FCC RF Test Report

APPLICANT	:	TCL Communication Ltd.
EQUIPMENT	:	Tablet PC
BRAND NAME	:	ALCATEL ONETOUCH
MODEL NAME	:	9015W
MARKETING NAME	:	ALCATEL ONETOUCH POP™ 7 LTE
FCC ID	:	2ACCJB052
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Jan. 22, 2016 and testing was completed on Feb. 26, 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.

Prepared by: Andy Yeh / Manager

Approved by: Jones Tsai / Manager

Testing Laboratory 2353

SPORTON INTERNATIONAL (SHENZHEN) INC.

1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR612205E	Rev. 01	Initial issue of report	Feb. 29, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm/MHz &15.209(a)	Pass	Under limit 1.79 dB at 5713.080 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.85 dB at 0.600 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	
Equipment	Tablet PC
Brand Name	ALCATEL ONETOUCH
Model Name	9015W
Marketing Name	ALCATEL ONETOUCH POP™ 7 LTE
FCC ID	2ACCJB052
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE/ WLAN2.4GHz 802.11b/g/n HT20/ WLAN 5GHz 802.11a/n HT20/HT40/ Bluetooth v3.0+EDR/Bluetooth v4.1 LE
IMEI Code	Conducted: 014620000104504 Radiation: 014620000104496 Conduction: 014620000104280
HW Version	V03
SW Version	BAW
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 Channel Frequency Range	5745 MHz ~ 5805 MHz
Maximum Output Power	802.11a : 12.09 dBm / 0.0162 W 802.11n HT20 : 12.16 dBm / 0.0164 W 802.11n HT40 : 13.57 dBm / 0.0228 W
99% Occupied Bandwidth	802.11a : 22.33 MHz 802.11n HT20 : 23.78 MHz 802.11n HT40 : 52.25 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	Chip Antenna

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	ALCATEL ONETOUCH	**Model Name**	UC13US
	Power Rating	I/P: 100-240Vac, 400mA, O/P: 5Vdc, 2000mA		
	P/N	CBA0059AG0C2		
AC Adapter 2	**Brand Name**	ALCATEL ONETOUCH	**Model Name**	UC13US
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA		
	P/N	CBA0059AG0C1		
Battery	**Brand Name**	ALCATEL ONETOUCH	**Model Name**	TLp032B2
	Power Rating	3.7Vdc, 3240mAh		
USB Cable	**Brand Name**	NA	**Model Name**	NA
	Signal Line Type	0.8meter,shielded cable, without ferrite core		

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.**
	03CH01-SZ	831040

Note: The test site complies with ANSI C63.4 2009 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 v01r01
- 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 and Channel

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

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

2.2 Pre-Scanned RF Power

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

WLAN 5GHz 802.11a Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 149	5745	11.94	CH 161	12.07	12.06	12.04	12.02	12.00	12.03	12.04
CH 157	5785	11.83								
CH 161	5805	**12.09**								

WLAN 5GHz 802.11n-HT20 Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 149	5745	12.10	CH 161	12.10	12.11	12.12	12.11	12.06	12.10	12.09
CH 157	5785	12.06								
CH 161	5805	**12.16**								

WLAN 5GHz 802.11n-HT40 Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 151	5755	10.74	CH 159	13.52	13.51	13.46	13.28	13.38	13.29	13.37
CH 159	5795	**13.57**								

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.

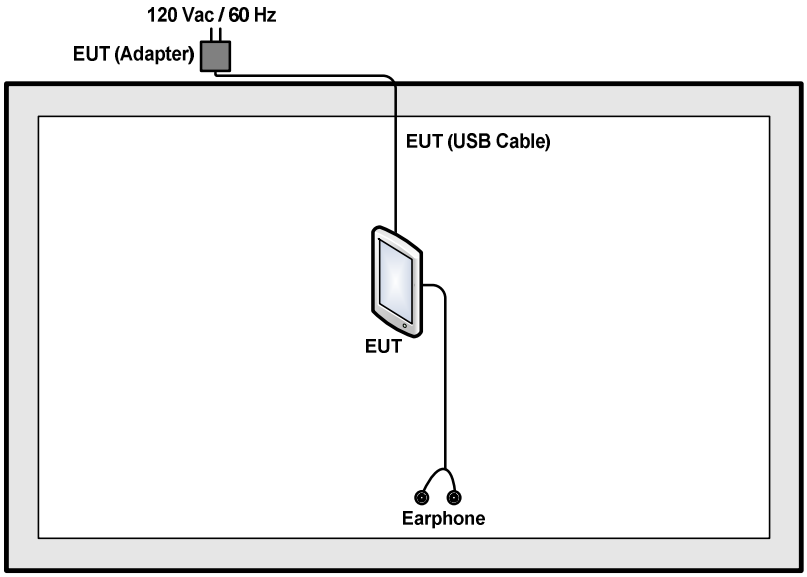
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WCDMA Band II Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter 2) + SIM 1
Remark: For Radiated Test Cases, The tests were performance with Adapter 2, Earphone and USB Cable.	

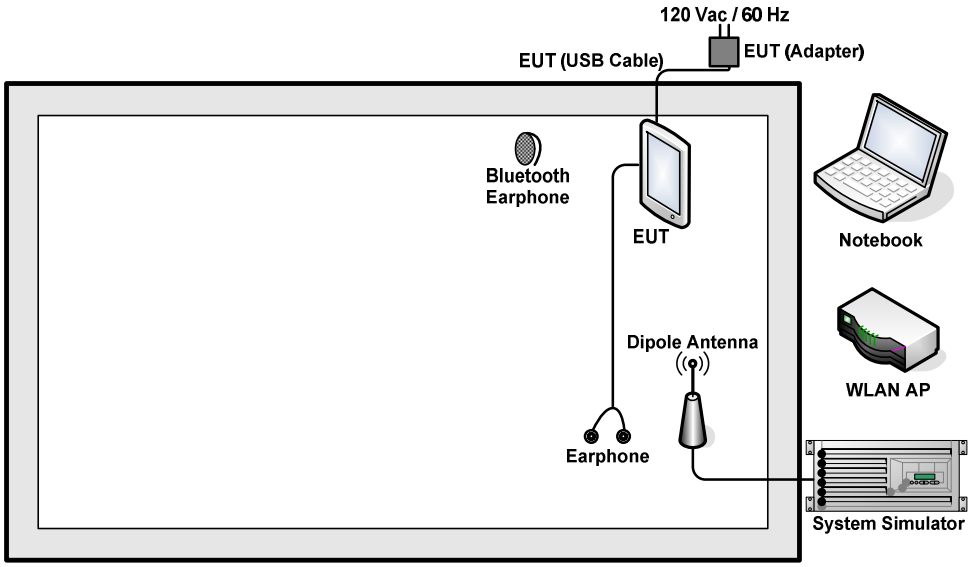
Ch. #		Band IV：5745-5805 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	161	161	159

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-815	KA2IR815A1	N/A	Unshielded, 1.8 m
2.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	E540	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
5.	iPod Earphone	Apple	MC690ZP/A	N/A	Shielded, 1.6 m	N/A
6.	DC Power Supply	GW INSTEK	GPS-3030D	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 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.

