FCC RF Test Report

APPLICANT	:	Huawei Technologies Co., Ltd.
EQUIPMENT	:	Smart Phone
BRAND NAME	:	Honor
MODEL NAME	:	YAL-L41
FCC ID	:	QISYAL-L41
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on May 10, 2019 and testing was completed on May 21, 2019. We, Sporton International (ShenZhen) 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.

Derreck Chen

Reviewed by: Derreck Chen / Supervisor

Eric Shih

Approved by: Eric Shih / Manager

Sporton International (ShenZhen) Inc.

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR951002F	Rev. 01	Initial issue of report	May 27, 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 12.71 dB at 5943.600 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 14.11 dB at 0.540 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

Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smart Phone
Brand Name	Honor
Model Name	YAL-L41
FCC ID	QISYAL-L41
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ DC-HSDPA/HSPA+(16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 Bluetooth BR/EDR/LE NFC and GNSS
IMEI Code	Conducted: 869436040038834/869436040043339 Conduction: 869436040038560/869436040043065 Radiation: 869436040037885/869436040042380
HW Version	HL2YALEM04
SW Version	9.1.0.119(C900E119R1P2)

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 sample 1 and sample 2, the differences between two samples is for Battery which is different suppliers. We only choose sample 1 to perform full tests.

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 : 16.12 dBm / 0.0409 W 802.11n HT20 : 15.02 dBm / 0.0318 W 802.11n HT40 : 8.97 dBm / 0.0079W 802.11ac VHT20: 15.01 dBm / 0.0317 W 802.11ac VHT40: 8.94 dBm / 0.0078 W 802.11ac VHT80: 9.09 dBm / 0.0081 W
99% Occupied Bandwidth	802.11a : 18.68 MHz 802.11n HT20 : 19.08 MHz 802.11n HT40 : 36.66 MHz 802.11ac VHT80 : 75.16 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	Internal Antenna with gain 1.00 dBi

Note: For 802.11an HT20 / ac VHT20 and 802.11an HT40 / ac VHT40 mode, the whole testing has assessed only 802.11an HT20/ 802.11an 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 (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China TEL: +86-755-3320-2398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

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.

1.7 Specification of Accessory

AC Adapter 1	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450U00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Salcomp		
AC Adapter 2	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450U00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	HUNTKEY		
AC Adapter 3	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450U00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	HuaweiTechnologies Co., Ltd.		
AC Adapter 4	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450E01
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	HuaweiTechnologies Co., Ltd.		
AC Adapter 5	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450A01
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Huawei Technologies Co., Ltd.		
AC Adapter 6	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450E00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Salcomp		
AC Adapter 7	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450E00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	HUNTKEY		
AC Adapter 8	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450E00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Huawei Technologies Co., Ltd.		
AC Adapter 9	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450A00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Salcomp		
AC Adapter 10	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450A00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	HUNTKEY	SN	
AC Adapter 11	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450A00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Huawei Technologies Co., Ltd.		
AC Adapter 12	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450B00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Salcomp		
AC Adapter 13	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450B00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	HUNTKEY		
AC Adapter 14	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-050450B00
	Power Rating	I/P:100 - 240 Vac, 750mA, O/P: 5Vdc, 2A; 4.5Vdc, 5A; 5Vdc, 4.5A		
	Manufacturer	Huawei Technologies Co., Ltd.		
USB Cable 1	Brand Name	FOXCONN INTERCONNECT TECHNOLOGY LIMITED.	Model Name	CUDU01B-HC350-EH
	Signal Line	1 meter, shielded cable, with w/o ferrite core		

USB Cable 2	Brand Name	LUXSHARE Precision Industry Co., Ltd.	Model Name	L99UC117-CS-H
	Signal Line	1 meter, shielded cable, with w/o ferrite core		
USB Cable 3	Brand Name	NingBo Broad Telecommunication Co.,Ltd.	Model Name	WA0009
	Signal Line	1 meter, shielded cable, with w/o ferrite core		
USB Cable 4	Brand Name	HUIZHOU DEHONG TECHNOLOGY CO.,LTD.	Model Name	330-50465
	Signal Line	1 meter, shielded cable, with w/o ferrite core		
Earphone 1	Brand Name	Boluo County Quancheng Electronic Co., Ltd.	Model Name	1331-3301-6001-TC-296
	Signal Line	1.1 meter, non-shielded cable, with w/o ferrite core		
Earphone 2	Brand Name	Goertek Inc.	Model Name	Windy-C
	Signal Line	1.1 meter, non-shielded cable, with w/o ferrite core		
Earphone 3	Brand Name	Jiangxi Lianchuang Hongsheng Electronic Co., LTD.	Model Name	MEND1632B729000
	Signal Line	1.1 meter, non-shielded cable, with w/o ferrite core		
Earphone 4	Brand Name	Foster Electric Co.,(GuangZhou) LTD.	Model Name	618017
	Signal Line	1.1 meter, non-shielded cable, with w/o ferrite core		
Battery 1	Brand Name	Huizhou Desay Battcry Co., Ltd.	Model Name	HB436486ECW
	Power Rating	3.82 Vdc, 3900 mAh	Type	Li-ion, Yes
Battery 2	Brand Name	SUNWODA Electronic Co., Ltd.	Model Name	HB436486ECW
	Power Rating	3.82 Vdc, 3900 mAh	Type	Li-ion, Yes

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, with dock. 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)
5745-5825 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

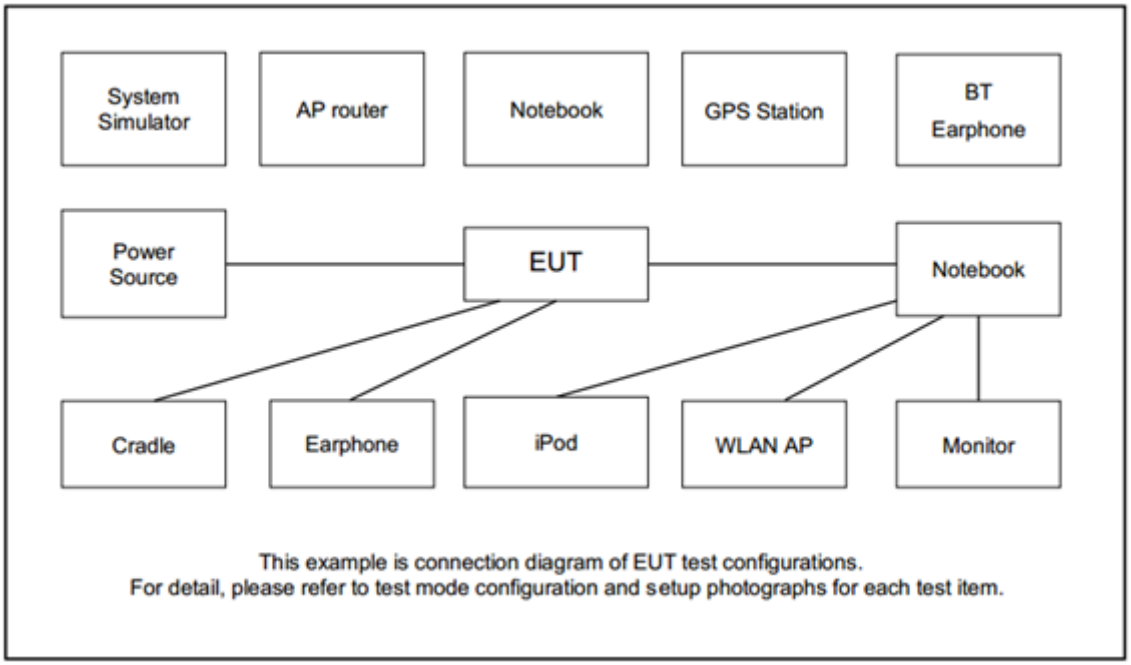
Test Cases	
AC Conducted Emission	Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link(5G) + USB Cable 1(Charging from Adapter 1) + SIM 1

Remark:

1. For Radiated Test Cases, The tests were performed with Adapter 3, USB Cable 3
2. For accessories, pre-scanned tests were conducted to determine the final configuration from all possible combinations.

