

FCC RF Test Report

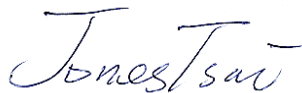
APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE/WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z970
FCC ID : SRQ-Z970
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Apr. 04, 2014 and testing was completed on Jul. 17, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR440404E	Rev. 01	Initial issue of report	Jul. 22, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
0	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 2.29 dB at 5713.320 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.48 dB at 0.390 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

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	LTE/WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z970
FCC ID	SRQ-Z970
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/DC-HSDPA/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ WLAN 5GHz 802.11a/n HT20/HT40/ WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	wwdB
SW Version	Z970V1.0.0B01
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

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5805 MHz
Maximum Output Power	802.11a : 16.83 dBm / 0.0482 W 802.11n HT20 : 16.45 dBm / 0.0442 W 802.11n HT40 : 15.95 dBm / 0.0394 W 802.11ac VHT20: 16.38 dBm / 0.0435 W 802.11ac VHT40: 15.41 dBm / 0.0348 W 802.11ac VHT80: 15.18 dBm / 0.0330 W
Antenna Type	PIFA Antenna with gain -6.00 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

1.5 Modification of EUT

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

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC Registration No.
	TH01-KS	03CH01-KS	CO01-KS	149928

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 v01
- ♦ ANSI C63.4-2003

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. 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 (Y 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	-	-

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.

WLAN 5GHz 802.11a RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 149	5745	14.73	CH 157	16.63	16.61	16.72	16.61	16.57	16.59	16.62
CH 157	5785	16.83								
CH 161	5805	16.71								

WLAN 5GHz 802.11n-HT20 RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 149	5745	14.39	CH 157	16.38	16.43	16.36	16.33	16.44	16.32	16.28
CH 157	5785	16.45								
CH 161	5805	16.33								

WLAN 5GHz 802.11n-HT40 RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 151	5755	12.54	CH 159	15.66	15.66	15.55	15.65	15.85	15.67	15.65
CH 159	5795	15.95								

WLAN 5GHz 802.11ac VHT20 RF Power (dBm)											
Power vs. Channel			Power vs. MCS Index								
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
		MCS0									
CH 149	5745	16.25	CH 157	16.11	16.22	15.93	16.14	16.31	16.05	15.97	16.14
CH 157	5785	16.38									
CH 161	5805	16.21									



WLAN 5GHz 802.11ac VHT40 RF Power (dBm)												
Power vs. Channel			Power vs. MCS Index									
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
		MCS0										
CH 151	5755	14.04	CH 159	15.25	15.28	14.99	15.32	15.33	15.38	15.23	15.33	15.08
CH 159	5795	15.41										

WLAN 5GHz 802.11ac VHT80 RF Power (dBm)												
Power vs. Channel			Power vs. MCS Index									
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
		MCS0										
CH 155	5775	15.18	CH 155	14.89	14.80	14.99	14.84	15.05	15.03	14.98	14.86	15.14

2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

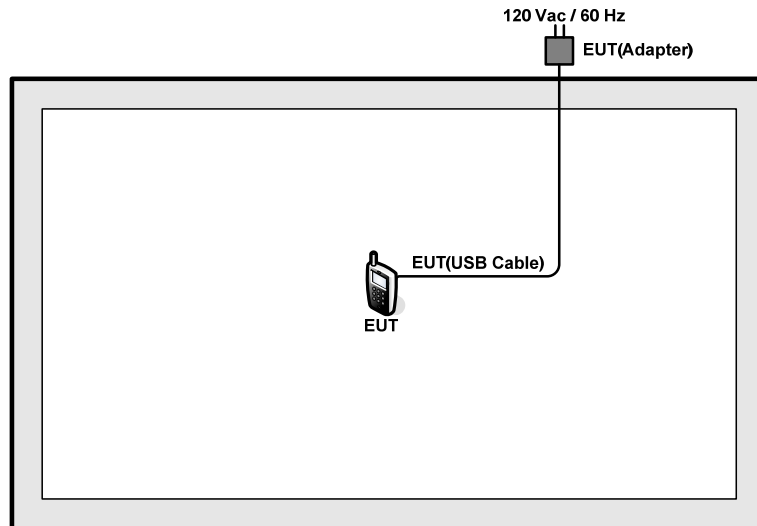
Test Cases				
Conducted TCs	Test Items	Mode	Data rate	Test Channel
	6dB Bandwidth Power Spectral Density	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0	L/M/H
		802.11n HT40	MCS0	L/M/H
		802.11ac VHT20	MCS0	L/M/H
		802.11ac VHT40	MCS0	L/M/H
		802.11ac VHT80	MCS0	M
	Output Power	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0	L/M/H
		802.11n HT40	MCS0	L/M/H
		802.11ac VHT20	MCS0	L/M/H
		802.11ac VHT40	MCS0	L/M/H
		802.11ac VHT80	MCS0	M
	Frequency Stability	802.11a	6 Mbps	L
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	MCS0	L/H
		802.11n HT40	MCS0	L/H
		802.11ac VHT80	MCS0	M
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0	L/M/H
		802.11n HT40	MCS0	L/M/H
		802.11ac VHT80	MCS0	M
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (5G) Link + 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	161	161	159

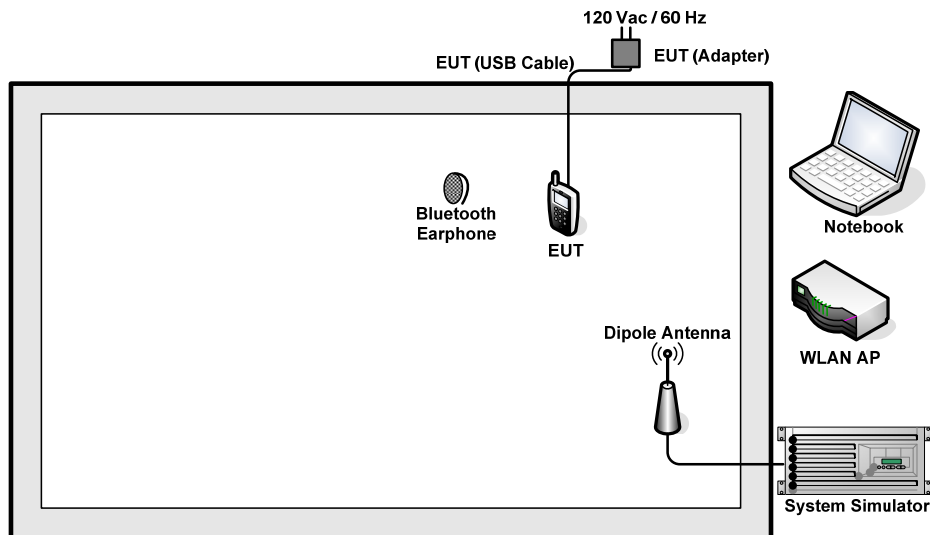
Ch. #		Band IV : 5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	161	159	-

