FCC RF Test Report

APPLICANT	:	vivo Mobile Communication Co., Ltd.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	vivo
MODEL NAME	:	V2202
FCC ID	:	2AUCY-V2202
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Jul. 10, 2022 ~ Jul. 16, 2022

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

Sporton International Inc. (ShenZhen)
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People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR260813E	Rev. 01	Initial issue of report	Aug. 05, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Report only	-
3.2	15.407(a)	Maximum Conducted Output Power	⩽ 24 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	⩽ 11 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 2.70 dB at 5458.960 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 14.95 dB at 1.730 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

vivo Mobile Communication Co., Ltd.
No.1, vivo Road, Chang'an, Dongguan,Guangdong,China

1.2 Manufacturer

vivo Mobile Communication Co., Ltd.
No.1, vivo Road, Chang'an, Dongguan,Guangdong,China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	vivo
Model Name	V2202
FCC ID	2AUCY-V2202
IMEI Code	Conducted: 866295060094959 / 866295060094942 Conduction: 866295060094033 / 866295060094025 Radiation: 866295060093910 / 866295060093902
HW Version	MP_0.1
SW Version	PD2215CF_EX_A_12.0.3.8.W30.V000L1
EUT Stage	Production Unit

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz
Maximum Output Power to Antenna	**<5180 MHz ~ 5240 MHz>** 802.11a : 17.50 dBm / 0.0562 W 802.11n HT20 : 17.82 dBm / 0.0605 W 802.11n HT40 : 16.63 dBm / 0.0460 W 802.11ac VHT20 : 15.94 dBm / 0.0393 W 802.11ac VHT40 : 16.16 dBm / 0.0413 W 802.11ac VHT80 : 9.78 dBm / 0.0095 W 802.11ax HE20 : 16.11 dBm / 0.0408 W 802.11ax HE40 : 16.10 dBm / 0.0407 W 802.11ax HE80 : 12.92 dBm / 0.0196 W **<5260 MHz ~ 5320 MHz>** 802.11a : 17.80 dBm / 0.0603 W 802.11n HT20 : 17.26 dBm / 0.0532 W 802.11n HT40 : 16.50 dBm / 0.0447 W 802.11ac VHT20 : 16.01 dBm / 0.0399 W 802.11ac VHT40 : 16.05 dBm / 0.0403 W 802.11ac VHT80 : 10.84 dBm / 0.0121 W 802.11ax HE20 : 16.18 dBm / 0.0415 W 802.11ax HE40 : 16.08 dBm / 0.0406 W 802.11ax HE80 : 13.42 dBm / 0.0220 W **<5500 MHz ~ 5720 MHz >** 802.11a : 17.66 dBm / 0.0583 W 802.11n HT20 : 17.04 dBm / 0.0506 W 802.11n HT40 : 16.63 dBm / 0.0460 W 802.11ac VHT20 : 15.69 dBm / 0.0371 W 802.11ac VHT40 : 16.16 dBm / 0.0413 W 802.11ac VHT80 : 15.43 dBm / 0.0349 W 802.11ax HE20 : 15.91 dBm / 0.0390 W 802.11ax HE40 : 16.09 dBm / 0.0406 W 802.11ax HE80 : 15.74 dBm / 0.0375 W

Standards-related Product Specification	
99% Occupied Bandwidth	**<5180 MHz ~ 5240 MHz>** 802.11a : 18.82 MHz 802.11n HT20 : 19.82 MHz 802.11n HT40 : 36.60 MHz 802.11ac VHT80 : 77.04 MHz 802.11ax HE20 : 19.26 MHz 802.11ax HE40 : 37.72 MHz 802.11ax HE80 : 78.16 MHz **<5260 MHz ~ 5320 MHz>** 802.11a : 18.38 MHz 802.11n HT20 : 19.10 MHz 802.11n HT40 : 36.76 MHz 802.11ac VHT80 : 76.88 MHz 802.11ax HE20 : 19.22 MHz 802.11ax HE40 : 37.80 MHz 802.11ax HE80 : 78.16 MHz **<5500 MHz ~ 5720 MHz >** 802.11a : 18.82 MHz 802.11n HT20 : 19.98 MHz 802.11n HT40 : 36.76 MHz 802.11ac VHT80 : 77.36 MHz 802.11ax HE20 : 19.10 MHz 802.11ax HE40 : 37.80 MHz 802.11ax HE80 : 78.64 MHz
Antenna Type / Gain	PIFA Antenna with gain -3.00 dBi
Type of Modulation	802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax: OFDMA (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)

Note:

1. 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.
2. The device support partial RU for 802.11ax mode.

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

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 (Y plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38	5190	46	5230
	40	5200	48	5240
	42	5210	50	5250

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz U-NII-2A	52	5260	60	5300
	54	5270	62	5310
	56	5280	64	5320
	58	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5500- 5720 MHz MHz U-NII-2C	100	5500	114	5570
	102	5510	116	5580
	104	5520	132	5660
	106	5530	134	5670
	108	5540	136	5680
	110	5550	140	5700
	112	5560		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118	5590	124	5620
	120	5600	126	5630
	122	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138	5690	144	5720
	142	5710		

2.2 Test Mode

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

Modulation	Data Rate
802.11a	**6 Mbps**
802.11n HT20	**MCS0**
802.11n HT40	**MCS0**
802.11ac VHT20 (Covered by HT20)	**MCS0**
802.11ac VHT40 (Covered by HT40)	**MCS0**
802.11ac VHT80	**MCS0**
802.11ax HE20	**MCS0**
802.11ax HE40	**MCS0**
802.11ax HE80	**MCS0**

Co-location
802.11ac VHT80_Tx_CH106 + LTE Band13 + Bluetooth Link

Test Cases	
AC Conducted Emission	Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link(5G) + USB Cable 1 (Charging from Adapter 1) + Battery 1
Remark: For Radiated Test Cases, The tests were performance with Adapter1 and USB Cable1.	

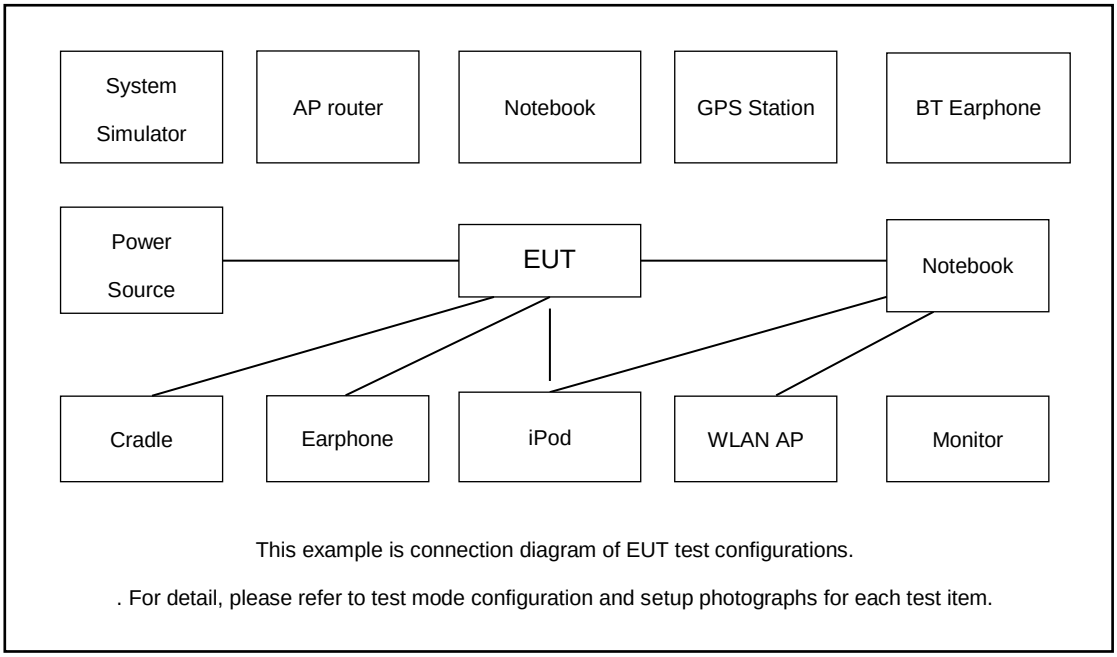
Ch. #		U-NII-1：5180-5240 MHz	U-NII-2A：5260-5320 MHz	U-NII-2C：5500- 5720 MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		U-NII-1：5180-5240 MHz	U-NII-2A：5260-5320 MHz	U-NII-2C：5500- 5720 MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		U-NII-1：5180-5240 MHz	U-NII-2A：5260-5320 MHz	U-NII-2C：5500- 5720 MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134
Straddle		-	-	142

Ch. #		U-NII-1：5180-5240 MHz	U-NII-2A：5260-5320 MHz	U-NII-2C：5500- 5720 MHz
		11ac/ax VHT80/HE80	11ac/ax VHT80/HE80	11ac/ax VHT80/HE80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	122
Straddle		-	-	138

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.	Base Station(LTE)	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	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.

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.8 dB and 10 dB attenuator.

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

= 2.8 + 10 = 12.8 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

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.

3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1% to 5% of the OBW and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup

3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15 – 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For the 5.47–5.6 GHz and 5.65–5.725 GHz band, the maximum conducted output power shall not exceed 250 mW or 11 + 10 log10 B, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

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 output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

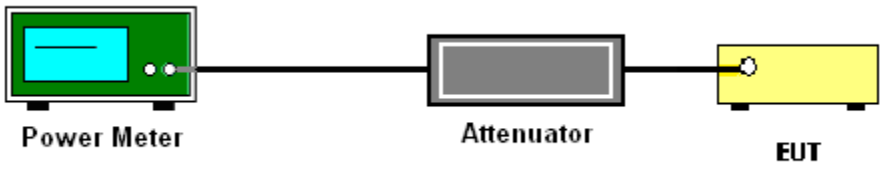
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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.

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.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15 – 5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz 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 output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

 # Method SA-2 #

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

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

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

3.3.4 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 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

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

For transmitters operating in the 5470-5725 MHz band: all emissions outside of the 5470-5725 MHz band shall not exceed an EIRP of -27 dBm/MHz.

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

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

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

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

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

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

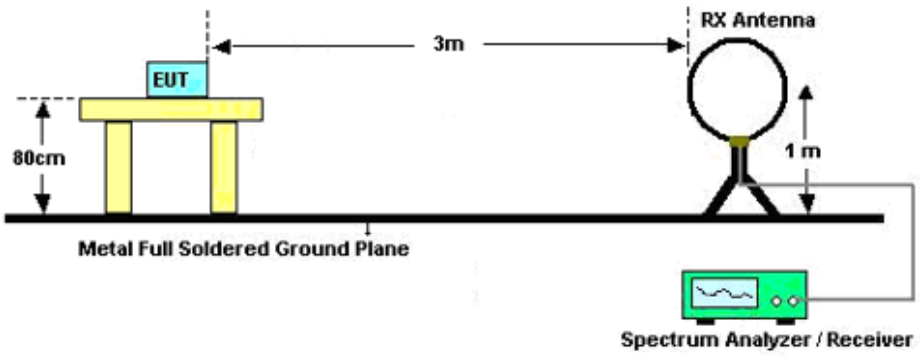
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

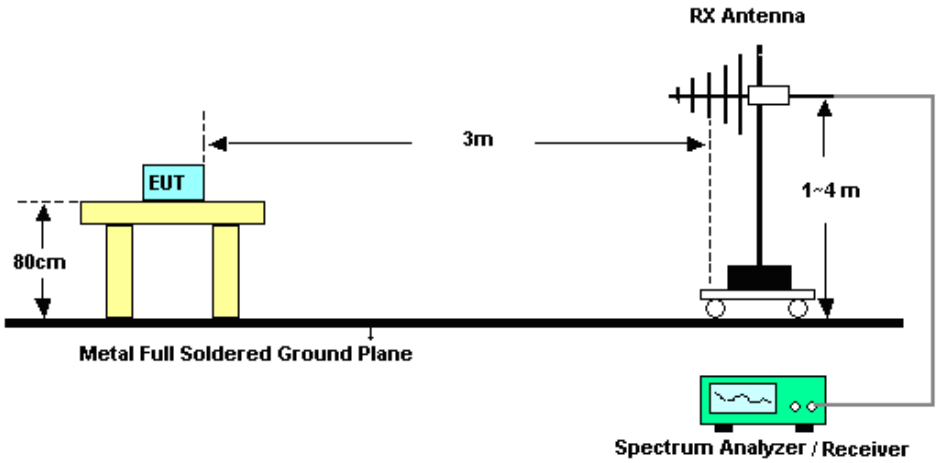
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