Ch. #		Band IV：5745-5825 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



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-Link	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	Bluetooth Earphone	Samsung	EO-MG900	N/A	N/A	N/A
4.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2m DC O/P: Shielded, 1.8 m

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 and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.4 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 5.4 + 10 = 15.4 (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.

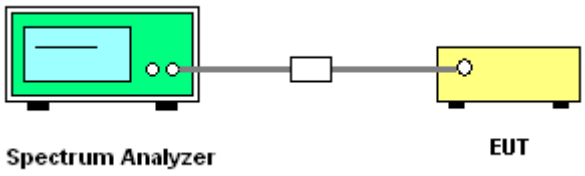
3.1.2 Measuring Instruments

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.

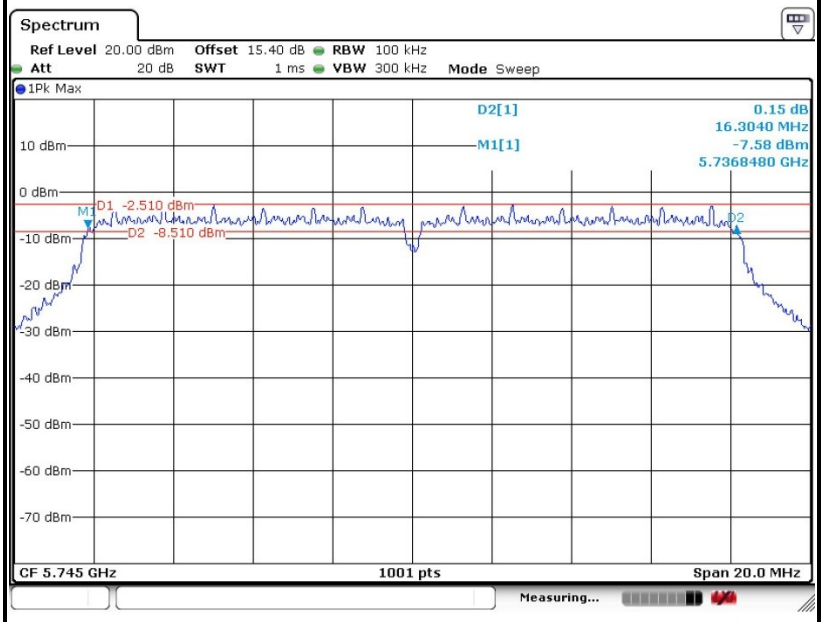
3.1.4 Test Setup



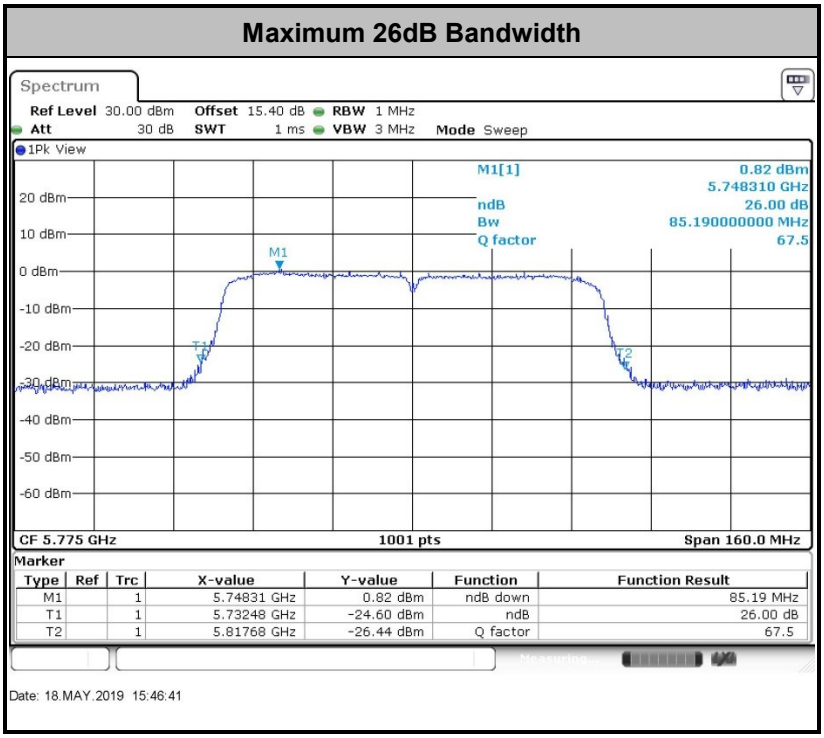
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

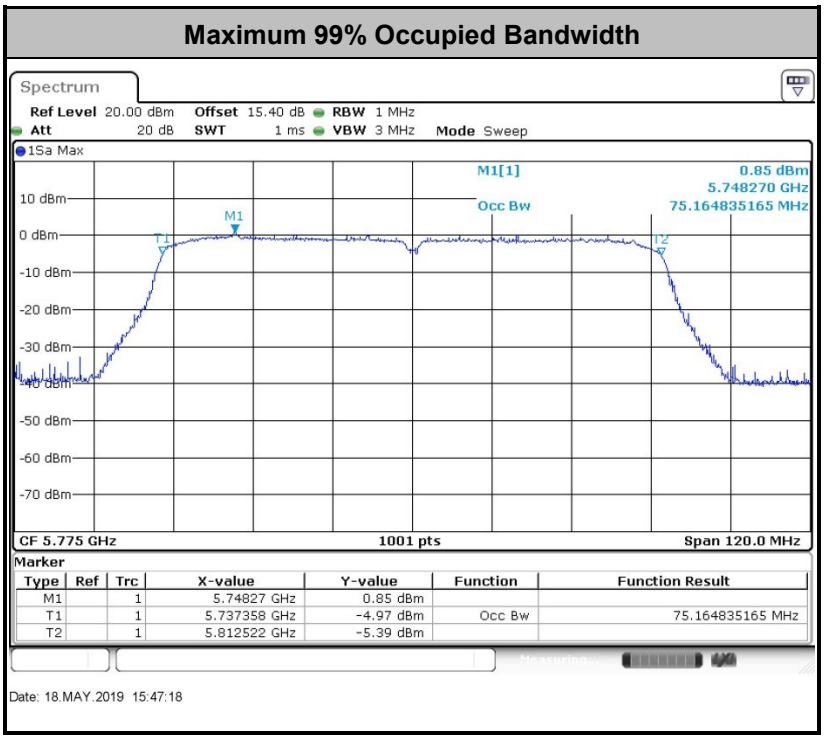
Minimum 6dB Bandwidth



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.

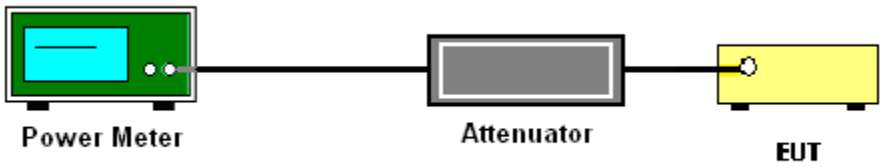
3.2.3 Test Procedures

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.

