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APPENDIX A. CONDUCTED TEST RESULTS

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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 9.55 dB at 38.730 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.52 dB at 0.174 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

Sonim Technologies, Inc.

6500 River Place Blvd. Building 7, Suite 250, Austin, TX 78730, USA

1.2 Manufacturer

Sonim Technologies, Inc.

6500 River Place Blvd. Building 7, Suite 250, Austin, TX 78730, USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM, WCDMA, LTE Cell Phone
Brand Name	Sonim
Model Name	XP5900(P14500) XP5900(P14600) XP5900(P14510) XP5900(P14610) XP5900(P14501) XP5900(P14601)
IMEI Code	Conducted: 357855510003391/357855510008390 Conduction: 016107000012711 Radiation: 016107000012646 for Sample 1 004400152020002 for Sample 2
FCC ID	WYPP14510
HW Version	1.0
SW Version	5P.2.0-01-11.0.0-10.22.14
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The different model names are for different market purpose.
3. There are two types of EUT, the sample 1 is 1st source with different Carriers and the sample 2 is 2nd source with different Carriers. The difference could refer to the XP5900_Operational Description of Product Equality Declaration which is exhibit separately. According to the difference, we evaluate the sample 1 to perform full test and the sample 2 is verified for RSE testing.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	<5745 MHz ~ 5825 MHz> 802.11a : 14.93 dBm / 0.0311 W 802.11n HT20 : 14.66 dBm / 0.0292 W 802.11n HT40 : 15.21 dBm / 0.0332 W 802.11ac VHT20: 13.23 dBm / 0.0210 W 802.11ac VHT40: 13.93 dBm / 0.0247 W 802.11ac VHT80: 13.60 dBm / 0.0229 W
99% Occupied Bandwidth	802.11a : 16.73 MHz 802.11n HT20 : 17.83 MHz 802.11n HT40 : 36.66 MHz 802.11ac VHT80 : 75.76 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	PIFA Antenna with gain 5.16 dBi

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n HT20/HT40 by referring to their maximum conducted power.

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 03CH02-KS 03CH05-KS TH01-KS	CN1257	314309



1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a
2.	03CH05-KS	AUDIX	E3	6.2009-8-24al
3.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

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

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- 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 (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 "#n" were 802.11ac VHT80.



2.2 Test Mode

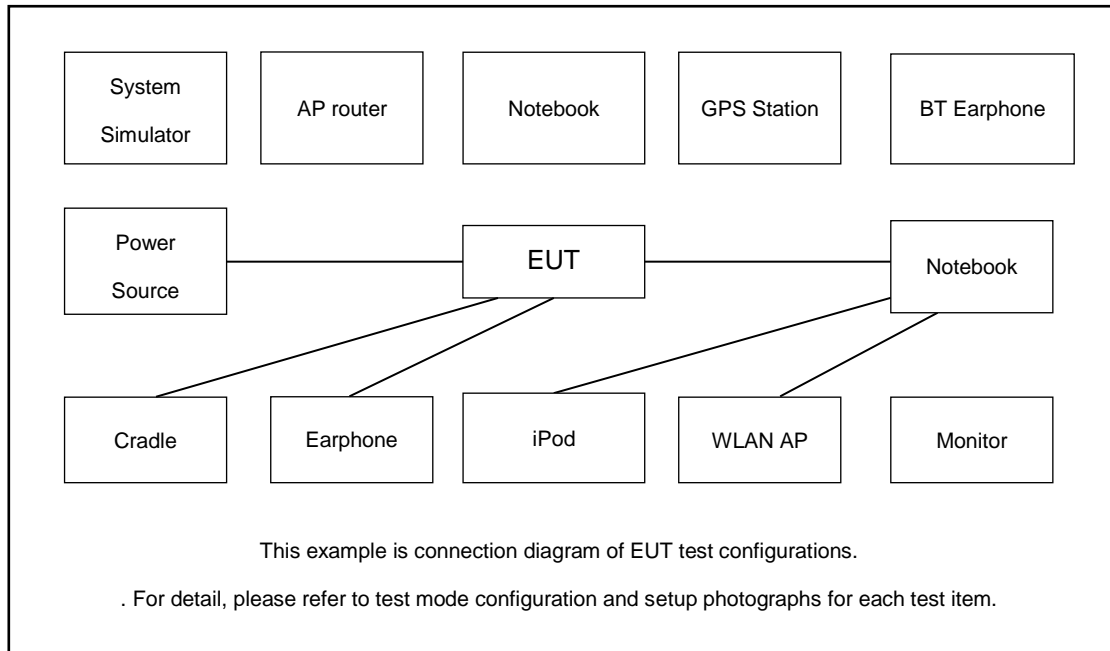
Final test modes are considering the modulation and worse data rates as below table.

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

AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN Link(5G) + USB Cable (Charging from Adapter) + Earphone
Remark:	
<ol style="list-style-type: none"> For Radiated Test Cases, The tests were performance with Adapter, Earphone and USB Cable All test modes of the Radiated Spurious Emission (RSE) were tested; only the worst data in each bandwidth are shown in the reported 	

Ch. #	U-NII-3 : 5745-5825 MHz			
	802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L Low	149	149	151	-
M Middle	157	157	-	155
H High	165	165	159	-

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
2.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
4.	SD Card	Kingston	8GB	N/A	N/A	N/A
5.	Earphone	Lenovo	P121	N/A	N/A	Unshielded,1.2m

2.5 EUT Operation Test Setup

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

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



2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

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

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

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

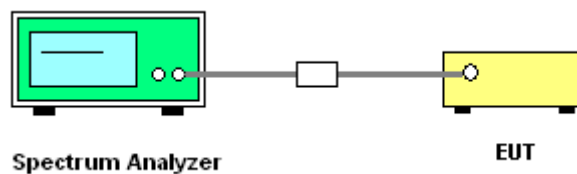
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. For 6dB BW, Set RBW = 100kHz.
For 26dB BW, Set RBW = approximately 1% of the emission bandwidth.
For 99% OBW, Set RBW = 1% to 5% of the OBW.
3. For 26dB BW, Set the VBW > RBW.
For 6dB BW & 99% OBW, Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

3.1.4 Test Setup

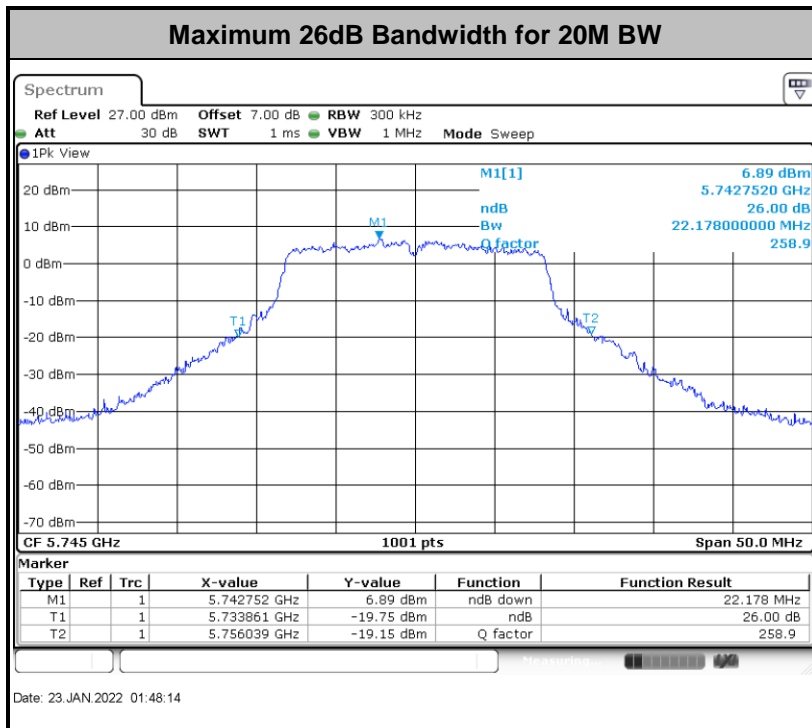
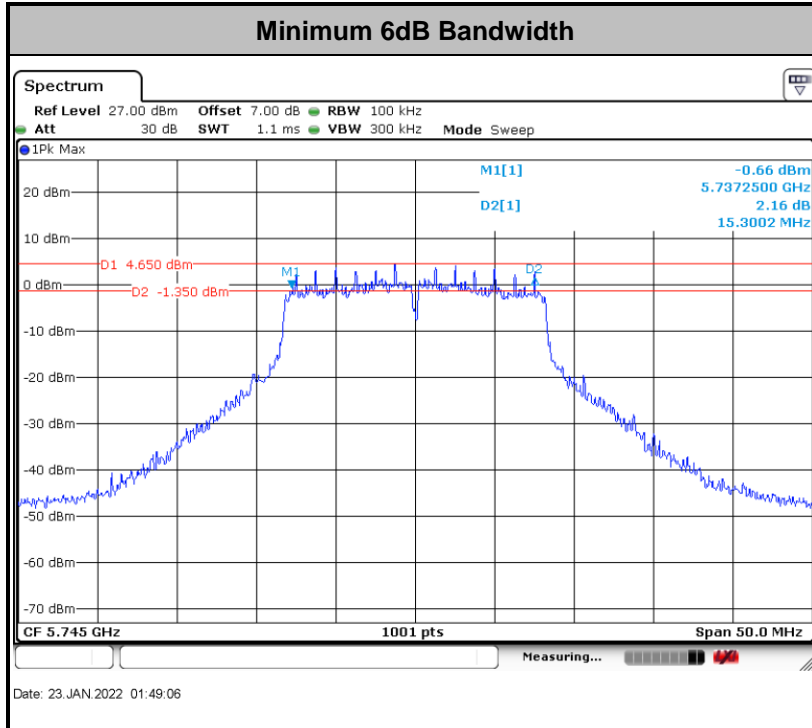


