FCC RF Test Report

APPLICANT	:	Motorola Solutions, Inc.
EQUIPMENT	:	WAVE TWO-WAY RADIO TLK 100
BRAND NAME	:	Motorola
MODEL NAME	:	TLK 100
MODEL NUMBER	:	HK2112A
FCC ID	:	AZ489FT7117
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Jul. 17, 2022 ~ Sep. 14, 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.

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
FR850818-02B	Rev. 01	Initial issue of report	Nov. 10, 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 11.47 dB at 30.00 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 17.80 dB at 3.681 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/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

Motorola Solutions, Inc.
8000 West Sunrise Blvd., Ft Lauderdale, Florida 33322, United States

1.2 Manufacturer

Motorola Solutions, Inc.
8000 West Sunrise Blvd., Ft Lauderdale, Florida 33322, United States

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	WAVE TWO-WAY RADIO TLK 100
Brand Name	Motorola
Model Name	TLK 100
Model Number	HK2112A
FCC ID	AZ489FT7117
EUT supports Radios application	LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
IMEI Code	Conducted: 355661090006370 Conduction: N/A Radiation: N/A
HW Version	P3
SW Version	TLK100_BASE_ENG_R03_05_01
EUT Stage	Production Unit

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	802.11a : 15.12 dBm / 0.0325 W 802.11n HT20 : 13.03 dBm / 0.0201 W 802.11n HT40 : 12.04 dBm / 0.0160 W 802.11ac VHT20 : 12.30 dBm / 0.0170 W 802.11ac VHT40 : 11.56 dBm / 0.0143 W 802.11ac VHT80 : 10.86 dBm / 0.0122 W
99% Occupied Bandwidth	802.11a : 16.83 MHz 802.11n HT20 : 17.78 MHz 802.11n HT40 : 36.06 MHz 802.11ac VHT20 : 17.38 MHz 802.11ac VHT40 : 35.96 MHz 802.11ac VHT80 : 74.93 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	Internal FPC Antenna with gain 1.00 dBi

1.5 Modification of EUT

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

1.6 Testing Location

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

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH03-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH03-KS	AUDIX	E3	6.2009-8-24a
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

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

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

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y/Z 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 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

2.2 Test Mode

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

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

AC Conducted Emission	Mode 1 : LTE Band 2 Idle + Bluetooth Link + WLAN Link (2.4G) + Earphone 1 + Battery + Adapter 1 Mode 2 : LTE Band 4 Idle + Bluetooth Link + WLAN Link (2.4G) + Earphone 2 + Battery + Adapter 1 Mode 3 : LTE Band 5 Idle + Bluetooth Link + WLAN Link (2.4G) + Earphone 3 + Battery + Adapter 1 Mode 4 : LTE Band 13 Idle + Bluetooth Link + WLAN Link (2.4G) + Earphone 4 + Battery + Adapter 1 Mode 5 : LTE Band 2 Idle + Bluetooth Link + WLAN Link (2.4G) + Earphone 5 + Battery + Adapter 1

Remark:

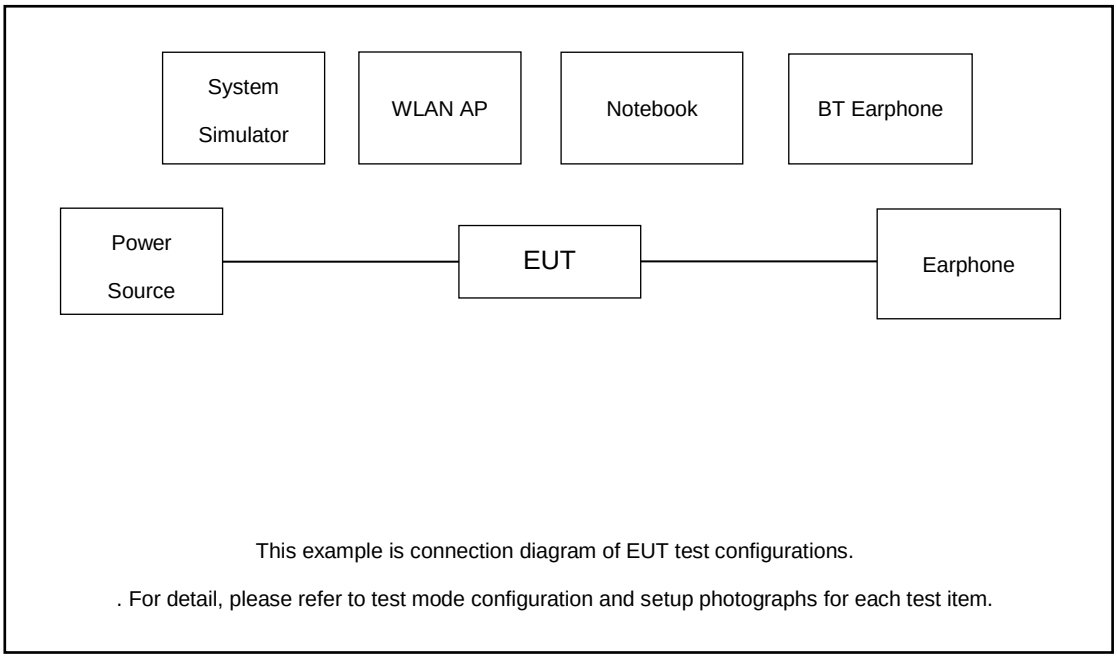
1. The worst case of conducted emission is mode 1; only the test data of it was reported.
2. For Radiated Test Cases, The tests were performed with Adapter1, Earphone2 and Battery.

Ch. #		U-NII-3 : 5745-5825 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

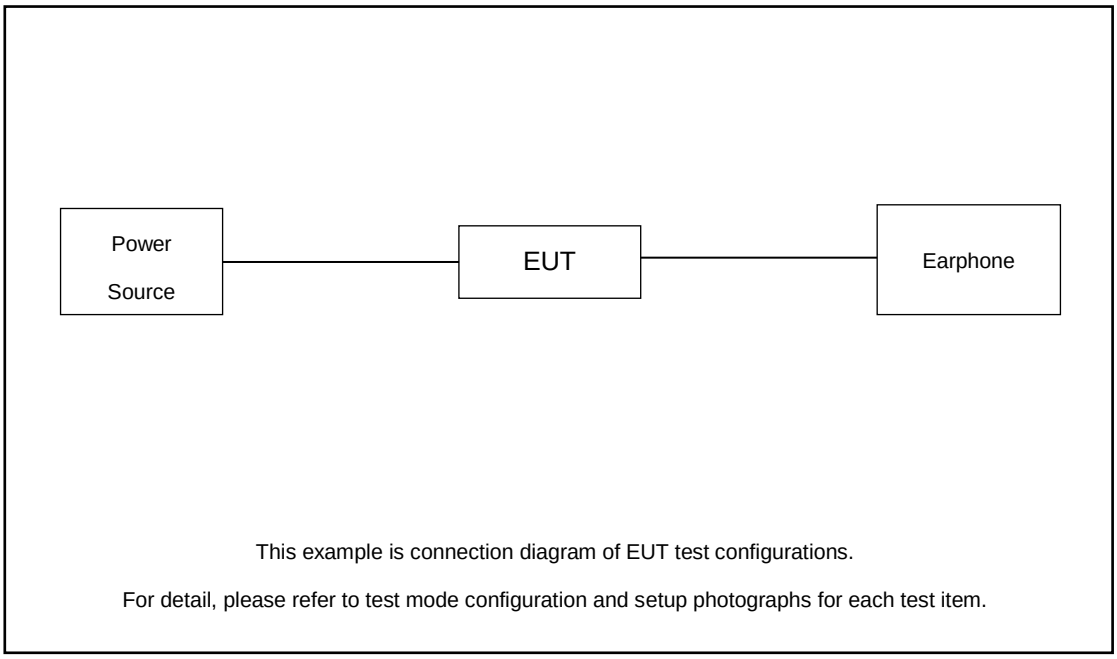
Ch. #		U-NII-3 : 5745-5825 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	149	151	-	151
M	157	-	155	-
H	165	159	-	159

2.3 Connection Diagram of Test System

AC Conducted Emission:



Radiated Emission:



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Mobile Phone	ZTE	A1	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/receive.

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss

Following shows an offset computation example with cable loss 6.5 dB.

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

= 6.5 (dB)

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

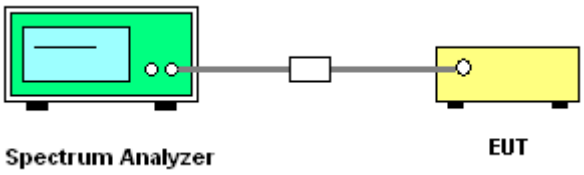
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

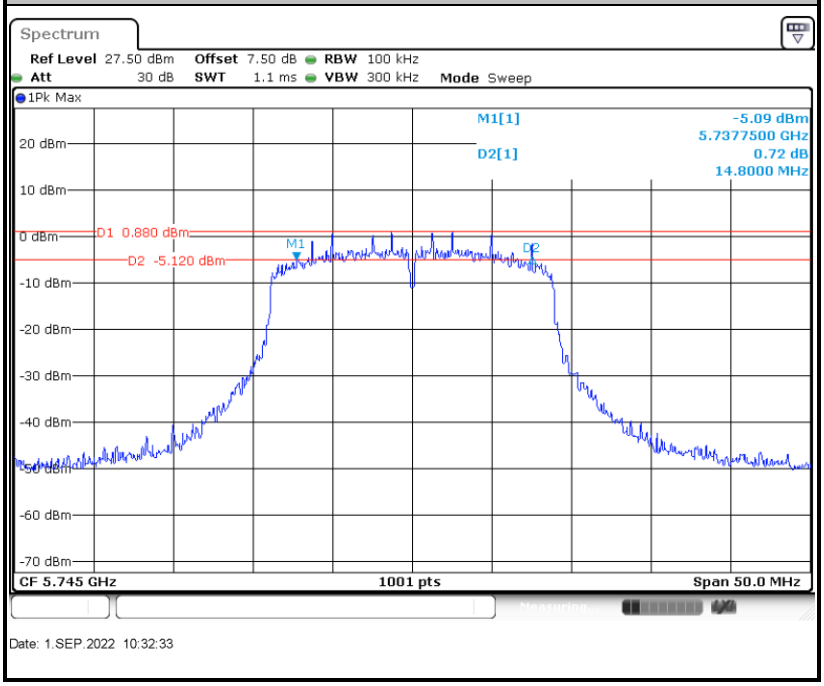
3.1.4 Test Setup



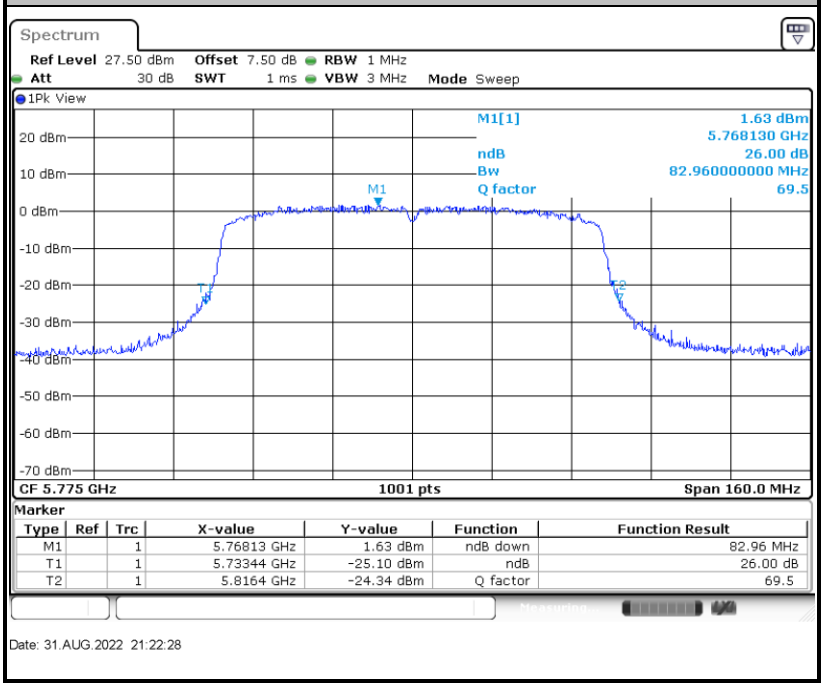
3.1.5 Test Result of 6dB and 26dB and 99% Occupied Bandwidth

Please refer to Appendix A.

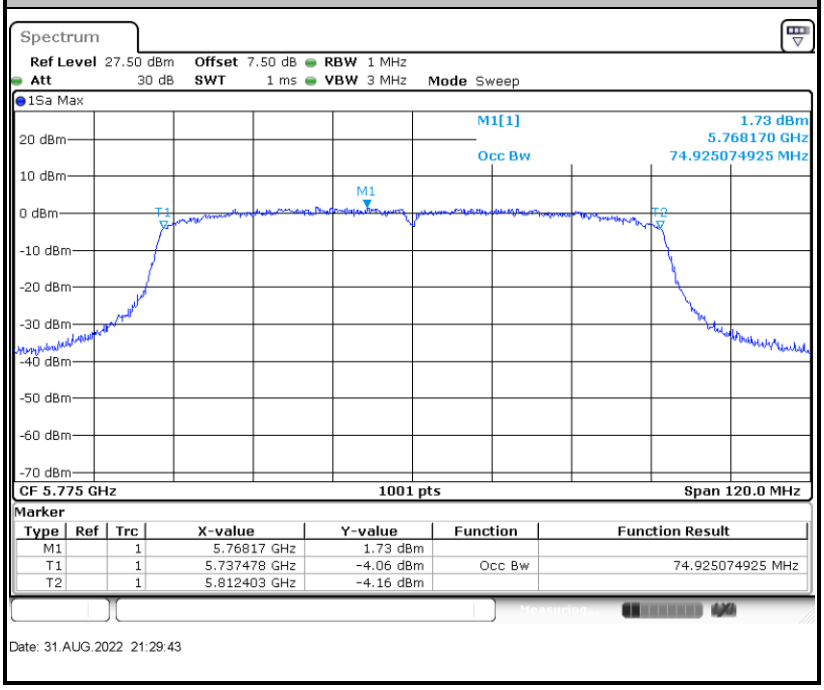
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

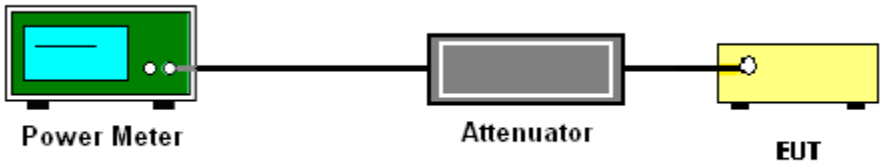
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

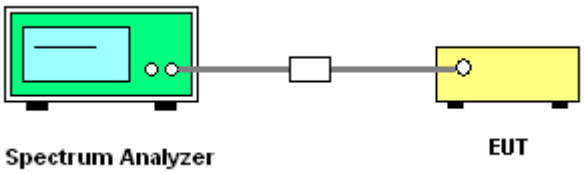
 # Method SA-2 #

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

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

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

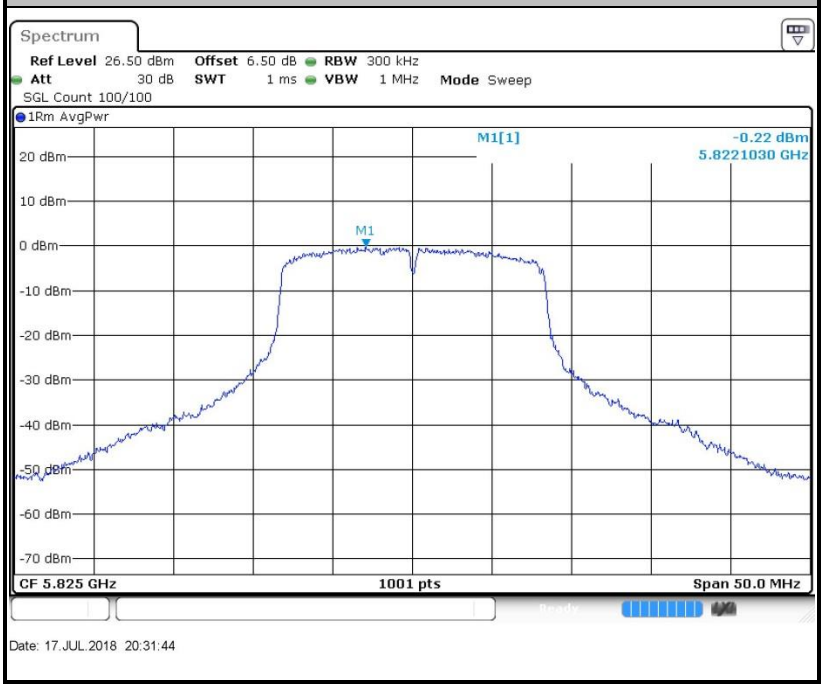
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300KHz)



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.

