FCC RF Test Report

APPLICANT	:	**Lenovo(Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Portable Tablet Computer**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**TB570FU**
FCC ID	:	**O57TB570FU**
Standard	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**15E 6 GHz Low Power Indoor Client (6XD)**
TEST DATE(S)	:	**Nov. 02, 2022 ~ Dec. 06, 2022**

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

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

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FR2O1214F	01	Initial issue of report	Dec. 09, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i) 15.407(a)(10)	26dB Emission Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)(8)	Maximum Conducted Output Power	Reporting only	-
3.2	15.407(a)(8)	Fundamental Maximum EIRP	Pass	-
3.3	15.407(a)(8)	Fundamental Power Spectral Density	Pass	-
3.4	15.407(b)(6)	In-Band Emissions (Channel Mask)	Pass	-
3.5	15.407(d)(6)	Contention Based Protocol	Pass	
3.6	15.407(b)	Unwanted Emissions	Pass	Under limit 3.82 dB at 2483.500 MHz
3.7	15.207	AC Conducted Emission	Pass	Under limit 8.34 dB at 0.161 MHz
3.8	15.203 15.407(a)	Antenna Requirement	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

Lenovo(Shanghai) Electronics Technology Co., Ltd.
Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

1.2 Manufacturer

Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	TB570FU
FCC ID	O57TB570FU
SN	Conducted: HA192AC0035 Conduction: HA1R5MJ7 Radiation: HA1R78HK/HA1R1LJD CBP: HA192AC001J
HW Version	TB570FU
SW Version	TB570FU_RF01_20221124
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 Frequency Range	U-NII-5: 5925 MHz ~ 6425 MHz U-NII-6: 6425 MHz ~ 6525 MHz U-NII-7: 6525 MHz ~ 6875 MHz U-NII-8: 6875 MHz ~ 7125 MHz
Maximum EIRP	**<MIMO Ant.4a+5a>** **<5925 MHz ~ 7125 MHz >** 802.11ax HE20 : 7.69 dBm / 0.0059 W 802.11ax HE40 : 10.72 dBm / 0.0118 W 802.11ax HE80 : 14.43 dBm / 0.0277 W 802.11ax HE160 : 13.24 dBm / 0.0211 W
99% Occupied Bandwidth	**<MIMO Ant.4a+5a>** 802.11ax HE20 : 19.02 MHz 802.11ax HE40 : 37.96 MHz 802.11ax HE80 : 78.00 MHz 802.11ax HE160 : 160.80 MHz
Antenna Type / Gain	**<5925 MHz ~ 6425 MHz >** <Ant. 4a> : FPC Antenna with gain -2.9 dBi <Ant. 5a> : FPC Antenna with gain -3.8 dBi **<6425 MHz ~ 6525 MHz >** <Ant. 4a> : FPC Antenna with gain -6.4 dBi <Ant. 5a> : FPC Antenna with gain -4.2 dBi **<6525 MHz ~ 6875 MHz >** <Ant. 4a> : FPC Antenna with gain -6.3 dBi <Ant. 5a> : FPC Antenna with gain -4.8 dBi **<6875 MHz ~ 7125 MHz >** <Ant. 4a> : FPC Antenna with gain -6.6 dBi <Ant. 5a> : FPC Antenna with gain -5.0 dBi
Type of Modulation	802.11ax: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)

Remark:

1. 802.11ax support 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 for conducted power/PSD/Channel Mask in appendix A, all the other test case were performed with full RU with its maximum power/PSD.
2. The EUT does not support channel puncturing mode.
3. WIFI MIMO support CDD by manufacturer declared.
4. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to the higher output power.
5. The device does not support UNII-8 CH233 (BW=20M, Center Frequency = 7115MHz).
6. CBP test with antenna path of minimum gain (Antenna 4a, Minimum gain= -6.6 dBi).
7. U-NII-5/-6/-7/-8 can't transmit simultaneously.

1.5 Modification of EUT

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

1.6 Testing Location

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

<table>
<tr><td>Test Firm</td><td colspan="3">Sporton International Inc. (Kunshan)</td></tr>
<tr><td>Test Site Location</td><td colspan="3">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</td></tr>
<tr><td rowspan="2">Test Site No.</td><td>Sporton Site No.</td><td>FCC Designation No.</td><td>FCC Test Firm Registration No.</td></tr>
<tr><td>CO01-KS
03CH07-KS
TH01-KS
DFS01-KS</td><td>CN1257</td><td>314309</td></tr>
</table>

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH07-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24
3.	DFS01-KS	Sporton	DFS & Adaptivity Test Tools	1.0

1.8 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- 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 (Z plane) were recorded in this report.

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

2.1 Carrier Frequency and Channel

<U-NII-5, 6, 7, 8>

BW 20M	**Channel**	1	5	9	13	17	21	25	29
	Freq. (MHz)	5955	5975	5995	6015	6035	6055	6075	6095
BW 40M	**Channel**	3		11		19		27	
	Freq. (MHz)	5965		6005		6045		6085	
BW 80M	**Channel**	7				23			
	Freq. (MHz)	5985				6065			
BW 160M	**Channel**	15							
	Freq. (MHz)	6025							

BW 20M	**Channel**	33	37	41	45	49	53	57	61
	Freq. (MHz)	6115	6135	6155	6175	6195	6215	6235	6255
BW 40M	**Channel**	35		43		51		59	
	Freq. (MHz)	6125		6165		6205		6245	
BW 80M	**Channel**	39				55			
	Freq. (MHz)	6145				6225			
BW 160M	**Channel**	47							
	Freq. (MHz)	6185							

BW 20M	**Channel**	65	69	73	77	81	85	89	93
	Freq. (MHz)	6275	6295	6315	6335	6355	6375	6395	6415
BW 40M	**Channel**	67		75		83		91	
	Freq. (MHz)	6285		6325		6365		6405	
BW 80M	**Channel**	71				87			
	Freq. (MHz)	6305				6385			
BW 160M	**Channel**	79							
	Freq. (MHz)	6345							

BW 20M	Channel	97	101	105	109	113	117	121	125
	Freq. (MHz)	6435	6455	6475	6495	6515	6535	6555	6575
BW 40M	Channel	99		107		115		123	
	Freq. (MHz)	6445		6485		6525		6565	
BW 80M	Channel	103				119			
	Freq. (MHz)	6465				6545			
BW 160M	Channel	111							
	Freq. (MHz)	6505							

BW 20M	Channel	129	133	137	141	145	149	153	157
	Freq. (MHz)	6595	6615	6635	6655	6675	6695	6715	6735
BW 40M	Channel	131		139		147		155	
	Freq. (MHz)	6605		6645		6685		6725	
BW 80M	Channel	135				151			
	Freq. (MHz)	6625				6705			
BW 160M	Channel	143							
	Freq. (MHz)	6665							

BW 20M	Channel	161	165	169	173	177	181	185	189
	Freq. (MHz)	6755	6775	6795	6815	6835	6855	6875	6895
BW 40M	Channel	163		171		179		187	
	Freq. (MHz)	6765		6805		6845		6885	
BW 80M	Channel	167				183			
	Freq. (MHz)	6785				6865			
BW 160M	Channel	175							
	Freq. (MHz)	6825							

BW 20M	Channel	193	197	201	205	209	213	217	221
	Freq. (MHz)	6915	6935	6955	6975	6995	7015	7035	7055
BW 40M	Channel	195		203		211		219	
	Freq. (MHz)	6925		6965		7005		7045	
BW 80M	Channel	199				215			
	Freq. (MHz)	6945				7025			
BW 160M	Channel	207							
	Freq. (MHz)	6985							

BW 20M	Channel	225	229
	Freq. (MHz)	7075	7095
BW 40M	Channel	227	
	Freq. (MHz)	7085	

2.2 Test Mode

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

Modulation	Data Rate
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0
802.11ax HE160	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : BT Link + WLAN Link(6G) + USB Cable 1(Charging From Adapter)+ Battery 1 + Earphone
Remark: For Radiated Test Cases, the tests were performed with Adapter 1, Earphone and USB Cable 1.	

Co-location
WLAN 6G 802.11ax HE160 CH15 TX + BLE 2Mbps CH39 Tx

Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE20	802.11ax HE20	802.11ax HE20	802.11ax HE20
L	Low	001	097	117	189
M	Middle	045	105	149	209
H	High	093	113	181	229
Straddle		-	-	-	185

Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE40	802.11ax HE40	802.11ax HE40	802.11ax HE40
L	Low	003	099	123	203
M	Middle	043	-	147	-
H	High	091	107	179	227
Straddle		-	115	-	187

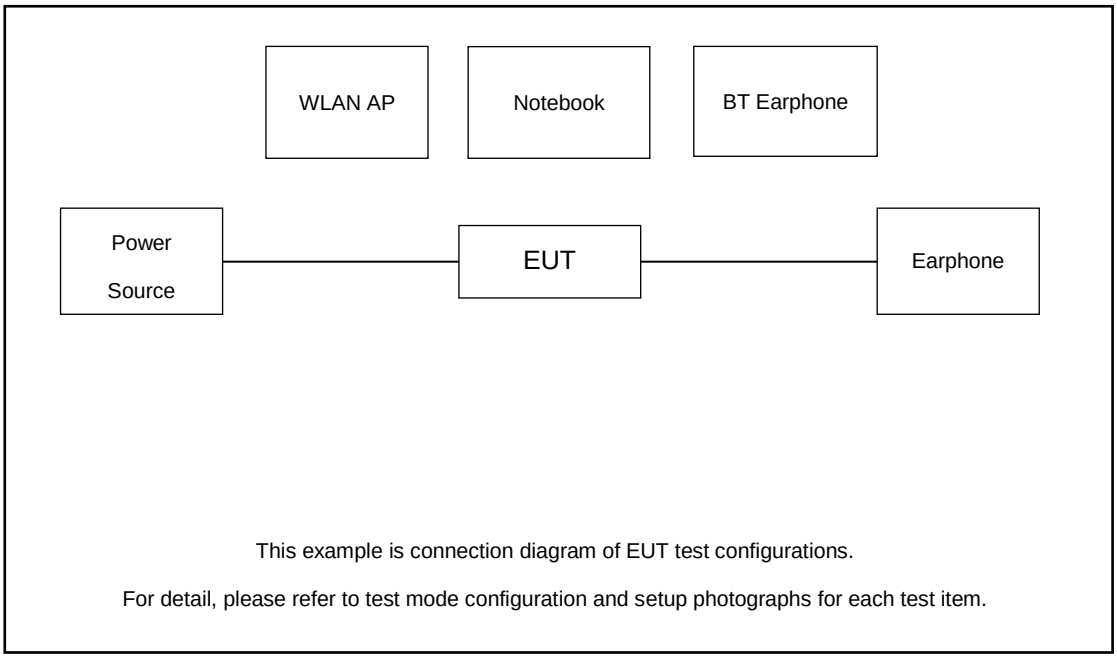
Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE80	802.11ax HE80	802.11ax HE80	802.11ax HE80
L	Low	007	103	135	199
M	Middle	039		-	-
H	High	087		151	215
Straddle		-	119	183	-

Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE160	802.11ax HE160	802.11ax HE160	802.11ax HE160
L	Low	015	-	143	207
M	Middle	047			
H	High	079			
Straddle		-	111	175	-

Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

2.3 Connection Diagram of Test System

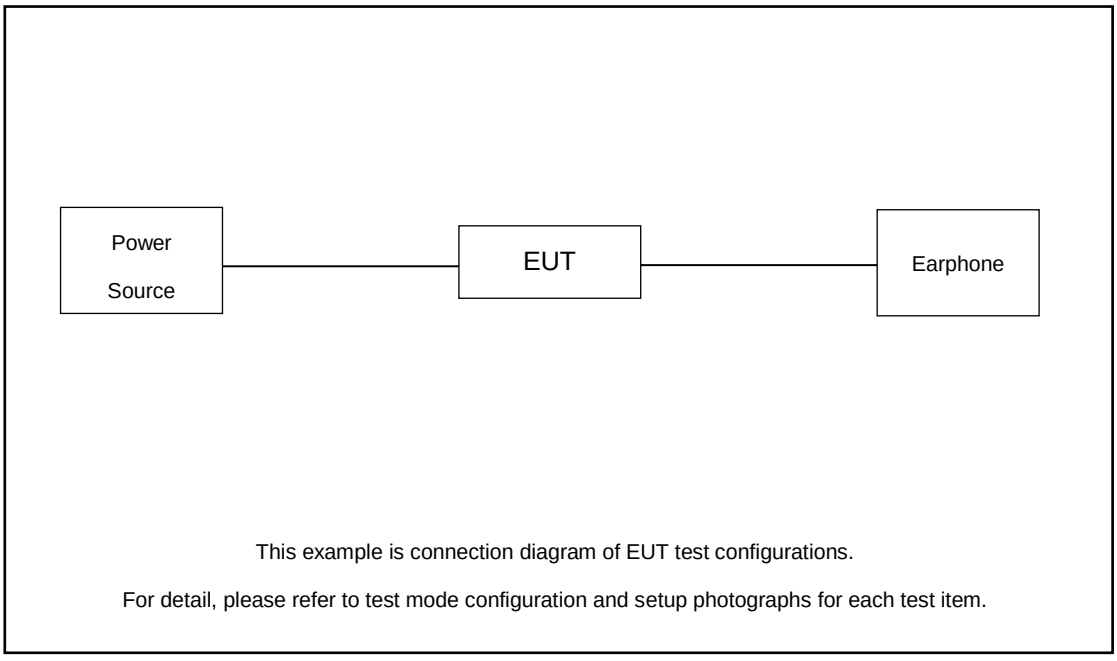
For AC Conducted Emission



This example is connection diagram of EUT test configurations.

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

For Radiated Emission



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	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
2.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
4.	Earphone	Lenovo	P121	N/A	N/A	Unshielded,1.2m
5.	SD Card	Kingston	8GB	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 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 6.23 dB and 10dB attenuator.

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

= 6.23 + 10 = 16.23 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Limit of 26dB & 99% Occupied Bandwidth

<FCC 14-30 CFR 15.407>

(a)(10) The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.

3.1.2 Measuring Instruments

See list of measuring equipment 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 1-5% of the emission bandwidth 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 and Fundamental Maximum EIRP Measurement

3.2.1 Limit of Fundamental Maximum EIRP

<FCC 14-30 CFR 15.407>

(a)(8) For client devices operating under the control of an indoor access point in the 5.925-7.125 GHz bands, the maximum e.i.r.p. over the frequency band of operation must not exceed 24 dBm.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

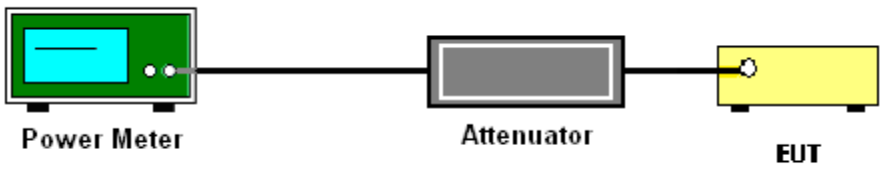
3.2.3 Test Procedures

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 Fundamental Maximum EIRP

Please refer to Appendix A.

3.3 Fundamental Power Spectral Density Measurement

3.3.1 Limit of Fundamental Power Spectral Density

<FCC 14-30 CFR 15.407>

(a)(8) For client devices operating under the control of an indoor access point in the 5.925-7.125 GHz bands, the maximum power spectral density must not exceed −1 dBm e.i.r.p. in any 1-megahertz band.

3.3.2 Measuring Instruments

See list of measuring equipment 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, attenuator loss and duty factor. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (a): Measure and sum the spectra across the outputs.

