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

ACCREDITED Cert #5145.02

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
FR2O1817B	Rev. 01	Initial issue of report	Dec. 23, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Report only	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 17 dBm/MHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 0.56 dB at 5149.280 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: CGA437TTCH3 lab2c067 Radiation: CGA437TTCH4lab2A128 Conduction: CGA437TTCH4lab2B030
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 Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna	**<MIMO Ant.1+2+3+4>** 802.11a : 26.52 dBm / 0.4487 W 802.11n HT20 : 28.99 dBm / 0.7925 W 802.11n HT40 : 28.11 dBm / 0.6471 W 802.11ac VHT20 : 28.91 dBm / 0.7780 W 802.11ac VHT40 : 28.02 dBm / 0.6339 W 802.11ac VHT80 : 22.64 dBm / 0.1837 W 802.11ax HE20 : 29.27 dBm / 0.8453 W 802.11ax HE40 : 28.26 dBm / 0.6699 W 802.11ax HE80 : 23.37 dBm / 0.2173 W
99% Occupied Bandwidth	802.11a : 17.13 MHz 802.11ax HE20 : 19.28 MHz 802.11ax HE40 : 38.16 MHz 802.11ax HE80 : 77.32 MHz
Antenna Type	Murphy 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
802.11 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-1	3.95	4.10	3.00	4.50	4.50	7.39	7.39	7.39	1.94	1.94

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 cases in section 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)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

Note:

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

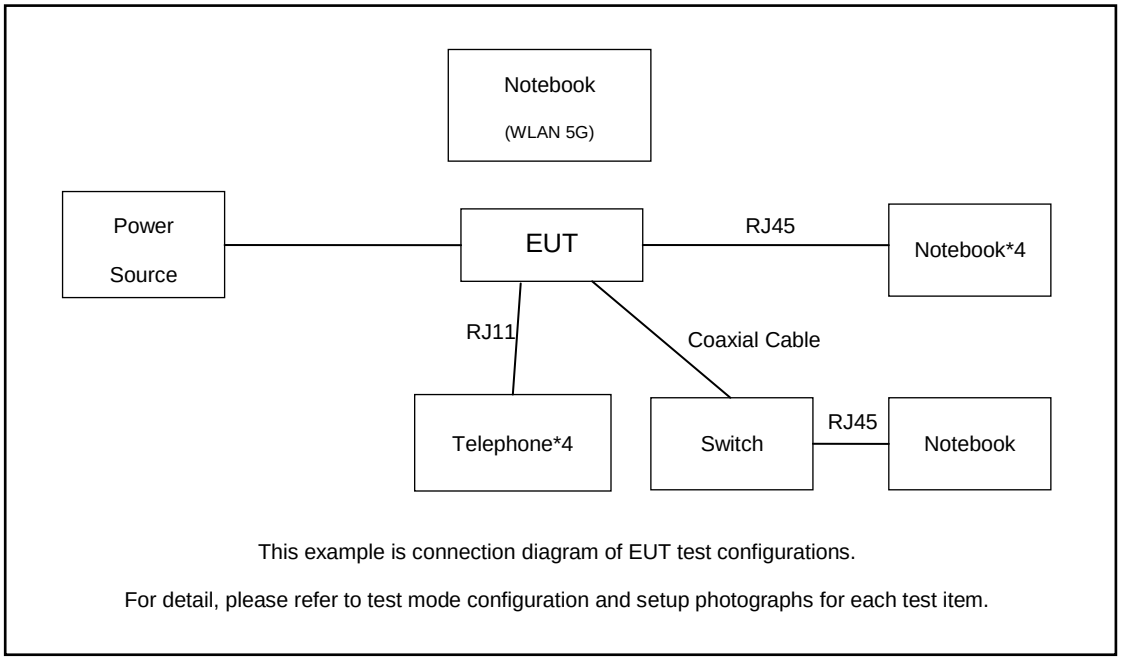
Modulation	Data Rate
802.11a CDD 1S4T	6 Mbps
802.11ax HE20 CDD 1S4T	MCS0
802.11ax HE40 CDD 1S4T	MCS0
802.11ax HE80 CDD 1S4T	MCS0
802.11ax HE20 SDM 4S4T	MCS0
802.11ax HE40 SDM 4S4T	MCS0
802.11ax HE80 SDM 4S4T	MCS0
802.11ax HE20 TX BF 1S4T	MCS0
802.11ax HE40 TX BF 1S4T	MCS0
802.11ax HE80 TX BF 1S4T	MCS0

Test Cases	
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. #		5180-5240 MHz	5180-5240 MHz	5180-5240 MHz	5180-5240 MHz
		802.11a	802.11ax HE20	802.11ax HE40	802.11ax HE80
L	Low	36	36	38	-
M	Middle	44	44	-	42
H	High	48	48	46	-

2.3 Connection Diagram of Test System

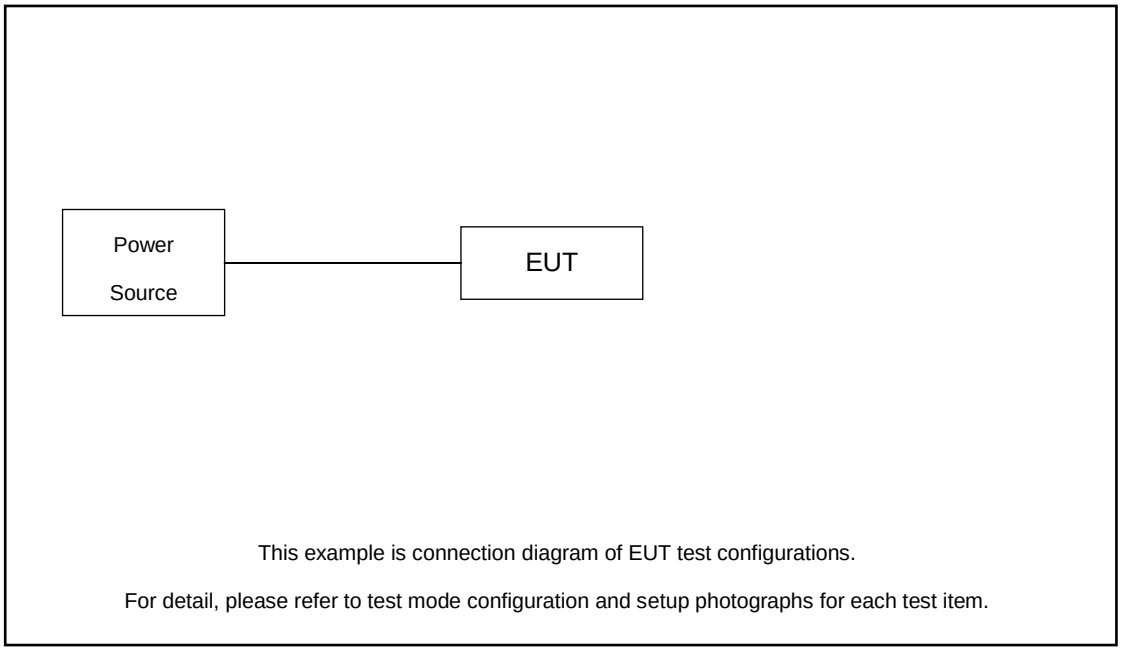
For Conducted Emission:



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

For Radiated Emission:



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

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	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
2.	Notebook	Acer	N20C5	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
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 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 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.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 2.7 + 10 = 12.7 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

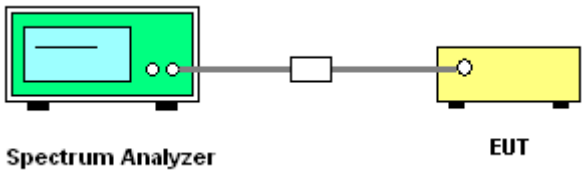
3.1.2 Measuring Instruments

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
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1% to 5% of the OBW and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup

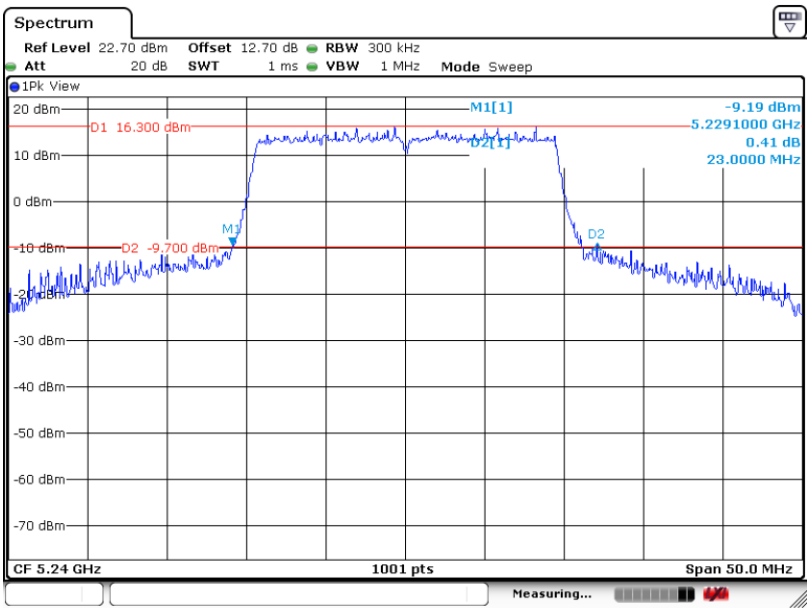


3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

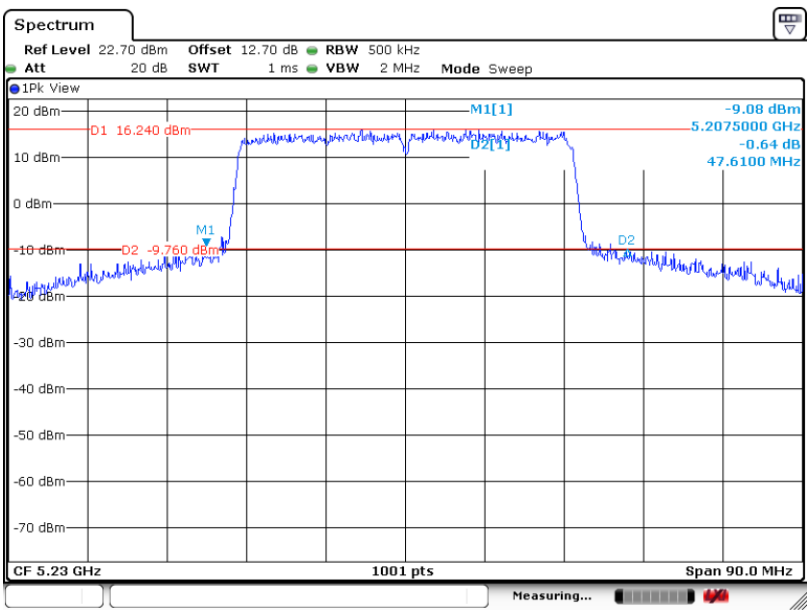
Please refer to Appendix A.

