FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	Rogers HSPA/LTE CPE
BRAND NAME	:	ZTE
MODEL NAME	:	MF275R
FCC ID	:	SRQ-MF275R
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Jun. 05, 2015 and testing was completed on Jul. 02, 2015. 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

Testing Laboratory 2627

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

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APPENDIX A. CONDUCTED TEST RESULTS

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR560506B	Rev. 01	Initial issue of report	Aug. 13, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	RSS-247 Section 6	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	RSS-247 Section 6	Maximum Conducted Output Power	FCC ≤24 dBm IC RSS-247 Section 6 Limit	Pass	-
3.3	15.407(a)	RSS-247 Section 6	Power Spectral Density	FCC ≤11 dBm IC RSS-247 Section 6 Limit	Pass	-
3.4	15.407(b)	RSS-247 Section 6	Unwanted Emissions	≤ -17, -27 dBm	Pass	Under limit 2.72 dB at 5148.900 MHz
3.5	15.207	RSS-Gen 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 14.85 dB at 0.150 MHz
3.6	15.407(g)	-	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	RSS-247 6.4(2)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	N/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	Rogers HSPA/LTE CPE
Brand Name	ZTE
Model Name	MF275R
FCC ID	SRQ-MF275R
EUT supports Radios application	WCDMA/HSPA/HSPA+(Downlink Only)/DC-HSDPA/LTE/ WLAN2.4GHz 802.11b/g/n HT20/HT40/ WLAN5GHz 802.11a/n HT20/HT40
IMEI Code	Conducted: 004401783465665 Radiation: 004401783465608 Conduction: 004401783465632
HW Version	dgpB
SW Version	MF275R1.0.5
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

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Frequency Range</td><td>5180 MHz ~ 5240 MHz</td></tr>
<tr><td>Maximum Output Power to Antenna</td><td>802.11a : 17.55 dBm / 0.0569 W
802.11n HT20 : 15.12 dBm / 0.0325 W
802.11n HT40 : 15.33 dBm / 0.0341 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11a : 18.05 MHz
802.11n HT20 : 18.90 MHz
802.11n HT40 : 37.10 MHz</td></tr>
<tr><td>Antenna Type / Gain</td><td>Chain Port 1 : Monopole Antenna with gain 0.76 dBi
Chain Port 2 : Monopole Antenna with gain 1.61 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><th></th><th>Chain Port 1</th><th>Chain Port 2</th></tr>
<tr><td>802.11a</td><td>V</td><td>V</td></tr>
<tr><td>802.11n SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11n MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

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. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	**Sporton Site No.**			**FCC/IC Registration No.**
	TH01-KS	03CH02-KS	CO01-KS	418269/4086E

Note: The test site complies with ANSI C63.4 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 v01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013
- IC RSS-247 Issue 1
- IC RSS-Gen Issue 4

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 (X/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 Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38	**5190**	**46**	**5230**
	40	5200	48	5240
	42	5210		

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 Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	1	**17.17**	CH 36	17.01	16.98	16.99	17.04	17.10	16.97	17.14
CH 44	5220	1	15.68								
CH 48	5240	1	16.01								
CH 36	5180	2	**17.55**	CH 36	17.33	17.37	17.44	17.42	17.50	17.52	17.53
CH 44	5220	2	16.35								
CH 48	5240	2	16.51								

WLAN 5GHz 802.11n-HT20 Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 36	5180	1	14.10	CH 44	14.36	14.32	14.39	14.43	14.45	14.54	14.55
CH 44	5220	1	**14.58**								
CH 48	5240	1	13.64								
CH 36	5180	2	13.89	CH 48	14.15	14.19	14.23	14.30	14.24	14.28	14.33
CH 44	5220	2	13.98								
CH 48	5240	2	**14.36**								
CH 36	5180	1+2(1)	11.90	CH 44	12.18	12.16	12.14	11.91	12.19	11.93	12.15
CH 44	5220	1+2(1)	**12.30**								
CH 48	5240	1+2(1)	12.09								
CH 36	5180	1+2(2)	11.60	CH 44	11.55	11.61	11.75	11.77	11.50	11.69	11.58
CH 44	5220	1+2(2)	**11.91**								
CH 48	5240	1+2(2)	11.86								
CH 36	5180	1+2	14.76	CH 44	14.89	14.91	14.96	14.85	14.87	14.82	14.88
CH 44	5220	1+2	**15.12**								
CH 48	5240	1+2	14.99								

WLAN 5GHz 802.11n-HT40 Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	1	**15.13**	CH 38	14.61	14.77	14.96	15.00	15.04	15.03	15.06
CH 46	5230	1	14.55								
CH 38	5190	2	14.44	CH 46	14.91	14.90	14.92	15.10	15.13	15.12	15.16
CH 46	5230	2	**15.18**								
CH 38	5190	1+2(1)	**12.44**	CH 38	12.37	12.36	12.11	12.18	12.20	12.23	12.16
CH 46	5230	1+2(1)	12.27								
CH 38	5190	1+2(2)	**12.19**	CH 38	12.13	11.91	11.72	11.84	12.01	12.03	11.92
CH 46	5230	1+2(2)	12.15								
CH 38	5190	1+2	**15.33**	CH 38	15.26	15.15	14.93	15.02	15.11	15.14	15.05
CH 46	5230	1+2	15.22								

Note: Chain Port 1+2 is a calculated result from sum of the power Chain Port 1+2(1) and Chain Port 1+2(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

Test Cases	
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + WLAN (5GHz) Link + Adapter
Remark: For Radiated TCs, the tests were performed with adapter.	

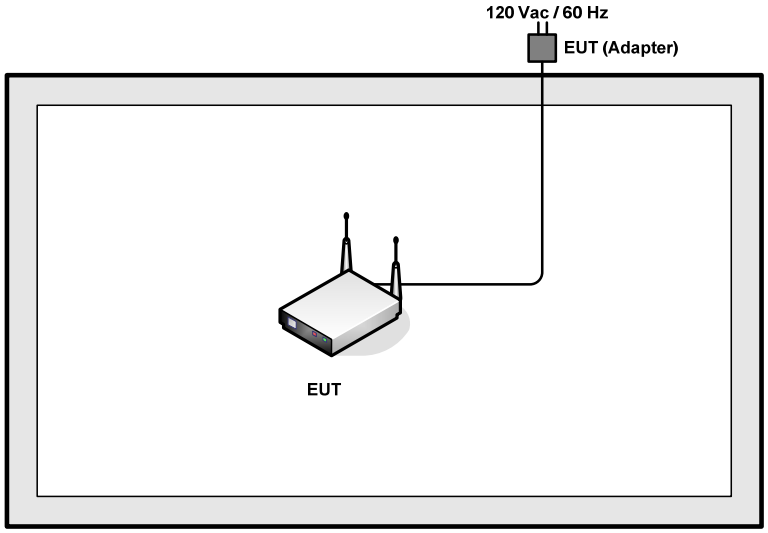
Ch. #		Band I : 5150-5250 MHz
		802.11a
L	Low	36
M	Middle	44
H	High	48

