

# FCC CERTIFICATION TEST REPORT

## FOR

<b>Applicant</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
<b>Equipment under Test</b>	:	Wireless Speaker
<b>Model No.</b>	:	CITATION 500
<b>Trade Mark</b>	:	harman/kardon
<b>FCC ID</b>	:	APIHKCT500A
<b>Manufacturer</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

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

**Add.:** No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park,  
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# REPORT

## Table of Contents

	Test report declares.....	4
1.	Summary of Test Results.....	6
2.	General Test Information .....	7
2.1.	Description of EUT .....	7
2.2.	Accessories of EUT.....	7
2.3.	Assistant equipment used for test.....	8
2.4.	Block diagram of EUT configuration for test .....	8
2.5.	Deviations of test standard.....	8
2.6.	Test environment conditions .....	8
2.7.	Test laboratory .....	9
2.8.	Measurement uncertainty.....	9
3.	Equipment Used During Test.....	10
4.	6dB Bandwidth .....	12
4.1.	Block diagram of test setup.....	12
4.2.	Limits .....	12
4.3.	Test procedure .....	12
4.4.	Test result.....	12
4.5.	Test graphs .....	13
5.	99% Bandwidth .....	19
5.1.	Block diagram of test setup.....	19
5.2.	Limits .....	19
5.3.	Test procedure .....	19
5.4.	Test Result .....	19
5.5.	Test Graphs.....	20
6.	Conducted Output Power.....	26
6.1.	Block diagram of test setup.....	26
6.2.	Limits .....	26
6.3.	Test procedure .....	26
6.4.	Test result average .....	27
7.	Power Spectral Density.....	28
7.1.	Block diagram of test setup.....	28
7.2.	Limits .....	28
7.3.	Test procedure .....	28
7.4.	Test result.....	29
7.5.	Test graphs .....	30
8.	Band Edge Compliance (Conducted Method) .....	36
8.1.	Block diagram of test setup.....	36

8.2.	Limits .....	36
8.3.	Test procedure .....	36
8.4.	Test result.....	36
8.5.	Test graphs .....	37
9.	RF Conducted Spurious Emissions .....	41
9.1.	Block diagram of test setup.....	41
9.2.	Limits .....	41
9.3.	Test procedure .....	41
9.4.	Test result.....	42
9.5.	Test graphs .....	43
10.	Duty Cycle .....	61
10.1.	Block diagram of test setup.....	61
10.2.	Limit.....	61
10.3.	Test procedure .....	61
10.4.	Test result.....	62
10.5.	Test graphs .....	63
11.	Radiated Spurious Emissions .....	69
11.1.	Block diagram of test setup.....	69
11.2.	Limit.....	70
11.3.	Test Procedure.....	71
11.4.	Test result.....	73
12.	Radiated Band Edge Compliance.....	82
12.1.	Block diagram of test setup.....	82
12.2.	Limit.....	82
12.3.	Test procedure .....	82
12.4.	Test result.....	82
13.	Power Line Conducted Emission .....	103
13.1.	Block diagram of test setup.....	103
13.2.	Power Line Conducted Emission Limits .....	103
13.3.	Test procedure .....	103
13.4.	Test result.....	104
14.	Antenna Requirements .....	107
14.1.	Limit.....	107
14.2.	Result .....	107
15.	Test Setup Photograph .....	108
16.	Photos of the EUT .....	110

## Test Report Declare

<b>Applicant</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
<b>Equipment under Test</b>	:	Wireless Speaker
<b>Model No</b>	:	CITATION 500
<b>Trade Mark</b>	:	harman/kardon
<b>Manufacturer</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

### Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C.

### Test procedure used:

ANSI C63.10:2013, 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 standards.**

<b>Report No:</b>	DDT-RE23082222-2E03		
<b>Date of Receipt:</b>	Sep. 04, 2023	<b>Date of Test:</b>	Sep. 04, 2023 ~ Sep. 25, 2023

**Prepared By:**

*Johnny Wang*

**Johnny Wang/Engineer**

**Approved By:**

*Damon Hu*

**Damon Hu/EMC Manager**

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

### Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Sep. 25, 2023	

## 1. Summary of Test Results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Verdict
6dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247(a)(2)	Pass
Peak Output Power	FCC Part 15: 15.247(b)(3)	Pass
Power Spectral Density	FCC Part 15:15.247(e)	Pass
Band Edge Compliance (conducted method)	FCC Part 15: 15.247(d)	Pass
RF Conducted Spurious Emissions	FCC Part 15: 15.247(d)	Pass
Radiation Emission	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	Pass
Emission in Restricted Frequency Bands	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	Pass
Power Line Conducted Emission	FCC Part 15: 15.207(a)	Pass
Antenna Requirement	FCC Part 15: 15.203	Pass

## 2. General Test Information

### 2.1. Description of EUT

EUT Name	: Wireless Speaker
Model Number	: CITATION 500
EUT function description	: Please reference user manual of this device
Power supply	: 100-240V~, 50/60Hz, 200W
Radio Technology	: IEEE 802.11b/g/n
Operation frequency	: IEEE 802.11b: 2412MHz-2462MHz : IEEE 802.11g: 2412MHz-2462MHz : IEEE 802.11n HT20: 2412MHz-2462MHz
Modulation	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) : IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) : IEEE 802.11n HT20: OFDM (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
Antenna	: Antenna 1: FPC antenna, Maximum PK gain: 2.52 dBi : Antenna 2: FPC antenna, Maximum PK gain: 2.82 dBi
SISO Mode	: <input checked="" type="checkbox"/> 11b <input checked="" type="checkbox"/> 11g <input checked="" type="checkbox"/> 11n
MIMO Mode	: <input type="checkbox"/> 11b <input type="checkbox"/> 11g <input checked="" type="checkbox"/> 11n
Sample Number	: S23082222-01 for conductive, : S23082222-02 for radiation

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

Note 2: “” means to be chosen or applicable; “” means don’t to be chosen or not applicable;  
This note applies to entire report.

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11b	2.52	2.82	/
IEEE 802.11g	2.52	2.82	/
IEEE 802.11n HT20	2.52	2.82	5.68

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	/	/

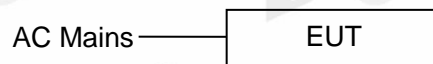
### 2.2. Accessories of EUT

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

### 2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
NoteBook	Lenovo	i7-4810MQ	N/A	00331-1000-00001-AA816

### 2.4. Block diagram of EUT configuration for test



Test software: Putty.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	Default	Default	1	LCH: CH1	2412
	Default	Default	1	MCH: CH6	2437
	Default	Default	1	HCH: CH11	2462
IEEE 802.11g	12	12	6	LCH: CH1	2412
	12	12	6	MCH: CH6	2437
	12	12	6	HCH: CH11	2462
IEEE 802.11n HT20	Default	Default	MCS 8	LCH: CH1	2412
	Default	Default	MCS 8	MCH: CH6	2437
	Default	Default	MCS 8	HCH: CH11	2462

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

### 2.5. Deviations of test standard

No Deviation

### 2.6. Test environment conditions

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



## 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](mailto: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 <sup>-8</sup> (Antenna couple method)
	5.5 × 10 <sup>-8</sup> (Conducted method)
Conducted spurious emissions	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.40 dB (3.6 GHz ≤ f < 8 GHz)
	1.66 dB (8 GHz ≤ f < 26.5 GHz)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10 <sup>-8</sup>
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 Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<b>☑RF Connected Test (Tonscend RF Measurement System 4#)</b>					
Signal & Spectrum analyzer	R&S	FSV3044	101173	Apr. 23, 2023	1 Year
Wideband Radio Communication tester	R&S	CMW500	168801	Apr. 27, 2023	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Apr. 27, 2023	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Sep. 28, 2022	1 Year
RF Control Unit	Tonsend	JS0806-2	2118060485	Apr. 27, 2023	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDS-150L	ZX170110-A	May 15, 2023	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.3.2.22	N/A	N/A
<b>☑Radiation 3#chamber</b>					
EMI Test Receiver	R&S	ESU26	100472	Apr. 23, 2023	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Apr. 23, 2023	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Sep. 29, 2022	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	01429	Jul. 12, 2023	2 Year
Double Ridged Horn Antenna	Schwarzbeck	BBHA9120 D	02468	Sep. 29, 2022	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	Apr. 26, 2023	1 Year
Pre-amplifier	COM-POWER	PAM-118A	18040084	Jul. 15, 2023	1 Year
Pre-amplifier	COM-POWER	PAM-840A	461369	Apr. 27, 2023	1 Year
RE Cable	N/A	W23.02 CP1-X2 + W23.09 AP1-X8+ JCT26S-NJ-NJ-1.5M	4.5M+8M+1.5M	Apr. 21, 2023	1 Year
RF Cable	Yuhu Technology	JCTB810-NJ-NJ-9M+ ZT26S-SMAJ-SMAJ-1M	21123964	Apr. 23, 2023	1 Year
Micro-Tronics filters	REBES	BRM50702	G555	N/A	N/A
Micro-Tronics filters	REBES	BRM50716	G392	N/A	N/A
High Pass filter	XB	XBLBQ-GTA67	210820-2-3	N/A	N/A
Test software	Tonscend	JS32-RE	V 5.0.0.1	N/A	N/A
<b>☑Power Line Conducted Emissions Test 3#</b>					
Test Receiver	R&S	ESCI	101028	Jul. 12, 2023	1 Year
LISN 1	R&S	ENV216	101725	Jul. 12, 2023	1 Year
LISN 2	R&S	ENV216	101726	Jul. 12, 2023	1 Year

LISN 3	SCHWARZBECK	NSLK 8163	00017	Jul. 12, 2023	1 Year
Pulse Limiter	SCHWARZBECK	VTSD 9561	102766	Jul. 15, 2023	1 Year
CE Cable 3	HUBSER	Z806-NJ-NJ-6M	21070275	Jul. 15, 2023	1 Year
Test software	Audix	E3	V 6.11111b	N/A	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:

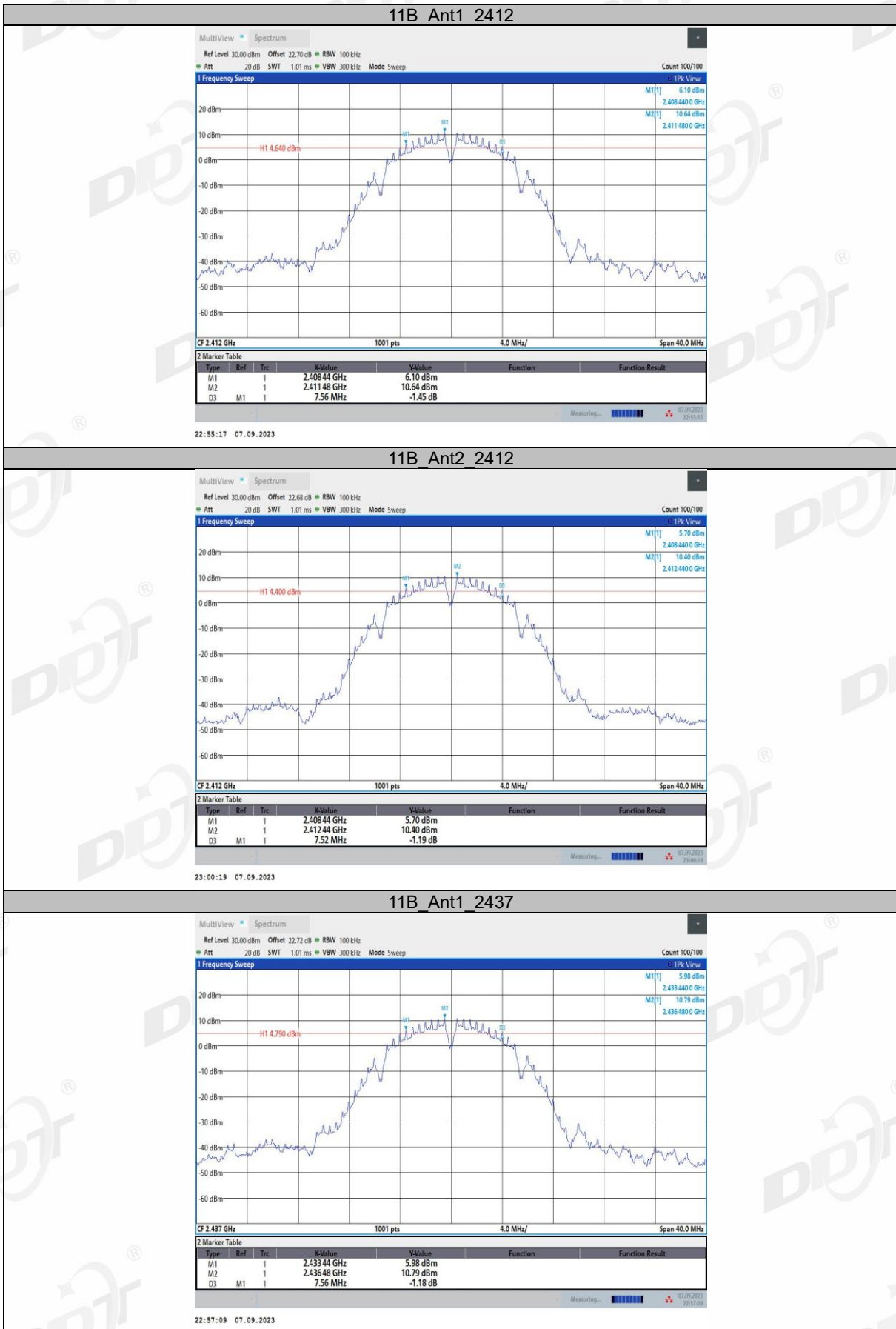
RBW:	100 kHz
VBW:	$\geq [3 \times \text{RBW}]$
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

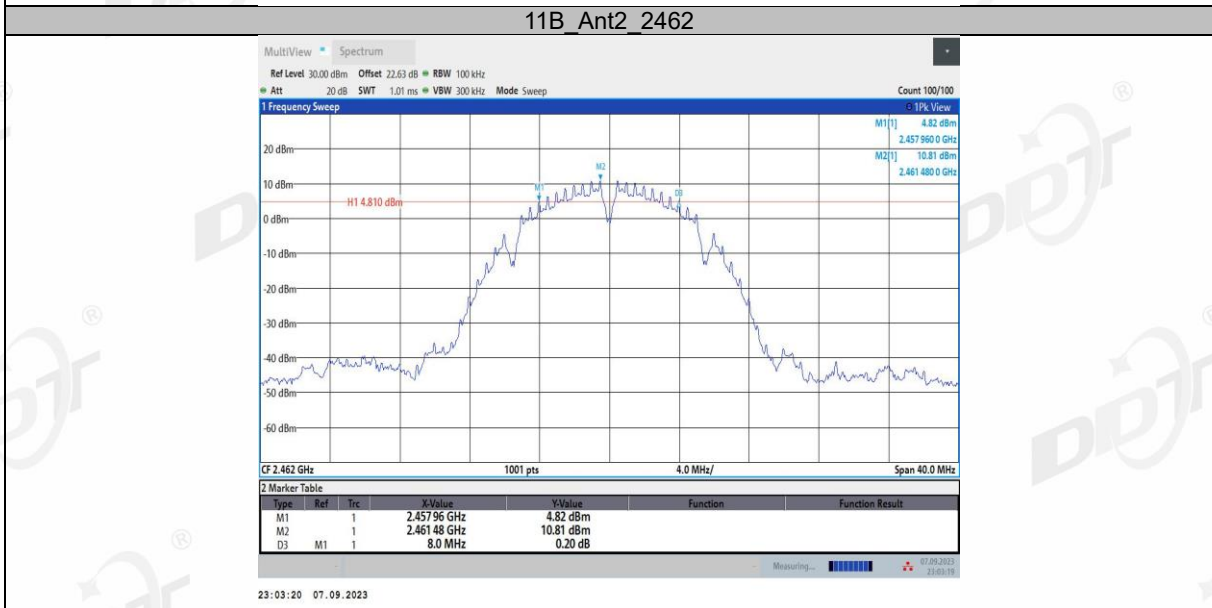
Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report

