FCC RF Test Report

APPLICANT	:	**Lenovo(Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Portable Tablet Computer**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**Lenovo TB-8304F**
FCC ID	:	**O57TB8304F**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Jan. 09, 2018 and testing was completed on Mar. 01, 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

Approved by: James Huang / Manager

NVLAP®
TESTING
NVLAP LAB CODE 600155-0

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR810906E	Rev. 01	Initial issue of report	Mar. 09, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 3.09 dB at 47.460 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.27 dB at 0.369 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Lenovo(Shanghai) Electronics Technology Co., Ltd.
NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

1.2 Manufacturer

Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo TB-8304F
FCC ID	O57TB8304F
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.1 LE/Bluetooth v4.2 LE
HW Version	Lenovo Tablet TB-8304F
SW Version	TB-8304F_RF01_180102
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

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	802.11a : 13.66 dBm / 0.0232 W 802.11n HT20 : 13.35 dBm / 0.0216 W 802.11n HT40 : 13.56 dBm / 0.0227 W
99% Occupied Bandwidth	802.11a : 17.73 MHz 802.11n HT20 : 18.33 MHz 802.11n HT40 : 36.36 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	IFA Antenna with gain -1.50 dBi

1.5 Component List

There are two samples under test, the differences of two samples are shown in the table below.

Based on the similarity of two samples, only choose sample 1 to perform full test.

Object	Sample 1	Sample 2
LPDDR3 EMCP	NANYA: NT6CL256T32CQ-H1	LEAHKINN: KPN055ES3-Zia1
EMMC	Samsung: KLMAG1JETD-B041003	SanDisk: SDINADF4-16G-H
PCB	CEE: A525c_MainboardPCB	Huashen:A525c_Mainboard PCB
Battery	Sunwoda: 1001000045501	SCUD: R5700000028
speakerBox1	Xichundz: ZA2060AAA601USAA_Speaker Box_1511_FPC_Xichundz	Keysound: ZA2060AAA601USAA_Speaker Box_1511_FPC_Keysound
LCM	TXD: TXDT800CXPA-36	Starry: 2081080BH8021006-51F
Camera_Back	JSL: HS6283A1D-0P0J0	JSL: HS6283A1D-0P0J0
Camera_Front	C&T: V20672 V0	Brodsands: B02SF0319

1.6 Modification of EUT

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

1.7 Testing Location

Sporton International (Kunshan) Inc. 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	CO01-KS	03CH03-KS	630927

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

1.8 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules 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 and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	-	-	165	5825

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

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
802.11n HT40	MCS0

AC Conducted Emission	Mode 1 : **Bluetooth Link + WLAN Link (5G) + USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 for Sample 1** Mode 2 : Bluetooth Link + WLAN Link (5G) + USB Cable 2(Charging from Adapter 2) + Earphone + Battery 2 for Sample 2

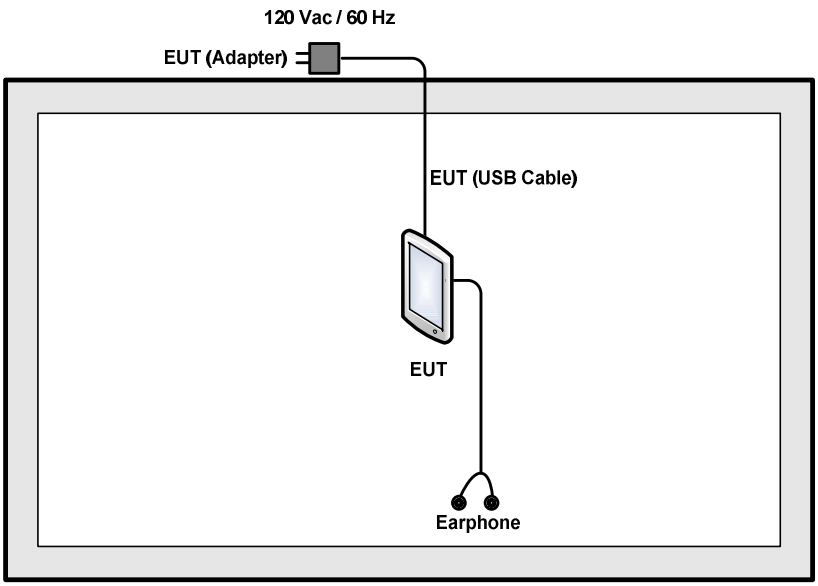
Remark:

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

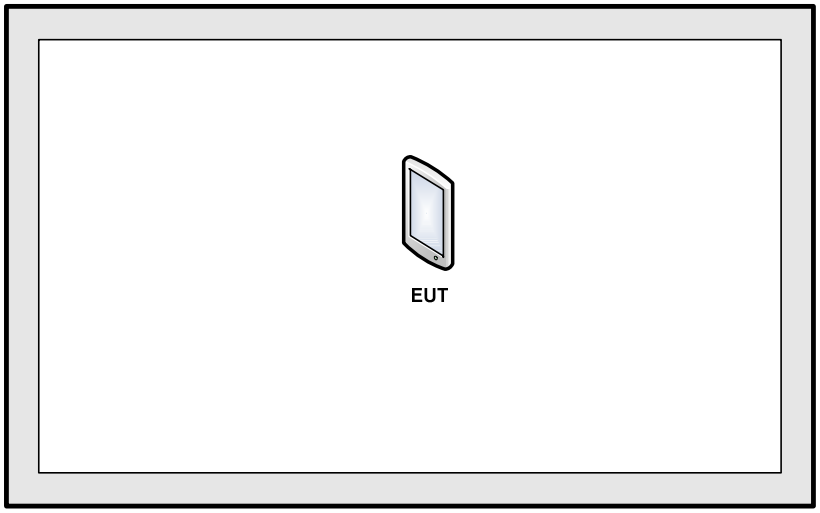
Ch. #		Band IV：5745-5825 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

2.3 Connection Diagram of Test System

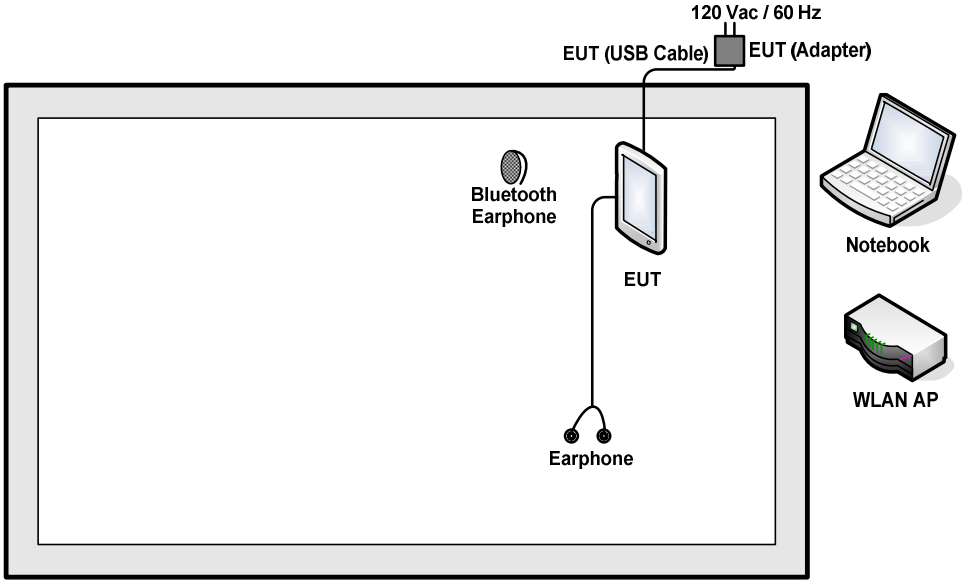
<WLAN 802.11a/n HT40 Tx Mode>



<WLAN 802.11n HT20 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.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
2.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
4.	Earphone	Lenovo	P121	N/A	N/A	Unshielded,1.2m
5.	SD Card	Kingston	8GB	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 6.9 dB.

