



FCC RF Test Report

APPLICANT : Nokia Shanghai Bell Co. Ltd.
EQUIPMENT : Nokia FastMile 5G Gateway 3.2
BRAND NAME : Nokia
MODEL NAME : 5G16-12W-A
FCC ID : 2ADZR5G1612WA
STANDARD : FCC Part 15 Subpart E § 15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Nov. 30, 2021 ~ Dec. 22, 2021

We, Sporton International Inc. (Kunshan), 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 Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager



Sporton International Inc. (Kunshan)

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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 Manufacturer.....	5
1.3 Product Feature of Equipment Under Test.....	5
1.4 Product Specification of Equipment Under Test.....	5
1.5 Modification of EUT	6
1.6 Testing Location	7
1.7 Test Software.....	7
1.8 Applicable Standards.....	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Carrier Frequency and Channel	8
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	10
2.6 Measurement Results Explanation Example.....	10
3 TEST RESULT	11
3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement	11
3.2 Maximum Conducted Output Power Measurement	17
3.3 Power Spectral Density Measurement	18
3.4 Unwanted Emissions Measurement.....	26
3.5 AC Conducted Emission Measurement.....	31
3.6 Antenna Requirements.....	33
4 LIST OF MEASURING EQUIPMENT	35
5 UNCERTAINTY OF EVALUATION	36
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	
APPENDIX F. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR1O2908C	Rev. 01	Initial issue of report	Jan. 20, 2022

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 1.10 dB at 11576.00 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.63 dB at 0.365 MHz
3.6	15.203 & 15.407(a)	Antenna Requirement	15.203 & 15.407(a)	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Nokia Shanghai Bell Co. Ltd.

No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai 201206 , China

1.2 Manufacturer

Nokia Solutions and Networks Oy

Karakaari 7 02610 Espoo Finland

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Nokia FastMile 5G Gateway 3.2
Brand Name	Nokia
Model Name	5G16-12W-A
FCC ID	2ADZR5G1612WA
HW Version	3TG01797A
SW Version	5GGW3-OMNI-1_D210400Bh3T0301E0156
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT: sample 1 with 1st source antenna and sample 2 with 2nd source antenna. According to the difference, we chose sample 1 to perform full test and sample 2 to verify the worst cases of RSE.

1.4 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> <CDD Mode> 802.11a : 29.90 dBm / 0.9772 W <Beamforming Mode> 802.11n HT20 : 29.39 dBm / 0.8690 W 802.11n HT40 : 29.50 dBm / 0.8913 W 802.11ac VHT20: 29.29 dBm / 0.8492 W 802.11ac VHT40: 29.36 dBm / 0.8630 W 802.11ac VHT80: 29.42 dBm / 0.8750 W 802.11ax HE20 : 29.67 dBm / 0.9268 W 802.11ax HE40 : 29.56 dBm / 0.9036 W 802.11ax HE80 : 29.51 dBm / 0.8933 W

99% Occupied Bandwidth	802.11a : 17.33 MHz 802.11ax HE20 : 19.43 MHz 802.11ax HE40 : 38.46 MHz 802.11ax HE80 : 77.20 MHz				
Antenna Type	Dipole Antenna				
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)				
Antenna Function Description		Ant. 1	Ant. 2	Ant. 3	Ant. 4
	802.11a CDD	V			
	802.11n/ac/ax CDD/Beamforming	V			

Note:

1. WLAN 5GHz support MIMO mode (CDD mode for 802.11a, CDD and Beamforming mode for 802.11n/ac/ax) only.
2. The beamforming EIRP is greater than CDD mode EIRP. So we only evaluate beamforming mode by referring to their maximum EIRP
3. For 802.11n HT20 / ac VHT20 / ax HE20 and 802.11n HT40 / ac VHT40 / ax HE40 and 802.11ac VHT80 / ax HE80 mode the whole testing have assessed only 802.11ax HE20/ HE40/HE80 by referring to the higher output power for OB/PSD/RSE testing.
4. The device does not support partial RU for 802.11ax mode.
5. WLAN antenna gain refer to Section 3.6

1.5 Modification of EUT

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



1.6 Testing Location

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

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

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH05-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8 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.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output 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).
- 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 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 HT40/11ac VHT40/11ax HE40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80 /11ax HE80.

2.2 Test Mode

Radiated Spurious Emission Test Modes

Mode	Sample	Band	Channel	Test Mode	
CDD 4*4	1	11a Tx	CH149	11a	fundamental+BE+Harmonic
CDD 4*4	1	11a Tx	CH157	11a	fundamental+BE+Harmonic
CDD 4*4	1	11a Tx	CH165	11a	fundamental+BE+Harmonic
BF 4*4	1	11ax Tx	CH149	HE20	fundamental+BE+Harmonic
BF 4*4	1	11ax Tx	CH157	HE20	fundamental+BE+Harmonic
BF 4*4	1	11ax Tx	CH165	HE20	fundamental+BE+Harmonic
BF 4*4	1	11ax Tx	CH151	HE40	fundamental+BE+Harmonic
BF 4*4	1	11ax Tx	CH159	HE40	fundamental+BE+Harmonic
BF 4*4	1	11ax Tx	CH155	HE80	fundamental+BE+Harmonic
CDD 4*4	2	11a Tx	CH157	11a	fundamental+BE+Harmonic

Note:

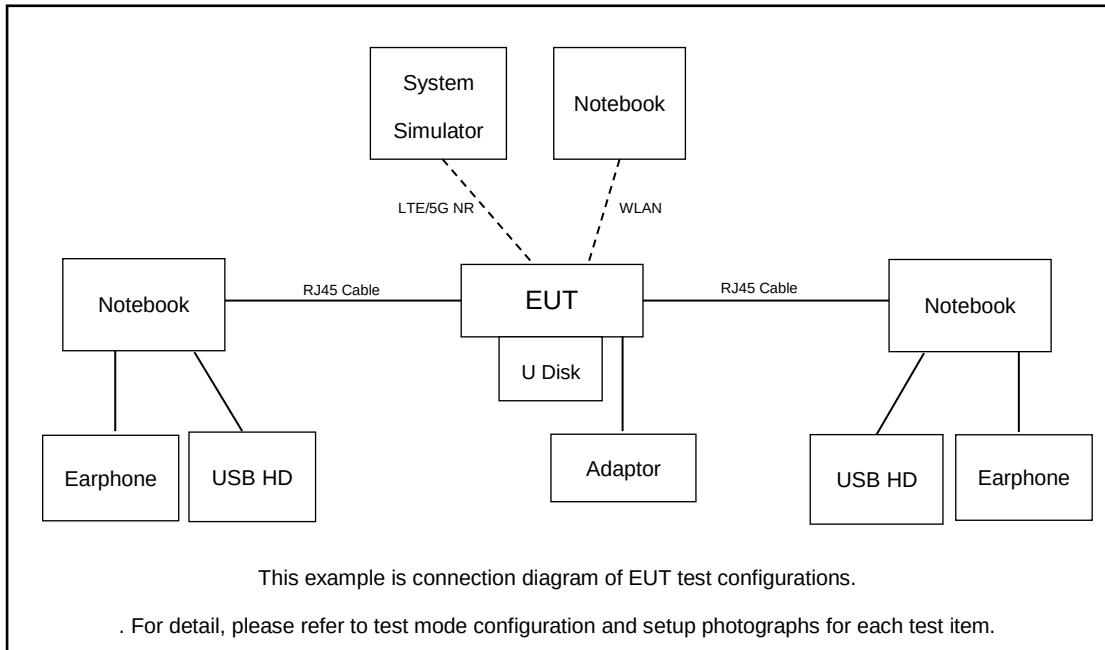
1. For Radiated Test Cases, The tests were performance with Adapter 1.
2. All the test modes of Radiated Spurious Emission (RSE) were tested at the worst data rate; only the worse data in each bandwidth (20/40/80MHz) shown in bold for these modes is reported.
3. The worst data of Low Frequency evaluation in report number FR1O2908B.

Conducted Emission Test mode

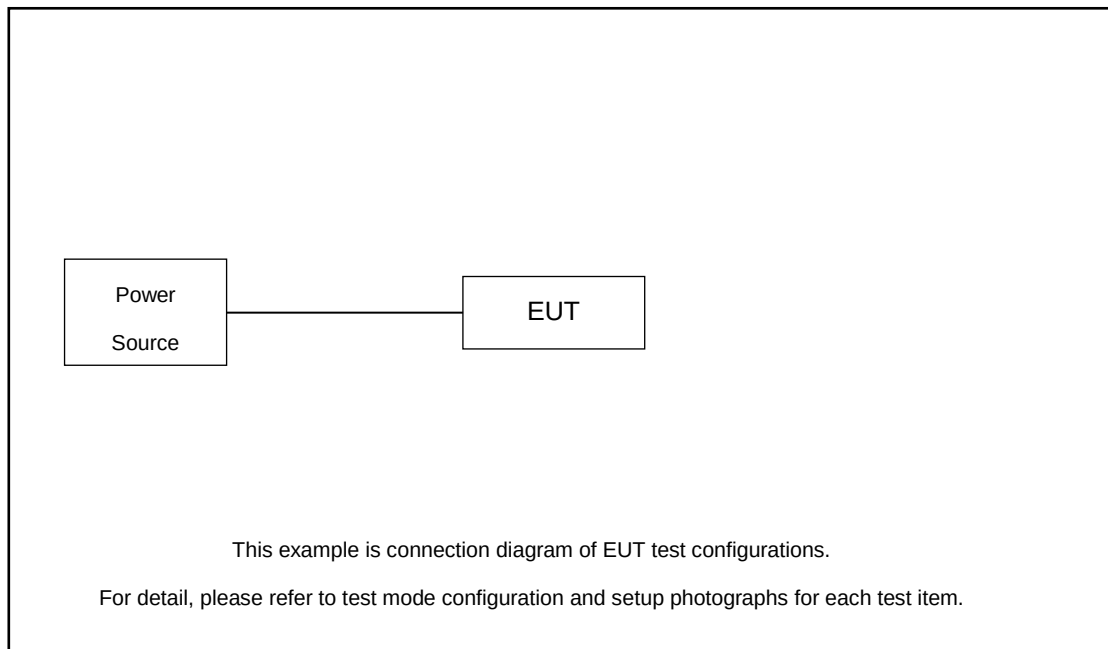
Mode 1 : LTE Band 5 Rx(Middle) + WLAN (2.4G&5G) Link + LAN Link + WAN Link + USB Cable
(Data Link With U Disk) + Power from Adapter1 + USIM for Sample 1

2.3 Connection Diagram of Test System

For Conducted Emission:



For Radiated Emission:



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	Anritus	MT8821C	N/A	N/A	Unshielded, 1.8m
2.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	Notebook	Lenovo	V130-14IKB004	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Hard Disk	WD	C6B	N/A	N/A	N/A
5.	Earphone	Lenovo	P121	N/A	N/A	Unshielded, 1.2m

2.5 EUT Operation Test Setup

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

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 7.0 dB.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\
 &= 7.0 \text{ (dB)}
 \end{aligned}$$

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.

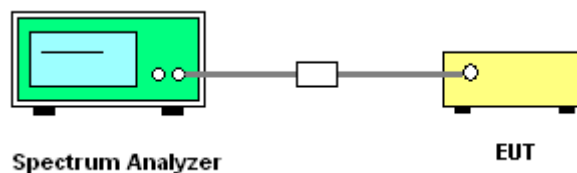
3.1.2 Measuring Instruments

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



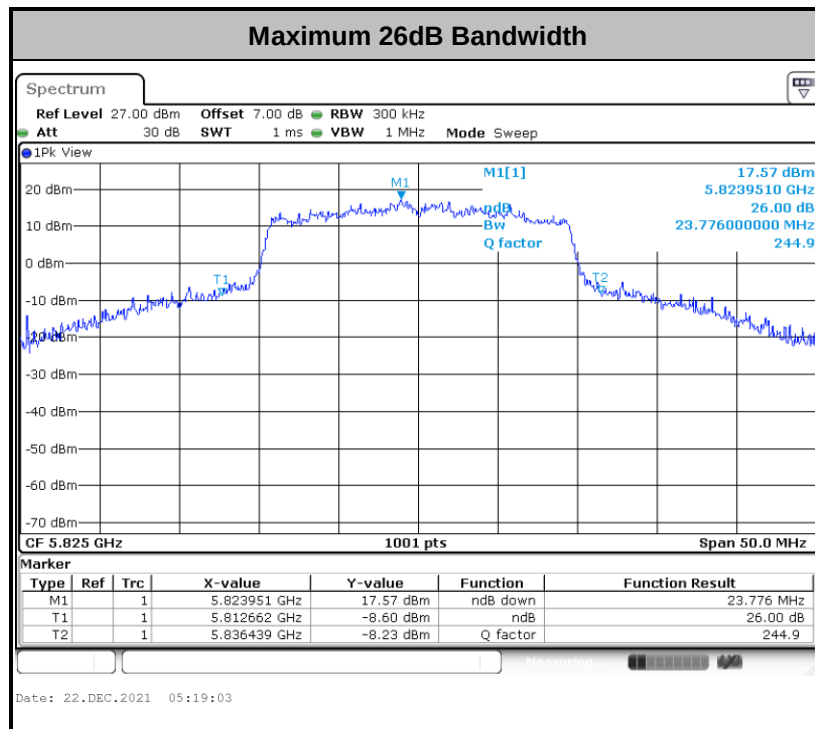
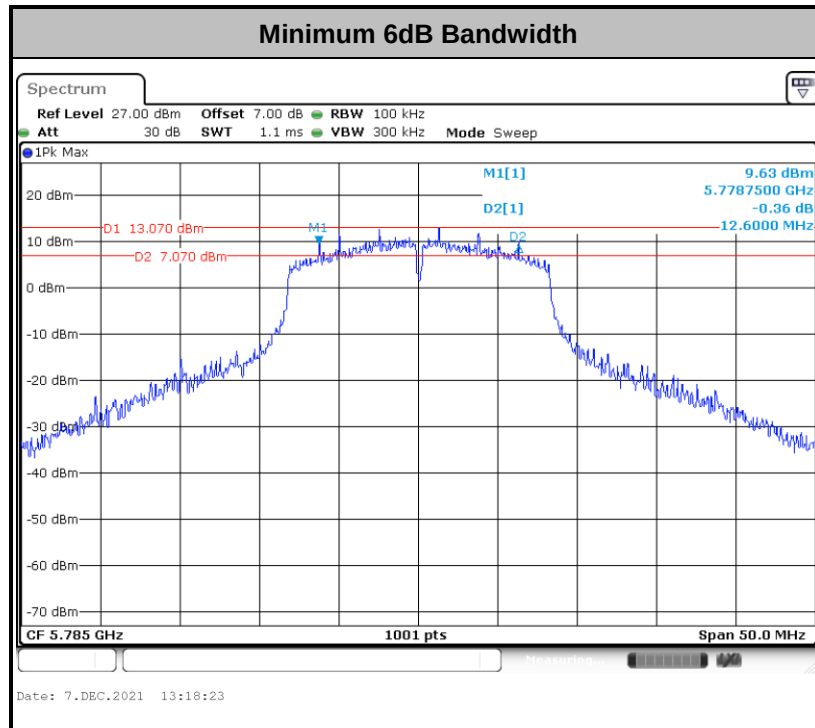
3.1.5 Test Result of 6dB Bandwidth

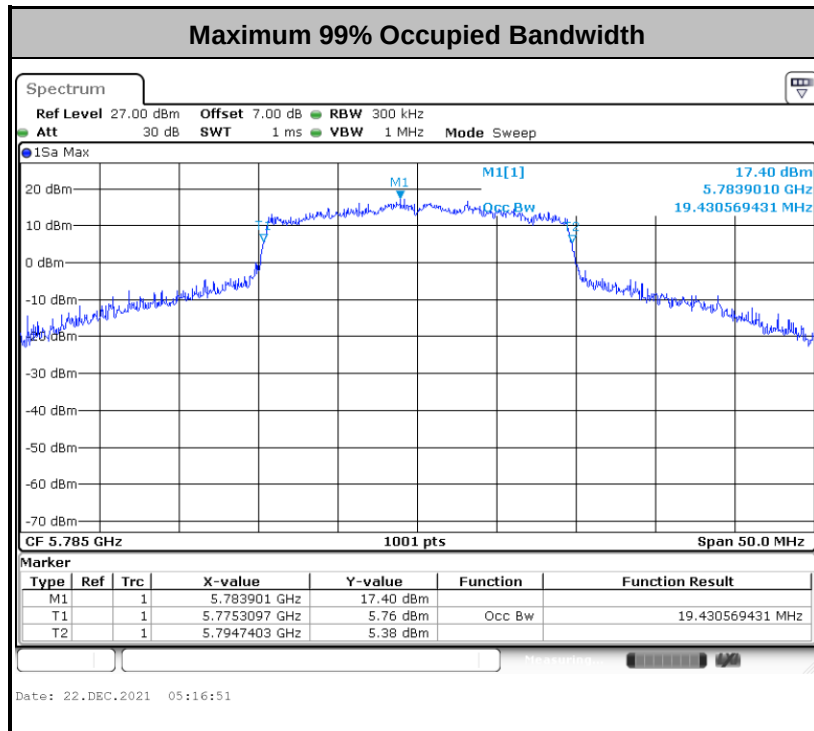
Please refer to Appendix A.

