FCC RF Test Report

APPLICANT	:	**ZTE CORPORATION**
EQUIPMENT	:	**LTE uFi**
BRAND NAME	:	**ZTE**
MODEL NAME	:	**MF985**
FCC ID	:	**SRQ-MF985**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Nov. 15, 2017 and testing was completed on Jan. 02, 2018. 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.

James Huang

NVLAP®
TESTING
NVLAP LAB CODE 600155-0

Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335
China

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7N1502B	Rev. 01	Initial issue of report	Jan. 10, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	FCC ≤ 24 dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	FCC ≤ 11 dBm (depend on band)	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) 15.209(a)	Pass	Under limit 0.91 dB at 5149.99 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.51 dB at 0.175 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

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 Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE uFi
Brand Name	ZTE
Model Name	MF985
FCC ID	SRQ-MF985
EUT supports Radios application	WCDMA/HSPA/HSPA+(16QAM uplink is not supported)/ DC-HSDPA/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80
IMEI Code	Conducted: NA Conduction: 867358030002319 Radiation: NA
HW Version	MF985HWV1.1
SW Version	MF985V1.3
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Frequency Range</td><td>5180 MHz ~ 5240 MHz</td></tr>
<tr><td>Maximum Output Power to Antenna</td><td><5180 MHz ~ 5240 MHz>
<Ant. 1>
802.11a : 12.10 dBm / 0.0162 W
<Ant. 2>
802.11a : 11.88 dBm / 0.0154 W
MIMO <Ant. 1 + 2>
802.11n HT20 : 13.77 dBm / 0.0238 W
802.11n HT40 : 13.86 dBm / 0.0243 W
802.11ac VHT20 : 11.88 dBm / 0.0154 W
802.11ac VHT40 : 11.94 dBm / 0.0156 W
802.11ac VHT80 : 11.22 dBm / 0.0132 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td><Ant. 1>
802.11a : 16.83 MHz
<Ant. 1+2>
802.11n HT20 : 17.88 MHz
802.11n HT40 : 36.16 MHz
802.11ac VHT80 : 74.81 MHz</td></tr>
<tr><td>Antenna Type / Gain</td><td><5180 MHz ~ 5240 MHz>
Ant. 1 : PIFA Antenna with gain 1.18 dBi
Ant. 2 : PIFA Antenna with gain 0.82 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><th></th><th>Ant. 1</th><th>Ant. 2</th></tr>
<tr><td>802.11a/n/ac SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11n/ac MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

Note:

1. 802.11a only support SISO mode, 802.11n/ac support SISO & MIMO mode.
2. For 802.11a SISO mode, we only test one Antenna by referring to the higher conducted power.
3. For 802.11n/ac mode, we only test MIMO mode for the MIMO power is higher than SISO power.
4. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
5. For 11n HT20 & 11ac VHT20 mode, 11n HT40 & 11ac VHT40 mode, the whole testing has assessed only 11n HT20 and 11n HT40 by referring to their higher conducted power.

1.5 Modification of EUT

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

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No is CN5013.

Test Site	Sporton International (Kunshan) Inc.			
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958			
Test Site No.	**Sporton Site No.**			**FCC Test Firm Registration No.**
	TH01-KS	03CH03-KS	CO01-KS	630927

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 v02r01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- 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 were recorded in this report.

2.1 Carrier Frequency 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 802.11n HT40 and 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.

Single Antenna

Modulation	Data Rate
802.11a	6 Mbps

MIMO Antenna

Modulation	Data Rate
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 : WCDMA Band V Idle + WLAN Link(5G) + USB Cable (Charging from Adapter)

Remark:

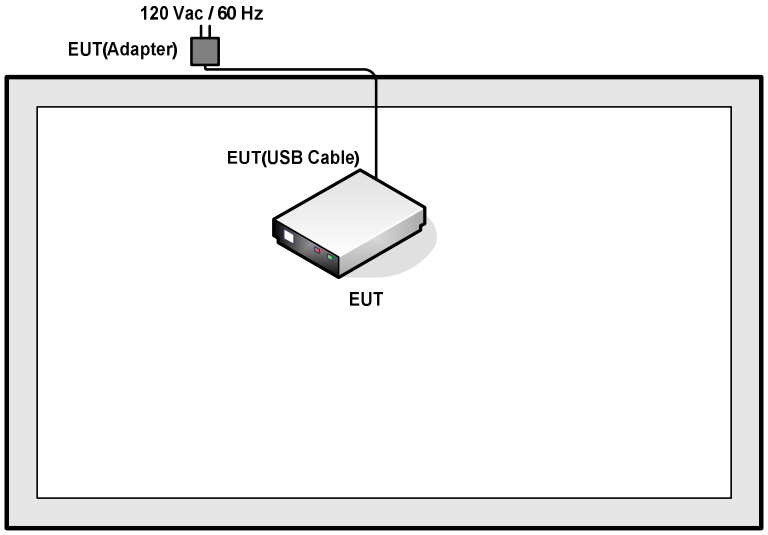
1. For Radiated Test Cases, The tests were performed with Adapter and USB Cable.
2. For 11n HT20 & 11ac VHT20 mode, 11n HT40 & 11ac VHT40 mode, the whole testing has assessed only 11n HT20 and 11n HT40 by referring to their higher conducted power.

Ch. #		Band I：5180-5240 MHz	Band I：5180-5240 MHz	Band I：5180-5240 MHz
		802.11a	802.11n HT20	802.11n HT40
L	Low	36	36	38
M	Middle	44	44	-
H	High	48	48	46

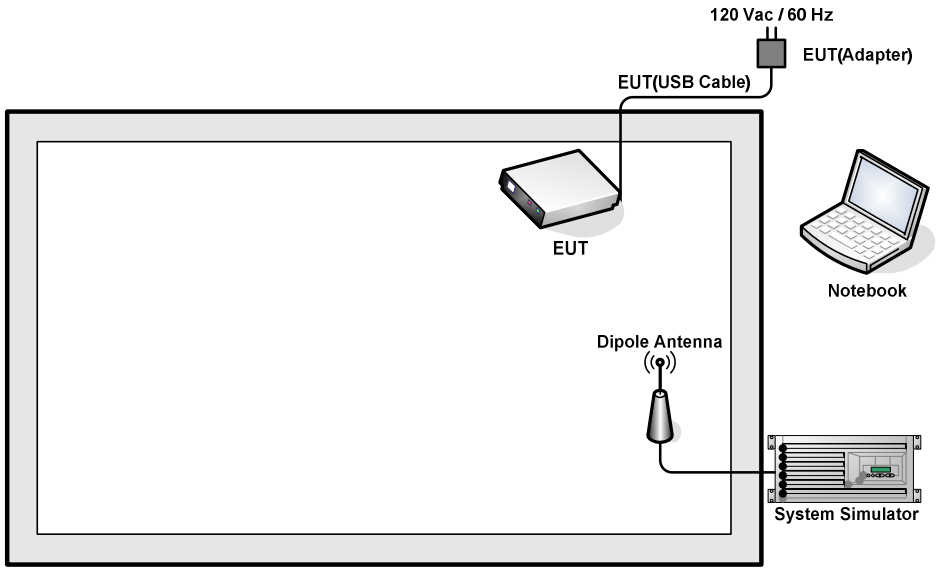
Ch. #		Band I：5180-5240 MHz
		802.11ac VHT80
L	Low	-
M	Middle	42
H	High	-

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	Anritus	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Notebook	Lenovo	G40-80	PRC4	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	SD Card	Kingston	SDC4/4GB	N/A	N/A	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 WLAN AP 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 derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.8 dB.