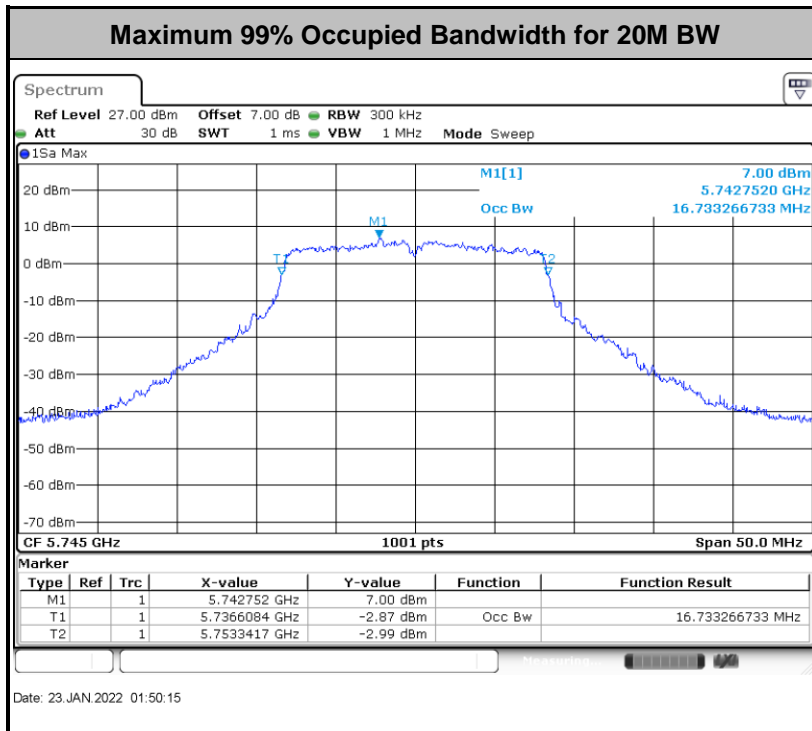


3.1.5 Test Result of 6dB Bandwidth

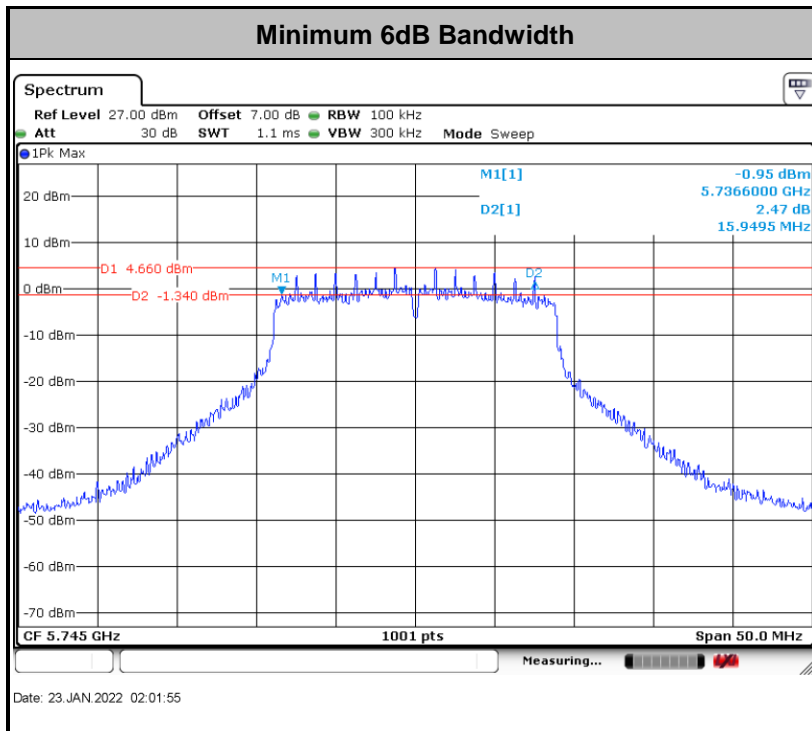
Please refer to Appendix A.

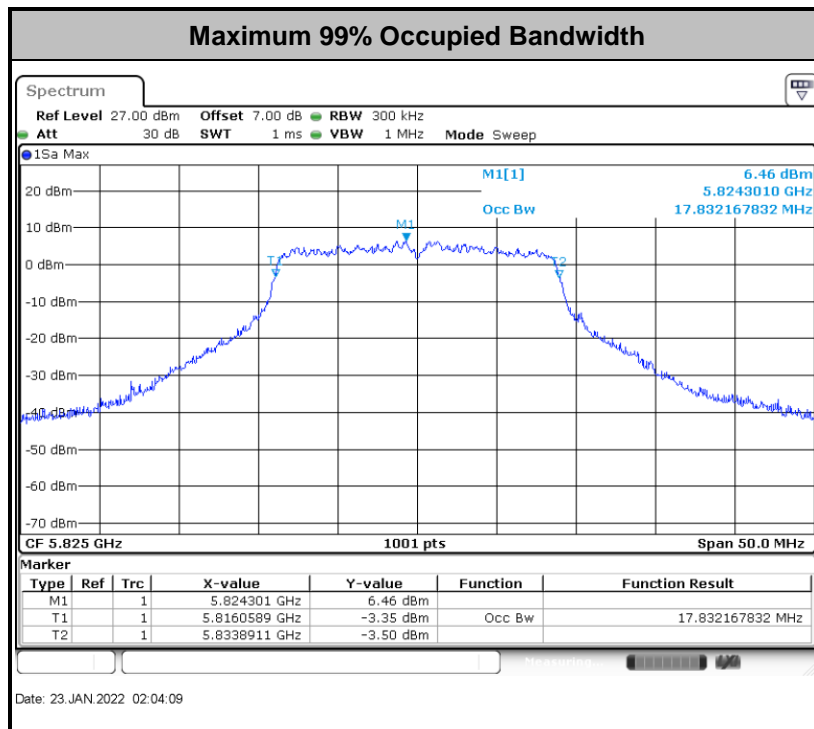
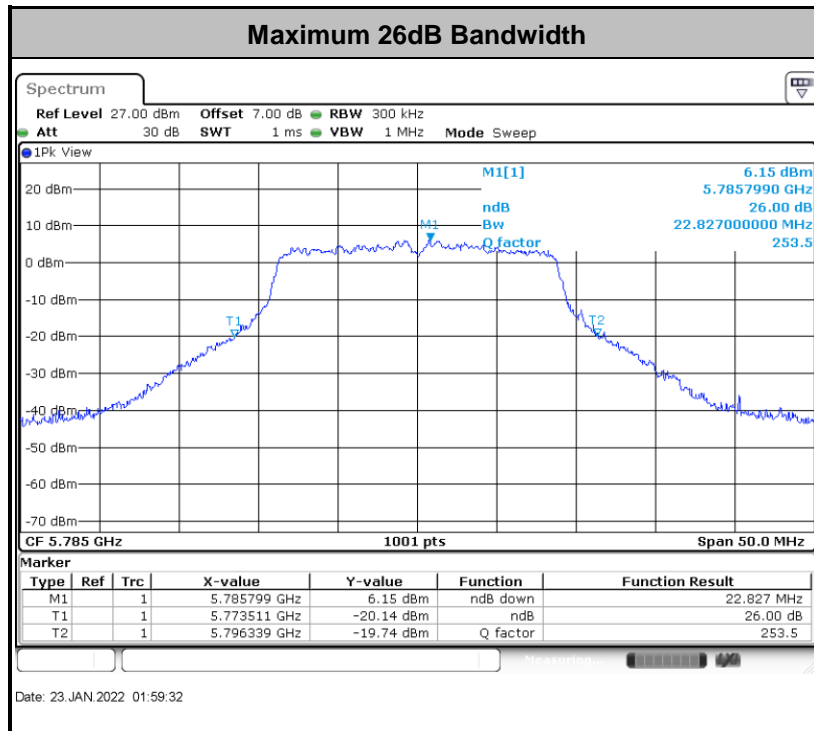
11a





