FCC PART 15C
TEST REPORT
No.23T04Z80206-06

for

OnePlus Technology (Shenzhen) Co., Ltd.

Mobile Phone

CPH2611

2ABZ2-AA560

With

Hardware Version: 11

Software Version: OxygenOS V14.0

Issued Date: 2023-11-27

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
23T04Z80206-06	Rev.0	1st edition	2023-11-15
23T04Z80206-06	Rev.1	Add the Antenna Gain for BF and Update the statements about antenna gain. Update Maximum Average Output Power Conducted table name. Add the polts for Output power and Peak Power Spectral Density.	2023-11-27

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Conducted testing Location: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

Radiated testing Location: CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

1.3. TestingEnvironment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

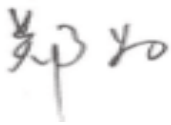
Testing Start Date: 2023-09-26

Testing End Date: 2023-11-15

1.5. Signature

Yao Xingyu

(Prepared this test report)



Zheng Wei

(Reviewed this test report)

Pang Shuai

(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China.
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	(86)75561882366
Fax:	/

2.2. Manufacturer Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China.
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	(86)75561882366
Fax:	/

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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Mobile Phone
Model name	CPH2611
FCC ID	2ABZ2-AA560
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Nominal Voltage	7.82V
Extreme High Voltage	9V
Extreme Low Voltage	6.6V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT04a	869135060023755/ 869135060023748	11	OxygenOS V14.0	2023-09-26
UT11a	869135060027210/ 869135060027202	11	OxygenOS V14.0	2023-10-07

*EUT ID: is used to identify the test sample in the lab internally.

UT04a is used for Conduction test, UT11a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	SN
AE1	Battery		
AE2	Charger		
AE3	USB Cable		

AE1

Model	BLPA33
Manufacturer	Sunwoda Electronic Co., Ltd.
Capacity	2680mAh
Nominal Voltage	/

AE2

Model	VCBAHBUH
Manufacturer	Shenzhen Huntkey Electric Co.,Ltd
Length of cable	/

AE3

Model	DL129
Manufacturer	Changzhou Duwei Electronics Co., Ltd.
Length of cable	/

*AE ID: is used to identify the test sample in the lab internally.

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3.4. General Description

Equipment Under Test (EUT) is a model of Mobile Phone with integrated antenna. It consists of normal options: Battery and Charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the Client.

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

FCC Part15	FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	2021
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band(e.g., MIMO, Smart Antenna, etc)	2013-10

5. Laboratory Environment

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

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6. Test Results

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.407 (a)	/	P
Peak Power Spectral Density	15.407 (a)	/	P
Occupied 6dB Bandwidth	15.407 (e)	/	P
Band Edges Compliance - Conducted& Radiated	15.407 (b)	/	P
Transmitter Spurious Emission - Radiated	15.407, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NM	Not measured, The test was not measured by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

6.2. For conducted result :

1. EUT support 802.11a/n/ac/ax/be modes on U-NII-3, and can't transmit simultaneously in U-NII-3.
2. As WLAN SISO(1x1) & MIMO(2x2) mode have the same power setting, the whole testing has assessed only MIMO mode.
3. 802.11ax support full RU and single RU modes.
4. 802.11be support full RU, single RU, small MRU, large MRU and puncturing modes.
5. For 802.11a/n/ac/ax full RU/be full RU, the whole testing (PSD/6dB bandwidth) has reported only 802.11a/be-EHT20/40/80MHz by referring to the higher output power.
6. For 802.11ax single RU and 802.11be singlel RU modes, the PSD has reported only 802.11be- EHT20-single RU by referring to the higher output power.
7. For 802.11be-EHT20/40MHz small MRU mode, the PSD has reported only 802.11be-EHT20 by referring to the higher output power.
   52 Tone,index38 + 26Tone,index1, 52 Tone,index39 + 26Tone,index7
   106 Tone,index53 + 26Tone,index4, 106 Tone,index54 + 26Tone,index4.
8. For 802.11be-EHT80MHz large MRU and Puncturing modes are tested for conducted power/PSD.

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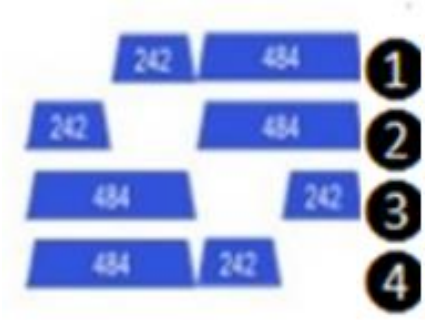
Bandwidth	Pattern	index
80MHz		484+242-tone Index 1 484+242-tone Index 2 484+242-tone Index 3 484+242-tone Index 4

6.3. Antenna Gain

Mode	Ant9(dBi)	Ant15(dBi)	Power(dBi)	PSD(dBi)
CDD	-1.5	-1.4	-1.4	1.55
BF	-1.5	-1.4	1.55	1.55

1. 1 For BF transmissions, power and PSD directional gain is calculated as:

   Directional gain = 10 log $[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{Gn/20})^2 /NANT]$ dBi, as following table for PSD. NANT = number of transmit antennas NSS = number of spatial streams. (When NSS=1 or 2, both powersettings are the same,The worst case directional gain will occur when NSS = 1)

2. For CDD transmissions, directional gain is calculated as:

   a. For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e.,Directional gain = GANT MAX (Ant.1 Gain, Ant.2 Gain, …) + Array Gain, where Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

   b. For PSD, the directional gain calculation is following:

   Directional gain = 10 log $[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{Gn/20})^2 /NANT]$ dBi. NANT = number of transmit antennas NSS = number of spatial streams. (When NSS=1 or 2, both powersettings are the same,The worst case directional gain will occur when NSS = 1).

3. 802.11a support CDD mode ;

4. 802.11n support CDD and STBC mode, as they use the same power setting, only eirp results of CDD have been reported.

5. 802.11ac/ax/be support CDD, BF and STBC mode, as they use the same power setting, only eirp results of BF have been reported.

6. The device what use a permanently attached antenna were considered sufficient to comply withthe provisions of 15.203.

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6.4. Statements

CTTL has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

6.5. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	7.82V
Humidity	44%

7. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2024-03-06
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2024-06-05
4	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2024-02-28
5	Attenuator	10dB/2W	/	Rosenberger	/	/
6	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103023	R&S	1 year	2024-07-08
2	EMI Antenna	VULB 9163	01223	SCHWARZBECK	1 year	2024-08-18
3	EMI Antenna	3115	6914	ETS-Lindgren	1 year	2024-04-25
4	EMI Antenna	3116	2661	ETS-Lindgren	1 year	2024-01-30

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8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. 6dB Emission Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Spurious Emissions

Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	4.72
1GHz ≤ f ≤18GHz	4.84
18GHz ≤ f ≤40GHz	5.12

8.6. AC Power-line Conducted Emission

Measurement Uncertainty : 3.08dB,k=2

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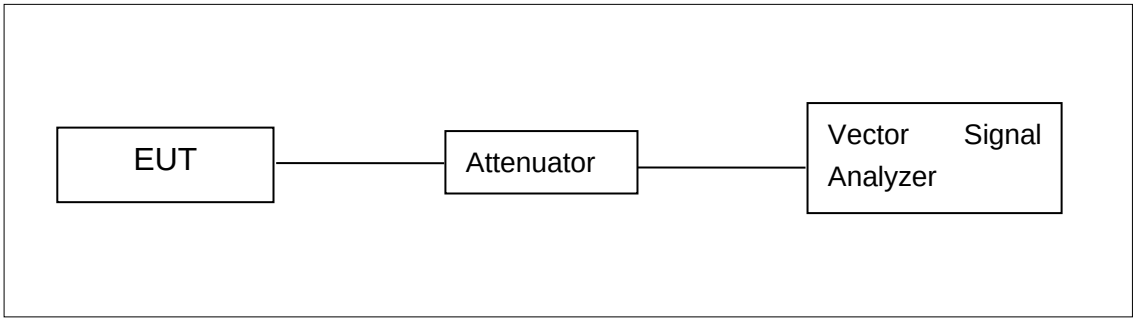
ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

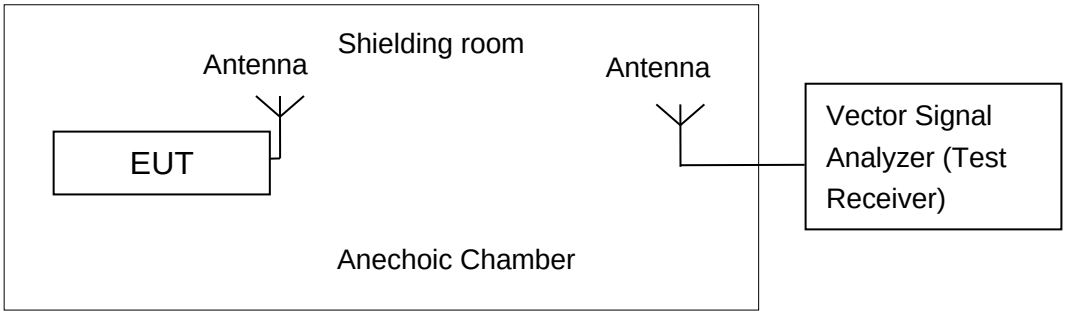
A.1.1. Conducted Measurements

1). Connect the EUT to the test system correctly.
2). Set the EUT to the required work mode.
3). Set the EUT to the required channel.
4). Set the spectrum analyzer to start measurement.
5). Record the values. Vector Signal Analyzer



A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,
Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;
Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 3MHz;



The measurement is made according to ANSI C63.10.
The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

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A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30

Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
Set RBW = 1 MHz.
Set VBW ≥ 3 MHz.
Number of points in sweep ≥ 2 × span / RBW.
Sweep time = auto.
Detector = power averaging (rms)
Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal. Add 10 log (1/x), where x is the duty cycle

A.2.1 Maximum Average Output Power-Conducted

EUT ID: UT04a

Measurement Results:

MIMO

Mode	Data Rate (Index)	Conducted power								
		5745MHz(Ch149)			5785MHz(Ch157)			5825MHz(Ch165)		
		Ant9	Ant15	MIMO	Ant9	Ant15	MIMO	Ant9	Ant15	MIMO
802.11a	6Mbps	17.93	17.80	20.88	17.35	17.55	20.46	17.10	17.50	20.31
802.11n-HT20	MCS0	18.06	17.89	20.99	17.41	17.69	20.56	17.14	17.56	20.37
802.11ac-VHT20	MCS0	17.98	17.92	20.96	17.44	17.62	20.54	17.18	17.60	20.41
802.11ax-HE20	MCS0	17.87	17.84	20.87	17.39	17.57	20.49	17.08	17.50	20.31
802.11be-EHT20	MCS0	17.77	17.86	20.83	17.23	17.63	20.44	17.04	17.59	20.33

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Mode	Data Rate (Index)	Conducted power					
		5755MHz(Ch151)			5795MHz(Ch159)		
		Ant9	Ant15	MIMO	Ant9	Ant15	MIMO
802.11n-HT40	MCS0	17.97	17.93	20.96	17.35	17.59	20.48
802.11ac-VHT40	MCS0	17.92	17.92	20.93	17.38	17.61	20.51
802.11ax-HE40	MCS0	17.97	18.08	21.04	17.45	17.77	20.62
802.11be-EHT40	MCS0	17.87	17.88	20.89	17.29	17.62	20.47

Mode	Data Rate (Index)	Conducted power		
		5755MHz(Ch155)		
		Ant9	Ant15	MIMO
802.11ac-VHT80	MCS0	17.34	17.39	20.38
802.11ax-HE80	MCS0	17.47	17.64	20.57
802.11be-EHT80	MCS0	17.47	17.73	20.61

RU mode：

Mode	RU index	Conducted power								
		5745MHz(Ch149)			5785MHz(Ch157)			5825MHz(Ch165)		
		Ant9	Ant15	MIMO	Ant9	Ant15	MIMO	Ant9	Ant15	MIMO
802.11ax -HE20	RU26 left	8.16	8.14	11.16	7.56	7.94	10.76	7.17	7.73	10.47
	RU26 right	7.91	7.94	10.94	7.46	7.49	10.49	7.18	7.58	10.39
	RU52 left	11.42	11.60	14.52	10.65	11.49	14.10	10.39	11.27	13.86
	RU52 right	11.30	11.30	14.31	10.79	11.03	13.92	10.45	10.98	13.73
	RU106 left	14.42	14.55	17.50	13.81	14.33	17.09	13.55	13.89	16.73
	RU106 right	14.36	14.28	17.33	13.80	13.93	16.88	13.65	13.66	16.67
802.11be -EHT20	RU26 left	7.91	8.27	11.10	7.34	8.13	10.76	7.12	7.83	10.50
	RU26 right	7.84	7.83	10.85	7.27	7.67	10.48	7.12	7.66	10.41
	RU52 left	11.29	11.63	14.47	10.55	11.44	14.03	10.24	11.20	13.76
	RU52 right	11.11	11.29	14.21	10.59	11.01	13.82	10.42	11.14	13.81
	RU106 left	14.36	14.58	17.48	13.67	14.32	17.02	13.41	13.94	16.69
	RU106 right	14.28	14.29	17.30	13.72	14.05	16.90	13.52	13.78	16.66

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MRU mode:

Mode	RU index	Conducted power								
		5745MHz(Ch149)			5785MHz(Ch157)			5825MHz(Ch165)		
		Ant9	Ant15	MIMO	Ant9	Ant15	MIMO	Ant9	Ant15	MIMO
802.11be -EHT20	52 Tone,index38 + 26Tone,index1	11.14	11.29	14.23	10.68	11.19	13.95	10.55	11.17	13.88
	52 Tone,index39 + 26Tone,index7	10.99	11.13	14.07	10.54	11.08	13.83	10.56	10.90	13.74
	106 Tone,index53 + 26Tone,index4	14.01	14.23	17.13	13.83	14.12	16.99	13.74	13.82	16.79
	106 Tone,index54 + 26Tone,index4	13.96	14.04	17.01	13.79	13.96	16.89	13.73	13.65	16.70

Mode	RU index	configure	Conducted power		
			5775MHz(Ch155)		
			Ant9	Ant15	MIMO
802.11be -EHT80	484+242 Tone	1	17.73	18.12	20.94
		2	17.64	18.07	20.87
		3	17.65	18.15	20.92
		4	17.59	18.11	20.87

Note:E.I.R.P value= Conducted values (with conducted samples) + Antenna Gain.

