



FCC AND ISCED CERTIFICATION TEST REPORT

Applicant	:	Harman International Industries, Inc.
Address of Applicant	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Wireless Speaker
Model No.	:	ENCHANT SPEAKER
FCC ID	:	APIENCHANTSPK
IC	:	6132A-ENCHANTSPK
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-RE24081509-1E03
Issue Date	:	2024/10/30
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

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Test Report Declare

Applicant	:	Harman International Industries, Inc.
Address of Applicant	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Wireless Speaker
Model No.	:	ENCHANT SPEAKER
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used:

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)

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.

Report No.:	DDT-RE24081509-1E03		
Date of Receipt:	2024/08/19	Date of Test:	2024/08/19 - 2024/10/30

Prepared By:

Bobo Chen

Bobo Chen/Engineer

Approved By:



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	2024/10/30	

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	6 dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247(a)(2), RSS-247 Issue 3 clause 5.2(a), RSS-Gen Issue 5 clause 6.7	/	Pass
2	Peak Output Power	FCC Part 15: 15.247(b)(3), RSS-247 Issue 3 clause 5.4(d)	/	Pass
3	Power Spectral Density	FCC Part 15:15.247(e), RSS-247 Issue 3 clause 5.2(b)	/	Pass
4	RF Conducted Spurious Emissions	FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5	/	Pass
5	Radiated Emission	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5, RSS-Gen Issue 5 clause 8.9, RSS-Gen Issue 5 clause 8.10	/	Pass
6	Band Edge Compliance	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d), RSS-247 Issue 3 clause 5.5, RSS-Gen Issue 5 clause 8.9, RSS-Gen Issue 5 clause 8.10	/	Pass
7	Antenna Requirement	FCC Part 15: 15.203, RSS-Gen Issue 5 clause 6.8	/	Pass
8	Power Line Conducted Emissions	FCC Part 15: 15.207(a), RSS-Gen Issue 5 clause 8.8	/	Pass
Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.				

2. General Test Information

2.1. Description of EUT

EUT Name	: Wireless Speaker
Model Number	: ENCHANT SPEAKER
EUT Function Description	: Please reference user manual of this device
Power Supply	: AC 100-240V ~ 50/60Hz

Note: This EUT support Bluetooth BR/EDR/LE, 2.4 GHz WLAN, 5 GHz WLAN, this report only for 2.4 GHz WLAN.

Radio Technology	: IEEE 802.11b/g/n/ax
Operation frequency	: IEEE 802.11b: 2412MHz-2462MHz IEEE 802.11g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz IEEE 802.11n HT40: 2422MHz-2452MHz IEEE 802.11ax HE20: 2412MHz-2462MHz IEEE 802.11ax HE40: 2422MHz-2452MHz
Modulation	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDM, OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)

Antenna information			
Antenna Type		FPC	
/		Ant1 gain	Ant2 gain
Max Antenna Gain(dBi)	IEEE 802.11b	2.67	2.30
	IEEE 802.11g	2.67	2.30
	IEEE 802.11n HT20	2.67	2.30
	IEEE 802.11n HT40	2.67	2.30
	IEEE 802.11ax HE20	2.67	2.30
	IEEE 802.11ax HE40	2.67	2.30

Note: This product does not support beamforming.

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	/	/

Operating Mode	Resource Unit	26 Tone(2M)	
IEEE 802.11ax(HE20)	Specific Resource Unit	0	
		1	
		2	
		3	
		4	
		5	
		6	
		7	
		8	
	Resource Unit	52 Tone(4M)	
	Specific Resource Unit	37	
		38	
		39	
		40	
	Resource Unit	106 Tone(8M)	
	Specific Resource Unit	53	
		54	
	Resource Unit	242 Tone(20M)	
	Specific Resource Unit	61	
Operating Mode	Resource Unit	26 Tone(2M)	
IEEE 802.11ax(HE40)	Specific Resource Unit	0	9
		1	10
		2	11
		3	12
		4	13
		5	14
		6	15
		7	16
		8	17
	Resource Unit	52 Tone(4M)	
	Specific Resource Unit	37	41
		38	42
		39	43
		40	44
	Resource Unit	106 Tone(8M)	
	Specific Resource Unit	53	55
		54	56
	Resource Unit	242 Tone(20M)	

	Specific Resource Unit	61	62
	Resource Unit	484 Tone(40M)	
	Specific Resource Unit	65	

Note: 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.

“☑” means to be chosen or applicable; “☐” means don't to be chosen or not applicable; This note applies to entire report.

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
AC cable	Harman	N/A	Length: 1.40m

2.3. Block diagram of EUT configuration for test



2.4. Decision of final test mode

According pre-test, the worst test modes were reported as below:

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	15	15	1	LCH: CH1	2412
	15	15	1	MCH: CH6	2437
	15	15	1	HCH: CH11	2462
IEEE 802.11g	15	15	6	LCH: CH1	2412
	15	15	6	MCH: CH6	2437
	15	15	6	HCH: CH11	2462
IEEE 802.11n HT20	15	15	MCS 8	LCH: CH1	2412
	15	15	MCS 8	MCH: CH6	2437
	15	15	MCS 8	HCH: CH11	2462
IEEE 802.11n HT40	10	10	MCS 8	LCH: CH3	2422
	10	10	MCS 8	MCH: CH6	2437
	10	10	MCS 8	HCH: CH9	2452
IEEE 802.11ax HE20	SU: 15 RU: 10	SU: 15 RU: 10	MCS 0	LCH: CH1	2412
	SU: 15 RU: 10	SU: 15 RU: 10	MCS 0	MCH: CH6	2437
	SU: 15 RU: 10	SU: 15 RU: 10	MCS 0	HCH: CH11	2462
IEEE 802.11ax HE40	SU: 10 RU: 10	SU: 10 RU: 10	MCS 0	LCH: CH3	2422
	SU: 10 RU: 10	SU: 10 RU: 10	MCS 0	MCH: CH6	2437
	SU: 10 RU: 10	SU: 10 RU: 10	MCS 0	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

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	+15°C to +35 °C
Humidity range:	20% to 75%
Pressure range:	86 kPa to 106 kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

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 ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
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)

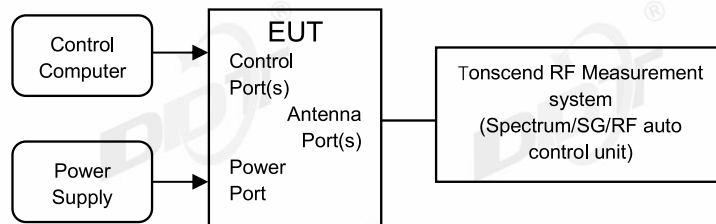
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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	2025/03/31
Wideband Radio Communication Tester	R&S	CMW500	168801	2025/03/31
MXG Vector Signal Generator	Agilent	N5182A	MY48180737	2025/03/31
PSG Vector Signal Generator	Agilent	E8267D	US49060192	2025/08/25
RF Control Unit	Tonsend	JS0806-2	2118060485	2025/03/31
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2025/04/22
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:	$\geq [3 \times \text{RBW}]$
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

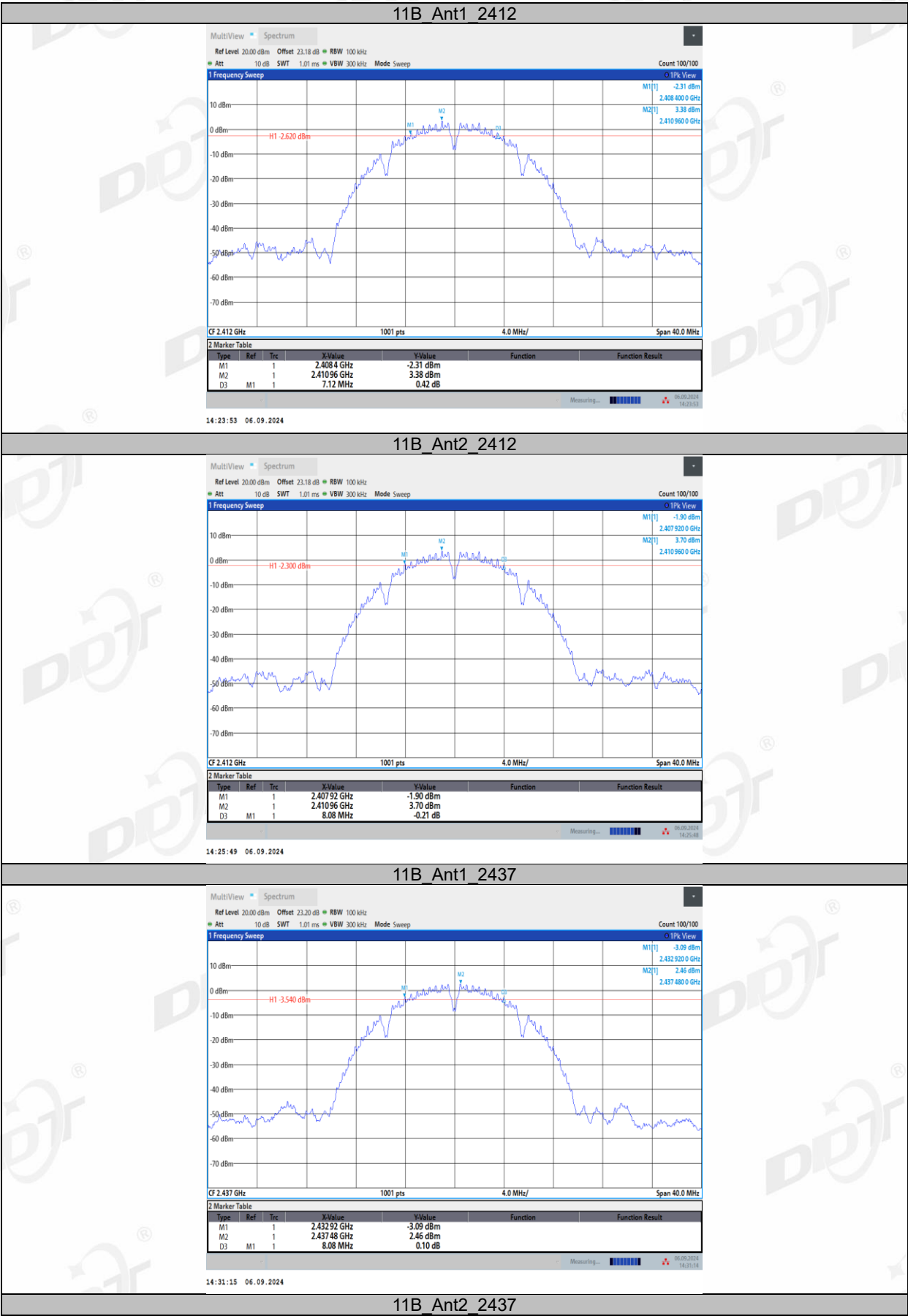
Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report

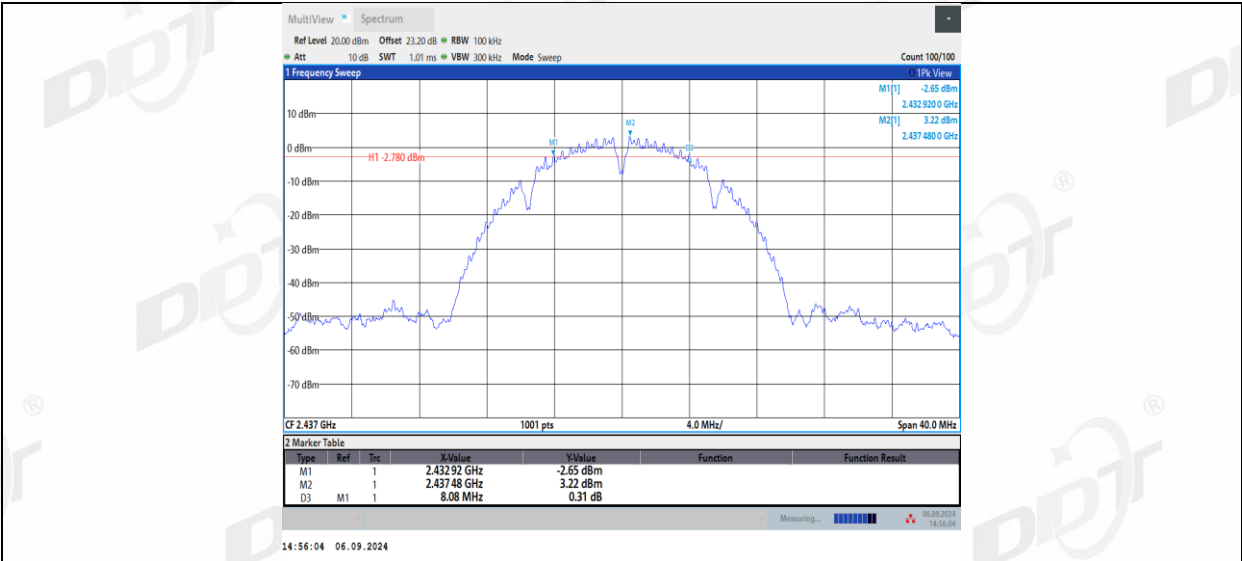
4.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	25.6-27.4℃,48.1-50.3%RH	Test Date:	2024.09.06-2024.09.12
Test Power Supply:	AC 120V/60Hz	Sample Number:	S24081509-002

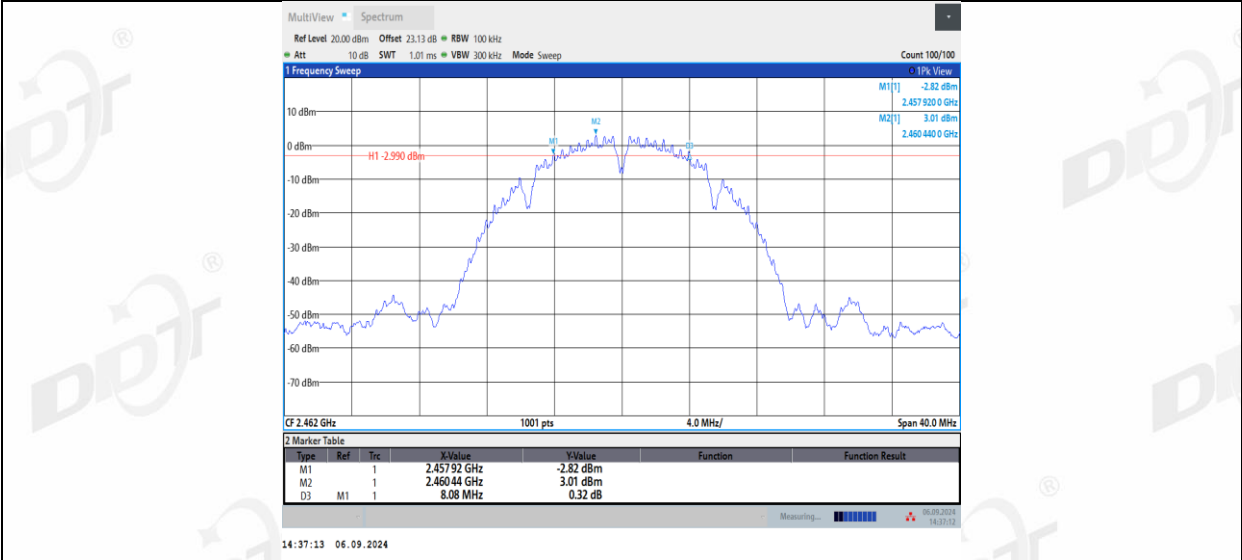
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	7.12	2408.40	2415.52	0.5	PASS
	Ant2	2412	8.08	2407.92	2416.00	0.5	PASS
	Ant1	2437	8.08	2432.92	2441.00	0.5	PASS
	Ant2	2437	8.08	2432.92	2441.00	0.5	PASS
	Ant1	2462	8.08	2457.92	2466.00	0.5	PASS
	Ant2	2462	7.12	2458.40	2465.52	0.5	PASS
11G	Ant1	2412	15.12	2404.40	2419.52	0.5	PASS
	Ant2	2412	15.12	2404.40	2419.52	0.5	PASS
	Ant1	2437	15.80	2429.04	2444.84	0.5	PASS
	Ant2	2437	15.76	2429.08	2444.84	0.5	PASS
	Ant1	2462	15.48	2454.04	2469.52	0.5	PASS
	Ant2	2462	15.48	2454.04	2469.52	0.5	PASS
11N20MI MO	Ant1	2412	15.12	2404.40	2419.52	0.5	PASS
	Ant2	2412	15.12	2404.40	2419.52	0.5	PASS
	Ant1	2437	15.96	2429.40	2445.36	0.5	PASS
	Ant2	2437	17.52	2428.20	2445.72	0.5	PASS
	Ant1	2462	15.96	2454.40	2470.36	0.5	PASS
	Ant2	2462	16.92	2453.20	2470.12	0.5	PASS
11N40MI MO	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
11AX20M IMO	Ant1	2412	18.44	2402.80	2421.24	0.5	PASS
	Ant2	2412	18.20	2403.16	2421.36	0.5	PASS
	Ant1	2437	18.56	2427.60	2446.16	0.5	PASS
	Ant2	2437	18.80	2427.52	2446.32	0.5	PASS
	Ant1	2462	18.64	2452.60	2471.24	0.5	PASS
	Ant2	2462	18.68	2452.60	2471.28	0.5	PASS
11AX40M IMO	Ant1	2422	37.20	2403.36	2440.56	0.5	PASS
	Ant2	2422	36.96	2403.84	2440.80	0.5	PASS
	Ant1	2437	37.60	2418.28	2455.88	0.5	PASS
	Ant2	2437	36.16	2419.16	2455.32	0.5	PASS
	Ant1	2452	37.12	2433.44	2470.56	0.5	PASS
	Ant2	2452	36.00	2433.60	2469.60	0.5	PASS