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

where

EIRP is the equivalent isotropically radiated power, in dBm

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

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

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

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

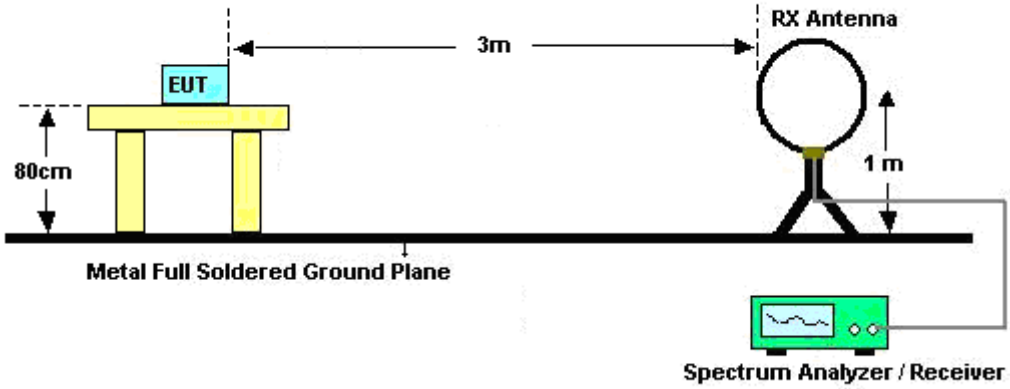
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

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

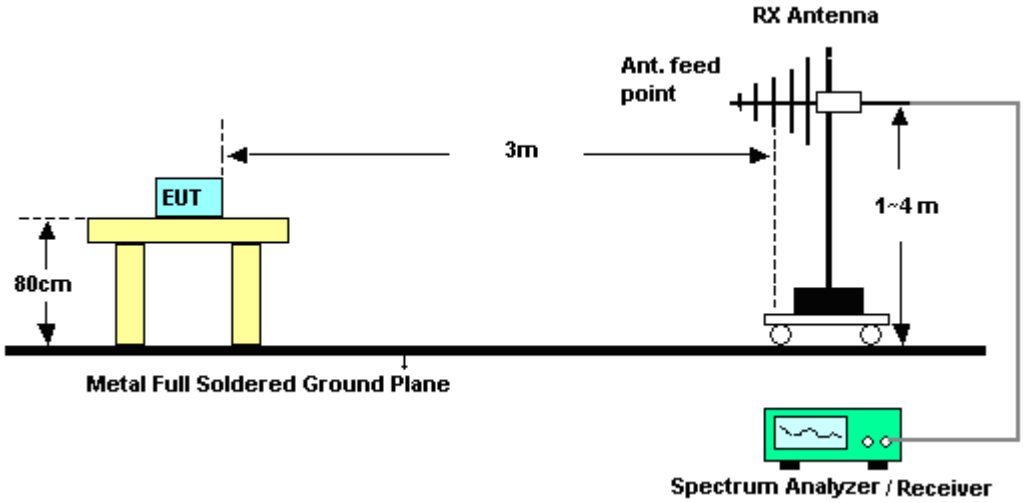
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2.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

3.4.4 Test Setup

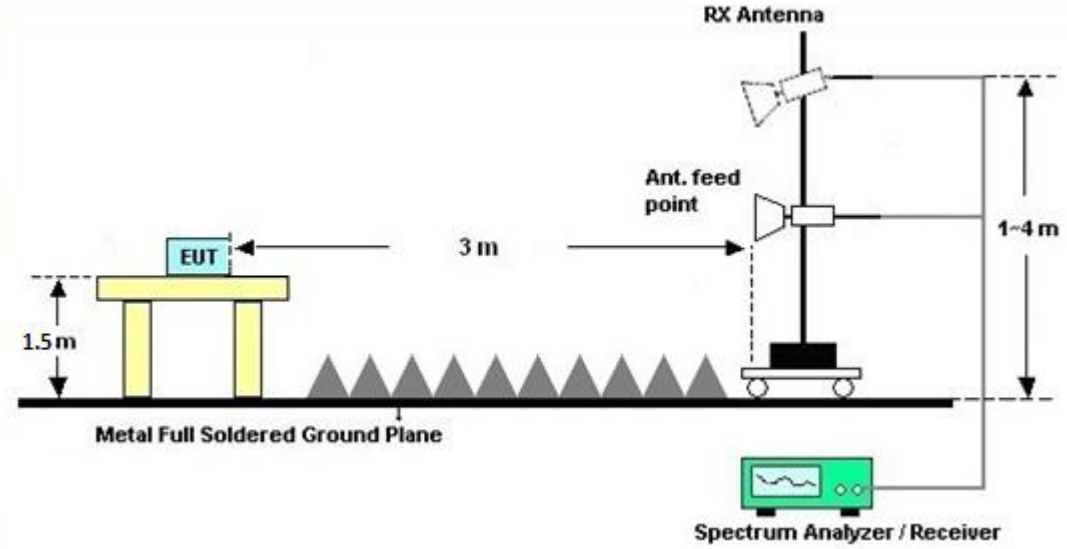
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

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

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.

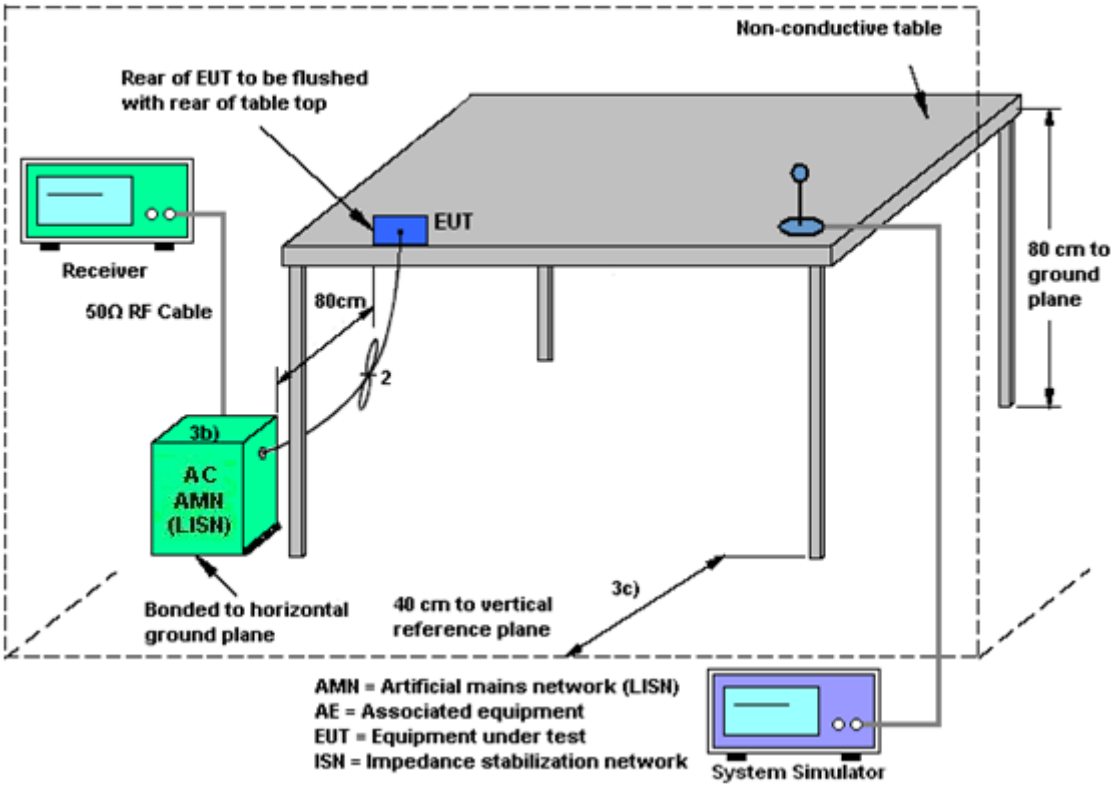
3.5.2 Measuring Instruments

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



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

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

3.6.2 Measuring Instruments

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

3.6.3 Test Result of Automatically Discontinue Transmission

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

3.7 Antenna Requirements

3.7.1 Standard Applicable

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

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 08, 2017	Jul. 17, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Jul. 17, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Jul. 17, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 12, 2017	Jul. 17, 2018	Oct. 11, 2018	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Aug. 31, 2022~ Sep. 01, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2022	Aug. 31, 2022~ Sep. 01, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2022	Aug. 31, 2022~ Sep. 01, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 26, 2021	Aug. 31, 2022~ Sep. 01, 2022	Oct. 25, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 19, 2017	Jul. 31, 2018~ Aug. 13, 2018	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	Apr. 17, 2018	Jul. 31, 2018~ Aug. 13, 2018	Apr. 16, 2019	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Jul. 31, 2018~ Aug. 13, 2018	Oct. 21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	47610	30MHz-1GHz	Sep. 12, 2017	Jul. 31, 2018~ Aug. 13, 2018	Sep. 11, 2018	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 21, 2018	Jul. 31, 2018~ Aug. 13, 2018	Jan. 20, 2019	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Jul. 31, 2018~ Aug. 13, 2018	Feb. 06, 2019	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz ~1000MHz / 32 dB	Apr. 17, 2018	Jul. 31, 2018~ Aug. 13, 2018	Apr. 16, 2019	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Apr. 17, 2018	Jul. 31, 2018~ Aug. 13, 2018	Apr. 16, 2019	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Jul. 31, 2018~ Aug. 13, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18~40GHz	Oct. 12, 2017	Jul. 31, 2018~ Aug. 13, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 31, 2018~ Aug. 13, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 31, 2018~ Aug. 13, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 31, 2018~ Aug. 13, 2018	NCR	Radiation (03CH03-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz;Max 30dBm	Oct. 14, 2021	Sep. 14, 2022	Oct. 13, 2022	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44GHz	Oct. 14, 2021	Sep. 14, 2022	Oct. 13, 2022	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 23, 2021	Sep. 14, 2022	Oct. 22, 2022	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-1GHz	Dec. 22, 2021	Sep. 14, 2022	Dec. 21, 2022	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Dec. 24, 2021	Sep. 14, 2022	Dec. 23, 2022	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101115	18GHz~40GHz	Dec. 23, 2021	Sep. 14, 2022	Dec. 22, 2022	Radiation (03CH03-KS)
Amplifier	Burgeon	BPA-530	102220	30MHz ~1000MHz	Oct. 14, 2021	Sep. 14, 2022	Oct. 13, 2022	Radiation (03CH03-KS)
Amplifier	EM	EM18G40GA	060851	18~40GHz	Jan. 05, 2022	Sep. 14, 2022	Jan. 04, 2023	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2082394	1Ghz-18Ghz	Jan. 05, 2022	Sep. 14, 2022	Jan. 04, 2023	Radiation (03CH03-KS)
Amplifier	Keysight	83017A	MY53270319	1GHz~26.5GHz	Oct. 14, 2021	Sep. 14, 2022	Oct. 13, 2022	Radiation (03CH03-KS)

AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 14, 2022	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 14, 2022	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 14, 2022	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 19, 2018	Aug. 01, 2018	Apr. 18, 2019	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Aug. 01, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Aug. 01, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Aug. 01, 2018	Oct. 11, 2018	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.94dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB

Appendix A. Conducted Test Results

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2018/7/17~2022/9/1	Relative Humidity:	51~55	%

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

Band IV									
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	16.78	20.879	15.305	0.5	Pass
11a	6Mbps	1	157	5785	16.83	20.879	15.145	0.5	Pass
11a	6Mbps	1	165	5825	16.78	20.579	15.125	0.5	Pass
HT20	MCS 0	1	149	5745	17.68	21.628	21.628	0.5	Pass
HT20	MCS 0	1	157	5785	17.73	21.578	21.578	0.5	Pass
HT20	MCS 0	1	165	5825	17.78	21.678	21.678	0.5	Pass
HT40	MCS 0	1	151	5755	36.06	41.628	35.085	0.5	Pass
HT40	MCS 0	1	159	5795	36.06	41.628	35.085	0.5	Pass

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.34	14.56	30.00	1.00		Pass
11a	6Mbps	1	157	5785	0.34	14.64	30.00	1.00		Pass
11a	6Mbps	1	165	5825	0.34	15.12	30.00	1.00		Pass
HT20	MCS 0	1	149	5745	0.35	12.39	30.00	1.00		Pass
HT20	MCS 0	1	157	5785	0.35	12.49	30.00	1.00		Pass
HT20	MCS 0	1	165	5825	0.35	13.03	30.00	1.00		Pass
HT40	MCS 0	1	151	5755	0.47	11.79	30.00	1.00		Pass
HT40	MCS 0	1	159	5795	0.47	12.04	30.00	1.00		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.34	2.22	1.89	30.00	1.00	Pass
11a	6Mbps	1	157	5785	0.34	2.22	2.04	30.00	1.00	Pass
11a	6Mbps	1	165	5825	0.34	2.22	2.34	30.00	1.00	Pass
HT20	MCS 0	1	149	5745	0.35	2.22	-0.49	30.00	1.00	Pass
HT20	MCS 0	1	157	5785	0.35	2.22	-0.25	30.00	1.00	Pass
HT20	MCS 0	1	165	5825	0.35	2.22	-0.07	30.00	1.00	Pass
HT40	MCS 0	1	151	5755	0.47	2.22	-4.01	30.00	1.00	Pass
HT40	MCS 0	1	159	5795	0.47	2.22	-4.18	30.00	1.00	Pass

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

Band IV									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
VHT20	MCS 0	1	149	5745	17.38	20.58	14.80	0.5	Pass
VHT20	MCS 0	1	157	5785	17.38	20.63	15.05	0.5	Pass
VHT20	MCS 0	1	165	5825	17.38	20.33	15.10	0.5	Pass
VHT40	MCS 0	1	151	5755	35.96	40.91	35.10	0.5	Pass
VHT40	MCS 0	1	159	5795	35.86	41.09	35.10	0.5	Pass
VHT80	MCS 0	1	155	5775	74.93	82.96	75.20	0.5	Pass

TEST RESULTS DATA
Average Power Table

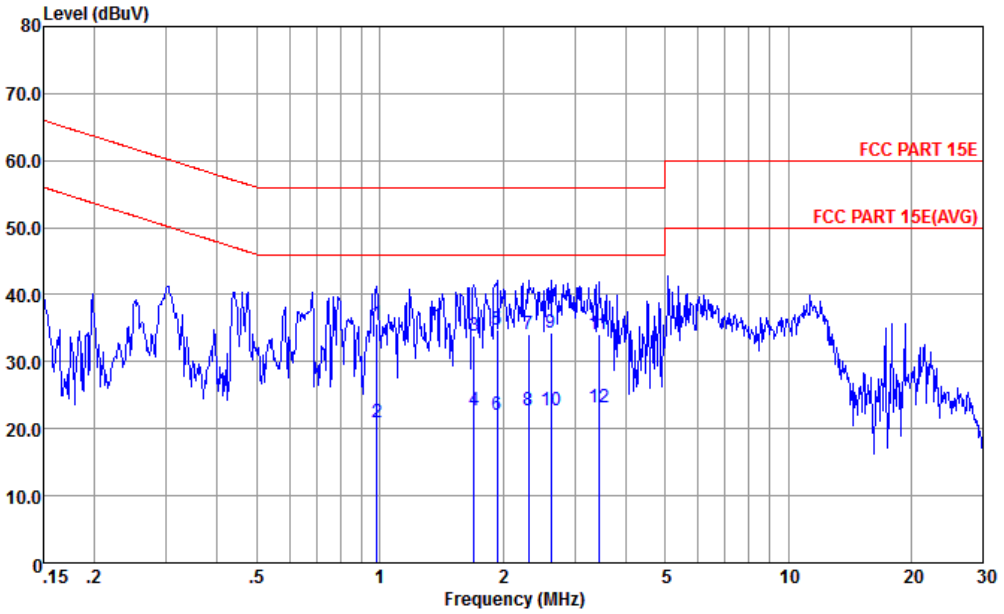
Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
VHT20	MCS 0	1	149	5745	0.25	12.13	30.00	1.00		Pass
VHT20	MCS 0	1	157	5785	0.25	12.16	30.00	1.00		Pass
VHT20	MCS 0	1	165	5825	0.25	12.30	30.00	1.00		Pass
VHT40	MCS 0	1	151	5755	0.41	11.49	30.00	1.00		Pass
VHT40	MCS 0	1	159	5795	0.41	11.56	30.00	1.00		Pass
VHT80	MCS 0	1	155	5775	0.82	10.86	30.00	1.00		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
VHT20	MCS 0	1	149	5745	0.25	2.22	-2.70	30.00	1.00	Pass
VHT20	MCS 0	1	157	5785	0.25	2.22	-2.59	30.00	1.00	Pass
VHT20	MCS 0	1	165	5825	0.25	2.22	-2.18	30.00	1.00	Pass
VHT40	MCS 0	1	151	5755	0.41	2.22	-6.39	30.00	1.00	Pass
VHT40	MCS 0	1	159	5795	0.41	2.22	-6.34	30.00	1.00	Pass
VHT80	MCS 0	1	155	5775	0.82	2.22	-10.07	30.00	1.00	Pass

