



# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : LTE/WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone  
**BRAND NAME** : ZTE  
**MODEL NAME** : Z978  
**FCC ID** : SRQ-Z978  
**STANDARD** : FCC Part 15 Subpart E §15.407  
**CLASSIFICATION** : (NII) Unlicensed National Information Infrastructure

The product was received on Aug. 31, 2016 and testing was completed on Oct. 02, 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.

Prepared by: James Huang / Manager

Approved by: Jones Tsai / Manager



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



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**SUMMARY OF TEST RESULT**

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	RSS-247 Section 6	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	RSS-247 Section 6	Maximum Conducted Output Power	FCC ≤ 24 dBm (depend on band)	Pass	-
3.3	15.407(a)	RSS-247 Section 6	Power Spectral Density	FCC ≤ 11 dBm/MHz (depend on band)	Pass	-
3.4	15.407(b)	RSS-247 Section 6	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 1.57 dB at 5147.350 MHz
3.5	15.207	RSS-Gen 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 14.60 dB at 0.413 MHz
3.6	15.407(g)	-	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	RSS-247 6.4(2)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	N/A	Antenna Requirement	N/A	Pass	-



# 1 General Description

## 1.1 Applicant

**ZTE CORPORATION**

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

## 1.2 Manufacturer

**ZTE CORPORATION**

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

## 1.3 Feature of Equipment Under Test

Product Feature	
<b>Equipment</b>	LTE/WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone
<b>Brand Name</b>	ZTE
<b>Model Name</b>	Z978
<b>FCC ID</b>	SRQ-Z978
<b>EUT supports Radios application</b>	GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/DC-HSDPA/LTE/NFC/ WLAN2.4GHz 802.11b/g/n HT20/ WLAN5GHz 802.11a/n HT20/ WLAN5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/Bluetooth v4.2 LE
<b>IMEI Code</b>	Conducted: 862424030004112 Conduction: 862424030003981 Radiation: 862424030004013
<b>HW Version</b>	u1xB
<b>SW Version</b>	Z978V1.0.0B08
<b>EUT Stage</b>	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

Standards-related Product Specification	
<b>Tx/Rx Frequency Range</b>	5180 MHz ~ 5240 MHz
<b>Maximum Output Power to Antenna</b>	802.11a : 13.68 dBm / 0.0233 W 802.11n HT20 : 10.96 dBm / 0.0125 W 802.11ac VHT20 : 11.09 dBm / 0.0129 W 802.11ac VHT40 : 11.07 dBm / 0.0128 W 802.11ac VHT80 : 11.03 dBm / 0.0127 W
<b>99% Occupied Bandwidth</b>	802.11a : 19.18 MHz 802.11ac VHT20 : 19.38 MHz 802.11ac VHT40 : 36.76 MHz 802.11ac VHT80 : 74.81 MHz
<b>Antenna Type / Gain</b>	IFA Antenna with gain 0.84 dBi
<b>Type of Modulation</b>	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

### 1.5 Modification of EUT

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



### 1.6 Testing Location

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.			
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
<b>Test Site No.</b>	<b>Sporton Site No.</b>			<b>FCC/IC Registration No.</b>
	TH01-KS	CO01-KS	03CH03-KS	306251/4086E

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

### 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03
- ♦ FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ♦ ANSI C63.10-2013
- ♦ IC RSS-247 Issue 1
- ♦ IC RSS-Gen Issue 4

**Remark:**

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

### 2.1 Carrier Frequency and Channel

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

**Note:**

1. The above Frequency and Channel in "\*" were 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.



## 2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	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 Link (5G) + USB Cable (Charging from Adapter) + Earphone
<b>Remark:</b> For Radiated TCs, the tests were performed with adapter, Earphone and USB Cable.	



Ch. #		Band I : 5180-5240 MHz	
		802.11a	
L	Low	36	
M	Middle	44	
H	High	48	

Ch. #		Band I : 5180-5240 MHz	
		802.11n HT20	
L	Low	36	
M	Middle	44	
H	High	48	

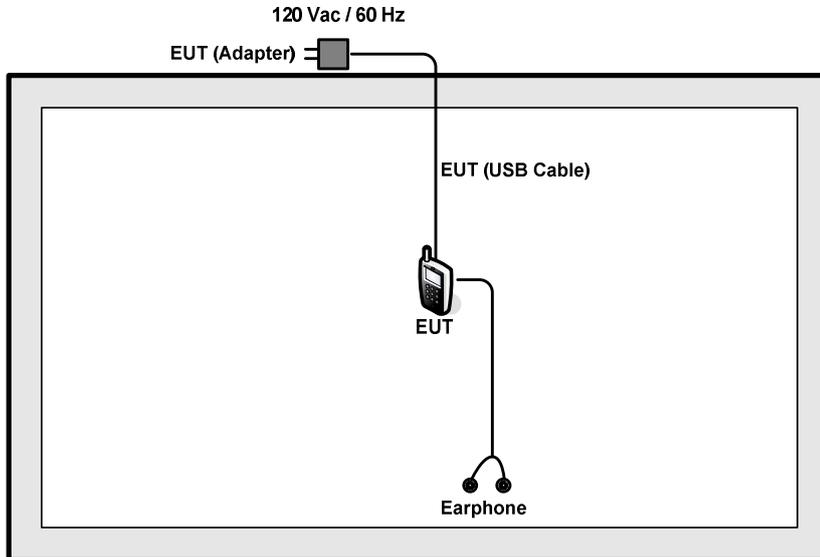
Ch. #		Band I : 5150-5250 MHz	
		802.11ac VHT20	
L	Low	36	
M	Middle	44	
H	High	48	

Ch. #		Band I : 5180-5240 MHz	
		802.11ac VHT40	
L	Low	38	
M	Middle	-	
H	High	46	

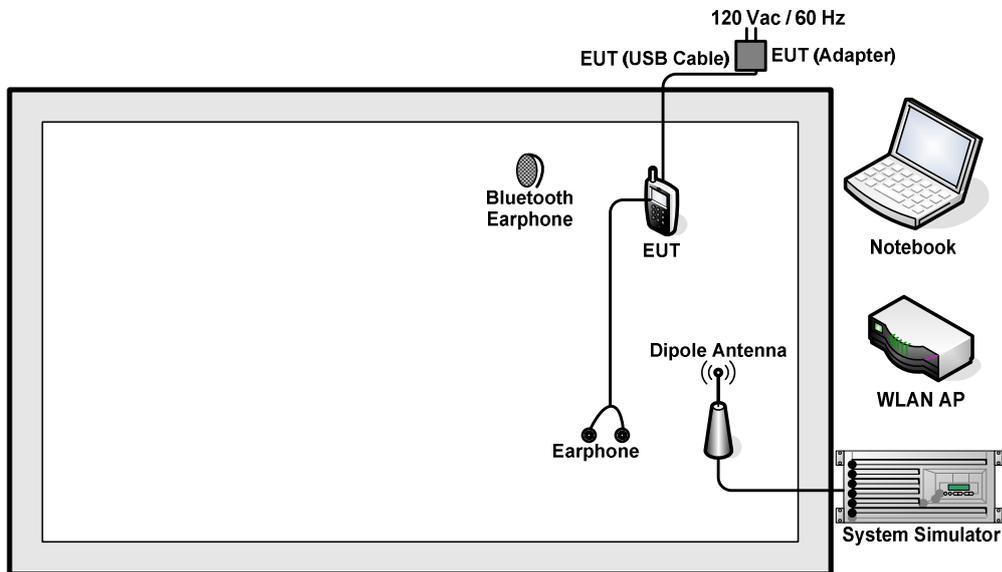
Ch. #		Band I : 5180-5240 MHz	
		802.11ac VHT80	
L	Low	-	
M	Middle	42	
H	High	-	

