

FCC AND ISED CERTIFICATION TEST REPORT

FOR

Applicant	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Wireless Speaker
Model No.	:	CHARGE 5 Wi-Fi
Trade Mark	:	JBL
FCC ID	:	APICHARGE5WIFI
IC	:	6132A-CHARGE5WIFI
Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

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REPORT

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Test Report Declare

Applicant	:	Harman International Industries, Inc.
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Equipment under Test	:	Wireless Speaker
Model No	:	CHARGE 5 Wi-Fi
Trade Mark	:	JBL
Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

Test procedure used: ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, 558074 D01 15.247 Meas Guidance v05r02, 662911 D01 Multiple Transmitter Output v02r01

We Declare:

The equipment described above is tested by Dongguan 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 Dongguan 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 FCC&ISED standards.

Report No:	DDT-R22070406-2E03		
Date of Receipt:	Jul. 08, 2022	Date of Test:	Jul. 08, 2022 ~ Aug. 31, 2022

Prepared By:

Jacky Huang

Jacky Huang/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 Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Aug. 31, 2022	

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 ANSI C63.10:2013 RSS-247 Issue 2	PASS
Conducted Peak Output Power	FCC Part 15: 15.247 ANSI C63.10:2013 RSS-247 Issue 2	PASS
Power Spectral Density	FCC Part 15:15.247 ANSI C63.10:2013 RSS-247 Issue 2	PASS
Band-edge and Spurious Emissions (Conducted)	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 RSS-247 Issue 2 RSS-Gen Issue 5	PASS
Radiated Spurious Emissions	FCC Part 15: 15.247 ANSI C63.10:2013 RSS-247 Issue 2 RSS-Gen Issue 5	PASS
Radiated Band Edge Compliance	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 RSS-247 Issue 2 RSS-Gen Issue 5	PASS
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10: 2013 RSS-Gen Issue 5	PASS
Antenna requirement	FCC Part 15: 15.203 RSS-Gen Issue 5	PASS

2. General Test Information

2.1. Description of EUT

EUT* Name	: Wireless Speaker
Model Number	: CHARGE 5 Wi-Fi
EUT function description	: Please reference user manual of this device
Power supply	: DC 5V from external adapter : DC 3.69V built-in battery, 14100mAh, 52Wh
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 HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax HE20, HE40: OFDM (1024QAM, 64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: IEEE 802.11b: up to 11 Mbps IEEE 802.11g: up to 54 Mbps IEEE 802.11n HT20: up to 144.4 Mbps IEEE 802.11n HT40: up to 300 Mbps IEEE 802.11ax HE20: up to 286.765 Mbps IEEE 802.11ax HE40: up to 573.529 Mbps
Antenna Type	: Antenna 1: FPC antenna, Maximum PK gain: 2.91 dBi : Antenna 2: FPC antenna, Maximum PK gain: 2.36 dBi
Sample Number	: S22070406-07 for conductive, : S22070406-09 for radiation

Note: EUT is the ab. of equipment under test.

Antenna information			
	Ant1 gain	Ant2 gain	Directional gain
IEEE 802.11b	2.91	2.36	/
IEEE 802.11g	2.91	2.36	/
IEEE 802.11n HT20	2.91	2.36	2.64
IEEE 802.11n HT40	2.91	2.36	2.64
IEEE 802.11ax HE20	2.91	2.36	2.64
IEEE 802.11ax HE40	2.91	2.36	2.64

Note: This EUT supports STBC, any transmit signals are uncorrelated with each other. So the Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10})/2]$ dBi

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	/	/
---	------	---	------	---	---

IEEE 802.11ax(HE20)	Operating Mode	Resource Unit	26 Tone(2M)	
	Specific Resource Unit		0	
			1	
			2	
			3	
			4	
			5	
			6	
			7	
			8	
		9		
		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		

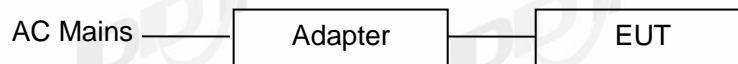
2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
USB cable	Harman	N/A	N/A	Length: 1.17m

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
N/A	N/A	N/A	N/A	N/A

2.4. Block diagram of EUT configuration for test



The test software was used to control EUT work in Continuous Tx mode and select test channel, wireless mode as below table.

Test software: adb.exe

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	14	14	1	LCH: CH1	2412
	14	14	1	MCH: CH6	2437
	14	14	1	HCH: CH11	2462
IEEE 802.11g	13	13	6	LCH: CH1	2412
	13	13	6	MCH: CH6	2437
	13	13	6	HCH: CH11	2462
IEEE 802.11n HT20	13	13	MCS 8	LCH: CH1	2412
	13	13	MCS 8	MCH: CH6	2437
	13	13	MCS 8	HCH: CH11	2462
IEEE 802.11n HT40	13	13	MCS 8	LCH: CH3	2422
	13	13	MCS 8	MCH: CH6	2437
	13	13	MCS 8	HCH: CH9	2452
IEEE 802.11ax HE20	SU:12 RU:15	SU:12 RU:15	MCS 9	LCH: CH1	2412
	SU:12 RU:15	SU:12 RU:15	MCS 9	MCH: CH6	2437
	SU:12 RU:15	SU:12 RU:15	MCS 9	HCH: CH11	2462
IEEE 802.11ax HE40	SU:15 RU:15	SU:15 RU:15	MCS 9	LCH: CH3	2422
	SU:15 RU:15	SU:15 RU:15	MCS 9	MCH: CH6	2437
	SU:15 RU:15	SU:15 RU:15	MCS 9	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:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, 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 × 10 ⁻⁸ (Antenna couple method)
	5.5 × 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 < 22 GHz)
Uncertainty for radio frequency (RBW<20 kHz)	3×10 ⁻⁸
Temperature	0.4°C
Humidity	2%
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	3.32 dB (150 kHz-30 MHz)

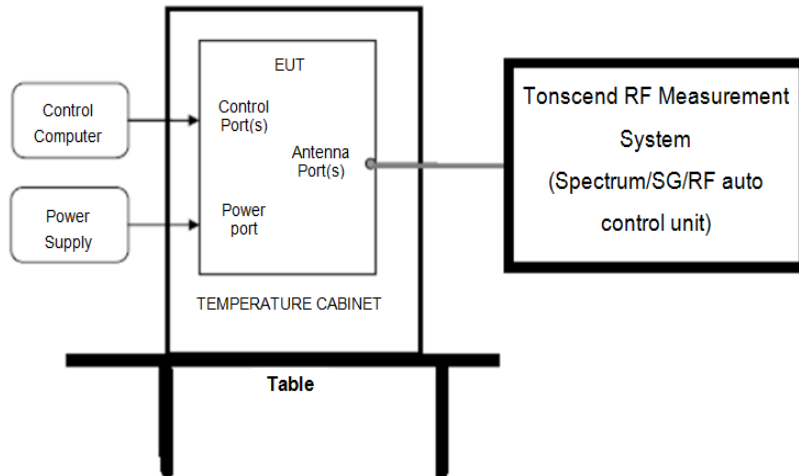
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Equipment Used During Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑RF Connected Test (Tonscend RF Measurement System 3#)					
SPECTRUM ANALYZER	R&S	FSV40	101407	Jul. 21, 2022	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	May 18, 2022	1 Year
Vector Signal Generator	Agilent	N5182A	MY19060405	May 18, 2022	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180912	May 18, 2022	1 Year
RF Control Unit	Tonsend	JS0806-2	DDT-ZC01449	May 18, 2022	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	May 26, 2022	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.6.77.0518	N/A	N/A
☑RF Connected Test (Tonscend RF Measurement System 4#)					
MXA Signal Analyzer	Agilent	N9020A	MY49100362	Sep. 02, 2021	1 Year
Signal & Spectrum analyzer	R&S	FSV3044	101173	Apr. 13, 2022	1 Year
Wideband Radio Communication tester	R&S	CMW500	120259	May 18, 2022	1 Year
MXG Vector Signal Generator	Agilent	N5182B	MY59100192	May 18, 2022	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Oct. 15, 2021	1 Year
RF Control Unit	Tonsend	JS0806-2	2118060485	Oct. 18, 2021	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	May 26, 2022	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.6.88.0346	N/A	N/A
☑Radiation 3#chamber					
EMI Test Receiver	R&S	ESU	100472	May 18, 2022	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	May 18, 2022	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Sep. 19, 2021	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9161	4034	Sep. 19, 2021	1 Year
Double Ridged Horn Antenna	Schwarzbeck	BBHA 9120 D	02468	Nov. 29, 2021	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	May 06, 2022	1 Year
Pre-amplifier	COM-POWER	PAM-118A	18040084	Sep. 02, 2021	1 Year
Pre-amplifier	COM-POWER	PAM-840A	461369	Apr. 11, 2022	1 Year
Test software	Audix	E3	V 6.1.1.1	N/A	N/A
☑Power Line Conducted Emissions Test 1#					
Test Receiver	R&S	ESCI	100551	Sep. 02, 2021	1 Year
LISN 1	R&S	ENV216	101109	Sep. 07, 2021	1 Year
LISN 2	R&S	ESH2-Z5	100309	Sep. 07, 2021	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Sep. 02, 2021	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Sep. 02, 2021	1 Year
LISN 3	SCHWARZBECK	NSLK 8163	00017	Sep. 02, 2021	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A

4. 6dB Bandwidth and 99% 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) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) 99% Bandwidth set the spectrum analyzer as follows:

RBW:	300 kHz
VBW:	1 MHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) 6dB Bandwidth set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(4) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.4. Test result

Test Mode	Test	Ant	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	2412	Ant1	8.04	0.5	PASS
11B	2412	Ant2	8.04	0.5	PASS
11B	2437	Ant1	8.08	0.5	PASS
11B	2437	Ant2	8.08	0.5	PASS
11B	2462	Ant1	8.08	0.5	PASS
11B	2462	Ant2	8.08	0.5	PASS
11G	2412	Ant1	15.08	0.5	PASS
11G	2412	Ant2	15.12	0.5	PASS
11G	2437	Ant1	15.92	0.5	PASS
11G	2437	Ant2	16.28	0.5	PASS
11G	2462	Ant1	16.32	0.5	PASS
11G	2462	Ant2	15.80	0.5	PASS
11N20MIMO	2412	Ant1	15.72	0.5	PASS
11N20MIMO	2412	Ant2	15.12	0.5	PASS
11N20MIMO	2437	Ant1	16.92	0.5	PASS
11N20MIMO	2437	Ant2	15.72	0.5	PASS
11N20MIMO	2462	Ant1	16.92	0.5	PASS
11N20MIMO	2462	Ant2	16.56	0.5	PASS
11N40MIMO	2422	Ant1	35.04	0.5	PASS
11N40MIMO	2422	Ant2	35.04	0.5	PASS
11N40MIMO	2437	Ant1	35.12	0.5	PASS
11N40MIMO	2437	Ant2	35.12	0.5	PASS
11N40MIMO	2452	Ant1	35.04	0.5	PASS
11N40MIMO	2452	Ant2	35.12	0.5	PASS
11AX20SU	2412	Ant1	18.24	0.5	PASS
11AX20SU	2412	Ant2	17.68	0.5	PASS
11AX20SU	2437	Ant1	18.04	0.5	PASS
11AX20SU	2437	Ant2	18.20	0.5	PASS
11AX20SU	2462	Ant1	18.68	0.5	PASS
11AX20SU	2462	Ant2	18.64	0.5	PASS
11AX40SU	2422	Ant1	35.12	0.5	PASS
11AX40SU	2422	Ant2	36.16	0.5	PASS
11AX40SU	2437	Ant1	35.12	0.5	PASS
11AX40SU	2437	Ant2	35.92	0.5	PASS
11AX40SU	2452	Ant1	35.12	0.5	PASS
11AX40SU	2452	Ant2	36.88	0.5	PASS