Appendix B. AC Conducted Emission Test Results

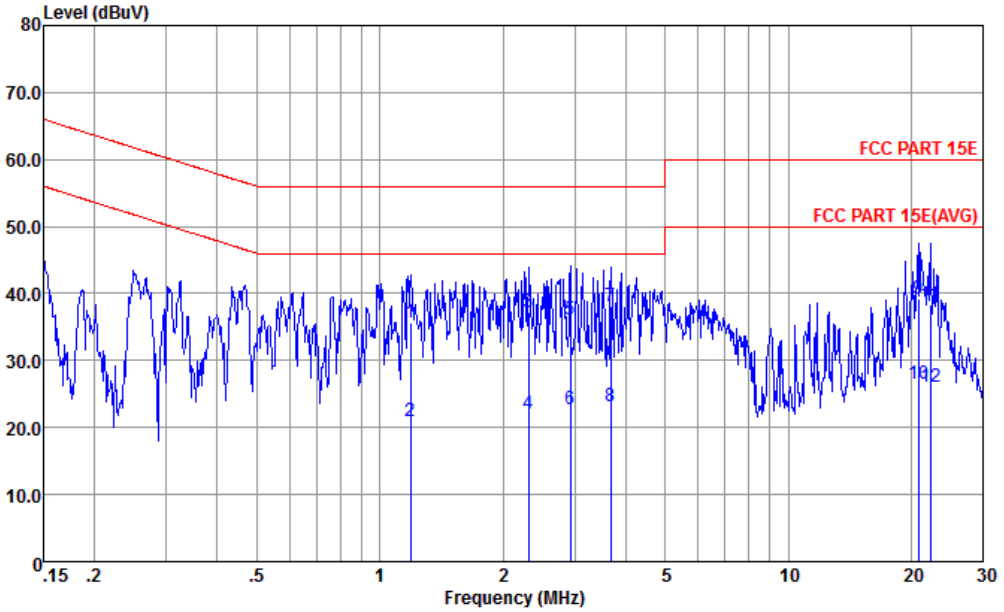
Test Engineer :	Amos Zhang	**Temperature :**	29.3~29.6℃
		Relative Humidity :	54~59%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.984	35.57	-20.43	56.00	25.20	0.26	10.11	QP
2	0.984	20.97	-25.03	46.00	10.60	0.26	10.11	Average
3	1.698	33.96	-22.04	56.00	23.49	0.28	10.19	QP
4	1.698	22.66	-23.34	46.00	12.19	0.28	10.19	Average
5	1.939	34.69	-21.31	56.00	24.20	0.28	10.21	QP
6	1.939	22.09	-23.91	46.00	11.60	0.28	10.21	Average
7	2.309	34.10	-21.90	56.00	23.61	0.29	10.20	QP
8	2.309	22.70	-23.30	46.00	12.21	0.29	10.20	Average
9	2.622	34.30	-21.70	56.00	23.80	0.31	10.19	QP
10	2.622	22.80	-23.20	46.00	12.30	0.31	10.19	Average
11	3.436	34.11	-21.89	56.00	23.60	0.33	10.18	QP
12	3.436	23.11	-22.89	46.00	12.60	0.33	10.18	Average

Test Engineer :	Amos Zhang	**Temperature :**	29.3~29.6℃
		Relative Humidity :	54~59%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



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

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		1.191	35.65	-20.35	56.00	25.21	0.31	10.13	QP
2		1.191	21.05	-24.95	46.00	10.61	0.31	10.13	Average
3		2.309	37.13	-18.87	56.00	26.61	0.32	10.20	QP
4		2.309	22.03	-23.97	46.00	11.51	0.32	10.20	Average
5		2.931	36.02	-19.98	56.00	25.50	0.33	10.19	QP
6		2.931	22.72	-23.28	46.00	12.20	0.33	10.19	Average
7	*	3.681	38.20	-17.80	56.00	27.70	0.33	10.17	QP
8		3.681	23.10	-22.90	46.00	12.60	0.33	10.17	Average
9		20.814	39.25	-20.75	60.00	28.60	0.15	10.50	QP
10		20.814	26.55	-23.45	50.00	15.90	0.15	10.50	Average
11		22.298	38.24	-21.76	60.00	27.50	0.21	10.53	QP
12		22.298	26.04	-23.96	50.00	15.30	0.21	10.53	Average

Appendix C. Radiated Spurious Emission

U-NII-3 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		5604	49.89	-18.41	68.3	42.24	34.5	8.34	35.19	363	235	P	H
		5650	49.04	-19.26	68.3	41.27	34.6	8.37	35.2	363	235	P	H
		5720	49.49	-61.41	110.9	41.56	34.67	8.42	35.16	363	235	P	H
		5724.8	55.6	-66.24	121.84	47.67	34.67	8.42	35.16	363	235	P	H
	*	5746	99.4	-	-	91.4	34.7	8.45	35.15	363	235	P	H
	*	5746	89.7	-	-	81.7	34.7	8.45	35.15	363	235	A	H
		5628.8	48.89	-19.41	68.3	41.19	34.53	8.37	35.2	298	348	P	V
		5693.6	48.87	-51.71	100.58	41.04	34.6	8.4	35.17	298	348	P	V
		5719.2	51.6	-59.08	110.68	43.67	34.67	8.42	35.16	298	348	P	V
		5724.8	59.86	-61.98	121.84	51.93	34.67	8.42	35.16	298	348	P	V
	*	5744	102.93	-	-	94.93	34.7	8.45	35.15	298	348	P	V
	*	5744	93.31	-	-	85.31	34.7	8.45	35.15	298	348	A	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5828	100.93	-	-	92.6	34.87	8.57	35.11	326	325	P	H
	*	5828	91.06	-	-	82.73	34.87	8.57	35.11	326	325	A	H
		5852	49.94	-67.8	117.74	41.57	34.9	8.57	35.1	326	325	P	H
		5858.8	49.19	-60.64	109.83	40.7	34.93	8.66	35.1	326	325	P	H
		5916	49.37	-25.57	74.94	40.7	35.03	8.76	35.12	326	325	P	H
		5946.8	49.53	-18.77	68.3	40.71	35.1	8.85	35.13	326	325	P	H
	*	5822	103.75	-	-	95.42	34.87	8.57	35.11	373	354	P	V
	*	5822	93.99	-	-	85.66	34.87	8.57	35.11	373	354	A	V
		5850.4	52.09	-69.3	121.39	43.72	34.9	8.57	35.1	373	354	P	V
		5860.8	50.11	-59.16	109.27	41.62	34.93	8.66	35.1	373	354	P	V
		5908	50.21	-30.63	80.84	41.54	35.03	8.76	35.12	373	354	P	V
		5964.8	49.76	-18.54	68.3	40.92	35.13	8.85	35.14	373	354	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	43.81	-30.19	74	58.3	38.28	12.58	65.35	100	360	P	H
		11490	42.35	-31.65	74	56.84	38.28	12.58	65.35	100	360	P	V
802.11a CH 157 5785MHz		11570	41.69	-32.31	74	56.19	38.3	12.64	65.44	100	360	P	H
		11570	43.22	-30.78	74	57.72	38.3	12.64	65.44	100	360	P	V
802.11a CH 165 5825MHz		11650	41.71	-32.29	74	56.18	38.38	12.69	65.54	100	360	P	H
		11650	42.49	-31.51	74	56.96	38.38	12.69	65.54	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5627.6	49	-19.3	68.3	41.3	34.53	8.37	35.2	300	234	P	H
		5696	48.79	-53.56	102.35	40.96	34.6	8.4	35.17	300	234	P	H
		5710.8	49.08	-59.25	108.33	41.2	34.63	8.42	35.17	300	234	P	H
		5724.4	52.74	-68.19	120.93	44.81	34.67	8.42	35.16	300	234	P	H
	*	5744	97.43	-	-	89.43	34.7	8.45	35.15	300	234	P	H
	*	5744	87.5	-	-	79.5	34.7	8.45	35.15	300	234	A	H
		5612.4	48.87	-19.43	68.3	41.23	34.5	8.34	35.2	385	350	P	V
		5668.8	49.69	-32.56	82.25	41.88	34.6	8.4	35.19	385	350	P	V
		5718.4	49.75	-60.7	110.45	41.82	34.67	8.42	35.16	385	350	P	V
		5724	55.21	-64.81	120.02	47.28	34.67	8.42	35.16	385	350	P	V
	*	5742	99.95	-	-	91.95	34.7	8.45	35.15	385	350	P	V
	*	5742	90.46	-	-	82.46	34.7	8.45	35.15	385	350	A	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz	*	5828	99.84	-	-	91.51	34.87	8.57	35.11	213	186	P	H
	*	5828	89.76	-	-	81.43	34.87	8.57	35.11	213	186	A	H
		5851.6	60.58	-58.07	118.65	52.21	34.9	8.57	35.1	213	186	P	H
		5855.2	58.59	-52.25	110.84	50.19	34.93	8.57	35.1	213	186	P	H
		5882	52.61	-47.49	100.1	44.09	34.97	8.66	35.11	213	186	P	H
		5952.4	51.03	-17.27	68.3	42.22	35.1	8.85	35.14	213	186	P	H
	*	5822	100.3	-	-	91.97	34.87	8.57	35.11	245	191	P	V
	*	5822	90.2	-	-	81.87	34.87	8.57	35.11	245	191	A	V
		5852.8	61.87	-54.04	115.91	53.5	34.9	8.57	35.1	245	191	P	V
		5856.8	59.43	-50.97	110.4	50.94	34.93	8.66	35.1	245	191	P	V
		5876.8	53.09	-50.87	103.96	44.57	34.97	8.66	35.11	245	191	P	V
		5942.4	49.57	-18.73	68.3	40.75	35.1	8.85	35.13	245	191	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	42.24	-31.76	74	56.73	38.28	12.58	65.35	100	360	P	H
		11490	42.43	-31.57	74	56.92	38.28	12.58	65.35	100	360	P	V
802.11n HT20 CH 157 5785MHz		11570	42.25	-31.75	74	56.75	38.3	12.64	65.44	100	360	P	H
		11570	43.2	-30.8	74	57.7	38.3	12.64	65.44	100	360	P	V
802.11n HT20 CH 165 5825MHz		11650	42.14	-31.86	74	56.61	38.38	12.69	65.54	100	360	P	H
		11650	42.14	-31.86	74	56.61	38.38	12.69	65.54	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5621.2	49.06	-19.24	68.3	41.39	34.53	8.34	35.2	100	94	P	H
		5695.2	49.22	-52.54	101.76	41.39	34.6	8.4	35.17	100	94	P	H
		5719.6	57.77	-53.02	110.79	49.84	34.67	8.42	35.16	100	94	P	H
		5724.4	58.2	-62.73	120.93	50.27	34.67	8.42	35.16	100	94	P	H
	*	5750	92.43	-	-	84.43	34.7	8.45	35.15	100	94	P	H
	*	5750	85.27	-	-	77.27	34.7	8.45	35.15	100	94	A	H
		5852.8	47.23	-68.69	115.92	38.86	34.9	8.57	35.1	100	94	P	H
		5855.2	49.93	-60.91	110.84	41.53	34.93	8.57	35.1	100	94	P	H
		5889.6	49.6	-44.86	94.46	41.05	35	8.66	35.11	100	94	P	H
		5952.4	49.1	-19.2	68.3	40.29	35.1	8.85	35.14	100	94	P	H
		5612.8	48.04	-20.26	68.3	40.4	34.5	8.34	35.2	100	262	P	V
		5667.6	51.72	-29.64	81.36	43.91	34.6	8.4	35.19	100	262	P	V
		5719.2	60.02	-50.66	110.68	52.09	34.67	8.42	35.16	100	262	P	V
		5721.6	59.67	-54.88	114.55	51.74	34.67	8.42	35.16	100	262	P	V
	*	5752	95.27	-	-	87.24	34.73	8.45	35.15	100	262	P	V
	*	5752	87.67	-	-	79.64	34.73	8.45	35.15	100	262	A	V
		5854.8	48.73	-62.63	111.36	40.33	34.93	8.57	35.1	100	262	P	V
		5873.6	48.84	-56.85	105.69	40.32	34.97	8.66	35.11	100	262	P	V
		5894.4	48.51	-42.4	90.91	39.96	35	8.66	35.11	100	262	P	V
		5990.8	48.91	-19.39	68.3	39.92	35.2	8.94	35.15	100	262	P	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5640.8	48.77	-19.53	68.3	41.03	34.57	8.37	35.2	104	93	P	H
		5698.8	48.33	-56.09	104.42	40.5	34.6	8.4	35.17	104	93	P	H
		5719.2	49.75	-60.93	110.68	41.82	34.67	8.42	35.16	104	93	P	H
		5724.4	49.25	-71.68	120.93	41.32	34.67	8.42	35.16	104	93	P	H
	*	5792	93.39	-	-	85.23	34.8	8.48	35.12	104	93	P	H
	*	5792	85.38	-	-	77.22	34.8	8.48	35.12	104	93	A	H
		5850.01	51.54	-70.74	122.28	43.17	34.9	8.57	35.1	104	93	P	H
		5859.6	50.83	-58.78	109.61	42.34	34.93	8.66	35.1	104	93	P	H
		5880.4	50.06	-51.23	101.29	41.54	34.97	8.66	35.11	104	93	P	H
		5955.6	50	-18.3	68.3	41.16	35.13	8.85	35.14	104	93	P	H
		5604.8	49.11	-19.19	68.3	41.46	34.5	8.34	35.19	115	156	P	V
		5680.4	49.75	-41.08	90.83	41.94	34.6	8.4	35.19	115	156	P	V
		5709.2	51.03	-56.85	107.88	43.15	34.63	8.42	35.17	115	156	P	V
		5724	51.22	-68.8	120.02	43.29	34.67	8.42	35.16	115	156	P	V
	*	5790	97.54	-	-	89.4	34.8	8.48	35.14	115	156	P	V
	*	5790	89.56	-	-	81.42	34.8	8.48	35.14	115	156	A	V
		5851.2	53.33	-66.23	119.56	44.96	34.9	8.57	35.1	115	156	P	V
		5862.4	51.94	-56.89	108.83	43.45	34.93	8.66	35.1	115	156	P	V
		5896	50.05	-39.67	89.72	41.41	35	8.76	35.12	115	156	P	V
		5990.8	49.3	-19	68.3	40.31	35.2	8.94	35.15	115	156	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11510	42.79	-31.21	74	57.25	38.3	12.58	65.34	100	360	P	H
		11510	42.73	-31.27	74	57.19	38.3	12.58	65.34	100	360	P	V
802.11n HT40 CH 159 5795MHz		11590	43.26	-30.74	74	57.76	38.3	12.67	65.47	100	360	P	H
		11590	42.85	-31.15	74	57.35	38.3	12.67	65.47	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF @ 3m)

