



FCC RF Test Report

APPLICANT : HTC Corporation
EQUIPMENT : Smartphone
MODEL NAME : 2Q5V200
FCC ID : NM82Q5V200
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jan. 02, 2018 and testing was completed on Feb. 28, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

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.

Approved by: James Huang / Manager



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China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR810208E	Rev. 01	Initial issue of report	Mar. 15, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) & 15.209(a)	Pass	Under limit 3.31 dB at 179.850 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 6.24 dB at 0.552 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

HTC Corporation

No. 88, Sec. 3, Zhongxing Rd. Xindian Dist., New Taipei City, Taiwan

1.2 Manufacturer

Shanghai Longcheer Technology Co.,Ltd

Building 1, No.401, Caobao Rd, Xuhui Dist, Shanghai, P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Model Name	2Q5V200
FCC ID	NM82Q5V200
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA /HSPA+/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/
EUT Stage	Production Unit

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	802.11a : 14.30 dBm / 0.0269 W 802.11n HT20 : 14.41 dBm / 0.0276 W 802.11n HT40 : 14.39 dBm / 0.0275 W
99% Occupied Bandwidth	802.11a : 18.38 MHz 802.11n HT20 : 18.83 MHz 802.11n HT40 : 37.06 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	PIFA Antenna with gain -2.20 dBi



1.5 Modification of EUT

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

1.6 Testing Location

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

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

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

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		
	03CH07-HY		

Note:

1. The test site complies with ANSI C63.4 2014 requirement.
2. Test data subcontracted: radiated emissions only in section 3.4 of this report.



1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

2.1 Carrier Frequency and Channel

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

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

2.2 Test Mode

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

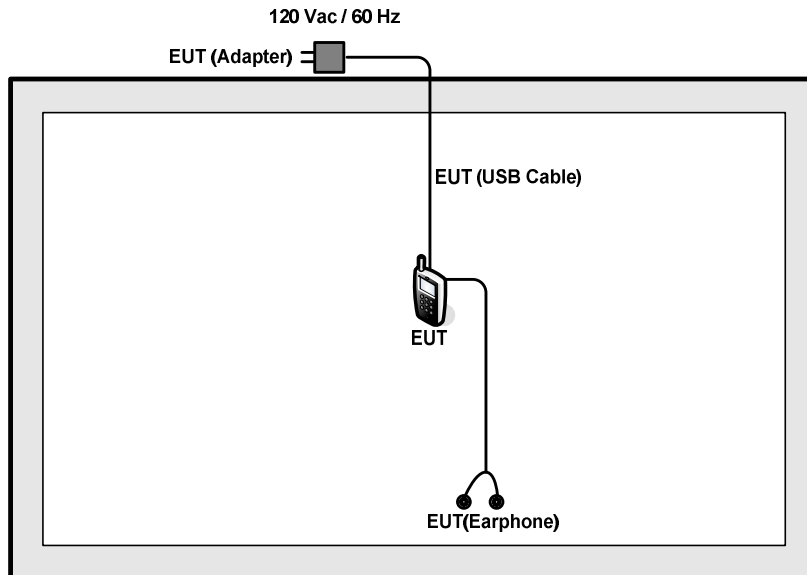
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable (Charging from Adapter) + Earphone
Remark: For Radiated Test Cases, The tests were performed with Earphone, Adapter and USB Cable.	

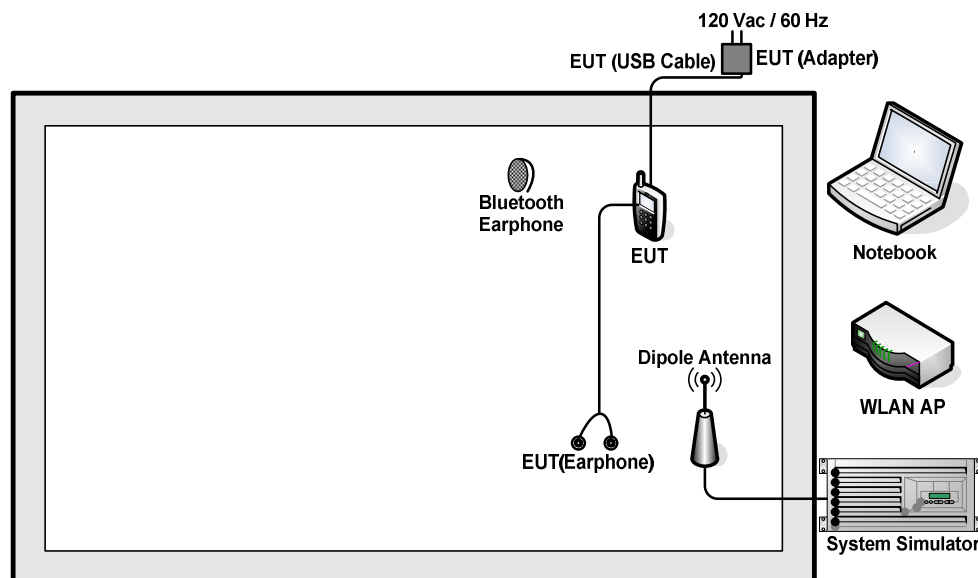
Ch. #		Band IV : 5745-5825 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
5.	SD Card	Kingston	8GB	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.6 dB.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} \\ &= 6.6(\text{dB})\end{aligned}$$

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.

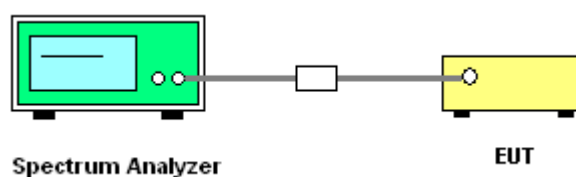
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

