FCC RF Test Report

APPLICANT	: Huawei Technologies Co.,Ltd.
EQUIPMENT	: Huawei Mediapad M5 wp
BRAND NAME	: HUAWEI
MODEL NAME	: d-02K
FCC ID	: QISHDL-L0J
STANDARD	: FCC Part 15 Subpart E §15.407
CLASSIFICATION	: (NII) Unlicensed National Information Infrastructure

The product was received on Apr. 04, 2018 and testing was completed on Apr. 23, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Approved by: James Huang / Manager

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR840402E	Rev. 01	Initial issue of report	May 11, 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 13.26 dB at 41.640 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.91 dB at 0.502 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 Manufacturer

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

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Huawei Mediapad M5 wp
Brand Name	HUAWEI
Model Name	d-02K
FCC ID	QISHDL-L0J
EUT supports Radios application	WCDMA/HSDPA/HSUPA B5 LTE B5 WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v2.1+EDR/Bluetooth v 4.2 LE
IMEI Code	Conducted: 867555030008853 Conduction: 867555030008838 Radiation: 867555030008713
HW Version	SH1HDLAL09M
SW Version	18032602

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 : 9.83 dBm / 0.0096 W 802.11ac VHT20: 9.62 dBm / 0.0092 W 802.11ac VHT40: 9.70 dBm / 0.0093 W 802.11ac VHT80: 9.38 dBm / 0.0087 W
99% Occupied Bandwidth	802.11a : 17.43 MHz 802.11ac VHT20 : 18.38 MHz 802.11ac VHT40 : 36.06 MHz 802.11ac VHT80 : 74.81 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	IFA Antenna with gain 1.30 dBi

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

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	03CH03-KS	630927

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

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

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

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

2.1 Carrier Frequency and Channel

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

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

2.2 Test Mode

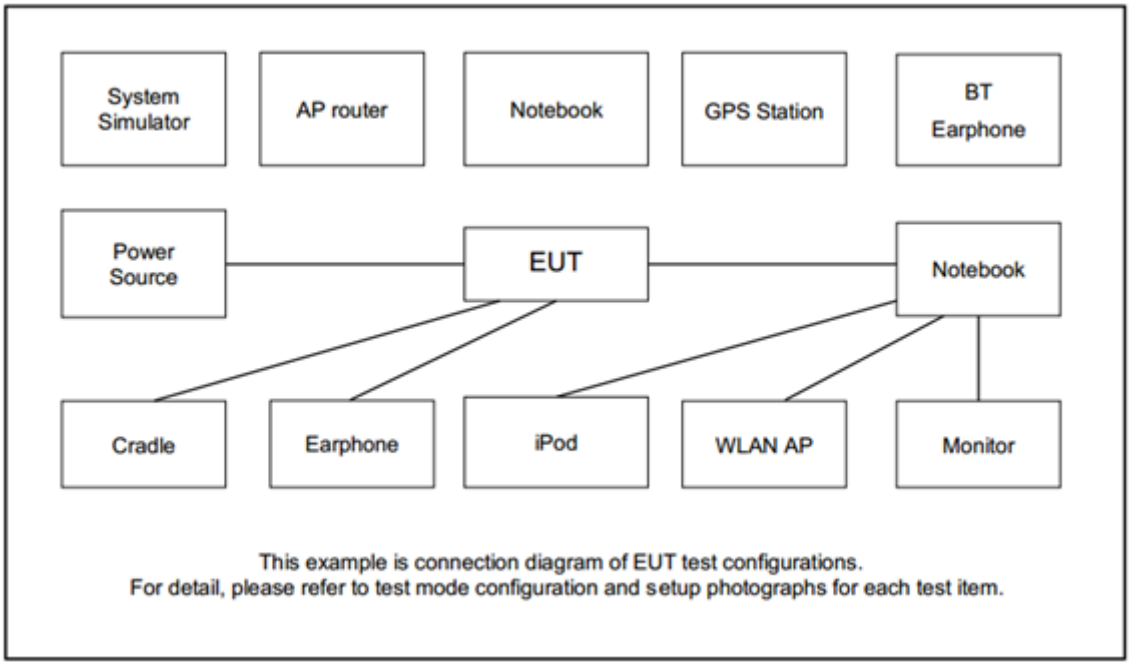
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20 (Covered by VHT20)	MCS0
802.11n HT40 (Covered by VHT40)	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

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

Ch. #		Band IV：5725-5850 MHz			
		802.11a	802.11ac VHT20	802.11ac VHT40	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	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	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	LH102	N/A	N/A	N/A
5.	SD Card	Kingston	SDC4/4GB	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

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

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

= 6.6 (dB)

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

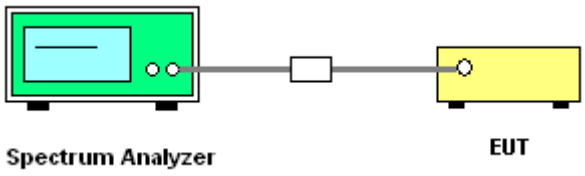
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

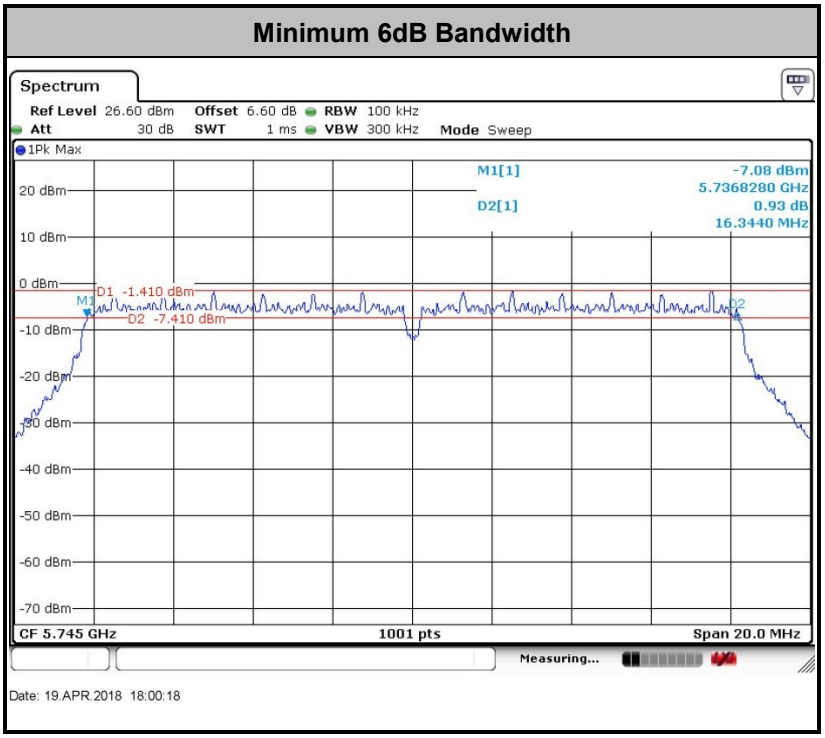
3.1.4 Test Setup



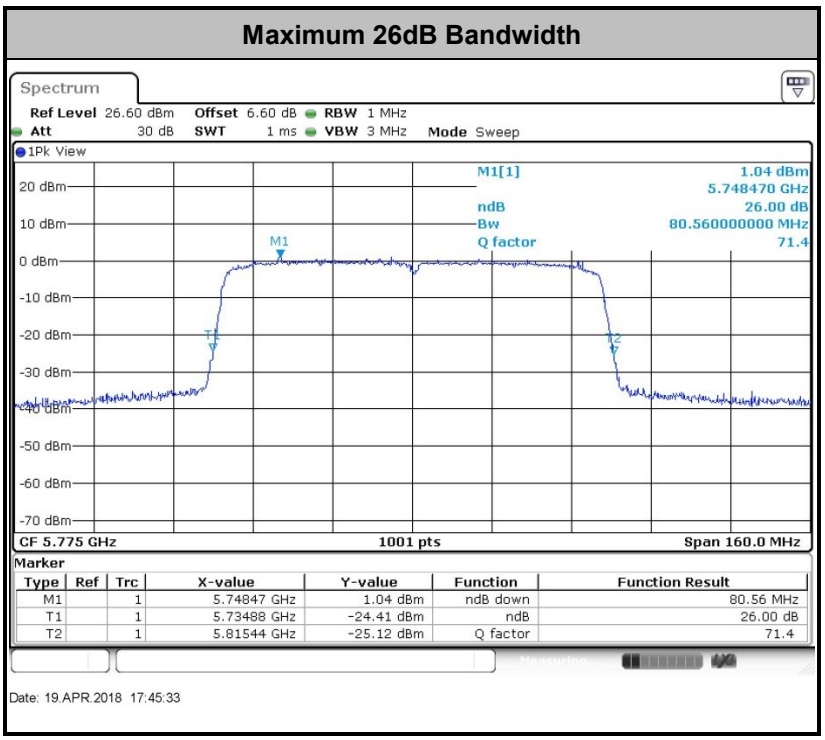
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

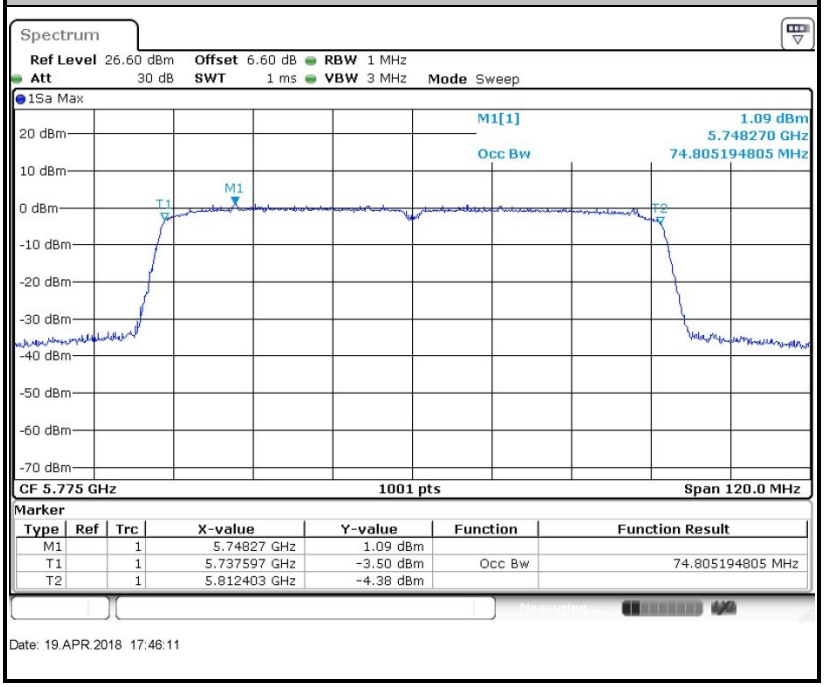
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