Only the maximum 6dB & 26dB & 99% OB plots of each bandwidth shown in the report

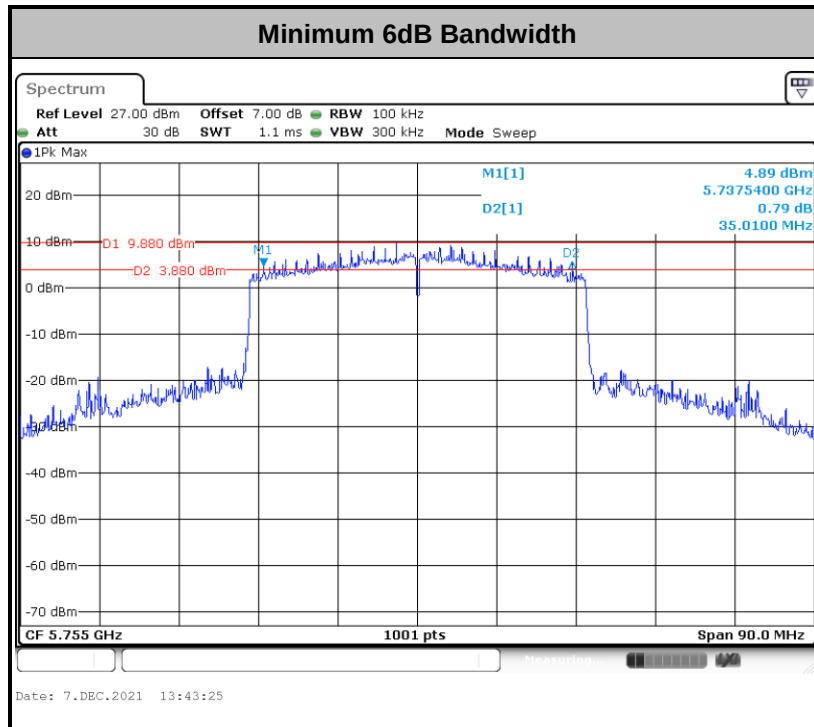


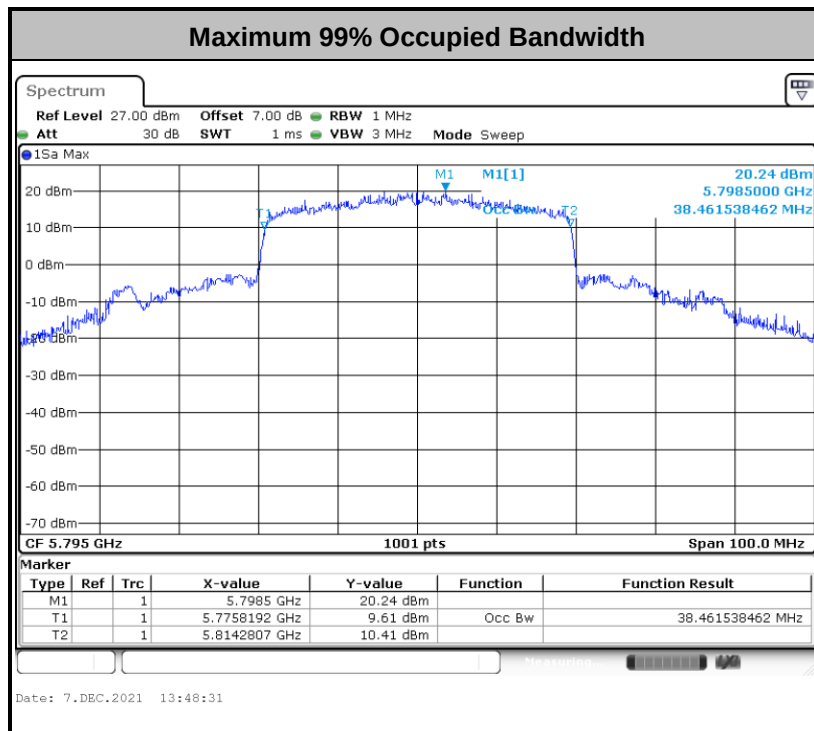
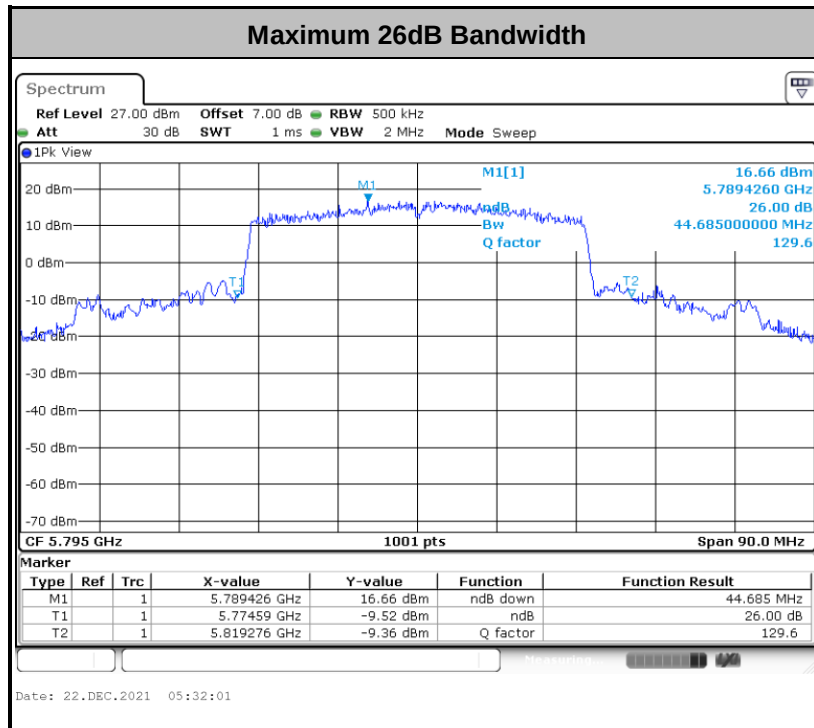
For 20MHz:





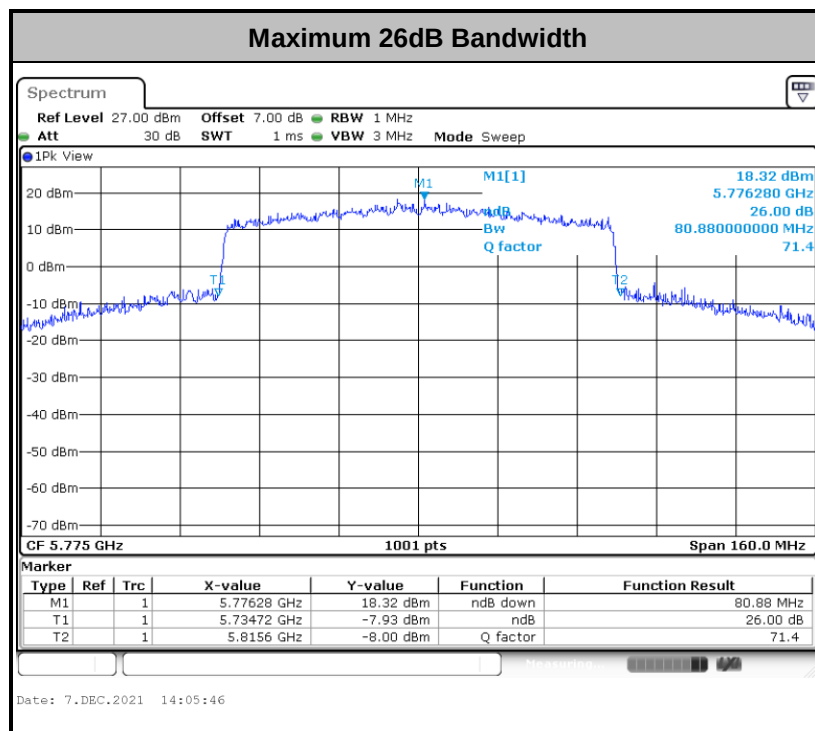
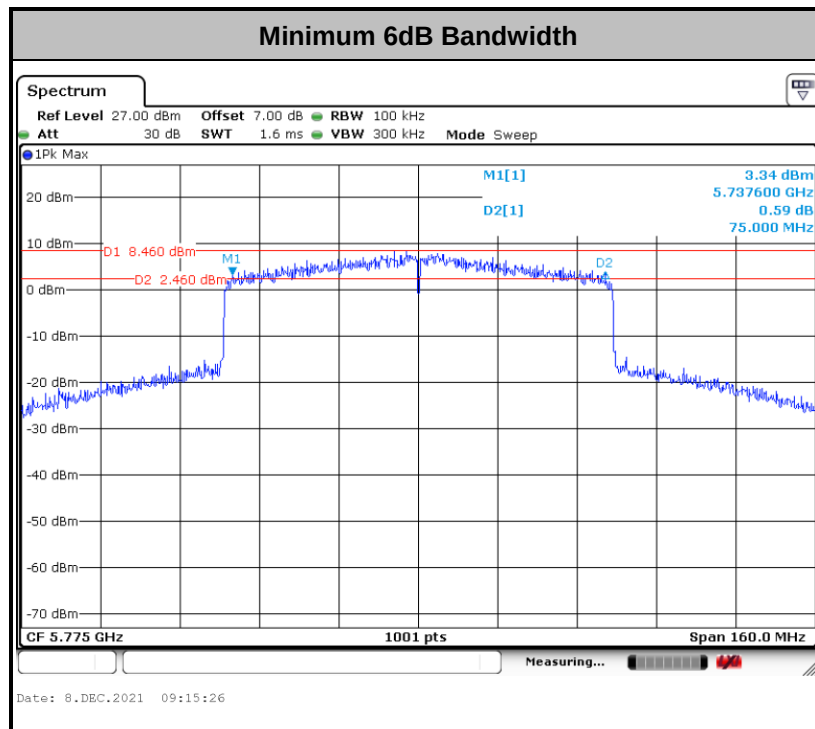
For 40MHz:

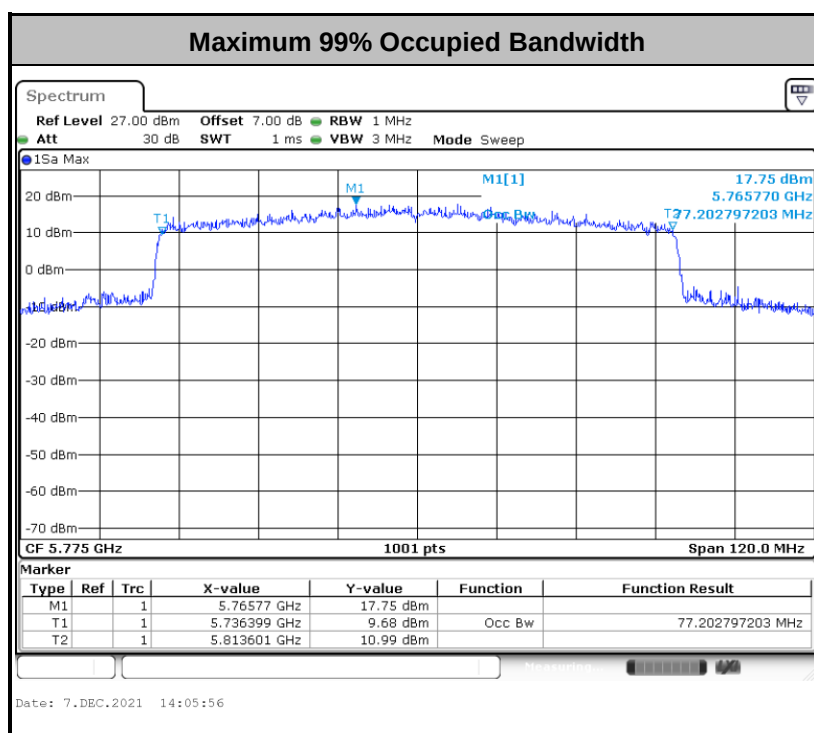






For 80MHz:





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.

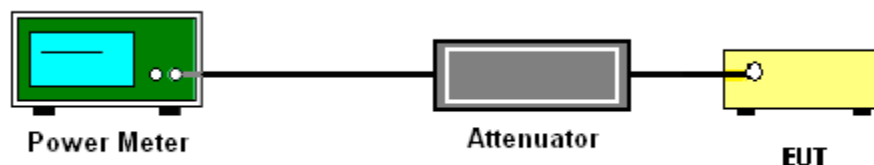
3.2.3 Test Procedures

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.
4. For MIMO mode, the measure-and-sum technique should be used for measuring the in-band transmit power of a device.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

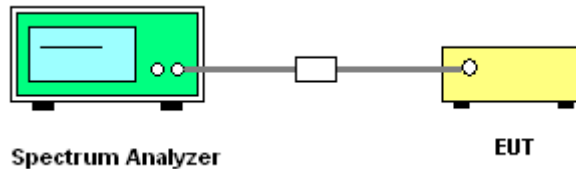
Method SA-2

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

- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW $\geq$ 1 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ to the test result.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
 3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
Method (c): Measure and add $10 \log(N_{\text{ANT}})$ dB.
With this technique, spectrum measurements are performed at each output of the device, but

