



FCC RF Test Report

APPLICANT : A2Z Development Center, Inc. dba
EQUIPMENT : Tablet
MODEL NAME : K29A5E
FCC ID : 2ATNY-8330
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was completed on Jun. 10, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

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



TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Product Feature of Equipment Under Test.....	5
1.3 Product Specification of Equipment Under Test.....	5
1.4 Modification of EUT	5
1.5 Testing Location	6
1.6 Applicable Standards.....	6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1 Carrier Frequency and Channel	7
2.2 Test Mode.....	8
2.3 Connection Diagram of Test System.....	9
2.4 Support Unit used in test configuration and system	10
2.5 EUT Operation Test Setup	11
2.6 Measurement Results Explanation Example.....	11
3 TEST RESULT	12
3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement	12
3.2 Maximum Conducted Output Power Measurement	15
3.3 Power Spectral Density Measurement	16
3.4 Unwanted Emissions Measurement	18
3.5 AC Conducted Emission Measurement.....	23
3.6 Automatically Discontinue Transmission	25
3.7 Antenna Requirements.....	25
4 LIST OF MEASURING EQUIPMENT	26
5 UNCERTAINTY OF EVALUATION	27
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. AC CONDUCTED EMISSION TEST RESULT	
APPENDIX C. RADIATED SPURIOUS EMISSION	
APPENDIX D. RADIATED SPURIOUS EMISSION PLOTS	
APPENDIX E. DUTY CYCLE PLOTS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR932118-02E	Rev. 01	Initial issue of report	Jul. 15, 2019



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result
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
3.5	15.207	AC Conducted Emission	15.207(a)	Pass
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

A2Z Development Center, Inc. dba
1100 Enterprise way , Sunnyvale, CA, USA

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet
Model Name	K29A5E
FCC ID	2ATNY-8330
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth BR/EDR/LE
SW Version	userdebug 6.0 NS6 100 1854

Note: There are three types of EUT, sample 1/3 are the 1st source, the difference between the two types are just for flash memory, the sample 2 is the 2nd source, the difference between 1st source and 2nd source are for speakerBox1/2. According to the difference, we only choose sample 3 to perform full tests.

1.3 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	<5745 MHz ~ 5825 MHz> 802.11a : 13.15 dBm / 0.0207 W 802.11n HT20 : 13.36 dBm / 0.0217 W 802.11n HT40 : 12.95 dBm / 0.0197 W
99% Occupied Bandwidth	802.11a : 17.73 MHz 802.11n HT20 : 18.48 MHz 802.11n HT40 : 36.66 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	Fixed internal Antenna with gain 0.27 dBi

1.4 Modification of EUT

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



1.5 Testing Location

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

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-KS 03CH06-KS TH01-KS	CN1257	314309

1.6 Applicable Standards

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

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

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

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: 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.

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

2.2 Test Mode

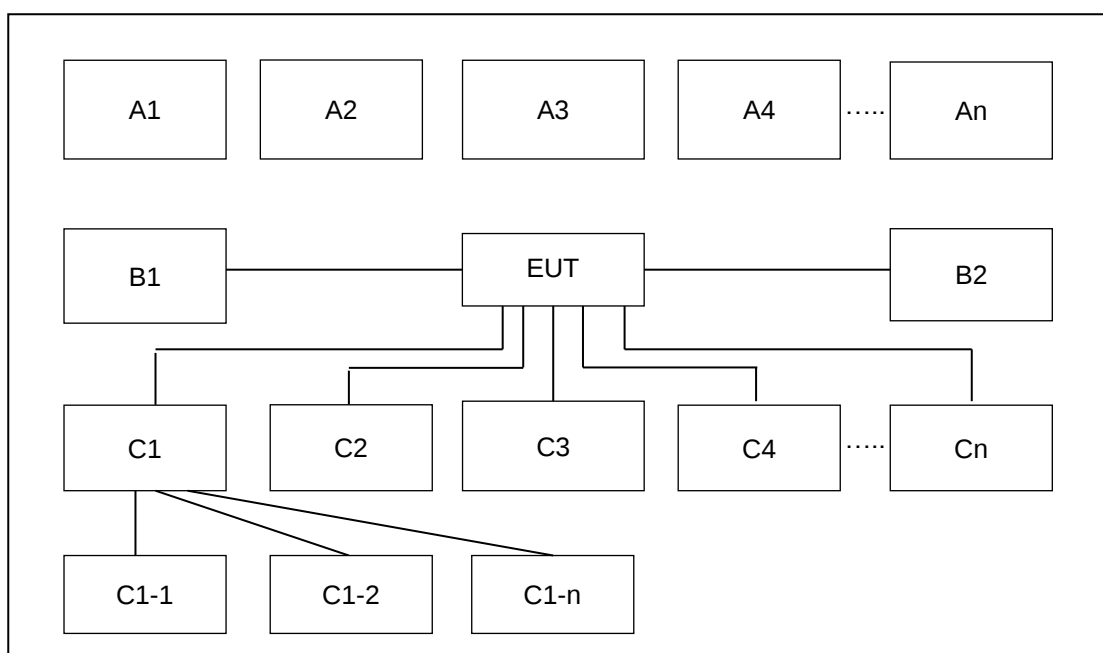
Final test modes are considering the modulation and worse data rates as below table.

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

AC Conducted Emission	Mode 1 : WLAN Link (5G)+ Bluetooth Link + Earphone + USB Cable(Charging from Adapter)
--------------------------------------	---

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



Radiation Test Setup											
No.	Wireless Station	Connection Type	Test Mode(11a/an HT20/HT40)								
			1	2	3	4	5	6	7	8	9
A1	Bluetooth speaker	Bluetooth	-	-	-						
A2	WLAN AP	WiFi	-	-	-						
A3	Bluetooth Base Station	Bluetooth	-	-	-						
No.	Power Source	Connection Type	1	2	3	4	5	6	7		
B1	AC : 120V/60Hz	AC Power Cable	X	X	X						
No.	Setup Peripherals	Connection Type	1	2	3	4	5	6	7		
C1	Notebook	USB Cable	-	-	-						
C1-1	USB HD	USB Cable to C1	-	-	-						
C1-2	WLAN AP	RJ-45 Cable to C1	-	-	-						
C2	Earphone	Earphone jack	X	X	X						
C3	SD card	SD I/O interface without Cable	-	-	-						

Note: Mode 1/2/3 means low/middle/high test channels.

Conduction Test Setup											
No.	Wireless Station	Connection Type	Test Mode								
			1	2	3	4	5	6	7		
A1	Bluetooth speaker	Bluetooth	X								
A2	WLAN AP	WiFi	X								
A3	Notebook	WiFi	X								
No.	Power Source	Connection Type	1	2	3	4	5	6	7		
B1	AC : 120V/60Hz	AC Power Cable	X								
No.	Setup Peripherals	Connection Type	1	2	3	4	5	6	7		
C1	Notebook	USB Cable	-								
C1-1	USB HD	USB Cable to C1	-								
C1-2	WLAN AP	RJ-45 Cable to C1	-								
C2	Earphone	Earphone jack	X								
C3	SD card	SD I/O interface without Cable	-								

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Speaker	JAWBONE	JAMBOX	N/A	N/A	N/A
2.	Notebook	Lenovo	G480	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
4.	Earphone	Lenovo	SH100	N/A	Unshielded,1.2m	N/A
5.	Adapter	N/A	FANA7R	N/A	N/A	N/A
6.	USB cable	Lenovo	N/A	N/A	Shielded,1.0m	N/A



2.5 EUT Operation Test Setup

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

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.9 dB.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} \\ &= 6.9 \text{ (dB)}\end{aligned}$$

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.

