

TEST REPORT

Applicant Name: Telepower Communication Co., Ltd.
Address: 5 Bld, Zone A, Hantian Technology Town No.17 ShenHai RD,
Nanhai District Foshan China
Report Number: SZ1240308-11533E-RF-00B
FCC ID: 2AJ2B-M10

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type: Pos terminal
Model No.: M10
Multiple Model(s) No.: M10P
Trade Mark: Telpo
Date Received: 2024/03/12
Issue Date: 2024/06/11

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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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.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ1240308-11533E-RF-00B	Original Report	2024/06/11

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Pos terminal
Tested Model	M10
Multiple Model(s)	M10P
Frequency Range	BLE: 2402-2480MHz Wi-Fi: 2412-2462MHz
Maximum Conducted Output Peak Power	BLE: 2.10dBm Wi-Fi: 14.82dBm(802.11b), 19.31dBm(802.11g), 19.11dBm(802.11n20) 19.97dBm(802.11n40)
Modulation Technique	BLE: GFSK Wi-Fi: DSSS, OFDM
Antenna Specification [#]	2.97dBi (provided by the applicant)
Voltage Range	DC 24V From Adapter
Sample serial number	2IGW-1 for Conducted and Radiated Emissions Test 2IGW-2 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Model: ADS-65HI-19A-3 24060E Input: AC 100-240V~50/60Hz, Max. 1.5A Output: DC 24.0V, 2.5A, 60.0W
Note: The Multiple models are electrically identical with the test model except for model name. Please refer to the declaration letter [#] for more detail, which was provided by manufacturer.	

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 2.4GHz 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	/	/

802.11b, 802.11g and 802.11n-HT20 mode was tested with Channel 1, 6 and 11.

802.11n-HT40 mode was tested with Channel 3, 6 and 9.

For BLE mode, 40 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

EUT was tested with Channel 0, 19 and 39.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“QRCT3, Cmd.exe”[#] exercise software was used.

The device was tested with the worst case was performed as below:

Mode	Data rate	Power Level [#]		
		Low Channel	Middle Channel	High Channel
802.11b	1Mbps	12	12	12
802.11g	6Mbps	12	12	12
802.11n20	MCS0	12	12	12
802.11n40	MCS0	12	12	12
BLE	1Mbps	Default	Default	Default
BLE	2Mbps	Default	Default	Default

Note: the software and power level was provided by applicant.

Duty cycle

Please refer to the Appendix.

Support Equipment List and Details

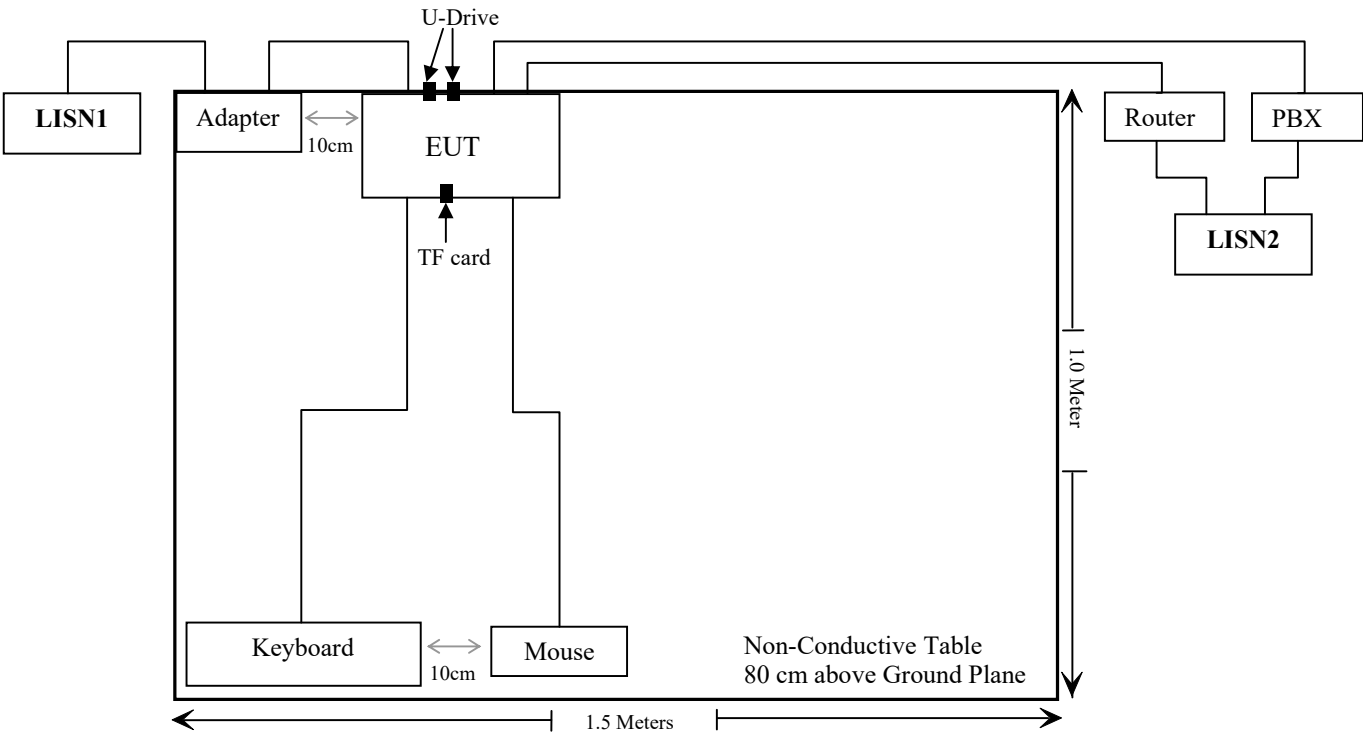
Manufacturer	Description	Model	Serial Number
Thinkplus	U drive*2	MU251	Unknown
Lenovo	Keyboard	EKB-536A	Unknown
DELL	Mouse	Ms116P	Unknown
TP-Link	Router	EAP225	22272F6001499
YIKE	PBX	TC-208	Unknown
Unknown	TF card	Unknown	Unknown