<CDD 1S4T Mode>

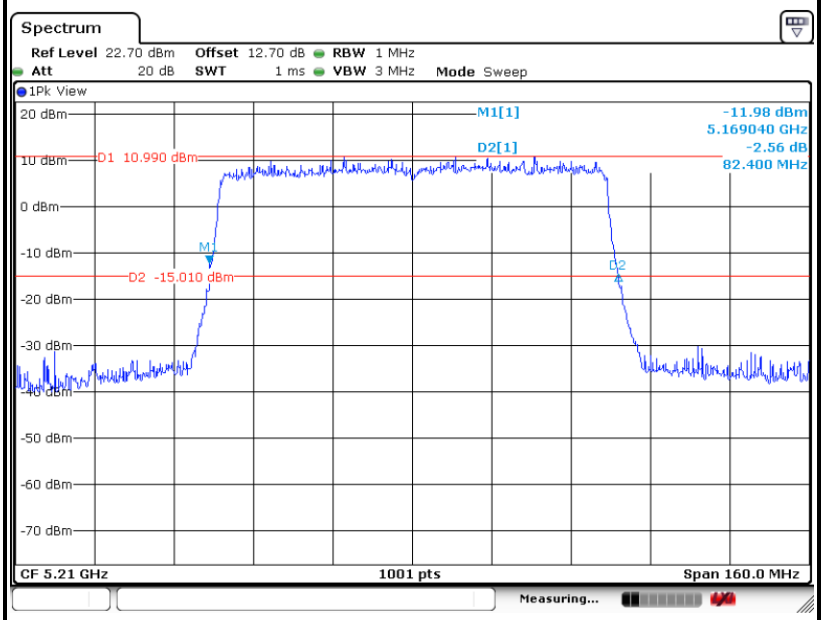
Maximum 26dB Bandwidth for 20M BW



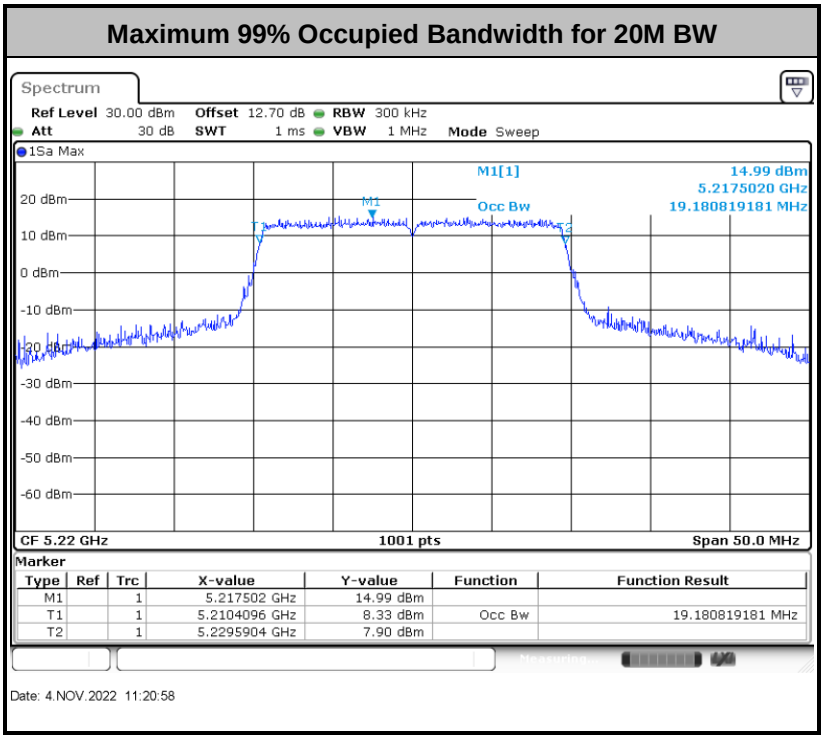
Maximum 26dB Bandwidth for 40M BW



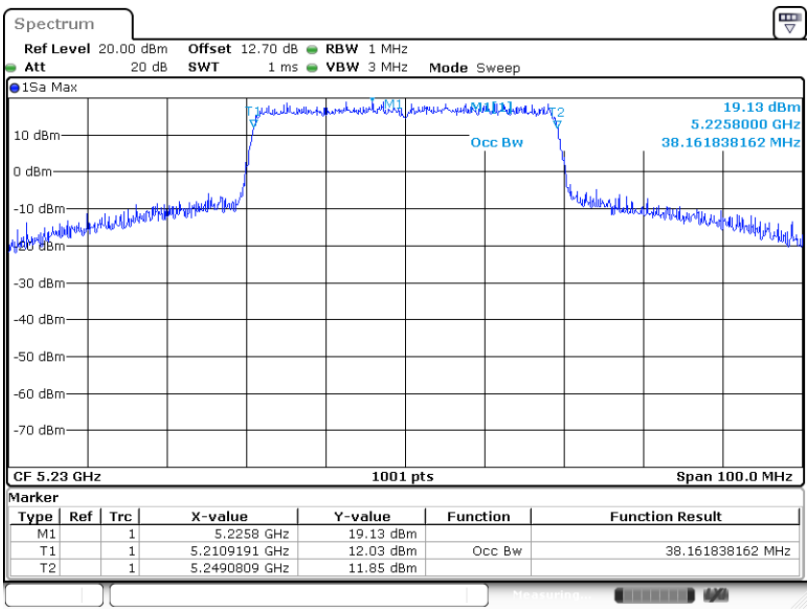
Maximum 26dB Bandwidth for 80M BW



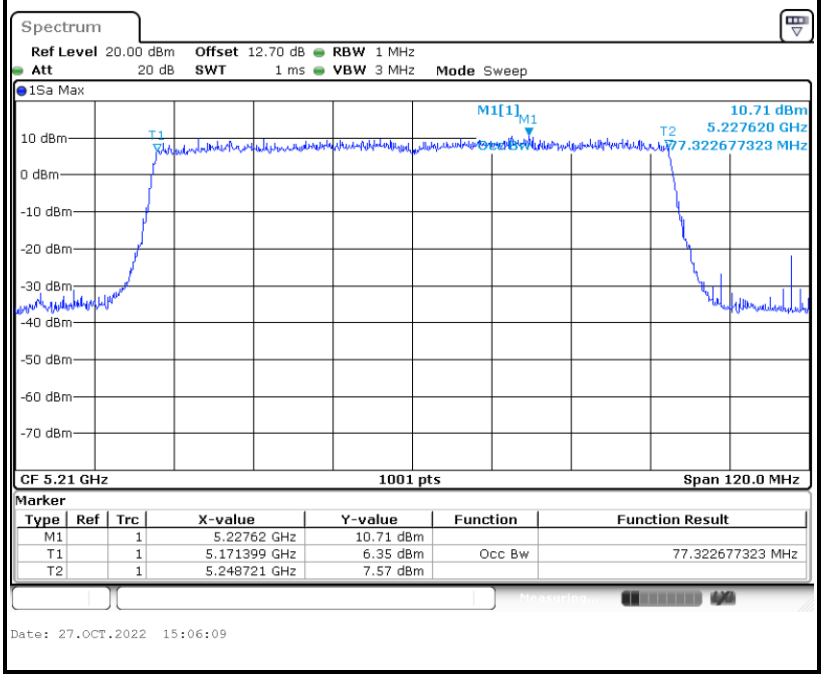
Maximum 99% Occupied Bandwidth for 20M BW



Maximum 99% Occupied Bandwidth for 40M BW



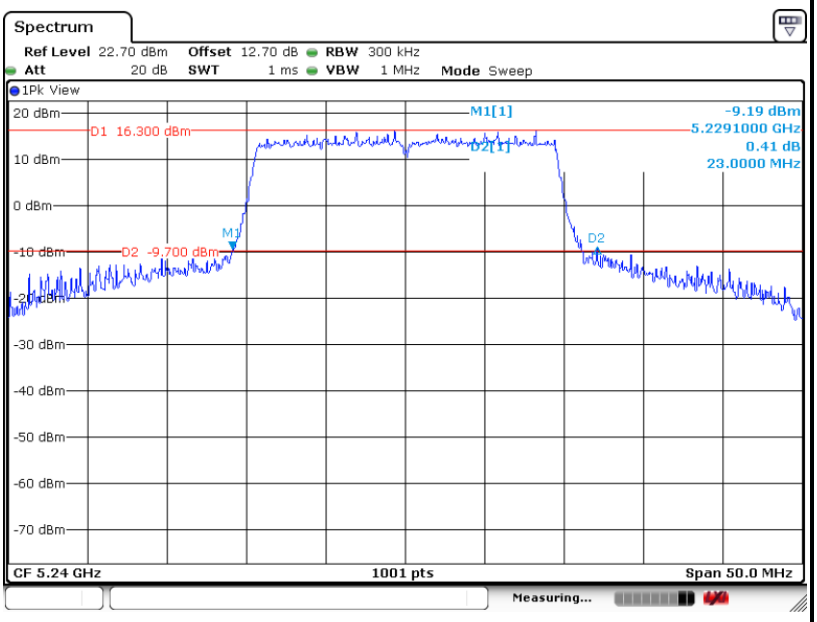
Maximum 99% Occupied Bandwidth for 80M BW



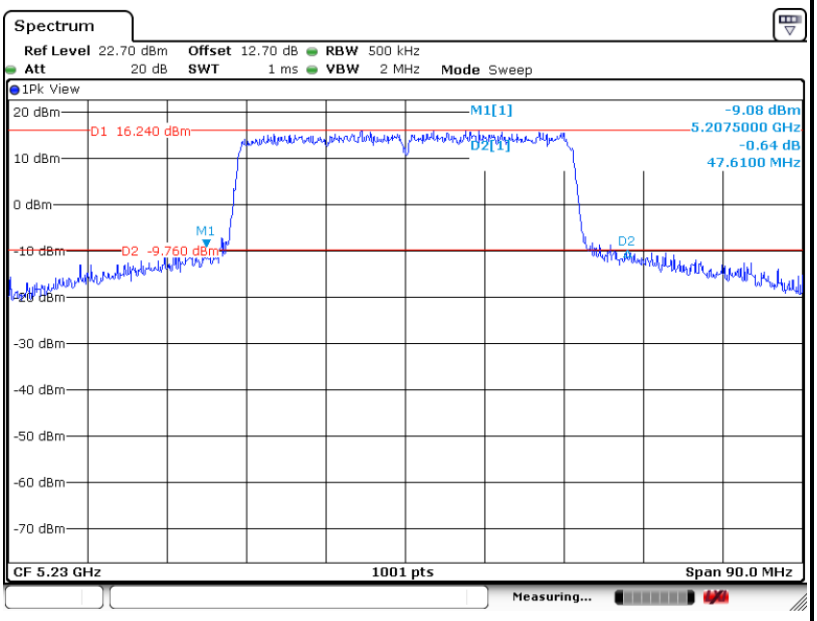
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<SDM 4S4T Mode>

