



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2175-1
FCC ID : IHDT56AC1
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Sep. 08, 2021 ~ Sep. 26, 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

Alex Wang

Approved by: Alex Wang / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR172703F	Rev. 01	Initial issue of report	Oct. 19, 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 6.13 dB at 42.610 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 6.73 dB at 0.206 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

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2175-1
FCC ID	IHDT56AC1
IMEI Code	Conducted: 350506880020187/350506880020195 Conduction: 350506880020864/350506880020872 Radiation: 350506880021441/350506880021458
HW Version	DVT2
SW Version	RRX31.Q3-38
EUT Stage	Identical Prototype

Remark:

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification			
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz		
Maximum Output Power	<MIMO Ant. 1+2> <5745 MHz ~ 5825 MHz> 802.11a : 20.37 dBm / 0.1089 W 802.11ax HE20 : 19.42 dBm / 0.0875 W 802.11ax HE40 : 19.12 dBm / 0.0817 W 802.11ax HE80 : 18.36 dBm / 0.0685 W		
99% Occupied Bandwidth	<MIMO Ant. 1+2> <5745 MHz ~ 5825 MHz> 802.11a : 17.30 MHz 802.11ax HE20 : 19.70 MHz 802.11ax HE40 : 38.04 MHz 802.11ax HE80 : 77.04 MHz		
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)		
Antenna Type / Gain	<Ant. 1> : IFA Antenna with gain -8.1 dBi <Ant. 2> : IFA Antenna with gain -8.3 dBi		
Antenna Function Description		Ant. 1	Ant. 2
	802.11 a/n/ac/ax MIMO	V	V

Note:

1. WLAN 5G Ant. 1 / Ant. 2 corresponding to EUT Photo Ant. 6 / Ant. 7
2. For 802.11n/11ac/11ax of 20M/40M/80M modes, the full testing assessed 802.11ax HE20/HE40/HE80 by referring to the maximum output power.
3. 802.11ax support OFDMA full RU tone and partial RU tone, both full RU and partial RU-left (for low CH) and partial RU-right (for high CH) are tested, only the worse data were reported.

1.5 Modification of EUT

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



1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola(Salcomp)	Model Name	MC-331
AC Adapter 1(EU)	Brand Name	Motorola(Salcomp)	Model Name	MC-332
AC Adapter 1(UK)	Brand Name	Motorola(Salcomp)	Model Name	MC-333
AC Adapter 1(AR)	Brand Name	Motorola(Salcomp)	Model Name	MC-336
AC Adapter 1(BR)	Brand Name	Motorola(Salcomp)	Model Name	MC-337
AC Adapter 1(PRC)	Brand Name	Motorola(Salcomp)	Model Name	MC-338
AC Adapter 1(CHILE)	Brand Name	Motorola(Salcomp)	Model Name	MC-339
AC Adapter 2(US)	Brand Name	Motorola(Chenyang)	Model Name	MC-331
AC Adapter 2(EU)	Brand Name	Motorola(Chenyang)	Model Name	MC-332
AC Adapter 2(AR)	Brand Name	Motorola(Chenyang)	Model Name	MC-336
AC Adapter 2(BR)	Brand Name	Motorola(Chenyang)	Model Name	MC-337
AC Adapter 3(US)	Brand Name	Motorola(Acbel)	Model Name	MC-331
AC Adapter 3(EU)	Brand Name	Motorola(Acbel)	Model Name	MC-332
AC Adapter 3(UK)	Brand Name	Motorola(Acbel)	Model Name	MC-333
Battery	Brand Name	Motorola(ATL)	Model Name	MB50
Earphone 1	Brand Name	Motorola(Lyand)	Model Name	MH191(SH38C81577)
Earphone 2	Brand Name	Motorola(LCHSE)	Model Name	MH191(SH38C81576)
Type C to Audio Cable	Brand Name	Motorola(Luxshare)	Model Name	SC18C27844
Type C to HDMI Cable	Brand Name	Motorola(Linxee)	Model Name	SC18D02146
USB Cable 1	Brand Name	Motorola(Saibao)	Model Name	SC18D22297
USB Cable 2	Brand Name	Motorola(Cabletech)	Model Name	SC18D22298
USB Cable 3	Brand Name	Motorola(Luxshare)	Model Name	SC18D22299



1.7 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 03CH05-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH05-KS	AUDIX	E3	6.2009-8-24a1
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.9 Applicable Standards

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

- ♦ 47 CFR Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
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 HT40/11ac VHT40/11ax HE40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80 /11ax HE80.

2.2 Test Mode

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

MIMO Mode

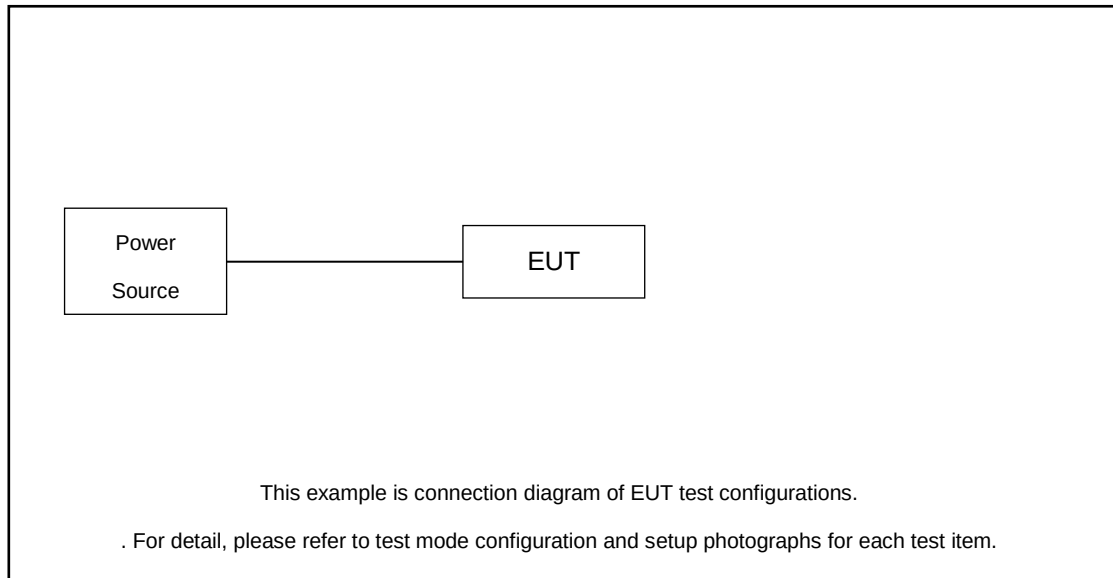
Modulation	Data Rate
802.11a	6 Mbps
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link(5G) + USB Cable 1(Charging from Adapter 1)
Remark: For Radiated Test Cases, The tests were performance with Adapter 1 and USB Cable 1.	

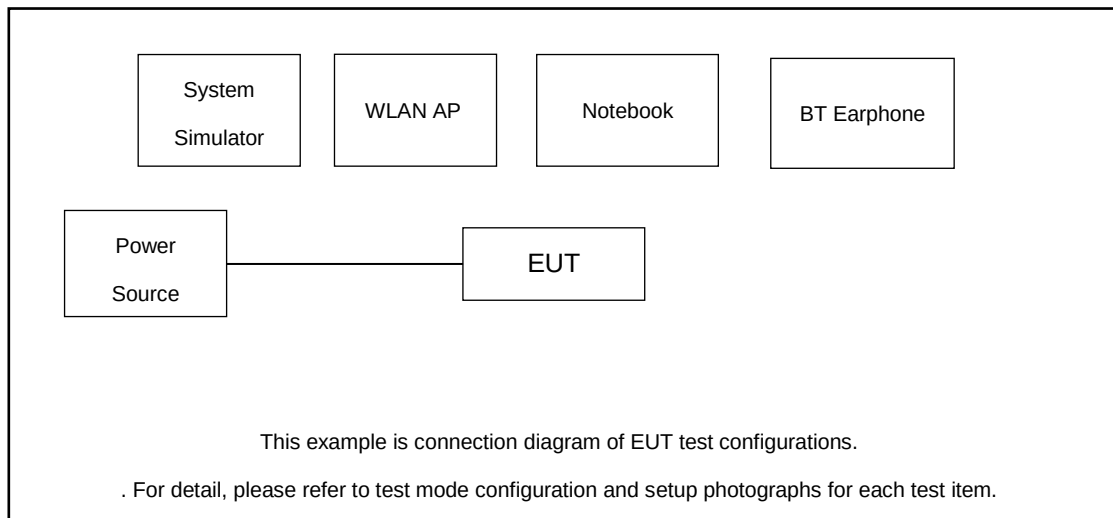
Ch. #		U-NII-3			
		802.11a	802.11ax HE20	802.11ax HE40	802.11ax HE80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

2.3 Connection Diagram of Test System

For Radiated Emission



For Conducted Emission



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded, 1.8m
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} \\ &= 7.2 \text{ (dB)}\end{aligned}$$

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.

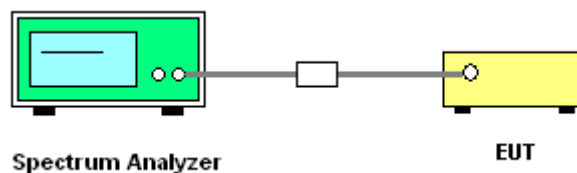
3.1.2 Measuring Instruments

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. Set RBW = 100kHz.
3. 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.

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.

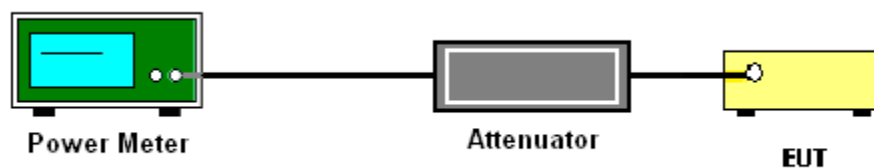
3.2.3 Test Procedures

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

U-NII-3 MIMO												
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	2	149	5745	17.21	16.89	20.07	30.00		-8.10		Pass
11a	6Mbps	2	157	5785	17.26	17.46	20.37	30.00		-8.10		Pass
11a	6Mbps	2	165	5825	17.31	17.00	20.17	30.00		-8.10		Pass
HT20	MCS0	2	149	5745	16.21	15.63	18.94	30.00		-8.10		Pass
HT20	MCS0	2	157	5785	16.26	16.21	19.25	30.00		-8.10		Pass
HT20	MCS0	2	165	5825	16.16	15.78	18.98	30.00		-8.10		Pass
HT40	MCS0	2	151	5755	16.15	15.76	18.97	30.00		-8.10		Pass
HT40	MCS0	2	159	5795	16.07	15.74	18.92	30.00		-8.10		Pass
VHT20	MCS0	2	149	5745	16.24	15.65	18.97	30.00		-8.10		Pass
VHT20	MCS0	2	157	5785	16.33	16.30	19.33	30.00		-8.10		Pass
VHT20	MCS0	2	165	5825	16.23	15.84	19.05	30.00		-8.10		Pass
VHT40	MCS0	2	151	5755	16.35	15.78	19.08	30.00		-8.10		Pass
VHT40	MCS0	2	159	5795	16.28	15.85	19.08	30.00		-8.10		Pass
VHT80	MCS0	2	155	5775	15.25	15.17	18.22	30.00		-8.10		Pass



U-NII-3 MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	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	
HE20	MCS0	2	149	5745	Full	16.37	15.77	19.09	30.00		-8.10		Pass
HE20	MCS0	2	149	5745	26/0	4.65	5.22	7.95	30.00		-8.10		Pass
HE20	MCS0	2	149	5745	52/37	9.03	8.51	11.79	30.00		-8.10		Pass
HE20	MCS0	2	149	5745	106/53	12.03	10.59	14.38	30.00		-8.10		Pass
HE20	MCS0	2	157	5785	Full	16.39	16.42	19.42	30.00		-8.10		Pass
HE20	MCS0	2	165	5825	Full	16.34	15.93	19.15	30.00		-8.10		Pass
HE20	MCS0	2	165	5825	26/8	5.44	5.48	8.47	30.00		-8.10		Pass
HE20	MCS0	2	165	5825	52/40	9.04	8.73	11.90	30.00		-8.10		Pass
HE20	MCS0	2	165	5825	106/54	11.78	10.92	14.38	30.00		-8.10		Pass
HE40	MCS0	2	151	5755	Full	16.34	15.87	19.12	30.00		-8.10		Pass
HE40	MCS0	2	151	5755	242/61	12.42	10.99	14.77	30.00		-8.10		Pass
HE40	MCS0	2	159	5795	Full	16.31	15.85	19.10	30.00		-8.10		Pass
HE40	MCS0	2	159	5795	242/62	12.25	11.27	14.80	30.00		-8.10		Pass
HE80	MCS0	2	155	5775	Full	15.38	15.31	18.36	30.00		-8.10		Pass
HE80	MCS0	2	155	5775	484/65	11.41	10.58	14.03	30.00		-8.10		Pass
HE80	MCS0	2	155	5775	484/66	11.52	10.65	14.12	30.00		-8.10		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).

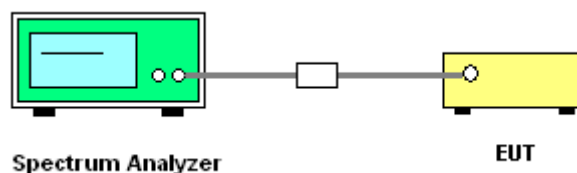
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500 kHz.
- Set VBW = 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (b): Measure and sum spectral maxima across the outputs.

Spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

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	68.2

Note: The following formula is used to convert the EIRP to field strength.

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

where

EIRP is the equivalent isotropically radiated power, in dBm

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

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

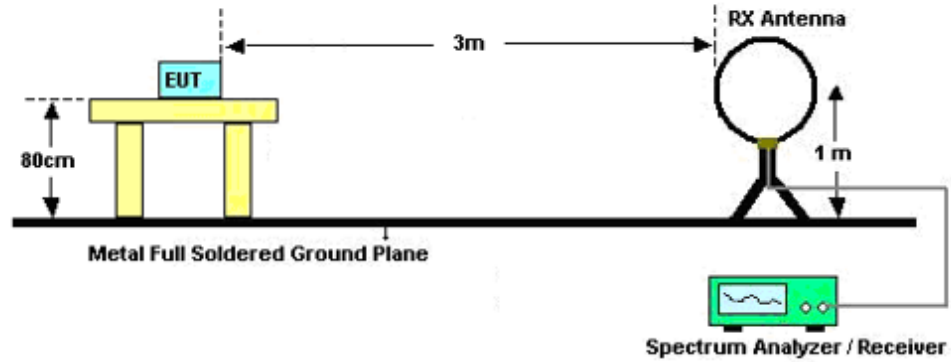
The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

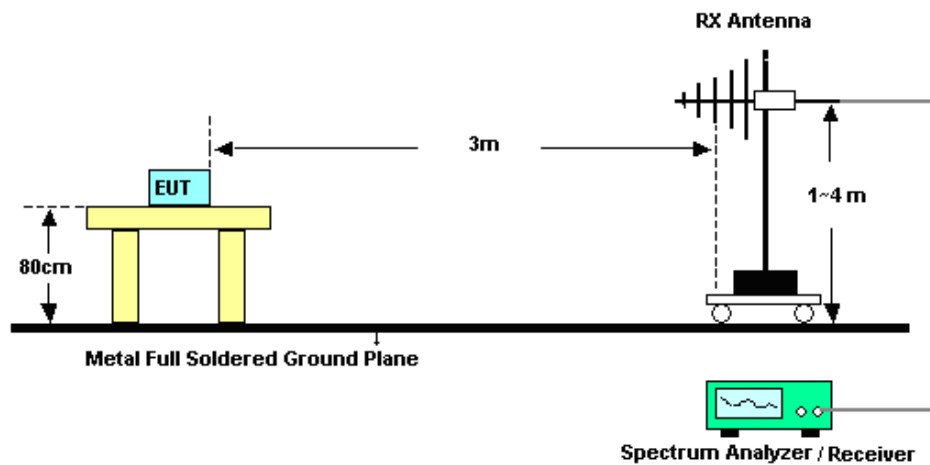
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak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

3.4.4 Test Setup

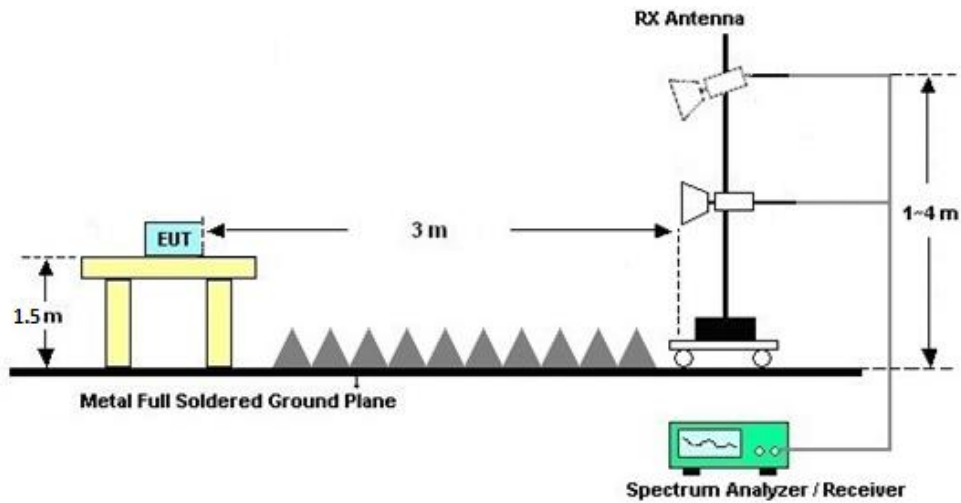
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



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.