## 2.3 Connection Diagram of Test System

### <WLAN Tx Mode>



### <AC Conducted Emission Mode>





## 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
5.	Earphone	Lenovo	SH100	N/A	Unshielded, 1.2 m	N/A

## 2.5 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.

## 2.6 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 from RF cable loss.

*Offset = RF cable loss.*

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

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 7.0 \text{ (dB)} \end{aligned}$$

### 3 Test Result

#### 3.1 26dB & 99% Occupied Bandwidth Measurement

##### 3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

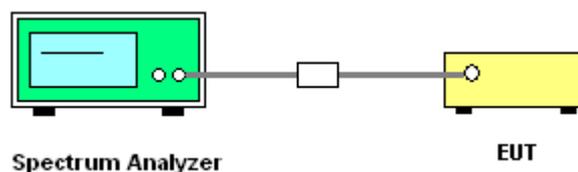
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.  
Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.  
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW)  $\geq 3 * RBW$ .
8. Measure and record the results in the test report.

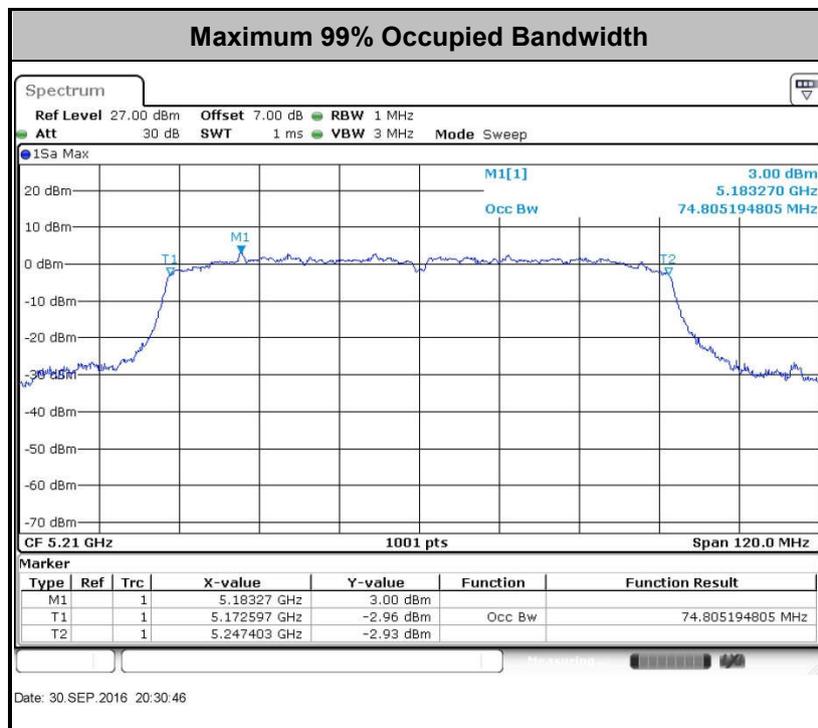
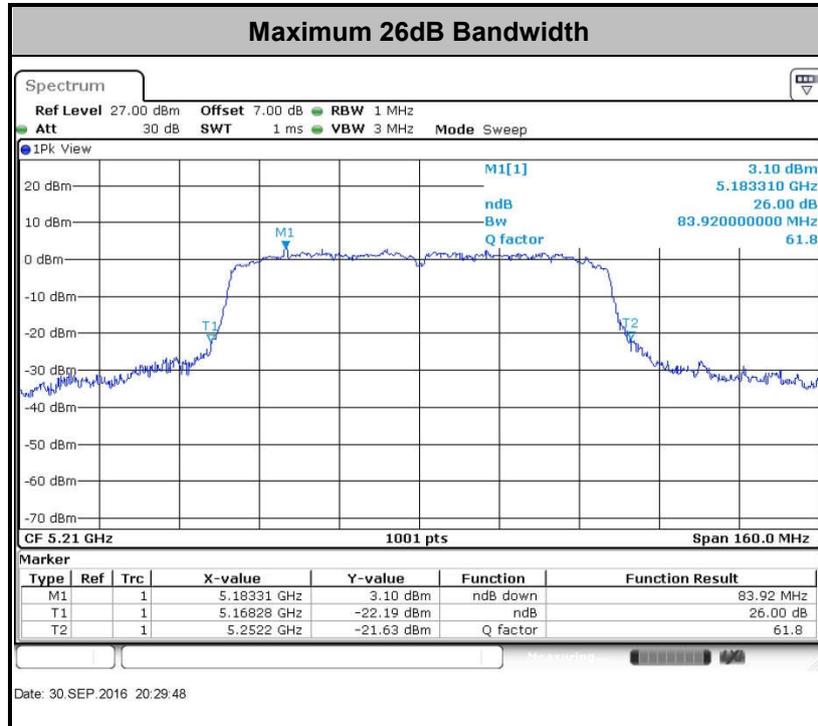
##### 3.1.4 Test Setup





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

Please refer to Appendix A.



**Note:** The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



## 3.2 Maximum Conducted Output Power Measurement

### 3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

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

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

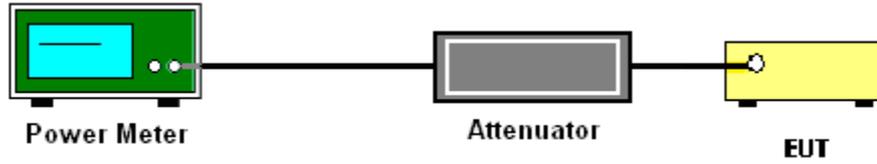
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.

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

For normal channel:



### 3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

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

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

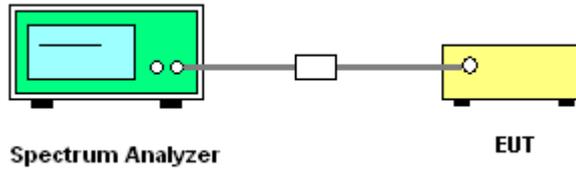
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03. Section F) Maximum power spectral density.