External I/O Cable

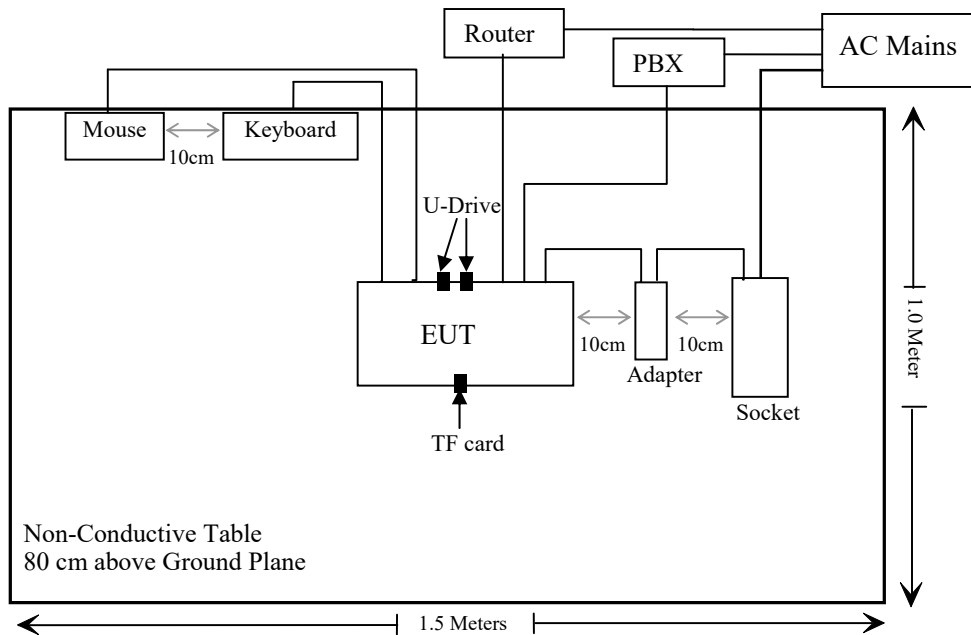
Cable Description	Length (m)	From Port	To
Un-shielded un-detachable AC cable	1.2	Socket	AC Mains
Un-shielded detachable AC cable	1.2	Adapter	LISN1/ Socket
Un-shielded un-detachable DC cable	1.8	EUT	Adapter
Un-shielded detachable RJ45 cable	8.0	EUT	Router
Un-shielded detachable RJ11 cable	10	EUT	PBX
Un-shielded un-detachable AC cable	1.5	PBX	LISN2/ AC Mains
Un-shielded detachable AC cable	1.2	Router	LISN2/ AC Mains
Un-shielded un-detachable USB cable	1.2	EUT	Keyboard
Un-shielded un-detachable USB cable	1.2	EUT	Mouse

Block Diagram of Test Setup

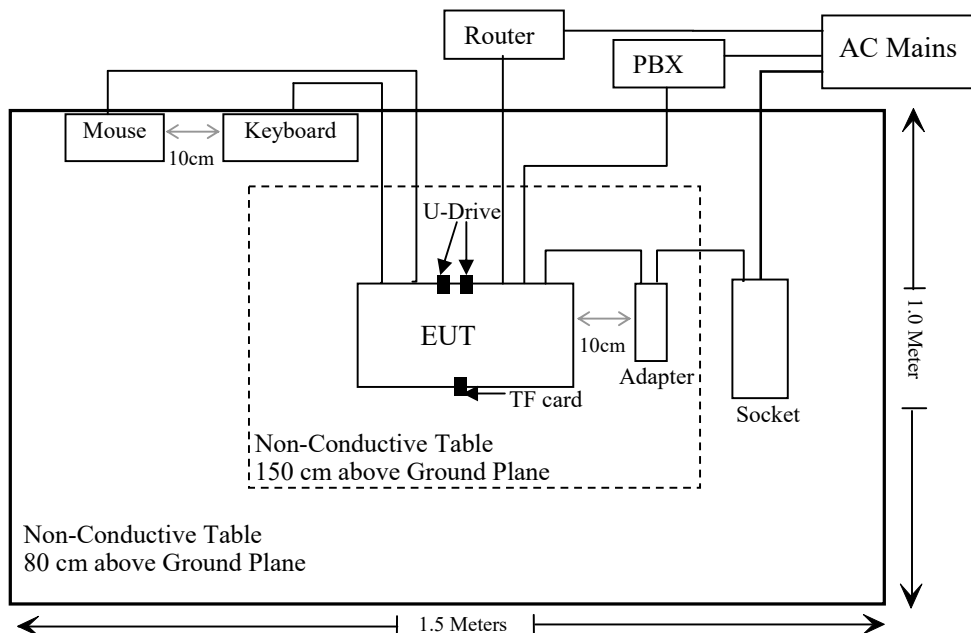
For Conducted Emissions:



For Radiated Emissions (below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 ,§2.1091	MPE-Based Exemption	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	2023/08/03	2024/08/02
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2023/08/03	2024/08/02
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
Sonoma instrument	Pre-amplifier	310 N	186238	2023/06/08	2024/06/07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
BACL	Active Loop Antenna	1313-1A	4031911	2024/03/21	2025/03/20
Unknown	Cable	Chamber Cable 1	F-03-EM236	2023/08/03	2024/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2023/08/03	2024/08/02
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	2023/06/29	2024/06/28
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
JD	Multiplex Switch Test Control Set	DT7220FSU	DQ77926	NCR	NCR
SNSD	2.4G Band Reject filter	BSF2402-2480MN-0898-001	2.4G filter	2023/08/03	2024/08/02
A.H.System	Pre-amplifier	PAM-1840VH	190	2023/08/02	2024/08/01
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2023/08/03	2024/08/02
RF Conducted Test					
Tonscend	RF control Unit	JS0806-2	19D8060154	2023/09/06	2024/09/05
ANRITSU	Microwave peak power sensor	MA24418A	12622	2023/08/08	2024/08/07
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101473	2024/01/16	2025/01/15
MARCONI	10dB Attenuator	6534/3	2942	2023/07/04	2024/07/03
Unknown	RF Cable	65475	01670515	2023/07/04	2024/07/03

* **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 §1.1307 (B) & §2.1091- MPE-BASED EXEMPTION

Applicable Standard

According to subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Result

Mode	Frequency (MHz)	Tune up conducted power [#]	Antenna Gain [#]		ERP		Evaluation Distance (m)	ERP Limit (mW)
		(dBm)	(dBi)	(dBd)	(dBm)	(mW)		
BT	2402-2480	11.5	2.97	0.82	12.32	17.06	0.2	768
BLE	2402-2480	2.5	2.97	0.82	3.32	2.15	0.2	768
2.4G Wi-Fi	2412-2462	20.0	2.97	0.82	20.82	120.78	0.2	768
5.2G Wi-Fi	5180-5240	16.5	4.34	2.19	18.69	73.96	0.2	768
GSM850*	824-849	26.24	-0.8	-2.95	23.29	213.30	0.2	422
PCS1900*	1850-1910	20.99	3.58	1.43	22.42	174.58	0.2	768
WCDMA B2	1850-1910	22.5	3.58	1.43	23.93	247.17	0.2	768
WCDMA B5	824-849	24.0	-0.8	-2.95	21.05	127.35	0.2	422
LTE B2	1850-1910	22.0	3.58	1.43	23.43	220.29	0.2	768
LTE B4	1710-1755	22.0	3.73	1.58	23.58	228.03	0.2	768
LTE B5	824-849	23.0	-0.8	-2.95	20.05	101.16	0.2	422
LTE B7	2500-2570	21.5	5.08	2.93	24.43	277.33	0.2	768
LTE B38	2570-2620	21.5	5.00	2.85	24.35	272.27	0.2	768
LTE B40 Lower	2305-2315	19.5	5.32	3.17	22.67	184.93	0.2	768
LTE B40 Upper	2350-2360	19.5	5.32	3.17	22.67	184.93	0.2	768
LTE B41	2496-2690	22.0	5.08	2.93	24.93	311.17	0.2	768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
 2. The BT, 2.4G Wi-Fi and 5G Wi-Fi can transmit at same time.
 3. 0dBd=2.15dBi

Note*: It was the time average power according to the duty cycle.

Mode		Tune-up Peak Output Power (dBm)			Tune-up Average Output Power (dBm)		
		Low	Middle	High	Low	Middle	High
GPRS850	1 slot	32.5	32.5	32.5	23.47	23.47	23.47
	2 slots	31.5	31.5	31.5	25.48	25.48	25.48
	3 slots	30.5	30.5	30.5	26.24	26.24	26.24
	4 slots	28.5	28.5	28.5	25.49	25.49	25.49
GPRS1900	1 slot	28.0	28.0	28.0	18.97	18.97	18.97
	2 slots	26.5	26.5	26.5	20.48	20.48	20.48
	3 slots	25.0	25.0	25.0	20.74	20.74	20.74
	4 slots	24.0	24.0	24.0	20.99	20.99	20.99

Note: the duty cycle for 1 slot is 1/8, 2 slots is 1/4, 3 slots is 3/8, 4 slots is 1/2
 The average power=Peak power+ duty cycle factor
 Duty cycle factor=10*log (duty cycle)