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

= 6.5 + 10 = 16.5 (dB)

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

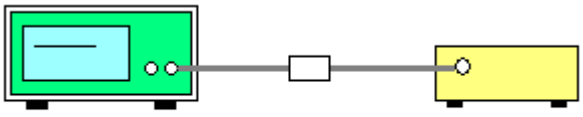
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

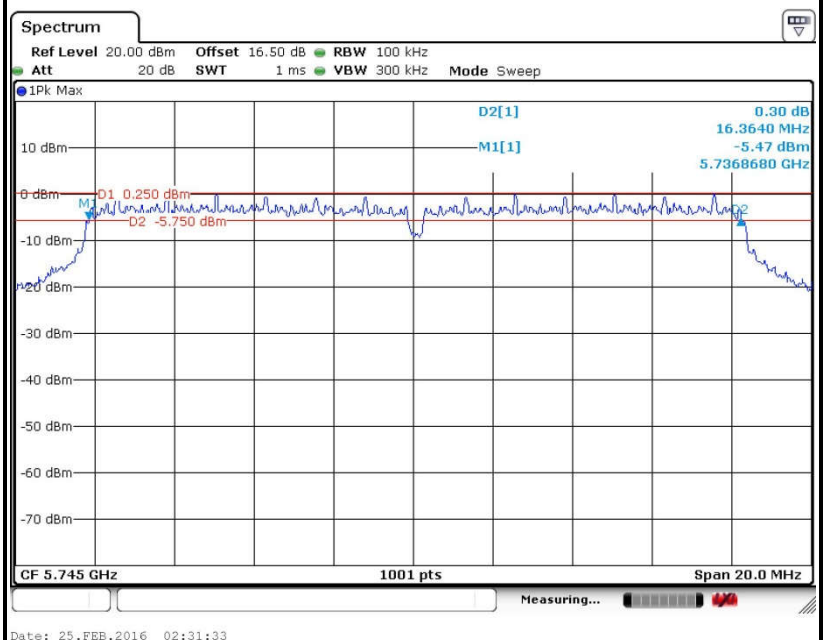
3.1.4 Test Setup



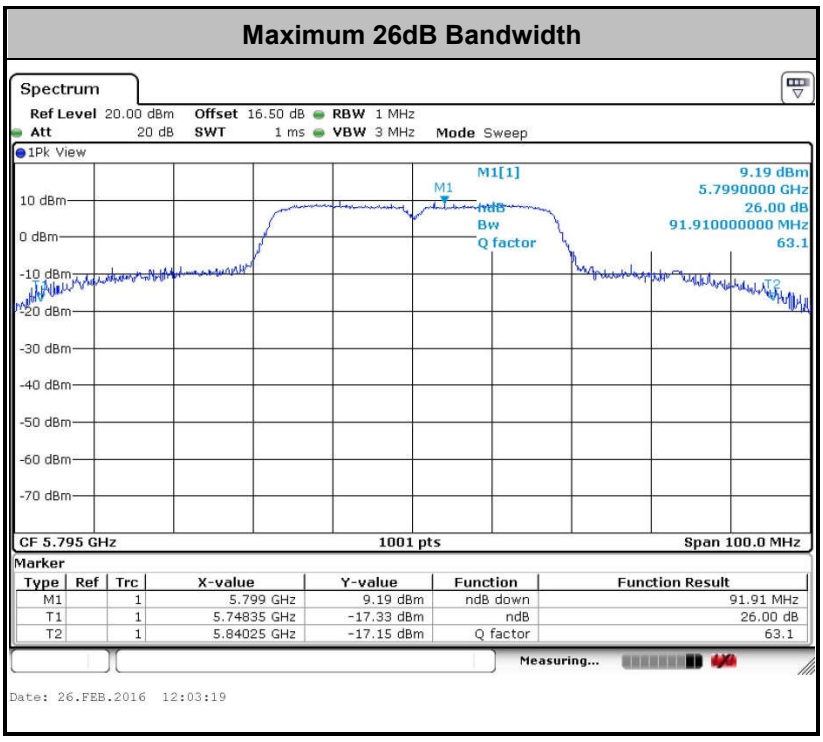
3.1.5 Test Result of 6dB and 26dB and 99% Occupied Bandwidth

Please refer to Appendix A.