### 4.4. Test result

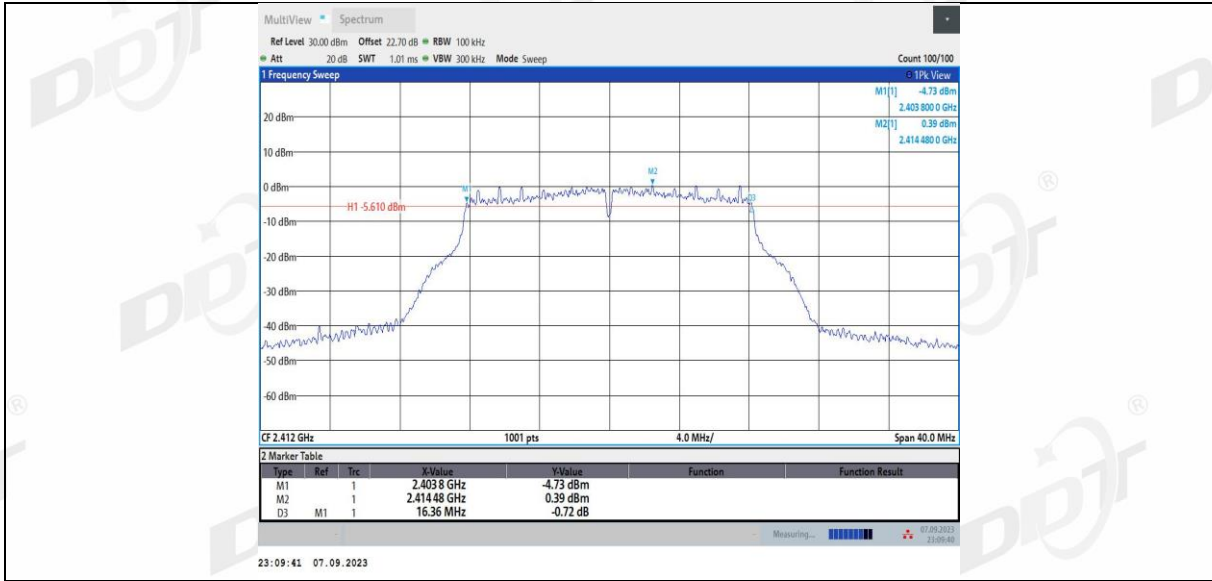
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	7.56	2408.44	2416.00	0.5	PASS
	Ant2	2412	7.52	2408.44	2415.96	0.5	PASS
	Ant1	2437	7.56	2433.44	2441.00	0.5	PASS
	Ant2	2437	7.52	2433.44	2440.96	0.5	PASS
	Ant1	2462	7.52	2458.44	2465.96	0.5	PASS
	Ant2	2462	8.00	2457.96	2465.96	0.5	PASS
11G	Ant1	2412	16.36	2403.80	2420.16	0.5	PASS
	Ant2	2412	16.36	2403.80	2420.16	0.5	PASS
	Ant1	2437	16.36	2428.80	2445.16	0.5	PASS
	Ant2	2437	16.36	2428.80	2445.16	0.5	PASS
	Ant1	2462	16.36	2453.80	2470.16	0.5	PASS
	Ant2	2462	16.36	2453.80	2470.16	0.5	PASS
11N20MIMO	Ant1	2412	17.60	2403.16	2420.76	0.5	PASS
	Ant2	2412	17.60	2403.16	2420.76	0.5	PASS
	Ant1	2437	17.60	2428.16	2445.76	0.5	PASS
	Ant2	2437	17.60	2428.16	2445.76	0.5	PASS
	Ant1	2462	17.60	2453.16	2470.76	0.5	PASS
	Ant2	2462	17.60	2453.16	2470.76	0.5	PASS

4.5. Test graphs





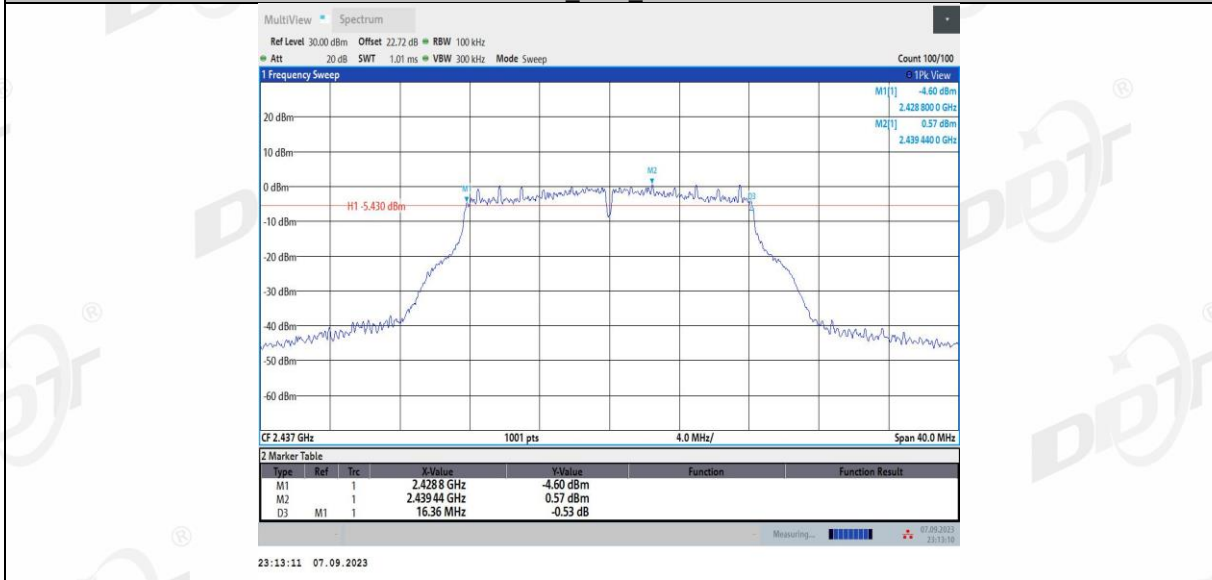
### 11G Ant1 2412



11G Ant2 2412



11G Ant1 2437



11G Ant2 2437



11G Ant1 2462

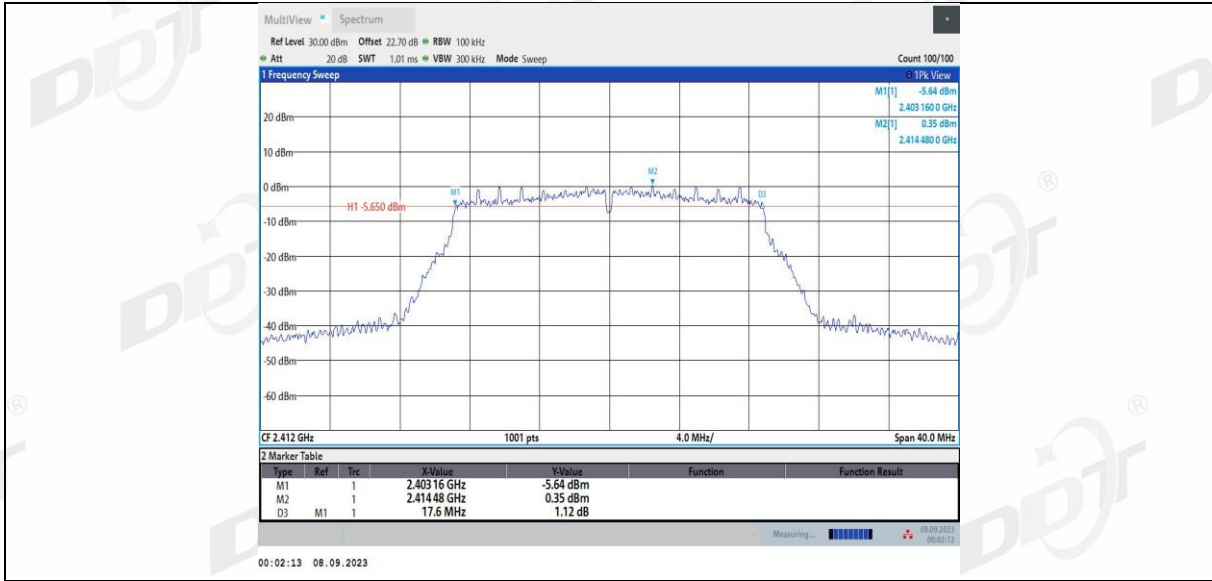


11G Ant2 2462



11N20MIMO Ant1 2412

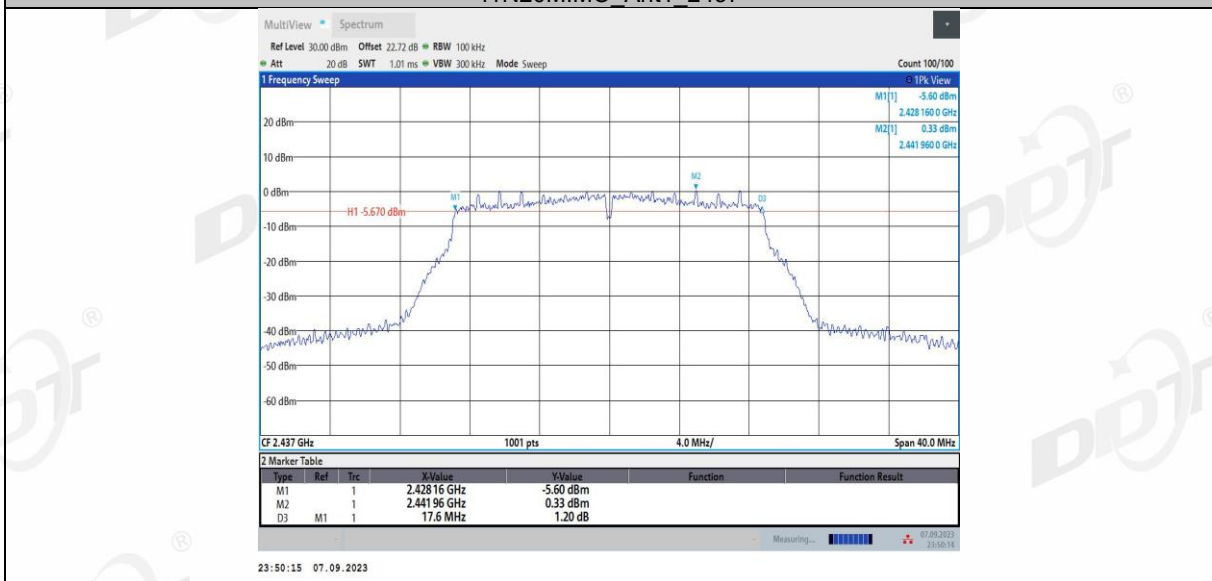




11N20MIMO Ant2 2412



11N20MIMO Ant1 2437



11N20MIMO Ant2 2437



11N20MIMO Ant1 2462

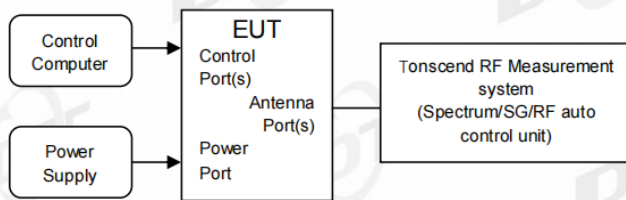


11N20MIMO Ant2 2462



## 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:

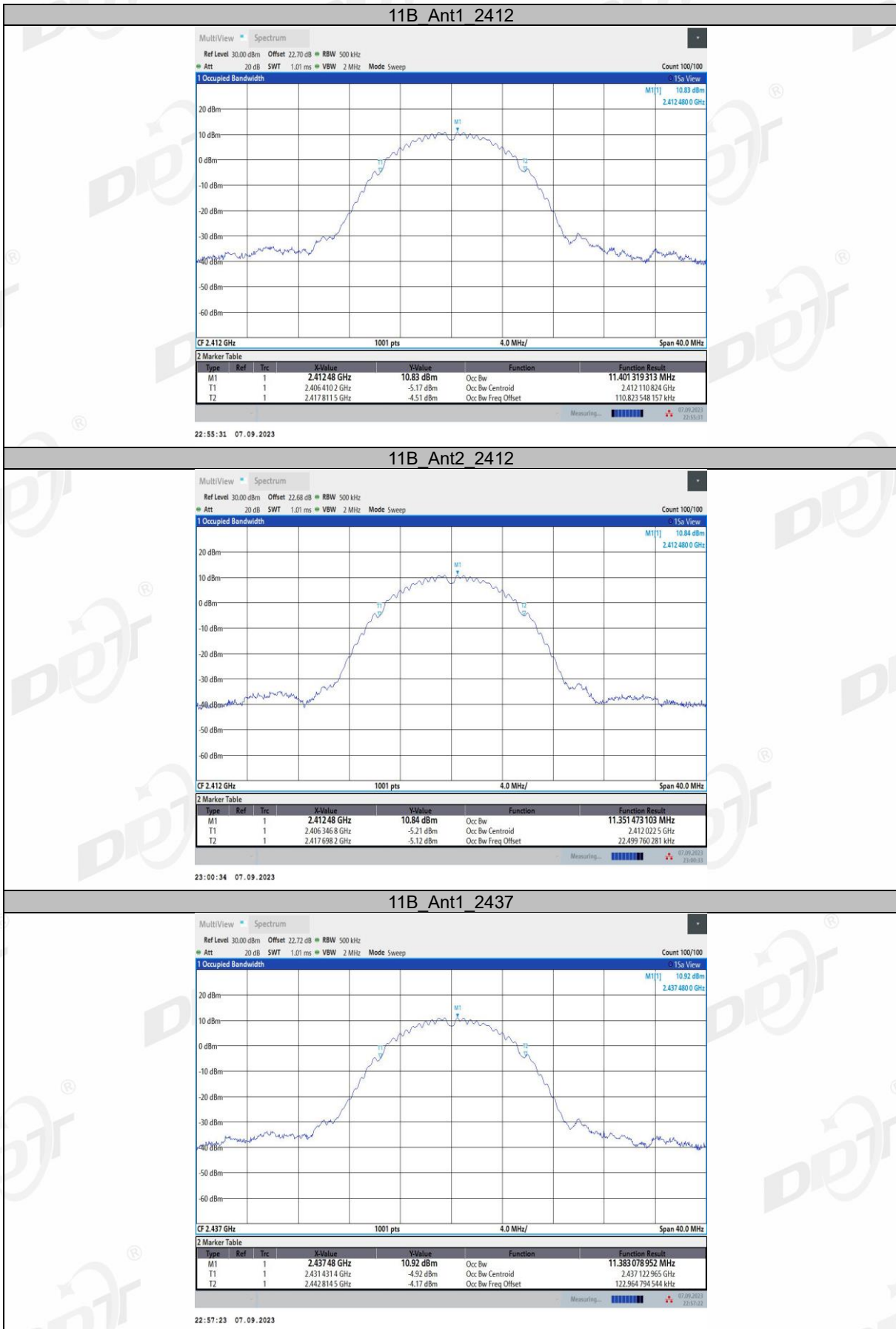
RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 1.5 times and 5.0 times the OBW
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

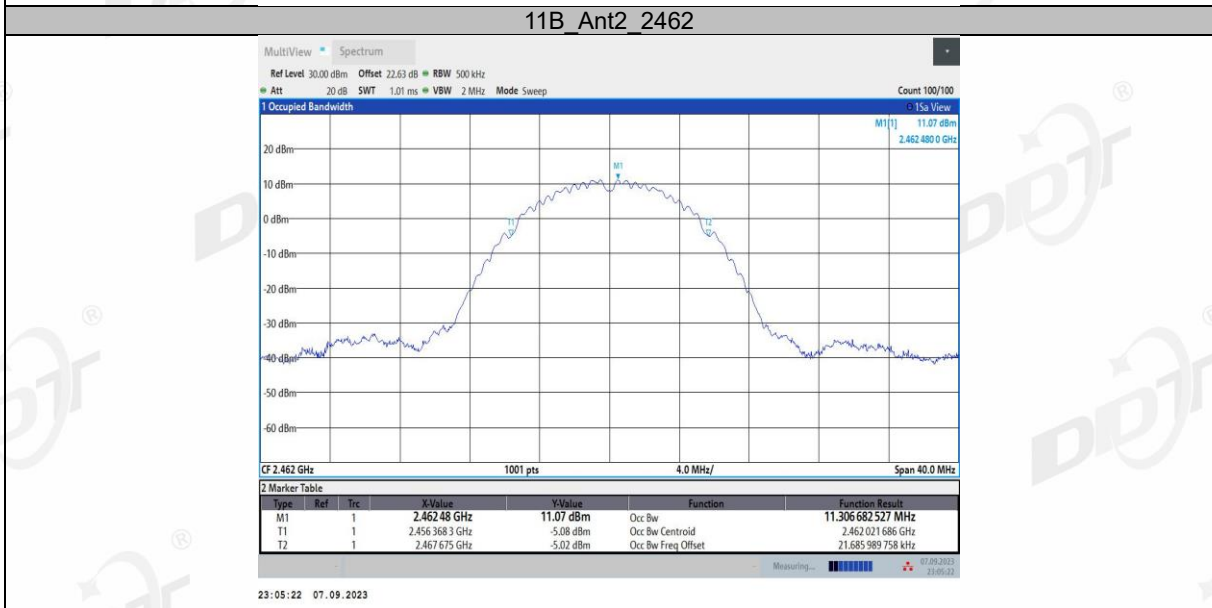
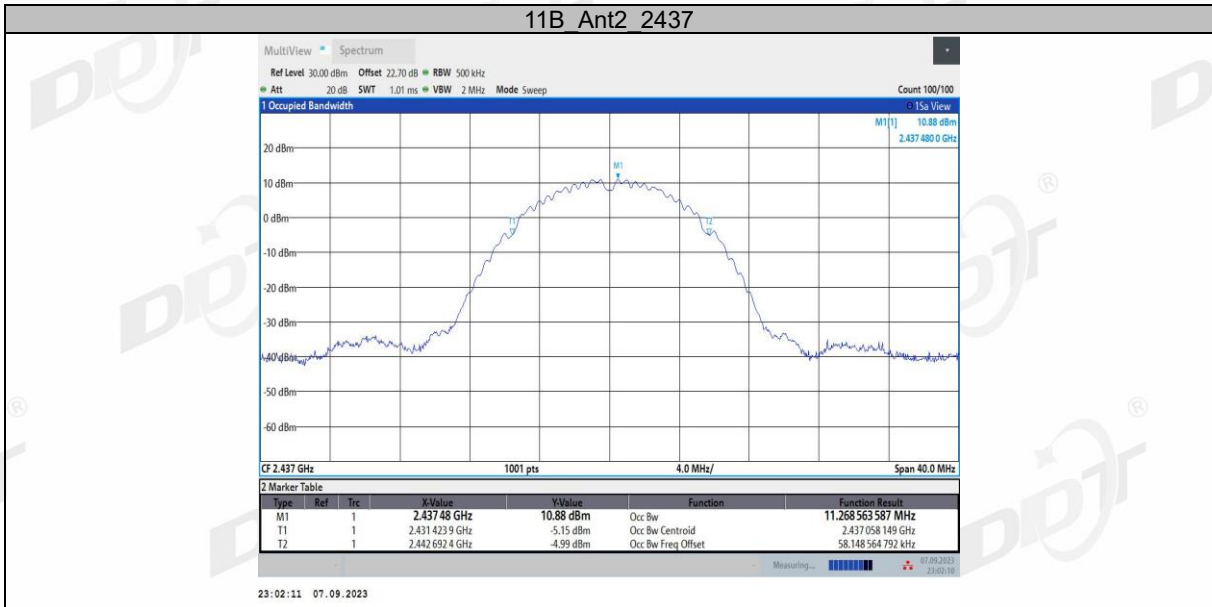
Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

