



FCC RF Test Report

APPLICANT : Technicolor Connected Home USA LLC
EQUIPMENT : DOCSIS 3.1 Residential Voice Gateway
BRAND NAME : Technicolor
MODEL NAME : CGA437TTCH4, CGA437TXXXXX (where X can be alphanumeric, -, or blank)
FCC ID : G95-CGA437T
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Oct. 27, 2022 ~ Dec. 07, 2022

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.

This report contains data that were produced under subcontract by Sporton International Inc. (Shenzhen).

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

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

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



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR201817C	Rev. 01	Initial issue of report	Dec. 23, 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 1.18 dB at 5648.40 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.08 dB at 0.499 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

Technicolor Connected Home USA LLC

4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

1.2 Manufacturer

Technicolor Connected Home USA LLC

4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	DOCSIS 3.1 Residential Voice Gateway
Brand Name	Technicolor
Model Name	CGA437TTCH4, CGA437TXXXXX (where X can be alphanumeric, -, or blank)
FCC ID	G95-CGA437T
SN	Conducted: CGA437TTCH3lab2C067 Conduction: CGA437TTCH4lab2B030 Radiation: CGA437TTCH4lab2A128
HW Version	1.0.0
SW Version	RG21.3-CGA437TTCH3-TCH_CORE-21.2P1_WLAN
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	<MIMO Ant.1+2+3+4> 802.11a : 29.45 dBm / 0.8810 W 802.11n HT20 : 29.45 dBm / 0.8810 W 802.11n HT40 : 29.37 dBm / 0.8650 W 802.11ac VHT20: 29.34 dBm / 0.8590 W 802.11ac VHT40: 29.26 dBm / 0.8433 W 802.11ac VHT80: 28.38 dBm / 0.6887 W 802.11ax HE20 : 29.49 dBm / 0.8892 W 802.11ax HE40 : 29.49 dBm / 0.8892 W 802.11ax HE80 : 29.04 dBm / 0.8017 W
99% Occupied Bandwidth	802.11a : 19.08 MHz 802.11ax HE20 : 19.78 MHz 802.11ax HE40 : 38.36 MHz 802.11ax HE80 : 77.44 MHz
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 Type	Murphy Antenna				
Antenna Function Description		Ant. 1	Ant. 2	Ant. 3	Ant. 4
	802.11 a/n/ac/ax SISO	V	V	V	V
	802.11 a/n/ac/ax CDD 1S4T	V	V	V	V
	802.11 n/ac/ax Tx Beamforming 1S4T	V	V	V	V
	802.11 n/ac/ax SDM 4S4T	V	V	V	V

Note:

1. For SISO&MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power.
2. For 802.11n HT20 / ac VHT20 / ax HE20 and 802.11n HT40 / ac VHT40 / ax HE40 and 802.11 ac VHT80 / ax HE80 mode, the whole testing have assessed only 802.11ax HE20/HE40/HE80 by referring to their maximum conducted power.
3. The device does not support partial RU tone for 802.11ax mode
4. The device supports 1S4T(CDD&TXBF) and 4S4T(SDM) mode; 1S4T: NSS=1, MIMO 4Tx; 4S4T: NSS=4, MIMO 4Tx.
5. Please refer to the antenna report for the maximum Single antenna gain and CDD (Cyclic Delay Diversity) directional gain and TXBF (Tx Beamforming) directional gain and SDM (Space Division Multiplexing) directional gain.

Frequency Band	Max Single Antenna gain (dBi)				CDD DG (dBi)		TXBF DG (dBi)		SDM DG (dBi)	
	ANT1	ANT2	ANT3	ANT4	For Power	For PSD	For Power	For PSD	For Power	For PSD
5GHz UNII-3	3.08	3.58	4.51	3.73	4.51	8.14	8.14	8.14	2.14	2.14

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	HONOTO	Model Name	ADS-50FKI-12 12048EPCU-L
AC Adapter 2	Brand Name	HONOTO	Model Name	ADS-50FKI-12 12048EPG

1.7 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	CN1257	314309

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

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

Test data subcontracted: Conducted test case in section 3.1~3.3 of this report.

1.8 Test Software

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



1.9 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). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 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, 802.11ac VHT40 and 802.11ax HE40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80 and 802.11ax HE80.

2.2 Test Mode

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

MIMO Mode

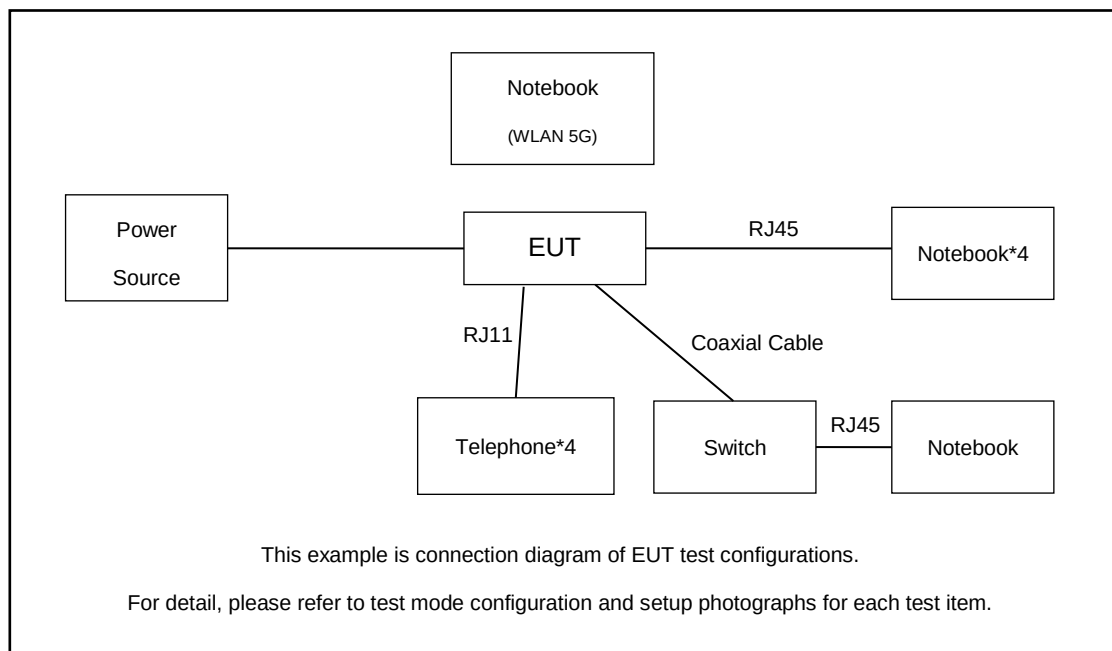
Modulation	Data Rate
802.11a CDD 1S4T	6 Mbps
802.11ax HE20 CDD 1S4T	MCS0
802.11ax HE40 CDD 1S4T	MCS0
802.11ax HE80 CDD 1S4T	MCS0
802.11ax HE20 SDM 4S4T	MCS0
802.11ax HE40 SDM 4S4T	MCS0
802.11ax HE80 SDM 4S4T	MCS0
802.11ax HE20 TX BF 1S4T	MCS0
802.11ax HE40 TX BF 1S4T	MCS0
802.11ax HE80 TX BF 1S4T	MCS0

AC Conducted Emission	Mode 1 : WLAN Link(5G) + Power from Adapter 1
Remark: For Radiated Test Cases, The tests were performance with Adapter 1.	

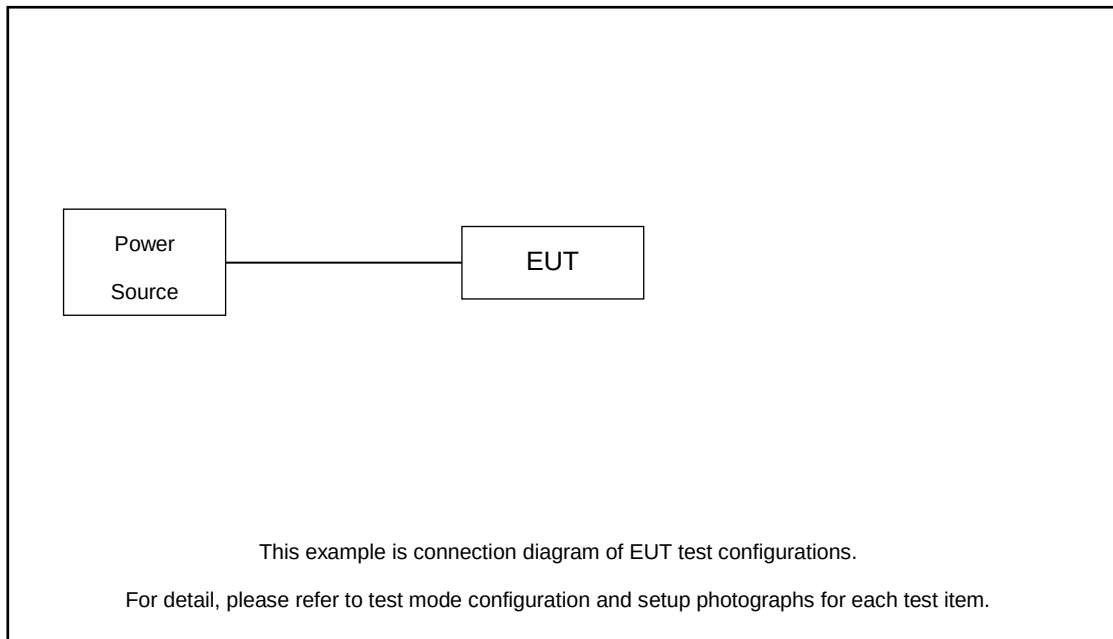
Ch. #		U-NII-3 : 5745-5825 MHz			
		802.11a	802.11axHE20	802.11ax HE40	802.11ax HE80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

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.	Notebook*4	Lenovo	G480	QDS-BRCM1050I	N/A	Shielded cable DC O/P 1.8m, Unshielded AC I/P cable 1.8m
2.	Notebook	Acer	N20C5	N/A	N/A	Shielded cable DC O/P 1.8m, Unshielded AC I/P cable 1.8m
3.	Telephone*4	bubugao	HCD007(6082)TSD	N/A	N/A	N/A
4.	Switch	CISCO	NPE-G2	N/A	N/A	N/A
5.	RJ45 Cable	N/A	N/A	N/A	N/A	N/A
6.	RJ11 Cable	N/A	N/A	N/A	N/A	N/A
7.	U disk	N/A	N/A	N/A	N/A	N/A



2.5 EUT Operation Test Setup

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

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 and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.7 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 2.7 + 10 = 12.7 \text{ (dB)}\end{aligned}$$

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.

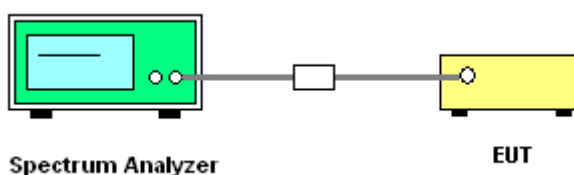
3.1.2 Measuring Instruments

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. For 6dB BW, Set RBW = 100kHz.
For 26dB BW, Set RBW = approximately 1% of the emission bandwidth.
For 99% OBW, Set RBW = 1% to 5% of the OBW.
3. For 26dB BW, Set the VBW > RBW.
For 6dB BW & 99% OBW, 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

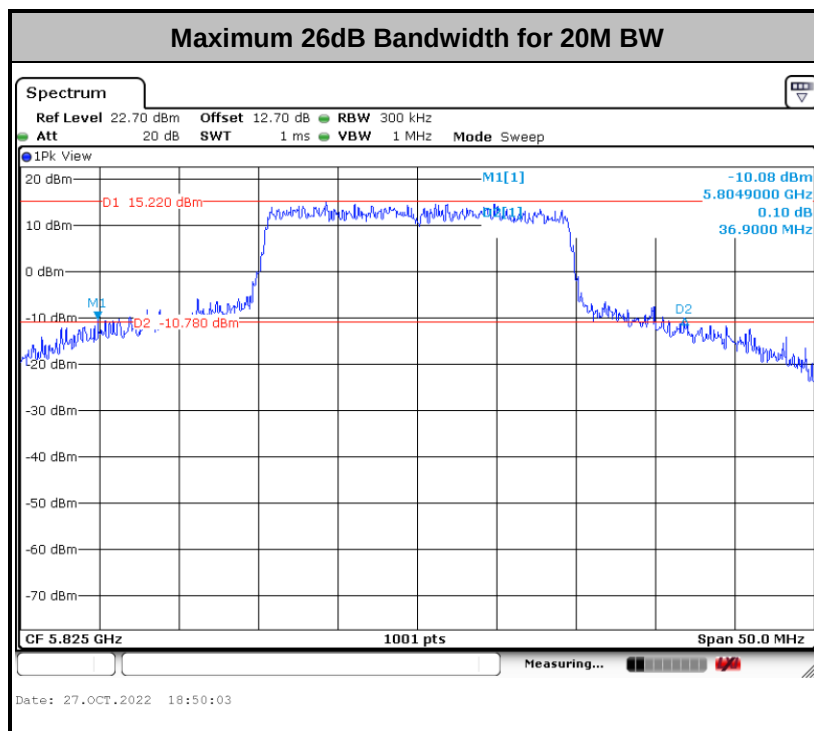
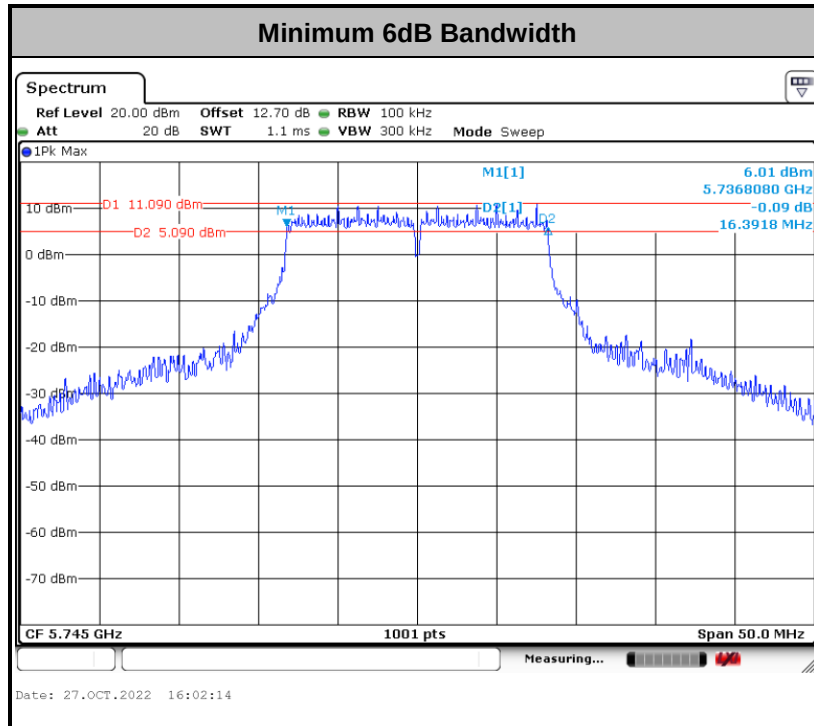


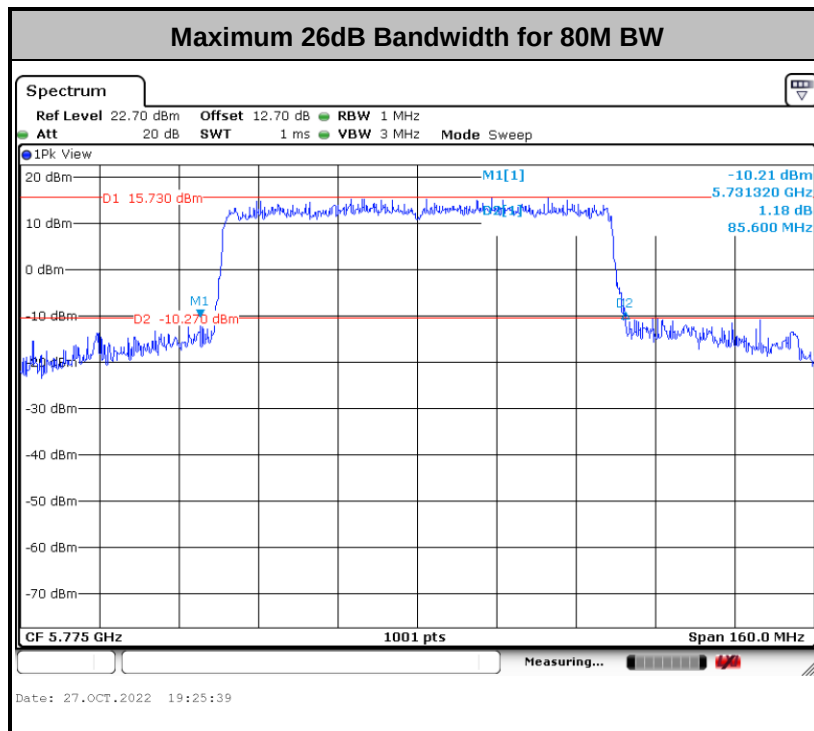
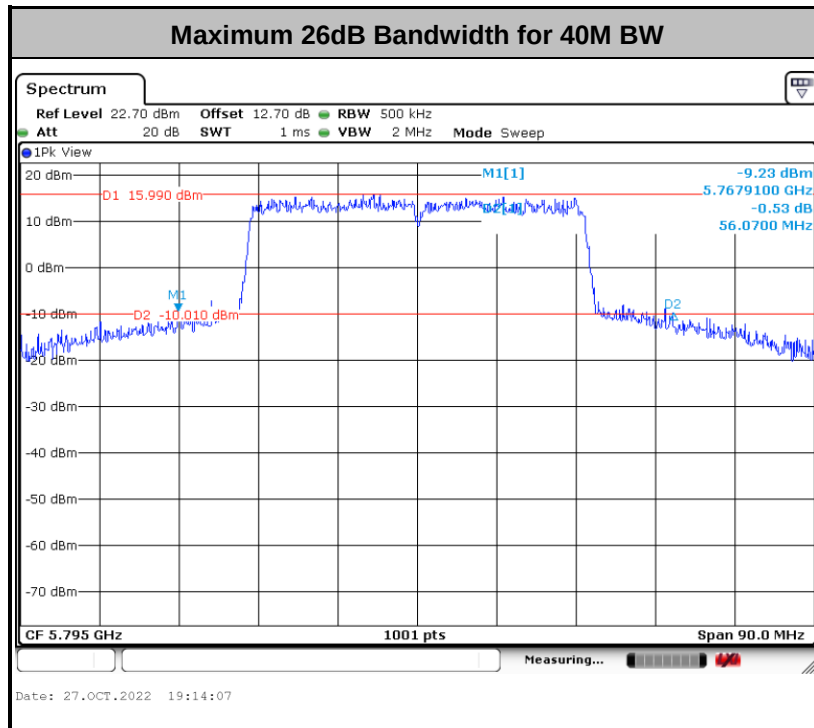
3.1.5 Test Result of 6dB Bandwidth