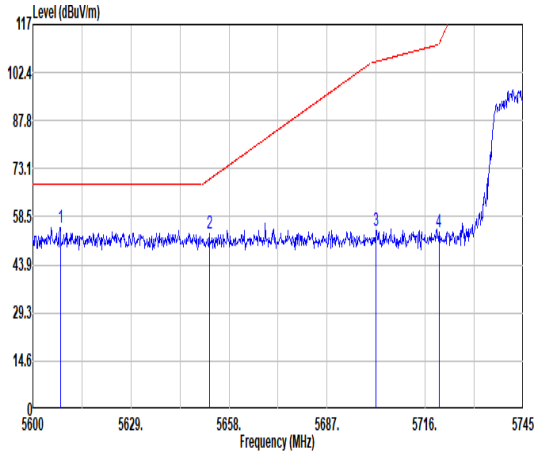
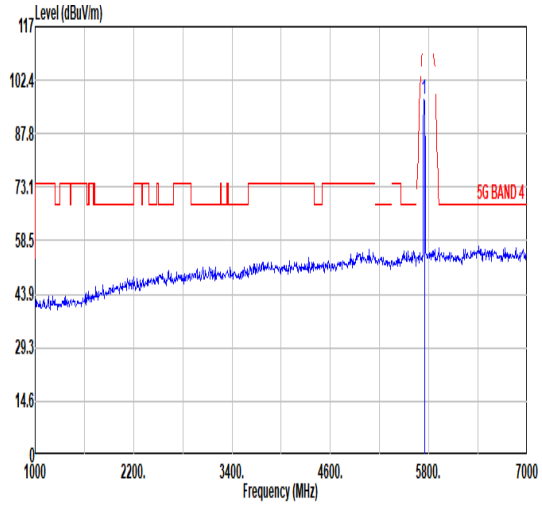
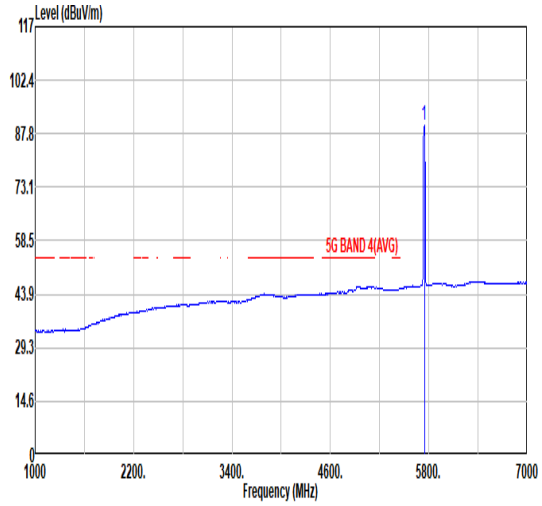
WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		30	23.18	-16.82	40	29.17	24.1	0.57	30.66	100	352	P	H
		70.74	19.46	-20.54	40	36.62	12.7	0.82	30.68	-	-	P	H
		125.06	17.55	-25.95	43.5	29.12	17.98	1.14	30.69	-	-	P	H
		485.9	23.34	-22.66	46	28.08	23.24	2.34	30.32	-	-	P	H
		677.96	26.33	-19.67	46	28.91	24.83	2.78	30.19	-	-	P	H
		869.05	28.33	-17.67	46	28.79	26.38	3.15	29.99	-	-	P	H
		30	28.57	-11.43	40	34.56	24.1	0.57	30.66	100	25	P	V
		38.73	27.9	-12.1	40	39.1	18.88	0.61	30.69	-	-	P	V
		75.59	26.6	-13.4	40	43.69	12.7	0.87	30.66	-	-	P	V
		96.93	19.8	-23.7	43.5	33.16	16.27	1	30.63	-	-	P	V
		344.28	20.26	-25.74	46	28.59	20.32	1.95	30.6	-	-	P	V
		937.92	29.36	-16.64	46	28.93	26.88	3.32	29.77	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

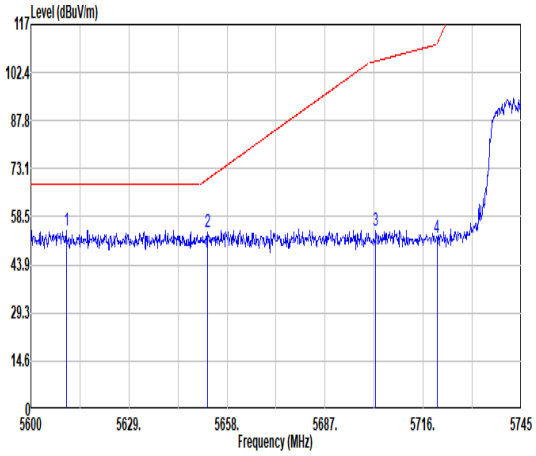
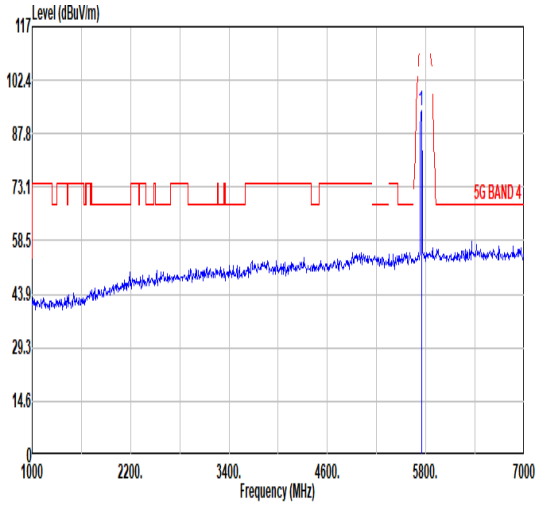
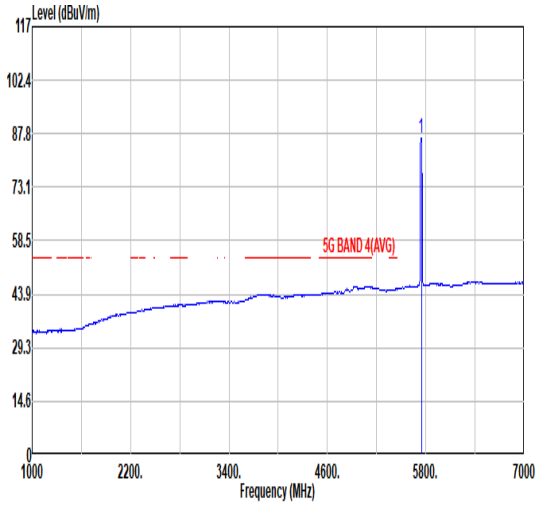
Radiated Spurious Emission Test Modes for 802.11ac

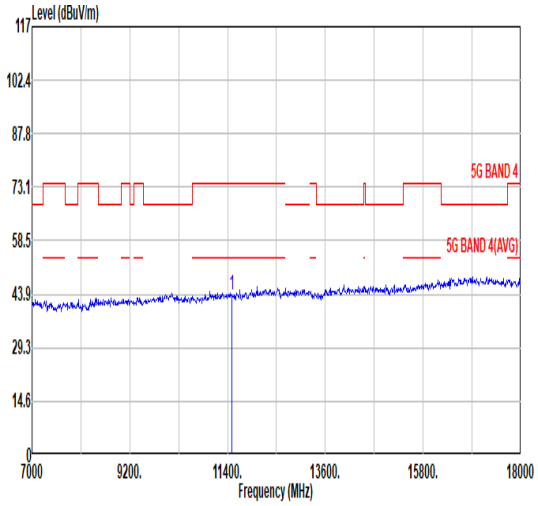
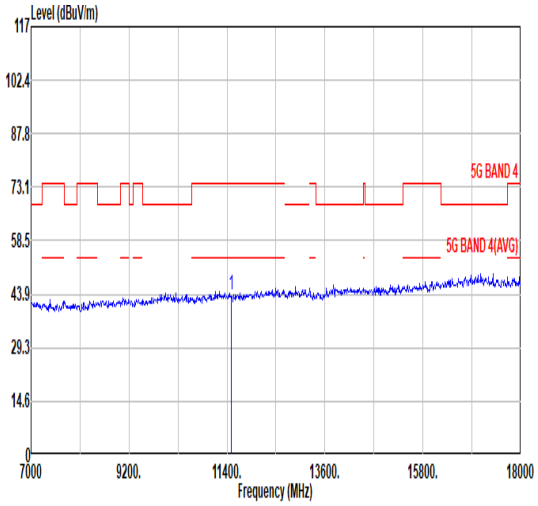
Mode	Band	Band (GHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 17	U-NII-3	5.725-5.85	SISO	802.11ac VHT20	149	5745	MCS0	-	-
Mode 18	U-NII-3	5.725-5.85	SISO	802.11ac VHT20	157	5785	MCS0	-	-
Mode 19	U-NII-3	5.725-5.85	SISO	802.11ac VHT20	165	5825	MCS0	-	-
Mode 20	U-NII-3	5.725-5.85	SISO	802.11ac VHT40	151	5755	MCS0	-	-
Mode 21	U-NII-3	5.725-5.85	SISO	802.11ac VHT40	159	5795	MCS0	-	-
Mode 29	U-NII-3	5.725-5.85	SISO	802.11ac VHT80	155	5775	MCS0	-	-

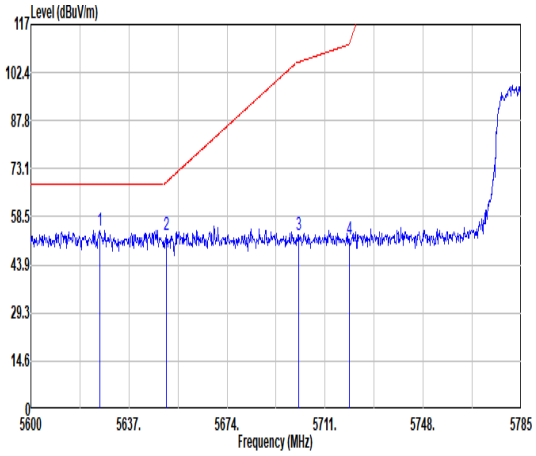
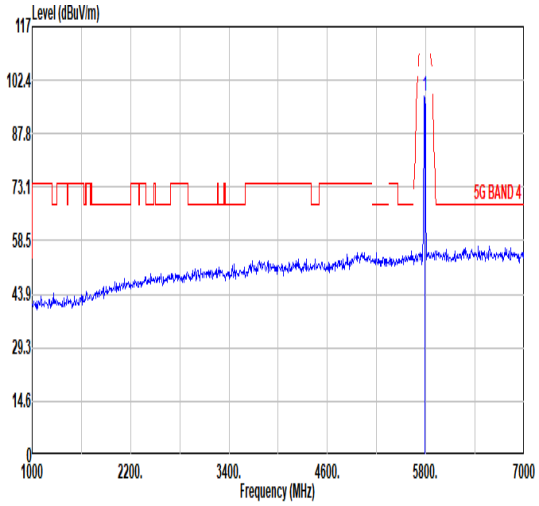
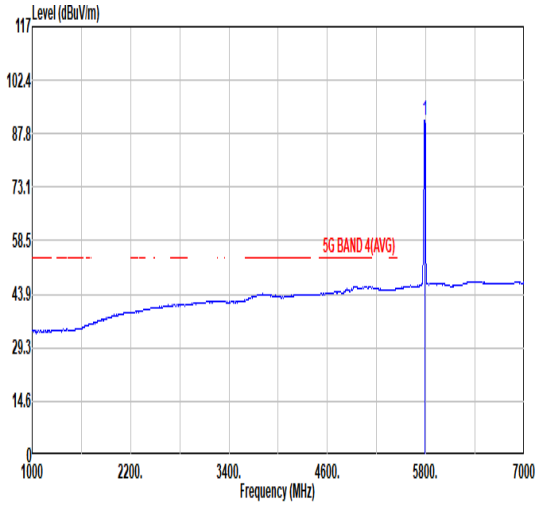
Summary of each worse mode

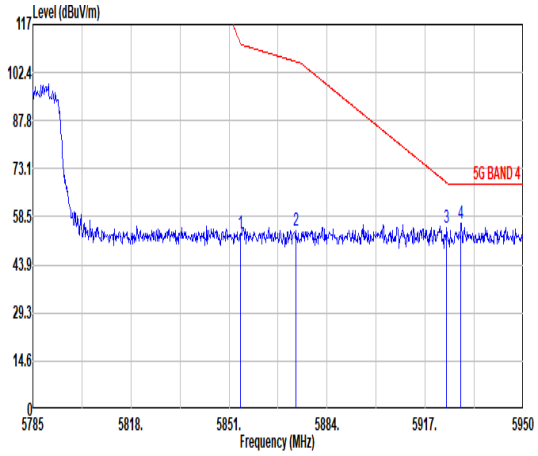
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
17	802.11ac VHT20	149	5608.12	55.27	68.30	-13.03	H	PEAK	Pass	Band Edge
18	802.11ac VHT20	157	5929.05	56.42	68.30	-11.88	H	PEAK	Pass	Band Edge
19	802.11ac VHT20	165	5935.25	55.48	68.30	-12.82	H	PEAK	Pass	Band Edge
20	802.11ac VHT40	151	5949.03	56.47	68.30	-11.83	H	PEAK	Pass	Band Edge
21	802.11ac VHT40	159	5609.56	56.22	68.30	-12.08	V	PEAK	Pass	Band Edge
29	802.11ac VHT80	155	5620.30	55.45	68.30	-12.85	H	PEAK	Pass	Band Edge

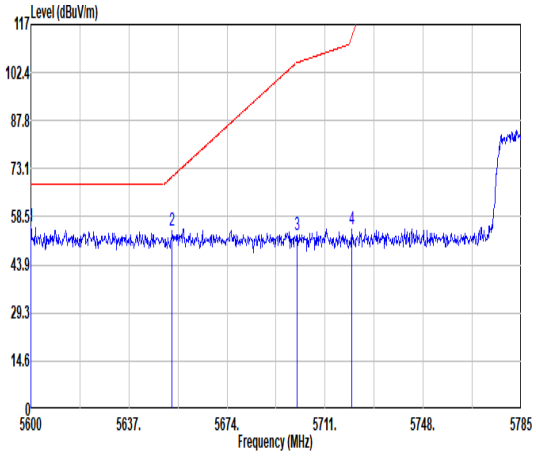
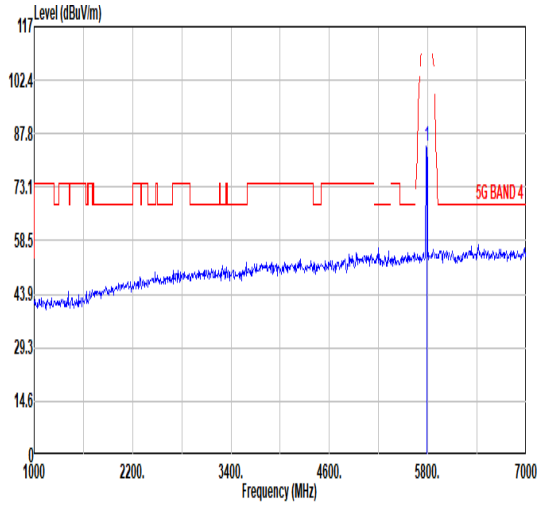
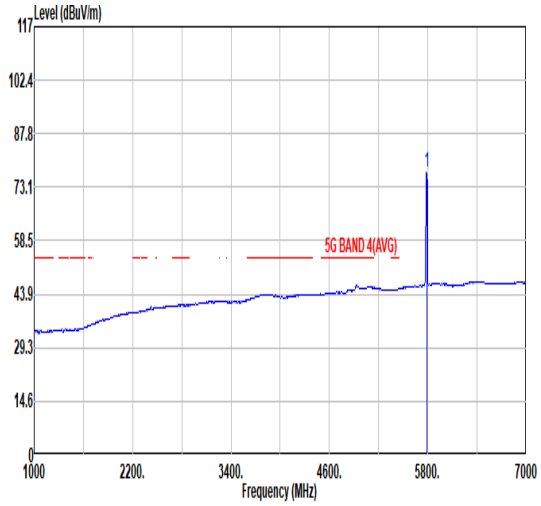
Mode	17	
	Band Edge	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH149_5745MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5608.12 55.27 68.30 -13.03 40.90 34.69 11.16 31.48 0.00 100 219 PEAK 2 5652.20 53.56 69.94 -16.38 39.10 34.72 11.22 31.48 0.00 100 219 PEAK 3 5701.50 54.49 105.72 -51.23 39.93 34.75 11.29 31.48 0.00 100 219 PEAK 4 5720.06 53.87 111.04 -57.17 39.25 34.77 11.32 31.47 0.00 100 219 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5745.00 96.98 ------ ------ 82.32 34.78 11.35 31.47 0.00 100 219 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5745.00 90.06 ------ ------ 75.38 34.79 11.36 31.47 0.00 100 219 AVERAGE