Offset(dB) = RF cable loss(dB) = 6.8 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

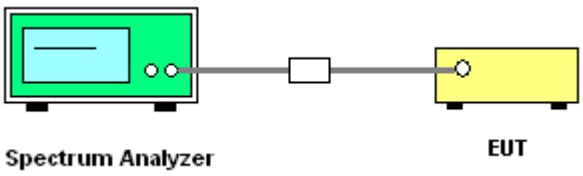
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

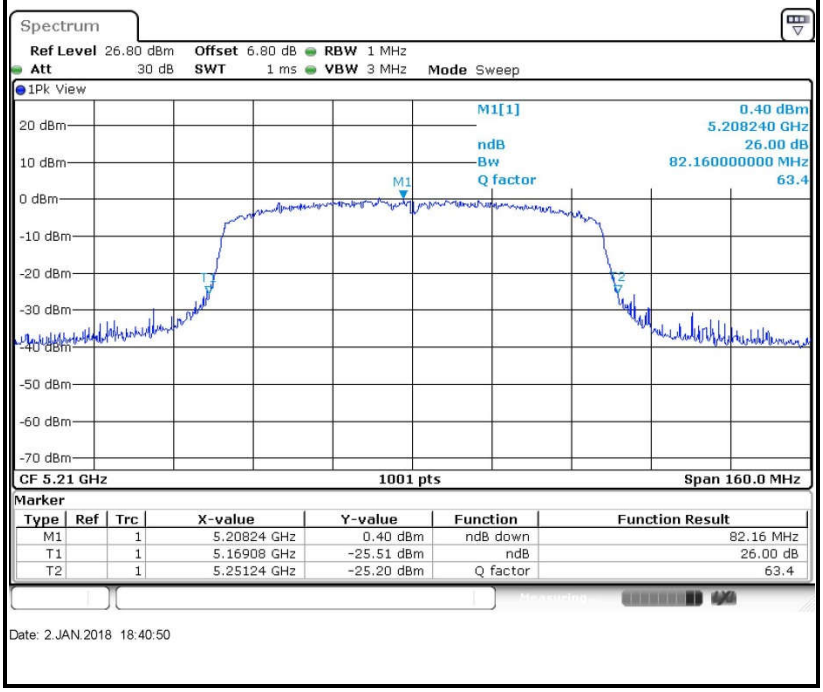
3.1.4 Test Setup



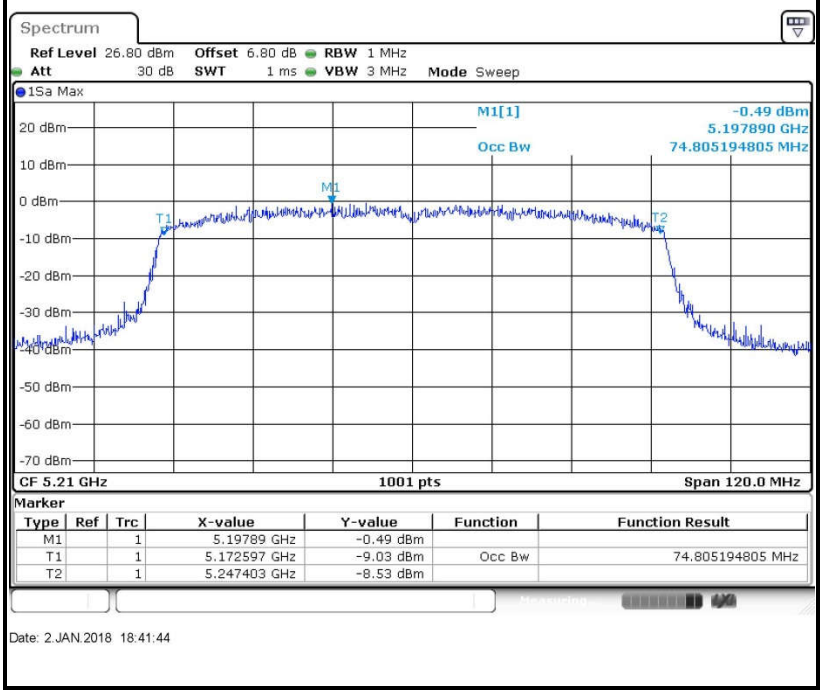
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth Plots

Please refer to Appendix A.

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

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

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

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

3.2.2 Measuring Instruments

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

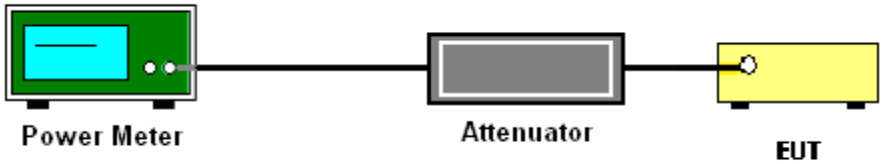
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

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

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 v02r01. 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).

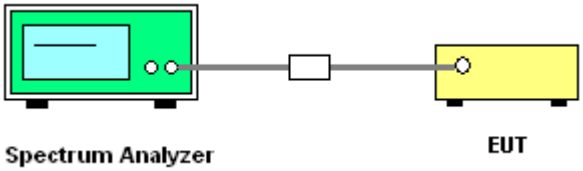
1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep time = auto.
   - Detector = RMS
   - Trace average at least 100 traces in power averaging mode.
   - Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (a): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

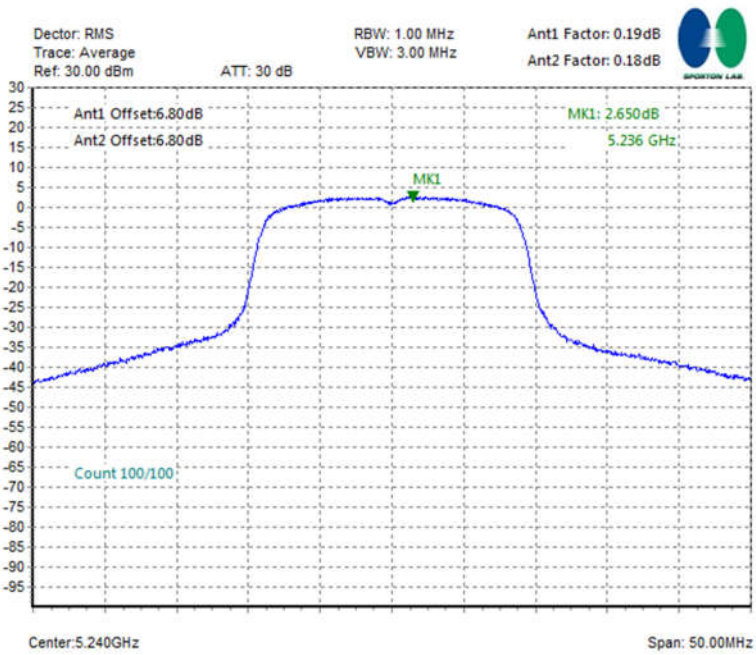
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Spectral Density(dBm/MHz)



