



# FCC PART 15C TEST REPORT No.I23Z60483-IOT13

for

**OnePlus Technology (Shenzhen) Co., Ltd.**

**Mobile Phone**

**Model Name: CPH2551**

**FCC ID: 2ABZ2-AA541**

with

**Hardware Version: 11**

**Software Version: OxygenOS 13.2**

**Issued Date: 2023-07-19**

**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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I23Z60483-IOT13	Rev.0	1st edition	2023-07-06
I23Z60483-IOT13	Rev.1	Update statement about antenna gain and testing strategy on page 11 to 13; Update ant1/2 and ant7/10 relationship.	2023-07-19

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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 NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP 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. Testing Environment**

Normal Temperature: 15-35°C

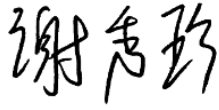
Relative Humidity: 20-75%

### **1.4. Project date**

Testing Start Date: 2023-3-17

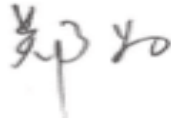
Testing End Date: 2023-07-06

### 1.5. Signature



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Xie Xiuzhen  
( Prepared this test report )



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Zheng Wei  
(Reviewed this test report)



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Pang Shuai  
(Approved this test report)



## **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  
City: Shenzhen  
Postal Code: /  
Country: China  
Telephone: (86)76986076999  
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  
City: Shenzhen  
Postal Code: /  
Country: China  
Telephone: (86)76986076999  
Fax: /

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

#### 3.1. About EUT

Description	Mobile Phone
Model name	CPH2551
FCC ID	2ABZ2-AA541
WLAN Frequency Band	ISM Bands: 5150MHz~5250MHz 5250MHz~5350MHz 5470MHz~5725MHz
Type of modulation	OFDM
Voltage	3.91V DC by Battery

#### 3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
UT35a	868147060021516/ 868147060021508	11	OxygenOS 13.2
UT65a	868147060022696/ 868147060022688	11	OxygenOS 13.2

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

UT35a is used for Conduction test, UT65 is used for Radiation test.

#### 3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	SN
AE1	Battery	/	/
AE2	Battery	/	/
AE3	Charger	/	/
AE4	USB Cable	/	/

##### AE1

Model	BLPA01
Manufacturer	Sunwoda Electronic Co., Ltd
Capacity	1470mAh
Nominal Voltage	/

##### AE2

Model	BLPA03
Manufacturer	Sunwoda Electronic Co., Ltd
Capacity	3210mAh
Nominal Voltage	/

##### AE3

Model	VCB8JAUH
Manufacturer	Huizhou Jinhu Industrial Development Co.,Ltd
Length of cable	/

##### AE4





Model DL129  
Manufacturer OnePlus Technology(Shenzhen) Co.,Ltd.  
Length of cable /

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

### 3.4. General Description

The Equipment under Test (EUT) is a model of Mobile Phone with integrated antenna and inbuilt battery.

It consists of normal options: travel charger, USB cable.

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

Samples undergoing test were selected by the client.

### 3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor  $k=2$ .

#### Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

## **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	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	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 558074 D01	Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019
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.

## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15E	Sub-clause of IC	Verdict
Maximum Output Power	15.407	/	<b>P</b>
Peak Power Spectral Density	15.407	/	<b>P</b>
Occupied 26dB Bandwidth	15.403	/	<b>P</b>
Band edge compliance (Radiated)	15.209	/	<b>P</b>
Transmitter spurious emissions (Radiated)	15.407	/	<b>P</b>
AC Powerline Conducted Emission (150kHz- 30MHz)	15.407	/	<b>P</b>
Frequency Stability	15.407	/	<b>P</b>
99% Occupied bandwidth	/	/	<b>P</b>
Transmit Power Control	15.407	/	<b>NA</b>

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-1/-2A/-2C, and can't transmit simultaneously in U-NII-1/-2A/-2C.
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/26dB bandwidth /99% bandwidth ) has reported only 802.11a/be-EHT20/40/80/160MHz by referring to the higher output power.
6. For 802.11ax single RU and 802.11be single 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.
  - a. For low channel : 52 Tone,index38 + 26Tone,index1 and 106 Tone,index53 + 26Tone,index4;
  - b. For high channel : 52 Tone,index39 + 26Tone,index7 and 106 Tone,index54 + 26Tone,index4.
8. For 802.11be-EHT80/160MHz large MRU and Puncturing modes are tested for conducted power/PSD.

Bandwidth	Pattern	index
80MHz		484+242-tone Index 1 484+242-tone Index 2 484+242-tone Index 3 484+242-tone Index 4
160MHz		996+484+242-tone Index 1 996+484+242-tone Index 2 996+484+242-tone Index 3 996+484+242-tone Index 4 996+484+242-tone Index 5 996+484+242-tone Index 6 996+484+242-tone Index 7 996+484+242-tone Index 8
160MHz		996+484-tone Index1 996+484-tone Index 2 996+484-tone Index 3 996+484-tone Index 4

### 6.3. Antenna Gain

Mode	Ant7(dBi)	Ant10(dBi)	Power(dBi)	PSD(dBi)
CDD	-1	-1.5	-1	1.76
BF	-1	-1.5	1.76	1.76

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

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

- 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 =  $10 \log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / \text{NANT}]$  dBi. NANT = number of transmit antennas NSS = number of spatial streams. (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 with the provisions of 15.203.

#### 6.4. Statements

CTTL has evaluated the test cases requested by the client/manufacture 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	3.91V
Humidity	44%

## 7. TEST EQUIPMENTS UTILIZED

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2024-06-04
2	Test Receiver	ESCI	100766	Rohde & Schwarz	1 year	2024-05-06
3	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	1 year	2024-05-10
4	Shielding Room	S81	/	ETS-Lindgren	/	/

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	1 year	2023-12-30
2	BiLog Antenna	VULB9163	514	Schwarzbeck	3 years	2021-01-03
3	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	3 years	2023-05-31
4	EMI Antenna	3117	00139065	ETS-Lindgren	3 Years	2020-11-15
5	Spectrum Analyzer	FSV40	101047	Rohde & Schwarz	1 year	2023-07-22

## 2.3 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 Occupied Channel 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)
$30\text{MHz} \leq f \leq 2\text{GHz}$	1.22
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	1.22
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.22
$8\text{GHz} \leq f \leq 12.75\text{GHz}$	1.51
$12.75\text{GHz} \leq f \leq 26\text{GHz}$	1.51
$26\text{GHz} \leq f \leq 40\text{GHz}$	1.59

#### Radiated (k=2)

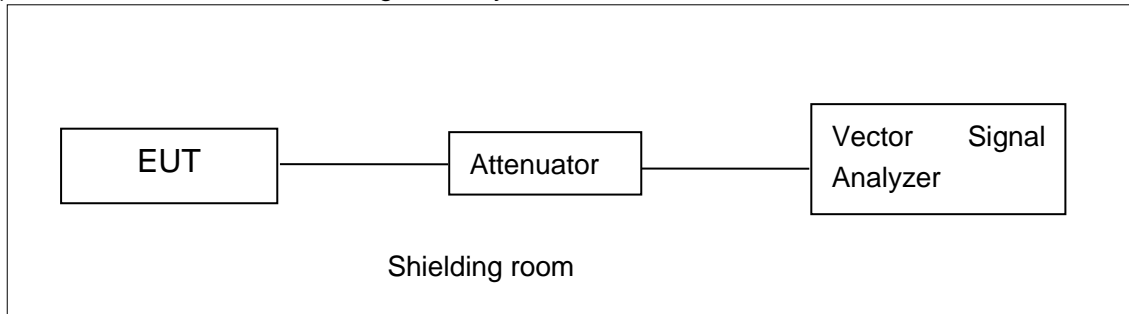
Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.40
$1\text{GHz} \leq f \leq 18\text{GHz}$	4.32
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

## 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

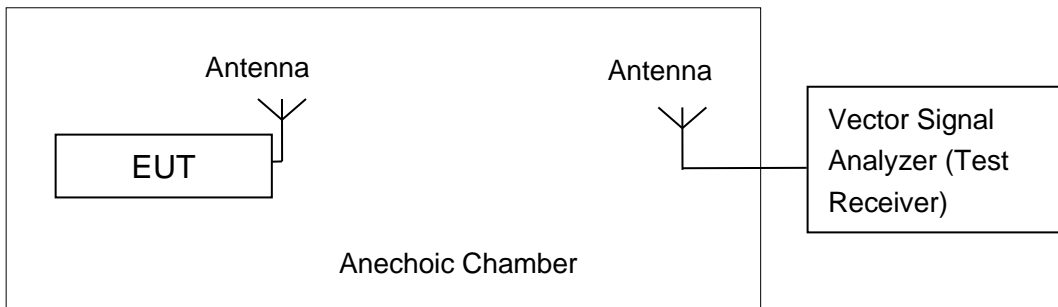


#### A.1.2. Radiated Emission Measurements

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 = 10Hz;



The measurement is made according to KDB 789033

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.



## A.2. Maximum output Power

### Measurement Limit and Method:

Standard	Frequency (MHz)	Limit (dBm)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	24dBm
	5250MHz~5350MHz	24dBm or 11+10logB
	5470MHz~5725MHz	24dBm or 11+10logB

Limit use the less value, and B is the 26dB bandwidth.

The measurement method SA-2 is made according to KDB 789033

### Measurement Results:

#### 802.11a mode

Mode	Channel	Test Result (dBm)		
		Data Rate (Mbps)		
		6		
		Ant7	Ant10	Sum
802.11a	5180MHz (Ch36)	16.62	16.98	19.81
	5200MHz (Ch40)	16.02	16.87	19.48
	5240MHz(Ch48)	16.16	16.14	19.16
	5260MHz(Ch52)	16.49	16.85	19.68
	5280MHz(Ch56)	16.02	16.05	19.05
	5320MHz(Ch64)	16.03	16.05	19.05
	5500MHz(Ch100)	16.67	16.08	19.40
	5580MHz(Ch116)	16.01	16.29	19.16
	5700MHz(Ch140)	16.20	16.53	19.38

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

#### 802.11n-HT20 mode

Mode	Channel	Test Result (dBm)		
		Data Rate (Mbps)		
		6		
		Ant7	Ant10	Sum
802.11n20	5180MHz (Ch36)	16.11	16.63	19.39
	5200MHz (Ch40)	16.26	16.91	19.61
	5240MHz(Ch48)	16.06	16.08	19.08
	5260MHz(Ch52)	16.51	16.54	19.54
	5280MHz(Ch56)	16.51	16.54	19.54
	5320MHz(Ch64)	16.02	16.04	19.04
	5500MHz(Ch100)	16.67	16.11	19.41

	5580MHz(Ch116)	16.01	16.25	19.14
	5700MHz(Ch140)	16.04	16.50	19.29

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT20 mode

Mode	Channel	Test Result (dBm)		
		Data Rate (Mbps)		
		6		
		Ant7	Ant10	Sum
802.11ac20	5180MHz (Ch36)	16.06	16.64	19.37
	5200MHz (Ch40)	16.24	16.91	19.60
	5240MHz(Ch48)	16.01	16.06	19.05
	5260MHz(Ch52)	16.49	16.54	19.53
	5280MHz(Ch56)	16.51	16.58	19.56
	5320MHz(Ch64)	16.04	16.09	19.08
	5500MHz(Ch100)	16.71	16.14	19.44
	5580MHz(Ch116)	16.27	16.79	19.55
	5700MHz(Ch140)	16.02	16.47	19.26

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE20 mode

Mode	Channel	Test Result (dBm)		
		Data Rate (Mbps)		
		6		
		Ant7	Ant10	Sum
802.11ax20	5180MHz (Ch36)	16.05	16.60	19.34
	5200MHz (Ch40)	16.20	16.90	19.57
	5240MHz(Ch48)	16.06	16.02	19.05
	5260MHz(Ch52)	16.51	16.57	19.55
	5280MHz(Ch56)	16.47	16.64	19.57
	5320MHz(Ch64)	16.05	16.11	19.09
	5500MHz(Ch100)	16.66	16.21	19.45
	5580MHz(Ch116)	16.33	16.93	19.65
	5700MHz(Ch140)	16.03	16.59	19.33

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11be-EHT20 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate (Mbps)		
		6		
		Ant7	Ant10	Sum
802.11be20	5180MHz (Ch36)	16.15	16.75	19.47
	5200MHz (Ch40)	16.23	16.99	19.64
	5240MHz(Ch48)	16.13	16.12	19.14
	5260MHz(Ch52)	16.55	16.70	19.64
	5280MHz(Ch56)	16.55	16.73	19.65
	5320MHz(Ch64)	16.07	16.13	19.11
	5500MHz(Ch100)	16.65	16.21	19.45
	5580MHz(Ch116)	16.30	16.95	19.65
	5700MHz(Ch140)	16.02	16.63	19.35

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11n-HT40 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11n40	5190MHz (Ch38)	16.42	16.87	19.66
	5230MHz(Ch46)	16.24	16.47	19.37
	5270MHz(Ch54)	16.09	16.59	19.36
	5310MHz(Ch62)	15.33	15.72	18.54
	5510MHz(Ch102)	15.12	15.26	18.20
	5550MHz(Ch110)	16.07	16.53	19.32
	5670MHz(Ch134)	16.29	16.77	19.55

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ac-VHT40 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11ac40	5190MHz (Ch38)	16.37	16.76	19.58
	5230MHz(Ch46)	16.20	16.42	19.32

	5270MHz(Ch54)	16.10	16.54	19.34
	5310MHz(Ch62)	15.30	15.67	18.50
	5510MHz(Ch102)	15.12	15.23	18.19
	5550MHz(Ch110)	16.08	16.51	19.31
	5670MHz(Ch134)	16.26	16.77	19.53

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE40 mode

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11ax40	5190MHz (Ch38)	16.42	16.82	19.63
	5230MHz(Ch46)	16.25	16.41	19.34
	5270MHz(Ch54)	16.20	16.55	19.39
	5310MHz(Ch62)	15.38	15.66	18.53
	5510MHz(Ch102)	15.19	15.25	18.23
	5550MHz(Ch110)	16.10	16.51	19.32
	5670MHz(Ch134)	16.38	16.78	19.59

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11be-EHT40 mode

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11be40	5190MHz (Ch38)	16.29	16.65	19.48
	5230MHz(Ch46)	16.06	16.19	19.14
	5270MHz(Ch54)	16.00	16.37	19.20
	5310MHz(Ch62)	15.20	15.24	18.23
	5510MHz(Ch102)	15.00	15.03	18.03
	5550MHz(Ch110)	16.06	16.36	19.22
	5670MHz(Ch134)	16.15	16.57	19.38

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ac-VHT80 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11ac80	5210MHz(Ch42)	16.24	16.59	19.43
	5290MHz(Ch58)	16.37	16.84	19.62
	5530MHz(Ch106)	16.02	16.32	19.18
	5610MHz(Ch122)	16.23	16.55	19.40

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ax-HE80 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11ax80	5210MHz(Ch42)	16.02	16.32	19.18
	5290MHz(Ch58)	16.58	16.97	19.79
	5530MHz(Ch106)	16.12	16.54	19.35
	5610MHz(Ch122)	16.50	16.76	19.64

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11be-EHT80 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11be80	5210MHz(Ch42)	16.03	16.37	19.21
	5290MHz(Ch58)	16.57	16.97	19.78
	5530MHz(Ch106)	16.17	16.57	19.38
	5610MHz(Ch122)	16.48	16.79	19.65

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ac-VHT160 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11ac160	5250MHz(Ch50)	15.61	15.52	18.58
	5570MHz(Ch114)	15.04	15.53	18.30

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ax-HE160 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11ax160	5250MHz(Ch50)	15.56	15.86	18.72
	5570MHz(Ch114)	15.87	16.27	19.08

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11be-EHT160 mode**

Mode	Channel	Test Result (dBm)		
		Data Rate		
		MCS0		
		Ant7	Ant10	Sum
802.11be160	5250MHz(Ch50)	15.55	15.54	18.56
	5570MHz(Ch114)	15.64	16.19	18.93

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**RU Mode**
**802.11ax-20 RU MIMO mode**

Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
RU26-L	5180MHz (Ch36)	8.10	8.82	11.49
	5200MHz (Ch40)	8.48	8.98	11.75
	5240MHz(Ch48)	8.06	8.70	11.40

	5260MHz(Ch52)	8.12	8.59	11.37
	5280MHz(Ch56)	8.29	9.42	11.90
	5320MHz(Ch64)	8.03	8.75	11.42
RU26-R	5500MHz(Ch100)	8.66	8.62	11.65
	5580MHz(Ch116)	8.51	9.00	11.77
	5700MHz(Ch140)	8.29	8.67	11.49
Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
RU52-L	5180MHz (Ch36)	11.27	12.14	14.74
	5200MHz (Ch40)	11.63	12.63	15.17
	5240MHz(Ch48)	11.89	12.75	15.35
	5260MHz(Ch52)	11.25	11.85	14.57
	5280MHz(Ch56)	11.05	12.42	14.80
	5320MHz(Ch64)	11.16	11.97	14.59
RU52-R	5500MHz(Ch100)	11.84	11.29	14.58
	5580MHz(Ch116)	11.19	11.63	14.43
	5700MHz(Ch140)	11.44	11.54	14.50
Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
RU106-L	5180MHz (Ch36)	14.29	14.44	17.38
	5200MHz (Ch40)	14.57	14.73	17.66
	5240MHz(Ch48)	14.31	14.52	17.43
	5260MHz(Ch52)	14.19	14.39	17.30
	5280MHz(Ch56)	14.07	14.55	17.33
	5320MHz(Ch64)	14.32	15.06	17.72
RU106-R	5500MHz(Ch100)	14.76	14.47	17.63
	5580MHz(Ch116)	14.31	14.61	17.47
	5700MHz(Ch140)	14.36	14.00	17.19

**802.11be-20 RU MIMO mode**

Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
RU26-L	5180MHz (Ch36)	8.12	8.89	11.53
	5200MHz (Ch40)	8.33	9.24	11.82
	5240MHz(Ch48)	8.14	8.86	11.53
	5260MHz(Ch52)	8.11	8.76	11.46
	5280MHz(Ch56)	8.50	9.54	12.06
	5320MHz(Ch64)	8.18	9.22	11.74

RU26-R	5500MHz(Ch100)	8.79	8.79	11.80
	5580MHz(Ch116)	8.36	9.54	12.00
	5700MHz(Ch140)	8.27	9.55	11.97
Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
RU52-L	5180MHz (Ch36)	11.10	12.50	14.87
	5200MHz (Ch40)	11.61	12.97	15.35
	5240MHz(Ch48)	11.70	12.85	15.32
	5260MHz(Ch52)	11.19	12.12	14.69
	5280MHz(Ch56)	11.15	12.66	14.98
	5320MHz(Ch64)	11.20	12.39	14.85
RU52-R	5500MHz(Ch100)	12.01	11.97	15.00
	5580MHz(Ch116)	11.16	11.95	14.58
	5700MHz(Ch140)	11.35	11.94	14.67
Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
RU106-L	5180MHz (Ch36)	14.24	14.57	17.42
	5200MHz (Ch40)	14.58	15.17	17.90
	5240MHz(Ch48)	14.24	14.60	17.43
	5260MHz(Ch52)	14.26	14.56	17.42
	5280MHz(Ch56)	14.09	14.84	17.49
	5320MHz(Ch64)	14.29	15.22	17.79
RU106-R	5500MHz(Ch100)	14.79	14.74	17.78
	5580MHz(Ch116)	14.12	14.78	17.47
	5700MHz(Ch140)	14.32	14.45	17.40
Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo
		MCS0	MCS0	MCS0
52 Tone,index38 + 26Tone,index1	5180MHz (Ch36)	8.70	8.69	11.71
	5200MHz (Ch40)	8.92	9.22	12.08
	5240MHz(Ch48)	8.74	8.66	11.71
	5260MHz(Ch52)	8.54	8.67	11.62
	5280MHz(Ch56)	8.45	8.88	11.68
	5320MHz(Ch64)	8.35	9.36	11.89
52 Tone,index39 + 26Tone,index7	5500MHz(Ch100)	8.85	8.70	11.79
	5580MHz(Ch116)	8.80	9.17	12.00
	5700MHz(Ch140)	8.83	9.19	12.02
Mode	Channel	Test Result (dBm)		
		ant7	ant10	mimo



		MCS0	MCS0	MCS0
106 Tone,index53 + 26Tone,index4	5180MHz (Ch36)	8.48	8.63	11.57
	5200MHz (Ch40)	8.71	9.13	11.94
	5240MHz(Ch48)	8.61	8.58	11.61
	5260MHz(Ch52)	8.36	8.61	11.50
	5280MHz(Ch56)	8.36	8.76	11.57
	5320MHz(Ch64)	8.35	9.27	11.84
106 Tone,index54 + 26Tone,index4	5500MHz(Ch100)	8.87	8.72	11.81
	5580MHz(Ch116)	8.62	9.23	11.95
	5700MHz(Ch140)	8.61	9.13	11.89

**802.11be-80 RU MIMO mode**

Mode	Channel	Tone	Test Result (dBm)			
			configure	ant7	ant10	mimo
				MCS0	MCS0	MCS0
802.11be-80	5210MHz(Ch42)	484+242 Tone	1	16.13	16.61	19.39
			2	16.04	16.54	19.31
			3	16.05	16.64	19.37
			4	16.03	16.67	19.37
	5290MHz(Ch58)	484+242 Tone	1	16.42	16.63	19.54
			2	16.24	16.65	19.46
			3	16.26	16.73	19.51
			4	16.15	16.72	19.45
	5530MHz(Ch106)	484+242 Tone	1	16.50	16.71	19.62
			2	16.33	16.76	19.56
			3	16.39	16.87	19.65
			4	16.28	16.84	19.58
	5610MHz(Ch122)	484+242 Tone	1	16.56	17.32	19.97
			2	16.46	17.28	19.90
			3	16.45	17.29	19.90
			4	16.43	17.39	19.95

**802.11be-160 RU MIMO mode**

Mode	Channel	RU	configure	ant7	ant10	mimo
802.11be-160	5250MHz(Ch50)	996+484 Tone	1	17.42	17.05	20.25
			2	17.54	17.17	20.37
			3	17.42	16.94	20.20
			4	17.35	16.98	20.18

	5570MHz(Ch114)	996+484 Tone	1	16.46	17.00	19.75
			2	16.55	17.30	19.95
			3	16.77	17.06	19.93
			4	16.68	17.22	19.97
802.11be-160	5250MHz(Ch50)	996+484+242 Tone	1	16.95	17.07	20.02
			2	16.94	17.04	20.00
			3	16.98	17.10	20.05
			4	16.93	17.00	19.98
			5	17.06	16.95	20.02
			6	16.91	16.82	19.88
			7	16.83	16.90	19.88
			8	16.75	16.92	19.85
	5570MHz(Ch114)	996+484+242 Tone	1	16.67	17.09	19.90
			2	16.61	17.11	19.88
			3	16.72	17.14	19.95
			4	16.67	17.11	19.91
			5	16.74	17.23	20.00
			6	16.68	17.16	19.94
			7	16.61	17.13	19.89
			8	16.58	17.22	19.92

The duty cycle of all mode >90%.

**Conclusion: PASS**

### A.3. Peak Power Spectral Density (conducted)

#### Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11
	5250MHz~5350MHz	11
	5470MHz~5725MHz	11

The output power measurement method Section F is made according to KDB 789033

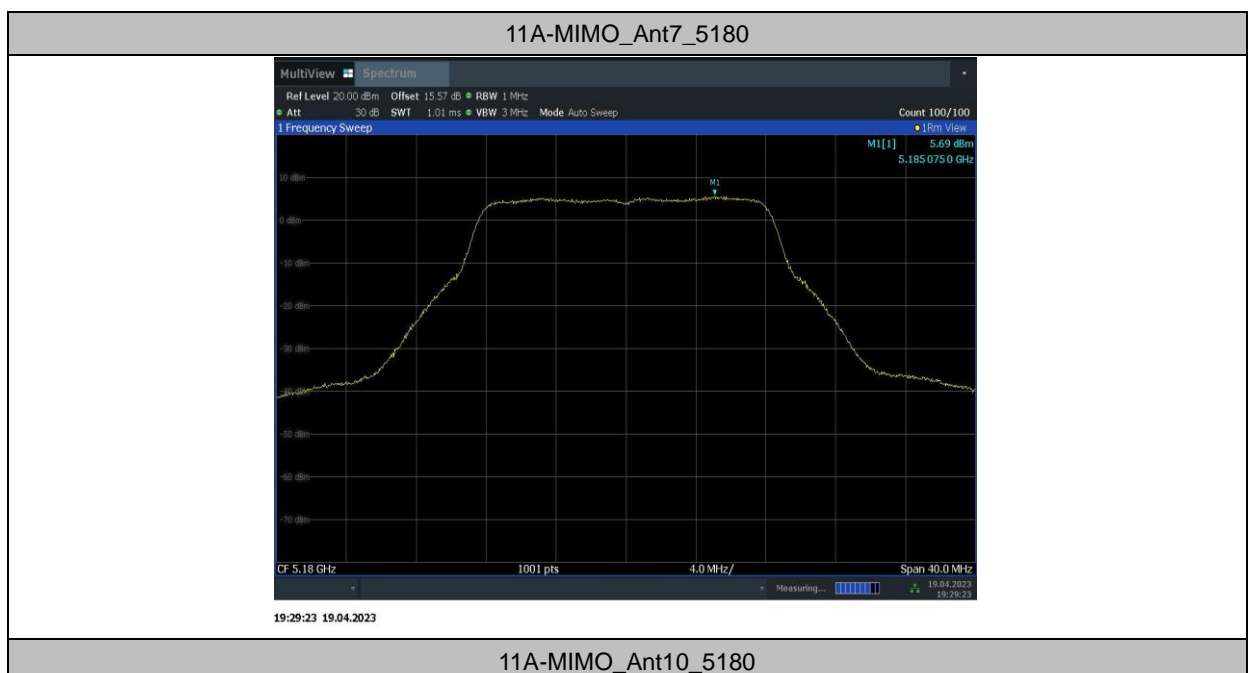
#### Measurement Results:

Ant1 of the result table and result graph corresponds to ant7 of the EUT, ant2 of the result table and result graph corresponds to ant10 of the EUT.