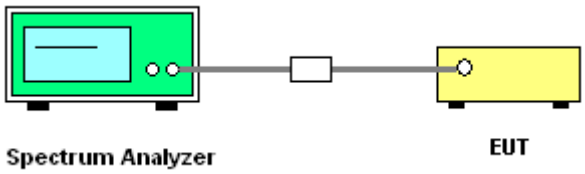
 # Method SA-2 #

(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.

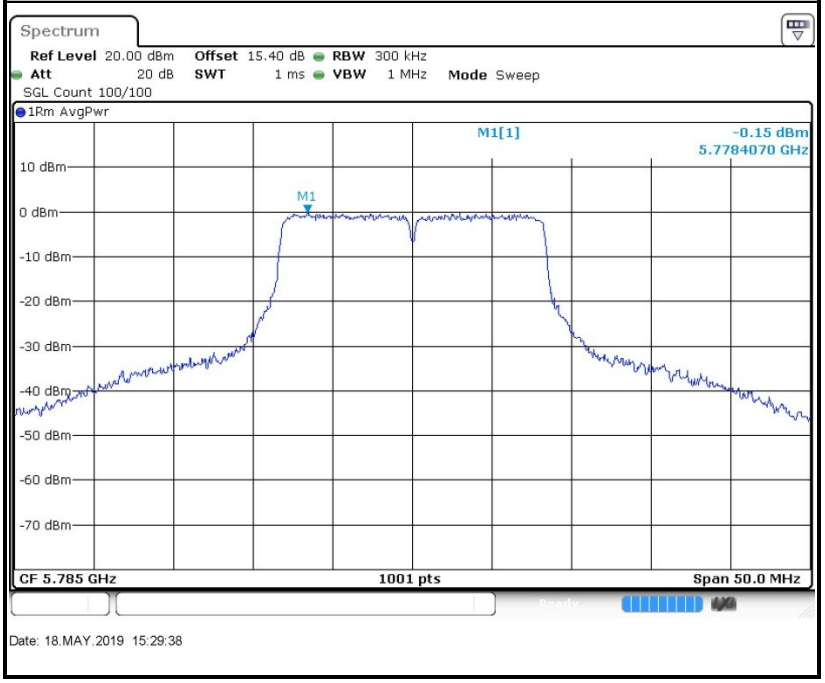
3.3.4 Test Setup



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 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.

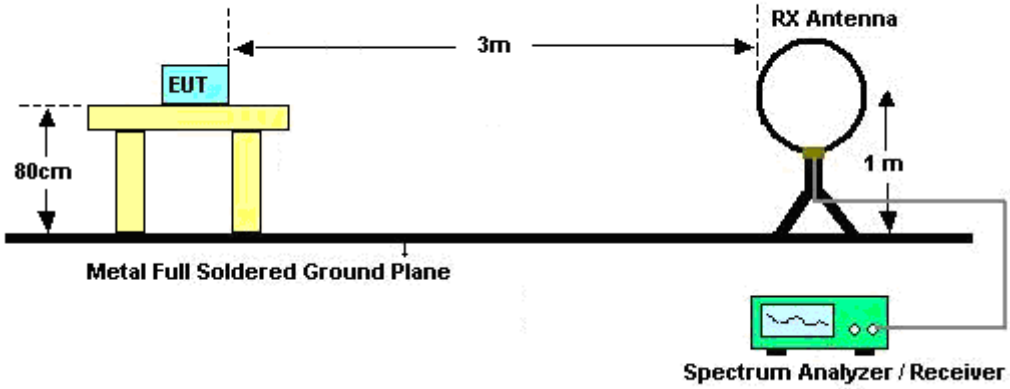
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (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

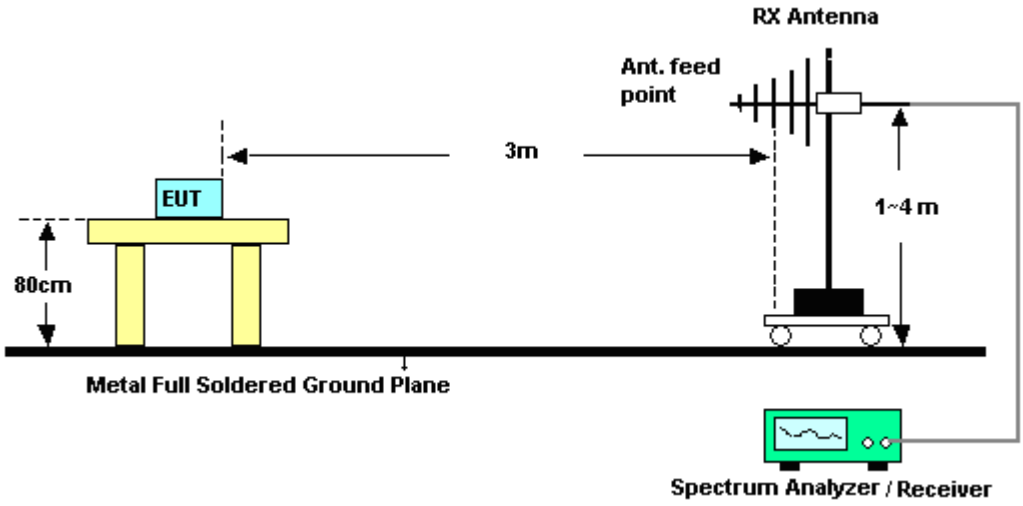
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting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

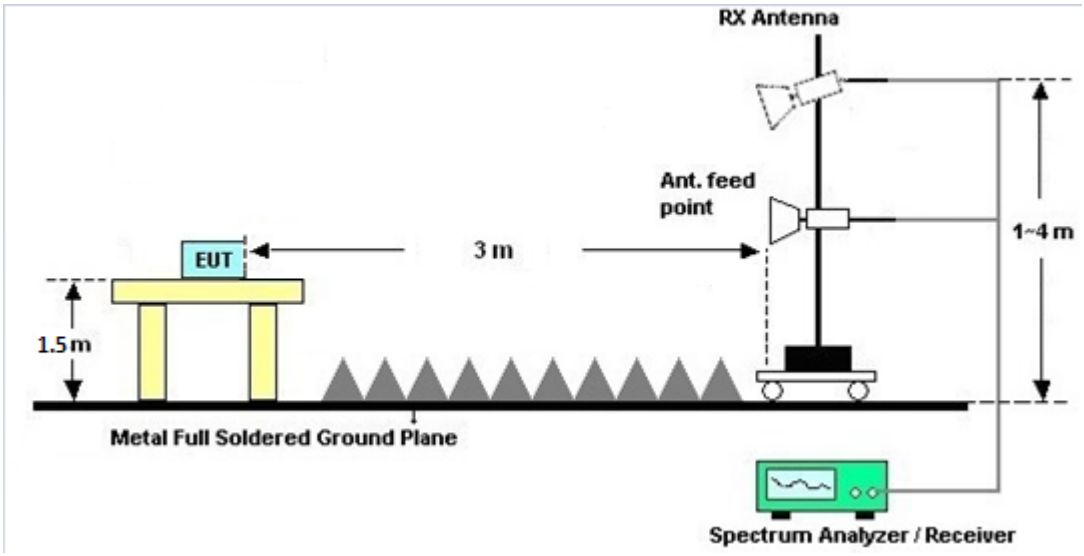
For radiated emissions below 30MHz



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.

