



FCC AND ISCED CERTIFICATION TEST REPORT

Applicant	:	Harman International Industries, Incorporated.
Address of Applicant	:	8500 Balboa Boulevard Nothridge CA 91329,USA
Manufacturer	:	Harman International Industries, Incorporated.
Address of Manufacturer	:	8500 Balboa Boulevard Nothridge CA 91329,USA
Equipment under Test	:	Wireless Speaker
Model No.	:	BOOMBOX 3 Wi-Fi
HVIN	:	JBLBB3WIFI
FCC ID	:	APIJBLBB3-WIFI
IC	:	6132A-BB3WIFI
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-RE23111312-2E03
Issue Date	:	2024/02/18
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

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Test Report Declare

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Equipment under Test	:	Wireless Speaker
Model No.	:	BOOMBOX 3 Wi-Fi
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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-RE23111312-2E03		
Date of Receipt:	2023/11/19	Date of Test:	2023/11/19~2024/02/08

Prepared By:**Ella Gong/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	2024/02/18	

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	: BOOMBOX 3 Wi-Fi
EUT Function Description	: Please reference user manual of this device
Power Supply	: AC 100-240V~, 50/60Hz 80W or DC 7.2V by Polymer Li-ion built-in battery

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, 64QAM, 16QAM, QPSK, BPSK)

Antenna information			
	Ant1 gain	Ant2 gain	Directional gain
IEEE 802.11b	2.67	2.3	/
IEEE 802.11g	2.67	2.3	/
IEEE 802.11n HT20	2.67	2.3	2.49
IEEE 802.11n HT40	2.67	2.3	2.49
IEEE 802.11ax HE20	2.67	2.3	2.49
IEEE 802.11ax HE40	2.67	2.3	2.49

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	/	/

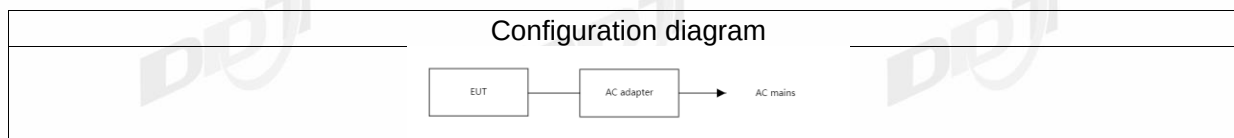
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's 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: 1.85m

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)
IEEE 802.11b	14	11	LCH: CH1	2412
	14	11	MCH: CH6	2437
	14	11	HCH: CH11	2462
IEEE 802.11g	13	54	LCH: CH1	2412
	13	54	MCH: CH6	2437
	13	54	HCH: CH11	2462
IEEE 802.11n HT20	12	MCS 15	LCH: CH1	2412
	12	MCS 15	MCH: CH6	2437
	12	MCS 15	HCH: CH11	2462
IEEE 802.11n HT40	12	MCS 15	LCH: CH3	2422
	12	MCS 15	MCH: CH6	2437
	12	MCS 15	HCH: CH9	2452
IEEE 802.11ax HE20	SU:12 RU:12	MCS 11	LCH: CH1	2412
	SU:12 RU:12	MCS 11	MCH: CH6	2437
	SU:12 RU:12	MCS 11	HCH: CH11	2462
IEEE 802.11ax HE40	SU:12 RU:12	MCS 11	LCH: CH3	2422
	SU:12 RU:12	MCS 11	MCH: CH6	2437
	SU:12 RU:12	MCS 11	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

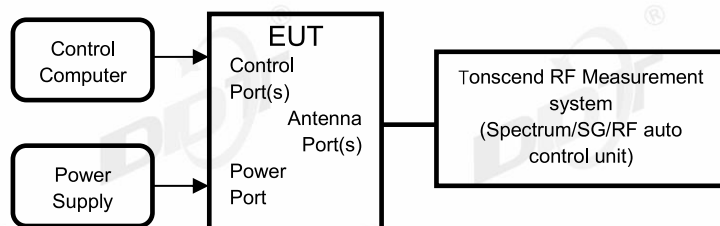
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 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	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	2118060485	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:	$\geq [3 \times \text{RBW}]$
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

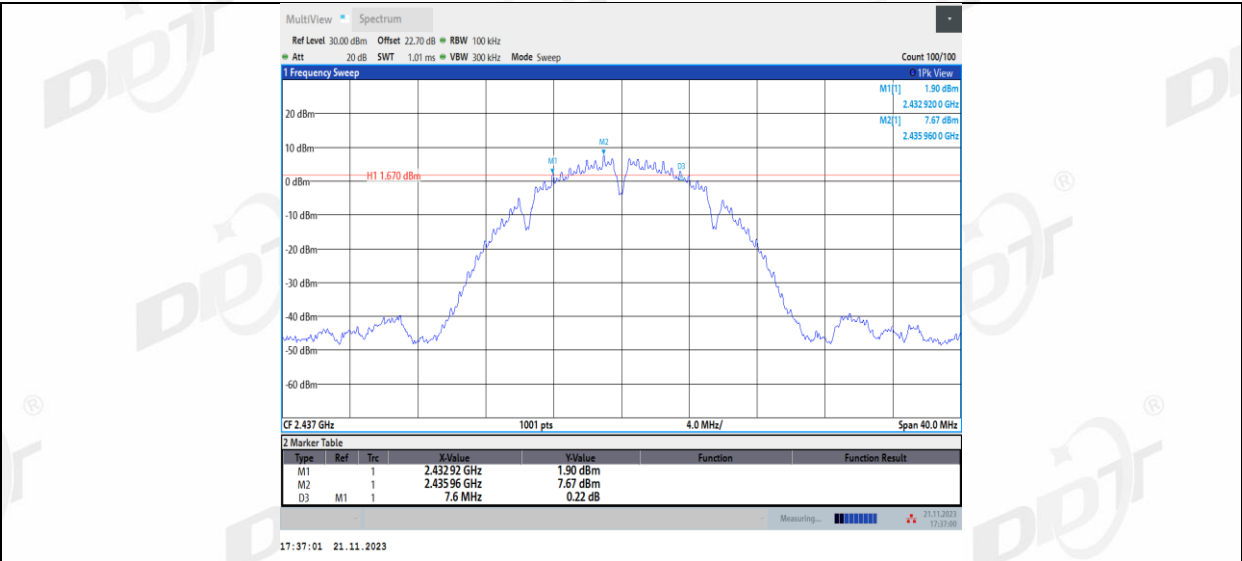
4.4. Test result

Test Engineer:	Haofeng	Test Site:	RF Measurement System 4#
Ambient Condition:	23.4℃,48.3%RH	Test Date:	2023.11.21/2024.02.01
Test Power Supply:	Battery	EUT:	Wireless Speaker
Sample Number:	S23111312-01	Model No.:	BOOMBOX3 Wi-Fi

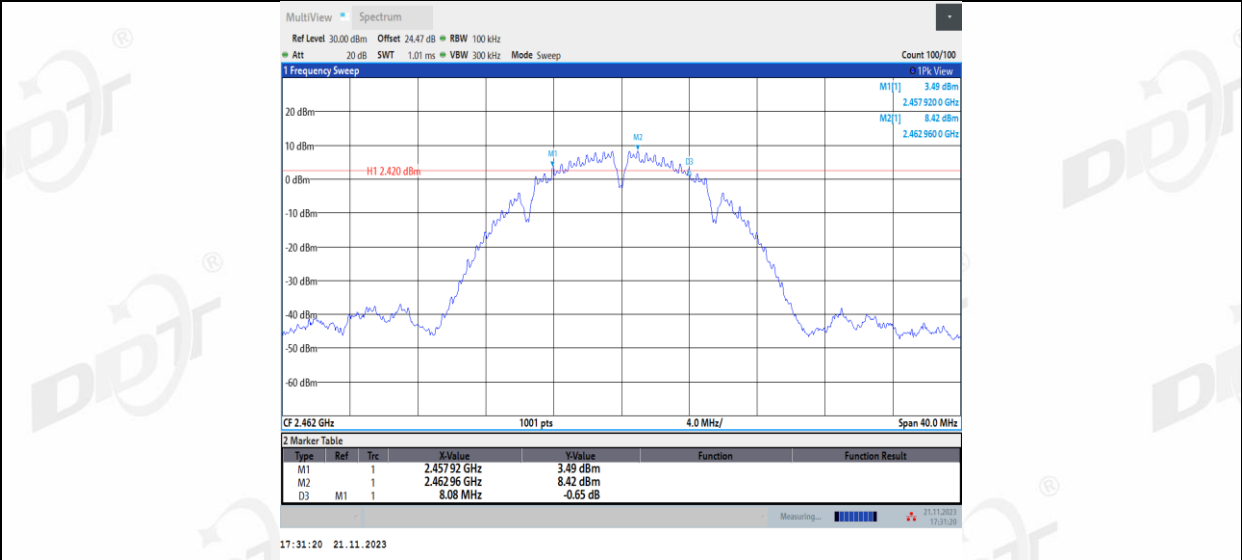
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	7.12	2408.40	2415.52	0.5	PASS
	Ant2	2412	8.08	2407.92	2416.00	0.5	PASS
	Ant1	2437	8.08	2432.92	2441.00	0.5	PASS
	Ant2	2437	7.60	2432.92	2440.52	0.5	PASS
	Ant1	2462	8.08	2457.92	2466.00	0.5	PASS
	Ant2	2462	8.04	2457.92	2465.96	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	15.48	2429.04	2444.52	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	16.32	2428.80	2445.12	0.5	PASS
	Ant1	2462	15.72	2453.80	2469.52	0.5	PASS
	Ant2	2462	17.16	2453.56	2470.72	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	18.48	2402.76	2421.24	0.5	PASS
	Ant2	2412	18.20	2403.16	2421.36	0.5	PASS
	Ant1	2437	18.72	2427.60	2446.32	0.5	PASS
	Ant2	2437	18.72	2427.52	2446.24	0.5	PASS
	Ant1	2462	18.64	2452.64	2471.28	0.5	PASS
	Ant2	2462	18.60	2452.60	2471.20	0.5	PASS
11AX40M IMO	Ant1	2422	37.28	2403.52	2440.80	0.5	PASS
	Ant2	2422	35.92	2404.40	2440.32	0.5	PASS
	Ant1	2437	37.12	2418.36	2455.48	0.5	PASS
	Ant2	2437	35.92	2419.40	2455.32	0.5	PASS
	Ant1	2452	37.12	2433.44	2470.56	0.5	PASS
	Ant2	2452	36.72	2433.60	2470.32	0.5	PASS