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

= 6.9 (dB)

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

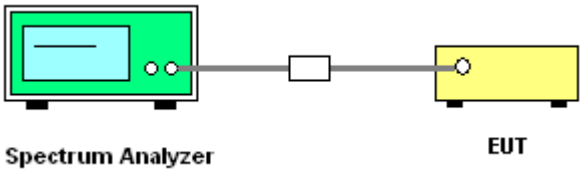
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

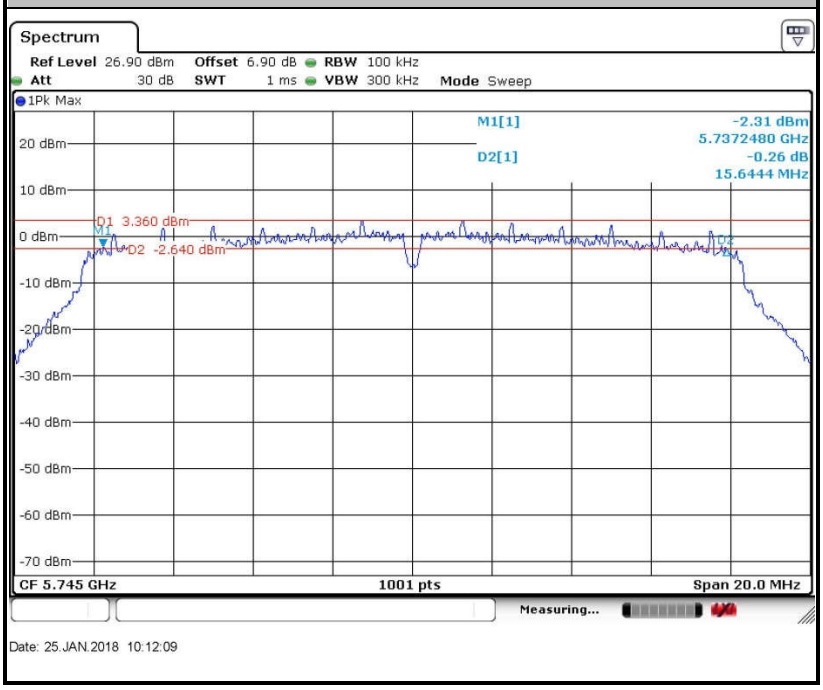
3.1.4 Test Setup



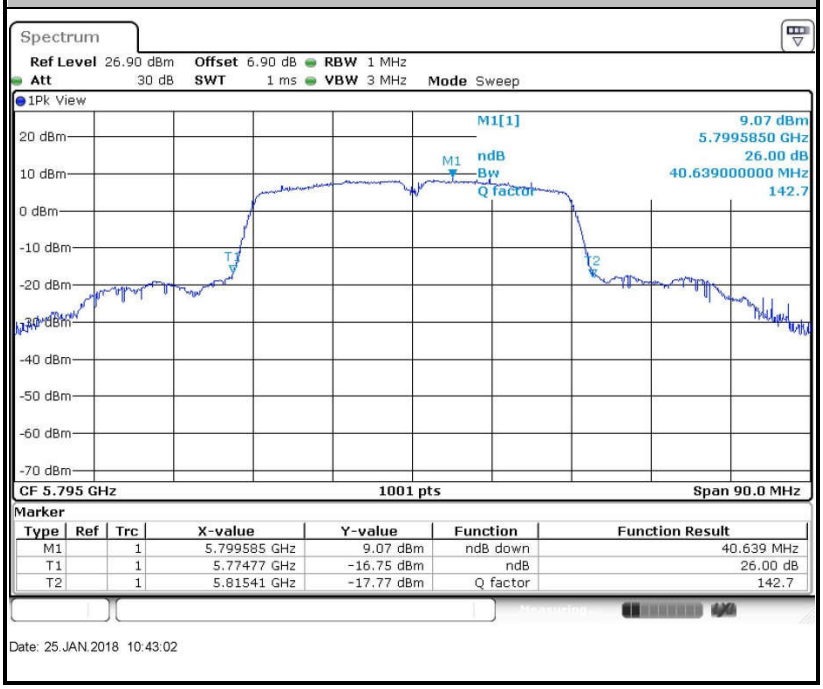
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

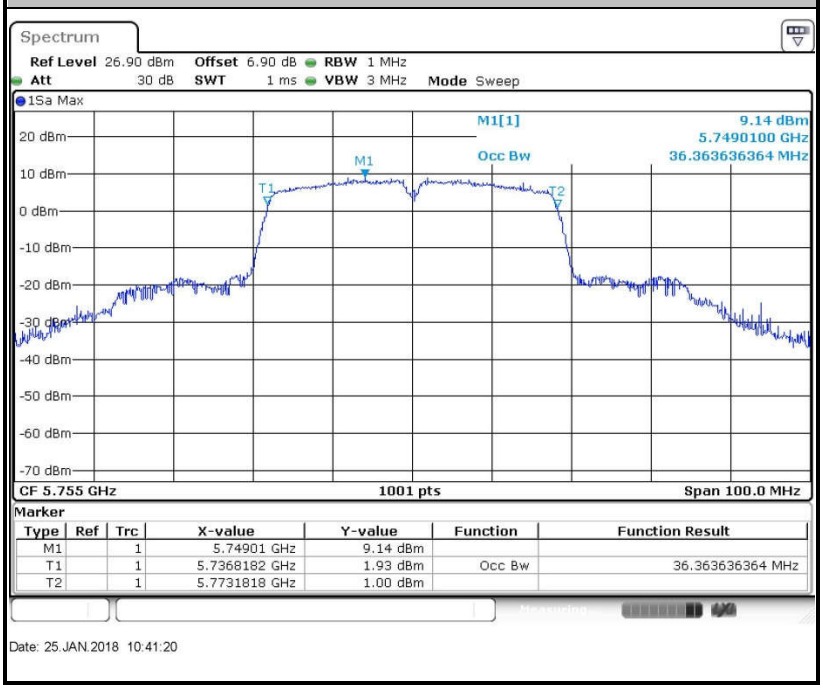
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

