FCC RF Test Report

APPLICANT	:	RealWear, Inc.
EQUIPMENT	:	Head Mounted Tablet
BRAND NAME	:	realwear
MODEL NAME	:	T21G
FCC ID	:	2AJOR2101GAA
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Sep. 09, 2021 ~ Sep. 23, 2021

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

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alexwang

Approved by: Alex Wang / Manager

ACCREDITED
Cert #5145.02

Sporton International (Kunshan) Inc.
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
FR182305E	Rev. 01	Initial issue of report	Oct. 13, 2021

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 5.04 dB at 11649.640 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 16.81 dB at 0.151 MHz
3.6	15.203 & 15.407(a)	Antenna Requirement	15.203 & 15.407(a)	Pass	-
Remark: Not required means after assessing, test items are not necessary to carry out.					

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

RealWear, Inc.
600 Hatheway Road, Vancouver, WA, 98661

1.2 Manufacturer

RealWear, Inc.
600 Hatheway Road, Vancouver, WA, 98661

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Head Mounted Tablet
Brand Name	realwear
Model Name	T21G
FCC ID	2AJOR2101GAA
HW Version	A
SW Version	1.0.3-08-T.NAV5XX.G
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	**<5745 MHz ~ 5825 MHz>** 802.11a : 14.13 dBm / 0.0259 W 802.11n HT20 : 12.07 dBm / 0.0161 W 802.11n HT40 : 12.03 dBm / 0.0160 W 802.11ac VHT20: 11.60 dBm / 0.0145 W 802.11ac VHT40: 11.34 dBm / 0.0136 W 802.11ac VHT80: 11.01 dBm / 0.0126 W
99% Occupied Bandwidth	802.11a : 17.622 MHz 802.11n HT20 : 18.621 MHz 802.11n HT40 : 36.523 MHz 802.11ac VHT80 : 75.445 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 -1.32 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 (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
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 03CH06-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

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

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- 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 (X 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)
5725-5850 MHz U-NII-3	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

2.2 Test Mode

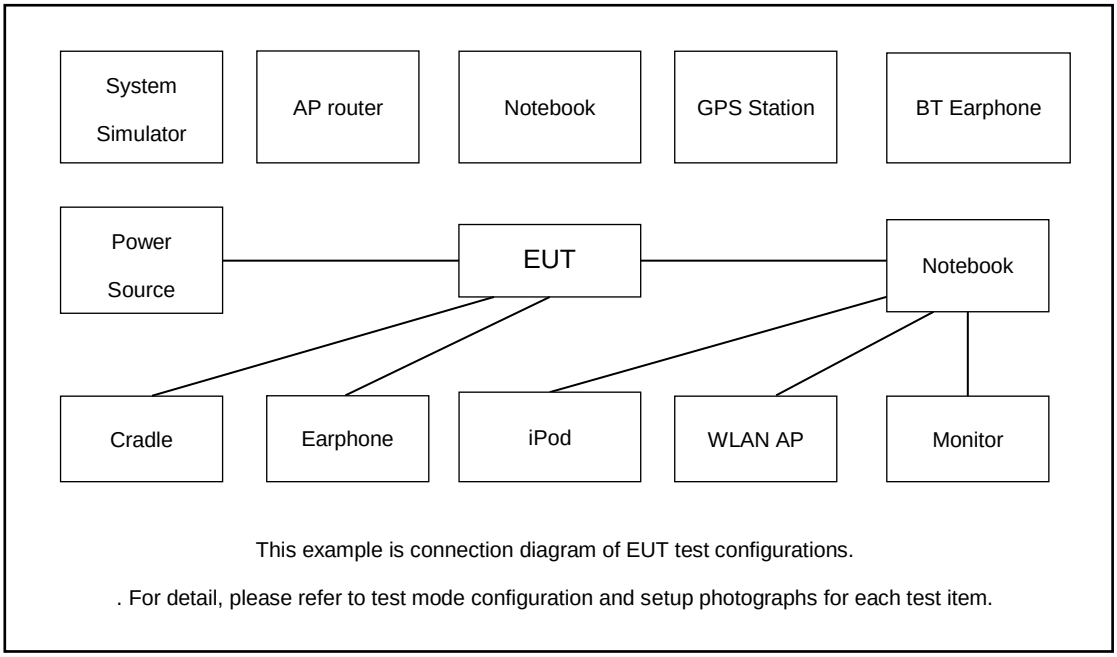
Final test modes are considering the modulation and worse data rates as below table.

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

AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN Link(5G) + Earphone + USB Cable(Charging from Adapter)
Remark: For Radiated Test Cases, The tests were performance with Adapter, Earphone, and USB Cable	

Ch. #		U-NII-3：5725-5850 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



This example is connection diagram of EUT test configurations.

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

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
2.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
4.	Earphone	Lenovo	P121	N/A	N/A	N/A
5.	Adapter	realwear	CK18W02U	N/A	N/A	N/A
6.	BT Base Station	R&S	CBT	N/A	N/A	Unshielded,1.8m

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 7.2 dB.

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

= 7.2 (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.

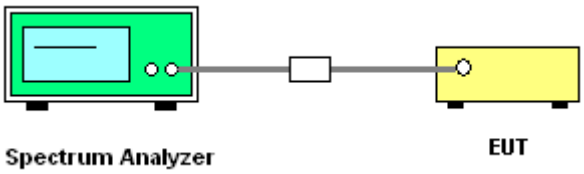
3.1.2 Measuring Instruments

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 Bandwidth

Please refer to Appendix A.

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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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.

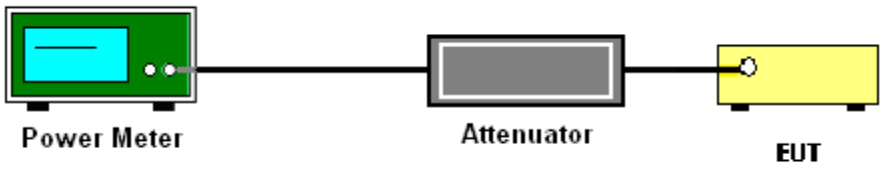
3.2.3 Test Procedures

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

FCC U-NII-3										
Mod.	Data Rate	NTX	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	0.08	13.60	30.00	-1.32		Pass
11a	6Mbps	1	157	5785	0.08	13.15	30.00	-1.32		Pass
11a	6Mbps	1	165	5825	0.08	14.13	30.00	-1.32		Pass
HT20	MCS 0	1	149	5745	0.08	11.56	30.00	-1.32		Pass
HT20	MCS 0	1	157	5785	0.08	11.09	30.00	-1.32		Pass
HT20	MCS 0	1	165	5825	0.08	12.07	30.00	-1.32		Pass
HT40	MCS 0	1	151	5755	0.16	12.03	30.00	-1.32		Pass
HT40	MCS 0	1	159	5795	0.16	11.48	30.00	-1.32		Pass
VHT20	MCS 0	1	149	5745	0.08	11.01	30.00	-1.32		Pass
VHT20	MCS 0	1	157	5785	0.08	10.51	30.00	-1.32		Pass
VHT20	MCS 0	1	165	5825	0.08	11.60	30.00	-1.32		Pass
VHT40	MCS 0	1	151	5755	0.16	11.34	30.00	-1.32		Pass
VHT40	MCS 0	1	159	5795	0.16	11.00	30.00	-1.32		Pass
VHT80	MCS 0	1	155	5775	0.34	11.01	30.00	-1.32		Pass

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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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.

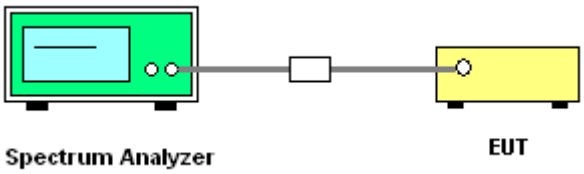
 # Method SA-2 #

(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.

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

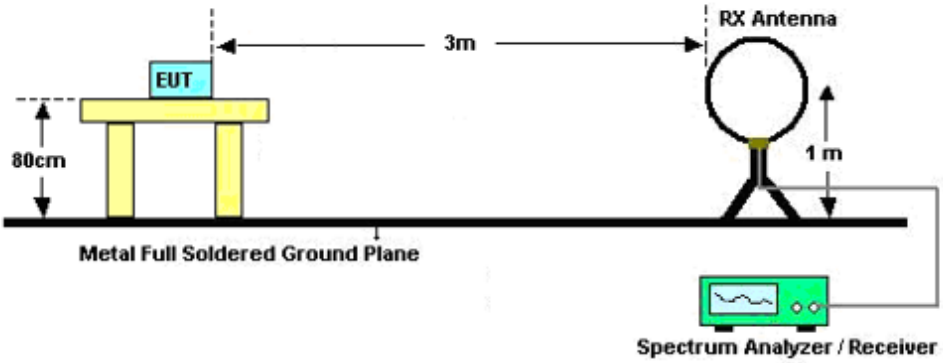
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

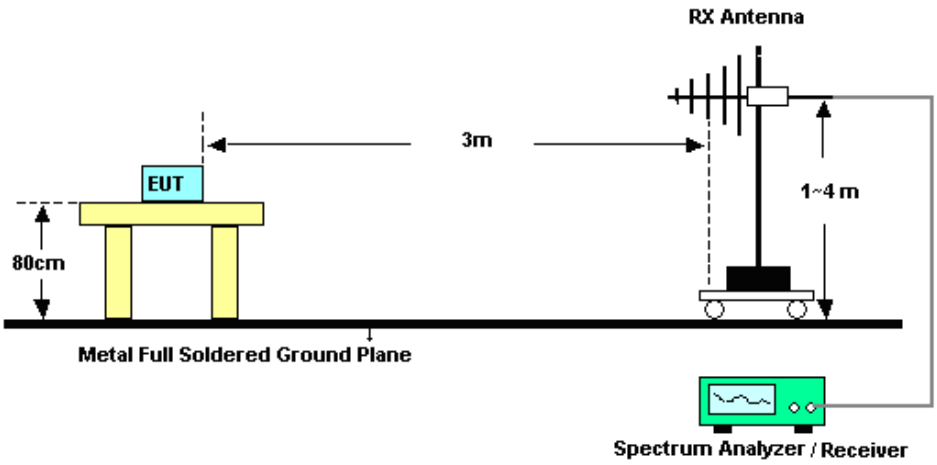
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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 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

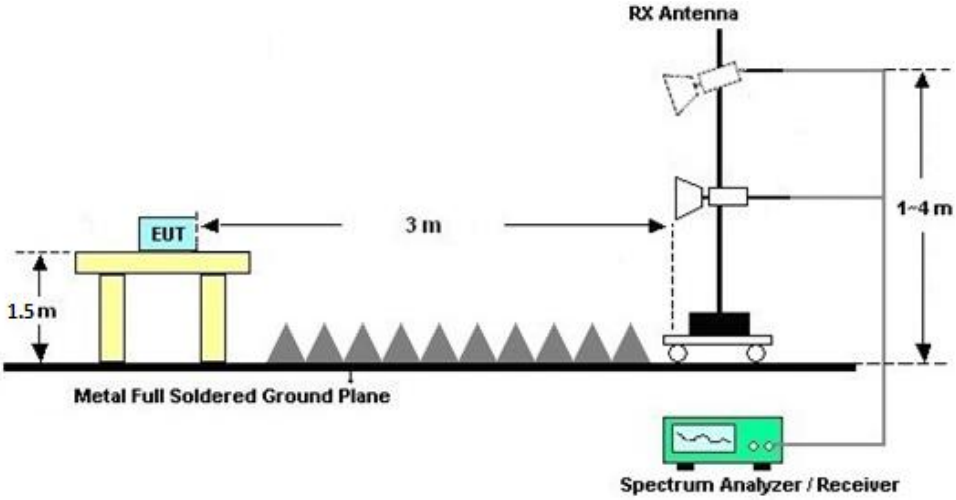
For radiated emissions below 30MHz



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.

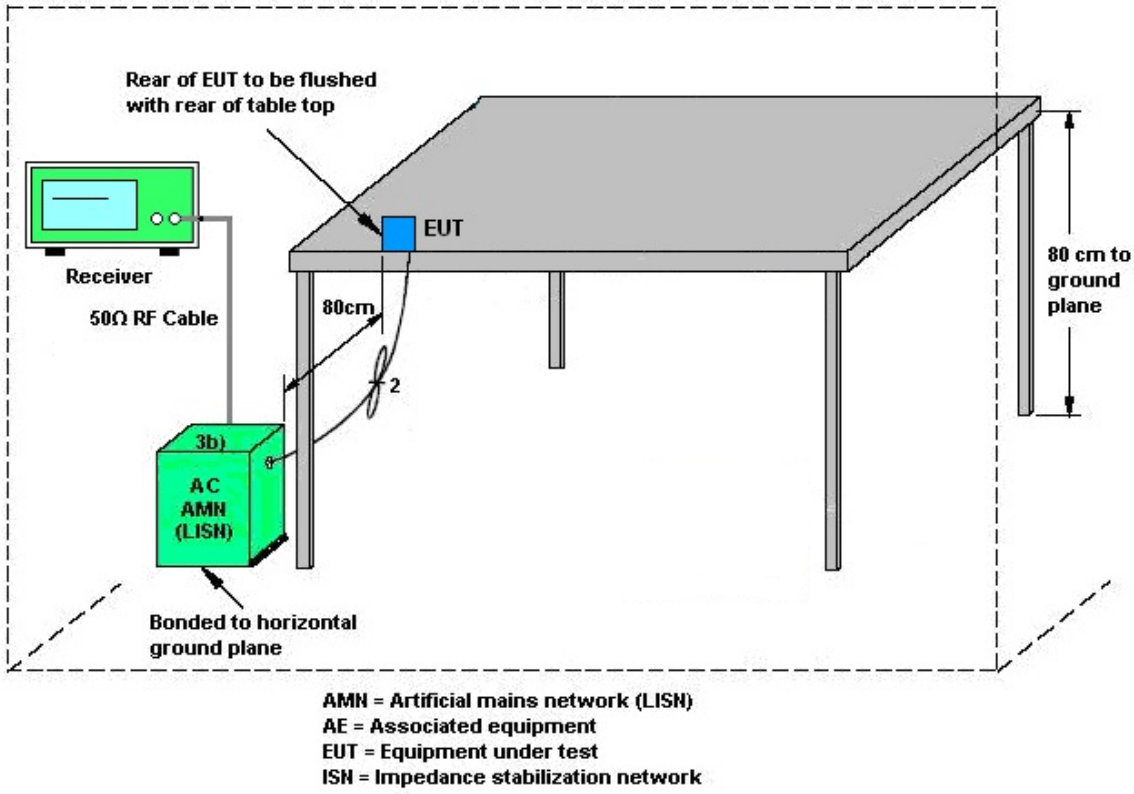
3.5.2 Measuring Instruments

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	Nov. 01, 2020	Sep. 09, 2021~ Sep. 19, 2021	Oct. 31, 2021	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 07, 2021	Sep. 09, 2021~ Sep. 19, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 07, 2021	Sep. 09, 2021~ Sep. 19, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Sep. 09, 2021~ Sep. 19, 2021	Jul. 11, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 17, 2020	Sep. 14, 2021	Oct. 16, 2021	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 12, 2021	Sep. 14, 2021	Apr. 11, 2022	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 01, 2020	Sep. 14, 2021	Oct. 31, 2021	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May. 27, 2021	Sep. 14, 2021	May. 26, 2022	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 25, 2021	Sep. 14, 2021	Apr. 24, 2022	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2020	Sep. 14, 2021	Nov. 09, 2021	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 12, 2021	Sep. 14, 2021	Apr. 11, 2022	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 06, 2021	Sep. 14, 2021	Jan. 05, 2022	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	Sep. 14, 2021	Jan. 05, 2022	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 13, 2021	Sep. 14, 2021	Apr. 12, 2022	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 14, 2021	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 14, 2021	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 14, 2021	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Sep. 23, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 17, 2020	Sep. 23, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 17, 2020	Sep. 23, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 17, 2020	Sep. 23, 2021	Oct. 16, 2021	Conduction (CO01-KS)

NCR: No Calibration Required.