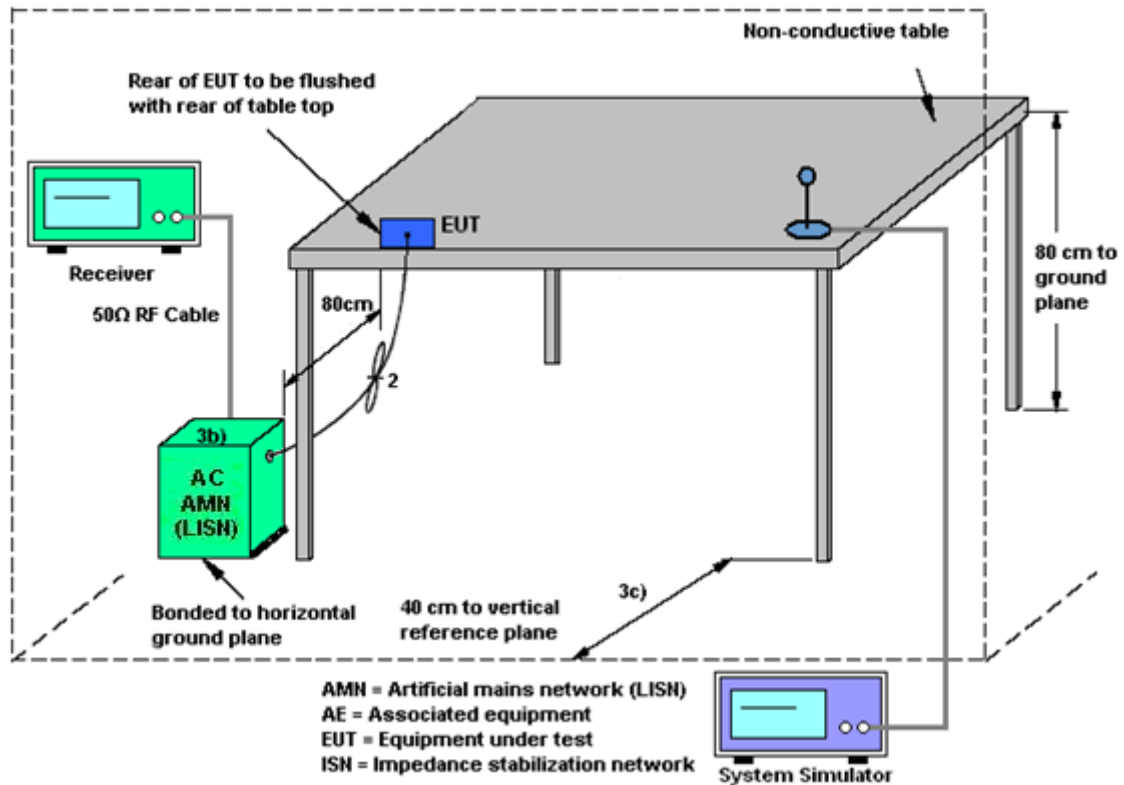
3.5.2 Measuring Instruments

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

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

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

For power measurements on IEEE 802.11 devices,

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

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

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

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

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

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. 1 (dBi)	Ant. 2 (dBi)				
Band IV	-8.10	-8.30	-8.10	-5.19	0.00	0.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



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. 08, 2021~ Sep. 11, 2021	Oct. 31, 2021	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 07, 2021	Sep. 08, 2021~ Sep. 11, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 07, 2021	Sep. 08, 2021~ Sep. 11, 2021	Jan. 06, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY564000 04	3Hz~8.5GHz;Max x 30dBm	Oct. 17, 2020	Sep. 24, 2021	Oct. 16, 2021	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 44	10Hz~44G,MAX 30dB	Apr. 13, 2021	Sep. 24, 2021	Apr. 12, 2022	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 01, 2020	Sep. 24, 2021	Oct. 31, 2021	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz~1GHz	Jun. 04, 2021	Sep. 24, 2021	Jun. 03, 2022	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 24, 2021	Sep. 24, 2021	Apr. 23, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2020	Sep. 24, 2021	Nov. 09, 2021	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Apr. 12, 2021	Sep. 24, 2021	Apr. 11, 2022	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 07, 2021	Sep. 24, 2021	Jan. 06, 2022	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2012228	1Ghz-18Ghz	Oct. 17, 2020	Sep. 24, 2021	Oct. 16, 2021	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY532703 16	500MHz~26.5GHz	Oct. 17, 2020	Sep. 24, 2021	Oct. 16, 2021	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Sep. 24, 2021	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 24, 2021	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 24, 2021	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Sep. 26, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 17, 2020	Sep. 26, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 17, 2020	Sep. 26, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 17, 2020	Sep. 26, 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 :	Albert shi	Temperature :	20~26°C
		Relative Humidity :	40~51%

26DB Emission Bandwidth Test Result

TestMode	Antenna	Frequency [MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5745	20.960	5734.400	5741.880	---	---
	Ant2	5745	24.480	5732.440	5756.920	---	---
	Ant1	5785	21.360	5774.160	5795.520	---	---
	Ant2	5785	26.160	5772.080	5798.240	---	---
	Ant1	5825	21.320	5814.080	5835.400	---	---
	Ant2	5825	30.800	5809.320	5840.120	---	---
11AX20MIMO	Ant1	5745	22.360	5733.800	5756.160	---	---
	Ant2	5745	22.640	5733.680	5756.320	---	---
	Ant1	5785	22.560	5773.840	5796.400	---	---
	Ant2	5785	22.680	5773.520	5796.200	---	---
	Ant1	5825	22.800	5813.520	5836.320	---	---
	Ant2	5825	22.800	5813.720	5836.520	---	---
11AX40MIMO	Ant1	5755	41.760	5734.040	5775.800	---	---
	Ant2	5755	42.080	5734.040	5776.120	---	---
	Ant1	5795	41.520	5774.280	5815.800	---	---
	Ant2	5795	41.840	5774.120	5815.960	---	---
11AX80MIMO	Ant1	5775	83.040	5733.400	5816.440	---	---
	Ant2	5775	82.720	5733.720	5816.440	---	---