4.5. Test graphs

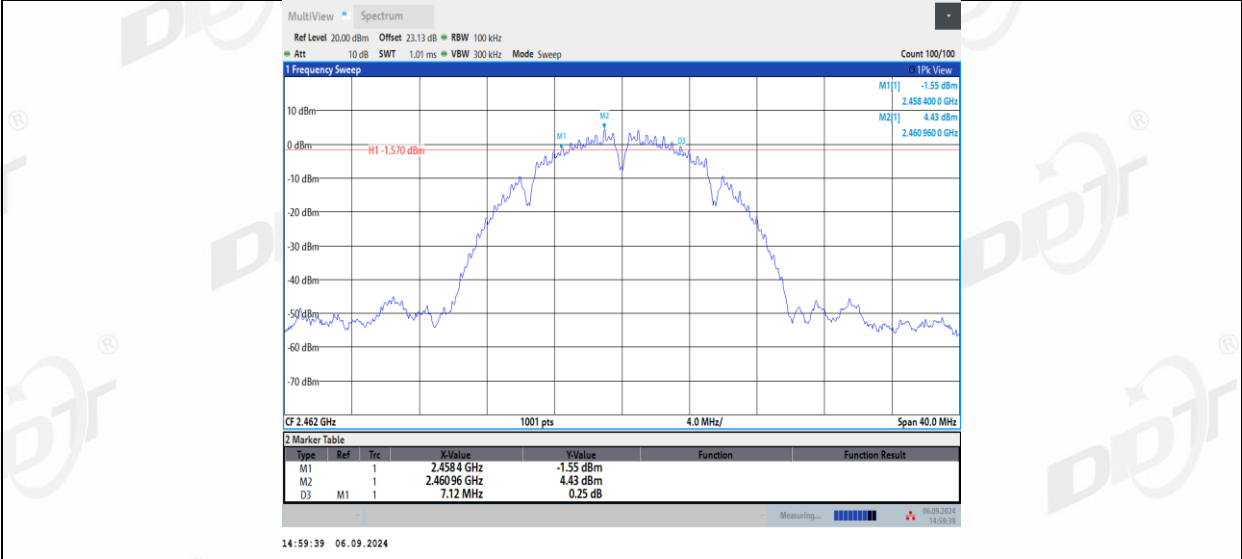




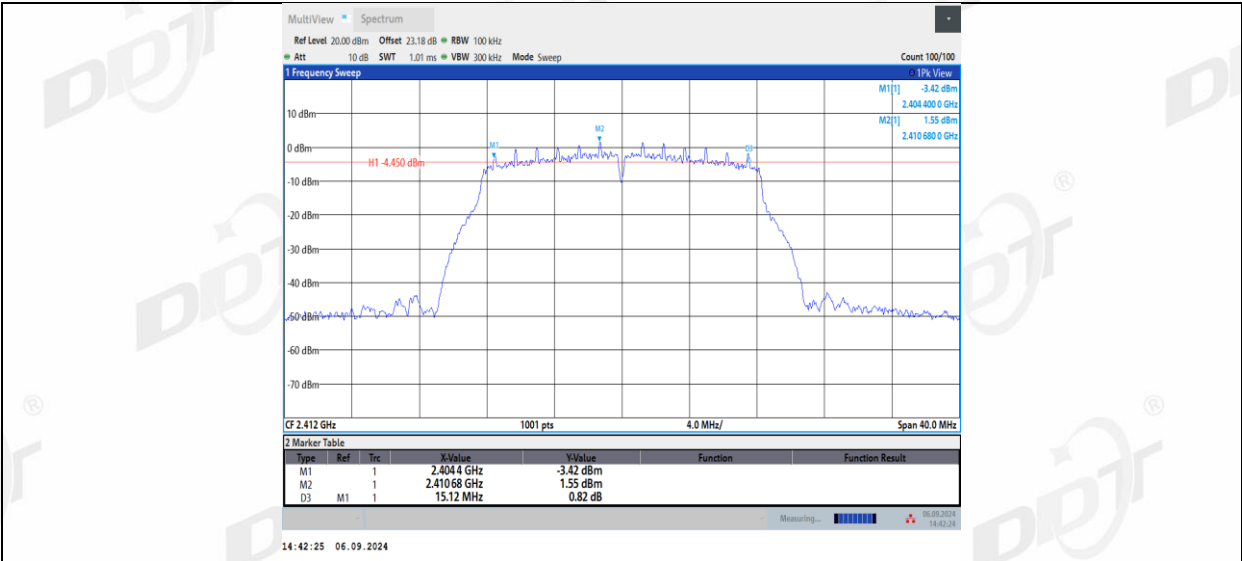
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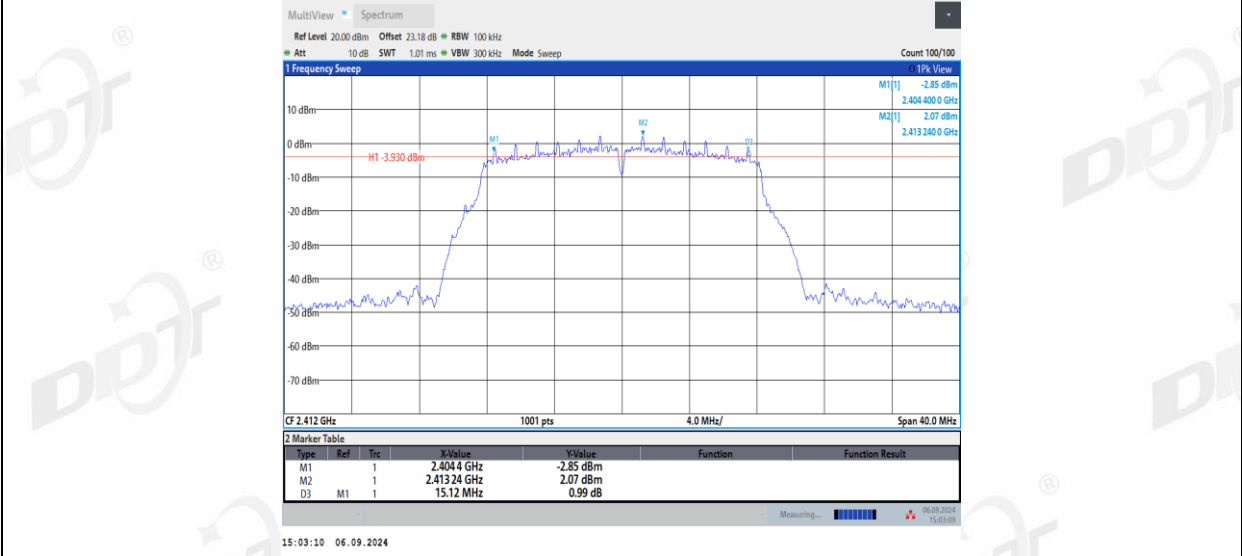
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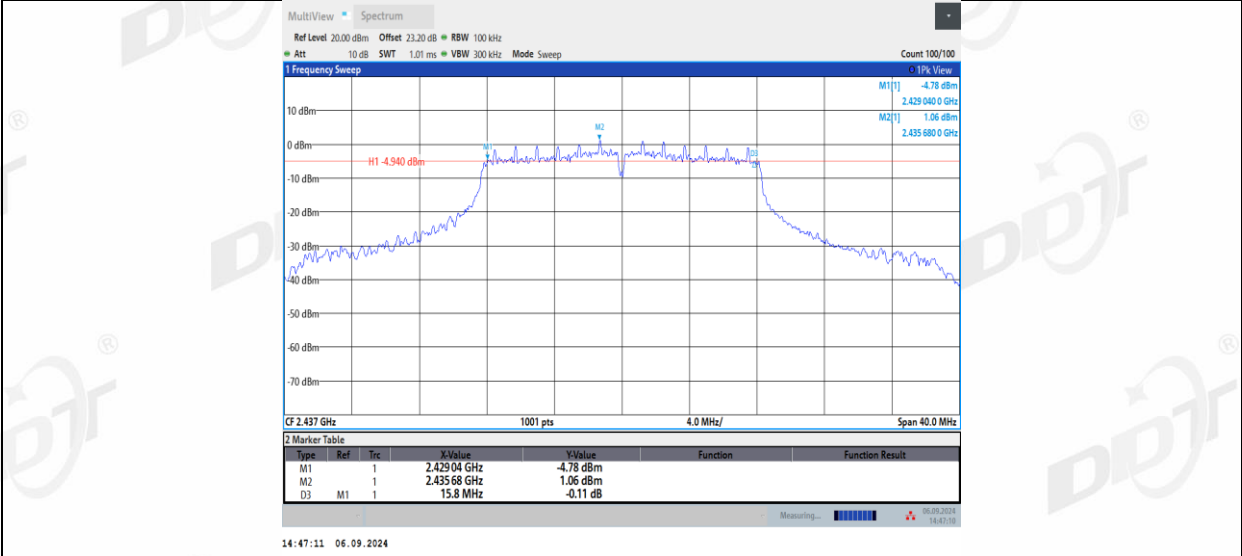
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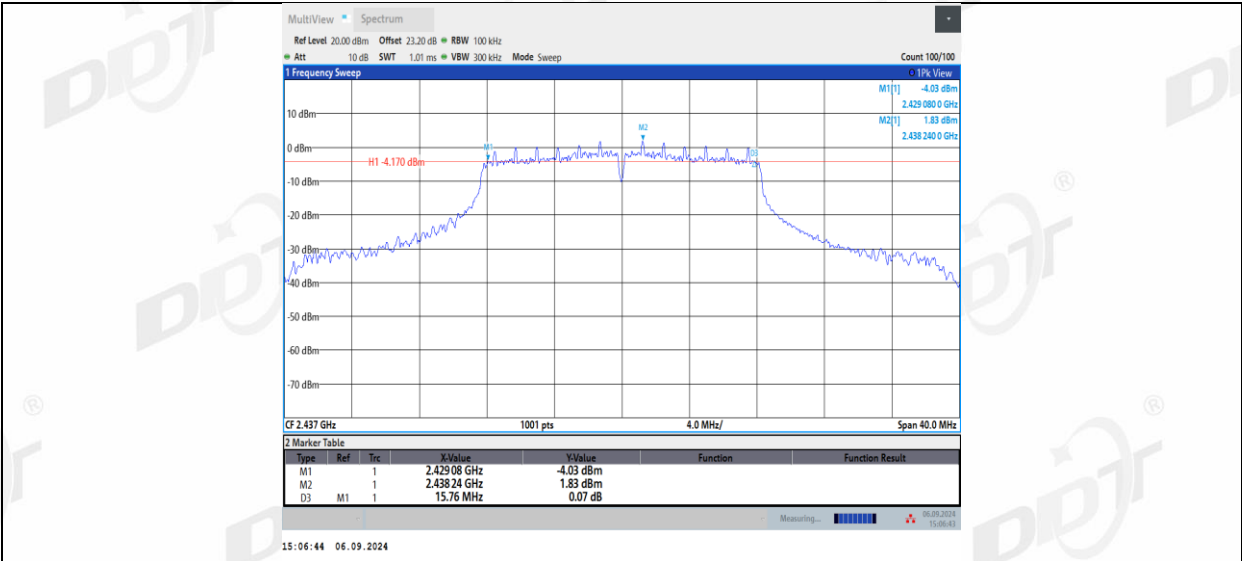
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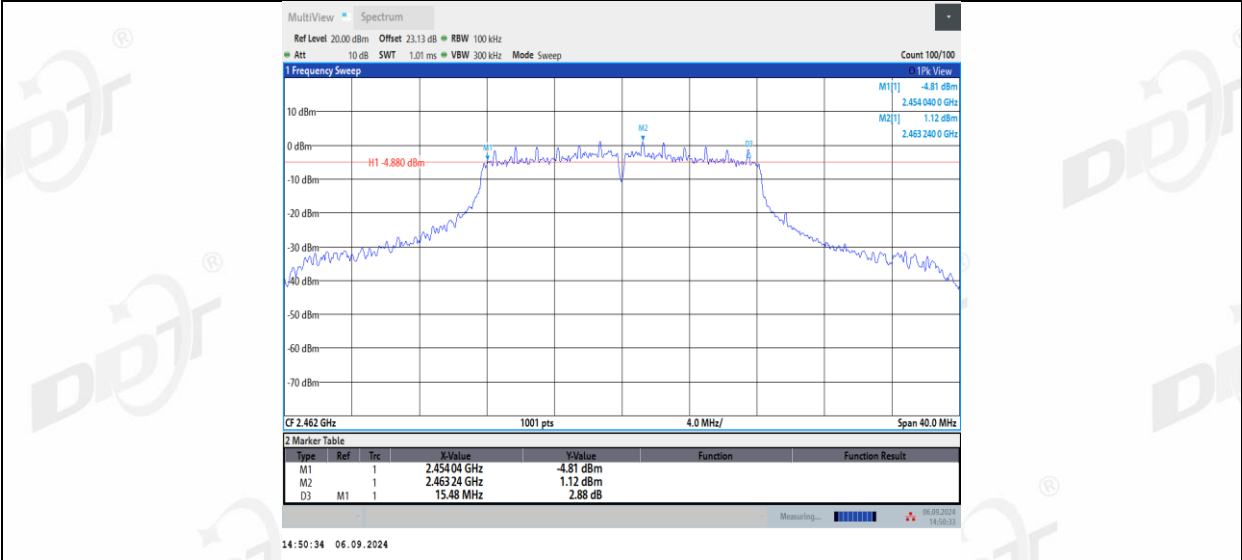
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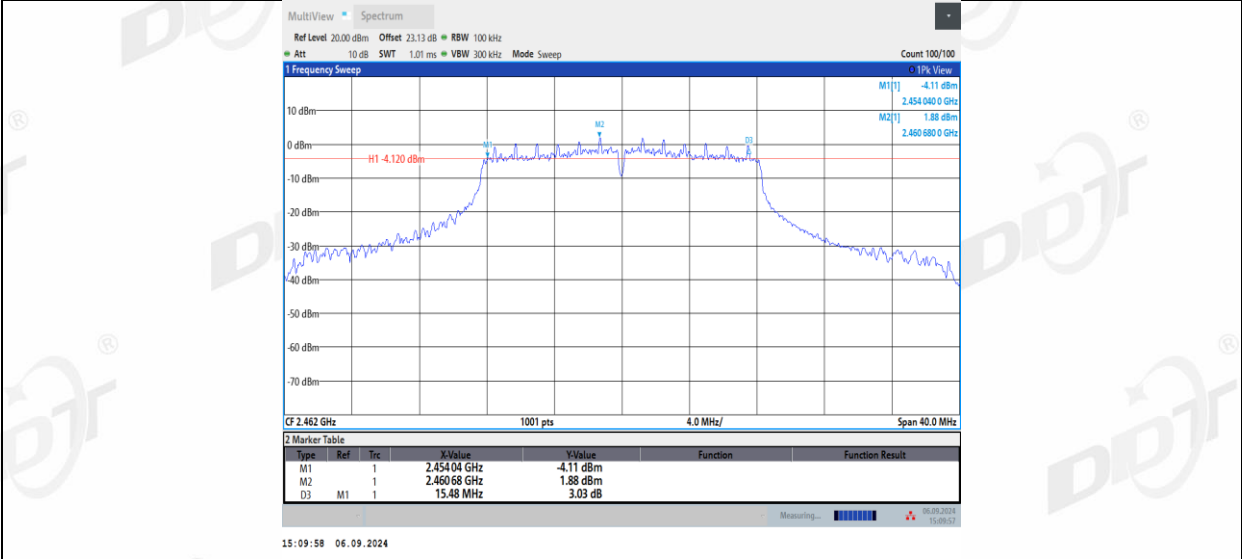
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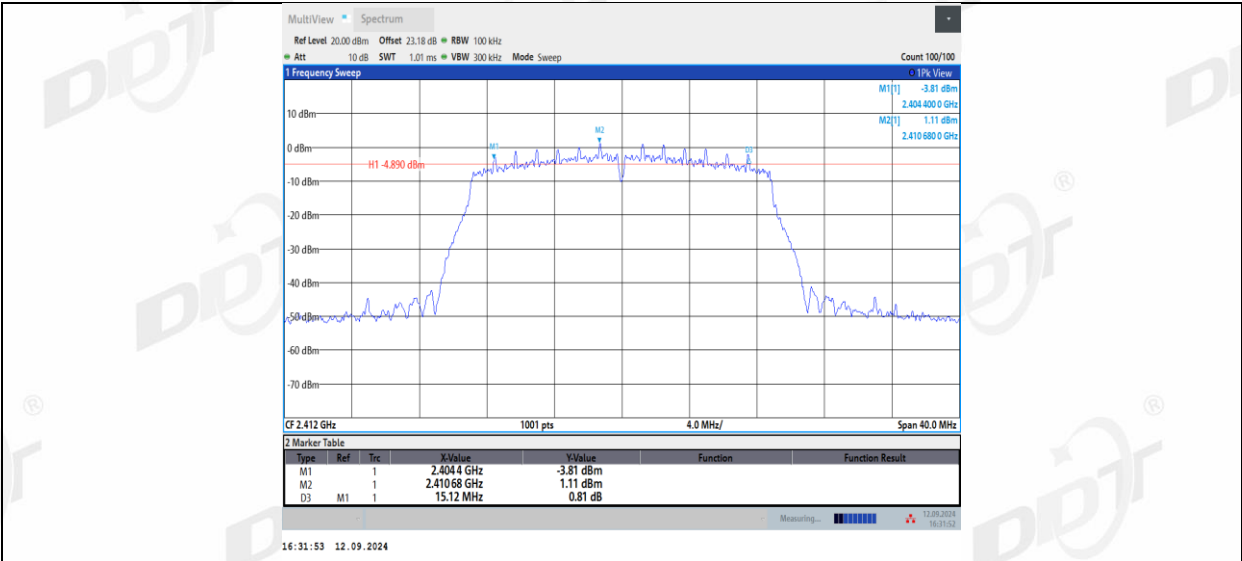
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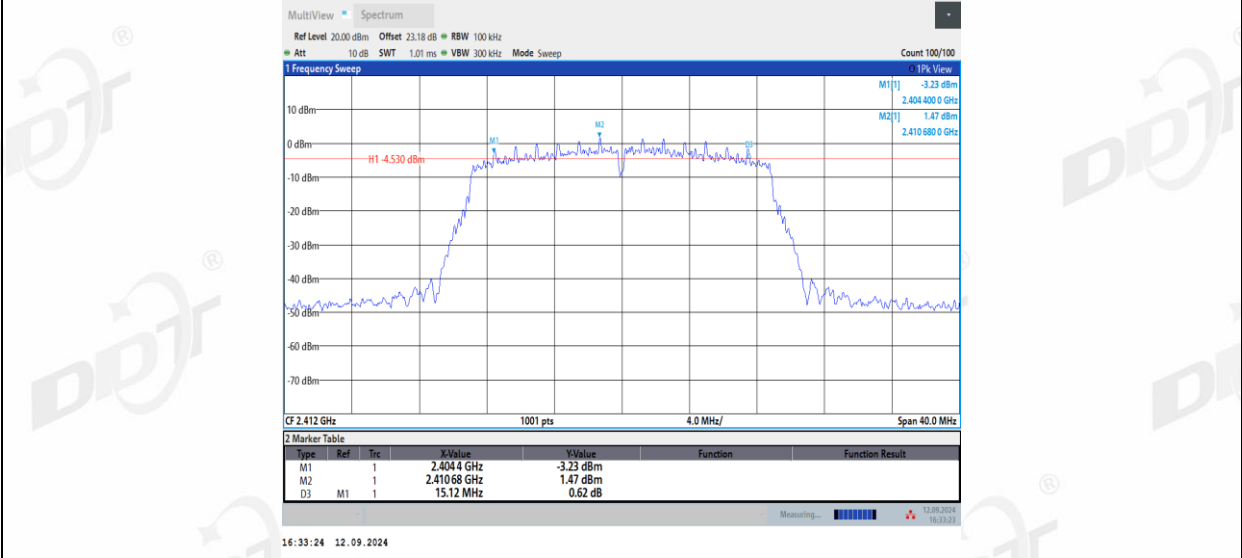
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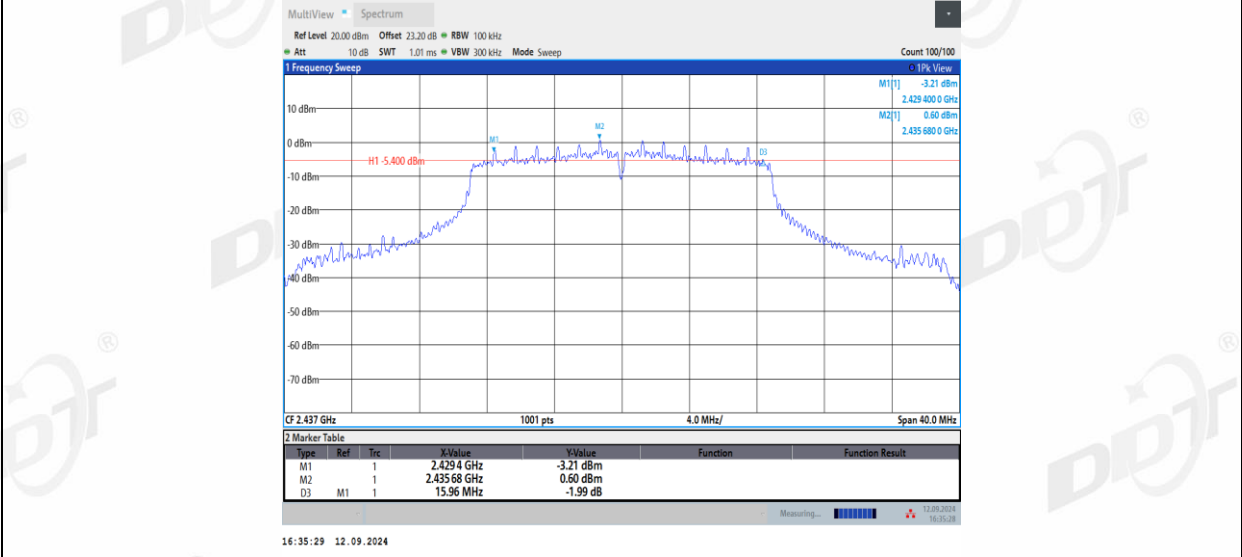
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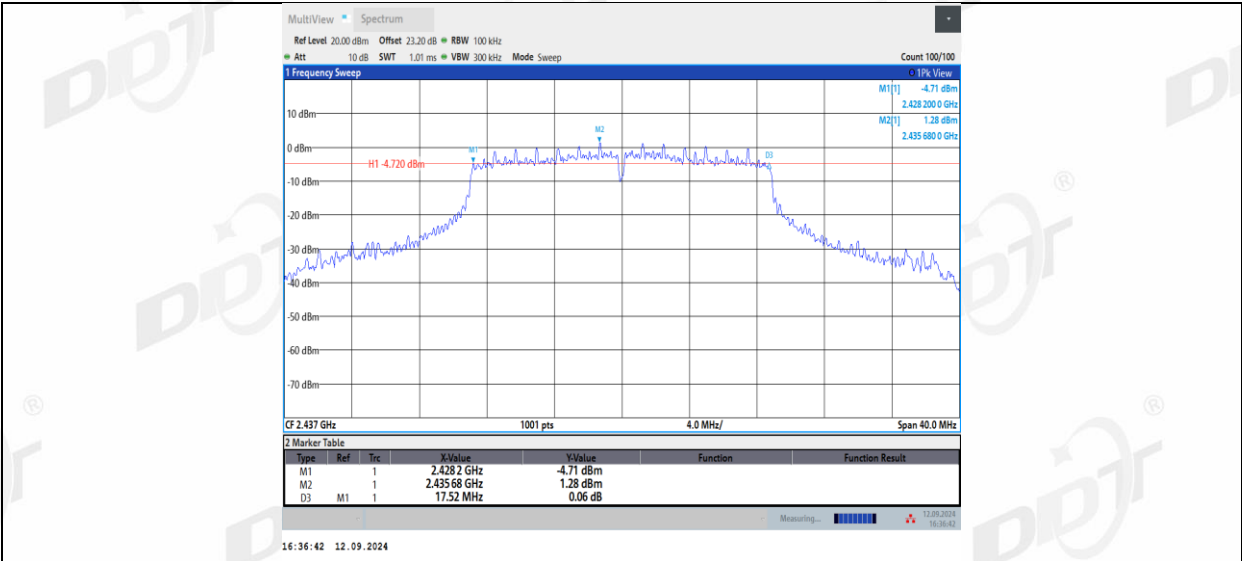
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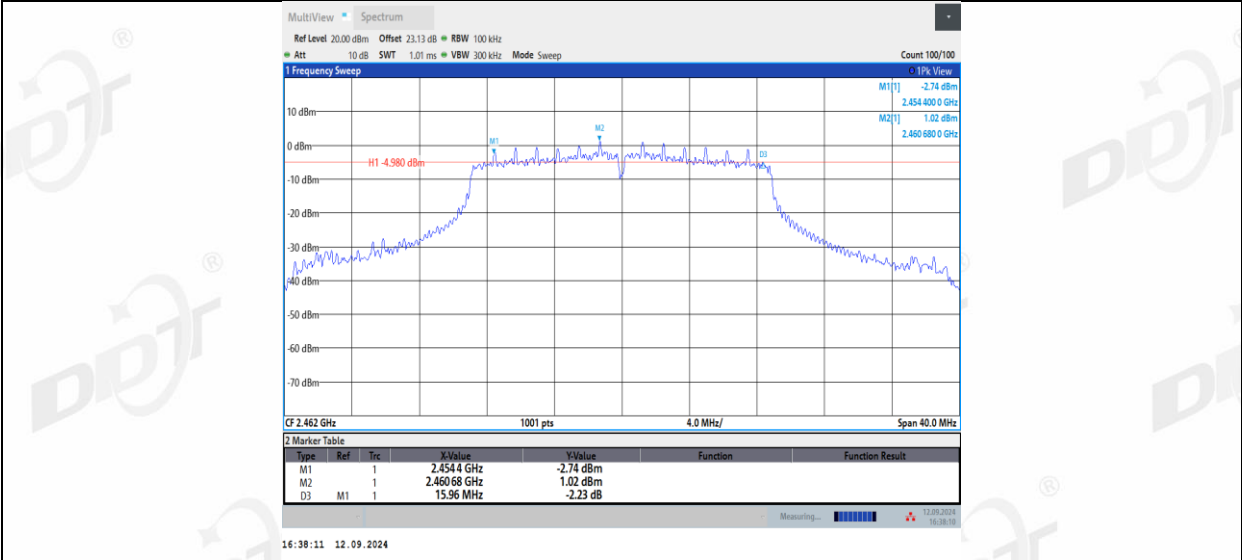
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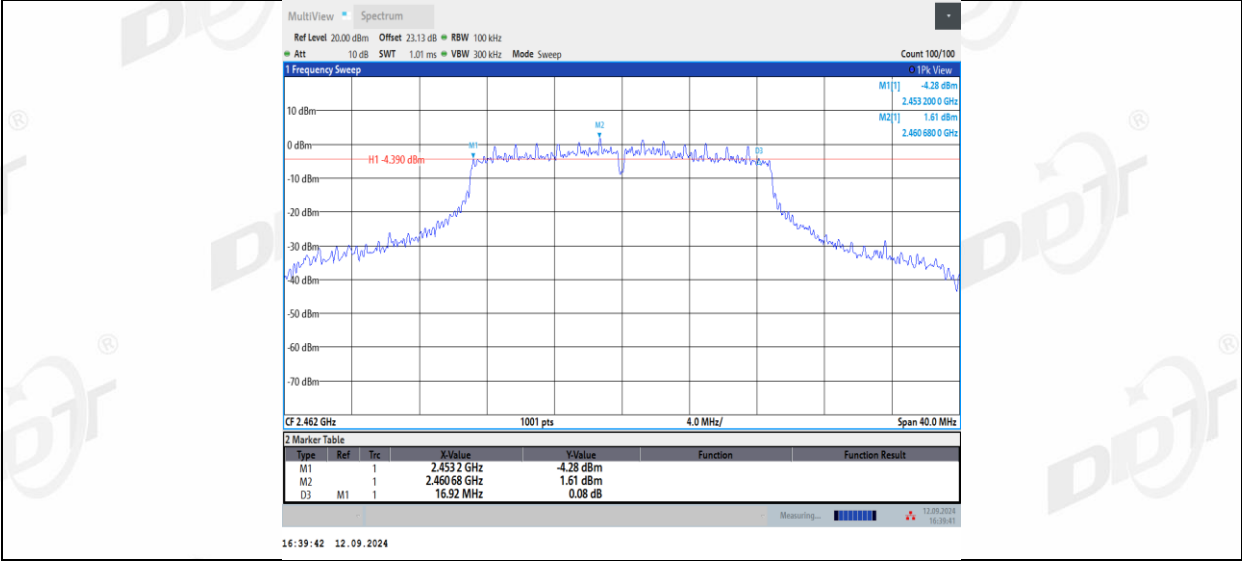
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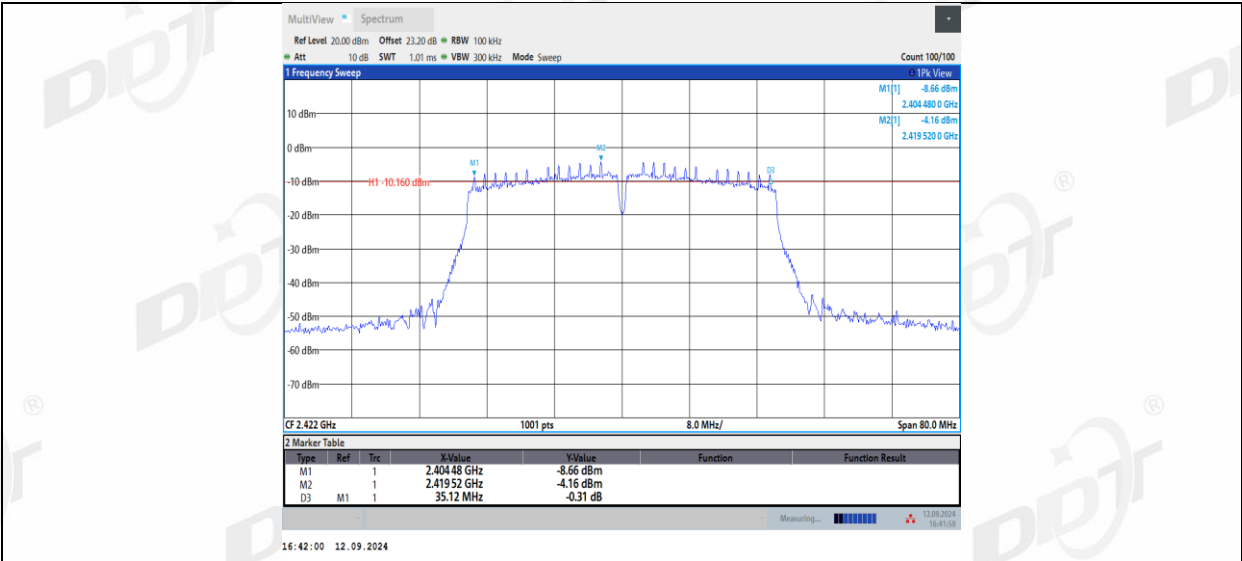
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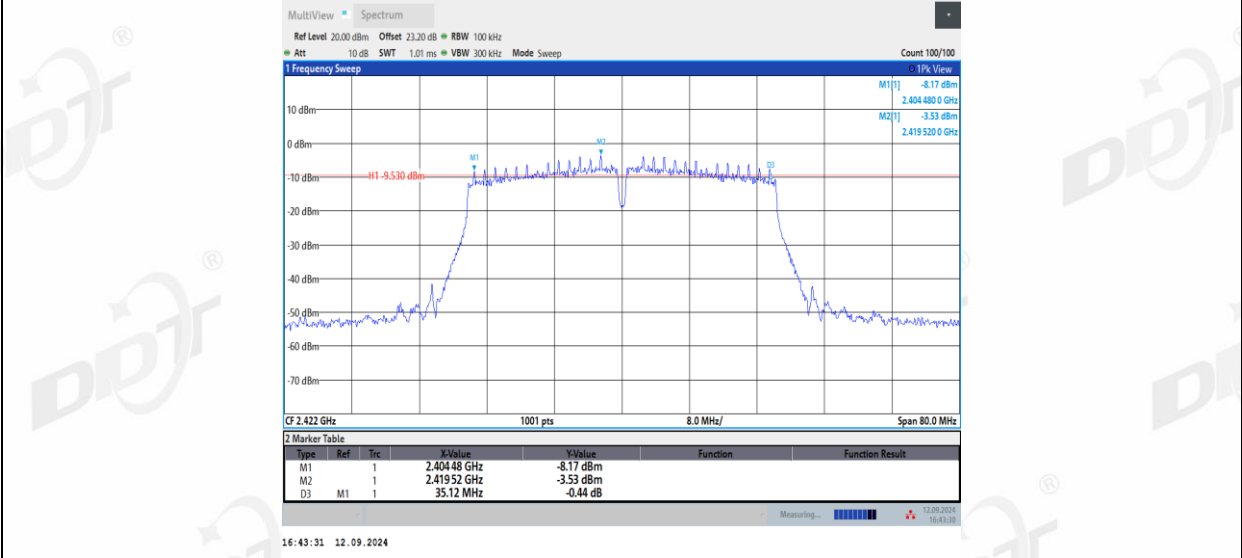
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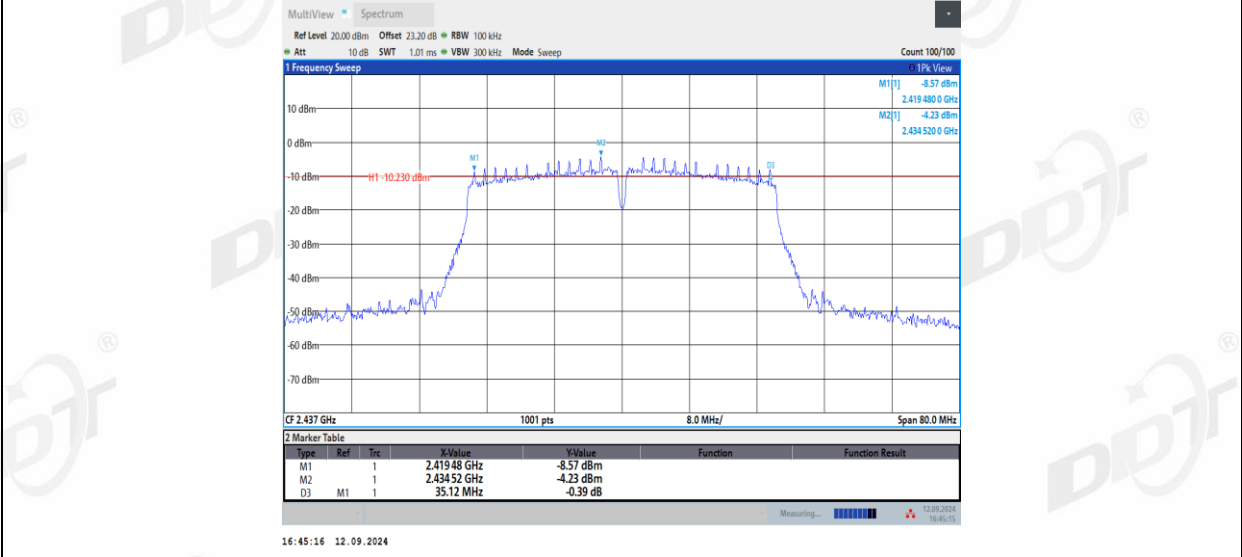
11N40MIMO_Ant1_2422