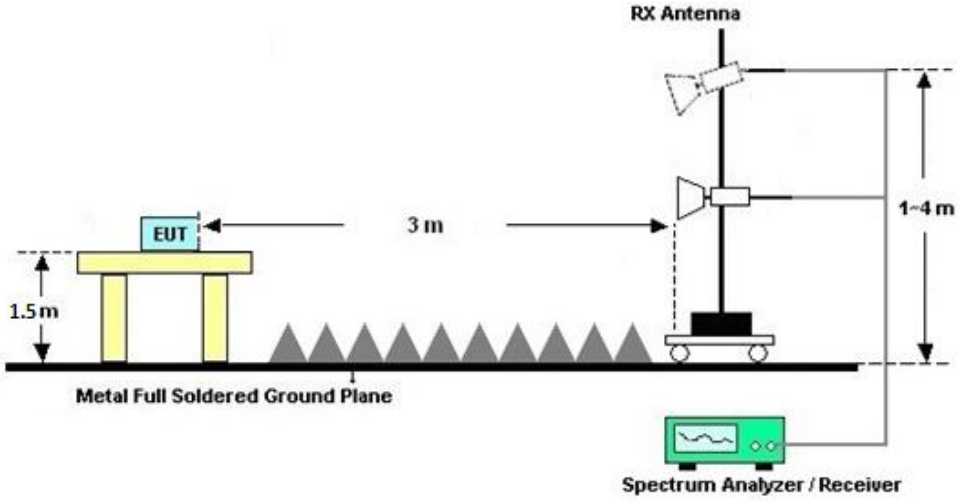
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

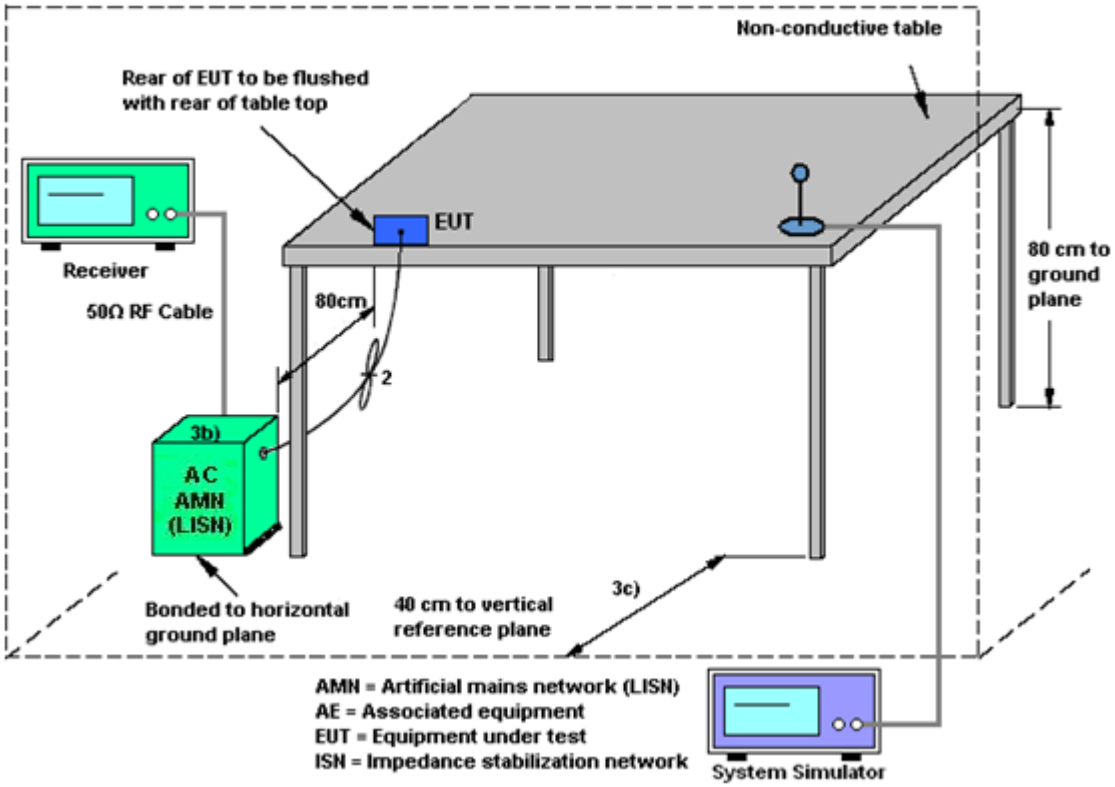
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



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	101078	10Hz~40GHz	Apr. 07, 2022	Jul. 10, 2022~ Jul. 16, 2022	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Jul. 10, 2022~ Jul. 16, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Jul. 10, 2022~ Jul. 16, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V，3A	Oct. 25, 2021	Jul. 10, 2022~ Jul. 16, 2022	Oct. 24, 2022	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 07, 2022	Jul. 10, 2022~ Jul. 16, 2022	Jul. 06, 2023	Conducted (TH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Sep. 01, 2021	Jul. 15, 2022	Aug. 31, 2022	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 01, 2021	Jul. 15, 2022	Aug. 31, 2022	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 29, 2021	Jul. 15, 2022	Oct. 28, 2022	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Jul. 15, 2022	Jul. 06, 2023	Conduction (CO01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2021	Jul. 15, 2022	Dec. 26, 2022	Radiation (03CH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 06, 2022	Jul. 15, 2022	Jul. 05, 2023	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 17, 2020	Jul. 15, 2022	Jul. 16, 2022	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Sep. 28, 2021	Jul. 15, 2022	Sep. 27, 2022	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 07, 2022	Jul. 15, 2022	Jul. 06, 2023	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 10, 2022	Jul. 15, 2022	Apr. 09, 2023	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 06, 2022	Jul. 15, 2022	Apr. 05, 2023	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 22, 2021	Jul. 15, 2022	Oct. 21, 2022	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 22, 2021	Jul. 15, 2022	Oct. 21, 2022	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 06, 2022	Jul. 15, 2022	Jul. 05, 2023	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jul. 15, 2022	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 15, 2022	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul. 15, 2022	NCR	Radiation (03CH01-SZ)

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))	**2.2 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.2 dB**

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.3 dB**

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

Appendix A. Conducted Test Results

Ambient Condition: 25 ℃, 45 %RH	
Test Date: 2022/07/11	**Test Engineer:** Ma Jie

Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	23.28	5168.48	5191.76	---	---
		5220	23.52	5208.16	5231.68	---	---
		5240	24.88	5227.12	5252.00	---	---
		5260	24.40	5248.44	5272.84	---	---
		5300	24.04	5288.24	5312.28	---	---
		5320	23.20	5308.76	5331.96	---	---
		5500	22.96	5488.36	5511.32	---	---
		5580	24.28	5568.24	5592.52	---	---
		5700	24.04	5687.92	5711.96	---	---
		5720	24.36	5708.16	5732.52	---	---
11N20 SISO	Ant1	5180	23.64	5168.16	5191.80	---	---
		5220	25.88	5207.00	5232.88	---	---
		5240	25.28	5227.56	5252.84	---	---
		5260	25.00	5247.52	5272.52	---	---
		5300	25.32	5287.60	5312.92	---	---
		5320	23.52	5308.28	5331.80	---	---
		5500	23.40	5488.40	5511.80	---	---
		5580	24.48	5568.00	5592.48	---	---
		5700	23.88	5687.76	5711.64	---	---
		5720	25.64	5707.24	5732.88	---	---

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11N40 SISO	Ant1	5190	40.24	5169.92	5210.16	---	---
		5230	45.92	5208.96	5254.88	---	---
		5270	42.48	5249.04	5291.52	---	---
		5310	40.72	5289.68	5330.40	---	---
		5510	40.24	5489.76	5530.00	---	---
		5550	45.92	5528.96	5574.88	---	---
		5670	40.56	5649.68	5690.24	---	---
		5710	43.12	5688.96	5732.08	---	---
11AC80 SISO	Ant1	5210	80.00	5170.00	5250.00	---	---
		5290	80.00	5250.00	5330.00	---	---
		5530	80.00	5490.00	5570.00	---	---
		5610	80.00	5570.00	5650.00	---	---
		5690	85.92	5650.00	5735.92	---	---
11AX20 SISO	Ant1	5180	21.12	5169.56	5190.68	---	---
		5220	21.56	5209.20	5230.76	---	---
		5240	21.64	5229.24	5250.88	---	---
		5260	22.00	5248.88	5270.88	---	---
		5300	22.48	5288.56	5311.04	---	---
		5320	23.04	5307.92	5330.96	---	---
		5500	23.60	5487.64	5511.24	---	---
		5580	23.52	5569.52	5593.04	---	---
		5700	22.00	5688.88	5710.88	---	---
		5720	21.12	5709.40	5730.52	---	---

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX40 SISO	Ant1	5190	39.68	5170.16	5209.84	---	---
		5230	39.92	5210.08	5250.00	---	---
		5270	39.68	5250.16	5289.84	---	---
		5310	39.76	5290.16	5329.92	---	---
		5510	39.76	5490.16	5529.92	---	---
		5550	39.84	5530.08	5569.92	---	---
		5670	39.84	5650.08	5689.92	---	---
		5710	39.84	5690.08	5729.92	---	---
11AX80 SISO	Ant1	5210	80.80	5169.52	5250.32	---	---
		5290	80.80	5249.52	5330.32	---	---
		5530	80.80	5489.68	5570.48	---	---
		5610	80.48	5569.84	5650.32	---	---
		5690	80.80	5649.52	5730.32	---	---

Test Graphs

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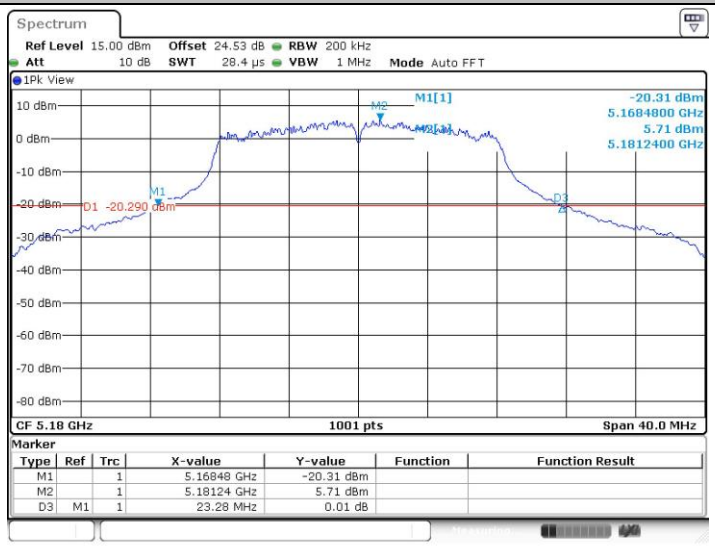

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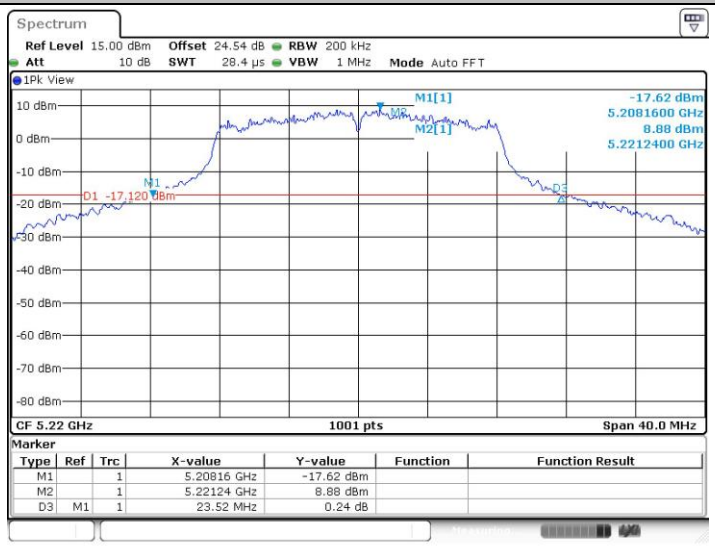

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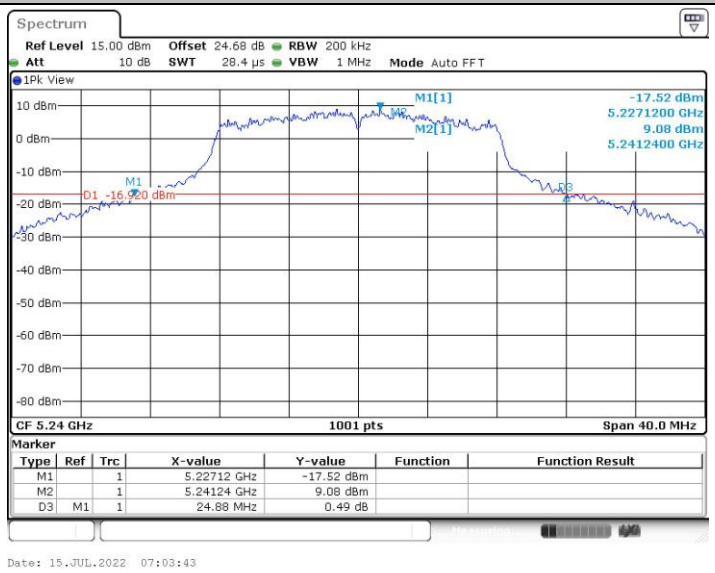

