



FCC PART 15C TEST REPORT No.I23Z60483-IOT12

for

Client name: OnePlus Technology (Shenzhen) Co., Ltd.

Product name: Mobile Phone

Model name: CPH2551

With

FCC ID: 2ABZ2-AA541

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

Report Number	Revision	Description	Issue Date
I23Z60483-IOT12	Rev.0	1st edition	2023-07-05
I23Z60483-IOT12	Rev.1	Update statement about antenna gain and testing strategy on page 10 to 11; Update ant1/2 and ant7/10 relationship.	2023-07-19

CONTENTS

1. TEST LABORATORY	5
1.1. INTRODUCTION & ACCREDITATION	5
1.2. TESTING LOCATION	5
1.3. TESTING ENVIRONMENT.....	6
1.4. PROJECT DATE	6
1.5. SIGNATURE	6
2. CLIENT INFORMATION.....	7
2.1. APPLICANT INFORMATION	7
2.2. MANUFACTURER INFORMATION	7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	8
3.1. ABOUT EUT	8
3.2. INTERNAL IDENTIFICATION OF EUT	8
3.3. INTERNAL IDENTIFICATION OF AE.....	8
3.4. GENERAL DESCRIPTION.....	9
3.5. INTERPRETATION OF THE TEST ENVIRONMENT.....	9
4. REFERENCE DOCUMENTS	9
4.1. DOCUMENTS SUPPLIED BY APPLICANT	9
4.2. REFERENCE DOCUMENTS FOR TESTING.....	9
5. TEST RESULTS	10
5.1. SUMMARY OF TEST RESULTS.....	10
5.2. FOR CONDUCTED RESULT :	10
5.3. ANTENNA GAIN	11
5.4. STATEMENTS.....	11
5.5. TEST CONDITIONS	11
6. TEST FACILITIES UTILIZED	12
7. MEASUREMENT UNCERTAINTY	13
7.1. MAXIMUM OUTPUT POWER.....	13
7.2. PEAK POWER SPECTRAL DENSITY.....	13
7.3. DTS 6-DB SIGNAL BANDWIDTH.....	13
7.4. BAND EDGES COMPLIANCE	13
7.5. TRANSMITTER SPURIOUS EMISSION	13
7.6. AC POWER-LINE CONDUCTED EMISSION	13
ANNEX A: DETAILED TEST RESULTS.....	14
A.1. MEASUREMENT METHOD.....	14
A.2. MAXIMUM OUTPUT POWER.....	15



A.2.1. PEAK OUTPUT POWER-CONDUCTED 15

A.3. PEAK POWER SPECTRAL DENSITY..... 21

A.4. DTS 6-DB SIGNAL BANDWIDTH 66

A.5. BAND EDGES COMPLIANCE 79

A.6. TRANSMITTER SPURIOUS EMISSION.....110

 A.6.1 TRANSMITTER SPURIOUS EMISSION – CONDUCTED110

 A.6.2 TRANSMITTER SPURIOUS EMISSION - RADIATED 243

A.7. AC POWER-LINE CONDUCTED EMISSION 284

ANNEX B: EUT PARAMETERS..... 288

ANNEX C: ACCREDITATION CERTIFICATE 288



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 1:CTTL(Huayuan North Road)

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

Radiated testing Location 2:CTTL(huayuan North Road)

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

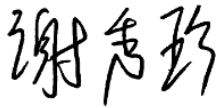
1.3. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%

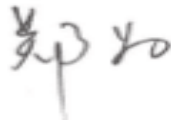
1.4. Project date

Testing Start Date: 2023-03-17
Testing End Date: 2023-07-05

1.5. Signature



Xie Xiuzhen
(Prepared this test report)



Zheng Wei
(Reviewed this test report)



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
With WLAN Function	Yes
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	27.95dBm
Power Supply	3.91V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version
UT35a	868147060030673/	11	OxygenOS 13.2
	868147060030665		
UT15a	868147060020070/	11	OxygenOS 13.2
	868147060020062		

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

UT35a is used for Conduction test, UT15a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Description	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.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	2021
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices Federal Communications Commission Office of Engineering and Technology Laboratory Division	2013
KDB 558074 D01	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID	2019

SYSTEM DEVICES OPERATING UNDER SECTION
 15.247 OF THE FCC RULES

 KDB 662911 D01 Emissions Testing of Transmitters with Multiple Outputs in
 the Same Band(e.g., MIMO, Smart Antenna, etc) 2013-10

5. Test Results

5.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	P
Peak Power Spectral Density	15.247 (e)	/	P
Occupied 6dB Bandwidth	15.247 (a)	/	P
Band Edges Compliance	15.247 (d)	/	P
Transmitter Spurious Emission - Conducted	15.247 (d)	/	P
Transmitter Spurious Emission - Radiated	15.247, 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.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

5.2. For conducted result :

- EUT support 802.11b/g/n/ax/be modes on 2.4G, and can't transmit simultaneously in 2.4G.
 - As WLAN SISO(1x1) & MIMO(2x2) mode have the same power setting, the whole testing has assessed only MIMO mode.
 - 802.11ax support full RU and single RU modes.
 - 802.11be support full RU, single RU, small MRU, large MRU and puncturing modes.
 - For 802.11b/g/n/ax full RU/be full RU, the whole testing (PSD/6dB bandwidth/band edges/ Transmitter Spurious Emission-Conducted) has reported only 802.11b/g/be-EHT20/40MHz by referring to the higher output power.
 - For 802.11ax single RU and 802.11be single RU modes, the whole testing (PSD/band edges/ Transmitter Spurious Emission-Conducted) has reported only 802.11be- EHT20-single RU by referring to the higher output power.
 - For 802.11be-EHT20/40MHz small MRU mode, the whole testing (PSD/band edges/ Transmitter Spurious Emission-Conducted) 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.

5.3. Antenna Gain

Mode	Ant5(dBi)	Ant6(dBi)	Power(dBi)	PSD(dBi)
CDD	-3	-0.5	-0.5	1.35
BF	-3	-0.5	1.35	1.35

1. 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)

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

3. 802.11g 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. 802.11ax/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.

5.4. Statements

The test cases as listed in section 5.1 of this report for the EUT specified in section 3 was performed by CTTL and according to the standards or reference documents listed in section 4.2

The EUT met all requirements of the standards or reference documents, and only the WLAN function was tested in this report.

5.5. Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage

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

Temperature	T nom	26°C
Voltage	V nom	3.91V(By battery)
Humidity	H nom	20-75%

6. Test Facilities 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	2024-06-15
2	LISN	ENV216	101459	R&S	1 year	2024-04-29
3	Test Receiver	ESCI 3	100766	R&S	1 year	2024-04-30
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103144	Rohde & Schwarz	1 year	2023-10-25
2	Dual-Ridge Waveguide Horn Antenna	VULB 9163	01223	Schwarzbeck	1 year	2023-07-25
3	Dual-Ridge Waveguide Horn Antenna	3115	00167250	ETS-Lindgren	1 year	2023-06-20

Note: The Dual-Ridge Waveguide Horn Antenna with series number of 00167250 did not exceed the CAL.DUE.DATE when used.

7. Measurement Uncertainty

7.1. Maximum Output Power

Measurement Uncertainty: 0.387dB,k=1.96

7.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

7.3. DTS 6-dB Signal Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

7.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

7.5. Transmitter Spurious Emission

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	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	4.92
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.15
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.54

7.6. AC Power-line Conducted Emission

Measurement Uncertainty : 3.08dB,k=2

ANNEX A: Detailed Test Results

A.1. Measurement Method

A.1.1. Conducted Measurements

Connect the EUT to the test system as Fig.A.1.1.1 shows.

Set the EUT to the required work mode.

Set the EUT to the required channel.

Set the Vector Signal Analyzer and start measurement.

Record the values. Vector Signal Analyzer

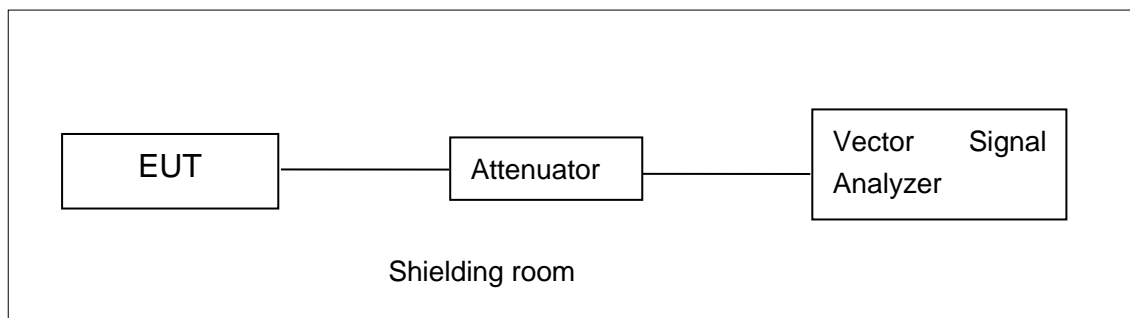


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

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;

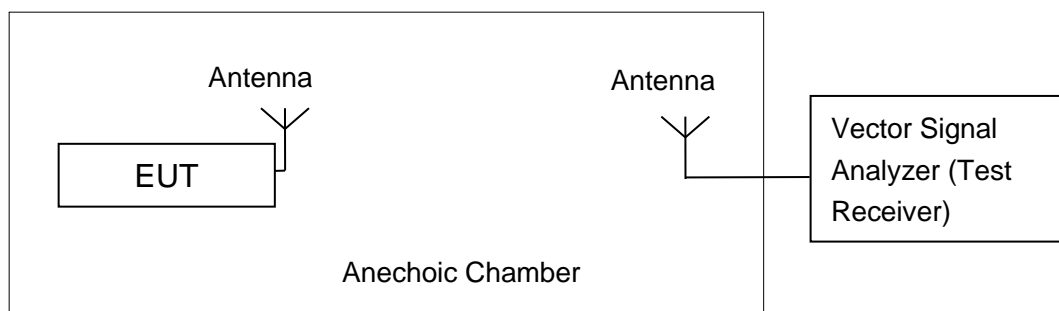


Fig.A.1.2.1: Test Setup Diagram for Radiated Measurements

A.2. Maximum Output Power

Method of Measurement: See ANSI C63.10-2013-clause 11.9.1.1

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW \geq [3 \times RBW].
- c) Set span \geq [3 \times RBW].
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

EUT ID: UT35a

A.2.1. Peak Output Power-conducted

Measurement Results:

MIMO

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11g	6	22.88	23.72	22.51	23.59	24.55	23.44	26.26	27.17	26.01

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

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	MCS0	22.86	23.73	23.46	23.74	24.69	24.52	26.33	27.25	27.03

The data rate MSC0 is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n (40MHz)	MCS0	21.62	23.87	19.54	22.97	24.79	20.73	25.36	27.36	23.19

The data rate MSC0 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax (20MHz)	MCS0	23.94	24.75	23.57	24.83	25.78	24.70	27.42	28.31	27.18

The data rate MSC0 is selected as worst condition, and the following cases are performed with this condition.

802.11ax-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11ax (40MHz)	MCS0	22.16	24.38	19.09	23.51	25.31	20.29	25.90	27.88	22.74

The data rate MSC0 is selected as worst condition, and the following cases are performed with this condition.

802.11be-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11be (20MHz)	MCS0	24.43	24.33	24.07	25.40	25.34	25.18	27.95	27.87	27.67

The data rate MSC0 is selected as worst condition, and the following cases are performed with this condition.

this condition.

802.11be-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11be (40MHz)	MCS0	21.94	24.14	19.82	23.32	25.15	21.08	25.69	27.68	23.51

The data rate MSC0 is selected as worst condition, and the following cases are performed with this condition.

RU MIMO

802.11ax20-RU26 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax20-RU26-left	MCS0	17.68	17.48	17.17	18.19	17.78	17.95	20.95	20.64	20.59
802.11ax20-RU26-right	MCS0	17.11	17.09	17.55	17.43	17.45	18.08	20.28	20.28	20.83

The data rate MSC0 are selected as worst condition, and the following cases are performed with this condition.

802.11ax20-RU52 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax20-RU52-left	MCS0	19.82	20.45	20.16	20.38	20.82	21.02	23.12	23.65	23.62
802.11ax20-RU52-right	MCS0	20.09	20.11	20.19	20.46	20.57	20.66	23.29	23.36	23.44

The data rate MSC0 are selected as worst condition, and the following cases are performed with this condition.

802.11ax20-RU106 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11ax20-RU106-left	MCS0	23.17	23.09	22.77	23.87	23.7	23.87	26.54	26.42	26.27
802.11ax20-RU106-right	MCS0	23.10	23.33	23.46	23.81	23.80	23.81	26.48	26.58	26.77

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

802.11be20-RU26 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11be20-RU26-left	MCS0	17.28	17.70	17.45	17.92	17.90	18.12	20.62	20.81	20.81
802.11be20-RU26-right	MCS0	17.10	17.21	17.02	17.32	17.64	17.46	20.22	20.44	20.26

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

802.11be20-RU52 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11be20-RU52-left	MCS0	19.95	20.69	20.32	20.48	21.01	21.11	23.23	23.86	23.74
802.11be20-RU52-right	MCS0	20.16	20.29	20.31	20.51	20.72	20.72	23.35	23.52	23.53

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

802.11be20-RU106 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11be20-RU106-left	MCS0	23.14	23.09	22.81	23.85	23.67	23.65	26.52	26.40	26.26
802.11be20-RU106-right	MCS0	23.34	22.88	23.03	23.89	23.52	23.53	26.63	26.22	26.30

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

Small MRU MIMO
802.11be20 mode

Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412 MHz (Ch1)	2437 MHz (Ch6)	2462 MHz (Ch11)	2412 MHz (Ch1)	2437 MHz (Ch6)	2462 MHz (Ch11)	2412 MHz (Ch1)	2437 MHz (Ch6)	2462 MHz (Ch11)
52 Tone,index38 + 26Tone,index1	MCS0	17.71	17.97	17.68	18.16	18.34	18.33	20.95	21.17	21.03
52 Tone,index39 + 26Tone,index7	MCS0	18.14	17.74	17.41	18.44	18.16	18.08	21.30	20.97	20.77
Mode	Data Rate (Mbps)	Test Result (dBm)								
		ANT5			ANT6			MIMO		
		2412 MHz (Ch1)	2437 MHz (Ch6)	2462 MHz (Ch11)	2412 MHz (Ch1)	2437 MHz (Ch6)	2462 MHz (Ch11)	2412 MHz (Ch1)	2437 MHz (Ch6)	2462 MHz (Ch11)
106 Tone,index53 + 26Tone,index4	MCS0	17.04	17.14	17.07	17.56	17.61	17.82	20.32	20.39	20.47
106 Tone,index54 + 26Tone,index4	MCS0	17.67	17.34	16.88	17.98	17.78	17.45	20.84	20.58	20.18

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

Duty Cycle

Mode	802.11b	802.11g	802.11n20	802.11n40	802.11ax-20	802.11ax-20 RU	802.11ax-40	802.11ax-40 RU
Duty Cycle	95%	99%	99%	99%	90%	94%	90%	94%

Mode	802.11BE-20	802.11BE-20 RU	802.11BE-40	802.11BE-40 RU
Duty Cycle	89%	94%	89%	94%

Mode	802.11BE-20 52-index38+26-index1 MRU1	802.11BE-20 52-index39+26-index7 MRU3	802.11BE-20 106-index53+26-index4 MRU1	802.11BE-20 106-index54+26-index4 MRU2
Duty Cycle	94%	94%	93%	93%

Conclusion: Pass

A.3. Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-2013-clause 11.10.2

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to RBW = 3 kHz.
- d) Set the VBW = 10 kHz.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.