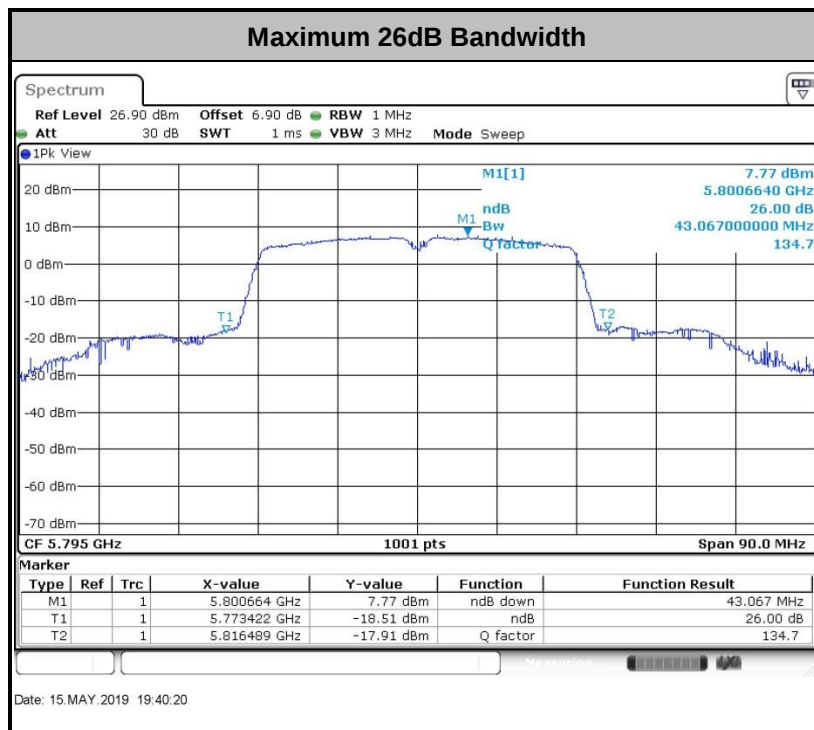
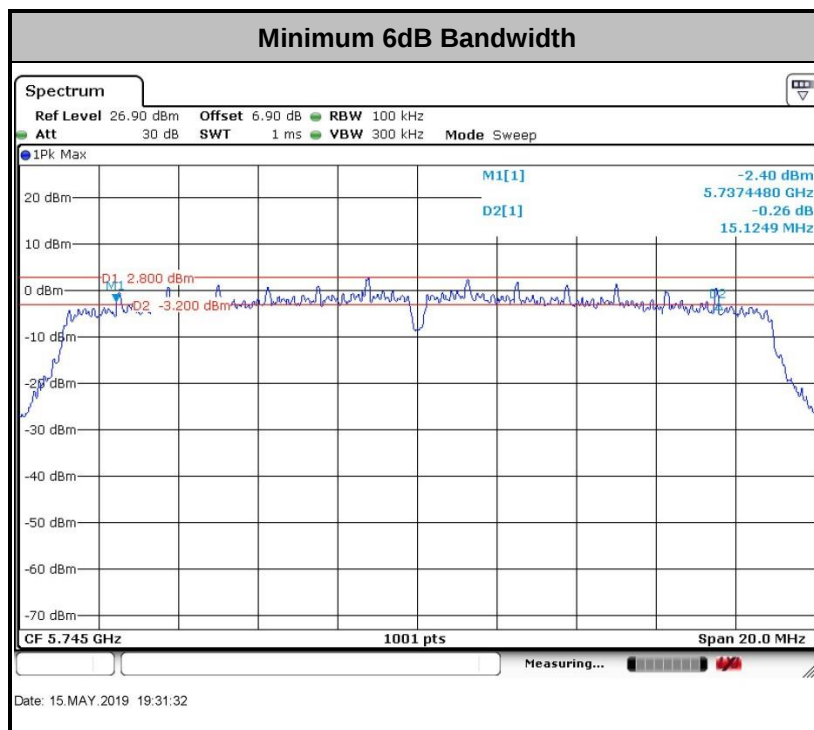
3.1.4 Test Setup

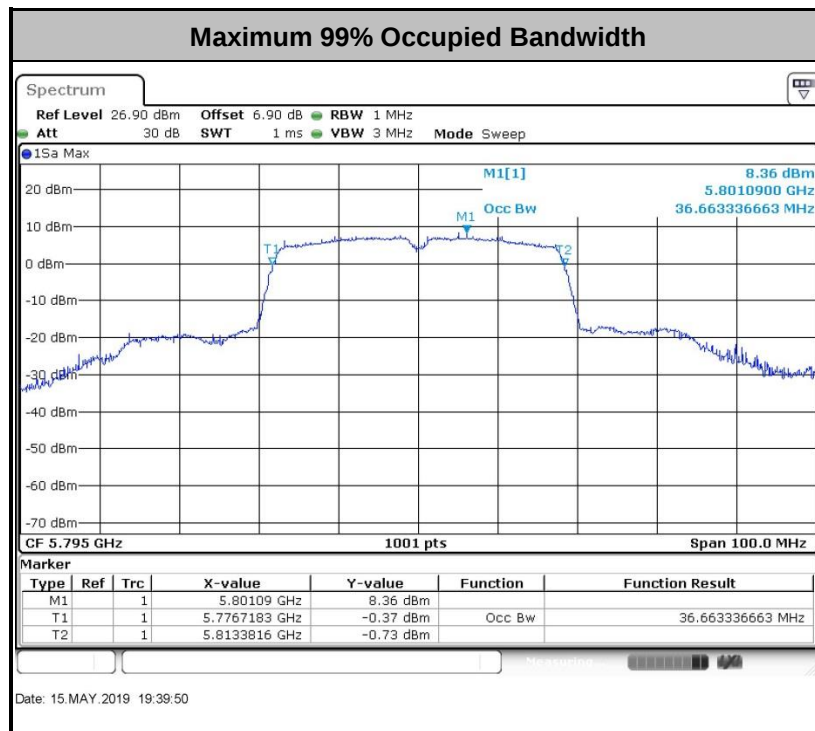




3.1.5 Test Result of 6dB Bandwidth

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).

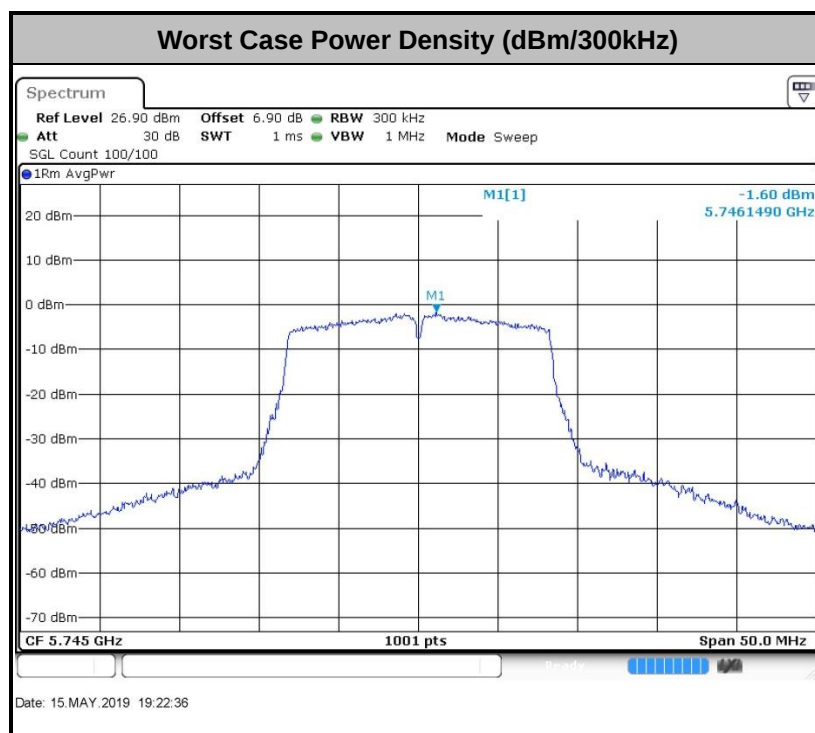
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW $\geq$ 1 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - 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.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.





3.4 Unwanted Emissions Measurement

This section 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 (dB μ V/m)
- 27	68.3

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

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

where

EIRP is the equivalent isotropically radiated power, in dBm

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

d_{Meas} is the measurement distance, in m

(3) ANSI C63.10-2013 clause 12.7.3 note 97

As specified by regulatory requirements, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit. However, an out-of-band emission that complies with both the average and peak general regulatory limits is not required to satisfy the peak emission limit.

3.4.2 Measuring Instruments

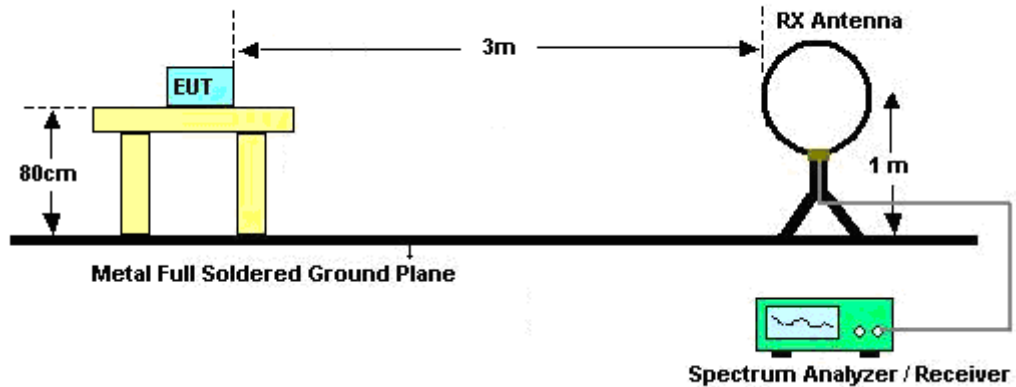
The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

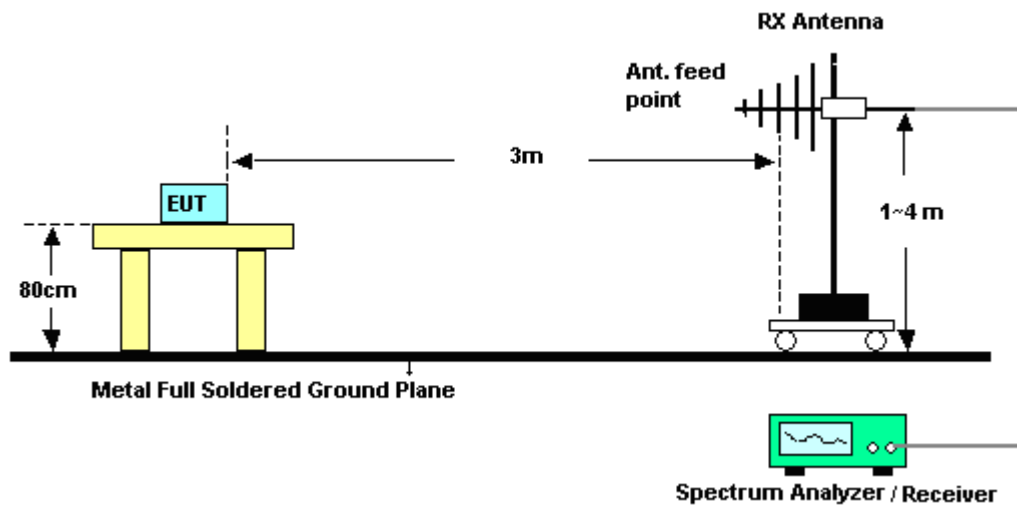
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak 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.
Detector = power averaging (rms)
 - 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.
Detector = peak.
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