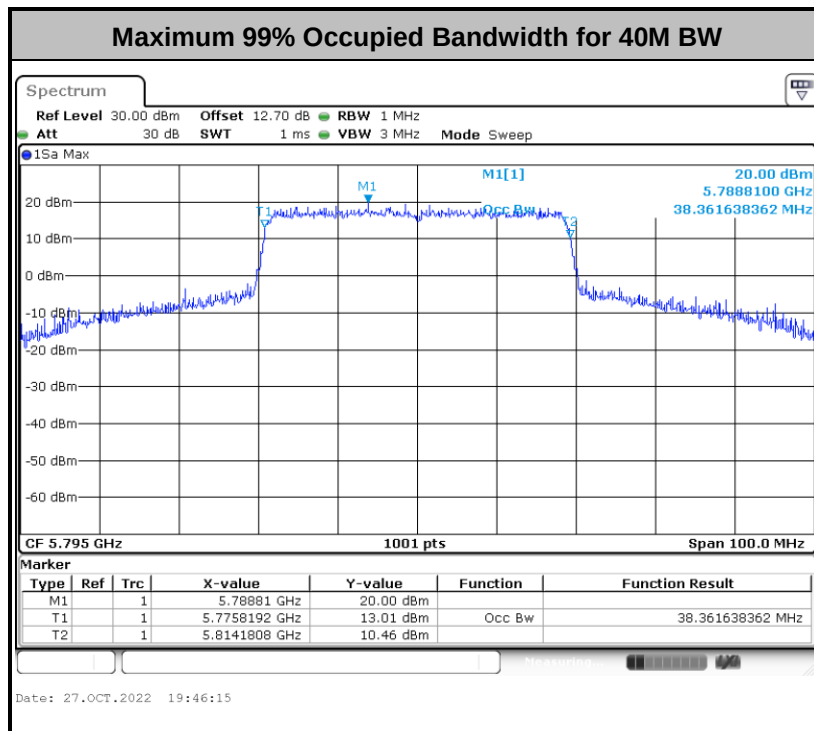
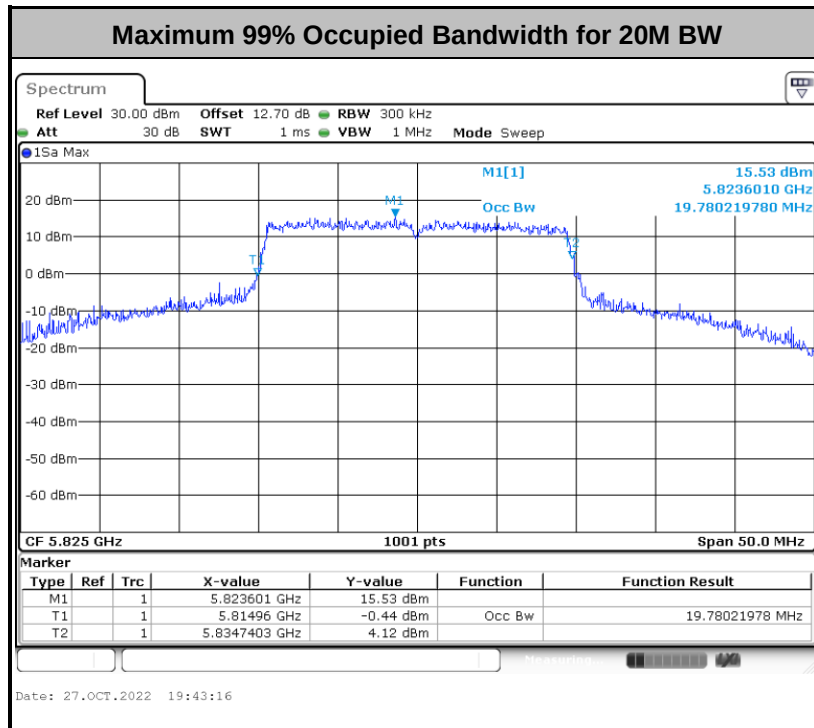
Please refer to Appendix A.

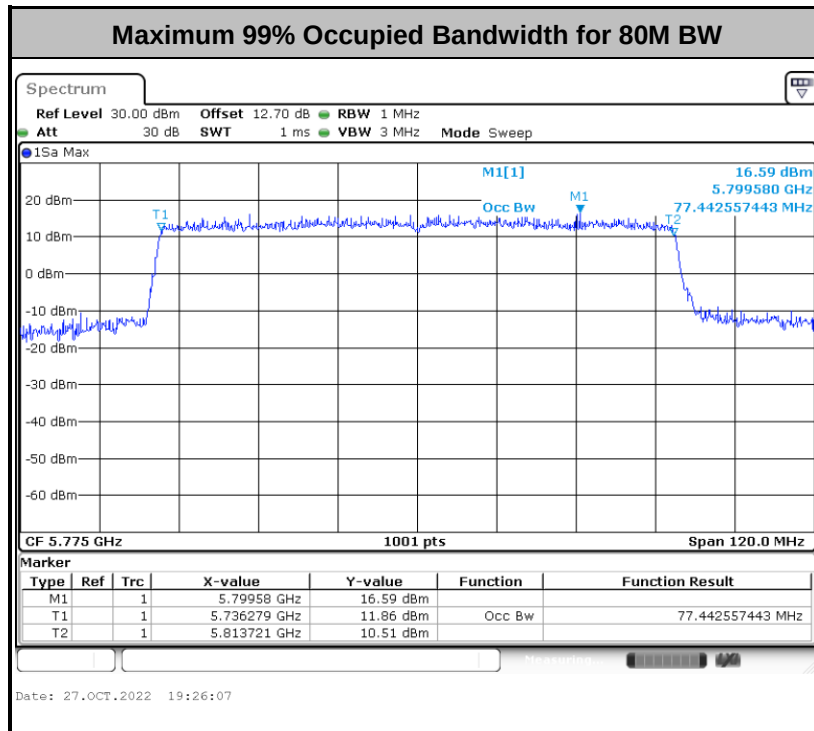


<CDD 1S4T Mode>



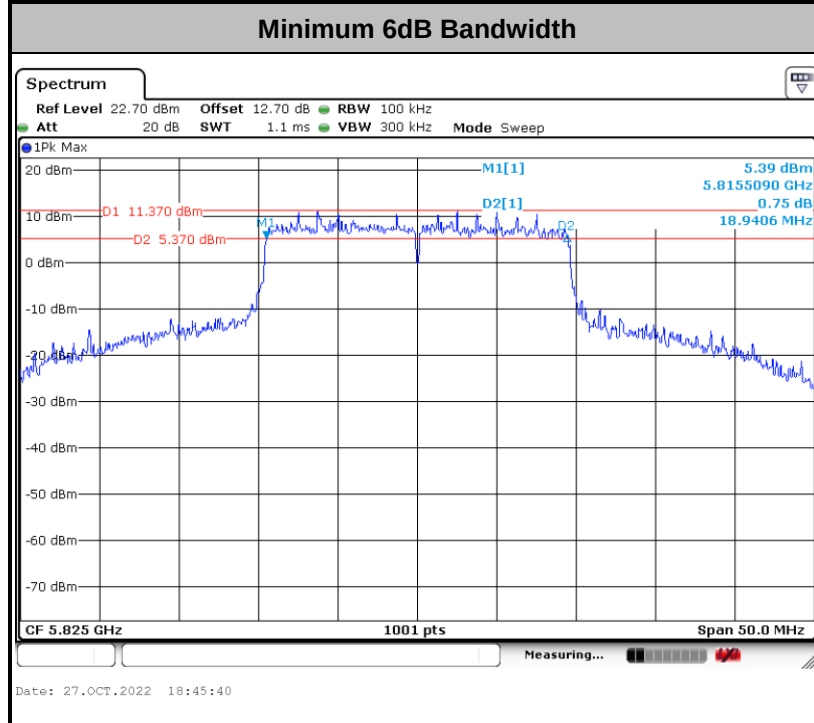


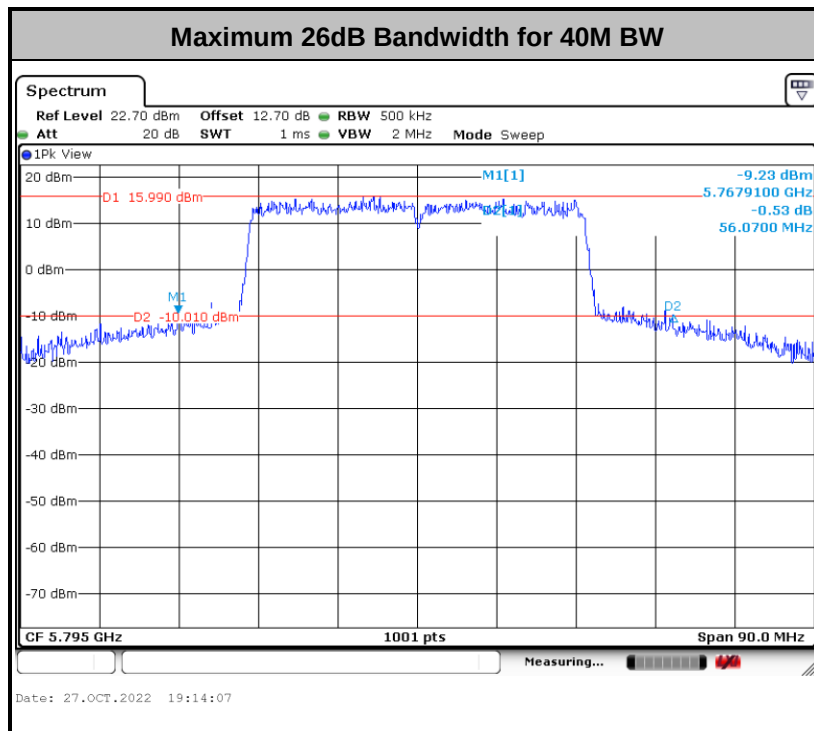
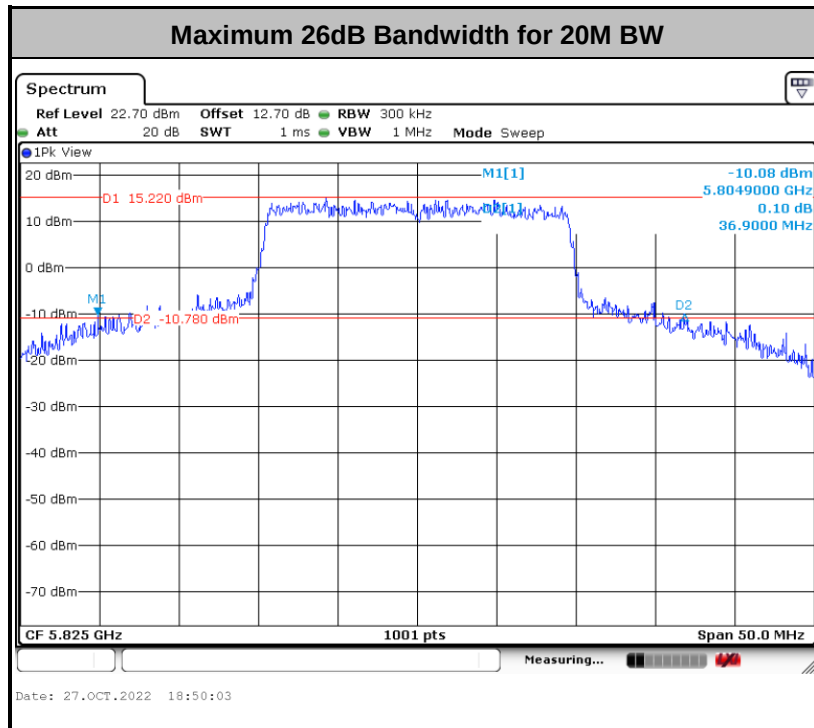


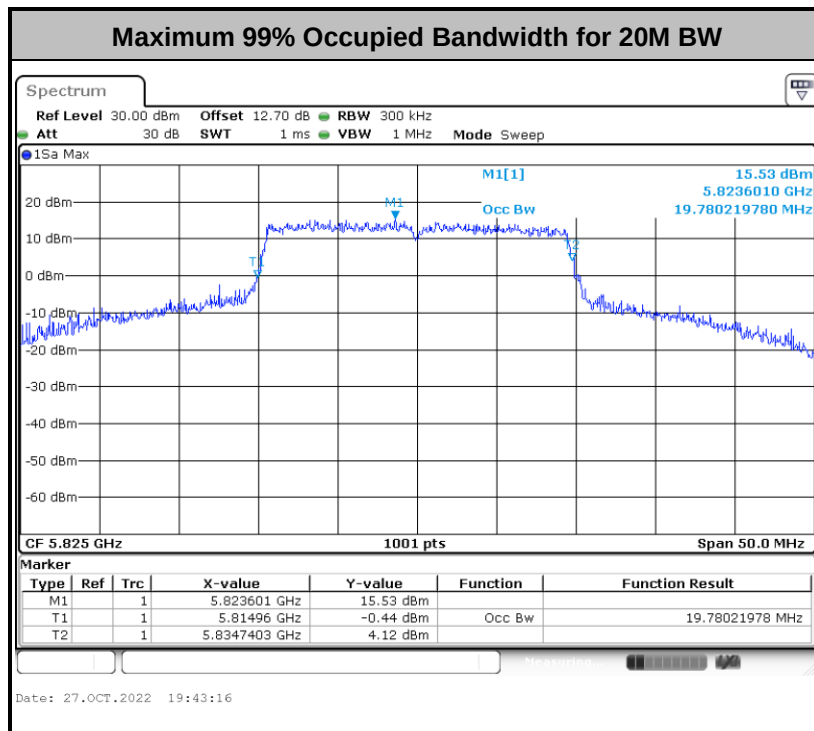
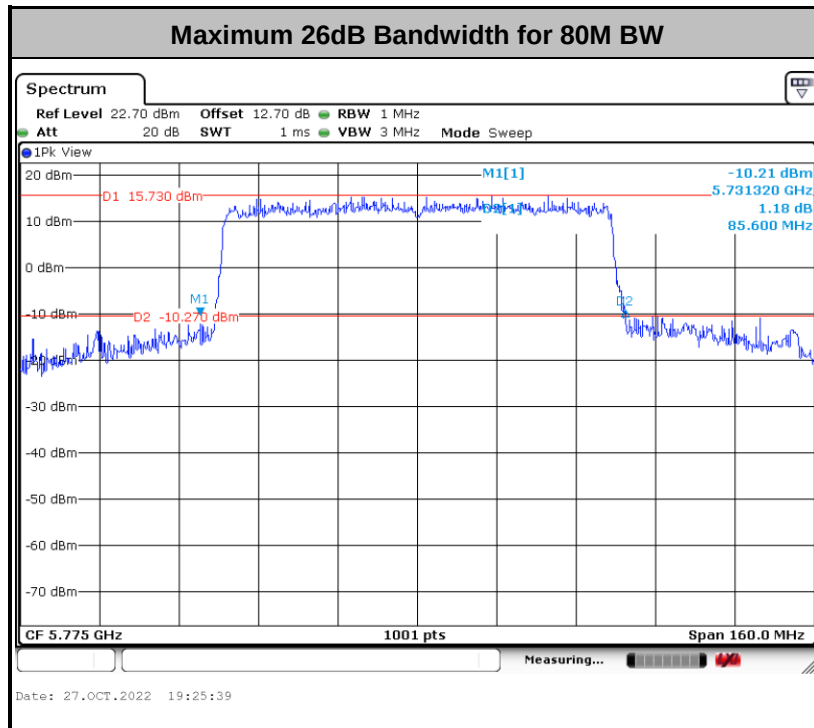


