FCC AND ISED CERTIFICATION TEST REPORT

Applicant	:	Roadway Smart Technologies Co., Ltd
Address of Applicant	:	Room 1118, Jinao International Apartment, No.19 Madian East Road, Haidian District, Beijing, China
Manufacturer	:	Roadway Smart Technologies Co., Ltd
Address of Manufacturer	:	Room 1118, Jinao International Apartment, No.19 Madian East Road, Haidian District, Beijing, China
Equipment under Test	:	AIoT Edge Controller
Model No.	:	MB41
FCC ID	:	2BECT-MB41
IC	:	31883-MB41
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023, ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)
Report No.	:	DDT-RE23111537-2E09
Issue Date	:	2024/02/06
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd.
Address of Laboratory	:	Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

Table of Contents

Test report declares....4
1. Summary of Test Results.... 6
2. General Test Information 7
2.1. Description of EUT 7
2.2. Accessories of EUT.... 8
2.3. Assistant equipment used for test.... 8
2.4. Block diagram of EUT configuration for test 8
2.5. Deviations of test standard.... 9
2.6. Test environment conditions 9
2.7. Test laboratory 9
2.8. Measurement uncertainty.... 10
3. Equipment Used During Conductive Test.... 11
4. 6dB Bandwidth 12
4.1. Block diagram of test setup.... 12
4.2. Limits 12
4.3. Test procedure 12
4.4. Test result.... 13
4.5. Test graphs 13
5. 99% Bandwidth 22
5.1. Block diagram of test setup.... 22
5.2. Limits 22
5.3. Test procedure 22
5.4. Test result.... 23
5.5. Test graphs 23
6. Conducted Output Power.... 32
6.1. Block diagram of test setup.... 32
6.2. Limits 32
6.3. Test procedure 32
6.4. Test result average 33
7. Power Spectral Density.... 34
7.1. Block diagram of test setup.... 34
7.2. Limits 34
7.3. Test procedure 34
7.4. Test result.... 35
7.5. Test graphs 36
8. Band Edge Compliance (Conducted Method) 44
8.1. Block diagram of test setup.... 44

8.2. Limits 44
8.3. Test procedure 44
8.4. Test result 45
8.5. Test graphs 45
9. RF Conducted Spurious Emissions 51
9.1. Block diagram of test setup 51
9.2. Limits 51
9.3. Test procedure 51
9.4. Test result 52
9.5. Test graphs 52
10. Duty Cycle 77
10.1. Block diagram of test setup 77
10.2. Limit 77
10.3. Test procedure 77
10.4. Test result 78
10.5. Test graphs 79
11. Radiated Spurious Emissions 87
11.1. Test equipment 87
11.2. Block diagram of test setup 87
11.3. Limit 89
11.4. Test procedure 91
11.5. Test result 93
12. Radiated Band Edge Compliance 102
12.1. Test equipment 102
12.2. Block diagram of test setup 102
12.3. Limit 102
12.4. Test procedure 102
12.5. Test result 103
13. Power Line Conducted Emission 128
13.1. Test equipment 128
13.2. Block diagram of test setup 128
13.3. Power Line Conducted Emission Limits 128
13.4. Test procedure 128
13.5. Test result 129
14. Antenna Requirements 132
14.1. Limit 132
14.2. Result 132
15. Test Setup Photograph 133
16. Photos of the EUT 136

Test Report Declare

Applicant	:	Roadway Smart Technologies Co., Ltd
Address of Applicant	:	Room 1118, Jinao International Apartment, No.19 Madian East Road, Haidian District, Beijing, China
Equipment under Test	:	AIoT Edge Controller
Model No.	:	MB41
Manufacturer	:	Roadway Smart Technologies Co., Ltd
Address of Manufacturer	:	Room 1118, Jinao International Apartment, No.19 Madian East Road, Haidian District, Beijing, China

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023.

Test Procedure Used:

ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)
, 558074 D01 15.247 Meas Guidance v05r02, 662911 D01 Multiple Transmitter Output v02r01

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above standards.

Report No.:	DDT-RE23111537-2E09		
Date of Receipt:	2023/12/25	**Date of Test:**	2023/12/25 ~ 2024/02/06

Prepared By: ***Approved By:***

Tiger Mo

Tiger Mo/Engineer

Damon Hu

Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2024/02/06	

1. Summary of Test Results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	**Standard**	**Results**
6dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247(a)(2) RSS-247 Issue 2 clause 5.2(a)	PASS
Conducted Output Power	FCC Part 15: 15.247(b)(3) RSS-247 Issue 2 clause 5.4(d)	PASS
Power Spectral Density	FCC Part 15:15.247(e) RSS-247 Issue 2 clause 5.2(b)	PASS
Band-edge and Spurious Emissions (Conducted)	FCC Part 15: 15.247(d) RSS-247 Issue 2 clause 5.5	PASS
Radiated Spurious Emissions	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-247 Issue 2 clause 5.5 RSS-Gen Issue 5 clause 8.9	PASS
Radiated Band Edge Compliance	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-247 Issue 2 clause 5.5 RSS-Gen Issue 5 clause 8.9	PASS
Power Line Conducted Emission	FCC Part 15: 15.207(a) RSS-Gen Issue 5 clause 8.8	PASS
Antenna requirement	FCC Part 15: 15.203 RSS-Gen Issue 5 clause 6.8	PASS

2. General Test Information

2.1. Description of EUT

EUT Name	:	AIoT Edge Controller
Model Number	:	MB41
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 5V from external Power supply
Radio Technology	:	Bluetooth V5.0 (BR/EDR/LE), WLAN(2.4 GHz): IEEE 802.11b/g/n, WLAN(5 GHz): IEEE 802.11a/n/ac
Operation frequency	:	Bluetooth (BR/EDR/LE): 2402 MHz-2480 MHz IEEE 802.11b/g/n: 2412 MHz to 2462 MHz, IEEE 802.11a/n/ac: 5180 MHz to 5240 MHz, 5260 MHz to 5320 MHz, 5500 MHz to 5720 MHz, 5745 MHz to 5825 MHz
Modulation	:	Bluetooth BR/EDR: GFSK, π/4-DQPSK, 8DPSK Bluetooth LE: GFSK IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g/a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	:	Bluetooth BR/EDR: 1 Mbps, 2 Mbps, 3 Mbps Bluetooth LE: 1 Mbps , 2 Mbps IEEE 802.11b: up to 11 Mbps IEEE 802.11a/g: up to 54 Mbps IEEE 802.11n HT20: up to 144.4 Mbps IEEE 802.11n HT40: up to 300 Mbps IEEE 802.11ac VHT20: up to 173.4 Mbps IEEE 802.11ac VHT40: up to 400 Mbps IEEE 802.11ac VHT80: up to 866.6 Mbps
Operating mode		□ Master ☒ Client Without Radar Detection □ Client with Radar Detection
TPC function		□With TPC ☒Without TPC

Note 1: EUT is the abbreviation of equipment under test.

Note 2: "☒" means to be chosen or applicable; "☐" means don't to be chosen or not applicable; This note applies to entire report.

Note 3: This report only for WLAN(2.4 GHz).

Note 4: Antenna information:

WLAN(2.4 GHz) Antenna information			
Antenna Type		Dual band fan-shaped rubber rod omnidirectional	FPC
/		Ant1 gain(G1)	Ant2 gain(G2)
Antenna Gain(dBi)	IEEE 802.11b	3.09	2.0
	IEEE 802.11g	3.09	2.0
	IEEE 802.11n HT20	3.09	2.0
	IEEE 802.11n HT40	3.09	2.0
Note: This EUT MIMO 2X2, any transmit signals are correlated with each other. So the Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2/2$] =5.57dBi			

Note 5: Channel information

Channel information					
CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447	/	/

Note 6: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

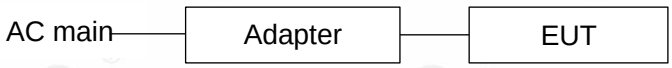
2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
N/A	N/A	N/A	N/A	N/A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
NoteBook	Lenovo	I7-4810MQ	N/A	00331-1000-00001-AA816
AC ADAPTER	SUNUN	SA182V-050300U	INPUT:100-240V-50/60Hz 0.4A OUTPUT: 5V/3A	A182-548

2.4. Block diagram of EUT configuration for test



Test software: adb.exe

The test software was used to control EUT work in Continuous Tx mode and select test channel, wireless mode as below table.
The pathloss of external cable: 0.5dB (According to the manufacturer's claims)

Tested mode, channel, and data rate information					
Mode	Setting Tx Power		data rate (Mbps) (see Note)	Channel	Frequency (MHz)
	ANT1	ANT2			
IEEE 802.11b	100	90	1	LCH: CH1	2412
	100	90	1	MCH: CH6	2437
	100	90	1	HCH: CH11	2462
IEEE 802.11g	80	70	6	LCH: CH1	2412
	80	70	6	MCH: CH6	2437
	80	70	6	HCH: CH11	2462
IEEE 802.11n HT20	68	58	MCS 8	LCH: CH1	2412
	68	58	MCS 8	MCH: CH6	2437
	68	58	MCS 8	HCH: CH11	2462
IEEE 802.11n HT40	65	55	MCS 8	LCH: CH3	2422
	65	55	MCS 8	MCH: CH6	2437
	65	55	MCS 8	HCH: CH9	2452
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.					

2.5. Deviations of test standard

No Deviation

2.6. Test environment conditions

Temperature range:	+15℃ to +35 ℃
Humidity range:	20% to 75%
Pressure range:	86 kPa to106 kPa

2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No.17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China 523808

Tel.: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.8. Measurement uncertainty

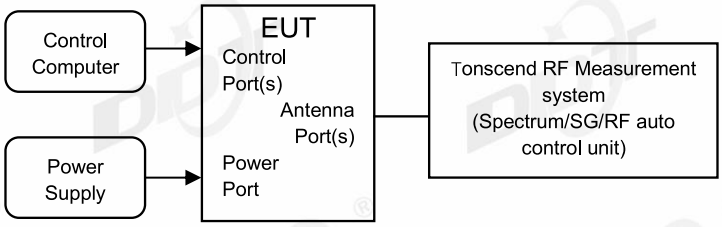
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Frequencies Stability	6.7 x 10^{-8} (Antenna couple method)
	5.5 x 10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.40 dB (3.6 GHz ≤ f < 8 GHz)
	1.66 dB (8 GHz ≤ f < 26.5 GHz)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 ℃
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz)
	4.40 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☒RF Connected Test (RF Measurement System 4#)				
Signal &Spectrum Analyzer	R&S	FSV3044	101173	2024/04/22
Wideband Radio Communication Tester	R&S	CMW500	168801	2024/04/26
MXG Vector Signal Generator	Agilent	N5182A	MY48180737	2024/04/26
PSG Vector Signal Generator	Agilent	E8267D	US49060192	2024/09/05
RF Control Unit	Tonsend	JS0806-2	21I8060485	2024/04/26
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2024/05/14
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A

4. 6dB Bandwidth

4.1. Block diagram of test setup



4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

4.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 11.8.
(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
(3) Set the EUT as maximum power setting and enable the EUT transmit continuously
(4) Use the following spectrum analyzer settings for 6 dB Bandwidth:

RBW:	100 kHz
VBW:	≥ [3 × RBW]
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report

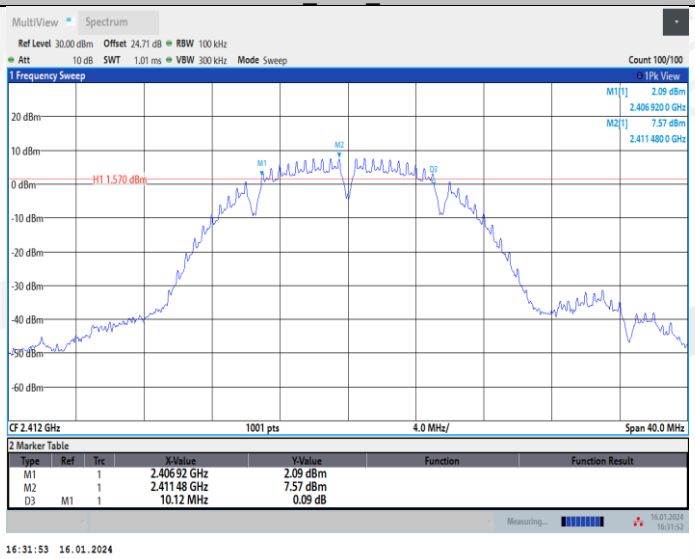
4.4. Test result

Test Engineer:	Haofeng	Test Site:	RF Measuremnet System 4#
Ambient Condition:	23.4℃,37.5%RH	Test Date:	2024.01.05-2024.01.16
Test Power Supply:	DC 5V	EUT:	AIoT Edge Controller
Sample Number:	S23111537-05	Model No.:	MB41

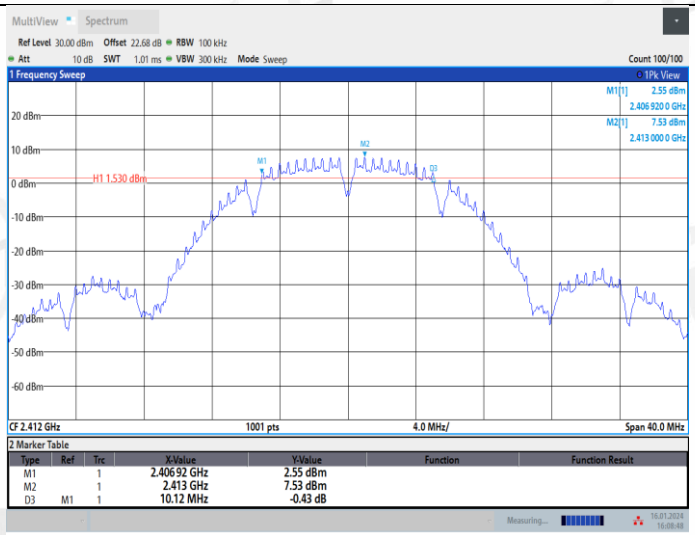
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	10.12	2406.92	2417.04	0.5	PASS
	Ant2	2412	10.12	2406.92	2417.04	0.5	PASS
	Ant1	2437	10.12	2431.92	2442.04	0.5	PASS
	Ant2	2437	10.12	2431.92	2442.04	0.5	PASS
	Ant1	2462	10.12	2456.92	2467.04	0.5	PASS
	Ant2	2462	10.12	2456.92	2467.04	0.5	PASS
11G	Ant1	2412	15.68	2404.20	2419.88	0.5	PASS
	Ant2	2412	15.84	2404.04	2419.88	0.5	PASS
	Ant1	2437	15.92	2429.20	2445.12	0.5	PASS
	Ant2	2437	15.80	2429.08	2444.88	0.5	PASS
	Ant1	2462	15.80	2454.08	2469.88	0.5	PASS
	Ant2	2462	16.04	2453.84	2469.88	0.5	PASS
11N20MIMO	Ant1	2412	16.16	2404.20	2420.36	0.5	PASS
	Ant2	2412	16.04	2403.84	2419.88	0.5	PASS
	Ant1	2437	16.28	2428.84	2445.12	0.5	PASS
	Ant2	2437	15.92	2428.84	2444.76	0.5	PASS
	Ant1	2462	15.96	2453.80	2469.76	0.5	PASS
	Ant2	2462	15.36	2454.20	2469.56	0.5	PASS
11N40MIMO	Ant1	2422	35.12	2404.48	2439.60	0.5	PASS
	Ant2	2422	35.12	2404.48	2439.60	0.5	PASS
	Ant1	2437	35.12	2419.48	2454.60	0.5	PASS
	Ant2	2437	35.12	2419.48	2454.60	0.5	PASS
	Ant1	2452	35.12	2434.48	2469.60	0.5	PASS
	Ant2	2452	35.12	2434.48	2469.60	0.5	PASS