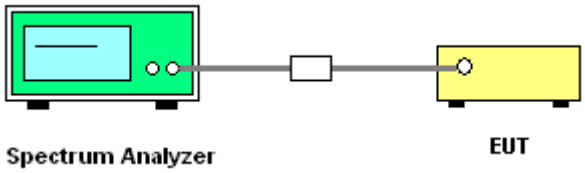
   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first

spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

Method (b): Measure and sum spectral maxima across the outputs.
The measurement on each individual output were performed with the same span and number on each individual output. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

Method (c): Measure and add 10 log(N_{ANT}) dB, where N_{ANT} is the number of outputs.
The measurement on each individual output were performed with the same span and number on each individual output. The quantity 10 log(N_{ANT}) dB is added to each spectrum value before comparing to the emission limit.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 In-Band Emissions (Channel Mask)

3.4.1 Limit of Unwanted Emissions

<FCC 14-30 CFR 15.407>

(b)(6) For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01.

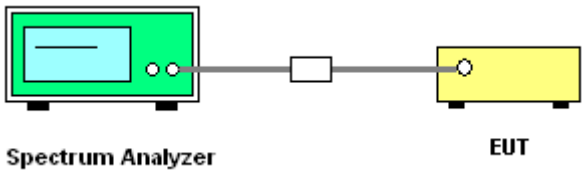
Section J) In-Band Emissions.

1. Take nominal bandwidth as reference channel bandwidth provided that 26 dB emission bandwidth is always larger than nominal bandwidth
2. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:
   a) Set the span to encompass the entire 26 dB EBW of the signal.
   b) Set RBW = same RBW used for 26 dB EBW measurement.
   c) Set VBW ≥ 3 X RBW
   d) Number of points in sweep ≥ [2 X span / RBW].
   e) Sweep time = auto.
   f) Detector = RMS (i.e., power averaging)
   g) Trace average at least 100 traces in power averaging (rms) mode.
   h) Use the peak search function on the instrument to find the peak of the spectrum.
3. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
   a. Suppressed by 20 dB at 1 MHz outside of the channel edge.
   b. Suppressed by 28 dB at one channel bandwidth from the channel center.

c. Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.

4. Adjust the span to encompass the entire mask as necessary.
5. Clear trace.
6. Trace average at least 100 traces in power averaging (rms) mode.
7. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

3.4.4 Test Setup



3.4.5 Test Result

Please refer to Appendix A.

3.5 Contention Based Protocol

3.5.1 Limit of Contention Based Protocol

<FCC 14-30 CFR 15.407>

(d)(6) Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:
$BWEUT$: Transmission bandwidth of EUT signal
$BWInc$: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)
$fc1$: Center frequency of EUT transmission
$fc2$: Center frequency of simulated incumbent signal

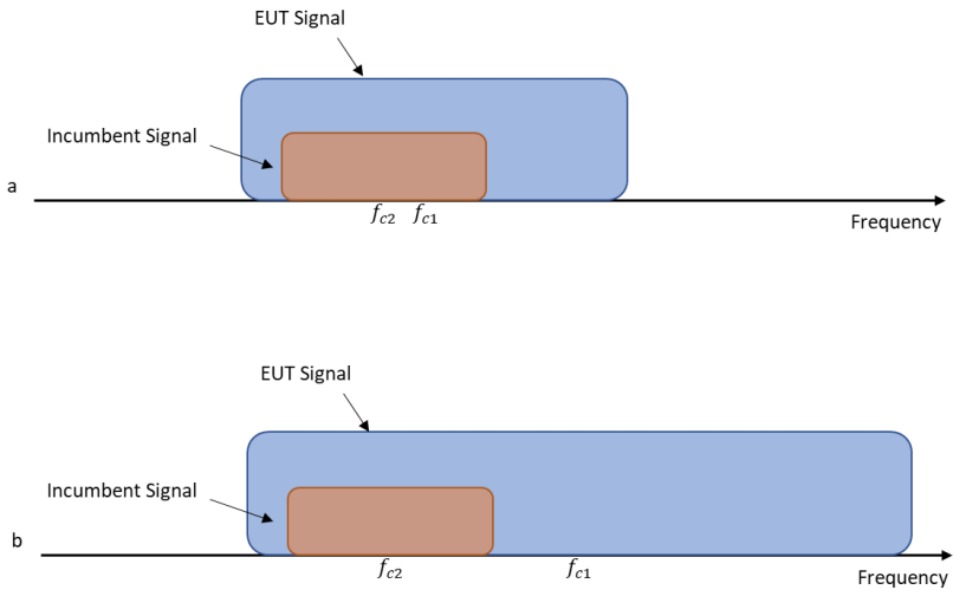


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

Refer to KDB 987594 D02 v01r01.

1. To ensure EUT reliably detects an incumbent signal in both scenarios shown in Figure 1, the detection threshold test may be repeated more than once with the incumbent signal (having center frequency $fc2$) tuned to different center frequencies within the UT transmission bandwidth. The criteria specified in Table 1 determines how many times the detection threshold test must be performed
2. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
3. Monitor the signal analyzer to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
4. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
5. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 2, choose a different center frequency for the AWGN signal and repeat the process.

3.5.4 Test Setup

Conducted Setup

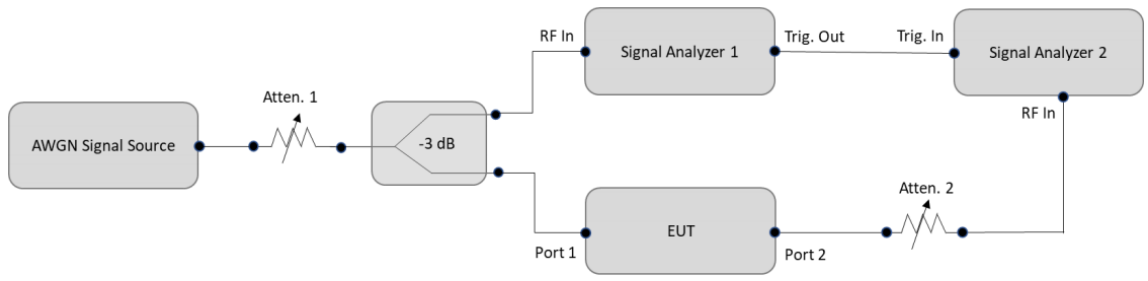


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

3.5.5 Support Unit used in test configuration and system

Instrument	Brand Name	Model No.	Characteristics
WLAN AP	ASUS	GT-AXE11000	Dual Band AP
Notebook	Dell	P78G	LAN

3.5.6 Test Summary of Contention Based Protocol Test

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 5	6135	20	6135	-75.70	100	-62	-69.1	7.1
					Result: Stop Transmission			
				-76.70	< 90	-62	-70.1	8.1
					Result: Minimal Operation			
				-77.12	0	-62	-70.52	8.52
					Result: Normal Operation			
	6185	160	6110	-74.93	100	-62	-68.33	6.33
					Result: Stop Transmission			
				-75.93	< 90	-62	-69.33	7.33
					Result: Minimal Operation			
				-76.26	0	-62	-69.66	7.66
					Result: Normal Operation			
			6185	-74.13	100	-62	-67.53	5.53
					Result: Stop Transmission			
				-75.13	< 90	-62	-68.53	6.53
					Result: Minimal Operation			
				-76.21	0	-62	-69.61	7.61
					Result: Normal Operation			
			6260	-74.93	100	-62	-68.33	6.33
					Result: Stop Transmission			
				-75.93	< 90	-62	-69.33	7.33
					Result: Minimal Operation			
				-76.37	0	-62	-69.77	7.77
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 4a, gain = -6.6dBi)

Note 2: Pass Loss is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 6	6455	20	6455	-74.52	100	-62	-67.92	5.92
					Result: Stop Transmission			
				-75.52	< 90	-62	-68.92	6.92
					Result: Minimal Operation			
				-75.95	0	-62	-69.35	7.35
					Result: Normal Operation			
	6505	160	6430	-74.68	100	-62	-68.08	6.08
					Result: Stop Transmission			
				-75.68	< 90	-62	-69.08	7.08
					Result: Minimal Operation			
				-75.88	0	-62	-69.28	7.28
					Result: Normal Operation			
			6505	-74.69	100	-62	-68.09	6.09
					Result: Stop Transmission			
				-75.69	< 90	-62	-69.09	7.09
					Result: Minimal Operation			
				-76.05	0	-62	-69.45	7.45
					Result: Normal Operation			
			6580	-75.02	100	-62	-68.42	6.42
					Result: Stop Transmission			
				-76.02	< 90	-62	-69.42	7.42
					Result: Minimal Operation			
				-76.12	0	-62	-69.52	7.52
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 4a, gain = -6.6dBi)

Note 2: Pass Loss is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 7	6695	20	6695	-74.98	100	-62	-68.38	6.38
					Result: Stop Transmission			
				-75.98	< 90	-62	-69.38	7.38
					Result: Minimal Operation			
				-76.22	0	-62	-69.62	7.62
					Result: Normal Operation			
	6665	160	6590	-74.52	100	-62	-67.92	5.92
					Result: Stop Transmission			
				-75.52	< 90	-62	-68.92	6.92
					Result: Minimal Operation			
				-75.84	0	-62	-69.24	7.24
					Result: Normal Operation			
			6665	-74.88	100	-62	-68.28	6.28
					Result: Stop Transmission			
				-75.88	< 90	-62	-69.28	7.28
					Result: Minimal Operation			
				-75.91	0	-62	-69.31	7.31
					Result: Normal Operation			
			6740	-74.78	100	-62	-68.18	6.18
					Result: Stop Transmission			
				-75.78	< 90	-62	-69.18	7.18
					Result: Minimal Operation			
				-76.76	0	-62	-70.16	8.16
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 4a, gain = -6.6dBi)

Note 2: Pass Loss is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

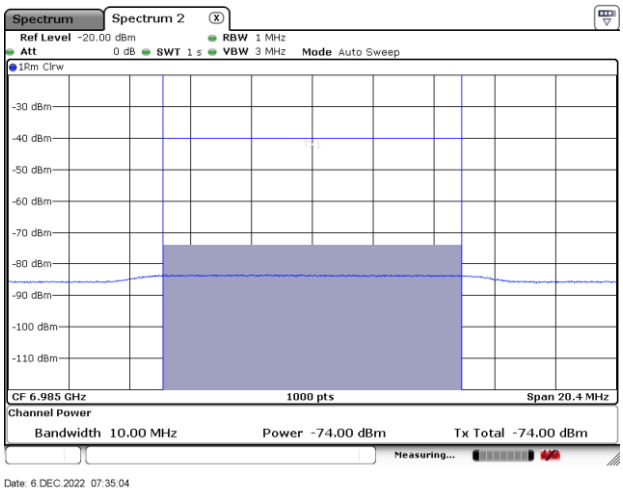
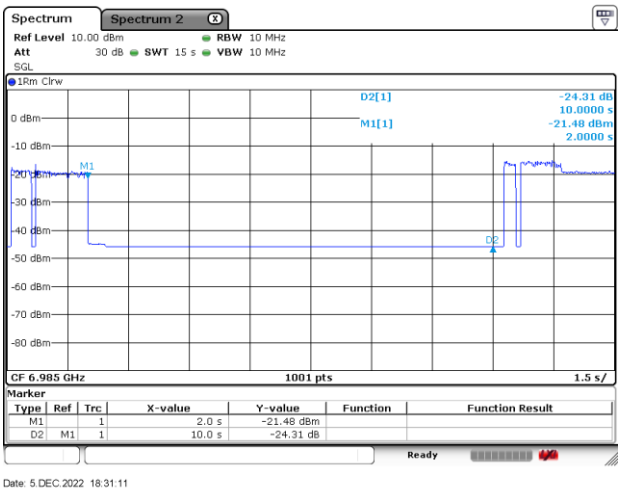
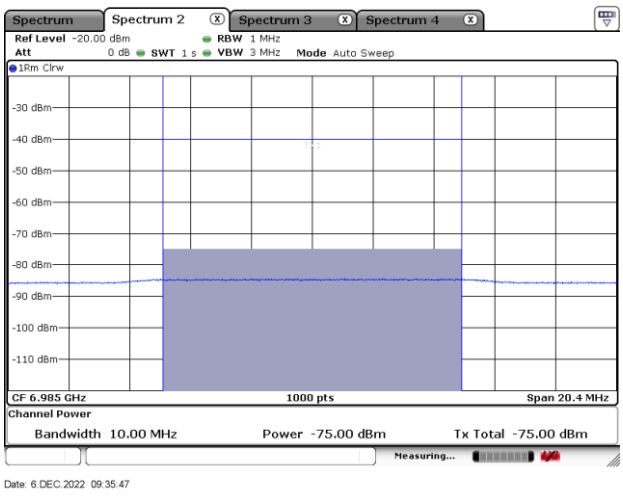
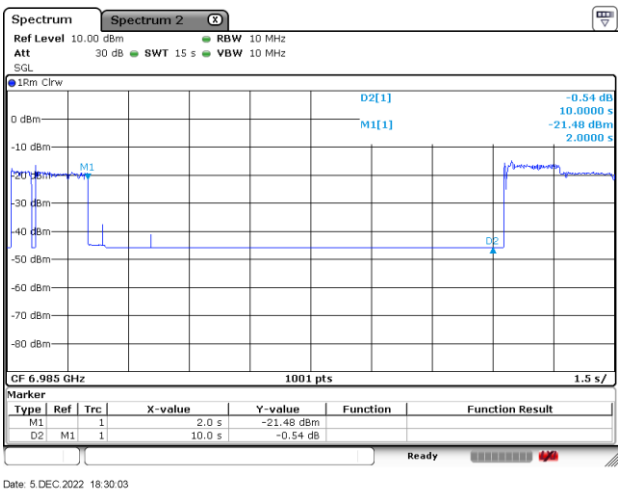
Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 8	7015	20	7015	-76.88	100	-62	-70.28	8.28
					Result: Stop Transmission			
				-77.88	< 90	-62	-71.28	9.28
					Result: Minimal Operation			
				-78.48	0	-62	-71.88	9.88
					Result: Normal Operation			
	6985	160	6910	-74.16	100	-62	-67.56	5.56
					Result: Stop Transmission			
				-75.16	< 90	-62	-68.56	6.56
					Result: Minimal Operation			
				-75.61	0	-62	-69.01	7.01
					Result: Normal Operation			
			6985	**-74.00 (worst)**	100	-62	-67.4	**5.4**
					Result: Stop Transmission			
				-75.00	< 90	-62	-68.4	6.4
					Result: Minimal Operation			
				-75.26	0	-62	-68.66	6.66
					Result: Normal Operation			
			7060	-77.31	100	-62	-70.71	8.71
					Result: Stop Transmission			
				-78.31	< 90	-62	-71.71	9.71
					Result: Minimal Operation			
				-78.47	0	-62	-71.87	9.87
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 4a, gain = -6.6dBi)

Note 2: Pass Loss is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

3.5.7 Worst Case Plots of Contention Based Protocol

Contention Based Protocol Result Plots on U-NII 8 (AWGN Interference)	
802.11ax (HE160) / 6985MHz Threshold Level (TL) = -74.00dBm	802.11ax (HE160) / 6985MHz Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 6985MHz Threshold Level (TL) = -75.00dBm	802.11ax (HE160) / 6985MHz Transmit when the interferer is 1dB lower.
	

