

TEST REPORT

Applicant Name: Fanvil Technology Co., LTD.
Address: 10/F Block A, Dualshine Global Science Innovation Honglang
North 2nd Road, Bao'an District, Shenzhen, 518101, China
Report Number: 2401V86481E-RF-00A
FCC ID: 2APPZ-H603W

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type: Portable Wi-Fi Phone
Model No.: H603W
Multiple Model(s) No.: N/A
Trade Mark: **Fanvil**
Date Received: 2024/07/17
Issue Date: 2024/09/14

Test Result:	Pass▲
--------------	-------

▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Jojo Guo

Jojo Guo
RF Engineer

Approved By:

Nancy Wang

Nancy Wang
RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP or any agency of the U.S. Government.

This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "▼".

Bay Area Compliance Laboratories Corp. (Shenzhen)

5F(B-West), 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China

Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	4
GENERAL INFORMATION.....	5
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	5
OBJECTIVE	5
TEST METHODOLOGY	6
MEASUREMENT UNCERTAINTY	7
TEST FACILITY	7
SYSTEM TEST CONFIGURATION	8
DESCRIPTION OF TEST CONFIGURATION	8
EQUIPMENT MODIFICATIONS	8
EUT EXERCISE SOFTWARE	8
DUTY CYCLE	8
SUPPORT EQUIPMENT LIST AND DETAILS	9
EXTERNAL I/O CABLE.....	9
BLOCK DIAGRAM OF TEST SETUP	9
SUMMARY OF TEST RESULTS	12
TEST EQUIPMENT LIST	13
FCC §15.247 (I) & §1.1307 (B) (1) & §2.1093 - RF EXPOSURE	15
APPLICABLE STANDARD	15
MEASUREMENT RESULT	15
FCC §15.203 - ANTENNA REQUIREMENT.....	16
APPLICABLE STANDARD	16
ANTENNA CONNECTOR CONSTRUCTION	16
FCC §15.207 (A) - AC LINE CONDUCTED EMISSIONS	17
APPLICABLE STANDARD	17
EUT SETUP	17
EMI TEST RECEIVER SETUP.....	17
TEST PROCEDURE	17
FACTOR & OVER LIMIT CALCULATION.....	18
TEST DATA	18
FCC §15.209, §15.205 & §15.247(D) - SPURIOUS EMISSIONS	25
APPLICABLE STANDARD	25
EUT SETUP	25
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	26
TEST PROCEDURE	27
FACTOR & OVER LIMIT/MARGIN CALCULATION	27
TEST DATA	27
FCC §15.247(A) (2) - 6 DB EMISSION BANDWIDTH.....	49
APPLICABLE STANDARD	49
TEST PROCEDURE	49
TEST DATA	49

FCC §15.247(B) (3) - MAXIMUM CONDUCTED OUTPUT POWER	50
APPLICABLE STANDARD	50
TEST PROCEDURE	50
TEST DATA	50
FCC §15.247(D) - 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE.....	51
APPLICABLE STANDARD	51
TEST PROCEDURE	51
TEST DATA	51
FCC §15.247(E) - POWER SPECTRAL DENSITY.....	52
APPLICABLE STANDARD	52
TEST PROCEDURE	52
TEST DATA	52
EUT PHOTOGRAPHS.....	53
TEST SETUP PHOTOGRAPHS	54
APPENDIX	55
APPENDIX A: DTS BANDWIDTH	55
APPENDIX B: OCCUPIED CHANNEL BANDWIDTH	68
APPENDIX C: MAXIMUM CONDUCTED OUTPUT POWER.....	81
APPENDIX D: MAXIMUM POWER SPECTRAL DENSITY	82
APPENDIX E: BAND EDGE MEASUREMENTS.....	95
APPENDIX F: DUTY CYCLE	103

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2401V86481E-RF-00A	Original Report	2024/09/14

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Portable Wi-Fi Phone
Tested Model	H603W
Multiple Model(s)	N/A
Frequency Range	2412-2462MHz
Maximum Conducted Peak Output Power	20.40dBm
Modulation Technique	DSSS,OFDM,OFDMA
Antenna Specification [#]	ANT1: 2.9dBi ; ANT2: 7.0dBi (provided by the applicant)
Voltage Range	DC 12V from adapter or DC 5V from USB Port or DC 3.8V from battery
Sample serial number	2ON2-2 for Conducted and Radiated Emissions Test 2ON2-1 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Adapter1 Model: DCT36W120300US-A2 Input: AC 100-240V, 50/60Hz, 1.0A max Output: DC 12.0V, 3.0A Adapter2 Model: F36L7-120300SPAU Input: AC 100-240V, 50/60Hz, 0.9A Output: DC 12.0V, 3.0A, 36.0W Adapter3 (For Direct Charging) Model: F12L20-050200SPAU Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2.0A, 10.0W

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		0.72 dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz~150 kHz	3.94dB(k=2, 95% level of confidence)
	150 kHz ~30MHz	3.84dB(k=2, 95% level of confidence)
Radiated Emissions	9kHz - 30MHz	3.30dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.05dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.35dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.44dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.16dB(k=2, 95% level of confidence)
Temperature		±1°C
Humidity		±1%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For Wi-Fi mode, total 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	/	/
6	2437	/	/
7	2442	/	/

802.11 b, 802.11g, 802.11n-HT20 and 802.11ax-HE 20 modes were tested with Channel 1, 6 and 11.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“Moba Xterm”[#] software was used. The software and power level was provided by the manufacturer.

The worst case was performed under:

Mode	Data rate	Power Level [#]		
		Low Channel	Middle Channel	High Channel
802.11b	1Mbps	10	10	10
802.11g	6Mbps	10	10	10
802.11n-HT20	MCS0	10	10	10
802.11ax-HE20	MCS0	10	10	10

Note:

1. The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, power and PSD across all data rates bandwidths, and modulations.
2. The device supports SISO/MIMO 2T2R in all modes, per pretest, 2T2R mode was the worst mode and reported for all modes.
3. For 802.11 ax modes, the device not support partial RU mode.

Duty cycle

Please refer to the Appendix.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
BULL	Receptacle	GN-415K	5503290068073
Vivo	Smart Phone	VIVO Y200T	100112572436
Inrico	Smart Terminal	S300 PLUS	7A14A0002

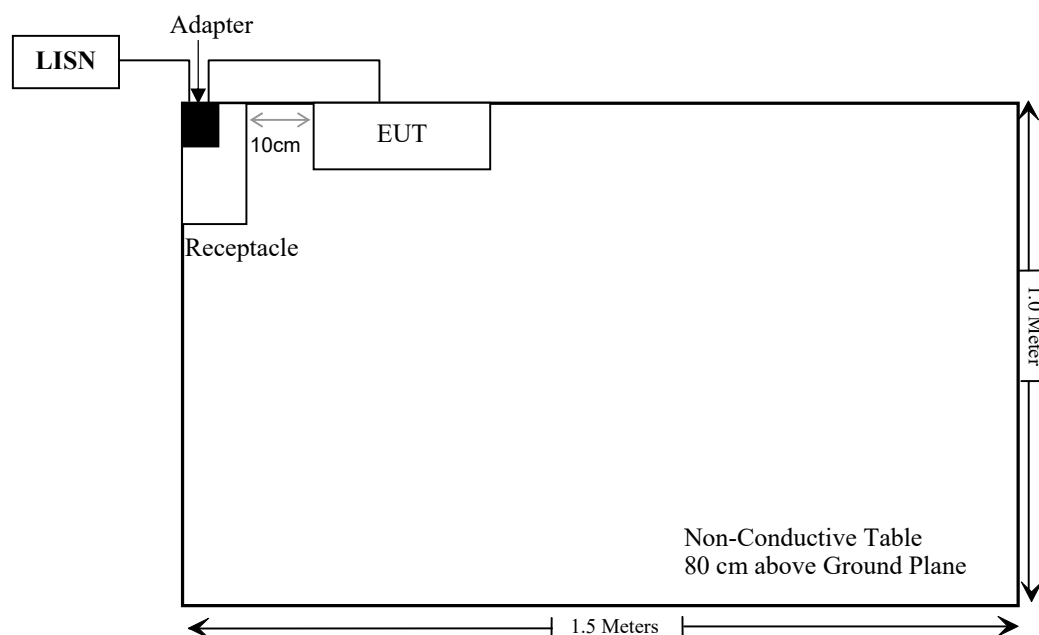
External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielded un-detachable AC cable	1.2	Receptacle	LISN/Mains
Un-shielded un-detachable DC cable	1.5	Adapter	EUT
Un-shielded detachable USB cable	1.0	Smart Phone	EUT
Un-shielded detachable USB cable	1.0	Smart Terminal	EUT

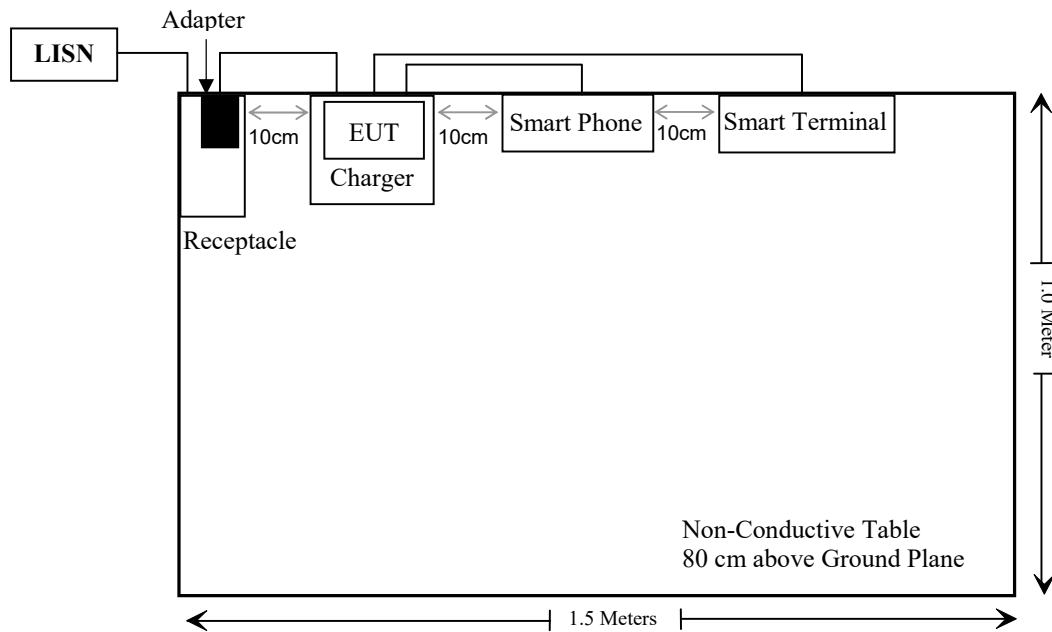
Block Diagram of Test Setup

For Conducted Emissions:

Direct Charging

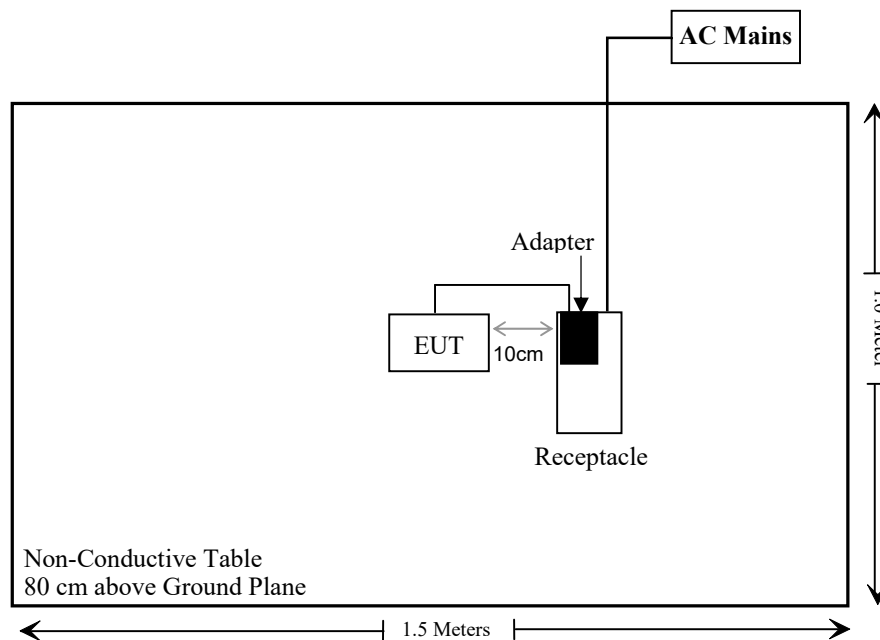


Charging by Adapter

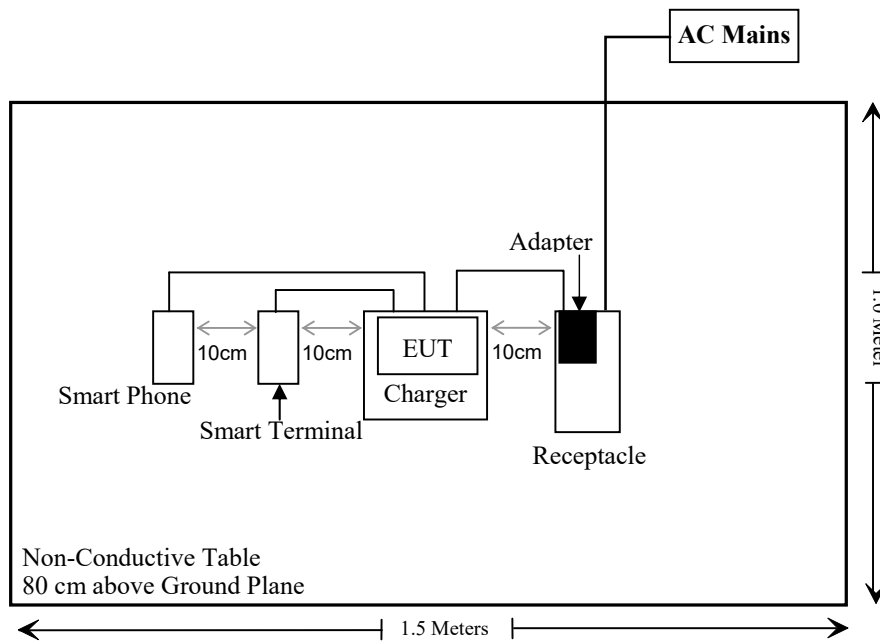


For Radiated Emissions below 1GHz:

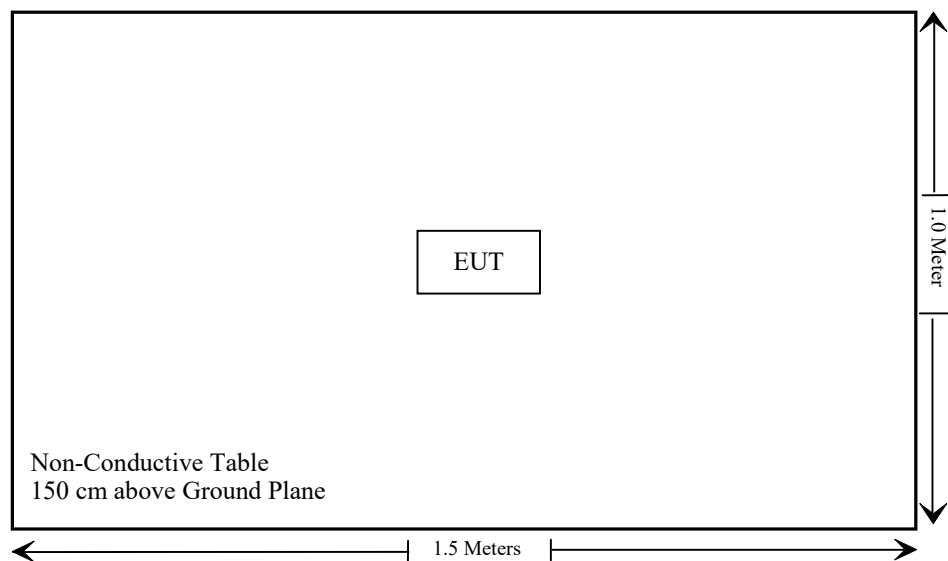
Direct Charging



Charging by Adapter



For Radiated Emissions above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1307 (b) (1) & §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/01/16	2025/01/15
Rohde & Schwarz	LISN	ENV216	101613	2024/01/16	2025/01/15
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2024/05/21	2025/05/20
Unknown	CE Cable	Unknown	UF A210B-1-0720-504504	2024/05/21	2025/05/20
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
Radiated Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/05/21	2025/05/20
Unknown	Cable	XH500C	J-10M-A	2024/05/21	2025/05/20
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/05/21	2025/05/20
Unknown	Cable	PNG214	1354	2024/05/21	2025/05/20
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
COM-POWER	Pre-amplifier	PA-122	181919	2024/06/18	2025/06/17
Schwarzbeck	Horn Antenna	BBHA9120D (1201)	1143	2023/07/26	2026/07/25
Unknown	RF Cable	KMSE	0735	2023/10/08	2024/10/07
Unknown	RF Cable	UFA147	219661	2023/10/08	2024/10/07
Unknown	RF Cable	XH750A-N	J-10M	2023/10/08	2024/10/07
JD	Multiplex Switch Test Control Set	DT7220FSU	DQ77926	NCR	NCR
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
A.H.System	Pre-amplifier	PAM-1840VH	190	2024/06/18	2025/06/17
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2024/06/18	2025/06/17

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Tonscend	RF control Unit	JS0806-2	19D8060154	2023/09/06	2024/09/05
ANRITSU	Microwave peak power sensor	MA24418A	12622	2024/05/21	2025/05/20
Rohde & Schwarz	Spectrum Analyzer	FSV40	101473	2024/01/16	2025/01/15
MARCONI	10dB Attenuator	6534/3	2942	2024/06/27	2025/06/26
Unknown	RF Cable	65475	01670515	2024/06/27	2025/06/26

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.247 (i) & §1.1307 (B) (1) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Measurement Result

Please refer to SAR test report: 2401V86481E-SAA.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Antenna Connector Construction

The EUT has two internal antennas arrangement, which were permanently attached and the antenna gain[#] is ANT1: 2.9dBi, ANT2: 7.0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

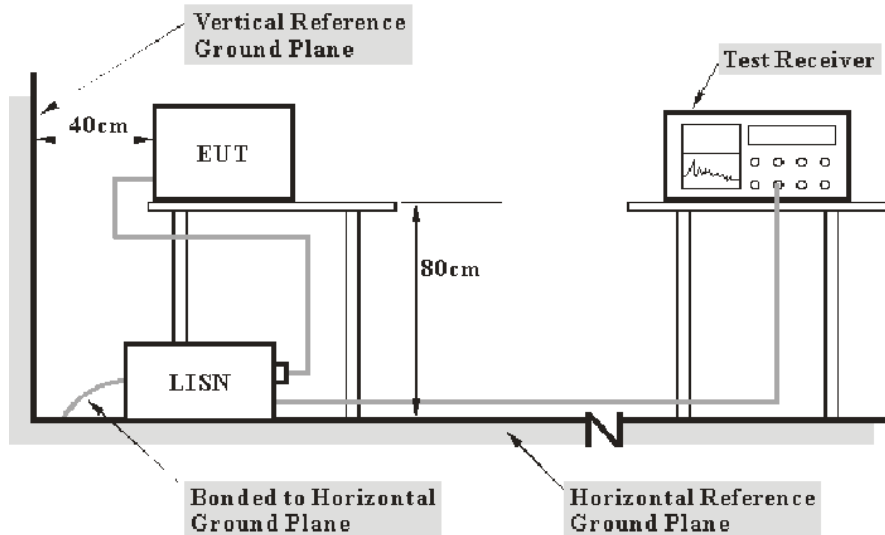
Result: Compliant

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the device was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\begin{aligned}\text{Over Limit} &= \text{level} - \text{Limit} \\ \text{Level} &= \text{reading level} + \text{Factor}\end{aligned}$$

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

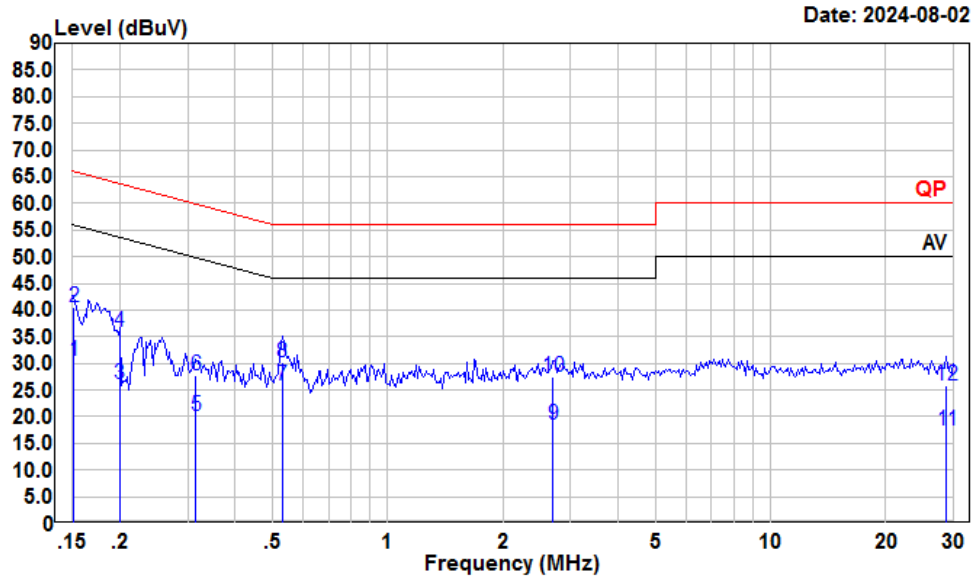
Test Data

Environmental Conditions

Temperature:	20~25 °C
Relative Humidity:	55~64 %
ATM Pressure:	101 kPa

The testing was performed by Macy Shi from 2024-08-02 to 2024-08-21.

EUT operation mode: Transmitting (Maximum output power mode, 802.11ax-HE20 Low channel)

Direct Charging:**AC 120V/60 Hz, Line**

Condition: Line

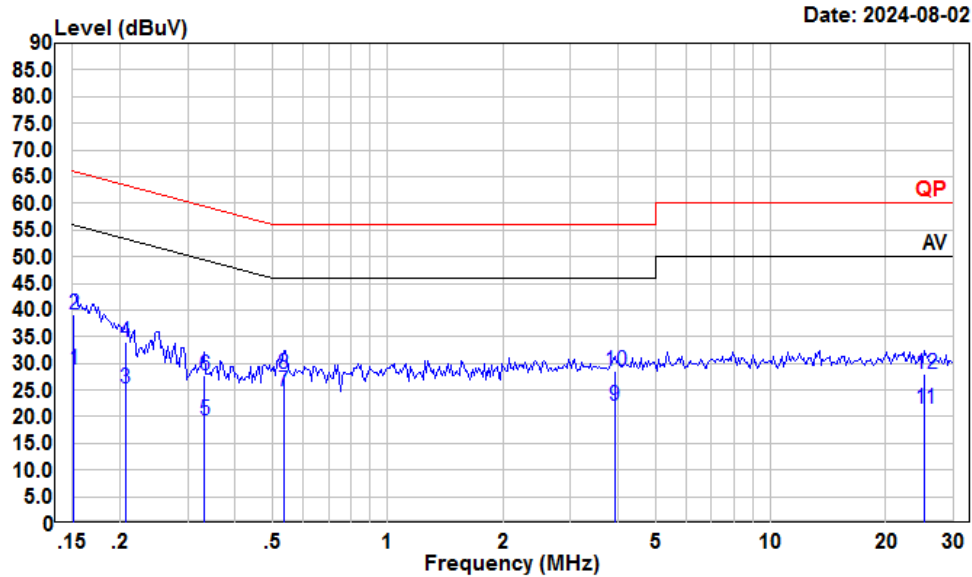
Project : 2401V86481E-RF

tester : Macy.shi

Note : 2.4G WIFI

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.15	9.32	30.35	10.90	10.13	55.91	-25.56	Average
2	0.15	19.49	40.52	10.90	10.13	65.91	-25.39	QP
3	0.20	5.29	26.18	10.80	10.09	53.62	-27.44	Average
4	0.20	14.91	35.80	10.80	10.09	63.62	-27.82	QP
5	0.31	-0.60	20.16	10.65	10.11	49.84	-29.68	Average
6	0.31	6.85	27.61	10.65	10.11	59.84	-32.23	QP
7	0.53	5.25	25.88	10.50	10.13	46.00	-20.12	Average
8	0.53	9.58	30.21	10.50	10.13	56.00	-25.79	QP
9	2.71	-2.12	18.52	10.47	10.17	46.00	-27.48	Average
10	2.71	6.77	27.41	10.47	10.17	56.00	-28.59	QP
11	28.75	-3.42	17.33	10.54	10.21	50.00	-32.67	Average
12	28.75	5.02	25.77	10.54	10.21	60.00	-34.23	QP

AC 120V/60 Hz, Neutral



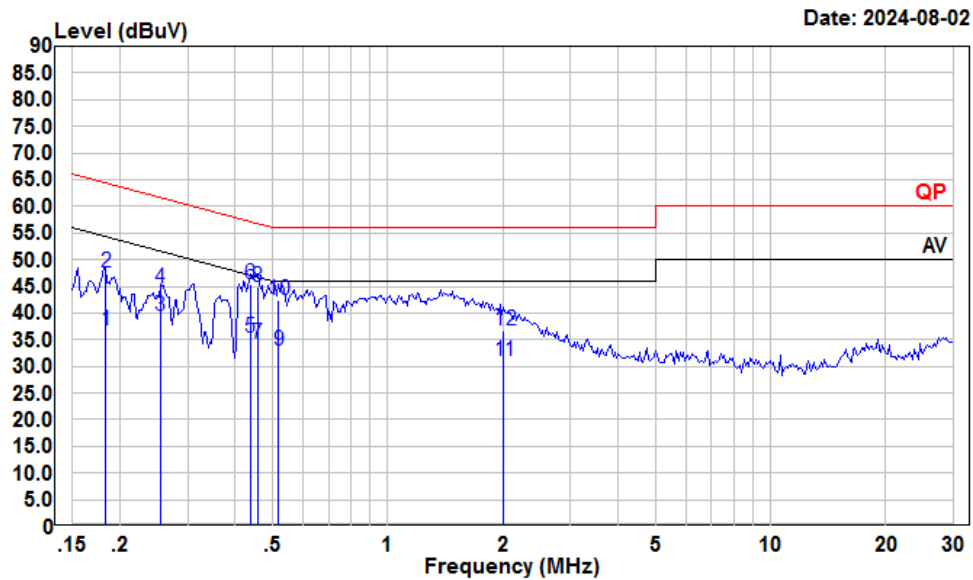
Condition: Neutral

Project : 2401V86481E-RF

tester : Macy.shi

Note : 2.4G WIFI

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.15	8.01	28.73	10.59	10.13	55.91	-27.18	Average
2	0.15	18.58	39.30	10.59	10.13	65.91	-26.61	QP
3	0.21	4.73	25.23	10.41	10.09	53.36	-28.13	Average
4	0.21	13.59	34.09	10.41	10.09	63.36	-29.27	QP
5	0.33	-1.49	19.20	10.57	10.12	49.40	-30.20	Average
6	0.33	6.96	27.65	10.57	10.12	59.40	-31.75	QP
7	0.53	3.90	24.73	10.70	10.13	46.00	-21.27	Average
8	0.53	7.20	28.03	10.70	10.13	56.00	-27.97	QP
9	3.92	1.46	22.07	10.40	10.21	46.00	-23.93	Average
10	3.92	8.08	28.69	10.40	10.21	56.00	-27.31	QP
11	25.32	0.81	21.58	10.58	10.19	50.00	-28.42	Average
12	25.32	7.18	27.95	10.58	10.19	60.00	-32.05	QP

Charging by Adapter 1:**AC 120V/60 Hz, Line**

Condition: Line

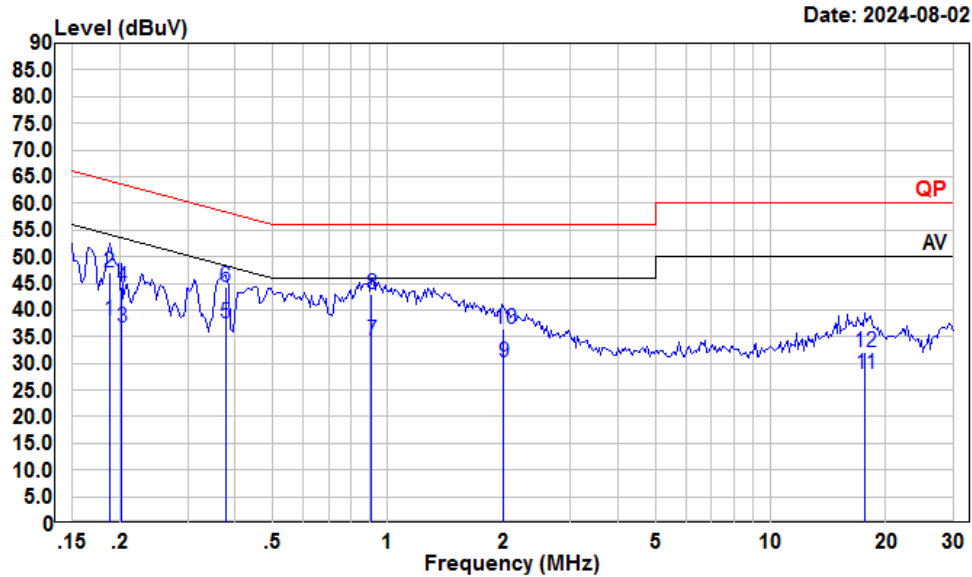
Project : 2401V86481E-RF

tester : Macy.shi

Note : 2.4G WIFI

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.18	15.75	36.68	10.83	10.10	54.33	-17.65	Average
2	0.18	26.63	47.56	10.83	10.10	64.33	-16.77	QP
3	0.25	18.55	39.35	10.72	10.08	51.60	-12.25	Average
4	0.25	23.77	44.57	10.72	10.08	61.60	-17.03	QP
5	0.44	14.59	35.24	10.54	10.11	47.11	-11.87	Average
6	0.44	24.65	45.30	10.54	10.11	57.11	-11.81	QP
7	0.46	13.50	34.15	10.53	10.12	46.76	-12.61	Average
8	0.46	24.10	44.75	10.53	10.12	56.76	-12.01	QP
9	0.52	12.21	32.85	10.50	10.14	46.00	-13.15	Average
10	0.52	21.80	42.44	10.50	10.14	56.00	-13.56	QP
11	2.01	10.12	30.91	10.60	10.19	46.00	-15.09	Average
12	2.01	16.01	36.80	10.60	10.19	56.00	-19.20	QP

AC 120V/60 Hz, Neutral



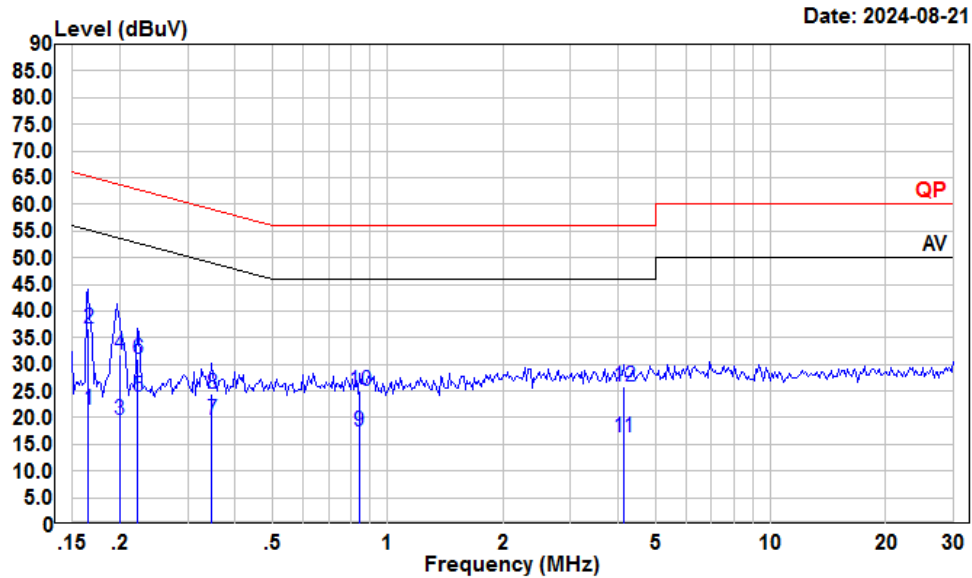
Condition: Neutral

Project : 2401V86481E-RF

tester : Macy.shi

Note : 2.4G WIFI

	Freq	Read Level	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.19	17.46	38.00	10.45	10.09	54.15	-16.15	Average
2	0.19	26.42	46.96	10.45	10.09	64.15	-17.19	QP
3	0.20	16.13	36.62	10.40	10.09	53.54	-16.92	Average
4	0.20	23.97	44.46	10.40	10.09	63.54	-19.08	QP
5	0.38	16.79	37.51	10.61	10.11	48.34	-10.83	Average
6	0.38	23.70	44.42	10.61	10.11	58.34	-13.92	QP
7	0.91	13.45	34.40	10.85	10.10	46.00	-11.60	Average
8	0.91	21.97	42.92	10.85	10.10	56.00	-13.08	QP
9	2.01	9.69	30.28	10.40	10.19	46.00	-15.72	Average
10	2.01	15.77	36.36	10.40	10.19	56.00	-19.64	QP
11	17.66	7.05	27.98	10.74	10.19	50.00	-22.02	Average
12	17.66	11.15	32.08	10.74	10.19	60.00	-27.92	QP