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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	Notebook	Acer	MS2204	QDS-BRCM1018	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 0.9 m
5.	Bluetooth Earphone	Lenovo	LBH505	N/A	N/A	N/A

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

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 7.3 dB and 10dB attenuator.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\
 &= 7.3 + 10 = 17.3 \text{ (dB)}
 \end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Description of 6dB Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

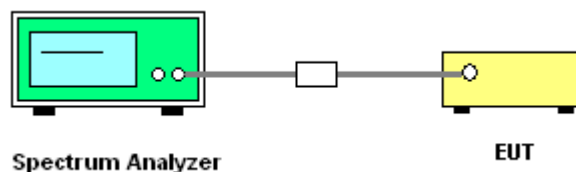
3.1.2 Measuring Instruments

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 v01.
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW $\geq 3 \times$ 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.

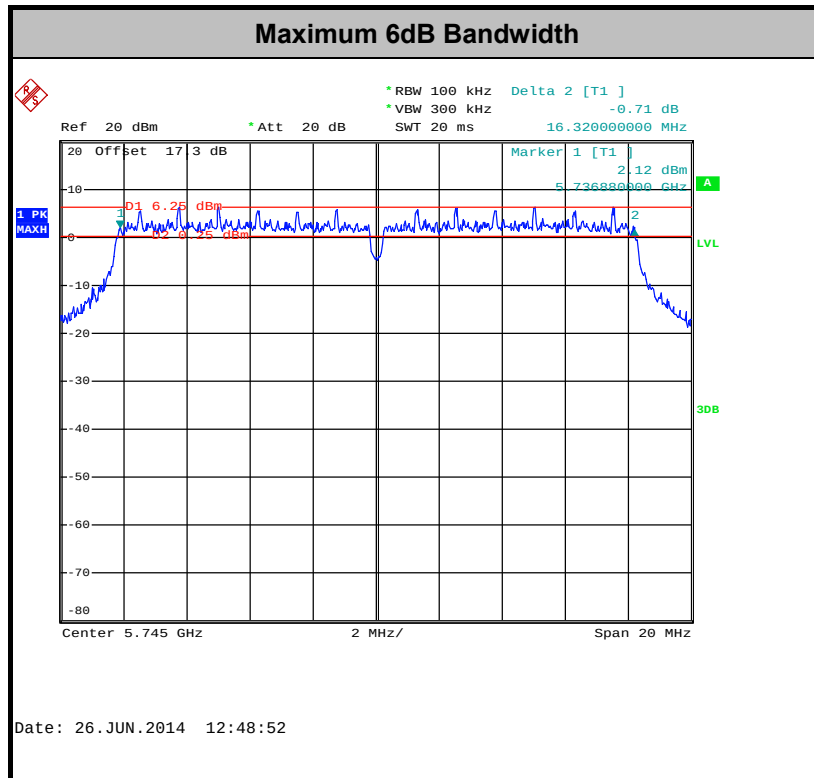
3.1.4 Test Setup



**3.1.5 Test Result of 6dB Bandwidth**

Test Band :	5GHz band 4	Temperature :	25~27℃
Test Engineer :	Steven Hao	Relative Humidity :	42~43%

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
11a	6Mbps	1	149	5745	16.32	0.5	Pass
11a	6Mbps	1	157	5785	16.36	0.5	Pass
11a	6Mbps	1	161	5805	16.36	0.5	Pass
HT20	MCS0	1	149	5745	17.56	0.5	Pass
HT20	MCS0	1	157	5785	17.56	0.5	Pass
HT20	MCS0	1	161	5805	17.56	0.5	Pass
HT40	MCS0	1	151	5755	35.36	0.5	Pass
HT40	MCS0	1	159	5795	35.12	0.5	Pass
VHT20	MCS0	1	149	5745	17.56	0.5	Pass
VHT20	MCS0	1	157	5785	17.56	0.5	Pass
VHT20	MCS0	1	161	5805	17.56	0.5	Pass
VHT40	MCS0	1	151	5755	35.12	0.5	Pass
VHT40	MCS0	1	159	5795	35.12	0.5	Pass
VHT80	MCS0	1	155	5775	75.10	0.5	Pass



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

<FCC 14-30 CFR 15.407>

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.

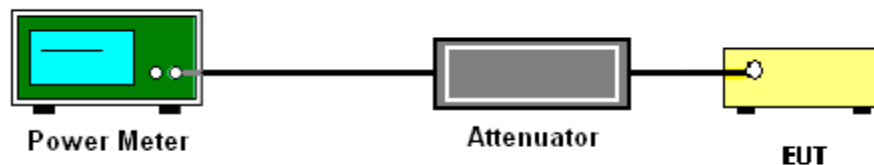
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

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

Test Band :	5GHz band 4	Temperature :	25~27°C
Test Engineer :	Steven Hao	Relative Humidity :	42~43%

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	Pass /Fail
11a	6Mbps	1	149	5745	0.59	14.73	30.00	-6.00	Pass
11a	6Mbps	1	157	5785	0.59	16.83	30.00	-6.00	Pass
11a	6Mbps	1	165	5825	0.59	16.71	30.00	-6.00	Pass
HT20	MCS0	1	149	5745	0.62	14.39	30.00	-6.00	Pass
HT20	MCS0	1	157	5785	0.62	16.45	30.00	-6.00	Pass
HT20	MCS0	1	165	5825	0.62	16.33	30.00	-6.00	Pass
HT40	MCS0	1	151	5755	1.17	12.54	30.00	-6.00	Pass
HT40	MCS0	1	159	5795	1.17	15.95	30.00	-6.00	Pass
VHT20	MCS0	1	149	5745	0.82	16.25	30.00	-6.00	Pass
VHT20	MCS0	1	157	5785	0.82	16.38	30.00	-6.00	Pass
VHT20	MCS0	1	165	5825	0.82	16.21	30.00	-6.00	Pass
VHT40	MCS0	1	151	5755	1.45	14.04	30.00	-6.00	Pass
VHT40	MCS0	1	159	5795	1.45	15.41	30.00	-6.00	Pass
VHT80	MCS0	1	155	5775	2.59	15.18	30.00	-6.00	Pass

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

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 v01.
Section F) Maximum power spectral density.