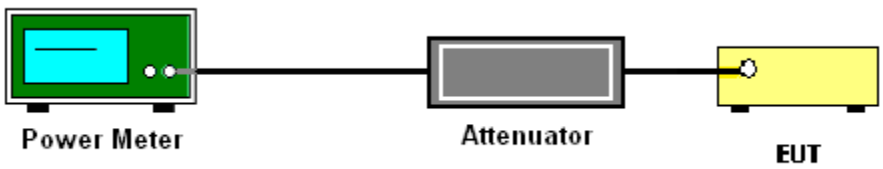
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

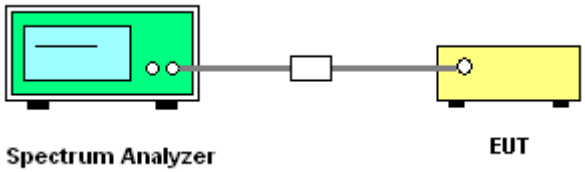
 # Method SA-2 #

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

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

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

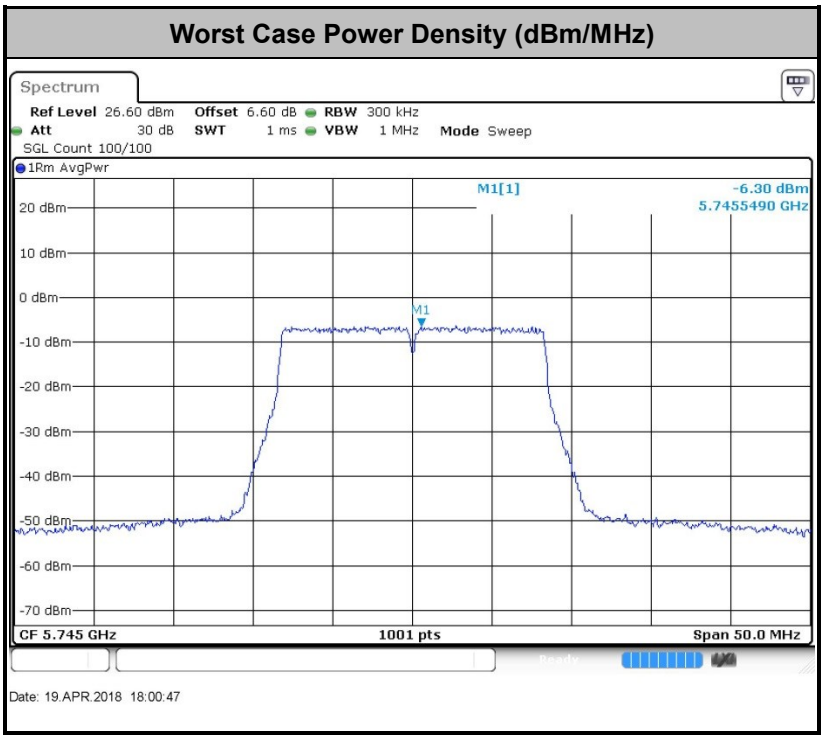
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

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

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

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

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

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

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

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

where

EIRP is the equivalent isotropically radiated power, in dBm

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

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

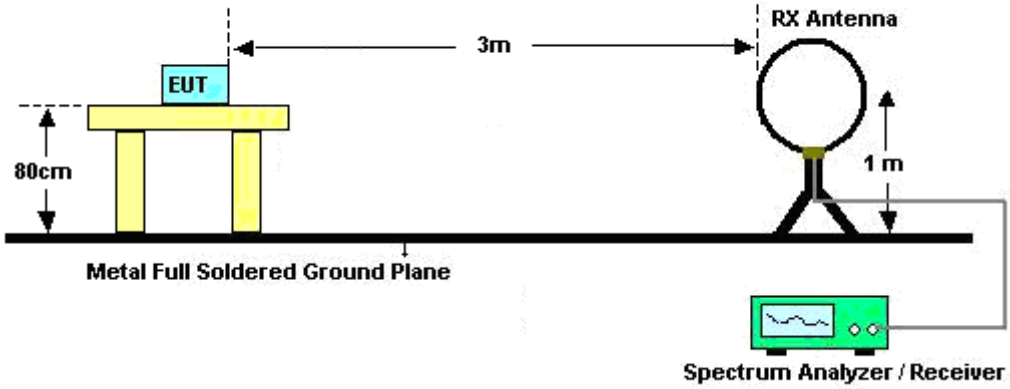
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

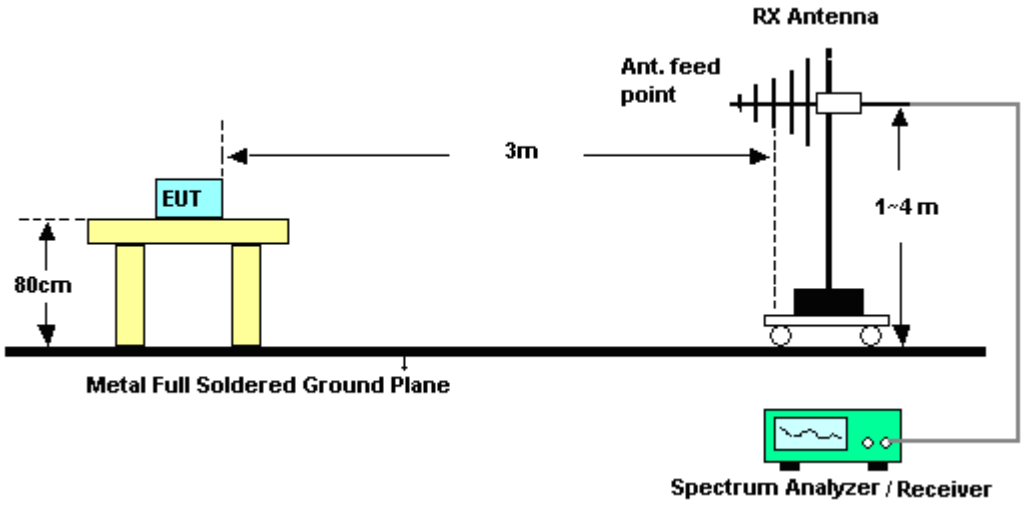
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

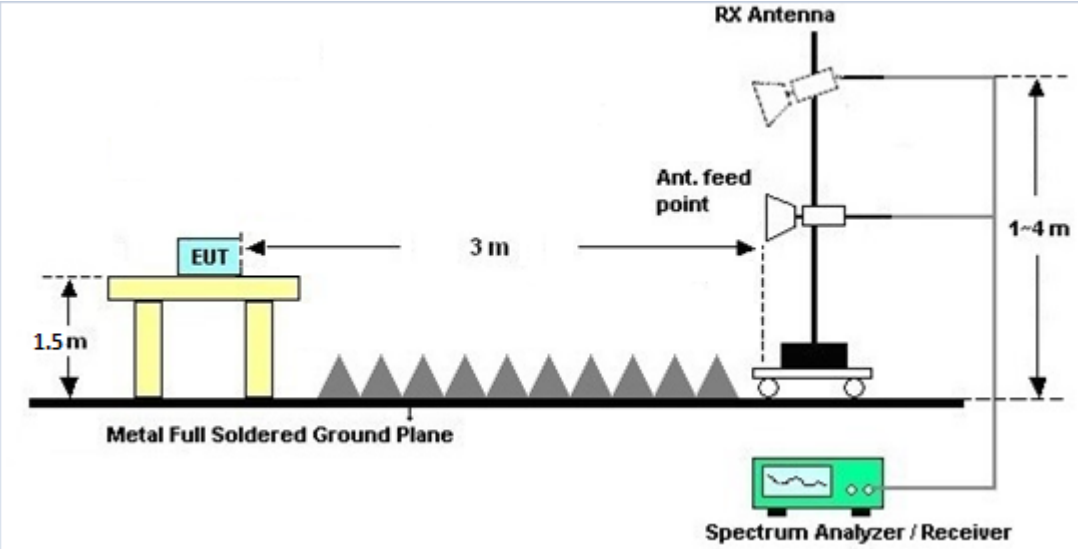
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C and Appendix D.

3.4.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and Appendix D.

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.