Test Mode	Antenna	Channel	Ru Size	Ru Index	DTS BW [MHz]	Limit [MHz]	Verdict
11AX20MIMO	Ant1	2412	26Tone	RU0	2.08	0.5	PASS
				RU4	2.68	0.5	PASS
				RU8	2.12	0.5	PASS
			52Tone	RU37	17.08	0.5	PASS
				RU38	13.84	0.5	PASS
				RU39	6.32	0.5	PASS
			106Tone	RU40	8.28	0.5	PASS
				RU53	17.12	0.5	PASS
				RU54	17.08	0.5	PASS
	Ant2	2412	26Tone	RU0	17.08	0.5	PASS
				RU4	2.64	0.5	PASS
				RU8	2.08	0.5	PASS
			52Tone	RU37	17.08	0.5	PASS
				RU38	12.88	0.5	PASS
				RU39	6.16	0.5	PASS
			106Tone	RU40	7.04	0.5	PASS
				RU53	17.72	0.5	PASS
				RU54	17.08	0.5	PASS
	Ant1	2437	26Tone	RU0	2.12	0.5	PASS
				RU4	2.64	0.5	PASS
				RU8	2.08	0.5	PASS
			52Tone	RU37	17.08	0.5	PASS
				RU38	13.84	0.5	PASS
				RU39	13.84	0.5	PASS
			106Tone	RU40	15.84	0.5	PASS
				RU53	17.08	0.5	PASS
				RU54	17.12	0.5	PASS
	Ant2	2437	26Tone	RU0	2.12	0.5	PASS
				RU4	2.64	0.5	PASS
				RU8	2.12	0.5	PASS
			52Tone	RU37	17.08	0.5	PASS
				RU38	15.08	0.5	PASS
				RU39	15.04	0.5	PASS
			106Tone	RU40	17.04	0.5	PASS
				RU53	17.12	0.5	PASS
				RU54	17.12	0.5	PASS
	Ant1	2462	26Tone	RU0	2.12	0.5	PASS
				RU4	2.64	0.5	PASS
				RU8	2.12	0.5	PASS
			52Tone	RU37	17.08	0.5	PASS
				RU38	15.08	0.5	PASS
				RU39	15.08	0.5	PASS
106Tone			RU40	17.08	0.5	PASS	
			RU53	17.16	0.5	PASS	
			RU54	17.16	0.5	PASS	
Ant2	2462	26Tone	RU0	2.12	0.5	PASS	
			RU4	2.64	0.5	PASS	
			RU8	2.12	0.5	PASS	
		52Tone	RU37	14.52	0.5	PASS	

11AX40MIMO	Ant1	2422	242Tone	RU38	15.08	0.5	PASS
				RU39	13.76	0.5	PASS
				RU40	17.08	0.5	PASS
				RU53	17.16	0.5	PASS
				RU54	17.16	0.5	PASS
	Ant2	2422	242Tone	RU61	2.08	0.5	PASS
				RU62	2.08	0.5	PASS
	Ant1	2437	242Tone	RU61	18.80	0.5	PASS
				RU62	18.80	0.5	PASS
	Ant2	2437	242Tone	RU61	18.80	0.5	PASS
RU62				18.80	0.5	PASS	
Ant1	2452	242Tone	RU61	18.80	0.5	PASS	
			RU62	18.88	0.5	PASS	
Ant2	2452	242Tone	RU61	18.80	0.5	PASS	
			RU62	18.80	0.5	PASS	

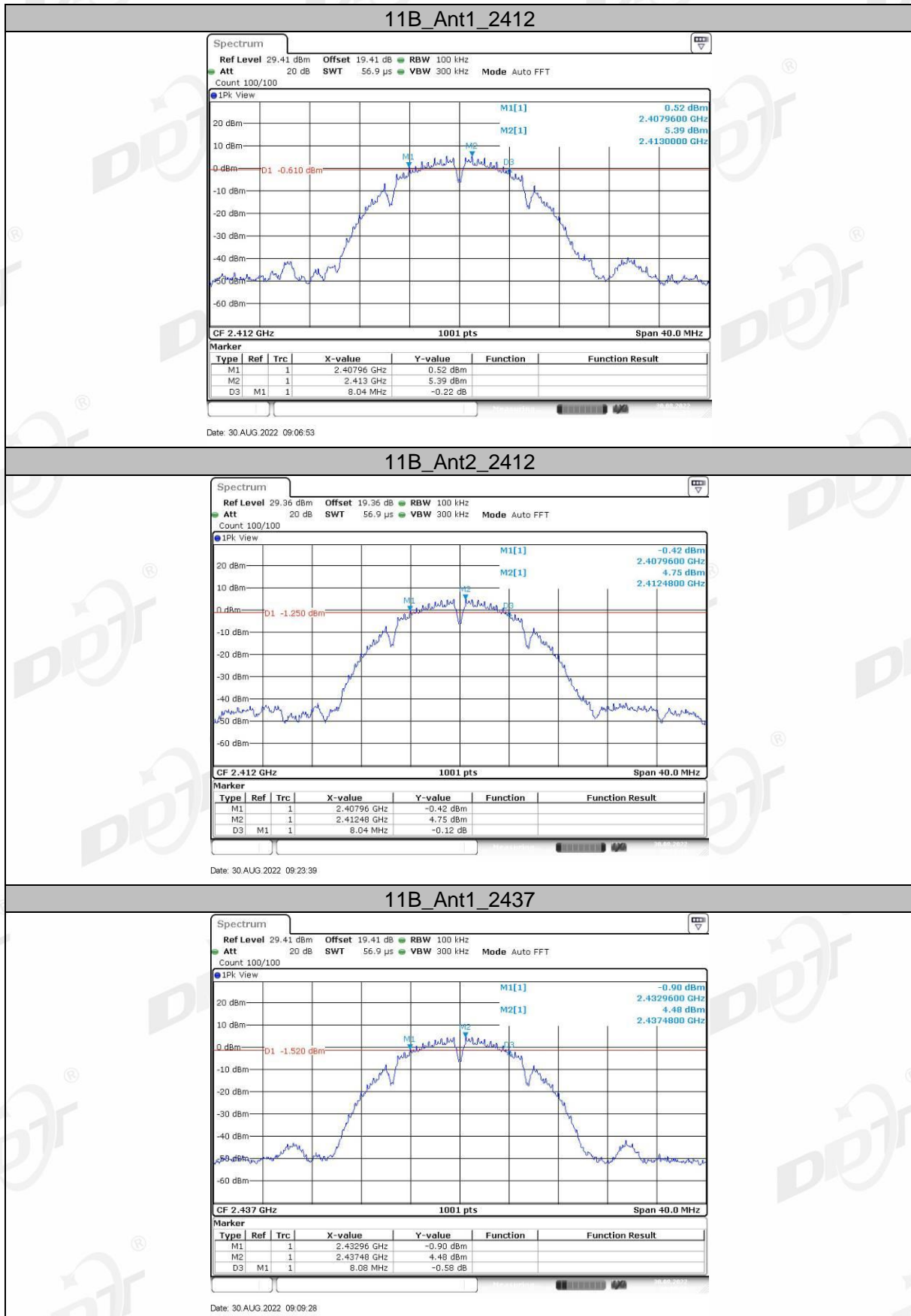
Test Mode	Test	Ant	99% OBW [MHz]	Limit [MHz]	Verdict
11B	2412	Ant1	12.348	---	PASS
11B	2412	Ant2	12.507	---	PASS
11B	2437	Ant1	12.507	---	PASS
11B	2437	Ant2	12.587	---	PASS
11B	2462	Ant1	12.468	---	PASS
11B	2462	Ant2	12.587	---	PASS
11G	2412	Ant1	16.464	---	PASS
11G	2412	Ant2	16.783	---	PASS
11G	2437	Ant1	16.943	---	PASS
11G	2437	Ant2	17.862	---	PASS
11G	2462	Ant1	17.103	---	PASS
11G	2462	Ant2	17.862	---	PASS
11N20MIMO	2412	Ant1	17.582	---	PASS
11N20MIMO	2412	Ant2	17.582	---	PASS
11N20MIMO	2437	Ant1	18.142	---	PASS
11N20MIMO	2437	Ant2	18.941	---	PASS
11N20MIMO	2462	Ant1	17.942	---	PASS
11N20MIMO	2462	Ant2	18.701	---	PASS
11N40MIMO	2422	Ant1	35.964	---	PASS
11N40MIMO	2422	Ant2	35.884	---	PASS
11N40MIMO	2437	Ant1	35.884	---	PASS
11N40MIMO	2437	Ant2	35.884	---	PASS
11N40MIMO	2452	Ant1	35.964	---	PASS
11N40MIMO	2452	Ant2	35.964	---	PASS

11AX20SU	2412	Ant1	18.781	---	PASS
11AX20SU	2412	Ant2	18.821	---	PASS
11AX20SU	2437	Ant1	19.221	---	PASS
11AX20SU	2437	Ant2	19.021	---	PASS
11AX20SU	2462	Ant1	18.981	---	PASS
11AX20SU	2462	Ant2	19.101	---	PASS
11AX40SU	2422	Ant1	37.562	---	PASS
11AX40SU	2422	Ant2	37.562	---	PASS
11AX40SU	2437	Ant1	37.562	---	PASS
11AX40SU	2437	Ant2	37.562	---	PASS
11AX40SU	2452	Ant1	37.642	---	PASS
11AX40SU	2452	Ant2	37.642	---	PASS

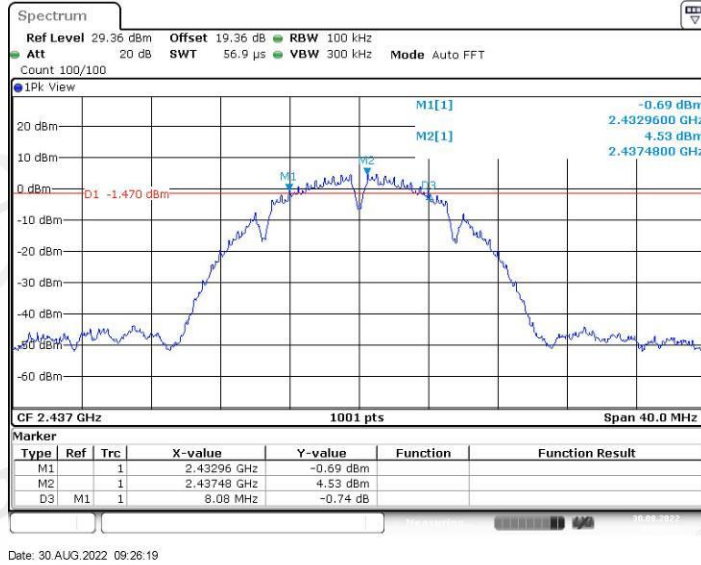
Note: according exploratory explorer test, for 802.11ax Mode, Specific Resource Unit have no distinct influence on 99% OBW, so for 99% OBW, the final test was only performed with EUT working in 802.11ax SU mode.