Ch. #		Band I : 5150-5250 MHz
		802.11n HT20
L	Low	36
M	Middle	44
H	High	48

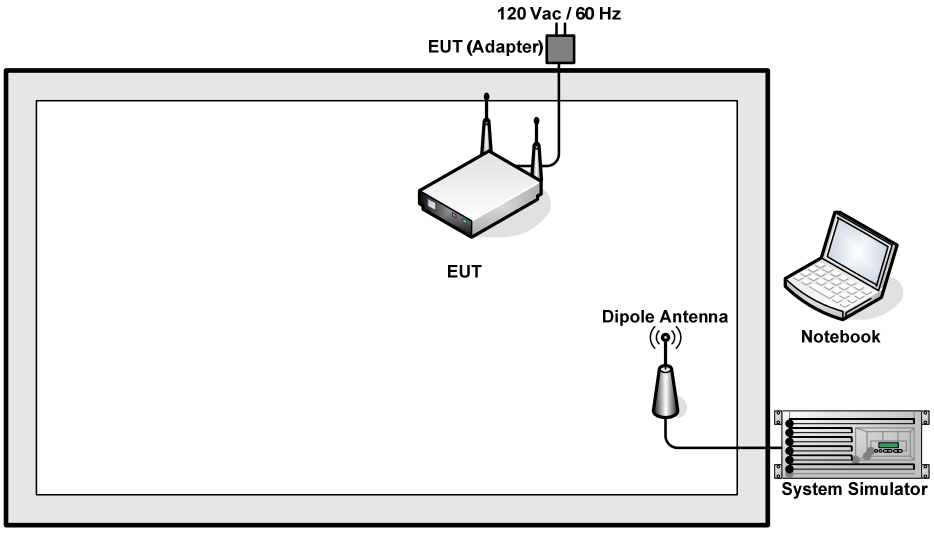
Ch. #		Band I : 5150-5250 MHz
		802.11n HT40
L	Low	38
M	Middle	-
H	High	46

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.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	DC Power Supply	GW INSTEK	GPD-2303S	N/A	N/A	Unshielded, 1.8 m

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously 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 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 7.5 dB.

Offset (dB) = RF cable loss(dB).

= 7.5 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

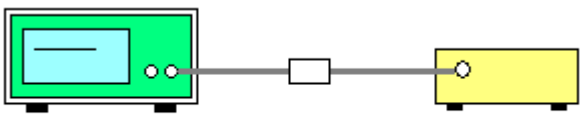
3.1.2 Measuring Instruments

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
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

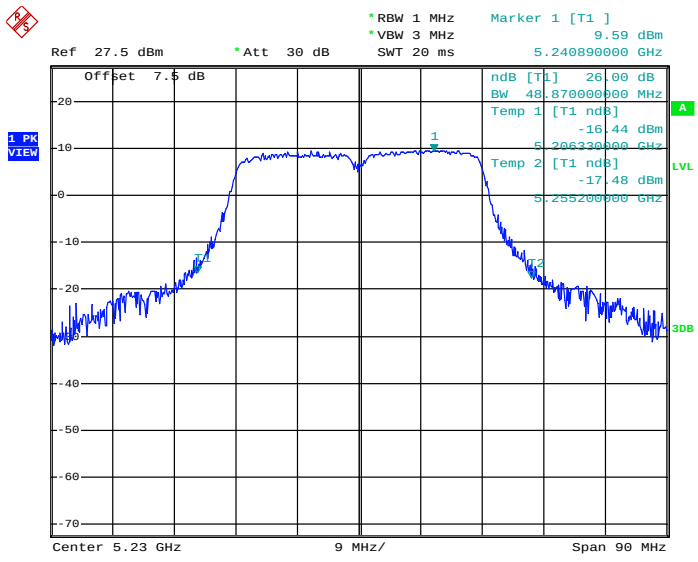
3.1.4 Test Setup



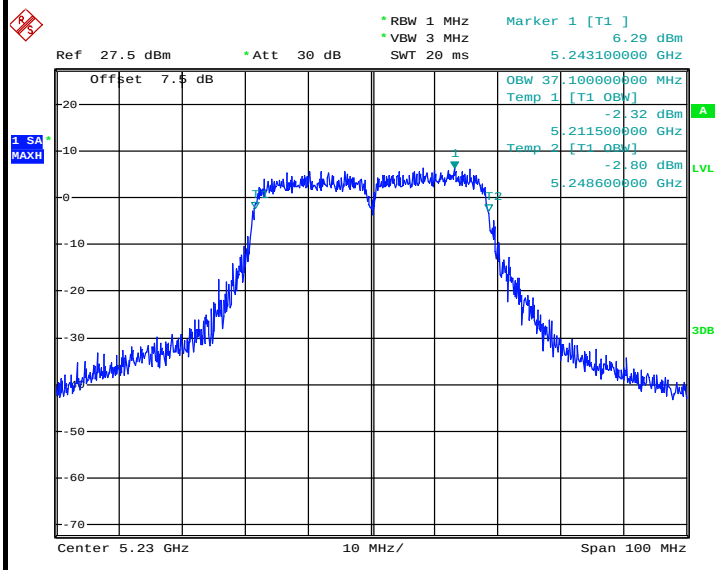
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth Plots

Please refer to Appendix A.

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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 mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

<IC RSS-247 Section 6>

For the 5.15–5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

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.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

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

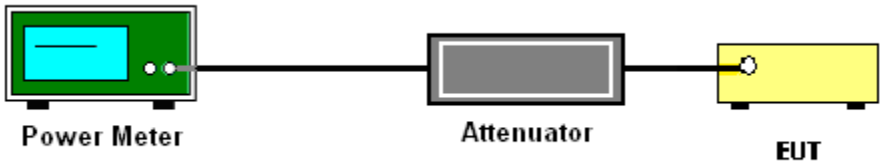
3.2.3 Test Procedures

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

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

<IC RSS-247 Section 6>

For the 5.15–5.25 GHz band, the e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz 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 #

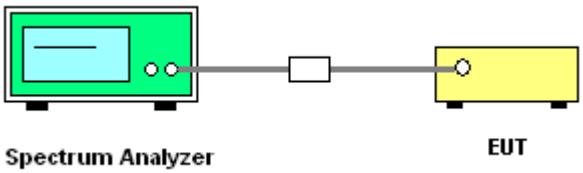
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 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(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 (1): 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.