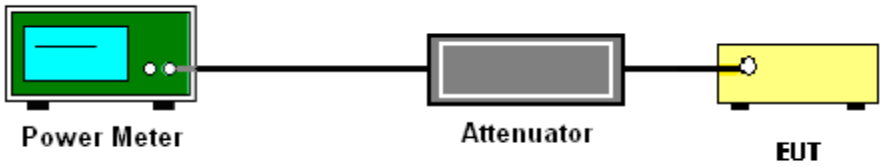
3.2.3 Test Procedures

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

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

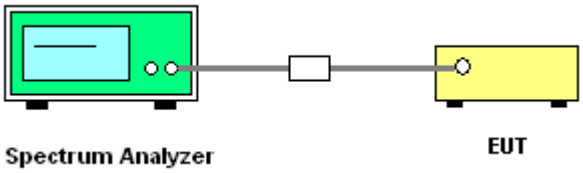
 # Method SA-2 #

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

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

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

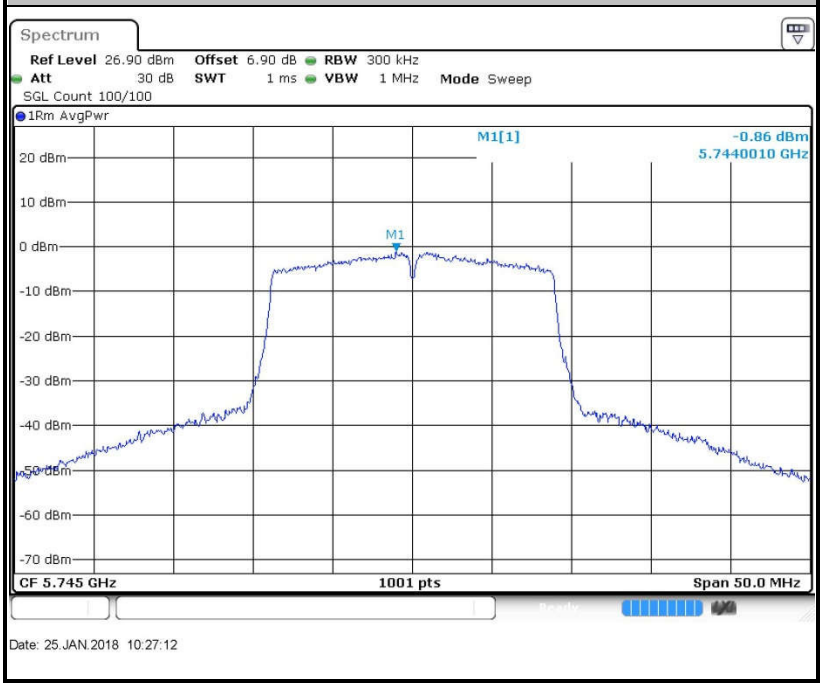
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

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

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

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

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

(3) KDB789033 D02 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

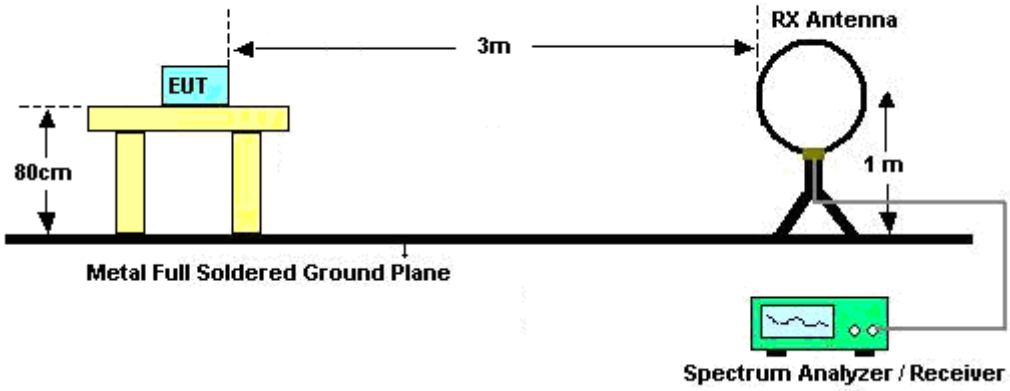
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

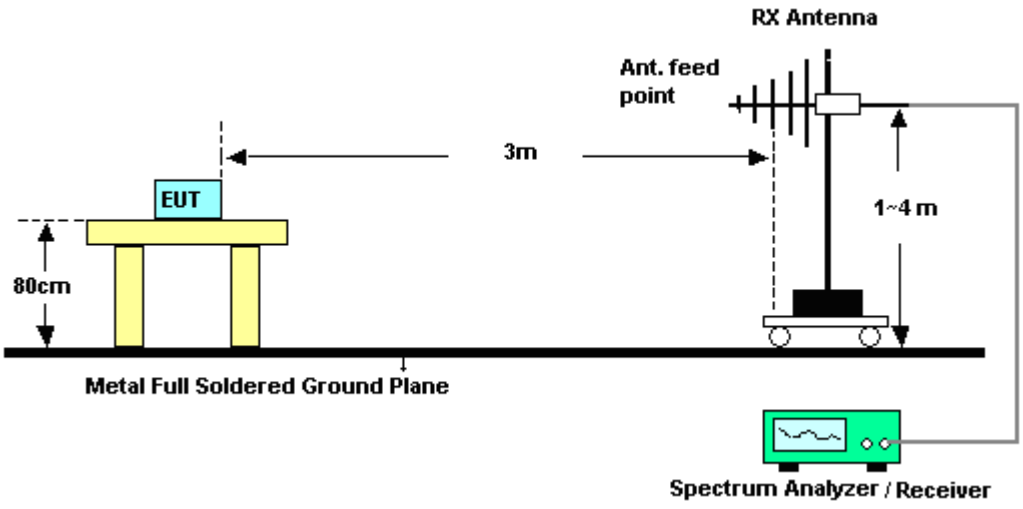
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

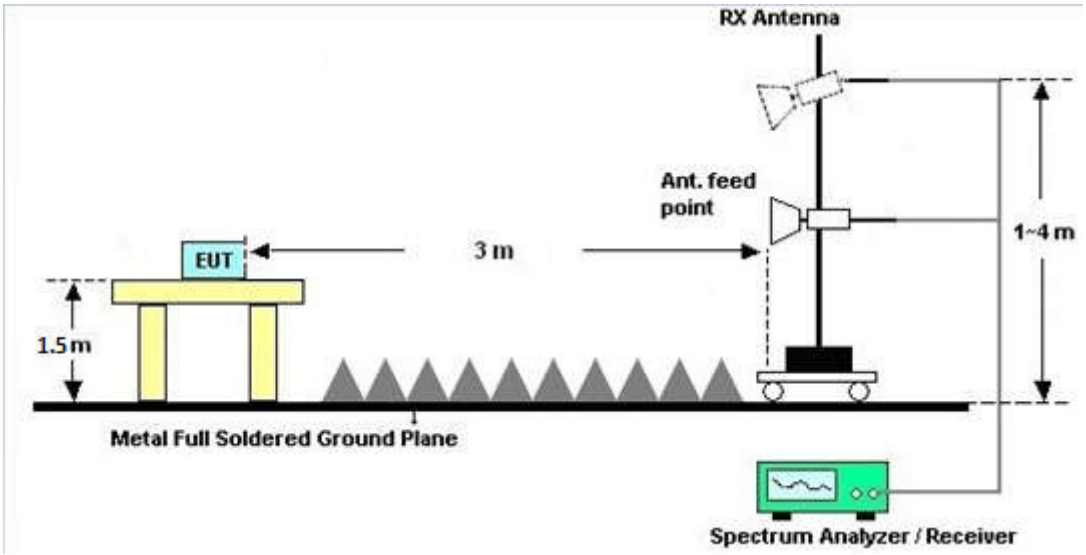
For radiated emissions below 30MHz



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 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 (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