4.5. Original test data

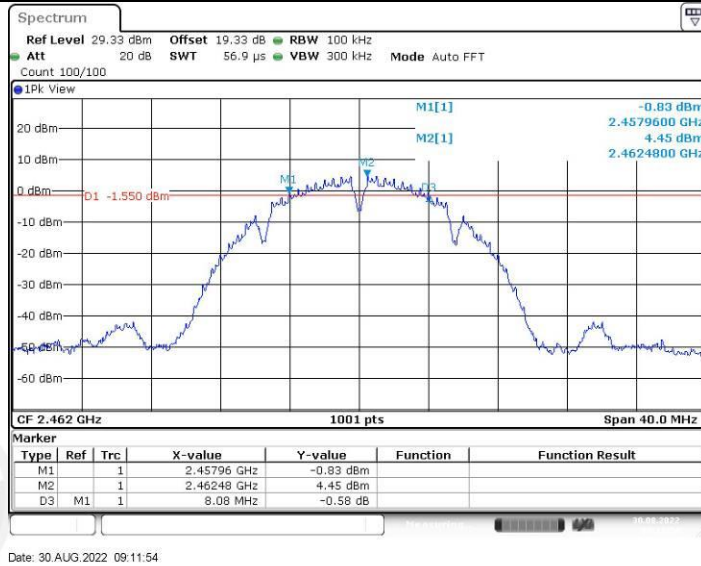
6 dB bandwidth:



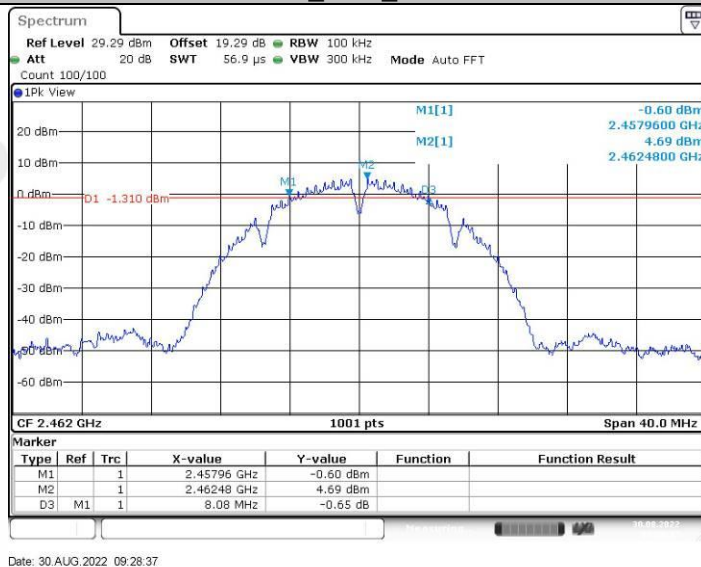
11B_Ant2_2437



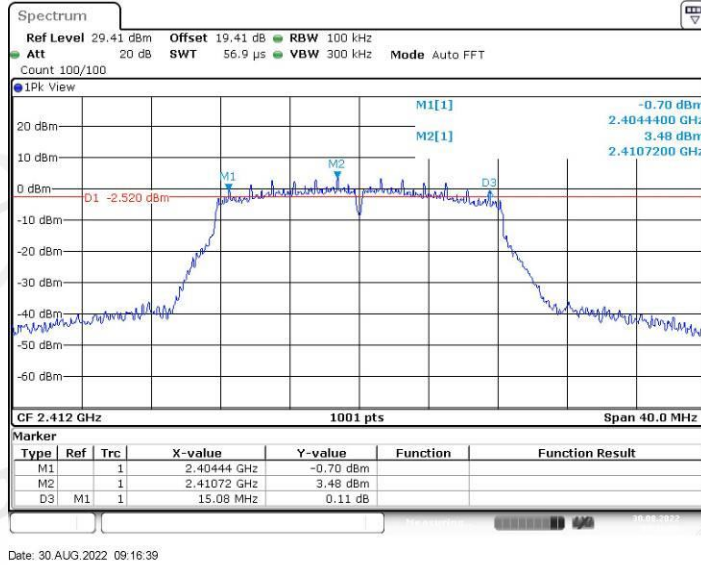
11B_Ant1_2462



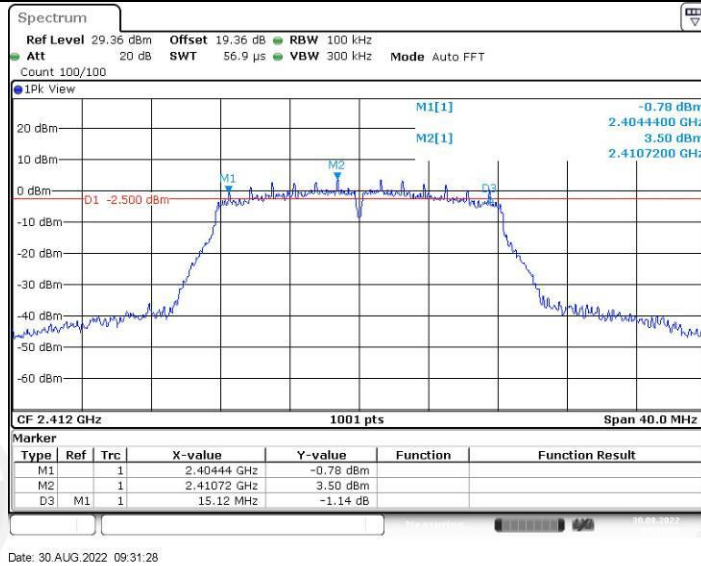
11B_Ant2_2462



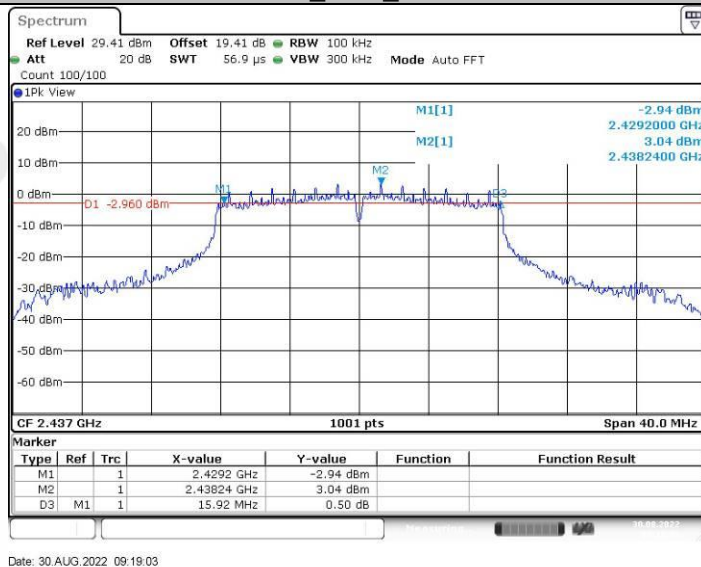
11G_Ant1_2412

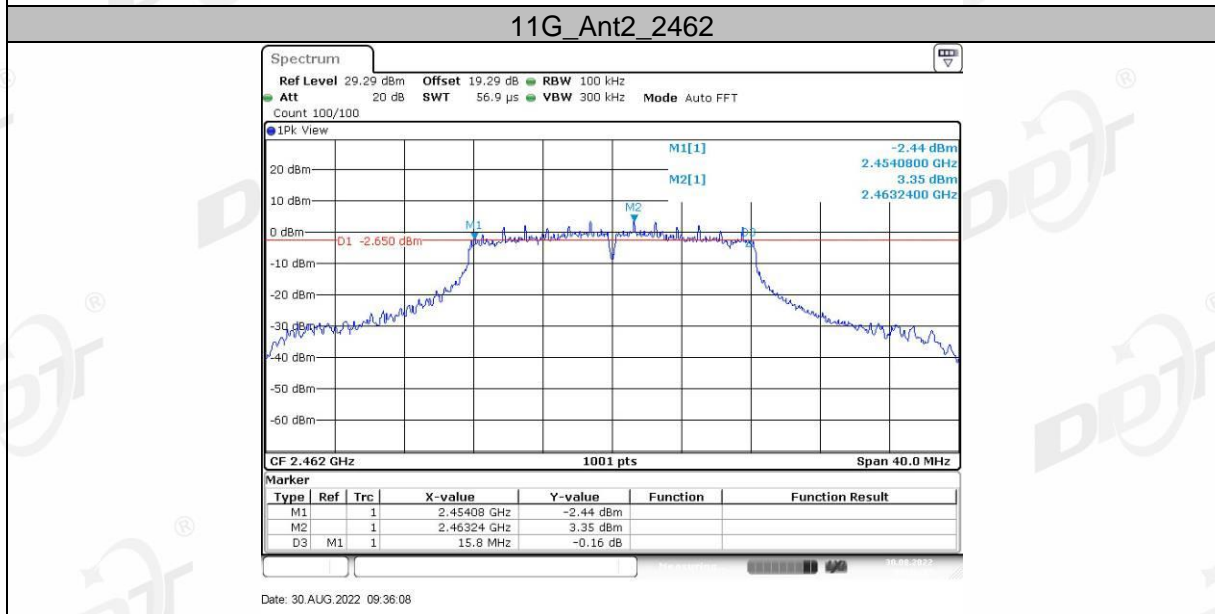
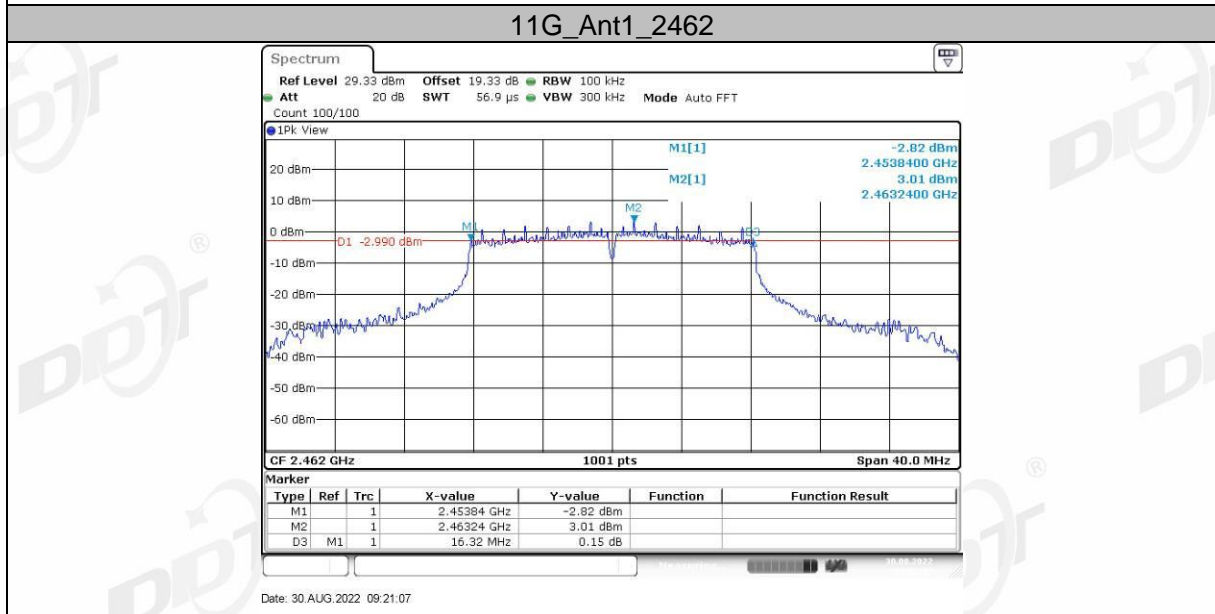
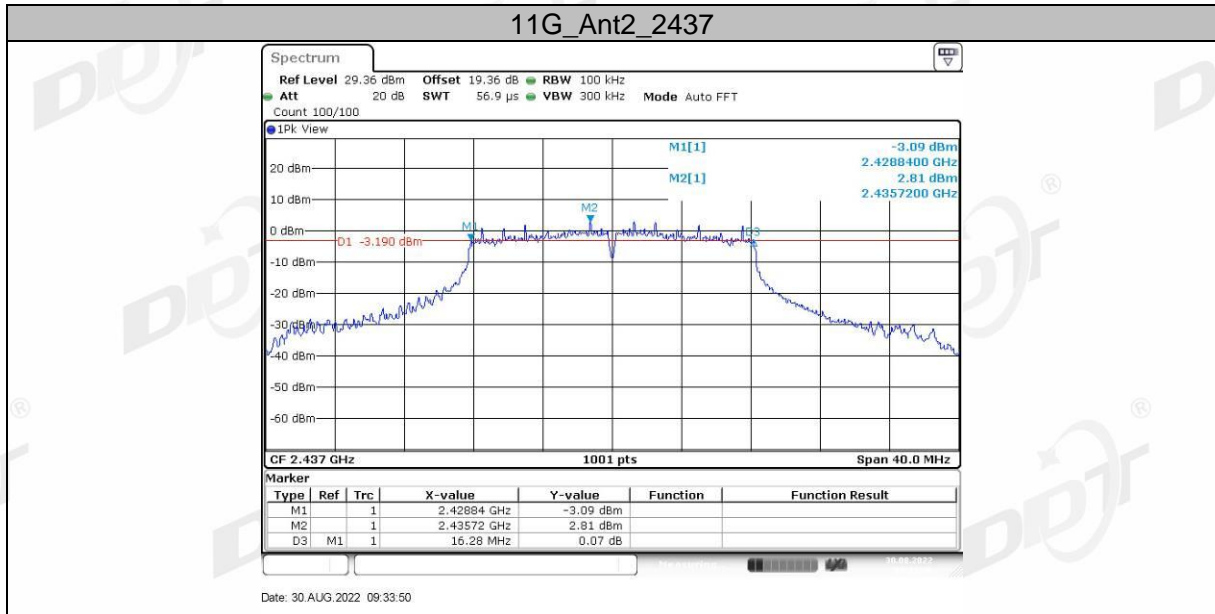