**# Method SA-2 #**

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

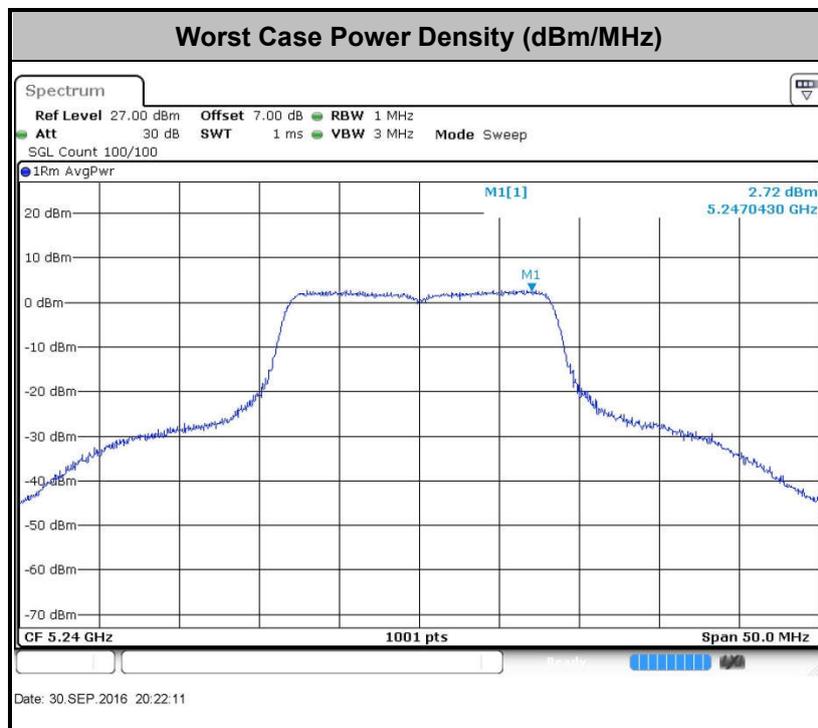
1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.
  - Measure the duty cycle.
  - Set span to encompass the entire emission bandwidth (EBW) of the signal.
  - Set RBW = 1 MHz.
  - Set VBW  $\geq$  3 MHz.
  - Number of points in sweep  $\geq$  2 Span / RBW.
  - Sweep time = auto.
  - Detector = RMS
  - Trace average at least 100 traces in power averaging mode.
  - Add  $10 \log(1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add  $10 \log(1/0.25) = 6$  dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



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



### 3.4 Unwanted 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 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

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

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

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



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

(3) KDB789033 D02 v01r03 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 v01r03. 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

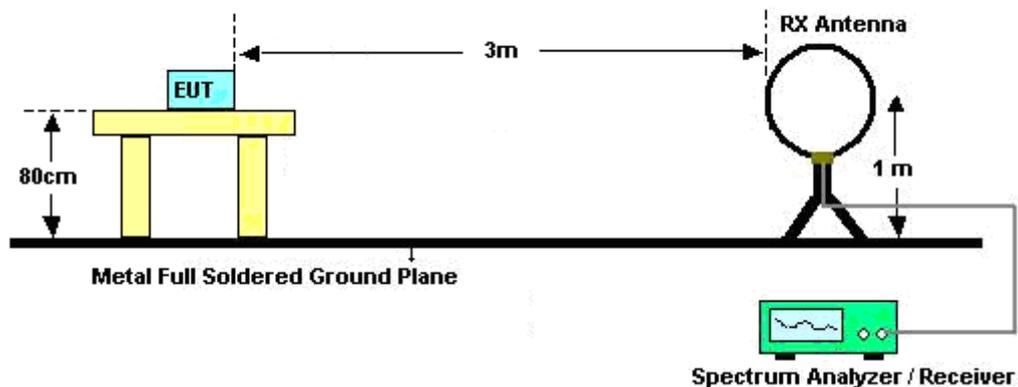
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- 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.

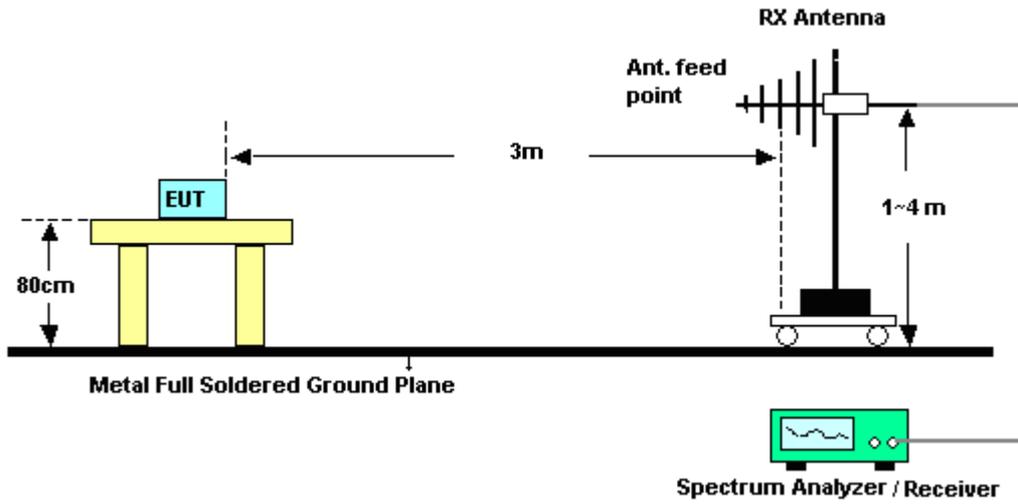
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

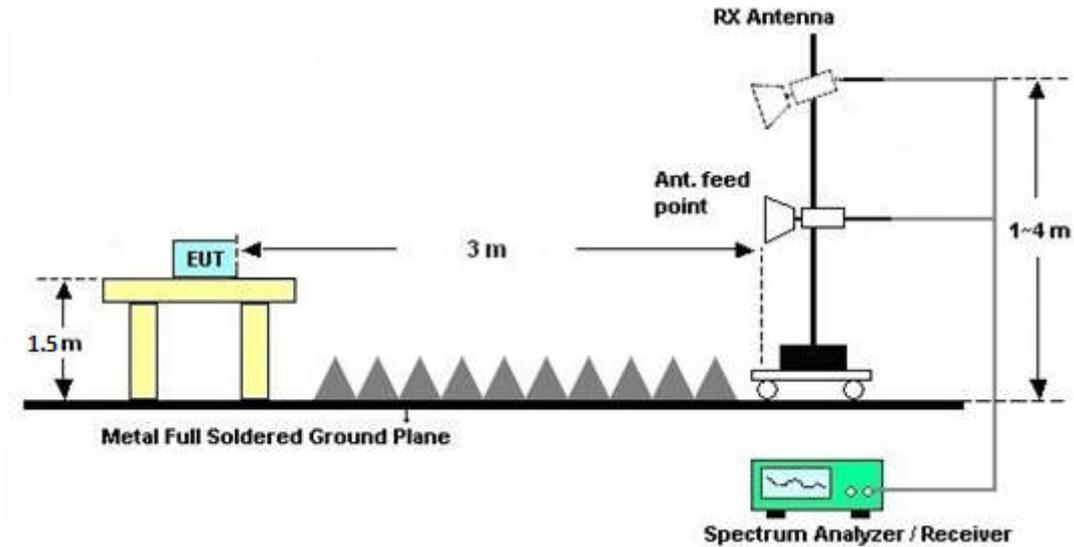
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





### **3.4.5 Test Results of Radiated Spurious 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 Spurious at Band Edges**

Please refer to Appendix B.

### **3.4.7 Duty Cycle**

Please refer to Appendix C.

### **3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)**

Please refer to Appendix B.