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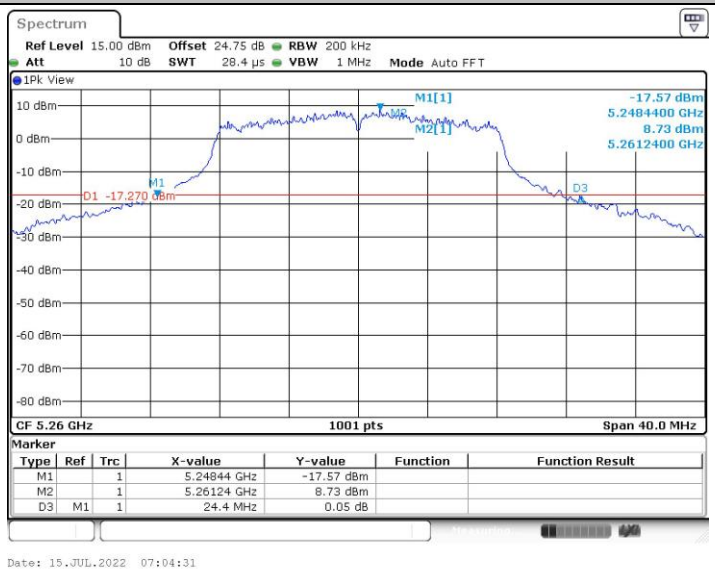

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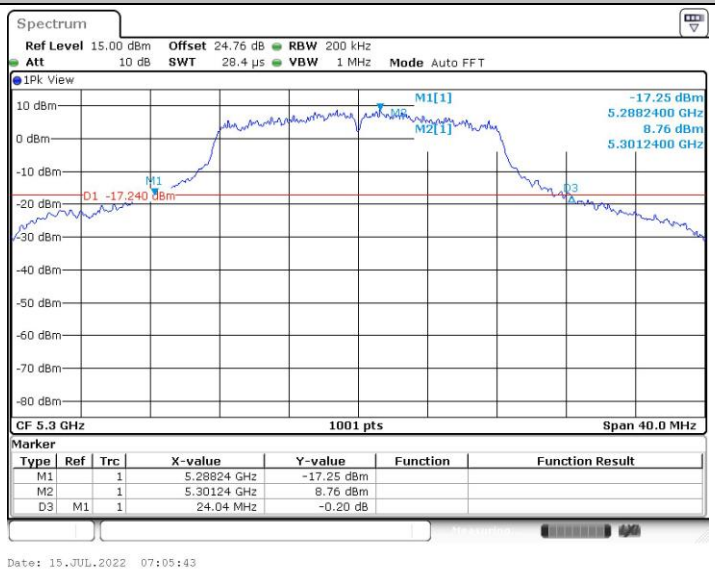

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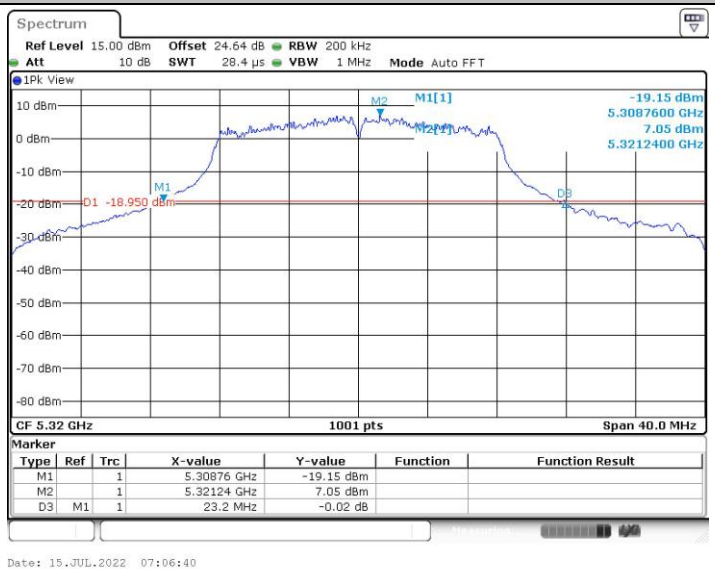

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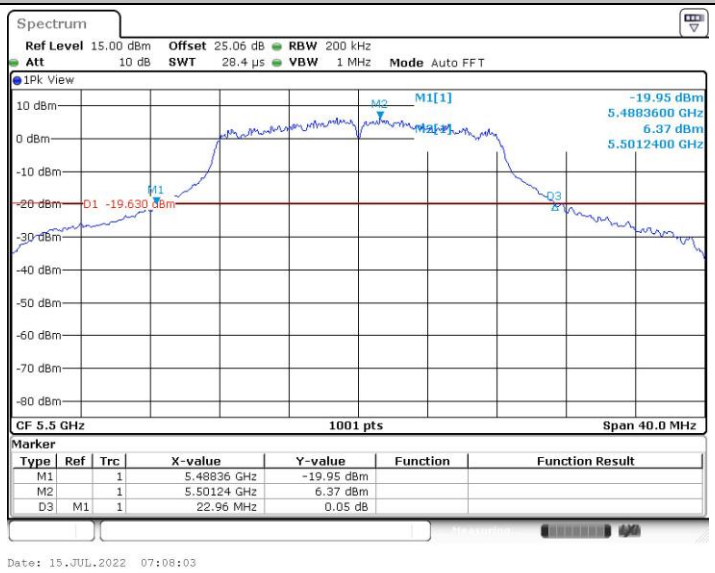

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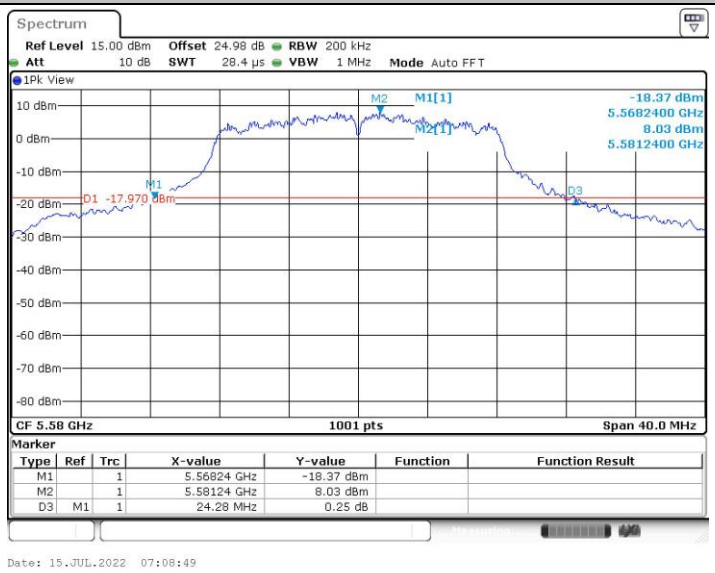

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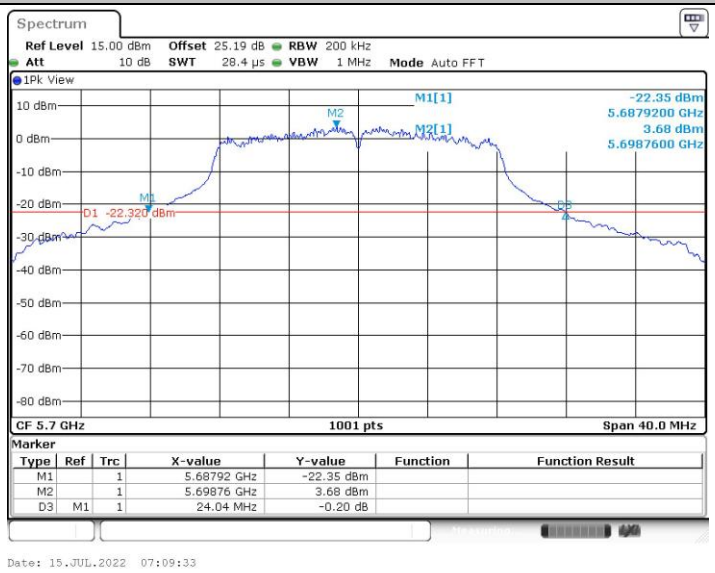

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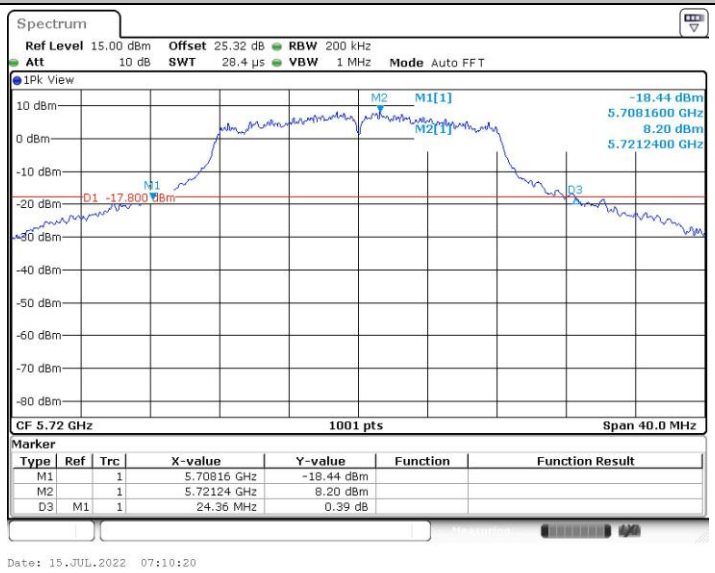

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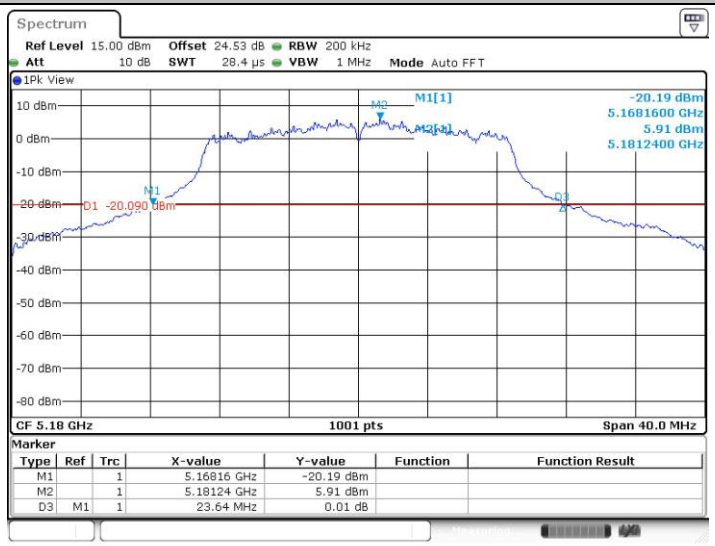

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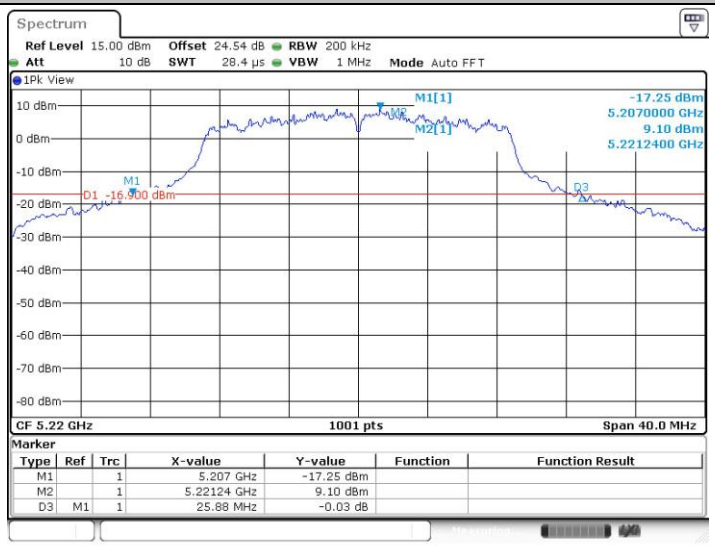

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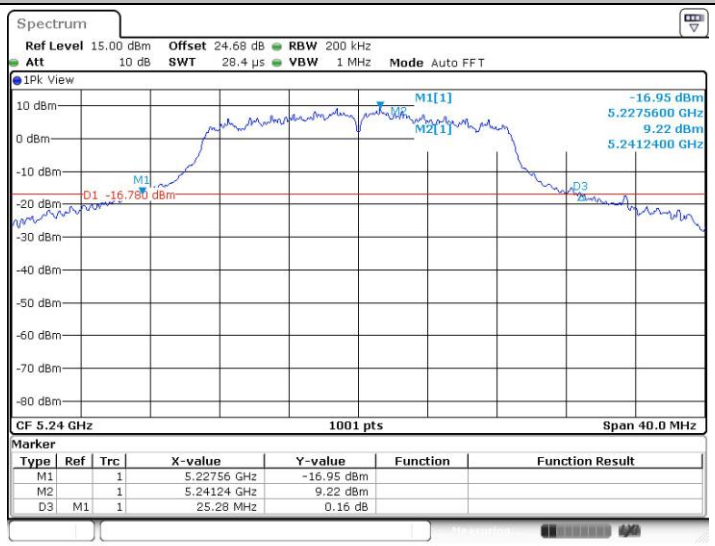