5 Uncertainty of Evaluation

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

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

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

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

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

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

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

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

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

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

Appendix A. Conducted Test Results

Test Engineer :	Yong He	Temperature :	20~26°C
		Relative Humidity :	40~51%

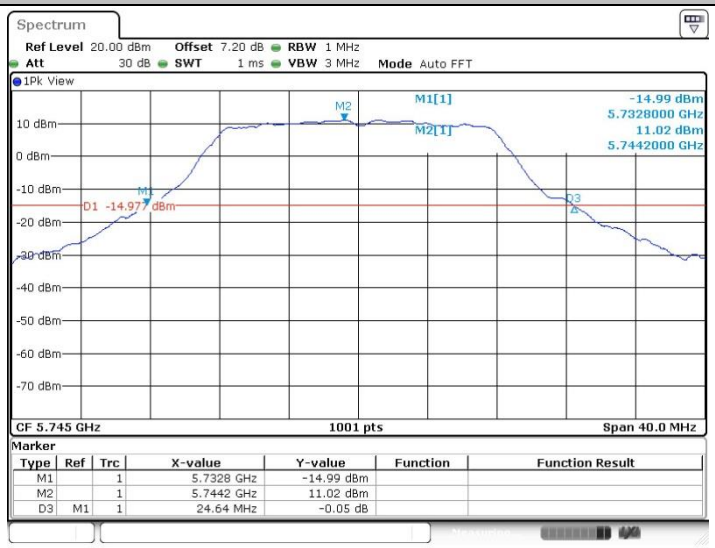
Appendix A1: Emission Bandwidth

Test Result

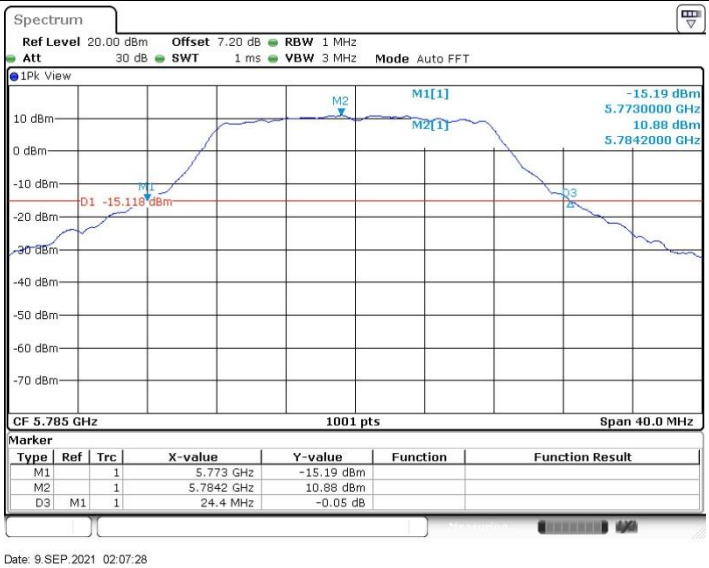
Test Mode	Antenna	Frequency [MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	24.640	5732.800	5757.440	---	---
		5785	24.400	5773.000	5797.400	---	---
		5825	24.400	5812.960	5837.360	---	---
11N20SISO	Ant1	5745	26.520	5731.880	5758.400	---	---
		5785	25.920	5772.360	5798.280	---	---
		5825	25.960	5812.280	5838.240	---	---
11N40SISO	Ant1	5755	42.320	5733.880	5776.200	---	---
		5795	41.920	5774.120	5816.040	---	---
11AC80SISO	Ant1	5775	84.320	5732.760	5817.080	---	---

Test Graphs

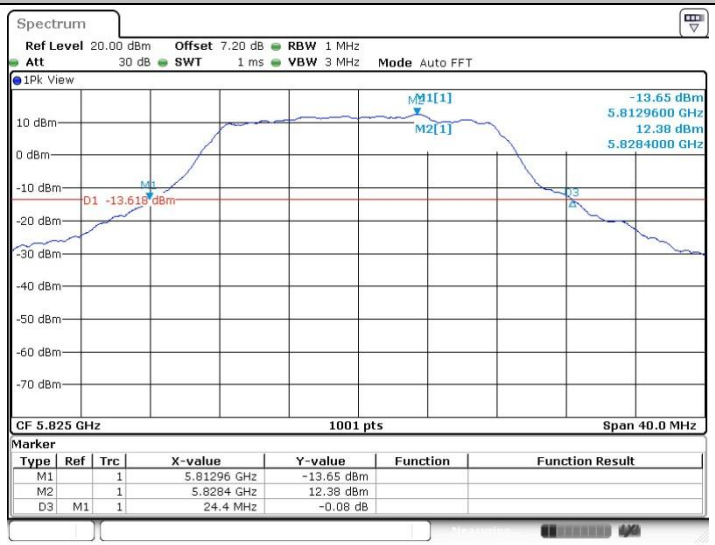
11A_Ant1_5745



11A_Ant1_5785

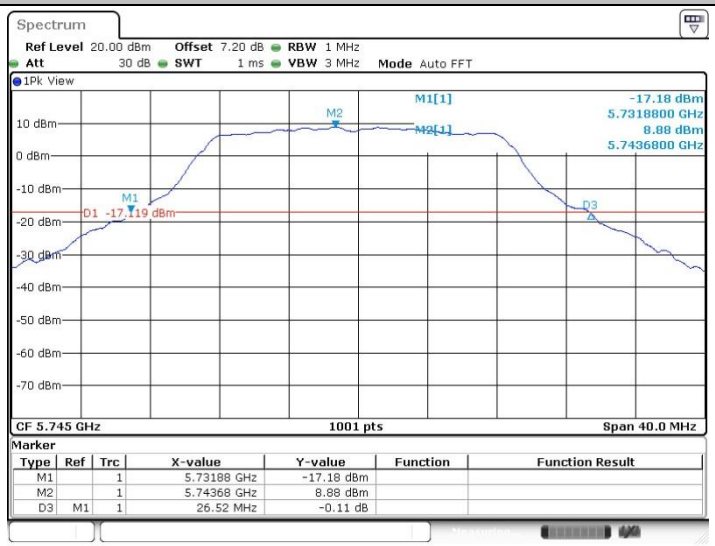


11A_Ant1_5825



Date: 9.SEP.2021 02:08:44

11N20SISO_Ant1_5745



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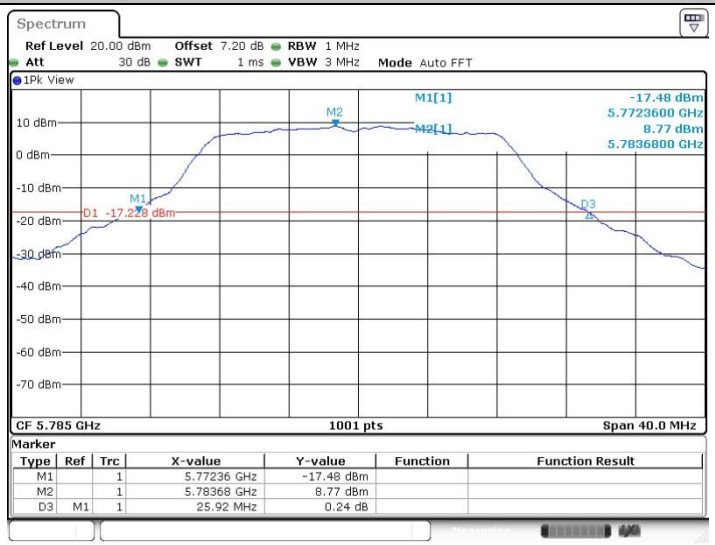
11N20SISO_Ant1_5785



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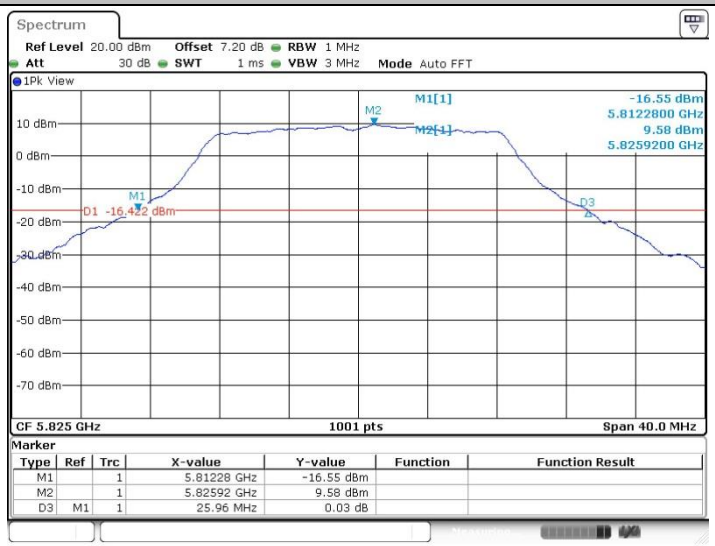
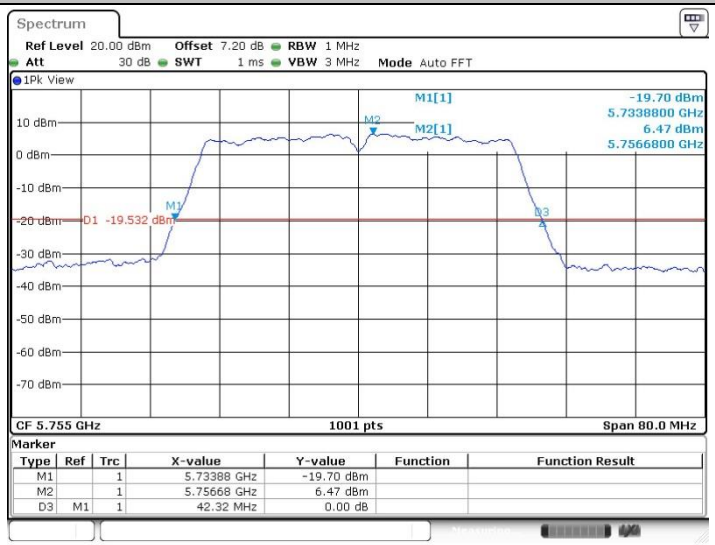
11N20SISO_Ant1_5825



