FCC RF Test Report

APPLICANT	:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT	:	Portable Tablet Computer
BRAND NAME	:	Lenovo
MODEL NAME	:	Lenovo YT-X705L, Lenovo YT-X705X
FCC ID	:	O57YTX705L
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on May 09, 2019 and testing was completed on Jul. 04, 2019. 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.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED Cert #5145.02

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR950901E	Rev. 01	Initial issue of report	Jul. 15, 2019

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 14.48 dB at 5958.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 9.43 dB at 1.197 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.
Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo YT-X705L, Lenovo YT-X705X
FCC ID	O57YTX705L
EUT supports Radios application	GSM/WCDMA/LTE WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE FM Receiver/GNSS
IMEI Code	Conducted: 865913040007682 Conduction: 868521040050334 Radiation:N/A
HW Version	Lenovo Tablet YT-X705L for Data, Lenovo Tablet YT-X705X for Voice
SW Version	YT-X705L_RF01_190516 for Data, YT-X705X_RF01_190516 for Voice
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT, the one type of EUT (model name, Lenovo YT-X705L) has four samples, the other type of EUT (model name, Lenovo YT-X705X) has four samples, the difference could be referred to the product equality declaration which is exhibit separately. According to the difference, we choose the EUT (Model name, Lenovo YT-X705X) to full test.
3. For the EUT (Model name, Lenovo YT-X705X), the sample 1/2 only the differences for memory capacity, the sample 3/4 has different suppliers of memory, the details refer to the product equality declaration which is exhibit separately. So we choose sample 1 to full test.

1.3 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	**<5745 MHz ~ 5825 MHz>** 802.11a : 15.12 dBm / 0.0325 W 802.11n HT20 : 15.14 dBm / 0.0327 W 802.11n HT40 : 15.23 dBm / 0.0333 W 802.11ac VHT20: 15.02 dBm / 0.0318 W 802.11ac VHT40: 14.08 dBm / 0.0256 W 802.11ac VHT80: 13.98 dBm / 0.0250 W
99% Occupied Bandwidth	**<5745 MHz ~ 5825 MHz>** 802.11a : 18.78 MHz 802.11n HT20 : 19.43 MHz 802.11n HT40 : 36.86 MHz 802.11ac VHT80 : 74.57 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	IFA Antenna with gain 1.10 dBi

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n HT20/HT40 by referring to their maximum conducted power.

1.4 Modification of EUT

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

1.5 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH05-KS TH01-KS	CN1257	314309

1.6 Applicable Standards

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

- 47 CFR 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

a. 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: conduction emission (150 kHz to 30 MHz), radiation 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 (X plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

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

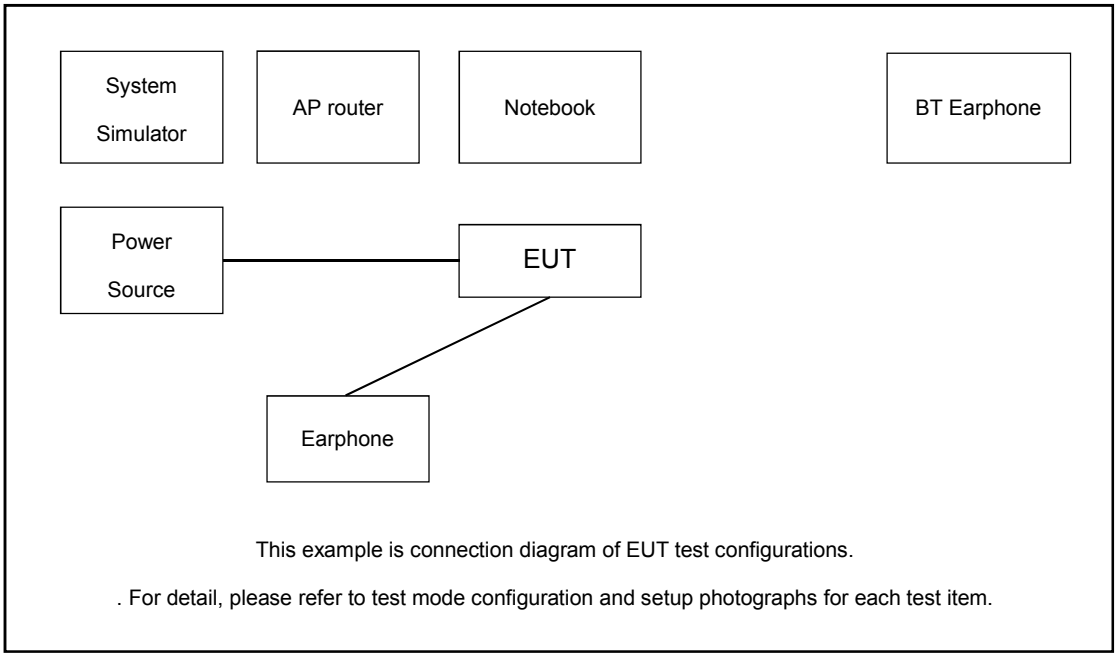
Final test modes are considering the modulation and worse data rates as below table.

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

AC Conducted Emission	Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable 1(Charging from Adapter 1) + Earphone 1
Remark: For Radiated Test Cases, The tests were performance with Adapter 1, Earphone 1 and USB Cable 1	

Ch. #		Band IV：5725-5850 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

2.3 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
5.	Earphone	Lenovo	P121	N/A	N/A	Unshielded,1.2m
6.	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 7.6 dB

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

= 7.6 (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.

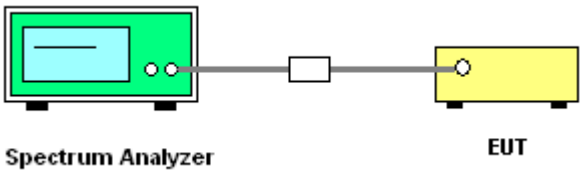
3.1.2 Measuring Instruments

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.