Charging by Adapter 2:**AC 120V/60 Hz, Line**

Condition: Line

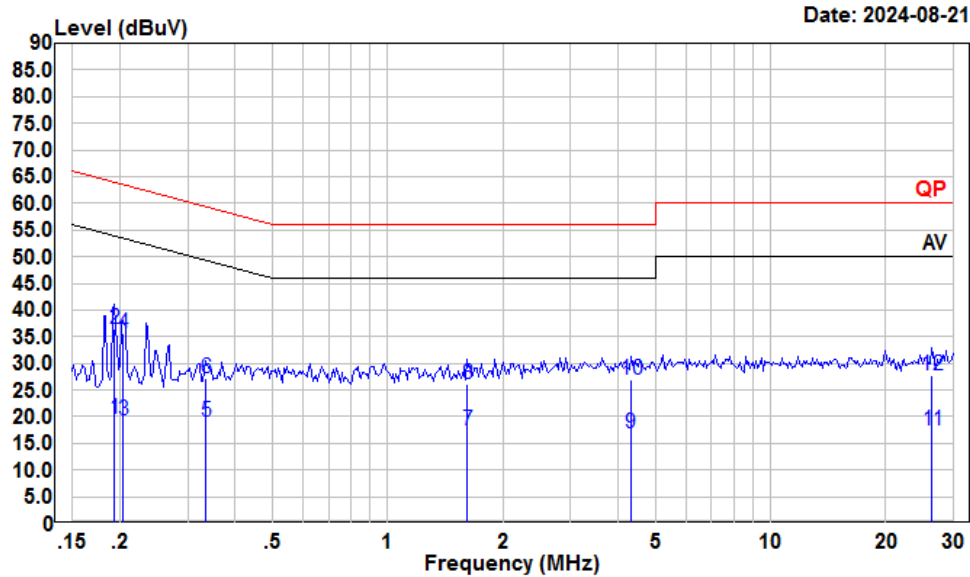
Project : 2401V86481E-RF

tester : Macy.shi

Note : 2.4G WIFI

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.165	0.49	21.47	10.87	10.11	55.21	-33.74	Average
2	0.165	15.63	36.61	10.87	10.11	65.21	-28.60	QP
3	0.200	-1.38	19.51	10.80	10.09	53.62	-34.11	Average
4	0.200	10.81	31.70	10.80	10.09	63.62	-31.92	QP
5	0.222	3.16	24.02	10.77	10.09	52.74	-28.72	Average
6	0.222	10.27	31.13	10.77	10.09	62.74	-31.61	QP
7	0.346	-1.16	19.58	10.62	10.12	49.05	-29.47	Average
8	0.346	3.63	24.37	10.62	10.12	59.05	-34.68	QP
9	0.844	-3.23	17.33	10.45	10.11	46.00	-28.67	Average
10	0.844	4.57	25.13	10.45	10.11	56.00	-30.87	QP
11	4.136	-4.29	16.23	10.31	10.21	46.00	-29.77	Average
12	4.136	5.41	25.93	10.31	10.21	56.00	-30.07	QP

AC 120V/60 Hz, Neutral



Condition: Neutral

Project : 2401V86481E-RF

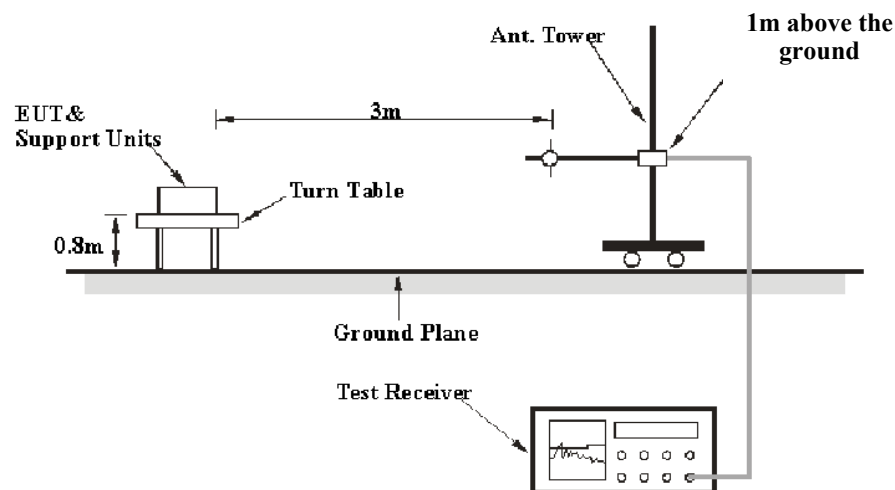
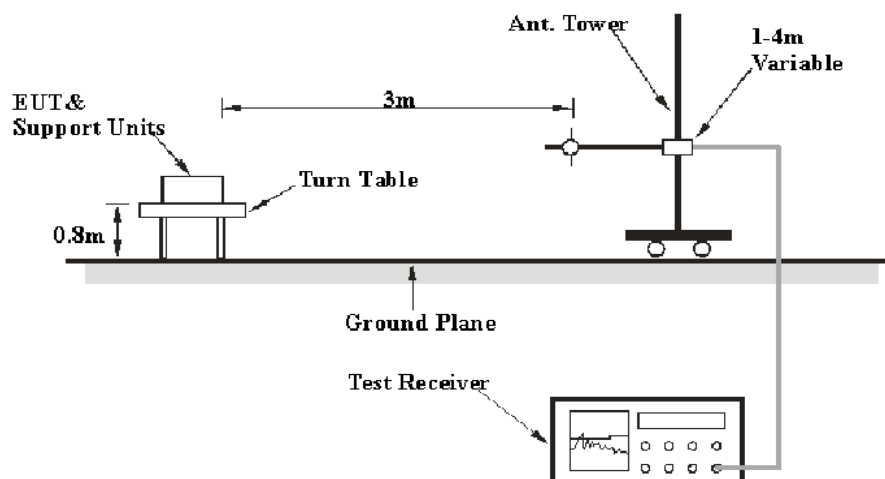
tester : Macy.shi

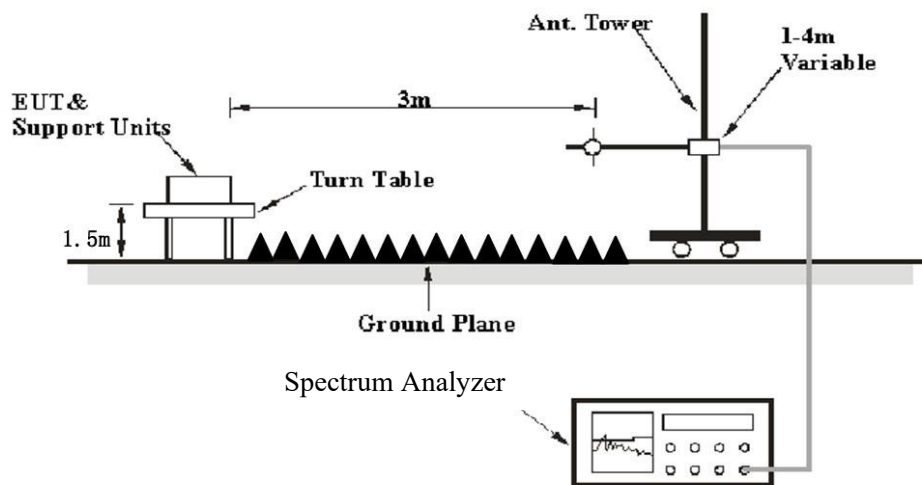
Note : 2.4G WIFI

	Freq	Read Level	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.193	-1.00	19.51	10.42	10.09	53.89	-34.38	Average
2	0.193	15.82	36.33	10.42	10.09	63.89	-27.56	QP
3	0.204	-1.16	19.34	10.41	10.09	53.45	-34.11	Average
4	0.204	15.25	35.75	10.41	10.09	63.45	-27.70	QP
5	0.336	-1.60	19.09	10.57	10.12	49.31	-30.22	Average
6	0.336	6.48	27.17	10.57	10.12	59.31	-32.14	QP
7	1.610	-3.43	17.30	10.56	10.17	46.00	-28.70	Average
8	1.610	5.39	26.12	10.56	10.17	56.00	-29.88	QP
9	4.315	-3.88	16.76	10.44	10.20	46.00	-29.24	Average
10	4.315	6.41	27.05	10.44	10.20	56.00	-28.95	QP
11	26.418	-3.30	17.46	10.56	10.20	50.00	-32.54	Average
12	26.418	6.97	27.73	10.56	10.20	60.00	-32.27	QP

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

EUT Setup**9 kHz-30MHz:****30MHz-1GHz:**

Above 1GHz:

The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

9 kHz-1GHz:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	/	/	200 Hz	QP
	300 Hz	1 kHz	/	PK
150 kHz – 30 MHz	/	/	9 kHz	QP
	10 kHz	30 kHz	/	PK
30 MHz – 1000 MHz	/	/	120 kHz	QP
	100 kHz	300 kHz	/	PK

1-25GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	10 Hz
	<98%	1MHz	≥1/Ton

Note: Ton is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

All emissions under the average limit and under the noise floor have not recorded in the report.

Factor & Over Limit/Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned}\text{Over Limit/Margin} &= \text{Level/Corrected Amplitude} - \text{Limit} \\ \text{Level / Corrected Amplitude} &= \text{Read Level} + \text{Factor}\end{aligned}$$

Test Data

Environmental Conditions

Temperature:	22 ~25°C
Relative Humidity:	50~54 %
ATM Pressure:	101 kPa

The testing was performed by Anson Su on 2024-08-13 for below 1GHz and Zenos Qiao on 2024-09-06 for above 1GHz.

EUT operation mode: Transmitting

Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axis of orientation was recorded.

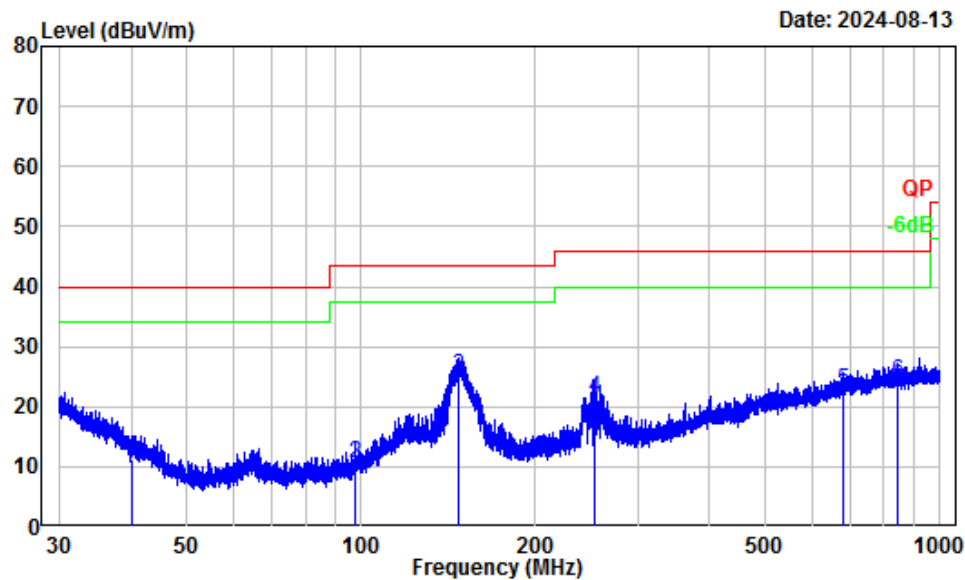
9 kHz-30MHz: (*Maximum output power mode, 802.11ax-HE20 Low channel*)

The amplitude of spurious emissions attenuated more than 20 dB below the limit was not recorded.

30MHz-1GHz: (Maximum output power mode, 802.11ax-HE20 Low channel)

Direct Charging

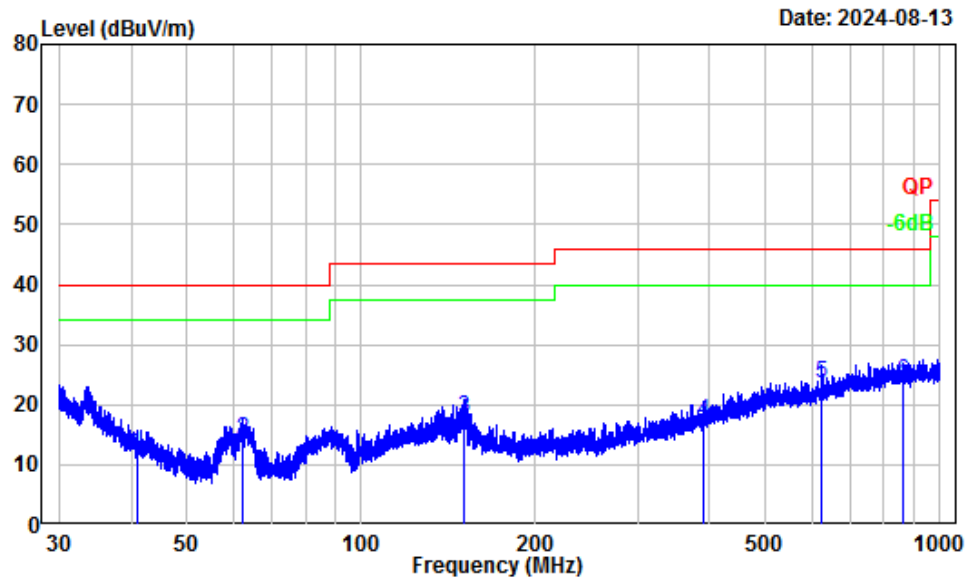
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401V86481E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.06	-12.41	23.61	11.20	40.00	-28.80	QP
2	97.67	-16.38	26.83	10.45	43.50	-33.05	QP
3	147.60	-12.33	37.31	24.98	43.50	-18.52	QP
4	252.28	-13.00	34.51	21.51	46.00	-24.49	QP
5	678.77	-3.78	26.46	22.68	46.00	-23.32	QP
6	842.87	-1.78	25.87	24.09	46.00	-21.91	QP

Vertical

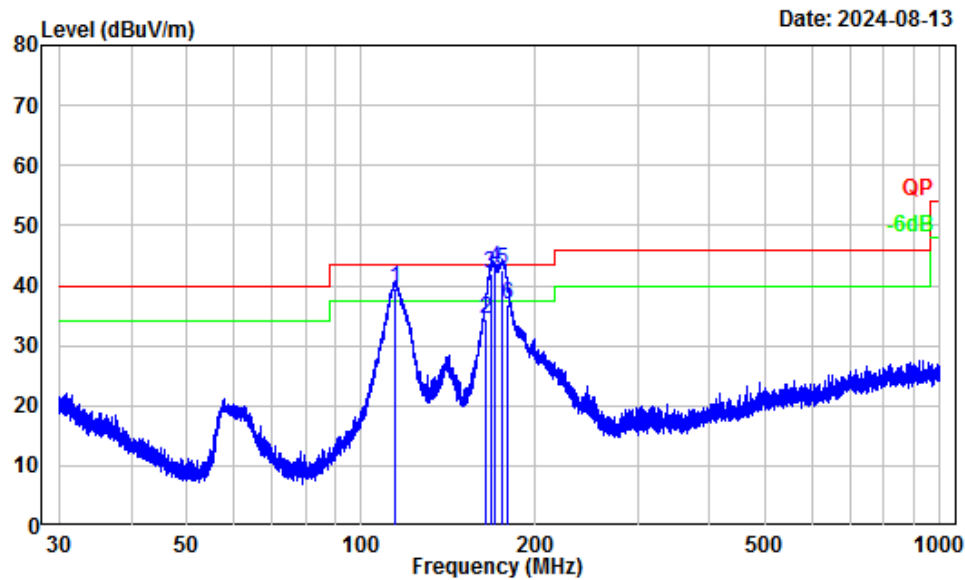


Site : Chamber A
Condition : 3m Vertical
Project Number: 2401V86481E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

	Freq Factor		Read Level	Limit Level	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1	40.86	-12.86	24.52	11.66	40.00	-28.34 QP
2	62.29	-18.06	32.37	14.31	40.00	-25.69 QP
3	150.34	-12.47	30.19	17.72	43.50	-25.78 QP
4	391.24	-8.72	26.05	17.33	46.00	-28.67 QP
5	626.17	-4.67	28.25	23.58	46.00	-22.42 QP
6	866.47	-1.59	25.51	23.92	46.00	-22.08 QP

Charging by Adapter 1

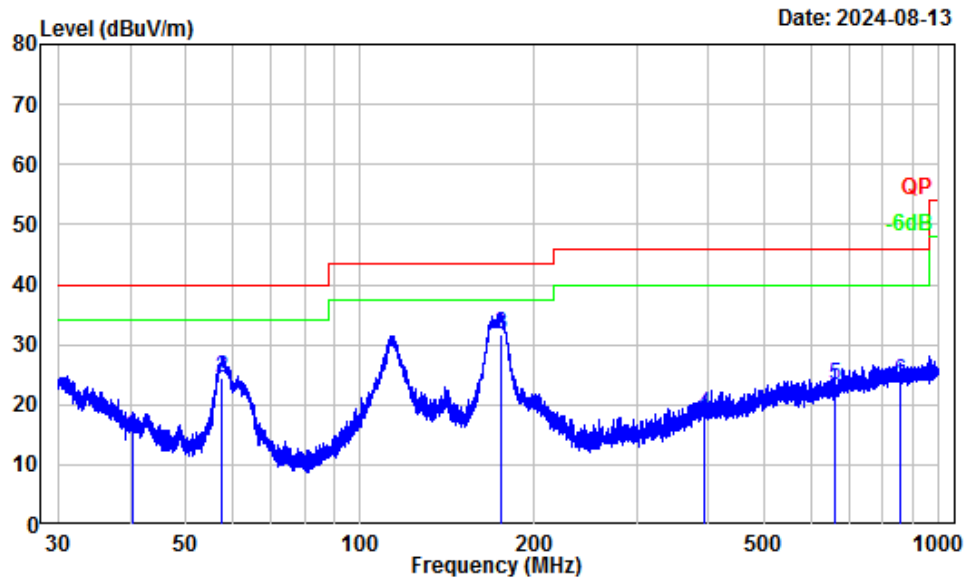
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401V86481E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

	Freq Factor		Read	Level	Limit	Over	Remark
	MHz	dB/m	Level	Level	Line	Limit	
			dBuV	dBuV/m	dBuV/m	dB	
1	114.36	-12.38	51.91	39.53	43.50	-3.97	QP
2	164.19	-12.88	47.30	34.42	43.50	-9.08	QP
3	167.09	-12.99	55.00	42.01	43.50	-1.49	QP
4	170.42	-13.13	56.01	42.88	43.50	-0.62	QP
5	174.96	-13.38	55.91	42.53	43.50	-0.97	QP
6	179.23	-13.60	50.49	36.89	43.50	-6.61	QP

Vertical

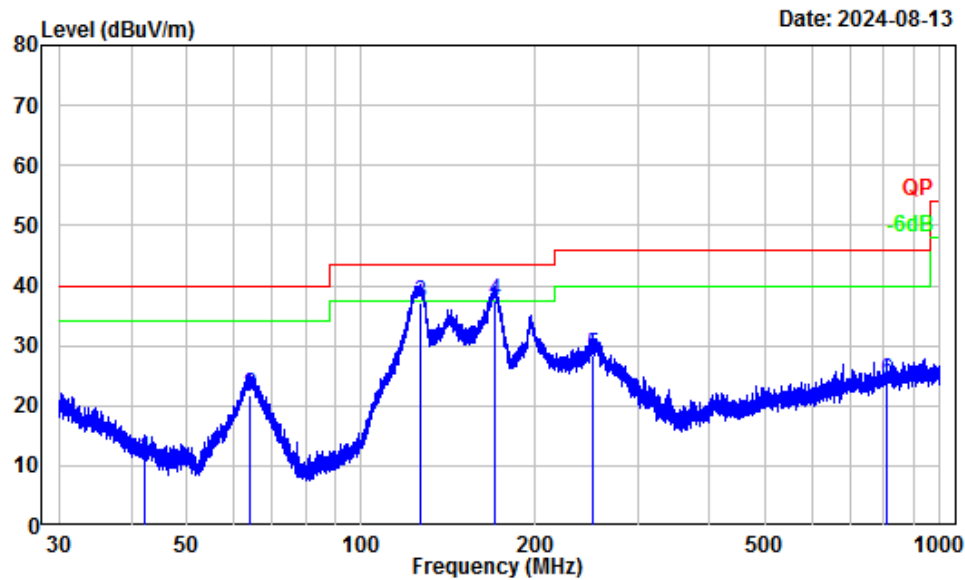


Site : Chamber A
Condition : 3m Vertical
Project Number: 2401V86481E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

	Freq Factor		Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.28	-12.52	27.18	14.66	40.00	-25.34	QP
2	57.70	-18.07	42.43	24.36	40.00	-15.64	QP
3	175.42	-13.40	45.18	31.78	43.50	-11.72	QP
4	392.96	-8.66	27.17	18.51	46.00	-27.49	QP
5	662.89	-3.98	27.20	23.22	46.00	-22.78	QP
6	856.27	-1.67	25.42	23.75	46.00	-22.25	QP

Charging by Adapter 2

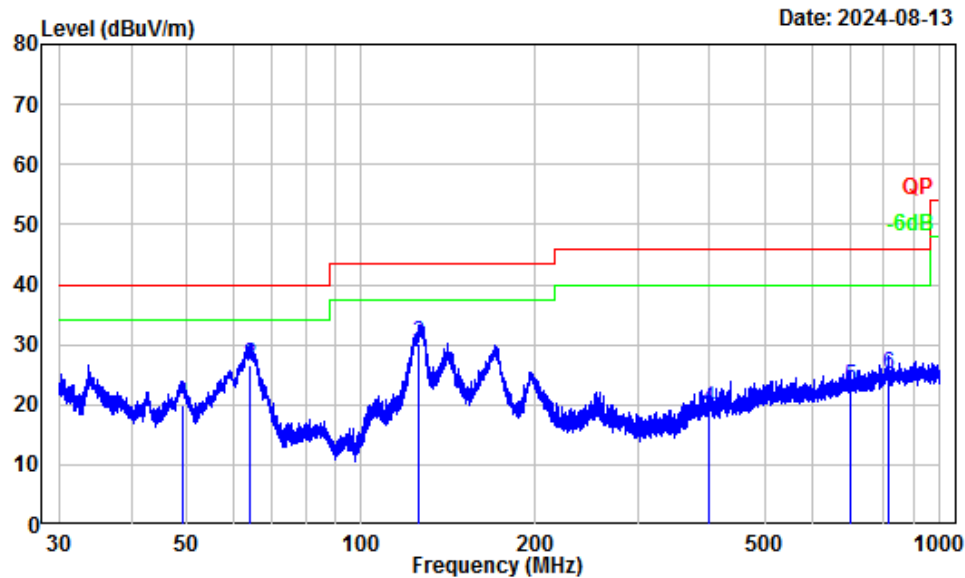
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401V86481E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	42.30	-13.66	24.68	11.02	40.00	-28.98	QP
2	64.15	-18.02	39.84	21.82	40.00	-18.18	QP
3	126.33	-11.29	48.40	37.11	43.50	-6.39	QP
4	169.67	-13.09	50.41	37.32	43.50	-6.18	QP
5	250.96	-13.06	41.58	28.52	46.00	-17.48	QP
6	809.56	-2.06	26.35	24.29	46.00	-21.71	QP

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number: 2401V86481E-RF
Test Mode : 2.4G WIFI
Tester : Anson Su

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	49.06	-17.40	37.24	19.84	40.00	-20.16	QP
2	64.07	-18.02	44.68	26.66	40.00	-13.34	QP
3	125.39	-11.31	41.47	30.16	43.50	-13.34	QP
4	399.56	-8.42	27.89	19.47	46.00	-26.53	QP
5	699.30	-3.53	26.43	22.90	46.00	-23.10	QP
6	814.18	-2.02	27.17	25.15	46.00	-20.85	QP

1-25 GHz:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
802.11b Ant1							
Low Channel 2412MHz							
2389.59	72.57	PK	H	-2.93	69.64	74	-4.36
2389.59	42.24	AV	H	-2.93	39.31	54	-14.69
2389.24	70.72	PK	V	-2.93	67.79	74	-6.21
2389.24	41.81	AV	V	-2.93	38.88	54	-15.12
4824.00	50.57	PK	H	2.45	53.02	74	-20.98
4824.00	40.99	AV	H	2.45	43.44	54	-10.56
4824.00	49.08	PK	V	2.45	51.53	74	-22.47
4824.00	39.74	AV	V	2.45	42.19	54	-11.81
Middle Channel 2437MHz							
4874.00	50.89	PK	H	2.56	53.45	74	-20.55
4874.00	41.30	AV	H	2.56	43.86	54	-10.14
4874.00	49.36	PK	V	2.56	51.92	74	-22.08
4874.00	40.12	AV	V	2.56	42.68	54	-11.32
High Channel 2462MHz							
2484.01	56.73	PK	H	-3.17	53.56	74	-20.44
2484.01	43.57	AV	H	-3.17	40.40	54	-13.60
2483.82	56.25	PK	V	-3.17	53.08	74	-20.92
2483.82	43.04	AV	V	-3.17	39.87	54	-14.13
4924.00	49.53	PK	H	2.63	52.16	74	-21.84
4924.00	40.32	AV	H	2.63	42.95	54	-11.05
4924.00	48.04	PK	V	2.63	50.67	74	-23.33
4924.00	39.15	AV	V	2.63	41.78	54	-12.22

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
802.11b Ant2							
Low Channel 2412MHz							
2387.86	55.45	PK	H	-2.93	52.52	74	-21.48
2387.86	41.52	AV	H	-2.93	38.59	54	-15.41
2388.25	55.21	PK	V	-2.93	52.28	74	-21.72
2388.25	41.37	AV	V	-2.93	38.44	54	-15.56
4824.00	47.17	PK	H	2.45	49.62	74	-24.38
4824.00	34.08	AV	H	2.45	36.53	54	-17.47
4824.00	46.32	PK	V	2.45	48.77	74	-25.23
4824.00	33.59	AV	V	2.45	36.04	54	-17.96
Middle Channel 2437MHz							
4874.00	47.49	PK	H	2.56	50.05	74	-23.95
4874.00	34.36	AV	H	2.56	36.92	54	-17.08
4874.00	46.64	PK	V	2.56	49.20	74	-24.80
4874.00	33.85	AV	V	2.56	36.41	54	-17.59
High Channel 2462MHz							
2483.56	55.58	PK	H	-3.17	52.41	74	-21.59
2483.56	42.49	AV	H	-3.17	39.32	54	-14.68
2483.75	55.27	PK	V	-3.17	52.10	74	-21.90
2483.75	42.12	AV	V	-3.17	38.95	54	-15.05
4924.00	46.82	PK	H	2.63	49.45	74	-24.55
4924.00	33.54	AV	H	2.63	36.17	54	-17.83
4924.00	46.10	PK	V	2.63	48.73	74	-25.27
4924.00	33.03	AV	V	2.63	35.66	54	-18.34

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
802.11g Ant1							
Low Channel 2412MHz							
2389.25	57.13	PK	H	-2.93	54.20	74	-19.80
2389.25	44.71	AV	H	-2.93	41.78	54	-12.22
2389.48	56.64	PK	V	-2.93	53.71	74	-20.29
2389.48	44.32	AV	V	-2.93	41.39	54	-12.61
4824.00	49.24	PK	H	2.45	51.69	74	-22.31
4824.00	36.35	AV	H	2.45	38.80	54	-15.20
4824.00	48.07	PK	V	2.45	50.52	74	-23.48
4824.00	35.62	AV	V	2.45	38.07	54	-15.93
Middle Channel 2437MHz							
4874.00	48.87	PK	H	2.56	51.43	74	-22.57
4874.00	36.14	AV	H	2.56	38.70	54	-15.30
4874.00	47.69	PK	V	2.56	50.25	74	-23.75
4874.00	35.45	AV	V	2.56	38.01	54	-15.99
High Channel 2462MHz							
2483.75	59.42	PK	H	-3.17	56.25	74	-17.75
2483.75	46.76	AV	H	-3.17	43.59	54	-10.41
2483.60	58.25	PK	V	-3.17	55.08	74	-18.92
2483.60	46.09	AV	V	-3.17	42.92	54	-11.08
4924.00	48.25	PK	H	2.63	50.88	74	-23.12
4924.00	35.63	AV	H	2.63	38.26	54	-15.74
4924.00	47.06	PK	V	2.63	49.69	74	-24.31
4924.00	34.92	AV	V	2.63	37.55	54	-16.45

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
802.11g Ant2							
Low Channel 2412MHz							
2388.90	55.39	PK	H	-2.93	52.46	74	-21.54
2388.90	42.52	AV	H	-2.93	39.59	54	-14.41
2389.18	55.07	PK	V	-2.93	52.14	74	-21.86
2389.18	42.28	AV	V	-2.93	39.35	54	-14.65
4824.00	47.64	PK	H	2.45	50.09	74	-23.91
4824.00	34.28	AV	H	2.45	36.73	54	-17.27
4824.00	47.05	PK	V	2.45	49.50	74	-24.50
4824.00	33.90	AV	V	2.45	36.35	54	-17.65
Middle Channel 2437MHz							
4874.00	47.25	PK	H	2.56	49.81	74	-24.19
4874.00	33.97	AV	H	2.56	36.53	54	-17.47
4874.00	46.48	PK	V	2.56	49.04	74	-24.96
4874.00	33.52	AV	V	2.56	36.08	54	-17.92
High Channel 2462MHz							
2483.60	55.78	PK	H	-3.17	52.61	74	-21.39
2483.60	42.84	AV	H	-3.17	39.67	54	-14.33
2483.82	55.25	PK	V	-3.17	52.08	74	-21.92
2483.82	42.53	AV	V	-3.17	39.36	54	-14.64
4924.00	46.94	PK	H	2.63	49.57	74	-24.43
4924.00	33.68	AV	H	2.63	36.31	54	-17.69
4924.00	46.17	PK	V	2.63	48.80	74	-25.20
4924.00	33.25	AV	V	2.63	35.88	54	-18.12

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
802.11n20							
Low Channel 2412MHz							
2389.13	62.48	PK	H	-2.93	59.55	74	-14.45
2389.13	48.86	AV	H	-2.93	45.93	54	-8.07
2389.40	60.75	PK	V	-2.93	57.82	74	-16.18
2389.40	48.04	AV	V	-2.93	45.11	54	-8.89
4824.00	47.25	PK	H	2.45	49.70	74	-24.30
4824.00	35.63	AV	H	2.45	38.08	54	-15.92
4824.00	46.38	PK	V	2.45	48.83	74	-25.17
4824.00	34.79	AV	V	2.45	37.24	54	-16.76
Middle Channel 2437MHz							
4874.00	48.14	PK	H	2.56	50.70	74	-23.30
4874.00	36.52	AV	H	2.56	39.08	54	-14.92
4874.00	47.26	PK	V	2.56	49.82	74	-24.18
4874.00	35.67	AV	V	2.56	38.23	54	-15.77
High Channel 2462MHz							
2483.82	64.17	PK	H	-3.17	61.00	74	-13.00
2483.82	49.49	AV	H	-3.17	46.32	54	-7.68
2483.67	62.52	PK	V	-3.17	59.35	74	-14.65
2483.67	48.64	AV	V	-3.17	45.47	54	-8.53
4924.00	48.87	PK	H	2.63	51.50	74	-22.50
4924.00	37.09	AV	H	2.63	39.72	54	-14.28
4924.00	47.96	PK	V	2.63	50.59	74	-23.41
4924.00	36.24	AV	V	2.63	38.87	54	-15.13

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
802.11ax20							
Low Channel 2412MHz							
2389.94	64.76	PK	H	-2.93	61.83	74	-12.17
2389.94	49.94	AV	H	-2.93	47.01	54	-6.99
2389.73	63.19	PK	V	-2.93	60.26	74	-13.74
2389.73	49.07	AV	V	-2.93	46.14	54	-7.86
4824.00	47.09	PK	H	2.45	49.54	74	-24.46
4824.00	35.95	AV	H	2.45	38.40	54	-15.60
4824.00	46.26	PK	V	2.45	48.71	74	-25.29
4824.00	35.11	AV	V	2.45	37.56	54	-16.44
Middle Channel 2437MHz							
4874.00	47.87	PK	H	2.56	50.43	74	-23.57
4874.00	36.78	AV	H	2.56	39.34	54	-14.66
4874.00	47.05	PK	V	2.56	49.61	74	-24.39
4874.00	35.94	AV	V	2.56	38.50	54	-15.50
High Channel 2462MHz							
2483.56	65.69	PK	H	-3.17	62.52	74	-11.48
2483.56	50.78	AV	H	-3.17	47.61	54	-6.39
2483.63	64.07	PK	V	-3.17	60.90	74	-13.10
2483.63	49.81	AV	V	-3.17	46.64	54	-7.36
4924.00	48.73	PK	H	2.63	51.36	74	-22.64
4924.00	37.12	AV	H	2.63	39.75	54	-14.25
4924.00	47.89	PK	V	2.63	50.52	74	-23.48
4924.00	36.25	AV	V	2.63	38.88	54	-15.12

Note:

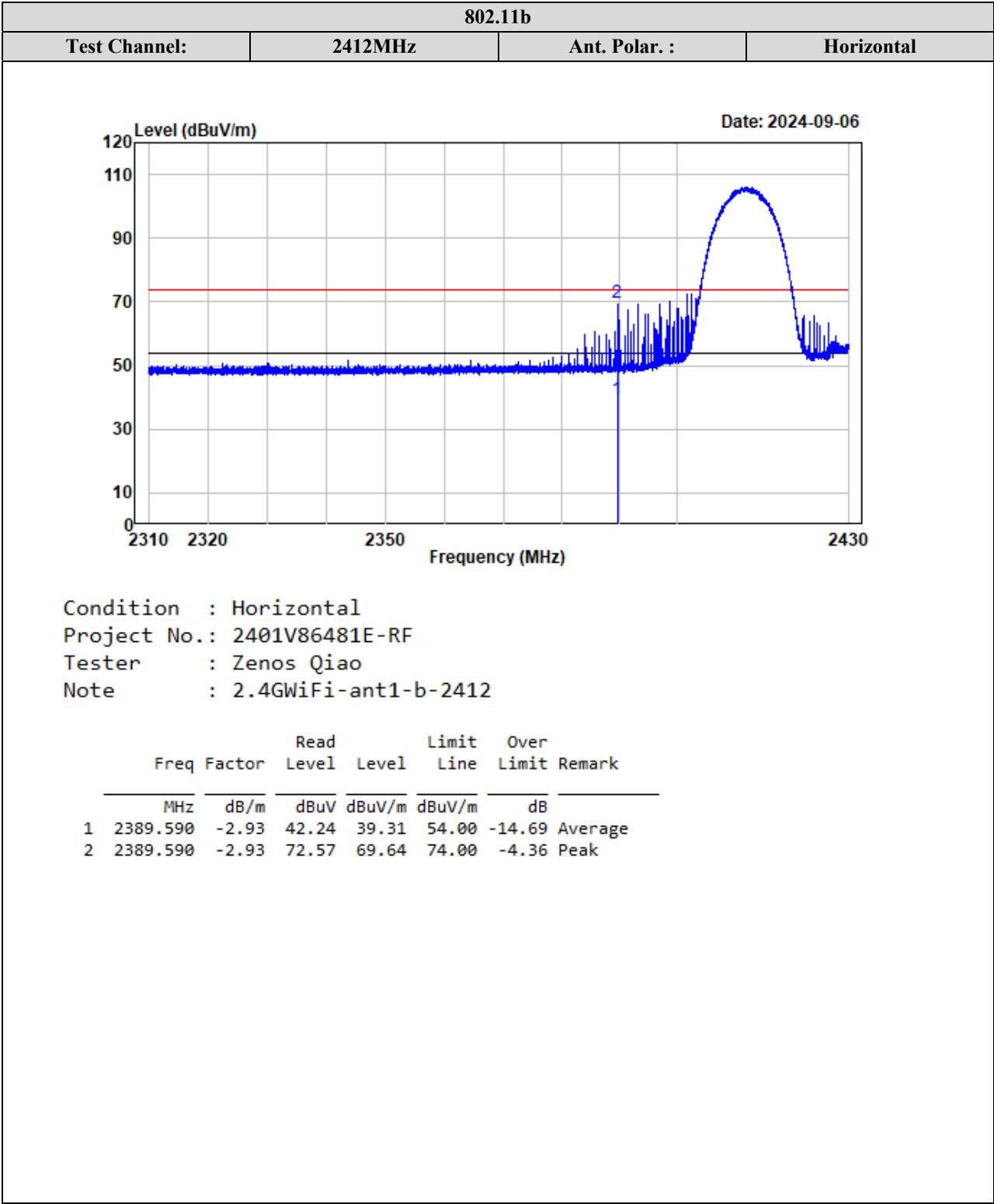
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

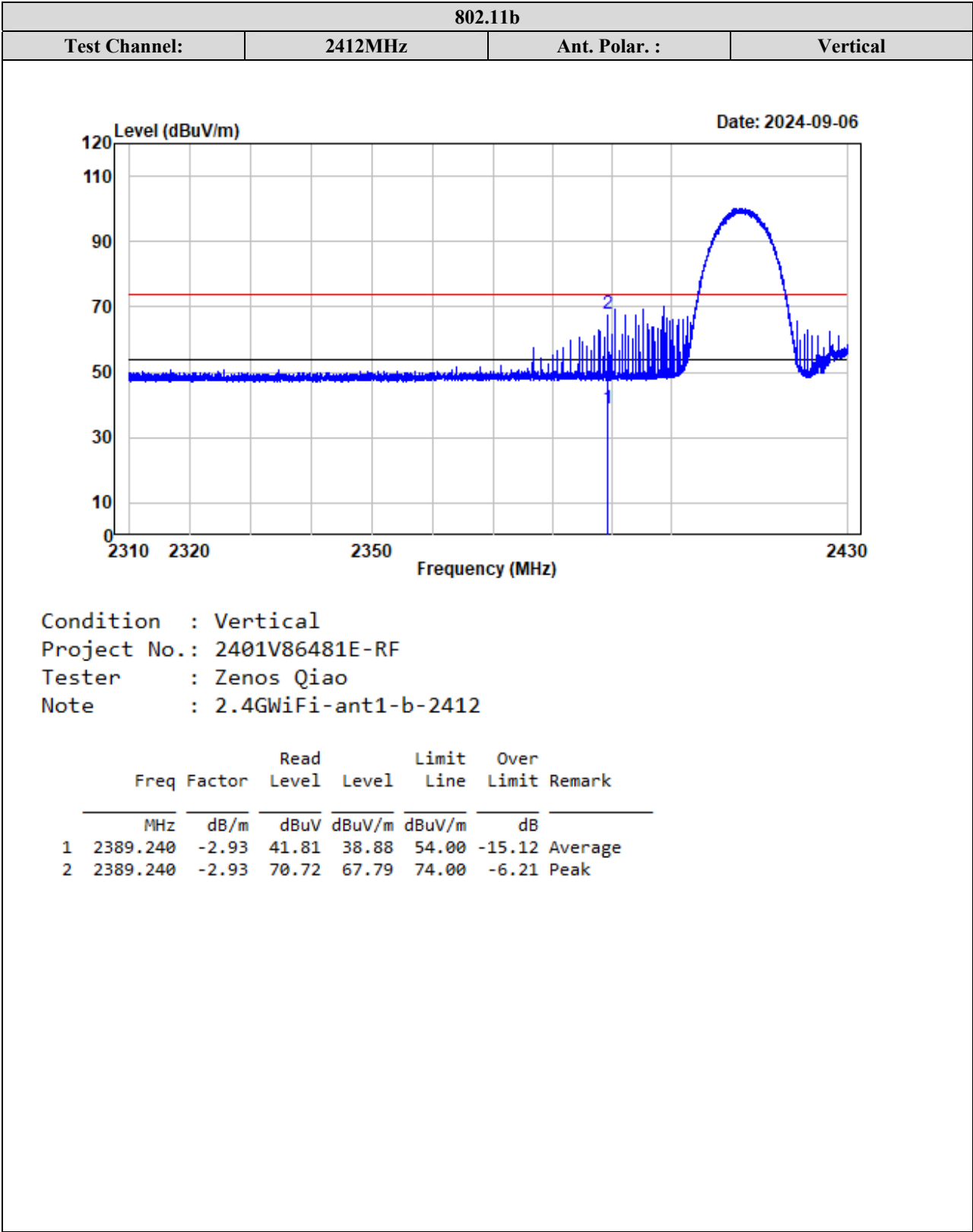
Corrected Amplitude = Factor + Reading

Margin = Corrected. Amplitude - Limit

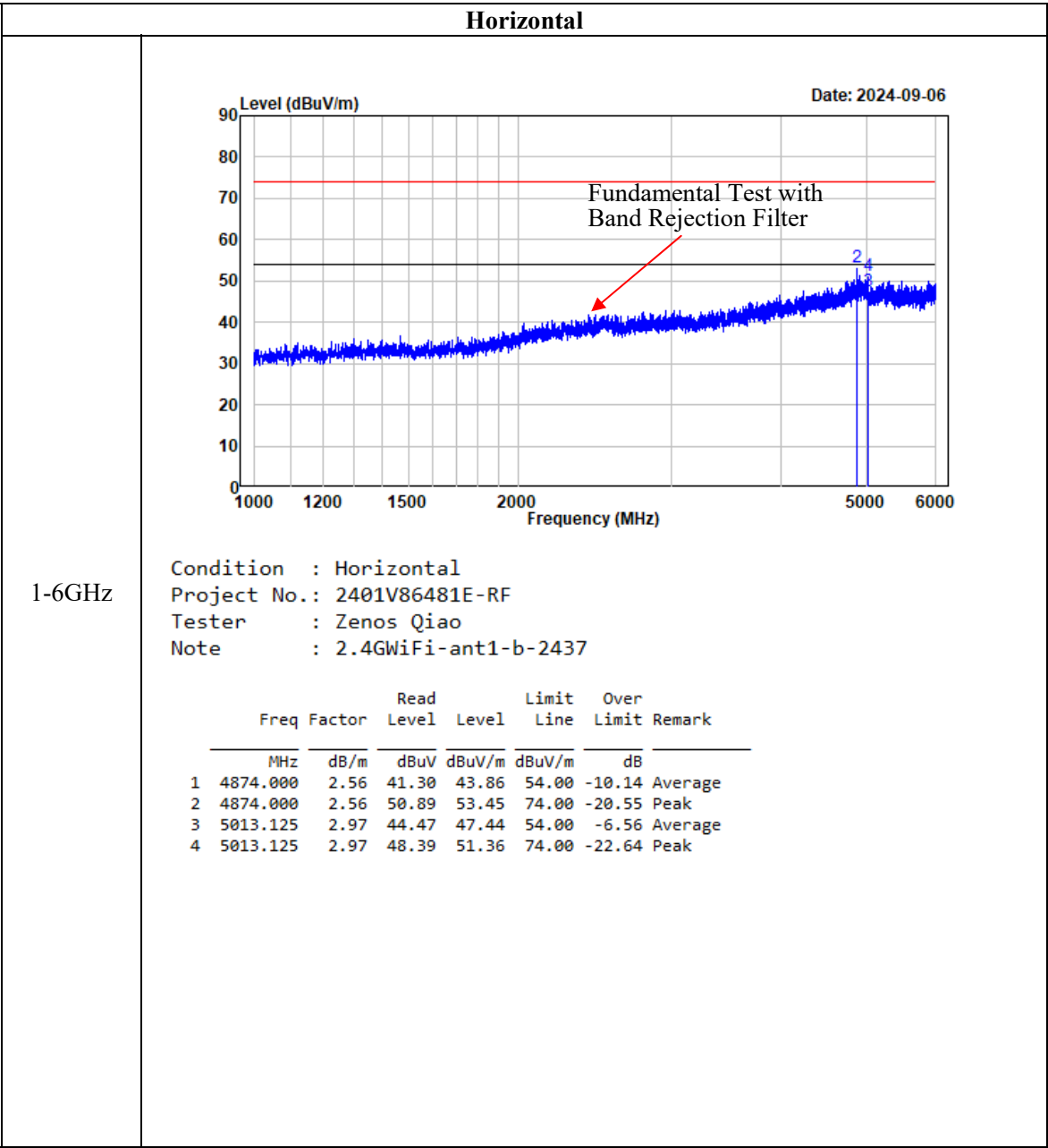
The other spurious emission which is in the noise floor level was not recorded.

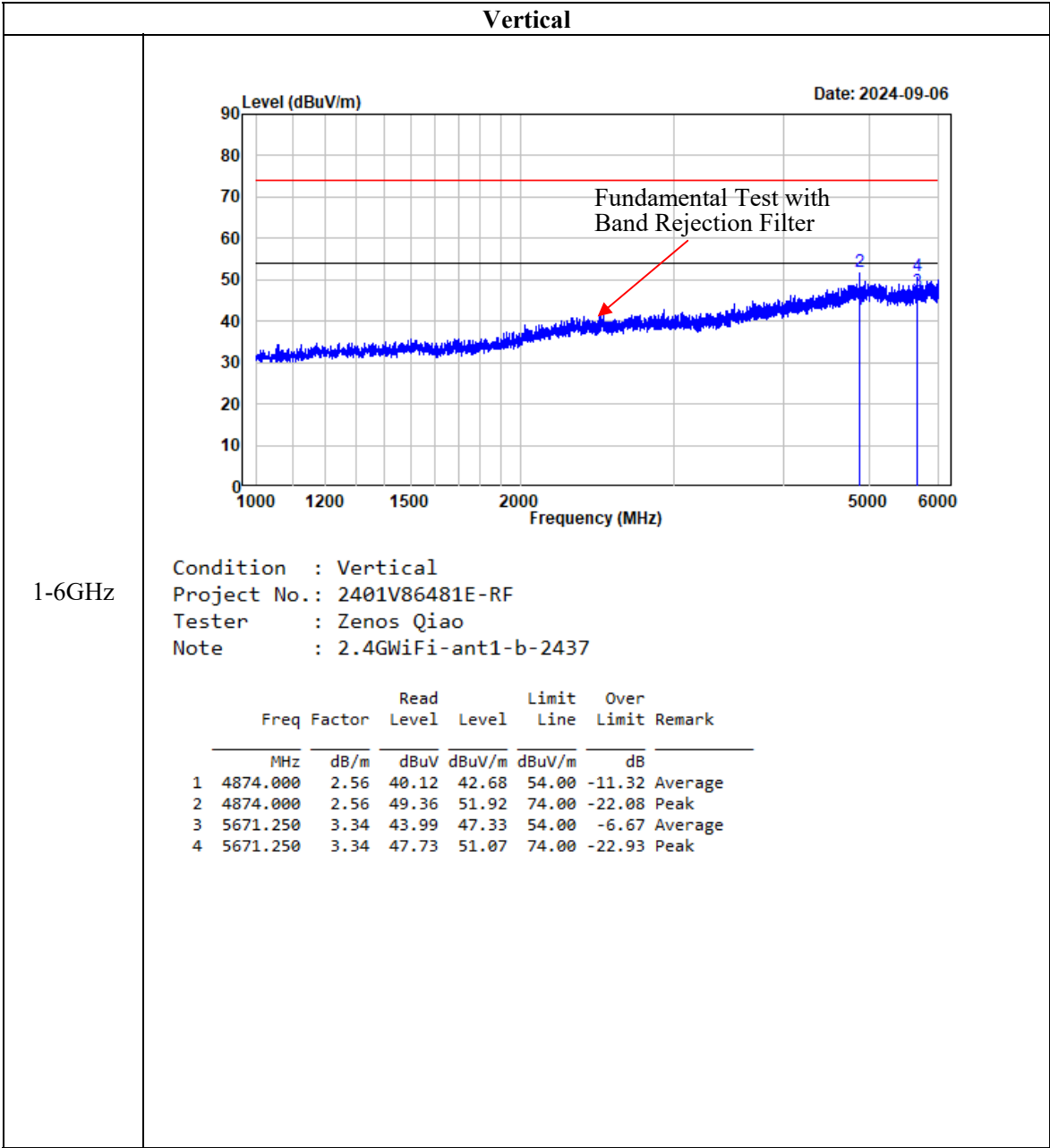
Test plots for worst Band Edge Measurements (Radiated):

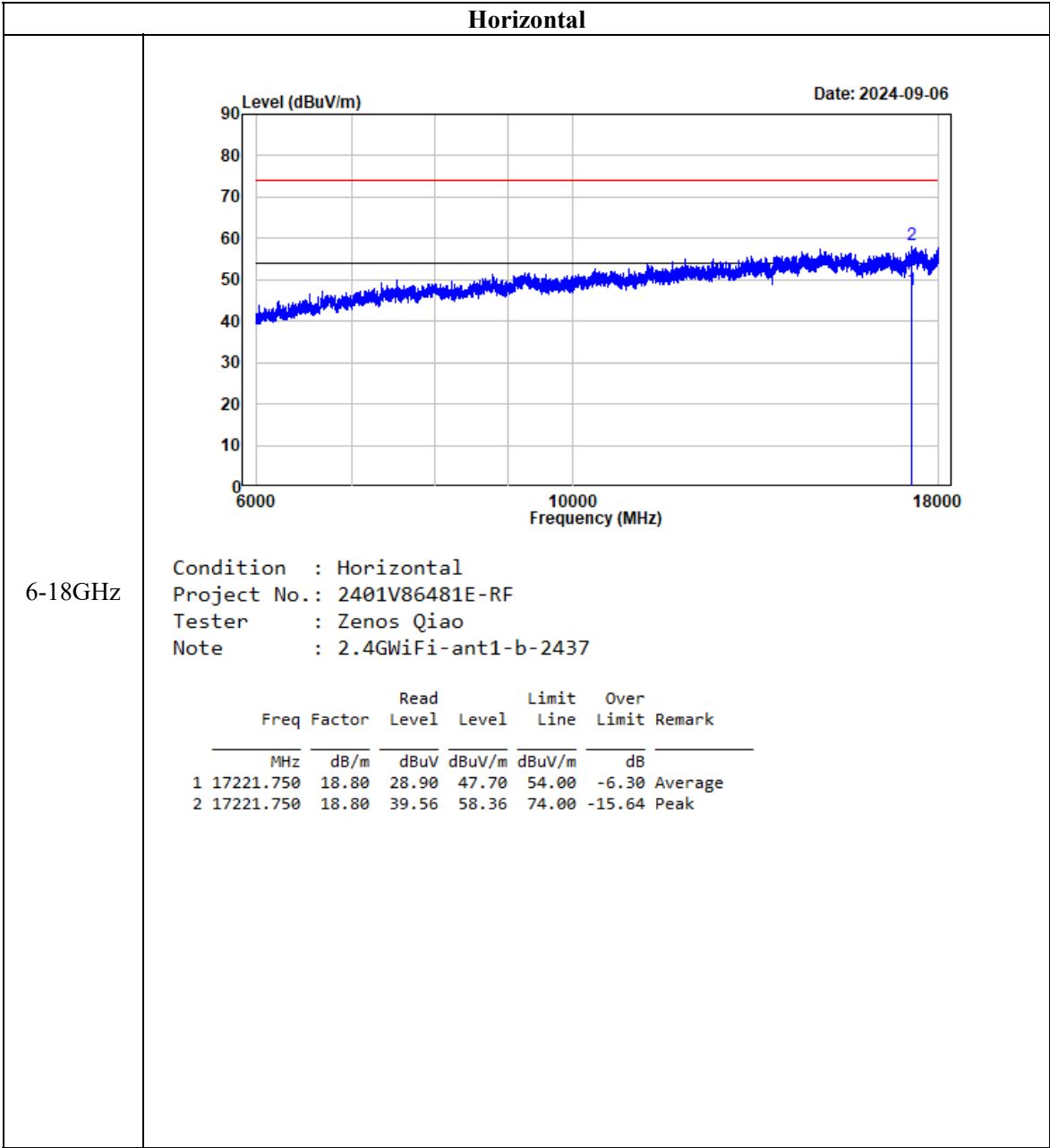


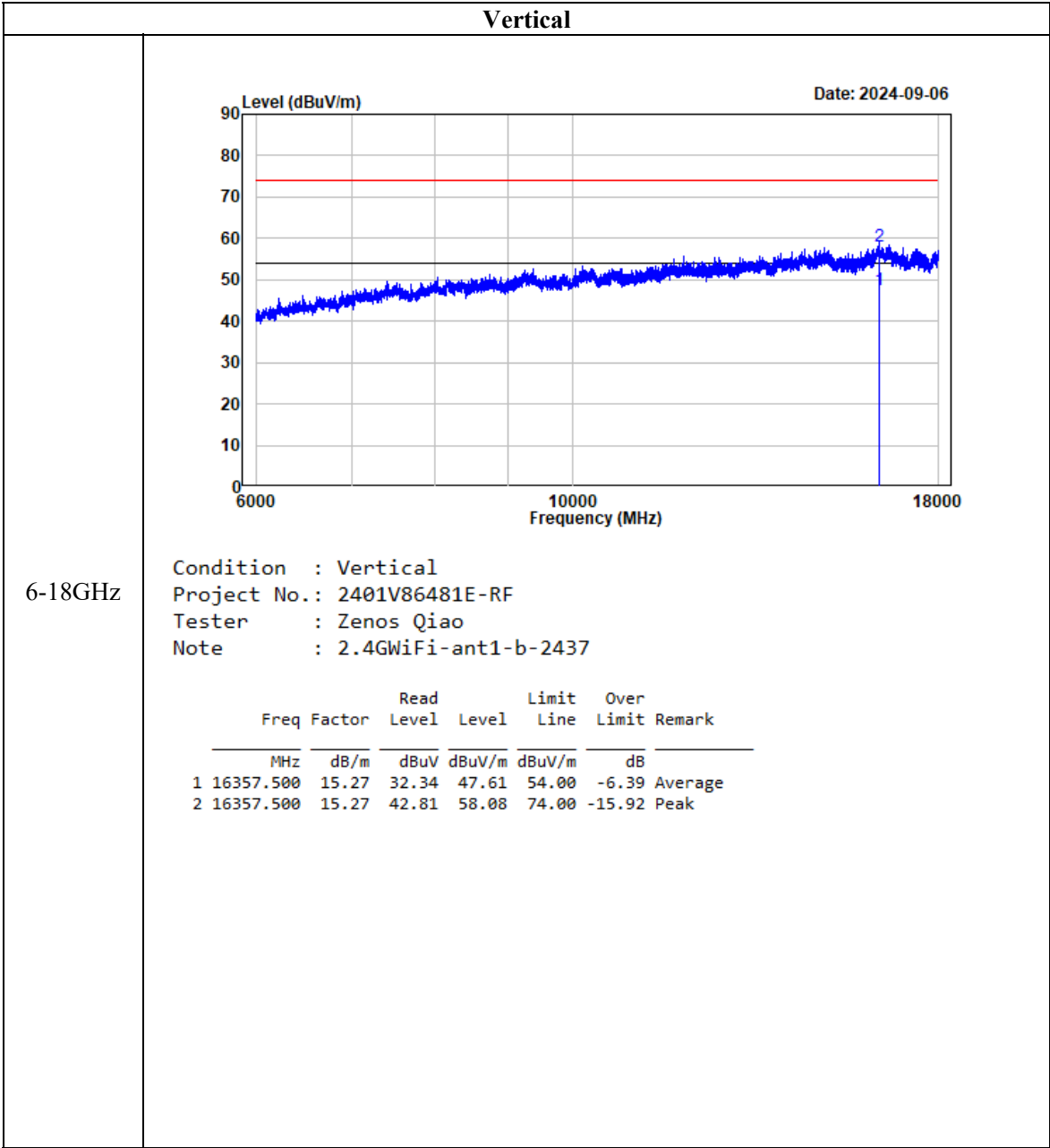


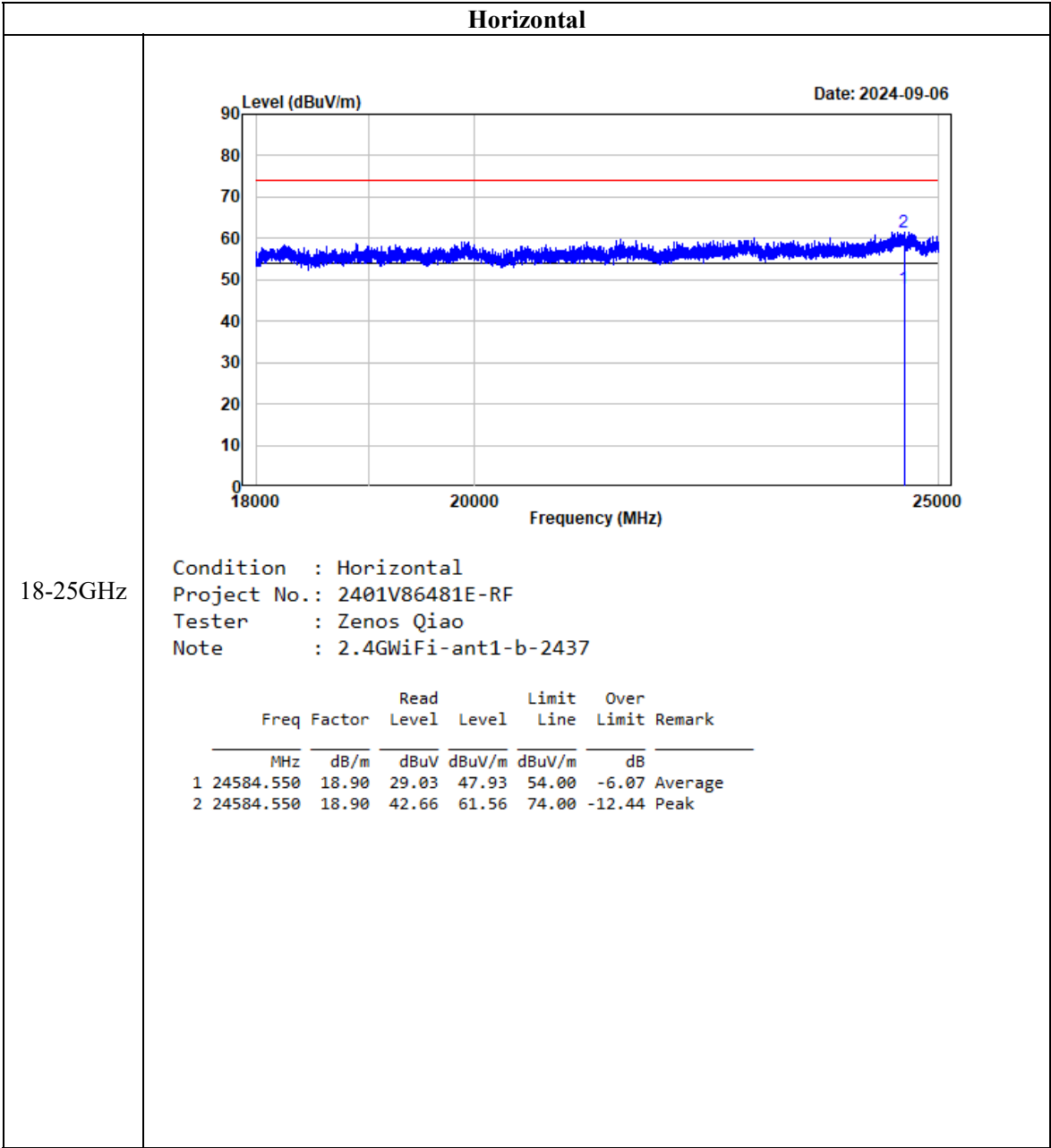
Listed with the worst harmonic margin test plot:

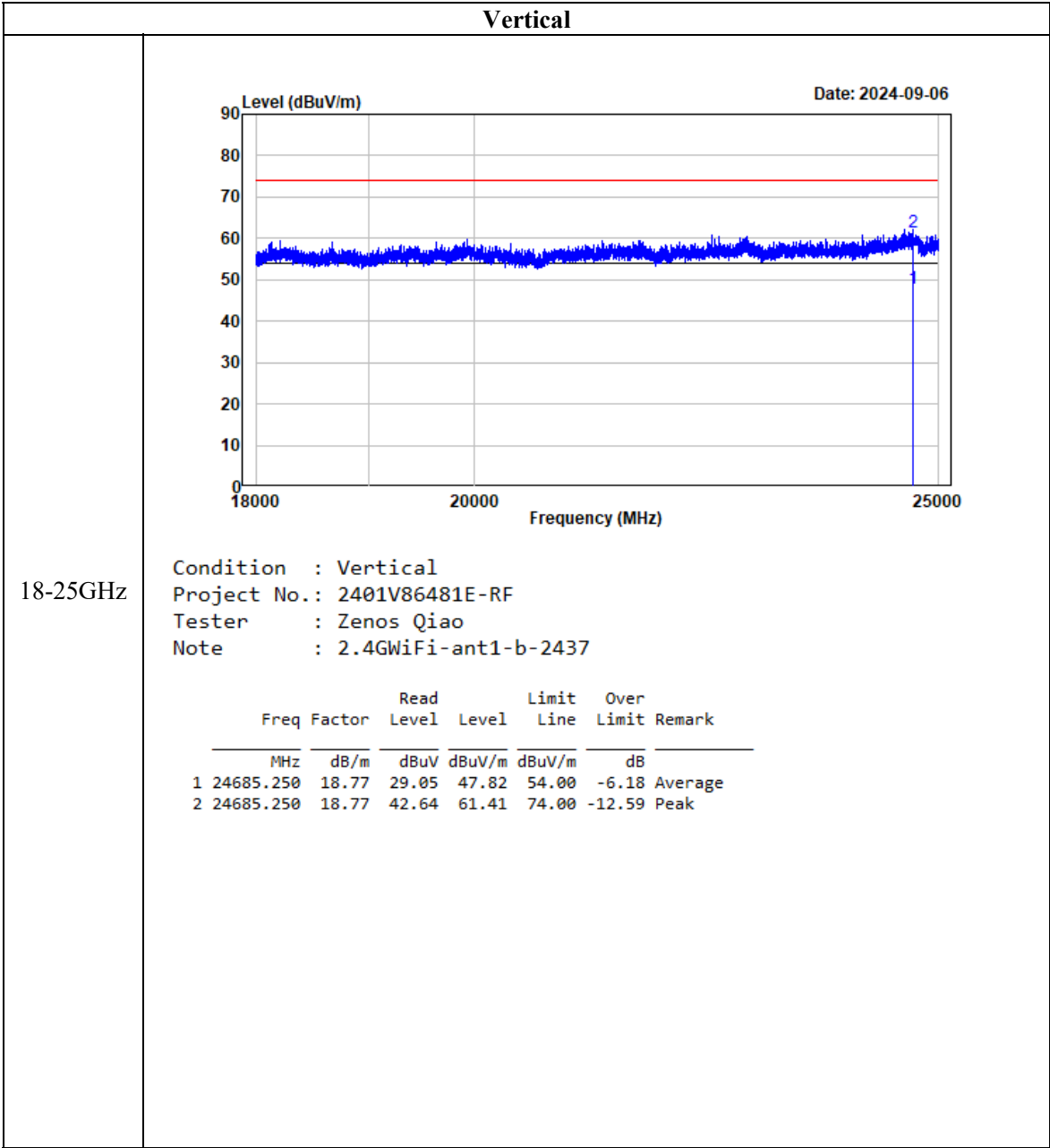












FCC §15.247(a) (2) - 6 dB EMISSION BANDWIDTH

Applicable Standard

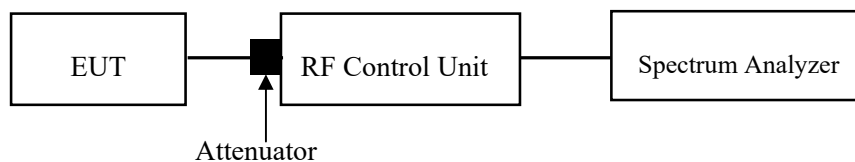
According to FCC §15.247(a) (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.8.1 & Clause 6.9.3

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	39 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-08-09.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

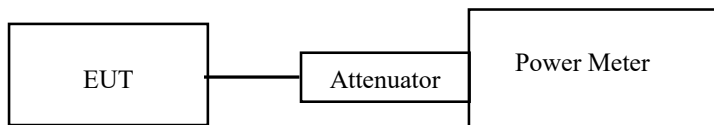
Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.9.1.3 & 11.9.2.3.2

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	39 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-08-09.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

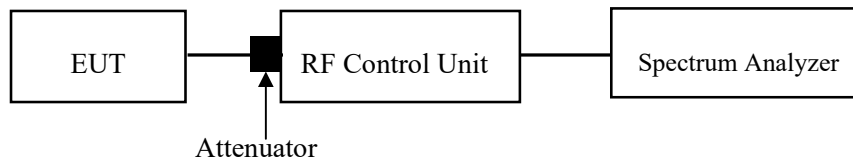
FCC §15.247(d) - 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.11

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

**Test Data****Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	39 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-08-09.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

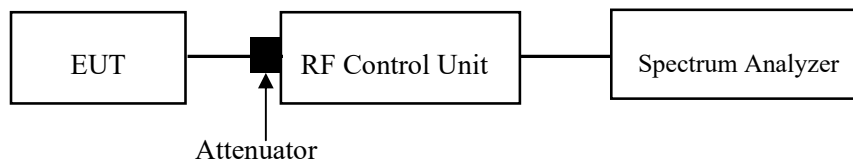
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.10.2

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

1. Set the RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
2. Set the VBW $\geq 3 \times \text{RBW}$.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	39 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-08-09.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

EUT PHOTOGRAPHS

Please refer to the attachment 2401V86481E-RF External photo and 2401V86481E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401V86481E-RFA Test Setup photo.