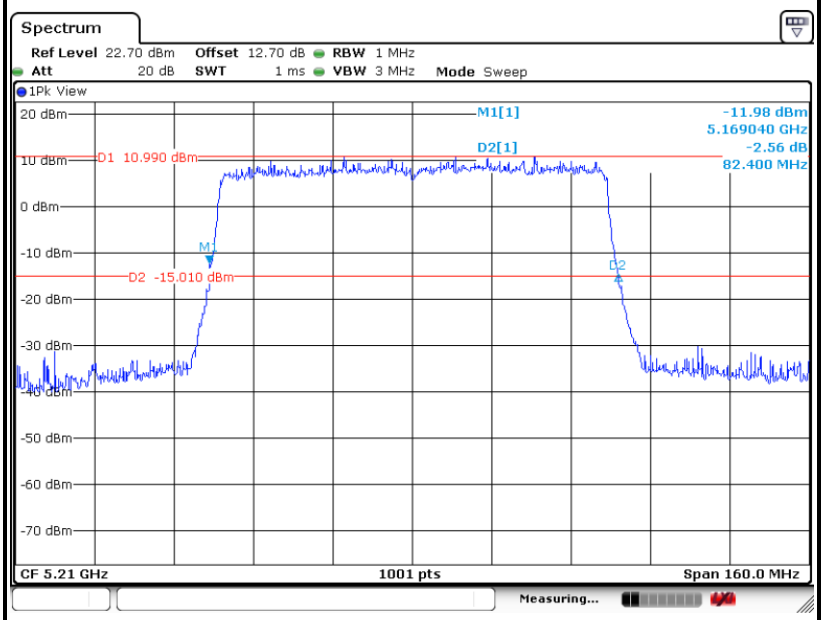
Maximum 26dB Bandwidth for 20M BW



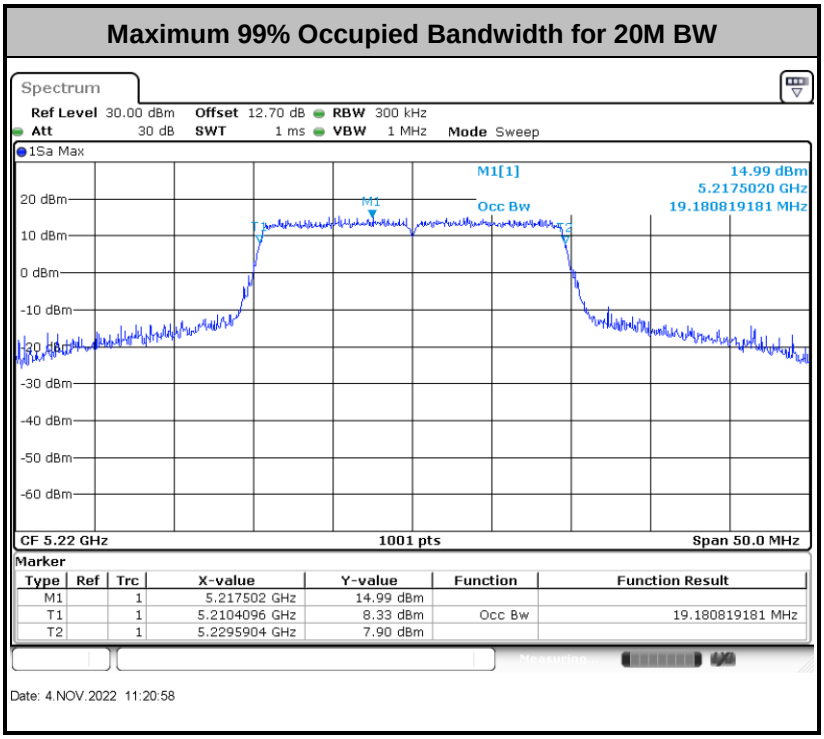
Maximum 26dB Bandwidth for 40M BW



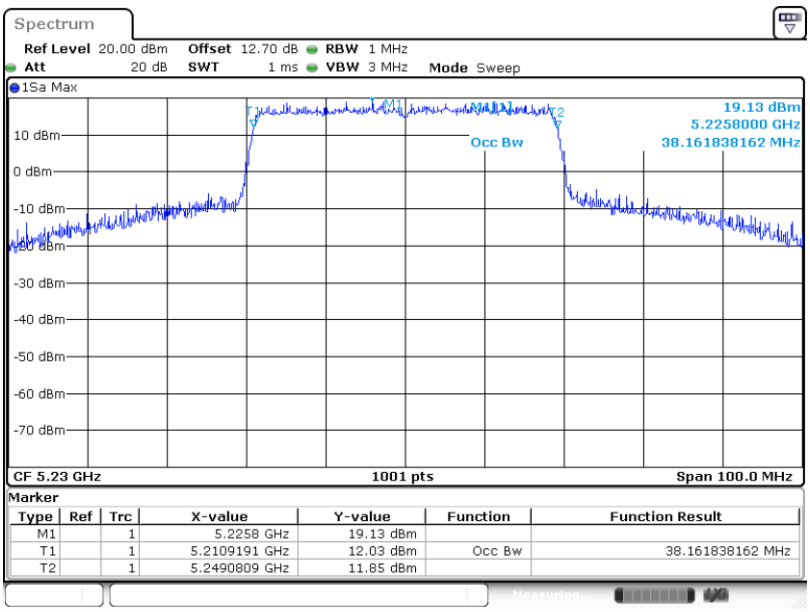
Maximum 26dB Bandwidth for 80M BW



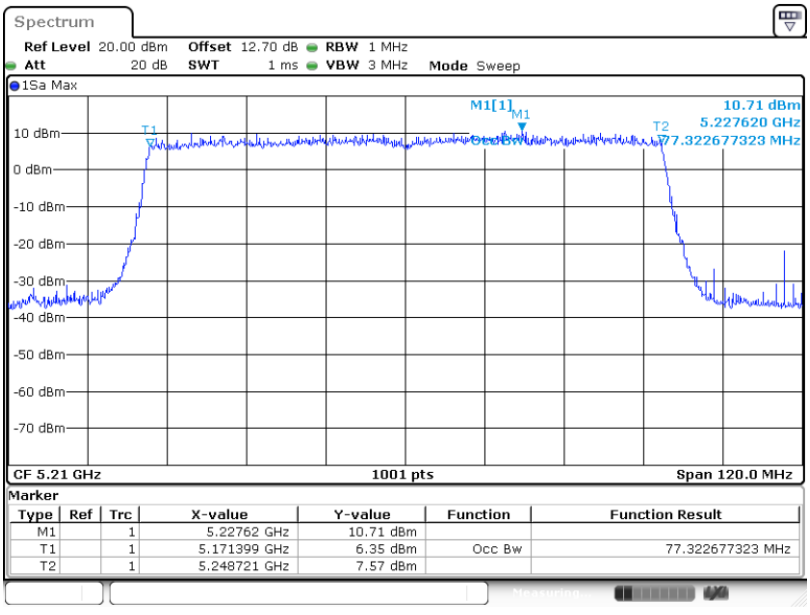
Maximum 99% Occupied Bandwidth for 20M BW



Maximum 99% Occupied Bandwidth for 40M BW



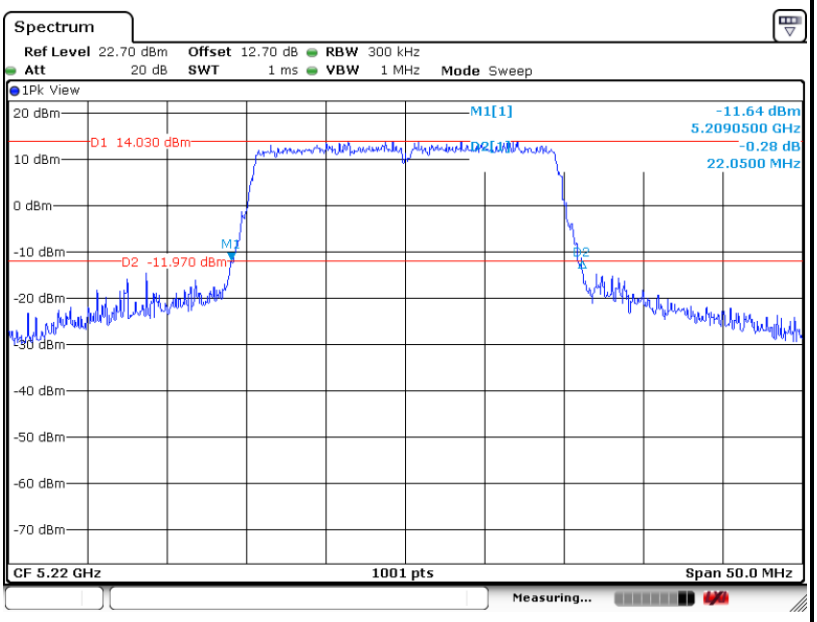
Maximum 99% Occupied Bandwidth for 80M BW



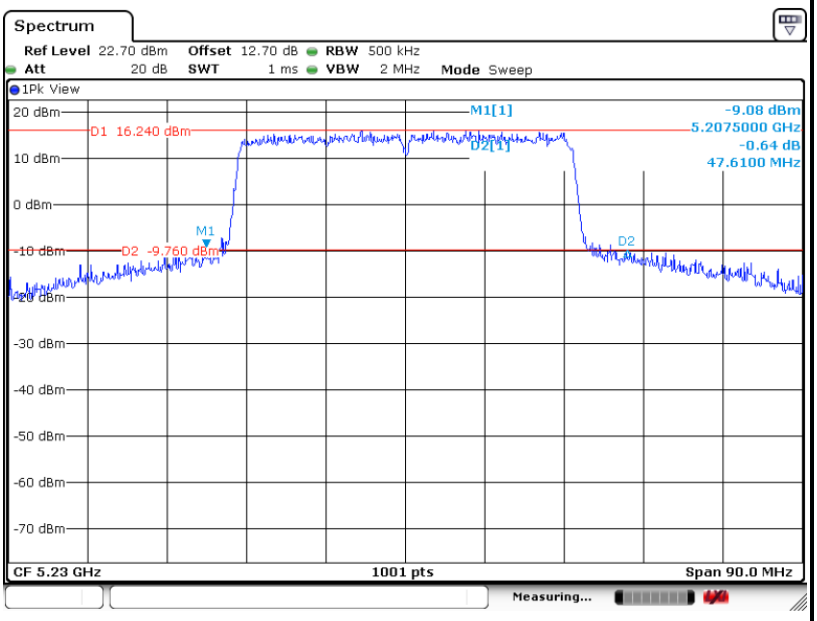
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<TXBF Modes>

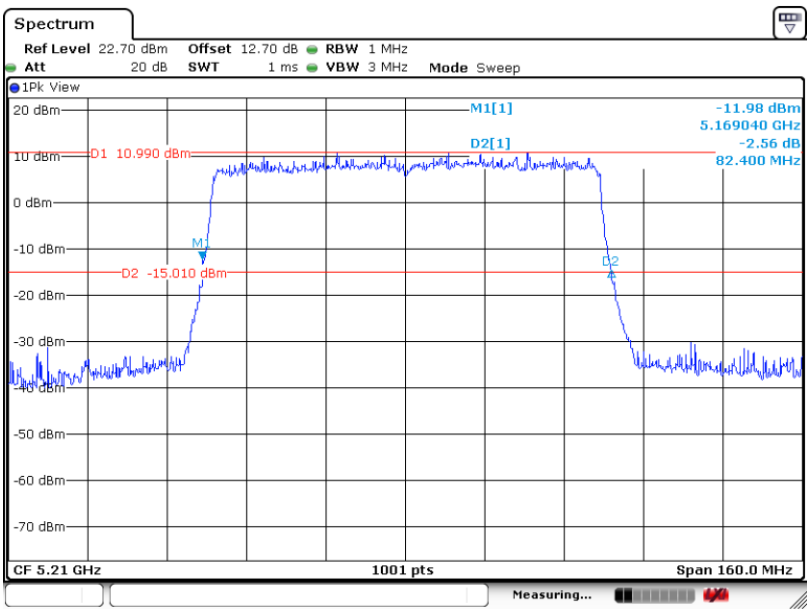
Maximum 26dB Bandwidth for 20M BW



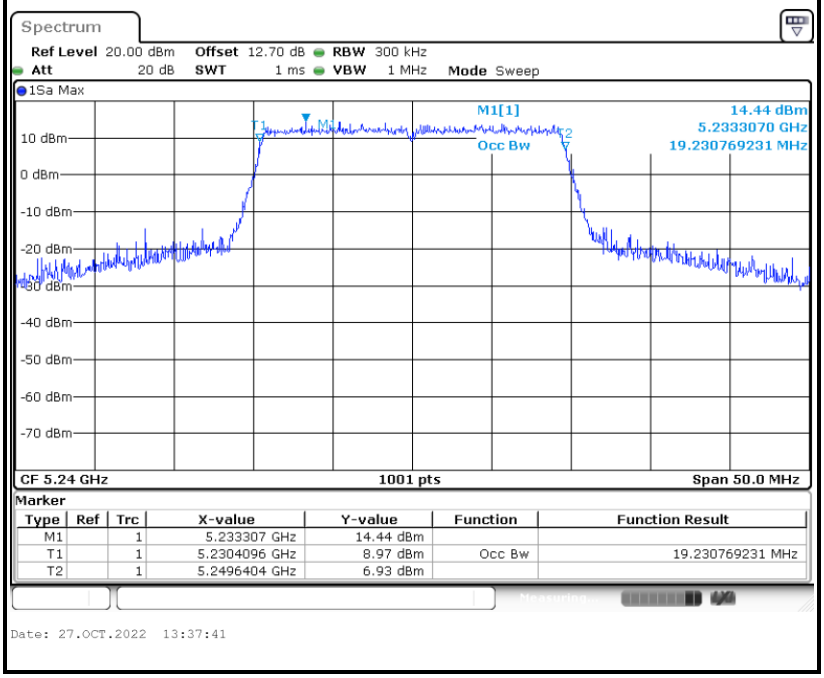
Maximum 26dB Bandwidth for 40M BW



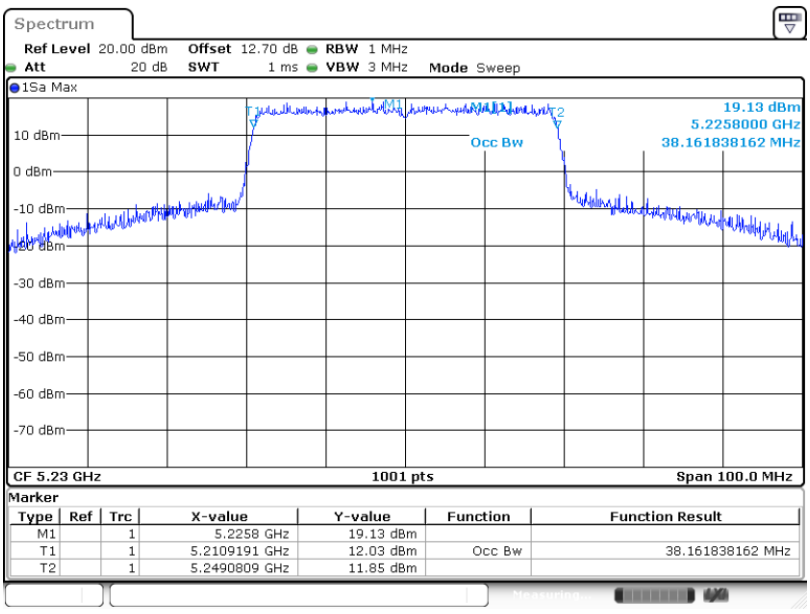
Maximum 26dB Bandwidth for 80M BW



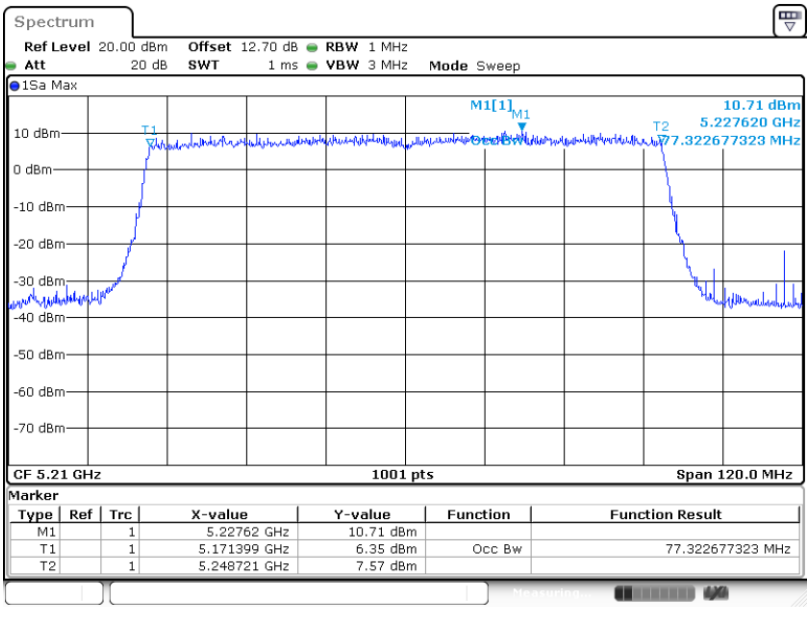
Maximum 99% Occupied Bandwidth for 20M BW



Maximum 99% Occupied Bandwidth for 40M BW



Maximum 99% Occupied Bandwidth for 80M BW



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

<FCC 14-30 CFR 15.407>

For an indoor access point operating in the band 5.15-5.25 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.