Remark: M1: Injection of AWGN signal, D1: Removal of AWGN signal

3.6 Unwanted Emissions Measurement

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

3.6.1 Limit of Unwanted Emissions

(1) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27 (RMS)	68.2
- 7 (Peak)	88.2

According 987594 D02 U-NII 6GHz EMC Measurement v01r01 section G:
Unwanted emissions outside of restricted bands are measured with a RMS detector.
In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

(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

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

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

   Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

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

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

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

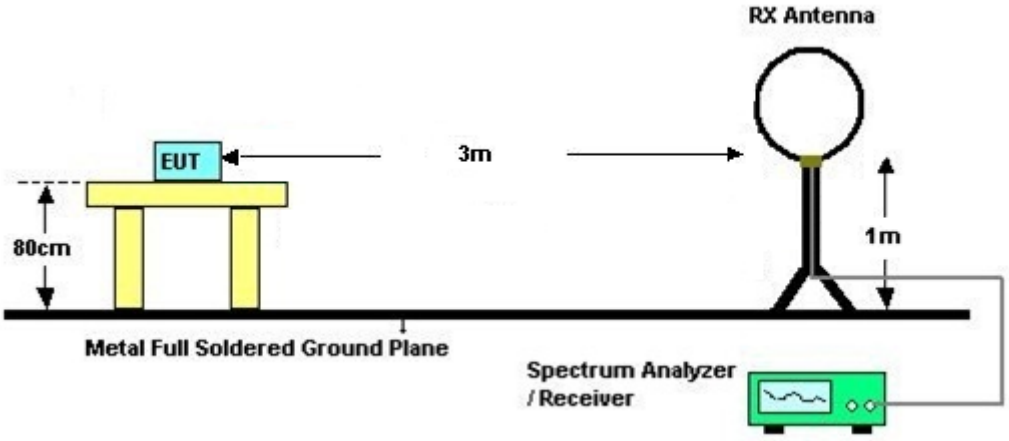
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

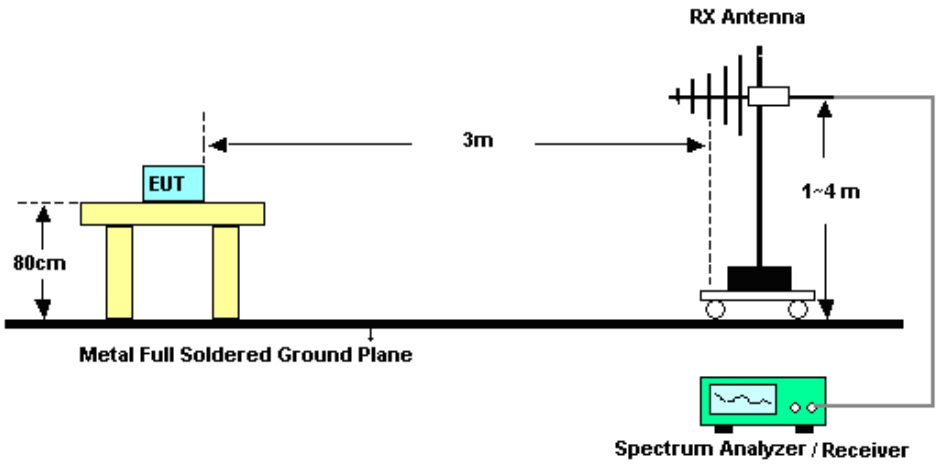
3.6.4 Test Setup

For radiated emissions below 30MHz



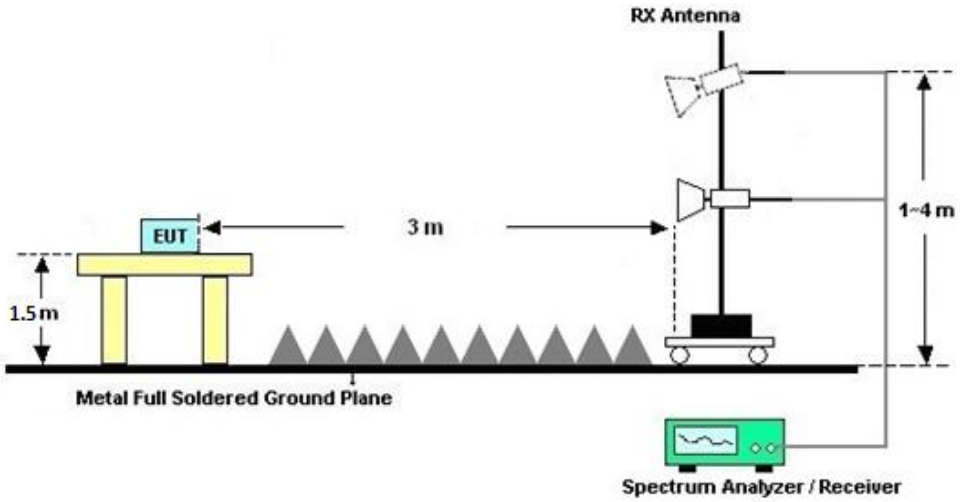
For radiated emissions from 30MHz to 1GHz

<CDD Mode>



For radiated emissions above 1GHz

<CDD Mode>



3.6.5 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 adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.6.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C

3.6.7 Duty Cycle

Please refer to Appendix D.

3.6.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.7 AC Conducted Emission Measurement

3.7.1 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.

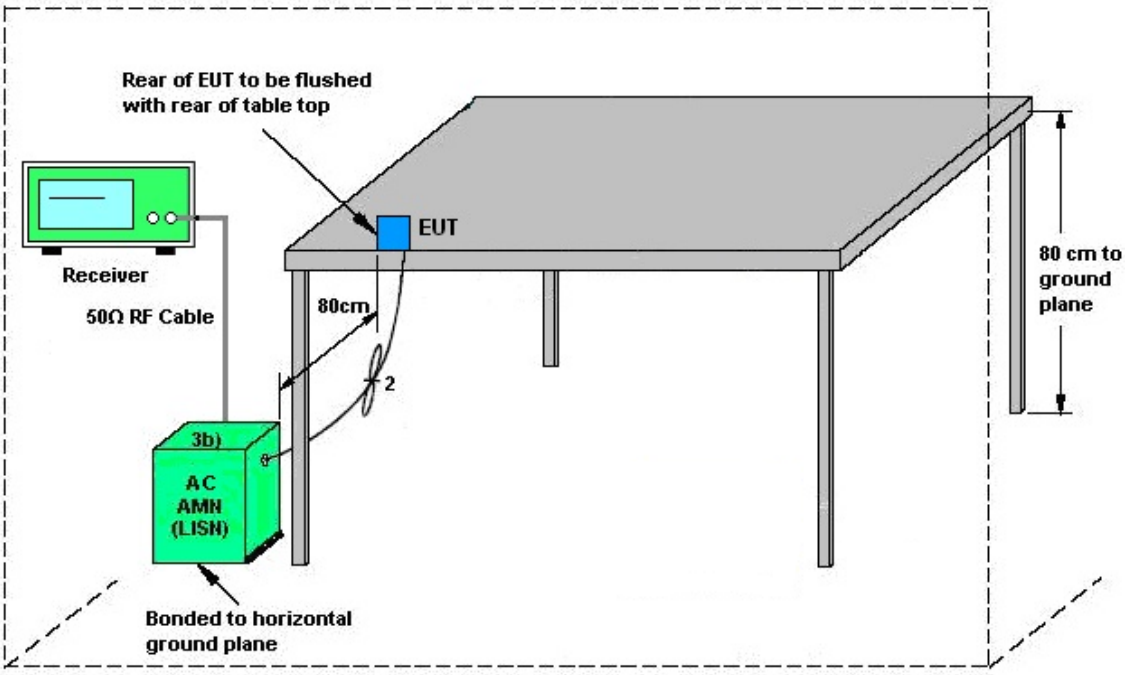
3.7.2 Measuring Instruments

See list of measuring equipment of this test report.

3.7.3 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.

3.7.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.7.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.8 Antenna Requirements

3.8.1 Standard Applicable

§15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used. The EUT complies with the requirement of 15.203.

3.8.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e.,

Directional gain = $G_{ANT\ MAX}$(Ant.1 Gain, Ant.2 Gain,…) + Array Gain, as following table for Power,

where Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

For PSD, the directional gain calculation is following,

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{Gn/20})^2 / N_{ANT}$] dBi, as following table for PSD.

N_{ANT} = number of transmit antennas

N_{SS} = number of spatial streams. (The worst case directional gain will occur when NSS = 1)

For completely uncorrelated transmissions, directional gain is calculated as,

Directional gain = $G_{ANT\ MAX}$(Ant.1 Gain, Ant.2 Gain,…), as following table

<CDD Modes>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)
U-NII-5	-2.90	-3.80	-2.90	-0.33
U-NII-6	-6.40	-4.20	-4.20	-2.22
U-NII-7	-6.30	-4.80	-4.80	-2.51
U-NII-8	-6.60	-5.00	-5.00	-2.75

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Nov. 02, 2022~ Nov. 09, 2022	Oct. 11, 2023	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2022	Nov. 02, 2022~ Nov. 09, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2022	Nov. 02, 2022~ Nov. 09, 2022	Jan. 04, 2023	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 12, 2022	Nov. 28, 2022	Oct. 11, 2023	Radiation (03CH07-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 12, 2022	Nov. 28, 2022	Oct. 11, 2023	Radiation (03CH07-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Nov. 28, 2022	Oct. 15, 2023	Radiation (03CH07-KS)
Bilog Antenna	TeseQ	CBL6111D	59913	30MHz-1GHz	Aug. 26, 2022	Nov. 28, 2022	Aug. 25, 2023	Radiation (03CH07-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 06, 2022	Nov. 28, 2022	Apr. 05, 2023	Radiation (03CH07-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Nov. 28, 2022	Oct. 11, 2023	Radiation (03CH07-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Nov. 28, 2022	Jan. 04, 2023	Radiation (03CH07-KS)
Amplifier	SONOMA	310N	413740	9KHz-1GHz	Jan. 05, 2022	Nov. 28, 2022	Jan. 04, 2023	Radiation (03CH07-KS)
Amplifier	EM	EM01G18GA	060834	1Ghz-18Ghz	Oct. 12, 2022	Nov. 28, 2022	Oct. 11, 2023	Radiation (03CH07-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Nov. 28, 2022	Jan. 04, 2023	Radiation (03CH07-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Nov. 28, 2022	NCR	Radiation (03CH07-KS)
Turn Table	EM	EM 1000-T	N/A	0~360 degree	NCR	Nov. 28, 2022	NCR	Radiation (03CH07-KS)
Antenna Mast	EM	EM 1000-A	N/A	1 m~4 m	NCR	Nov. 28, 2022	NCR	Radiation (03CH07-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 24, 2022	Nov. 16, 2022	May 23, 2023	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2022	Nov. 16, 2022	Oct. 12, 2023	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 24, 2022	Nov. 16, 2022	May 23, 2023	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2022	Nov. 16, 2022	Oct. 11, 2023	Conduction (CO01-KS)
Spectrum Analyzer	R&S	FSV30	101338	10Hz~30GHz	Apr. 12, 2022	Dec. 05, 2022~ Dec. 06, 2022	Apr. 11, 2023	CBP (DFS01-KS)
MXG-B RF Vector Signal Genertor	Keysight	5182B /5182BX07	MY56200417 /MY59360210	9kHz~7.2GHz	May 24, 2022	Dec. 05, 2022~ Dec. 06, 2022	May 23, 2023	CBP (DFS01-KS)
Vector Signal Generator	R&S	SMBV100A	258305	9kHz~6GHz	Jan. 06, 2022	Dec. 05, 2022~ Dec. 06, 2022	Jan. 05, 2023	CBP (DFS01-KS)
Combiner	MTJ Cooperation	MTJ7112	N/A	0.4-6GHz	NCR	Dec. 05, 2022~ Dec. 06, 2022	NCR	CBP (DFS01-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 Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.10 %
Conducted Power Spectral Density	±0.40 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.78 dB

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

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

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

Appendix A. Conducted Test Results

Report Number : FR2O1214F

Test Engineer:	Jiang Jun	Temperature:	21~25	°C
Test Date:	2022.11.2~2022.11.9	Relative Humidity:	51~54	%

TEST RESULTS DATA
EIRP Power Table

U-NII-5															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power with duty factor (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						Ant 4a	Ant 5a	Ant 4a	Ant 5a	SUM	Ant 4a	Ant 5a	SUM		
HE20	MCS0	2	001	5955	Full	0.18	0.18	6.71	6.50	9.62	-2.90		6.72	24.00	Pass
HE20	MCS0	2	001	5955	26/0	0.03	0.05	-0.86	-3.28	1.11	-2.90		-1.79	24.00	Pass
HE20	MCS0	2	001	5955	52/37	0.03	0.03	1.41	0.62	4.05	-2.90		1.15	24.00	Pass
HE20	MCS0	2	001	5955	106/53	0.09	0.07	4.55	3.89	7.24	-2.90		4.34	24.00	Pass
HE20	MCS0	2	045	6175	Full	0.18	0.18	6.03	6.37	9.21	-2.90		6.31	24.00	Pass
HE20	MCS0	2	045	6175	26/4	0.03	0.05	-2.41	-1.27	1.21	-2.90		-1.69	24.00	Pass
HE20	MCS0	2	045	6175	52/39	0.03	0.03	0.40	1.69	4.11	-2.90		1.21	24.00	Pass
HE20	MCS0	2	045	6175	106/53	0.09	0.07	3.63	4.33	7.00	-2.90		4.10	24.00	Pass
HE20	MCS0	2	093	6415	Full	0.18	0.18	6.33	6.56	9.46	-2.90		6.56	24.00	Pass
HE20	MCS0	2	093	6415	26/8	0.03	0.05	-4.60	-3.13	-0.79	-2.90		-3.69	24.00	Pass
HE20	MCS0	2	093	6415	52/40	0.03	0.03	-1.69	1.55	3.24	-2.90		0.34	24.00	Pass
HE20	MCS0	2	093	6415	106/54	0.09	0.07	4.11	4.13	7.13	-2.90		4.23	24.00	Pass
HE40	MCS0	2	003	5965	Full	0.34	0.34	9.71	9.43	12.58	-2.90		9.68	24.00	Pass
HE40	MCS0	2	043	6165	Full	0.34	0.34	9.21	9.57	12.40	-2.90		9.50	24.00	Pass
HE40	MCS0	2	091	6405	Full	0.34	0.34	9.75	9.71	12.74	-2.90		9.84	24.00	Pass
HE80	MCS0	2	007	5985	Full	0.61	0.61	13.53	13.65	16.60	-2.90		13.70	24.00	Pass
HE80	MCS0	2	039	6145	Full	0.61	0.61	13.33	13.53	16.44	-2.90		13.54	24.00	Pass
HE80	MCS0	2	087	6385	Full	0.61	0.61	13.08	13.14	16.12	-2.90		13.22	24.00	Pass
HE160	MCS0	2	015	6025	Full	1.77	1.77	13.01	12.76	15.90	-2.90		13.00	24.00	Pass
HE160	MCS0	2	047	6185	Full	1.77	1.77	12.88	12.60	15.76	-2.90		12.86	24.00	Pass
HE160	MCS0	2	079	6345	Full	1.77	1.77	12.47	13.23	15.88	-2.90		12.98	24.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-6															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power with duty factor (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						Ant 4a	Ant 5a	Ant 4a	Ant 5a	SUM	Ant 4a	Ant 5a	SUM		
HE20	MCS0	2	097	6435	Full	0.18	0.18	8.31	8.95	11.65	-4.20		7.45	24.00	Pass
HE20	MCS0	2	097	6435	26/0	0.03	0.05	-5.61	-2.02	-0.44	-4.20		-4.64	24.00	Pass
HE20	MCS0	2	097	6435	52/37	0.03	0.03	-5.06	-1.32	0.22	-4.20		-3.98	24.00	Pass
HE20	MCS0	2	097	6435	106/53	0.09	0.07	5.36	5.95	8.68	-4.20		4.48	24.00	Pass
HE20	MCS0	2	105	6475	Full	0.18	0.18	8.64	8.70	11.68	-4.20		7.48	24.00	Pass
HE20	MCS0	2	105	6475	26/4	0.03	0.05	7.37	1.50	8.37	-4.20		4.17	24.00	Pass
HE20	MCS0	2	105	6475	52/39	0.03	0.03	3.32	3.29	6.32	-4.20		2.12	24.00	Pass
HE20	MCS0	2	105	6475	106/54	0.09	0.07	5.86	6.04	8.96	-4.20		4.76	24.00	Pass
HE20	MCS0	2	113	6515	Full	0.18	0.18	8.67	9.07	11.89	-4.20		7.69	24.00	Pass
HE20	MCS0	2	113	6515	26/8	0.03	0.05	6.87	0.72	7.82	-4.20		3.62	24.00	Pass
HE20	MCS0	2	113	6515	52/40	0.03	0.03	3.02	3.67	6.37	-4.20		2.17	24.00	Pass
HE20	MCS0	2	113	6515	106/54	0.09	0.07	5.74	6.25	9.01	-4.20		4.81	24.00	Pass
HE40	MCS0	2	099	6445	Full	0.34	0.34	11.46	11.83	14.66	-4.20		10.46	24.00	Pass
HE40	MCS0	2	107	6485	Full	0.34	0.34	11.19	11.36	14.28	-4.20		10.08	24.00	Pass
HE40	MCS0	2	115	6525	Full	0.34	0.34	11.23	11.52	14.39	-4.20		10.19	24.00	Pass
HE80	MCS0	2	103	6465	Full	0.61	0.61	15.58	15.66	18.63	-4.20		14.43	24.00	Pass
HE80	MCS0	2	119	6545	Full	0.61	0.61	15.38	15.34	18.37	-4.20		14.17	24.00	Pass
HE160	MCS0	2	111	6505	Full	1.77	1.77	13.93	14.85	17.43	-4.20		13.23	24.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-7														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power with duty factor (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						Ant 4a	Ant 5a	Ant 4a	Ant 5a	SUM	Ant 4a	Ant 5a	SUM		
HE20	MCS0	2	117	6535	Full	0.18	0.18	8.67	9.14	11.92	-4.80		7.12	24.00	Pass
HE20	MCS0	2	117	6535	26/0	0.03	0.05	6.98	1.20	8.00	-4.80		3.20	24.00	Pass
HE20	MCS0	2	117	6535	52/37	0.03	0.03	3.30	3.67	6.50	-4.80		1.70	24.00	Pass
HE20	MCS0	2	117	6535	106/53	0.09	0.07	6.38	6.61	9.51	-4.80		4.71	24.00	Pass
HE20	MCS0	2	149	6695	Full	0.18	0.18	8.63	8.60	11.63	-4.80		6.83	24.00	Pass
HE20	MCS0	2	149	6695	26/4	0.03	0.05	-3.00	1.57	2.87	-4.80		-1.93	24.00	Pass
HE20	MCS0	2	149	6695	52/38	0.03	0.03	3.50	3.22	6.38	-4.80		1.58	24.00	Pass
HE20	MCS0	2	149	6695	106/53	0.09	0.07	6.66	6.39	9.54	-4.80		4.74	24.00	Pass
HE20	MCS0	2	181	6855	Full	0.18	0.18	9.33	8.56	11.97	-4.80		7.17	24.00	Pass
HE20	MCS0	2	181	6855	26/8	0.18	0.18	-1.06	2.23	3.90	-4.80		-0.90	24.00	Pass
HE20	MCS0	2	181	6855	52/40	0.18	0.18	4.23	2.77	6.57	-4.80		1.77	24.00	Pass
HE20	MCS0	2	181	6855	106/54	0.18	0.18	7.25	5.84	9.61	-4.80		4.81	24.00	Pass
HE40	MCS0	2	123	6565	Full	0.34	0.34	12.02	11.63	14.84	-4.80		10.04	24.00	Pass
HE40	MCS0	2	147	6685	Full	0.34	0.34	11.17	11.36	14.27	-4.80		9.47	24.00	Pass
HE40	MCS0	2	179	6845	Full	0.34	0.34	11.97	10.97	14.51	-4.80		9.71	24.00	Pass
HE80	MCS0	2	135	6625	Full	0.61	0.61	15.19	15.47	18.34	-4.80		13.54	24.00	Pass
HE80	MCS0	2	151	6705	Full	0.61	0.61	15.27	15.62	18.46	-4.80		13.66	24.00	Pass
HE80	MCS0	2	183	6865	Full	0.61	0.61	15.38	15.33	18.37	-4.80		13.57	24.00	Pass
HE160	MCS0	2	143	6665	Full	1.77	1.77	14.78	14.52	17.67	-4.80		12.87	24.00	Pass
HE160	MCS0	2	175	6825	Full	1.77	1.77	15.40	14.61	18.04	-4.80		13.24	24.00	Pass

