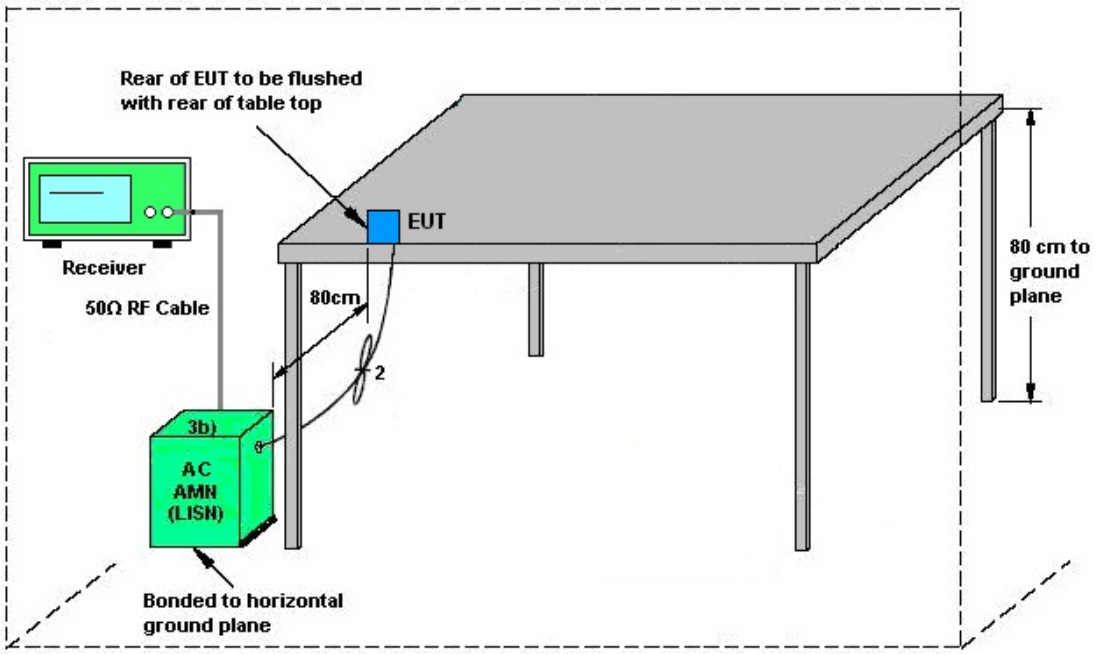
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

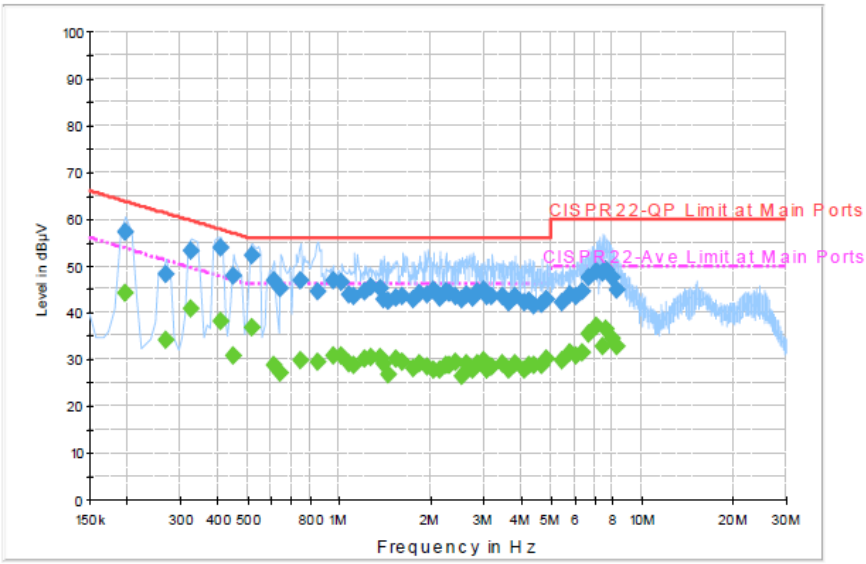
3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