Mode	Ant	Fre	result	limit	Verdict
11AMIMO	Ant7	5180	5.69	≤11.00	PASS
	Ant10	5180	5.43	≤11.00	PASS
	total	5180	8.57	≤11.00	PASS
	Ant7	5200	5.12	≤11.00	PASS
	Ant10	5200	5.29	≤11.00	PASS
	total	5200	8.22	≤11.00	PASS
	Ant7	5240	5.17	≤11.00	PASS
	Ant10	5240	4.76	≤11.00	PASS
	total	5240	7.98	≤11.00	PASS
	Ant7	5260	5.62	≤11.00	PASS
	Ant10	5260	5.27	≤11.00	PASS
	total	5260	8.46	≤11.00	PASS
	Ant7	5280	4.94	≤11.00	PASS
	Ant10	5280	4.73	≤11.00	PASS
	total	5280	7.85	≤11.00	PASS
	Ant7	5320	4.95	≤11.00	PASS
	Ant10	5320	4.78	≤11.00	PASS
	total	5320	7.88	≤11.00	PASS
	Ant7	5500	5.78	≤11.00	PASS
	Ant10	5500	4.93	≤11.00	PASS
	total	5500	8.39	≤11.00	PASS
	Ant7	5580	5.09	≤11.00	PASS
	Ant10	5580	4.87	≤11.00	PASS
	total	5580	7.99	≤11.00	PASS
	Ant7	5700	5.63	≤11.00	PASS
	Ant10	5700	5.51	≤11.00	PASS
	total	5700	8.58	≤11.00	PASS
11BE20MIMO	Ant7	5180	5.24	≤11.00	PASS

	Ant10	5180	6.06	≤11.00	PASS
	total	5180	8.68	≤11.00	PASS
	Ant7	5200	5.64	≤11.00	PASS
	Ant10	5200	6.96	≤11.00	PASS
	total	5200	9.36	≤11.00	PASS
	Ant7	5240	5.47	≤11.00	PASS
	Ant10	5240	6.37	≤11.00	PASS
	total	5240	8.95	≤11.00	PASS
	Ant7	5260	5.69	≤11.00	PASS
	Ant10	5260	6.17	≤11.00	PASS
	total	5260	8.95	≤11.00	PASS
	Ant7	5280	5.18	≤11.00	PASS
	Ant10	5280	6.61	≤11.00	PASS
	total	5280	8.96	≤11.00	PASS
	Ant7	5320	5.75	≤11.00	PASS
	Ant10	5320	6.76	≤11.00	PASS
	total	5320	9.29	≤11.00	PASS
	Ant7	5500	6.22	≤11.00	PASS
	Ant10	5500	6.75	≤11.00	PASS
	total	5500	9.50	≤11.00	PASS
	Ant7	5580	5.95	≤11.00	PASS
	Ant10	5580	6.9	≤11.00	PASS
	total	5580	9.46	≤11.00	PASS
	Ant7	5700	6.21	≤11.00	PASS
	Ant10	5700	6.89	≤11.00	PASS
	total	5700	9.57	≤11.00	PASS
11BE40MIMO	Ant7	5190	1.81	≤11.00	PASS
	Ant10	5190	1.83	≤11.00	PASS
	total	5190	4.83	≤11.00	PASS
	Ant7	5230	1.91	≤11.00	PASS
	Ant10	5230	1.63	≤11.00	PASS
	total	5230	4.78	≤11.00	PASS
	Ant7	5270	1.6	≤11.00	PASS
	Ant10	5270	1.75	≤11.00	PASS
	total	5270	4.69	≤11.00	PASS
	Ant7	5310	0.81	≤11.00	PASS
	Ant10	5310	0.85	≤11.00	PASS
	total	5310	3.84	≤11.00	PASS
	Ant7	5510	1.19	≤11.00	PASS
	Ant10	5510	1.06	≤11.00	PASS
	total	5510	4.14	≤11.00	PASS
		Ant7	5550	2.18	≤11.00
	Ant10	5550	1.95	≤11.00	PASS

	total	5550	5.08	≤11.00	PASS
	Ant7	5670	2.46	≤11.00	PASS
	Ant10	5670	2.43	≤11.00	PASS
	total	5670	5.46	≤11.00	PASS
11BE80MIMO	Ant7	5210	-1.4	≤11.00	PASS
	Ant10	5210	-1.51	≤11.00	PASS
	total	5210	1.56	≤11.00	PASS
	Ant7	5290	-0.59	≤11.00	PASS
	Ant10	5290	-0.39	≤11.00	PASS
	total	5290	2.52	≤11.00	PASS
	Ant7	5530	-0.67	≤11.00	PASS
	Ant10	5530	-0.53	≤11.00	PASS
	total	5530	2.41	≤11.00	PASS
	Ant7	5610	-0.42	≤11.00	PASS
	Ant10	5610	-0.8	≤11.00	PASS
	total	5610	2.40	≤11.00	PASS
11BE160MIMO	Ant7	5250_UNII-1	-3.99	≤11.00	PASS
	Ant10	5250_UNII-1	-4.62	≤11.00	PASS
	total	5250_UNII-1	-1.28	≤11.00	PASS
	Ant7	5250_UNII-2A	-4.16	≤11.00	PASS
	Ant10	5250_UNII-2A	-4.61	≤11.00	PASS
	total	5250_UNII-2A	-1.37	≤11.00	PASS
	Ant7	5570	-3.79	≤11.00	PASS
	Ant10	5570	-3.39	≤11.00	PASS
	total	5570	-0.58	≤11.00	PASS





### RU Mode

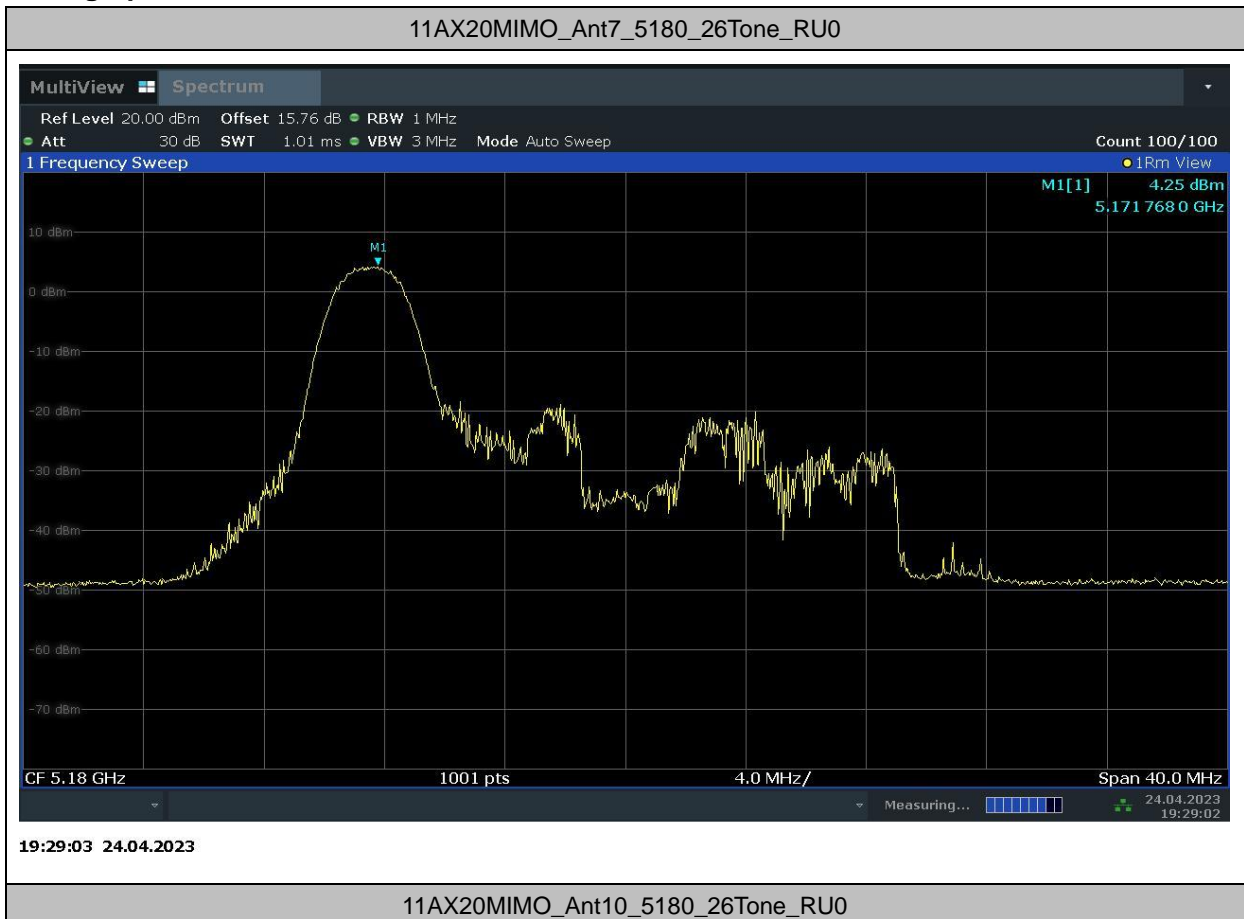
Ant1 of the result table and result graph corresponds to ant7 of the EUT, ant2 of the result table and result graph corresponds to ant10 of the EUT.

Mode	Ant	Fre	Tone	RU Size	Result	Limit	Verdict
11BE20MIMO	Ant7	5180	26Tone	RU0	4.25	≤11.00	PASS
			52Tone	RU37	4.37	≤11.00	PASS
			106Tone	RU53	5.24	≤11.00	PASS
	Ant10	5180	26Tone	RU0	5.87	≤11.00	PASS
			52Tone	RU37	6.77	≤11.00	PASS
			106Tone	RU53	6.06	≤11.00	PASS
	total	5180	26Tone	RU0	8.15	≤11.00	PASS
			52Tone	RU37	8.74	≤11.00	PASS
			106Tone	RU53	8.68	≤11.00	PASS
	Ant7	5200	26Tone	RU0	5.01	≤11.00	PASS
			52Tone	RU37	5.57	≤11.00	PASS
			106Tone	RU53	5.64	≤11.00	PASS
	Ant10	5200	26Tone	RU0	6.47	≤11.00	PASS
			52Tone	RU37	7.28	≤11.00	PASS
			106Tone	RU53	6.96	≤11.00	PASS
	total	5200	26Tone	RU0	8.81	≤11.00	PASS
			52Tone	RU37	9.52	≤11.00	PASS
			106Tone	RU53	9.36	≤11.00	PASS
	Ant7	5240	26Tone	RU0	5.01	≤11.00	PASS
			52Tone	RU37	6.04	≤11.00	PASS
			106Tone	RU53	5.47	≤11.00	PASS
	Ant10	5240	26Tone	RU0	6.55	≤11.00	PASS
			52Tone	RU37	7.46	≤11.00	PASS
			106Tone	RU53	6.37	≤11.00	PASS

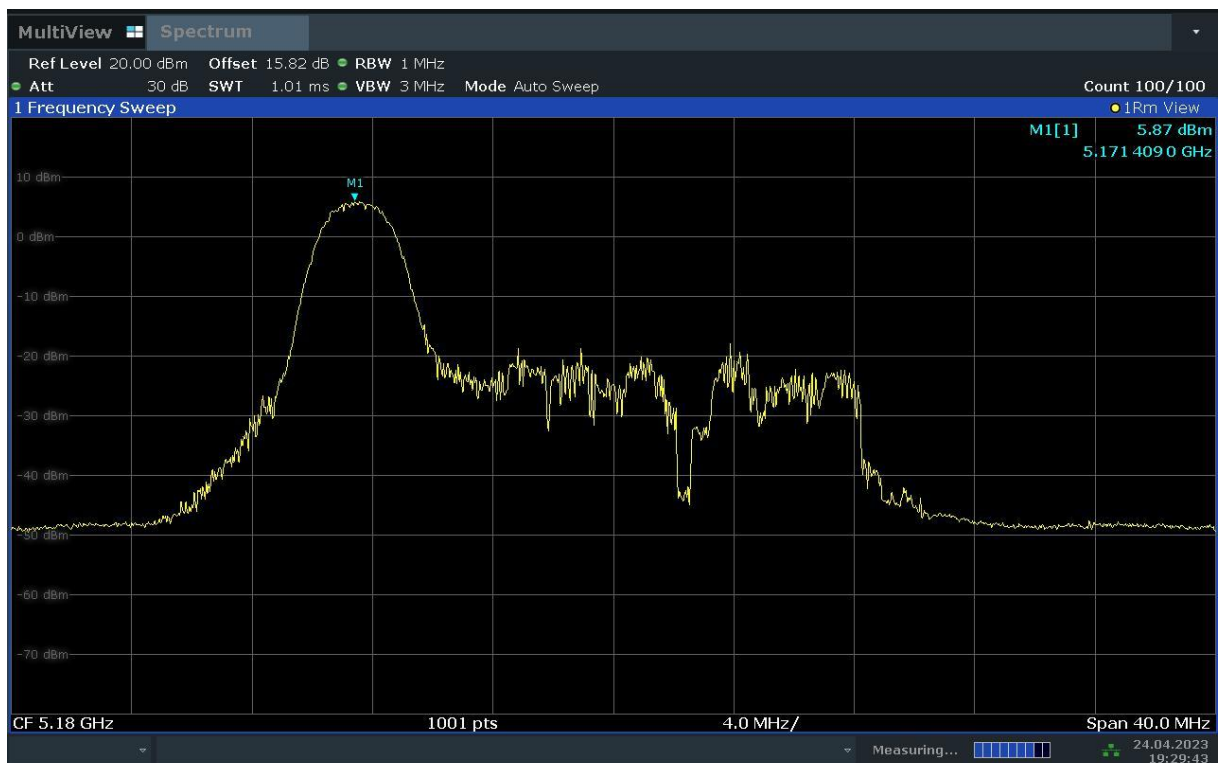
	total	5240	26Tone	RU0	8.86	≤11.00	PASS
			52Tone	RU37	9.82	≤11.00	PASS
			106Tone	RU53	8.95	≤11.00	PASS
	Ant7	5260	26Tone	RU0	5.42	≤11.00	PASS
			52Tone	RU37	5.55	≤11.00	PASS
			106Tone	RU53	5.69	≤11.00	PASS
	Ant10	5260	26Tone	RU0	6.23	≤11.00	PASS
			52Tone	RU37	7.06	≤11.00	PASS
			106Tone	RU53	6.17	≤11.00	PASS
	total	5260	26Tone	RU0	8.85	≤11.00	PASS
			52Tone	RU37	9.38	≤11.00	PASS
			106Tone	RU53	8.95	≤11.00	PASS
	Ant7	5280	26Tone	RU0	5.17	≤11.00	PASS
			52Tone	RU37	5.11	≤11.00	PASS
			106Tone	RU53	5.18	≤11.00	PASS
	Ant10	5280	26Tone	RU0	7.22	≤11.00	PASS
			52Tone	RU37	7.37	≤11.00	PASS
			106Tone	RU53	6.61	≤11.00	PASS
	total	5280	26Tone	RU0	9.33	≤11.00	PASS
			52Tone	RU37	9.40	≤11.00	PASS
			106Tone	RU53	8.96	≤11.00	PASS
	Ant7	5320	26Tone	RU0	4.68	≤11.00	PASS
			52Tone	RU37	5.26	≤11.00	PASS
			106Tone	RU53	5.75	≤11.00	PASS
Ant10	5320	26Tone	RU0	7.19	≤11.00	PASS	
		52Tone	RU37	7.13	≤11.00	PASS	
		106Tone	RU53	6.76	≤11.00	PASS	
total	5320	26Tone	RU0	9.12	≤11.00	PASS	
		52Tone	RU37	9.31	≤11.00	PASS	
		106Tone	RU53	9.29	≤11.00	PASS	
Ant7	5500	26Tone	RU8	5.26	≤11.00	PASS	
		52Tone	RU40	6.34	≤11.00	PASS	
		106Tone	RU54	6.22	≤11.00	PASS	
Ant10	5500	26Tone	RU8	6.98	≤11.00	PASS	
		52Tone	RU40	6.79	≤11.00	PASS	
		106Tone	RU54	6.75	≤11.00	PASS	
total	5500	26Tone	RU8	9.21	≤11.00	PASS	
		52Tone	RU40	9.58	≤11.00	PASS	
		106Tone	RU54	9.50	≤11.00	PASS	
Ant7	5580	26Tone	RU8	5.71	≤11.00	PASS	
		52Tone	RU40	6.19	≤11.00	PASS	
		106Tone	RU54	5.95	≤11.00	PASS	
Ant10	5580	26Tone	RU8	7.07	≤11.00	PASS	

	total	5580	52Tone	RU40	6.88	$\leq 11.00$	PASS
			106Tone	RU54	6.90	$\leq 11.00$	PASS
			26Tone	RU8	9.45	$\leq 11.00$	PASS
	Ant7	5700	52Tone	RU40	9.56	$\leq 11.00$	PASS
			106Tone	RU54	9.46	$\leq 11.00$	PASS
			26Tone	RU8	5.21	$\leq 11.00$	PASS
	Ant10	5700	52Tone	RU40	6.14	$\leq 11.00$	PASS
			106Tone	RU54	6.21	$\leq 11.00$	PASS
			26Tone	RU8	5.21	$\leq 11.00$	PASS
	total	5700	26Tone	RU8	8.22	$\leq 11.00$	PASS
			52Tone	RU40	9.15	$\leq 11.00$	PASS
			106Tone	RU54	9.22	$\leq 11.00$	PASS