The data rate 6Mbps (11a mode), MCS0 (11n-HT20 mode), MCS0 (11n-HT40 mode), MCS0 (11ac-VHT20 mode), MCS0 (11ac-VHT40 mode), MCS0 (11ac-VHT80 mode) , MCS0 (11ax-HE20 mode), MCS0 (11ax-HE40 mode), MCS0 (11ax-HE80 mode),MCS0 (11be-EHT20 mode), MCS0 (11be-EHT40 mode), MCS0 (11be-EHT80 mode)are selected as the worst condition; as the maximum power is got with these data rate. The following cases are performed with this condition.

Duty Cycle

Mode	802.11a	802.11n20	802.11n40	802.11ac20	802.11ac40	802.11ac80
Duty Cycle	99%	99%	99%	99%	99%	99%

802.11ax20	802.11ax40	802.11ax80	802.11be20	802.11be40	802.11be80
95%	95%	95%	95%	95%	95%

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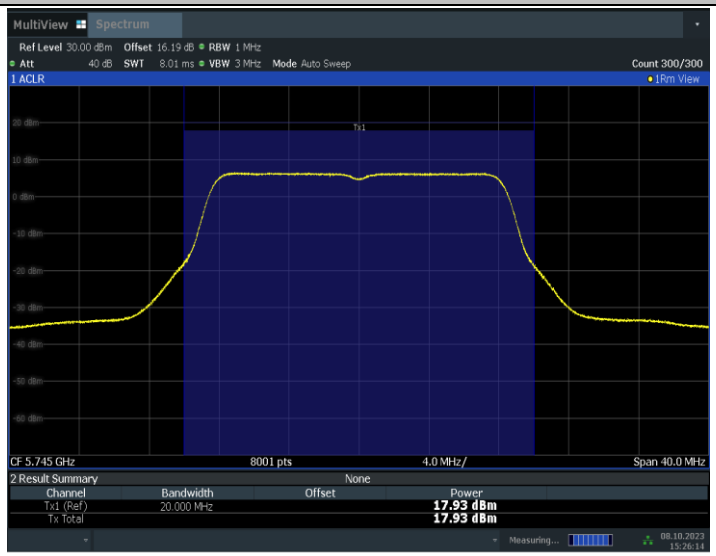
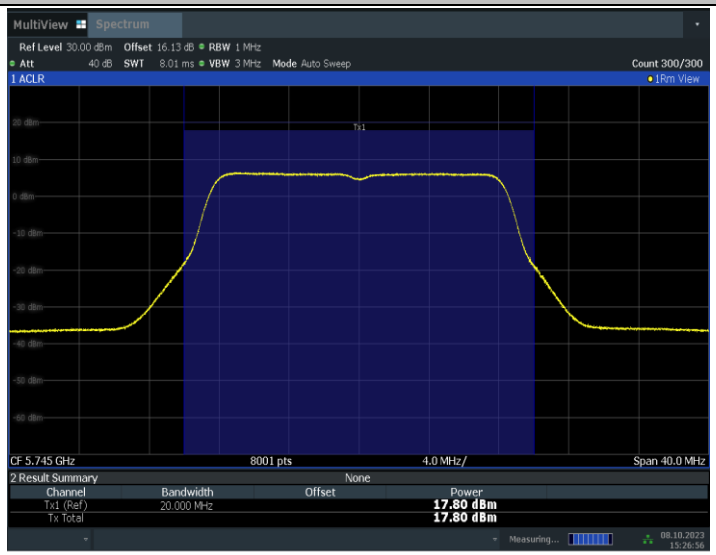
11A-MIMO_Ant9_5745


15:26:15 08.10.2023

11A-MIMO_Ant15_5745


15:26:56 08.10.2023

11a CH149

Conclusion: PASS

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A.3. Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407(a)	< 30 dBm/500 kHz

Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
Set RBW = 500 kHz.
Set VBW ≥ 3 MHz.
Number of points in sweep ≥ 2 × span / RBW.
Sweep time = auto.
Detector = power averaging (rms)
Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter. Use the peak search function on the instrument to find the peak of the spectrum and record its value. Add 10 log (1/x), where x is the duty cycle.

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

EUT ID: UT04a

Measurement Results:

TestMode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A-MIMO	Ant9	5745	3.83	≤30.00	PASS
	Ant15	5745	3.69	≤30.00	PASS
	total	5745	6.77	≤30.00	PASS
	Ant9	5785	3.25	≤30.00	PASS
	Ant15	5785	3.65	≤30.00	PASS
	total	5785	6.46	≤30.00	PASS
	Ant9	5825	2.86	≤30.00	PASS
	Ant15	5825	3.35	≤30.00	PASS
	total	5825	6.12	≤30.00	PASS
11N20MIMO	Ant9	5745	3.48	≤30.00	PASS
	Ant15	5745	3.61	≤30.00	PASS
	total	5745	6.56	≤30.00	PASS
	Ant9	5785	3.06	≤30.00	PASS
	Ant15	5785	3.24	≤30.00	PASS
	total	5785	6.16	≤30.00	PASS
	Ant9	5825	2.81	≤30.00	PASS
	Ant15	5825	3.18	≤30.00	PASS
	total	5825	6.01	≤30.00	PASS
11N40MIMO	Ant9	5755	0.50	≤30.00	PASS
	Ant15	5755	0.22	≤30.00	PASS

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	total	5755	3.37	≤30.00	PASS
	Ant9	5795	-0.02	≤30.00	PASS
	Ant15	5795	0.17	≤30.00	PASS
	total	5795	3.09	≤30.00	PASS
11AC20MIMO	Ant9	5745	3.50	≤30.00	PASS
	Ant15	5745	3.51	≤30.00	PASS
	total	5745	6.52	≤30.00	PASS
	Ant9	5785	3.17	≤30.00	PASS
	Ant15	5785	3.27	≤30.00	PASS
	total	5785	6.23	≤30.00	PASS
	Ant9	5825	2.82	≤30.00	PASS
	Ant15	5825	3.08	≤30.00	PASS
	total	5825	5.96	≤30.00	PASS
11AC40MIMO	Ant9	5755	0.52	≤30.00	PASS
	Ant15	5755	0.41	≤30.00	PASS
	total	5755	3.48	≤30.00	PASS
	Ant9	5795	-0.04	≤30.00	PASS
	Ant15	5795	0.29	≤30.00	PASS
	total	5795	3.14	≤30.00	PASS
11AC80MIMO	Ant9	5775	-3.53	≤30.00	PASS
	Ant15	5775	-3.47	≤30.00	PASS
	total	5775	-0.49	≤30.00	PASS
11AX20MIMO	Ant9	5745	3.28	≤30.00	PASS
	Ant15	5745	3.30	≤30.00	PASS
	total	5745	6.30	≤30.00	PASS
	Ant9	5785	2.92	≤30.00	PASS
	Ant15	5785	3.04	≤30.00	PASS
	total	5785	5.99	≤30.00	PASS
	Ant9	5825	2.48	≤30.00	PASS
	Ant15	5825	3.09	≤30.00	PASS
	total	5825	5.81	≤30.00	PASS
11AX40MIMO	Ant9	5755	0.53	≤30.00	PASS
	Ant15	5755	0.41	≤30.00	PASS
	total	5755	3.48	≤30.00	PASS
	Ant9	5795	-0.13	≤30.00	PASS
	Ant15	5795	0.27	≤30.00	PASS
	total	5795	3.08	≤30.00	PASS
11AX80MIMO	Ant9	5775	-3.51	≤30.00	PASS
	Ant15	5775	-3.15	≤30.00	PASS
	total	5775	-0.32	≤30.00	PASS
11BE20MIMO	Ant9	5745	3.20	≤30.00	PASS
	Ant15	5745	3.18	≤30.00	PASS
	total	5745	6.20	≤30.00	PASS

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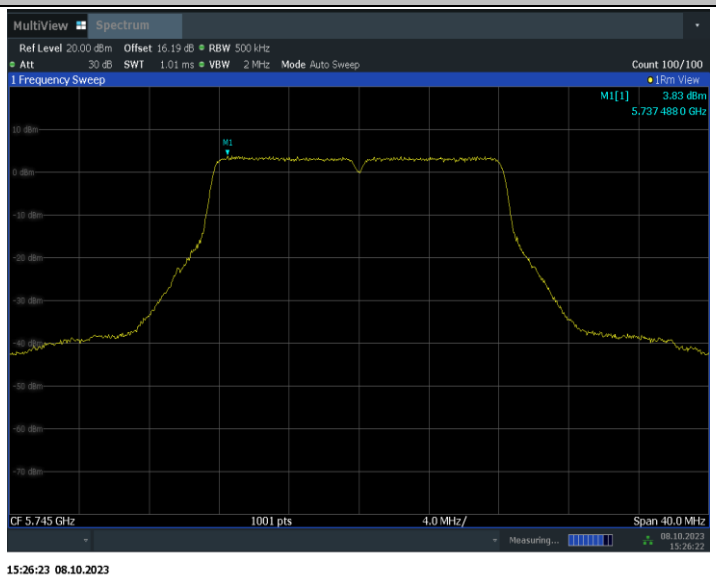
	Ant9	5785	2.51	≤30.00	PASS
	Ant15	5785	3.18	≤30.00	PASS
	total	5785	5.87	≤30.00	PASS
	Ant9	5825	2.36	≤30.00	PASS
	Ant15	5825	3.32	≤30.00	PASS
	total	5825	5.88	≤30.00	PASS
11BE40MIMO	Ant9	5755	0.20	≤30.00	PASS
	Ant15	5755	0.23	≤30.00	PASS
	total	5755	3.23	≤30.00	PASS
	Ant9	5795	-0.32	≤30.00	PASS
	Ant15	5795	-0.02	≤30.00	PASS
	total	5795	2.84	≤30.00	PASS
11BE80MIMO	Ant9	5775	-3.53	≤30.00	PASS
	Ant15	5775	-3.21	≤30.00	PASS
	total	5775	-0.36	≤30.00	PASS

11A-MIMO_Ant9_5745



11A-MIMO_Ant15_5745

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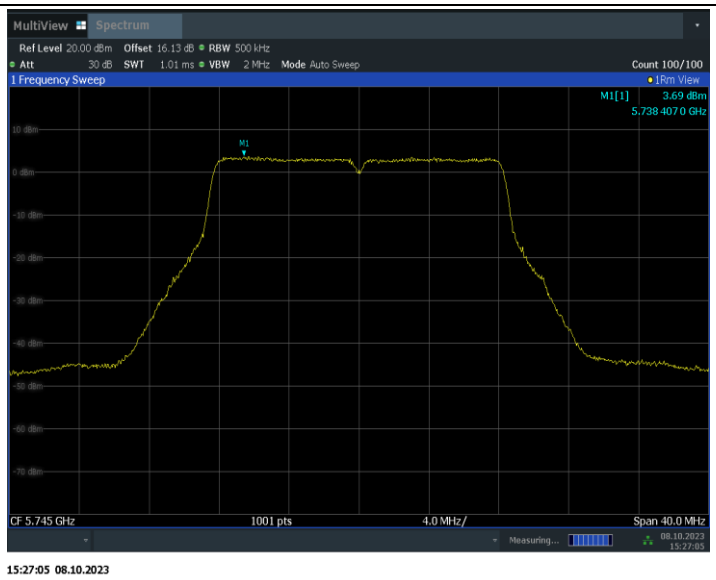

15:27:05 08.10.2023

RU mode

Test Mode	Antenna	Frequency [MHz]	Ru Size	Ru Index	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11AX20MIMO	Ant9	5745	26Tone	RU0	3.17	≤30.00	PASS
				RU8	2.66	≤30.00	PASS
			52Tone	RU37	3.32	≤30.00	PASS
				RU40	3.13	≤30.00	PASS
			106Tone	RU53	3.20	≤30.00	PASS
				RU54	3.24	≤30.00	PASS
	Ant15	5745	26Tone	RU0	2.98	≤30.00	PASS
				RU8	2.59	≤30.00	PASS
			52Tone	RU37	3.56	≤30.00	PASS
				RU40	3.11	≤30.00	PASS
			106Tone	RU53	3.55	≤30.00	PASS
				RU54	3.12	≤30.00	PASS
	total	5745	26Tone	RU0	6.09	≤30.00	PASS
				RU8	5.64	≤30.00	PASS
			52Tone	RU37	6.45	≤30.00	PASS
				RU40	6.13	≤30.00	PASS
			106Tone	RU53	6.39	≤30.00	PASS
				RU54	6.19	≤30.00	PASS
	Ant9	5785	26Tone	RU0	2.02	≤30.00	PASS
				RU8	2.18	≤30.00	PASS
			52Tone	RU37	2.76	≤30.00	PASS
				RU40	2.59	≤30.00	PASS
			106Tone	RU53	2.70	≤30.00	PASS
				RU54	2.67	≤30.00	PASS