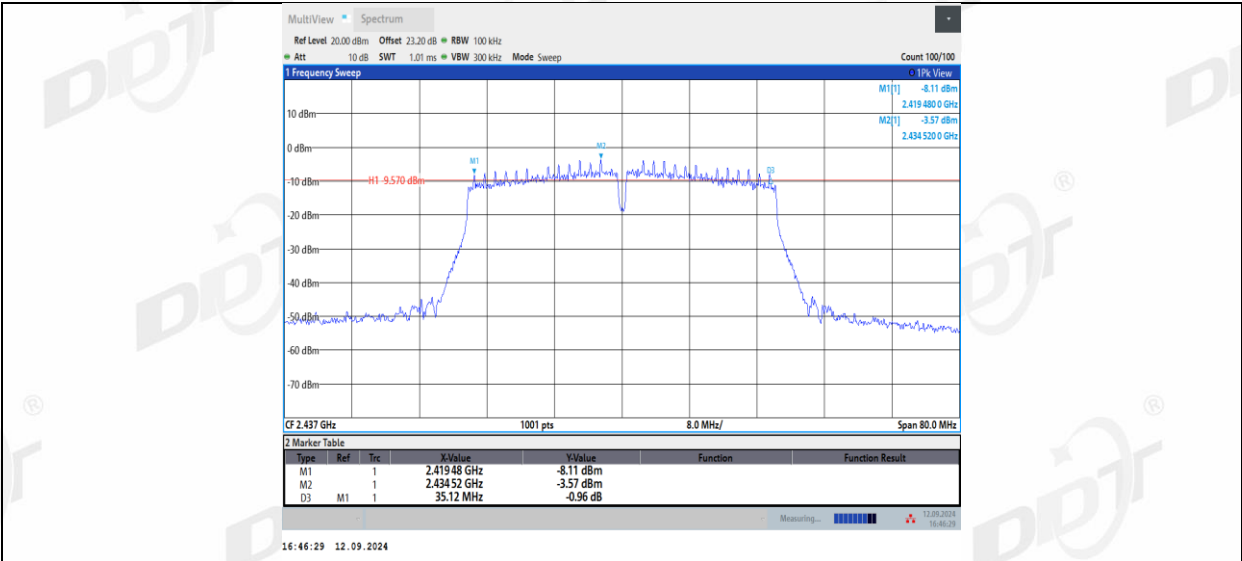
11N40MIMO_Ant2_2422



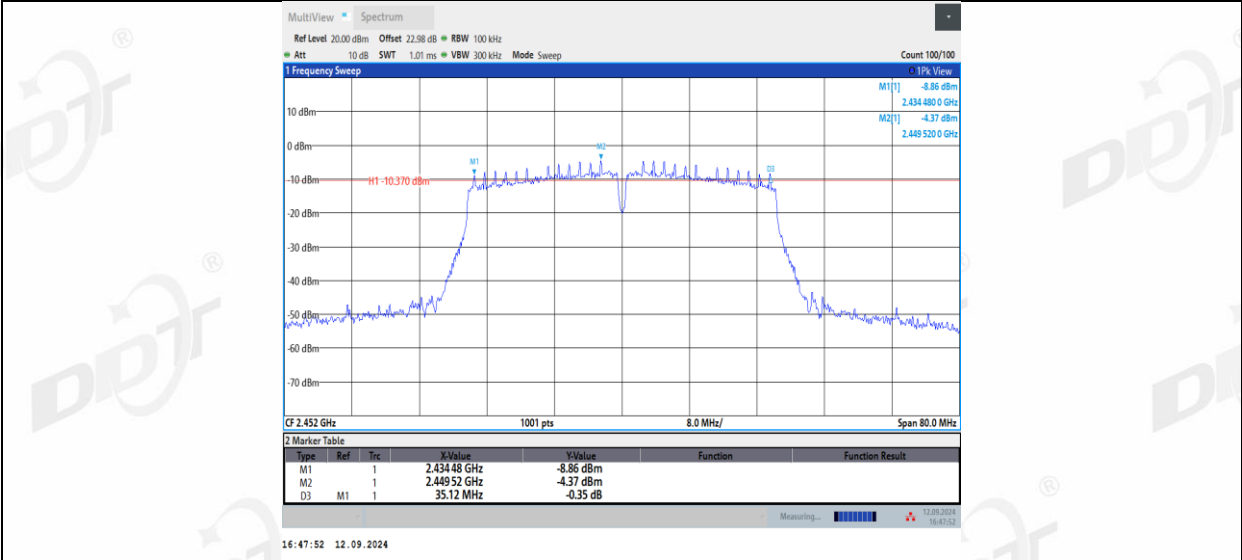
11N40MIMO_Ant1_2437



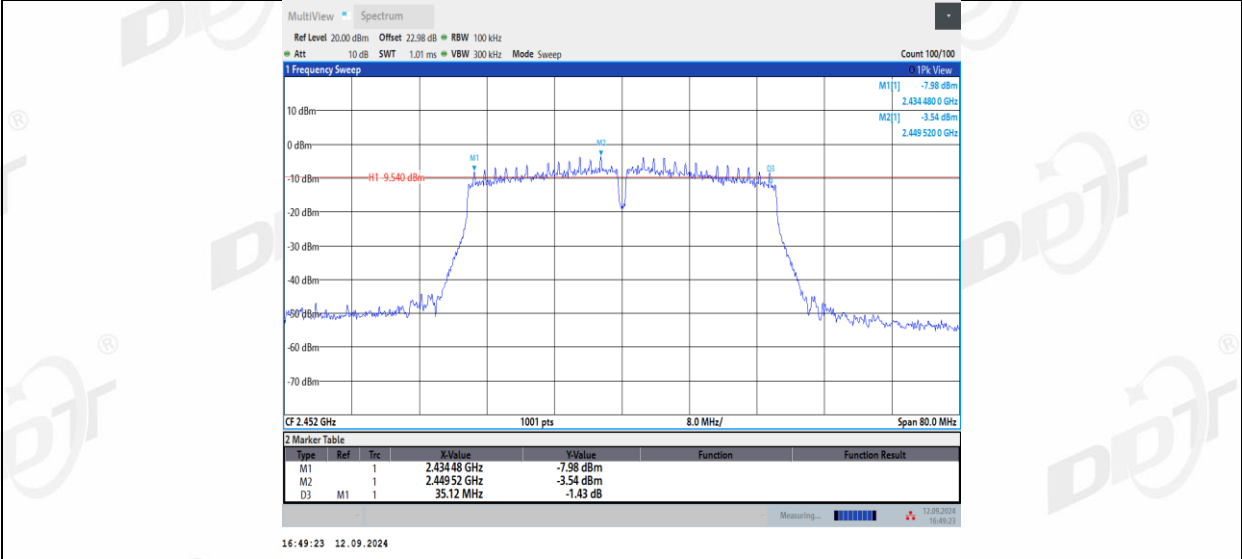
11N40MIMO_Ant2_2437



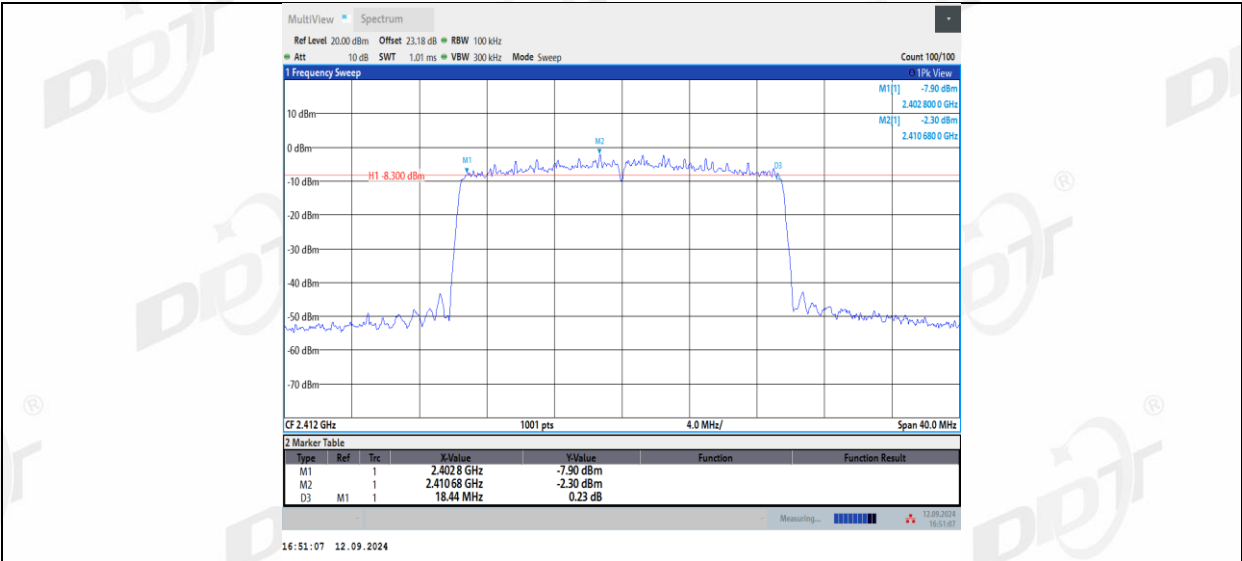
11N40MIMO_Ant1_2452



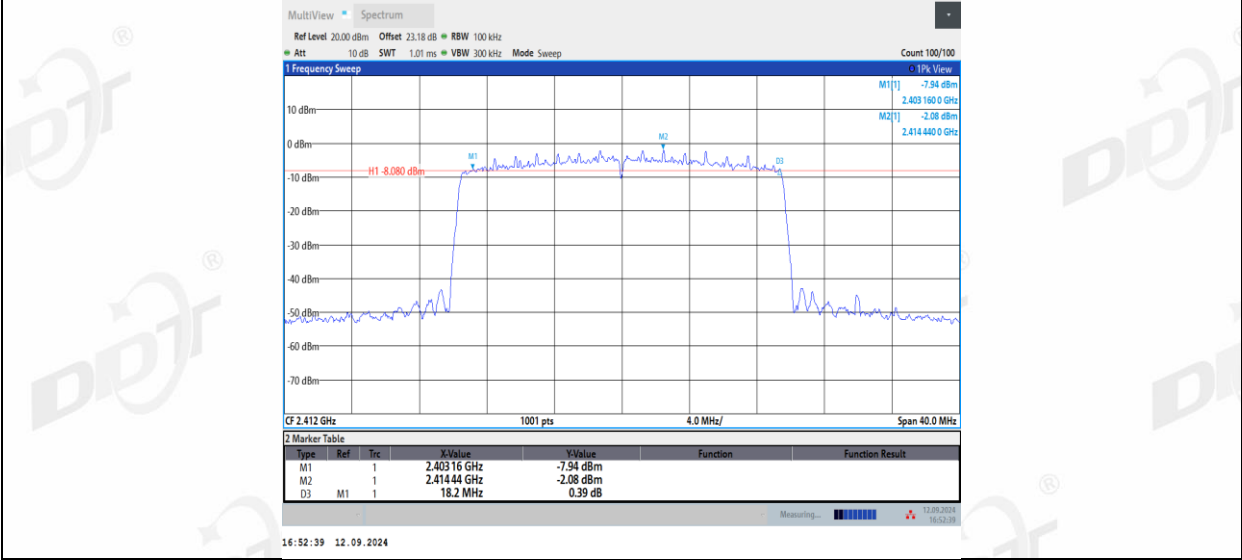
11N40MIMO_Ant2_2452



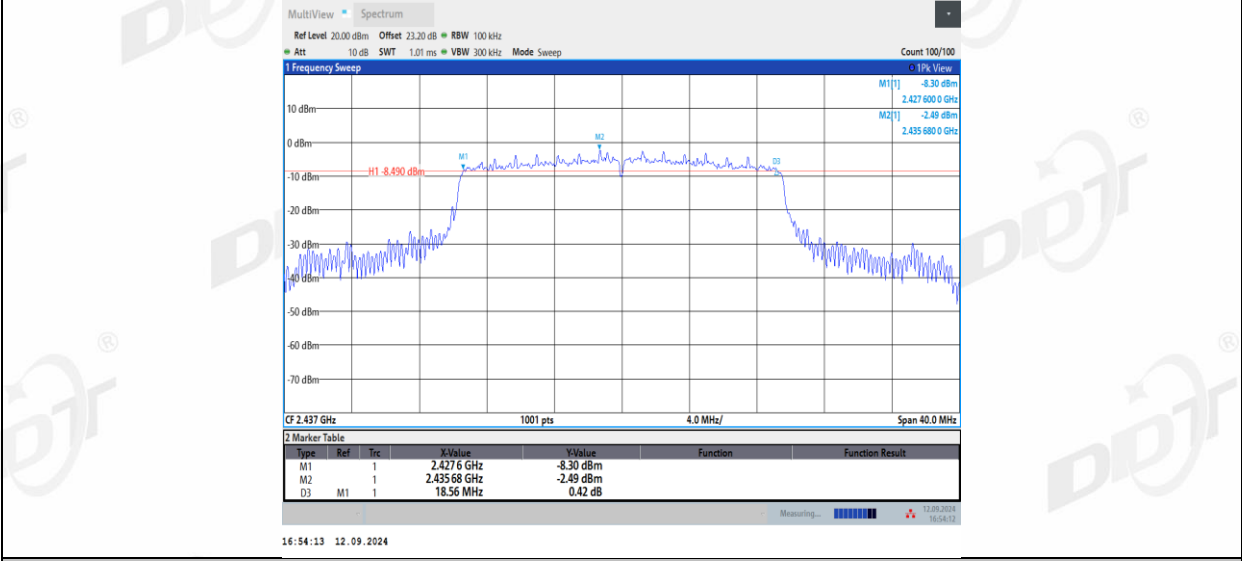
11AX20MIMO_Ant1_2412



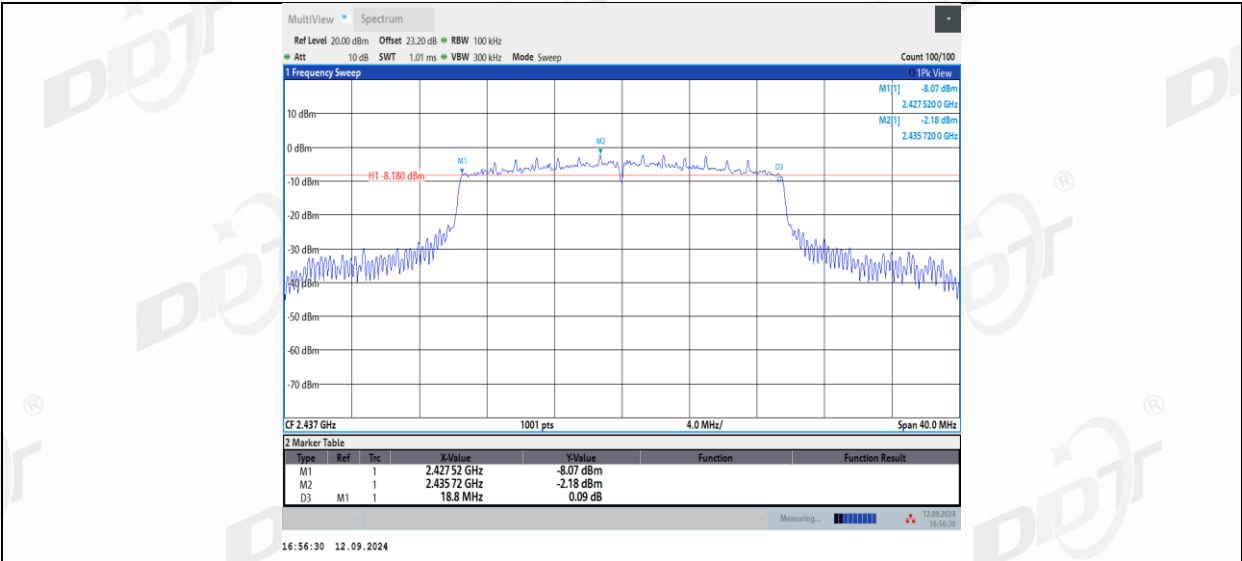
11AX20MIMO_Ant2_2412



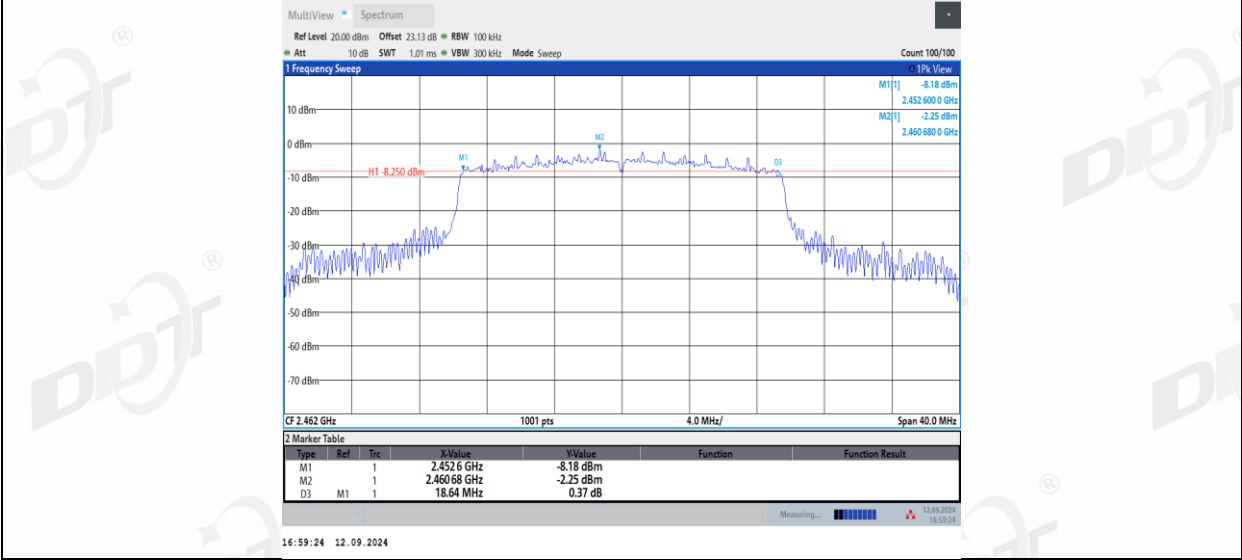
11AX20MIMO_Ant1_2437



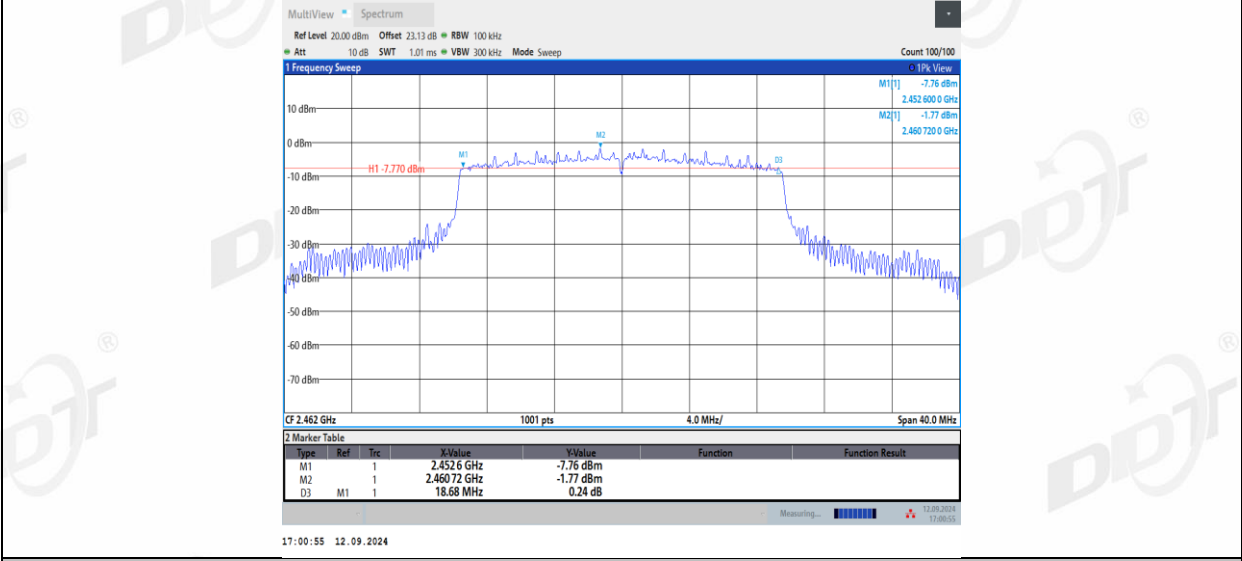
11AX20MIMO_Ant2_2437



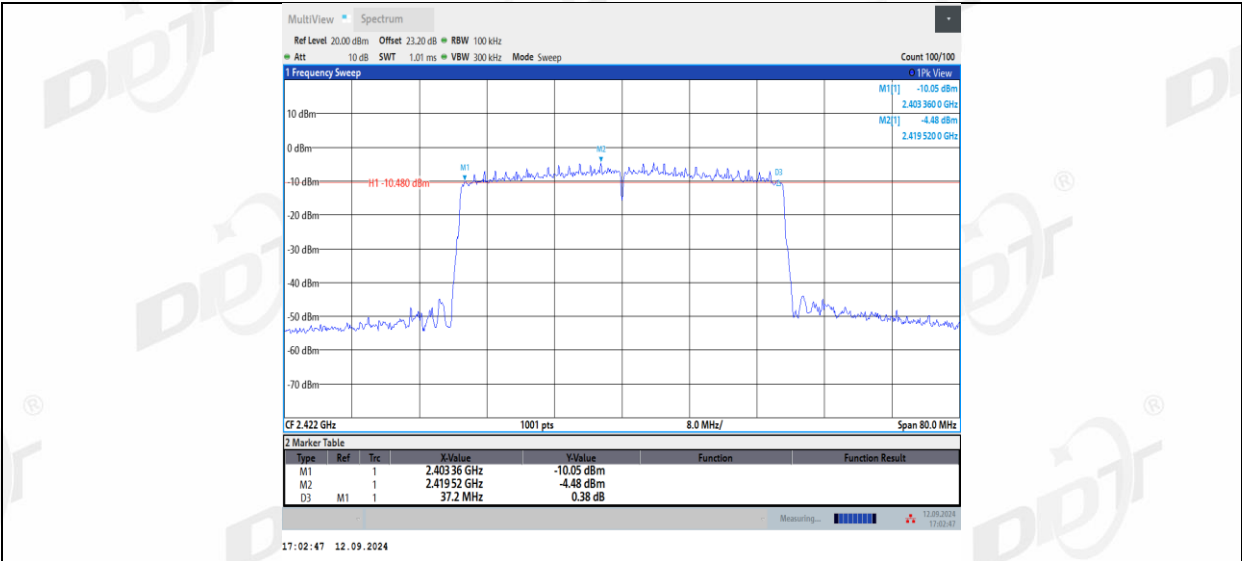
11AX20MIMO_Ant1_2462



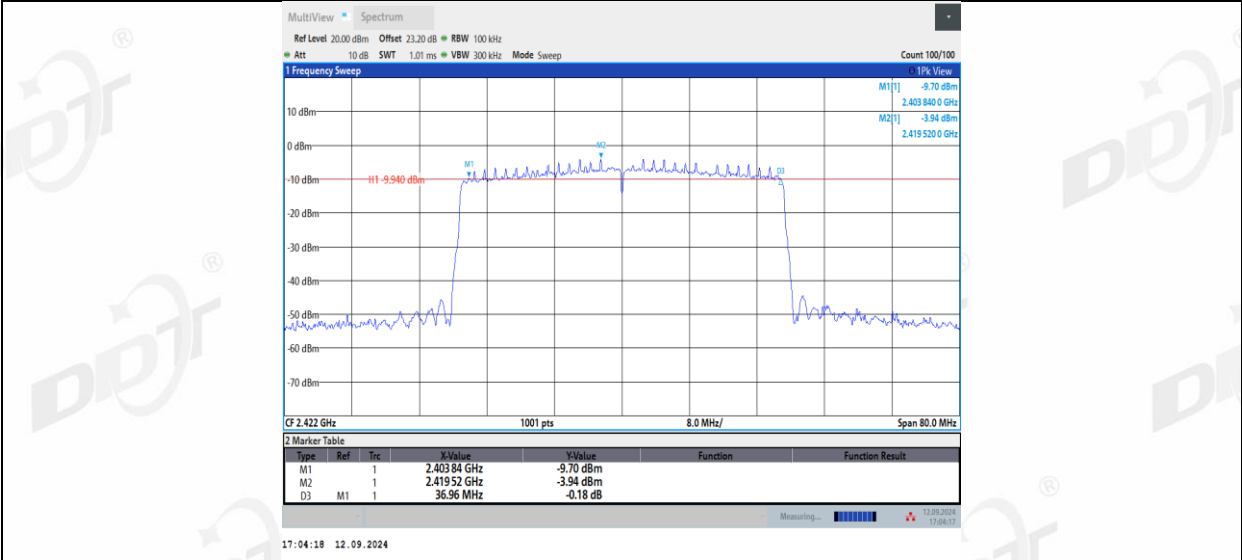
11AX20MIMO_Ant2_2462



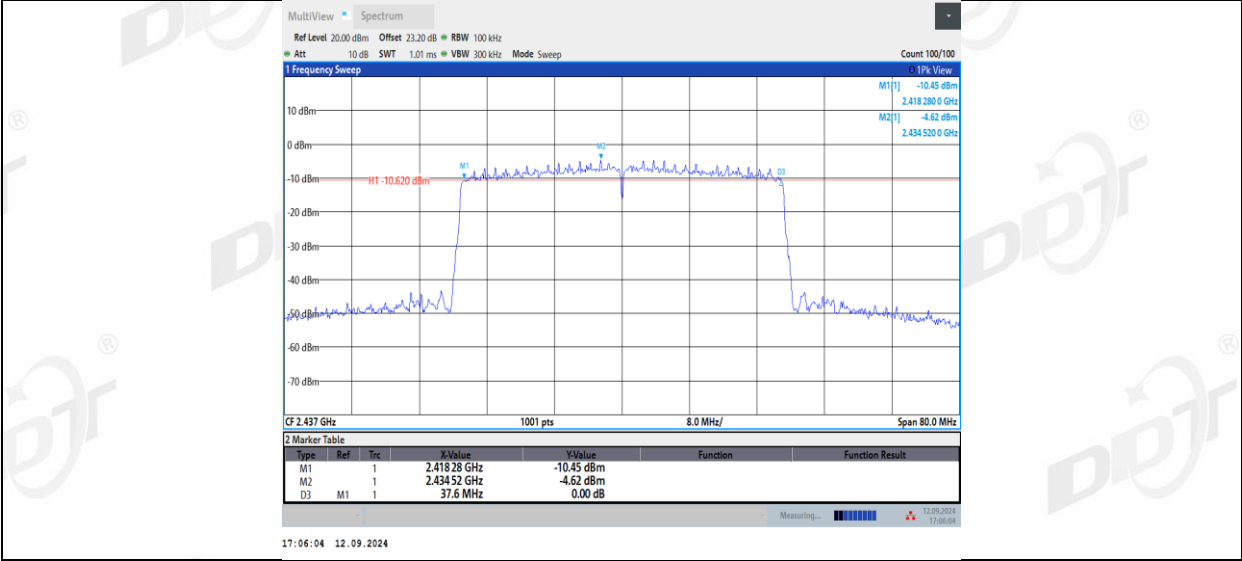
11AX40MIMO_Ant1_2422



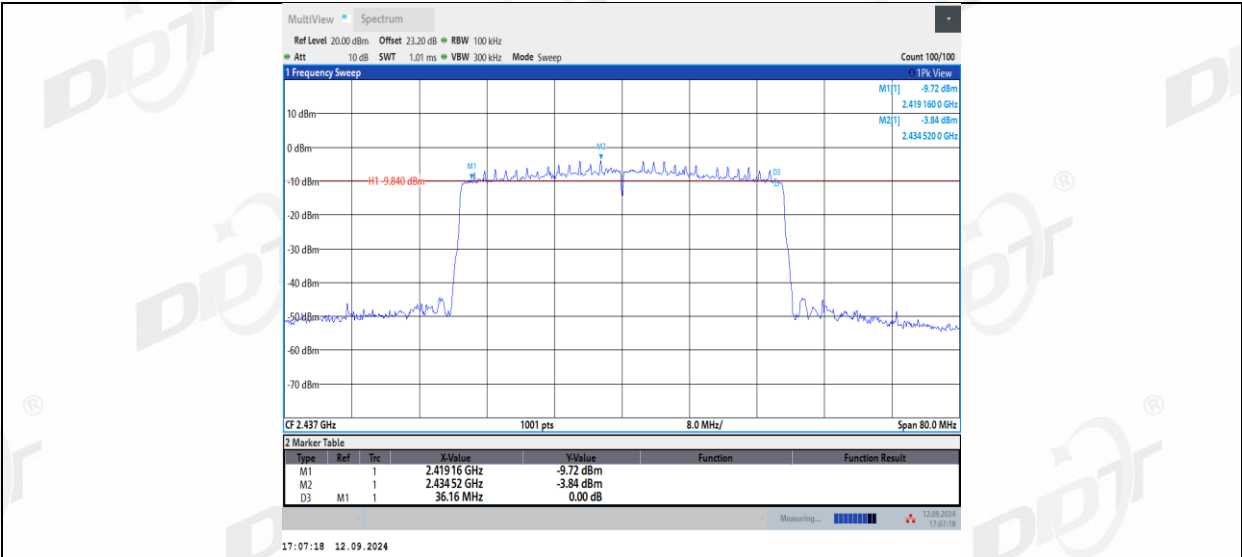
11AX40MIMO_Ant2_2422



11AX40MIMO_Ant1_2437



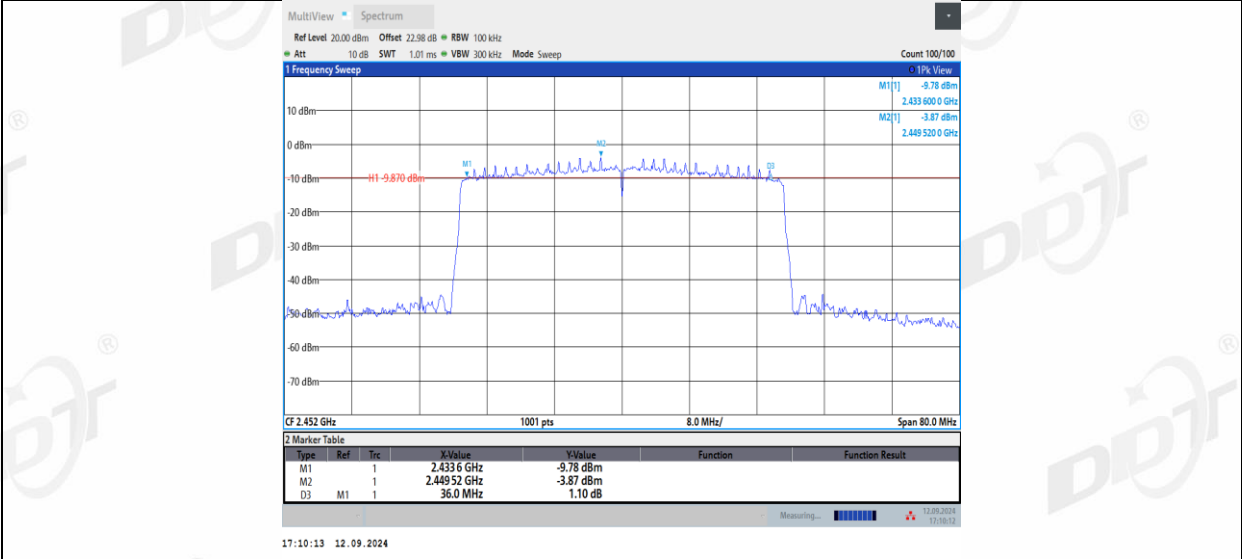
11AX40MIMO_Ant2_2437



11AX40MIMO_Ant1_2452

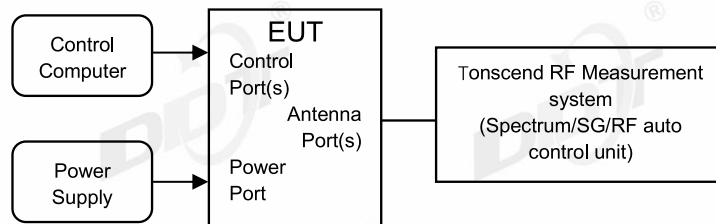


11AX40MIMO_Ant2_2452



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

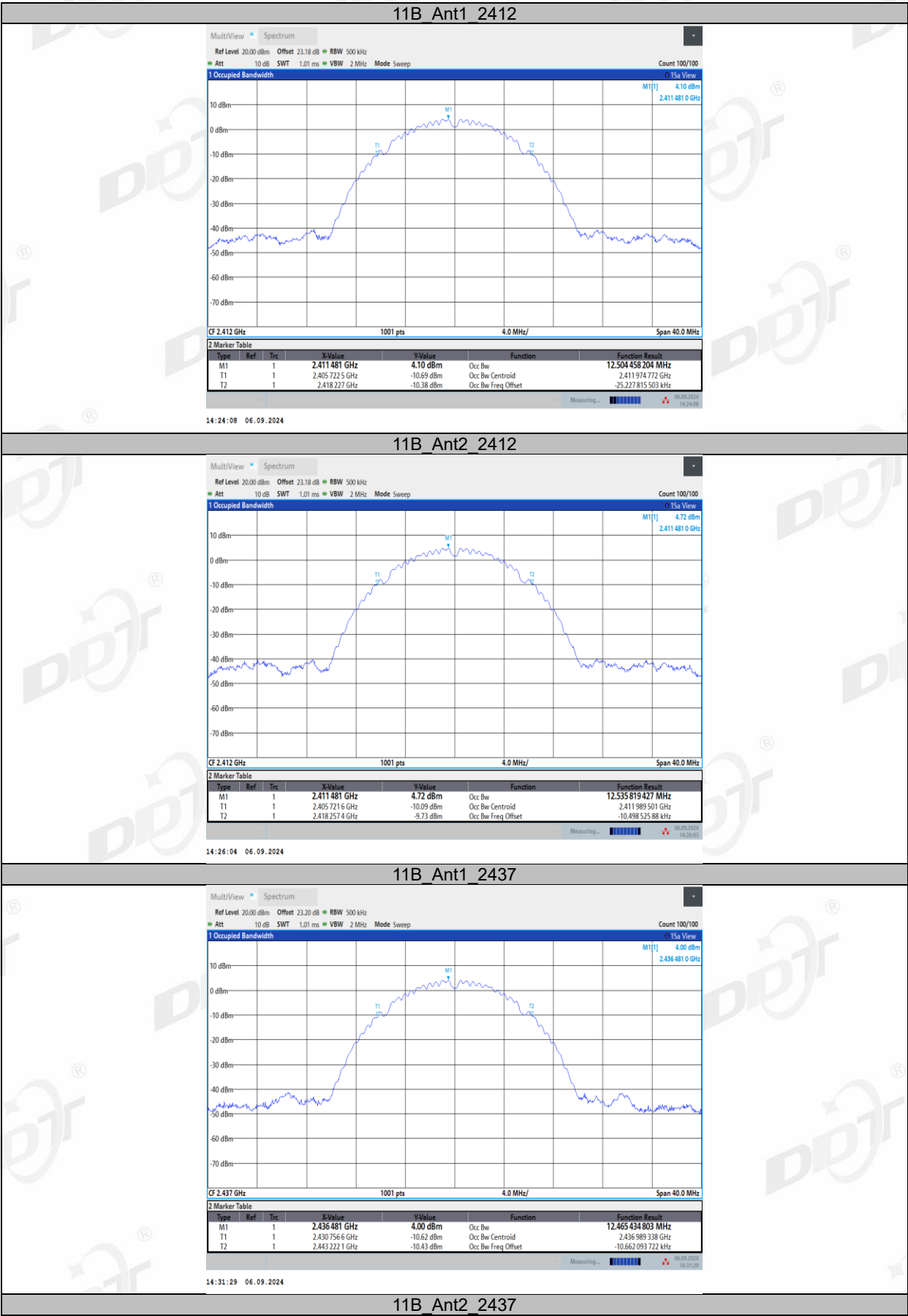
Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