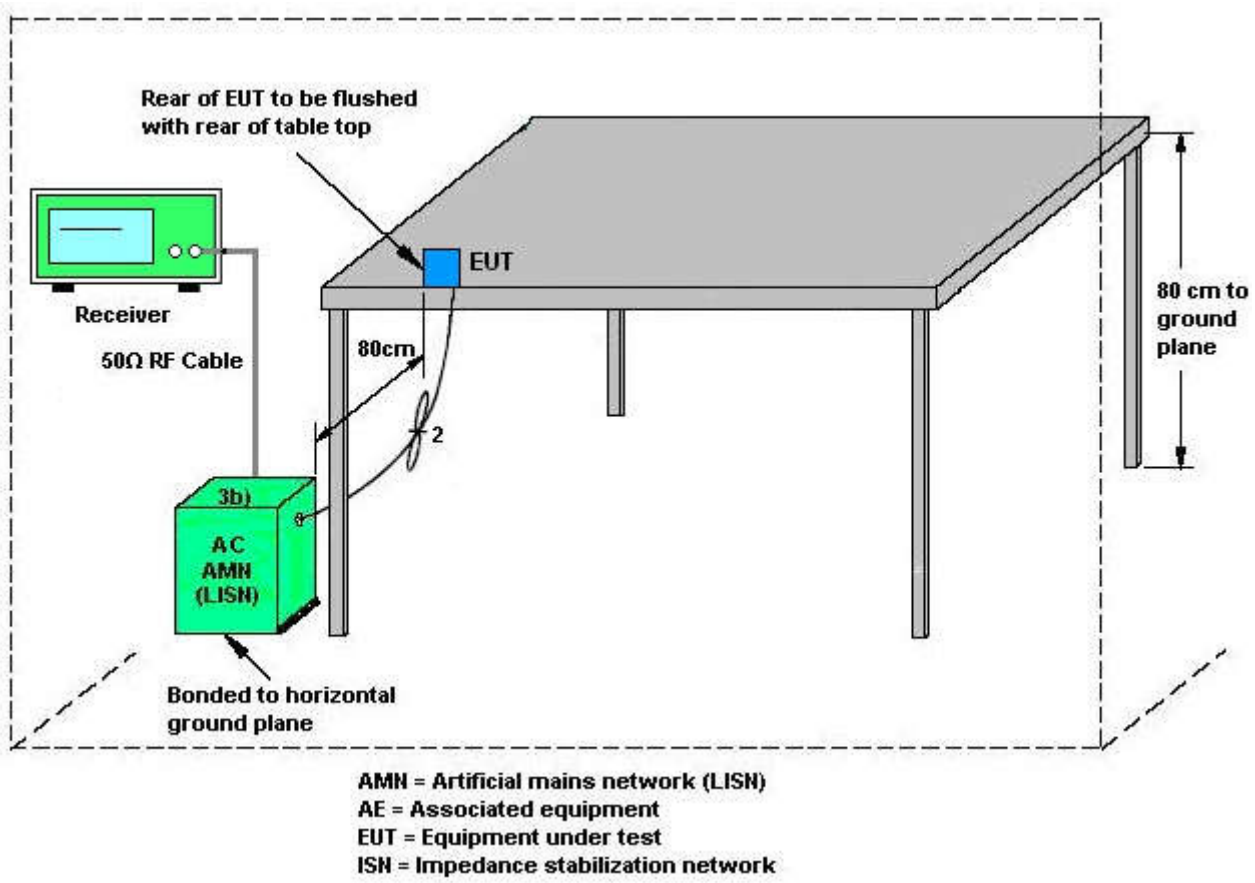
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

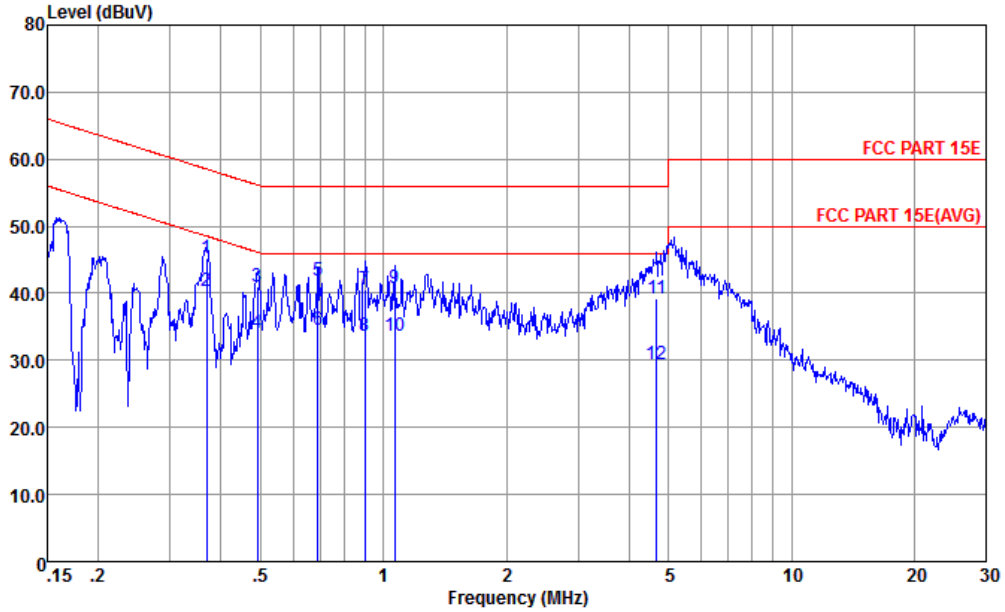
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

