



FCC RF Test Report

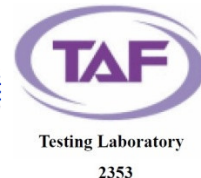
APPLICANT : TCL Communication Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : alcatel & CRICKET
MODEL NAME : 5098O
MARKETING NAME : PIXI THEATRE
FCC ID : 2ACCJB061
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on May 20, 2016 and testing was completed on Jun. 15, 2016. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR652001D	Rev. 01	Initial issue of report	Jun. 25, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	FCC ≤ 24 dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	FCC ≤ 11 dBm (depend on band)	Pass	-
3.4	15.407(b)	Unwanted Emissions	$\leq -17, -27$ dBm (depend on band)&15.209(a)	Pass	Under limit 3.28 dB at 5350.330 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.22 dB at 0.410 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

TCL Communication Ltd.

5F, C-Tower, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area, Shanghai, 201203,
P.R.China

1.2. Manufacturer

TCL Communication Ltd.

5F, C-Tower, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area, Shanghai, 201203,
P.R.China

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Phone
Brand Name	alcatel & CRICKET
Model Name	5098O
Marketing Name	PIXI THEATRE
FCC ID	2ACCJB061
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ WLAN 5GHz 802.11a/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.1 LE
IMEI Code	Conducted: 014678000400496 Radiation: 014678000400512 Conduction: 014678000400447
HW Version	V04
SW Version	AA3
EUT Stage	Production Unit

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 Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz
Maximum Output Power to Antenna	<5180 MHz ~ 5240 MHz> 802.11a : 9.88 dBm / 0.0097 W 802.11n HT20 : 9.99 dBm / 0.0100 W 802.11n HT40 : 10.50 dBm / 0.0112 W <5260 MHz ~ 5320 MHz> 802.11a : 8.88 dBm / 0.0077 W 802.11n HT20 : 9.03 dBm / 0.0080 W 802.11n HT40 : 9.48 dBm / 0.0089 W
99% Occupied Bandwidth	<5180 MHz ~ 5240 MHz> 802.11a : 18.80 MHz 802.11n HT20 : 19.55 MHz 802.11n HT40 : 36.80 MHz <5260 MHz ~ 5320 MHz> 802.11a : 19.00 MHz 802.11n HT20 : 19.45 MHz 802.11n HT40 : 37.00 MHz
Antenna Type	PIFA Antenna
Antenna Gain	<5180 MHz ~ 5240 MHz> : -2.00 dBi <5260 MHz ~ 5320 MHz> : -1.00 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5. Specification of Accessory

Specification of Accessory				
AC Adapter	Brand Name	ALCATEL ONETOUCH	Model Name	UC11US
	Power Rating	I/P: 100-240Vac, 200mA, O/P: 5Vdc, 1000mA		
	P/N	CBA0057AG6C2		
Battery	Brand Name	ALCATEL ONETOUCH	Model Name	TLp025D2
	Power Rating	3.8Vdc, 2580mAh		
USB Cable	Brand Name	N/A	Model Name	N/A
	Signal Line Type	1.0m shielded without core		

1.6. Modification of EUT

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

1.7. Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	Sporton Site No.	
	TH01-SZ	CO01-SZ

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH03-SZ	565805

Note: The test site complies with ANSI C63.4 2014 requirement.

1.8. 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 v01r02
- ♦ ANSI C63.10-2013

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 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

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54	5270	62	5310
	56	5280	64	5320

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.

WLAN 5GHz 802.11a Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
		6Mbps								
CH 36	5180	9.88	CH 36	9.87	9.87	9.86	9.85	9.88	9.87	9.85
CH 44	5220	8.99								
CH 48	5240	9.16								
CH 52	5260	8.88	CH 52	8.87	8.84	8.82	8.86	8.86	8.83	8.87
CH 60	5300	8.68								
CH 64	5320	8.49								

WLAN 5GHz 802.11n-HT20 Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0								
CH 36	5180	9.99	CH 36	9.98	9.97	9.95	9.97	9.95	9.97	9.96
CH 44	5220	9.04								
CH 48	5240	9.26								
CH 52	5260	9.03	CH 52	9.00	8.98	8.98	8.97	8.95	9.02	8.98
CH 60	5300	8.75								
CH 64	5320	8.63								

WLAN 5GHz 802.11n-HT40 Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0								
CH 38	5190	10.50	CH 38	10.50	10.47	10.48	10.49	10.47	10.46	10.48
CH 46	5230	9.51								
CH 54	5270	9.48	CH 54	9.46	9.47	9.43	9.42	9.45	9.47	9.46
CH 62	5310	8.86								

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 : GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter) + SD Card
Remark: For Radiated TCs, the tests were performed with adapter, earphone, SD Card and USB cable.	



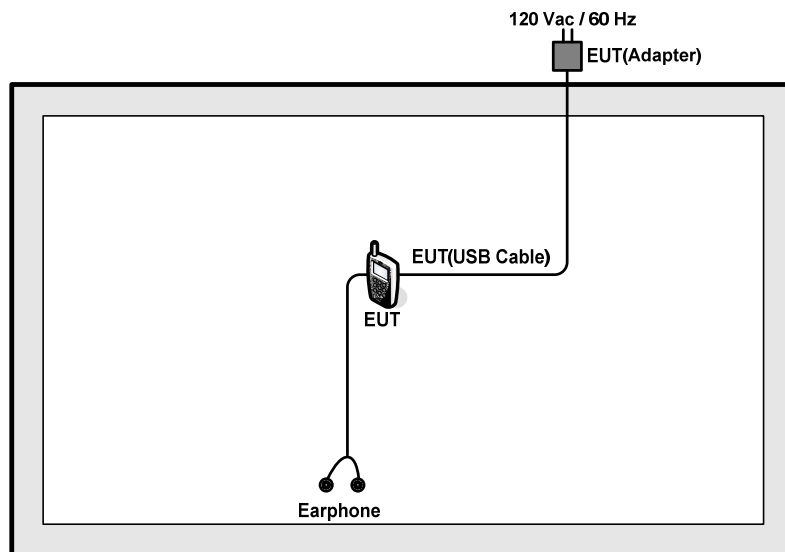
Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz
		802.11a	802.11a
L	Low	36	52
M	Middle	44	60
H	High	48	64

Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz
		802.11n HT20	802.11n HT20
L	Low	36	52
M	Middle	44	60
H	High	48	64