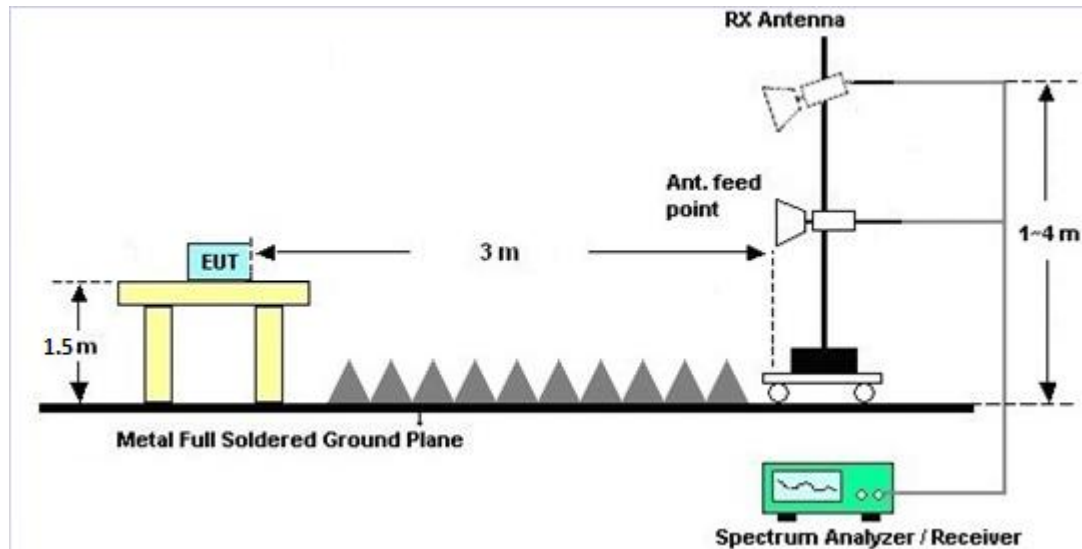
For radiated emissions below 30MHz



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 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 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 (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.

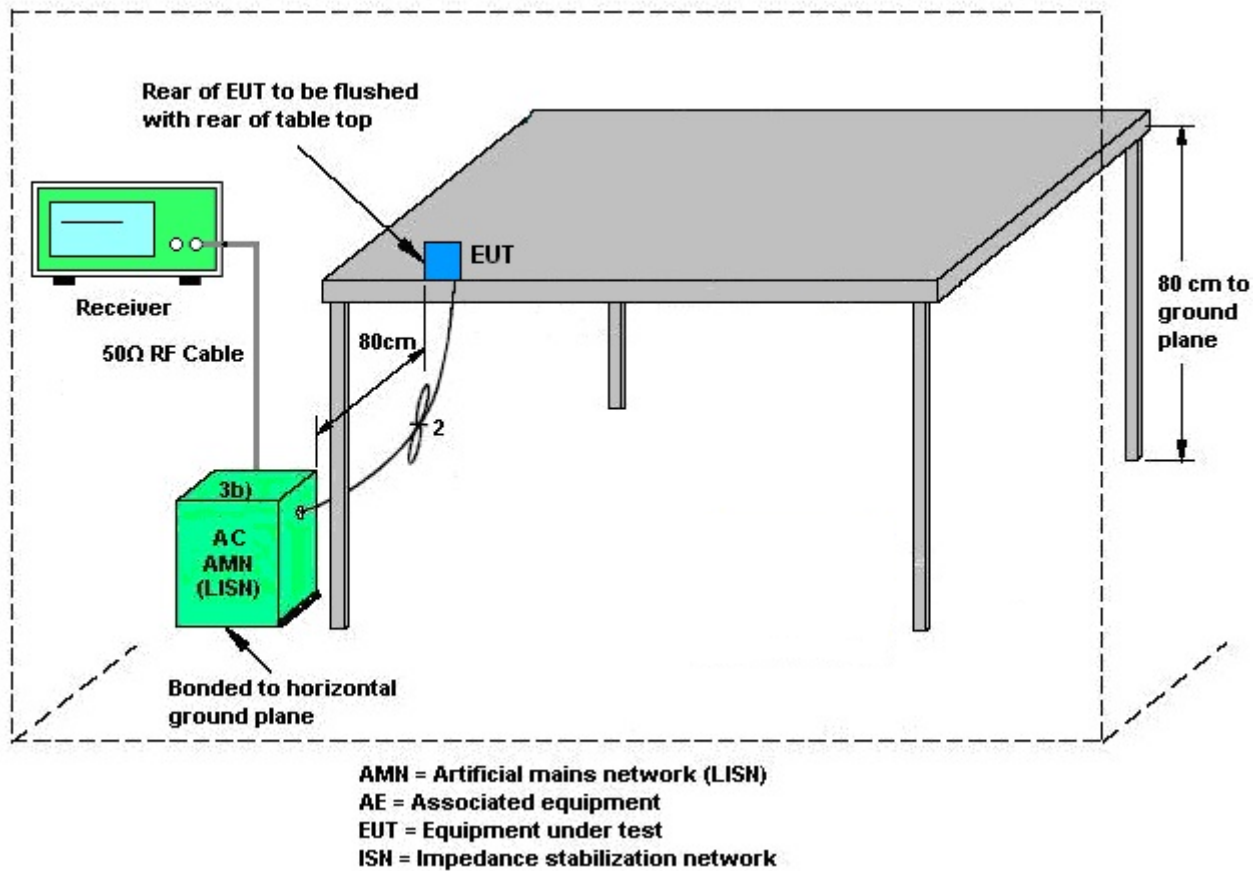
3.5.2 Measuring Instruments

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

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

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

3.6.2 Measuring Instruments

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

3.6.3 Test Result of Automatically Discontinue Transmission

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

3.7 Antenna Requirements

3.7.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2018	May 15, 2019	Aug. 06, 2019	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 14, 2019	May 15, 2019	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	May 15, 2019	Jan. 13, 2020	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz; Max 30dBm	Oct. 12, 2018	Jun. 07, 2019	Oct. 11, 2019	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471084	10Hz~44GHz	Jun. 25, 2018	Jun. 07, 2019	Jun. 24, 2019	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 19, 2018	Jun. 07, 2019	Oct. 18, 2019	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 28, 2018	Jun. 07, 2019	Dec. 27, 2019	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 20, 2018	Jun. 07, 2019	Oct. 19, 2019	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Jun. 07, 2019	Jan. 04, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHz	Aug. 06, 2018	Jun. 07, 2019	Aug. 05, 2019	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Jan. 14, 2019	Jun. 07, 2019	Jan. 13, 2020	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Apr. 17, 2019	Jun. 07, 2019	Apr. 16, 2020	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 15, 2019	Jun. 07, 2019	Apr. 14, 2020	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jun. 07, 2019	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jun. 07, 2019	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jun. 07, 2019	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 16, 2019	Jun. 10, 2019	Apr. 15, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 12, 2018	Jun. 10, 2019	Oct. 11, 2019	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Nov. 19, 2018	Jun. 10, 2019	Nov. 18, 2019	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2018	Jun. 10, 2019	Oct. 11, 2019	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

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

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

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

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

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

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

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



Appendix A. Conducted test results

Test Engineer:	Lex Wu	Temperature:	21~25	°C
Test Date:	2019/5/15	Relative Humidity:	51~54	%

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

Band IV									
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.73	20.88	15.44	0.5	Pass
11a	6Mbps	1	157	5785	17.68	20.88	15.32	0.5	Pass
11a	6Mbps	1	165	5825	17.68	20.88	15.64	0.5	Pass
HT20	MCS 0	1	149	5745	18.38	23.33	15.12	0.5	Pass
HT20	MCS 0	1	157	5785	18.33	21.63	15.92	0.5	Pass
HT20	MCS 0	1	165	5825	18.48	21.78	16.38	0.5	Pass
HT40	MCS 0	1	151	5755	36.56	40.91	35.16	0.5	Pass
HT40	MCS 0	1	159	5795	36.66	43.07	35.12	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	0.00	13.05	30.00	0.27		Pass
11a	6Mbps	1	157	5785	0.00	13.15	30.00	0.27		Pass
11a	6Mbps	1	165	5825	0.00	12.93	30.00	0.27		Pass
HT20	MCS 0	1	149	5745	0.00	12.98	30.00	0.27		Pass
HT20	MCS 0	1	157	5785	0.00	13.35	30.00	0.27		Pass
HT20	MCS 0	1	165	5825	0.00	13.36	30.00	0.27		Pass
HT40	MCS 0	1	151	5755	0.00	12.79	30.00	0.27		Pass
HT40	MCS 0	1	159	5795	0.00	12.95	30.00	0.27		Pass