4.5. Test graphs

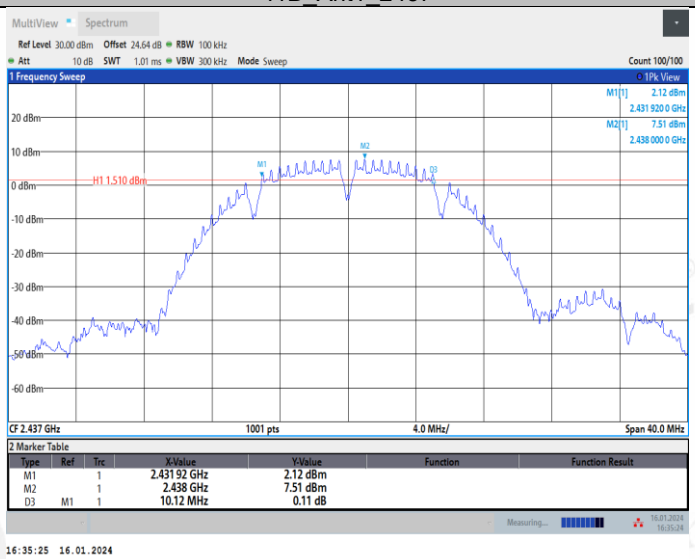
11B_Ant1_2412



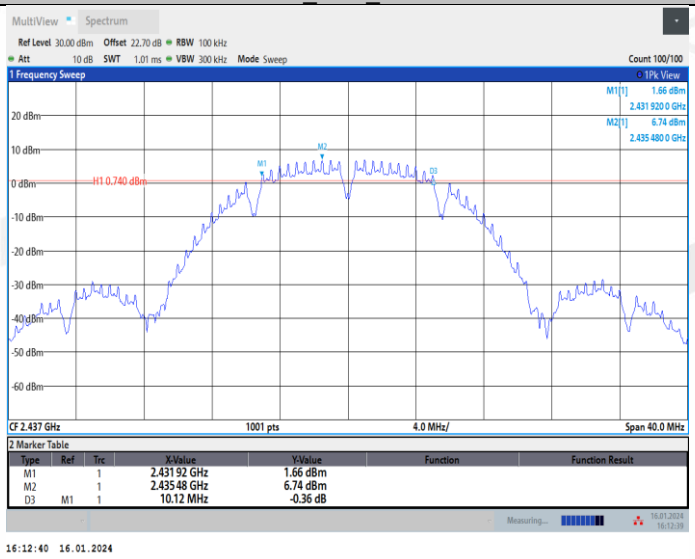
11B_Ant2_2412



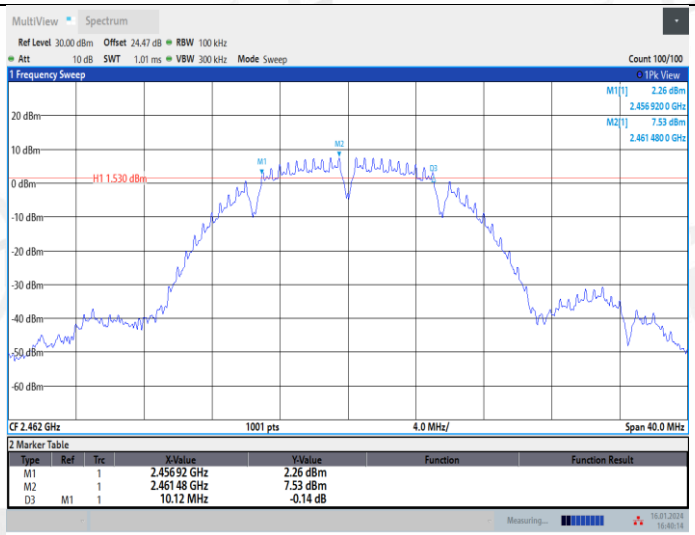
11B_Ant1_2437



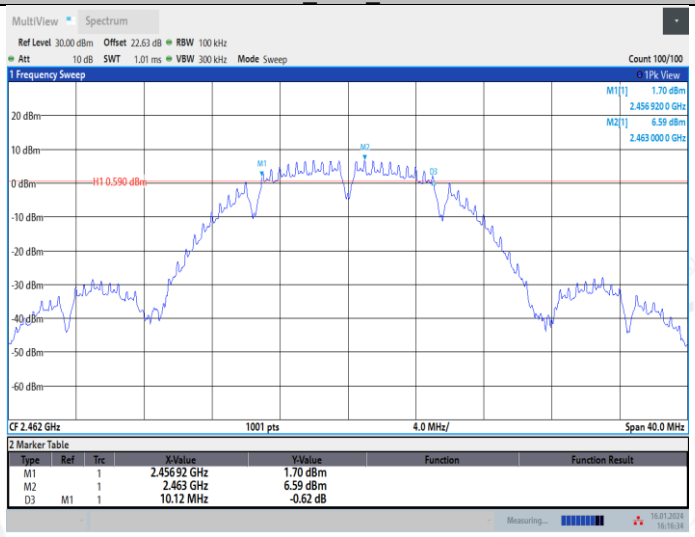
11B_Ant2_2437



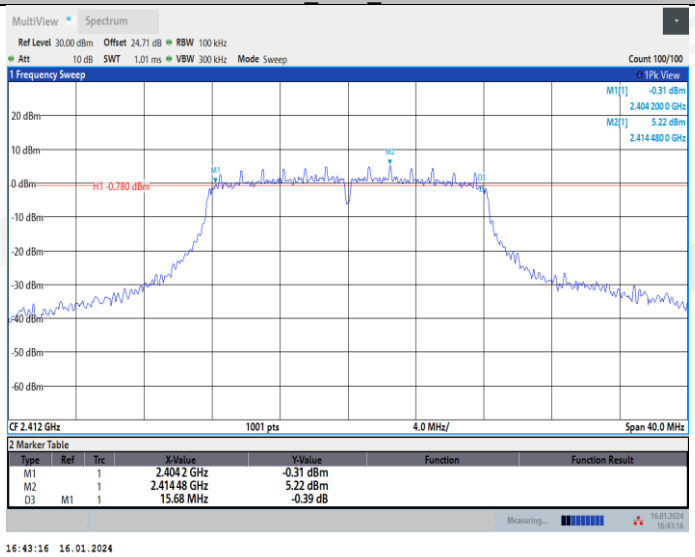
11B_Ant1_2462



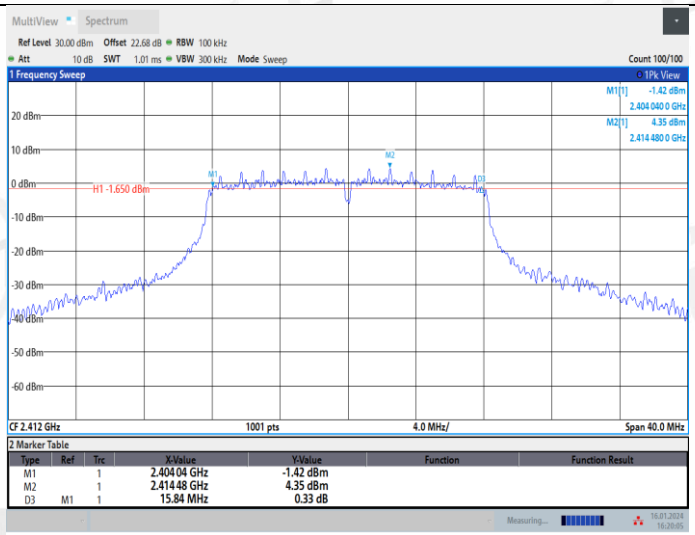
11B_Ant2_2462



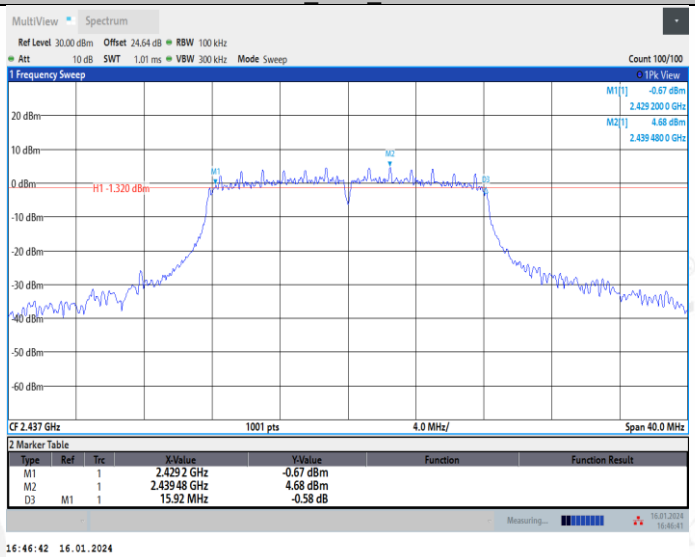
11G_Ant1_2412



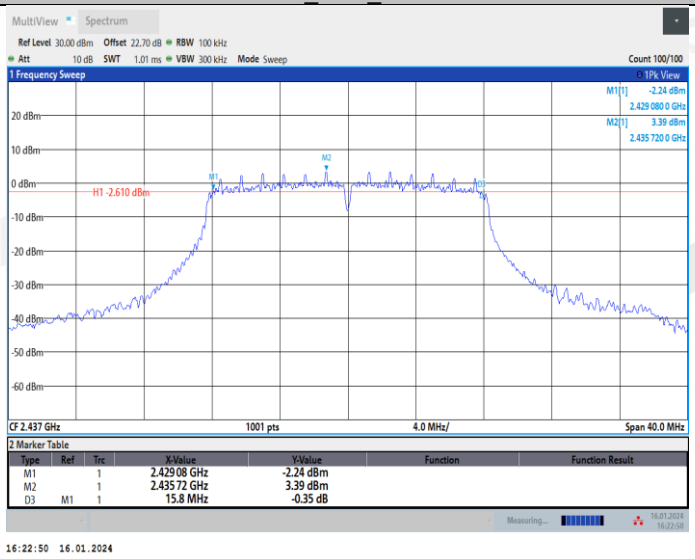
11G_Ant2_2412



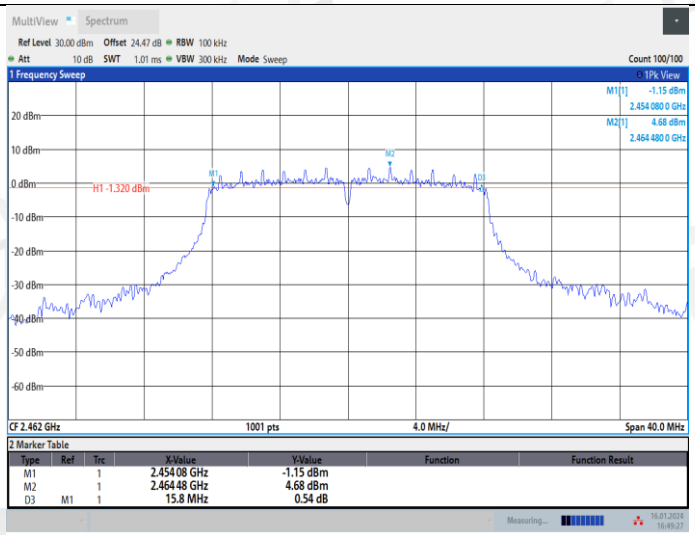
11G_Ant1_2437



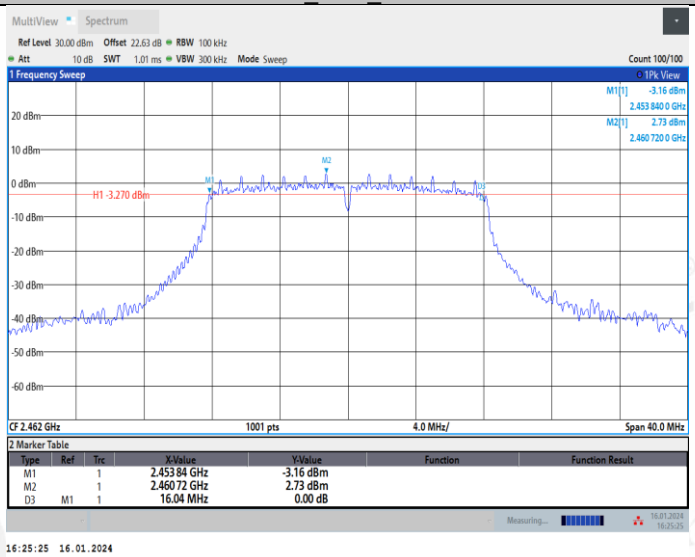
11G_Ant2_2437



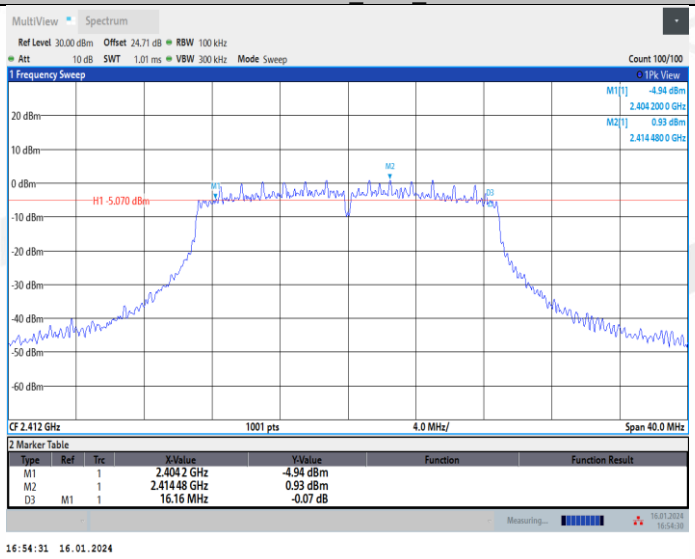
11G_Ant1_2462



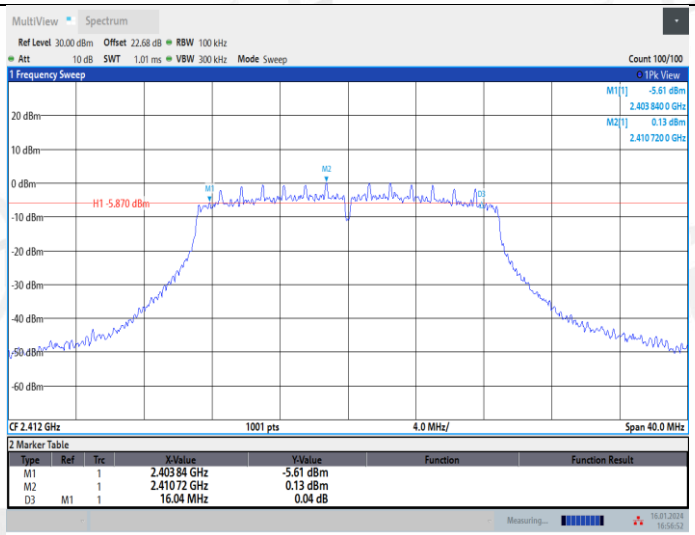
11G_Ant2_2462



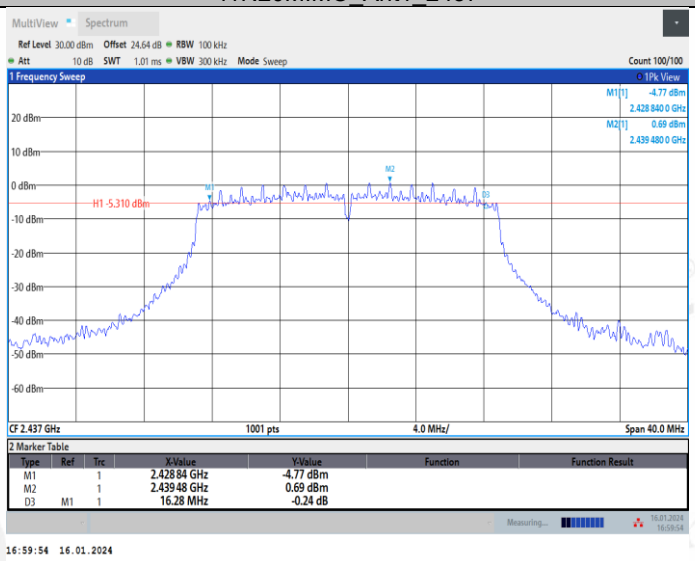
11N20MIMO_Ant1_2412