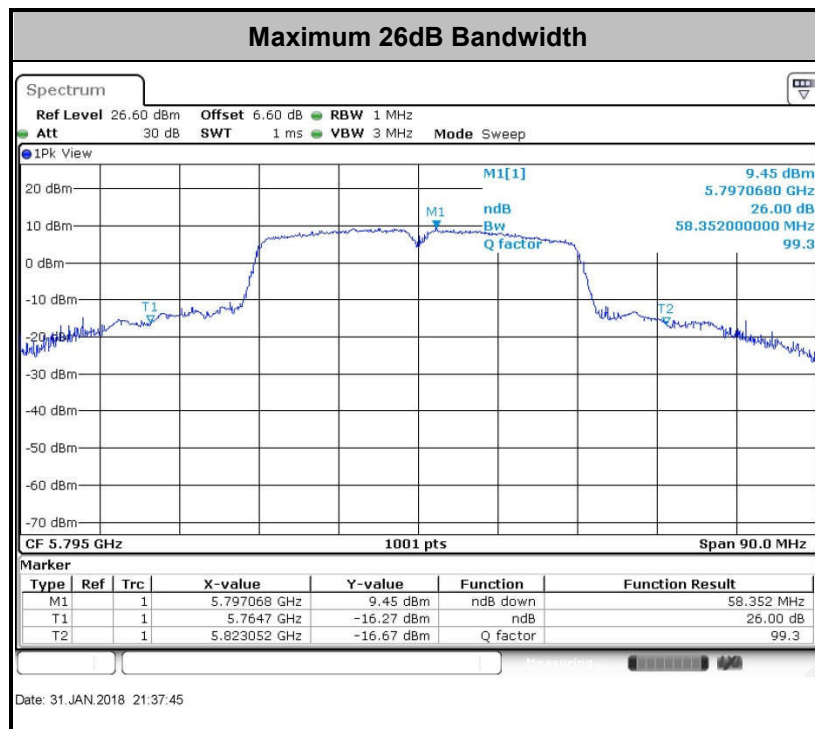
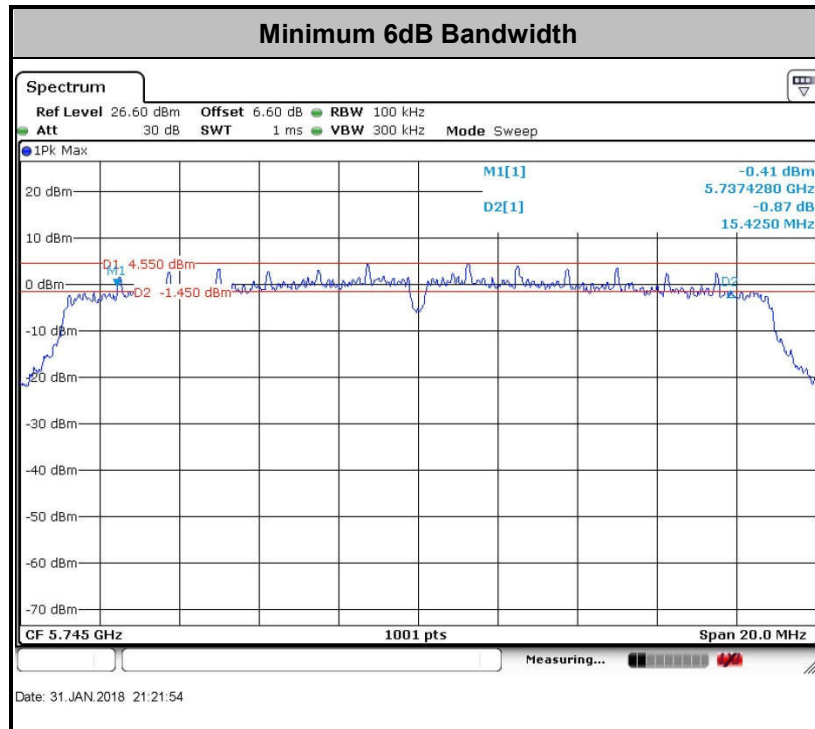
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is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

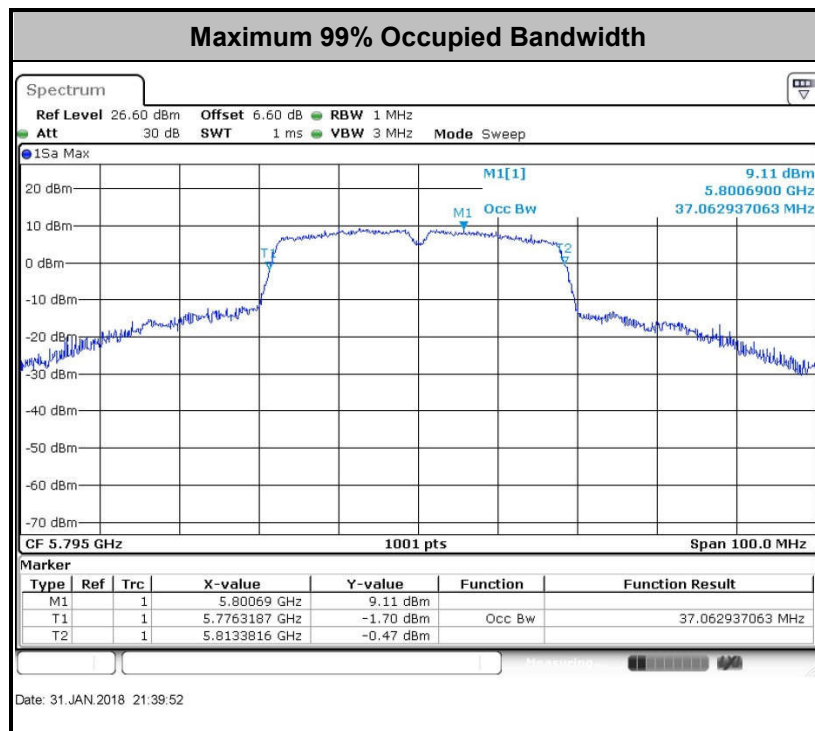
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.





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.

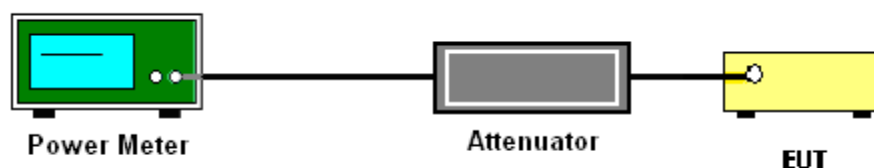
3.2.3 Test Procedures

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).

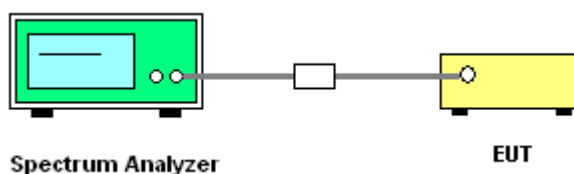
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz.
- Set VBW $\geq$ 1 MHz.
- Number of points in sweep $\geq$ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add $10 \log(500\text{kHz}/\text{RBW})$ 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. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (c): Measure and add $10 \log(N_{\text{ANT}})$ dB.

With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity $10 \log(N_{\text{ANT}})$ dB is added to each spectrum value before comparing to the emission limit. The addition of $10 \log(N_{\text{ANT}})$ dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{\text{ANT}}^{\text{th}}$ of the PSD limit.

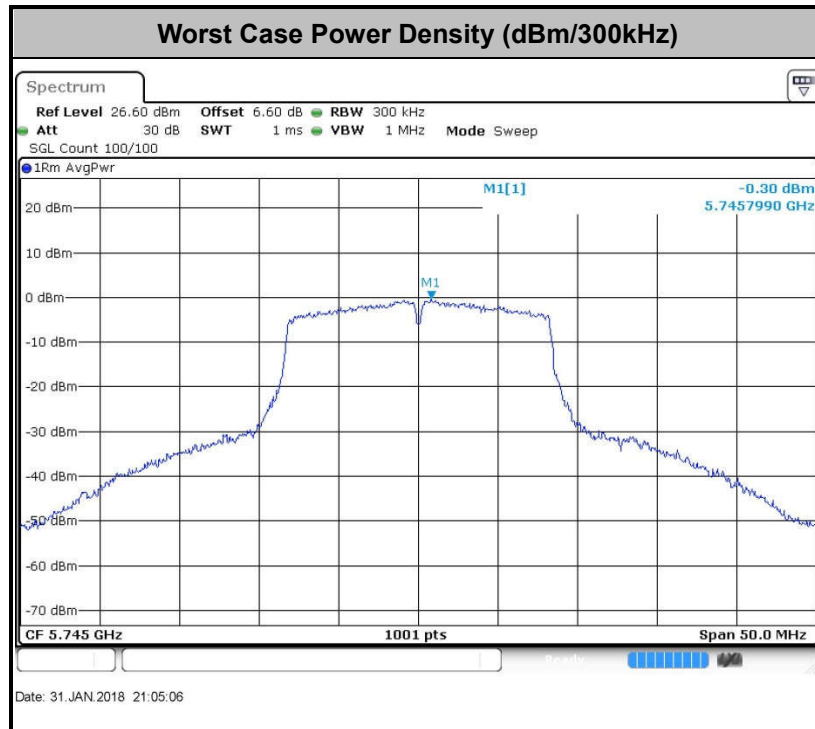
3.3.4 Test Setup





3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

3.4.1 Limit of Unwanted Emissions

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

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

- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

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

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

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

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

(3) KDB789033 D02 v02r01 G)2)c)