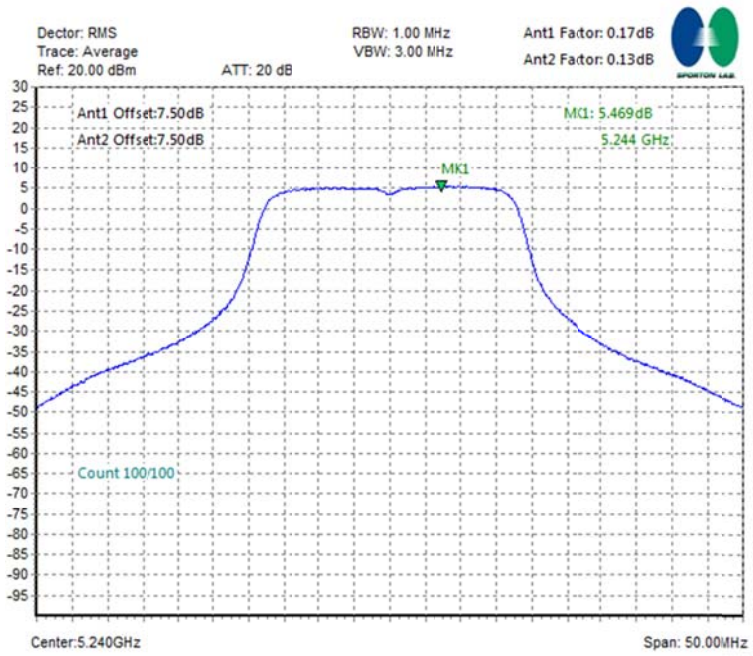
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Spectral Density(dBm/MHz)



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

3.4 Unwanted Radiated Emission 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 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

(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.

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

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

(3) KDB789033 v01 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 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 ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

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

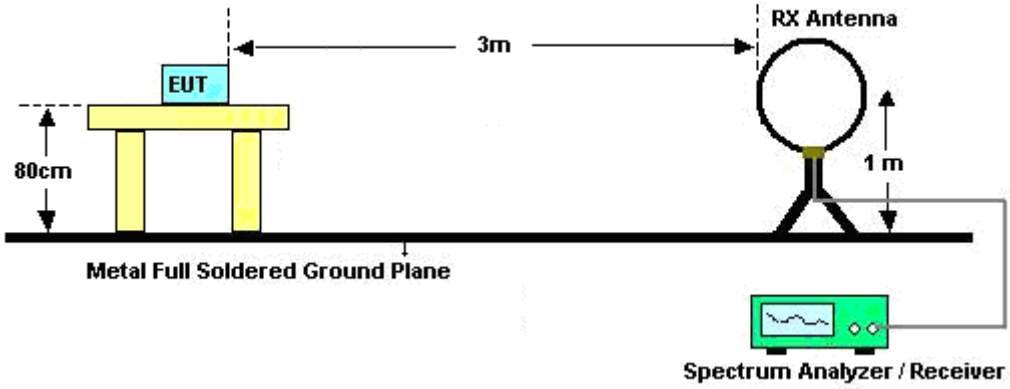
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Chain Port	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a	96.454	1.360	0.735	1kHz
2	802.11a	96.893	1.372	0.729	1kHz
1+2	802.11n HT20	96.212	1.270	0.787	1kHz
1+2	802.11n HT40	96.970	1.280	0.781	1kHz

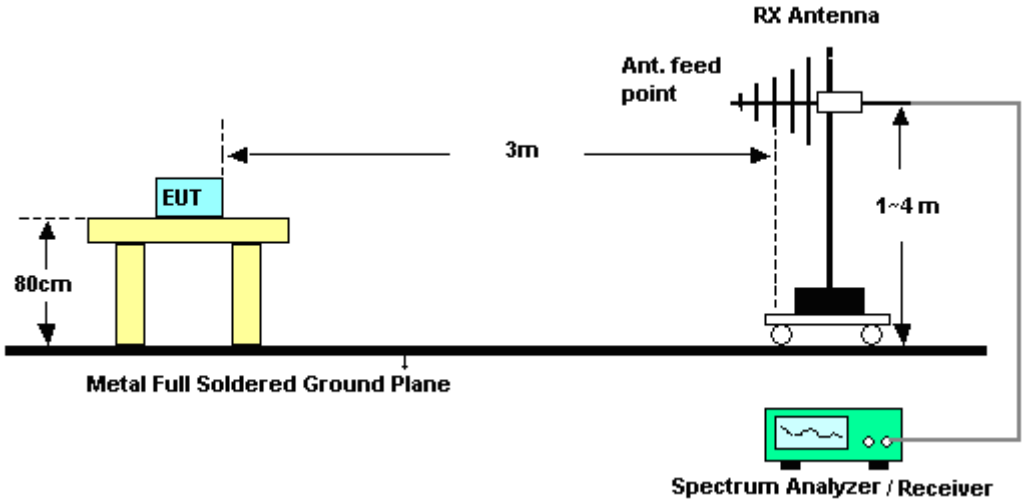
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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

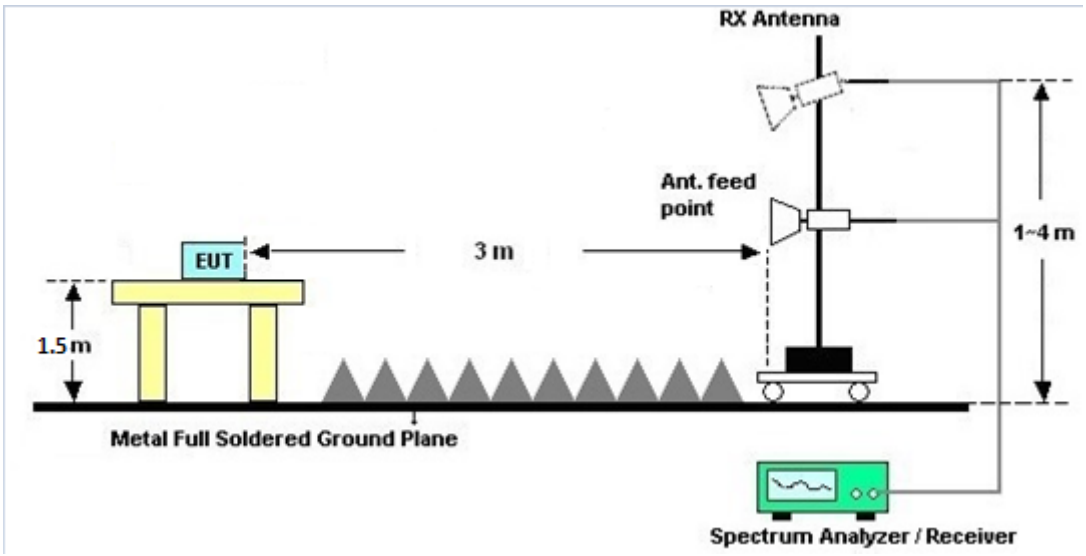
For radiated emissions below 30MHz



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.

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

Please refer to Appendix B.

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.