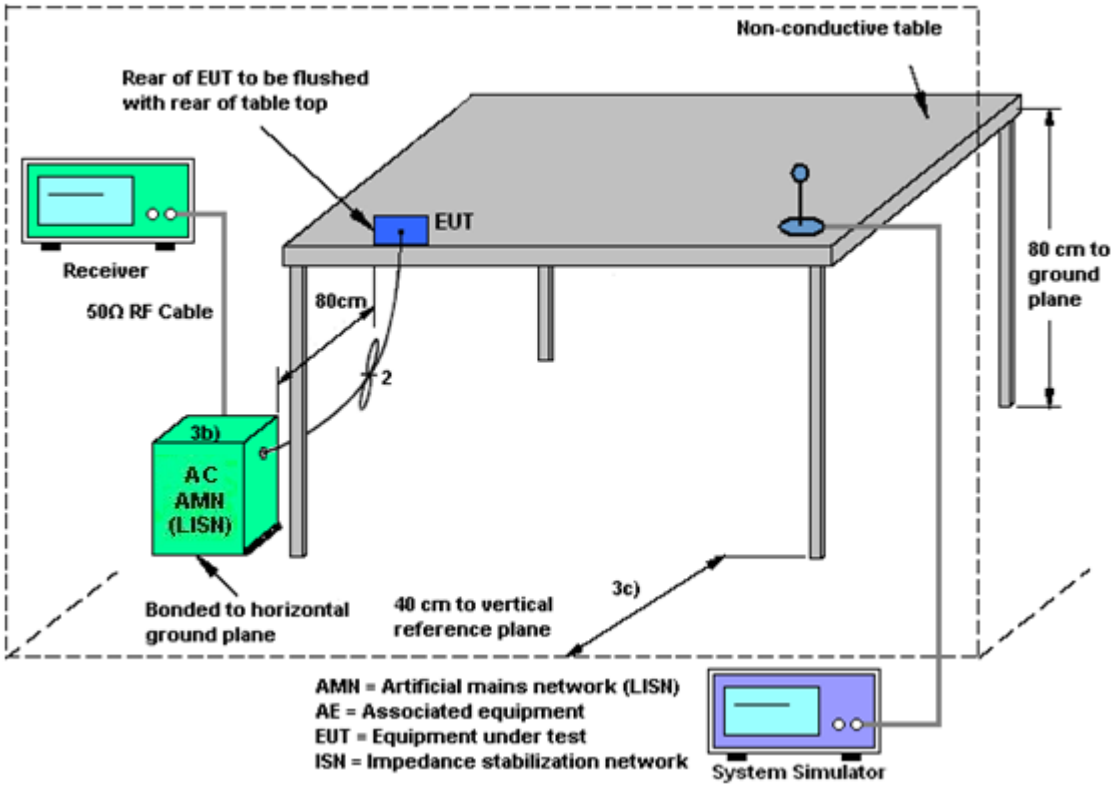
3.5.2 Measuring Instruments

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	101078	10Hz~40GHz	Apr. 18, 2019	May 18, 2019	Apr. 17, 2020	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 22, 2018	May 18, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 22, 2018	May 18, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Aug. 30, 2018	May 21, 2019	Aug. 29, 2019	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2018	May 21, 2019	May 29, 2019	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jun. 05, 2018	May 21, 2019	Jun. 04, 2019	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	119436	1GHz~18GHz	Jun. 28, 2018	May 21, 2019	Jun. 27, 2019	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Mar. 30, 2019	May 21, 2019	Mar. 29, 2020	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 19, 2019	May 21, 2019	Apr. 18, 2020	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1707137	1GHz~18GHz	Oct. 19, 2018	May 21, 2019	Oct. 18, 2019	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270104	0.5GHz~26.5Ghz	Dec. 22, 2018	May 21, 2019	Dec. 21, 2019	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 17, 2018	May 21, 2019	Jul. 16, 2019	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	May 21, 2019	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 21, 2019	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 21, 2019	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 23, 2018	May 18, 2019	Dec. 22, 2019	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Oct. 18, 2018	May 18, 2019	Oct. 17, 2019	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Dec. 23, 2018	May 18, 2019	Dec. 22, 2019	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 18, 2018	May 18, 2019	Jul. 17, 2019	Conduction (CO01-SZ)

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))	**2.6dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.8 dB**

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.3 dB**

Appendix A. Conducted Test Results

Report Number : FR951002F

Test Engineer:	Sam Zheng	Temperature:	24~26	°C
Test Date:	2019/5/18	Relative Humidity:	50~53	%

Report Number : FR951002F

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	18.03	22.08	16.30	0.5	Pass
11a	6Mbps	1	157	5785	18.68	25.18	16.30	0.5	Pass
11a	6Mbps	1	165	5825	17.93	21.73	16.30	0.5	Pass
HT20	MCS 0	1	149	5745	18.73	22.28	17.04	0.5	Pass
HT20	MCS 0	1	157	5785	19.08	22.48	17.24	0.5	Pass
HT20	MCS 0	1	165	5825	18.53	22.33	17.30	0.5	Pass
HT40	MCS 0	1	151	5755	36.66	43.07	35.72	0.5	Pass
HT40	MCS 0	1	159	5795	36.56	42.89	35.49	0.5	Pass
VHT80	MCS 0	1	155	5775	75.16	85.19	75.05	0.5	Pass

TEST RESULTS DATA
Average Power Table

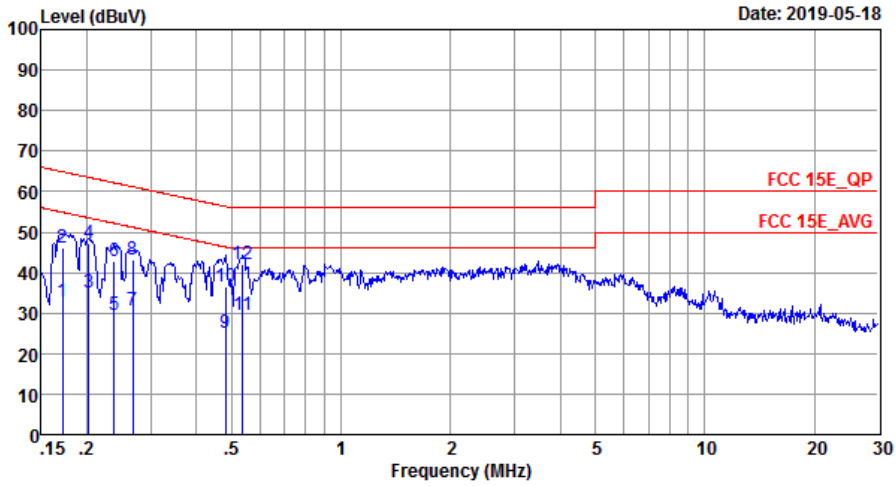
Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.04	8.91	30.00	1.00		Pass
11a	6Mbps	1	157	5785	0.04	16.12	30.00	1.00		Pass
11a	6Mbps	1	165	5825	0.04	8.92	30.00	1.00		Pass
HT20	MCS 0	1	149	5745	0.04	8.88	30.00	1.00		Pass
HT20	MCS 0	1	157	5785	0.04	15.02	30.00	1.00		Pass
HT20	MCS 0	1	165	5825	0.04	8.83	30.00	1.00		Pass
HT40	MCS 0	1	151	5755	0.08	8.97	30.00	1.00		Pass
HT40	MCS 0	1	159	5795	0.08	8.96	30.00	1.00		Pass
VHT20	MCS 0	1	149	5745	0.04	8.79	30.00	1.00		Pass
VHT20	MCS 0	1	157	5785	0.04	15.01	30.00	1.00		Pass
VHT20	MCS 0	1	165	5825	0.04	8.81	30.00	1.00		Pass
VHT40	MCS 0	1	151	5755	0.08	8.93	30.00	1.00		Pass
VHT40	MCS 0	1	159	5795	0.08	8.94	30.00	1.00		Pass
VHT80	MCS 0	1	155	5775	0.12	9.09	30.00	1.00		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.04	2.22	-5.39	30.00	1.00	Pass
11a	6Mbps	1	157	5785	0.04	2.22	2.11	30.00	1.00	Pass
11a	6Mbps	1	165	5825	0.04	2.22	-5.42	30.00	1.00	Pass
HT20	MCS 0	1	149	5745	0.04	2.22	-5.17	30.00	1.00	Pass
HT20	MCS 0	1	157	5785	0.04	2.22	0.80	30.00	1.00	Pass
HT20	MCS 0	1	165	5825	0.04	2.22	-5.69	30.00	1.00	Pass
HT40	MCS 0	1	151	5755	0.08	2.22	-8.26	30.00	1.00	Pass
HT40	MCS 0	1	159	5795	0.08	2.22	-8.22	30.00	1.00	Pass
VHT80	MCS 0	1	155	5775	0.12	2.22	-10.93	30.00	1.00	Pass