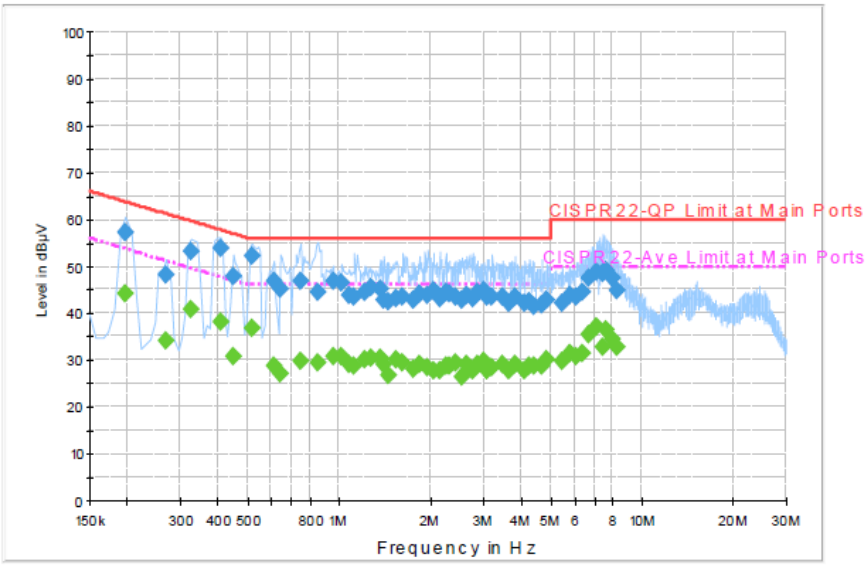
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	57.1	Off	L1	19.7	6.6	63.7
0.270000	48.3	Off	L1	19.7	12.8	61.1
0.326000	53.3	Off	L1	19.7	6.3	59.6
0.406000	53.8	Off	L1	19.7	3.9	57.7
0.446000	47.9	Off	L1	19.6	9.0	56.9
0.518000	52.0	Off	L1	19.7	4.0	56.0
0.614000	46.9	Off	L1	19.6	9.1	56.0
0.638000	45.2	Off	L1	19.7	10.8	56.0
0.750000	46.8	Off	L1	19.7	9.2	56.0
0.854000	44.4	Off	L1	19.6	11.6	56.0
0.958000	46.8	Off	L1	19.7	9.2	56.0
1.022000	46.6	Off	L1	19.7	9.4	56.0
1.078000	43.7	Off	L1	19.7	12.3	56.0
1.126000	43.3	Off	L1	19.6	12.7	56.0
1.214000	44.3	Off	L1	19.6	11.7	56.0
1.278000	45.5	Off	L1	19.6	10.5	56.0
1.366000	45.2	Off	L1	19.6	10.8	56.0
1.414000	42.7	Off	L1	19.6	13.3	56.0
1.462000	42.4	Off	L1	19.7	13.6	56.0
1.550000	43.2	Off	L1	19.7	12.8	56.0