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

3.4 Unwanted Radiated Emission Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

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 shall comply with the general field strength limits 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)
- 27	68.3

(3) KDB789033 D01 v02r01 G)2)c)

(i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.[3]

(ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.[4]

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

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 v02r01. 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

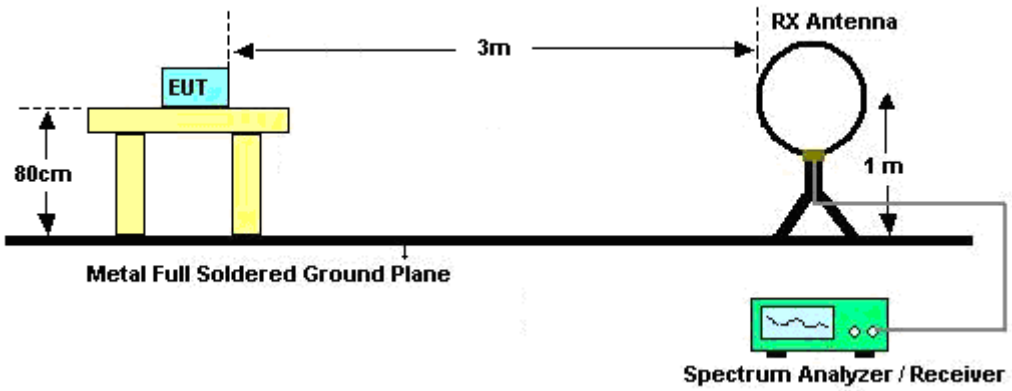
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

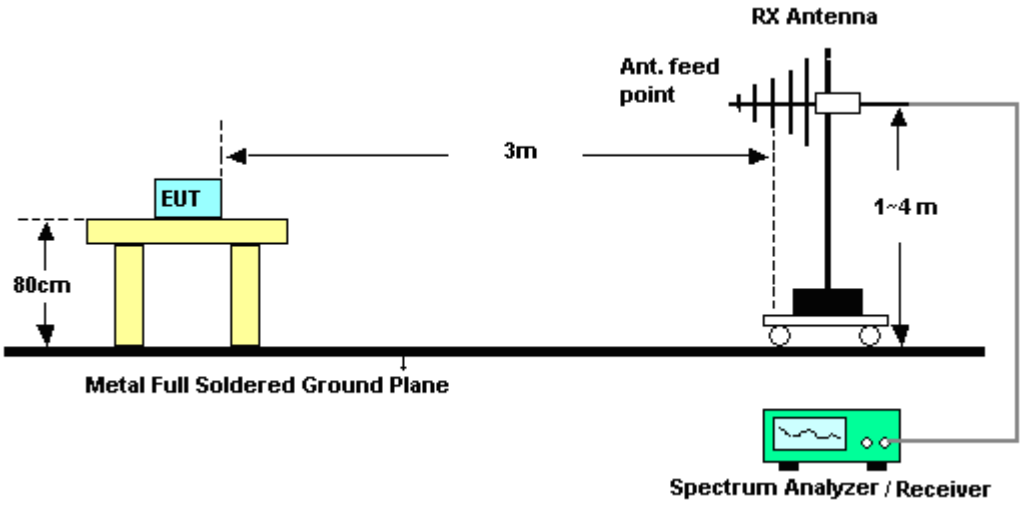
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

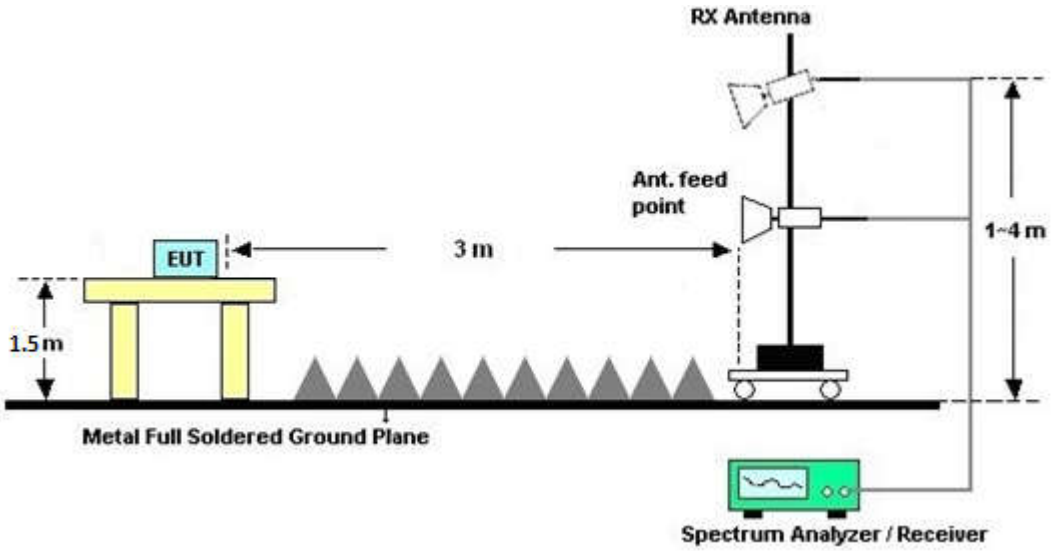
For radiated emissions below 30MHz



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 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 Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

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

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

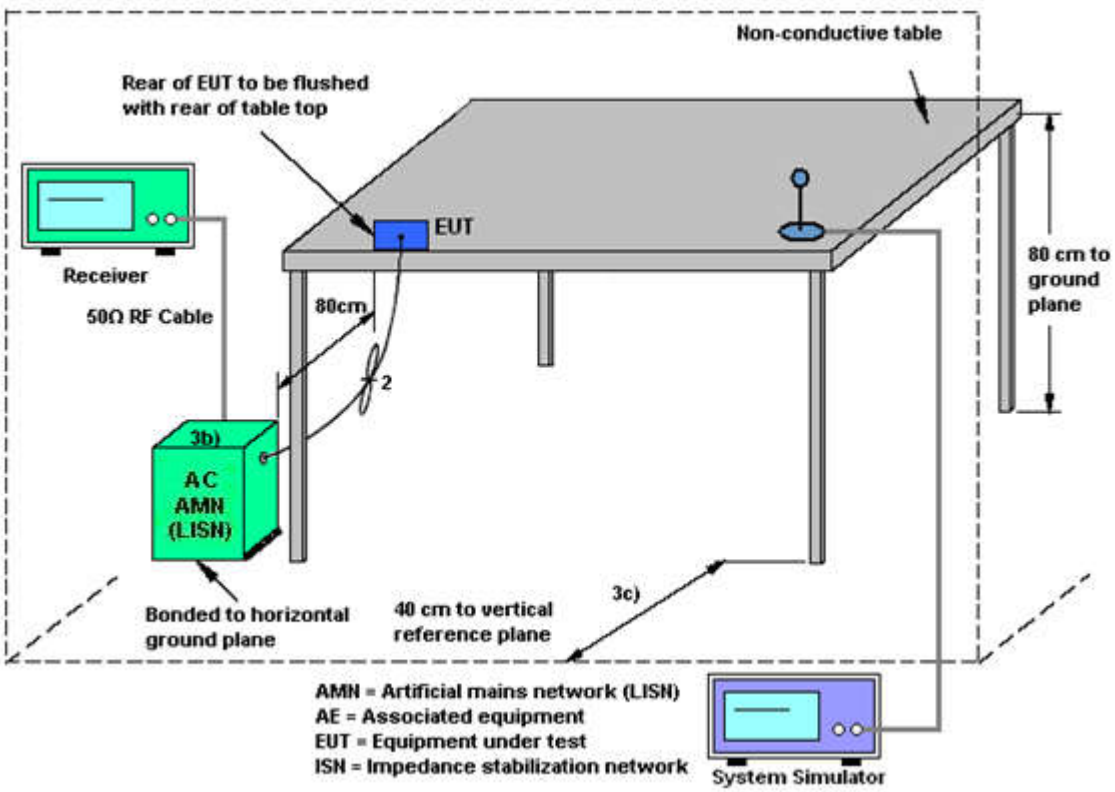
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

