FCC RF Test Report

APPLICANT	:	**TCL Communication Ltd.**
EQUIPMENT	:	**GSM Quad-band / UMTS Quad-band / LTE hepta-band mobile phone**
BRAND NAME	:	**alcatel**
MODEL NAME	:	**6055B**
FCC ID	:	**2ACCJA015**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Jan. 15, 2016 and testing was completed on Apr. 18, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

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Testing Laboratory 2627

SPORTON INTERNATIONAL (KUNSHAN) INC.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR611504F	Rev. 01	Initial issue of report	Apr. 22, 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 4.64 dB at 11610.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.98 dB at 17.290 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 building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

1.2 Manufacturer

TCL Communication Ltd.

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

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM Quad-band / UMTS Quad-band / LTE hepta-band mobile phone
Brand Name	alcatel
Model Name	6055B
FCC ID	2ACCJA015
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE/NFC/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ WLAN 5GHz 802.11a/n HT20/HT40/ WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/ Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.2 LE
IMEI Code	Conducted: 356132070002499 Radiation: 356132070001855 Conduction: 35613207001459
HW Version	PIO
SW Version	010 01
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5805 MHz
Maximum Output Power	802.11a : 12.44 dBm / 0.0175 W 802.11n HT20 : 11.74 dBm / 0.0149 W 802.11n HT40 : 12.38 dBm / 0.0173 W 802.11ac VHT20: 11.24 dBm / 0.0133 W 802.11ac VHT40: 12.15 dBm / 0.0164 W 802.11ac VHT80: 11.43 dBm / 0.0139 W
99% Occupied Bandwidth	802.11a : 19.08 MHz 802.11n HT20 : 19.48 MHz 802.11n HT40 : 37.16 MHz 802.11ac VHT20: 19.43 MHz 802.11ac VHT40: 37.16 MHz 802.11ac VHT80: 74.81 MHz
Antenna Type / Gain	IFA Antenna with gain -2.40 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

1.5 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, 350mA, O/P: 5Vdc, 2000mA		
	P/N	CBA0059AG0C4		
AC Adapter 3	Brand Name	N/A	Model Name	UC13US
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA		
	P/N	CBA0059AG4C1		
AC Adapter 4	Brand Name	alcatel	Model Name	UC13US
	Power Rating	I/P: 100-240Vac, 350mA, O/P: 5Vdc, 2000mA		
	P/N	CBA0059AG0C4		
AC Adapter 5	Brand Name	alcatel	Model Name	UC13US
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA		
	P/N	CBA0059AGAC1		
Battery 1	Brand Name	ALCATEL onetouch	Model Name	TLp026EJ
	Power Rating	3.85Vdc, 2610mAh		
Battery 2	Brand Name	ALCATEL onetouch	Model Name	TLp026E2
	Power Rating	3.84Vdc, 2610mAh		
Battery 3	Brand Name	alcatel	Model Name	TLp026EJ
	Power Rating	3.85Vdc, 2610mAh		
Battery 4	Brand Name	alcatel	Model Name	TLp026E2
	Power Rating	3.84Vdc, 2610mAh		
USB Cable 1	Brand Name	N/A	Model Name	CDA0000043C8
	Signal Line Type	1.0m shielded without core		
USB Cable 2	Brand Name	N/A	Model Name	CDA0000043C2
	Signal Line Type	1.0m shielded without core		
Earphone 1	Brand Name	alcatel	Model Name	J22C
	Signal Line Type	1.4m non-shielded without core		
	P/N	CCB0029A10CC		
Earphone 2	Brand Name	alcatel	Model Name	J22H
	Signal Line Type	1.0m non-shielded without core		
	P/N	CCB0047A10CC		

Note: The adapter 4, 5 and battery 3, 4 are just with different logo, all the designs are identical with adapter 2, 3 and battery 1, 2.

1.6 Modification of EUT

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

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC Registration No.
	TH01-KS	CO01-KS	03CH03-KS	306251

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/Z plane) were recorded in this report.

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

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

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
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.

WLAN 5GHz 802.11a Average 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	12.44	CH 149	12.35	12.38	12.40	12.37	12.41	12.42	12.39
CH 157	5785	11.54								
CH 161	5805	12.28								

WLAN 5GHz 802.11n-HT20 Average 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	11.74	CH 149	11.55	11.60	11.61	11.66	11.70	11.71	11.68
CH 157	5785	10.66								
CH 161	5805	11.41								

WLAN 5GHz 802.11n-HT40 Average 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	12.38	CH 151	12.27	12.29	12.31	12.35	12.32	12.37	12.34
CH 159	5795	11.87								

WLAN 5GHz 802.11ac VHT20 Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 149	5745	11.24	CH 157	11.10	11.16	11.22	11.21	11.20	11.17	11.19	11.18
CH 157	5785	10.73									
CH 161	5805	10.34									

WLAN 5GHz 802.11ac VHT40 Average Power (dBm)											
Power vs. Channel			Power vs. Data Rate								
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 151	5755	12.15	CH 159	11.99	12.05	11.93	12.10	12.02	12.13	12.12	12.08	12.11
CH 159	5795	11.51										

WLAN 5GHz 802.11n-HT80 Average Power (dBm)											
Power vs. Channel			Power vs. Data Rate								
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 155	5775	11.43	CH 155	11.24	11.34	11.32	11.19	11.41	11.23	11.33	11.39	11.31

2.3 Test Mode

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

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

Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone 1 + USB Cable 1 (Charging from Adapter 1) + Battery 1 Mode 2 : **GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone 2 + USB Cable 2 (Charging from Adapter 2) + Battery 2**

Remark:

1. For Radiated TCs, the tests were performed with Adapter 1, Earphone 1, Battery 1 and USB Cable 1, only the worst mode need to verify Adapter 2, Battery 2 and USB Cable 2.
2. The worst case of conducted emission is mode 2; only the test data of it was reported.

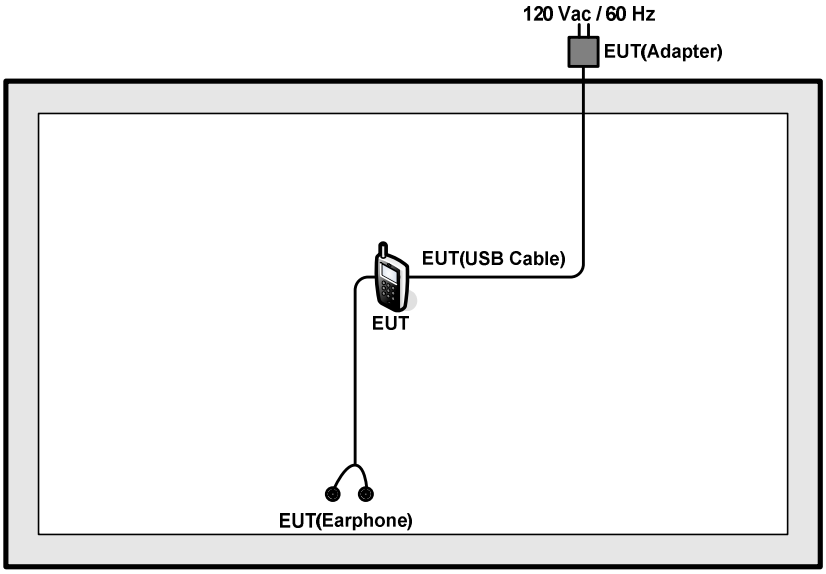
Ch. #		Band IV：5745 ~ 5805 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	161	161	159

Ch. #		Band IV：5745 ~ 5805MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	161	159	-