Measurement Limit:

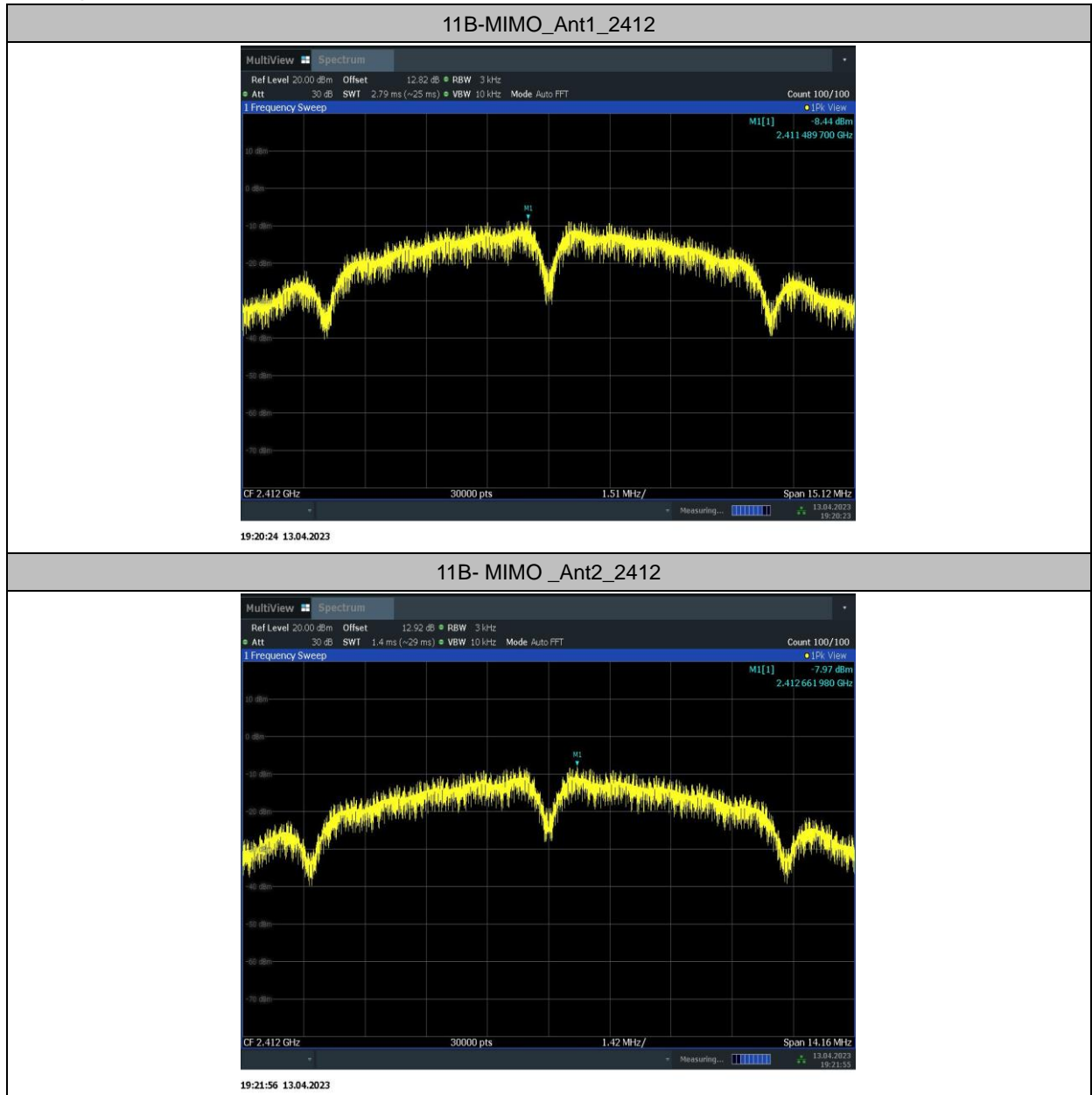
Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

Measurement Results:

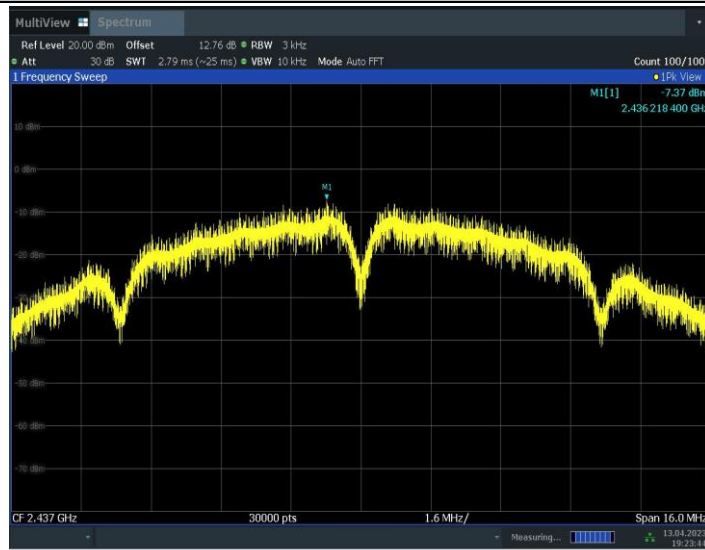
Test Mode	Antenna	Fre [MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B-MIMO	Ant5	2412	-8.44	≤8.00	PASS
	Ant6	2412	-7.97	≤8.00	PASS
	total	2412	-5.19	≤8.00	PASS
	Ant5	2437	-7.37	≤8.00	PASS
	Ant6	2437	-7.65	≤8.00	PASS
	total	2437	-4.50	≤8.00	PASS
	Ant5	2462	-8.4	≤8.00	PASS
	Ant6	2462	-8.12	≤8.00	PASS
	total	2462	-5.25	≤8.00	PASS
11G-MIMO	Ant5	2412	-11.18	≤8.00	PASS
	Ant6	2412	-10.6	≤8.00	PASS
	total	2412	-7.87	≤8.00	PASS
	Ant5	2437	-10.52	≤8.00	PASS
	Ant6	2437	-10.71	≤8.00	PASS
	total	2437	-7.60	≤8.00	PASS
	Ant5	2462	-10.62	≤8.00	PASS
	Ant6	2462	-11.81	≤8.00	PASS
	total	2462	-8.16	≤8.00	PASS
11BE20MIMO	Ant5	2412	-9.54	≤8.00	PASS
	Ant6	2412	-10.08	≤8.00	PASS
	total	2412	-6.79	≤8.00	PASS
	Ant5	2437	-10.27	≤8.00	PASS
	Ant6	2437	-9.69	≤8.00	PASS
	total	2437	-6.96	≤8.00	PASS
	Ant5	2462	-9.11	≤8.00	PASS

	Ant6	2462	-10.1	≤8.00	PASS
	total	2462	-6.57	≤8.00	PASS
11BE40MIMO	Ant5	2422	-15.97	≤8.00	PASS
	Ant6	2422	-15.99	≤8.00	PASS
	total	2422	-12.97	≤8.00	PASS
	Ant5	2437	-13.81	≤8.00	PASS
	Ant6	2437	-13.76	≤8.00	PASS
	total	2437	-10.77	≤8.00	PASS
	Ant5	2452	-17.83	≤8.00	PASS
	Ant6	2452	-17.74	≤8.00	PASS
total	2452	-14.77	≤8.00	PASS	

Test graphs as below:

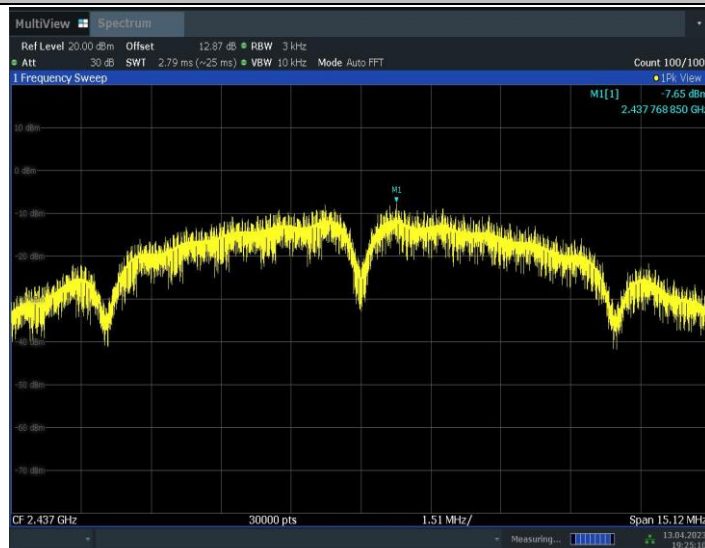


11B- MIMO_Ant1_2437



19:23:44 13.04.2023

11B- MIMO_Ant2_2437



19:25:11 13.04.2023

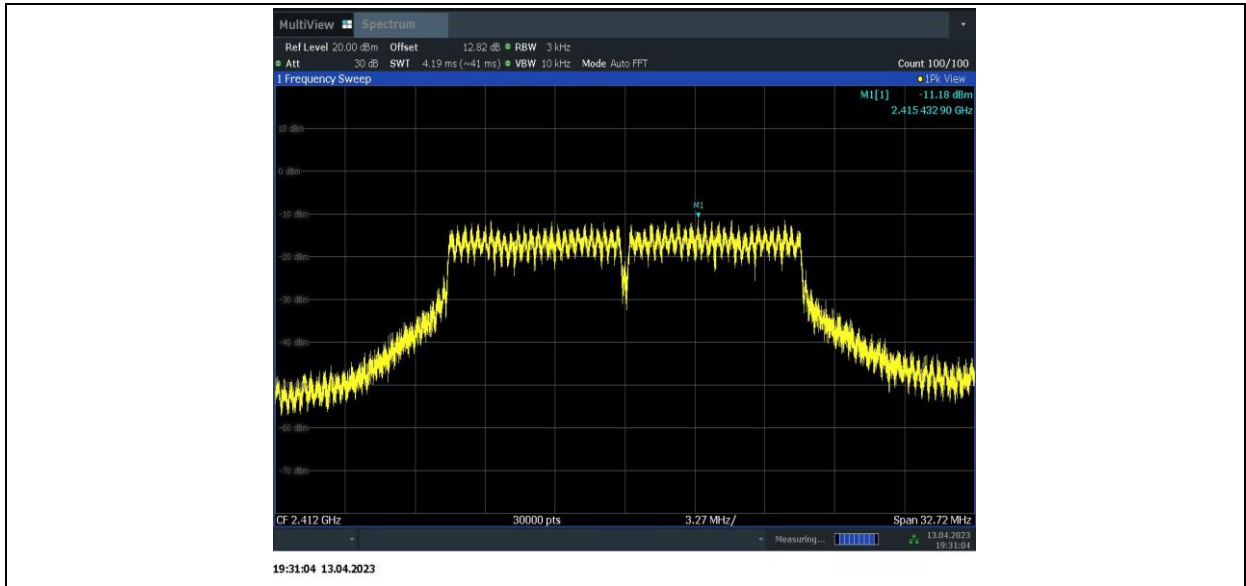
11B- MIMO_Ant1_2462



11B- MIMO_Ant2_2462



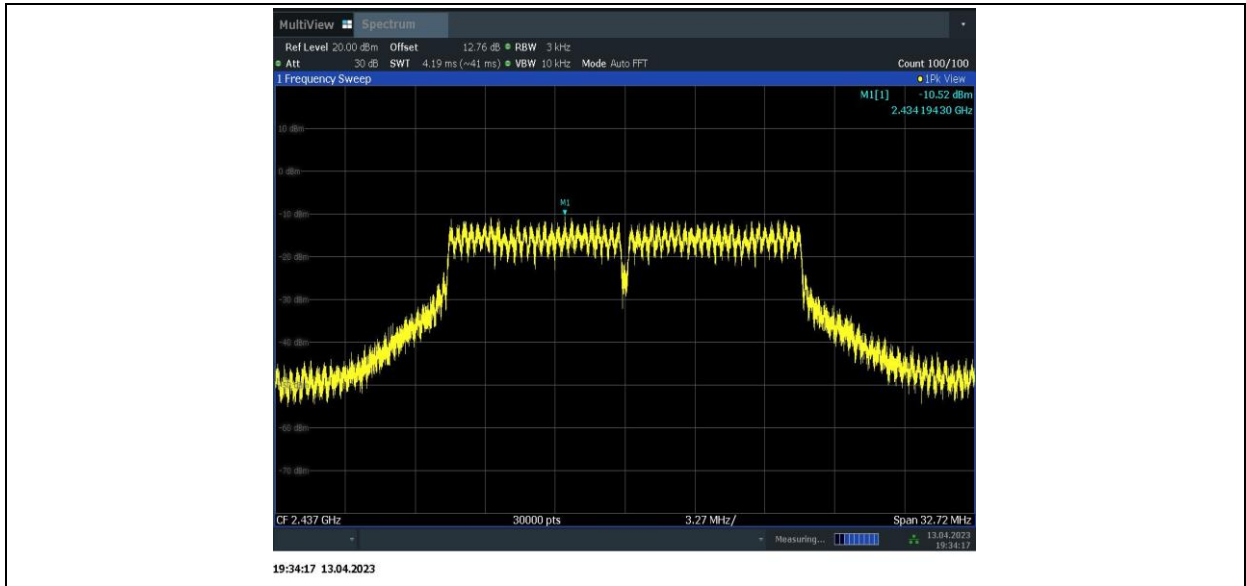
11G- MIMO_Ant1_2412



11G- MIMO_Ant2_2412



11G- MIMO_Ant1_2437



11G- MIMO_Ant2_2437



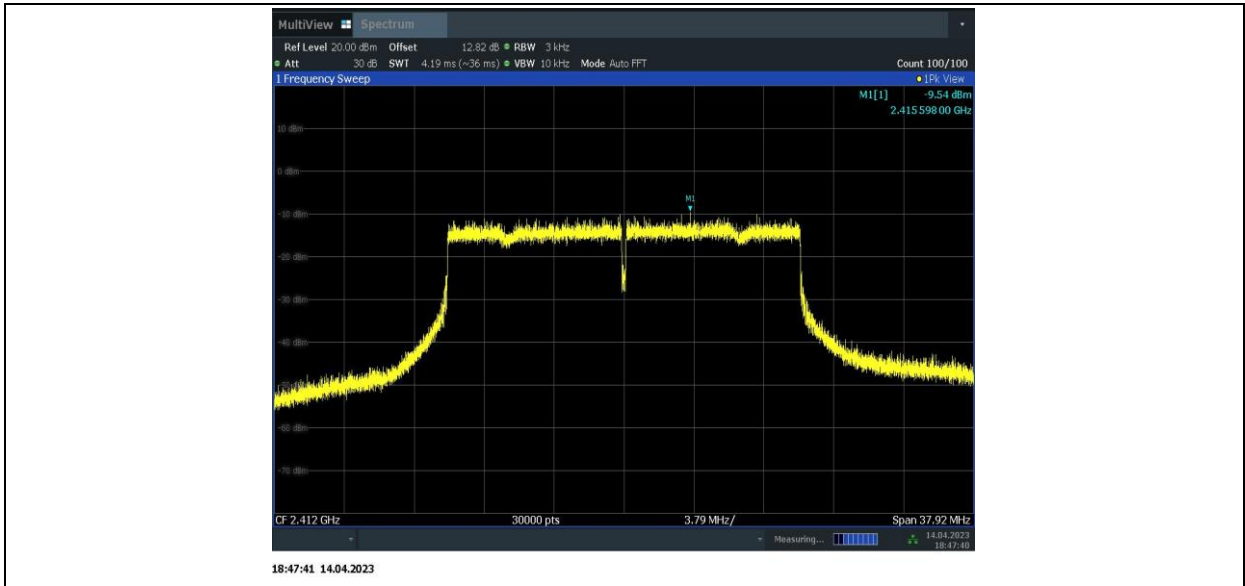
11G- MIMO_Ant1_2462



11G- MIMO_Ant2_2462



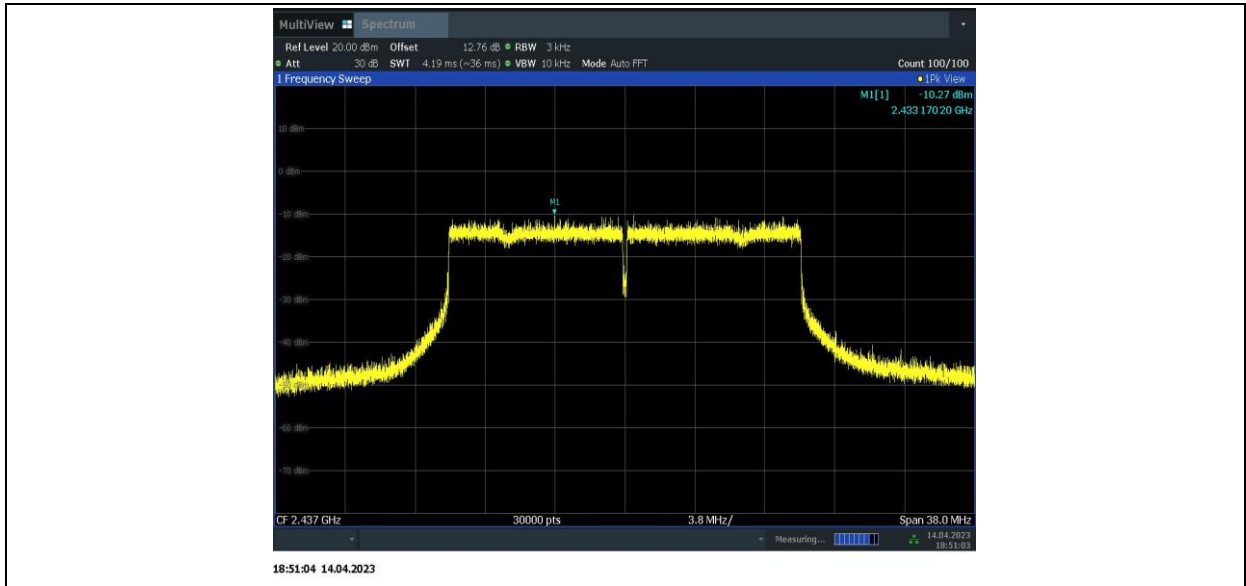
11BE20MIMO_Ant1_2412



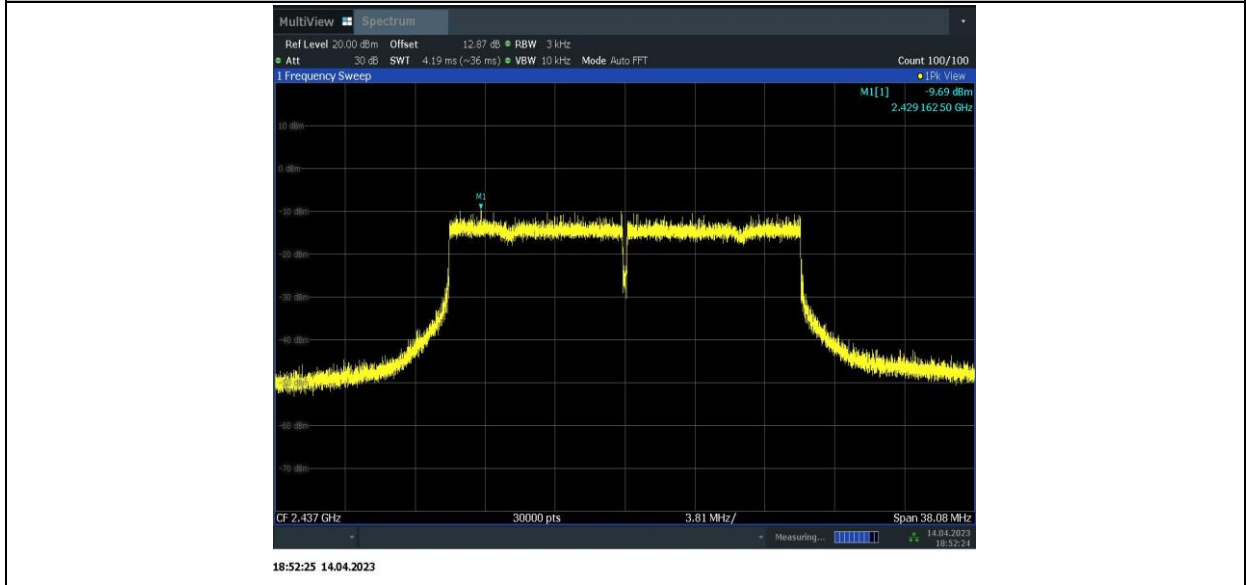
11BE20MIMO_Ant2_2412



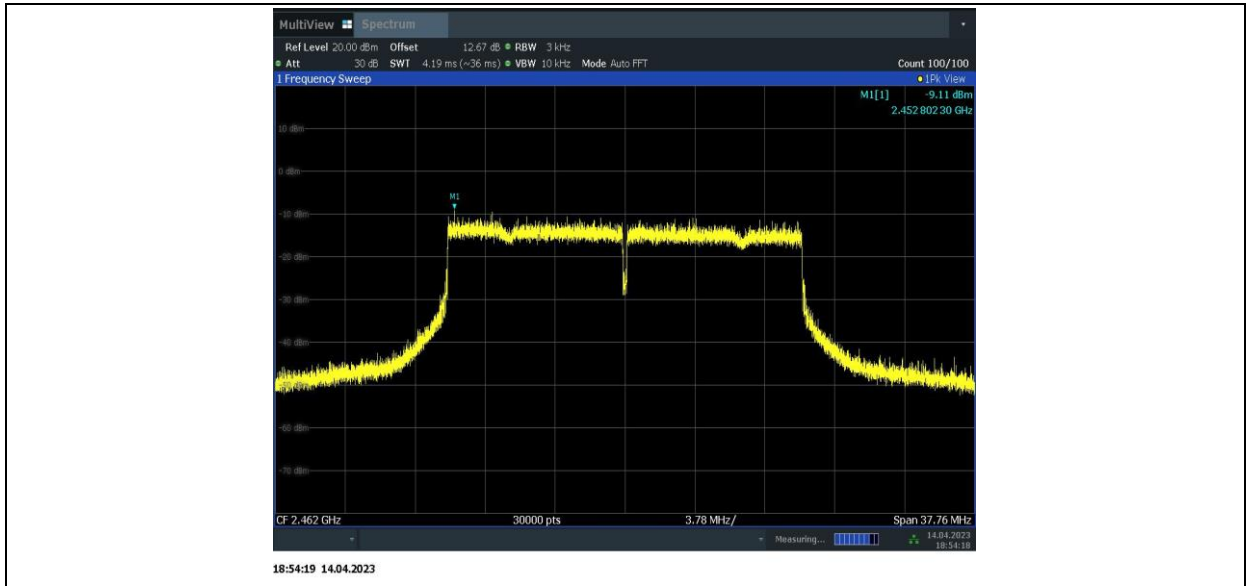
11BE20MIMO_Ant1_2437



11BE20MIMO_Ant2_2437



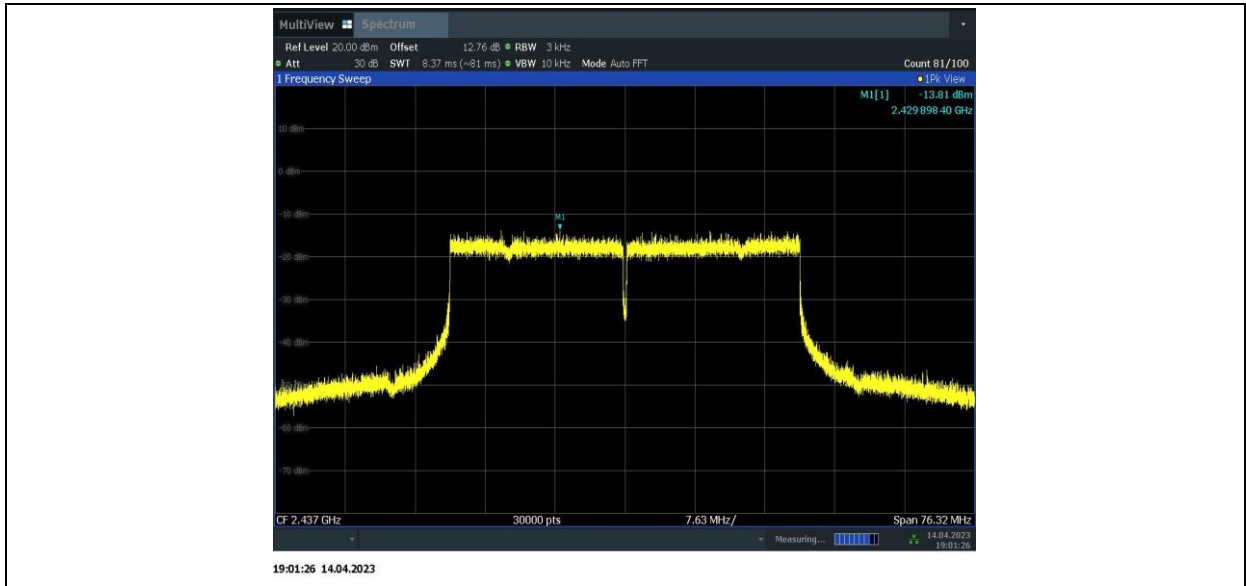
11BE20MIMO_Ant1_2462



11BE20MIMO_Ant2_2462



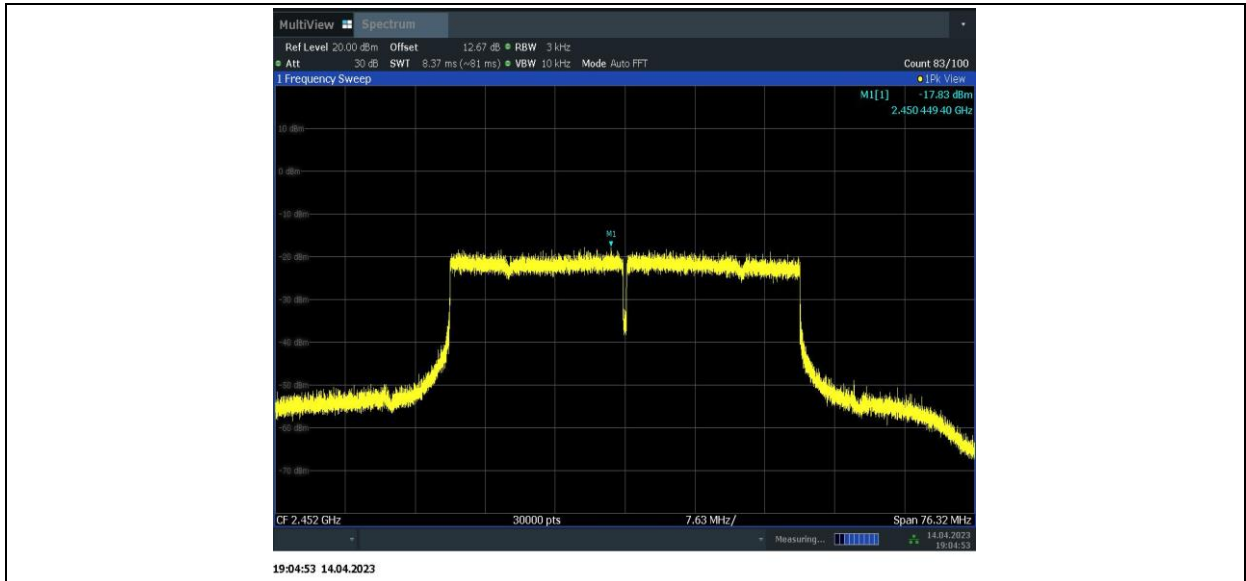
11BE40MIMO_Ant1_2422



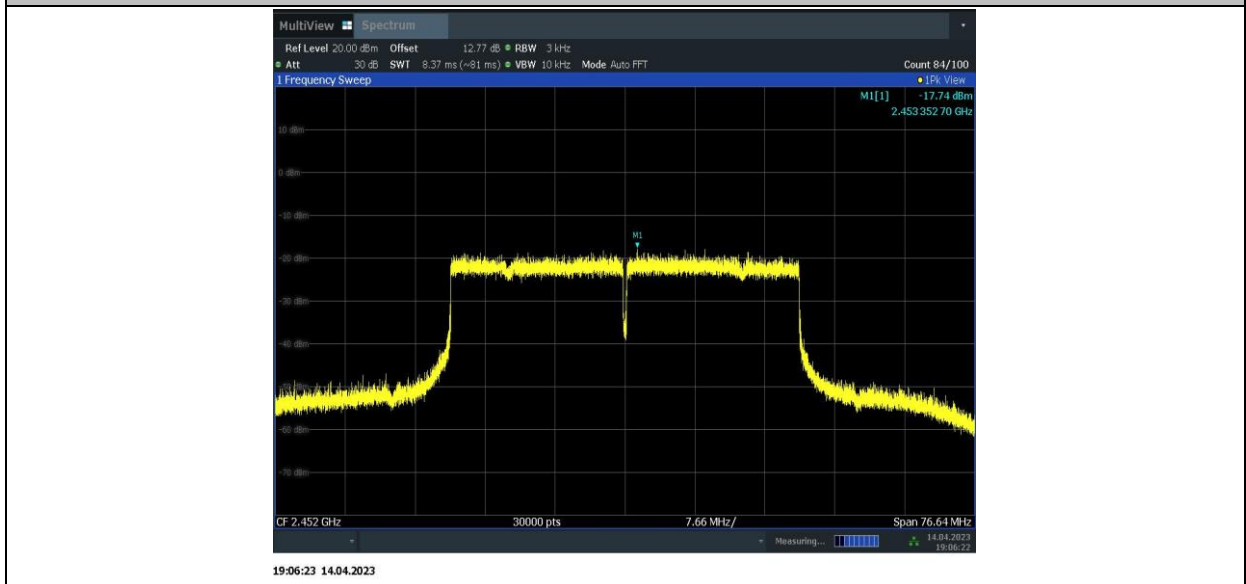
11BE40MIMO_Ant2_2437



11BE40MIMO_Ant1_2452



11BE40MIMO_Ant2_2452

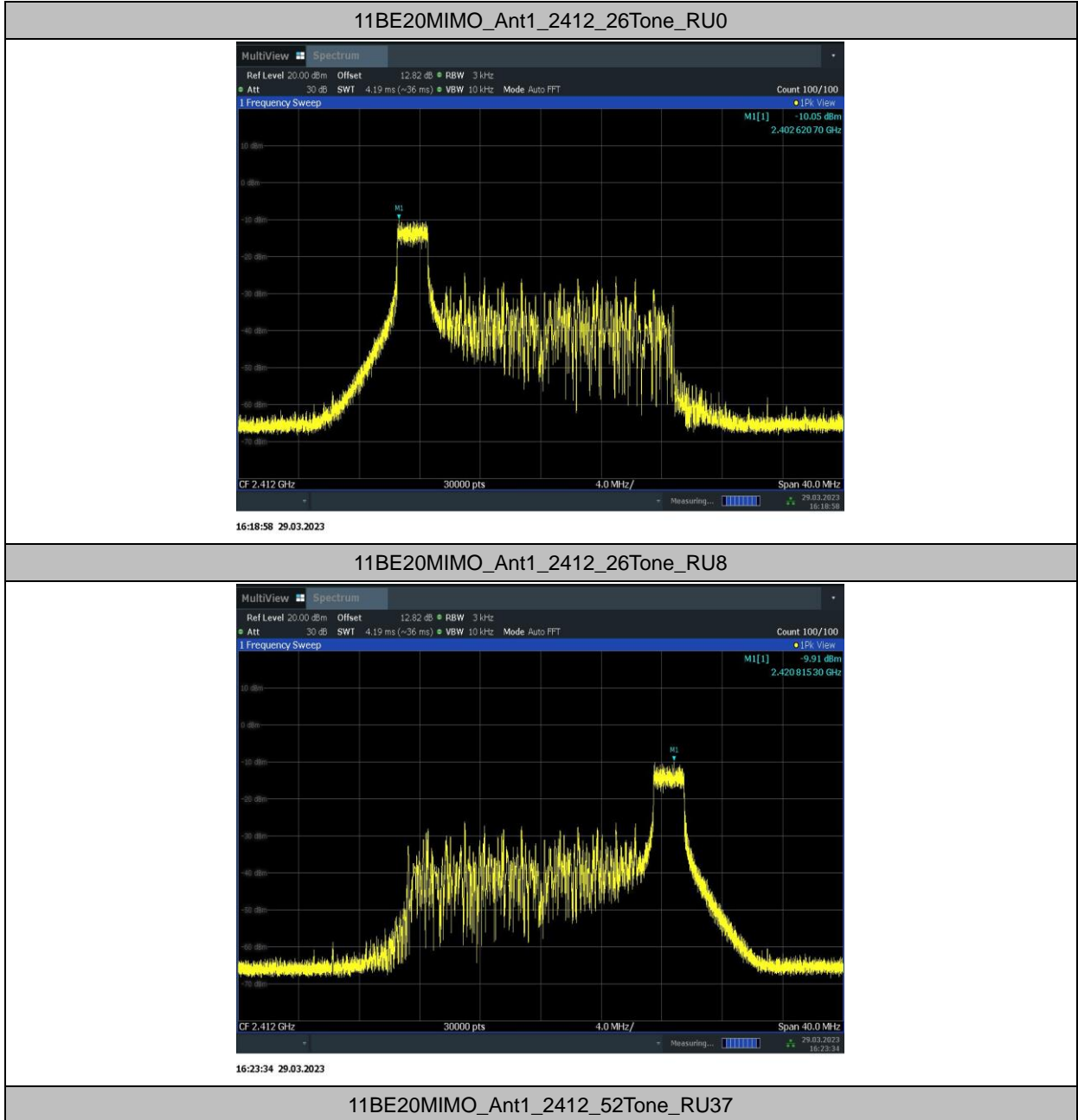

RU mode

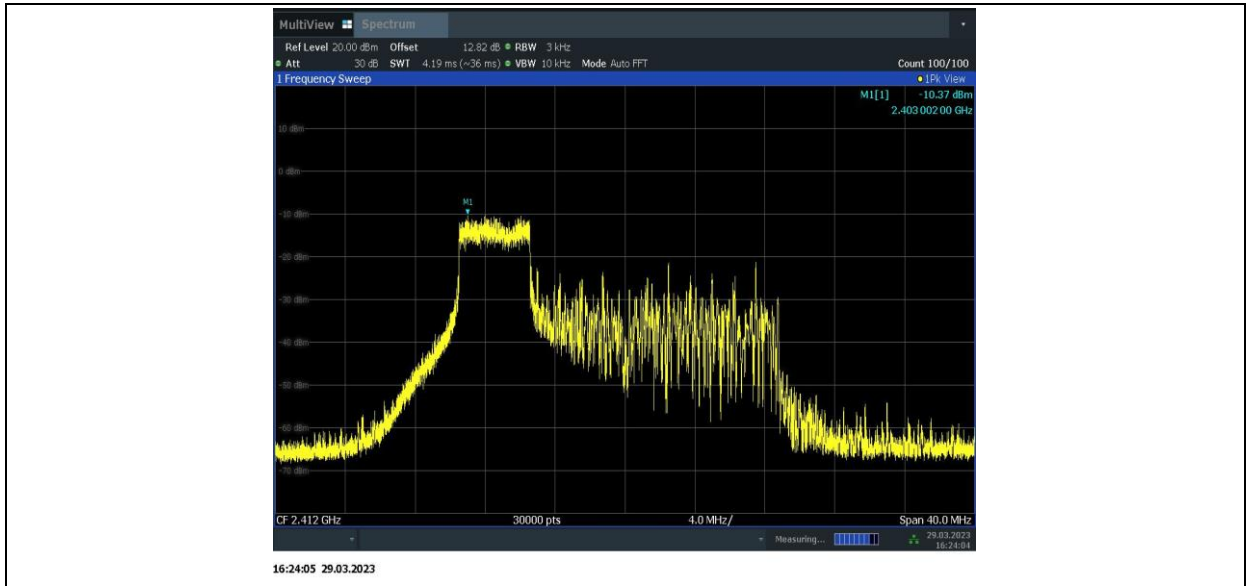
Test Mode	Antenna	Frequency[MHz]	RuSize	RuIndex	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11BE20MIMO	Ant1	2412	26Tone	RU0	-10.05	≤8.00	PASS
				RU8	-9.91	≤8.00	PASS
			52Tone	RU37	-10.37	≤8.00	PASS
				RU40	-10.26	≤8.00	PASS
	Ant2	2412	106Tone	RU53	-8.7	≤8.00	PASS
				RU54	-9.03	≤8.00	PASS
			26Tone	RU0	-10.6	≤8.00	PASS
				RU8	-10.55	≤8.00	PASS
			52Tone	RU37	-10.33	≤8.00	PASS

			106Tone	RU40	-10.26	≤ 8.00	PASS