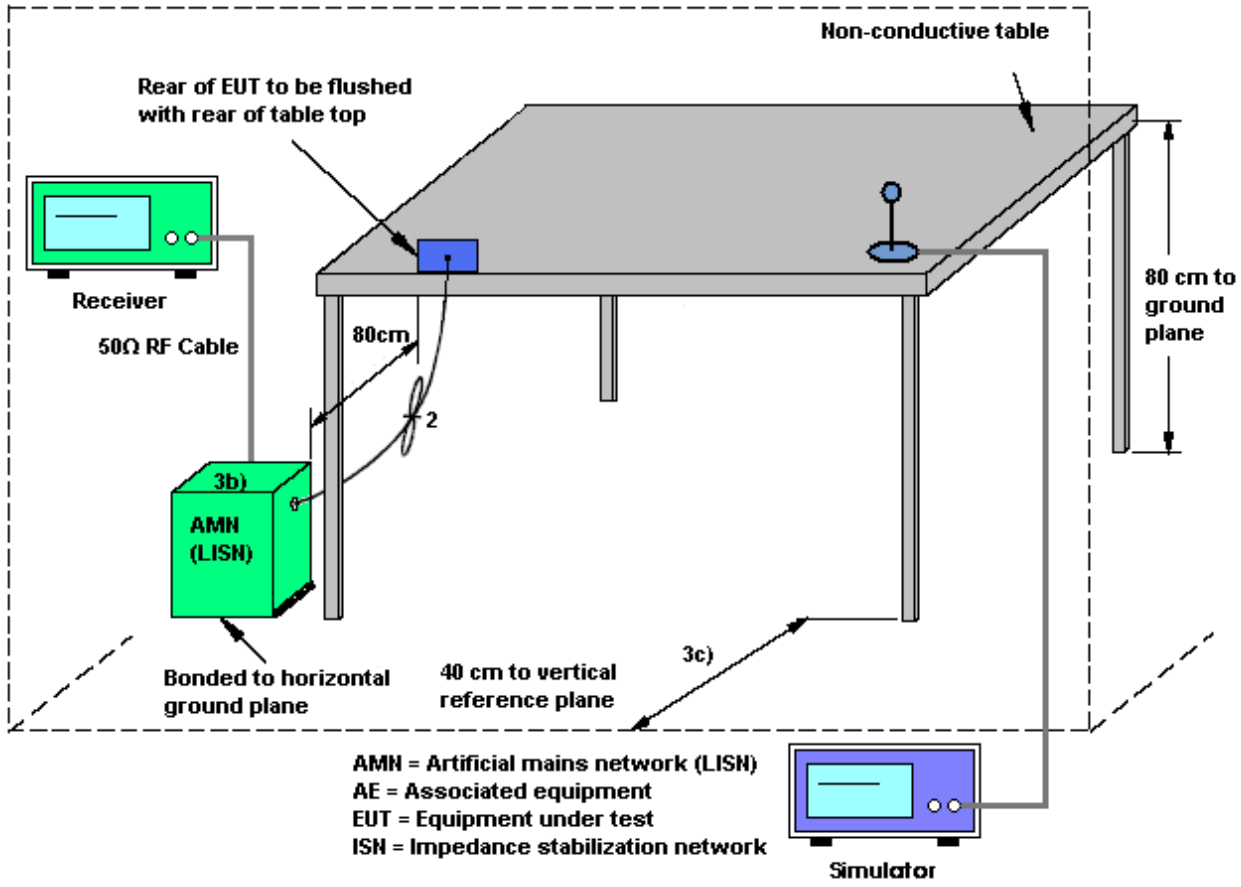
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

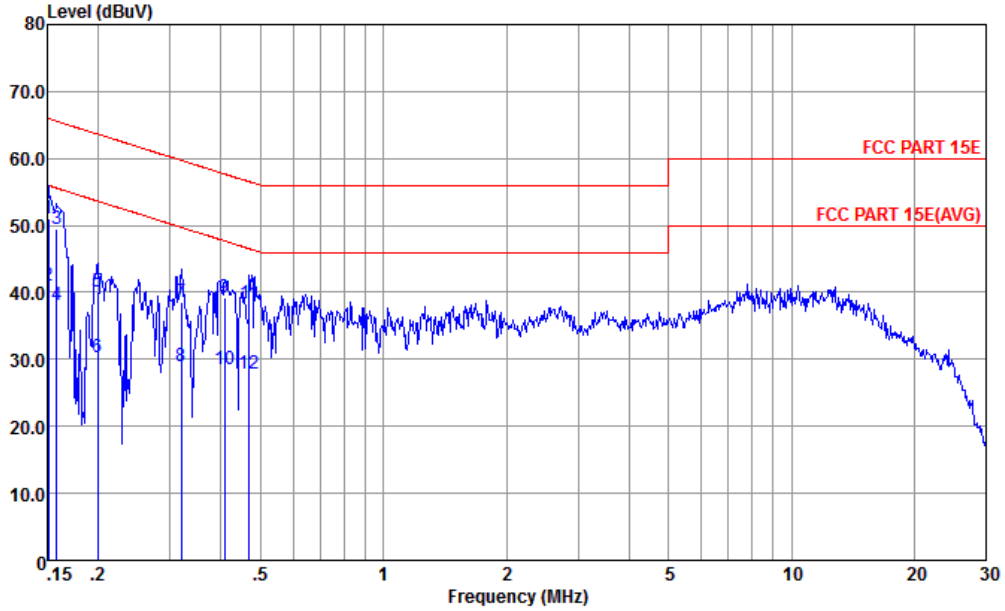
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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



3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eko Guan	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band V Idle + WLAN (5GHz) Link + Adapter		