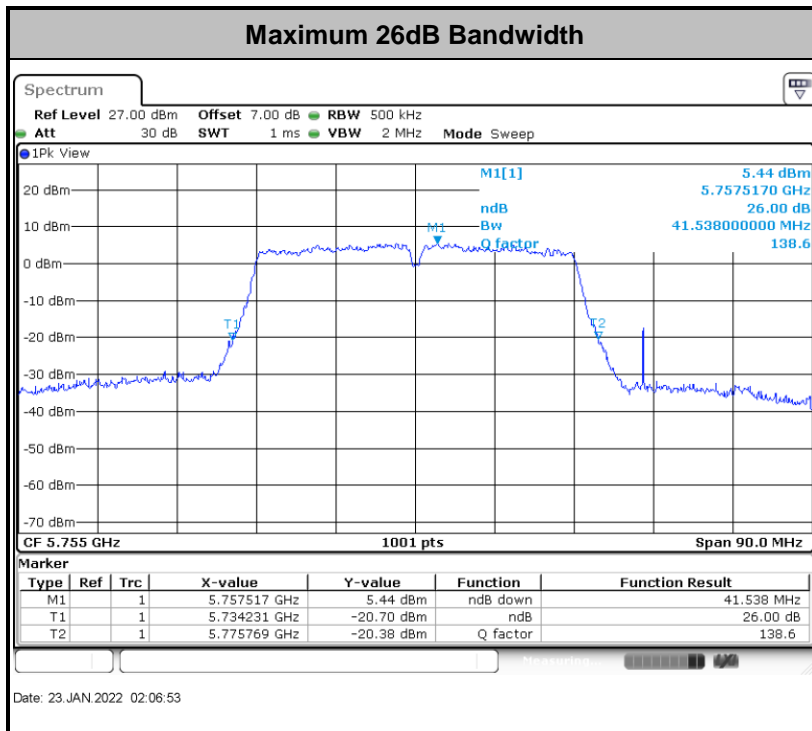
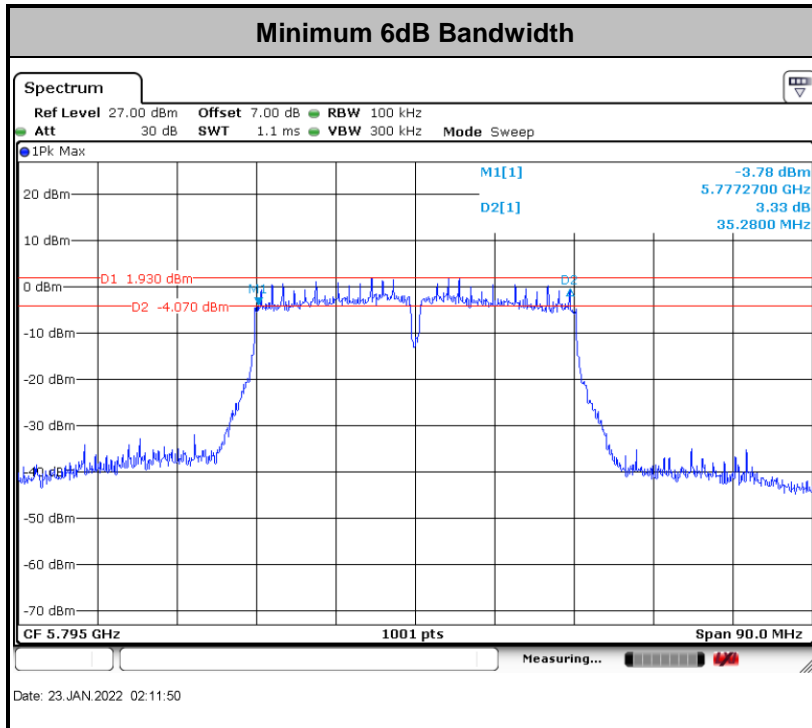
11n HT20