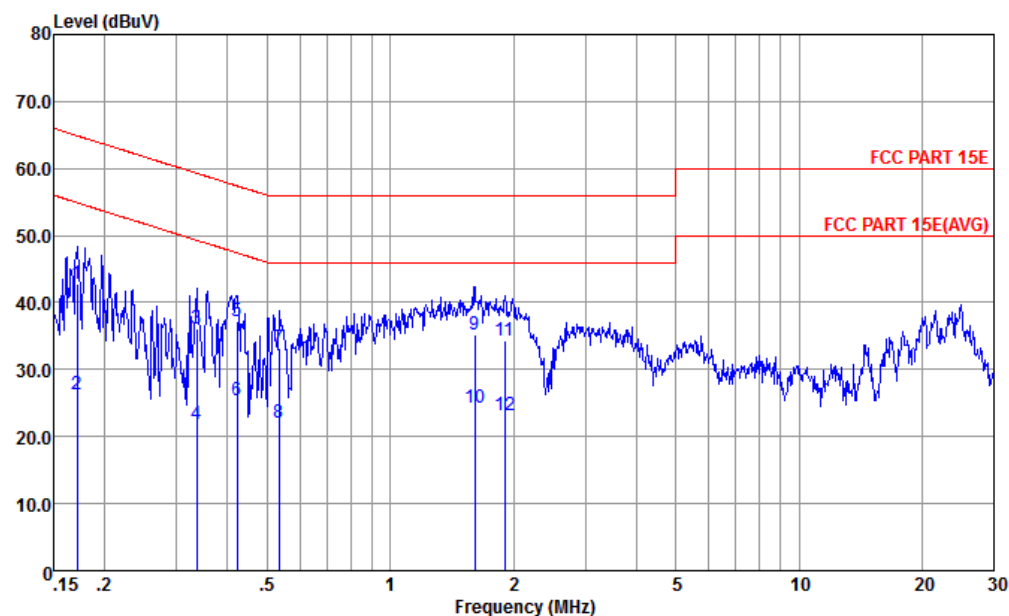
TEST RESULTS DATA
Power Spectral Density

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	0.00	2.22	0.62	30.00	0.27	Pass
11a	6Mbps	1	157	5785	0.00	2.22	-0.10	30.00	0.27	Pass
11a	6Mbps	1	165	5825	0.00	2.22	0.16	30.00	0.27	Pass
HT20	MCS 0	1	149	5745	0.00	2.22	-0.07	30.00	0.27	Pass
HT20	MCS 0	1	157	5785	0.00	2.22	-0.09	30.00	0.27	Pass
HT20	MCS 0	1	165	5825	0.00	2.22	0.34	30.00	0.27	Pass
HT40	MCS 0	1	151	5755	0.00	2.22	-3.66	30.00	0.27	Pass
HT40	MCS 0	1	159	5795	0.00	2.22	-3.73	30.00	0.27	Pass



Appendix B. AC Conducted Emission Test Results

Test Engineer :	Morris Zhang	Temperature :	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line

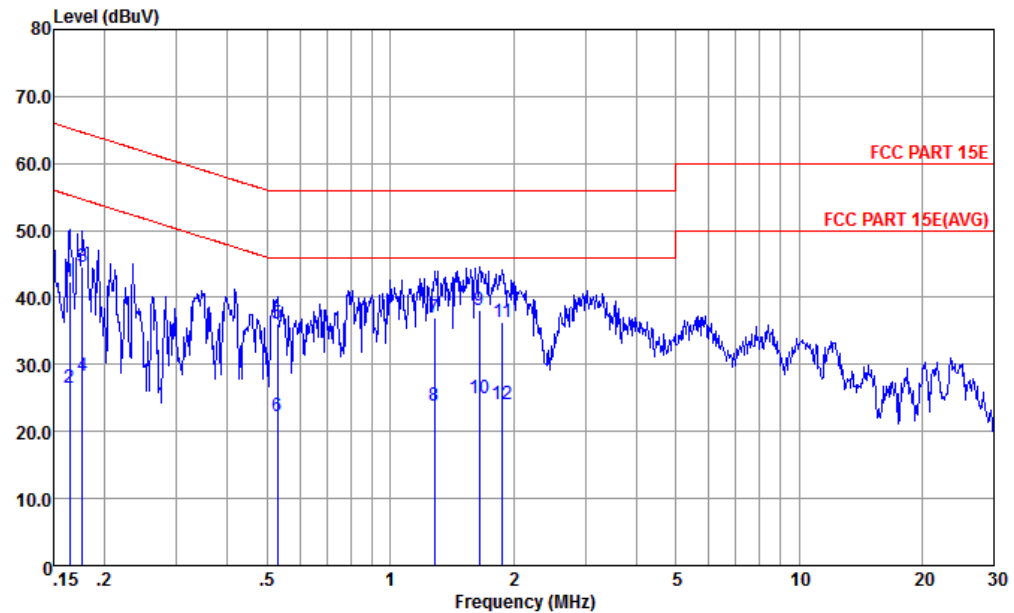


Site : CO01-KS
Condition : FCC PART 15E LISN-L-181119-060105 LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.171	42.83	-22.07	64.90	32.30	0.10	10.43	QP
2	0.171	26.23	-28.67	54.90	15.70	0.10	10.43	Average
3	0.336	36.04	-23.27	59.31	25.60	0.15	10.29	QP
4	0.336	21.74	-27.57	49.31	11.30	0.15	10.29	Average
5 *	0.421	37.22	-20.20	57.42	26.80	0.16	10.26	QP
6	0.421	25.32	-22.10	47.42	14.90	0.16	10.26	Average
7	0.535	33.21	-22.79	56.00	22.80	0.17	10.24	QP
8	0.535	22.11	-23.89	46.00	11.70	0.17	10.24	Average
9	1.610	35.24	-20.76	56.00	24.80	0.21	10.23	QP
10	1.610	24.34	-21.66	46.00	13.90	0.21	10.23	Average
11	1.908	34.35	-21.65	56.00	23.90	0.22	10.23	QP
12	1.908	23.15	-22.85	46.00	12.70	0.22	10.23	Average