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	Ant15	5785	26Tone	RU0	2.66	≤30.00	PASS
				RU8	2.30	≤30.00	PASS
			52Tone	RU37	3.26	≤30.00	PASS
				RU40	2.92	≤30.00	PASS
			106Tone	RU53	3.21	≤30.00	PASS
				RU54	2.94	≤30.00	PASS
	total	5785	26Tone	RU0	5.36	≤30.00	PASS
				RU8	5.25	≤30.00	PASS
			52Tone	RU37	6.03	≤30.00	PASS
				RU40	5.77	≤30.00	PASS
			106Tone	RU53	5.97	≤30.00	PASS
				RU54	5.82	≤30.00	PASS
	Ant9	5825	26Tone	RU0	1.92	≤30.00	PASS
				RU8	2.05	≤30.00	PASS
			52Tone	RU37	2.10	≤30.00	PASS
				RU40	2.31	≤30.00	PASS
			106Tone	RU53	2.54	≤30.00	PASS
				RU54	2.34	≤30.00	PASS
	Ant15	5825	26Tone	RU0	2.33	≤30.00	PASS
				RU8	2.47	≤30.00	PASS
			52Tone	RU37	2.93	≤30.00	PASS
				RU40	2.60	≤30.00	PASS
			106Tone	RU53	2.67	≤30.00	PASS
				RU54	2.54	≤30.00	PASS
	total	5825	26Tone	RU0	5.14	≤30.00	PASS
				RU8	5.28	≤30.00	PASS
			52Tone	RU37	5.55	≤30.00	PASS
				RU40	5.47	≤30.00	PASS
			106Tone	RU53	5.62	≤30.00	PASS
				RU54	5.45	≤30.00	PASS
11BE20MIMO	Ant9	5745	26Tone	RU0	2.62	≤30.00	PASS
				RU8	2.53	≤30.00	PASS
			52Tone	RU37	3.01	≤30.00	PASS
				RU40	3.02	≤30.00	PASS
			106Tone	RU53	3.11	≤30.00	PASS
				RU54	3.09	≤30.00	PASS
	Ant15	5745	26Tone	RU0	2.90	≤30.00	PASS
				RU8	2.47	≤30.00	PASS
			52Tone	RU37	3.38	≤30.00	PASS
				RU40	3.21	≤30.00	PASS
			106Tone	RU53	3.49	≤30.00	PASS
				RU54	3.20	≤30.00	PASS
	total	5745	26Tone	RU0	5.77	≤30.00	PASS

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				RU8	5.51	≤30.00	PASS
			52Tone	RU37	6.21	≤30.00	PASS
				RU40	6.13	≤30.00	PASS
			106Tone	RU53	6.31	≤30.00	PASS
				RU54	6.16	≤30.00	PASS
	Ant9	5785	26Tone	RU0	2.55	≤30.00	PASS
				RU8	1.98	≤30.00	PASS
			52Tone	RU37	2.46	≤30.00	PASS
				RU40	2.52	≤30.00	PASS
			106Tone	RU53	2.59	≤30.00	PASS
				RU54	2.54	≤30.00	PASS
	Ant15	5785	26Tone	RU0	2.69	≤30.00	PASS
				RU8	2.33	≤30.00	PASS
			52Tone	RU37	3.33	≤30.00	PASS
				RU40	2.95	≤30.00	PASS
			106Tone	RU53	3.17	≤30.00	PASS
				RU54	3.00	≤30.00	PASS
	total	5785	26Tone	RU0	5.63	≤30.00	PASS
				RU8	5.17	≤30.00	PASS
			52Tone	RU37	5.93	≤30.00	PASS
				RU40	5.75	≤30.00	PASS
			106Tone	RU53	5.90	≤30.00	PASS
				RU54	5.79	≤30.00	PASS
	Ant9	5825	26Tone	RU0	1.76	≤30.00	PASS
				RU8	1.66	≤30.00	PASS
			52Tone	RU37	2.25	≤30.00	PASS
				RU40	2.19	≤30.00	PASS
			106Tone	RU53	2.42	≤30.00	PASS
				RU54	2.37	≤30.00	PASS
	Ant15	5825	26Tone	RU0	2.56	≤30.00	PASS
				RU8	2.49	≤30.00	PASS
			52Tone	RU37	2.94	≤30.00	PASS
				RU40	2.93	≤30.00	PASS
			106Tone	RU53	2.85	≤30.00	PASS
				RU54	2.71	≤30.00	PASS
	total	5825	26Tone	RU0	5.19	≤30.00	PASS
				RU8	5.11	≤30.00	PASS
			52Tone	RU37	5.62	≤30.00	PASS
				RU40	5.59	≤30.00	PASS
			106Tone	RU53	5.65	≤30.00	PASS
				RU54	5.55	≤30.00	PASS

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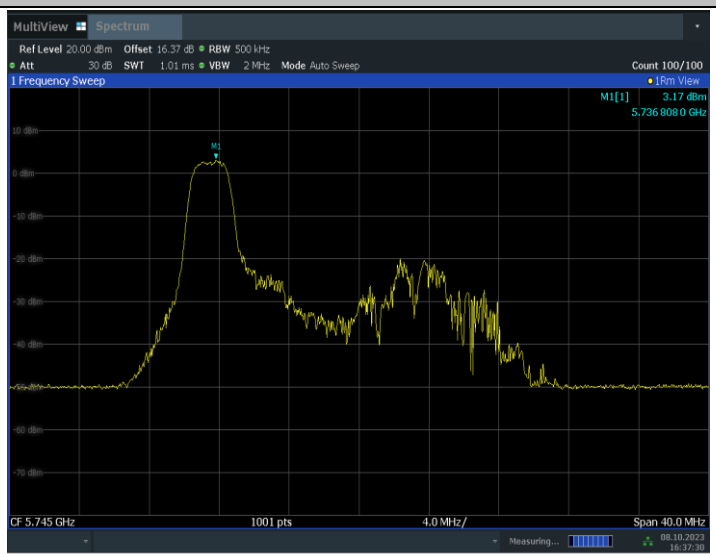
11AX20MIMO_Ant9_5745_26Tone_RU0
 16:37:31 08.10.2023
11AX20MIMO_Ant9_5745_26Tone_RU8
16:50:06 08.10.2023
11AX20MIMO_Ant9_5745_52Tone_RU37

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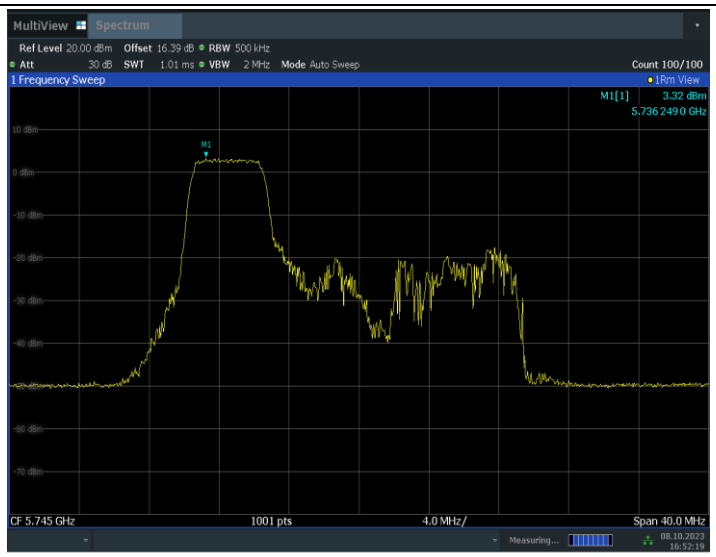
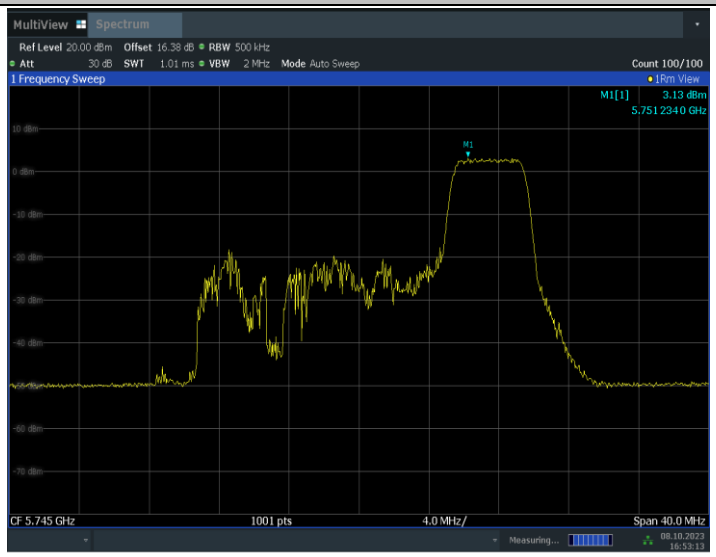


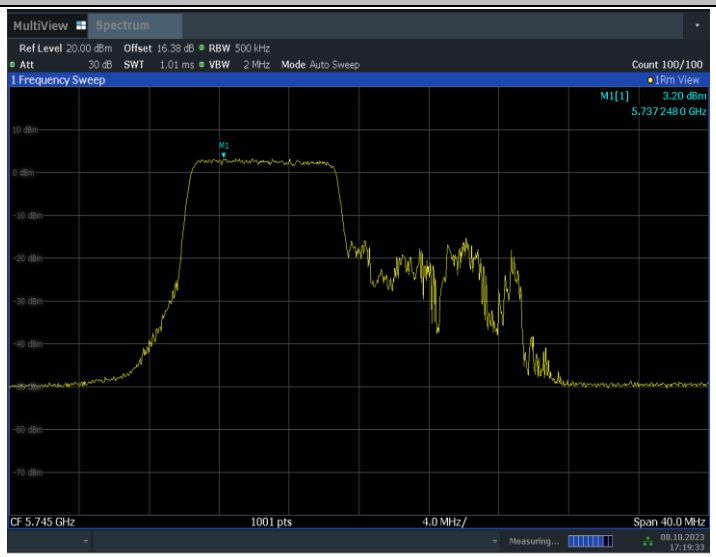
16:52:19 08.10.2023

11AX20MIMO_Ant9_5745_52Tone_RU40



16:53:14 08.10.2023

11AX20MIMO_Ant9_5745_106Tone_RU53



17:19:34 08.10.2023

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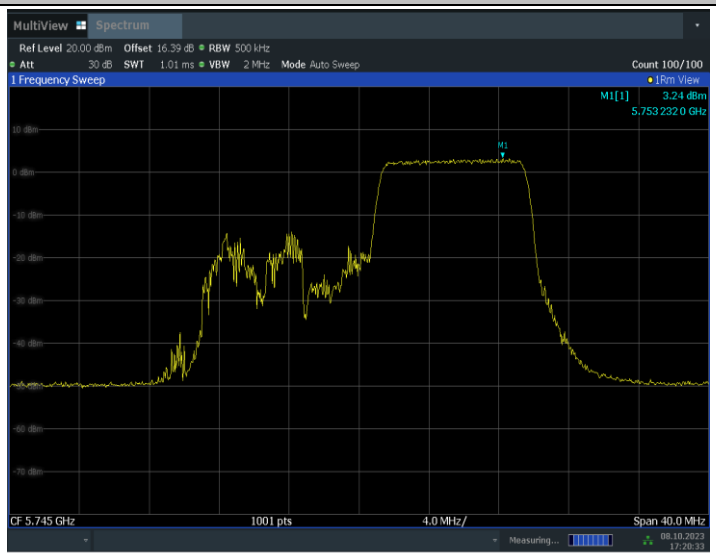
11AX20MIMO_Ant9_5745_106Tone_RU54
 17:20:34 08.10.2023
11AX20MIMO_Ant15_5745_26Tone_RU0
16:39:24 08.10.2023
11AX20MIMO_Ant15_5745_26Tone_RU8

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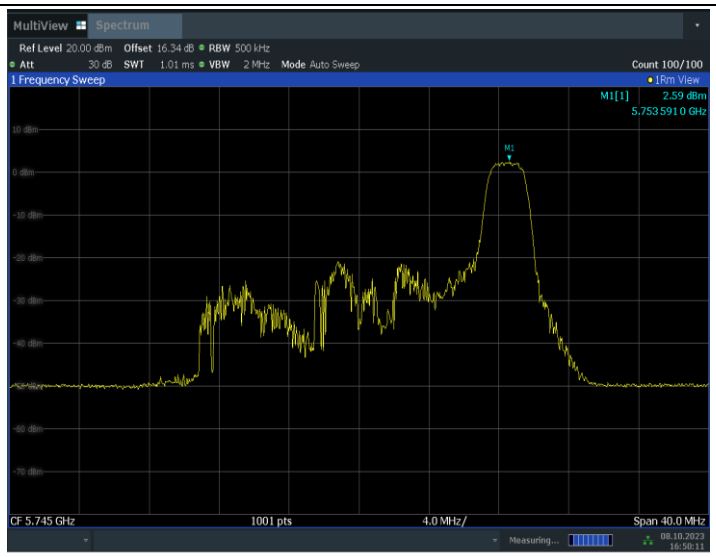
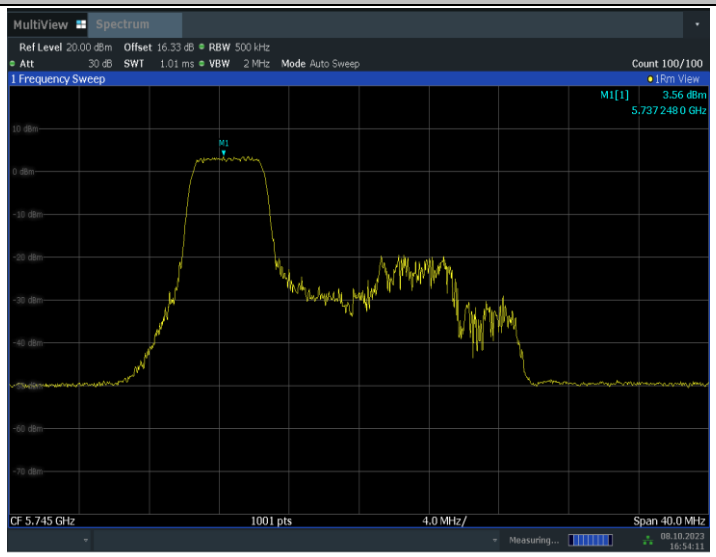