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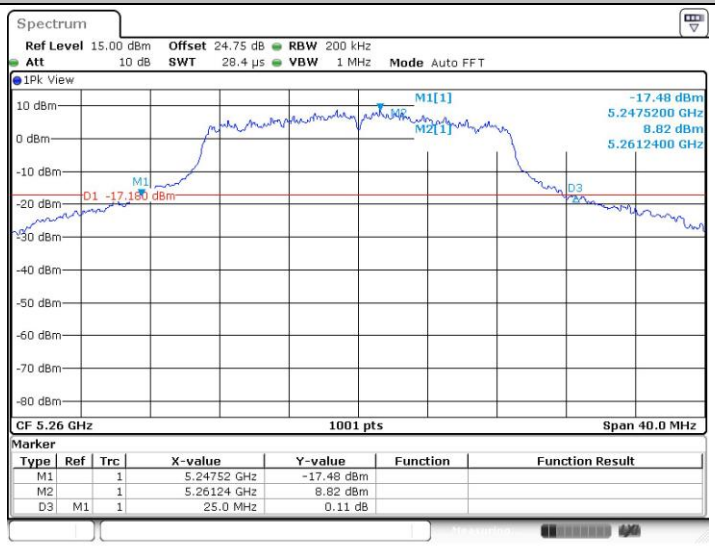

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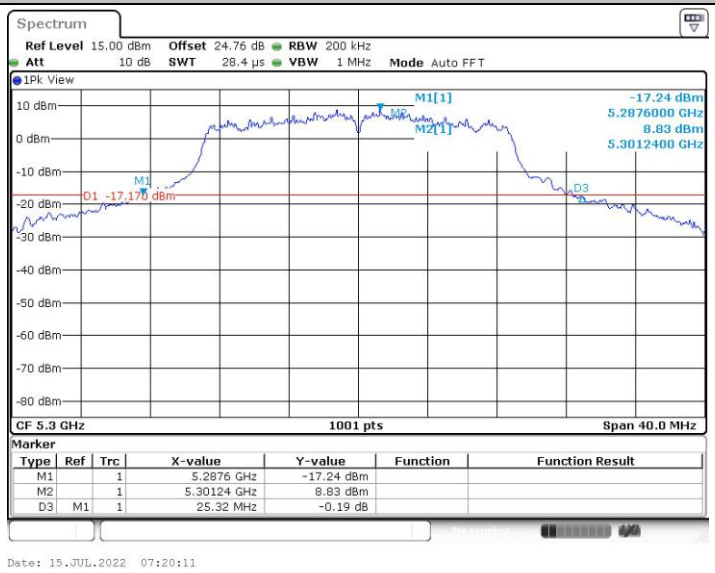

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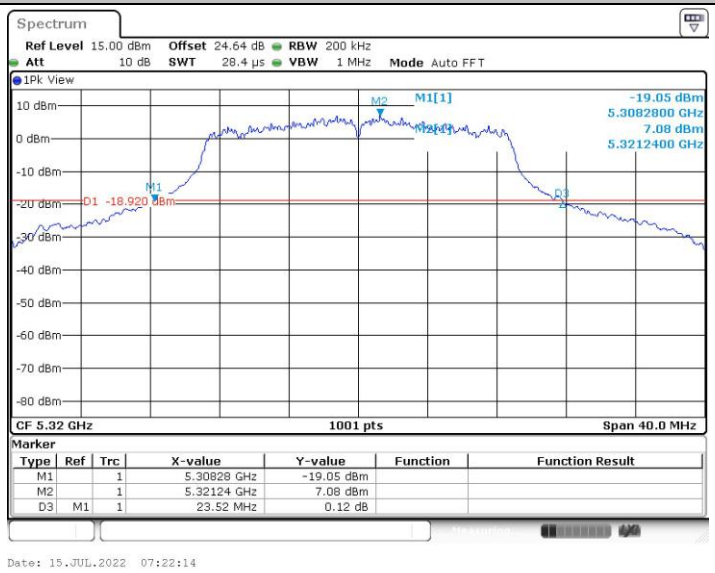

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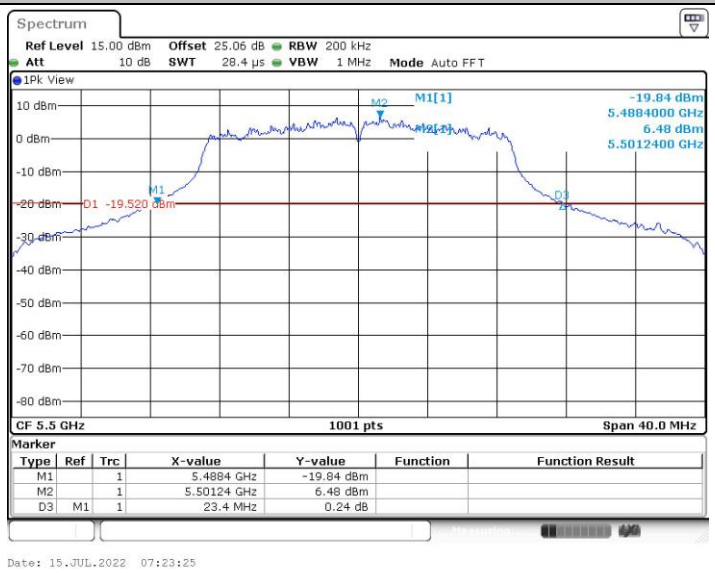

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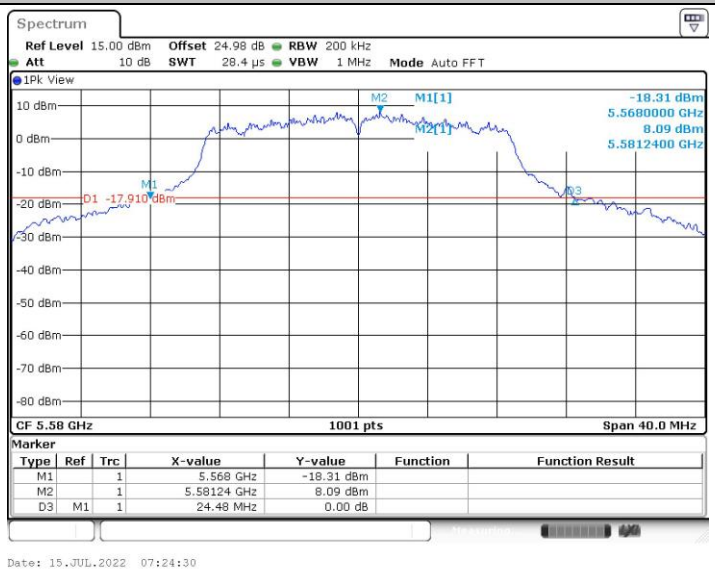

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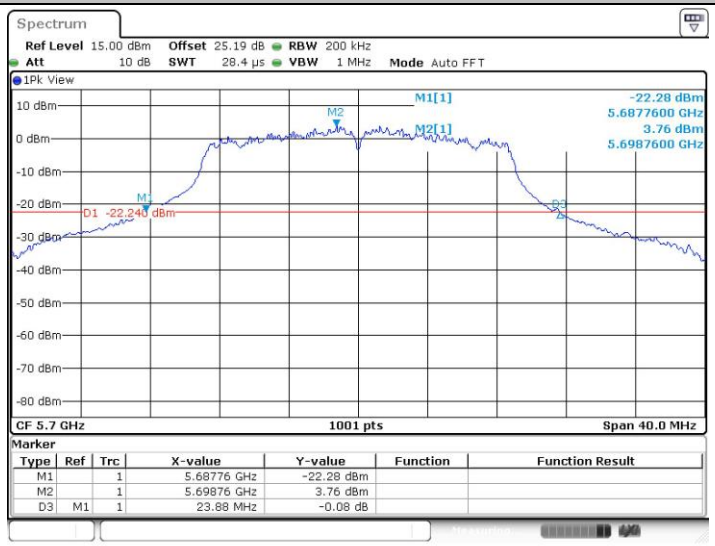

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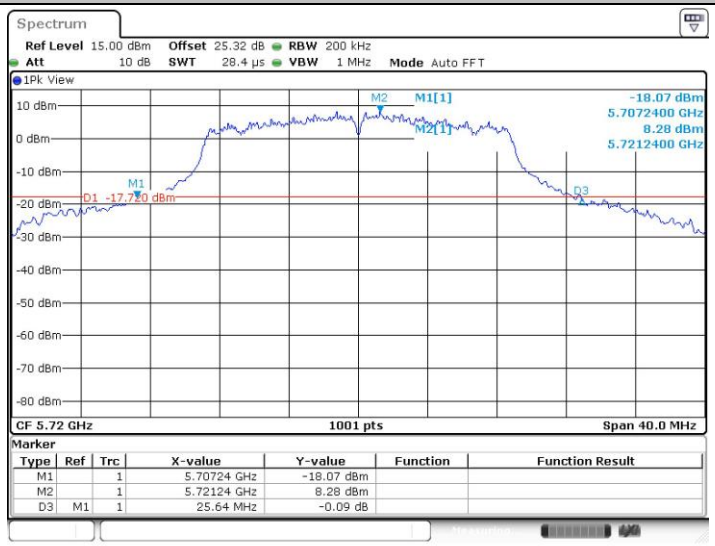

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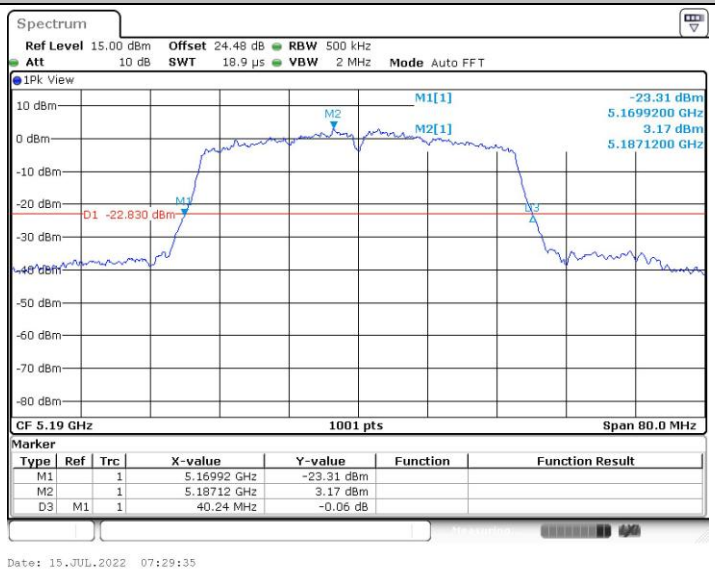

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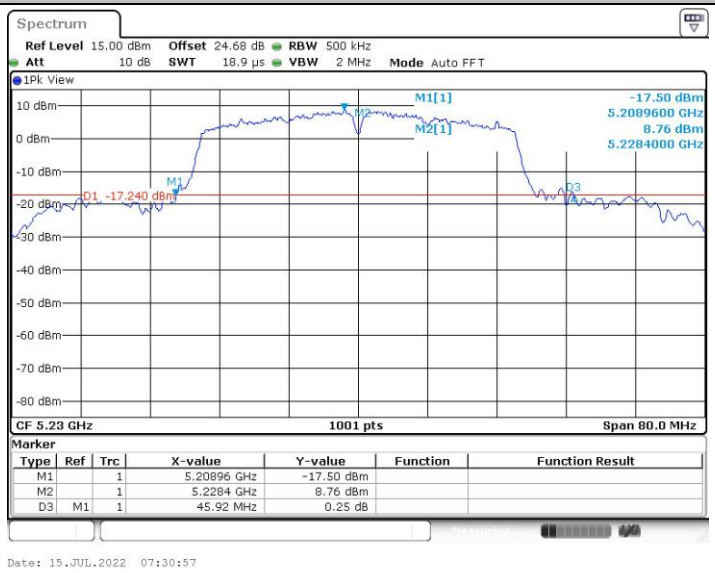