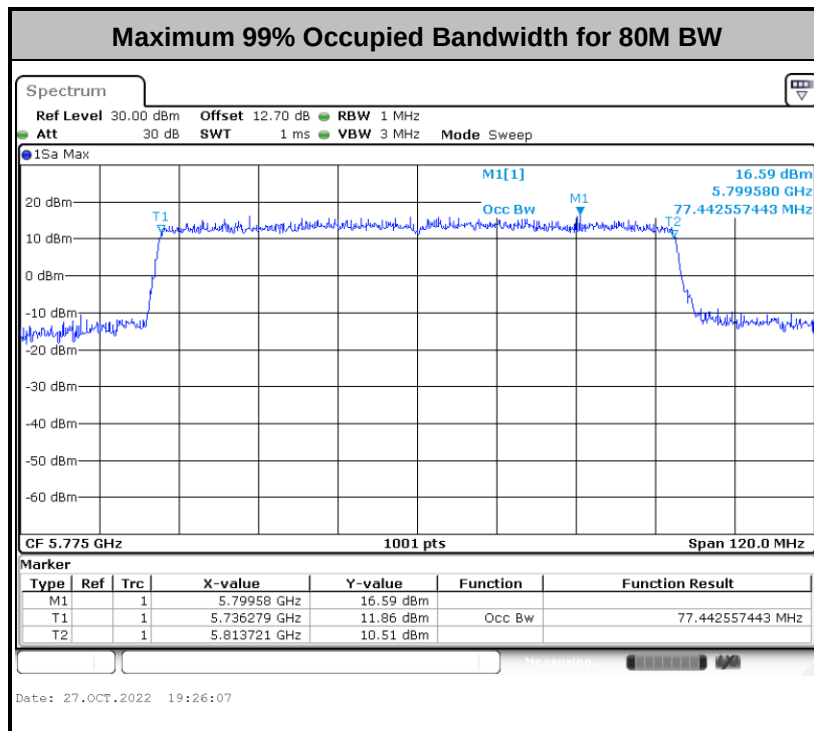
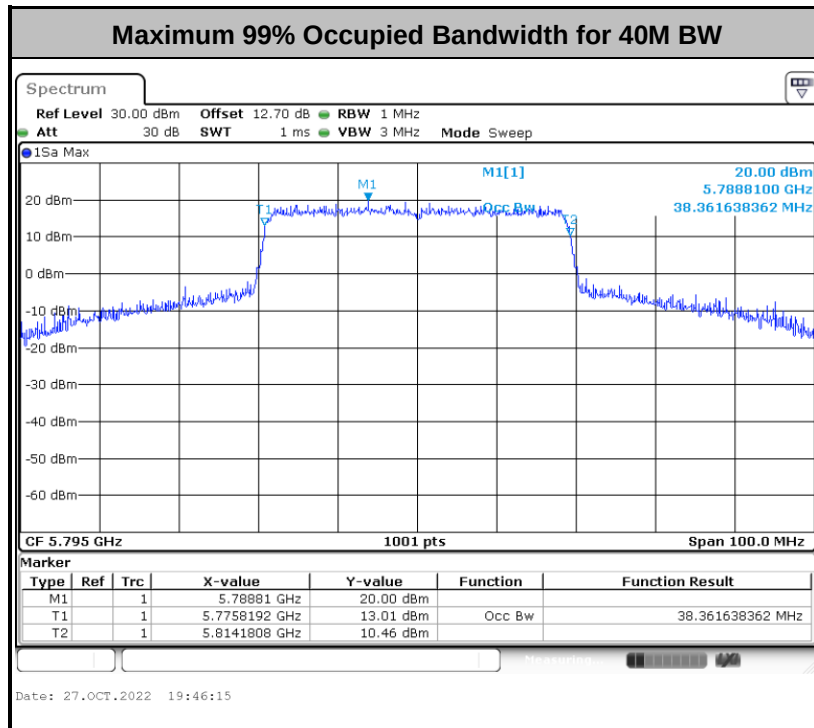
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<SDM 4S4T Mode>





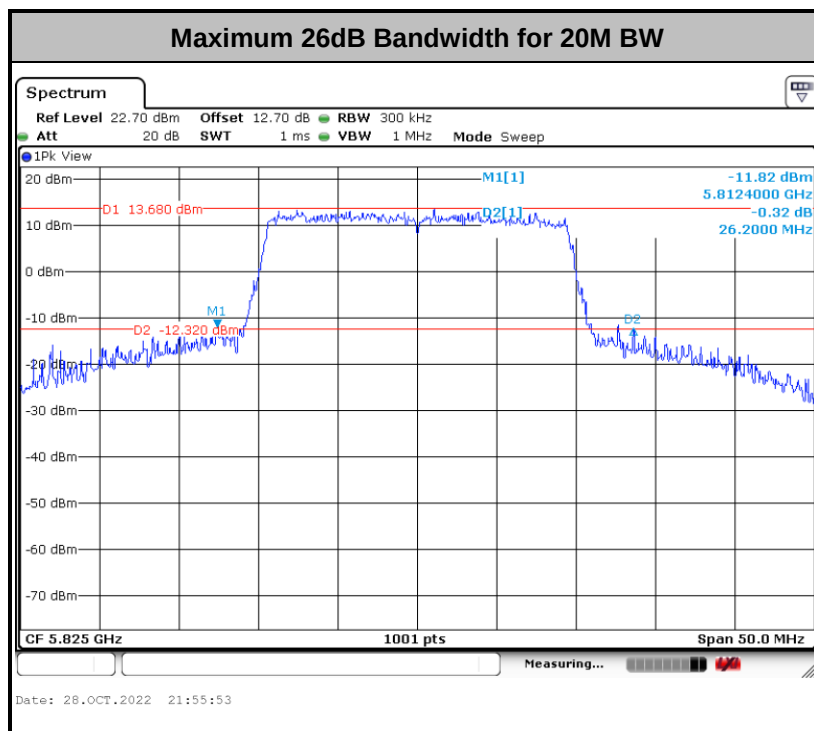
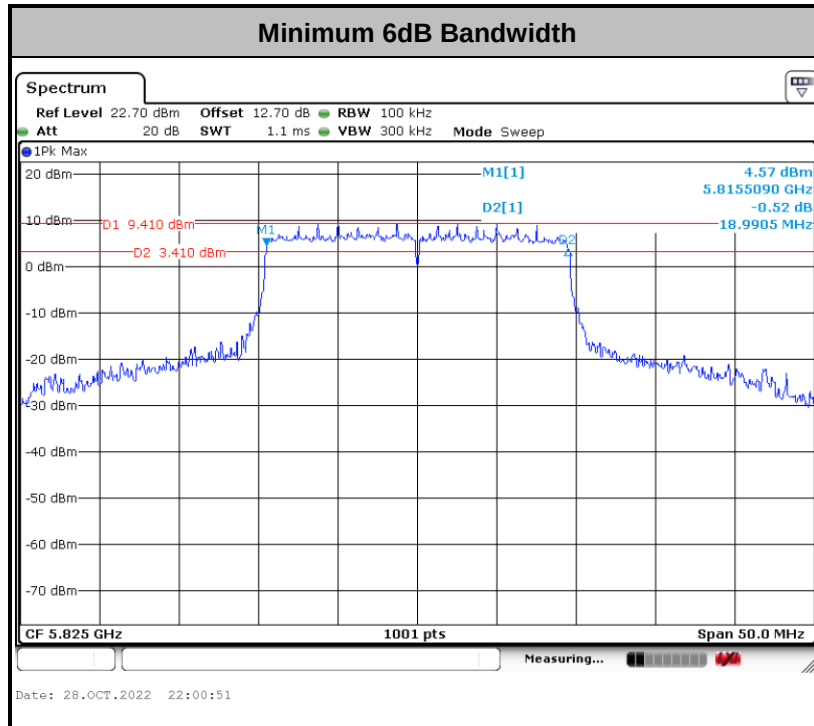


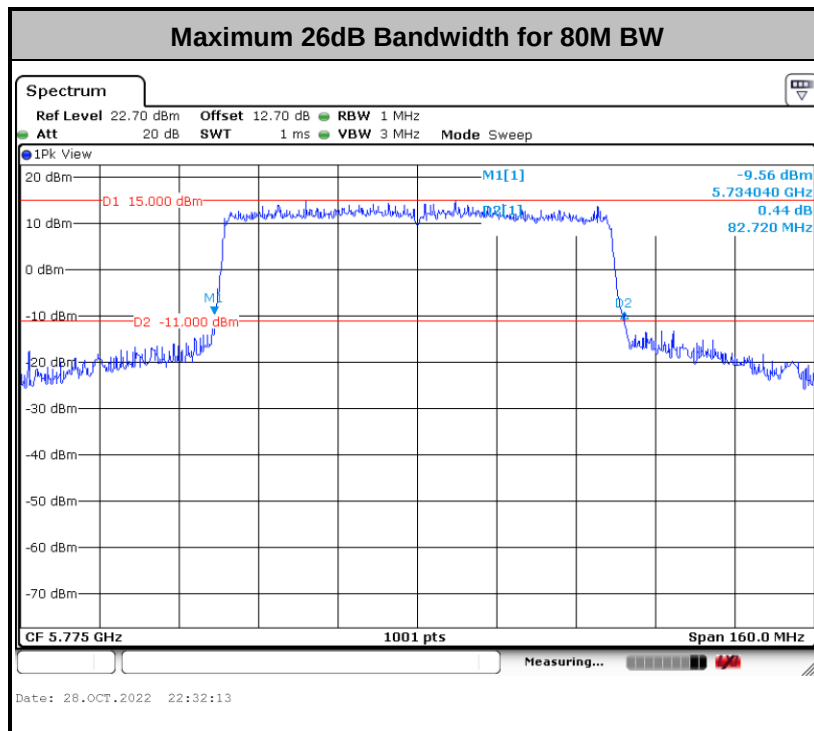
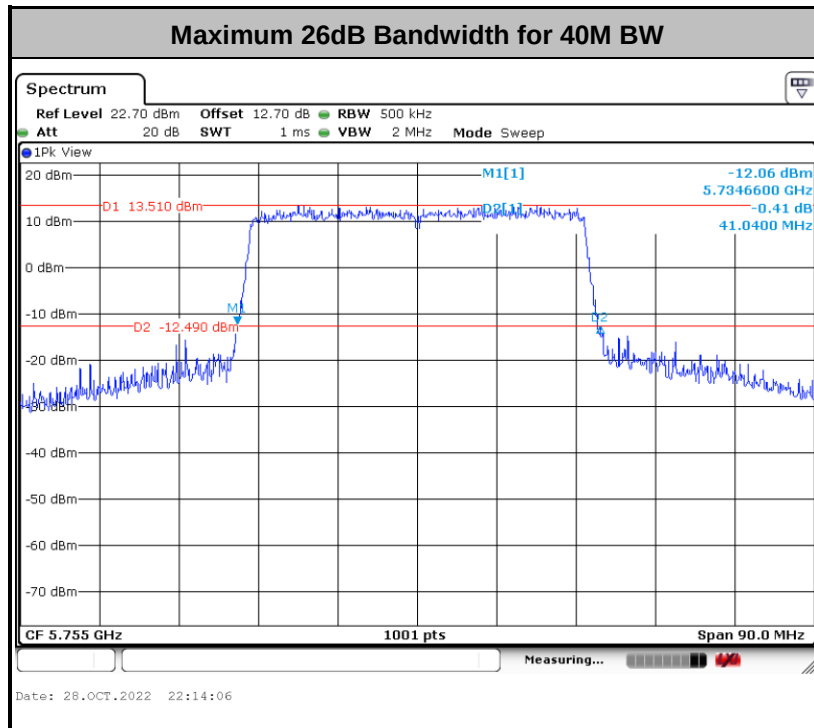


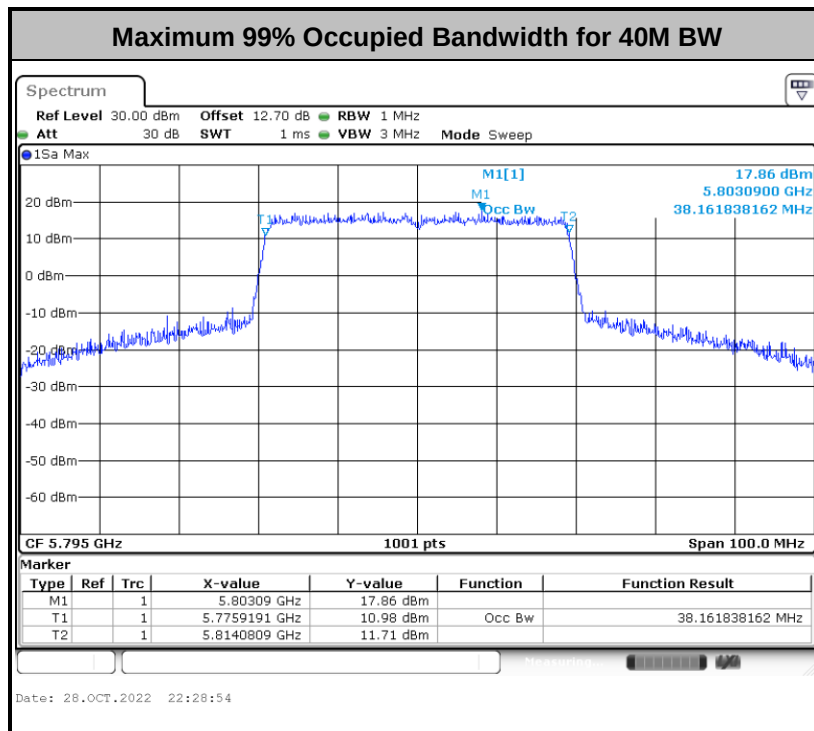
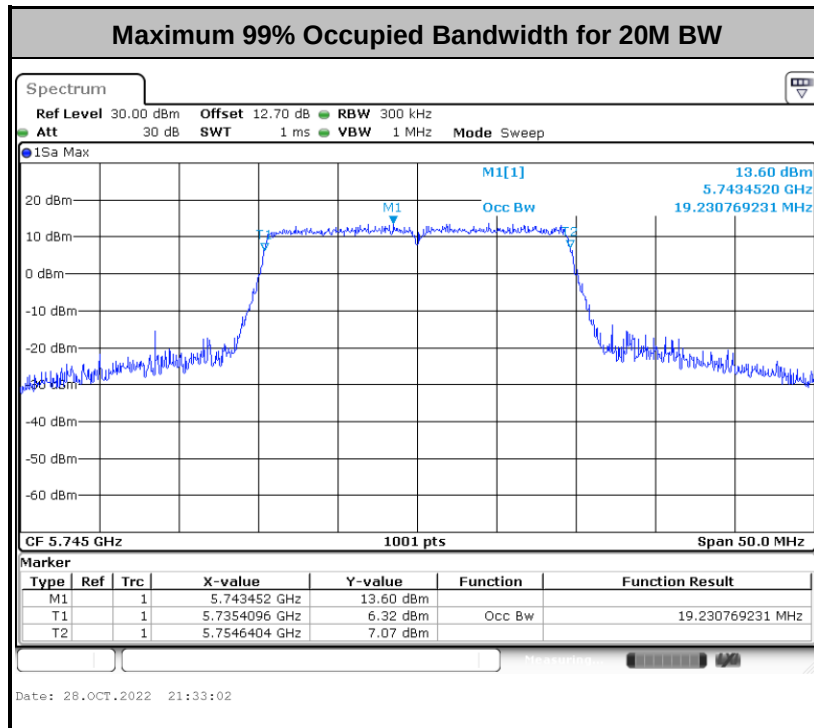
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

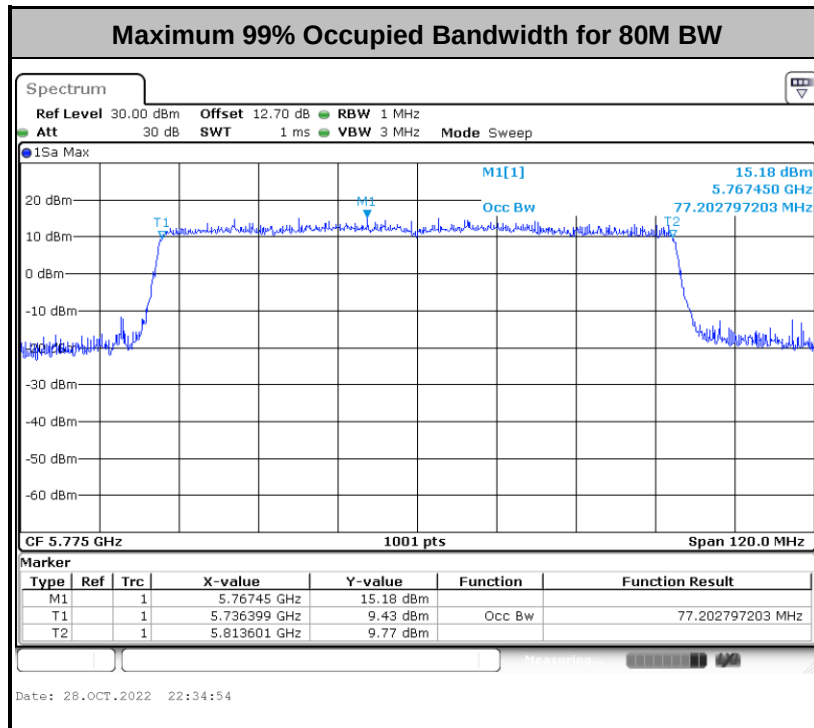


<TX BF 1S4T Modes>









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.

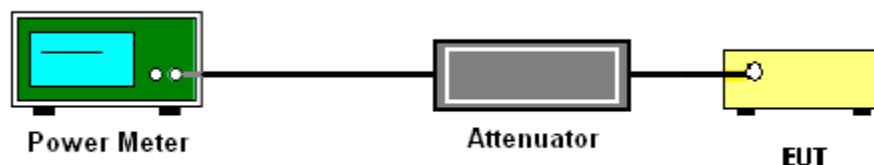
3.2.3 Test Procedures

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).

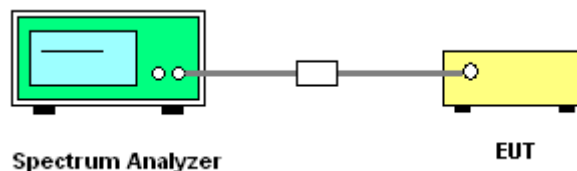
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500KHz (or 300 kHz if the SA can't set RBW=500KHz).
- Set VBW $\geq$ 1 MHz.
- Number of points in sweep $\geq$ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- If the SA can't set RBW=500KHz, then 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.