				RU53	-9.65	≤ 8.00	PASS
				RU54	-9.55	≤ 8.00	PASS
	total	2412	26Tone	RU0	-7.31	≤ 8.00	PASS
				RU8	-7.21	≤ 8.00	PASS
			52Tone	RU37	-7.34	≤ 8.00	PASS
				RU40	-7.25	≤ 8.00	PASS
			106Tone	RU53	-6.14	≤ 8.00	PASS
				RU54	-6.27	≤ 8.00	PASS
	Ant1	2437	26Tone	RU0	-9.95	≤ 8.00	PASS
				RU8	-9.99	≤ 8.00	PASS
			52Tone	RU37	-9.22	≤ 8.00	PASS
				RU40	-9.65	≤ 8.00	PASS
			106Tone	RU53	-8.87	≤ 8.00	PASS
				RU54	-9.81	≤ 8.00	PASS
	Ant2	2437	26Tone	RU0	-10.47	≤ 8.00	PASS
				RU8	-10.41	≤ 8.00	PASS
			52Tone	RU37	-9.56	≤ 8.00	PASS
				RU40	-10.22	≤ 8.00	PASS
			106Tone	RU53	-9.85	≤ 8.00	PASS
				RU54	-10.35	≤ 8.00	PASS
	total	2437	26Tone	RU0	-7.19	≤ 8.00	PASS
				RU8	-7.18	≤ 8.00	PASS
			52Tone	RU37	-6.38	≤ 8.00	PASS
RU40				-6.92	≤ 8.00	PASS	
106Tone			RU53	-6.32	≤ 8.00	PASS	
			RU54	-7.06	≤ 8.00	PASS	
Ant1	2462	26Tone	RU0	-9.52	≤ 8.00	PASS	
			RU8	-10.28	≤ 8.00	PASS	
		52Tone	RU37	-9.67	≤ 8.00	PASS	
			RU40	-9.86	≤ 8.00	PASS	
		106Tone	RU53	-8.68	≤ 8.00	PASS	
			RU54	-9.91	≤ 8.00	PASS	
Ant2	2462	26Tone	RU0	-10.57	≤ 8.00	PASS	
			RU8	-10.62	≤ 8.00	PASS	
		52Tone	RU37	-10.19	≤ 8.00	PASS	
			RU40	-10.19	≤ 8.00	PASS	
		106Tone	RU53	-9.61	≤ 8.00	PASS	
			RU54	-10.39	≤ 8.00	PASS	
total	2462	26Tone	RU0	-7.00	≤ 8.00	PASS	
			RU8	-7.44	≤ 8.00	PASS	
		52Tone	RU37	-6.91	≤ 8.00	PASS	

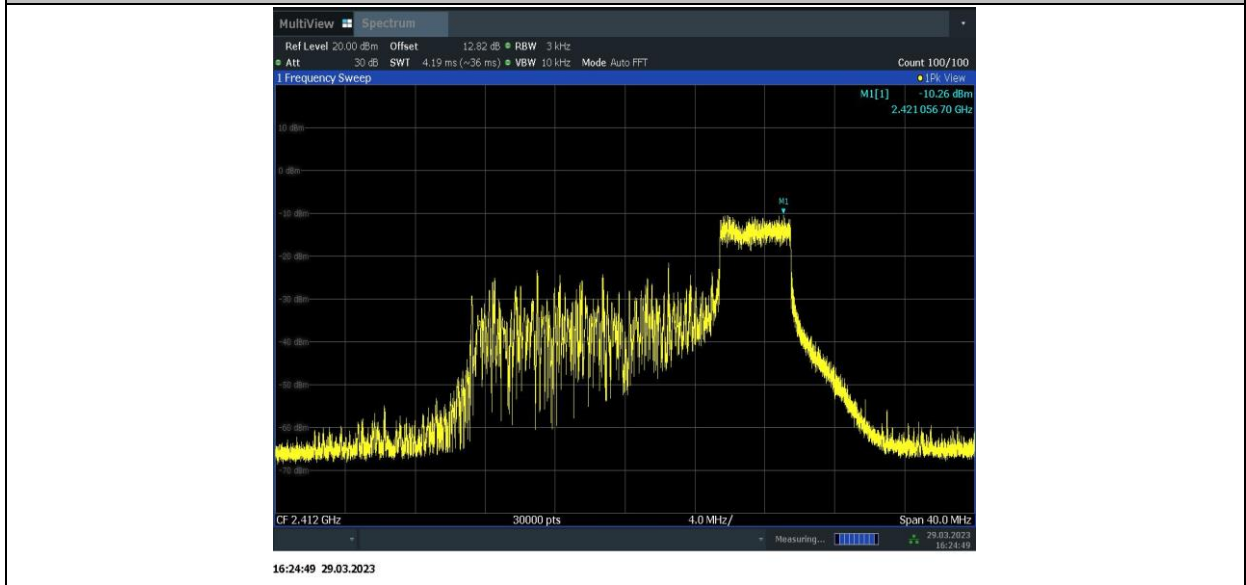
				RU40	-7.01	≤8.00	PASS
			106Tone	RU53	-6.11	≤8.00	PASS
				RU54	-7.13	≤8.00	PASS

Test graphs as below:

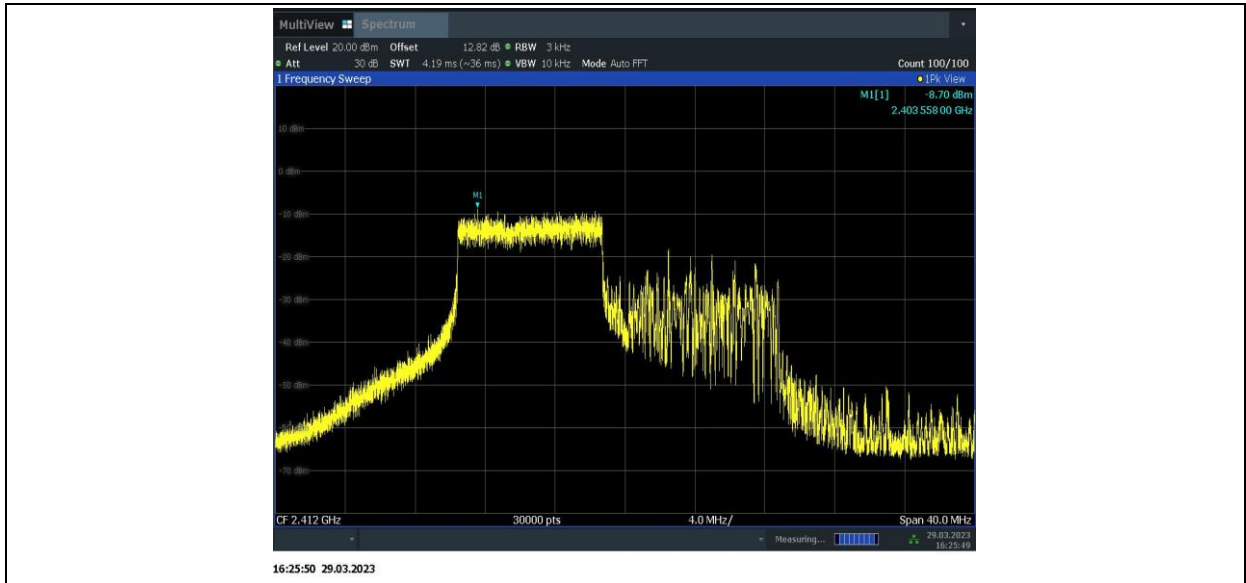




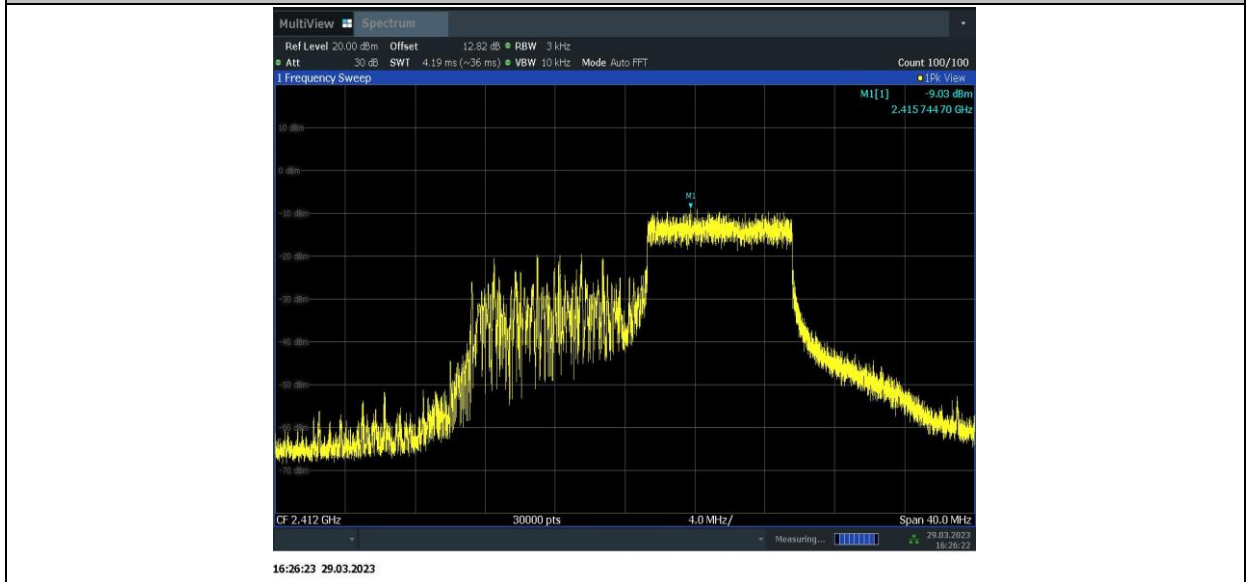
11BE20MIMO_Ant1_2412_52Tone_RU40



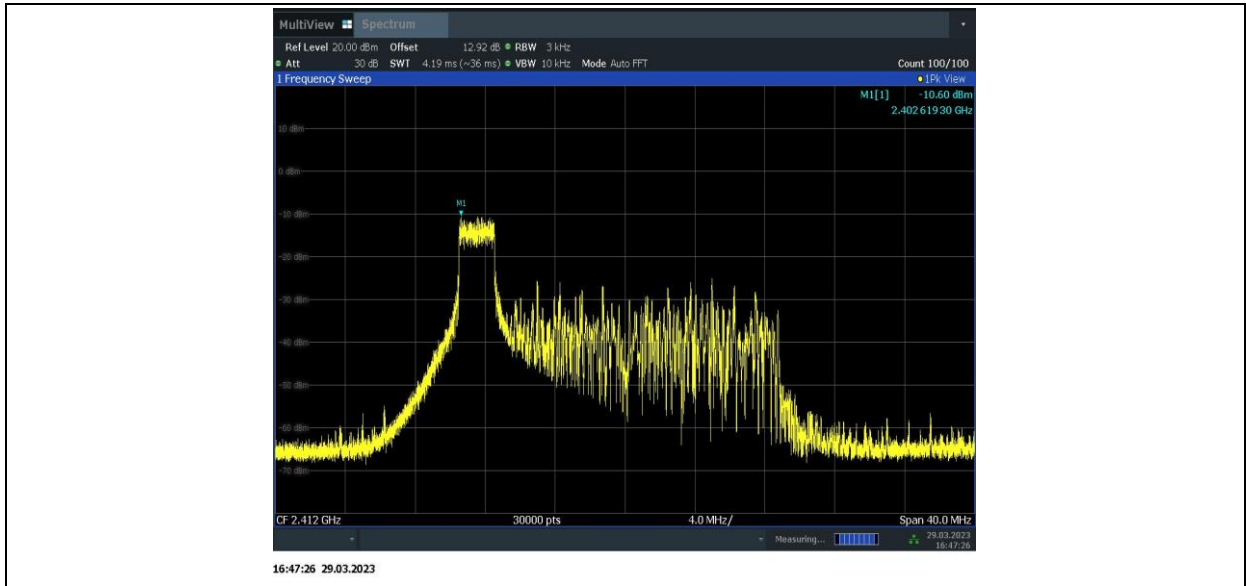
11BE20MIMO_Ant1_2412_106Tone_RU53



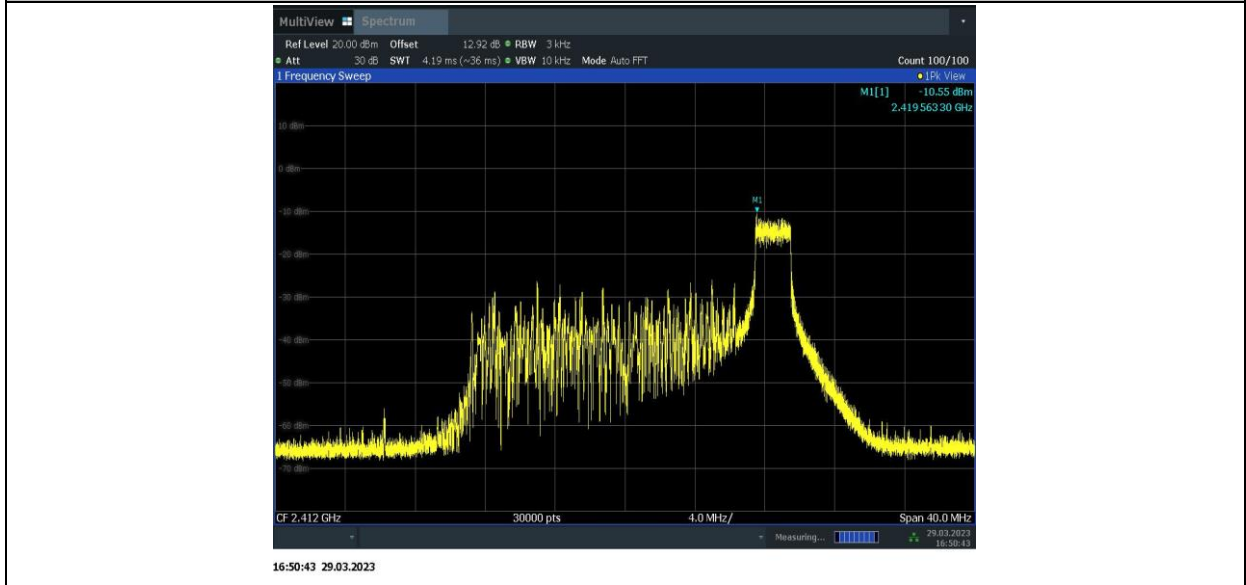
11BE20MIMO_Ant1_2412_106Tone_RU54



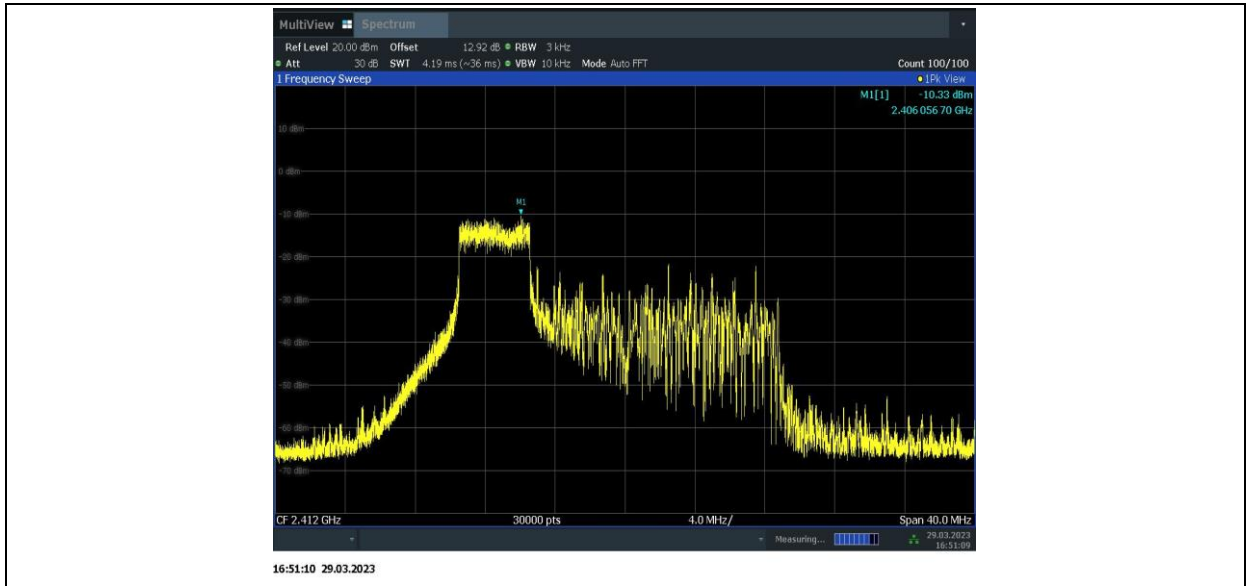
11BE20MIMO_Ant2_2412_26Tone_RU0



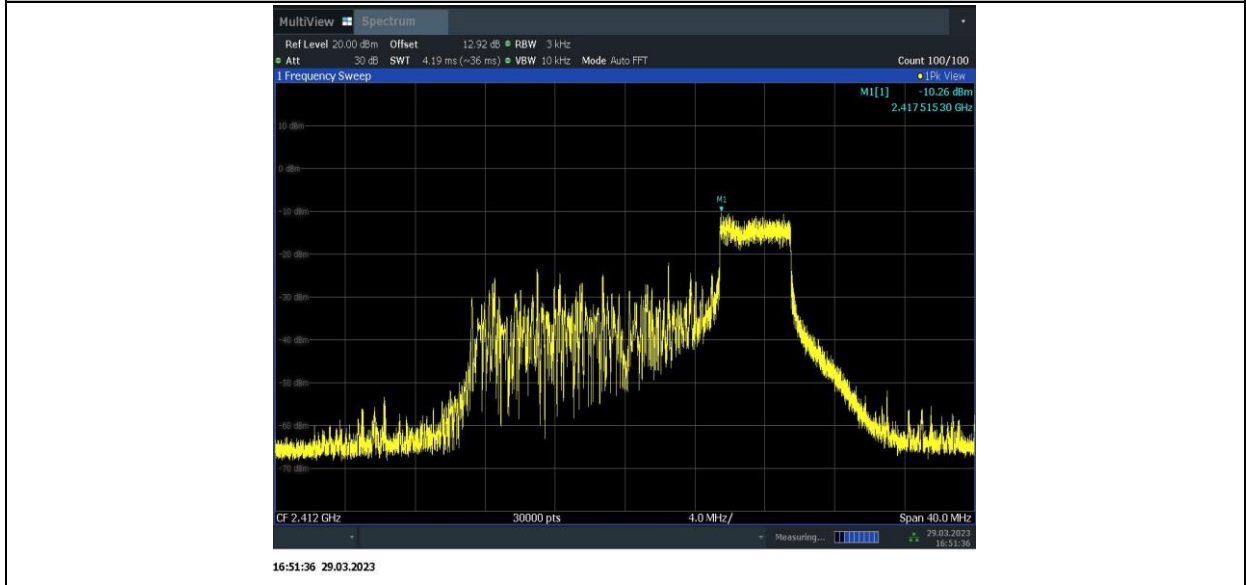
11BE20MIMO_Ant2_2412_26Tone_RU8



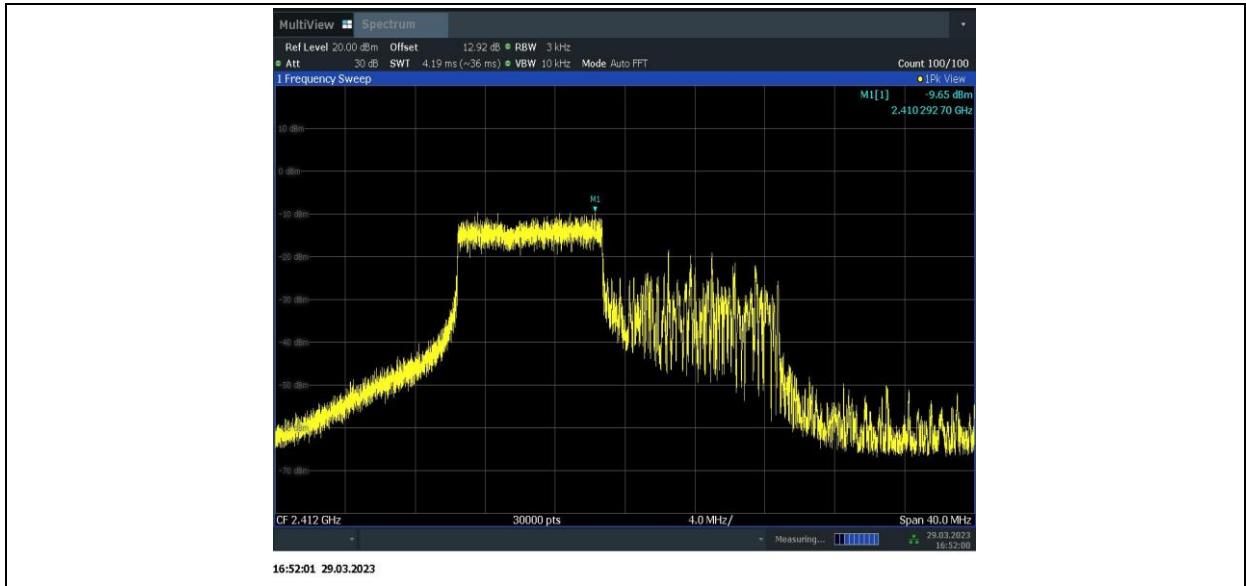
11BE20MIMO_Ant2_2412_52Tone_RU37



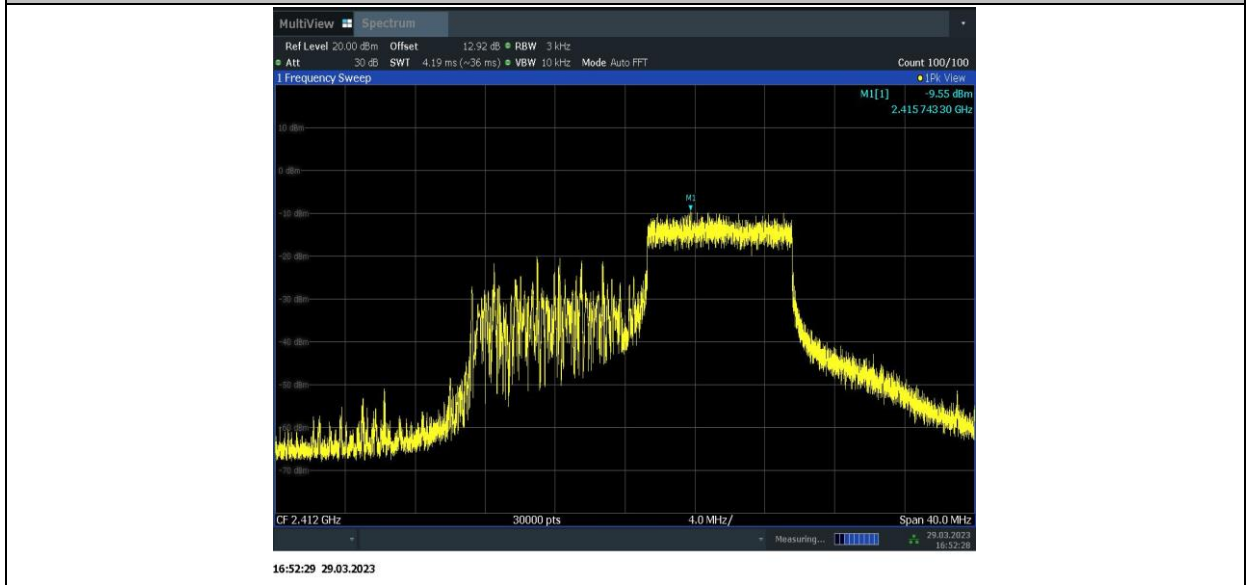