TEST RESULTS DATA
EIRP Power Table

U-NII-8														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power with duty factor (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
						Ant 4a	Ant 5a	Ant 4a	Ant 5a	SUM	Ant 4a	Ant 5a	SUM		
HE20	MCS0	2	185	6875	Full	0.18	0.18	9.23	9.03	12.14	-5.00		7.14	24.00	Pass
HE20	MCS0	2	185	6875	26/0	0.03	0.05	1.02	2.20	4.66	-5.00		-0.34	24.00	Pass
HE20	MCS0	2	185	6875	52/37	0.03	0.03	3.94	3.20	6.60	-5.00		1.60	24.00	Pass
HE20	MCS0	2	185	6875	106/53	0.09	0.07	6.47	5.81	9.16	-5.00		4.16	24.00	Pass
HE20	MCS0	2	189	6895	Full	0.18	0.18	9.20	9.24	12.23	-5.00		7.23	24.00	Pass
HE20	MCS0	2	189	6895	26/0	0.03	0.05	1.42	1.37	4.41	-5.00		-0.59	24.00	Pass
HE20	MCS0	2	189	6895	52/37	0.03	0.03	4.11	3.56	6.86	-5.00		1.86	24.00	Pass
HE20	MCS0	2	189	6895	106/53	0.09	0.07	6.64	6.39	9.53	-5.00		4.53	24.00	Pass
HE20	MCS0	2	209	6995	Full	0.18	0.18	9.27	8.75	12.03	-5.00		7.03	24.00	Pass
HE20	MCS0	2	209	6995	26/4	0.03	0.05	-2.60	2.44	3.63	-5.00		-1.37	24.00	Pass
HE20	MCS0	2	209	6995	52/38	0.03	0.03	3.29	2.56	5.95	-5.00		0.95	24.00	Pass
HE20	MCS0	2	209	6995	106/53	0.09	0.07	6.56	5.53	9.09	-5.00		4.09	24.00	Pass
HE20	MCS0	2	229	7095	Full	0.18	0.18	9.52	8.70	12.14	-5.00		7.14	24.00	Pass
HE20	MCS0	2	229	7095	26/8	0.03	0.05	-2.74	2.67	3.77	-5.00		-1.23	24.00	Pass
HE20	MCS0	2	229	7095	52/40	0.03	0.03	3.37	2.68	6.05	-5.00		1.05	24.00	Pass
HE20	MCS0	2	229	7095	106/54	0.09	0.07	6.72	6.22	9.49	-5.00		4.49	24.00	Pass
HE40	MCS0	2	187	6885	Full	0.34	0.34	11.96	11.47	14.73	-5.00		9.73	24.00	Pass
HE40	MCS0	2	203	6965	Full	0.34	0.34	15.22	6.09	15.72	-5.00		10.72	24.00	Pass
HE40	MCS0	2	227	7085	Full	0.34	0.34	12.55	11.31	14.98	-5.00		9.98	24.00	Pass
HE80	MCS0	2	199	6945	Full	0.61	0.61	18.50	10.06	19.08	-5.00		14.08	24.00	Pass
HE80	MCS0	2	215	7025	Full	0.61	0.61	15.64	15.45	18.56	-5.00		13.56	24.00	Pass
HE160	MCS0	2	207	6985	Full	1.77	1.77	14.72	14.40	17.58	-5.00		12.58	24.00	Pass

Emission Bandwidth

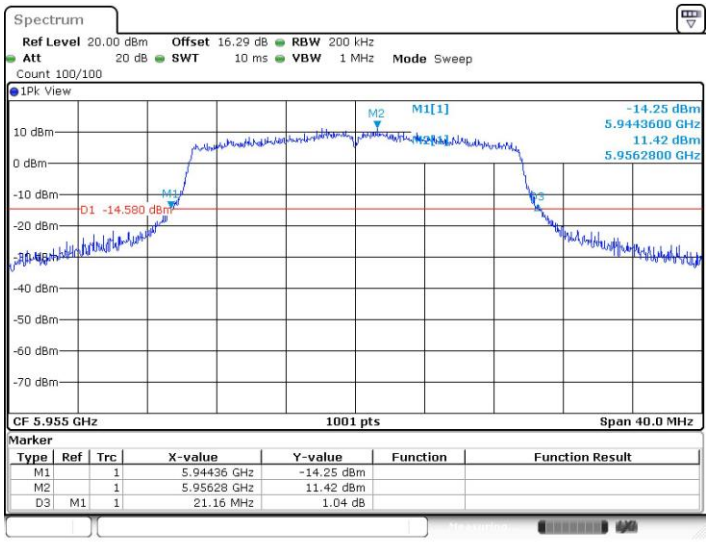
Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX20MIMO	Ant4a	5955	21.16	5944.36	5965.52	---	---
	Ant5a	5955	20.92	5944.60	5965.52	---	---
	Ant4a	6175	21.64	6164.16	6185.80	---	---
	Ant5a	6175	21.08	6164.32	6185.40	---	---
	Ant4a	6415	21.72	6404.16	6425.88	---	---
	Ant5a	6415	21.36	6404.40	6425.76	---	---
	Ant4a	6435	21.60	6424.12	6445.72	---	---
	Ant5a	6435	21.28	6424.40	6445.68	---	---
	Ant4a	6475	21.28	6464.20	6485.48	---	---
	Ant5a	6475	21.12	6464.44	6485.56	---	---
	Ant4a	6515	21.28	6504.28	6525.56	---	---
	Ant5a	6515	21.36	6504.36	6525.72	---	---
	Ant4a	6535	21.08	6524.48	6545.56	---	---
	Ant5a	6535	20.84	6524.72	6545.56	---	---
	Ant4a	6695	21.48	6684.32	6705.80	---	---
	Ant5a	6695	20.96	6684.48	6705.44	---	---
	Ant4a	6855	21.40	6844.32	6865.72	---	---
	Ant5a	6855	21.16	6844.44	6865.60	---	---
	Ant4a	6875	21.24	6864.36	6885.60	---	---
	Ant5a	6875	21.16	6864.40	6885.56	---	---
	Ant4a	6895	21.56	6884.32	6905.88	---	---
	Ant5a	6895	21.04	6884.28	6905.32	---	---
	Ant4a	6995	21.56	6984.24	7005.80	---	---
	Ant5a	6995	21.36	6984.44	7005.80	---	---
	Ant4a	7095	21.52	7084.24	7105.76	---	---
	Ant5a	7095	21.36	7084.28	7105.64	---	---
11AX40MIMO	Ant4a	5965	39.68	5945.24	5984.92	---	---
	Ant5a	5965	39.60	5945.24	5984.84	---	---
	Ant4a	6165	39.68	6145.16	6184.84	---	---
	Ant5a	6165	39.76	6145.16	6184.92	---	---
	Ant4a	6405	39.68	6385.16	6424.84	---	---
	Ant5a	6405	39.68	6385.16	6424.84	---	---
	Ant4a	6445	39.68	6425.16	6464.84	---	---
	Ant5a	6445	39.68	6425.16	6464.84	---	---
	Ant4a	6485	39.76	6465.16	6504.92	---	---
	Ant5a	6485	39.68	6465.16	6504.84	---	---
	Ant4a	6525	39.68	6505.16	6544.84	---	---
	Ant5a	6525	39.68	6505.16	6544.84	---	---
	Ant4a	6565	39.76	6545.16	6584.92	---	---
	Ant5a	6565	39.76	6545.16	6584.92	---	---
	Ant4a	6685	39.68	6665.16	6704.84	---	---
	Ant5a	6685	39.60	6665.24	6704.84	---	---
	Ant4a	6845	39.68	6825.16	6864.84	---	---
	Ant5a	6845	39.60	6825.24	6864.84	---	---
	Ant4a	6885	39.68	6865.16	6904.84	---	---

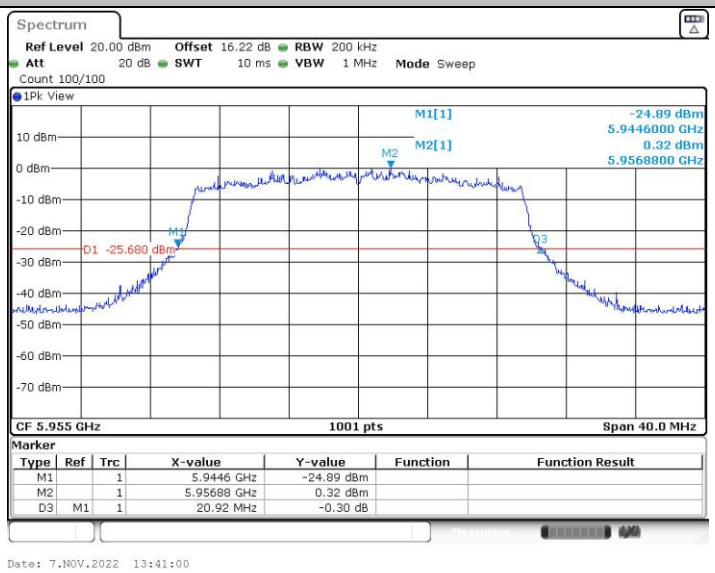
	Ant5a	6885	39.60	6865.16	6904.76	---	---
	Ant4a	6925	39.68	6905.16	6944.84	---	---
	Ant5a	6925	39.68	6905.16	6944.84	---	---
	Ant4a	6965	39.52	6945.24	6984.76	---	---
	Ant5a	6965	39.52	6945.16	6984.68	---	---
	Ant4a	7085	39.68	7065.16	7104.84	---	---
	Ant5a	7085	39.60	7065.16	7104.76	---	---
11AX80MIMO	Ant4a	5985	80.64	5944.68	6025.32	---	---
	Ant5a	5985	80.64	5944.68	6025.32	---	---
	Ant4a	6145	80.64	6104.68	6185.32	---	---
	Ant5a	6145	80.64	6104.68	6185.32	---	---
	Ant4a	6385	80.64	6344.68	6425.32	---	---
	Ant5a	6385	80.64	6344.68	6425.32	---	---
	Ant4a	6465	80.64	6424.68	6505.32	---	---
	Ant5a	6465	80.80	6424.52	6505.32	---	---
	Ant4a	6545	80.64	6504.68	6585.32	---	---
	Ant5a	6545	80.80	6504.68	6585.48	---	---
	Ant4a	6625	80.64	6584.68	6665.32	---	---
	Ant5a	6625	80.64	6584.68	6665.32	---	---
	Ant4a	6705	80.64	6664.68	6745.32	---	---
	Ant5a	6705	80.64	6664.68	6745.32	---	---
	Ant4a	6785	80.64	6744.68	6825.32	---	---
	Ant5a	6785	80.64	6744.68	6825.32	---	---
	Ant4a	6865	80.64	6824.68	6905.32	---	---
	Ant5a	6865	80.64	6824.68	6905.32	---	---
	Ant4a	6945	80.80	6904.68	6985.48	---	---
	Ant5a	6945	80.64	6904.68	6985.32	---	---
	Ant4a	7025	80.32	6984.84	7065.16	---	---
	Ant5a	7025	80.48	6984.68	7065.16	---	---
11AX160MIMO	Ant4a	6025	162.56	5943.72	6106.28	---	---
	Ant5a	6025	161.92	5944.04	6105.96	---	---
	Ant4a	6185	162.56	6103.72	6266.28	---	---
	Ant5a	6185	162.24	6103.72	6265.96	---	---
	Ant4a	6345	162.88	6263.72	6426.60	---	---
	Ant5a	6345	165.44	6263.72	6429.16	---	---
	Ant4a	6505	166.40	6423.72	6590.12	---	---
	Ant5a	6505	162.56	6423.72	6586.28	---	---
	Ant4a	6665	162.24	6583.72	6745.96	---	---
	Ant5a	6665	162.56	6583.72	6746.28	---	---
	Ant4a	6825	167.36	6743.72	6911.08	---	---
	Ant5a	6825	165.44	6743.72	6909.16	---	---
	Ant4a	6985	166.08	6903.72	7069.80	---	---
	Ant5a	6985	162.56	6903.72	7066.28	---	---