- (i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.³
- (ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.⁴

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

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

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW $\geq$ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

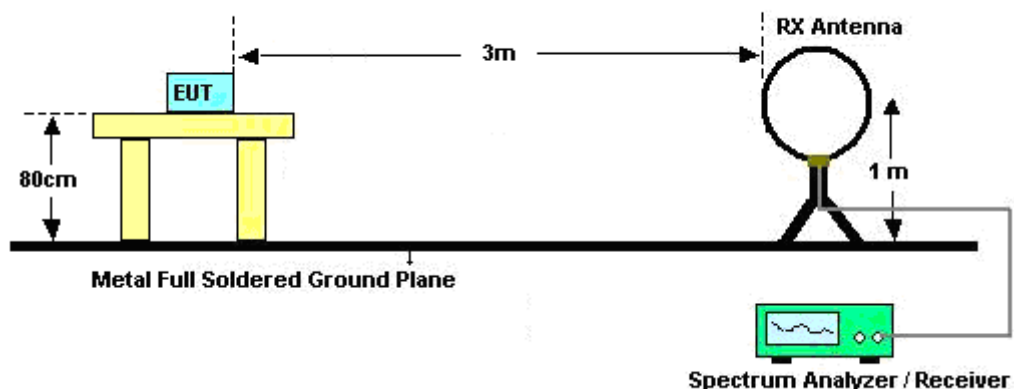
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

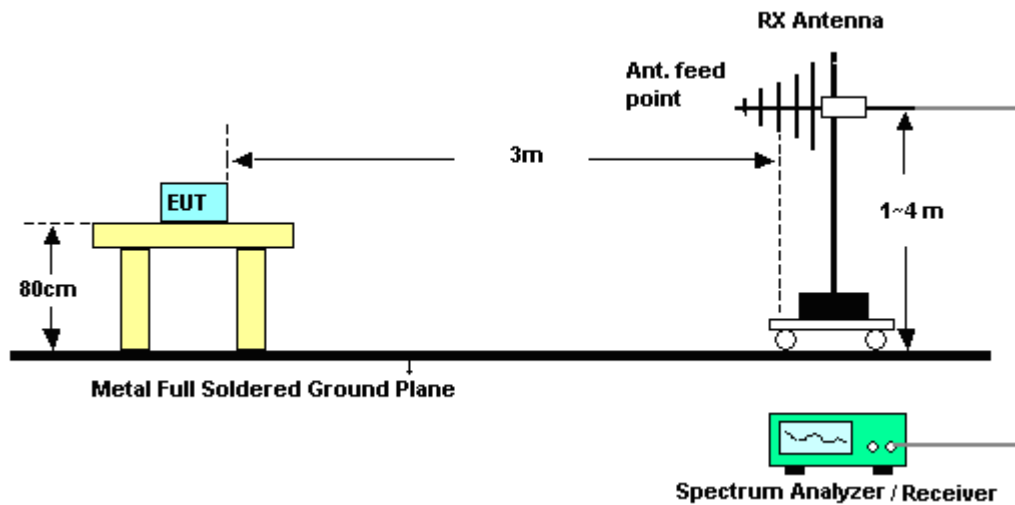
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

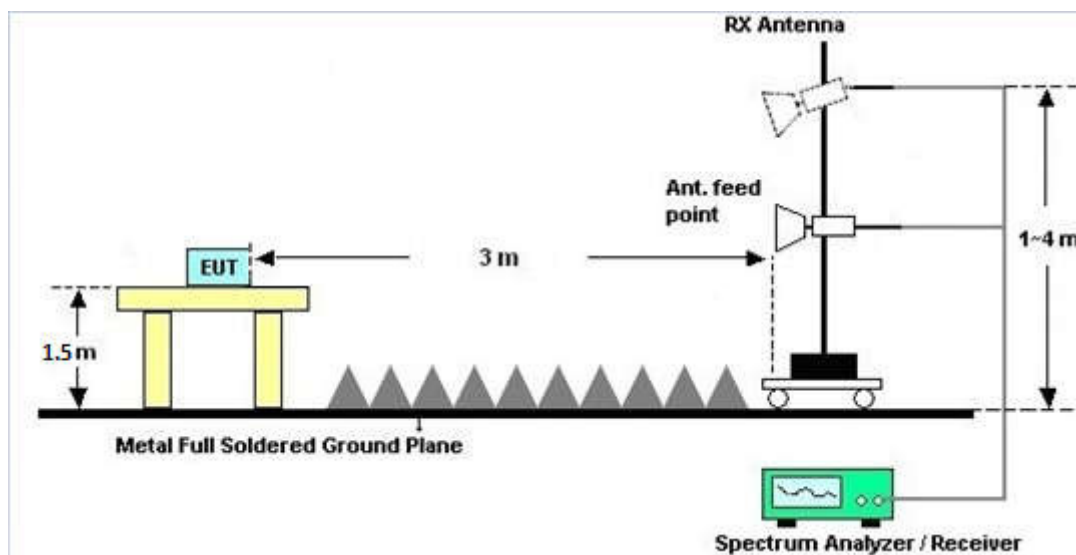
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



**3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.4.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix B.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

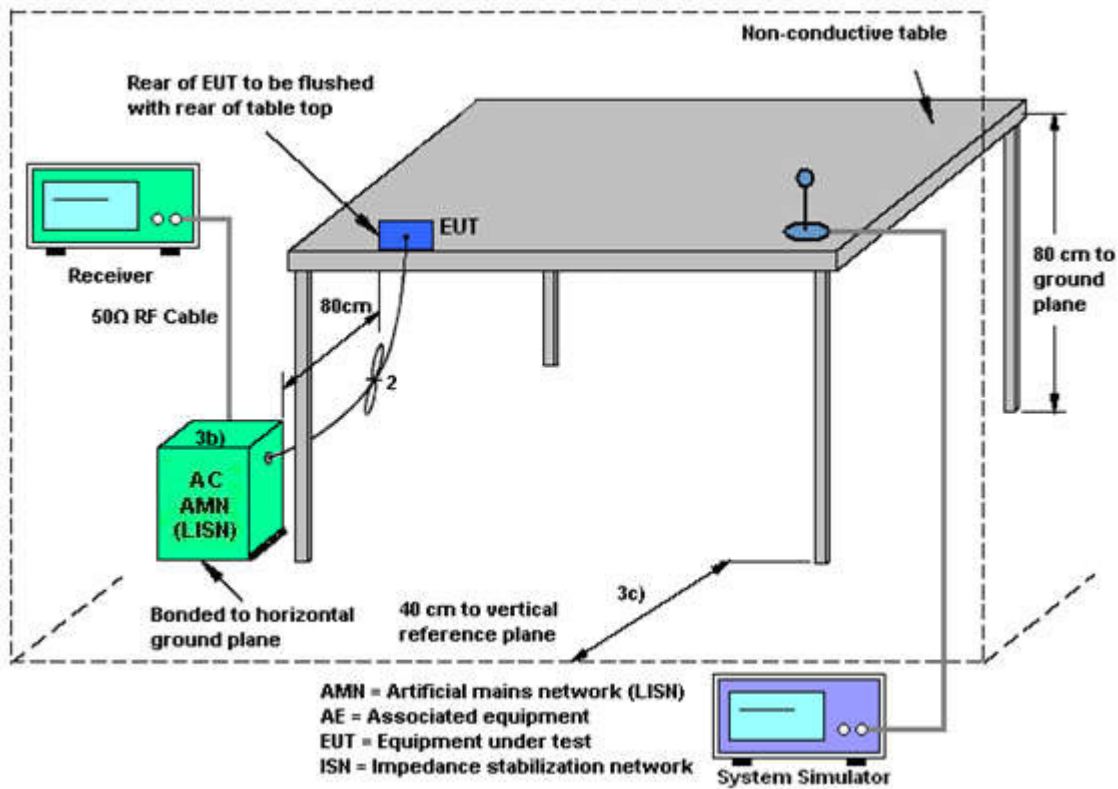
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

