



FCC RF Test Report

APPLICANT : vivo Mobile Communication Co., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : vivo
MODEL NAME : V2202
FCC ID : 2AUCY-V2202
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Jul. 01, 2022 ~ Jul. 16, 2022

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

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People's Republic of China



TABLE OF CONTENTS

REVISION HISTORY..... 3

SUMMARY OF TEST RESULT 4

1 GENERAL DESCRIPTION 5

 1.1 Applicant 5

 1.2 Manufacturer 5

 1.3 Product Feature of Equipment Under Test..... 5

 1.4 Product Specification of Equipment Under Test..... 5

 1.5 Modification of EUT 6

 1.6 Testing Location 6

 1.7 Test Software..... 6

 1.8 Applicable Standards..... 7

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST 8

 2.1 Carrier Frequency and Channel 8

 2.2 Test Mode..... 8

 2.3 Connection Diagram of Test System..... 9

 2.4 Support Unit used in test configuration and system 9

 2.5 EUT Operation Test Setup 10

 2.6 Measurement Results Explanation Example..... 10

3 TEST RESULT..... 11

 3.1 6dB Bandwidth Measurement 11

 3.2 Output Power Measurement..... 12

 3.3 Power Spectral Density Measurement 13

 3.4 Conducted Band Edges and Spurious Emission Measurement 15

 3.5 Radiated Band Edges and Spurious Emission Measurement 16

 3.6 AC Conducted Emission Measurement..... 20

 3.7 Antenna Requirements 22

4 LIST OF MEASURING EQUIPMENT 23

5 UNCERTAINTY OF EVALUATION 24

APPENDIX A. CONDUCTED TEST RESULTS

APPENDIX B. AC CONDUCTED EMISSION TEST RESULT

APPENDIX C. RADIATED SPURIOUS EMISSION

APPENDIX D. DUTY CYCLE PLOTS

APPENDIX E. SETUP PHOTOGRAPHS



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report Only	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 30dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.34 dB at 2483.620 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 10.93 dB at 1.590 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

vivo Mobile Communication Co., Ltd.
No.1, vivo Road, Chang'an, Dongguan,Guangdong,China

1.2 Manufacturer

vivo Mobile Communication Co., Ltd.
No.1, vivo Road, Chang'an, Dongguan,Guangdong,China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	vivo
Model Name	V2202
FCC ID	2AUCY-V2202
IMEI Code	Conducted: 866295060098836 / 866295060098828 Conduction: 866295060094033 / 866295060094025 Radiation: 866295060093993 / 866295060093985
HW Version	MP_0.1
SW Version	PD2215CF_EX_A_12.0.3.8.W30.V000L1
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (AV) Output Power to antenna	802.11b : 18.88 dBm (0.0773 W) 802.11g : 17.27 dBm (0.0533 W) 802.11n HT20 : 16.29 dBm (0.0426 W) 802.11ax HE20 : 16.37 dBm (0.0434 W)
Antenna Type / Gain	PIFA Antenna type with gain -3.00 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ax: OFDMA (BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)

Note: The device support partial RU for 802.11ax mode.



1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (Shenzhen)		
Test Location Site	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b



1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart C §15.247
- ♦ FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

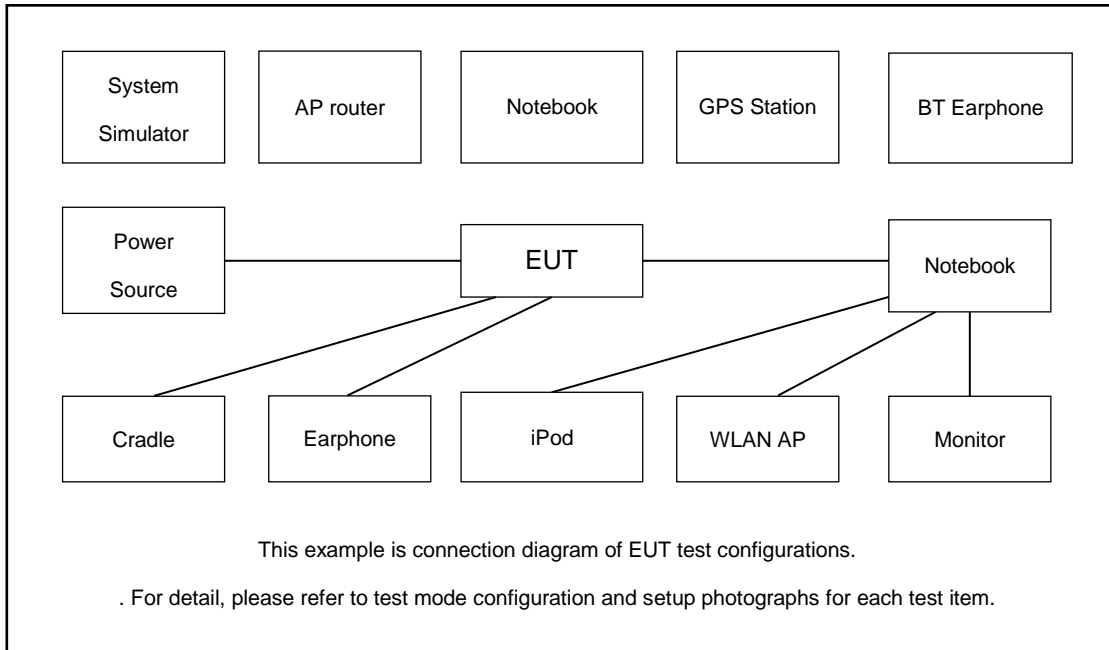
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11ax HE20	MCS0

Co-location
802.11ax20 CH06 + Bluetooth Link + LTE Band 13

Test Cases	
AC Conducted Emission	Mode 1 : GSM 850 Idle + WLAN (2.4GHz) Link + USB Cable (Charging from Adapter) + Battery

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station(LTE)	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8m
3.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
4.	Bluetooth Earphone	Nokia	BH-108	2010DP1340	N/A	N/A
5.	NFC Card	N/A	N/A	N/A	N/A	N/A



2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 1.5 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 1.5 + 10 = 11.5 \text{ (dB)} \end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Occupied Bandwidth

Please refer to Appendix A.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

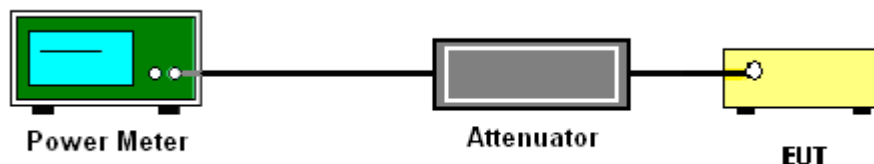
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Average Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

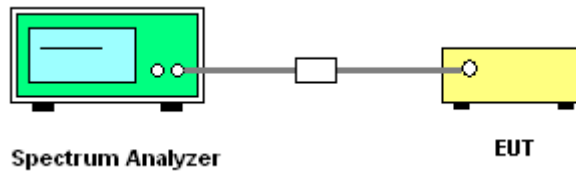
If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

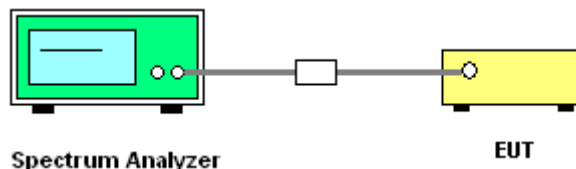
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.13
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Please refer to Appendix A.



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

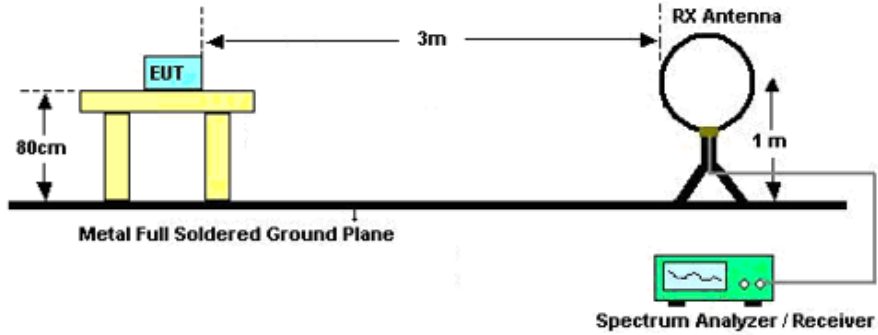


3.5.3 Test Procedures

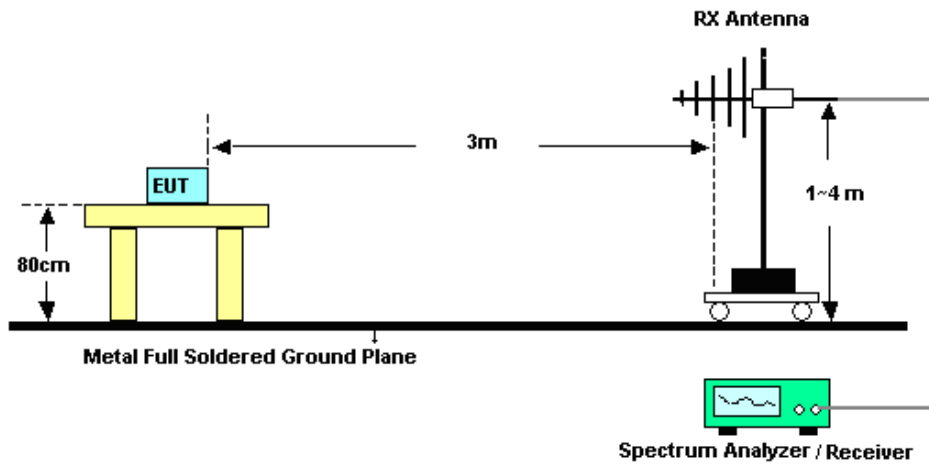
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

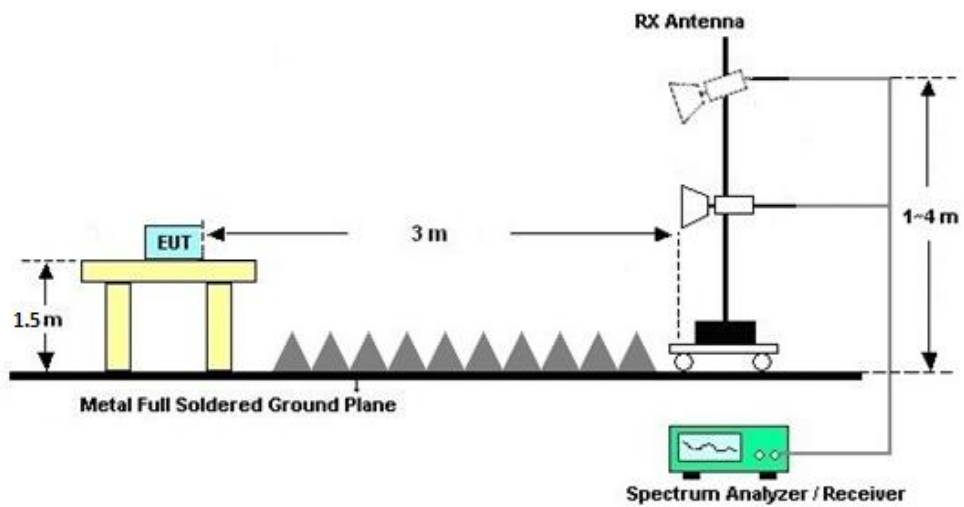
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.



3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

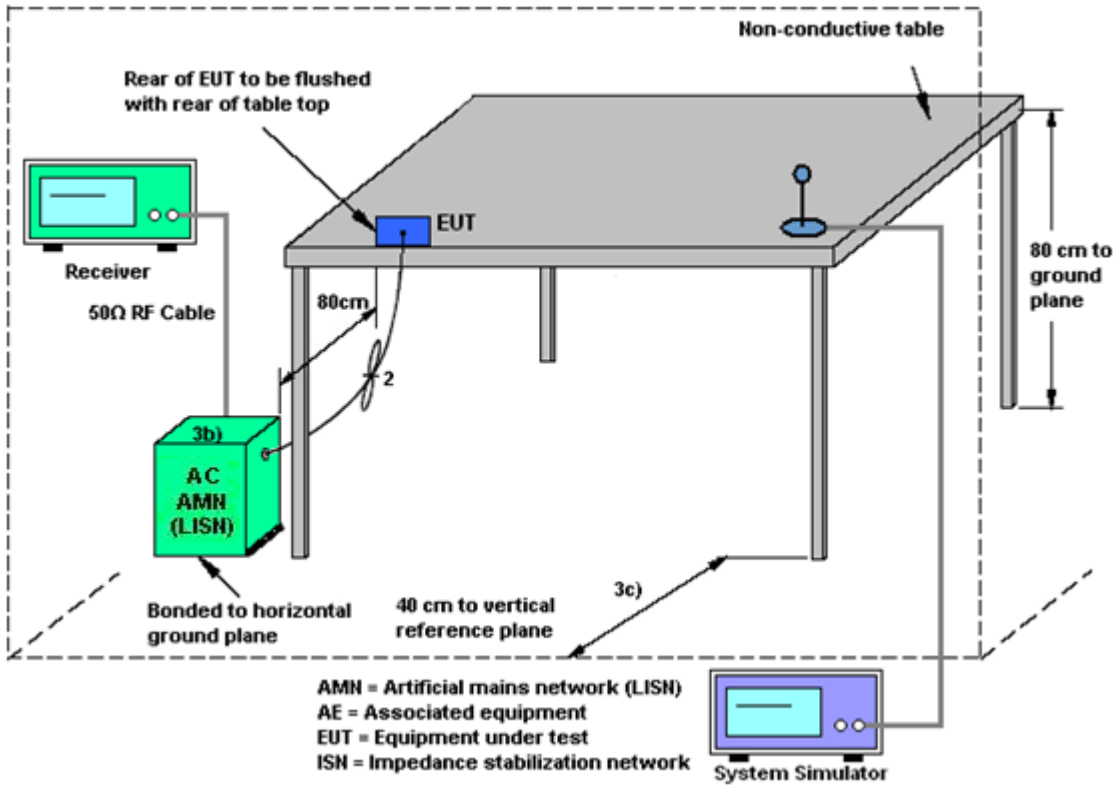
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 07, 2022	Jul. 01, 2022~ Jul. 14, 2022	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Jul. 01, 2022~ Jul. 14, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Jul. 01, 2022~ Jul. 14, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Sep. 01, 2021	Jul. 14, 2022	Aug. 31, 2022	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 01, 2021	Jul. 14, 2022	Aug. 31, 2022	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 29, 2021	Jul. 14, 2022	Oct. 28, 2022	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Jul. 14, 2022	Jul. 06, 2023	Conduction (CO01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 07, 2022	Jul. 16, 2022	Jul. 06, 2023	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 17, 2020	Jul. 15, 2022	Jul. 16, 2022	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	Sep. 28, 2021	Jul. 16, 2022	Sep. 27, 2022	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 07, 2022	Jul. 16, 2022	Jul. 06, 2023	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-3 5-HG	1871923	18GHz~40GHz	Jul. 06, 2022	Jul. 16, 2022	Jul. 05, 2023	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 11 2022	Jul. 16, 2022	Apr. 10, 2023	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 22,2021	Jul. 16, 2022	Oct. 21,2022	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30- 10P-R	1943528	1GHz~18GHz	Oct. 22,2021	Jul. 16, 2022	Oct. 21,2022	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 22,2021	Jul. 16, 2022	Oct. 21,2022	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Jul. 16, 2022	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Jul. 16, 2022	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Jul. 16, 2022	NCR	Radiation (03CH02-SZ)

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.2 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1 dB
---	--------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1 dB
---	--------

----- THE END -----



Appendix A. Conducted Test Results



Ambient Condition: <u>25</u> °C, <u>45</u> %RH
Test Date: <u>2022/07/12</u> Test Engineer: <u>Ma Jie</u>