Appendix B. AC Conducted Emission Test Results

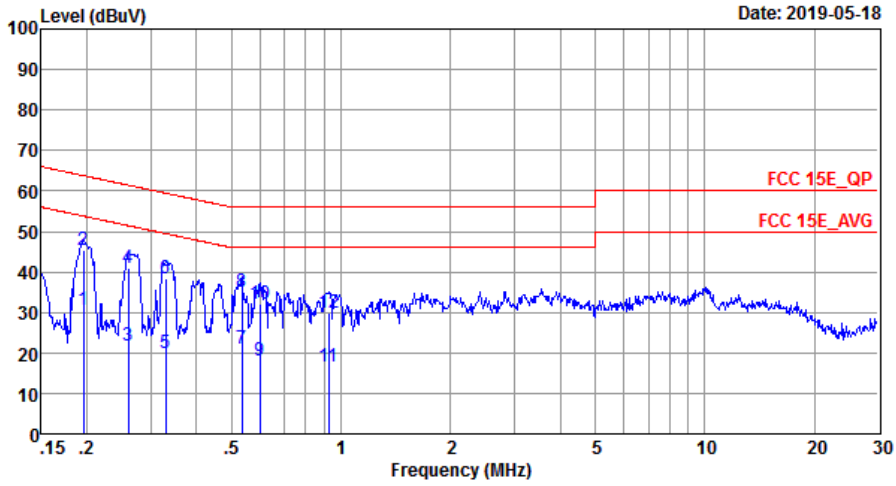
Test Engineer :	Liuda Lin	Temperature :	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20180719_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.17	32.69	-22.21	54.90	22.50	0.03	10.16	Average
2		0.17	45.99	-18.91	64.90	35.80	0.03	10.16	QP
3		0.20	34.99	-18.50	53.49	24.80	0.03	10.16	Average
4		0.20	47.09	-16.40	63.49	36.90	0.03	10.16	QP
5		0.24	29.69	-22.48	52.17	19.50	0.03	10.16	Average
6		0.24	42.79	-19.38	62.17	32.60	0.03	10.16	QP
7		0.27	30.80	-20.40	51.20	20.60	0.03	10.17	Average
8		0.27	43.20	-18.00	61.20	33.00	0.03	10.17	QP
9		0.48	25.00	-21.32	46.32	14.81	0.02	10.17	Average
10		0.48	36.40	-19.92	56.32	26.21	0.02	10.17	QP
11		0.54	29.69	-16.31	46.00	19.50	0.02	10.17	Average
12	*	0.54	41.89	-14.11	56.00	31.70	0.02	10.17	QP

Test Engineer :	Liuda Lin	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20180719_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.20	30.69	-23.11	53.80	20.50	0.03	10.16	Average
2	*	0.20	45.49	-18.31	63.80	35.30	0.03	10.16	QP
3		0.26	21.90	-29.52	51.42	11.70	0.03	10.17	Average
4		0.26	41.10	-20.32	61.42	30.90	0.03	10.17	QP
5		0.33	20.00	-29.44	49.44	9.80	0.03	10.17	Average
6		0.33	38.40	-21.04	59.44	28.20	0.03	10.17	QP
7		0.53	21.19	-24.81	46.00	11.00	0.02	10.17	Average
8		0.53	34.89	-21.11	56.00	24.70	0.02	10.17	QP
9		0.60	18.00	-28.00	46.00	7.80	0.02	10.18	Average
10		0.60	32.20	-23.80	56.00	22.00	0.02	10.18	QP
11		0.92	16.52	-29.48	46.00	6.30	0.04	10.18	Average
12		0.92	29.82	-26.18	56.00	19.60	0.04	10.18	QP

Appendix C. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5623.8	53.6	-14.6	68.2	37.44	34.48	14.78	33.1	100	268	P	H
		5682.4	54.48	-37.73	92.21	38.23	34.48	14.87	33.1	100	268	P	H
		5702.8	53.84	-52.15	105.99	37.5	34.47	14.97	33.1	100	268	P	H
		5721.2	53.84	-59.7	113.54	37.51	34.46	14.97	33.1	100	268	P	H
	*	5745	94.86	-	-	78.45	34.45	15.06	33.1	100	268	P	H
		5745	89.86	-	-	73.45	34.45	15.06	33.1	100	268	A	H
		5603.4	53.67	-14.53	68.2	37.62	34.46	14.69	33.1	397	241	P	V
		5681.6	53.69	-37.93	91.62	37.44	34.48	14.87	33.1	397	241	P	V
		5703.6	53.59	-52.62	106.21	37.25	34.47	14.97	33.1	397	241	P	V
		5723.6	53.46	-65.55	119.01	37.13	34.46	14.97	33.1	397	241	P	V
	*	5745	96.59	-	-	80.18	34.45	15.06	33.1	397	241	P	V
		5745	88.97	-	-	72.56	34.45	15.06	33.1	397	241	A	V

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 157 5785MHz		5615.6	54.57	-13.63	68.2	38.5	34.48	14.69	33.1	103	264	P	H
		5671.8	53.53	-30.84	84.37	37.28	34.48	14.87	33.1	103	264	P	H
		5700.8	54.72	-50.7	105.42	38.38	34.47	14.97	33.1	103	264	P	H
		5724.2	53.58	-66.8	120.38	37.25	34.46	14.97	33.1	103	264	P	H
	*	5785	102	-	-	85.51	34.44	15.15	33.1	103	264	P	H
		5785	95.45	-	-	78.96	34.44	15.15	33.1	103	264	A	H
		5852	53.07	-64.57	117.64	36.53	34.41	15.23	33.1	103	264	P	H
		5862	53.33	-55.51	108.84	36.71	34.4	15.32	33.1	103	264	P	H
		5889.6	53.53	-40.83	94.36	36.89	34.42	15.32	33.1	103	264	P	H
		5934.2	54.21	-13.99	68.2	37.37	34.45	15.49	33.1	103	264	P	H
		5632.4	54.05	-14.15	68.2	37.89	34.48	14.78	33.1	393	239	P	V
		5694.4	54.21	-46.86	101.07	37.96	34.48	14.87	33.1	393	239	P	V
		5713	54.12	-54.72	108.84	37.78	34.47	14.97	33.1	393	239	P	V
		5723.6	53.64	-65.37	119.01	37.31	34.46	14.97	33.1	393	239	P	V
	*	5785	101.19	-	-	84.71	34.43	15.15	33.1	393	239	P	V
		5785	93.88	-	-	77.4	34.43	15.15	33.1	393	239	A	V
		5851.6	52.57	-65.98	118.55	36.03	34.41	15.23	33.1	393	239	P	V
		5858	53.2	-56.76	109.96	36.58	34.4	15.32	33.1	393	239	P	V
		5923	53.72	-15.95	69.67	36.97	34.45	15.4	33.1	393	239	P	V
		5949.6	53.5	-14.7	68.2	36.65	34.46	15.49	33.1	393	239	P	V