NFC:

Mode	Frequency (MHz)	Maximum E-Field (dBuV/m@3m)	Maximum EIRP (dBm)	ERP		Evaluation Distance (m)	ERP Limit (mW)
				(dBm)	(mW)		
NFC	13.56	72.09	-23.11	-25.26	0.003	0.2	751

Note: EIRP = E-Field – 95.2 @3m, ERP = EIRP-2.15

Simultaneous transmitting consideration (worst case):

The ratio= $\text{ERP}_{\text{BT}}/\text{limit} + \text{ERP}_{2.4\text{G Wi-Fi}}/\text{limit} + \text{ERP}_{5\text{G Wi-Fi}}/\text{limit} + \text{ERP}_{\text{GSM850}}/\text{limit} + \text{ERP}_{\text{NFC}}/\text{limit}$
 $= 17.06/768 + 120.78/768 + 73.96/768 + 213.3/422 + 0.003/751 = 0.781 < 1.0$

So simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one internal antenna arrangement, which was permanently attached, the antenna gain[#] is 2.97dBi, fulfill the requirement of this section. Please refer to the EUT photos.

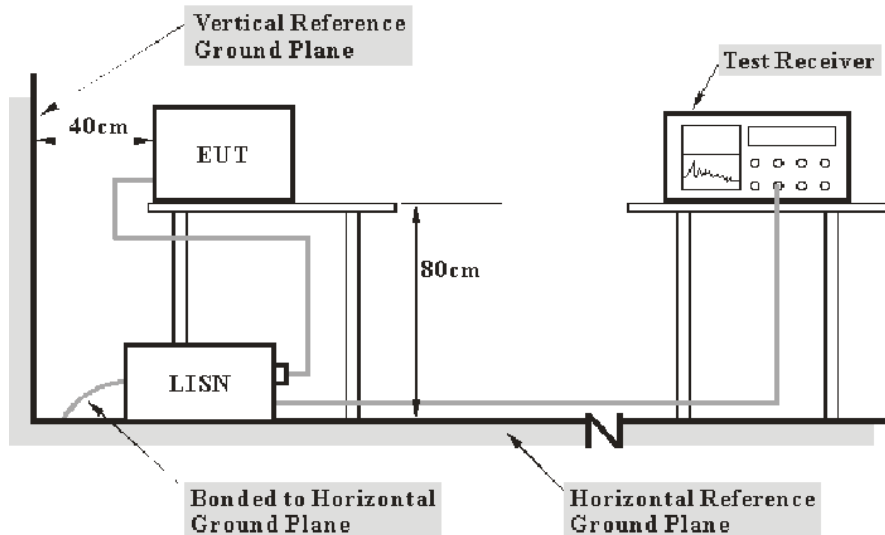
Result: Compliant

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 adapter 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 calculation is as follows:

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

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

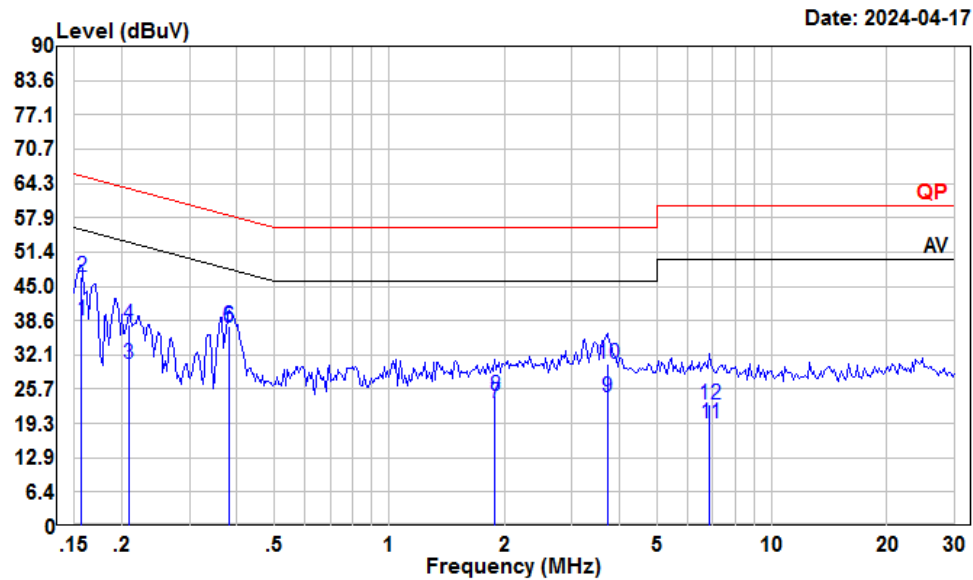
Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	65 %
ATM Pressure:	101 kPa

The testing was performed by Macy Shi on 2024-04-17.