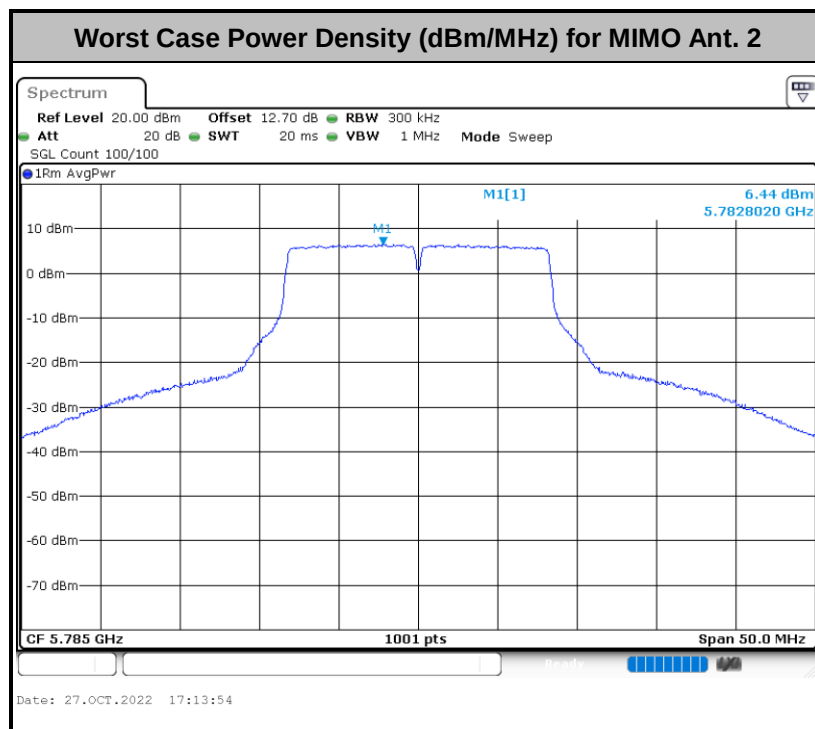
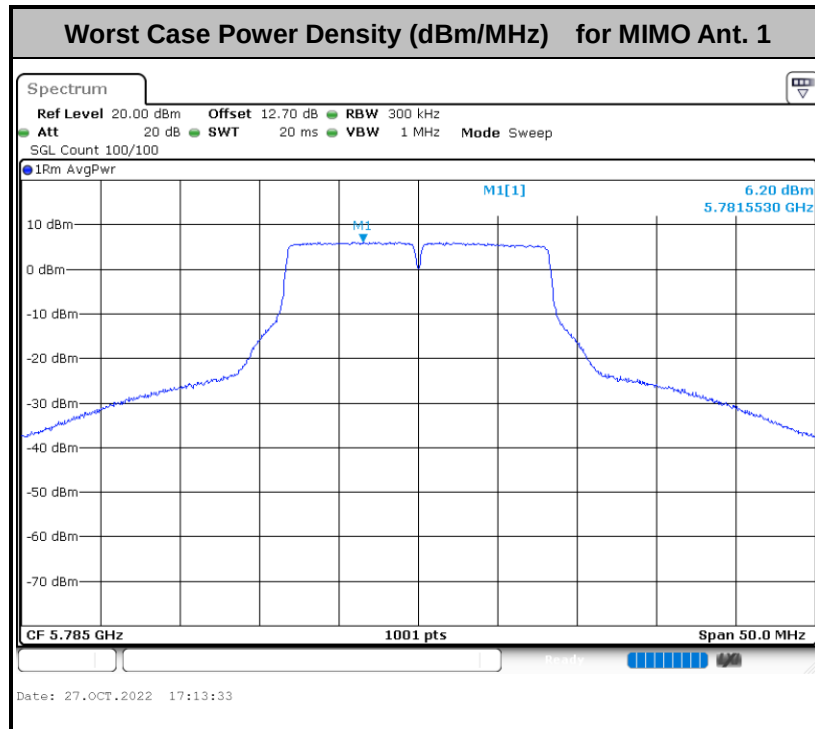
3.3.4 Test Setup

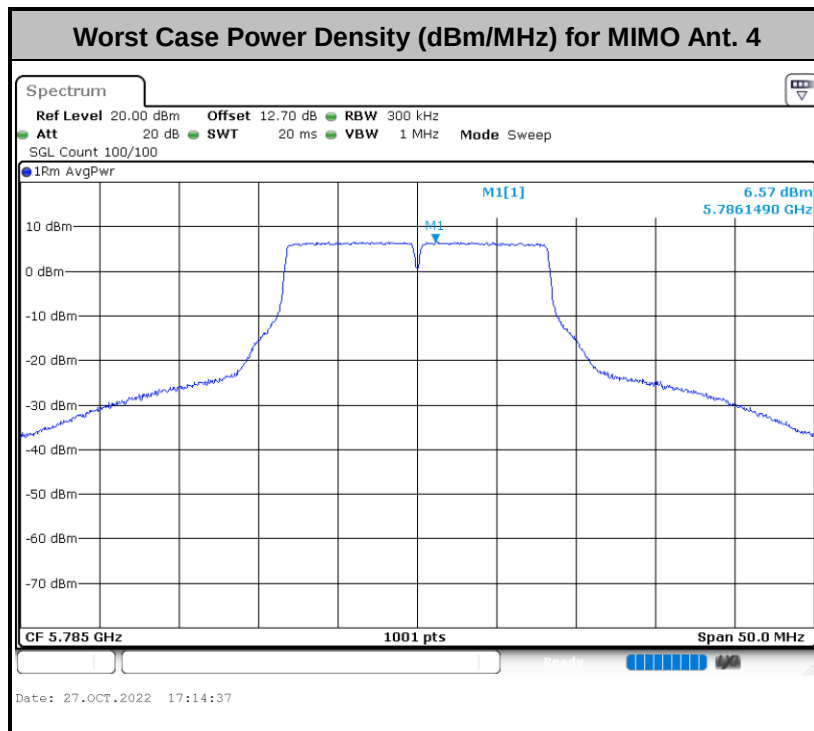
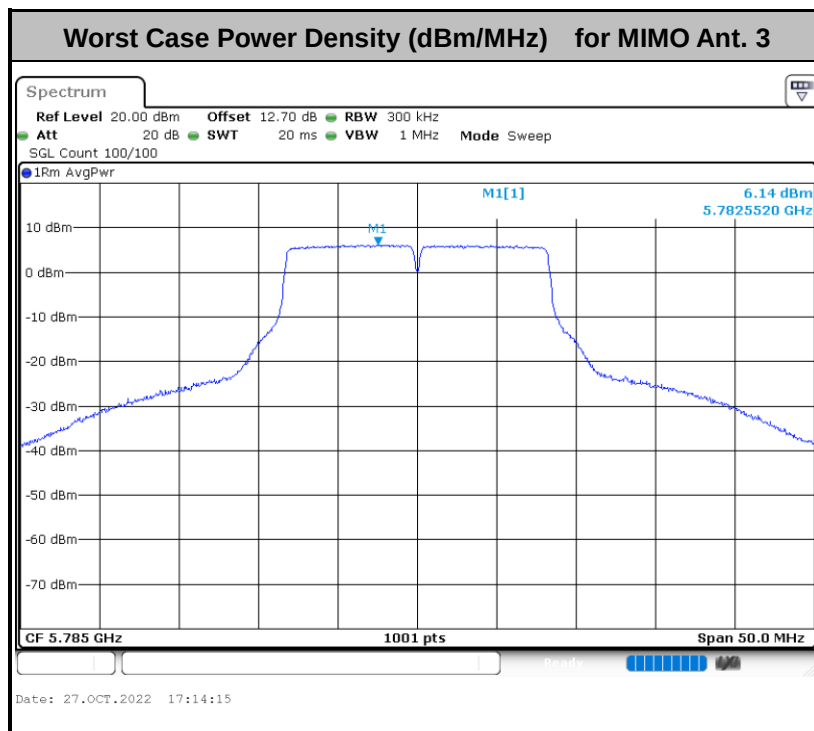


3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

<CDD 1S4T Modes>

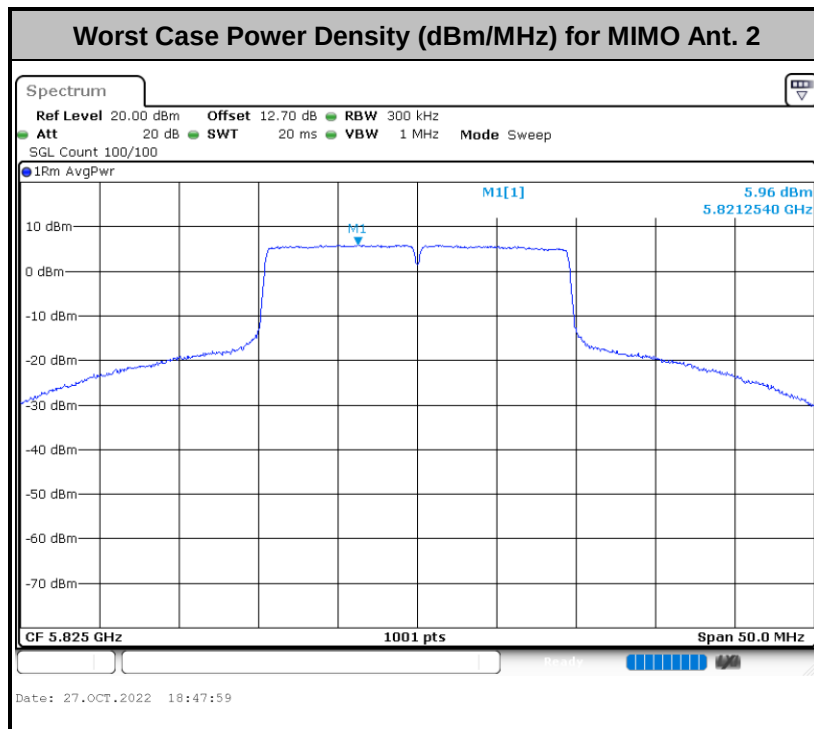
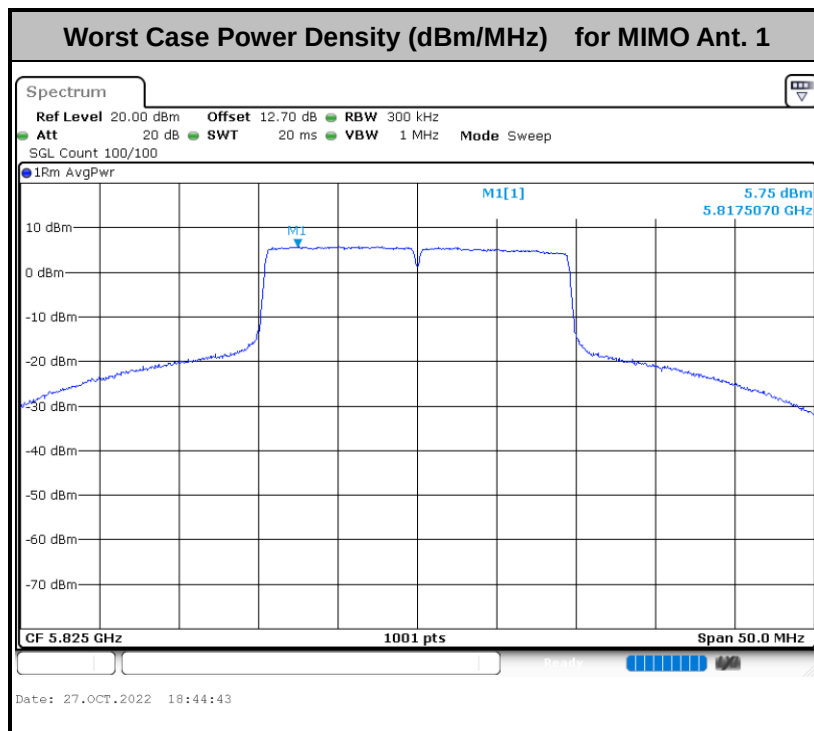


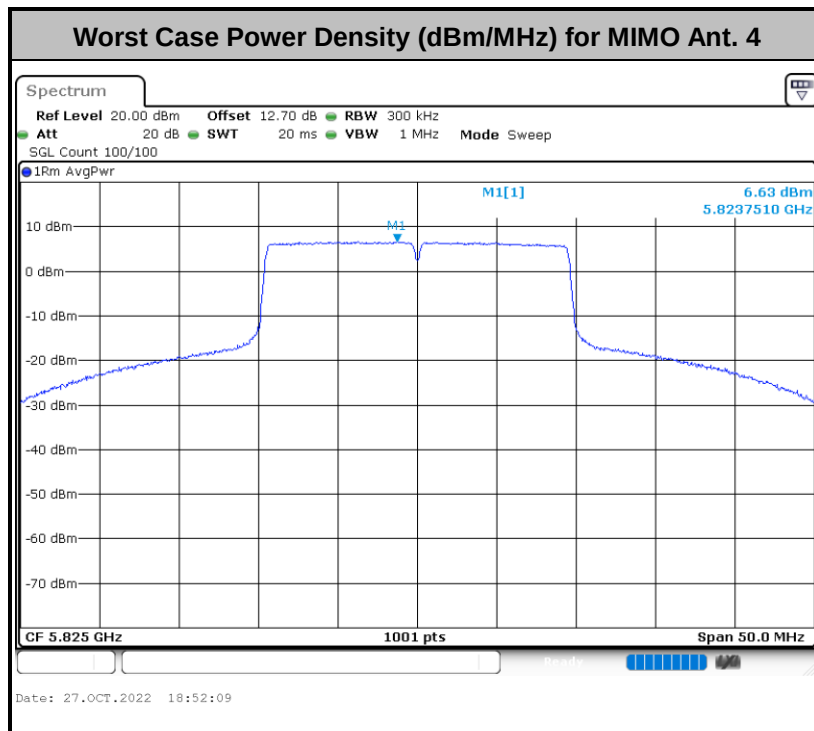
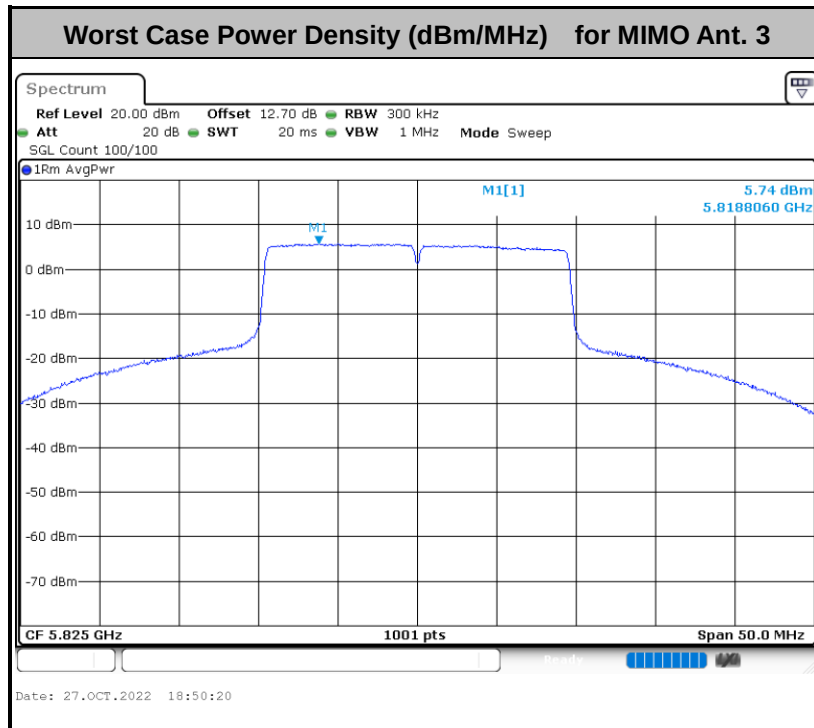