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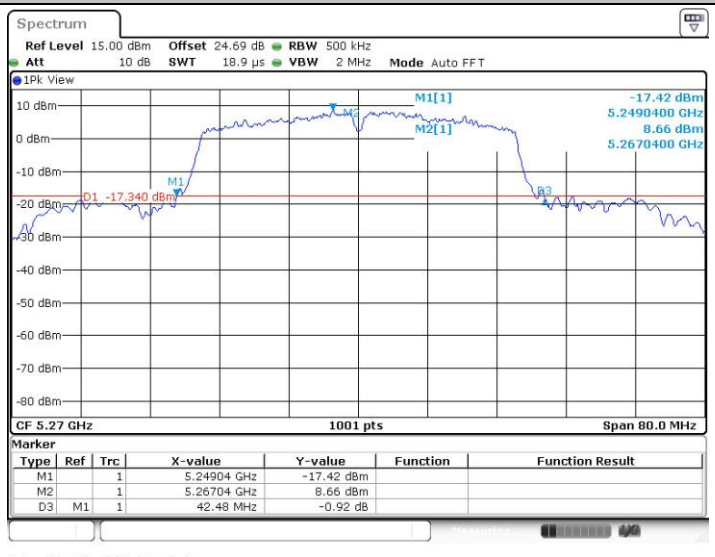

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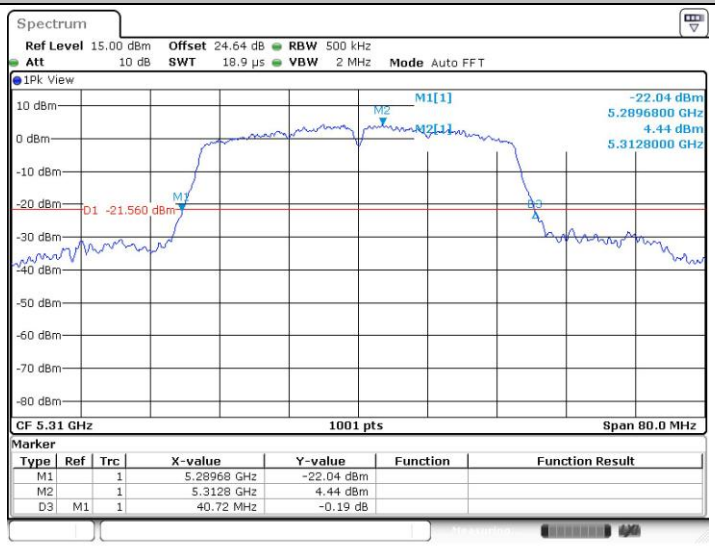

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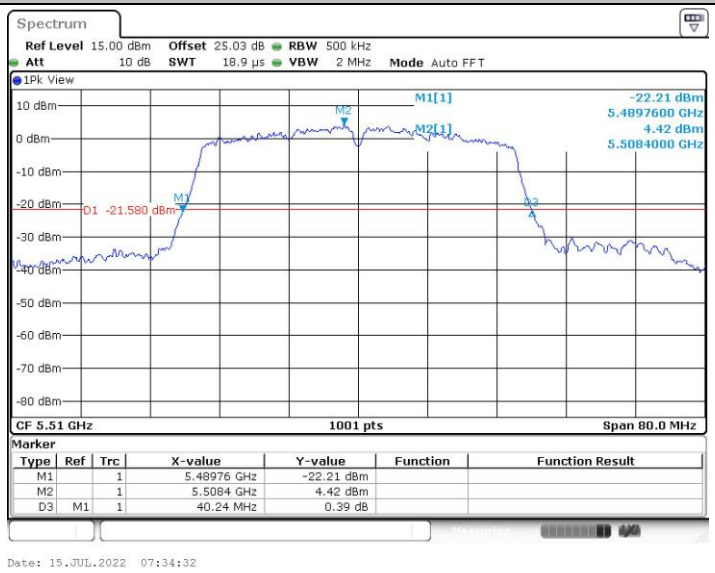

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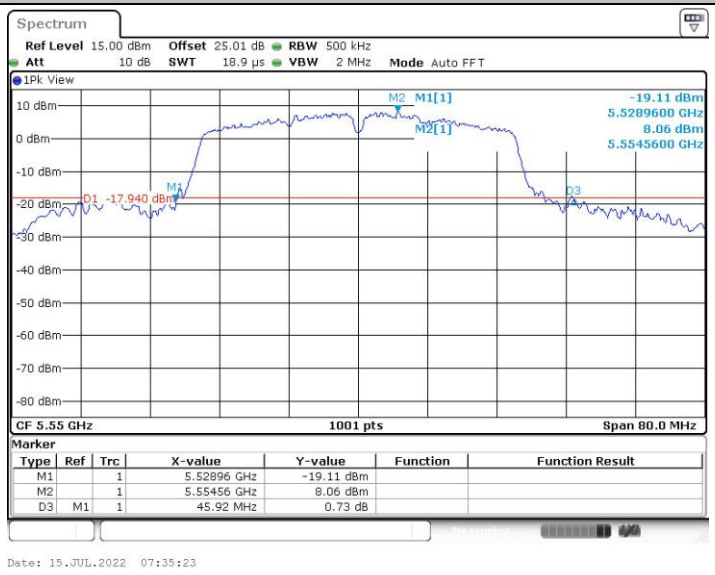

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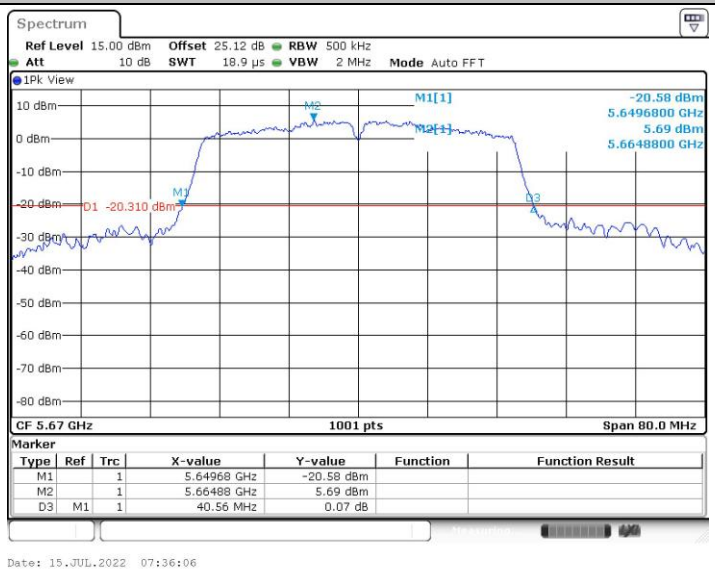

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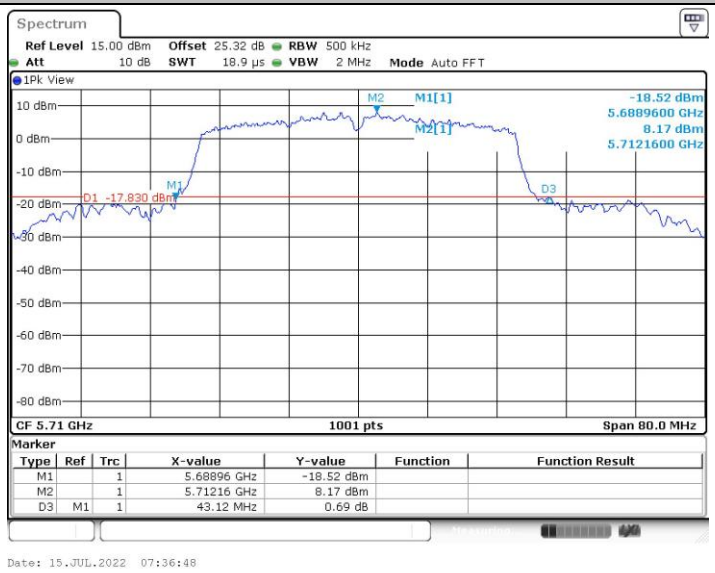

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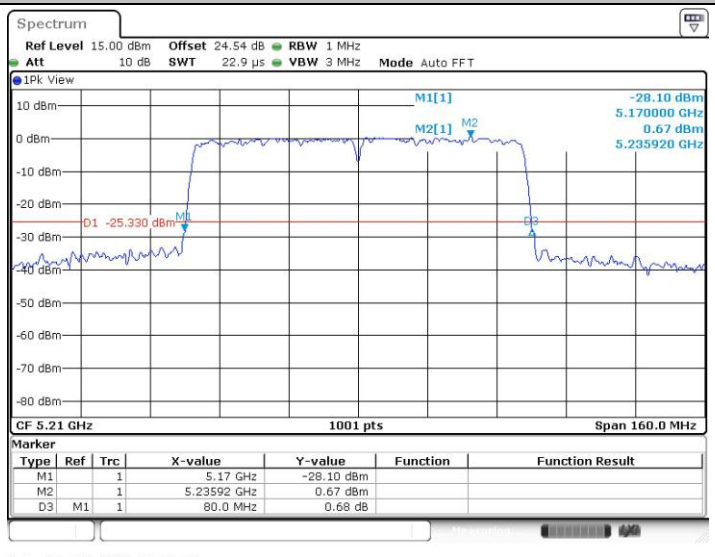

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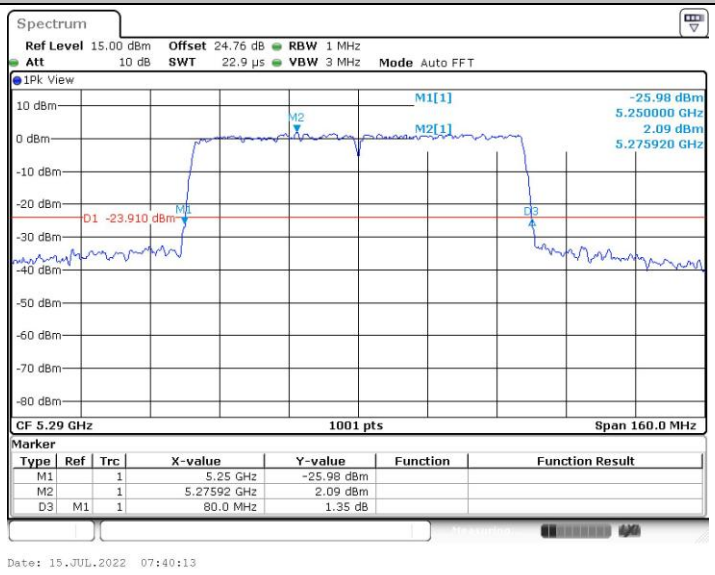

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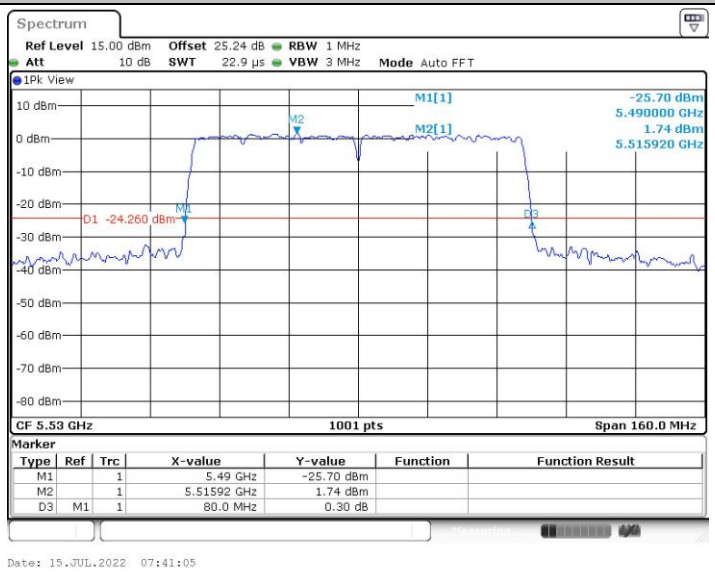

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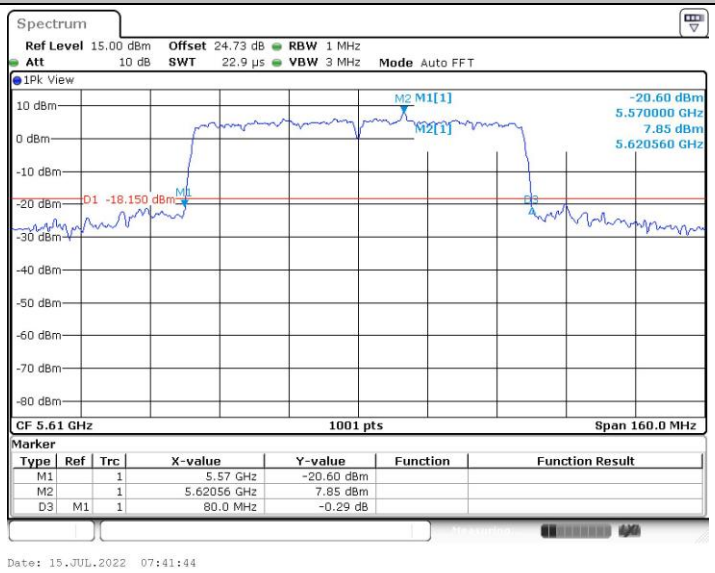