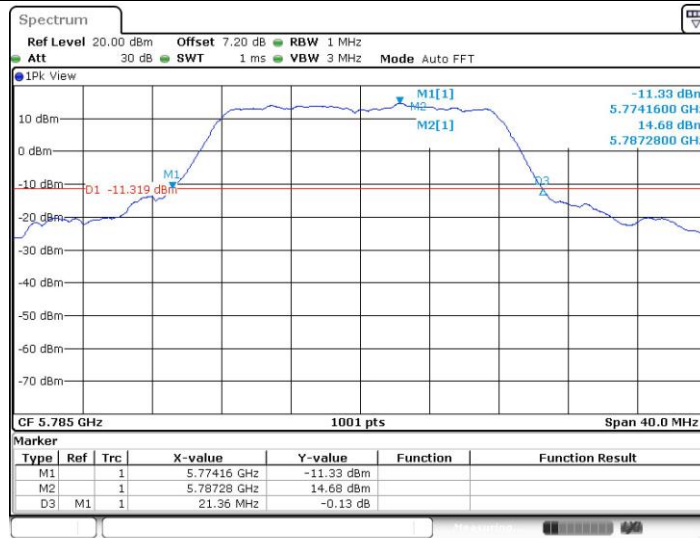


Test Graphs



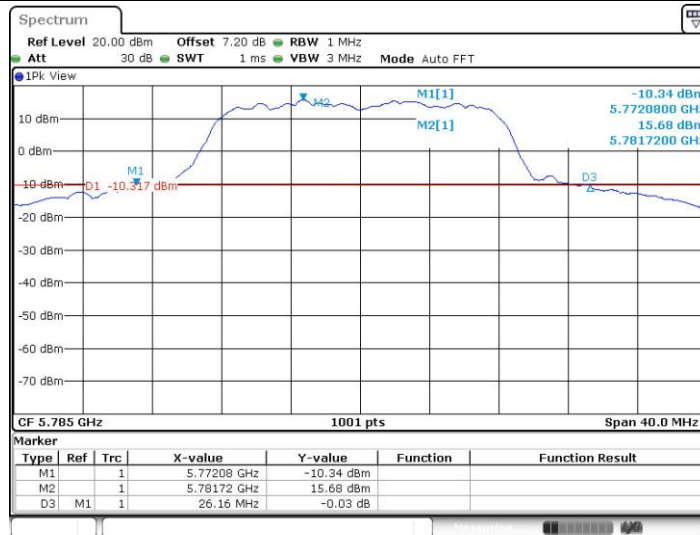


11A-CDD_Ant1_5785



Date: 8 SEP 2021 21:18:01

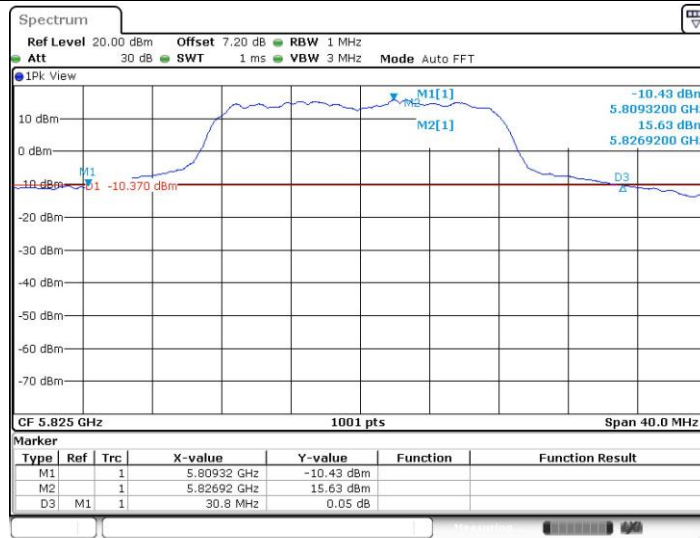
11A-CDD_Ant2_5785



Date: 8 SEP 2021 21:18:59

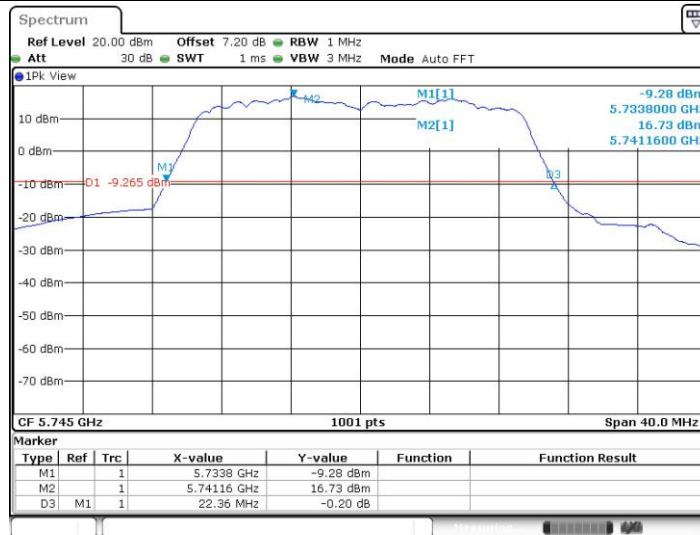


11A-CDD_Ant2_5825



Date: 8 SEP 2021 21:21:34

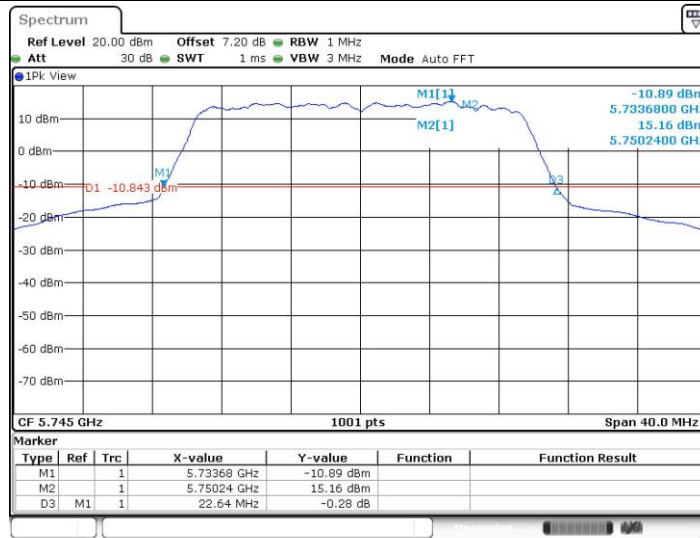
11AX20MIMO_Ant1_5745



Date: 8 SEP 2021 05:28:29

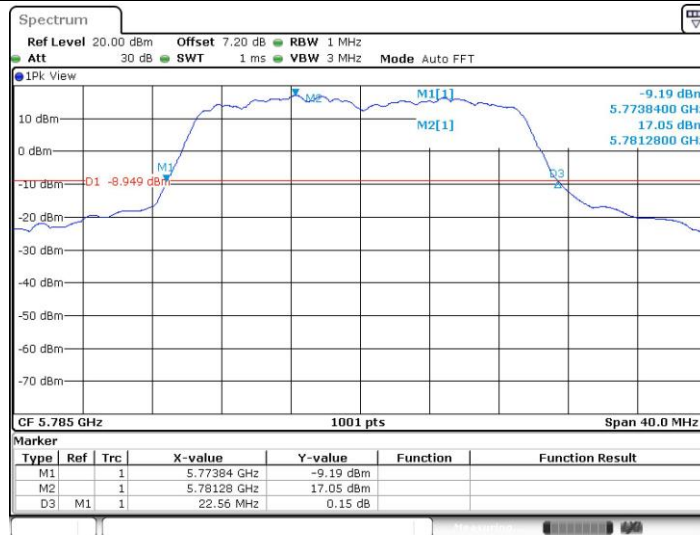


11AX20MIMO_Ant2_5745



Date: 8 SEP 2021 05:30:28

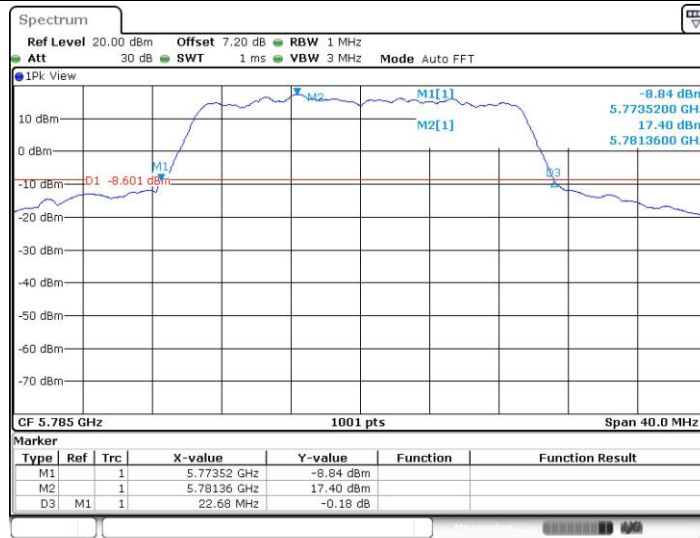
11AX20MIMO_Ant1_5785



Date: 8 SEP 2021 05:33:05

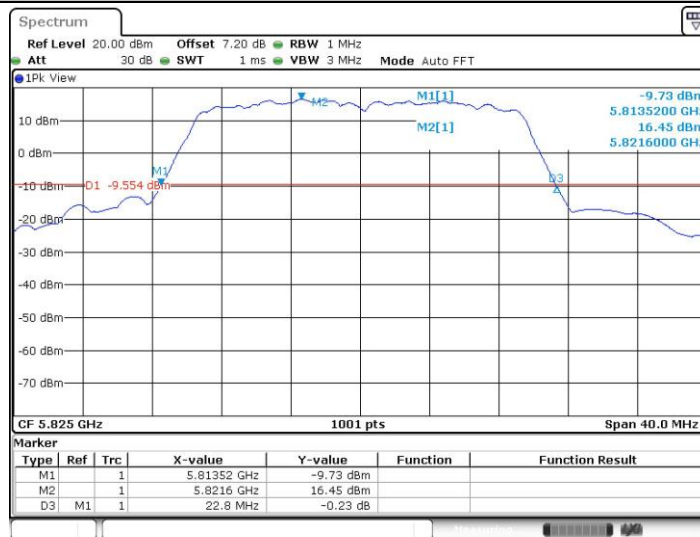


11AX20MIMO_Ant2_5785



Date: 8 SEP 2021 05:35:17

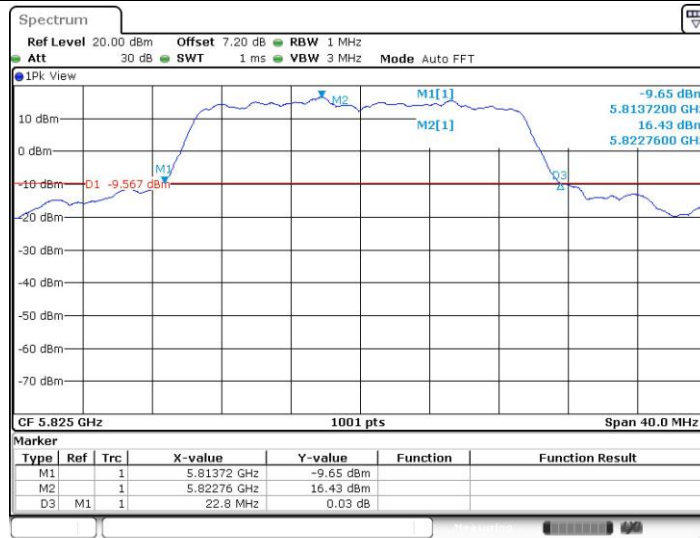
11AX20MIMO_Ant1_5825



Date: 8 SEP 2021 05:37:38

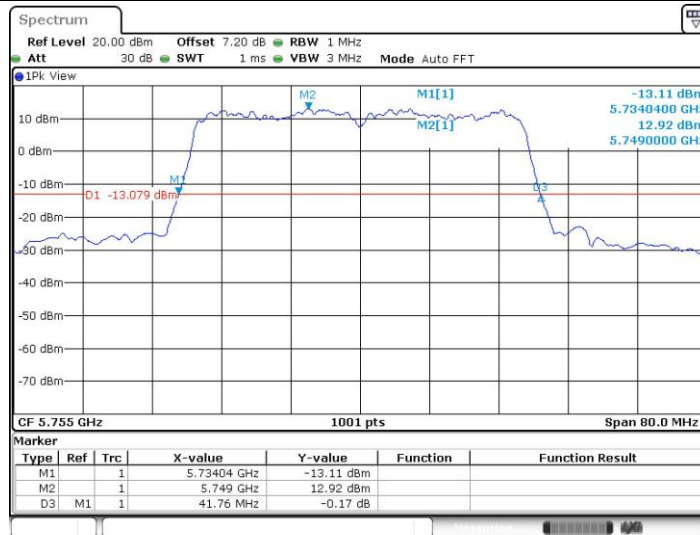


11AX20MIMO_Ant2_5825



Date: 8 SEP 2021 05:39:32

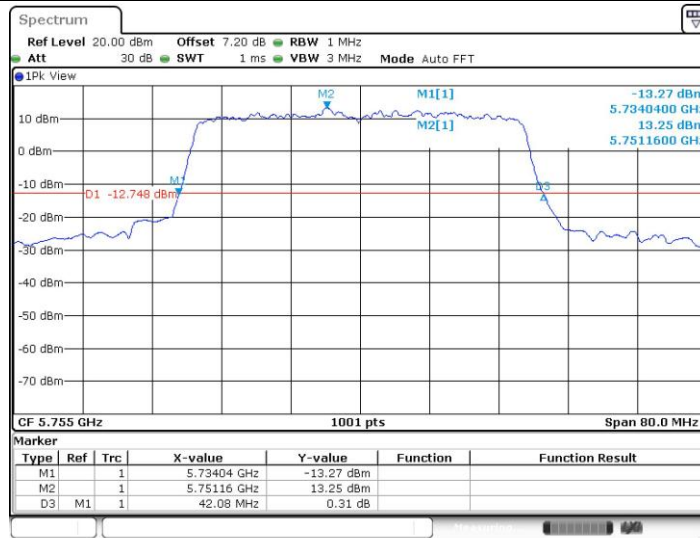
11AX40MIMO_Ant1_5755



Date: 8 SEP 2021 06:37:26

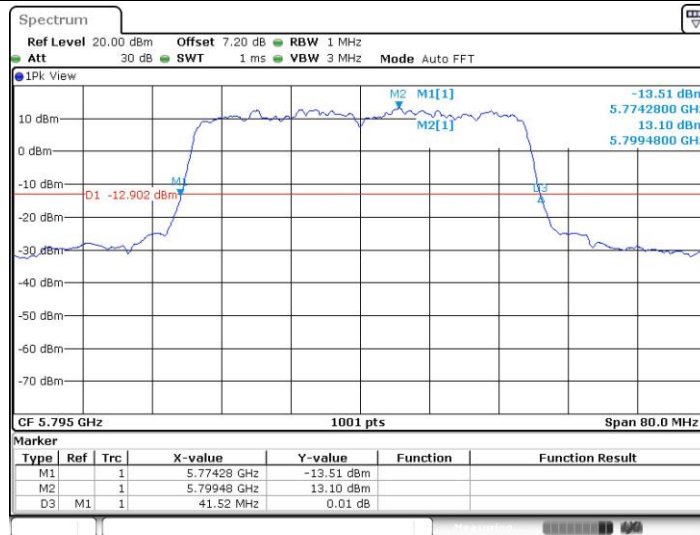


11AX40MIMO_Ant2_5755



Date: 8 SEP 2021 06:39:38

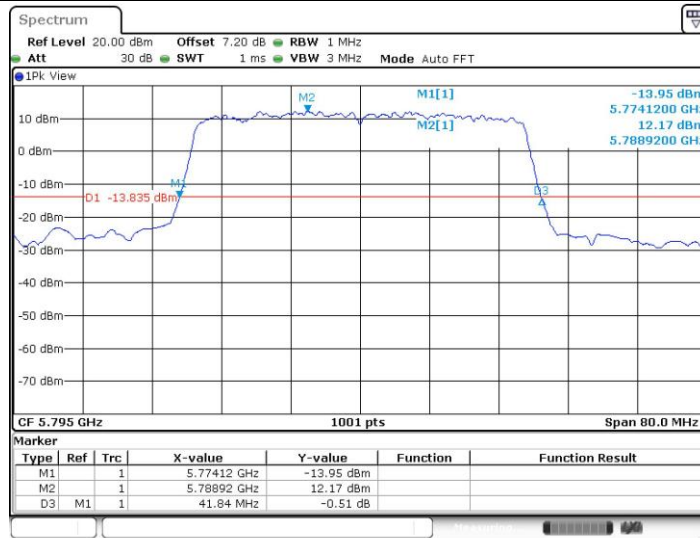
11AX40MIMO_Ant1_5795



Date: 8 SEP 2021 06:41:38

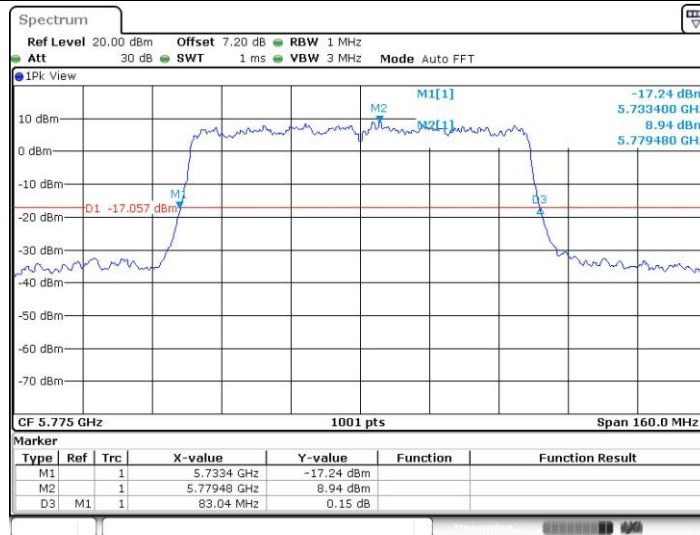


11AX40MIMO_Ant2_5795

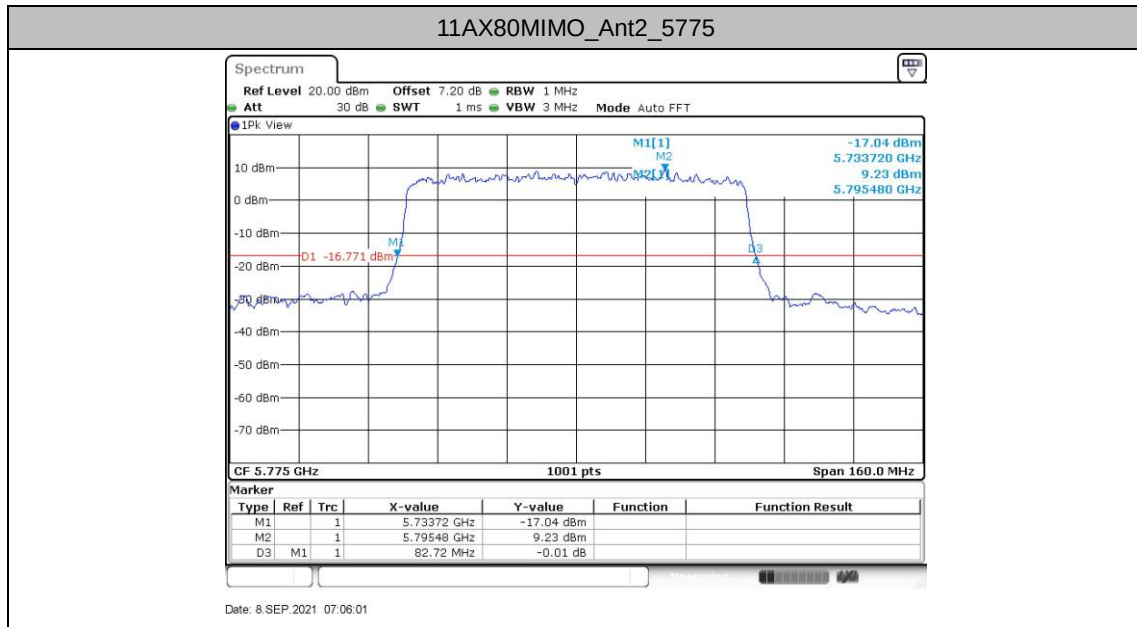


Date: 8 SEP 2021 06:43:17

11AX80MIMO_Ant1_5775



Date: 8 SEP 2021 07:03:59



Occupied channel bandwidth Test Result

TestMode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5745	17.183	5736.409	5753.591	---	---
	Ant2	5745	17.303	5736.329	5753.631	---	---
	Ant1	5785	17.183	5776.369	5793.551	---	---
	Ant2	5785	17.223	5776.369	5793.591	---	---
	Ant1	5825	17.063	5816.528	5833.591	---	---
	Ant2	5825	17.263	5816.249	5833.511	---	---
11AX20MIMO	Ant1	5745	19.221	5735.410	5754.630	---	---
	Ant2	5745	19.341	5735.330	5754.670	---	---
	Ant1	5785	19.221	5775.450	5794.670	---	---
	Ant2	5785	19.7	5775.170	5794.870	---	---
	Ant1	5825	19.221	5815.370	5834.590	---	---
	Ant2	5825	19.54	5815.250	5834.790	---	---
11AX40MIMO	Ant1	5755	37.802	5736.059	5773.861	---	---
	Ant2	5755	38.042	5735.899	5773.941	---	---
	Ant1	5795	37.802	5776.059	5813.861	---	---
	Ant2	5795	38.042	5775.899	5813.941	---	---
11AX80MIMO	Ant1	5775	76.883	5736.638	5813.521	---	---
	Ant2	5775	77.043	5736.479	5813.521	---	---