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

3.3.4 Test Setup

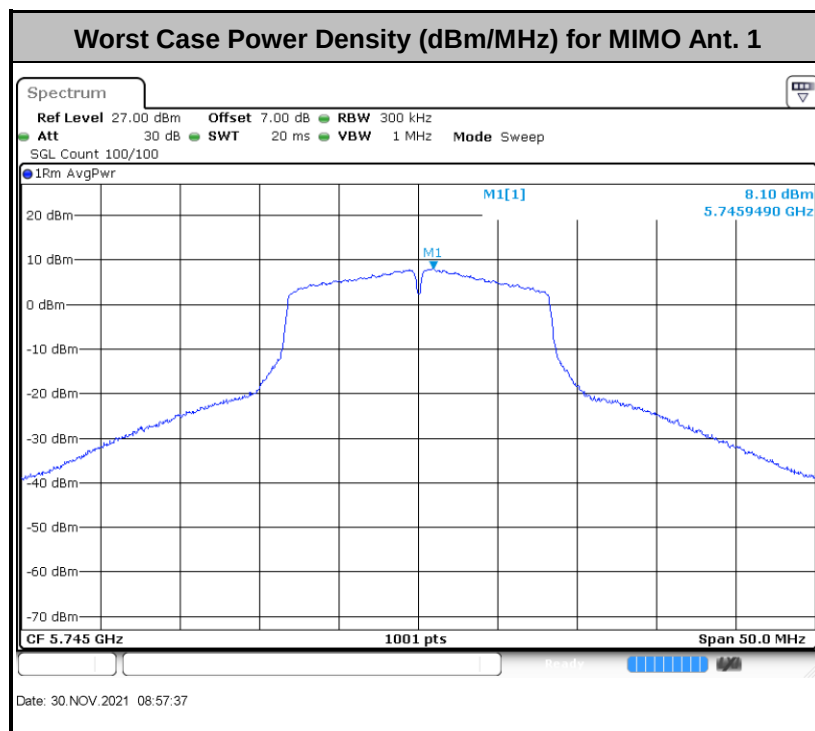


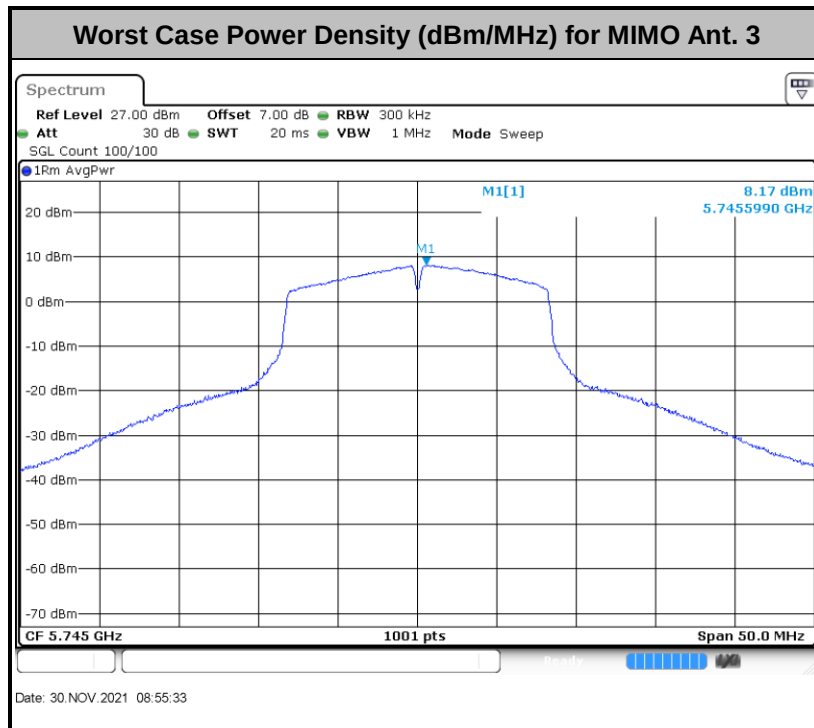
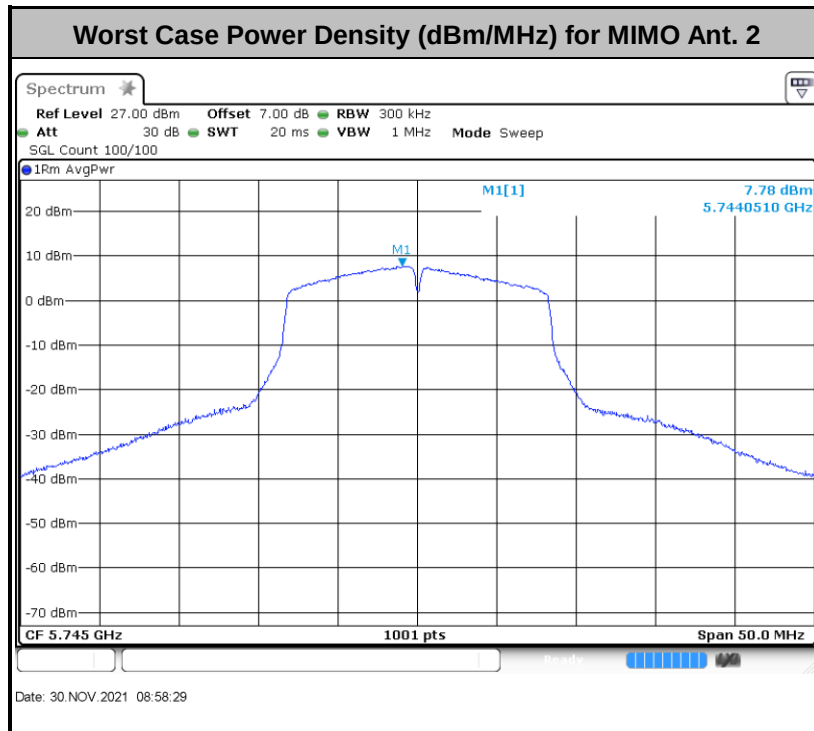
3.3.5 Test Result of Power Spectral Density

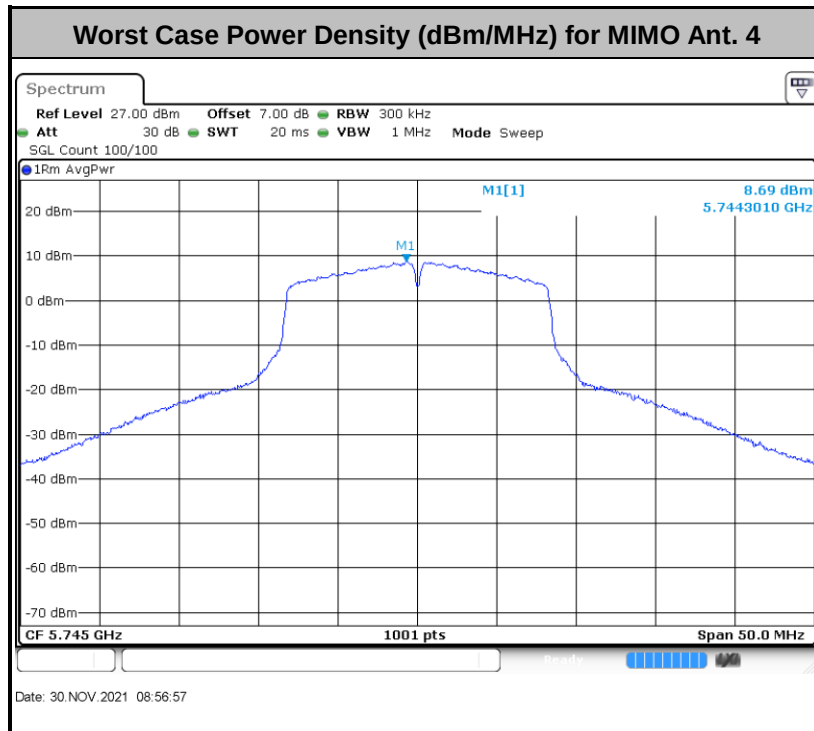
Please refer to Appendix A.

Only the maximum PSD plots of each bandwidth shown in the report.

For 20MHz:

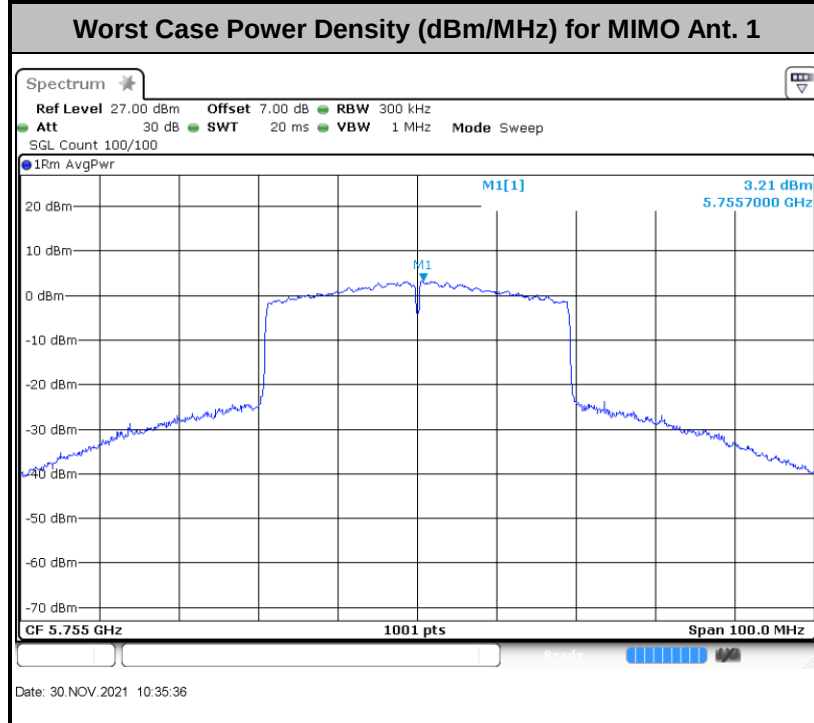


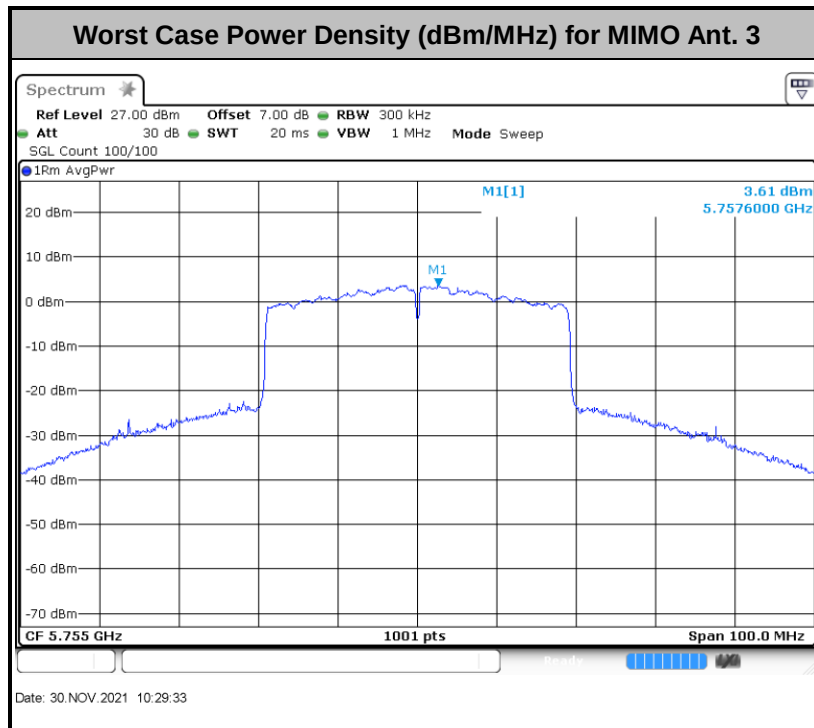
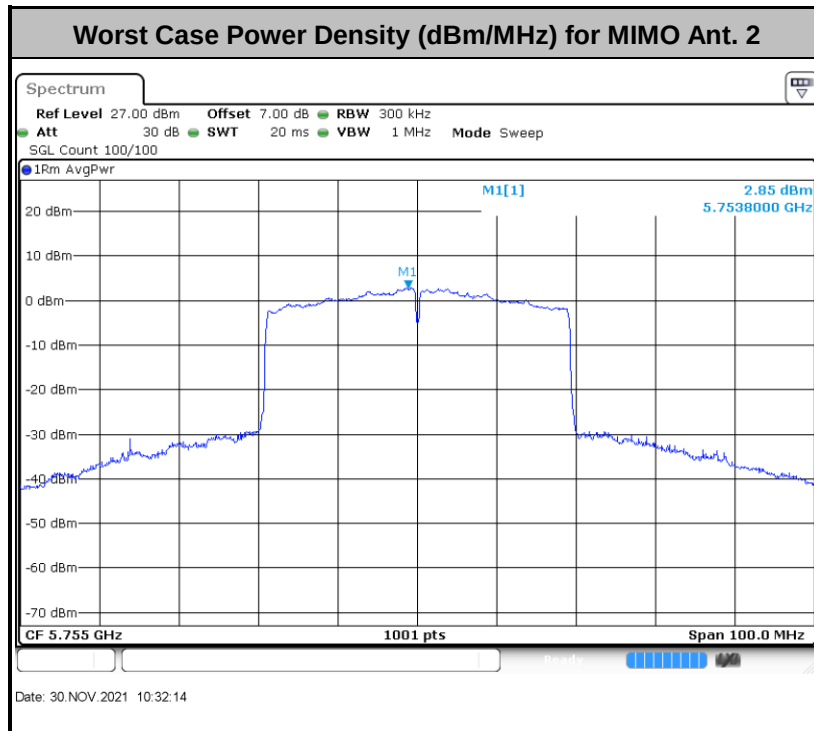


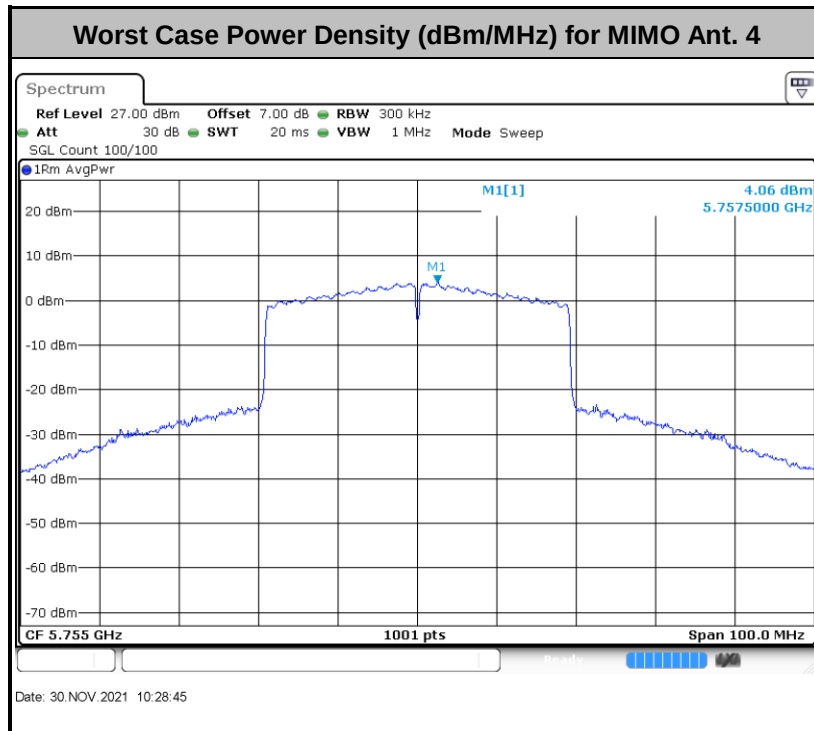


Note: Average Power Density (dB) = Measured value+ Duty Factor

For 40MHz:

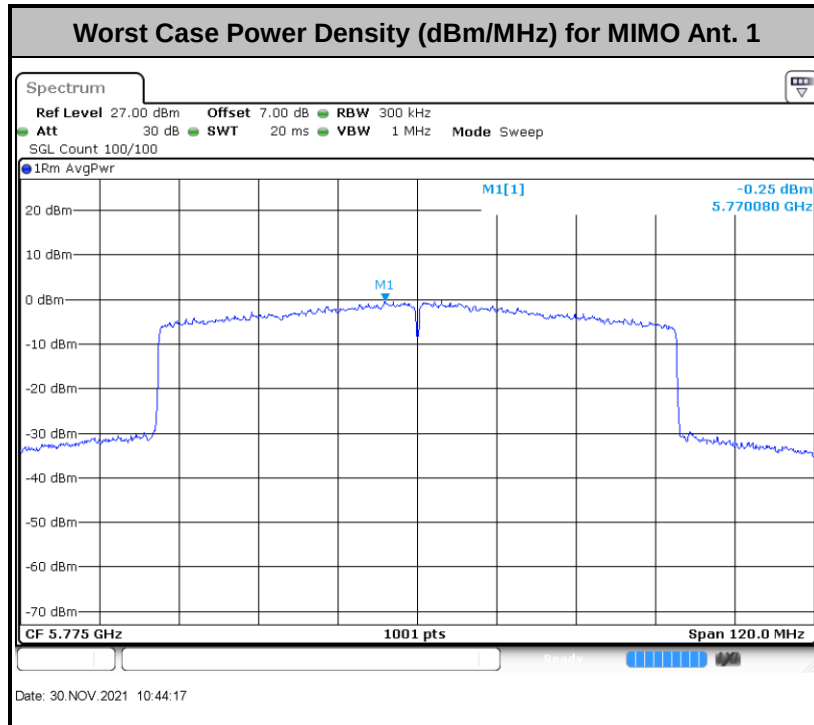


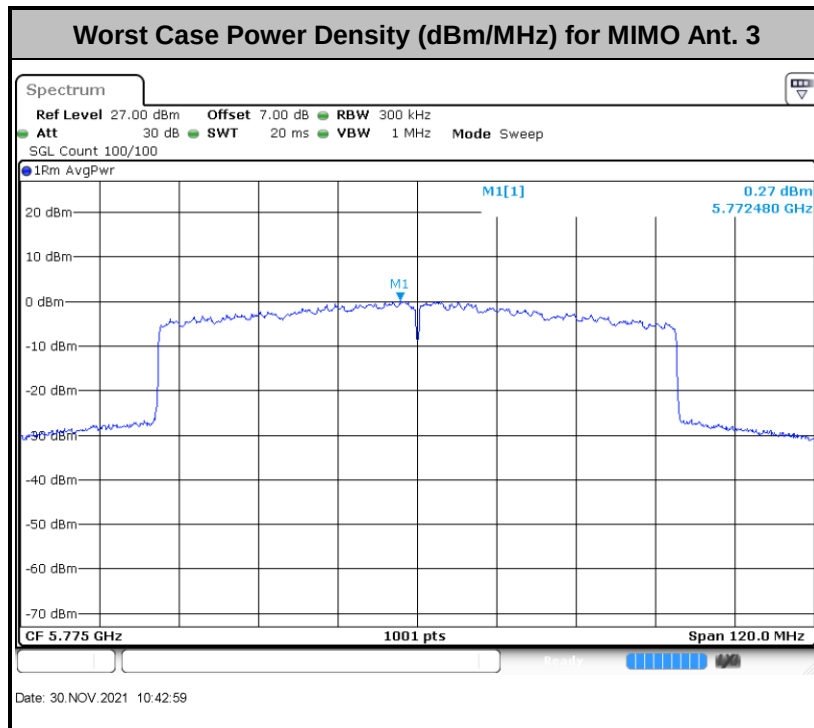
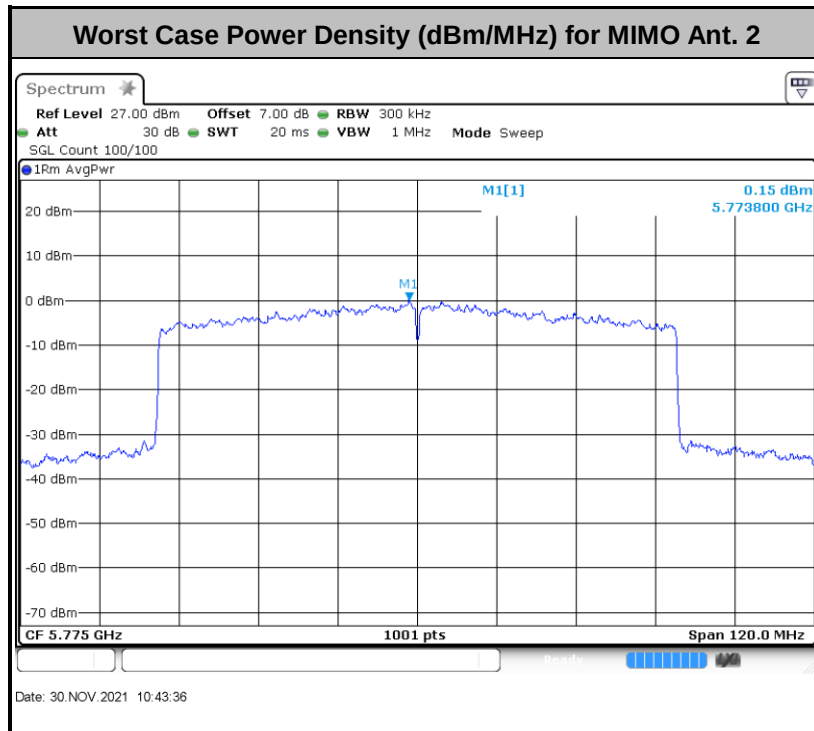


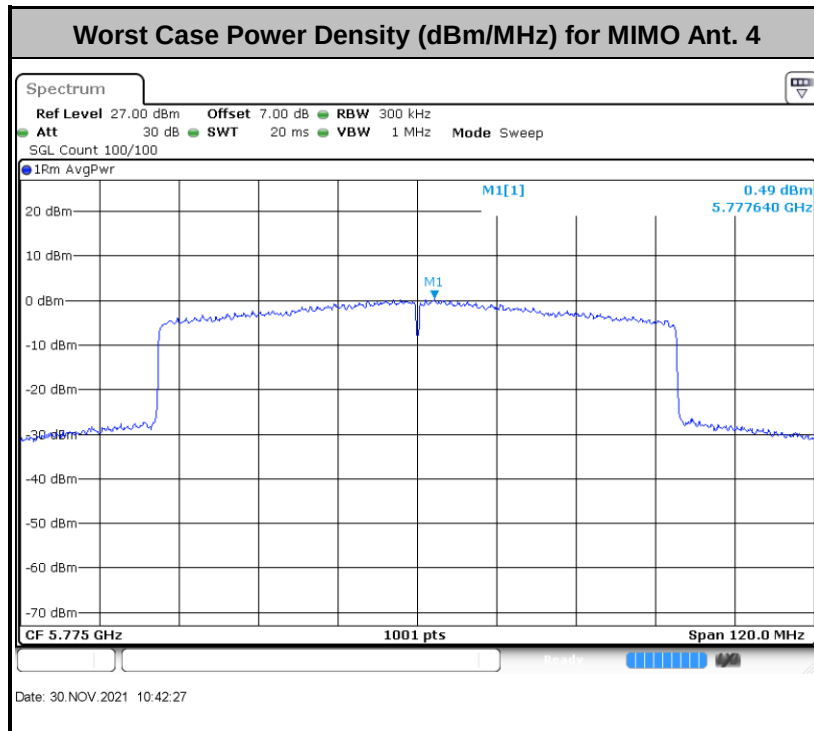


Note: Average Power Density (dB) = Measured value+ Duty Factor

For 80MHz:







Note: Average Power Density (dB) = Measured value+ Duty Factor

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	68.3

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

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.77$$

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

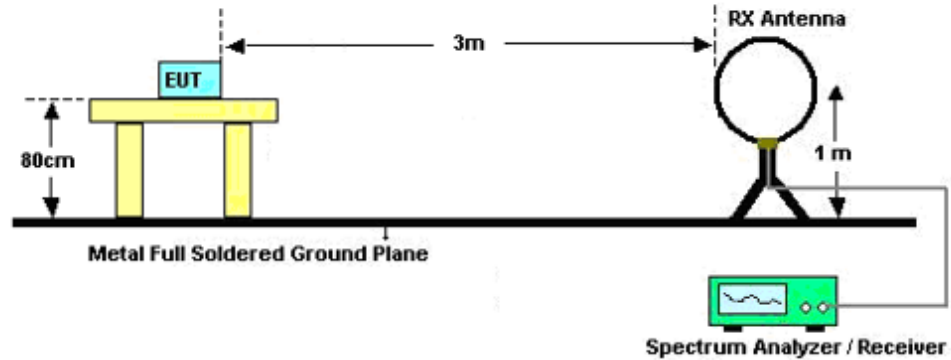
The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

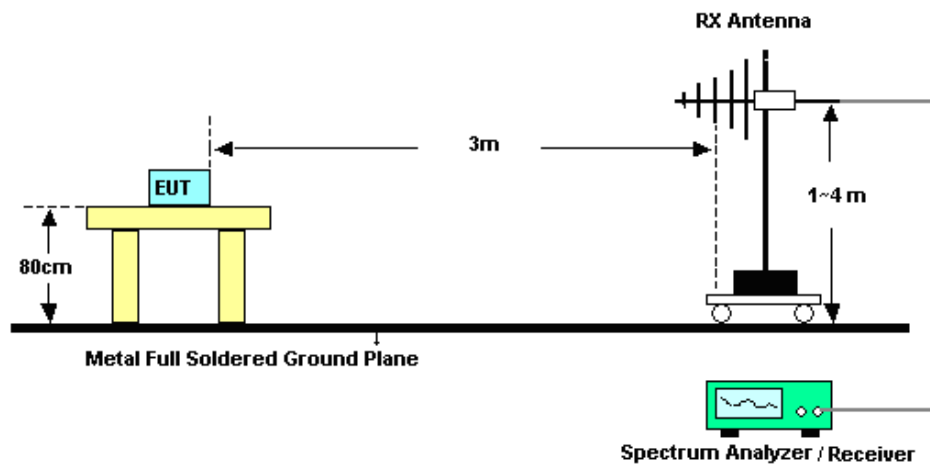
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak 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

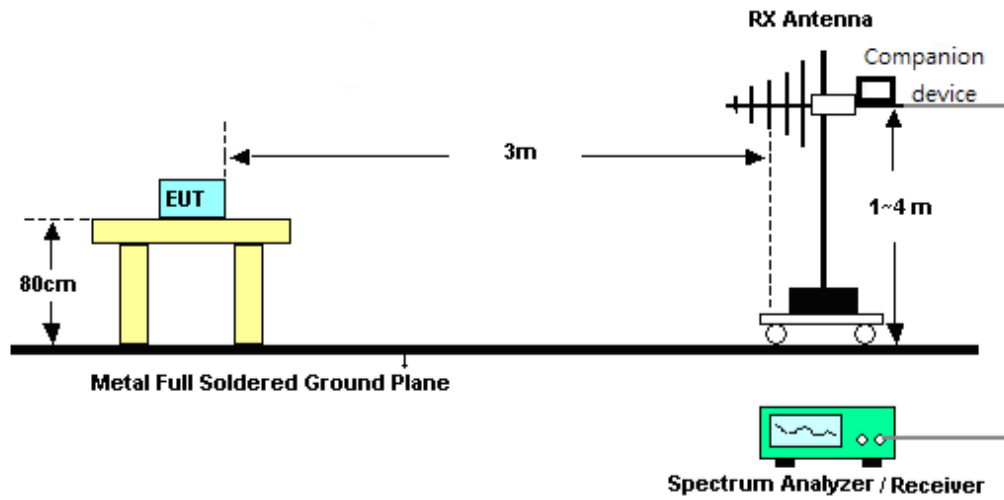
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz

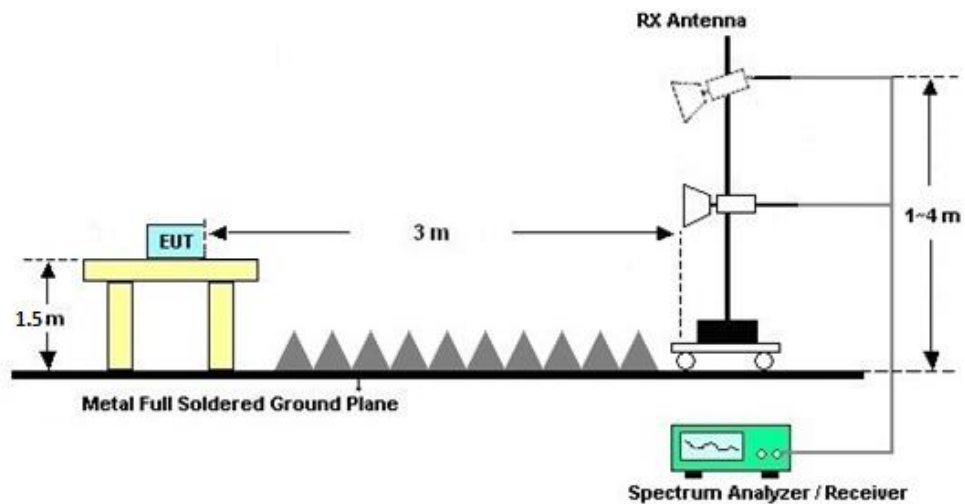


<TXBF Modes>

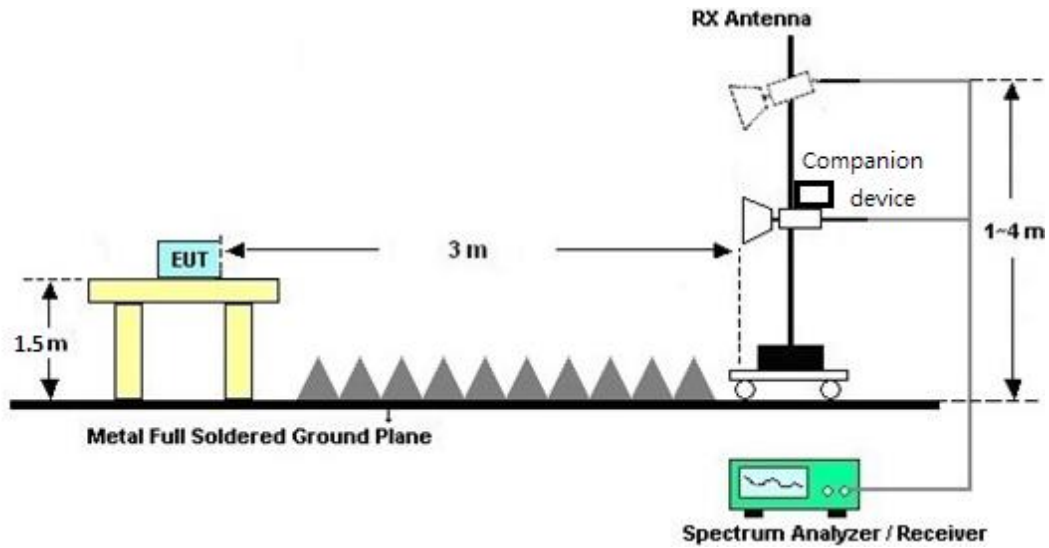


For radiated emissions above 1GHz

<CDD Mode>



<TXBF Modes>



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

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

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

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

Frequency of emission (MHz)	Conducted limit (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.