11BE20MIMO_Ant2_2412_52Tone_RU40



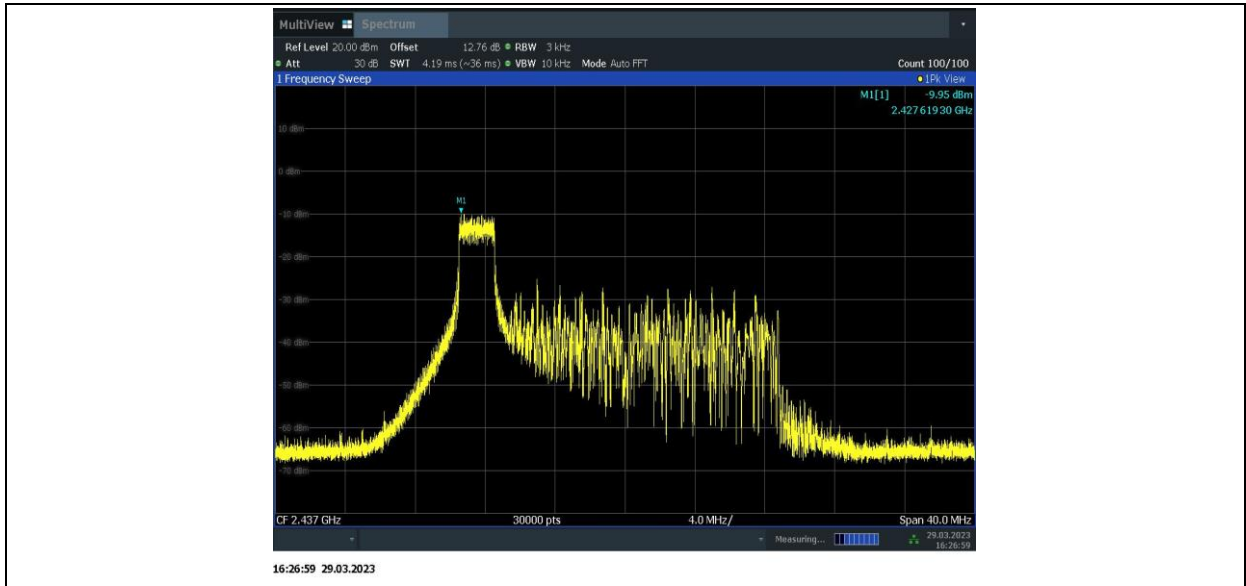
11BE20MIMO_Ant2_2412_106Tone_RU53



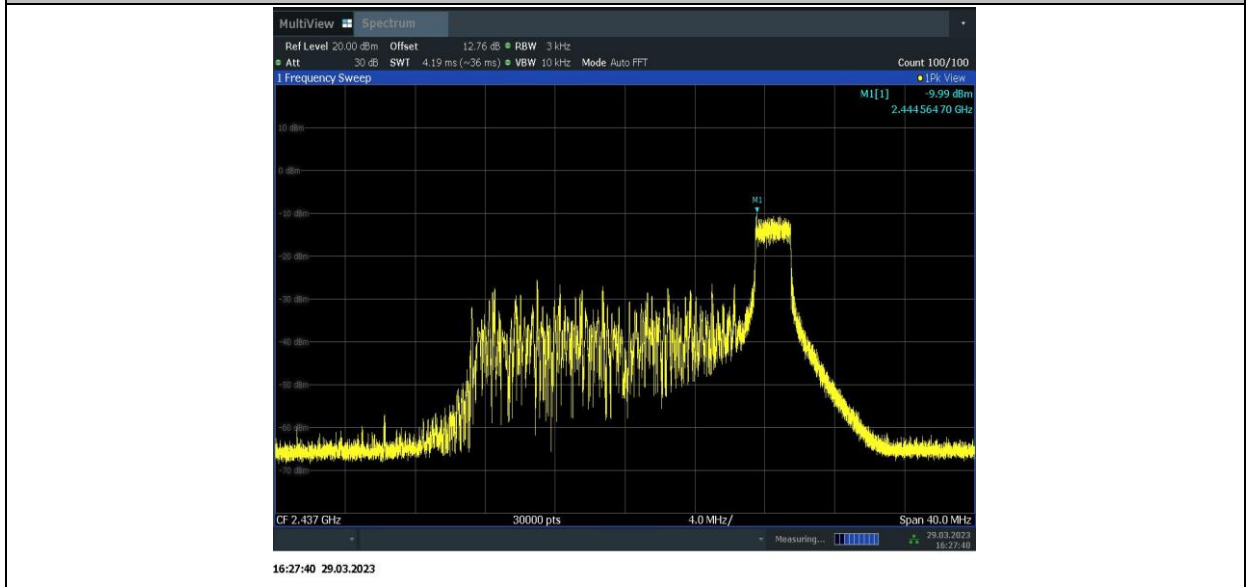
11BE20MIMO_Ant2_2412_106Tone_RU54



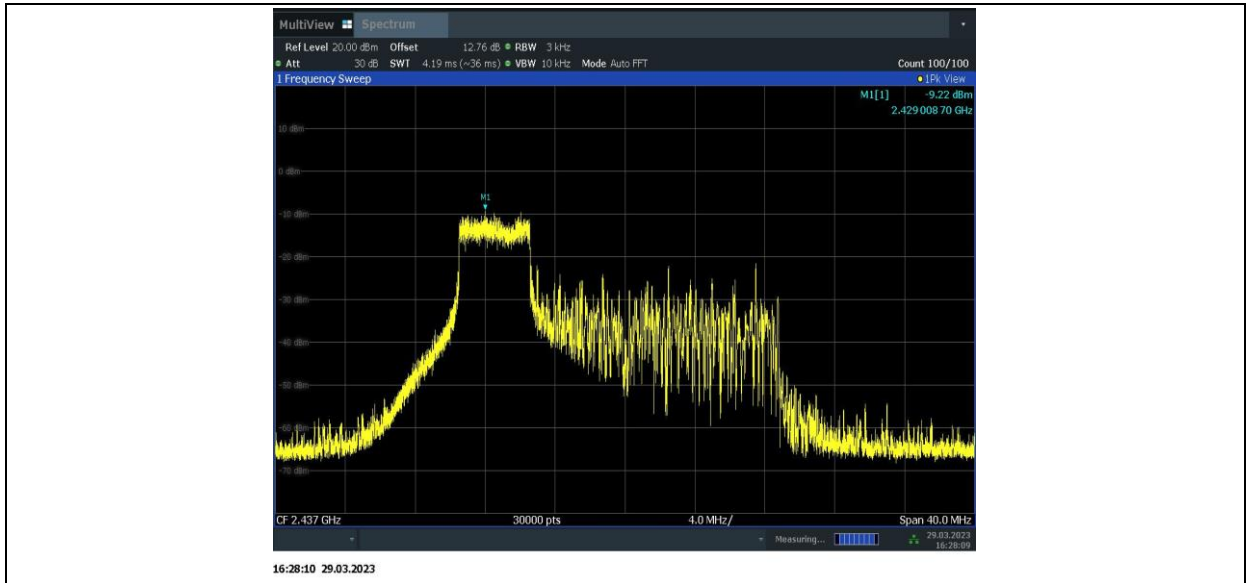
11BE20MIMO_Ant1_2437_26Tone_RU0



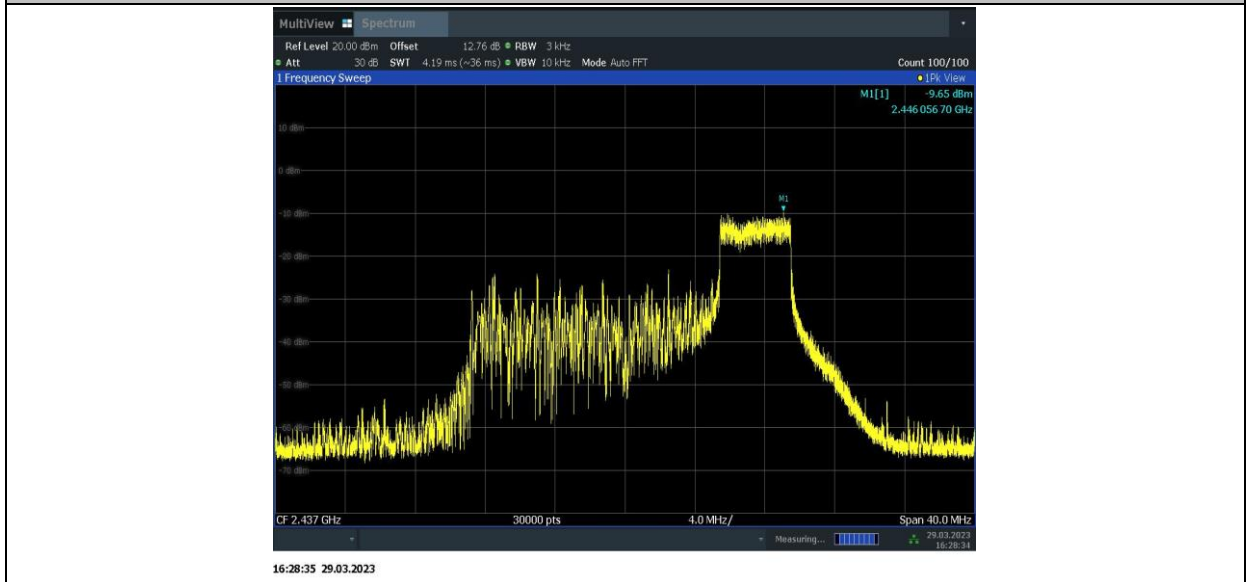
11BE20MIMO_Ant1_2437_26Tone_RU8



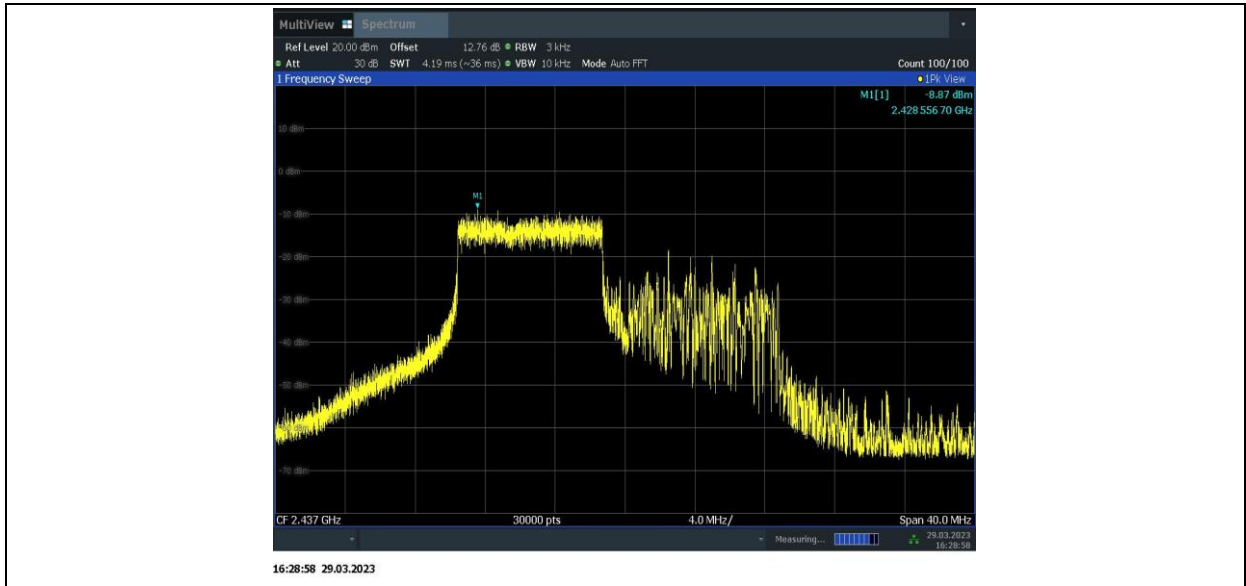
11BE20MIMO_Ant1_2437_52Tone_RU37



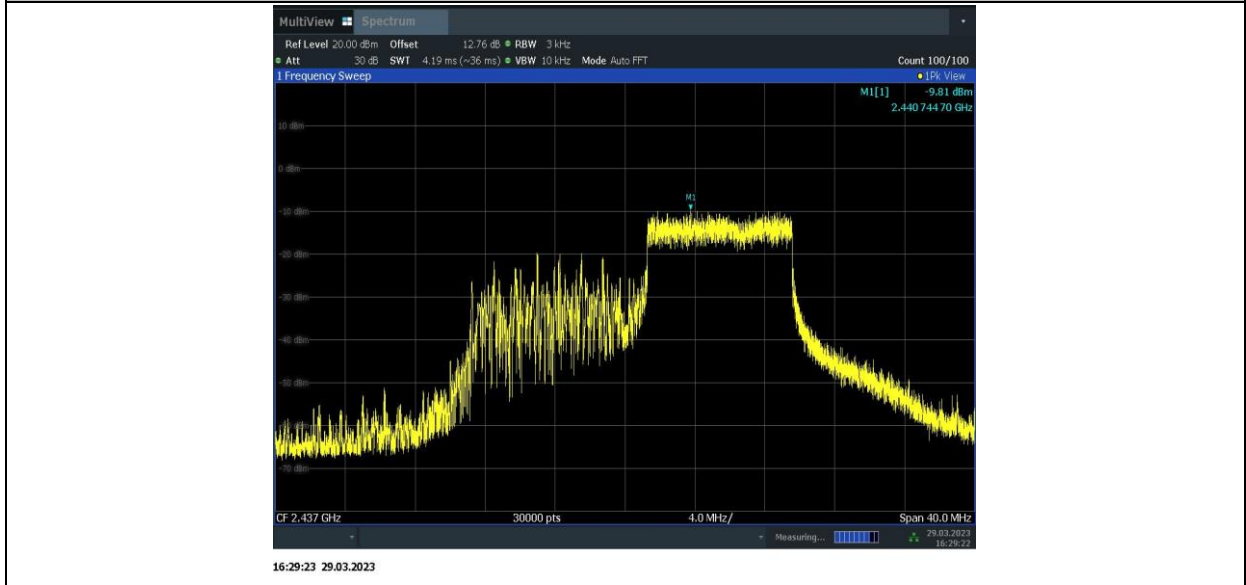
11BE20MIMO_Ant1_2437_52Tone_RU40



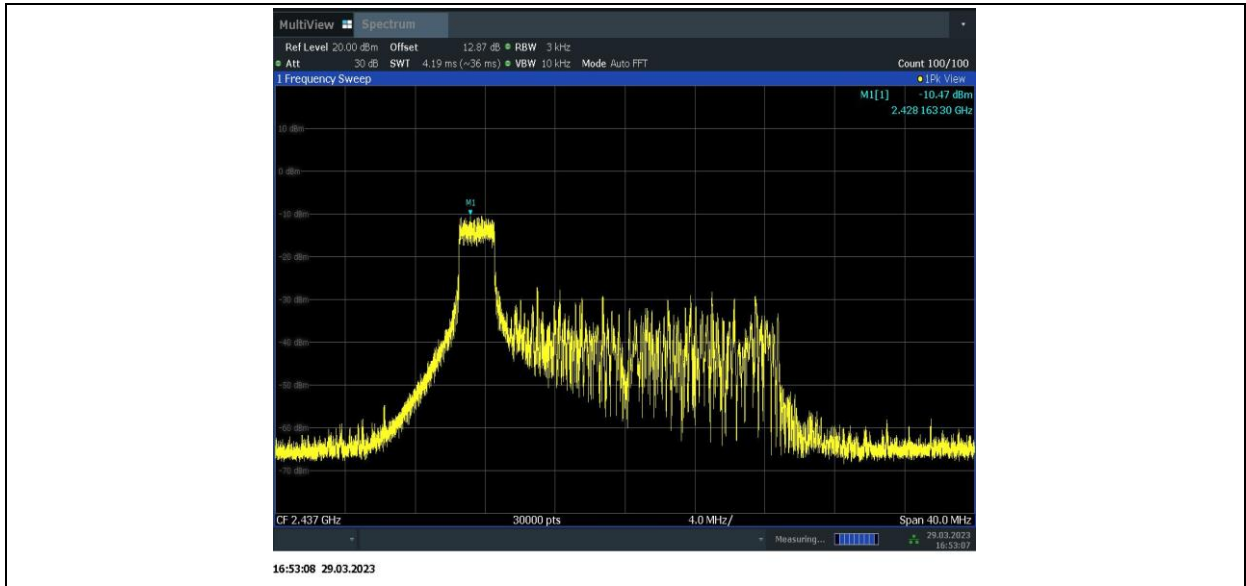
11BE20MIMO_Ant1_2437_106Tone_RU53