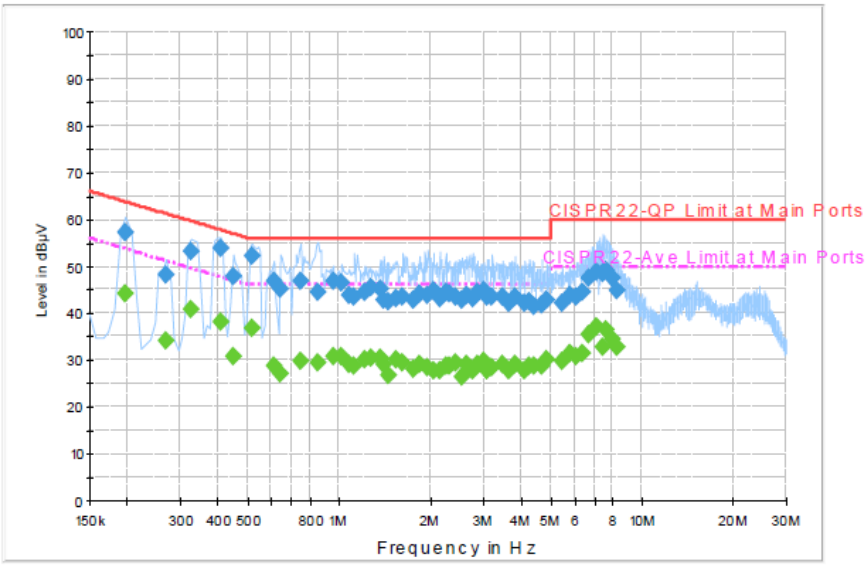
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.630000	43.4	Off	L1	19.7	12.6	56.0
1.766000	42.8	Off	L1	19.7	13.2	56.0
1.846000	44.1	Off	L1	19.7	11.9	56.0
1.974000	44.0	Off	L1	19.7	12.0	56.0
2.062000	44.7	Off	L1	19.6	11.3	56.0
2.150000	43.1	Off	L1	19.6	12.9	56.0
2.254000	44.4	Off	L1	19.7	11.6	56.0
2.318000	44.2	Off	L1	19.6	11.8	56.0
2.438000	43.6	Off	L1	19.6	12.4	56.0
2.542000	42.9	Off	L1	19.6	13.1	56.0
2.654000	43.9	Off	L1	19.6	12.1	56.0
2.758000	43.2	Off	L1	19.7	12.8	56.0
2.870000	44.3	Off	L1	19.6	11.7	56.0
3.006000	44.8	Off	L1	19.7	11.2	56.0
3.102000	43.5	Off	L1	19.7	12.5	56.0
3.214000	43.3	Off	L1	19.7	12.7	56.0
3.478000	43.4	Off	L1	19.7	12.6	56.0
3.662000	42.1	Off	L1	19.7	13.9	56.0
3.830000	43.6	Off	L1	19.7	12.4	56.0

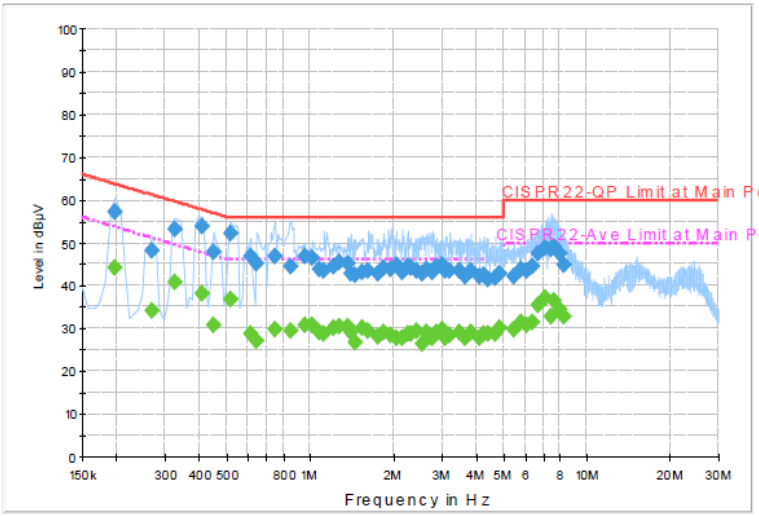
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
4.126000	42.0	Off	L1	19.7	14.0	56.0
4.278000	42.5	Off	L1	19.7	13.5	56.0
4.430000	41.4	Off	L1	19.7	14.6	56.0
4.686000	41.9	Off	L1	19.7	14.1	56.0
4.878000	42.9	Off	L1	19.8	13.1	56.0
5.494000	42.0	Off	L1	19.7	18.0	60.0
5.814000	43.7	Off	L1	19.7	16.3	60.0
6.094000	43.4	Off	L1	19.7	16.6	60.0
6.358000	44.5	Off	L1	19.8	15.5	60.0
6.702000	47.4	Off	L1	19.7	12.6	60.0
7.094000	48.7	Off	L1	19.8	11.3	60.0
7.406000	48.6	Off	L1	19.7	11.4	60.0
7.630000	49.2	Off	L1	19.7	10.8	60.0
7.982000	47.6	Off	L1	19.7	12.4	60.0
8.302000	44.9	Off	L1	19.7	15.1	60.0