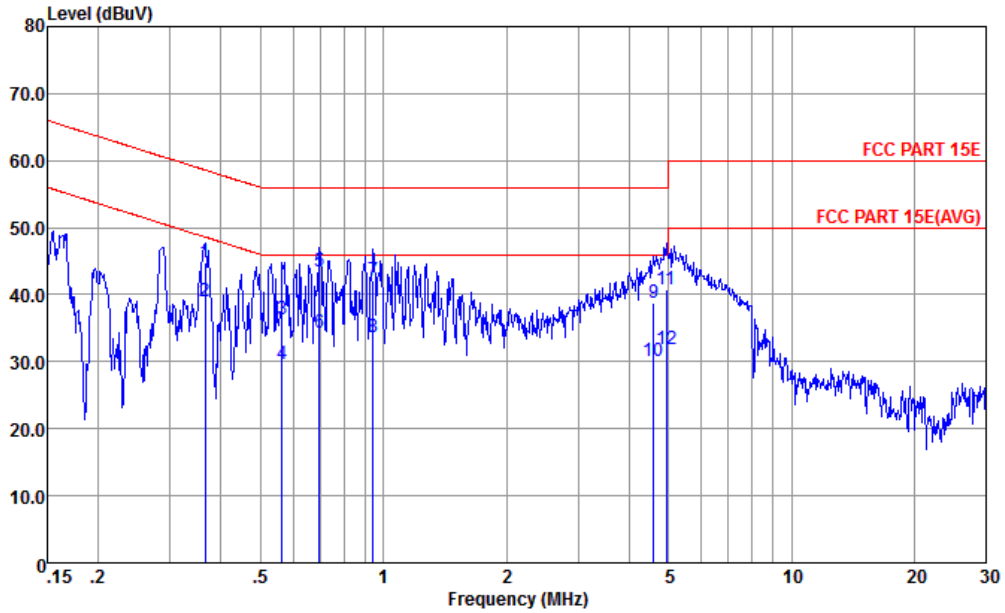
Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	42~44%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN Link (5G) + USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 for Sample 1		



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.369	45.15	-13.37	58.52	34.50	0.24	10.41	QP
2 *	0.369	40.25	-8.27	48.52	29.60	0.24	10.41	Average
3	0.491	41.07	-15.07	56.14	30.50	0.26	10.31	QP
4	0.491	34.17	-11.97	46.14	23.60	0.26	10.31	Average
5	0.690	41.93	-14.07	56.00	31.50	0.26	10.17	QP
6	0.690	34.63	-11.37	46.00	24.20	0.26	10.17	Average
7	0.899	40.57	-15.43	56.00	30.20	0.26	10.11	QP
8	0.899	33.57	-12.43	46.00	23.20	0.26	10.11	Average
9	1.065	40.88	-15.12	56.00	30.50	0.26	10.12	QP
10	1.065	33.68	-12.32	46.00	23.30	0.26	10.12	Average
11	4.672	39.18	-16.82	56.00	28.61	0.36	10.21	QP
12	4.672	29.48	-16.52	46.00	18.91	0.36	10.21	Average

Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	42~44%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Bluetooth Link + WLAN Link (5G) + USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1 for Sample 1		



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

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.365	44.90	-13.71	58.61	34.20	0.29	10.41	QP
2	*	0.365	39.00	-9.61	48.61	28.30	0.29	10.41	Average
3		0.564	36.35	-19.65	56.00	25.80	0.29	10.26	QP
4		0.564	29.75	-16.25	46.00	19.20	0.29	10.26	Average
5		0.697	43.36	-12.64	56.00	32.90	0.30	10.16	QP
6		0.697	34.36	-11.64	46.00	23.90	0.30	10.16	Average
7		0.943	42.01	-13.99	56.00	31.59	0.31	10.11	QP
8		0.943	33.61	-12.39	46.00	23.19	0.31	10.11	Average
9		4.598	38.75	-17.25	56.00	28.20	0.34	10.21	QP
10		4.598	30.15	-15.85	46.00	19.60	0.34	10.21	Average
11		4.926	40.77	-15.23	56.00	30.20	0.34	10.23	QP
12		4.926	31.77	-14.23	46.00	21.20	0.34	10.23	Average

3.6 Automatically Discontinue Transmission

3.6.1 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.

3.6.2 Measuring Instruments

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

3.6.3 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.

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 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. 08, 2017	Jan. 25, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Jan. 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Jan. 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 19, 2017	Mar. 01, 2018	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Mar. 01, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Mar. 01, 2018	Oct.21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Mar. 01, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Mar. 01, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Com-Power	AH-840	101070	18GHz~40GHz	Dec. 06. 2017	Mar. 01, 2018	Dec. 05. 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Mar. 01, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 12, 2017	Mar. 01, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1GHz~18GHz	Apr. 18. 2017	Mar. 01, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Mar. 01, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 01, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 01, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 01, 2018	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 20, 2017	Feb. 28, 2018	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Feb. 28, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Feb. 28, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Feb. 28, 2018	Oct. 11, 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))	2.3 dB

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))	4.5dB

Appendix A. Conducted Test Results

Report Number : FR810906E

Test Engineer:	Slient Hai	Temperature:	21~25	°C
Test Date:	2018/1/25	Relative Humidity:	51~55	%

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

Band IV									
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.73	20.63	15.64	0.5	Pass
11a	6Mbps	1	157	5785	17.73	20.63	15.66	0.5	Pass
11a	6Mbps	1	165	5825	17.68	20.63	15.80	0.5	Pass
HT20	MCS 0	1	149	5745	18.33	21.33	15.66	0.5	Pass
HT20	MCS 0	1	157	5785	18.33	21.33	16.38	0.5	Pass
HT20	MCS 0	1	165	5825	18.28	21.03	17.04	0.5	Pass
HT40	MCS 0	1	151	5755	36.36	40.55	35.12	0.5	Pass
HT40	MCS 0	1	159	5795	36.36	40.64	35.13	0.5	Pass

Report Number : FR810906E

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.11	13.60	30.00	2.47		Pass
11a	6Mbps	1	157	5785	0.11	13.66	30.00	2.47		Pass
11a	6Mbps	1	165	5825	0.11	13.32	30.00	2.47		Pass
HT20	MCS 0	1	149	5745	0.12	13.25	30.00	2.47		Pass
HT20	MCS 0	1	157	5785	0.12	13.27	30.00	2.47		Pass
HT20	MCS 0	1	165	5825	0.12	13.35	30.00	2.47		Pass
HT40	MCS 0	1	151	5755	0.24	13.39	30.00	2.47		Pass
HT40	MCS 0	1	159	5795	0.24	13.56	30.00	2.47		Pass

Report Number : FR810906E

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.11	2.22	1.18	30.00	2.47	Pass
11a	6Mbps	1	157	5785	0.11	2.22	1.21	30.00	2.47	Pass
11a	6Mbps	1	165	5825	0.11	2.22	1.20	30.00	2.47	Pass
HT20	MCS 0	1	149	5745	0.12	2.22	1.48	30.00	2.47	Pass
HT20	MCS 0	1	157	5785	0.12	2.22	0.84	30.00	2.47	Pass
HT20	MCS 0	1	165	5825	0.12	2.22	0.87	30.00	2.47	Pass
HT40	MCS 0	1	151	5755	0.24	2.22	-2.34	30.00	2.47	Pass
HT40	MCS 0	1	159	5795	0.24	2.22	-2.42	30.00	2.47	Pass