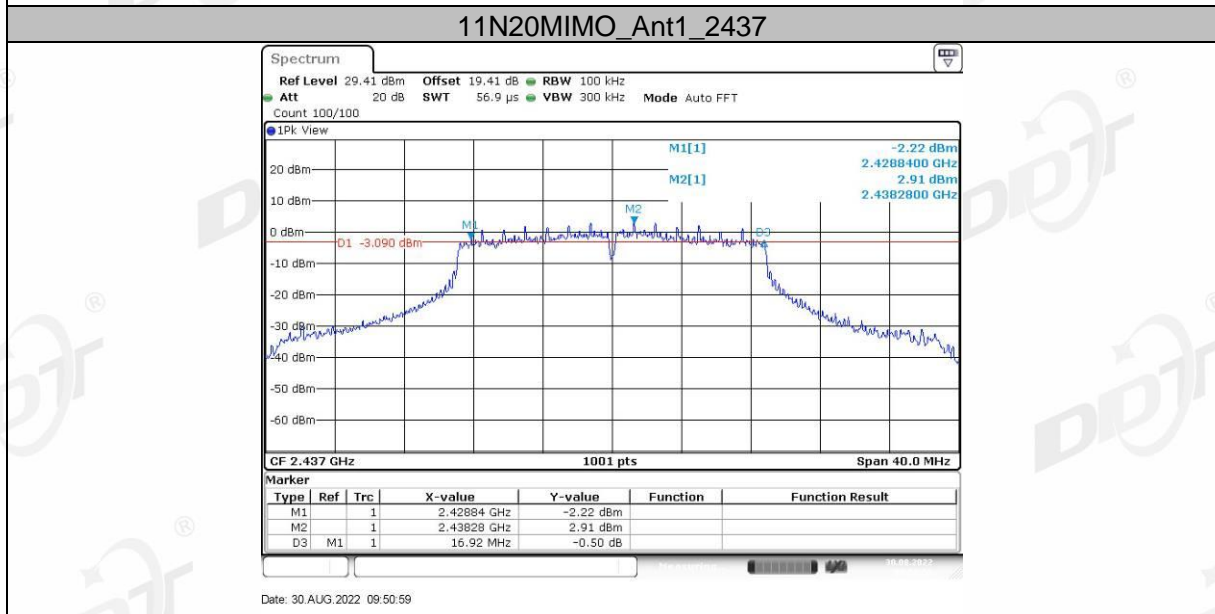
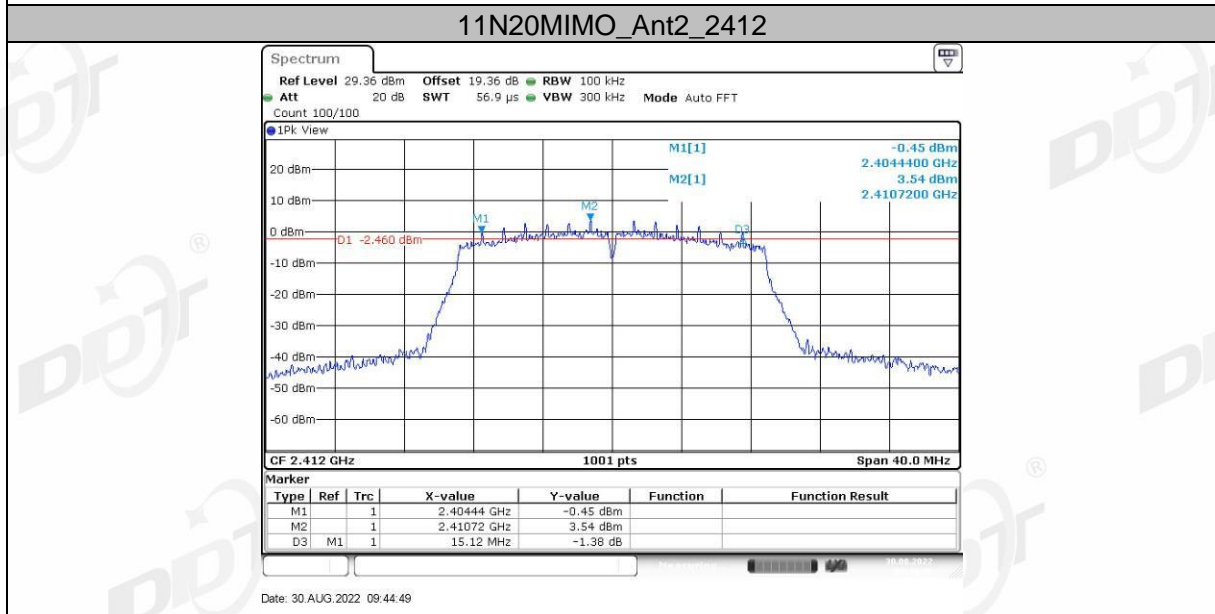
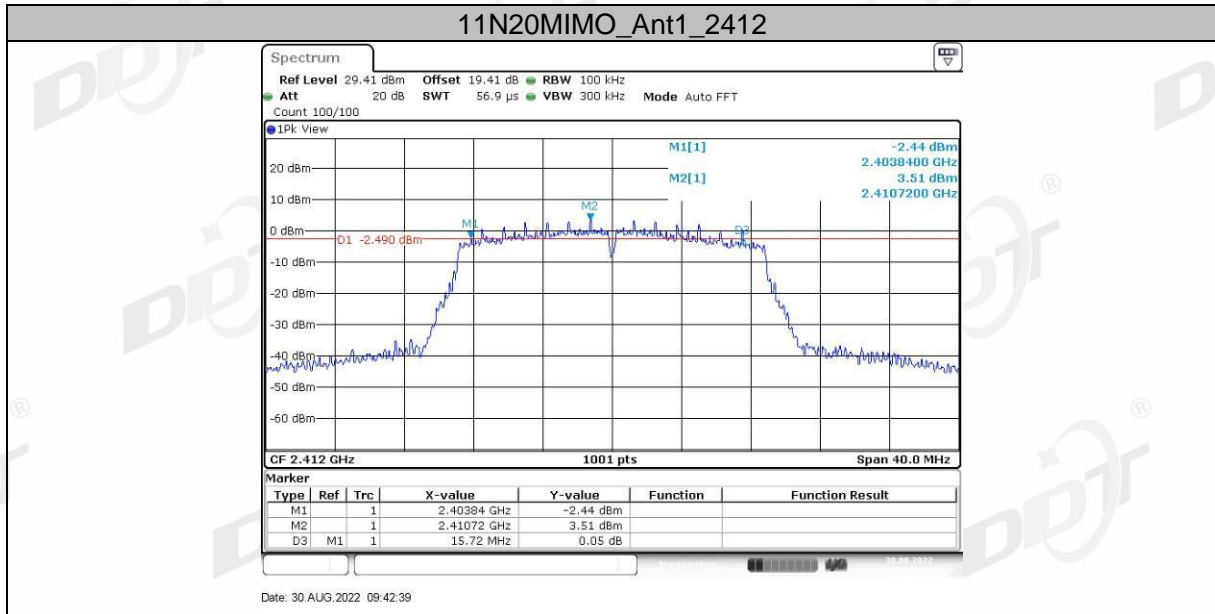
11G_Ant2_2412

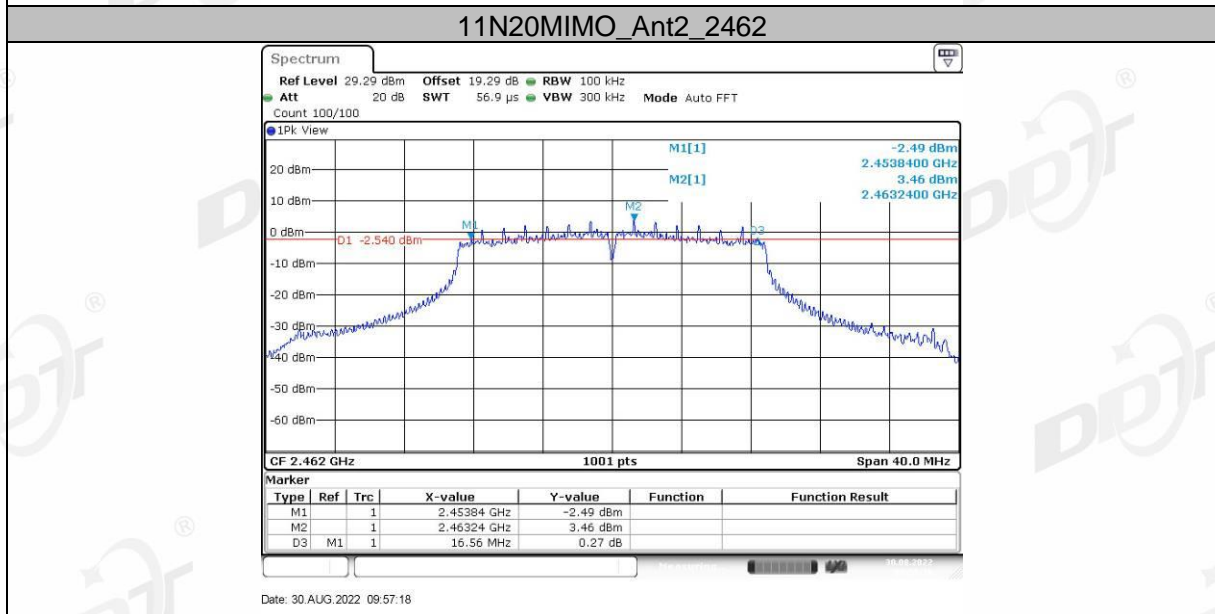
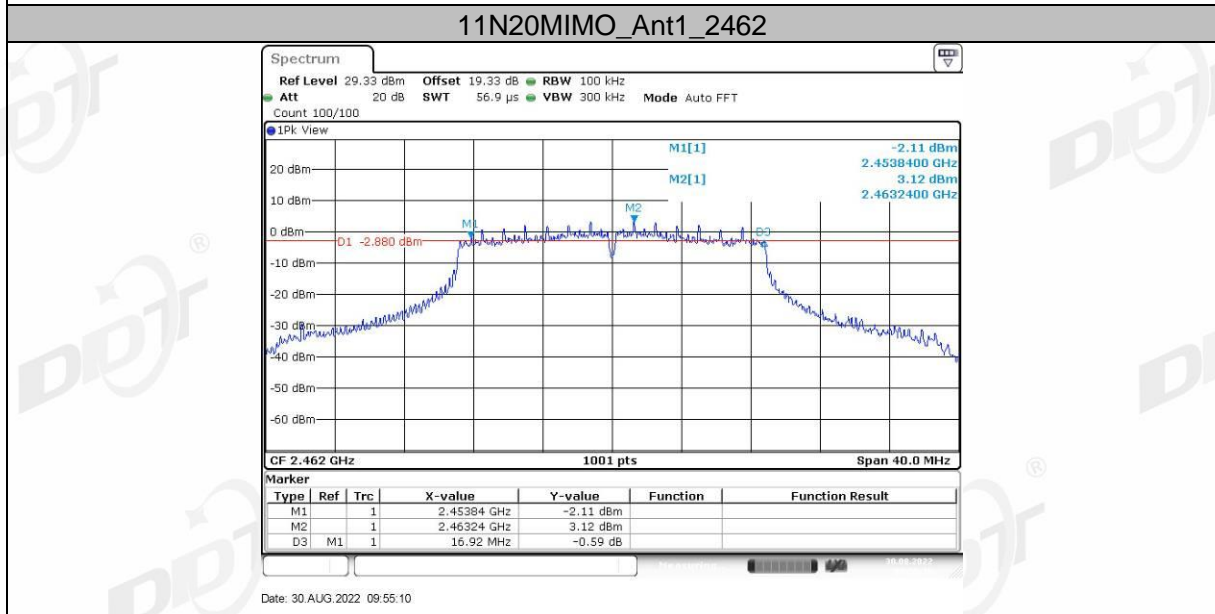
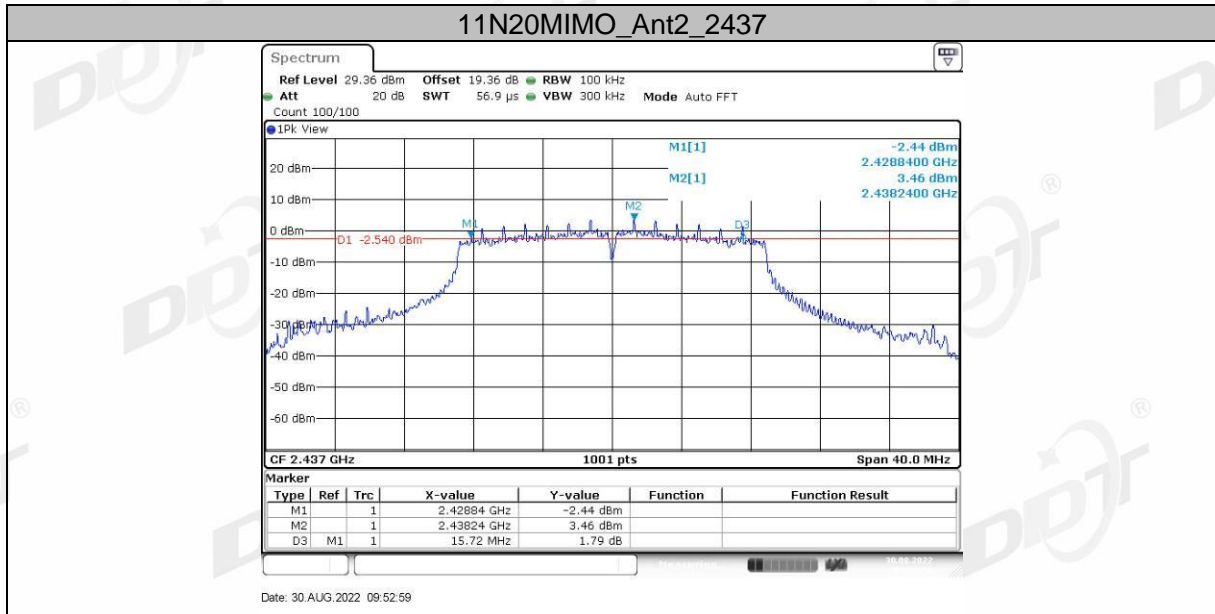