### 3.5 AC Conducted Emission Measurement

#### 3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

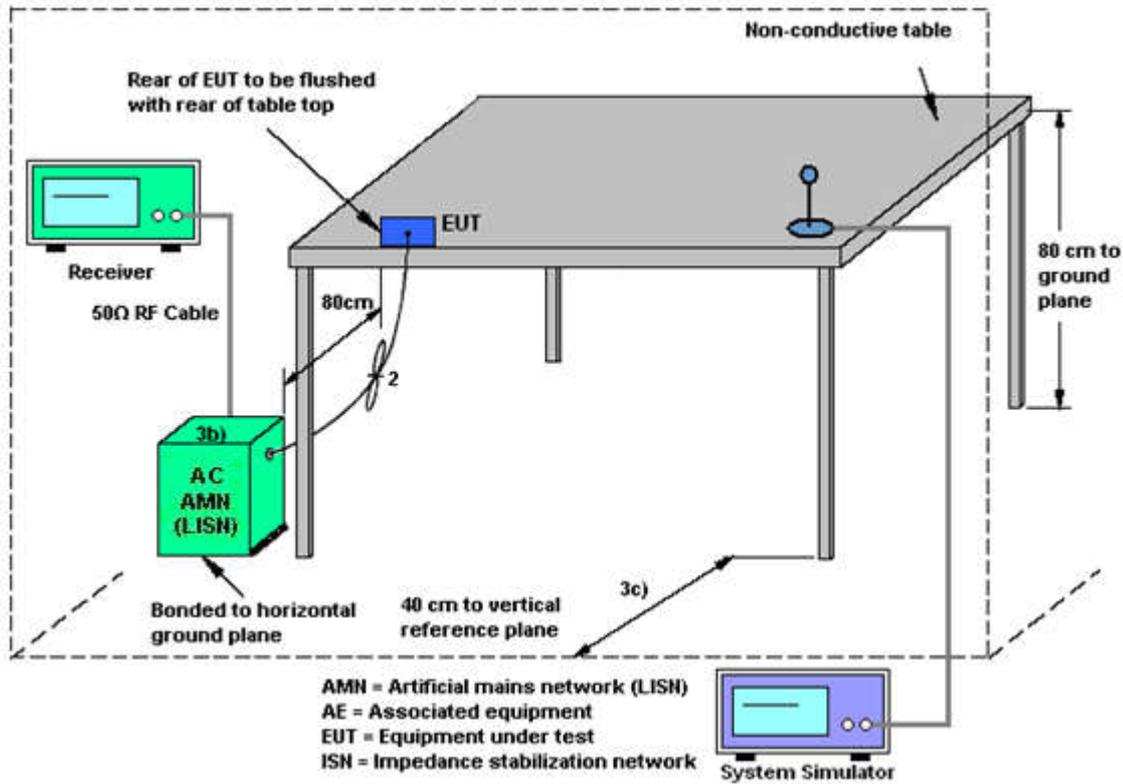
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

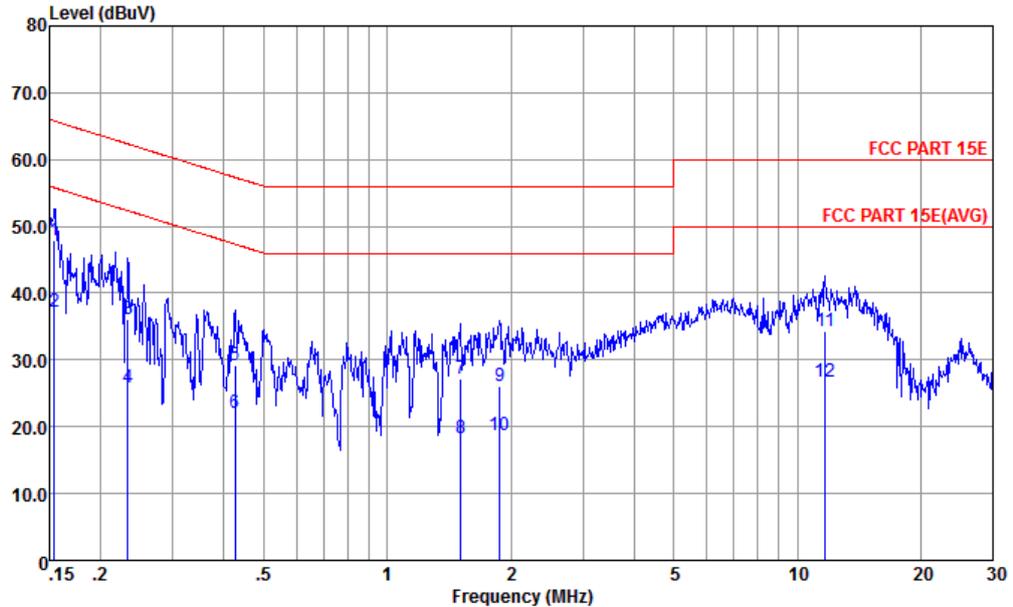
### 3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Morris Li	Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable (Charging from Adapter) + Earphone		

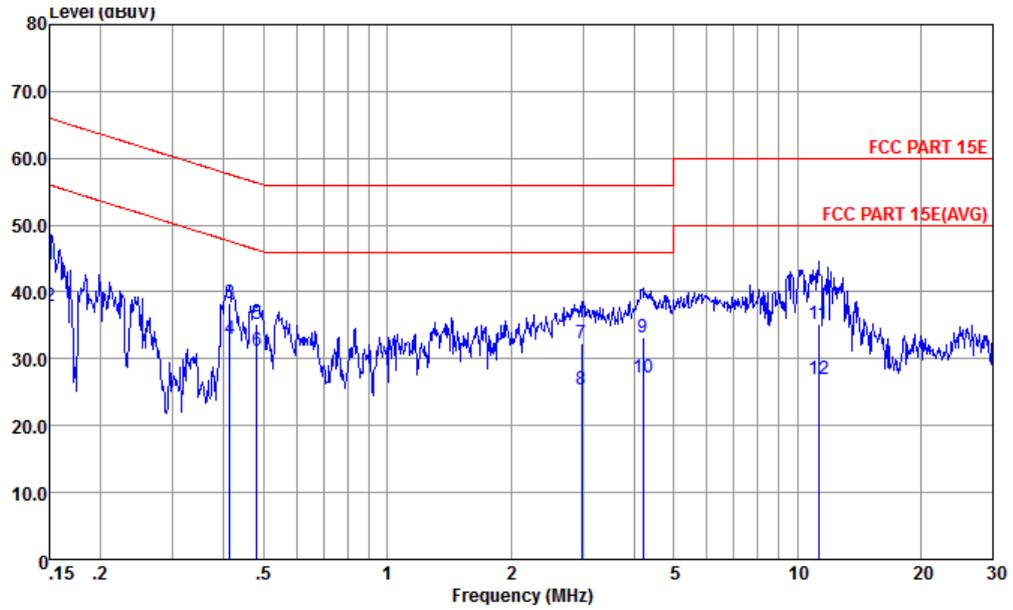


Site : CO01-KS  
 Condition : FCC PART 15E LISN-L-20151024 LINE  
 mode : Mode 1  
 IMEI : 862424030003981 #1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.154	48.01	-17.77	65.78	37.40	0.50	10.11	QP
2	0.154	37.21	-18.57	55.78	26.60	0.50	10.11	Average
3	0.233	36.06	-26.29	62.35	25.70	0.22	10.14	QP
4	0.233	25.96	-26.39	52.35	15.60	0.22	10.14	Average
5	0.426	29.30	-28.03	57.33	18.90	0.23	10.17	QP
6	0.426	22.00	-25.33	47.33	11.60	0.23	10.17	Average
7	1.511	27.15	-28.85	56.00	16.80	0.21	10.14	QP
8	1.511	18.25	-27.75	46.00	7.90	0.21	10.14	Average
9	1.878	26.13	-29.87	56.00	15.80	0.19	10.14	QP
10	1.878	18.83	-27.17	46.00	8.50	0.19	10.14	Average
11	11.683	34.36	-25.64	60.00	23.80	0.25	10.31	QP
12	11.683	26.76	-23.24	50.00	16.20	0.25	10.31	Average



Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Morris Li	Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable (Charging from Adapter) + Earphone		



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

mode : Mode 1  
 IMEI : 862424030003981 #1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	44.11	-21.89	66.00	33.70	0.30	10.11	QP
2	0.150	37.91	-18.09	56.00	27.50	0.30	10.11	Average
3	0.413	38.29	-19.30	57.59	27.80	0.32	10.17	QP
4 *	0.413	32.99	-14.60	47.59	22.50	0.32	10.17	Average
5	0.481	35.28	-21.04	56.32	24.80	0.32	10.16	QP
6	0.481	31.28	-15.04	46.32	20.80	0.32	10.16	Average
7	2.978	32.23	-23.77	56.00	21.71	0.37	10.15	QP
8	2.978	25.33	-20.67	46.00	14.81	0.37	10.15	Average
9	4.202	33.23	-22.77	56.00	22.70	0.36	10.17	QP
10	4.202	27.23	-18.77	46.00	16.70	0.36	10.17	Average
11	11.257	35.27	-24.73	60.00	24.69	0.28	10.30	QP
12	11.257	27.07	-22.93	50.00	16.49	0.28	10.30	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.

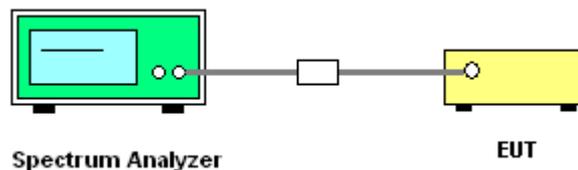
### 3.6.2 Measuring Instruments

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 peak output power limit.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 09, 2016	Sep. 14, 2016~ Sep. 30, 2016	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Sep. 14, 2016~ Sep. 30, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Sep. 14, 2016~ Sep. 30, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 24, 2015	Sep. 14, 2016~ Sep. 30, 2016	Oct. 23, 2016	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Oct. 02, 2016	Aug. 08, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 24, 2015	Oct. 02, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 24, 2015	Oct. 02, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 24, 2015	Oct. 02, 2016	Oct. 23, 2016	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Sep. 14, 2016~ Sep. 30, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Sep. 14, 2016~ Sep. 30, 2016	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 07, 2015	Sep. 14, 2016~ Sep. 30, 2016	Nov. 06, 2016	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Sep. 14, 2016~ Sep. 30, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Sep. 14, 2016~ Sep. 30, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Oct. 10, 2015	Sep. 14, 2016~ Sep. 30, 2016	Oct. 09, 2016	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 09, 2016	Sep. 14, 2016~ Sep. 30, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-H G	1887435	18GHz~40GHz	Jan. 20, 2016	Sep. 14, 2016~ Sep. 30, 2016	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 24, 2015	Sep. 14, 2016~ Sep. 30, 2016	Oct. 23, 2016	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 14, 2016~ Sep. 30, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 14, 2016~ Sep. 30, 2016	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 14, 2016~ Sep. 30, 2016	NCR	Radiation (03CH03-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
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5dB
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### Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5dB
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### Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.6dB
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## **Appendix A. Conducted Test Results**

Test Engineer:	Ivan Zhang	Temperature:	24~25	°C
Test Date:	2016/9/14~2016/9/30	Relative Humidity:	54~55	%

**TEST RESULTS DATA**  
**26dB and 99% OBW**

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)		
11a	6Mbps	1	36	5180	18.93	24.88	-	22.77		
11a	6Mbps	1	44	5220	19.03	25.33	-	22.79		
11a	6Mbps	1	48	5240	19.18	26.57	-	22.83		
VHT20	MCS0	1	36	5180	19.33	24.03	-	22.86		
VHT20	MCS0	1	44	5220	19.38	24.33	-	22.87		
VHT20	MCS0	1	48	5240	19.33	24.38	-	22.86		
VHT40	MCS0	1	38	5190	36.76	45.14	-	23.01		
VHT40	MCS0	1	46	5230	36.76	44.96	-	23.01		
VHT80	MCS0	1	42	5210	74.81	83.92	-	23.01		

**TEST RESULTS DATA**  
**Average Power Table**

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.60	13.24	24.00	0.84		Pass
11a	6Mbps	1	44	5220	0.60	13.12	24.00	0.84		Pass
11a	6Mbps	1	48	5240	0.60	13.68	24.00	0.84		Pass
HT20	MCS0	1	36	5180	0.62	10.53	24.00	0.84		Pass
HT20	MCS0	1	44	5220	0.62	10.65	24.00	0.84		Pass
HT20	MCS0	1	48	5240	0.62	10.96	24.00	0.84		Pass
VHT20	MCS0	1	36	5180	0.83	10.87	24.00	0.84		Pass
VHT20	MCS0	1	44	5220	0.83	10.77	24.00	0.84		Pass
VHT20	MCS0	1	48	5240	0.83	11.09	24.00	0.84		Pass
VHT40	MCS0	1	38	5190	1.48	10.99	24.00	0.84		Pass
VHT40	MCS0	1	46	5230	1.48	11.07	24.00	0.84		Pass
VHT80	MCS0	1	42	5210	2.57	11.03	24.00	0.84		Pass

**TEST RESULTS DATA**  
**Power Spectral Density**

FCC Band I										
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)	-	Pass/Fail
11a	6Mbps	1	36	5180	0.60	2.24	11.00	0.84		Pass
11a	6Mbps	1	44	5220	0.60	3.06	11.00	0.84		Pass
11a	6Mbps	1	48	5240	0.60	3.32	11.00	0.84		Pass
VHT20	MCS0	1	36	5180	0.62	-0.12	11.00	0.84		Pass
VHT20	MCS0	1	44	5220	0.62	-0.20	11.00	0.84		Pass
VHT20	MCS0	1	48	5240	0.62	0.46	11.00	0.84		Pass
VHT40	MCS0	1	38	5190	1.48	-2.45	11.00	0.84		Pass
VHT40	MCS0	1	46	5230	1.48	-1.86	11.00	0.84		Pass
VHT80	MCS0	1	42	5210	2.57	-4.35	11.00	0.84		Pass

**TEST RESULTS DATA**  
**Frequency Stability**

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	50	3.8	
11a	6Mbps	1	36	5180	5180.025	0.025	4.83	-30	3.8	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	4.35	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.5	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.8	