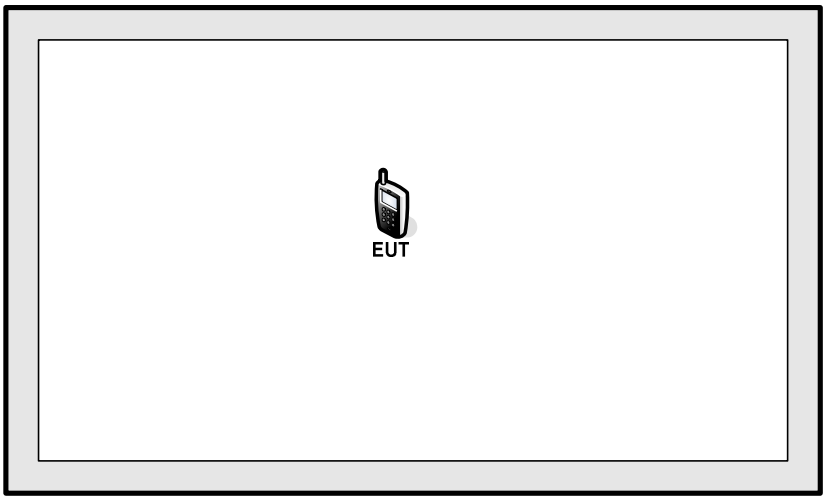
2.4 Connection Diagram of Test System

<WLAN Tx Mode>

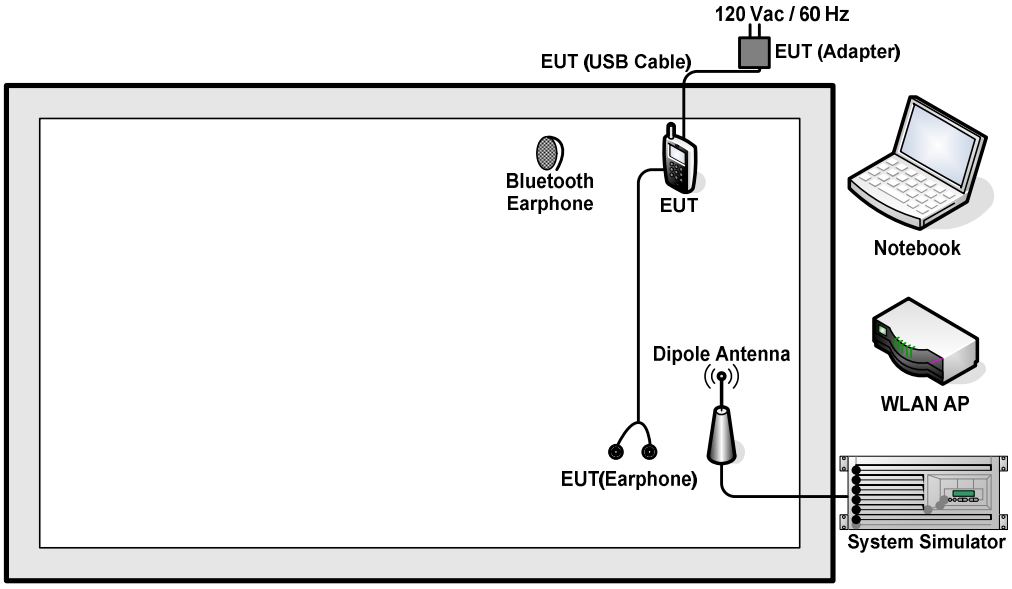
For WLAN 5GHz 802.11a/802.11ac VHT20/VHT40/VHT80



For WLAN 5GHz 802.11n HT20/HT40



<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	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
2.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
3.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
5.	DC Power Supply	GW INSTEK	GPD-2303S	N/A	N/A	Unshielded, 1.8 m

2.6 EUT Operation Test Setup

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

For AC power line conducted emissions, the EUT was set to connect with the 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 between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 7.0 dB.

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

= 7.0 (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

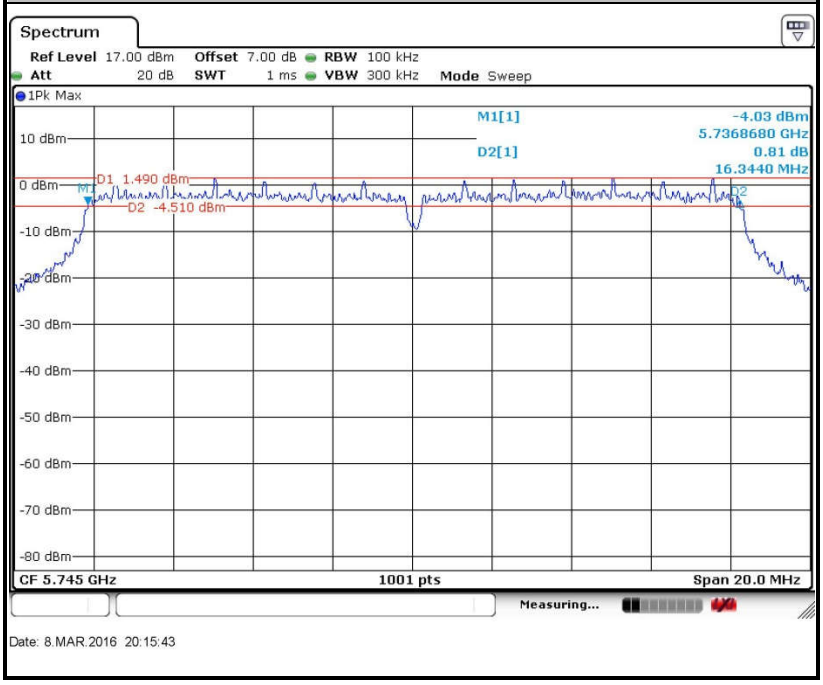
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

3.1.4 Test Setup

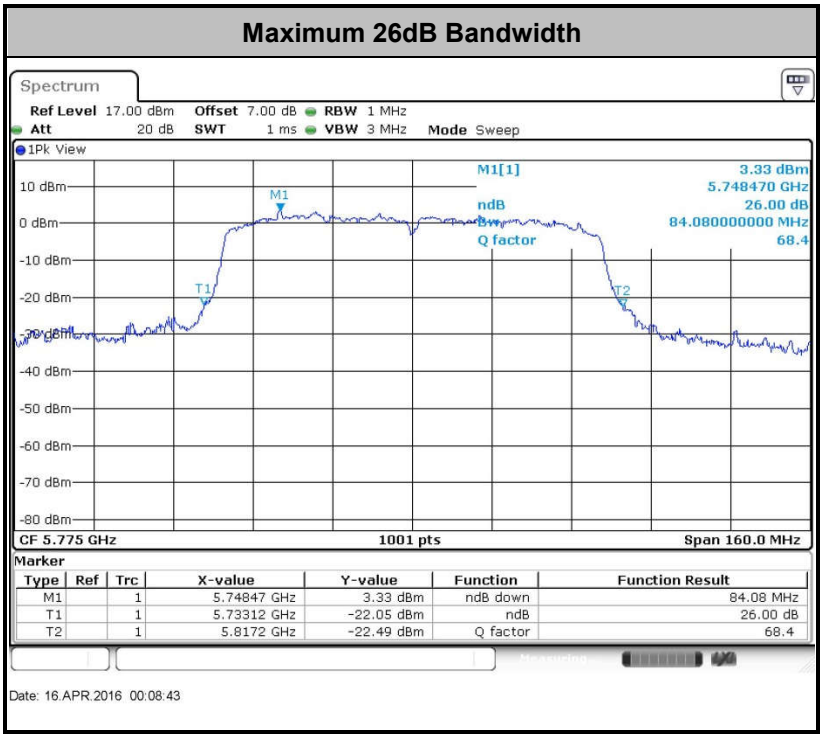
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

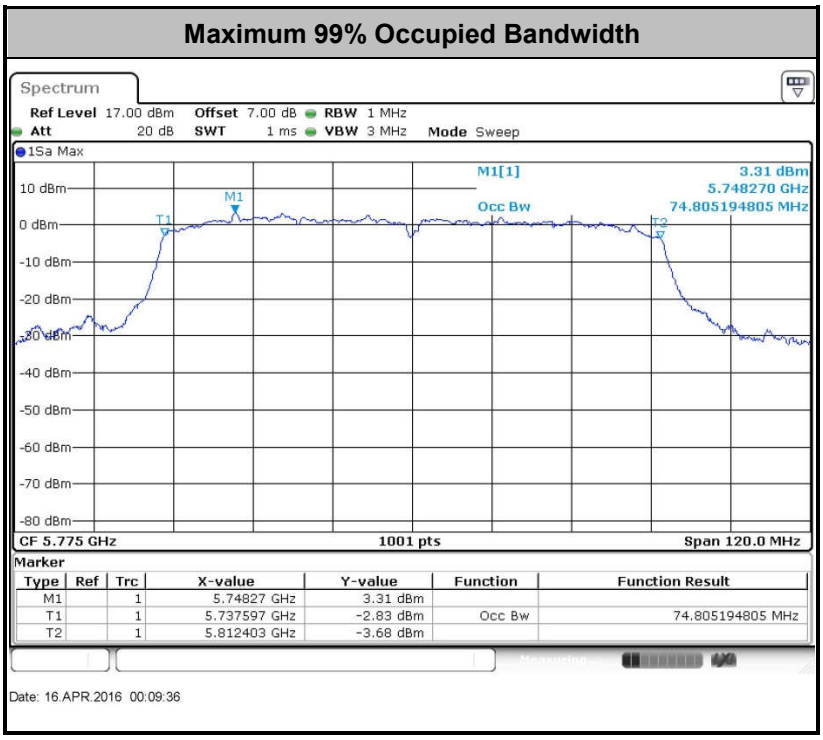
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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.

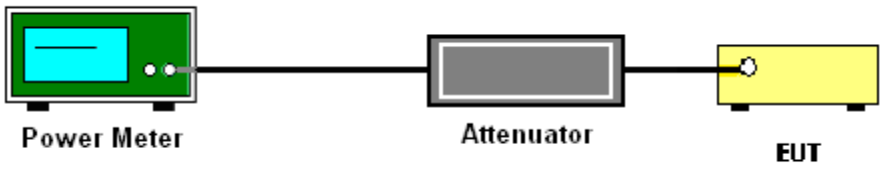
3.2.3 Test Procedures

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

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 v01r02. Section F) Maximum power spectral density.