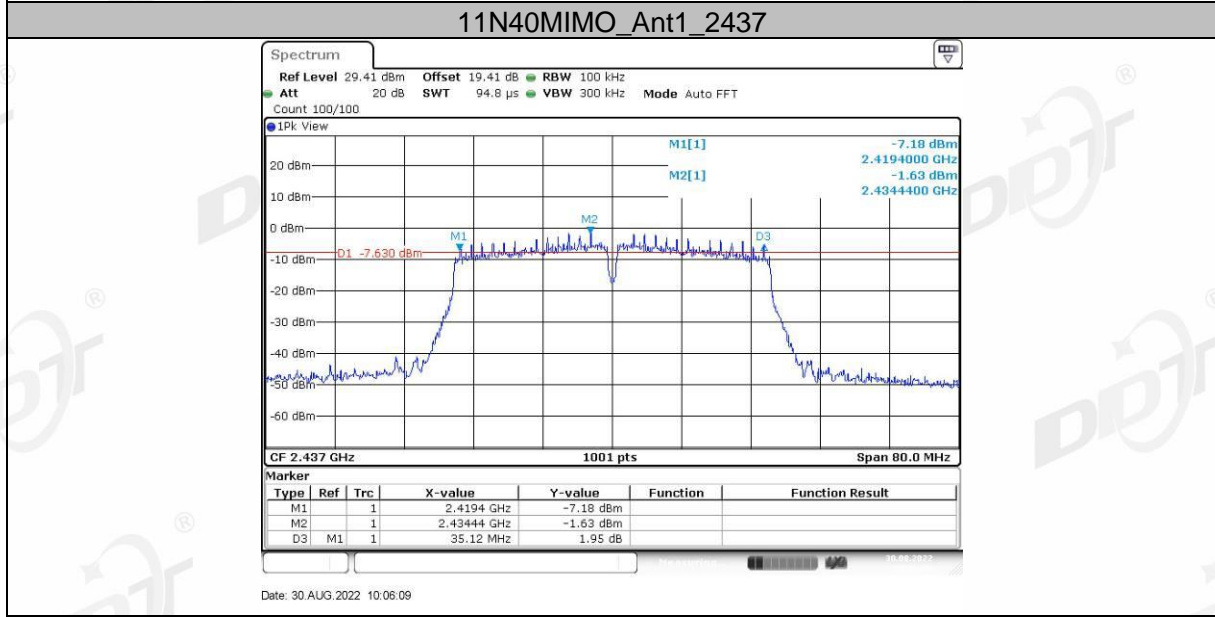
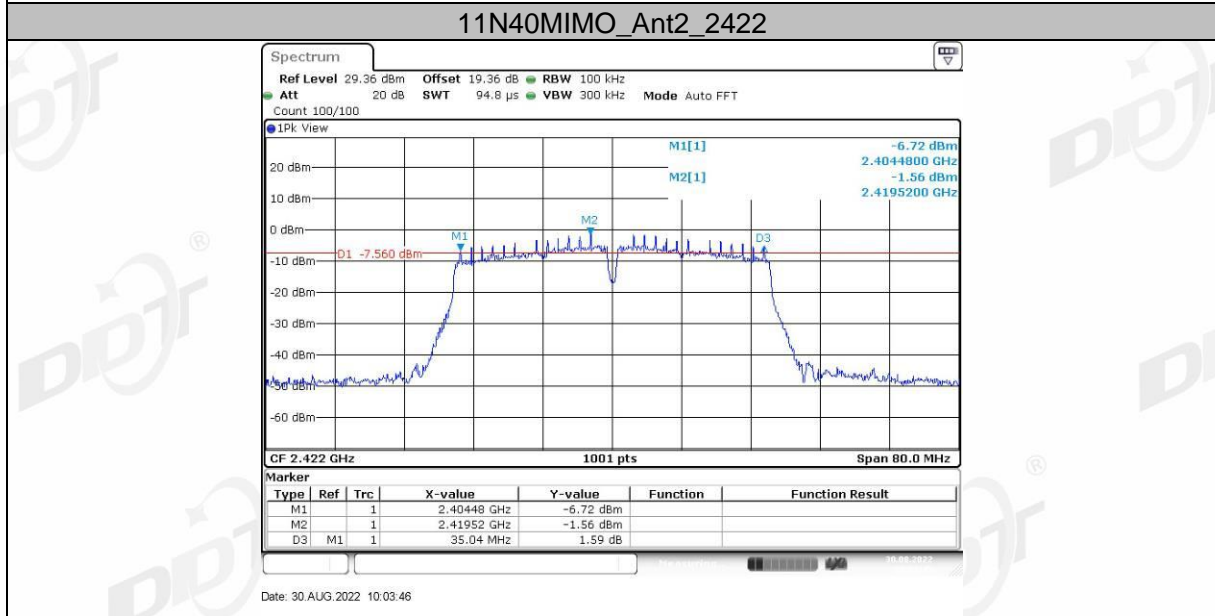
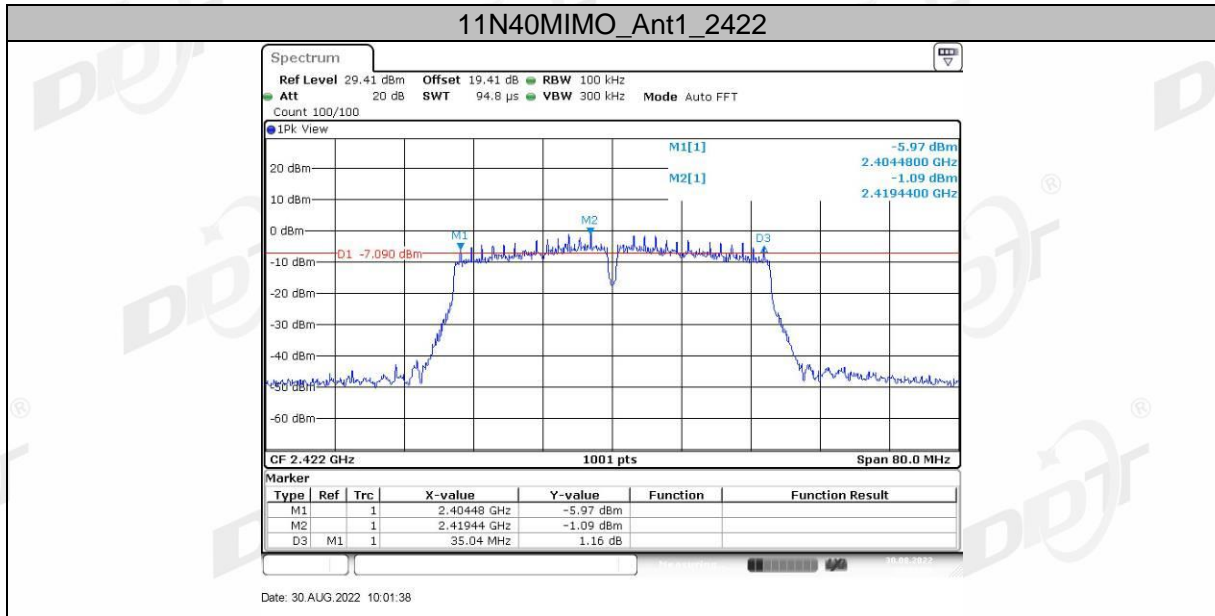
11G_Ant1_2437