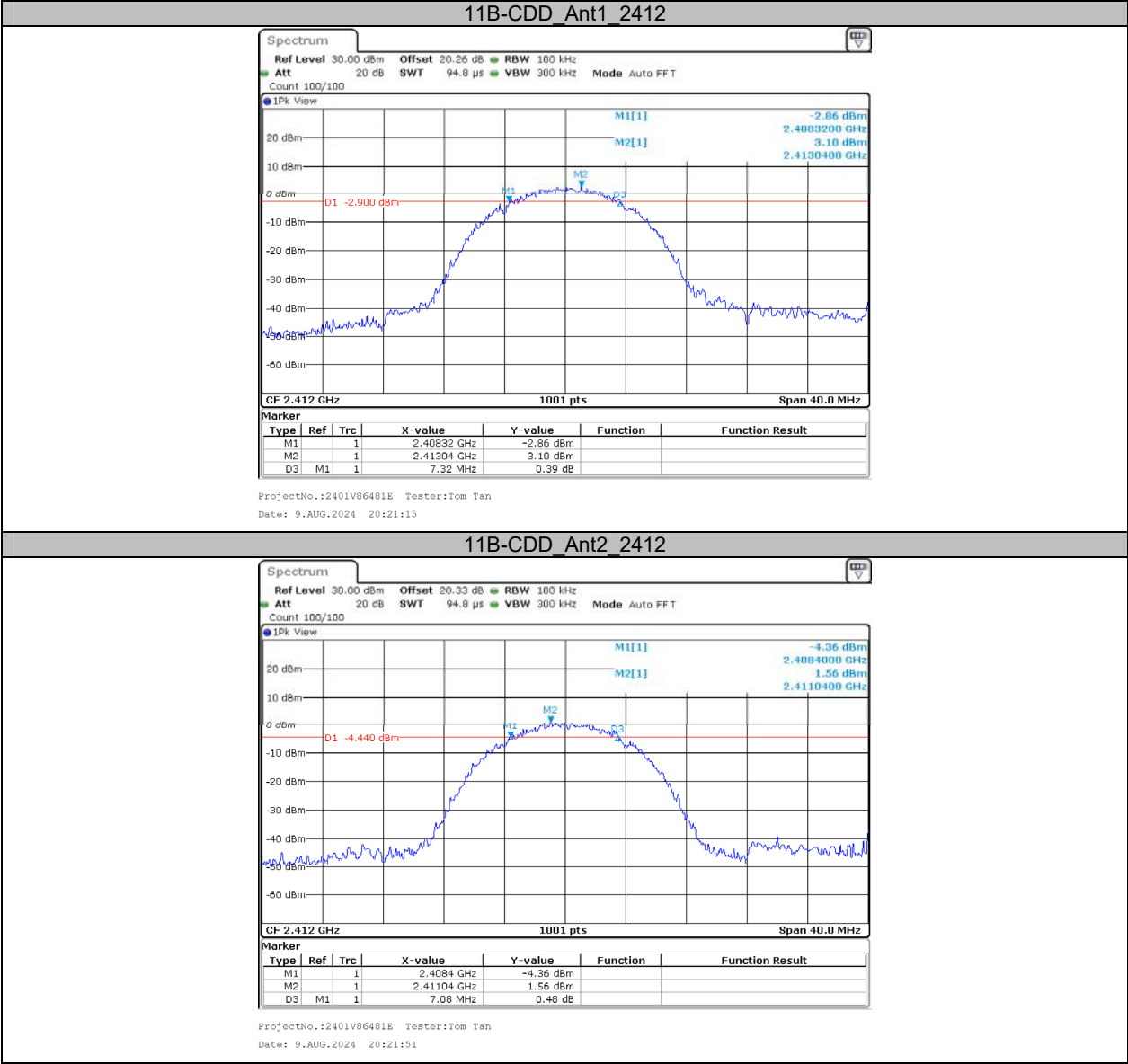
APPENDIX

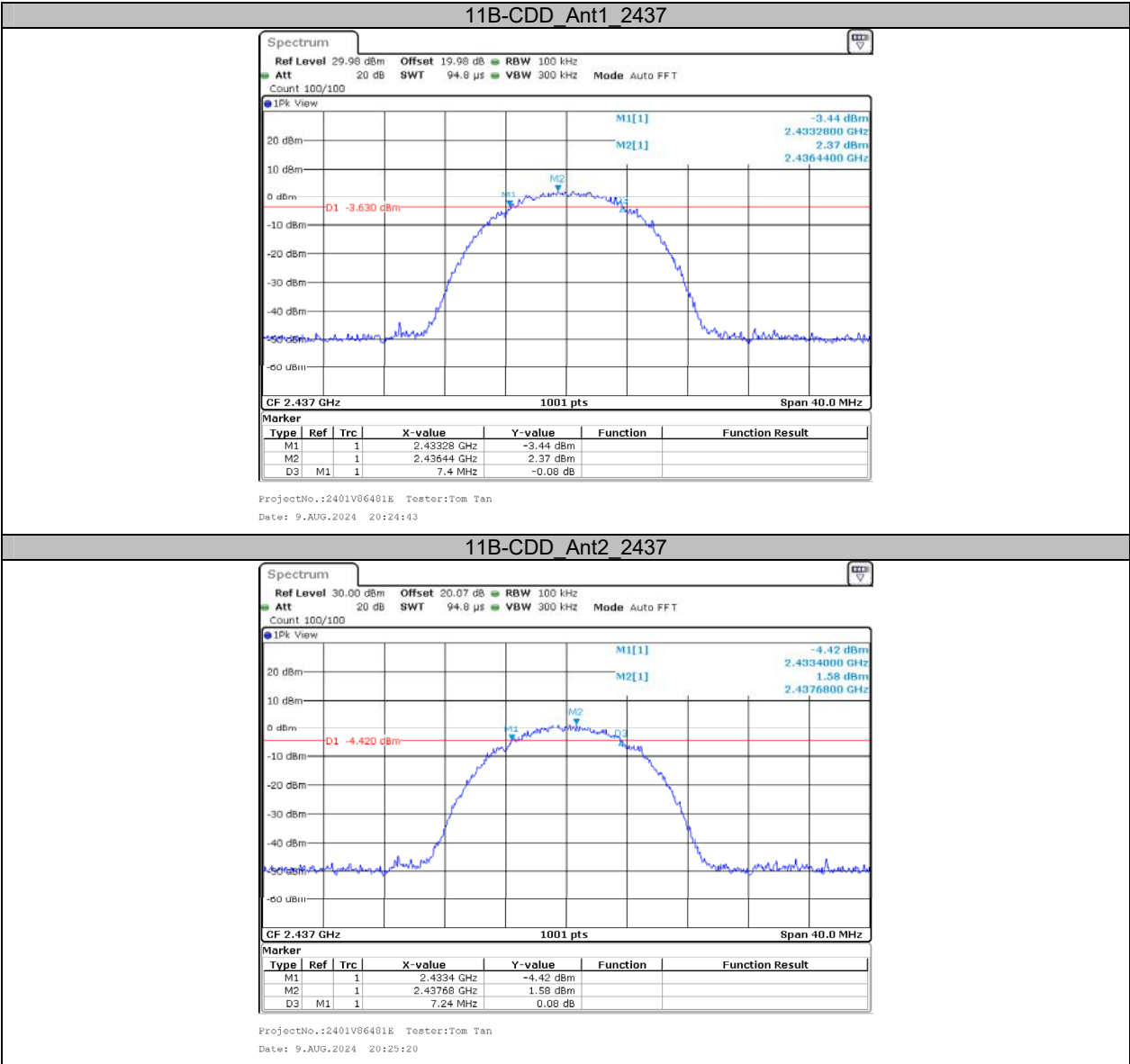
Appendix A: DTS Bandwidth

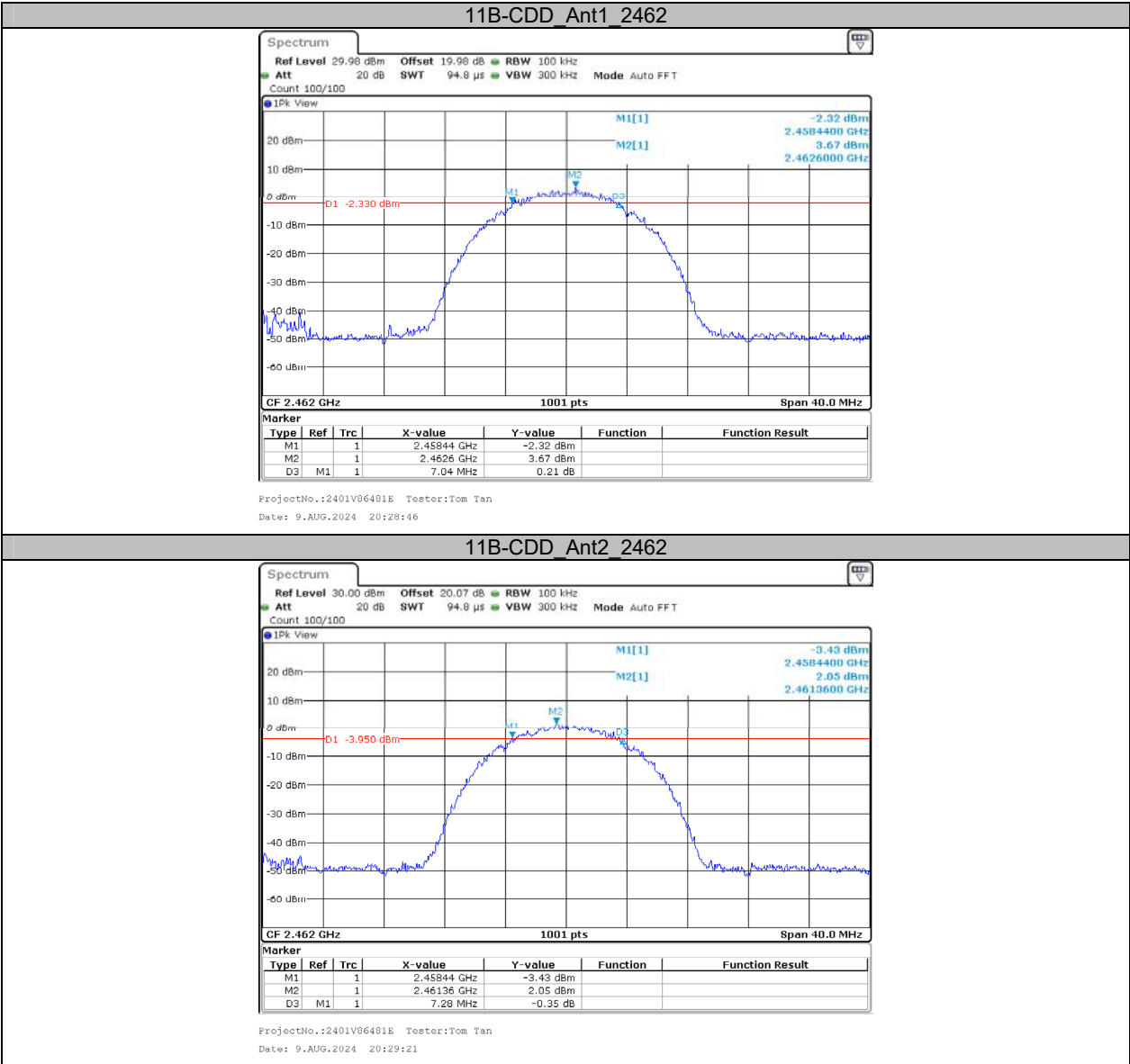
Test Result

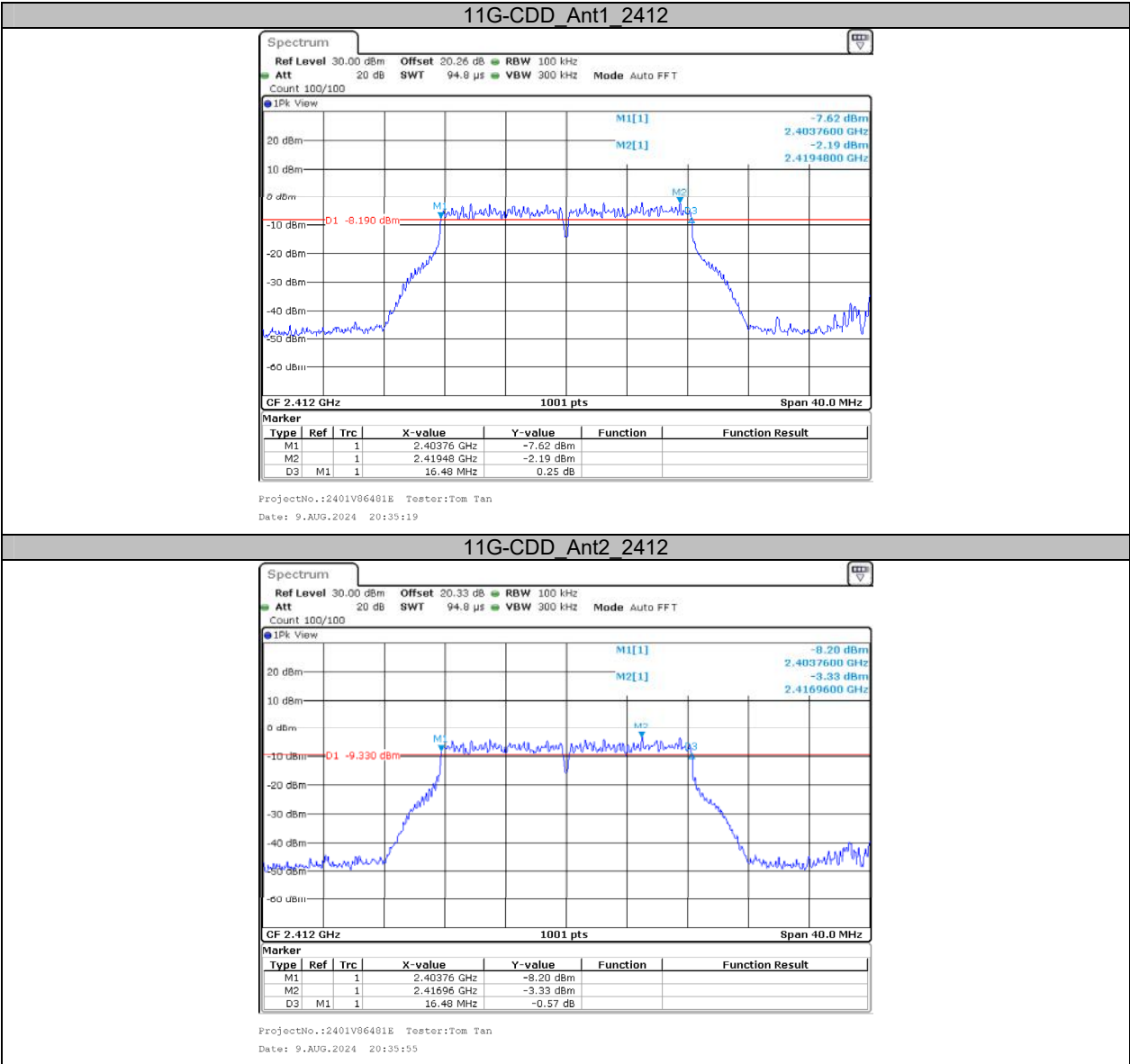
Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant1	2412	7.32	2408.32	2415.64	0.5	PASS
	Ant2	2412	7.08	2408.40	2415.48	0.5	PASS
	Ant1	2437	7.40	2433.28	2440.68	0.5	PASS
	Ant2	2437	7.24	2433.40	2440.64	0.5	PASS
	Ant1	2462	7.04	2458.44	2465.48	0.5	PASS
	Ant2	2462	7.28	2458.44	2465.72	0.5	PASS
11G-CDD	Ant1	2412	16.48	2403.76	2420.24	0.5	PASS
	Ant2	2412	16.48	2403.76	2420.24	0.5	PASS
	Ant1	2437	16.48	2428.76	2445.24	0.5	PASS
	Ant2	2437	16.48	2428.76	2445.24	0.5	PASS
	Ant1	2462	16.48	2453.76	2470.24	0.5	PASS
	Ant2	2462	16.48	2453.76	2470.24	0.5	PASS
11N20MIMO	Ant1	2412	17.76	2403.12	2420.88	0.5	PASS
	Ant2	2412	17.76	2403.12	2420.88	0.5	PASS
	Ant1	2437	17.72	2428.16	2445.88	0.5	PASS
	Ant2	2437	17.76	2428.12	2445.88	0.5	PASS
	Ant1	2462	17.76	2453.12	2470.88	0.5	PASS
	Ant2	2462	17.80	2453.08	2470.88	0.5	PASS
11AX20MIMO	Ant1	2412	19.08	2402.44	2421.52	0.5	PASS
	Ant2	2412	19.04	2402.48	2421.52	0.5	PASS
	Ant1	2437	19.04	2427.48	2446.52	0.5	PASS
	Ant2	2437	19.04	2427.48	2446.52	0.5	PASS
	Ant1	2462	19.04	2452.48	2471.52	0.5	PASS
	Ant2	2462	19.04	2452.48	2471.52	0.5	PASS