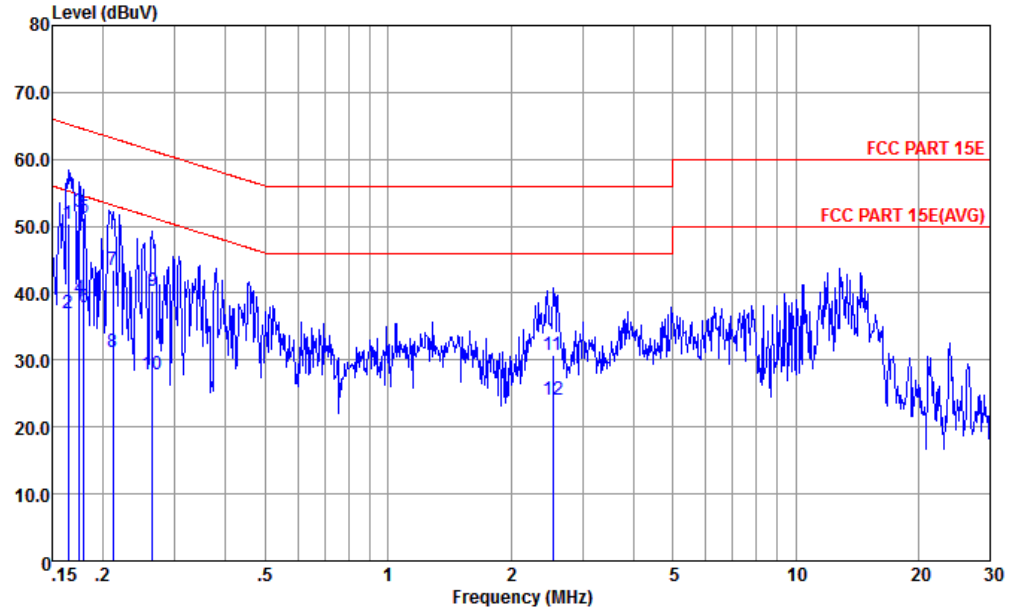
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	22~24℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	42~46%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WCDMA Band V Idle + WLAN Link(5G) + USB Cable (Charging from Adapter)		

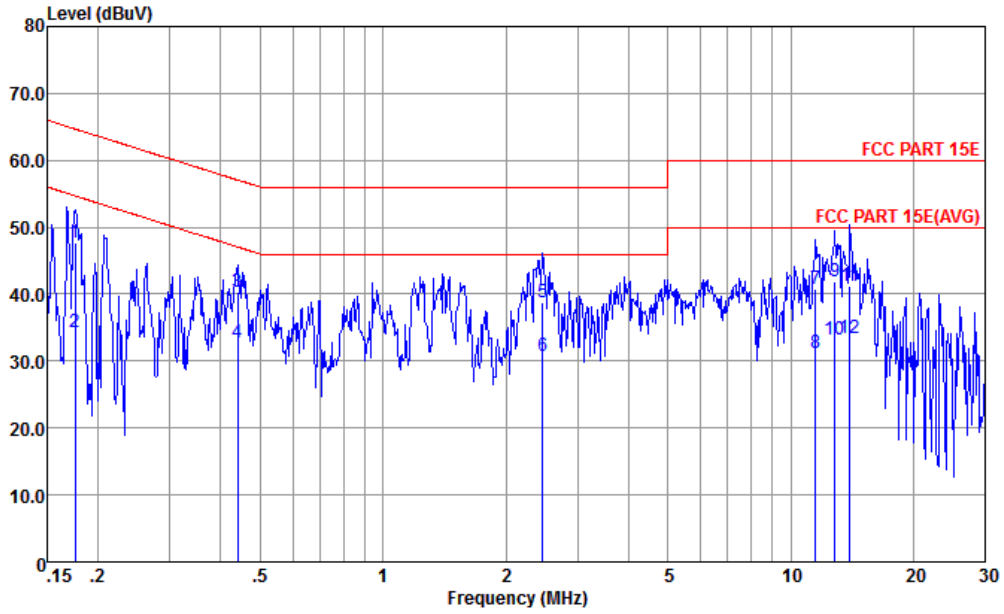


Site : CO01-KS
Condition : FCC PART 15E LISN-L-171013-060103 LINE

mode : Mode 1
: 867358030002319 #14

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.164	50.34	-14.91	65.25	39.60	0.17	10.57	QP
2		0.164	37.04	-18.21	55.25	26.30	0.17	10.57	Average
3	*	0.175	52.21	-12.51	64.72	41.50	0.18	10.53	QP
4		0.175	39.31	-15.41	54.72	28.60	0.18	10.53	Average
5		0.180	51.30	-13.20	64.50	40.59	0.19	10.52	QP
6		0.180	37.90	-16.60	54.50	27.19	0.19	10.52	Average
7		0.212	43.46	-19.68	63.14	32.81	0.20	10.45	QP
8		0.212	31.26	-21.88	53.14	20.61	0.20	10.45	Average
9		0.264	40.25	-21.04	61.29	29.59	0.22	10.44	QP
10		0.264	27.85	-23.44	51.29	17.19	0.22	10.44	Average
11		2.540	30.70	-25.30	56.00	20.20	0.30	10.20	QP
12		2.540	24.10	-21.90	46.00	13.60	0.30	10.20	Average

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	42~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN Link(5G) + USB Cable (Charging from Adapter)		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-171013-060103 NEUTRAL

mode : Mode 1
: 867358030002319 #14

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.176	47.61	-17.07	64.68	36.80	0.28	10.53	QP
2		0.176	34.41	-20.27	54.68	23.60	0.28	10.53	Average
3		0.440	40.25	-16.82	57.07	29.60	0.29	10.36	QP
4	*	0.440	32.85	-14.22	47.07	22.20	0.29	10.36	Average
5		2.461	38.72	-17.28	56.00	28.20	0.32	10.20	QP
6		2.461	30.82	-15.18	46.00	20.30	0.32	10.20	Average
7		11.498	40.83	-19.17	60.00	30.20	0.27	10.36	QP
8		11.498	31.23	-18.77	50.00	20.60	0.27	10.36	Average
9		12.852	41.83	-18.17	60.00	31.20	0.25	10.38	QP
10		12.852	33.23	-16.77	50.00	22.60	0.25	10.38	Average
11		13.989	41.22	-18.78	60.00	30.59	0.23	10.40	QP
12		13.989	33.52	-16.48	50.00	22.89	0.23	10.40	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