Appendix B. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5630.4	52.76	-15.54	68.3	42.37	35.01	8.56	33.18	148	108	P	H
		5675.2	54.69	-32.3	86.99	44.32	34.97	8.57	33.17	148	108	P	H
		5720	55.2	-55.7	110.9	44.87	34.92	8.58	33.17	148	108	P	H
		5724.8	62.19	-59.65	121.84	51.86	34.92	8.58	33.17	148	108	P	H
		5744	103.26	-	-	92.93	34.91	8.59	33.17	148	108	P	H
		5744	96.03	-	-	85.7	34.91	8.59	33.17	148	108	A	H
		5624.4	52.3	-16	68.3	41.91	35.01	8.56	33.18	294	59	P	V
		5699.2	53.18	-51.53	104.71	42.83	34.95	8.57	33.17	294	59	P	V
		5714.4	53.42	-55.91	109.33	43.07	34.94	8.58	33.17	294	59	P	V
		5724.8	58.1	-63.74	121.84	47.77	34.92	8.58	33.17	294	59	P	V
		5744	100.8	-	-	90.47	34.91	8.59	33.17	294	59	P	V
		5744	93.54	-	-	83.21	34.91	8.59	33.17	294	59	A	V

WIFI	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 157 5785MHz		5632	52.17	-16.13	68.3	41.78	35.01	8.56	33.18	143	110	P	H
		5693.6	53.19	-47.39	100.58	42.84	34.95	8.57	33.17	143	110	P	H
		5704.4	52.47	-54.06	106.53	42.12	34.94	8.58	33.17	143	110	P	H
		5723.2	52.88	-65.32	118.2	42.55	34.92	8.58	33.17	143	110	P	H
		5850.4	52.4	-68.99	121.39	42.14	34.82	8.61	33.17	143	110	P	H
		5856.8	52.84	-57.56	110.4	42.59	34.8	8.62	33.17	143	110	P	H
		5889.2	52.04	-42.72	94.76	41.79	34.8	8.63	33.18	143	110	P	H
		5929.6	51.54	-16.76	68.3	41.29	34.81	8.64	33.2	143	110	P	H
		5784	103.49	-	-	93.18	34.88	8.6	33.17	143	110	P	H
		5784	95.37	-	-	85.06	34.88	8.6	33.17	143	110	A	H
		5632	52.16	-16.14	68.3	41.77	35.01	8.56	33.18	298	56	P	V
		5675.6	52.95	-34.33	87.28	42.58	34.97	8.57	33.17	298	56	P	V
		5711.2	52.85	-55.59	108.44	42.5	34.94	8.58	33.17	298	56	P	V
		5720.8	52.81	-59.91	112.72	42.48	34.92	8.58	33.17	298	56	P	V
		5852.4	51.68	-65.15	116.83	41.42	34.82	8.61	33.17	298	56	P	V
		5872.8	52.9	-53.02	105.92	42.66	34.8	8.62	33.18	298	56	P	V
		5880	51.84	-49.75	101.59	41.6	34.8	8.62	33.18	298	56	P	V
		5976.8	52.31	-15.99	68.3	42.08	34.81	8.65	33.23	298	56	P	V
		5786	101.44	-	-	91.15	34.86	8.6	33.17	298	56	P	V
		5786	93.38	-	-	83.09	34.86	8.6	33.17	298	56	A	V

WIFI	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 165 5825MHz		5852	53.6	-64.14	117.74	43.34	34.82	8.61	33.17	143	112	P	H
		5855.6	53.43	-57.3	110.73	43.18	34.8	8.62	33.17	143	112	P	H
		5884.8	52.75	-45.27	98.02	42.51	34.8	8.62	33.18	143	112	P	H
		5998	52.11	-16.19	68.3	41.86	34.82	8.66	33.23	143	112	P	H
		5824	102.34	-	-	92.07	34.83	8.61	33.17	143	112	P	H
		5824	94.2	-	-	83.93	34.83	8.61	33.17	143	112	A	H
		5854.4	52.96	-59.31	112.27	42.71	34.8	8.62	33.17	288	55	P	V
		5870	52.63	-54.07	106.7	42.38	34.8	8.62	33.17	288	55	P	V
		5875.6	53.05	-51.8	104.85	42.81	34.8	8.62	33.18	288	55	P	V
		5933.2	52.76	-15.54	68.3	42.51	34.81	8.64	33.2	288	55	P	V
		5824	102.57	-	-	92.3	34.83	8.61	33.17	288	55	P	V
		5824	93.72	-	-	83.45	34.83	8.61	33.17	288	55	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI	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 149 5745MHz		11490	44.9	-29.1	74	55.28	39.29	12.91	62.58	100	360	P	H
		11490	45.02	-28.98	74	55.4	39.29	12.91	62.58	100	360	P	V
802.11a CH 157 5785MHz		11570	44.56	-29.44	74	55.05	39.37	12.84	62.7	100	360	P	H
		11570	45	-29	74	55.49	39.37	12.84	62.7	100	360	P	V
802.11a CH 165 5825MHz		11650	46.17	-27.83	74	56.79	39.44	12.78	62.84	100	360	P	H
		11650	45.92	-28.08	74	56.54	39.44	12.78	62.84	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5640.8	54.22	-14.08	68.3	43.83	35	8.56	33.17	140	120	P	H
		5696	54.15	-48.2	102.35	43.8	34.95	8.57	33.17	140	120	P	H
		5714.8	54.14	-55.31	109.45	43.79	34.94	8.58	33.17	140	120	P	H
		5724.8	67.84	-54	121.84	57.51	34.92	8.58	33.17	140	120	P	H
		5748	104.33	-	-	94	34.91	8.59	33.17	140	120	P	H
		5748	97.45	-	-	87.12	34.91	8.59	33.17	140	120	A	H
		5632.8	52.16	-16.14	68.3	41.77	35	8.56	33.17	100	321	P	V
		5689.6	53.45	-44.18	97.63	43.1	34.95	8.57	33.17	100	321	P	V
		5719.2	54.81	-55.87	110.68	44.48	34.92	8.58	33.17	100	321	P	V
		5723.2	60.25	-57.95	118.2	49.92	34.92	8.58	33.17	100	321	P	V
		5748	100.64	-	-	90.31	34.91	8.59	33.17	100	321	P	V
		5748	92.77	-	-	82.44	34.91	8.59	33.17	100	321	A	V