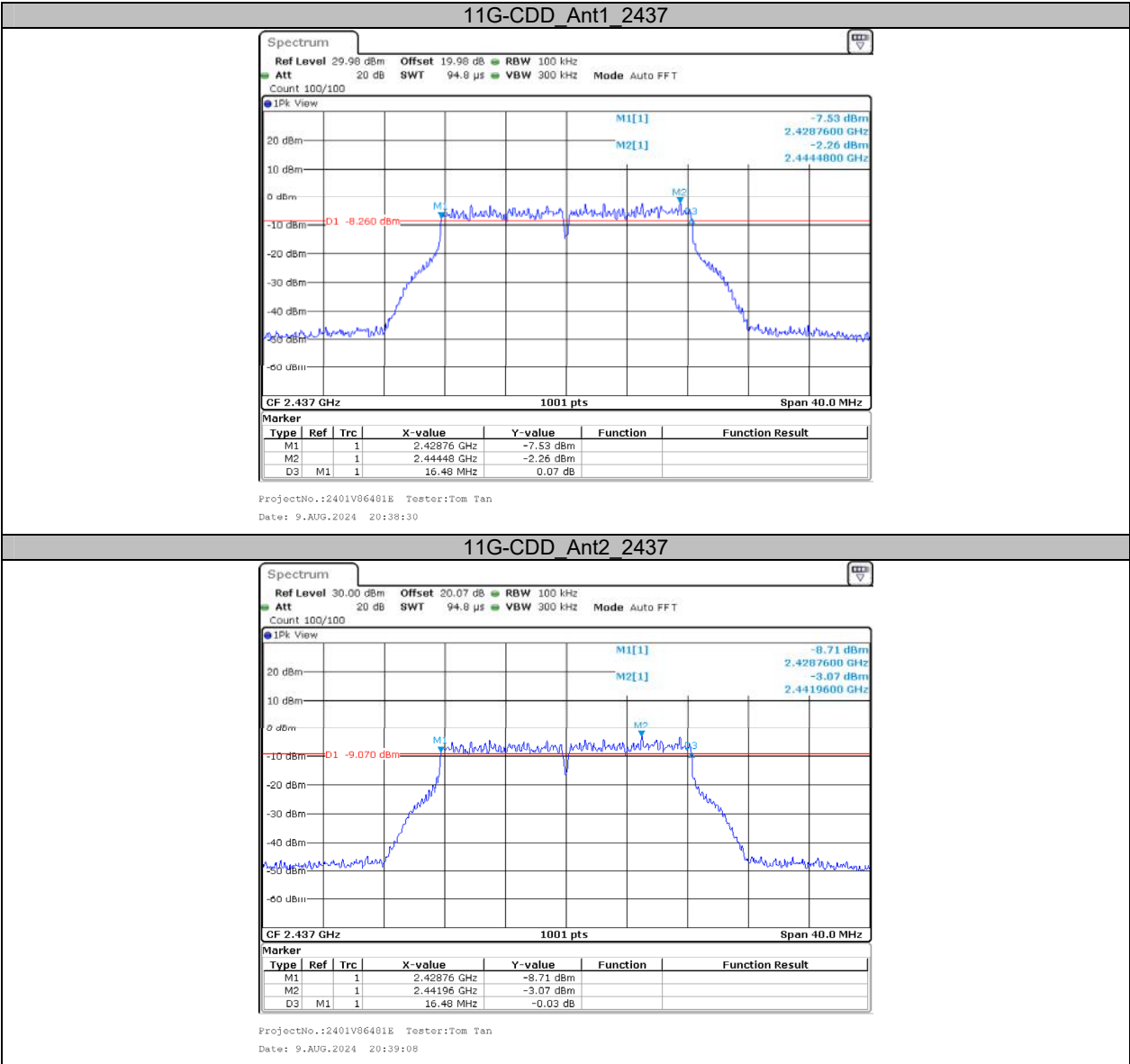
Test Graphs

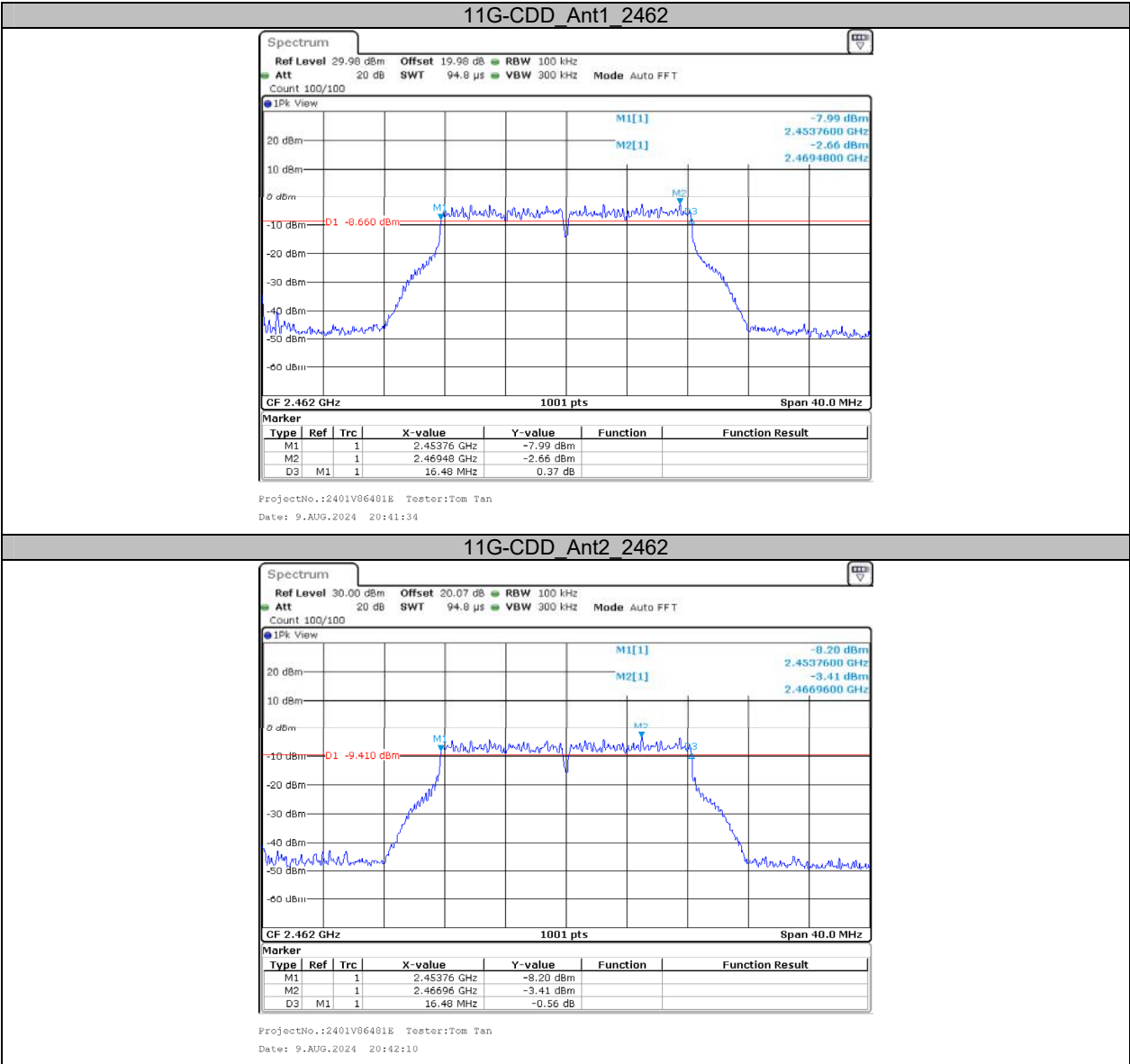


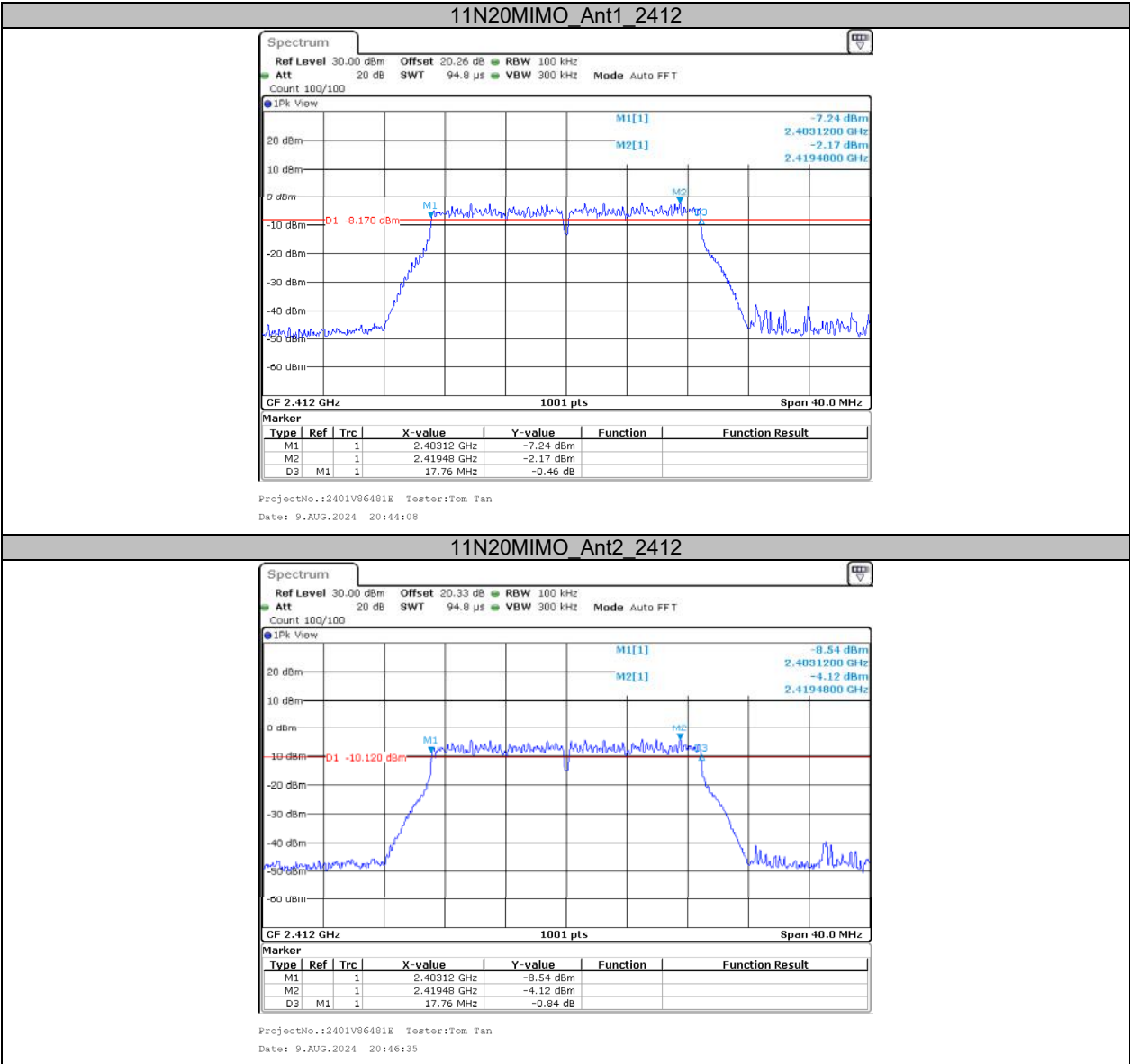


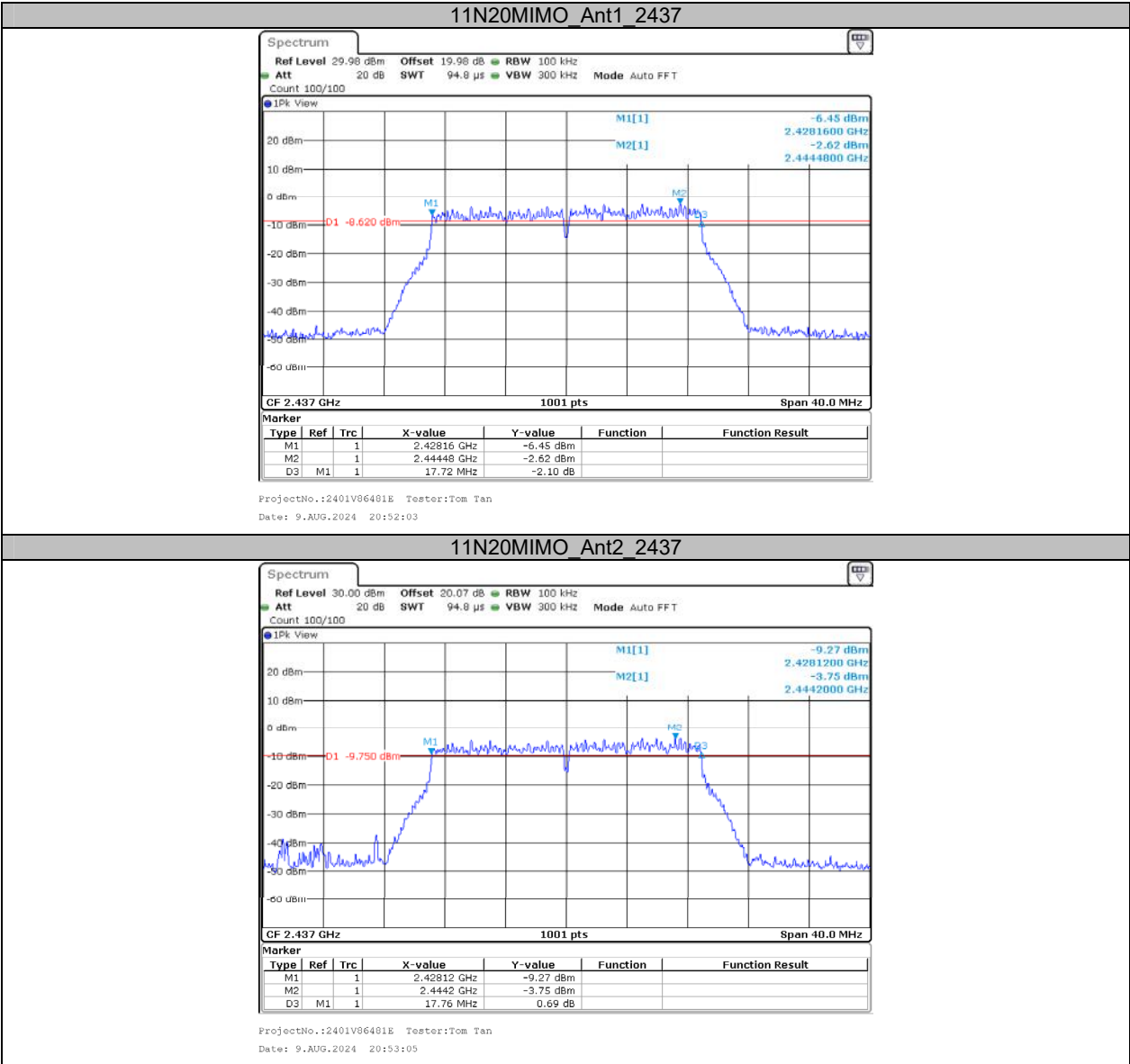


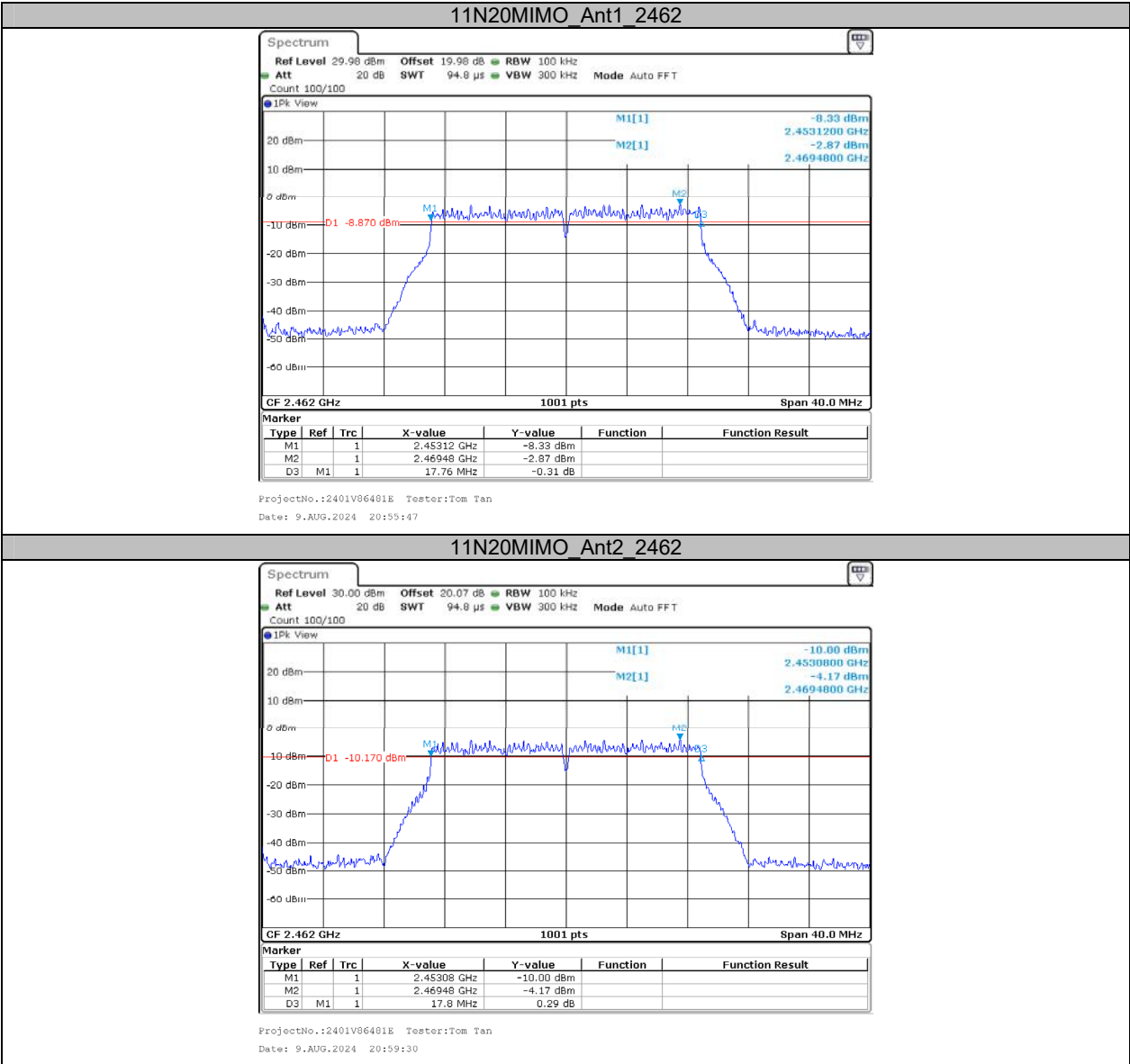


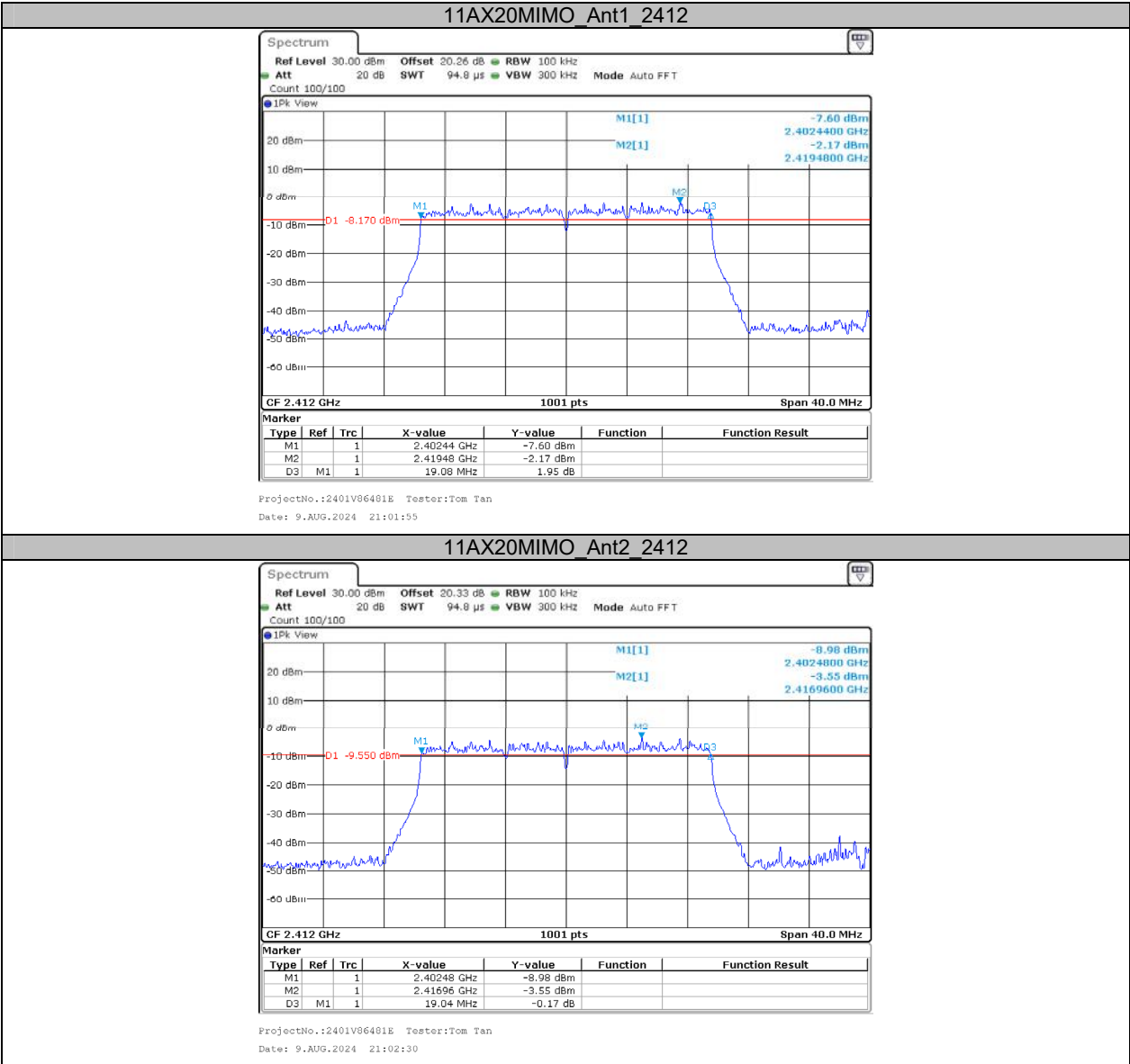


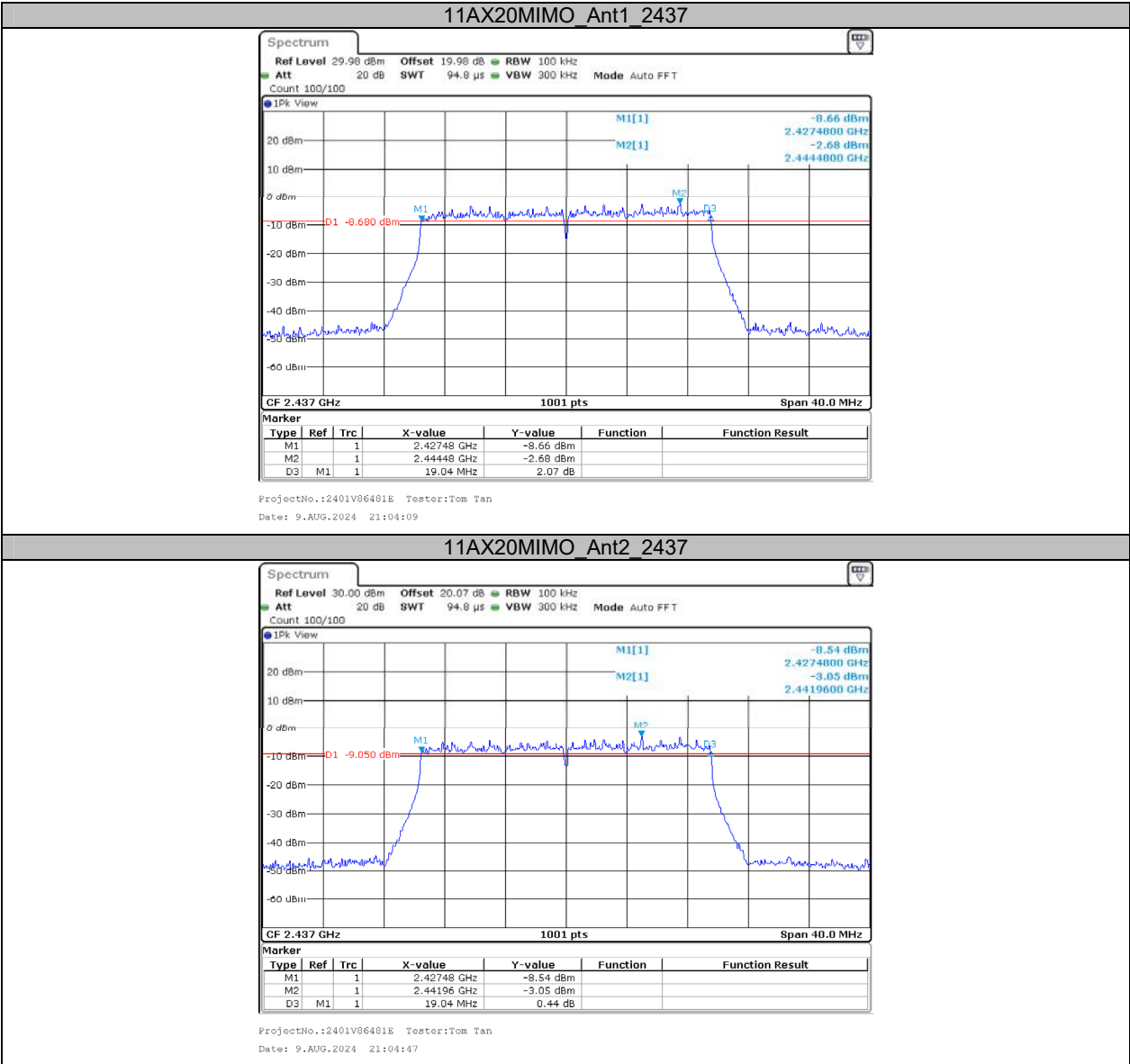


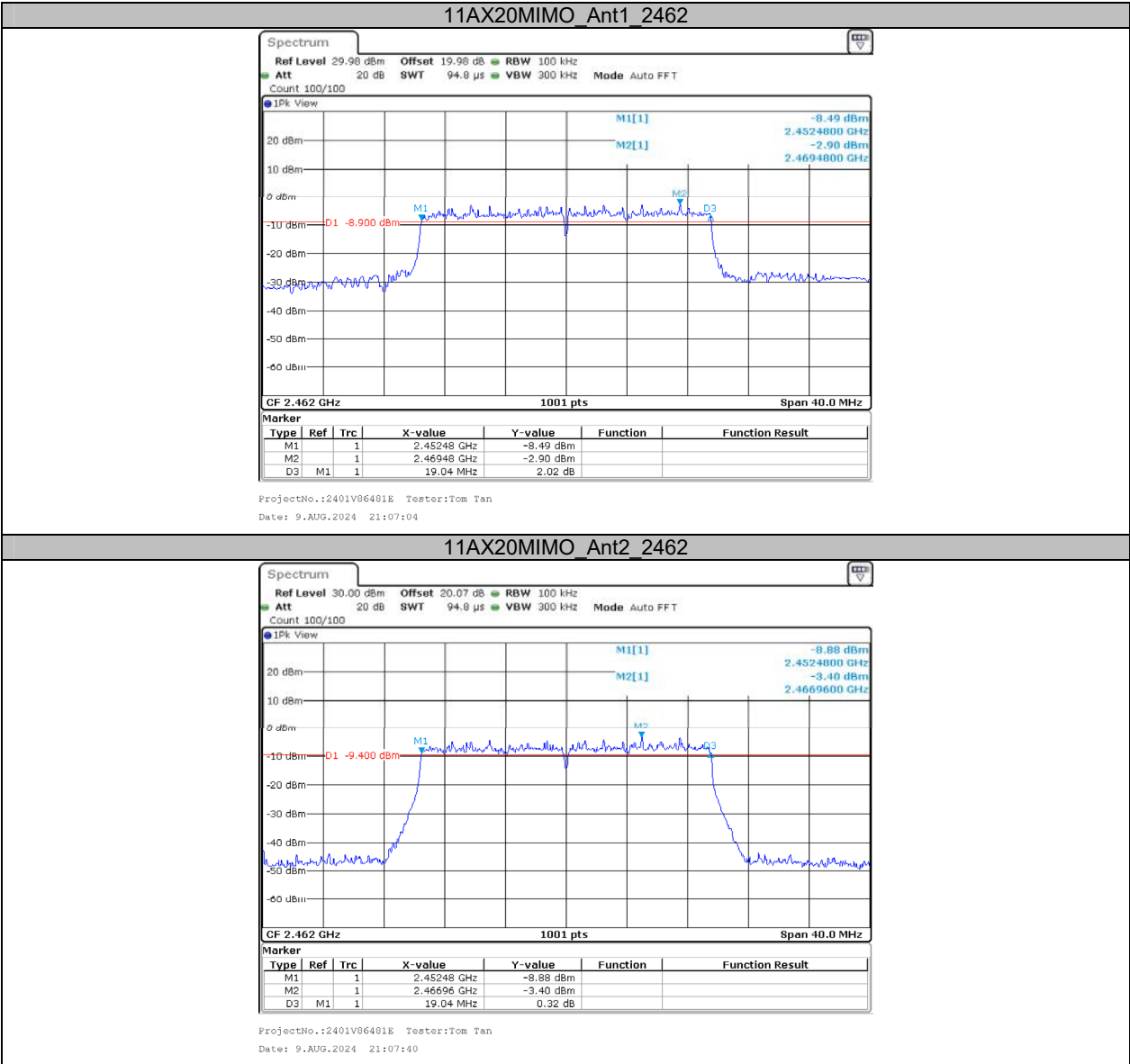








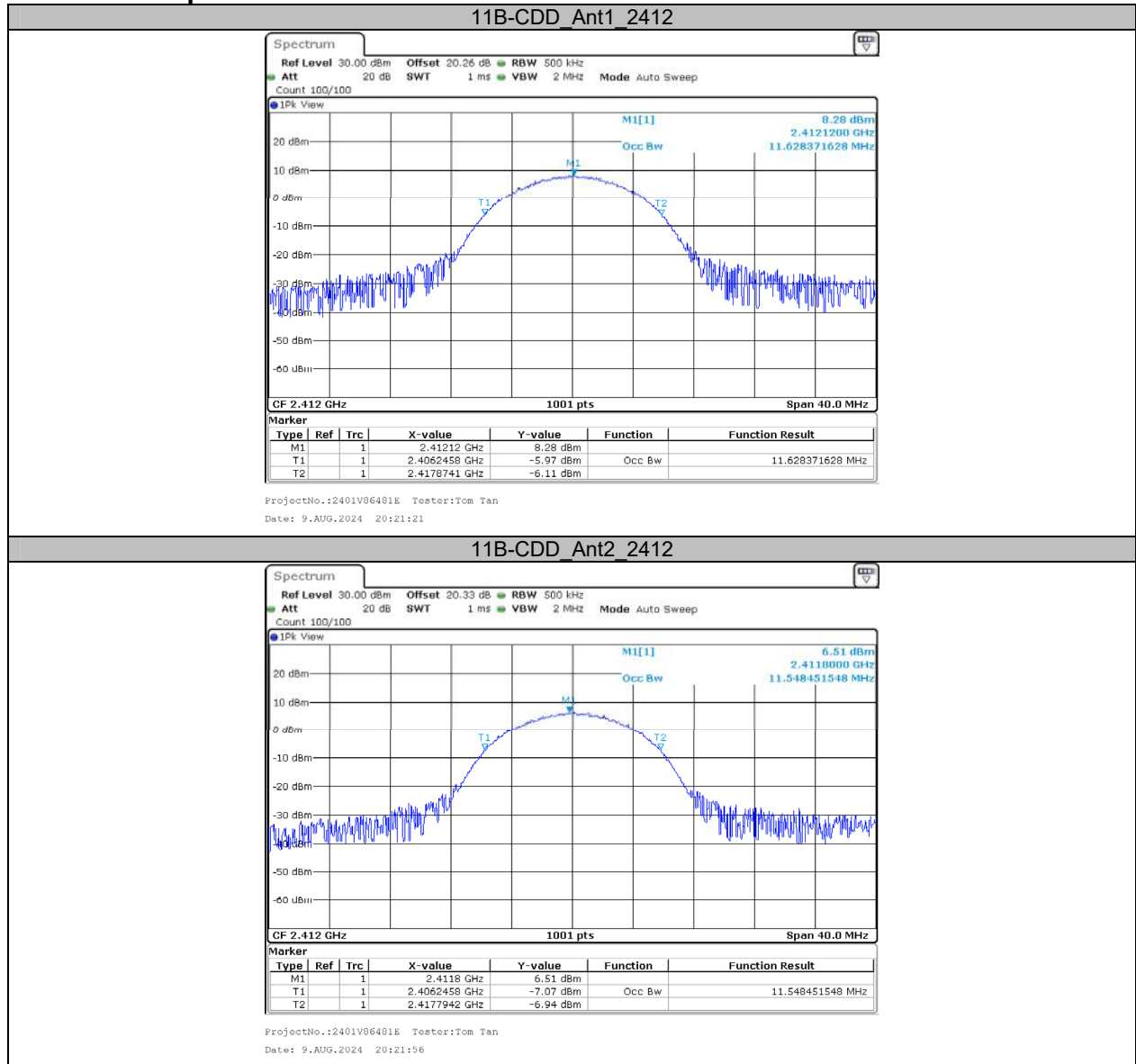


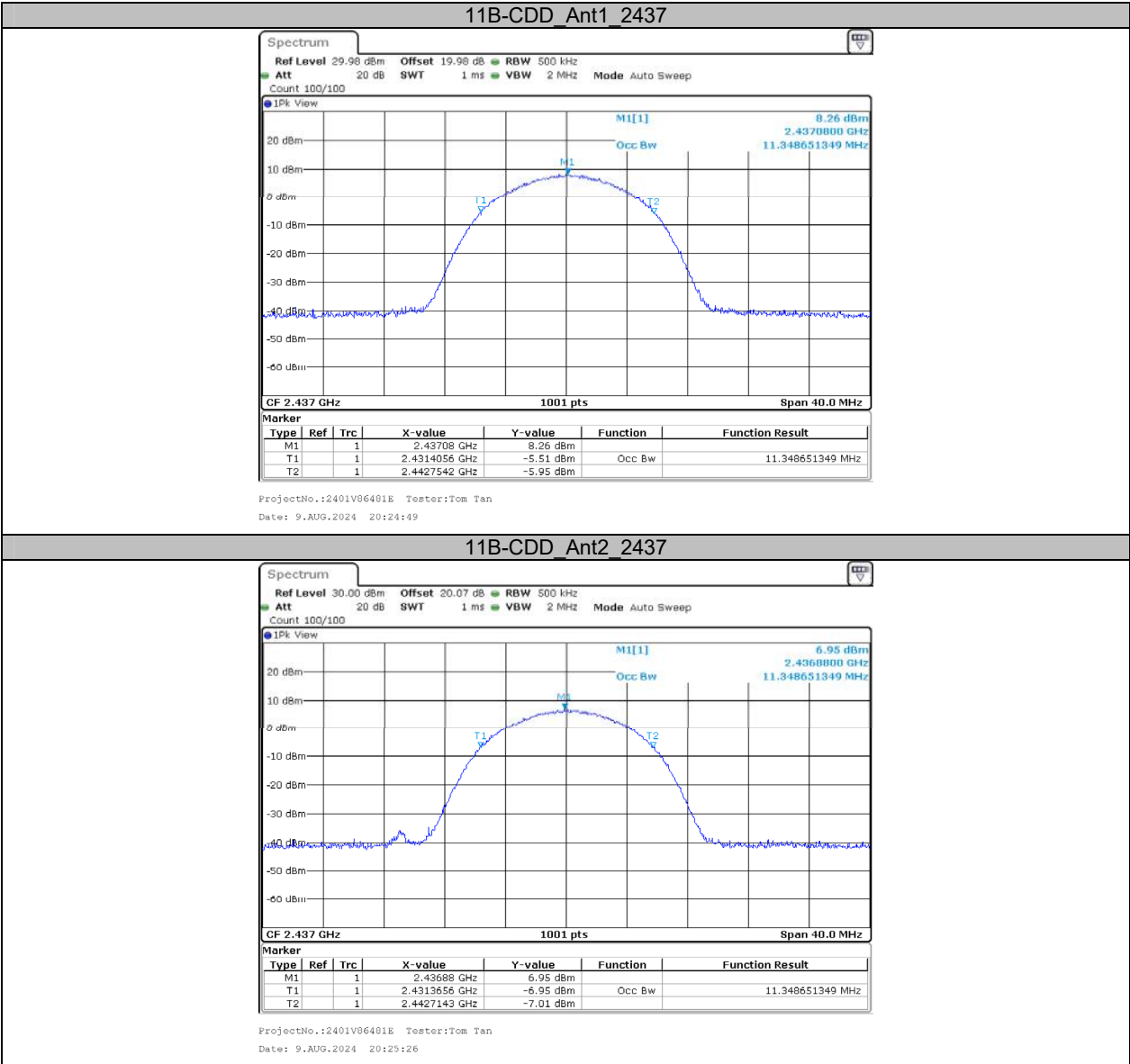


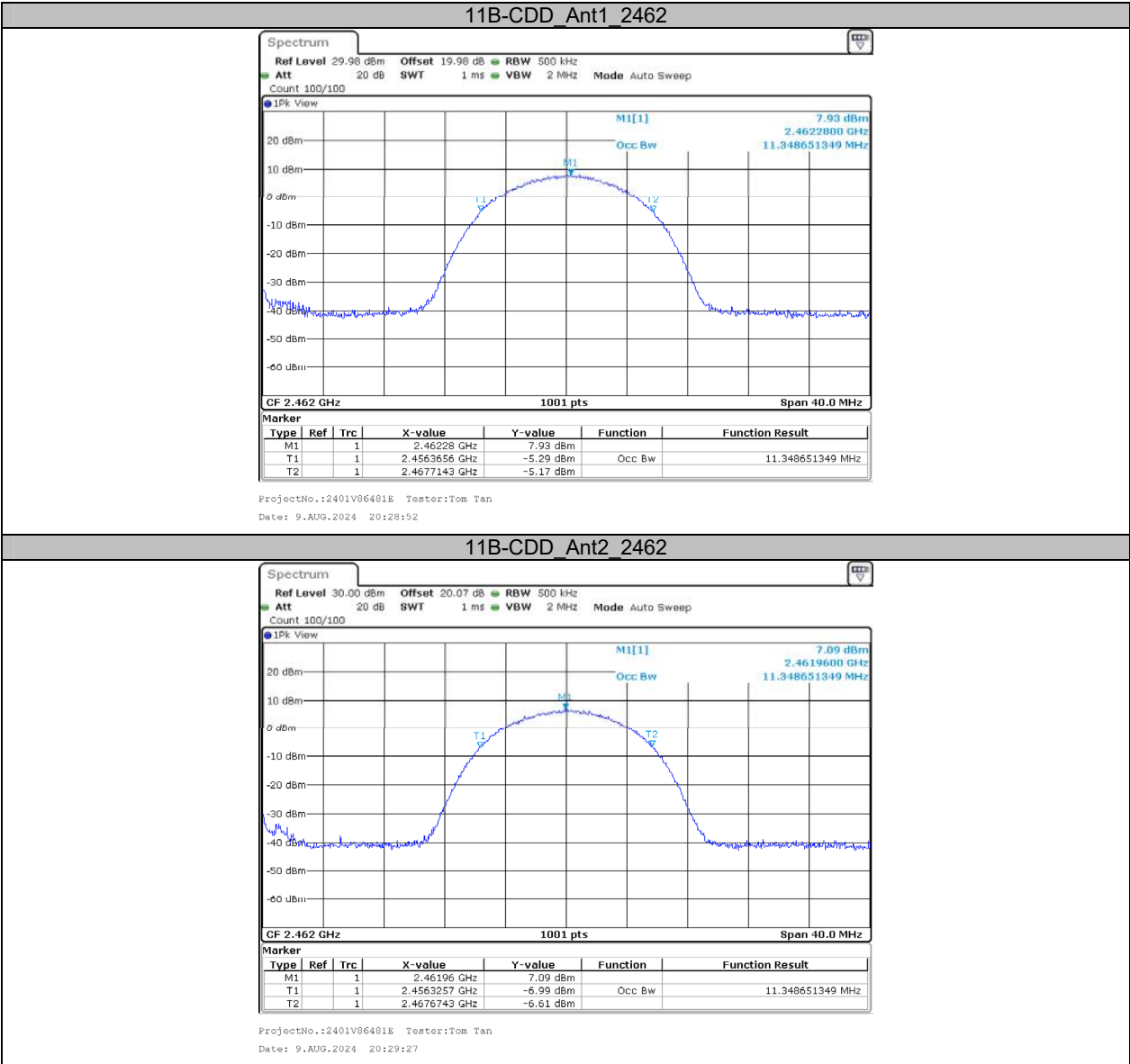
Appendix B: Occupied Channel Bandwidth**Test Result**

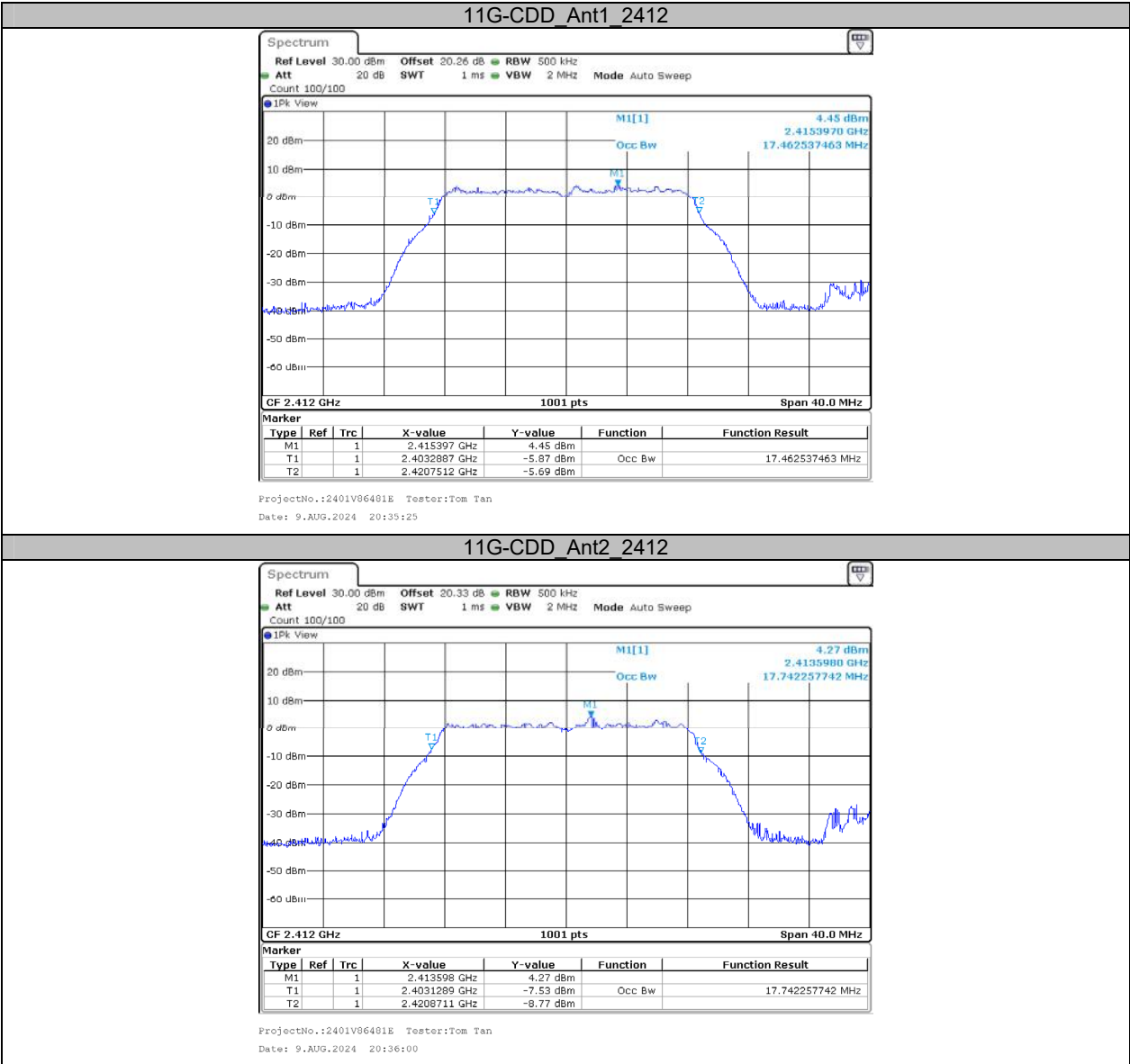
Test Mode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant1	2412	11.628	2406.2458	2417.8741	---	---
	Ant2	2412	11.548	2406.2458	2417.7942	---	---
	Ant1	2437	11.349	2431.4056	2442.7542	---	---
	Ant2	2437	11.349	2431.3656	2442.7143	---	---
	Ant1	2462	11.349	2456.3656	2467.7143	---	---
	Ant2	2462	11.349	2456.3257	2467.6743	---	---
11G-CDD	Ant1	2412	17.463	2403.2887	2420.7512	---	---
	Ant2	2412	17.742	2403.1289	2420.8711	---	---
	Ant1	2437	17.383	2428.3686	2445.7512	---	---
	Ant2	2437	17.622	2428.2088	2445.8312	---	---
	Ant1	2462	17.463	2453.2887	2470.7512	---	---
	Ant2	2462	17.702	2453.1688	2470.8711	---	---
11N20MIMO	Ant1	2412	18.462	2402.8492	2421.3107	---	---
	Ant2	2412	18.422	2402.8492	2421.2707	---	---
	Ant1	2437	18.422	2427.8891	2446.3107	---	---
	Ant2	2437	18.422	2427.8891	2446.3107	---	---
	Ant1	2462	18.422	2452.8492	2471.2707	---	---
	Ant2	2462	18.462	2452.8492	2471.3107	---	---
11AX20MIMO	Ant1	2412	19.221	2402.4096	2421.6304	---	---
	Ant2	2412	19.261	2402.4096	2421.6703	---	---
	Ant1	2437	19.181	2427.4496	2446.6304	---	---
	Ant2	2437	19.221	2427.4496	2446.6703	---	---
	Ant1	2462	23.856	2451.1708	2475.0270	---	---
	Ant2	2462	19.261	2452.4096	2471.6703	---	---