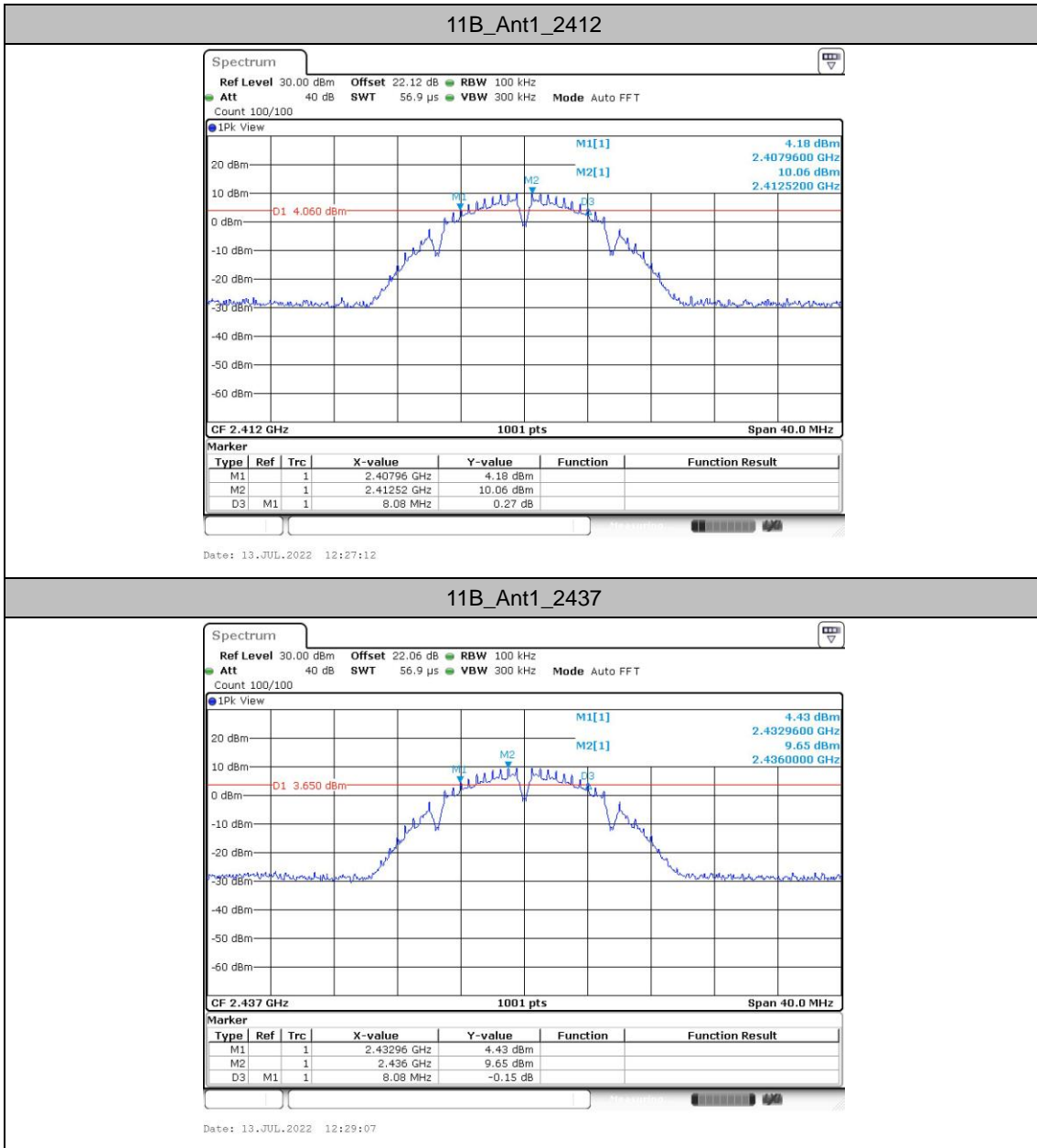
DTS Bandwidth

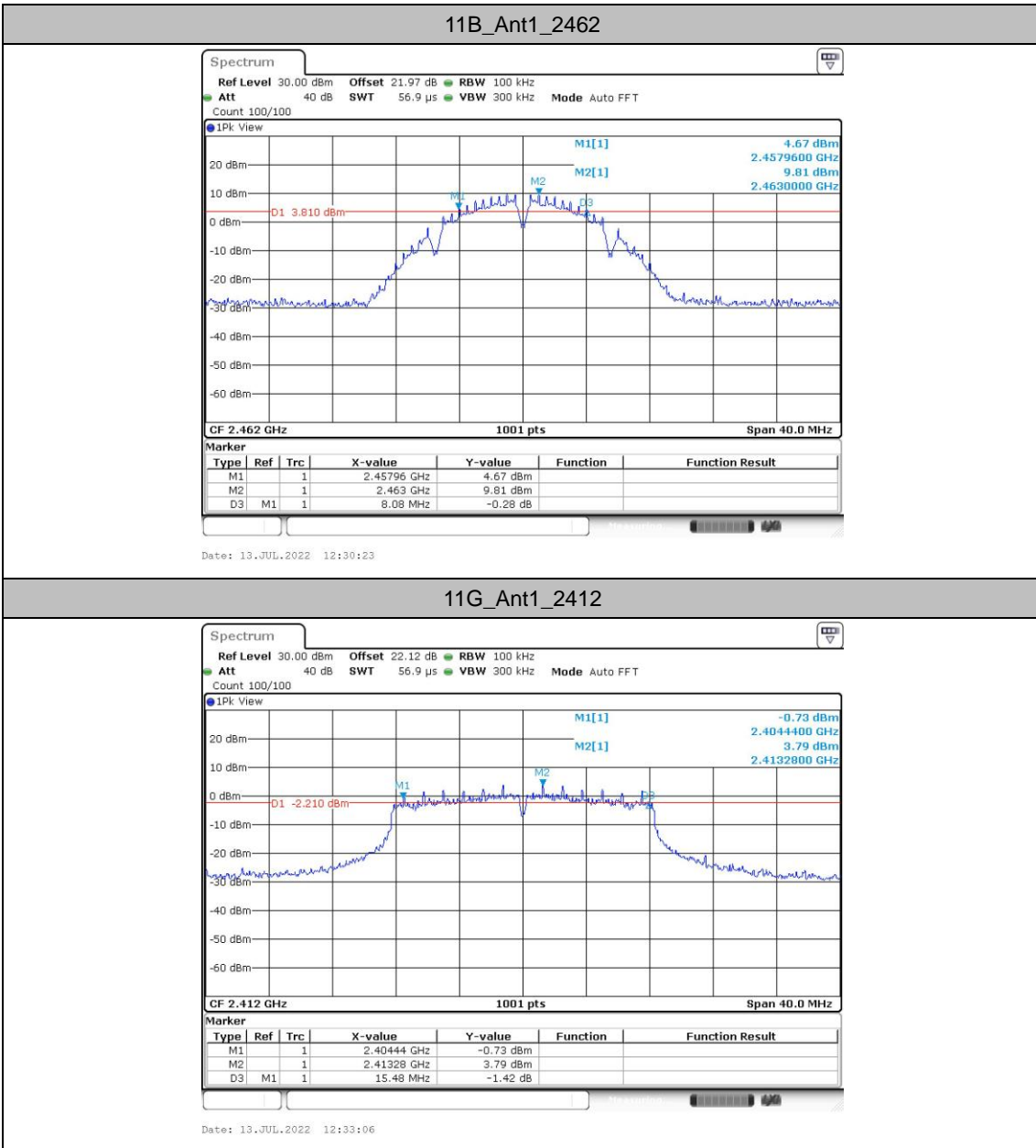
Test Result

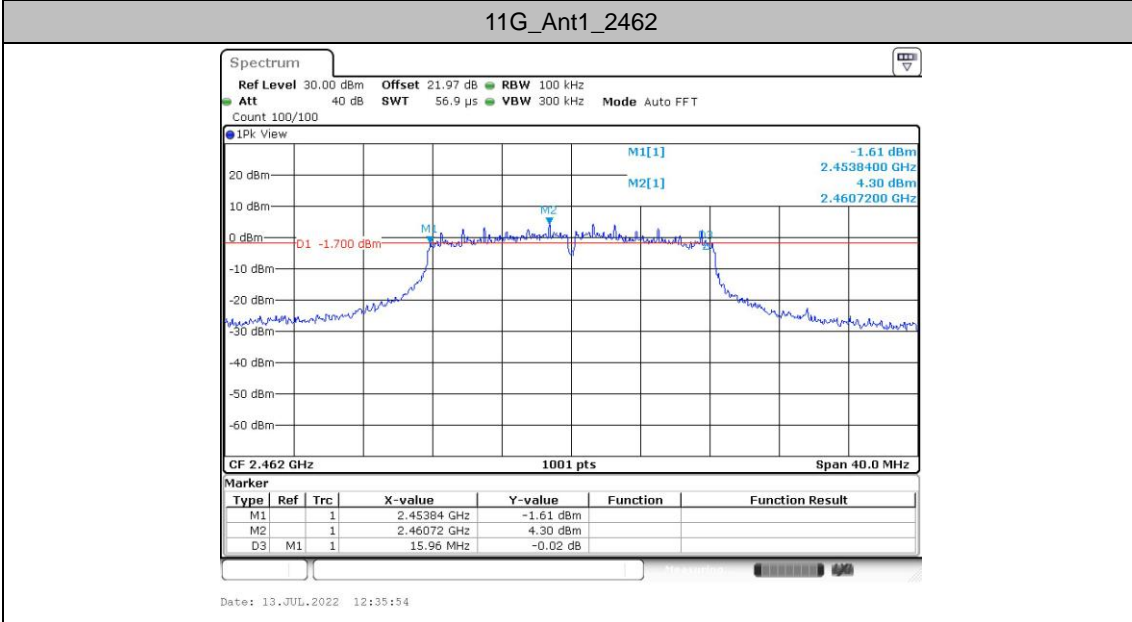
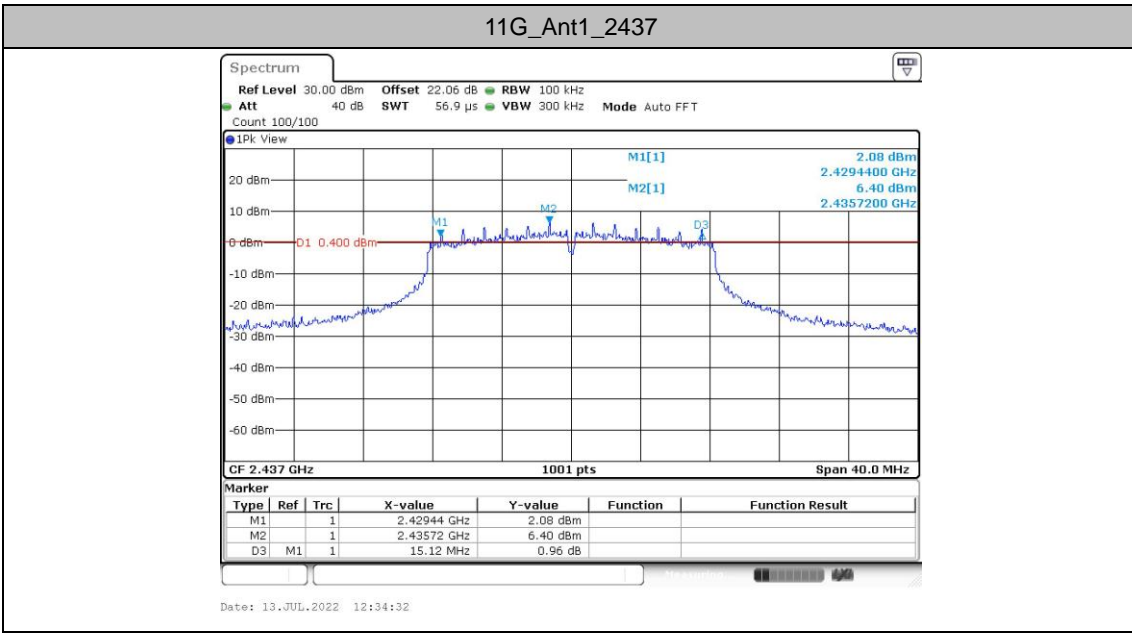
TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.08	2407.96	2416.04	0.5	PASS
		2437	8.08	2432.96	2441.04	0.5	PASS
		2462	8.08	2457.96	2466.04	0.5	PASS
11G	Ant1	2412	15.48	2404.44	2419.92	0.5	PASS
		2437	15.12	2429.44	2444.56	0.5	PASS
		2462	15.96	2453.84	2469.80	0.5	PASS
11N20SISO	Ant1	2412	16.72	2403.84	2420.56	0.5	PASS
		2437	16.04	2429.48	2445.52	0.5	PASS
		2462	16.92	2453.60	2470.52	0.5	PASS
11AX20SISO	Ant1	2412	17.96	2403.44	2421.40	0.5	PASS
		2437	17.04	2427.96	2445.00	0.5	PASS
		2462	18.64	2452.80	2471.44	0.5	PASS