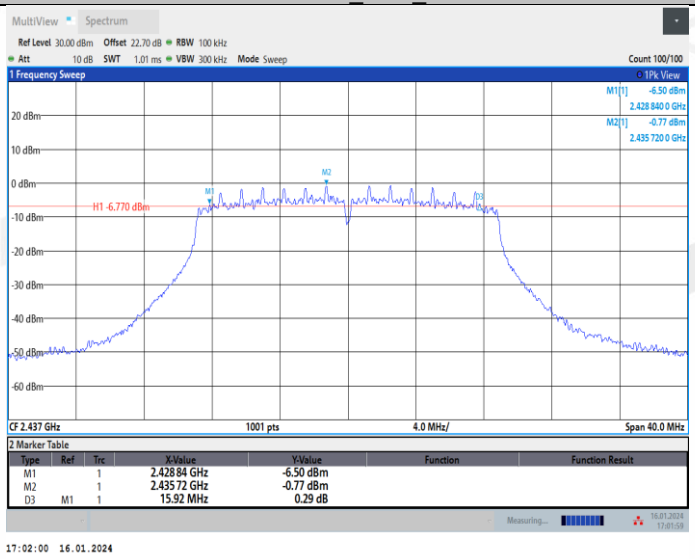
11N20MIMO_Ant2_2412



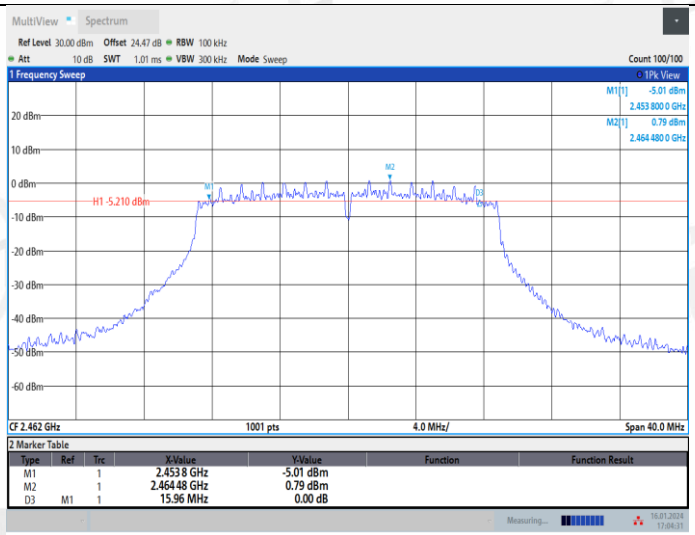
11N20MIMO_Ant1_2437



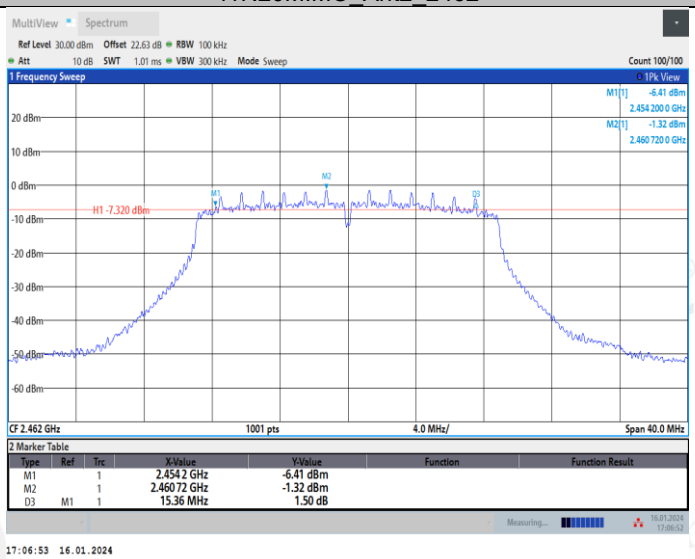
11N20MIMO_Ant2_2437



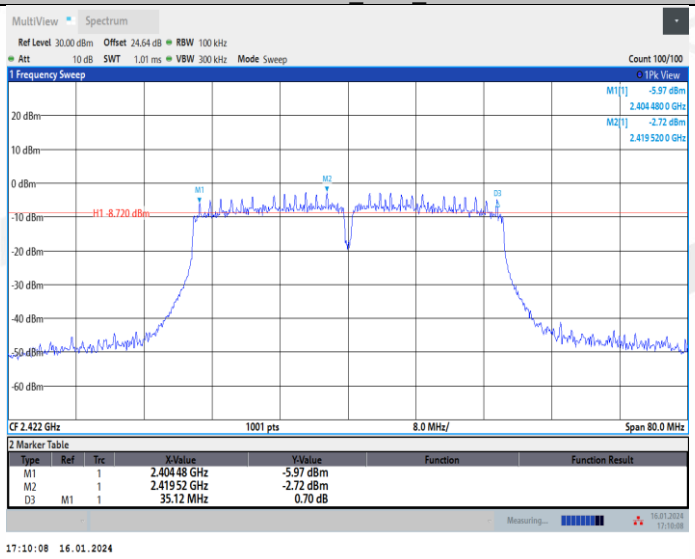
11N20MIMO_Ant1_2462



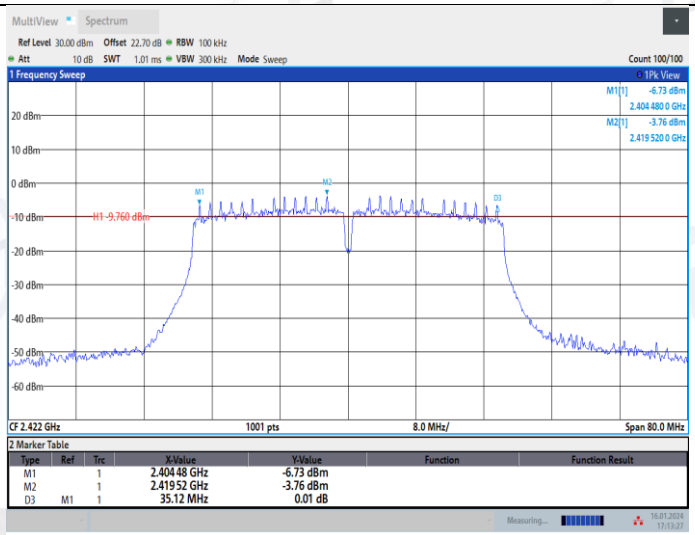
11N20MIMO_Ant2_2462



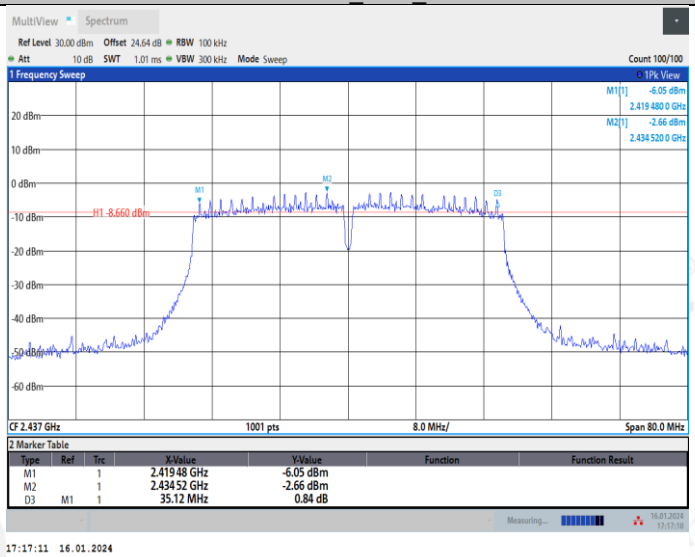
11N40MIMO_Ant1_2422



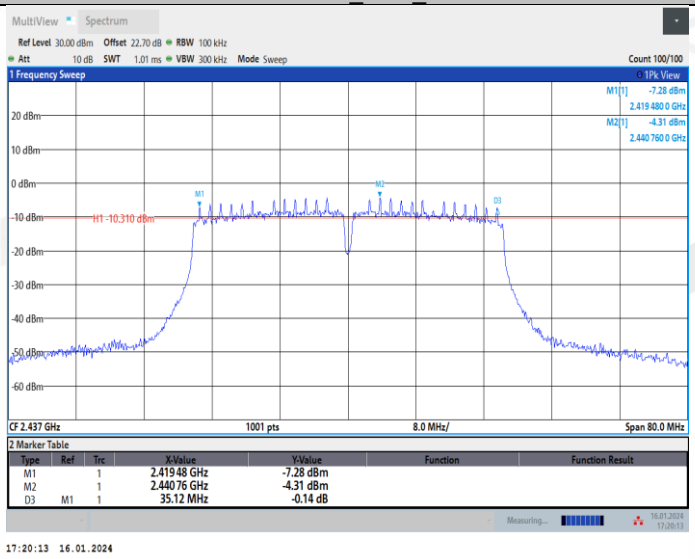
11N40MIMO_Ant2_2422



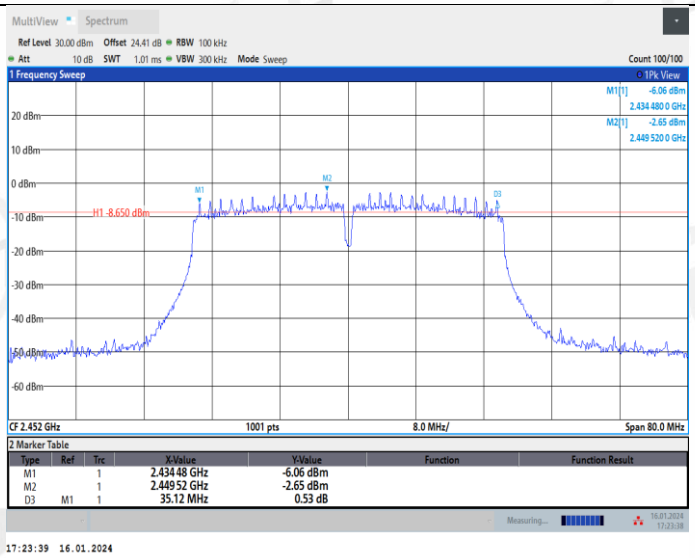
11N40MIMO_Ant1_2437



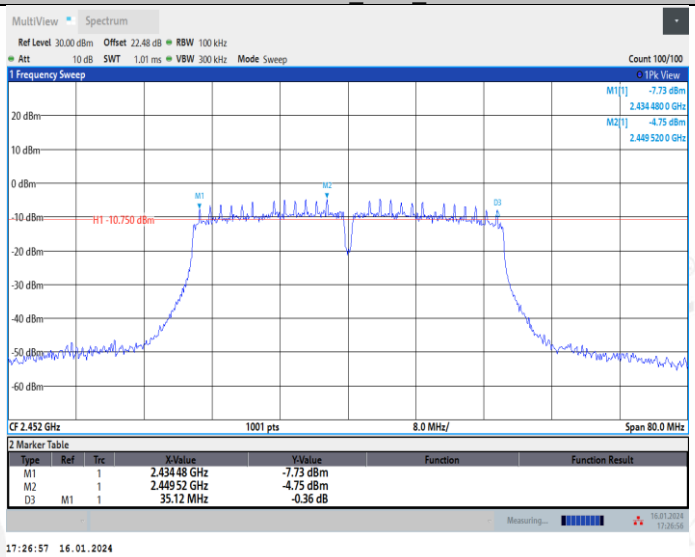
11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452

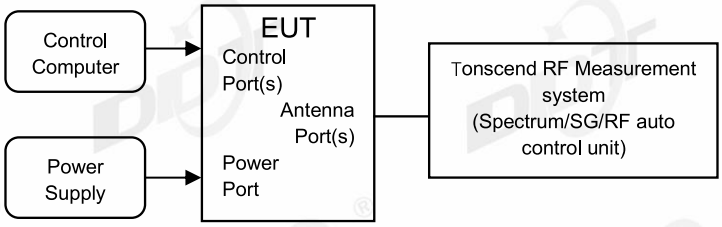


11N40MIMO_Ant2_2452



5. 99% Bandwidth

5.1. Block diagram of test setup



5.2. Limits

Just for Report.