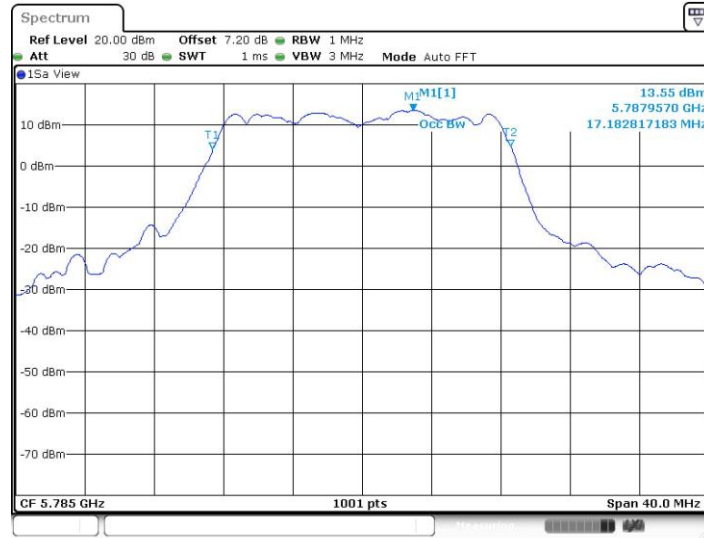


Test Graphs





11A-CDD_Ant1_5785



Date: 8 SEP 2021 21:18:21

11A-CDD_Ant2_5785



Date: 8 SEP 2021 21:19:19





11AX20MIMO_Ant1_5745



Date: 8 SEP 2021 05:28:49

11AX20MIMO_Ant2_5745



Date: 8 SEP 2021 05:30:48

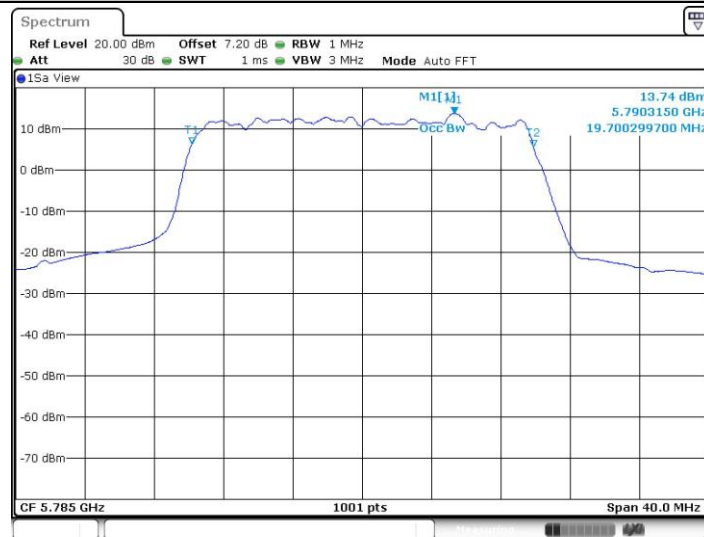


11AX20MIMO_Ant1_5785



Date: 8 SEP 2021 05:33:25

11AX20MIMO_Ant2_5785



Date: 8 SEP 2021 05:35:37



11AX20MIMO_Ant1_5825



Date: 8 SEP 2021 05:37:58

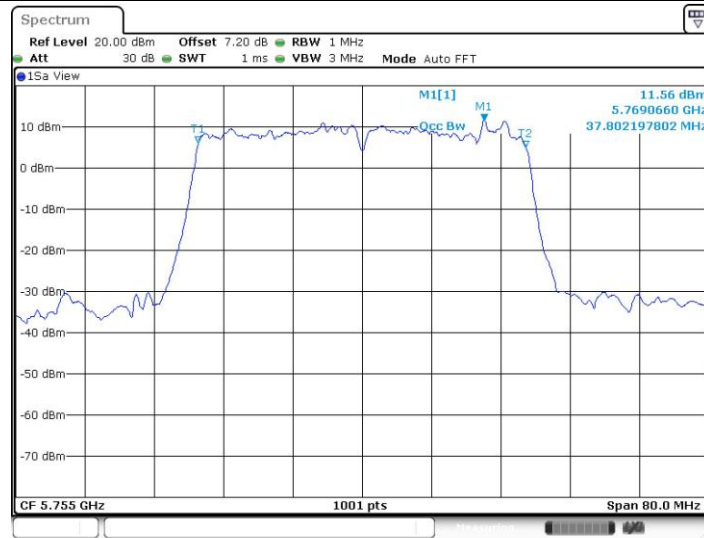
11AX20MIMO_Ant2_5825



Date: 8 SEP 2021 05:39:51

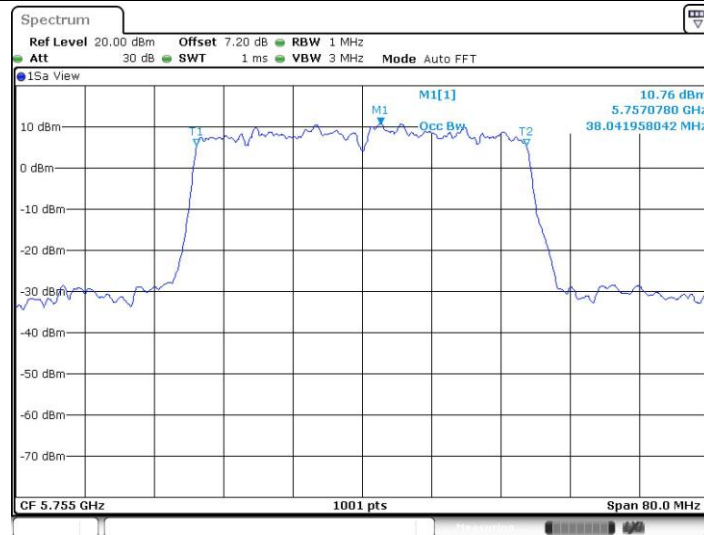


11AX40MIMO_Ant1_5755



Date: 8 SEP 2021 06:37:45

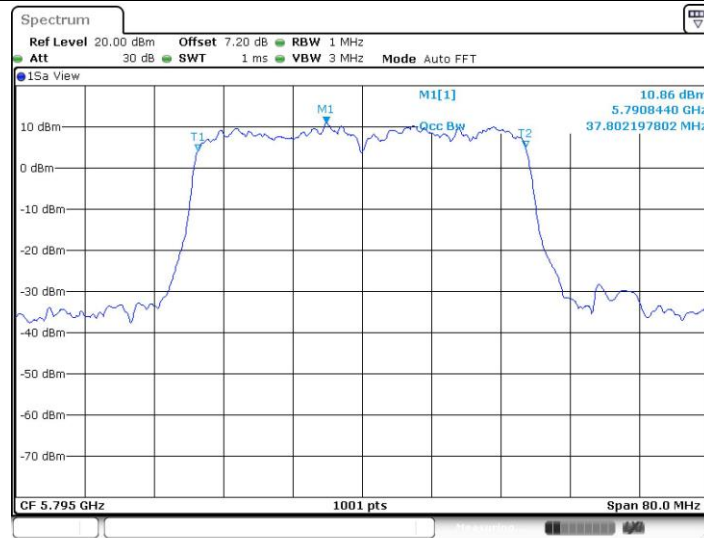
11AX40MIMO_Ant2_5755



Date: 8 SEP 2021 06:39:58

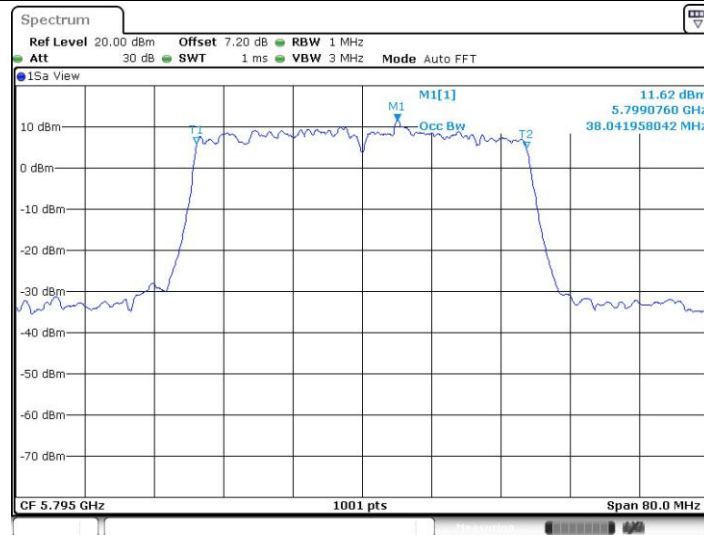


11AX40MIMO_Ant1_5795



Date: 8 SEP 2021 06:41:58

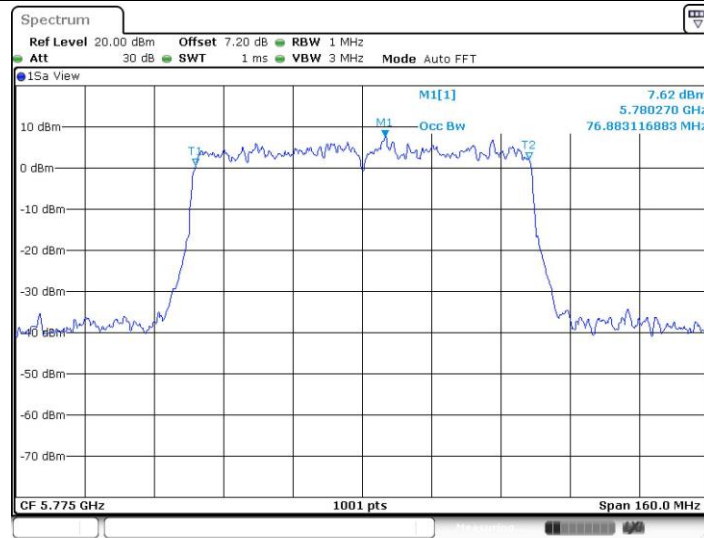
11AX40MIMO_Ant2_5795



Date: 8 SEP 2021 06:43:37

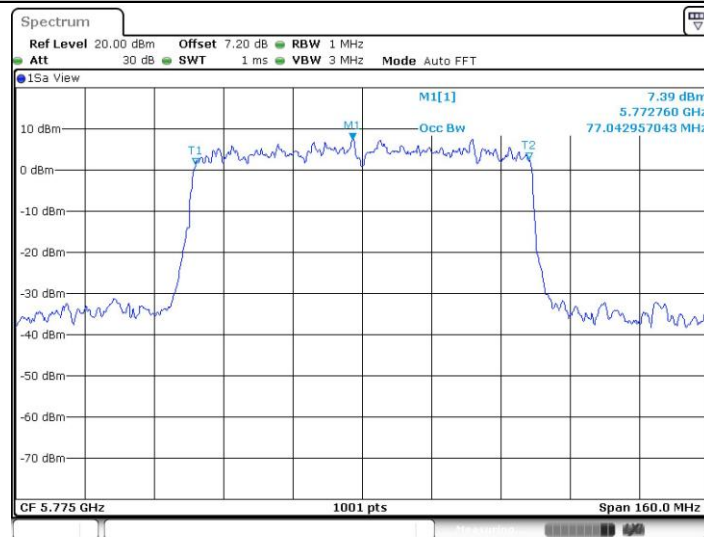


11AX80MIMO_Ant1_5775



Date: 8 SEP 2021 07:04:19

11AX80MIMO_Ant2_5775



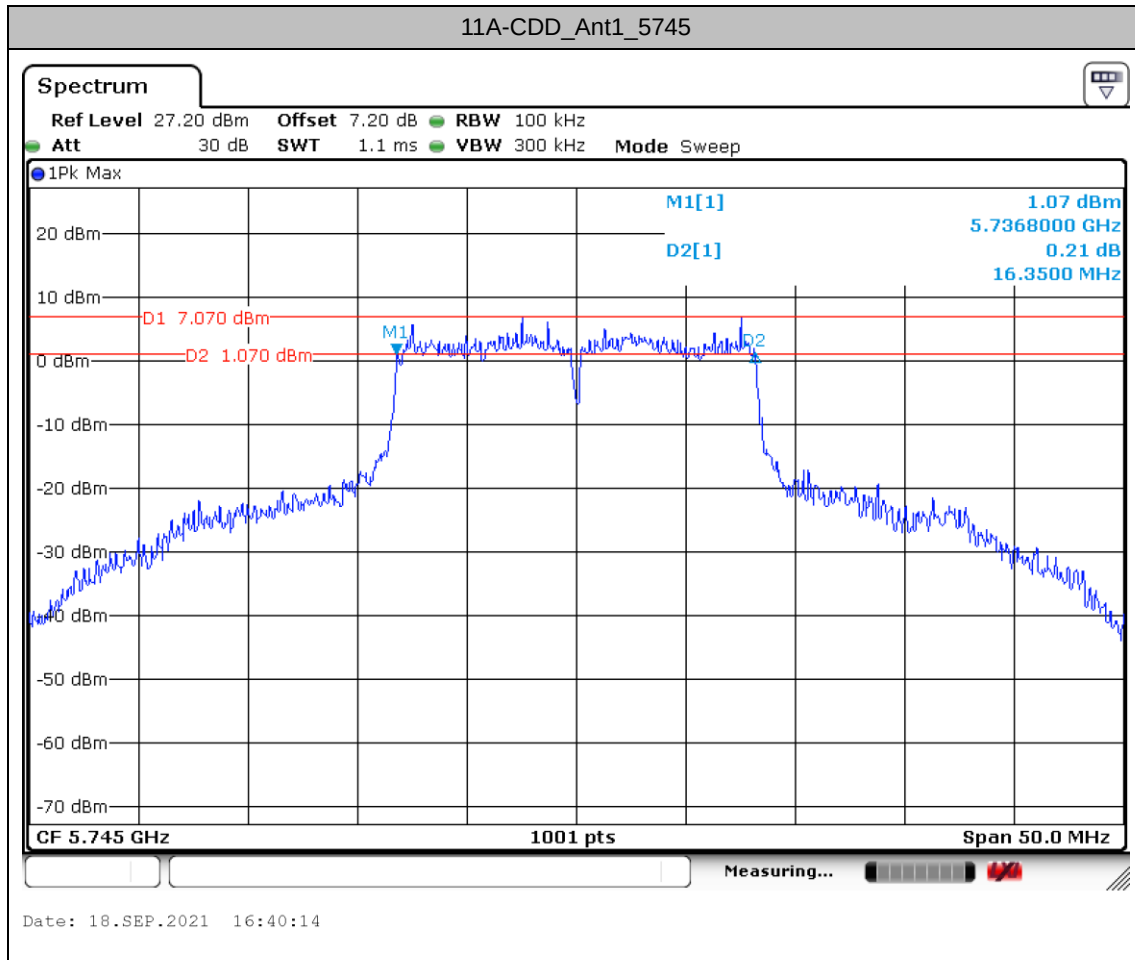
Date: 8 SEP 2021 07:06:21

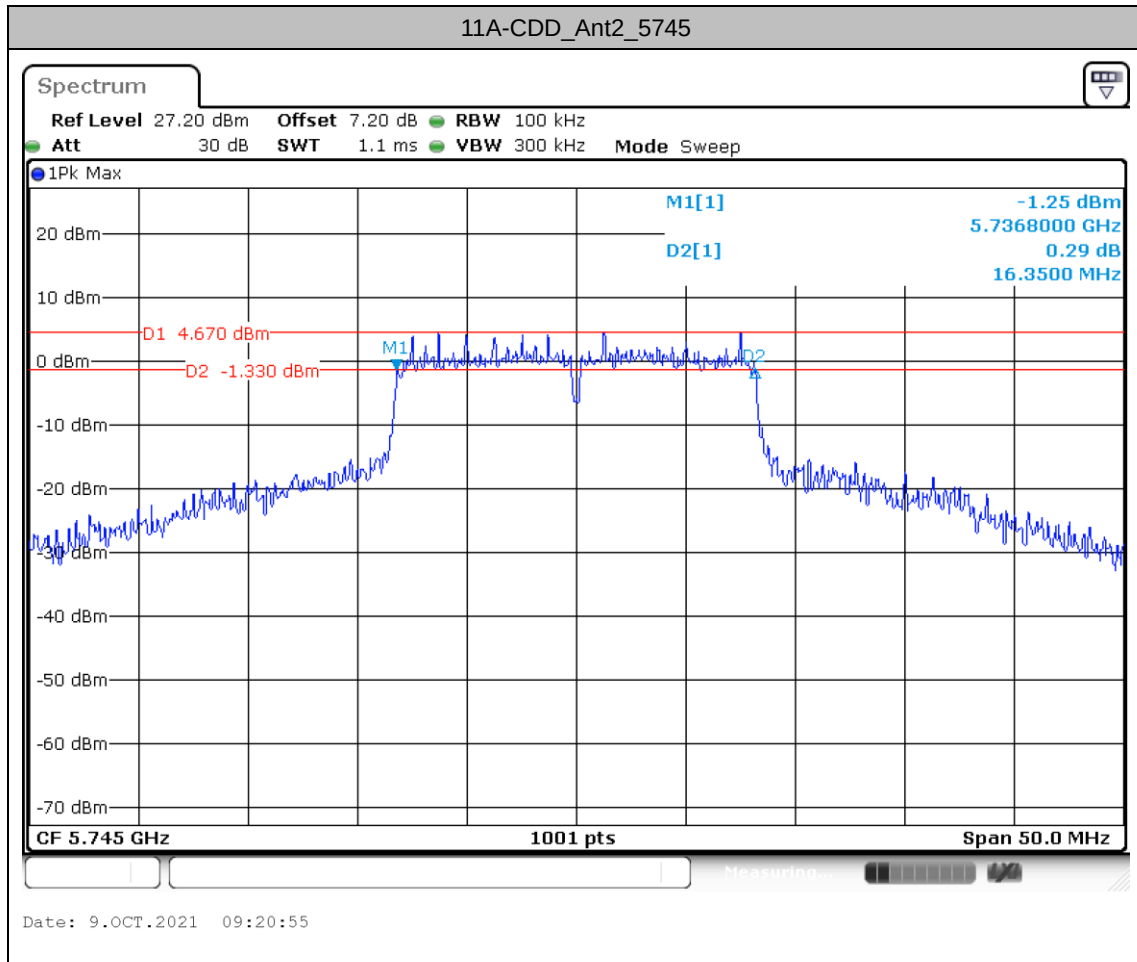
**6DB emission bandwidth Test Result**

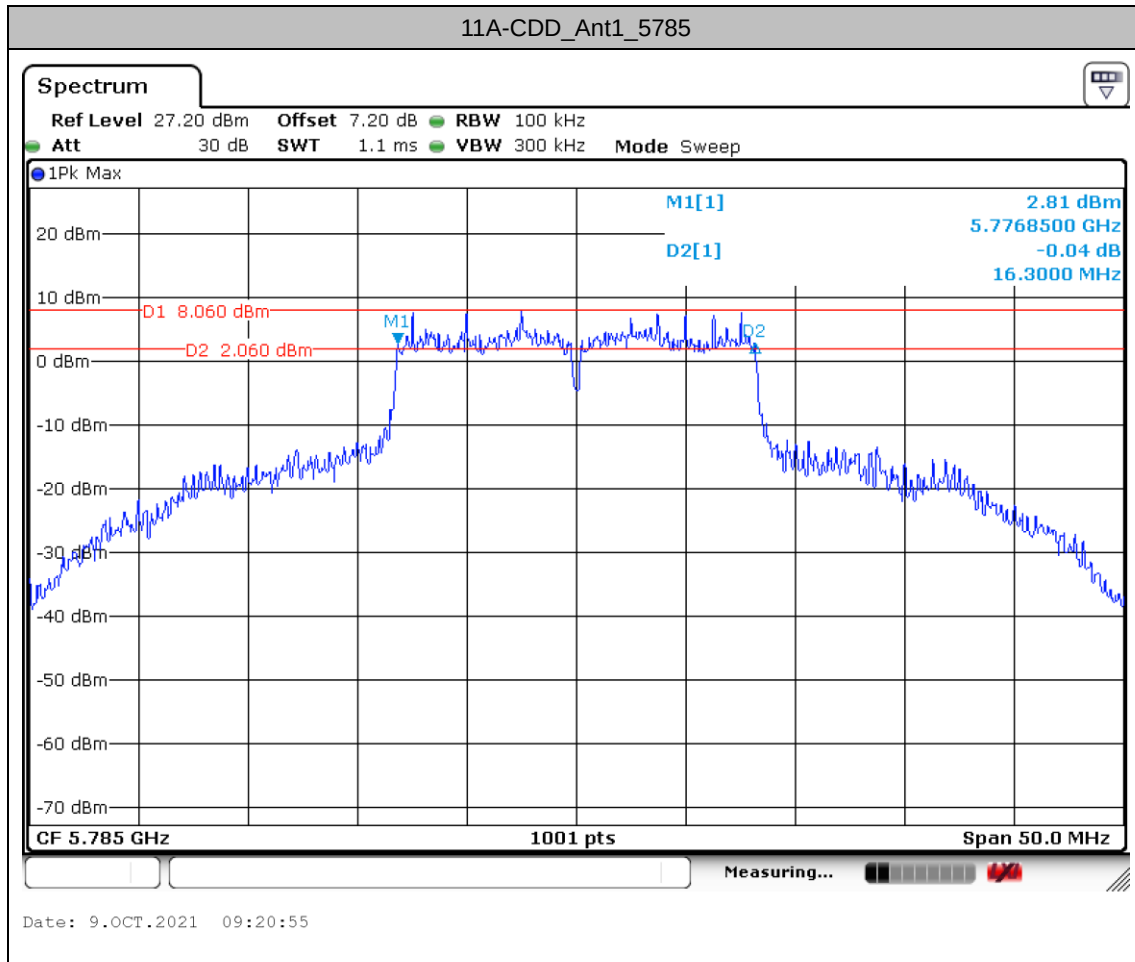
TestMode	Antenna	Frequency [MHz]	6db EBW [MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5745	16.3500	0.5	PASS
	Ant2	5745	16.3500	0.5	PASS
	Ant1	5785	16.3000	0.5	PASS
	Ant2	5785	16.3000	0.5	PASS
	Ant1	5825	16.3000	0.5	PASS
	Ant2	5825	16.2500	0.5	PASS
11AX20MIMO	Ant1	5745	18.3500	0.5	PASS
	Ant2	5745	18.5500	0.5	PASS
	Ant1	5785	18.6000	0.5	PASS
	Ant2	5785	18.8000	0.5	PASS
	Ant1	5825	18.6000	0.5	PASS
	Ant2	5825	18.7999	0.5	PASS
11AX40MIMO	Ant1	5755	36.9000	0.5	PASS
	Ant2	5755	37.4400	0.5	PASS
	Ant1	5795	37.6200	0.5	PASS
	Ant2	5795	37.8000	0.5	PASS
11AX80MIMO	Ant1	5775	76.960	0.5	PASS
	Ant2	5775	77.120	0.5	PASS