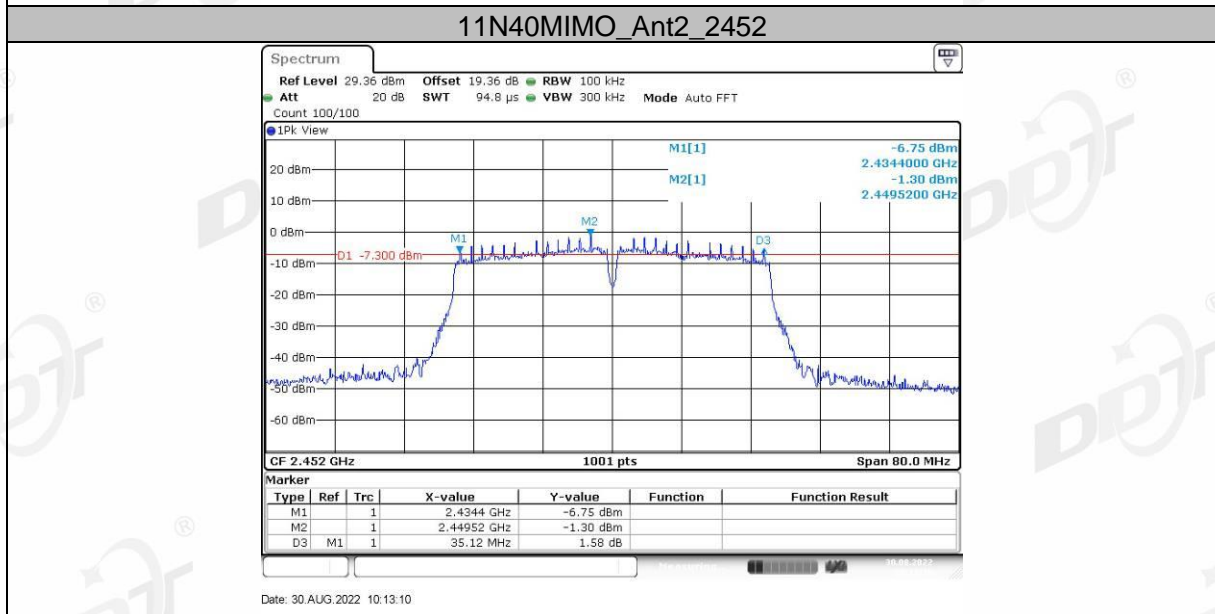
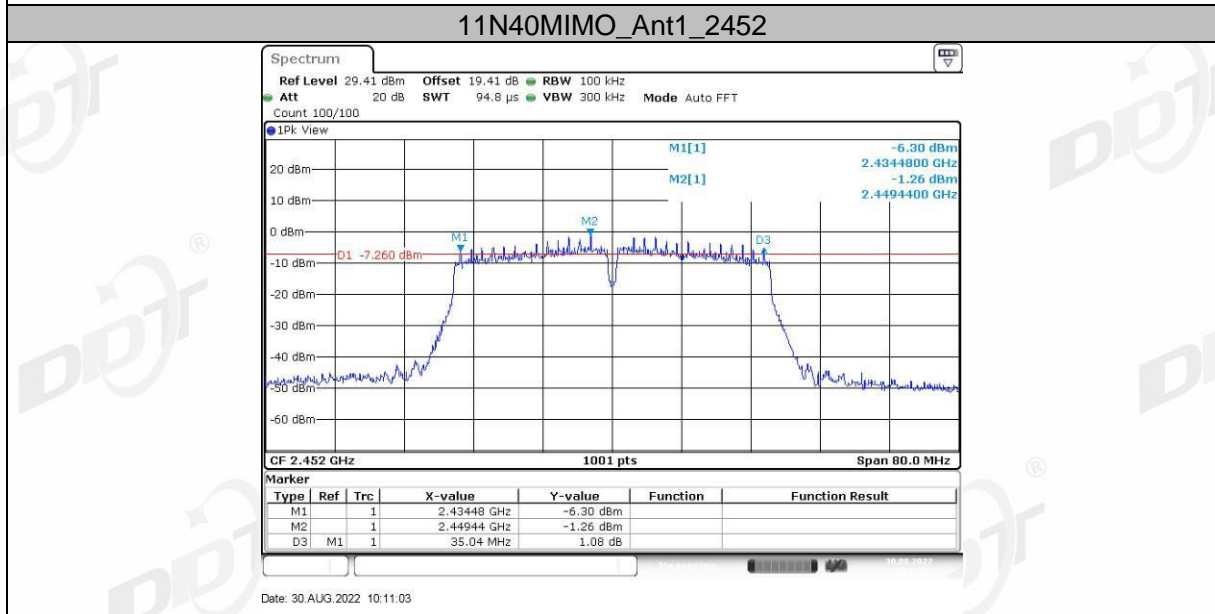
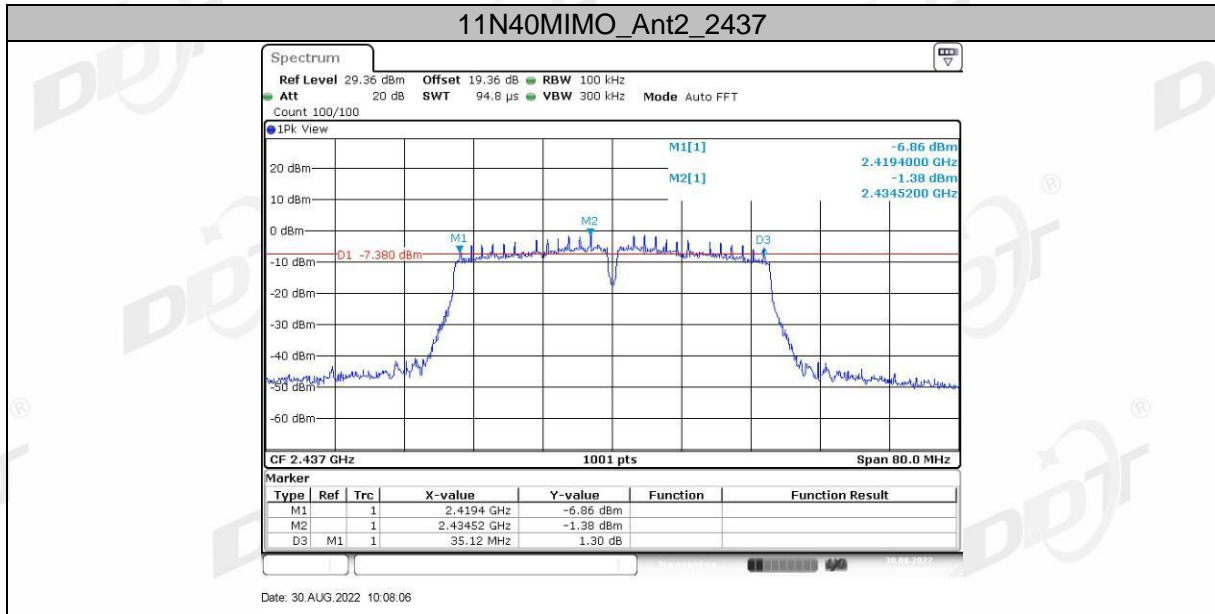