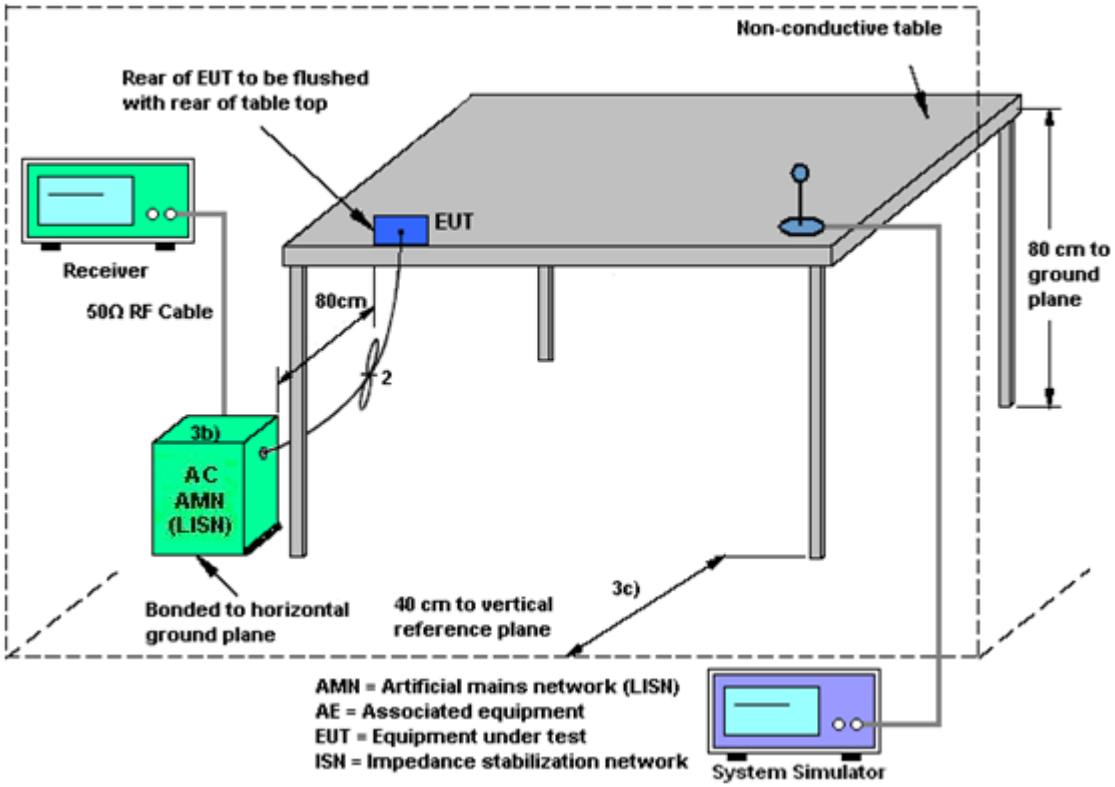
3.5.2 Measuring Instruments

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 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. 8, 2017	Apr. 19, 2018	Aug. 7, 2018	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Apr. 19, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Apr. 19, 2018	Jan. 17, 2019	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct..19.2017	Apr. 23, 2018	Oct..18.2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	Apr. 17, 2018	Apr. 23, 2018	Apr.16, 2019	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Apr. 23, 2018	Oct. 21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	47610	30MHz-1GHz	Sep. 12, 2017	Apr. 23, 2018	Sep. 11, 2018	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 21, 2018	Apr. 23, 2018	Jan. 20, 2019	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Apr. 23, 2018	Feb.06, 2019	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz ~1000MHz / 32 dB	Apr 17, 2018	Apr. 23, 2018	Apr 16, 2019	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18~40GHz	Oct. 12, 2017	Apr. 23, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Apr.17.2018	Apr. 23, 2018	Apr.16, 2019	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Apr. 23, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Apr. 23, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Apr. 23, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Apr. 23, 2018	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 20, 2017	Apr. 18, 2018	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Apr. 18, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Apr. 18, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Apr. 18, 2018	Oct. 11, 2018	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.3dB

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.1dB

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

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

Appendix A. Conducted test results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2018/4/19	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	17.43	20.68	16.34	0.5	Pass
11a	6Mbps	1	157	5785	17.38	20.78	16.34	0.5	Pass
11a	6Mbps	1	165	5825	17.43	20.63	16.36	0.5	Pass
VHT20	MCS 0	1	149	5745	18.38	21.28	17.58	0.5	Pass
VHT20	MCS 0	1	157	5785	18.28	21.38	17.58	0.5	Pass
VHT20	MCS 0	1	165	5825	18.23	21.18	17.56	0.5	Pass
VHT40	MCS 0	1	151	5755	36.06	40.28	35.52	0.5	Pass
VHT40	MCS 0	1	159	5795	36.06	40.19	35.64	0.5	Pass
VHT80	MCS 0	1	155	5775	74.81	80.56	75.05	0.5	Pass

TEST RESULTS DATA
Average Power Table

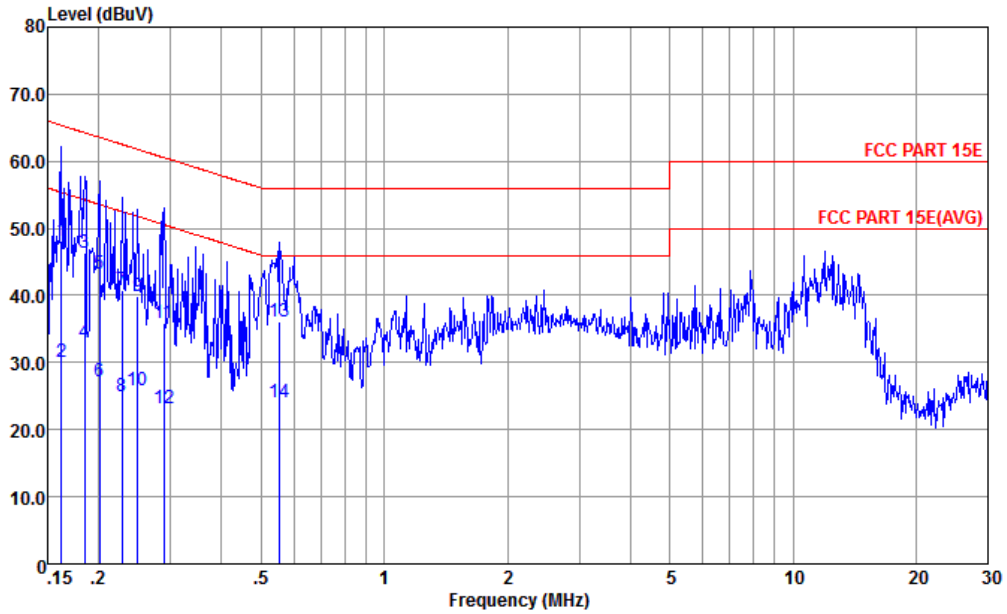
Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.10	9.83	30.00	1.30		Pass
11a	6Mbps	1	157	5785	0.10	9.74	30.00	1.30		Pass
11a	6Mbps	1	165	5825	0.10	9.22	30.00	1.30		Pass
HT20	MCS 0	1	149	5745	0.11	9.60	30.00	1.30		Pass
HT20	MCS 0	1	157	5785	0.11	9.50	30.00	1.30		Pass
HT20	MCS 0	1	165	5825	0.11	9.00	30.00	1.30		Pass
HT40	MCS 0	1	151	5755	0.21	9.69	30.00	1.30		Pass
HT40	MCS 0	1	159	5795	0.21	9.45	30.00	1.30		Pass
VHT20	MCS 0	1	149	5745	0.11	9.62	30.00	1.30		Pass
VHT20	MCS 0	1	157	5785	0.11	9.51	30.00	1.30		Pass
VHT20	MCS 0	1	165	5825	0.11	9.02	30.00	1.30		Pass
VHT40	MCS 0	1	151	5755	0.18	9.70	30.00	1.30		Pass
VHT40	MCS 0	1	159	5795	0.18	9.46	30.00	1.30		Pass
VHT80	MCS 0	1	155	5775	0.19	9.38	30.00	1.30		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	0.10	2.22	-3.98	30.00	1.30	Pass
11a	6Mbps	1	157	5785	0.10	2.22	-4.28	30.00	1.30	Pass
11a	6Mbps	1	165	5825	0.10	2.22	-4.61	30.00	1.30	Pass
VHT20	MCS 0	1	149	5745	0.11	2.22	-4.74	30.00	1.30	Pass
VHT20	MCS 0	1	157	5785	0.11	2.22	-4.86	30.00	1.30	Pass
VHT20	MCS 0	1	165	5825	0.11	2.22	-5.06	30.00	1.30	Pass
VHT40	MCS 0	1	151	5755	0.18	2.22	-7.25	30.00	1.30	Pass
VHT40	MCS 0	1	159	5795	0.18	2.22	-7.67	30.00	1.30	Pass
VHT80	MCS 0	1	155	5775	0.19	2.22	-10.78	30.00	1.30	Pass

Appendix B. AC Conducted Emission Test Results

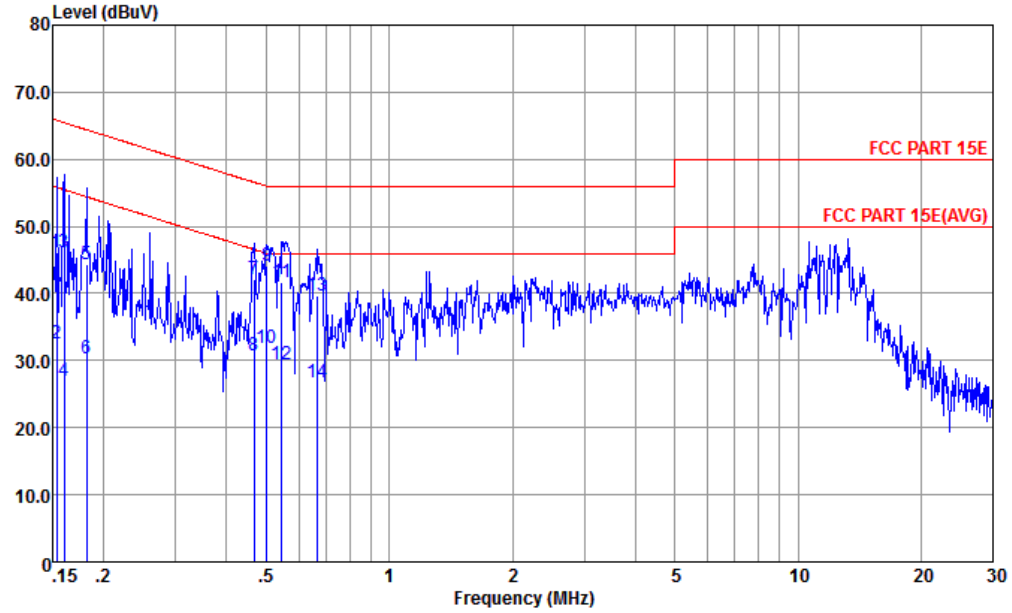
Test Engineer :	Amos Zhang	**Temperature :**	21.1~22.3℃
		Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



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

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.162	48.05	-17.29	65.34	37.31	0.17	10.57	QP
2		0.162	30.05	-25.29	55.34	19.31	0.17	10.57	Average
3		0.184	46.29	-17.99	64.28	35.60	0.19	10.50	QP
4		0.184	32.99	-21.29	54.28	22.30	0.19	10.50	Average
5		0.201	43.26	-20.32	63.58	32.61	0.20	10.45	QP
6		0.201	27.26	-26.32	53.58	16.61	0.20	10.45	Average
7		0.228	40.85	-21.67	62.52	30.19	0.21	10.45	QP
8		0.228	24.85	-27.67	52.52	14.19	0.21	10.45	Average
9		0.249	39.85	-21.93	61.78	29.20	0.21	10.44	QP
10		0.249	25.85	-25.93	51.78	15.20	0.21	10.44	Average
11		0.289	35.85	-24.69	60.54	25.20	0.22	10.43	QP
12		0.289	23.25	-27.29	50.54	12.60	0.22	10.43	Average
13		0.555	36.12	-19.88	56.00	25.60	0.26	10.26	QP
14		0.555	24.02	-21.98	46.00	13.50	0.26	10.26	Average