### Test graphs

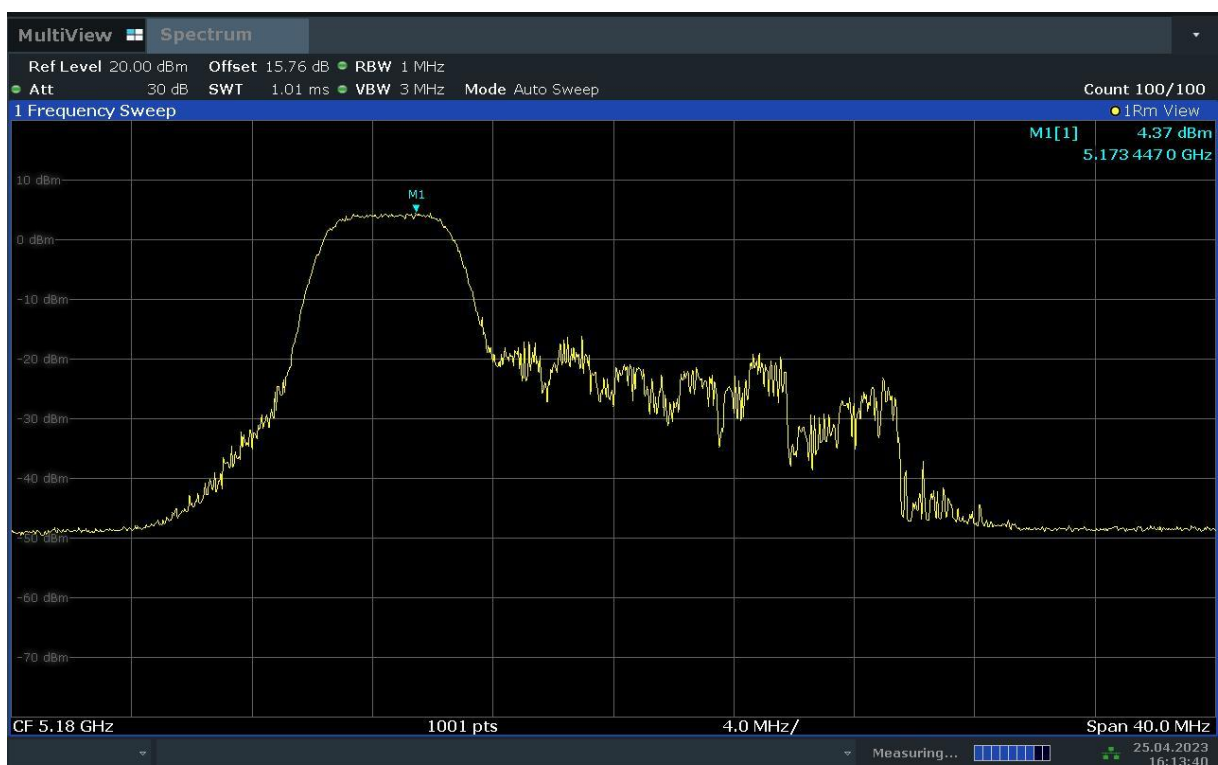






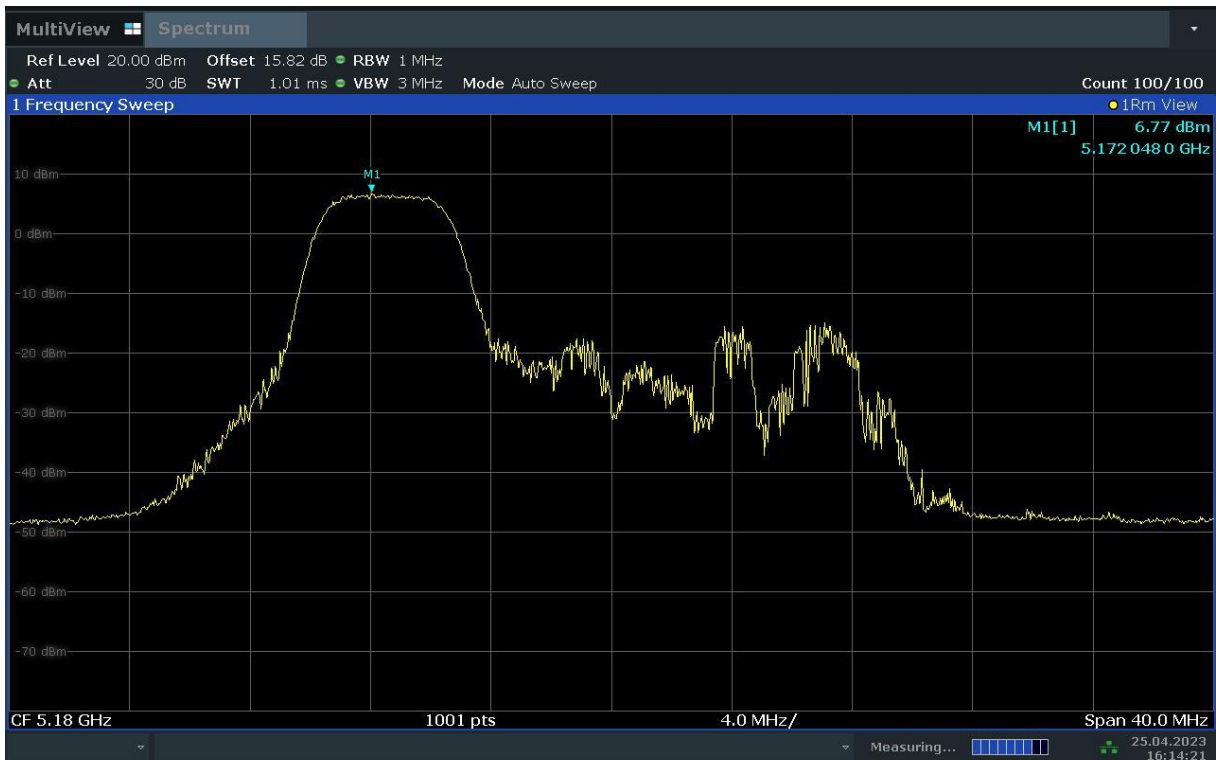
19:29:44 24.04.2023

11AX20MIMO\_Ant7\_5180\_52Tone\_RU37



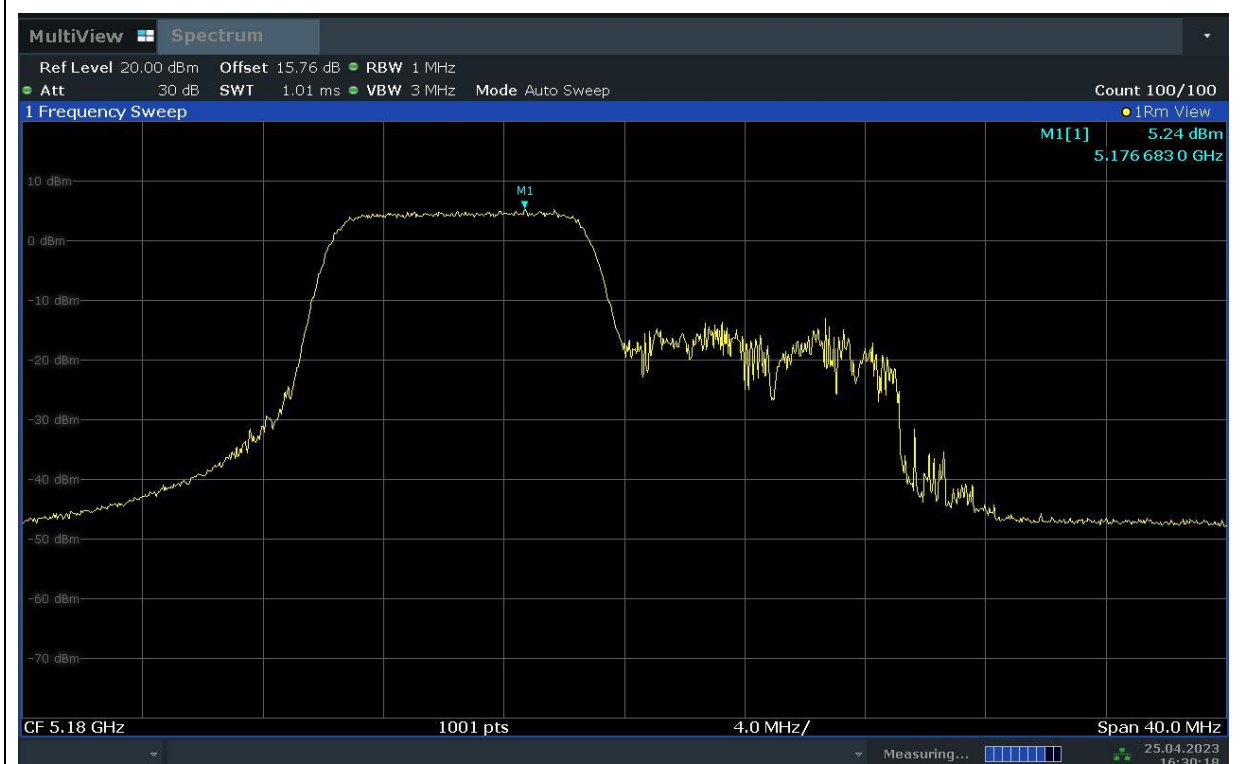
16:13:41 25.04.2023

11AX20MIMO\_Ant10\_5180\_52Tone\_RU37



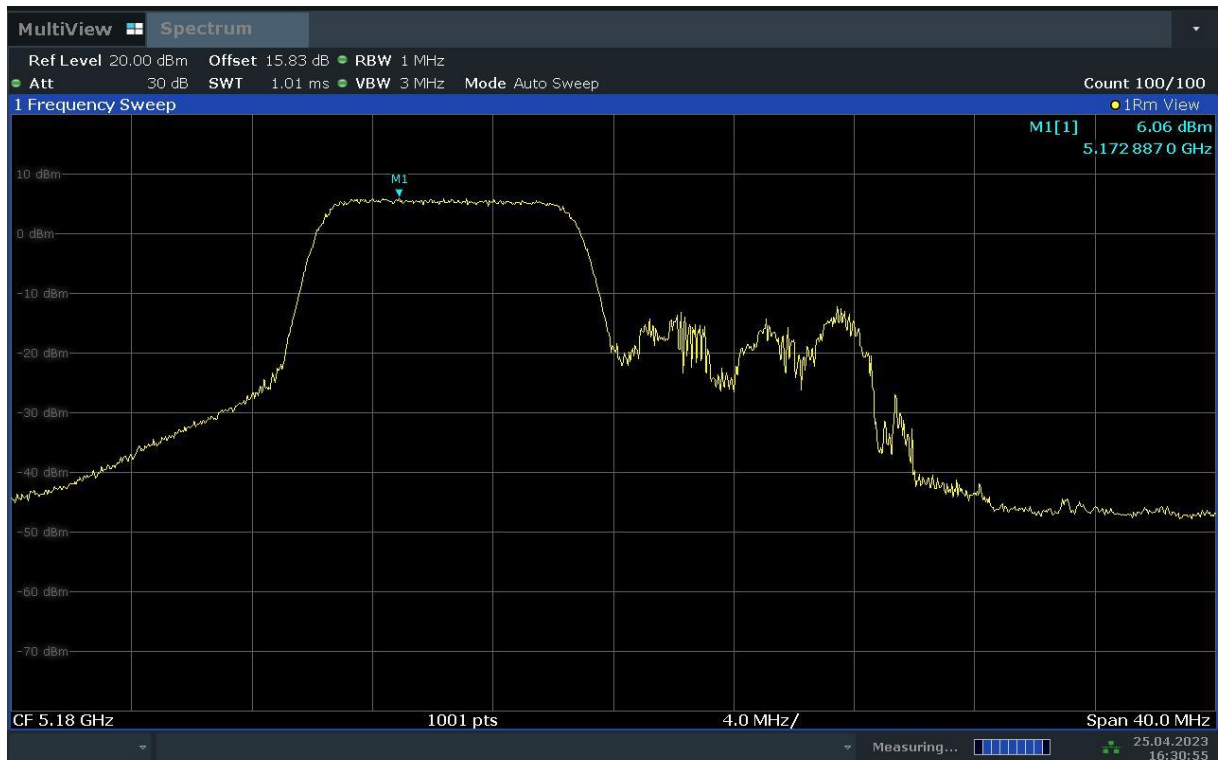
16:14:22 25.04.2023

11AX20MIMO\_Ant7\_5180\_106Tone\_RU53



16:30:18 25.04.2023

11AX20MIMO\_Ant10\_5180\_106Tone\_RU53



16:30:56 25.04.2023

### Small MRU mode

Ant1 of the result table and result graph corresponds to ant7 of the EUT, ant2 of the result table and result graph corresponds to ant10 of the EUT.

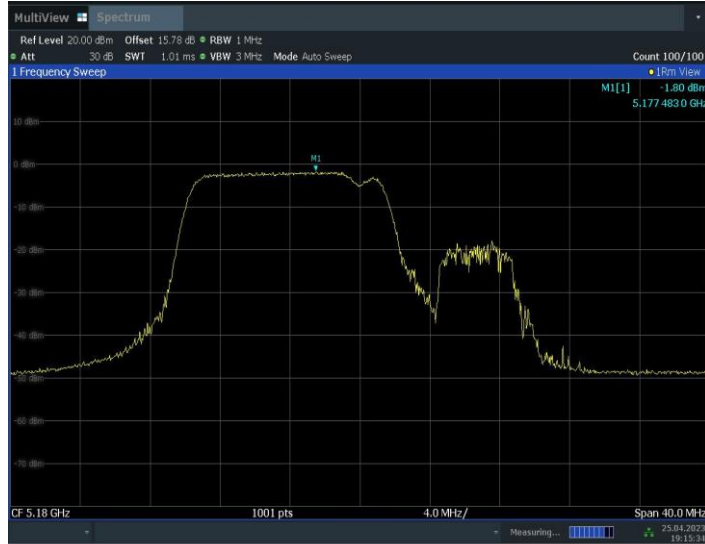
Test Mode	Antenna	Channel	Small Mru	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11BE20 MIMO	Ant7	5180	106 Tone,index53 + 26Tone,index4	-1.8	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	0.7	≤11.00	PASS
	Ant10	5180	106 Tone,index53 + 26Tone,index4	-0.9	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.29	≤11.00	PASS
	total	5180	106 Tone,index53 + 26Tone,index4	1.68	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	4.02	≤11.00	PASS
	Ant7	5200	106 Tone,index53 + 26Tone,index4	-0.99	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.55	≤11.00	PASS
	Ant10	5200	106 Tone,index53 + 26Tone,index4	-0.41	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.68	≤11.00	PASS

			26Tone,index1			
total	5200		106 Tone,index53 + 26Tone,index4	2.32	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	4.63	≤11.00	PASS
Ant7	5240		106 Tone,index53 + 26Tone,index4	-0.91	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.13	≤11.00	PASS
Ant10	5240		106 Tone,index53 + 26Tone,index4	-0.5	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.45	≤11.00	PASS
total	5240		106 Tone,index53 + 26Tone,index4	2.31	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	4.30	≤11.00	PASS
Ant7	5260		106 Tone,index53 + 26Tone,index4	-1.12	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.4	≤11.00	PASS
Ant10	5260		106 Tone,index53 + 26Tone,index4	-0.55	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.59	≤11.00	PASS
total	5260		106 Tone,index53 + 26Tone,index4	2.18	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	4.51	≤11.00	PASS
Ant7	5280		106 Tone,index53 + 26Tone,index4	-1.37	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	0.85	≤11.00	PASS
Ant10	5280		106 Tone,index53 + 26Tone,index4	-0.07	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	1.76	≤11.00	PASS
total	5280		106 Tone,index53 + 26Tone,index4	2.34	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	4.34	≤11.00	PASS
Ant7	5320		106 Tone,index53 + 26Tone,index4	-1.23	≤11.00	PASS

			52 Tone,index38 + 26Tone,index1	1.02	≤11.00	PASS
Ant10	5320		106 Tone,index53 + 26Tone,index4	0.15	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	2.22	≤11.00	PASS
total	5320		106 Tone,index53 + 26Tone,index4	2.52	≤11.00	PASS
			52 Tone,index38 + 26Tone,index1	4.67	≤11.00	PASS
Ant7	5500		106 Tone,index54 + 26Tone,index4	-0.24	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	1.96	≤11.00	PASS
Ant10	5500		106 Tone,index54 + 26Tone,index4	-0.17	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	2.14	≤11.00	PASS
total	5500		106 Tone,index54 + 26Tone,index4	2.81	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	5.06	≤11.00	PASS
Ant7	5580		106 Tone,index54 + 26Tone,index4	-0.43	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	1.87	≤11.00	PASS
Ant10	5580		106 Tone,index54 + 26Tone,index4	0.35	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	2.67	≤11.00	PASS
total	5580		106 Tone,index54 + 26Tone,index4	2.99	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	5.30	≤11.00	PASS
Ant7	5700		106 Tone,index54 + 26Tone,index4	-0.51	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	1.95	≤11.00	PASS
Ant10	5700		106 Tone,index54 + 26Tone,index4	0.58	≤11.00	PASS
			52 Tone,index39 + 26Tone,index7	2.49	≤11.00	PASS
total	5700		106 Tone,index54 +	3.08	≤11.00	PASS

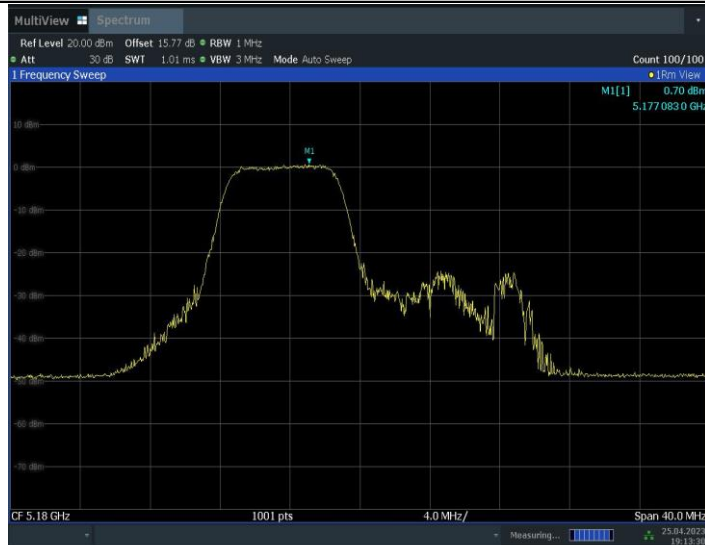
			26Tone,index4			
			52 Tone,index39 + 26Tone,index7	5.24	≤11.00	PASS

11BE20MIMO\_Ant7\_5180\_106+26\_1



19:15:34 25.04.2023

11BE20MIMO\_Ant7\_5180\_52+26\_1

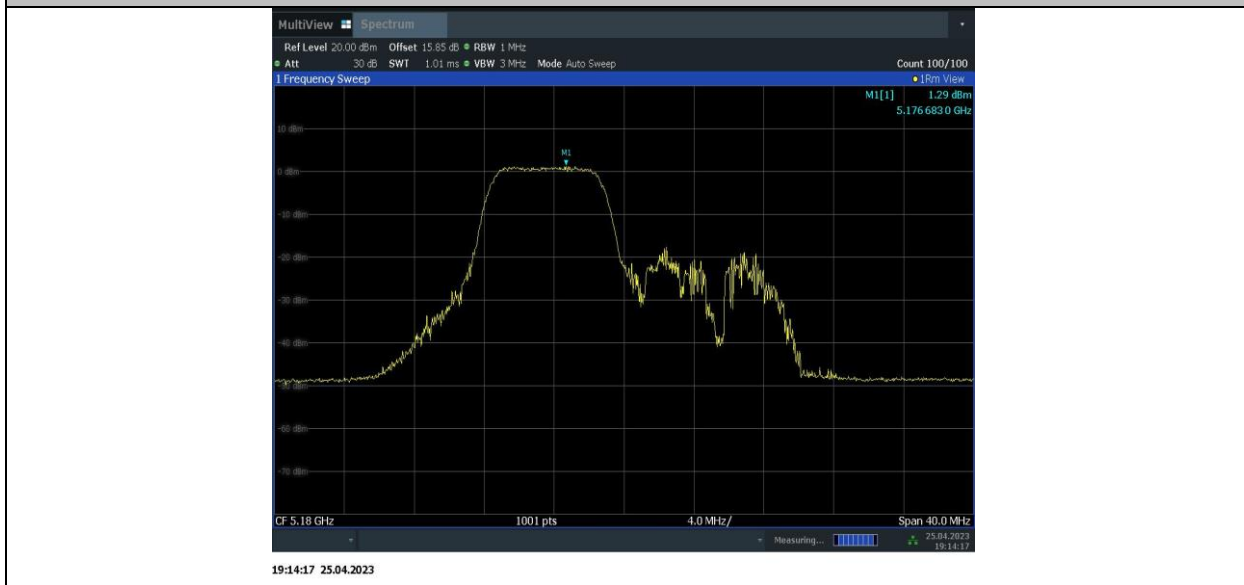


19:13:30 25.04.2023

11BE20MIMO\_Ant10\_5180\_106+26\_1



11BE20MIMO\_Ant10\_5180\_52+26\_1



### Large MRU mode

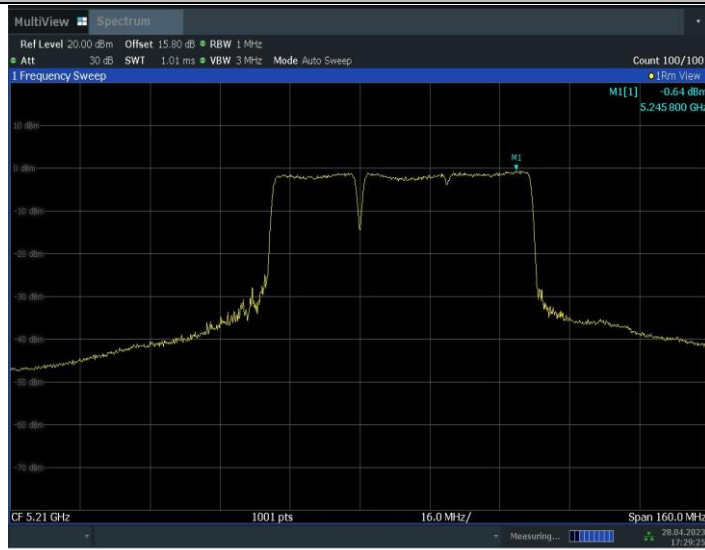
Ant1 of the result table and result graph corresponds to ant7 of the EUT, ant2 of the result table and result graph corresponds to ant10 of the EUT.

Test Mode	Antenna	Fre [MHz]	Large MRU	configure	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11BE80MIMO	Ant7	5210	484+242	1	-0.64	≤11.00	PASS
				2	-0.74	≤11.00	PASS
				3	-0.83	≤11.00	PASS
				4	-1.03	≤11.00	PASS
	Ant10	5210	484+242	1	-0.41	≤11.00	PASS
				2	0.06	≤11.00	PASS
				3	-0.18	≤11.00	PASS
				4	-0.2	≤11.00	PASS
	total	5210	484+242	1	2.49	≤11.00	PASS

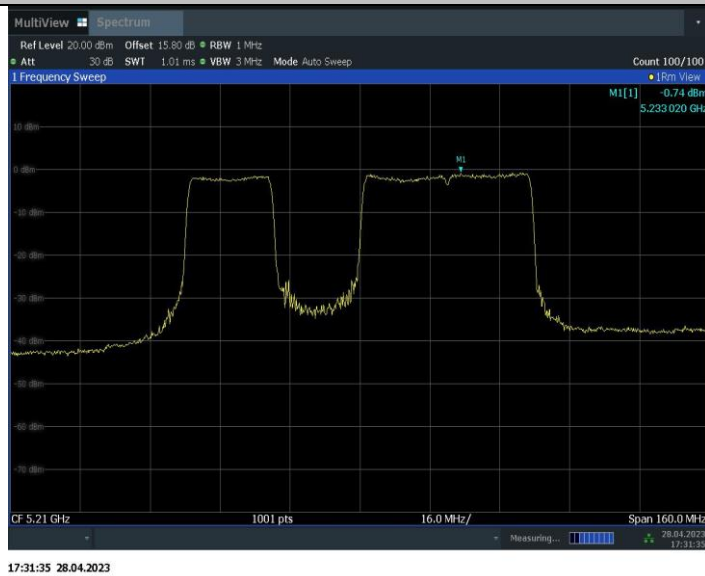
			2	2.69	≤11.00	PASS
			3	2.52	≤11.00	PASS
			4	2.42	≤11.00	PASS
Ant7	5290	484+242	1	-0.23	≤11.00	PASS
			2	-0.45	≤11.00	PASS
			3	-0.41	≤11.00	PASS
			4	-0.51	≤11.00	PASS
Ant10	5290	484+242	1	0.45	≤11.00	PASS
			2	0.43	≤11.00	PASS
			3	0.48	≤11.00	PASS
			4	0.52	≤11.00	PASS
total	5290	484+242	1	3.13	≤11.00	PASS
			2	3.02	≤11.00	PASS
			3	3.07	≤11.00	PASS
			4	3.05	≤11.00	PASS
Ant7	5530	484+242	1	0.71	≤11.00	PASS
			2	0.17	≤11.00	PASS
			3	0.44	≤11.00	PASS
			4	0.65	≤11.00	PASS
Ant10	5530	484+242	1	0.99	≤11.00	PASS
			2	0.97	≤11.00	PASS
			3	1.17	≤11.00	PASS
			4	1.08	≤11.00	PASS
total	5530	484+242	1	3.86	≤11.00	PASS
			2	3.60	≤11.00	PASS
			3	3.83	≤11.00	PASS
			4	3.88	≤11.00	PASS
Ant7	5610	484+242	1	0.4	≤11.00	PASS
			2	0.11	≤11.00	PASS
			3	0.02	≤11.00	PASS
			4	0.24	≤11.00	PASS
Ant10	5610	484+242	1	0.71	≤11.00	PASS
			2	0.64	≤11.00	PASS
			3	0.63	≤11.00	PASS
			4	0.56	≤11.00	PASS
total	5610	484+242	1	3.57	≤11.00	PASS
			2	3.39	≤11.00	PASS
			3	3.35	≤11.00	PASS
			4	3.41	≤11.00	PASS



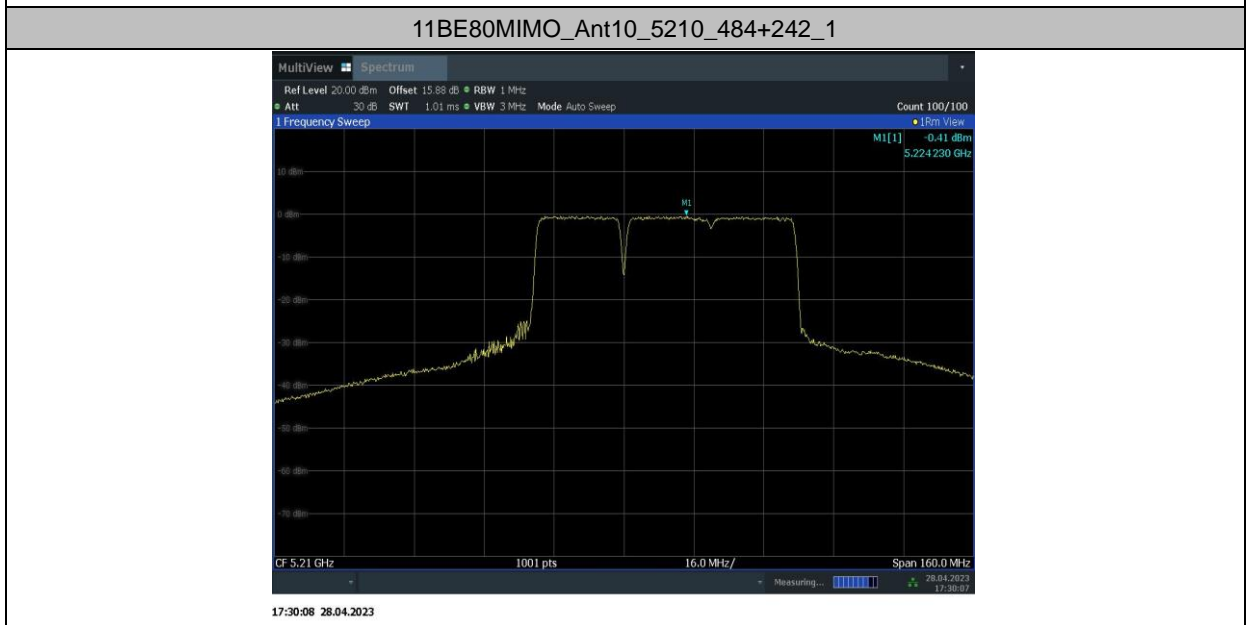
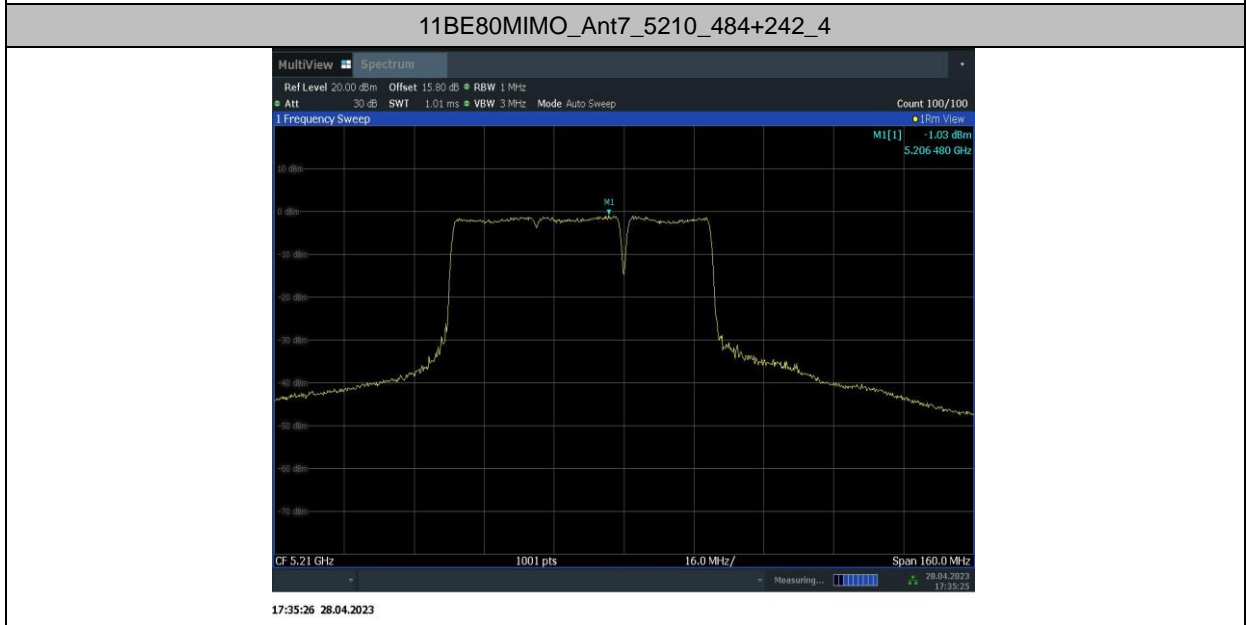
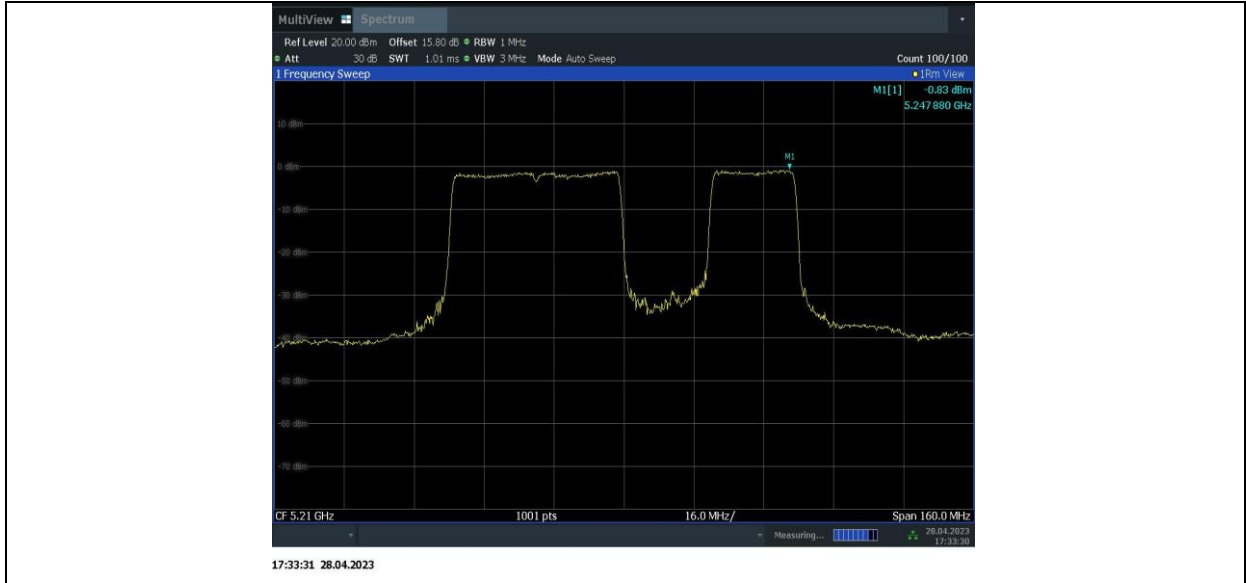
11BE80MIMO\_Ant7\_5210\_484+242\_1