4.5. Test graphs

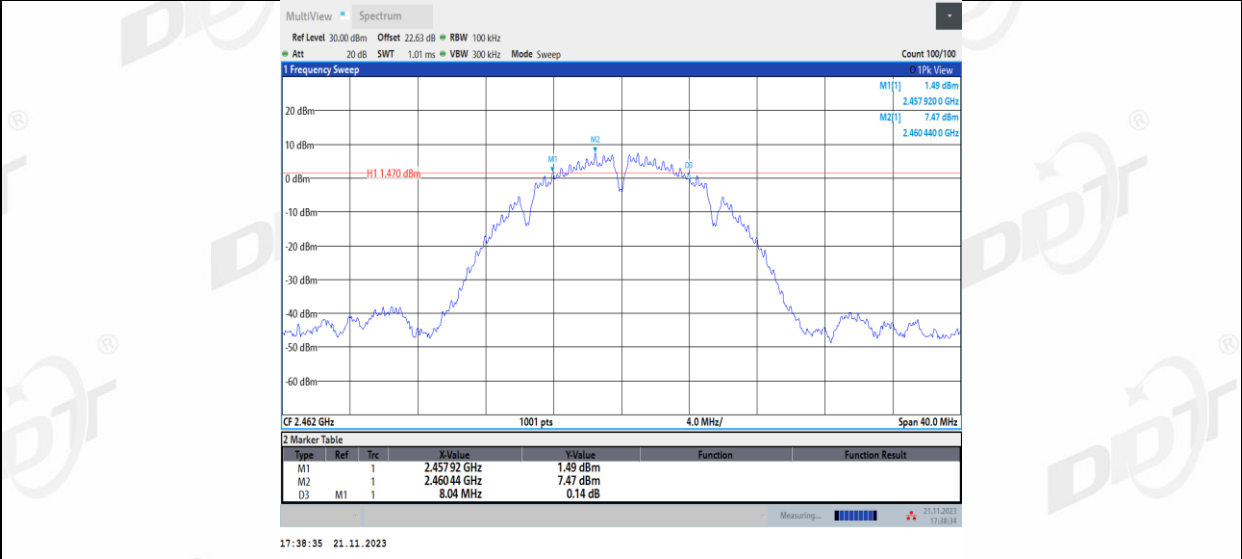




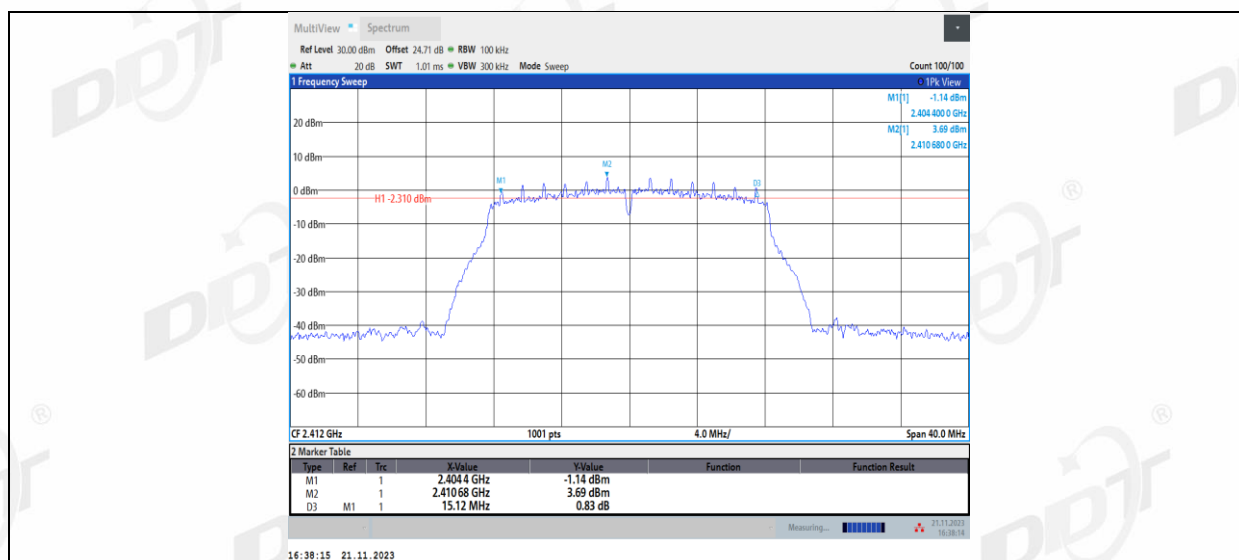
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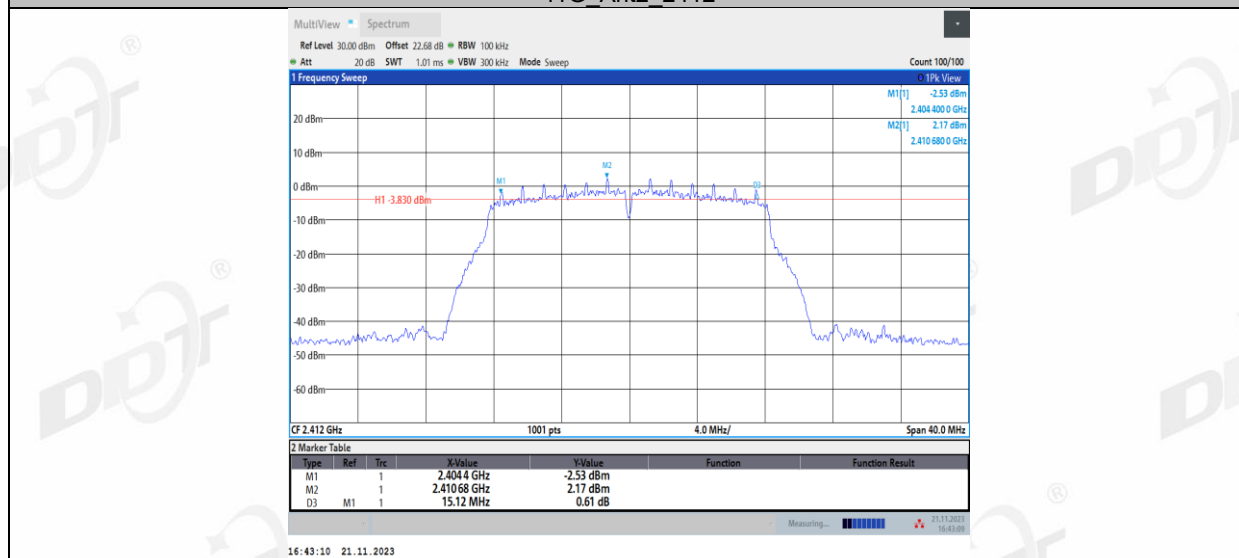
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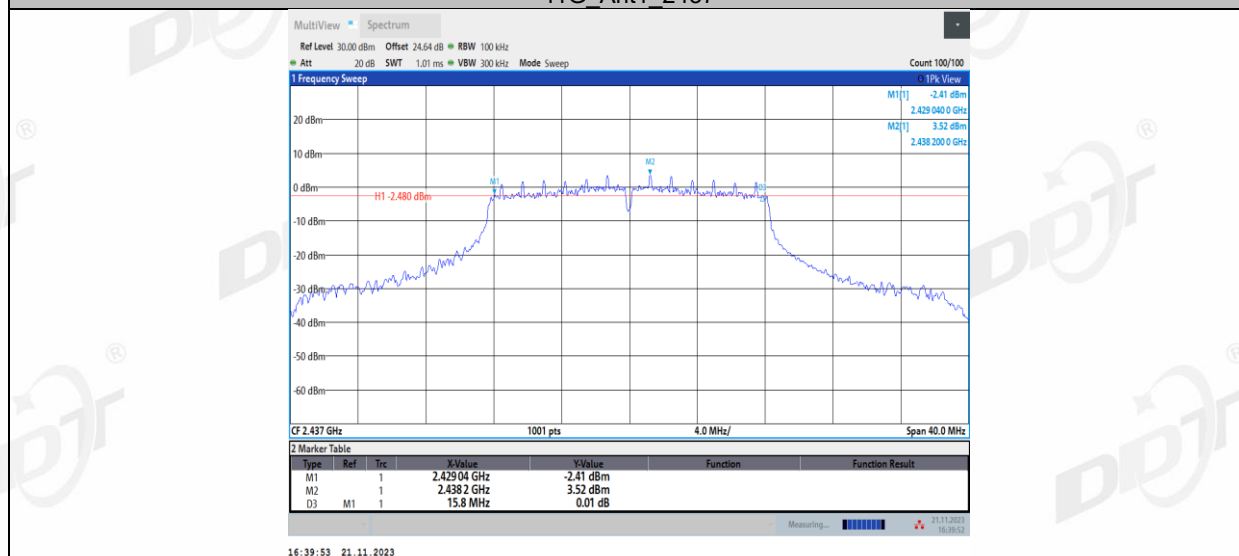
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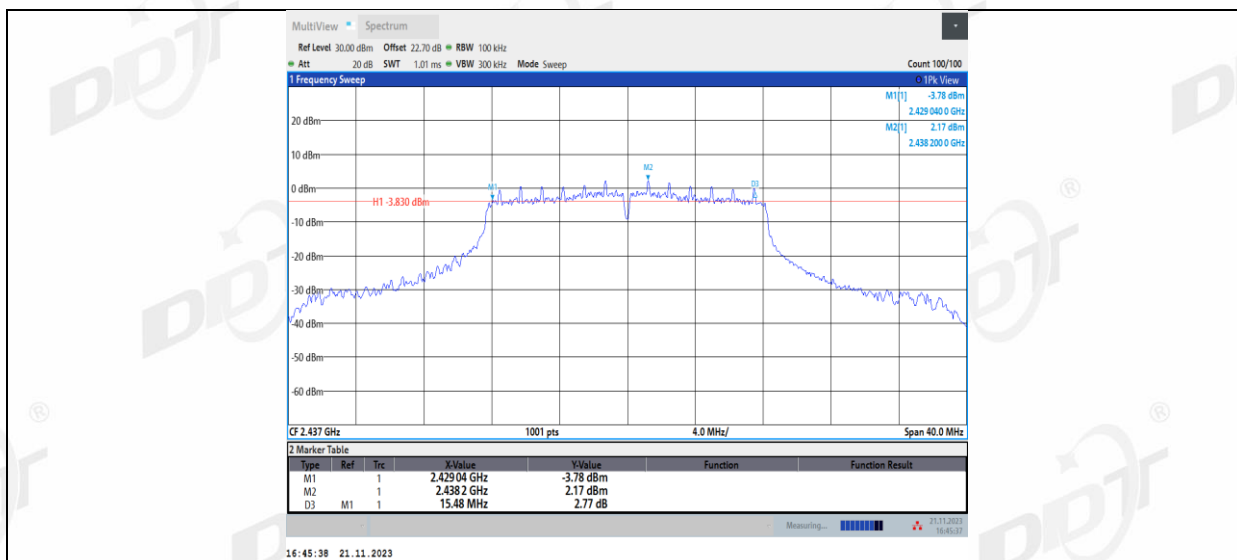
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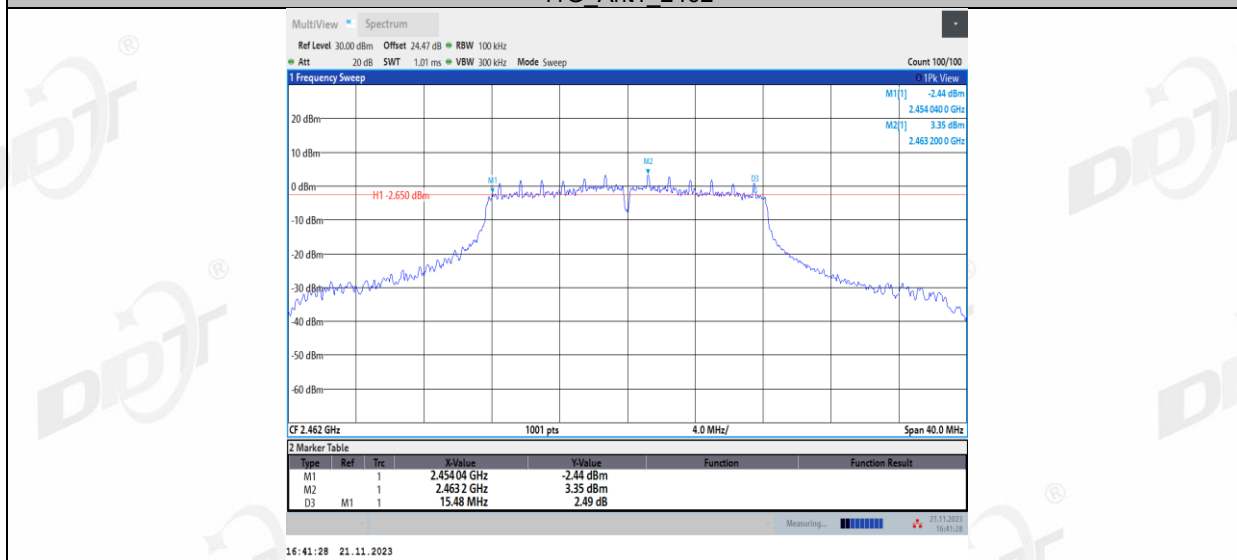
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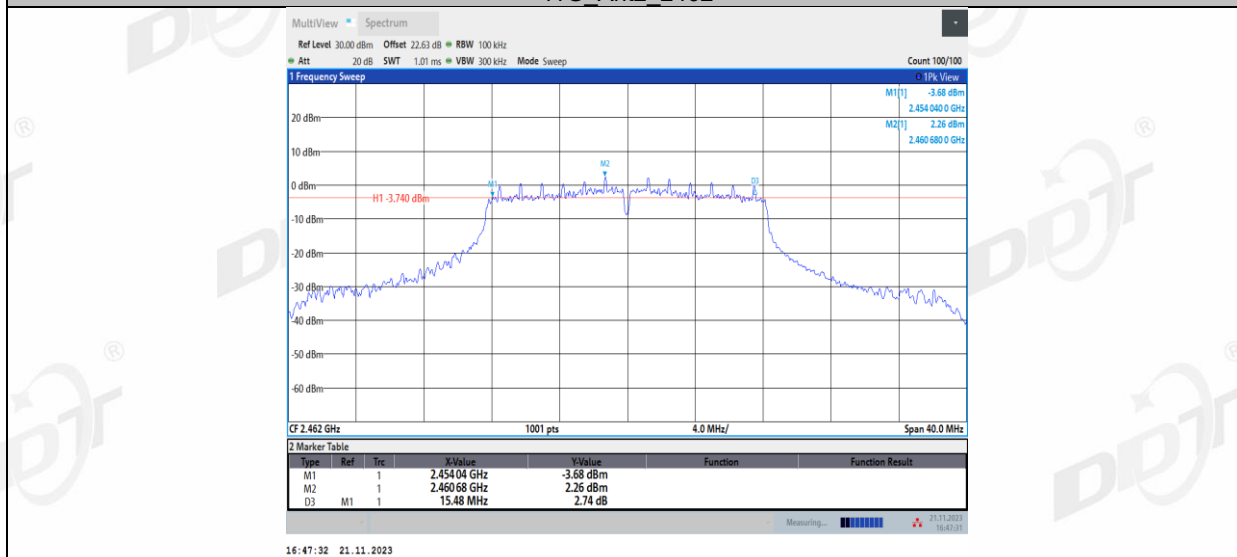
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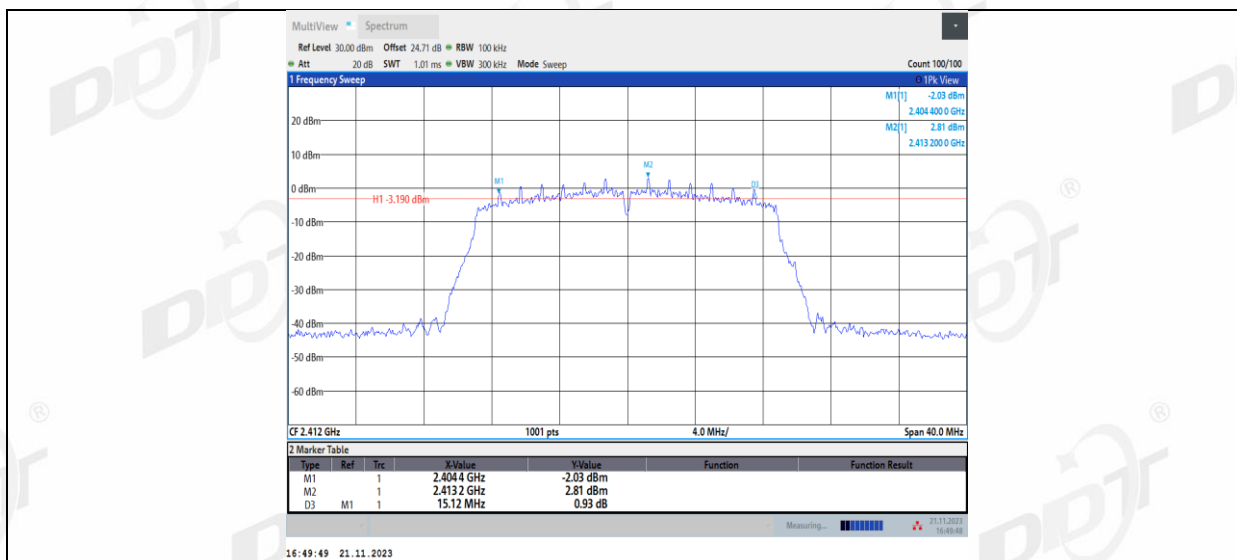