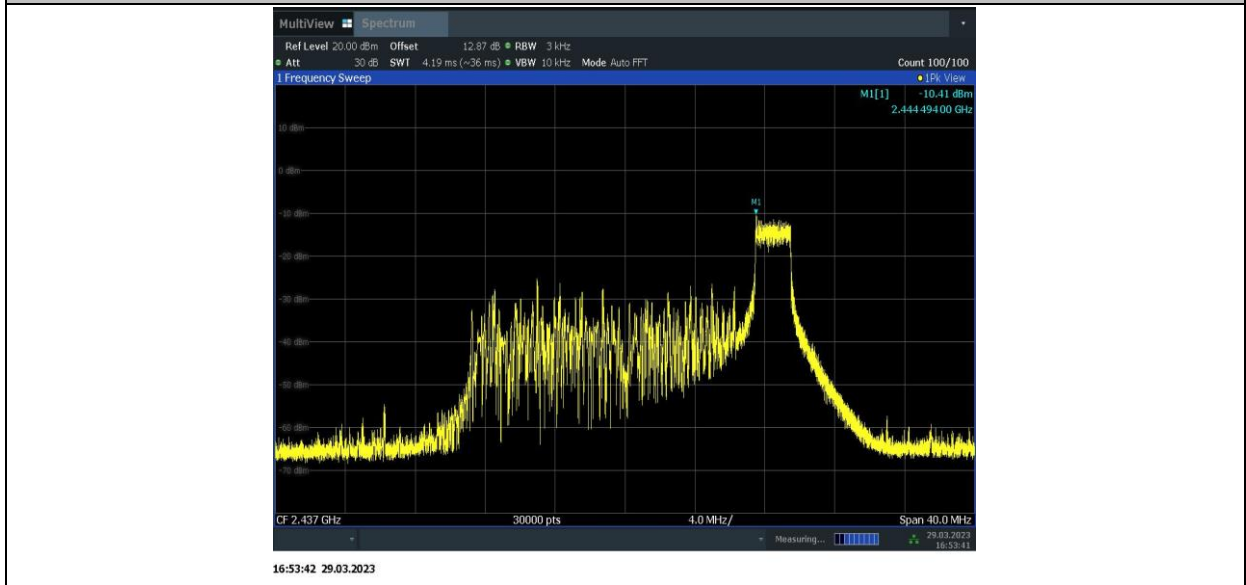
11BE20MIMO_Ant1_2437_106Tone_RU54



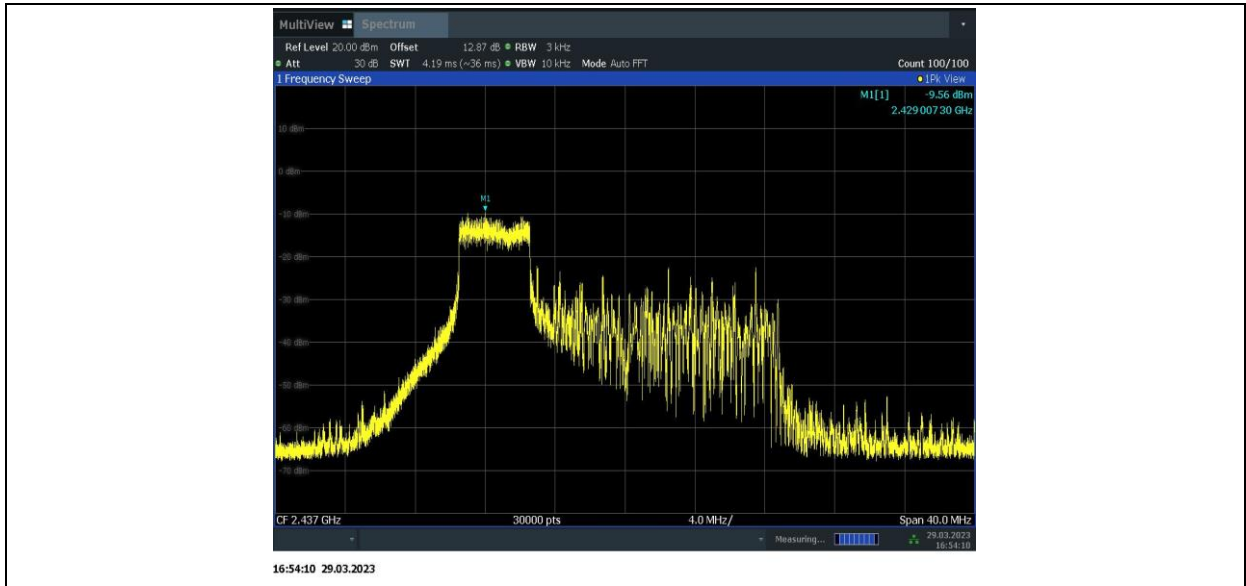
11BE20MIMO_Ant2_2437_26Tone_RU0



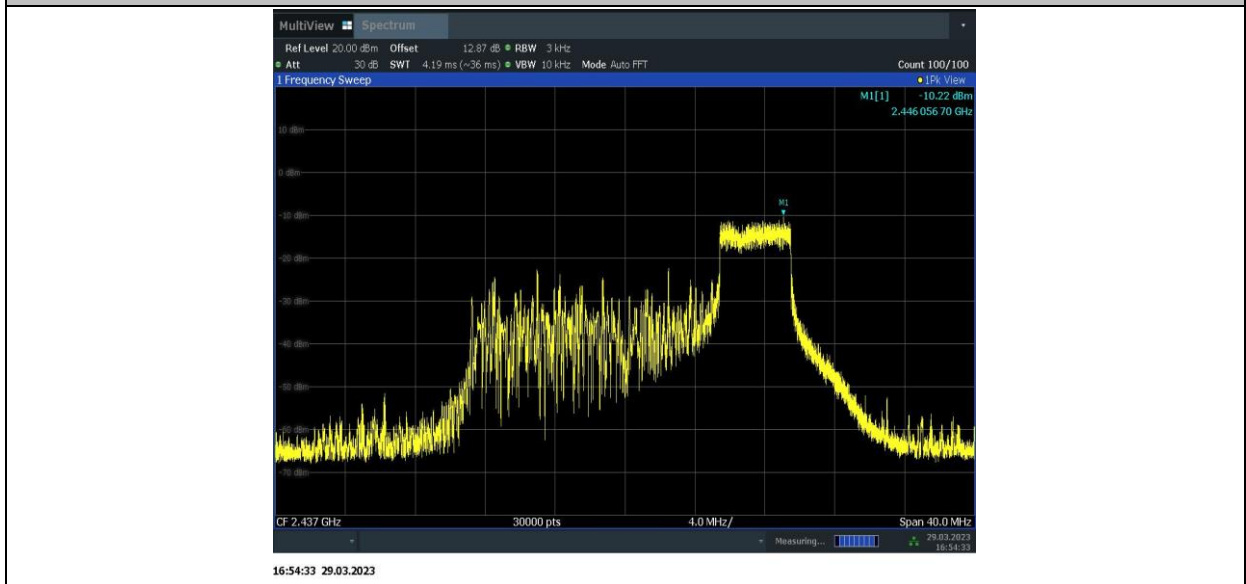
11BE20MIMO_Ant2_2437_26Tone_RU8



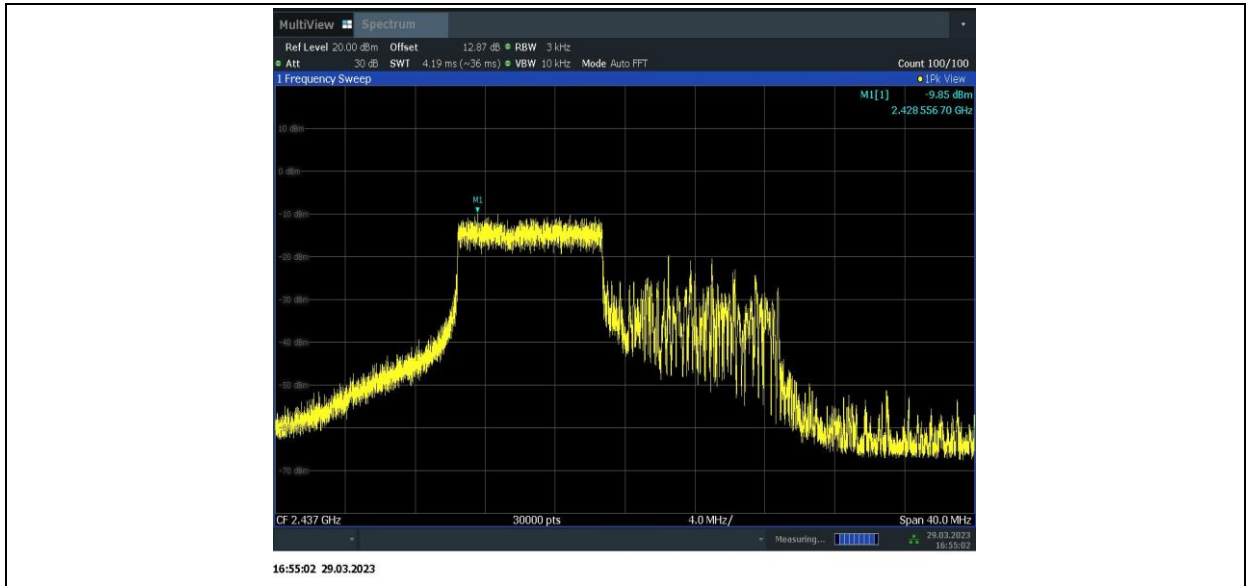
11BE20MIMO_Ant2_2437_52Tone_RU37



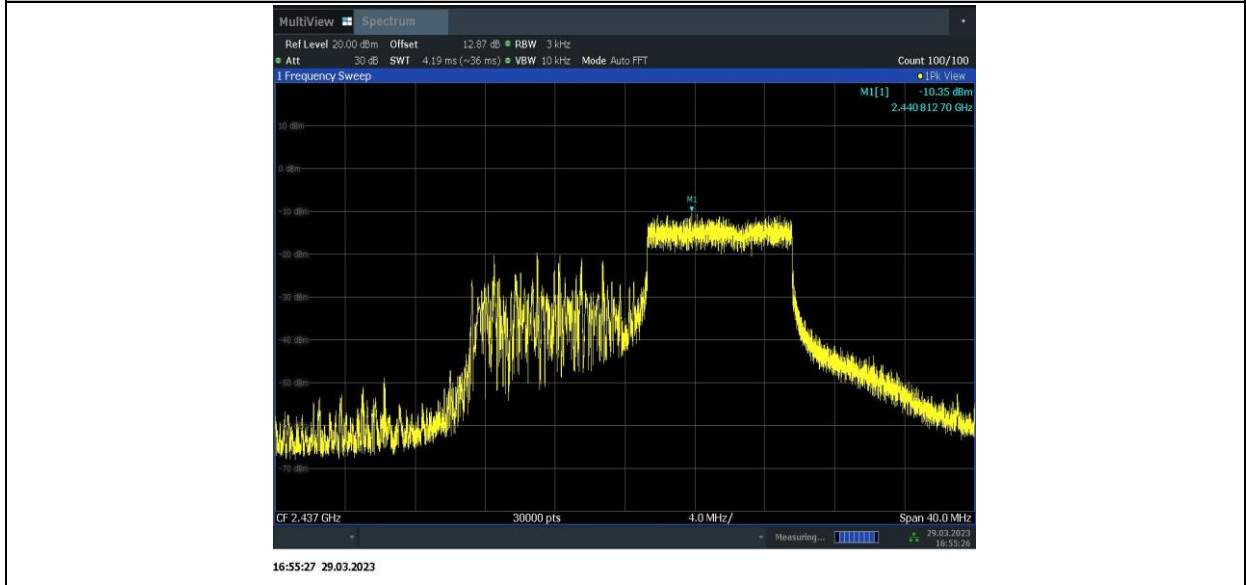
11BE20MIMO_Ant2_2437_52Tone_RU40



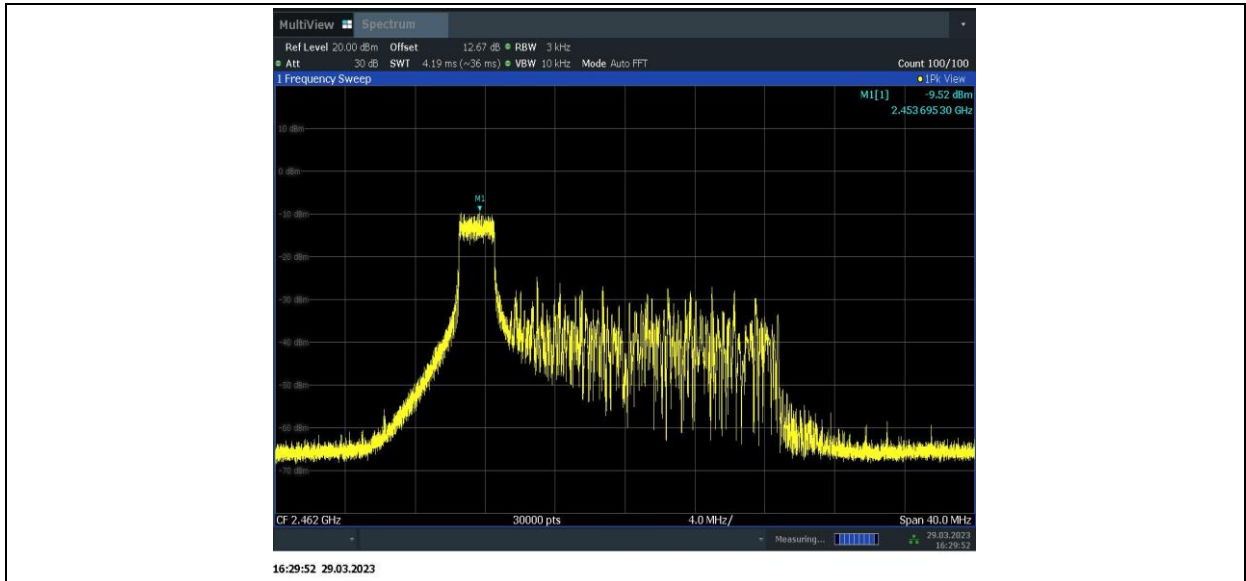
11BE20MIMO_Ant2_2437_106Tone_RU53



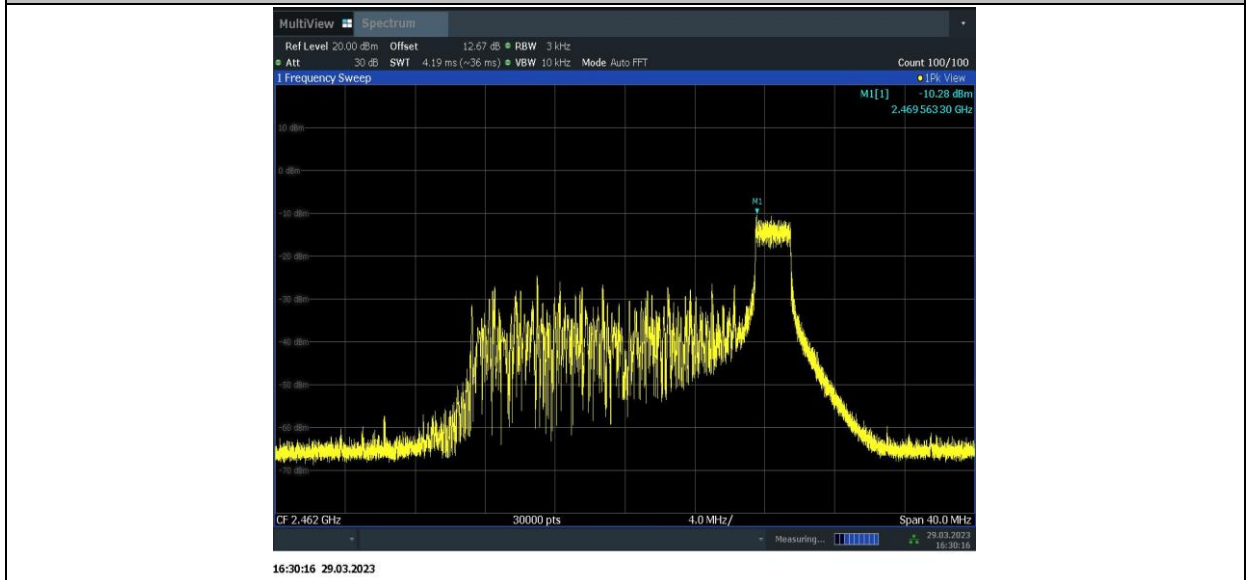
11BE20MIMO_Ant2_2437_106Tone_RU54