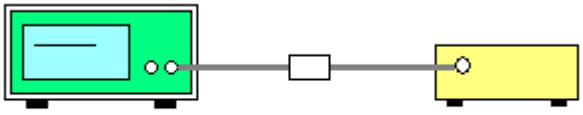
 # Method SA-2 #

(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 = 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.

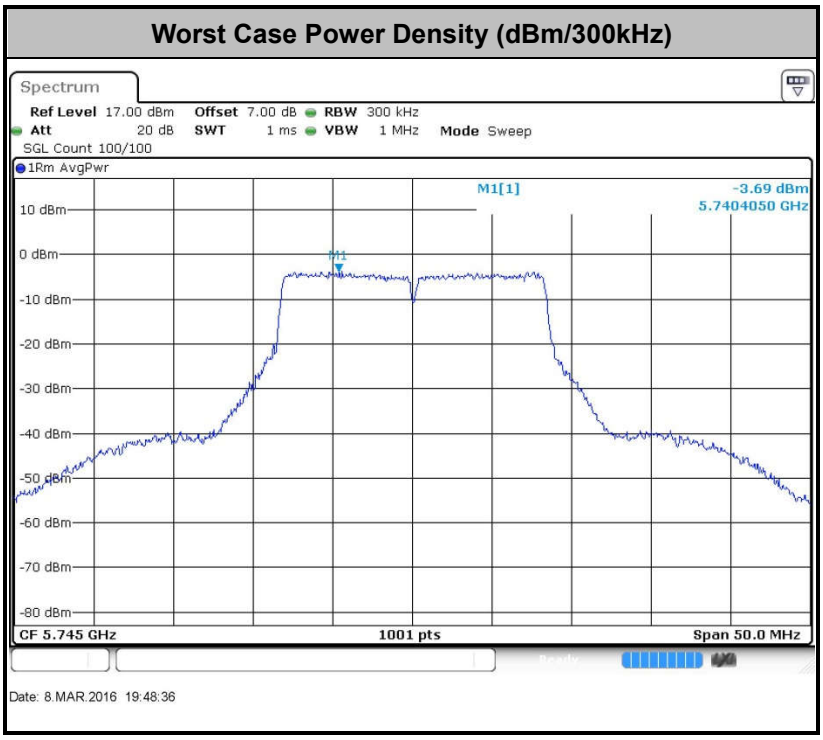
3.3.4 Test Setup



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

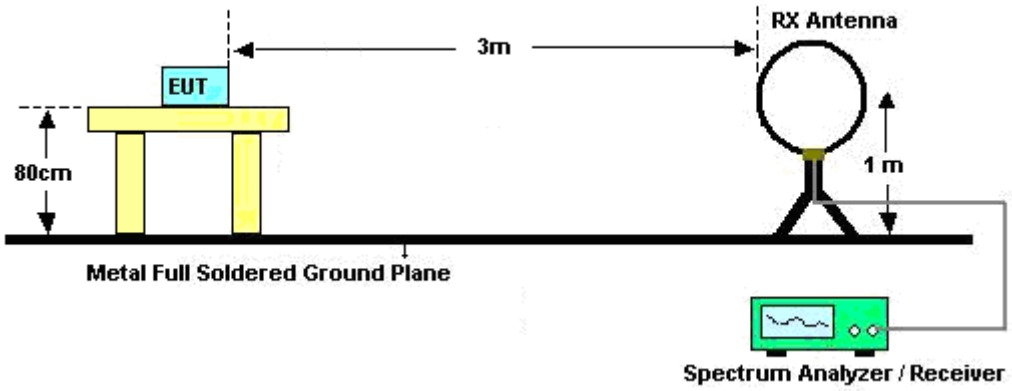
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

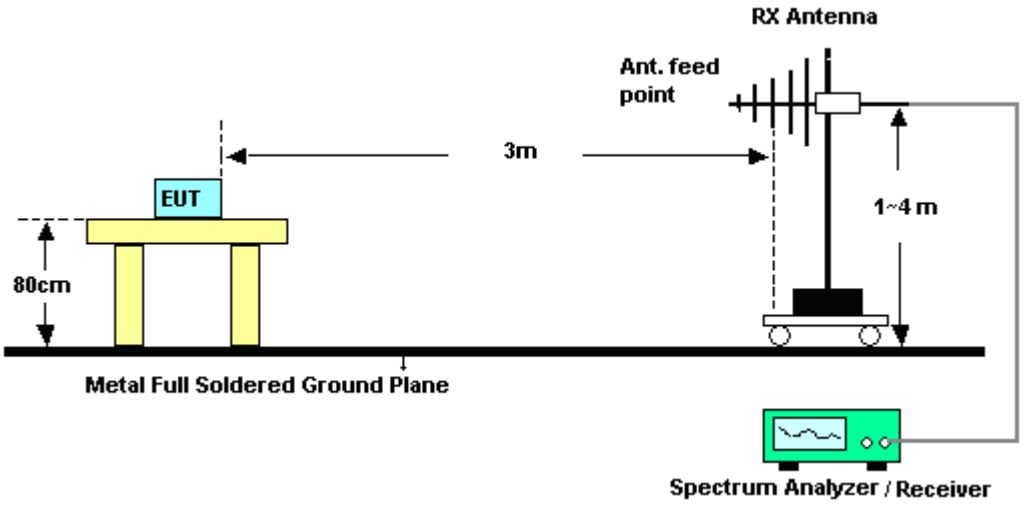
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

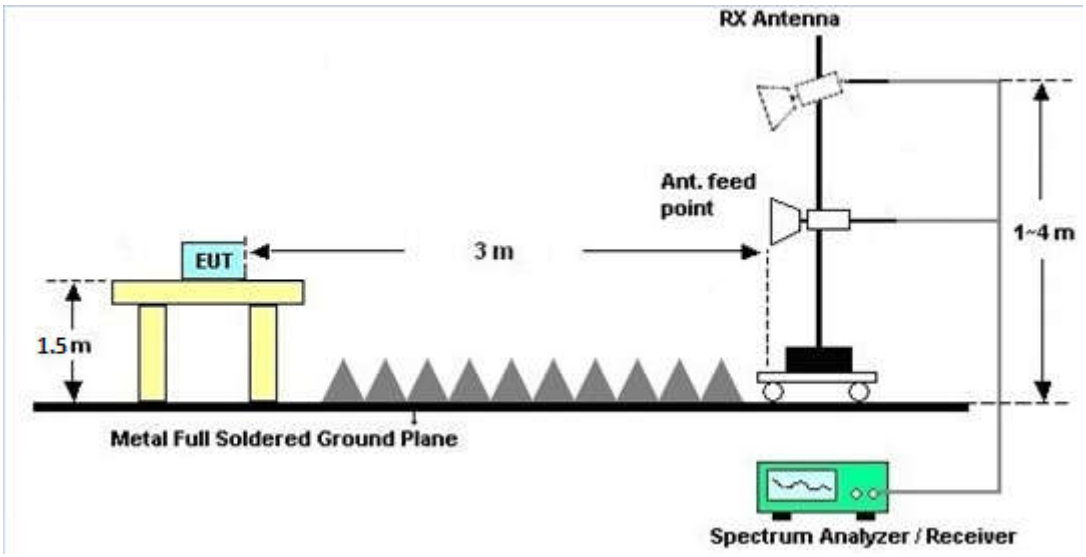
For radiated emissions below 30MHz



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 D.

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 (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.

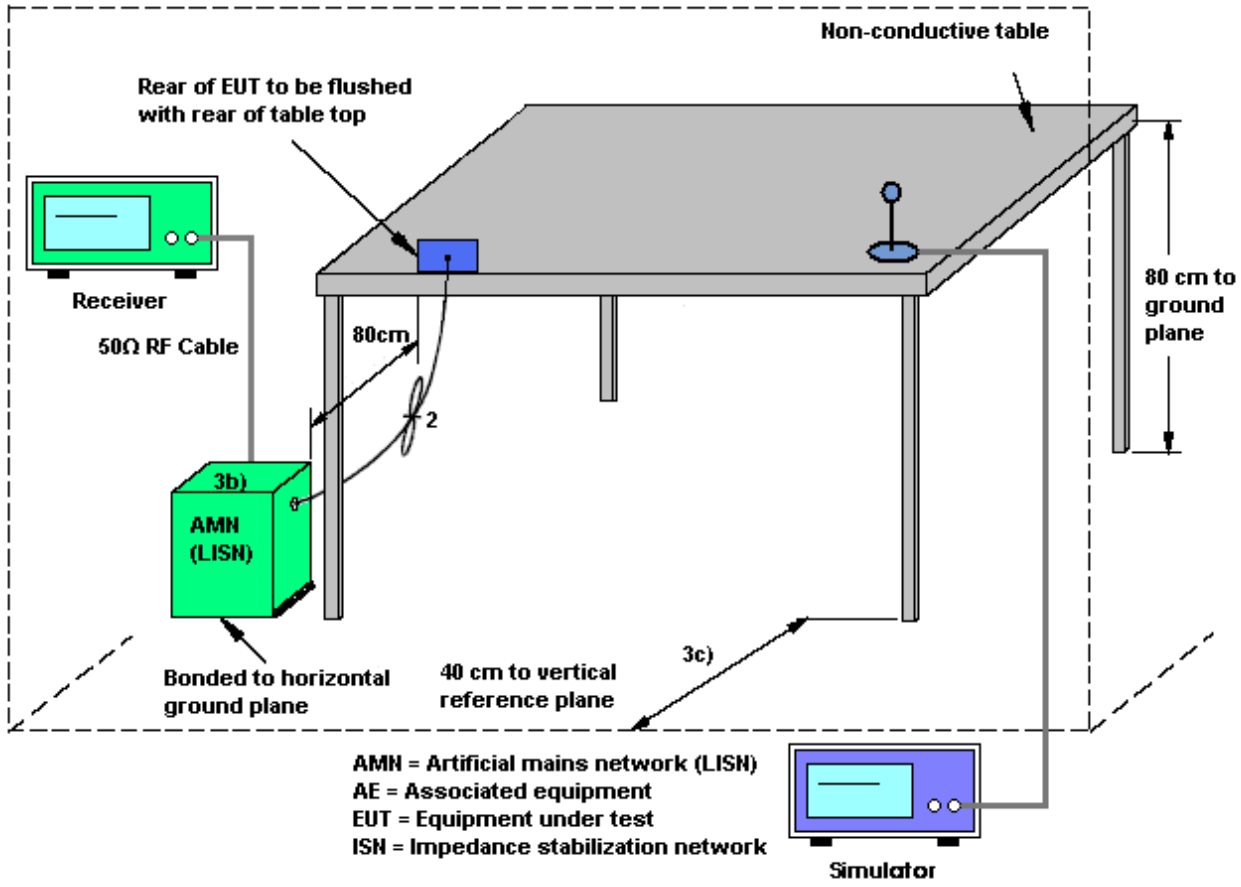
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