5.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 6.9.3.
(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
(3) Set the EUT as maximum power setting and enable the EUT transmit continuously
(4) Use the following spectrum analyzer settings for the 99% Bandwidth:

RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 1.5 times and 5.0 times the OBW
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

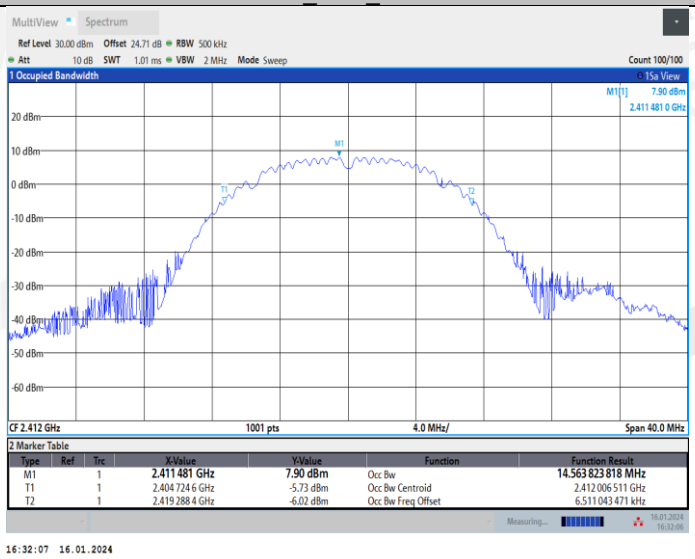
5.4. Test result

Test Engineer:	Haofeng	Test Site:	RF Measuremnet System 4#
Ambient Condition:	23.4℃,37.5%RH	Test Date:	2024.01.05-2024.01.16
Test Power Supply:	DC 5V	EUT:	AIoT Edge Controller
Sample Number:	S23111537-05	Model No.:	MB41

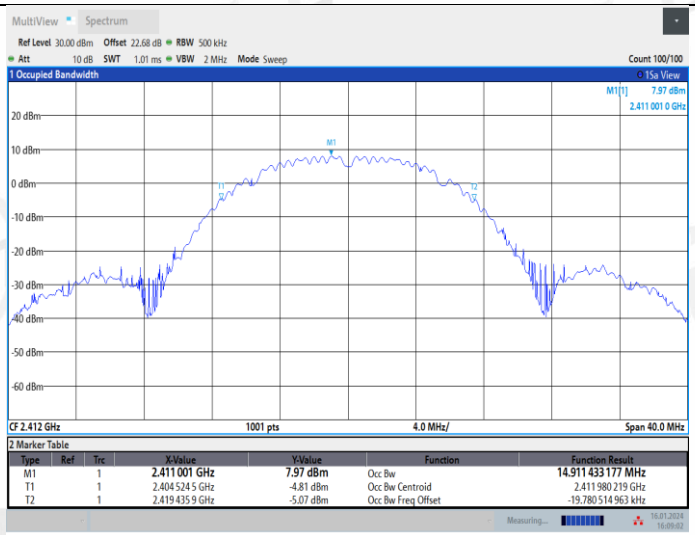
TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.564	2404.7246	2419.2884	---	---
	Ant2	2412	14.911	2404.5245	2419.4359	---	---
	Ant1	2437	14.649	2429.6873	2444.3361	---	---
	Ant2	2437	14.857	2429.5399	2444.3971	---	---
	Ant1	2462	14.656	2454.6551	2469.3108	---	---
	Ant2	2462	14.882	2454.4895	2469.3720	---	---
11G	Ant1	2412	17.123	2403.4444	2420.5671	---	---
	Ant2	2412	17.096	2403.4152	2420.5112	---	---
	Ant1	2437	17.154	2428.4563	2445.6108	---	---
	Ant2	2437	17.183	2428.3855	2445.5684	---	---
	Ant1	2462	17.114	2453.4295	2470.5432	---	---
	Ant2	2462	16.994	2453.4270	2470.4215	---	---
11N20MIMO	Ant1	2412	17.723	2403.1349	2420.8576	---	---
	Ant2	2412	18.096	2402.9131	2421.0087	---	---
	Ant1	2437	17.825	2428.0770	2445.9017	---	---
	Ant2	2437	18.061	2427.9347	2445.9959	---	---
	Ant1	2462	17.858	2453.0188	2470.8764	---	---
	Ant2	2462	18.066	2452.9406	2471.0068	---	---
11N40MIMO	Ant1	2422	36.282	2403.9011	2440.1828	---	---
	Ant2	2422	36.325	2403.8549	2440.1801	---	---
	Ant1	2437	36.448	2418.7954	2455.2430	---	---
	Ant2	2437	36.190	2418.9074	2455.0972	---	---
	Ant1	2452	36.196	2433.8031	2469.9990	---	---
	Ant2	2452	36.290	2433.7031	2469.9934	---	---