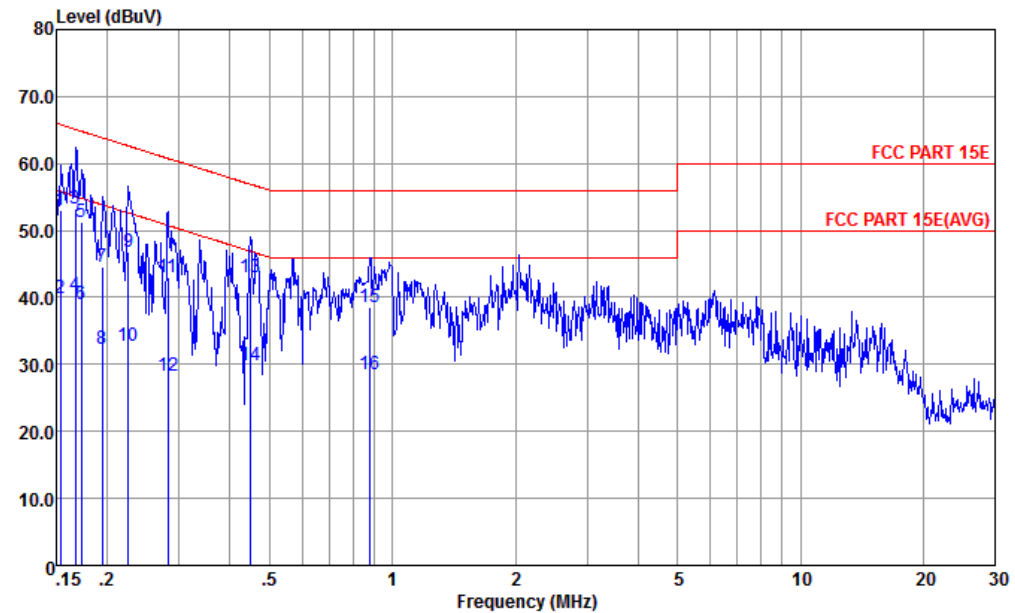
3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Amos Zhang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable (Charging from Adapter) + Earphone		

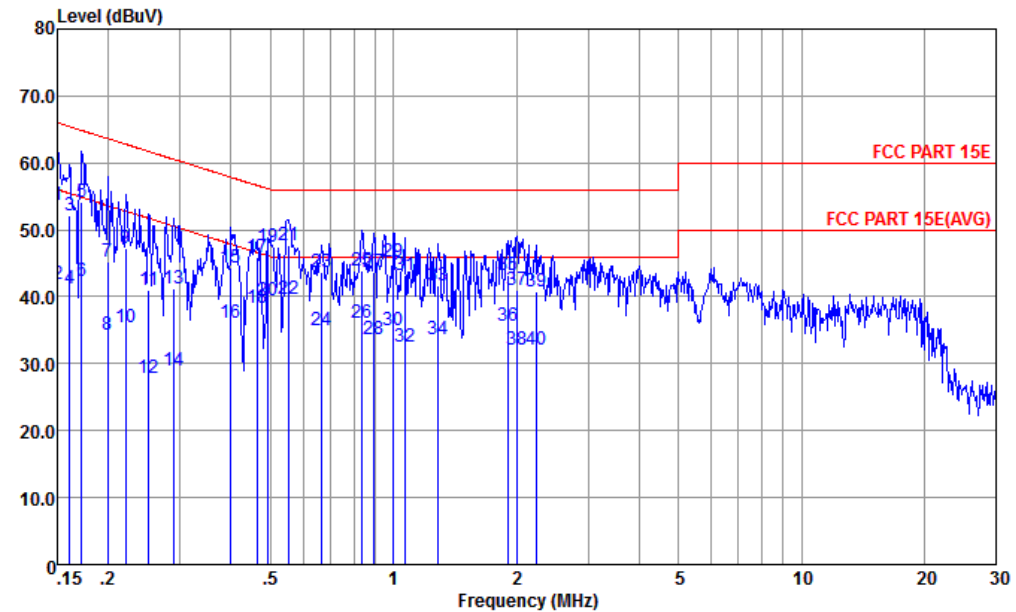


Site : CO01-KS
Condition : FCC PART 15E LISN-L-171013-060103 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.153	52.97	-12.85	65.82	42.20	0.16	10.61	QP
2	0.153	39.97	-15.85	55.82	29.20	0.16	10.61	Average
3 *	0.167	53.33	-11.79	65.12	42.60	0.17	10.56	QP
4	0.167	40.23	-14.89	55.12	29.50	0.17	10.56	Average
5	0.173	51.32	-13.49	64.81	40.60	0.18	10.54	QP
6	0.173	38.92	-15.89	54.81	28.20	0.18	10.54	Average
7	0.194	44.57	-19.27	63.84	33.90	0.20	10.47	QP
8	0.194	32.27	-21.57	53.84	21.60	0.20	10.47	Average
9	0.226	46.85	-15.76	62.61	36.19	0.21	10.45	QP
10	0.226	32.75	-19.86	52.61	22.09	0.21	10.45	Average
11	0.282	42.95	-17.81	60.76	32.30	0.22	10.43	QP
12	0.282	28.25	-22.51	50.76	17.60	0.22	10.43	Average
13	0.447	42.91	-14.02	56.93	32.30	0.25	10.36	QP
14	0.447	29.81	-17.12	46.93	19.20	0.25	10.36	Average
15	0.880	38.46	-17.54	56.00	28.10	0.26	10.10	QP
16	0.880	28.46	-17.54	46.00	18.10	0.26	10.10	Average



Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Amos Zhang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable (Charging from Adapter) + Earphone		