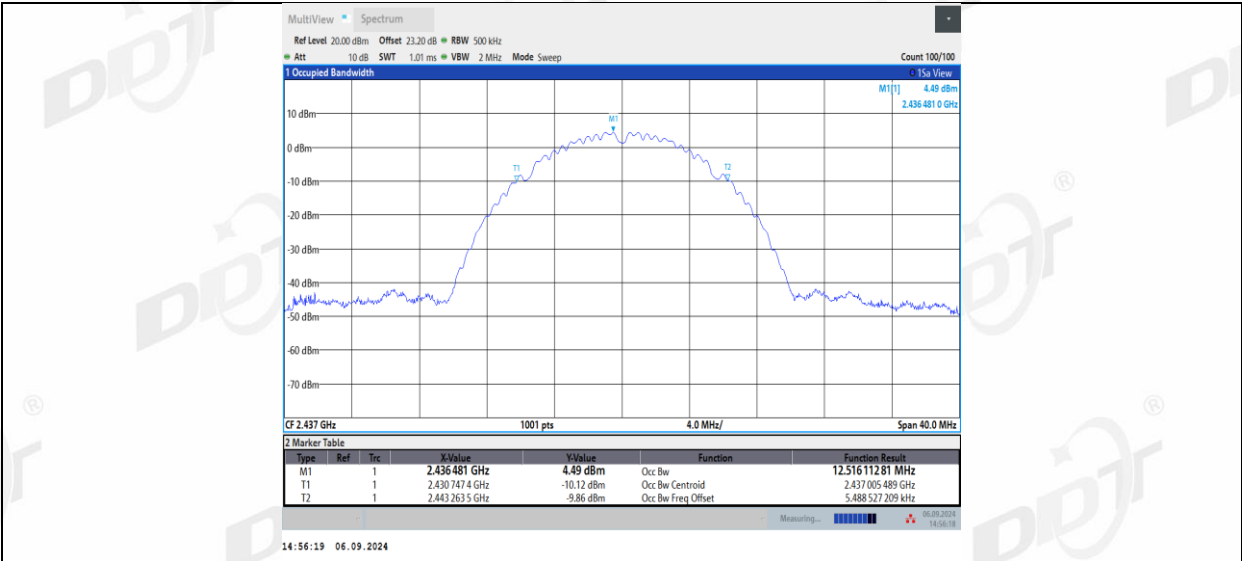
5.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	25.6-27.4℃,48.1-50.3%RH	Test Date:	2024.09.06-2024.09.12
Test Power Supply:	AC 120V/60Hz	Sample Number:	S24081509-002

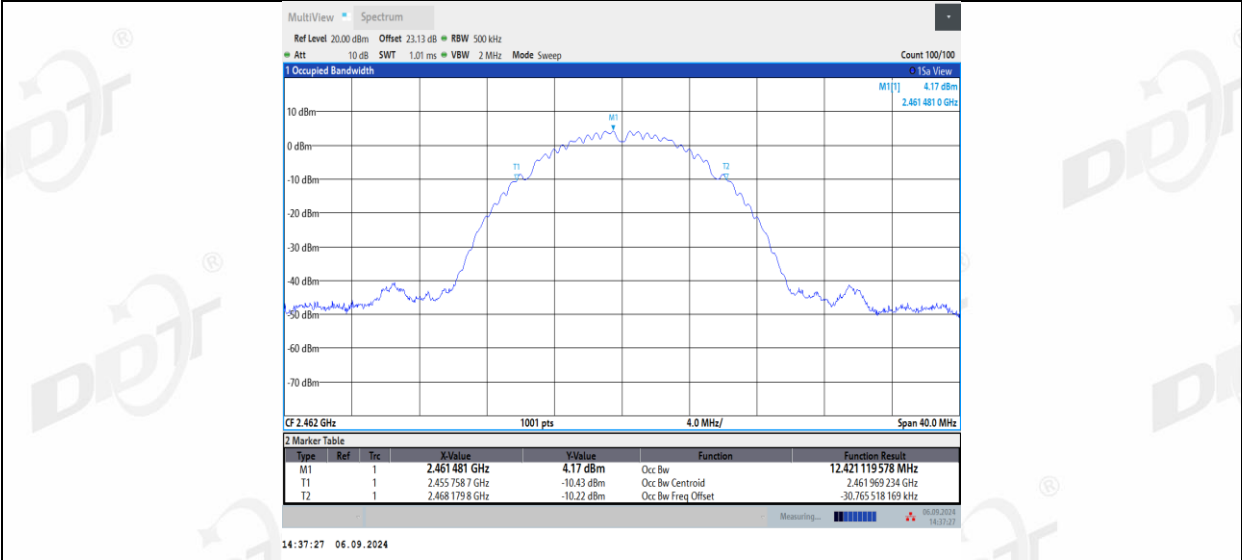
Test Mode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	12.504	2405.7225	2418.2270	---	---
	Ant2	2412	12.536	2405.7216	2418.2574	---	---
	Ant1	2437	12.465	2430.7566	2443.2221	---	---
	Ant2	2437	12.516	2430.7474	2443.2635	---	---
	Ant1	2462	12.421	2455.7587	2468.1798	---	---
	Ant2	2462	12.465	2455.7471	2468.2121	---	---
11G	Ant1	2412	17.04	2403.4240	2420.4642	---	---
	Ant2	2412	17.041	2403.4093	2420.4504	---	---
	Ant1	2437	19.111	2427.3391	2446.4506	---	---
	Ant2	2437	19.122	2427.3740	2446.4959	---	---
	Ant1	2462	18.995	2452.3460	2471.3409	---	---
	Ant2	2462	18.91	2452.4177	2471.3277	---	---
11N20MI MO	Ant1	2412	17.882	2403.0291	2420.9107	---	---
	Ant2	2412	17.655	2403.1399	2420.7949	---	---
	Ant1	2437	19.947	2426.9757	2446.9223	---	---
	Ant2	2437	18.512	2427.6215	2446.1340	---	---
	Ant1	2462	19.86	2452.0008	2471.8612	---	---
	Ant2	2462	18.436	2452.5857	2471.0214	---	---
11N40MI MO	Ant1	2422	36.144	2403.9262	2440.0699	---	---
	Ant2	2422	36.211	2403.8889	2440.1001	---	---
	Ant1	2437	36.209	2418.9048	2455.1139	---	---
	Ant2	2437	36.177	2418.8827	2455.0599	---	---
	Ant1	2452	36.104	2433.9306	2470.0343	---	---
	Ant2	2452	36.197	2433.8273	2470.0245	---	---
11AX20M IMO	Ant1	2412	18.83	2402.5599	2421.3894	---	---
	Ant2	2412	18.824	2402.5691	2421.3928	---	---
	Ant1	2437	19.297	2427.3428	2446.6401	---	---
	Ant2	2437	19.221	2427.3684	2446.5895	---	---
	Ant1	2462	19.279	2452.3281	2471.6074	---	---
	Ant2	2462	19.234	2452.3175	2471.5510	---	---
11AX40M IMO	Ant1	2422	37.765	2403.1222	2440.8877	---	---
	Ant2	2422	37.769	2403.1276	2440.8969	---	---
	Ant1	2437	37.815	2418.0459	2455.8605	---	---
	Ant2	2437	37.754	2418.1056	2455.8594	---	---
	Ant1	2452	37.755	2433.0849	2470.8401	---	---
	Ant2	2452	37.77	2433.0607	2470.8311	---	---