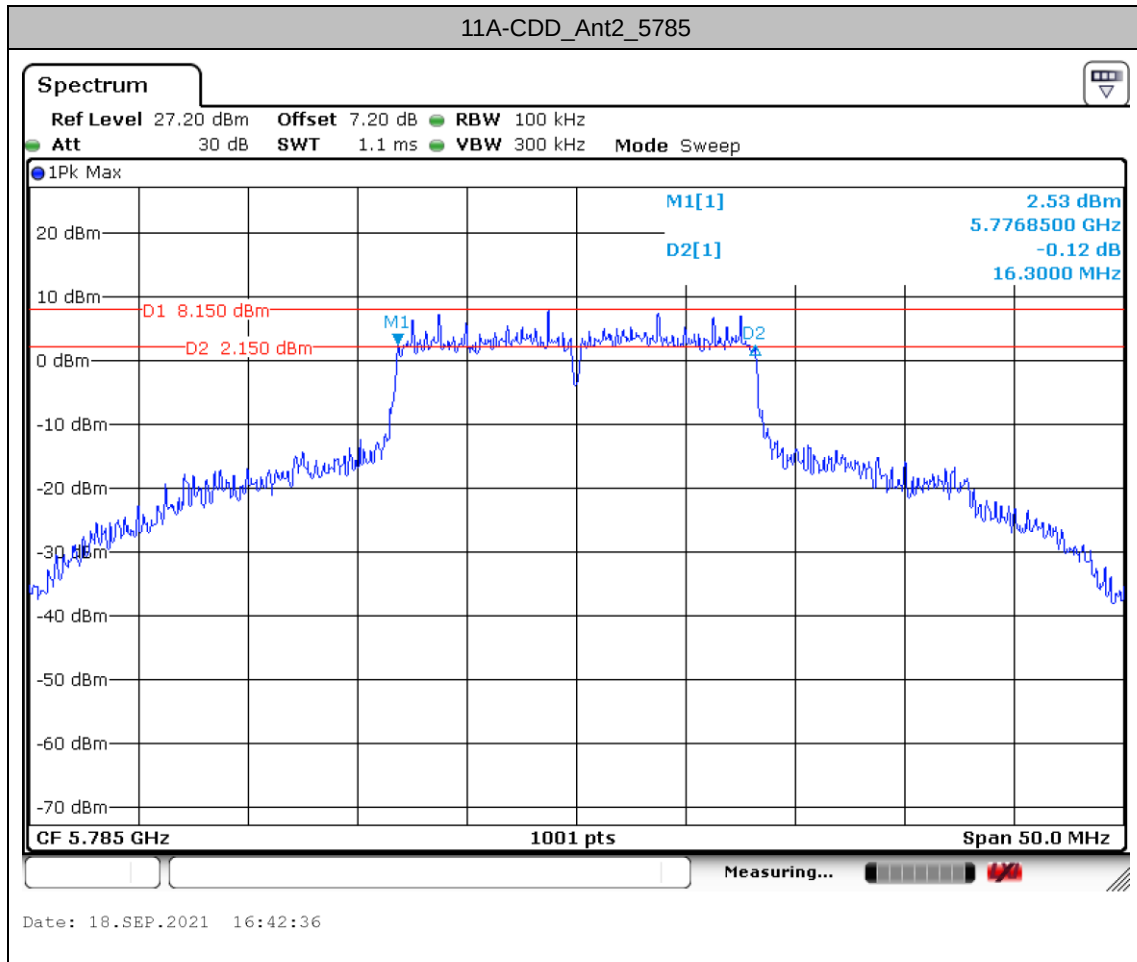


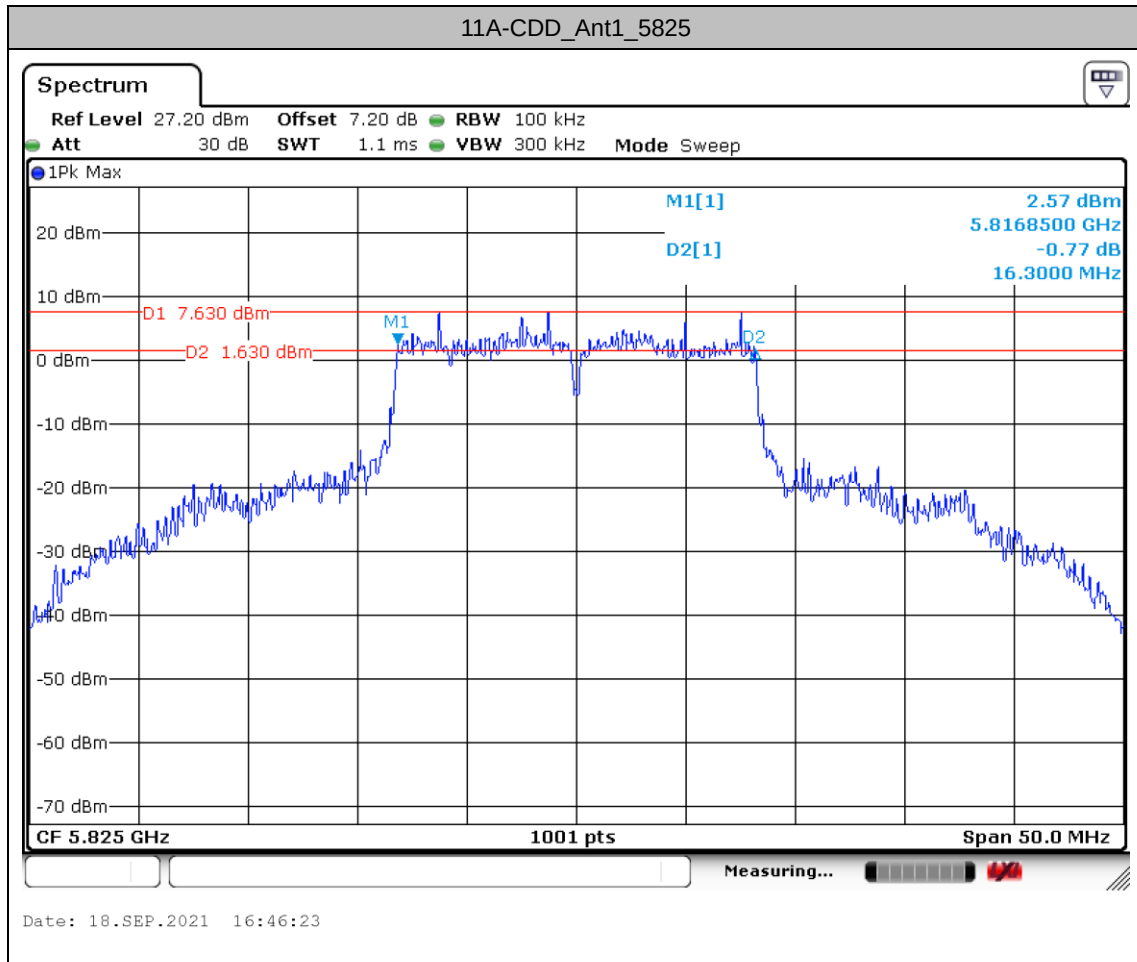
Test Graphs

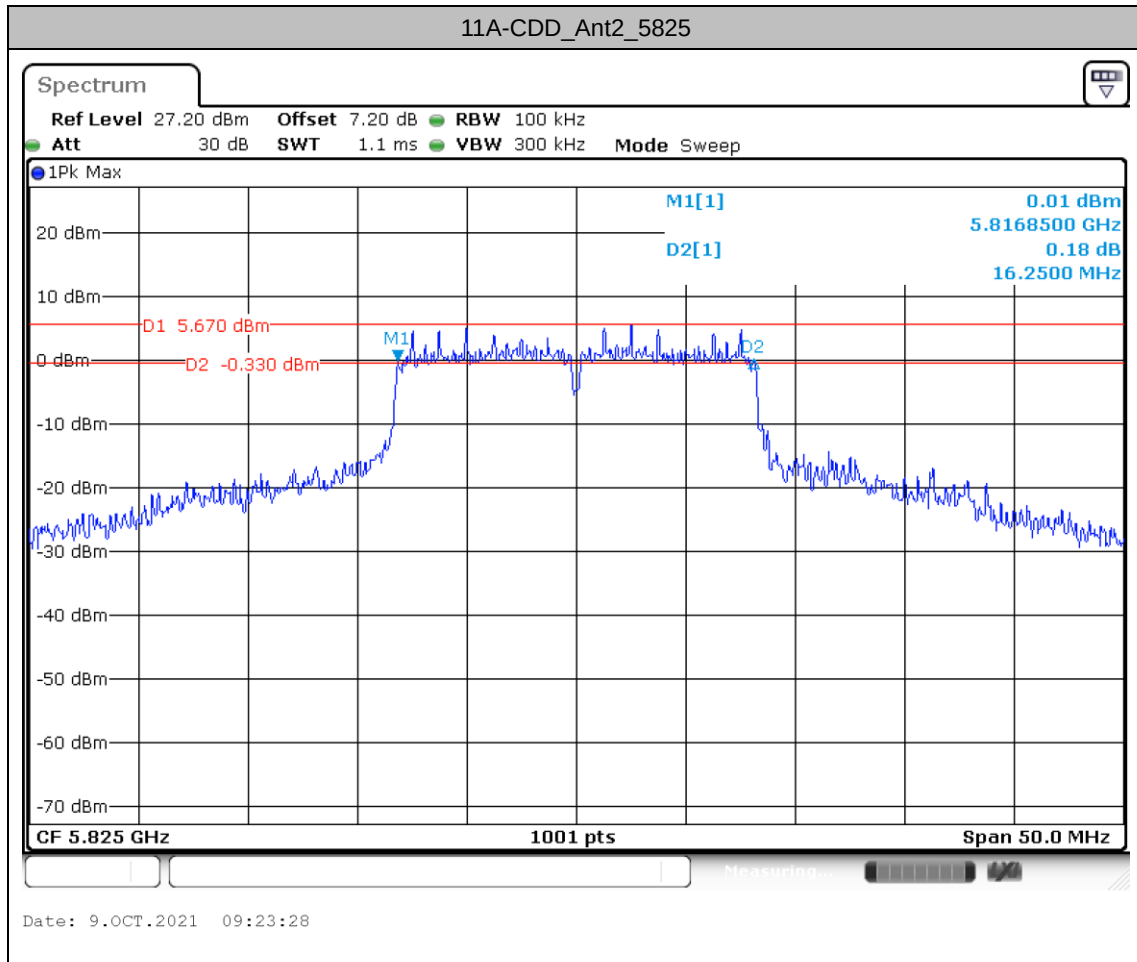


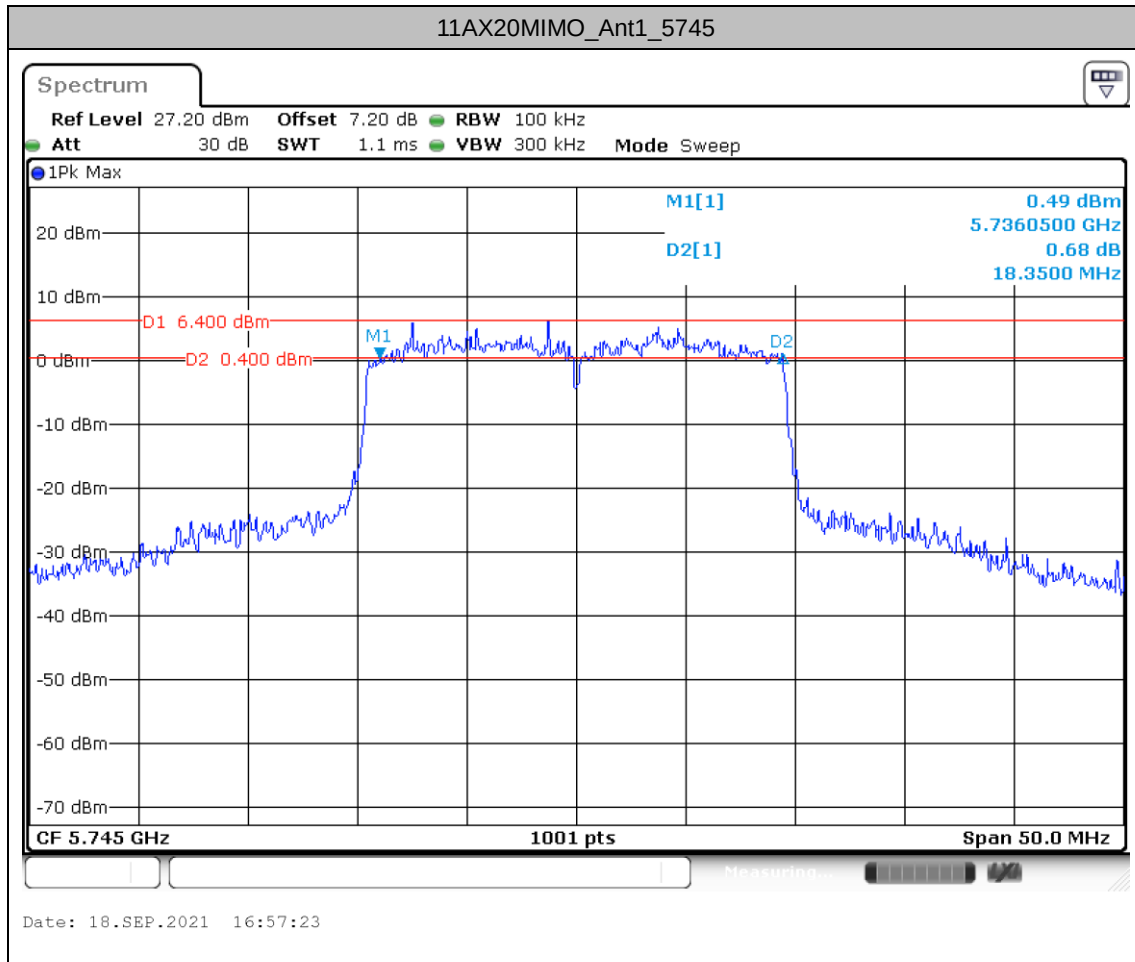


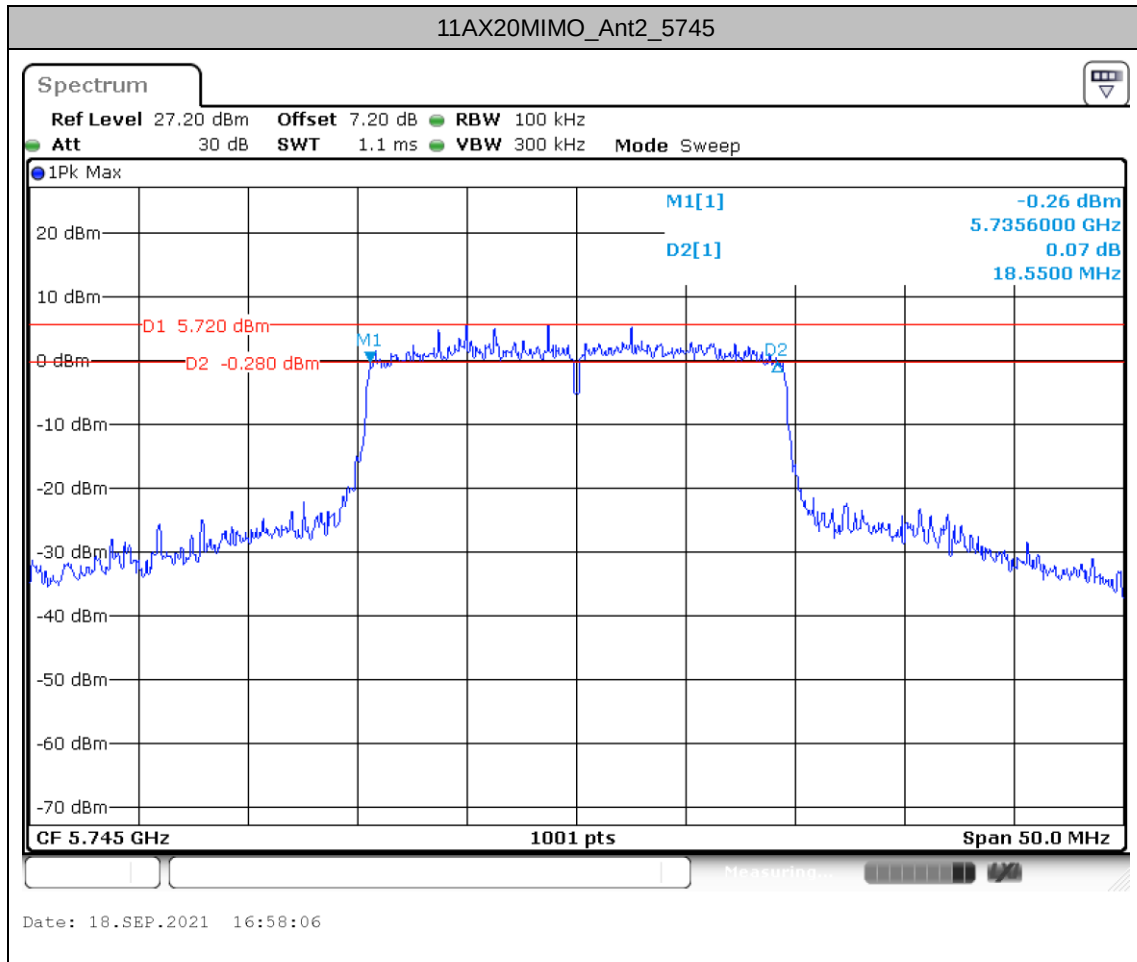


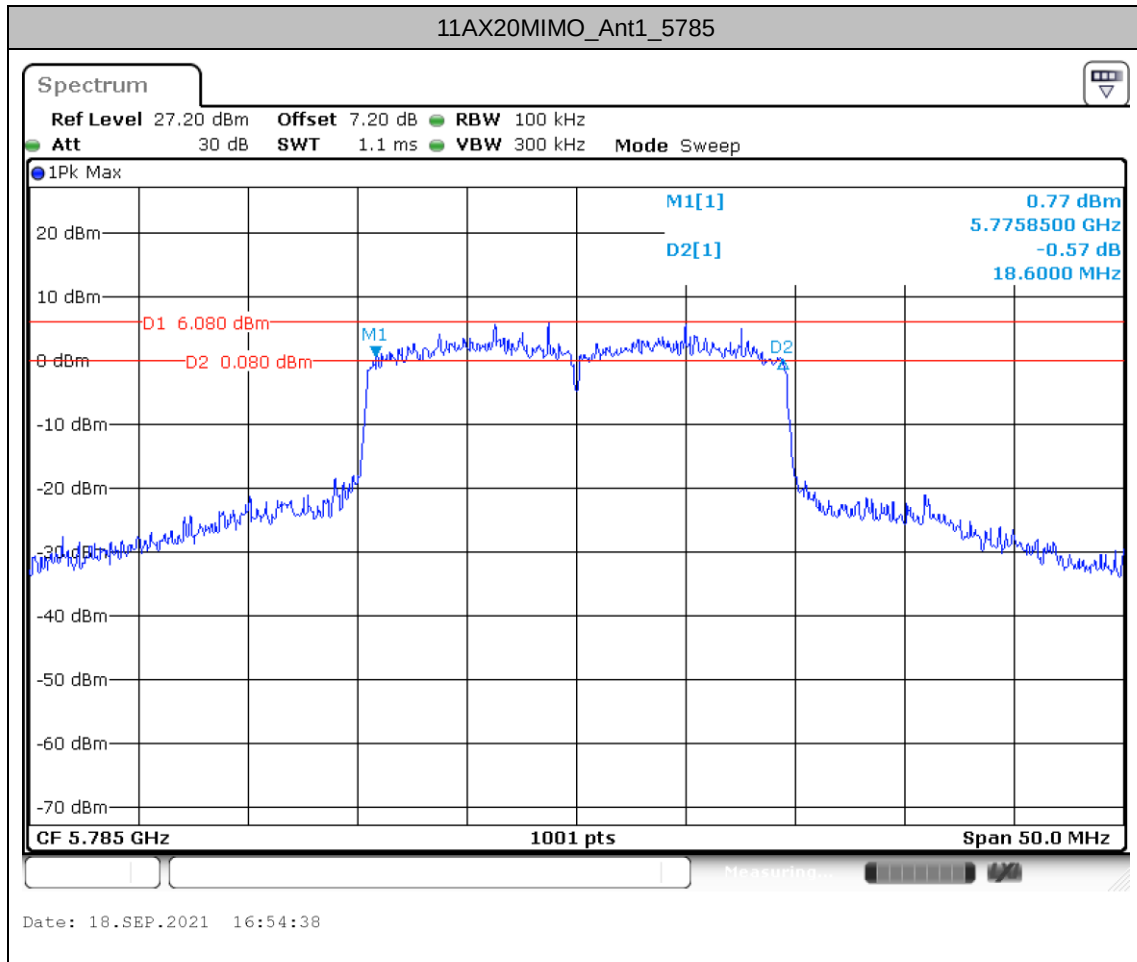


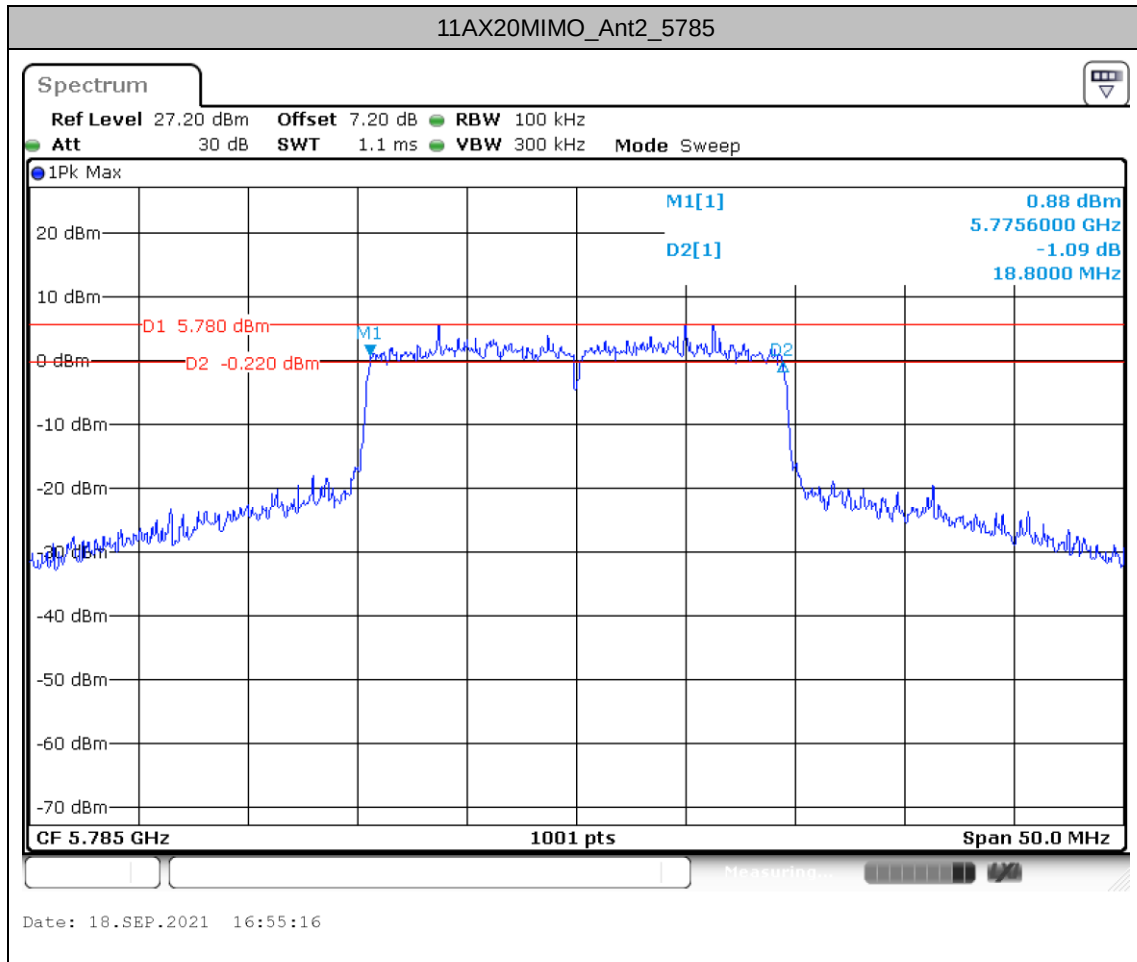


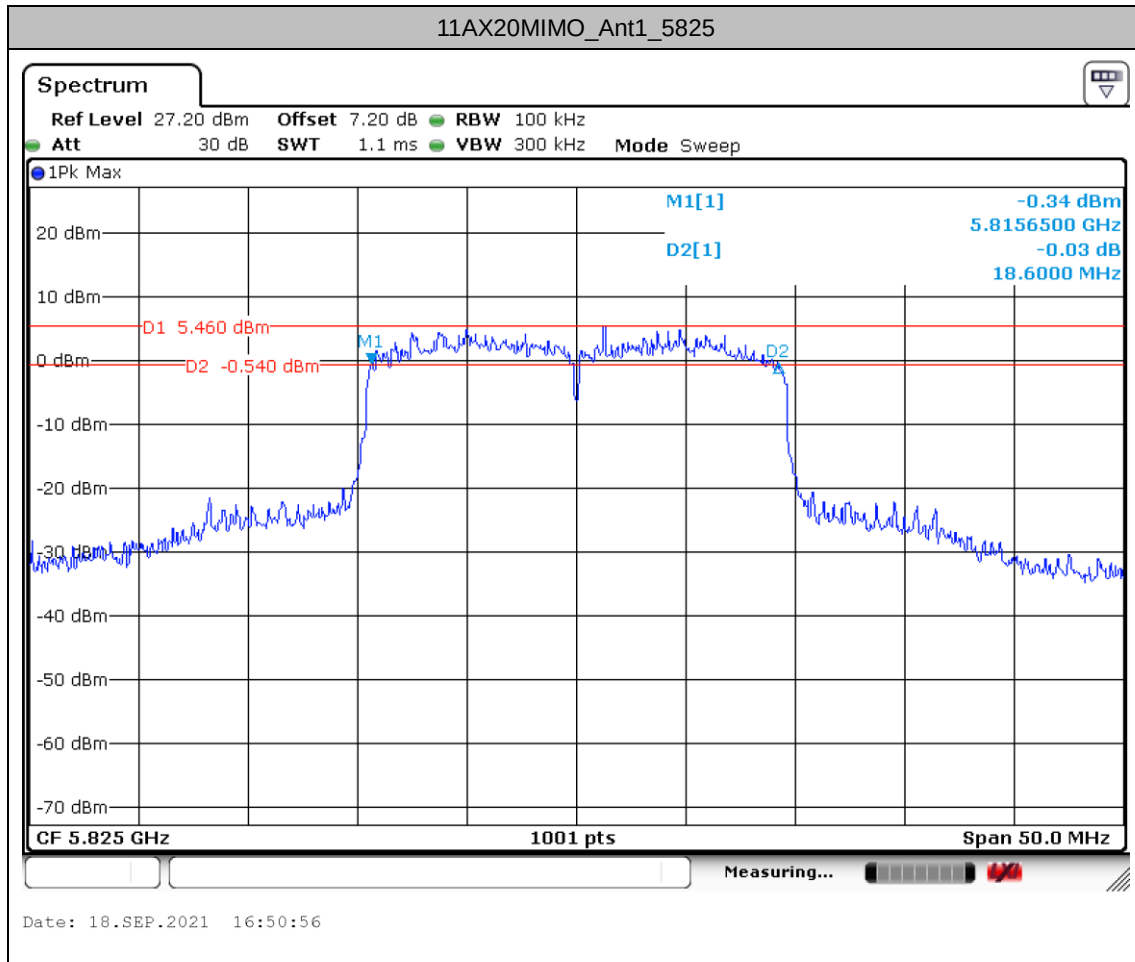


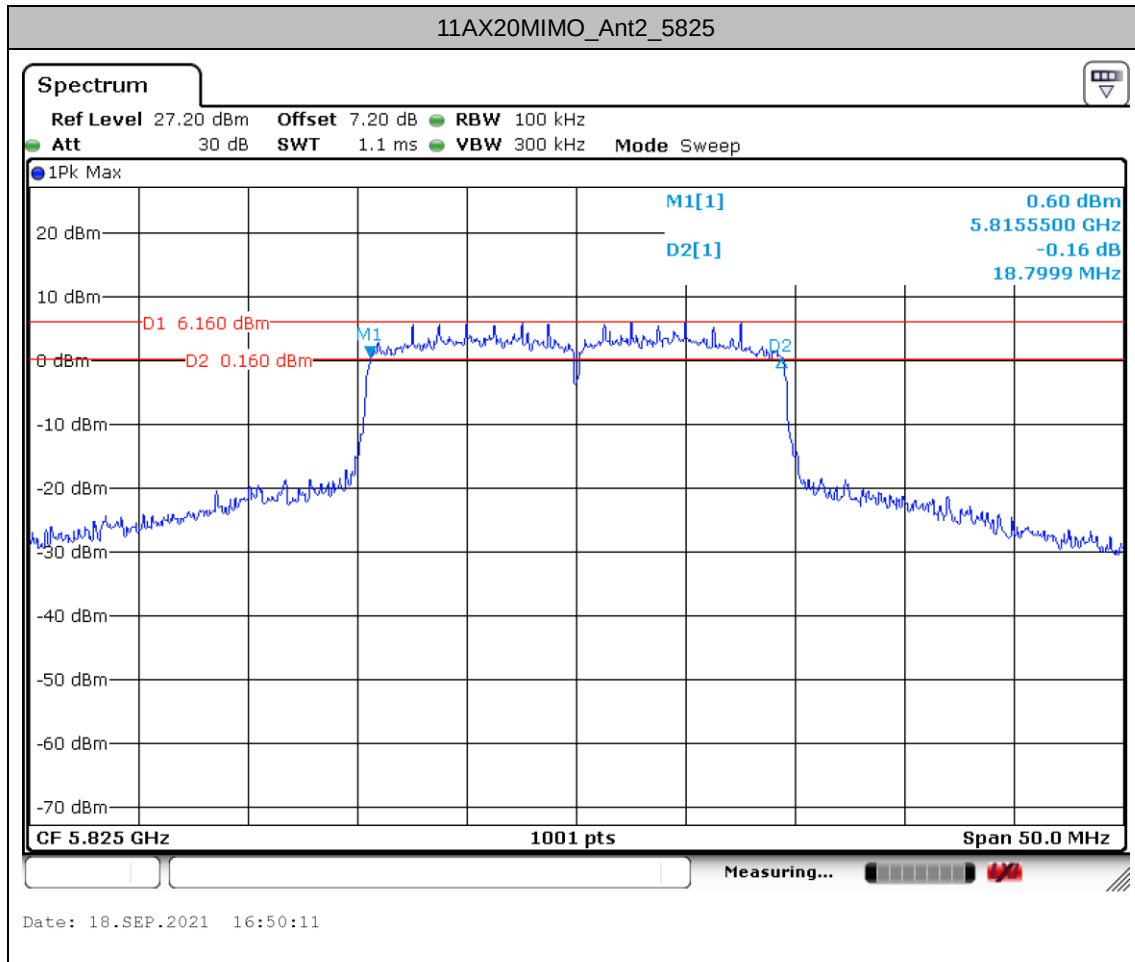


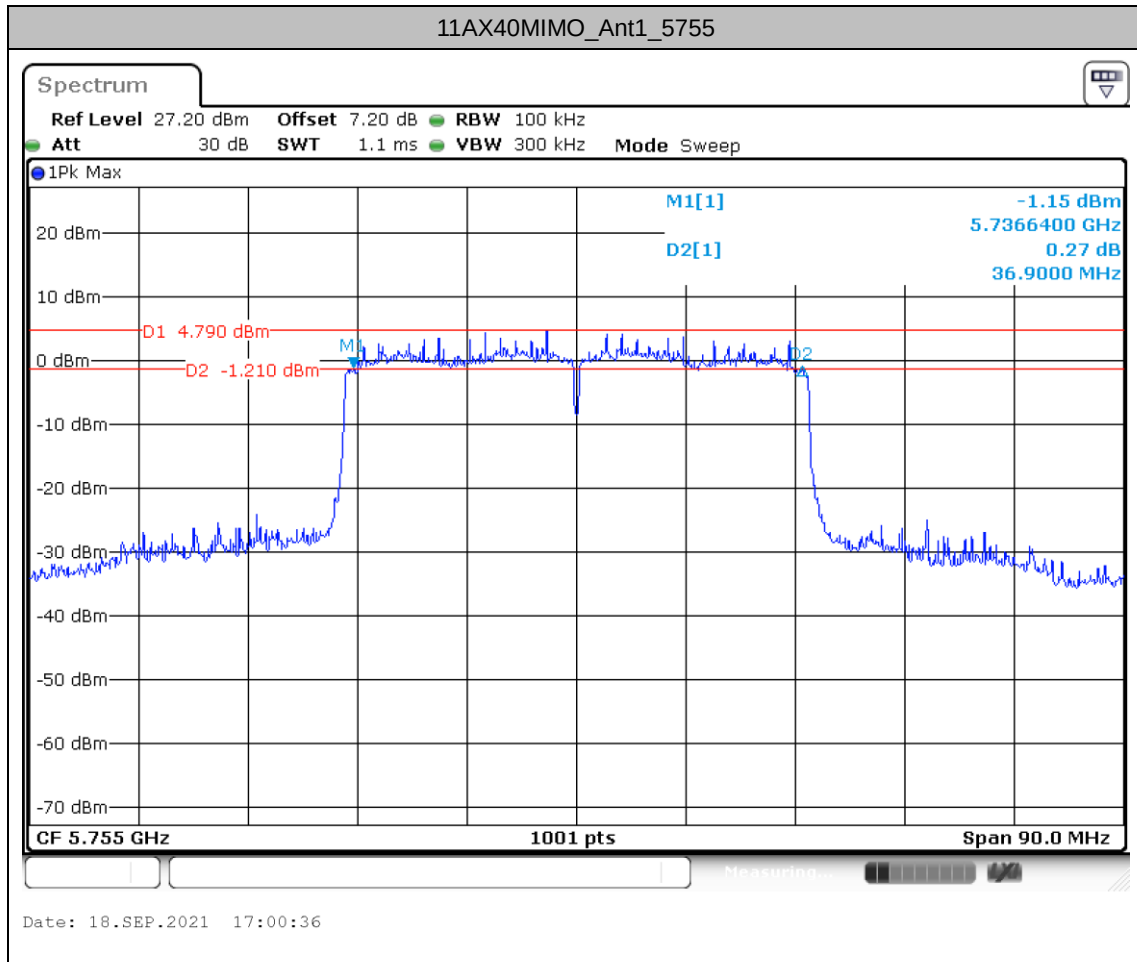


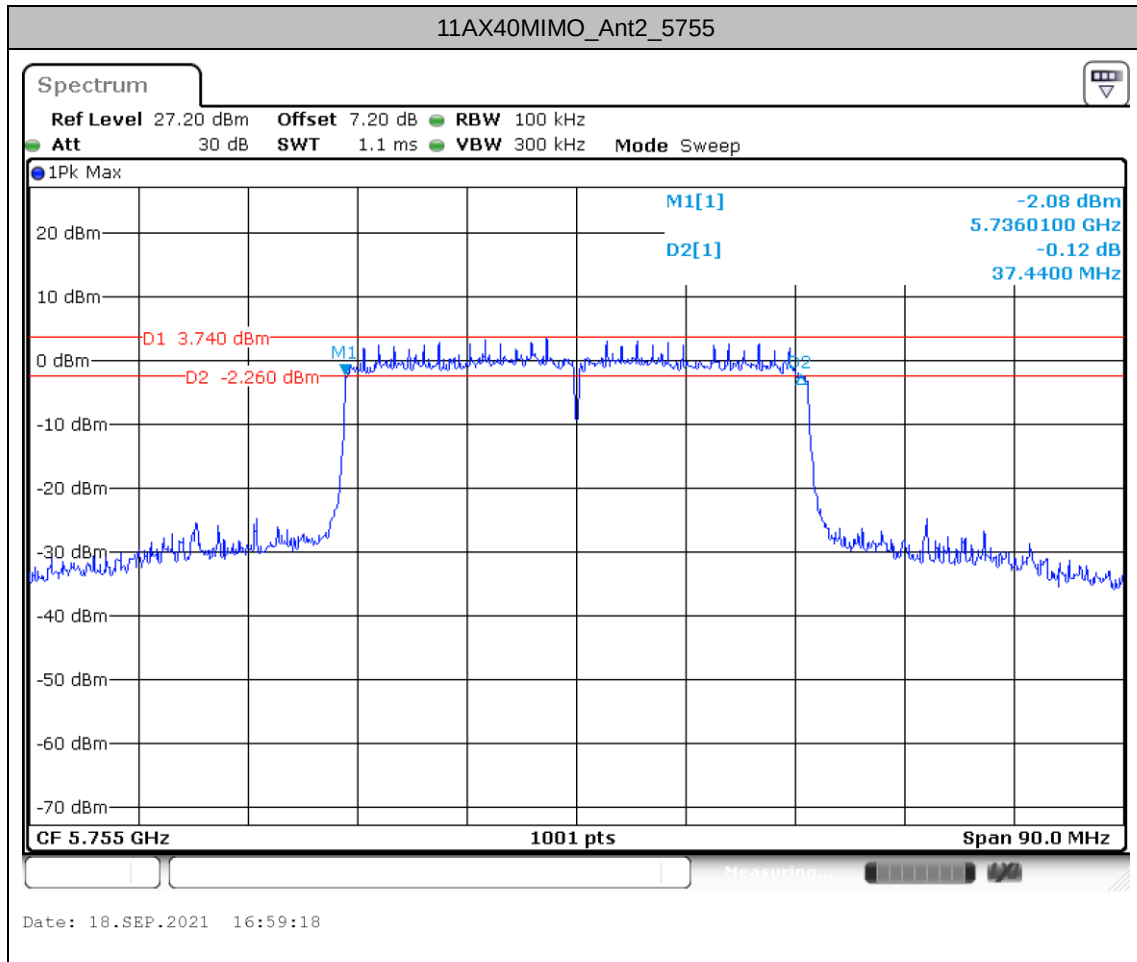


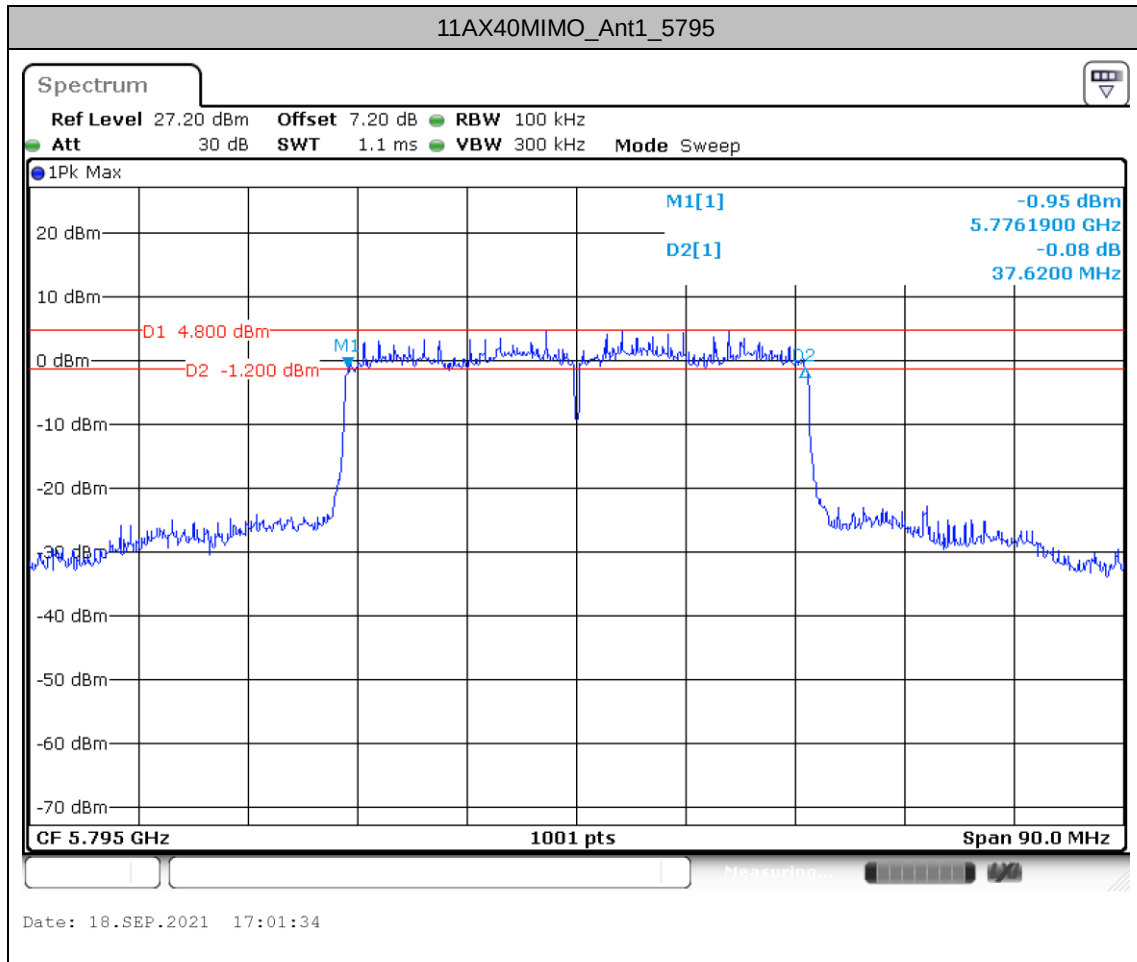


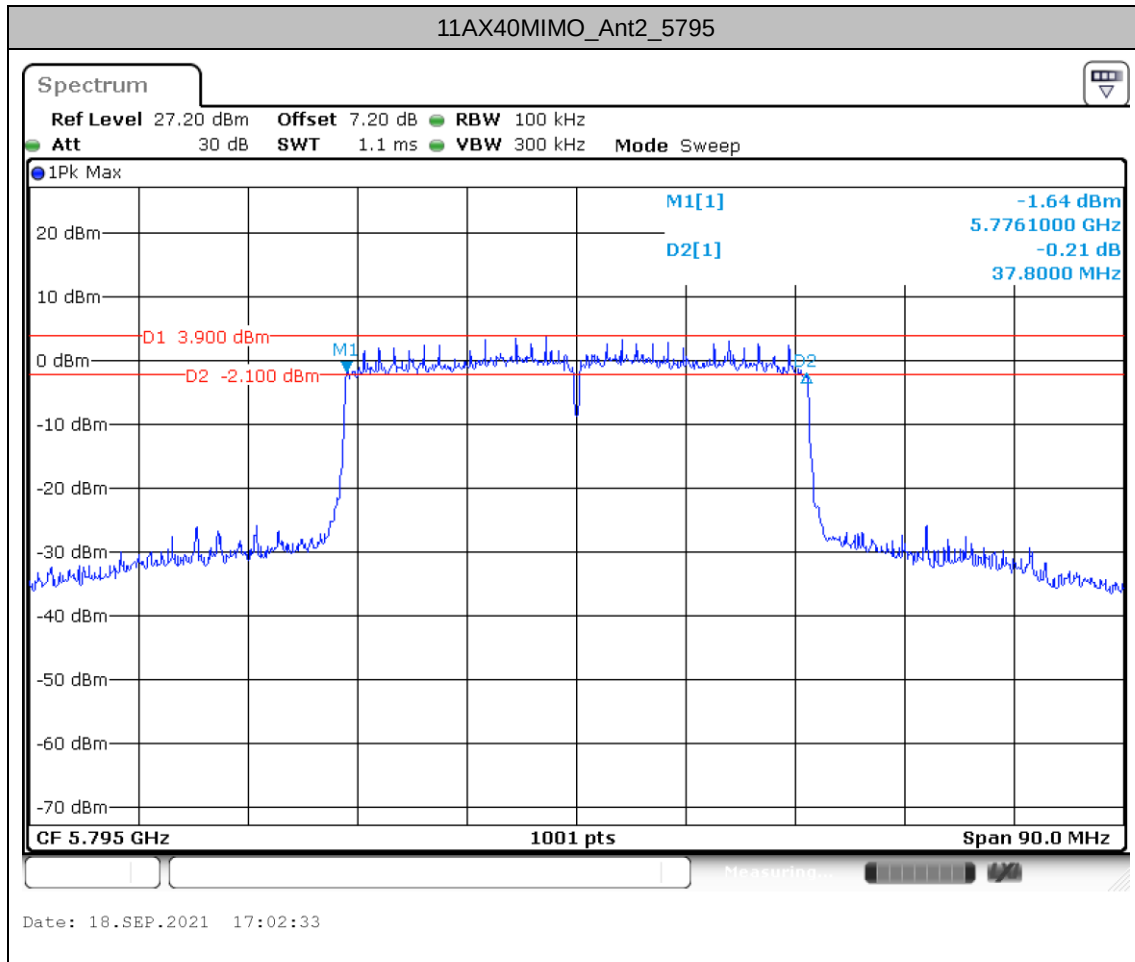