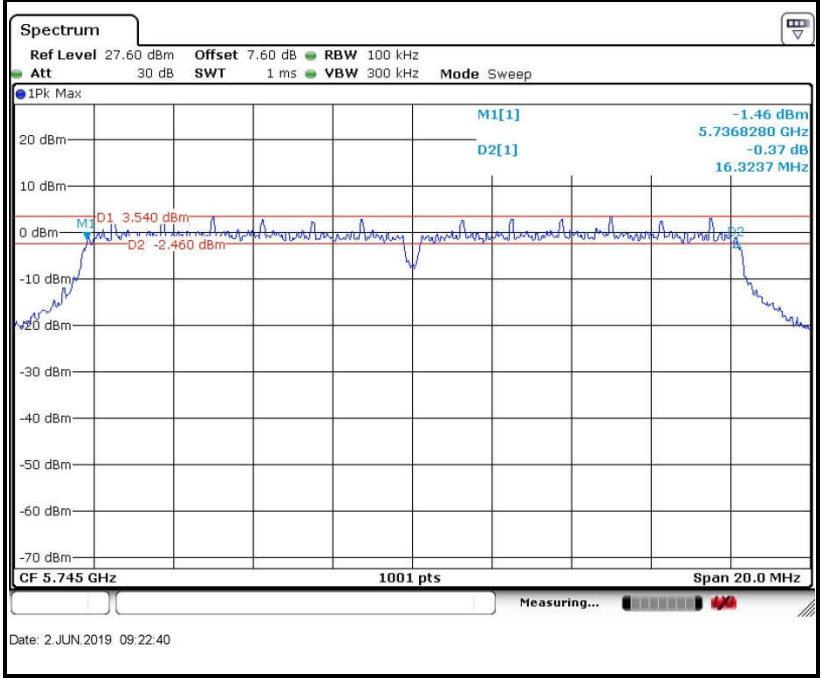
3.1.4 Test Setup



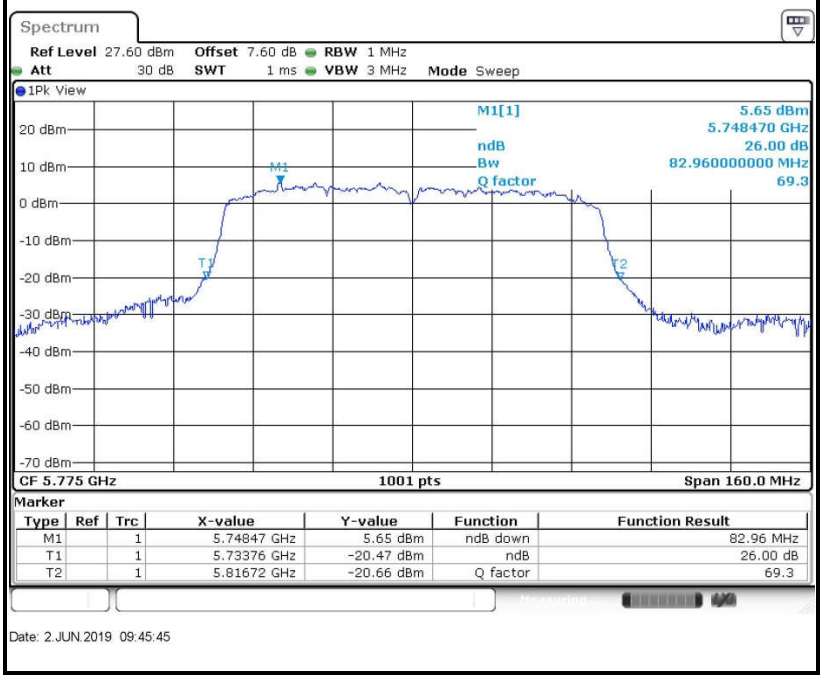
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

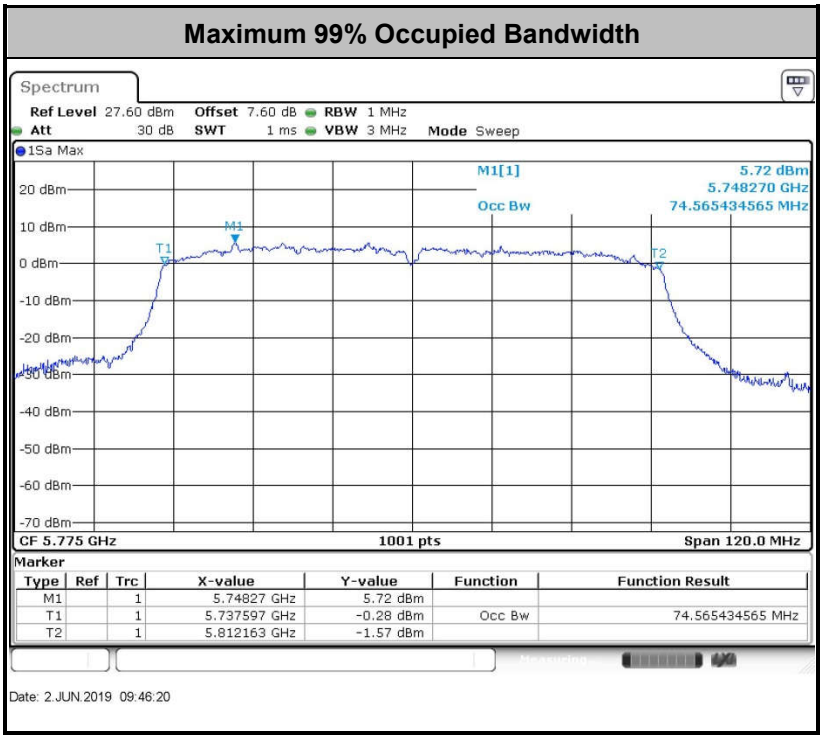
Minimum 6dB Bandwidth



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.

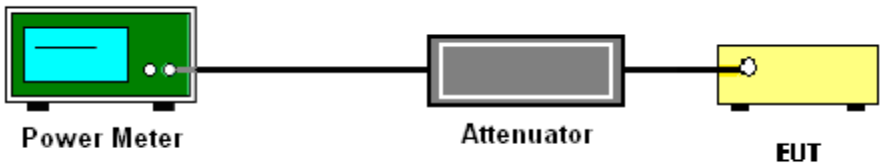
3.2.3 Test Procedures

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.

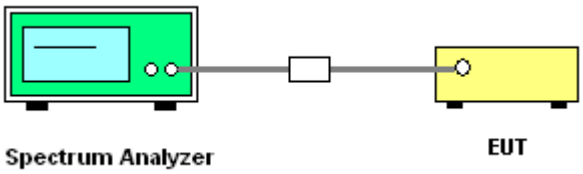
 # Method SA-2 #

(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.

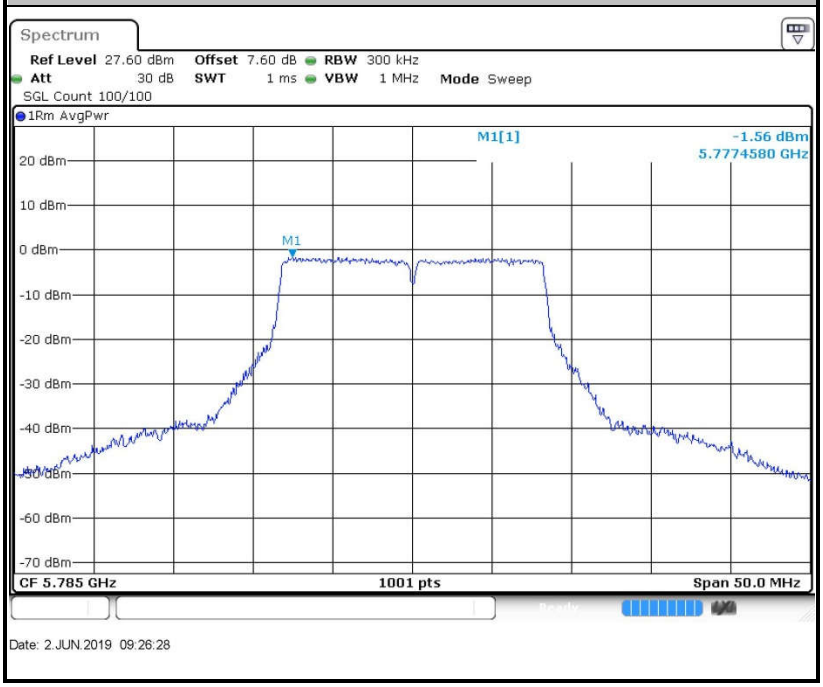
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



3.4 Unwanted Emissions 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 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 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

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.2

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

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m

d_{Meas} is the measurement distance, in m

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.