5.5. Test graphs

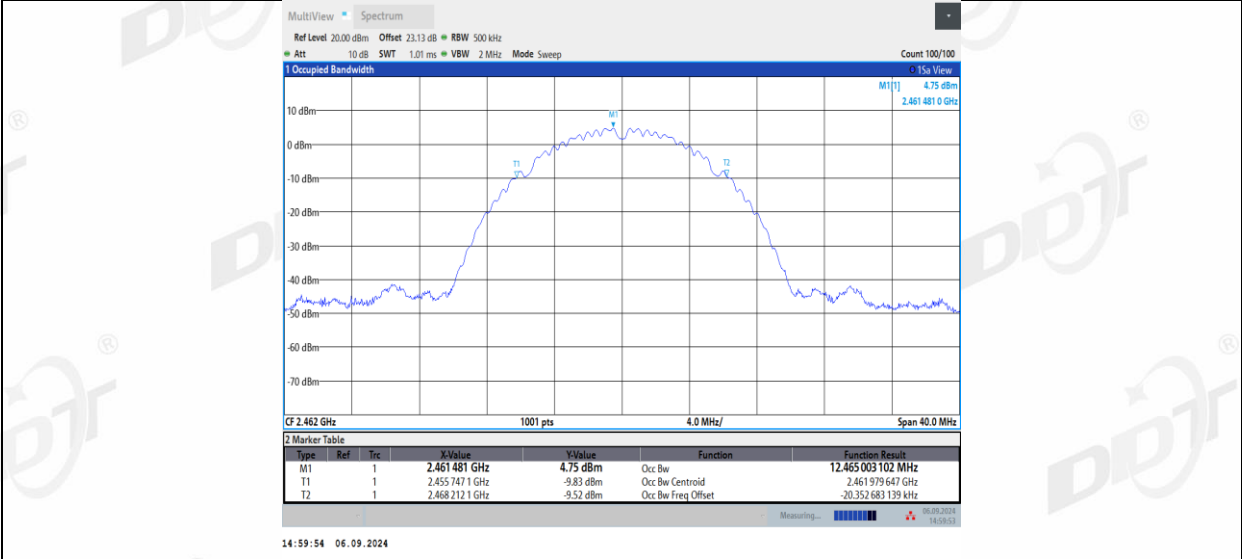




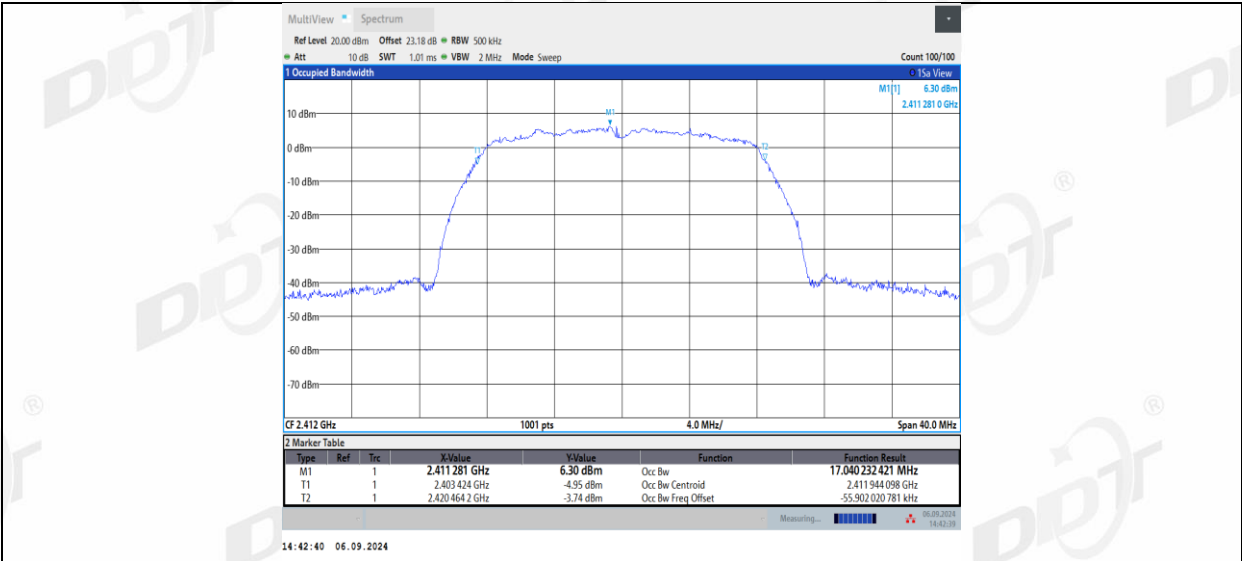
11B_Ant1_2462



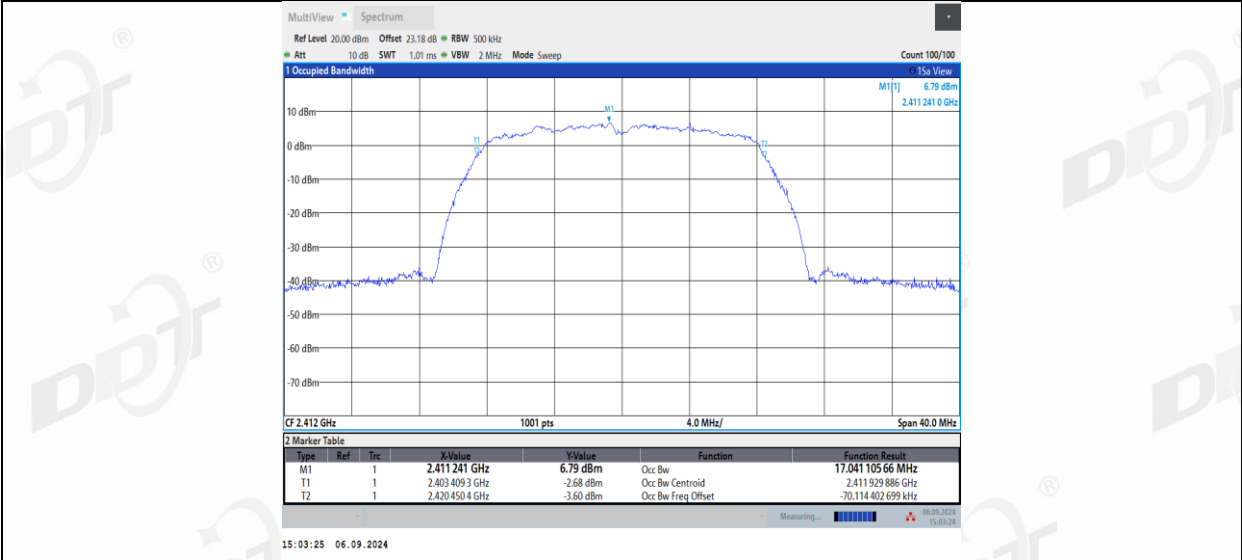
11B_Ant2_2462



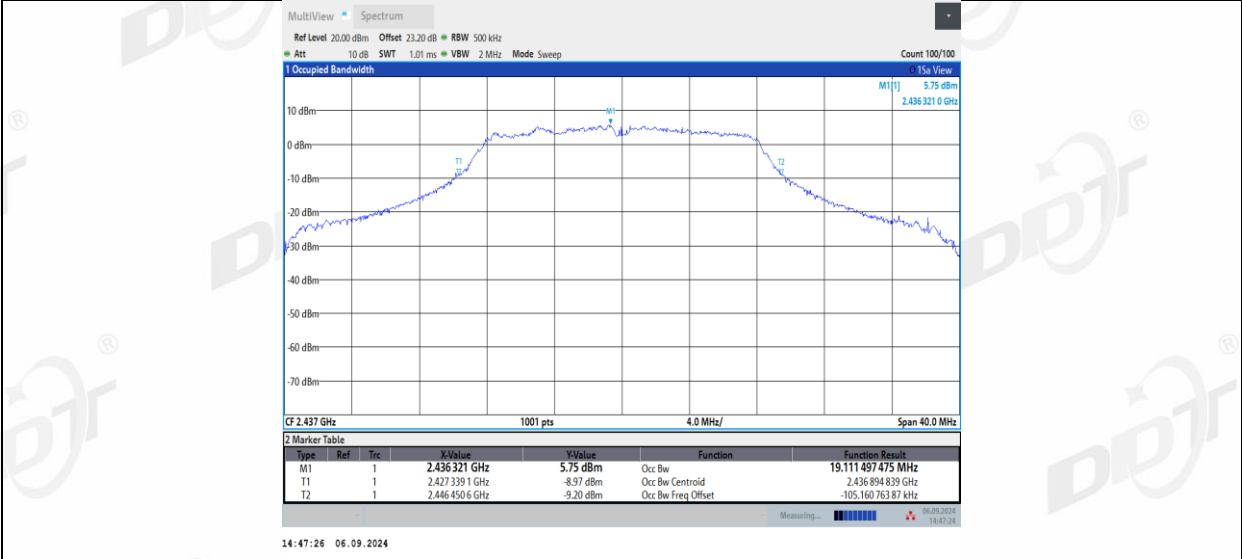
11G_Ant1_2412



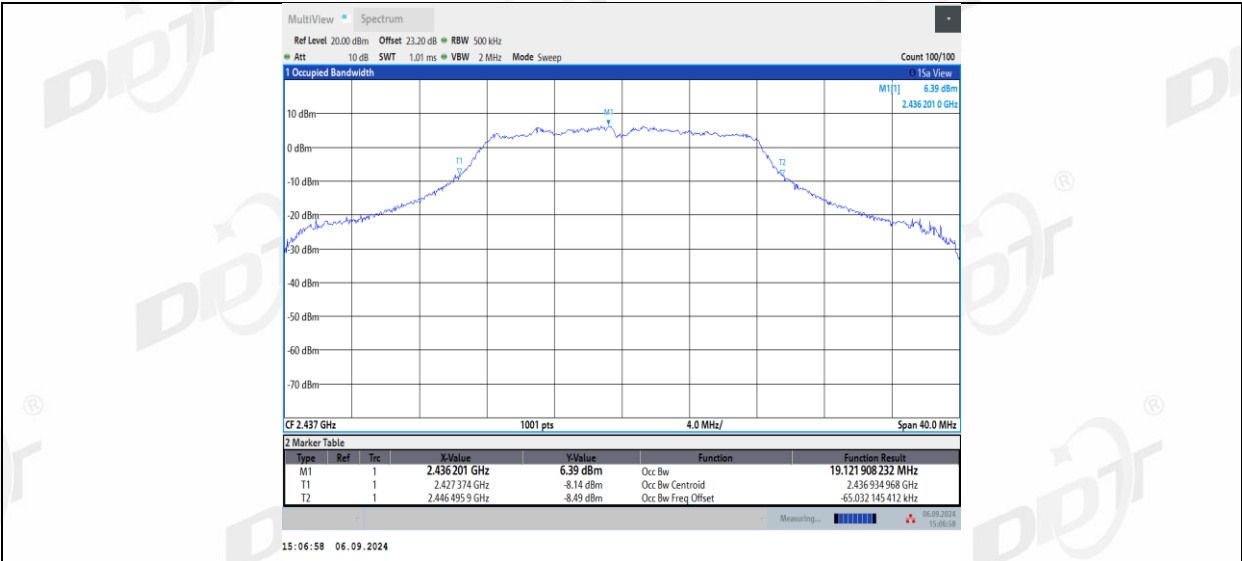
11G_Ant2_2412



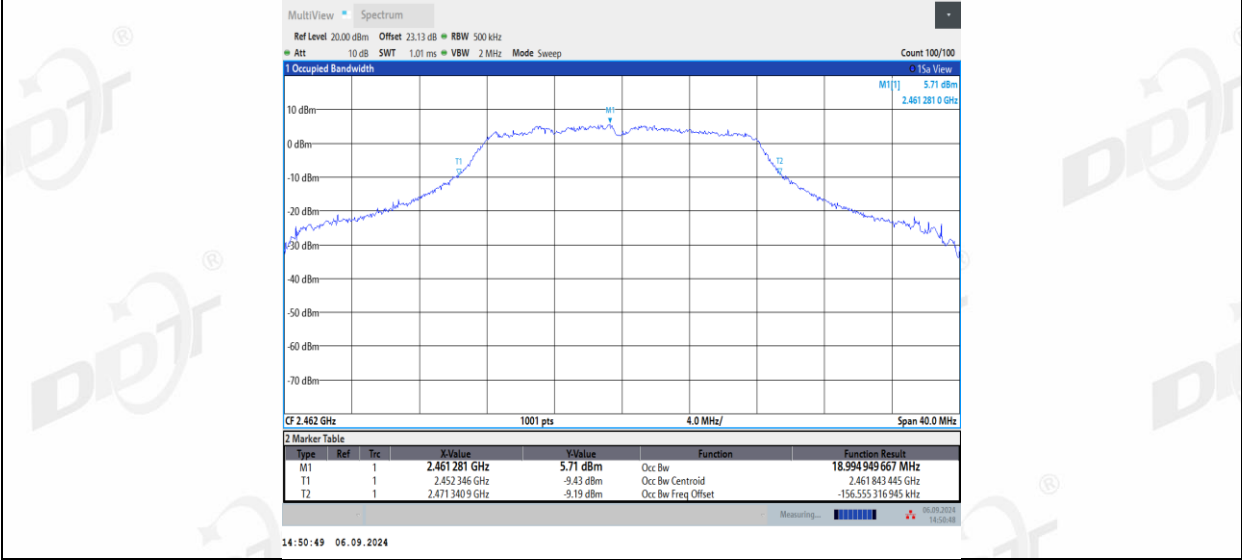
11G_Ant1_2437



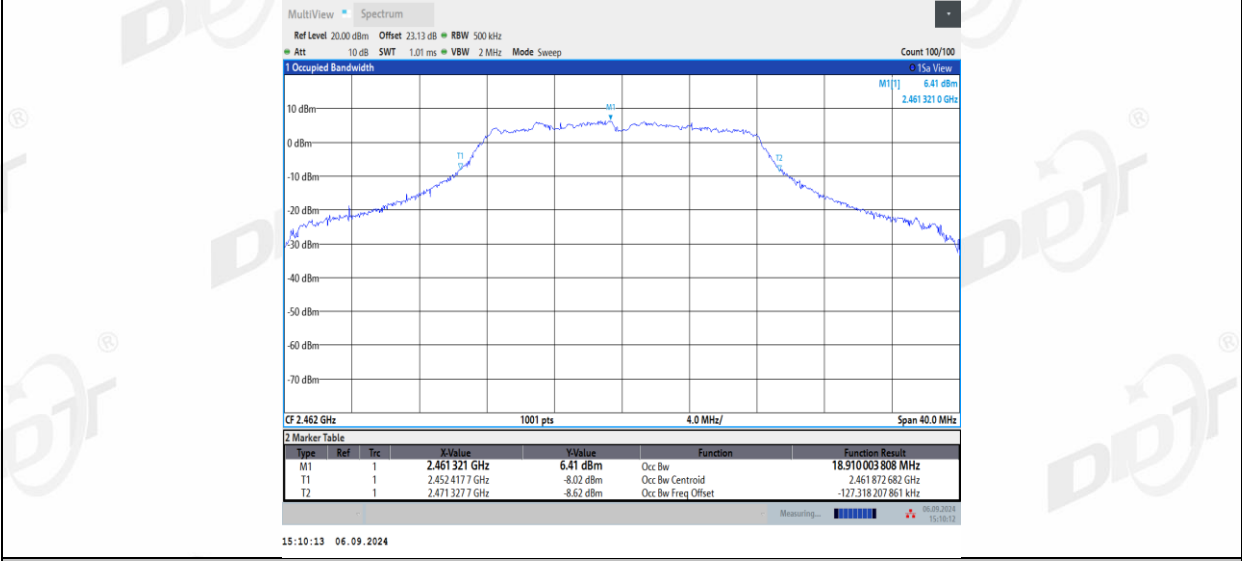
11G_Ant2_2437



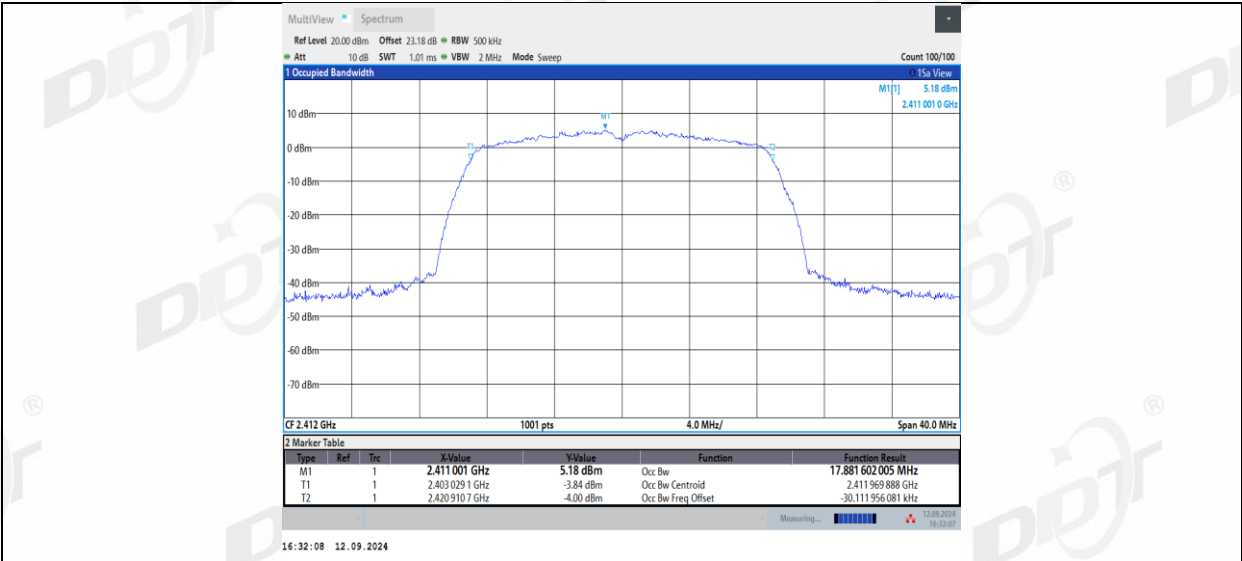
11G_Ant1_2462



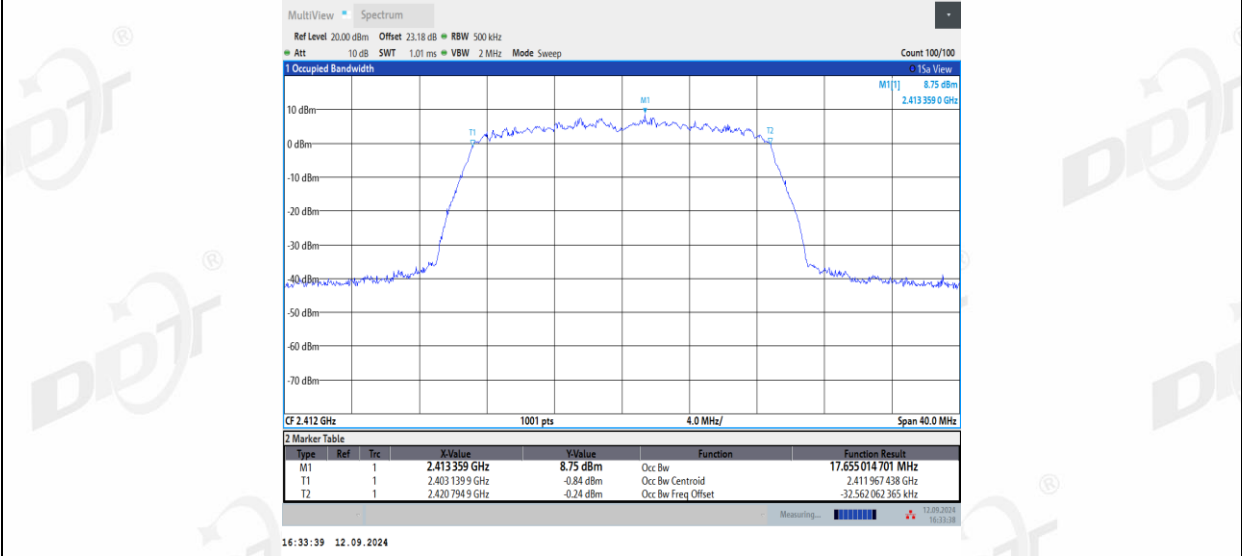
11G_Ant2_2462



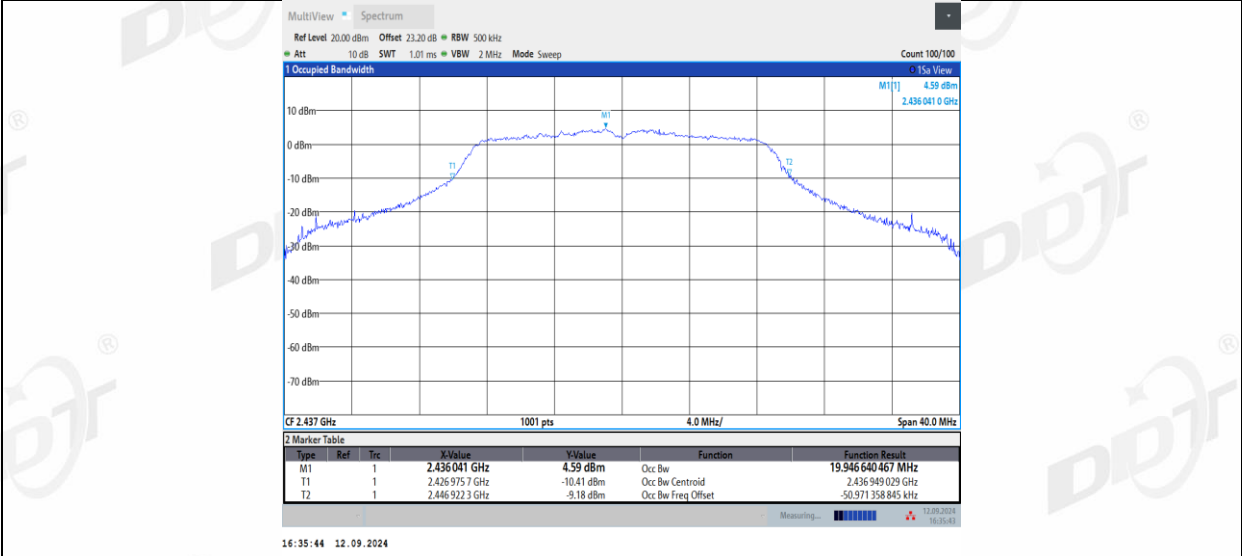
11N20MIMO_Ant1_2412



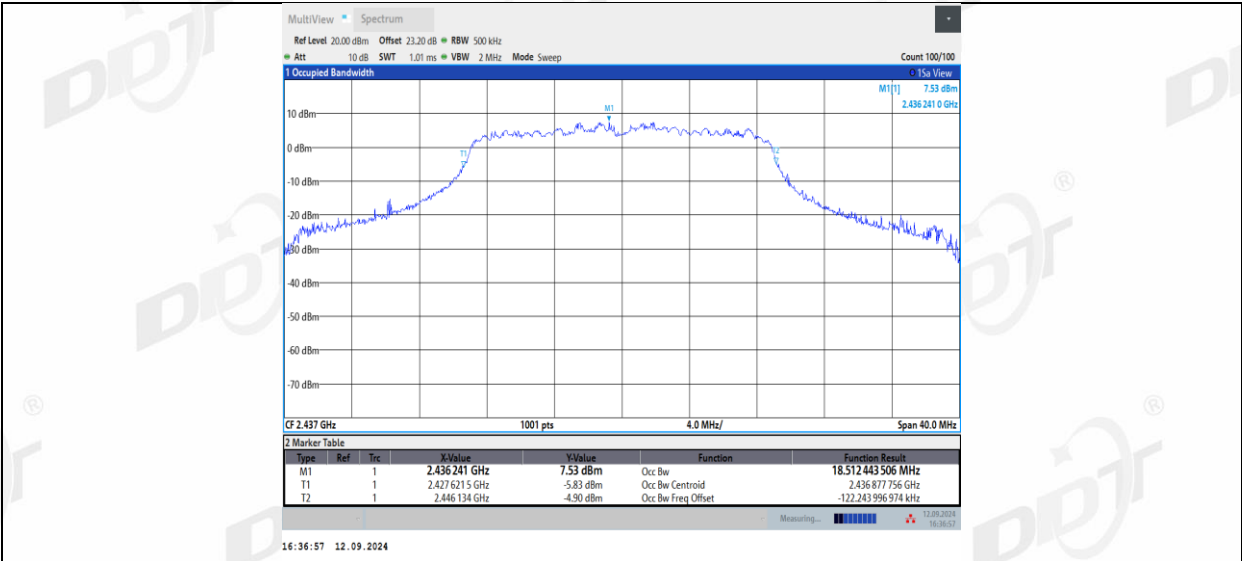
11N20MIMO_Ant2_2412



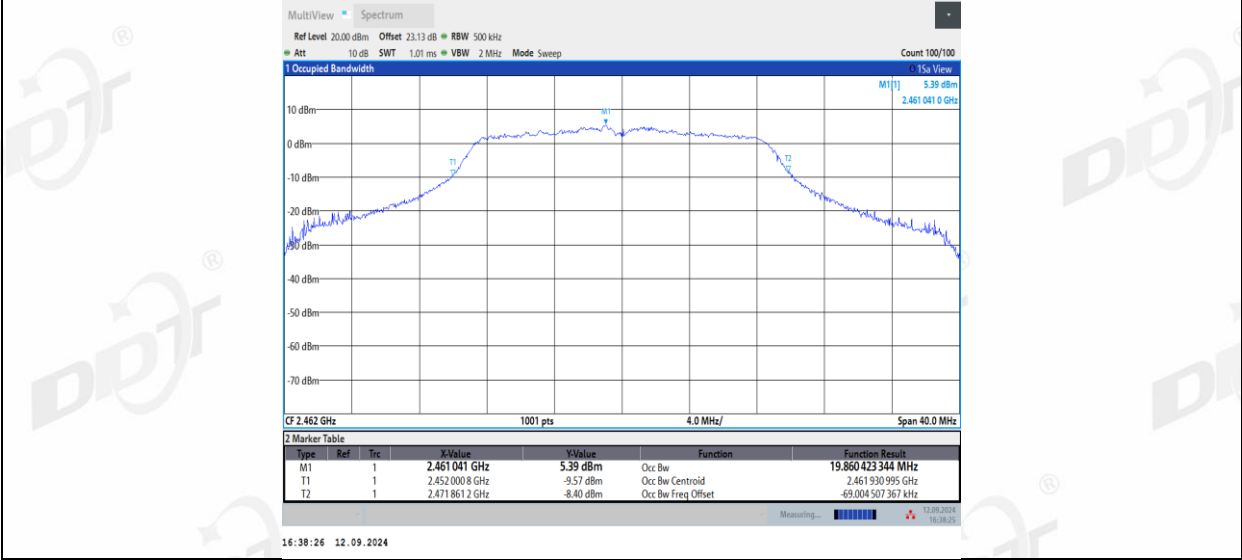
11N20MIMO_Ant1_2437



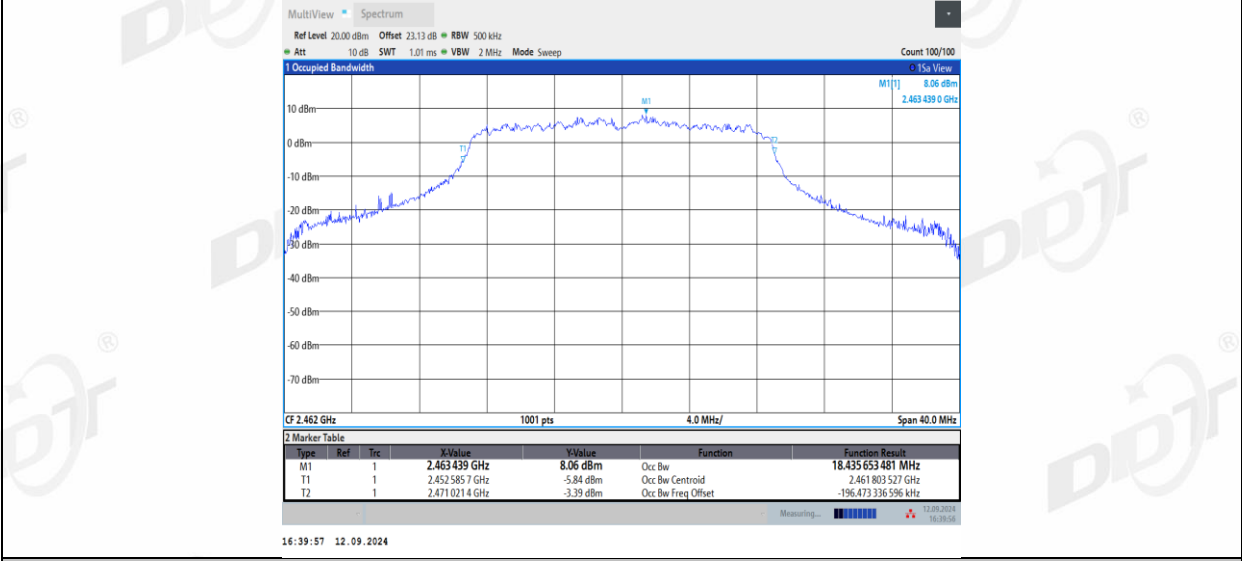
11N20MIMO_Ant2_2437



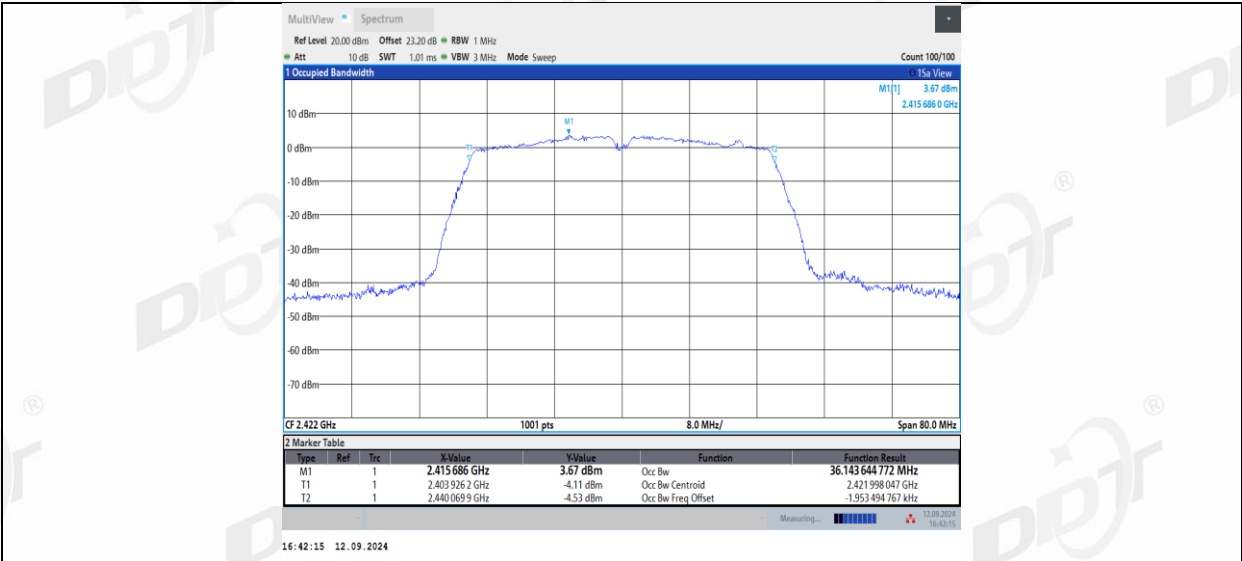
11N20MIMO_Ant1_2462



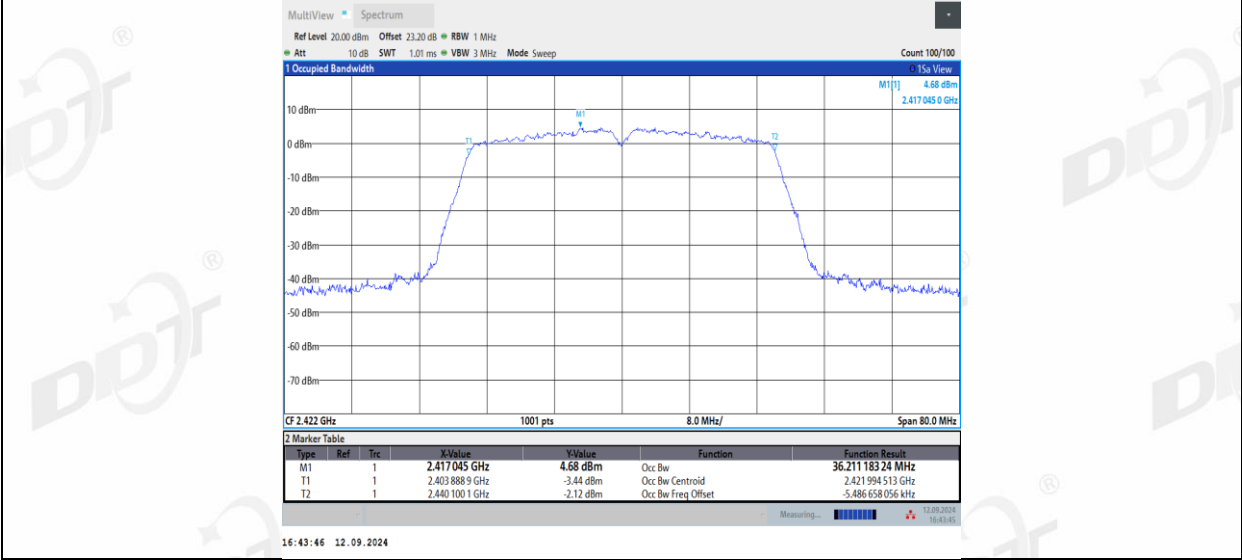
11N20MIMO_Ant2_2462



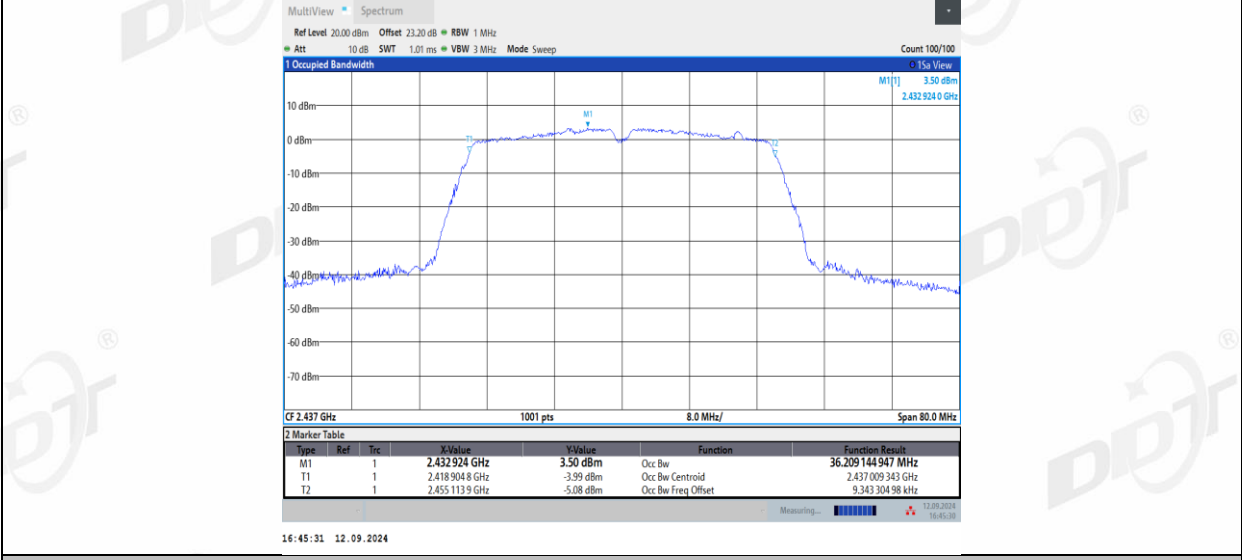
11N40MIMO_Ant1_2422



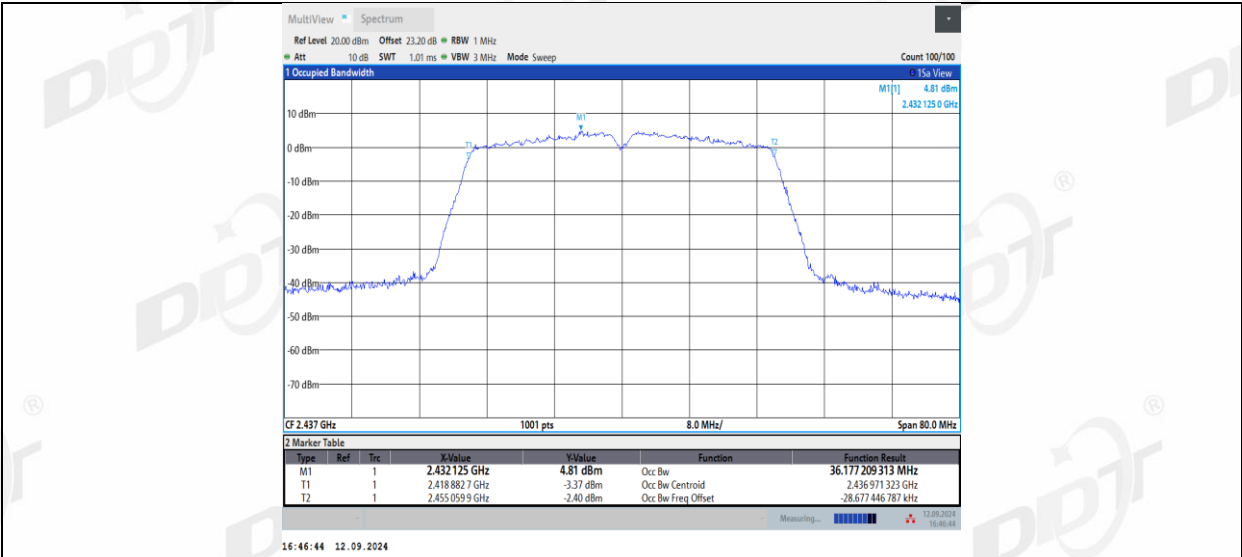
11N40MIMO_Ant2_2422



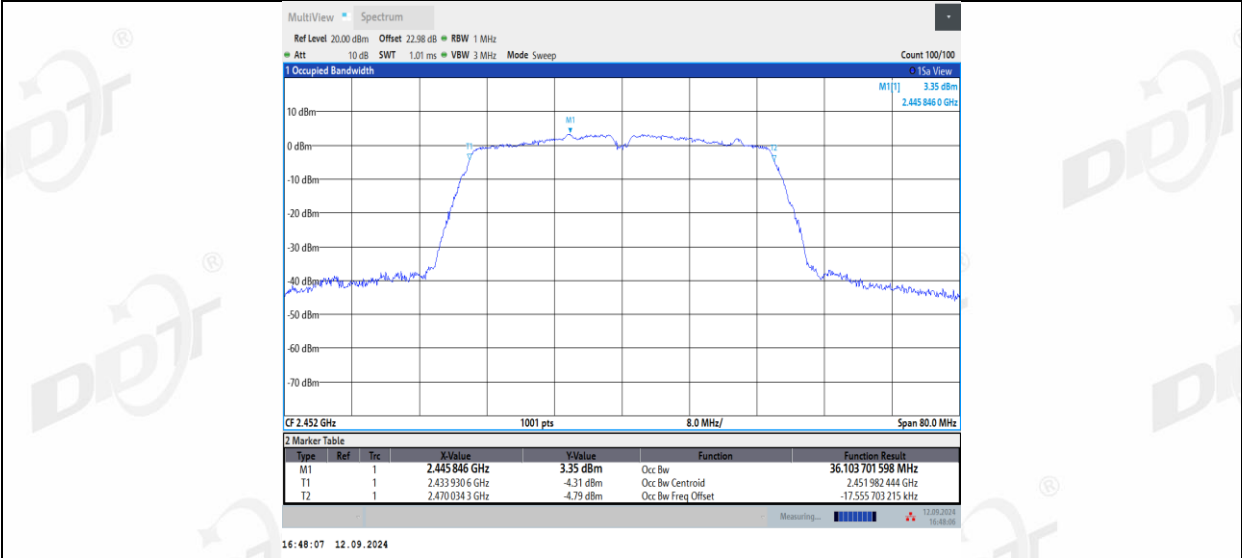
11N40MIMO_Ant1_2437



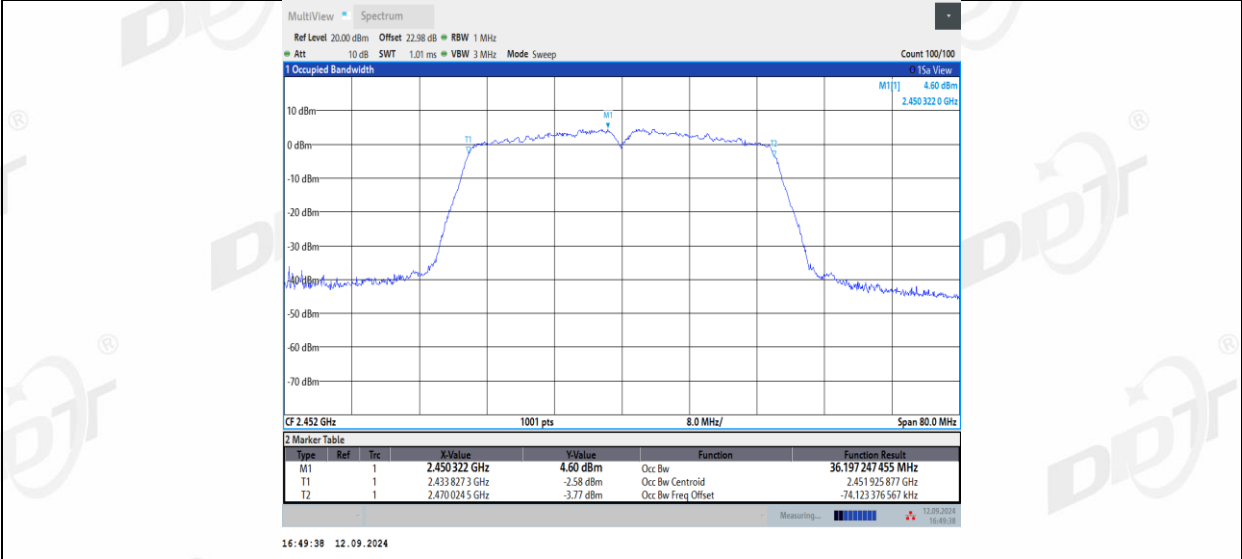
11N40MIMO_Ant2_2437



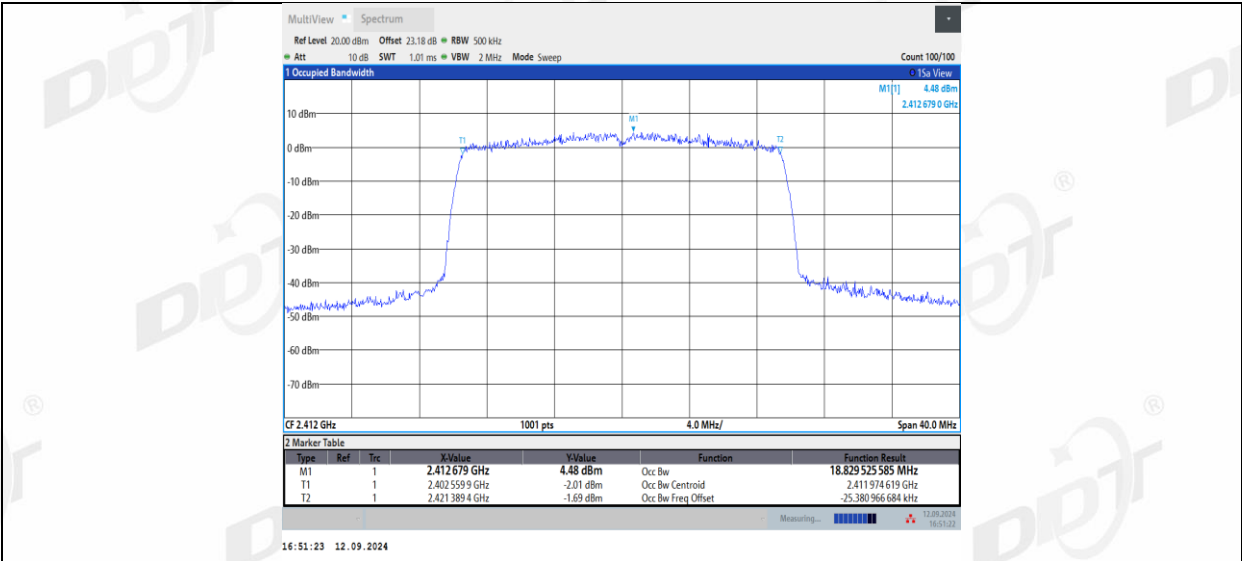
11N40MIMO_Ant1_2452



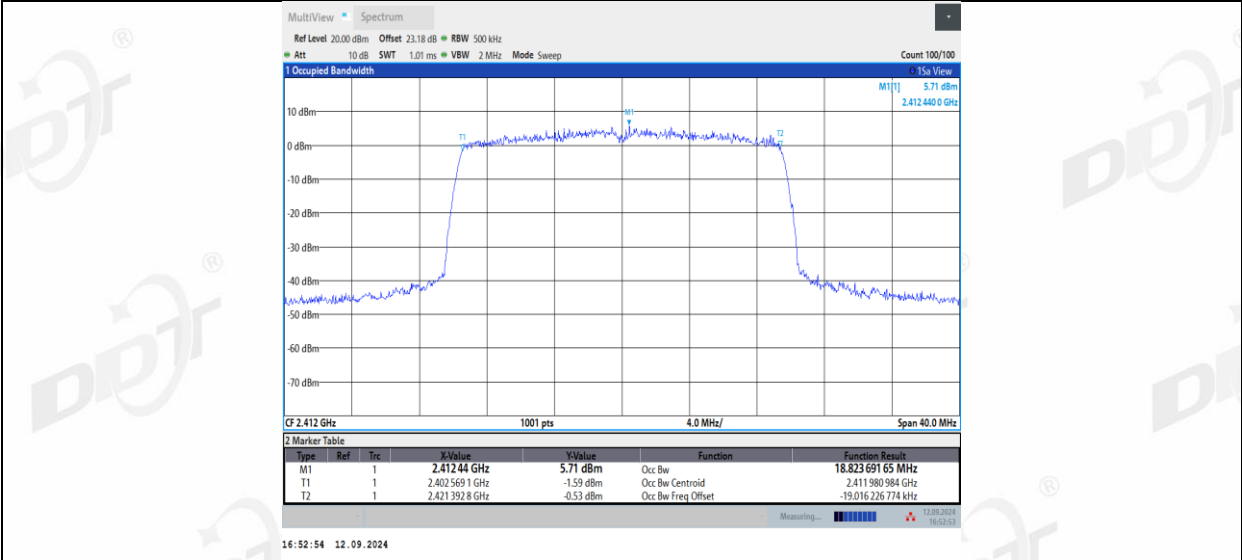
11N40MIMO_Ant2_2452



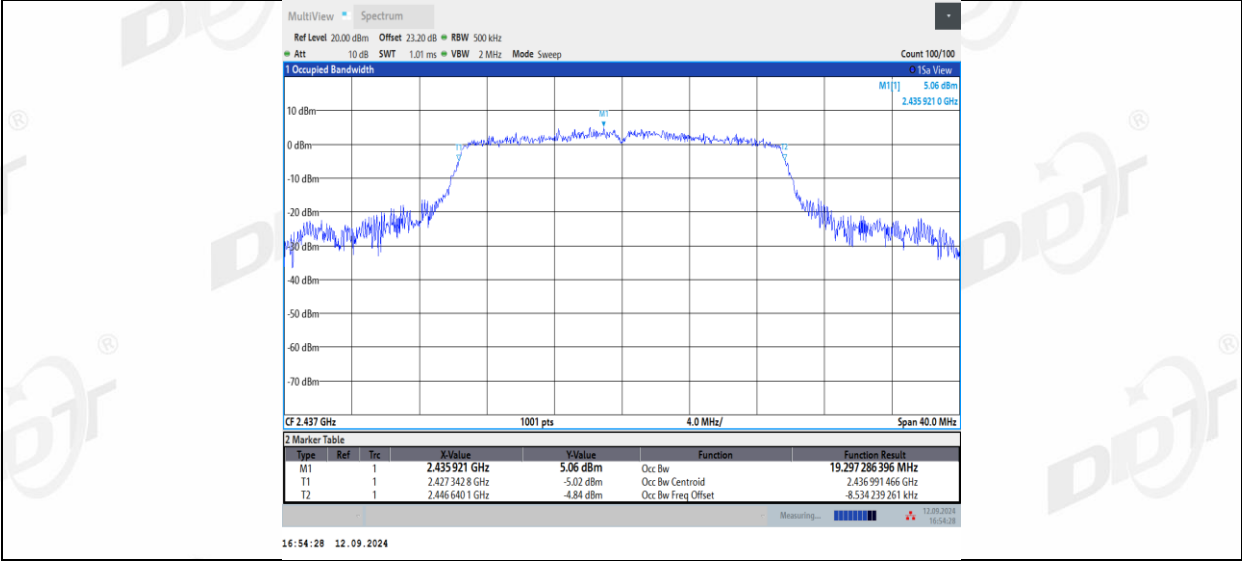
11AX20MIMO_Ant1_2412



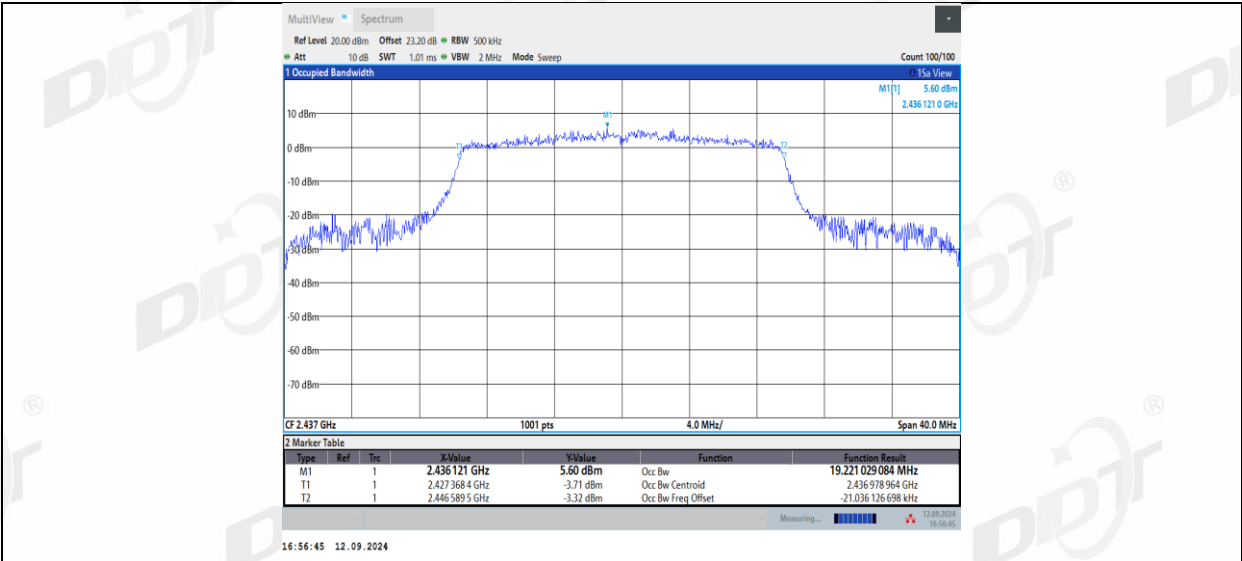
11AX20MIMO_Ant2_2412



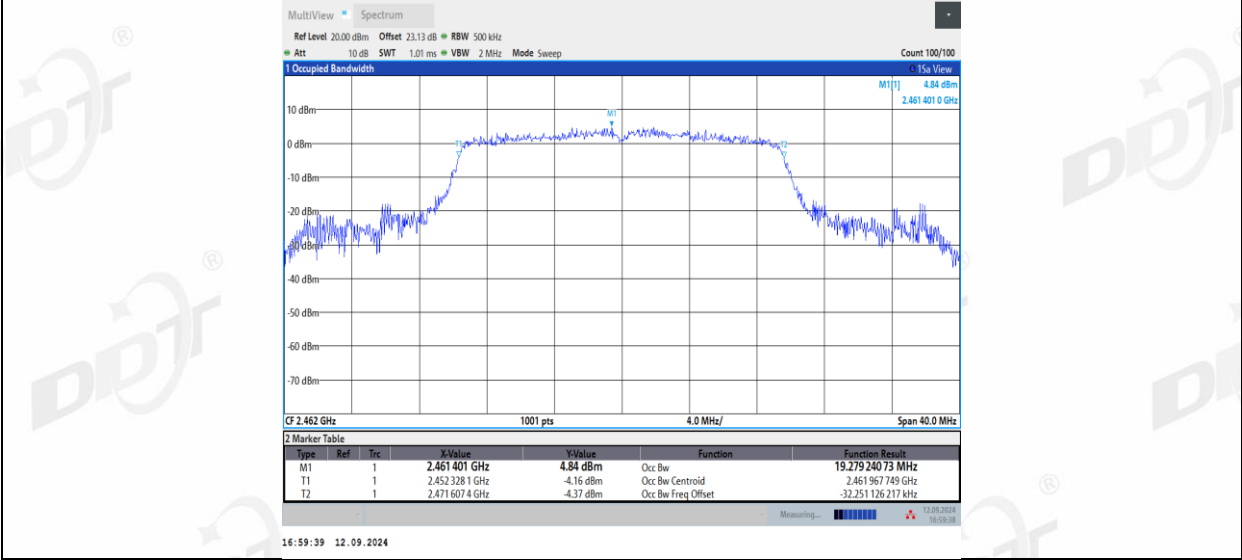
11AX20MIMO_Ant1_2437



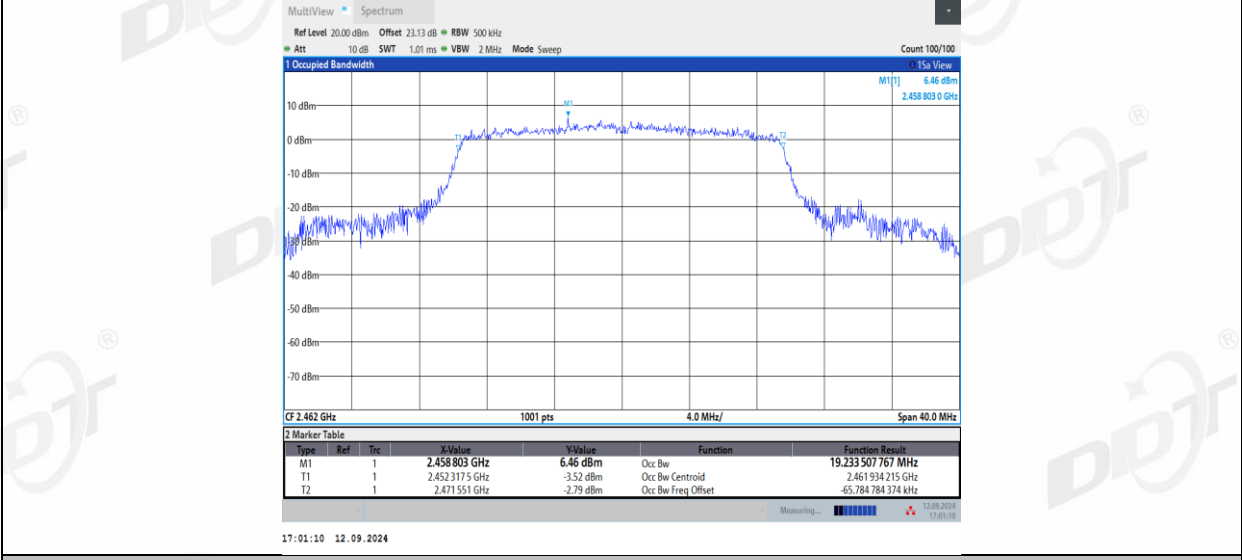
11AX20MIMO_Ant2_2437



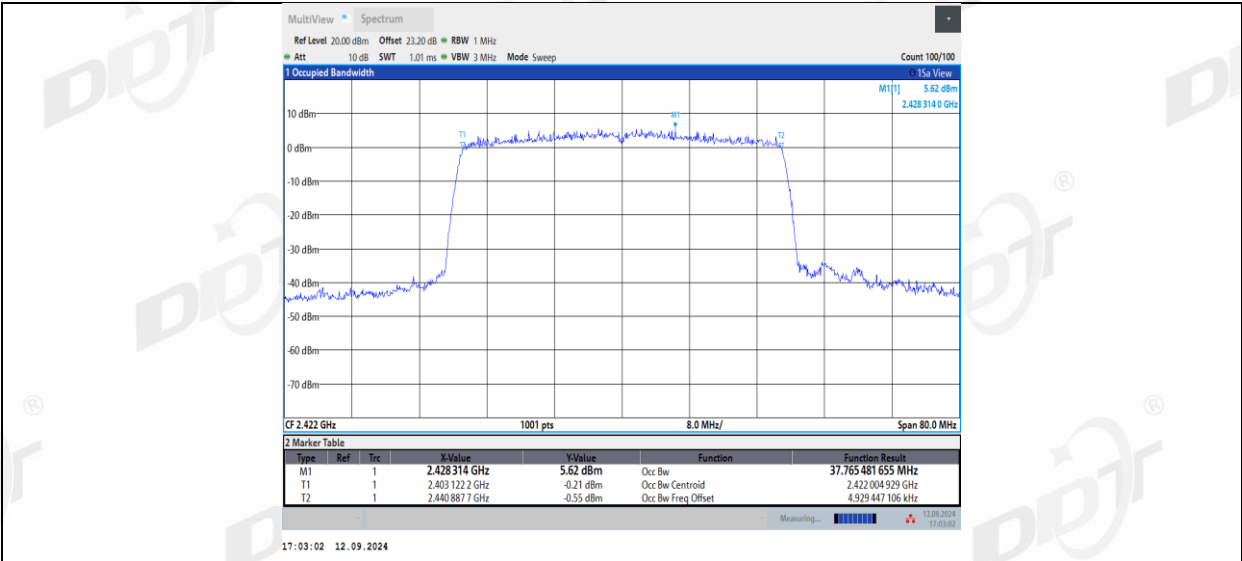
11AX20MIMO_Ant1_2462



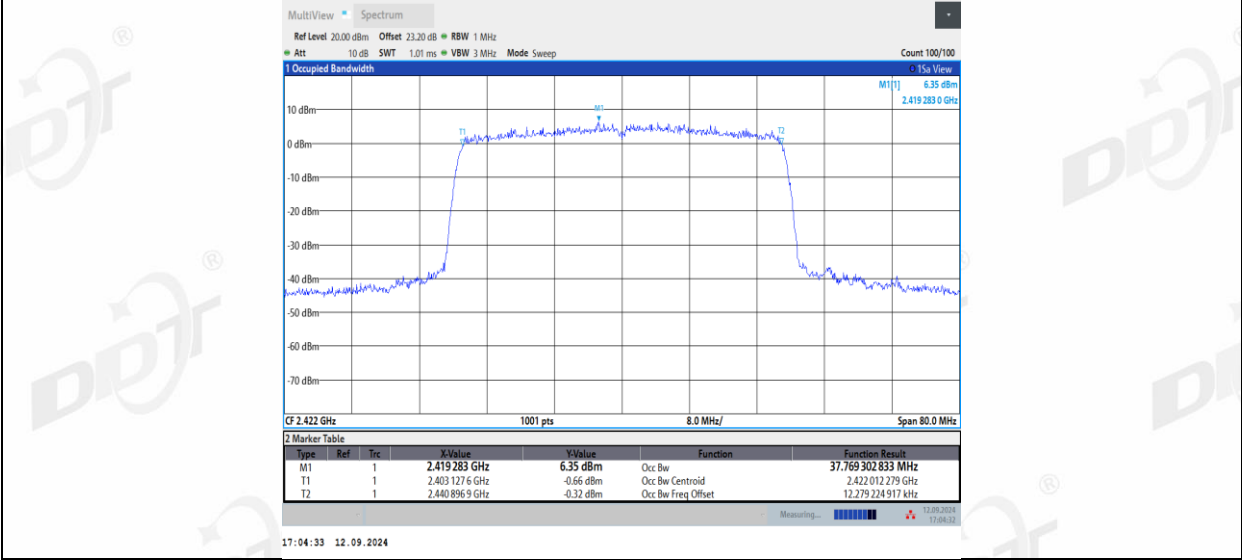
11AX20MIMO_Ant2_2462



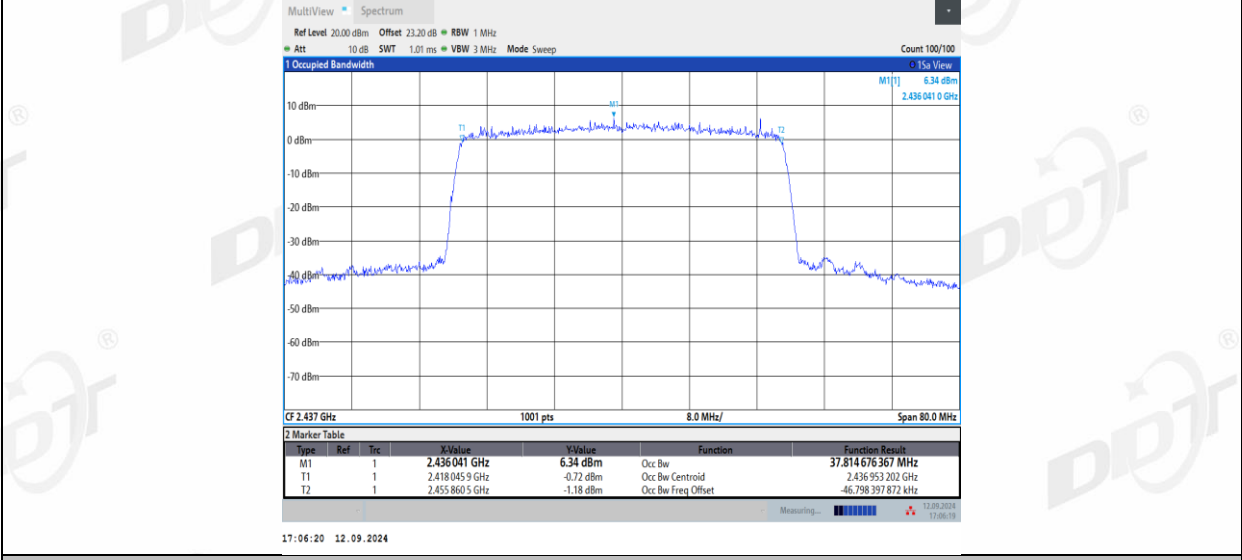
11AX40MIMO_Ant1_2422



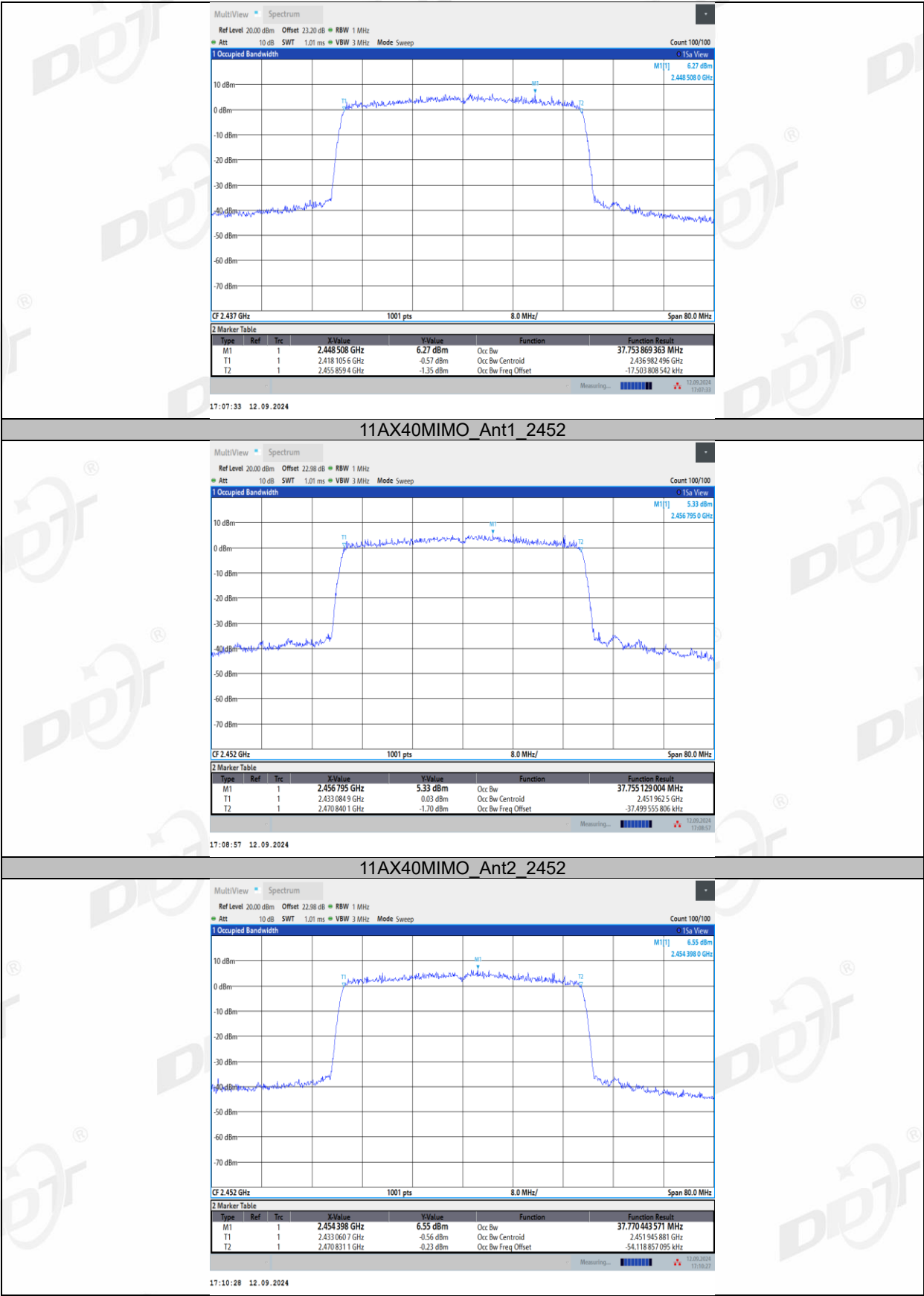
11AX40MIMO_Ant2_2422



11AX40MIMO_Ant1_2437

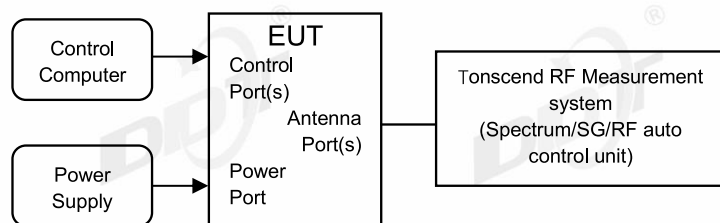


11AX40MIMO_Ant2_2437



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:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.2-25.6℃,45.3-48.6%RH	Test Date:	2024.10.26-2024.10.28
Test Power Supply:	AC 120V/60Hz	Sample Number:	S24081509-002

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	16.93	99.76	0.01	16.94	≤30.00	19.61	≤36.00	PASS
	Ant2	2412	16.97	99.64	0.02	16.99	≤30.00	19.29	≤36.00	PASS
	Ant1	2437	16.83	99.64	0.02	16.85	≤30.00	19.52	≤36.00	PASS
	Ant2	2437	16.85	99.64	0.02	16.87	≤30.00	19.17	≤36.00	PASS
	Ant1	2462	16.80	99.64	0.02	16.82	≤30.00	19.49	≤36.00	PASS
	Ant2	2462	16.78	99.64	0.02	16.80	≤30.00	19.10	≤36.00	PASS
11G	Ant1	2412	15.94	97.20	0.12	16.06	≤30.00	18.73	≤36.00	PASS
	Ant2	2412	15.98	97.90	0.09	16.07	≤30.00	18.37	≤36.00	PASS
	Ant1	2437	15.94	97.20	0.12	16.06	≤30.00	18.73	≤36.00	PASS
	Ant2	2437	16.04	97.89	0.09	16.13	≤30.00	18.43	≤36.00	PASS