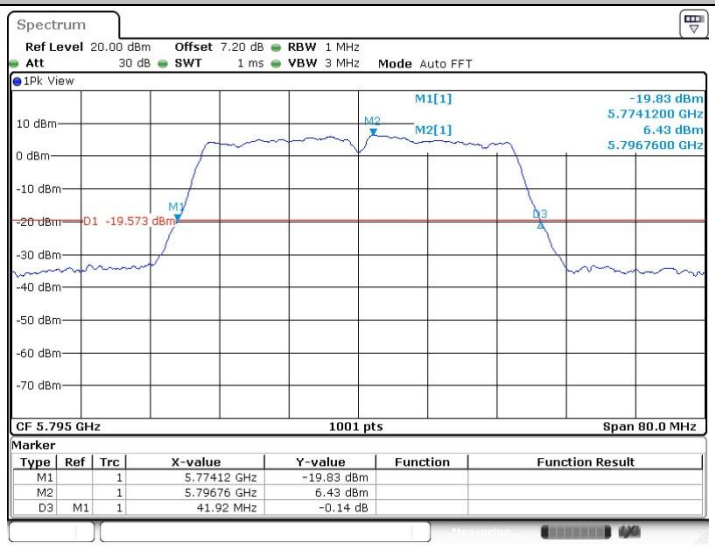
Date: 9.SEP.2021 02:29:49

11N40SISO_Ant1_5755



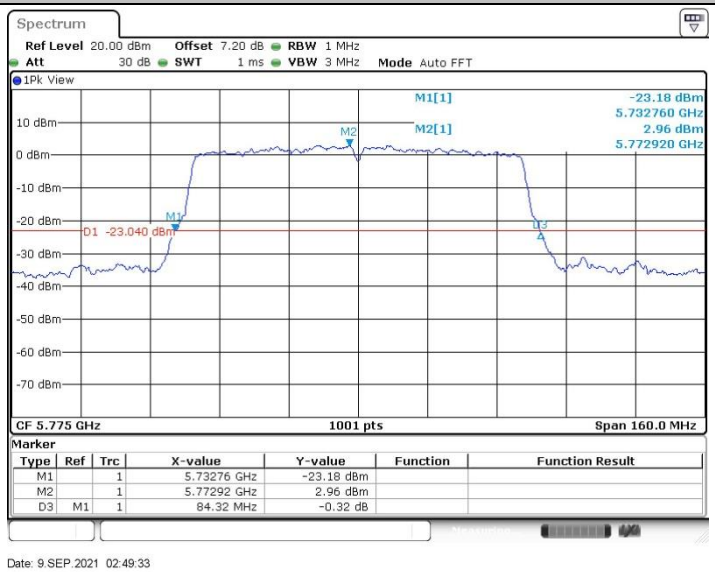
Date: 9.SEP.2021 02:40:02

11N40SISO_Ant1_5795



Date: 9.SEP.2021 02:41:58

11AC80SISO_Ant1_5775



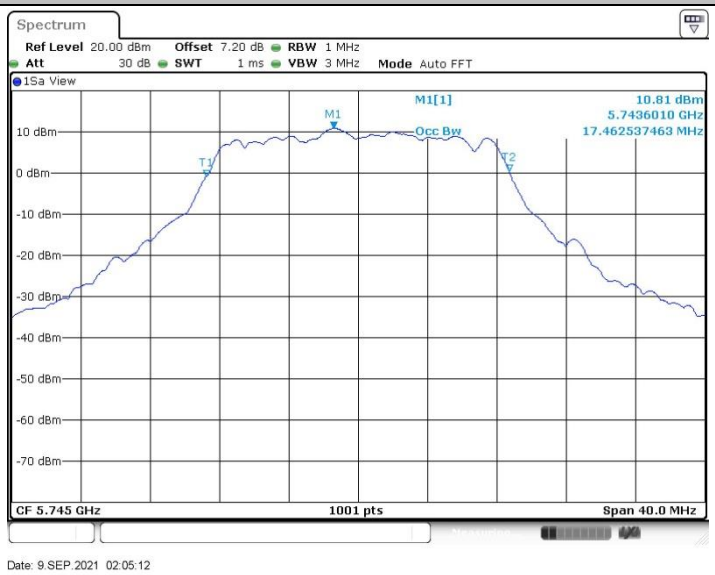
Appendix A2: Occupied channel bandwidth

Test Result

Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	17.463	5736.249	5753.711	---	---
		5785	17.622	5776.129	5793.751	---	---
		5825	17.423	5816.329	5833.751	---	---
11N20SISO	Ant1	5745	18.501	5735.689	5754.191	---	---
		5785	18.541	5775.729	5794.271	---	---
		5825	18.621	5815.649	5834.271	---	---
11N40SISO	Ant1	5755	36.444	5736.778	5773.222	---	---
		5795	36.523	5776.698	5813.222	---	---
11AC80SISO	Ant1	5775	75.445	5737.278	5812.722	---	---

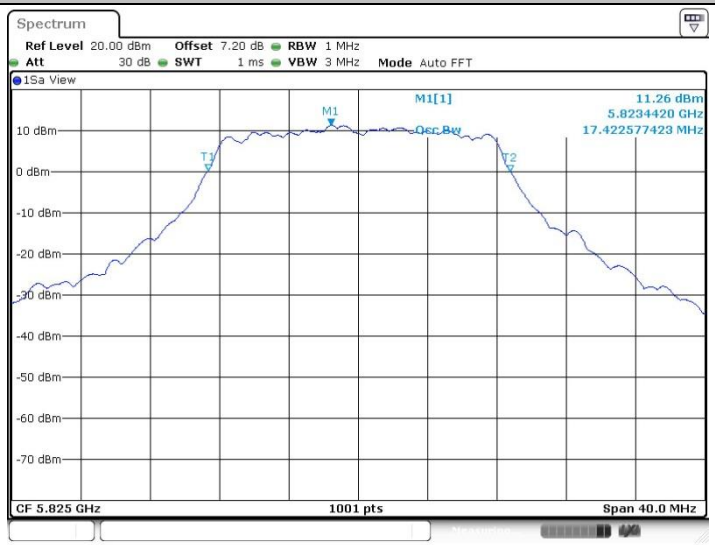
Test Graphs

11A_Ant1_5745



11A_Ant1_5785

11A_Ant1_5825



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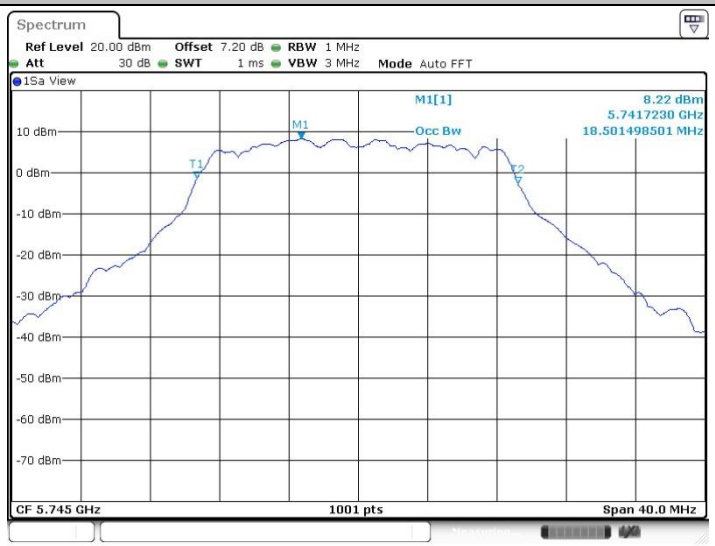
11N20SISO_Ant1_5745



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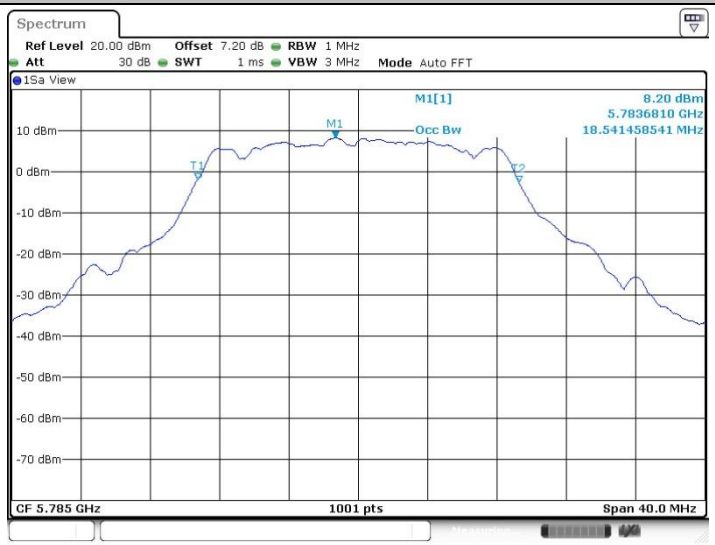

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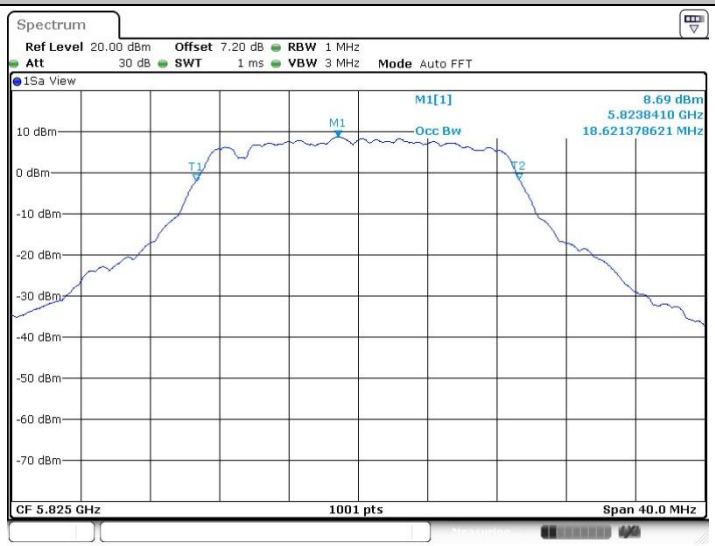
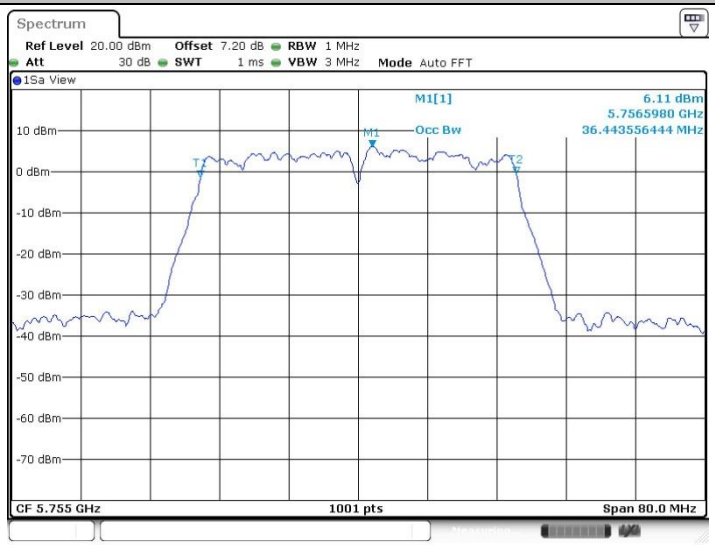
11N20SISO_Ant1_5825



Date: 9.SEP.2021 02:30:09

11N40SISO_Ant1_5755



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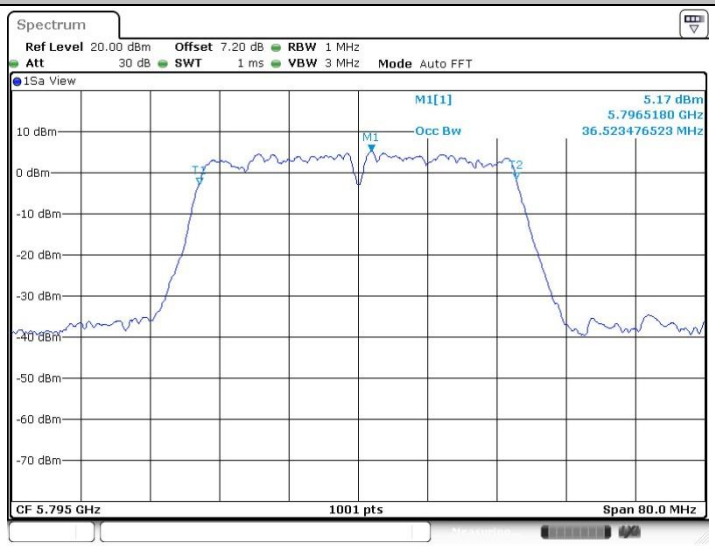
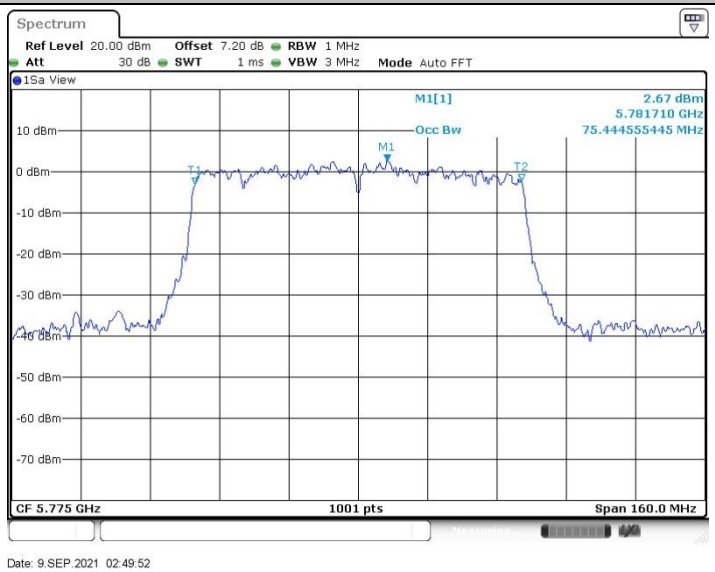
11N40SISO_Ant1_5795