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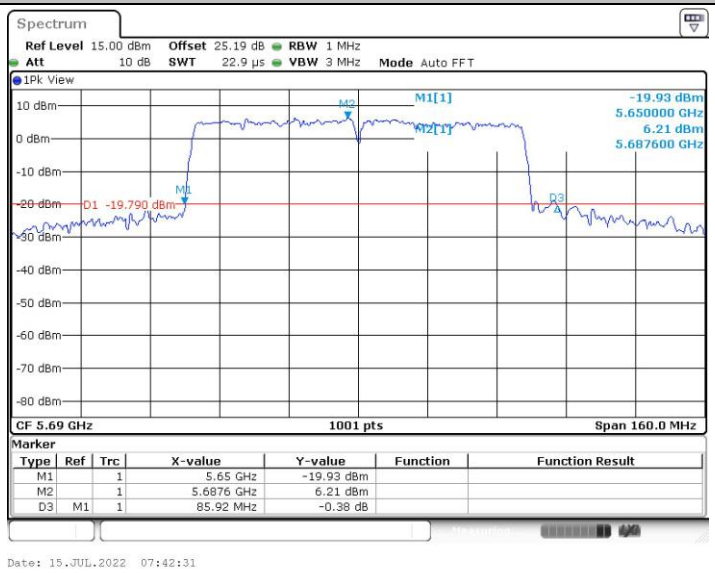

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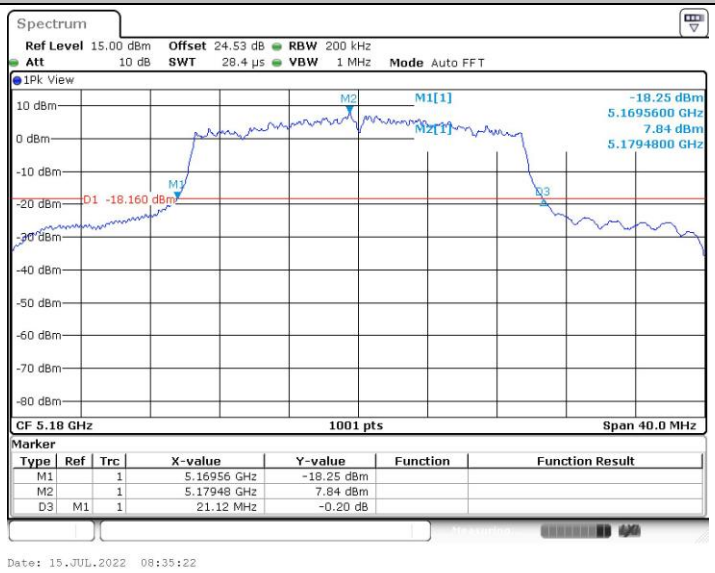

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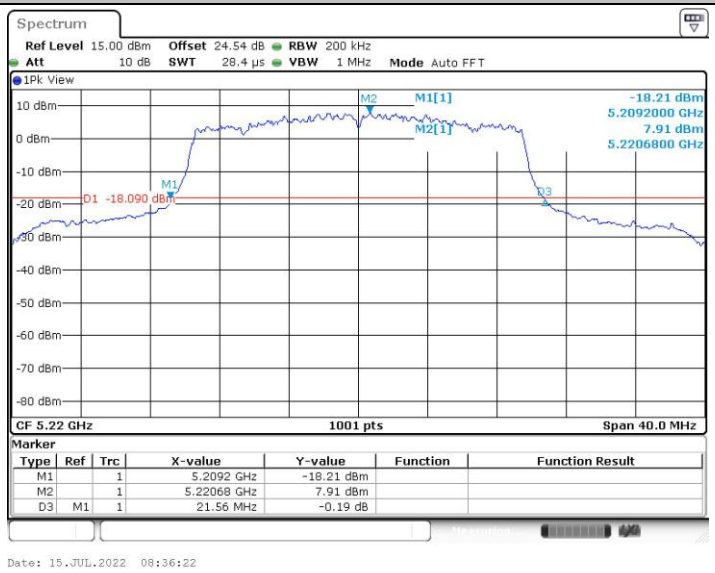

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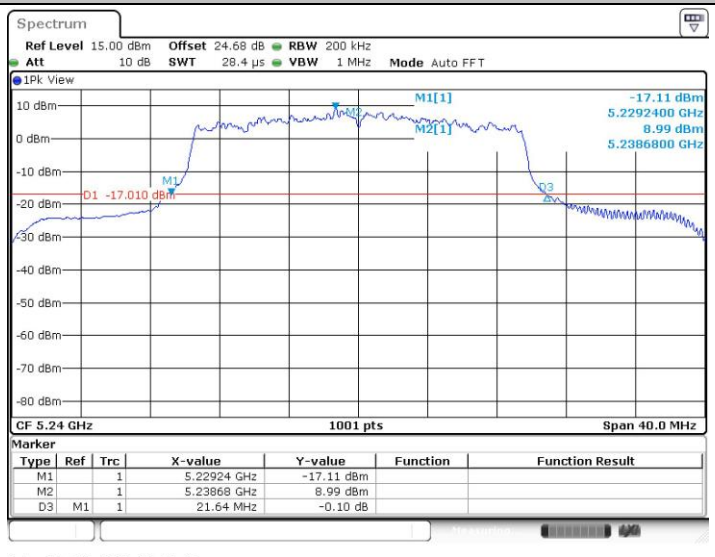

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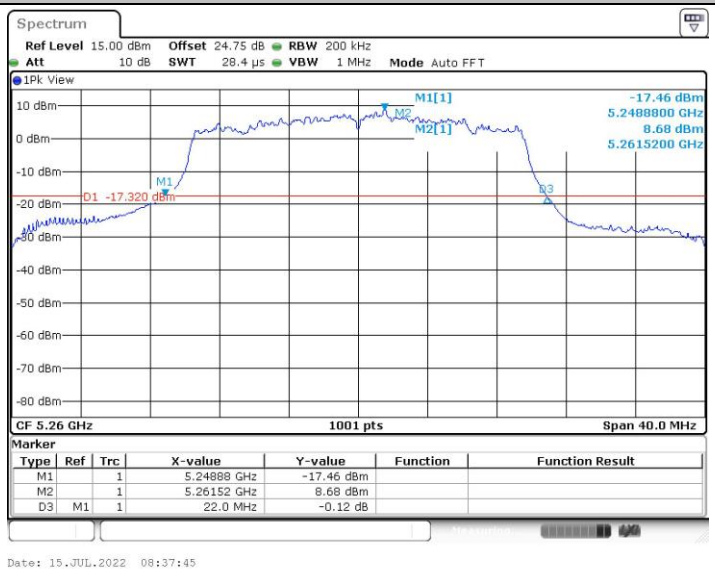

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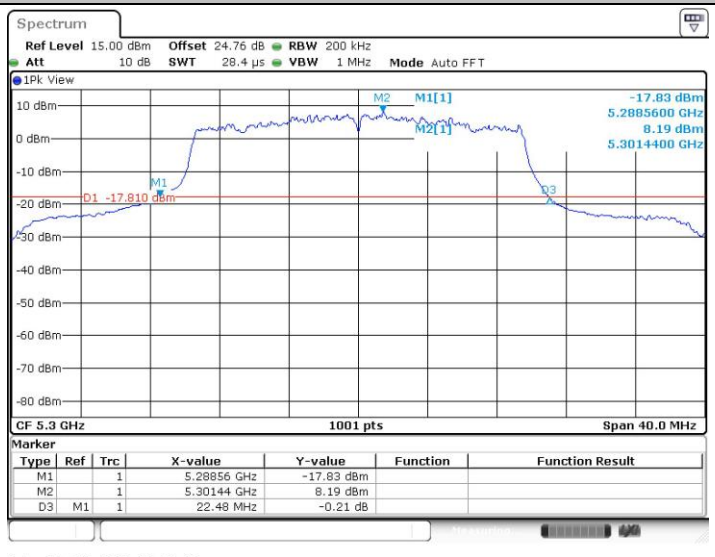

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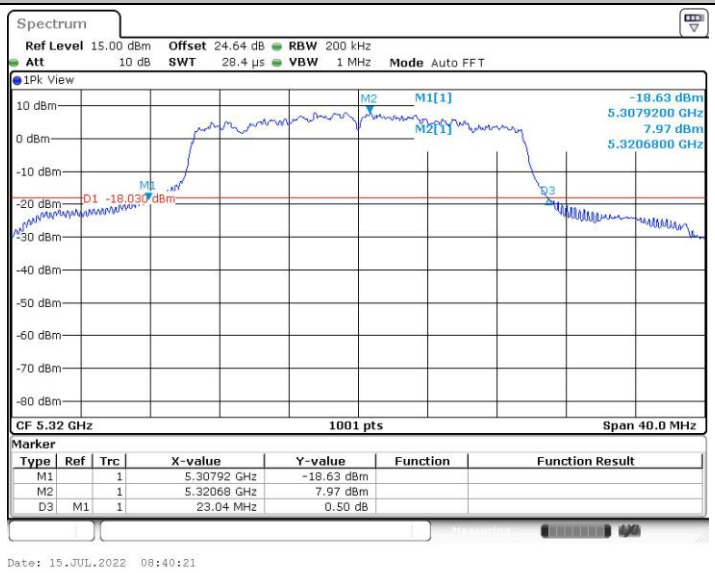

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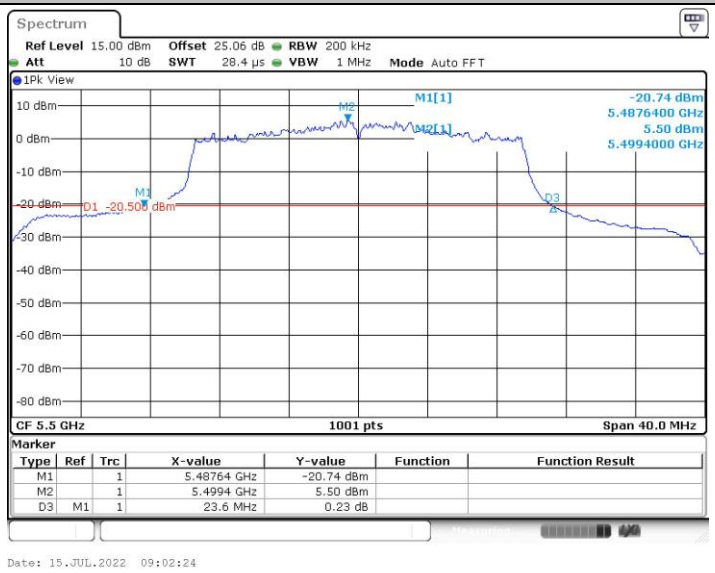

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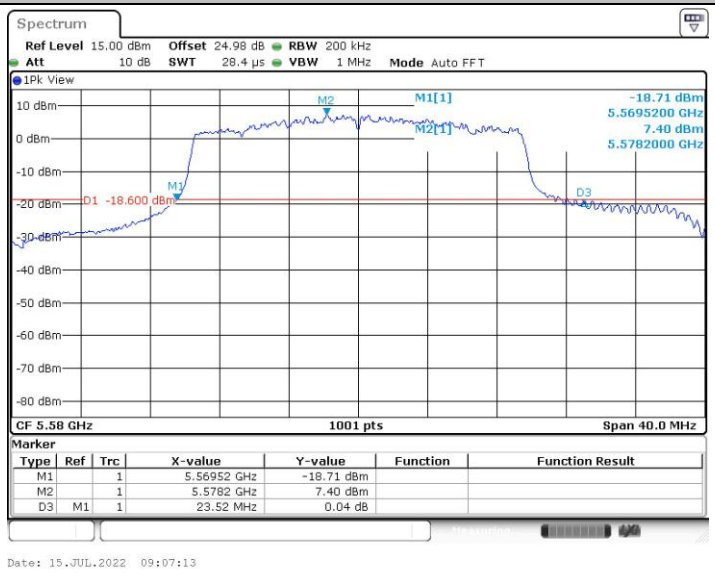

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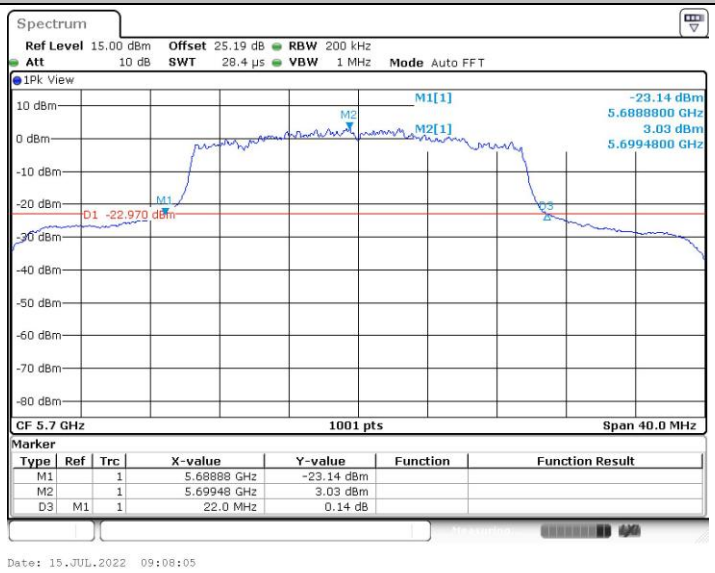