Test Engineer :	Morris Zhang	Temperature :	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.164	42.42	-22.83	65.25	31.80	0.18	10.44	QP
2	0.164	26.62	-28.63	55.25	16.00	0.18	10.44	Average
3	0.177	44.49	-20.15	64.64	33.90	0.18	10.41	QP
4	0.177	28.39	-26.25	54.64	17.80	0.18	10.41	Average
5	0.529	36.18	-19.82	56.00	25.79	0.15	10.24	QP
6	0.529	22.28	-23.72	46.00	11.89	0.15	10.24	Average
7	1.282	37.07	-18.93	56.00	26.70	0.14	10.23	QP
8	1.282	23.77	-22.23	46.00	13.40	0.14	10.23	Average
9 *	1.654	38.17	-17.83	56.00	27.80	0.14	10.23	QP
10	1.654	24.97	-21.03	46.00	14.60	0.14	10.23	Average
11	1.878	36.28	-19.72	56.00	25.90	0.15	10.23	QP
12	1.878	24.08	-21.92	46.00	13.70	0.15	10.23	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		5607.2	50.65	-17.65	68.3	43.25	35.28	8.52	36.4	151	119	P	H
		5688	53.11	-43.34	96.45	45.7	35.25	8.58	36.42	151	119	P	H
		5719.98	57.14	-53.75	110.89	49.74	35.22	8.61	36.43	151	119	P	H
		5724.4	62.66	-58.27	120.93	55.26	35.22	8.61	36.43	151	119	P	H
		5746	104.68	-	-	97.27	35.21	8.64	36.44	151	119	P	H
		5746	97.44	-	-	90.03	35.21	8.64	36.44	151	119	A	H
		5609.6	49.43	-18.87	68.3	42.03	35.28	8.52	36.4	106	319	P	V
		5684.4	51.54	-42.25	93.79	44.13	35.25	8.58	36.42	106	319	P	V
		5717.2	56	-54.12	110.12	48.57	35.24	8.61	36.42	106	319	P	V
		5723.6	62.68	-56.43	119.11	55.28	35.22	8.61	36.43	106	319	P	V
		5746	103.83	-	-	96.42	35.21	8.64	36.44	106	319	P	V
		5746	96.55	-	-	89.14	35.21	8.64	36.44	106	319	A	V
802.11a CH 165 5825MHz		5826	106.07	-	-	98.7	35.13	8.72	36.48	100	124	P	H
		5826	98.25	-	-	90.88	35.13	8.72	36.48	100	124	A	H
		5850.4	58.65	-62.74	121.39	51.3	35.12	8.72	36.49	100	124	P	H
		5858	56.07	-53.99	110.06	48.7	35.1	8.77	36.5	100	124	P	H
		5888.4	54.52	-40.83	95.35	47.16	35.1	8.77	36.51	100	124	P	H
		5949.6	51.05	-17.25	68.3	43.61	35.09	8.88	36.53	100	124	P	H
		5826	106.21	-	-	98.84	35.13	8.72	36.48	135	326	P	V
		5826	98.68	-	-	91.31	35.13	8.72	36.48	135	326	A	V
		5850.04	58.8	-63.41	122.21	51.45	35.12	8.72	36.49	135	326	P	V
		5860.8	55.36	-53.91	109.27	47.99	35.1	8.77	36.5	135	326	P	V
		5901.6	53.2	-32.38	85.58	45.79	35.1	8.82	36.51	135	326	P	V
		5929.6	52.14	-16.16	68.3	44.75	35.09	8.82	36.52	135	326	P	V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	44.02	-29.98	74	56.12	37.99	12.74	62.83	100	360	P	H
		11490	43.62	-30.38	74	55.72	37.99	12.74	62.83	100	360	P	V
802.11a CH 157 5785MHz		11570	43.23	-30.77	74	55.2	38.06	12.79	62.82	100	360	P	H
		11570	43.98	-30.02	74	55.95	38.06	12.79	62.82	100	360	P	V
802.11a CH 165 5825MHz		11650	43.1	-30.9	74	54.95	38.11	12.85	62.81	100	360	P	H
		11650	42.76	-31.24	74	54.61	38.11	12.85	62.81	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5638	50.74	-17.56	68.3	43.28	35.3	8.55	36.39	129	124	P	H
		5695.2	53.74	-48.02	101.76	46.33	35.25	8.58	36.42	129	124	P	H
		5719.2	60.13	-50.55	110.68	52.73	35.22	8.61	36.43	129	124	P	H
		5722.4	70.44	-45.93	116.37	63.04	35.22	8.61	36.43	129	124	P	H
		5748	104.8	-	-	97.39	35.21	8.64	36.44	129	124	P	H
		5748	97.92	-	-	90.51	35.21	8.64	36.44	129	124	A	H
		5649.6	50.27	-18.03	68.3	42.84	35.28	8.55	36.4	182	320	P	V
		5698.8	53.63	-50.79	104.42	46.22	35.25	8.58	36.42	182	320	P	V
		5716.4	59.61	-50.28	109.89	52.18	35.24	8.61	36.42	182	320	P	V
		5724.8	67.65	-54.19	121.84	60.25	35.22	8.61	36.43	182	320	P	V
		5742	104.86	-	-	97.45	35.21	8.64	36.44	182	320	P	V
		5742	98.71	-	-	91.3	35.21	8.64	36.44	182	320	A	V
802.11n HT20 CH 165 5825MHz		5824	105.22	-	-	97.85	35.13	8.72	36.48	100	117	P	H
		5824	98.04	-	-	90.67	35.13	8.72	36.48	100	117	A	H
		5850.04	59.62	-62.59	122.21	52.27	35.12	8.72	36.49	100	117	P	H
		5860.4	56.6	-52.79	109.39	49.23	35.1	8.77	36.5	100	117	P	H
		5886.4	54.65	-42.19	96.84	47.29	35.1	8.77	36.51	100	117	P	H
		5932	51.88	-16.42	68.3	44.49	35.09	8.82	36.52	100	117	P	H
		5824	104.52	-	-	97.15	35.13	8.72	36.48	247	321	P	V
		5824	97.63	-	-	90.26	35.13	8.72	36.48	247	321	A	V
		5853.2	59.17	-55.83	115	51.82	35.12	8.72	36.49	247	321	P	V
		5855.2	57.64	-53.2	110.84	50.32	35.1	8.72	36.5	247	321	P	V
		5897.2	52.33	-36.5	88.83	44.92	35.1	8.82	36.51	247	321	P	V
		5960	51.31	-16.99	68.3	43.87	35.09	8.88	36.53	247	321	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20		11490	42.3	-31.7	74	54.4	37.99	12.74	62.83	100	360	P	H
CH 149 5745MHz		11490	44.21	-29.79	74	56.31	37.99	12.74	62.83	100	360	P	V
802.11n HT20		11570	43.69	-30.31	74	55.66	38.06	12.79	62.82	100	360	P	H
CH 157 5785MHz		11570	43.04	-30.96	74	55.01	38.06	12.79	62.82	100	360	P	V
802.11n HT20		11650	44.91	-29.09	74	56.76	38.11	12.85	62.81	100	360	P	H
CH 165 5825MHz		11650	43.94	-30.06	74	55.79	38.11	12.85	62.81	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5646	50.14	-18.16	68.3	42.68	35.3	8.55	36.39	106	117	P	H
		5697.2	53.29	-49.95	103.24	45.88	35.25	8.58	36.42	106	117	P	H
		5719.6	69.25	-41.54	110.79	61.85	35.22	8.61	36.43	106	117	P	H
		5723.6	74.69	-44.42	119.11	67.29	35.22	8.61	36.43	106	117	P	H
		5758	101.37	-	-	93.99	35.19	8.64	36.45	106	117	P	H
		5758	93.52	-	-	86.14	35.19	8.64	36.45	106	117	A	H
		5853.6	51.5	-62.59	114.09	44.18	35.1	8.72	36.5	106	117	P	H
		5855.2	51.07	-59.77	110.84	43.75	35.1	8.72	36.5	106	117	P	H
		5893.6	51.97	-39.53	91.5	44.61	35.1	8.77	36.51	106	117	P	H
		5957.2	49.9	-18.4	68.3	42.46	35.09	8.88	36.53	106	117	P	H
		5606.8	51.57	-16.73	68.3	44.17	35.28	8.52	36.4	254	320	P	V
		5699.2	61.93	-42.78	104.71	54.52	35.25	8.58	36.42	254	320	P	V
		5715.6	68.72	-40.95	109.67	61.29	35.24	8.61	36.42	254	320	P	V
		5724.4	70.4	-50.53	120.93	63	35.22	8.61	36.43	254	320	P	V
		5754	101.76	-	-	94.38	35.19	8.64	36.45	254	320	P	V
		5754	94.17	-	-	86.79	35.19	8.64	36.45	254	320	A	V
		5850.8	51.46	-69.02	120.48	44.11	35.12	8.72	36.49	254	320	P	V
		5861.6	51.87	-57.18	109.05	44.5	35.1	8.77	36.5	254	320	P	V
		5906	50.69	-31.63	82.32	43.3	35.09	8.82	36.52	254	320	P	V
		5937.6	50.31	-17.99	68.3	42.86	35.09	8.88	36.52	254	320	P	V



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5644.4	50.99	-17.31	68.3	43.53	35.3	8.55	36.39	100	119	P	H
		5697.2	50.45	-52.79	103.24	43.04	35.25	8.58	36.42	100	119	P	H
		5718.8	50.88	-59.68	110.56	43.48	35.22	8.61	36.43	100	119	P	H
		5724.8	52.4	-69.44	121.84	45	35.22	8.61	36.43	100	119	P	H
		5796	101.81	-	-	94.45	35.16	8.67	36.47	100	119	P	H
		5796	93.91	-	-	86.55	35.16	8.67	36.47	100	119	A	H
		5852.8	54.46	-61.46	115.92	47.11	35.12	8.72	36.49	100	119	P	H
		5864	54.77	-53.61	108.38	47.4	35.1	8.77	36.5	100	119	P	H
		5874.8	53.39	-51.97	105.36	46.03	35.1	8.77	36.51	100	119	P	H
		5938.8	51.32	-16.98	68.3	43.88	35.09	8.88	36.53	100	119	P	H
		5620.8	50.75	-17.55	68.3	43.33	35.29	8.52	36.39	228	321	P	V
		5676.8	50.72	-37.45	88.17	43.28	35.27	8.58	36.41	228	321	P	V
		5719.6	52.04	-58.75	110.79	44.64	35.22	8.61	36.43	228	321	P	V
		5720.4	51.7	-60.11	111.81	44.3	35.22	8.61	36.43	228	321	P	V
		5802	101.46	-	-	94.1	35.16	8.67	36.47	228	321	P	V
		5802	93.86	-	-	86.5	35.16	8.67	36.47	228	321	A	V
		5851.6	62.46	-56.19	118.65	55.11	35.12	8.72	36.49	228	321	P	V
		5858	54.67	-55.39	110.06	47.3	35.1	8.77	36.5	228	321	P	V
		5878	51.02	-52.05	103.07	43.66	35.1	8.77	36.51	228	321	P	V
		5946.4	50.07	-18.23	68.3	42.63	35.09	8.88	36.53	228	321	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40		11510	43.93	-30.07	74	56.02	38	12.74	62.83	100	360	P	H
CH 151 5755MHz		11510	44.21	-29.79	74	56.3	38	12.74	62.83	100	360	P	V
802.11n HT40		11590	43.05	-30.95	74	54.97	38.07	12.82	62.81	100	360	P	H
CH 159 5795MHz		11590	43.26	-30.74	74	55.18	38.07	12.82	62.81	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

5GHz WIFI 802.11a (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 802.11a LF		30	22.5	-17.5	40	30.75	24.1	0.63	32.98	100	20	P	H
		89.17	21.67	-21.83	43.5	38.94	14.59	1.06	32.92	-	-	P	H
		191.02	23.79	-19.71	43.5	39.71	15.47	1.53	32.92	-	-	P	H
		770.11	26.17	-19.83	46	30.43	25.74	3.07	33.07	-	-	P	H
		870.99	26.57	-19.43	46	29.42	26.38	3.25	32.48	-	-	P	H
		939.86	27.93	-18.07	46	29.48	26.9	3.38	31.83	-	-	P	H
		30	27.02	-12.98	40	35.27	24.1	0.63	32.98	-	-	P	V
		48.43	25.99	-14.01	40	43.45	14.7	0.8	32.96	-	-	P	V
		55.22	32.55	-7.45	40	51.46	13.2	0.85	32.96	100	30	P	V
		88.2	22.28	-21.22	43.5	39.77	14.38	1.05	32.92	-	-	P	V
		821.52	28.04	-17.96	46	31.51	26.19	3.16	32.82	-	-	P	V
		926.28	28.77	-17.23	46	30.66	26.76	3.35	32	-	-	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		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. 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)