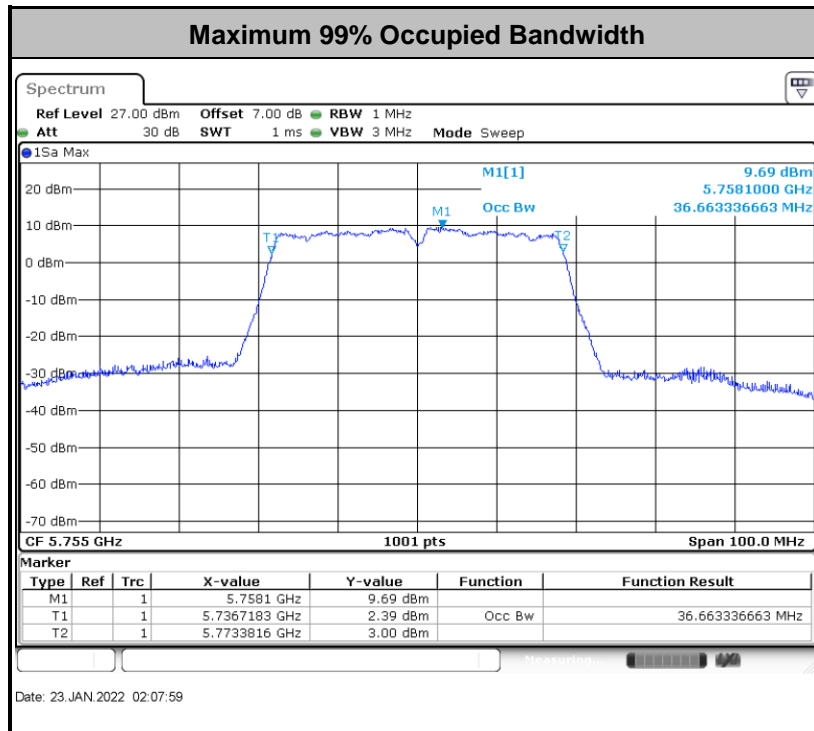




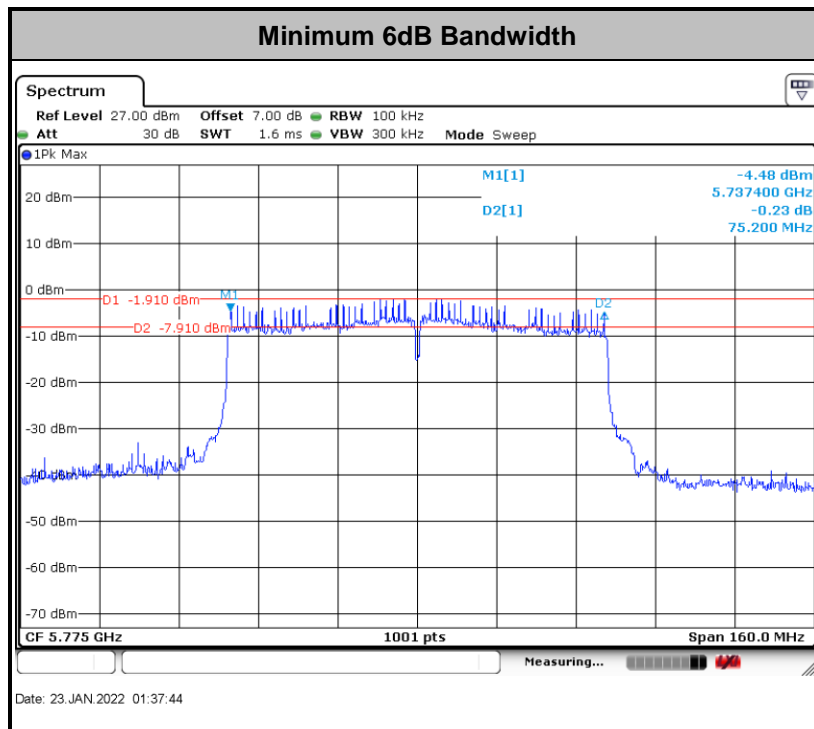


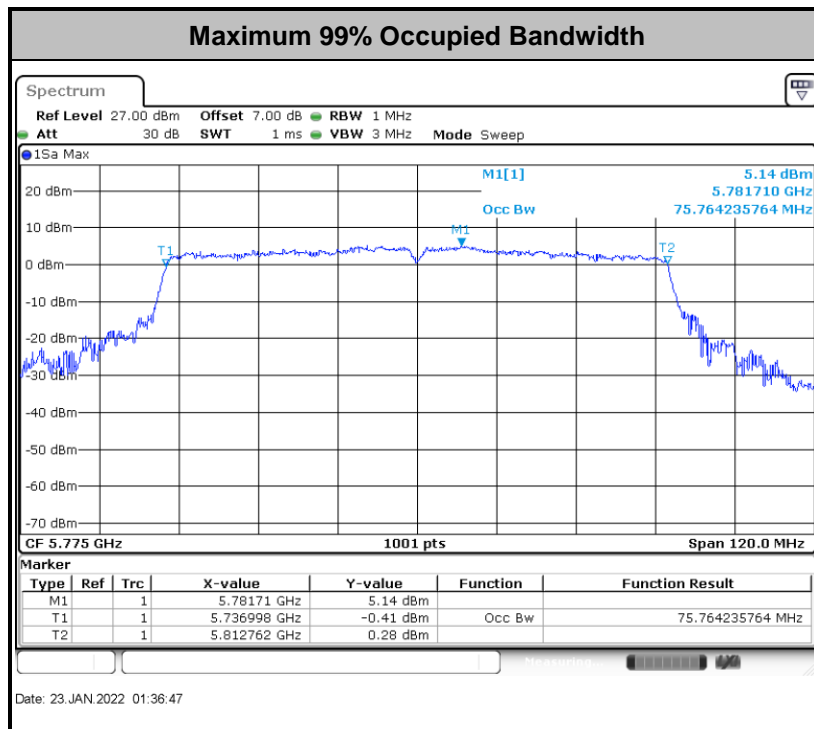
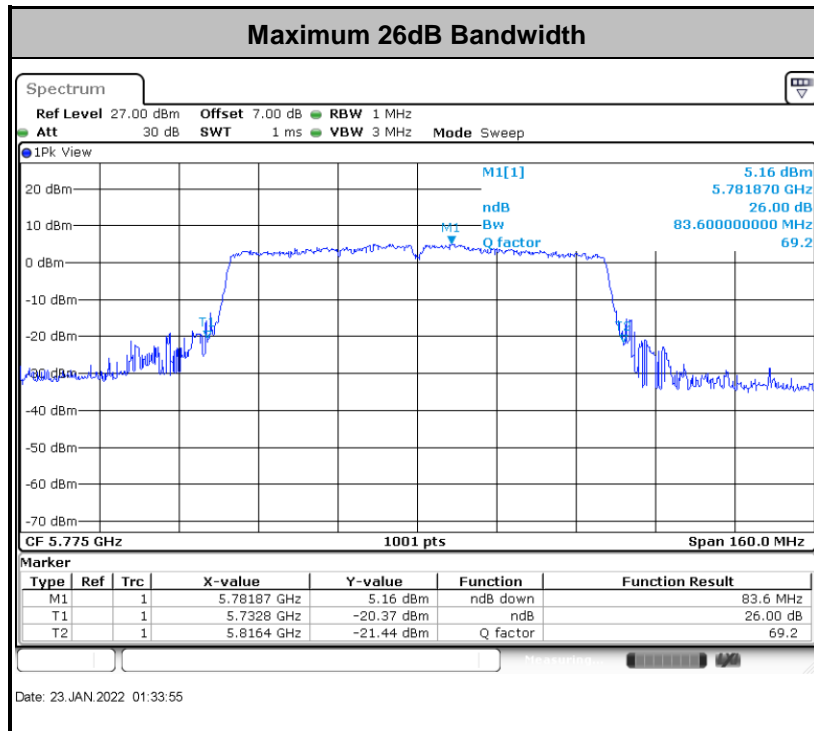
11n HT40





11ac VHT80





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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

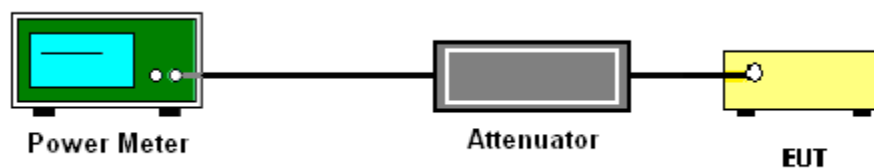
3.2.3 Test Procedures

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

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

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.
4. For MIMO mode, the measure-and-sum technique should be used for measuring the in-band transmit power of a device.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

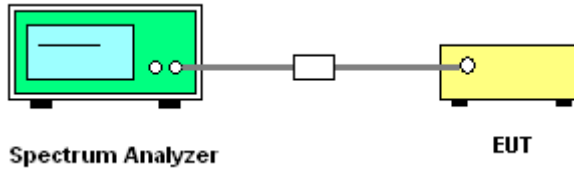
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

Method SA-2

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

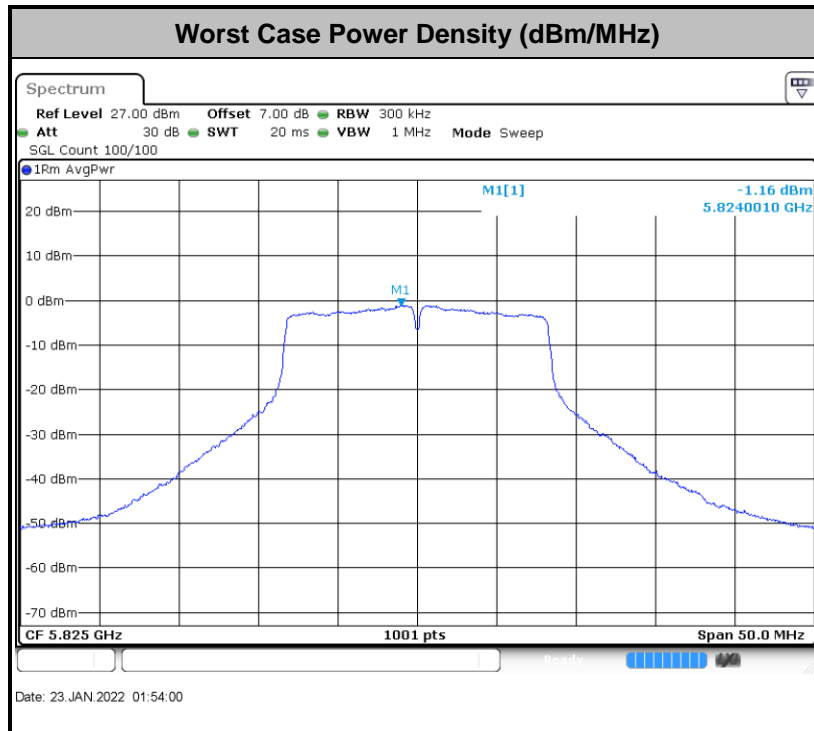
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW \geq 1 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ to the test result.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



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



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

(1) 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

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

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

3.4.2 Measuring Instruments

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

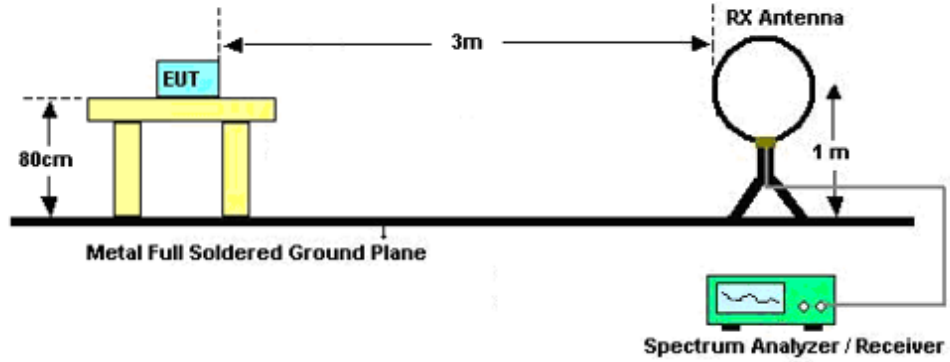


3.4.3 Test Procedures

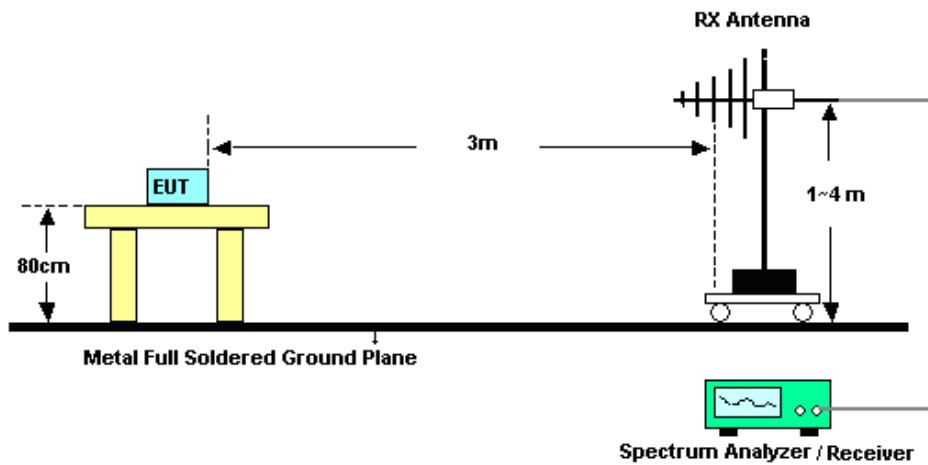
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak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

3.4.4 Test Setup

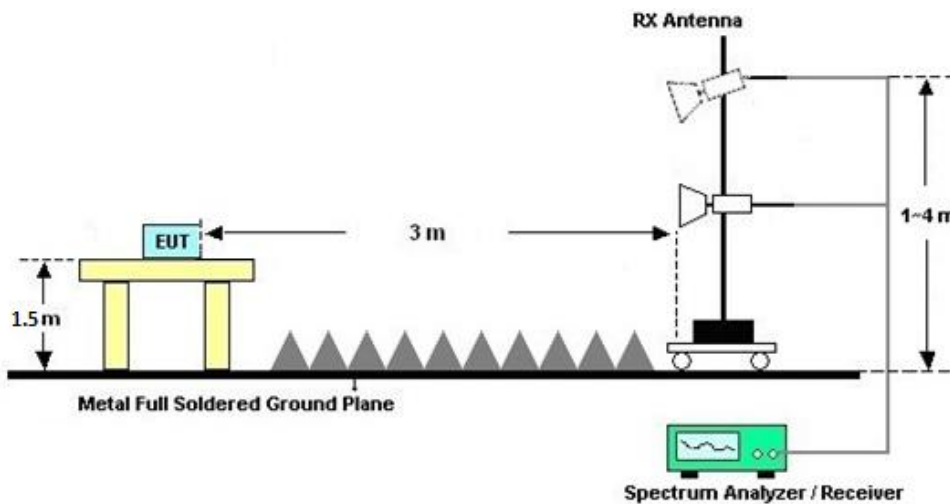
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



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 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.