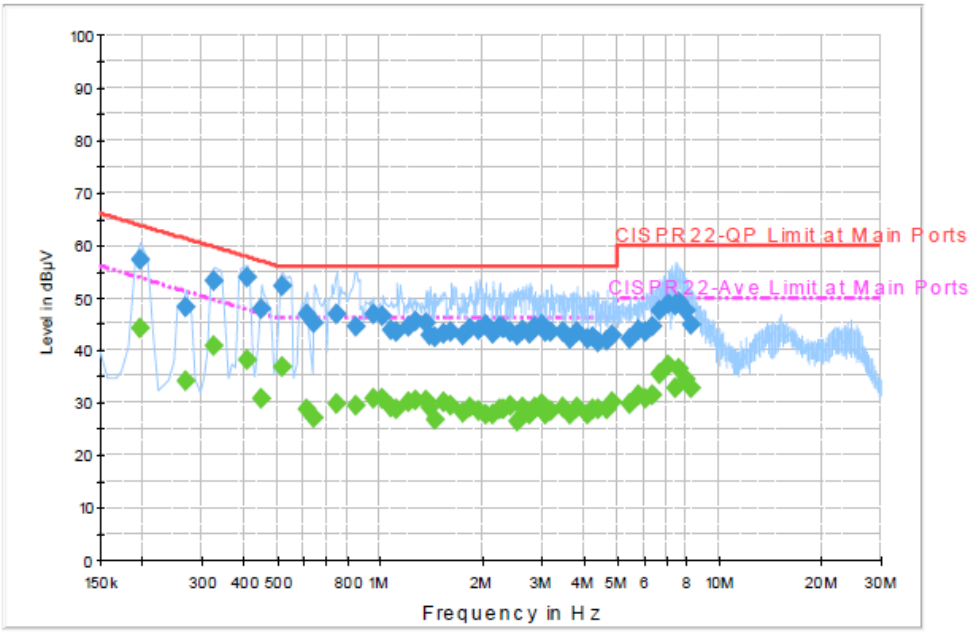
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	44.3	Off	L1	19.7	9.4	53.7
0.270000	34.0	Off	L1	19.7	17.1	51.1
0.326000	40.7	Off	L1	19.7	8.9	49.6
0.406000	38.2	Off	L1	19.7	9.5	47.7
0.446000	30.7	Off	L1	19.6	16.2	46.9
0.518000	36.6	Off	L1	19.7	9.4	46.0
0.614000	28.7	Off	L1	19.6	17.3	46.0
0.638000	27.3	Off	L1	19.7	18.7	46.0
0.750000	29.6	Off	L1	19.7	16.4	46.0
0.854000	29.4	Off	L1	19.6	16.6	46.0
0.958000	30.8	Off	L1	19.7	15.2	46.0
1.022000	30.9	Off	L1	19.7	15.1	46.0
1.078000	28.9	Off	L1	19.7	17.1	46.0
1.126000	28.8	Off	L1	19.6	17.2	46.0
1.214000	30.3	Off	L1	19.6	15.7	46.0
1.278000	30.3	Off	L1	19.6	15.7	46.0
1.366000	30.3	Off	L1	19.6	15.7	46.0
1.414000	29.2	Off	L1	19.6	16.8	46.0
1.462000	26.8	Off	L1	19.7	19.2	46.0
1.550000	30.1	Off	L1	19.7	15.9	46.0
1.630000	29.4	Off	L1	19.7	16.6	46.0
1.766000	28.0	Off	L1	19.7	18.0	46.0
1.846000	29.1	Off	L1	19.7	16.9	46.0
1.974000	28.5	Off	L1	19.7	17.5	46.0