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5632.8	53.22	-15.08	68.3	42.83	35	8.56	33.17	128	126	P	H
		5693.6	52.33	-48.25	100.58	41.98	34.95	8.57	33.17	128	126	P	H
		5714.4	53.82	-55.51	109.33	43.47	34.94	8.58	33.17	128	126	P	H
		5724.4	54.77	-66.16	120.93	44.44	34.92	8.58	33.17	128	126	P	H
		5852.4	53.06	-63.77	116.83	42.8	34.82	8.61	33.17	128	126	P	H
		5864.8	53.79	-54.36	108.15	43.54	34.8	8.62	33.17	128	126	P	H
		5892.4	52.4	-39.99	92.39	42.15	34.8	8.63	33.18	128	126	P	H
		5943.2	52.39	-15.91	68.3	42.15	34.81	8.64	33.21	128	126	P	H
		5784	104.36	-	-	94.05	34.88	8.6	33.17	128	126	P	H
		5784	96.66	-	-	86.35	34.88	8.6	33.17	128	126	A	H
		5630.8	52.21	-16.09	68.3	41.82	35.01	8.56	33.18	100	316	P	V
		5695.6	52.62	-49.44	102.06	42.27	34.95	8.57	33.17	100	316	P	V
		5719.6	52.77	-58.02	110.79	42.44	34.92	8.58	33.17	100	316	P	V
		5721.2	52.39	-61.25	113.64	42.06	34.92	8.58	33.17	100	316	P	V
		5852.4	51.35	-65.48	116.83	41.09	34.82	8.61	33.17	100	316	P	V
		5871.2	51.99	-54.37	106.36	41.75	34.8	8.62	33.18	100	316	P	V
		5888	52.15	-43.5	95.65	41.9	34.8	8.63	33.18	100	316	P	V
		5938.8	52.65	-15.65	68.3	42.41	34.81	8.64	33.21	100	316	P	V
		5784	100.17	-	-	89.86	34.88	8.6	33.17	100	316	P	V
		5784	92.7	-	-	82.39	34.88	8.6	33.17	100	316	A	V

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz		5850	55.25	-67.05	122.3	44.99	34.82	8.61	33.17	120	126	P	H
		5866.8	54.57	-53.02	107.59	44.32	34.8	8.62	33.17	120	126	P	H
		5893.2	55.96	-35.84	91.8	45.71	34.8	8.63	33.18	120	126	P	H
		5938.8	52.62	-15.68	68.3	42.38	34.81	8.64	33.21	120	126	P	H
		5824	104.78	-	-	94.51	34.83	8.61	33.17	120	126	P	H
		5824	97.11	-	-	86.84	34.83	8.61	33.17	120	126	A	H
		5854.8	52.27	-59.09	111.36	42.02	34.8	8.62	33.17	100	324	P	V
		5864	53.1	-55.28	108.38	42.85	34.8	8.62	33.17	100	324	P	V
		5907.2	52.76	-28.68	81.44	42.51	34.81	8.63	33.19	100	324	P	V
		5940.8	52.22	-16.08	68.3	41.98	34.81	8.64	33.21	100	324	P	V
		5826	100.11	-	-	89.84	34.83	8.61	33.17	100	324	P	V
		5826	92.17	-	-	81.9	34.83	8.61	33.17	100	324	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	46.43	-27.57	74	56.81	39.29	12.91	62.58	100	360	P	H
		11490	46.12	-27.88	74	56.5	39.29	12.91	62.58	100	360	P	V
802.11n HT20 CH 157 5785MHz		11570	46.32	-27.68	74	56.81	39.37	12.84	62.7	100	360	P	H
		11570	48.03	-25.97	74	58.52	39.37	12.84	62.7	100	360	P	V
802.11n HT20 CH 165 5825MHz		11650	45.48	-28.52	74	56.1	39.44	12.78	62.84	100	360	P	H
		11650	46.58	-27.42	74	57.2	39.44	12.78	62.84	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	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 151 5755MHz		5648.4	52.57	-15.73	68.3	42.18	35	8.56	33.17	100	87	P	H
		5700	54.82	-50.48	105.3	44.47	34.95	8.57	33.17	100	87	P	H
		5719.2	69.5	-41.18	110.68	59.17	34.92	8.58	33.17	100	87	P	H
		5724	73.01	-47.01	120.02	62.68	34.92	8.58	33.17	100	87	P	H
		5853.6	52.59	-61.5	114.09	42.34	34.8	8.62	33.17	100	87	P	H
		5856.8	53.76	-56.64	110.4	43.51	34.8	8.62	33.17	100	87	P	H
		5884.8	53.06	-44.96	98.02	42.82	34.8	8.62	33.18	100	87	P	H
		5949.2	53.55	-14.75	68.3	43.31	34.81	8.64	33.21	100	87	P	H
		5748	102.89	-	-	92.56	34.91	8.59	33.17	100	87	P	H
		5748	94.55	-	-	84.22	34.91	8.59	33.17	100	87	A	H
		5611.2	52.88	-15.42	68.3	42.48	35.03	8.55	33.18	100	322	P	V
		5698.4	52.82	-51.3	104.12	42.47	34.95	8.57	33.17	100	322	P	V
		5720	63.66	-47.24	110.9	53.33	34.92	8.58	33.17	100	322	P	V
		5722.8	70.01	-47.27	117.28	59.68	34.92	8.58	33.17	100	322	P	V
		5854.8	52.01	-59.35	111.36	41.76	34.8	8.62	33.17	100	322	P	V
		5862.4	52.52	-56.31	108.83	42.27	34.8	8.62	33.17	100	322	P	V
		5902.8	51.65	-33.04	84.69	41.4	34.8	8.63	33.18	100	322	P	V
		5927.6	52.08	-16.22	68.3	41.83	34.81	8.64	33.2	100	322	P	V
		5762	98.6	-	-	88.29	34.89	8.59	33.17	100	322	P	V
		5762	90.46	-	-	80.15	34.89	8.59	33.17	100	322	A	V

WIFI	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 159 5795MHz		5638.4	52.4	-15.9	68.3	42.01	35	8.56	33.17	100	87	P	H
		5693.6	53.12	-47.46	100.58	42.77	34.95	8.57	33.17	100	87	P	H
		5704.8	53.84	-52.81	106.65	43.49	34.94	8.58	33.17	100	87	P	H
		5724.4	53.23	-67.7	120.93	42.9	34.92	8.58	33.17	100	87	P	H
		5852	53.26	-64.48	117.74	43	34.82	8.61	33.17	100	87	P	H
		5866	54.38	-53.44	107.82	44.13	34.8	8.62	33.17	100	87	P	H
		5877.2	53.45	-50.22	103.67	43.21	34.8	8.62	33.18	100	87	P	H
		5965.2	53.02	-15.28	68.3	42.78	34.81	8.65	33.22	100	87	P	H
		5792	102.69	-	-	92.4	34.86	8.6	33.17	100	87	P	H
		5792	94.46	-	-	84.17	34.86	8.6	33.17	100	87	A	H
		5602	51.85	-16.45	68.3	41.45	35.03	8.55	33.18	100	316	P	V
		5653.2	52.56	-18.12	70.68	42.18	34.98	8.57	33.17	100	316	P	V
		5718	51.87	-58.47	110.34	41.54	34.92	8.58	33.17	100	316	P	V
		5720.4	51.63	-60.18	111.81	41.3	34.92	8.58	33.17	100	316	P	V
		5853.2	54.05	-60.95	115	43.79	34.82	8.61	33.17	100	316	P	V
		5863.2	53.37	-55.23	108.6	43.12	34.8	8.62	33.17	100	316	P	V
		5884.8	52.9	-45.12	98.02	42.66	34.8	8.62	33.18	100	316	P	V
		5965.2	52.01	-16.29	68.3	41.77	34.81	8.65	33.22	100	316	P	V
		5802	98.3	-	-	88.01	34.86	8.6	33.17	100	316	P	V
		5802	90.09	-	-	79.8	34.86	8.6	33.17	100	316	A	V