## Appendix B. Radiated Spurious Emission

### Band 1 - 5150~5250MHz WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11a CH 36 5180MHz		5149.92	64.09	-9.91	74	60.86	31.84	7.92	36.53	268	199	P	H
	!	5149.92	48.35	-5.65	54	45.12	31.84	7.92	36.53	268	199	A	H
	*	5184	105.73	-	-	102.45	31.85	7.94	36.51	268	199	P	H
	*	5184	97.81	-	-	94.53	31.85	7.94	36.51	268	199	A	H
		5139.84	54.76	-19.24	74	51.53	31.84	7.92	36.53	330	192	P	V
		5149.92	42.96	-11.04	54	39.73	31.84	7.92	36.53	330	192	A	V
	*	5186	99.79	-	-	96.51	31.85	7.94	36.51	330	192	P	V
	*	5186	92.39	-	-	89.11	31.85	7.94	36.51	330	192	A	V
802.11a CH 44 5220MHz		5107.8	47.28	-26.72	74	44.09	31.83	7.91	36.55	355	187	P	H
		5136.85	37.24	-16.76	54	34.03	31.84	7.91	36.54	355	187	A	H
	*	5216	103.43	-	-	100.08	31.86	7.99	36.5	355	187	P	H
	*	5216	96.77	-	-	93.42	31.86	7.99	36.5	355	187	A	H
		5353.85	46.22	-27.78	74	42.47	31.91	8.34	36.5	355	187	P	H
		5380.45	36.3	-17.7	54	32.45	31.92	8.43	36.5	355	187	A	H
		5149.75	45.98	-28.02	74	42.75	31.84	7.92	36.53	330	199	P	V
		5143.75	36.73	-17.27	54	33.5	31.84	7.92	36.53	330	199	A	V
	*	5216	100.88	-	-	97.53	31.86	7.99	36.5	330	199	P	V
	*	5216	93.83	-	-	90.48	31.86	7.99	36.5	330	199	A	V
		5399.95	45.66	-28.34	74	41.76	31.92	8.48	36.5	330	199	P	V
	5398.55	36.25	-17.75	54	32.35	31.92	8.48	36.5	330	199	A	V	



<b>802.11a</b> <b>CH 48</b> <b>5240MHz</b>		5400	46.24	-27.76	74	42.34	31.92	8.48	36.5	355	196	P	H
		5393.88	36.51	-17.49	54	32.66	31.92	8.43	36.5	355	196	A	H
	*	5238	104.21	-	-	100.8	31.87	8.04	36.5	355	196	P	H
	*	5238	96.87	-	-	93.46	31.87	8.04	36.5	355	196	A	H
		5385.6	45.67	-28.33	74	41.82	31.92	8.43	36.5	305	193	P	V
		5398.56	36.66	-17.34	54	32.76	31.92	8.48	36.5	305	193	A	V
	*	5234	100.64	-	-	97.23	31.87	8.04	36.5	305	193	P	V
	*	5234	93.43	-	-	90.02	31.87	8.04	36.5	305	193	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 1 5150~5250MHz**  
**WIFI 802.11a (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36		10360	44.65	-29.35	74	52.04	38.02	11.84	57.25	160	360	P	H
5180MHz		10360	44.61	-29.39	74	52	38.02	11.84	57.25	160	360	P	V
802.11a CH 44		10440	46.19	-27.81	74	53.36	38.06	11.89	57.12	160	360	P	H
5220MHz		10440	45.87	-28.13	74	53.04	38.06	11.89	57.12	160	360	P	V
802.11a CH 48		10480	45.68	-28.32	74	52.69	38.09	11.92	57.02	160	360	P	H
5240MHz		10480	45.68	-28.32	74	52.69	38.09	11.92	57.02	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 1 5150~5250MHz**  
**WIFI 802.11ac VHT20 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 36 5180MHz		5150.08	54.15	-19.85	74	50.92	31.84	7.92	36.53	100	228	P	H
		5149.12	41.91	-12.09	54	38.68	31.84	7.92	36.53	100	228	A	H
	*	5186	99.82	-	-	96.54	31.85	7.94	36.51	100	228	P	H
	*	5186	92.53	-	-	89.25	31.85	7.94	36.51	100	228	A	H
		5149.6	54.81	-19.19	74	51.58	31.84	7.92	36.53	330	344	P	V
		5149.92	43.41	-10.59	54	40.18	31.84	7.92	36.53	330	344	A	V
	*	5188	101.23	-	-	97.95	31.85	7.94	36.51	330	344	P	V
		5188	94.53	-	-	91.25	31.85	7.94	36.51	330	344	A	V
802.11ac VHT20 CH 44 5220MHz		5149.6	46.07	-27.93	74	42.84	31.84	7.92	36.53	100	228	P	H
		5141.92	37.39	-16.61	54	34.16	31.84	7.92	36.53	100	228	A	H
	*	5228	99.5	-	-	96.09	31.87	8.04	36.5	100	228	P	H
	*	5228	92.11	-	-	88.7	31.87	8.04	36.5	100	228	A	H
		5379.48	45.19	-28.81	74	41.34	31.92	8.43	36.5	100	228	P	H
		5376.6	36.67	-17.33	54	32.87	31.91	8.39	36.5	100	228	A	H
		5104.48	45.36	-28.64	74	42.19	31.83	7.9	36.56	212	357	P	V
		5137.6	37.57	-16.43	54	34.36	31.84	7.91	36.54	212	357	A	V
	*	5226	100.88	-	-	97.47	31.87	8.04	36.5	212	357	P	V
	*	5226	93.68	-	-	90.27	31.87	8.04	36.5	212	357	A	V
		5389.92	45.84	-28.16	74	41.99	31.92	8.43	36.5	212	357	P	V
	5381.28	36.52	-17.48	54	32.67	31.92	8.43	36.5	212	357	A	V	



802.11ac VHT20 CH 48 5240MHz		5359.68	45.4	-28.6	74	41.65	31.91	8.34	36.5	100	228	P	H
		5398.02	36.69	-17.31	54	32.79	31.92	8.48	36.5	100	228	A	H
	*	5244	97.71	-	-	94.25	31.88	8.08	36.5	100	228	P	H
	*	5244	91.13	-	-	87.67	31.88	8.08	36.5	100	228	A	H
		5396.76	46.59	-27.41	74	42.69	31.92	8.48	36.5	300	355	P	V
		5371.2	36.86	-17.14	54	33.06	31.91	8.39	36.5	300	355	A	V
	*	5242	99.56	-	-	96.1	31.88	8.08	36.5	300	355	P	V
	*	5242	93.08	-	-	89.62	31.88	8.08	36.5	300	355	A	V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