Test Graphs

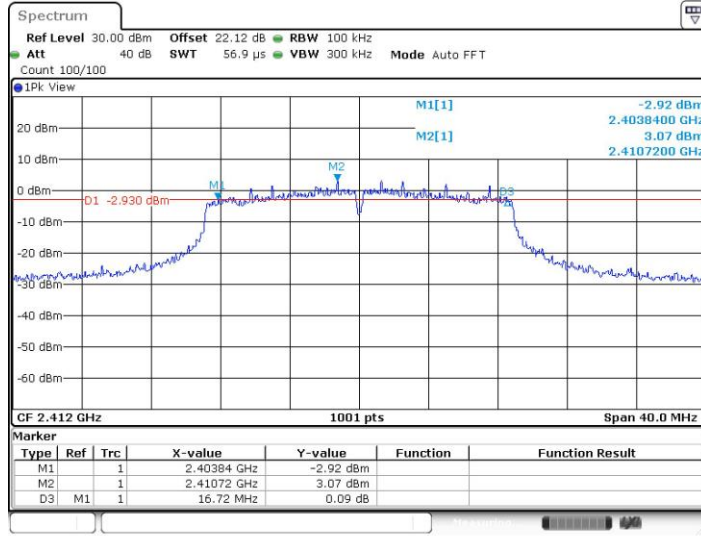




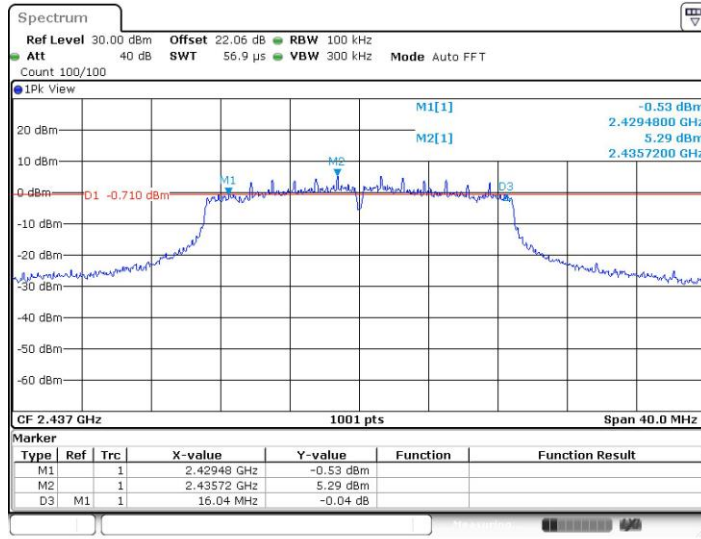




11N20SISO_Ant1_2412

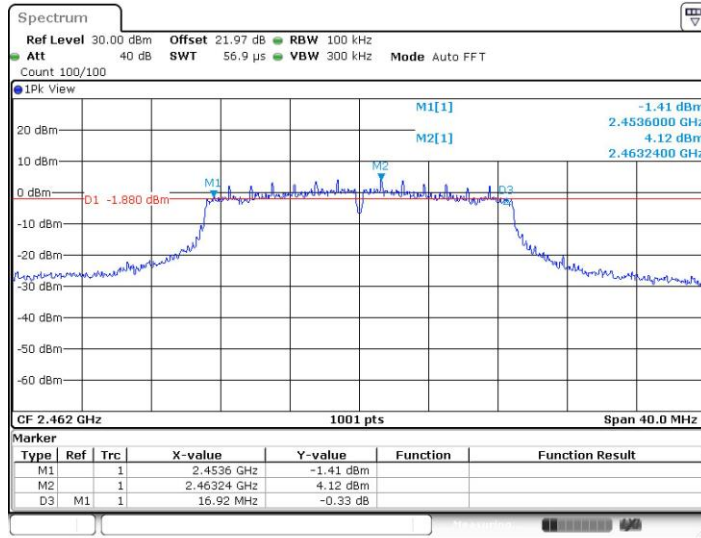


11N20SISO_Ant1_2437

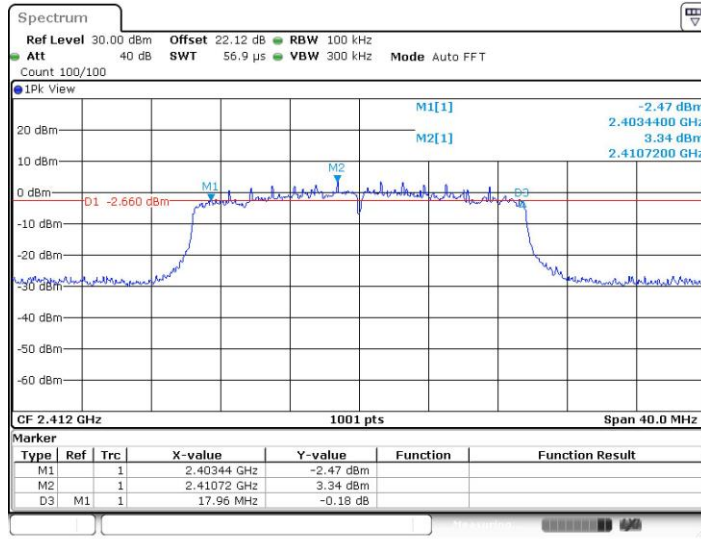




11N20SISO_Ant1_2462

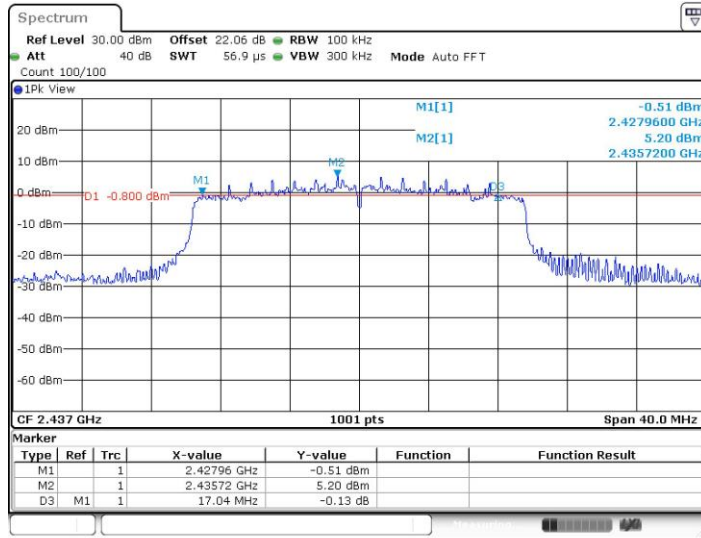


11AX20SISO_Ant1_2412

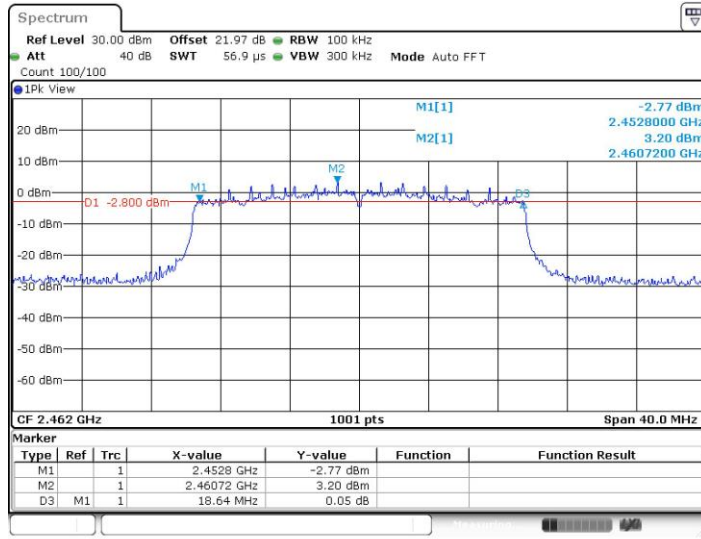




11AX20SISO_Ant1_2437



11AX20SISO_Ant1_2462





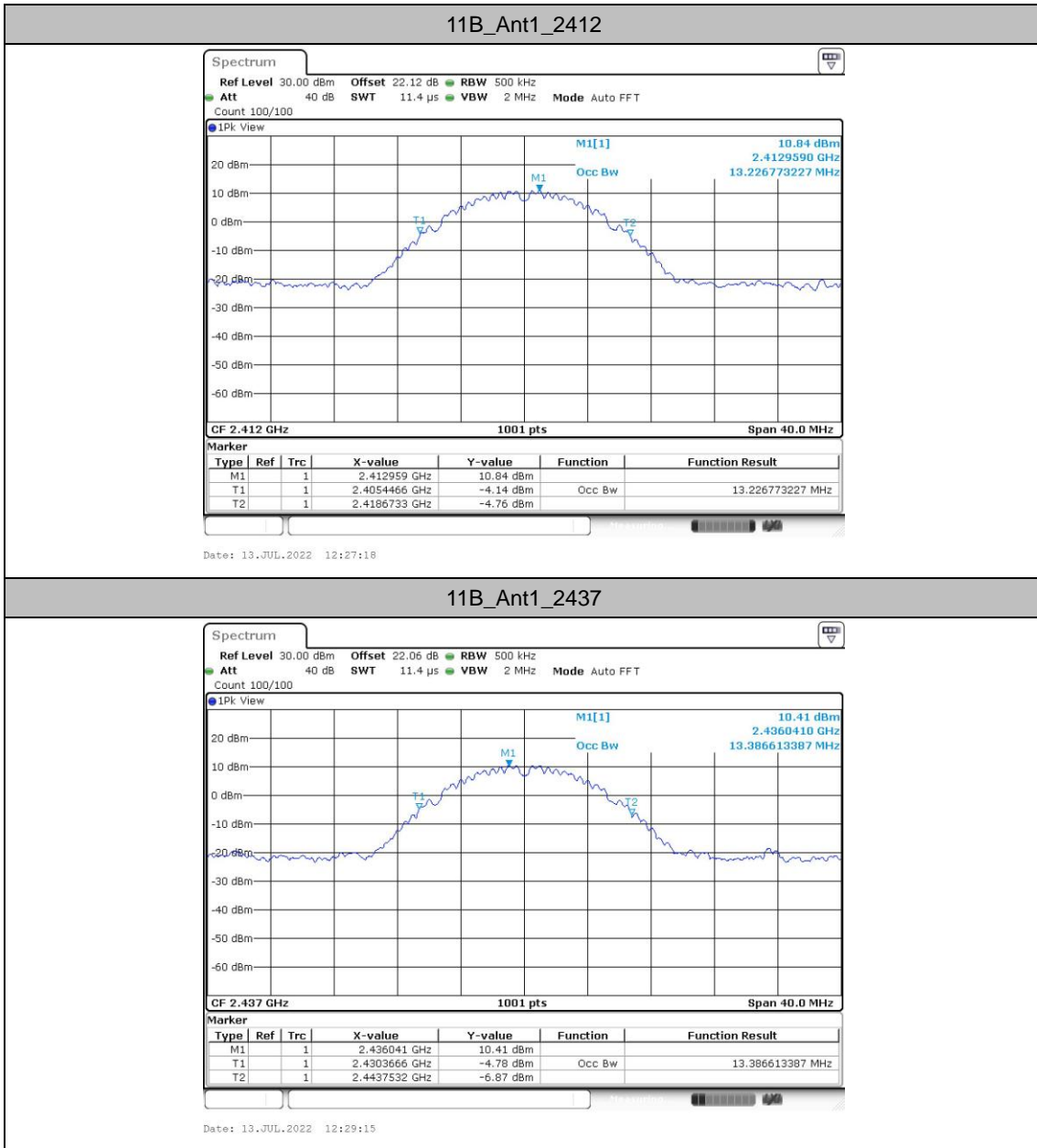
Occupied Channel Bandwidth

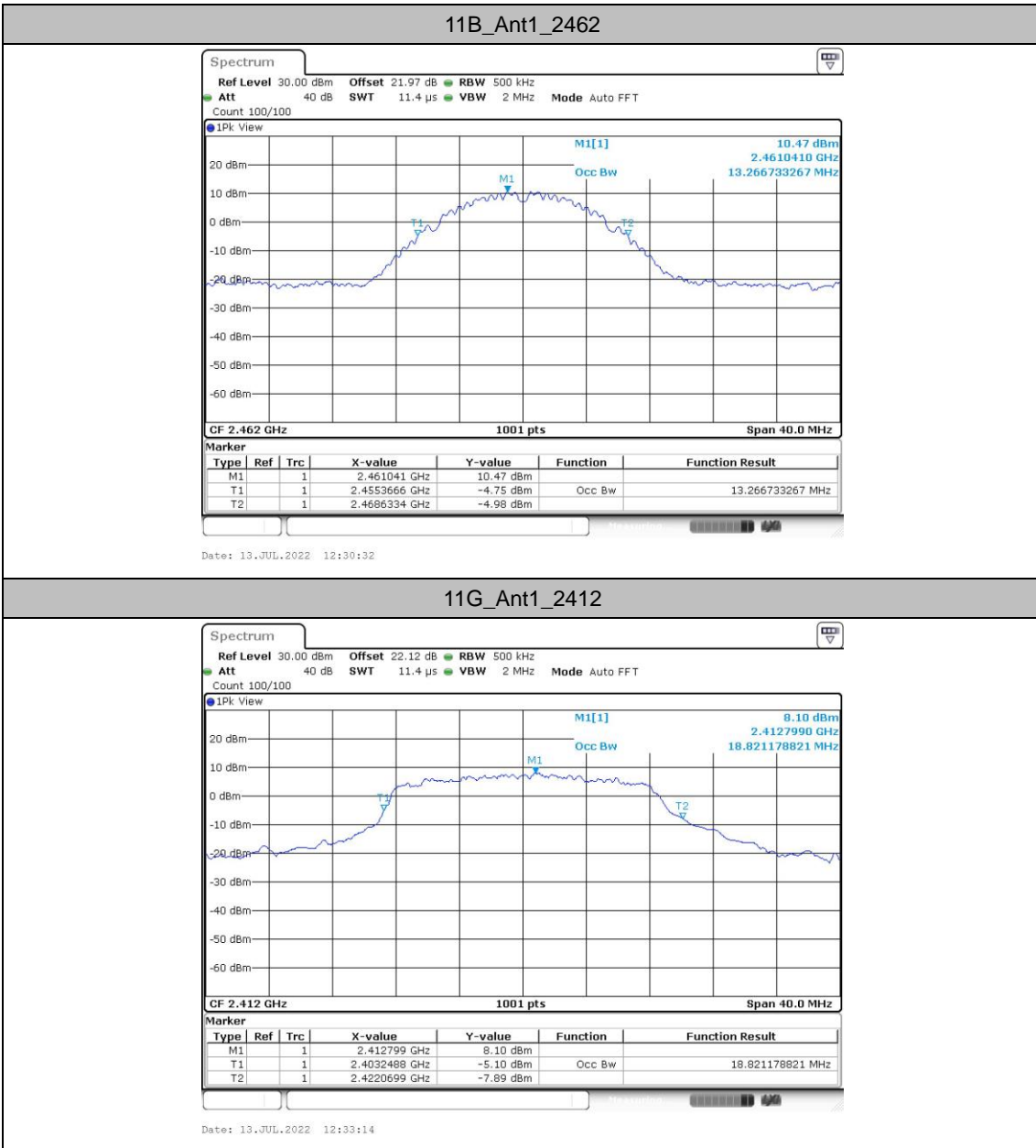
Test Result

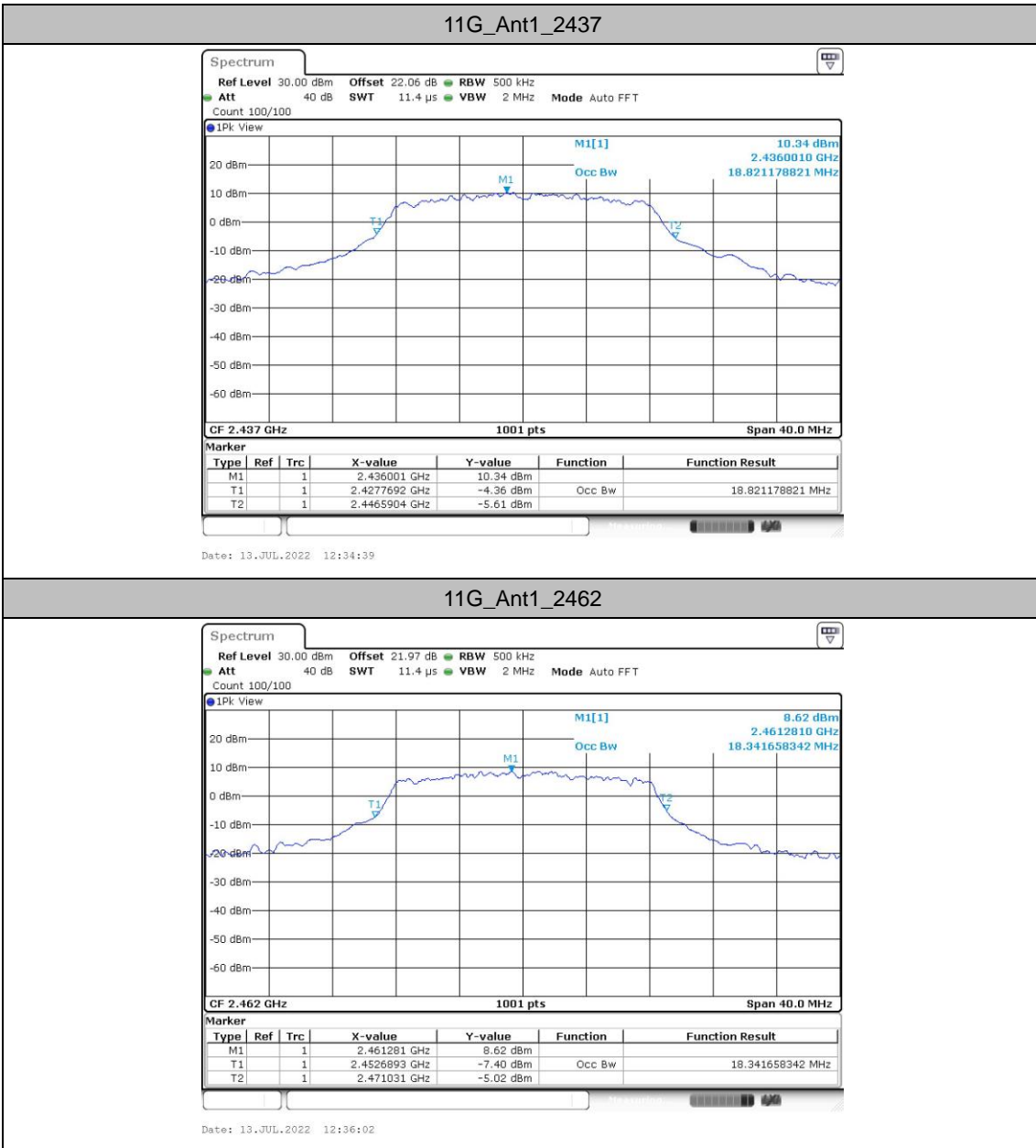
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.227	2405.447	2418.673	---	---
		2437	13.387	2430.367	2443.753	---	---
		2462	13.267	2455.367	2468.633	---	---
11G	Ant1	2412	18.821	2403.249	2422.070	---	---
		2437	18.821	2427.769	2446.590	---	---
		2462	18.342	2452.689	2471.031	---	---
11N20SISO	Ant1	2412	19.061	2402.450	2421.510	---	---
		2437	19.620	2427.450	2447.070	---	---
		2462	19.980	2451.890	2471.870	---	---
11AX20SISO	Ant1	2412	19.181	2402.450	2421.630	---	---
		2437	19.221	2427.370	2446.590	---	---
		2462	19.341	2452.330	2471.670	---	---