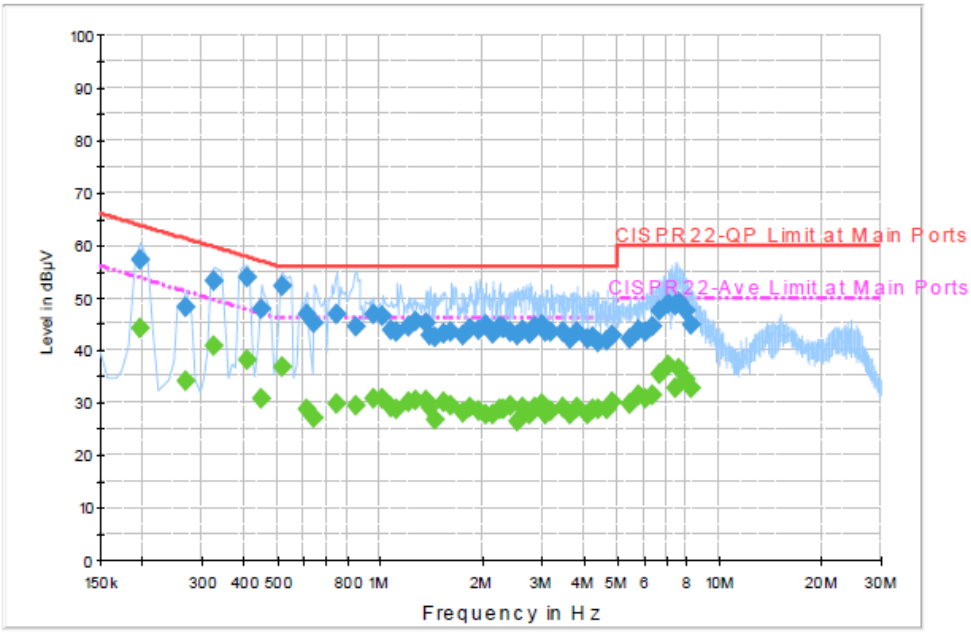
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.062000	27.7	Off	L1	19.6	18.3	46.0
2.150000	27.9	Off	L1	19.6	18.1	46.0
2.254000	28.9	Off	L1	19.7	17.1	46.0
2.318000	28.9	Off	L1	19.6	17.1	46.0
2.438000	29.4	Off	L1	19.6	16.6	46.0
2.542000	26.5	Off	L1	19.6	19.5	46.0
2.654000	29.1	Off	L1	19.6	16.9	46.0
2.758000	27.9	Off	L1	19.7	18.1	46.0
2.870000	29.0	Off	L1	19.6	17.0	46.0
3.006000	29.7	Off	L1	19.7	16.3	46.0
3.102000	27.8	Off	L1	19.7	18.2	46.0
3.214000	28.4	Off	L1	19.7	17.6	46.0
3.478000	29.2	Off	L1	19.7	16.8	46.0
3.662000	27.6	Off	L1	19.7	18.4	46.0
3.830000	29.1	Off	L1	19.7	16.9	46.0
4.126000	27.9	Off	L1	19.7	18.1	46.0
4.278000	28.8	Off	L1	19.7	17.2	46.0
4.430000	28.8	Off	L1	19.7	17.2	46.0

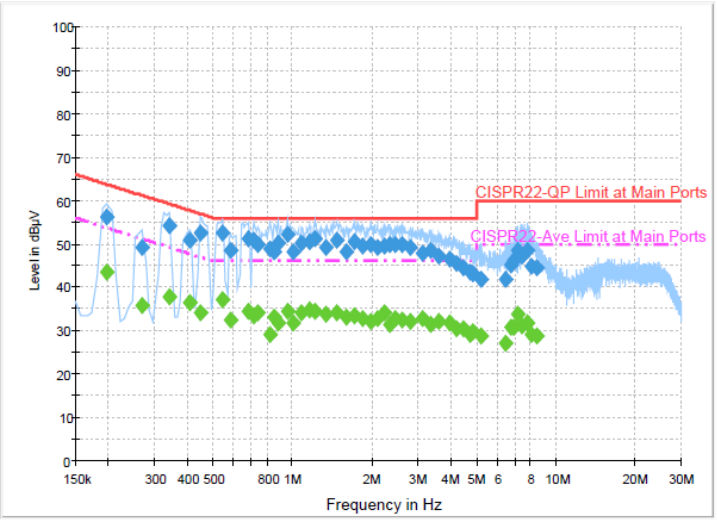
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
4.686000	28.7	Off	L1	19.7	17.3	46.0
4.878000	30.2	Off	L1	19.8	15.8	46.0
5.494000	29.6	Off	L1	19.7	20.4	50.0
5.814000	31.3	Off	L1	19.7	18.7	50.0
6.094000	30.8	Off	L1	19.7	19.2	50.0
6.358000	31.5	Off	L1	19.8	18.5	50.0
6.702000	35.5	Off	L1	19.7	14.5	50.0
7.094000	37.1	Off	L1	19.8	12.9	50.0
7.406000	32.9	Off	L1	19.7	17.1	50.0
7.630000	36.3	Off	L1	19.7	13.7	50.0
7.982000	34.6	Off	L1	19.7	15.4	50.0
8.302000	32.6	Off	L1	19.7	17.4	50.0