**Band 1 5150~5250MHz**  
**WIFI 802.11ac VHT20 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20		10360	43.31	-30.69	74	50.7	38.02	11.84	57.25	160	360	P	H
CH 36		10360	43.83	-30.17	74	51.22	38.02	11.84	57.25	160	360	P	V
5180MHz													
802.11ac VHT20		10440	44.59	-29.41	74	51.76	38.06	11.89	57.12	160	360	P	H
CH 44		10440	44.86	-29.14	74	52.03	38.06	11.89	57.12	160	360	P	V
5220MHz													
802.11ac VHT20		10480	44.15	-29.85	74	51.16	38.09	11.92	57.02	160	360	P	H
CH 48		10480	44.36	-29.64	74	51.37	38.09	11.92	57.02	160	360	P	V
5240MHz													
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 1 5150~5250MHz**  
**WIFI 802.11ac VHT40 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11ac VHT40 CH 38 5190MHz		5146.4	59.38	-14.62	74	56.15	31.84	7.92	36.53	274	222	P	H
	!	5149.92	49.2	-4.8	54	45.97	31.84	7.92	36.53	274	222	A	H
	*	5204	95.95	-	-	92.64	31.86	7.95	36.5	274	222	P	H
	*	5204	88.83	-	-	85.52	31.86	7.95	36.5	274	222	A	H
		5380.56	44.93	-29.07	74	41.08	31.92	8.43	36.5	274	222	P	H
		5387.04	36.75	-17.25	54	32.9	31.92	8.43	36.5	274	222	A	H
		5148.32	65.76	-8.24	74	62.53	31.84	7.92	36.53	300	344	P	V
	!	5148.48	51.61	-2.39	54	48.38	31.84	7.92	36.53	300	344	A	V
	*	5176	98.31	-	-	95.03	31.85	7.94	36.51	300	344	P	V
	*	5176	91.25	-	-	87.97	31.85	7.94	36.51	300	344	A	V
		5398.02	45.71	-28.29	74	41.81	31.92	8.48	36.5	300	344	P	V
		5400	36.64	-17.36	54	32.74	31.92	8.48	36.5	300	344	A	V
802.11ac VHT40 CH 46 5230MHz		5149.12	46.08	-27.92	74	42.85	31.84	7.92	36.53	274	223	P	H
		5127.68	38.43	-15.57	54	35.22	31.84	7.91	36.54	274	223	A	H
	*	5242	96.06	-	-	92.6	31.88	8.08	36.5	274	223	P	H
	*	5242	89.07	-	-	85.61	31.88	8.08	36.5	274	223	A	H
		5371.92	45	-29	74	41.2	31.91	8.39	36.5	274	223	P	H
		5391.72	36.42	-17.58	54	32.57	31.92	8.43	36.5	274	223	A	H
		5147.2	45.93	-28.07	74	42.7	31.84	7.92	36.53	300	354	P	V
		5127.84	38	-16	54	34.79	31.84	7.91	36.54	300	354	A	V
	*	5228	97.66	-	-	94.25	31.87	8.04	36.5	300	354	P	V
	*	5228	90.58	-	-	87.17	31.87	8.04	36.5	300	354	A	V
	5375.88	45.09	-28.91	74	41.29	31.91	8.39	36.5	300	354	P	V	
	5379.3	36.5	-17.5	54	32.65	31.92	8.43	36.5	300	354	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 1 5150~5250MHz**  
**WIFI 802.11ac VHT40 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40		10380	43.76	-30.24	74	51.1	38.03	11.85	57.22	160	360	P	H
CH 38 5190MHz		10380	43.63	-30.37	74	50.97	38.03	11.85	57.22	160	360	P	V
802.11ac VHT40		10460	44.52	-29.48	74	51.63	38.07	11.9	57.08	160	360	P	H
CH 46 5230MHz		10460	43.26	-30.74	74	50.37	38.07	11.9	57.08	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 1 5150~5250MHz**  
**WIFI 802.11ac VHT80 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5146.65	59.73	-14.27	74	56.5	31.84	7.92	36.53	100	225	P	H
	!	5149.6	50.48	-3.52	54	47.25	31.84	7.92	36.53	100	225	A	H
	*	5190	92.06	-	-	88.78	31.85	7.94	36.51	100	225	P	H
	*	5190	85.4	-	-	82.12	31.85	7.94	36.51	100	225	A	H
		5370.3	45.64	-28.36	74	41.84	31.91	8.39	36.5	100	225	P	H
		5396.25	37.5	-16.5	54	33.6	31.92	8.48	36.5	100	225	A	H
		5148.05	62.07	-11.93	74	58.84	31.84	7.92	36.53	265	347	P	V
	!	5147.35	52.43	-1.57	54	49.2	31.84	7.92	36.53	265	347	A	V
	*	5196	94.95	-	-	91.64	31.86	7.95	36.5	265	347	P	V
	*	5196	88.61	-	-	85.3	31.86	7.95	36.5	265	347	A	V
	5378.7	46.05	-27.95	74	42.2	31.92	8.43	36.5	265	347	P	V	
	5351.95	37.9	-16.1	54	34.15	31.91	8.34	36.5	265	347	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test data for 802.11ac VHT80 and CH 42 5210MHz, and a Remark section.



Emission below 1GHz

WIFI 802.11n VHT80 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11n VHT80 LF		30	25.72	-14.28	40	29.14	27.2	0.65	31.27	100	214	P	H
		120.21	18.59	-24.91	43.5	30.26	18.49	1.32	31.48	-	-	P	H
		222.06	23.25	-22.75	46	36.61	16.38	1.73	31.47	-	-	P	H
		471.35	26.94	-19.06	46	30.93	24.55	2.71	31.25	-	-	P	H
		780.78	28.68	-17.32	46	28.5	27.66	3.54	31.02	-	-	P	H
		932.1	29.9	-16.1	46	27.6	29.13	3.93	30.76	-	-	P	H
		30.97	32.74	-7.26	40	36.51	26.86	0.66	31.29	100	56	P	V
		42.61	30.73	-9.27	40	40.78	20.55	0.8	31.4	-	-	P	V
		323.91	25.86	-20.14	46	34.82	20.13	2.21	31.3	-	-	P	V
		451.95	26.14	-19.86	46	29.32	25.41	2.65	31.24	-	-	P	V
		624.61	25.69	-20.31	46	28.89	25.09	3.14	31.43	-	-	P	V
		714.82	28.5	-17.5	46	29.36	26.82	3.38	31.06	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



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

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

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

**For Peak Limit @ 2390MHz:**

- 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)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- 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)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

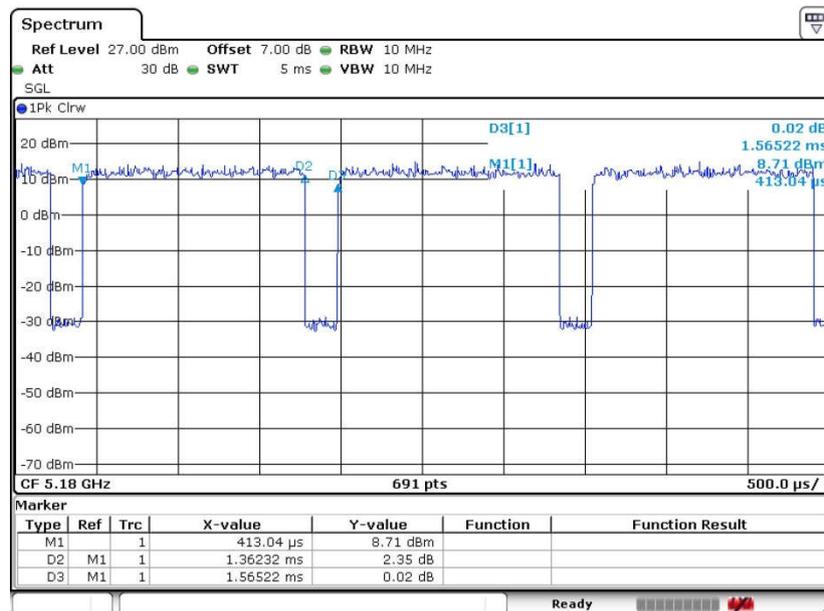
Both peak and average measured complies with the limit line, so test result is “PASS”.



## Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.04	1.36	0.73	1kHz
802.11n HT20	86.70	1.28	0.78	1kHz
802.11ac VHT20	82.52	0.98	1.02	3kHz
802.11ac VHT40	71.13	0.49	2.03	3kHz
802.11ac VHT80	55.34	0.25	4.04	10kHz

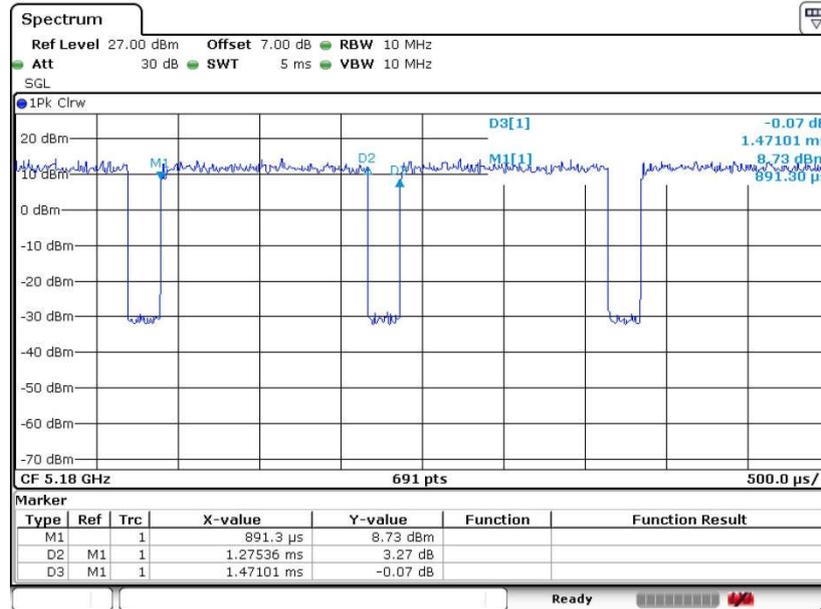
### 802.11a



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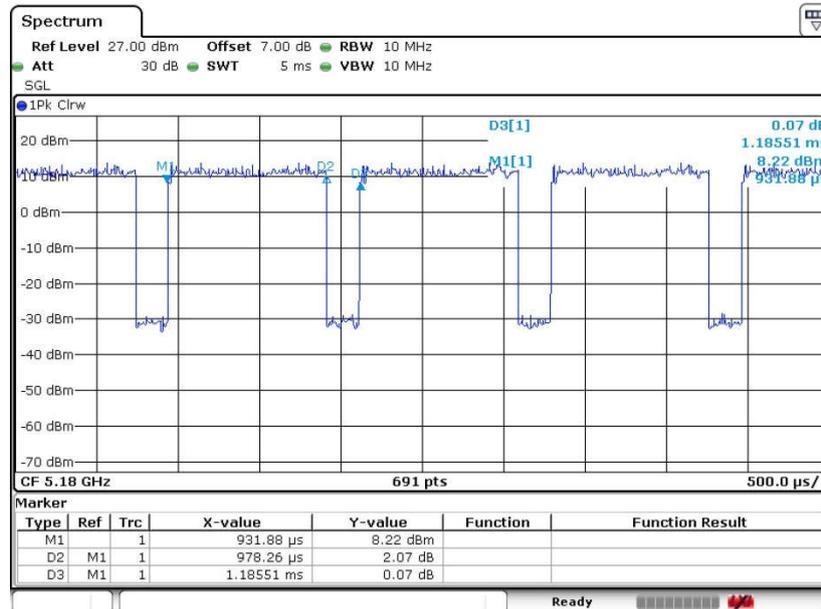


802.11n HT20



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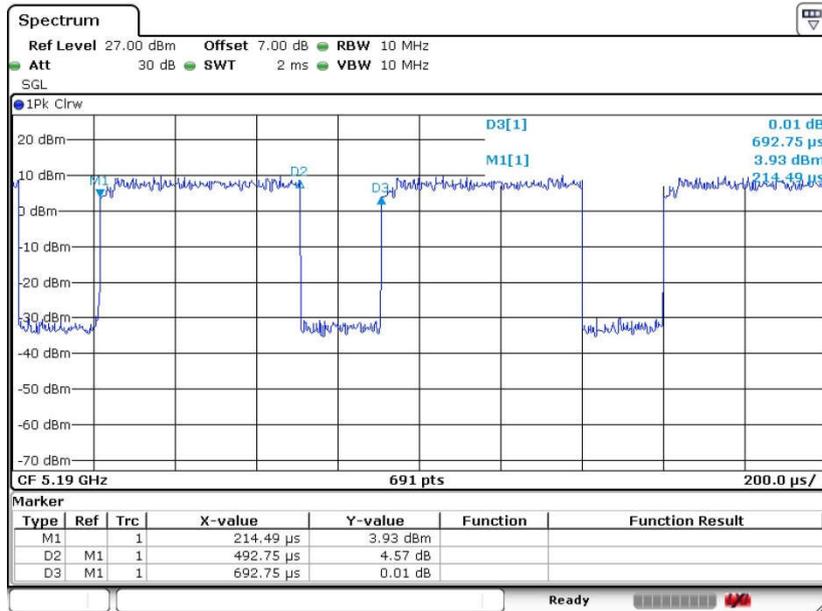
802.11ac VHT20



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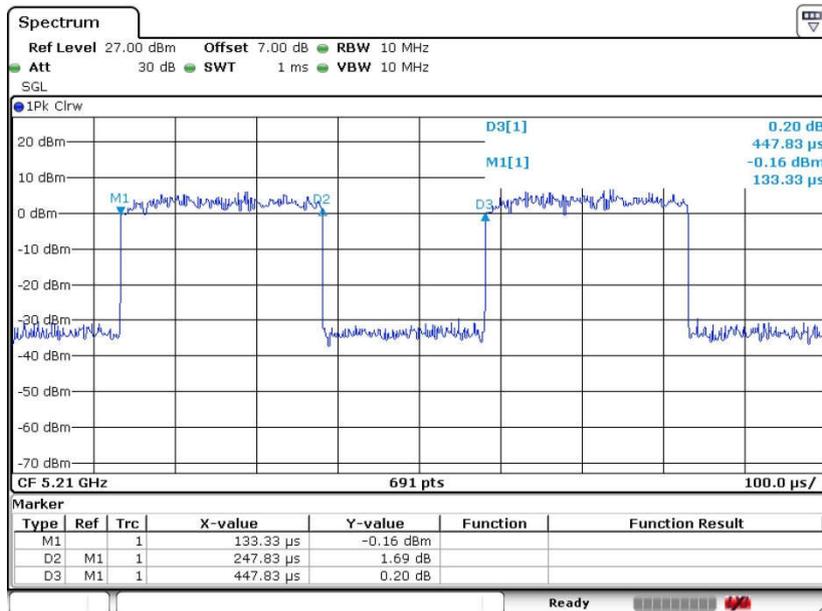


802.11ac VHT40



Date: 14.SEP.2016 14:29:16

802.11ac VHT80



Date: 14.SEP.2016 14:30:50