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 165 5825MHz	*	5825	94.73	-	-	78.18	34.42	15.23	33.1	120	265	P	H
	*	5825	88.03	-	-	71.48	34.42	15.23	33.1	120	265	A	H
		5854.4	53.09	-59.08	112.17	36.56	34.4	15.23	33.1	120	265	P	H
		5866.6	52.97	-54.58	107.55	36.35	34.4	15.32	33.1	120	265	P	H
		5923.4	53.66	-15.72	69.38	36.91	34.45	15.4	33.1	120	265	P	H
		5949	54.12	-14.08	68.2	37.27	34.46	15.49	33.1	120	265	P	H
	*	5825	96.55	-	-	80	34.42	15.23	33.1	393	239	P	V
	*	5825	90.78	-	-	74.23	34.42	15.23	33.1	393	239	A	V
		5852.8	55.73	-60.09	115.82	39.19	34.41	15.23	33.1	393	239	P	V
		5859.8	55.26	-54.19	109.45	38.64	34.4	15.32	33.1	393	239	P	V
		5919.2	54.33	-18.15	72.48	37.59	34.44	15.4	33.1	393	239	P	V
		5931.8	54.76	-13.44	68.2	38.01	34.45	15.4	33.1	393	239	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11a (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	43.85	-30.15	74	43.7	37.69	20.22	57.76	160	360	P	H
		17235	49.39	-18.81	68.2	40.05	43.89	23.42	57.97	170	360	P	H
		11490	46.26	-27.74	74	46.11	37.69	20.22	57.76	142	325	P	V
		17235	46.93	-21.27	68.2	37.59	43.89	23.42	57.97	129	317	P	V
802.11a CH 157 5785MHz		11570	44.67	-29.33	74	44.28	37.81	20.25	57.67	175	198	P	H
		17355	48.18	-20.02	68.2	38.96	43.53	23.49	57.8	189	185	P	H
		11570	45.84	-28.16	74	45.45	37.81	20.25	57.67	148	263	P	V
		17355	46.24	-21.96	68.2	37.02	43.53	23.49	57.8	157	149	P	V
802.11a CH 165 5825MHz		11650	44.5	-29.5	74	43.88	37.92	20.29	57.59	129	316	P	H
		17475	49.17	-19.03	68.2	40.07	43.18	23.56	57.64	142	199	P	H
		11650	46.15	-27.85	74	45.53	37.92	20.29	57.59	156	347	P	V
		17475	46.88	-21.32	68.2	37.78	43.18	23.56	57.64	150	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 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)
		5627.4	54.05	-14.15	68.2	37.89	34.48	14.78	33.1	124	266	P	H
		5694.2	54.64	-46.28	100.92	38.39	34.48	14.87	33.1	124	266	P	H
		5705.2	54.42	-52.24	106.66	38.08	34.47	14.97	33.1	124	266	P	H
		5724.2	54.12	-66.26	120.38	37.79	34.46	14.97	33.1	124	266	P	H
802.11n	*	5745	95.11	-	-	78.7	34.45	15.06	33.1	124	266	P	H
HT20		5745	88.89	-	-	72.48	34.45	15.06	33.1	124	266	A	H
CH 149		5619.8	53.47	-14.73	68.2	37.4	34.48	14.69	33.1	384	236	P	V
5745MHz		5668.4	54.44	-27.41	81.85	38.19	34.48	14.87	33.1	384	236	P	V
		5712	53.84	-54.72	108.56	37.5	34.47	14.97	33.1	384	236	P	V
		5721.6	53.87	-60.58	114.45	37.54	34.46	14.97	33.1	384	236	P	V
	*	5745	97.95	-	-	81.54	34.45	15.06	33.1	384	236	P	V
		5745	91.26	-	-	74.85	34.45	15.06	33.1	384	236	A	V

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)
		5627.4	53.71	-14.49	68.2	37.55	34.48	14.78	33.1	124	266	P	H
		5675.2	53.69	-33.2	86.89	37.44	34.48	14.87	33.1	124	266	P	H
		5717.2	53.52	-56.5	110.02	37.18	34.47	14.97	33.1	124	266	P	H
		5723	52.57	-65.07	117.64	36.24	34.46	14.97	33.1	124	266	P	H
	*	5785	100.74	-	-	84.25	34.44	15.15	33.1	124	266	P	H
		5785	95.45	-	-	78.96	34.44	15.15	33.1	124	266	A	H
		5853	52.79	-62.57	115.36	36.25	34.41	15.23	33.1	124	266	P	H
		5873.4	52.93	-52.72	105.65	36.3	34.41	15.32	33.1	124	266	P	H
802.11n		5883.8	53.56	-45.11	98.67	36.93	34.41	15.32	33.1	124	266	P	H
HT20		5931.8	53.78	-14.42	68.2	37.03	34.45	15.4	33.1	124	266	P	H
CH 157		5636.6	55.4	-12.8	68.2	39.22	34.5	14.78	33.1	379	249	P	V
5785MHz		5655.2	54.58	-17.48	72.06	38.41	34.49	14.78	33.1	379	249	P	V
		5713	54.98	-53.86	108.84	38.64	34.47	14.97	33.1	379	249	P	V
		5723	53.44	-64.2	117.64	37.11	34.46	14.97	33.1	379	249	P	V
	*	5785	102.87	-	-	86.38	34.44	15.15	33.1	379	249	P	V
		5785	96.7	-	-	80.21	34.44	15.15	33.1	379	249	A	V
		5854.2	54.71	-57.91	112.62	38.18	34.4	15.23	33.1	379	249	P	V
		5862.8	55.02	-53.59	108.61	38.4	34.4	15.32	33.1	379	249	P	V
		5921.2	53.94	-17.06	71	37.2	34.44	15.4	33.1	379	249	P	V
		5943.6	55.49	-12.71	68.2	38.64	34.46	15.49	33.1	379	249	P	V