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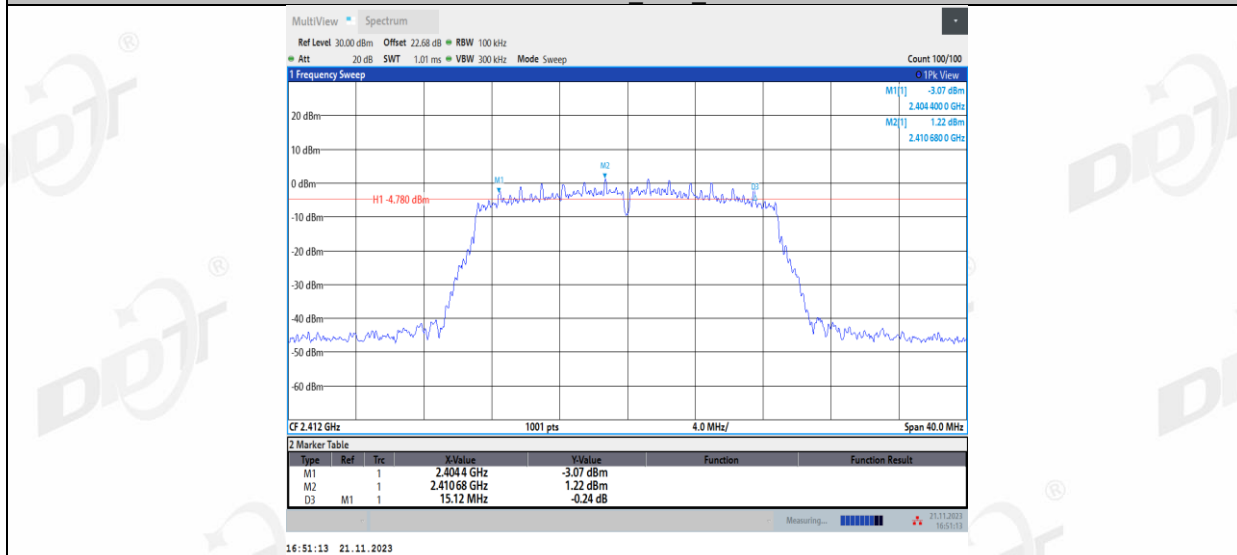
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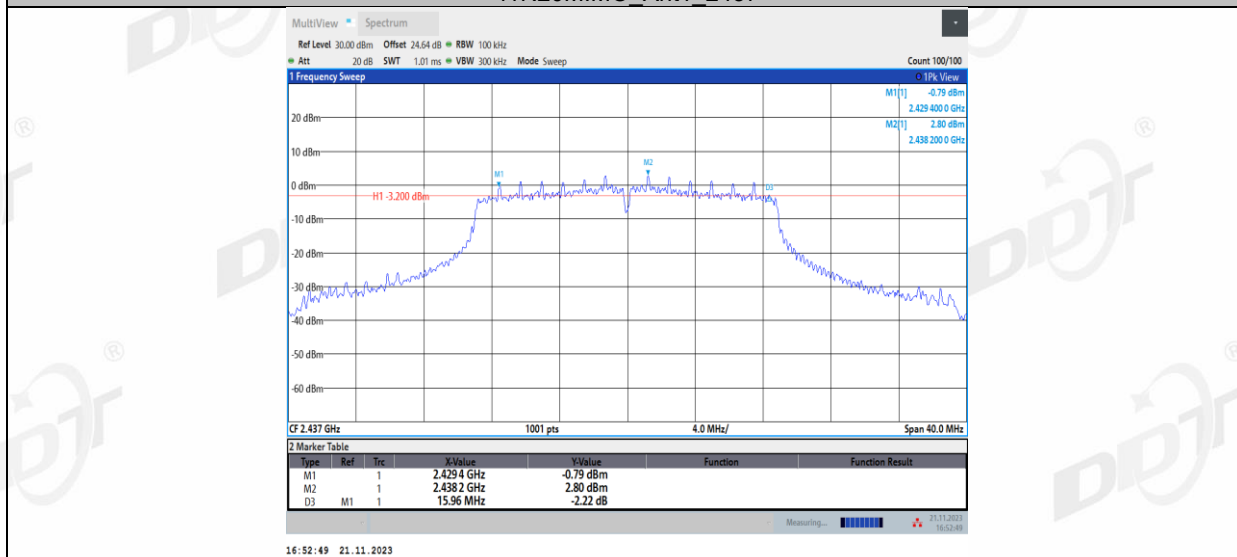
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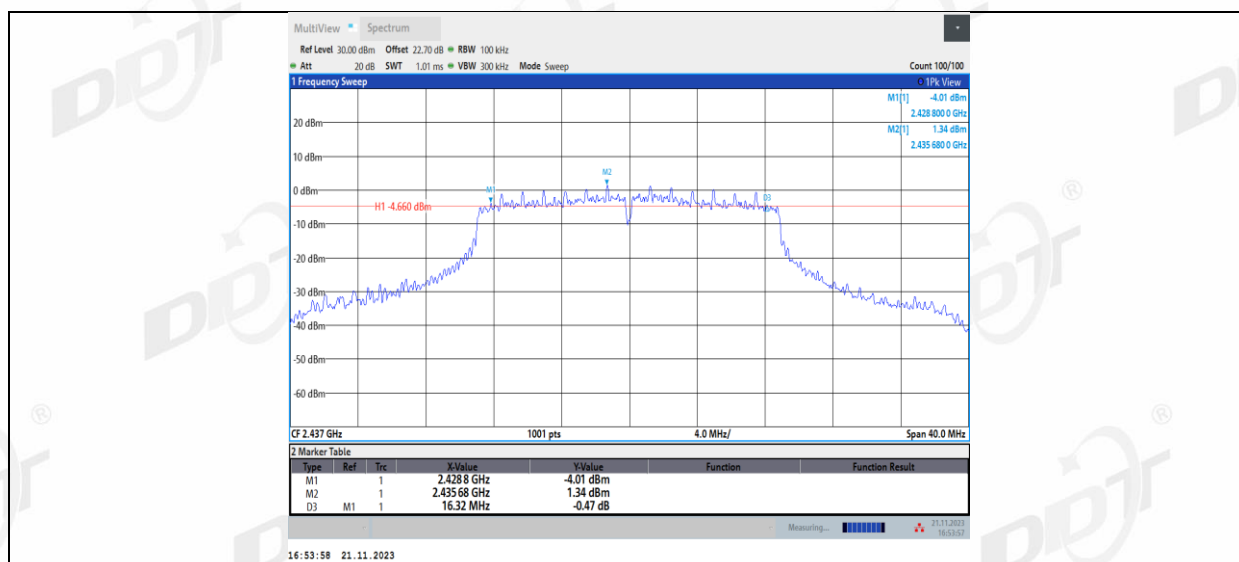
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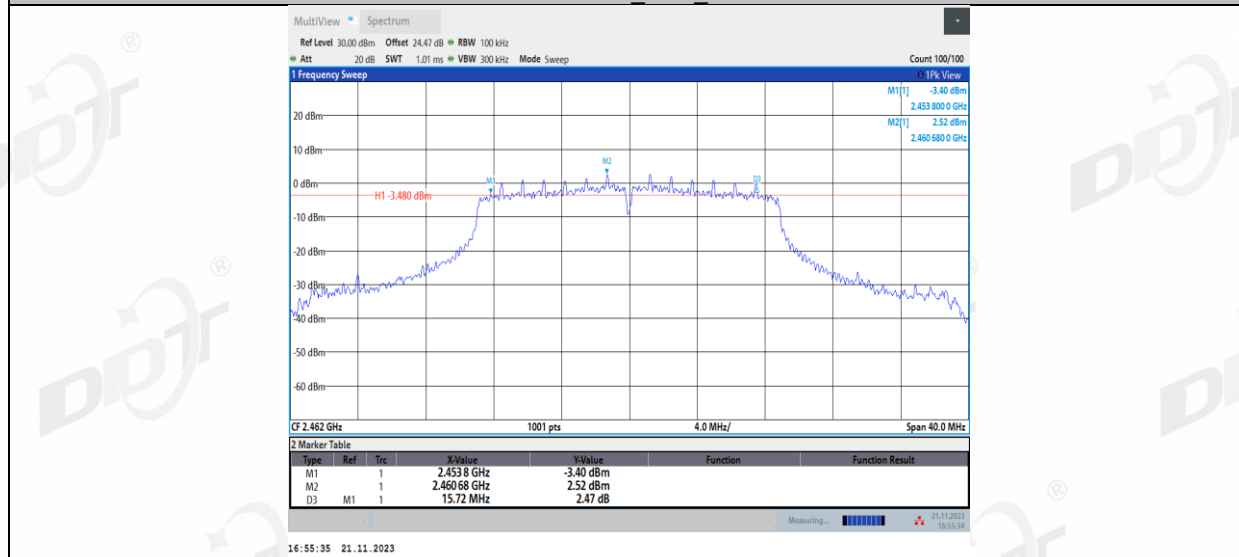
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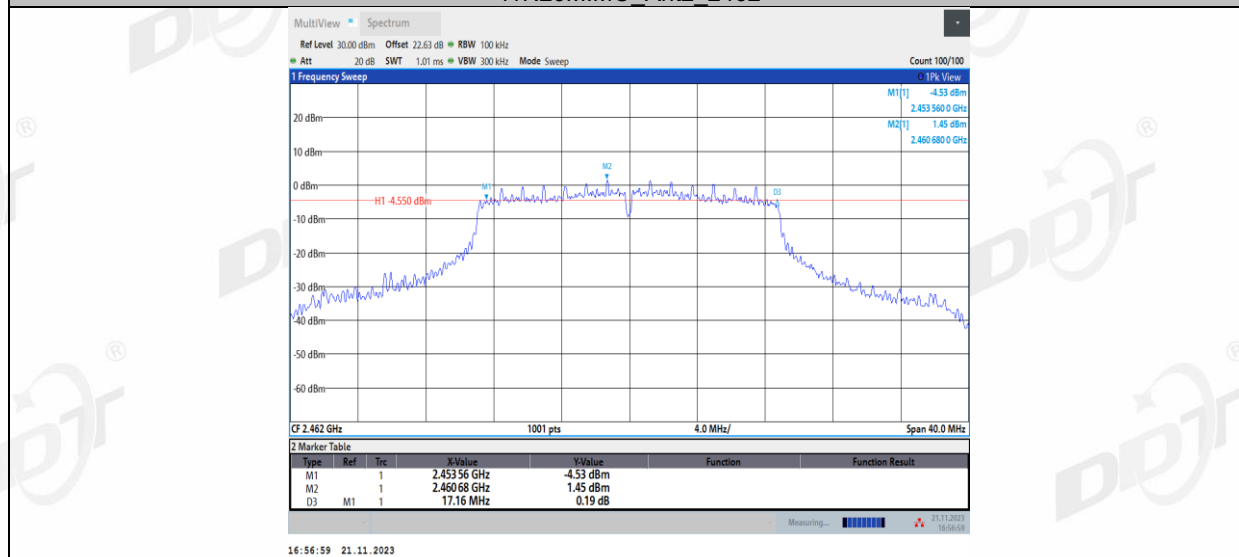
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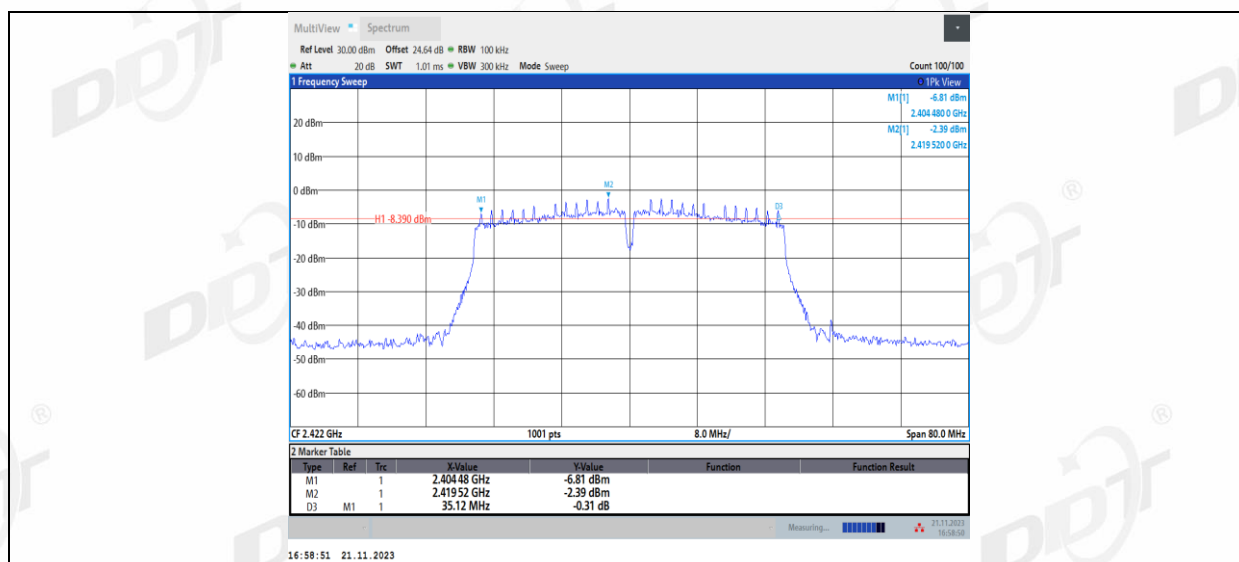
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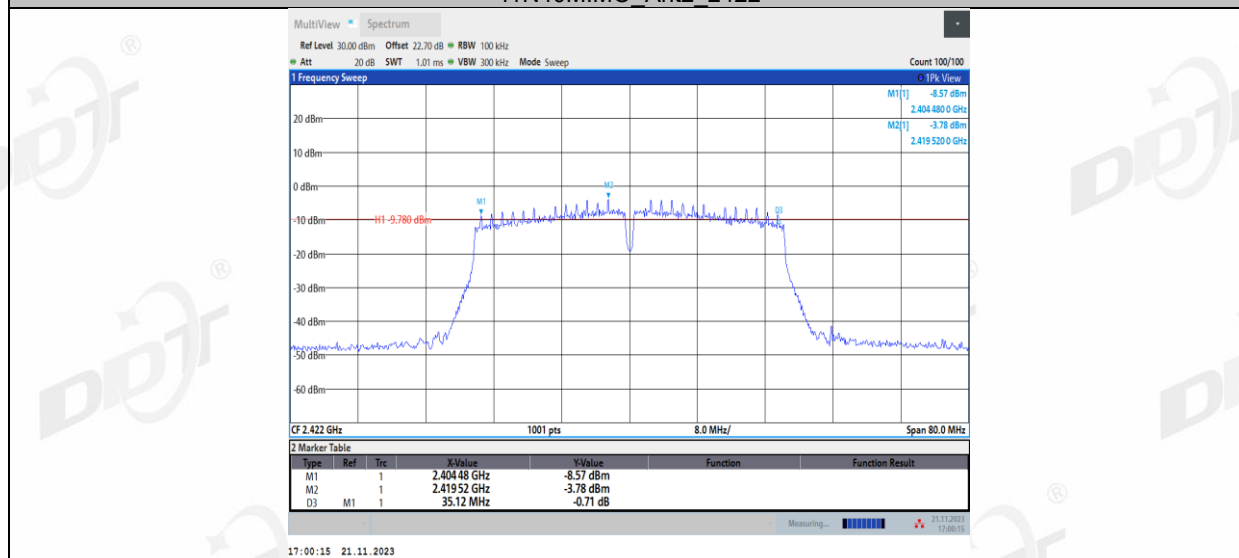