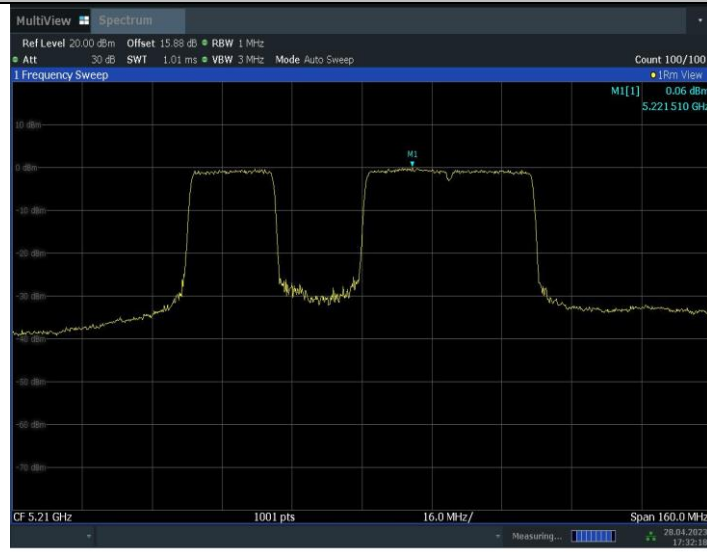
11BE80MIMO\_Ant7\_5210\_484+242\_2



11BE80MIMO\_Ant7\_5210\_484+242\_3

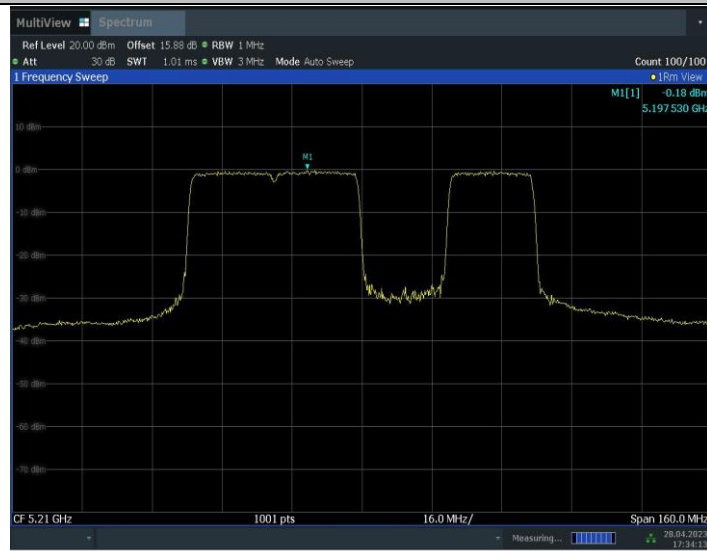


11BE80MIMO\_Ant10\_5210\_484+242\_2



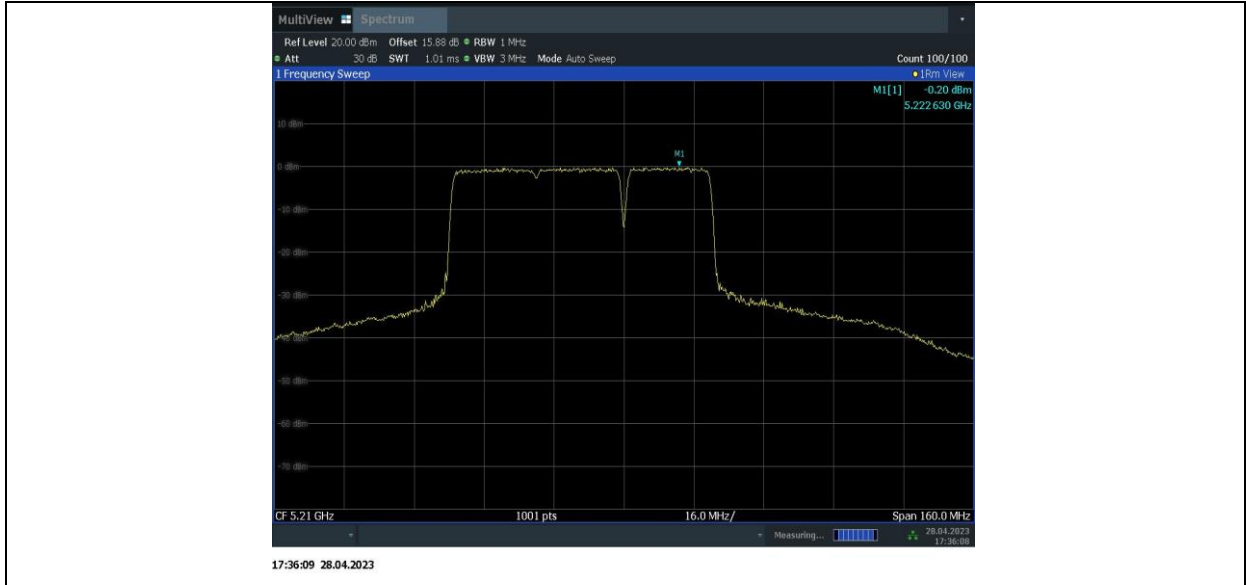
17:32:18 28.04.2023

11BE80MIMO\_Ant10\_5210\_484+242\_3



17:34:14 28.04.2023

11BE80MIMO\_Ant10\_5210\_484+242\_4



### Large MRU mode

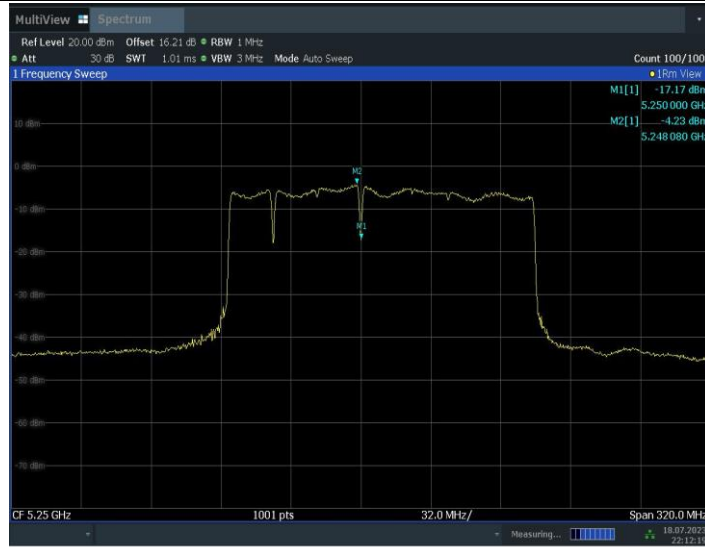
Ant1 of the result table and result graph corresponds to ant7 of the EUT, ant2 of the result table and result graph corresponds to ant10 of the EUT.

Test Mode	Antenna	Channel	Mru Type	Mru Index	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11BE160 MIMO	Ant7	5250_UNII-1	996+484+242	1	-4.23	≤11.00	PASS
				2	-4.21	≤11.00	PASS
				3	-4.38	≤11.00	PASS
				4	-5.30	≤11.00	PASS
				5	-4.01	≤11.00	PASS
				6	-4.29	≤11.00	PASS
				7	-4.46	≤11.00	PASS
				8	-4.51	≤11.00	PASS
	Ant7	5250_UNII-1	996+484	1	-2.77	≤11.00	PASS
				2	-3.55	≤11.00	PASS
				3	-2.53	≤11.00	PASS
				4	-2.95	≤11.00	PASS
	Ant10	5250_UNII-1	996+484+242	1	-4.17	≤11.00	PASS
				2	-4.08	≤11.00	PASS
				3	-3.71	≤11.00	PASS
				4	-4.44	≤11.00	PASS
				5	-3.53	≤11.00	PASS
				6	-3.95	≤11.00	PASS
				7	-4.18	≤11.00	PASS
				8	-3.86	≤11.00	PASS
Ant10		5250_UNII-1	996+484	1	-2.12	≤11.00	PASS
				2	-2.93	≤11.00	PASS
				3	-2.02	≤11.00	PASS
				4	-2.22	≤11.00	PASS

	total	5250_UNII-1	996+484+242	1	-1.19	≤11.00	PASS			
				2	-1.13	≤11.00	PASS			
				3	-1.02	≤11.00	PASS			
				4	-1.84	≤11.00	PASS			
				5	-0.75	≤11.00	PASS			
				6	-1.11	≤11.00	PASS			
				7	-1.31	≤11.00	PASS			
				8	-1.16	≤11.00	PASS			
			996+484	1	0.58	≤11.00	PASS			
				2	-0.22	≤11.00	PASS			
				3	0.74	≤11.00	PASS			
				4	0.44	≤11.00	PASS			
				Ant7	5250_UNII-2A	996+484+242	1	-4.97	≤11.00	PASS
							2	-4.64	≤11.00	PASS
	3	-4.25	≤11.00				PASS			
	4	-4.84	≤11.00				PASS			
	5	-4.99	≤11.00				PASS			
	6	-4.67	≤11.00				PASS			
	7	-4.67	≤11.00				PASS			
	8	-4.43	≤11.00				PASS			
	996+484	1	-3.00	≤11.00	PASS					
		2	-2.35	≤11.00	PASS					
		3	-4.24	≤11.00	PASS					
		4	-2.99	≤11.00	PASS					
		Ant10	5250_UNII-2A	996+484+242	1	-3.84	≤11.00	PASS		
					2	-3.73	≤11.00	PASS		
					3	-3.49	≤11.00	PASS		
					4	-3.96	≤11.00	PASS		
5	-4.53				≤11.00	PASS				
6	-3.82				≤11.00	PASS				
7	-3.88				≤11.00	PASS				
8	-3.9				≤11.00	PASS				
996+484	1			-2.23	≤11.00	PASS				
	2			-1.88	≤11.00	PASS				
	3			-3.00	≤11.00	PASS				
	4			-2.04	≤11.00	PASS				
	total			5250_UNII-2A	996+484+242	1	-1.36	≤11.00	PASS	
						2	-1.15	≤11.00	PASS	
3		-0.84	≤11.00			PASS				
4		-1.37	≤11.00			PASS				
5		-1.74	≤11.00			PASS				
6		-1.21	≤11.00			PASS				
7		-1.25	≤11.00			PASS				

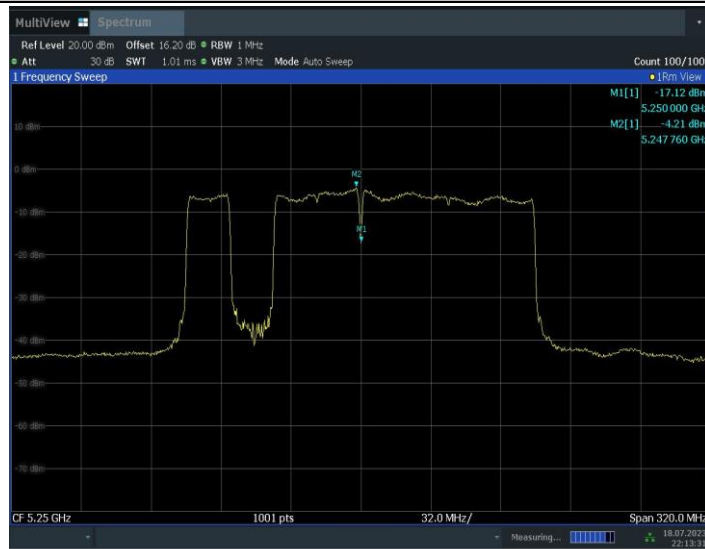
	Ant7	5570	996+484	8	-1.15	≤11.00	PASS
				1	0.41	≤11.00	PASS
				2	0.90	≤11.00	PASS
				3	-0.57	≤11.00	PASS
			4	0.52	≤11.00	PASS	
			996+484+242	1	-4.44	≤11.00	PASS
				2	-4.44	≤11.00	PASS
				3	-4.25	≤11.00	PASS
	4	-4.27		≤11.00	PASS		
	5	-4.48		≤11.00	PASS		
	6	-4.27		≤11.00	PASS		
	7	-4.46		≤11.00	PASS		
	8	-4.27		≤11.00	PASS		
	996+484	1	-3.34	≤11.00	PASS		
		2	-3.28	≤11.00	PASS		
		3	-3.47	≤11.00	PASS		
		4	-3.66	≤11.00	PASS		
	Ant10	5570	996+484+242	1	-4.04	≤11.00	PASS
				2	-3.92	≤11.00	PASS
				3	-3.89	≤11.00	PASS
				4	-3.97	≤11.00	PASS
				5	-3.62	≤11.00	PASS
				6	-3.77	≤11.00	PASS
				7	-3.74	≤11.00	PASS
				8	-4.01	≤11.00	PASS
	996+484	1	-3.17	≤11.00	PASS		
		2	-3.04	≤11.00	PASS		
		3	-2.55	≤11.00	PASS		
4		-3.16	≤11.00	PASS			
total	5570	996+484+242	1	-1.23	≤11.00	PASS	
			2	-1.16	≤11.00	PASS	
			3	-1.06	≤11.00	PASS	
			4	-1.11	≤11.00	PASS	
			5	-1.02	≤11.00	PASS	
			6	-1.00	≤11.00	PASS	
			7	-1.07	≤11.00	PASS	
			8	-1.13	≤11.00	PASS	
		996+484	1	-0.24	≤11.00	PASS	
			2	-0.15	≤11.00	PASS	
			3	0.02	≤11.00	PASS	
			4	-0.39	≤11.00	PASS	

11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_1



22:12:19 18.07.2023

11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_2

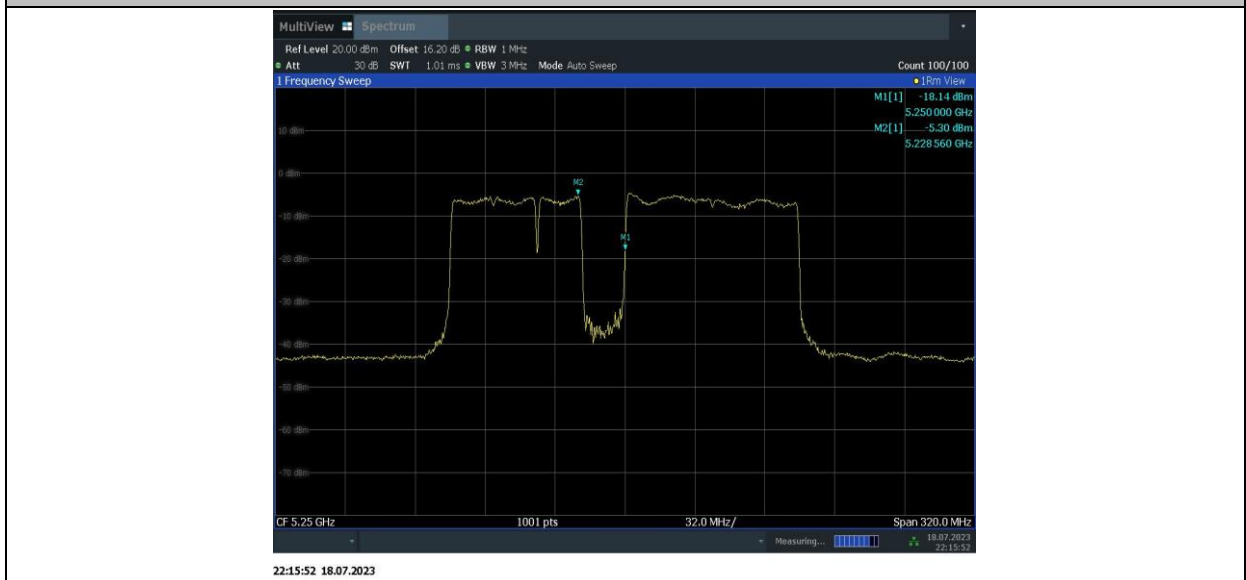


22:13:31 18.07.2023

11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_3



11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_4

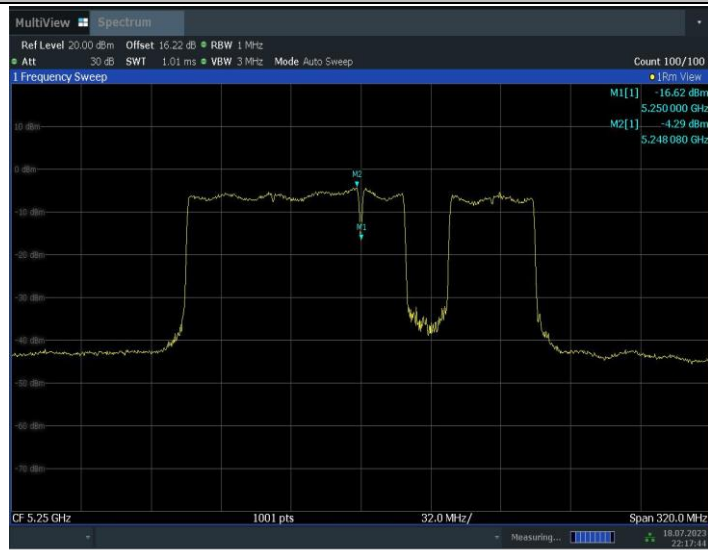


11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_5

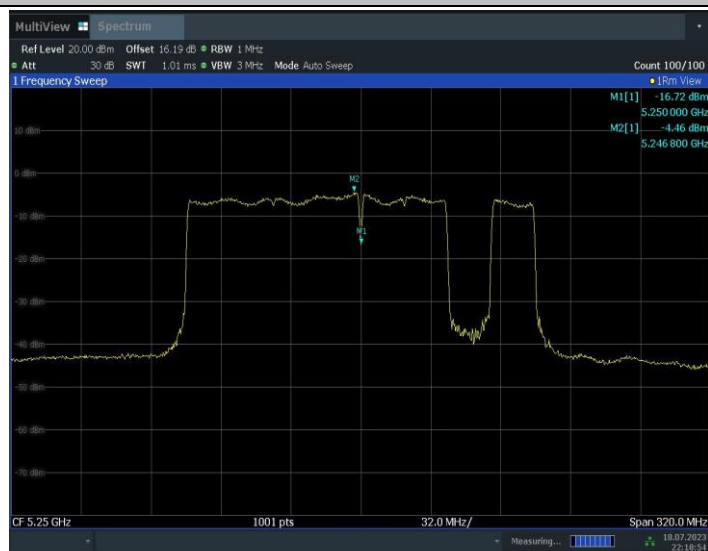




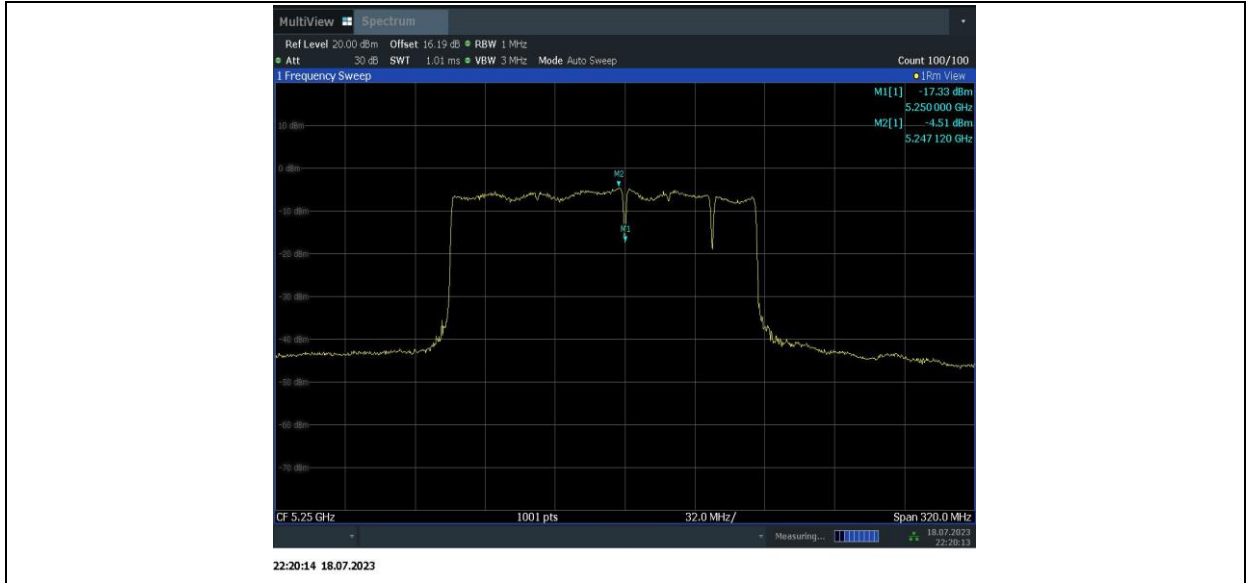
11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_6



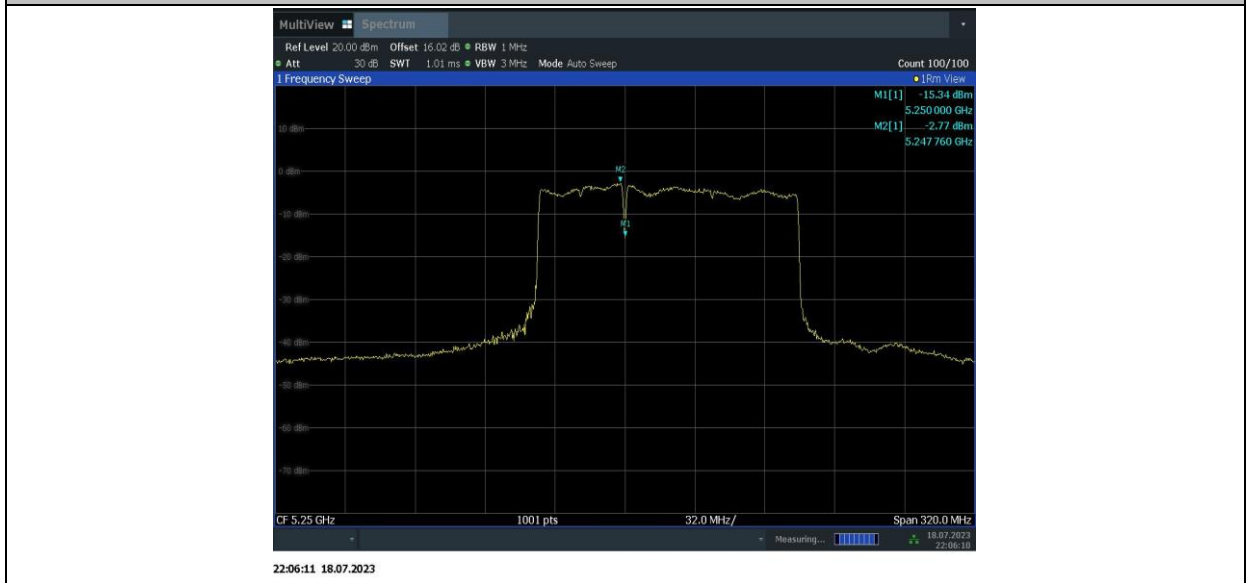
11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_7