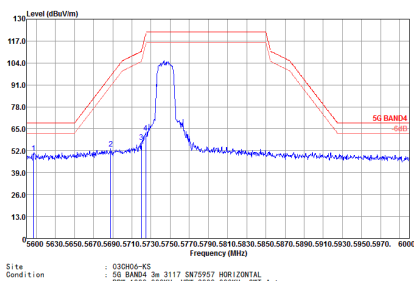
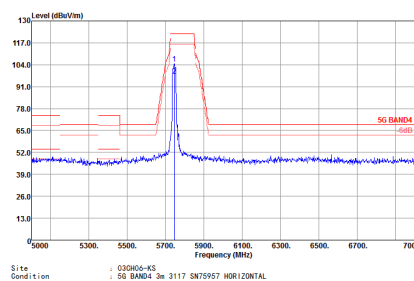
Both peak and average measured complies with the limit line, so test result is “PASS”.



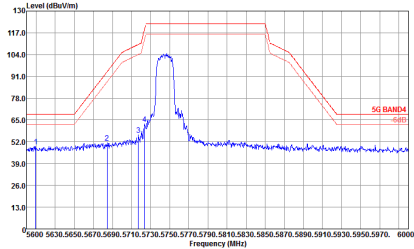
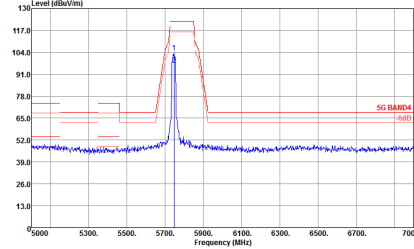
Appendix D. Radiated Spurious Emission Plots

Band 4 - 5725~5850MHz

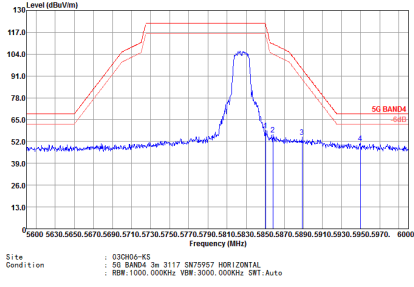
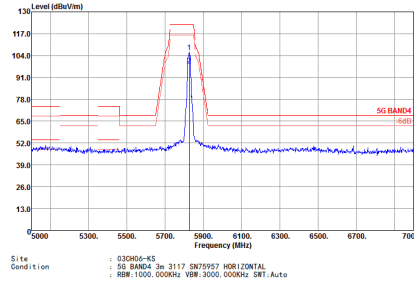
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Fundamental
Peak/ Avg.	 Site Condition : 03CH05-KS : SG BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000, 000KHz VBW:3000, 000KHz SRT:Auto	 Site Condition : 03CH05-KS : SG BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000, 000KHz VBW:3000, 000KHz SRT:Auto

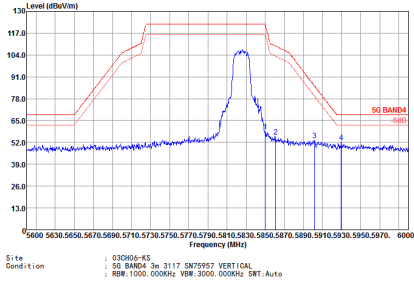
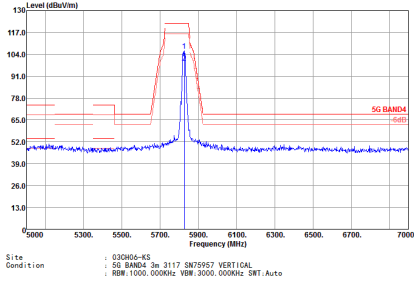


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Vertical	Fundamental
Peak/ Avg.	 Site Condition : 030806-KS : 5G BAND 4 3m 3117 SN75957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SMT:Auto	 Site Condition : 030806-KS : 5G BAND 4 3m 3117 SN75957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SMT:Auto



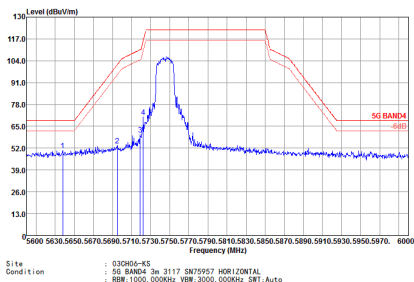
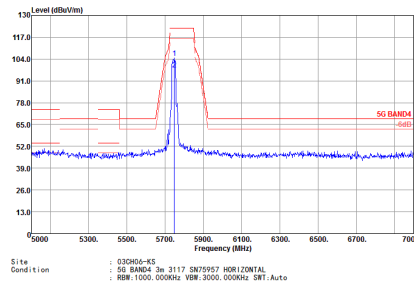
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak/ Avg.	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 SN75957 HORIZONTAL RBW: 100K, 1000Hz, VBW: 300K, 1000Hz, SMT: Auto	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 SN75957 HORIZONTAL RBW: 100K, 1000Hz, VBW: 300K, 1000Hz, SMT: Auto



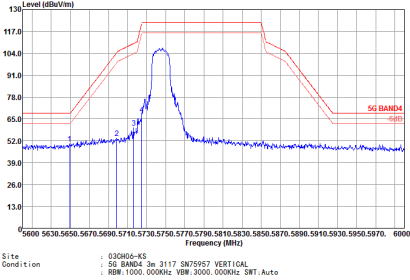
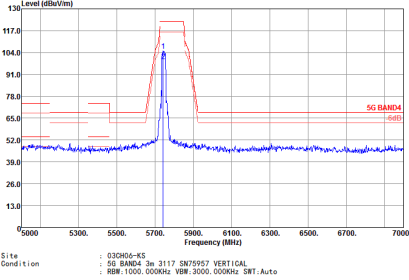
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak/ Avg.	 Site Condition : 03CH06-KS : 5G BAND/ 3m 3117 5875957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SRT:Auto	 Site Condition : 03CH06-KS : 5G BAND/ 3m 3117 5875957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SRT:Auto



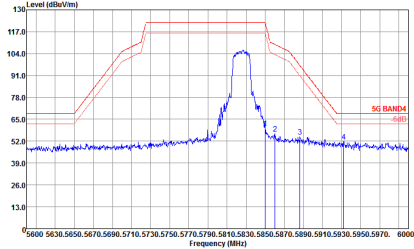
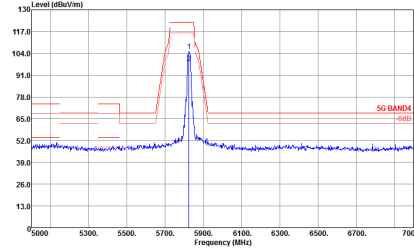
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak/ Avg.	 Site : 03CH05-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL RBW: 1000, 5000Hz VBW: 3000, 5000Hz SFT: Auto	 Site : 03CH05-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL RBW: 1000, 5000Hz VBW: 3000, 5000Hz SFT: Auto

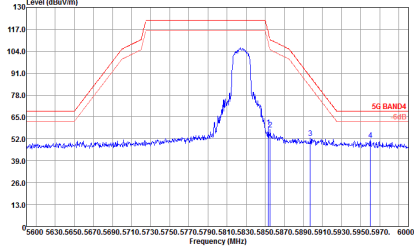
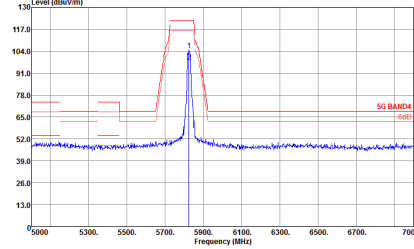


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Vertical	Fundamental
Peak/ Avg.	 Site Condition : 03CH06-K5 : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 0000kHz VBW:3000, 0000kHz SRT:Auto	 Site Condition : 03CH06-K5 : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 0000kHz VBW:3000, 0000kHz SRT:Auto



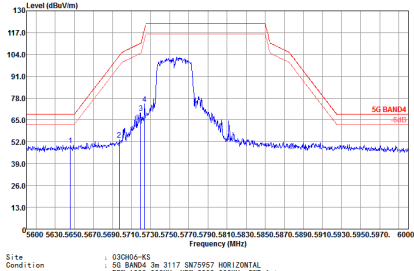
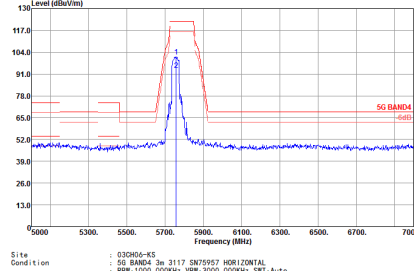
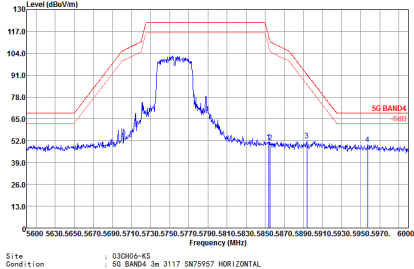
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak/ Avg.	 Site : 030806-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SMT:Auto	 Site : 030806-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SMT:Auto