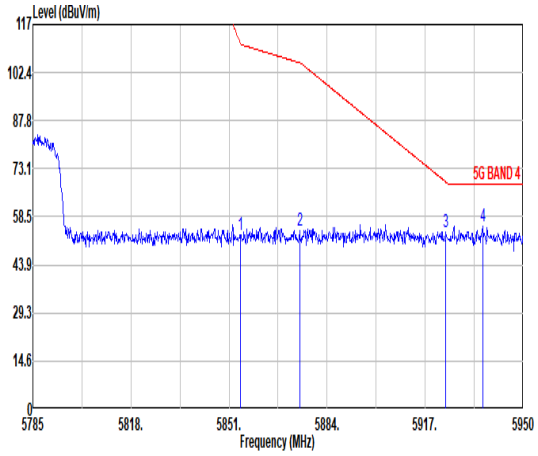
Mode	17	
	Band Edge	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH149_5745MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5610.44 54.35 68.30 -13.95 39.98 34.69 11.16 31.48 0.00 100 77 PEAK 2 5652.35 54.05 70.04 -15.99 39.59 34.72 11.22 31.48 0.00 100 77 PEAK 3 5701.94 54.42 105.84 -51.42 39.86 34.75 11.29 31.48 0.00 100 77 PEAK 4 5720.06 51.99 111.04 -59.05 37.37 34.77 11.32 31.47 0.00 100 77 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5745.00 93.92 ------ ------ 79.23 34.79 11.37 31.47 0.00 100 77 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5745.00 86.70 ------ ------ 72.04 34.78 11.35 31.47 0.00 100 77 AVERAGE

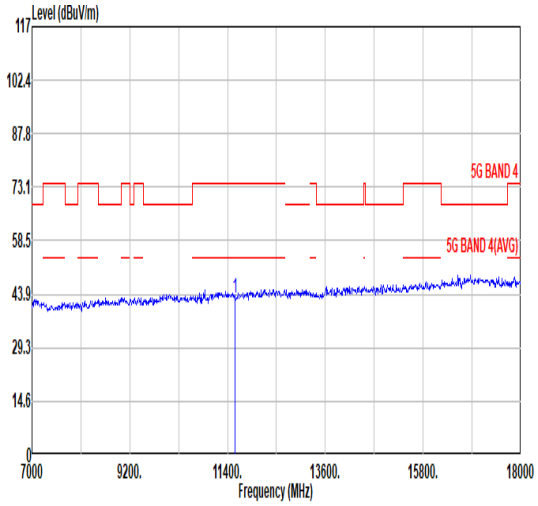
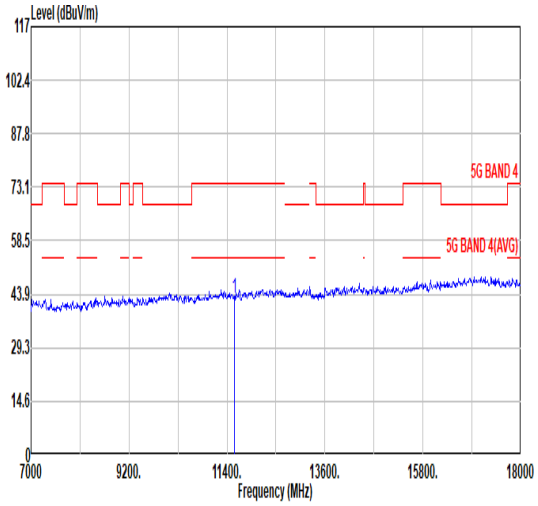
Mode	17	
	Harmonic	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH149_5745MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11490.00 43.56 74.00 -30.44 56.10 38.04 16.12 66.70 0.00 300 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11490.00 43.74 74.00 -30.26 56.28 38.04 16.12 66.70 0.00 300 0 PEAK

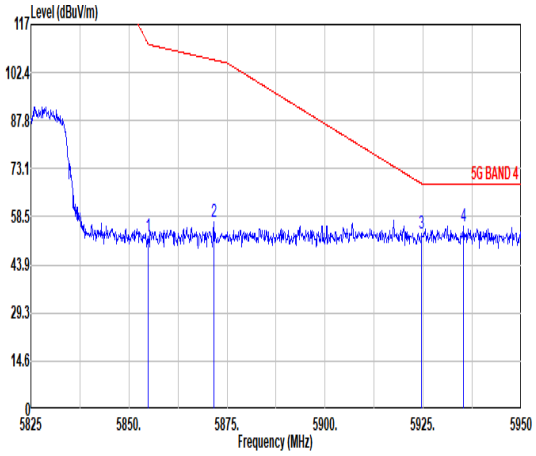
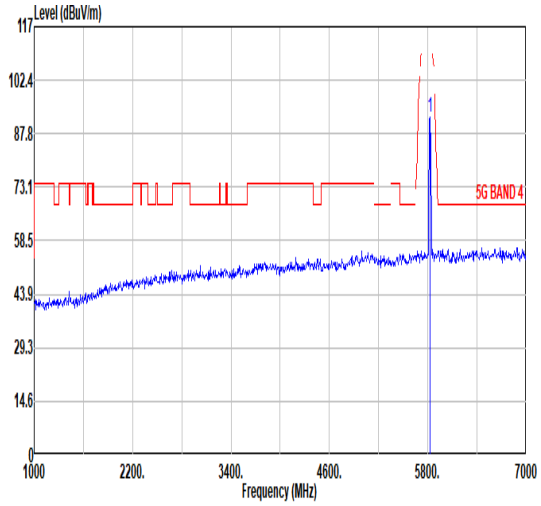
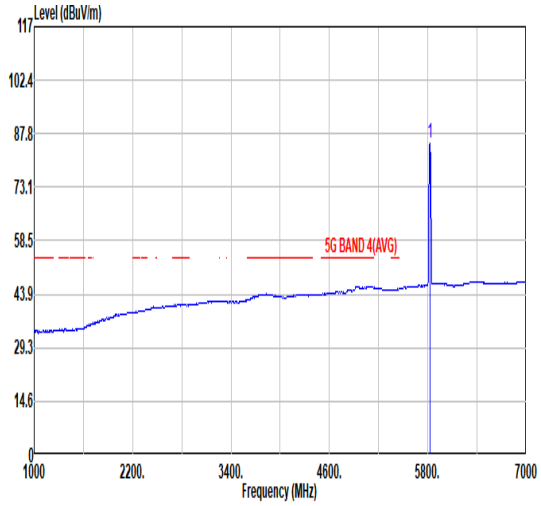
Mode	18	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH157_5785MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5626.09 54.44 68.30 -13.86 40.03 34.70 11.19 31.48 0.00 100 17 PEAK 2 5651.06 52.87 69.09 -16.22 38.41 34.72 11.22 31.48 0.00 100 17 PEAK 3 5701.01 53.07 105.58 -52.51 38.51 34.75 11.29 31.48 0.00 100 17 PEAK 4 5720.25 51.50 111.47 -59.97 36.88 34.77 11.32 31.47 0.00 100 17 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5785.00 98.19 ------ ------ 83.42 34.82 11.42 31.47 0.00 100 17 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5785.00 91.43 ------ ------ 76.65 34.82 11.43 31.47 0.00 100 17 AVERAGE

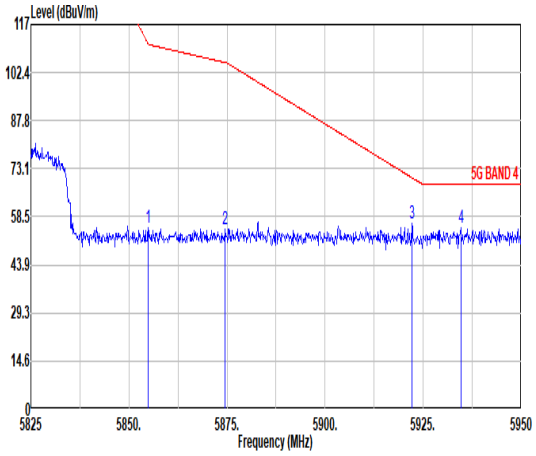
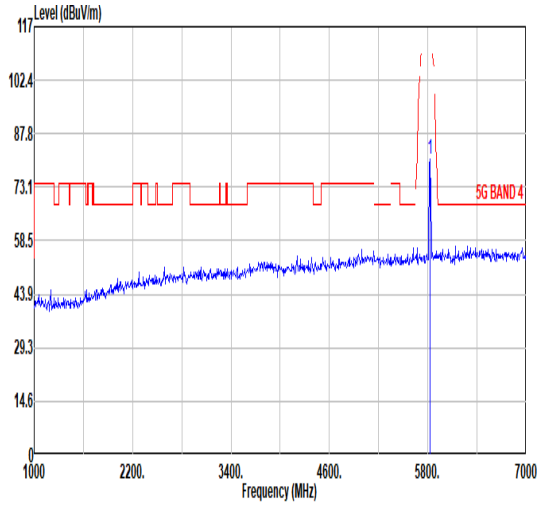
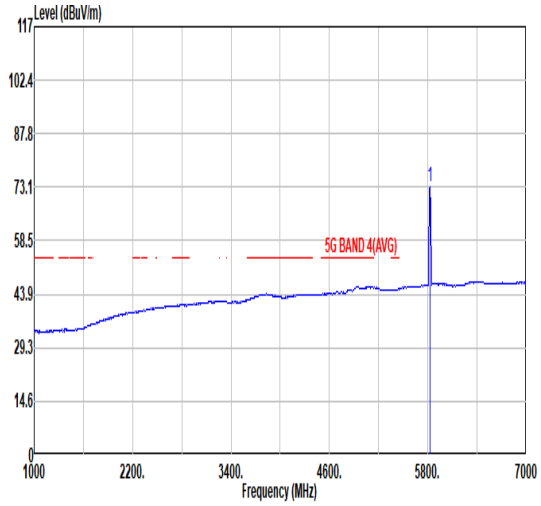
Mode	18	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH157_5785MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.80 53.33 111.37 -58.04 38.45 34.87 11.49 31.48 0.00 100 17 PEAK 2 5873.61 54.10 105.69 -51.59 39.19 34.89 11.51 31.49 0.00 100 17 PEAK 3 5924.26 55.13 68.85 -13.72 40.15 34.93 11.55 31.50 0.00 100 17 PEAK 4 5929.05 56.42 68.30 -11.88 41.44 34.93 11.55 31.50 0.00 100 17 PEAK	Blank

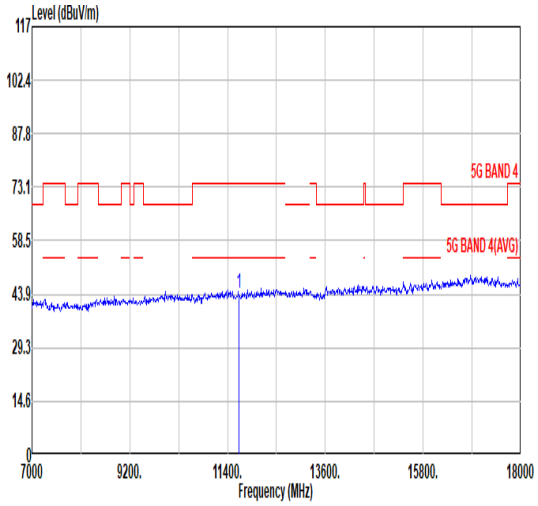
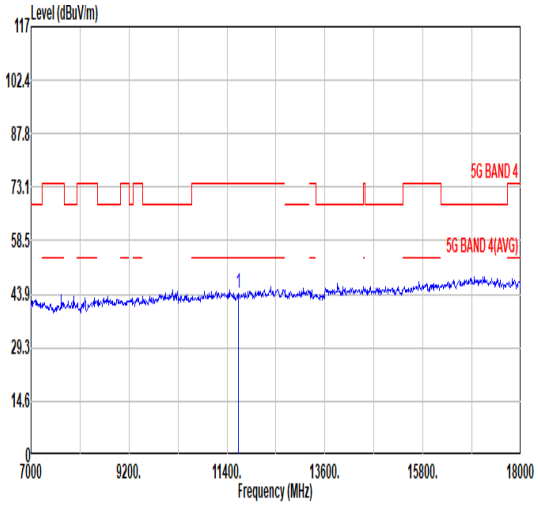
Mode	18	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH157_5785MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5600.00 55.56 68.30 -12.74 41.21 34.68 11.15 31.48 0.00 233 360 PEAK 2 5653.28 54.34 70.74 -16.40 39.88 34.72 11.22 31.48 0.00 233 360 PEAK 3 5700.46 52.79 105.43 -52.64 38.23 34.75 11.29 31.48 0.00 233 360 PEAK 4 5720.99 54.58 113.16 -58.58 39.96 34.77 11.32 31.47 0.00 233 360 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5785.00 84.33 ------ ------ 69.56 34.82 11.42 31.47 0.00 233 360 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5785.00 77.21 ------ ------ 62.44 34.82 11.42 31.47 0.00 233 360 AVERAGE

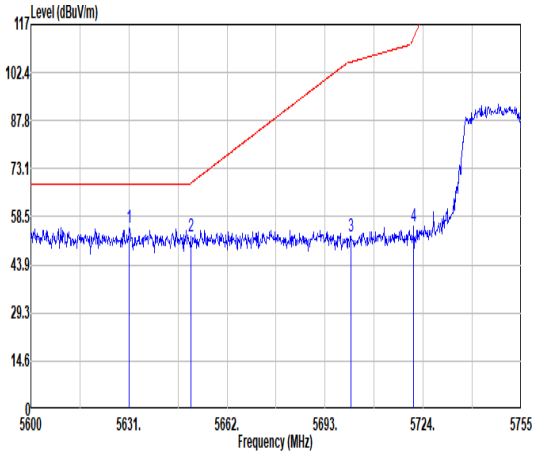
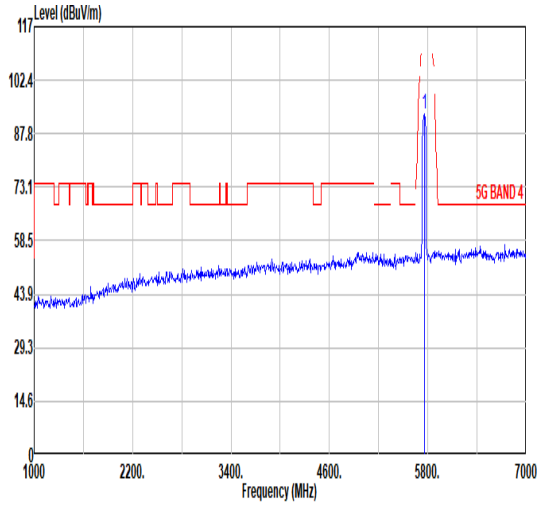
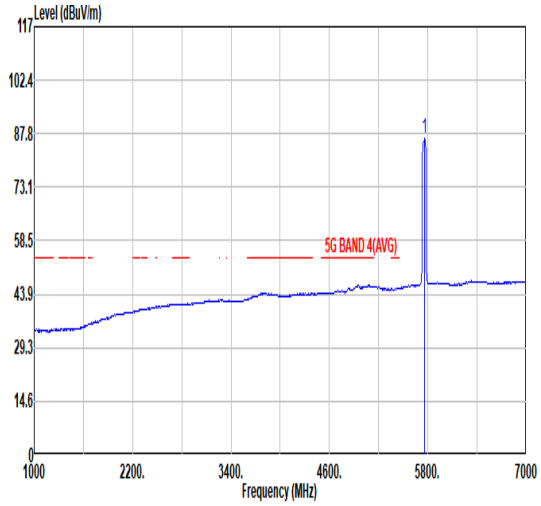
Mode	18	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH157_5785MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.96 53.11 110.99 -57.88 38.23 34.87 11.49 31.48 0.00 233 360 PEAK 2 5874.76 54.18 105.37 -51.19 39.27 34.89 11.51 31.49 0.00 233 360 PEAK 3 5923.93 54.01 69.09 -15.08 39.03 34.93 11.55 31.50 0.00 233 360 PEAK 4 5936.31 55.72 68.30 -12.58 40.72 34.94 11.56 31.50 0.00 233 360 PEAK	Blank