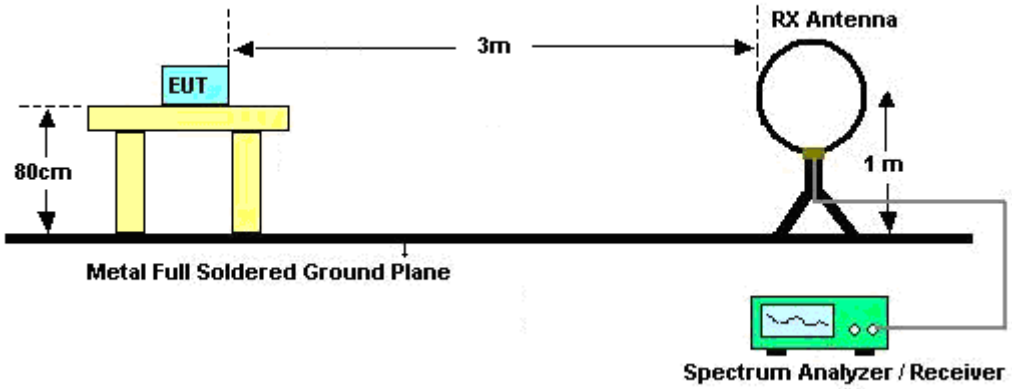
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (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

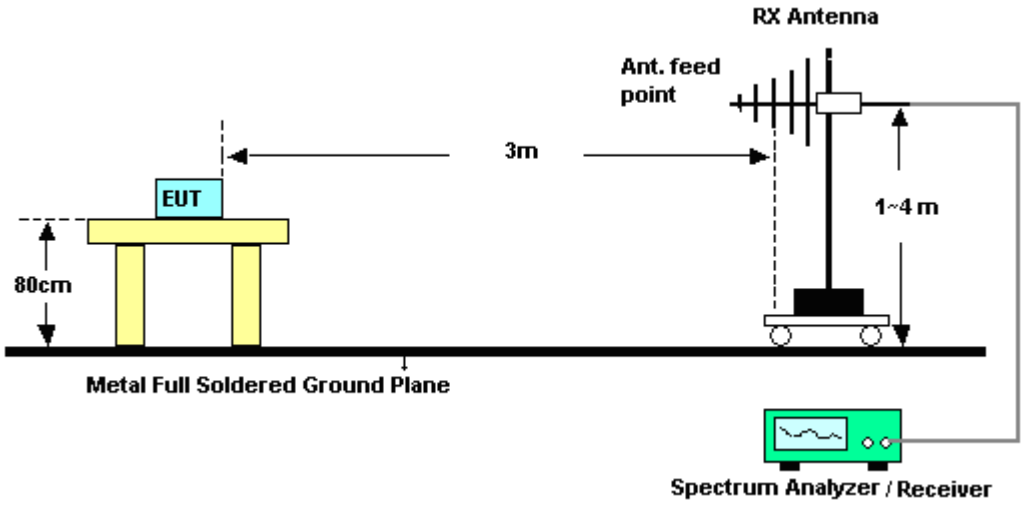
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting 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

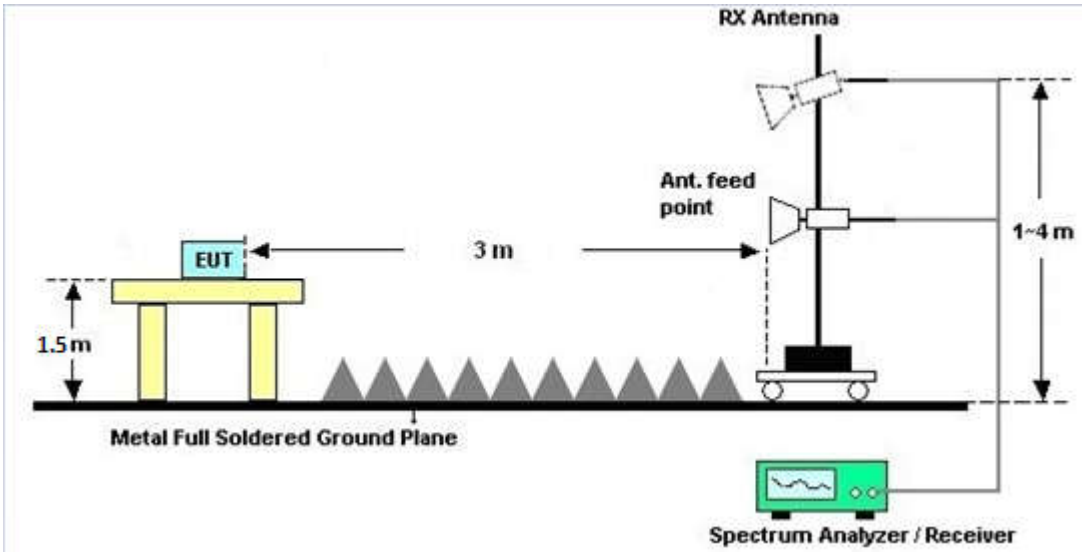
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated 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.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

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.