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 165 5825MHz	*	5825	93.06	-	-	76.51	34.42	15.23	33.1	123	268	P	H
	*	5825	86.97	-	-	70.42	34.42	15.23	33.1	123	268	A	H
		5854.8	52.6	-58.66	111.26	36.07	34.4	15.23	33.1	123	268	P	H
		5873.4	53.64	-52.01	105.65	37.01	34.41	15.32	33.1	123	268	P	H
		5894.4	54.07	-36.74	90.81	37.43	34.42	15.32	33.1	123	268	P	H
		5936.4	53.86	-14.34	68.2	37.02	34.45	15.49	33.1	123	268	P	H
	*	5825	96.35	-	-	79.8	34.42	15.23	33.1	354	257	P	V
	*	5825	88.91	-	-	72.36	34.42	15.23	33.1	354	257	A	V
		5854	53.14	-59.94	113.08	36.61	34.4	15.23	33.1	354	257	P	V
		5863.2	54.94	-53.56	108.5	38.32	34.4	15.32	33.1	354	257	P	V
		5886.4	55.65	-41.09	96.74	39.02	34.41	15.32	33.1	354	257	P	V
		5927.2	54.49	-13.71	68.2	37.74	34.45	15.4	33.1	354	257	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 (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		11490	43.81	-30.19	74	43.66	37.69	20.22	57.76	160	360	P	H
HT20		17235	49.07	-19.13	68.2	39.73	43.89	23.42	57.97	170	360	P	H
CH 149		11490	46.2	-27.8	74	46.05	37.69	20.22	57.76	142	325	P	V
5745MHz		17235	46.75	-21.45	68.2	37.41	43.89	23.42	57.97	129	317	P	V
802.11n		11570	44.36	-29.64	74	43.97	37.81	20.25	57.67	175	198	P	H
HT20		17355	47.99	-20.21	68.2	38.77	43.53	23.49	57.8	189	185	P	H
CH 157		11570	45.43	-28.57	74	45.04	37.81	20.25	57.67	148	263	P	V
5785MHz		17355	45.57	-22.63	68.2	36.35	43.53	23.49	57.8	157	149	P	V
802.11n		11650	44.36	-29.64	74	43.74	37.92	20.29	57.59	129	316	P	H
HT20		17475	48.9	-19.3	68.2	39.8	43.18	23.56	57.64	142	199	P	H
CH 165		11650	45.94	-28.06	74	45.32	37.92	20.29	57.59	156	347	P	V
5825MHz		17475	47.02	-21.18	68.2	37.92	43.18	23.56	57.64	150	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 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)
		5612.2	54.32	-13.88	68.2	38.27	34.46	14.69	33.1	125	268	P	H
		5685.6	53.57	-41.01	94.58	37.32	34.48	14.87	33.1	125	268	P	H
		5708.4	53.81	-53.74	107.55	37.47	34.47	14.97	33.1	125	268	P	H
		5724.6	55.66	-65.63	121.29	39.33	34.46	14.97	33.1	125	268	P	H
	*	5755	91.97	-	-	75.56	34.45	15.06	33.1	125	268	P	H
		5755	85.36	-	-	68.95	34.45	15.06	33.1	125	268	A	H
		5851.2	53.25	-66.21	119.46	36.71	34.41	15.23	33.1	125	268	P	H
		5860.2	53.41	-55.93	109.34	36.79	34.4	15.32	33.1	125	268	P	H
802.11n		5911.8	54.03	-23.91	77.94	37.29	34.44	15.4	33.1	125	268	P	H
HT40		5948.8	53.96	-14.24	68.2	37.11	34.46	15.49	33.1	125	268	P	H
CH 151		5611	54.06	-14.14	68.2	38.01	34.46	14.69	33.1	383	236	P	V
5755MHz		5676	53.22	-34.26	87.48	36.97	34.48	14.87	33.1	383	236	P	V
		5719.6	54.14	-56.55	110.69	37.81	34.46	14.97	33.1	383	236	P	V
		5724.4	55.37	-65.46	120.83	39.04	34.46	14.97	33.1	383	236	P	V
	*	5755	94.22	-	-	77.81	34.45	15.06	33.1	383	236	P	V
		5755	86.58	-	-	70.17	34.45	15.06	33.1	383	236	A	V
		5854.2	53.58	-59.04	112.62	37.05	34.4	15.23	33.1	383	236	P	V
		5868.2	54.38	-52.72	107.1	37.76	34.4	15.32	33.1	383	236	P	V
		5876.8	54.89	-48.97	103.86	38.26	34.41	15.32	33.1	383	236	P	V
		5930.6	54.16	-14.04	68.2	37.41	34.45	15.4	33.1	383	236	P	V

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)
		5600.2	54.5	-13.7	68.2	38.45	34.46	14.69	33.1	120	266	P	H
		5650.2	54.43	-13.92	68.35	38.26	34.49	14.78	33.1	120	266	P	H
		5713.8	53.52	-55.55	109.07	37.18	34.47	14.97	33.1	120	266	P	H
		5720	52.86	-57.94	110.8	36.53	34.46	14.97	33.1	120	266	P	H
	*	5795	92.51	-	-	76.03	34.43	15.15	33.1	120	266	P	H
		5795	86.63	-	-	70.15	34.43	15.15	33.1	120	266	A	H
		5853.2	52.04	-62.86	114.9	35.5	34.41	15.23	33.1	120	266	P	H
		5868.4	53.09	-53.96	107.05	36.47	34.4	15.32	33.1	120	266	P	H
802.11n		5920.8	53.59	-17.71	71.3	36.85	34.44	15.4	33.1	120	266	P	H
HT40		5927.4	54.29	-13.91	68.2	37.54	34.45	15.4	33.1	120	266	P	H
CH 159		5604.6	52.59	-15.61	68.2	36.54	34.46	14.69	33.1	388	291	P	V
5795MHz		5649.8	53.47	-14.73	68.2	37.3	34.49	14.78	33.1	388	291	P	V
		5663.4	52.64	-25.51	78.15	36.38	34.49	14.87	33.1	388	291	P	V
		5712.4	53.11	-55.56	108.67	36.77	34.47	14.97	33.1	388	291	P	V
	*	5795	96.51	-	-	80.03	34.43	15.15	33.1	388	291	P	V
		5795	89.13	-	-	72.65	34.43	15.15	33.1	388	291	A	V
		5854.4	51.41	-60.76	112.17	34.88	34.4	15.23	33.1	388	291	P	V
		5869	52.48	-54.4	106.88	35.86	34.4	15.32	33.1	388	291	P	V
		5920	53.53	-18.36	71.89	36.79	34.44	15.4	33.1	388	291	P	V
		5929	51.21	-16.99	68.2	34.46	34.45	15.4	33.1	388	291	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		11510	44.07	-29.93	74	43.89	37.7	20.22	57.74	160	185	P	H
HT40		17265	48.71	-19.49	68.2	39.4	43.79	23.44	57.92	170	285	P	H
CH 151		11510	45.72	-28.28	74	45.54	37.7	20.22	57.74	160	360	P	V
5755MHz		17265	46.33	-21.87	68.2	37.02	43.79	23.44	57.92	170	360	P	V
802.11n		11590	44.08	-29.92	74	43.62	37.84	20.27	57.65	170	300	P	H
HT40		17385	47.99	-20.21	68.2	38.8	43.43	23.51	57.75	150	200	P	H
CH 159		11590	47.24	-26.76	74	46.78	37.84	20.27	57.65	170	300	P	V
5795MHz		17385	46.51	-21.69	68.2	37.32	43.43	23.51	57.75	150	200	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 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)
		5626	53.38	-14.82	68.2	37.22	34.48	14.78	33.1	120	263	P	H
		5656.6	54.22	-18.88	73.1	38.05	34.49	14.78	33.1	120	263	P	H
		5716	54.16	-55.52	109.68	37.82	34.47	14.97	33.1	120	263	P	H
		5725	54.57	-67.63	122.2	38.24	34.46	14.97	33.1	120	263	P	H
	*	5775	91.47	-	-	75.07	34.44	15.06	33.1	120	263	P	H
		5775	86.55	-	-	70.15	34.44	15.06	33.1	120	263	A	H
		5854.2	52.72	-59.9	112.62	36.19	34.4	15.23	33.1	120	263	P	H
		5868.8	53.8	-53.13	106.93	37.18	34.4	15.32	33.1	120	263	P	H
802.11n		5909.2	54.13	-25.73	79.86	37.39	34.44	15.4	33.1	120	263	P	H
VHT80		5932.6	53.66	-14.54	68.2	36.91	34.45	15.4	33.1	120	263	P	H
CH 155		5626.4	53.57	-14.63	68.2	37.41	34.48	14.78	33.1	382	235	P	V
5775MHz		5655.8	54.7	-17.81	72.51	38.53	34.49	14.78	33.1	382	235	P	V
		5707	53.83	-53.33	107.16	37.49	34.47	14.97	33.1	382	235	P	V
		5722.4	52.94	-63.33	116.27	36.61	34.46	14.97	33.1	382	235	P	V
	*	5775	92.2	-	-	75.8	34.44	15.06	33.1	382	235	P	V
		5775	84.63	-	-	68.23	34.44	15.06	33.1	382	235	A	V
		5854.8	53.91	-57.35	111.26	37.38	34.4	15.23	33.1	382	235	P	V
		5871.6	55	-51.15	106.15	38.37	34.41	15.32	33.1	382	235	P	V
		5885.2	54.66	-42.97	97.63	38.03	34.41	15.32	33.1	382	235	P	V
		5932.2	54.49	-13.71	68.2	37.74	34.45	15.4	33.1	382	235	P	V