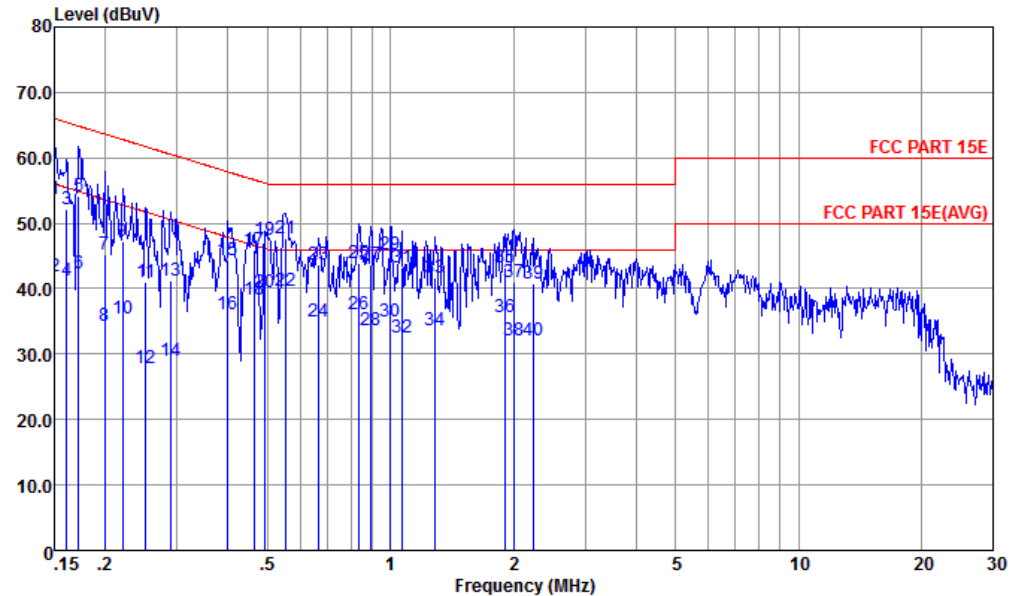


Site : CO01-KS
Condition : FCC PART 15E LISN-N-171013-060103 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	53.80	-12.20	66.00	42.90	0.28	10.62	QP
2	0.150	42.00	-14.00	56.00	31.10	0.28	10.62	Average
3	0.161	52.06	-13.37	65.43	41.20	0.28	10.58	QP
4	0.161	41.16	-14.27	55.43	30.30	0.28	10.58	Average
5	0.172	54.12	-10.74	64.86	43.30	0.28	10.54	QP
6	0.172	42.32	-12.54	54.86	31.50	0.28	10.54	Average
7	0.200	45.34	-18.28	63.62	34.60	0.28	10.46	QP
8	0.200	34.34	-19.28	53.62	23.60	0.28	10.46	Average
9	0.221	47.33	-15.46	62.79	36.60	0.28	10.45	QP
10	0.221	35.33	-17.46	52.79	24.60	0.28	10.45	Average
11	0.251	40.92	-20.81	61.73	30.20	0.28	10.44	QP
12	0.251	27.82	-23.91	51.73	17.10	0.28	10.44	Average
13	0.289	41.31	-19.23	60.54	30.60	0.28	10.43	QP
14	0.289	29.01	-21.53	50.54	18.30	0.28	10.43	Average
15	0.400	44.29	-13.57	57.86	33.59	0.29	10.41	QP
16	0.400	36.19	-11.67	47.86	25.49	0.29	10.41	Average
17	0.464	45.83	-10.80	56.63	35.20	0.29	10.34	QP



Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Amos Zhang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link (5G) + USB Cable (Charging from Adapter) + Earphone		



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	0.464	38.23	-8.40	46.63	27.60	0.29	10.34	Average
19	0.491	47.50	-8.64	56.14	36.90	0.29	10.31	QP
20	0.491	39.50	-6.64	46.14	28.90	0.29	10.31	Average
21	0.552	47.66	-8.34	56.00	37.11	0.29	10.26	QP
22 *	0.552	39.76	-6.24	46.00	29.21	0.29	10.26	Average
23	0.668	43.58	-12.42	56.00	33.10	0.30	10.18	QP
24	0.668	34.98	-11.02	46.00	24.50	0.30	10.18	Average
25	0.839	43.91	-12.09	56.00	33.50	0.31	10.10	QP
26	0.839	36.01	-9.99	46.00	25.60	0.31	10.10	Average
27	0.894	43.61	-12.39	56.00	33.20	0.31	10.10	QP
28	0.894	33.71	-12.29	46.00	23.30	0.31	10.10	Average
29	1.000	45.22	-10.78	56.00	34.80	0.31	10.11	QP
30	1.000	35.02	-10.98	46.00	24.60	0.31	10.11	Average
31	1.065	43.33	-12.67	56.00	32.90	0.31	10.12	QP
32	1.065	32.53	-13.47	46.00	22.10	0.31	10.12	Average
33	1.289	41.56	-14.44	56.00	31.10	0.31	10.15	QP
34	1.289	33.66	-12.34	46.00	23.20	0.31	10.15	Average
35	1.908	43.13	-12.87	56.00	32.60	0.32	10.21	QP
36	1.908	35.63	-10.37	46.00	25.10	0.32	10.21	Average
37	2.012	41.03	-14.97	56.00	30.50	0.32	10.21	QP
38	2.012	32.13	-13.87	46.00	21.60	0.32	10.21	Average
39	2.249	40.73	-15.27	56.00	30.20	0.32	10.21	QP
40	2.249	32.13	-13.87	46.00	21.60	0.32	10.21	Average



3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.6.2 Measuring Instruments

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

3.6.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



3.7 Antenna Requirements

3.7.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2), if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 08, 2017	Jan. 31, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Jan. 31, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Jan. 31, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Dec. 18, 2017	Feb. 08, 2018~ Feb. 14, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Feb. 08, 2018~ Feb. 14, 2018	Aug. 22, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Feb. 08, 2018~ Feb. 14, 2018	Nov. 09, 2019	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2017	Feb. 08, 2018~ Feb. 14, 2018	Apr. 24, 2018	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 14, 2017	Feb. 08, 2018~ Feb. 14, 2018	Mar. 13, 2018	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 30, 2017	Feb. 08, 2018~ Feb. 14, 2018	Oct. 29, 2018	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 17, 2017	Feb. 08, 2018~ Feb. 14, 2018	Apr. 16, 2018	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	N/A	Feb. 08, 2018~ Feb. 14, 2018	N/A	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF78020836 8	Control Ant Mast	N/A	Feb. 08, 2018~ Feb. 14, 2018	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Feb. 08, 2018~ Feb. 14, 2018	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Feb. 08, 2018~ Feb. 14, 2018	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-35-H G	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Feb. 08, 2018~ Feb. 14, 2018	Jul. 17, 2018	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	18GHz- 40GHz	Nov. 10, 2017	Feb. 08, 2018~ Feb. 14, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Feb. 08, 2018~ Feb. 14, 2018	Jan. 15, 2019	Radiation (03CH07-HY)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 20, 2017	Feb. 28, 2018	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Feb. 28, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Feb. 28, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Feb. 28, 2018	Oct. 11, 2018	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.3 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.7 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.5 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.2 dB
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Appendix A. Conducted Test Results

Report Number : FR810208E

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2018/1/31	Relative Humidity:	51~55	%

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	18.18	23.58	15.64	0.5	Pass
11a	6Mbps	1	157	5785	18.38	25.87	15.64	0.5	Pass
11a	6Mbps	1	165	5825	18.03	22.48	15.66	0.5	Pass
HT20	MCS 0	1	149	5745	18.83	26.67	15.43	0.5	Pass
HT20	MCS 0	1	157	5785	18.83	27.32	15.96	0.5	Pass
HT20	MCS 0	1	165	5825	18.63	24.48	16.26	0.5	Pass
HT40	MCS 0	1	151	5755	36.86	50.44	35.13	0.5	Pass
HT40	MCS 0	1	159	5795	37.06	58.35	35.13	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	0.11	14.30	30.00	-2.00		Pass
11a	6Mbps	1	157	5785	0.11	14.28	30.00	-2.00		Pass
11a	6Mbps	1	165	5825	0.11	14.13	30.00	-2.00		Pass
HT20	MCS 0	1	149	5745	0.12	14.41	30.00	-2.00		Pass
HT20	MCS 0	1	157	5785	0.12	13.73	30.00	-2.00		Pass
HT20	MCS 0	1	165	5825	0.12	13.64	30.00	-2.00		Pass
HT40	MCS 0	1	151	5755	0.23	14.38	30.00	-2.00		Pass
HT40	MCS 0	1	159	5795	0.23	14.39	30.00	-2.00		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.11	2.22	2.03	30.00	-2.00	Pass
11a	6Mbps	1	157	5785	0.11	2.22	1.56	30.00	-2.00	Pass
11a	6Mbps	1	165	5825	0.11	2.22	1.73	30.00	-2.00	Pass
HT20	MCS 0	1	149	5745	0.12	2.22	1.62	30.00	-2.00	Pass
HT20	MCS 0	1	157	5785	0.12	2.22	1.65	30.00	-2.00	Pass
HT20	MCS 0	1	165	5825	0.12	2.22	1.59	30.00	-2.00	Pass
HT40	MCS 0	1	151	5755	0.23	2.22	-1.93	30.00	-2.00	Pass
HT40	MCS 0	1	159	5795	0.23	2.22	-1.83	30.00	-2.00	Pass