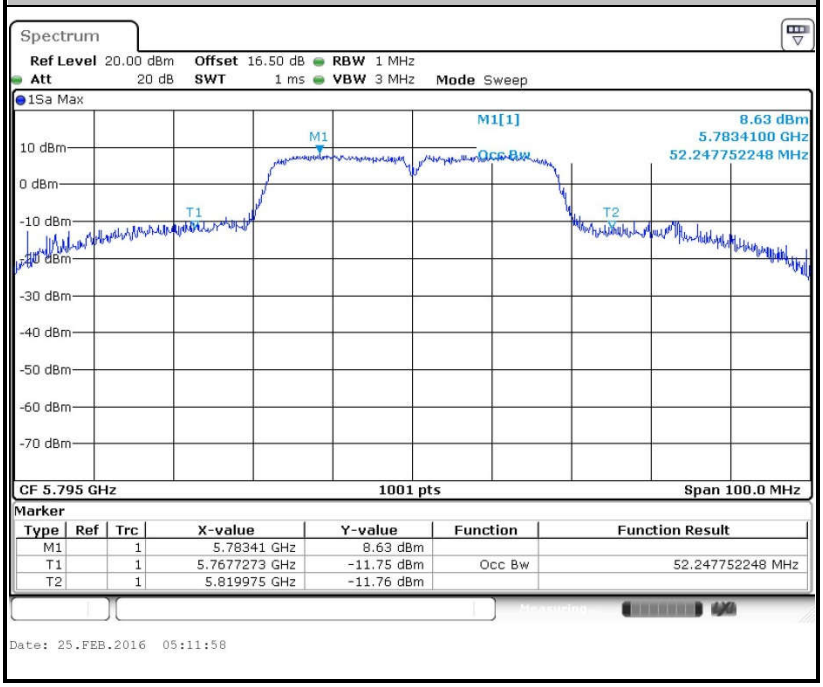
Minimum 6dB Bandwidth



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

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

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

3.2.2 Measuring Instruments

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

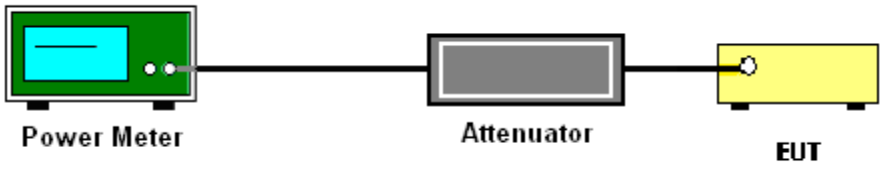
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

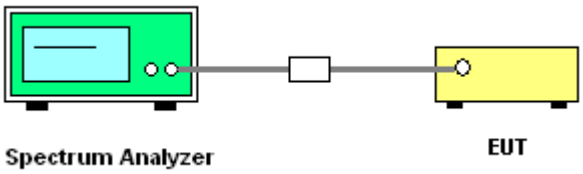
 # Method SA-2 #

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

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

2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

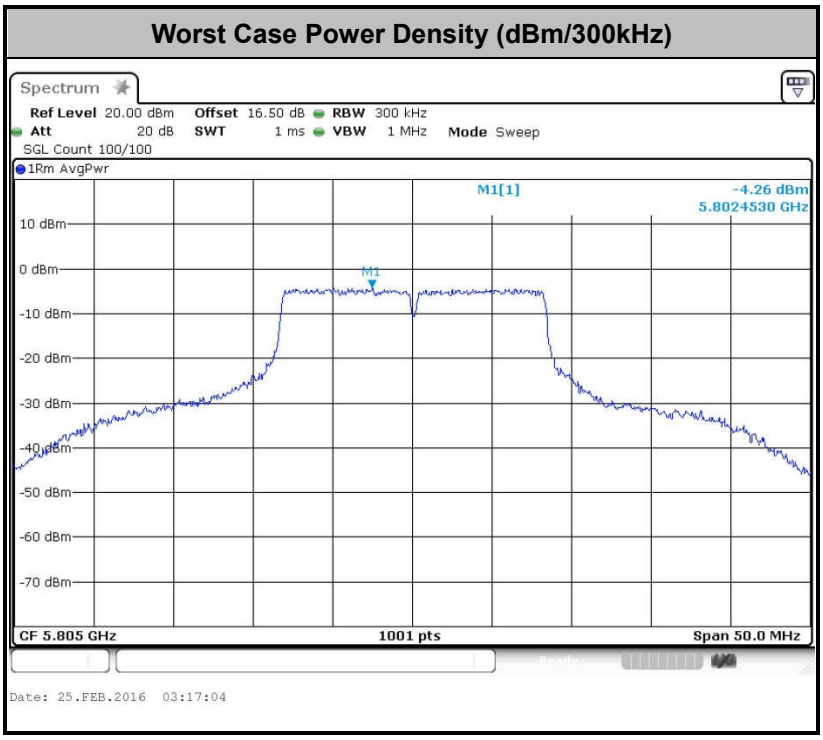
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

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

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

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

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

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

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

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

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

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

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

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

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

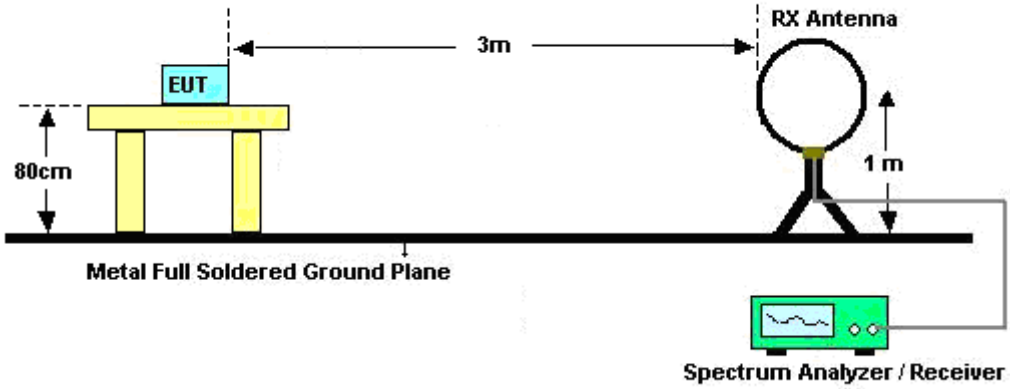
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.26	1.37	0.73	1kHz
802.11n HT20	86.54	1.29	0.77	1kHz
802.11n HT40	86.49	1.28	0.78	1kHz

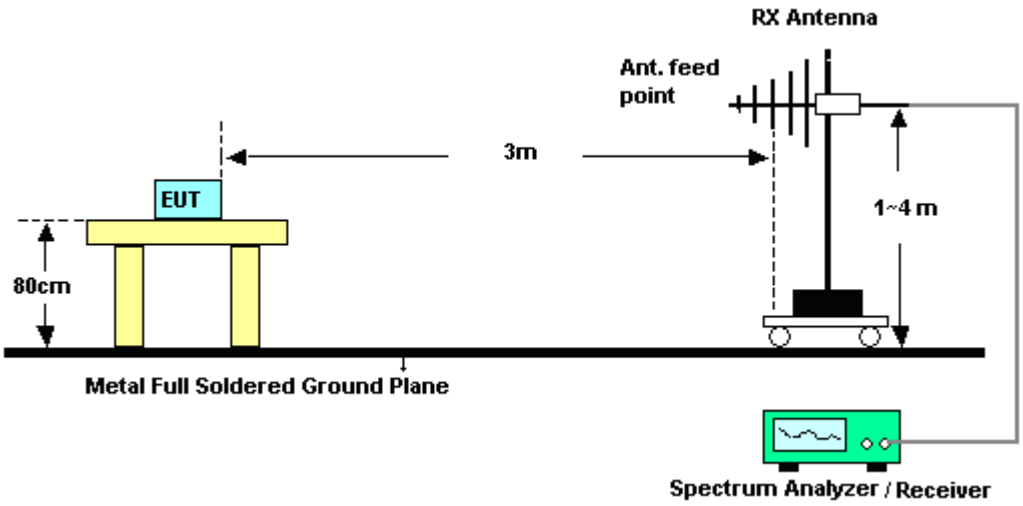
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