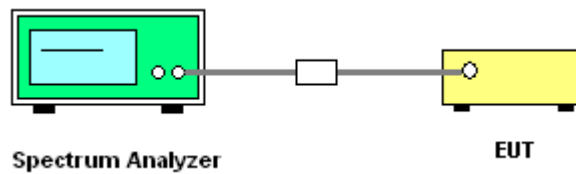
Method SA-2

(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 D01 General UNII Test Procedures v01r03.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW $\geq$ 1 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ 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.

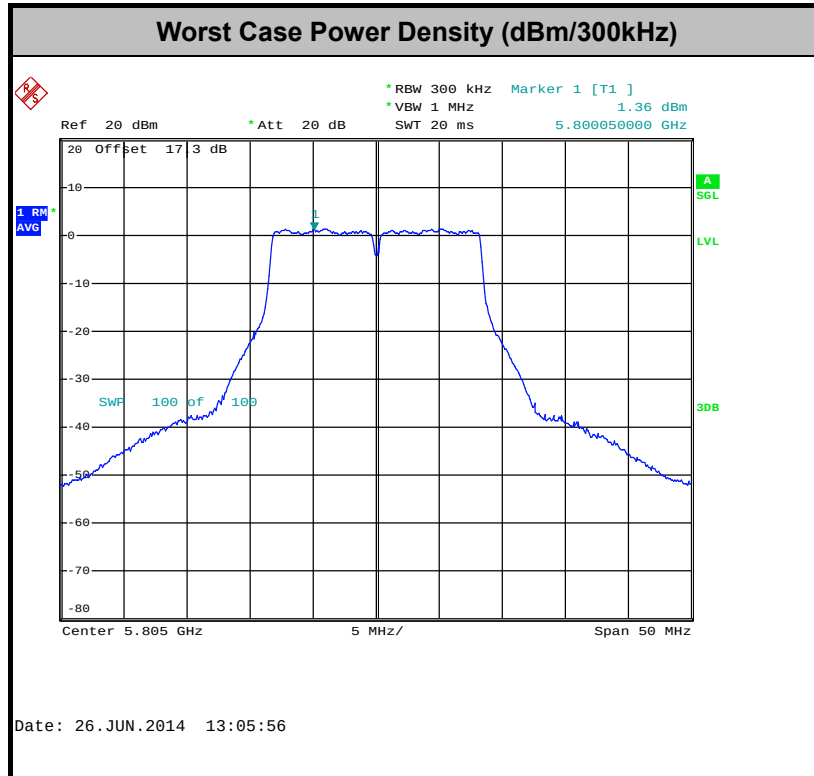
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 4	Temperature :	25~27°C
Test Engineer :	Steven Hao	Relative Humidity :	42~43%

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass /Fail
11a	6Mbps	1	149	5745	0.59	2.22	2.70	30.00	-6.00	Pass
11a	6Mbps	1	157	5785	0.59	2.22	4.04	30.00	-6.00	Pass
11a	6Mbps	1	161	5805	0.59	2.22	4.17	30.00	-6.00	Pass
HT20	MCS0	1	149	5745	0.62	2.22	1.10	30.00	-6.00	Pass
HT20	MCS0	1	157	5785	0.62	2.22	3.41	30.00	-6.00	Pass
HT20	MCS0	1	161	5805	0.62	2.22	3.16	30.00	-6.00	Pass
HT40	MCS0	1	151	5755	1.17	2.22	-2.92	30.00	-6.00	Pass
HT40	MCS0	1	159	5795	1.17	2.22	0.71	30.00	-6.00	Pass
VHT20	MCS0	1	149	5745	0.82	2.22	3.54	30.00	-6.00	Pass
VHT20	MCS0	1	157	5785	0.82	2.22	3.53	30.00	-6.00	Pass
VHT20	MCS0	1	161	5805	0.82	2.22	3.79	30.00	-6.00	Pass
VHT40	MCS0	1	151	5755	1.45	2.22	-0.02	30.00	-6.00	Pass
VHT40	MCS0	1	159	5795	1.45	2.22	0.03	30.00	-6.00	Pass
VHT80	MCS0	1	155	5775	2.59	2.22	-2.44	30.00	-6.00	Pass



Note: Average Power Density (dB) = Measured value+ Duty Factor+ RBW Factor

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 Part 15.205.

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 Part 15.205 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.

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

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

- (3) KDB789033 v01r03 H)2)c)(i) 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 v01.

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 $\geq$ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

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

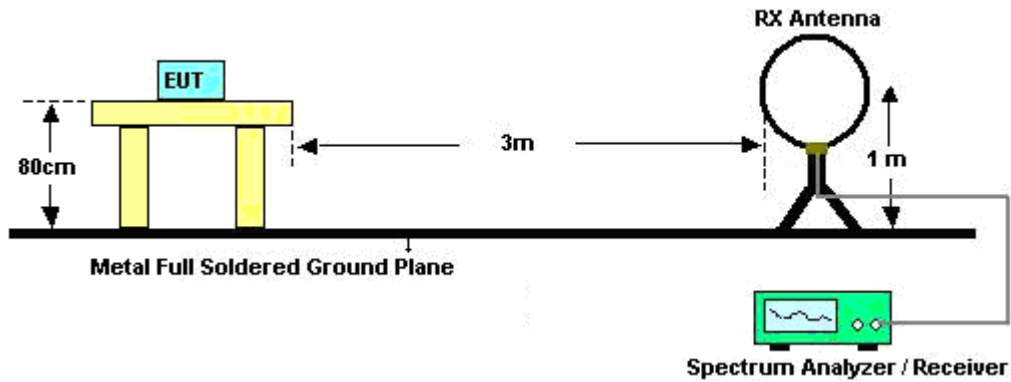
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.23	1.36	0.74	1kHz
802.11n HT20	86.60	1.27	0.79	1kHz
802.11n HT40	76.31	0.64	1.56	3kHz
802.11n VHT20	82.85	0.98	1.02	3kHz
802.11n VHT40	71.55	0.50	2.01	3kHz
802.11n VHT80	55.11	0.25	4.03	10kHz