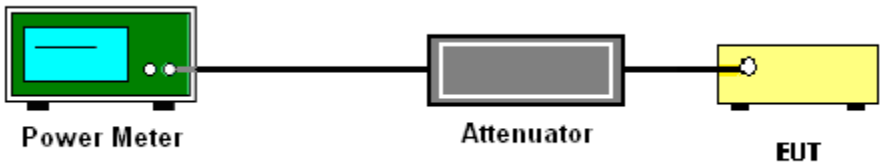
<TXBF Modes>

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 for TXBF modes.

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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

<FCC 14-30 CFR 15.407>

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz 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 = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(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 (a): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is the bin-by-bin summation to obtain the combined spectrum. For the device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

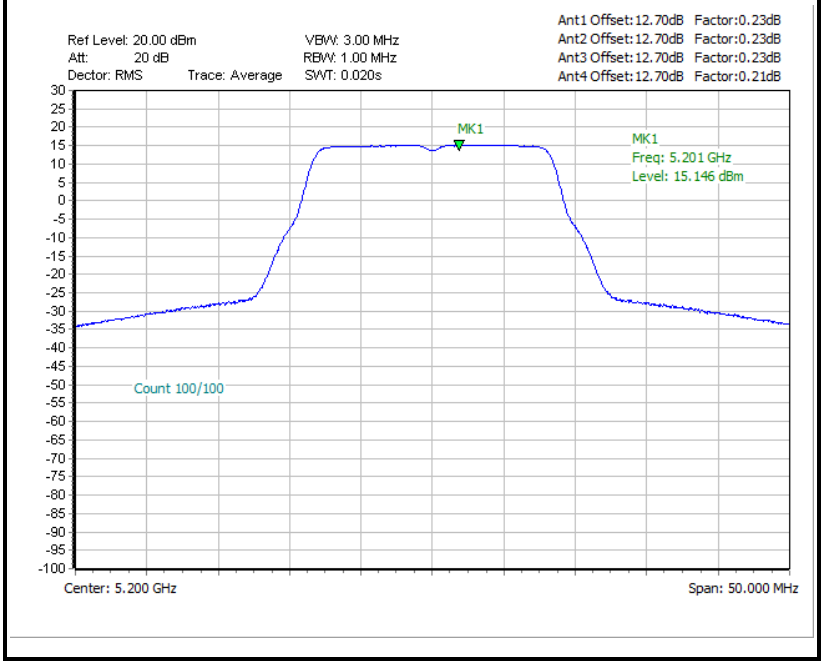
3.3.4 Test Setup

3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

<CDD 1S4T Modes>

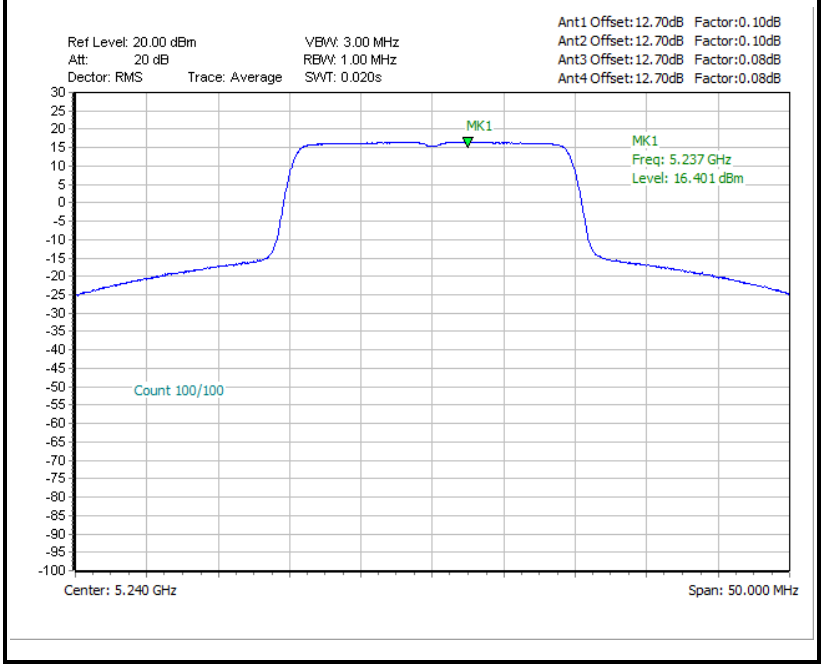
Worst Case Power Density (dBm/MHz)



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

<SDM 4S4T Modes>

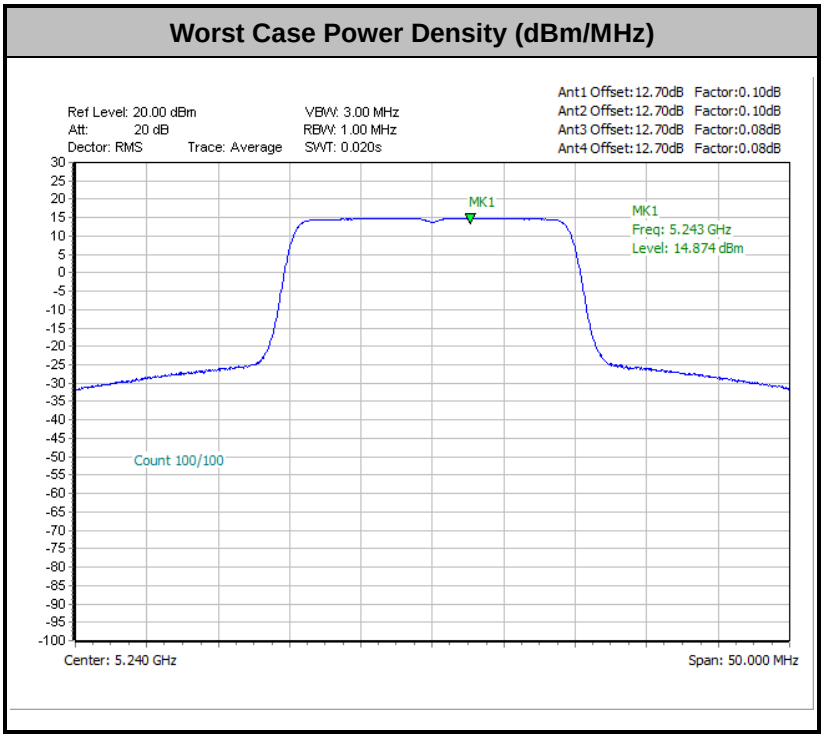
Worst Case Power Density (dBm/MHz)



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

<TXBF 1S4T Modes>

Worst Case Power Density (dBm/MHz)



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

(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.

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

where

EIRP is the equivalent isotropically radiated power, in dBm

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

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

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

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

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

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

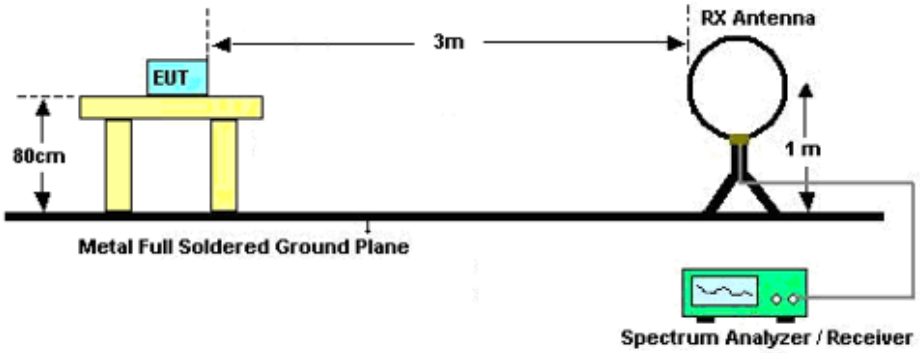
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

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

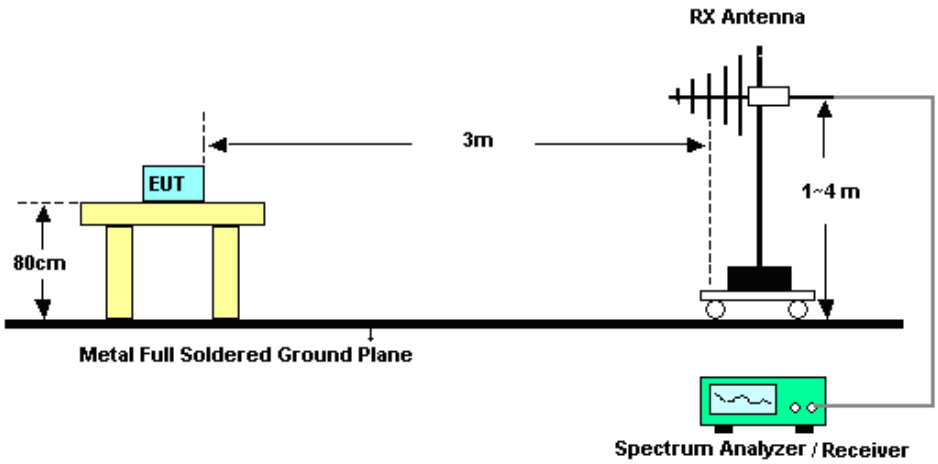
3.4.4 Test Setup

For radiated emissions below 30MHz

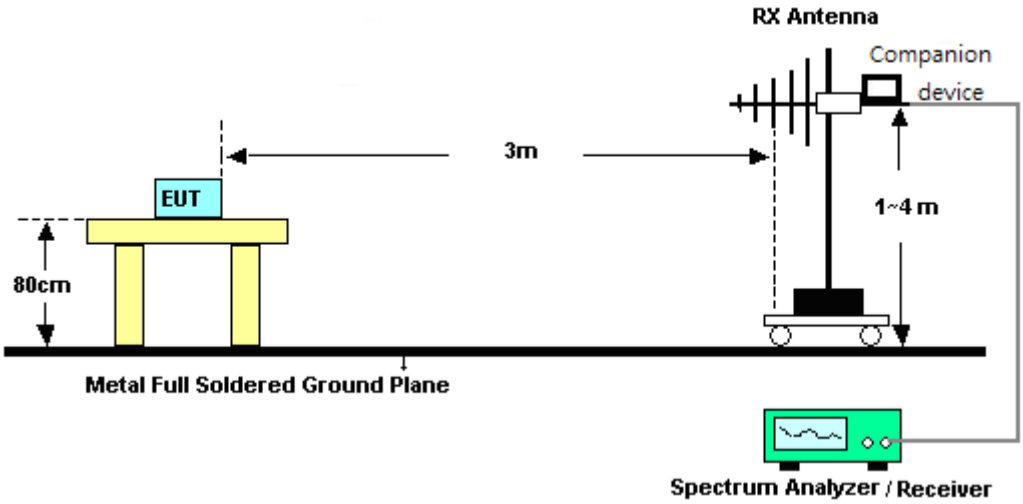


For radiated emissions from 30MHz to 1GHz

<CDD Mode>

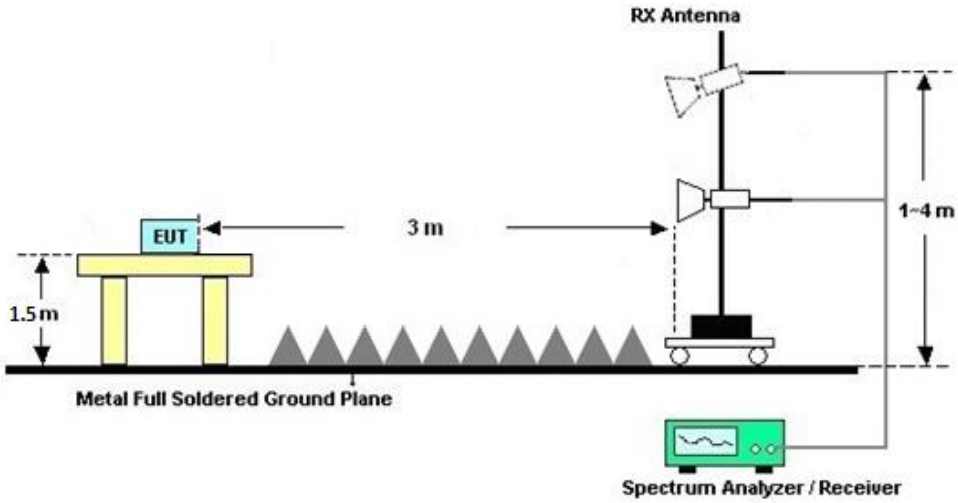


<TXBF Modes>

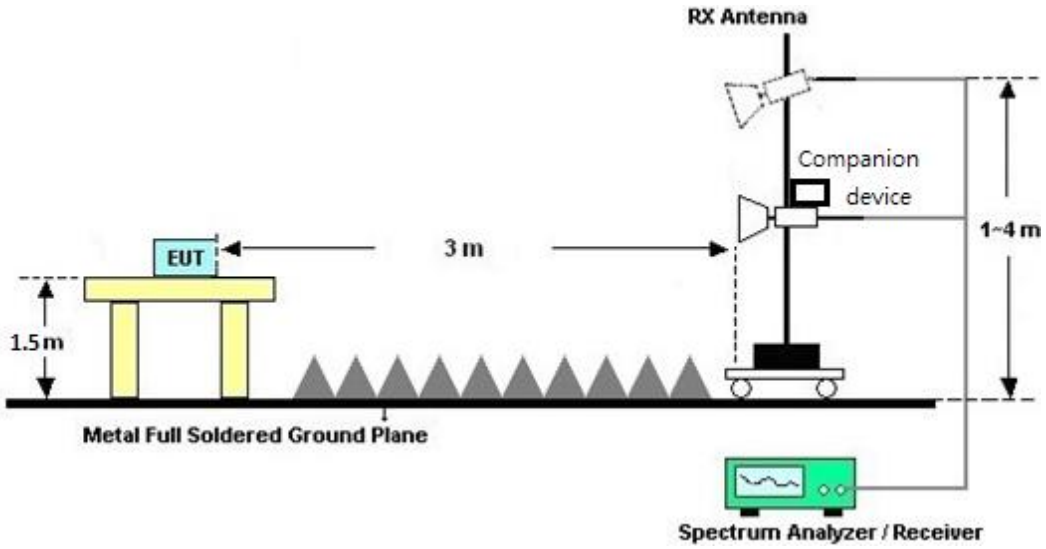


For radiated emissions above 1GHz

<CDD Mode>



<TXBF Modes>



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

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line 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 Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (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 (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