Note: Average Power Density (dB) = Measured value+ Duty Factor



<SDM 4S4T Modes>

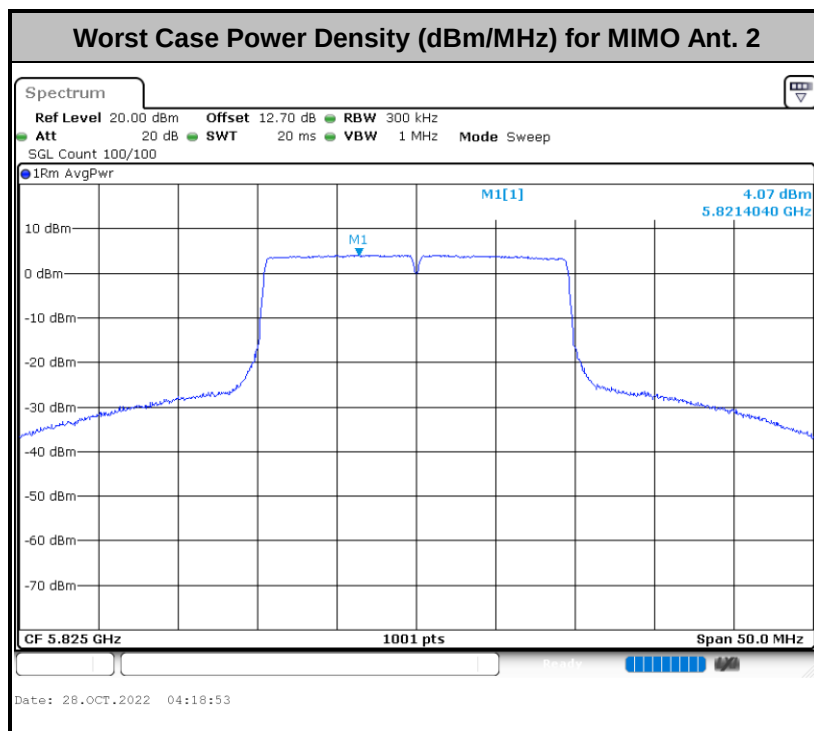
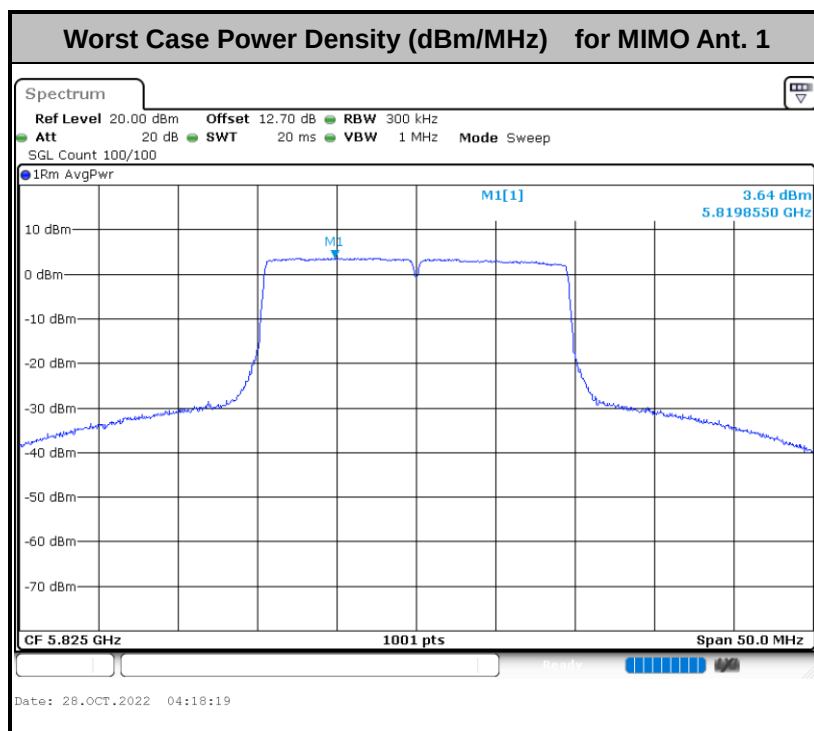


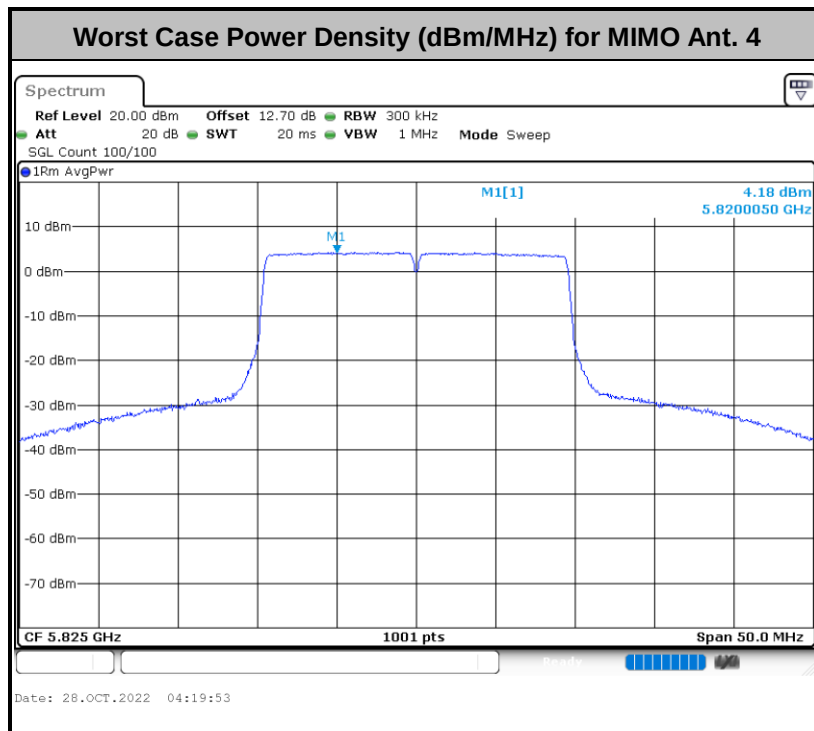
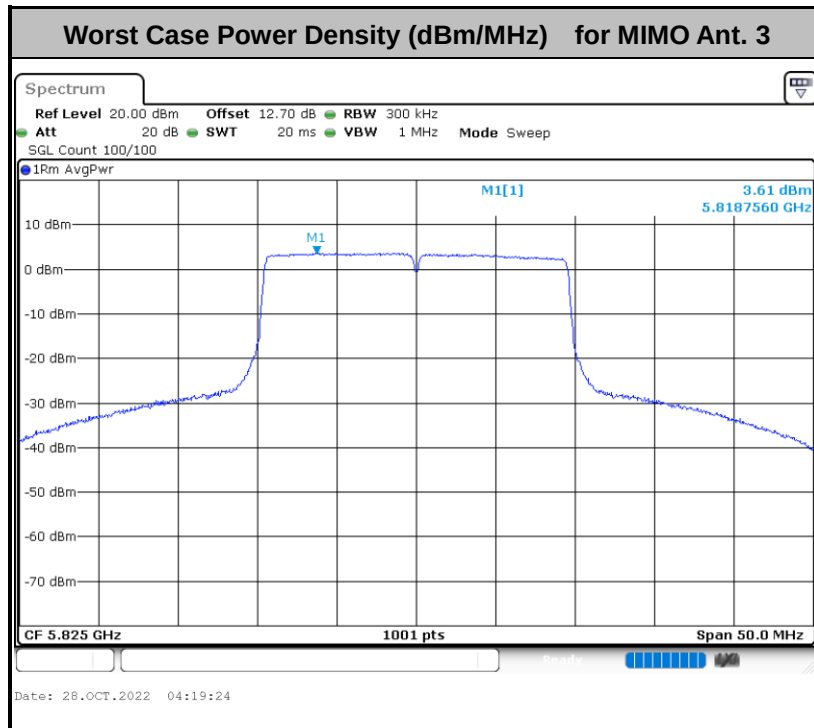


Note: Average Power Density (dB) = Measured value+ Duty Factor



<TX BF 1S4T Modes>





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.

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

where

EIRP is the equivalent isotropically radiated power, in dBm

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

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

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

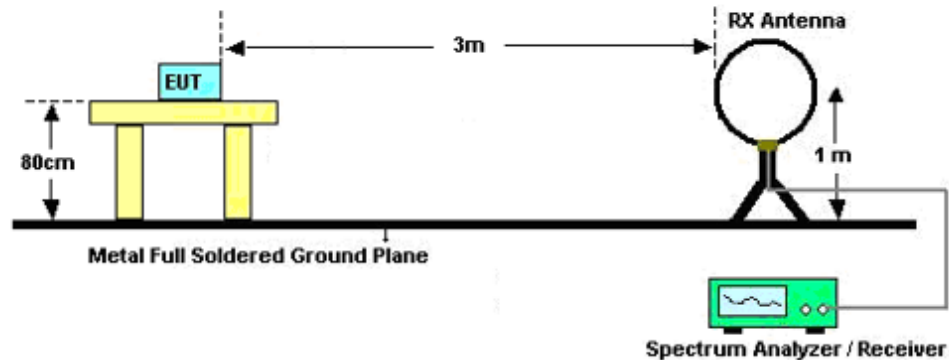
3.4.3 Test Procedures

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

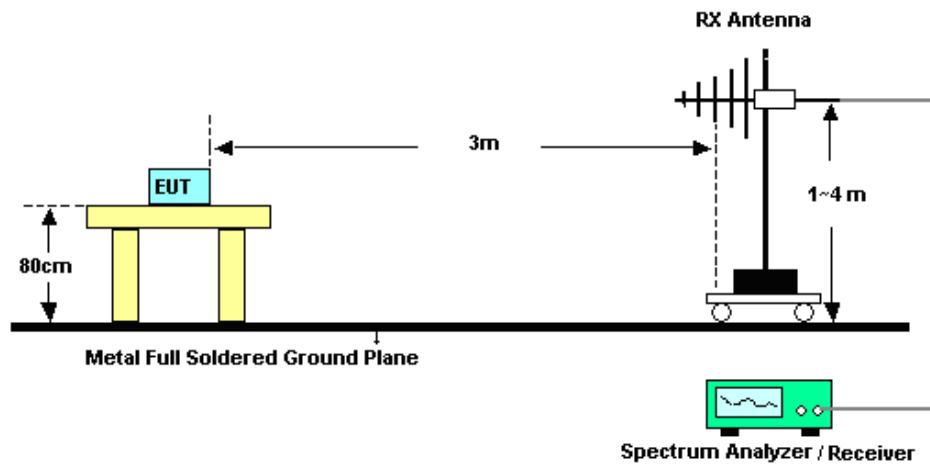
3.4.4 Test Setup

For radiated emissions below 30MHz

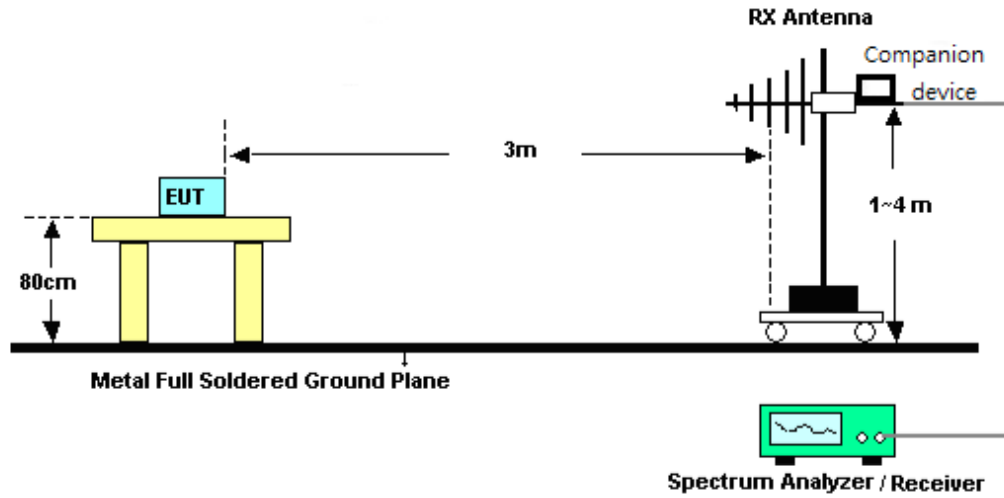


For radiated emissions from 30MHz to 1GHz

<CDD Mode>

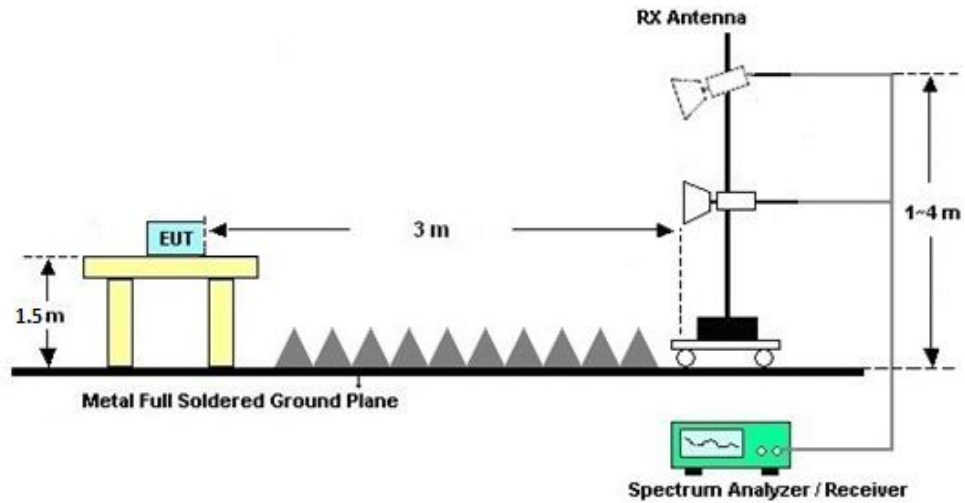


<TXBF Modes>

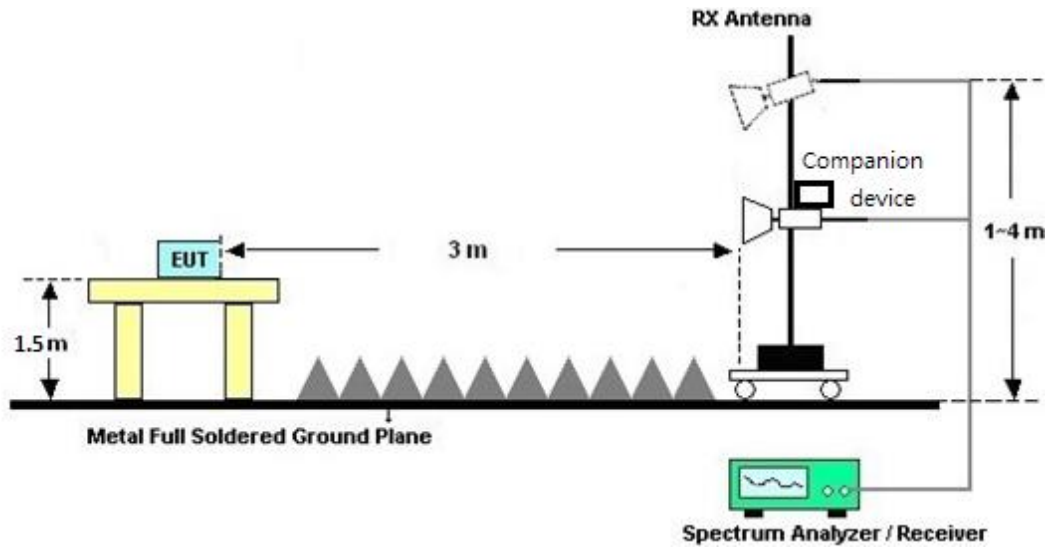


For radiated emissions above 1GHz

<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.

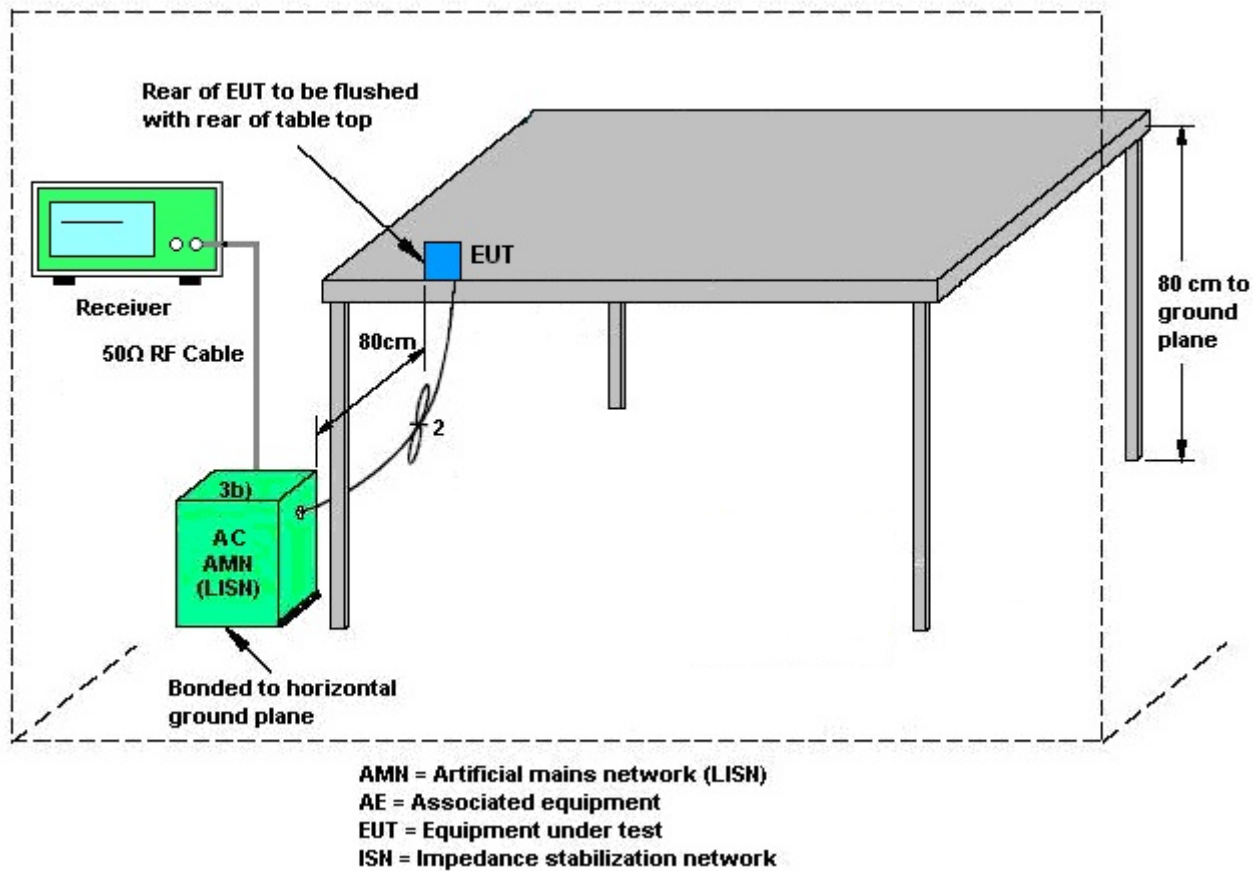
3.5.2 Measuring Instruments

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

<CDD Modes >

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 spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

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

The EUT supports CDD for 802.11b/g/n/ac/ax modes

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii).

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$ dBi

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi

<For TXBF Mode>

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For TXBF transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;

G_k is the gain in dBi of the k th antenna.

The EUT supports beamforming for 802.11n/ac/ax modes.

The directional gain calculation is following F)2)e)ii).