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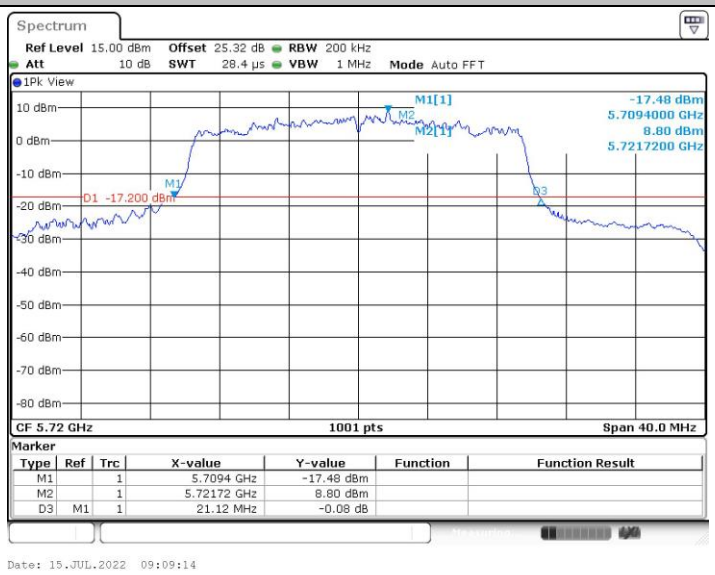

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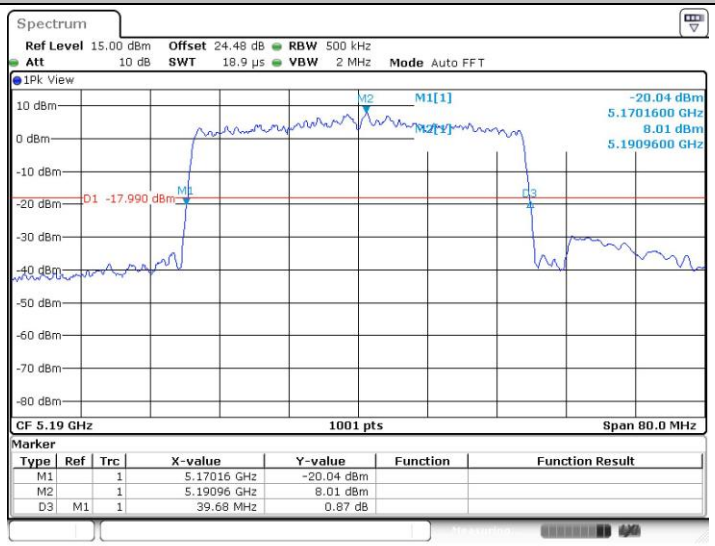

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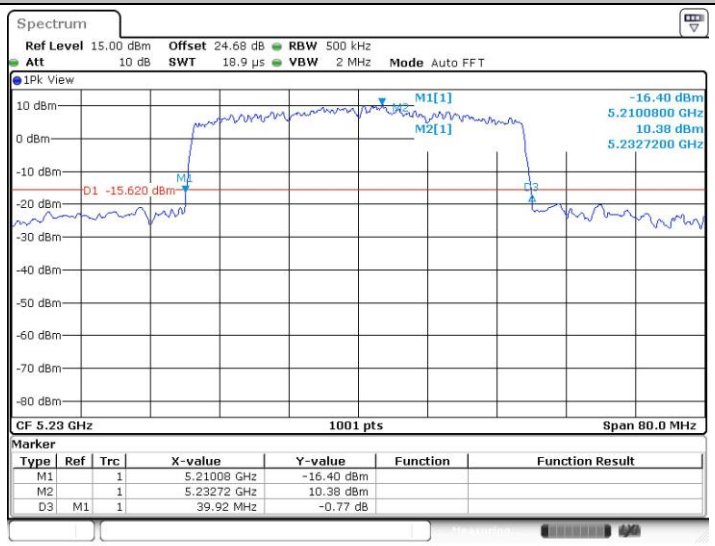

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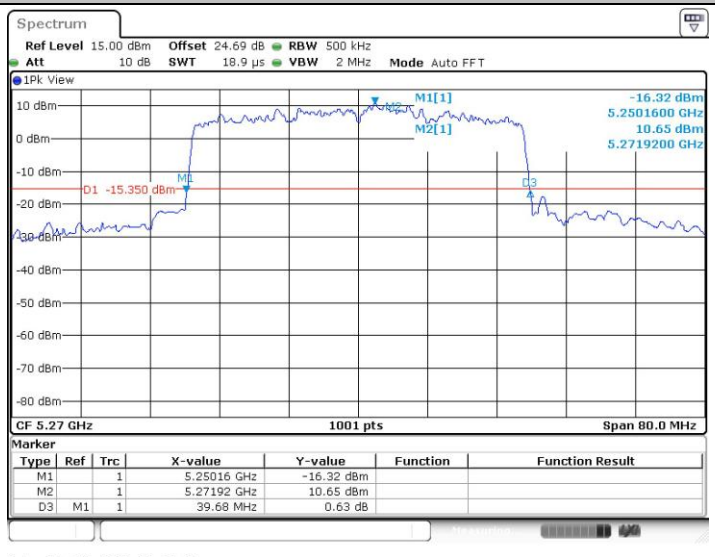

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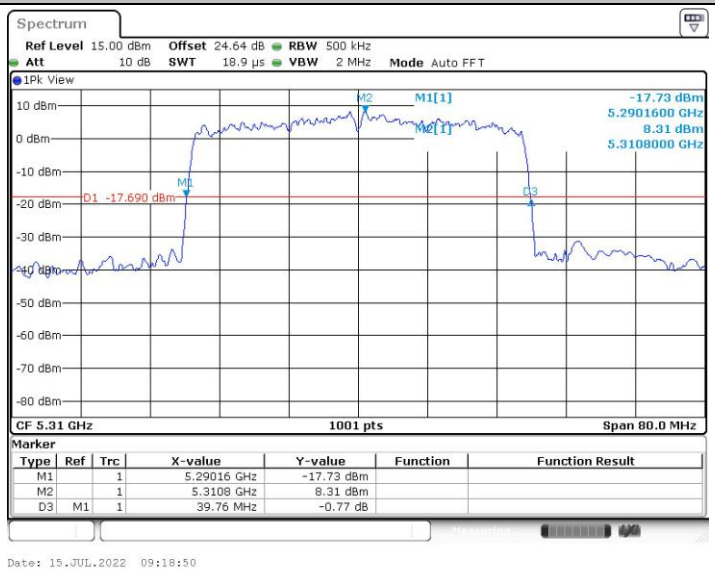

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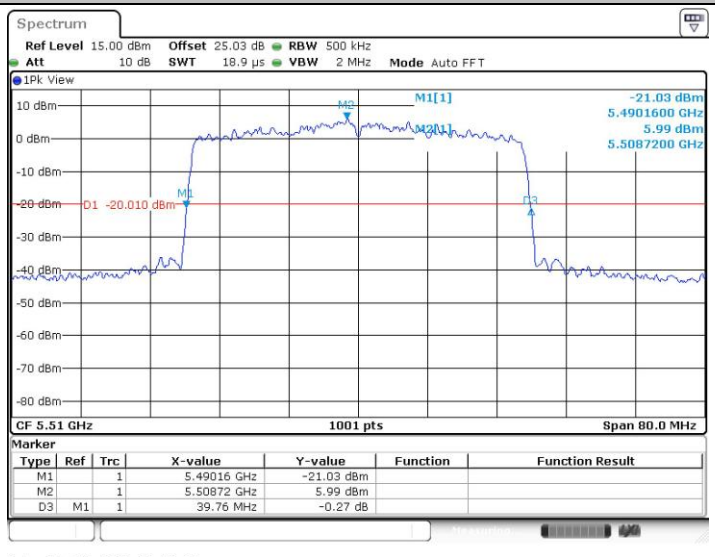

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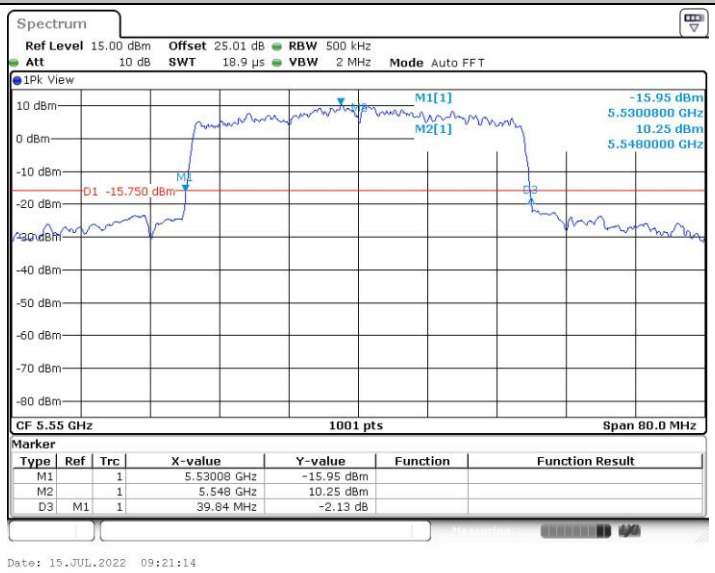

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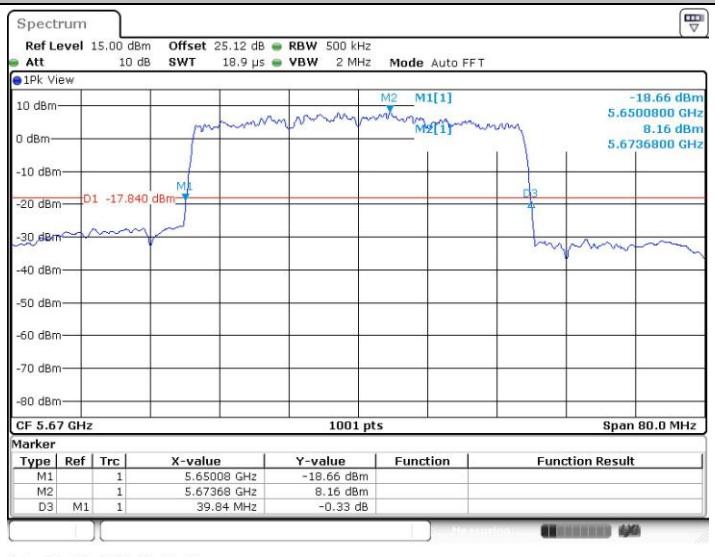

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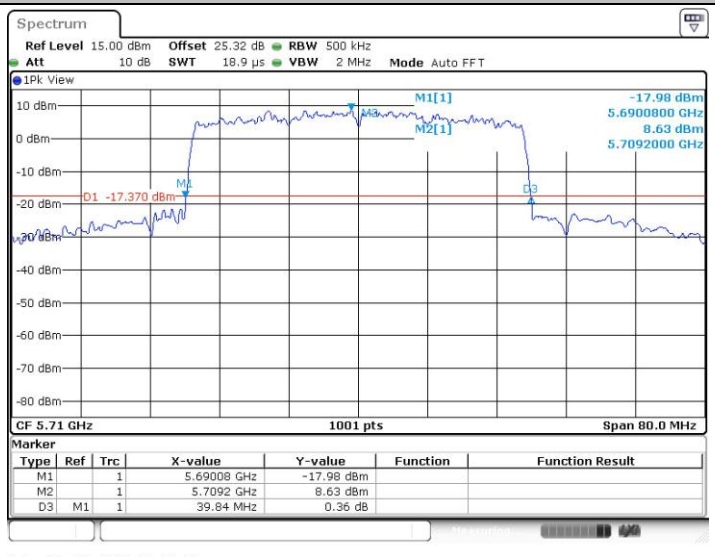

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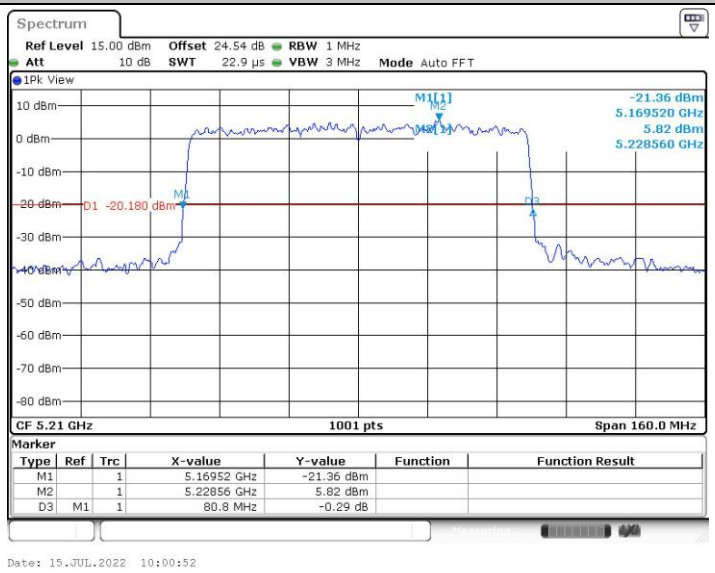