Date: 9.SEP.2021 02:42:17

11AC80SISO_Ant1_5775


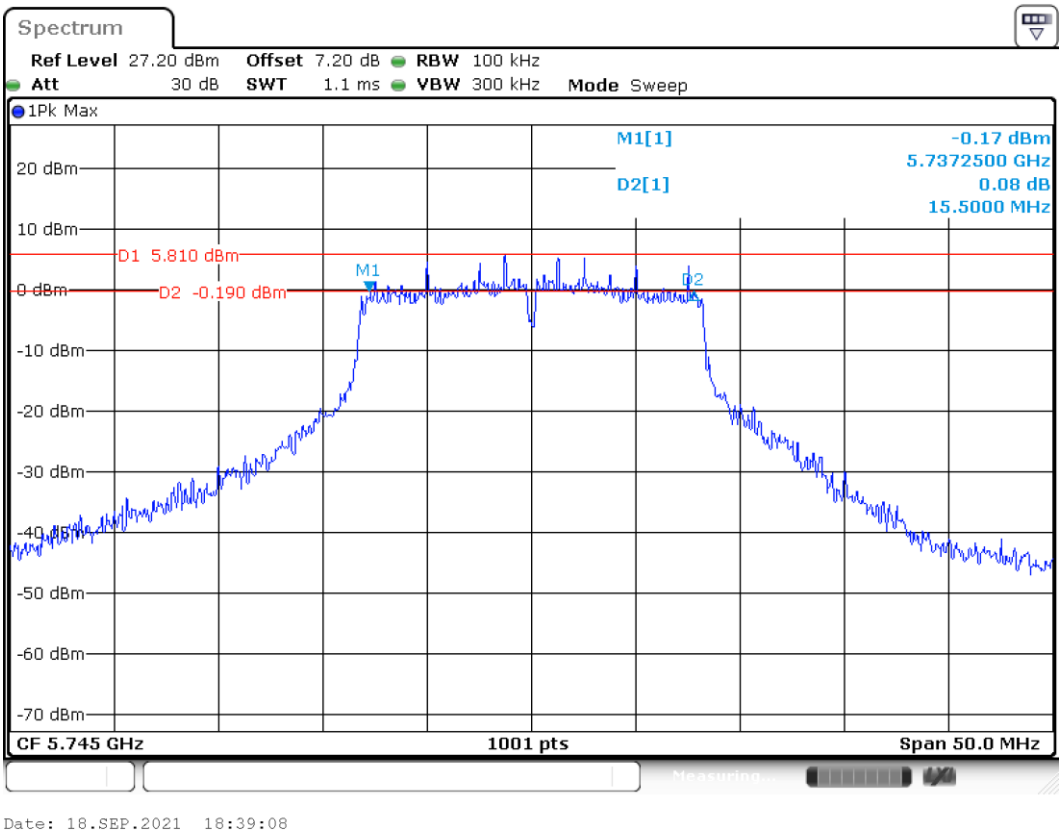
Appendix A3: 6DB emission bandwidth

Test Result

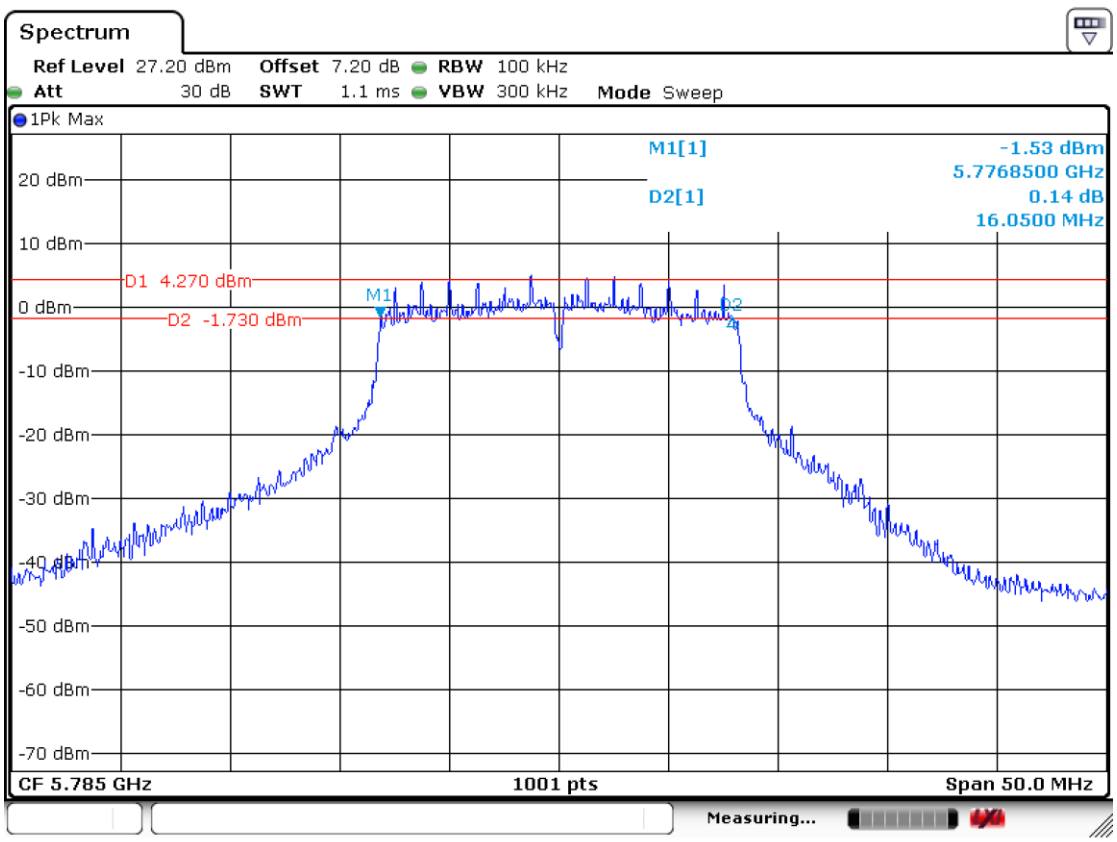
Test Mode	Antenna	Frequency [MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	15.5000			0.5	PASS
		5785	16.0500			0.5	PASS
		5825	16.3000			0.5	PASS
11N20SISO	Ant1	5745	15.0500			0.5	PASS
		5785	15.9500			0.5	PASS
		5825	15.7000			0.5	PASS
11N40SISO	Ant1	5755	35.1000			0.5	PASS
		5795	35.2800			0.5	PASS
11AC80SISO	Ant1	5775	75.200			0.5	PASS

Test Graphs

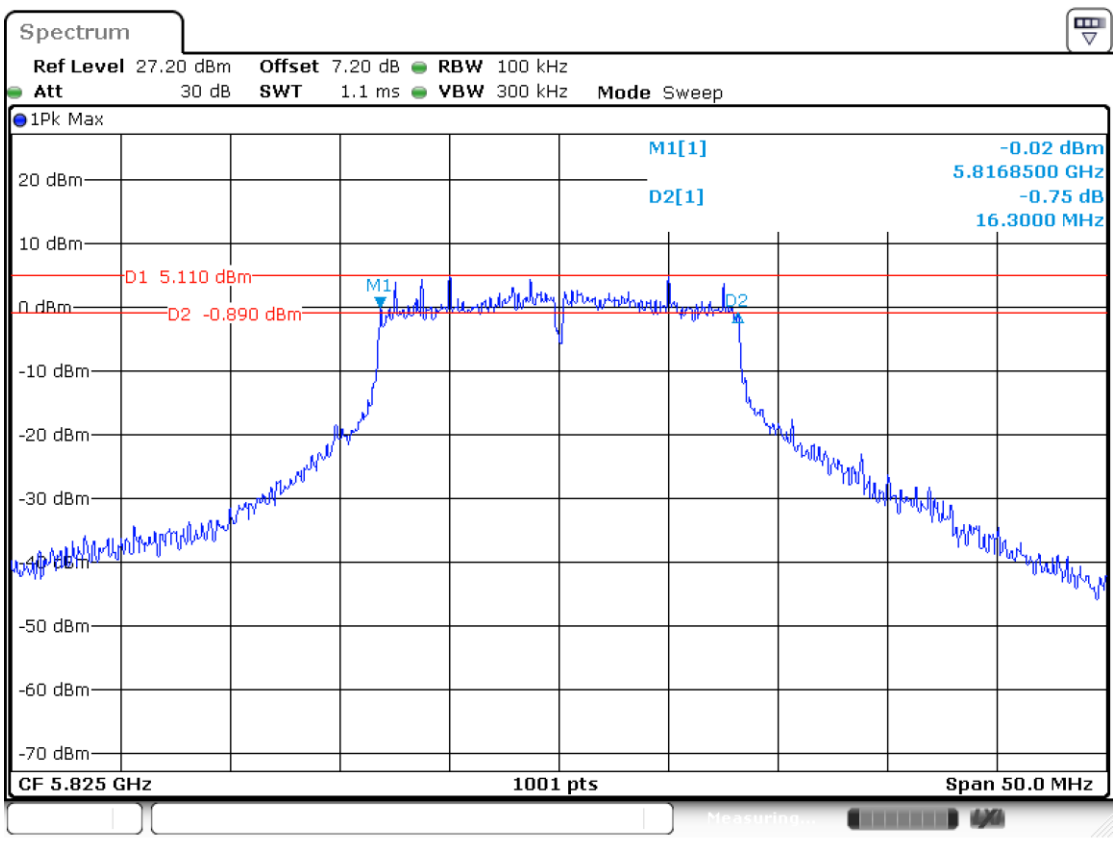
11A_Ant1_5745



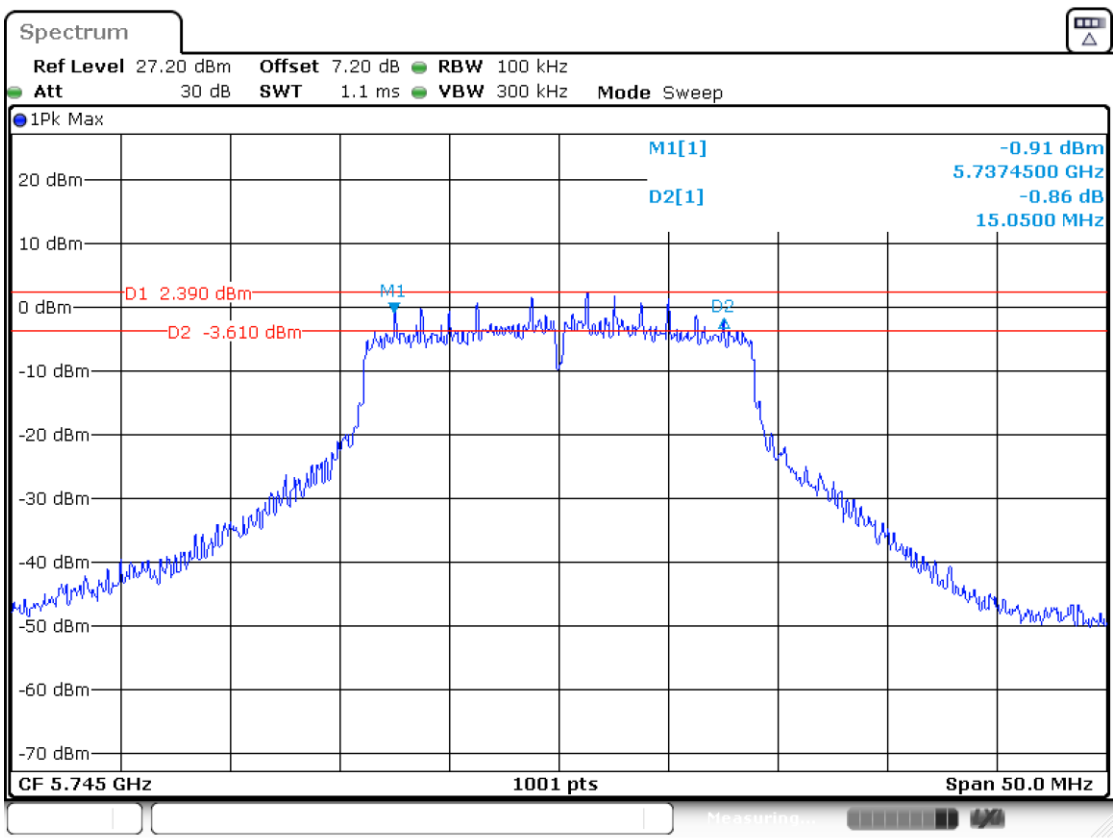
11A_Ant1_5785



11A_Ant1_5825



11N20SISO_Ant1_5745



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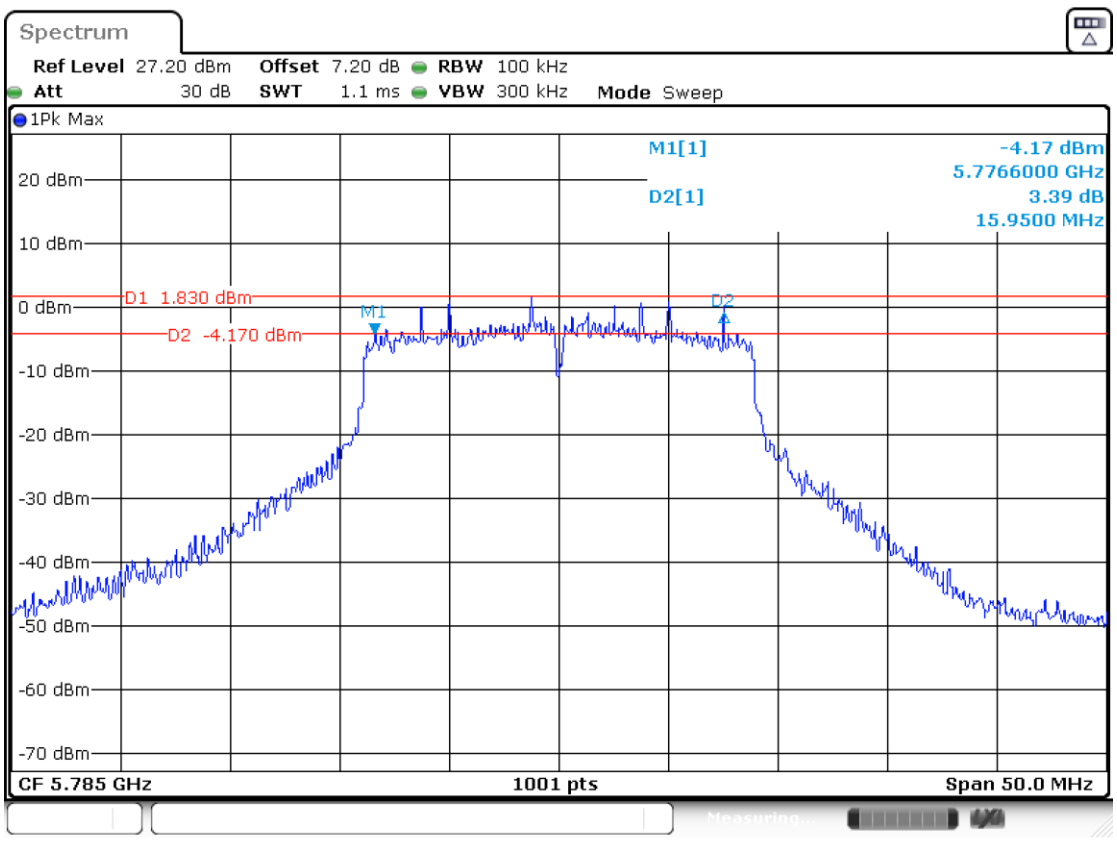