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

CDD modes

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	1.18	0.82	1.18	4.01	0.00	0.00

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

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. 08, 2017	Dec. 20, 2017~ Jan. 02, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Dec. 20, 2017~ Jan. 02, 2018	Jan. 19, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Dec. 20, 2017~ Jan. 02, 2018	Jan. 19, 2018	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 12, 2017	Dec. 20, 2017~ Jan. 02, 2018	Oct. 11, 2018	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 19, 2017	Dec. 20, 2017~ Jan. 01, 2018	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Dec. 20, 2017~ Jan. 01, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Dec. 20, 2017~ Jan. 01, 2018	Oct. 21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Dec. 20, 2017~ Jan. 01, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Dec. 20, 2017~ Jan. 01, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Dec. 20, 2017~ Jan. 01, 2018	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Dec. 20, 2017~ Jan. 01, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1GHz~18GHz	Apr. 18. 2017	Dec. 20, 2017~ Jan. 01, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-H G	1887435	18GHz~40GHz	Oct. 12, 2017	Dec. 20, 2017~ Jan. 01, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 20, 2017~ Jan. 01, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 20, 2017~ Jan. 01, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 20, 2017~ Jan. 01, 2018	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jan. 06, 2017	Dec. 26, 2017	Jan. 05, 2018	Conduction (CO01-KS)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Jan. 05, 2017	Dec. 26, 2017	Jan. 04, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103892	9kHz~30MHz	Jan. 05, 2017	Dec. 26, 2017	Jan. 04, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 19, 2017	Dec. 26, 2017	Jul. 18, 2018	Conduction (CO01-KS)
Pulse Limiter	SCHWARZBECK MESS-ELEKTRONIK	VTSD9561-FN	9561-F N00294	150kHz~30MHz	Oct. 18, 2017	Dec. 26, 2017	Oct. 17, 2018	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))	**2.3dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.6dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

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

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7dB**

Appendix A. Conducted Test Results

Report Number : FR7N1502B

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2017/12/20~2018/1/2	Relative Humidity:	51~55	%

Report Number : FR7N1502B

TEST RESULTS DATA
26dB and 99% OBW

Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	16.83		20.68		-		22.26			
11a	6Mbps	1	44	5220	16.83		20.63		-		22.26			
11a	6Mbps	1	48	5240	16.83		20.93		-		22.26			
HT20	MCS0	2	36	5180	17.73	17.73	21.38	21.18	-		22.49			
HT20	MCS0	2	44	5220	17.73	17.88	21.53	21.38	-		22.49			
HT20	MCS0	2	48	5240	17.73	17.83	21.53	21.38	-		22.49			
HT40	MCS0	2	38	5190	36.06	36.06	41.54	41.72	-		23.01			
HT40	MCS0	2	46	5230	36.16	35.96	41.81	41.90	-		23.01			
VHT80	MCS0	2	42	5210	74.81	74.81	82.16	81.68	-		23.01			

Report Number : FR7N1502B

TEST RESULTS DATA
Average Power Table

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.18	0.16	11.60	11.48		24.00	24.00	1.18	0.82		Pass
11a	6Mbps	1	44	5220	0.18	0.16	11.97	11.74		24.00	24.00	1.18	0.82		Pass
11a	6Mbps	1	48	5240	0.18	0.16	12.10	11.88		24.00	24.00	1.18	0.82		Pass
HT20	MCS0	2	36	5180	0.19	0.18	10.64	10.33	13.50	24.00		1.18			Pass
HT20	MCS0	2	44	5220	0.19	0.18	10.67	10.42	13.56	24.00		1.18			Pass
HT20	MCS0	2	48	5240	0.19	0.18	10.87	10.64	13.77	24.00		1.18			Pass
HT40	MCS0	2	38	5190	0.38	0.41	9.84	9.69	12.78	24.00		1.18			Pass
HT40	MCS0	2	46	5230	0.38	0.41	10.95	10.75	13.86	24.00		1.18			Pass
VHT20	MCS0	2	36	5180	0.19	0.22	8.81	8.40	11.62	24.00		1.18			Pass
VHT20	MCS0	2	44	5220	0.19	0.22	8.70	8.60	11.66	24.00		1.18			Pass
VHT20	MCS0	2	48	5240	0.19	0.22	8.87	8.86	11.88	24.00		1.18			Pass
VHT40	MCS0	2	38	5190	0.41	0.41	8.82	8.55	11.70	24.00		1.18			Pass
VHT40	MCS0	2	46	5230	0.41	0.41	8.96	8.89	11.94	24.00		1.18			Pass
VHT80	MCS0	2	42	5210	0.81	0.81	8.23	8.19	11.22	24.00		1.18			Pass

Report Number : FR7N1502B

TEST RESULTS DATA
Power Spectral Density

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.18	0.16	1.34			11.00	11.00	1.18	0.82		Pass
11a	6Mbps	1	44	5220	0.18	0.16	1.47			11.00	11.00	1.18	0.82		Pass
11a	6Mbps	1	48	5240	0.18	0.16	1.64			11.00	11.00	1.18	0.82		Pass
HT20	MCS0	2	36	5180	0.19	0.18			2.32	11.00		4.01			Pass
HT20	MCS0	2	44	5220	0.19	0.18			2.51	11.00		4.01			Pass
HT20	MCS0	2	48	5240	0.19	0.18			2.65	11.00		4.01			Pass
HT40	MCS0	2	38	5190	0.38	0.41			-1.36	11.00		4.01			Pass
HT40	MCS0	2	46	5230	0.38	0.41			-0.44	11.00		4.01			Pass
VHT80	MCS0	2	42	5210	0.81	0.81			-5.65	11.00		4.01			Pass

Report Number : FR7N1502B

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5179.950	-0.050	-9.65	50	3.85	
11a	6Mbps	1	36	5180	5180.025	0.025	4.83	-30	3.85	
11a	6Mbps	1	36	5180	5179.975	-0.025	-4.83	20	4.4	
11a	6Mbps	1	36	5180	5179.975	-0.025	-4.83	20	3.4	
11a	6Mbps	1	36	5180	5179.975	-0.025	-4.83	20	3.85	

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		5139.52	55.23	-18.77	74	44.66	35.39	11.88	36.7	100	62	P	H
		5117.12	43.55	-10.45	54	32.99	35.42	11.84	36.7	100	62	A	H
	*	5178	94.76	-	-	84.16	35.36	11.93	36.69	100	62	P	H
	*	5178	87.31	-	-	76.71	35.36	11.93	36.69	100	62	A	H
		5138.08	60.75	-13.25	74	50.18	35.41	11.86	36.7	333	78	P	V
		5149.92	45.85	-8.15	54	35.28	35.39	11.88	36.7	333	78	A	V
	*	5182	101.95	-	-	91.35	35.36	11.93	36.69	333	78	P	V
	*	5182	94.63	-	-	84.03	35.36	11.93	36.69	333	78	A	V
802.11a CH 44 5220MHz		5124.64	53.8	-20.2	74	43.23	35.41	11.86	36.7	100	66	P	H
		5110.24	43.5	-10.5	54	32.94	35.42	11.84	36.7	100	66	A	H
	*	5216	95.71	-	-	85.09	35.34	11.97	36.69	100	66	P	H
	*	5216	88.59	-	-	77.97	35.34	11.97	36.69	100	66	A	H
		5355.72	52.05	-21.95	74	41.38	35.23	12.13	36.69	100	66	P	H
		5387.76	42.5	-11.5	54	31.82	35.2	12.17	36.69	100	66	A	H
		5128.16	53.36	-20.64	74	42.79	35.41	11.86	36.7	360	84	P	V
		5100.16	43.67	-10.33	54	33.12	35.43	11.82	36.7	360	84	A	V
	*	5218	101.32	-	-	90.7	35.34	11.97	36.69	360	84	P	V
	*	5218	94.76	-	-	84.14	35.34	11.97	36.69	360	84	A	V
		5383.62	51.78	-22.22	74	41.1	35.2	12.17	36.69	360	84	P	V
		5382.54	42.5	-11.5	54	31.82	35.2	12.17	36.69	360	84	A	V