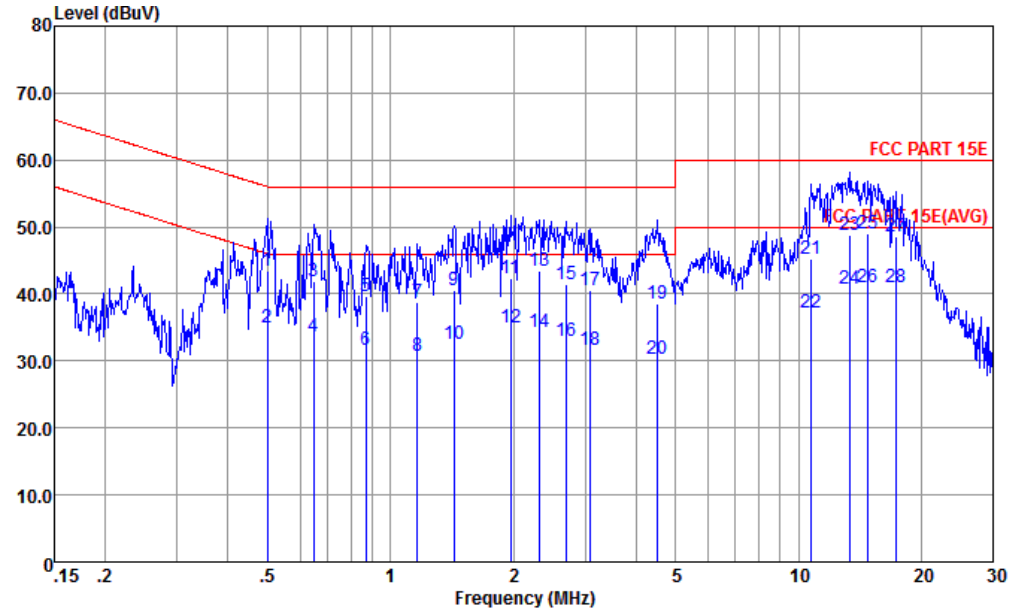
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

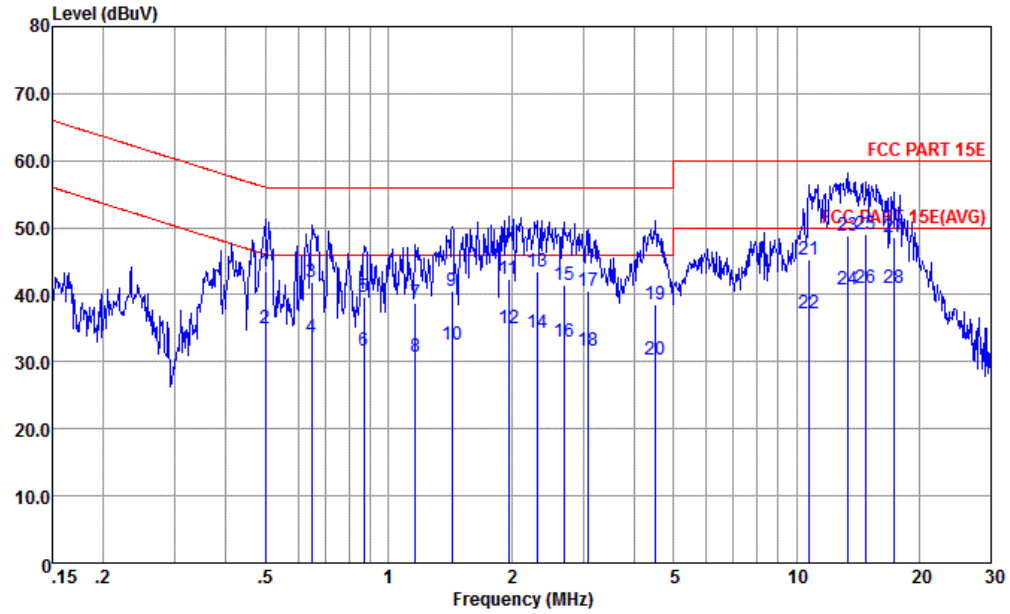
Test Mode :	Mode 2	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone 2 + USB Cable 2 (Charging from Adapter 2) + Battery 2		



Site : CO01-KS
Condition : FCC PART 15E LISN-L-20151024 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.50	43.49	-12.52	56.01	33.10	0.23	10.16	QP
2	0.50	34.99	-11.02	46.01	24.60	0.23	10.16	Average
3	0.65	41.99	-14.01	56.00	31.60	0.24	10.15	QP
4	0.65	33.59	-12.41	46.00	23.20	0.24	10.15	Average
5	0.87	39.59	-16.41	56.00	29.20	0.25	10.14	QP
6	0.87	31.69	-14.31	46.00	21.30	0.25	10.14	Average
7	1.17	38.67	-17.33	56.00	28.30	0.23	10.14	QP
8	1.17	30.67	-15.33	46.00	20.30	0.23	10.14	Average
9	1.43	40.65	-15.35	56.00	30.30	0.21	10.14	QP
10	1.43	32.55	-13.45	46.00	22.20	0.21	10.14	Average
11	1.97	42.42	-13.58	56.00	32.10	0.18	10.14	QP
12	1.97	34.92	-11.08	46.00	24.60	0.18	10.14	Average
13	2.31	43.53	-12.47	56.00	33.20	0.18	10.15	QP
14	2.31	34.23	-11.77	46.00	23.90	0.18	10.15	Average
15	2.69	41.53	-14.47	56.00	31.20	0.18	10.15	QP
16	2.69	32.93	-13.07	46.00	22.60	0.18	10.15	Average
17	3.07	40.64	-15.36	56.00	30.31	0.18	10.15	QP

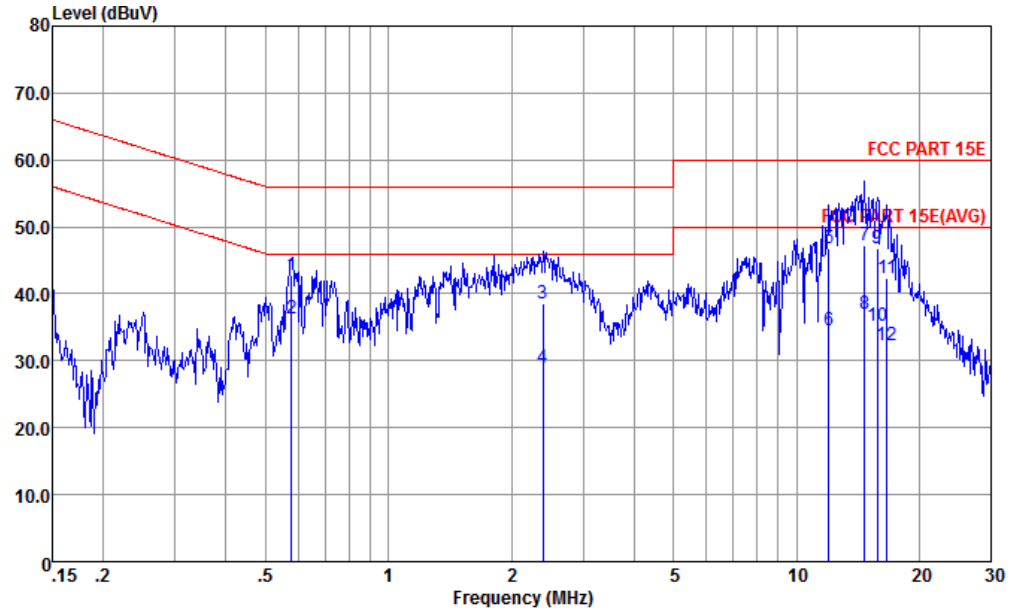
Test Mode :	Mode 2	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone 2 + USB Cable 2 (Charging from Adapter 2) + Battery 2		