11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484+242\_8



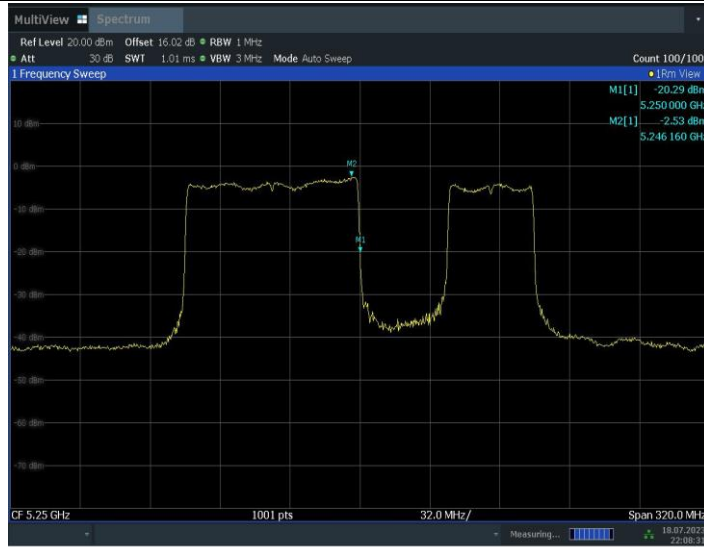
11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484\_1



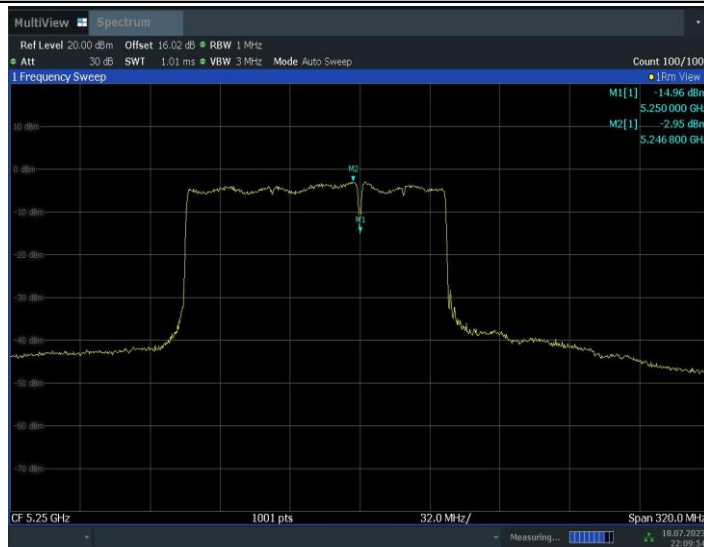
11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484\_2



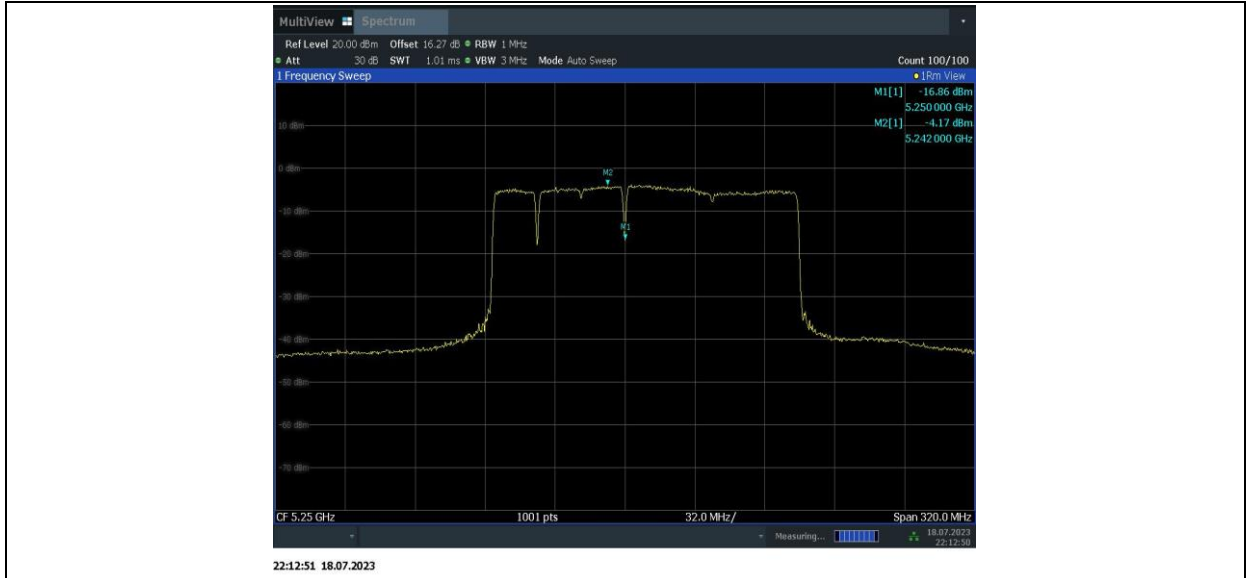
11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484\_3



11BE160MIMO\_Ant7\_5250\_UNII-1\_996+484\_4



11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_1



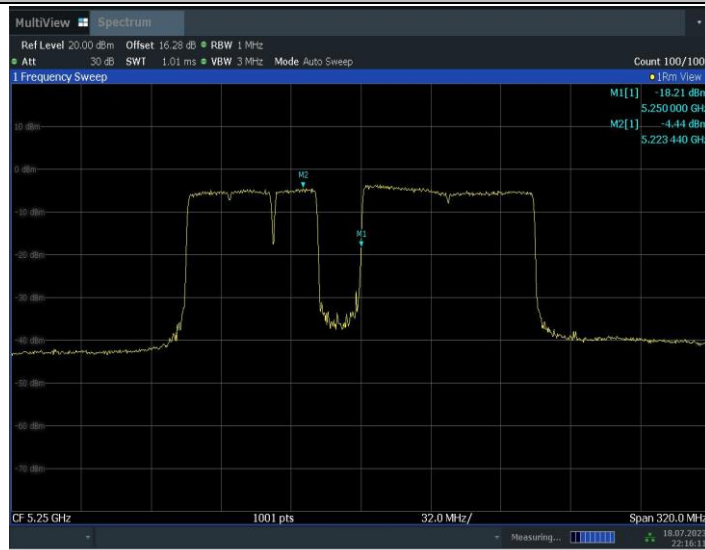
11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_2



11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_3

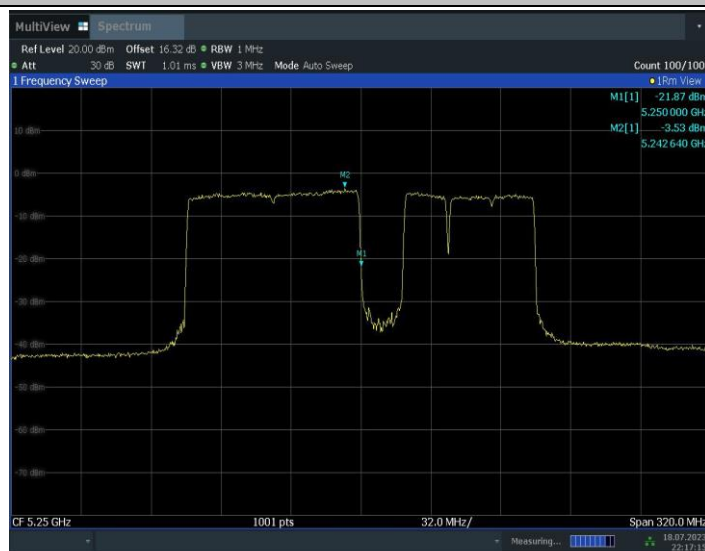


11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_4



22:16:11 18.07.2023

11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_5

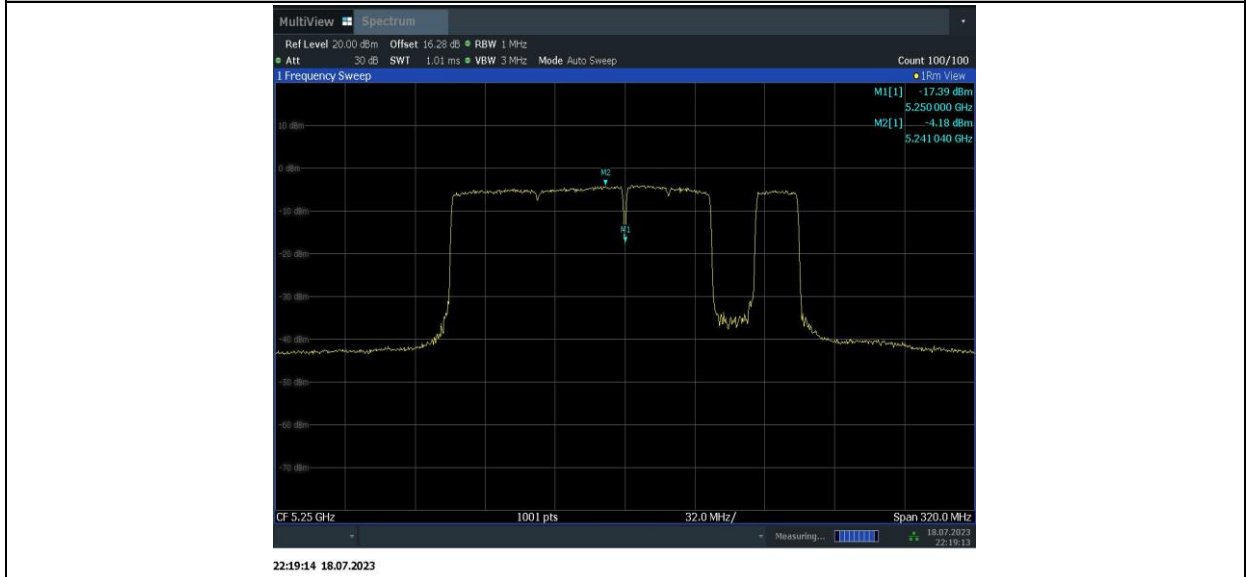


22:17:15 18.07.2023

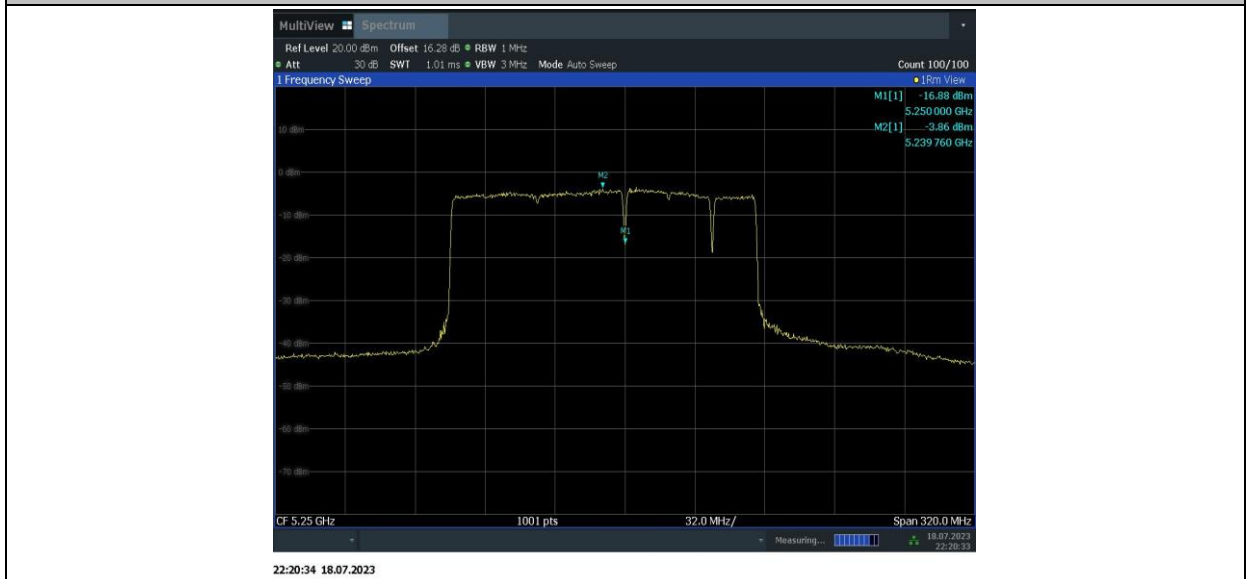
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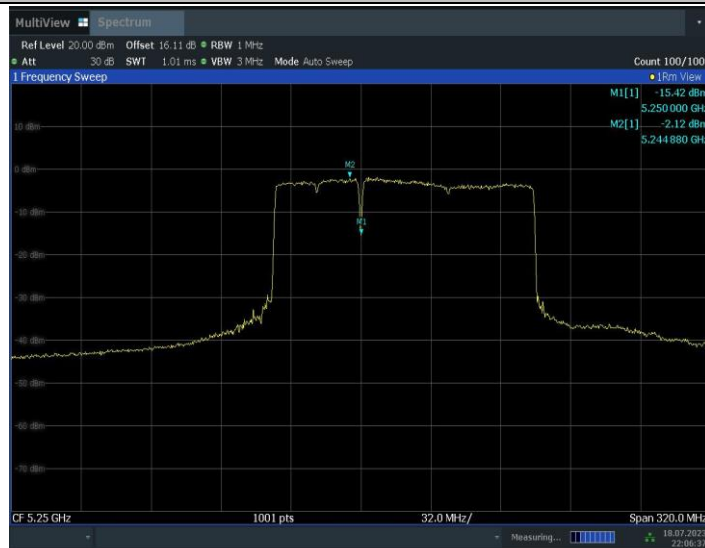
11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_7



11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484+242\_8

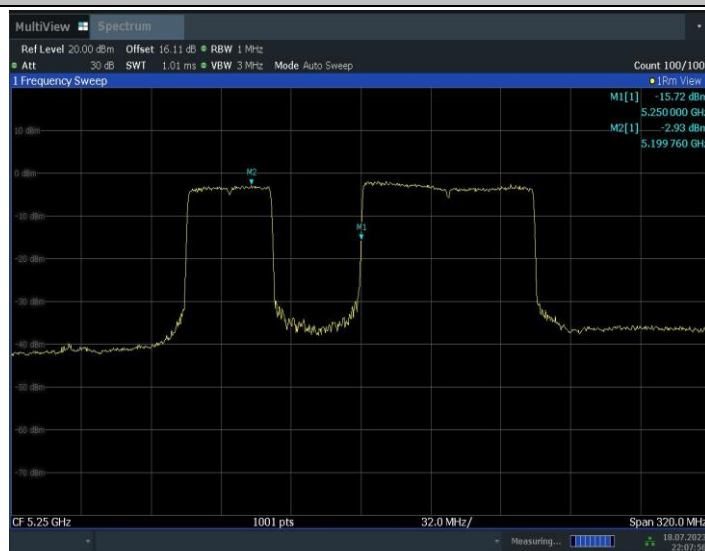


11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484\_1



22:06:38 18.07.2023

11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484\_2

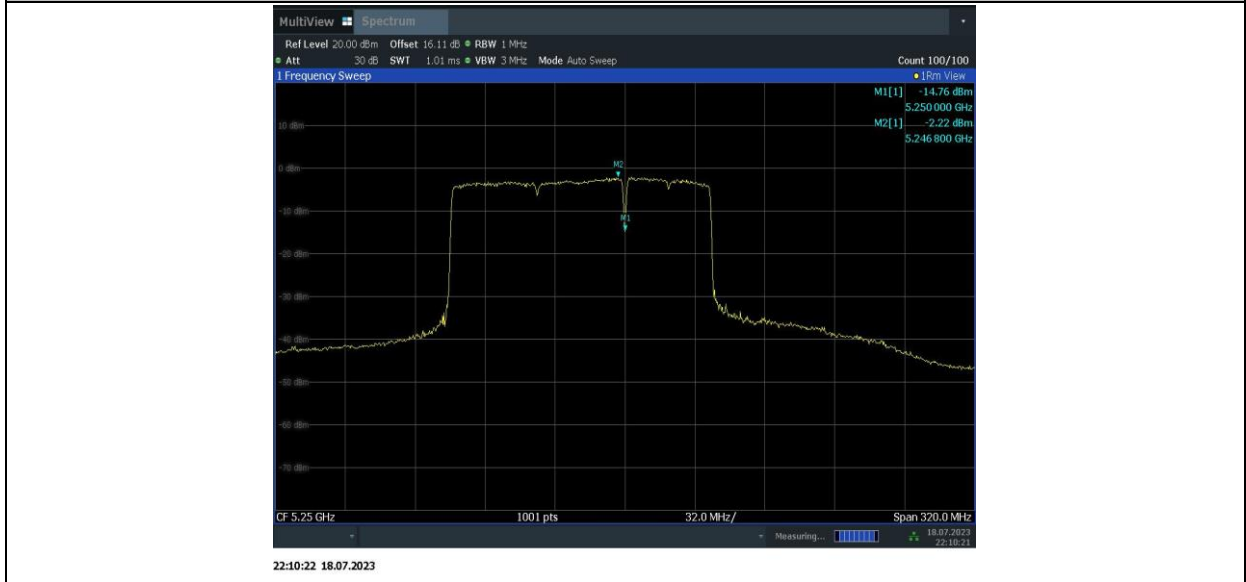


22:07:57 18.07.2023

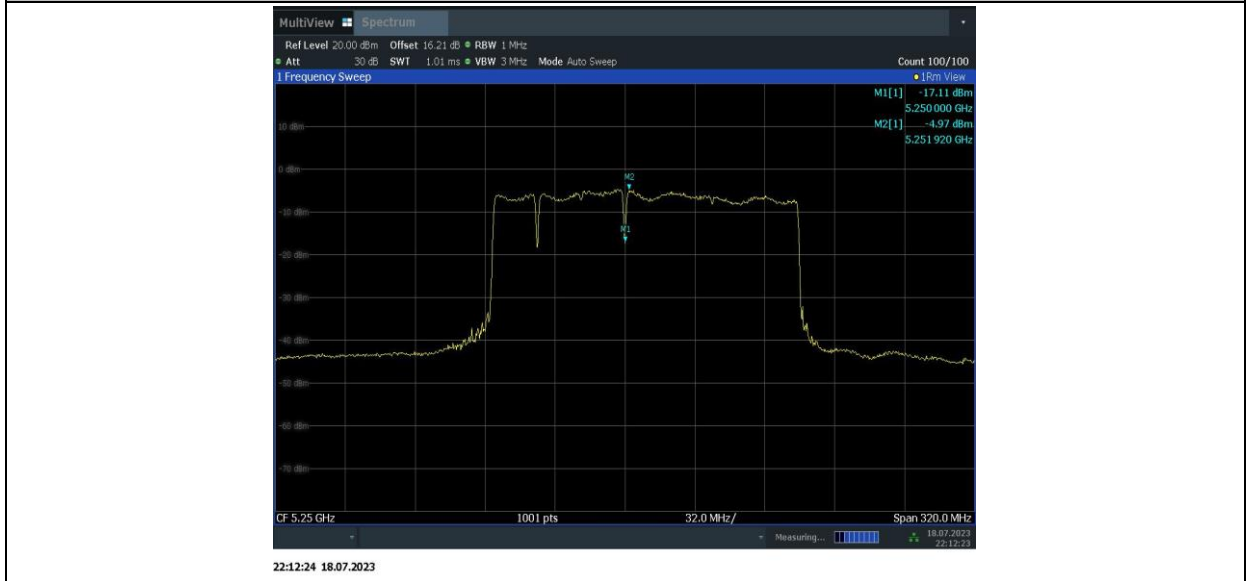
11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484\_3



11BE160MIMO\_Ant10\_5250\_UNII-1\_996+484\_4

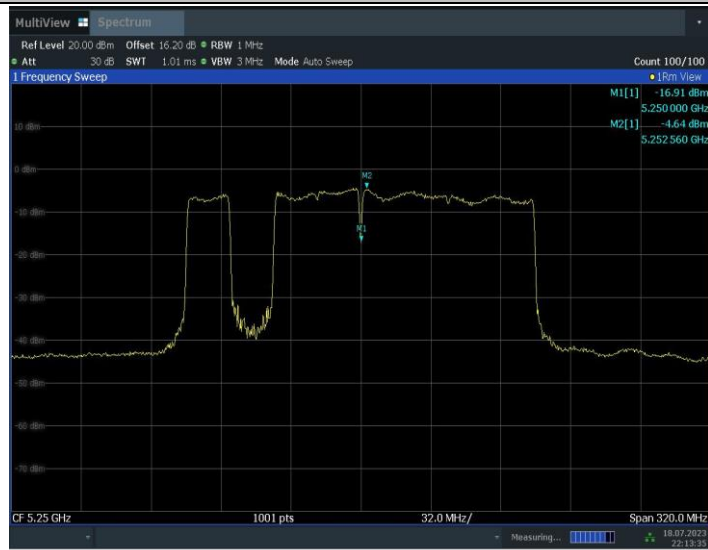


11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_1



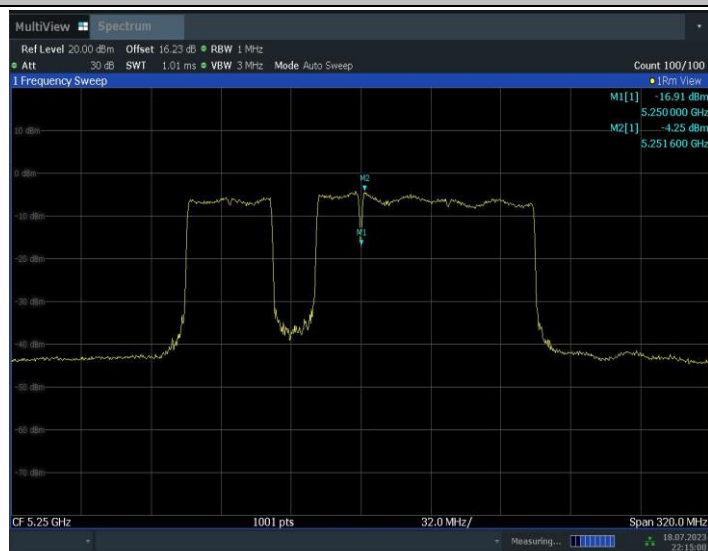


11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_2



22:13:36 18.07.2023

11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_3

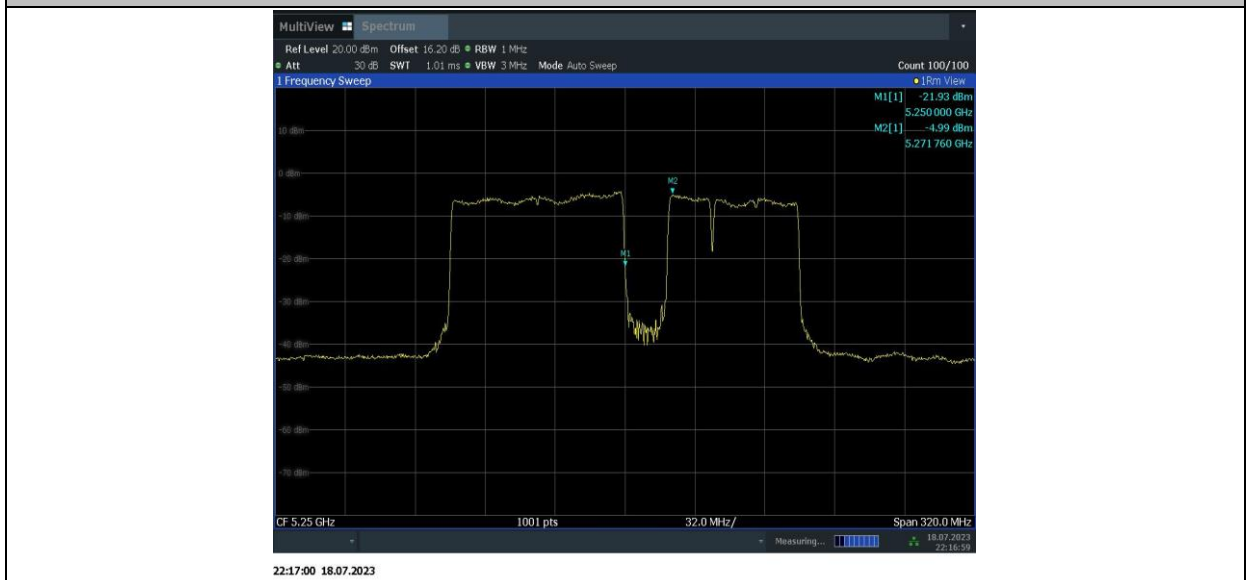


22:15:01 18.07.2023

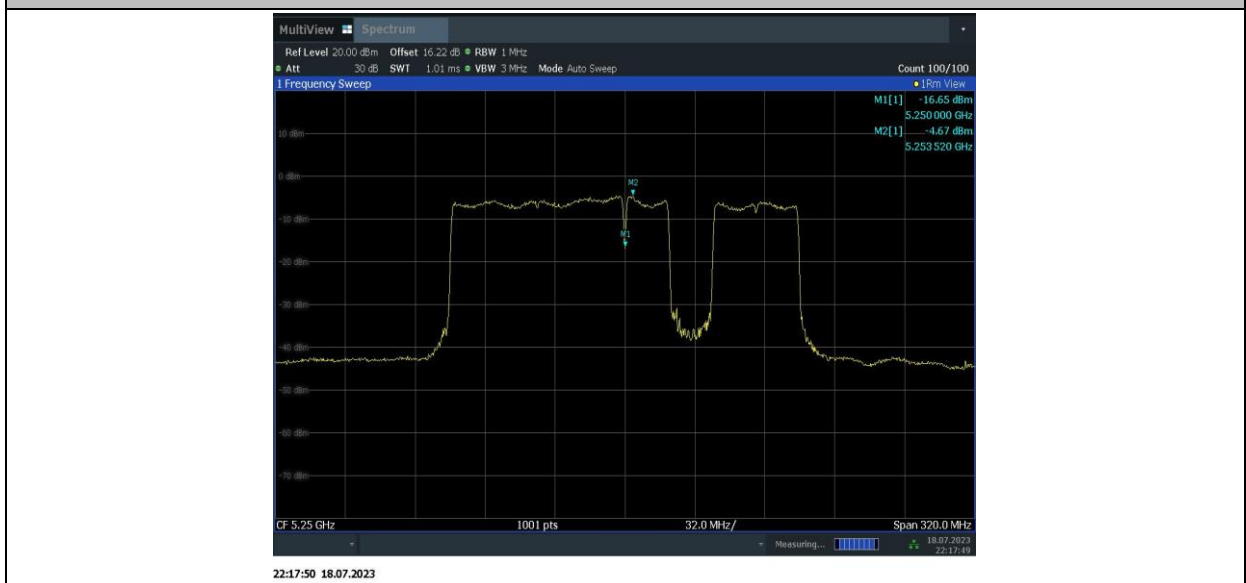
11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_4