EUT operation mode: Transmitting

BLE: (maximum output power mode, BLE 2M High channel)**AC 120V/60 Hz, Line**

Condition: Line

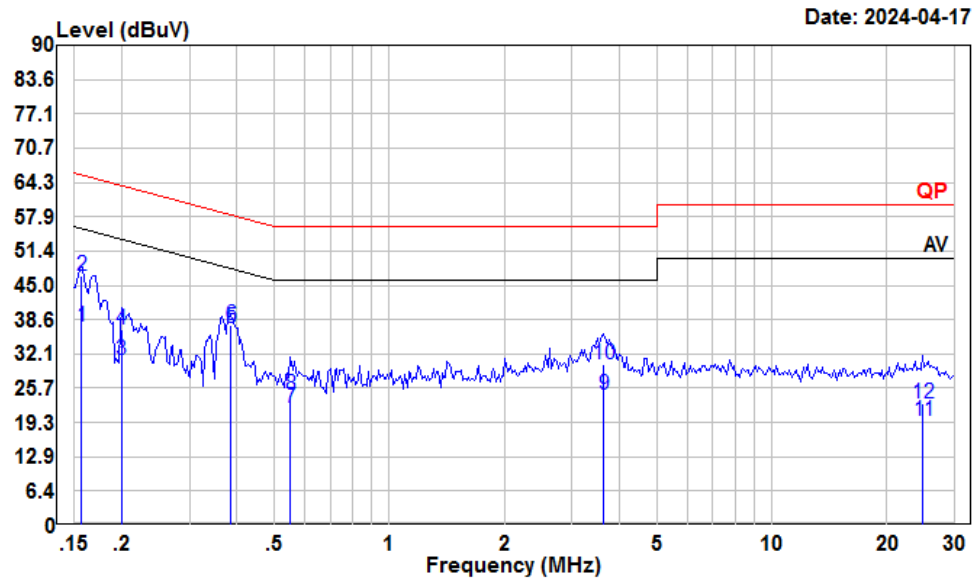
Project : SZ1240308-11533E-RF

Tester : Macy shi

Note : BLE

		Read		LISN	Cable	Limit	Over	
	Freq	Level	Level	Factor	Loss	Line	Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.16	18.13	38.68	10.40	10.15	55.65	-16.97	Average
2	0.16	26.15	46.70	10.40	10.15	65.65	-18.95	QP
3	0.21	10.04	30.54	10.39	10.11	53.27	-22.73	Average
4	0.21	17.36	37.86	10.39	10.11	63.27	-25.41	QP
5	0.38	16.72	37.18	10.26	10.20	48.25	-11.07	Average
6	0.38	17.14	37.60	10.26	10.20	58.25	-20.65	QP
7	1.89	2.57	23.05	10.32	10.16	46.00	-22.95	Average
8	1.89	4.06	24.54	10.32	10.16	56.00	-31.46	QP
9	3.72	3.46	24.11	10.39	10.26	46.00	-21.89	Average
10	3.72	9.68	30.33	10.39	10.26	56.00	-25.67	QP
11	6.88	-1.60	19.21	10.59	10.22	50.00	-30.79	Average
12	6.88	2.00	22.81	10.59	10.22	60.00	-37.19	QP

AC 120V/60 Hz, Neutral



Condition: Neutral

Project : SZ1240308-11533E-RF

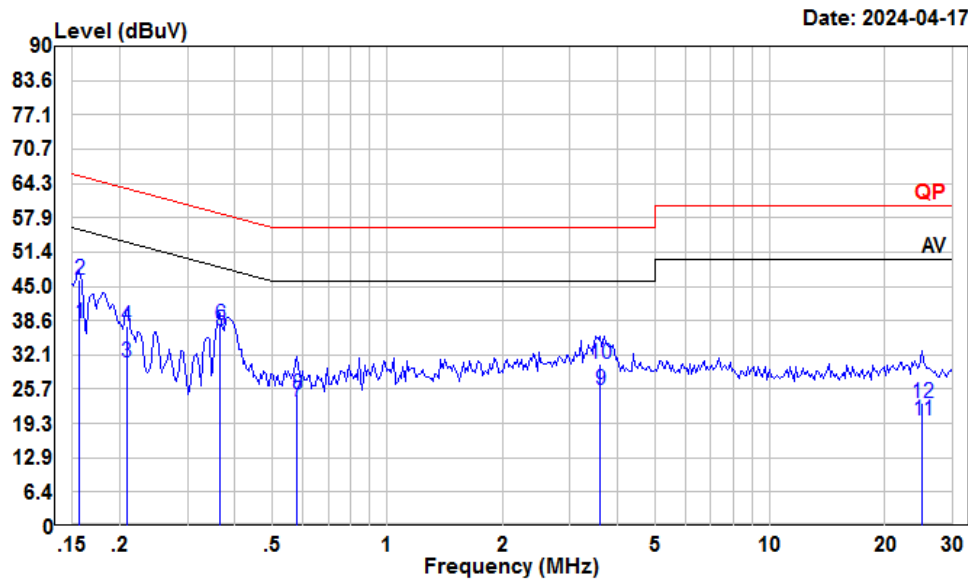
Tester : Macy shi

Note : BLE

	Freq	Read Level	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.16	16.87	37.28	10.26	10.15	55.65	-18.37	Average
2	0.16	26.48	46.89	10.26	10.15	65.65	-18.76	QP
3	0.20	10.37	31.06	10.60	10.09	53.62	-22.56	Average
4	0.20	15.98	36.67	10.60	10.09	63.62	-26.95	QP
5	0.39	16.03	36.97	10.74	10.20	48.17	-11.20	Average
6	0.39	16.47	37.41	10.74	10.20	58.17	-20.76	QP
7	0.55	1.26	22.16	10.71	10.19	46.00	-23.84	Average
8	0.55	3.48	24.38	10.71	10.19	56.00	-31.62	QP
9	3.64	3.78	24.40	10.36	10.26	46.00	-21.60	Average
10	3.64	9.52	30.14	10.36	10.26	56.00	-25.86	QP
11	24.79	-0.87	19.61	10.25	10.23	50.00	-30.39	Average
12	24.79	2.47	22.95	10.25	10.23	60.00	-37.05	QP