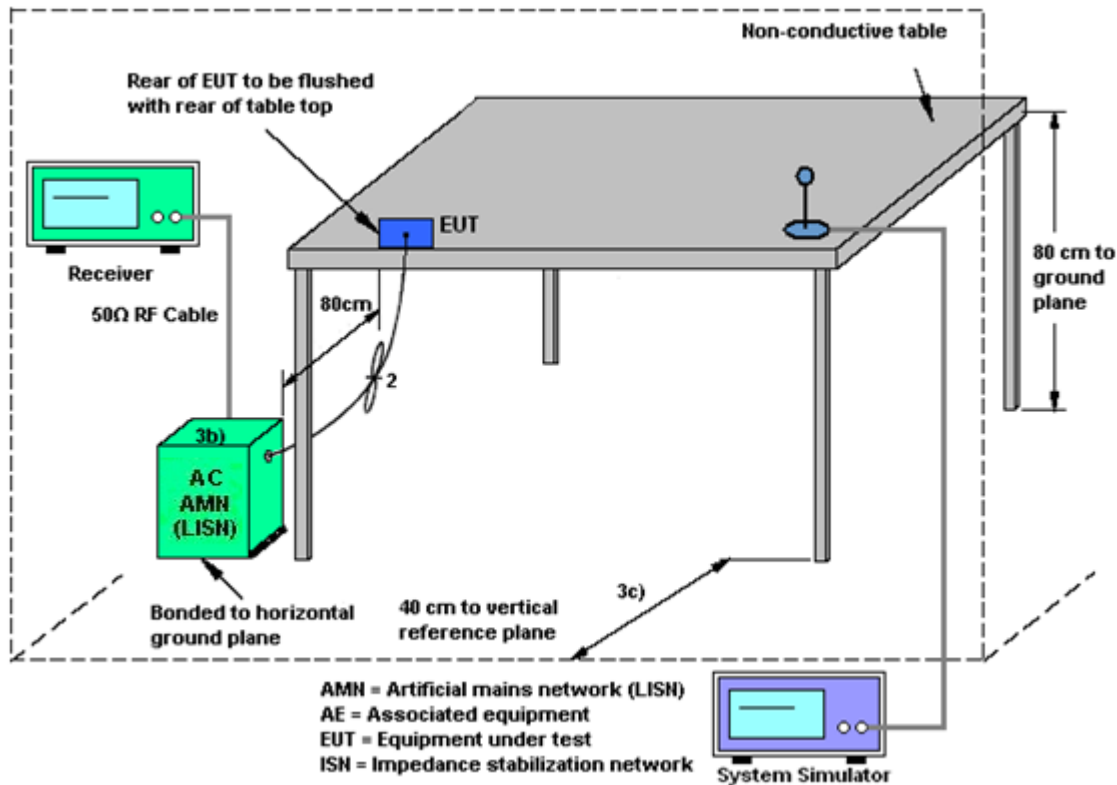
3.5.2 Measuring Instruments

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 Antenna Requirements

3.6.1 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.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

Band	Frequency (TX,MHz)	BW	Sub Frequency &CH		Max TX Antenna gain (dBi)				TX Antenna gain (dBi) (The angle at which DG gain is the largest)				CDD(dBi)		Beamforming (dBi)		Beamforming Limit(dBm)		CDD Limit (dBm)	
					ANT1	ANT2	ANT3	ANT4	ANT1	ANT2	ANT3	ANT4	For Power	For PSD	For Power	For PSD	For Power	For PSD	For Power	For PSD
U-NII -3	5725 ~ 5850	20M	149	5745	4.63	2.54	4.08	2.32	4.63	-1.90	0.20	-3.76	4.63	6.40	6.40	6.40	29.60	29.60	30.00	29.60
			153	5765	4.63	2.54	4.08	2.32	4.63	-1.90	0.20	-3.76	4.63	6.40	6.40	6.40	29.60	29.60	30.00	29.60
			157	5785	4.63	2.54	4.08	2.32	4.63	-1.90	0.20	-3.76	4.63	6.40	6.40	6.40	29.60	29.60	30.00	29.60
			161	5805	3.64	3.21	3.83	3.10	1.49	-0.42	1.57	-1.99	3.83	6.31	6.31	6.31	29.69	29.69	30.00	29.69
			165	5825	3.10	2.82	3.12	2.60	1.67	0.13	0.82	-2.00	3.12	6.28	6.28	6.28	29.72	29.72	30.00	29.72
		40M	151	5755	4.63	2.54	4.08	2.32	4.63	-1.90	0.20	-3.76	4.63	6.40	6.40	6.40	29.60	29.60	30.00	29.60
			159	5795	4.63	2.54	4.08	2.32	4.63	-1.90	0.20	-3.76	4.63	6.40	6.40	6.40	29.60	29.60	30.00	29.60
		80M	155	5775	4.63	2.54	4.08	2.32	4.63	-1.90	0.20	-3.76	4.63	6.40	6.40	6.40	29.60	29.60	30.00	29.60

Note:

- TX Antenna gain (dBi) is the angle at which DG gain is the largest, the directional gain of CDD for PSD and Beamforming for Power/PSD is calculated using the TX Antenna gain in the table.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as:

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain(Max TX Antenna gain in table);

For power spectral density (PSD) measurements on the devices:

The directional gain = $10 \cdot \log[(10^{G_{ANT1}/20} + 10^{G_{ANT2}/20} + 10^{G_{ANT3}/20} + 10^{G_{ANT4}/20})^2 / 4]$ dBi.



For Beamforming transmissions, directional gain for power and PSD is calculated as:

The directional gain = $10 \cdot \log[(10^{G_{ant1}/20} + 10^{G_{ant2}/20} + 10^{G_{ant3}/20} + 10^{G_{ant4}/20})^2 / 4]$ dBi.

For CDD and Beamforming:

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)



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	Oct. 14, 2021	Nov. 30, 2021~ Dec. 22, 2021	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 07, 2021	Nov. 30, 2021~ Dec. 22, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 07, 2021	Nov. 30, 2021~ Dec. 22, 2021	Jan. 06, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 16, 2021	Dec. 20, 2021	Oct. 15, 2022	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44G, MAX 30dB	Apr. 13, 2021	Dec. 20, 2021	Apr. 12, 2022	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Dec. 20, 2021	Oct. 29, 2022	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz~1GHz	Jun. 04, 2021	Dec. 20, 2021	Jun. 03, 2022	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 24, 2021	Dec. 20, 2021	Apr. 23, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Jan. 06, 2021	Dec. 20, 2021	Jan. 05, 2022	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Apr. 12, 2021	Dec. 20, 2021	Apr. 11, 2022	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 07, 2021	Dec. 20, 2021	Jan. 06, 2022	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2012228	1Ghz~18Ghz	Oct. 16, 2021	Dec. 20, 2021	Oct. 15, 2022	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	Dec. 20, 2021	Oct. 15, 2022	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 20, 2021	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 20, 2021	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 20, 2021	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Dec. 06, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Dec. 06, 2021	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 14, 2021	Dec. 06, 2021	Oct. 13, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Dec. 06, 2021	Oct. 13, 2022	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% ($U = 2Uc(y)$)	2.94dB
---	--------

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
---	-------

----- THE END -----



Appendix A. Conducted Test Results

Report Number : FR1O2908C

Test Engineer:	Gene Wang/Long Wu	Temperature:	21~25	°C
Test Date:	2021/11/30~2021/12/22	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% OBW

U NII-3														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26dB Bandwidth (MHz)				6 dB Bandwidth (MHz)				6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4		
11a	6Mbps	4	149	5745	20.28	20.08	20.83	21.18	13.90	15.05	13.85	13.85	0.5	Pass
11a	6Mbps	4	157	5785	23.88	21.38	24.73	22.68	12.60	12.65	15.10	14.20	0.5	Pass
11a	6Mbps	4	165	5825	20.98	21.03	25.18	22.68	15.10	13.80	14.15	13.85	0.5	Pass
HE20	MCS0	4	149	5745	22.28	21.63	22.33	21.98	15.15	15.10	17.50	15.00	0.5	Pass
HE20	MCS0	4	157	5785	22.28	22.13	23.23	25.33	15.15	16.75	15.15	15.30	0.5	Pass
HE20	MCS0	4	165	5825	22.13	21.68	23.78	23.03	16.30	15.85	15.15	16.50	0.5	Pass
HE40	MCS0	4	151	5755	39.83	39.65	39.83	39.74	35.28	35.01	35.01	36.18	0.5	Pass
HE40	MCS0	4	159	5795	39.83	39.65	44.42	44.69	36.00	35.37	36.43	35.53	0.5	Pass
HE80	MCS0	4	155	5775	80.56	80.40	80.88	80.72	75.04	75.04	75.20	75.00	0.5	Pass

U NII-3								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)			
					Ant 1	Ant 2	Ant 3	Ant 4
11a	6Mbps	4	149	5745	16.68	16.48	16.68	16.68
11a	6Mbps	4	157	5785	16.98	16.83	16.88	16.93
11a	6Mbps	4	165	5825	16.83	16.68	17.33	16.93
HE20	MCS0	4	149	5745	19.03	19.03	19.13	19.08
HE20	MCS0	4	157	5785	19.13	19.08	19.43	19.23
HE20	MCS0	4	165	5825	19.03	19.03	19.38	19.18
HE40	MCS0	4	151	5755	38.26	37.96	38.16	38.26
HE40	MCS0	4	159	5795	38.06	37.96	38.46	38.26
HE80	MCS0	4	155	5775	76.96	76.84	77.20	77.08

TEST RESULTS DATA
Average Power Table

U NII-3															
Mod.	Data Rate	N _{Tx}	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)					FCC Conducted Power Limit (dBm)	DG (dBi)				Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4	
11a	6Mbps	4	149	5745	23.56	23.45	23.90	24.41	29.87	30.00	4.63				Pass
11a	6Mbps	4	157	5785	23.72	23.13	23.68	24.12	29.70	30.00	4.63				Pass
11a	6Mbps	4	165	5825	23.65	24.03	23.64	24.17	29.90	30.00	3.12				Pass
HT20	MCS0	4	149	5745	23.08	22.87	23.45	23.61	29.29	29.60	6.40				Pass
HT20	MCS0	4	157	5785	23.24	22.98	23.56	23.66	29.39	29.60	6.40				Pass
HT20	MCS0	4	165	5825	22.78	23.26	23.25	23.76	29.30	29.72	6.28				Pass
HT40	MCS0	4	151	5755	23.39	23.03	23.47	23.95	29.50	29.60	6.40				Pass
HT40	MCS0	4	159	5795	22.87	22.81	23.05	23.43	29.07	29.60	6.40				Pass
VHT20	MCS0	4	149	5745	23.12	22.88	23.43	23.48	29.26	29.60	6.40				Pass
VHT20	MCS0	4	157	5785	23.08	22.85	23.51	23.60	29.29	29.60	6.40				Pass
VHT20	MCS0	4	165	5825	22.68	23.16	23.38	23.65	29.26	29.72	6.28				Pass
VHT40	MCS0	4	151	5755	23.26	22.90	23.34	23.80	29.36	29.60	6.40				Pass
VHT40	MCS0	4	159	5795	22.75	22.69	22.83	23.38	28.94	29.60	6.40				Pass
VHT80	MCS0	4	155	5775	23.51	22.87	23.48	23.69	29.42	29.60	6.40				Pass
HE20	MCS0	4	149	5745	22.32	22.99	23.56	23.84	29.46	29.60	6.40				Pass
HE20	MCS0	4	157	5785	23.48	23.15	23.37	24.02	29.54	29.60	6.40				Pass
HE20	MCS0	4	165	5825	23.56	23.52	23.40	24.06	29.67	29.72	6.28				Pass
HE40	MCS0	4	151	5755	23.46	22.95	23.55	23.95	29.51	29.60	6.40				Pass
HE40	MCS0	4	159	5795	23.12	23.18	23.33	23.71	29.56	29.60	6.40				Pass
HE80	MCS0	4	155	5775	23.51	22.99	23.53	23.87	29.51	29.60	6.40				Pass

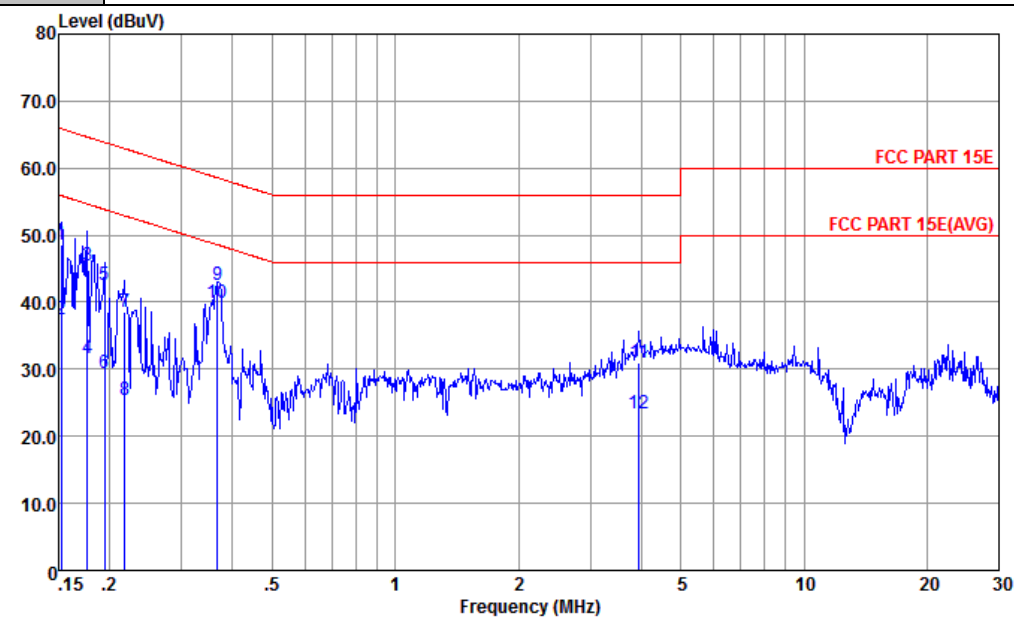
TEST RESULTS DATA
Power Spectral Density

U NII-3															
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Average Power Density with RBW and duty factor (dBm/500kHz)					Average PSD Limit (dBm/500kHz)	DG (dBi)				Pass /Fail
					Ant 1	Ant 2	Ant 3	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4	
11a	6Mbps	4	149	5745	10.91	8.37	8.76	9.28	17.52	29.60	6.40				Pass
11a	6Mbps	4	157	5785	10.96	7.87	8.38	9.13	17.37	29.60	6.40				Pass
11a	6Mbps	4	165	5825	10.81	8.16	8.22	8.90	17.14	29.72	6.28				Pass
HE20	MCS0	4	149	5745	9.66	7.22	8.40	8.30	16.64	29.60	6.40				Pass
HE20	MCS0	4	157	5785	10.44	7.83	8.10	8.73	16.97	29.60	6.40				Pass
HE20	MCS0	4	165	5825	9.90	7.83	8.09	8.45	16.69	29.72	6.28				Pass
HE40	MCS0	4	151	5755	6.80	4.22	4.99	5.43	13.67	29.60	6.40				Pass
HE40	MCS0	4	159	5795	6.81	4.35	4.97	4.86	13.21	29.60	6.40				Pass
HE80	MCS0	4	155	5775	4.24	2.42	2.54	2.76	11.00	29.60	6.40				Pass



Appendix B. AC Conducted Emission Test Results

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

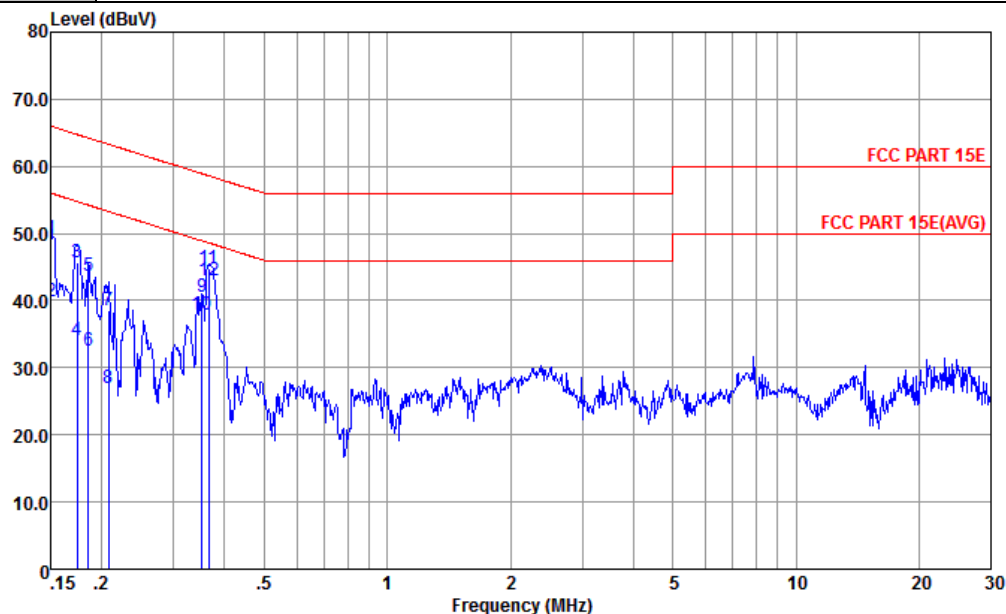


Site : CO01-KS
Condition : FCC PART 15E LISN-060105-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.152	48.59	-17.28	65.87	38.10	0.02	10.47	QP
2	0.152	37.39	-18.48	55.87	26.90	0.02	10.47	Average
3	0.177	45.55	-19.09	64.64	35.11	0.03	10.41	QP
4	0.177	31.75	-22.89	54.64	21.31	0.03	10.41	Average
5	0.194	42.61	-21.23	63.84	32.20	0.04	10.37	QP
6	0.194	29.31	-24.53	53.84	18.90	0.04	10.37	Average
7	0.217	38.60	-24.32	62.92	28.20	0.05	10.35	QP
8	0.217	25.30	-27.62	52.92	14.90	0.05	10.35	Average
9	0.367	42.66	-15.90	58.56	32.30	0.08	10.28	QP
10 *	0.367	39.96	-8.60	48.56	29.60	0.08	10.28	Average
11	3.943	31.02	-24.98	56.00	20.60	0.17	10.25	QP
12	3.943	23.32	-22.68	46.00	12.90	0.17	10.25	Average