	Ant1	2462	15.60	97.89	0.09	15.69	≤30.00	18.36	≤36.00	PASS
	Ant2	2462	15.98	97.89	0.09	16.07	≤30.00	18.37	≤36.00	PASS
11N20MIMO	Ant1	2412	15.84	94.37	0.25	16.09	≤30.00	18.76	≤36.00	PASS
	Ant2	2412	15.96	94.37	0.25	16.21	≤30.00	18.51	≤36.00	PASS
	total	2412	---	---	---	19.16	≤30.00	21.65	≤36.00	PASS
	Ant1	2437	15.72	95.71	0.19	15.91	≤30.00	18.58	≤36.00	PASS
	Ant2	2437	15.97	95.71	0.19	16.16	≤30.00	18.46	≤36.00	PASS
	total	2437	---	---	---	19.05	≤30.00	21.53	≤36.00	PASS
	Ant1	2462	15.79	94.37	0.25	16.04	≤30.00	18.71	≤36.00	PASS
	Ant2	2462	15.81	95.71	0.19	16.00	≤30.00	18.30	≤36.00	PASS
11N40MIMO	total	2462	---	---	---	19.03	≤30.00	21.52	≤36.00	PASS
	Ant1	2422	8.94	92.11	0.36	9.30	≤30.00	11.97	≤36.00	PASS
	Ant2	2422	9.67	89.74	0.47	10.14	≤30.00	12.44	≤36.00	PASS
	total	2422	---	---	---	12.75	≤30.00	15.22	≤36.00	PASS
	Ant1	2437	8.83	92.11	0.36	9.19	≤30.00	11.86	≤36.00	PASS
	Ant2	2437	9.56	92.11	0.36	9.92	≤30.00	12.22	≤36.00	PASS
	total	2437	---	---	---	12.58	≤30.00	15.05	≤36.00	PASS
	Ant1	2452	8.78	89.47	0.48	9.26	≤30.00	11.93	≤36.00	PASS
11AX20MIMO	Ant2	2452	9.55	92.11	0.36	9.91	≤30.00	12.21	≤36.00	PASS
	total	2452	---	---	---	12.61	≤30.00	15.08	≤36.00	PASS
	Ant1	2412	16.10	96.23	0.17	16.27	≤30.00	18.94	≤36.00	PASS
	Ant2	2412	16.06	96.23	0.17	16.23	≤30.00	18.53	≤36.00	PASS
	total	2412	---	---	---	19.26	≤30.00	21.75	≤36.00	PASS
	Ant1	2437	16.09	96.19	0.17	16.26	≤30.00	18.93	≤36.00	PASS
	Ant2	2437	16.25	97.14	0.13	16.38	≤30.00	18.68	≤36.00	PASS
	total	2437	---	---	---	19.33	≤30.00	21.82	≤36.00	PASS
11AX40MIMO	Ant1	2462	16.08	96.19	0.17	16.25	≤30.00	18.92	≤36.00	PASS
	Ant2	2462	16.02	97.14	0.13	16.15	≤30.00	18.45	≤36.00	PASS
	total	2462	---	---	---	19.21	≤30.00	21.70	≤36.00	PASS
	Ant1	2422	9.33	92.98	0.32	9.65	≤30.00	12.32	≤36.00	PASS
	Ant2	2422	10.10	92.98	0.32	10.42	≤30.00	12.72	≤36.00	PASS
	total	2422	---	---	---	13.06	≤30.00	15.53	≤36.00	PASS
	Ant1	2437	9.30	92.98	0.32	9.62	≤30.00	12.29	≤36.00	PASS
	Ant2	2437	10.06	92.98	0.32	10.38	≤30.00	12.68	≤36.00	PASS
11AX40MIMO	total	2437	---	---	---	13.03	≤30.00	15.50	≤36.00	PASS
	Ant1	2452	9.26	92.98	0.32	9.58	≤30.00	12.25	≤36.00	PASS
	Ant2	2452	10.01	92.98	0.32	10.33	≤30.00	12.63	≤36.00	PASS
	total	2452	---	---	---	12.98	≤30.00	15.45	≤36.00	PASS

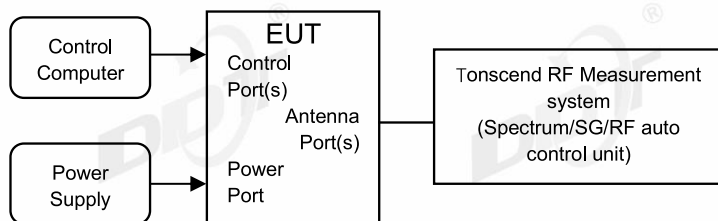
Test Mode	Antenna	Frequency [MHz]	Ru Size	Ru Index	Peak Power [dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11AX20MI MO	Ant1	2412	26Tone	RU0	7.50	≤30.00	10.17	≤36.00	PASS
				RU4	7.85	≤30.00	10.52	≤36.00	PASS
				RU8	7.52	≤30.00	10.19	≤36.00	PASS
			52Tone	RU37	7.97	≤30.00	10.64	≤36.00	PASS
				RU39	7.77	≤30.00	10.44	≤36.00	PASS
				RU40	8.09	≤30.00	10.76	≤36.00	PASS
			106Tone	RU53	8.39	≤30.00	11.06	≤36.00	PASS
				RU54	8.37	≤30.00	11.04	≤36.00	PASS