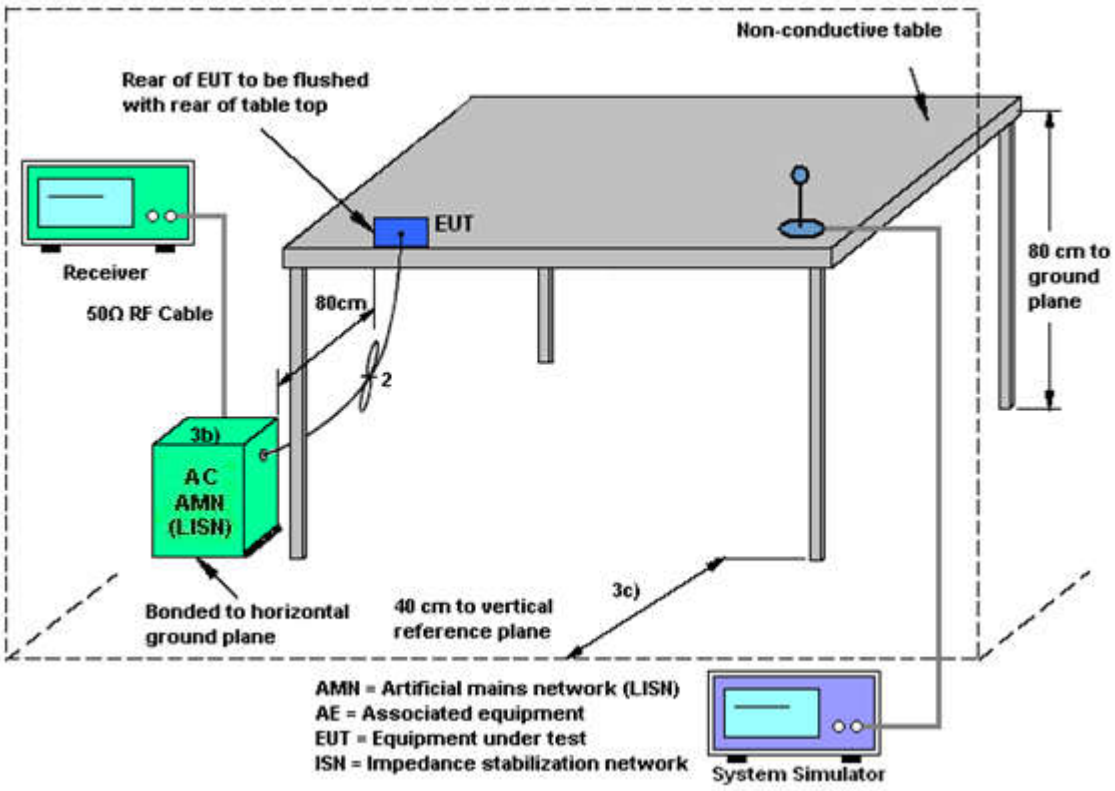
3.5.2 Measuring Instruments

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

Please refer to Appendix B.

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

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 peak gain of EUT 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. 07, 2018	Jun. 02, 2019	Aug. 06, 2019	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 14, 2019	Jun. 02, 2019	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	Jun. 02, 2019	Jan. 13, 2020	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY57290151	3Hz~8.5GHz;Max 30dBm	Jun. 25, 2018	Jun. 07, 2019~ Jul. 04, 2019	Jun. 24, 2019	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44GHz	Oct. 09, 2018	Jun. 07, 2019~ Jul. 04, 2019	Oct. 08, 2019	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 19, 2018	Jun. 07, 2019~ Jul. 04, 2019	Oct. 18, 2019	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jun. 12, 2018	Jun. 07, 2019~ Jul. 04, 2019	Jun. 11, 2019	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 27, 2019	Jun. 07, 2019~ Jul. 04, 2019	Jan. 26, 2020	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Jun. 07, 2019~ Jul. 04, 2019	Jan. 04, 2020	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2018	Jun. 07, 2019~ Jul. 04, 2019	Aug. 05, 2019	Radiation (03CH05-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Jan. 14, 2019	Jun. 07, 2019~ Jul. 04, 2019	Jan. 13, 2020	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Aug. 17, 2018	Jun. 07, 2019~ Jul. 04, 2019	Aug. 16, 2019	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Dec. 22, 2018	Jun. 07, 2019~ Jul. 04, 2019	Dec. 21, 2019	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jun. 07, 2019~ Jul. 04, 2019	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jun. 07, 2019~ Jul. 04, 2019	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jun. 07, 2019~ Jul. 04, 2019	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 16, 2019	Jun. 12, 2019	Apr. 15, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 12, 2018	Jun. 12, 2019	Oct. 11, 2019	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Nov. 19, 2018	Jun. 12, 2019	Nov. 18, 2019	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2018	Jun. 12, 2019	Oct. 11, 2019	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.9dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Appendix A. Conducted Test Results

Report Number : FR950901E

Test Engineer:	Weller Liu	Temperature:	21~25	°C
Test Date:	2019/6/2	Relative Humidity:	51~54	%

Report Number : FR950901E

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

Band IV									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	18.58	23.676	16.3237	0.5	Pass
11a	6Mbps	1	157	5785	18.78	23.926	16.3237	0.5	Pass
11a	6Mbps	1	165	5825	18.63	23.626	16.3237	0.5	Pass
HT20	MCS 0	1	149	5745	19.43	23.976	17.5624	0.5	Pass
HT20	MCS 0	1	157	5785	19.28	24.376	17.5624	0.5	Pass
HT20	MCS 0	1	165	5825	19.33	23.876	17.5624	0.5	Pass
HT40	MCS 0	1	151	5755	36.76	45.225	35.3247	0.5	Pass
HT40	MCS 0	1	159	5795	36.86	45.225	35.1249	0.5	Pass
VHT80	MCS 0	1	155	5775	74.57	82.96	74.965	0.5	Pass

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.05	14.92	30.00	1.10		Pass
11a	6Mbps	1	157	5785	0.05	15.01	30.00	1.10		Pass
11a	6Mbps	1	165	5825	0.05	15.12	30.00	1.10		Pass
HT20	MCS 0	1	149	5745	0.08	15.09	30.00	1.10		Pass
HT20	MCS 0	1	157	5785	0.08	15.14	30.00	1.10		Pass
HT20	MCS 0	1	165	5825	0.08	15.03	30.00	1.10		Pass
HT40	MCS 0	1	151	5755	0.09	15.23	30.00	1.10		Pass
HT40	MCS 0	1	159	5795	0.09	15.02	30.00	1.10		Pass
VHT20	MCS 0	1	149	5745	0.08	14.90	30.00	1.10		Pass
VHT20	MCS 0	1	157	5785	0.08	15.02	30.00	1.10		Pass
VHT20	MCS 0	1	165	5825	0.08	15.00	30.00	1.10		Pass
VHT40	MCS 0	1	151	5755	0.29	14.08	30.00	1.10		Pass
VHT40	MCS 0	1	159	5795	0.29	14.01	30.00	1.10		Pass
VHT80	MCS 0	1	155	5775	0.32	13.98	30.00	1.10		Pass