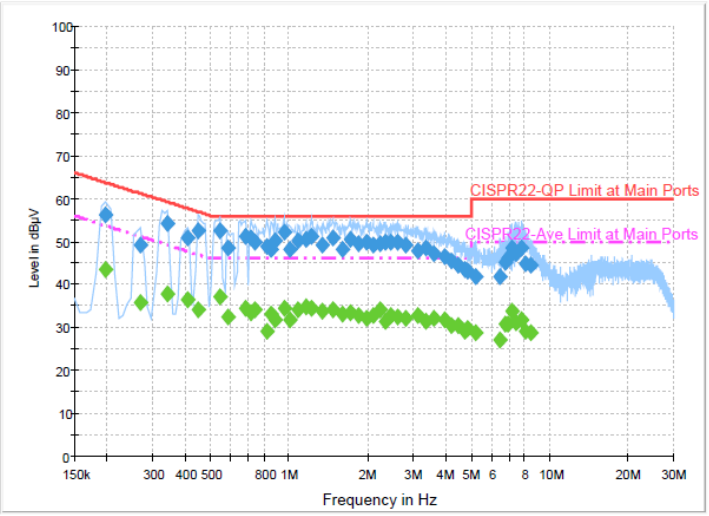
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	56.1	Off	N	19.7	7.6	63.7
0.270000	49.1	Off	N	19.7	12.0	61.1
0.342000	54.3	Off	N	19.7	4.9	59.2
0.406000	51.0	Off	N	19.7	6.7	57.7
0.446000	52.5	Off	N	19.6	4.4	56.9
0.542000	52.6	Off	N	19.7	3.4	56.0
0.582000	48.4	Off	N	19.7	7.6	56.0
0.678000	51.3	Off	N	19.6	4.7	56.0
0.710000	50.9	Off	N	19.6	5.1	56.0
0.742000	49.9	Off	N	19.6	6.1	56.0
0.822000	49.0	Off	N	19.6	7.0	56.0
0.854000	48.0	Off	N	19.6	8.0	56.0
0.886000	50.0	Off	N	19.7	6.0	56.0
0.958000	52.0	Off	N	19.7	4.0	56.0
1.006000	48.2	Off	N	19.7	7.8	56.0
1.086000	50.3	Off	N	19.6	5.7	56.0
1.158000	50.5	Off	N	19.7	5.5	56.0
1.214000	51.1	Off	N	19.6	4.9	56.0
1.342000	49.0	Off	N	19.6	7.0	56.0
1.470000	50.7	Off	N	19.7	5.3	56.0
1.606000	48.2	Off	N	19.7	7.8	56.0
1.726000	50.6	Off	N	19.7	5.4	56.0
1.854000	49.4	Off	N	19.7	6.6	56.0