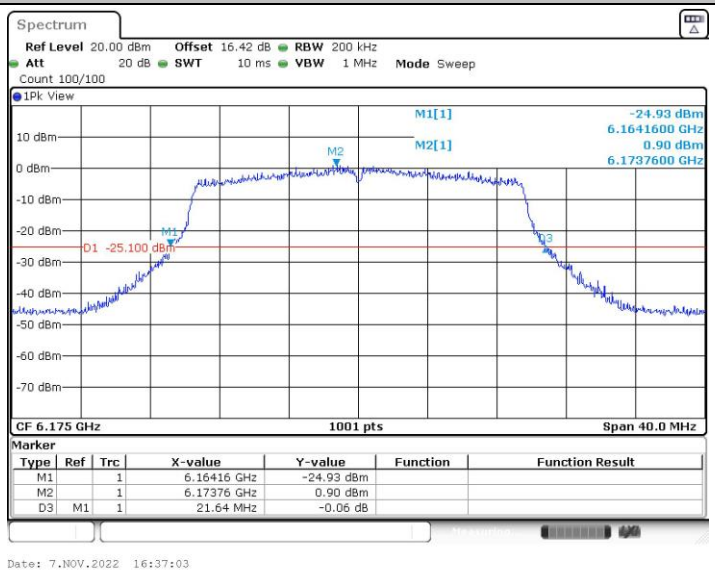
Test Graphs

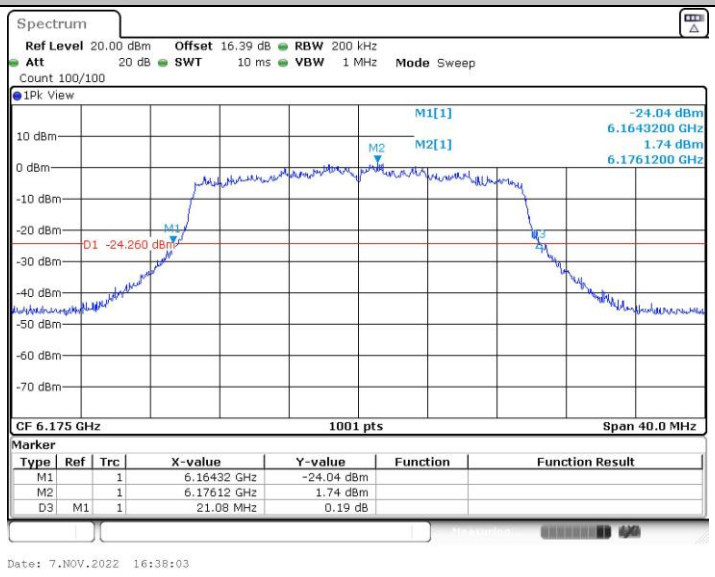
11AX20MIMO_Ant4a_5955



11AX20MIMO_Ant5a_5955



11AX20MIMO_Ant4a_6175


11AX20MIMO_Ant5a_6175


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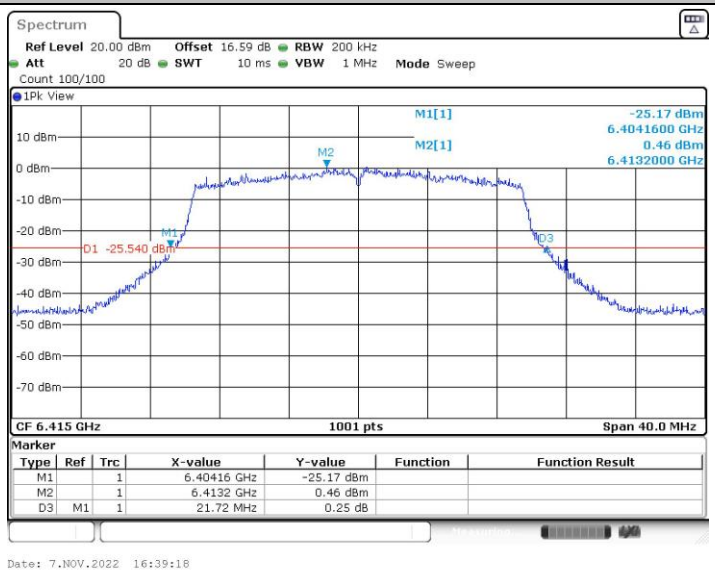

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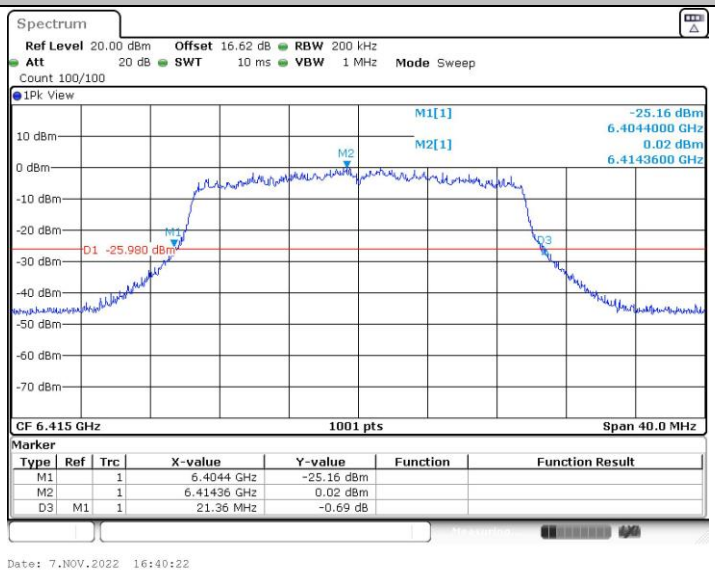

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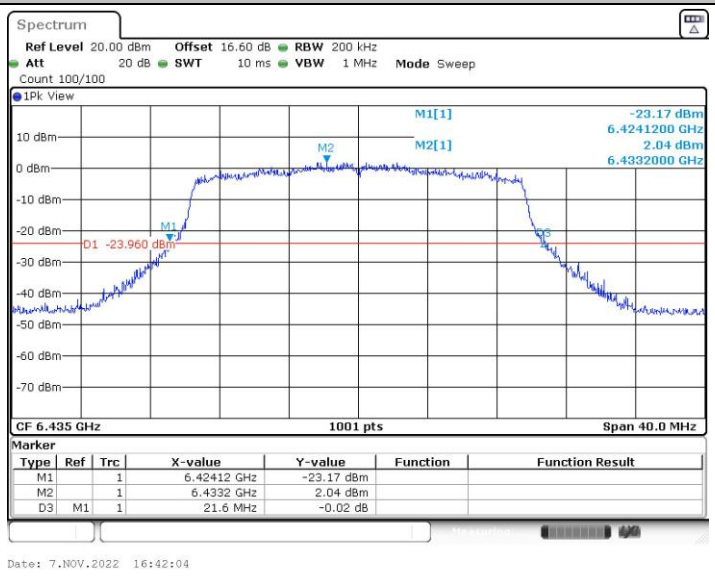

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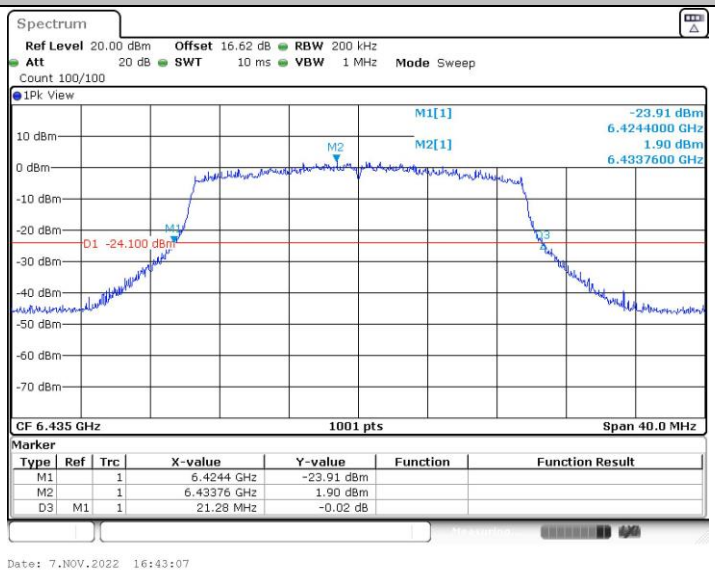

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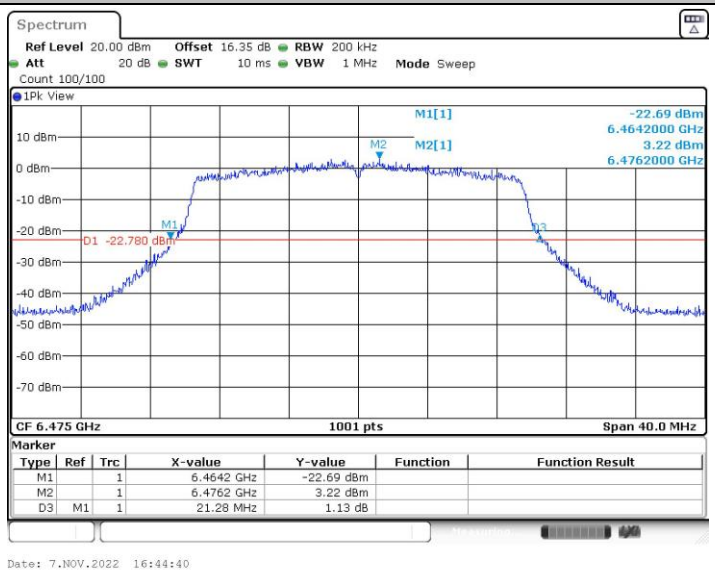

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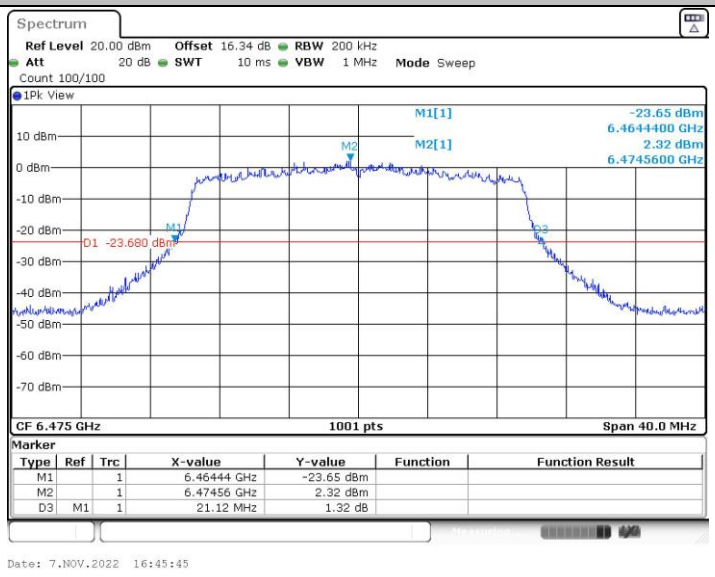

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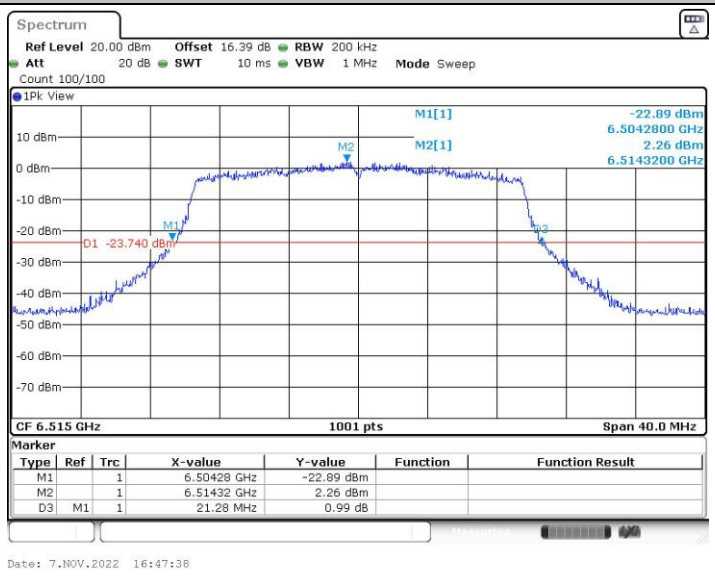

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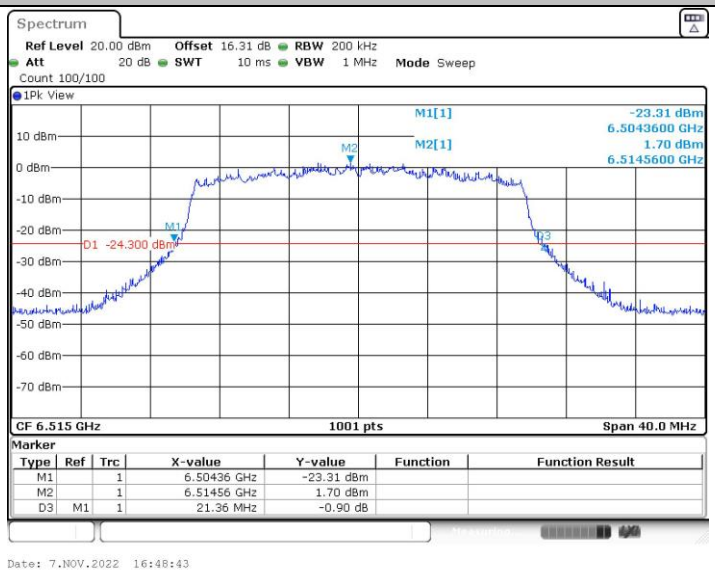

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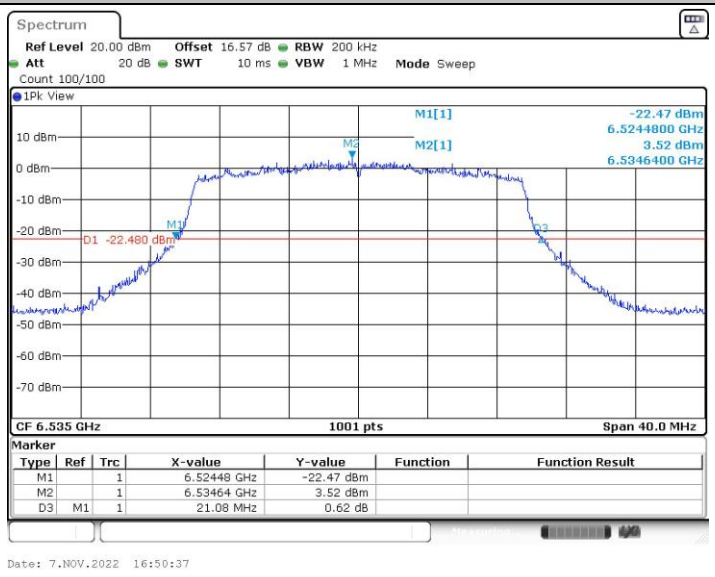