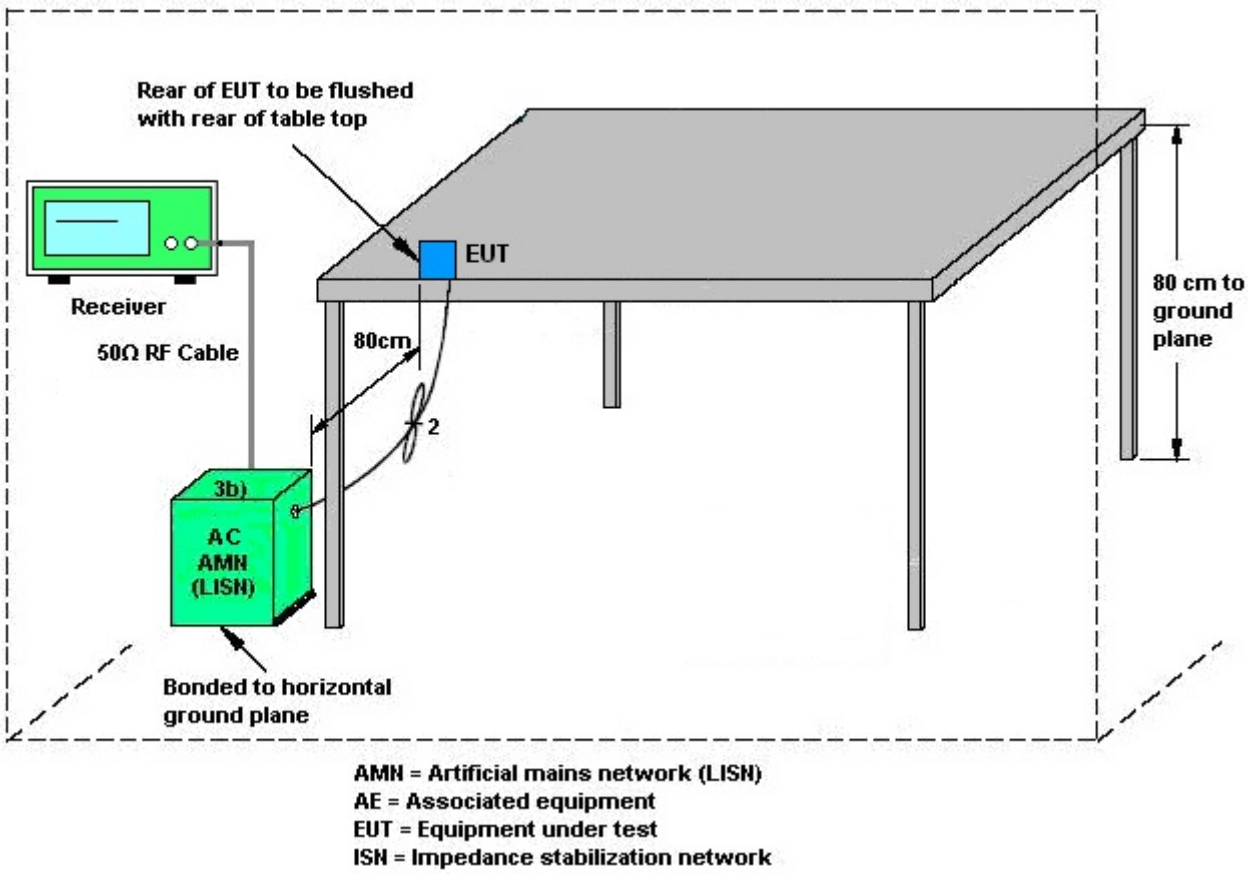
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

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[($10^{G1/20}$ + $10^{G2/20}$ + … + $10^{GN/20}$)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 kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth 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[($10^{G/10}$ + $10^{G2/10}$ + … + $10^{GN/10}$)/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	3.95	4.10	3.00	4.50	4.50	7.39	7.39	7.39	1.94	1.94

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~ Nov. 04, 2022	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Oct. 27, 2022~ Nov. 04, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Oct. 27, 2022~ Nov. 04, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 13, 2022	Dec. 07, 2022	Oct. 12, 2023	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Mar. 24, 2022	Dec. 07, 2022	Mar. 23, 2023	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Dec. 07, 2022	Oct. 15, 2023	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24 ,2022	Dec. 07, 2022	May 23, 2023	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218642	1GHz~18GHz	Apr. 18, 2022	Dec. 07, 2022	Apr. 17, 2023	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Dec. 07, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	380826	9KHz-1GHz	Jul. 11, 2022	Dec. 07, 2022	Jul. 10, 2023	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Dec. 07, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
high gain Amplifier	EM	EM01G18GA	060839	1Ghz-18Ghz	Oct. 12, 2022	Dec. 07, 2022	Oct. 11, 2023	Radiation (03CH05-KS)
Amplifier	EM	EM01G18GA	060833	1Ghz-18Ghz	Jan. 05, 2022	Dec. 07, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 07, 2022	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 07, 2022	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	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	ABP000000811	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	±0.12 %
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

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 : FR2O1817B

Test Engineer:	Liu Qiu Qiu	Temperature:	21~25	°C
Test Date:	2022/10/27~2022.11.4	Relative Humidity:	51~54	%

CDD 1S4T mode Report Number : FR2O1817B

TEST RESULTS DATA
Average Power Table

FCC U-NII-1																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail	Setting
						Ant 1	Ant 2	Ant 3	Ant 4	SUM						4Tx
HT20	MCS0	4	36	5180	1+2+3+4	19.37	19.62	19.66	19.14	25.47	30.00	4.50	29.97	-	Pass	19
HT20	MCS0	4	40	5200	1+2+3+4	20.95	21.24	21.20	20.40	26.98	30.00	4.50	31.48	-	Pass	20
HT20	MCS0	4	44	5220	1+2+3+4	20.62	20.67	20.58	20.43	26.60	30.00	4.50	31.10	-	Pass	20
HT20	MCS0	4	48	5240	1+2+3+4	20.58	20.62	20.62	20.55	26.61	30.00	4.50	31.11	-	Pass	20
HT40	MCS0	4	38	5190	1+2+3+4	16.97	17.28	16.94	17.30	23.15	30.00	4.50	27.65	-	Pass	16.5
HT40	MCS0	4	46	5230	1+2+3+4	21.58	21.64	21.33	21.85	27.62	30.00	4.50	32.12	-	Pass	20.5
VHT20	MCS0	4	36	5180	1+2+3+4	19.28	19.53	19.58	19.05	25.39	30.00	4.50	29.89	-	Pass	19
VHT20	MCS0	4	40	5200	1+2+3+4	20.58	21.20	21.16	20.37	26.86	30.00	4.50	31.36	-	Pass	20
VHT20	MCS0	4	44	5220	1+2+3+4	20.53	20.58	20.50	20.34	26.51	30.00	4.50	31.01	-	Pass	20
VHT20	MCS0	4	48	5240	1+2+3+4	20.49	20.53	20.54	20.46	26.53	30.00	4.50	31.03	-	Pass	20
VHT40	MCS0	4	38	5190	1+2+3+4	16.89	17.12	16.90	17.18	23.05	30.00	4.50	27.55	-	Pass	16.5
VHT40	MCS0	4	46	5230	1+2+3+4	21.51	21.57	21.27	21.80	27.56	30.00	4.50	32.06	-	Pass	20.5
VHT80	MCS0	4	42	5210	1+2+3+4	16.70	16.85	16.41	16.53	22.65	30.00	4.50	27.15	-	Pass	16

Report Number : FR2O1817B

TEST RESULTS DATA
26dB and 99% OBW

U-NII-1																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26 dB Bandwidth (MHz)				99% Bandwidth (MHz)				IC 99% Bandwidth EIRP Limit (dBm)			
					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	36	5180	22.10	22.45	21.55	21.60	17.08	17.08	17.03	16.93	22.33	22.33	22.31	22.29
11a	6Mbps	4	40	5200	21.65	21.70	21.60	21.60	17.13	17.13	17.03	16.98	22.34	22.34	22.31	22.30
11a	6Mbps	4	44	5220	21.60	22.55	22.55	22.05	17.13	17.13	16.98	16.98	22.34	22.34	22.30	22.30
11a	6Mbps	4	48	5240	21.85	22.55	21.55	21.45	17.08	17.13	16.98	16.98	22.33	22.34	22.30	22.30
HE20	MCS0	4	36	5180	21.75	21.65	21.70	21.60	19.18	19.13	19.18	19.13	22.83	22.82	22.83	22.82
HE20	MCS0	4	40	5200	22.85	21.85	22.60	21.70	19.23	19.23	19.18	19.23	22.84	22.84	22.83	22.84
HE20	MCS0	4	44	5220	21.90	22.85	22.55	22.75	19.18	19.18	19.23	19.23	22.83	22.83	22.84	22.84
HE20	MCS0	4	48	5240	21.80	22.15	22.85	23.00	19.28	19.18	19.18	19.23	22.85	22.83	22.83	22.84
HE40	MCS0	4	38	5190	40.86	40.32	40.59	40.50	38.06	37.86	37.96	37.86	23.01	23.01	23.01	23.01
HE40	MCS0	4	46	5230	40.86	41.40	40.59	47.61	38.16	38.16	38.16	38.16	23.01	23.01	23.01	23.01
HE80	MCS0	4	42	5210	82.40	82.08	81.92	82.24	77.20	77.20	77.32	77.20	23.01	23.01	23.01	23.01

Report Number : FR2O1817B

TEST RESULTS DATA
Average Power Table

U-NII-1																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail	Setting
						Ant 1	Ant 2	Ant 3	Ant 4	SUM						4Tx
11a	6Mbps	4	36	5180	1+2+3+4	20.03	20.24	20.38	19.27	26.02	30.00	4.50	30.52	-	Pass	20
11a	6Mbps	4	40	5200	1+2+3+4	20.36	20.56	20.36	20.39	26.44	30.00	4.50	30.94	-	Pass	20
11a	6Mbps	4	44	5220	1+2+3+4	20.45	20.78	20.76	19.94	26.52	30.00	4.50	31.02	-	Pass	20
11a	6Mbps	4	48	5240	1+2+3+4	20.37	20.40	20.38	19.66	26.23	30.00	4.50	30.73	-	Pass	19.5
HE20	MCS0	4	36	5180	1+2+3+4	19.68	19.93	19.94	19.43	25.77	30.00	4.50	30.27	-	Pass	19
HE20	MCS0	4	40	5200	1+2+3+4	20.98	21.26	21.23	20.43	27.01	30.00	4.50	31.51	-	Pass	20
HE20	MCS0	4	44	5220	1+2+3+4	20.93	20.98	20.86	20.72	26.89	30.00	4.50	31.39	-	Pass	20
HE20	MCS0	4	48	5240	1+2+3+4	20.89	20.93	20.90	20.84	26.91	30.00	4.50	31.41	-	Pass	20
HE40	MCS0	4	38	5190	1+2+3+4	17.50	17.84	17.69	17.84	23.74	30.00	4.50	28.24	-	Pass	16.5
HE40	MCS0	4	46	5230	1+2+3+4	21.64	21.71	21.48	21.93	27.71	30.00	4.50	32.21	-	Pass	20.5
HE80	MCS0	4	42	5210	1+2+3+4	17.20	17.64	17.26	17.28	23.37	30.00	4.50	27.87	-	Pass	16