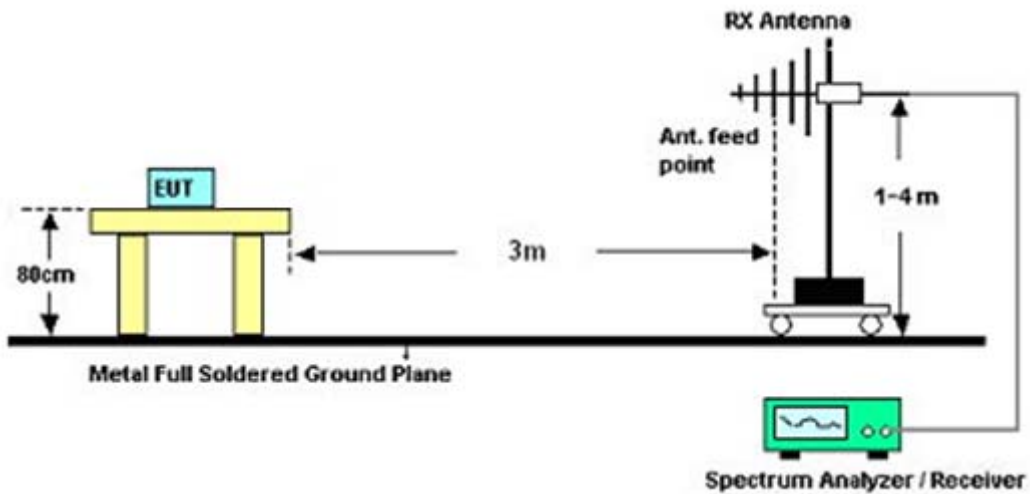
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters 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

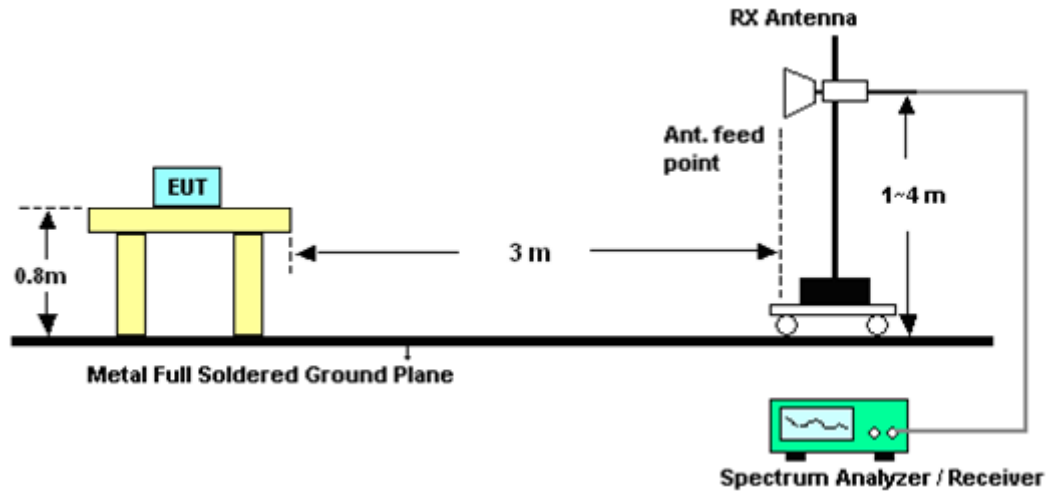
For radiated emissions below 30MHz



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

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5710.6	59.15	-9.15	68.3	56.01	34.72	4.13	35.71	100	306	Peak
5724.92	72.7	-5.6	78.3	69.55	34.73	4.15	35.73	100	306	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5713.4	58.47	-9.83	68.3	55.33	34.72	4.13	35.71	115	77	Peak
5724.36	74.47	-3.83	78.3	71.32	34.73	4.15	35.73	115	77	Peak

Remark:

- 5710.6/5713.4 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
- 5724.92/5724.36 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5857.6	53.79	-24.51	78.3	50.6	34.82	4.24	35.87	100	309	Peak
5885.04	53.26	-15.04	68.3	50.08	34.83	4.23	35.88	100	309	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5857.6	55.54	-22.76	78.3	52.35	34.82	4.24	35.87	114	79	Peak
5860.32	53.26	-15.04	68.3	50.07	34.82	4.24	35.87	114	79	Peak

Remark:

- 5885.04/5860.32MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
- 5857.6 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5693.08	55.84	-12.46	68.3	52.72	34.71	4.1	35.69	100	319	Peak
5724.2	70.49	-7.81	78.3	67.34	34.73	4.15	35.73	100	319	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.28	57.15	-11.15	68.3	54.01	34.72	4.13	35.71	115	86	Peak
5723.8	72.68	-5.62	78.3	69.53	34.73	4.15	35.73	115	86	Peak

Remark:

- 5693.08/5714.28 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
- 5724.2/5723.8 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5857.6	54.1	-24.2	78.3	50.91	34.82	4.24	35.87	100	302	Peak
5879.6	52.72	-15.58	68.3	49.54	34.83	4.23	35.88	100	302	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5856.96	53.69	-24.61	78.3	50.5	34.82	4.24	35.87	112	107	Peak
5877.44	52.66	-15.64	68.3	49.47	34.83	4.24	35.88	112	107	Peak

Remark:

- 5879.6/5877.44 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
- 5857.6/5856.96 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.68	62.57	-5.73	68.3	59.43	34.72	4.13	35.71	113	301	Peak
5724.44	73.97	-4.33	78.3	70.82	34.73	4.15	35.73	113	301	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5713.8	61.82	-6.48	68.3	58.68	34.72	4.13	35.71	104	103	Peak
5724.84	71.54	-6.76	78.3	68.39	34.73	4.15	35.73	104	103	Peak

Remark:

- 5714.68/5713.8 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
- 5724.44/5724.84 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.08	55.18	-23.12	78.3	51.98	34.81	4.24	35.85	100	309	Peak
5868.32	53.05	-15.25	68.3	49.86	34.82	4.24	35.87	100	309	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.72	56.28	-22.02	78.3	53.08	34.81	4.24	35.85	113	108	Peak
5867.2	53.77	-14.53	68.3	50.58	34.82	4.24	35.87	113	108	Peak

Remark:

- 5868.32/5867.2 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
- 5850.08/5850.72 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.