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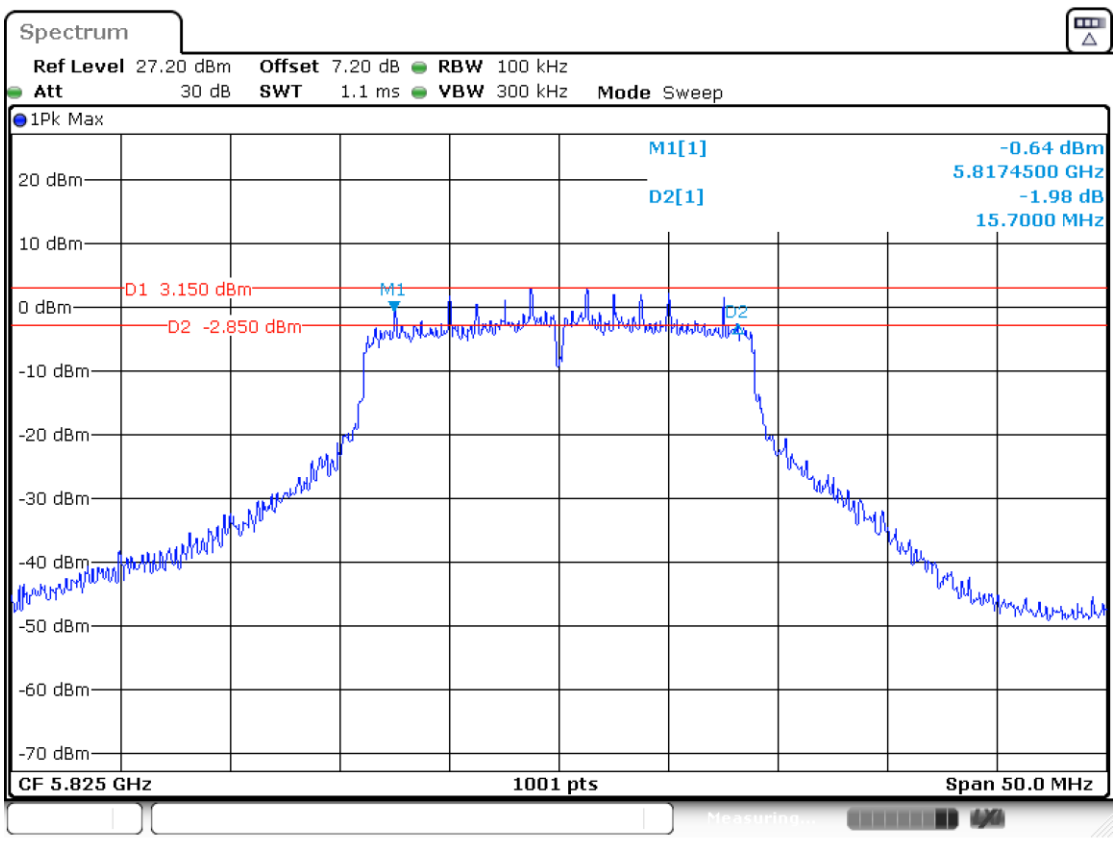

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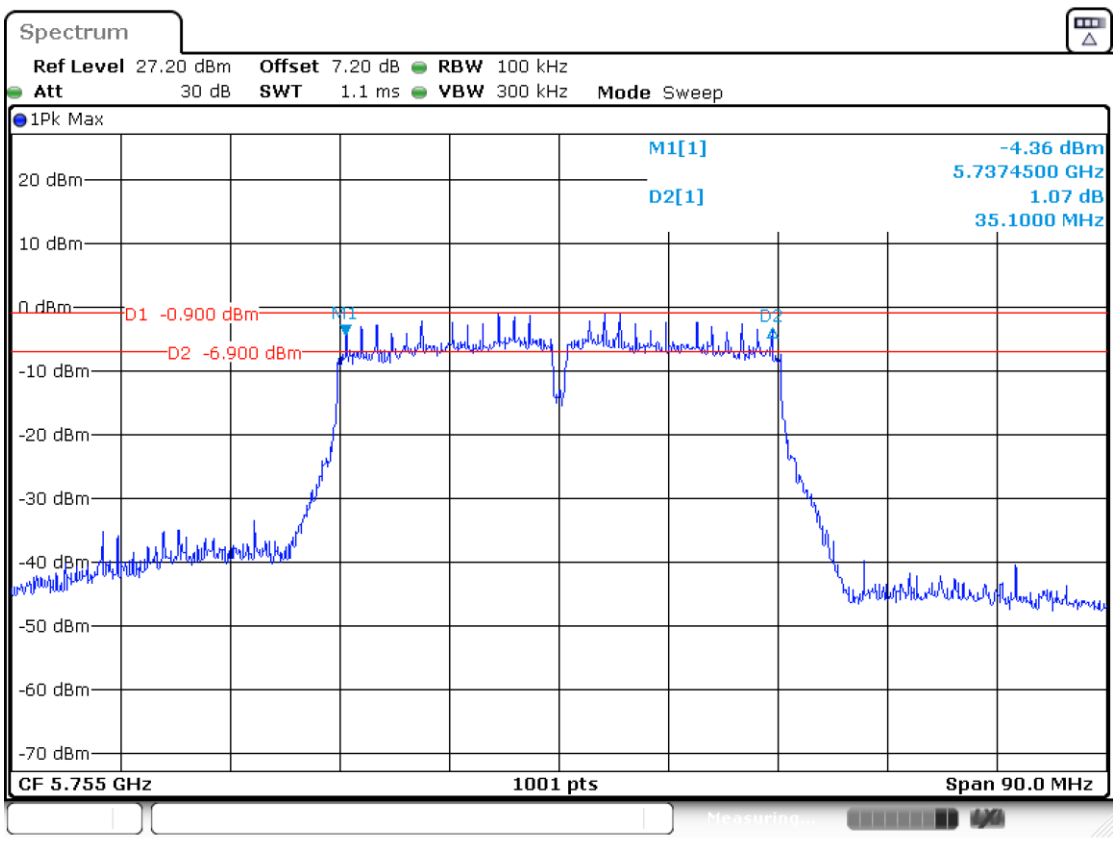
11N40SISO_Ant1_5755



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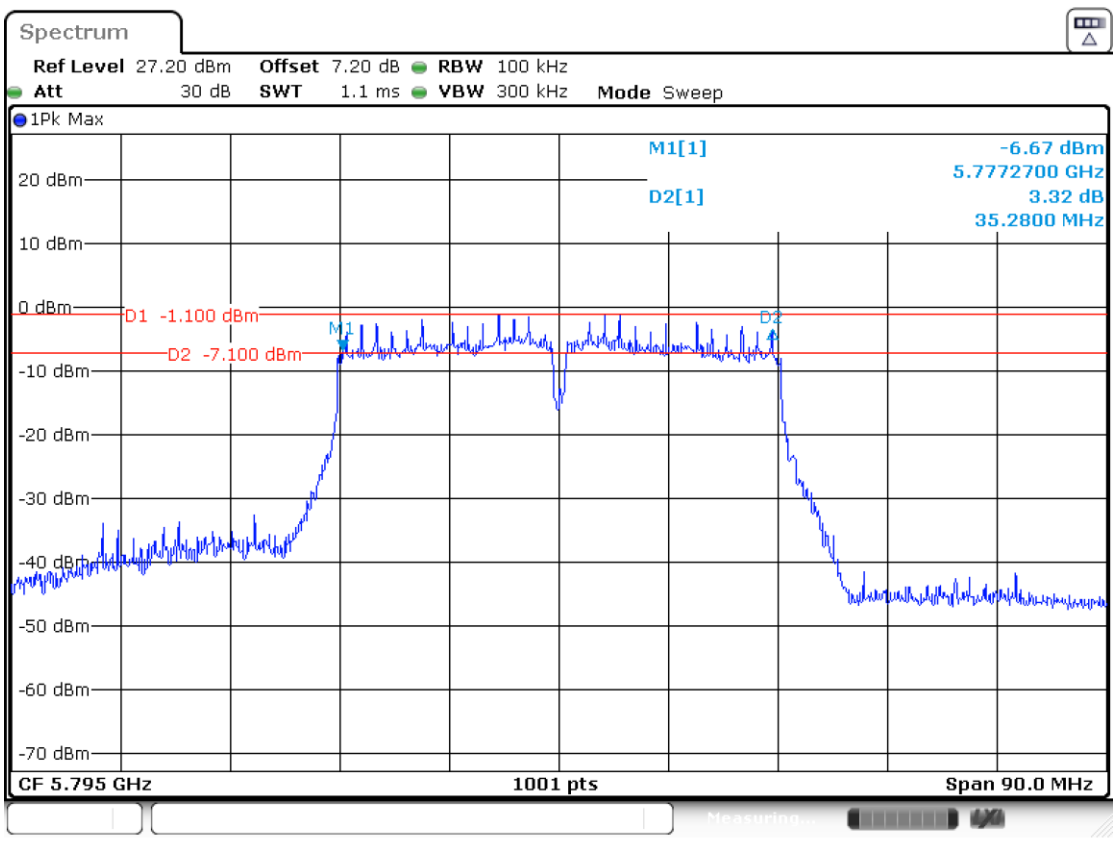
11N40SISO_Ant1_5795



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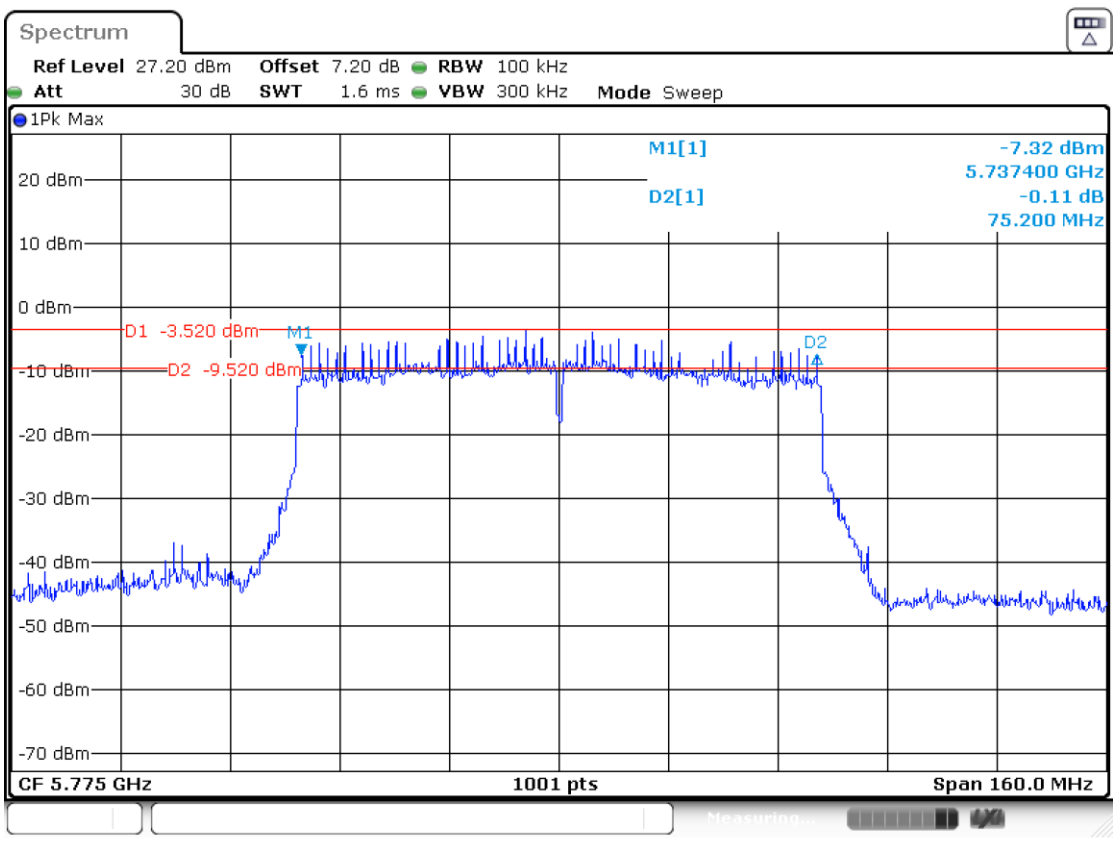
11AC80SISO_Ant1_5775



Date: 19.SEP.2021 01:26:09

Appendix B: Maximum power spectral density

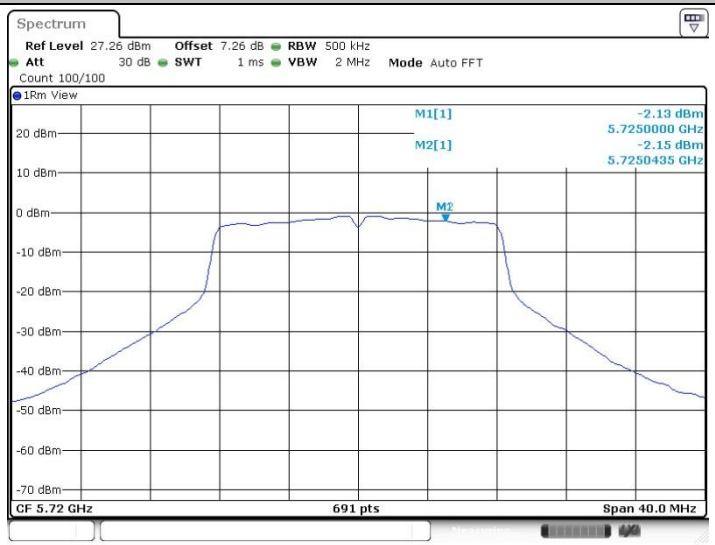
Test Result

Test Mode	Antenna	Frequency [MHz]	Power [dBm/MHz]	Limit [dBm/MHz]	EIRP [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	Ant1	5720_UNII-3	-2.15	≤11	---	---	---
		5745	-0.18	≤30	---	---	---
		5785	-0.24	≤30	---	---	---
		5825	0.72	≤30	---	---	---
11N20SISO	Ant1	5720_UNII-3	-4.37	≤11	---	---	---
		5745	-2.53	≤30	---	---	---
		5785	-2.68	≤30	---	---	---
		5825	-2.08	≤30	---	---	---
11N40SISO	Ant1	5710_UNII-3	-8.26	≤11	---	---	---
		5755	-5.42	≤30	---	---	---
		5795	-5.69	≤30	---	---	---
11N80SISO	Ant1	5690_UNII-3	-12.39	≤11	---	---	---
		5775	-8.71	≤30	---	---	---

Note：1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.
2.The Duty Cycle Factor and RBW Factor is compensated in the graph.