### 5.4. Test Result

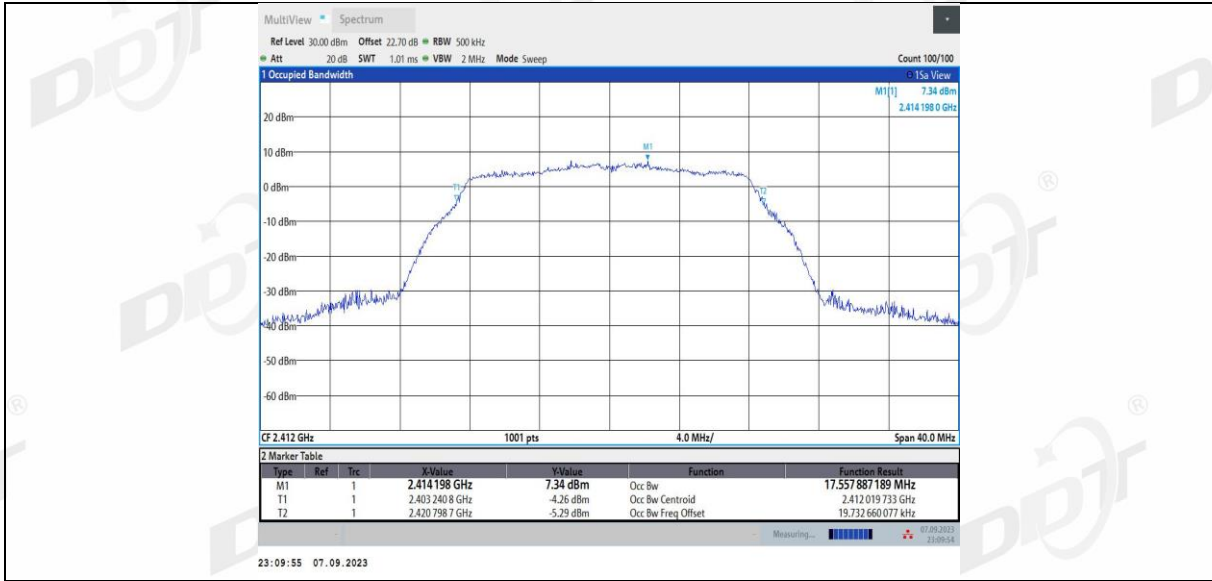
Test Mode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
11B	Ant1	2412	11.401	2406.4102	2417.8115
	Ant2	2412	11.351	2406.3468	2417.6982
	Ant1	2437	11.383	2431.4314	2442.8145
	Ant2	2437	11.269	2431.4239	2442.6924
	Ant1	2462	11.373	2456.4431	2467.8164
	Ant2	2462	11.307	2456.3683	2467.6750
11G	Ant1	2412	17.558	2403.2408	2420.7987
	Ant2	2412	17.548	2403.2116	2420.7596
	Ant1	2437	17.576	2428.2393	2445.8154
	Ant2	2437	17.515	2428.2551	2445.7697
	Ant1	2462	17.590	2453.2400	2470.8297
	Ant2	2462	17.595	2453.2068	2470.8016
11N20MIMO	Ant1	2412	18.513	2402.7483	2421.2609
	Ant2	2412	18.059	2402.9520	2421.0111
	Ant1	2437	18.530	2427.7538	2446.2838
	Ant2	2437	18.079	2427.9549	2446.0343
	Ant1	2462	18.537	2452.7440	2471.2808
	Ant2	2462	18.059	2452.9545	2471.0131