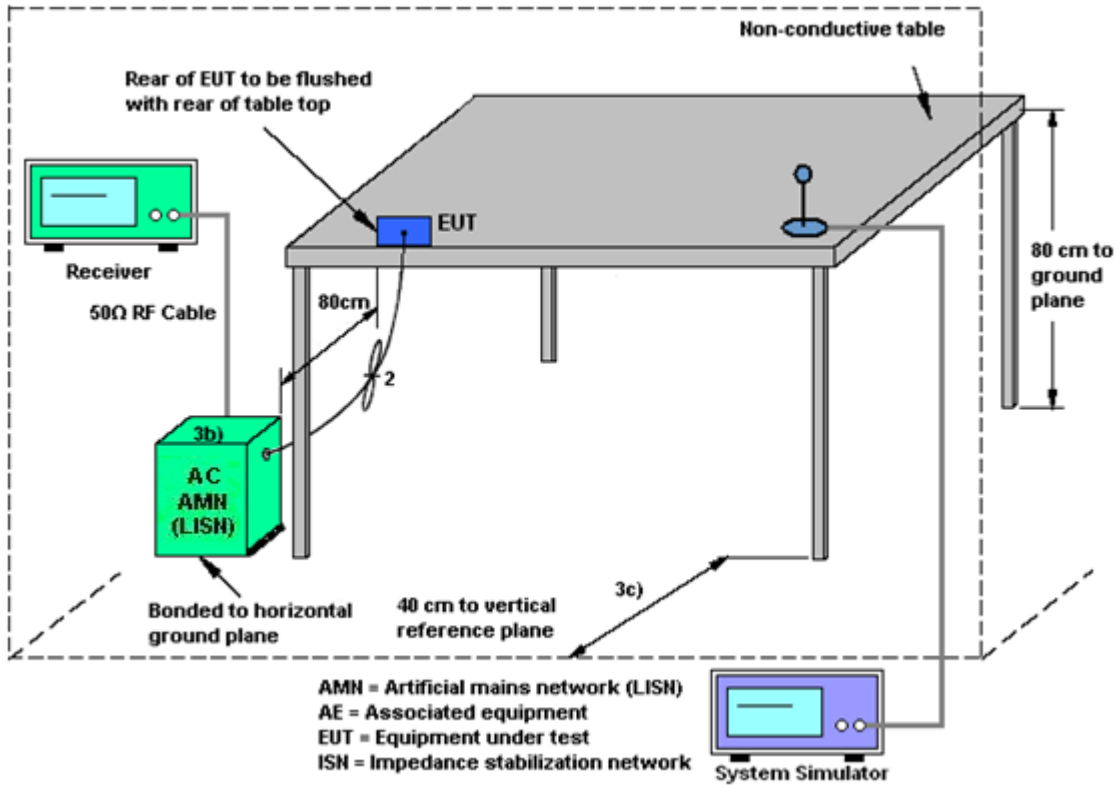
3.5.2 Measuring Instruments

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



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

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	Oct. 14, 2021	Jan. 23, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2021	Jan. 23, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2021	Jan. 23, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Jan. 23, 2022	Jul. 11, 2022	Conducted (TH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 30, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Oct. 29, 2022	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Jul. 29, 2023	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Jan. 06, 2022 ~Feb. 26, 2022	Jan. 04, 2023	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Apr. 13, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Apr. 12, 2022	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Jan. 06, 2022 ~Feb. 26, 2022	Jan. 04, 2023	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jan. 06, 2022 ~Feb. 26, 2022	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jan. 06, 2022 ~Feb. 26, 2022	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jan. 06, 2022 ~Feb. 26, 2022	NCR	Radiation (03CH02-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max x 30dBm	Oct. 16, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 13, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Apr. 12, 2022	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Oct. 29, 2022	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jun. 04, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Jun. 03, 2022	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 24, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Apr. 23, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Jan. 06, 2022 ~Feb. 26, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Apr. 12, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Apr. 11, 2022	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Jan. 06, 2022 ~Feb. 26, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2012228	1Ghz-18Ghz	Oct. 16, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	Jan. 06, 2022 ~Feb. 26, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 06, 2022 ~Feb. 26, 2022	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 06, 2022 ~Feb. 26, 2022	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 06, 2022 ~Feb. 26, 2022	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Feb. 01, 2022	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Feb. 01, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Apr. 13, 2021	Feb. 01, 2022	Apr. 12, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Feb. 01, 2022	Oct. 13, 2022	Conduction (CO01-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.94dB
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For 03CH02-KS:

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1dB
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For 03CH05-KS:

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

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

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

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



Appendix A. Conducted Test Results

A1. Conducted Test Results

Test Engineer:	Alan He	Temperature:	21~25	°C
Test Date:	2022/1/23	Relative Humidity:	51~54	%

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

U-NII-3 single antenna												
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	149	5745	16.73	-	22.18	-	15.30	-	0.5	Pass
11a	6Mbps	1	157	5785	16.68	-	21.43	-	15.35	-	0.5	Pass
11a	6Mbps	1	165	5825	16.68	-	21.58	-	15.35	-	0.5	Pass
HT20	MCS0	1	149	5745	17.83	-	22.63	-	15.95	-	0.5	Pass
HT20	MCS0	1	157	5785	17.83	-	22.83	-	16.80	-	0.5	Pass
HT20	MCS0	1	165	5825	17.83	-	22.83	-	15.95	-	0.5	Pass
HT40	MCS0	1	151	5755	36.66	-	41.54	-	36.37	-	0.5	Pass
HT40	MCS0	1	159	5795	36.56	-	41.45	-	35.28	-	0.5	Pass
VHT80	MCS0	1	155	5775	75.76	-	83.60	-	75.20	-	0.5	Pass

TEST RESULTS DATA
Average Power Table

U-NII-3 single antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	14.93	-		30.00	-	5.16	-	Pass
11a	6Mbps	1	157	5785	14.09	-		30.00	-	5.16	-	Pass
11a	6Mbps	1	165	5825	14.84	-		30.00	-	5.16	-	Pass
HT20	MCS0	1	149	5745	14.64	-		30.00	-	5.16	-	Pass
HT20	MCS0	1	157	5785	13.86	-		30.00	-	5.16	-	Pass
HT20	MCS0	1	165	5825	14.66	-		30.00	-	5.16	-	Pass
HT40	MCS0	1	151	5755	15.21	-		30.00	-	5.16	-	Pass
HT40	MCS0	1	159	5795	15.03	-		30.00	-	5.16	-	Pass
VHT20	MCS0	1	149	5745	13.21	-		30.00	-	5.16	-	Pass
VHT20	MCS0	1	157	5785	12.35	-		30.00	-	5.16	-	Pass
VHT20	MCS0	1	165	5825	13.23	-		30.00	-	5.16	-	Pass
VHT40	MCS0	1	151	5755	13.93	-		30.00	-	5.16	-	Pass
VHT40	MCS0	1	159	5795	13.44	-		30.00	-	5.16	-	Pass
VHT80	MCS0	1	155	5775	13.60	-		30.00	-	5.16	-	Pass

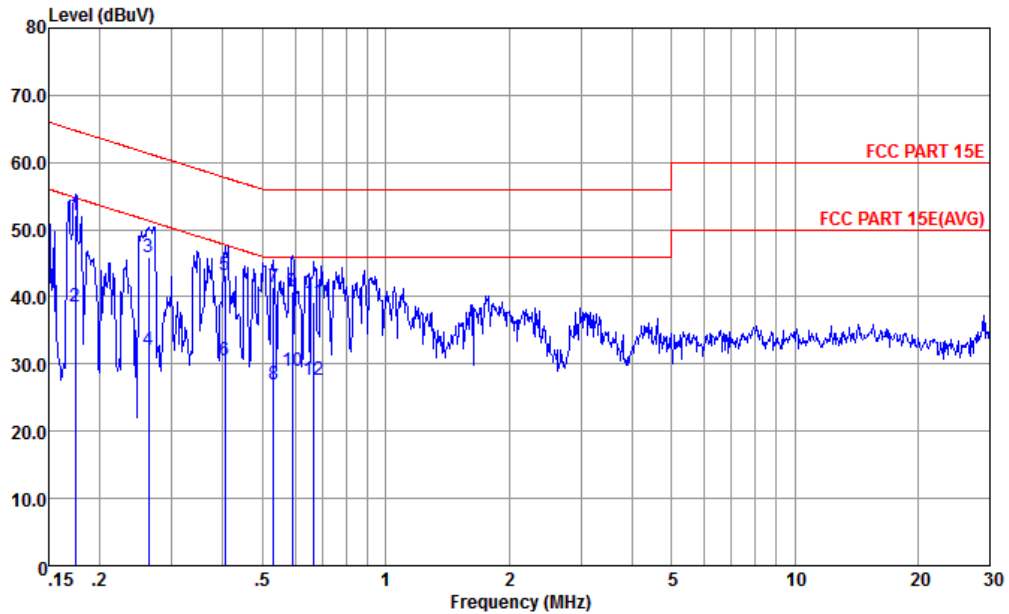
TEST RESULTS DATA
Power Spectral Density