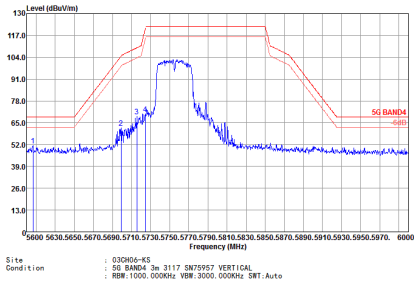
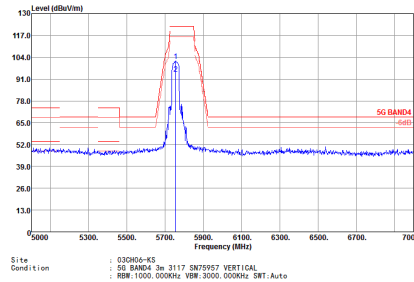
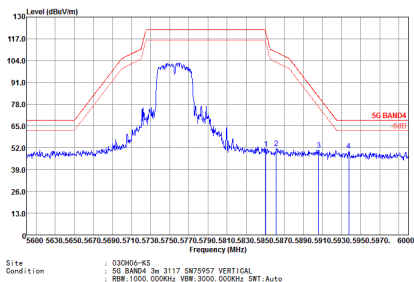
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Vertical	Fundamental
Peak/ Avg.	 Site Condition : 032016-15 : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SWT:Auto	 Site Condition : 032016-15 : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SWT:Auto



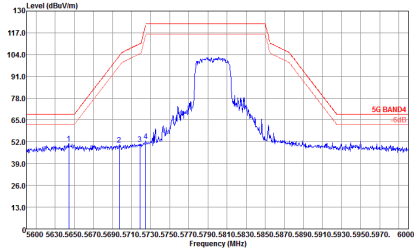
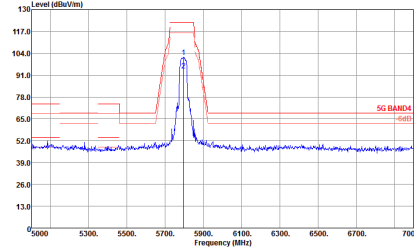
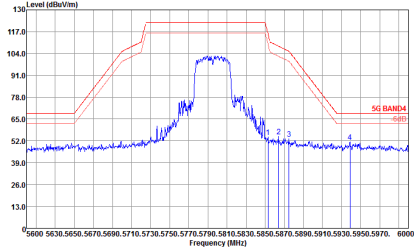
Band 4 5725~5850MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Horizontal	Fundamental
Peak/ Avg.	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW: 100K 300KHz VBW: 300K 300KHz SFT: Auto	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW: 100K 300KHz VBW: 300K 300KHz SFT: Auto
Peak	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW: 100K 300KHz VBW: 300K 300KHz SFT: Auto	-

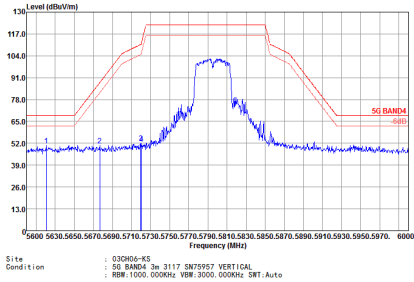
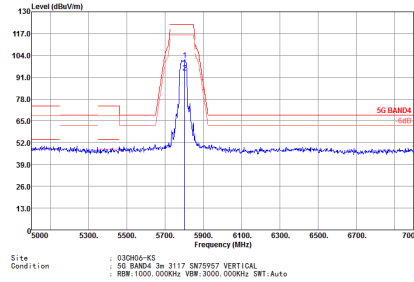
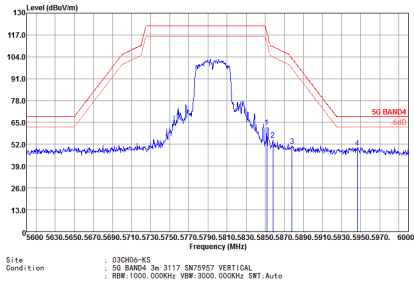


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Vertical	Fundamental
Peak/ Avg.	 Site : 030KH0-KS Condition : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 0000KHz VBW:3000, 0000KHz SWT:Auto	 Site : 030KH0-KS Condition : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 0000KHz VBW:3000, 0000KHz SWT:Auto
Peak	 Site : 030KH0-KS Condition : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 0000KHz VBW:3000, 0000KHz SWT:Auto	-



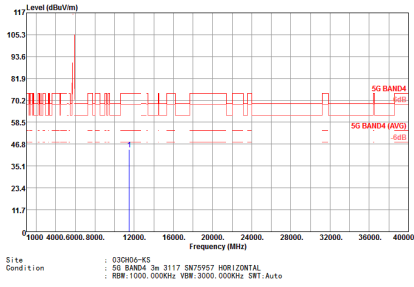
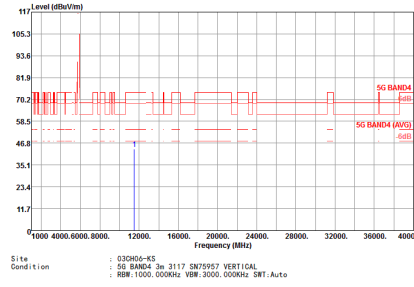
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Fundamental
Peak/ Avg.	 Site : 030802-KS Condition : 5G_BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SMT:Auto	 Site : 030802-KS Condition : 5G_BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SMT:Auto
Peak	 Site : 030802-KS Condition : 5G_BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SMT:Auto	-



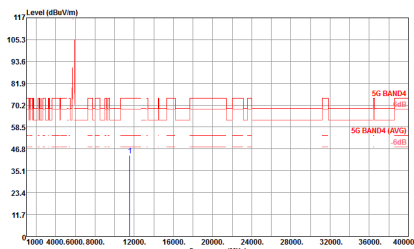
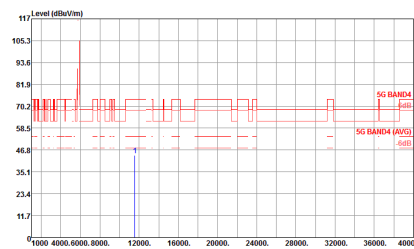
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Vertical	Fundamental
Peak/ Avg.	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 57957 VERTICAL RBW:1000,0000Hz VBW:3000,0000Hz SRT:Auto	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 57957 VERTICAL RBW:1000,0000Hz VBW:3000,0000Hz SRT:Auto
Peak	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 57957 VERTICAL RBW:1000,0000Hz VBW:3000,0000Hz SRT:Auto	-



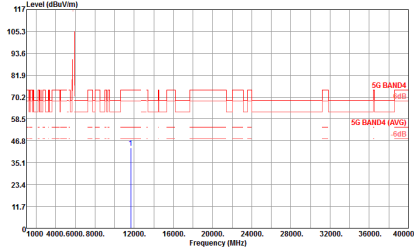
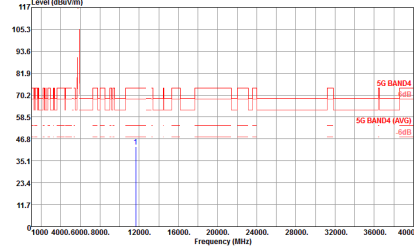
Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 SN79557 HORIZONTAL : RBW:100K 1000KHz VBW:3000 1000KHz SFT:Auto	 Site Condition : 03CH06-KS : 5G BAND4 3m 3117 SN79557 VERTICAL : RBW:100K 1000KHz VBW:3000 1000KHz SFT:Auto



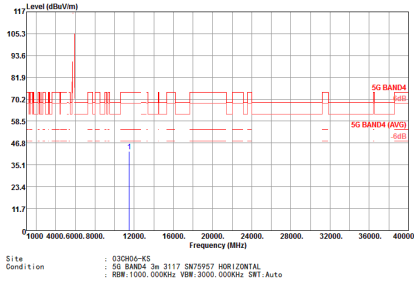
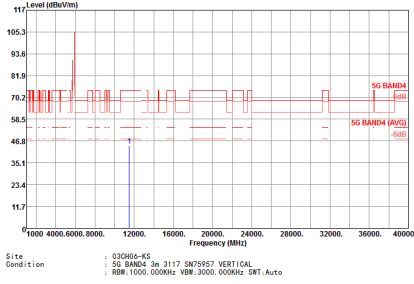
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH06-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL RBW: 1000, 5000Hz VBW: 3000, 5000Hz SMT: Auto	 Site : 03CH06-KS Condition : 5G BAND4 3m 3117 SN75957 VERTICAL RBW: 1000, 5000Hz VBW: 3000, 5000Hz SMT: Auto