5.5. Test Graphs

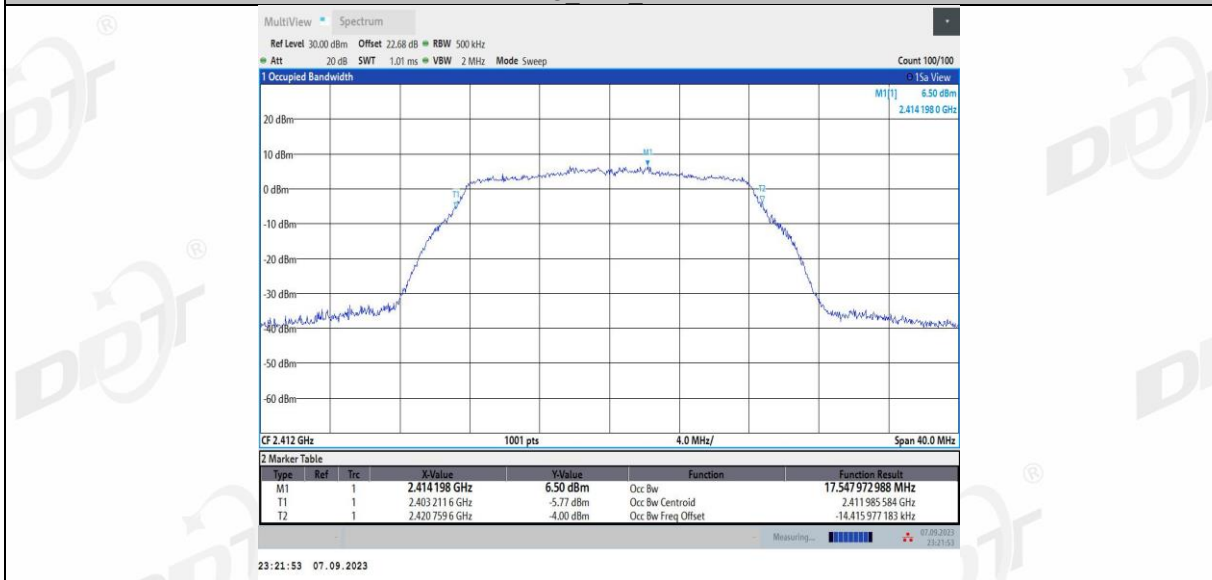




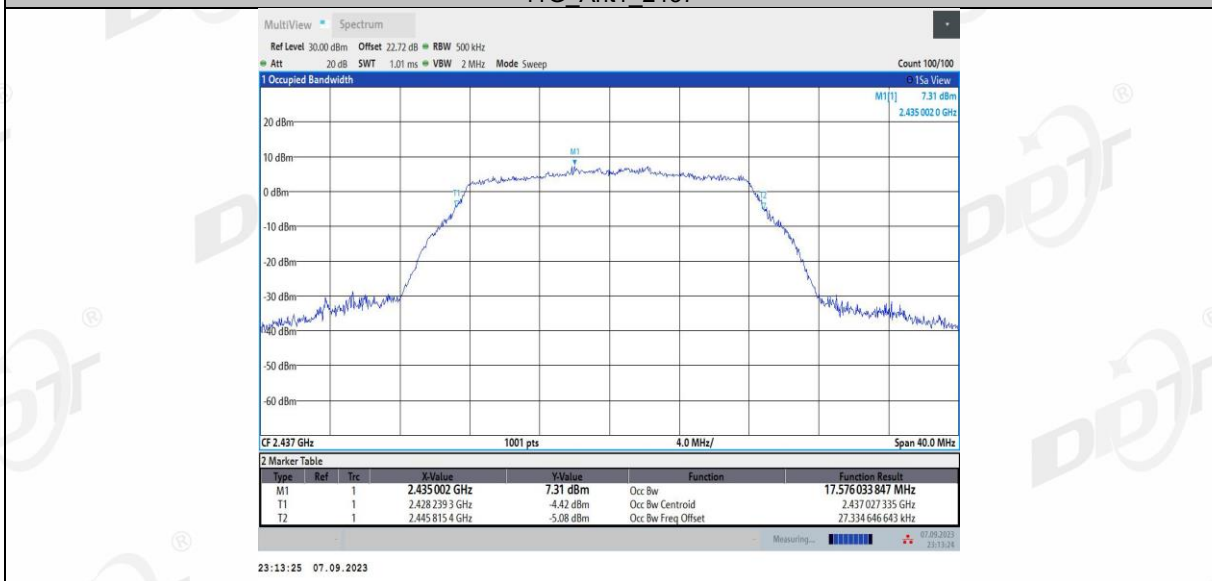
### 11G Ant1 2412



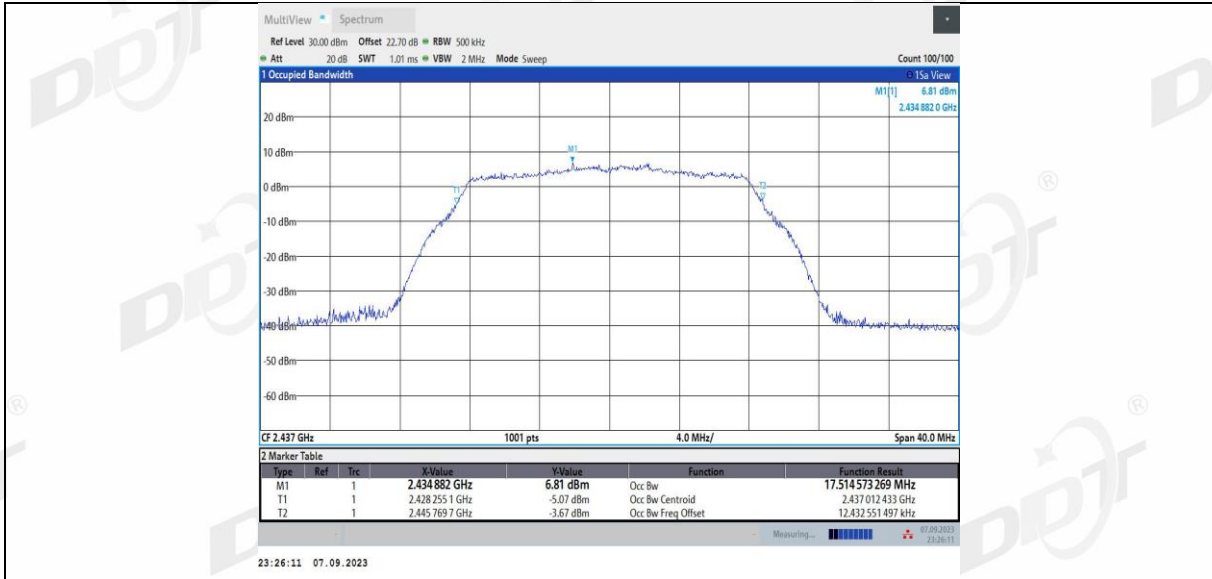
11G Ant2 2412



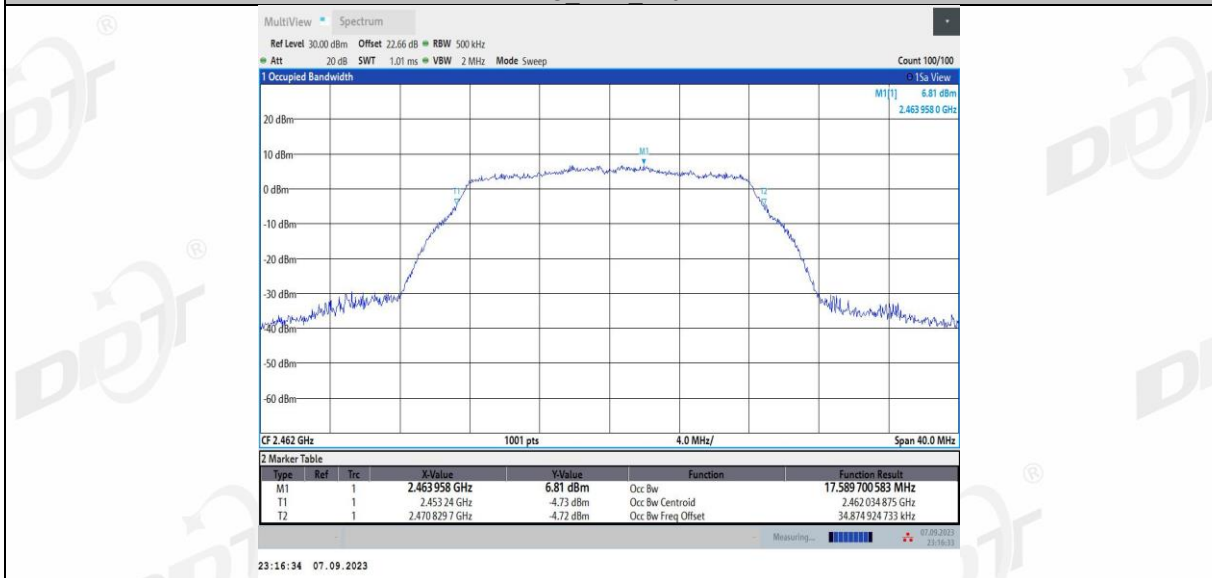
11G Ant1 2437



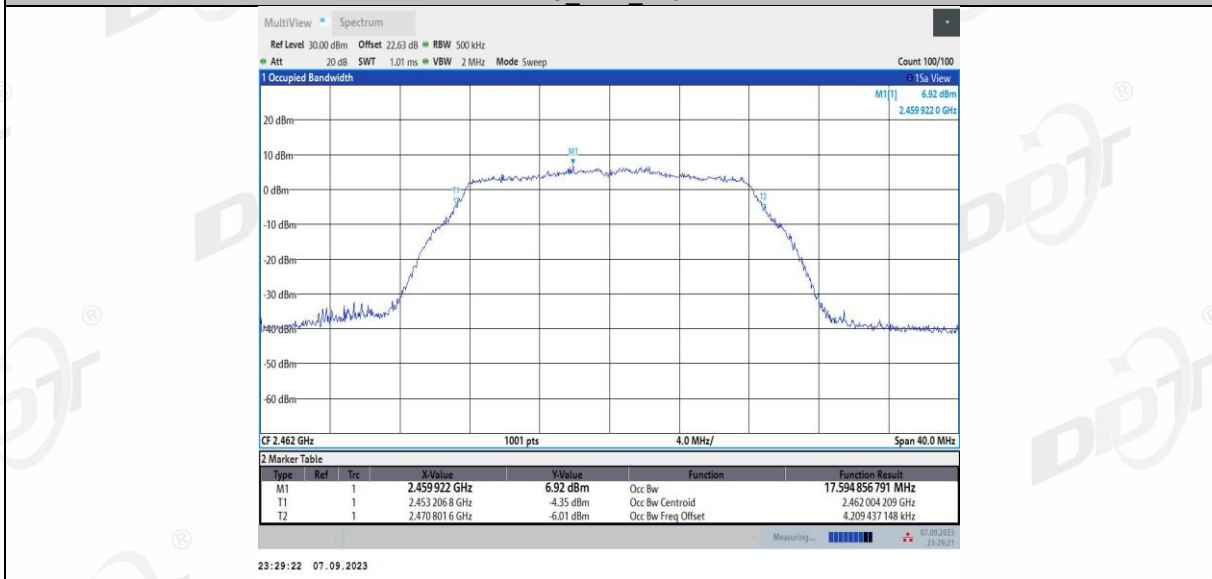
11G Ant2 2437



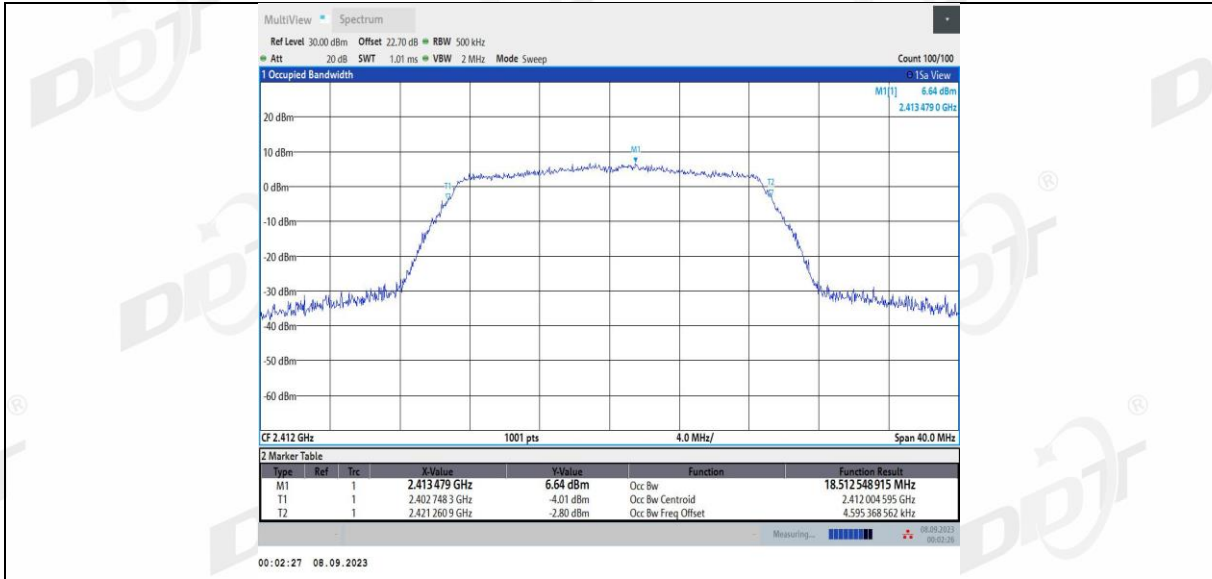
11G Ant1 2462



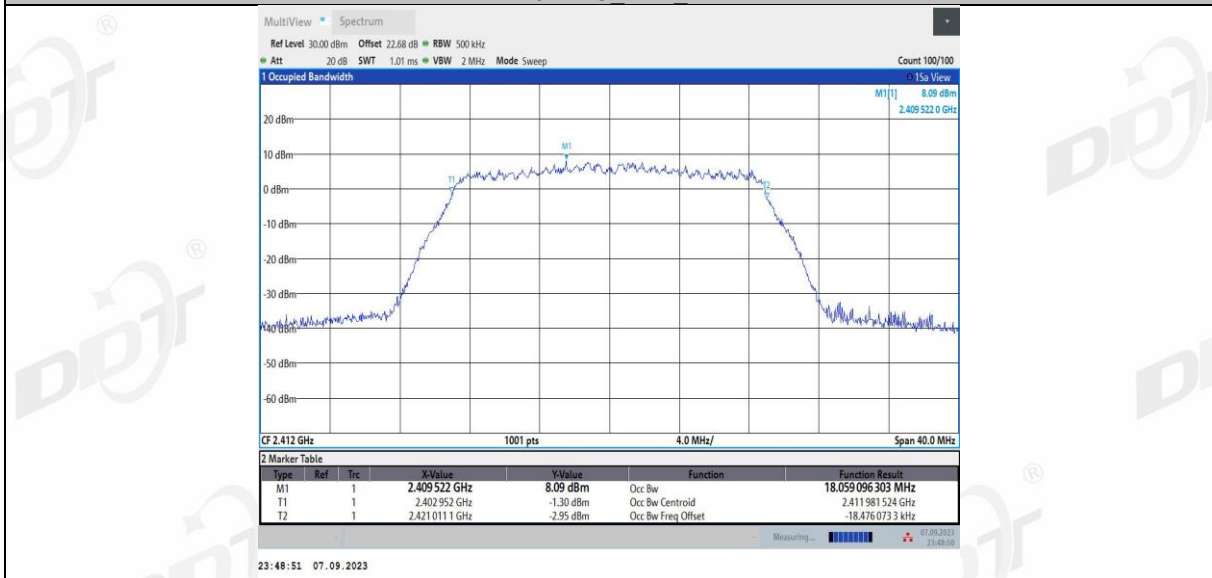
11G Ant2 2462



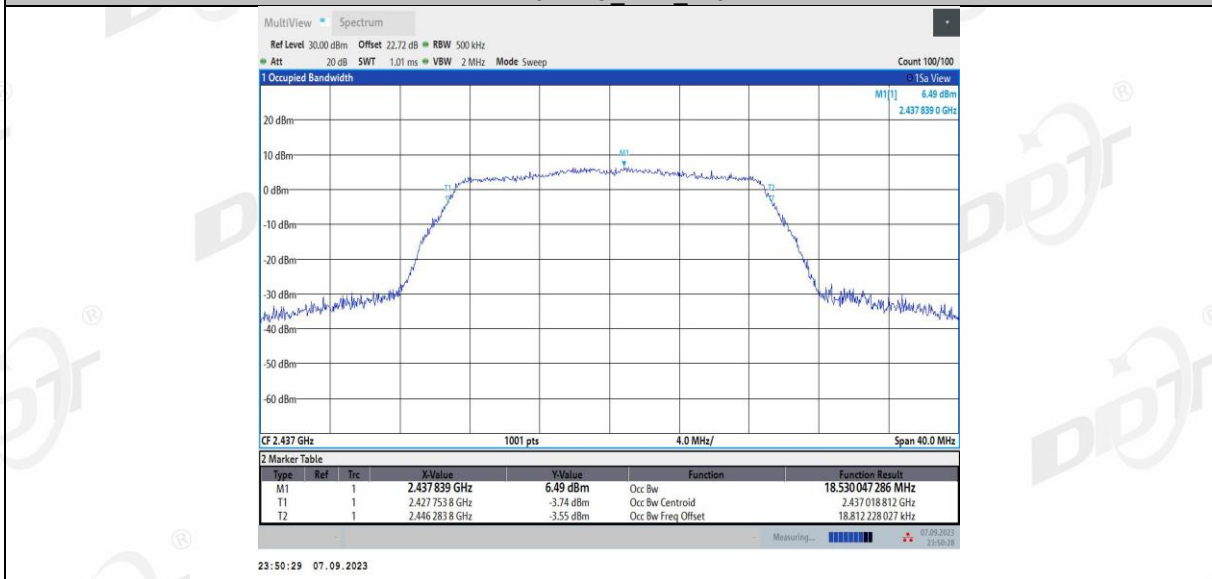
11N20MIMO Ant1 2412



11N20MIMO Ant2 2412

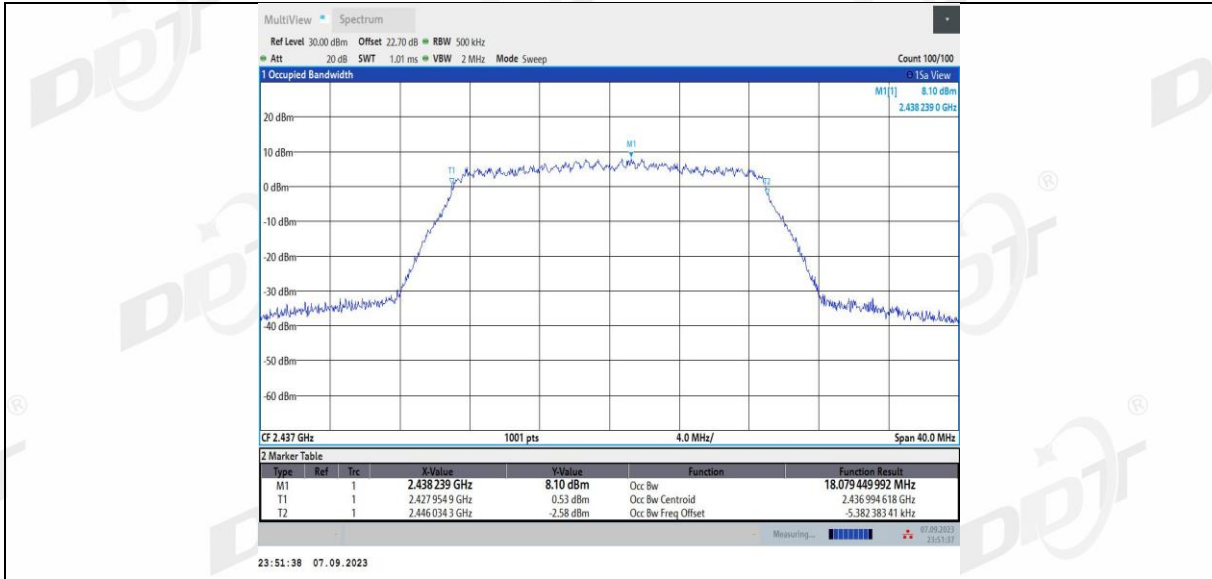


11N20MIMO Ant1 2437

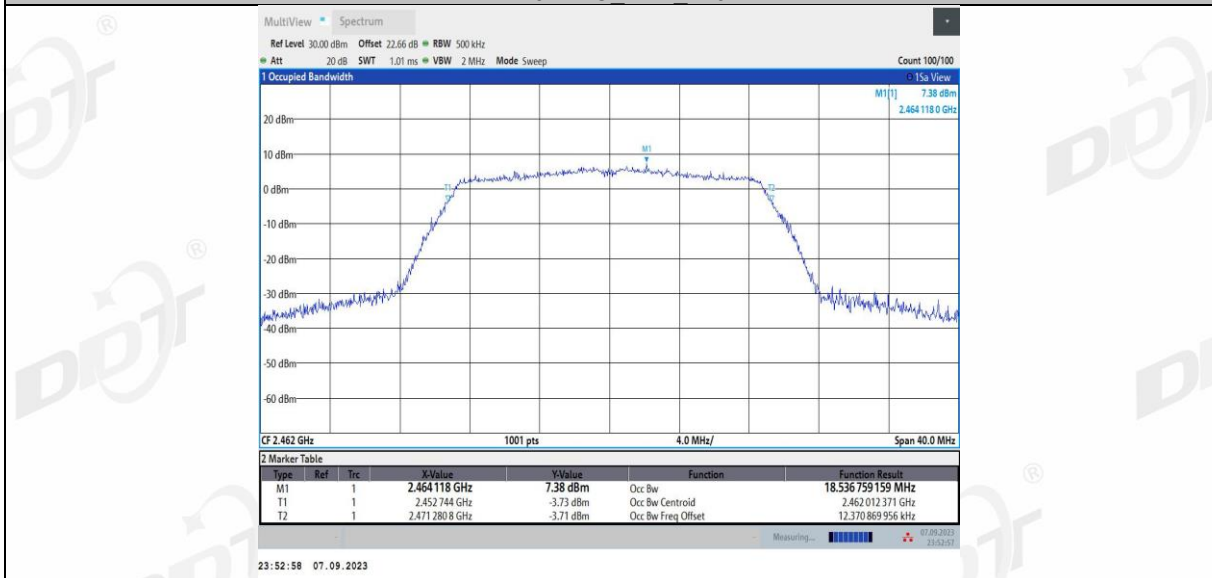


11N20MIMO Ant2 2437

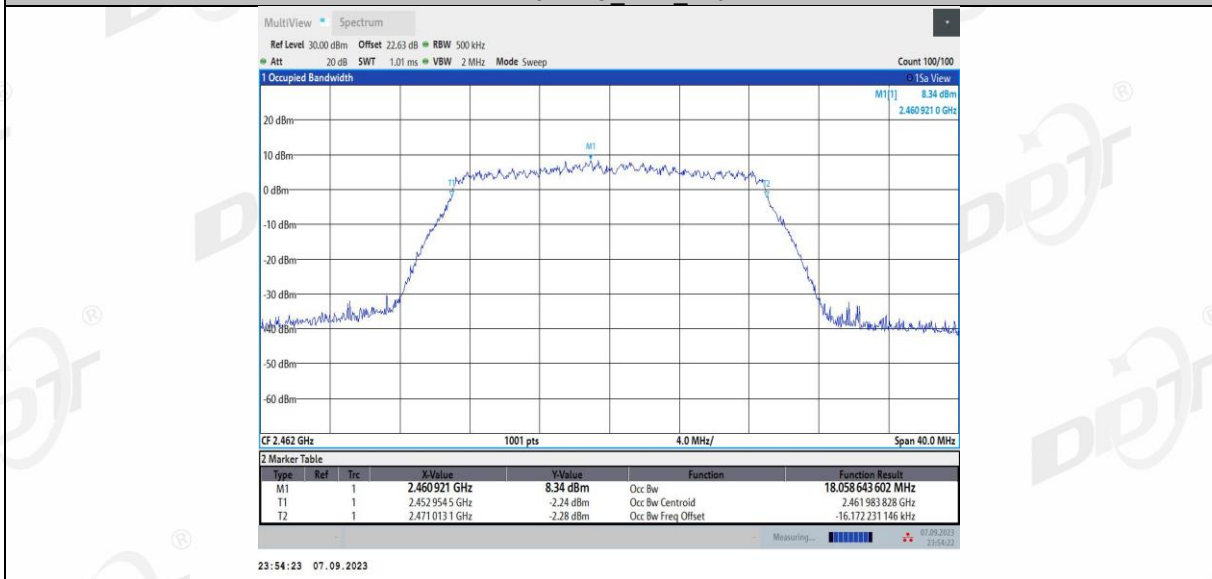




11N20MIMO Ant1 2462

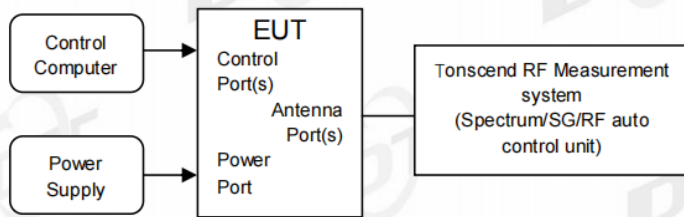


11N20MIMO Ant2 2462



## 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 Mode	Antenna	Frequency [MHz]	Average power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	18.35	99.65	0.02	18.37	≤30.00	PASS
	Ant2	2412	18.64	99.65	0.02	18.66	≤30.00	PASS
	Ant1	2437	18.41	99.53	0.02	18.43	≤30.00	PASS
	Ant2	2437	18.76	99.53	0.02	18.78	≤30.00	PASS
	Ant1	2462	18.32	99.65	0.02	18.34	≤30.00	PASS
	Ant2	2462	18.77	99.65	0.02	18.79	≤30.00	PASS
11G	Ant1	2412	12.98	99.04	0.04	13.02	≤30.00	PASS
	Ant2	2412	12.47	99.04	0.04	12.51	≤30.00	PASS
	Ant1	2437	12.87	99.04	0.04	12.91	≤30.00	PASS
	Ant2	2437	12.41	99.04	0.04	12.45	≤30.00	PASS
	Ant1	2462	12.54	99.04	0.04	12.58	≤30.00	PASS
	Ant2	2462	12.41	99.04	0.04	12.45	≤30.00	PASS
11N20MIMO	Ant1	2412	12.59	98.97	0.04	12.63	≤30.00	PASS
	Ant2	2412	12.37	98.97	0.04	12.41	≤30.00	PASS
	total	2412	---	---	---	15.53	≤30.00	PASS
	Ant1	2437	12.75	98.97	0.04	12.79	≤30.00	PASS
	Ant2	2437	12.53	98.97	0.04	12.57	≤30.00	PASS
	total	2437	---	---	---	15.69	≤30.00	PASS
	Ant1	2462	12.55	98.97	0.04	12.59	≤30.00	PASS
	Ant2	2462	12.62	98.97	0.04	12.66	≤30.00	PASS
total	2462	---	---	---	15.64	≤30.00	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:
 

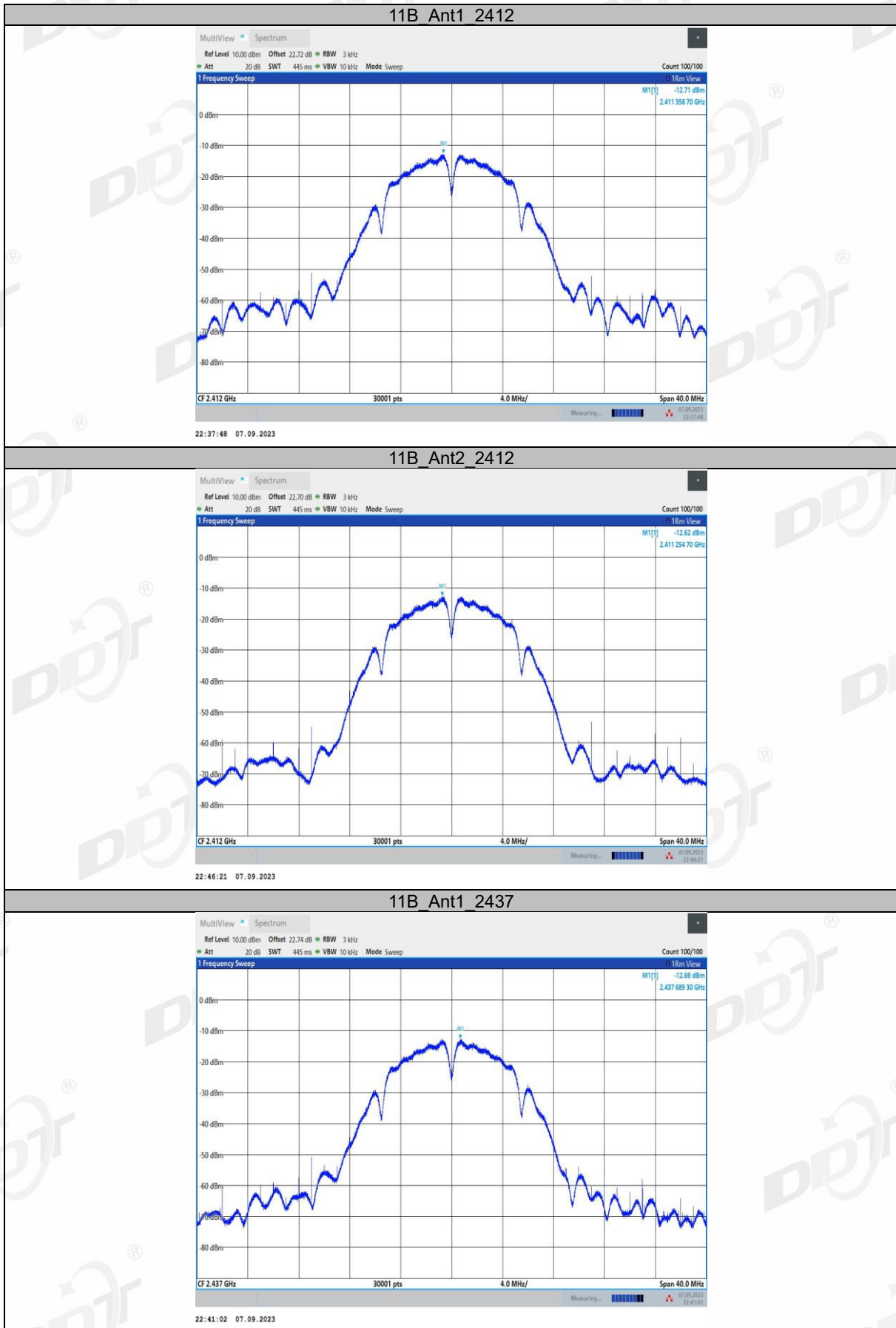
Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	RMS
Sweep time:	auto
Trace mode	max hold
	Employ trace averaging (rms)
Trace	mode over a minimum of 100 traces.
  - (5) Add  $[10 \log (1 / D)]$ , 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.