16:50:11 08.10.2023

11AX20MIMO_Ant15_5745_52Tone_RU37



16:54:12 08.10.2023

11AX20MIMO_Ant15_5745_52Tone_RU40

16:55:12 08.10.2023

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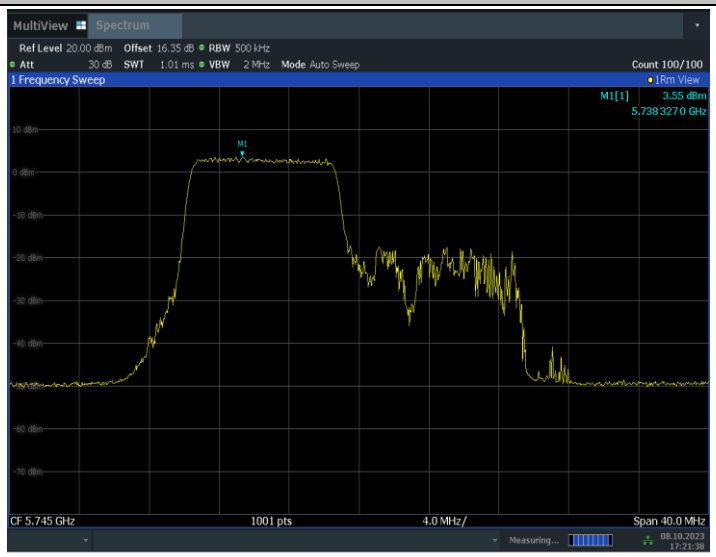
11AX20MIMO_Ant15_5745_106Tone_RU53


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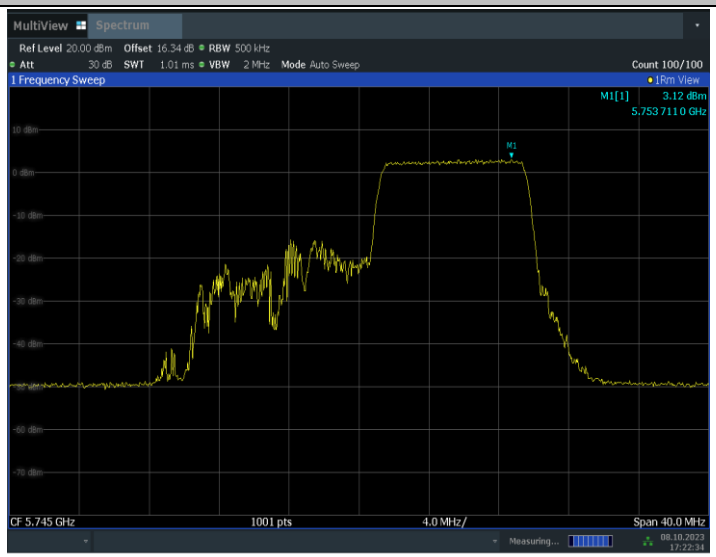
11AX20MIMO_Ant15_5745_106Tone_RU54


17:22:34 08.10.2023

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MRU mode

Test Mode	Antenna	Channel	Mru Type	Mru Index	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11BE20MIMO	Ant9	5745	52+26_OFDMA	1	1.48	≤30.00	PASS
				3	1.25	≤30.00	PASS
			106+26_OFDMA	1	2.44	≤30.00	PASS
				2	2.00	≤30.00	PASS
	Ant15	5745	52+26_OFDMA	1	1.88	≤30.00	PASS
				3	1.57	≤30.00	PASS
			106+26_OFDMA	1	2.76	≤30.00	PASS
				2	2.53	≤30.00	PASS
	total	5745	52+26_OFDMA	1	4.69	≤30.00	PASS
				3	4.42	≤30.00	PASS
			106+26_OFDMA	1	5.61	≤30.00	PASS
				2	5.28	≤30.00	PASS
	Ant9	5785	52+26_OFDMA	1	0.69	≤30.00	PASS
				3	0.62	≤30.00	PASS
			106+26_OFDMA	1	1.73	≤30.00	PASS
				2	1.82	≤30.00	PASS
	Ant15	5785	52+26_OFDMA	1	1.80	≤30.00	PASS
				3	1.22	≤30.00	PASS
			106+26_OFDMA	1	2.31	≤30.00	PASS
				2	2.42	≤30.00	PASS
	total	5785	52+26_OFDMA	1	4.29	≤30.00	PASS
				3	3.94	≤30.00	PASS
			106+26_OFDMA	1	5.04	≤30.00	PASS
				2	5.14	≤30.00	PASS
	Ant9	5825	52+26_OFDMA	1	0.56	≤30.00	PASS
				3	0.56	≤30.00	PASS
			106+26_OFDMA	1	1.51	≤30.00	PASS
				2	1.49	≤30.00	PASS
	Ant15	5825	52+26_OFDMA	1	1.48	≤30.00	PASS
				3	1.42	≤30.00	PASS
			106+26_OFDMA	1	2.18	≤30.00	PASS
				2	1.99	≤30.00	PASS
	total	5825	52+26_OFDMA	1	4.05	≤30.00	PASS
				3	4.02	≤30.00	PASS
			106+26_OFDMA	1	4.87	≤30.00	PASS
				2	4.76	≤30.00	PASS
11BE80MIMO	Ant9	5775	484+242_OFDMA	1	-1.94	≤30.00	PASS
				2	-1.68	≤30.00	PASS
				3	-1.81	≤30.00	PASS
				4	-1.87	≤30.00	PASS

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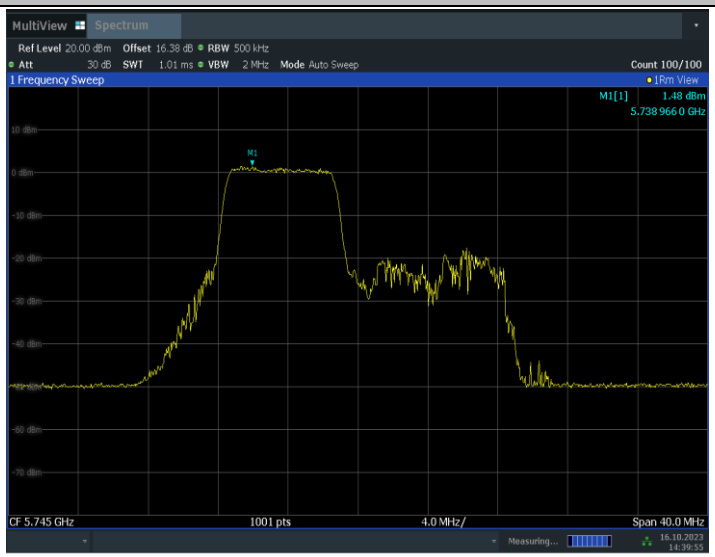
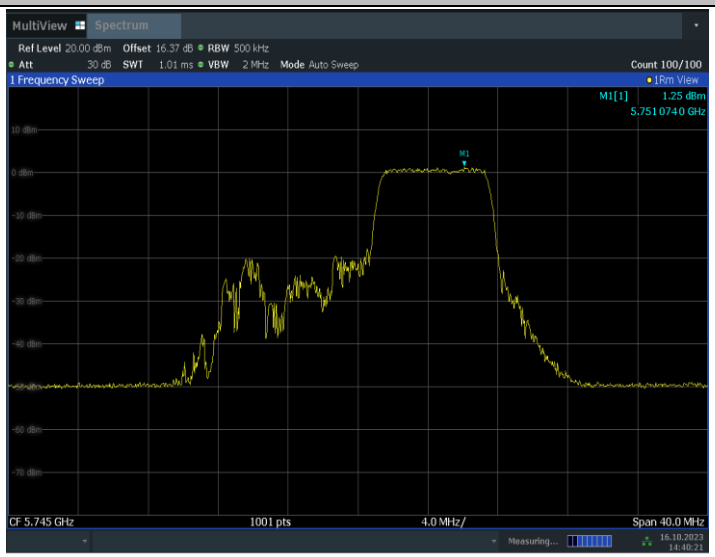
	Ant15	5775	484+242_OFDMA	1	-1.41	≤30.00	PASS
				2	-1.01	≤30.00	PASS
				3	-1.21	≤30.00	PASS
				4	-1.33	≤30.00	PASS
	total	5775	484+242_OFDMA	1	1.34	≤30.00	PASS
				2	1.68	≤30.00	PASS
				3	1.51	≤30.00	PASS
				4	1.42	≤30.00	PASS

11BE20MIMO_Ant9_5745_52+26_OFDMA_1



14:39:55 16.10.2023

11BE20MIMO_Ant9_5745_52+26_OFDMA_3



14:40:21 16.10.2023

11BE20MIMO_Ant9_5745_106+26_OFDMA_1

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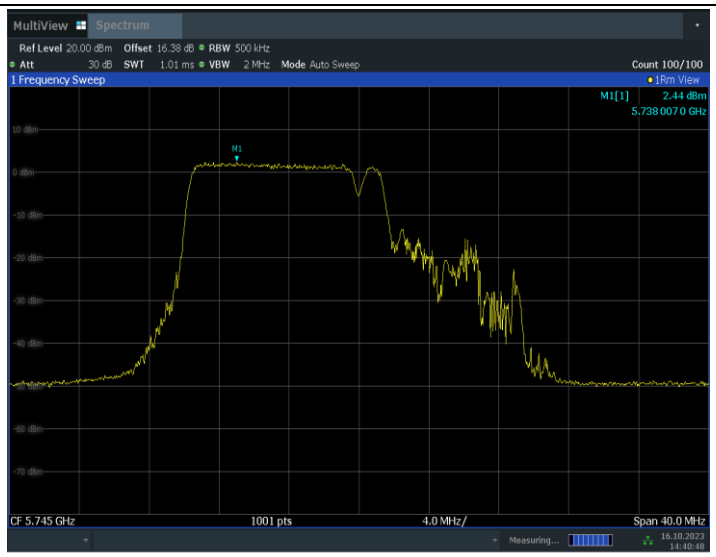
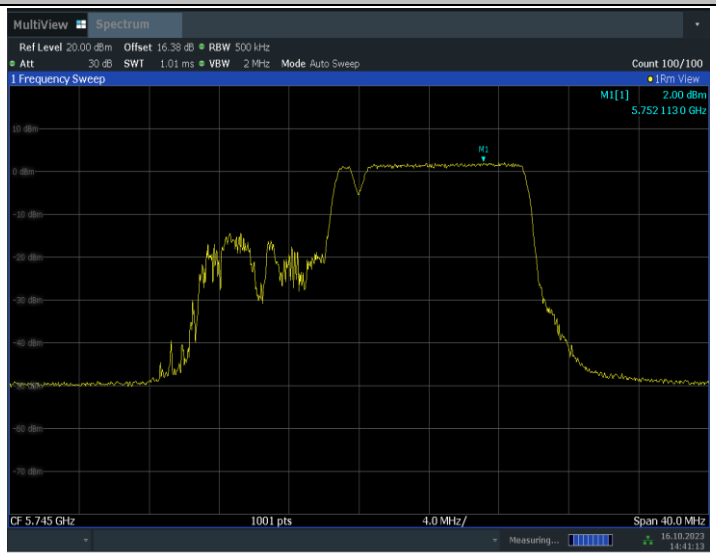


14:40:48 16.10.2023

11BE20MIMO_Ant9_5745_106+26_OFDMA_2



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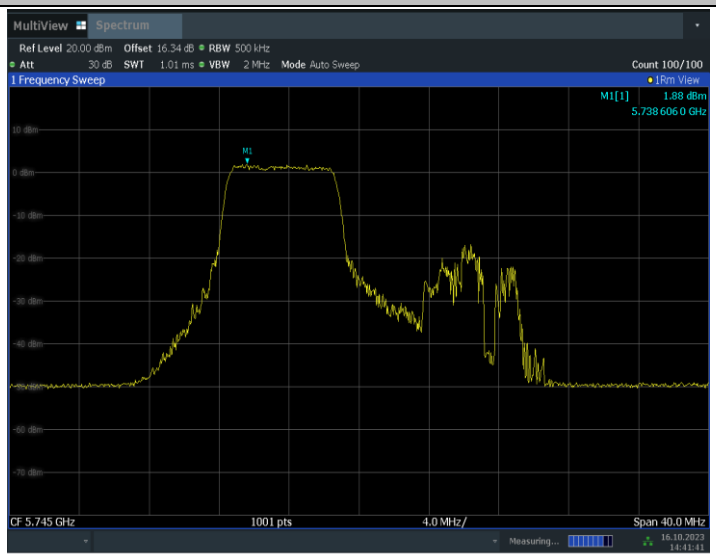
11BE20MIMO_Ant15_5745_52+26_OFDMA_1



14:41:42 16.10.2023

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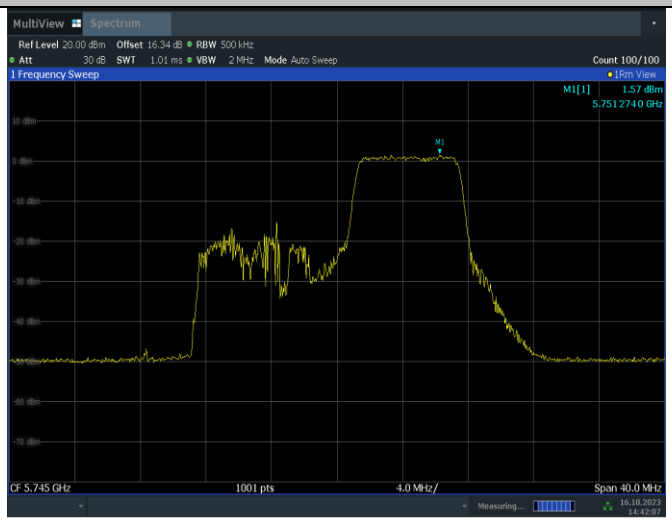
11BE20MIMO_Ant15_5745_52+26_OFDMA_3



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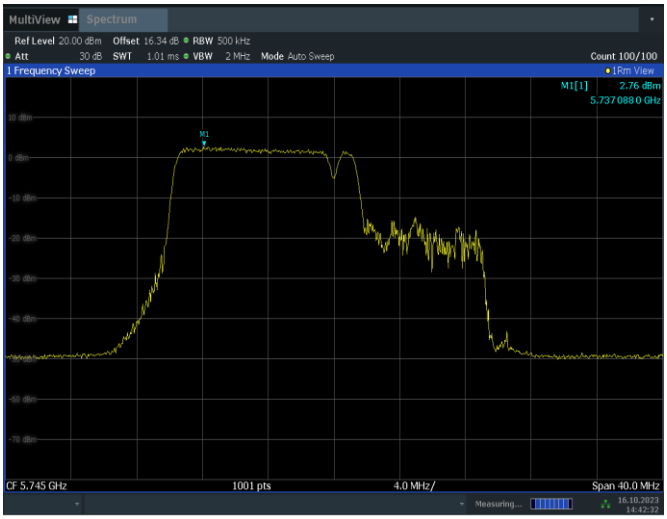

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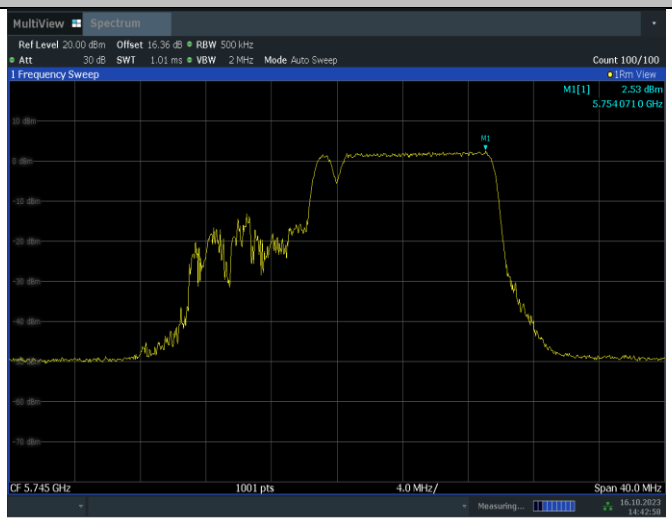
11BE20MIMO_Ant15_5745_106+26_OFDMA_2



14:42:59 16.10.2023

Conclusion: PASS

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A.4. 6dB Emission Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.407 (e)	≥ 500

Set RBW = 100 kHz.