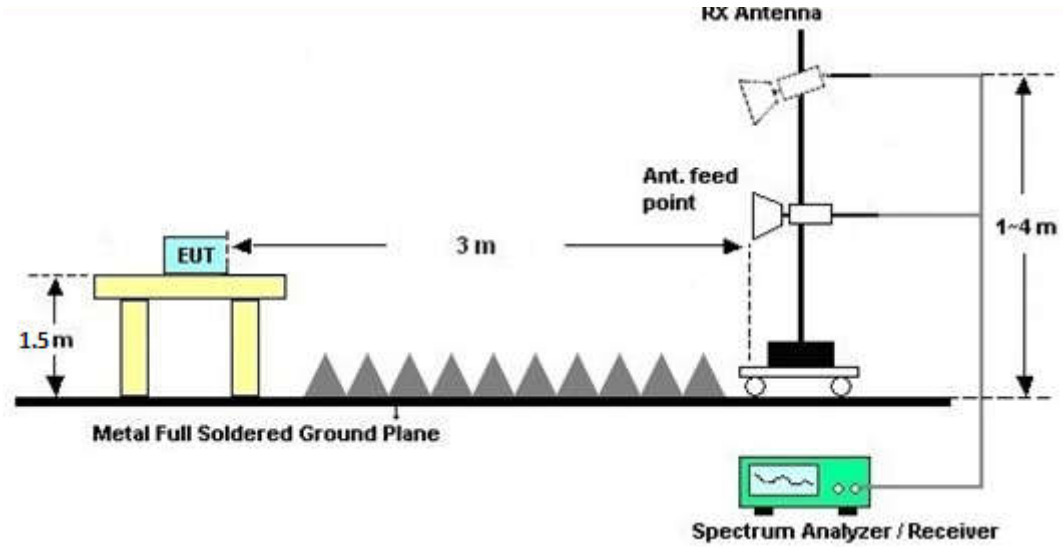
For radiated emissions below 30MHz



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.

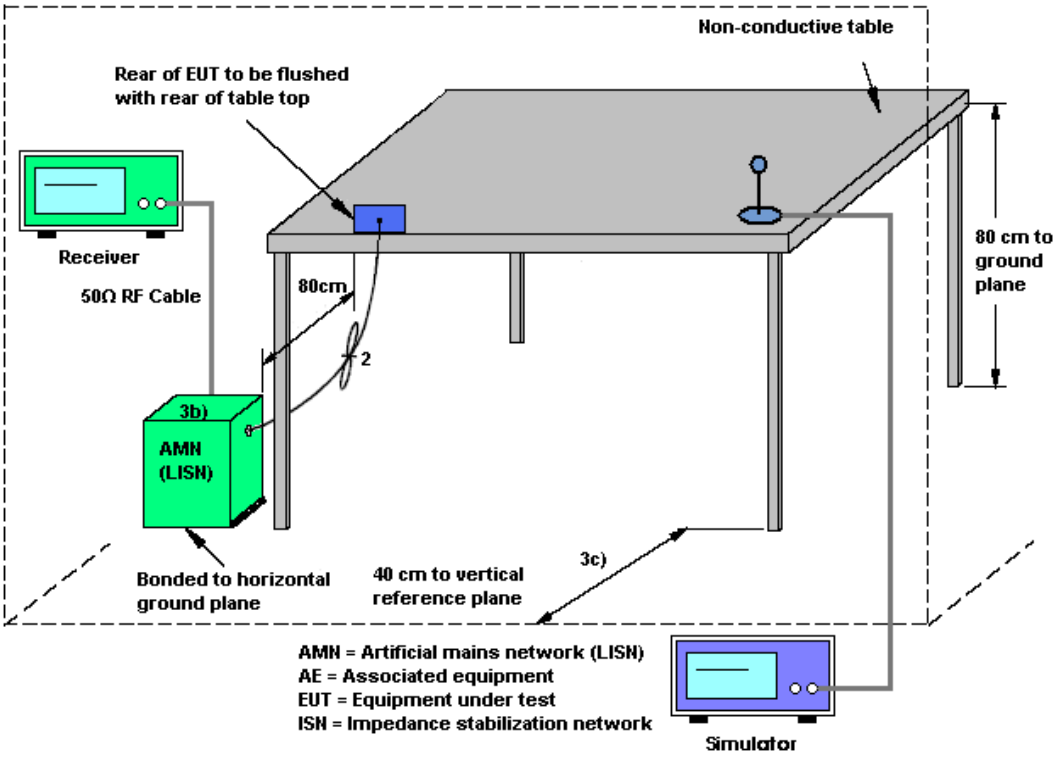
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

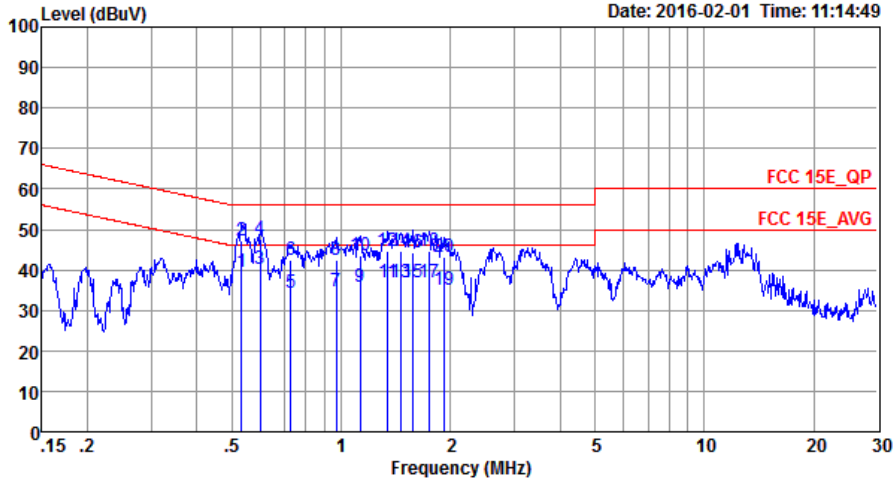
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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 :	21~23℃
Test Engineer :	Jacky Yang	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band II Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter 2) + SIM 1		