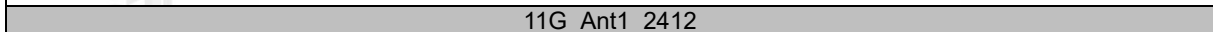
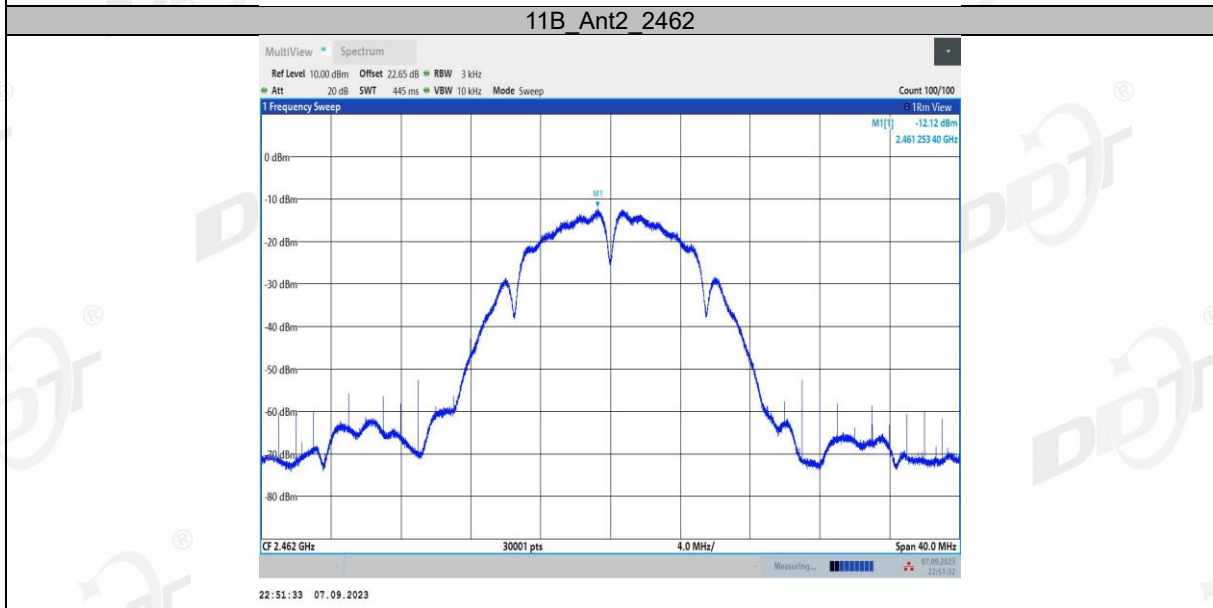
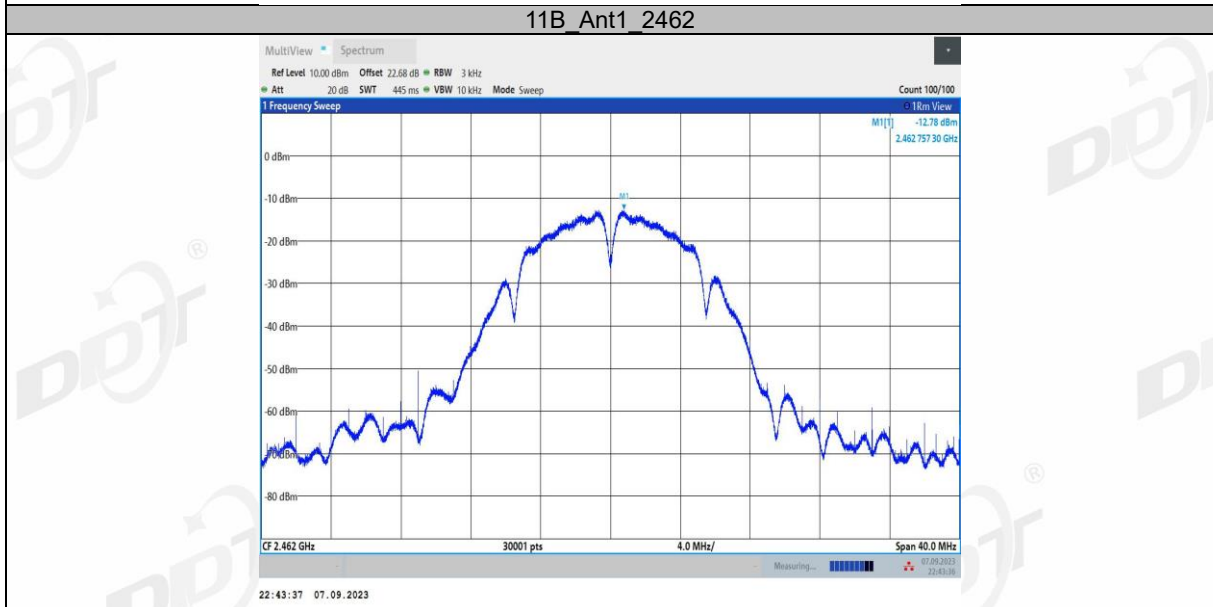
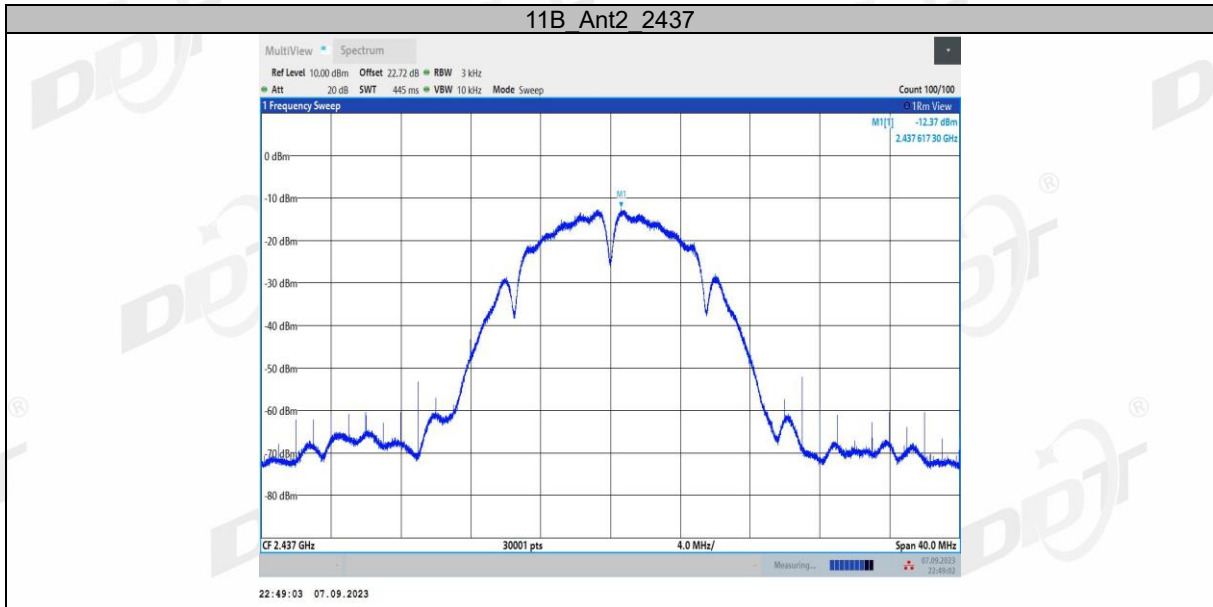
#### 7.4. Test result

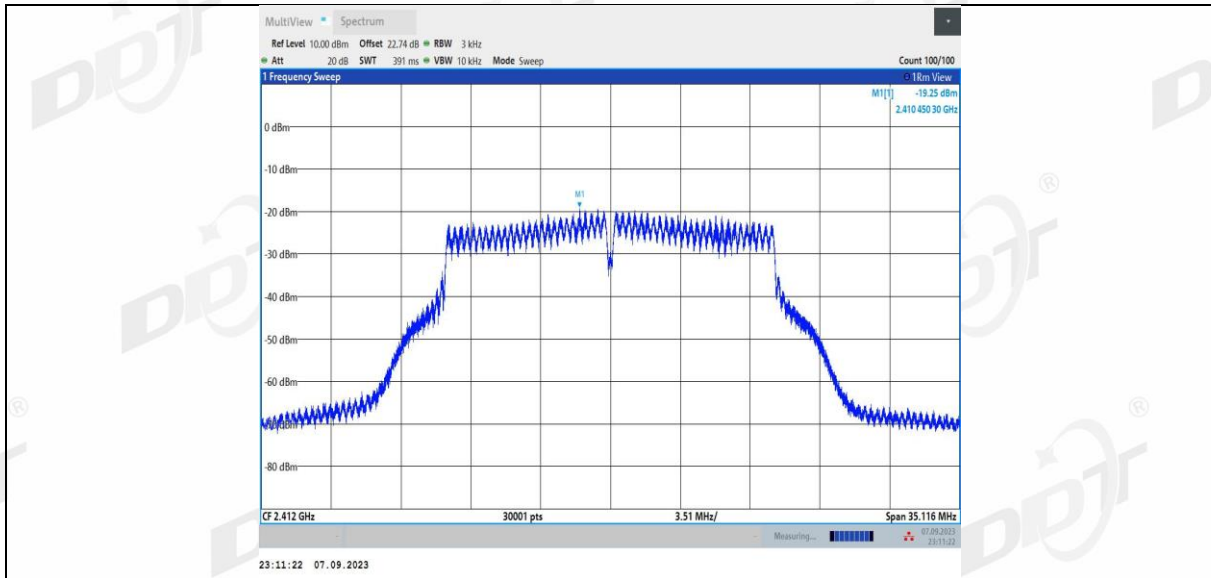
Test Mode	Antenna	Frequency [MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-12.71	≤8.00	PASS
	Ant2	2412	-12.62	≤8.00	PASS
	Ant1	2437	-12.69	≤8.00	PASS
	Ant2	2437	-12.37	≤8.00	PASS
	Ant1	2462	-12.78	≤8.00	PASS
	Ant2	2462	-12.12	≤8.00	PASS
11G	Ant1	2412	-19.25	≤8.00	PASS
	Ant2	2412	-19.83	≤8.00	PASS
	Ant1	2437	-19.19	≤8.00	PASS
	Ant2	2437	-20.15	≤8.00	PASS
	Ant1	2462	-19.12	≤8.00	PASS
	Ant2	2462	-19.83	≤8.00	PASS
11N20MIMO	Ant1	2412	-21.11	≤8.00	PASS
	Ant2	2412	-21.56	≤8.00	PASS
	total	2412	-18.32	≤8.00	PASS
	Ant1	2437	-20.77	≤8.00	PASS
	Ant2	2437	-21.09	≤8.00	PASS
	total	2437	-17.92	≤8.00	PASS
	Ant1	2462	-21.15	≤8.00	PASS
	Ant2	2462	-21.27	≤8.00	PASS
	total	2462	-18.20	≤8.00	PASS