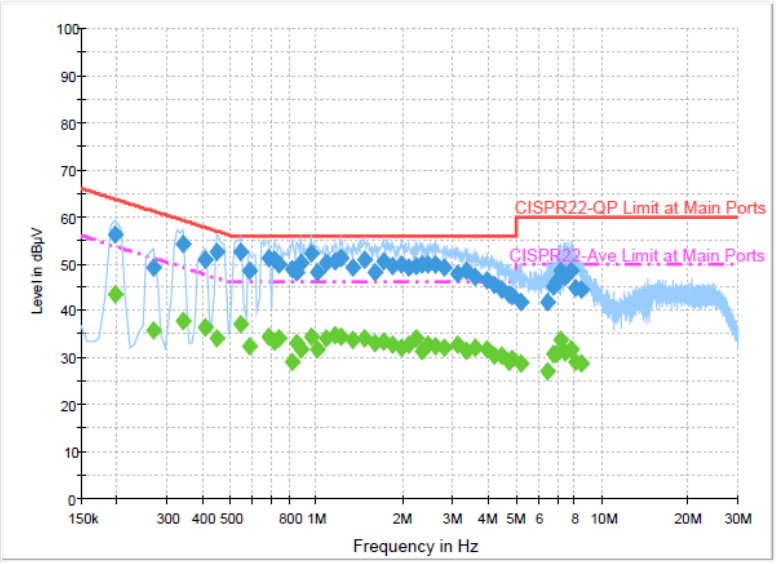
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.998000	49.8	Off	N	19.7	6.2	56.0
2.102000	49.3	Off	N	19.6	6.7	56.0
2.238000	49.6	Off	N	19.7	6.4	56.0
2.342000	49.8	Off	N	19.6	6.2	56.0
2.462000	49.7	Off	N	19.6	6.3	56.0
2.598000	49.8	Off	N	19.7	6.2	56.0
2.822000	49.0	Off	N	19.7	7.0	56.0
3.134000	48.0	Off	N	19.7	8.0	56.0
3.366000	48.4	Off	N	19.7	7.6	56.0
3.622000	47.2	Off	N	19.7	8.8	56.0
3.958000	46.6	Off	N	19.7	9.4	56.0
4.206000	45.5	Off	N	19.7	10.5	56.0
4.486000	44.6	Off	N	19.7	11.4	56.0
4.718000	43.3	Off	N	19.7	12.7	56.0
4.862000	43.3	Off	N	19.7	12.7	56.0
5.238000	41.7	Off	N	19.7	18.3	60.0
6.494000	41.7	Off	N	19.7	18.3	60.0
6.766000	45.1	Off	N	19.7	14.9	60.0
6.958000	46.2	Off	N	19.7	13.8	60.0
7.222000	48.6	Off	N	19.8	11.4	60.0
7.494000	47.1	Off	N	19.7	12.9	60.0
7.790000	48.6	Off	N	19.8	11.4	60.0
8.070000	44.9	Off	N	19.7	15.1	60.0
8.510000	44.3	Off	N	19.7	15.7	60.0

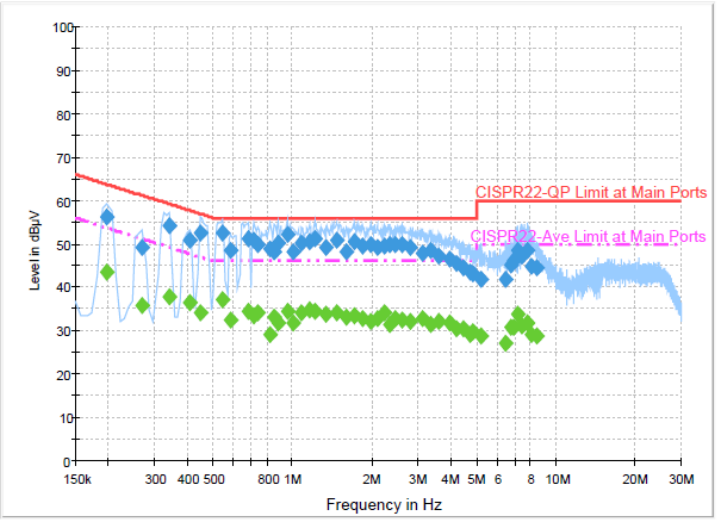
Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	43.5	Off	N	19.7	10.2	53.7
0.270000	35.8	Off	N	19.7	15.3	51.1
0.342000	37.8	Off	N	19.7	11.4	49.2
0.406000	36.3	Off	N	19.7	11.4	47.7
0.446000	34.2	Off	N	19.6	12.7	46.9
0.542000	37.1	Off	N	19.7	8.9	46.0
0.582000	32.5	Off	N	19.7	13.5	46.0
0.678000	34.4	Off	N	19.6	11.6	46.0
0.710000	33.5	Off	N	19.6	12.5	46.0
0.742000	34.1	Off	N	19.6	11.9	46.0
0.822000	29.1	Off	N	19.6	16.9	46.0
0.854000	33.0	Off	N	19.6	13.0	46.0
0.886000	31.8	Off	N	19.7	14.2	46.0
0.958000	34.3	Off	N	19.7	11.7	46.0
1.006000	31.7	Off	N	19.7	14.3	46.0
1.086000	34.2	Off	N	19.6	11.8	46.0
1.158000	34.9	Off	N	19.7	11.1	46.0
1.214000	34.6	Off	N	19.6	11.4	46.0
1.342000	33.7	Off	N	19.6	12.3	46.0
1.470000	34.1	Off	N	19.7	11.9	46.0
1.606000	33.0	Off	N	19.7	13.0	46.0
1.726000	33.5	Off	N	19.7	12.5	46.0
1.854000	32.9	Off	N	19.7	13.1	46.0

Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Bluetooth Link + WLAN (5GHz) Link + Camera + Earphone + USB Cable (Charging from Adapter)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.998000	32.2	Off	N	19.7	13.8	46.0
2.102000	32.8	Off	N	19.6	13.2	46.0
2.238000	34.1	Off	N	19.7	11.9	46.0
2.342000	31.5	Off	N	19.6	14.5	46.0
2.462000	32.9	Off	N	19.6	13.1	46.0
2.598000	32.5	Off	N	19.7	13.5	46.0
2.822000	32.2	Off	N	19.7	13.8	46.0
3.134000	32.9	Off	N	19.7	13.1	46.0
3.366000	31.3	Off	N	19.7	14.7	46.0
3.622000	32.1	Off	N	19.7	13.9	46.0
3.958000	31.9	Off	N	19.7	14.1	46.0
4.206000	30.5	Off	N	19.7	15.5	46.0
4.486000	30.4	Off	N	19.7	15.6	46.0
4.718000	29.2	Off	N	19.7	16.8	46.0
4.862000	29.6	Off	N	19.7	16.4	46.0
5.238000	28.9	Off	N	19.7	21.1	50.0
6.494000	27.1	Off	N	19.7	22.9	50.0
6.766000	30.9	Off	N	19.7	19.1	50.0
6.958000	30.9	Off	N	19.7	19.1	50.0
7.222000	33.6	Off	N	19.8	16.4	50.0
7.494000	31.0	Off	N	19.7	19.0	50.0
7.790000	31.9	Off	N	19.8	18.1	50.0
8.070000	29.0	Off	N	19.7	21.0	50.0
8.510000	28.9	Off	N	19.7	21.1	50.0

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

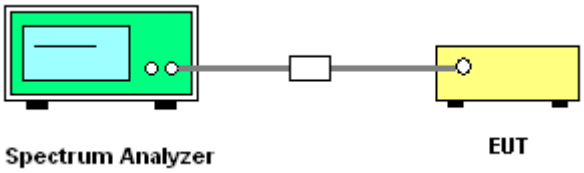
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.8 Antenna Requirements

3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band IV	2.86	-0.78	4.24	4.24	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Jul. 29, 2015	Dec. 17, 2015	Jul. 28, 2016	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 29, 2015	Dec. 17, 2015	Jul. 28, 2016	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 18, 2015	Dec. 17, 2015	Jun. 17, 2016	Conducted (TH02-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 08, 2015	Dec. 17, 2015	Sep. 07, 2016	Conducted (TH02-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 12, 2015	Dec. 17, 2015	Oct. 11, 2016	Conducted (TH02-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Sep. 01, 2016	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 20, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Nov. 19, 2016	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 08, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Oct. 07, 2016	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 19, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Nov. 18, 2016	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1902247	1GHz~18GHz	Jul. 01, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Jun. 30, 2016	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHZ	Sep. 24, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Sep. 23, 2016	Radiation (03CH11-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Feb. 02, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Feb. 01, 2016	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Dec. 16, 2015 ~ Jan. 06, 2016	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0-360 degree	N/A	Dec. 16, 2015 ~ Jan. 06, 2016	N/A	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D	35414	30MHz to 1GHz	Nov. 17, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Nov. 16, 2016	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 20, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Apr. 19, 2016	Radiation (03CH11-HY)
Preamplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	Dec. 16, 2015 ~ Jan. 06, 2016	Jun. 01, 2016	Radiation (03CH11-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Dec. 23, 2015	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	Dec. 23, 2015	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Dec. 23, 2015	Dec. 01, 2016	Conduction (CO05-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.9**

Appendix A. Conducted Test Results