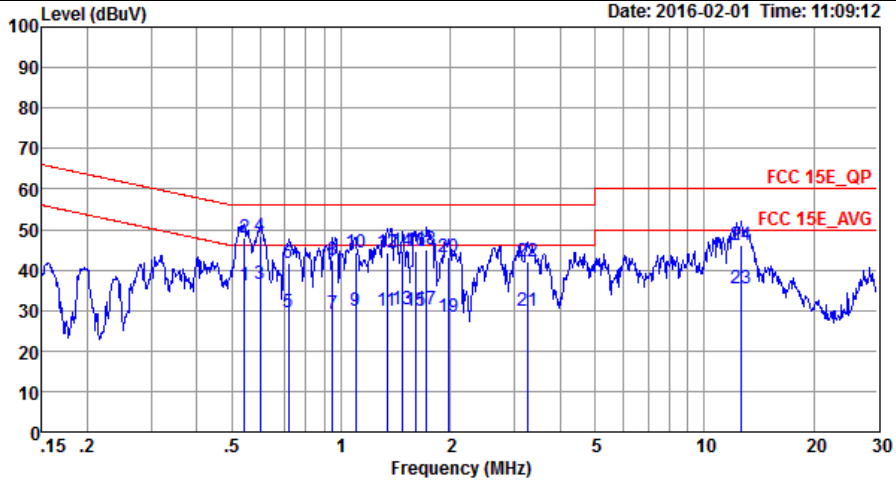


Site : CO01-SZ
Condition: FCC 15E_QP LISN_L_20160112 LINE

Mode : Mode 1
IMEI : 014620000104280

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.53	39.60	-6.40	46.00	28.80	0.65	10.15	Average
2		0.53	47.30	-8.70	56.00	36.50	0.65	10.15	QP
3	*	0.60	40.15	-5.85	46.00	29.40	0.60	10.15	Average
4		0.60	47.55	-8.45	56.00	36.80	0.60	10.15	QP
5		0.73	34.39	-11.61	46.00	23.70	0.54	10.15	Average
6		0.73	42.49	-13.51	56.00	31.80	0.54	10.15	QP
7		0.97	34.86	-11.14	46.00	24.20	0.51	10.15	Average
8		0.97	42.46	-13.54	56.00	31.80	0.51	10.15	QP
9		1.13	35.66	-10.34	46.00	25.00	0.50	10.16	Average
10		1.13	43.46	-12.54	56.00	32.80	0.50	10.16	QP
11		1.34	36.76	-9.24	46.00	26.10	0.49	10.17	Average
12		1.34	44.56	-11.44	56.00	33.90	0.49	10.17	QP
13		1.46	37.05	-8.95	46.00	26.40	0.48	10.17	Average
14		1.46	44.55	-11.45	56.00	33.90	0.48	10.17	QP
15		1.57	37.05	-8.95	46.00	26.39	0.48	10.18	Average
16		1.57	44.35	-11.65	56.00	33.69	0.48	10.18	QP
17		1.74	36.75	-9.25	46.00	26.10	0.47	10.18	Average
18		1.74	44.75	-11.25	56.00	34.10	0.47	10.18	QP
19		1.93	35.15	-10.85	46.00	24.50	0.46	10.19	Average
20		1.93	43.15	-12.85	56.00	32.50	0.46	10.19	QP

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Jacky Yang	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band II Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter 2) + SIM 1		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_N_20160112 NEUTRAL

Mode : Mode 1
IMEI : 014620000104280

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.54	36.25	-9.75	46.00	25.50	0.60	10.15	Average
2		0.54	48.15	-7.85	56.00	37.40	0.60	10.15	QP
3		0.60	36.53	-9.47	46.00	25.80	0.58	10.15	Average
4	*	0.60	48.43	-7.57	56.00	37.70	0.58	10.15	QP
5		0.72	29.50	-16.50	46.00	18.80	0.55	10.15	Average
6		0.72	41.80	-14.20	56.00	31.10	0.55	10.15	QP
7		0.95	29.11	-16.89	46.00	18.40	0.56	10.15	Average
8		0.95	42.61	-13.39	56.00	31.90	0.56	10.15	QP
9		1.09	30.02	-15.98	46.00	19.30	0.56	10.16	Average
10		1.09	44.42	-11.58	56.00	33.70	0.56	10.16	QP
11		1.34	30.03	-15.97	46.00	19.30	0.56	10.17	Average
12		1.34	44.43	-11.57	56.00	33.70	0.56	10.17	QP
13		1.48	30.24	-15.76	46.00	19.50	0.57	10.17	Average
14		1.48	44.74	-11.26	56.00	34.00	0.57	10.17	QP
15		1.60	29.84	-16.16	46.00	19.09	0.57	10.18	Average
16		1.60	44.64	-11.36	56.00	33.89	0.57	10.18	QP
17		1.72	30.15	-15.85	46.00	19.40	0.57	10.18	Average
18		1.72	44.85	-11.15	56.00	34.10	0.57	10.18	QP
19		1.97	28.36	-17.64	46.00	17.60	0.57	10.19	Average
20		1.97	43.06	-12.94	56.00	32.30	0.57	10.19	QP
21		3.26	29.73	-16.27	46.00	18.90	0.61	10.22	Average
22		3.26	42.13	-13.87	56.00	31.30	0.61	10.22	QP
23		12.65	35.35	-14.65	50.00	24.20	0.71	10.44	Average
24		12.65	46.05	-13.95	60.00	34.90	0.71	10.44	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 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	FSV40	101078	9kHz~40GHz	May 05. 2015	Feb. 25, 2016~ Feb. 26, 2016	May 04. 2016	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 12, 2016	Feb. 25, 2016~ Feb. 26, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 12, 2016	Feb. 25, 2016~ Feb. 26, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Aug. 07, 2015	Feb. 25, 2016~ Feb. 26, 2016	Aug. 06, 2016	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2015	Feb. 26, 2016	May 25, 2016	Radiation (03CH01-SZ)
Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz;Max 30dBm	Jun. 07, 2015	Feb. 26, 2016	Jun. 06, 2016	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 06, 2015	Feb. 26, 2016	May 05, 2016	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz-2GHz	Oct. 17, 2015	Feb. 26, 2016	Oct. 16, 2016	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 11, 2016	Feb. 26, 2016	Jan. 10, 2017	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Aug. 19, 2015	Feb. 26, 2016	Aug. 18, 2016	Radiation (03CH01-SZ)
Amplifier	HP	8447F	3113A04622	9kHz ~1300MHz / 30 dB	Aug. 07, 2015	Feb. 26, 2016	Aug. 06, 2016	Radiation (03CH01-SZ)
Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1889561	1GHz~18GHz	Oct. 20, 2015	Feb. 26, 2016	Oct. 19, 2016	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 05, 2015	Feb. 26, 2016	May 04, 2016	Radiation (03CH01-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 12, 2016	Feb. 26, 2016	Jan. 11, 2017	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 18, 2015	Feb. 26, 2016	Jul. 17, 2016	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Feb. 26, 2016	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 26, 2016	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 26, 2016	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESCI7	100724	9kHz~3GHz;	Nov. 23, 2015	Feb. 01, 2016	Nov. 22, 2016	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan. 12, 2016	Feb. 01, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 12, 2016	Feb. 01, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Aug. 07, 2015	Feb. 01, 2016	Aug. 06, 2016	Conduction (CO01-SZ)
Pulse Limiter	COM-POWER	LIT-153 Transient Limiter	53139	150kHz~30MHz	Oct. 20, 2015	Feb. 01, 2016	Oct. 19, 2016	Conduction (CO01-SZ)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.3dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.8dB**