				RU0	8.37	≤30.00	10.67	≤36.00	PASS
	Ant2	2412	26Tone	RU4	8.49	≤30.00	10.79	≤36.00	PASS
				RU8	8.07	≤30.00	10.37	≤36.00	PASS
				RU37	8.92	≤30.00	11.22	≤36.00	PASS
			52Tone	RU39	8.79	≤30.00	11.09	≤36.00	PASS
				RU40	8.51	≤30.00	10.81	≤36.00	PASS
				RU53	8.94	≤30.00	11.24	≤36.00	PASS
			106Tone	RU54	9.18	≤30.00	11.48	≤36.00	PASS
				RU0	10.97	≤30.00	13.44	≤36.00	PASS
				RU4	11.19	≤30.00	13.67	≤36.00	PASS
	total	2412	26Tone	RU8	10.81	≤30.00	13.29	≤36.00	PASS
				RU37	11.48	≤30.00	13.95	≤36.00	PASS
				RU39	11.32	≤30.00	13.79	≤36.00	PASS
			52Tone	RU40	11.32	≤30.00	13.80	≤36.00	PASS
				RU53	11.68	≤30.00	14.16	≤36.00	PASS
				RU54	11.80	≤30.00	14.28	≤36.00	PASS
			106Tone	RU0	7.09	≤30.00	9.76	≤36.00	PASS
				RU4	7.24	≤30.00	9.91	≤36.00	PASS
				RU8	6.98	≤30.00	9.65	≤36.00	PASS
	Ant1	2437	26Tone	RU37	7.45	≤30.00	10.12	≤36.00	PASS
				RU39	7.63	≤30.00	10.30	≤36.00	PASS
				RU40	7.78	≤30.00	10.45	≤36.00	PASS
			52Tone	RU53	7.96	≤30.00	10.63	≤36.00	PASS
				RU54	8.01	≤30.00	10.68	≤36.00	PASS
			106Tone	RU0	7.88	≤30.00	10.18	≤36.00	PASS
				RU4	8.14	≤30.00	10.44	≤36.00	PASS
				RU8	7.90	≤30.00	10.20	≤36.00	PASS
	Ant2	2437	26Tone	RU37	8.24	≤30.00	10.54	≤36.00	PASS
				RU39	8.29	≤30.00	10.59	≤36.00	PASS
				RU40	8.27	≤30.00	10.57	≤36.00	PASS
			52Tone	RU53	8.77	≤30.00	11.07	≤36.00	PASS
				RU54	8.60	≤30.00	10.90	≤36.00	PASS
			106Tone	RU0	10.51	≤30.00	12.99	≤36.00	PASS
				RU4	10.72	≤30.00	13.19	≤36.00	PASS
				RU8	10.47	≤30.00	12.94	≤36.00	PASS
	total	2437	26Tone	RU37	10.87	≤30.00	13.35	≤36.00	PASS
				RU39	10.98	≤30.00	13.46	≤36.00	PASS
				RU40	11.04	≤30.00	13.52	≤36.00	PASS
			52Tone	RU53	11.39	≤30.00	13.87	≤36.00	PASS
				RU54	11.33	≤30.00	13.80	≤36.00	PASS
			106Tone	RU0	7.27	≤30.00	9.94	≤36.00	PASS
				RU4	7.43	≤30.00	10.10	≤36.00	PASS
				RU8	7.23	≤30.00	9.90	≤36.00	PASS
	Ant1	2462	26Tone	RU37	7.63	≤30.00	10.30	≤36.00	PASS
				RU39	8.06	≤30.00	10.73	≤36.00	PASS
				RU40	7.82	≤30.00	10.49	≤36.00	PASS
			52Tone	RU53	7.80	≤30.00	10.47	≤36.00	PASS
				RU54	8.00	≤30.00	10.67	≤36.00	PASS
			106Tone	RU0	7.92	≤30.00	10.22	≤36.00	PASS
				RU4	8.17	≤30.00	10.47	≤36.00	PASS
				RU8	7.92	≤30.00	10.22	≤36.00	PASS
	Ant2	2462	26Tone	RU37	8.48	≤30.00	10.78	≤36.00	PASS
				RU39	8.48	≤30.00	10.78	≤36.00	PASS
				RU40	8.33	≤30.00	10.63	≤36.00	PASS
			52Tone	RU53	8.54	≤30.00	10.84	≤36.00	PASS
				RU54	8.74	≤30.00	11.04	≤36.00	PASS
			106Tone	RU0	10.62	≤30.00	13.09	≤36.00	PASS
				RU4	10.83	≤30.00	13.30	≤36.00	PASS
				RU8	10.60	≤30.00	13.07	≤36.00	PASS
	total	2462	26Tone	RU37	11.09	≤30.00	13.56	≤36.00	PASS
				RU39	11.29	≤30.00	13.77	≤36.00	PASS

11AX40MI MO			106Tone	RU40	11.09	≤30.00	13.57	≤36.00	PASS
				RU53	11.20	≤30.00	13.67	≤36.00	PASS
	Ant1	2422	242Tone	RU54	11.40	≤30.00	13.87	≤36.00	PASS