Report Number : FR2O1817B

TEST RESULTS DATA
Power Spectral Density

U-NII-1														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Duty Factor (dB)				Average PSD with Duty Factor (dBm/MHz)	PSD Limit (dBm/ MHz)	DG (dBi)		Pass /Fail
						Ant 1	Ant 2	Ant 3	Ant 4					
11a	6Mbps	4	36	5180	1+2+3+4	0.23	0.23	0.23	0.21	14.38	15.61	7.39		Pass
11a	6Mbps	4	40	5200	1+2+3+4	0.23	0.23	0.23	0.21	15.15	15.61	7.39		Pass
11a	6Mbps	4	44	5220	1+2+3+4	0.23	0.23	0.23	0.21	14.85	15.61	7.39		Pass
11a	6Mbps	4	48	5240	1+2+3+4	0.23	0.23	0.23	0.21	14.73	15.61	7.39		Pass
HE20	MCS0	4	36	5180	1+2+3+4	0.10	0.10	0.08	0.08	13.29	15.61	7.39		Pass
HE20	MCS0	4	40	5200	1+2+3+4	0.10	0.10	0.08	0.08	14.77	15.61	7.39		Pass
HE20	MCS0	4	44	5220	1+2+3+4	0.10	0.10	0.08	0.08	14.84	15.61	7.39		Pass
HE20	MCS0	4	48	5240	1+2+3+4	0.10	0.10	0.08	0.08	14.87	15.61	7.39		Pass
HE40	MCS0	4	38	5190	1+2+3+4	0.17	0.17	0.17	0.17	8.70	15.61	7.39		Pass
HE40	MCS0	4	46	5230	1+2+3+4	0.17	0.17	0.17	0.17	14.12	15.61	7.39		Pass
HE80	MCS0	4	42	5210	1+2+3+4	0.34	0.32	0.34	0.34	5.73	15.61	7.39		Pass

SDM 4S4T mode

Report Number : FR2O1817B

TEST RESULTS DATA
Average Power Table

FCC U-NII-1																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail	Setting
						Ant 1	Ant 2	Ant 3	Ant 4	SUM						4Tx
HT20	MCS0	4	36	5180	1+2+3+4	19.37	19.65	19.68	19.27	25.52	30.00	1.94	27.46	-	Pass	19
HT20	MCS0	4	40	5200	1+2+3+4	22.66	22.86	22.49	22.74	28.71	30.00	1.94	30.65	-	Pass	22
HT20	MCS0	4	44	5220	1+2+3+4	22.62	22.82	22.77	22.74	28.76	30.00	1.94	30.70	-	Pass	22
HT20	MCS0	4	48	5240	1+2+3+4	22.96	22.98	22.95	22.97	28.99	30.00	1.94	30.93	-	Pass	22
HT40	MCS0	4	38	5190	1+2+3+4	16.97	17.28	16.94	17.30	23.14	30.00	1.94	25.08	-	Pass	16.5
HT40	MCS0	4	46	5230	1+2+3+4	22.20	21.91	22.10	22.17	28.11	30.00	1.94	30.05	-	Pass	21
VHT20	MCS0	4	36	5180	1+2+3+4	19.29	19.57	19.61	19.19	25.44	30.00	1.94	27.38	-	Pass	19
VHT20	MCS0	4	40	5200	1+2+3+4	22.64	22.83	22.46	22.69	28.68	30.00	1.94	30.62	-	Pass	22
VHT20	MCS0	4	44	5220	1+2+3+4	22.54	22.74	22.70	22.66	28.69	30.00	1.94	30.63	-	Pass	22
VHT20	MCS0	4	48	5240	1+2+3+4	22.88	22.90	22.88	22.89	28.91	30.00	1.94	30.85	-	Pass	22
VHT40	MCS0	4	38	5190	1+2+3+4	16.89	17.12	16.90	17.18	23.05	30.00	1.94	24.99	-	Pass	16.5
VHT40	MCS0	4	46	5230	1+2+3+4	22.17	21.79	21.88	22.14	28.02	30.00	1.94	29.96	-	Pass	21
VHT80	MCS0	4	42	5210	1+2+3+4	16.70	16.85	16.41	16.53	22.64	30.00	1.94	24.58	-	Pass	16

Report Number : FR2O1817B

TEST RESULTS DATA
26dB and 99% OBW

U-NII-1																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26 dB Bandwidth (MHz)				99% Bandwidth (MHz)				IC 99% Bandwidth EIRP Limit (dBm)			
					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	36	5180	21.75	21.65	21.70	21.60	19.18	19.13	19.18	19.13	22.83	22.82	22.83	22.82
HE20	MCS0	4	40	5200	22.85	21.85	22.60	21.70	19.23	19.23	19.18	19.23	22.84	22.84	22.83	22.84
HE20	MCS0	4	44	5220	21.90	22.85	22.55	22.75	19.18	19.18	19.23	19.23	22.83	22.83	22.84	22.84
HE20	MCS0	4	48	5240	21.80	22.15	22.85	23.00	19.28	19.18	19.18	19.23	22.85	22.83	22.83	22.84
HE40	MCS0	4	38	5190	40.86	40.32	40.59	40.50	38.06	37.86	37.96	37.86	23.01	23.01	23.01	23.01
HE40	MCS0	4	46	5230	40.86	41.40	40.59	47.61	38.16	38.16	38.16	38.16	23.01	23.01	23.01	23.01
HE80	MCS0	4	42	5210	82.40	82.08	81.92	82.24	77.20	77.20	77.32	77.20	23.01	23.01	23.01	23.01

Report Number : FR2O1817B

TEST RESULTS DATA
Average Power Table

U-NII-1																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail	Setting
						Ant 1	Ant 2	Ant 3	Ant 4	SUM						4Tx
HE20	MCS0	4	36	5180	1+2+3+4	19.66	19.94	19.94	19.54	25.80	30.00	1.94	27.74	-	Pass	19
HE20	MCS0	4	40	5200	1+2+3+4	22.74	22.95	22.60	22.80	28.80	30.00	1.94	30.74	-	Pass	22
HE20	MCS0	4	44	5220	1+2+3+4	22.91	23.11	23.03	23.01	29.04	30.00	1.94	30.98	-	Pass	22
HE20	MCS0	4	48	5240	1+2+3+4	23.25	23.27	23.21	23.24	29.27	30.00	1.94	31.21	-	Pass	22
HE40	MCS0	4	38	5190	1+2+3+4	17.50	17.84	17.69	17.84	23.74	30.00	1.94	25.68	-	Pass	16.5
HE40	MCS0	4	46	5230	1+2+3+4	22.33	22.07	22.23	22.33	28.26	30.00	1.94	30.20	-	Pass	21
HE80	MCS0	4	42	5210	1+2+3+4	17.20	17.64	17.26	17.28	23.37	30.00	1.94	25.31	-	Pass	16

Report Number : FR2O1817B

TEST RESULTS DATA
Power Spectral Density

U-NII-1														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Duty Factor (dB)				Average PSD with Duty Factor (dBm/MHz)	PSD Limit (dBm/ MHz)	DG (dBi)		Pass /Fail
						Ant 1	Ant 2	Ant 3	Ant 4					
HE20	MCS0	4	36	5180	1+2+3+4	0.10	0.10	0.08	0.08	13.29	17.00	1.94		Pass
HE20	MCS0	4	40	5200	1+2+3+4	0.10	0.10	0.08	0.08	16.32	17.00	1.94		Pass
HE20	MCS0	4	44	5220	1+2+3+4	0.10	0.10	0.08	0.08	16.20	17.00	1.94		Pass
HE20	MCS0	4	48	5240	1+2+3+4	0.10	0.10	0.08	0.08	16.40	17.00	1.94		Pass
HE40	MCS0	4	38	5190	1+2+3+4	0.17	0.17	0.17	0.17	8.70	17.00	1.94		Pass
HE40	MCS0	4	46	5230	1+2+3+4	0.17	0.17	0.17	0.17	12.51	17.00	1.94		Pass
HE80	MCS0	4	42	5210	1+2+3+4	0.34	0.32	0.34	0.34	5.73	17.00	1.94		Pass

TX-Beamforming 1S4T mode

Report Number : FR2O1817B

TEST RESULTS DATA
Average Power Table

U-NII-1																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail	Setting
						Ant 1	Ant 2	Ant 3	Ant 4	SUM						4Tx
HT20	MCS0	4	36	5180	1+2+3+4	17.06	17.26	17.27	16.66	23.09	28.61	7.39	30.48	-	Pass	16.5
HT20	MCS0	4	40	5200	1+2+3+4	20.72	20.93	20.77	20.71	26.80	28.61	7.39	34.19	-	Pass	20
HT20	MCS0	4	44	5220	1+2+3+4	20.62	20.67	20.58	20.43	26.60	28.61	7.39	33.99	-	Pass	20
HT20	MCS0	4	48	5240	1+2+3+4	20.58	20.62	20.62	20.55	26.61	28.61	7.39	34.00	-	Pass	20
HT40	MCS0	4	38	5190	1+2+3+4	13.71	13.96	13.83	13.96	19.88	28.61	7.39	27.27	-	Pass	13
HT40	MCS0	4	46	5230	1+2+3+4	21.49	21.62	21.37	21.78	27.59	28.61	7.39	34.98	-	Pass	20.5
VHT20	MCS0	4	36	5180	1+2+3+4	17.04	17.20	17.23	16.62	23.05	28.61	7.39	30.44	-	Pass	16.5
VHT20	MCS0	4	40	5200	1+2+3+4	20.68	20.88	20.73	20.67	26.77	28.61	7.39	34.16	-	Pass	20
VHT20	MCS0	4	44	5220	1+2+3+4	20.53	20.58	20.50	20.34	26.51	28.61	7.39	33.90	-	Pass	20
VHT20	MCS0	4	48	5240	1+2+3+4	20.49	20.53	20.54	20.46	26.53	28.61	7.39	33.92	-	Pass	20
VHT40	MCS0	4	38	5190	1+2+3+4	13.65	13.89	13.74	13.89	19.81	28.61	7.39	27.20	-	Pass	13
VHT40	MCS0	4	46	5230	1+2+3+4	21.42	21.54	21.33	21.70	27.52	28.61	7.39	34.91	-	Pass	20.5
VHT80	MCS0	4	42	5210	1+2+3+4	12.68	12.94	12.50	12.89	18.77	28.61	7.39	26.16	-	Pass	14

Report Number : FR2O1817B

TEST RESULTS DATA
26dB and 99% OBW

U-NII-1																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26 dB Bandwidth (MHz)				99% Bandwidth (MHz)				IC 99% Bandwidth EIRP Limit (dBm)			
					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	36	5180	21.75	21.65	21.70	21.60	19.18	19.13	19.18	19.13	22.83	22.82	22.83	22.82
HE20	MCS0	4	40	5200	21.75	21.75	21.60	21.70	19.18	19.18	19.18	19.18	22.83	22.83	22.83	22.83
HE20	MCS0	4	44	5220	22.05	21.75	21.70	21.60	19.18	19.13	19.13	19.13	22.83	22.82	22.82	22.82
HE20	MCS0	4	48	5240	21.95	21.60	21.65	21.95	19.23	19.13	19.13	19.13	22.84	22.82	22.82	22.82
HE40	MCS0	4	38	5190	40.86	40.32	40.59	40.50	38.06	37.86	37.96	37.86	23.01	23.01	23.01	23.01
HE40	MCS0	4	46	5230	40.86	41.40	40.59	47.61	38.16	38.16	38.16	38.16	23.01	23.01	23.01	23.01
HE80	MCS0	4	42	5210	82.40	82.08	81.92	82.24	77.20	77.20	77.32	77.20	23.01	23.01	23.01	23.01

Report Number : FR2O1817B

TEST RESULTS DATA
Average Power Table

U-NII-1																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail	Setting
						Ant 1	Ant 2	Ant 3	Ant 4	SUM						4Tx
HE20	MCS0	4	36	5180	1+2+3+4	17.13	17.36	17.31	16.78	23.18	28.61	7.39	30.57	-	Pass	16.5
HE20	MCS0	4	40	5200	1+2+3+4	20.78	21.02	20.82	20.79	26.88	28.61	7.39	34.27	-	Pass	20
HE20	MCS0	4	44	5220	1+2+3+4	20.93	20.98	20.86	20.72	26.90	28.61	7.39	34.29	-	Pass	20
HE20	MCS0	4	48	5240	1+2+3+4	20.89	20.93	20.90	20.84	26.92	28.61	7.39	34.31	-	Pass	20
HE40	MCS0	4	38	5190	1+2+3+4	13.82	14.04	13.95	14.07	19.99	28.61	7.39	27.38	-	Pass	13
HE40	MCS0	4	46	5230	1+2+3+4	21.64	21.71	21.48	21.93	27.71	28.61	7.39	35.10	-	Pass	20.5
HE80	MCS0	4	42	5210	1+2+3+4	12.87	13.09	12.70	13.06	18.95	28.61	7.39	26.34	-	Pass	12