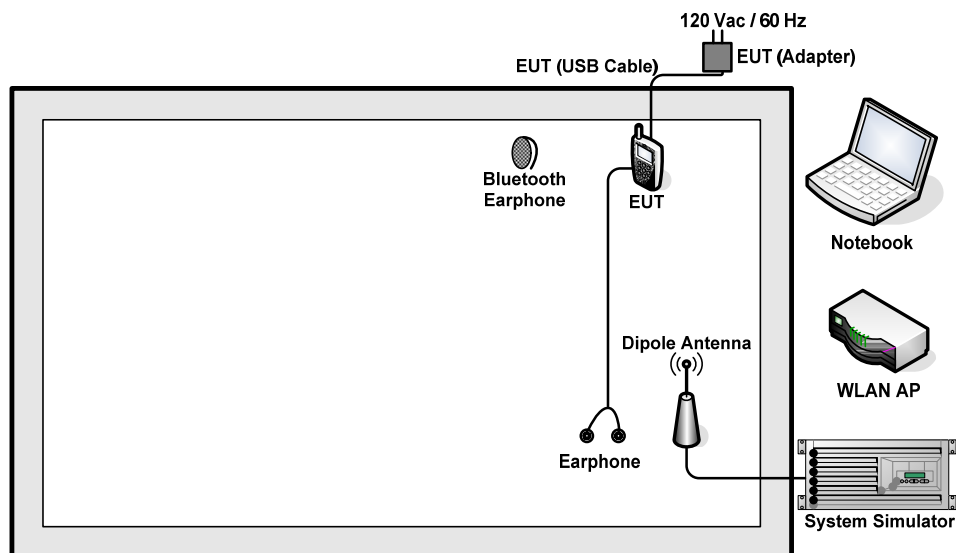
Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz
		802.11n HT40	802.11n HT40
L	Low	38	54
M	Middle	-	-
H	High	46	62

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.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	WLAN AP	ASUSTek	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
5.	DC Power Supply	GW INSTEK	GPD-2303S	N/A	N/A	Unshielded, 1.8 m
6.	iPod Earphone	Apple	MC690 ZP/A	FCC DoC	Unshielded, 1.0 m	N/A
7.	SD Card	SanDisk	4G class 4	FCC DoC	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 continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the Notebook 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 6.5 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 6.5 + 10 = 16.5 \text{ (dB)}\end{aligned}$$

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.

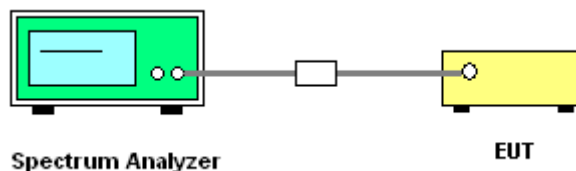
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

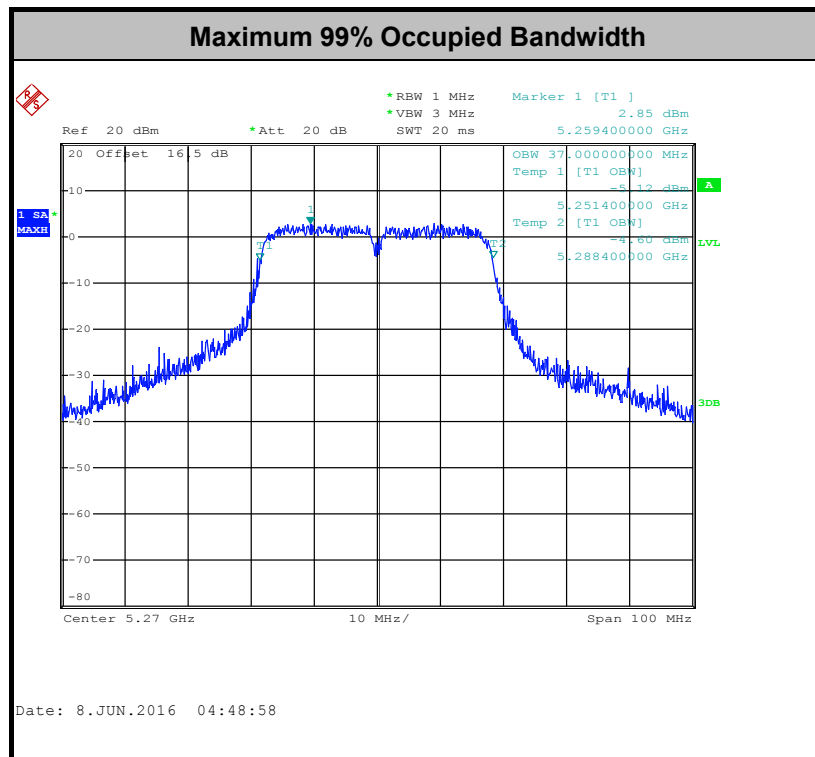
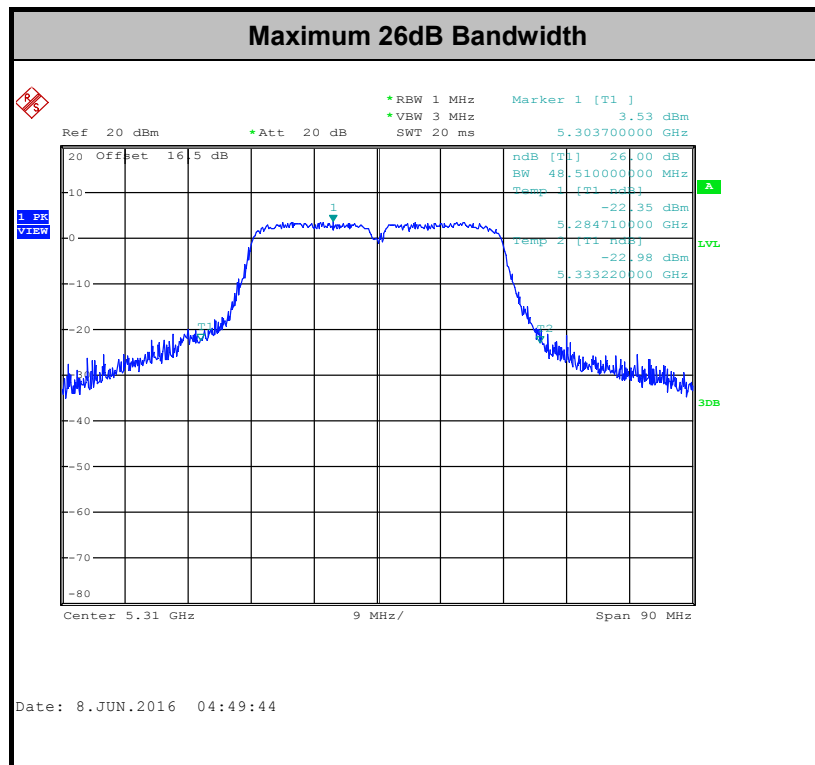
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.
Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB 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) $\geq 3 * \text{RBW}$.
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.



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.

For the 5.25–5.35 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

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.

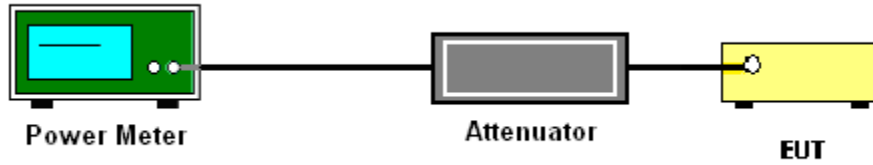
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.

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.

For the 5.25–5.35 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz 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 v01r02.

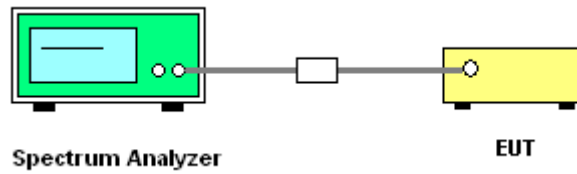
Section F) Maximum power spectral density.