				RU61	8.32	≤30.00	10.99	≤36.00	PASS
	Ant2	2422	242Tone	RU62	8.09	≤30.00	10.76	≤36.00	PASS
				RU61	9.19	≤30.00	11.49	≤36.00	PASS
	total	2422	242Tone	RU62	8.92	≤30.00	11.22	≤36.00	PASS
				RU61	11.79	≤30.00	14.26	≤36.00	PASS
	Ant1	2437	242Tone	RU62	11.54	≤30.00	14.01	≤36.00	PASS
				RU61	8.26	≤30.00	10.93	≤36.00	PASS
	Ant2	2437	242Tone	RU62	8.46	≤30.00	11.13	≤36.00	PASS
				RU61	9.14	≤30.00	11.44	≤36.00	PASS
	total	2437	242Tone	RU62	8.86	≤30.00	11.16	≤36.00	PASS
				RU61	11.73	≤30.00	14.20	≤36.00	PASS
	Ant1	2452	242Tone	RU62	11.67	≤30.00	14.16	≤36.00	PASS
				RU61	8.16	≤30.00	10.83	≤36.00	PASS
	Ant2	2452	242Tone	RU62	8.15	≤30.00	10.82	≤36.00	PASS
				RU61	9.15	≤30.00	11.45	≤36.00	PASS
	total	2452	242Tone	RU62	9.28	≤30.00	11.58	≤36.00	PASS
				RU61	11.69	≤30.00	14.16	≤36.00	PASS
				RU62	11.76	≤30.00	14.23	≤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:	$3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	RMS
Sweep time:	auto
Trace mode	max hold
	Employ trace averaging (rms)
Trace	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:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.2-25.6℃,45.3-48.6%RH	Test Date:	2024.10.26-2024.10.28
Test Power Supply:	AC 120V/60Hz	Sample Number:	S24081509-002

Test Mode	Antenna	Frequency [MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-10.90	≤8.00	PASS
	Ant2	2412	-14.14	≤8.00	PASS
	Ant1	2437	-12.45	≤8.00	PASS
	Ant2	2437	-13.66	≤8.00	PASS
	Ant1	2462	-12.62	≤8.00	PASS
	Ant2	2462	-14.11	≤8.00	PASS
11G	Ant1	2412	-15.36	≤8.00	PASS
	Ant2	2412	-15.90	≤8.00	PASS
	Ant1	2437	-15.26	≤8.00	PASS
	Ant2	2437	-15.24	≤8.00	PASS
	Ant1	2462	-16.07	≤8.00	PASS
	Ant2	2462	-15.82	≤8.00	PASS
11N20MIMO	Ant1	2412	-16.42	≤8.00	PASS
	Ant2	2412	-16.29	≤8.00	PASS
	total	2412	-13.34	≤8.00	PASS
	Ant1	2437	-16.84	≤8.00	PASS
	Ant2	2437	-15.87	≤8.00	PASS
	total	2437	-13.32	≤8.00	PASS
	Ant1	2462	-16.64	≤8.00	PASS
	Ant2	2462	-16.48	≤8.00	PASS
11N40MIMO	total	2462	-13.55	≤8.00	PASS
	Ant1	2422	-24.18	≤8.00	PASS
	Ant2	2422	-24.15	≤8.00	PASS
	total	2422	-21.15	≤8.00	PASS
	Ant1	2437	-23.94	≤8.00	PASS
	Ant2	2437	-23.93	≤8.00	PASS
	total	2437	-20.92	≤8.00	PASS
	Ant1	2452	-23.58	≤8.00	PASS
11AX20MIMO	Ant2	2452	-23.48	≤8.00	PASS
	total	2452	-20.52	≤8.00	PASS
	Ant1	2412	-16.95	≤8.00	PASS
	Ant2	2412	-15.37	≤8.00	PASS
	total	2412	-13.08	≤8.00	PASS
	Ant1	2437	-16.43	≤8.00	PASS
	Ant2	2437	-16.00	≤8.00	PASS
	total	2437	-13.20	≤8.00	PASS
11AX40MIMO	Ant1	2462	-16.82	≤8.00	PASS
	Ant2	2462	-16.04	≤8.00	PASS
	total	2462	-13.40	≤8.00	PASS
	Ant1	2422	-25.65	≤8.00	PASS
	Ant2	2422	-24.77	≤8.00	PASS
	total	2422	-22.18	≤8.00	PASS
	Ant1	2437	-26.07	≤8.00	PASS
	Ant2	2437	-24.65	≤8.00	PASS
11AX40MIMO	total	2437	-22.29	≤8.00	PASS
	Ant1	2452	-25.64	≤8.00	PASS
	Ant2	2452	-24.65	≤8.00	PASS
	total	2452	-22.11	≤8.00	PASS