Remark

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

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	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 151 5755MHz		11510	45.99	-28.01	74	56.35	39.3	12.9	62.56	100	360	P	H
		11510	46.87	-27.13	74	57.23	39.3	12.9	62.56	100	360	P	V
802.11n HT40 CH 159 5795MHz		11590	46.39	-27.61	74	56.92	39.39	12.82	62.74	100	360	P	H
		11590	47.04	-26.96	74	57.57	39.39	12.82	62.74	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF @ 3m)

WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		30	26.02	-13.98	40	30.25	26.3	0.57	31.1	100	36	P	H
		74.62	24.5	-15.5	40	40.38	14.6	0.92	31.4	-	-	P	H
		116.33	23.57	-19.93	43.5	35.5	17.64	1.2	30.77	-	-	P	H
		182.29	24.09	-19.41	43.5	37.4	16.26	1.46	31.03	-	-	P	H
		234.67	23.75	-22.25	46	36.04	17.22	1.66	31.17	-	-	P	H
		519.85	24.67	-21.33	46	29.33	24.37	2.53	31.56	-	-	P	H
	!	32.91	36.75	-3.25	40	42.56	24.62	0.61	31.04	-	-	P	V
	!	47.46	36.91	-3.09	40	51.22	16.4	0.74	31.45	100	52	P	V
		70.74	30.11	-9.89	40	46.9	13.72	0.89	31.4	-	-	P	V
		95.96	31.39	-12.11	43.5	43.7	17.4	1.07	30.78	-	-	P	V
		179.38	22.76	-20.74	43.5	35.97	16.36	1.45	31.02	-	-	P	V
		650.8	27.93	-18.07	46	29.34	26.31	2.89	30.61	-	-	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.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

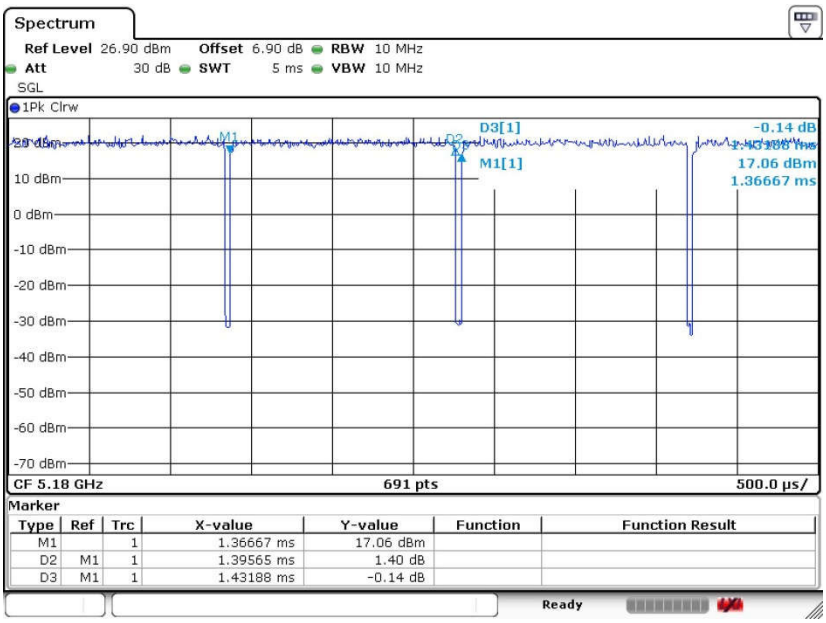
= -10.46(dB)

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

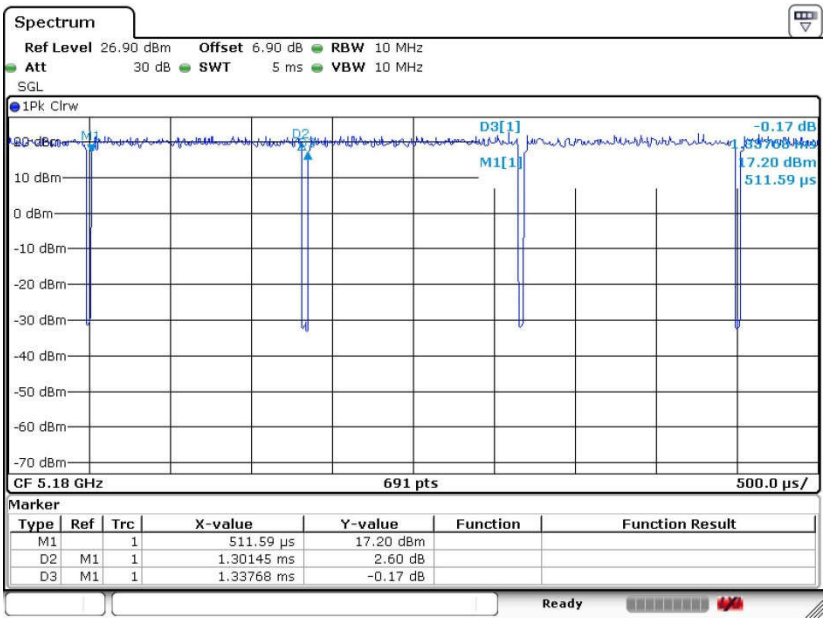
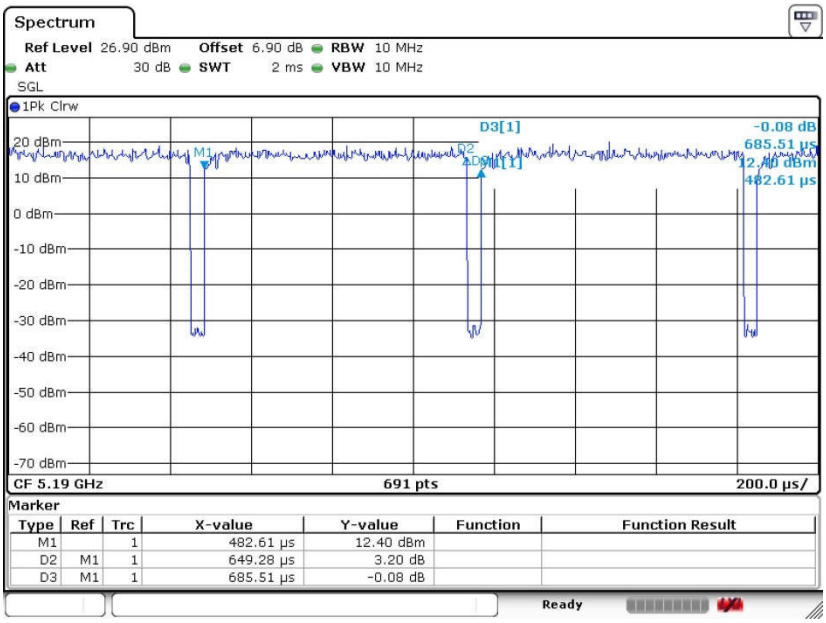
Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	97.47	1.396	0.717	1 kHz
802.11n HT20	97.29	1.301	0.768	1 kHz
802.11n HT40	94.71	0.649	1.540	3 kHz

802.11a



802.11n HT20



802.11n HT40