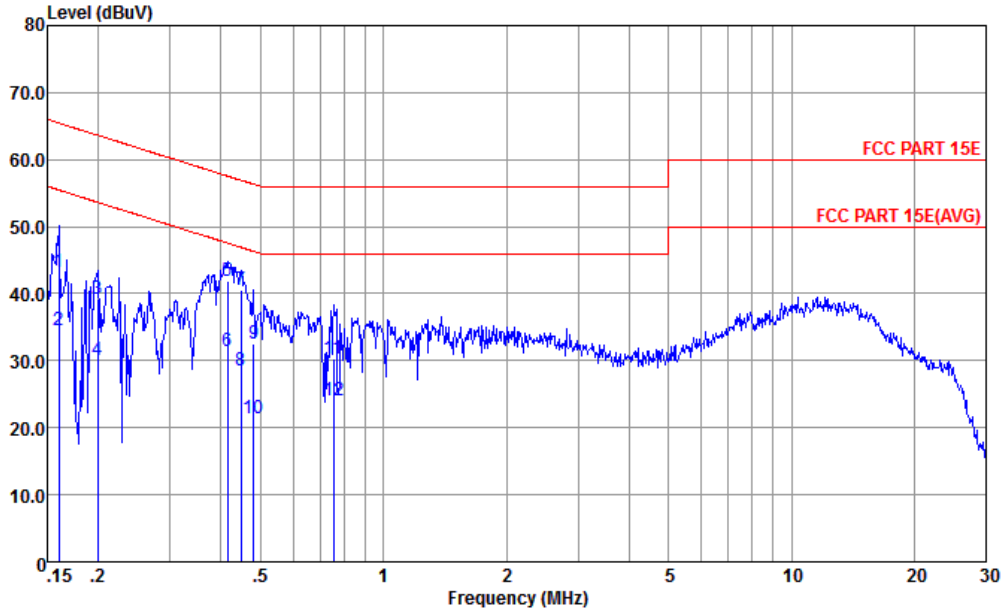


Site : CO01-KS
Condition : FCC PART 15E LISN-L20140306 LINE

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.15	51.11	-14.85	65.96	38.80	1.94	10.37	QP
2	0.15	40.91	-15.05	55.96	28.60	1.94	10.37	Average
3	0.16	49.41	-16.15	65.56	37.20	1.82	10.39	QP
4	0.16	38.01	-17.55	55.56	25.80	1.82	10.39	Average
5	0.20	40.10	-23.52	63.62	28.60	1.00	10.50	QP
6	0.20	30.40	-23.22	53.62	18.90	1.00	10.50	Average
7	0.32	38.66	-21.05	59.71	27.50	0.57	10.59	QP
8	0.32	29.06	-20.65	49.71	17.90	0.57	10.59	Average
9	0.41	39.12	-18.56	57.68	28.20	0.30	10.62	QP
10	0.41	28.42	-19.26	47.68	17.50	0.30	10.62	Average
11	0.47	38.35	-18.19	56.54	27.50	0.23	10.62	QP
12	0.47	27.75	-18.79	46.54	16.90	0.23	10.62	Average

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eko Guan	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN (5GHz) Link + Adapter		



Site : CO01-KS
Condition : FCC PART 15E LISN-N20140306 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		0.16	43.24	-22.23	65.47	31.11	1.74	10.39	QP
2		0.16	34.54	-20.93	55.47	22.41	1.74	10.39	Average
3		0.20	39.30	-24.32	63.62	27.80	1.00	10.50	QP
4		0.20	30.00	-23.62	53.62	18.50	1.00	10.50	Average
5	*	0.41	41.80	-15.75	57.55	30.80	0.38	10.62	QP
6		0.41	31.50	-16.05	47.55	20.50	0.38	10.62	Average
7		0.45	40.47	-16.46	56.93	29.50	0.35	10.62	QP
8		0.45	28.47	-18.46	46.93	17.50	0.35	10.62	Average
9		0.48	32.64	-23.68	56.32	21.71	0.31	10.62	QP
10		0.48	21.44	-24.88	46.32	10.51	0.31	10.62	Average
11		0.75	30.23	-25.77	56.00	19.41	0.18	10.64	QP
12		0.75	24.03	-21.97	46.00	13.21	0.18	10.64	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

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

Non-standard antenna connector is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

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.

	Chain Port 1 (dBi)	Chain Port 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	0.76	1.61	4.21	4.21	0.00	0.00

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

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

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Oct. 28, 2014	Jul. 02, 2015	Oct. 27, 2015	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	101338	9kHz~30GHz	May 04, 2015	Jul. 02, 2015	May 03, 2016	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	30MHz~40GHz	Jan. 23, 2015	Jul. 02, 2015	Jan. 22, 2016	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 23, 2015	Jul. 02, 2015	Jan. 22, 2016	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Jul. 02, 2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	Jul. 01, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Jul. 01, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Jul. 01, 2015	Nov. 12, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	Jul. 01, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Jul. 01, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Jul. 01, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 04, 2014	Jul. 01, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	Jul. 01, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	Jul. 01, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jul. 01, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 01, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 01, 2015	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2015	Jun. 24, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Jun. 24, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Jun. 24, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Jun. 24, 2015	Oct. 24, 2015	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 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1 dB**

Appendix A. Conducted Test Results

Report Number : FR560506B

Test Engineer:	Len Wu	Temperature:	21~25	°C
Test Date:	2015/7/2	Relative Humidity:	51~54	%

Report Number : FR560506B

TEST RESULTS DATA
26dB and 99% OBW

Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	18.00	18.05		26.20	-		22.55	22.56		
11a	6Mbps	1	44	5220	17.85	17.95		25.50	-		22.52	22.54		
11a	6Mbps	1	48	5240	18.05	18.00		25.50	-		22.56	22.55		
HT20	MCS0	1	36	5180	18.65	18.85	25.50		-		22.71	22.75		
HT20	MCS0	1	44	5220	18.90	18.80	25.75		-		22.76	22.74		
HT20	MCS0	1	48	5240	18.75	18.80	25.55		-		22.73	22.74		
HT40	MCS0	1	38	5190	36.80	37.00		47.79	-		23.01	23.01		
HT40	MCS0	1	46	5230	37.10	37.00		48.87	-		23.01	23.01		
HT20	MCS0	2	36	5180	18.75	18.70	26.05	25.35	-		22.72			
HT20	MCS0	2	44	5220	18.70	18.70	25.15	25.15	-		22.72			
HT20	MCS0	2	48	5240	18.90	18.60	25.90	25.10	-		22.70			
HT40	MCS0	2	38	5190	36.90	36.90	48.24	46.62	-		23.01			
HT40	MCS0	2	46	5230	37.10	36.90	47.52	46.53	-		23.01			

Report Number : FR560506B

TEST RESULTS DATA
Average Power Table

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.16	0.14	17.17	17.55		24.00	24.00	0.76	1.61		Pass
11a	6Mbps	1	44	5220	0.16	0.14	15.68	16.35		24.00	24.00	0.76	1.61		Pass
11a	6Mbps	1	48	5240	0.16	0.14	16.01	16.51		24.00	24.00	0.76	1.61		Pass
HT20	MCS0	1	36	5180	0.12	0.15	14.10	13.89		24.00	24.00	0.76	1.61		Pass
HT20	MCS0	1	44	5220	0.12	0.15	14.58	13.98		24.00	24.00	0.76	1.61		Pass
HT20	MCS0	1	48	5240	0.12	0.15	13.64	14.36		24.00	24.00	0.76	1.61		Pass
HT40	MCS0	1	38	5190	0.21	0.23	15.13	14.44		24.00	24.00	0.76	1.61		Pass
HT40	MCS0	1	46	5230	0.21	0.23	14.55	15.18		24.00	24.00	0.76	1.61		Pass
HT20	MCS0	2	36	5180	0.17	0.13	11.90	11.60	14.76	24.00		4.21			Pass
HT20	MCS0	2	44	5220	0.17	0.13	12.30	11.91	15.12	24.00		4.21			Pass
HT20	MCS0	2	48	5240	0.17	0.13	12.09	11.86	14.99	24.00		4.21			Pass
HT40	MCS0	2	38	5190	0.13	0.13	12.44	12.19	15.33	24.00		4.21			Pass
HT40	MCS0	2	46	5230	0.13	0.13	12.27	12.15	15.22	24.00		4.21			Pass