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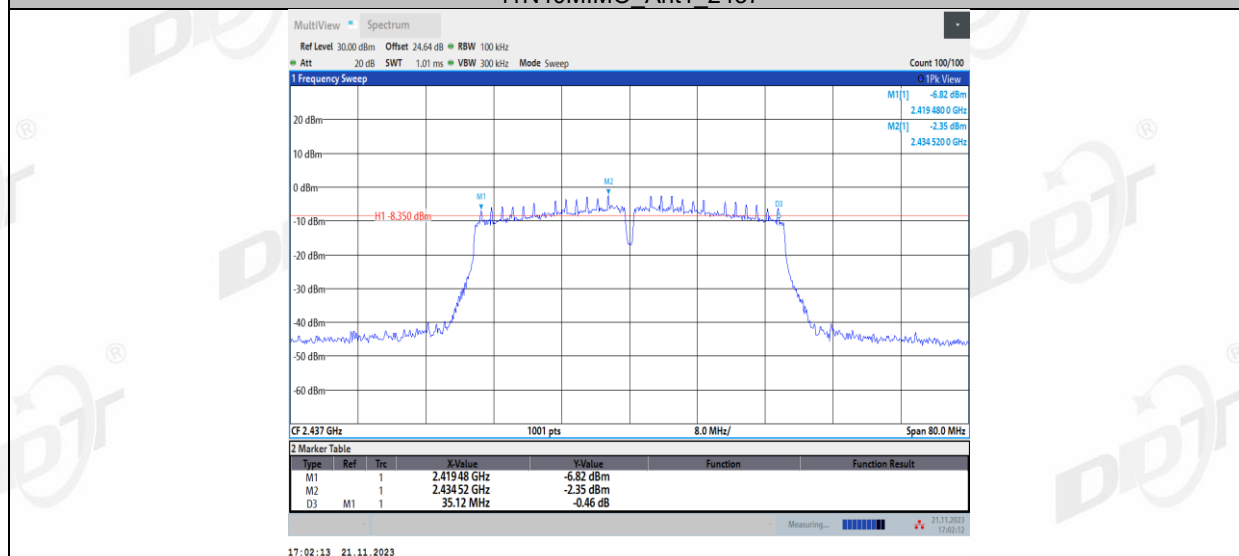
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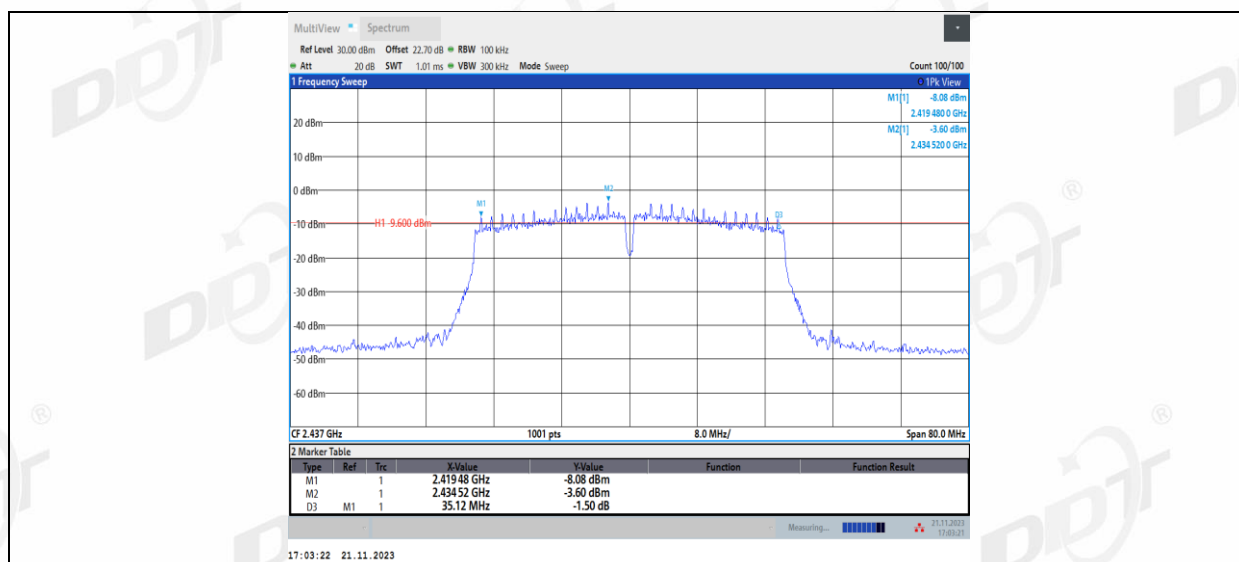
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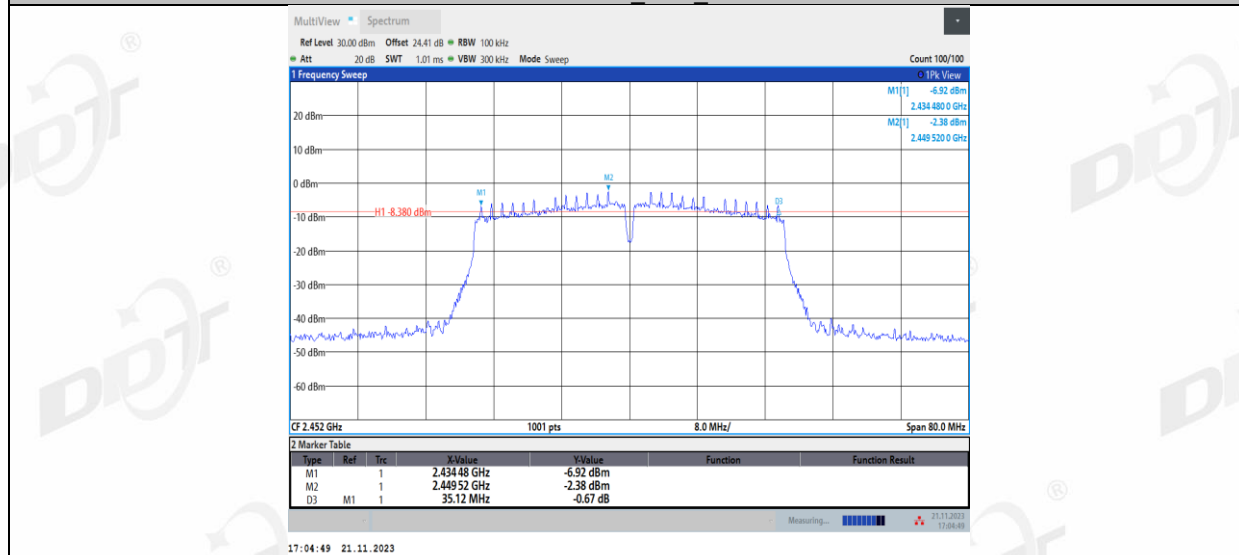
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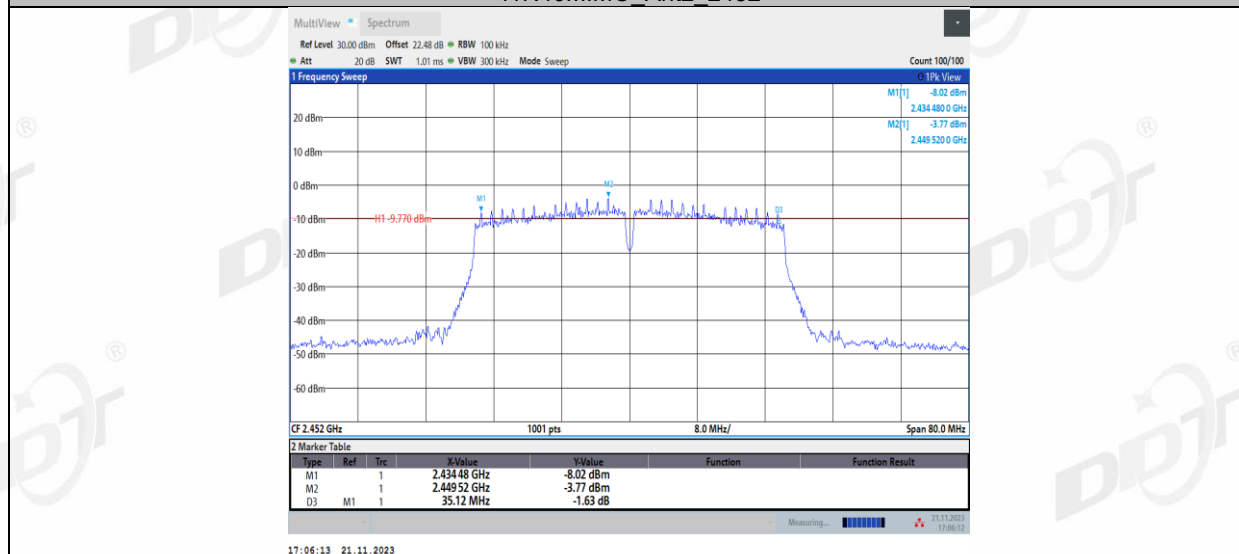
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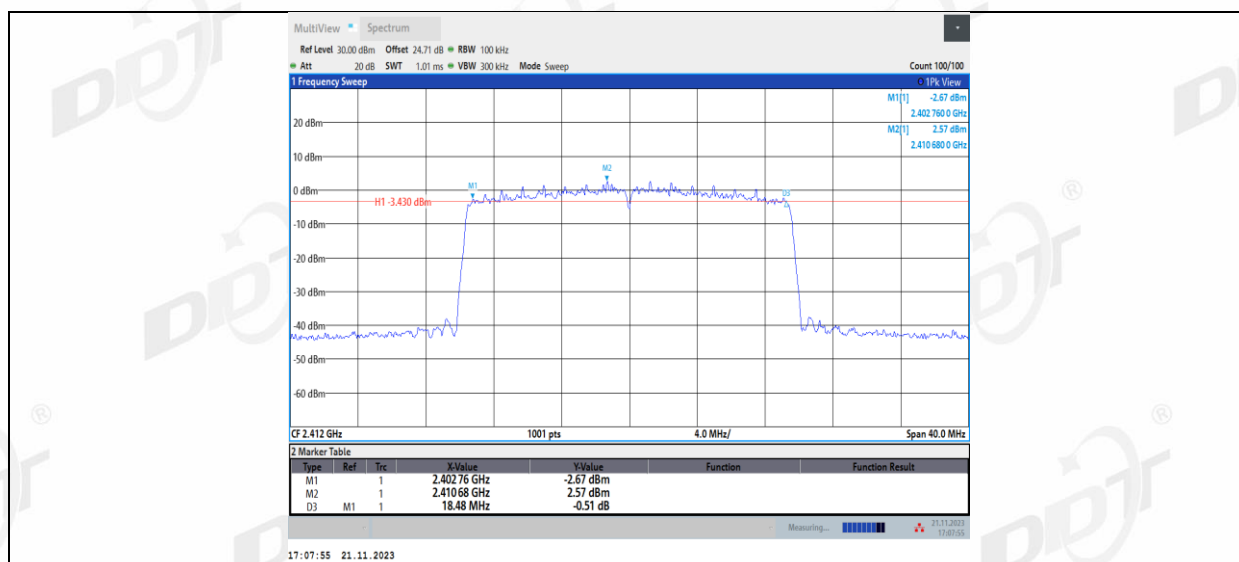
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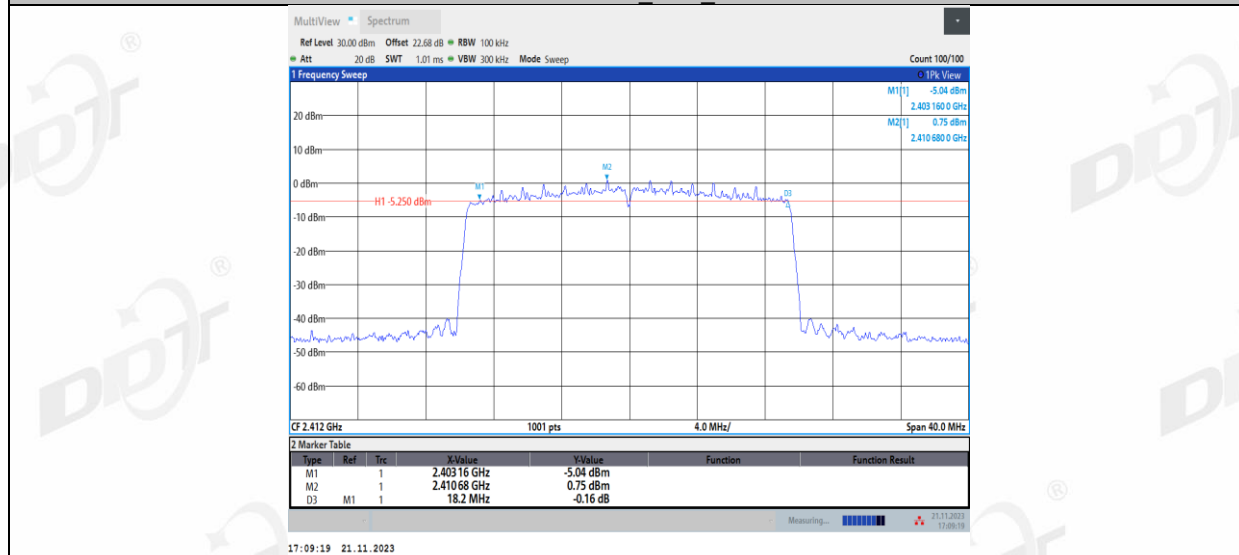
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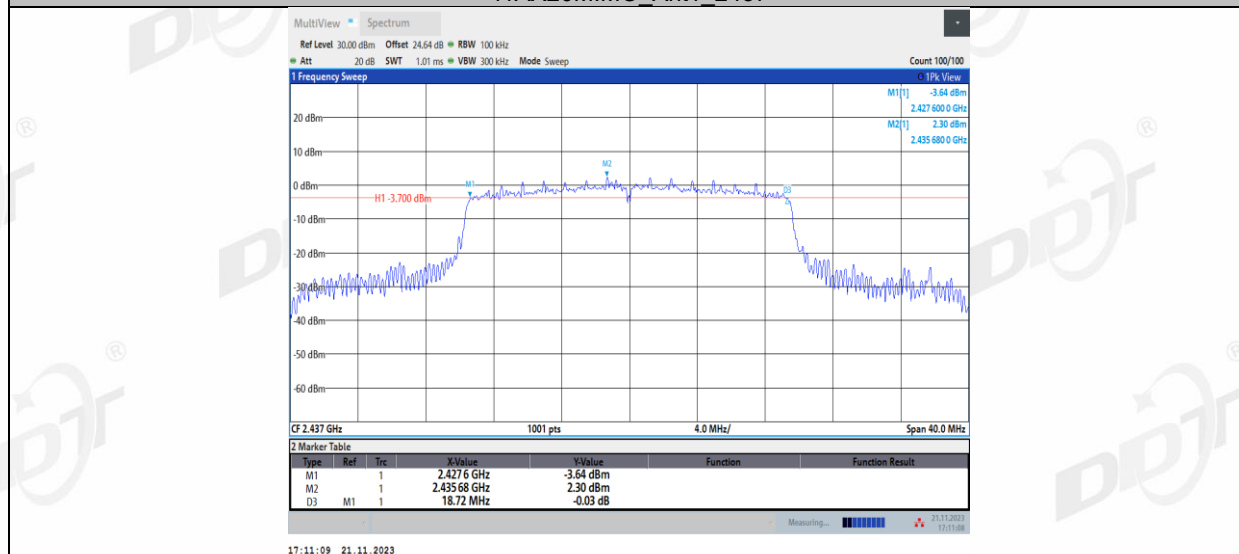
11AX20MIMO_Ant1_2412