Appendix B. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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		5621.8	50.95	-17.25	68.2	38.15	35.07	12.91	35.18	100	298	P	H
		5656.4	52.79	-20.16	72.95	39.95	35.12	12.91	35.19	100	298	P	H
		5719.6	54.46	-56.23	110.69	41.43	35.21	13.02	35.2	100	298	P	H
		5724.4	63.42	-57.41	120.83	50.39	35.21	13.02	35.2	100	298	P	H
	*	5745	106.73	-	-	93.63	35.24	13.07	35.21	100	298	P	H
	*	5745	100.37	-	-	87.27	35.24	13.07	35.21	100	298	A	H
		5639.8	50.74	-17.46	68.2	37.93	35.09	12.91	35.19	397	0	P	V
		5696	51.23	-51.02	102.25	38.3	35.17	12.96	35.2	397	0	P	V
		5719.8	52.22	-58.52	110.74	39.19	35.21	13.02	35.2	397	0	P	V
		5724.2	63.36	-57.02	120.38	50.33	35.21	13.02	35.2	397	0	P	V
	*	5745	104.54	-	-	91.44	35.24	13.07	35.21	397	0	P	V
	*	5745	98.75	-	-	85.65	35.24	13.07	35.21	397	0	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5616.6	50.79	-17.41	68.2	38.05	35.07	12.85	35.18	104	298	P	H
		5663.4	50.73	-27.42	78.15	37.84	35.12	12.96	35.19	104	298	P	H
		5718.6	51.44	-58.97	110.41	38.41	35.21	13.02	35.2	104	298	P	H
		5723.6	51.83	-67.18	119.01	38.8	35.21	13.02	35.2	104	298	P	H
	*	5785	106.73	-	-	93.53	35.29	13.13	35.22	104	298	P	H
	*	5785	99.86	-	-	86.66	35.29	13.13	35.22	104	298	A	H
		5852.8	51.49	-64.33	115.82	38.16	35.38	13.18	35.23	104	298	P	H
		5869.8	52.5	-54.15	106.65	39.1	35.41	13.23	35.24	104	298	P	H
		5920.8	52.3	-19	71.3	38.79	35.48	13.27	35.24	104	298	P	H
		5935	52.05	-16.15	68.2	38.53	35.5	13.27	35.25	104	298	P	H
		5612	50.62	-17.58	68.2	37.91	35.04	12.85	35.18	389	0	P	V
		5686.8	50.57	-44.89	95.46	37.64	35.17	12.96	35.2	389	0	P	V
		5718.8	49.81	-60.65	110.46	36.78	35.21	13.02	35.2	389	0	P	V
		5722.2	49.54	-66.28	115.82	36.51	35.21	13.02	35.2	389	0	P	V
	*	5785	104.82	-	-	91.62	35.29	13.13	35.22	389	0	P	V
	*	5785	98.11	-	-	84.91	35.29	13.13	35.22	389	0	A	V
		5852.4	50	-66.73	116.73	36.67	35.38	13.18	35.23	389	0	P	V
		5864	51.21	-57.07	108.28	37.81	35.41	13.23	35.24	389	0	P	V
		5892	53.52	-39.06	92.58	40.07	35.46	13.23	35.24	389	0	P	V
		5934.4	51.76	-16.44	68.2	38.24	35.5	13.27	35.25	389	0	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	106.46	-	-	93.14	35.36	13.18	35.22	100	300	P	H
	*	5825	99.62	-	-	86.3	35.36	13.18	35.22	100	300	A	H
		5851.4	56.72	-62.29	119.01	43.39	35.38	13.18	35.23	100	300	P	H
		5858	53.84	-56.12	109.96	40.49	35.41	13.18	35.24	100	300	P	H
		5894.4	53.6	-37.21	90.81	40.15	35.46	13.23	35.24	100	300	P	H
		5937.8	51.47	-16.73	68.2	37.95	35.5	13.27	35.25	100	300	P	H
	*	5825	104.85	-	-	91.53	35.36	13.18	35.22	363	2	P	V
	*	5825	97.33	-	-	84.01	35.36	13.18	35.22	363	2	A	V
		5853.8	53.03	-60.51	113.54	39.67	35.41	13.18	35.23	363	2	P	V
		5860	52.17	-57.23	109.4	38.82	35.41	13.18	35.24	363	2	P	V
		5915.4	52.35	-22.93	75.28	38.84	35.48	13.27	35.24	363	2	P	V
		5935.2	52.91	-15.29	68.2	39.39	35.5	13.27	35.25	363	2	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	49.95	-24.05	74	50.05	38.38	18.86	57.34	100	0	P	H
		17235	47.05	-21.15	68.2	37.64	41.77	23.44	55.8	100	0	P	H
		11490	49.37	-24.63	74	49.47	38.38	18.86	57.34	100	0	P	V
		17235	49.08	-19.12	68.2	39.67	41.77	23.44	55.8	100	0	P	V
802.11a CH 157 5785MHz		11570	49.9	-24.1	74	49.75	38.46	18.88	57.19	100	0	P	H
		17355	47.36	-20.84	68.2	38.01	41.61	23.54	55.8	100	0	P	H
		11570	48.5	-25.5	74	48.35	38.46	18.88	57.19	100	0	P	V
		17355	49.71	-18.49	68.2	40.36	41.61	23.54	55.8	100	0	P	V
802.11a CH 165 5825MHz		11650	49.96	-24.04	74	49.57	38.51	18.96	57.08	100	0	P	H
		17475	47.31	-20.89	68.2	38.04	41.45	23.62	55.8	100	0	P	H
		11650	49.9	-24.1	74	49.51	38.51	18.96	57.08	100	0	P	V
		17475	48.59	-19.61	68.2	39.32	41.45	23.62	55.8	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5614	50.68	-17.52	68.2	37.97	35.04	12.85	35.18	100	299	P	H
		5686.6	51.76	-43.56	95.32	38.83	35.17	12.96	35.2	100	299	P	H
		5720	55.18	-55.62	110.8	42.15	35.21	13.02	35.2	100	299	P	H
		5723.8	63.52	-55.94	119.46	50.49	35.21	13.02	35.2	100	299	P	H
	*	5745	106.89	-	-	93.79	35.24	13.07	35.21	100	299	P	H
	*	5745	100.23	-	-	87.13	35.24	13.07	35.21	100	299	A	H
		5628.8	50.39	-17.81	68.2	37.6	35.07	12.91	35.19	396	1	P	V
		5697.8	50.53	-53.05	103.58	37.6	35.17	12.96	35.2	396	1	P	V
		5720	53.83	-56.97	110.8	40.8	35.21	13.02	35.2	396	1	P	V
		5722.4	64.16	-52.11	116.27	51.13	35.21	13.02	35.2	396	1	P	V
	*	5745	104.58	-	-	91.48	35.24	13.07	35.21	396	1	P	V
	*	5745	98.47	-	-	85.37	35.24	13.07	35.21	396	1	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5639.4	51.82	-16.38	68.2	39.01	35.09	12.91	35.19	105	299	P	H
		5696.2	51.16	-51.24	102.4	38.23	35.17	12.96	35.2	105	299	P	H
		5713.4	51.66	-57.29	108.95	38.65	35.19	13.02	35.2	105	299	P	H
		5722.2	52.5	-63.32	115.82	39.47	35.21	13.02	35.2	105	299	P	H
	*	5785	106.04	-	-	92.84	35.29	13.13	35.22	105	299	P	H
	*	5785	99.06	-	-	85.86	35.29	13.13	35.22	105	299	A	H
		5851.8	51.4	-66.7	118.1	38.07	35.38	13.18	35.23	105	299	P	H
		5859.2	52.18	-57.44	109.62	38.83	35.41	13.18	35.24	105	299	P	H
		5908.6	52.32	-27.98	80.3	38.81	35.48	13.27	35.24	105	299	P	H
		5941	51.53	-16.67	68.2	37.93	35.53	13.32	35.25	105	299	P	H
		5614.6	49.84	-18.36	68.2	37.13	35.04	12.85	35.18	391	0	P	V
		5667	51.47	-29.35	80.82	38.56	35.14	12.96	35.19	391	0	P	V
		5716.6	50.2	-59.65	109.85	37.19	35.19	13.02	35.2	391	0	P	V
		5724.4	49.52	-71.31	120.83	36.49	35.21	13.02	35.2	391	0	P	V
	*	5785	104.15	-	-	90.95	35.29	13.13	35.22	391	0	P	V
	*	5785	97.47	-	-	84.27	35.29	13.13	35.22	391	0	A	V
		5851	50.02	-69.9	119.92	36.69	35.38	13.18	35.23	391	0	P	V
		5871.8	51.66	-54.43	106.09	38.24	35.43	13.23	35.24	391	0	P	V
		5888.2	51.92	-43.48	95.4	38.47	35.46	13.23	35.24	391	0	P	V
		5925	51.84	-16.36	68.2	38.31	35.5	13.27	35.24	391	0	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)	Path 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	106.24	-	-	92.92	35.36	13.18	35.22	101	299	P	H
	*	5825	99.49	-	-	86.17	35.36	13.18	35.22	101	299	A	H
		5850.2	58.64	-63.1	121.74	45.31	35.38	13.18	35.23	101	299	P	H
		5855	53.43	-57.37	110.8	40.07	35.41	13.18	35.23	101	299	P	H
		5892.2	53.03	-39.41	92.44	39.58	35.46	13.23	35.24	101	299	P	H
		5938	52.48	-15.72	68.2	38.96	35.5	13.27	35.25	101	299	P	H
	*	5825	104.83	-	-	91.51	35.36	13.18	35.22	364	0	P	V
	*	5825	97.7	-	-	84.38	35.36	13.18	35.22	364	0	A	V
		5852.2	55.85	-61.33	117.18	42.52	35.38	13.18	35.23	364	0	P	V
		5864.6	51.92	-56.19	108.11	38.52	35.41	13.23	35.24	364	0	P	V
		5922.2	52.14	-18.12	70.26	38.61	35.5	13.27	35.24	364	0	P	V
		5937	51.71	-16.49	68.2	38.19	35.5	13.27	35.25	364	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 (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)	Path 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	54.55	-19.45	74	54.65	38.38	18.86	57.34	100	121	P	H
		11490	43.72	-10.28	54	43.82	38.38	18.86	57.34	100	121	A	H
		17235	47.39	-20.81	68.2	37.98	41.77	23.44	55.8	100	0	P	H
		11490	49.72	-24.28	74	49.82	38.38	18.86	57.34	100	0	P	V
		17235	49.59	-18.61	68.2	40.18	41.77	23.44	55.8	100	0	P	V
802.11n HT20 CH 157 5785MHz		11570	48.62	-25.38	74	48.47	38.46	18.88	57.19	100	0	P	H
		17355	47.45	-20.75	68.2	38.1	41.61	23.54	55.8	100	0	P	H
		11570	49.41	-24.59	74	49.26	38.46	18.88	57.19	100	0	P	V
		17355	47.99	-20.21	68.2	38.64	41.61	23.54	55.8	100	0	P	V
802.11n HT20 CH 165 5825MHz		11650	49.3	-24.7	74	48.91	38.51	18.96	57.08	100	0	P	H
		17475	49.79	-18.41	68.2	40.52	41.45	23.62	55.8	100	0	P	H
		11650	50.38	-23.62	74	49.99	38.51	18.96	57.08	100	0	P	V
		17475	48.79	-19.41	68.2	39.52	41.45	23.62	55.8	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5632.4	50.1	-18.1	68.2	37.31	35.07	12.91	35.19	100	298	P	H
		5697	60.95	-42.04	102.99	48.02	35.17	12.96	35.2	100	298	P	H
		5720	66.15	-44.65	110.8	53.12	35.21	13.02	35.2	100	298	P	H
		5722.6	69.95	-46.78	116.73	56.92	35.21	13.02	35.2	100	298	P	H
	*	5755	103.91	-	-	90.79	35.26	13.07	35.21	100	298	P	H
	*	5755	97.03	-	-	83.91	35.26	13.07	35.21	100	298	A	H
		5852	51.08	-66.56	117.64	37.75	35.38	13.18	35.23	100	298	P	H
		5867.2	50.37	-57.01	107.38	36.97	35.41	13.23	35.24	100	298	P	H
		5915.2	52.13	-23.3	75.43	38.62	35.48	13.27	35.24	100	298	P	H
		5929.2	51.72	-16.48	68.2	38.19	35.5	13.27	35.24	100	298	P	H
		5603.4	50.62	-17.58	68.2	37.91	35.04	12.85	35.18	395	0	P	V
		5695.6	50.79	-51.17	101.96	37.86	35.17	12.96	35.2	395	0	P	V
		5719	66.59	-43.93	110.52	53.56	35.21	13.02	35.2	395	0	P	V
		5723.2	65.07	-53.03	118.1	52.04	35.21	13.02	35.2	395	0	P	V
	*	5755	101.55	-	-	88.43	35.26	13.07	35.21	395	0	P	V
	*	5755	94.81	-	-	81.69	35.26	13.07	35.21	395	0	A	V
		5854.6	49.55	-62.16	111.71	36.19	35.41	13.18	35.23	395	0	P	V
		5866.2	50.97	-56.69	107.66	37.57	35.41	13.23	35.24	395	0	P	V
		5898.6	51.4	-36.3	87.7	37.95	35.46	13.23	35.24	395	0	P	V
		5926.2	52.09	-16.11	68.2	38.56	35.5	13.27	35.24	395	0	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5635.8	50.45	-17.75	68.2	37.64	35.09	12.91	35.19	107	299	P	H
		5687.2	51.65	-44.11	95.76	38.72	35.17	12.96	35.2	107	299	P	H
		5710.6	51.68	-56.49	108.17	38.67	35.19	13.02	35.2	107	299	P	H
		5720.2	51.4	-59.86	111.26	38.37	35.21	13.02	35.2	107	299	P	H
	*	5795	103.78	-	-	90.56	35.31	13.13	35.22	107	299	P	H
	*	5795	96.4	-	-	83.18	35.31	13.13	35.22	107	299	A	H
		5851.8	53.32	-64.78	118.1	39.99	35.38	13.18	35.23	107	299	P	H
		5863	54.26	-54.3	108.56	40.86	35.41	13.23	35.24	107	299	P	H
		5888.6	52.68	-42.42	95.1	39.23	35.46	13.23	35.24	107	299	P	H
		5939.8	51.58	-16.62	68.2	38.03	35.53	13.27	35.25	107	299	P	H
		5625.6	50.61	-17.59	68.2	37.81	35.07	12.91	35.18	349	2	P	V
		5688.6	50.08	-46.71	96.79	37.15	35.17	12.96	35.2	349	2	P	V
		5710	49.88	-58.12	108	36.87	35.19	13.02	35.2	349	2	P	V
		5721.6	51.18	-63.27	114.45	38.15	35.21	13.02	35.2	349	2	P	V
	*	5795	101.41	-	-	88.19	35.31	13.13	35.22	349	2	P	V
	*	5795	94.36	-	-	81.14	35.31	13.13	35.22	349	2	A	V
		5852.8	51.24	-64.58	115.82	37.91	35.38	13.18	35.23	349	2	P	V
		5855.6	50.53	-60.1	110.63	37.17	35.41	13.18	35.23	349	2	P	V
		5876.6	51.02	-52.99	104.01	37.6	35.43	13.23	35.24	349	2	P	V
		5934.4	51.24	-16.96	68.2	37.72	35.5	13.27	35.25	349	2	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)	Path 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	46.63	-27.37	74	46.66	38.4	18.87	57.3	100	0	P	H
		17265	47.15	-21.05	68.2	37.74	41.73	23.48	55.8	100	0	P	H
		11510	47.55	-26.45	74	47.58	38.4	18.87	57.3	100	0	P	V
		17265	47.98	-20.22	68.2	38.57	41.73	23.48	55.8	100	0	P	V
802.11n HT40 CH 159 5795MHz		11590	47.41	-26.59	74	47.19	38.47	18.91	57.16	100	0	P	H
		17385	47.25	-20.95	68.2	37.92	41.56	23.57	55.8	100	0	P	H
		11590	46.9	-27.1	74	46.68	38.47	18.91	57.16	100	0	P	V
		17385	47.65	-20.55	68.2	38.32	41.56	23.57	55.8	100	0	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	Path	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		98.58	38.94	-4.56	43.5	52.91	15.7	1.89	31.56	-	-	P	H
		170.94	39.54	-3.96	43.5	52.96	15.51	2.55	31.48	-	-	P	H
		179.85	40.19	-3.31	43.5	54.11	15.04	2.51	31.47	100	0	P	H
		513.5	41.17	-4.83	46	44.12	23.91	4.1	30.96	-	-	P	H
		834.8	36.39	-9.61	46	33.43	28.34	5.19	30.57	-	-	P	H
		958	34.95	-11.05	46	29.08	30.8	5.58	30.51	-	-	P	H
		155.28	37.08	-6.42	43.5	49.23	16.81	2.54	31.5	100	0	P	V
		220.35	37.06	-8.94	46	50.33	15.32	2.83	31.42	-	-	P	V
		263.82	36.89	-9.11	46	45.77	19.39	3.08	31.35	-	-	P	V
		532.4	34.09	-11.91	46	36.96	23.98	4.08	30.93	-	-	P	V
		925.1	34.15	-11.85	46	29.85	29.33	5.49	30.52	-	-	P	V
		955.2	35.44	-10.56	46	29.73	30.64	5.58	30.51	-	-	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	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path 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:

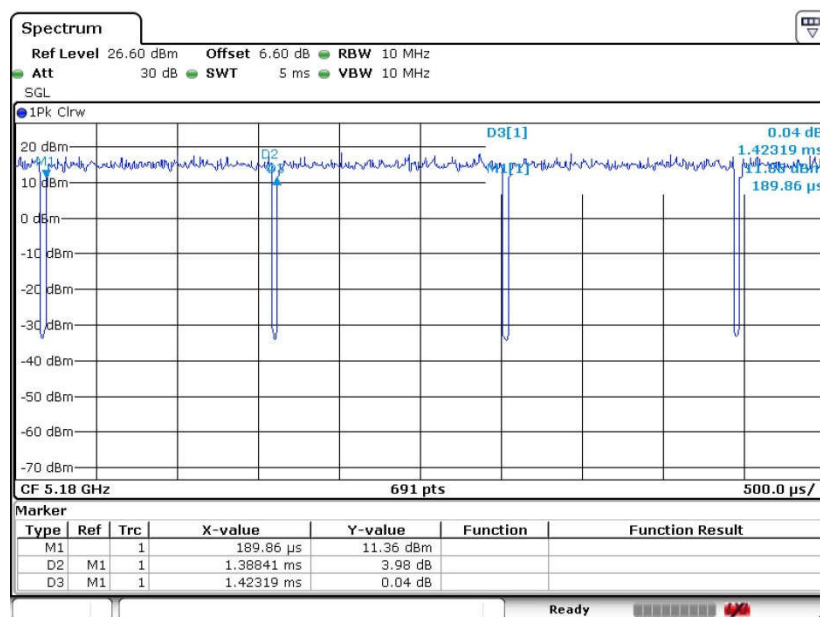
1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
 = 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
 = 43.54(dBμV/m) – 54(dBμV/m)
 = -10.46(dB)