802.11a CH 48 5240MHz	*	5242	96.27	-	-	85.64	35.31	12.01	36.69	100	59	P	H
	*	5242	88.72	-	-	78.09	35.31	12.01	36.69	100	59	A	H
		5399.99	51.23	-22.77	74	40.54	35.19	12.19	36.69	100	59	P	H
		5399.28	42.59	-11.41	54	31.9	35.19	12.19	36.69	100	59	A	H
	*	5240	101.72	-	-	91.1	35.32	11.99	36.69	335	75	P	V
	*	5240	94.6	-	-	83.98	35.32	11.99	36.69	335	75	A	V
		5380.74	52.22	-21.78	74	41.54	35.2	12.17	36.69	335	75	P	V
		5397.12	42.52	-11.48	54	31.83	35.19	12.19	36.69	335	75	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a		10360	41.87	-32.13	74	54.97	37.4	15.65	66.15	300	360	P	H
CH 36 5180MHz		10360	41.07	-32.93	74	54.17	37.4	15.65	66.15	300	360	P	V
802.11a		10440	42.5	-31.5	74	54.4	38.52	15.68	66.1	100	360	P	H
CH 44 5220MHz		10440	43.47	-30.53	74	55.37	38.52	15.68	66.1	100	360	P	V
802.11a		10480	42.88	-31.12	74	55.73	37.52	15.7	66.07	300	80	P	H
CH 48 5240MHz		10480	42.32	-31.68	74	55.17	37.52	15.7	66.07	300	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 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz	!	5148.16	68.1	-5.9	74	57.53	35.39	11.88	36.7	385	320	P	H
	!	5149.99	49.41	-4.59	54	38.84	35.39	11.88	36.7	385	320	A	H
	*	5182	106.46	-	-	95.86	35.36	11.93	36.69	385	320	P	H
	*	5182	98.96	-	-	88.36	35.36	11.93	36.69	385	320	A	H
		5141.28	62.34	-11.66	74	51.77	35.39	11.88	36.7	100	344	P	V
		5149.76	47.77	-6.23	54	37.2	35.39	11.88	36.7	100	344	A	V
	*	5182	103.29	-	-	92.69	35.36	11.93	36.69	100	344	P	V
	*	5182	95.91	-	-	85.31	35.36	11.93	36.69	100	344	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	42.88	-31.12	74	54.91	38.47	15.65	66.15	300	0	P	H
		10360	42.56	-31.44	74	54.59	38.47	15.65	66.15	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 - 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	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)
		5149.6	64.83	-9.17	74	54.26	35.39	11.88	36.7	100	332	P	H
		5149.44	47.07	-6.93	54	36.5	35.39	11.88	36.7	100	332	A	H
802.11n	*	5184	103.88	-	-	93.28	35.36	11.93	36.69	100	332	P	H
HT20	*	5184	96.27	-	-	85.67	35.36	11.93	36.69	100	332	A	H
CH 36		5132	55.57	-18.43	74	45	35.41	11.86	36.7	100	205	P	V
5180MHz		5149.44	45.27	-8.73	54	34.7	35.39	11.88	36.7	100	205	A	V
	*	5176	101.61	-	-	91.01	35.36	11.93	36.69	100	205	P	V
	*	5176	94.29	-	-	83.69	35.36	11.93	36.69	100	205	A	V
		5141.28	54.27	-19.73	74	43.7	35.39	11.88	36.7	100	335	P	H
		5100.8	43.82	-10.18	54	33.27	35.43	11.82	36.7	100	335	A	H
	*	5216	103.75	-	-	93.13	35.34	11.97	36.69	100	335	P	H
	*	5216	95.34	-	-	84.72	35.34	11.97	36.69	100	335	A	H
802.11n		5388.48	51.66	-22.34	74	40.98	35.2	12.17	36.69	100	335	P	H
HT20		5391.54	42.78	-11.22	54	32.1	35.2	12.17	36.69	100	335	A	H
CH 44		5105.44	53.48	-20.52	74	42.93	35.43	11.82	36.7	100	204	P	V
5220MHz		5106.88	43.86	-10.14	54	33.3	35.42	11.84	36.7	100	204	A	V
	*	5218	101.8	-	-	91.18	35.34	11.97	36.69	100	204	P	V
	*	5218	95.01	-	-	84.39	35.34	11.97	36.69	100	204	A	V
		5392.44	51.97	-22.03	74	41.29	35.2	12.17	36.69	100	204	P	V
		5399.46	42.78	-11.22	54	32.09	35.19	12.19	36.69	100	204	A	V

	*	5244	103.4	-	-	92.77	35.31	12.01	36.69	100	332	P	H
	*	5244	95.71	-	-	85.08	35.31	12.01	36.69	100	332	A	H
802.11n		5369.58	51.64	-22.36	74	40.96	35.22	12.15	36.69	100	332	P	H
HT20		5386.86	42.91	-11.09	54	32.23	35.2	12.17	36.69	100	332	A	H
CH 48	*	5236	100.9	-	-	90.28	35.32	11.99	36.69	100	305	P	V
5240MHz	*	5236	94.08	-	-	83.46	35.32	11.99	36.69	100	305	A	V
		5377.86	52.31	-21.69	74	41.63	35.2	12.17	36.69	100	305	P	V
		5398.56	42.93	-11.07	54	32.24	35.19	12.19	36.69	100	305	A	V