Test Mode :	802.11n VHT80	Temperature :	22~23°C
Test Channel :	155	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5713.32	66.01	-2.29	68.3	62.87	34.72	4.13	35.71	100	302	Peak
5724.84	73.13	-5.17	78.3	69.98	34.73	4.15	35.73	100	302	Peak
5850.72	60.32	-17.98	78.3	57.12	34.81	4.24	35.85	100	302	Peak
5861.84	59.89	-8.41	68.3	56.7	34.82	4.24	35.87	100	302	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5713.56	64.54	-3.76	68.3	61.4	34.72	4.13	35.71	104	110	Peak
5724.92	71.48	-6.82	78.3	68.33	34.73	4.15	35.73	104	110	Peak
5850.32	57.86	-20.44	78.3	54.66	34.81	4.24	35.85	104	110	Peak
5861.84	57.96	-10.34	68.3	54.77	34.82	4.24	35.87	104	110	Peak

Remark:

1. 5713.32/5861.84/5713.56/5861.84 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit.
2. 5724.84/5850.72/5724.92/5850.32 MHz is not within a restricted band, and satisfies 78.3 dBμV /m peak emission limit.

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

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored.. 2. 17238 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	107.66	-	-	104.49	34.74	4.18	35.75	100	306	Peak
5745	96.37	-	-	93.2	34.74	4.18	35.75	100	306	Average
11487	45.3	-28.7	74	65.99	4.47	8.84	34	100	200	Peak
17238	40.82	-27.48	68.3	63.19	2.12	9.17	33.66	100	109	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. 17247 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	109.55	-	-	106.38	34.74	4.18	35.75	115	77	Peak
5745	97.44	-	-	94.27	34.74	4.18	35.75	115	77	Average
11496	43.3	-30.7	74	63.99	4.47	8.84	34	100	194	Peak
17247	36.16	-32.14	68.3	58.48	2.17	9.16	33.65	100	41	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. 17346 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	108.32	-	-	105.09	34.77	4.24	35.78	100	308	Peak
5785	96.89	-	-	93.66	34.77	4.24	35.78	100	308	Average
11568	45.54	-28.46	74	66.38	4.38	8.8	34.02	100	125	Peak
17346	38.96	-29.34	68.3	60.93	2.45	9.16	33.58	100	102	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. 17346 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	109.47	-	-	106.24	34.77	4.24	35.78	114	77	Peak
5785	98.1	-	-	94.87	34.77	4.24	35.78	114	77	Average
11568	39.13	-34.87	74	59.97	4.38	8.8	34.02	100	20	Peak
17346	34.74	-33.56	68.3	56.71	2.45	9.16	33.58	100	41	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. 17418 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	107.63	-	-	104.39	34.79	4.27	35.82	100	309	Peak
5805	96.19	-	-	92.95	34.79	4.27	35.82	100	309	Average
11610	45.63	-28.37	74	66.62	4.29	8.76	34.04	100	109	Peak
17418	37.2	-31.1	68.3	58.92	2.67	9.15	33.54	100	194	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. 17418 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	107.85	-	-	104.61	34.79	4.27	35.82	114	79	Peak
5805	96.39	-	-	93.15	34.79	4.27	35.82	114	79	Average
11604	38.38	-35.62	74	59.37	4.29	8.76	34.04	100	41	Peak
17418	35.44	-32.86	68.3	57.16	2.67	9.15	33.54	100	15	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored.. 2. 17232 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	106.51	-	-	103.34	34.74	4.18	35.75	100	319	Peak
5745	94.34	-	-	91.17	34.74	4.18	35.75	100	319	Average
11484	40.88	-33.12	74	61.57	4.47	8.84	34	100	225	Peak
17232	33.99	-34.31	68.3	56.36	2.12	9.17	33.66	100	221	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored.. 2. 17226 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	107.31	-	-	104.14	34.74	4.18	35.75	115	86	Peak
5745	96.19	-	-	93.02	34.74	4.18	35.75	115	86	Average
11490	37.53	-36.47	74	58.22	4.47	8.84	34	100	19	Peak
17226	34.04	-34.26	68.3	56.47	2.08	9.17	33.68	100	106	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. 17349 MHz is not within a restricted band, and satisfies 68.3 dB μ V /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	107.27	-	-	104.04	34.77	4.24	35.78	100	318	Peak
5785	95.58	-	-	92.35	34.77	4.24	35.78	100	318	Average
11565	44.31	-29.69	74	65.1	4.42	8.81	34.02	100	23	Peak
17349	37.23	-31.07	68.3	59.2	2.45	9.16	33.58	100	108	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. 17346 MHz is not within a restricted band, and satisfies 68.3 dB μ V /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	108.81	-	-	105.58	34.77	4.24	35.78	112	75	Peak
5785	96.78	-	-	93.55	34.77	4.24	35.78	112	75	Average
11571	38.79	-35.21	74	59.63	4.38	8.8	34.02	100	302	Peak
17346	34.65	-33.65	68.3	56.62	2.45	9.16	33.58	100	169	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. 17409 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	106.81	-	-	103.57	34.79	4.27	35.82	100	302	Peak
5805	95.37	-	-	92.13	34.79	4.27	35.82	100	302	Average
11610	42.69	-31.31	74	63.68	4.29	8.76	34.04	100	19	Peak
17409	36.47	-31.83	68.3	58.25	2.61	9.16	33.55	100	240	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. 17418 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	105.23	-	-	101.99	34.79	4.27	35.82	112	107	Peak
5805	94.08	-	-	90.84	34.79	4.27	35.82	112	107	Average
11610	36.84	-37.16	74	57.83	4.29	8.76	34.04	100	29	Peak
17418	32.48	-35.82	68.3	54.2	2.67	9.15	33.54	100	102	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. 17265 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5755	103.59	-	-	100.38	34.76	4.21	35.76	113	301	Peak
5755	91.82	-	-	88.61	34.76	4.21	35.76	113	301	Average
11511	38.35	-35.65	74	58.96	4.53	8.86	34	100	112	Peak
17265	30.2	-38.1	68.3	52.47	2.21	9.16	33.64	100	52	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. 17265 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5755	102.49	-	-	99.28	34.76	4.21	35.76	104	103	Peak
5755	90.87	-	-	87.66	34.76	4.21	35.76	104	103	Average
11511	37.09	-36.91	74	57.7	4.53	8.86	34	100	45	Peak
17265	30.93	-37.37	68.3	53.2	2.21	9.16	33.64	100	198	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. 17385 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	105.56	-	-	102.31	34.78	4.27	35.8	100	309	Peak
5795	94.19	-	-	90.94	34.78	4.27	35.8	100	309	Average
11592	42.86	-31.14	74	63.77	4.34	8.78	34.03	100	25	Peak
17385	31.09	-37.21	68.3	52.94	2.55	9.16	33.56	100	154	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. 17385 MHz is not within a restricted band, and satisfies 68.3 dBμV /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	104.77	-	-	101.52	34.78	4.27	35.8	113	108	Peak
5795	93.46	-	-	90.21	34.78	4.27	35.8	113	108	Average
11589	37.12	-36.88	74	58.03	4.34	8.78	34.03	100	202	Peak
17385	30.57	-37.73	68.3	52.42	2.55	9.16	33.56	100	221	Peak