Site : CO01-KS
Condition : FCC PART 15E LISN-L-20151024 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	3.07	31.54	-14.46	46.00	21.21	0.18	10.15	Average
19	4.53	38.56	-17.44	56.00	28.19	0.19	10.18	QP
20	4.53	30.26	-15.74	46.00	19.89	0.19	10.18	Average
21	10.73	45.14	-14.86	60.00	34.60	0.25	10.29	QP
22	10.73	37.14	-12.86	50.00	26.60	0.25	10.29	Average
23	13.41	48.91	-11.09	60.00	38.30	0.26	10.35	QP
24	13.41	40.71	-9.29	50.00	30.10	0.26	10.35	Average
25	14.83	48.94	-11.06	60.00	38.30	0.26	10.38	QP
26	14.83	40.94	-9.06	50.00	30.30	0.26	10.38	Average
27	17.29	48.62	-11.38	60.00	37.91	0.26	10.45	QP
28 *	17.29	41.02	-8.98	50.00	30.31	0.26	10.45	Average

Test Mode :	Mode 2	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone 2 + USB Cable 2 (Charging from Adapter 2) + Battery 2		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-20151024 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.58	42.69	-13.31	56.00	32.20	0.33	10.16	QP
2	*	0.58	36.39	-9.61	46.00	25.90	0.33	10.16	Average
3		2.40	38.62	-17.38	56.00	28.09	0.38	10.15	QP
4		2.40	29.02	-16.98	46.00	18.49	0.38	10.15	Average
5		12.00	46.89	-13.11	60.00	36.29	0.28	10.32	QP
6		12.00	34.49	-15.51	50.00	23.89	0.28	10.32	Average
7		14.67	47.25	-12.75	60.00	36.60	0.27	10.38	QP
8		14.67	36.95	-13.05	50.00	26.30	0.27	10.38	Average
9		15.80	46.78	-13.22	60.00	36.10	0.27	10.41	QP
10		15.80	35.28	-14.72	50.00	24.60	0.27	10.41	Average
11		16.66	42.30	-17.70	60.00	31.60	0.26	10.44	QP
12		16.66	32.30	-17.70	50.00	21.60	0.26	10.44	Average

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

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

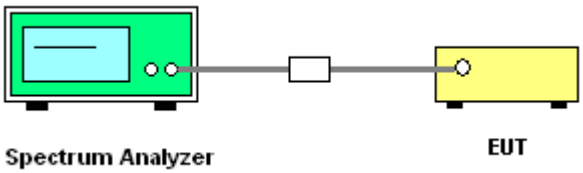
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

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

3.7.2 Measuring Instruments

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

3.7.3 Test Result of Automatically Discontinue Transmission

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

3.8 Antenna Requirements

3.8.1 Standard Applicable

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

3.8.2 Antenna Anti-Replacement Construction

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	FSV30	101338	9kHz~30GHz	May 04, 2015	Feb. 19, 2016~ Apr. 16, 2016	May 03, 2016	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	30MHz~40GHz	Jan. 20, 2016	Feb. 19, 2016~ Apr. 16, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Feb. 19, 2016~ Apr. 16, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 24, 2015	Feb. 19, 2016~ Apr. 16, 2016	Oct. 23, 2016	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 10, 2015	Mar. 13, 2016~ Apr. 18, 2016	Sep. 09, 2016	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	Jun. 05, 2015	Mar. 13, 2016~ Apr. 18, 2016	Jun. 04, 2016	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 07, 2015	Mar. 13, 2016~ Apr. 18, 2016	Nov. 06, 2016	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	25MHz-2GHz	Mar. 12, 2016	Mar. 13, 2016~ Apr. 18, 2016	Mar. 11, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120 D	9120D-1356	1GHz~18GHz	Jun. 25, 2015	Mar. 13, 2016~ Apr. 18, 2016	Jun. 24, 2016	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101070	18Ghz-40Ghz	Oct. 10, 2015	Mar. 13, 2016~ Apr. 18, 2016	Oct. 09, 2016	Radiation (03CH03-KS)
Amplifier	Burgeon	BPA-530	102212	0.01MHz-3000MHz	Aug. 10, 2015	Mar. 13, 2016~ Apr. 18, 2016	Aug. 09, 2016	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 24, 2015	Mar. 13, 2016~ Apr. 18, 2016	Oct. 23, 2016	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Aug. 27, 2015	Mar. 13, 2016~ Apr. 18, 2016	Aug. 26, 2016	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 13, 2016~ Apr. 18, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 13, 2016~ Apr. 18, 2016	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 13, 2016~ Apr. 18, 2016	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2015	Mar. 03, 2016	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 24, 2015	Mar. 03, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 24, 2015	Mar. 03, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 24, 2015	Mar. 03, 2016	Oct. 23, 2016	Conduction (CO01-KS)

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**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5 dB**

Appendix A. Conducted Test Results

Report Number : FR611504F

Test Engineer:	Issac Song	Temperature:	24~25	°C
Test Date:	2016/2/19~2016/4/16	Relative Humidity:	49~51	%

Report Number : FR611504F

TEST RESULTS DATA
6dB and 26dB EBW and 99% OBW

Band IV									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	18.83	23.93	16.34	0.5	Pass
11a	6Mbps	1	157	5785	19.08	23.93	16.34	0.5	Pass
11a	6Mbps	1	161	5805	18.83	23.63	16.34	0.5	Pass
HT20	MCS 0	1	149	5745	19.33	23.93	17.58	0.5	Pass
HT20	MCS 0	1	157	5785	19.43	23.73	17.58	0.5	Pass
HT20	MCS 0	1	161	5805	19.48	23.93	17.58	0.5	Pass
HT40	MCS 0	1	151	5755	36.96	44.96	35.13	0.5	Pass
HT40	MCS 0	1	159	5795	37.16	45.14	35.45	0.5	Pass
VHT20	MCS 0	1	149	5745	19.33	23.88	17.56	0.5	Pass
VHT20	MCS 0	1	157	5785	19.38	24.03	17.56	0.5	Pass
VHT20	MCS 0	1	161	5805	19.43	23.93	17.58	0.5	Pass
VHT40	MCS 0	1	151	5755	36.96	44.60	35.13	0.5	Pass
VHT40	MCS 0	1	159	5795	37.16	44.96	35.33	0.5	Pass
VHT80	MCS 0	1	155	5775	74.81	84.08	75.05	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	12.44	30.00	-2.40		Pass
11a	6Mbps	1	157	5785	0.59	11.54	30.00	-2.40		Pass
11a	6Mbps	1	161	5805	0.59	12.28	30.00	-2.40		Pass
HT20	MCS 0	1	149	5745	0.63	11.74	30.00	-2.40		Pass
HT20	MCS 0	1	157	5785	0.63	10.66	30.00	-2.40		Pass
HT20	MCS 0	1	161	5805	0.63	11.41	30.00	-2.40		Pass
HT40	MCS 0	1	151	5755	1.19	12.38	30.00	-2.40		Pass
HT40	MCS 0	1	159	5795	1.19	11.87	30.00	-2.40		Pass
VHT20	MCS 0	1	149	5745	0.79	11.24	30.00	-2.40		Pass
VHT20	MCS 0	1	157	5785	0.79	10.73	30.00	-2.40		Pass
VHT20	MCS 0	1	161	5805	0.79	10.34	30.00	-2.40		Pass
VHT40	MCS 0	1	151	5755	1.47	12.15	30.00	-2.40		Pass
VHT40	MCS 0	1	159	5795	1.47	11.51	30.00	-2.40		Pass
VHT80	MCS 0	1	155	5775	2.58	11.43	30.00	-2.40		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	-0.88	30.00	-2.40	Pass
11a	6Mbps	1	157	5785	0.59	2.22	-2.12	30.00	-2.40	Pass
11a	6Mbps	1	161	5805	0.59	2.22	-1.85	30.00	-2.40	Pass
HT20	MCS 0	1	149	5745	0.63	2.22	-2.34	30.00	-2.40	Pass
HT20	MCS 0	1	157	5785	0.63	2.22	-3.57	30.00	-2.40	Pass
HT20	MCS 0	1	161	5805	0.63	2.22	-3.07	30.00	-2.40	Pass
HT40	MCS 0	1	151	5755	1.19	2.22	-3.81	30.00	-2.40	Pass
HT40	MCS 0	1	159	5795	1.19	2.22	-5.23	30.00	-2.40	Pass
VHT20	MCS 0	1	149	5745	0.79	2.22	-2.70	30.00	-2.40	Pass
VHT20	MCS 0	1	157	5785	0.79	2.22	-2.60	30.00	-2.40	Pass
VHT20	MCS 0	1	161	5805	0.79	2.22	-3.43	30.00	-2.40	Pass
VHT40	MCS 0	1	151	5755	1.47	2.22	-5.16	30.00	-2.40	Pass
VHT40	MCS 0	1	159	5795	1.47	2.22	-5.30	30.00	-2.40	Pass
VHT80	MCS 0	1	155	5775	2.58	2.22	-7.80	30.00	-2.40	Pass