Method SA-2

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

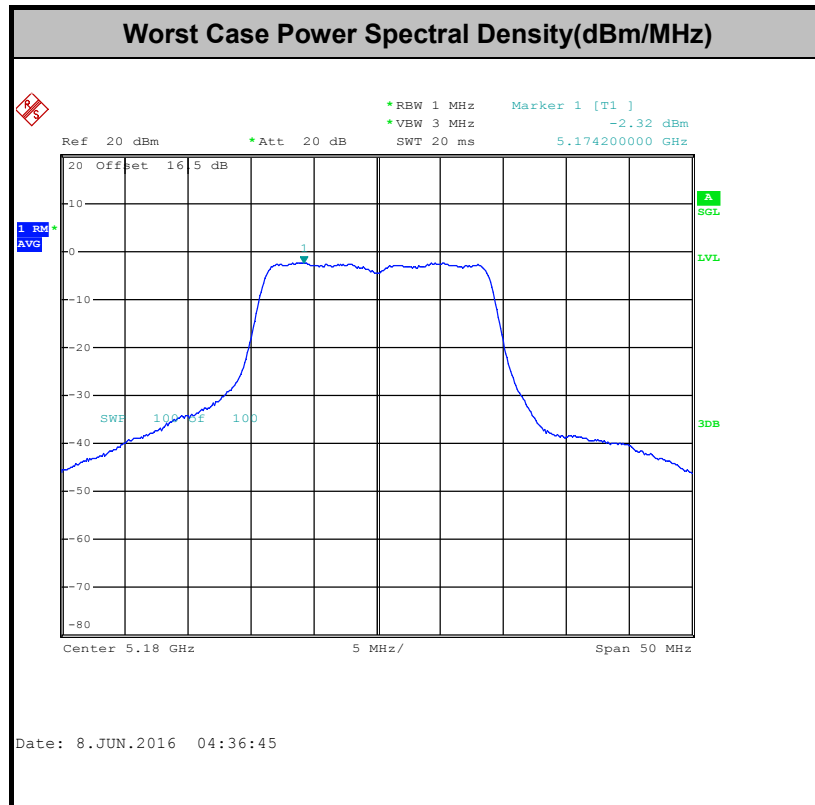
1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW $\geq$ 3 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, 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

Please refer to Appendix A.



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.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

- (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.

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

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

- (3) KDB789033 D02 v01r02 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

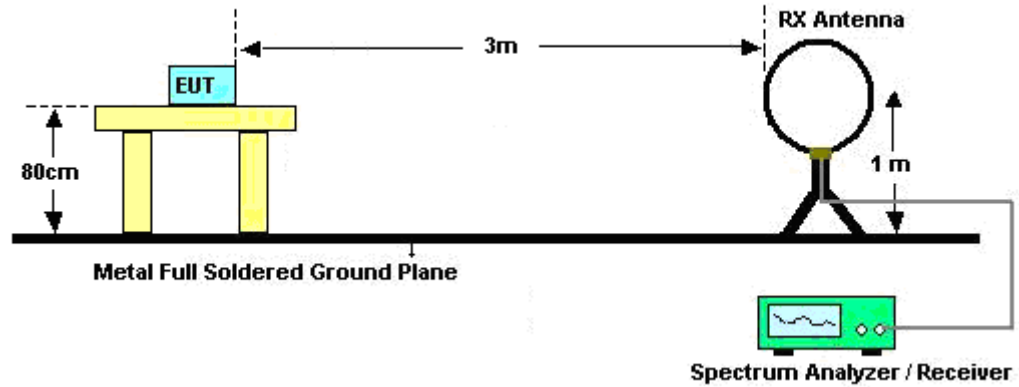
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak 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.



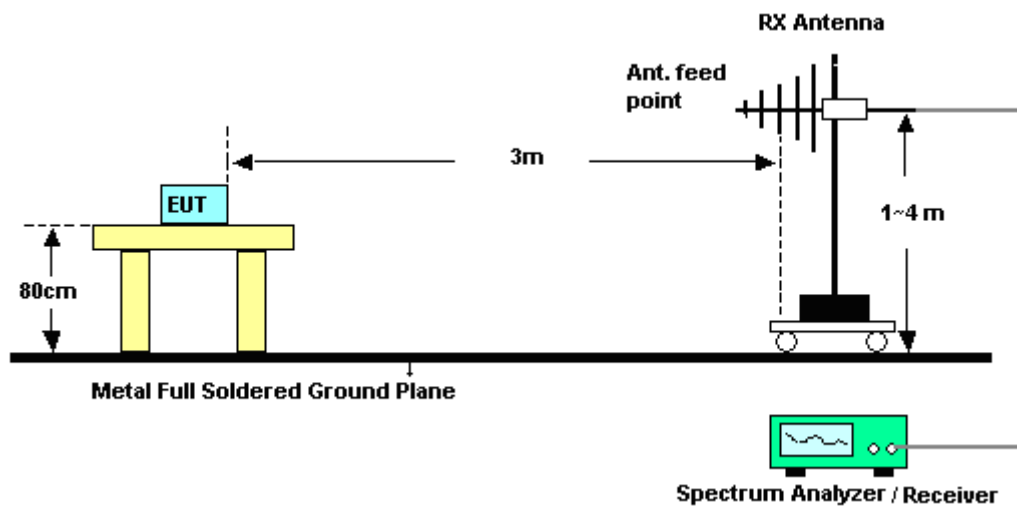
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

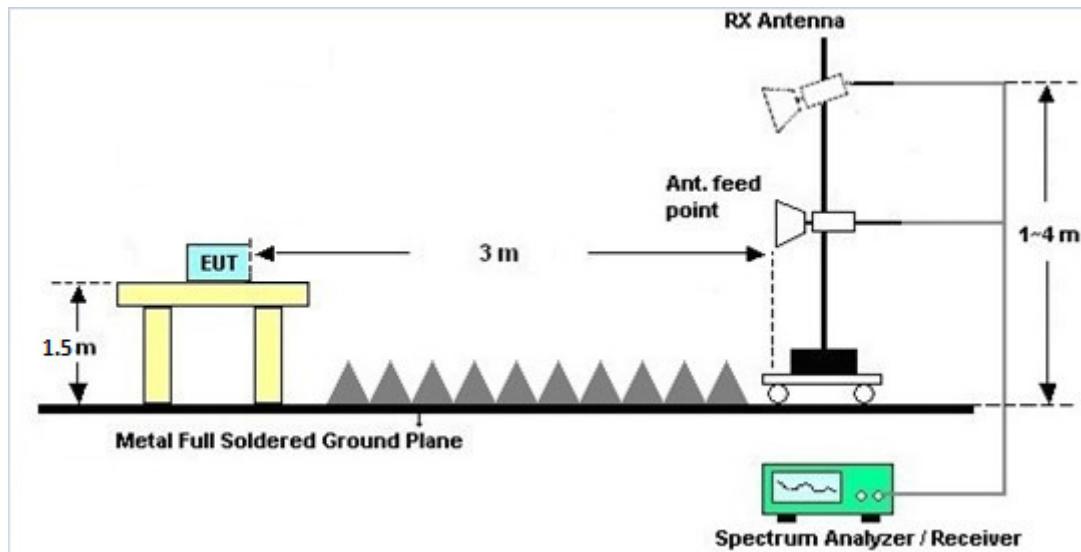
For radiated emissions below 30MHz



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 Duty Cycle

Please refer to Appendix C.