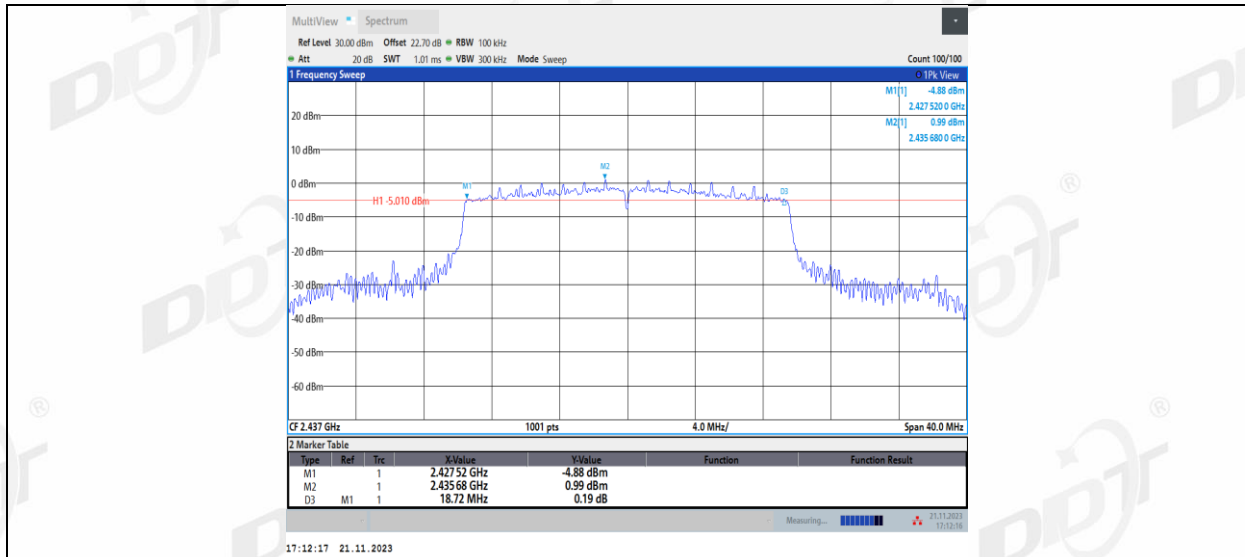
11AX20MIMO_Ant2_2412



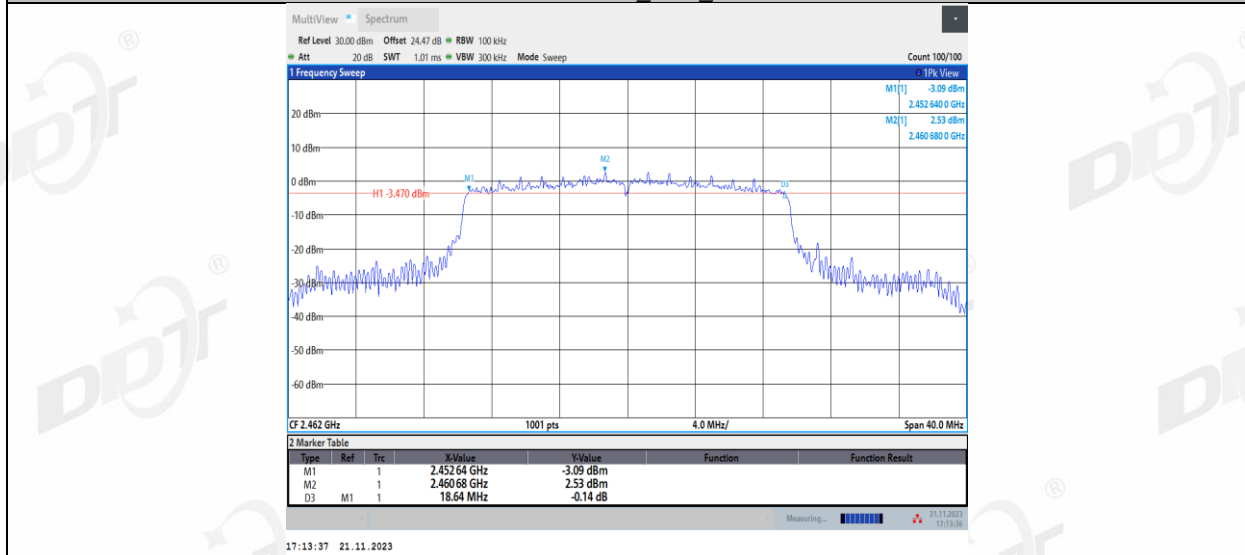
11AX20MIMO_Ant1_2437



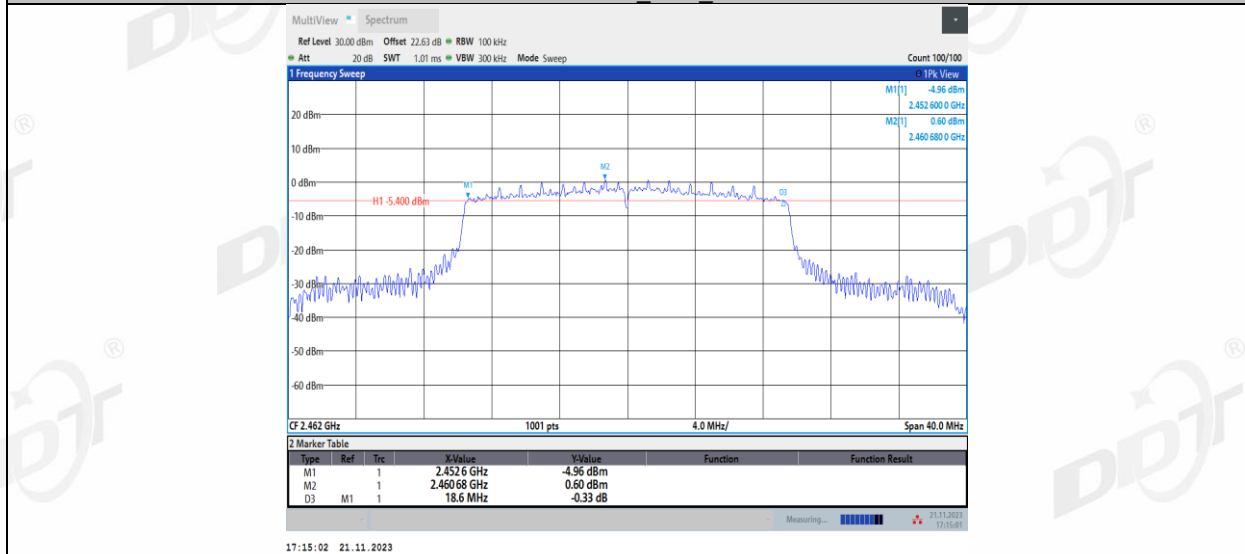
11AX20MIMO_Ant2_2437



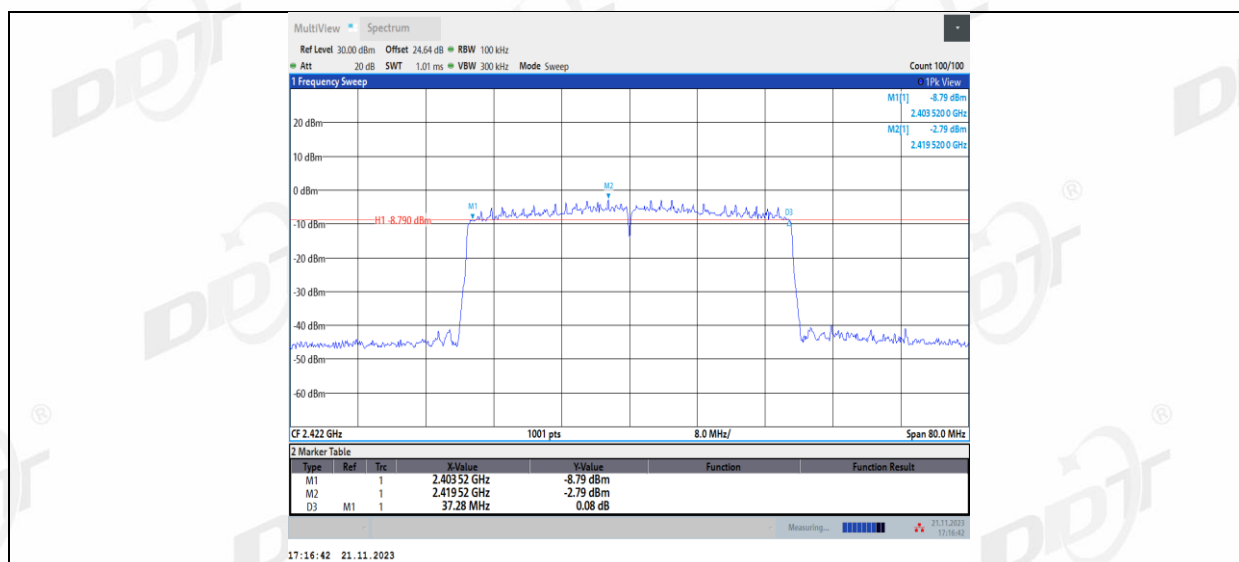
11AX20MIMO_Ant1_2462



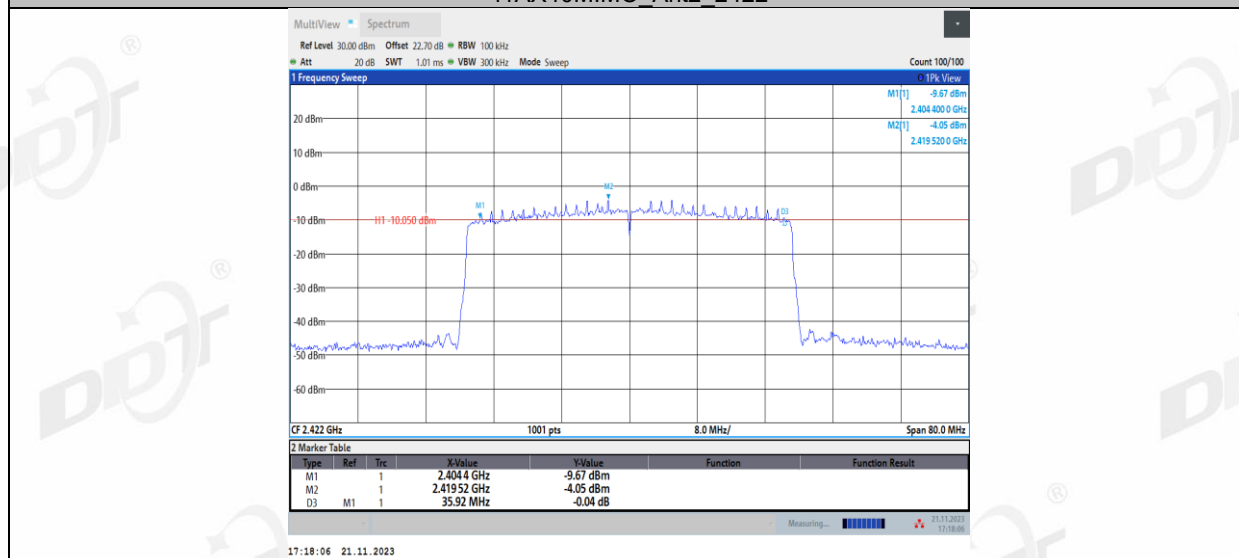
11AX20MIMO_Ant2_2462



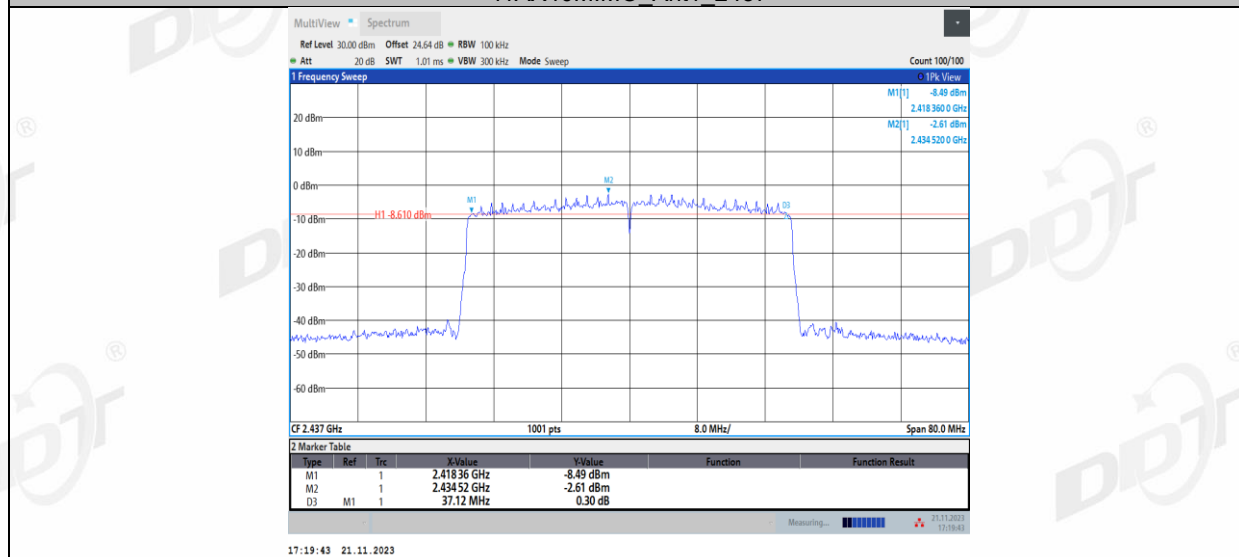
11AX40MIMO_Ant1_2422



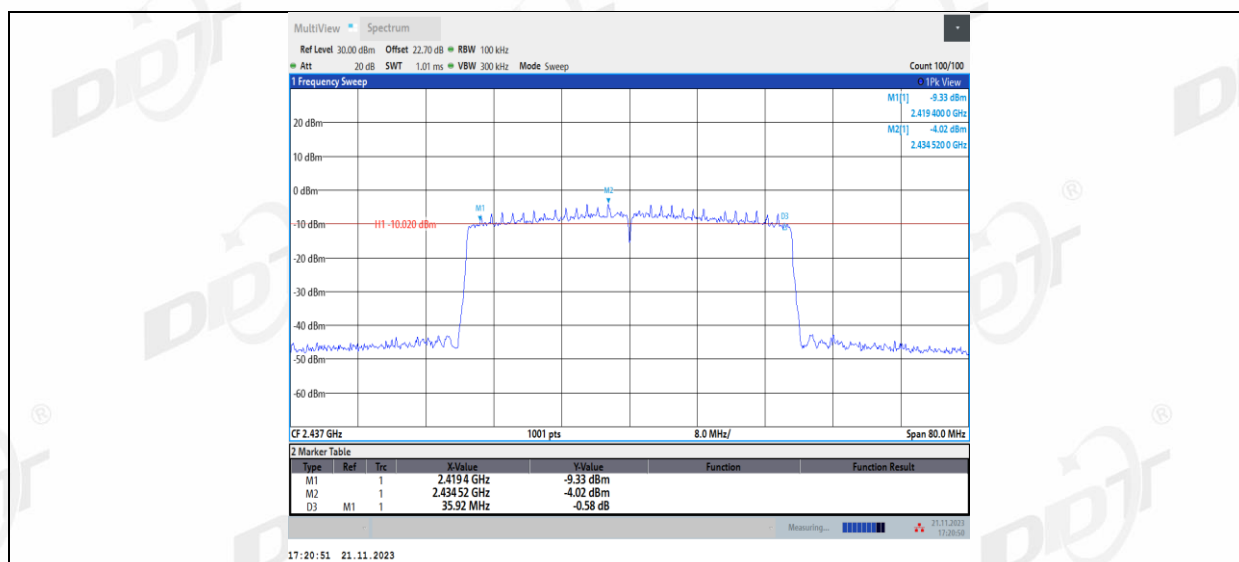
11AX40MIMO_Ant2_2422



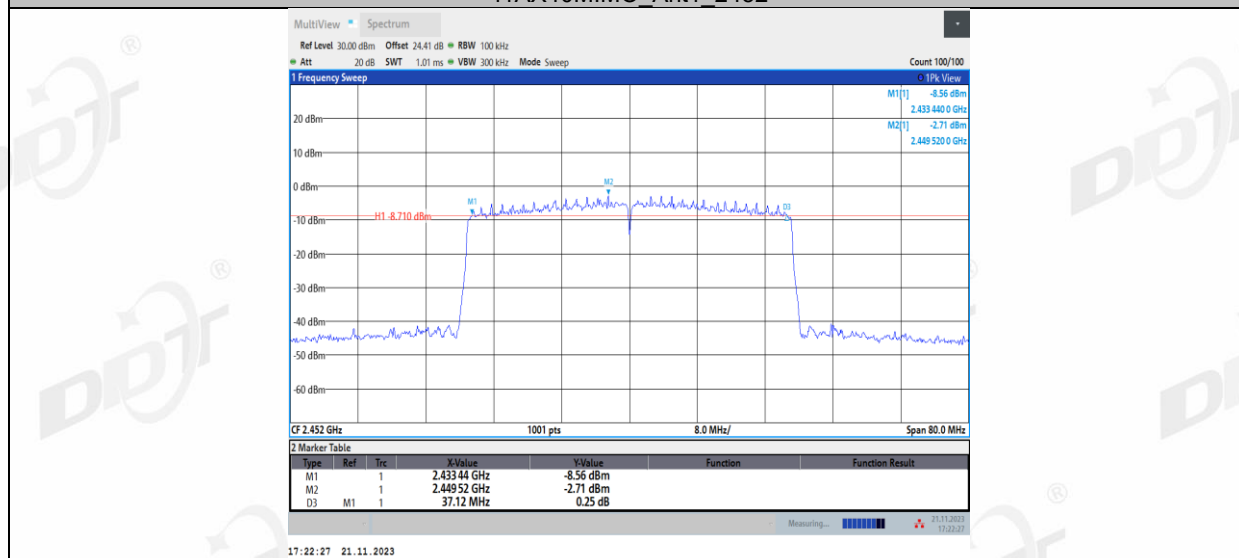
11AX40MIMO_Ant1_2437



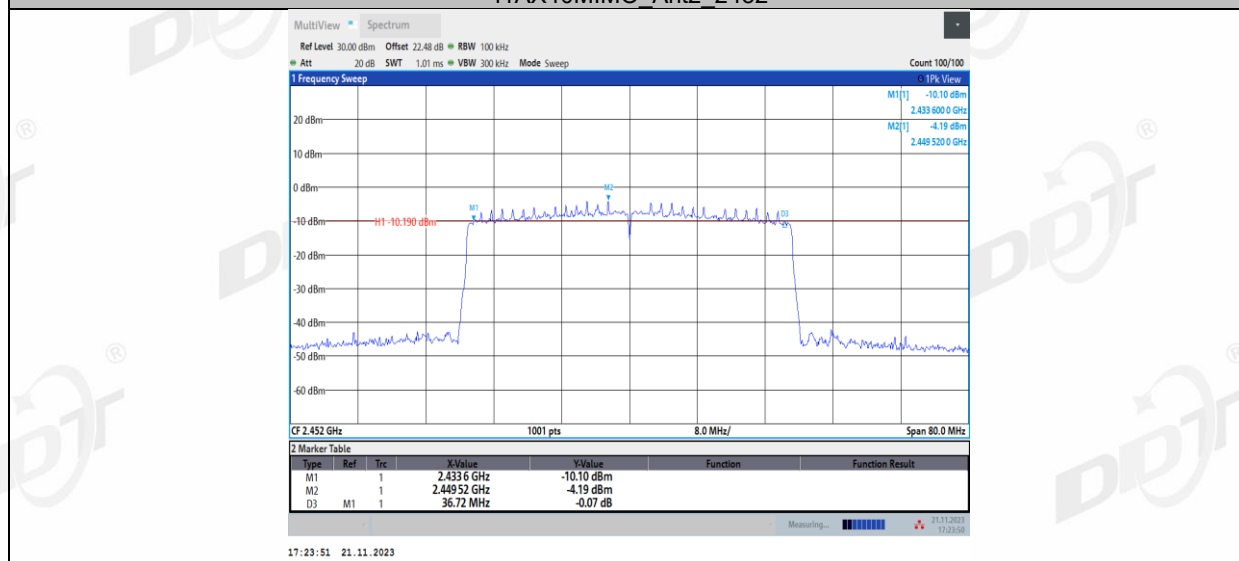
11AX40MIMO_Ant2_2437



11AX40MIMO_Ant1_2452

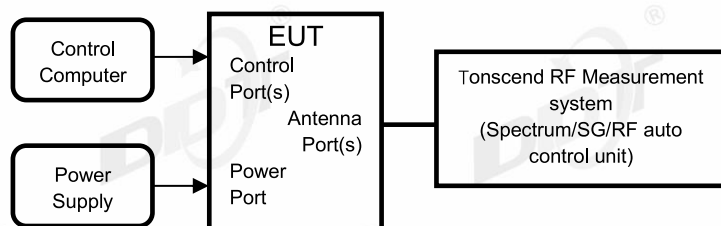


11AX40MIMO_Ant2_2452



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

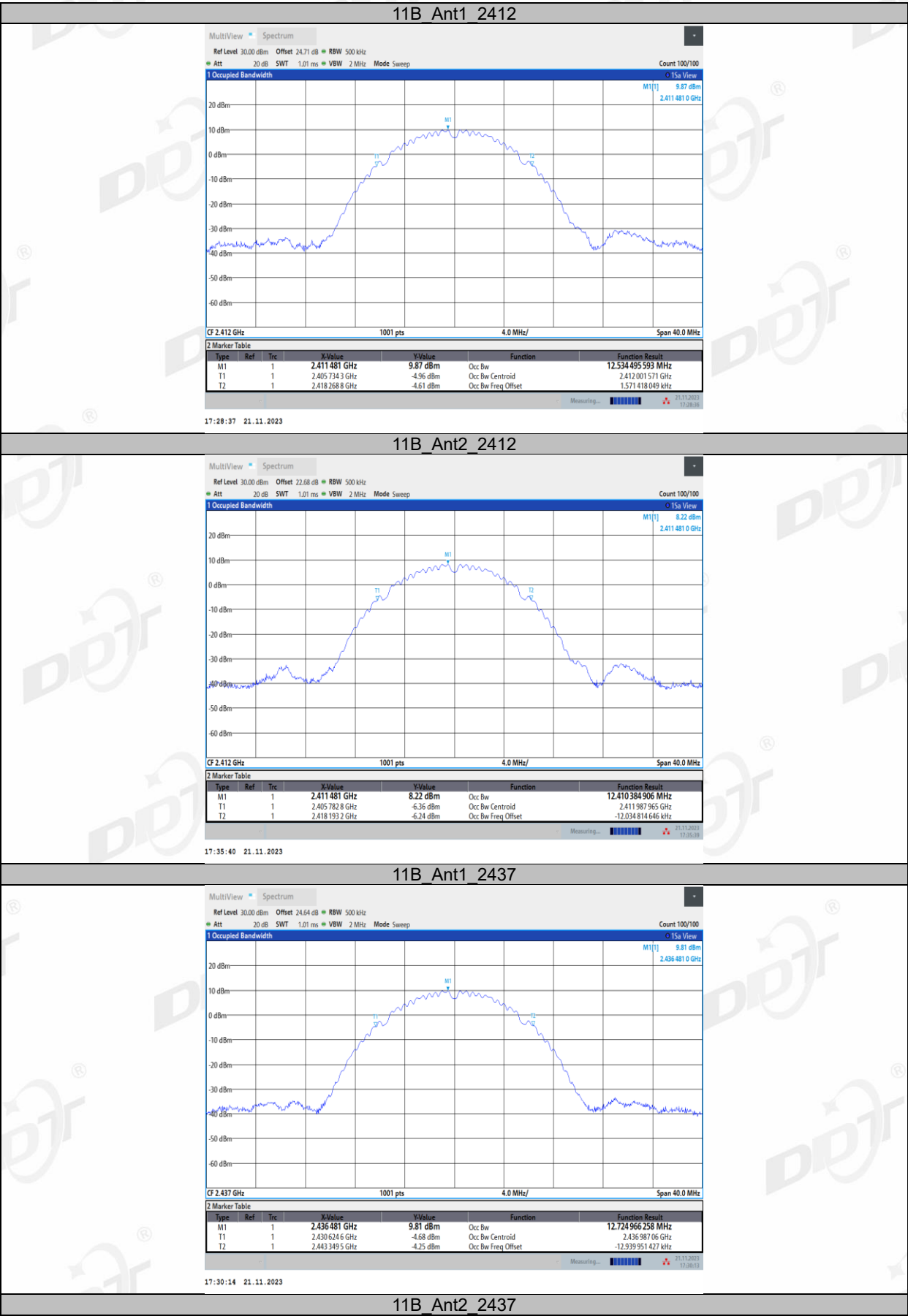
Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

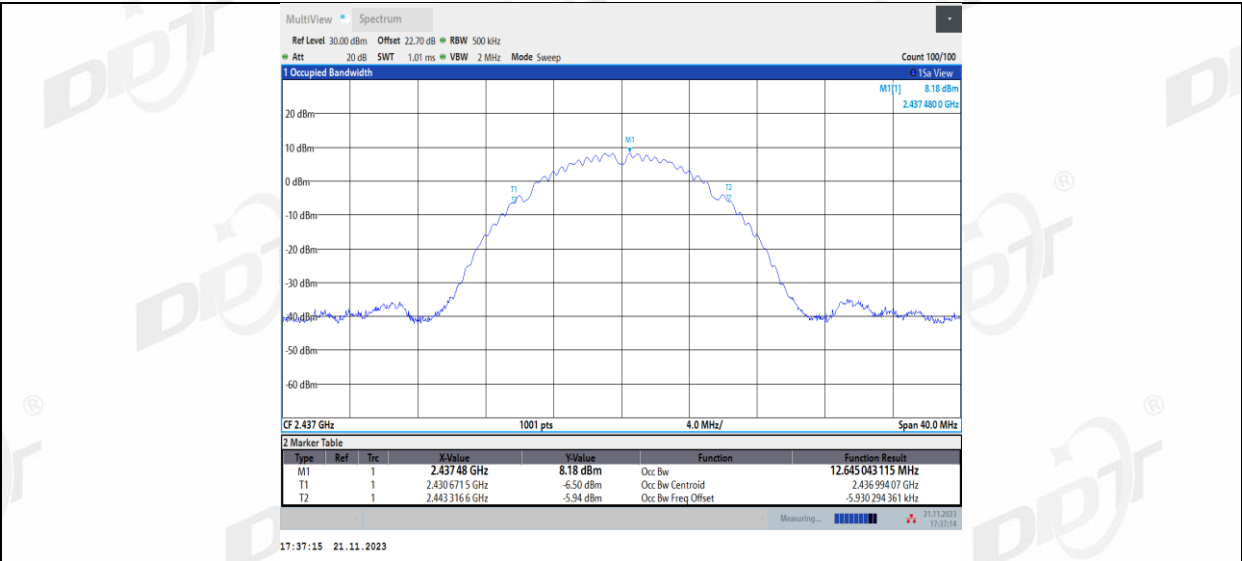
5.4. Test result

Test Engineer:	Haofeng	Test Site:	RF Measurement System 4#
Ambient Condition:	23.4℃,48.3%RH	Test Date:	2023.11.21/2024.02.01
Test Power Supply:	Battery	EUT:	Wireless Speaker
Sample Number:	S23111312-01	Model No.:	BOOMBOX3 Wi-Fi

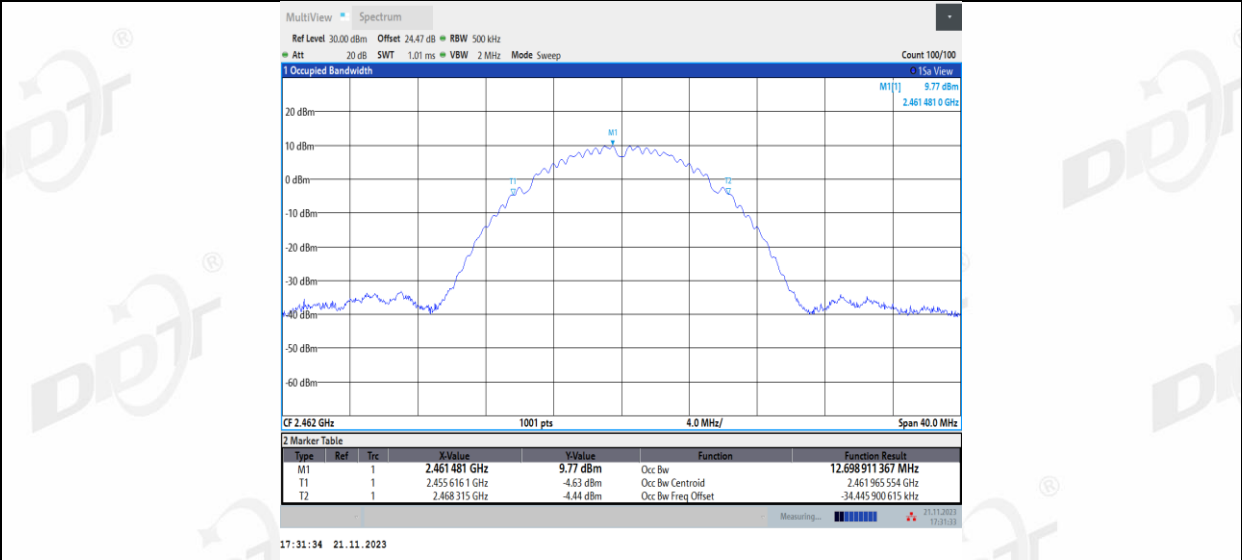
TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	12.534	2405.7343	2418.2688	---	---
	Ant2	2412	12.41	2405.7828	2418.1932	---	---
	Ant1	2437	12.725	2430.6246	2443.3495	---	---
	Ant2	2437	12.645	2430.6715	2443.3166	---	---
	Ant1	2462	12.699	2455.6161	2468.3150	---	---