Test Engineer :	Amos Zhang	**Temperature :**	21.1~22.3℃
		Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



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

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.153	46.09	-19.73	65.82	35.20	0.28	10.61	QP
2		0.153	32.49	-23.33	55.82	21.60	0.28	10.61	Average
3		0.160	46.06	-19.41	65.47	35.20	0.28	10.58	QP
4		0.160	27.06	-28.41	55.47	16.20	0.28	10.58	Average
5		0.182	44.39	-20.03	64.42	33.60	0.28	10.51	QP
6		0.182	30.39	-24.03	54.42	19.60	0.28	10.51	Average
7		0.466	42.13	-14.45	56.58	31.50	0.29	10.34	QP
8		0.466	30.83	-15.75	46.58	20.20	0.29	10.34	Average
9	*	0.502	44.09	-11.91	56.00	33.50	0.29	10.30	QP
10		0.502	31.89	-14.11	46.00	21.30	0.29	10.30	Average
11		0.546	41.76	-14.24	56.00	31.20	0.29	10.27	QP
12		0.546	29.46	-16.54	46.00	18.90	0.29	10.27	Average
13		0.665	39.68	-16.32	56.00	29.20	0.30	10.18	QP
14		0.665	26.78	-19.22	46.00	16.30	0.30	10.18	Average

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		5606.8	53.53	-14.77	68.3	43.08	34.69	12.44	36.68	111	181	P	H
		5673.6	53.78	-32.02	85.8	43.26	34.72	12.52	36.72	111	181	P	H
		5711.2	53.98	-54.46	108.44	43.51	34.73	12.55	36.81	111	181	P	H
		5724.8	55.31	-66.53	121.84	44.81	34.74	12.57	36.81	111	181	P	H
		5744	100.1	-	-	89.61	34.75	12.59	36.85	111	181	P	H
		5744	93.48	-	-	82.99	34.75	12.59	36.85	111	181	A	H
		5611.2	53.25	-15.05	68.3	42.8	34.69	12.44	36.68	350	90	P	V
		5665.6	52.97	-26.91	79.88	42.48	34.71	12.5	36.72	350	90	P	V
		5712.4	52.68	-56.09	108.77	42.21	34.73	12.55	36.81	350	90	P	V
		5723.2	52.55	-65.65	118.2	42.05	34.74	12.57	36.81	350	90	P	V
		5750	98.35	-	-	87.86	34.75	12.59	36.85	350	90	P	V
		5750	90.47	-	-	79.98	34.75	12.59	36.85	350	90	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 165 5825MHz		5830	99.85	-	-	89.39	34.78	12.67	36.99	100	183	P	H
		5830	92.65	-	-	82.19	34.78	12.67	36.99	100	183	A	H
		5851.6	53.09	-65.56	118.65	42.64	34.79	12.69	37.03	100	183	P	H
		5857.2	53.48	-56.8	110.28	43	34.8	12.71	37.03	100	183	P	H
		5919.2	52.32	-20.26	72.58	41.71	34.84	12.76	36.99	100	183	P	H
		5951.6	53.16	-15.14	68.3	42.46	34.87	12.8	36.97	100	183	P	H
		5828	97.29	-	-	86.83	34.78	12.67	36.99	303	99	P	V
		5828	89.97	-	-	79.51	34.78	12.67	36.99	303	99	A	V
		5853.2	52.64	-62.36	115	42.19	34.79	12.69	37.03	303	99	P	V
		5856.4	53.64	-56.87	110.51	43.16	34.8	12.71	37.03	303	99	P	V
		5921.2	51.89	-19.21	71.1	41.28	34.84	12.76	36.99	303	99	P	V
		5962	52.59	-15.71	68.3	41.84	34.89	12.82	36.96	303	99	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		11490	45.59	-28.41	74	56.52	38.29	16.13	65.35	100	360	P	H
CH 149 5745MHz		11490	46.17	-27.83	74	57.1	38.29	16.13	65.35	100	360	P	V
802.11a		11570	43.24	-30.76	74	54.1	38.36	16.22	65.44	100	360	P	H
CH 157 5785MHz		11570	44.35	-29.65	74	55.21	38.36	16.22	65.44	100	360	P	V
802.11a		11650	44.25	-29.75	74	55.09	38.41	16.29	65.54	100	360	P	H
CH 165 5825MHz		11650	44.14	-29.86	74	54.98	38.41	16.29	65.54	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT20 (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)
		5636	53.41	-14.89	68.3	42.91	34.7	12.48	36.68	108	180	P	H
		5699.2	53.39	-51.32	104.71	42.91	34.72	12.53	36.77	108	180	P	H
		5717.6	53.39	-56.84	110.23	42.89	34.74	12.57	36.81	108	180	P	H
		5723.6	54.03	-65.08	119.11	43.53	34.74	12.57	36.81	108	180	P	H
802.11ac		5750	99.75	-	-	89.26	34.75	12.59	36.85	108	180	P	H
VHT20		5750	92.61	-	-	82.12	34.75	12.59	36.85	108	180	A	H
CH 149		5628.8	52.87	-15.43	68.3	42.4	34.69	12.46	36.68	305	97	P	V
5745MHz		5690.4	52.52	-45.7	98.22	42.04	34.72	12.53	36.77	305	97	P	V
		5703.6	52.28	-54.03	106.31	41.77	34.73	12.55	36.77	305	97	P	V
		5724	53.62	-66.4	120.02	43.12	34.74	12.57	36.81	305	97	P	V
		5738	97.61	-	-	87.12	34.75	12.59	36.85	305	97	P	V
		5738	90.39	-	-	79.9	34.75	12.59	36.85	305	97	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)
802.11ac VHT20 CH 165 5825MHz		5822	100.24	-	-	89.78	34.78	12.67	36.99	299	158	P	H
		5822	93.01	-	-	82.55	34.78	12.67	36.99	299	158	A	H
		5850.4	54.15	-67.24	121.39	43.7	34.79	12.69	37.03	299	158	P	H
		5871.6	53.57	-52.68	106.25	43.05	34.81	12.73	37.02	299	158	P	H
		5916	52.83	-22.11	74.94	42.22	34.84	12.76	36.99	299	158	P	H
		5928.8	53.99	-14.31	68.3	43.34	34.86	12.78	36.99	299	158	P	H
		5820	96.97	-	-	86.51	34.78	12.67	36.99	308	102	P	V
		5820	89.01	-	-	78.55	34.78	12.67	36.99	308	102	A	V
		5853.6	52.34	-61.75	114.09	41.86	34.8	12.71	37.03	308	102	P	V
		5862.4	52.18	-56.65	108.83	41.69	34.8	12.71	37.02	308	102	P	V
		5896.4	51.88	-37.55	89.43	41.3	34.83	12.75	37	308	102	P	V
		5956.4	52.53	-15.77	68.3	41.79	34.89	12.82	36.97	308	102	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11490	44.66	-29.34	74	55.59	38.29	16.13	65.35	100	360	P	H
VHT20 CH 149 5745MHz		11490	42.87	-31.13	74	53.8	38.29	16.13	65.35	100	0	P	V
802.11ac		11570	44.07	-29.93	74	54.93	38.36	16.22	65.44	100	360	P	H
VHT20 CH 157 5785MHz		11570	43.22	-30.78	74	54.08	38.36	16.22	65.44	100	360	P	V
802.11ac		11650	44.11	-29.89	74	54.95	38.41	16.29	65.54	100	360	P	H
VHT20 CH 165 5825MHz		11650	43.92	-30.08	74	54.76	38.41	16.29	65.54	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT40 (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)
		5608	53.37	-14.93	68.3	42.92	34.69	12.44	36.68	286	188	P	H
		5674	53.53	-32.57	86.1	43.01	34.72	12.52	36.72	286	188	P	H
		5718	55.35	-54.99	110.34	44.85	34.74	12.57	36.81	286	188	P	H
		5722.4	55.59	-60.78	116.37	45.09	34.74	12.57	36.81	286	188	P	H
		5762	100.41	-	-	89.96	34.75	12.6	36.9	286	188	P	H
		5762	92.48	-	-	82.03	34.75	12.6	36.9	286	188	A	H
		5854.8	53.15	-58.21	111.36	42.67	34.8	12.71	37.03	286	188	P	H
		5855.1	53.15	-57.72	110.87	42.67	34.8	12.71	37.03	286	188	P	H
802.11ac		5884.4	53.38	-44.94	98.32	42.84	34.81	12.73	37	286	188	P	H
VHT40		5940.4	53.47	-14.83	68.3	42.77	34.87	12.8	36.97	286	188	P	H
CH 151		5610.4	54.06	-14.24	68.3	43.61	34.69	12.44	36.68	334	104	P	V
5755MHz		5674	53.8	-32.3	86.1	43.28	34.72	12.52	36.72	334	104	P	V
		5719.6	54.3	-56.49	110.79	43.8	34.74	12.57	36.81	334	104	P	V
		5720.1	54.24	-56.89	111.13	43.74	34.74	12.57	36.81	334	104	P	V
		5762	97.48	-	-	87.03	34.75	12.6	36.9	334	104	P	V
		5762	89.75	-	-	79.3	34.75	12.6	36.9	334	104	A	V
		5853.6	52.35	-61.74	114.09	41.87	34.8	12.71	37.03	334	104	P	V
		5860.8	51.17	-58.1	109.27	40.68	34.8	12.71	37.02	334	104	P	V
		5917.6	52.57	-21.19	73.76	41.96	34.84	12.76	36.99	334	104	P	V
		5976.4	53.52	-14.78	68.3	42.74	34.9	12.84	36.96	334	104	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)
802.11ac VHT40 CH 159 5795MHz		5623.6	54.11	-14.19	68.3	43.64	34.69	12.46	36.68	298	164	P	H
		5666.8	53.39	-27.38	80.77	42.87	34.72	12.52	36.72	298	164	P	H
		5712.4	53.98	-54.79	108.77	43.51	34.73	12.55	36.81	298	164	P	H
		5724	53.12	-66.9	120.02	42.62	34.74	12.57	36.81	298	164	P	H
		5802	99.04	-	-	88.57	34.77	12.64	36.94	298	164	P	H
		5802	92.09	-	-	81.62	34.77	12.64	36.94	298	164	A	H
		5850.1	52.12	-69.95	122.07	41.67	34.79	12.69	37.03	298	164	P	H
		5865.2	53.35	-54.69	108.04	42.86	34.8	12.71	37.02	298	164	P	H
		5900.4	53.38	-33.08	86.46	42.8	34.83	12.75	37	298	164	P	H
		5928.8	52.88	-15.42	68.3	42.23	34.86	12.78	36.99	298	164	P	H
		5645.2	53.22	-15.08	68.3	42.72	34.7	12.48	36.68	313	97	P	V
		5683.2	53.69	-39.21	92.9	43.22	34.72	12.52	36.77	313	97	P	V
		5705.6	53.57	-53.3	106.87	43.1	34.73	12.55	36.81	313	97	P	V
		5722	51.96	-63.5	115.46	41.46	34.74	12.57	36.81	313	97	P	V
		5792	95.57	-	-	85.1	34.77	12.64	36.94	313	97	P	V
		5792	88.41	-	-	77.94	34.77	12.64	36.94	313	97	A	V
		5850.4	52.41	-68.98	121.39	41.96	34.79	12.69	37.03	313	97	P	V
		5855.1	52.02	-58.85	110.87	41.54	34.8	12.71	37.03	313	97	P	V
		5896.4	52.5	-36.93	89.43	41.92	34.83	12.75	37	313	97	P	V
		5998	52.92	-15.38	68.3	42.1	34.91	12.85	36.94	313	97	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11510	45.99	-28.01	74	56.89	38.3	16.14	65.34	100	360	P	H
VHT40 CH 151 5755MHz		11510	45.46	-28.54	74	56.36	38.3	16.14	65.34	100	360	P	V
802.11ac		11590	44.38	-29.62	74	55.24	38.37	16.24	65.47	100	360	P	H
VHT40 CH 159 5795MHz		11590	44.69	-29.31	74	55.55	38.37	16.24	65.47	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5645.6	53.93	-14.37	68.3	43.43	34.7	12.48	36.68	298	164	P	H
		5697.6	54.23	-49.3	103.53	43.75	34.72	12.53	36.77	298	164	P	H
		5718.8	55.72	-54.84	110.56	45.22	34.74	12.57	36.81	298	164	P	H
		5722.4	56.86	-59.51	116.37	46.36	34.74	12.57	36.81	298	164	P	H
		5794	96.09	-	-	85.62	34.77	12.64	36.94	298	164	P	H
		5794	88.13	-	-	77.66	34.77	12.64	36.94	298	164	A	H
		5852.4	53.84	-62.99	116.83	43.39	34.79	12.69	37.03	298	164	P	H
		5858	53.85	-56.21	110.06	43.36	34.8	12.71	37.02	298	164	P	H
		5915.6	55.02	-20.21	75.23	44.41	34.84	12.76	36.99	298	164	P	H
		5982.8	54.31	-13.99	68.3	43.53	34.9	12.84	36.96	298	164	P	H
		5639.2	53.81	-14.49	68.3	43.31	34.7	12.48	36.68	333	103	P	V
		5691.2	53.06	-45.75	98.81	42.58	34.72	12.53	36.77	333	103	P	V
		5718	54.57	-55.77	110.34	44.07	34.74	12.57	36.81	333	103	P	V
		5724.8	54.39	-67.45	121.84	43.89	34.74	12.57	36.81	333	103	P	V
		5756	92.8	-	-	82.35	34.75	12.6	36.9	333	103	P	V
		5756	85.75	-	-	75.3	34.75	12.6	36.9	333	103	A	V
		5851.2	51.91	-67.65	119.56	41.46	34.79	12.69	37.03	333	103	P	V
		5868.8	52.84	-54.19	107.03	42.35	34.8	12.71	37.02	333	103	P	V
		5900.4	53	-33.46	86.46	42.42	34.83	12.75	37	333	103	P	V
		5941.6	52.87	-15.43	68.3	42.17	34.87	12.8	36.97	333	103	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11550	43.33	-30.67	74	54.21	38.34	16.2	65.42	100	360	P	H
VHT80 CH 155 5775MHz		11550	43.84	-30.16	74	54.72	38.34	16.2	65.42	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT80 LF		31.94	23.33	-16.67	40	30.79	24.1	0.73	32.29	-	-	P	H
		64.92	23.9	-16.1	40	42.78	12.2	1.18	32.26	100	112	P	H
		80.44	22.63	-17.37	40	40.17	13.4	1.31	32.25	-	-	P	H
		142.52	21.41	-22.09	43.5	34.6	17.33	1.76	32.28	-	-	P	H
		202.66	21.64	-21.86	43.5	36.76	15.03	2.1	32.25	-	-	P	H
		304.51	27.03	-18.97	46	37.16	19.32	2.62	32.07	-	-	P	H
		33.88	30.05	-9.95	40	38.54	23	0.81	32.3	100	31	P	V
		41.64	26.74	-13.26	40	39.29	18.68	0.97	32.2	-	-	P	V
		59.1	25.44	-14.56	40	44.51	12.03	1.11	32.21	-	-	P	V
		67.83	25.46	-14.54	40	44.02	12.44	1.21	32.21	-	-	P	V
		143.49	19.33	-24.17	43.5	32.58	17.27	1.76	32.28	-	-	P	V
		269.59	22.11	-23.89	46	32.38	19.38	2.43	32.08	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