3.4.8 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 (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.

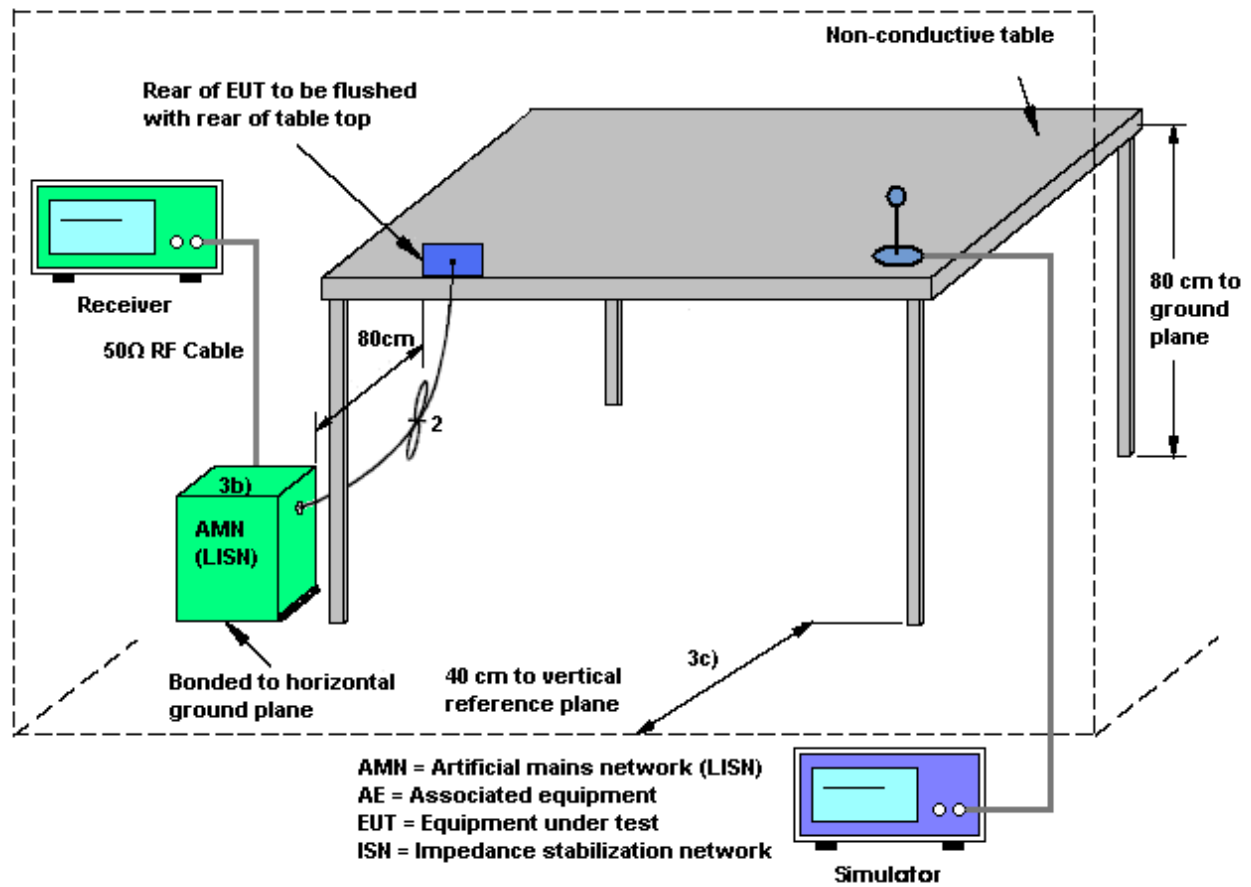
3.5.2 Measuring Instruments

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.

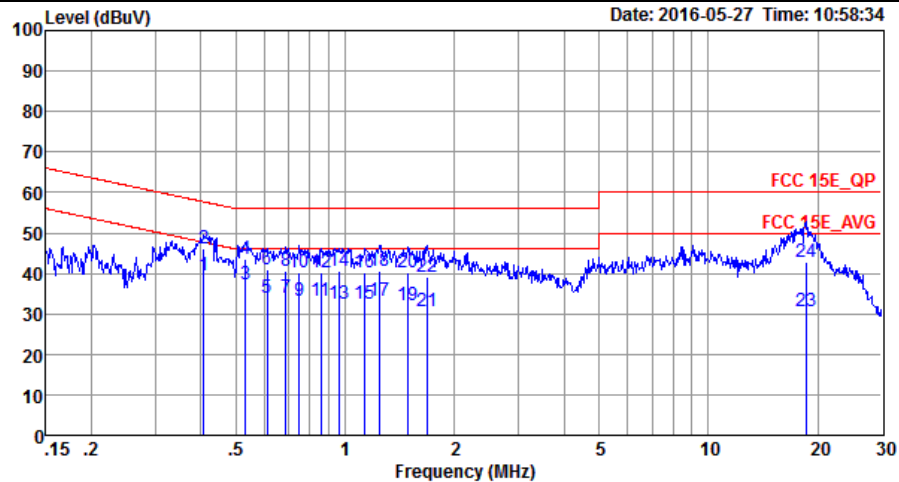
3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter) + SD Card		



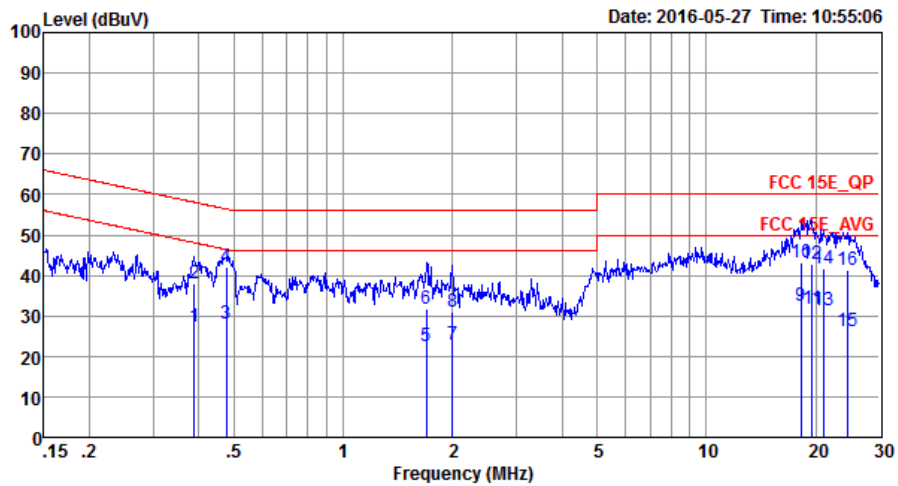
Site : CO01-SZ
Condition: FCC 15E_QP LISN_20160509 LINE