Appendix A. Conducted Test Results

Report Number : FR612205E

Test Engineer:	Tiny You	Temperature:	24~26	°C
Test Date:	2016/2/25~2016/2/26	Relative Humidity:	50~53	%

TEST RESULTS DATA
6dB and 99% OBW

Band IV									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	FCC 6dB Bandwidth Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	20.98	34.67	16.36	0.5	Pass
11a	6Mbps	1	157	5785	20.18	32.12	16.42	0.5	Pass
11a	6Mbps	1	161	5805	22.33	38.71	16.36	0.5	Pass
HT20	MCS 0	1	149	5745	21.18	38.86	17.58	0.5	Pass
HT20	MCS 0	1	157	5785	21.18	39.36	17.60	0.5	Pass
HT20	MCS 0	1	161	5805	23.78	43.81	17.60	0.5	Pass
HT40	MCS 0	1	151	5755	38.66	70.58	35.33	0.5	Pass
HT40	MCS 0	1	159	5795	52.25	91.91	35.64	0.5	Pass

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.59	11.94	30.00	-1.00		Pass
11a	6Mbps	1	157	5785	0.59	11.83	30.00	-1.00		Pass
11a	6Mbps	1	161	5805	0.59	12.09	30.00	-1.00		Pass
HT20	MCS 0	1	149	5745	0.63	12.10	30.00	-1.00		Pass
HT20	MCS 0	1	157	5785	0.63	12.06	30.00	-1.00		Pass
HT20	MCS 0	1	161	5805	0.63	12.16	30.00	-1.00		Pass
HT40	MCS 0	1	151	5755	0.63	10.74	30.00	-1.00		Pass
HT40	MCS 0	1	159	5795	0.63	13.57	30.00	-1.00		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.59	2.22	-2.08	30.00	-1.00	Pass
11a	6Mbps	1	157	5785	0.59	2.22	-2.64	30.00	-1.00	Pass
11a	6Mbps	1	161	5805	0.59	2.22	-1.45	30.00	-1.00	Pass
HT20	MCS 0	1	149	5745	0.63	2.22	-2.46	30.00	-1.00	Pass
HT20	MCS 0	1	157	5785	0.63	2.22	-2.01	30.00	-1.00	Pass
HT20	MCS 0	1	161	5805	0.63	2.22	-1.55	30.00	-1.00	Pass
HT40	MCS 0	1	151	5755	0.63	2.22	-5.49	30.00	-1.00	Pass
HT40	MCS 0	1	159	5795	0.63	2.22	-3.24	30.00	-1.00	Pass

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6M bps	1	149	5745	5745.055	0.055	9.57	20	3.6	
11a	6M bps	1	149	5745	5745.055	0.055	9.57	20	4.2	
11a	6M bps	1	149	5745	5745.055	0.055	9.57	20	3.9	
11a	6M bps	1	149	5745	5745.055	0.055	9.57	-30	3.9	
11a	6M bps	1	149	5745	5745.055	0.055	9.57	50	3.9	

Appendix B. Radiated Test Results

15E Band 4 - 5725~5850MHz

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 149 5745MHz		5714.9	59.23	-9.07	68.3	53.06	32.33	7.36	33.52	150	196	P	H
		5724.52	70.88	-7.42	78.3	64.68	32.36	7.36	33.52	150	196	P	H
	*	5745	103.05	-	-	96.78	32.39	7.41	33.53	150	196	P	H
		5745	92.22	-	-	85.95	32.39	7.41	33.53	150	196	A	H
		5714.84	57.65	-10.65	68.3	51.48	32.33	7.36	33.52	150	273	P	V
		5724.76	69.23	-9.07	78.3	63.03	32.36	7.36	33.52	150	273	P	V
	*	5745	102.03	-	-	95.76	32.39	7.41	33.53	150	273	P	V
		5745	91.14	-	-	84.87	32.39	7.41	33.53	150	273	A	V
802.11a CH 157 5785MHz		5689.32	47	-21.3	68.3	40.85	32.3	7.36	33.51	150	196	P	H
		5719.96	47.12	-31.18	78.3	40.92	32.36	7.36	33.52	150	196	P	H
	*	5785	102.67	-	-	96.32	32.44	7.45	33.54	150	196	P	H
		5785	92.11	-	-	85.76	32.44	7.45	33.54	150	196	A	H
		5851.92	47.18	-31.12	78.3	40.68	32.55	7.51	33.56	150	196	P	H
		5883.2	48.5	-19.8	68.3	41.94	32.61	7.51	33.56	150	196	P	H
		5694.76	46.52	-21.78	68.3	40.37	32.3	7.36	33.51	150	274	P	V
		5718.6	47.19	-31.11	78.3	40.99	32.36	7.36	33.52	150	274	P	V
	*	5785	101.78	-	-	95.43	32.44	7.45	33.54	150	274	P	V
		5785	90.77	-	-	84.42	32.44	7.45	33.54	150	274	A	V
		5853.76	47.1	-31.2	78.3	40.57	32.58	7.51	33.56	150	274	P	V
		5860.88	47.87	-20.43	68.3	41.34	32.58	7.51	33.56	150	274	P	V