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



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

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.150	49.19	-16.81	66.00	38.60	0.11	10.48	QP
2	0.150	39.89	-16.11	56.00	29.30	0.11	10.48	Average
3	0.174	45.73	-19.04	64.77	35.21	0.10	10.42	QP
4	0.174	34.13	-20.64	64.77	23.61	0.10	10.42	Average
5	0.185	43.70	-20.54	64.24	33.21	0.10	10.39	QP
6	0.185	32.60	-21.64	54.24	22.11	0.10	10.39	Average
7	0.208	38.56	-24.71	63.27	28.10	0.10	10.36	QP
8	0.208	27.06	-26.21	53.27	16.60	0.10	10.36	Average
9	0.352	40.59	-18.32	58.91	30.21	0.10	10.28	QP
10	0.352	37.99	-10.92	48.91	27.61	0.10	10.28	Average
11	0.365	44.68	-13.93	58.61	34.30	0.10	10.28	QP
12 *	0.365	42.98	-5.63	48.61	32.60	0.10	10.28	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

UNII-3 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)---Sample 1

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
CDD 4*4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 157 5785MHz		5643.2	58.02	-10.28	68.3	47.98	35.5	11.05	36.51	100	175	P	H
		5668.8	58.18	-24.07	82.25	48.06	35.56	11.11	36.55	100	175	P	H
		5716	58.58	-51.2	109.78	48.38	35.62	11.16	36.58	100	175	P	H
		5723.2	57.98	-60.22	118.2	47.75	35.65	11.18	36.6	100	175	P	H
		5788	120.62	-	-	110.25	35.78	11.26	36.67	100	175	P	H
		5788	116.07	-	-	105.7	35.78	11.26	36.67	100	175	A	H
		5853.6	57.8	-56.29	114.09	47.31	35.9	11.33	36.74	100	175	P	H
		5857.2	59.03	-51.25	110.28	48.53	35.9	11.34	36.74	100	175	P	H
		5907.2	57.52	-23.92	81.44	47.05	35.88	11.38	36.79	100	175	P	H
		5929.6	56.05	-12.25	68.3	45.59	35.87	11.4	36.81	100	175	P	H
		5633.6	54.04	-14.26	68.3	44	35.5	11.05	36.51	370	72	P	V
		5667.2	55.39	-25.67	81.06	45.27	35.56	11.11	36.55	370	72	P	V
		5703.2	54.9	-51.3	106.2	44.7	35.62	11.16	36.58	370	72	P	V
		5724	56.14	-63.88	120.02	45.91	35.65	11.18	36.6	370	72	P	V
		5782	119.85	-	-	109.49	35.75	11.26	36.65	370	72	P	V
		5782	114.69	-	-	104.33	35.75	11.26	36.65	370	72	A	V
		5851.6	55.34	-63.31	118.65	44.86	35.87	11.33	36.72	370	72	P	V
		5857.2	56.5	-53.78	110.28	46	35.9	11.34	36.74	370	72	P	V
		5896.8	55.11	-34.02	89.13	44.62	35.88	11.38	36.77	370	72	P	V
		5936.8	54.36	-13.94	68.3	43.88	35.87	11.42	36.81	370	72	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)---Sample 1

WIFI Ant. CDD 4*4	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		7660	50.47	-23.53	74	67.07	36.73	13.08	66.41	300	0	P	H
		11576	56.97	-17.03	74	68.24	38.74	16.41	66.42	100	65	P	H
		11576	44.72	-9.28	54	55.99	38.74	16.41	66.42	100	65	A	H
		17351	61.87	-6.43	68.3	64.06	42.42	20.24	64.85	300	0	P	H
		7660	47.67	-26.33	74	64.27	36.73	13.08	66.41	100	0	P	V
		11576	62.32	-11.68	74	73.59	38.74	16.41	66.42	335	80	P	V
		11576	52.9	-1.1	54	64.17	38.74	16.41	66.42	335	80	A	V
		17340	57.43	-10.87	68.3	59.64	42.41	20.23	64.85	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz

WIFI 802.11ax HE40_Full (Band Edge @ 3m)---Sample 1

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
BF 4*4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE40 Full CH 159 5795MHz		5612.4	56.36	-11.94	68.3	46.34	35.47	11.03	36.48	281	280	P	H
		5696.8	60.5	-42.44	102.94	50.34	35.59	11.13	36.56	281	280	P	H
		5718.8	69.64	-40.92	110.56	59.43	35.65	11.16	36.6	281	280	P	H
		5724	64.82	-55.2	120.02	54.59	35.65	11.18	36.6	281	280	P	H
		5794	117.68	-	-	107.31	35.78	11.26	36.67	281	280	P	H
		5794	111.4	-	-	101.03	35.78	11.26	36.67	281	280	A	H
		5850	71.94	-50.36	122.3	61.46	35.87	11.33	36.72	281	280	P	H
		5866	72.26	-35.56	107.82	61.76	35.9	11.34	36.74	281	280	P	H
		5889.6	62.1	-32.36	94.46	51.63	35.88	11.36	36.77	281	280	P	H
		5926	56.6	-11.7	68.3	46.14	35.87	11.4	36.81	281	280	P	H
		5632.4	57.69	-10.61	68.3	47.65	35.48	11.05	36.49	358	360	P	V
		5684	58.26	-35.24	93.5	48.1	35.59	11.13	36.56	358	360	P	V
		5719.2	68.18	-42.5	110.68	57.97	35.65	11.16	36.6	358	360	P	V
		5720.4	63.41	-48.4	111.81	53.2	35.65	11.16	36.6	358	360	P	V
		5782	116.88	-	-	106.52	35.75	11.26	36.65	358	360	P	V
		5782	110.43	-	-	100.07	35.75	11.26	36.65	358	360	A	V
		5854.8	68.44	-42.92	111.36	57.94	35.9	11.34	36.74	358	360	P	V
		5854.8	68.44	-42.92	111.36	57.94	35.9	11.34	36.74	358	360	P	V
		5879.6	62.97	-38.91	101.88	52.48	35.89	11.36	36.76	358	360	P	V
		5938	56.74	-11.56	68.3	46.26	35.87	11.42	36.81	358	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz

WIFI 802.11ax HE40_Full (Harmonic @ 3m)---Sample 1

WIFI Ant. BF 4*4	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 159 5795MHz		7660	53.64	-20.36	74	70.24	36.73	13.08	66.41	302	64	P	H
		7660	48.88	-5.12	54	65.48	36.73	13.08	66.41	302	64	A	H
		11590	49.76	-24.24	74	61	38.75	16.41	66.4	300	0	P	H
		17373	58.83	-9.47	68.3	60.99	42.44	20.25	64.85	300	0	P	H
		7660	46.74	-27.26	74	63.34	36.73	13.08	66.41	100	0	P	V
		11590	54.14	-19.86	74	65.38	38.75	16.41	66.4	345	246	P	V
		11590	45.01	-8.99	54	56.25	38.75	16.41	66.4	345	246	A	V
		17384	53.2	-15.1	68.3	55.34	42.45	20.25	64.84	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz

WIFI 802.11ax HE80_Full (Band Edge @ 3m)---Sample 1

WIFI Ant. BF 4*4	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE80 Full CH 155 5775MHz		5647.6	64.68	-3.62	68.3	54.61	35.5	11.08	36.51	116	186	P	H
		5682.4	79.16	-13.15	92.31	69.04	35.56	11.11	36.55	116	186	P	H
		5717.6	84.27	-25.96	110.23	74.06	35.65	11.16	36.6	116	186	P	H
		5722.4	85.06	-31.31	116.37	74.83	35.65	11.18	36.6	116	186	P	H
		5770	116.17	-	-	105.83	35.75	11.24	36.65	116	186	P	H
		5770	110.15	-	-	99.81	35.75	11.24	36.65	116	186	A	H
		5850	81.24	-41.06	122.3	70.76	35.87	11.33	36.72	116	186	P	H
		5857.6	80.48	-29.69	110.17	69.98	35.9	11.34	36.74	116	186	P	H
		5882	74.55	-25.55	100.1	64.06	35.89	11.36	36.76	116	186	P	H
		5932.4	62.57	-5.73	68.3	52.09	35.87	11.42	36.81	116	186	P	H
		5626	65.02	-3.28	68.3	55	35.48	11.03	36.49	400	346	P	V
		5698.4	78.73	-25.39	104.12	68.57	35.59	11.13	36.56	400	346	P	V
		5719.2	81.85	-28.83	110.68	71.64	35.65	11.16	36.6	400	346	P	V
		5724.4	84.76	-36.17	120.93	74.53	35.65	11.18	36.6	400	346	P	V
		5776	113.88	-	-	103.54	35.75	11.24	36.65	400	346	P	V
		5776	107.64	-	-	97.3	35.75	11.24	36.65	400	346	A	V
		5853.6	76.83	-37.26	114.09	66.34	35.9	11.33	36.74	400	346	P	V
		5866.4	78.77	-28.94	107.71	68.27	35.9	11.34	36.74	400	346	P	V
		5878.4	70.54	-32.23	102.77	60.05	35.89	11.36	36.76	400	346	P	V
		5938.8	60.95	-7.35	68.3	50.5	35.86	11.42	36.83	400	346	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz

WIFI 802.11ax HE80_Full (Harmonic @ 3m)---Sample 1

WIFI Ant. BF 4*4	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE80 Full CH 155 5775MHz		7660	50.2	-23.8	74	66.8	36.73	13.08	66.41	300	65	P	H
		7660	47.88	-6.12	54	64.48	36.73	13.08	66.41	300	65	A	H
		11550	47.11	-26.89	74	58.42	38.73	16.39	66.43	300	0	P	H
		7660	47.49	-26.51	74	64.09	36.73	13.08	66.41	100	0	P	V
		11554	49.29	-24.71	74	60.6	38.73	16.39	66.43	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Note symbol**

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



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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
CDD 4*4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
 = 55.45 (dBμV/m)
2. Over Limit(dB)
 = Level(dBμV/m) – Limit Line(dBμV/m)
 = 55.45(dBμV/m) – 74(dBμV/m)
 = -18.55(dB)

For Average Limit @ 2390MHz:

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

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

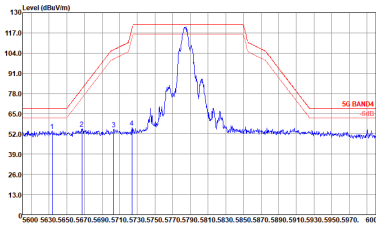
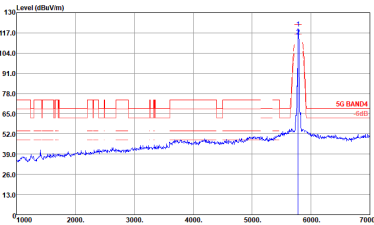
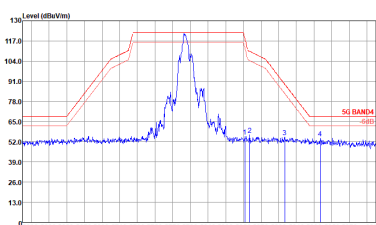


Appendix D. Radiated Spurious Emission Plots

Note symbol

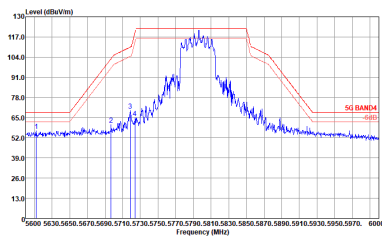
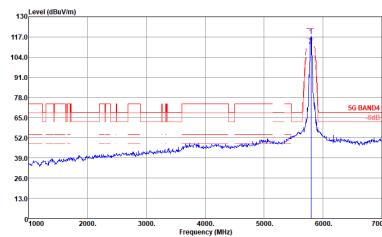
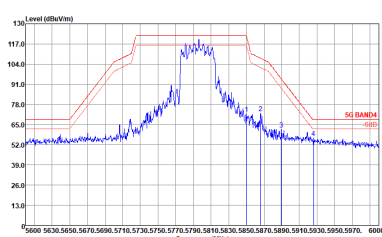
-L	Low channel location
-R	High channel location



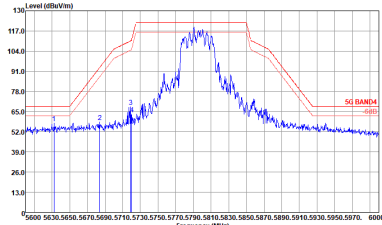
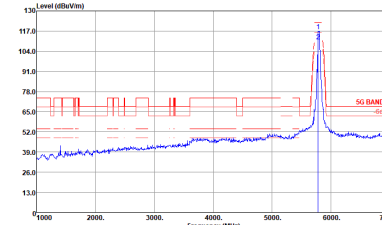
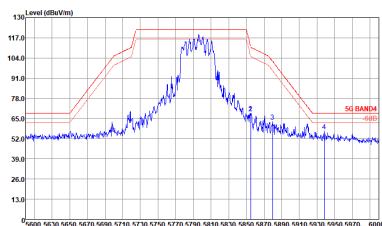
WIFI	UNII-3 5725~5850MHz Band Edge @ 3m																																																																																																													
ANT	802.11a CH157 5785MHz																																																																																																													
CDD 4*4	Vertical					Fundamental																																																																																																								
Peak	 Site : 032005-E5 Condition : 5G BAND4 3a 3117 00018652 VERTICAL Project : NEW 1000.000000 NEW 3000.000000 SWT Auto Model : (FR)102908 Plane : Y Polarization : Full-directivity #16 PowerSetting : 19.5 Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>5653.68</td><td>54.04</td><td>-14.26</td><td>68.30</td><td>44.00</td><td>35.58</td><td>11.85</td><td>36.51</td><td>72 Peak VERTICAL</td></tr><tr><td>2</td><td>5667.20</td><td>55.39</td><td>-25.67</td><td>81.06</td><td>45.27</td><td>35.58</td><td>11.11</td><td>36.55</td><td>72 Peak VERTICAL</td></tr><tr><td>3</td><td>5705.20</td><td>54.90</td><td>-51.30</td><td>106.20</td><td>44.70</td><td>35.62</td><td>11.16</td><td>36.58</td><td>72 Peak VERTICAL</td></tr><tr><td>4</td><td>5724.00</td><td>56.14</td><td>-63.88</td><td>120.02</td><td>45.91</td><td>35.65</td><td>11.18</td><td>36.60</td><td>72 Peak VERTICAL</td></tr></table>  Site : 032005-E5 Condition : 5G BAND4 3a 3117 00018652 VERTICAL Project : NEW 1000.000000 NEW 3000.000000 SWT Auto Model : (FR)102908 Plane : Y Polarization : Full-directivity #16 PowerSetting : 19.5 Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>5782.00</td><td>119.85</td><td>-2.45</td><td>122.30</td><td>109.40</td><td>35.75</td><td>11.26</td><td>36.65</td><td>72 Peak VERTICAL</td></tr><tr><td>2</td><td>5782.00</td><td>114.69</td><td>-----</td><td>104.33</td><td>35.75</td><td>11.26</td><td>36.65</td><td>72 Average</td><td>VERTICAL</td></tr></table>										Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		1	5653.68	54.04	-14.26	68.30	44.00	35.58	11.85	36.51	72 Peak VERTICAL	2	5667.20	55.39	-25.67	81.06	45.27	35.58	11.11	36.55	72 Peak VERTICAL	3	5705.20	54.90	-51.30	106.20	44.70	35.62	11.16	36.58	72 Peak VERTICAL	4	5724.00	56.14	-63.88	120.02	45.91	35.65	11.18	36.60	72 Peak VERTICAL	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		1	5782.00	119.85	-2.45	122.30	109.40	35.75	11.26	36.65	72 Peak VERTICAL	2	5782.00	114.69	-----	104.33	35.75	11.26	36.65	72 Average	VERTICAL
Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																																																																					
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1	5653.68	54.04	-14.26	68.30	44.00	35.58	11.85	36.51	72 Peak VERTICAL																																																																																																					
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3	5705.20	54.90	-51.30	106.20	44.70	35.62	11.16	36.58	72 Peak VERTICAL																																																																																																					
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1	5782.00	119.85	-2.45	122.30	109.40	35.75	11.26	36.65	72 Peak VERTICAL																																																																																																					
2	5782.00	114.69	-----	104.33	35.75	11.26	36.65	72 Average	VERTICAL																																																																																																					
Peak	 Site : 032005-E5 Condition : 5G BAND4 3a 3117 00018652 VERTICAL Project : NEW 1000.000000 NEW 3000.000000 SWT Auto Model : (FR)102908 Plane : Y Polarization : Full-directivity #16 PowerSetting : 19.5 Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>5851.68</td><td>55.34</td><td>-63.31</td><td>118.65</td><td>44.66</td><td>35.67</td><td>11.10</td><td>36.72</td><td>72 Peak VERTICAL</td></tr><tr><td>2</td><td>5857.20</td><td>56.58</td><td>-53.78</td><td>110.28</td><td>46.00</td><td>35.90</td><td>11.34</td><td>36.74</td><td>72 Peak VERTICAL</td></tr><tr><td>3</td><td>5896.00</td><td>55.11</td><td>-34.82</td><td>89.93</td><td>44.62</td><td>35.88</td><td>11.38</td><td>36.77</td><td>72 Peak VERTICAL</td></tr><tr><td>4</td><td>5936.00</td><td>54.36</td><td>-13.54</td><td>68.30</td><td>43.08</td><td>35.67</td><td>11.42</td><td>36.81</td><td>72 Peak VERTICAL</td></tr></table> Left blank										Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		1	5851.68	55.34	-63.31	118.65	44.66	35.67	11.10	36.72	72 Peak VERTICAL	2	5857.20	56.58	-53.78	110.28	46.00	35.90	11.34	36.74	72 Peak VERTICAL	3	5896.00	55.11	-34.82	89.93	44.62	35.88	11.38	36.77	72 Peak VERTICAL	4	5936.00	54.36	-13.54	68.30	43.08	35.67	11.42	36.81	72 Peak VERTICAL																																								
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UNII-3 5725~5850MHz
WIFI 802.11ax HE40 Full (Band Edge @ 3m)---Sample 1