	Ant2	2462	12.646	2455.6409	2468.2871	---	---
11G	Ant1	2412	17.111	2403.3983	2420.5095	---	---
	Ant2	2412	17.086	2403.3822	2420.4680	---	---
	Ant1	2437	18.998	2427.4243	2446.4224	---	---
	Ant2	2437	19.031	2427.3312	2446.3624	---	---
	Ant1	2462	19.042	2452.3382	2471.3804	---	---
	Ant2	2462	19.029	2452.3395	2471.3682	---	---
11N20MI MO	Ant1	2412	17.939	2403.0098	2420.9488	---	---
	Ant2	2412	17.665	2403.1277	2420.7927	---	---
	Ant1	2437	19.915	2427.0310	2446.9457	---	---
	Ant2	2437	18.489	2427.6169	2446.1058	---	---
	Ant1	2462	19.895	2451.9697	2471.8645	---	---
	Ant2	2462	18.513	2452.6185	2471.1311	---	---
11N40MI MO	Ant1	2422	36.231	2403.9054	2440.1359	---	---
	Ant2	2422	36.233	2403.8753	2440.1080	---	---
	Ant1	2437	36.128	2418.9285	2455.0568	---	---
	Ant2	2437	36.183	2418.8377	2455.0207	---	---
	Ant1	2452	36.161	2433.9035	2470.0641	---	---
	Ant2	2452	36.258	2433.8002	2470.0579	---	---
11AX20M IMO	Ant1	2412	18.85	2402.5433	2421.3934	---	---
	Ant2	2412	18.854	2402.5603	2421.4147	---	---
	Ant1	2437	19.317	2427.3378	2446.6553	---	---
	Ant2	2437	19.234	2427.3435	2446.5775	---	---
	Ant1	2462	19.315	2452.2957	2471.6105	---	---
	Ant2	2462	19.265	2452.3263	2471.5915	---	---
11AX40M IMO	Ant1	2422	37.785	2403.0687	2440.8534	---	---
	Ant2	2422	37.766	2403.1038	2440.8695	---	---
	Ant1	2437	37.735	2418.0997	2455.8347	---	---
	Ant2	2437	37.81	2418.0427	2455.8522	---	---
	Ant1	2452	37.728	2433.1015	2470.8299	---	---
	Ant2	2452	37.783	2433.0466	2470.8300	---	---