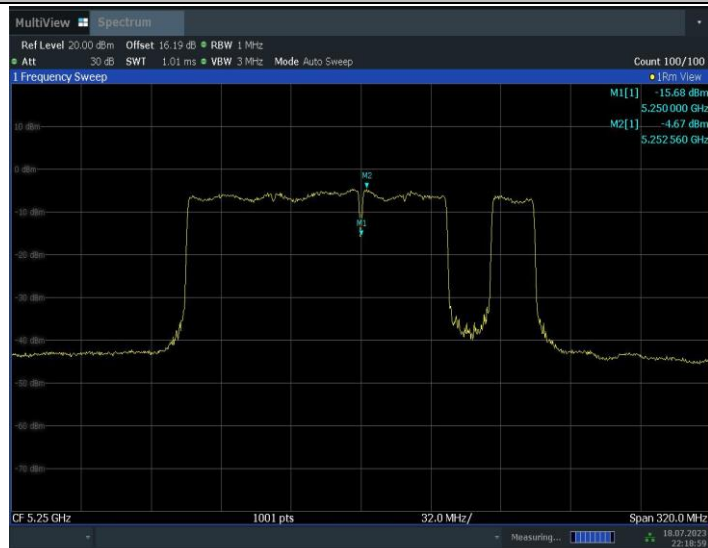
11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_5



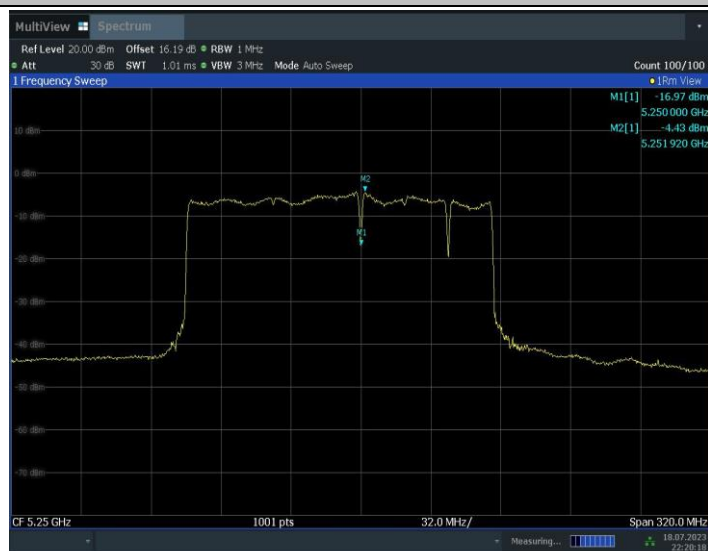
11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_6



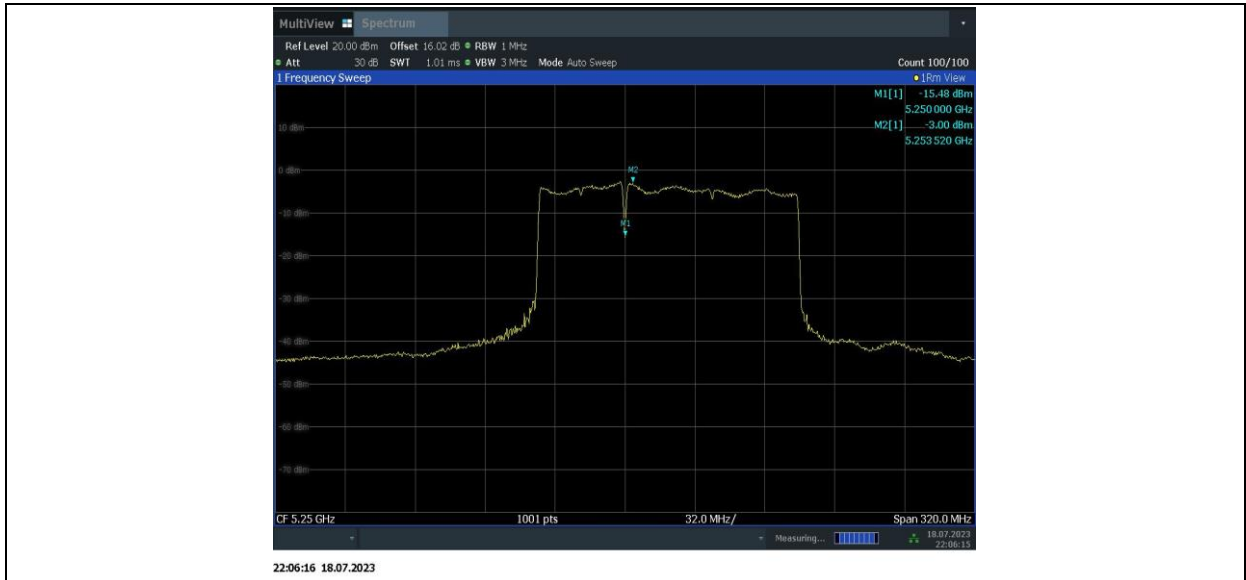
## 11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_7



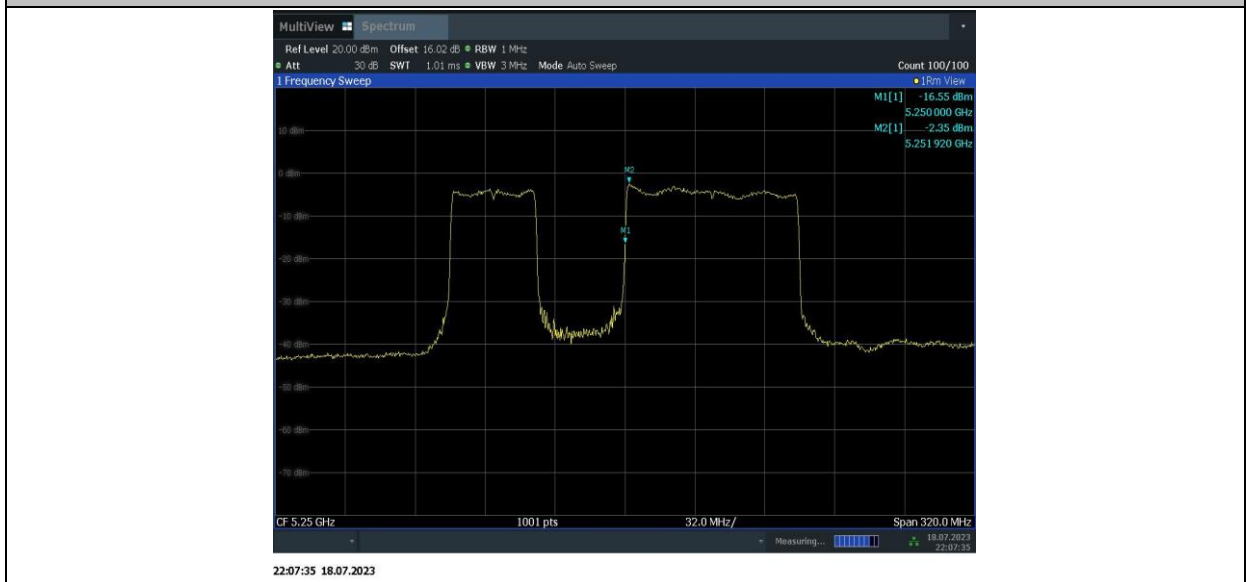
## 11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484+242\_8



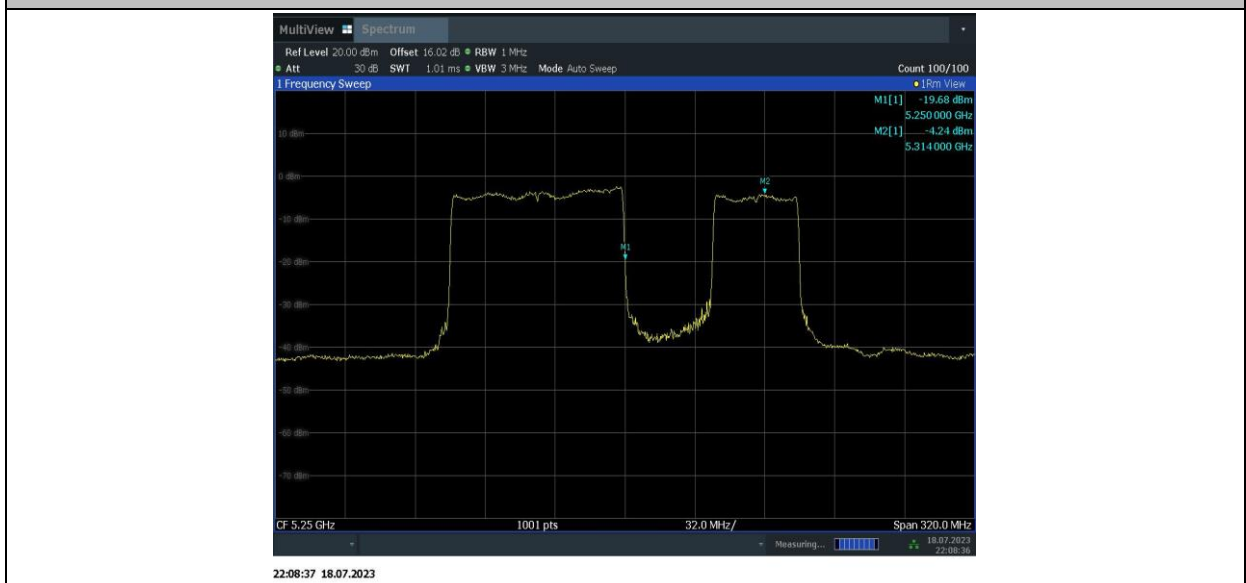
## 11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484\_1



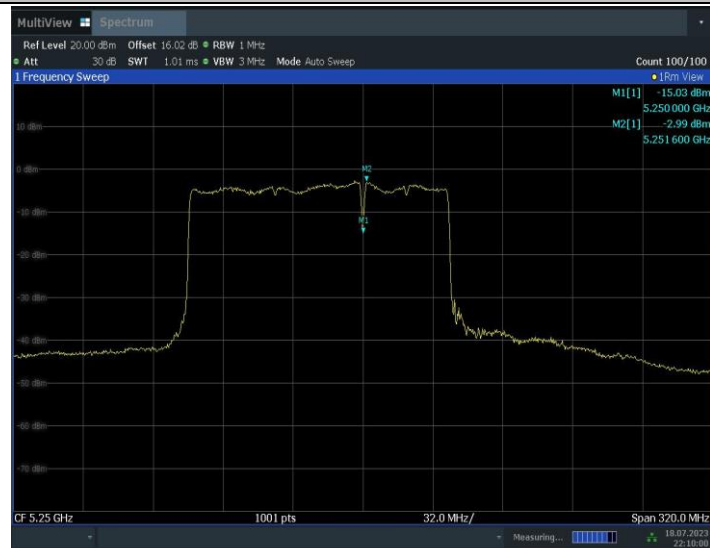
11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484\_2



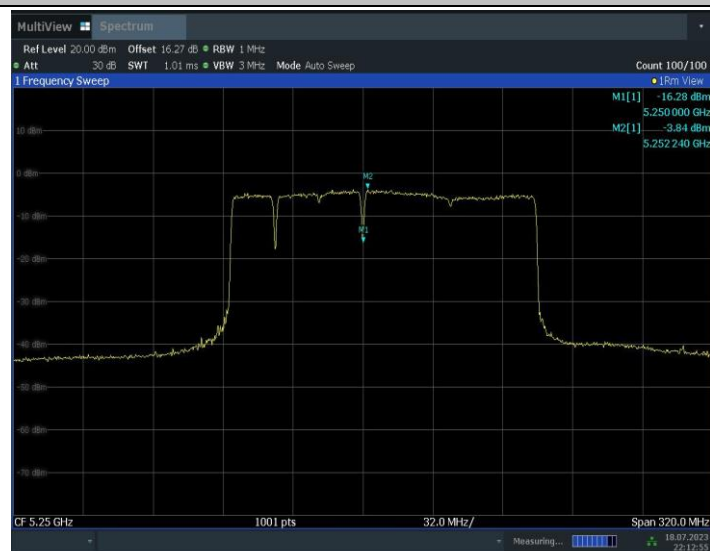
11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484\_3



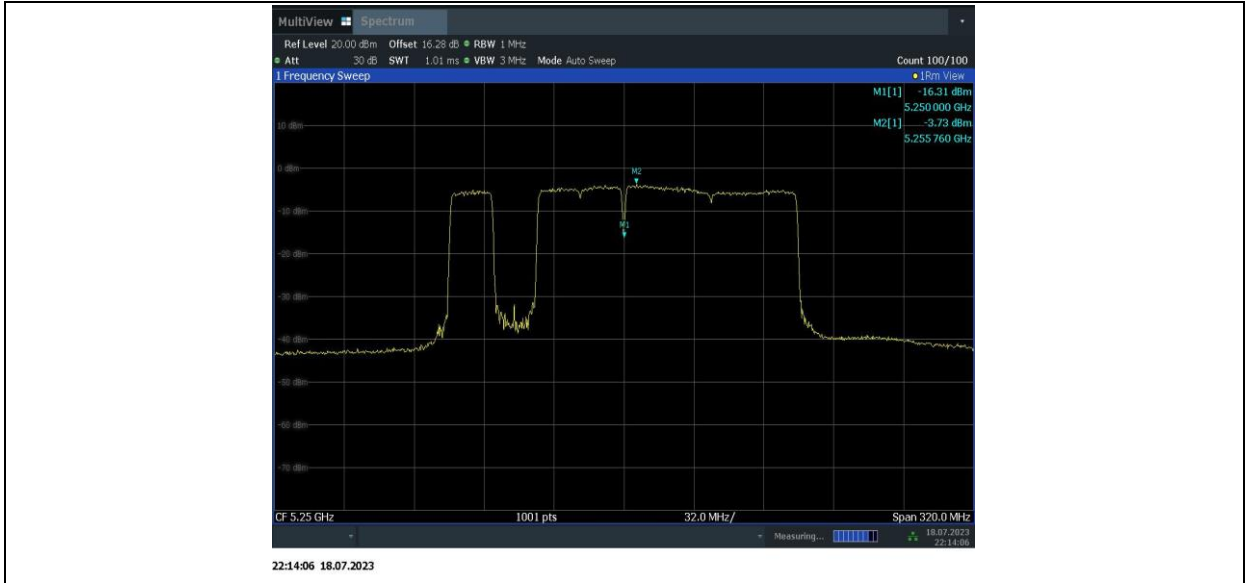
11BE160MIMO\_Ant7\_5250\_UNII-2A\_996+484\_4



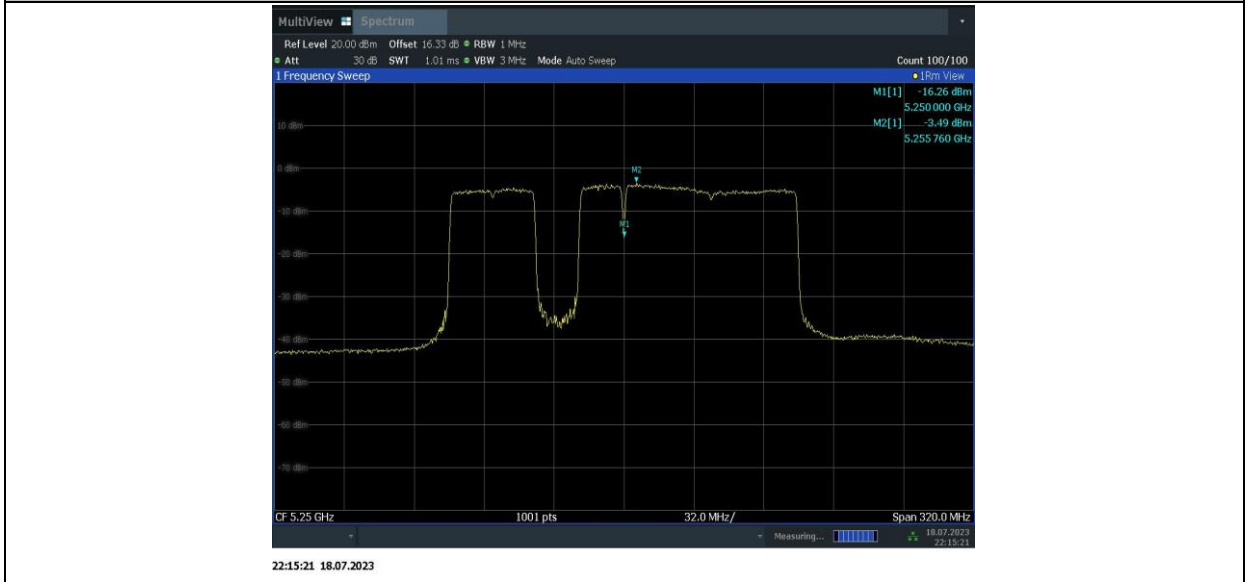
11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484+242\_1



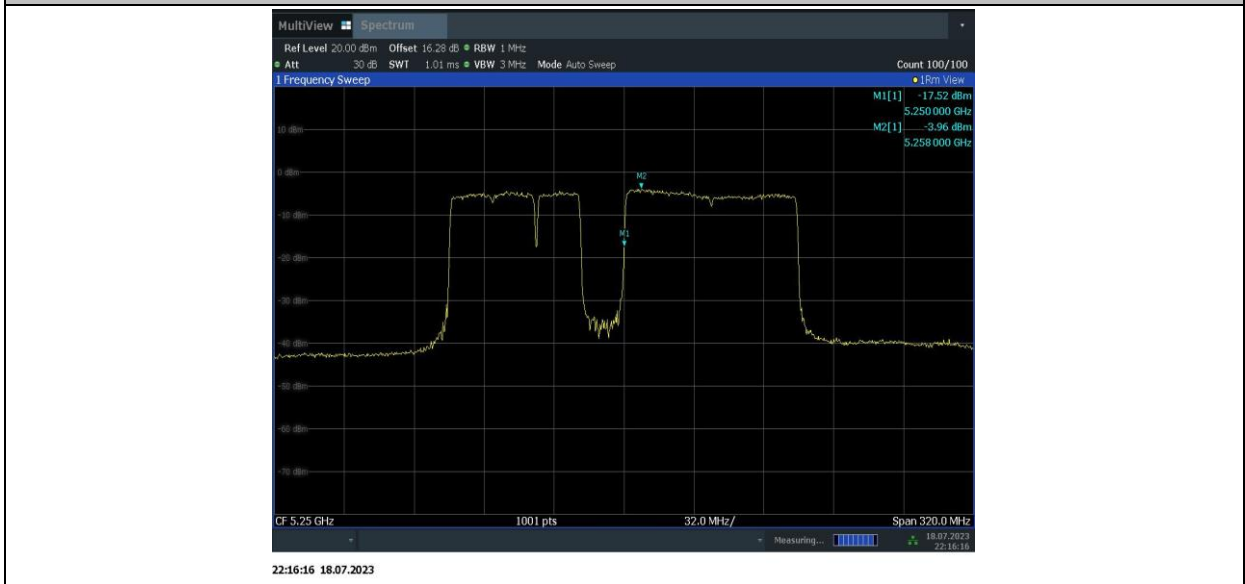
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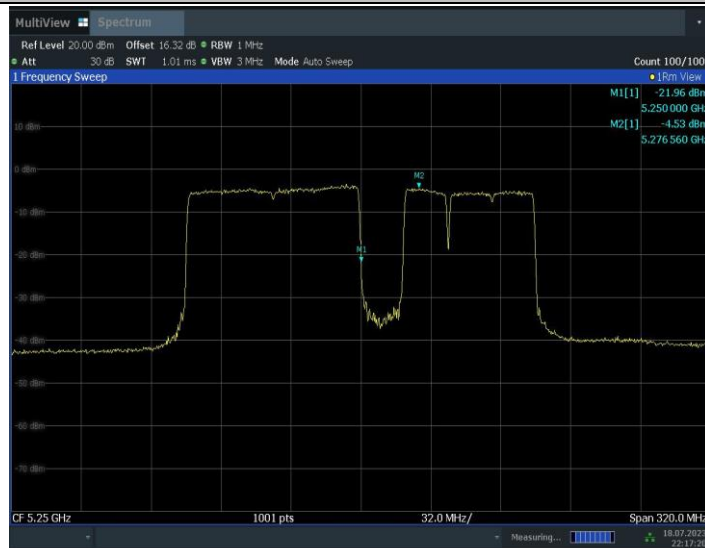
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11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484+242\_4