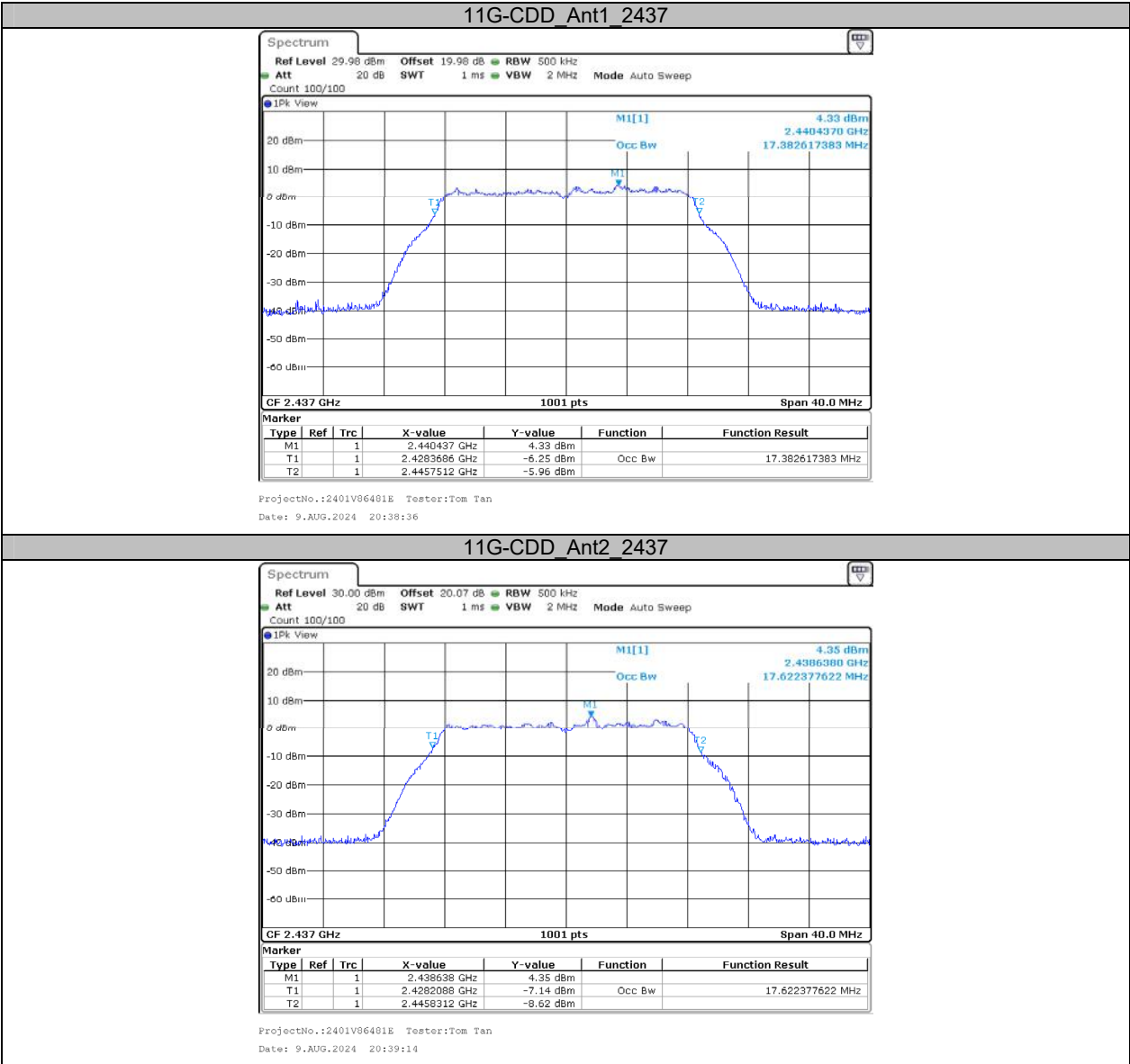
Test Graphs

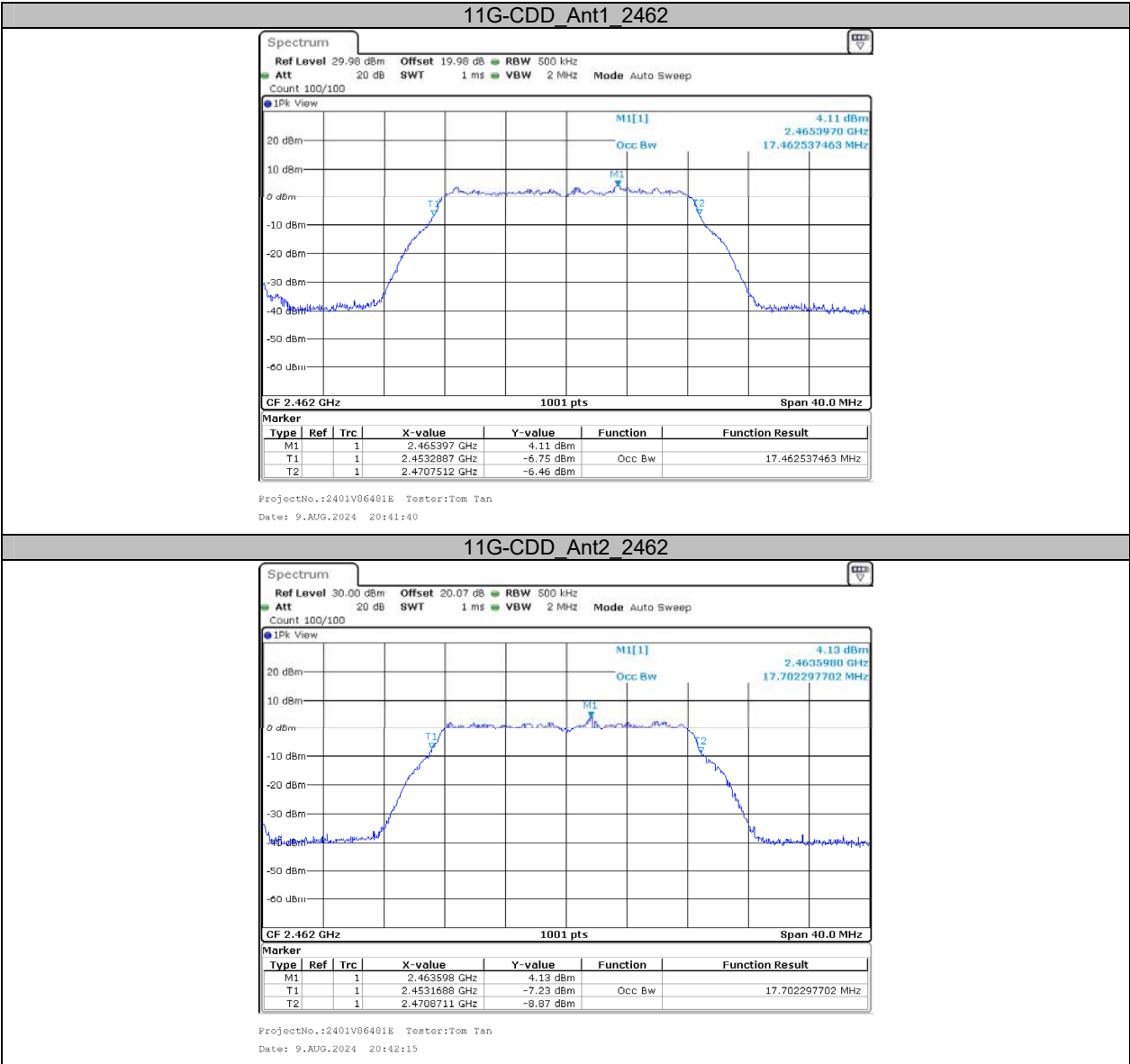


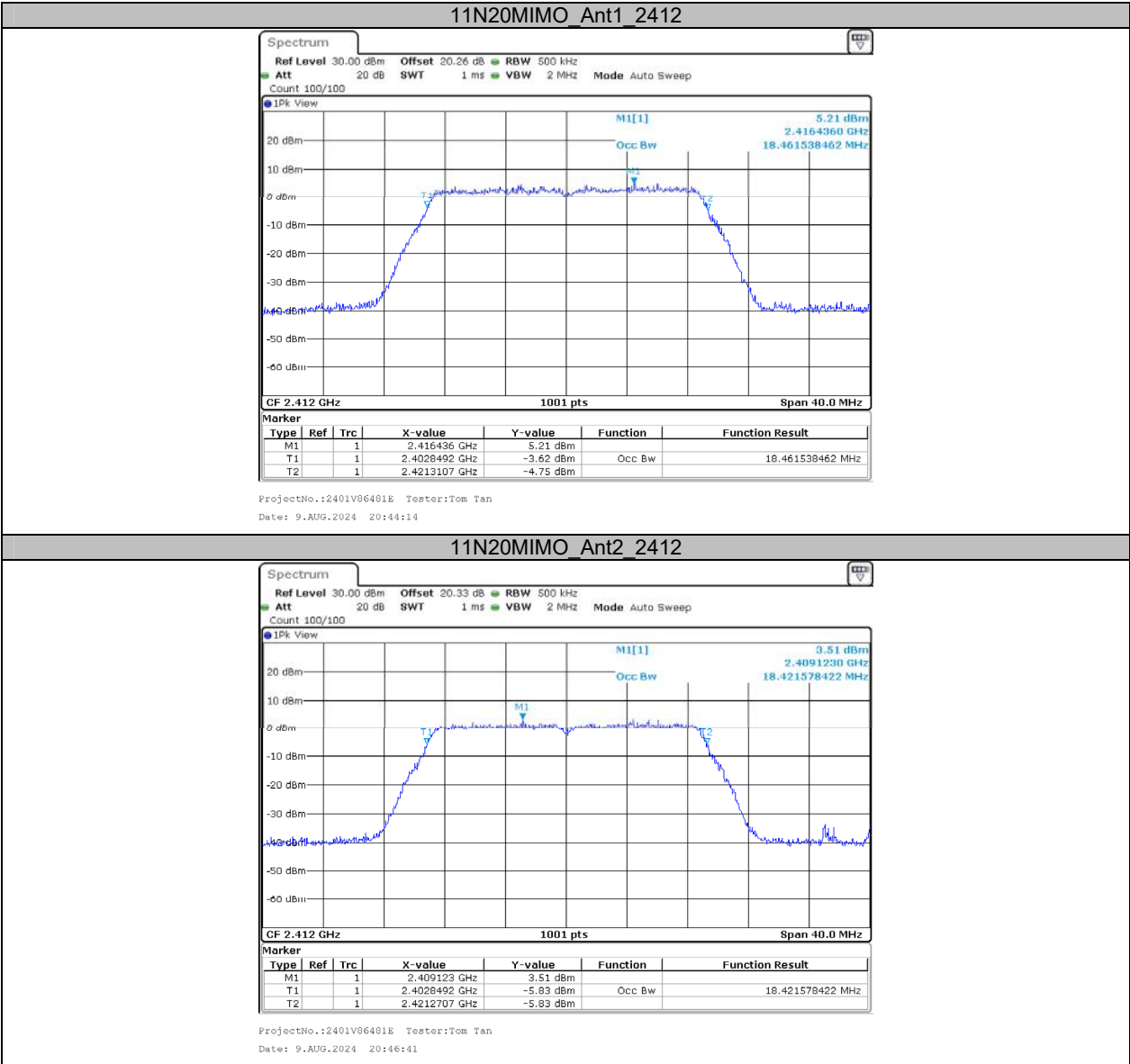


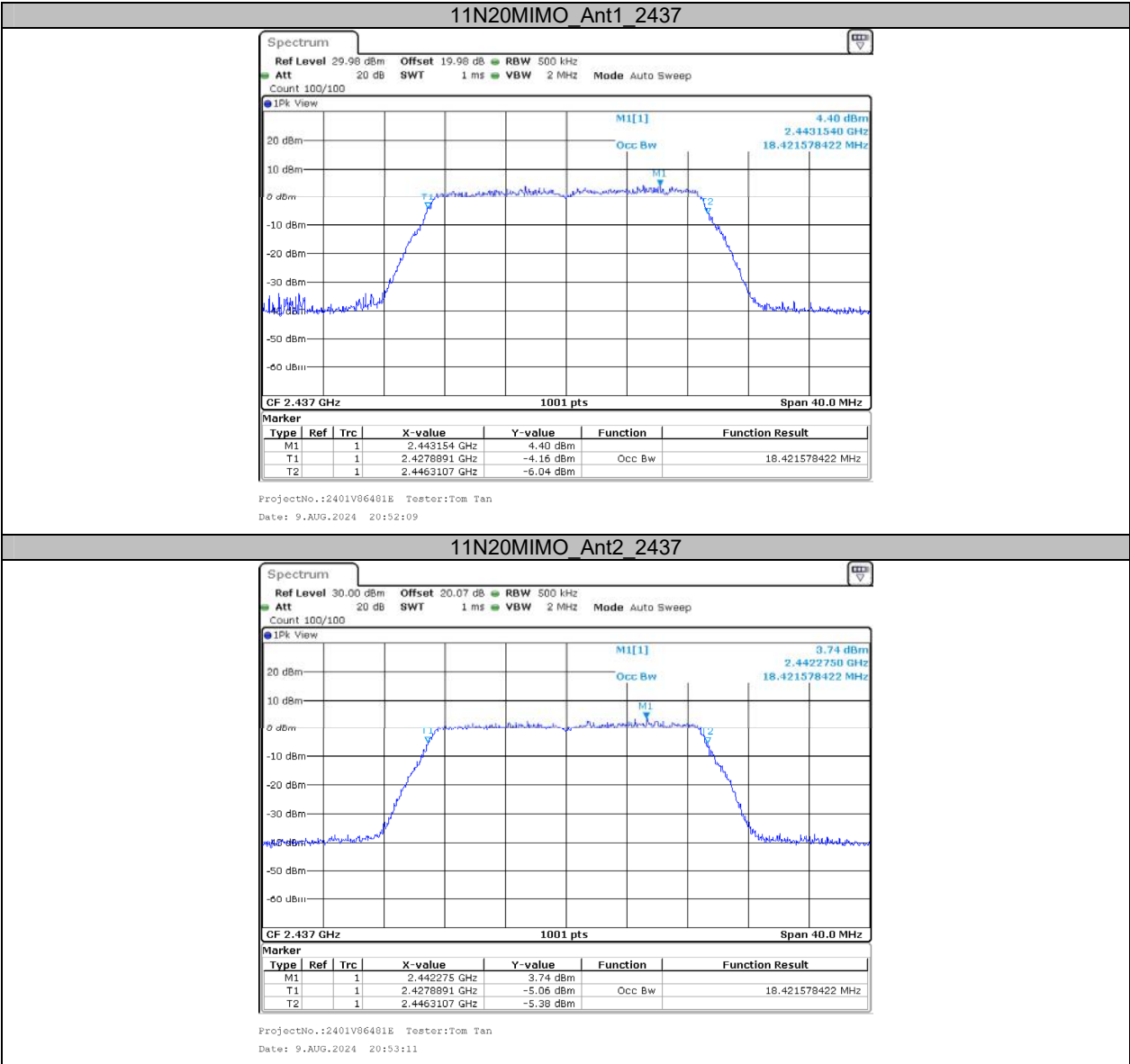


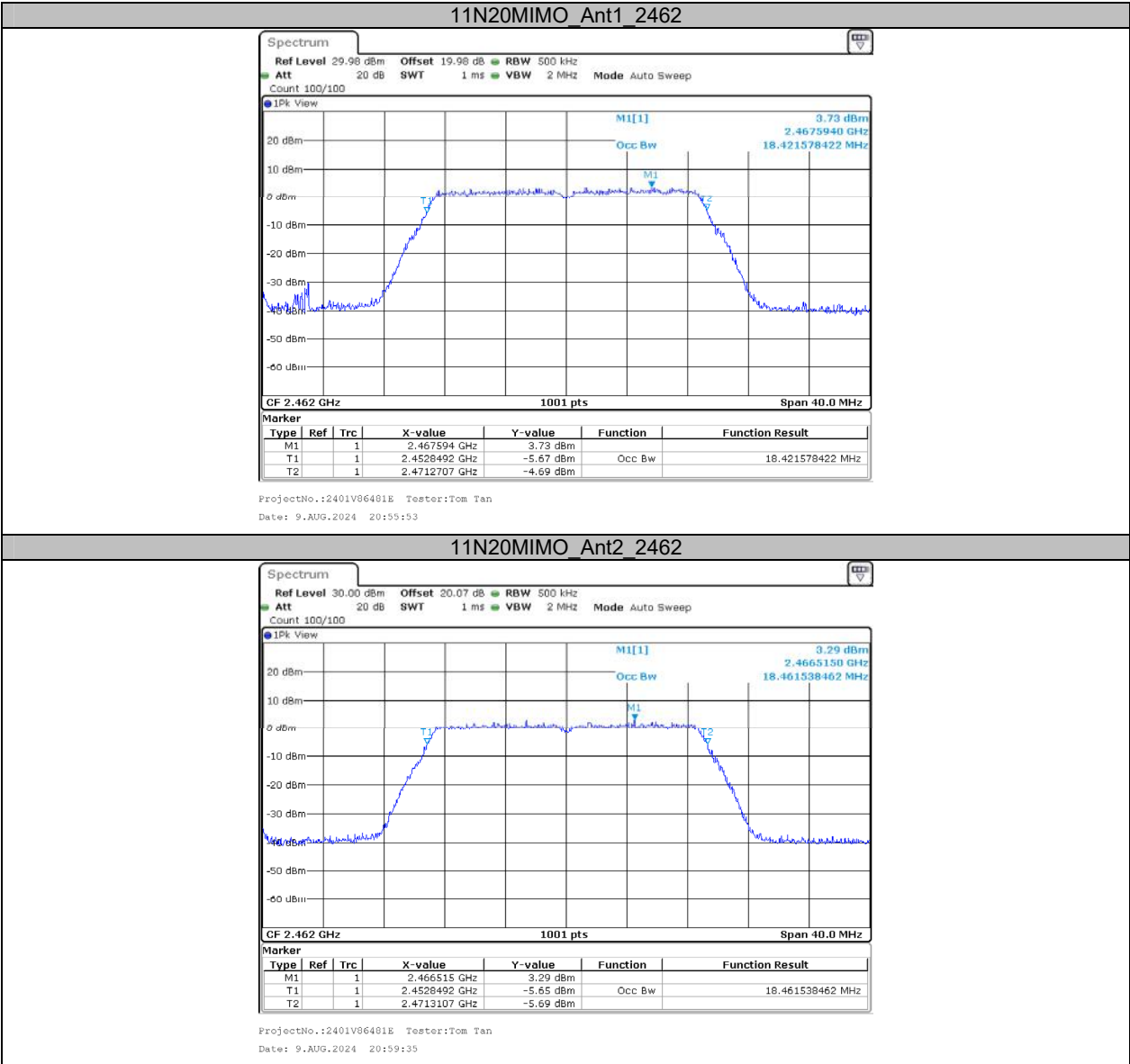


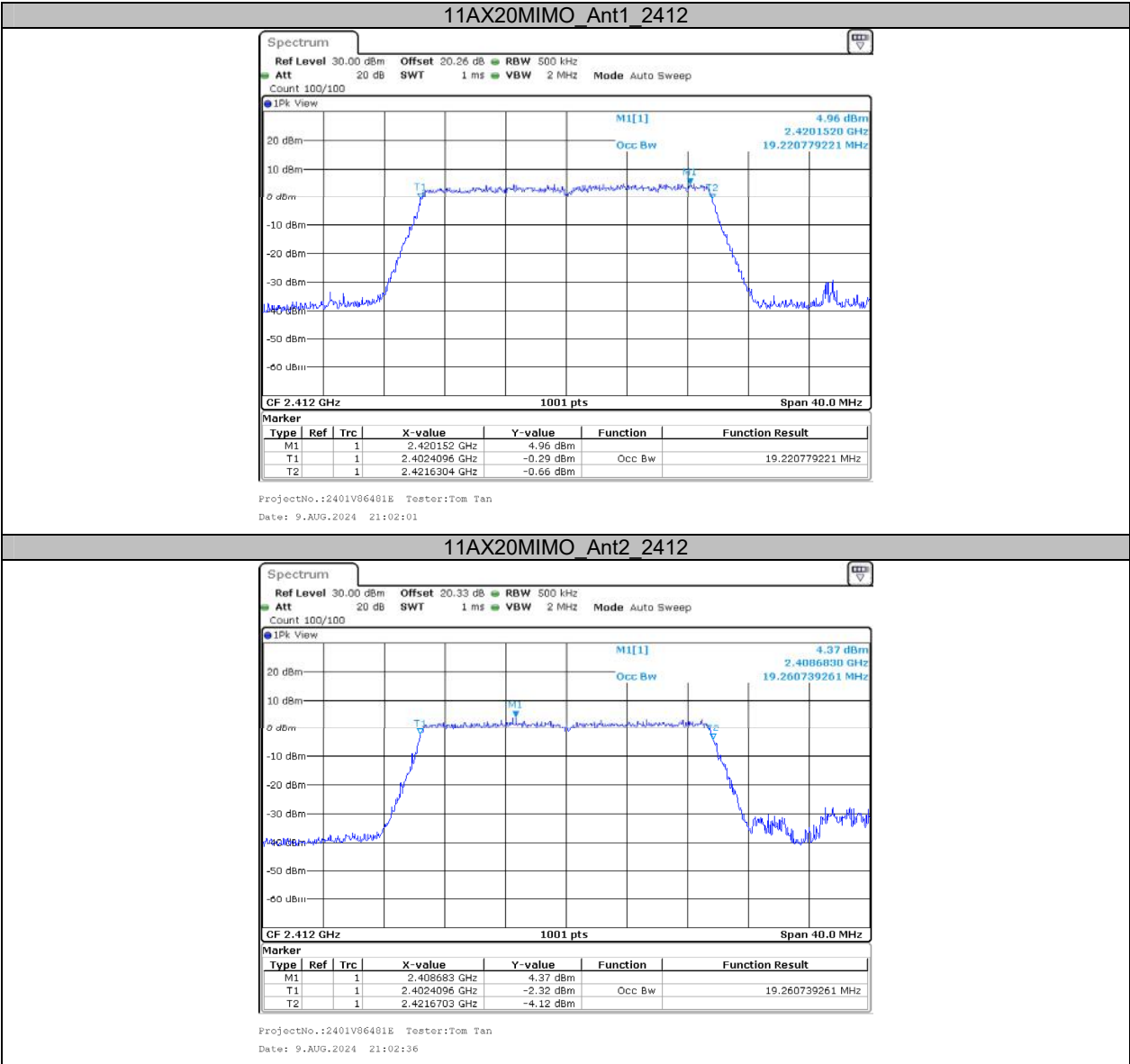


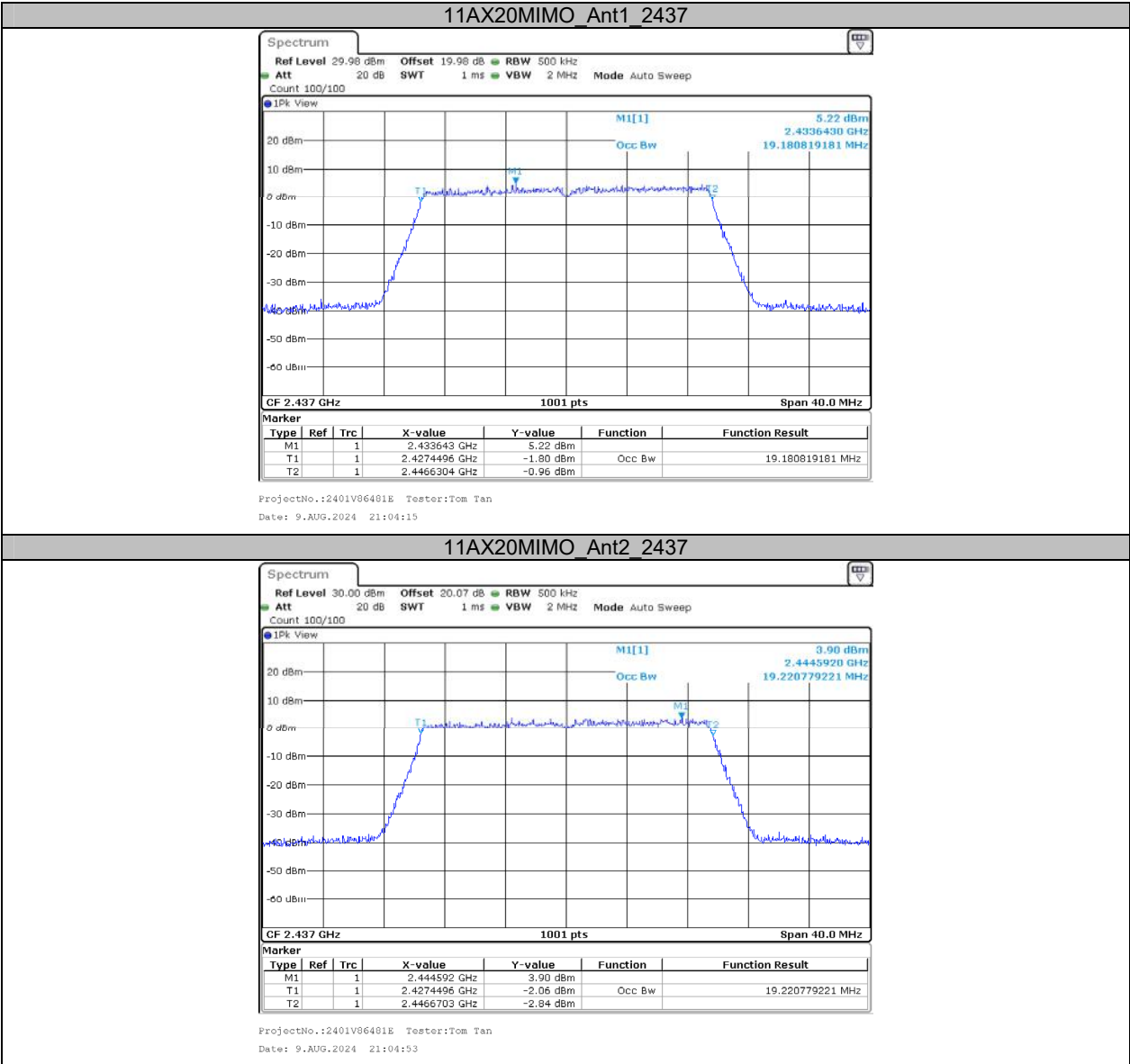


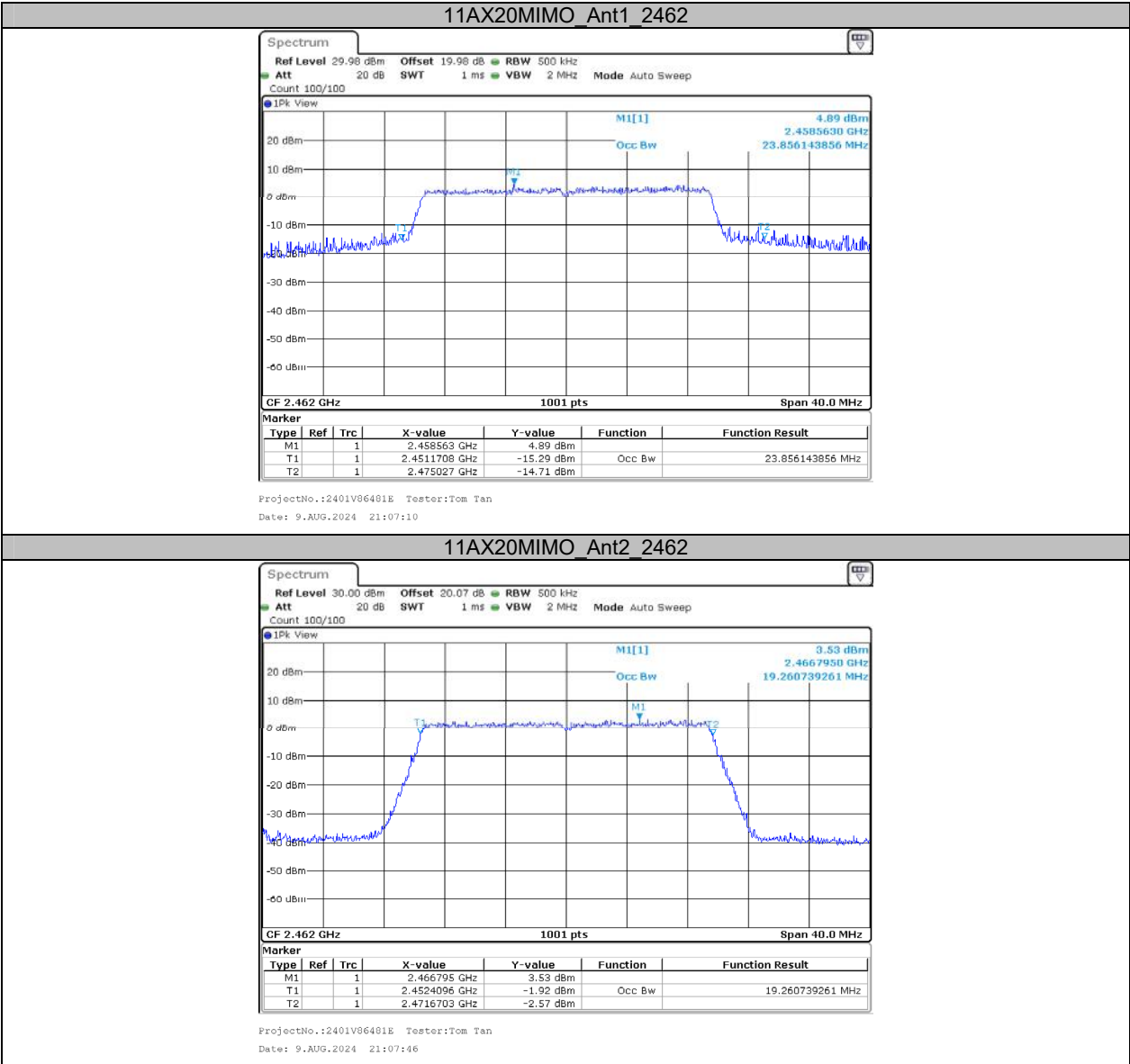












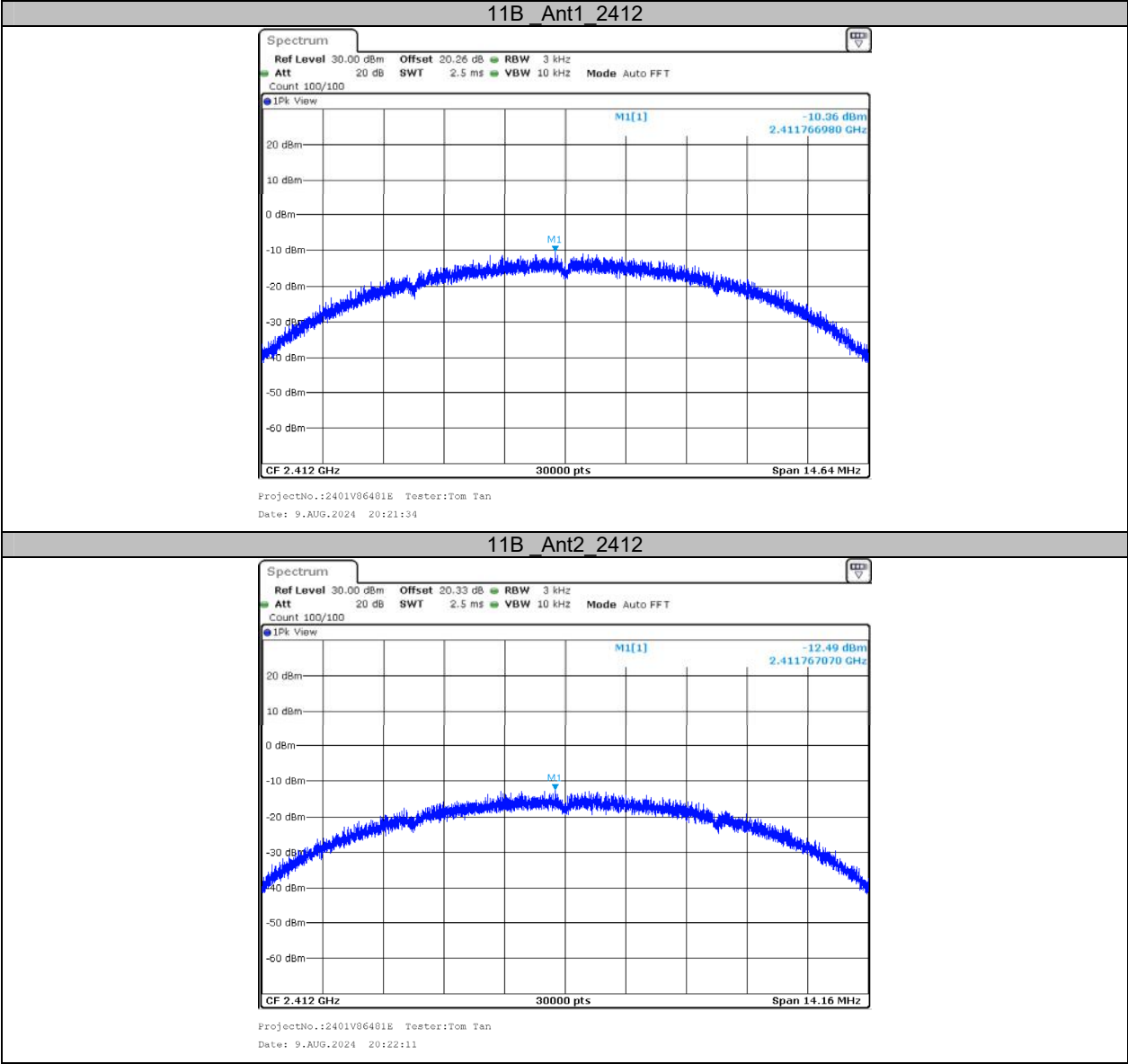
Appendix C: Maximum Conducted Output Power**Test Result**

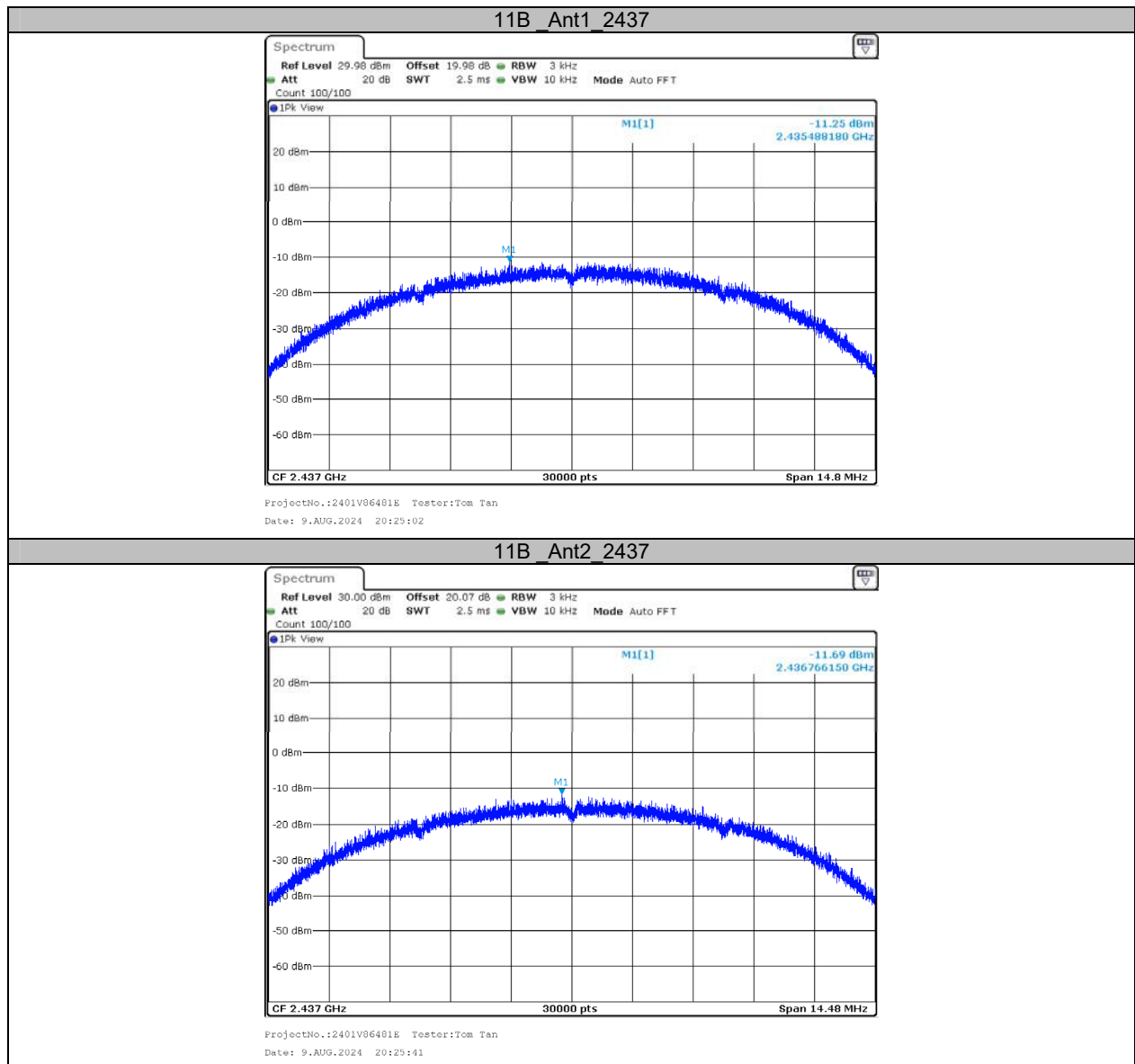
Test Mode	Antenna	Frequency [MHz]	Average Power [dBm]	Peak Power [dBm]	Conducted Limit [dBm]	Verdict
11B-CDD	Ant1	2412	9.77	13.46	≤29.00	PASS
	Ant2	2412	8.49	11.89	≤29.00	PASS
	Ant1	2437	9.40	13.25	≤29.00	PASS
	Ant2	2437	8.78	12.16	≤29.00	PASS
	Ant1	2462	9.08	13.07	≤29.00	PASS
	Ant2	2462	8.82	12.16	≤29.00	PASS
11G-CDD	Ant1	2412	8.26	17.42	≤29.00	PASS
	Ant2	2412	7.22	15.99	≤29.00	PASS
	Ant1	2437	7.74	16.98	≤29.00	PASS
	Ant2	2437	7.26	16.00	≤29.00	PASS
	Ant1	2462	6.56	16.98	≤29.00	PASS
	Ant2	2462	7.47	15.97	≤29.00	PASS
11N20MIMO	Ant1	2412	8.53	17.52	≤29.00	PASS
	Ant2	2412	8.14	15.79	≤29.00	PASS
	total	2412	11.35	19.75	≤29.00	PASS
	Ant1	2437	7.66	16.79	≤29.00	PASS
	Ant2	2437	7.09	15.83	≤29.00	PASS
	total	2437	10.39	19.35	≤29.00	PASS
	Ant1	2462	8.03	16.86	≤29.00	PASS
	Ant2	2462	7.27	15.75	≤29.00	PASS
11AX20MIMO	total	2462	10.68	19.35	≤29.00	PASS
	Ant1	2412	6.01	18.19	≤29.00	PASS
	Ant2	2412	7.49	16.40	≤29.00	PASS
	total	2412	9.82	20.40	≤29.00	PASS
	Ant1	2437	7.74	17.57	≤29.00	PASS
	Ant2	2437	7.35	16.74	≤29.00	PASS
	total	2437	10.56	20.19	≤29.00	PASS
	Ant1	2462	5.82	17.46	≤29.00	PASS
	Ant2	2462	7.83	16.62	≤29.00	PASS
	total	2462	9.95	20.07	≤29.00	PASS
Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices: Array Gain = 0 dB (i.e., no array gain) for $N_{\text{ANT}} \leq 4$						
Antenna Gain:		7.0	dBi	Directional gain:	7.0	dBi

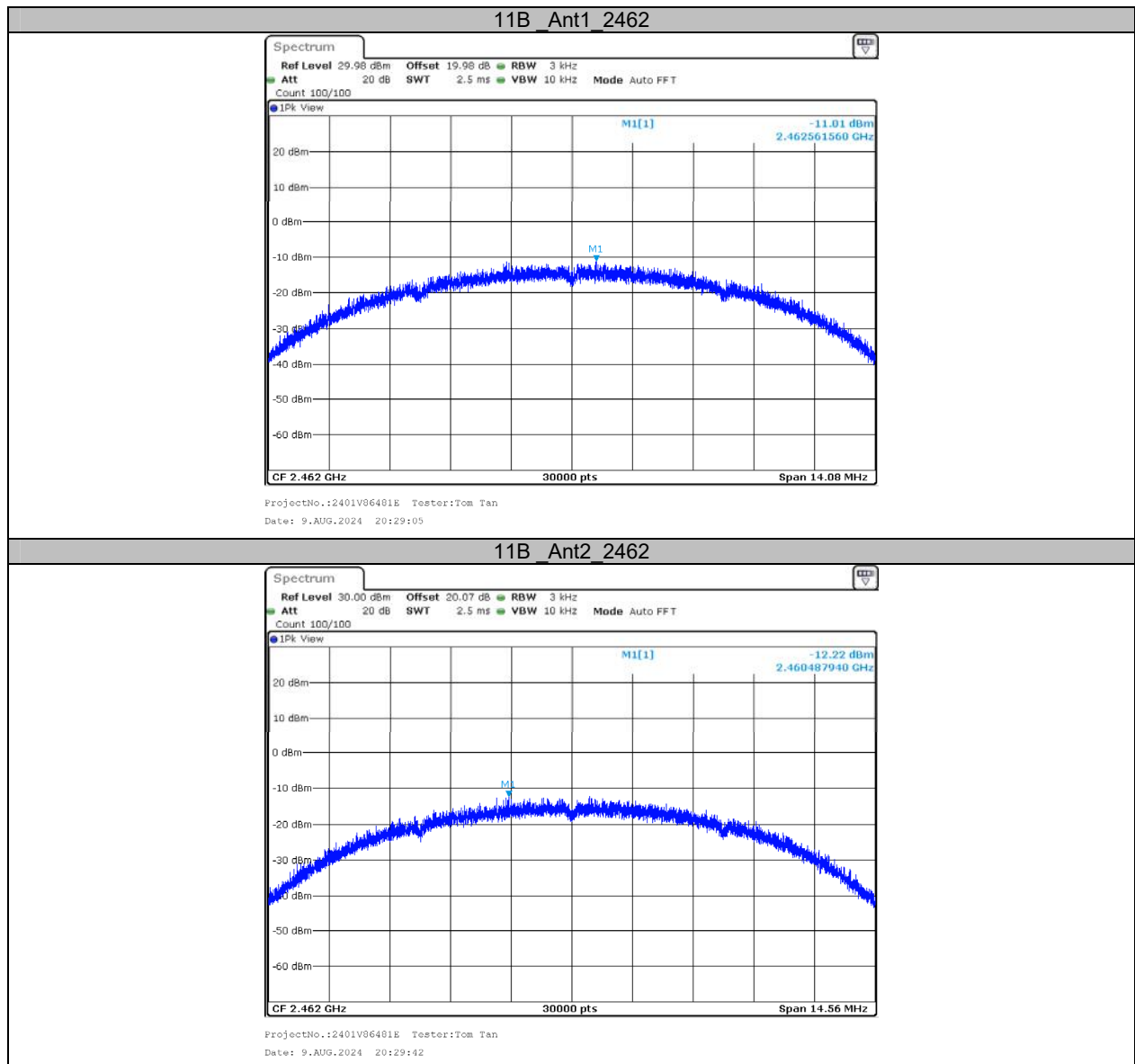
Appendix D: Maximum Power Spectral Density**Test Result**