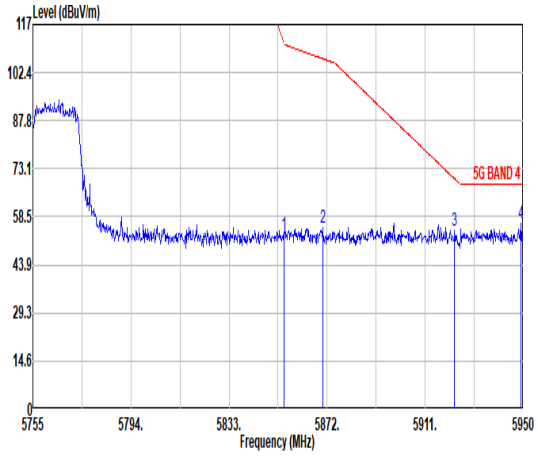
Mode	18	
	Harmonic	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH157_5785MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11570.00 42.89 74.00 -31.11 55.23 38.12 16.18 66.64 0.00 100 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11570.00 42.67 74.00 -31.33 55.01 38.12 16.18 66.64 0.00 300 0 PEAK

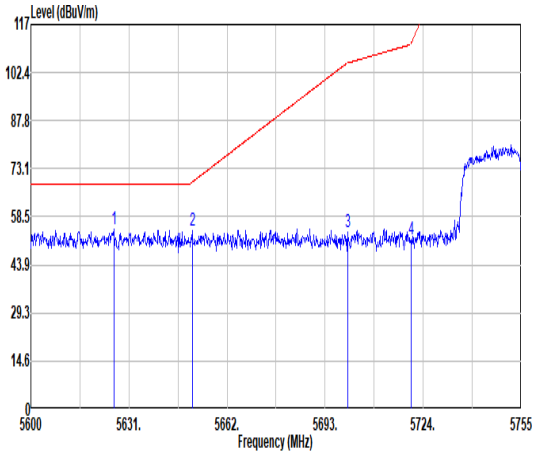
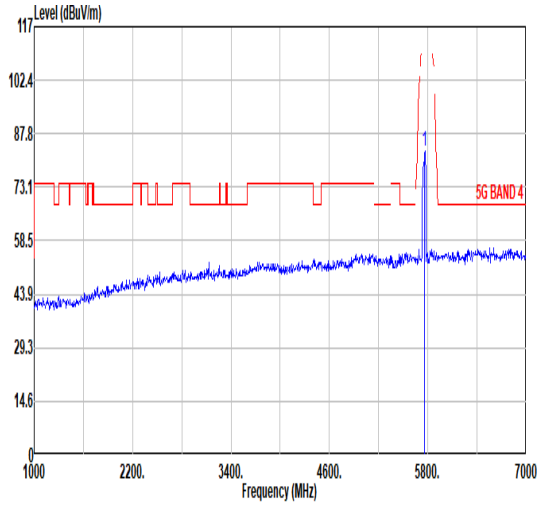
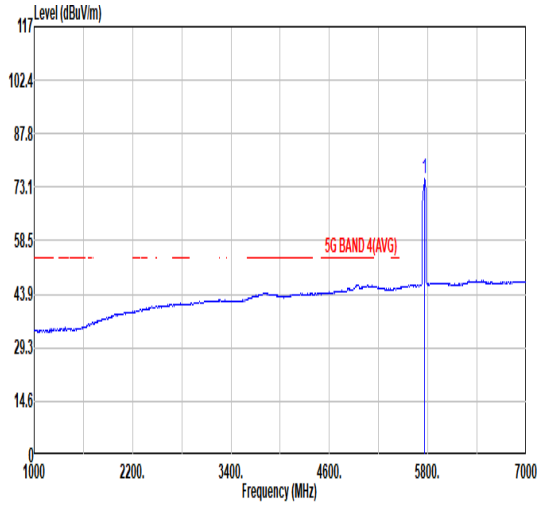
Mode	19	
	Band Edge	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH165_5825MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.88 52.32 111.18 -58.86 37.44 34.87 11.49 31.48 0.00 300 343 PEAK 2 5871.63 57.17 106.24 -49.07 42.26 34.89 11.51 31.49 0.00 300 343 PEAK 3 5924.63 53.35 68.58 -15.23 38.37 34.93 11.55 31.50 0.00 300 343 PEAK 4 5935.25 55.48 68.30 -12.82 40.48 34.94 11.56 31.50 0.00 300 343 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5825.00 92.20 ------ ------ 77.35 34.85 11.47 31.47 0.00 300 343 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5825.00 85.03 ------ ------ 70.18 34.85 11.47 31.47 0.00 300 343 AVERAGE

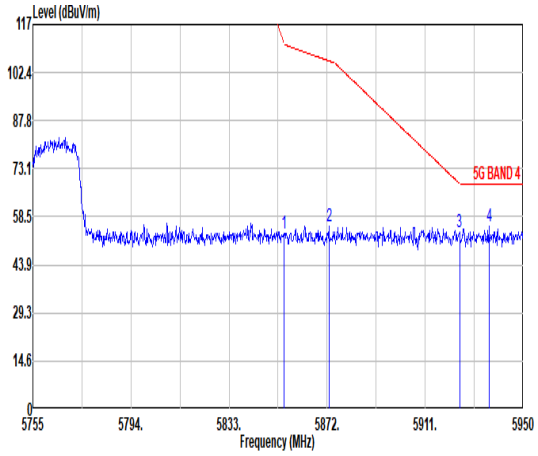
Mode	19	
	Band Edge	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH165_5825MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.88 55.01 111.18 -56.17 40.13 34.87 11.49 31.48 0.00 300 360 PEAK 2 5874.50 54.70 105.44 -50.74 39.79 34.89 11.51 31.49 0.00 300 360 PEAK 3 5922.13 56.51 70.42 -13.91 41.53 34.93 11.55 31.50 0.00 300 360 PEAK 4 5934.63 55.03 68.30 -13.27 40.03 34.94 11.56 31.50 0.00 300 360 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5825.00 80.82 ------ ------ 65.97 34.85 11.47 31.47 0.00 300 360 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5825.00 73.29 ------ ------ 58.44 34.85 11.47 31.47 0.00 300 360 AVERAGE

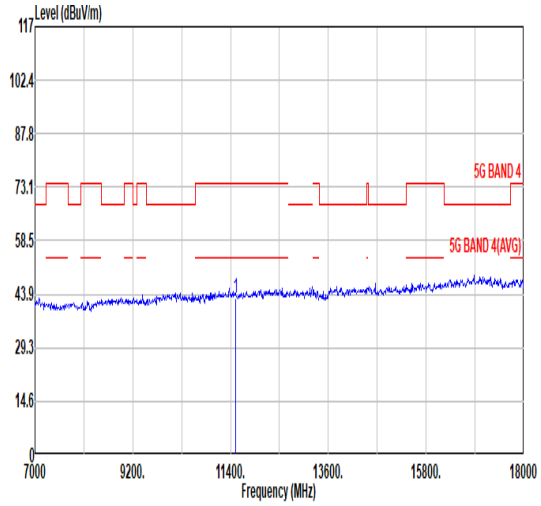
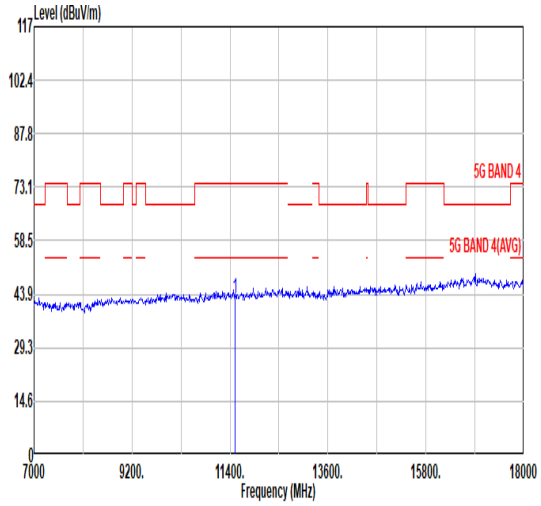
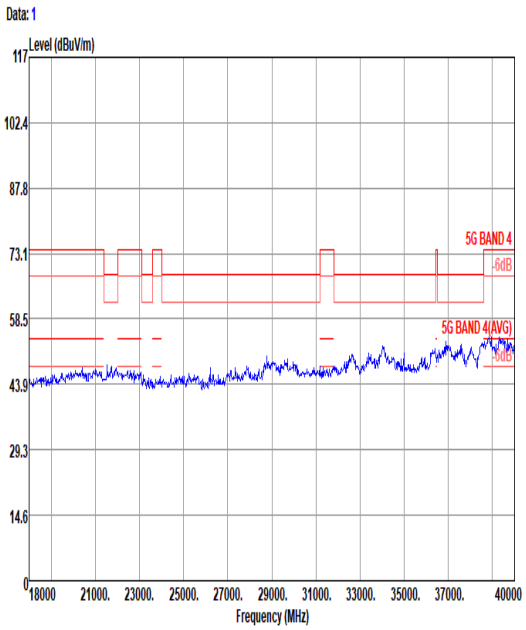
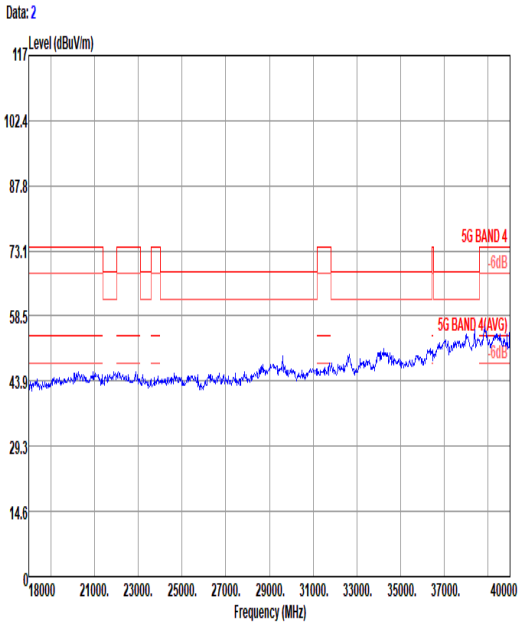
Mode	19	
	Harmonic	
	U-NII-3_5.725-5.85_802.11ac VHT20_CH165_5825MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11650.00 44.30 74.00 -29.70 56.46 38.19 16.23 66.58 0.00 100 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11650.00 43.99 74.00 -30.01 56.15 38.19 16.23 66.58 0.00 300 0 PEAK

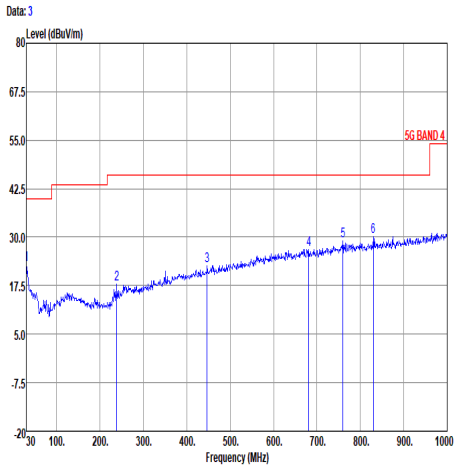
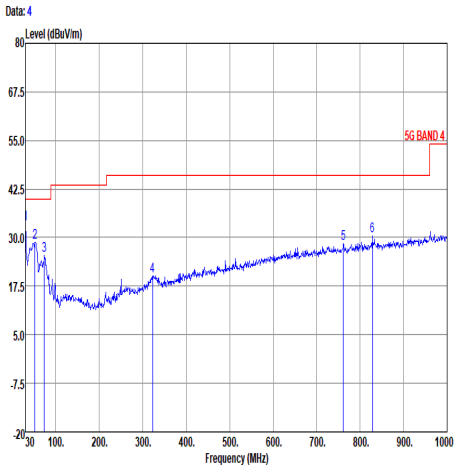
Mode	20	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH151_5755MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5631.16 55.17 68.30 -13.13 40.76 34.70 11.19 31.48 0.00 117 0 PEAK 2 5650.53 52.44 68.69 -16.25 37.98 34.72 11.22 31.48 0.00 117 0 PEAK 3 5701.22 52.53 105.64 -53.11 37.97 34.75 11.29 31.48 0.00 117 0 PEAK 4 5721.06 55.70 113.31 -57.61 41.08 34.77 11.32 31.47 0.00 117 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5755.00 92.98 ------ ------ 78.26 34.80 11.39 31.47 0.00 117 0 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5755.00 86.49 ------ ------ 71.77 34.80 11.39 31.47 0.00 117 0 AVERAGE

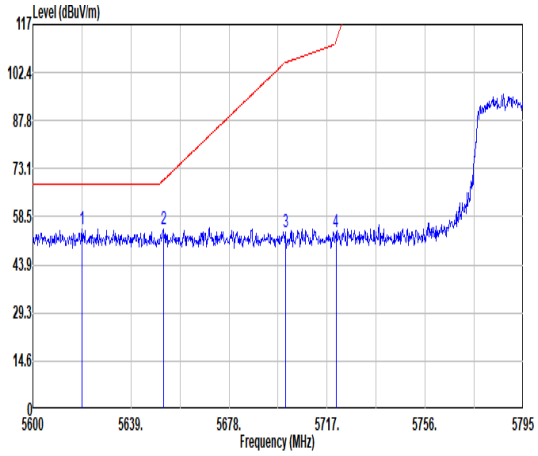
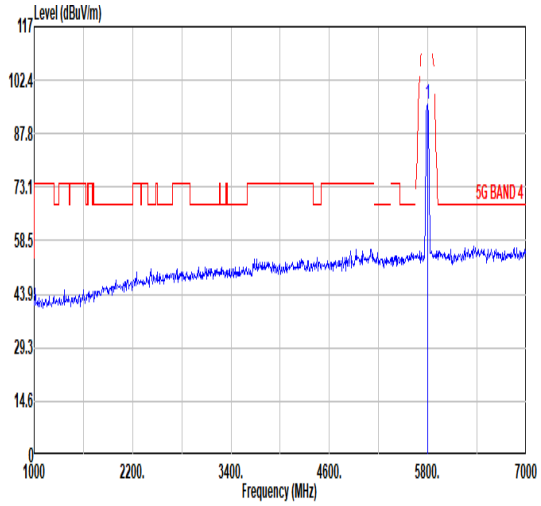
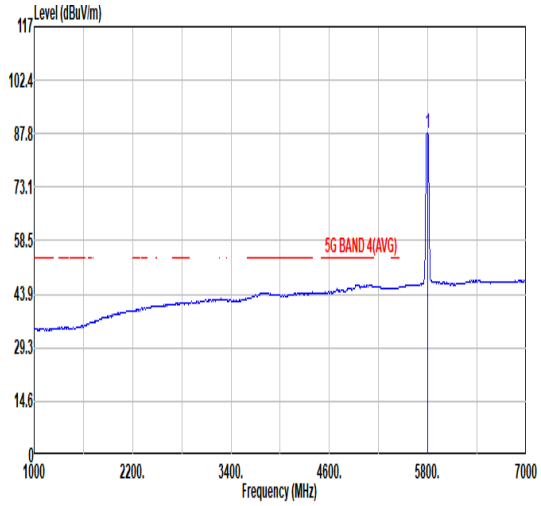
Mode	20	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH151_5755MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq / Level / Limit Line / Margin / Read Level / Ant Factor / Cable Loss / Preamp Factor / Aux Factor / APos / TPos / Remark MHz / dBuV/m / dBuV/m / dB / dBuV / dB/m / dB / dB / dB / cm / deg 1 5854.84 52.77 111.26 -58.49 37.89 34.87 11.49 31.48 0.00 117 0 PEAK 2 5870.25 55.19 106.63 -51.44 40.28 34.89 11.51 31.49 0.00 117 0 PEAK 3 5922.70 54.15 70.00 -15.85 39.17 34.93 11.55 31.50 0.00 117 0 PEAK 4 5949.03 56.47 68.30 -11.83 41.45 34.95 11.57 31.50 0.00 117 0 PEAK	Blank