5.5. Test graphs

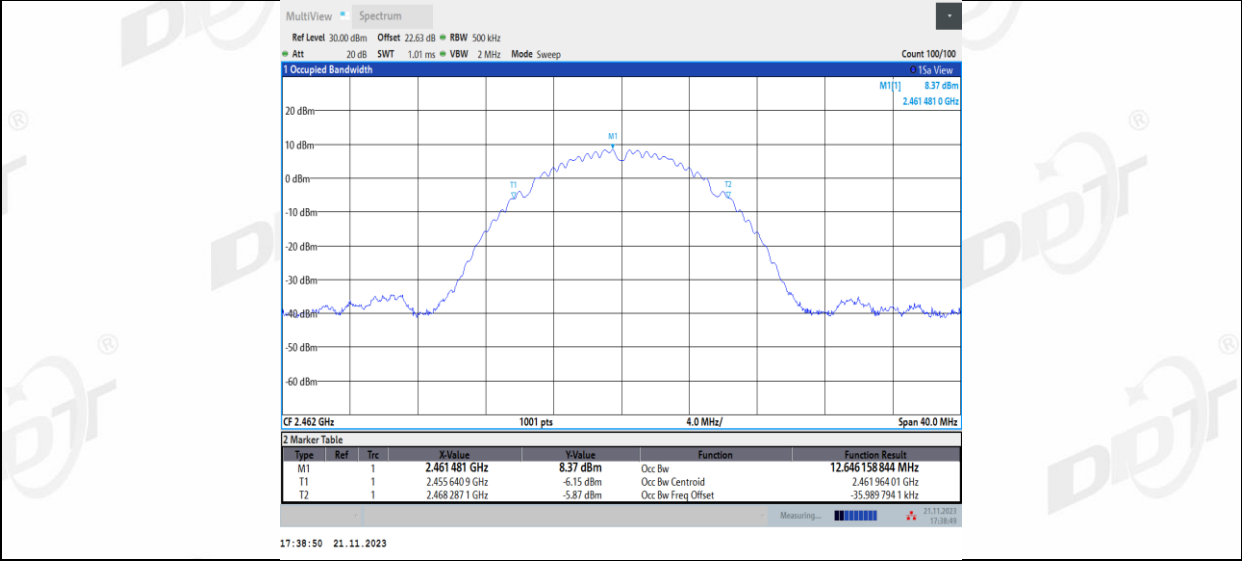




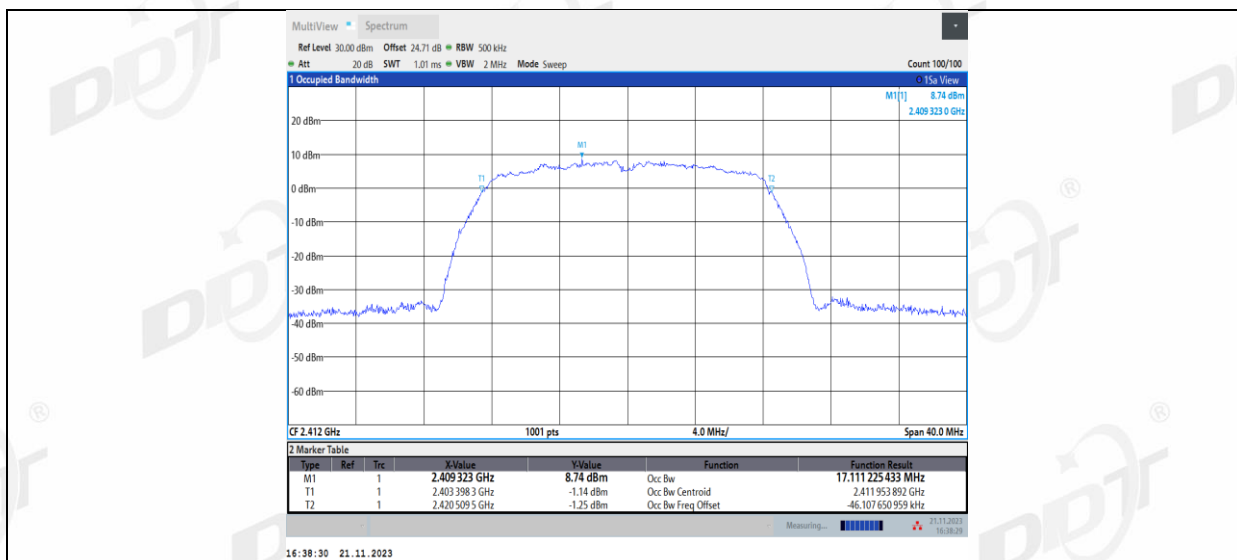
11B_Ant1_2462



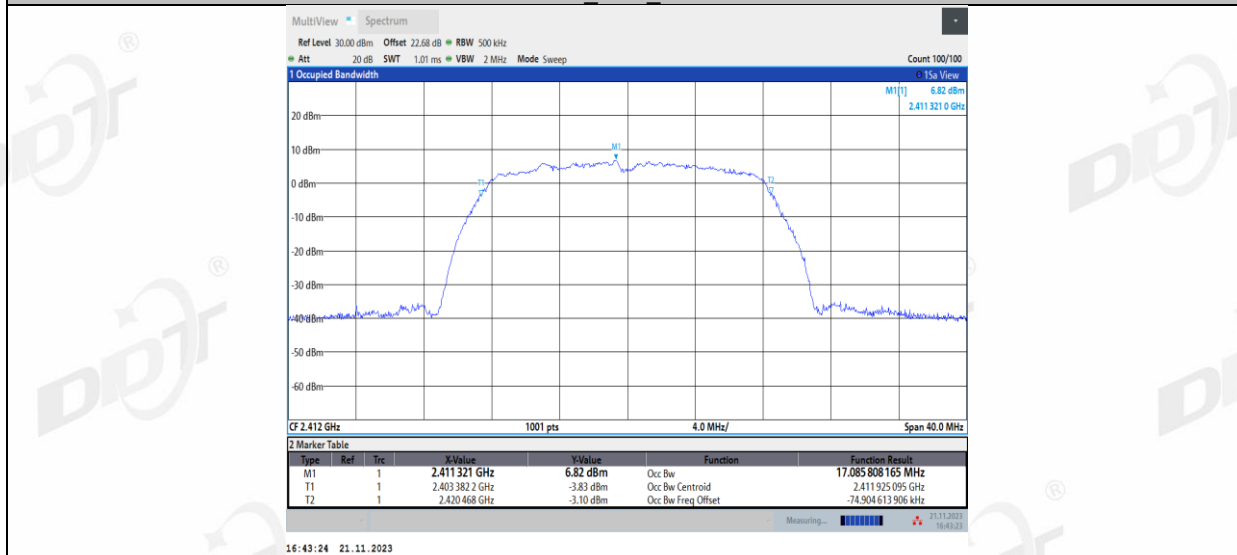
11B_Ant2_2462



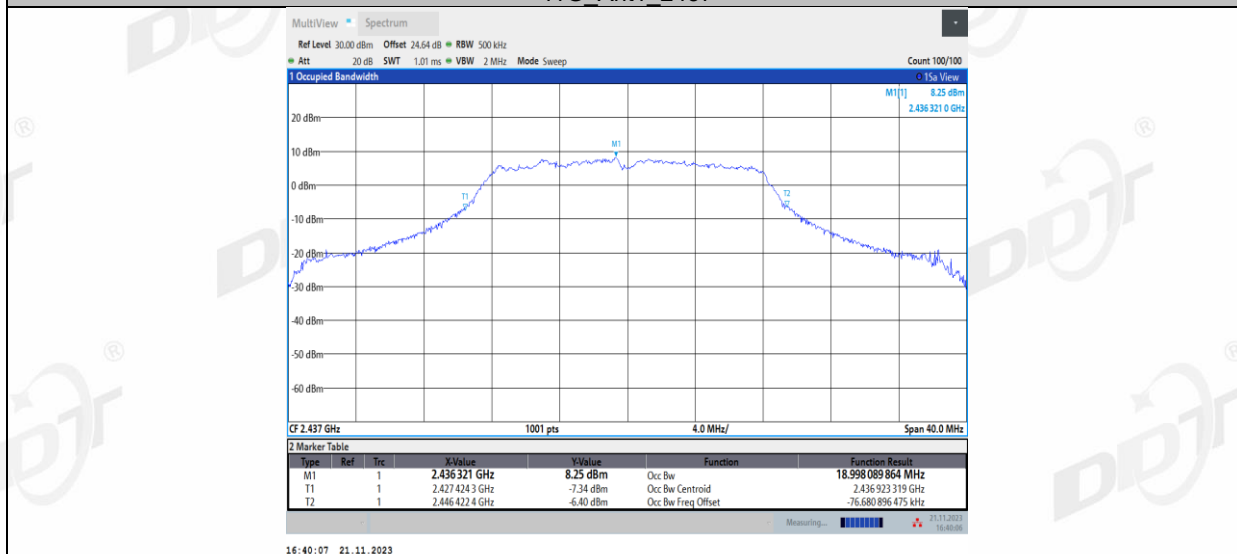
11G_Ant1_2412



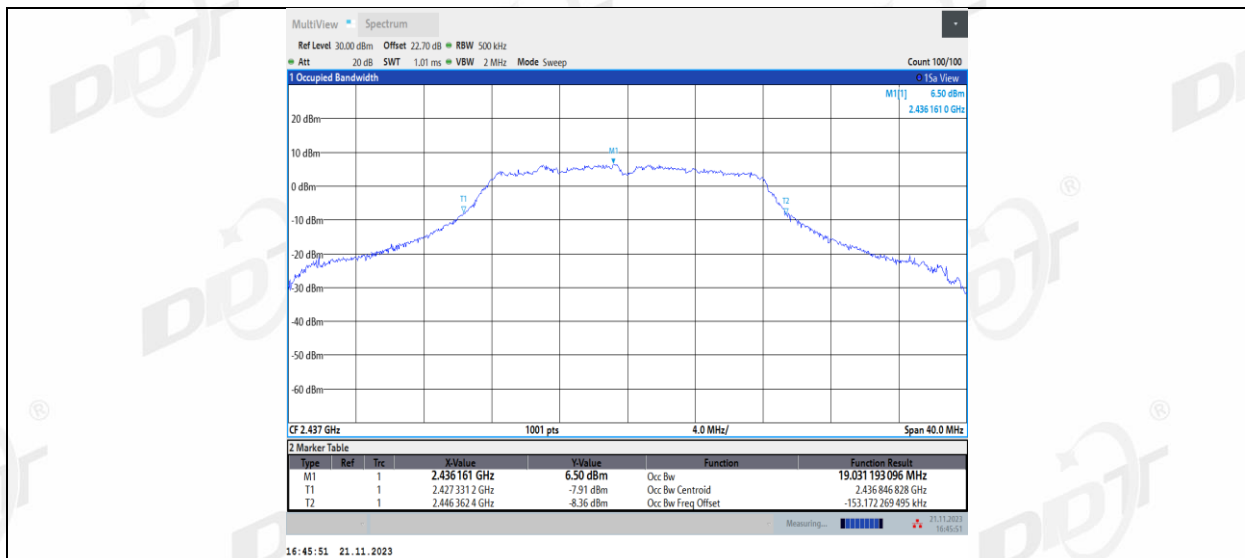
11G_Ant2_2412



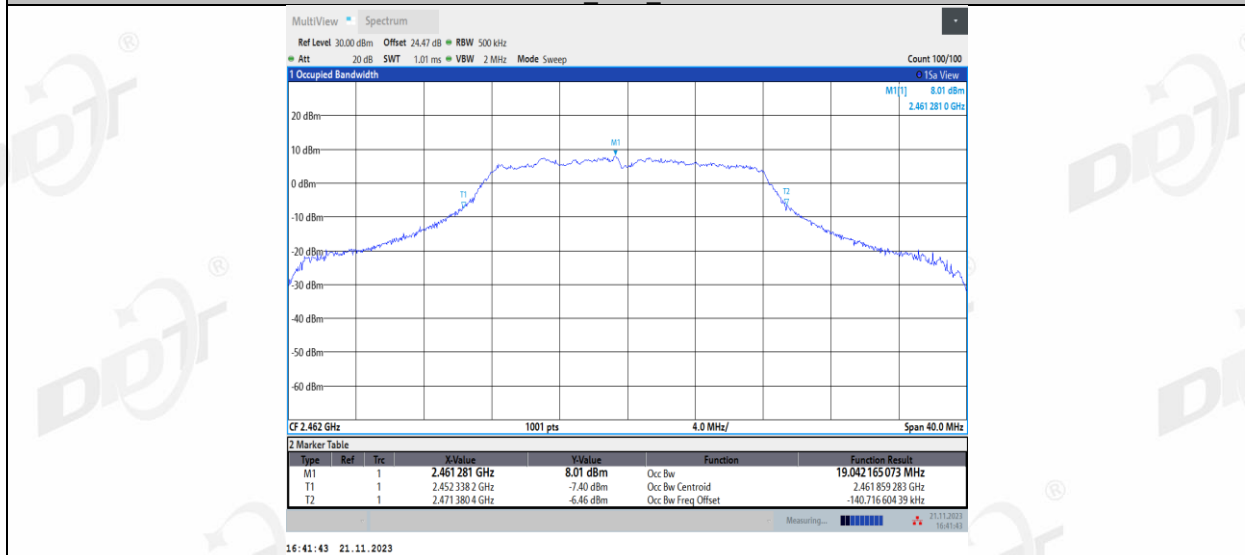
11G_Ant1_2437



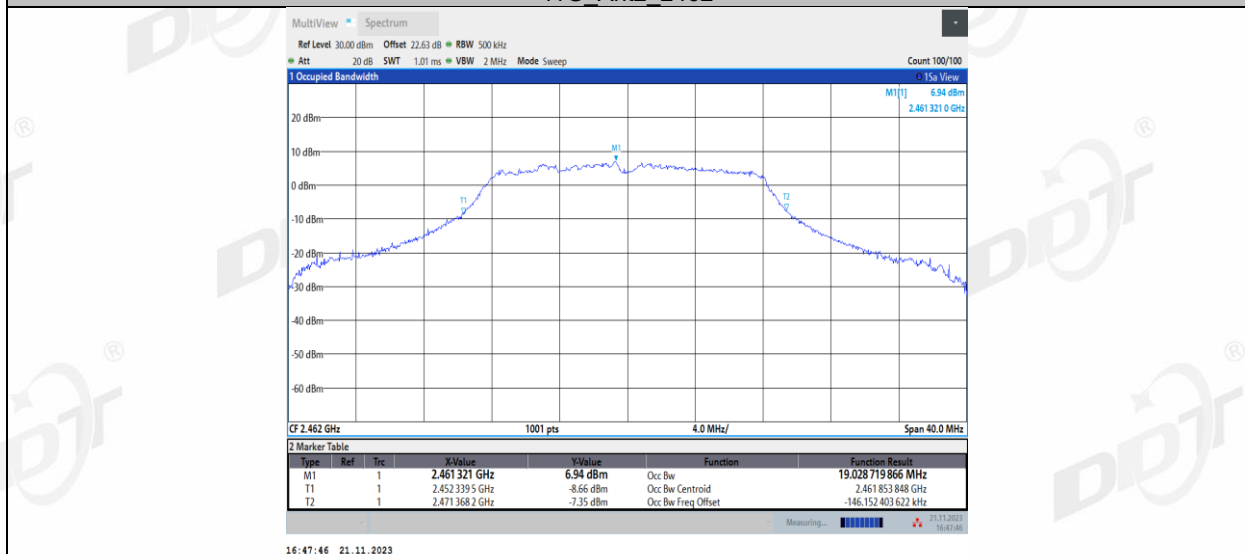
11G_Ant2_2437