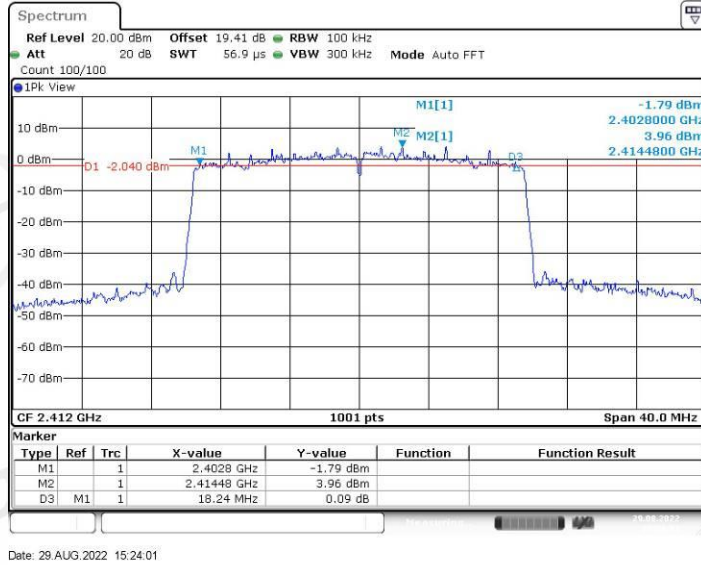




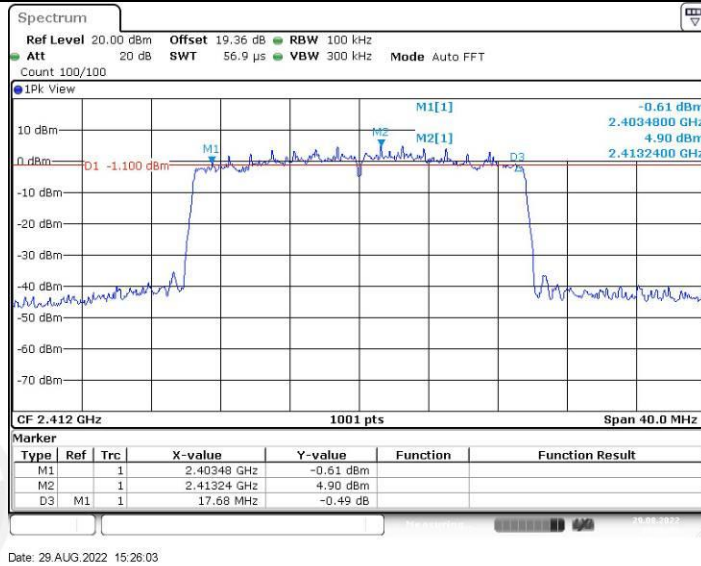




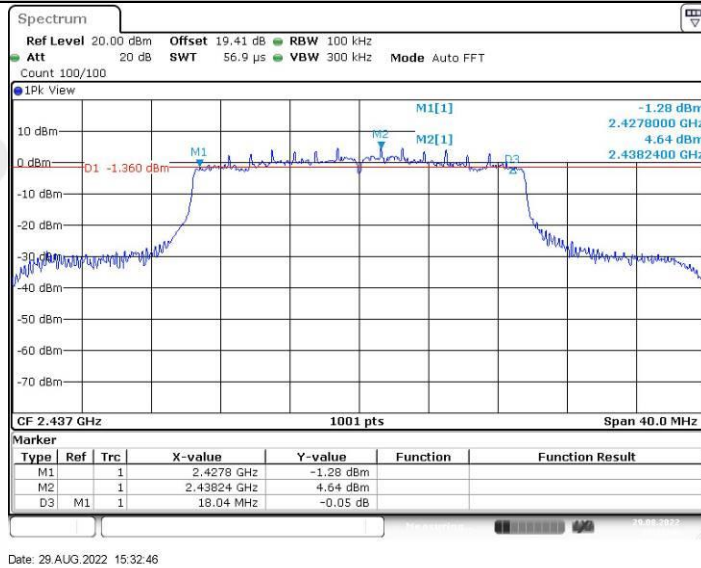
11AX20MIMO_Ant1_2412



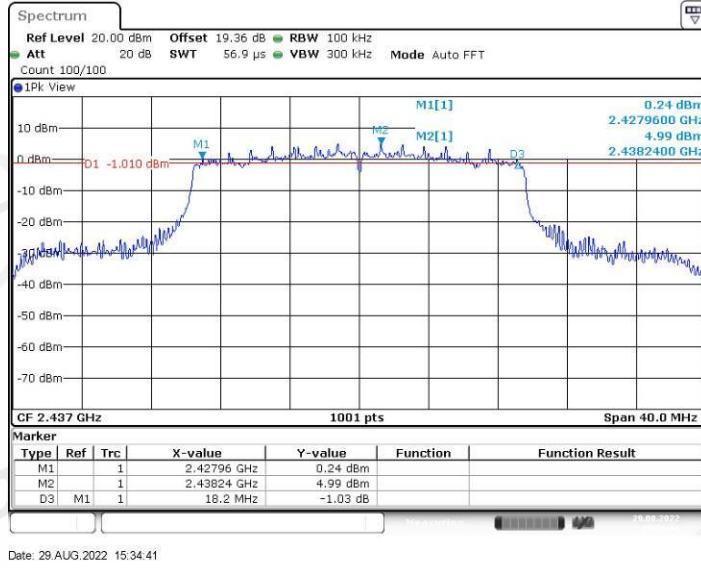
11AX20MIMO_Ant2_2412



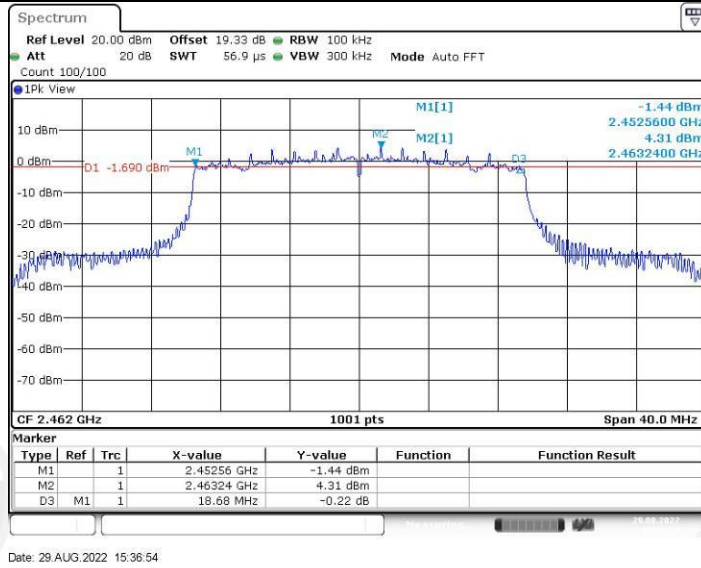
11AX20MIMO_Ant1_2437



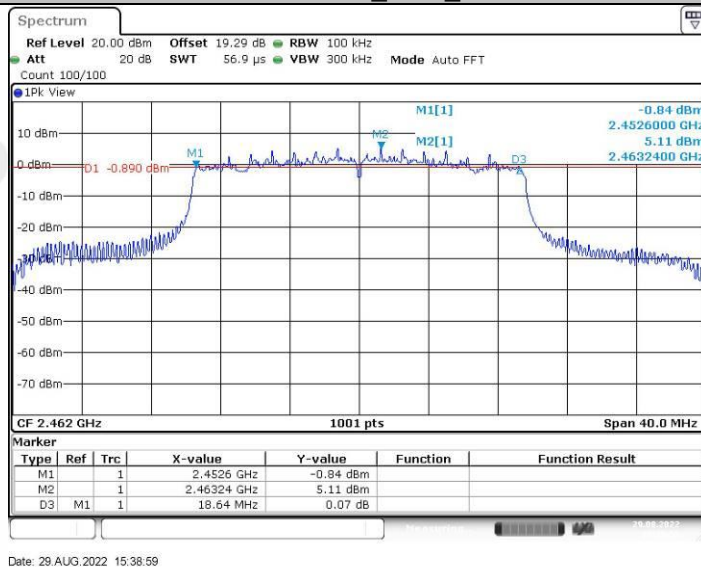
11AX20MIMO_Ant2_2437



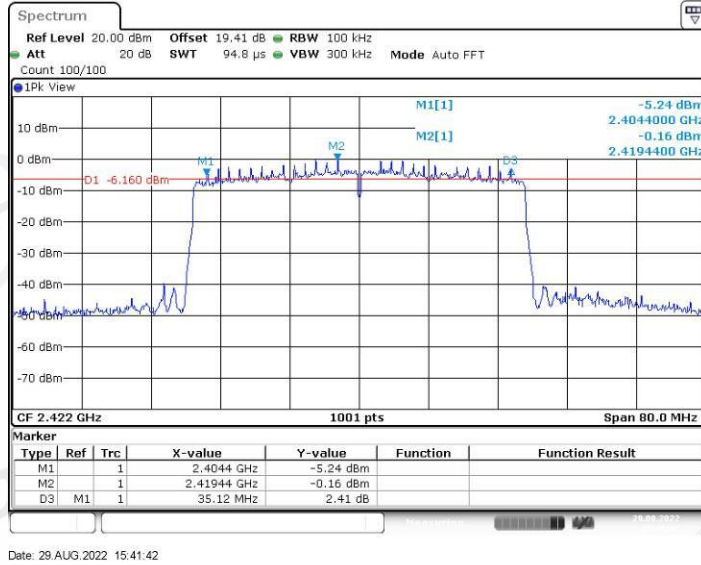
11AX20MIMO_Ant1_2462



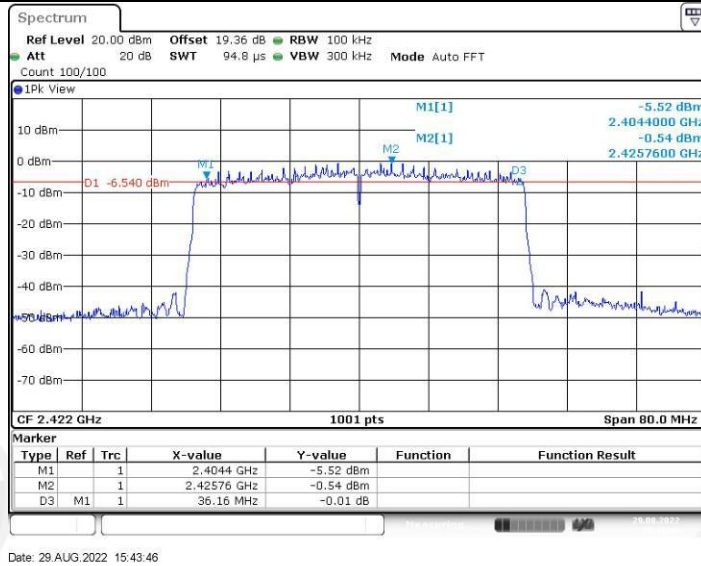
11AX20MIMO_Ant2_2462



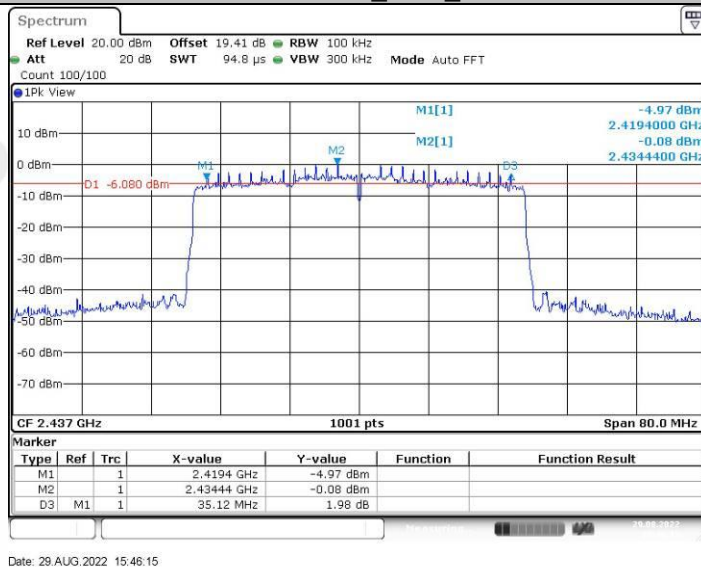
11AX40MIMO_Ant1_2422



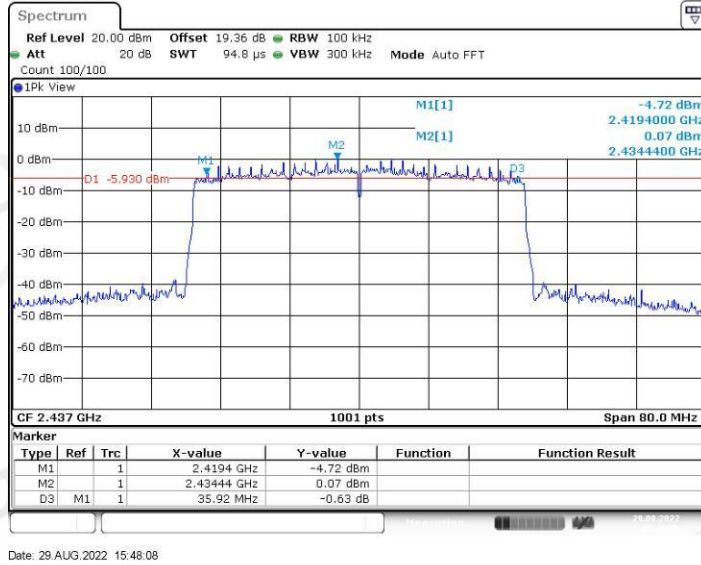
11AX40MIMO_Ant2_2422



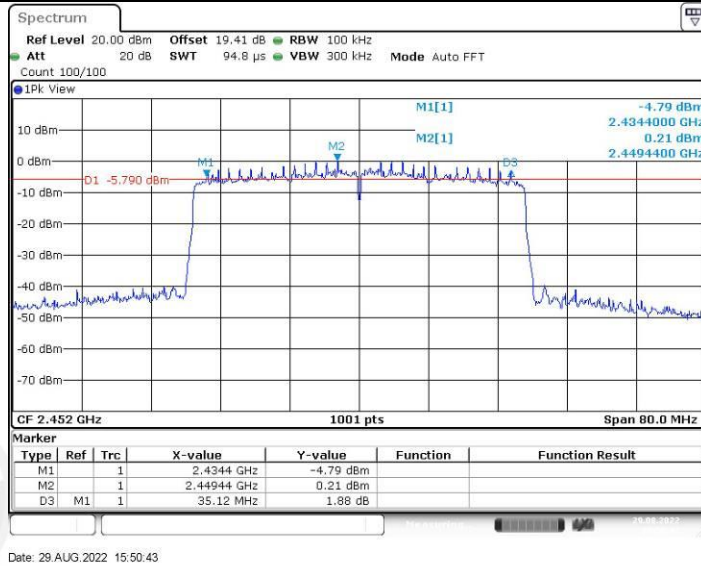
11AX40MIMO_Ant1_2437



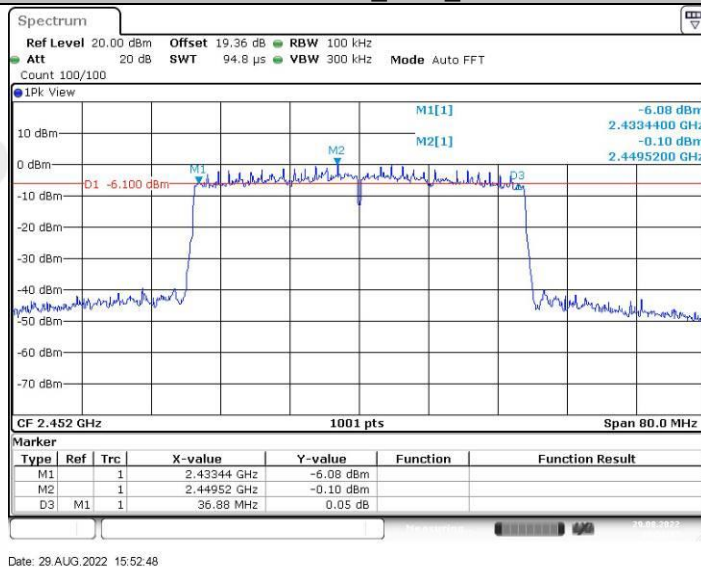
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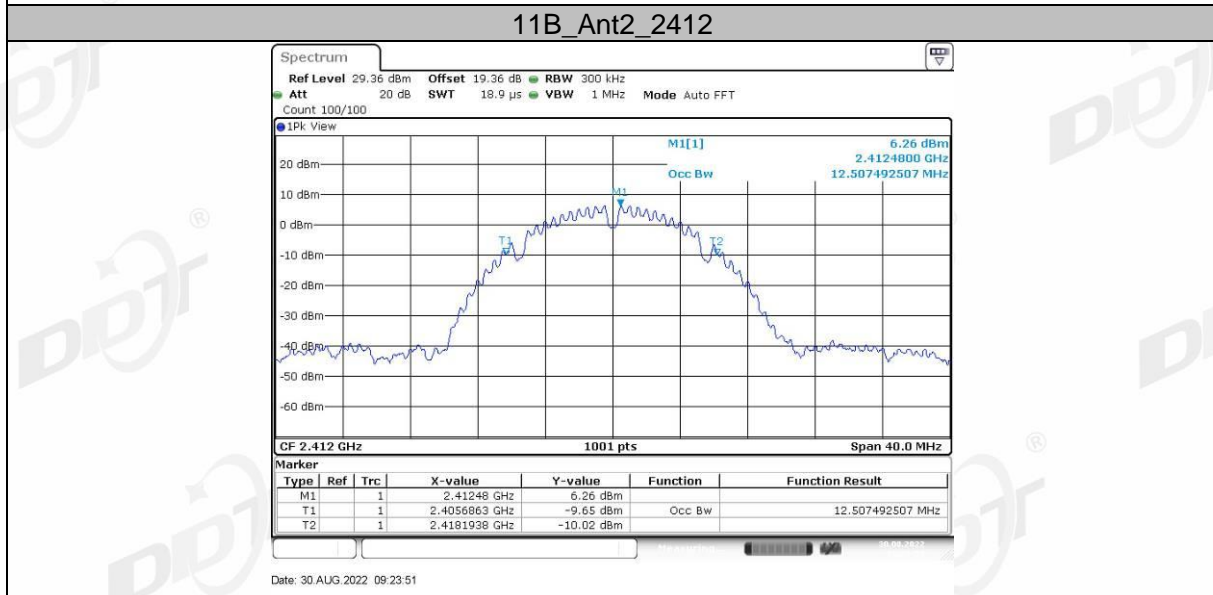
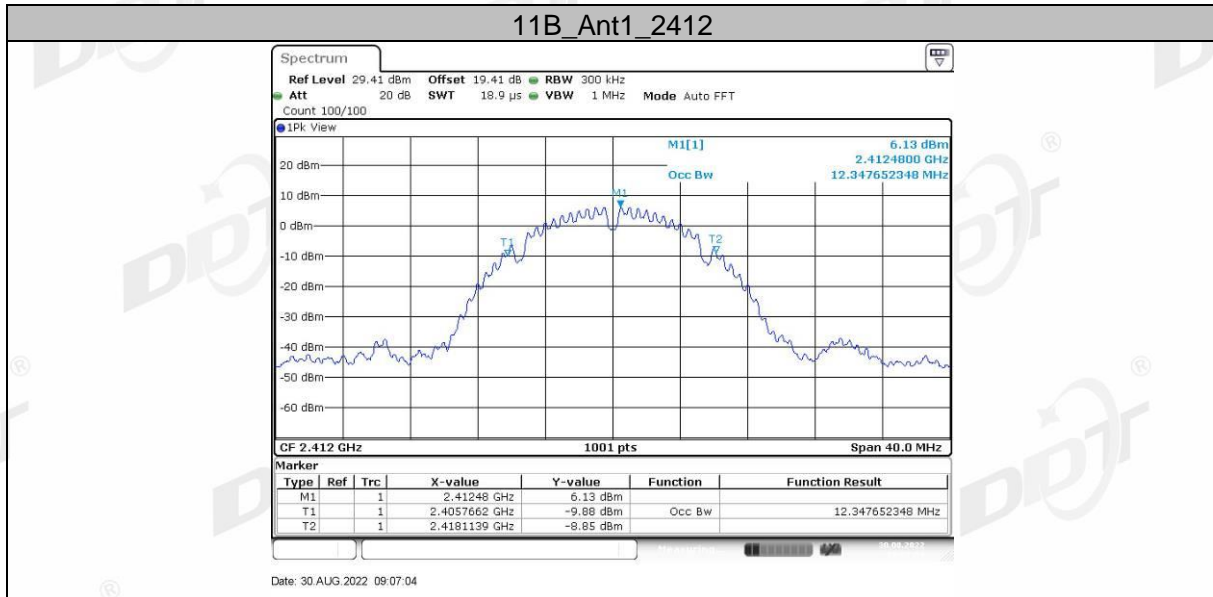
11AX40MIMO_Ant1_2452