Mode	20	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH151_5755MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5626.20 54.59 68.30 -13.71 40.18 34.70 11.19 31.48 0.00 300 360 PEAK 2 5651.00 54.39 69.04 -14.65 39.93 34.72 11.22 31.48 0.00 300 360 PEAK 3 5700.29 53.82 105.38 -51.56 39.26 34.75 11.29 31.48 0.00 300 360 PEAK 4 5720.13 51.46 111.19 -59.73 36.84 34.77 11.32 31.47 0.00 300 360 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5755.00 83.14 ------ ------ 68.40 34.81 11.40 31.47 0.00 300 360 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5755.00 75.35 ------ ------ 60.63 34.80 11.39 31.47 0.00 300 360 AVERAGE

Mode	20	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH151_5755MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.84 53.63 111.26 -57.63 38.75 34.87 11.49 31.48 0.00 300 360 PEAK 2 5872.78 55.54 105.92 -50.38 40.63 34.89 11.51 31.49 0.00 300 360 PEAK 3 5924.65 53.80 68.56 -14.76 38.82 34.93 11.55 31.50 0.00 300 360 PEAK 4 5936.35 55.69 68.30 -12.61 40.69 34.94 11.56 31.50 0.00 300 360 PEAK	Blank

Mode	20	
	Harmonic	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH151_5755MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11510.00 42.77 74.00 -31.23 55.27 38.06 16.13 66.69 0.00 100 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11510.00 42.69 74.00 -31.31 55.19 38.06 16.13 66.69 0.00 300 0 PEAK
Peak Avg		

Mode	20	
	Emission below 1GHz	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH151_5755MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak QP	 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 30.00 22.86 -17.14 40.00 31.50 23.00 0.76 32.40 --- --- Peak HORIZONT 2 238.55 17.97 -28.03 46.00 30.49 17.79 2.09 32.40 --- --- Peak HORIZONT 3 447.10 22.55 -23.45 46.00 28.80 23.02 3.13 32.40 --- --- Peak HORIZONT 4 680.87 26.79 -19.21 46.00 28.66 26.66 3.87 32.40 --- --- Peak HORIZONT 5 759.44 28.92 -17.08 46.00 28.70 28.38 4.10 32.26 --- --- Peak HORIZONT 6 830.25 30.10 -15.90 46.00 28.98 28.85 4.25 31.98 --- --- Peak HORIZONT	 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 30.00 33.50 -6.50 40.00 42.14 23.00 0.76 32.40 --- --- Peak VERTICAL 2 52.31 28.81 -11.19 40.00 46.20 14.00 1.01 32.40 --- --- Peak VERTICAL 3 73.65 25.42 -14.58 40.00 43.54 13.08 1.20 32.40 --- --- Peak VERTICAL 4 322.94 20.17 -25.83 46.00 30.02 19.90 2.65 32.40 --- --- Peak VERTICAL 5 761.38 28.33 -17.67 46.00 28.10 28.38 4.10 32.25 --- --- Peak VERTICAL 6 828.31 30.35 -15.65 46.00 29.29 28.81 4.24 31.99 --- --- Peak VERTICAL

Mode	21	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH159_5795MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5619.50 54.83 68.30 -13.47 40.44 34.69 11.18 31.48 0.00 178 0 PEAK 2 5651.87 54.92 69.69 -14.77 40.46 34.72 11.22 31.48 0.00 178 0 PEAK 3 5700.43 53.65 105.42 -51.77 39.09 34.75 11.29 31.48 0.00 178 0 PEAK 4 5720.51 53.79 112.06 -58.27 39.17 34.77 11.32 31.47 0.00 178 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5795.00 95.99 ------ ------ 81.19 34.83 11.44 31.47 0.00 178 0 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5795.00 87.90 ------ ------ 73.12 34.82 11.43 31.47 0.00 178 0 AVERAGE

Mode	21	
	Band Edge - R	
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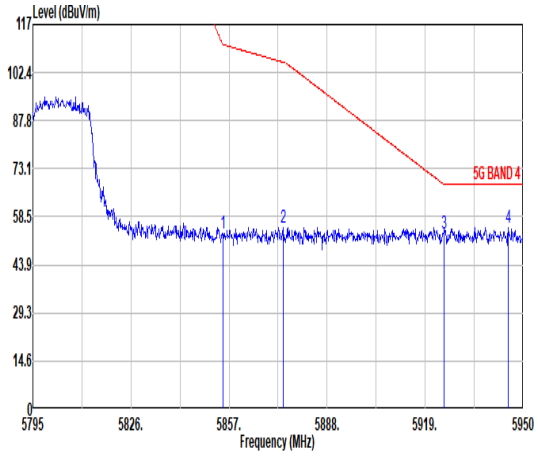
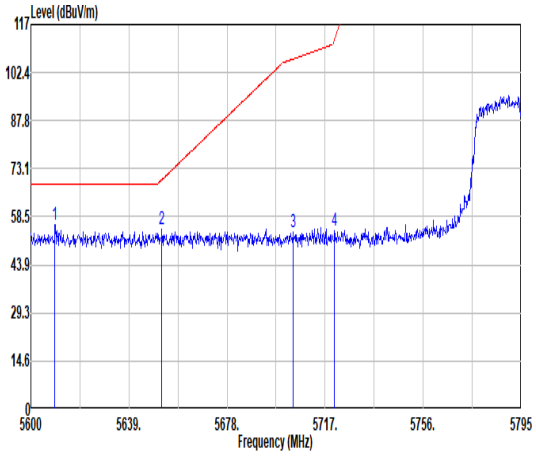
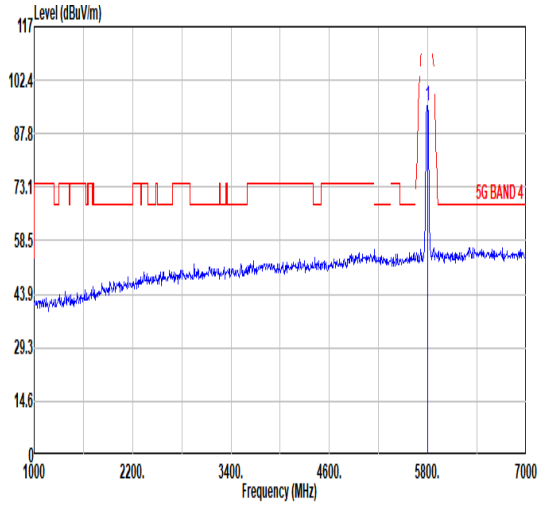
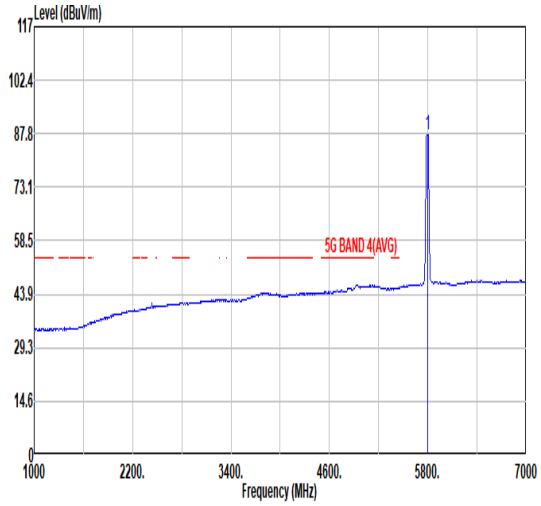
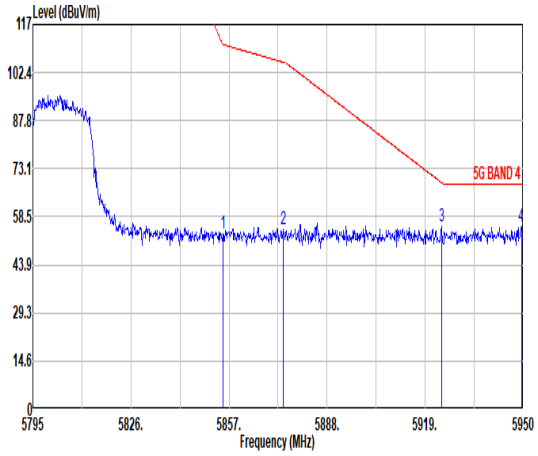
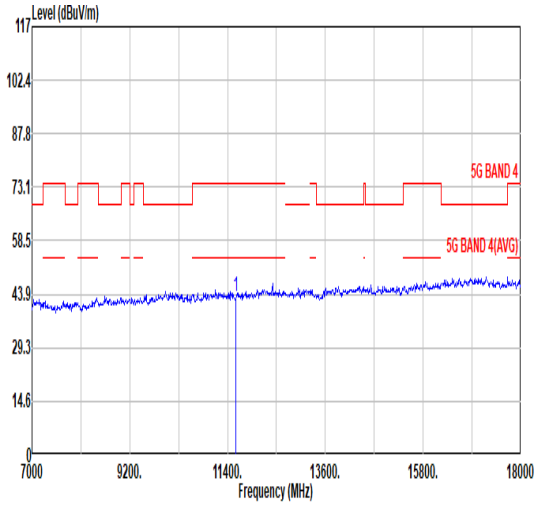
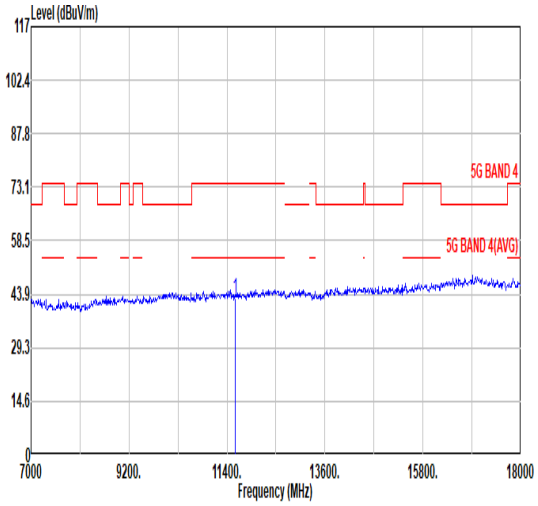
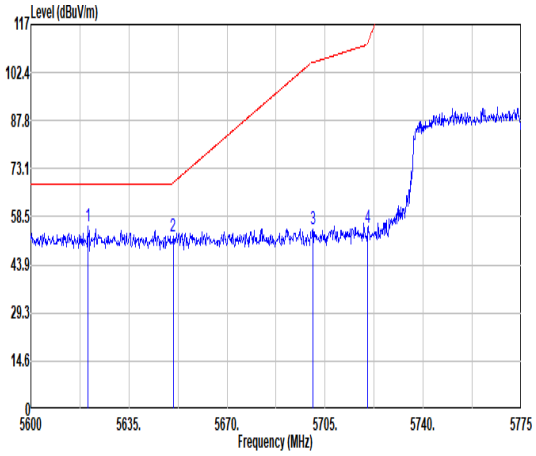
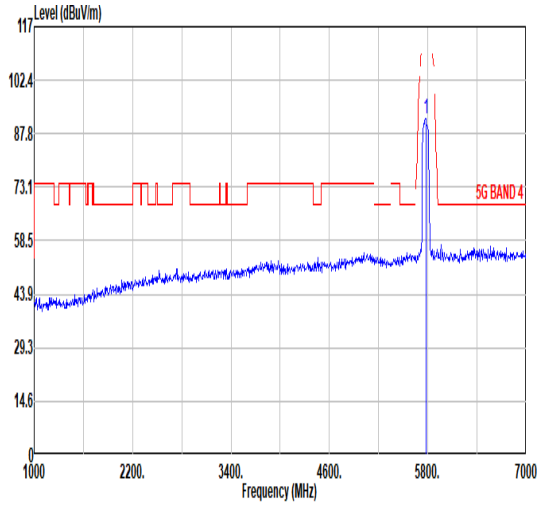
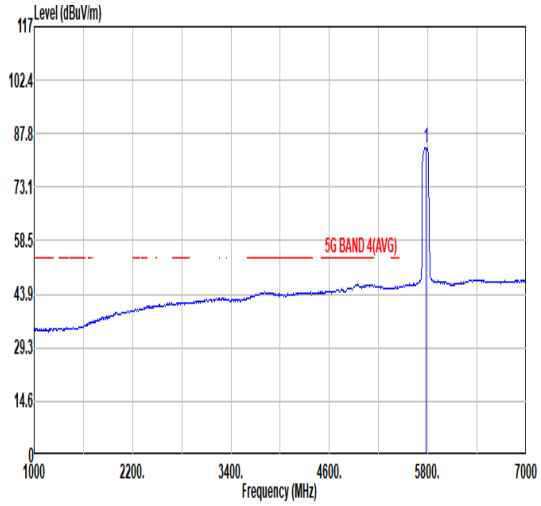
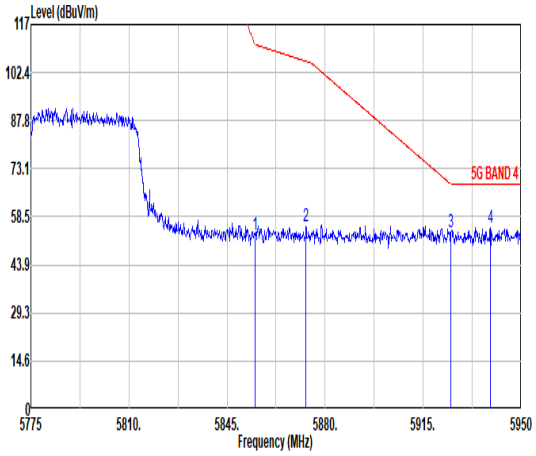
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.99 53.47 110.93 -57.46 38.59 34.87 11.49 31.48 0.00 178 0 PEAK 2 5874.21 55.24 105.52 -50.28 40.33 34.89 11.51 31.49 0.00 178 0 PEAK 3 5924.89 53.62 68.38 -14.76 38.64 34.93 11.55 31.50 0.00 178 0 PEAK 4 5945.35 55.39 68.30 -12.91 40.37 34.95 11.57 31.50 0.00 178 0 PEAK	Blank

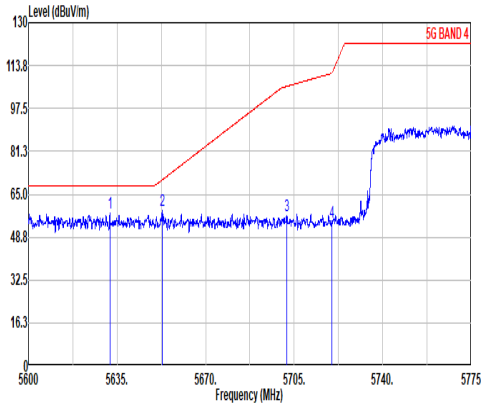
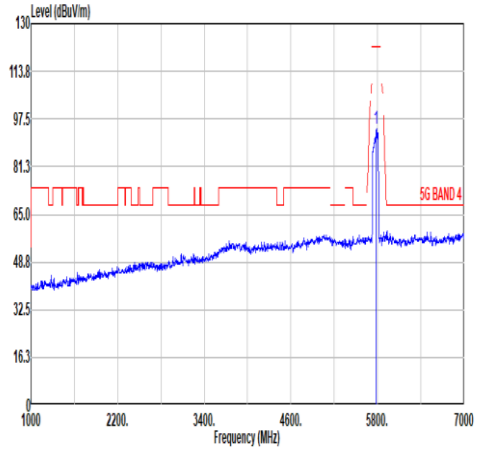
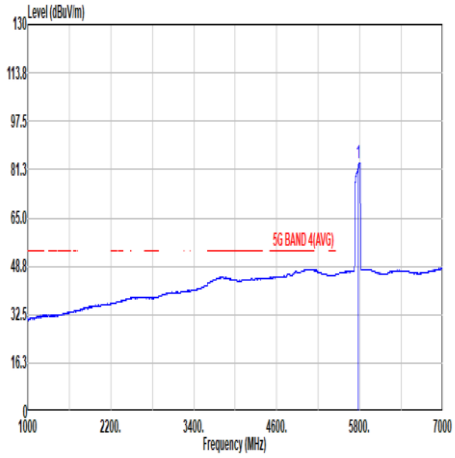
Mode	21	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH159_5795MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5609.56 56.22 68.30 -12.08 41.85 34.69 11.16 31.48 0.00 300 90 PEAK 2 5652.07 54.55 69.83 -15.28 40.09 34.72 11.22 31.48 0.00 300 90 PEAK 3 5704.13 53.88 106.46 -52.58 39.31 34.75 11.30 31.48 0.00 300 90 PEAK 4 5720.71 54.13 112.51 -58.38 39.51 34.77 11.32 31.47 0.00 300 90 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5795.00 95.34 ------ ------ 80.56 34.82 11.43 31.47 0.00 300 90 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5795.00 87.53 ------ ------ 72.72 34.83 11.45 31.47 0.00 300 90 AVERAGE