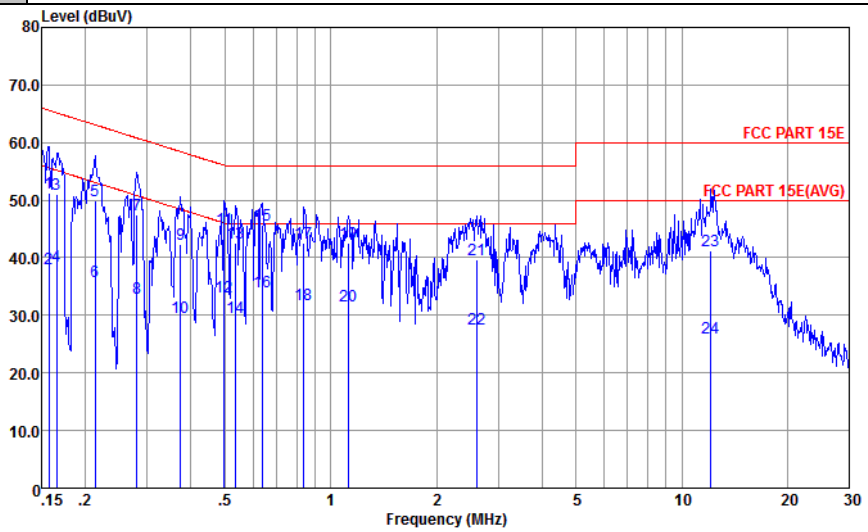
Report Number : FR950901E

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	0.05	2.22	0.48	30.00	1.10	Pass
11a	6Mbps	1	157	5785	0.05	2.22	0.71	30.00	1.10	Pass
11a	6Mbps	1	165	5825	0.05	2.22	0.38	30.00	1.10	Pass
HT20	MCS 0	1	149	5745	0.08	2.22	0.27	30.00	1.10	Pass
HT20	MCS 0	1	157	5785	0.08	2.22	0.34	30.00	1.10	Pass
HT20	MCS 0	1	165	5825	0.08	2.22	0.44	30.00	1.10	Pass
HT40	MCS 0	1	151	5755	0.09	2.22	-2.26	30.00	1.10	Pass
HT40	MCS 0	1	159	5795	0.09	2.22	-2.22	30.00	1.10	Pass
VHT80	MCS 0	1	155	5775	0.32	2.22	-5.81	30.00	1.10	Pass

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

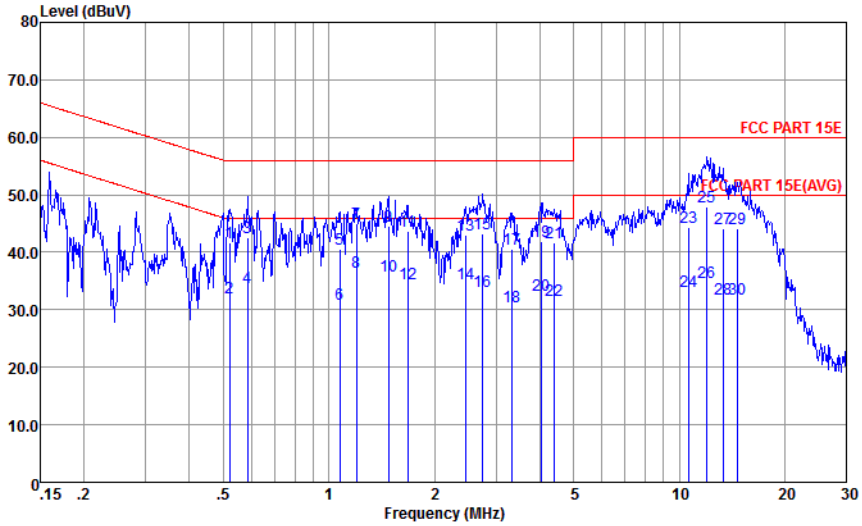


Site : CO01-KS
Condition : FCC PART 15E LISN-L-181119-060105 LINE

mode : Mode 1
: 868521040050334 #37

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.157	51.15	-14.45	65.60	40.59	0.10	10.46	QP
2		0.157	38.15	-17.45	55.60	27.59	0.10	10.46	Average
3		0.166	51.14	-14.02	65.16	40.60	0.10	10.44	QP
4		0.166	38.44	-16.72	55.16	27.90	0.10	10.44	Average
5		0.213	49.98	-13.12	63.10	39.50	0.12	10.36	QP
6		0.213	35.98	-17.12	53.10	25.50	0.12	10.36	Average
7		0.280	47.56	-13.25	60.81	37.10	0.14	10.32	QP
8		0.280	32.96	-17.85	50.81	22.50	0.14	10.32	Average
9		0.373	42.33	-16.10	58.43	31.90	0.15	10.28	QP
10		0.373	29.63	-18.80	48.43	19.20	0.15	10.28	Average
11		0.497	44.91	-11.14	56.05	34.50	0.17	10.24	QP
12		0.497	33.31	-12.74	46.05	22.90	0.17	10.24	Average
13		0.535	42.61	-13.39	56.00	32.20	0.17	10.24	QP
14		0.535	29.61	-16.39	46.00	19.20	0.17	10.24	Average
15	*	0.637	45.62	-10.38	56.00	35.20	0.18	10.24	QP
16		0.637	34.02	-11.98	46.00	23.60	0.18	10.24	Average
17		0.839	42.63	-13.37	56.00	32.20	0.19	10.24	QP
18		0.839	31.93	-14.07	46.00	21.50	0.19	10.24	Average
19		1.123	42.64	-13.36	56.00	32.21	0.20	10.23	QP
20		1.123	31.64	-14.36	46.00	21.21	0.20	10.23	Average
21		2.608	39.67	-16.33	56.00	29.20	0.23	10.24	QP
22		2.608	27.67	-18.33	46.00	17.20	0.23	10.24	Average
23		12.124	41.20	-18.80	60.00	30.59	0.24	10.37	QP
24		12.124	26.10	-23.90	50.00	15.49	0.24	10.37	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-181119-060105 NEUTRAL

mode : Mode 1
: 868521040050334 #37

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.521	41.58	-14.42	56.00	31.19	0.15	10.24	QP
2		0.521	31.98	-14.02	46.00	21.59	0.15	10.24	Average
3		0.585	42.58	-13.42	56.00	32.20	0.14	10.24	QP
4		0.585	33.98	-12.02	46.00	23.60	0.14	10.24	Average
5		1.077	40.57	-15.43	56.00	30.21	0.13	10.23	QP
6		1.077	30.87	-15.13	46.00	20.51	0.13	10.23	Average
7		1.197	44.97	-11.03	56.00	34.60	0.14	10.23	QP
8	*	1.197	36.57	-9.43	46.00	26.20	0.14	10.23	Average
9		1.480	44.57	-11.43	56.00	34.20	0.14	10.23	QP
10		1.480	35.87	-10.13	46.00	25.50	0.14	10.23	Average
11		1.680	43.57	-12.43	56.00	33.19	0.15	10.23	QP
12		1.680	34.57	-11.43	46.00	24.19	0.15	10.23	Average
13		2.461	42.99	-13.01	56.00	32.60	0.16	10.23	QP
14		2.461	34.59	-11.41	46.00	24.20	0.16	10.23	Average
15		2.750	43.20	-12.80	56.00	32.80	0.16	10.24	QP
16		2.750	33.30	-12.70	46.00	22.90	0.16	10.24	Average
17		3.328	40.61	-15.39	56.00	30.19	0.17	10.25	QP
18		3.328	30.61	-15.39	46.00	20.19	0.17	10.25	Average
19		4.027	41.92	-14.08	56.00	31.50	0.17	10.25	QP
20		4.027	32.62	-13.38	46.00	22.20	0.17	10.25	Average
21		4.384	41.64	-14.36	56.00	31.20	0.18	10.26	QP
22		4.384	31.64	-14.36	46.00	21.20	0.18	10.26	Average
23		10.620	44.41	-15.59	60.00	33.90	0.16	10.35	QP
24		10.620	33.11	-16.89	50.00	22.60	0.16	10.35	Average
25		11.996	47.81	-12.19	60.00	37.29	0.15	10.37	QP
26		11.996	34.81	-15.19	50.00	24.29	0.15	10.37	Average
27		13.337	44.11	-15.89	60.00	33.59	0.14	10.38	QP
28		13.337	31.81	-18.19	50.00	21.29	0.14	10.38	Average
29		14.672	44.12	-15.88	60.00	33.61	0.12	10.39	QP
30		14.672	31.82	-18.18	50.00	21.31	0.12	10.39	Average