Test Graphs

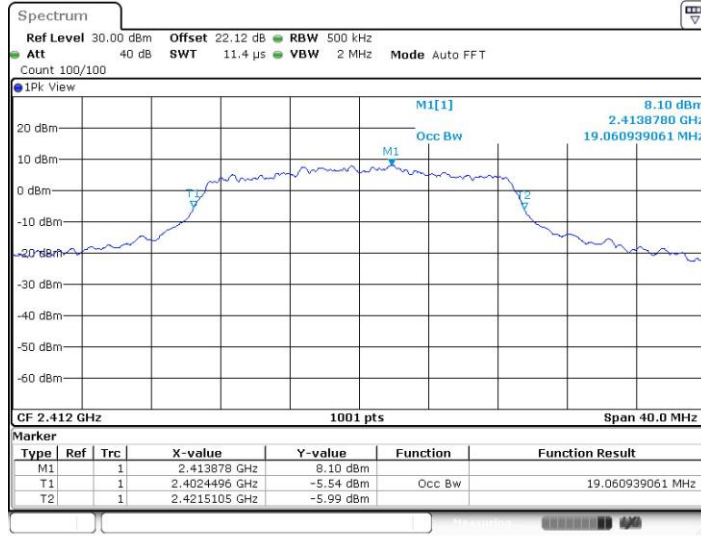






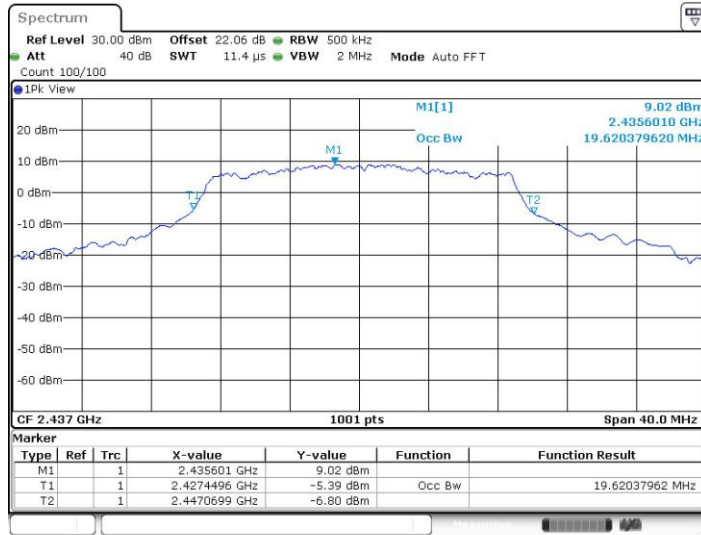


11N20SISO_Ant1_2412



Date: 13.JUL.2022 12:37:34

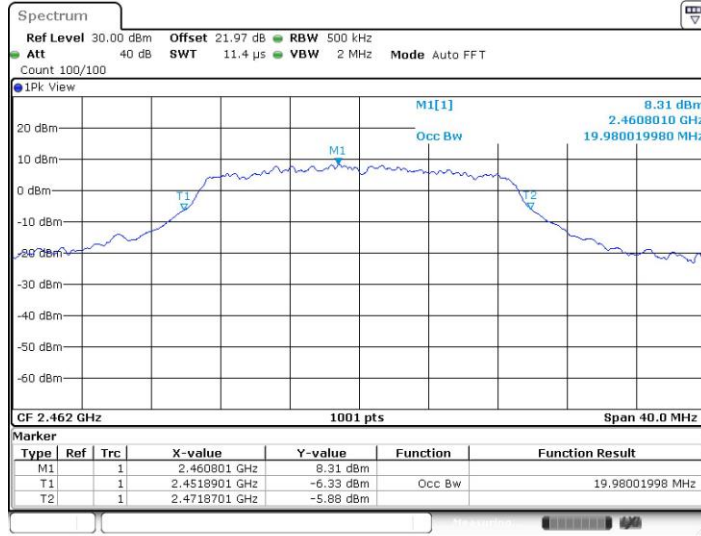
11N20SISO_Ant1_2437



Date: 13.JUL.2022 12:38:58

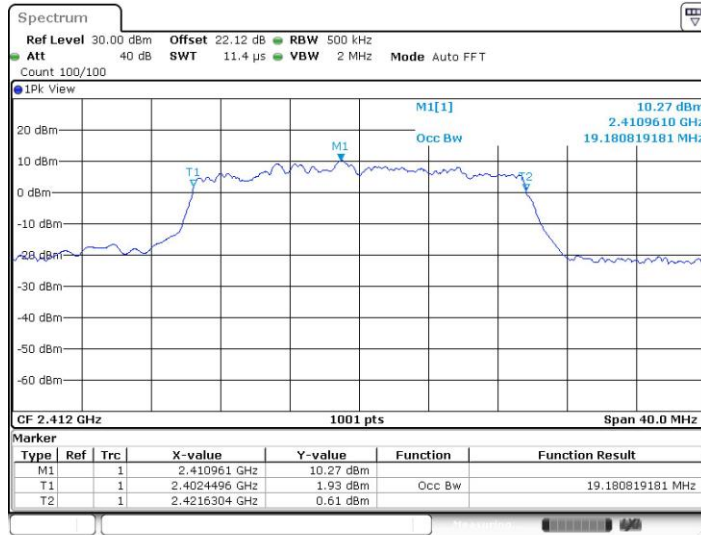


11N20SISO_Ant1_2462



Date: 13.JUL.2022 12:40:21

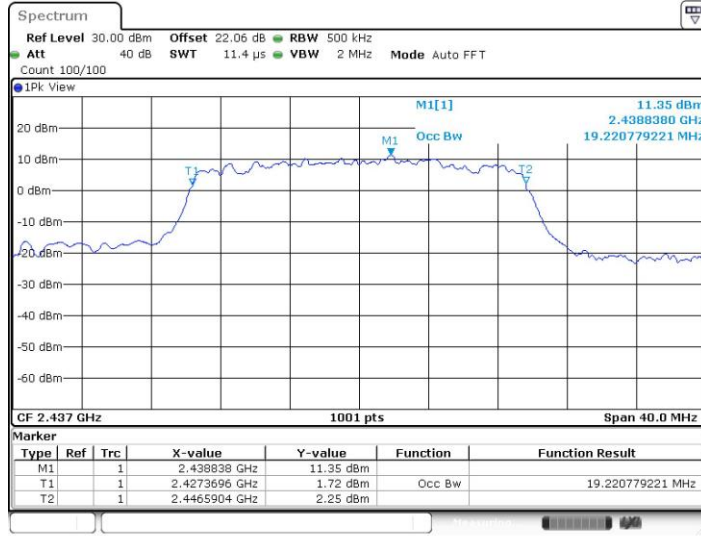
11AX20SISO_Ant1_2412



Date: 13.JUL.2022 12:42:05

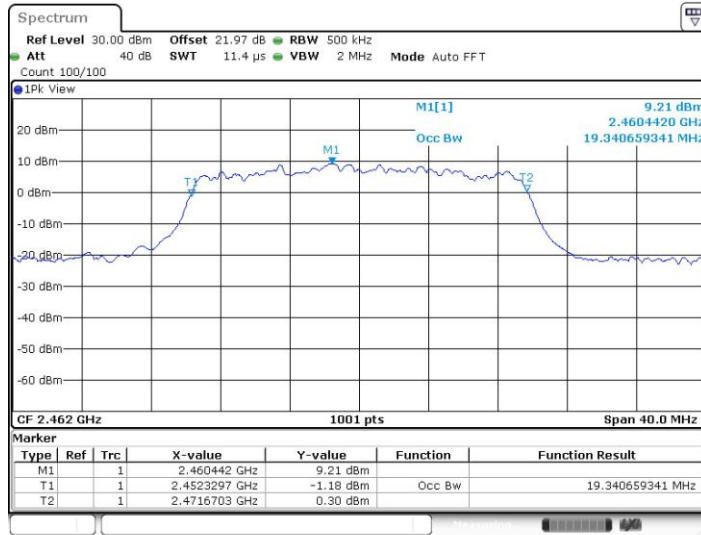


11AX20SISO_Ant1_2437



Date: 13.JUL.2022 12:43:37

11AX20SISO_Ant1_2462



Date: 13.JUL.2022 12:44:58



Maximum conducted output power

Test Result Peak

TestMode	Antenna	Freq(MHz)	Set Power	Peak Power[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
11B	Ant1	2412	18	20.42	≤30.00	17.42	≤36.00	PASS
		2437	18	20.58	≤30.00	17.58	≤36.00	PASS
		2462	18	20.15	≤30.00	17.15	≤36.00	PASS
11G	Ant1	2412	14	23.88	≤30.00	20.88	≤36.00	PASS
		2437	17	25.43	≤30.00	22.43	≤36.00	PASS
		2462	15	24.47	≤30.00	21.47	≤36.00	PASS
11N20SIS O	Ant1	2412	14	24.41	≤30.00	21.41	≤36.00	PASS
		2437	16	25.64	≤30.00	22.64	≤36.00	PASS
		2462	15	24.87	≤30.00	21.87	≤36.00	PASS
11AX20SI SO	Ant1	2422	14	23.77	≤30.00	20.77	≤36.00	PASS
		2437	16	25.28	≤30.00	22.28	≤36.00	PASS
		2452	14	24.04	≤30.00	21.04	≤36.00	PASS



Test Result Average

Test Mode	Antenna	Freq (MHz)	Set Power	Average power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Gain [dBi]	EIRP [dBm]
11B	Ant1	2412	18	18.88	99.41	0.03	18.91	-3.00	15.91
		2437	18	18.61	99.41	0.03	18.64	-3.00	15.64
		2462	18	18.51	99.41	0.03	18.54	-3.00	15.54
11G	Ant1	2412	14	14.68	97.20	0.12	14.80	-3.00	11.80
		2437	17	17.27	97.20	0.12	17.39	-3.00	14.39
		2462	15	15.48	97.20	0.12	15.60	-3.00	12.60
11N20SISO	Ant1	2412	14	14.58	96.30	0.16	14.74	-3.00	11.74
		2437	16	16.29	96.30	0.16	16.45	-3.00	13.45
		2462	15	15.37	96.30	0.16	15.53	-3.00	12.53
11AX20SISO	Ant1	2412	14	14.80	95.28	0.21	15.01	-3.00	12.01
		2437	16	16.37	95.28	0.21	16.58	-3.00	13.58
		2462	14	14.56	95.28	0.21	14.77	-3.00	11.77



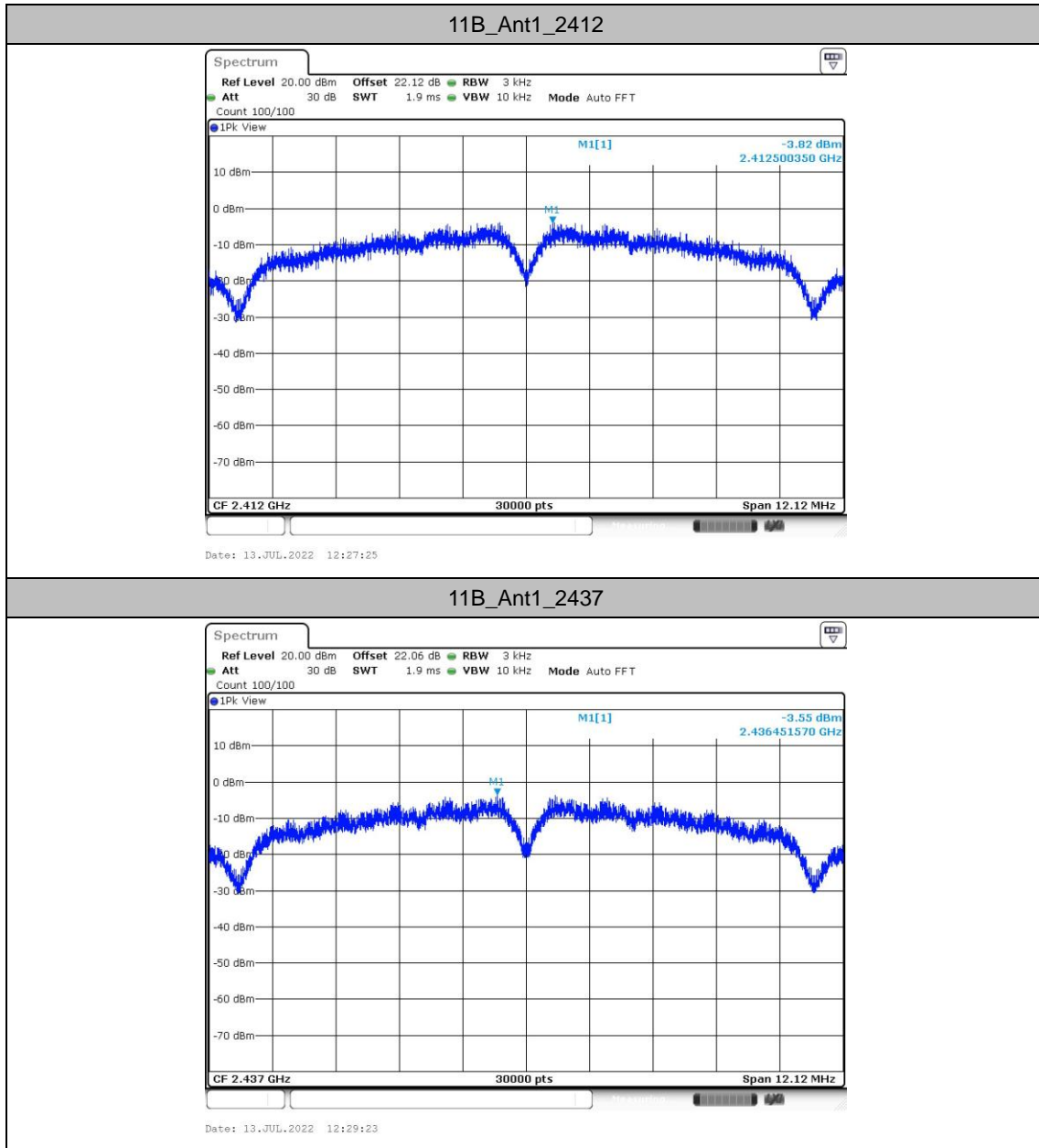
Maximum power spectral density

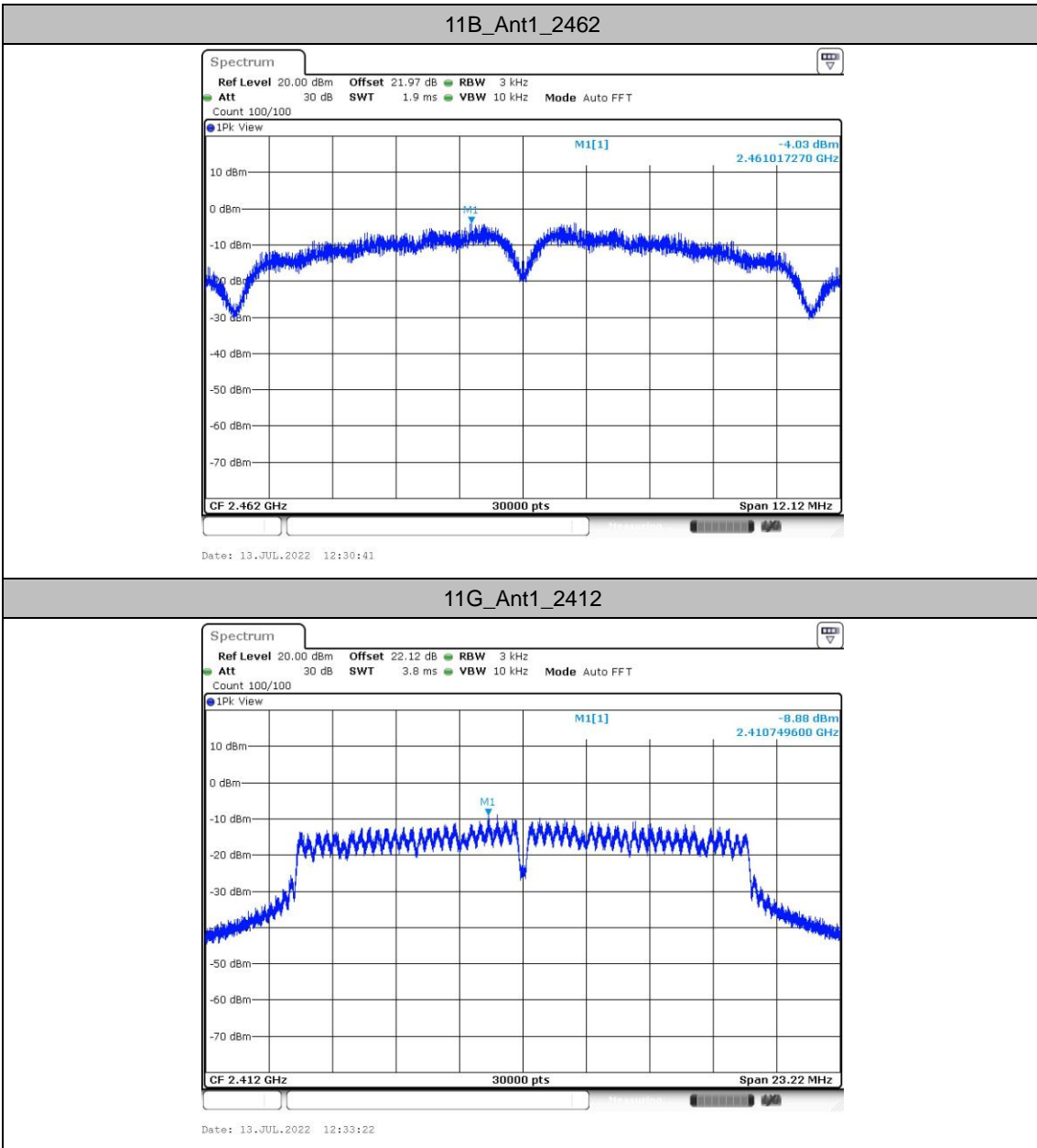
TestMode	Antenna	Freq(MHz)	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-3.82	≤8.00	PASS
		2437	-3.55	≤8.00	PASS
		2462	-4.03	≤8.00	PASS
11G	Ant1	2412	-8.88	≤8.00	PASS
		2437	-6.54	≤8.00	PASS
		2462	-9.22	≤8.00	PASS
11N20SISO	Ant1	2412	-9.47	≤8.00	PASS
		2437	-8.52	≤8.00	PASS
		2462	-8.61	≤8.00	PASS
11AX20SISO	Ant1	2412	-10.17	≤8.00	PASS
		2437	-8.59	≤8.00	PASS
		2462	-11.1	≤8.00	PASS