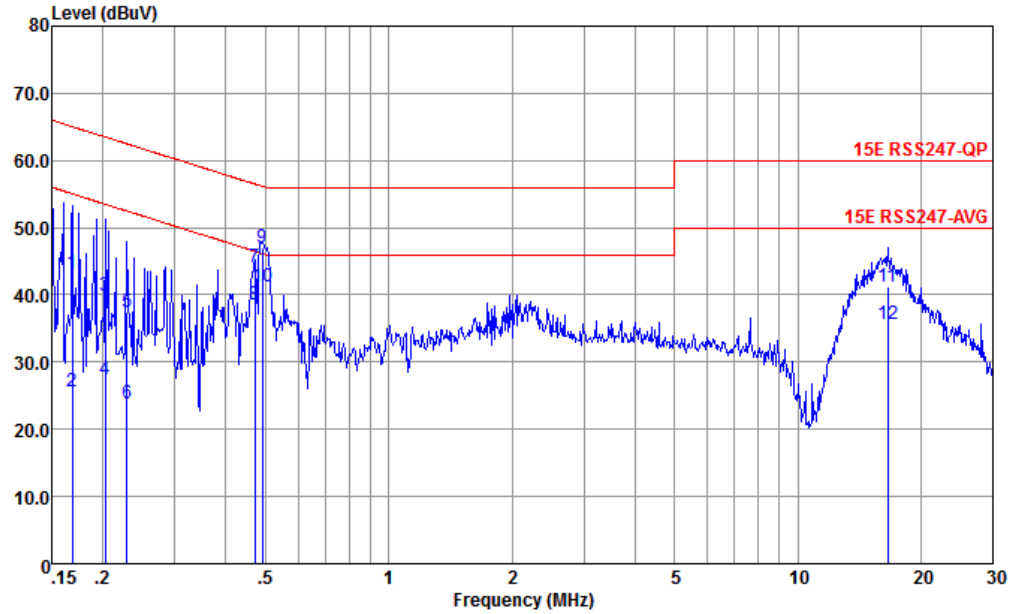
Report Number : FR2O1817B

TEST RESULTS DATA
Power Spectral Density

U-NII-1														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Duty Factor (dB)				Average PSD with Duty Factor (dBm/MHz)	PSD Limit (dBm/ MHz)	DG (dBi)		Pass /Fail
						Ant 1	Ant 2	Ant 3	Ant 4					
HE20	MCS0	4	36	5180	1+2+3+4	0.10	0.10	0.08	0.08	10.95	15.61	7.39		Pass
HE20	MCS0	4	40	5200	1+2+3+4	0.10	0.10	0.08	0.08	14.51	15.61	7.39		Pass
HE20	MCS0	4	44	5220	1+2+3+4	0.10	0.10	0.08	0.08	14.84	15.61	7.39		Pass
HE20	MCS0	4	48	5240	1+2+3+4	0.10	0.10	0.08	0.08	14.87	15.61	7.39		Pass
HE40	MCS0	4	38	5190	1+2+3+4	0.17	0.17	0.17	0.17	5.19	15.61	7.39		Pass
HE40	MCS0	4	46	5230	1+2+3+4	0.17	0.17	0.17	0.17	12.61	15.61	7.39		Pass
HE80	MCS0	4	42	5210	1+2+3+4	0.34	0.32	0.34	0.34	1.56	15.61	7.39		Pass

Appendix B. AC Conducted Emission Test Results

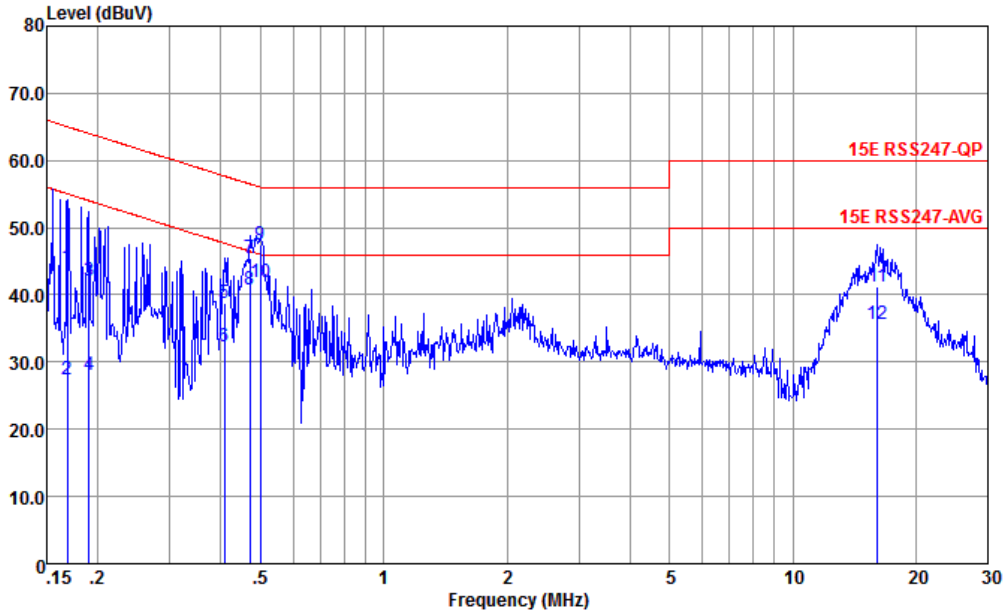
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



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

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.169	43.28	-21.75	65.03	32.80	0.05	10.43	QP
2		0.169	25.58	-29.45	55.03	15.10	0.05	10.43	Average
3		0.203	39.94	-23.55	63.49	29.50	0.02	10.42	QP
4		0.203	27.34	-26.15	53.49	16.90	0.02	10.42	Average
5		0.229	37.33	-25.15	62.48	26.90	0.03	10.40	QP
6		0.229	23.93	-28.55	52.48	13.50	0.03	10.40	Average
7		0.471	44.11	-12.38	56.49	33.90	-0.02	10.23	QP
8		0.471	38.51	-7.98	46.49	28.30	-0.02	10.23	Average
9		0.491	47.09	-9.05	56.14	36.90	-0.03	10.22	QP
10	*	0.491	41.29	-4.85	46.14	31.10	-0.03	10.22	Average
11		16.573	41.22	-18.78	60.00	30.20	-0.25	11.27	QP
12		16.573	35.65	-14.35	50.00	24.63	-0.25	11.27	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		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	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	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:

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

Test Engineer :	Carry Xu	Temperature :	22~23°C
		Relative Humidity :	41~42%

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

CDD 1S4T

UNII-1 - 5150~5250MHz

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 36 5180MHz		5150	64.86	-9.14	74	56.57	34.42	10.6	36.73	219	134	P	H
		5145.28	51.83	-2.17	54	43.54	34.42	10.6	36.73	219	134	A	H
		5176	117.06	-	-	108.66	34.45	10.64	36.69	219	134	P	H
		5176	110.03	-	-	101.63	34.45	10.64	36.69	219	134	A	H
		5147.36	69.82	-4.18	74	61.53	34.42	10.6	36.73	194	174	P	V
		5148.32	53.42	-0.58	54	45.13	34.42	10.6	36.73	194	174	A	V
		5188	117.51	-	-	109.11	34.45	10.64	36.69	194	174	P	V
		5188	110.6	-	-	102.2	34.45	10.64	36.69	194	174	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 36 5180MHz		10355	48.74	-19.56	68.3	62.95	37.38	15.44	67.03	300	0	P	H
		10366	52.41	-15.89	68.3	66.58	37.39	15.46	67.02	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 36 5180MHz		5150	67.19	-6.81	74	58.9	34.42	10.6	36.73	244	118	P	H
		5146.88	51.87	-2.13	54	43.58	34.42	10.6	36.73	244	118	A	H
		5182	116.72	-	-	108.32	34.45	10.64	36.69	244	118	P	H
		5182	108.48	-	-	100.08	34.45	10.64	36.69	244	118	A	H
		5146.08	67.24	-6.76	74	58.95	34.42	10.6	36.73	184	190	P	V
		5146.24	52.71	-1.29	54	44.42	34.42	10.6	36.73	184	190	A	V
		5188	117.39	-	-	108.99	34.45	10.64	36.69	184	190	P	V
		5188	109.46	-	-	101.06	34.45	10.64	36.69	184	190	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 36 5180MHz		10355	46.98	-21.32	68.3	61.19	37.38	15.44	67.03	300	0	P	H
		10355	48.27	-20.03	68.3	62.48	37.38	15.44	67.03	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 38 5190MHz		5147.52	66.18	-7.82	74	57.89	34.42	10.6	36.73	231	125	P	H
		5148.96	52.82	-1.18	54	44.53	34.42	10.6	36.73	231	125	A	H
		5200	113.46	-	-	105.02	34.46	10.66	36.68	231	125	P	H
		5200	103.7	-	-	95.26	34.46	10.66	36.68	231	125	A	H
		5372.1	52.53	-21.47	74	43.69	34.59	10.76	36.51	231	125	P	H
		5350	42.67	-11.33	54	33.86	34.58	10.75	36.52	231	125	A	H
		5145.44	66.12	-7.88	74	57.83	34.42	10.6	36.73	149	193	P	V
		5146.24	52.1	-1.9	54	43.81	34.42	10.6	36.73	149	193	A	V
		5194	112.46	-	-	104.02	34.46	10.66	36.68	149	193	P	V
		5194	104.86	-	-	96.42	34.46	10.66	36.68	149	193	A	V
		5351.94	52.63	-21.37	74	43.82	34.58	10.75	36.52	149	193	P	V
		5375.88	42.99	-11.01	54	34.15	34.59	10.76	36.51	149	193	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 38 5190MHz		10377	45.23	-23.07	68.3	59.36	37.41	15.47	67.01	300	0	P	H
		10377	45.42	-22.88	68.3	59.55	37.41	15.47	67.01	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 42 5210MHz		5124.96	67.37	-6.63	74	59.12	34.41	10.58	36.74	241	122	P	H
		5146.4	52.98	-1.02	54	44.69	34.42	10.6	36.73	241	122	A	H
		5200	109.59	-	-	101.15	34.46	10.66	36.68	241	122	P	H
		5200	101.89	-	-	93.45	34.46	10.66	36.68	241	122	A	H
		5361.84	54.92	-19.08	74	46.08	34.59	10.76	36.51	241	122	P	H
		5357.34	44.12	-9.88	54	35.31	34.58	10.75	36.52	241	122	A	H
		5141.76	63.75	-10.25	74	55.46	34.42	10.6	36.73	141	190	P	V
		5145.6	52.56	-1.44	54	44.27	34.42	10.6	36.73	141	190	A	V
		5194	110.06	-	-	101.62	34.46	10.66	36.68	141	190	P	V
		5194	101.23	-	-	92.79	34.46	10.66	36.68	141	190	A	V
		5355.36	53.91	-20.09	74	45.1	34.58	10.75	36.52	141	190	P	V
		5355.72	44.33	-9.67	54	35.52	34.58	10.75	36.52	141	190	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 HE80 Full CH 42 5210MHz		10421	44.24	-24.06	68.3	58.29	37.43	15.51	66.99	300	0	P	H
		10421	45.68	-22.62	68.3	59.73	37.43	15.51	66.99	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

SDM 4S4T

UNII-1 - 5150~5250MHz

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 36 5180MHz		5149.12	64.12	-9.88	74	56.35	34.22	10.6	37.05	288	278	P	H
		5149.44	50.7	-3.3	54	42.93	34.22	10.6	37.05	288	278	A	H
		5188	114.66	-	-	106.74	34.27	10.64	36.99	288	278	P	H
		5188	107.04	-	-	99.12	34.27	10.64	36.99	288	278	A	H
		5149.28	64.39	-9.61	74	56.62	34.22	10.6	37.05	219	323	P	V
		5149.28	53.39	-0.61	54	45.62	34.22	10.6	37.05	219	323	A	V
		5176	115.98	-	-	108.06	34.27	10.64	36.99	219	323	P	V
		5176	109.49	-	-	101.57	34.27	10.64	36.99	219	323	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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.
SDM 4S4T		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE20 Full CH 36 5180MHz		10355	46.27	-22.03	68.3	60.52	37.45	15.44	67.14	300	0	P	H
		10355	46.67	-21.63	68.3	60.92	37.45	15.44	67.14	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

WIFI 802.11ax HE40 Full (Band Edge @ 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 38 5190MHz		5149.92	66.03	-7.97	74	58.26	34.22	10.6	37.05	117	287	P	H
		5149.92	53.42	-0.58	54	45.65	34.22	10.6	37.05	117	287	A	H
		5200	111.47	-	-	103.47	34.3	10.66	36.96	117	287	P	H
		5200	101.55	-	-	93.55	34.3	10.66	36.96	117	287	A	H
		5399.64	53.31	-20.69	74	44.5	34.6	10.78	36.57	117	287	P	H
		5375.16	43.63	-10.37	54	34.95	34.55	10.76	36.63	117	287	A	H
		5146.56	64.12	-9.88	74	56.35	34.22	10.6	37.05	201	6	P	V
		5149.28	53.44	-0.56	54	45.67	34.22	10.6	37.05	201	6	A	V
		5200	112.51	-	-	104.51	34.3	10.66	36.96	201	6	P	V
		5200	102.98	-	-	94.98	34.3	10.66	36.96	201	6	A	V
		5382.18	52.91	-21.09	74	44.17	34.57	10.77	36.6	201	6	P	V
		5377.5	43.85	-10.15	54	35.12	34.57	10.76	36.6	201	6	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 38 5190MHz		10377	44.47	-23.83	68.3	58.66	37.47	15.47	67.13	300	0	P	H
		10377	45.61	-22.69	68.3	59.8	37.47	15.47	67.13	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