Mode : Mode 1
IMEI : 014678000400447

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.41	39.46	-8.22	47.68	29.10	0.11	10.25	Average
2	0.41	45.96	-11.72	57.68	35.60	0.11	10.25	QP
3	0.53	37.12	-8.88	46.00	26.80	0.11	10.21	Average
4	0.53	43.42	-12.58	56.00	33.10	0.11	10.21	QP
5	0.61	34.09	-11.91	46.00	23.80	0.11	10.18	Average
6	0.61	41.09	-14.91	56.00	30.80	0.11	10.18	QP
7	0.69	33.87	-12.13	46.00	23.60	0.11	10.16	Average
8	0.69	40.77	-15.23	56.00	30.50	0.11	10.16	QP
9	0.75	33.17	-12.83	46.00	22.90	0.11	10.16	Average
10	0.75	40.17	-15.83	56.00	29.90	0.11	10.16	QP
11	0.86	33.27	-12.73	46.00	23.00	0.11	10.16	Average
12	0.86	40.37	-15.63	56.00	30.10	0.11	10.16	QP
13	0.96	32.47	-13.53	46.00	22.20	0.11	10.16	Average
14	0.96	40.47	-15.53	56.00	30.20	0.11	10.16	QP
15	1.14	32.37	-13.63	46.00	22.10	0.11	10.16	Average
16	1.14	40.07	-15.93	56.00	29.80	0.11	10.16	QP
17	1.24	33.17	-12.83	46.00	22.90	0.11	10.16	Average
18	1.24	40.47	-15.53	56.00	30.20	0.11	10.16	QP
19	1.49	32.28	-13.72	46.00	22.00	0.11	10.17	Average
20	1.49	40.28	-15.72	56.00	30.00	0.11	10.17	QP
21	1.68	30.78	-15.22	46.00	20.50	0.11	10.17	Average
22	1.68	39.18	-16.82	56.00	28.90	0.11	10.17	QP
23	18.62	30.45	-19.55	50.00	19.50	0.36	10.59	Average
24	18.62	42.65	-17.35	60.00	31.70	0.36	10.59	QP



Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter) + SD Card		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20160509 NEUTRAL

Mode : Mode 1
IMEI : 014678000400447

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.39	27.28	-20.80	48.08	16.90	0.11	10.27	Average
2	0.39	37.98	-20.10	58.08	27.60	0.11	10.27	QP
3	0.48	27.94	-18.47	46.41	17.60	0.11	10.23	Average
4 *	0.48	42.14	-14.27	56.41	31.80	0.11	10.23	QP
5	1.70	22.38	-23.62	46.00	12.10	0.11	10.17	Average
6	1.70	31.68	-24.32	56.00	21.40	0.11	10.17	QP
7	2.00	22.88	-23.12	46.00	12.60	0.11	10.17	Average
8	2.00	31.18	-24.82	56.00	20.90	0.11	10.17	QP
9	18.23	32.43	-17.57	50.00	21.50	0.36	10.57	Average
10	18.23	43.23	-16.77	60.00	32.30	0.36	10.57	QP
11	19.53	31.81	-18.19	50.00	20.80	0.38	10.63	Average
12	19.53	42.91	-17.09	60.00	31.90	0.38	10.63	QP
13	21.04	31.54	-18.46	50.00	20.50	0.42	10.62	Average
14	21.04	41.74	-18.26	60.00	30.70	0.42	10.62	QP
15	24.40	26.04	-23.96	50.00	15.00	0.50	10.54	Average
16	24.40	41.44	-18.56	60.00	30.40	0.50	10.54	QP

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

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

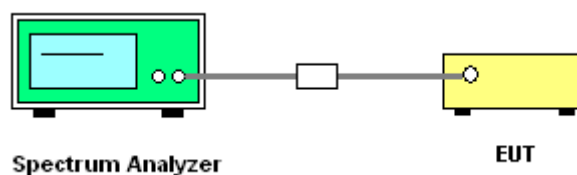
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.



3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

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

3.7.2 Measuring Instruments

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

3.7.3 Test Result of Automatically Discontinue Transmission

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



3.8 Antenna Requirements

3.8.1 Standard Applicable

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

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

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	FSP30	101400	9kHz~30GHz	Jan. 12, 2016	Jun. 08, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 12, 2016	Jun. 08, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 12, 2016	Jun. 08, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhonggroup	LP-150U	H2014081803	-40~+150°C	Aug. 07, 2015	Jun. 08, 2016	Aug. 06, 2016	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	May 07, 2016	Jun. 04, 2016~ Jun. 15, 2016	May 06, 2017	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz	May 07, 2016	Jun. 04, 2016~ Jun. 15, 2016	May 06, 2017	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 07, 2016	Jun. 04, 2016~ Jun. 15, 2016	May 06, 2017	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	May 21, 2016	Jun. 04, 2016~ Jun. 15, 2016	May 20, 2017	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	May 07, 2016	Jun. 04, 2016~ Jun. 15, 2016	May 06, 2017	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Aug. 19, 2015	Jun. 04, 2016~ Jun. 15, 2016	Aug. 18, 2016	Radiation (03CH03-SZ)
Amplifier	PREAMPLIFIER	BPA-530	102210	0.01Hz~3000MHz	Oct. 20, 2015	Jun. 04, 2016~ Jun. 15, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 12, 2016	Jun. 04, 2016~ Jun. 15, 2016	Jan. 11, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 18, 2015	Jun. 04, 2016~ Jun. 15, 2016	Jul. 17, 2016	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jun. 04, 2016~ Jun. 15, 2016	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jun. 04, 2016~ Jun. 15, 2016	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jun. 04, 2016~ Jun. 15, 2016	NCR	Radiation (03CH03-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz; Max 30dBm	Oct. 20, 2015	May 27, 2016	Oct. 19, 2016	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan.12, 2016	May 27, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 12, 2016	May 27, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Aug. 07, 2015	May 27, 2016	Aug. 06, 2016	Conduction (CO01-SZ)

NCR: No Calibration Required

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0 dB
---	--------

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8dB
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Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------



Appendix A. Conducted Test Results

Test Engineer:	Mygai Mo	Temperature:	24~26	°C
Test Date:	2016/6/8	Relative Humidity:	50~53	%

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)		
11a	6Mbps	1	36	5180	18.75	25.35	-	22.73		
11a	6Mbps	1	44	5220	18.65	24.60	-	22.71		
11a	6Mbps	1	48	5240	18.80	24.95	-	22.74		
HT20	MCS0	1	36	5180	19.55	25.70	-	22.91		
HT20	MCS0	1	44	5220	19.20	24.80	-	22.83		
HT20	MCS0	1	48	5240	19.40	24.50	-	22.88		
HT40	MCS0	1	38	5190	36.80	47.34	-	23.01		
HT40	MCS0	1	46	5230	36.80	46.08	-	23.01		