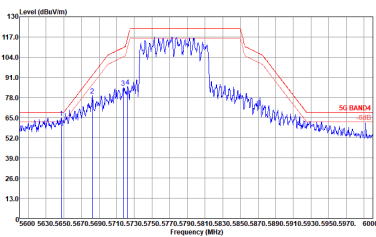
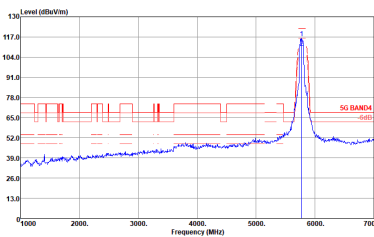
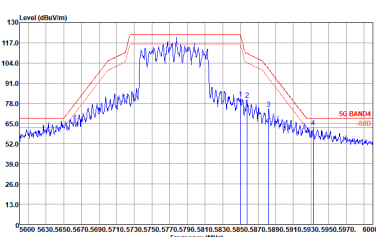
WIFI	UNII-3 5725~5850MHz Band Edge @ 3m																																																																																																														
ANT	802.11ax HE40 Full HT40 CH159 5795MHz																																																																																																														
BF 4*4	Horizontal	Fundamental																																																																																																													
Peak	 Site Condition : SC BAND4 3a 3117 00218652 HORIZONTAL FREQ 1000.000MHz FWH 3000.000MHz SWT Auto Project : (FR)102908 Mode : 2F Plane : T Full-directivity : #16 IMEI : 19.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Limit</th><th>Line</th><th>Level Factor</th><th>Cable Preamp</th><th>Loss Factor</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>Freq</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>5622.40</td><td>56.56</td><td>-11.94</td><td>68.30</td><td>46.34</td><td>35.47</td><td>11.83</td><td>36.48</td><td>281</td><td>280 Peak HORIZONTAL</td></tr><tr><td>2</td><td>5696.00</td><td>60.50</td><td>-42.44</td><td>102.94</td><td>50.54</td><td>35.59</td><td>11.13</td><td>36.56</td><td>281</td><td>280 Peak HORIZONTAL</td></tr><tr><td>3</td><td>5718.00</td><td>69.64</td><td>-40.92</td><td>110.56</td><td>59.43</td><td>35.85</td><td>11.10</td><td>36.60</td><td>281</td><td>280 Peak HORIZONTAL</td></tr><tr><td>4</td><td>5724.00</td><td>64.82</td><td>-55.20</td><td>120.02</td><td>54.59</td><td>35.65</td><td>11.18</td><td>36.60</td><td>281</td><td>280 Peak HORIZONTAL</td></tr></table>	Freq	Level	Limit	Line	Level Factor	Cable Preamp	Loss Factor	A/Pos	T/Pos	Remark	Pol/Phas	Freq	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg		1	5622.40	56.56	-11.94	68.30	46.34	35.47	11.83	36.48	281	280 Peak HORIZONTAL	2	5696.00	60.50	-42.44	102.94	50.54	35.59	11.13	36.56	281	280 Peak HORIZONTAL	3	5718.00	69.64	-40.92	110.56	59.43	35.85	11.10	36.60	281	280 Peak HORIZONTAL	4	5724.00	64.82	-55.20	120.02	54.59	35.65	11.18	36.60	281	280 Peak HORIZONTAL	 Site Condition : SC BAND4 3a 3117 00218652 HORIZONTAL FREQ 1000.000MHz FWH 3000.000MHz SWT Auto Project : (FR)102908 Mode : 2F Plane : T Full-directivity : #16 IMEI : 19.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Limit</th><th>Line</th><th>Level Factor</th><th>Cable Preamp</th><th>Loss Factor</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>Freq</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>5794.00</td><td>117.60</td><td>-4.62</td><td>122.30</td><td>107.31</td><td>35.70</td><td>11.26</td><td>36.67</td><td>281</td><td>280 Peak HORIZONTAL</td></tr><tr><td>2</td><td>5794.00</td><td>111.40</td><td>-----</td><td>243.83</td><td>35.70</td><td>11.26</td><td>36.67</td><td>281</td><td>280 Average HORIZONTAL</td></tr></table>	Freq	Level	Limit	Line	Level Factor	Cable Preamp	Loss Factor	A/Pos	T/Pos	Remark	Pol/Phas	Freq	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg		1	5794.00	117.60	-4.62	122.30	107.31	35.70	11.26	36.67	281	280 Peak HORIZONTAL	2	5794.00	111.40	-----	243.83	35.70	11.26	36.67	281	280 Average HORIZONTAL
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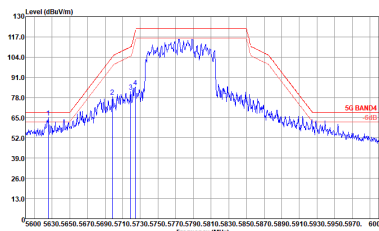
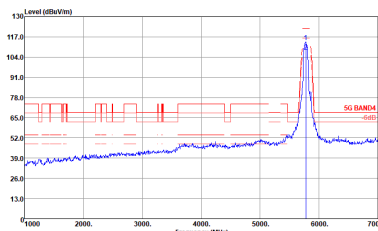
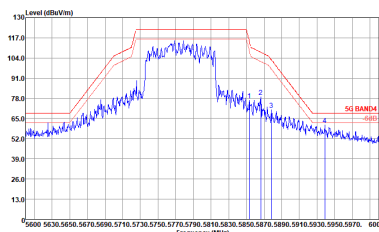
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1	5854.00	68.44	-42.92	111.36	57.94	35.98	11.34	36.74	358	360 Peak	VERTICAL																																																																																																														
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3	5879.00	62.97	-38.93	101.88	52.48	35.89	11.30	36.76	358	360 Peak	VERTICAL																																																																																																														
4	5938.00	56.74	-11.56	68.30	46.25	35.87	11.42	36.81	358	360 Peak	VERTICAL																																																																																																														



UNII-3 5725~5850MHz
WIFI 802.11ax HE80 Full (Band Edge @ 3m)---Sample 1

WIFI	UNII-3 5725~5850MHz Band Edge @ 3m																																																																																																										
ANT	802.11ax HE80 Full CH155 5775MHz																																																																																																										
BF 4*4	Horizontal	Fundamental																																																																																																									
Peak	 Site Condition : SC BAND4 3a 3117 00218652 HORIZONTAL RFW 1000.000MHz FFW 3000.000MHz SWT Auto Project : (PR)102908 Mode : 42 Plane : T Pull-directivity : #16 IMEI : 15.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>5647.00</td><td>64.68</td><td>-3.62</td><td>68.30</td><td>54.61</td><td>35.58</td><td>11.00</td><td>36.51</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>2</td><td>5682.00</td><td>79.16</td><td>-13.15</td><td>92.31</td><td>69.04</td><td>35.56</td><td>11.11</td><td>36.55</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>3</td><td>5717.00</td><td>84.27</td><td>-25.96</td><td>110.23</td><td>74.06</td><td>35.65</td><td>11.16</td><td>36.60</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>4</td><td>5722.00</td><td>85.06</td><td>-31.31</td><td>116.37</td><td>74.63</td><td>35.65</td><td>11.18</td><td>36.60</td><td>116</td><td>186 Peak HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	1	5647.00	64.68	-3.62	68.30	54.61	35.58	11.00	36.51	116	186 Peak HORIZONTAL	2	5682.00	79.16	-13.15	92.31	69.04	35.56	11.11	36.55	116	186 Peak HORIZONTAL	3	5717.00	84.27	-25.96	110.23	74.06	35.65	11.16	36.60	116	186 Peak HORIZONTAL	4	5722.00	85.06	-31.31	116.37	74.63	35.65	11.18	36.60	116	186 Peak HORIZONTAL	 Site Condition : SC BAND4 3a 3117 00218652 HORIZONTAL RFW 1000.000MHz FFW 3000.000MHz SWT Auto Project : (PR)102908 Mode : 42 Plane : T Pull-directivity : #16 IMEI : 15.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>5770.00</td><td>116.17</td><td>-6.13</td><td>122.30</td><td>105.83</td><td>35.73</td><td>11.24</td><td>36.65</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>2</td><td>5770.00</td><td>118.15</td><td>-----</td><td>99.81</td><td>35.73</td><td>11.24</td><td>36.65</td><td>116</td><td>186 Average HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	1	5770.00	116.17	-6.13	122.30	105.83	35.73	11.24	36.65	116	186 Peak HORIZONTAL	2	5770.00	118.15	-----	99.81	35.73	11.24	36.65	116	186 Average HORIZONTAL
	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																																																																	
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1	5647.00	64.68	-3.62	68.30	54.61	35.58	11.00	36.51	116	186 Peak HORIZONTAL																																																																																																	
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1	5770.00	116.17	-6.13	122.30	105.83	35.73	11.24	36.65	116	186 Peak HORIZONTAL																																																																																																	
2	5770.00	118.15	-----	99.81	35.73	11.24	36.65	116	186 Average HORIZONTAL																																																																																																		
Peak	 Site Condition : SC BAND4 3a 3117 00218652 HORIZONTAL RFW 1000.000MHz FFW 3000.000MHz SWT Auto Project : (PR)102908 Mode : 42 Plane : T Pull-directivity : #16 IMEI : 15.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>5858.00</td><td>81.24</td><td>-41.06</td><td>122.30</td><td>79.76</td><td>35.87</td><td>11.33</td><td>36.72</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>2</td><td>5857.00</td><td>88.48</td><td>-29.69</td><td>118.17</td><td>69.08</td><td>35.98</td><td>11.34</td><td>36.74</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>3</td><td>5882.00</td><td>74.55</td><td>-25.53</td><td>100.08</td><td>64.00</td><td>35.89</td><td>11.36</td><td>36.76</td><td>116</td><td>186 Peak HORIZONTAL</td></tr><tr><td>4</td><td>5932.00</td><td>62.57</td><td>-5.73</td><td>68.30</td><td>52.09</td><td>35.87</td><td>11.42</td><td>36.81</td><td>116</td><td>186 Peak HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	1	5858.00	81.24	-41.06	122.30	79.76	35.87	11.33	36.72	116	186 Peak HORIZONTAL	2	5857.00	88.48	-29.69	118.17	69.08	35.98	11.34	36.74	116	186 Peak HORIZONTAL	3	5882.00	74.55	-25.53	100.08	64.00	35.89	11.36	36.76	116	186 Peak HORIZONTAL	4	5932.00	62.57	-5.73	68.30	52.09	35.87	11.42	36.81	116	186 Peak HORIZONTAL	Left blank																																									
Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																																																																		
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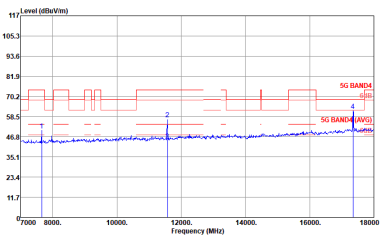
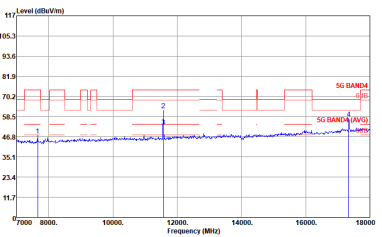