Set the video bandwidth (VBW) ≥ 3 × RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

EUT ID: UT04a

Measurement Result:

TestMode	Antenna	Frequency[MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A-MIMO	Ant9	5745	16.32	5736.80	5753.12	0.5	PASS
	Ant15	5745	16.32	5736.80	5753.12	0.5	PASS
	Ant9	5785	16.32	5776.80	5793.12	0.5	PASS
	Ant15	5785	16.32	5776.80	5793.12	0.5	PASS
	Ant9	5825	16.32	5816.80	5833.12	0.5	PASS
	Ant15	5825	16.36	5816.80	5833.16	0.5	PASS
11N20MIMO	Ant9	5745	17.60	5736.16	5753.76	0.5	PASS
	Ant15	5745	17.60	5736.16	5753.76	0.5	PASS
	Ant9	5785	17.72	5776.08	5793.80	0.5	PASS
	Ant15	5785	17.60	5776.16	5793.76	0.5	PASS
	Ant9	5825	17.60	5816.16	5833.76	0.5	PASS
	Ant15	5825	17.60	5816.16	5833.76	0.5	PASS
11N40MIMO	Ant9	5755	36.40	5736.76	5773.16	0.5	PASS
	Ant15	5755	36.40	5736.76	5773.16	0.5	PASS
	Ant9	5795	36.40	5776.76	5813.16	0.5	PASS
	Ant15	5795	36.40	5776.76	5813.16	0.5	PASS
11AC20MIMO	Ant9	5745	17.60	5736.16	5753.76	0.5	PASS
	Ant15	5745	17.60	5736.16	5753.76	0.5	PASS
	Ant9	5785	17.60	5776.16	5793.76	0.5	PASS
	Ant15	5785	17.60	5776.16	5793.76	0.5	PASS
	Ant9	5825	17.60	5816.16	5833.76	0.5	PASS
	Ant15	5825	17.60	5816.16	5833.76	0.5	PASS

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11AC40MIMO	Ant9	5755	36.40	5736.76	5773.16	0.5	PASS
	Ant15	5755	36.40	5736.76	5773.16	0.5	PASS
	Ant9	5795	36.40	5776.76	5813.16	0.5	PASS
	Ant15	5795	36.40	5776.76	5813.16	0.5	PASS
11AC80MIMO	Ant9	5775	76.32	5736.76	5813.08	0.5	PASS
	Ant15	5775	76.32	5736.76	5813.08	0.5	PASS
11AX20MIMO	Ant9	5745	19.00	5735.44	5754.44	0.5	PASS
	Ant15	5745	18.92	5735.48	5754.40	0.5	PASS
	Ant9	5785	19.00	5775.48	5794.48	0.5	PASS
	Ant15	5785	18.92	5775.48	5794.40	0.5	PASS
	Ant9	5825	19.00	5815.48	5834.48	0.5	PASS
	Ant15	5825	18.92	5815.48	5834.40	0.5	PASS
11AX40MIMO	Ant9	5755	38.00	5735.96	5773.96	0.5	PASS
	Ant15	5755	38.24	5735.88	5774.12	0.5	PASS
	Ant9	5795	38.16	5775.80	5813.96	0.5	PASS
	Ant15	5795	38.00	5775.88	5813.88	0.5	PASS
11AX80MIMO	Ant9	5775	77.92	5735.96	5813.88	0.5	PASS
	Ant15	5775	78.24	5735.80	5814.04	0.5	PASS
11BE20MIMO	Ant9	5745	19.04	5735.44	5754.48	0.5	PASS
	Ant15	5745	19.04	5735.44	5754.48	0.5	PASS
	Ant9	5785	19.00	5775.48	5794.48	0.5	PASS
	Ant15	5785	19.00	5775.48	5794.48	0.5	PASS
	Ant9	5825	19.00	5815.48	5834.48	0.5	PASS
	Ant15	5825	18.96	5815.48	5834.44	0.5	PASS
11BE40MIMO	Ant9	5755	38.32	5735.80	5774.12	0.5	PASS
	Ant15	5755	38.16	5735.96	5774.12	0.5	PASS
	Ant9	5795	38.24	5775.88	5814.12	0.5	PASS
	Ant15	5795	38.16	5775.80	5813.96	0.5	PASS
11BE80MIMO	Ant9	5775	78.08	5735.96	5814.04	0.5	PASS
	Ant15	5775	78.08	5735.96	5814.04	0.5	PASS

Test graphs as below:

11A-MIMO_Ant9_5745

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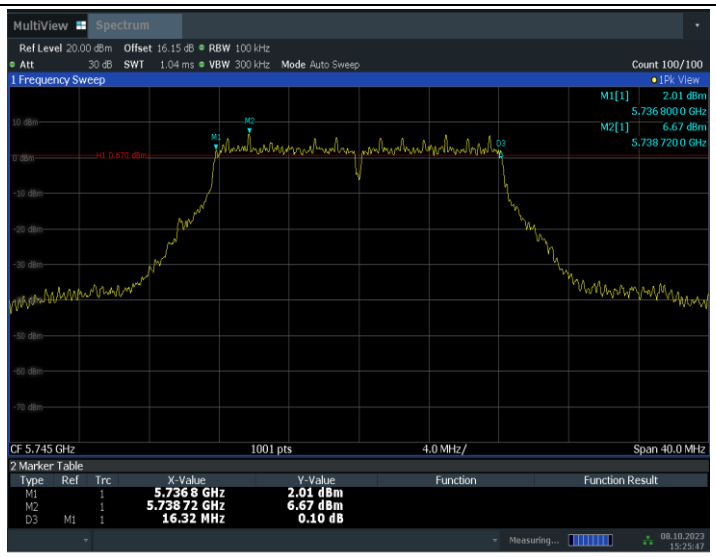

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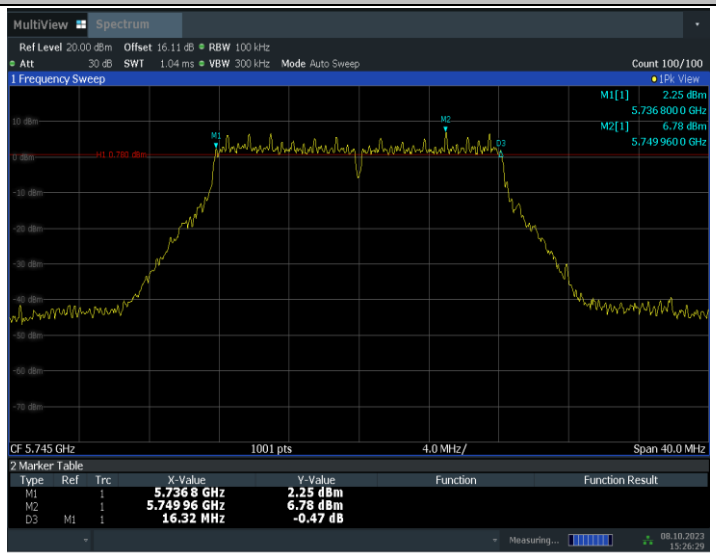

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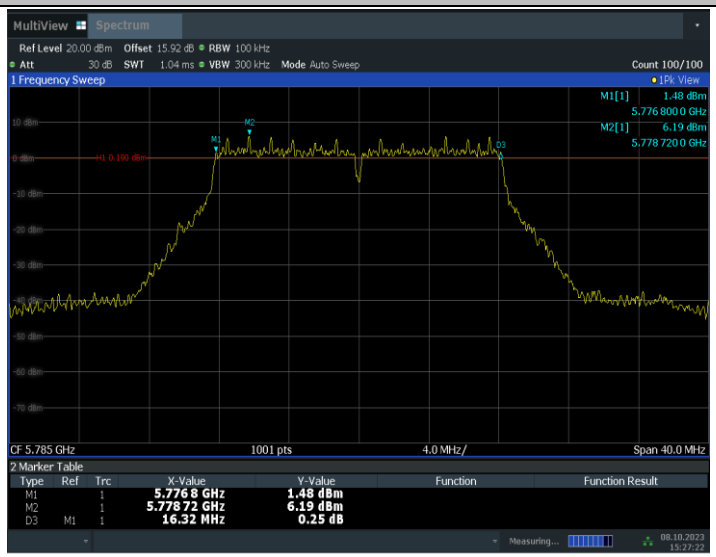

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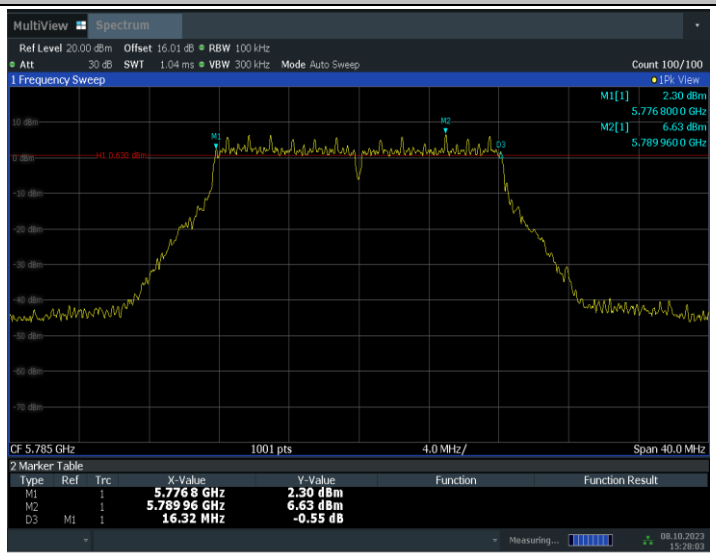

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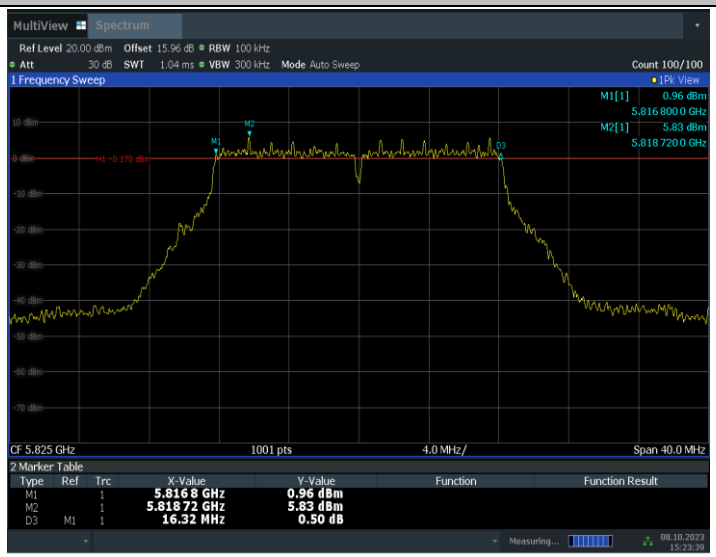

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11A-MIMO_Ant15_5825

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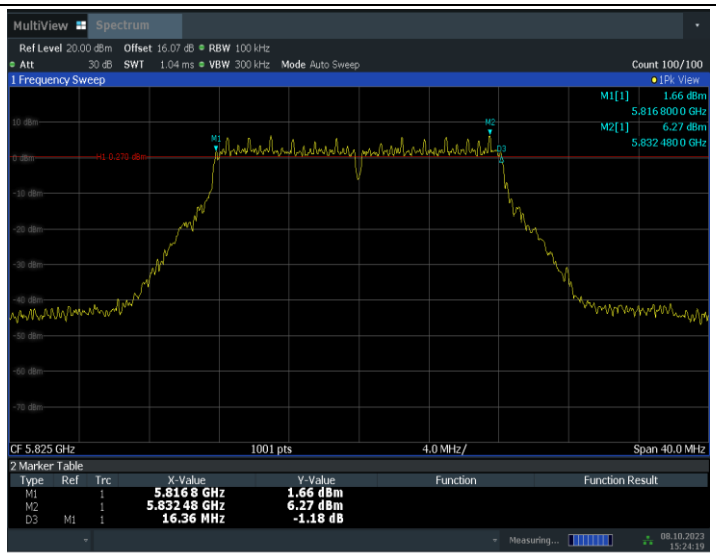