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 161 5805MHz		5713.88	47.02	-21.28	68.3	40.85	32.33	7.36	33.52	150	199	P	H
		5724.6	47.05	-31.25	78.3	40.85	32.36	7.36	33.52	150	199	P	H
	*	5805	102.54	-	-	96.13	32.5	7.45	33.54	150	199	P	H
		5805	91.83	-	-	85.42	32.5	7.45	33.54	150	199	A	H
		5857.2	52.64	-25.66	78.3	46.11	32.58	7.51	33.56	150	199	P	H
		5890	48.33	-19.97	68.3	41.74	32.63	7.53	33.57	150	199	P	H
		5704.28	47.99	-20.31	68.3	41.81	32.33	7.36	33.51	150	272	P	V
		5715.48	46.06	-32.24	78.3	39.89	32.33	7.36	33.52	150	272	P	V
	*	5805	101.67	-	-	95.26	32.5	7.45	33.54	150	272	P	V
		5805	90.53	-	-	84.12	32.5	7.45	33.54	150	272	A	V
		5851.04	52.92	-25.38	78.3	46.42	32.55	7.51	33.56	150	272	P	V
		5860	48.96	-19.34	68.3	42.43	32.58	7.51	33.56	150	272	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 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 149 5745MHz		11490	49.48	-24.52	74	59.12	39.06	11.05	59.75	250	0	P	H
		17235	49.5	-18.8	68.3	51.71	41.39	14.65	58.25	150	0	P	H
		11490	50.06	-23.94	74	59.7	39.06	11.05	59.75	250	0	P	V
		17235	49.26	-19.04	68.3	51.47	41.39	14.65	58.25	150	0	P	V
802.11a CH 157 5785MHz		11570	48.74	-25.26	74	58.58	38.98	11.01	59.83	250	0	P	H
		17355	48.04	-20.26	68.3	48.88	42.18	14.78	57.8	150	0	P	H
		11570	49.53	-24.47	74	59.37	38.98	11.01	59.83	250	0	P	V
		17355	48.24	-20.06	68.3	49.08	42.18	14.78	57.8	150	0	P	V
802.11a CH 161 5805MHz		11610	47.83	-26.17	74	57.75	38.95	10.99	59.86	250	0	P	H
		17415	48.57	-19.73	68.3	48.61	42.64	14.86	57.54	150	0	P	H
		11610	48.39	-25.61	74	58.31	38.95	10.99	59.86	250	0	P	V
		17415	49.76	-18.54	68.3	49.8	42.64	14.86	57.54	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT20 (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)
802.11n HT20 CH 149 5745MHz		5714.76	60.25	-8.05	68.3	54.08	32.33	7.36	33.52	150	336	P	H
		5724.84	75.06	-3.24	78.3	68.86	32.36	7.36	33.52	150	336	P	H
	*	5745	102.46	-	-	96.19	32.39	7.41	33.53	150	336	P	H
		5745	91.52	-	-	85.25	32.39	7.41	33.53	150	336	A	H
		5712.68	56.7	-11.6	68.3	50.53	32.33	7.36	33.52	150	259	P	V
		5723.08	74.77	-3.53	78.3	68.57	32.36	7.36	33.52	150	259	P	V
	*	5745	100.98	-	-	94.71	32.39	7.41	33.53	150	259	P	V
		5745	90.09	-	-	83.82	32.39	7.41	33.53	150	259	A	V
802.11n HT20 CH 157 5785MHz		5685.48	48.19	-20.11	68.3	42.08	32.3	7.32	33.51	150	198	P	H
		5716.12	49.43	-28.87	78.3	43.26	32.33	7.36	33.52	150	198	P	H
	*	5785	103.04	-	-	96.69	32.44	7.45	33.54	150	198	P	H
		5785	92.08	-	-	85.73	32.44	7.45	33.54	150	198	A	H
		5852.32	46.8	-31.5	78.3	40.3	32.55	7.51	33.56	150	198	P	H
		5867.92	48.06	-20.24	68.3	41.53	32.58	7.51	33.56	150	198	P	H
		5689.56	46.69	-21.61	68.3	40.54	32.3	7.36	33.51	150	257	P	V
		5719.08	46.87	-31.43	78.3	40.67	32.36	7.36	33.52	150	257	P	V
	*	5785	101.64	-	-	95.29	32.44	7.45	33.54	150	257	P	V
		5785	90.59	-	-	84.24	32.44	7.45	33.54	150	257	A	V
		5853.04	46.97	-31.33	78.3	40.47	32.55	7.51	33.56	150	257	P	V
		5880.88	48.44	-19.86	68.3	41.88	32.61	7.51	33.56	150	257	P	V