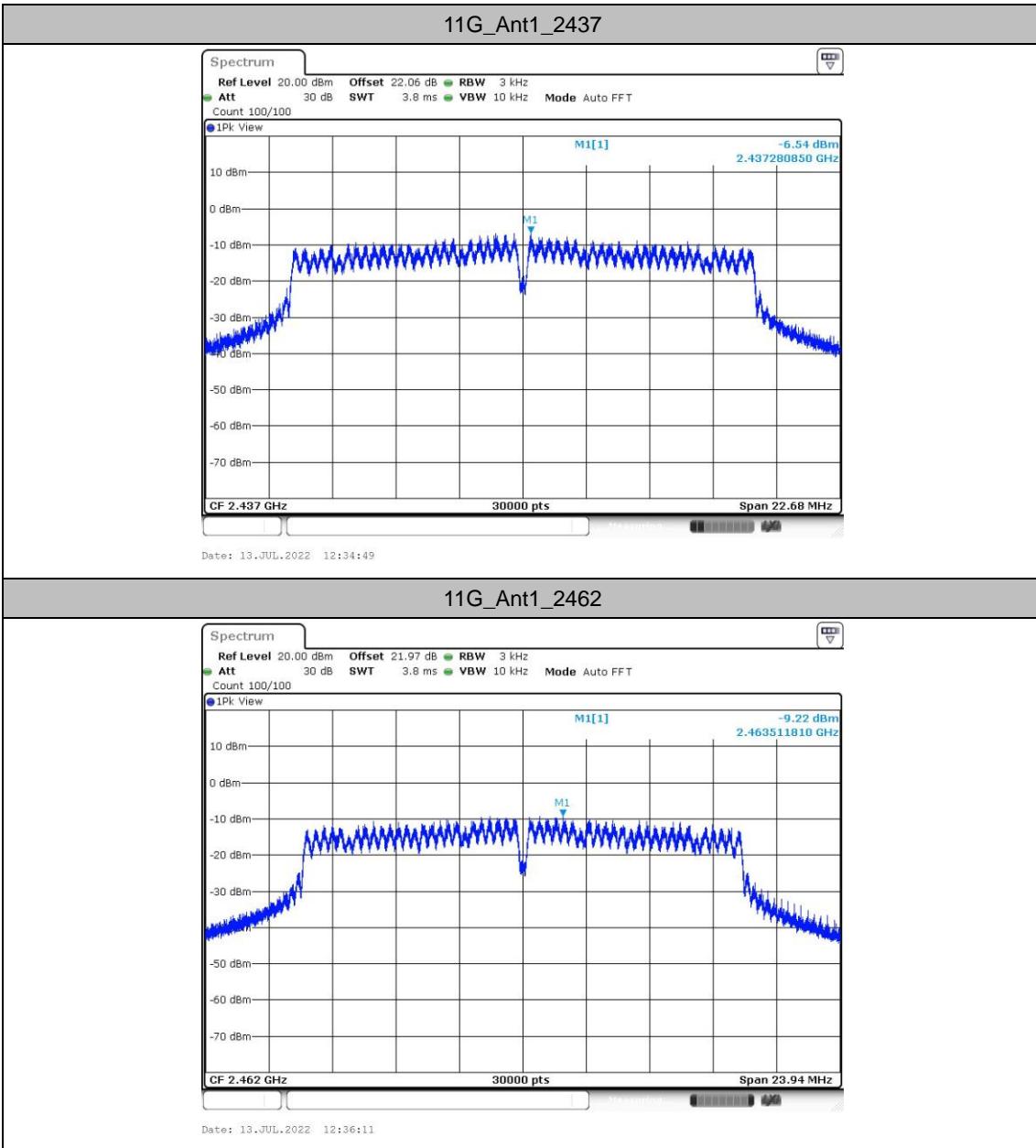
Test Result



Test Graphs

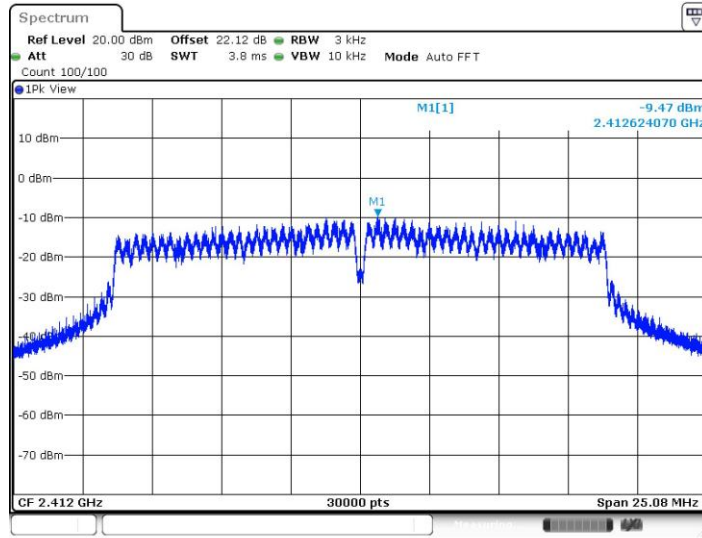






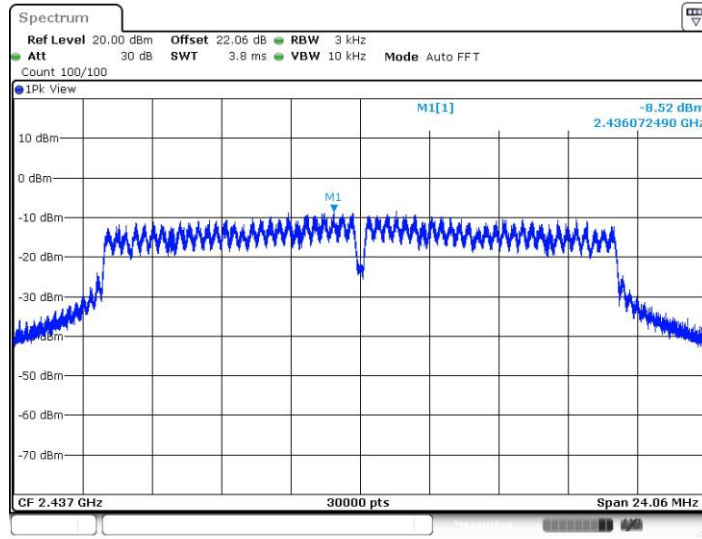


11N20SISO_Ant1_2412

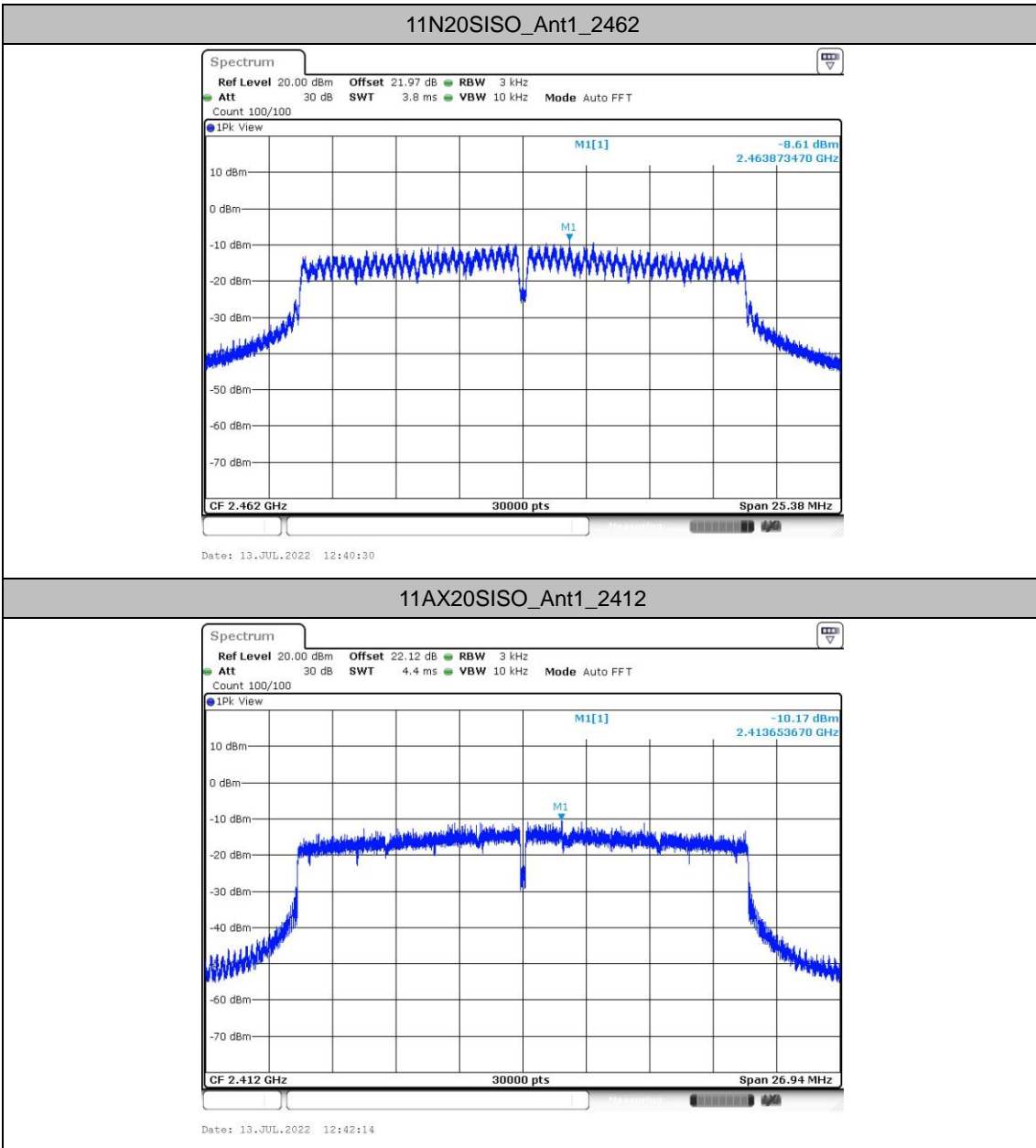


Date: 13.JUL.2022 12:37:43

11N20SISO_Ant1_2437

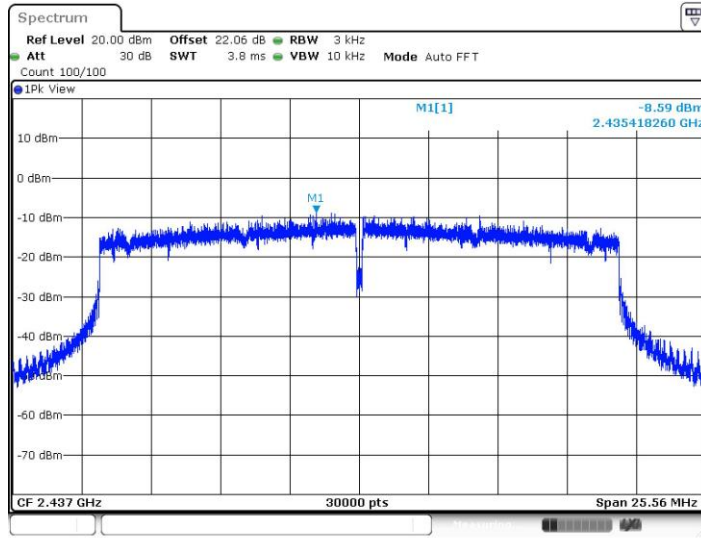


Date: 13.JUL.2022 12:39:06



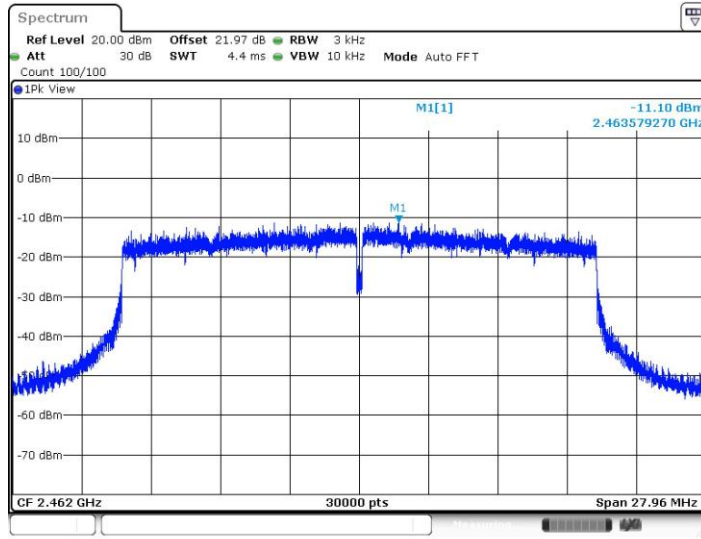


11AX20SISO_Ant1_2437



Date: 13.JUL.2022 12:43:46

11AX20SISO_Ant1_2462



Date: 13.JUL.2022 12:45:07



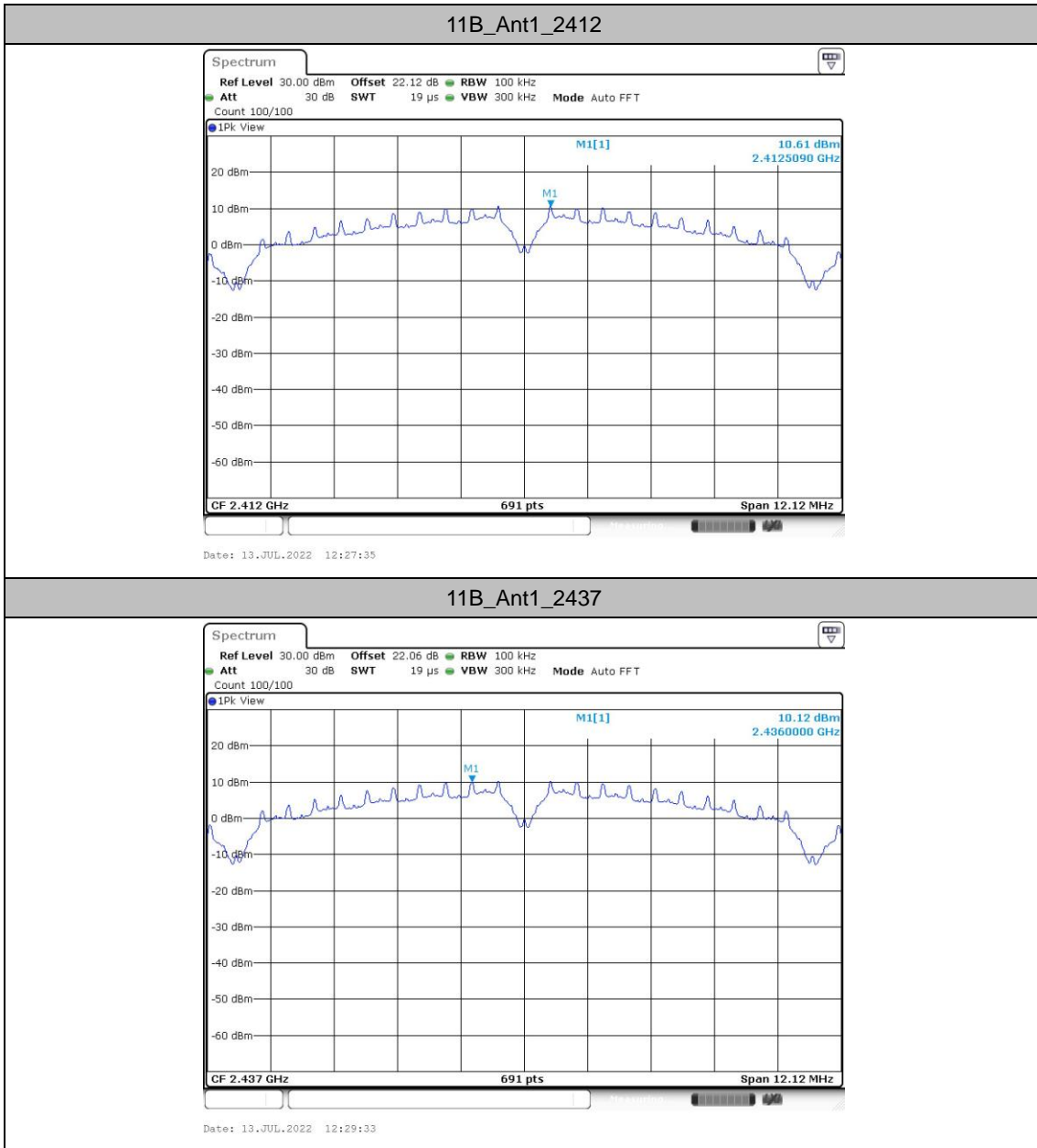