U-NII-3 single antenna														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	2.22	-	0.74	-		30.00	-	5.16	-	Pass
11a	6Mbps	1	157	5785	2.22	-	0.64	-		30.00	-	5.16	-	Pass
11a	6Mbps	1	165	5825	2.22	-	1.06	-		30.00	-	5.16	-	Pass
HT20	MCS0	1	149	5745	2.22	-	0.34	-		30.00	-	5.16	-	Pass
HT20	MCS0	1	157	5785	2.22	-	0.12	-		30.00	-	5.16	-	Pass
HT20	MCS0	1	165	5825	2.22	-	0.51	-		30.00	-	5.16	-	Pass
HT40	MCS0	1	151	5755	2.22	-	-2.25	-		30.00	-	5.16	-	Pass
HT40	MCS0	1	159	5795	2.22	-	-2.00	-		30.00	-	5.16	-	Pass
VHT80	MCS0	1	155	5775	2.22	-	-6.31	-		30.00	-	5.16	-	Pass



Appendix B. AC Conducted Emission Test Results

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

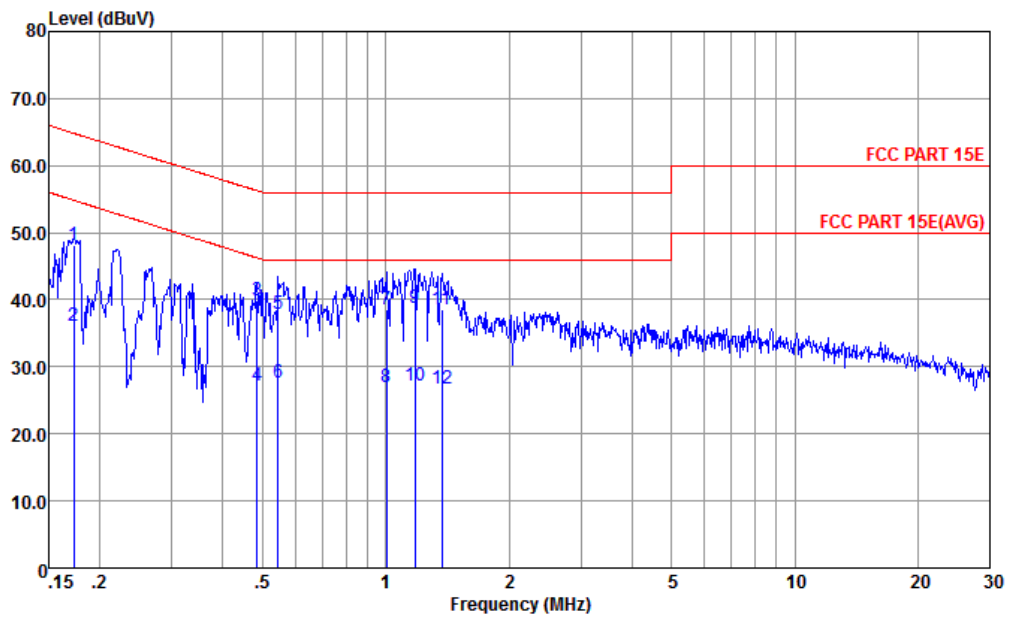


Site : CO01-KS
 Condition : FCC PART 15E LISN-060105-L LINE

	Freq	Level	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.174	52.25	-12.52	64.77	41.80	0.03	10.42	QP
2	0.174	38.65	-16.12	54.77	28.20	0.03	10.42	Average
3	0.263	45.89	-15.45	61.34	35.50	0.06	10.33	QP
4	0.263	31.99	-19.35	51.34	21.60	0.06	10.33	Average
5	0.404	43.25	-14.52	57.77	32.90	0.09	10.26	QP
6	0.404	30.55	-17.22	47.77	20.20	0.09	10.26	Average
7	0.532	41.54	-14.46	56.00	31.20	0.10	10.24	QP
8	0.532	26.94	-19.06	46.00	16.60	0.10	10.24	Average
9	0.592	40.84	-15.16	56.00	30.49	0.11	10.24	QP
10	0.592	28.94	-17.06	46.00	18.59	0.11	10.24	Average
11	0.668	39.15	-16.85	56.00	28.80	0.11	10.24	QP
12	0.668	27.55	-18.45	46.00	17.20	0.11	10.24	Average



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



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

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.173	48.03	-16.78	64.81	37.50	0.11	10.42	QP
2	0.173	36.03	-18.78	54.81	25.50	0.11	10.42	Average
3 *	0.484	39.95	-16.32	56.27	29.60	0.11	10.24	QP
4	0.484	27.25	-19.02	46.27	16.90	0.11	10.24	Average
5	0.546	37.95	-18.05	56.00	27.60	0.11	10.24	QP
6	0.546	27.65	-18.35	46.00	17.30	0.11	10.24	Average
7	1.005	38.55	-17.45	56.00	28.20	0.12	10.23	QP
8	1.005	26.95	-19.05	46.00	16.60	0.12	10.23	Average
9	1.178	38.86	-17.14	56.00	28.51	0.12	10.23	QP
10	1.178	27.26	-18.74	46.00	16.91	0.12	10.23	Average
11	1.374	38.56	-17.44	56.00	28.20	0.13	10.23	QP
12	1.374	26.66	-19.34	46.00	16.30	0.13	10.23	Average

Note:

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



Appendix C. Radiated Spurious Emission

UNII-3 - 5725~5850MHz---Sample 1

WIFI 802.11n HT20---Sample 1 (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.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 149 5745MHz		5644.4	52.84	-15.46	68.3	42.8	35.5	11.05	36.51	100	352	P	H
		5694.8	54.81	-46.66	101.47	44.65	35.59	11.13	36.56	100	352	P	H
		5712.8	54.97	-53.92	108.89	44.77	35.62	11.16	36.58	100	352	P	H
		5724.8	61.87	-59.97	121.84	51.64	35.65	11.18	36.6	100	352	P	H
		5746	107.05	-	-	96.78	35.68	11.21	36.62	100	352	P	H
		5746	99.37	-	-	89.1	35.68	11.21	36.62	100	352	A	H
		5636	50.95	-17.35	68.3	40.91	35.5	11.05	36.51	100	121	P	V
		5699.6	53.77	-51.24	105.01	43.61	35.59	11.13	36.56	100	121	P	V
		5719.6	55.95	-54.84	110.79	45.74	35.65	11.16	36.6	100	121	P	V
		5724.8	60.06	-61.78	121.84	49.83	35.65	11.18	36.6	100	121	P	V
		5746	107.67	-	-	97.4	35.68	11.21	36.62	100	121	P	V
	5746	99.3	-	-	89.03	35.68	11.21	36.62	100	121	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz---Sample 1

WIFI 802.11n HT20---Sample 1 (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.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 149 5745MHz		11488	45.42	-28.58	74	56.86	38.69	16.35	66.48	300	0	P	H
		11488	45.49	-28.51	74	56.93	38.69	16.35	66.48	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 1

WIFI 802.11n HT40---Sample 1 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5648.4	53.15	-15.15	68.3	43.08	35.5	11.08	36.51	100	351	P	H
		5698	58	-45.83	103.83	47.84	35.59	11.13	36.56	100	351	P	H
		5715.6	64.91	-44.76	109.67	54.71	35.62	11.16	36.58	100	351	P	H
		5723.2	65.36	-52.84	118.2	55.13	35.65	11.18	36.6	100	351	P	H
		5758	106.28	-	-	95.98	35.72	11.21	36.63	100	351	P	H
		5758	97.61	-	-	87.31	35.72	11.21	36.63	100	351	A	H
		5853.2	50.15	-64.85	115	39.67	35.87	11.33	36.72	100	351	P	H
		5859.6	51.22	-58.39	109.61	40.72	35.9	11.34	36.74	100	351	P	H
		5879.6	51.04	-50.84	101.88	40.55	35.89	11.36	36.76	100	351	P	H
		5925.2	49.91	-18.39	68.3	39.45	35.87	11.4	36.81	100	351	P	H
		5604	53.55	-14.75	68.3	43.56	35.47	11	36.48	100	119	P	V
		5699.2	57.14	-47.57	104.71	46.98	35.59	11.13	36.56	100	119	P	V
		5720	63.42	-47.48	110.9	53.21	35.65	11.16	36.6	100	119	P	V
		5724	65.09	-54.93	120.02	54.86	35.65	11.18	36.6	100	119	P	V
		5758	106.04	-	-	95.74	35.72	11.21	36.63	100	119	P	V
		5758	97.19	-	-	86.89	35.72	11.21	36.63	100	119	A	V
		5850	51.43	-70.87	122.3	40.95	35.87	11.33	36.72	100	119	P	V
		5873.2	51.42	-54.38	105.8	40.95	35.89	11.34	36.76	100	119	P	V
	5912	51.01	-26.88	77.89	40.52	35.88	11.4	36.79	100	119	P	V	
	5942	50.58	-17.72	68.3	40.13	35.86	11.42	36.83	100	119	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 1