5.5. Test graphs

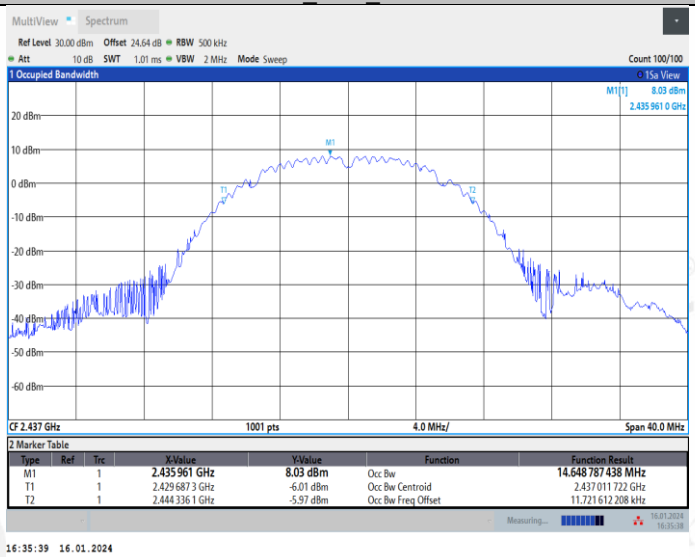
11B_Ant1_2412



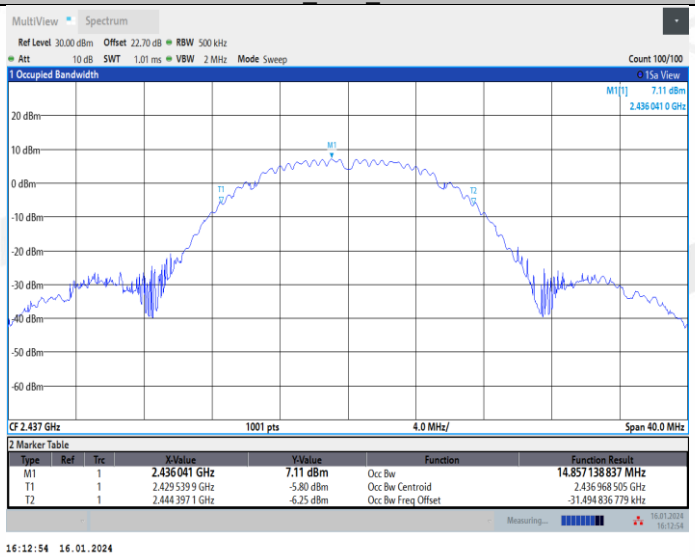
11B_Ant2_2412



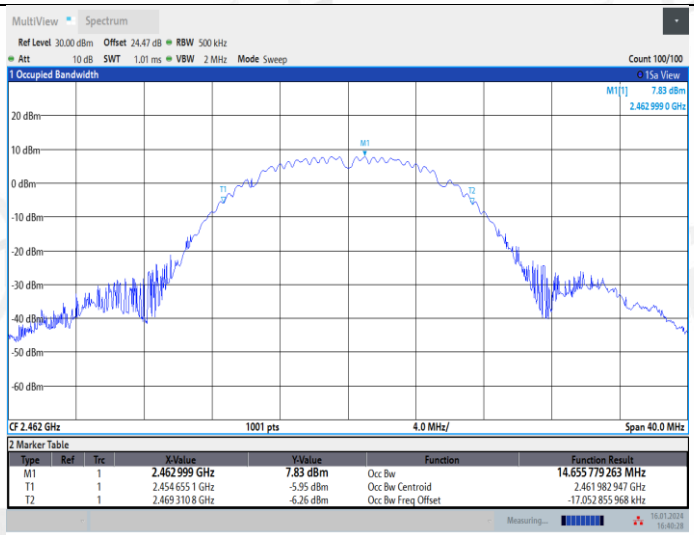
11B_Ant1_2437



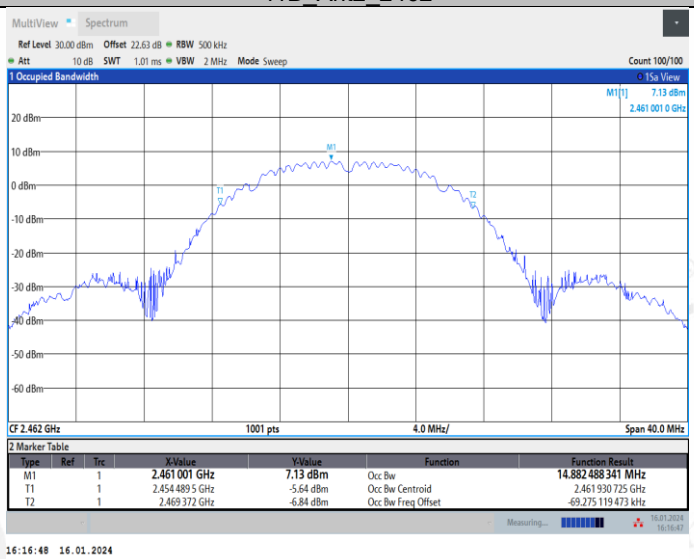
11B_Ant2_2437



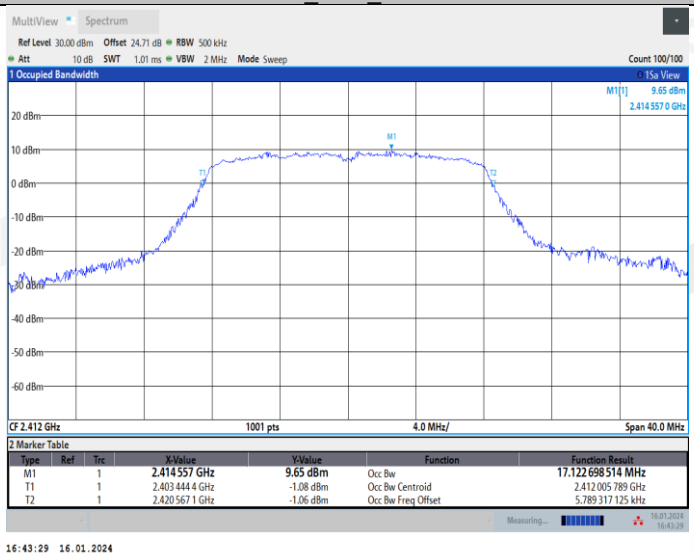
11B_Ant1_2462



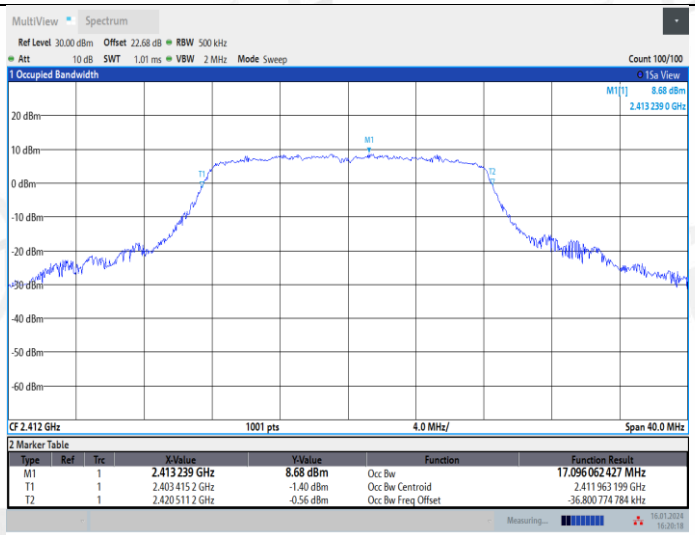
11B_Ant2_2462



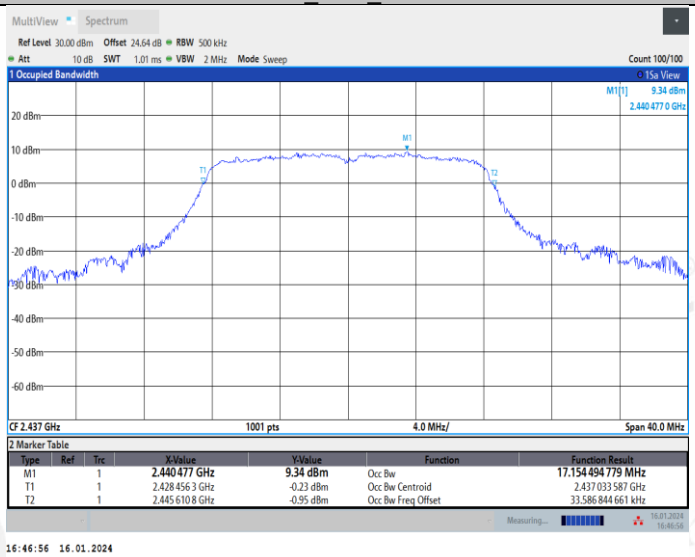
11G_Ant1_2412



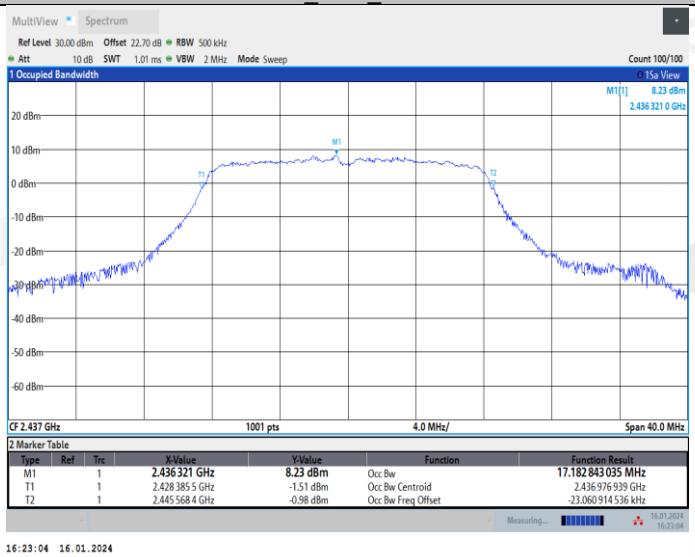
11G_Ant2_2412



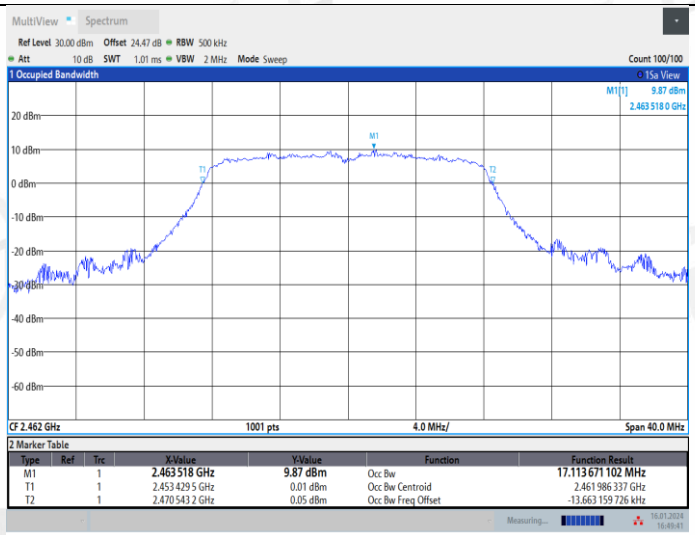
11G_Ant1_2437



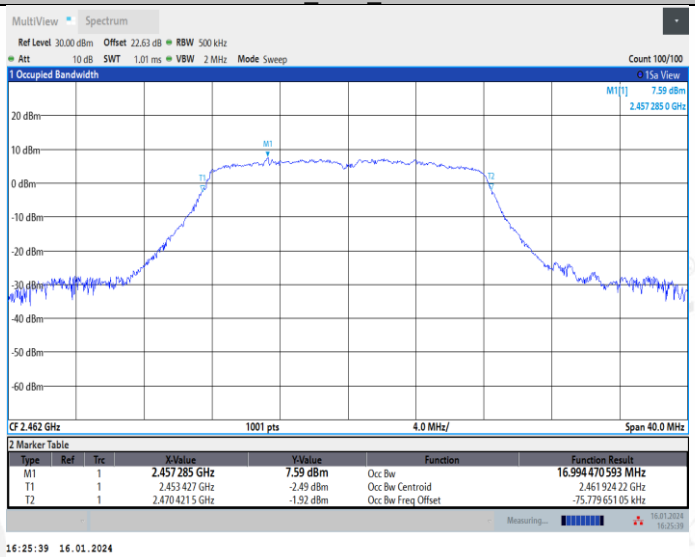
11G_Ant2_2437



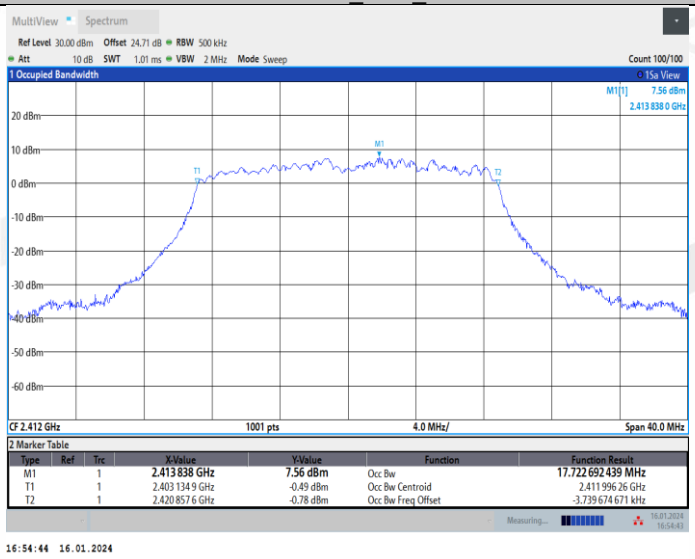
11G_Ant1_2462



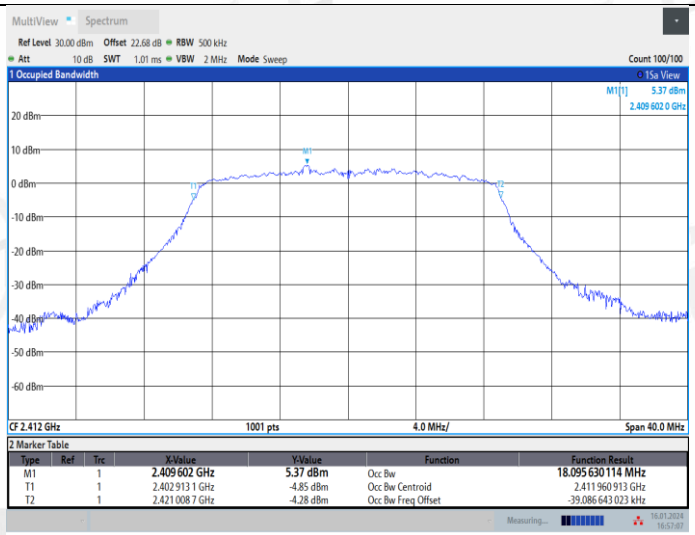
11G_Ant2_2462



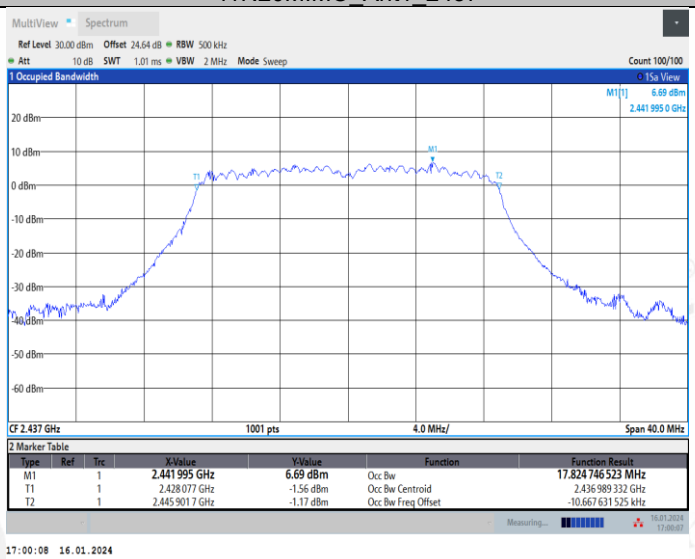
11N20MIMO_Ant1_2412



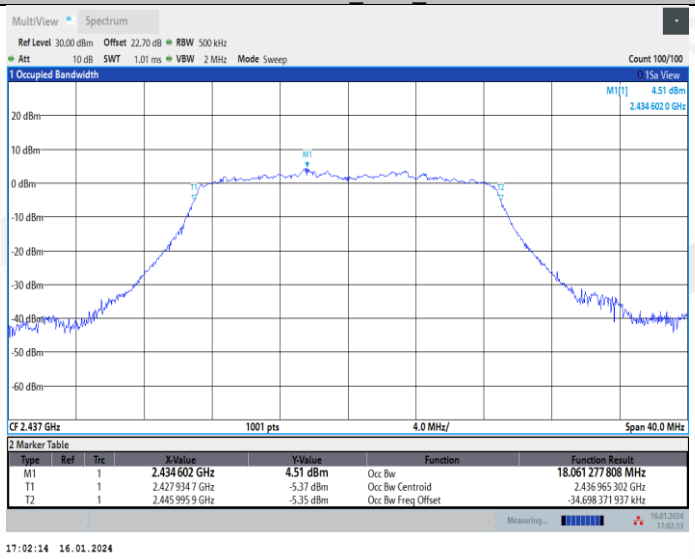
11N20MIMO_Ant2_2412



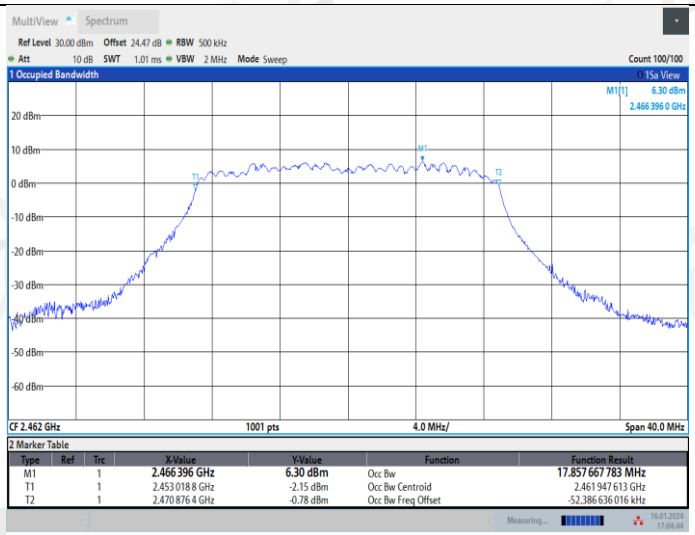
11N20MIMO_Ant1_2437



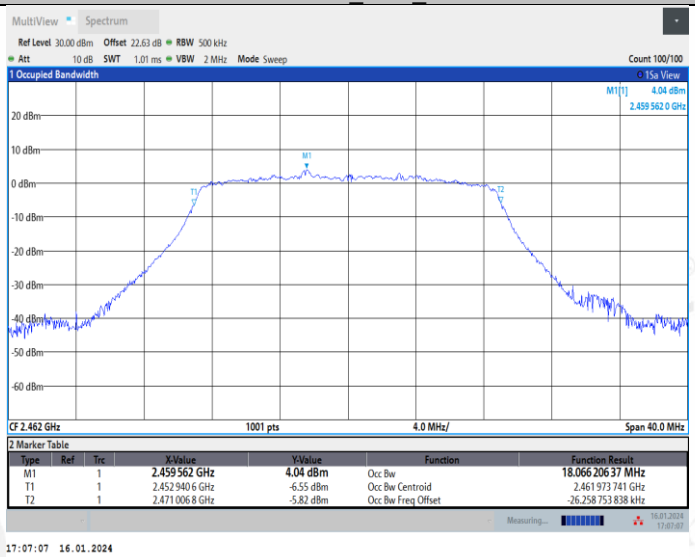
11N20MIMO_Ant2_2437



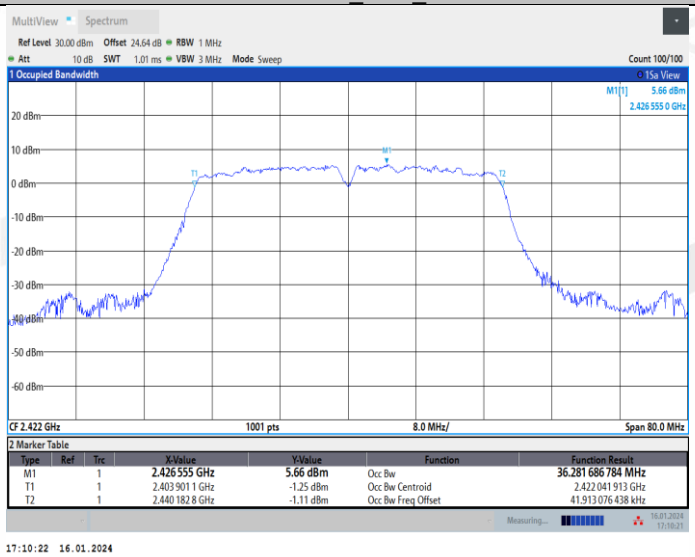
11N20MIMO_Ant1_2462



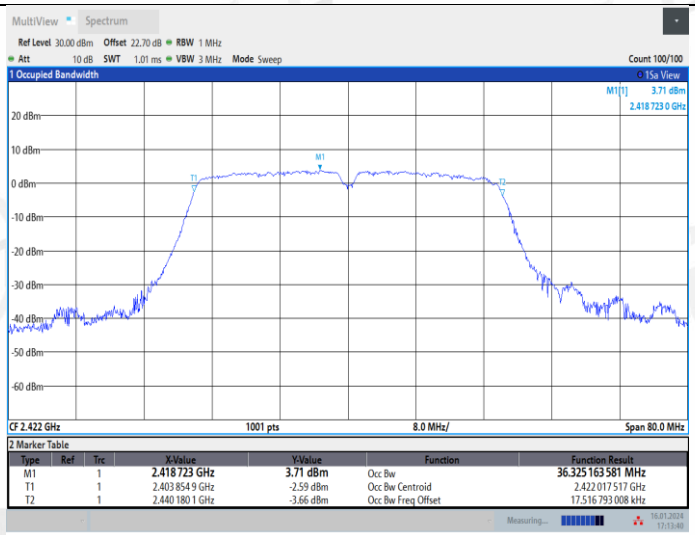
11N20MIMO_Ant2_2462



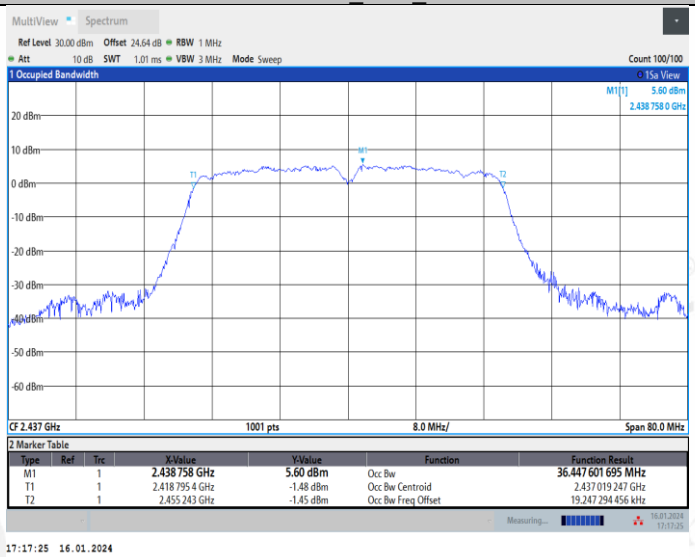
11N40MIMO_Ant1_2422



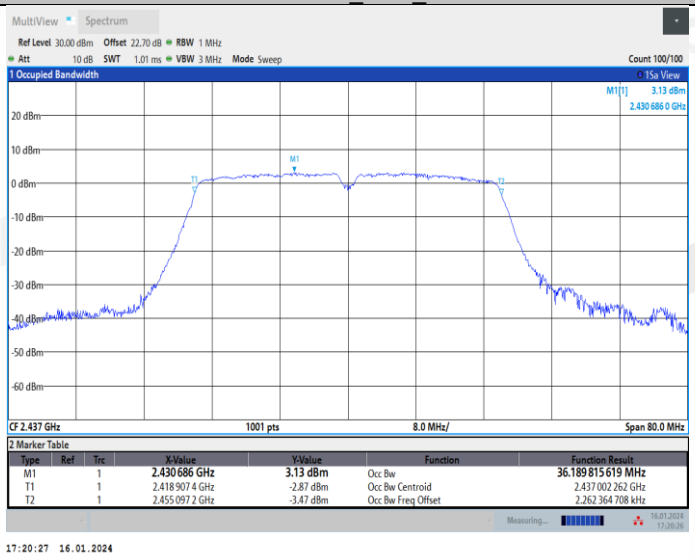
11N40MIMO_Ant2_2422



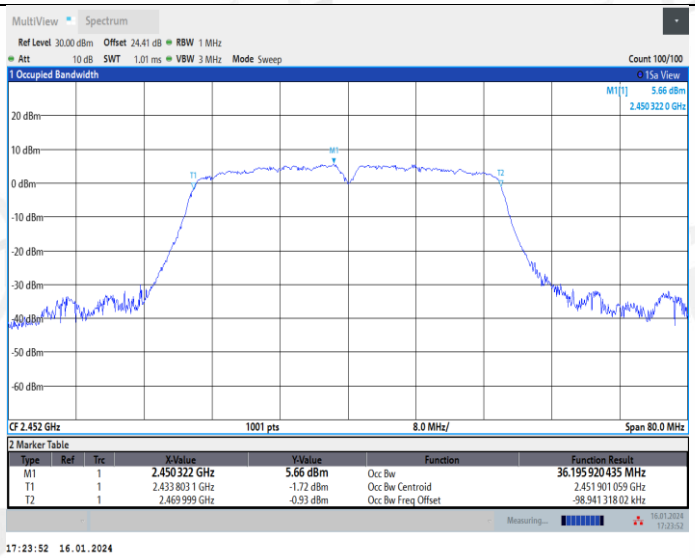
11N40MIMO_Ant1_2437



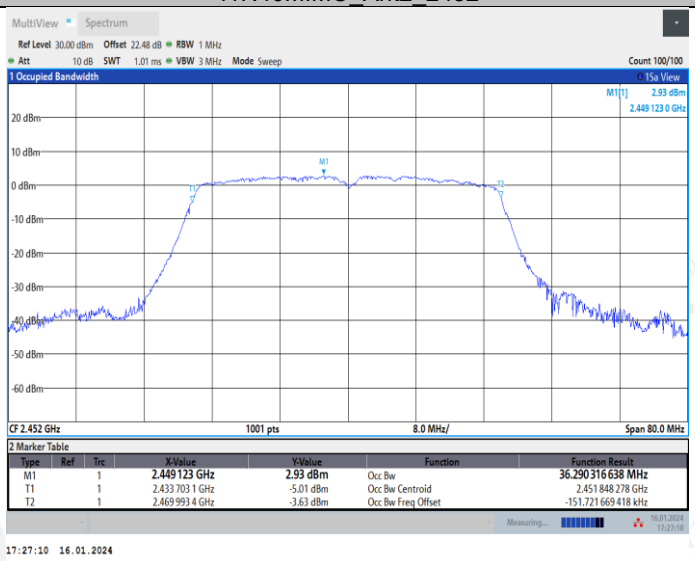
11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452

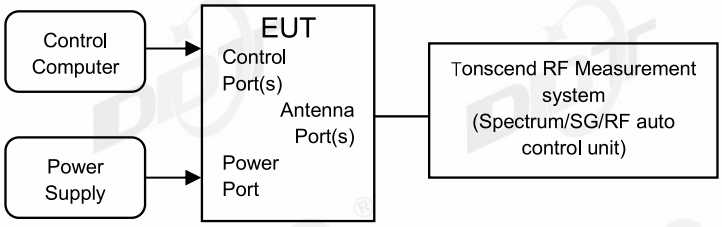


11N40MIMO_Ant2_2452



6. Conducted Output Power

6.1. Block diagram of test setup



6.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 11.9.2.3.
(2) Connect EUT's antenna output to RF power meter by RF cable, the path loss was compensated to the results.
(3) Set the EUT as maximum power setting and enable the EUT transmit continuously, If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal.
(4) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
(5) Adjust the measurement in dBm by adding [10 log (1 / D)], where D is the duty cycle.
(6) Record the RF average power of each antenna port.

6.4. Test result average

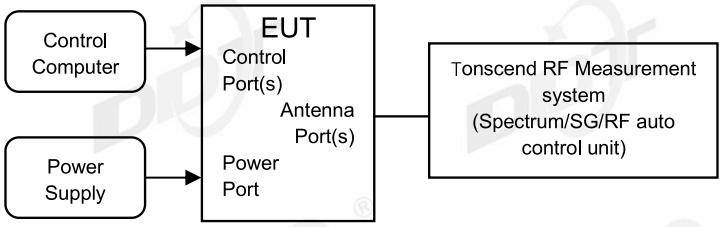
Test Engineer:	Haofeng	Test Site:	RF Measuremnet System 4#
Ambient Condition:	23.4℃,37.5%RH	Test Date:	2024.01.05-2024.01.16
Test Power Supply:	DC 5V	EUT:	AIoT Edge Controller
Sample Number:	S23111537-05	Model No.:	MB41

Test Mode	Antenna	Frequency [MHz]	Average power [dBm]	Duty Cycle [%]	DC Factor [dB]	Result [dBm]	Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11B	Ant1	2412	18.59	96.58	0.15	18.74	≤30.00	21.83	≤36.00	PASS
	Ant2	2412	18.76	96.36	0.16	**18.92**	≤30.00	20.92	≤36.00	PASS
	Ant1	2437	18.03	96.88	0.14	18.17	≤30.00	21.26	≤36.00	PASS
	Ant2	2437	17.97	97.03	0.13	18.10	≤30.00	20.10	≤36.00	PASS
	Ant1	2462	17.53	96.88	0.14	17.67	≤30.00	20.76	≤36.00	PASS
	Ant2	2462	17.89	96.58	0.15	18.04	≤30.00	20.04	≤36.00	PASS
11G	Ant1	2412	16.16	90.79	0.42	16.58	≤30.00	19.67	≤36.00	PASS
	Ant2	2412	16.63	93.21	0.31	16.94	≤30.00	18.94	≤36.00	PASS
	Ant1	2437	15.96	92.79	0.32	16.28	≤30.00	19.37	≤36.00	PASS
	Ant2	2437	15.85	94.52	0.24	16.09	≤30.00	18.09	≤36.00	PASS
	Ant1	2462	15.76	91.59	0.38	16.14	≤30.00	19.23	≤36.00	PASS