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

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

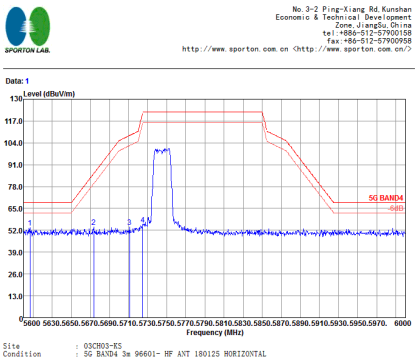
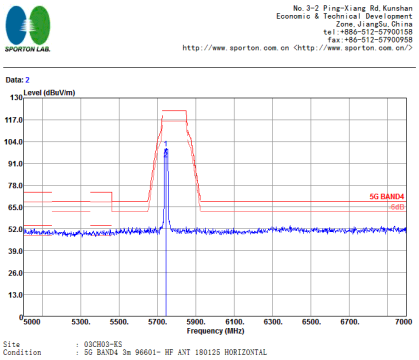
= -10.46(dB)

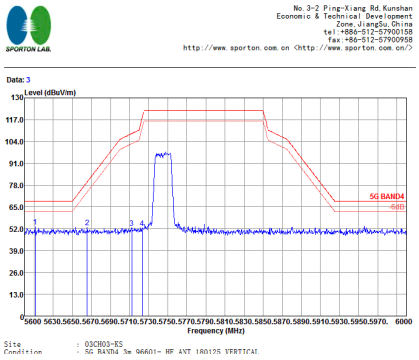
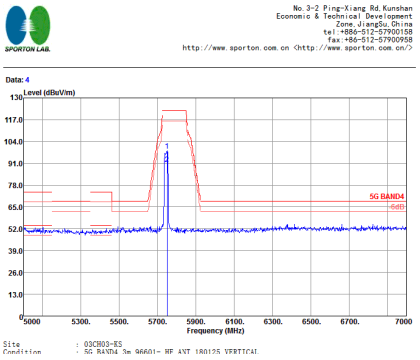
Both peak and average measured complies with the limit line, so test result is “PASS”.

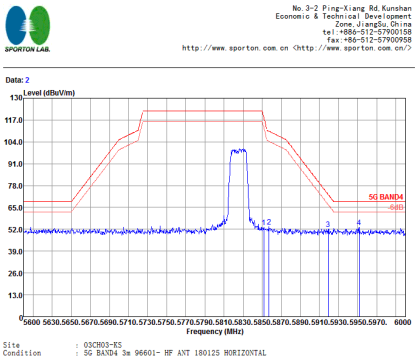
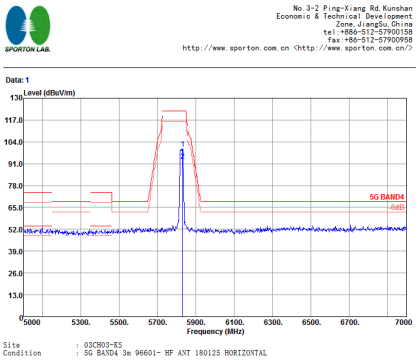
Appendix D. Radiated Spurious Emission Plots

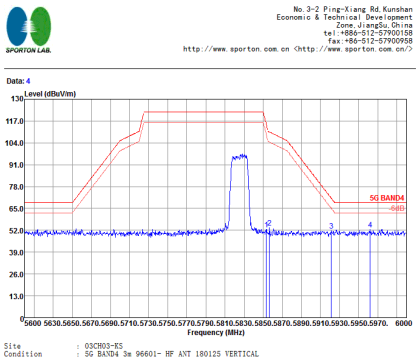
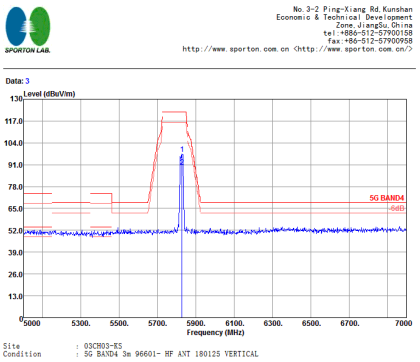
Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

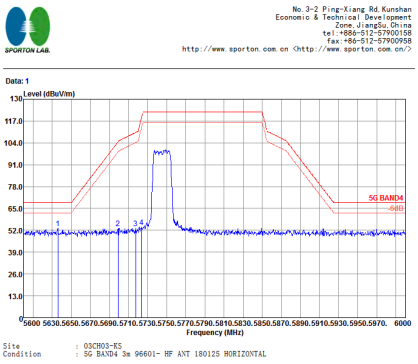
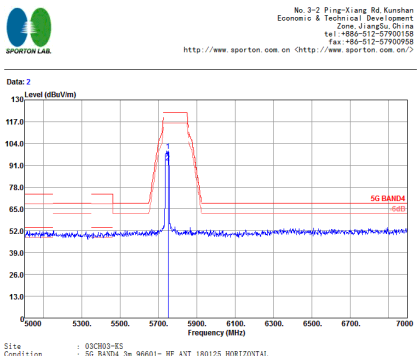
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