Report Number : FR611504F

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	5745.050	0.050	8.70	20	3.5	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	20	4.35	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	20	3.9	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	-30	3.9	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	50	3.9	

Appendix B. Radiated Test Results

15E Band 4 - 5725~5825MHz

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		5712.76	49.88	-18.42	68.3	45.57	32.03	8.55	36.27	315	350	P	H
		5724.36	54.3	-24	78.3	49.97	32.04	8.57	36.28	315	350	P	H
	*	5750	94.76	-	-	90.42	32.05	8.58	36.29	315	350	P	H
	*	5740	86.14	-	-	81.8	32.05	8.58	36.29	315	350	A	H
		5710.2	48.91	-19.39	68.3	44.6	32.03	8.55	36.27	315	34	P	V
		5724.36	58.85	-19.45	78.3	54.52	32.04	8.57	36.28	315	34	P	V
	*	5746	95.78	-	-	91.44	32.05	8.58	36.29	315	34	P	V
	*	5740	88.19	-	-	83.85	32.05	8.58	36.29	315	34	A	V
802.11a CH 157 5785MHz	*	5782	93.59	-	-	89.24	32.06	8.6	36.31	326	352	P	H
	*	5780	86.21	-	-	81.86	32.06	8.6	36.31	326	352	A	H
	*	5780	96.68	-	-	92.33	32.06	8.6	36.31	314	33	P	V
	*	5792	89.48	-	-	85.11	32.07	8.62	36.32	314	33	A	V
802.11a CH 161 5805MHz	*	5810	94.33	-	-	89.95	32.08	8.63	36.33	322	350	P	H
	*	5810	86.77	-	-	82.39	32.08	8.63	36.33	322	350	A	H
		5852.88	46.19	-32.11	78.3	41.81	32.09	8.65	36.36	322	350	P	H
		5869.44	45.7	-22.6	68.3	41.31	32.1	8.66	36.37	322	350	P	H
	*	5810	96.79	-	-	92.41	32.08	8.63	36.33	311	36	P	V
	*	5800	88.96	-	-	84.59	32.07	8.62	36.32	311	36	A	V
		5859.36	46.39	-31.91	78.3	42	32.1	8.66	36.37	311	36	P	V
		5881.12	46.63	-21.67	68.3	42.24	32.1	8.67	36.38	311	36	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5825MHz

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		11490	47.73	-26.27	74	55.48	38.59	14.2	60.54	100	0	P	H
CH 149		11490	45.65	-28.35	74	53.4	38.59	14.2	60.54	100	0	P	V
5745MHz													
802.11a		11571	49.02	-24.98	74	56.52	38.75	14.25	60.5	100	0	P	H
CH 157		11571	44.38	-29.62	74	51.88	38.75	14.25	60.5	100	0	P	V
5785MHz													
802.11a		11610	54.79	-19.21	74	62.17	38.83	14.27	60.48	100	24	P	H
CH 161	!	11610	49.36	-4.64	54	56.74	38.83	14.27	60.48	100	24	A	H
5805MHz		11610	45.52	-28.48	74	52.9	38.83	14.27	60.48	100	0	P	V

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

15E Band 4 5725~5825MHz

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)
		5712.68	49.82	-18.48	68.3	45.51	32.03	8.55	36.27	400	312	P	H
		5724.12	58.02	-20.28	78.3	53.69	32.04	8.57	36.28	400	312	P	H
802.11n	*	5738	93.85	-	-	89.51	32.05	8.58	36.29	400	312	P	H
HT20	*	5738	86.78	-	-	82.44	32.05	8.58	36.29	400	312	A	H
CH 149		5713.96	50.18	-18.12	68.3	45.87	32.03	8.55	36.27	100	0	P	V
5745MHz		5723.56	57.77	-20.53	78.3	53.44	32.04	8.57	36.28	100	0	P	V
	*	5740	92.52	-	-	88.18	32.05	8.58	36.29	100	0	P	V
	*	5740	85.3	-	-	80.96	32.05	8.58	36.29	100	0	A	V
802.11n	*	5780	94.11	-	-	89.76	32.06	8.6	36.31	400	360	P	H
HT20	*	5778	86.96	-	-	82.61	32.06	8.6	36.31	400	360	A	H
CH 157	*	5778	92.81	-	-	88.46	32.06	8.6	36.31	100	360	P	V
5785MHz	*	5780	85.52	-	-	81.17	32.06	8.6	36.31	100	360	A	V
	*	5810	94.37	-	-	89.99	32.08	8.63	36.33	400	335	P	H
	*	5810	87.06	-	-	82.68	32.08	8.63	36.33	400	335	A	H
802.11n		5856.96	48.34	-29.96	78.3	43.95	32.1	8.66	36.37	400	335	P	H
HT20		5860.96	47.88	-20.42	68.3	43.49	32.1	8.66	36.37	400	335	P	H
CH 161	*	5812	93.28	-	-	88.9	32.08	8.63	36.33	100	0	P	V
5805MHz	*	5800	85.96	-	-	81.59	32.07	8.62	36.32	100	0	A	V
		5856.32	47.41	-30.89	78.3	43.02	32.1	8.66	36.37	100	0	P	V
		5881.36	47.27	-21.03	68.3	42.88	32.1	8.67	36.38	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5825MHz

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 HT20 CH 149 5745MHz		11490	47.63	-26.37	74	55.38	38.59	14.2	60.54	100	0	P	H
		11490	47.64	-26.36	74	55.39	38.59	14.2	60.54	100	0	P	V
802.11n HT20 CH 157 5785MHz		11571	48.7	-25.3	74	56.2	38.75	14.25	60.5	100	0	P	H
		11571	48.07	-25.93	74	55.57	38.75	14.25	60.5	100	0	P	V
802.11n HT20 CH 161 5805MHz		11610	48.27	-25.73	74	55.65	38.83	14.27	60.48	100	0	P	H
		11610	49.4	-24.6	74	56.78	38.83	14.27	60.48	100	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		5712.6	58.57	-9.73	68.3	54.26	32.03	8.55	36.27	329	339	P	H
		5724.84	63.67	-14.63	78.3	59.34	32.04	8.57	36.28	329	339	P	H
	*	5744	93.53	-	-	89.19	32.05	8.58	36.29	329	339	P	H
	*	5744	86.44	-	-	82.1	32.05	8.58	36.29	329	339	A	H
		5709.16	56.23	-12.07	68.3	51.92	32.03	8.55	36.27	100	360	P	V
		5721	60.04	-18.26	78.3	55.71	32.04	8.57	36.28	100	360	P	V
	*	5768	91.13	-	-	86.79	32.05	8.59	36.3	100	360	P	V
	*	5768	84.09	-	-	79.75	32.05	8.59	36.3	100	360	A	V
802.11n HT40 CH 159 5795MHz	*	5808	92.83	-	-	88.45	32.08	8.63	36.33	400	0	P	H
	*	5806	85.94	-	-	81.56	32.08	8.63	36.33	400	0	A	H
		5852.08	49.38	-28.92	78.3	45	32.09	8.65	36.36	400	0	P	H
		5861.92	48.32	-19.98	68.3	43.93	32.1	8.66	36.37	400	0	P	H
	*	5800	90.84	-	-	86.47	32.07	8.62	36.32	100	356	P	V
	*	5784	83.99	-	-	79.64	32.06	8.6	36.31	100	356	A	V
		5854.32	49.7	-28.6	78.3	45.31	32.1	8.66	36.37	100	356	P	V
		5864	47.85	-20.45	68.3	43.46	32.1	8.66	36.37	100	356	P	V

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

15E Band 4 5725~5825MHz

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		11511	47.6	-26.4	74	55.33	38.6	14.21	60.54	100	0	P	H
		11511	45.63	-28.37	74	53.36	38.6	14.21	60.54	100	0	P	V
802.11n HT40 CH 159 5795MHz		11589	48.76	-25.24	74	56.2	38.79	14.26	60.49	100	0	P	H
		11589	48.14	-25.86	74	55.58	38.79	14.26	60.49	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5825MHz