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 HT20 CH 161 5805MHz		5708.76	47.3	-21	68.3	41.13	32.33	7.36	33.52	150	194	P	H
		5716.52	47.94	-30.36	78.3	41.77	32.33	7.36	33.52	150	194	P	H
		5805	102.33	-	-	95.92	32.5	7.45	33.54	150	194	P	H
		5805	93.12	-	-	86.71	32.5	7.45	33.54	150	194	A	H
		5850.8	54.04	-24.26	78.3	47.54	32.55	7.51	33.56	150	194	P	H
		5860.96	51.59	-16.71	68.3	45.06	32.58	7.51	33.56	150	194	P	H
		5714.6	46.09	-22.21	68.3	39.92	32.33	7.36	33.52	150	269	P	V
		5719.56	45.95	-32.35	78.3	39.75	32.36	7.36	33.52	150	269	P	V
		5805	100.04	-	-	93.63	32.5	7.45	33.54	150	269	P	V
		5805	90.88	-	-	84.47	32.5	7.45	33.54	150	269	A	V
		5851.36	51.34	-26.96	78.3	44.84	32.55	7.51	33.56	150	269	P	V
		5867.04	49.21	-19.09	68.3	42.68	32.58	7.51	33.56	150	269	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 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		11490	48.45	-25.55	74	58.09	39.06	11.05	59.75	250	0	P	H
HT20		17235	48.09	-20.21	68.3	50.3	41.39	14.65	58.25	150	0	P	H
CH 149		11490	50.27	-23.73	74	59.91	39.06	11.05	59.75	250	0	P	V
5745MHz		17235	48.39	-19.91	68.3	50.6	41.39	14.65	58.25	150	0	P	V
802.11n		11570	48.16	-25.84	74	58	38.98	11.01	59.83	250	0	P	H
HT20		17355	49.74	-18.56	68.3	50.58	42.18	14.78	57.8	150	0	P	H
CH 157		11570	50.2	-23.8	74	60.04	38.98	11.01	59.83	250	0	P	V
5785MHz		17355	49.85	-18.45	68.3	50.69	42.18	14.78	57.8	150	0	P	V
802.11n		11610	48	-26	74	57.92	38.95	10.99	59.86	250	0	P	H
HT20		17415	50.37	-17.93	68.3	50.41	42.64	14.86	57.54	150	0	P	H
CH 161		11610	48.89	-25.11	74	58.81	38.95	10.99	59.86	250	0	P	V
5805MHz		17415	48.1	-20.2	68.3	48.14	42.64	14.86	57.54	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT40 (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)
802.11n HT40 CH 151 5755MHz		5713.08	66.51	-1.79	68.3	60.34	32.33	7.36	33.52	150	201	P	H
		5721.72	70.3	-8	78.3	64.1	32.36	7.36	33.52	150	201	P	H
	*	5755	99.43	-	-	93.14	32.41	7.41	33.53	150	201	P	H
		5755	87.71	-	-	81.42	32.41	7.41	33.53	150	201	A	H
		5858.48	47.18	-31.12	78.3	40.65	32.58	7.51	33.56	150	201	P	H
		5883.28	47.81	-20.49	68.3	41.26	32.61	7.51	33.57	150	201	P	H
		5713.72	66.45	-1.85	68.3	60.28	32.33	7.36	33.52	150	269	P	V
		5723.64	67.16	-11.14	78.3	60.96	32.36	7.36	33.52	150	269	P	V
	*	5755	97.02	-	-	90.73	32.41	7.41	33.53	150	269	P	V
		5755	84.99	-	-	78.7	32.41	7.41	33.53	150	269	A	V
		5859.28	47.96	-30.34	78.3	41.43	32.58	7.51	33.56	150	269	P	V
		5881.52	48.59	-19.71	68.3	42.03	32.61	7.51	33.56	150	269	P	V
802.11n HT40 CH 159 5795MHz		5710.76	54.38	-13.92	68.3	48.21	32.33	7.36	33.52	150	197	P	H
		5723.88	59.36	-18.94	78.3	53.16	32.36	7.36	33.52	150	197	P	H
	*	5795	102.13	-	-	95.75	32.47	7.45	33.54	150	197	P	H
		5795	91.7	-	-	85.32	32.47	7.45	33.54	150	197	A	H
		5850.16	61.72	-16.58	78.3	55.22	32.55	7.51	33.56	150	197	P	H
		5860.16	59.28	-9.02	68.3	52.75	32.58	7.51	33.56	150	197	P	H
		5710.68	53.61	-14.69	68.3	47.44	32.33	7.36	33.52	150	277	P	V
		5721.24	58.34	-19.96	78.3	52.14	32.36	7.36	33.52	150	277	P	V
	*	5795	101.43	-	-	95.05	32.47	7.45	33.54	150	277	P	V
		5795	90.85	-	-	84.47	32.47	7.45	33.54	150	277	A	V
		5851.36	61.26	-17.04	78.3	54.76	32.55	7.51	33.56	150	277	P	V
		5860.16	59.19	-9.11	68.3	52.66	32.58	7.51	33.56	150	277	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 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 CH 151 5755MHz		11510	48.48	-25.52	74	58.15	39.04	11.05	59.76	250	0	P	H
		17265	48.74	-19.56	68.3	50.56	41.62	14.69	58.13	150	0	P	H
		11510	50.21	-23.79	74	59.88	39.04	11.05	59.76	250	0	P	V
		17265	48.73	-19.57	68.3	50.55	41.62	14.69	58.13	150	0	P	V
802.11n HT40 CH 159 5795MHz		11590	48.83	-25.17	74	58.7	38.97	11.01	59.85	250	0	P	H
		17385	49.2	-19.1	68.3	49.64	42.41	14.82	57.67	150	0	P	H
		11590	48.93	-25.07	74	58.8	38.97	11.01	59.85	250	0	P	V
		17385	49.92	-18.38	68.3	50.36	42.41	14.82	57.67	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Emission below 1GHz

5GHz 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)
5GHz 802.11n HT40 LF		45.52	22.7	-17.3	40	44.37	10.72	1	33.39	-	-	P	H
		104.69	29.21	-14.29	43.5	48.99	12.19	1.38	33.35	100	200	P	H
		148.34	24.48	-19.02	43.5	44.96	11.23	1.53	33.24	-	-	P	H
		194.9	22.13	-21.37	43.5	43.51	10.21	1.57	33.16	-	-	P	H
		249.22	24.97	-21.03	46	44.34	11.93	1.8	33.1	-	-	P	H
		379.2	18.6	-27.4	46	33.36	15.95	2.12	32.83	-	-	P	H
		45.52	36.77	-3.23	40	58.44	10.72	1	33.39	100	360	Q	V
		66.86	26.09	-13.91	40	51.23	7.07	1.14	33.35	-	-	P	V
		107.6	20.7	-22.8	43.5	40.54	12.13	1.38	33.35	-	-	P	V
		181.32	26.4	-17.1	43.5	47.51	10.51	1.57	33.19	-	-	P	V
		242.43	29.16	-16.84	46	48.79	11.68	1.8	33.11	-	-	P	V
		322.94	20.51	-25.49	46	37.12	14.43	1.94	32.98	-	-	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 per 15.209(c).
!	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".