Appendix C. 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.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5623.6	49.48	-18.82	68.3	42.03	35.29	8.55	36.39	101	244	P	H
		5692.4	51.69	-48.01	99.7	44.28	35.25	8.58	36.42	101	244	P	H
		5720	49.78	-61.12	110.9	42.38	35.22	8.61	36.43	101	244	P	H
		5724.4	55.69	-65.24	120.93	48.29	35.22	8.61	36.43	101	244	P	H
		5742	103.38	-	-	95.97	35.21	8.64	36.44	101	244	P	H
		5742	97.06	-	-	89.65	35.21	8.64	36.44	101	244	A	H
		5642	49.53	-18.77	68.3	42.07	35.3	8.55	36.39	113	24	P	V
		5691.6	53.24	-45.87	99.11	45.83	35.25	8.58	36.42	113	24	P	V
		5719.2	53.32	-57.36	110.68	45.92	35.22	8.61	36.43	113	24	P	V
		5724.8	62.02	-59.82	121.84	54.62	35.22	8.61	36.43	113	24	P	V
		5742	106.38	-	-	98.97	35.21	8.64	36.44	113	24	P	V
		5742	99.16	-	-	91.75	35.21	8.64	36.44	113	24	A	V
802.11a CH 165 5825MHz		5850.4	52.99	-68.4	121.39	40.83	35.12	8.72	31.68	100	65	P	H
		5867.6	52.79	-54.58	107.37	40.62	35.1	8.77	31.7	100	65	P	H
		5890.8	52.71	-40.86	93.57	40.55	35.1	8.77	31.71	100	65	P	H
		5941.2	52.26	-16.04	68.3	40.03	35.09	8.88	31.74	100	65	P	H
		5820	104.9	-	-	92.7	35.13	8.72	31.65	100	65	P	H
		5820	98.14	-	-	85.94	35.13	8.72	31.65	100	65	A	H
		5851.6	52.45	-66.2	118.65	40.29	35.12	8.72	31.68	100	195	P	V
		5865.2	52.18	-55.86	108.04	40.01	35.1	8.77	31.7	100	195	P	V
		5877.2	53.44	-50.23	103.67	41.27	35.1	8.77	31.7	100	195	P	V
		5992.8	53.3	-15	68.3	41.07	35.08	8.93	31.78	100	195	P	V
		5830	104.74	-	-	92.54	35.13	8.72	31.65	100	195	P	V
		5830	97.41	-	-	85.21	35.13	8.72	31.65	100	195	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 Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	44.43	-29.57	74	56.53	37.99	12.74	62.83	100	360	P	H
		11490	48.5	-25.5	74	60.6	37.99	12.74	62.83	100	360	P	V
802.11a CH 157 5785MHz		11570	43.17	-30.83	74	55.14	38.06	12.79	62.82	100	360	P	H
		11570	48.4	-25.6	74	60.37	38.06	12.79	62.82	100	360	P	V
802.11a CH 165 5825MHz		11650	42.97	-31.03	74	54.82	38.11	12.85	62.81	100	360	P	H
		11650	45.96	-28.04	74	57.81	38.11	12.85	62.81	100	0	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 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)
802.11n HT20 CH 149 5745MHz		5648	50.38	-17.92	68.3	42.92	35.3	8.55	36.39	100	244	P	H
		5692.8	52.87	-47.12	99.99	45.46	35.25	8.58	36.42	100	244	P	H
		5701.2	51	-54.64	105.64	43.57	35.24	8.61	36.42	100	244	P	H
		5724.8	58.74	-63.1	121.84	51.34	35.22	8.61	36.43	100	244	P	H
		5740	104.73	-	-	97.32	35.21	8.64	36.44	100	244	P	H
		5740	98.66	-	-	91.25	35.21	8.64	36.44	100	244	A	H
		5632.4	49.12	-19.18	68.3	41.67	35.29	8.55	36.39	143	23	P	V
		5693.2	53.69	-46.6	100.29	46.28	35.25	8.58	36.42	143	23	P	V
		5719.6	51.16	-59.63	110.79	43.76	35.22	8.61	36.43	143	23	P	V
		5724.8	57.77	-64.07	121.84	50.37	35.22	8.61	36.43	143	23	P	V
		5738	104.6	-	-	97.22	35.21	8.61	36.44	143	23	P	V
		5738	98.24	-	-	90.86	35.21	8.61	36.44	143	23	A	V
802.11n HT20 CH 165 5825MHz		5852	54.77	-62.97	117.74	42.61	35.12	8.72	31.68	100	64	P	H
		5861.2	52.68	-56.48	109.16	40.51	35.1	8.77	31.7	100	64	P	H
		5877.2	52.79	-50.88	103.67	40.62	35.1	8.77	31.7	100	64	P	H
		5958	53.82	-14.48	68.3	41.59	35.09	8.88	31.74	100	64	P	H
		5818	104.7	-	-	92.48	35.15	8.72	31.65	100	64	P	H
		5818	97.34	-	-	85.12	35.15	8.72	31.65	100	64	A	H
		5853.2	55.1	-59.9	115	42.94	35.12	8.72	31.68	127	197	P	V
		5868.4	53.12	-54.03	107.15	40.95	35.1	8.77	31.7	127	197	P	V
		5876.4	54.03	-50.23	104.26	41.86	35.1	8.77	31.7	127	197	P	V
		5961.2	53.31	-14.99	68.3	41.1	35.09	8.88	31.76	127	197	P	V
		5824	103.95	-	-	91.75	35.13	8.72	31.65	127	197	P	V
		5824	96.73	-	-	84.53	35.13	8.72	31.65	127	197	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 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)
802.11n HT20 CH 149 5745MHz		11490	43.4	-30.6	74	55.5	37.99	12.74	62.83	100	360	P	H
		11490	46.61	-27.39	74	58.71	37.99	12.74	62.83	100	360	P	V
802.11n HT20 CH 157 5785MHz		11570	44.49	-29.51	74	56.46	38.06	12.79	62.82	100	360	P	H
		11570	46.22	-27.78	74	58.19	38.06	12.79	62.82	100	360	P	V
802.11n HT20 CH 165 5825MHz		11650	43.67	-30.33	74	55.52	38.11	12.85	62.81	100	0	P	H
		11650	46.49	-27.51	74	58.34	38.11	12.85	62.81	100	0	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 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)
		5649.96	50.27	-18.03	68.3	42.84	35.28	8.55	36.4	100	243	P	H
		5650.46	50.27	-18.37	68.64	42.84	35.28	8.55	36.4	100	243	P	H
		5717.2	57.98	-52.14	110.12	50.55	35.24	8.61	36.42	100	243	P	H
		5723.6	61.15	-57.96	119.11	53.75	35.22	8.61	36.43	100	243	P	H
		5758	102.96	-	-	95.58	35.19	8.64	36.45	100	243	P	H
		5758	96.19	-	-	88.81	35.19	8.64	36.45	100	243	A	H
		5852.8	47.88	-68.04	115.92	40.53	35.12	8.72	36.49	100	243	P	H
		5858.8	49.87	-59.96	109.83	42.5	35.1	8.77	36.5	100	243	P	H
802.11n		5890	49.71	-44.46	94.17	42.35	35.1	8.77	36.51	100	243	P	H
HT40		5976.4	49.14	-19.16	68.3	41.66	35.09	8.93	36.54	100	243	P	H
CH 151		5649.98	51.2	-17.1	68.3	43.77	35.28	8.55	36.4	109	18	P	V
5755MHz		5652.4	51.32	-18.76	70.08	43.89	35.28	8.55	36.4	109	18	P	V
		5718	61.29	-49.05	110.34	53.89	35.22	8.61	36.43	109	18	P	V
		5723.6	63.24	-55.87	119.11	55.84	35.22	8.61	36.43	109	18	P	V
		5744	103.36	-	-	95.95	35.21	8.64	36.44	109	18	P	V
		5744	96.02	-	-	88.61	35.21	8.64	36.44	109	18	A	V
		5852.4	50.19	-66.64	116.83	42.84	35.12	8.72	36.49	109	18	P	V
		5863.6	50.68	-57.81	108.49	43.31	35.1	8.77	36.5	109	18	P	V
		5880	51.12	-50.47	101.59	43.76	35.1	8.77	36.51	109	18	P	V
		5943.2	49.86	-18.44	68.3	42.42	35.09	8.88	36.53	109	18	P	V