WIFI	UNII-3 5725~5850MHz Band Edge @ 3m																																																																																											
ANT	802.11ax HE80 Full CH155 5775MHz																																																																																											
BF 4*4	Vertical	Fundamental																																																																																										
Peak	 Site Condition : 5G BAND4 3m 2017 00010000 VERTICAL Project : NEW 1000.000MHz VSW 3000.000MHz SWT Auto FREQ 102908 Mode : 42 Plane : Y Full-directivity : #10 IMEI : 19.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBm/100MHz</th><th>dB</th><th>dBm/100MHz</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1 5626.00</td><td>65.82</td><td>-3.28</td><td>68.38</td><td>55.00</td><td>35.48</td><td>11.83</td><td>36.49</td><td>400 346 Peak VERTICAL</td></tr><tr><td>2 5698.40</td><td>78.73</td><td>-25.29</td><td>104.12</td><td>68.57</td><td>35.59</td><td>11.13</td><td>36.56</td><td>400 346 Peak VERTICAL</td></tr><tr><td>3 5739.30</td><td>81.85</td><td>-28.85</td><td>110.68</td><td>71.64</td><td>35.65</td><td>11.24</td><td>36.65</td><td>400 346 Peak VERTICAL</td></tr><tr><td>4 5724.40</td><td>84.76</td><td>-36.17</td><td>120.93</td><td>74.53</td><td>35.65</td><td>11.18</td><td>36.68</td><td>400 346 Peak VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBm/100MHz	dB	dBm/100MHz	dB	dB	cm	deg		1 5626.00	65.82	-3.28	68.38	55.00	35.48	11.83	36.49	400 346 Peak VERTICAL	2 5698.40	78.73	-25.29	104.12	68.57	35.59	11.13	36.56	400 346 Peak VERTICAL	3 5739.30	81.85	-28.85	110.68	71.64	35.65	11.24	36.65	400 346 Peak VERTICAL	4 5724.40	84.76	-36.17	120.93	74.53	35.65	11.18	36.68	400 346 Peak VERTICAL	 Site Condition : 5G BAND4 3m 2017 00010000 VERTICAL Project : NEW 1000.000MHz VSW 3000.000MHz SWT Auto FREQ 102908 Mode : 42 Plane : Y Full-directivity : #10 IMEI : 19.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBm/100MHz</th><th>dB</th><th>dBm/100MHz</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1 5776.00</td><td>113.88</td><td>-8.42</td><td>122.30</td><td>183.54</td><td>35.75</td><td>11.24</td><td>36.65</td><td>400 346 Peak VERTICAL</td></tr><tr><td>2 5776.00</td><td>187.64</td><td>-----</td><td>-----</td><td>97.30</td><td>35.75</td><td>11.24</td><td>36.65</td><td>400 346 Average VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBm/100MHz	dB	dBm/100MHz	dB	dB	cm	deg		1 5776.00	113.88	-8.42	122.30	183.54	35.75	11.24	36.65	400 346 Peak VERTICAL	2 5776.00	187.64	-----	-----	97.30	35.75	11.24	36.65	400 346 Average VERTICAL
	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																																																			
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Peak	 Site Condition : 5G BAND4 3m 2017 00010000 VERTICAL Project : NEW 1000.000MHz VSW 3000.000MHz SWT Auto FREQ 102908 Mode : 42 Plane : Y Full-directivity : #10 IMEI : 19.5 Powersetting : Sample 1 <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBm/100MHz</th><th>dB</th><th>dBm/100MHz</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1 5853.68</td><td>76.83</td><td>-27.26</td><td>104.09</td><td>66.34</td><td>35.98</td><td>11.33</td><td>36.74</td><td>400 346 Peak VERTICAL</td></tr><tr><td>2 5866.40</td><td>78.77</td><td>-28.94</td><td>107.71</td><td>68.27</td><td>35.98</td><td>11.34</td><td>36.74</td><td>400 346 Peak VERTICAL</td></tr><tr><td>3 5878.40</td><td>78.54</td><td>-32.23</td><td>106.77</td><td>68.85</td><td>35.89</td><td>11.36</td><td>36.76</td><td>400 346 Peak VERTICAL</td></tr><tr><td>4 5938.08</td><td>68.95</td><td>-7.35</td><td>68.38</td><td>58.58</td><td>35.86</td><td>11.42</td><td>36.83</td><td>400 346 Peak VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBm/100MHz	dB	dBm/100MHz	dB	dB	cm	deg		1 5853.68	76.83	-27.26	104.09	66.34	35.98	11.33	36.74	400 346 Peak VERTICAL	2 5866.40	78.77	-28.94	107.71	68.27	35.98	11.34	36.74	400 346 Peak VERTICAL	3 5878.40	78.54	-32.23	106.77	68.85	35.89	11.36	36.76	400 346 Peak VERTICAL	4 5938.08	68.95	-7.35	68.38	58.58	35.86	11.42	36.83	400 346 Peak VERTICAL	Left blank																																				
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UNII-3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)---Sample 1

WIFI	UNII-3 5725~5850MHz Harmonic @ 3m																																																																																																													
ANT	802.11a CH157 5785MHz																																																																																																													
CDD 4*4	Horizontal	Vertical																																																																																																												
Peak	 Site : 03CB05-E5 Condition : 5G BAND4 3m 3117 00218652 HORIZONTAL Power : 100.00Watts TWR 3000.00Watts SWT Auto Project : FR102908 Model : 17 Plane : 17 Full-directivity : 17 IMEI : 19.5 Powersetting : 19.5 <table><tr><th>Sample 1</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>Freq</th><th>Level</th><th>Limit</th><th>Line</th><th>Level Factor</th><th>Loss Factor</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1 7668.00</td><td>59.47</td><td>-23.33</td><td>74.00</td><td>67.07</td><td>36.73</td><td>13.00</td><td>66.41</td><td>00 Peak HORIZONTAL</td></tr><tr><td>2 11576.00</td><td>56.97</td><td>-17.83</td><td>74.00</td><td>68.24</td><td>38.74</td><td>16.41</td><td>66.42</td><td>00 Peak HORIZONTAL</td></tr><tr><td>3 13576.00</td><td>44.72</td><td>-9.38</td><td>74.00</td><td>59.99</td><td>38.74</td><td>16.41</td><td>66.42</td><td>00 Average HORIZONTAL</td></tr><tr><td>4 17351.00</td><td>61.87</td><td>-6.43</td><td>68.39</td><td>64.06</td><td>42.42</td><td>20.24</td><td>64.85</td><td>00 Peak HORIZONTAL</td></tr></table>	Sample 1	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	Freq	Level	Limit	Line	Level Factor	Loss Factor	cm	deg		1 7668.00	59.47	-23.33	74.00	67.07	36.73	13.00	66.41	00 Peak HORIZONTAL	2 11576.00	56.97	-17.83	74.00	68.24	38.74	16.41	66.42	00 Peak HORIZONTAL	3 13576.00	44.72	-9.38	74.00	59.99	38.74	16.41	66.42	00 Average HORIZONTAL	4 17351.00	61.87	-6.43	68.39	64.06	42.42	20.24	64.85	00 Peak HORIZONTAL	 Site : 03CB05-E5 Condition : 5G BAND4 3m 3117 00218652 VERTICAL Power : 100.00Watts TWR 3000.00Watts SWT Auto Project : FR102908 Model : 17 Plane : 17 Full-directivity : 17 IMEI : 19.5 Powersetting : 19.5 <table><tr><th>Sample 1</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>Freq</th><th>Level</th><th>Limit</th><th>Line</th><th>Level Factor</th><th>Loss Factor</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1 7668.00</td><td>47.67</td><td>-26.33</td><td>74.00</td><td>64.27</td><td>36.73</td><td>13.00</td><td>66.41</td><td>00 Peak VERTICAL</td></tr><tr><td>2 11576.00</td><td>62.32</td><td>-11.68</td><td>74.00</td><td>73.59</td><td>38.74</td><td>16.41</td><td>66.42</td><td>00 Peak VERTICAL</td></tr><tr><td>3 13576.00</td><td>52.00</td><td>-1.38</td><td>74.00</td><td>64.17</td><td>38.74</td><td>16.41</td><td>66.42</td><td>00 Average VERTICAL</td></tr><tr><td>4 17349.00</td><td>57.43</td><td>-10.57</td><td>68.39</td><td>59.64</td><td>42.41</td><td>20.23</td><td>64.85</td><td>00 Peak VERTICAL</td></tr></table>	Sample 1	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	Freq	Level	Limit	Line	Level Factor	Loss Factor	cm	deg		1 7668.00	47.67	-26.33	74.00	64.27	36.73	13.00	66.41	00 Peak VERTICAL	2 11576.00	62.32	-11.68	74.00	73.59	38.74	16.41	66.42	00 Peak VERTICAL	3 13576.00	52.00	-1.38	74.00	64.17	38.74	16.41	66.42	00 Average VERTICAL	4 17349.00	57.43	-10.57	68.39	59.64	42.41	20.23	64.85	00 Peak VERTICAL
Sample 1	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																																																																						
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UNII-3 5725~5850MHz
WIFI 802.11ax HE40 Full (Harmonic @ 3m)---Sample 1

WIFI

UNII-3 5725~5850MHz Harmonic @ 3m

ANT

802.11ax HE40 Full CH159 5795MHz

BF 4*4

Horizontal

Vertical

Peak

Avg.

Site Condition : OX305-E5
SG BAND4 In 3117 00218652 HORIZONTAL
SNR 100% DOWNR NEW 100% DOWNR ST Auto
Project : UFI102908
Mode : C
Plane : T
Full-directivity
TWR : 19.5
Polarization : 19.5

Freq	Level	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pd/Phas			
MHz	dBuV/m	dB	Line	Loss Factor	cm	deg					
1	7660.00	-31.64	-20.30	74.00	70.24	36.73	13.08	66.41	302	0 Peak	HORIZONTAL
2	7660.00	-40.88	-51.12	54.00	45.48	36.73	13.08	66.41	302	64 Average	HORIZONTAL
3	11590.00	-49.70	-24.24	74.00	63.00	38.75	16.41	66.40	345	0 Peak	HORIZONTAL
4	11590.00	-58.83	-5.47	68.00	60.00	42.44	20.25	64.85	300	0 Peak	HORIZONTAL

Site Condition : OX305-E5
SG BAND4 In 3117 00218652 VERTICAL
SNR 100% DOWNR NEW 100% DOWNR ST Auto
Project : UFI102908
Mode : C
Plane : T
Full-directivity
TWR : 19.5
Polarization : 19.5

Freq	Level	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pd/Phas			
MHz	dBuV/m	dB	Line	Loss Factor	cm	deg					
1	7660.00	-46.74	-27.26	74.00	63.34	36.73	13.08	66.41	300	0 Peak	VERTICAL
2	11590.00	-54.14	-19.86	74.00	65.30	38.75	16.41	66.40	345	246 Peak	VERTICAL
3	11590.00	-45.81	-8.09	54.00	56.25	38.75	16.41	66.40	345	246 Average	VERTICAL
4	17504.00	-53.08	-15.10	60.00	55.34	42.45	20.25	64.84	300	0 Peak	VERTICAL

UNII-3 5725~5850MHz
WIFI 802.11ax HE80 Full (Harmonic @ 3m)---Sample 1

WIFI

ANT

BF 4*4

UNII-3 5725~5850MHz Harmonic @ 3m

802.11ax HE80 Full CH155 5775MHz

Horizontal

Vertical

Peak

Avg.

Site
Condition : OX3005-E5
SG BAND4 3m 3117 00210852 HORIZONTAL
RSP 1000,1000Hz, NFW 1000,1000Hz, DFT Auto
Project : (FRI)028908
Mode : 42
Flare : 7
Full-directivity
IMEI : 816
Firmware : 15.5

Sample 1													
Freq	Level	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas				
MHz	dBuV/m	dB	dBuV/m	dB	dB	cm	deg						
1	7560.00	58.20	-23.80	74.00	66.00	36.73	13.00	66.41	300	0 Peak	HORIZONTAL		
2	7560.00	47.00	-6.12	54.00	64.40	36.73	13.00	66.41	300	0 Average	HORIZONTAL		
3	11550.00	47.11	-20.89	74.00	58.42	38.73	16.39	66.43	300	0 Peak	HORIZONTAL		

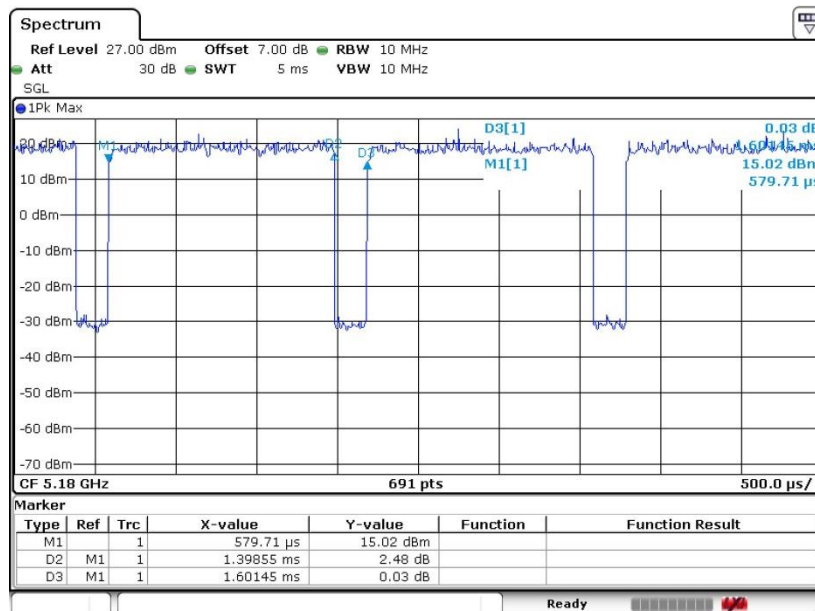
Site
Condition : OX3005-E5
SG BAND4 3m 3117 00210852 VERTICAL
RSP 1000,1000Hz, NFW 1000,1000Hz, DFT Auto
Project : (FRI)028908
Mode : 42
Flare : 7
Full-directivity
IMEI : 816
Firmware : 15.5

Sample 1													
Freq	Level	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas				
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg					
1	7560.00	47.49	-26.51	74.00	64.09	36.73	13.00	66.41	100	0 Peak	VERTICAL		
2	11550.00	49.29	-24.71	74.00	60.00	38.73	16.39	66.43	100	0 Peak	VERTICAL		

Appendix E. Duty Cycle Plots

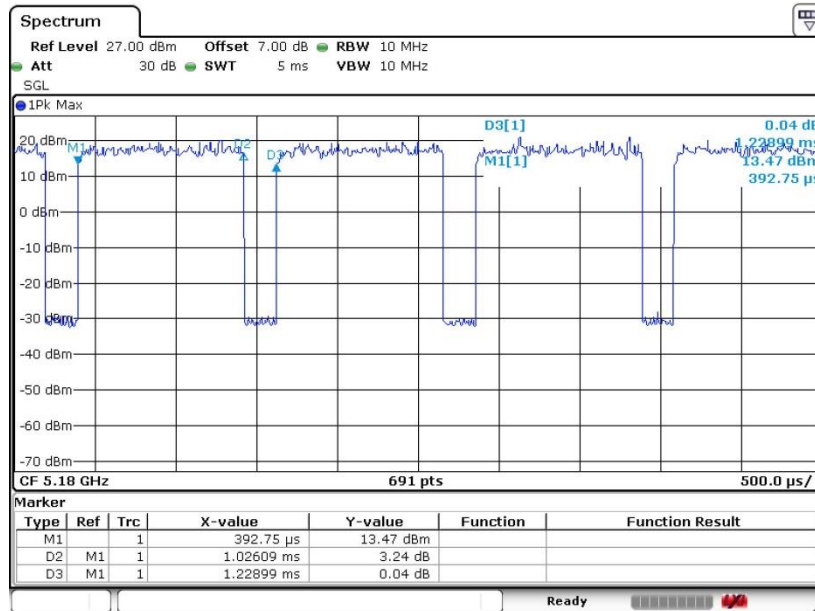
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2+3+4	802.11a	87.33	1.399	0.715	0.75kHz
1+2+3+4	802.11ax HE20	83.49	1.026	0.975	1kHz
1+2+3+4	802.11ax HE40	72.97	0.548	1.825	2kHz
1+2+3+4	802.11ax HE80	59.30	0.296	3.382	3.6kHz

802.11a

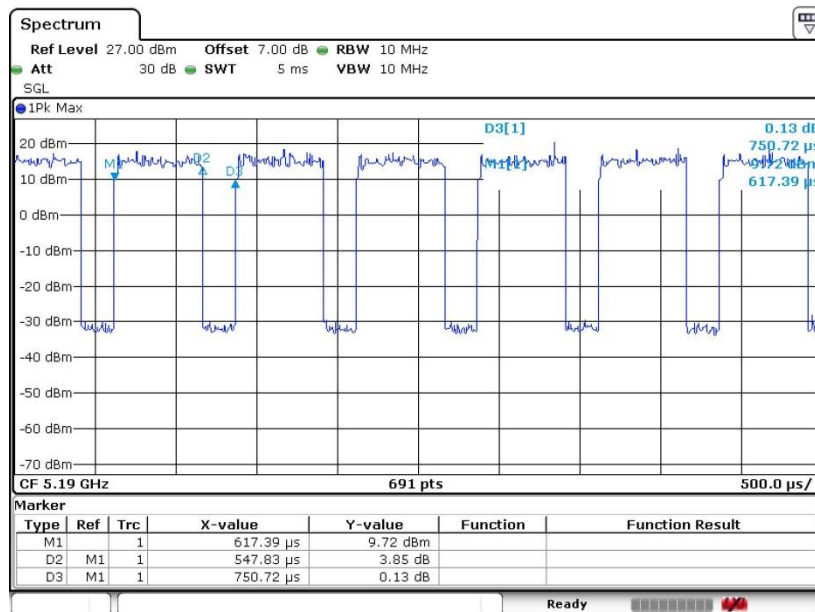




802.11ax HE20



802.11ax HE40



802.11ax HE80