Remark

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

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		10360	43.47	-30.53	74	55.5	38.47	15.65	66.15	300	360	P	H
HT20 CH 36 5180MHz		10360	43.43	-30.57	74	55.46	38.47	15.65	66.15	300	360	P	V
802.11n		10440	44.17	-29.83	74	56.07	38.52	15.68	66.1	300	360	P	H
HT20 CH 44 5220MHz		10440	43.34	-30.66	74	55.24	38.52	15.68	66.1	300	360	P	V
802.11n		10480	43.93	-30.07	74	55.74	38.56	15.7	66.07	300	360	P	H
HT20 CH 48 5240MHz		10480	43.24	-30.76	74	55.05	38.56	15.7	66.07	300	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 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5147.2	62.42	-11.58	74	51.85	35.39	11.88	36.7	100	336	P	H
	!	5149.99	53.09	-0.91	54	42.52	35.39	11.88	36.7	100	336	A	H
	*	5184	100.13	-	-	89.53	35.36	11.93	36.69	100	336	P	H
	*	5184	93.44	-	-	82.84	35.36	11.93	36.69	100	336	A	H
		5388.12	52.05	-21.95	74	41.37	35.2	12.17	36.69	100	336	P	H
		5396.58	43.41	-10.59	54	32.72	35.19	12.19	36.69	100	336	A	H
		5145.76	61.68	-12.32	74	51.11	35.39	11.88	36.7	301	78	P	V
	!	5149.99	51.98	-2.02	54	41.41	35.39	11.88	36.7	301	78	A	V
	*	5200	100.27	-	-	89.66	35.35	11.95	36.69	301	78	P	V
	*	5200	92.99	-	-	82.38	35.35	11.95	36.69	301	78	A	V
		5351.22	52.36	-21.64	74	41.69	35.23	12.13	36.69	301	78	P	V
		5361.3	43.15	-10.85	54	32.47	35.22	12.15	36.69	301	78	A	V
802.11n HT40 CH 46 5230MHz		5137.28	54.7	-19.3	74	44.13	35.41	11.86	36.7	100	342	P	H
		5101.92	44.45	-9.55	54	33.9	35.43	11.82	36.7	100	342	A	H
	*	5234	100.36	-	-	89.74	35.32	11.99	36.69	100	342	P	H
	*	5234	92.45	-	-	81.83	35.32	11.99	36.69	100	342	A	H
		5388.48	51.84	-22.16	74	41.16	35.2	12.17	36.69	100	342	P	H
		5386.86	43.09	-10.91	54	32.41	35.2	12.17	36.69	100	342	A	H
		5134.4	54	-20	74	43.43	35.41	11.86	36.7	334	16	P	V
		5103.68	44.7	-9.3	54	34.15	35.43	11.82	36.7	334	16	A	V
	*	5226	99.9	-	-	89.28	35.32	11.99	36.69	334	16	P	V
	*	5226	92.63	-	-	82.01	35.32	11.99	36.69	334	16	A	V
		5395.32	53.91	-20.09	74	43.22	35.19	12.19	36.69	334	16	P	V
		5350.68	43.35	-10.65	54	32.68	35.23	12.13	36.69	334	16	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	44.16	-29.84	74	56.16	38.48	15.66	66.14	300	360	P	H
		10380	42.61	-31.39	74	54.61	38.48	15.66	66.14	300	360	P	V
802.11n HT40 CH 46 5230MHz		10460	42.28	-31.72	74	54.15	38.53	15.69	66.09	300	360	P	H
		10460	41.59	-32.41	74	53.46	38.53	15.69	66.09	300	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+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5145.44	60.98	-13.02	74	50.41	35.39	11.88	36.7	100	249	P	H
	!	5148.32	52.51	-1.49	54	41.94	35.39	11.88	36.7	100	249	A	H
	*	5204	94.98	-	-	84.37	35.35	11.95	36.69	100	249	P	H
	*	5204	87.42	-	-	76.81	35.35	11.95	36.69	100	249	A	H
		5371.38	52.28	-21.72	74	41.6	35.22	12.15	36.69	100	249	P	H
		5356.08	43.33	-10.67	54	32.66	35.23	12.13	36.69	100	249	A	H
		5148.48	60.02	-13.98	74	49.45	35.39	11.88	36.7	286	82	P	V
	!	5147.84	51.26	-2.74	54	40.69	35.39	11.88	36.7	286	82	A	V
	*	5224	95.19	-	-	84.57	35.34	11.97	36.69	286	82	P	V
	*	5224	88.06	-	-	77.44	35.34	11.97	36.69	286	82	A	V
		5352.84	54.23	-19.77	74	43.56	35.23	12.13	36.69	286	82	P	V
		5354.28	43.8	-10.2	54	33.13	35.23	12.13	36.69	286	82	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)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		10420	41.93	-32.07	74	53.87	38.51	15.67	66.12	300	360	P	H
VHT80 CH 42 5210MHz		10420	41.92	-32.08	74	53.86	38.51	15.67	66.12	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		36.79	25.48	-14.52	40	32.15	24.7	0.89	32.26	-	-	P	H
		59.1	24.42	-15.58	40	41.2	14.32	1.11	32.21	-	-	P	H
		86.26	26.34	-13.66	40	40.65	16.62	1.31	32.24	150	195	P	H
		189.08	26.69	-16.81	43.5	39.82	17.11	2.02	32.26	-	-	P	H
		702.21	28.54	-17.46	46	28.25	27.95	4.02	31.68	-	-	P	H
		923.37	29.67	-16.33	46	27.46	29	4.62	31.41	-	-	P	H
		36.79	33.98	-6.02	40	40.65	24.7	0.89	32.26	120	252	P	V
		47.46	29.74	-10.26	40	43.27	17.7	1.03	32.26	-	-	P	V
		79.47	27.09	-12.91	40	42.65	15.4	1.3	32.26	-	-	P	V
		106.63	25.78	-17.72	43.5	37.78	18.8	1.47	32.27	-	-	P	V
		189.08	22.29	-21.21	43.5	35.42	17.11	2.02	32.26	-	-	P	V
		323.91	24.46	-21.54	46	33.05	20.61	2.88	32.08	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **not under limit 6dB**.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b 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)

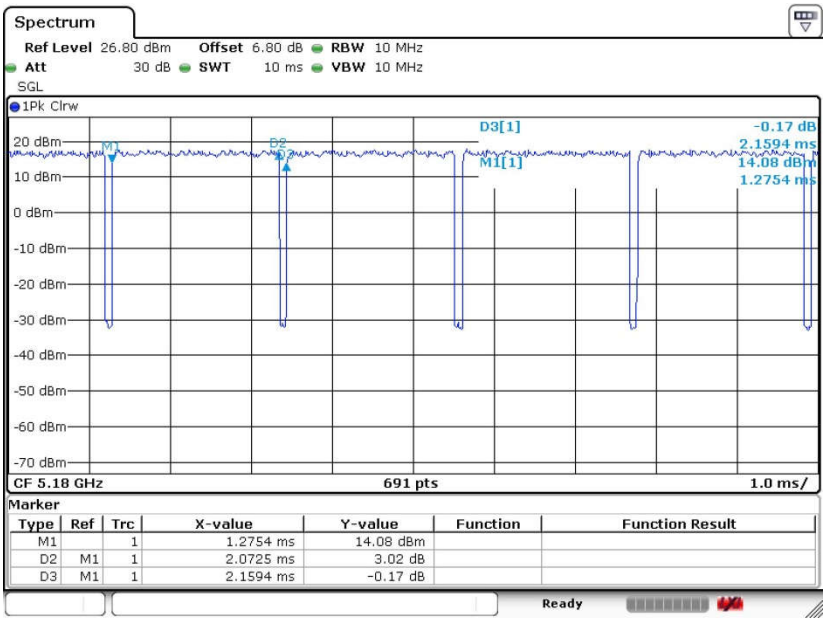
= -10.46(dB)