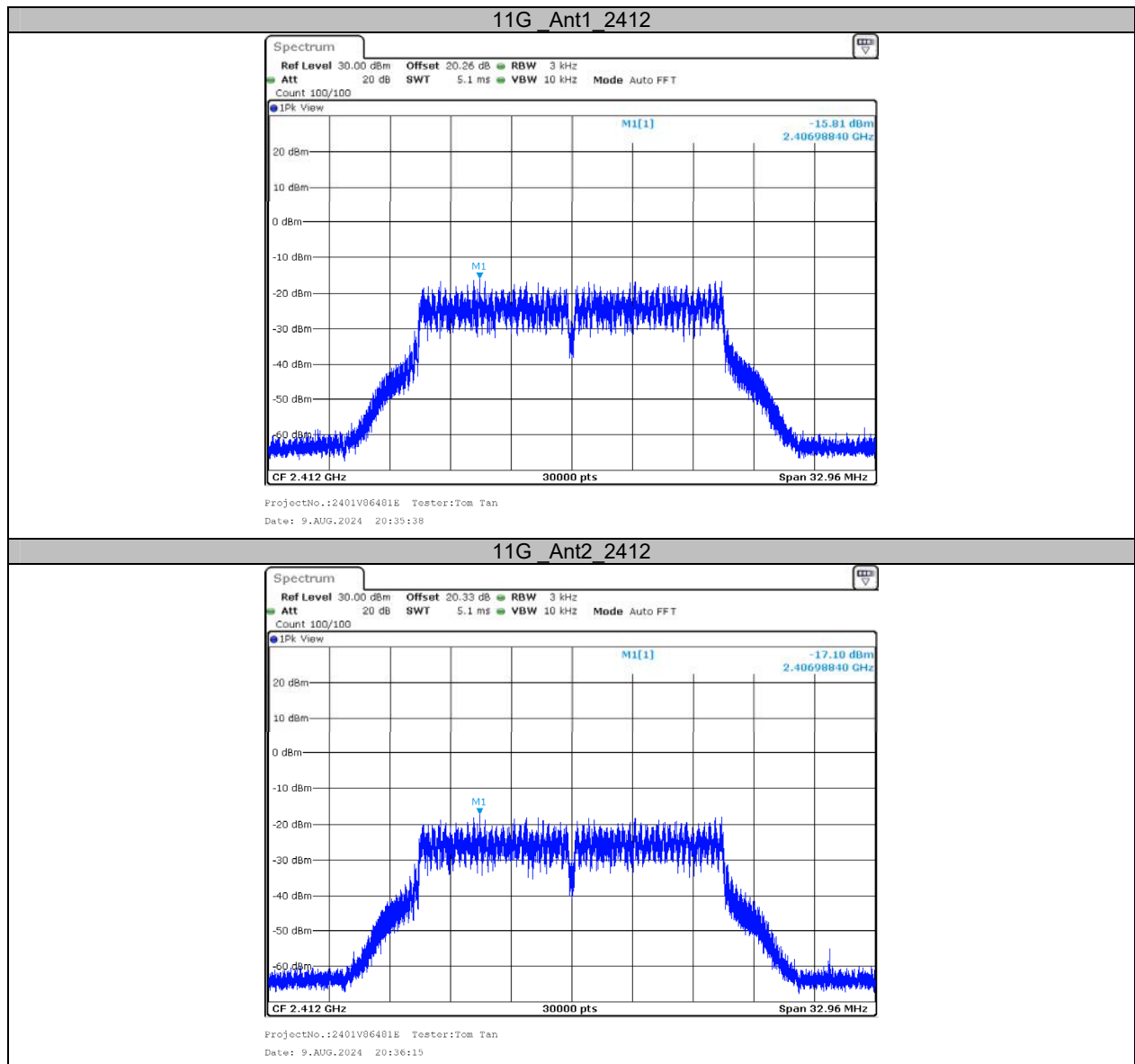
Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B-CDD	Ant1	2412	-10.36	≤7.00	PASS
	Ant2	2412	-12.49	≤7.00	PASS
	Ant1	2437	-11.25	≤7.00	PASS
	Ant2	2437	-11.69	≤7.00	PASS
	Ant1	2462	-11.01	≤7.00	PASS
	Ant2	2462	-12.22	≤7.00	PASS
11G-CDD	Ant1	2412	-15.81	≤7.00	PASS
	Ant2	2412	-17.10	≤7.00	PASS
	Ant1	2437	-16.38	≤7.00	PASS
	Ant2	2437	-17.24	≤7.00	PASS
	Ant1	2462	-16.25	≤7.00	PASS
	Ant2	2462	-17.17	≤7.00	PASS
11N20MIMO	Ant1	2412	-16.38	≤4.00	PASS
	Ant2	2412	-17.27	≤4.00	PASS
	total	2412	-13.79	≤4.00	PASS
	Ant1	2437	-16.23	≤4.00	PASS
	Ant2	2437	-17.18	≤4.00	PASS
	total	2437	-13.67	≤4.00	PASS
	Ant1	2462	-17.00	≤4.00	PASS
	Ant2	2462	-17.55	≤4.00	PASS
	total	2462	-14.26	≤4.00	PASS
11AX20MIMO	Ant1	2412	-17.24	≤4.00	PASS
	Ant2	2412	-19.24	≤4.00	PASS
	total	2412	-15.12	≤4.00	PASS
	Ant1	2437	-17.31	≤4.00	PASS
	Ant2	2437	-18.02	≤4.00	PASS
	total	2437	-14.64	≤4.00	PASS
	Ant1	2462	-18.32	≤4.00	PASS
	Ant2	2462	-17.75	≤4.00	PASS
	total	2462	-15.02	≤4.00	PASS
Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices: Array Gain = $10 \log(N_{\text{ANT}}/N_{\text{SS}})$ dB					
Antenna Gain:	7.0	dBi	Directional gain:	10.0	dBi