IC Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			IC Conducted Power Limit (dBm)		DG (dBi)		IC EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	36	5180	0.16	0.14	17.17	17.55		21.79	20.95	0.76	1.61	22.55	22.56	Pass
11a	6Mbps	1	44	5220	0.16	0.14	15.68	16.35		21.76	20.93	0.76	1.61	22.52	22.54	Pass
11a	6Mbps	1	48	5240	0.16	0.14	16.01	16.51		21.80	20.94	0.76	1.61	22.56	22.55	Pass
HT20	MCS0	1	36	5180	0.12	0.15	14.10	13.89		21.95	21.14	0.76	1.61	22.71	22.75	Pass
HT20	MCS0	1	44	5220	0.12	0.15	14.58	13.98		22.00	21.13	0.76	1.61	22.76	22.74	Pass
HT20	MCS0	1	48	5240	0.12	0.15	13.64	14.36		21.97	21.13	0.76	1.61	22.73	22.74	Pass
HT40	MCS0	1	38	5190	0.21	0.23	15.13	14.44		22.25	21.40	0.76	1.61	23.01	23.01	Pass
HT40	MCS0	1	46	5230	0.21	0.23	14.55	15.18		22.25	21.40	0.76	1.61	23.01	23.01	Pass
HT20	MCS0	2	36	5180	0.17	0.13	11.90	11.60	14.76	18.51		4.21		22.72		Pass
HT20	MCS0	2	44	5220	0.17	0.13	12.30	11.91	15.12	18.51		4.21		22.72		Pass
HT20	MCS0	2	48	5240	0.17	0.13	12.09	11.86	14.99	18.49		4.21		22.70		Pass
HT40	MCS0	2	38	5190	0.13	0.13	12.44	12.19	15.33	18.80		4.21		23.01		Pass
HT40	MCS0	2	46	5230	0.13	0.13	12.27	12.15	15.22	18.80		4.21		23.01		Pass

Report Number : FR560506B

TEST RESULTS DATA
Power Spectral Density

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.16	0.14		5.30		11.00	11.00	0.76	1.61		Pass
11a	6Mbps	1	44	5220	0.16	0.14		4.74		11.00	11.00	0.76	1.61		Pass
11a	6Mbps	1	48	5240	0.16	0.14		4.97		11.00	11.00	0.76	1.61		Pass
HT20	MCS0	1	36	5180	0.12	0.15	4.10			11.00	11.00	0.76	1.61		Pass
HT20	MCS0	1	44	5220	0.12	0.15	4.39			11.00	11.00	0.76	1.61		Pass
HT20	MCS0	1	48	5240	0.12	0.15	4.10			11.00	11.00	0.76	1.61		Pass
HT40	MCS0	1	38	5190	0.21	0.23		1.09		11.00	11.00	0.76	1.61		Pass
HT40	MCS0	1	46	5230	0.21	0.23		1.22		11.00	11.00	0.76	1.61		Pass
HT20	MCS0	2	36	5180	0.17	0.13			5.01	11.00		4.21			Pass
HT20	MCS0	2	44	5220	0.17	0.13			5.39	11.00		4.21			Pass
HT20	MCS0	2	48	5240	0.17	0.13			5.47	11.00		4.21			Pass
HT40	MCS0	2	38	5190	0.13	0.13			1.59	11.00		4.21			Pass
HT40	MCS0	2	46	5230	0.13	0.13			1.21	11.00		4.21			Pass

IC Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)		IC EIRP PSD Limit (dBm/MHz)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	36	5180	0.16	0.14		5.30		9.24	8.39	0.76	1.61	10	10	Pass
11a	6Mbps	1	44	5220	0.16	0.14		4.74		9.24	8.39	0.76	1.61	10	10	Pass
11a	6Mbps	1	48	5240	0.16	0.14		4.97		9.24	8.39	0.76	1.61	10	10	Pass
HT20	MCS0	1	36	5180	0.12	0.15	4.10			9.24	8.39	0.76	1.61	10	10	Pass
HT20	MCS0	1	44	5220	0.12	0.15	4.39			9.24	8.39	0.76	1.61	10	10	Pass
HT20	MCS0	1	48	5240	0.12	0.15	4.10			9.24	8.39	0.76	1.61	10	10	Pass
HT40	MCS0	1	38	5190	0.21	0.23		1.09		9.24	8.39	0.76	1.61	10	10	Pass
HT40	MCS0	1	46	5230	0.21	0.23		1.22		9.24	8.39	0.76	1.61	10	10	Pass
HT20	MCS0	2	36	5180	0.17	0.13			5.01	5.79		4.21		10		Pass
HT20	MCS0	2	44	5220	0.17	0.13			5.39	5.79		4.21		10		Pass
HT20	MCS0	2	48	5240	0.17	0.13			5.47	5.79		4.21		10		Pass
HT40	MCS0	2	38	5190	0.13	0.13			1.59	5.79		4.21		10		Pass
HT40	MCS0	2	46	5230	0.13	0.13			1.21	5.79		4.21		10		Pass

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.6	
11a	6Mbps	1	36	5180	5179.975	-0.025	-4.83	20	4.35	
11a	6Mbps	1	36	5180	5180.025	0.025	4.83	20	3.8	
11a	6Mbps	1	36	5180	5179.975	-0.025	-4.83	-30	3.8	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	50	3.8	