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

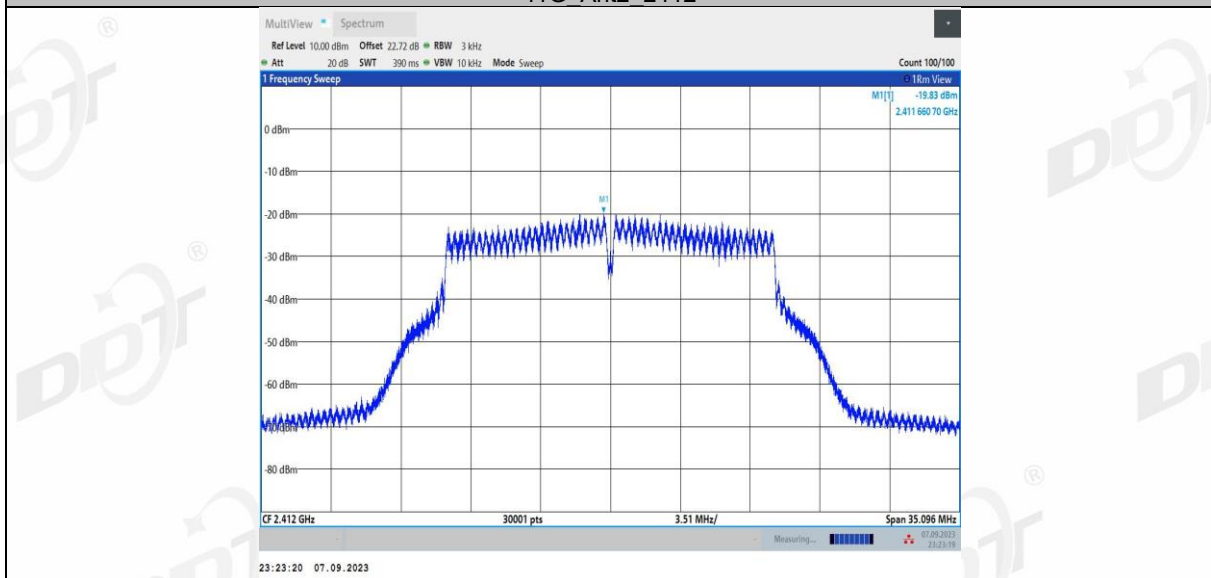
### 7.5. Test graphs



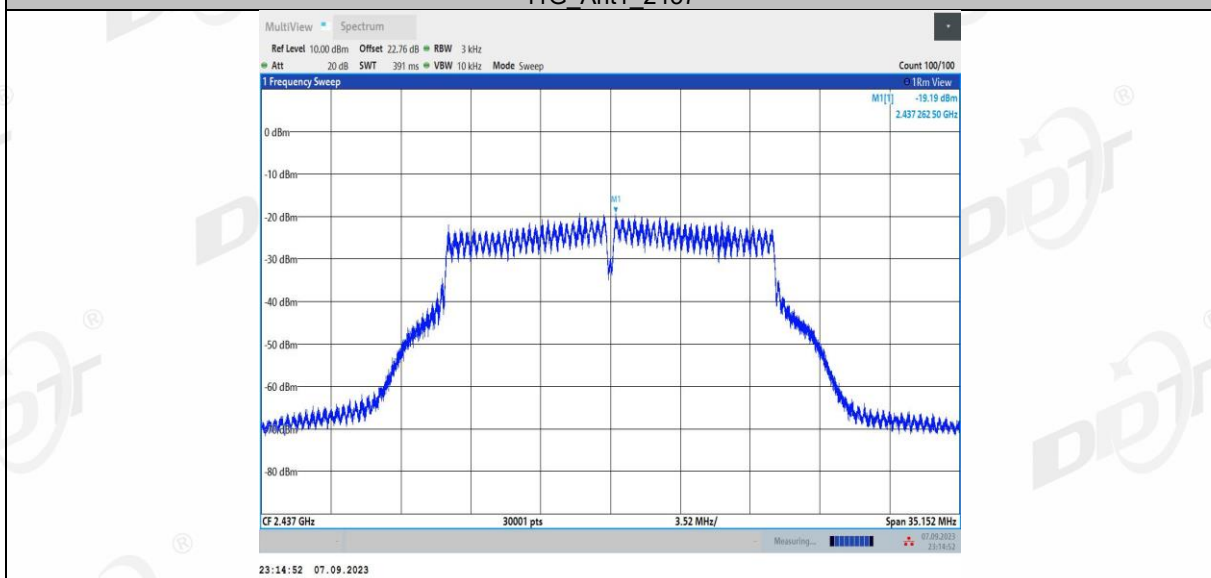




11G Ant2 2412

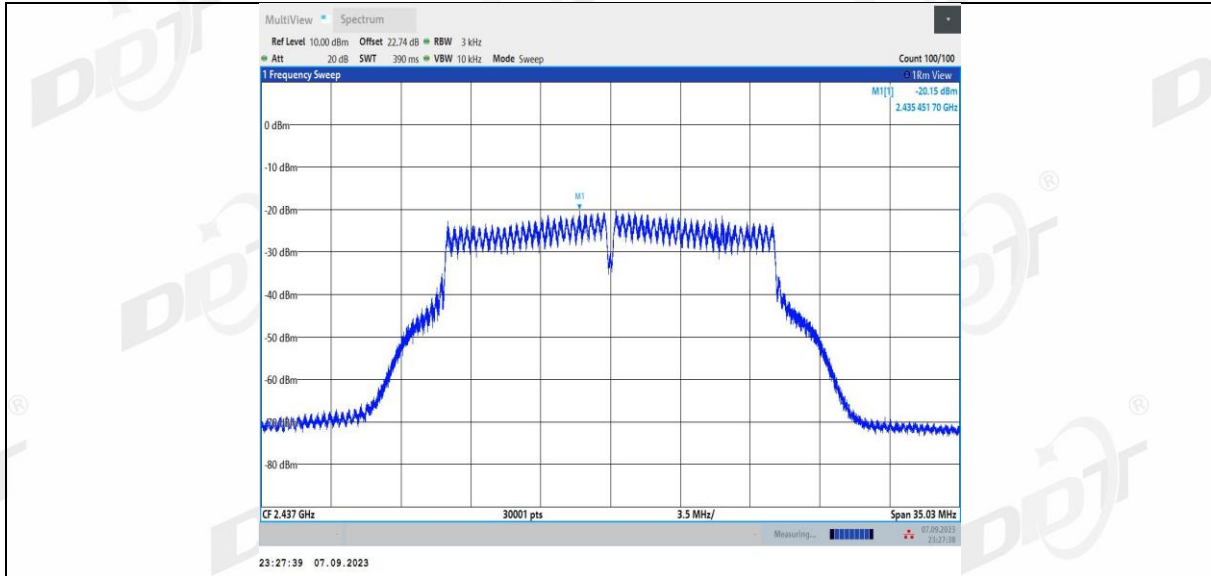


11G Ant1 2437

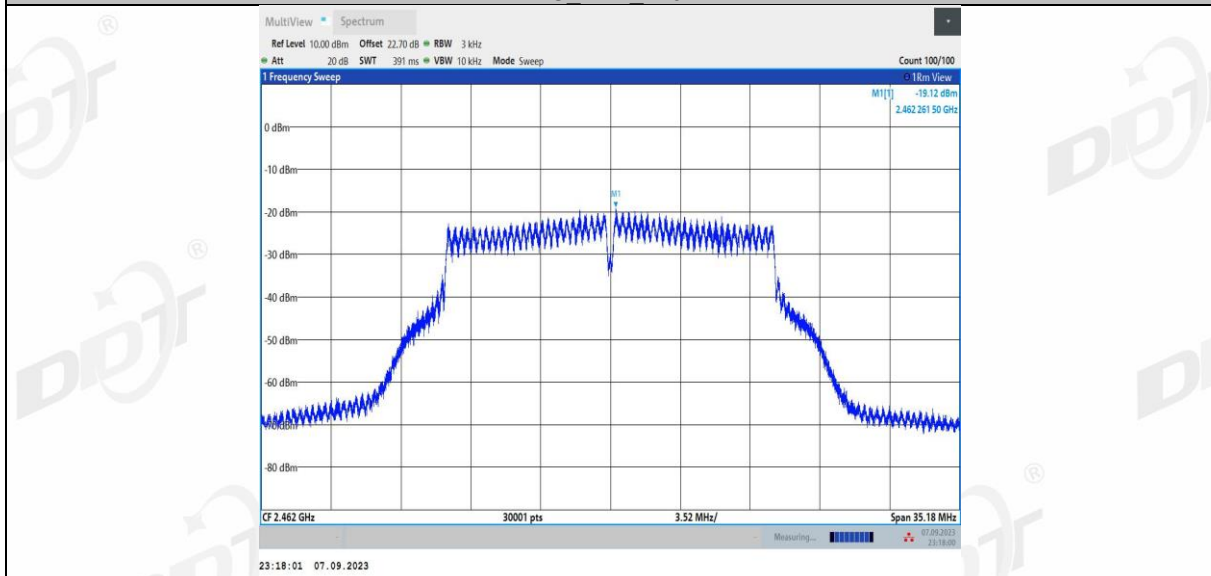


11G Ant2 2437

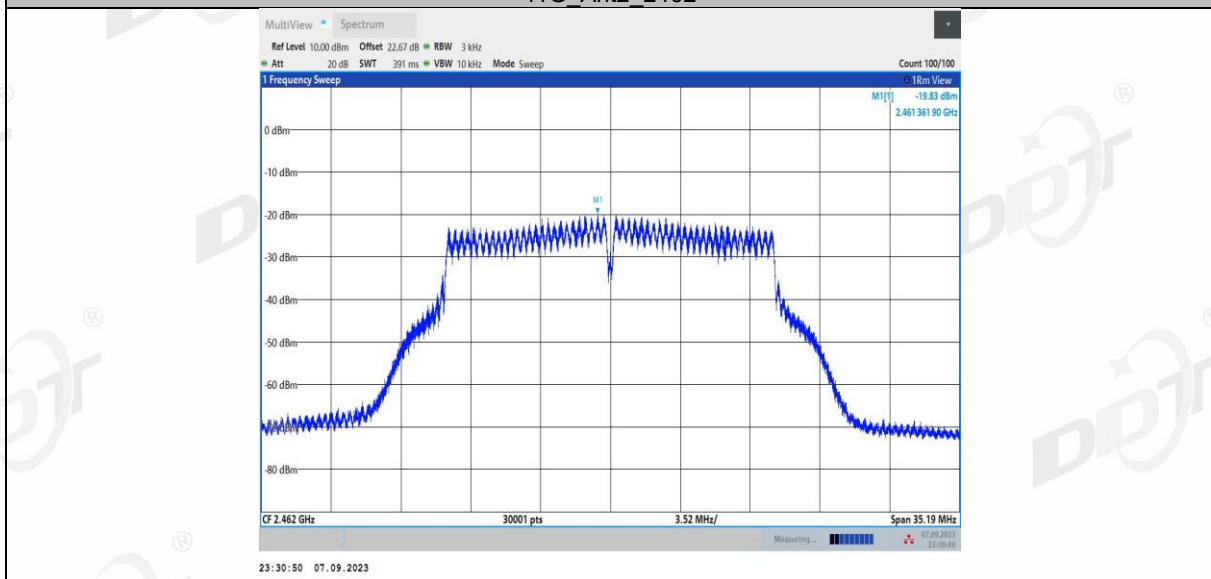




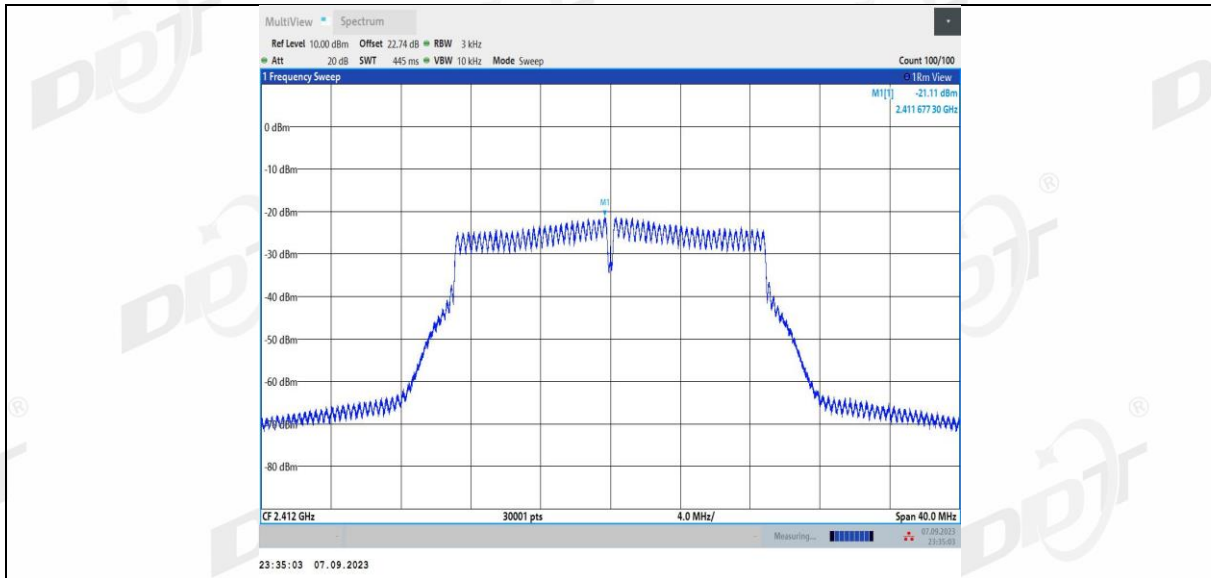
11G Ant1 2462



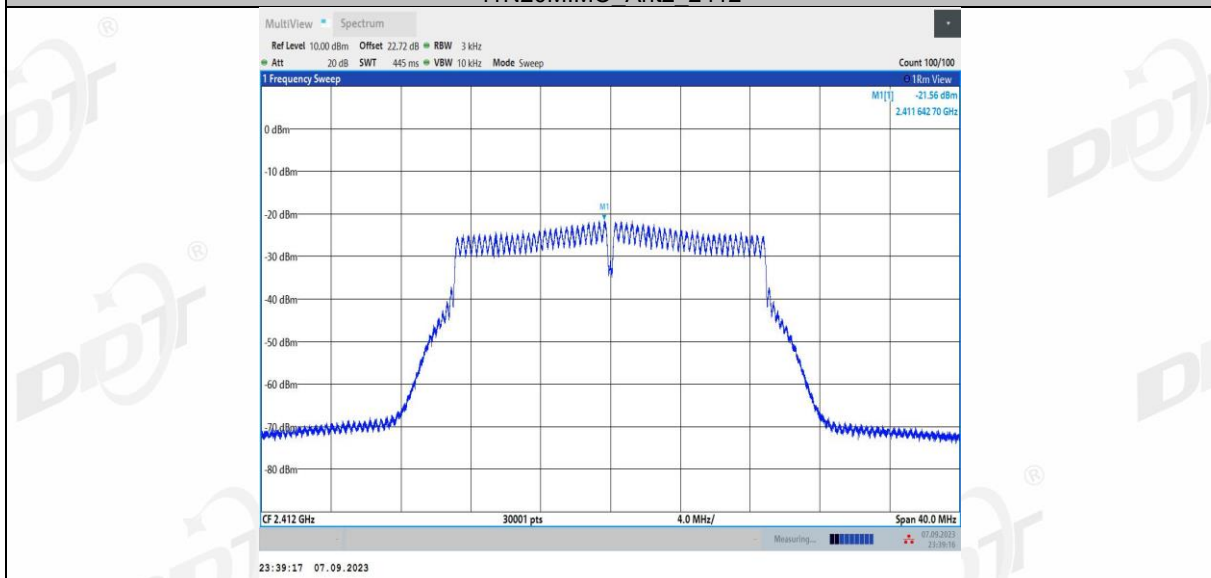
11G Ant2 2462



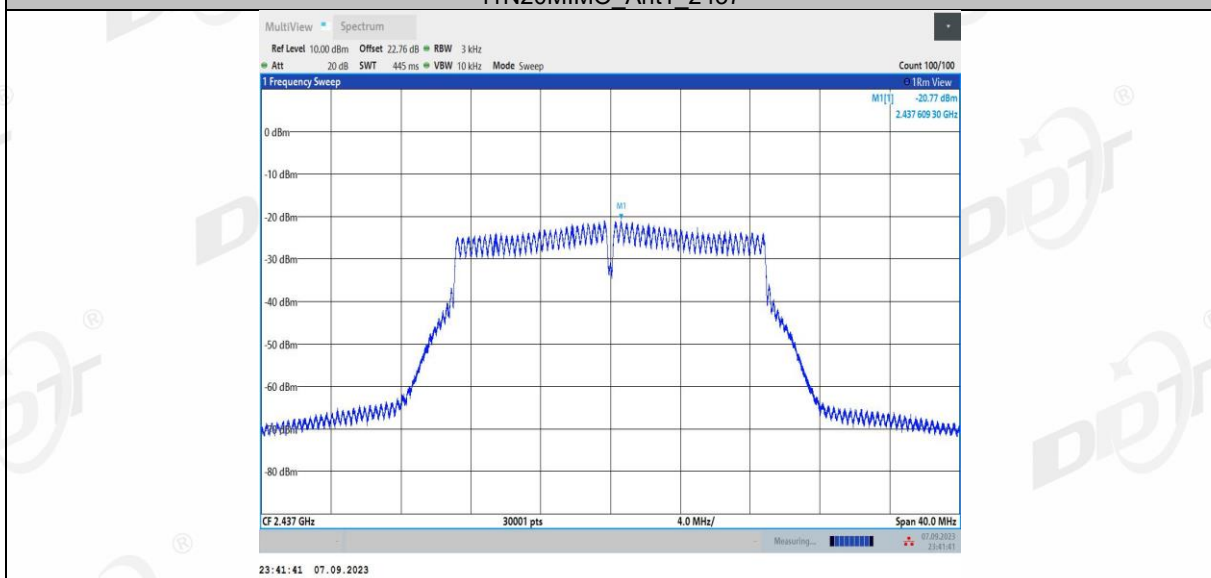
11N20MIMO Ant1 2412



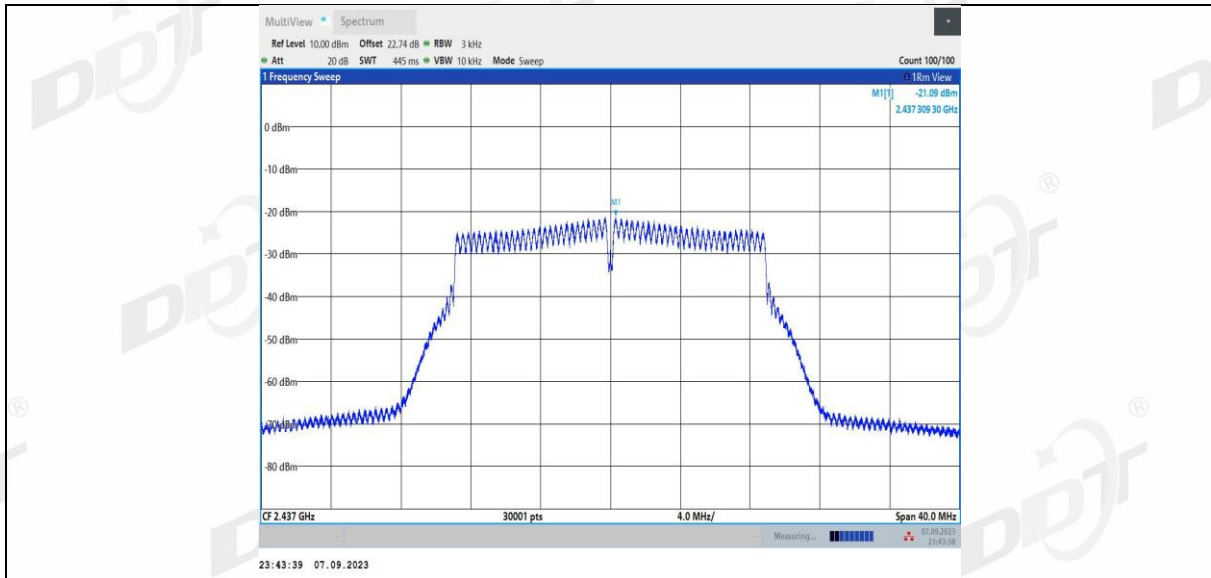
11N20MIMO Ant2 2412



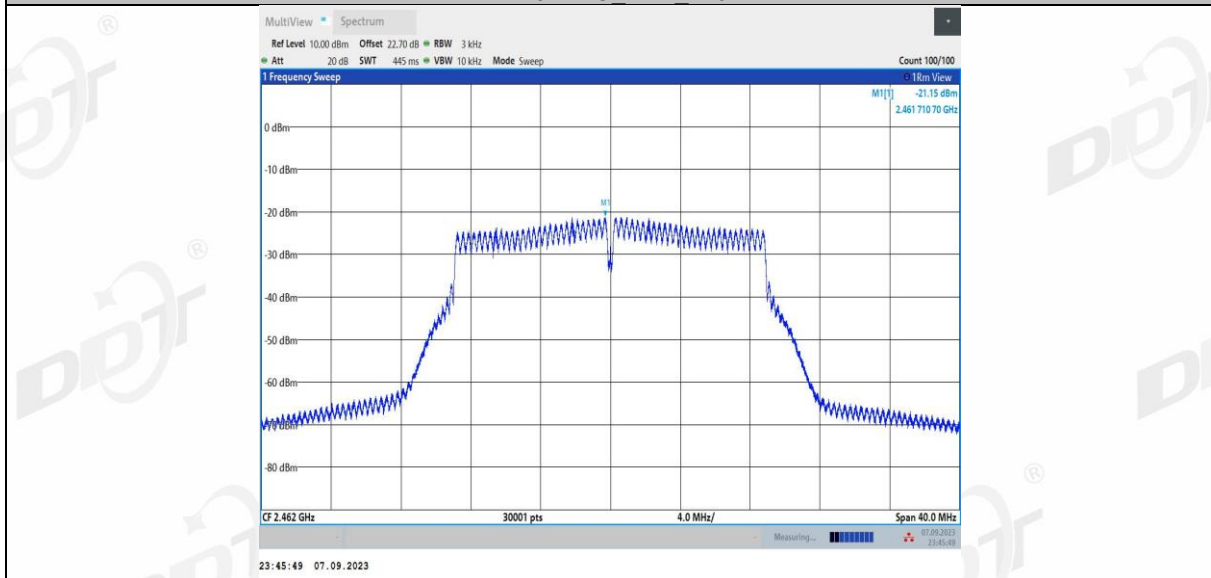
11N20MIMO Ant1 2437



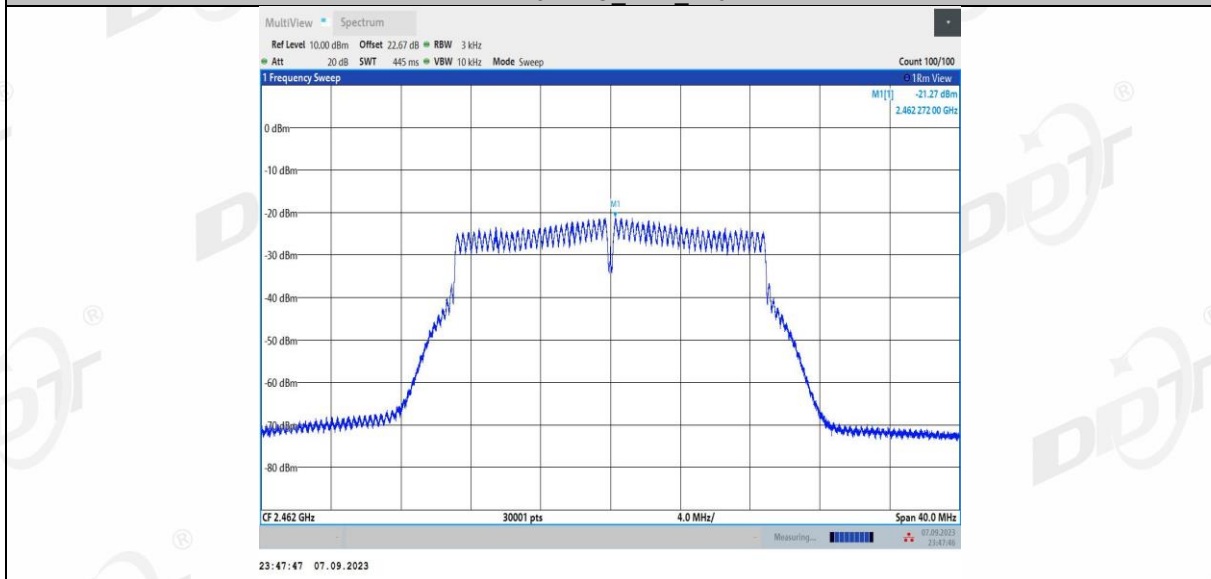
11N20MIMO Ant2 2437



11N20MIMO Ant1 2462