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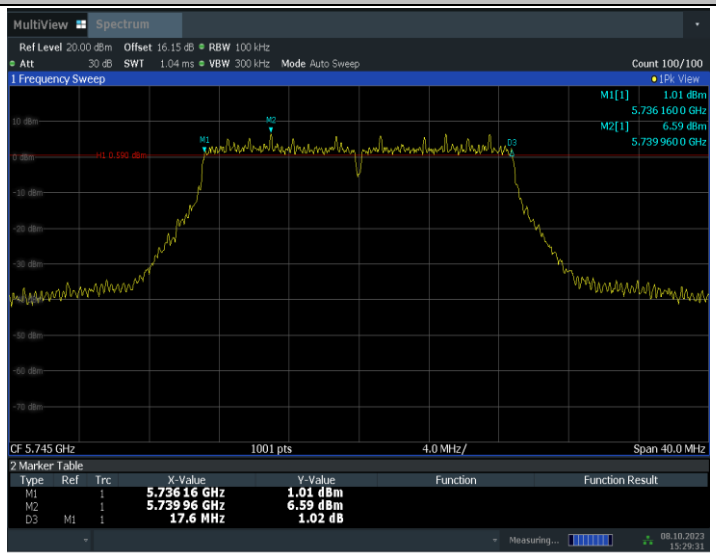

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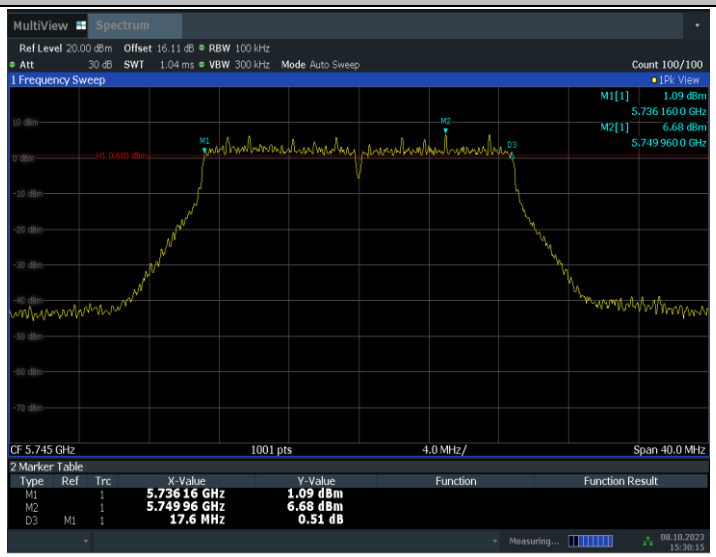

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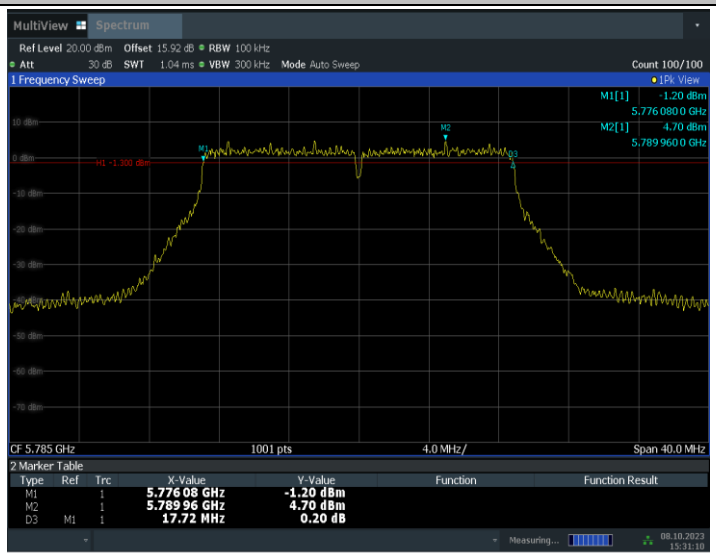
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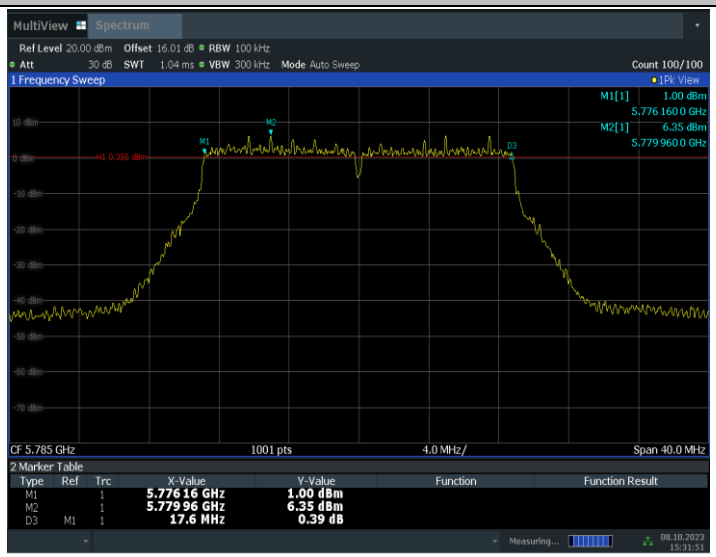
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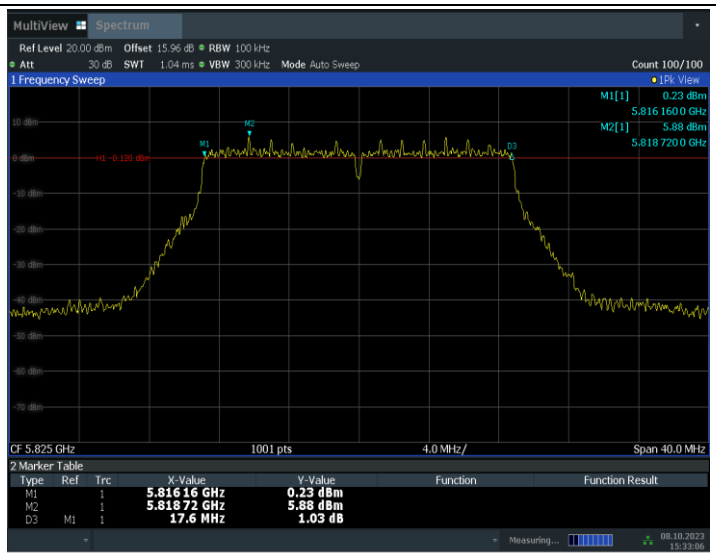

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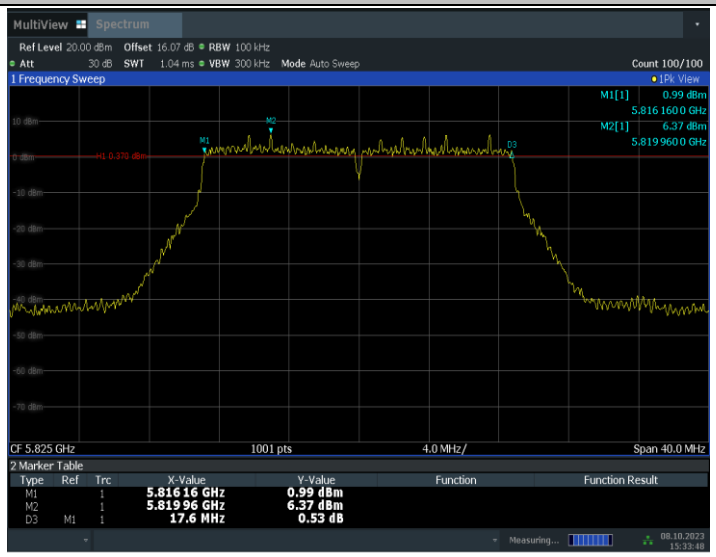

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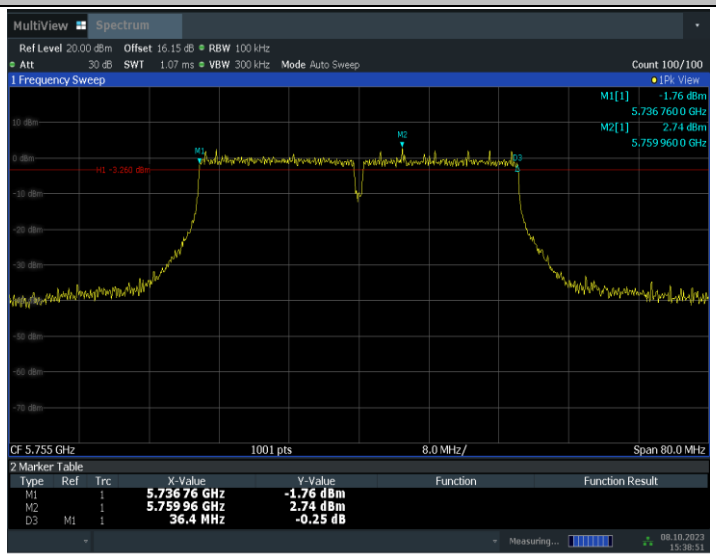

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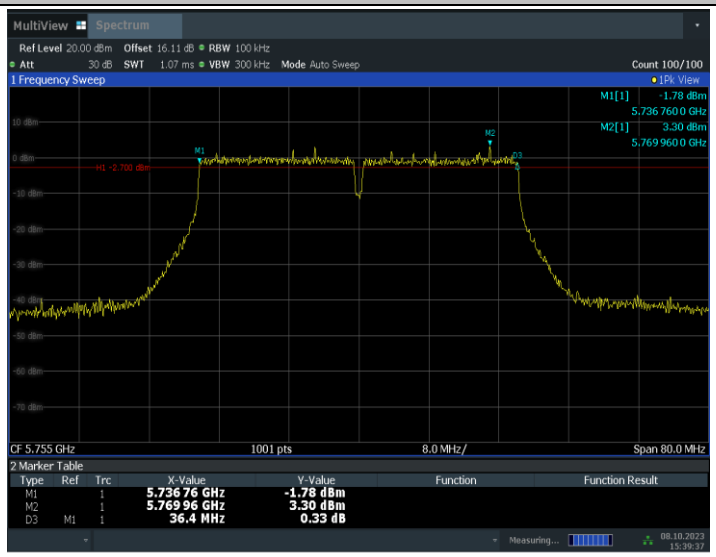

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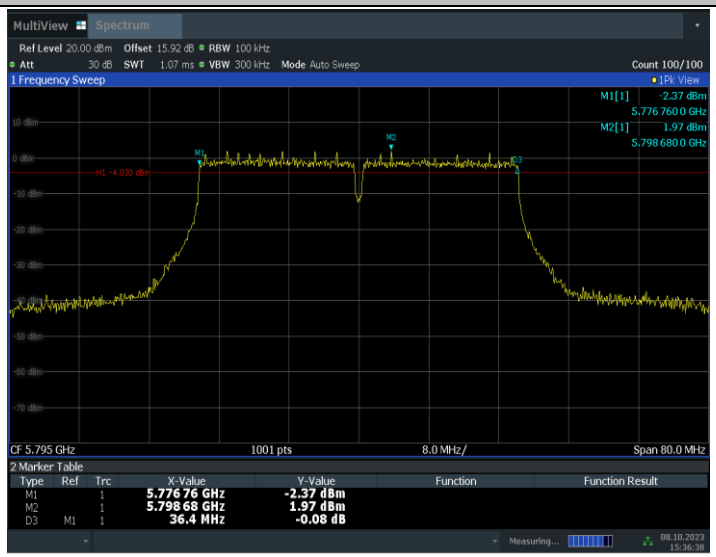

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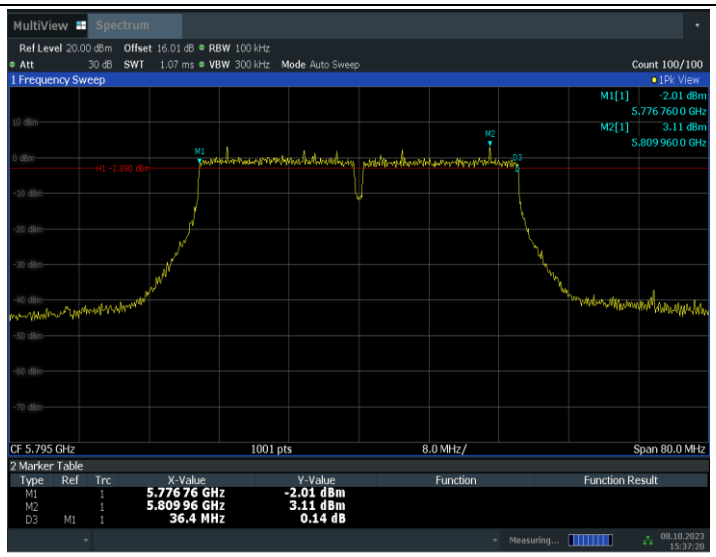

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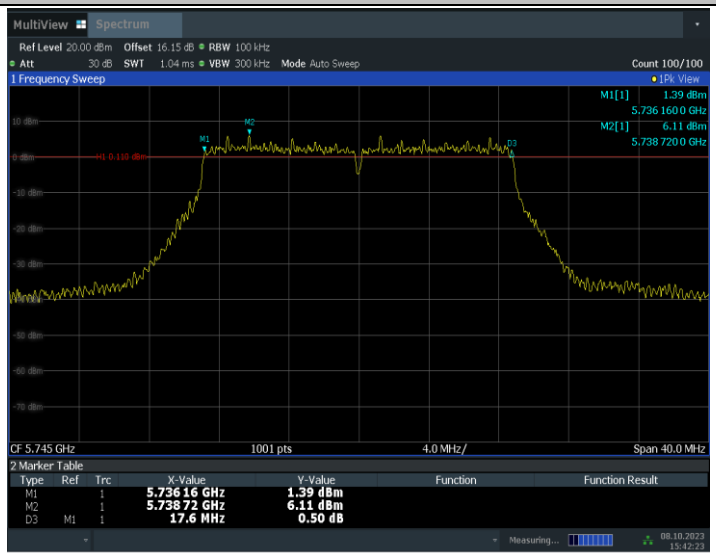