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

<For SDM Mode>

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)d)ii)

Directional gain = $10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_{N_{ANT}}/10})/N_{ANT}]$ dBi

The EUT supports SDM for 802.11n/ac/ax modes.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi

The directional gain “DG” is as following table.

Frequency Band	Max Single Antenna gain (dBi)				CDD DG (dBi)		TXBF DG (dBi)		SDM DG (dBi)	
	ANT1	ANT2	ANT3	ANT4	For Power	For PSD	For Power	For PSD	For Power	For PSD
5GHz UNII-3	3.08	3.58	4.51	3.73	4.51	8.14	8.14	8.14	2.14	2.14

Note:

1. Please refer to the antenna report for the maximum Single antenna gain and CDD (Cyclic Delay Diversity) directional gain and TXBF (Tx Beamforming) directional gain and SDM (Space Division Multiplexing) directional gain.
2. The device supports 1S4T(CDD&TXBF) and 4S4T(SDM) mode;
1S4T: NSS=1, MIMO 4Tx; 4S4T: NSS=4, MIMO 4Tx



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 07, 2022	Oct. 27, 2022~ Oct. 28, 2022	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Oct. 27, 2022~ Oct. 28, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Oct. 27, 2022~ Oct. 28, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
EMI Test Receiver	Keysight	N9038A	MY564000 04	3Hz~8.5GHz;Max 30dBm	Oct. 13, 2022	Dec. 05, 2022~ Dec. 07, 2022	Oct. 12, 2023	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 44	10Hz~44G,MAX 30dB	Mar. 24, 2022	Dec. 05, 2022~ Dec. 07, 2022	Mar. 23, 2023	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Dec. 05, 2022~ Dec. 07, 2022	Oct. 15, 2023	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz~1GHz	May 24, 2022	Dec. 05, 2022~ Dec. 07, 2022	May 23, 2023	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218642	1GHz~18GHz	Apr. 18, 2022	Dec. 05, 2022~ Dec. 07, 2022	Apr. 17, 2023	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Dec. 05, 2022~ Dec. 07, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	380826	9KHz~1GHz	Jul. 11, 2022	Dec. 05, 2022~ Dec. 07, 2022	Jul. 10, 2023	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 05, 2022	Dec. 05, 2022~ Dec. 07, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
high gain Amplifier	EM	EM01G18GA	060839	1Ghz~18Ghz	Oct. 12, 2022	Dec. 05, 2022~ Dec. 07, 2022	Oct. 11, 2023	Radiation (03CH05-KS)
Amplifier	EM	EM01G18GA	060833	1Ghz~18Ghz	Jan. 05, 2022	Dec. 05, 2022~ Dec. 07, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Dec. 05, 2022~ Dec. 07, 2022	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 05, 2022~ Dec. 07, 2022	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 05, 2022~ Dec. 07, 2022	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 24, 2022	Nov. 23, 2022	May 23, 2023	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2022	Nov. 23, 2022	Oct. 12, 2023	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 24, 2022	Nov. 23, 2022	May 23, 2023	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2022	Nov. 23, 2022	Oct. 11, 2023	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 Measurement

Test Item	Uncertainty
Conducted Power	±1.34 dB
Conducted Emissions	±1.34 dB
Occupied Channel Bandwidth	±0.13 %
Conducted Power Spectral Density	±1.32 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.78dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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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 : FR2O1817C

Test Engineer:	Zhang Xue Yi	Temperature:	21~25	°C
Test Date:	2022/10/27~2022/10/28	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% OBW

UNII-3																		
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26dB Bandwidth (MHz)				6 dB Bandwidth (MHz)				99% 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	Ant 1	Ant 2	Ant 3	Ant 4		
11a	6Mbps	4	149	5745	25.70	27.75	25.85	25.70	16.39	16.39	16.39	16.39	17.38	17.33	17.23	17.23	0.5	Pass
11a	6Mbps	4	157	5785	27.65	29.25	28.80	27.10	16.34	16.34	16.34	16.29	17.68	17.83	17.63	17.58	0.5	Pass
11a	6Mbps	4	165	5825	36.90	36.90	36.40	36.35	16.29	16.39	16.29	16.34	19.03	19.08	19.03	18.83	0.5	Pass
HE20	MCS0	4	149	5745	24.30	22.30	23.50	22.65	18.99	18.99	18.99	18.99	19.28	19.28	19.33	19.28	0.5	Pass
HE20	MCS0	4	157	5785	29.25	28.85	29.85	30.20	18.99	18.99	19.04	18.94	19.43	19.48	19.43	19.38	0.5	Pass
HE20	MCS0	4	165	5825	32.65	35.85	36.90	36.55	18.94	18.99	18.99	19.04	19.73	19.68	19.78	19.68	0.5	Pass
HE40	MCS0	4	151	5755	41.13	47.79	40.95	45.27	38.05	37.87	38.05	37.96	38.16	38.26	38.16	38.26	0.5	Pass
HE40	MCS0	4	159	5795	47.79	50.58	56.07	55.71	37.96	37.78	38.05	37.96	38.26	38.36	38.36	38.36	0.5	Pass
HE80	MCS0	4	155	5775	84.00	85.60	81.92	83.20	77.56	77.72	77.72	77.72	77.32	77.44	77.32	77.44	0.5	Pass

TEST RESULTS DATA
Average Power Table

UNII-3															
Mod.	Data Rate	NTx	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	
HT20	MCS0	4	149	5745	23.04	23.32	23.28	23.48	29.30	30.00	4.51				Pass
HT20	MCS0	4	157	5785	23.21	23.37	23.43	23.69	29.45	30.00	4.51				Pass
HT20	MCS0	4	165	5825	23.26	23.26	23.00	23.77	29.35	30.00	4.51				Pass
HT40	MCS0	4	151	5755	23.02	23.41	23.30	23.66	29.37	30.00	4.51				Pass
HT40	MCS0	4	159	5795	22.84	23.21	23.14	23.73	29.26	30.00	4.51				Pass
VHT20	MCS0	4	149	5745	22.92	23.20	23.17	23.36	29.19	30.00	4.51				Pass
VHT20	MCS0	4	157	5785	23.09	23.25	23.32	23.57	29.34	30.00	4.51				Pass
VHT20	MCS0	4	165	5825	23.22	23.19	22.87	23.70	29.28	30.00	4.51				Pass
VHT40	MCS0	4	151	5755	22.89	23.30	23.21	23.55	29.26	30.00	4.51				Pass
VHT40	MCS0	4	159	5795	22.71	23.10	23.05	23.62	29.15	30.00	4.51				Pass
VHT80	MCS0	4	155	5775	22.44	22.23	22.24	22.51	28.38	30.00	4.51				Pass

Setting
22
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22.5
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22
23
24
22.5
23
22

TEST RESULTS DATA
Average Power Table

UNII-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	22.96	23.18	23.28	23.39	29.23	30.00	4.51				Pass
11a	6Mbps	4	157	5785	23.21	23.42	23.41	23.67	29.45	30.00	4.51				Pass
11a	6Mbps	4	165	5825	23.19	23.31	22.90	23.88	29.36	30.00	4.51				Pass
HE20	MCS0	4	149	5745	23.21	23.49	23.42	23.61	29.46	30.00	4.51				Pass
HE20	MCS0	4	157	5785	23.30	23.44	23.47	23.64	29.49	30.00	4.51				Pass
HE20	MCS0	4	165	5825	23.28	23.45	23.20	23.91	29.49	30.00	4.51				Pass
HE40	MCS0	4	151	5755	23.20	23.54	23.42	23.72	29.49	30.00	4.51				Pass
HE40	MCS0	4	159	5795	23.02	23.39	23.34	23.91	29.44	30.00	4.51				Pass
HE80	MCS0	4	155	5775	23.06	22.98	22.96	23.09	29.04	30.00	4.51				Pass

Setting
22
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22.5
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22

TEST RESULTS DATA
Power Spectral Density

UNII-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	8.35	8.65	8.81	8.29	14.83	27.86	8.14				Pass
11a	6Mbps	4	157	5785	8.65	8.89	8.59	9.00	15.02	27.86	8.14				Pass
11a	6Mbps	4	165	5825	8.07	8.52	8.50	8.69	14.71	27.86	8.14				Pass
HE20	MCS0	4	149	5745	7.88	8.39	8.28	8.38	14.41	27.86	8.14				Pass
HE20	MCS0	4	157	5785	8.36	8.69	8.37	8.67	14.71	27.86	8.14				Pass
HE20	MCS0	4	165	5825	8.07	8.28	8.04	8.93	14.95	27.86	8.14				Pass
HE40	MCS0	4	151	5755	4.86	5.56	5.56	5.58	11.60	27.86	8.14				Pass
HE40	MCS0	4	159	5795	5.23	5.23	5.42	5.86	11.88	27.86	8.14				Pass
HE80	MCS0	4	155	5775	2.38	2.51	2.33	2.60	8.62	27.86	8.14				Pass

TEST RESULTS DATA
6dB and 99% OBW

UNII-3																		
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26dB Bandwidth (MHz)				6 dB Bandwidth (MHz)				99% 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	Ant 1	Ant 2	Ant 3	Ant 4		
HE20	MCS0	4	149	5745	24.30	22.30	23.50	22.65	18.99	18.99	18.99	18.99	19.28	19.28	19.33	19.28	0.5	Pass
HE20	MCS0	4	157	5785	29.25	28.85	29.85	30.20	18.99	18.99	19.04	18.94	19.43	19.48	19.43	19.38	0.5	Pass
HE20	MCS0	4	165	5825	32.65	35.85	36.90	36.55	18.94	18.99	18.99	19.04	19.73	19.68	19.78	19.68	0.5	Pass
HE40	MCS0	4	151	5755	41.13	47.79	40.95	45.27	38.05	37.87	38.05	37.96	38.16	38.26	38.16	38.26	0.5	Pass
HE40	MCS0	4	159	5795	47.79	50.58	56.07	55.71	37.96	37.78	38.05	37.96	38.26	38.36	38.36	38.36	0.5	Pass
HE80	MCS0	4	155	5775	84.00	85.60	81.92	83.20	77.56	77.72	77.72	77.72	77.32	77.44	77.32	77.44	0.5	Pass

TEST RESULTS DATA
Average Power Table

UNII-3															
Mod.	Data Rate	NTx	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	
HT20	MCS0	4	149	5745	23.04	23.32	23.28	23.48	29.30	30.00	2.14				Pass
HT20	MCS0	4	157	5785	23.21	23.37	23.43	23.69	29.45	30.00	2.14				Pass
HT20	MCS0	4	165	5825	23.26	23.26	23.00	23.77	29.35	30.00	2.14				Pass
HT40	MCS0	4	151	5755	23.02	23.41	23.30	23.66	29.37	30.00	2.14				Pass
HT40	MCS0	4	159	5795	22.84	23.21	23.14	23.73	29.26	30.00	2.14				Pass
VHT20	MCS0	4	149	5745	22.92	23.20	23.17	23.36	29.19	30.00	2.14				Pass
VHT20	MCS0	4	157	5785	23.09	23.25	23.32	23.57	29.34	30.00	2.14				Pass
VHT20	MCS0	4	165	5825	23.22	23.19	22.87	23.70	29.28	30.00	2.14				Pass
VHT40	MCS0	4	151	5755	22.89	23.30	23.21	23.55	29.26	30.00	2.14				Pass
VHT40	MCS0	4	159	5795	22.71	23.10	23.05	23.62	29.15	30.00	2.14				Pass
VHT80	MCS0	4	155	5775	22.44	22.23	22.24	22.51	28.38	30.00	2.14				Pass

Setting
22
23
24
22.5
23
22
23
24
22.5
23
22

TEST RESULTS DATA
Average Power Table

UNII-3															Setting	
Mod.	Data Rate	NTX	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		
HE20	MCS0	4	149	5745	23.21	23.49	23.42	23.61	29.46	30.00	2.14				Pass	22
HE20	MCS0	4	157	5785	23.30	23.44	23.47	23.64	29.49	30.00	2.14				Pass	23
HE20	MCS0	4	165	5825	23.28	23.45	23.20	23.91	29.49	30.00	2.14				Pass	24
HE40	MCS0	4	151	5755	23.20	23.54	23.42	23.72	29.49	30.00	2.14				Pass	22.5
HE40	MCS0	4	159	5795	23.02	23.39	23.34	23.91	29.44	30.00	2.14				Pass	23
HE80	MCS0	4	155	5775	23.06	22.98	22.96	23.09	29.04	30.00	2.14				Pass	22

TEST RESULTS DATA
Power Spectral Density

UNII-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	
HE20	MCS0	4	149	5745	7.88	8.39	8.28	8.38	14.41	30.00	2.14				Pass
HE20	MCS0	4	157	5785	8.36	8.69	8.37	8.67	14.71	30.00	2.14				Pass
HE20	MCS0	4	165	5825	8.07	8.28	8.04	8.93	14.95	30.00	2.14				Pass
HE40	MCS0	4	151	5755	4.86	5.56	5.56	5.58	11.60	30.00	2.14				Pass
HE40	MCS0	4	159	5795	5.23	5.23	5.42	5.86	11.88	30.00	2.14				Pass
HE80	MCS0	4	155	5775	2.38	2.51	2.33	2.60	8.62	30.00	2.14				Pass

TEST RESULTS DATA
6dB and 99% OBW

UNII-3																		
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26dB Bandwidth (MHz)				6 dB Bandwidth (MHz)				99% 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	Ant 1	Ant 2	Ant 3	Ant 4		
HE20	MCS0	4	149	5745	21.85	21.75	21.85	21.70	19.09	19.04	19.04	19.04	19.23	19.18	19.13	19.18	0.5	Pass
HE20	MCS0	4	157	5785	21.95	21.95	21.95	21.65	19.04	19.04	19.14	19.04	19.18	19.18	19.23	19.18	0.5	Pass
HE20	MCS0	4	165	5825	26.20	25.95	24.65	24.05	19.04	18.99	19.04	19.04	19.23	19.18	19.23	19.23	0.5	Pass
HE40	MCS0	4	151	5755	41.04	40.59	40.77	40.68	37.96	37.96	38.05	37.96	37.96	37.96	38.06	37.96	0.5	Pass
HE40	MCS0	4	159	5795	40.77	40.68	40.68	40.50	38.05	37.96	37.96	37.96	38.06	37.96	38.16	38.06	0.5	Pass
HE80	MCS0	4	155	5775	82.72	82.08	81.92	81.76	78.04	77.88	77.88	78.04	77.20	77.20	77.20	77.20	0.5	Pass

TEST RESULTS DATA
Average Power Table

UNII-3																
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)					FCC Conducted Power Limit (dBm)	DG (dBi)				Pass/ Fail	Setting
					Ant 1	Ant 2	Ant 3	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4		
HT20	MCS0	4	149	5745	20.86	21.41	21.29	21.40	27.27	27.86	8.14				Pass	20
HT20	MCS0	4	157	5785	20.76	21.38	21.12	21.52	27.23	27.86	8.14				Pass	20.5
HT20	MCS0	4	165	5825	20.69	21.56	20.96	21.62	27.25	27.86	8.14				Pass	21.5
HT40	MCS0	4	151	5755	20.59	20.89	20.95	21.12	26.91	27.86	8.14				Pass	20
HT40	MCS0	4	159	5795	20.69	20.91	20.91	21.22	26.95	27.86	8.14				Pass	20.5
VHT20	MCS0	4	149	5745	20.81	21.36	21.26	21.34	27.22	27.86	8.14				Pass	20
VHT20	MCS0	4	157	5785	20.71	21.31	21.08	21.47	27.18	27.86	8.14				Pass	20.5
VHT20	MCS0	4	165	5825	20.65	21.52	20.92	21.58	27.21	27.86	8.14				Pass	21.5
VHT40	MCS0	4	151	5755	20.51	20.85	20.93	21.08	26.87	27.86	8.14				Pass	20
VHT40	MCS0	4	159	5795	20.64	20.89	20.89	21.15	26.92	27.86	8.14				Pass	20.5
VHT80	MCS0	4	155	5775	21.13	21.16	21.12	21.23	27.18	27.86	8.14				Pass	20.5