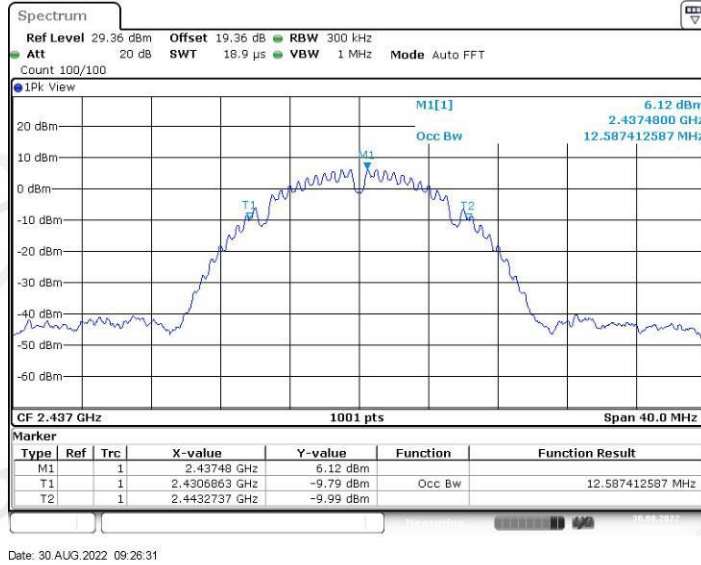
11AX40MIMO_Ant2_2452



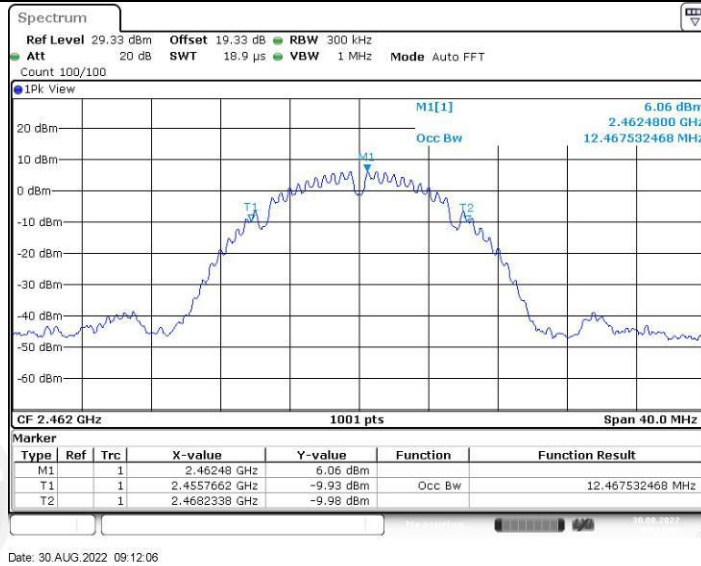
99% bandwidth:



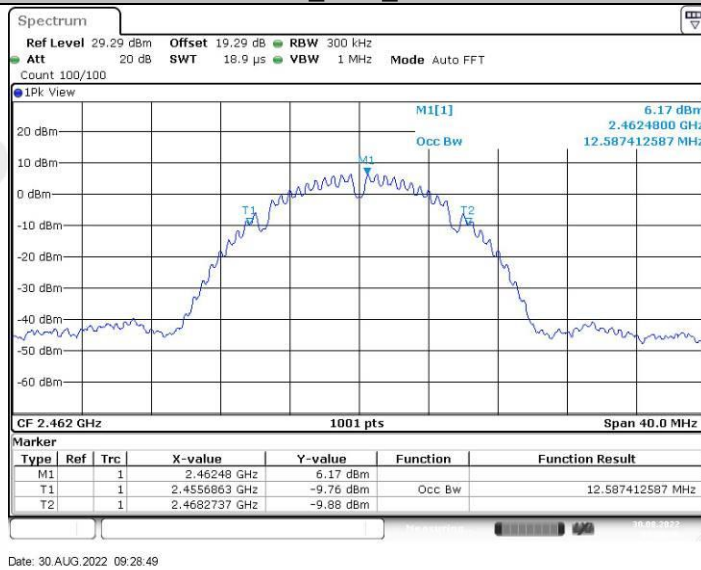
11B_Ant2_2437



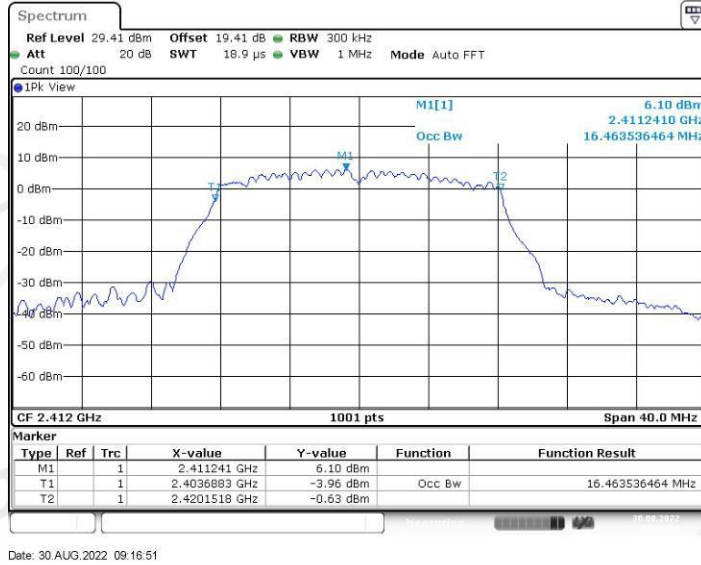
11B_Ant1_2462



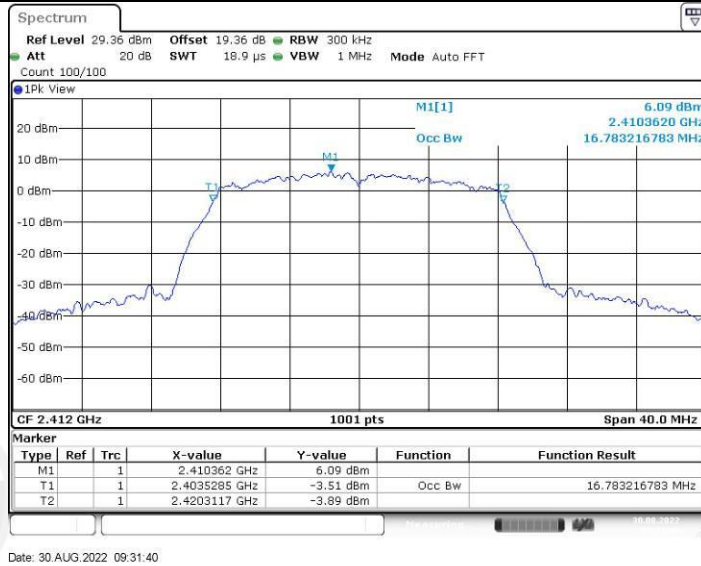
11B_Ant2_2462



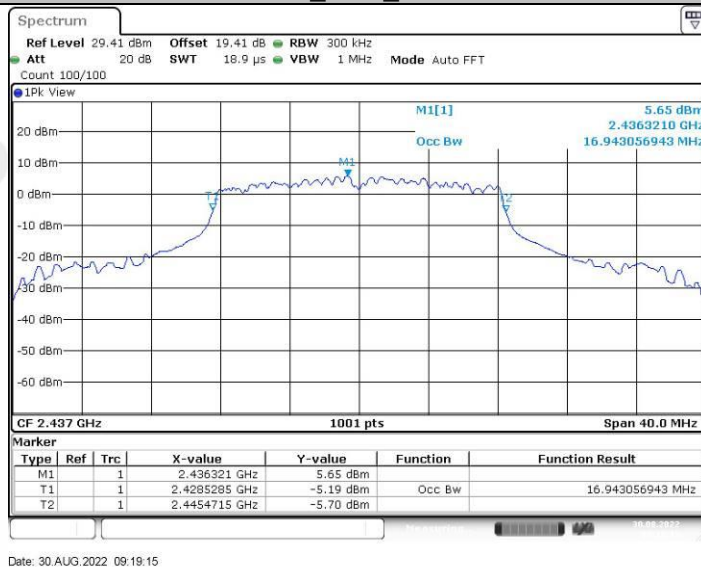
11G_Ant1_2412



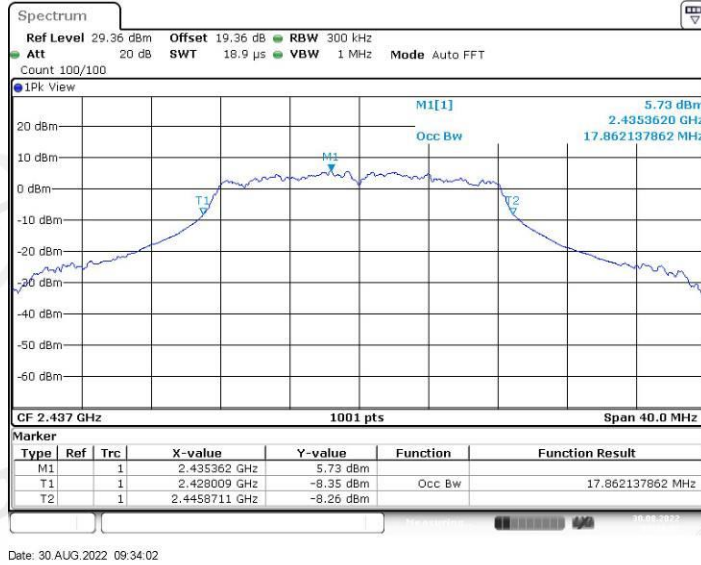
11G_Ant2_2412



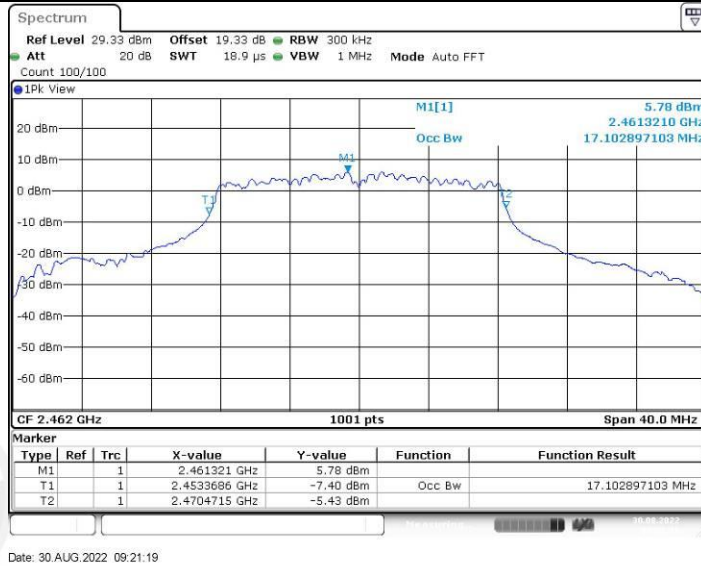
11G_Ant1_2437



11G_Ant2_2437



11G_Ant1_2462



11G_Ant2_2462