	Ant2	2462	15.44	94.09	0.26	15.70	≤30.00	17.70	≤36.00	PASS
11N20MIMO	Ant1	2412	11.89	84.62	0.73	12.62	≤30.00	15.71	≤36.00	PASS
	Ant2	2412	12.24	84.62	0.73	12.97	≤30.00	14.97	≤36.00	PASS
	total	2412	---	---	---	15.81	≤30.00	18.37	≤36.00	PASS
	Ant1	2437	11.65	80.99	0.92	12.57	≤30.00	15.66	≤36.00	PASS
	Ant2	2437	11.34	81.67	0.88	12.22	≤30.00	14.22	≤36.00	PASS
	total	2437	---	---	---	15.41	≤30.00	18.01	≤36.00	PASS
	Ant1	2462	11.51	84.48	0.73	12.24	≤30.00	15.33	≤36.00	PASS
	Ant2	2462	10.72	81.82	0.87	11.59	≤30.00	13.59	≤36.00	PASS
	total	2462	---	---	---	14.94	≤30.00	17.56	≤36.00	PASS
11N40MIMO	Ant1	2422	10.90	70.42	1.52	12.42	≤30.00	15.51	≤36.00	PASS
	Ant2	2422	11.20	68.06	1.67	12.87	≤30.00	14.87	≤36.00	PASS
	total	2422	---	---	---	15.66	≤30.00	18.21	≤36.00	PASS
	Ant1	2437	10.68	71.01	1.49	12.17	≤30.00	15.26	≤36.00	PASS
	Ant2	2437	10.39	69.01	1.61	12.00	≤30.00	14.00	≤36.00	PASS
	total	2437	---	---	---	15.10	≤30.00	17.69	≤36.00	PASS
	Ant1	2452	10.65	69.44	1.58	12.23	≤30.00	15.32	≤36.00	PASS
	Ant2	2452	10.07	71.43	1.46	11.53	≤30.00	13.53	≤36.00	PASS
	total	2452	---	---	---	14.90	≤30.00	17.53	≤36.00	PASS

Note: EIRP (dBm)=Conducted Output Power (dBm)+ Antenna Gain (dBi)

7. Power Spectral Density

7.1. Block diagram of test setup



7.2. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 11.10.5.
(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
(4) Use the following spectrum analyzer settings for Power Spectral Density measurement:

Center frequency	DTS Channel center frequency
RBW:	3 kHz ≤ RBW ≤ 100 kHz
VBW:	≥ 3RBW
Span	1.5 times the DTS bandwidth
Detector Mode:	RMS
Sweep time:	auto
Trace mode	max hold
Trace	Employ trace averaging (rms) mode over a minimum of 100 traces.

(5) Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.4. Test result

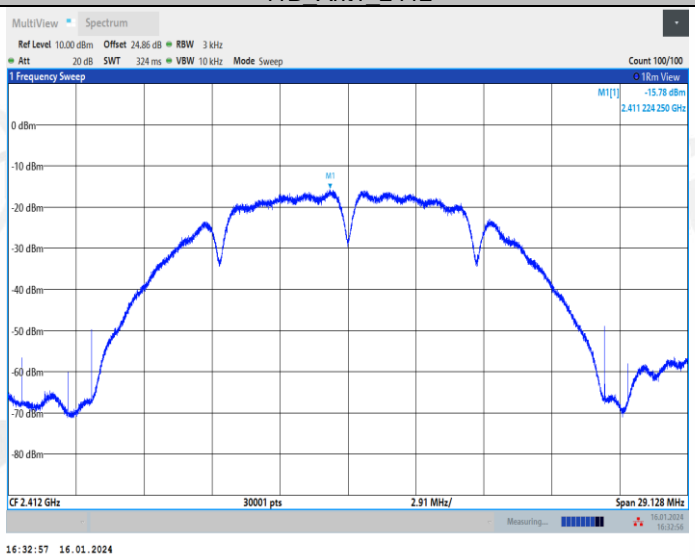
Test Engineer:	Haofeng	Test Site:	RF Measuremnet System 4#
Ambient Condition:	23.4℃,37.5%RH	Test Date:	2024.01.05-2024.01.16
Test Power Supply:	DC 5V	EUT:	AIoT Edge Controller
Sample Number:	S23111537-05	Model No.:	MB41

Test Mode	Antenna	Frequency [MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-15.78	≤8.00	PASS
	Ant2	2412	-15.68	≤8.00	PASS
	Ant1	2437	-15.58	≤8.00	PASS
	Ant2	2437	-16.31	≤8.00	PASS
	Ant1	2462	-15.50	≤8.00	PASS
	Ant2	2462	-16.57	≤8.00	PASS
11G	Ant1	2412	-15.35	≤8.00	PASS
	Ant2	2412	-16.37	≤8.00	PASS
	Ant1	2437	-15.87	≤8.00	PASS
	Ant2	2437	-17.11	≤8.00	PASS
	Ant1	2462	-15.52	≤8.00	PASS
	Ant2	2462	-16.95	≤8.00	PASS
11N20MIMO	Ant1	2412	-18.10	≤8.00	PASS
	Ant2	2412	-19.06	≤8.00	PASS
	total	2412	-15.54	≤8.00	PASS
	Ant1	2437	-17.83	≤8.00	PASS
	Ant2	2437	-20.29	≤8.00	PASS
	total	2437	-15.88	≤8.00	PASS
	Ant1	2462	-19.16	≤8.00	PASS
	Ant2	2462	-19.47	≤8.00	PASS
	total	2462	-16.30	≤8.00	PASS
11N40MIMO	Ant1	2422	-20.27	≤8.00	PASS
	Ant2	2422	-21.03	≤8.00	PASS
	total	2422	-17.62	≤8.00	PASS
	Ant1	2437	-20.24	≤8.00	PASS
	Ant2	2437	-21.61	≤8.00	PASS
	total	2437	-17.86	≤8.00	PASS
	Ant1	2452	-20.87	≤8.00	PASS
	Ant2	2452	-21.87	≤8.00	PASS
	total	2452	-18.33	≤8.00	PASS

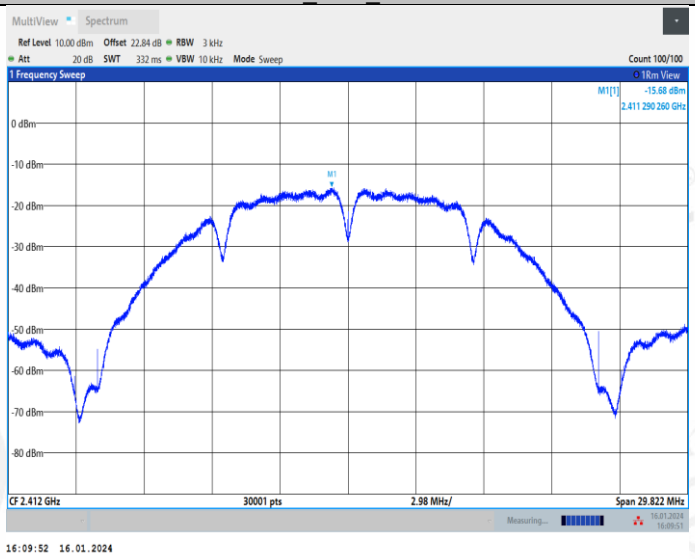
Note：The Duty Cycle Factor is compensated in the graph.