WIFI 802.11ax HE80 Full (Band Edge @ 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 CH 42 5210MHz		5141.28	62.68	-11.32	74	54.91	34.22	10.6	37.05	115	286	P	H
		5141.44	52.82	-1.18	54	45.05	34.22	10.6	37.05	115	286	A	H
		5200	108.09	-	-	100.09	34.3	10.66	36.96	115	286	P	H
		5200	99.33	-	-	91.33	34.3	10.66	36.96	115	286	A	H
		5357.34	53.3	-20.7	74	44.7	34.52	10.75	36.67	115	286	P	H
		5354.46	45.19	-8.81	54	36.59	34.52	10.75	36.67	115	286	A	H
		5119.2	58.12	-15.88	74	50.49	34.17	10.58	37.12	321	182	P	V
		5117.44	49.26	-4.74	54	41.63	34.17	10.58	37.12	321	182	A	V
		5236	108.48	-	-	100.34	34.35	10.68	36.89	321	182	P	V
		5236	100.85	-	-	92.71	34.35	10.68	36.89	321	182	A	V
		5353.74	56.12	-17.88	74	47.52	34.52	10.75	36.67	321	182	P	V
		5350.14	46.58	-7.42	54	37.98	34.52	10.75	36.67	321	182	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 CH 42 5210MHz		10421	44.52	-23.78	68.3	58.63	37.5	15.51	67.12	300	0	P	H
		10421	45.98	-22.32	68.3	60.09	37.5	15.51	67.12	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

TX-BF 1S4T mode

UNII-1 - 5150~5250MHz

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.
BF 1S4T		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE20 Full CH 36 5180MHz		5149.76	69.19	-4.81	74	61.42	34.22	10.6	37.05	166	239	P	H
		5148.96	53.39	-0.61	54	45.62	34.22	10.6	37.05	166	239	A	H
		5194	119.03	-	-	111.03	34.3	10.66	36.96	166	239	P	H
		5194	113.24	-	-	105.24	34.3	10.66	36.96	166	239	A	H
		5149.76	67.94	-6.06	74	60.17	34.22	10.6	37.05	159	189	P	V
		5150	52.1	-1.9	54	44.33	34.22	10.6	37.05	159	189	A	V
		5206	120.9	-	-	112.9	34.3	10.66	36.96	159	189	P	V
		5206	113.5	-	-	105.5	34.3	10.66	36.96	159	189	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 36 5180MHz		10399	50.42	-17.88	68.3	64.57	37.48	15.49	67.12	300	0	P	H
		15602	55.54	-18.46	74	60.47	40.14	19.09	64.16	232	155	P	H
		15602	46.54	-7.46	54	51.47	40.14	19.09	64.16	232	155	A	H
		10399	50.47	-17.83	68.3	64.62	37.48	15.49	67.12	100	0	P	V
		15624	55.57	-18.43	74	60.47	40.16	19.1	64.16	331	185	P	V
		15624	46.06	-7.94	54	50.96	40.16	19.1	64.16	331	185	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 46 5230MHz		5140	63.11	-10.89	74	55.34	34.22	10.6	37.05	138	239	P	H
		5148.48	52.76	-1.24	54	44.99	34.22	10.6	37.05	138	239	A	H
		5356.44	56.69	-17.31	74	48.09	34.52	10.75	36.67	138	239	P	H
		5350.14	46.91	-7.09	54	38.31	34.52	10.75	36.67	138	239	A	H
		5236	117.44	-	-	109.3	34.35	10.68	36.89	138	239	P	H
		5236	109.68	-	-	101.54	34.35	10.68	36.89	138	239	A	H
		5149.92	64.27	-9.73	74	56.5	34.22	10.6	37.05	204	183	P	V
		5148	53.14	-0.86	54	45.37	34.22	10.6	37.05	204	183	A	V
		5350.86	57	-17	74	48.4	34.52	10.75	36.67	204	183	P	V
		5351.4	46.17	-7.83	54	37.57	34.52	10.75	36.67	204	183	A	V
		5224	116.98	-	-	108.9	34.33	10.67	36.92	204	183	P	V
		5224	108.52	-	-	100.44	34.33	10.67	36.92	204	183	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 46 5230MHz		10465	49.31	-18.99	68.3	63.27	37.47	15.54	66.97	300	0	P	H
		15723	58.95	-15.05	74	63.29	40.99	19.17	64.5	310	10	P	H
		15723	48.47	-5.53	54	52.81	40.99	19.17	64.5	310	10	A	H
		10443	50.5	-17.8	68.3	64.51	37.45	15.53	66.99	100	0	P	V
		15679	58.45	-15.55	74	62.95	40.88	19.14	64.52	100	0	P	V
		15679	48.81	-5.19	54	53.31	40.88	19.14	64.52	314	346	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 42 5210MHz		5148.64	66.1	-7.9	74	57.81	34.42	10.6	36.73	176	262	P	H
		5148.8	53.14	-0.86	54	44.85	34.42	10.6	36.73	176	262	A	H
		5194	107.34	-	-	98.9	34.46	10.66	36.68	176	262	P	H
		5194	97.68	-	-	89.24	34.46	10.66	36.68	176	262	A	H
		5356.26	51.08	-22.92	74	42.27	34.58	10.75	36.52	176	262	P	H
		5379.84	42.57	-11.43	54	33.68	34.61	10.77	36.49	176	262	A	H
		5112	60.54	-13.46	74	52.35	34.39	10.56	36.76	100	160	P	V
		5148.32	47.13	-6.87	54	38.84	34.42	10.6	36.73	100	160	A	V
		5248	106.57	-	-	98	34.5	10.69	36.62	100	160	P	V
		5248	97.63	-	-	89.06	34.5	10.69	36.62	100	160	A	V
		5356.08	51.92	-22.08	74	43.11	34.58	10.75	36.52	100	160	P	V
		5352.84	41.14	-12.86	54	32.33	34.58	10.75	36.52	100	160	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

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 CH 42 5210MHz		10421	44.94	-23.36	68.3	58.99	37.43	15.51	66.99	300	0	P	H
		10421	44.41	-23.89	68.3	58.46	37.43	15.51	66.99	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 HE40 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 HE40 CH38 Full LF		86.26	25.71	-14.29	40	42.74	14.39	1.41	32.83	-	-	P	H
		184.23	23.47	-20.03	43.5	38.51	15.73	2.06	32.83	-	-	P	H
		300.63	26.51	-19.49	46	37.35	19.34	2.64	32.82	-	-	P	H
		513.06	32.2	-13.8	46	37.72	23.99	3.46	32.97	-	-	P	H
		527.61	33.38	-12.62	46	38.46	24.43	3.51	33.02	-	-	P	H
		538.28	32.48	-13.52	46	37.25	24.76	3.54	33.07	-	-	P	H
		48.43	34.51	-5.49	40	51.35	15.04	1.05	32.93	124	36	P	V
		139.61	29.68	-13.82	43.5	44.15	16.56	1.8	32.83	-	-	P	V
		254.07	24.62	-21.38	46	36.46	18.49	2.44	32.77	-	-	P	V
		511.12	39.86	-6.14	46	45.44	23.93	3.45	32.96	-	-	P	V
		541.19	38.34	-7.66	46	43.02	24.85	3.55	33.08	-	-	P	V
		624.61	30.56	-15.44	46	34.68	25.08	3.81	33.01	-	-	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 CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. 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)

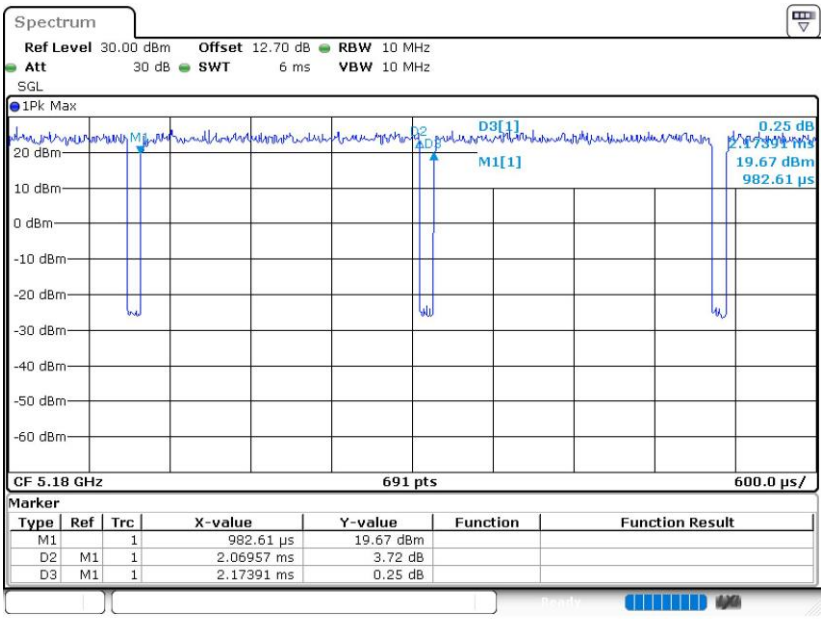
= -10.46(dB)

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

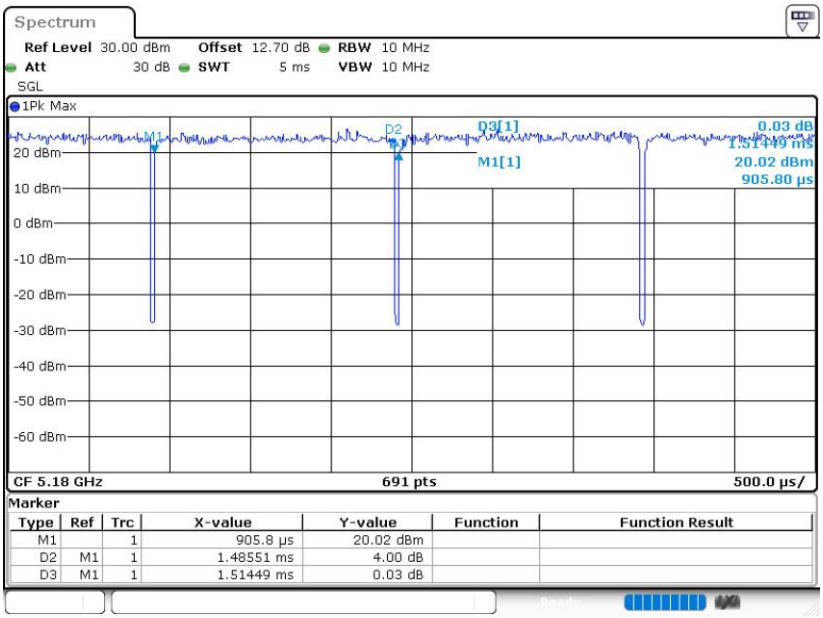
Appendix D. Duty Cycle Plots

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

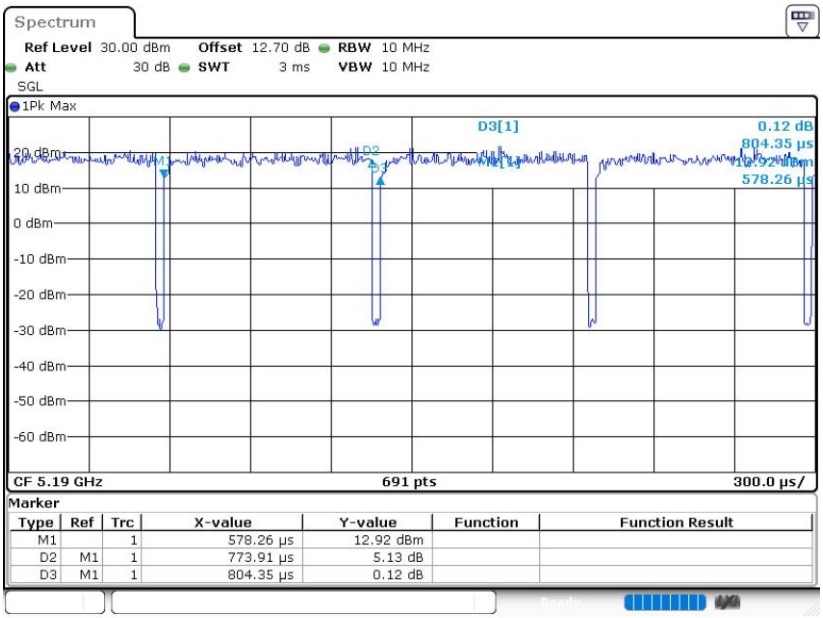
802.11a



802.11ax HE20



802.11ax HE40



802.11ax HE80