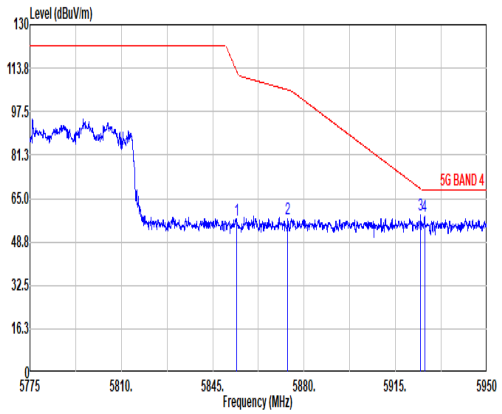
Mode	21	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH159_5795MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.99 53.52 110.93 -57.41 38.64 34.87 11.49 31.48 0.00 300 90 PEAK 2 5874.21 54.53 105.52 -50.99 39.62 34.89 11.51 31.49 0.00 300 90 PEAK 3 5924.12 55.58 68.95 -13.37 40.60 34.93 11.55 31.50 0.00 300 90 PEAK 4 5949.38 55.65 68.30 -12.65 40.63 34.95 11.57 31.50 0.00 300 90 PEAK	Blank

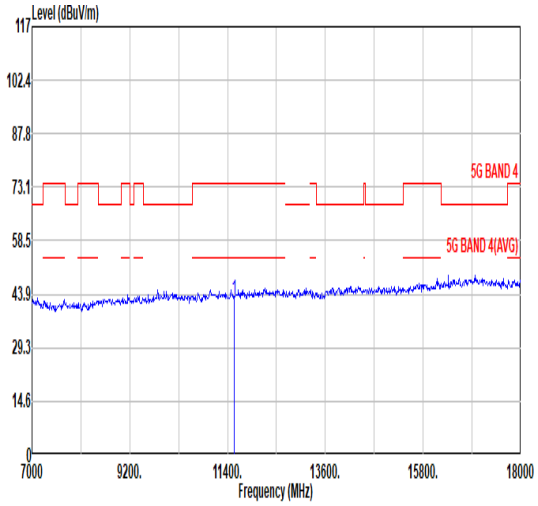
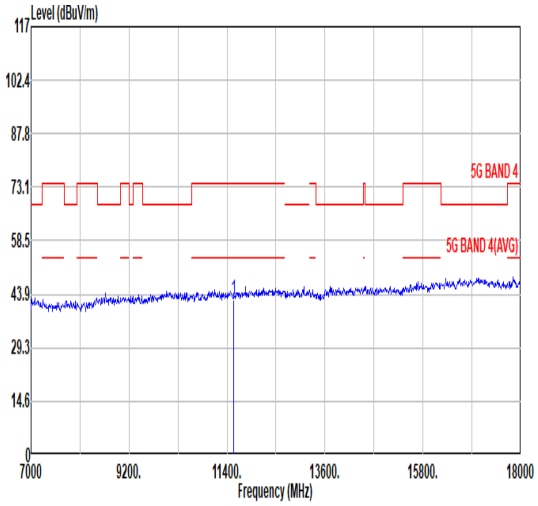
Mode	21	
	Harmonic	
	U-NII-3_5.725-5.85_802.11ac VHT40_CH159_5795MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11590.00 43.23 74.00 -30.77 55.53 38.14 16.19 66.63 0.00 100 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11590.00 42.84 74.00 -31.16 55.14 38.14 16.19 66.63 0.00 300 0 PEAK

Mode	29	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT80_CH155_5775MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5620.30 55.45 68.30 -12.85 41.06 34.69 11.18 31.48 0.00 171 0 PEAK 2 5650.75 52.75 68.86 -16.11 38.29 34.72 11.22 31.48 0.00 171 0 PEAK 3 5700.63 54.68 105.48 -50.80 40.12 34.75 11.29 31.48 0.00 171 0 PEAK 4 5720.23 55.39 111.41 -56.02 40.77 34.77 11.32 31.47 0.00 171 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5775.00 91.63 ------ ------ 76.89 34.81 11.40 31.47 0.00 171 0 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos Remark TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5775.00 84.03 ------ ------ 69.29 34.81 11.40 31.47 0.00 171 0 AVERAGE

Mode	29	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT80_CH155_5775MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.98 52.91 110.96 -58.05 38.03 34.87 11.49 31.48 0.00 171 0 PEAK 2 5873.18 55.50 105.81 -50.31 40.59 34.89 11.51 31.49 0.00 171 0 PEAK 3 5924.98 53.93 68.32 -14.39 38.95 34.93 11.55 31.50 0.00 171 0 PEAK 4 5938.98 55.18 68.30 -13.12 40.18 34.94 11.56 31.50 0.00 171 0 PEAK	Blank

Mode	29	
	Band Edge - L	
	U-NII-3_5.725-5.85_802.11ac VHT80_CH155_5775MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5632.12 57.94 68.30 -10.36 41.00 35.49 11.22 29.77 0.00 300 0 PEAK 2 5652.77 58.82 70.36 -11.54 41.84 35.52 11.24 29.78 0.00 300 0 PEAK 3 5701.94 56.98 105.84 -48.86 39.92 35.58 11.28 29.80 0.00 300 0 PEAK 4 5720.00 54.63 110.91 -56.28 37.51 35.61 11.30 29.79 0.00 300 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5775.00 94.29 ------ ------ 76.96 35.72 11.38 29.77 0.00 300 0 PEAK
Avg	Blank	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5775.00 83.48 ------ ------ 66.15 35.72 11.38 29.77 0.00 300 0 AVERAGE

Mode	29	
	Band Edge - R	
	U-NII-3_5.725-5.85_802.11ac VHT80_CH155_5775MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5854.19 57.04 112.74 -55.70 39.64 35.76 11.43 29.79 0.00 300 0 PEAK 2 5873.62 57.26 105.69 -48.43 39.84 35.77 11.44 29.79 0.00 300 0 PEAK 3 5924.54 58.80 68.64 -9.84 41.38 35.77 11.47 29.82 0.00 300 0 PEAK 4 5926.12 58.16 68.30 -10.14 40.73 35.77 11.48 29.82 0.00 300 0 PEAK	Blank

Mode	29	
	Harmonic	
	U-NII-3_5.725-5.85_802.11ac VHT80_CH155_5775MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11550.00 42.42 74.00 -31.58 54.82 38.10 16.16 66.66 0.00 100 0 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 11550.00 42.57 74.00 -31.43 54.97 38.10 16.16 66.66 0.00 300 0 PEAK

Note symbol

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

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

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

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

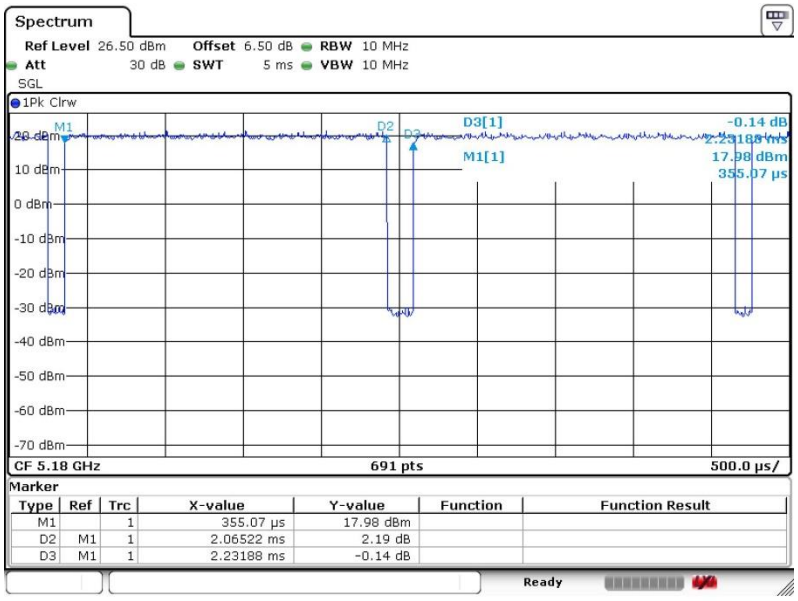
= -10.46(dB)

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

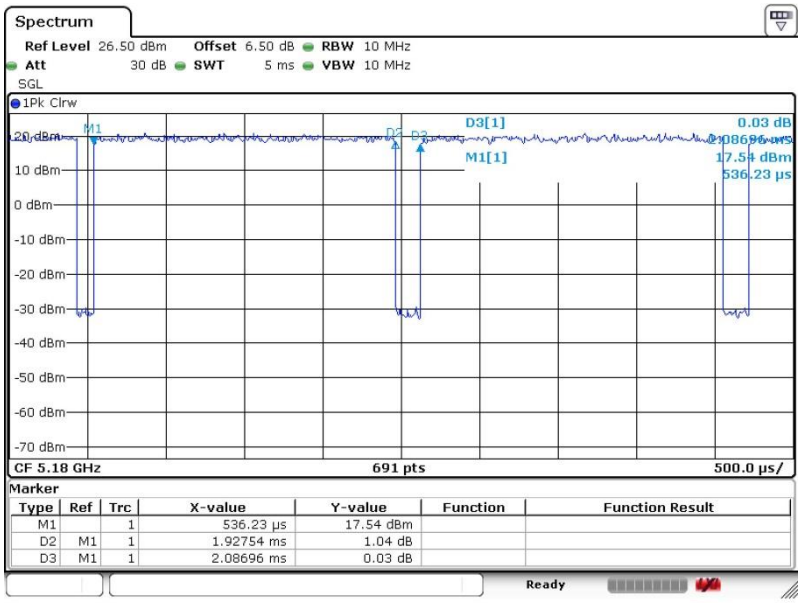
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	92.53	2.065	0.484	0.51kHz
802.11n HT20	92.36	1.928	0.519	0.56kHz
802.11n HT40	89.73	0.949	1.053	1.10kHz
802.11ac VHT20	94.32	1.928	0.519	0.56kHz
802.11ac VHT40	91.03	0.957	1.045	1.1kHz
802.11ac VHT80	82.78	0.467	2.143	2.2kHz

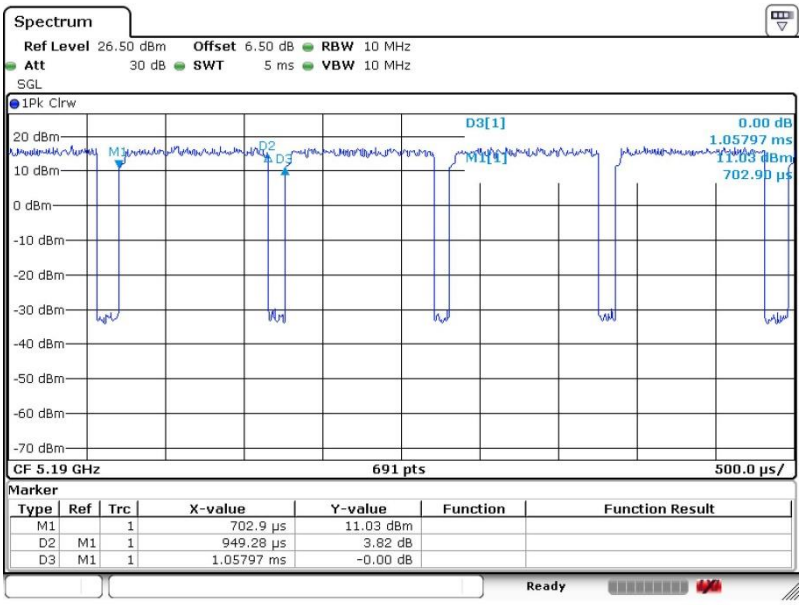
802.11a



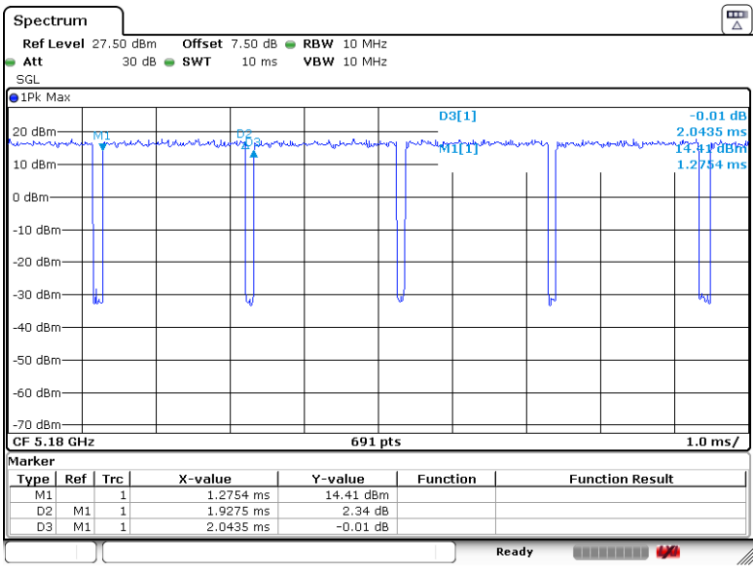
802.11n HT20



802.11n HT40



802.11ac VHT20



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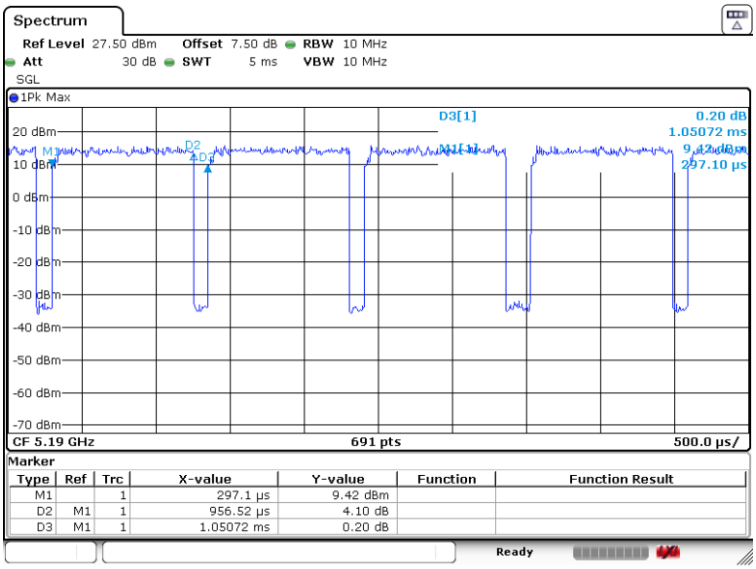
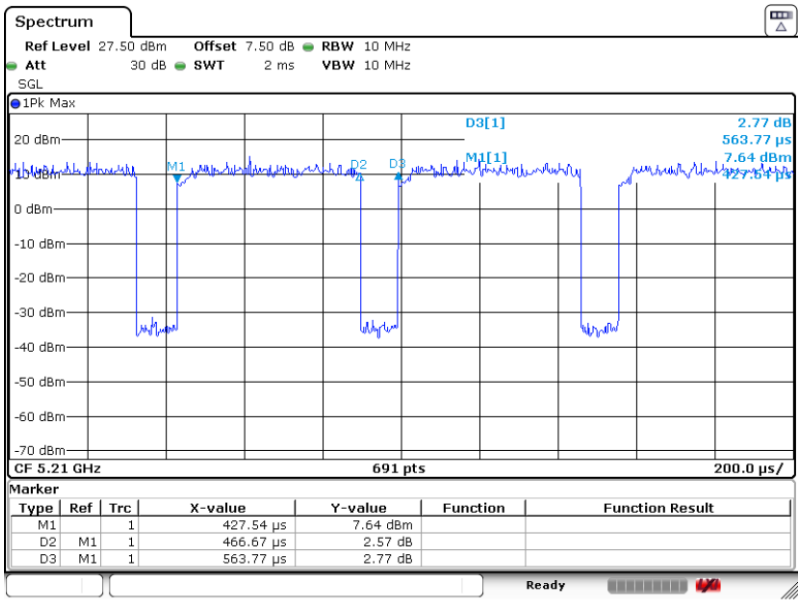
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