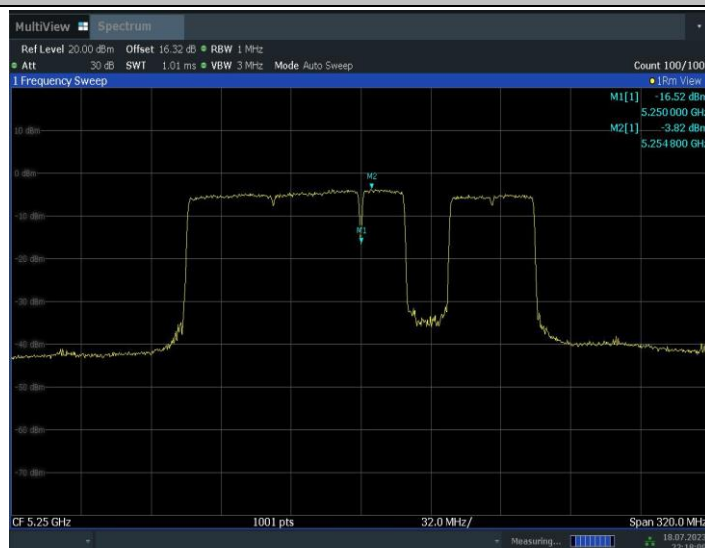


11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484+242\_5



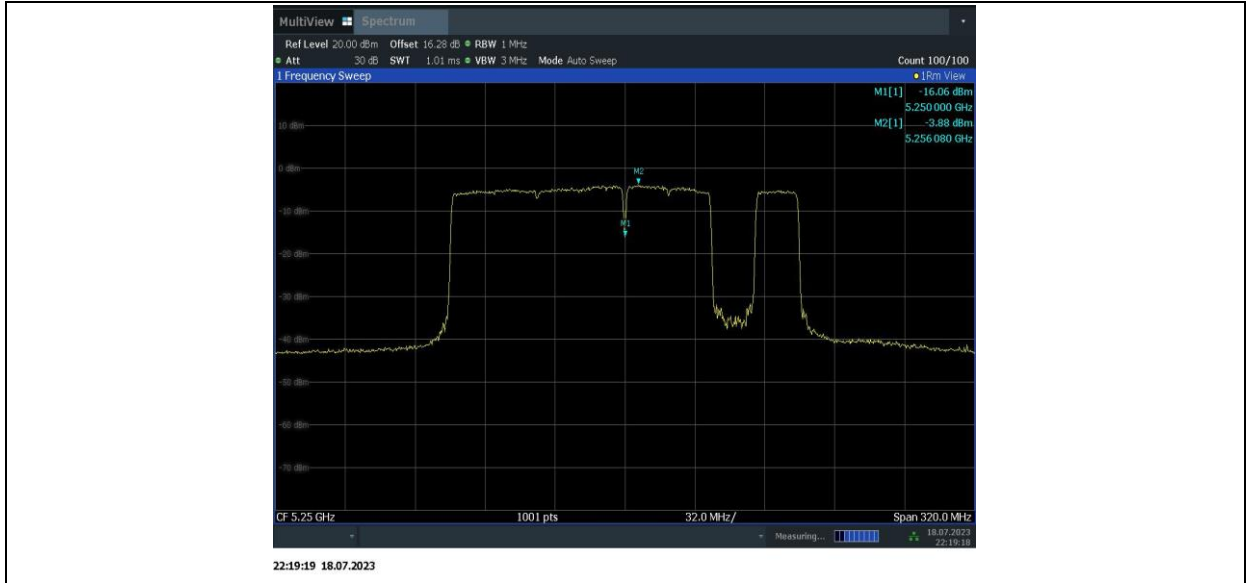
22:17:21 18.07.2023

11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484+242\_6

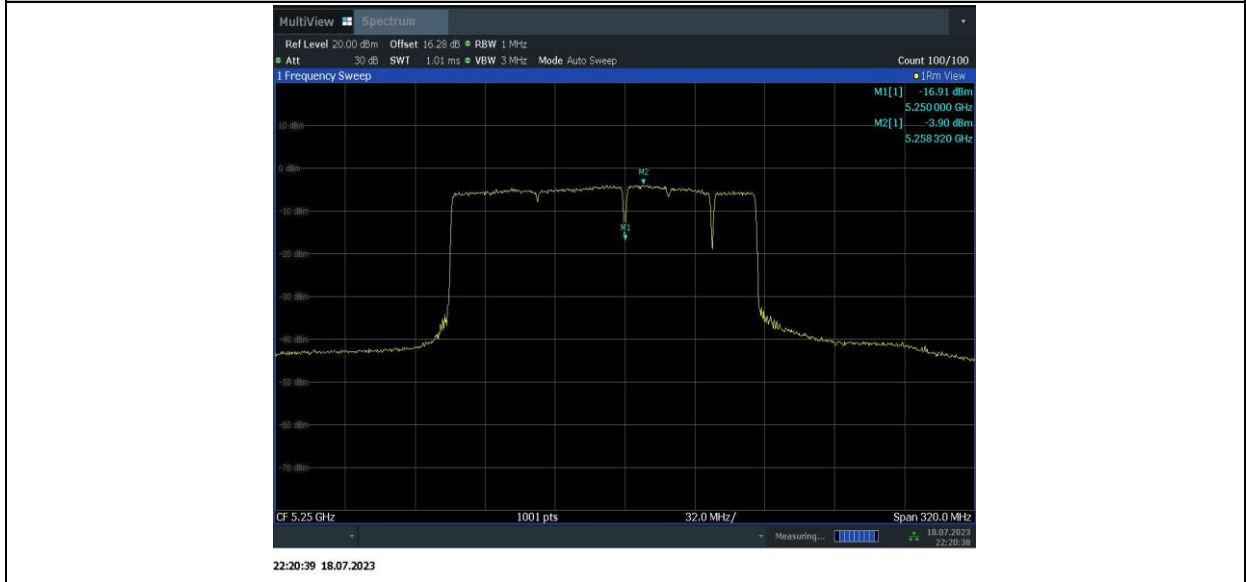


22:18:10 18.07.2023

11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484+242\_7



11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484+242\_8

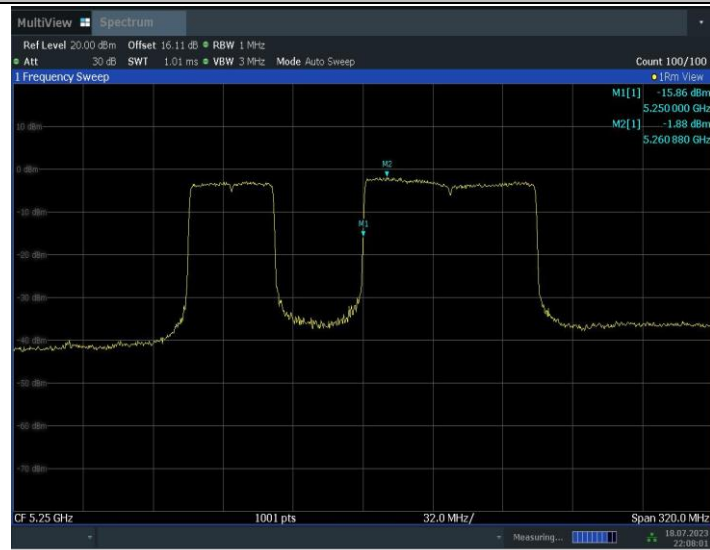


11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484\_1



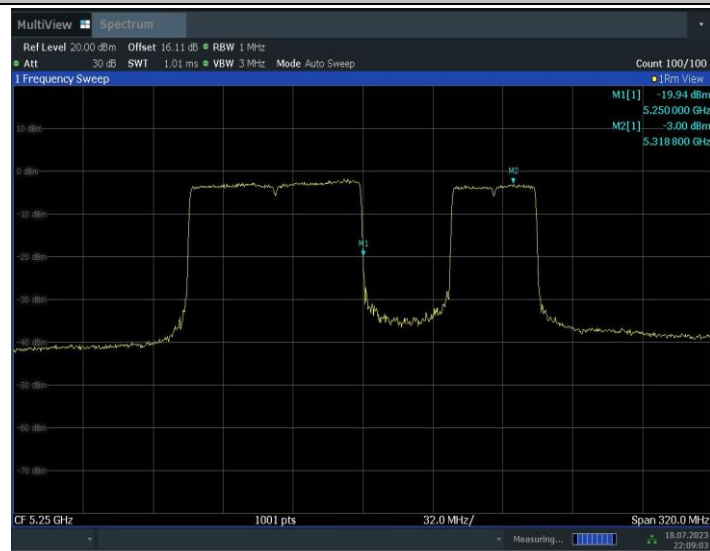


## 11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484\_2



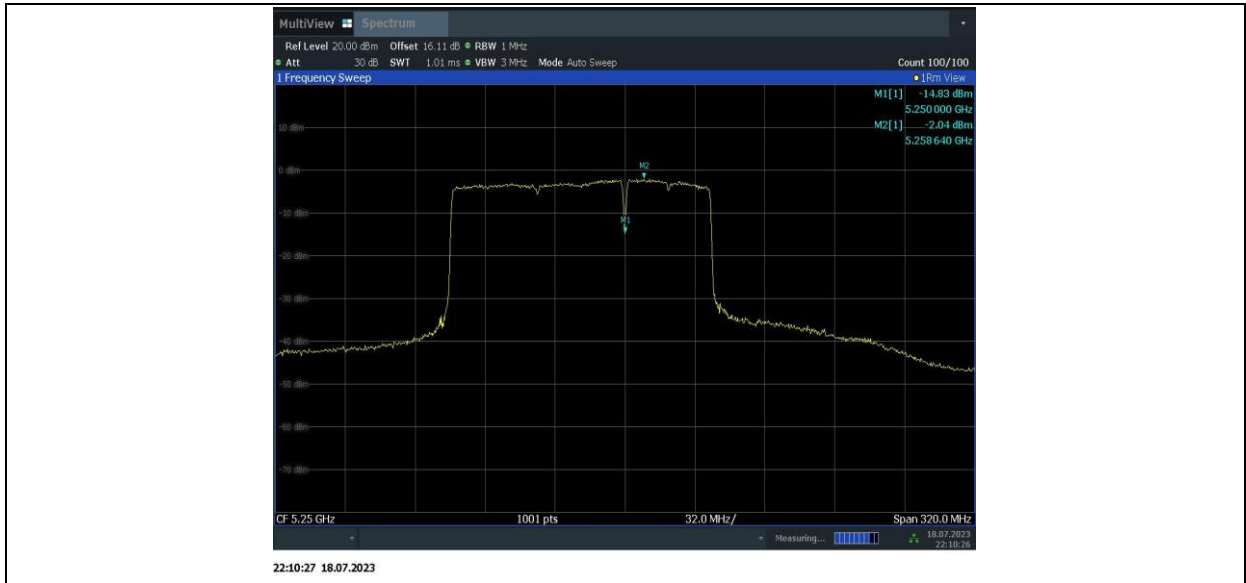
22:08:02 18.07.2023

## 11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484\_3

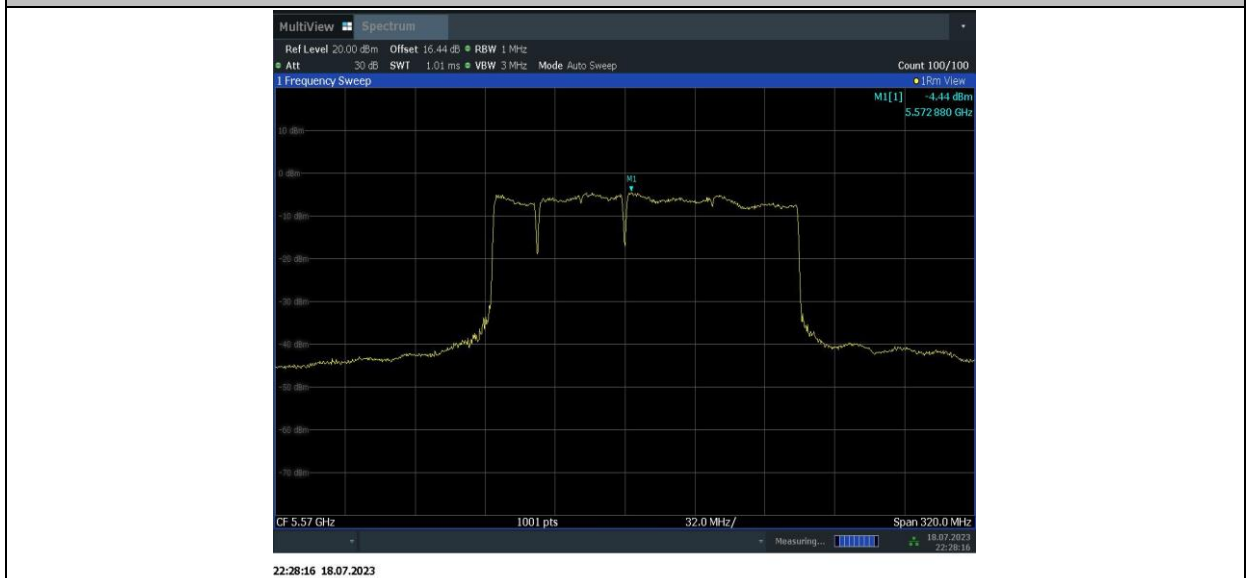


22:09:04 18.07.2023

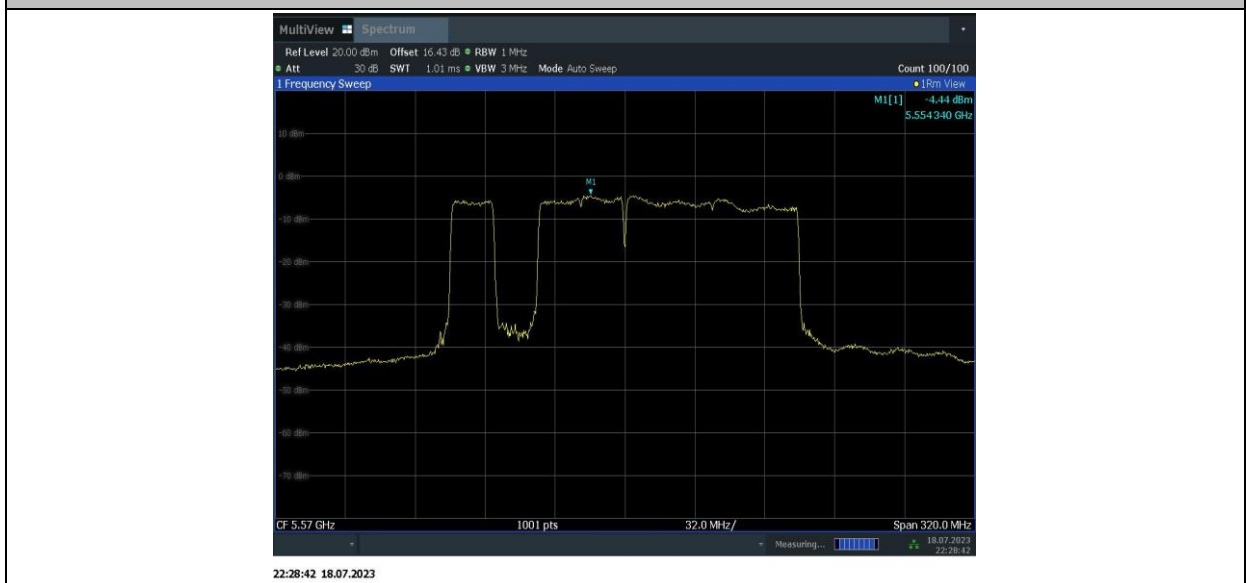
## 11BE160MIMO\_Ant10\_5250\_UNII-2A\_996+484\_4



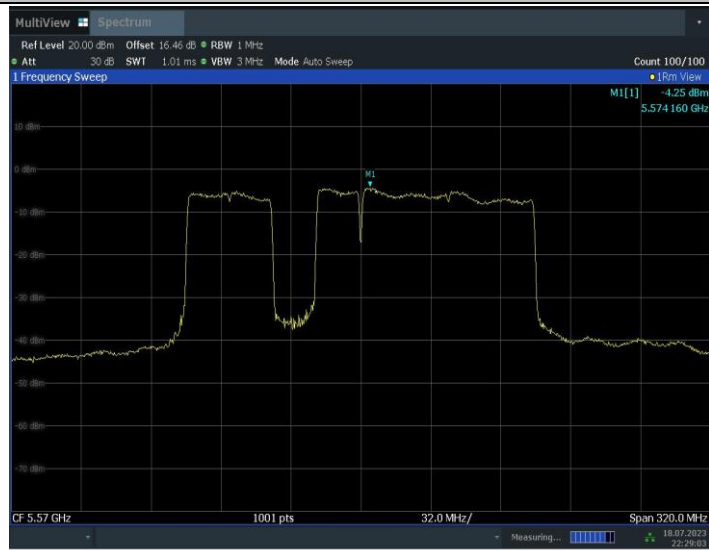
11BE160MIMO\_Ant7\_5570\_996+484+242\_1



11BE160MIMO\_Ant7\_5570\_996+484+242\_2

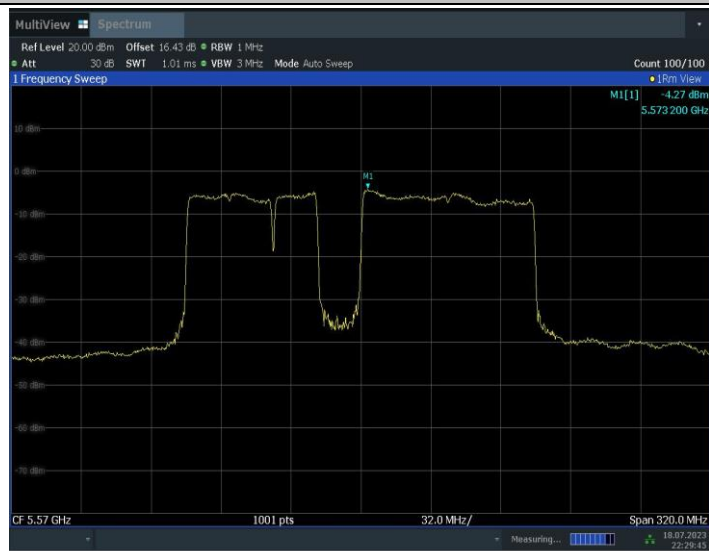


11BE160MIMO\_Ant7\_5570\_996+484+242\_3



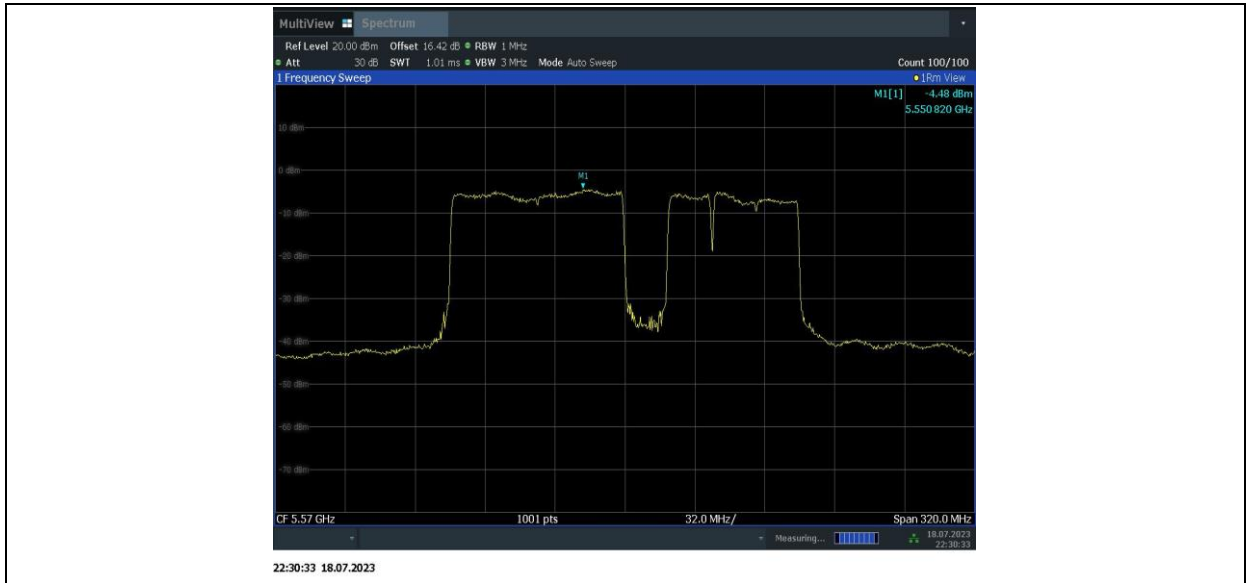
22:29:04 18.07.2023

11BE160MIMO\_Ant7\_5570\_996+484+242\_4

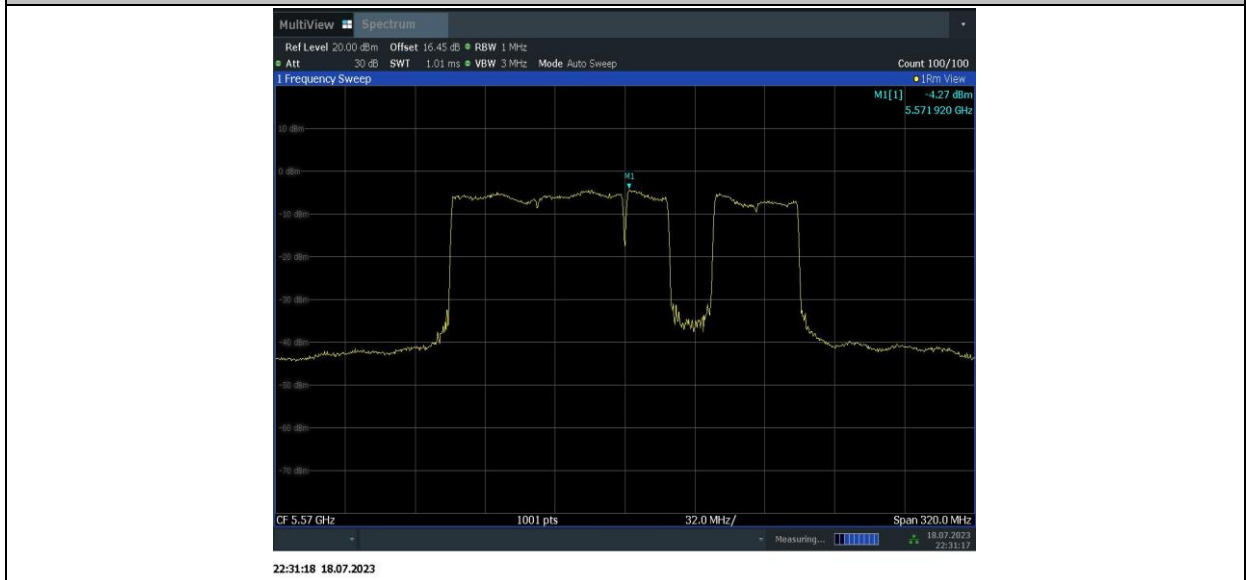


22:29:45 18.07.2023

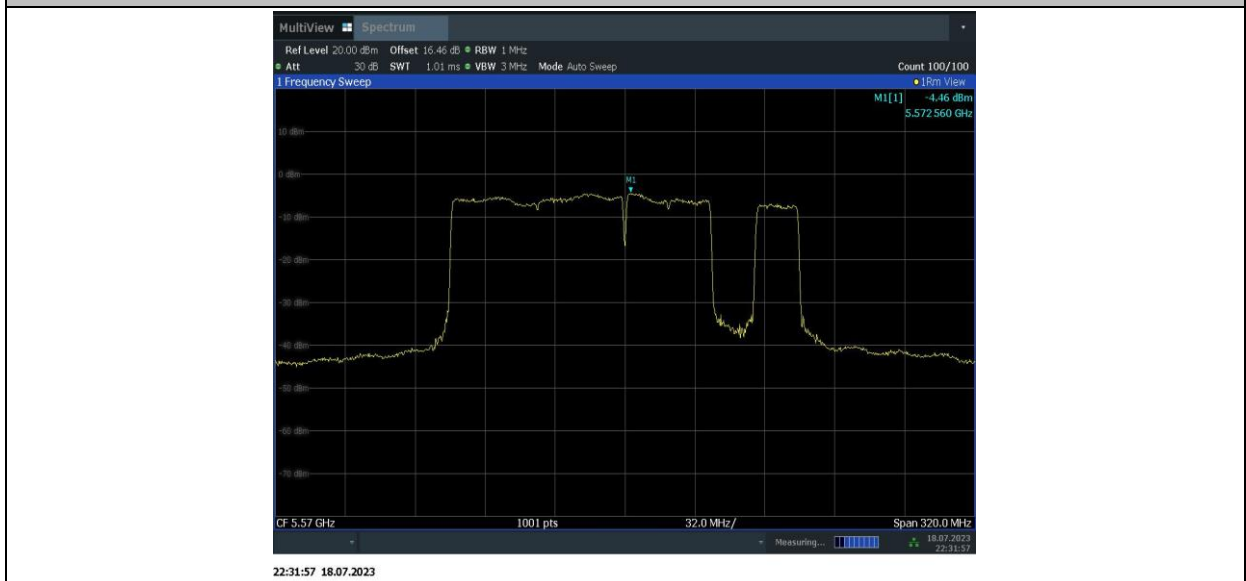
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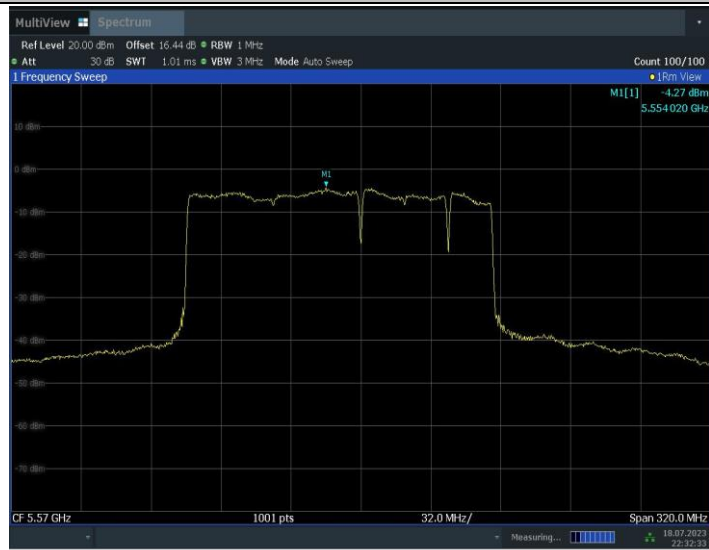
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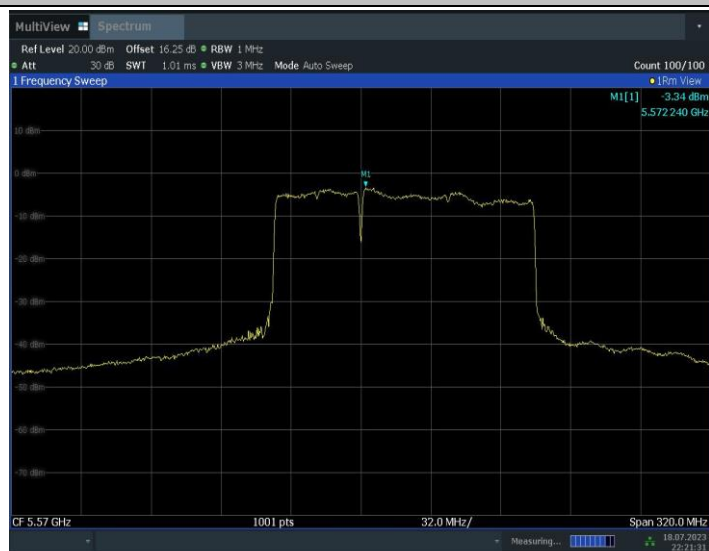
11BE160MIMO\_Ant7\_5570\_996+484+242\_7