TEST RESULTS DATA
Average Power Table

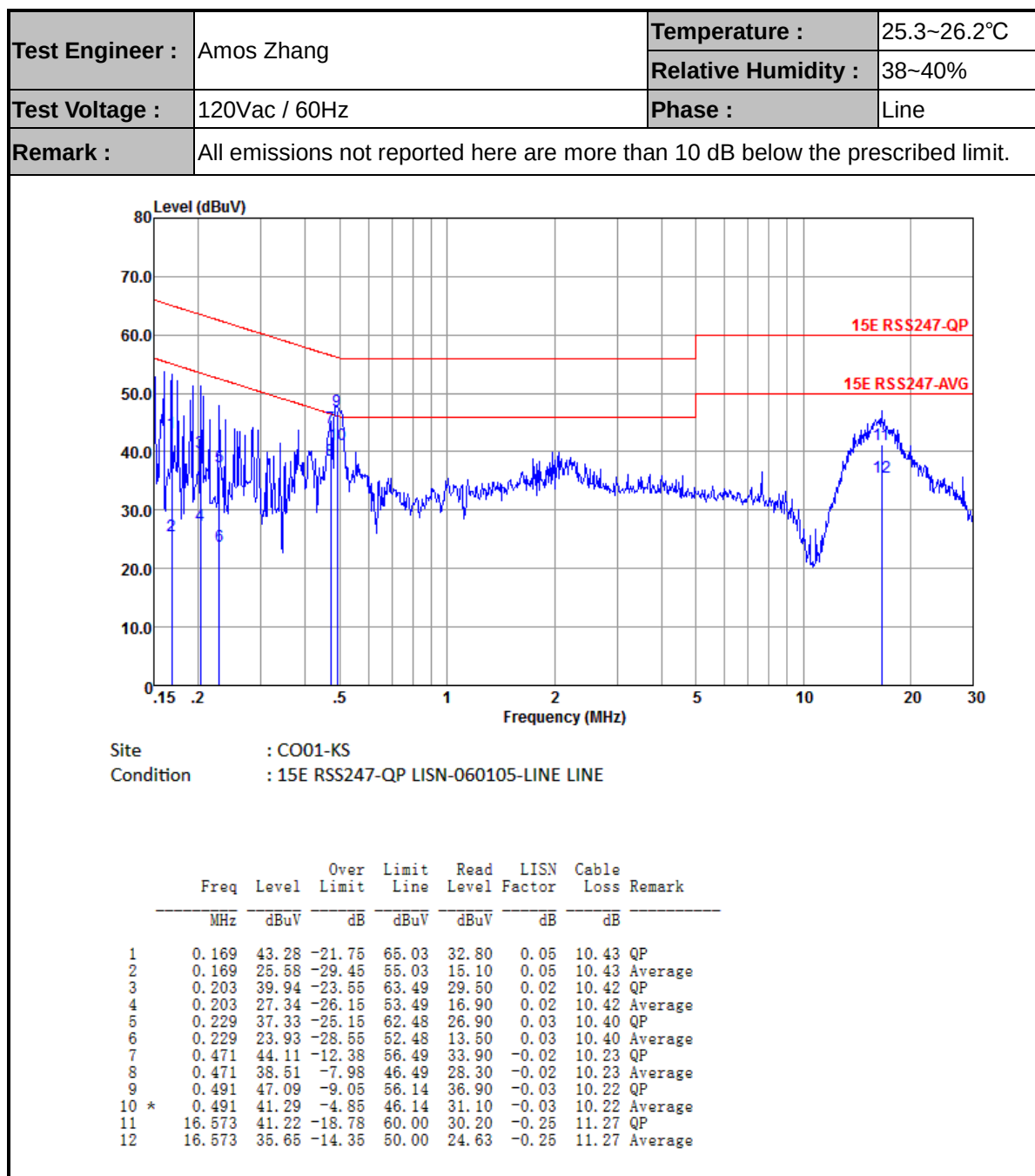
UNII-3																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)					FCC Conducted Power Limit (dBm)	DG (dBi)				Pass/ Fail	Setting
					Ant 1	Ant 2	Ant 3	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4		
HE20	MCS0	4	149	5745	20.96	21.52	21.344	21.46	27.35	27.86	8.14				Pass	20
HE20	MCS0	4	157	5785	20.89	21.46	21.184	21.58	27.31	27.86	8.14				Pass	20.5
HE20	MCS0	4	165	5825	20.83	21.65	21.014	21.74	27.35	27.86	8.14				Pass	21.5
HE40	MCS0	4	151	5755	20.72	20.99	21.078	21.24	27.03	27.86	8.14				Pass	20
HE40	MCS0	4	159	5795	20.78	21.04	21.058	21.30	27.07	27.86	8.14				Pass	20.5
HE80	MCS0	4	155	5775	21.26	21.30	21.27	21.44	27.34	27.86	8.14				Pass	20.5

TEST RESULTS DATA
Power Spectral Density

UNII-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	
HE20	MCS0	4	149	5745	5.75	6.42	6.26	6.37	12.44	27.86	8.14				Pass
HE20	MCS0	4	157	5785	5.96	6.45	6.20	6.37	12.47	27.86	8.14				Pass
HE20	MCS0	4	165	5825	5.96	6.39	5.91	6.48	12.50	27.86	8.14				Pass
HE40	MCS0	4	151	5755	2.77	3.26	3.22	3.36	9.38	27.86	8.14				Pass
HE40	MCS0	4	159	5795	2.77	3.22	3.23	3.33	9.35	27.86	8.14				Pass
HE80	MCS0	4	155	5775	0.81	0.92	0.82	0.86	6.94	27.86	8.14				Pass

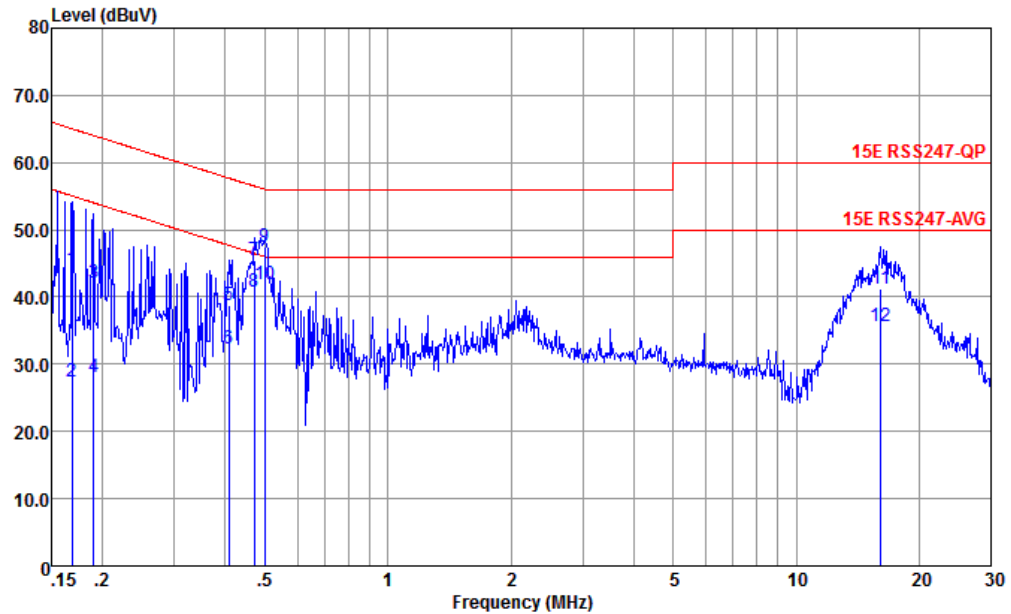


Appendix B. AC Conducted Emission Test Results





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



Site : CO01-KS
Condition : 15E RSS247-QP LISN-060105-NEUTRAL NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.169	44.06	-20.97	65.03	33.59	0.04	10.43	QP
2	0.169	27.36	-27.67	55.03	16.89	0.04	10.43	Average
3	0.190	42.07	-21.95	64.02	31.60	0.05	10.42	QP
4	0.190	27.97	-26.05	54.02	17.50	0.05	10.42	Average
5	0.408	38.82	-18.86	57.68	28.60	-0.07	10.29	QP
6	0.408	32.32	-15.36	47.68	22.10	-0.07	10.29	Average
7	0.471	45.36	-11.13	56.49	35.21	-0.08	10.23	QP
8	0.471	40.76	-5.73	46.49	30.61	-0.08	10.23	Average
9	0.499	47.43	-8.58	56.01	37.30	-0.08	10.21	QP
10 *	0.499	41.93	-4.08	46.01	31.80	-0.08	10.21	Average
11	16.140	41.25	-18.75	60.00	30.20	-0.21	11.26	QP
12	16.140	35.65	-14.35	50.00	24.60	-0.21	11.26	Average

Note:

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



Appendix C. Radiated Spurious Emission

Note: All modes had been tested and only the worst channel test data of each bandwidth shown in the report

<UNII-3 - 5725~5850MHz__CDD 1S4T>

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. CDD 1S4T	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz		5824	118.94	-	-	109.24	35.09	11.31	36.7	287	305	P	H
		5824	111.82	-	-	102.12	35.09	11.31	36.7	287	305	A	H
		5854	76.36	-36.82	113.18	66.64	35.13	11.33	36.74	287	305	P	H
		5856.4	74.51	-36	110.51	64.78	35.13	11.34	36.74	287	305	P	H
		5875.6	56.7	-48.15	104.85	46.94	35.16	11.36	36.76	287	305	P	H
		5934.8	50.08	-18.22	68.3	40.25	35.22	11.42	36.81	287	305	P	H
		5830	120.65	-	-	110.95	35.09	11.31	36.7	298	347	P	V
		5830	112.08	-	-	102.38	35.09	11.31	36.7	298	347	A	V
		5851.6	83	-35.65	118.65	73.28	35.11	11.33	36.72	298	347	P	V
		5856	77.32	-33.3	110.62	67.59	35.13	11.34	36.74	298	347	P	V
		5875.2	66.98	-38.17	105.15	57.22	35.16	11.36	36.76	298	347	P	V
		5928.8	51.42	-16.88	68.3	41.61	35.22	11.4	36.81	298	347	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)

WIFI Ant. CDD 1S4T	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz		11653	55.55	-18.45	74	67.14	38.29	16.46	66.34	303	254	P	H
		11653	49.08	-4.92	54	60.67	38.29	16.46	66.34	303	254	A	H
		17483	57.31	-10.99	68.3	60.29	41.51	20.33	64.82	300	0	P	H
		11642	55.7	-18.3	74	67.33	38.28	16.45	66.36	337	12	P	V
		11642	49.14	-4.86	54	60.77	38.28	16.45	66.36	337	12	A	V
		17472	56.97	-11.33	68.3	59.95	41.53	20.32	64.83	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 HE20_Full (Band Edge @ 3m)

WIFI Ant. CDD 1S4T	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 HE20 Full CH 149 5745MHz		5618.4	56.61	-11.69	68.3	47.23	34.84	11.03	36.49	297	306	P	H
		5699.6	67.29	-37.72	105.01	57.79	34.93	11.13	36.56	297	306	P	H
		5719.6	82.74	-28.05	110.79	73.21	34.97	11.16	36.6	297	306	P	H
		5724.4	88.79	-32.14	120.93	79.24	34.97	11.18	36.6	297	306	P	H
		5746	118.58	-	-	109	34.99	11.21	36.62	297	306	P	H
		5746	110.53	-	-	100.95	34.99	11.21	36.62	297	306	A	H
		5649.2	58.2	-10.1	68.3	48.76	34.87	11.08	36.51	286	0	P	V
		5700	68.69	-36.61	105.3	59.19	34.93	11.13	36.56	286	0	P	V
		5718.8	84.85	-25.71	110.56	75.32	34.97	11.16	36.6	286	0	P	V
		5724	90.02	-30	120.02	80.47	34.97	11.18	36.6	286	0	P	V
		5746	119.49	-	-	109.91	34.99	11.21	36.62	286	0	P	V
		5746	111.98	-	-	102.4	34.99	11.21	36.62	286	0	A	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 HE20 Full (Harmonic @ 3m)

WIFI Ant. CDD 1S4T	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 HE20 Full CH 149 5745MHz		11488	54.69	-19.31	74	66.63	38.19	16.35	66.48	311	12	P	H
		11488	47.4	-6.6	54	59.34	38.19	16.35	66.48	311	12	A	H
		17230	53.93	-14.37	68.3	56.94	41.71	20.15	64.87	300	0	P	H
		11477	55.13	-18.87	74	67.1	38.17	16.34	66.48	369	11	P	V
		11477	48.32	-5.68	54	60.29	38.17	16.34	66.48	369	11	A	V
		17230	55.26	-13.04	68.3	58.27	41.71	20.15	64.87	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)

WIFI Ant. CDD 1S4T	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 151 5755MHz		5648.8	62.39	-5.91	68.3	52.95	34.87	11.08	36.51	366	302	P	H
		5697.6	73.79	-29.74	103.53	64.29	34.93	11.13	36.56	366	302	P	H
		5719.2	88.53	-22.15	110.68	79	34.97	11.16	36.6	366	302	P	H
		5722.8	91.88	-25.4	117.28	82.33	34.97	11.18	36.6	366	302	P	H
		5764	117.15	-	-	107.53	35.01	11.24	36.63	366	302	P	H
		5764	107.92	-	-	98.3	35.01	11.24	36.63	366	302	A	H
		5854.4	66.06	-46.21	112.27	56.34	35.13	11.33	36.74	366	302	P	H
		5855.2	64.77	-46.07	110.84	55.04	35.13	11.34	36.74	366	302	P	H
		5879.6	53.76	-48.12	101.88	44	35.16	11.36	36.76	366	302	P	H
		5930	48.98	-19.32	68.3	39.17	35.22	11.4	36.81	366	302	P	H
		5648.8	62.44	-5.86	68.3	53	34.87	11.08	36.51	311	360	P	V
		5698.8	72.73	-31.69	104.42	63.23	34.93	11.13	36.56	311	360	P	V
		5718.8	89.59	-20.97	110.56	80.06	34.97	11.16	36.6	311	360	P	V
		5724	91.83	-28.19	120.02	82.28	34.97	11.18	36.6	311	360	P	V
		5752	118.58	-	-	108.99	35.01	11.21	36.63	311	360	P	V
		5752	109.44	-	-	99.85	35.01	11.21	36.63	311	360	A	V
		5850.8	62.08	-58.4	120.48	52.36	35.11	11.33	36.72	311	360	P	V
		5860.8	61.83	-47.44	109.27	52.1	35.13	11.34	36.74	311	360	P	V
		5875.6	55.72	-49.13	104.85	45.96	35.16	11.36	36.76	311	360	P	V
		5939.2	50.23	-18.07	68.3	40.4	35.24	11.42	36.83	311	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)

WIFI Ant. CDD 1S4T	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 151 5755MHz		11521	51.6	-22.4	74	63.47	38.21	16.38	66.46	256	50	P	H
		11521	44.11	-9.89	54	55.98	38.21	16.38	66.46	256	50	A	H
		17274	55.73	-12.57	68.3	58.72	41.69	20.19	64.87	300	0	P	H
		11510	54.49	-19.51	74	66.4	38.2	16.37	66.48	365	10	P	V
		11510	46.61	-7.39	54	58.52	38.2	16.37	66.48	365	10	A	V
		17285	54.22	-14.08	68.3	57.22	41.67	20.19	64.86	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)

WIFI Ant. CDD 1S4T	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		5632	64.94	-3.36	68.3	55.54	34.84	11.05	36.49	368	302	P	H
		5694.4	77.96	-23.21	101.17	68.46	34.93	11.13	36.56	368	302	P	H
		5710.4	82.56	-25.65	108.21	73.03	34.95	11.16	36.58	368	302	P	H
		5724	85.4	-34.62	120.02	75.85	34.97	11.18	36.6	368	302	P	H
		5806	115.7	-	-	106.03	35.07	11.29	36.69	368	302	P	H
		5806	104.76	-	-	95.09	35.07	11.29	36.69	368	302	A	H
		5851.2	86.53	-33.03	119.56	76.81	35.11	11.33	36.72	368	302	P	H
		5872.8	78.44	-27.48	105.92	68.7	35.16	11.34	36.76	368	302	P	H
		5875.2	71.86	-33.29	105.15	62.1	35.16	11.36	36.76	368	302	P	H
		5928.8	49.05	-19.25	68.3	39.24	35.22	11.4	36.81	368	302	P	H
		5649.2	66.93	-1.37	68.3	57.49	34.87	11.08	36.51	309	346	P	V
		5698.8	81.58	-22.84	104.42	72.08	34.93	11.13	36.56	309	346	P	V
		5712.8	86.24	-22.65	108.89	76.71	34.95	11.16	36.58	309	346	P	V
		5724	86.36	-33.66	120.02	76.81	34.97	11.18	36.6	309	346	P	V
		5770	116	-	-	106.38	35.03	11.24	36.65	309	346	P	V
		5770	106.75	-	-	97.13	35.03	11.24	36.65	309	346	A	V
		5853.2	83.29	-31.71	115	73.57	35.11	11.33	36.72	309	346	P	V
		5858.4	85.05	-24.9	109.95	75.32	35.13	11.34	36.74	309	346	P	V
		5878.8	72.02	-30.46	102.48	62.26	35.16	11.36	36.76	309	346	P	V
		5934.8	55.95	-12.35	68.3	46.12	35.22	11.42	36.81	309	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)

WIFI Ant. CDD 1S4T	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		11554	47.92	-26.08	74	59.73	38.23	16.39	66.43	300	0	P	H
HE80 Full		17373	53.29	-15.01	68.3	56.28	41.61	20.25	64.85	300	0	P	H
CH 155		11521	48.67	-25.33	74	60.54	38.21	16.38	66.46	100	0	P	V
5775MHz		17373	55.7	-12.6	68.3	58.69	41.61	20.25	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__SDM 4S4T>

WIFI 802.11ax HE20_Full (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
SDM 4S4T		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE20 Full CH 149 5745MHz		5604.4	56.46	-11.84	68.3	47.12	34.52	11	36.18	314	261	P	H
		5695.6	63.48	-38.58	102.06	54.79	34.59	11.13	37.03	314	261	P	H
		5720	84.28	-26.62	110.9	76.07	34.68	11.16	37.63	314	261	P	H
		5724	87.3	-32.72	120.02	79.07	34.68	11.18	37.63	314	261	P	H
		5752	115.56	-	-	107.82	34.77	11.21	38.24	314	261	P	H
		5752	106.81	-	-	99.07	34.77	11.21	38.24	314	261	A	H
		5646	58	-10.3	68.3	48.53	34.51	11.08	36.12	328	161	P	V
		5699.6	67.77	-37.24	105.01	59.08	34.59	11.13	37.03	328	161	P	V
		5720	84.03	-26.87	110.9	75.82	34.68	11.16	37.63	328	161	P	V
		5724.4	89.57	-31.36	120.93	81.34	34.68	11.18	37.63	328	161	P	V
		5752	117.56	-	-	109.82	34.77	11.21	38.24	328	161	P	V
		5752	108.97	-	-	101.23	34.77	11.21	38.24	328	161	A	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 HE20 Full (Harmonic @ 3m)