2.4G Wi-Fi: (maximum output power mode, 802.11N40 High channel)

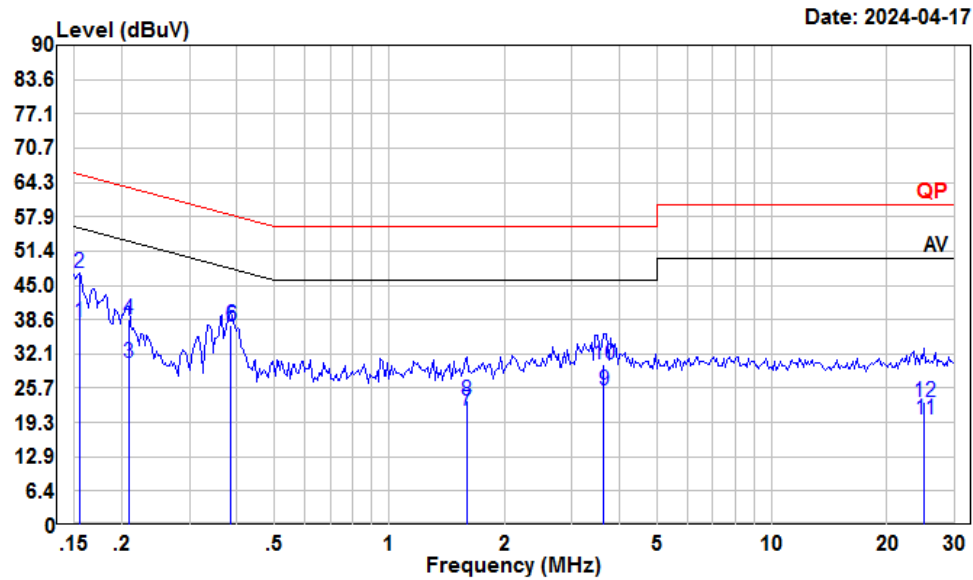
AC 120V/60 Hz, Line



Condition: Line
Project : SZ1240308-11533E-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	0.16	17.40	37.95	10.40	10.15	55.65	-17.70	Average
2	0.16	25.66	46.21	10.40	10.15	65.65	-19.44	QP
3	0.21	10.20	30.70	10.39	10.11	53.27	-22.57	Average
4	0.21	17.08	37.58	10.39	10.11	63.27	-25.69	QP
5	0.37	16.32	36.77	10.27	10.18	48.61	-11.84	Average
6	0.37	17.26	37.71	10.27	10.18	58.61	-20.90	QP
7	0.58	2.80	23.30	10.29	10.21	46.00	-22.70	Average
8	0.58	4.28	24.78	10.29	10.21	56.00	-31.22	QP
9	3.60	4.89	25.53	10.38	10.26	46.00	-20.47	Average
10	3.60	9.81	30.45	10.38	10.26	56.00	-25.55	QP
11	25.06	-1.02	19.86	10.64	10.24	50.00	-30.14	Average
12	25.06	2.29	23.17	10.64	10.24	60.00	-36.83	QP

AC 120V/60 Hz, Neutral



Condition: Neutral

Project : SZ1240308-11533E-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	0.15	17.75	38.14	10.24	10.15	55.74	-17.60	Average
2	0.15	26.85	47.24	10.24	10.15	65.74	-18.50	QP
3	0.21	9.66	30.38	10.61	10.11	53.27	-22.89	Average
4	0.21	17.99	38.71	10.61	10.11	63.27	-24.56	QP
5	0.39	16.40	37.34	10.74	10.20	48.17	-10.83	Average
6	0.39	16.58	37.52	10.74	10.20	58.17	-20.65	QP
7	1.59	1.29	21.54	10.17	10.08	46.00	-24.46	Average
8	1.59	3.18	23.43	10.17	10.08	56.00	-32.57	QP
9	3.64	4.71	25.33	10.36	10.26	46.00	-20.67	Average
10	3.64	9.52	30.14	10.36	10.26	56.00	-25.86	QP
11	25.06	-0.61	19.89	10.26	10.24	50.00	-30.11	Average
12	25.06	2.67	23.17	10.26	10.24	60.00	-36.83	QP