WIFI 802.11n HT40---Sample 1 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40		11510	45.93	-28.07	74	57.34	38.7	16.37	66.48	300	0	P	H
CH 151 5755MHz		11510	46.36	-27.64	74	57.77	38.7	16.37	66.48	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 1

WIFI 802.11ac VHT80---Sample 1 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5629.2	52.58	-15.72	68.3	42.54	35.48	11.05	36.49	100	50	P	H
		5698	69.69	-34.14	103.83	59.53	35.59	11.13	36.56	100	50	P	H
		5715.2	67.56	-42	109.56	57.36	35.62	11.16	36.58	100	50	P	H
		5724.4	72.88	-48.05	120.93	62.65	35.65	11.18	36.6	100	50	P	H
		5764	100.78	-	-	90.45	35.72	11.24	36.63	100	50	P	H
		5764	92.3	-	-	81.97	35.72	11.24	36.63	100	50	A	H
		5852	60.26	-57.48	117.74	49.78	35.87	11.33	36.72	100	50	P	H
		5860.8	58.91	-50.36	109.27	48.41	35.9	11.34	36.74	100	50	P	H
		5879.6	54.19	-47.69	101.88	43.7	35.89	11.36	36.76	100	50	P	H
		5964	50.12	-18.18	68.3	39.68	35.85	11.43	36.84	100	50	P	H
		5630	52.73	-15.57	68.3	42.69	35.48	11.05	36.49	100	119	P	V
		5695.6	69.1	-32.96	102.06	58.94	35.59	11.13	36.56	100	119	P	V
		5718	72.07	-38.27	110.34	61.86	35.65	11.16	36.6	100	119	P	V
		5724.8	74.06	-47.78	121.84	63.83	35.65	11.18	36.6	100	119	P	V
		5770	101.26	-	-	90.92	35.75	11.24	36.65	100	119	P	V
		5770	92.74	-	-	82.4	35.75	11.24	36.65	100	119	A	V
		5852	62.82	-54.92	117.74	52.34	35.87	11.33	36.72	100	119	P	V
		5856.8	60.89	-49.51	110.4	50.39	35.9	11.34	36.74	100	119	P	V
	5879.2	54.77	-47.41	102.18	44.28	35.89	11.36	36.76	100	119	P	V	
	5929.2	50.97	-17.33	68.3	40.51	35.87	11.4	36.81	100	119	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 1

WIFI 802.11ac VHT80---Sample 1 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		11554	46.65	-27.35	74	57.96	38.73	16.39	66.43	300	0	P	H
		11554	46.21	-27.79	74	57.52	38.73	16.39	66.43	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 - 5725~5850MHz---Sample 2

WIFI 802.11n HT20---Sample 2 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5607.6	51.15	-17.15	68.3	41.13	35.47	11.03	36.48	323	30	P	H
		5698.8	53.9	-50.52	104.42	43.74	35.59	11.13	36.56	323	30	P	H
		5720	54.1	-56.8	110.9	43.89	35.65	11.16	36.6	323	30	P	H
		5724.8	57.33	-64.51	121.84	47.1	35.65	11.18	36.6	323	30	P	H
		5746	107	-	-	96.73	35.68	11.21	36.62	323	30	P	H
		5746	99.6	-	-	89.33	35.68	11.21	36.62	323	30	A	H
		5642	50.89	-17.41	68.3	40.85	35.5	11.05	36.51	100	167	P	V
		5693.2	51.73	-48.56	100.29	41.57	35.59	11.13	36.56	100	167	P	V
		5718.8	51.92	-58.64	110.56	41.71	35.65	11.16	36.6	100	167	P	V
		5724	53.55	-66.47	120.02	43.32	35.65	11.18	36.6	100	167	P	V
		5746	103.68	-	-	93.41	35.68	11.21	36.62	100	167	P	V
	5746	96.4	-	-	86.13	35.68	11.21	36.62	100	167	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 2

WIFI 802.11n HT20---Sample 2 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20		11488	46.03	-27.97	74	57.47	38.69	16.35	66.48	300	0	P	H
CH 149 5745MHz		11488	45.81	-28.19	74	57.25	38.69	16.35	66.48	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 2
WIFI 802.11n HT40---Sample 2 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5649.6	52.17	-16.13	68.3	42.09	35.53	11.08	36.53	333	33	P	H
		5650.4	53.09	-15.51	68.6	43.01	35.53	11.08	36.53	333	33	P	H
		5714.4	52.37	-56.96	109.33	42.17	35.62	11.16	36.58	333	33	P	H
		5720.4	52.93	-58.88	111.81	42.72	35.65	11.16	36.6	333	33	P	H
		5794	105.76	-	-	95.39	35.78	11.26	36.67	333	33	P	H
		5794	96.52	-	-	86.15	35.78	11.26	36.67	333	33	A	H
		5850	52.69	-69.61	122.3	42.21	35.87	11.33	36.72	333	33	P	H
		5864	52.47	-55.91	108.38	41.97	35.9	11.34	36.74	333	33	P	H
		5876.4	52	-52.26	104.26	41.51	35.89	11.36	36.76	333	33	P	H
		5957.2	50.15	-18.15	68.3	39.71	35.85	11.43	36.84	333	33	P	H
		5640.4	51.81	-16.49	68.3	41.77	35.5	11.05	36.51	111	167	P	V
		5663.6	51.44	-26.96	78.4	41.36	35.53	11.08	36.53	111	167	P	V
		5718.4	51.82	-58.63	110.45	41.61	35.65	11.16	36.6	111	167	P	V
		5724	51.67	-68.35	120.02	41.44	35.65	11.18	36.6	111	167	P	V
		5800	103.53	-	-	93.13	35.78	11.29	36.67	111	167	P	V
		5800	94.63	-	-	84.23	35.78	11.29	36.67	111	167	A	V
		5850	52.5	-69.8	122.3	42.02	35.87	11.33	36.72	111	167	P	V
		5868.4	52.23	-54.92	107.15	41.73	35.9	11.34	36.74	111	167	P	V
	5880.4	52.07	-49.22	101.29	41.58	35.89	11.36	36.76	111	167	P	V	
	5950.4	50.84	-17.46	68.3	40.38	35.86	11.43	36.83	111	167	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 2

WIFI 802.11n HT40---Sample 2 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		11587	45.86	-28.14	74	57.1	38.75	16.41	66.4	300	0	P	H
		11587	46.07	-27.93	74	57.31	38.75	16.41	66.4	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz---Sample 2

WIFI 802.11ac VHT80---Sample 2 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5638.4	50.83	-17.47	68.3	40.79	35.5	11.05	36.51	336	31	P	H
		5689.6	56.61	-41.02	97.63	46.45	35.59	11.13	36.56	336	31	P	H
		5704.8	61.62	-45.03	106.65	51.42	35.62	11.16	36.58	336	31	P	H
		5720.8	67.69	-45.03	112.72	57.48	35.65	11.16	36.6	336	31	P	H
		5764	100.25	-	-	89.92	35.72	11.24	36.63	336	31	P	H
		5764	91.96	-	-	81.63	35.72	11.24	36.63	336	31	A	H
		5850.4	55.51	-65.88	121.39	45.03	35.87	11.33	36.72	336	31	P	H
		5859.6	55.16	-54.45	109.61	44.66	35.9	11.34	36.74	336	31	P	H
		5877.6	51.05	-52.32	103.37	40.56	35.89	11.36	36.76	336	31	P	H
		5952.8	50.81	-17.49	68.3	40.35	35.86	11.43	36.83	336	31	P	H
		5621.6	50.92	-17.38	68.3	40.9	35.48	11.03	36.49	100	168	P	V
		5698	56.65	-47.18	103.83	46.49	35.59	11.13	36.56	100	168	P	V
		5716.4	65.72	-44.17	109.89	55.52	35.62	11.16	36.58	100	168	P	V
		5721.2	66.99	-46.65	113.64	56.78	35.65	11.16	36.6	100	168	P	V
		5764	98.33	-	-	88	35.72	11.24	36.63	100	168	P	V
		5764	89.86	-	-	79.53	35.72	11.24	36.63	100	168	A	V
		5850.4	54.74	-66.65	121.39	44.26	35.87	11.33	36.72	100	168	P	V
		5869.2	54.59	-52.33	106.92	44.09	35.9	11.34	36.74	100	168	P	V
	5874.8	53.34	-52.02	105.36	42.85	35.89	11.36	36.76	100	168	P	V	
	5926.4	49.73	-18.57	68.3	39.27	35.87	11.4	36.81	100	168	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-3 5725~5850MHz---Sample 2