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
11a	6Mbps	1	36	5180	0.56	9.88	24.00	-2.00		Pass
11a	6Mbps	1	44	5220	0.56	8.99	24.00	-2.00		Pass
11a	6Mbps	1	48	5240	0.56	9.16	24.00	-2.00		Pass
HT20	MCS0	1	36	5180	0.63	9.99	24.00	-2.00		Pass
HT20	MCS0	1	44	5220	0.63	9.04	24.00	-2.00		Pass
HT20	MCS0	1	48	5240	0.63	9.26	24.00	-2.00		Pass
HT40	MCS0	1	38	5190	1.18	10.50	24.00	-2.00		Pass
HT40	MCS0	1	46	5230	1.18	9.51	24.00	-2.00		Pass

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
11a	6Mbps	1	36	5180	0.56	-1.74	11.00	-2.00		Pass
11a	6Mbps	1	44	5220	0.56	-2.57	11.00	-2.00		Pass
11a	6Mbps	1	48	5240	0.56	-2.35	11.00	-2.00		Pass
HT20	MCS0	1	36	5180	0.63	-1.69	11.00	-2.00		Pass
HT20	MCS0	1	44	5220	0.63	-2.68	11.00	-2.00		Pass
HT20	MCS0	1	48	5240	0.63	-2.39	11.00	-2.00		Pass
HT40	MCS0	1	38	5190	1.18	-3.92	11.00	-2.00		Pass
HT40	MCS0	1	46	5230	1.18	-5.04	11.00	-2.00		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band II										
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)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	52	5260	18.75	24.80	23.73	29.73	23.98	
11a	6M bps	1	60	5300	18.65	24.25	23.71	29.71	23.98	
11a	6M bps	1	64	5320	19.00	23.55	23.79	29.79	23.98	
HT20	MCS 0	1	52	5260	19.25	25.40	23.84	29.84	23.98	
HT20	MCS 0	1	60	5300	19.30	25.25	23.86	29.86	23.98	
HT20	MCS 0	1	64	5320	19.45	25.20	23.89	29.89	23.98	
HT40	MCS 0	1	54	5270	37.00	46.98	23.98	30.00	23.98	
HT40	MCS 0	1	62	5310	36.80	48.51	23.98	30.00	23.98	

TEST RESULTS DATA
Average Power Table

FCC Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	0.56	8.88	23.98	-1.00	26.99	Pass
11a	6M bps	1	60	5300	0.56	8.68	23.98	-1.00	26.99	Pass
11a	6M bps	1	64	5320	0.56	8.49	23.98	-1.00	26.99	Pass
HT20	MCS 0	1	52	5260	0.63	9.03	23.98	-1.00	26.99	Pass
HT20	MCS 0	1	60	5300	0.63	8.75	23.98	-1.00	26.99	Pass
HT20	MCS 0	1	64	5320	0.63	8.63	23.98	-1.00	26.99	Pass
HT40	MCS 0	1	54	5270	1.18	9.48	23.98	-1.00	26.99	Pass
HT40	MCS 0	1	62	5310	1.18	8.86	23.98	-1.00	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)		Pass/Fail
11a	6M bps	1	52	5260	0.56	-2.39	11.00	-1.00		Pass
11a	6M bps	1	60	5300	0.56	-2.93	11.00	-1.00		Pass
11a	6M bps	1	64	5320	0.56	-2.94	11.00	-1.00		Pass
HT20	MCS 0	1	52	5260	0.63	-2.60	11.00	-1.00		Pass
HT20	MCS 0	1	60	5300	0.63	-3.05	11.00	-1.00		Pass
HT20	MCS 0	1	64	5320	0.63	-3.18	11.00	-1.00		Pass
HT40	MCS 0	1	54	5270	1.18	-5.46	11.00	-1.00		Pass
HT40	MCS 0	1	62	5310	1.18	-5.08	11.00	-1.00		Pass

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.7	
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	20	4.35	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.8	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	-30	3.8	
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	50	3.8	

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	20	3.7	
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	20	4.35	
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	20	3.8	
11a	6Mbps	1	64	5320	5320.025	0.025	4.70	-30	3.8	
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	50	3.8	



Appendix B. Radiated Spurious Emission

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		5148.65	48.87	-25.13	74	43.97	31.5	7.07	33.67	165	54	P	H
		5149.55	40.58	-13.42	54	35.68	31.5	7.07	33.67	165	54	A	H
	*	5180	97.75	-	-	92.77	31.55	7.08	33.65	165	54	P	H
	*	5180	90.58	-	-	85.6	31.55	7.08	33.65	165	54	A	H
		5147.3	49.43	-24.57	74	44.53	31.5	7.07	33.67	169	114	P	V
		5150	40.95	-13.05	54	36.05	31.5	7.07	33.67	169	114	A	V
	*	5180	94.47	-	-	89.49	31.55	7.08	33.65	169	114	P	V
	*	5180	87.48	-	-	82.5	31.55	7.08	33.65	169	114	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	49.53	-24.47	74	59.84	38.62	10.07	59	250	0	P	H
		15540	48.87	-25.13	74	57.25	38.54	12.77	59.69	150	0	P	H
		10360	48.96	-25.04	74	59.27	38.62	10.07	59	250	0	P	V
		15540	49.49	-24.51	74	57.87	38.54	12.77	59.69	150	0	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 HT20 (Band Edge @ 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)
802.11n HT20 CH 36 5180MHz		5149.85	50.57	-23.43	74	45.67	31.5	7.07	33.67	183	55	P	H
		5149.7	41.43	-12.57	54	36.53	31.5	7.07	33.67	183	55	A	H
	*	5180	97.06	-	-	92.08	31.55	7.08	33.65	183	55	P	H
	*	5180	90.58	-	-	85.6	31.55	7.08	33.65	183	55	A	H
		5147.3	47.43	-26.57	74	42.53	31.5	7.07	33.67	171	113	P	V
		5150	38.95	-15.05	54	34.05	31.5	7.07	33.67	171	113	A	V
	*	5180	93.87	-	-	88.89	31.55	7.08	33.65	171	113	P	V
	*	5180	86.88	-	-	81.9	31.55	7.08	33.65	171	113	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	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	50.52	-23.48	74	60.83	38.62	10.07	59	250	0	P	H
		15540	50.64	-23.36	74	59.02	38.54	12.77	59.69	150	0	P	H
		10360	49.41	-24.59	74	59.72	38.62	10.07	59	250	0	P	V
		15540	49.04	-24.96	74	57.42	38.54	12.77	59.69	150	0	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	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		5145.65	56.89	-17.11	74	51.99	31.5	7.07	33.67	179	58	P	H
		5149.85	48.15	-5.85	54	43.25	31.5	7.07	33.67	179	58	A	H
	*	5190	94.42	-	-	89.44	31.55	7.08	33.65	179	58	P	H
	*	5190	87.58	-	-	82.6	31.55	7.08	33.65	179	58	A	H
		5362.87	45.94	-28.06	74	40.54	31.81	7.12	33.53	179	58	P	H
		5455.38	37.2	-16.8	54	31.57	31.93	7.17	33.47	179	58	A	H
		5147.45	52.88	-21.12	74	47.98	31.5	7.07	33.67	150	36	P	V
		5148.5	43.91	-10.09	54	39.01	31.5	7.07	33.67	150	36	A	V
	*	5190	89.61	-	-	84.63	31.55	7.08	33.65	150	36	P	V
	*	5190	83.38	-	-	78.4	31.55	7.08	33.65	150	36	A	V
		5439.32	46.17	-27.83	74	40.59	31.91	7.15	33.48	150	36	P	V
		5459.67	36.9	-17.1	54	31.27	31.93	7.17	33.47	150	36	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	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	49.99	-24.01	74	60.25	38.65	10.1	59.01	250	0	P	H
		15570	49.67	-24.33	74	58.12	38.44	12.82	59.71	150	0	P	H
		10380	50.14	-23.86	74	60.4	38.65	10.1	59.01	250	0	P	V
		15570	48.5	-25.5	74	56.95	38.44	12.82	59.71	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 - 5250~5350MHz