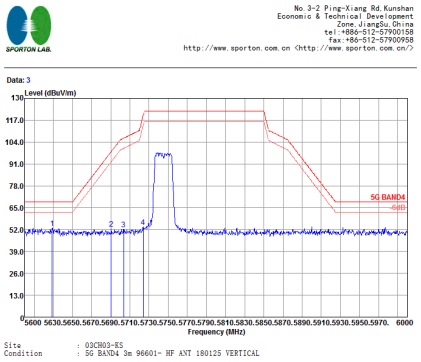
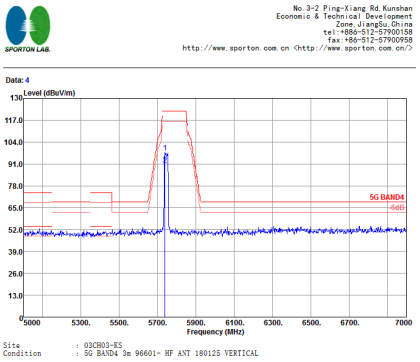
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Vertical	Fundamental
Peak		

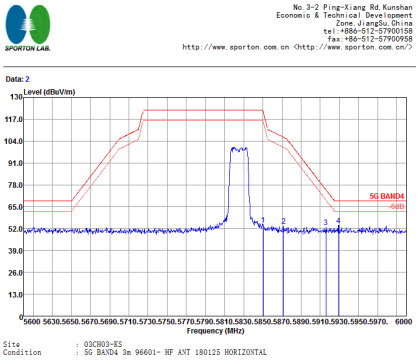
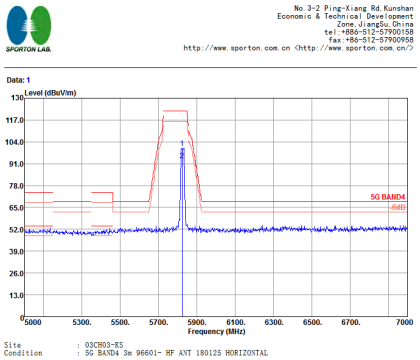
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

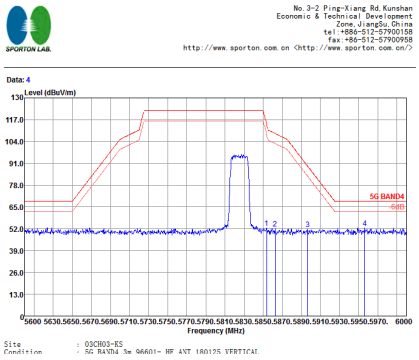
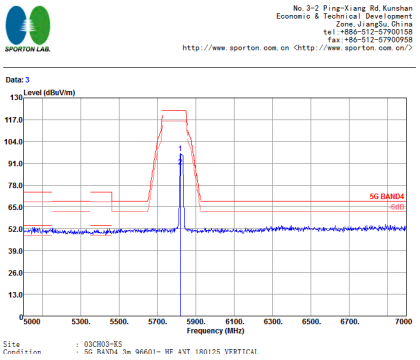
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak		

Band 4 5725~5850MHz
WIFI 802.11ac VHT20 (Band Edge @ 3m)

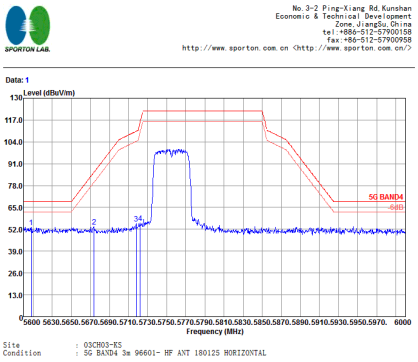
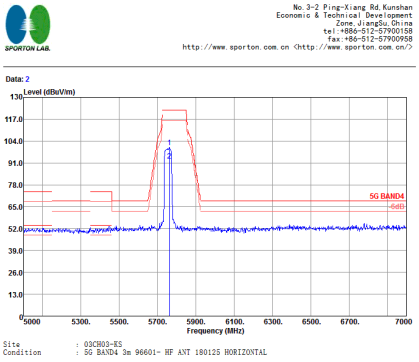
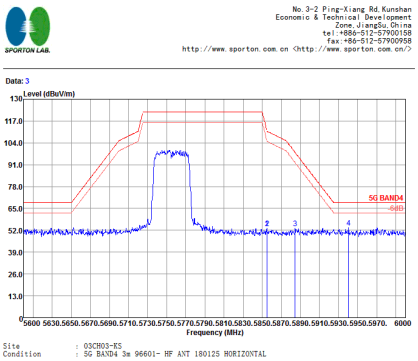
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

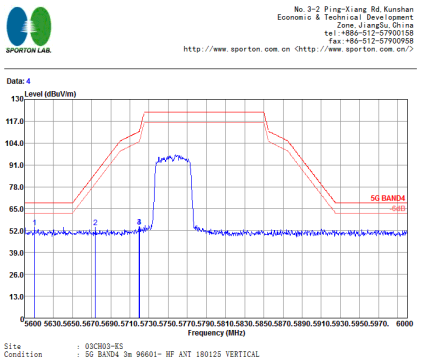
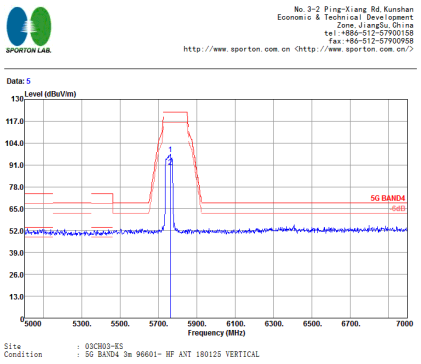
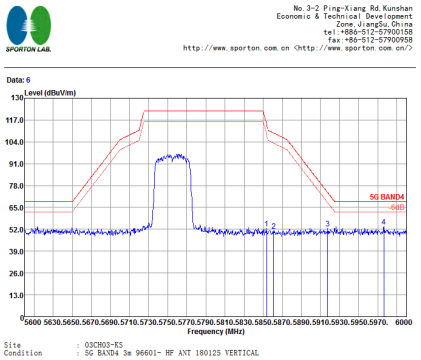
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1	Vertical	Fundamental
Peak Avg.		

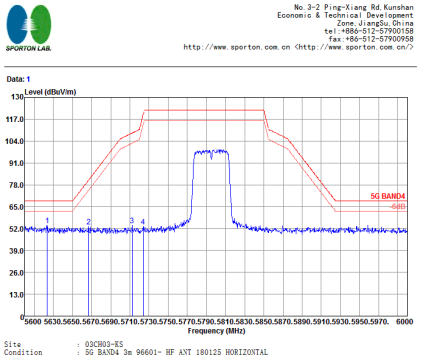
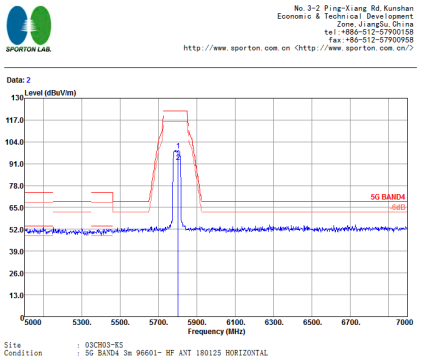
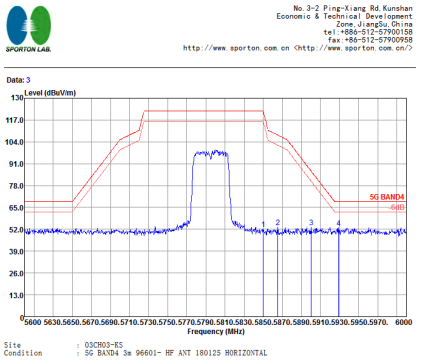
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

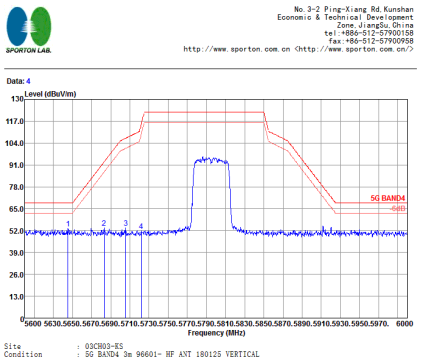
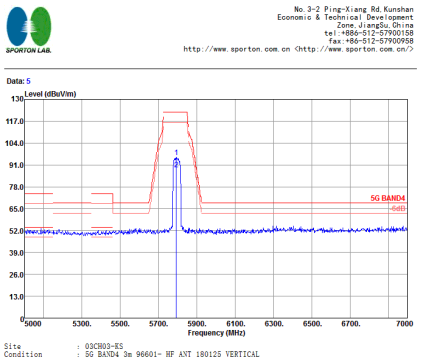
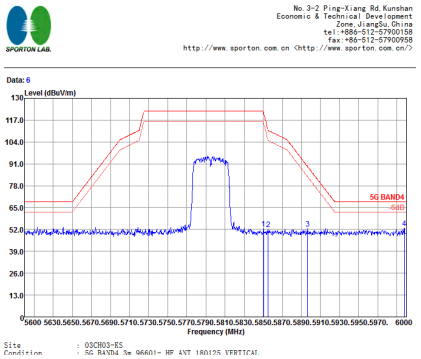
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1	Vertical	Fundamental
Peak Avg.		

Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Band Edge @ 3m)

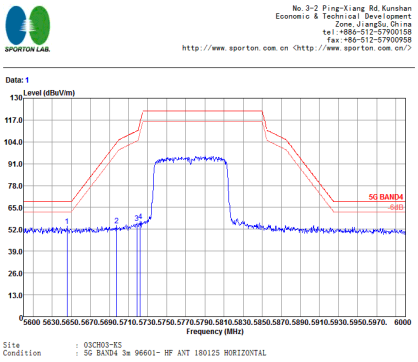
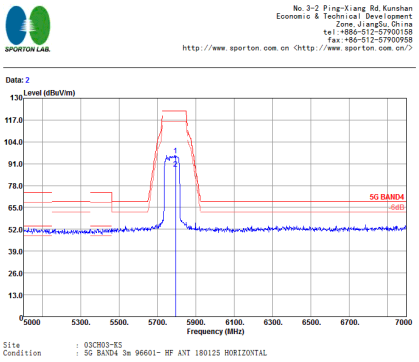
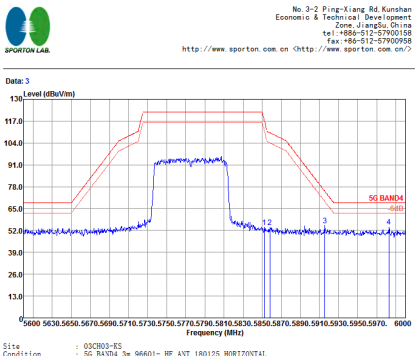
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz	
1	Horizontal	Fundamental
Peak		
Peak		-

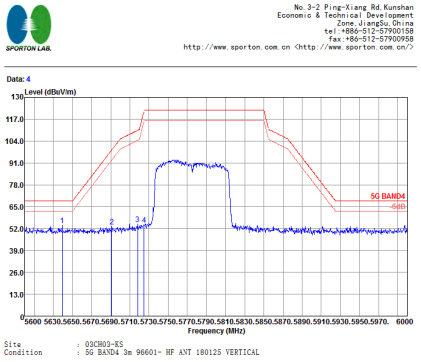
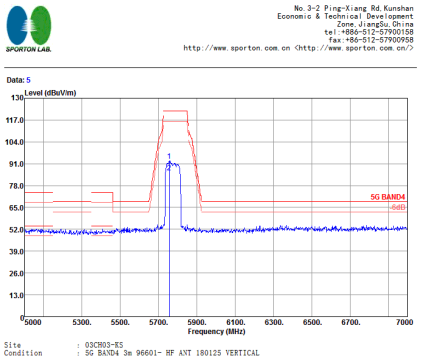
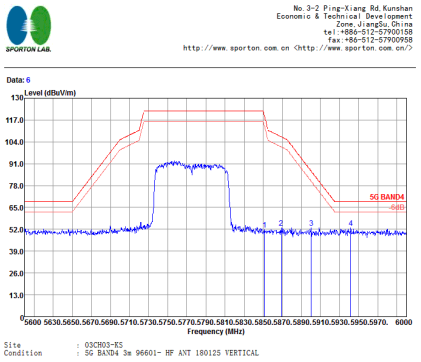
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz	
1	Vertical	Fundamental
Peak		
Peak		-

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1	Horizontal	Fundamental
Peak		
Peak		-

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1	Vertical	Fundamental
Peak		
Peak		-

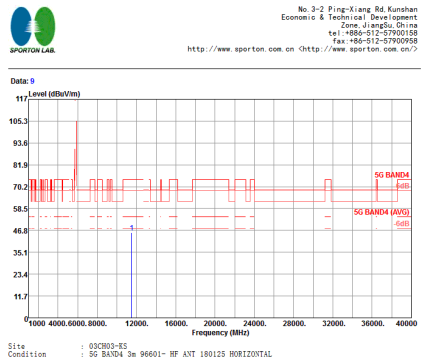
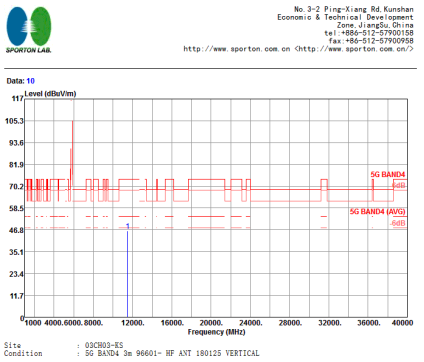
Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

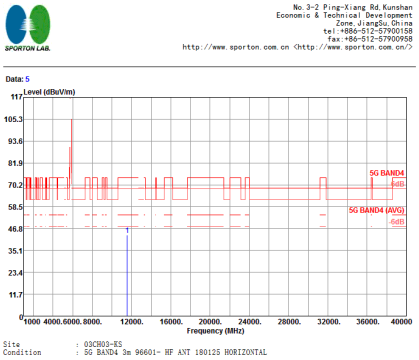
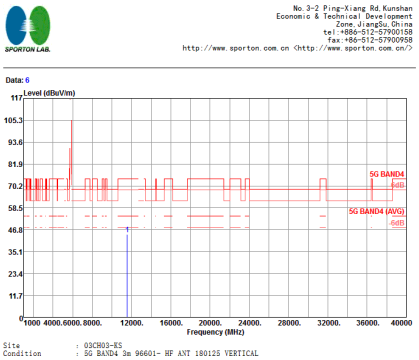
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Horizontal	Fundamental
Peak		
Peak		-

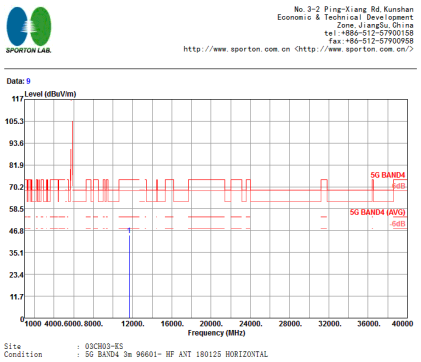
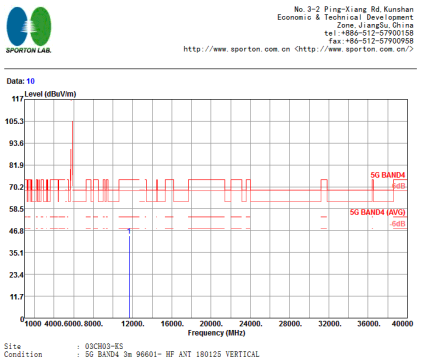
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Vertical	Fundamental
Peak		
Peak		-

Band 4 - 5725~5850MHz

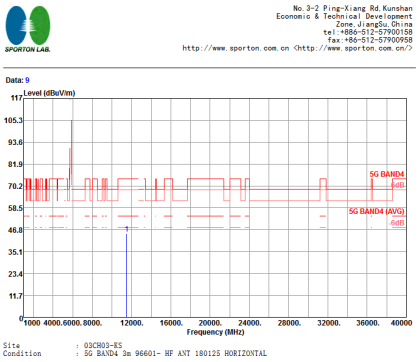
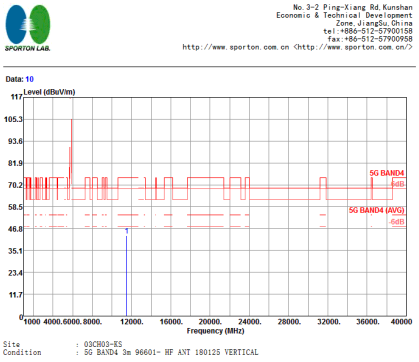
WIFI 802.11a (Harmonic @ 3m)

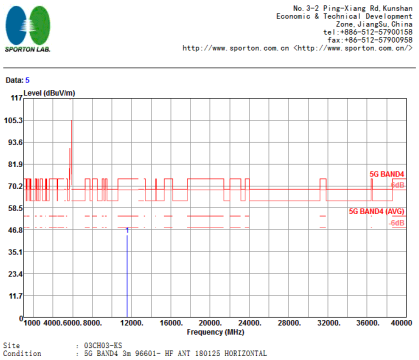
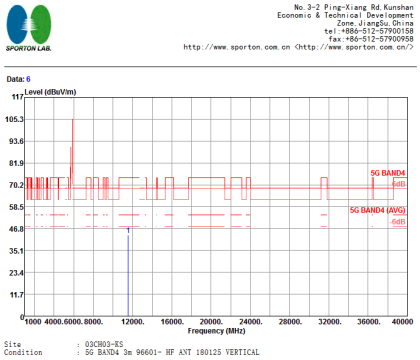
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

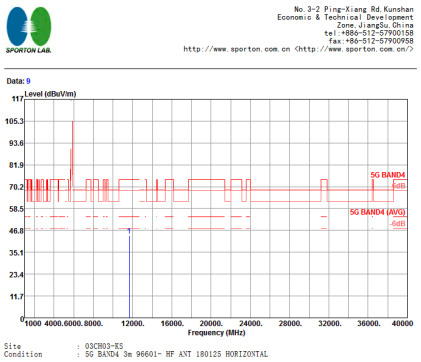
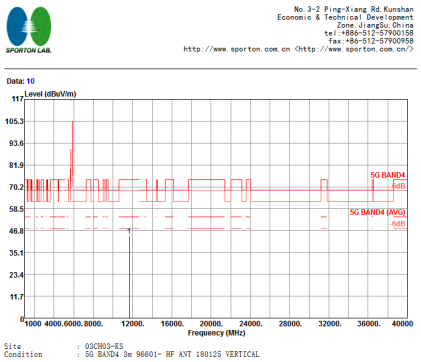
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.		

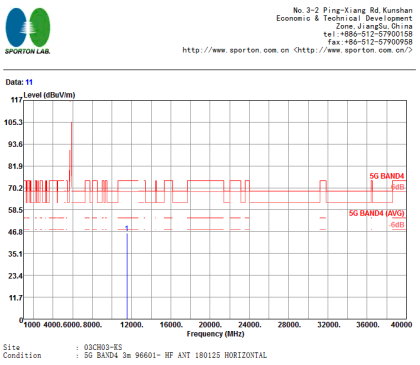
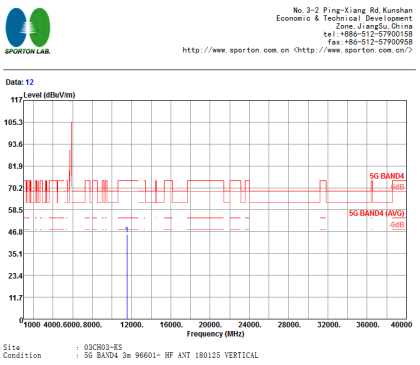
Band 4 5725~5850MHz
WIFI 802.11ac VHT20 (Harmonic @ 3m)

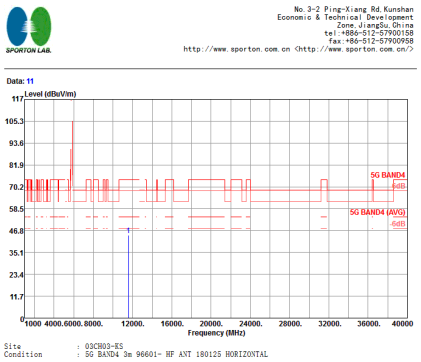
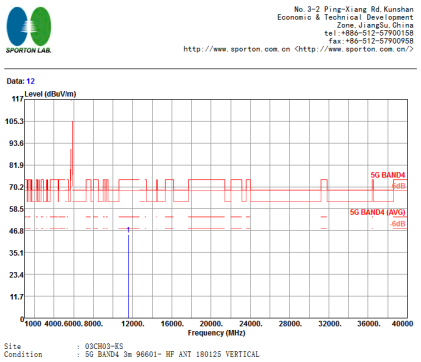
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.		