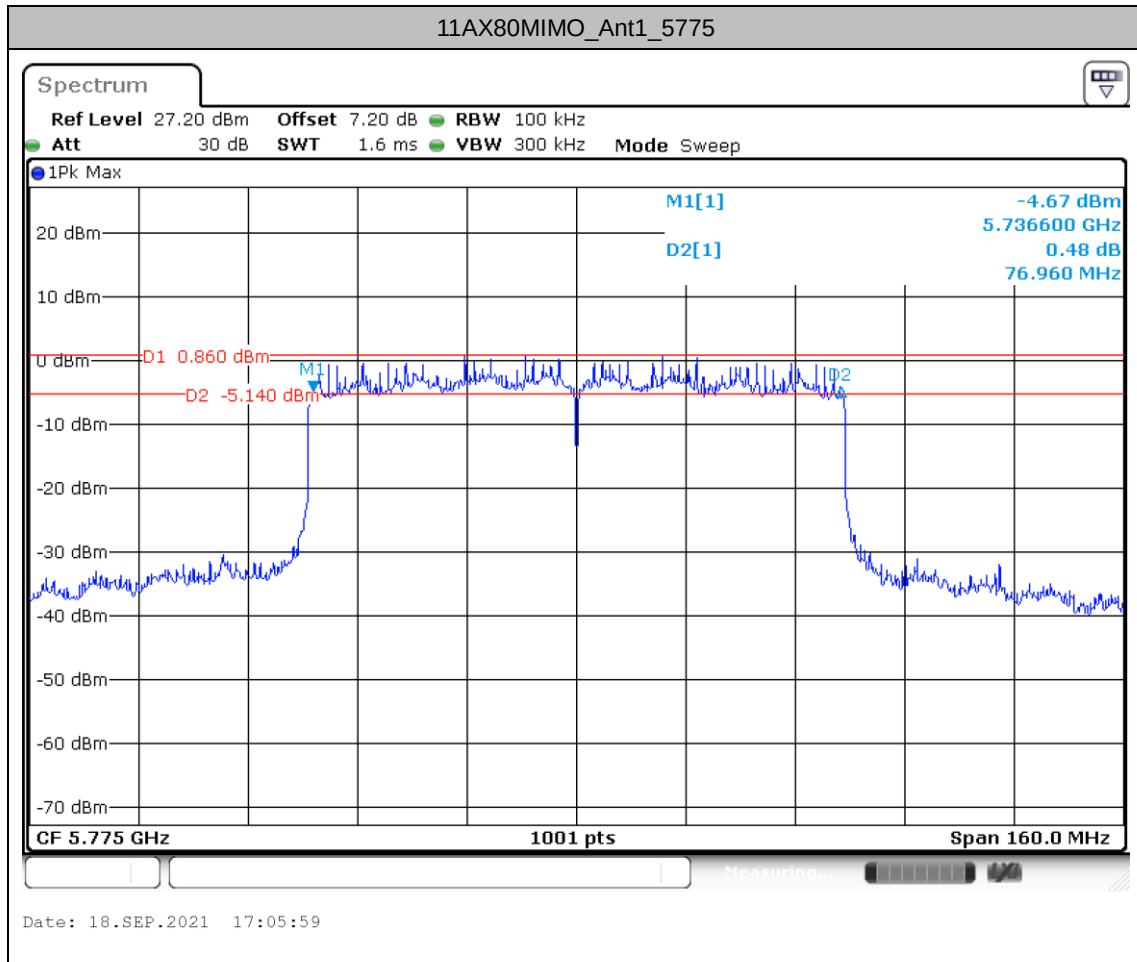


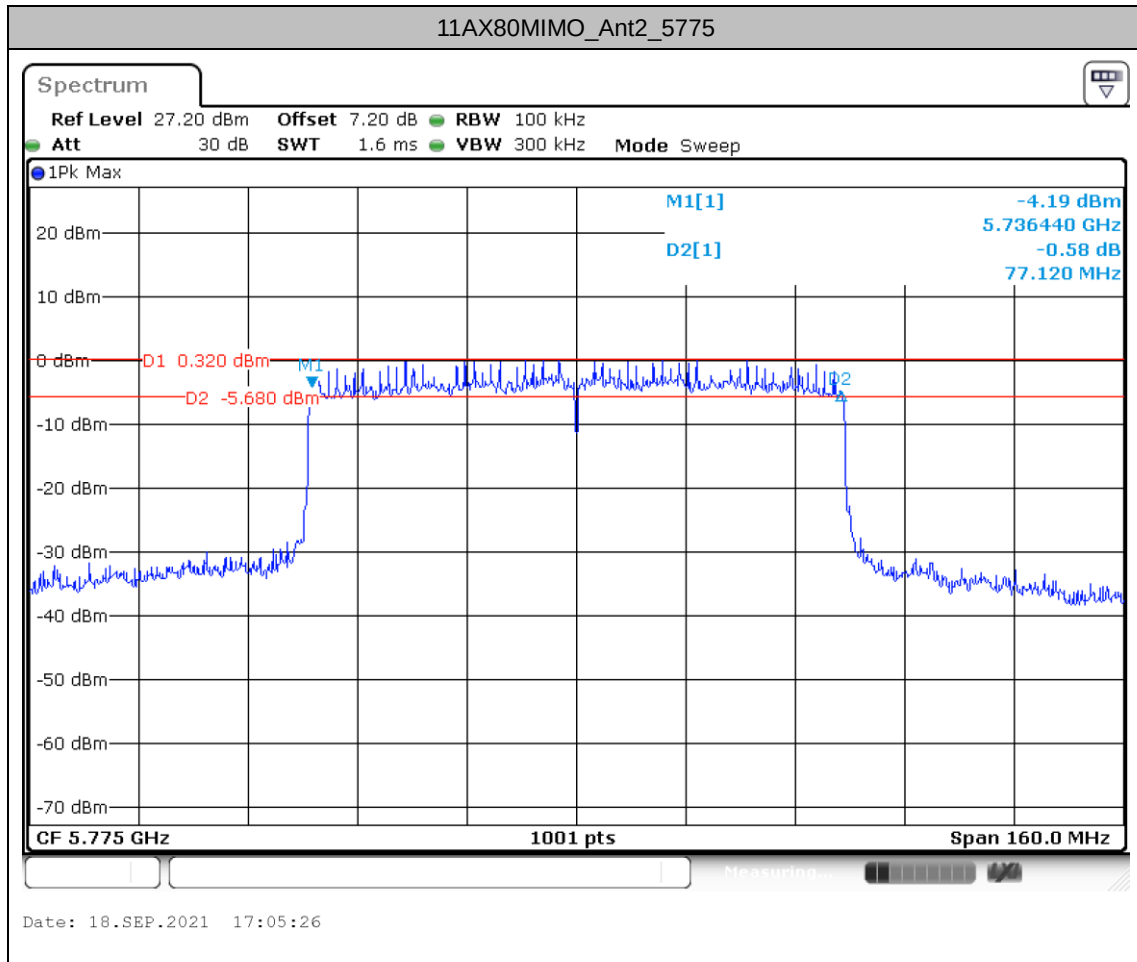










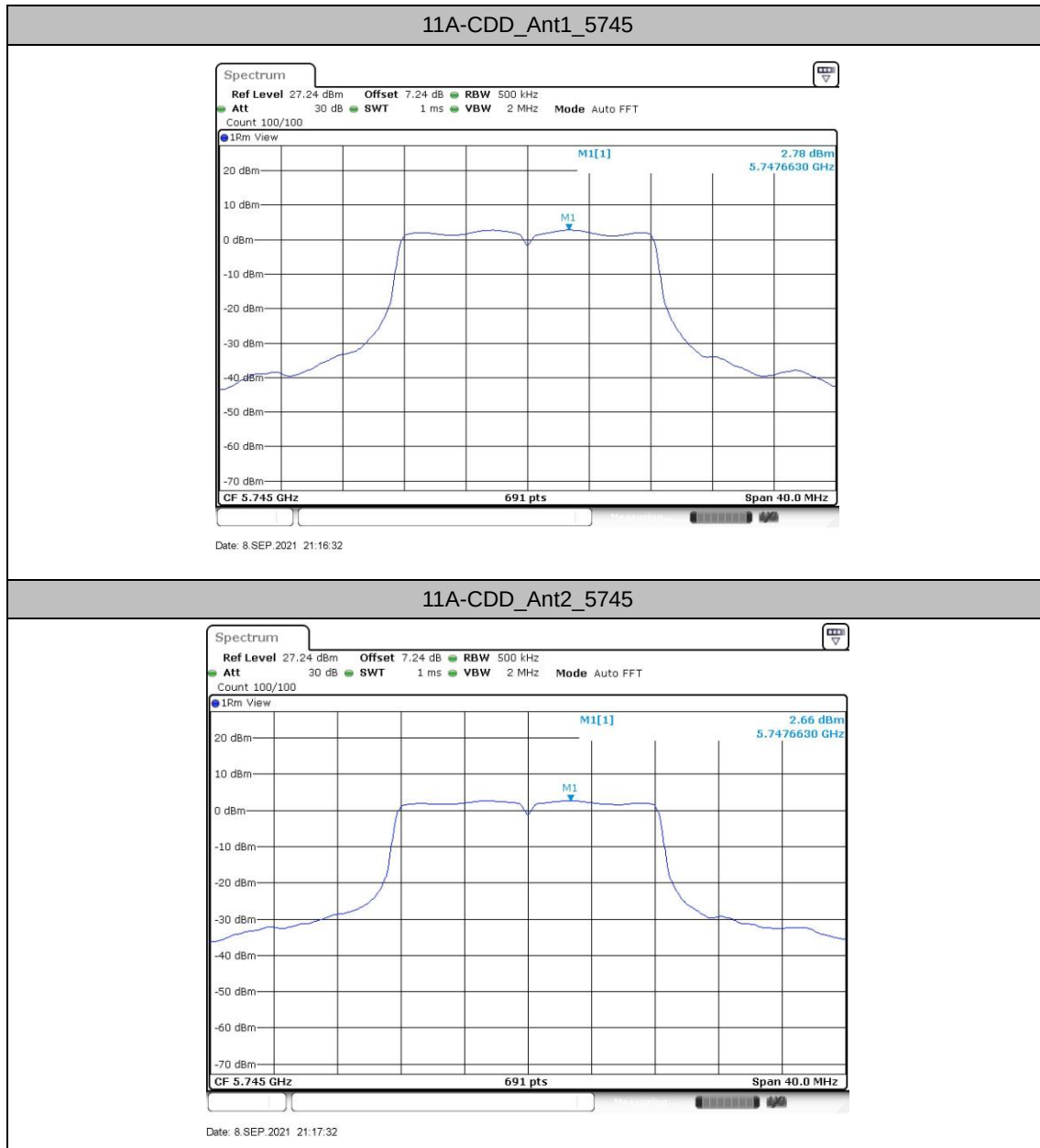


**Maximum power spectral density Test Result**

TestMode	Antenna	Frequency [MHz]	Result [dBm/500kHz]	Limit [dBm/500KHz]	Verdict
11A-CDD	Ant1	5745	2.78	≤30	PASS
	Ant2	5745	2.66	≤30	PASS
	total	5745	5.73	≤30	PASS
	Ant1	5785	2.81	≤30	PASS
	Ant2	5785	2.62	≤30	PASS
	total	5785	5.73	≤30	PASS
	Ant1	5825	3.32	≤30	PASS
	Ant2	5825	2.94	≤30	PASS
	total	5825	6.14	≤30	PASS
11AX20MIMO	Ant1	5745	1.32	≤30	PASS
	Ant2	5745	0.21	≤30	PASS
	total	5745	3.81	≤30	PASS
	Ant1	5785	1.48	≤30	PASS