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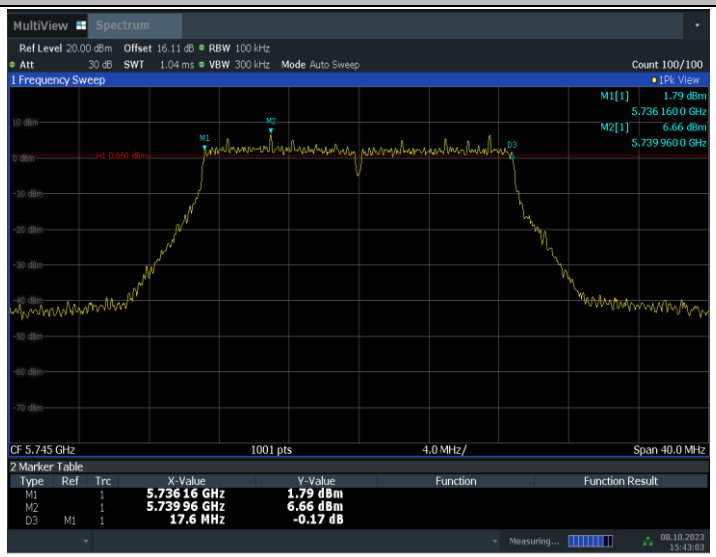

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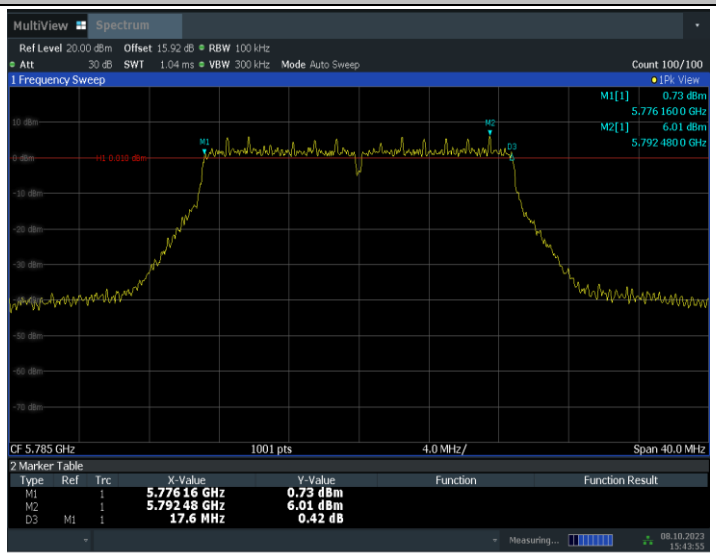

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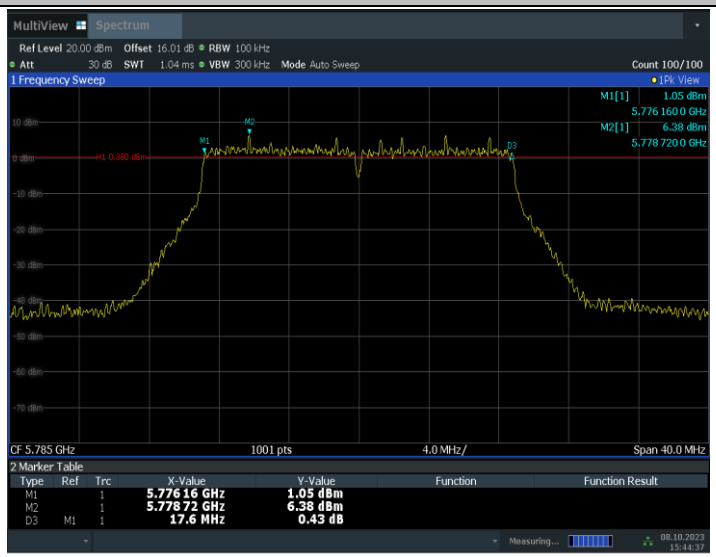

11AC20MIMO_Ant9_5825

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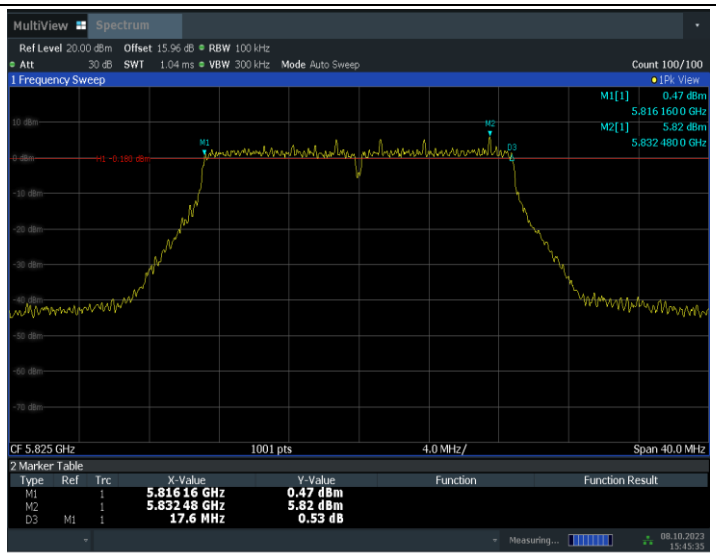

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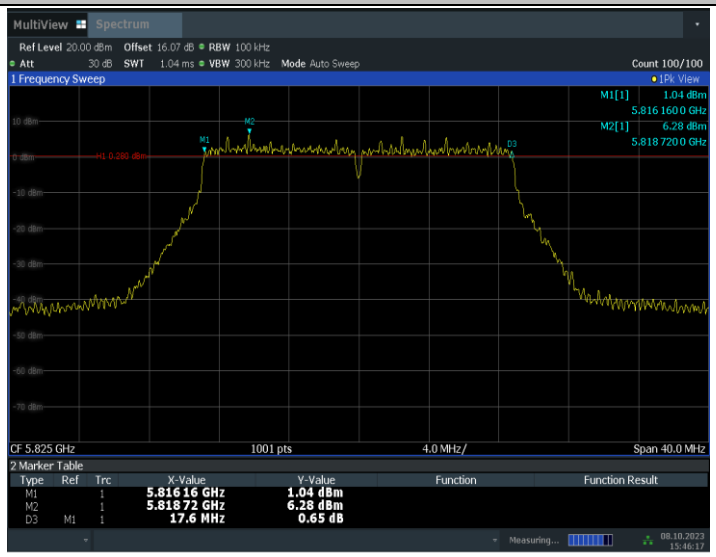

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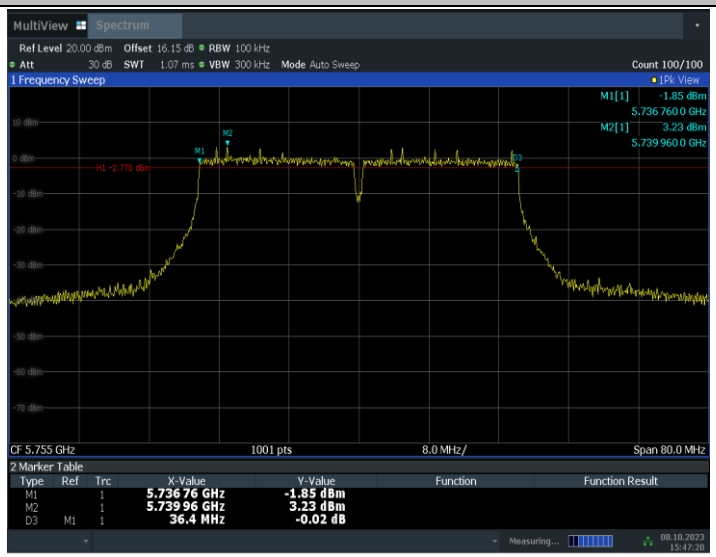

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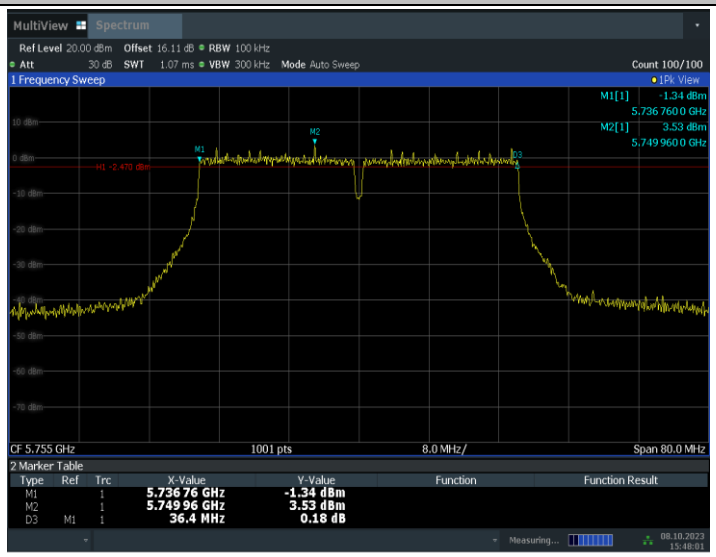

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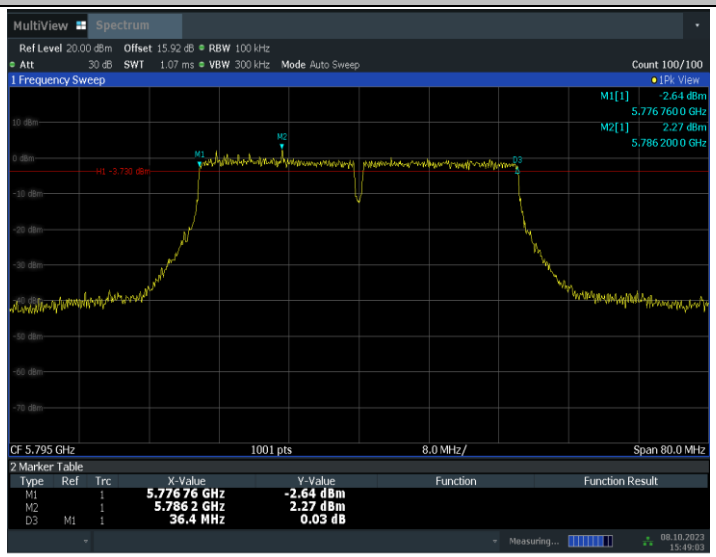

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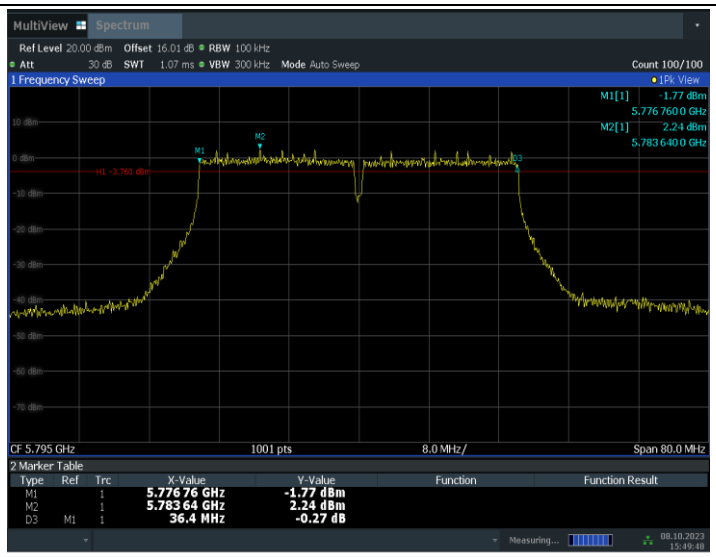

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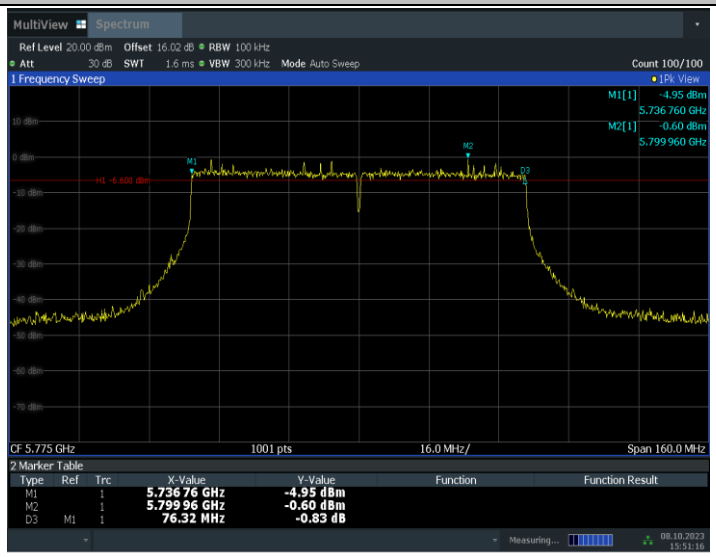

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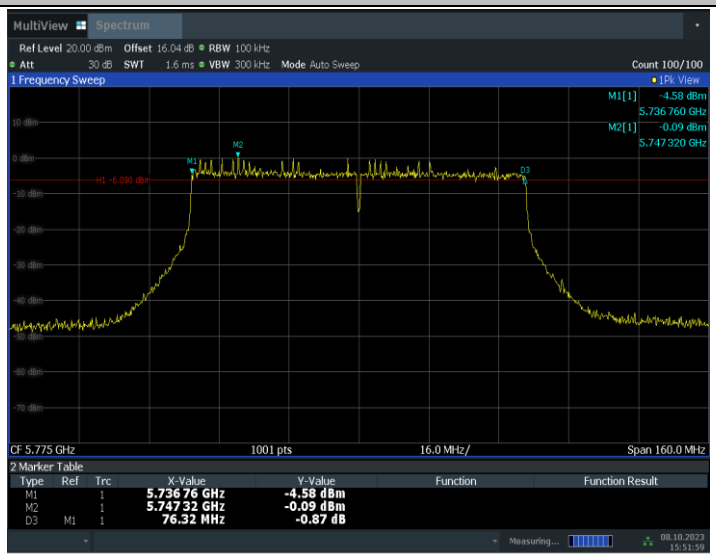