Test Graphs

11A_Ant1_5720_UNII-3



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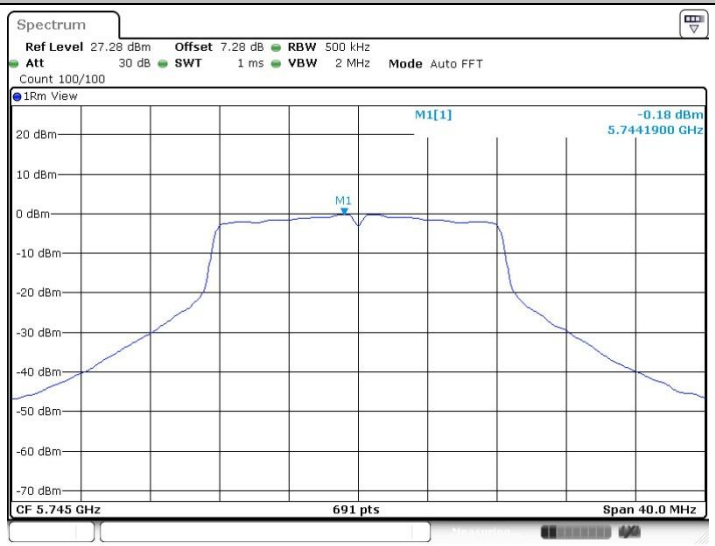
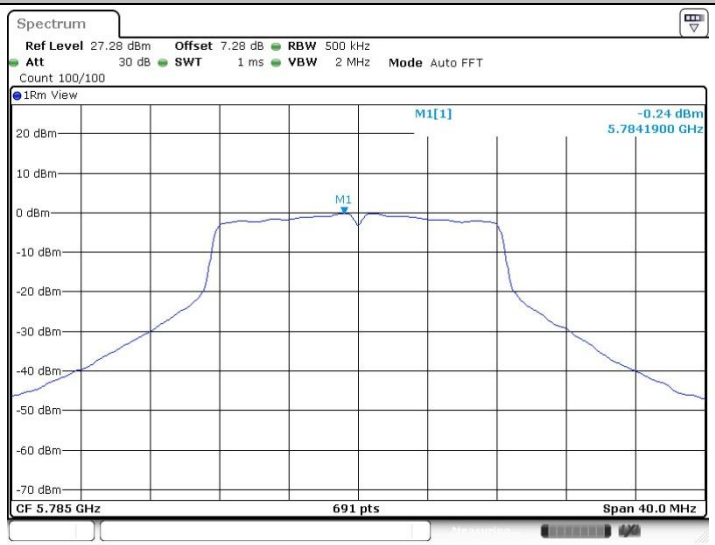
11A_Ant1_5745



Date: 9.SEP.2021 02:05:31

11A_Ant1_5785



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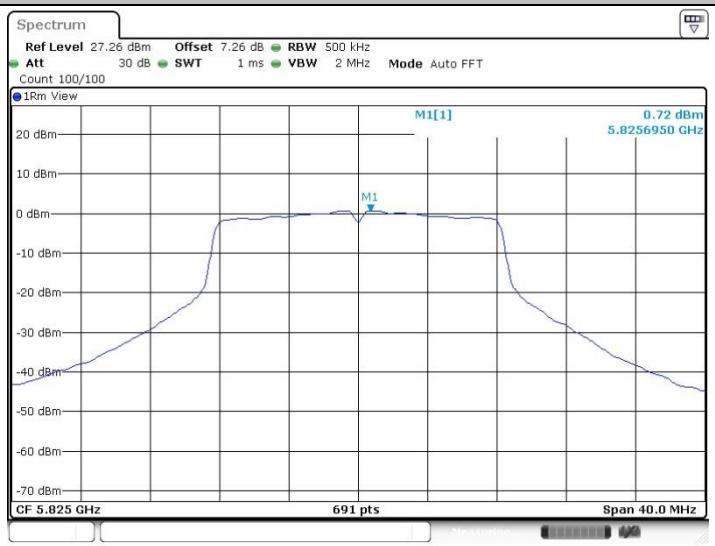
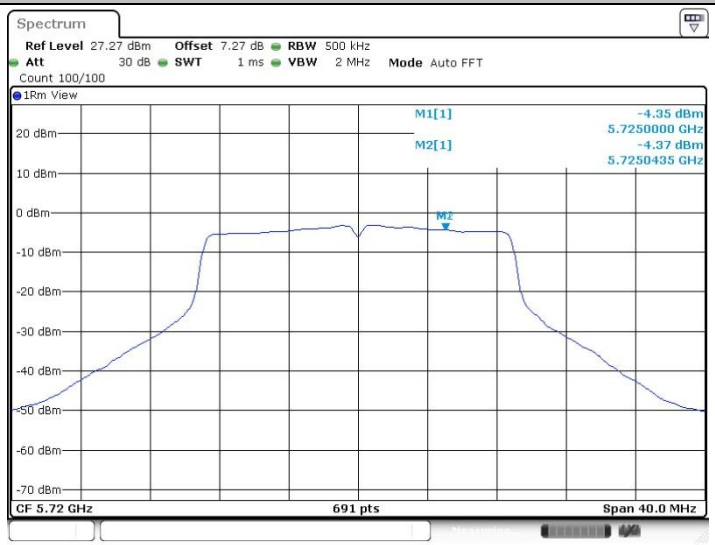
11A_Ant1_5825



Date: 9.SEP.2021 02:09:22

11N20SISO_Ant1_5720_UNII-3



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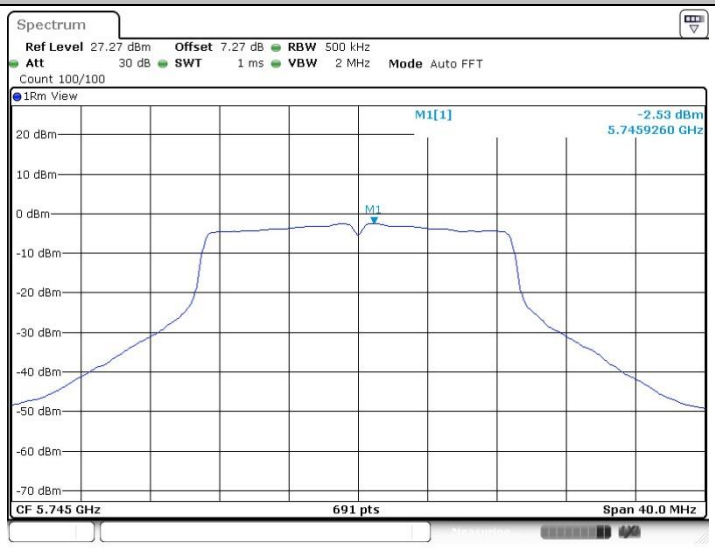

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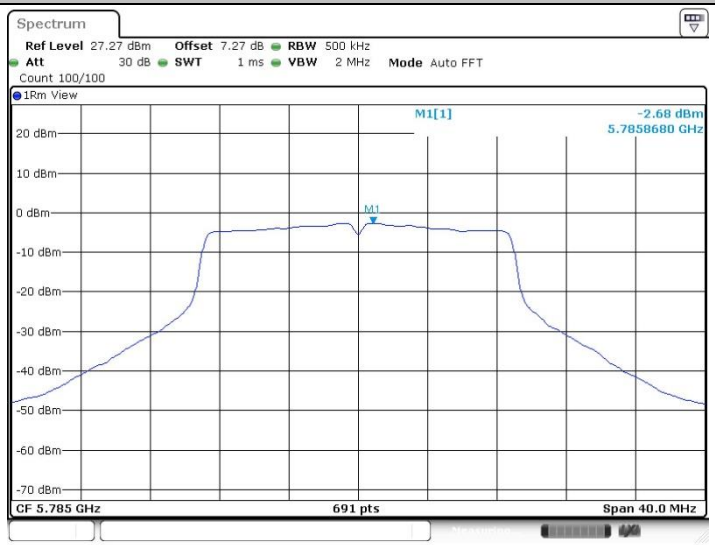
11N20SISO_Ant1_5785



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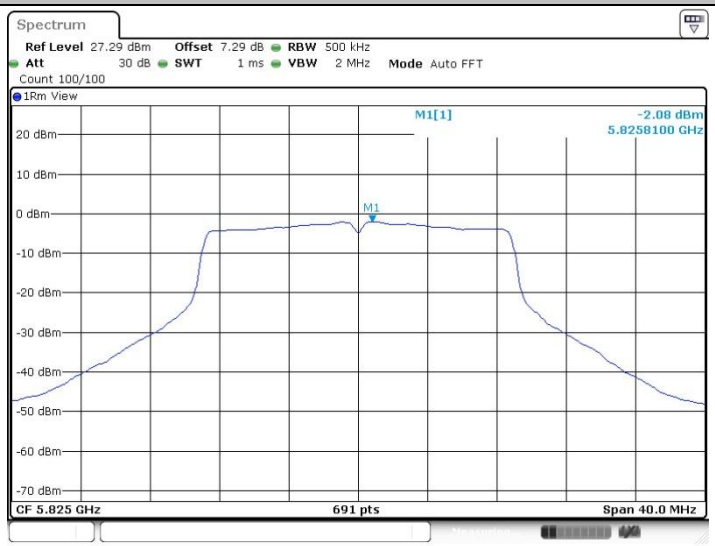
11N20SISO_Ant1_5825



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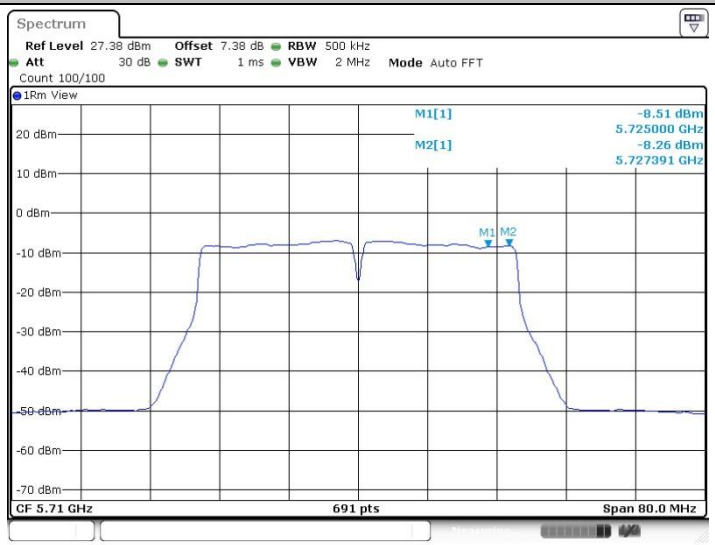
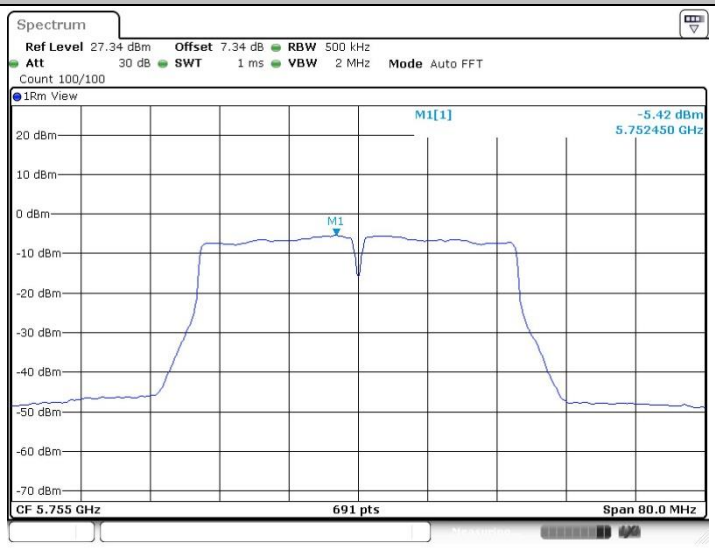
11N40SISO_Ant1_5710_UNII-3