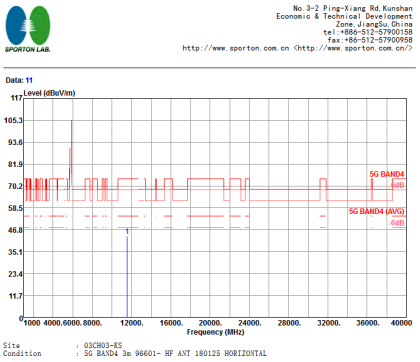
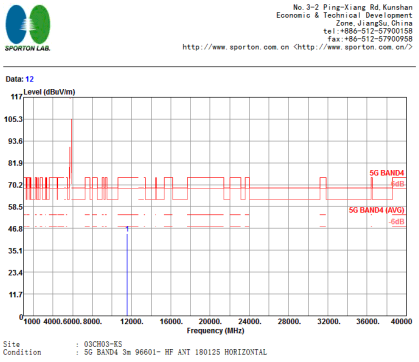
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.		

Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz	
1	Horizontal	Vertical
Peak Avg.		

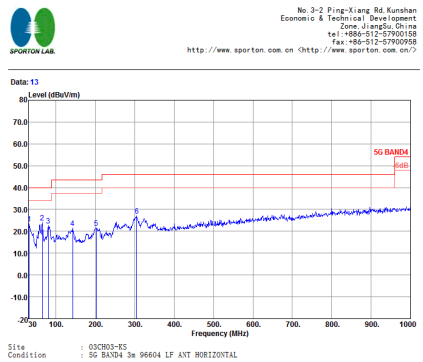
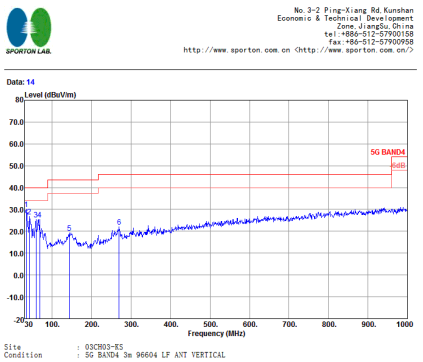
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1	Horizontal	Vertical
Peak Avg.		

Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

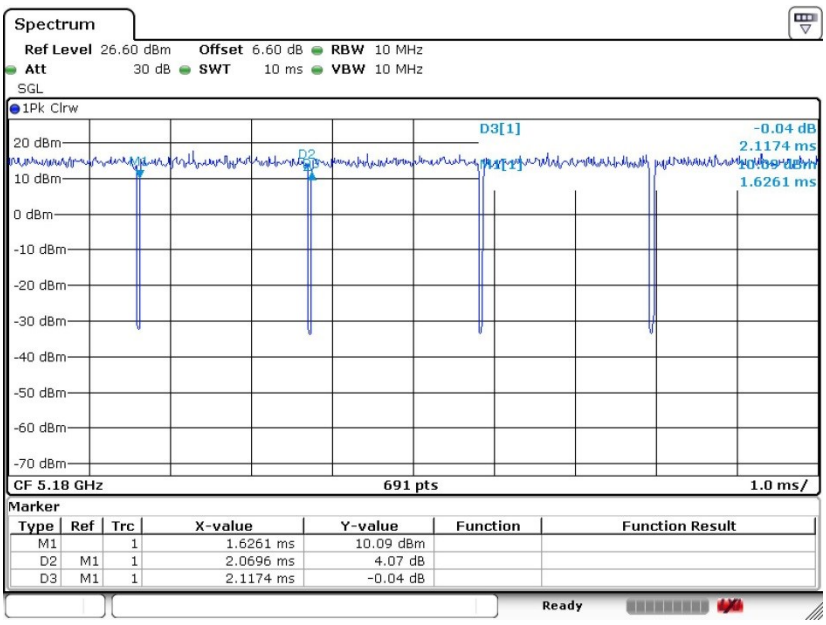
5GHz WIFI 802.11ac VHT80 (LF)

WIFI	5GHz 5725~5850MHz	
ANT	802.11ac VHT80 LF	
1	Horizontal	Vertical
QP / Peak		

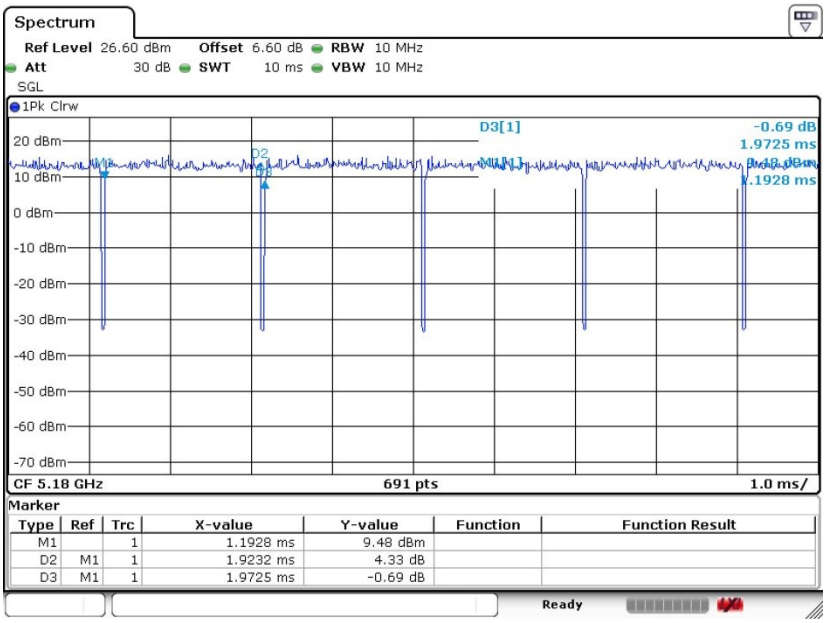
Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	97.74	2.070	0.483	1 kHz
802.11ac VHT20	97.50	1.923	0.520	1 kHz
802.11ac VHT40	96.04	0.948	1.055	3 kHz
802.11ac VHT80	95.74	0.880	1.137	3 kHz

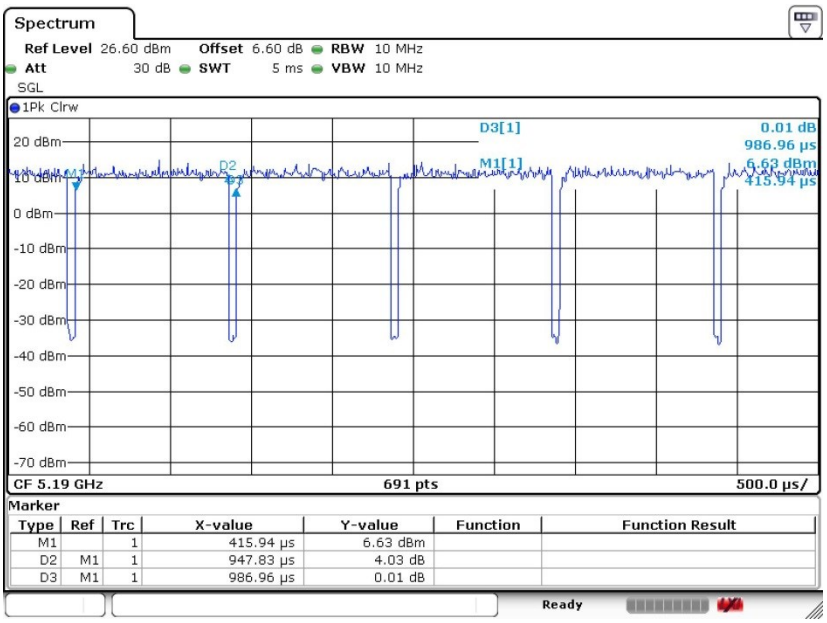
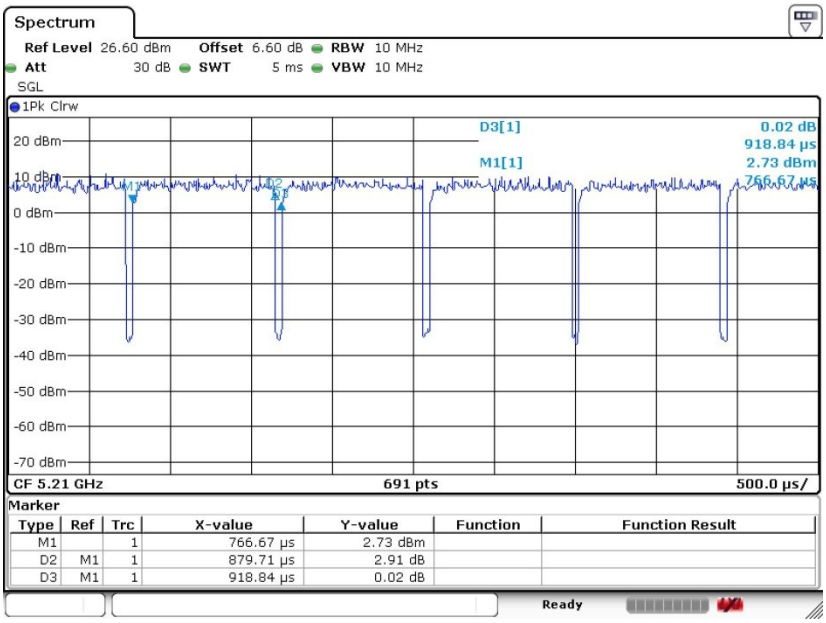
802.11a



802.11ac VHT20



802.11ac VHT40



802.11ac VHT80