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

Appendix C. Duty Cycle Plots

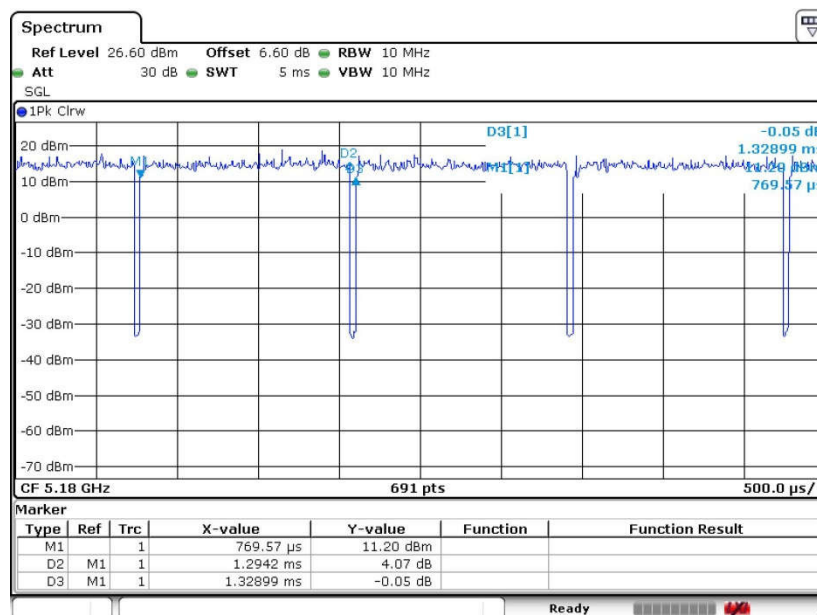
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	97.56	1.388	0.720	1 kHz
802.11n HT20	97.38	1.294	0.773	1 kHz
802.11n HT40	94.92	0.649	1.540	3 kHz

802.11a





802.11n HT20



802.11n HT40