Appendix B. Radiated Test Results

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz	*	5184	111.07	-	-	105.52	35.03	7.03	36.51	300	207	P	H
	*	5184	101.11	-	-	95.56	35.03	7.03	36.51	300	207	A	H
	!	5149.2	70.04	-3.96	74	64.53	35.02	7.02	36.53	300	207	P	H
	!	5149.7	50.32	-3.68	54	44.81	35.02	7.02	36.53	300	207	A	H
	*	5184	105.4	-	-	99.85	35.03	7.03	36.51	150	100	P	V
	*	5182	94.82	-	-	89.27	35.03	7.03	36.51	150	100	A	V
		5149.65	64.1	-9.9	74	58.59	35.02	7.02	36.53	150	100	P	V
		5149.85	47.28	-6.72	54	41.77	35.02	7.02	36.53	150	100	A	V
802.11a CH 44 5220MHz	*	5224	112.82	-	-	107.24	35.03	7.05	36.5	280	204	P	H
	*	5224	102.92	-	-	97.34	35.03	7.05	36.5	280	204	A	H
	*	5222	106.21	-	-	100.63	35.03	7.05	36.5	152	27	P	V
	*	5224	95.84	-	-	90.26	35.03	7.05	36.5	152	27	A	V
802.11a CH 48 5240MHz	*	5236	111.1	-	-	105.49	35.04	7.07	36.5	274	204	P	H
	*	5234	100.92	-	-	95.31	35.04	7.07	36.5	274	204	A	H
		5355.15	60.86	-13.14	74	55.11	35.05	7.2	36.5	274	204	P	H
		5371.35	47.33	-6.67	54	41.56	35.06	7.21	36.5	274	204	A	H
	*	5234	103.63	-	-	98.02	35.04	7.07	36.5	150	104	P	V
	*	5234	93.84	-	-	88.23	35.04	7.07	36.5	150	104	A	V
		5369.55	58.71	-15.29	74	52.94	35.06	7.21	36.5	150	104	P	V
		5351.5	46	-8	54	40.25	35.05	7.2	36.5	150	104	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	47.6	-26.4	74	36.53	38.1	10.3	37.33	150	221	P	H
		10359	49.47	-24.53	74	38.4	38.1	10.3	37.33	150	0	P	V
802.11a CH 44 5220MHz		10440	50.69	-23.31	74	39.52	38.15	10.33	37.31	150	199	P	H
		10440	49.56	-24.44	74	38.39	38.15	10.33	37.31	150	69	P	V
802.11a CH 48 5240MHz		10722	48.56	-25.44	74	36.97	38.38	10.45	37.24	150	178	P	H
		10479	47.73	-26.27	74	36.49	38.19	10.35	37.3	150	85	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		30	25.81	-14.19	40	41.2	19.1	0.73	35.22	125	228	P	H
		71.71	24.02	-15.98	40	50.42	7.52	1.09	35.01	-	-	P	H
		185.2	23.6	-19.9	43.5	46.91	9.93	1.76	35	-	-	P	H
		547.98	18.68	-27.32	46	31.89	18.16	3.13	34.5	-	-	P	H
		738.1	19.57	-26.43	46	30.76	19.68	3.65	34.52	-	-	P	H
		774.96	19.96	-26.04	46	30.64	20.05	3.74	34.47	-	-	P	H
		30	28.23	-11.77	40	43.62	19.1	0.73	35.22	178	45	P	V
		61.04	27.45	-12.55	40	55.17	6.68	1.02	35.42	-	-	P	V
		191.02	20.2	-23.3	43.5	43.72	9.72	1.79	35.03	-	-	P	V
		447.1	14.96	-31.04	46	30.13	16.95	2.79	34.91	-	-	P	V
		606.18	19.43	-26.57	46	32.55	18.56	3.27	34.95	-	-	P	V
		936.95	21.28	-24.72	46	30.09	21.62	4.12	34.55	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz	*	5182	99.76	-	-	94.21	35.03	7.03	36.51	222	185	P	H
	*	5184	89.37	-	-	83.82	35.03	7.03	36.51	222	185	A	H
		5149.25	58.56	-15.44	74	53.05	35.02	7.02	36.53	222	185	P	H
		5149.8	40.64	-13.36	54	35.13	35.02	7.02	36.53	222	185	A	H
	*	5174	106.15	-	-	100.6	35.03	7.03	36.51	150	250	P	V
	*	5178	96.42	-	-	90.87	35.03	7.03	36.51	150	250	A	V
		5149.1	65.03	-8.97	74	59.52	35.02	7.02	36.53	150	250	P	V
		5149.9	44.95	-9.05	54	39.44	35.02	7.02	36.53	150	250	A	V
802.11a CH 44 5220MHz	*	5224	100.33	-	-	94.75	35.03	7.05	36.5	150	167	P	H
	*	5224	90.18	-	-	84.6	35.03	7.05	36.5	150	167	A	H
	*	5222	108.37	-	-	102.79	35.03	7.05	36.5	300	243	P	V
		5400	54.79	-19.21	74	48.98	35.06	7.25	36.5	300	243	P	V
	*	5224	97.25	-	-	91.67	35.03	7.05	36.5	300	243	A	V
		5400	47.63	-6.37	54	41.82	35.06	7.25	36.5	300	243	A	V
802.11a CH 48 5240MHz	*	5244	99.92	-	-	94.29	35.04	7.09	36.5	150	166	P	H
	*	5236	89.83	-	-	84.22	35.04	7.07	36.5	150	166	A	H
		5382.2	51.87	-22.13	74	46.08	35.06	7.23	36.5	150	166	P	H
		5399.95	38.43	-15.57	54	32.62	35.06	7.25	36.5	150	166	A	H
	*	5242	108.4	-	-	102.77	35.04	7.09	36.5	270	242	P	V
	*	5246	97.93	-	-	92.3	35.04	7.09	36.5	270	242	A	V
		5399.65	55.33	-18.67	74	49.52	35.06	7.25	36.5	270	242	P	V
		5400	43.57	-10.43	54	37.76	35.06	7.25	36.5	270	242	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	49.91	-24.09	74	38.84	38.1	10.3	37.33	150	225	P	H
		10360	48.61	-25.39	74	37.54	38.1	10.3	37.33	150	178	P	V
802.11a CH 44 5220MHz		10440	48.73	-25.27	74	37.56	38.15	10.33	37.31	150	69	P	H
		10440	49.22	-24.78	74	38.05	38.15	10.33	37.31	150	258	P	V
802.11a CH 48 5240MHz		10480	50.72	-23.28	74	39.48	38.19	10.35	37.3	150	117	P	H
		10479	48.48	-25.52	74	37.24	38.19	10.35	37.3	150	108	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		31.94	28.38	-11.62	40	44.37	18.5	0.75	35.24	100	120	P	H
		71.71	28.02	-11.98	40	54.42	7.52	1.09	35.01	-	-	P	H
		185.2	19.6	-23.9	43.5	42.91	9.93	1.76	35	-	-	P	H
		491.72	18.51	-27.49	46	32.94	17.25	2.93	34.61	-	-	P	H
		637.22	18.33	-27.67	46	30.96	18.87	3.36	34.86	-	-	P	H
		838.01	20.19	-25.81	46	29.77	20.91	3.89	34.38	-	-	P	H
		52.31	30.29	-9.71	40	56.47	8.18	0.95	35.31	200	300	P	V
		159.98	17.5	-26	43.5	39.93	10.85	1.63	34.91	-	-	P	V
		191.02	17.2	-26.3	43.5	40.72	9.72	1.79	35.03	-	-	P	V