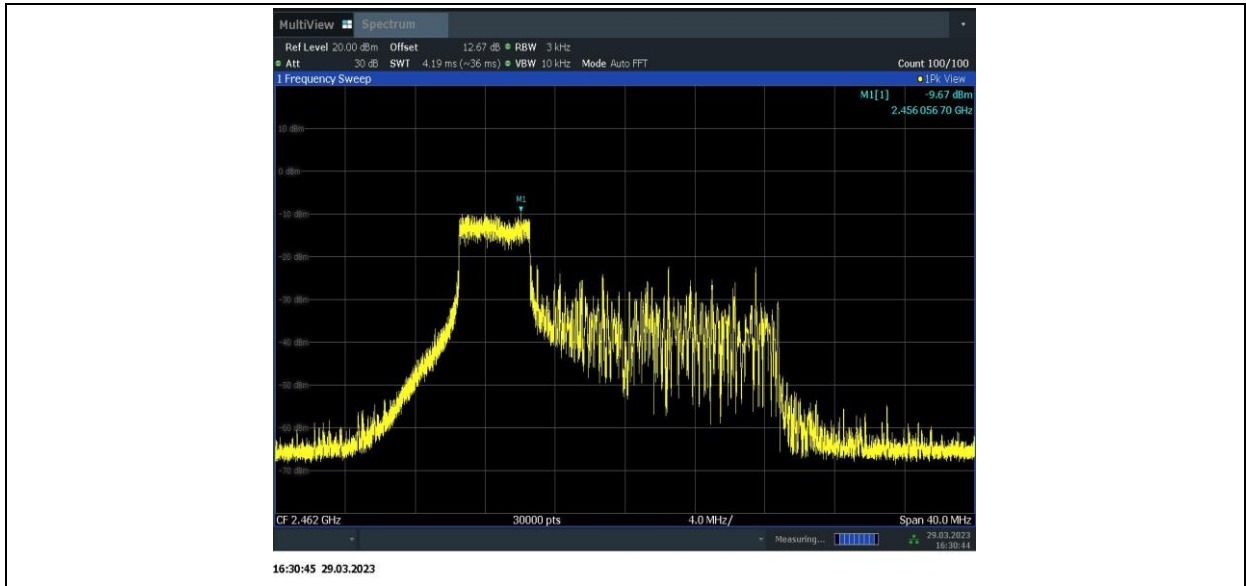
11BE20MIMO_Ant1_2462_26Tone_RU0



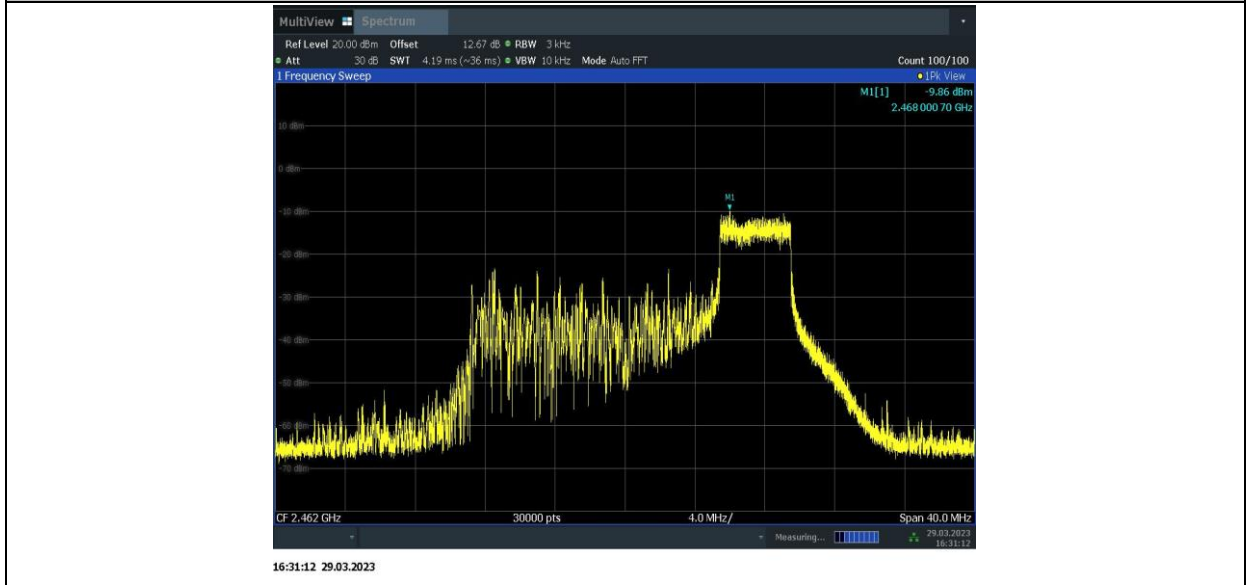
11BE20MIMO_Ant1_2462_26Tone_RU8



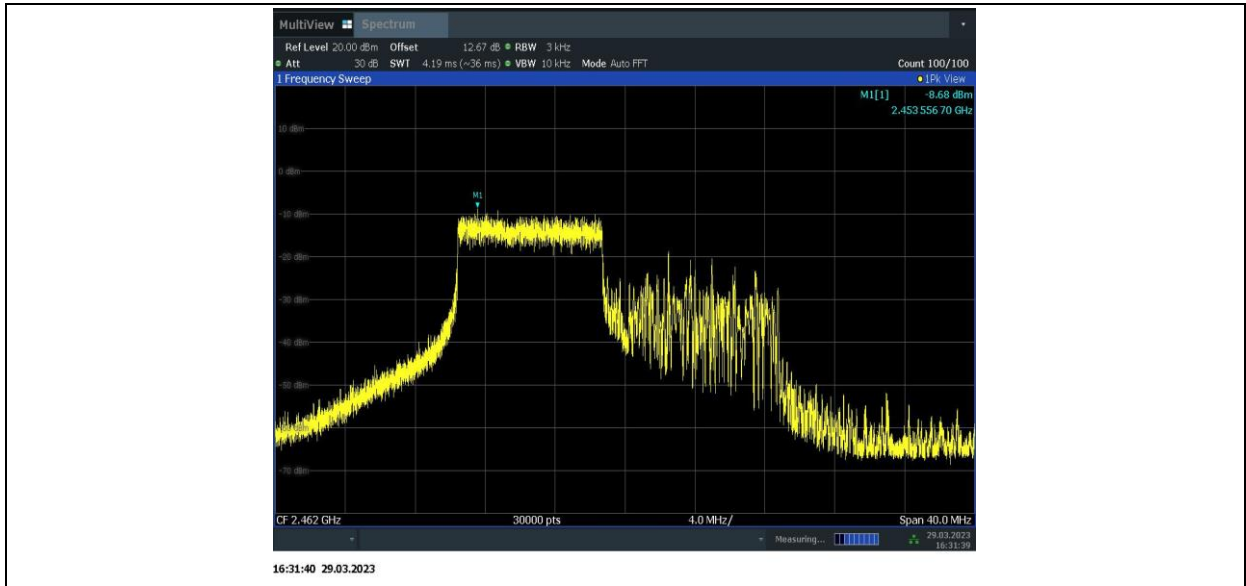
11BE20MIMO_Ant1_2462_52Tone_RU37



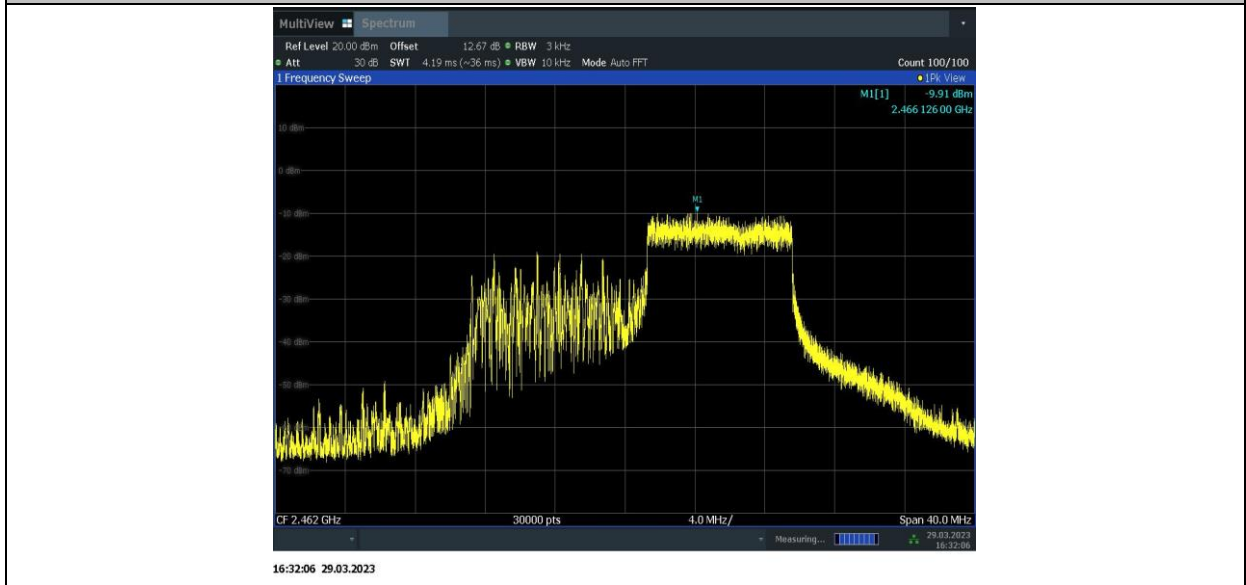
11BE20MIMO_Ant1_2462_52Tone_RU40



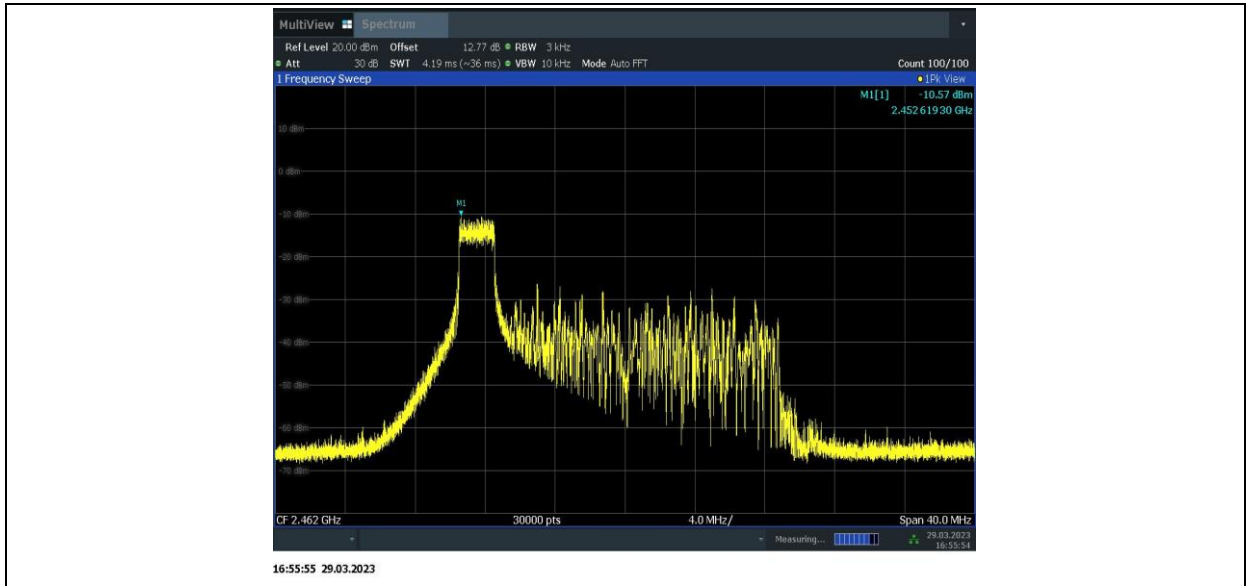
11BE20MIMO_Ant1_2462_106Tone_RU53



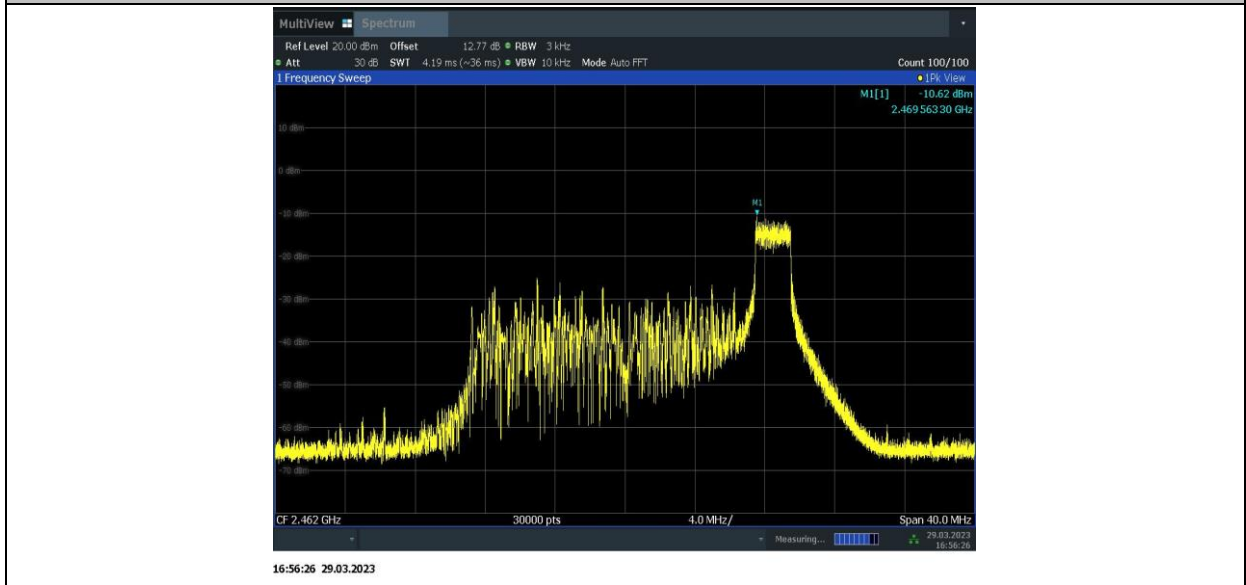
11BE20MIMO_Ant1_2462_106Tone_RU54



11BE20MIMO_Ant2_2462_26Tone_RU0



11BE20MIMO_Ant2_2462_26Tone_RU8



11BE20MIMO_Ant2_2462_52Tone_RU37