WIFI Ant. SDM 4S4T	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 HE20 Full CH 149 5745MHz		11488	55.48	-18.52	74	67.58	38.29	16.35	66.74	279	133	P	H
		11488	47.57	-6.43	54	59.67	38.29	16.35	66.74	279	133	A	H
		17241	55.73	-12.57	68.3	58.83	41.3	20.16	64.56	300	0	P	H
		11488	57.7	-16.3	74	69.8	38.29	16.35	66.74	254	161	P	V
		11488	48.5	-5.5	54	60.6	38.29	16.35	66.74	254	161	A	V
		17230	57.01	-11.29	68.3	60.12	41.3	20.15	64.56	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)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.		(MHz)	(dBμV/m)	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
SDM 4S4T				(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE40 Full CH 151 5755MHz		5644.4	59.79	-8.51	68.3	50.35	34.51	11.05	36.12	300	116	P	H
		5698.4	72.1	-32.02	104.12	63.41	34.59	11.13	37.03	300	116	P	H
		5720	86.04	-24.86	110.9	77.83	34.68	11.16	37.63	300	116	P	H
		5724.4	90.77	-30.16	120.93	82.54	34.68	11.18	37.63	300	116	P	H
		5764	113.91	-	-	106.14	34.77	11.24	38.24	300	116	P	H
		5764	104.68	-	-	96.91	34.77	11.24	38.24	300	116	A	H
		5851.2	59.91	-59.65	119.56	53.33	35	11.33	39.75	300	116	P	H
		5856.8	56.88	-53.52	110.4	50.56	35.03	11.34	40.05	300	116	P	H
		5875.2	51.2	-53.95	105.15	44.79	35.06	11.36	40.01	300	116	P	H
		5992.8	45.63	-22.67	68.3	38.6	35.26	11.47	39.7	300	116	P	H
		5648.8	61.7	-6.6	68.3	52.23	34.51	11.08	36.12	302	166	P	V
		5694.8	73.7	-27.77	101.47	65.01	34.59	11.13	37.03	302	166	P	V
		5720	90.66	-20.24	110.9	82.45	34.68	11.16	37.63	302	166	P	V
		5722.8	95.87	-21.41	117.28	87.64	34.68	11.18	37.63	302	166	P	V
		5758	116.61	-	-	108.87	34.77	11.21	38.24	302	166	P	V
		5758	106.8	-	-	99.06	34.77	11.21	38.24	302	166	A	V
		5853.2	62.06	-52.94	115	55.48	35	11.33	39.75	302	166	P	V
		5862	63.41	-45.53	108.94	57.09	35.03	11.34	40.05	302	166	P	V
		5880	55.67	-45.92	101.59	49.26	35.06	11.36	40.01	302	166	P	V
		5956.8	46.58	-21.72	68.3	39.74	35.2	11.43	39.79	302	166	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)

WIFI Ant. SDM 4S4T	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 151 5755MHz		11510	53.99	-20.01	74	66.04	38.31	16.37	66.73	270	131	P	H
		11510	45.08	-8.92	54	57.13	38.31	16.37	66.73	270	131	A	H
		17263	56.73	-11.57	68.3	59.81	41.3	20.18	64.56	300	0	P	H
		11510	52.41	-21.59	74	64.46	38.31	16.37	66.73	276	136	P	V
		11510	45.45	-8.55	54	57.5	38.31	16.37	66.73	276	136	A	V
		17274	54.34	-13.96	68.3	57.41	41.3	20.19	64.56	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)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.		(MHz)	(dBμV/m)	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
SDM 4S4T				(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE80 Full CH 155 5775MHz		5648.4	67.12	-1.18	68.3	57.65	34.51	11.08	36.12	340	122	P	H
		5692	80.54	-18.86	99.4	71.85	34.59	11.13	37.03	340	122	P	H
		5716	83.92	-25.86	109.78	75.45	34.64	11.16	37.33	340	122	P	H
		5724.4	84.08	-36.85	120.93	75.85	34.68	11.18	37.63	340	122	P	H
		5782	111.8	-	-	104.26	34.82	11.26	38.54	340	122	P	H
		5782	101.05	-	-	93.51	34.82	11.26	38.54	340	122	A	H
		5853.6	83.9	-30.19	114.09	77.59	35.03	11.33	40.05	340	122	P	H
		5855.2	77.29	-33.55	110.84	70.97	35.03	11.34	40.05	340	122	P	H
		5876.8	67.85	-36.11	103.96	61.44	35.06	11.36	40.01	340	122	P	H
		5928.4	50.46	-17.84	68.3	43.8	35.14	11.4	39.88	340	122	P	H
		5644.8	66.73	-1.57	68.3	57.29	34.51	11.05	36.12	297	167	P	V
		5698.8	80.75	-23.67	104.42	72.06	34.59	11.13	37.03	297	167	P	V
		5708.8	83.68	-24.09	107.77	75.21	34.64	11.16	37.33	297	167	P	V
		5723.6	87.56	-31.55	119.11	79.33	34.68	11.18	37.63	297	167	P	V
		5770	112.54	-	-	105.02	34.82	11.24	38.54	297	167	P	V
		5770	105.74	-	-	98.22	34.82	11.24	38.54	297	167	A	V
		5854.8	78.87	-32.49	111.36	72.55	35.03	11.34	40.05	297	167	P	V
		5864	80.98	-27.4	108.38	74.66	35.03	11.34	40.05	297	167	P	V
		5875.6	71.82	-33.03	104.85	65.41	35.06	11.36	40.01	297	167	P	V
		5931.6	52.93	-15.37	68.3	46.25	35.14	11.42	39.88	297	167	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)**

WIFI Ant. SDM 4S4T	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		11554	48.09	-25.91	74	60.02	38.35	16.39	66.67	300	0	P	H
CH 155 5775MHz		11554	48.21	-25.79	74	60.14	38.35	16.39	66.67	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__TX BF 1S4T>

WIFI 802.11ax HE20 Full (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
BF 1S4T		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE20 Full CH 157 5785MHz		11576	53.09	-20.91	74	64.86	38.24	16.41	66.42	304	223	P	H
		11576	45	-9	54	56.77	38.24	16.41	66.42	304	223	A	H
		17362	61.45	-6.85	68.3	64.44	41.62	20.24	64.85	300	0	P	H
		11576	52.39	-21.61	74	64.16	38.24	16.41	66.42	310	256	P	V
		11576	44.3	-9.7	54	56.07	38.24	16.41	66.42	310	256	A	V
		17373	58.74	-9.56	68.3	61.73	41.61	20.25	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)

WIFI Ant. BF 1S4T	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 151 5755MHz		5646	60.51	-7.79	68.3	51.04	34.51	11.08	36.12	240	83	P	H
		5700	76.59	-28.71	105.3	67.9	34.59	11.13	37.03	240	83	P	H
		5720	92.48	-18.42	110.9	84.27	34.68	11.16	37.63	240	83	P	H
		5724	95.75	-24.27	120.02	87.52	34.68	11.18	37.63	240	83	P	H
		5752	121.44	-	-	113.7	34.77	11.21	38.24	240	83	P	H
		5752	112.04	-	-	104.3	34.77	11.21	38.24	240	83	A	H
		5851.6	69.36	-49.29	118.65	62.78	35	11.33	39.75	240	83	P	H
		5861.6	62.73	-46.32	109.05	56.41	35.03	11.34	40.05	240	83	P	H
		5878	55.13	-47.94	103.07	48.72	35.06	11.36	40.01	240	83	P	H
		5953.6	51.61	-16.69	68.3	44.84	35.17	11.43	39.83	240	83	P	H
		5645.2	65.57	-2.73	68.3	56.13	34.51	11.05	36.12	297	342	P	V
		5694	80.99	-19.89	100.88	72.3	34.59	11.13	37.03	297	342	P	V
		5716	94.71	-15.07	109.78	86.24	34.64	11.16	37.33	297	342	P	V
		5724.8	95.97	-25.87	121.84	87.74	34.68	11.18	37.63	297	342	P	V
		5758	120.85	-	-	113.11	34.77	11.21	38.24	297	342	P	V
		5758	112.37	-	-	104.63	34.77	11.21	38.24	297	342	A	V
		5851.2	71.9	-47.66	119.56	65.32	35	11.33	39.75	297	342	P	V
		5855.2	68.64	-42.2	110.84	62.32	35.03	11.34	40.05	297	342	P	V
		5878	61.63	-41.44	103.07	55.22	35.06	11.36	40.01	297	342	P	V
		5954.8	51.72	-16.58	68.3	44.95	35.17	11.43	39.83	297	342	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)

WIFI Ant. BF 1S4T	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 151 5755MHz		11510	54.24	-19.76	74	66.15	38.2	16.37	66.48	320	311	P	H
		11510	44.6	-9.4	54	56.51	38.2	16.37	66.48	320	311	A	H
		17274	55.52	-12.78	68.3	58.51	41.69	20.19	64.87	300	0	P	H
		11510	55.47	-18.53	74	67.38	38.2	16.37	66.48	390	9	P	V
		11510	45.6	-8.4	54	57.51	38.2	16.37	66.48	390	9	A	V
		17252	54.54	-13.76	68.3	57.55	41.7	20.16	64.87	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)

WIFI Ant. BF 1S4T	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		5647.2	66.65	-1.65	68.3	57.18	34.51	11.08	36.12	155	94	P	H
		5697.6	81.36	-22.17	103.53	72.67	34.59	11.13	37.03	155	94	P	H
		5719.2	85.96	-24.72	110.68	77.75	34.68	11.16	37.63	155	94	P	H
		5720.4	85.94	-25.87	111.81	77.73	34.68	11.16	37.63	155	94	P	H
		5806	117.64	-	-	110.58	34.91	11.29	39.14	155	94	P	H
		5806	109.2	-	-	102.14	34.91	11.29	39.14	155	94	A	H
		5850.4	86.7	-34.69	121.39	80.12	35	11.33	39.75	155	94	P	H
		5857.2	84.19	-26.09	110.28	77.87	35.03	11.34	40.05	155	94	P	H
		5876.4	69.57	-34.69	104.26	63.16	35.06	11.36	40.01	155	94	P	H
		5929.2	61.51	-6.79	68.3	54.85	35.14	11.4	39.88	155	94	P	H
		5637.6	64.01	-4.29	68.3	54.57	34.51	11.05	36.12	285	337	P	V
		5697.6	79.49	-24.04	103.53	70.8	34.59	11.13	37.03	285	337	P	V
		5709.2	83.65	-24.23	107.88	75.18	34.64	11.16	37.33	285	337	P	V
		5724.8	87.18	-34.66	121.84	78.95	34.68	11.18	37.63	285	337	P	V
		5782	115	-	-	107.46	34.82	11.26	38.54	285	337	P	V
		5782	106.87	-	-	99.33	34.82	11.26	38.54	285	337	A	V
		5850.4	80.54	-40.85	121.39	73.96	35	11.33	39.75	285	337	P	V
		5867.6	80.48	-26.89	107.37	74.16	35.03	11.34	40.05	285	337	P	V
		5876.8	68.91	-35.05	103.96	62.5	35.06	11.36	40.01	285	337	P	V
		5931.6	55.48	-12.82	68.3	48.8	35.14	11.42	39.88	285	337	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)

WIFI Ant. BF 1S4T	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		11488	50.83	-23.17	74	62.77	38.19	16.35	66.48	300	0	P	H
CH 155 5775MHz		11521	47.71	-26.29	74	59.58	38.21	16.38	66.46	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

WIFI 802.11ax HE80 Full (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
SDM 4S4T		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE80 Full LF		84.32	25.45	-14.55	40	42.87	14.01	1.39	32.82	-	-	P	H
		185.2	23.2	-20.3	43.5	38.25	15.71	2.07	32.83	-	-	P	H
		295.78	27.39	-18.61	46	38.34	19.25	2.62	32.82	-	-	P	H
		512.09	32.04	-13.96	46	37.58	23.96	3.46	32.96	-	-	P	H
		526.64	33.89	-12.11	46	39.01	24.4	3.5	33.02	-	-	P	H
		831.22	30.47	-15.53	46	32.11	26.47	4.4	32.51	-	-	P	H
		48.43	36.52	-3.48	40	53.36	15.04	1.05	32.93	158	32	P	V
		66.86	32.02	-7.98	40	51.3	12.36	1.23	32.87	-	-	P	V
		138.64	29.39	-14.11	43.5	43.86	16.57	1.79	32.83	-	-	P	V
		253.1	26.51	-19.49	46	38.38	18.47	2.43	32.77	-	-	P	V
		511.12	39.58	-6.42	46	45.16	23.93	3.45	32.96	-	-	P	V
		540.22	38.33	-7.67	46	43.03	24.82	3.55	33.07	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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



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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
CDD 1S4T		(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:

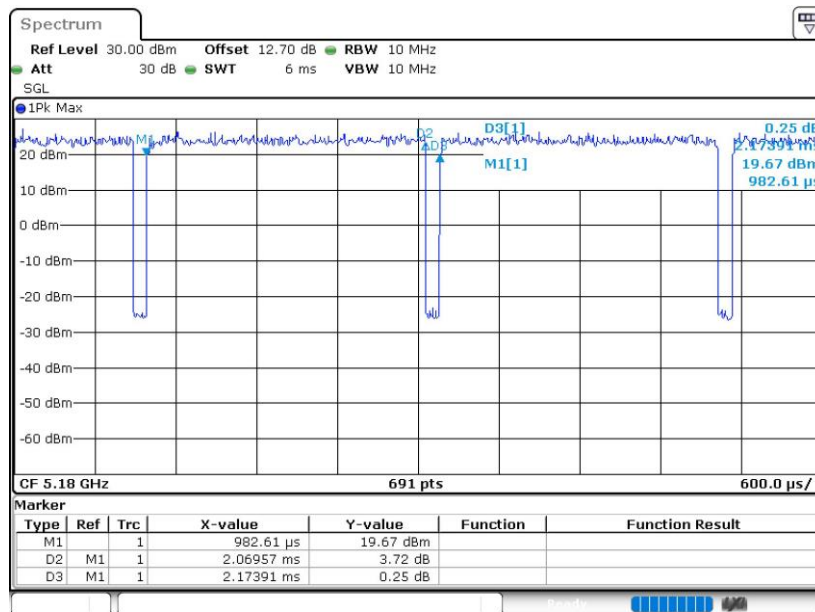
1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
 = 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
 = 43.54(dBμV/m) – 54(dBμV/m)
 = -10.46(dB)

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

Appendix D. Duty Cycle Plots

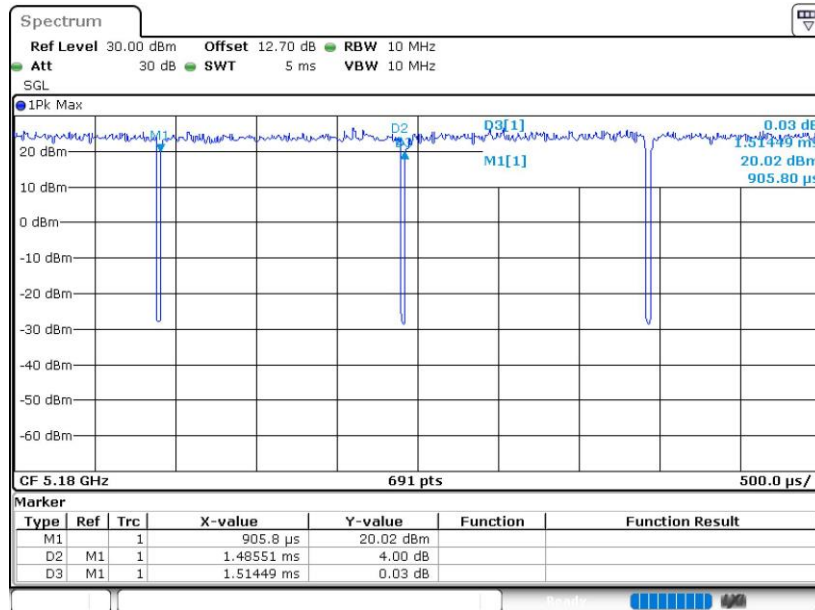
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2+3+4	802.11a	95.20	2.070	0.483	0.51kHz
1+2+3+4	802.11ax HE20	98.09	-	-	10Hz
1+2+3+4	802.11ax HE40	96.22	0.774	1.292	1.5kHz
1+2+3+4	802.11ax HE80	92.96	0.402	2.487	2.7kHz

802.11a

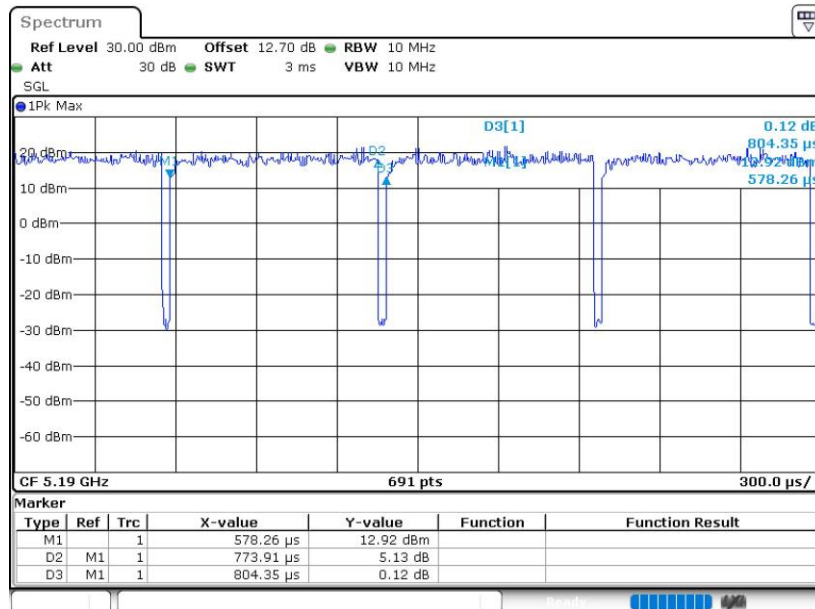




802.11ax HE20



802.11ax HE40





802.11ax HE80