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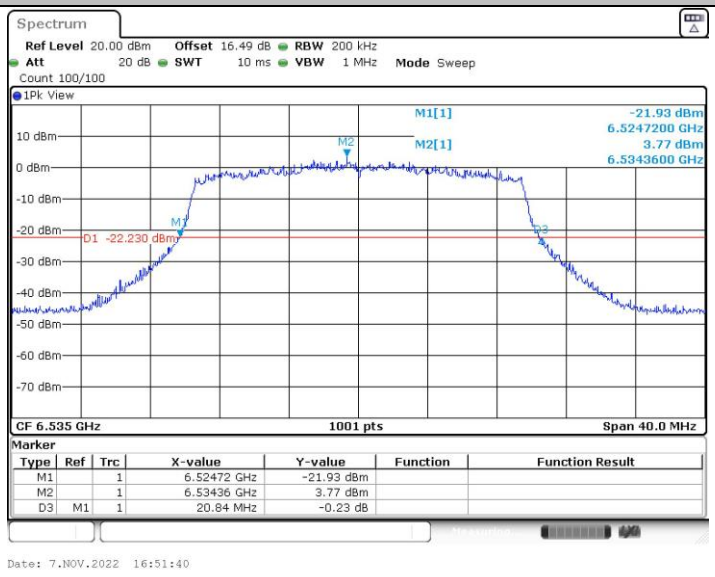

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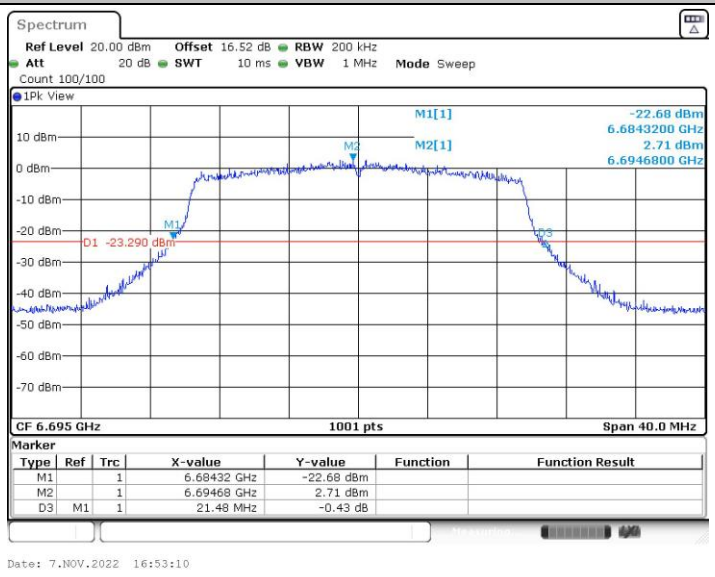

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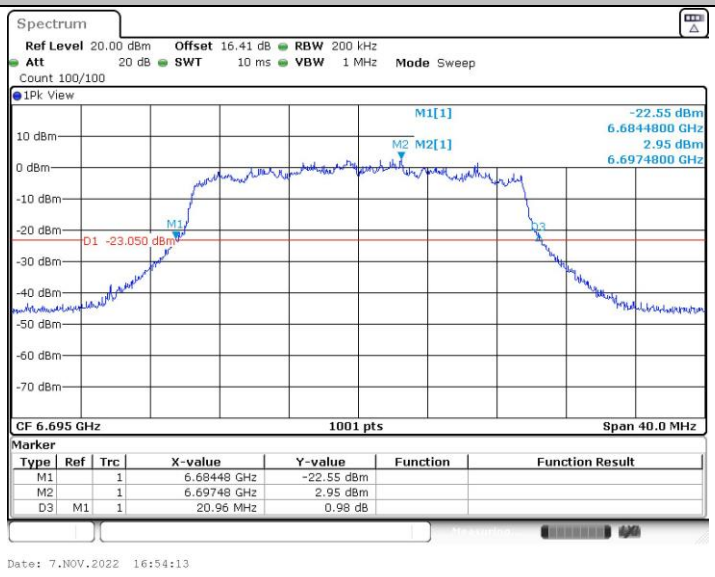

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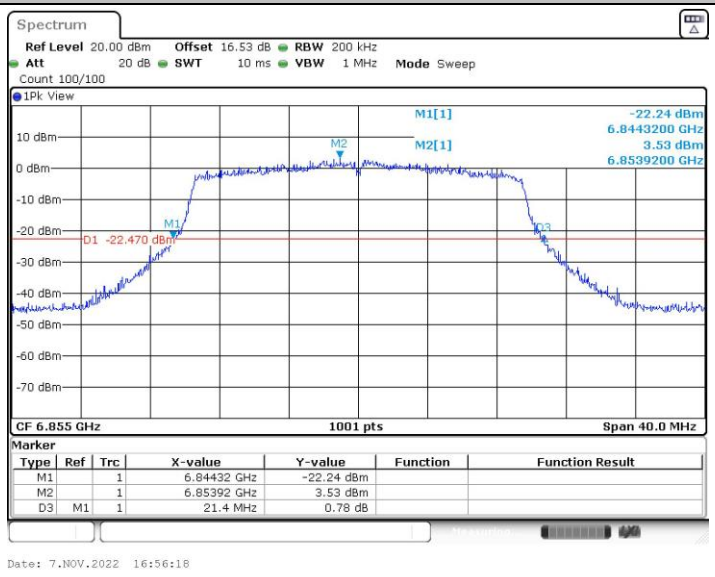

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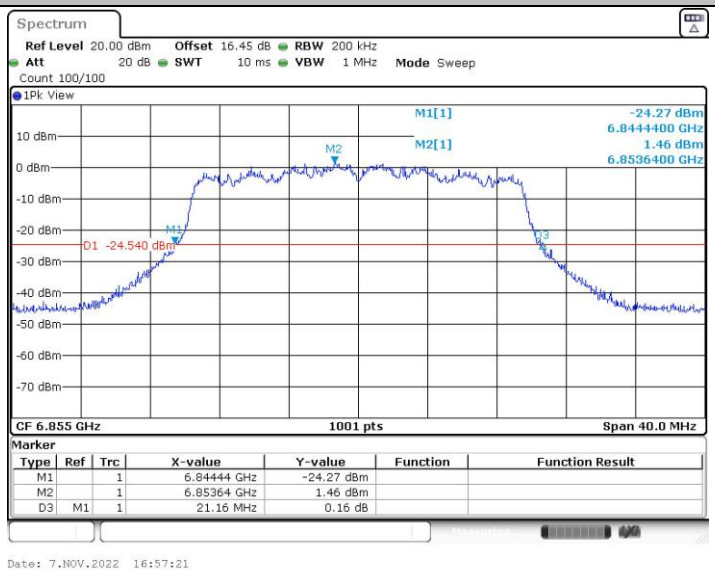

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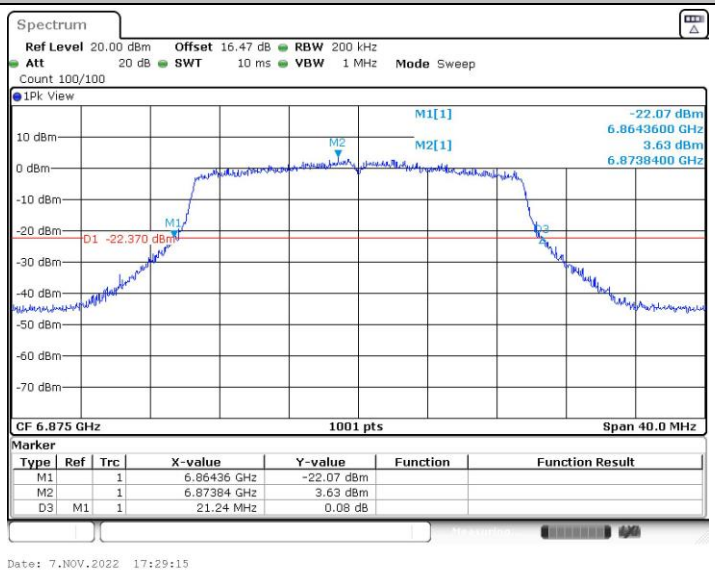

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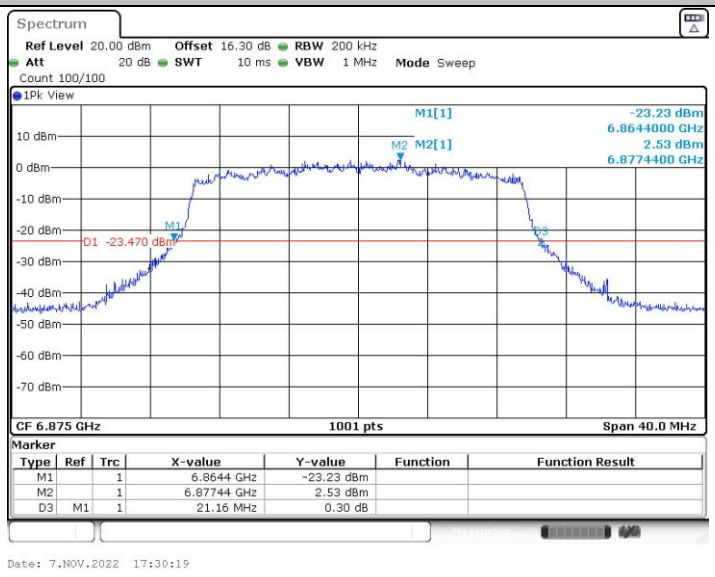

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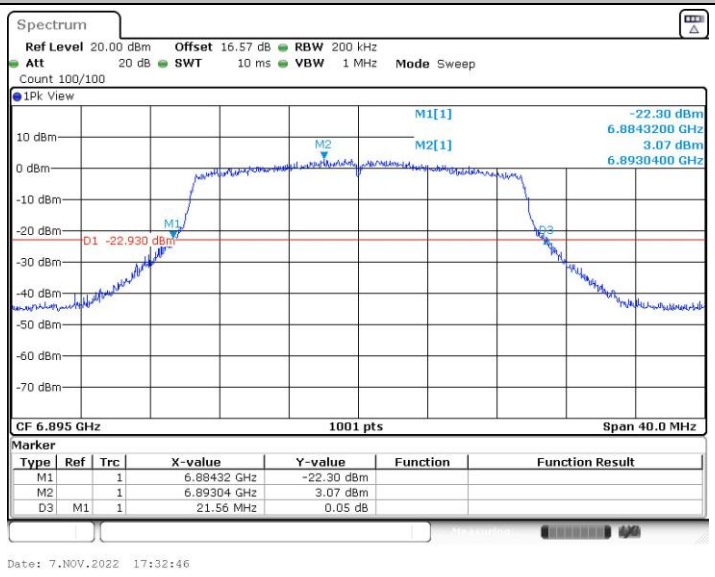

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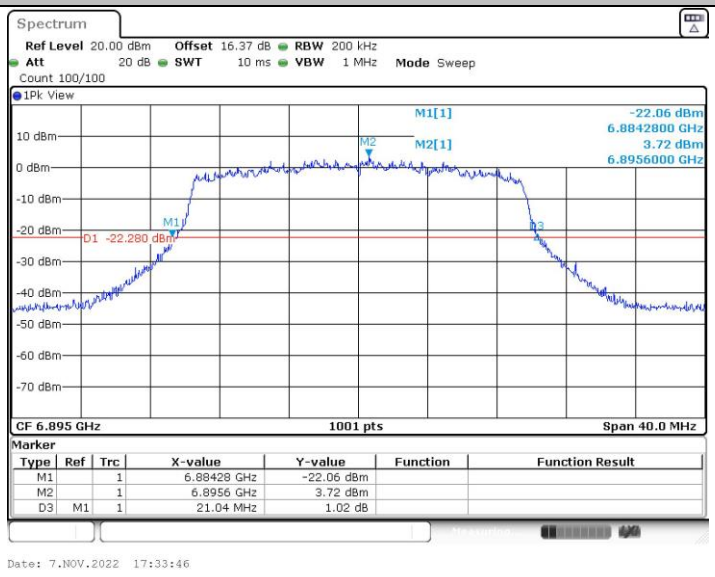

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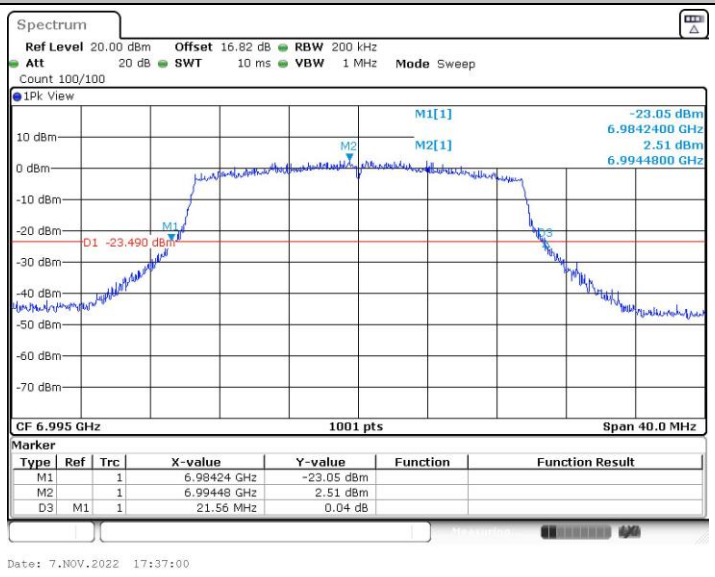

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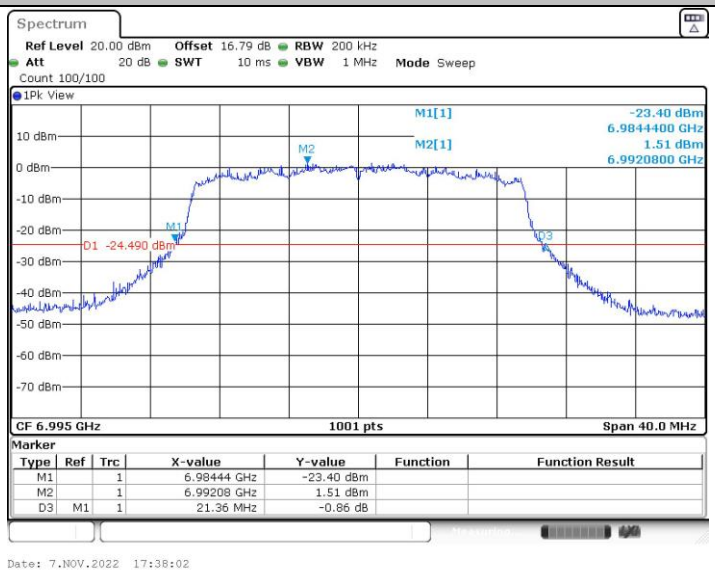

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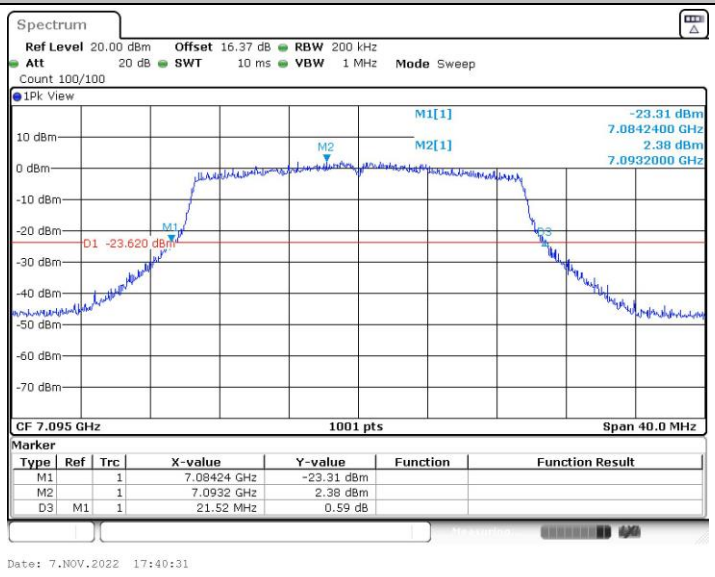