		341.37	19.33	-26.67	46	37.53	14.41	2.42	35.03	-	-	P	V
		523.73	19.98	-26.02	46	33.74	17.72	3.04	34.52	-	-	P	V
		647.89	22.41	-23.59	46	34.87	18.98	3.39	34.83	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
	*	5176	112.44	-	-	106.89	35.03	7.03	36.51	159	199	P	H
	*	5176	102.35	-	-	96.8	35.03	7.03	36.51	159	199	A	H
802.11n	!	5148.9	71.28	-2.72	74	65.77	35.02	7.02	36.53	159	199	P	H
HT20	!	5149.95	50.26	-3.74	54	44.75	35.02	7.02	36.53	159	199	A	H
CH 36	*	5176	109.33	-	-	103.78	35.03	7.03	36.51	172	228	P	V
5180MHz	*	5174	99.08	-	-	93.53	35.03	7.03	36.51	172	228	A	V
		5149.3	66.25	-7.75	74	60.74	35.02	7.02	36.53	172	228	P	V
	!	5150	49.35	-4.65	54	43.84	35.02	7.02	36.53	172	228	A	V
802.11n	*	5216	112.18	-	-	106.6	35.03	7.05	36.5	150	188	P	H
HT20	*	5216	102.16	-	-	96.58	35.03	7.05	36.5	150	188	A	H
CH 44	*	5214	110.04	-	-	104.46	35.03	7.05	36.5	150	228	P	V
5220MHz	*	5214	100.22	-	-	94.64	35.03	7.05	36.5	150	228	A	V
	*	5236	112.95	-	-	107.34	35.04	7.07	36.5	150	185	P	H
	*	5236	102.8	-	-	97.19	35.04	7.07	36.5	150	185	A	H
802.11n		5375.05	56.55	-17.45	74	50.78	35.06	7.21	36.5	150	185	P	H
HT20		5374.8	43.23	-10.77	54	37.46	35.06	7.21	36.5	150	185	A	H
CH 48	*	5234	109.85	-	-	104.24	35.04	7.07	36.5	150	228	P	V
5240MHz	*	5232	99.95	-	-	94.34	35.04	7.07	36.5	150	228	A	V
		5360.3	54.72	-19.28	74	48.97	35.05	7.2	36.5	150	228	P	V
		5400	41.79	-12.21	54	35.98	35.06	7.25	36.5	150	228	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	50.12	-23.88	74	39.05	38.1	10.3	37.33	150	118	P	H
		10360	50.38	-23.62	74	39.31	38.1	10.3	37.33	150	96	P	V
802.11n HT20 CH 44 5220MHz		10440	49.93	-24.07	74	38.76	38.15	10.33	37.31	150	87	P	H
		10440	50.22	-23.78	74	39.05	38.15	10.33	37.31	300	145	P	V
802.11n HT20 CH 48 5240MHz		10480	50.45	-23.55	74	39.21	38.19	10.35	37.3	150	116	P	H
		10480	50.27	-23.73	74	39.03	38.19	10.35	37.3	178	250	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
	*	5200	104.44	-	-	98.88	35.03	7.03	36.5	150	200	P	H
	*	5200	93.89	-	-	88.33	35.03	7.03	36.5	150	200	A	H
802.11n	!	5148.2	69.68	-4.32	74	64.17	35.02	7.02	36.53	150	200	P	H
HT40	!	5149.85	51.16	-2.84	54	45.65	35.02	7.02	36.53	150	200	A	H
CH 38	*	5194	102.8	-	-	97.24	35.03	7.03	36.5	150	277	P	V
5190MHz	*	5194	92.51	-	-	86.95	35.03	7.03	36.5	150	277	A	V
		5149.25	62.51	-11.49	74	57	35.02	7.02	36.53	150	277	P	V
		5150	47.94	-6.06	54	42.43	35.02	7.02	36.53	150	277	A	V
	*	5236	104.76	-	-	99.15	35.04	7.07	36.5	150	200	P	H
	*	5236	94.41	-	-	88.8	35.04	7.07	36.5	150	200	A	H
802.11n		5365.2	59.8	-14.2	74	54.03	35.06	7.21	36.5	150	200	P	H
HT40		5357.25	46.62	-7.38	54	40.87	35.05	7.2	36.5	150	200	A	H
CH 46	*	5218	100.08	-	-	94.5	35.03	7.05	36.5	188	64	P	V
5230MHz	*	5218	89.71	-	-	84.13	35.03	7.05	36.5	188	64	A	V
		5364.4	58.45	-15.55	74	52.68	35.06	7.21	36.5	188	64	P	V
		5355.3	45.8	-8.2	54	40.05	35.05	7.2	36.5	188	64	A	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	49.02	-24.98	74	37.94	38.11	10.3	37.33	150	178	P	H
		10380	50.2	-23.8	74	39.12	38.11	10.3	37.33	150	85	P	V
802.11n HT40 CH 46 5230MHz		10460	49.85	-24.15	74	38.67	38.16	10.33	37.31	150	55	P	H
		10460	50.17	-23.83	74	38.99	38.16	10.33	37.31	200	85	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT20 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 LF		30	26.81	-13.19	40	42.2	19.1	0.73	35.22	163	296	P	H
		71.71	26.02	-13.98	40	52.42	7.52	1.09	35.01	-	-	P	H
		99.84	25.72	-17.78	43.5	47.68	12.1	1.29	35.35	-	-	P	H
		185.2	20.6	-22.9	43.5	43.91	9.93	1.76	35	-	-	P	H
		288.99	16.29	-29.71	46	35.79	13.05	2.23	34.78	-	-	P	H
		491.72	16.51	-29.49	46	30.94	17.25	2.93	34.61	-	-	P	H
		71.71	29.47	-10.53	40	55.87	7.52	1.09	35.01	200	115	P	V
		159.98	16.5	-27	43.5	38.93	10.85	1.63	34.91	-	-	P	V
		341.37	15.33	-30.67	46	33.53	14.41	2.42	35.03	-	-	P	V
		437.4	16.29	-29.71	46	31.71	16.8	2.76	34.98	-	-	P	V
		538.28	18.14	-27.86	46	31.56	17.99	3.1	34.51	-	-	P	V
		738.1	20.05	-25.95	46	31.24	19.68	3.65	34.52	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		70.74	28.48	-11.52	40	55.07	7.26	1.08	34.93	108	165	P	H
		197.81	28.65	-14.85	43.5	52.43	9.47	1.83	35.08	-	-	P	H
		296.75	18.85	-27.15	46	37.96	13.38	2.27	34.76	-	-	P	H
		470.38	17.57	-28.43	46	32.34	17.12	2.86	34.75	-	-	P	H
		547.98	19.68	-26.32	46	32.89	18.16	3.13	34.5	-	-	P	H
		705.12	20.3	-25.7	46	32.17	19.35	3.58	34.8	-	-	P	H
		52.31	24.29	-15.71	40	50.47	8.18	0.95	35.31	152	285	P	V
		191.02	27.2	-16.3	43.5	50.72	9.72	1.79	35.03	-	-	P	V
		470.38	18.28	-27.72	46	33.05	17.12	2.86	34.75	-	-	P	V
		579.99	20.33	-25.67	46	33.51	18.38	3.21	34.77	-	-	P	V
		738.1	21.05	-24.95	46	32.24	19.68	3.65	34.52	-	-	P	V
		789.51	21.89	-24.11	46	32.43	20.19	3.78	34.51	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".