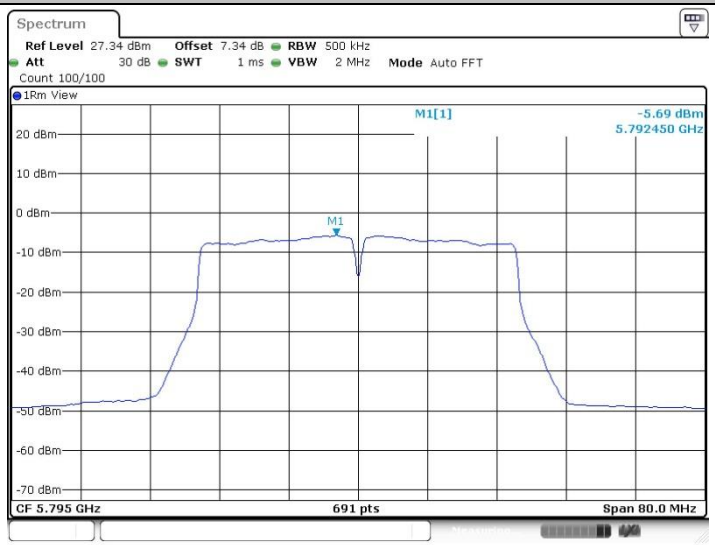
Date: 15.SEP.2021 11:12:56

11N40SISO_Ant1_5755



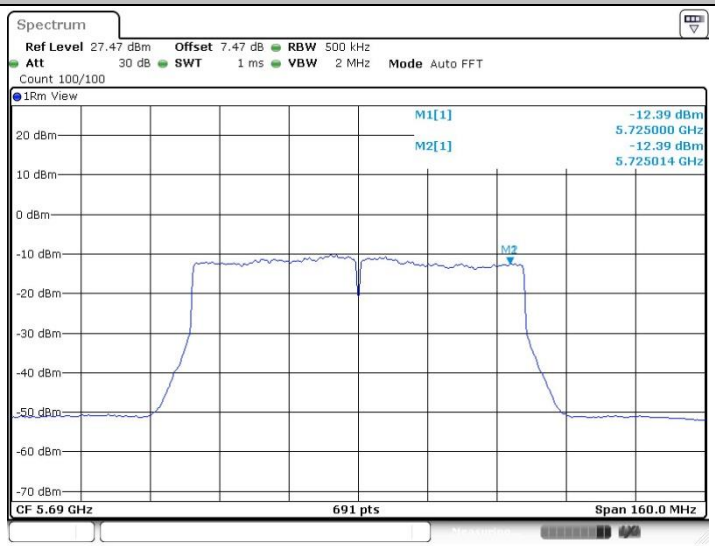
Date: 9.SEP.2021 02:40:40

11N40SISO_Ant1_5795



Date: 9.SEP.2021 02:42:36

11AC80SISO_Ant1_5690_UNII-3



Date: 15.SEP.2021 11:14:16

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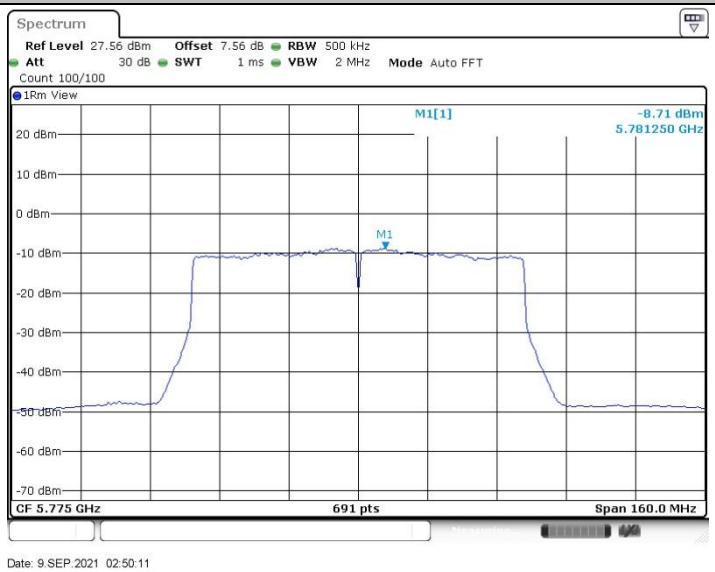
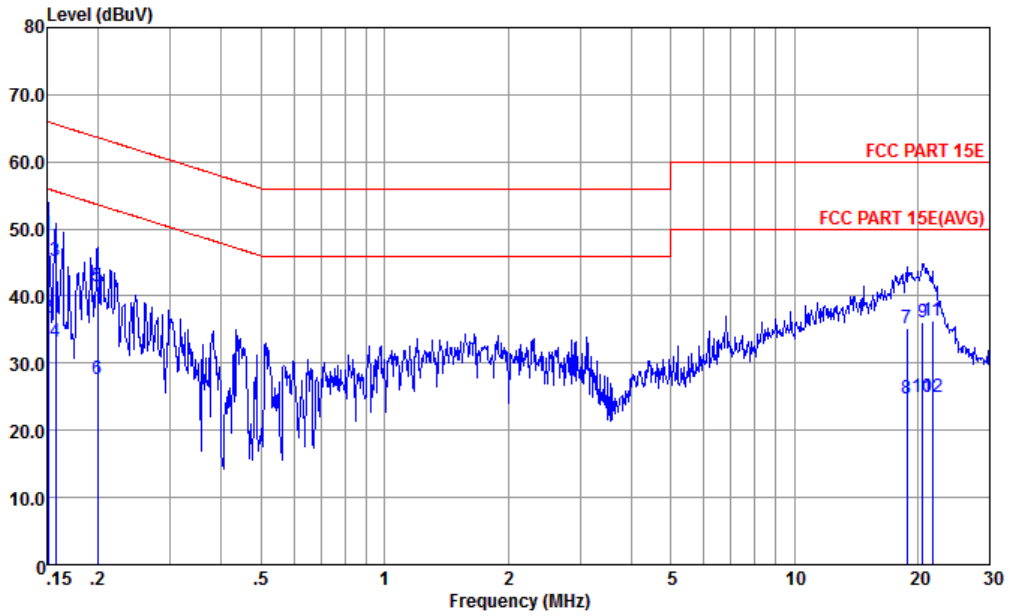


Appendix B. AC Conducted Emission Test Results

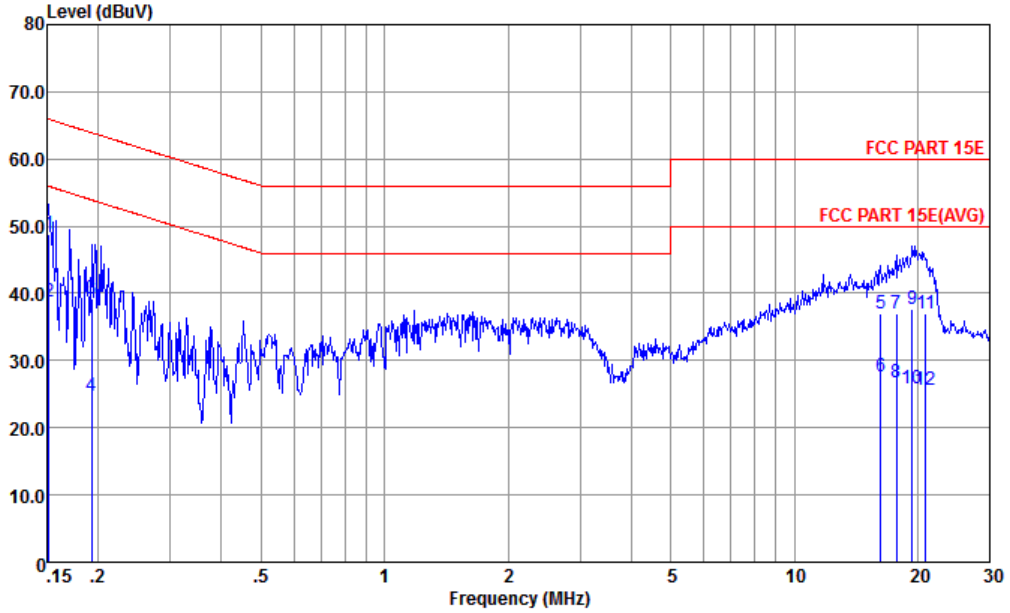
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15E LISN-L-060105-CN02 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.151	49.15	-16.81	65.96	38.60	0.07	10.48	QP
2		0.151	36.85	-19.11	55.96	26.30	0.07	10.48	Average
3		0.157	45.13	-20.47	65.60	34.60	0.07	10.46	QP
4		0.157	33.13	-22.47	55.60	22.60	0.07	10.46	Average
5		0.200	41.55	-22.07	63.62	31.10	0.09	10.36	QP
6		0.200	27.55	-26.07	53.62	17.10	0.09	10.36	Average
7		18.820	35.11	-24.89	60.00	22.61	2.03	10.47	QP
8		18.820	24.71	-25.29	50.00	12.21	2.03	10.47	Average
9		20.594	36.02	-23.98	60.00	23.30	2.21	10.51	QP
10		20.594	24.92	-25.08	50.00	12.20	2.21	10.51	Average
11		21.715	36.33	-23.67	60.00	23.50	2.31	10.52	QP
12		21.715	25.03	-24.97	50.00	12.20	2.31	10.52	Average

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



Site : CO01-KS
Condition : FCC PART 15E LISN-N-060105-CN02 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.152	48.83	-17.08	65.91	38.20	0.15	10.48	QP
2		0.152	38.83	-17.08	55.91	28.20	0.15	10.48	Average
3		0.192	39.24	-24.69	63.93	28.69	0.17	10.38	QP
4		0.192	24.74	-29.19	53.93	14.19	0.17	10.38	Average
5		16.226	37.08	-22.92	60.00	24.50	2.16	10.42	QP
6		16.226	27.68	-22.32	50.00	15.10	2.16	10.42	Average
7		17.755	36.97	-23.03	60.00	24.10	2.42	10.45	QP
8		17.755	26.77	-23.23	50.00	13.90	2.42	10.45	Average
9		19.428	37.67	-22.33	60.00	24.51	2.68	10.48	QP
10		19.428	25.77	-24.23	50.00	12.61	2.68	10.48	Average
11		20.924	37.00	-23.00	60.00	23.60	2.89	10.51	QP
12		20.924	25.60	-24.40	50.00	12.20	2.89	10.51	Average

Note:

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

Appendix C. Radiated Spurious Emission

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

UNII-3 - 5725~5850MHz

WIFI 802.11a (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)
802.11a CH 149 5745MHz		5600.4	55.38	-12.92	68.3	41.32	35.57	11.13	32.64	400	168	P	H
		5685.2	55.89	-38.49	94.38	41.72	35.65	11.22	32.7	400	168	P	H
		5719.6	57	-53.79	110.79	42.77	35.7	11.25	32.72	400	168	P	H
		5724.4	65.4	-55.53	120.93	51.15	35.72	11.25	32.72	400	168	P	H
		5746	104.07	-	-	89.78	35.75	11.27	32.73	400	168	P	H
		5746	97.69	-	-	83.4	35.75	11.27	32.73	400	168	A	H
		5607.2	55.52	-12.78	68.3	41.66	35.37	11.13	32.64	114	296	P	V
		5694.4	55.3	-45.87	101.17	41.43	35.35	11.22	32.7	114	296	P	V
		5718.8	56.17	-54.39	110.56	42.32	35.32	11.25	32.72	114	296	P	V
		5724.4	59.14	-61.79	120.93	45.29	35.32	11.25	32.72	114	296	P	V
		5746	98.66	-	-	84.81	35.31	11.27	32.73	114	296	P	V
		5746	92.45	-	-	78.6	35.31	11.27	32.73	114	296	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz		5824	106.83	-	-	92.42	35.85	11.35	32.79	111	257	P	H
		5824	99.51	-	-	85.1	35.85	11.35	32.79	111	257	A	H
		5854	58.16	-55.02	113.18	43.69	35.9	11.38	32.81	111	257	P	H
		5872	56.17	-49.97	106.14	41.7	35.9	11.39	32.82	111	257	P	H
		5888.8	56.03	-39.03	95.06	41.54	35.9	11.41	32.82	111	257	P	H
		5942.8	55.76	-12.54	68.3	41.29	35.89	11.45	32.87	111	257	P	H
		5830	99.75	-	-	85.96	35.23	11.35	32.79	113	312	P	V
		5830	93.1	-	-	79.31	35.23	11.35	32.79	113	312	A	V
		5854	54.23	-58.95	113.18	40.46	35.2	11.38	32.81	113	312	P	V
		5855.6	56.12	-54.61	110.73	42.35	35.2	11.38	32.81	113	312	P	V
		5901.2	55.21	-30.66	85.87	41.43	35.21	11.41	32.84	113	312	P	V
		5948.8	56.24	-12.06	68.3	42.44	35.22	11.45	32.87	113	312	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 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)
802.11a CH 149 5745MHz		11489.48	51.78	-22.22	74	56.77	39.19	16.31	60.49	100	291	P	H
		11489.48	45.7	-8.3	54	50.69	39.19	16.31	60.49	100	291	A	H
		11489.48	48.88	-25.12	74	54.47	38.59	16.31	60.49	100	360	P	V
		11489.48	48.88	-25.12	74	54.47	38.59	16.31	60.49	100	360	P	V
802.11a CH 157 5785MHz		11569.56	53.92	-20.08	74	58.64	39.42	16.39	60.53	100	290	P	H
		11569.56	47.63	-6.37	54	52.35	39.42	16.39	60.53	100	290	A	H
		11569.56	50.45	-23.55	74	55.91	38.68	16.39	60.53	100	360	P	V
		11569.56	50.45	-23.55	74	55.91	38.68	16.39	60.53	100	360	P	V
802.11a CH 165 5825MHz		11649.64	55.85	-18.15	74	60.32	39.64	16.46	60.57	100	290	P	H
		11649.64	48.96	-5.04	54	53.43	39.64	16.46	60.57	100	290	A	H
		11649.64	49.95	-24.05	74	55.29	38.77	16.46	60.57	100	360	P	V
		11649.64	49.95	-24.05	74	55.29	38.77	16.46	60.57	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz

WIFI 802.11n 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)	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		5609.6	55.31	-12.99	68.3	41.24	35.58	11.13	32.64	400	190	P	H
		5675.6	55.7	-31.58	87.28	41.54	35.65	11.2	32.69	400	190	P	H
		5704.4	55.22	-51.31	106.53	41.02	35.67	11.23	32.7	400	190	P	H
		5724.8	59.91	-61.93	121.84	45.66	35.72	11.25	32.72	400	190	P	H
		5740	101.04	-	-	86.75	35.75	11.27	32.73	400	190	P	H
		5740	94.58	-	-	80.29	35.75	11.27	32.73	400	190	A	H
		5626.4	54.54	-13.76	68.3	40.67	35.38	11.15	32.66	336	57	P	V
		5676.8	55.17	-33	88.17	41.29	35.37	11.2	32.69	336	57	P	V
		5706.8	55.68	-51.53	107.21	41.83	35.34	11.23	32.72	336	57	P	V
		5724.8	57.13	-64.71	121.84	43.28	35.32	11.25	32.72	336	57	P	V
		5740	97	-	-	83.15	35.31	11.27	32.73	336	57	P	V
		5740	90.93	-	-	77.08	35.31	11.27	32.73	336	57	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz		5852	56.51	-61.23	117.74	42.06	35.9	11.36	32.81	400	169	P	H
		5868.8	55.33	-51.7	107.03	40.86	35.9	11.38	32.81	400	169	P	H
		5923.6	55.92	-13.41	69.33	41.44	35.89	11.44	32.85	400	169	P	H
		5955.6	55.88	-12.42	68.3	41.39	35.89	11.47	32.87	400	169	P	H
		5824	104.2	-	-	89.79	35.85	11.35	32.79	400	169	P	H
		5824	96.7	-	-	82.29	35.85	11.35	32.79	400	169	A	H
		5852.8	54.3	-61.62	115.92	40.53	35.22	11.36	32.81	326	77	P	V
		5862.8	54.97	-53.74	108.71	41.2	35.2	11.38	32.81	326	77	P	V
		5894.8	54.54	-36.07	90.61	40.76	35.21	11.41	32.84	326	77	P	V
		5949.6	55.33	-12.97	68.3	41.53	35.22	11.45	32.87	326	77	P	V
		5826	99.75	-	-	85.96	35.23	11.35	32.79	326	77	P	V
		5826	93.03	-	-	79.24	35.23	11.35	32.79	326	77	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz

WIFI 802.11n 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)	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		11490	47.01	-26.99	74	52	39.19	16.31	60.49	100	360	P	H
		11490	47.19	-26.81	74	52.78	38.59	16.31	60.49	100	360	P	V
802.11n HT20 CH 157 5785MHz		11570	50.89	-23.11	74	55.61	39.42	16.39	60.53	100	360	P	H
		11570	47.88	-26.12	74	53.34	38.68	16.39	60.53	100	360	P	V
802.11n HT20 CH 165 5825MHz		11650	50.53	-23.47	74	55	39.64	16.46	60.57	100	360	P	H
		11650	50.55	-23.45	74	55.89	38.77	16.46	60.57	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz

WIFI 802.11n 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)	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		5609.2	55.06	-13.24	68.3	40.99	35.58	11.13	32.64	100	260	P	H
		5665.6	55.9	-23.98	79.88	41.79	35.62	11.18	32.69	100	260	P	H
		5717.2	63.88	-46.24	110.12	49.67	35.7	11.23	32.72	100	260	P	H
		5724.4	63.87	-57.06	120.93	49.62	35.72	11.25	32.72	100	260	P	H
		5758	101.07	-	-	86.75	35.78	11.29	32.75	100	260	P	H
		5758	93.21	-	-	78.89	35.78	11.29	32.75	100	260	A	H
		5853.6	54.88	-59.21	114.09	40.41	35.9	11.38	32.81	100	260	P	H
		5860	54.95	-54.55	109.5	40.48	35.9	11.38	32.81	100	260	P	H
		5912.4	56.37	-21.22	77.59	41.89	35.89	11.43	32.84	100	260	P	H
		5973.6	55.27	-13.03	68.3	40.78	35.89	11.48	32.88	100	260	P	H
		5647.6	56.1	-12.2	68.3	42.21	35.4	11.16	32.67	319	30	P	V
		5693.6	55.08	-45.5	100.58	41.21	35.35	11.22	32.7	319	30	P	V
		5716.8	57.72	-52.29	110.01	43.87	35.34	11.23	32.72	319	30	P	V
		5724.8	58.61	-63.23	121.84	44.76	35.32	11.25	32.72	319	30	P	V
		5758	95.24	-	-	81.41	35.29	11.29	32.75	319	30	P	V
		5758	87.65	-	-	73.82	35.29	11.29	32.75	319	30	A	V
		5850.4	52.92	-68.47	121.39	39.15	35.22	11.36	32.81	319	30	P	V
		5866	53.59	-54.23	107.82	39.82	35.2	11.38	32.81	319	30	P	V
		5892	55.65	-37.03	92.68	41.85	35.21	11.41	32.82	319	30	P	V
		5956.8	54.48	-13.82	68.3	40.66	35.22	11.47	32.87	319	30	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)	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		5610.8	55.5	-12.8	68.3	41.43	35.58	11.13	32.64	100	260	P	H
		5660.4	54.67	-21.35	76.02	40.56	35.62	11.18	32.69	100	260	P	H
		5714.4	55.63	-53.7	109.33	41.42	35.7	11.23	32.72	100	260	P	H
		5721.6	54.24	-60.31	114.55	40.01	35.7	11.25	32.72	100	260	P	H
		5800	101.3	-	-	86.93	35.83	11.32	32.78	100	260	P	H
		5800	94.04	-	-	79.67	35.83	11.32	32.78	100	260	A	H
		5852.8	55.96	-59.96	115.92	41.51	35.9	11.36	32.81	100	260	P	H
		5861.2	55.18	-53.98	109.16	40.71	35.9	11.38	32.81	100	260	P	H
		5885.6	56.42	-41.01	97.43	41.95	35.9	11.39	32.82	100	260	P	H
		5942.8	55.97	-12.33	68.3	41.5	35.89	11.45	32.87	100	260	P	H
		5602.8	55.17	-13.13	68.3	41.31	35.37	11.13	32.64	108	316	P	V
		5681.2	55.88	-35.55	91.43	42	35.37	11.2	32.69	108	316	P	V
		5708	54.66	-52.88	107.54	40.81	35.34	11.23	32.72	108	316	P	V
		5722.4	55.23	-61.14	116.37	41.38	35.32	11.25	32.72	108	316	P	V
		5794	95.15	-	-	81.33	35.26	11.32	32.76	108	316	P	V
		5794	87.7	-	-	73.88	35.26	11.32	32.76	108	316	A	V
		5850.8	54.81	-65.67	120.48	41.04	35.22	11.36	32.81	108	316	P	V
		5859.6	54.04	-55.57	109.61	40.27	35.2	11.38	32.81	108	316	P	V
		5890.4	55.78	-38.09	93.87	41.98	35.21	11.41	32.82	108	316	P	V
		5994.4	55.12	-13.18	68.3	41.29	35.23	11.5	32.9	108	316	P	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

UNII-3 5725~5850MHz

WIFI 802.11n 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)	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		11510	48.68	-25.32	74	53.65	39.2	16.32	60.49	100	360	P	H
		11510	46.96	-27.04	74	52.53	38.6	16.32	60.49	100	360	P	V
802.11n HT40 CH 159 5795MHz		11590	48.25	-25.75	74	52.9	39.48	16.41	60.54	100	360	P	H
		11590	47.42	-26.58	74	52.85	38.7	16.41	60.54	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz

WIFI 802.11ac VHT80 (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		5600.4	56.12	-12.18	68.3	42.06	35.57	11.13	32.64	102	259	P	H
		5699.8	59.84	-45.31	105.15	45.65	35.67	11.22	32.7	102	259	P	H
		5719.8	62.27	-48.57	110.84	48.04	35.7	11.25	32.72	102	259	P	H
		5721.2	62.75	-50.89	113.64	48.52	35.7	11.25	32.72	102	259	P	H
		5794	96.64	-	-	82.25	35.83	11.32	32.76	102	259	P	H
		5794	89.42	-	-	75.03	35.83	11.32	32.76	102	259	A	H
		5854	55.58	-57.6	113.18	41.11	35.9	11.38	32.81	102	259	P	H
		5860	56.63	-52.87	109.5	42.16	35.9	11.38	32.81	102	259	P	H
		5886.4	55.53	-41.31	96.84	41.06	35.9	11.39	32.82	102	259	P	H
		5968	56.04	-12.26	68.3	41.56	35.89	11.47	32.88	102	259	P	H
		5606.4	55.23	-13.07	68.3	41.37	35.37	11.13	32.64	366	77	P	V
		5656.8	57.05	-16.3	73.35	43.16	35.38	11.18	32.67	366	77	P	V
		5717.6	57.49	-52.74	110.23	43.64	35.32	11.25	32.72	366	77	P	V
		5720.8	57.57	-55.15	112.72	43.72	35.32	11.25	32.72	366	77	P	V
		5776	93.4	-	-	79.58	35.28	11.3	32.76	366	77	P	V
		5776	85.65	-	-	71.83	35.28	11.3	32.76	366	77	A	V
		5851.2	54.31	-65.25	119.56	40.54	35.22	11.36	32.81	366	77	P	V
		5872.8	54.96	-50.96	105.92	41.19	35.2	11.39	32.82	366	77	P	V
		5897.2	54.9	-33.93	88.83	41.12	35.21	11.41	32.84	366	77	P	V
		5952.4	55	-13.3	68.3	41.2	35.22	11.45	32.87	366	77	P	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

UNII-3 5725~5850MHz

WIFI 802.11ac VHT80 (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		11550	47.82	-26.18	74	52.66	39.31	16.37	60.52	100	360	P	H
		11550	46.56	-27.44	74	52.05	38.66	16.37	60.52	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-3 5725~5850MHz

Emission below 1GHz

WIFI 802.11a (LF @ 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)
802.11a LF		30.97	20.79	-19.21	40	27.86	24.57	0.56	32.2	-	-	P	H
		154.16	28	-15.5	43.5	41.23	16.86	2.01	32.1	156	210	P	H
		211.39	26.33	-17.17	43.5	40.86	15.21	2.38	32.12	-	-	P	H
		305.48	23.5	-22.5	46	33.3	19.46	2.85	32.11	-	-	P	H
		745.86	28.96	-17.04	46	28.71	28.08	4.46	32.29	-	-	P	H
		869.05	29.39	-16.61	46	27.68	29.22	4.81	32.32	-	-	P	H
		34.85	30.16	-9.84	40	39.29	22.45	0.62	32.2	-	-	P	V
		47.46	30.62	-9.38	40	46.14	15.87	0.81	32.2	226	257	P	V
		156.1	24	-19.5	43.5	37.34	16.74	2.02	32.1	-	-	P	V
		213.33	27.59	-15.91	43.5	42.1	15.23	2.39	32.13	-	-	P	V
		588.72	25.84	-20.16	46	28.48	25.71	3.95	32.3	-	-	P	V
		758.47	28.96	-17.04	46	28.57	28.2	4.49	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	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

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

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

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

= 43.54(dBμV/m) – 54(dBμV/m)

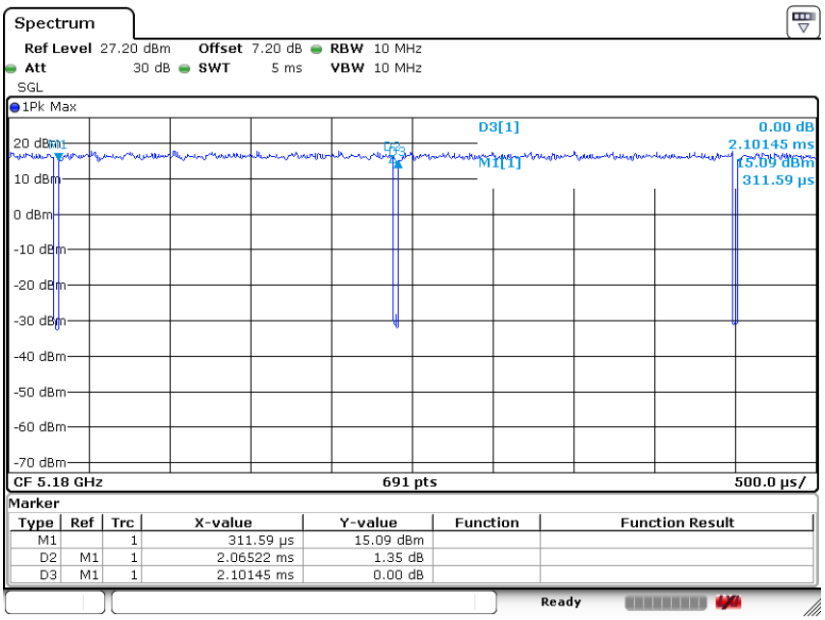
= -10.46(dB)

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

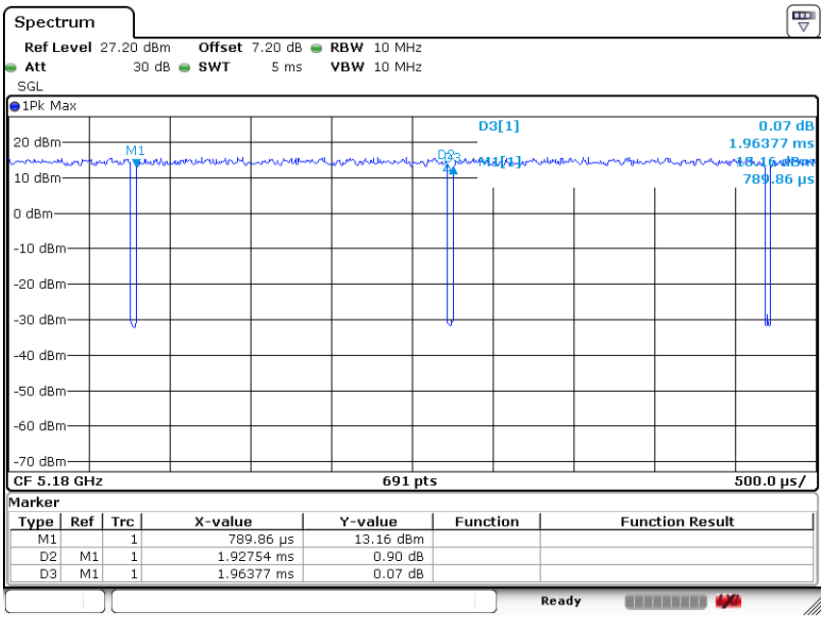
Appendix D. Duty Cycle Plots

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	92.49	0.464	2.156	2.2KHz

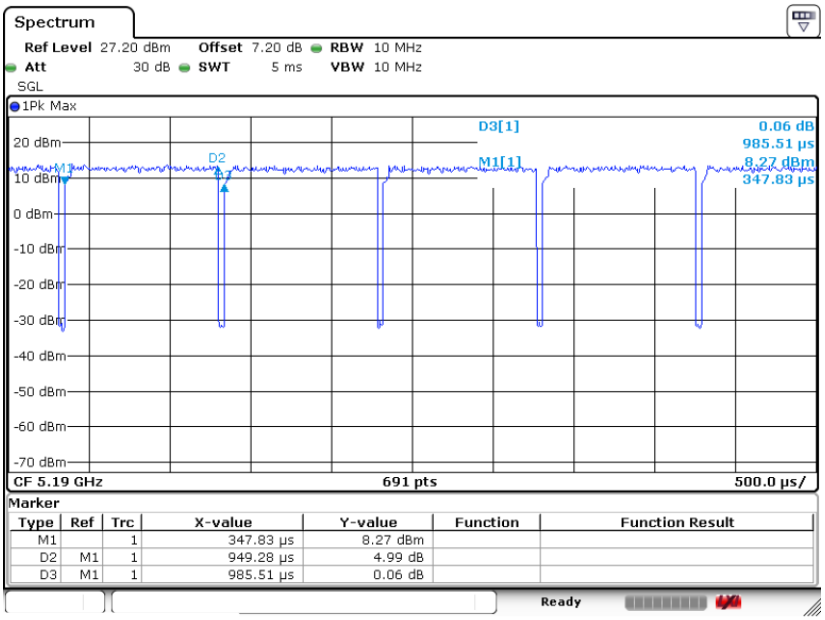
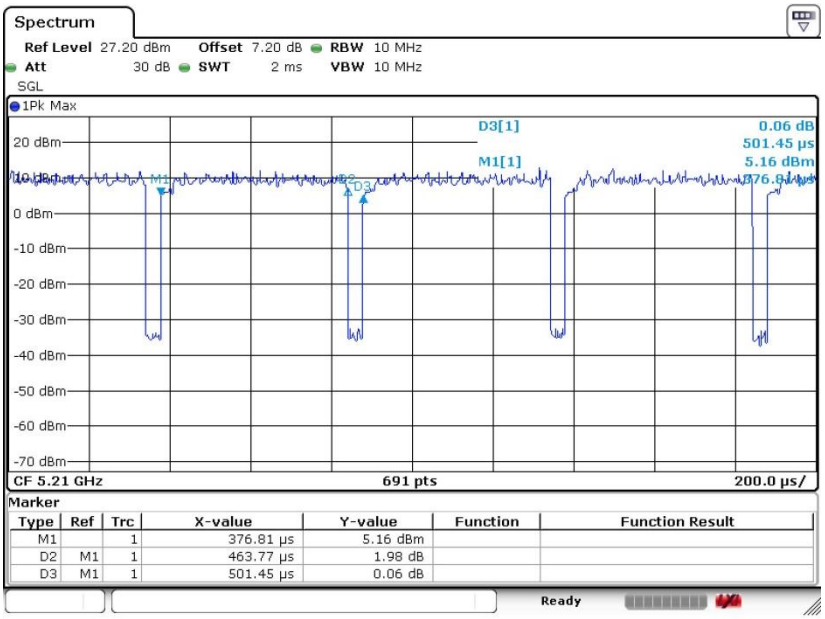
802.11a



802.11n HT20



802.11n HT40



802.11ac VHT80