WIFI 802.11ac VHT20 (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)
		5708.76	52.61	-15.69	68.3	44.74	35.59	8.55	36.27	326	360	P	H
		5722.92	62.72	-15.58	78.3	54.81	35.62	8.57	36.28	326	360	P	H
802.11ac	*	5738	95.99	-	-	88.06	35.64	8.58	36.29	326	360	P	H
VHT20	*	5740	89.03	-	-	81.1	35.64	8.58	36.29	326	360	A	H
CH 149		5707.96	51.38	-16.92	68.3	43.51	35.59	8.55	36.27	100	336	P	V
5745MHz		5724.36	56.71	-21.59	78.3	48.8	35.62	8.57	36.28	100	336	P	V
	*	5752	92.1	-	-	84.15	35.66	8.59	36.3	100	336	P	V
	*	5752	85.03	-	-	77.08	35.66	8.59	36.3	100	336	A	V
802.11ac	*	5790	97.42	-	-	89.41	35.71	8.62	36.32	365	337	P	H
VHT20	*	5790	90.21	-	-	82.2	35.71	8.62	36.32	365	337	A	H
CH 157	*	5790	93.64	-	-	85.63	35.71	8.62	36.32	100	343	P	V
5785MHz	*	5792	86.84	-	-	78.83	35.71	8.62	36.32	100	343	A	V
	*	5808	96.32	-	-	88.29	35.73	8.63	36.33	352	339	P	H
	*	5812	89.33	-	-	81.3	35.73	8.63	36.33	352	339	A	H
802.11ac		5857.2	51.71	-26.59	78.3	43.62	35.8	8.66	36.37	352	339	P	H
VHT20		5862.64	50.02	-18.28	68.3	41.93	35.8	8.66	36.37	352	339	P	H
CH 161	*	5798	92.76	-	-	84.75	35.71	8.62	36.32	100	342	P	V
5805MHz	*	5810	85.63	-	-	77.6	35.73	8.63	36.33	100	342	A	V
		5858.64	50.71	-27.59	78.3	42.62	35.8	8.66	36.37	100	342	P	V
		5880.88	49.94	-18.36	68.3	41.84	35.81	8.67	36.38	100	342	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 802.11ac VHT20 (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)
802.11ac VHT20 CH 149 5745MHz		11490	45.12	-28.88	74	52.47	38.99	14.2	60.54	100	0	P	H
		11490	44.49	-29.51	74	51.84	38.99	14.2	60.54	100	0	P	V
802.11ac VHT20 CH 157 5785MHz		11571	46.47	-27.53	74	53.6	39.12	14.25	60.5	100	0	P	H
		11571	47.6	-26.4	74	54.73	39.12	14.25	60.5	100	0	P	V
802.11ac VHT20 CH 161 5805MHz		11610	47.29	-26.71	74	54.31	39.19	14.27	60.48	100	0	P	H
		11610	47.85	-26.15	74	54.87	39.19	14.27	60.48	100	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 802.11ac VHT40 (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)
802.11ac VHT40 CH 151 5755MHz		5713.24	59.75	-8.55	68.3	51.88	35.59	8.55	36.27	335	347	P	H
		5723.32	62.94	-15.36	78.3	55.03	35.62	8.57	36.28	335	347	P	H
	*	5752	95.6	-	-	87.65	35.66	8.59	36.3	335	347	P	H
	*	5758	87.01	-	-	79.06	35.66	8.59	36.3	335	347	A	H
		5713.08	56.1	-12.2	68.3	48.23	35.59	8.55	36.27	100	344	P	V
		5721.32	60.38	-17.92	78.3	52.47	35.62	8.57	36.28	100	344	P	V
	*	5752	92.75	-	-	84.8	35.66	8.59	36.3	100	344	P	V
	*	5756	84.31	-	-	76.36	35.66	8.59	36.3	100	344	A	V
802.11ac VHT40 CH 159 5795MHz	*	5792	93.45	-	-	85.44	35.71	8.62	36.32	362	325	P	H
	*	5792	86.21	-	-	78.2	35.71	8.62	36.32	362	325	A	H
		5853.2	51.39	-26.91	78.3	43.32	35.78	8.65	36.36	362	325	P	H
		5871.52	51	-17.3	68.3	42.9	35.81	8.67	36.38	362	325	P	H
	*	5784	92.04	-	-	84.07	35.68	8.6	36.31	100	345	P	V
	*	5784	84.73	-	-	76.76	35.68	8.6	36.31	100	345	A	V
		5850.8	51.67	-26.63	78.3	43.6	35.78	8.65	36.36	100	345	P	V
		5873.36	50.06	-18.24	68.3	41.96	35.81	8.67	36.38	100	345	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 802.11ac VHT40 (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)
802.11ac VHT40 CH 151 5755MHz		11511	47.09	-26.91	74	54.42	39	14.21	60.54	100	0	P	H
		11511	45.01	-28.99	74	52.34	39	14.21	60.54	100	0	P	V
802.11ac VHT40 CH 159 5795MHz		11592	48.07	-25.93	74	55.14	39.16	14.26	60.49	100	0	P	H
		11589	47.38	-26.62	74	54.45	39.16	14.26	60.49	100	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 802.11ac VHT80 (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)
802.11ac VHT80 CH 155 5775MHz		5705	61.9	-6.4	68.3	54.03	35.59	8.55	36.27	321	360	P	H
		5724.12	61.92	-16.38	78.3	54.01	35.62	8.57	36.28	321	360	P	H
	*	5758	91.47	-	-	83.52	35.66	8.59	36.3	321	360	P	H
	*	5756	84.55	-	-	76.6	35.66	8.59	36.3	321	360	A	H
		5854.48	55.32	-22.98	78.3	47.23	35.8	8.66	36.37	321	360	P	H
		5860.64	53.21	-15.09	68.3	45.12	35.8	8.66	36.37	321	360	P	H
		5699.72	60.5	-7.8	68.3	52.64	35.57	8.54	36.25	100	340	P	V
		5718.2	60.93	-17.37	78.3	53.02	35.62	8.57	36.28	100	340	P	V
	*	5768	89.89	-	-	81.94	35.66	8.59	36.3	100	340	P	V
	*	5768	82.67	-	-	74.72	35.66	8.59	36.3	100	340	A	V
		5850.4	55.42	-22.88	78.3	47.35	35.78	8.65	36.36	100	340	P	V
		5863.28	53.67	-14.63	68.3	45.58	35.8	8.66	36.37	100	340	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 802.11ac VHT80 (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)
802.11ac VHT80 CH 155 5775MHz		11550	46.9	-27.1	74	54.08	39.09	14.24	60.51	100	0	P	H
		11550	46.21	-27.79	74	53.39	39.09	14.24	60.51	100	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 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11a LF		35.82	18.16	-21.84	40	31.18	17.16	0.72	30.9	-	-	P	H
		156.1	21.39	-22.11	43.5	36.84	13.44	1.51	30.4	-	-	P	H
		176.47	22.37	-21.13	43.5	39	12.16	1.61	30.4	-	-	P	H
		488.81	23.2	-22.8	46	32.76	18.09	2.77	30.42	-	-	P	H
		882.63	26.98	-19.02	46	31.08	22.63	3.8	30.53	101	269	P	H
		925.31	26.52	-19.48	46	29.94	23.21	3.92	30.55	-	-	P	H
		37.76	31.56	-8.44	40	46.04	15.68	0.74	30.9	104	258	P	V
		43.58	30.82	-9.18	40	47.74	13.08	0.82	30.82	-	-	P	V
		50.37	27.49	-12.51	40	48.12	9.3	0.85	30.78	-	-	P	V
		178.41	21.68	-21.82	43.5	38.42	12.04	1.62	30.4	-	-	P	V
		488.81	27.13	-18.87	46	36.69	18.09	2.77	30.42	-	-	P	V
		882.63	35.16	-10.84	46	39.26	22.63	3.8	30.53	-	-	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)

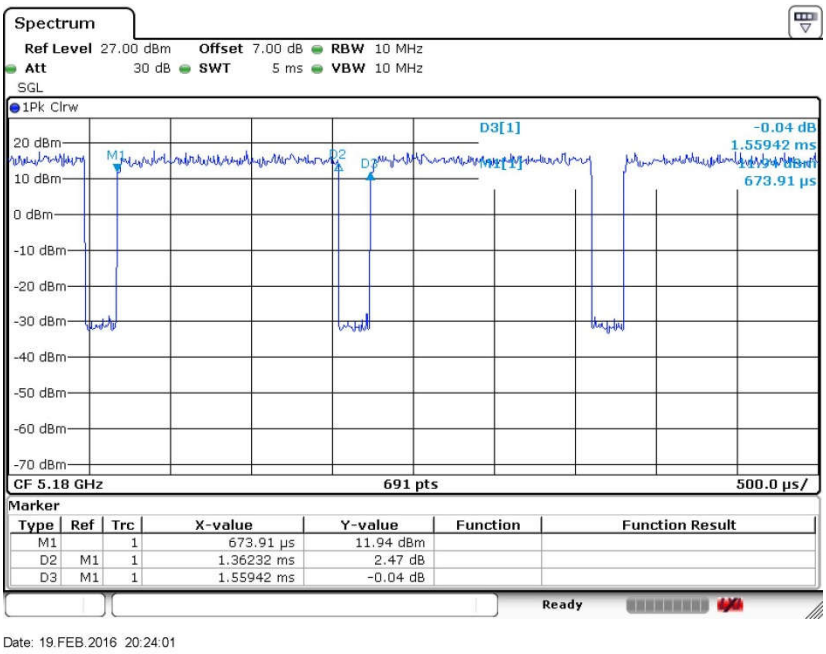
= -10.46(dB)