	Ant2	5785	1.38	≤30	PASS
	total	5785	4.44	≤30	PASS
	Ant1	5825	1.9	≤30	PASS
	Ant2	5825	0.68	≤30	PASS
	total	5825	4.34	≤30	PASS
11AX40MIMO	Ant1	5755	-1.1	≤30	PASS
	Ant2	5755	-2.09	≤30	PASS
	total	5755	1.44	≤30	PASS
	Ant1	5795	-1.36	≤30	PASS
	Ant2	5795	-2.16	≤30	PASS
	total	5795	1.27	≤30	PASS
11AX80MIMO	Ant1	5775	-5.33	≤30	PASS
	Ant2	5775	-5.42	≤30	PASS
	total	5775	-2.36	≤30	PASS

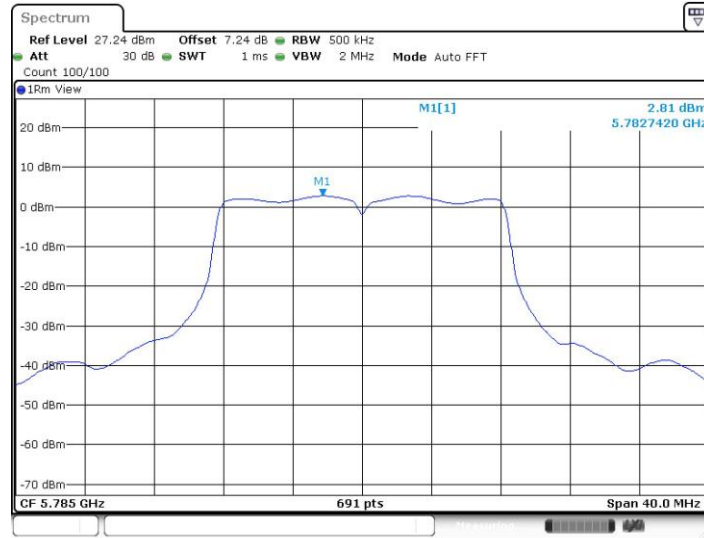


Test Graphs



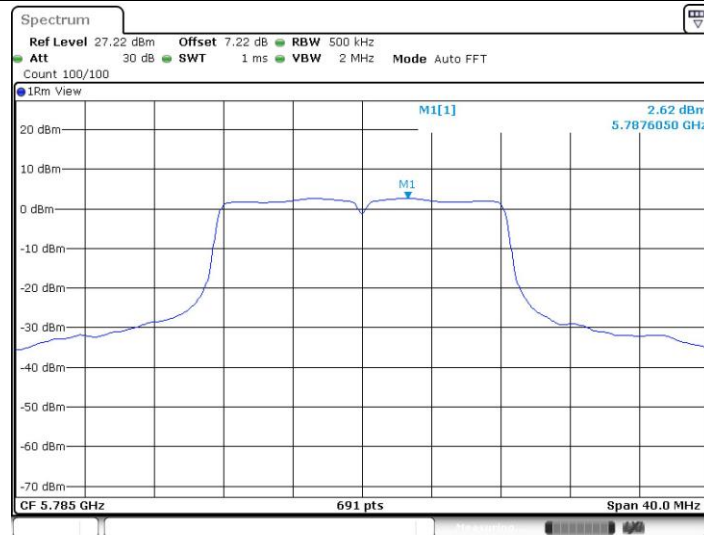


11A-CDD_Ant1_5785



Date: 8 SEP 2021 21:18:39

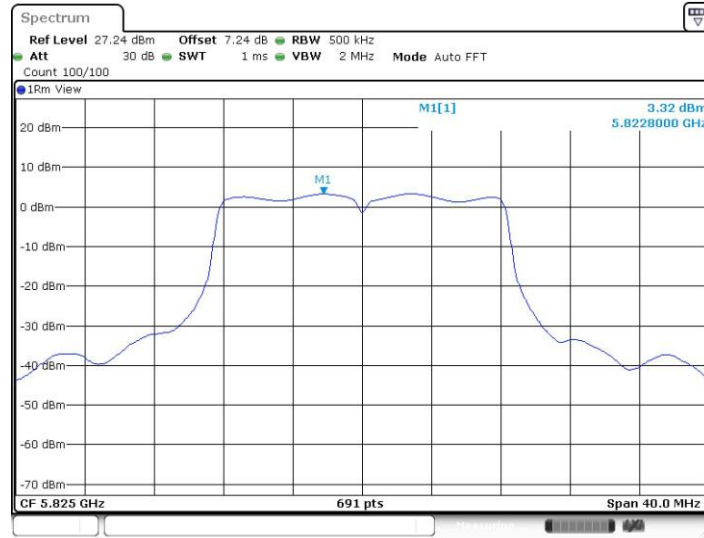
11A-CDD_Ant2_5785