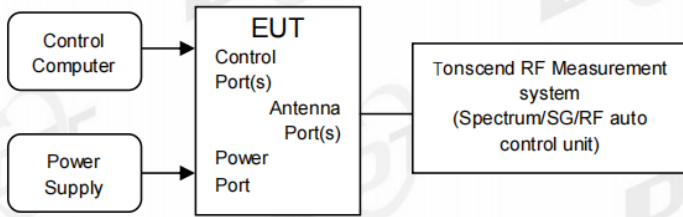


11N20MIMO Ant2 2462



## 8. Band Edge Compliance (Conducted Method)

### 8.1. Block diagram of test setup



### 8.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

### 8.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

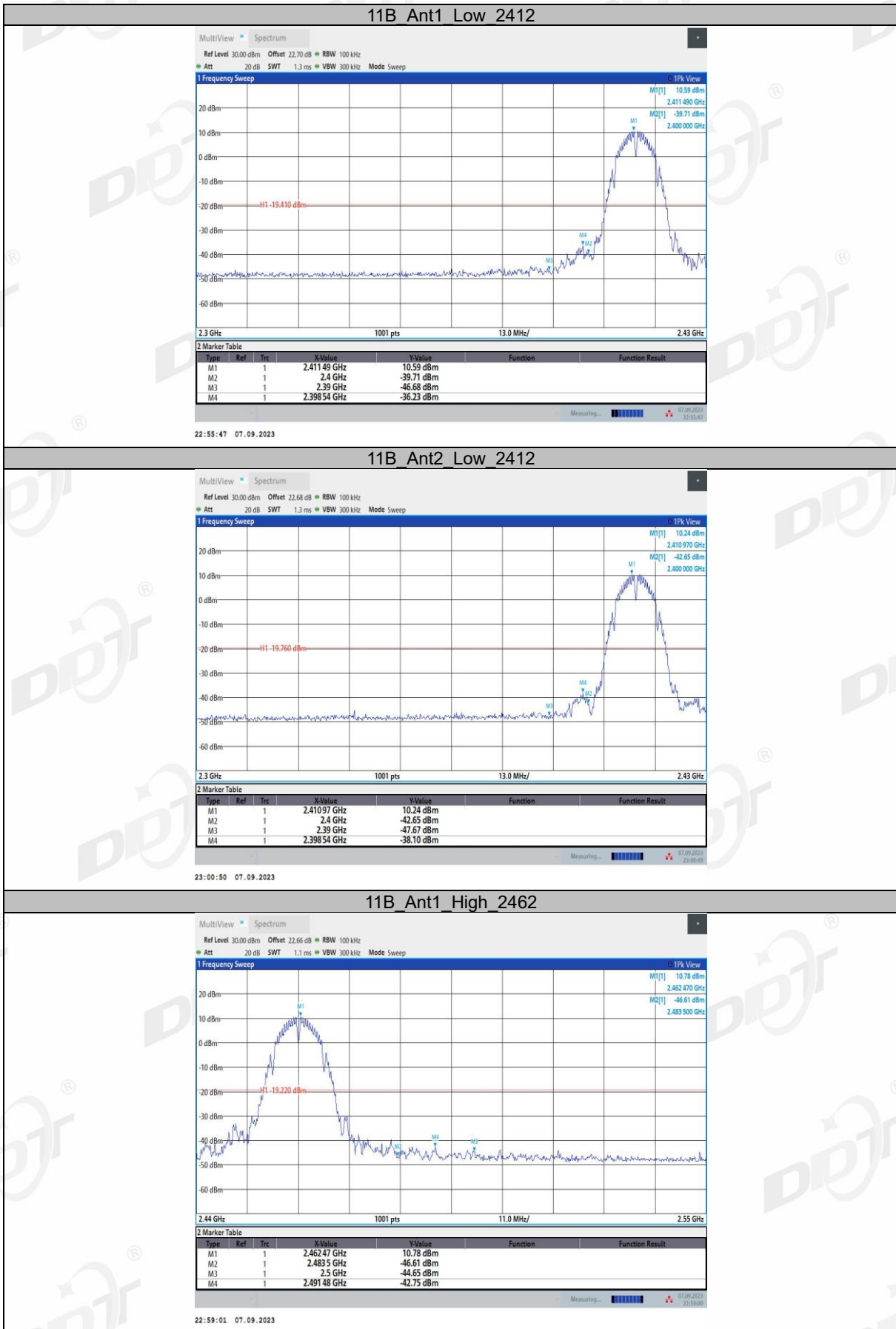
- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

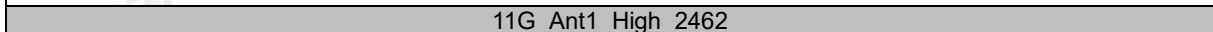
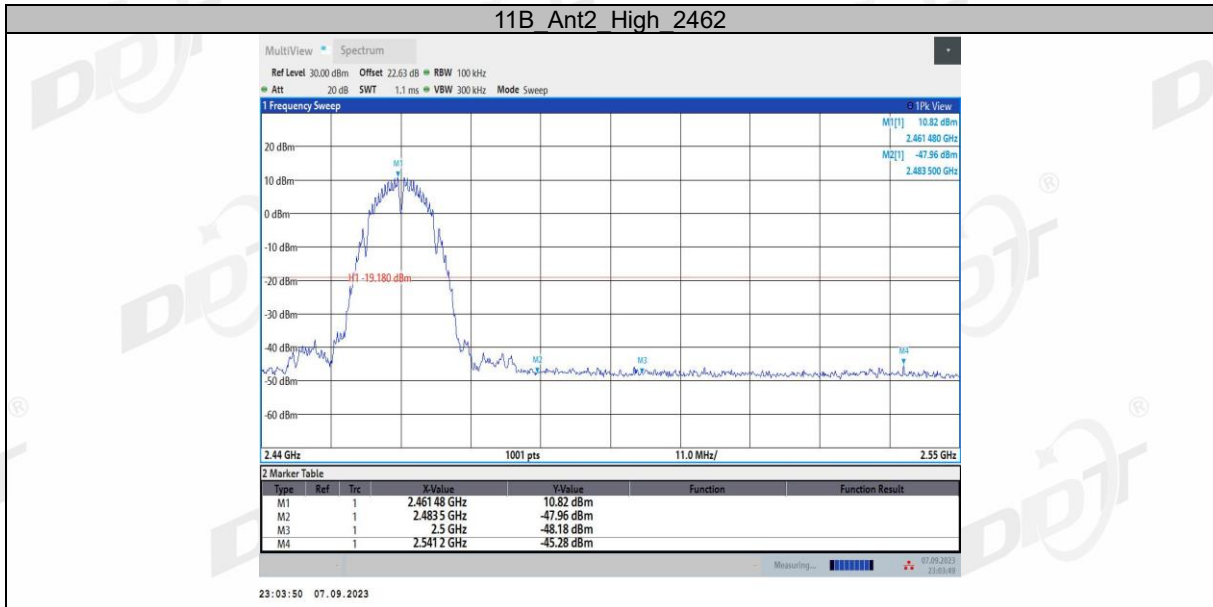
Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

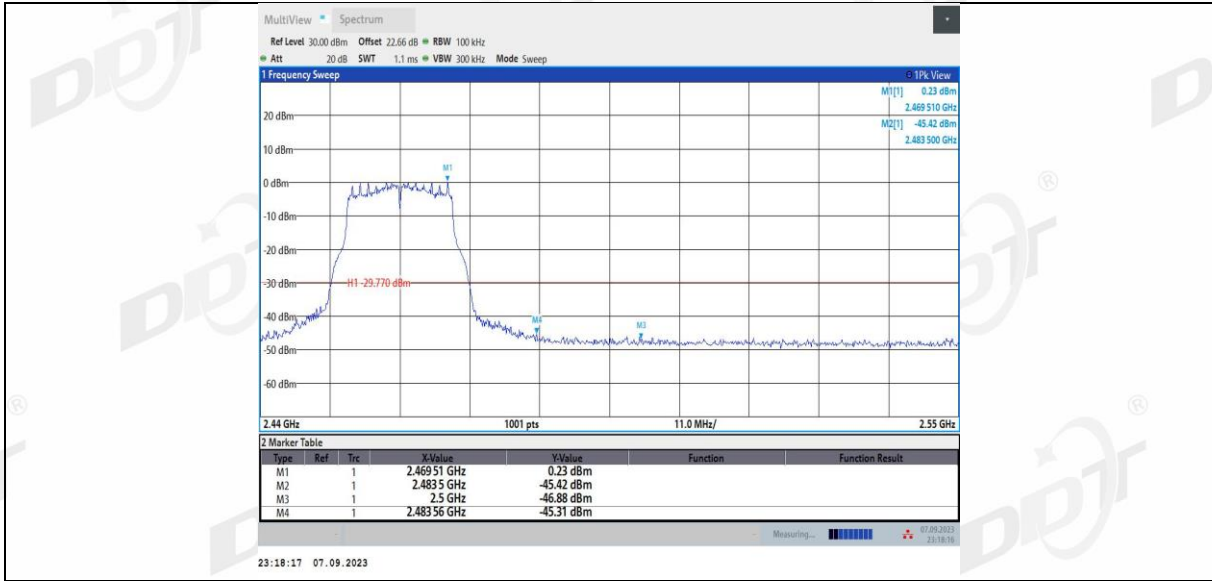
### 8.4. Test result

EUT Set Mode	CH or Frequency	Result (dBm)	EUT Set Mode	CH or Frequency	Result (dBm)
11b	CH1	Pass	11g	CH1	Pass
	CH11	Pass		CH11	Pass
11n HT 20	CH1	Pass	/	/	/
	CH11	Pass		/	/