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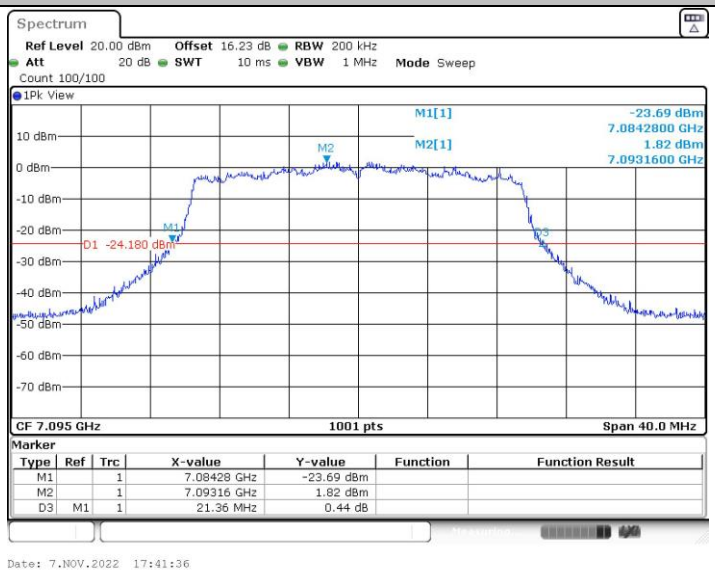

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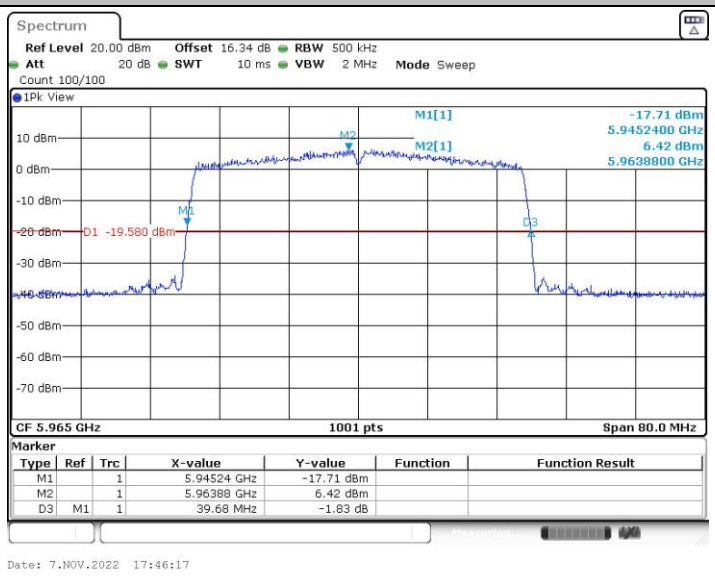

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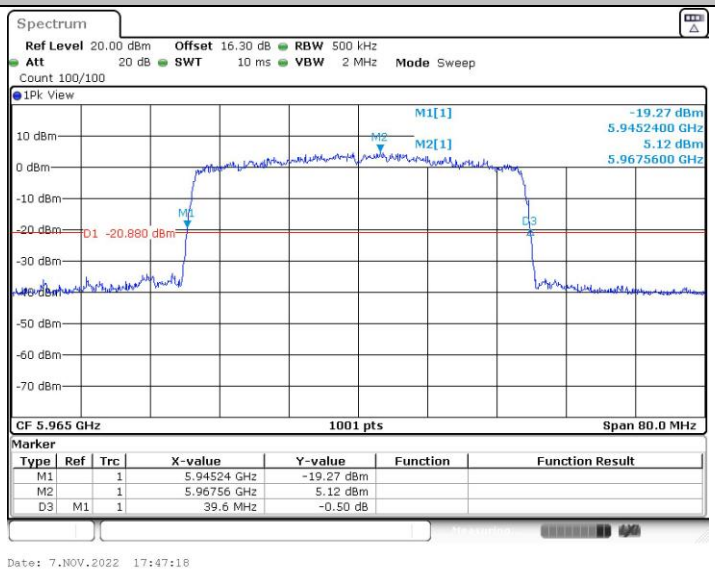

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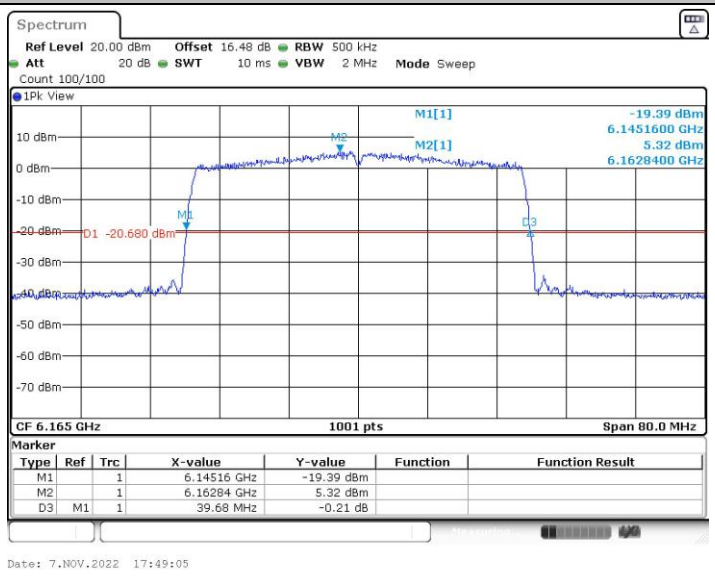

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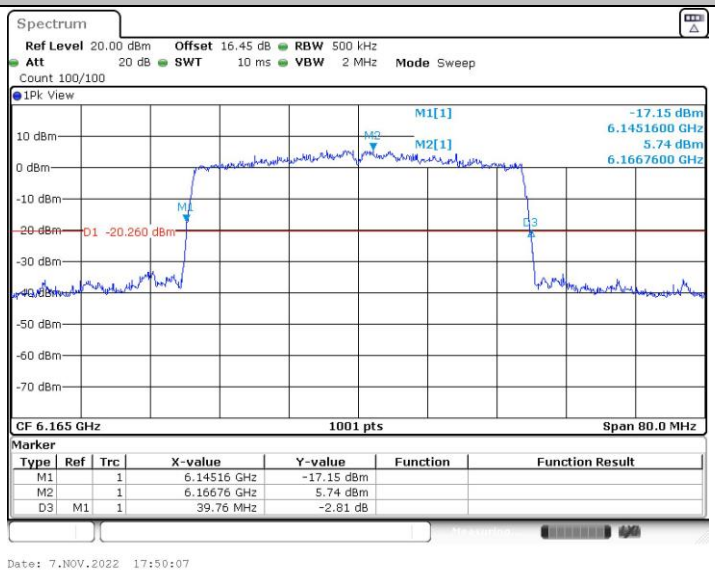

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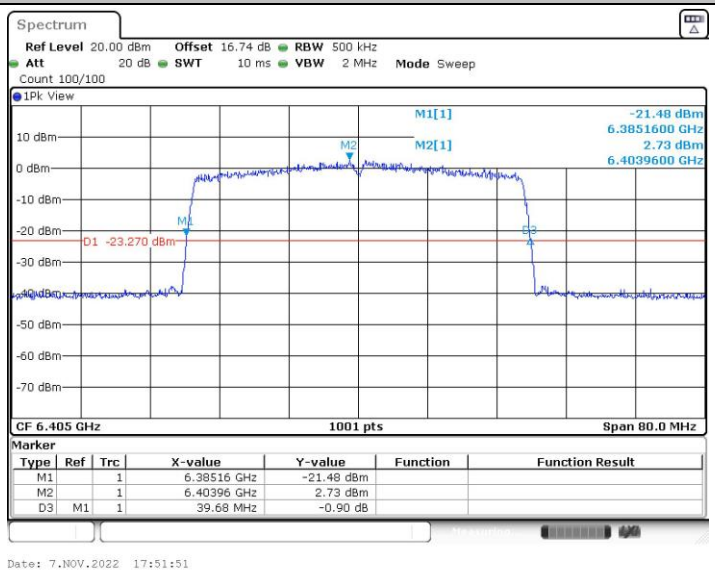

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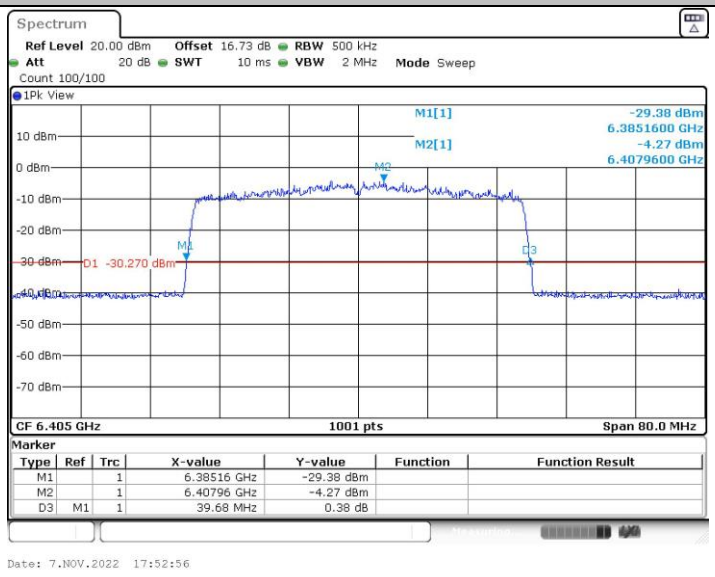

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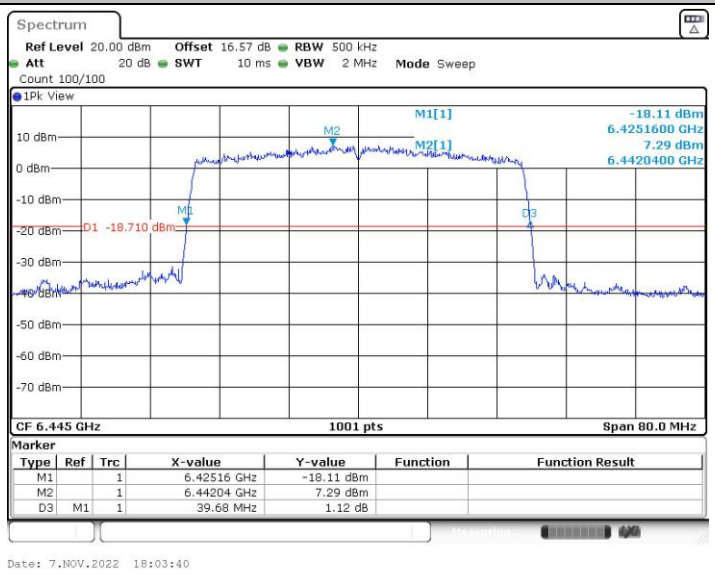

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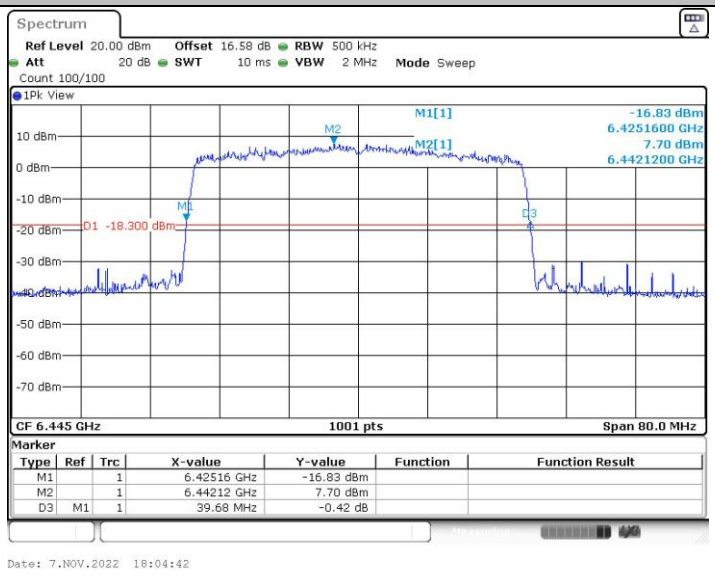

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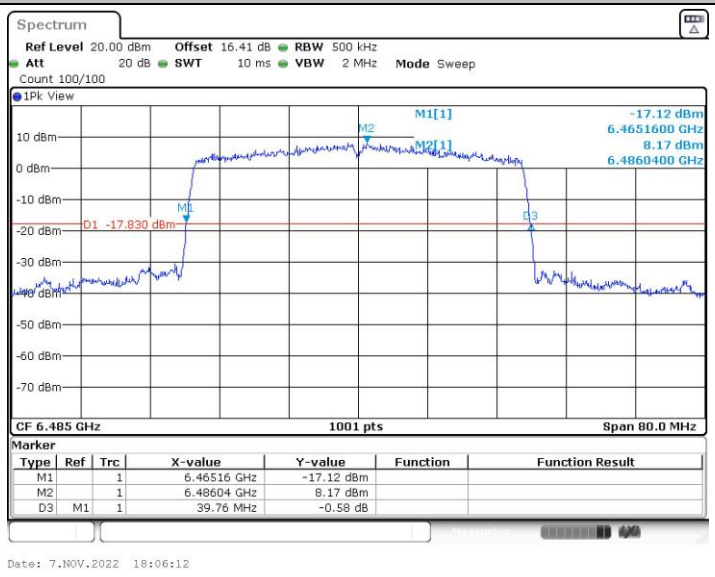

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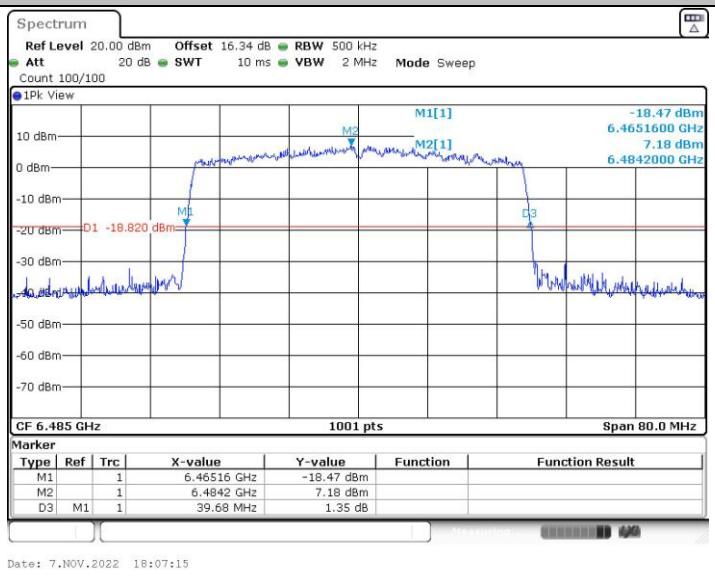

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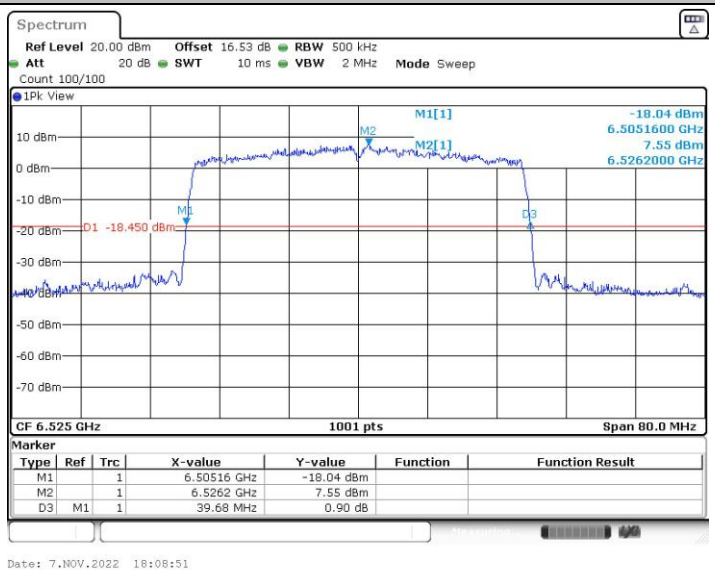