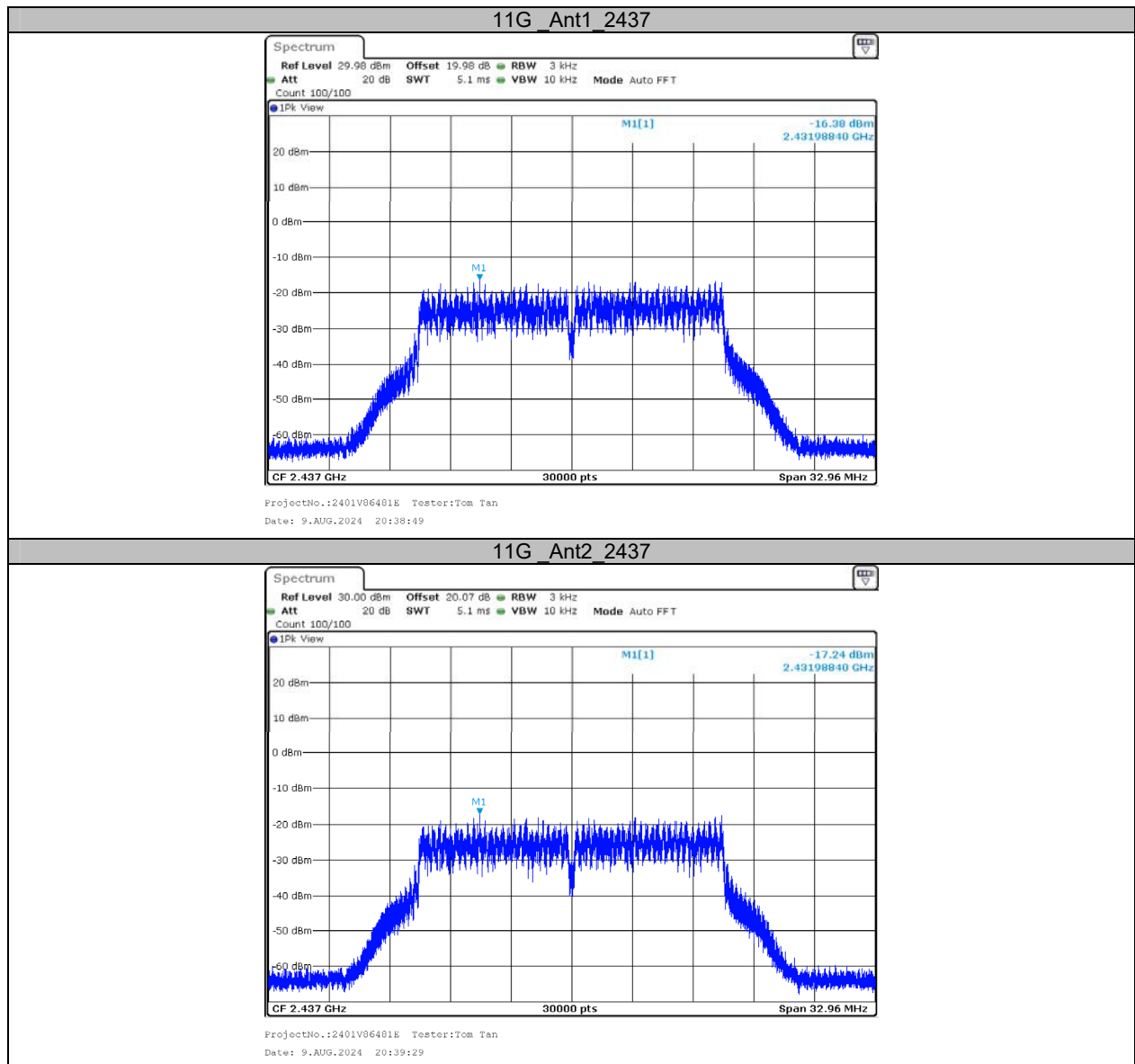
Test Graphs

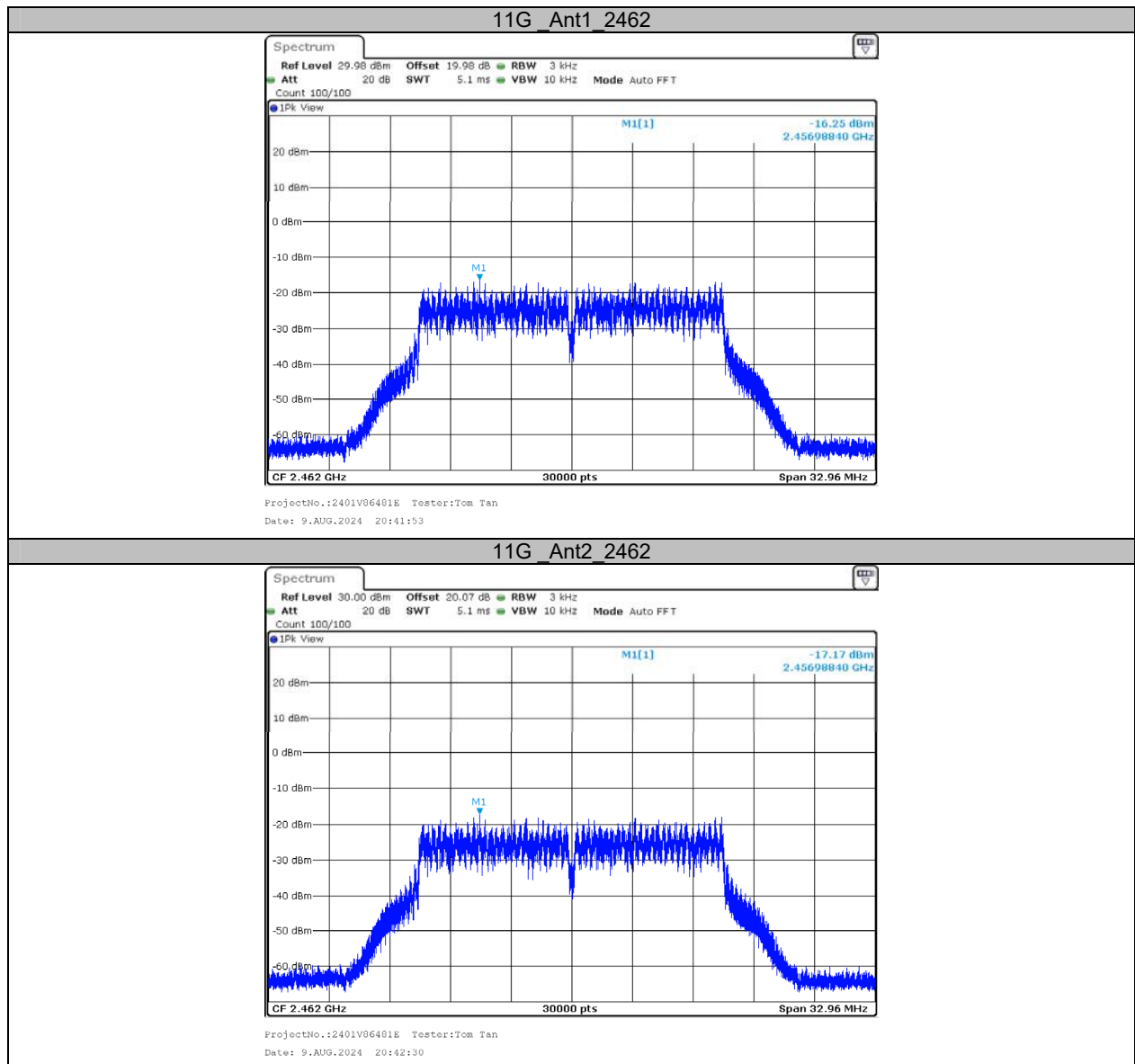


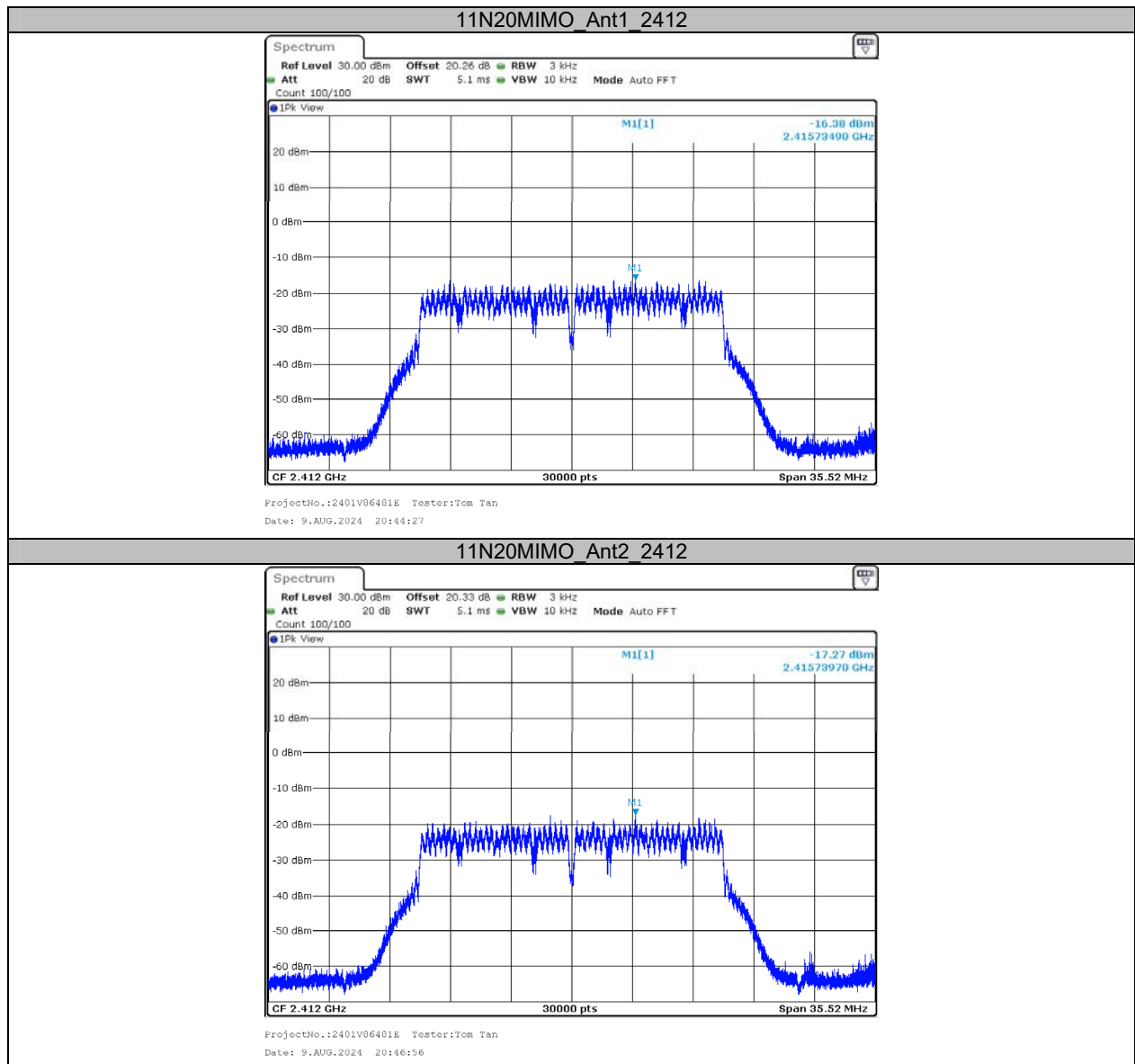


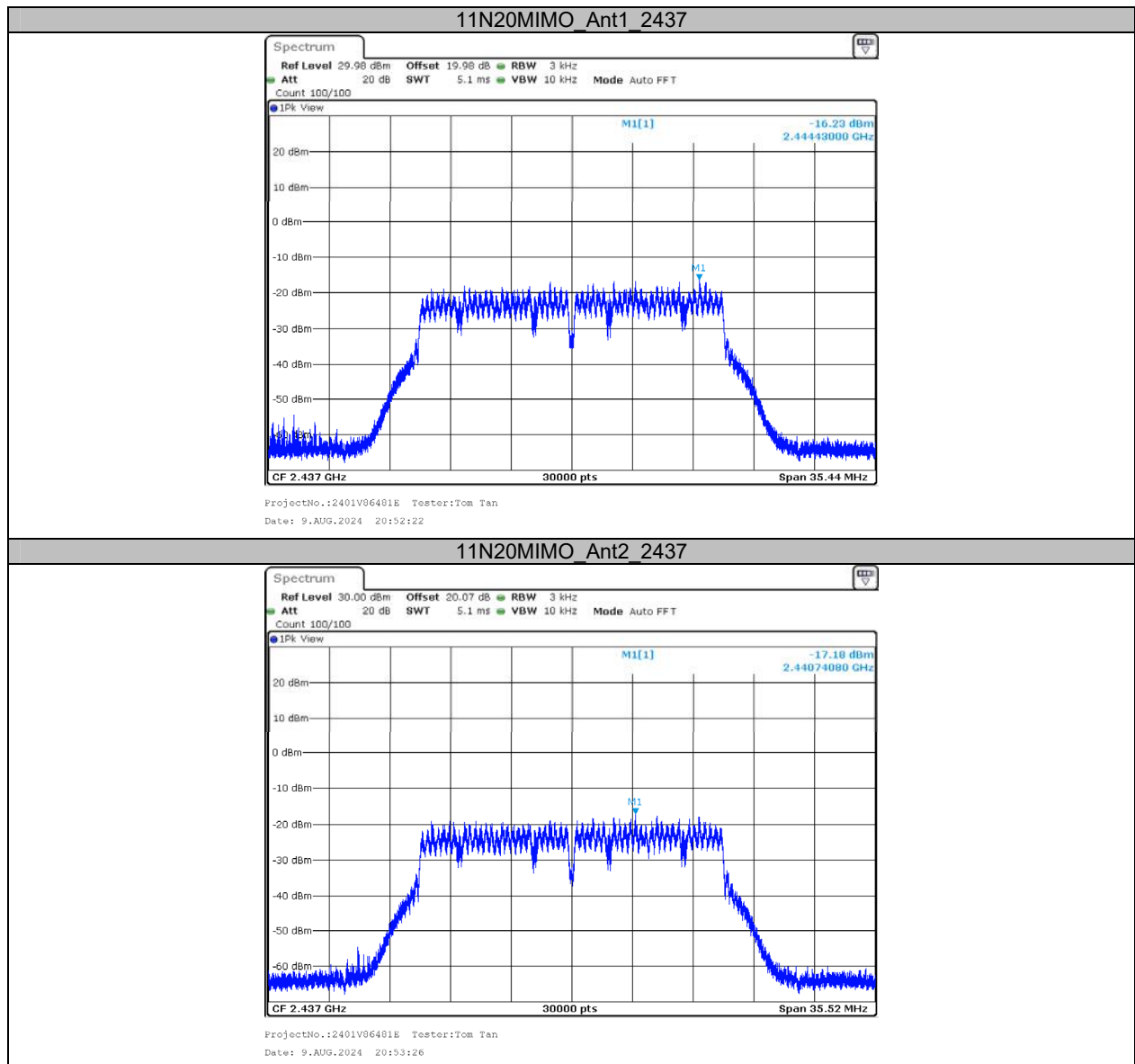


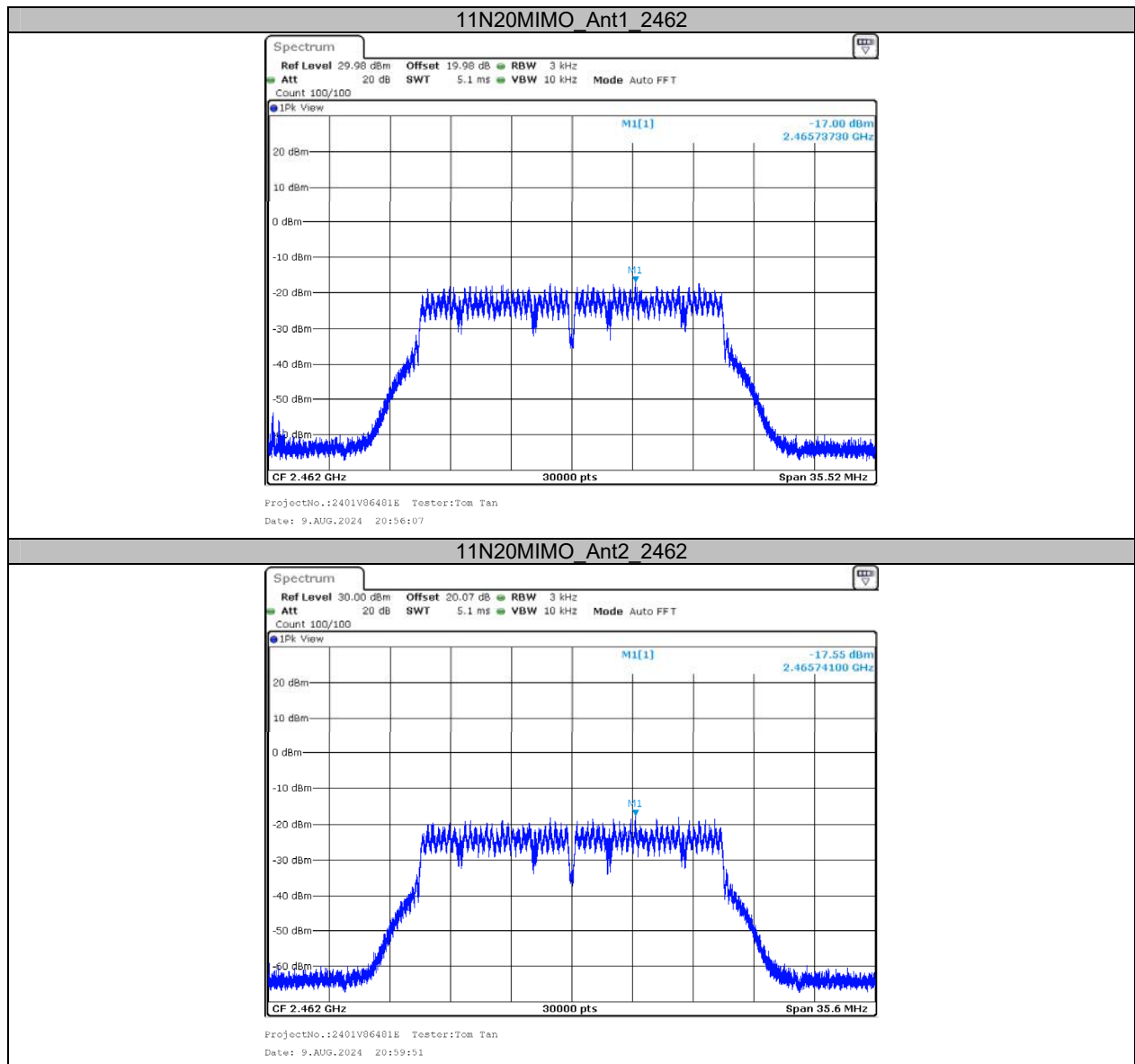


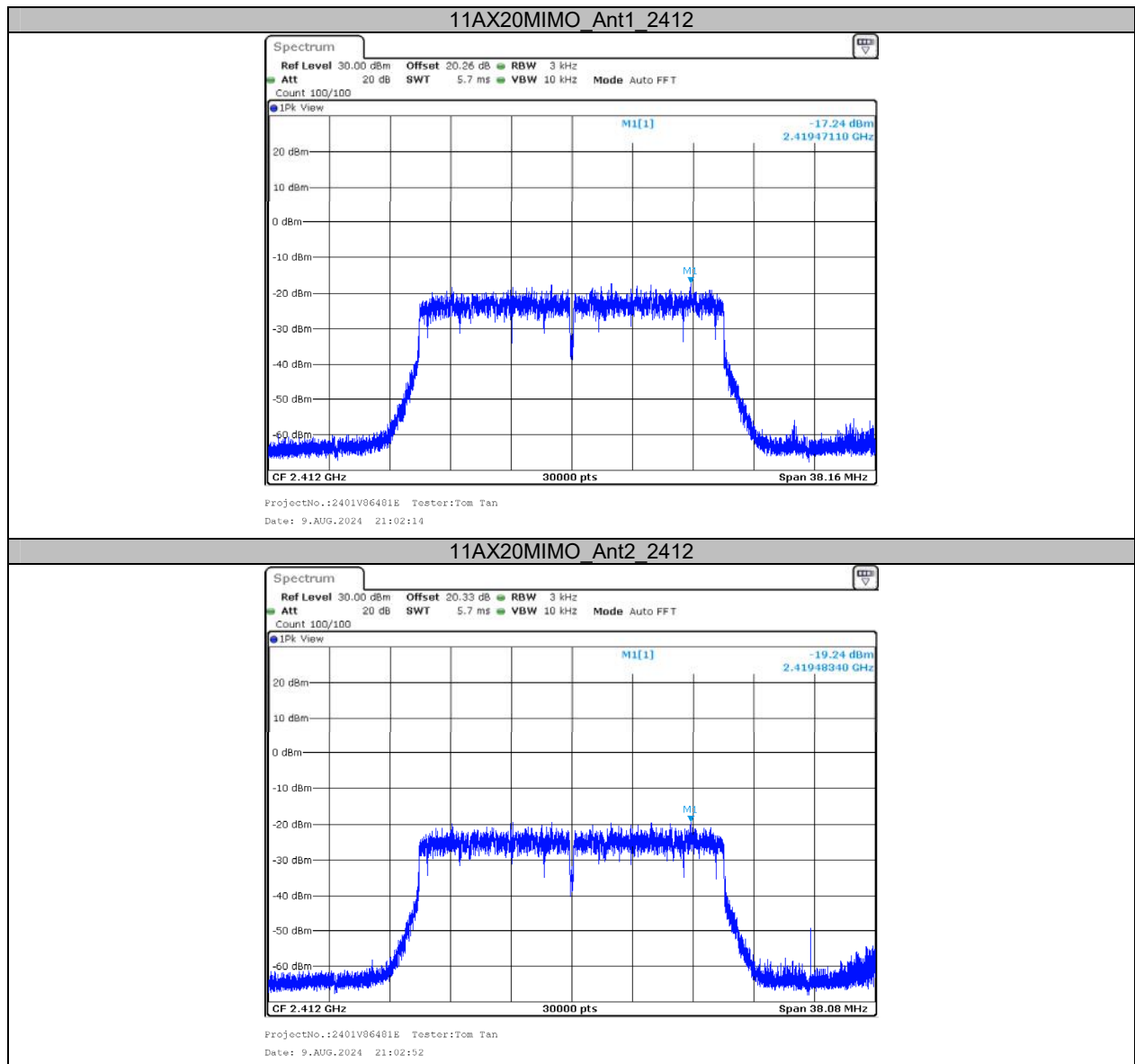


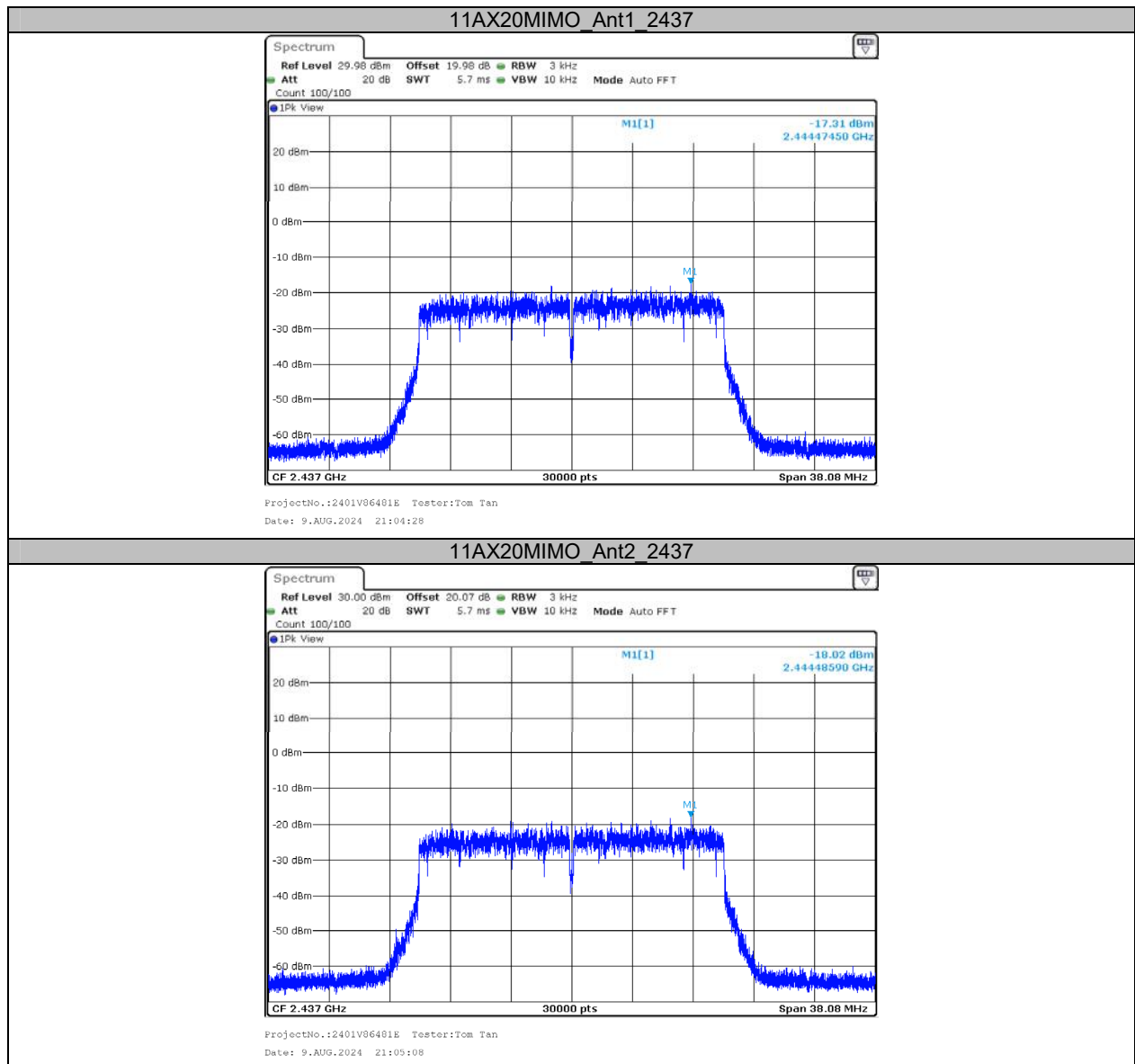


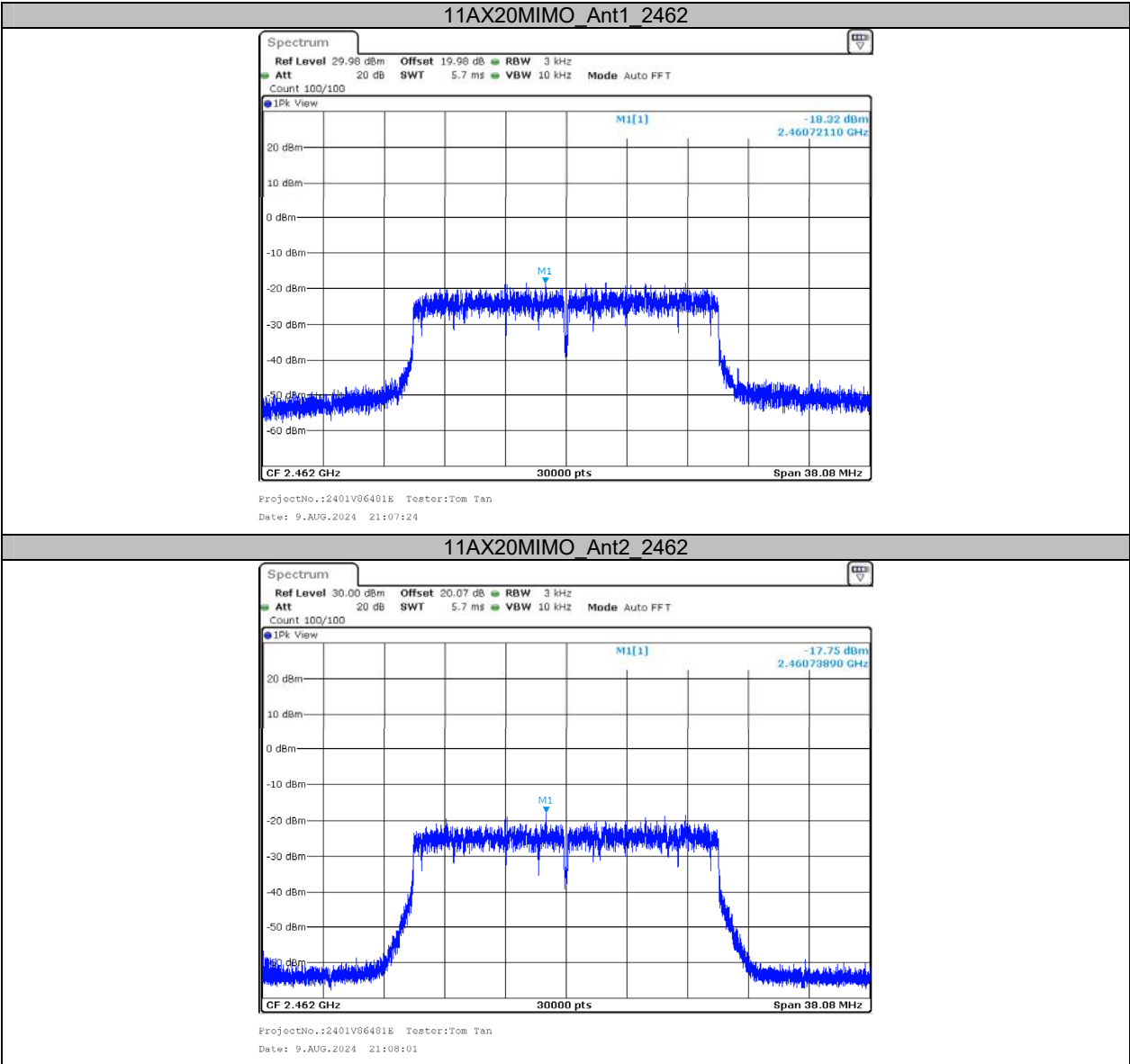






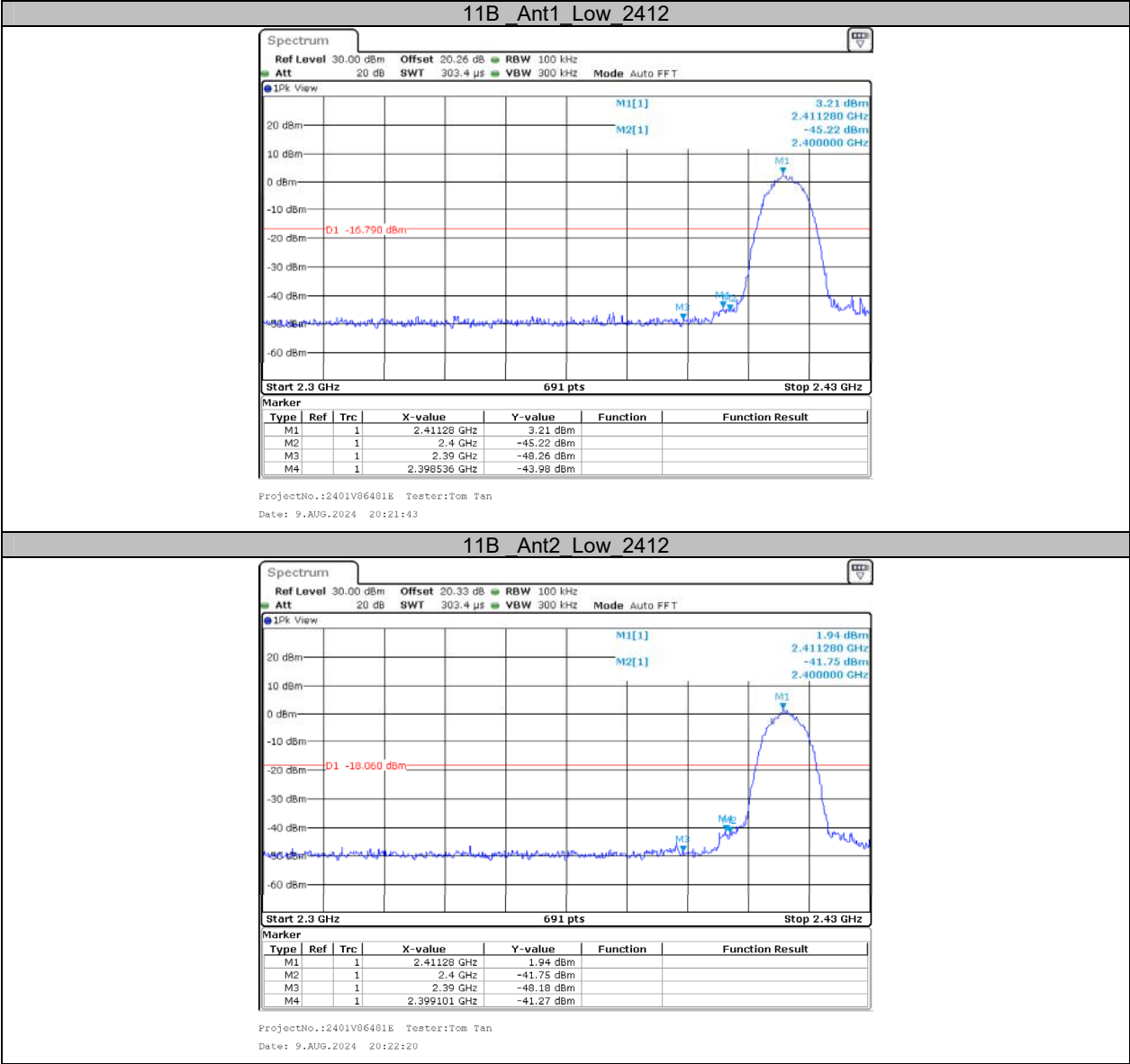


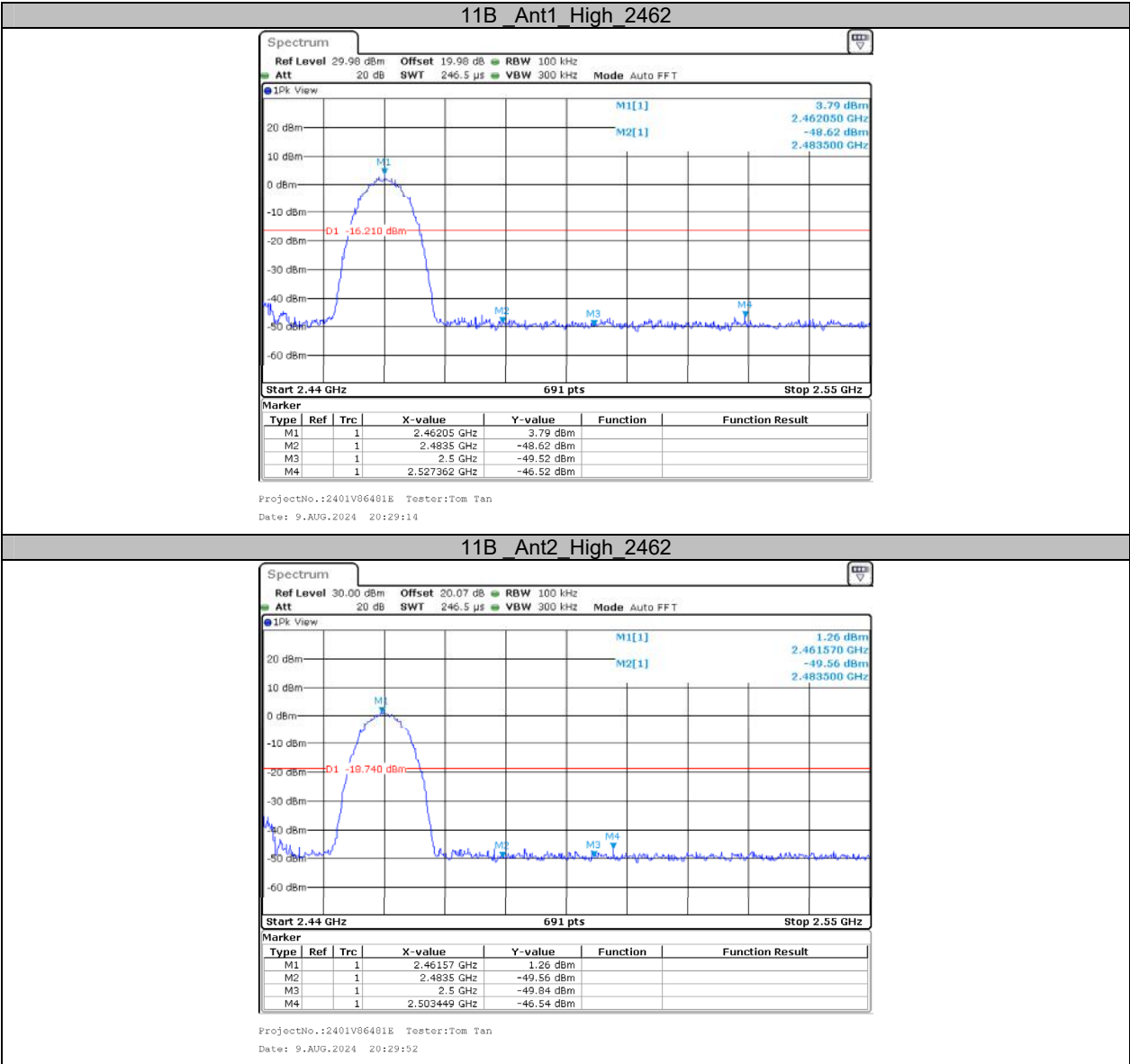


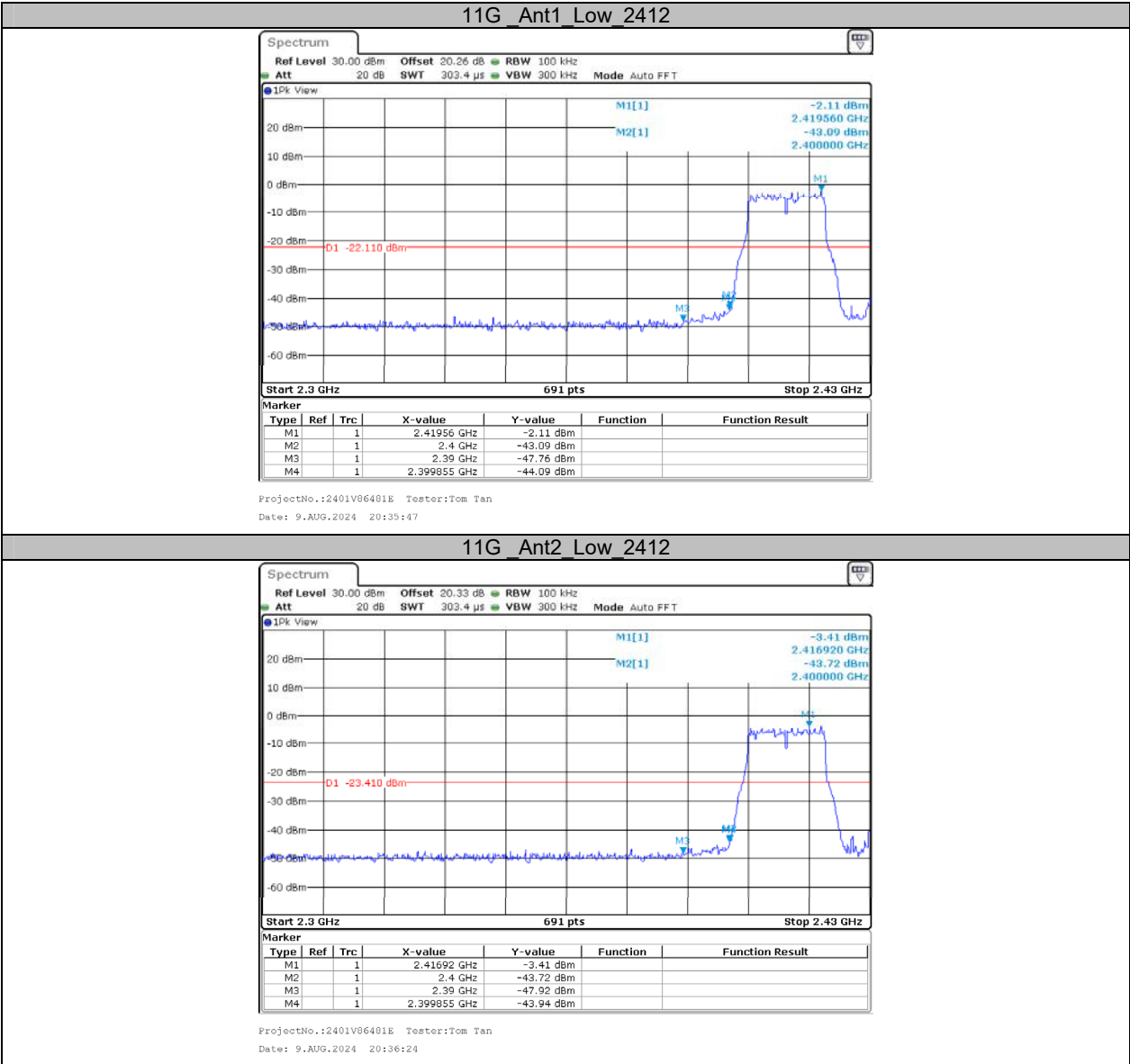


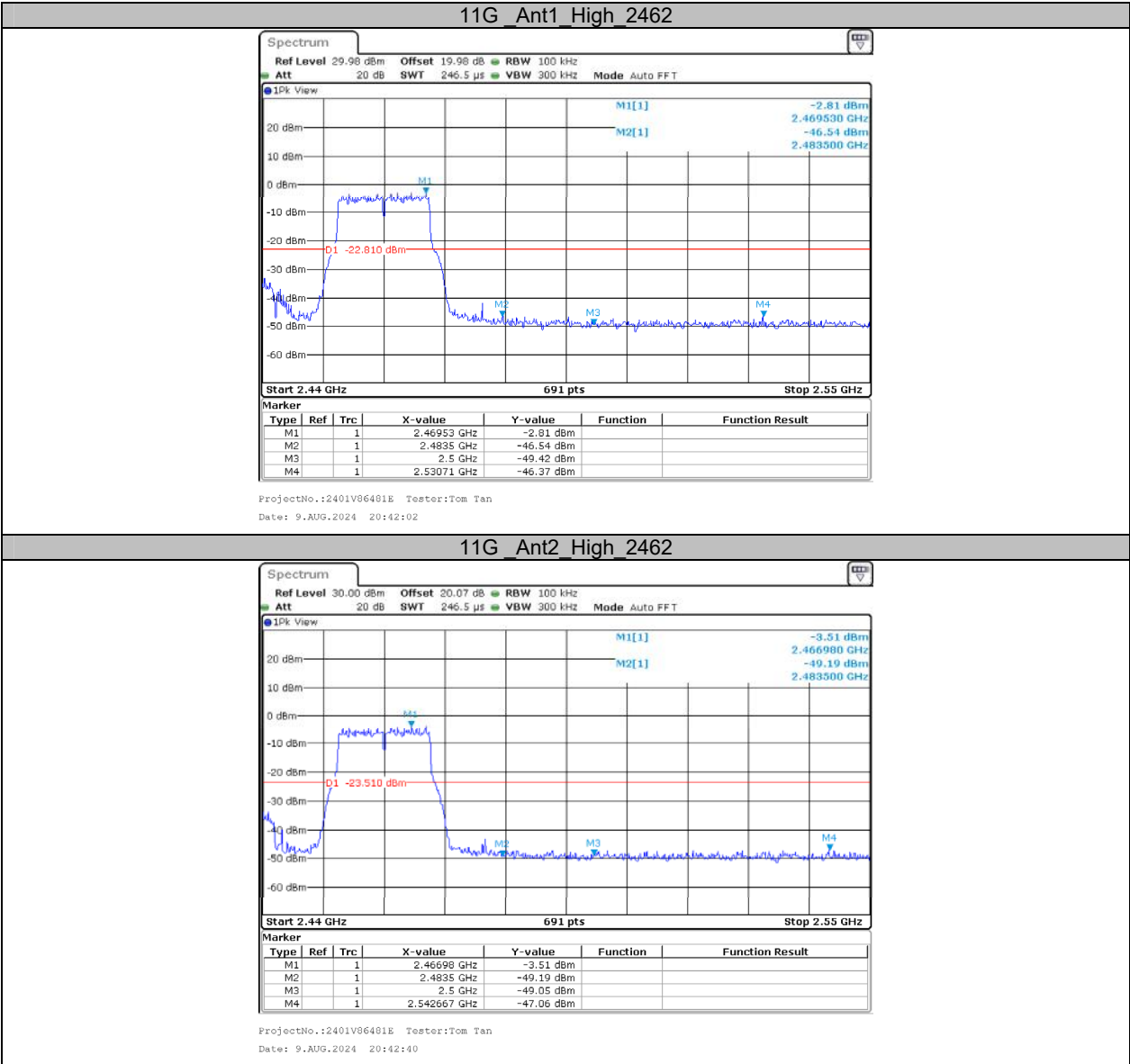
Appendix E: Band Edge Measurements

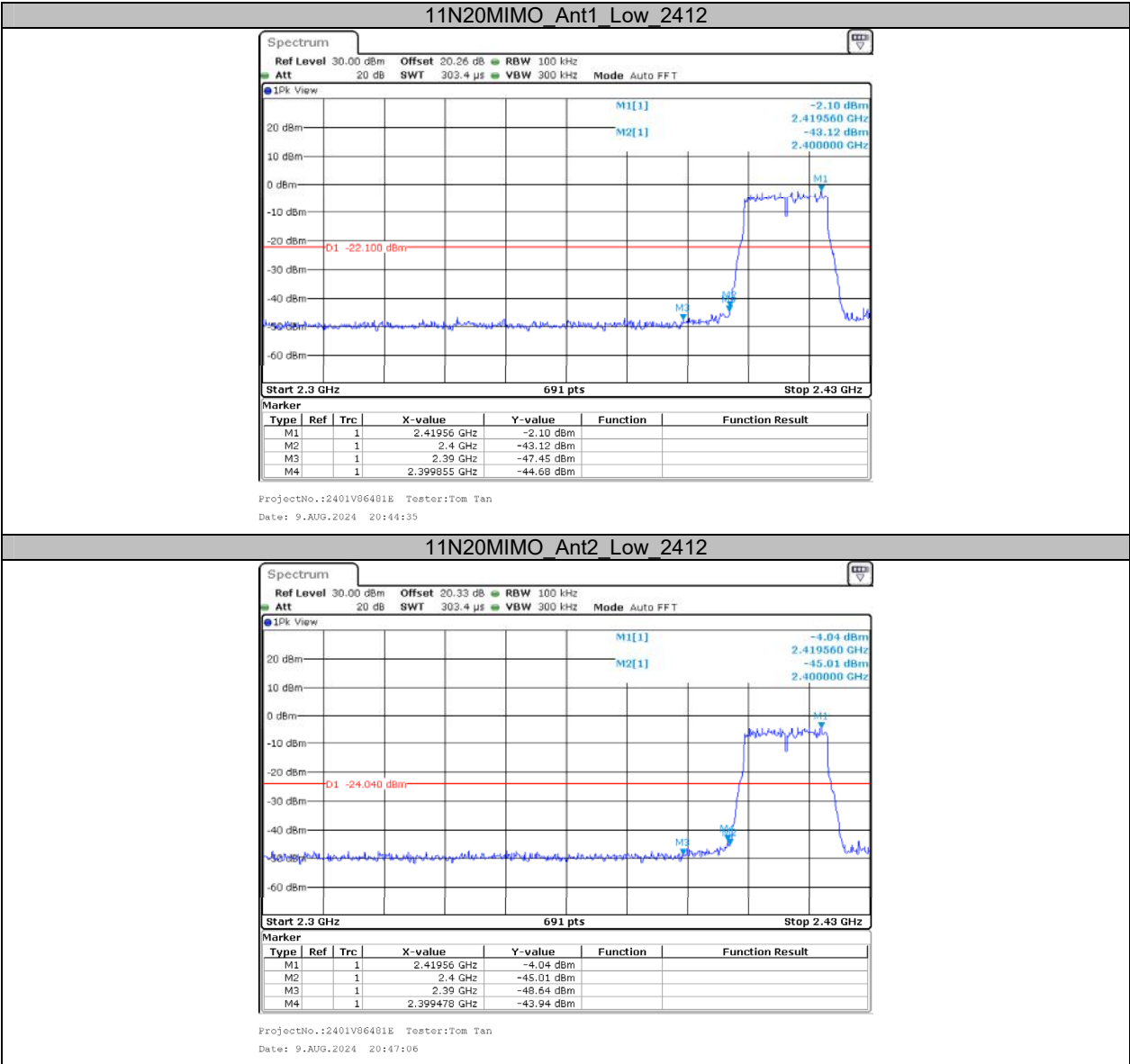
Test Graphs

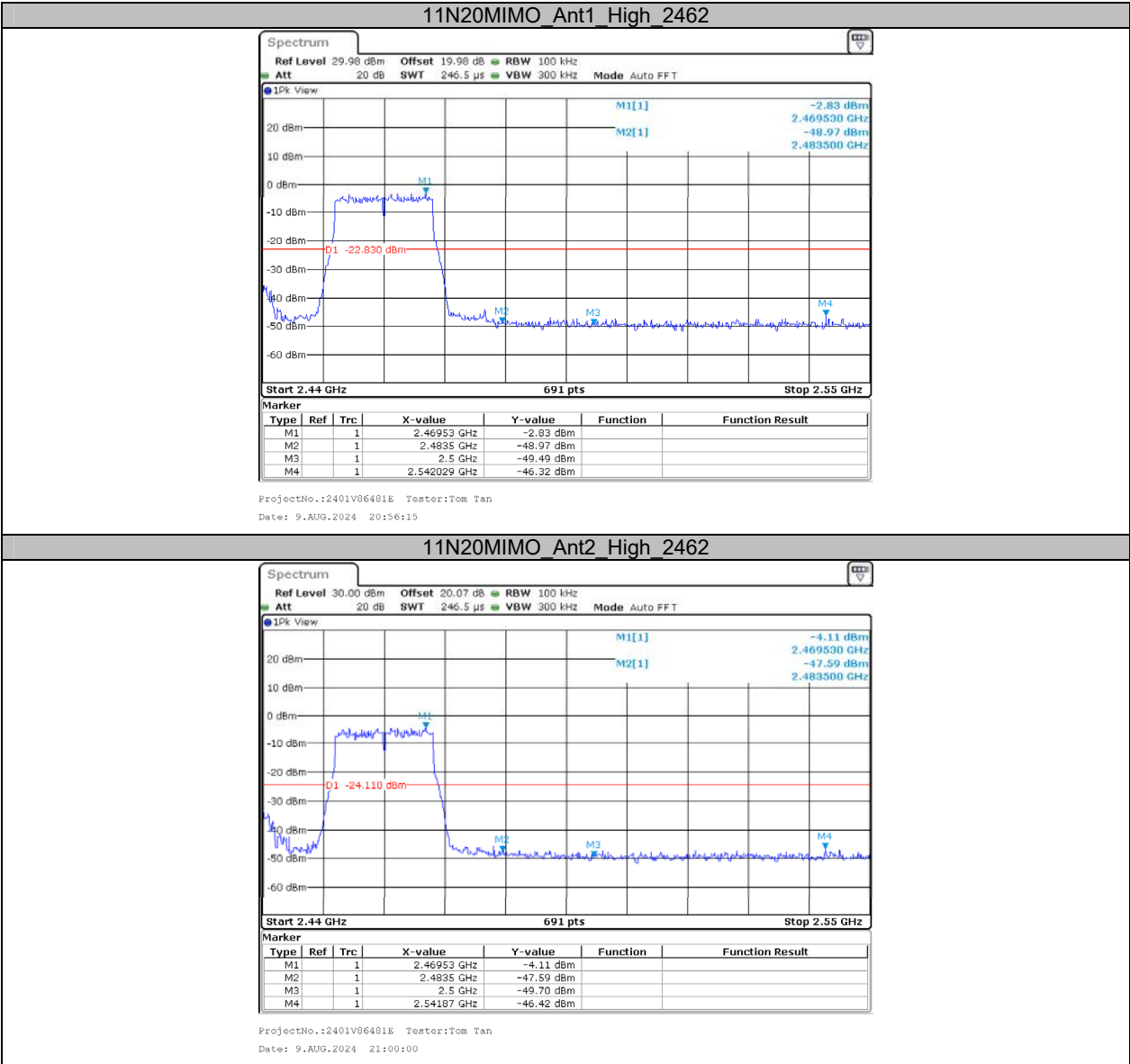


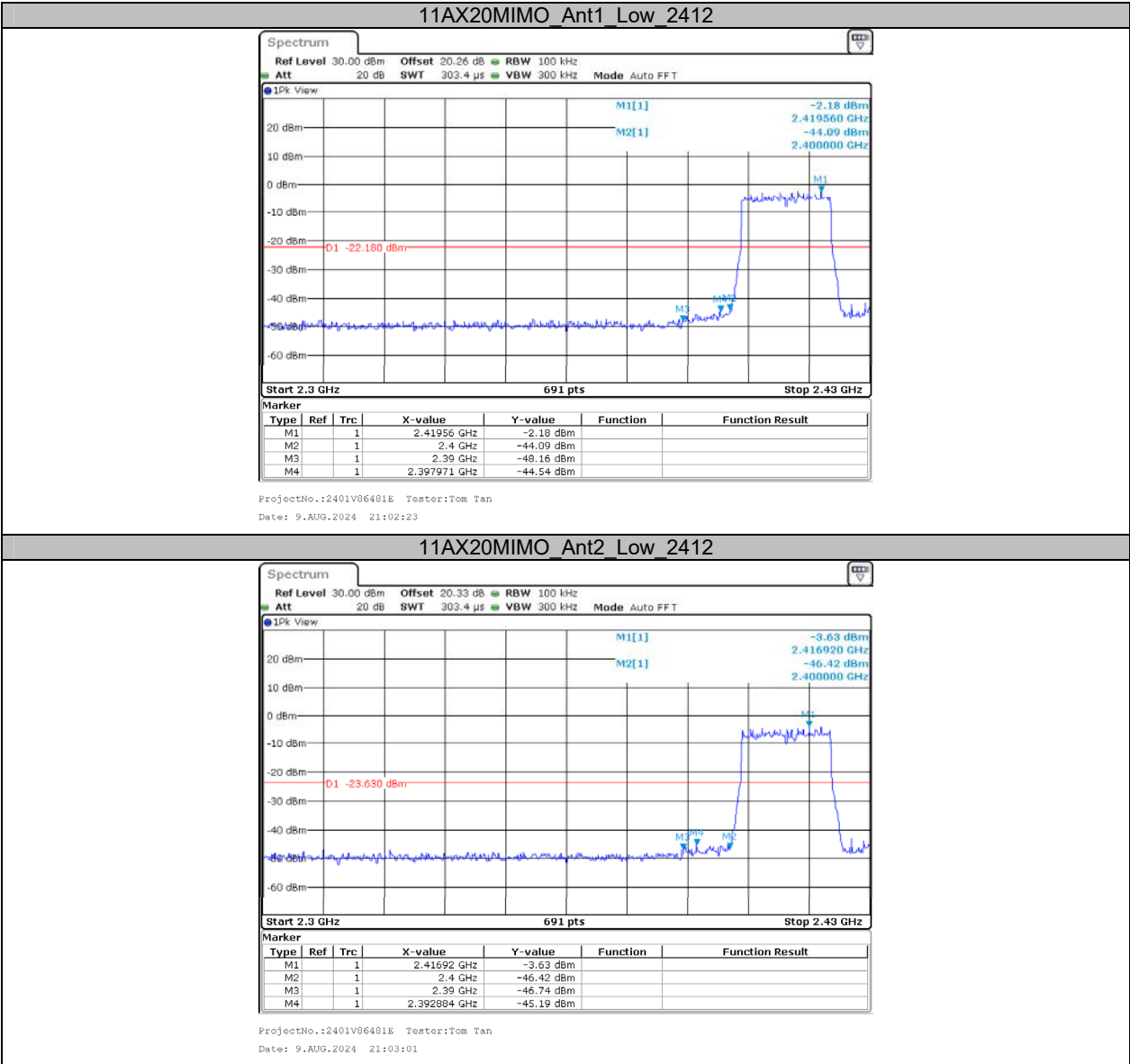


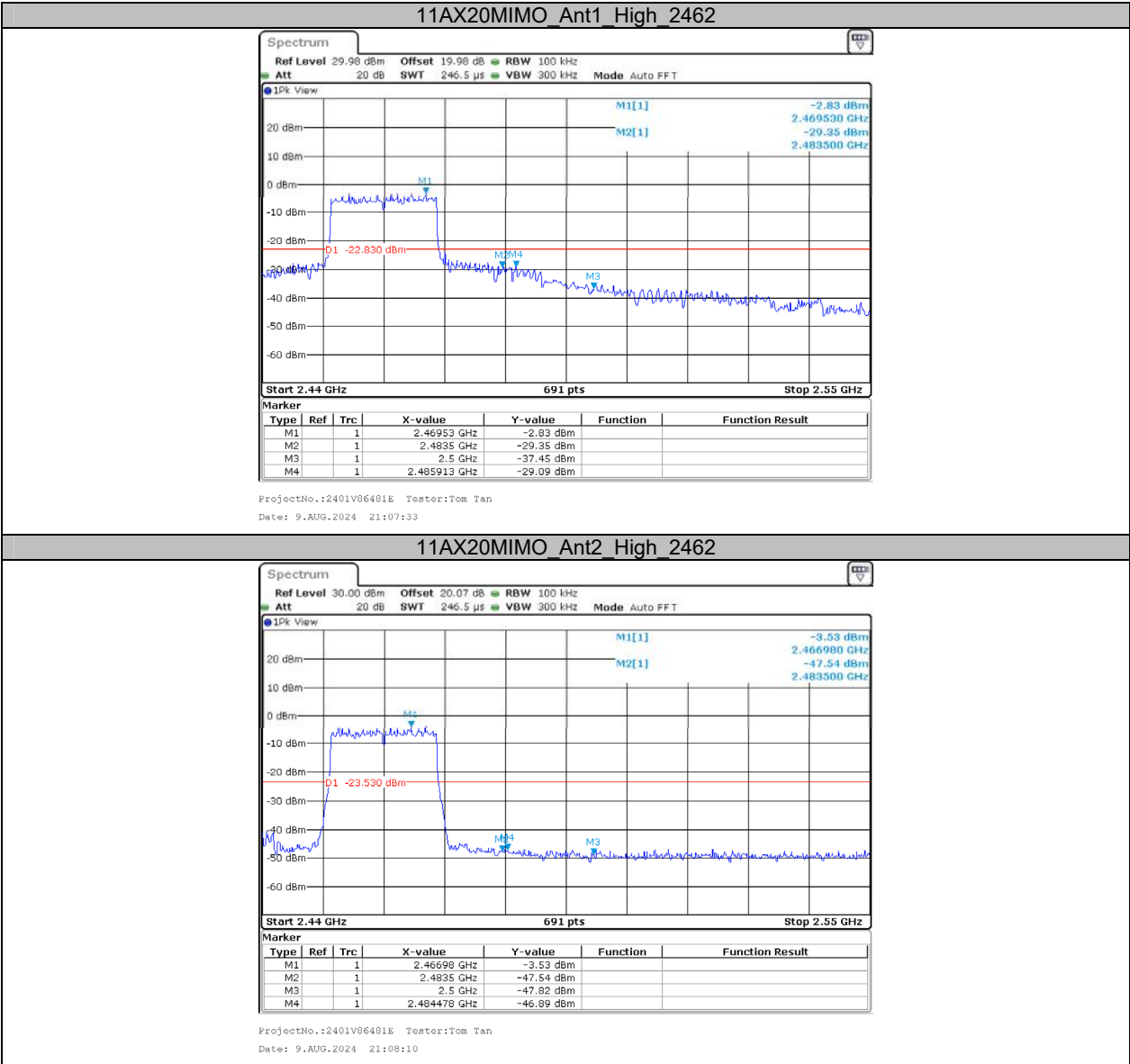












Appendix F: Duty Cycle**Test Result**

Test Mode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T (Hz)	VBW Setting (Hz)
11B	Ant1	2437	0.84	0.94	89.36	1190	2000
	Ant2	2437	0.84	0.94	89.36	1190	2000
11G	Ant1	2437	0.25	0.35	71.43	4000	5000
	Ant2	2437	0.25	0.35	71.43	4000	5000
11N20MIMO	Ant1	2437	0.16	0.26	61.54	6250	10000
	Ant2	2437	0.16	0.26	61.54	6250	10000
11AX20MIMO	Ant1	2437	0.14	0.24	58.33	7143	10000
	Ant2	2437	0.14	0.24	58.33	7143	10000

Test Graphs