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

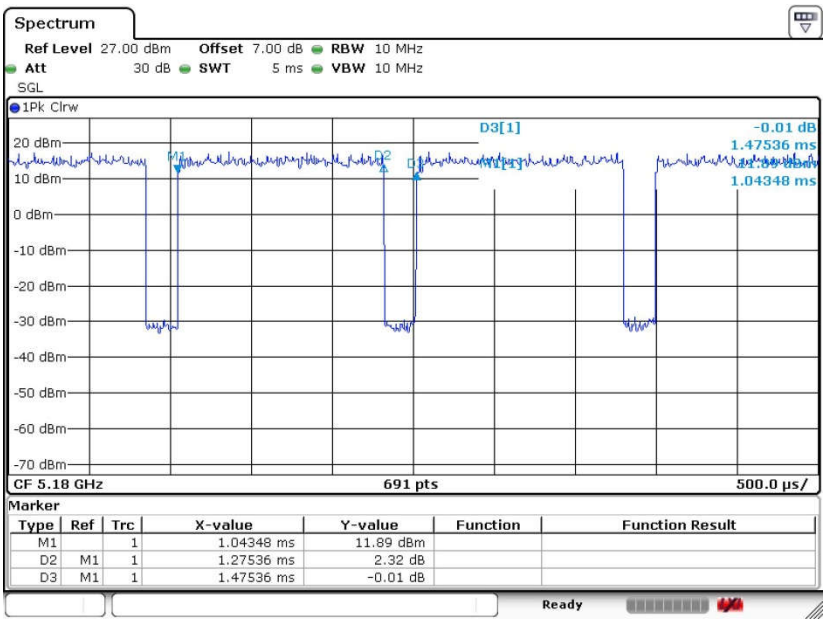
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.361	1.362	0.734	1kHz
802.11n HT20	86.444	1.275	0.784	1kHz
802.11n HT40	76.125	0.638	1.567	3kHz
802.11ac VHT20	83.333	0.978	1.022	3kHz
802.11ac VHT40	71.339	0.494	2.024	3kHz
802.11ac VHT80	55.195	0.246	4.059	10kHz

802.11a



802.11n HT20



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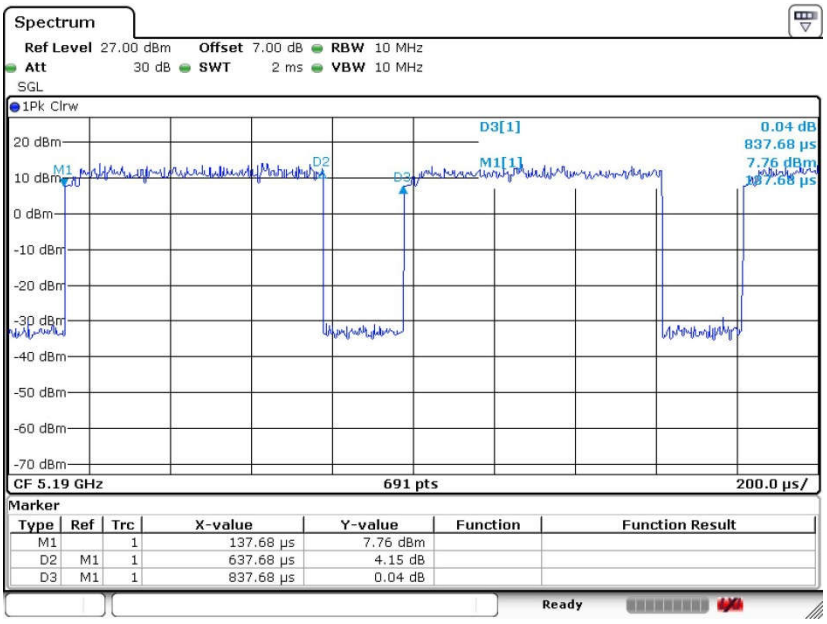
802.11n HT40



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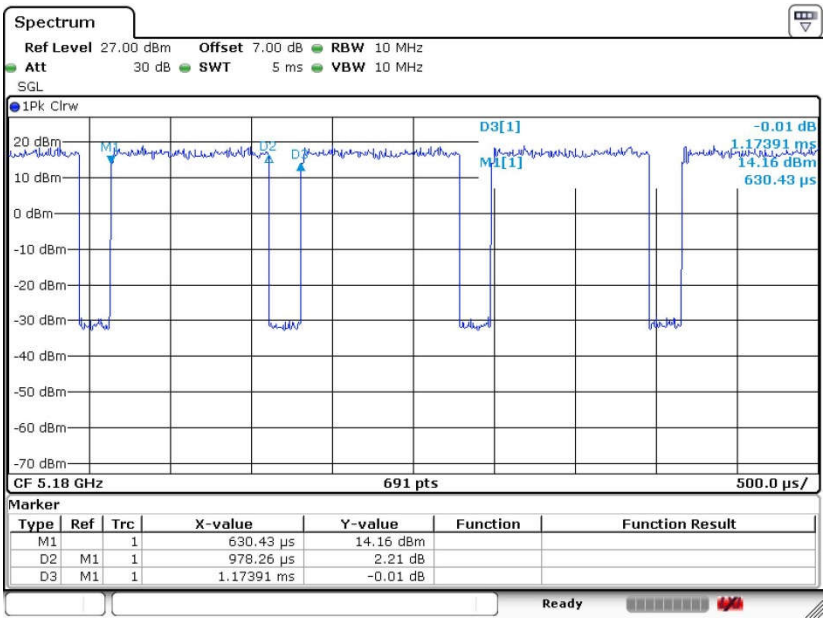
802.11ac VHT20



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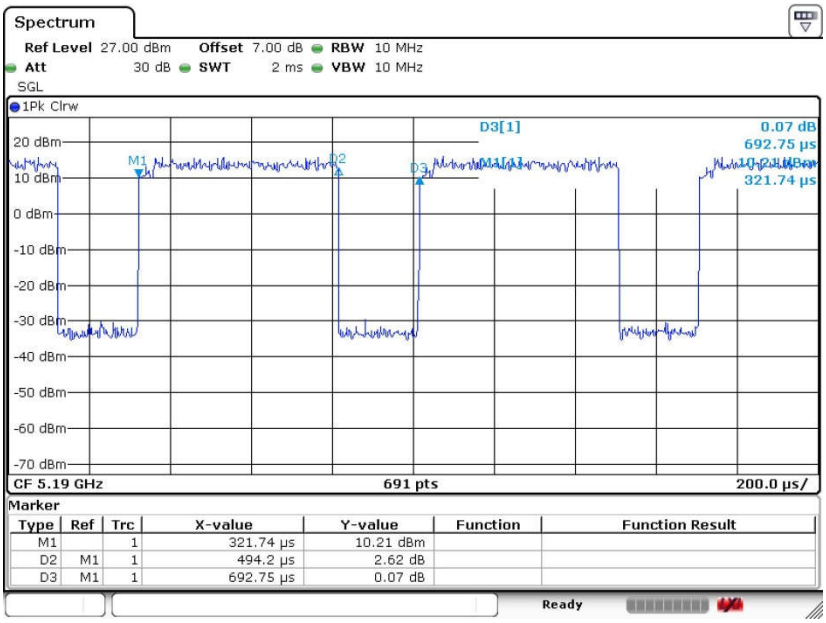
802.11ac VHT40



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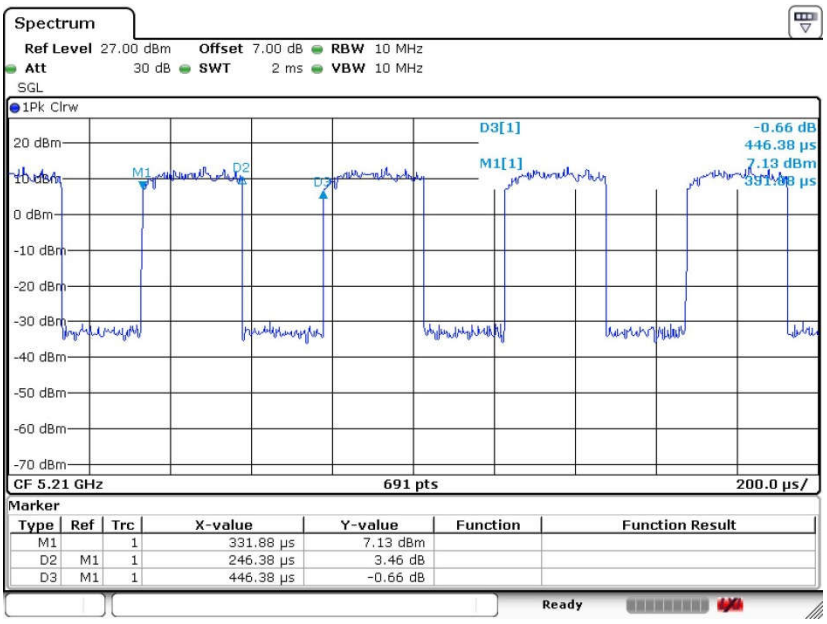
802.11ac VHT80



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