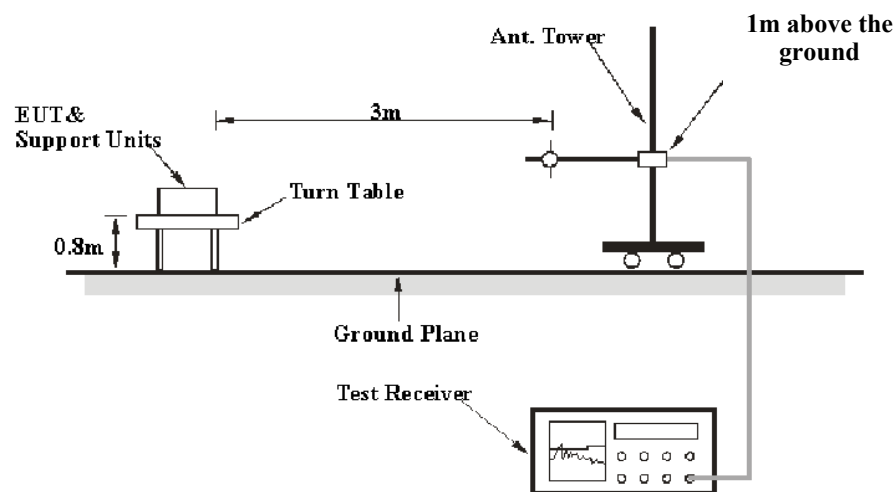
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

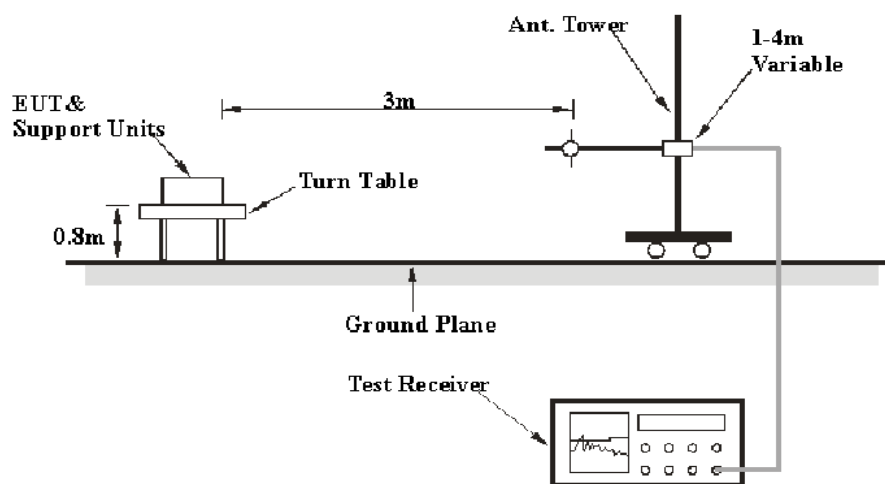
FCC §15.247 (d); §15.209; §15.205;

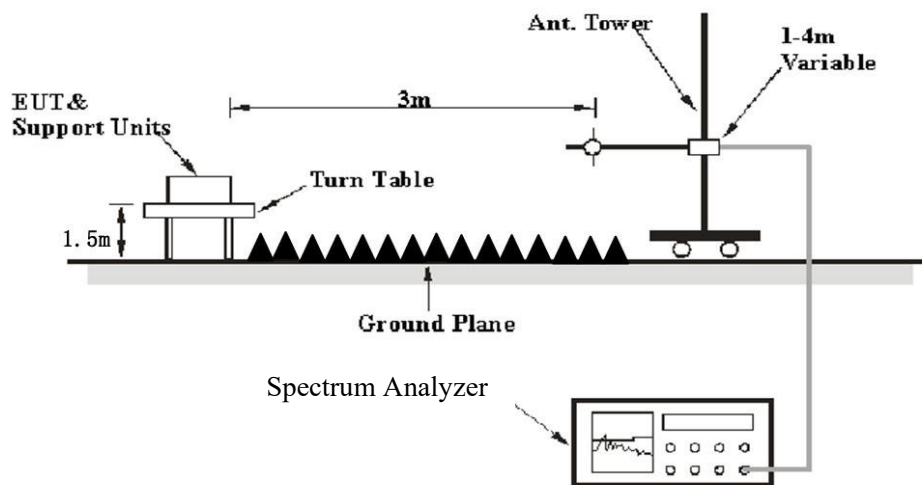
EUT Setup

9 kHz-30MHz:



30MHz-1GHz:



Above 1GHz:

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and 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:	22~25.3 °C
Relative Humidity:	50~55%
ATM Pressure:	101 kPa