7.5. Test graphs

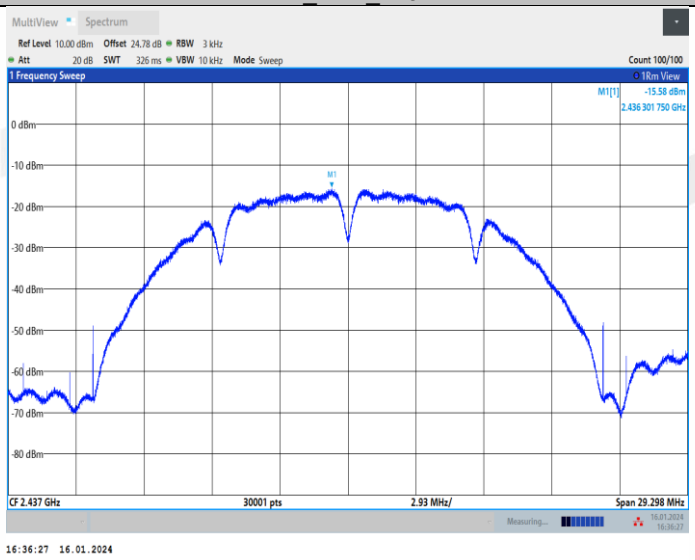
11B_Ant1_2412



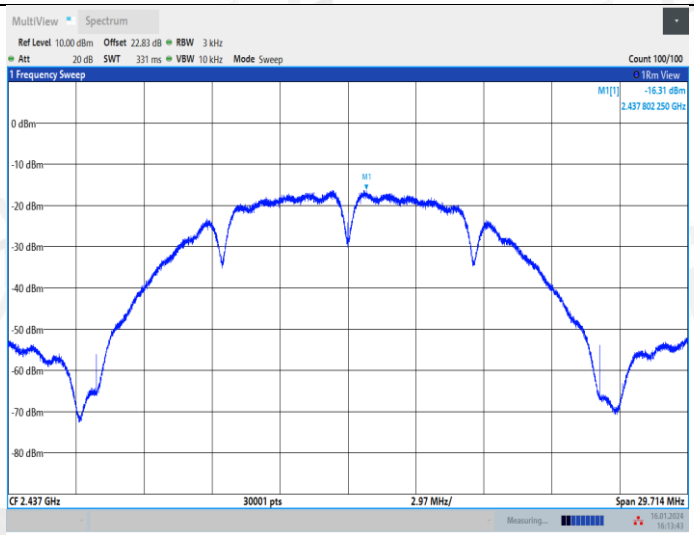
11B_Ant2_2412



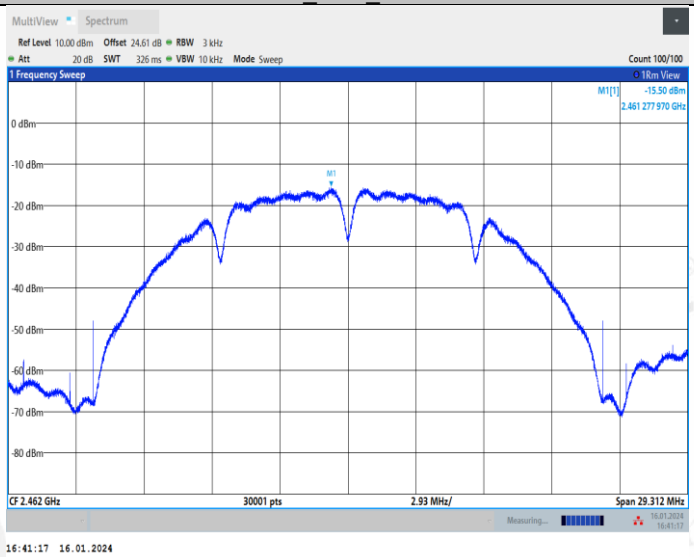
11B_Ant1_2437



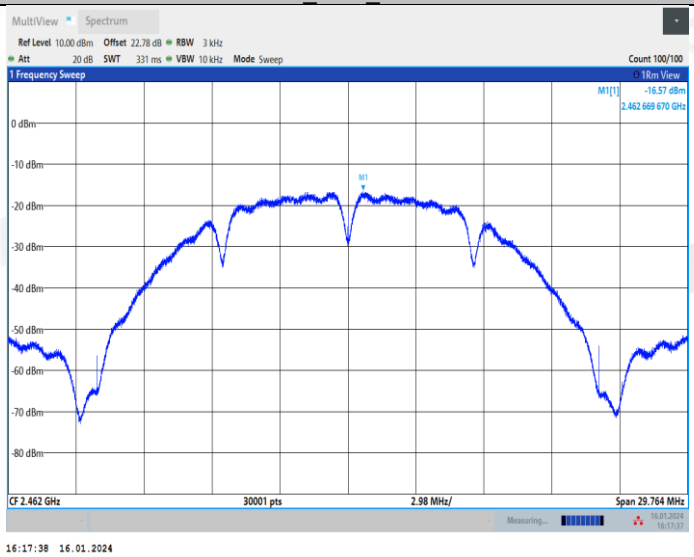
11B_Ant2_2437



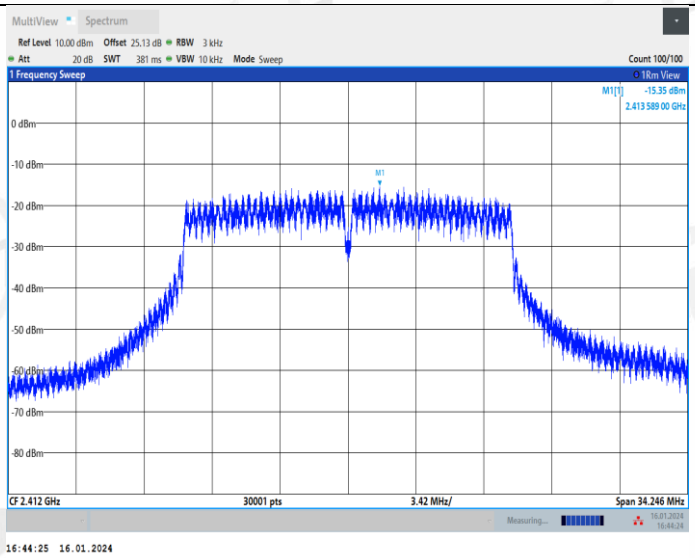
11B_Ant1_2462



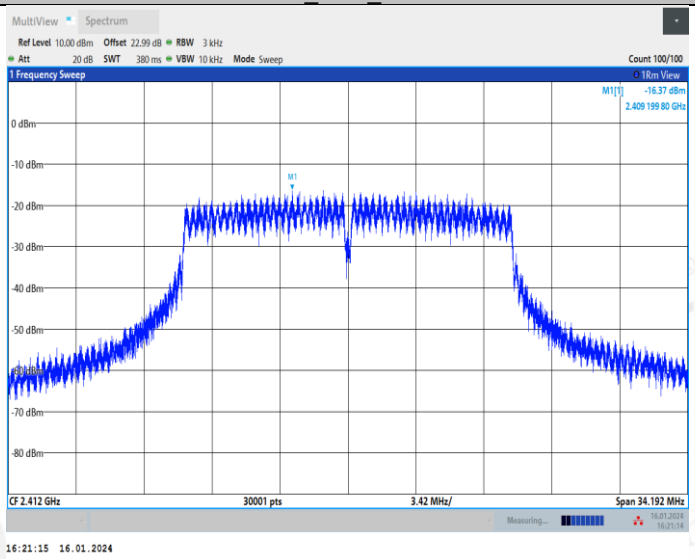
11B_Ant2_2462



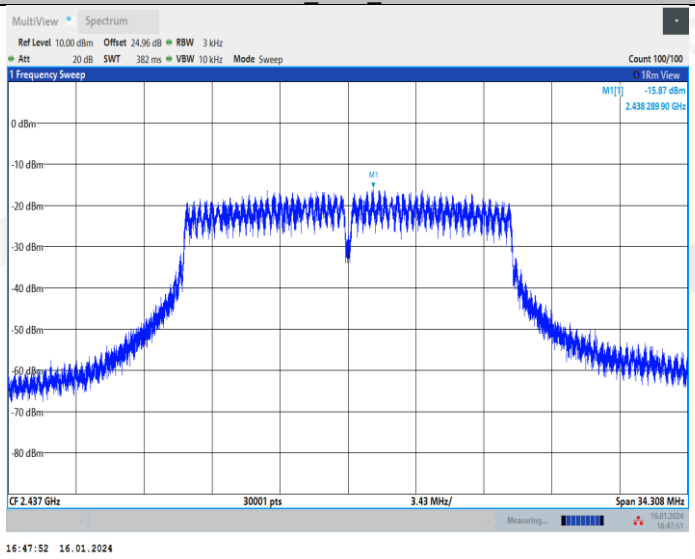
11G_Ant1_2412



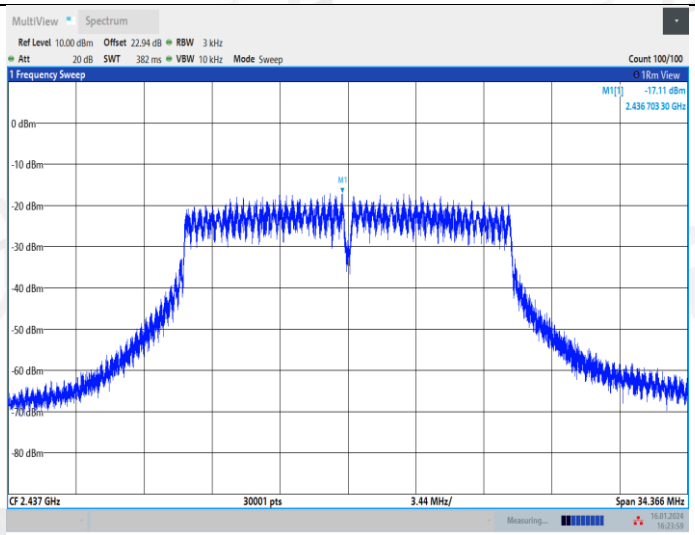
11G_Ant2_2412



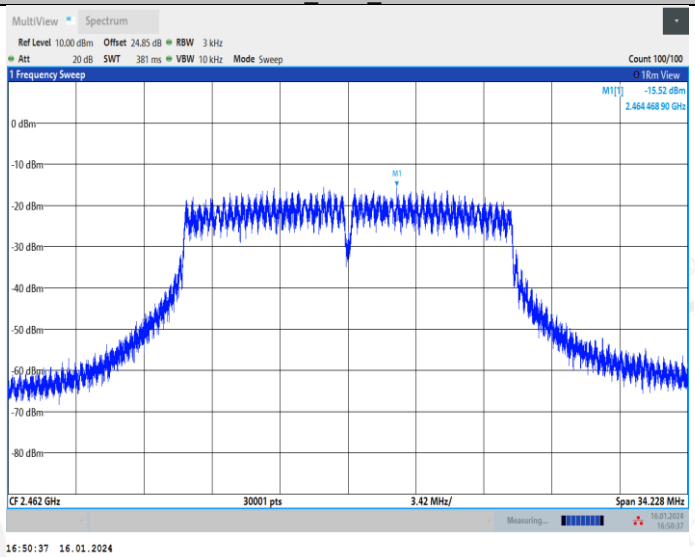
11G_Ant1_2437



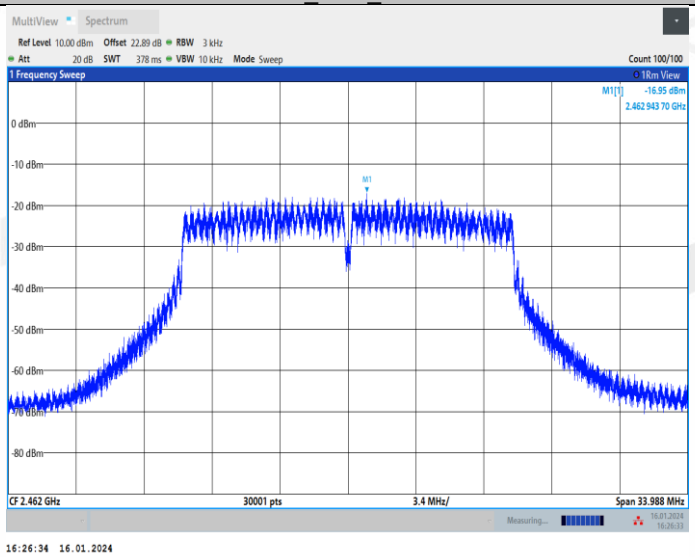
11G_Ant2_2437



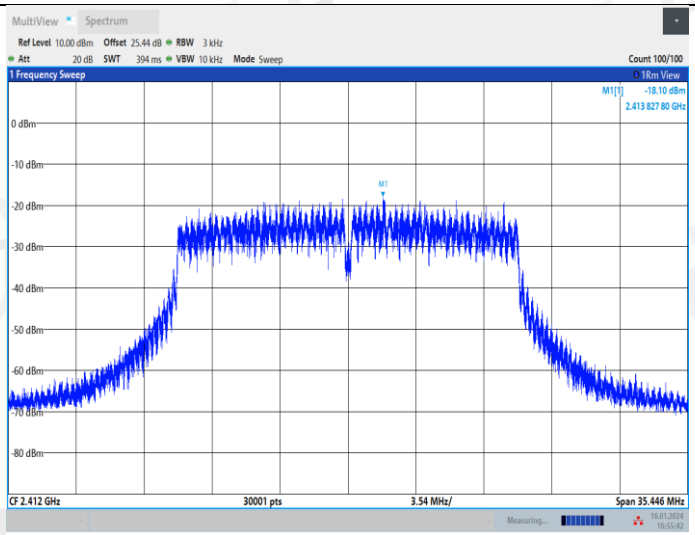
11G_Ant1_2462



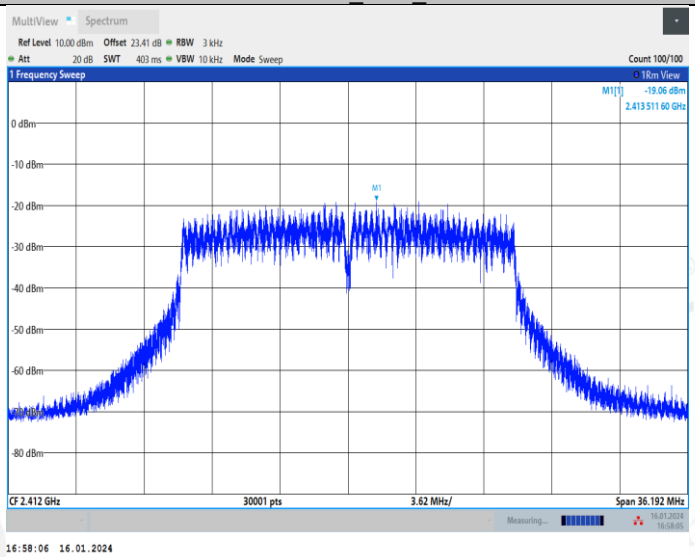