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

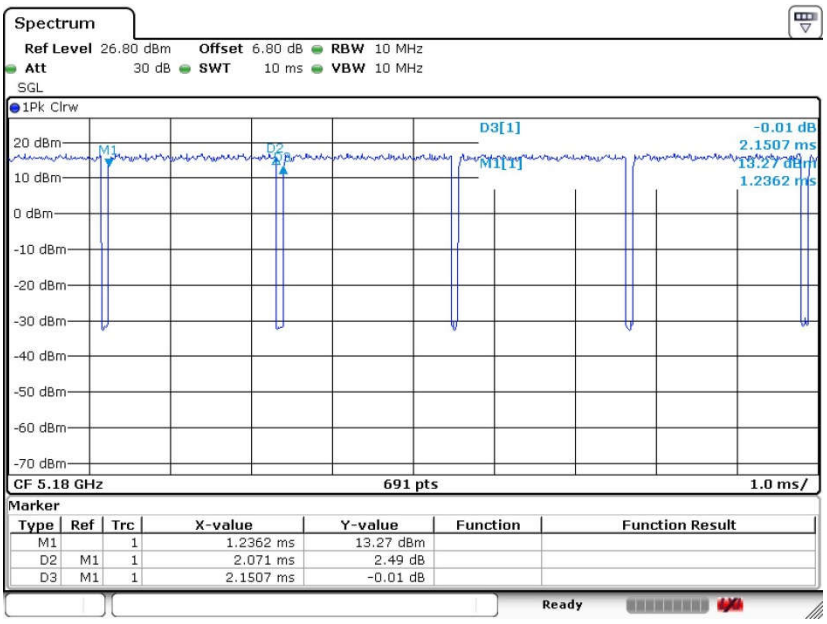
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a	95.98	2.073	0.483	1kHz
2	802.11a	96.29	2.071	0.483	1kHz
1+2	802.11n HT20	96.03	1.926	0.519	1kHz
1+2	802.11n HT40	91.61	0.949	1.053	3kHz
1+2	802.11ac VHT80	83.07	0.462	2.163	3kHz

802.11a Ant.1

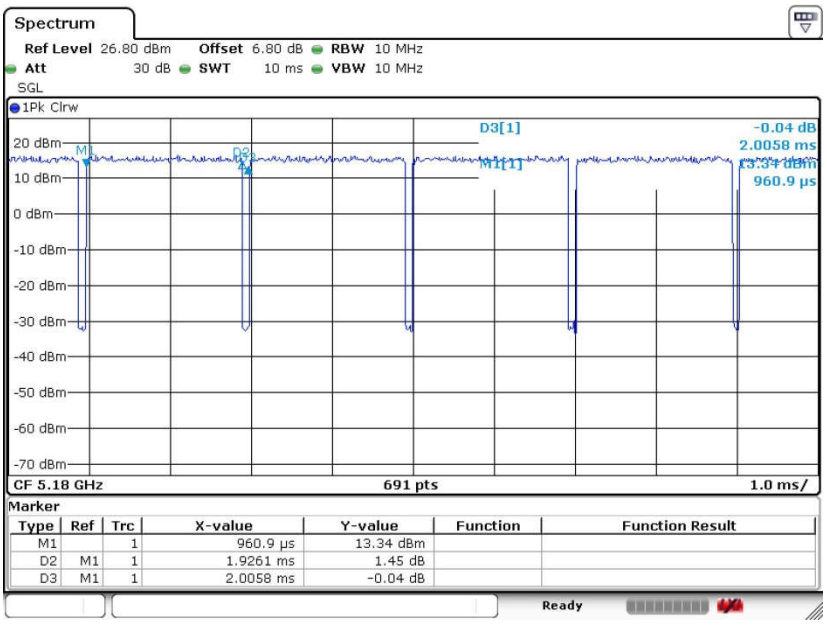


802.11a Ant.2



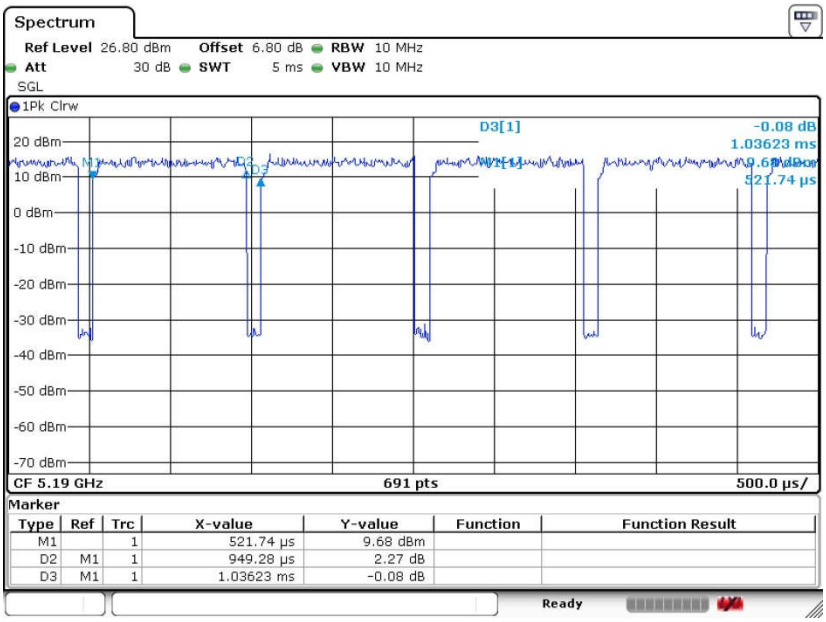
Date: 20.DEC.2017 19:57:36

802.11n HT20 Ant.1+2



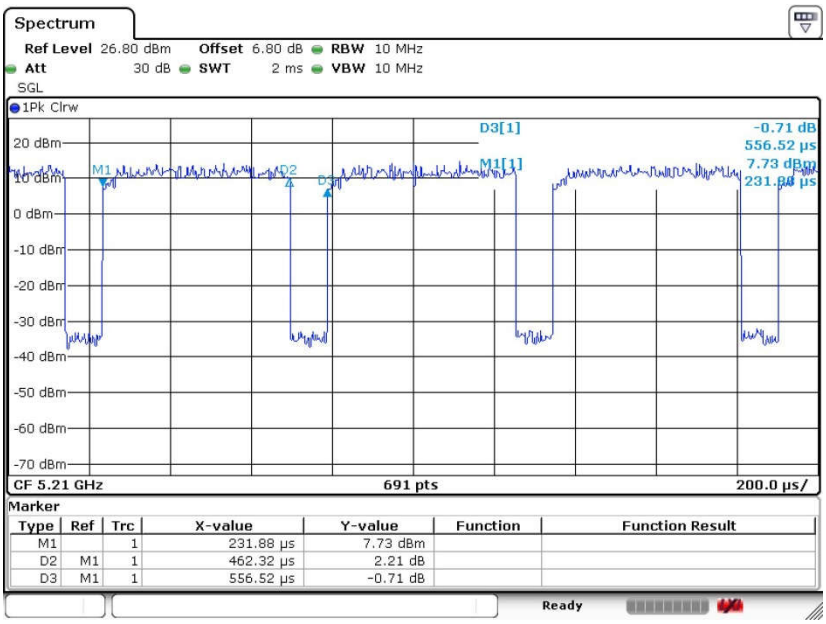
Date: 20.DEC.2017 19:56:47

802.11n HT40 Ant.1+2



Date: 20.DEC.2017 19:49:46

802.11ac VHT80 Ant.1+2



Date: 20.DEC.2017 19:52:16