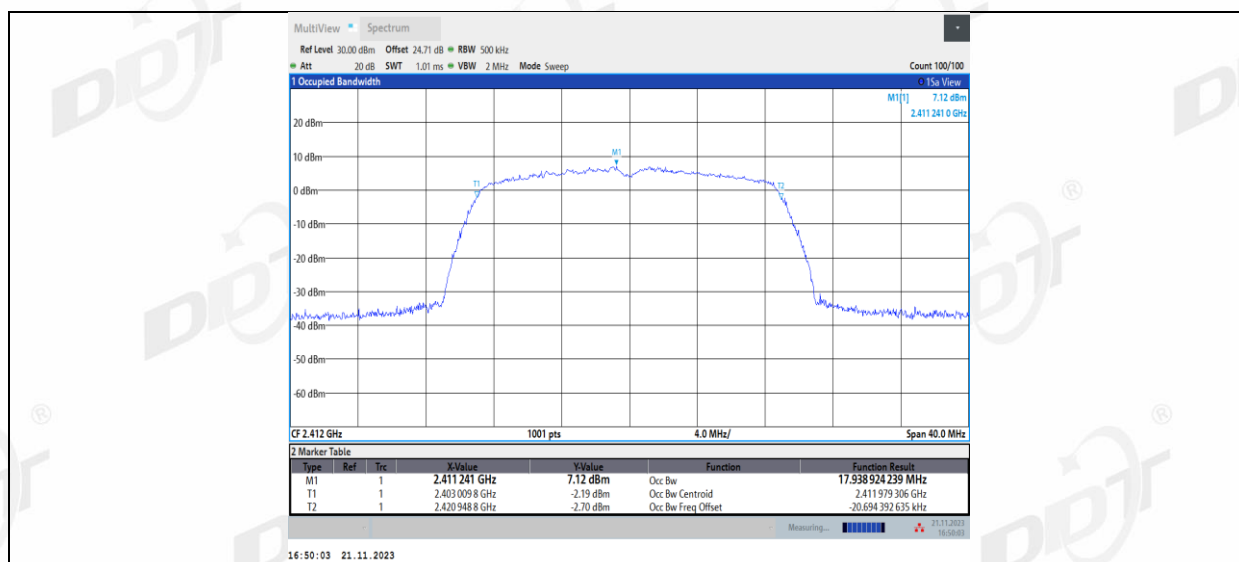
11G_Ant1_2462



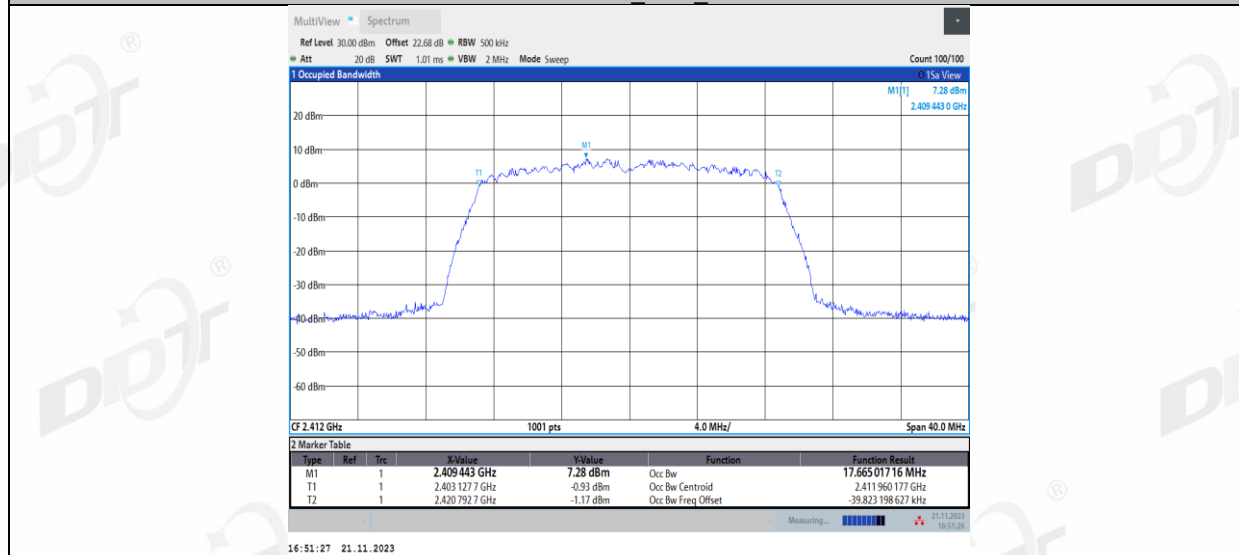
11G_Ant2_2462



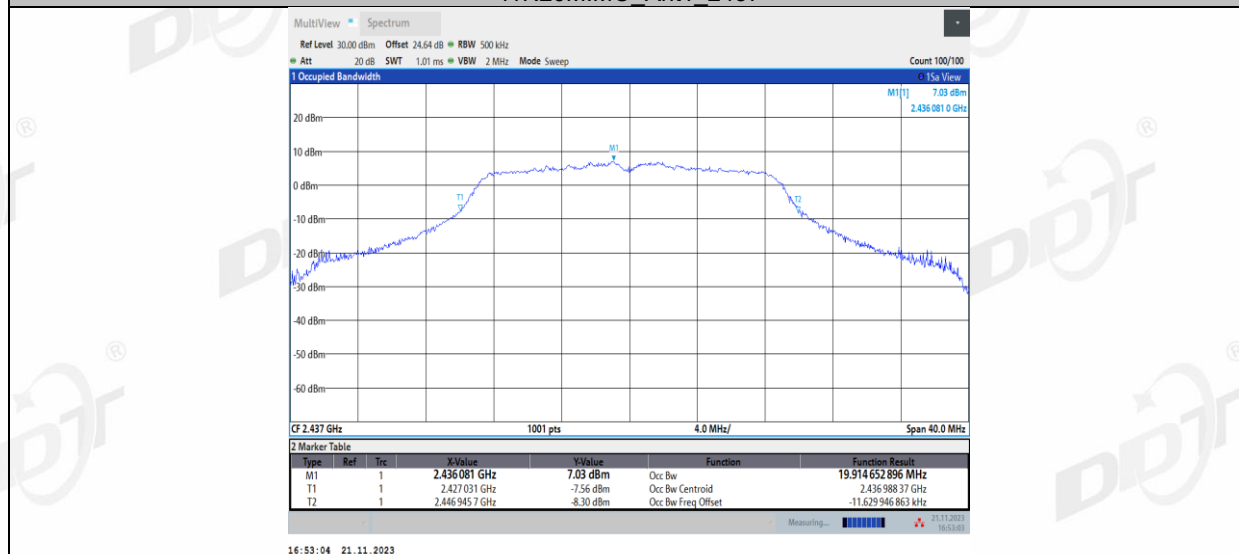
11N20MIMO_Ant1_2412



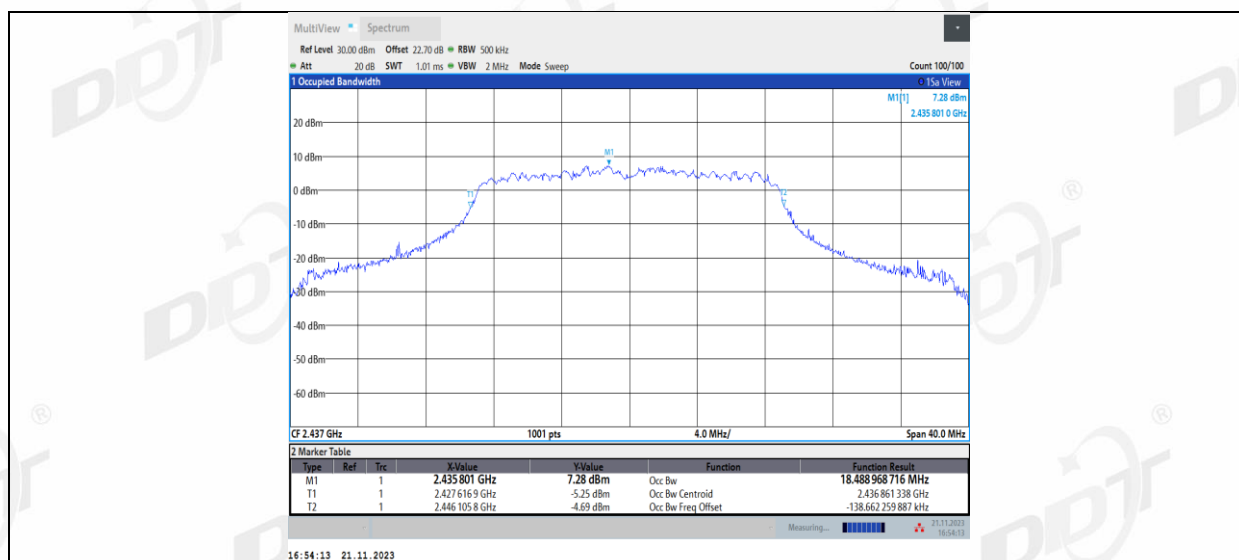
11N20MIMO_Ant2_2412



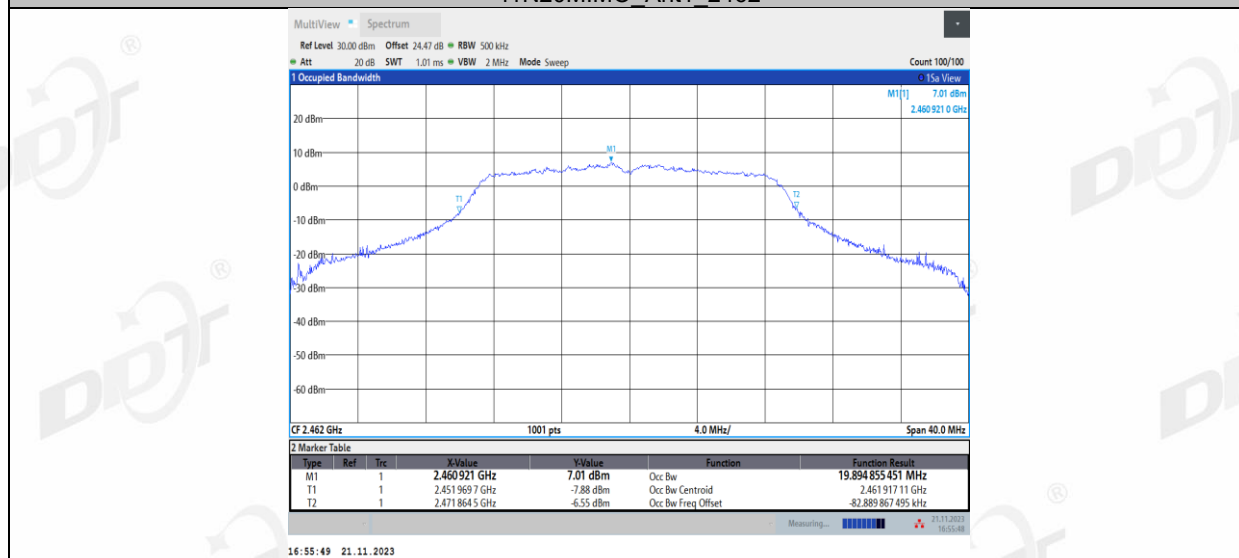
11N20MIMO_Ant1_2437



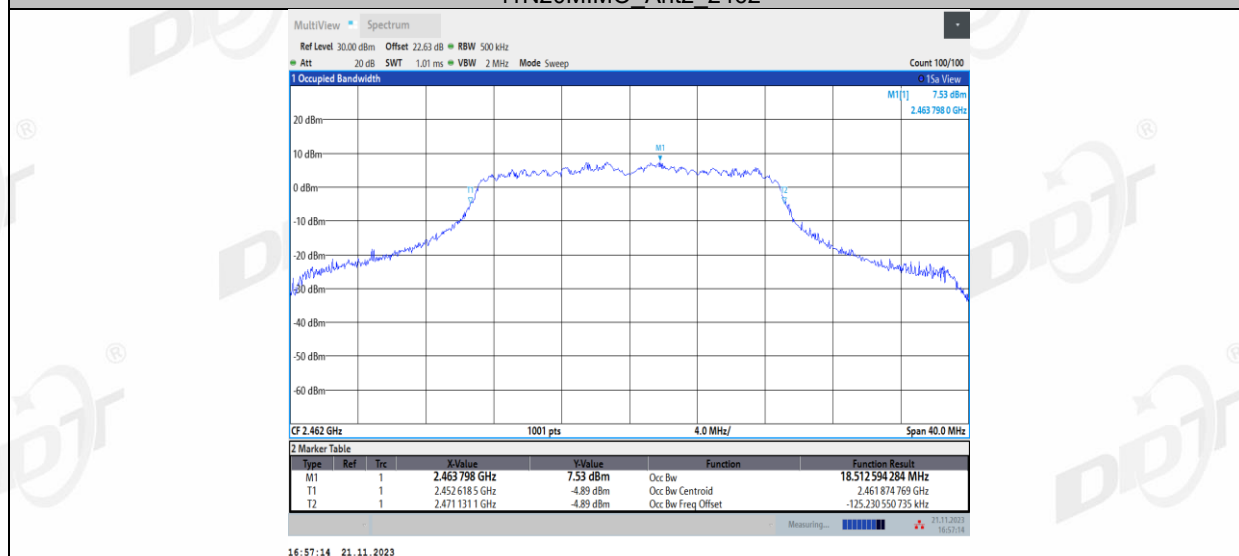
11N20MIMO_Ant2_2437



11N20MIMO_Ant1_2462



11N20MIMO_Ant2_2462



11N40MIMO_Ant1_2422