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1		(MHz)	(dBµV/m)	Limit (dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)
		5646.4	49.51	-18.79	68.3	42.05	35.3	8.55	36.39	100	244	P	H
		5692	52.21	-47.19	99.4	44.8	35.25	8.58	36.42	100	244	P	H
		5701.6	49.42	-56.33	105.75	41.99	35.24	8.61	36.42	100	244	P	H
		5723.2	48.9	-69.3	118.2	41.5	35.22	8.61	36.43	100	244	P	H
		5806	103.17	-	-	95.82	35.15	8.67	36.47	100	244	P	H
		5806	95.99	-	-	88.64	35.15	8.67	36.47	100	244	A	H
		5850.4	53.18	-68.21	121.39	45.83	35.12	8.72	36.49	100	244	P	H
		5866	50	-57.82	107.82	42.63	35.1	8.77	36.5	100	244	P	H
802.11n		5900	50.4	-36.36	86.76	42.99	35.1	8.82	36.51	100	244	P	H
HT40		5954.8	50.06	-18.24	68.3	42.62	35.09	8.88	36.53	100	244	P	H
CH 159		5639.6	49.49	-18.81	68.3	42.03	35.3	8.55	36.39	100	15	P	V
5795MHz		5692	51.38	-48.02	99.4	43.97	35.25	8.58	36.42	100	15	P	V
		5709.2	50.02	-57.86	107.88	42.59	35.24	8.61	36.42	100	15	P	V
		5723.6	49.67	-69.44	119.11	42.27	35.22	8.61	36.43	100	15	P	V
		5786	103.39	-	-	96.03	35.16	8.67	36.47	100	15	P	V
		5786	96.07	-	-	88.71	35.16	8.67	36.47	100	15	A	V
		5850.19	49.82	-72.05	121.87	42.47	35.12	8.72	36.49	100	15	P	V
		5865.2	49.5	-58.54	108.04	42.13	35.1	8.77	36.5	100	15	P	V
		5900	50.68	-36.08	86.76	43.27	35.1	8.82	36.51	100	15	P	V
		5981.6	49.04	-19.26	68.3	41.56	35.09	8.93	36.54	100	15	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 (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)
802.11n HT40 CH 151 5755MHz		11510	43.78	-30.22	74	55.87	38	12.74	62.83	100	360	P	H
		11510	44.93	-29.07	74	57.02	38	12.74	62.83	100	360	P	V
802.11n HT40 CH 159 5795MHz		11590	43.04	-30.96	74	54.96	38.07	12.82	62.81	100	360	P	H
		11590	46.89	-27.11	74	58.81	38.07	12.82	62.81	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 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5629.6	49.95	-18.35	68.3	42.5	35.29	8.55	36.39	100	246	P	H
		5690.4	51.92	-46.3	98.22	44.51	35.25	8.58	36.42	100	246	P	H
		5719.98	57.52	-53.37	110.89	50.12	35.22	8.61	36.43	100	246	P	H
		5724.4	64.32	-56.61	120.93	56.92	35.22	8.61	36.43	100	246	P	H
		5768	98.54	-	-	91.16	35.19	8.64	36.45	100	246	P	H
		5768	93.61	-	-	86.23	35.19	8.64	36.45	100	246	A	H
		5853.6	55.72	-58.37	114.09	48.4	35.1	8.72	36.5	100	246	P	H
		5855.6	54.99	-55.74	110.73	47.62	35.1	8.77	36.5	100	246	P	H
		5880	49.56	-52.03	101.59	42.2	35.1	8.77	36.51	100	246	P	H
		5973.2	50.09	-18.21	68.3	42.61	35.09	8.93	36.54	100	246	P	H
		5604	49.49	-18.81	68.3	42.09	35.28	8.52	36.4	129	23	P	V
		5693.2	50.93	-49.36	100.29	43.52	35.25	8.58	36.42	129	23	P	V
		5720	56.74	-54.16	110.9	49.34	35.22	8.61	36.43	129	23	P	V
		5724.8	63.76	-58.08	121.84	56.36	35.22	8.61	36.43	129	23	P	V
		5768	100.69	-	-	93.31	35.19	8.64	36.45	129	23	P	V
		5768	92.13	-	-	84.75	35.19	8.64	36.45	129	23	A	V
		5852.8	57.3	-58.62	115.92	49.95	35.12	8.72	36.49	129	23	P	V
		5858	56.63	-53.43	110.06	49.26	35.1	8.77	36.5	129	23	P	V
		5877.6	50.17	-53.2	103.37	42.81	35.1	8.77	36.51	129	23	P	V
		5930.4	49.23	-19.07	68.3	41.84	35.09	8.82	36.52	129	23	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		11550	42.24	-31.76	74	54.23	38.04	12.79	62.82	100	360	P	H
		11550	47.26	-26.74	74	59.25	38.04	12.79	62.82	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	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		30	17.62	-22.38	40	26.16	22.8	0.64	31.98	-	-	P	H
		213.33	21.3	-22.2	43.5	35.44	16.08	1.7	31.92	-	-	P	H
		277.35	24.31	-21.69	46	35.66	18.75	1.93	32.03	-	-	P	H
		312.27	22.87	-23.13	46	33.4	19.48	2.01	32.02	-	-	P	H
		358.83	22.8	-23.2	46	32.21	20.55	2.13	32.09	-	-	P	H
		905.91	25.23	-20.77	46	26.33	26.85	3.46	31.41	100	0	P	H
		37.76	18.72	-21.28	40	30.75	19.22	0.71	31.96	-	-	P	V
		42.61	19.5	-20.5	40	34.17	16.54	0.74	31.95	100	0	P	V
		93.05	16.38	-27.12	43.5	31.79	15.4	1.12	31.93	-	-	P	V
		212.36	18.18	-25.32	43.5	32.38	16.02	1.69	31.91	-	-	P	V
		905.91	25.15	-20.85	46	26.25	26.85	3.46	31.41	-	-	P	V
		965.08	25.81	-28.19	54	25.74	27.35	3.56	30.84	-	-	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 **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