Test Mode :	802.11ac VHT80	Temperature :	22~23°C
Test Channel :	155	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5775 MHz is fundamental signal which can be ignored. 2. 17325 MHz is not within a restricted band, and satisfies 68.3 dB μ V /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5775	102.48	-	-	99.25	34.77	4.24	35.78	100	302	Peak
5775	92.06	-	-	88.83	34.77	4.24	35.78	100	302	Average
11550	38	-36	74	58.79	4.42	8.81	34.02	100	115	Peak
17325	32.64	-35.66	68.3	54.73	2.35	9.16	33.6	100	56	Peak

Test Mode :	802.11ac VHT80	Temperature :	22~23°C
Test Channel :	155	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5775 MHz is fundamental signal which can be ignored. 2. 17325 MHz is not within a restricted band, and satisfies 68.3 dB μ V /m peak emission limit. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5775	100.4	-	-	97.17	34.77	4.24	35.78	104	110	Peak
5775	90.83	-	-	87.6	34.77	4.24	35.78	104	110	Average
11550	37.08	-36.92	74	57.87	4.42	8.81	34.02	100	201	Peak
17325	30.79	-37.51	68.3	52.88	2.35	9.16	33.6	100	94	Peak

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 (dB μ V)	
	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.

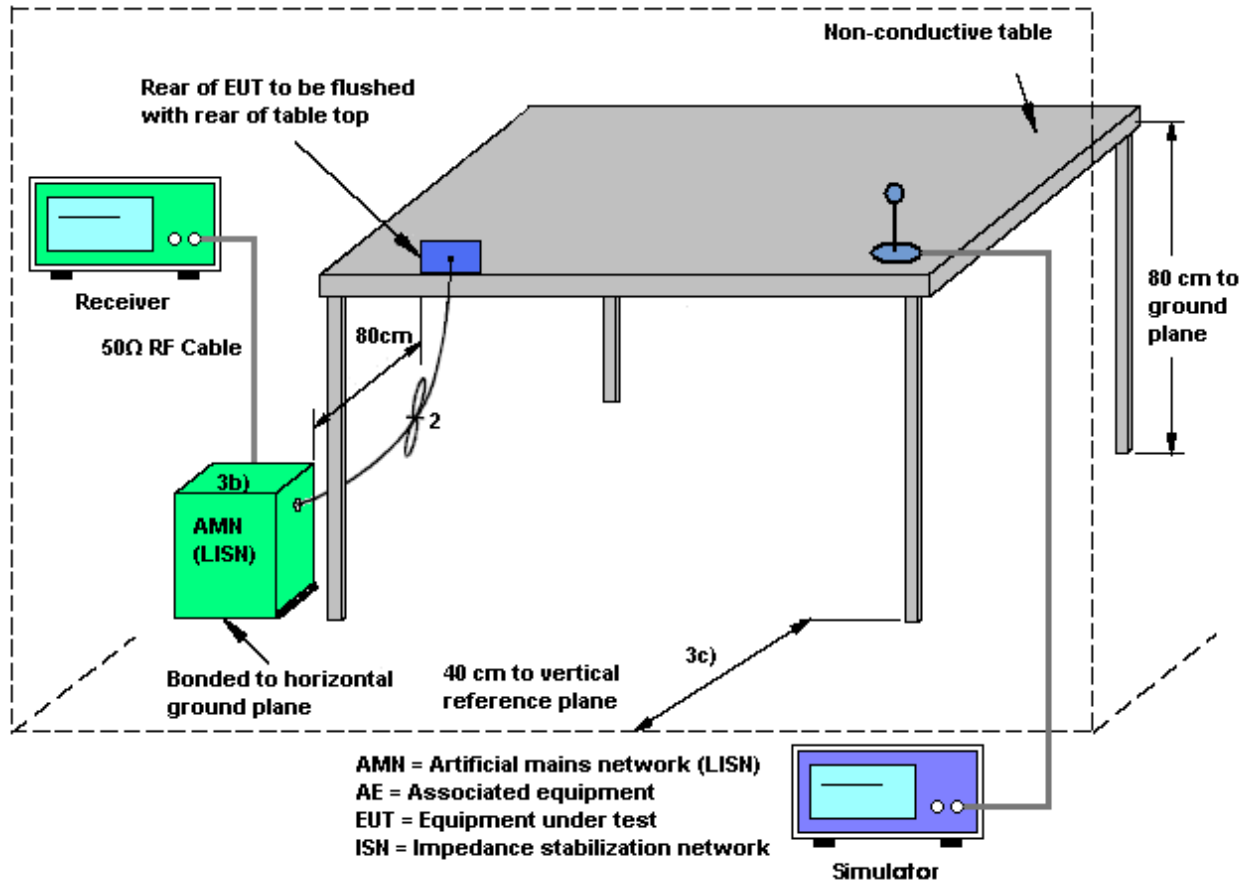
3.5.2 Measuring Instruments

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

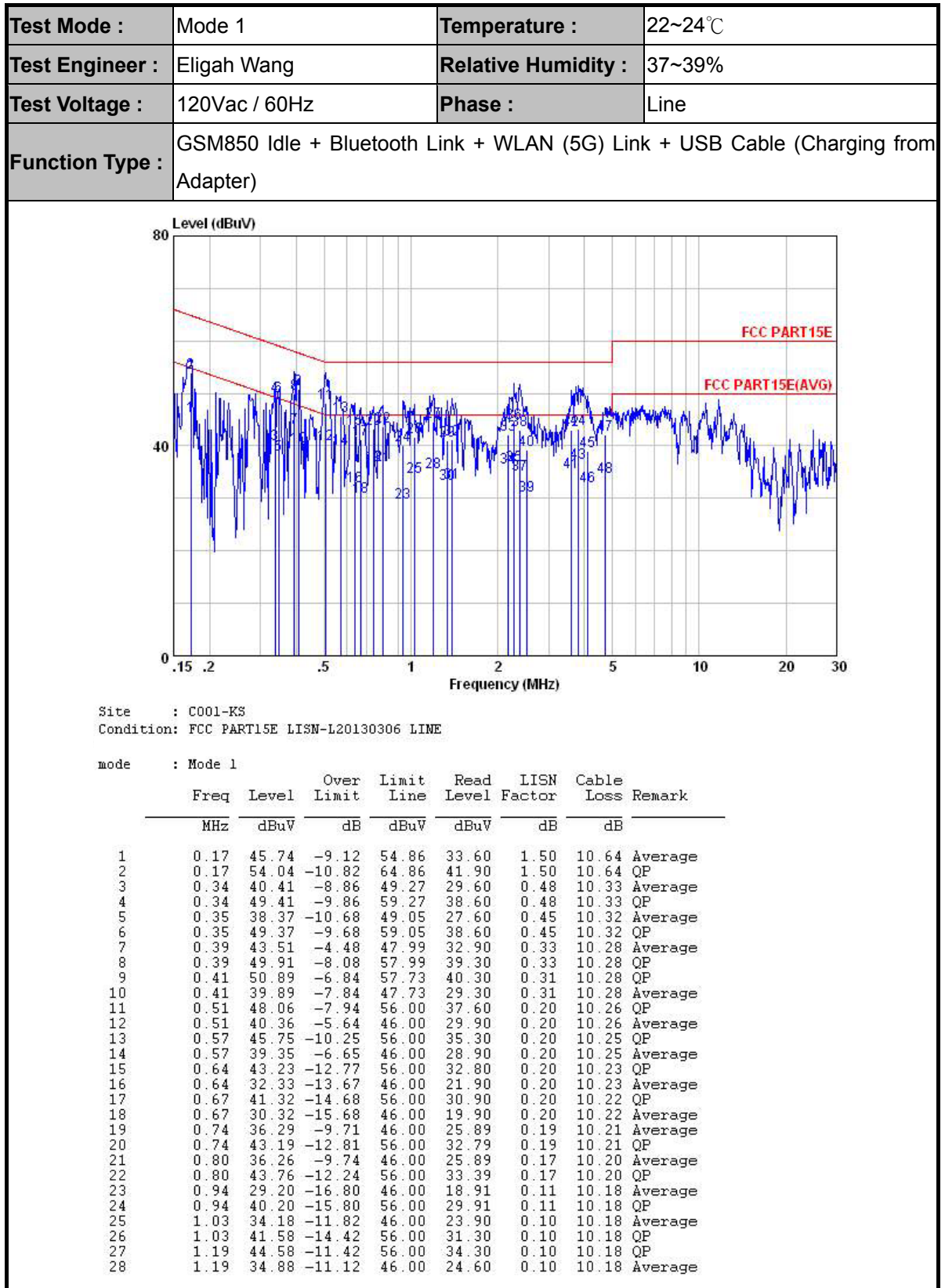
3.5.3 Test Procedures

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

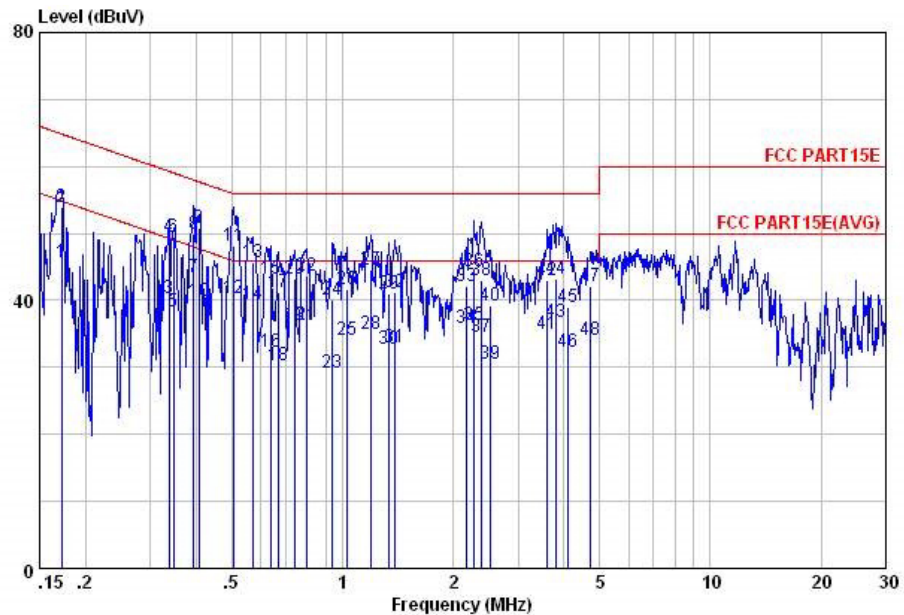


3.5.5 Test Result of AC Conducted Emission





Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eligah Wang	Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5G) Link + USB Cable (Charging from Adapter)		