11G_Ant2_2462



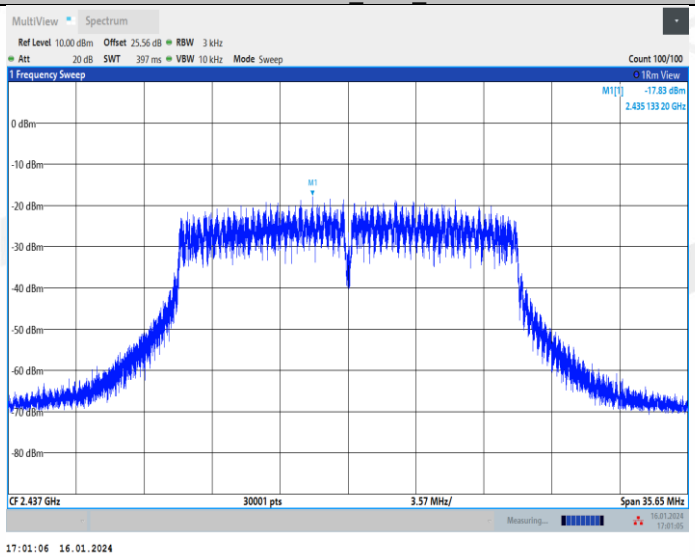
11N20MIMO_Ant1_2412



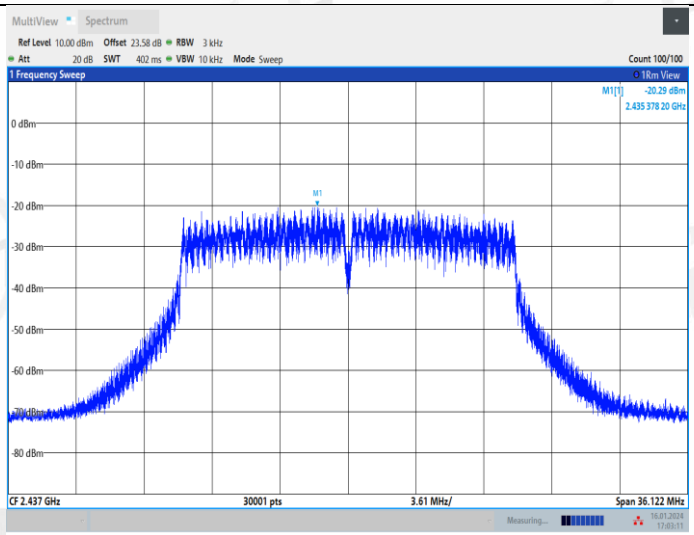
11N20MIMO_Ant2_2412



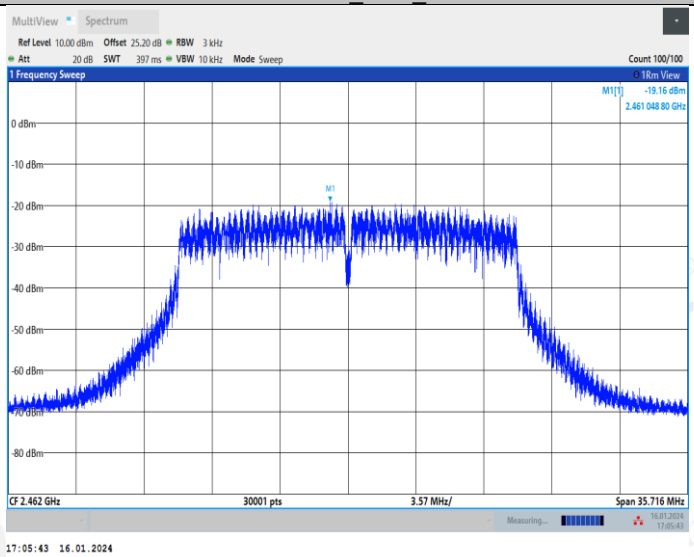
11N20MIMO_Ant1_2437



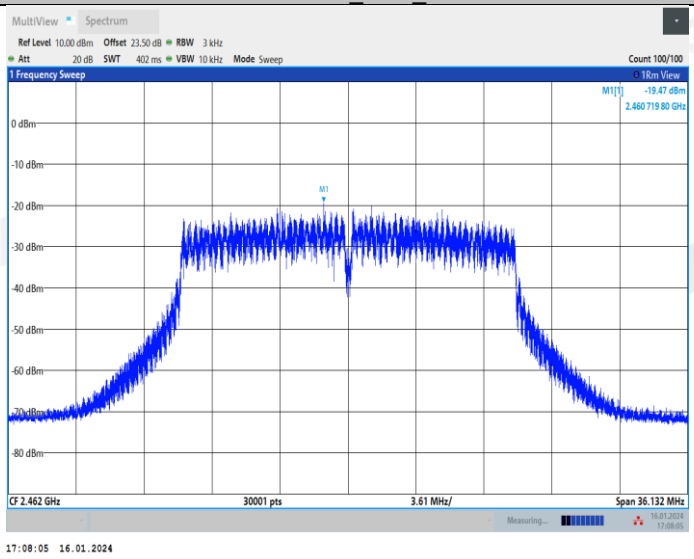
11N20MIMO_Ant2_2437



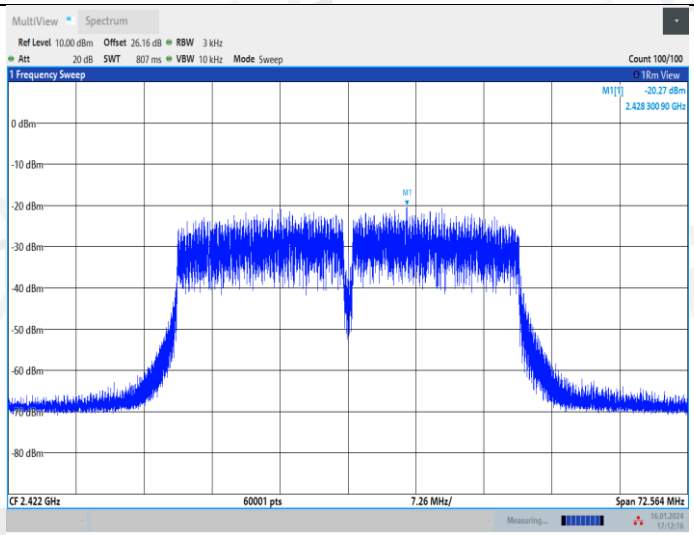
11N20MIMO_Ant1_2462



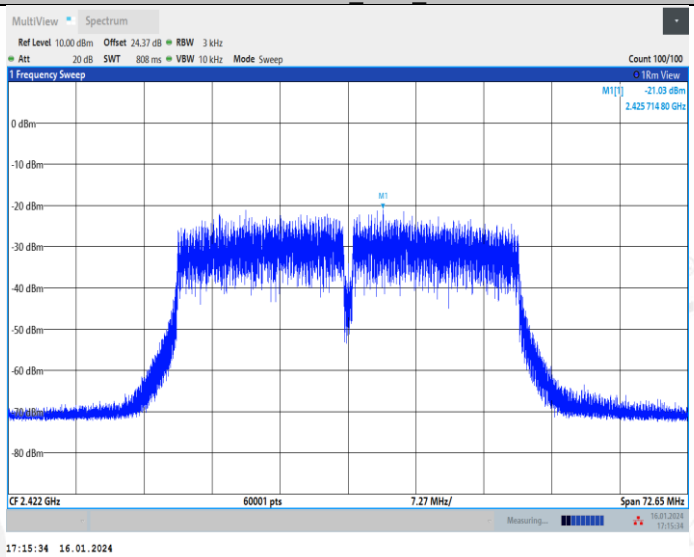
11N20MIMO_Ant2_2462



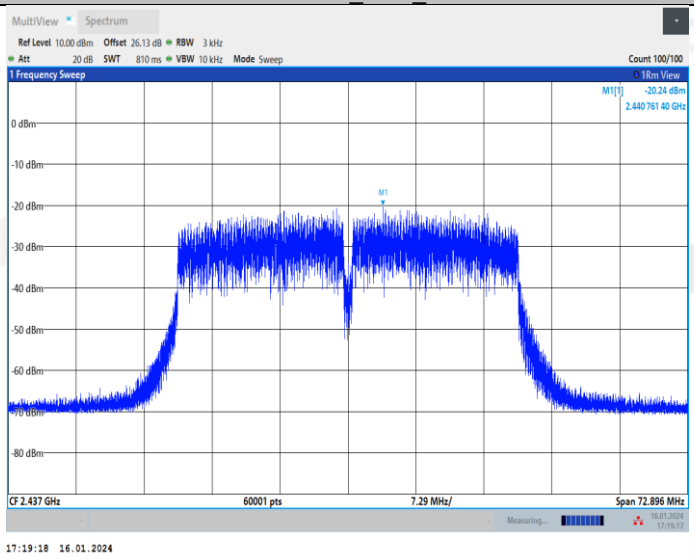
11N40MIMO_Ant1_2422



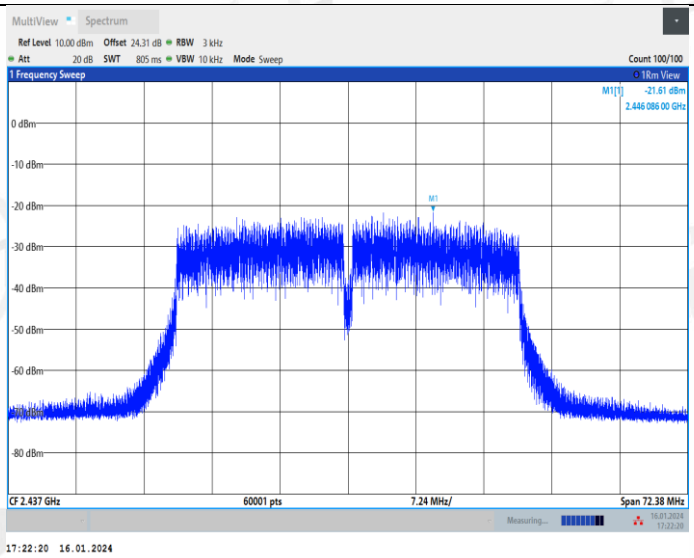
11N40MIMO_Ant2_2422



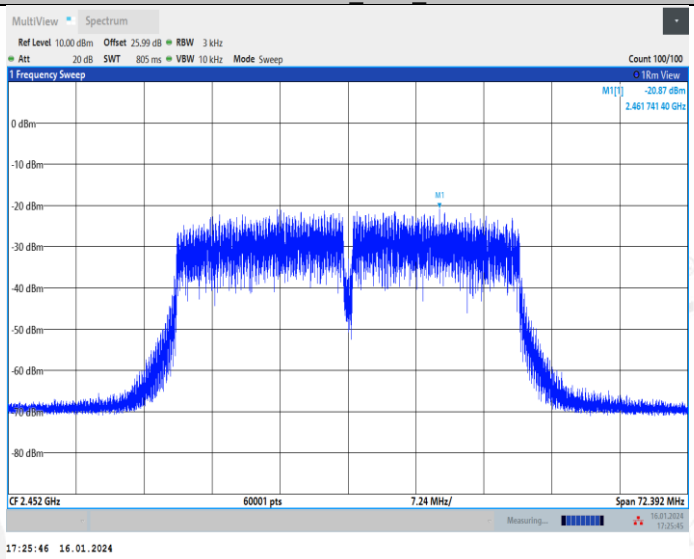
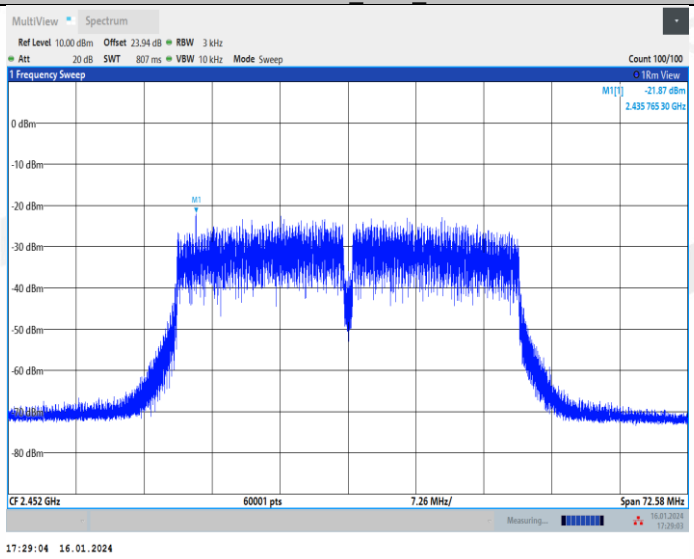
11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452



11N40MIMO_Ant2_2452