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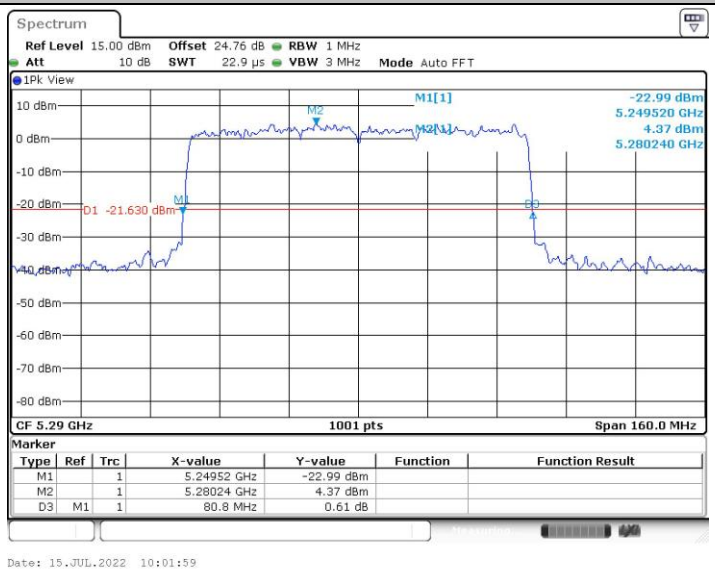

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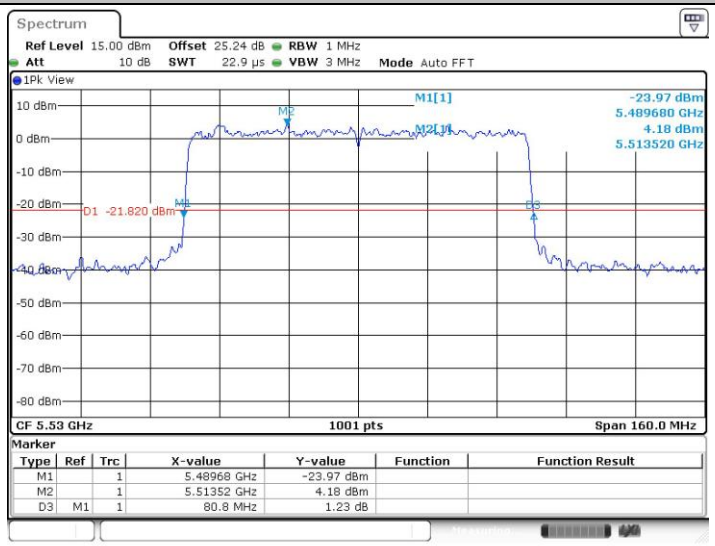

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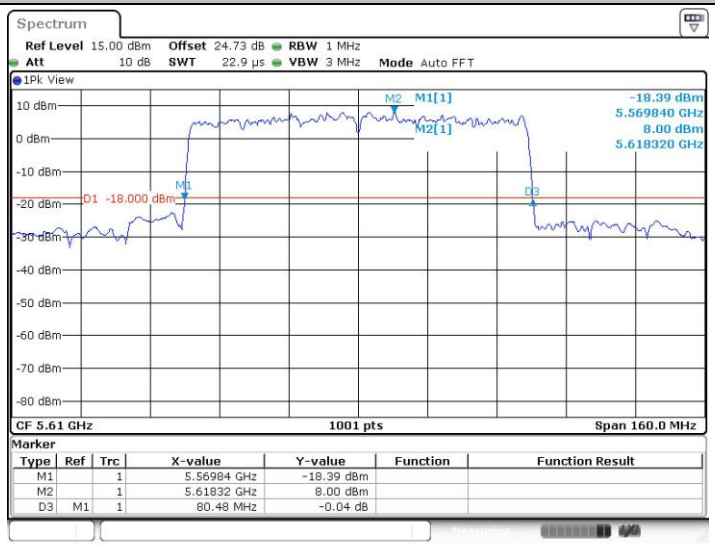
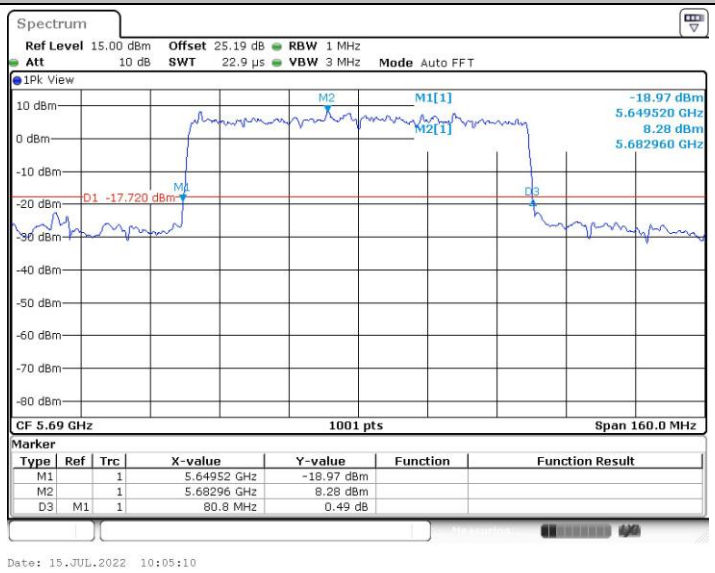


11AX80 SISO_Ant1_5690


Occupied channel bandwidth

Test Result

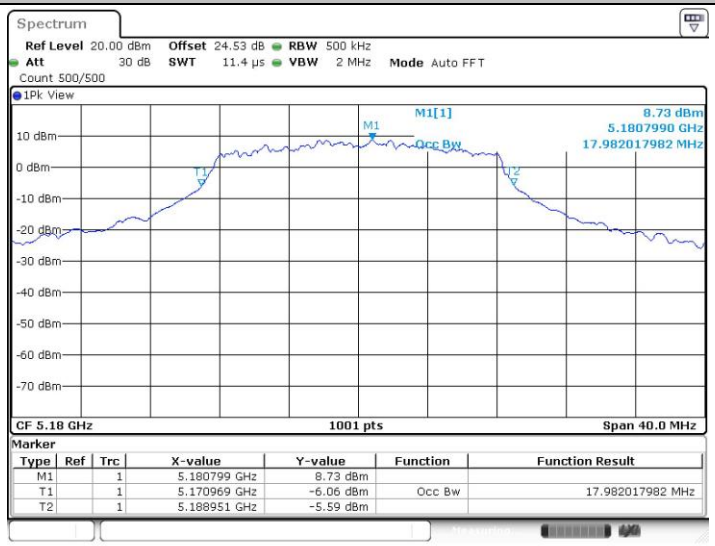
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.982	5170.969	5188.951	---	---
		5220	17.862	5211.049	5228.911	---	---
		5240	18.821	5230.729	5249.550	---	---
		5260	18.342	5250.969	5269.311	---	---
		5300	18.382	5290.689	5309.071	---	---
		5320	17.662	5311.049	5328.711	---	---
		5500	17.702	5491.009	5508.711	---	---
		5580	18.422	5570.529	5588.951	---	---
		5700	18.821	5689.850	5708.671	---	---
		5720	17.902	5710.969	5728.871	---	---
11N20 SISO	Ant1	5180	19.181	5170.210	5189.391	---	---
		5220	19.82	5210.090	5229.910	---	---
		5240	19.061	5230.529	5249.590	---	---
		5260	18.821	5250.569	5269.391	---	---
		5300	19.101	5290.529	5309.630	---	---
		5320	18.821	5310.410	5329.231	---	---
		5500	19.58	5490.010	5509.590	---	---
		5580	19.98	5570.609	5590.589	---	---
		5700	19.381	5690.130	5709.510	---	---
		5720	19.181	5710.370	5729.550	---	---

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11N40 SISO	Ant1	5190	36.444	5171.778	5208.222	---	---
		5230	36.603	5211.618	5248.222	---	---
		5270	36.763	5251.698	5288.462	---	---
		5310	36.523	5291.618	5328.142	---	---
		5510	36.284	5491.778	5528.062	---	---
		5550	36.364	5531.858	5568.222	---	---
		5670	36.763	5651.698	5688.462	---	---
		5710	36.603	5691.698	5728.302	---	---
11AC80 SISO	Ant1	5210	77.043	5171.479	5248.521	---	---
		5290	76.883	5251.479	5328.362	---	---
		5530	77.363	5491.319	5568.681	---	---
		5610	76.404	5571.798	5648.202	---	---
		5690	76.404	5651.798	5728.202	---	---
11AX20 SISO	Ant1	5180	19.261	5170.250	5189.510	---	---
		5220	19.061	5210.450	5229.510	---	---
		5240	19.021	5230.490	5249.510	---	---
		5260	19.141	5250.410	5269.550	---	---
		5300	19.221	5290.290	5309.510	---	---
		5320	19.181	5310.410	5329.590	---	---
		5500	19.061	5490.490	5509.550	---	---
		5580	19.101	5570.450	5589.550	---	---
		5700	19.101	5690.450	5709.550	---	---
		5720	18.981	5710.490	5729.471	---	---

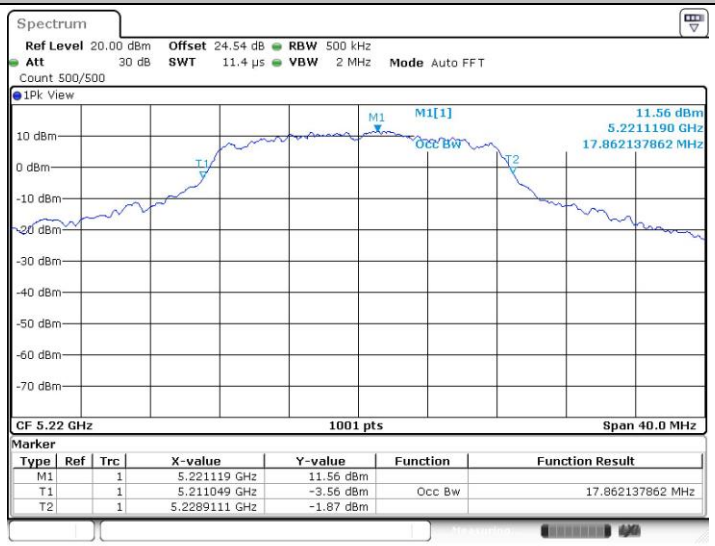
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX40 SISO	Ant1	5190	37.722	5171.139	5208.861	---	---
		5230	37.722	5211.139	5248.861	---	---
		5270	37.722	5251.139	5288.861	---	---
		5310	37.802	5291.059	5328.861	---	---
		5510	37.642	5491.139	5528.781	---	---
		5550	37.642	5531.219	5568.861	---	---
		5670	37.722	5651.059	5688.781	---	---
		5710	37.802	5691.139	5728.941	---	---
11AX80 SISO	Ant1	5210	78.162	5170.999	5249.161	---	---
		5290	78.162	5250.999	5329.161	---	---
		5530	78.641	5490.679	5569.321	---	---
		5610	77.682	5571.319	5649.001	---	---
		5690	77.842	5651.159	5729.001	---	---

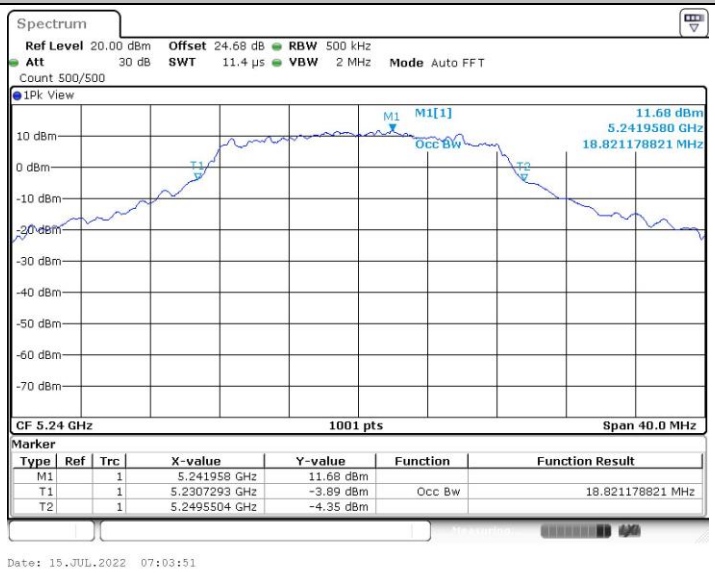
Test Graphs

11A_Ant1_5180



11A_Ant1_5220



11A_Ant1_5240


11A_Ant1_5260