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

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

1. Level(dBµV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBµV/m)

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

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

= 55.45 (dBµV/m)

2. Over Limit(dB)

= Level(dBµV/m) – Limit Line(dBµV/m)

= 55.45(dBµV/m) – 74(dBµV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBµV/m)

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

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

= 43.54 (dBµV/m)

2. Over Limit(dB)

= Level(dBµV/m) – Limit Line(dBµV/m)

= 43.54(dBµV/m) – 54(dBµV/m)

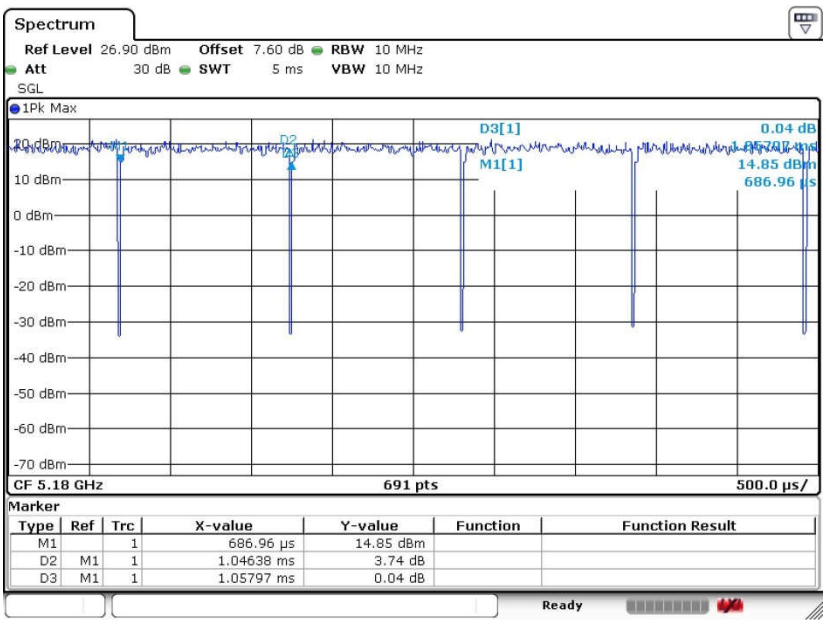
= -10.46(dB)

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

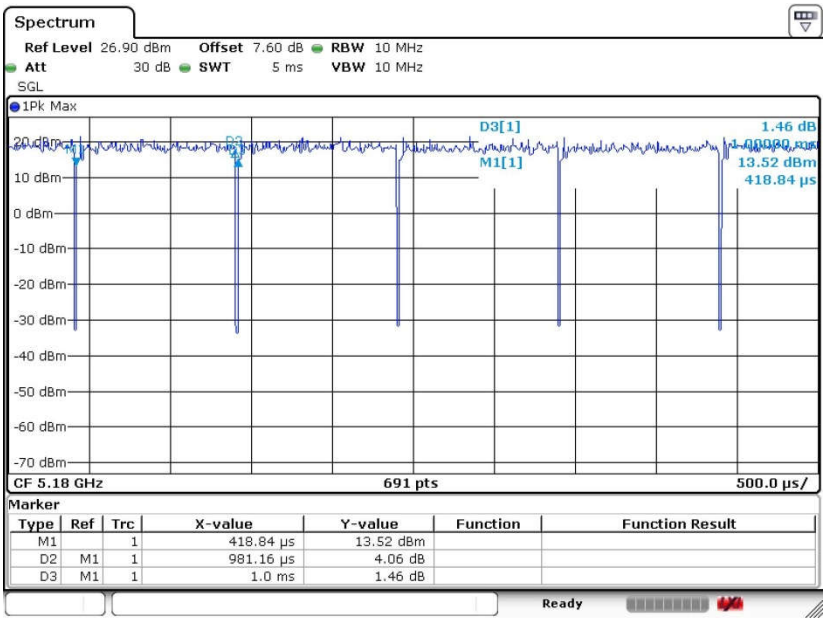
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	98.90	-	-	10Hz
802.11n HT20	98.12	-	-	10Hz
802.11n HT40	97.90	1.219	0.820	1kHz
802.11ac VHT80	92.94	0.248	4.035	10kHz

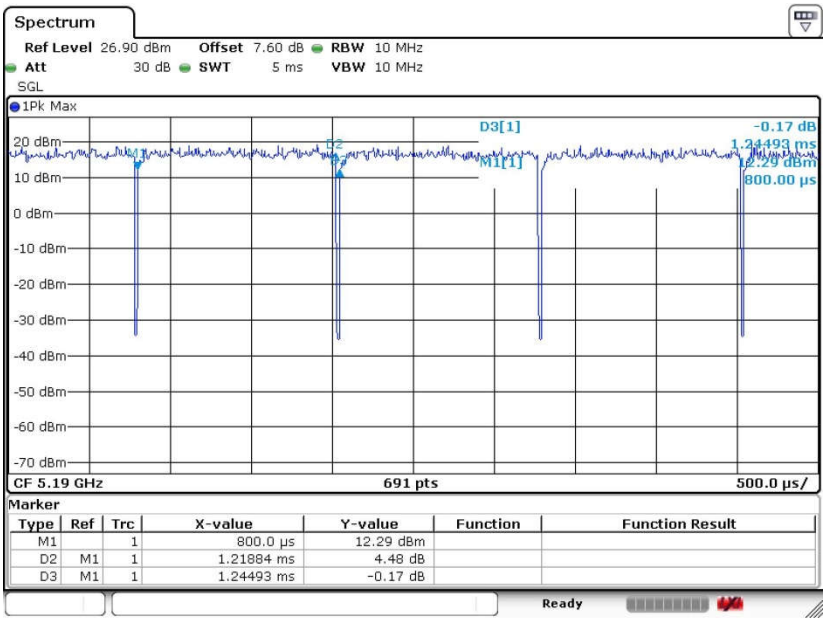
802.11a



802.11n HT20



802.11n HT40



802.11ac VHT80