WIFI 802.11ac VHT80---Sample 2 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		11554	46.39	-27.61	74	57.7	38.73	16.39	66.43	300	0	P	H
		11554	45.44	-28.56	74	56.75	38.73	16.39	66.43	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI Ant. 1	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)
802.11n HT40 LF		94.02	25.09	-18.41	43.5	40.63	15.32	1.36	32.22	-	-	P	H
		135.73	25.37	-18.13	43.5	38.24	17.54	1.72	32.13	-	-	P	H
		185.2	27.56	-15.94	43.5	42.72	14.95	1.99	32.1	-	-	P	H
		288.99	28.07	-17.93	46	38.56	19.18	2.45	32.12	-	-	P	H
		321	26.39	-19.61	46	36.26	19.63	2.64	32.14	-	-	P	H
		749.74	30.94	-15.06	46	30.97	28.2	4.07	32.3	-	-	P	H
		38.73	30.45	-9.55	40	41.42	20.33	0.84	32.14	-	-	P	V
		94.99	26.39	-17.11	43.5	41.77	15.45	1.37	32.2	-	-	P	V
		159.01	26.25	-17.25	43.5	39.95	16.56	1.84	32.1	-	-	P	V
		205.57	28.12	-15.38	43.5	42.98	15.16	2.09	32.11	-	-	P	V
		311.3	27.5	-18.5	46	37.51	19.51	2.6	32.12	-	-	P	V
	553.8	33.9	-12.1	46	37.55	25.43	3.22	32.3	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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

For Peak Limit @ 2390MHz:

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

For Average Limit @ 2390MHz:

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

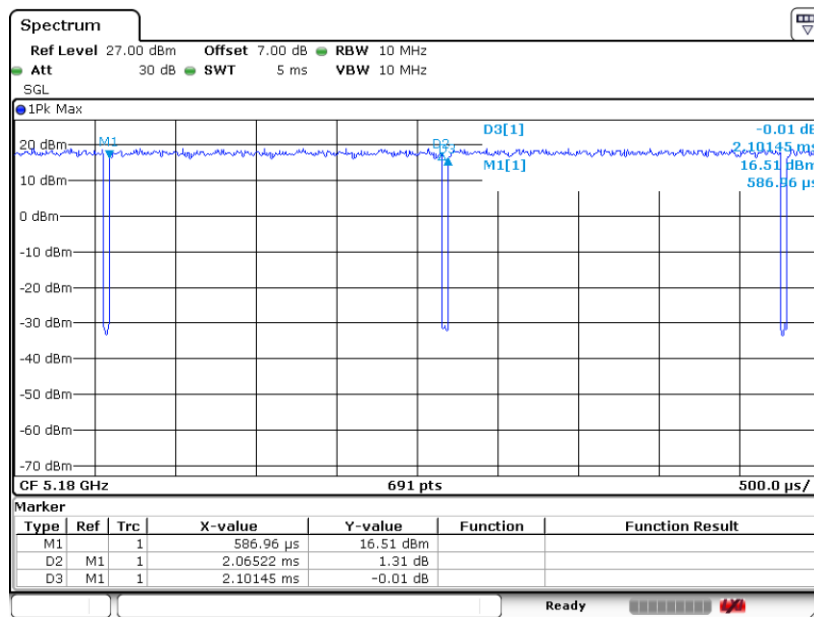
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	98.28	-	-	10Hz
802.11n HT20	98.16	-	-	10Hz
802.11n HT40	96.32	0.949	1.053	1.1KHz
802.11ac VHT80	92.20	0.462	2.163	2.2KHz

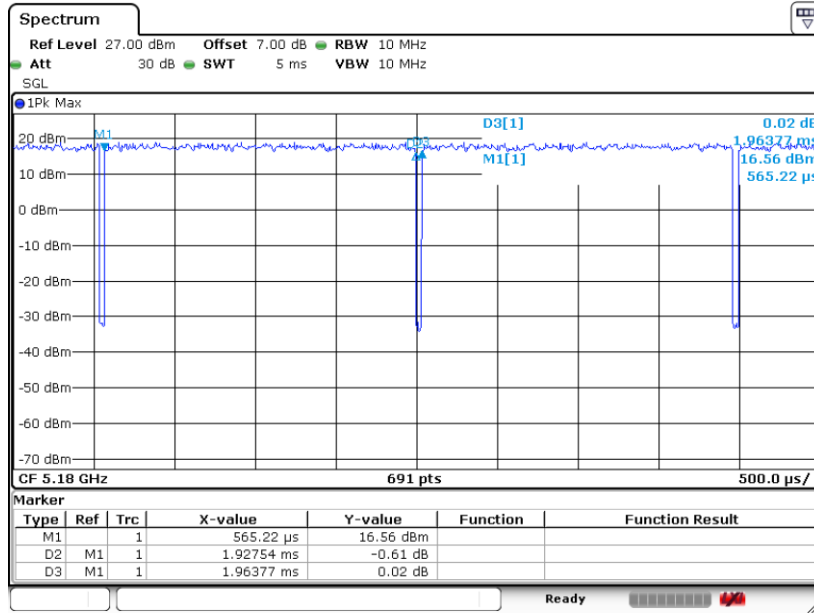
802.11a



Date: 19 JAN 2022 00:58:42

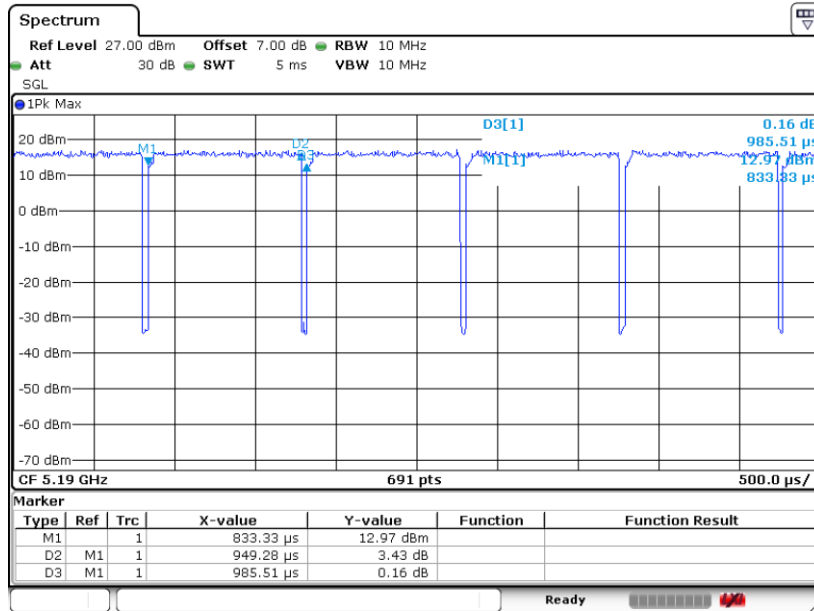


802.11n HT20



Date: 19 JAN 2022 01:08:43

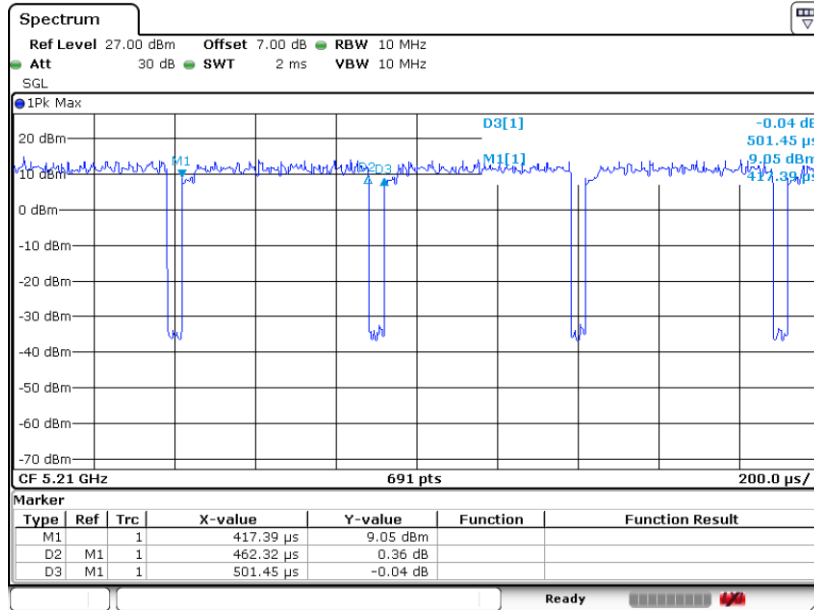
802.11n HT40



Date: 19 JAN 2022 01:17:14



802.11ac VHT80



Date: 19 JAN 2022 01:42:25