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 52 5260MHz		5060	46.28	-27.72	74	41.58	31.38	7.06	33.74	177	55	P	H
		5118.65	37.03	-16.97	54	32.21	31.45	7.06	33.69	177	55	A	H
	*	5260	99.03	-	-	93.86	31.67	7.1	33.6	177	55	P	H
	*	5260	91.92	-	-	86.75	31.67	7.1	33.6	177	55	A	H
		5087.75	46.56	-27.44	74	41.81	31.41	7.06	33.72	163	111	P	V
		5115.2	36.86	-17.14	54	32.05	31.45	7.06	33.7	163	111	A	V
	*	5260	96.47	-	-	91.3	31.67	7.1	33.6	163	111	P	V
	*	5260	89.43	-	-	84.26	31.67	7.1	33.6	163	111	A	V
802.11a CH 64 5320MHz	*	5320	99.5	-	-	94.22	31.74	7.11	33.57	164	54	P	H
	*	5320	92.34	-	-	87.06	31.74	7.11	33.57	164	54	A	H
		5354.73	57.4	-16.6	74	52.02	31.79	7.12	33.53	164	54	P	H
		5350.55	45.9	-8.1	54	40.52	31.79	7.12	33.53	164	54	A	H
	*	5320	97.11	-	-	91.83	31.74	7.11	33.57	161	111	P	V
	*	5320	89.78	-	-	84.5	31.74	7.11	33.57	161	111	A	V
		5350.11	55.27	-18.73	74	49.89	31.79	7.12	33.53	161	111	P	V
		5350.11	43.77	-10.23	54	38.39	31.79	7.12	33.53	161	111	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

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 52 5260MHz		10520	50.8	-23.2	74	60.84	38.84	10.18	59.06	250	0	P	H
		15780	49.39	-24.61	74	58.33	37.79	13.09	59.82	150	0	P	H
		10520	49.7	-24.3	74	59.74	38.84	10.18	59.06	250	0	P	V
		15780	50.02	-23.98	74	58.96	37.79	13.09	59.82	150	0	P	V
802.11a CH 64 5320MHz		10640	49.34	-24.66	74	59.18	39	10.34	59.18	250	0	P	H
		15960	49.61	-24.39	74	58.97	37.21	13.35	59.92	150	0	P	H
		10640	50.51	-23.49	74	60.35	39	10.34	59.18	250	0	P	V
		15960	49.89	-24.11	74	59.25	37.21	13.35	59.92	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11n HT20 (Band Edge @ 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)
802.11n HT20 CH 52 5260MHz		5012.6	45.98	-28.02	74	41.39	31.31	7.05	33.77	150	56	P	H
		5117.6	37.06	-16.94	54	32.25	31.45	7.06	33.7	150	56	A	H
	*	5260	98.9	-	-	93.73	31.67	7.1	33.6	150	56	P	H
	*	5260	91.57	-	-	86.4	31.67	7.1	33.6	150	56	A	H
		5459.12	47.27	-26.73	74	41.64	31.93	7.17	33.47	150	56	P	H
		5459.34	37.28	-16.72	54	31.65	31.93	7.17	33.47	150	56	A	H
		5038.4	46.34	-27.66	74	41.68	31.36	7.05	33.75	163	113	P	V
		5130.05	36.87	-17.13	54	32.01	31.48	7.07	33.69	163	113	A	V
	*	5260	96.02	-	-	90.85	31.67	7.1	33.6	163	113	P	V
	*	5260	88.67	-	-	83.5	31.67	7.1	33.6	163	113	A	V
		5439.65	46.07	-27.93	74	40.49	31.91	7.15	33.48	163	113	P	V
		5458.9	36.87	-17.13	54	31.24	31.93	7.17	33.47	163	113	A	V
802.11n HT20 CH 64 5320MHz	*	5320	99.33	-	-	94.05	31.74	7.11	33.57	150	55	P	H
	*	5320	92.13	-	-	86.85	31.74	7.11	33.57	150	55	A	H
		5350.77	58.38	-15.62	74	53	31.79	7.12	33.53	150	55	P	H
		5350	46.58	-7.42	54	41.2	31.79	7.12	33.53	150	55	A	H
	*	5320	97.07	-	-	91.79	31.74	7.11	33.57	150	111	P	V
	*	5320	90.08	-	-	84.8	31.74	7.11	33.57	150	111	A	V
		5350	54.43	-19.57	74	49.05	31.79	7.12	33.53	150	111	P	V
		5350	44.15	-9.85	54	38.77	31.79	7.12	33.53	150	111	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz
WIFI 802.11n HT20 (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)
802.11n HT20 CH 52 5260MHz		10520	51.7	-22.3	74	61.74	38.84	10.18	59.06	250	0	P	H
		10520	48.86	-5.14	54	58.9	38.84	10.18	59.06	150	302	A	H
		15780	50.13	-23.87	74	59.07	37.79	13.09	59.82	150	0	P	H
		10520	49.42	-24.58	74	59.46	38.84	10.18	59.06	250	0	P	V
		15780	50.22	-23.78	74	59.16	37.79	13.09	59.82	150	0	P	V
802.11n HT20 CH 64 5320MHz		10640	51.9	-22.1	74	61.74	39	10.34	59.18	250	0	P	H
		10640	48.56	-5.44	54	58.4	39	10.34	59.18	150	298	A	H
		15960	49.1	-24.9	74	58.46	37.21	13.35	59.92	150	0	P	H
		10640	50.24	-23.76	74	60.08	39	10.34	59.18	250	0	P	V
		15960	49.27	-24.73	74	58.63	37.21	13.35	59.92	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11n HT40 (Band Edge @ 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)
802.11n HT40 CH 54 5270MHz		5102.3	46.7	-27.3	74	41.91	31.43	7.06	33.7	171	51	P	H
		5140.4	37.59	-16.41	54	32.71	31.5	7.07	33.69	171	51	A	H
	*	5270	94.47	-	-	89.3	31.67	7.1	33.6	171	51	P	H
	*	5270	86.37	-	-	81.2	31.67	7.1	33.6	171	51	A	H
		5372.22	46.67	-27.33	74	41.26	31.81	7.13	33.53	171	51	P	H
		5372.66	38.18	-15.82	54	32.77	31.81	7.13	33.53	171	51	A	H
		5124.5	46.11	-27.89	74	41.26	31.48	7.06	33.69	175	112	P	V
		5123.75	37.61	-16.39	54	32.76	31.48	7.06	33.69	175	112	A	V
	*	5270	92.95	-	-	87.78	31.67	7.1	33.6	175	112	P	V
	*	5270	86.77	-	-	81.6	31.67	7.1	33.6	175	112	A	V
		5374.64	47.18	-26.82	74	41.76	31.81	7.13	33.52	175	112	P	V
		5372.77	37.72	-16.28	54	32.31	31.81	7.13	33.53	175	112	A	V
802.11n HT40 CH 62 5310MHz		5011.25	47.19	-26.81	74	42.6	31.31	7.05	33.77	150	360	P	H
		5117	37.51	-16.49	54	32.7	31.45	7.06	33.7	150	360	A	H
	*	5310	95.36	-	-	90.08	31.74	7.11	33.57	150	360	P	H
	*	5310	88.68	-	-	83.4	31.74	7.11	33.57	150	360	A	H
		5352.42	62.87	-11.13	74	57.49	31.79	7.12	33.53	150	360	P	H
		5350.88	49.26	-4.74	54	43.88	31.79	7.12	33.53	150	218	P	H
		5082.65	46.05	-27.95	74	41.3	31.41	7.06	33.72	150	112	P	V
		5123.15	37.49	-16.51	54	32.64	31.48	7.06	33.69	150	112	A	V
	*	5310	93.94	-	-	88.66	31.74	7.11	33.57	150	112	P	V
	*	5310	84.18	-	-	78.9	31.74	7.11	33.57	150	112	A	V
		5352.2	63.6	-10.4	74	58.22	31.79	7.12	33.53	150	112	P	V
		5350.33	50.72	-3.28	54	45.34	31.79	7.12	33.53	150	112	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz
WIFI 802.11n HT40 (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)
802.11n HT40 CH 54 5270MHz		10540	51.75	-22.25	74	61.74	38.86	10.23	59.08	250	0	P	H
		10540	48.72	-5.28	54	58.71	38.86	10.23	59.08	250	0	A	H
		15810	50.21	-23.79	74	59.22	37.69	13.14	59.84	150	0	P	H
		10540	49.53	-24.47	74	59.52	38.86	10.23	59.08	250	0	P	V
		15810	50.47	-23.53	74	59.48	37.69	13.14	59.84	150	0	P	V
802.11n HT40 CH 62 5310MHz		10620	50.68	-23.32	74	60.53	38.98	10.34	59.17	250	0	P	H
		15930	50.02	-23.98	74	59.31	37.31	13.3	59.9	150	0	P	H
		10620	49.6	-24.4	74	59.45	38.98	10.34	59.17	250	0	P	V
		15930	49.8	-24.2	74	59.09	37.31	13.3	59.9	150	0	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 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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		30	23.25	-16.75	40	31.41	24.2	1	33.36	-	-	P	H
		73.65	20.83	-19.17	40	38.91	14.16	1.14	33.38	-	-	P	H
		110.51	29.25	-14.25	43.5	43.14	18.07	1.38	33.34	100	300	P	H
		227.88	27.4	-18.6	46	41.58	17.14	1.8	33.12	-	-	P	H
		320.03	27.19	-18.81	46	37.88	20.35	1.94	32.98	-	-	P	H
		460.68	27.76	-18.24	46	34.7	23.35	2.31	32.6	-	-	P	H
		30	31.67	-8.33	40	39.83	24.2	1	33.36	100	200	P	V
		47.46	30.17	-9.83	40	46.56	15.99	1	33.38	-	-	P	V
		72.68	28.71	-11.29	40	46.97	13.97	1.14	33.37	-	-	P	V
		111.48	23.47	-20.03	43.5	37.39	18.04	1.38	33.34	-	-	P	V
		184.23	21.04	-22.46	43.5	36.21	16.44	1.57	33.18	-	-	P	V
		475.23	26.39	-19.61	46	33.09	23.55	2.31	32.56	-	-	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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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)