Date: 8 SEP 2021 21:19:38



11A-CDD_Ant1_5825



Date: 8 SEP 2021 21:21:12

11A-CDD_Ant2_5825



Date: 8 SEP 2021 21:22:12



11AX20MIMO_Ant1_5745



Date: 8 SEP 2021 05:29:07

11AX20MIMO_Ant2_5745



Date: 8 SEP 2021 05:31:06

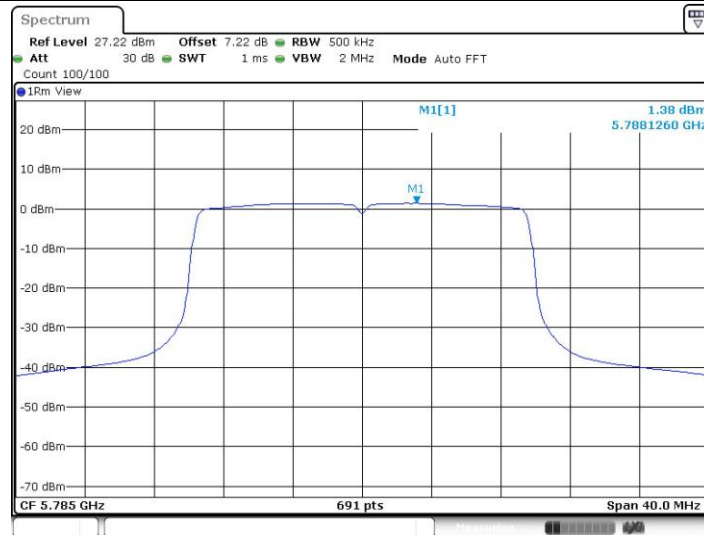


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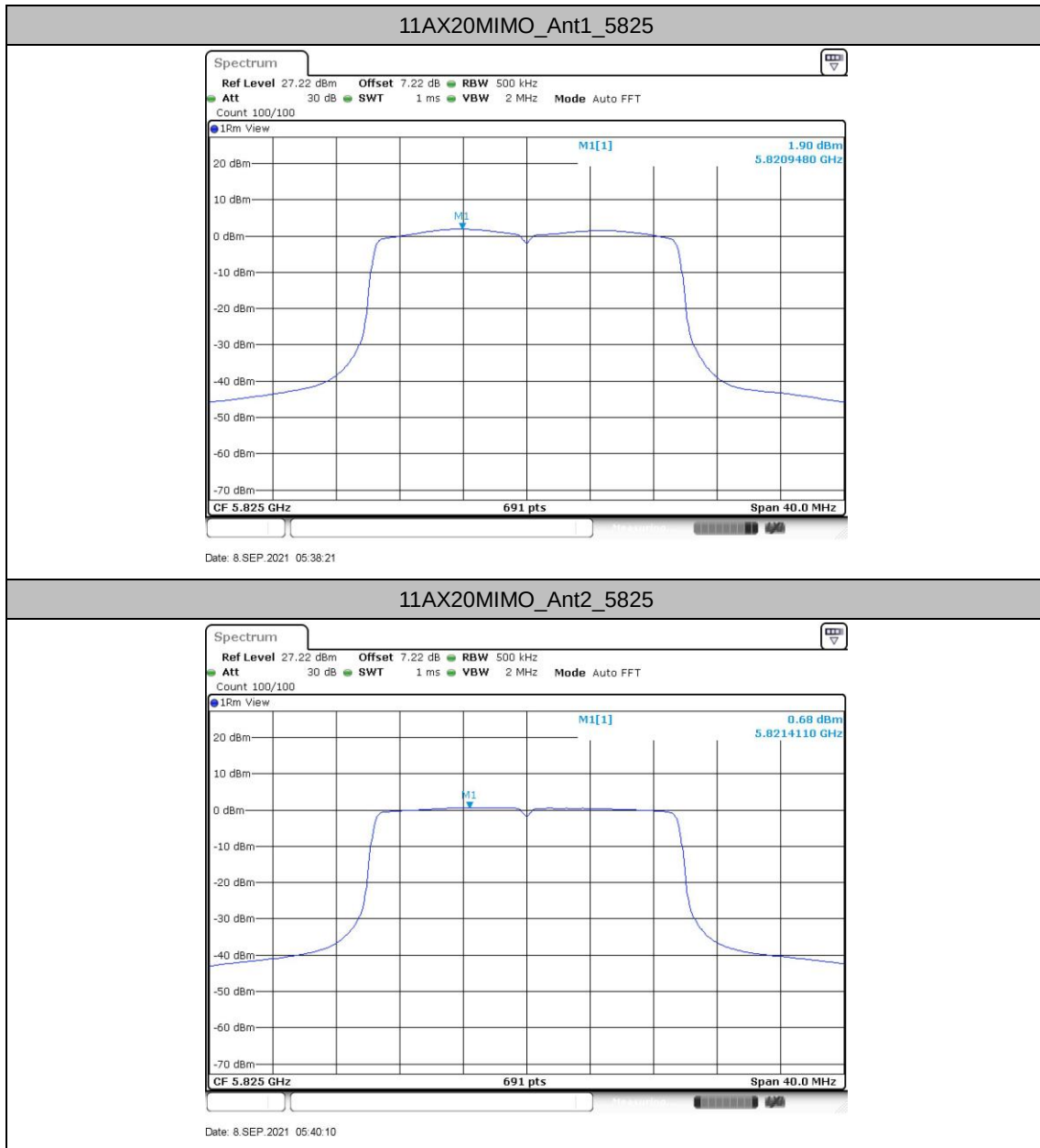


Date: 8 SEP 2021 05:33:44

11AX20MIMO_Ant2_5785



Date: 8 SEP 2021 05:35:55



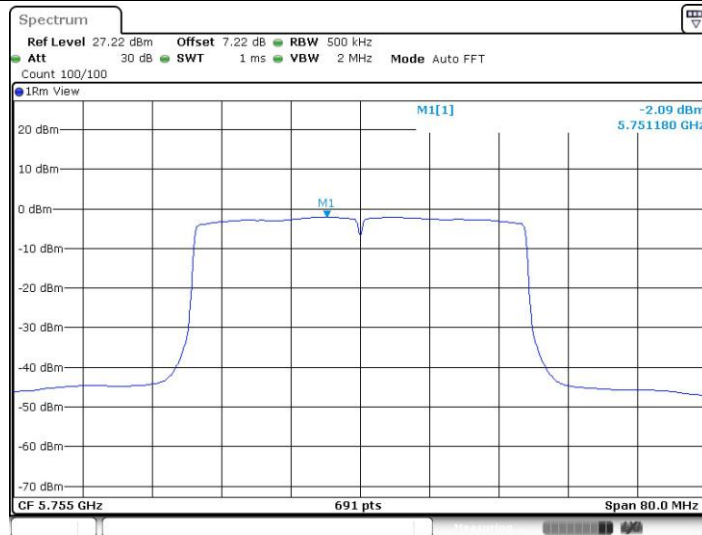


11AX40MIMO_Ant1_5755



Date: 8 SEP 2021 06:38:04

11AX40MIMO_Ant2_5755



Date: 8 SEP 2021 06:40:16