Reference level measurement

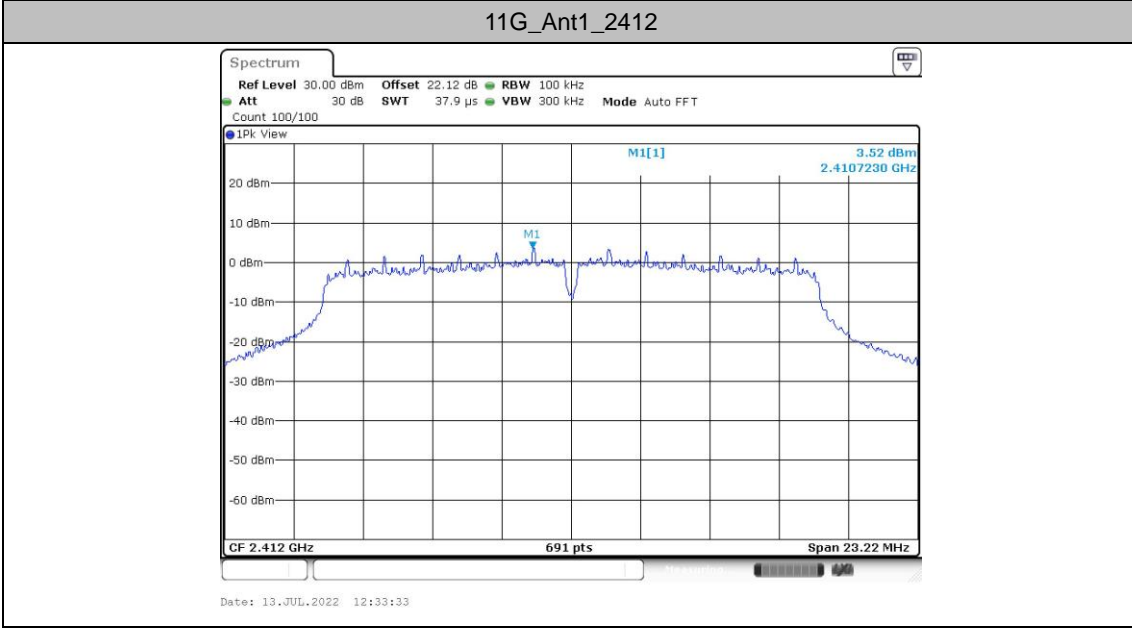
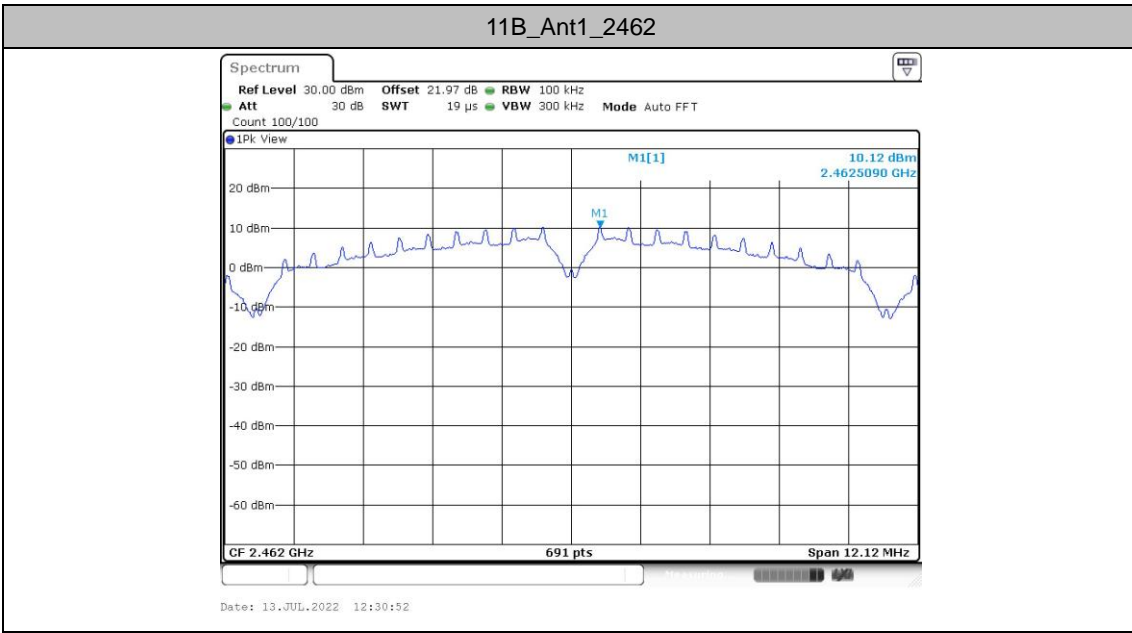
Test Result

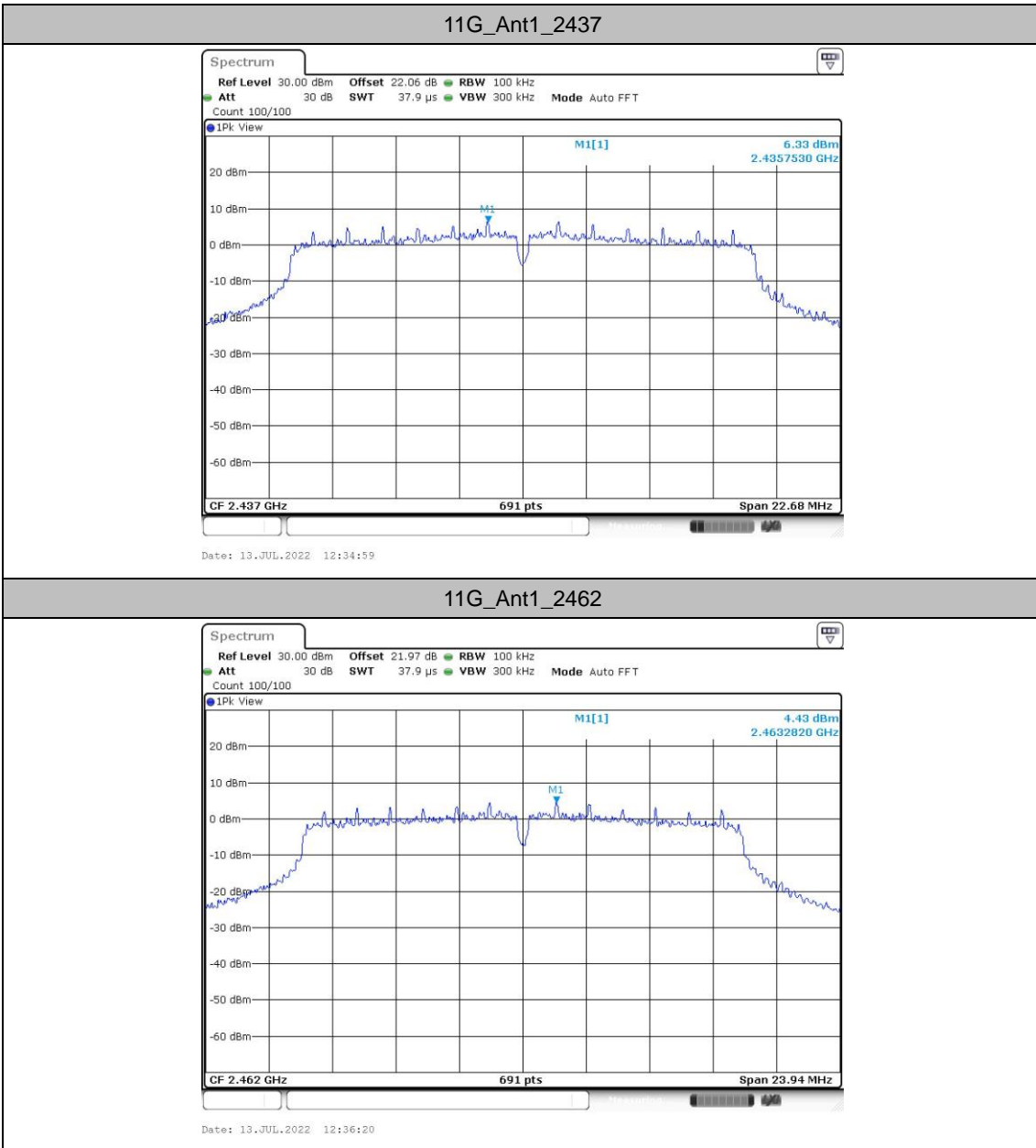
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm/100KHz]
11B	Ant1	2412	2412.51	10.61
		2437	2436.00	10.12
		2462	2462.51	10.12
11G	Ant1	2412	2410.72	3.52
		2437	2435.75	6.33
		2462	2463.28	4.43
11N20SISO	Ant1	2412	2413.27	3.88
		2437	2438.25	5.30
		2462	2463.25	4.50
11AX20SISO	Ant1	2412	2413.25	3.46
		2437	2435.74	5.11
		2462	2460.75	3.20