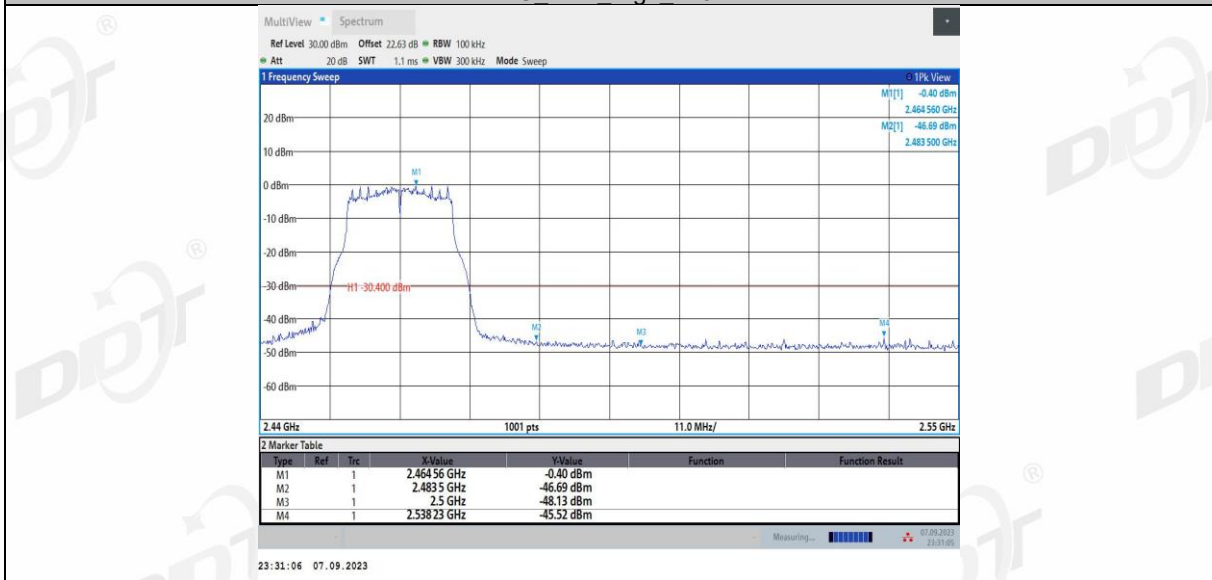
8.5. Test graphs







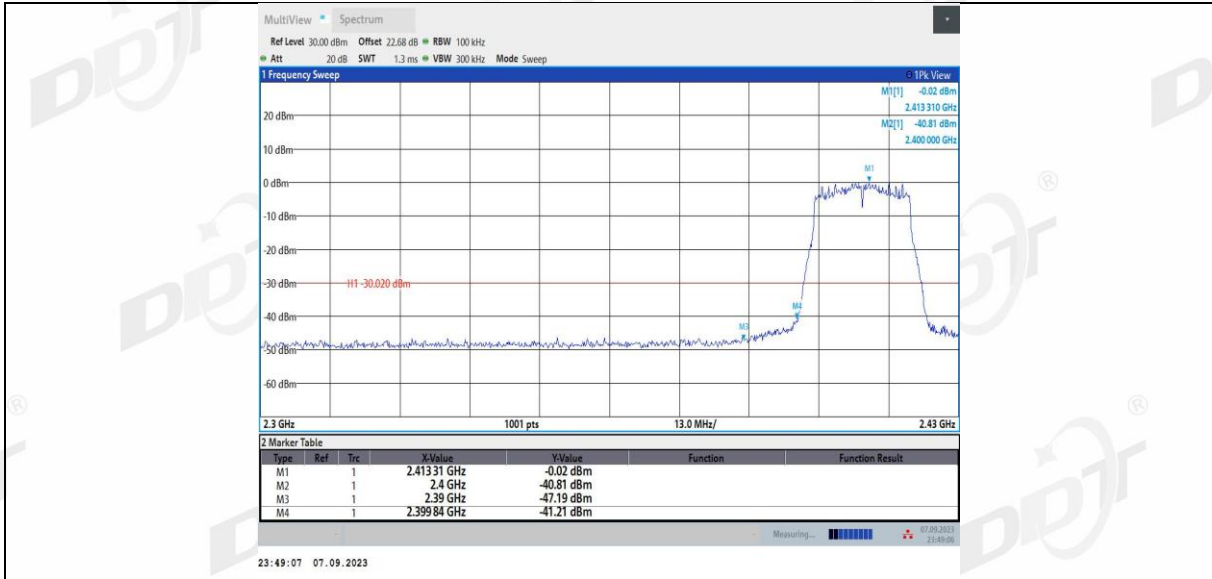
11G Ant2 High 2462



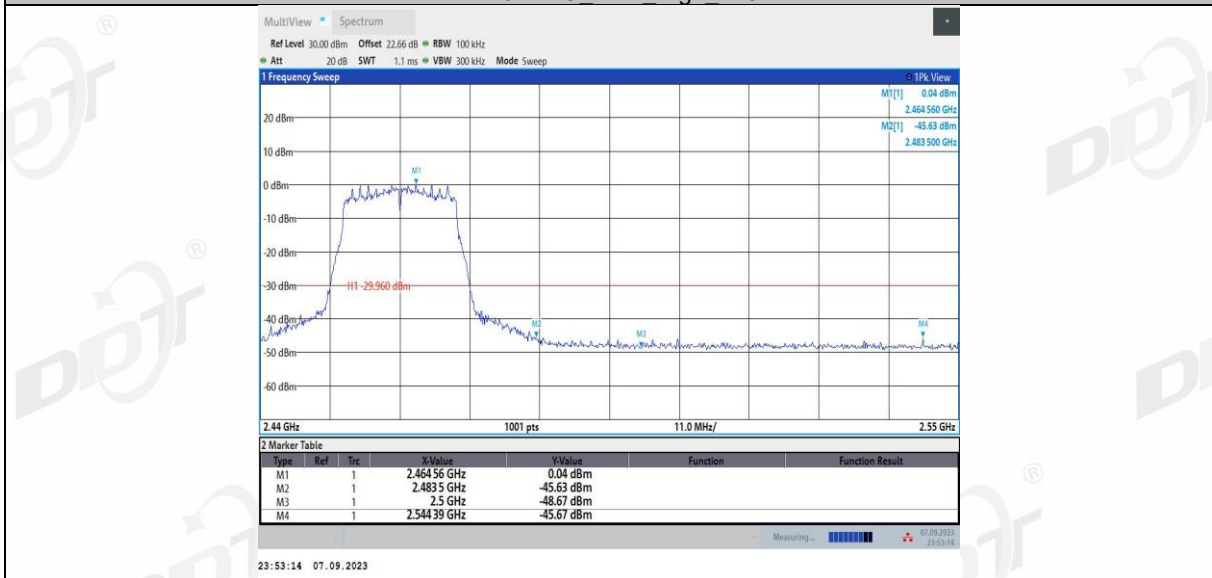
11N20MIMO Ant1\_Low\_2412



11N20MIMO Ant2\_Low\_2412



11N20MIMO Ant1 High 2462



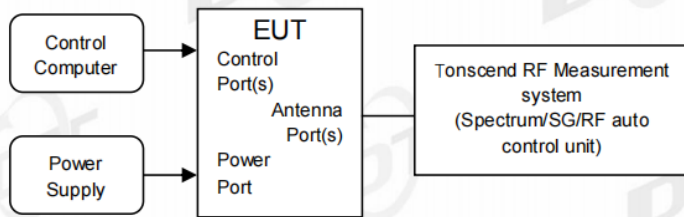
11N20MIMO Ant2 High 2462





## 9. RF Conducted Spurious Emissions

### 9.1. Block diagram of test setup



### 9.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

### 9.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

Center frequency	Test frequency
RBW:	100 kHz
VBW:	300 kHz
Span	Wide enough to capture the peak level of the in-band emission
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
- (4) Set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{Span}/\text{RBW}$
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

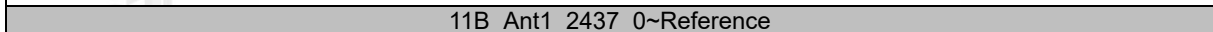
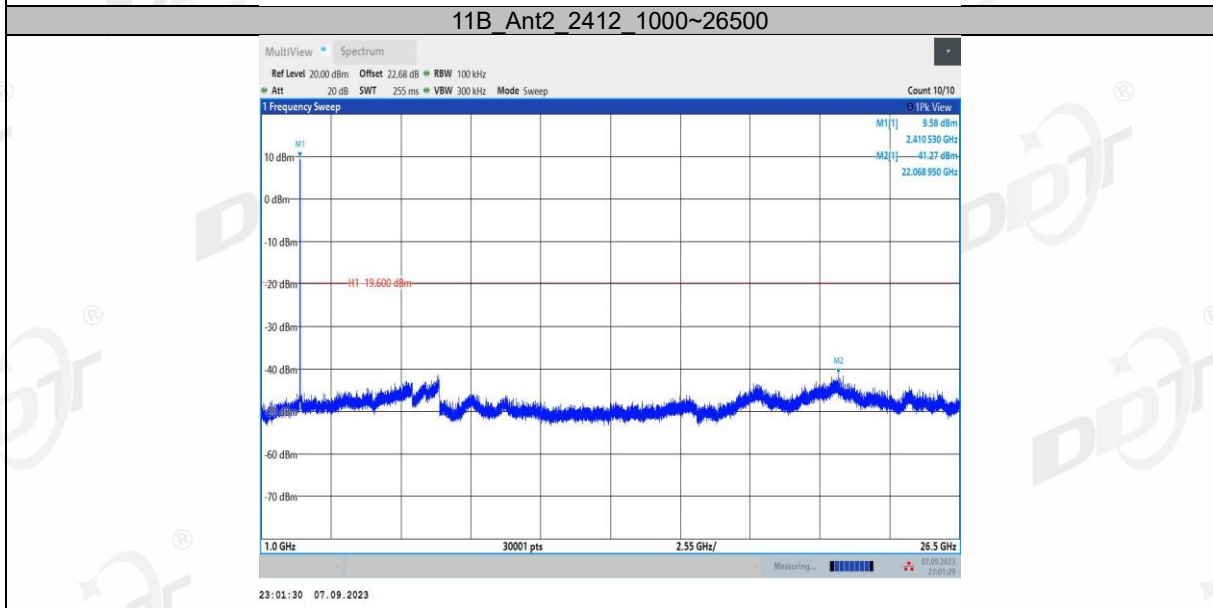
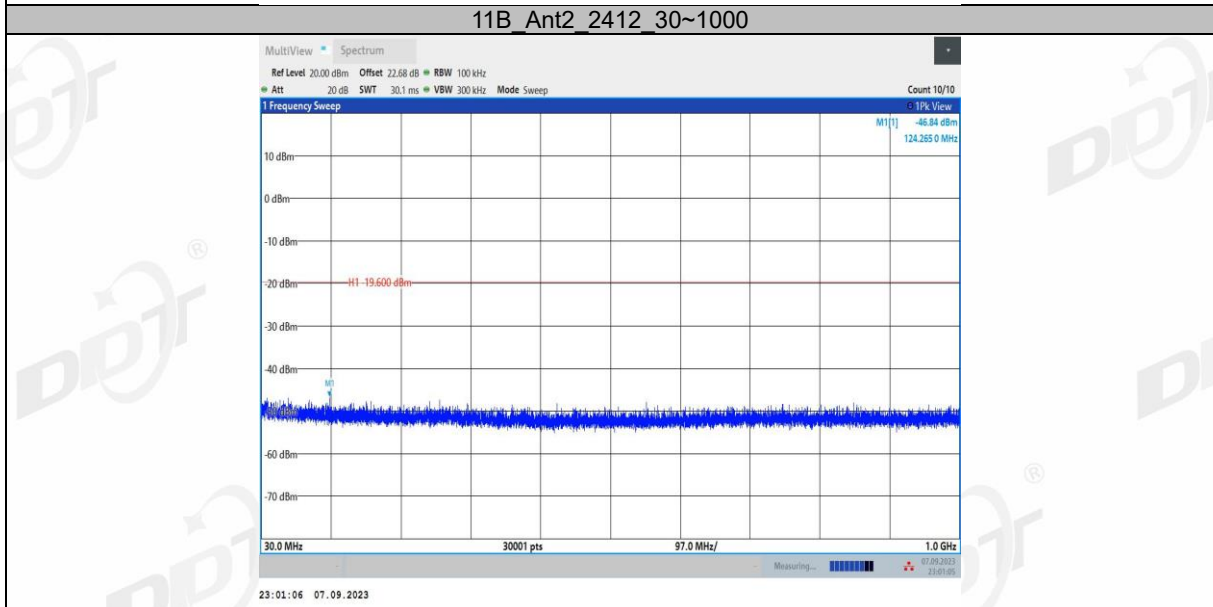
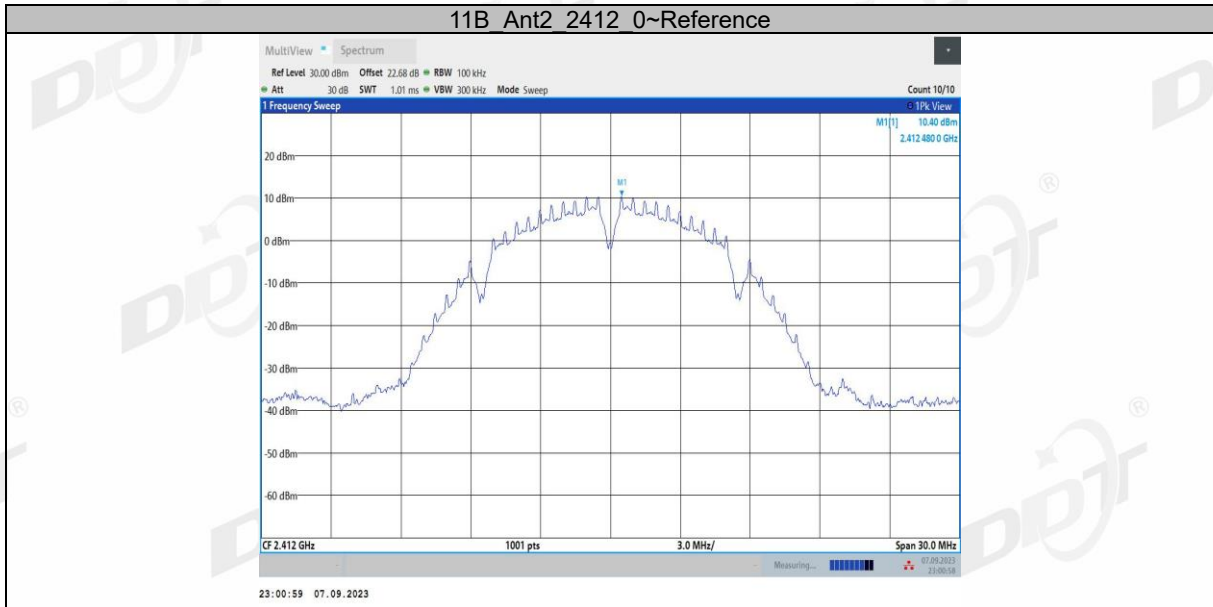
- (5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

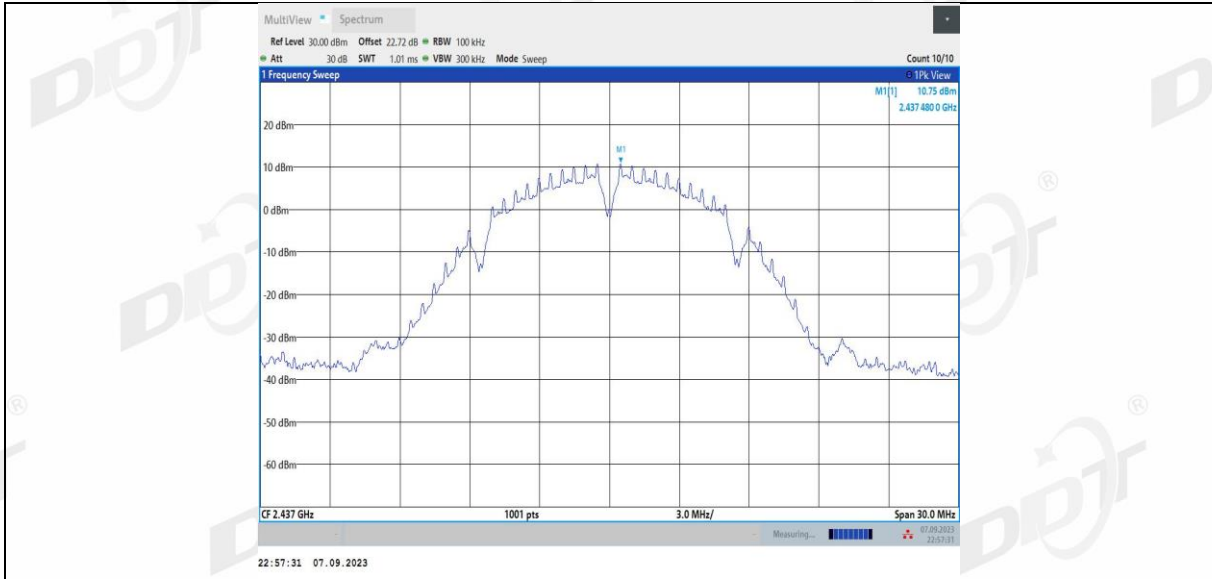
#### 9.4. Test result

EUT Set Mode	CH or Frequency	Result (dBm)	EUT Set Mode	CH or Frequency	Result (dBm)
11b	CH1	Pass	11g	CH1	Pass
	CH6	Pass		CH6	Pass
	CH11	Pass		CH11	Pass
11n HT 20	CH1	Pass	/	/	/
	CH6	Pass	/	/	/
	CH11	Pass	/	/	/

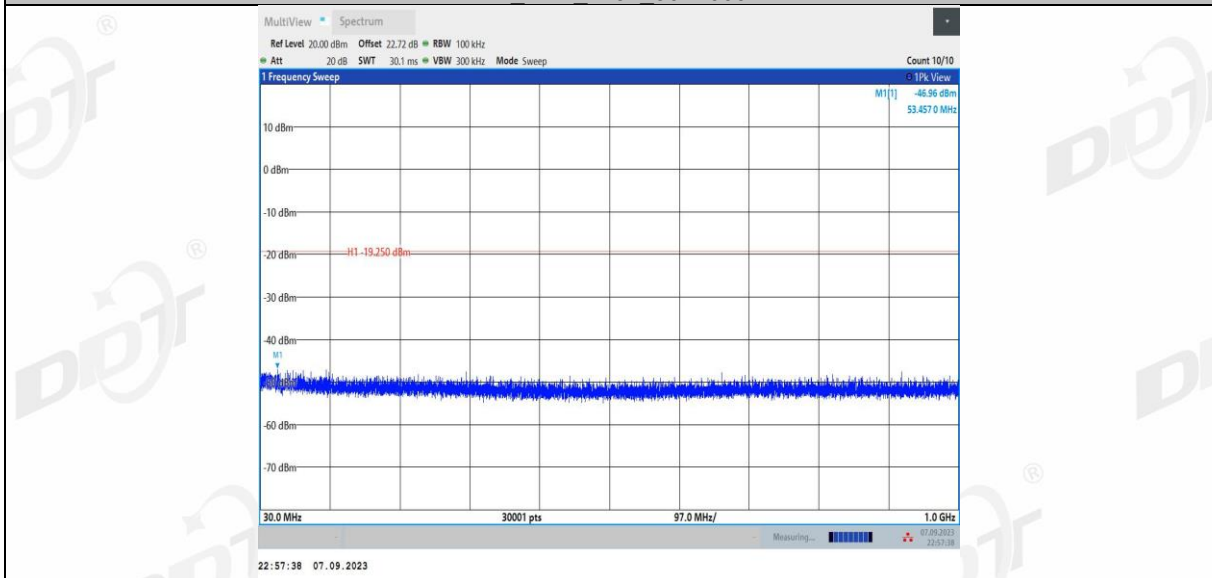
### 9.5. Test graphs



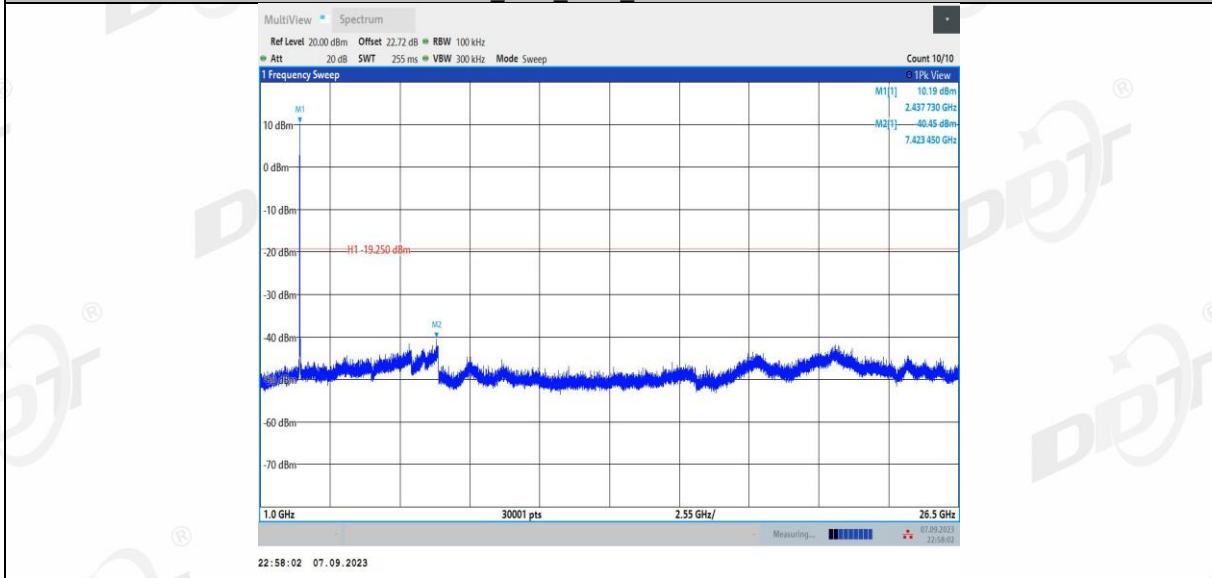




11B Ant1 2437 30~1000



11B Ant1 2437 1000~26500



11B Ant2 2437 0~Reference