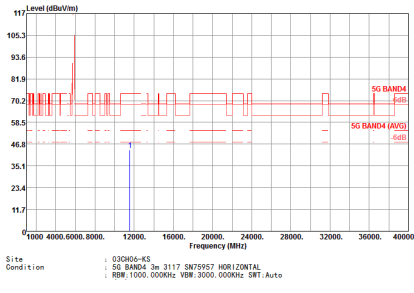
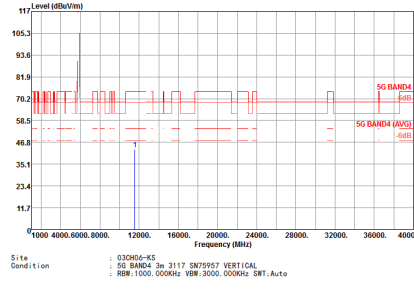
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 030602-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000, 000KHz VBW:3000, 000KHz SWT:Auto	 Site : 030602-KS Condition : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 000KHz VBW:3000, 000KHz SWT:Auto



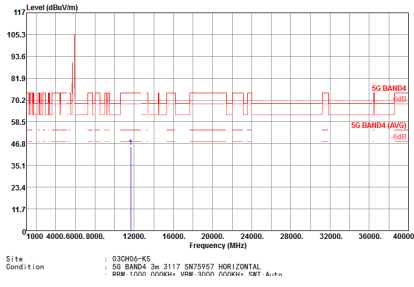
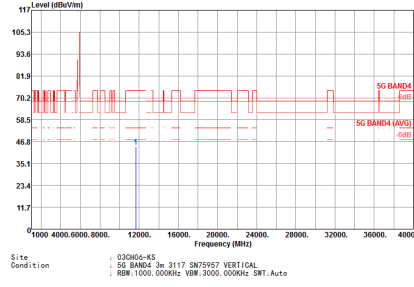
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.	 Site Condition : 03CH05-K5 : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW: 1000, 5000Hz VBW: 3000, 5000Hz SFT: Auto	 Site Condition : 03CH05-K5 : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW: 1000, 5000Hz VBW: 3000, 5000Hz SFT: Auto



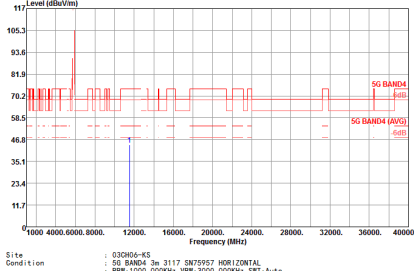
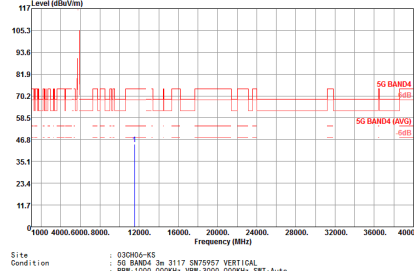
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.	 Site Condition 032004-KS : 5G BAND4 3m 3117 SN75957 HORIZONTAL : RBW:1000, 5000Hz VBW:3000, 5000Hz SWT:Auto	 Site Condition 032004-KS : 5G BAND4 3m 3117 SN75957 VERTICAL : RBW:1000, 5000Hz VBW:3000, 5000Hz SWT:Auto



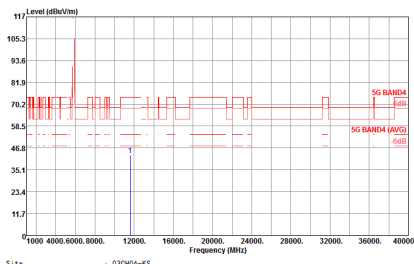
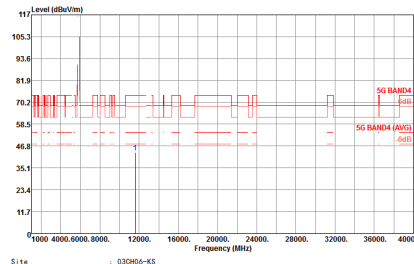
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH04-KS Condition : 5G BAND4 3m 3117 SN75957 HORIZONTAL RBW 1000 10000Hz VBW 10000 10000Hz SFT Auto	 Site : 03CH04-KS Condition : 5G BAND4 3m 3117 SN75957 VERTICAL RBW 1000 10000Hz VBW 10000 10000Hz SFT Auto



Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

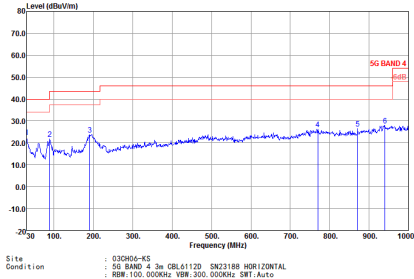
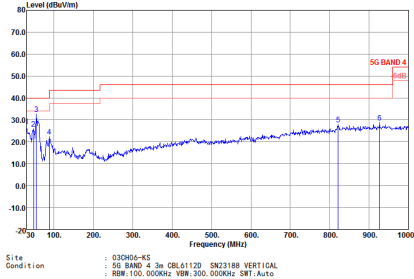
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Horizontal	Vertical
Peak Avg.	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 SN7957 HORIZONTAL RBW: 1000, 10000Hz, VBW: 3000, 10000Hz, SFT: Auto	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 SN7957 VERTICAL RBW: 1000, 10000Hz, VBW: 3000, 10000Hz, SFT: Auto



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Vertical
Peak Avg.	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 5W5957 HORIZONTAL RBW:1000,0000Hz VBW:3000,0000Hz SFT:Auto	 Site Condition : 03CH04-KS : 5G BAND4 3m 3117 5W5957 VERTICAL RBW:1000,0000Hz VBW:3000,0000Hz SFT:Auto



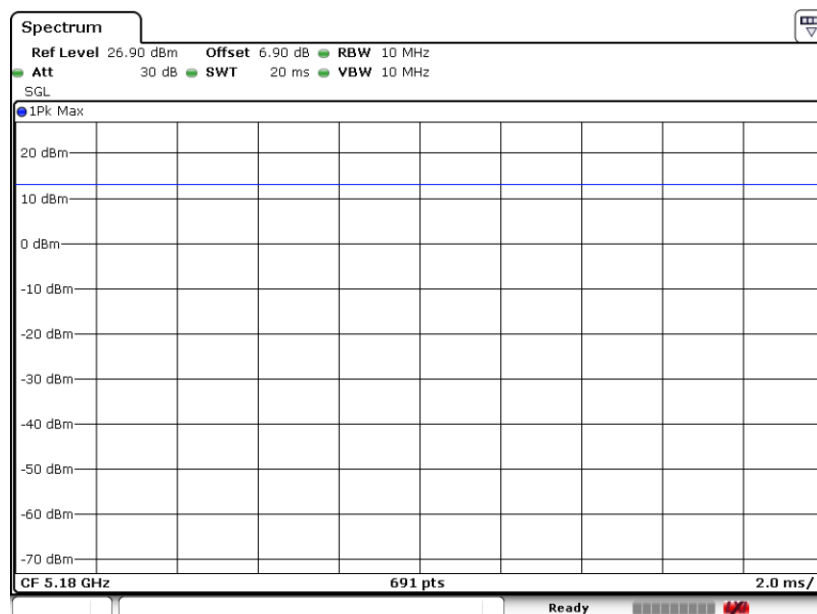
Emission below 1GHz
5GHz WIFI 802.11a (LF)

WIFI	5GHz 5725~5850MHz	
ANT	802.11a LF	
1	Horizontal	Vertical
Peak		

Appendix E. Duty Cycle Plots

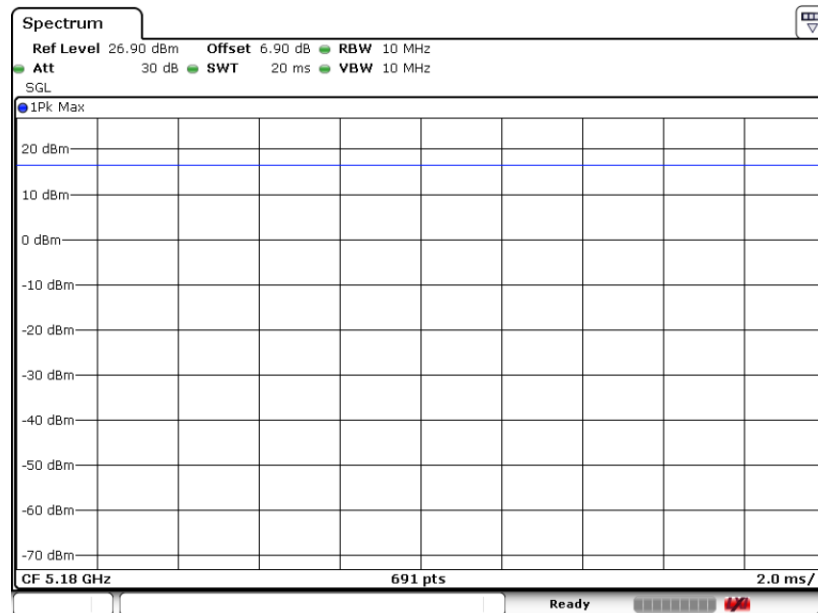
Band	Duty Cycle(%)	Duty factor(dB)	T(ms)	1/T(kHz)	VBW Setting
802.11a	100	0	-	-	10Hz
802.11n HT20	100	0	-	-	10Hz
802.11n HT40	100	0	-	-	10Hz

802.11a





802.11n HT20



802.11n HT40