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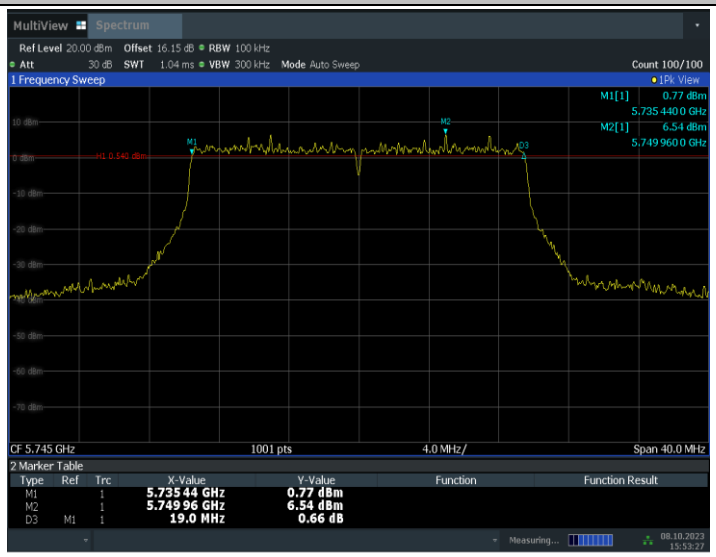 15:53:27 08.10.2023
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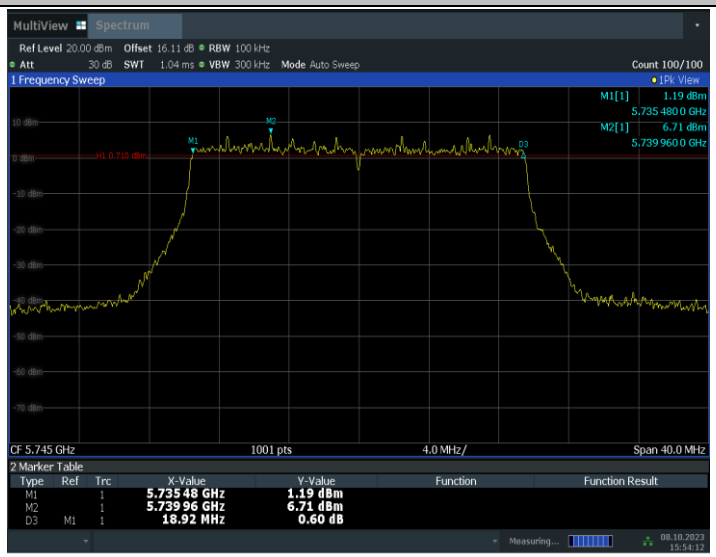 15:54:12 08.10.2023
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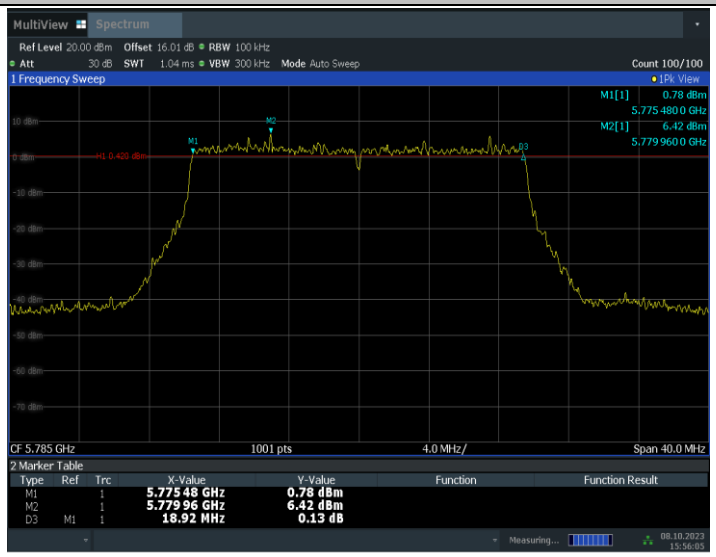

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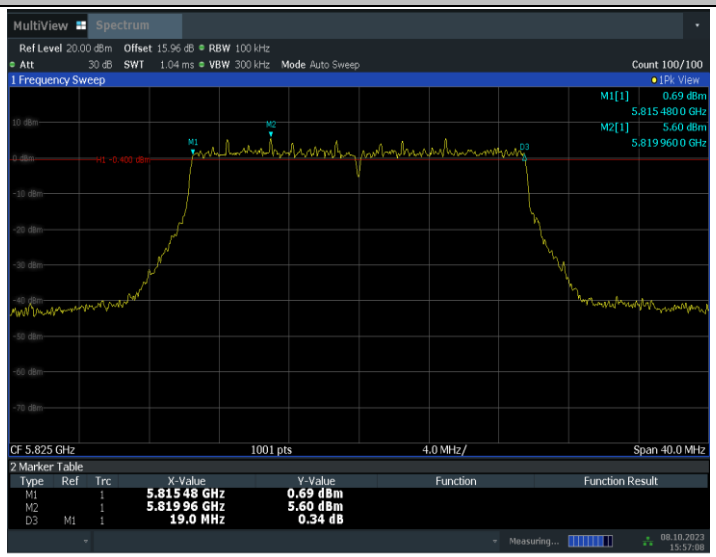

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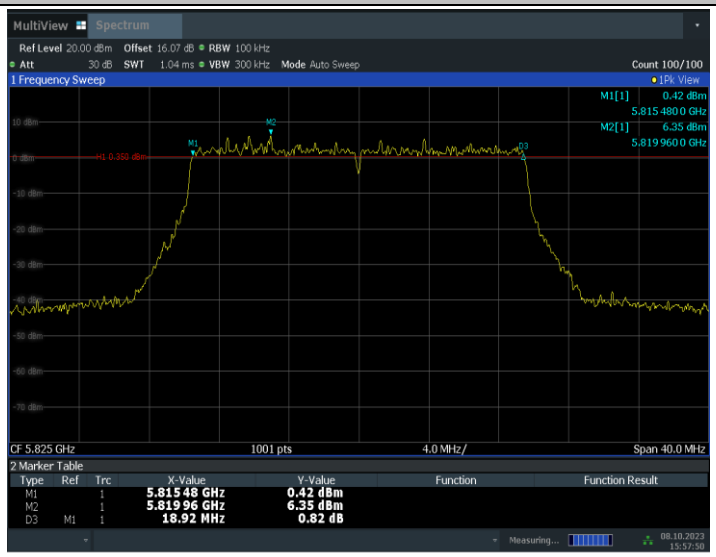

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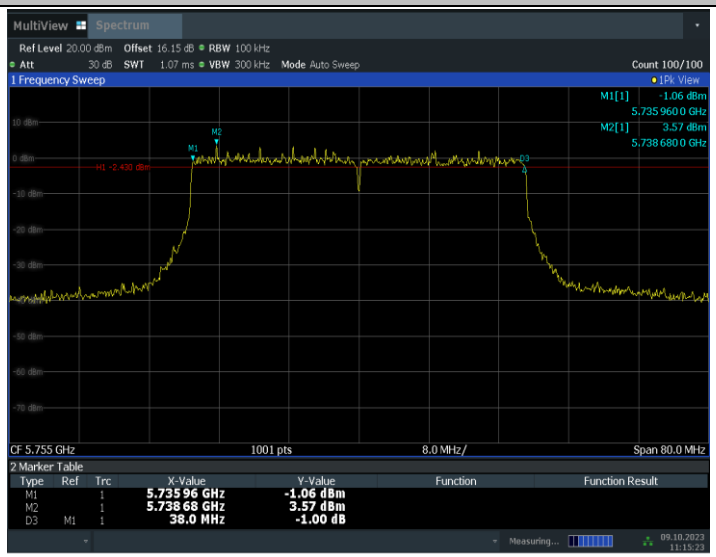

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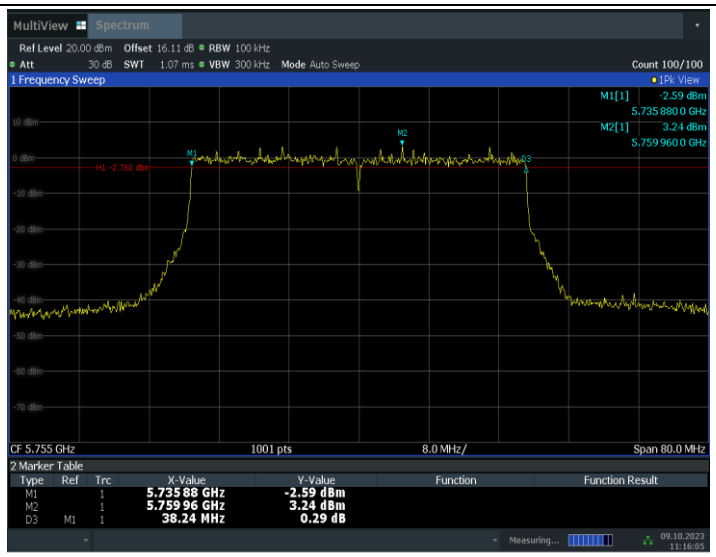

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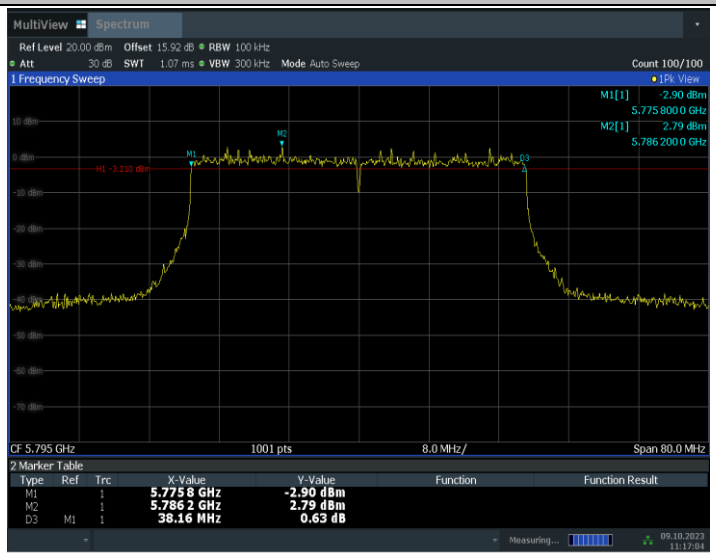

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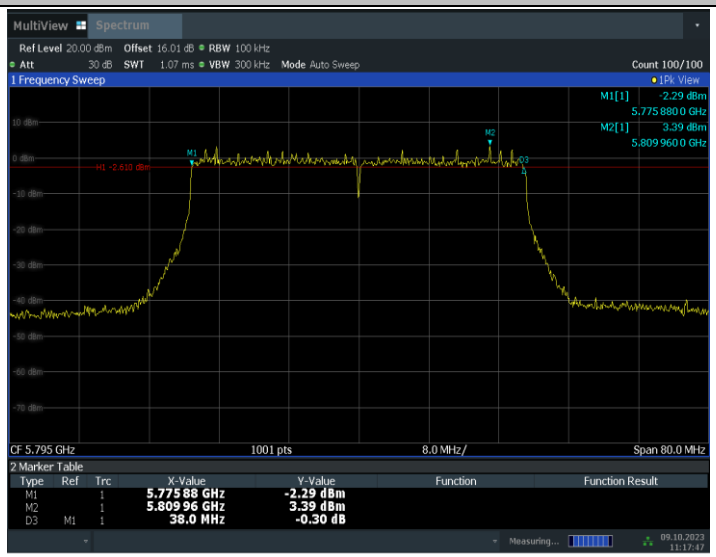

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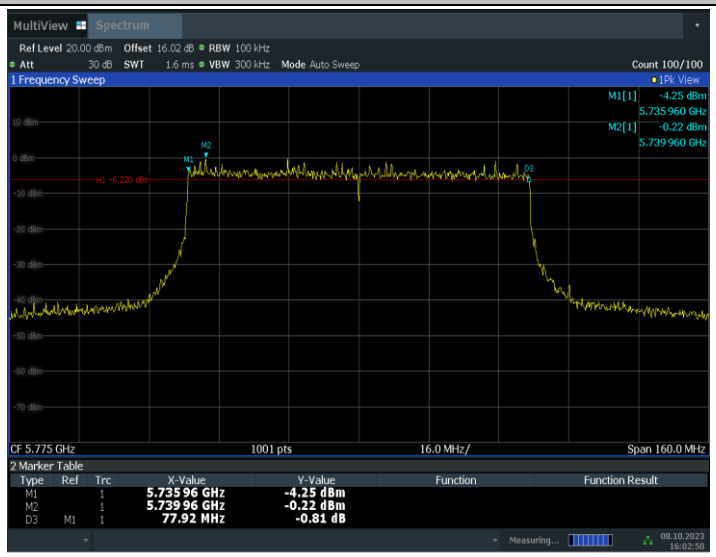
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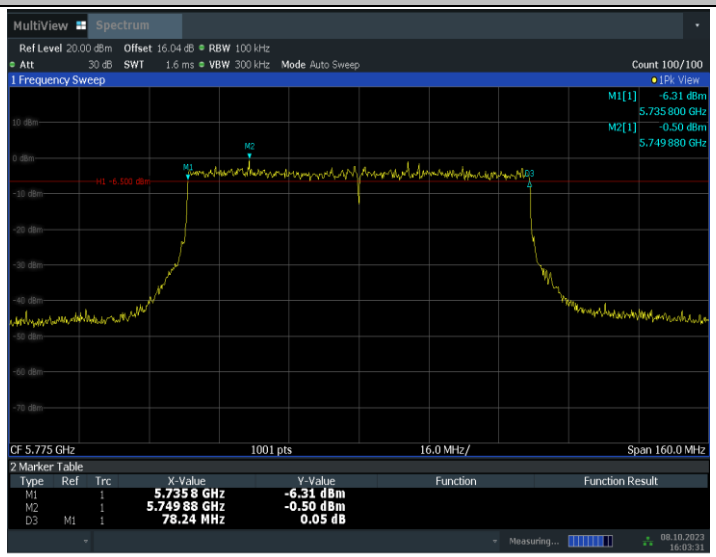
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