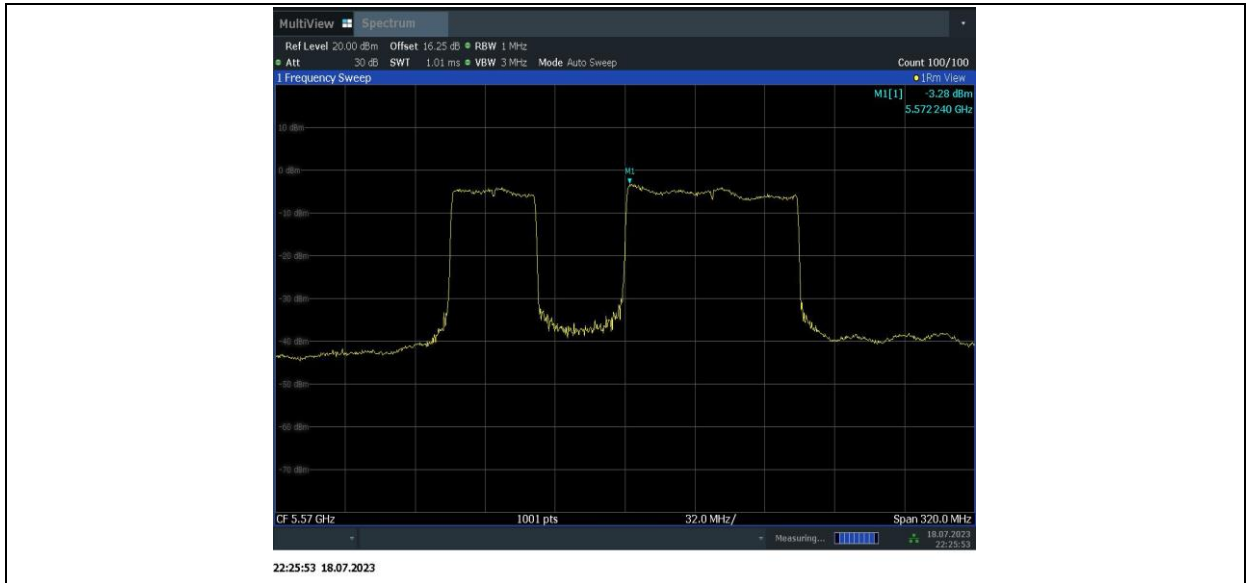
11BE160MIMO\_Ant7\_5570\_996+484+242\_8



11BE160MIMO\_Ant7\_5570\_996+484\_1



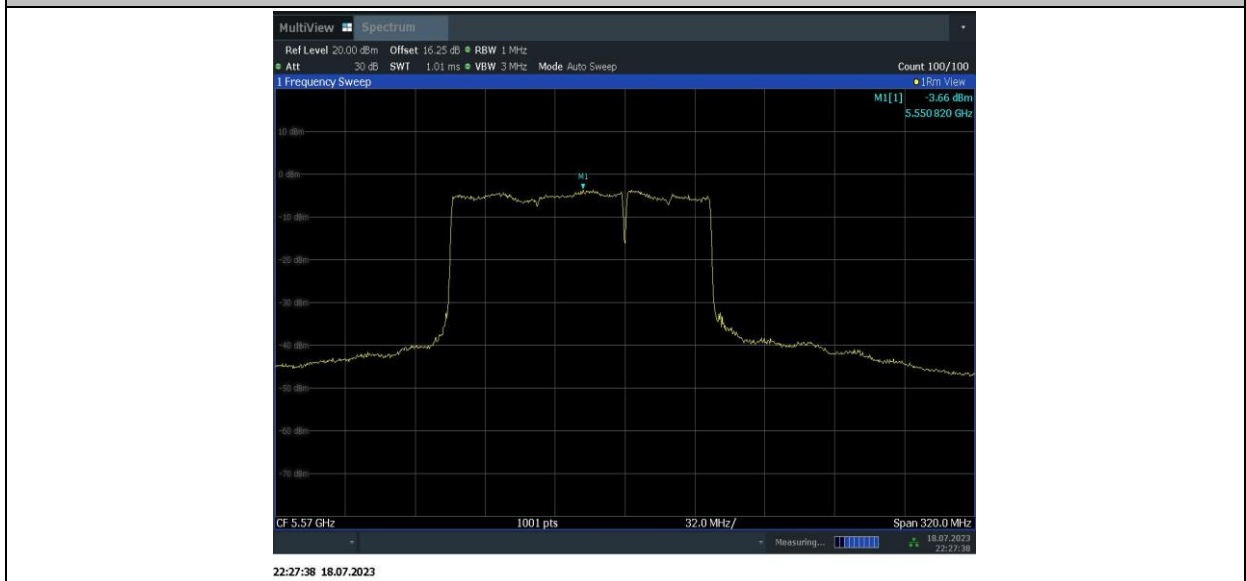
11BE160MIMO\_Ant7\_5570\_996+484\_2



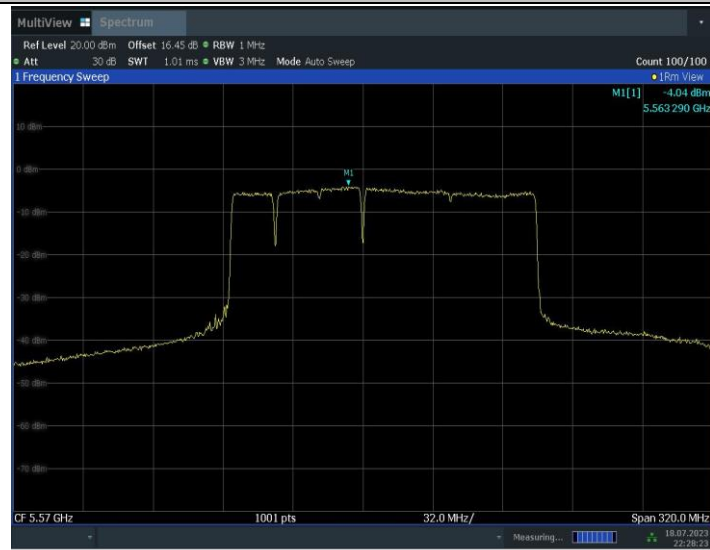
11BE160MIMO\_Ant7\_5570\_996+484\_3



11BE160MIMO\_Ant7\_5570\_996+484\_4

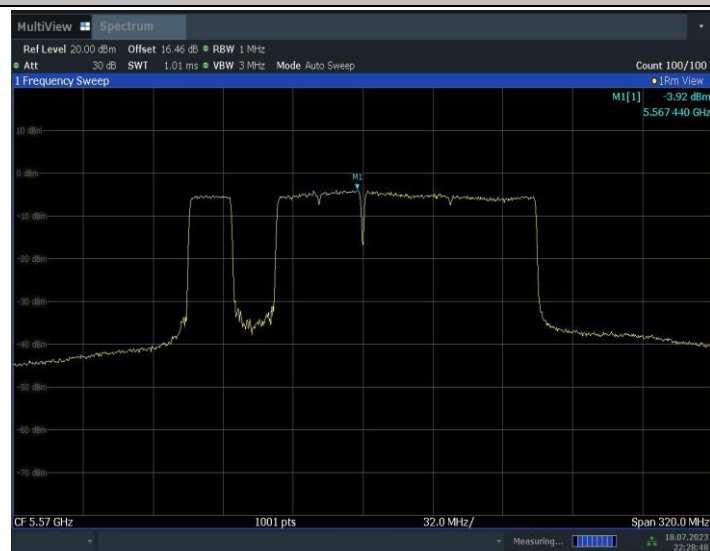


11BE160MIMO\_Ant10\_5570\_996+484+242\_1



22:28:23 18.07.2023

11BE160MIMO\_Ant10\_5570\_996+484+242\_2

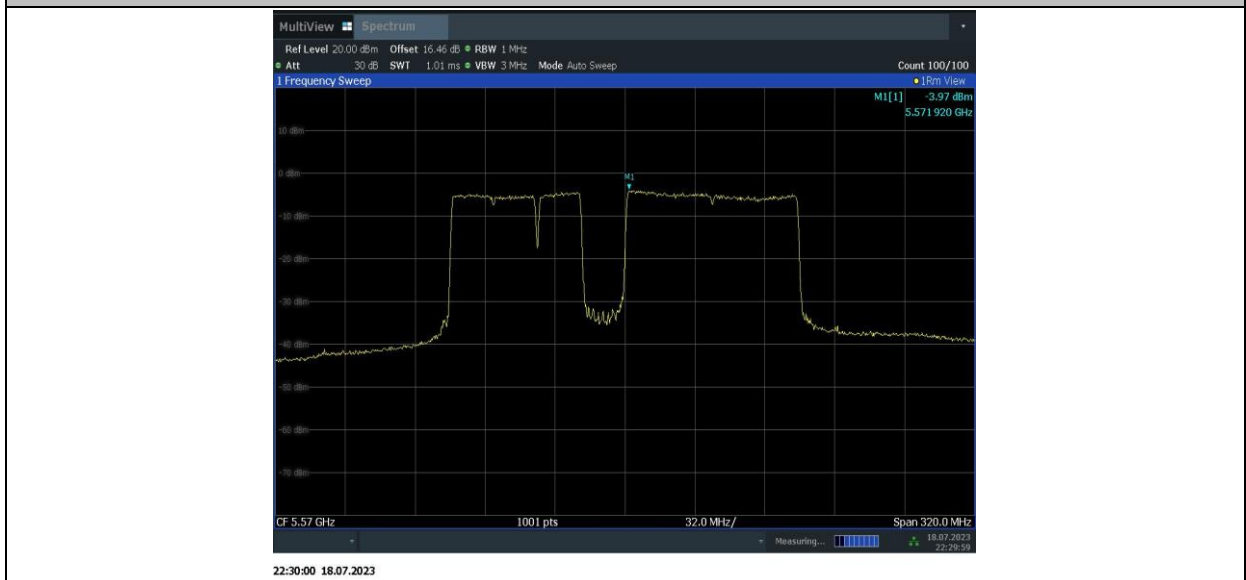


22:28:49 18.07.2023

11BE160MIMO\_Ant10\_5570\_996+484+242\_3



11BE160MIMO\_Ant10\_5570\_996+484+242\_4

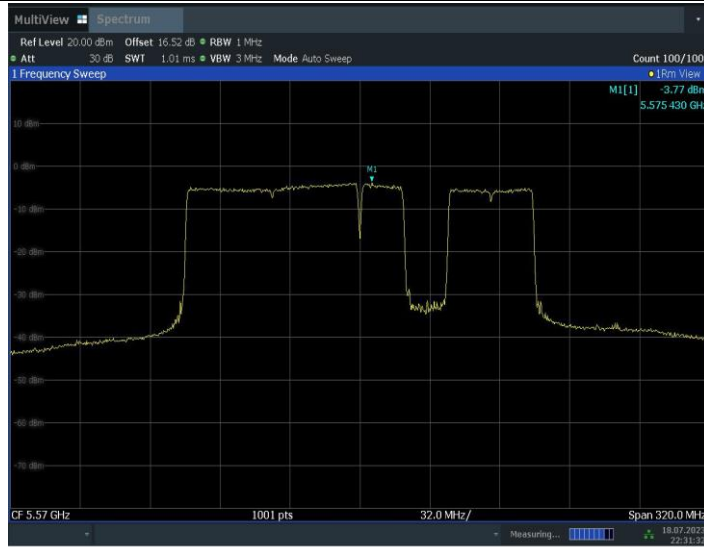


11BE160MIMO\_Ant10\_5570\_996+484+242\_5



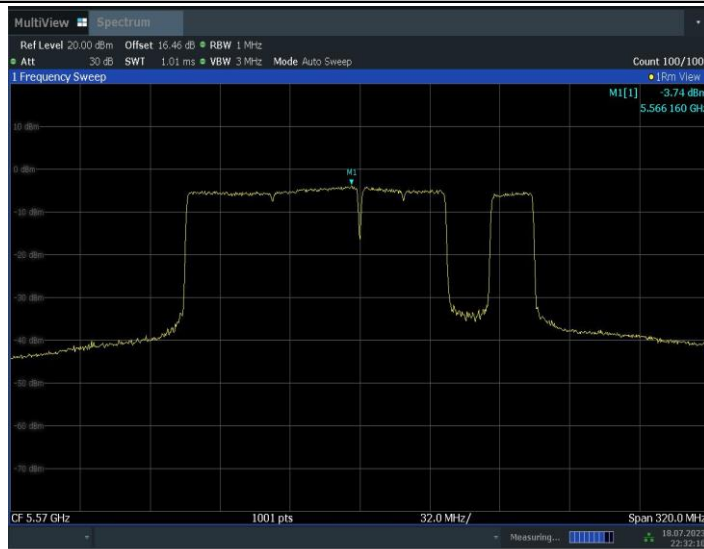


11BE160MIMO\_Ant10\_5570\_996+484+242\_6



22:31:33 18.07.2023

11BE160MIMO\_Ant10\_5570\_996+484+242\_7

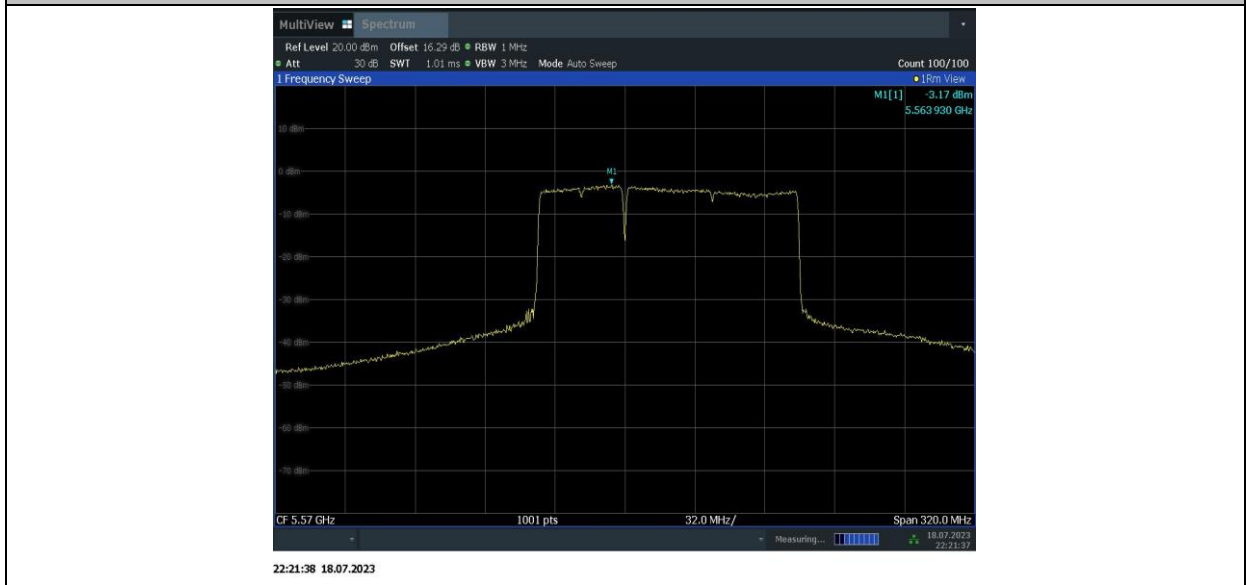


22:32:11 18.07.2023

11BE160MIMO\_Ant10\_5570\_996+484+242\_8



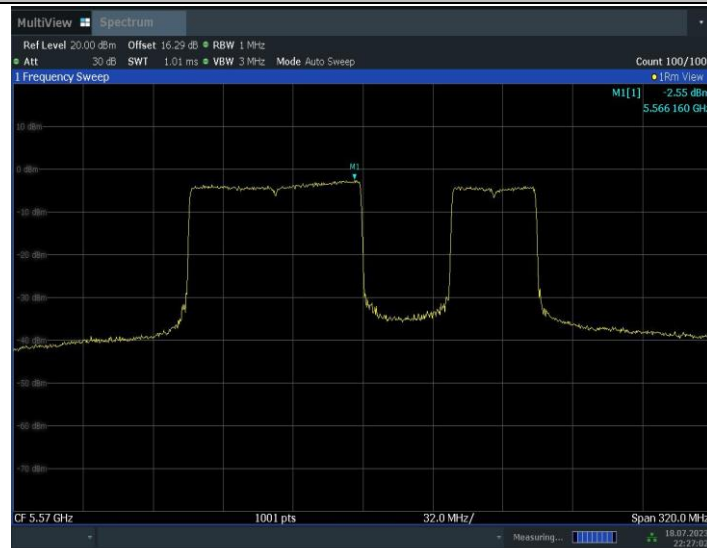
11BE160MIMO\_Ant10\_5570\_996+484\_1



11BE160MIMO\_Ant10\_5570\_996+484\_2

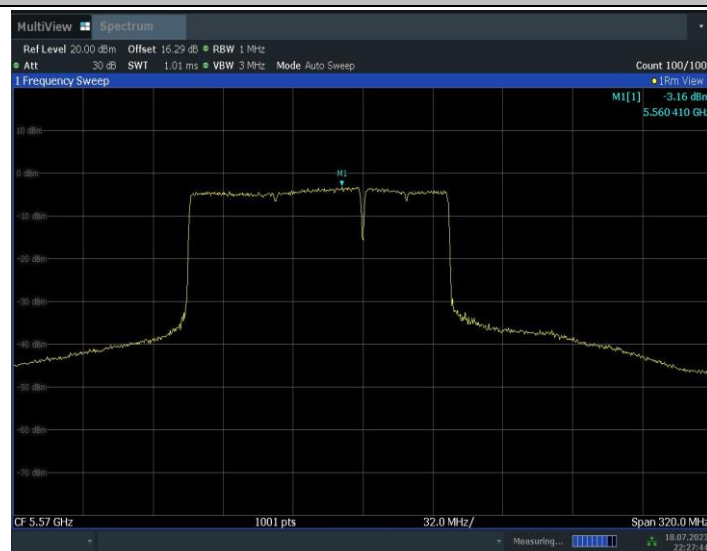


## 11BE160MIMO\_Ant10\_5570\_996+484\_3



22:27:02 18.07.2023

## 11BE160MIMO\_Ant10\_5570\_996+484\_4



22:27:45 18.07.2023

**Conclusion: PASS**

#### A.4. Occupied 26dB Bandwidth(conducted)

##### Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.403 (i)	/

The measurement is made according to KDB 789033

##### Measurement Uncertainty:

Measurement Uncertainty	60.80Hz
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##### Measurement Result:

Ant1 of the result table and result graph corresponds to ant7 of the EUT, ant2 of the result table and result graph corresponds to ant10 of the EUT.

Mode	Ant	Fre	result			Verdict
11A-MIMO	Ant1	5180	23.40	5168.20	5191.60	PASS
	Ant2	5180	23.64	5168.36	5192.00	PASS
	Ant1	5200	23.36	5188.20	5211.56	PASS
	Ant2	5200	22.96	5188.40	5211.36	PASS
	Ant1	5240	23.36	5228.20	5251.56	PASS
	Ant2	5240	23.60	5228.36	5251.96	PASS
	Ant1	5260	23.40	5248.16	5271.56	PASS
	Ant2	5260	23.68	5248.32	5272.00	PASS
	Ant1	5280	23.40	5268.20	5291.60	PASS
	Ant2	5280	23.16	5268.16	5291.32	PASS
	Ant1	5320	23.52	5308.20	5331.72	PASS
	Ant2	5320	23.76	5308.20	5331.96	PASS
	Ant1	5500	23.48	5488.16	5511.64	PASS
	Ant2	5500	23.16	5488.20	5511.36	PASS
	Ant1	5580	23.44	5568.16	5591.60	PASS
	Ant2	5580	23.44	5567.96	5591.40	PASS
	Ant1	5700	23.56	5688.24	5711.80	PASS
	Ant2	5700	23.08	5688.28	5711.36	PASS
11BE20MIMO	Ant1	5180	20.12	5169.00	5189.12	PASS
	Ant2	5180	20.68	5168.80	5189.48	PASS
	Ant1	5200	20.12	5189.00	5209.12	PASS
	Ant2	5200	20.44	5188.80	5209.24	PASS
	Ant1	5240	20.12	5229.00	5249.12	PASS
	Ant2	5240	20.44	5228.76	5249.20	PASS
	Ant1	5260	20.04	5249.04	5269.08	PASS
	Ant2	5260	20.64	5248.80	5269.44	PASS
	Ant1	5280	20.12	5269.00	5289.12	PASS
	Ant2	5280	20.32	5268.84	5289.16	PASS
	Ant1	5320	20.12	5309.00	5329.12	PASS
	Ant2	5320	20.72	5308.76	5329.48	PASS

	Ant1	5500	20.88	5490.04	5510.92	PASS
	Ant2	5500	20.60	5490.76	5511.36	PASS
	Ant1	5580	20.92	5570.00	5590.92	PASS
	Ant2	5580	20.60	5570.76	5591.36	PASS
	Ant1	5700	20.64	5690.28	5710.92	PASS
	Ant2	5700	20.44	5690.80	5711.24	PASS
11BE40MIMO	Ant1	5190	44.72	5167.68	5212.40	PASS
	Ant2	5190	45.60	5167.04	5212.64	PASS
	Ant1	5230	45.12	5207.60	5252.72	PASS
	Ant2	5230	45.28	5207.28	5252.56	PASS
	Ant1	5270	44.80	5247.68	5292.48	PASS
	Ant2	5270	44.72	5247.36	5292.08	PASS
	Ant1	5310	44.96	5287.36	5332.32	PASS
	Ant2	5310	44.08	5287.84	5331.92	PASS
	Ant1	5510	45.04	5487.36	5532.40	PASS
	Ant2	5510	43.92	5487.76	5531.68	PASS
	Ant1	5550	44.96	5527.60	5572.56	PASS
	Ant2	5550	44.32	5527.76	5572.08	PASS
	Ant1	5670	45.36	5647.20	5692.56	PASS
	Ant2	5670	44.96	5647.52	5692.48	PASS
11BE80MIMO	Ant1	5210	90.56	5164.08	5254.64	PASS
	Ant2	5210	89.44	5165.36	5254.80	PASS
	Ant1	5290	89.76	5244.72	5334.48	PASS
	Ant2	5290	89.60	5245.04	5334.64	PASS
	Ant1	5530	90.56	5484.56	5575.12	PASS
	Ant2	5530	90.56	5484.72	5575.28	PASS
	Ant1	5610	90.08	5564.88	5654.96	PASS
	Ant2	5610	90.24	5565.52	5655.76	PASS
11BE160MIMO	Ant1	5250	176.32	5162.96	5339.28	PASS
	Ant2	5250	173.44	5163.60	5337.04	PASS
	Ant1	5250_UNII-1	87.04	5162.96	5250	PASS
	Ant2	5250_UNII-1	86.4	5163.60	5250	PASS
	Ant1	5250_UNII-2A	89.28	5250	5339.28	PASS
	Ant2	5250_UNII-2A	87.04	5250	5337.04	PASS
	Ant1	5570	177.60	5482.00	5659.60	PASS
	Ant2	5570	177.28	5482.32	5659.60	PASS

Test Graphs

11A-MIMO\_Ant1\_5180



19:28:56 19.04.2023

11A-MIMO\_Ant2\_5180



19:43:53 19.04.2023

11A-MIMO\_Ant1\_5200



11A-MIMO\_Ant2\_5200



11A-MIMO\_Ant1\_5240



## 11A-MIMO\_Ant2\_5240



19:47:43 19.04.2023

## 11A-MIMO\_Ant1\_5260



19:48:58 19.04.2023

## 11A-MIMO\_Ant2\_5260