Test Graphs

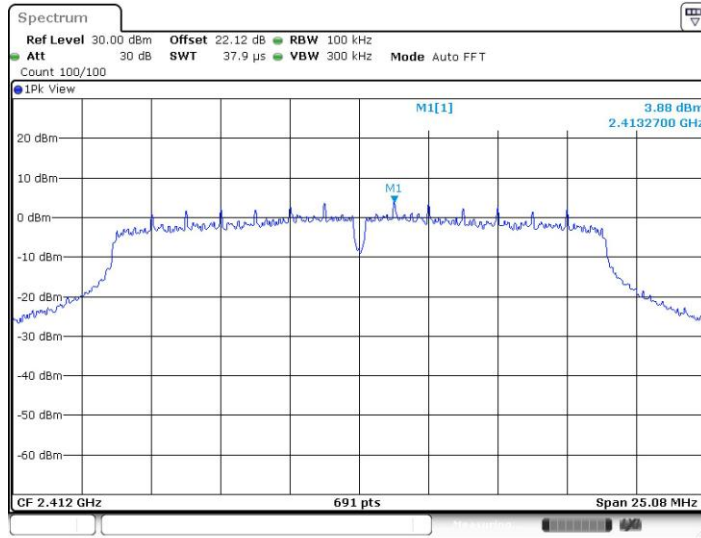






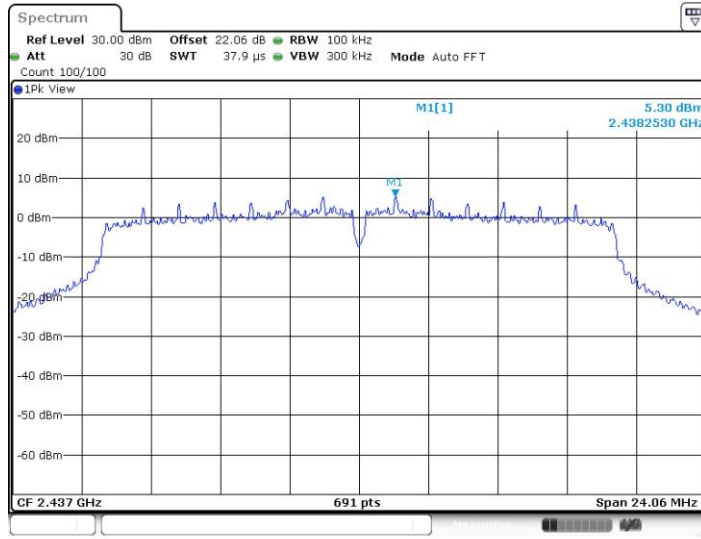


11N20SISO_Ant1_2412



Date: 13.JUL.2022 12:37:53

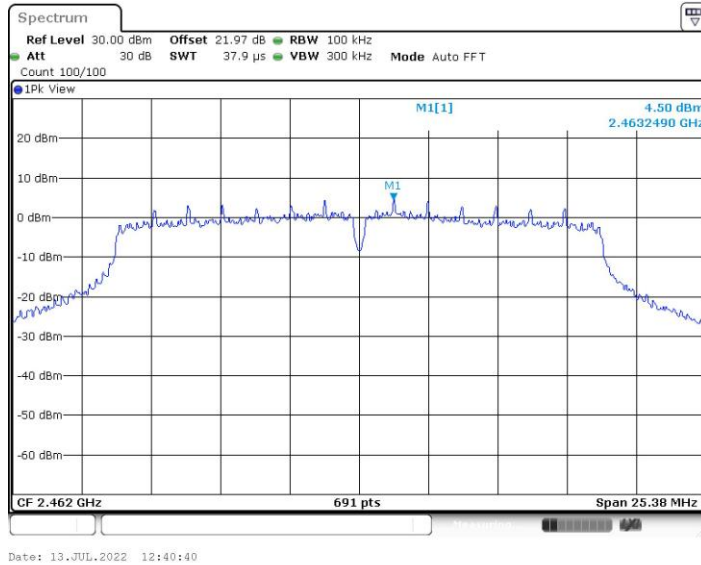
11N20SISO_Ant1_2437



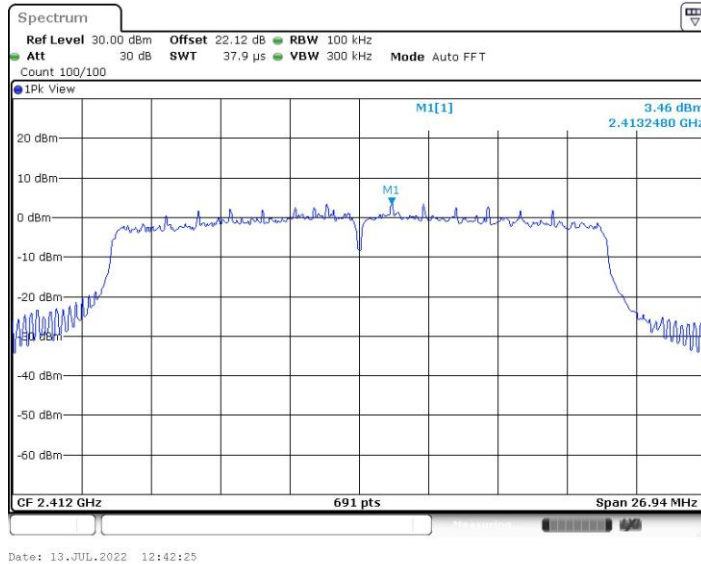
Date: 13.JUL.2022 12:39:15

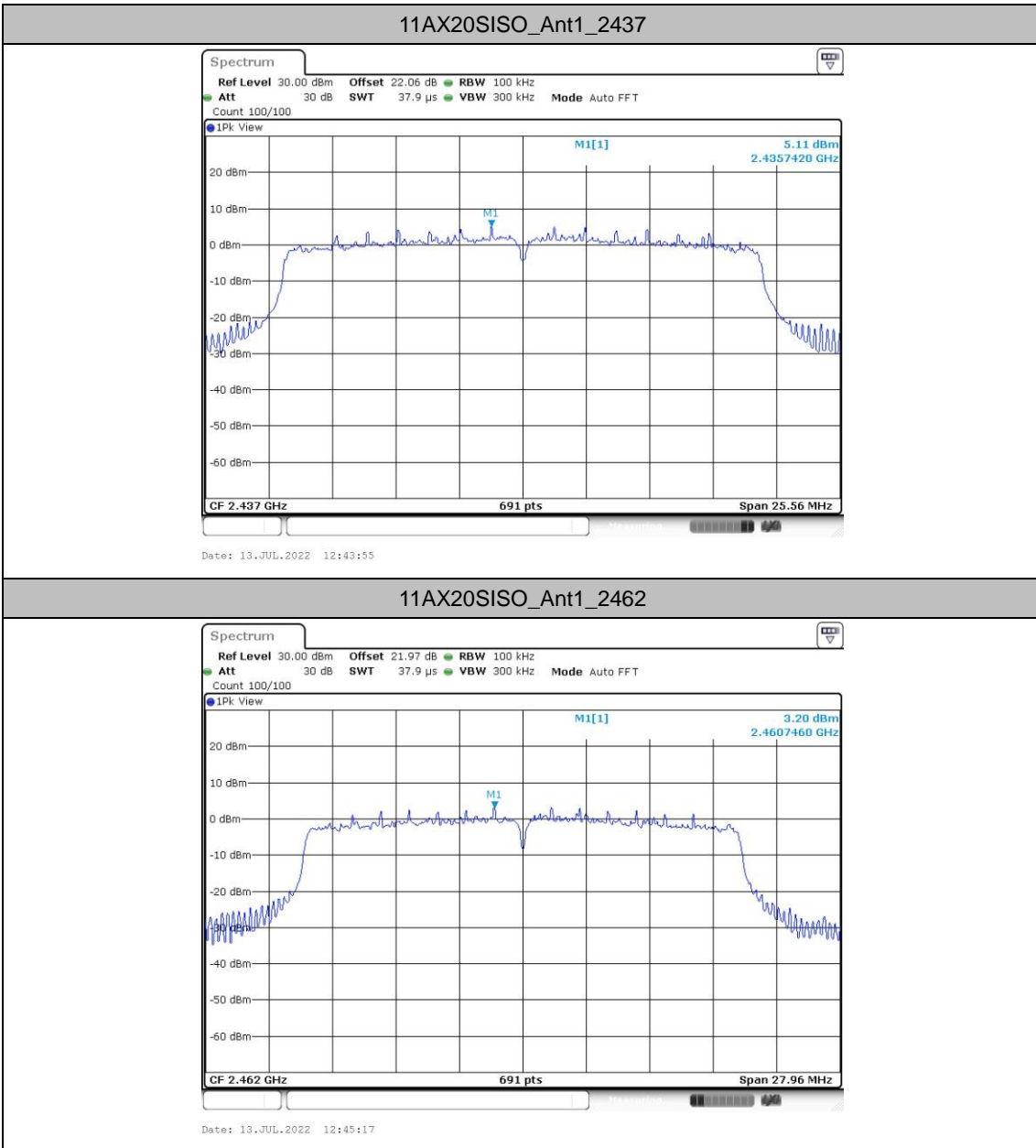


11N20SISO_Ant1_2462



11AX20SISO_Ant1_2412







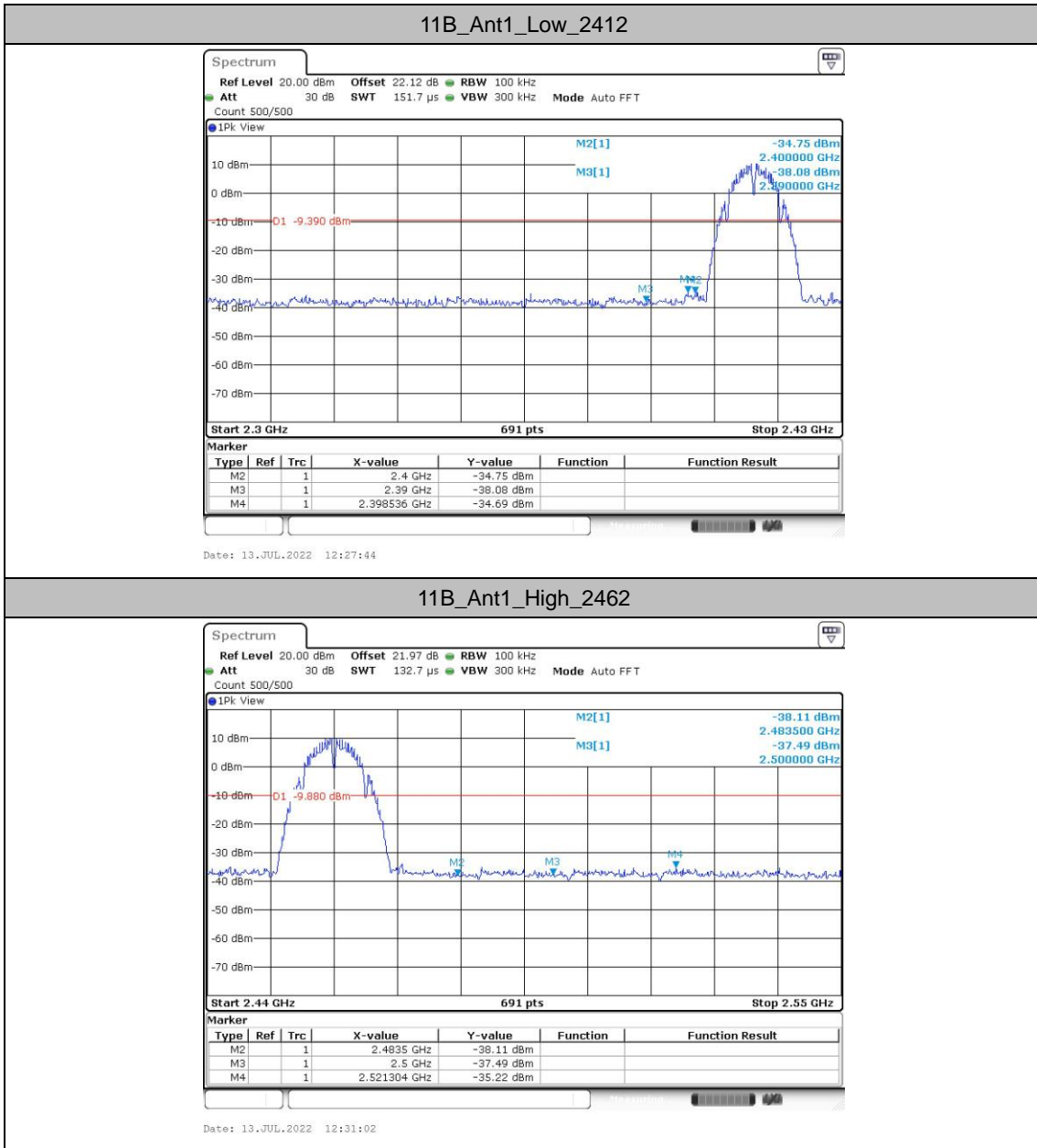
Band edge measurements

Test Result

TestMode	Antenna	ChName	Freq (MHz)	RefLevel [dBm/100KHz]	Result [dBm/100KHz]	Limit [dBm/100KHz]	Verdict
11B	Ant1	Low	2412	10.61	-34.69	≤-9.39	PASS
		High	2462	10.12	-35.22	≤-9.88	PASS
11G	Ant1	Low	2412	3.52	-26.99	≤-16.48	PASS
		High	2462	4.43	-34.94	≤-15.57	PASS
11N20SISO	Ant1	Low	2412	3.88	-25.65	≤-16.12	PASS
		High	2462	4.50	-34.71	≤-15.5	PASS
11AX20SISO	Ant1	Low	2412	3.46	-27.82	≤-16.54	PASS
		High	2462	3.20	-35.03	≤-16.8	PASS