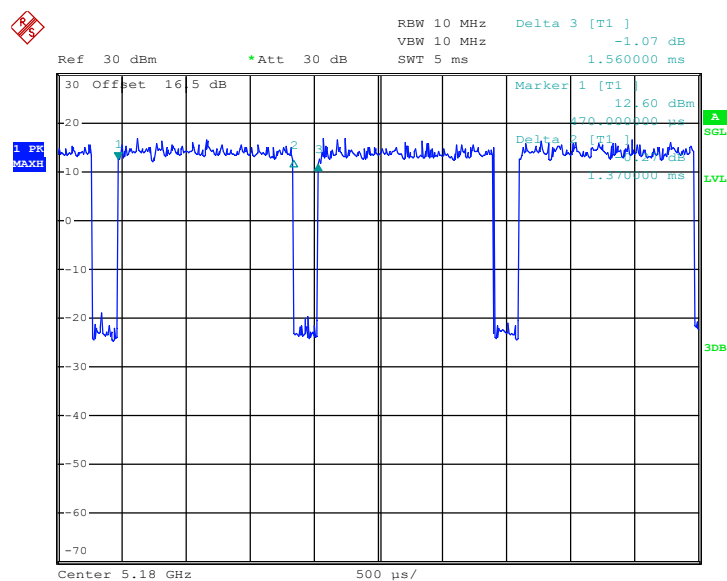
= -10.46(dB)

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

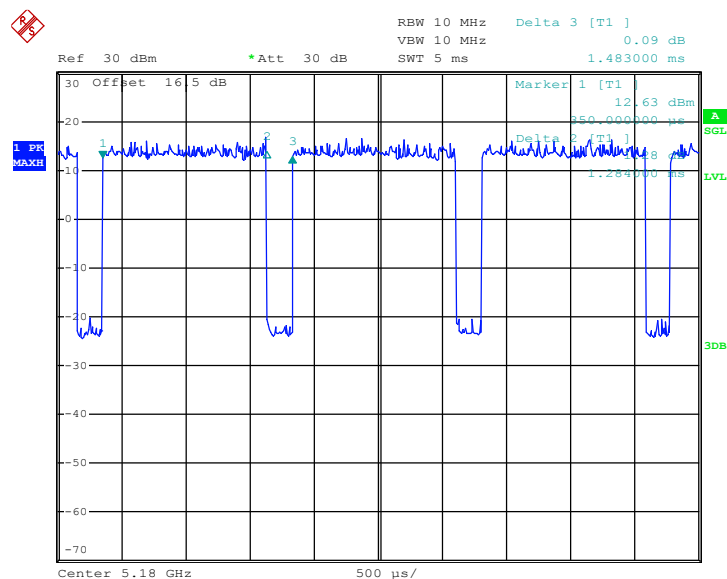
Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.82	1.37	0.73	1kHz
802.11n HT20	86.58	1.28	0.78	1kHz
802.11n HT40	76.22	0.64	1.56	3kHz

802.11a



802.11n HT20



802.11n HT40