Band 4 5725~5850MHz

WIFI 802.11n 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)
802.11n		11550	43.91	-30.09	74	43.56	37.78	20.25	57.68	160	360	P	H
VHT80		17325	48.38	-19.82	68.2	39.11	43.63	23.49	57.85	170	360	P	H
CH 155		11550	46.53	-27.47	74	46.18	37.78	20.25	57.68	160	285	P	V
5775MHz		17325	46.81	-21.39	68.2	37.54	43.63	23.49	57.85	186	360	P	V

Emission below 1GHz

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

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		30	25.37	-14.63	40	31.31	24.4	0.96	31.3	-	-	P	H
		91.11	27.36	-16.14	43.5	42.31	14.9	1.7	31.55	-	-	P	H
		262.8	22	-24	46	31.07	19.67	2.89	31.63	-	-	P	H
		490.75	25.8	-20.2	46	29.87	23.23	3.95	31.25	-	-	P	H
		618.79	29.89	-16.11	46	32.42	24.57	4.43	31.53	-	-	P	H
		879.72	31.81	-14.19	46	31.54	26.44	5.29	31.46	100	95	P	H
		31.94	24.93	-15.07	40	32.31	23.24	0.98	31.6	-	-	P	V
		74.62	26.66	-13.34	40	43.84	12.9	1.52	31.6	100	72	P	V
		88.2	24.71	-18.79	43.5	40.2	14.34	1.67	31.5	-	-	P	V
		417.03	25.23	-20.77	46	31.11	21.91	3.64	31.43	-	-	P	V
		627.52	31.03	-14.97	46	33.45	24.61	4.46	31.49	-	-	P	V
		871.96	32.37	-13.63	46	32.12	26.42	5.27	31.44	-	-	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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

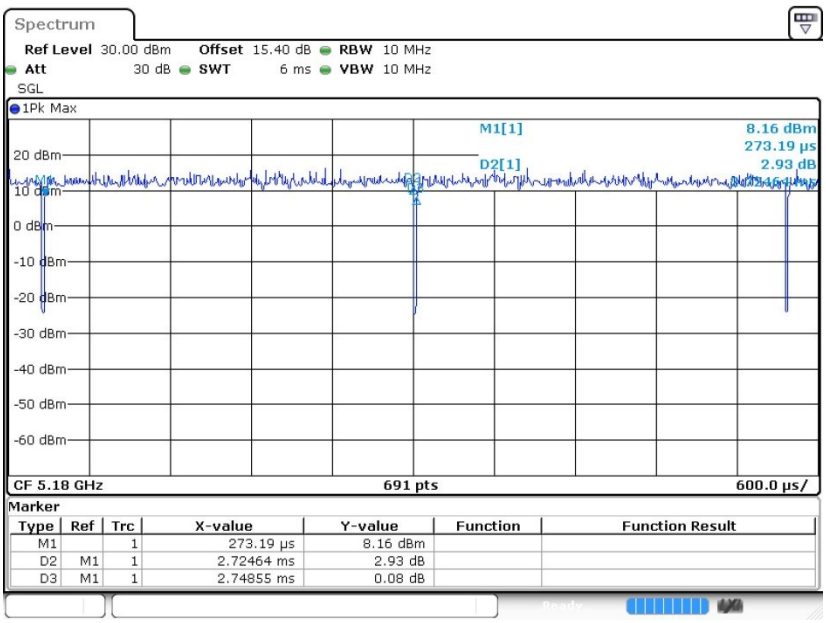
= -10.46(dB)

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

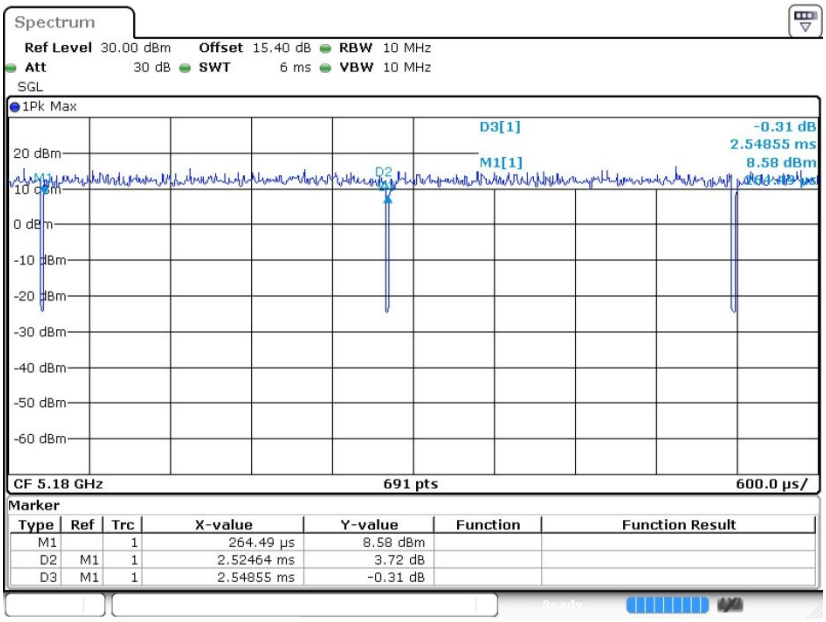
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	99.13	-	-	10Hz
802.11an HT 20	99.06	-	-	10Hz
802.11an HT 40	98.11	-	-	10Hz
802.11ac VHT80	97.19	0.601	1.665	3KHz

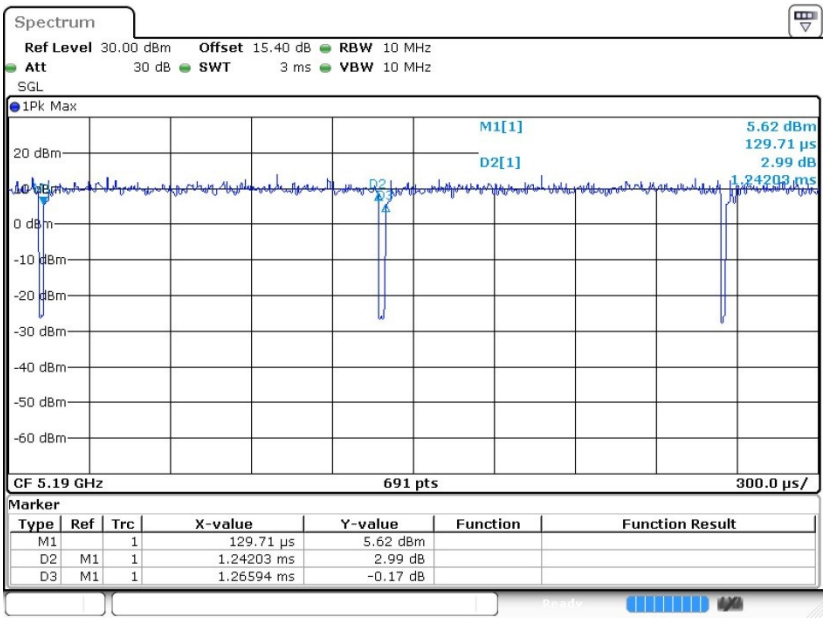
802.11a



802.11an HT20



802.11an HT40



802.11ac VHT80