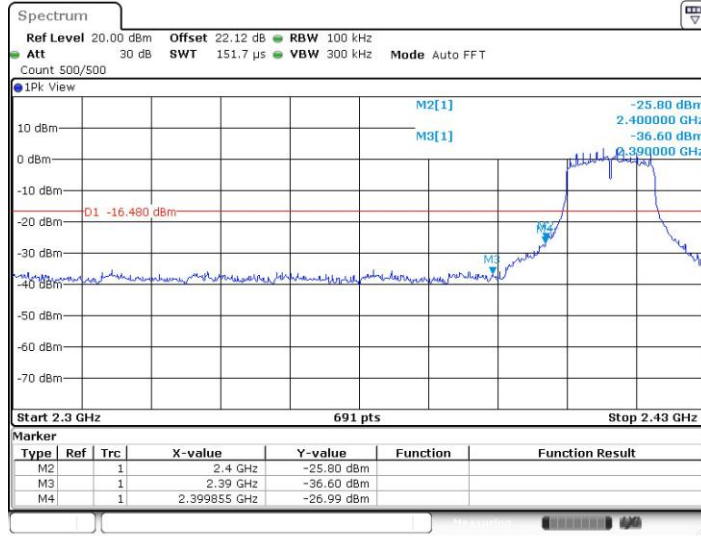


Test Graphs



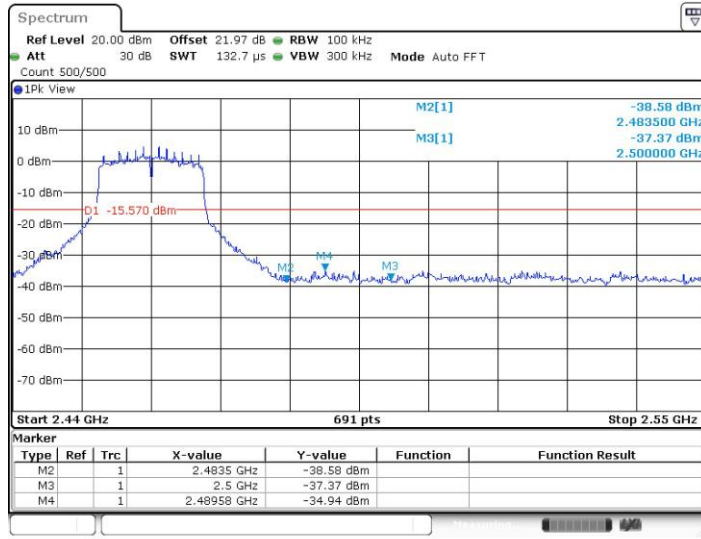


11G_Ant1_Low_2412



Date: 13.JUL.2022 12:33:42

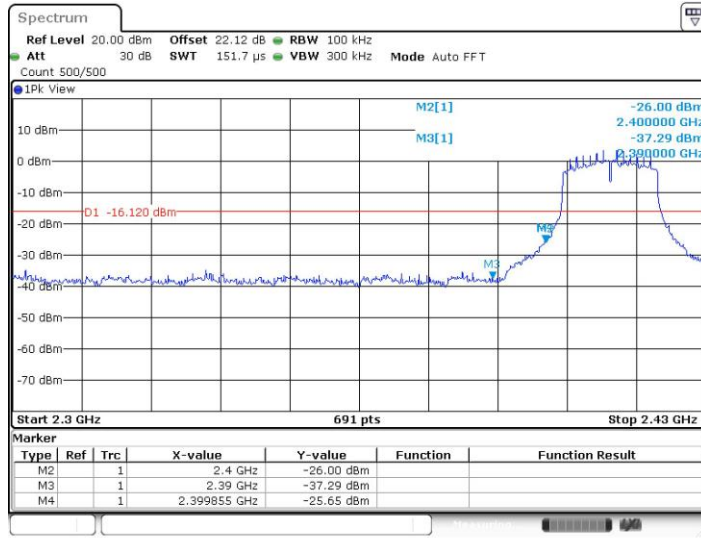
11G_Ant1_High_2462



Date: 13.JUL.2022 12:36:31

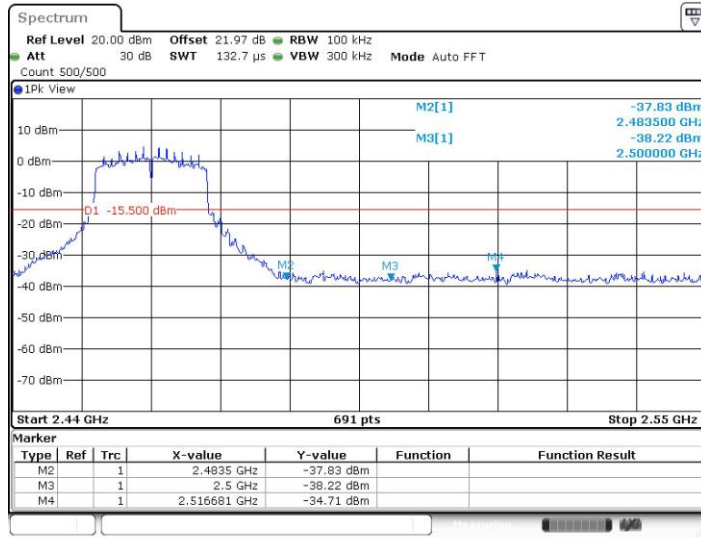


11N20SISO_Ant1_Low_2412



Date: 13.JUL.2022 12:38:02

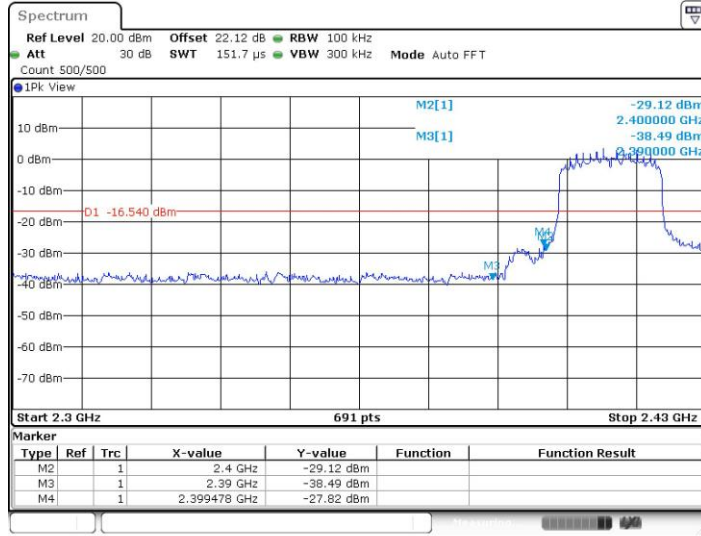
11N20SISO_Ant1_High_2462



Date: 13.JUL.2022 12:40:50

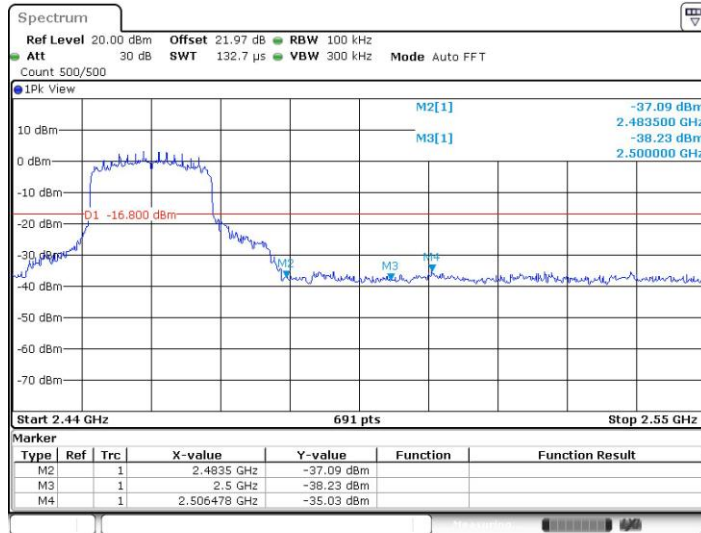


11AX20SISO_Ant1_Low_2412



Date: 13.JUL.2022 12:42:36

11AX20SISO_Ant1_High_2462



Date: 13.JUL.2022 12:45:27



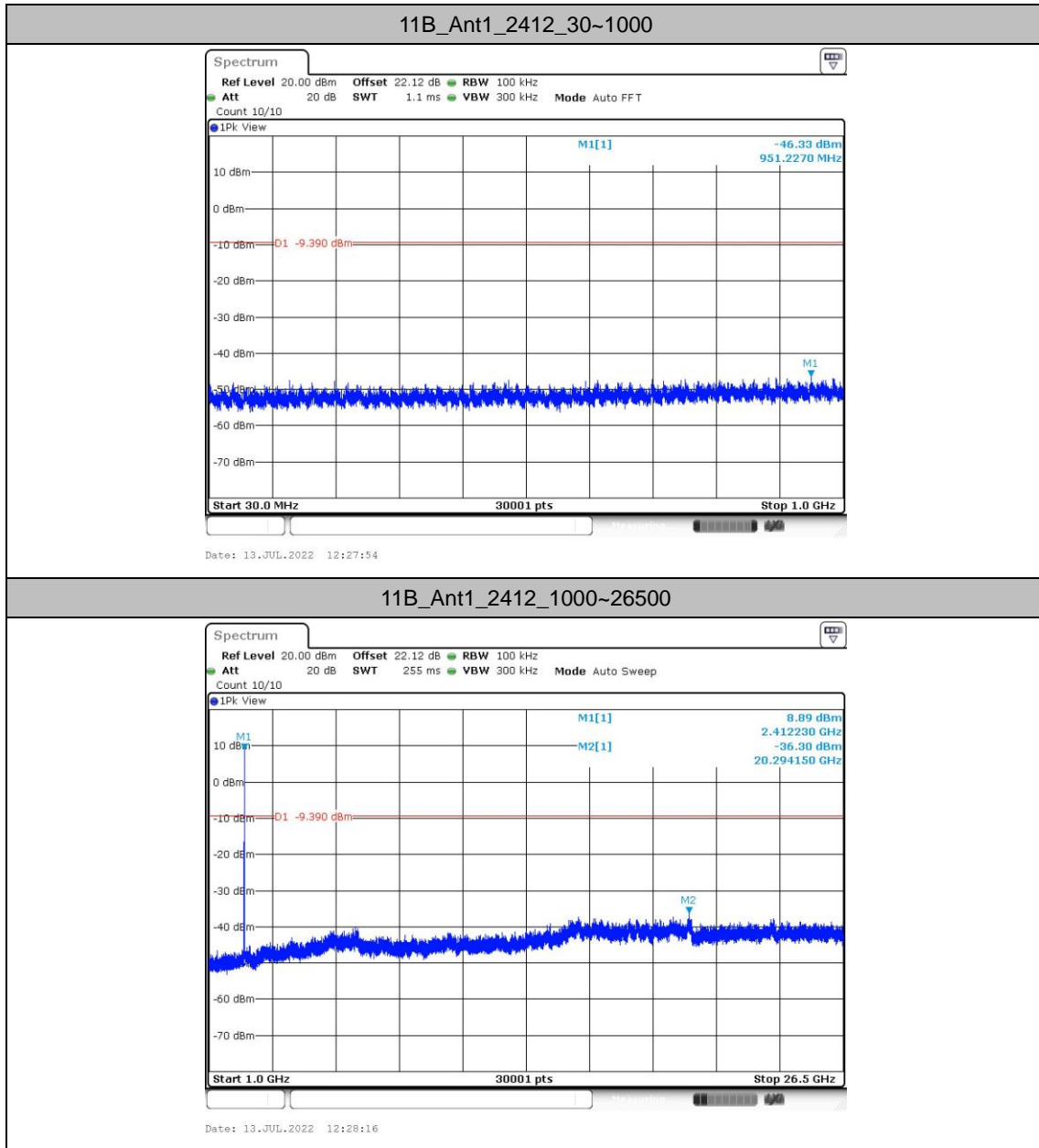
Conducted Spurious Emission

Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [Mhz]	RefLevel [dBm/100KHz]	Result [dBm/100KHz]	Limit [dBm/100KHz]	Verdict
11B	Ant1	2412	30~1000	10.61	-46.33	≤-9.39	PASS
			1000~26500	10.61	-36.3	≤-9.39	PASS
		2437	30~1000	10.12	-44.59	≤-9.88	PASS
			1000~26500	10.12	-36.66	≤-9.88	PASS
		2462	30~1000	10.12	-46.01	≤-9.88	PASS
			1000~26500	10.12	-36.79	≤-9.88	PASS
11G	Ant1	2412	30~1000	3.52	-46.17	≤-16.48	PASS
			1000~26500	3.52	-36.39	≤-16.48	PASS
		2437	30~1000	6.33	-46.52	≤-13.67	PASS
			1000~26500	6.33	-36.55	≤-13.67	PASS
		2462	30~1000	4.43	-46.34	≤-15.57	PASS
			1000~26500	4.43	-37.21	≤-15.57	PASS
11N20SISO	Ant1	2412	30~1000	3.88	-46.6	≤-16.12	PASS
			1000~26500	3.88	-37.16	≤-16.12	PASS
		2437	30~1000	5.30	-45.73	≤-14.7	PASS
			1000~26500	5.30	-36.73	≤-14.7	PASS
		2462	30~1000	4.50	-46.69	≤-15.5	PASS
			1000~26500	4.50	-36.57	≤-15.5	PASS
11AX20SISO	Ant1	2412	30~1000	3.46	-46.38	≤-16.54	PASS
			1000~26500	3.46	-35.76	≤-16.54	PASS
		2437	30~1000	5.11	-45.98	≤-14.89	PASS
			1000~26500	5.11	-36.72	≤-14.89	PASS
		2462	30~1000	3.20	-46.39	≤-16.8	PASS
			1000~26500	3.20	-36.62	≤-16.8	PASS

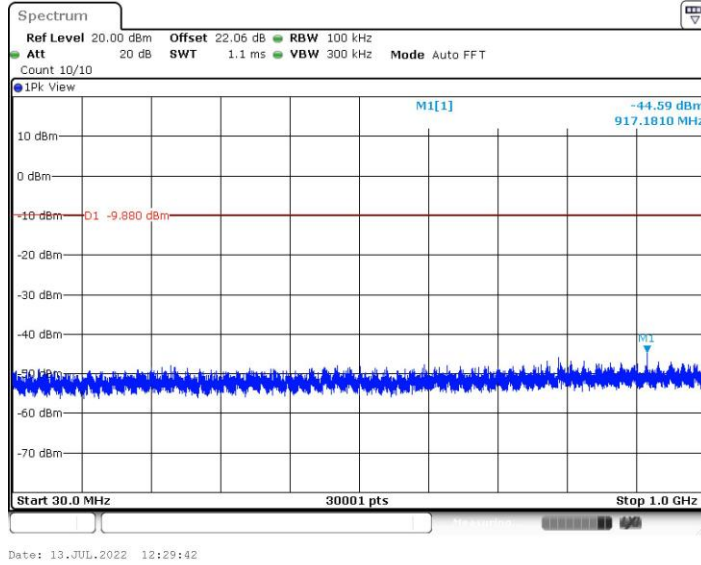


Test Graphs

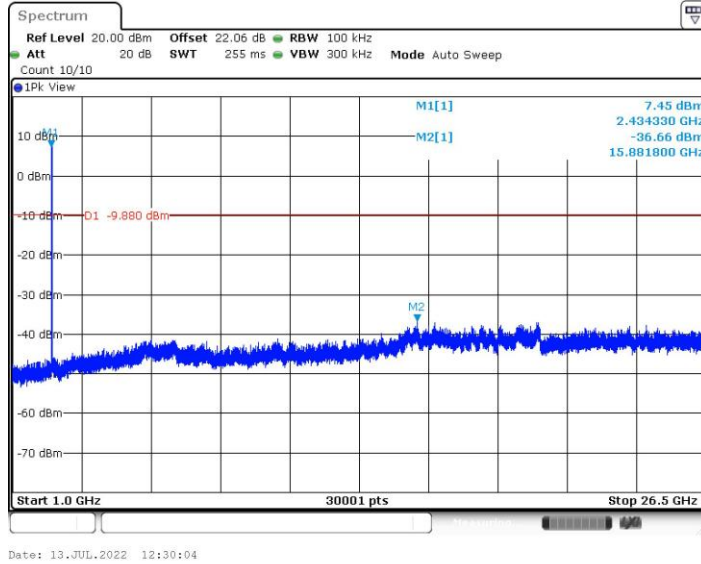




11B_Ant1_2437_30~1000

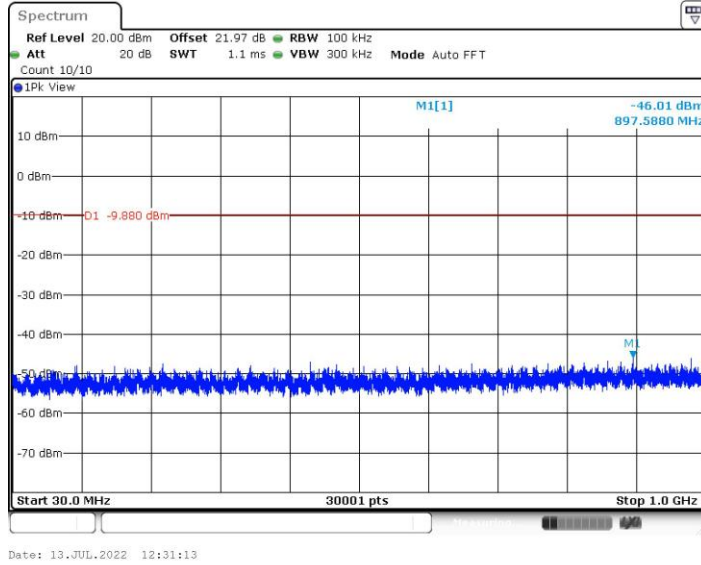


11B_Ant1_2437_1000~26500

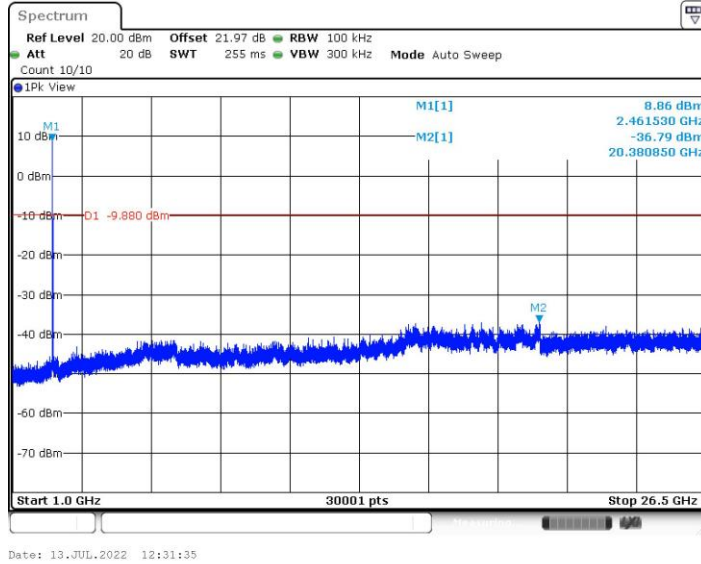


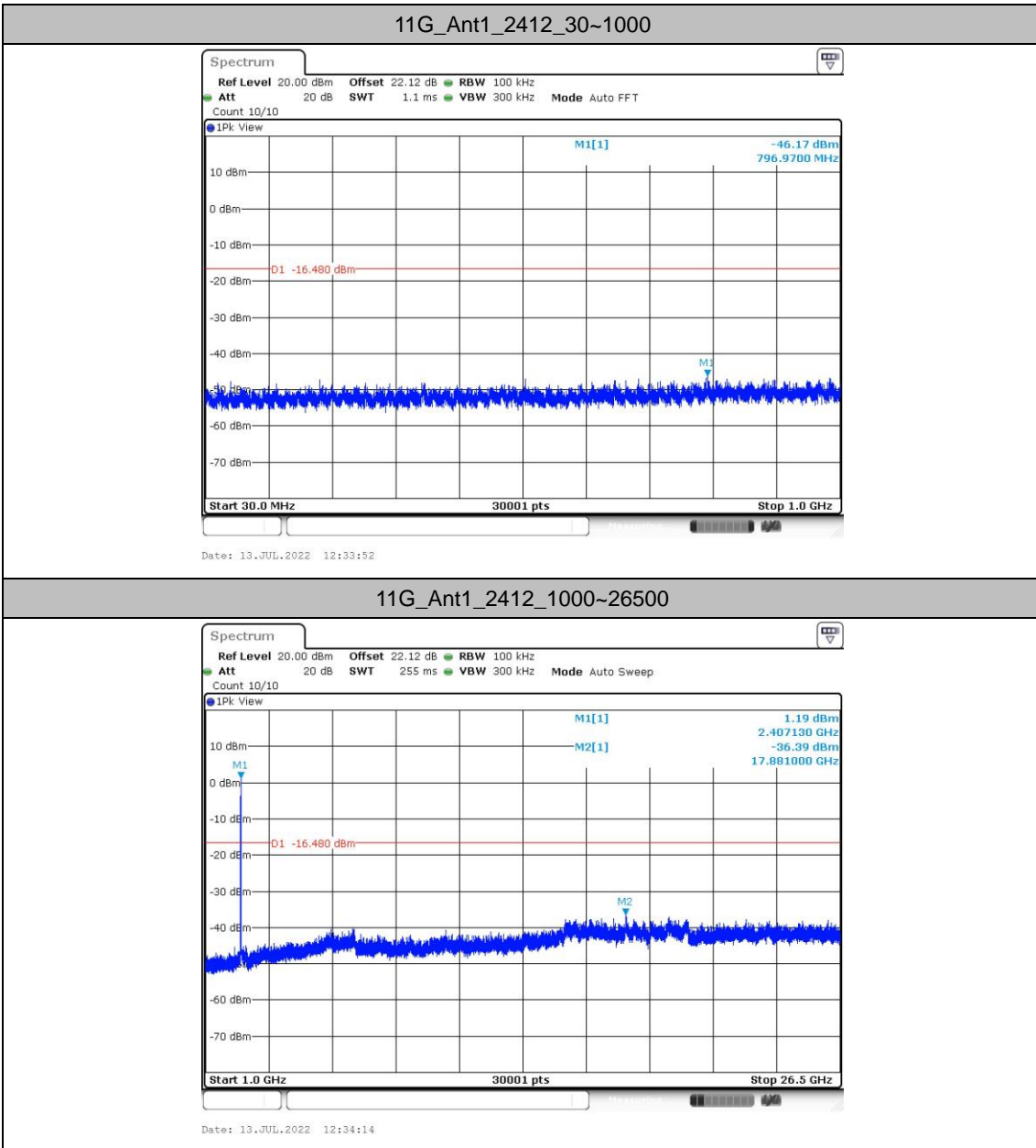


11B_Ant1_2462_30~1000



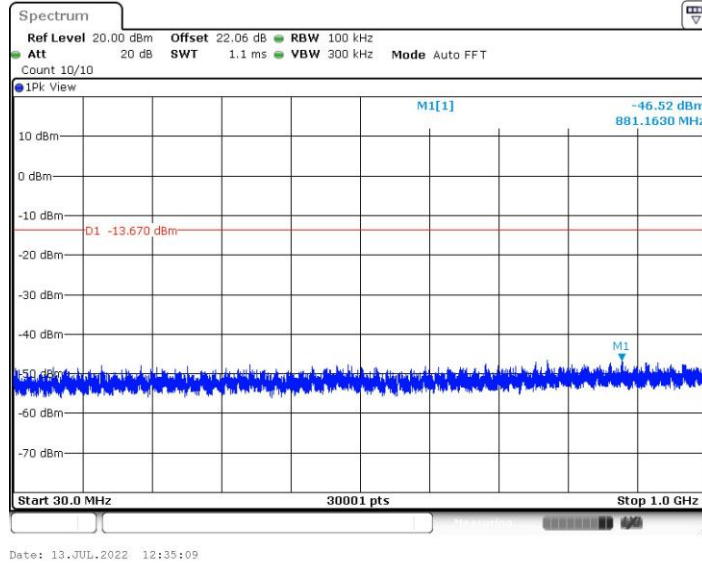
11B_Ant1_2462_1000~26500







11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500