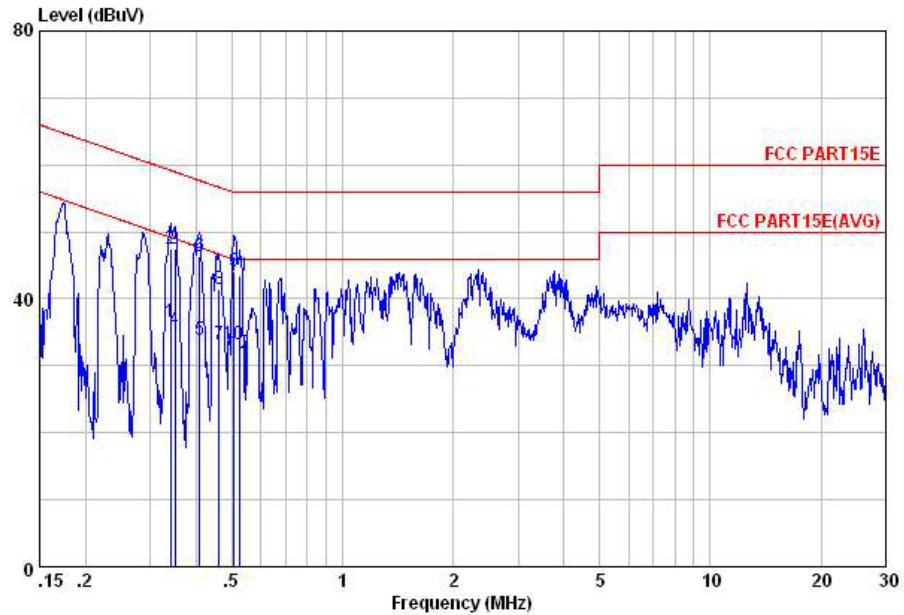
Site : C001-KS
Condition: FCC PART15E LISN-L20130306 LINE

mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
29	1.33	41.08	-14.92	56.00	30.80	0.10	10.18	QP
30	1.33	32.68	-13.32	46.00	22.40	0.10	10.18	Average
31	1.39	33.08	-12.92	46.00	22.80	0.10	10.18	Average
32	1.39	41.18	-14.82	56.00	30.90	0.10	10.18	QP
33	2.17	42.10	-13.90	56.00	31.81	0.10	10.19	QP
34	2.17	35.90	-10.10	46.00	25.61	0.10	10.19	Average
35	2.27	36.40	-9.60	46.00	26.09	0.11	10.20	Average
36	2.27	44.40	-11.60	56.00	34.09	0.11	10.20	QP
37	2.38	34.61	-11.39	46.00	24.30	0.11	10.20	Average
38	2.38	42.91	-13.09	56.00	32.60	0.11	10.20	QP
39	2.51	30.42	-15.58	46.00	20.10	0.12	10.20	Average
40	2.51	39.22	-16.78	56.00	28.90	0.12	10.20	QP
41	3.60	35.01	-10.99	46.00	24.61	0.17	10.23	Average
42	3.60	43.01	-12.99	56.00	32.61	0.17	10.23	QP
43	3.82	36.72	-9.28	46.00	26.30	0.18	10.24	Average
44	3.82	43.32	-12.68	56.00	32.90	0.18	10.24	QP
45	4.11	39.03	-16.97	56.00	28.60	0.19	10.24	QP
46	4.11	32.33	-13.67	46.00	21.90	0.19	10.24	Average
47	4.72	42.05	-13.95	56.00	31.60	0.20	10.25	QP
48	4.72	34.05	-11.95	46.00	23.60	0.20	10.25	Average



Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eligah Wang	Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5G) Link + USB Cable (Charging from Adapter)		



Site : C001-KS
Condition: FCC PART15E LISN-N20130306 NEUTRAL

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.34	36.46	-12.72	49.18	25.60	0.53	10.33	Average
2	0.34	47.46	-11.72	59.18	36.60	0.53	10.33	QP
3	0.35	47.43	-11.53	58.96	36.60	0.51	10.32	QP
4	0.35	35.43	-13.53	48.96	24.60	0.51	10.32	Average
5	0.41	33.97	-13.71	47.68	23.30	0.39	10.28	Average
6	0.41	46.27	-11.41	57.68	35.60	0.39	10.28	QP
7	0.46	33.20	-13.47	46.67	22.60	0.33	10.27	Average
8	0.46	41.50	-15.17	56.67	30.90	0.33	10.27	QP
9	0.51	44.16	-11.84	56.00	33.60	0.30	10.26	QP
10	0.51	33.16	-12.84	46.00	22.60	0.30	10.26	Average
11	0.53	43.45	-12.55	56.00	32.90	0.29	10.26	QP
12	0.53	31.85	-14.15	46.00	21.30	0.29	10.26	Average

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.

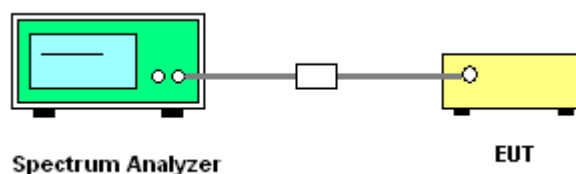
3.6.2 Measuring Instruments

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

Test Band :	5GHz band 4	Test Engineer :	Steven Hao
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Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	3.5
11a	6Mbps	1	149	5745	5745.025	0.025	4.35	20	4.35
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	3.8
11a	6Mbps	1	149	5745	5745.025	0.025	4.35	-10	3.8
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	55	3.8

Note: Center Frequency = (Low Frequency + High Frequency) / 2.

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

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 28, 2013	Jun. 26, 2014	Dec. 27, 2014	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	Jun. 26, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	Jun. 26, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Dec. 10, 2013	Jun. 26, 2014	Dec. 09, 2014	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Jul. 15, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 28, 2013	Jul. 15, 2014	Dec. 27, 2014	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 09, 2013	Jul. 15, 2014	Oct. 08, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Jul. 15, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Jul. 15, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Jul. 15, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Jul. 15, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Jul. 15, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Jul. 15, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 15, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 15, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 15, 2014	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2014	Jul. 17, 2014	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 10, 2013	Jul. 17, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Dec. 10, 2013	Jul. 17, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Nov. 12, 2013	Jul. 17, 2014	Nov. 11, 2014	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5
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