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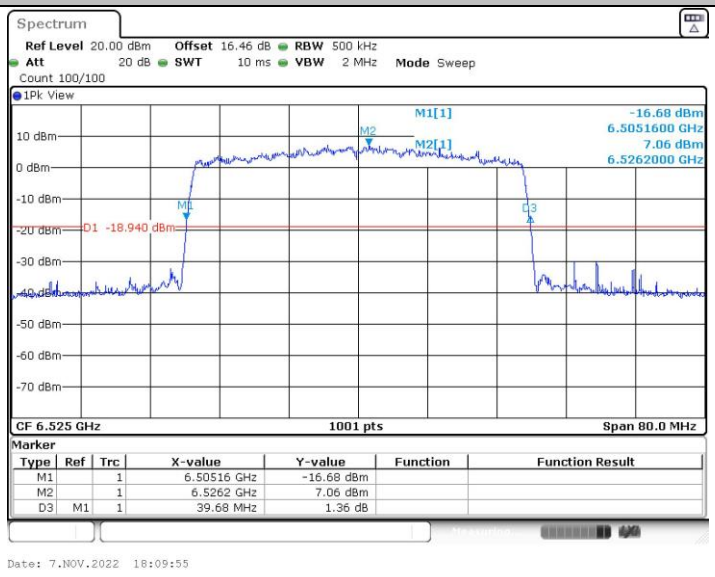

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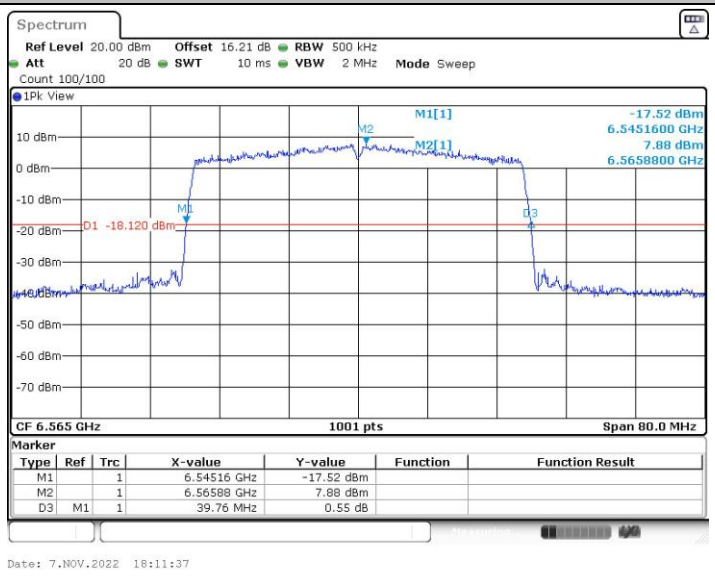

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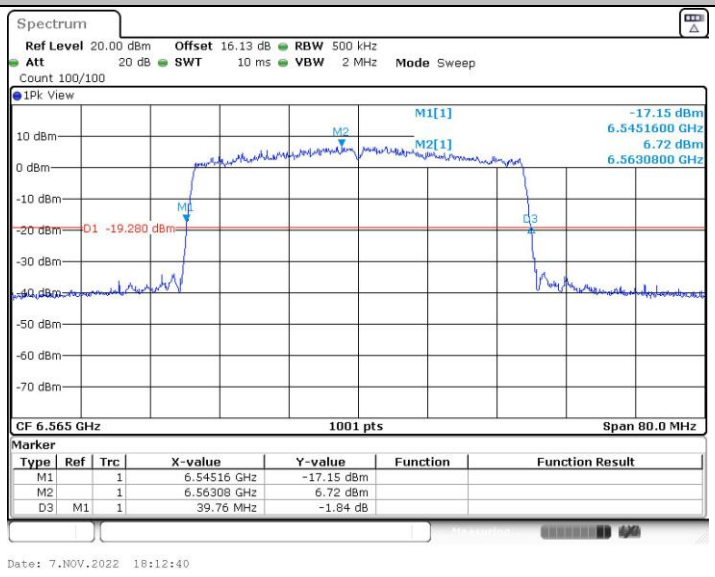

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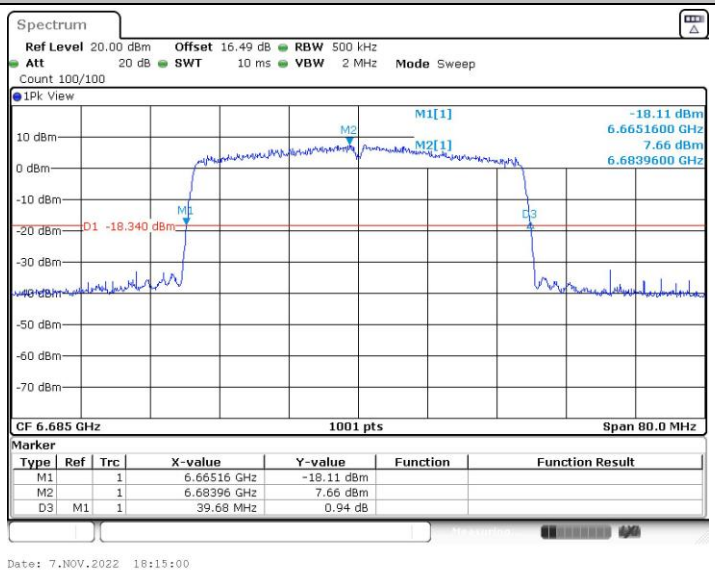

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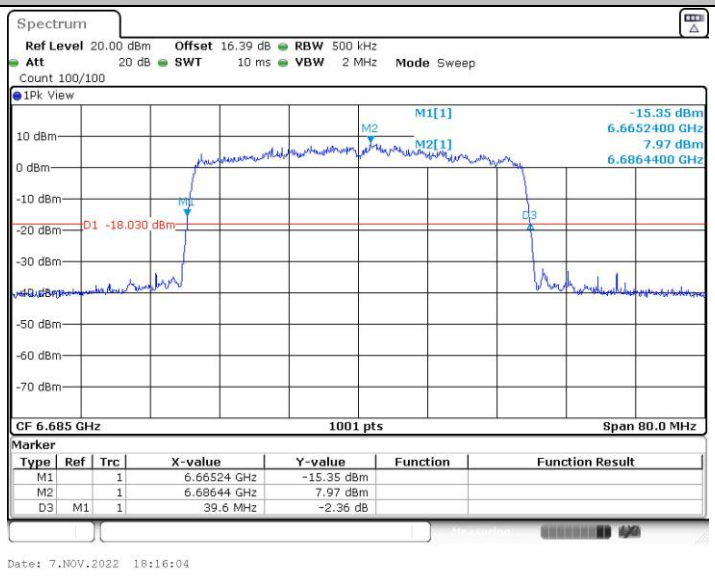

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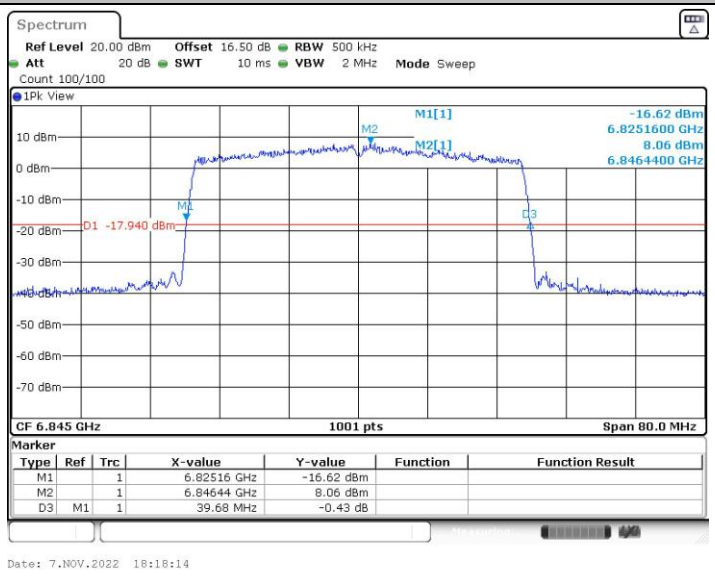

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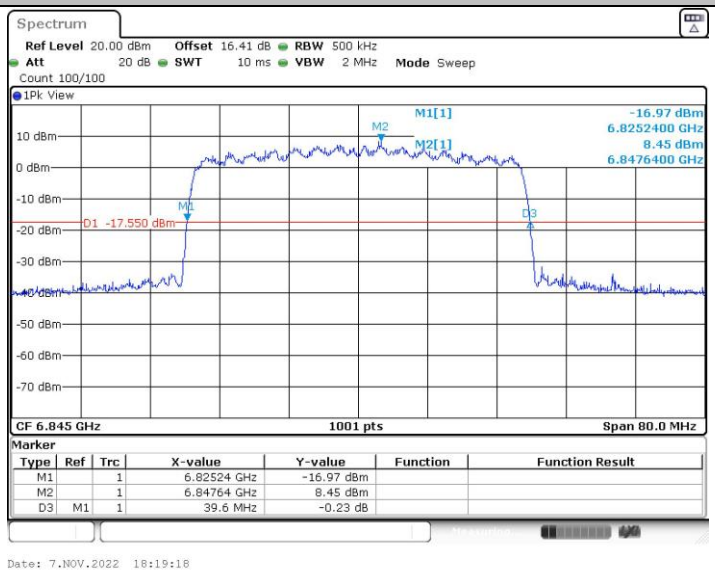

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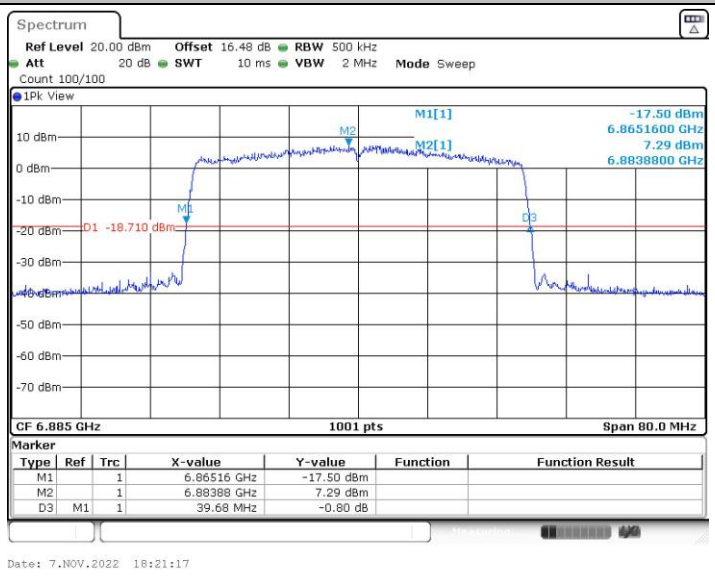

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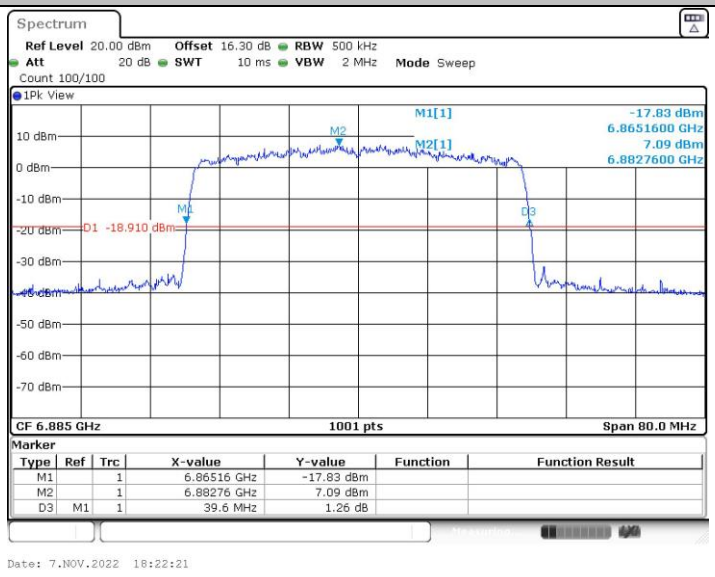

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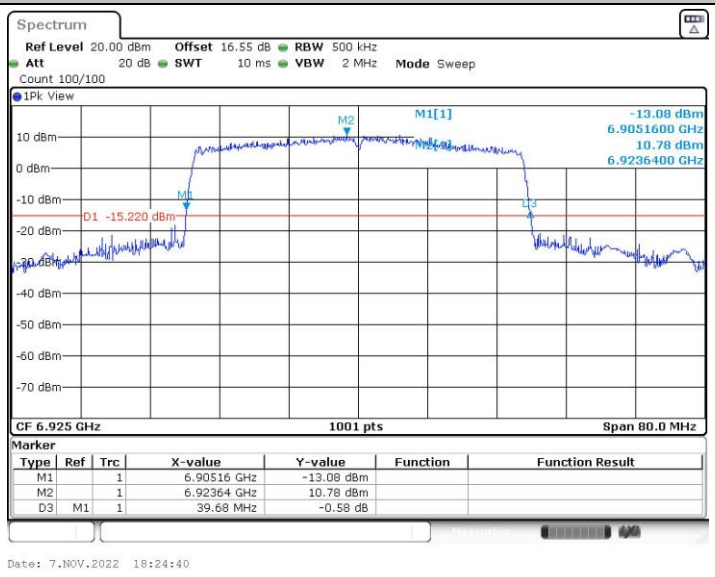

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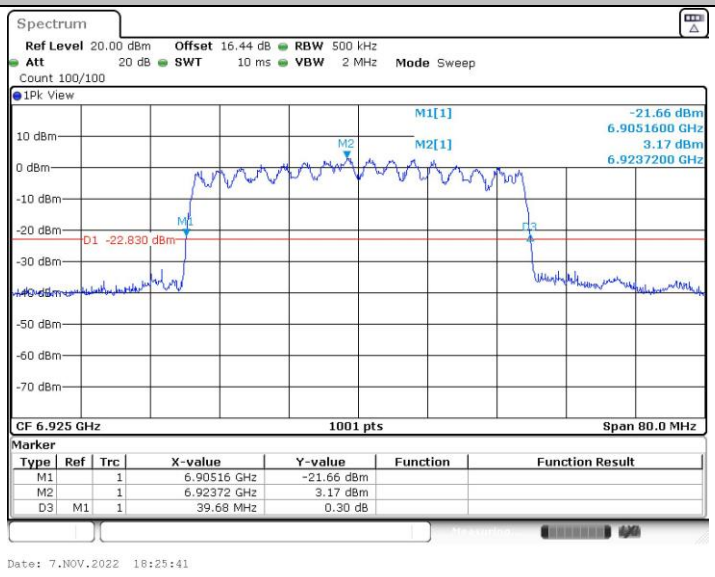

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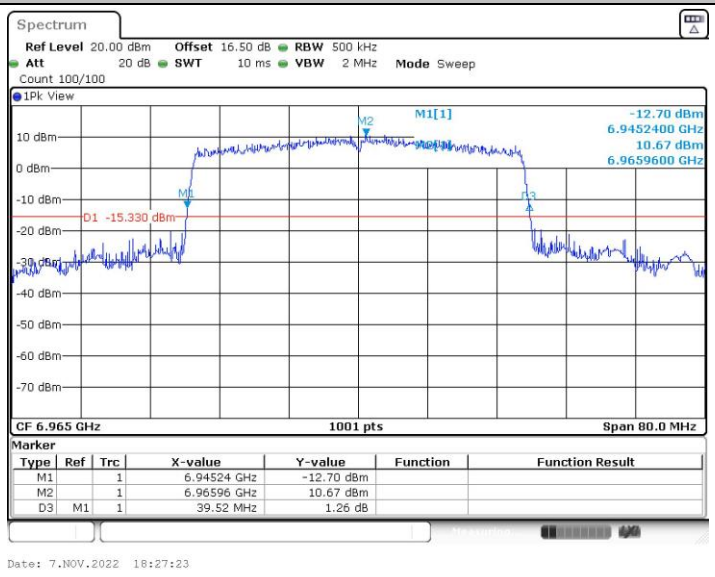

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