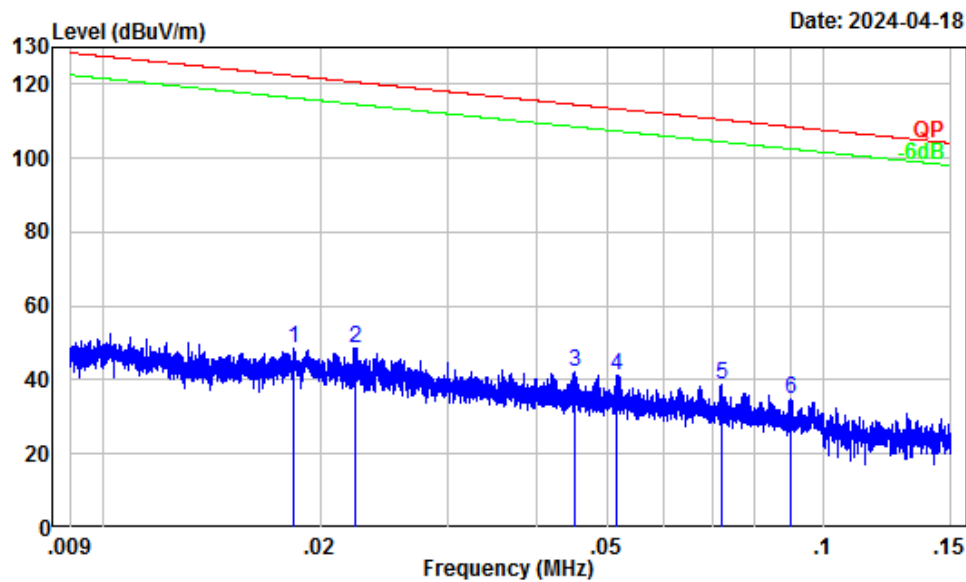
The testing was performed by Anson Su on 2024-04-18 for below 1GHz, Tyler Wu and Zenos Qiao on 2024-04-11 for above 1GHz.

EUT operation mode: Transmitting

9 kHz-30MHz: Parallel (worst case)

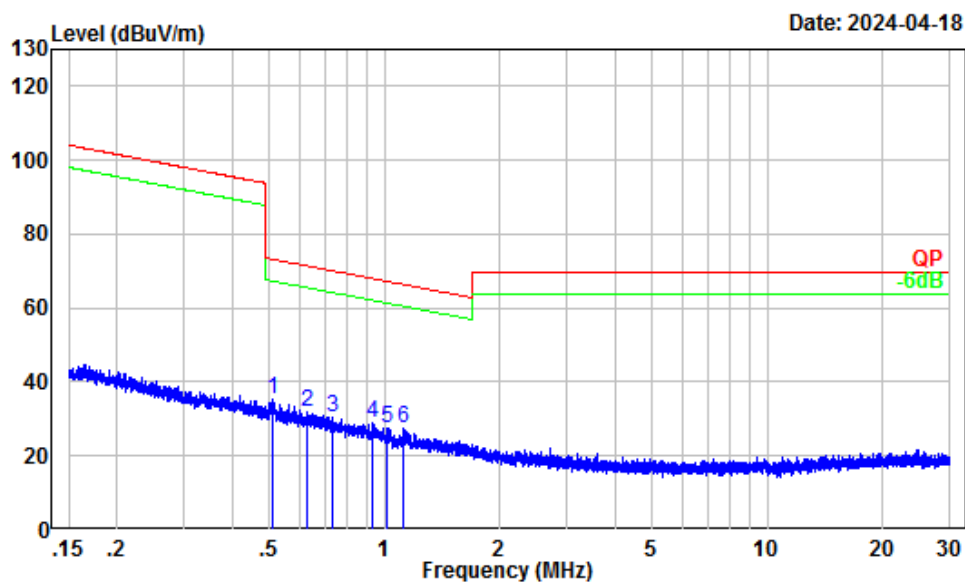
Note: When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

BLE: (maximum output power mode, BLE 2M High channel)



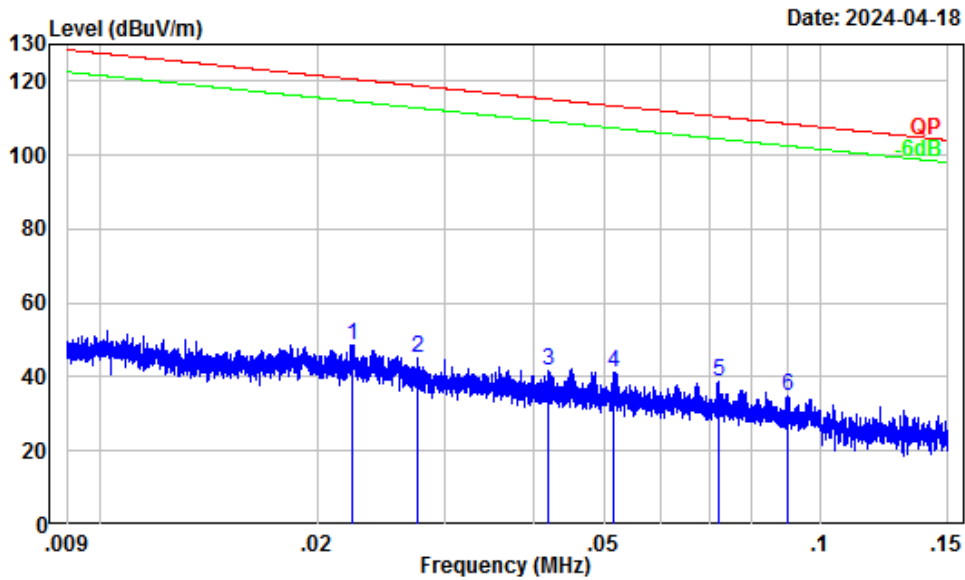
Site : Chamber A
Condition : 3m
Project Number: SZ1240308-11533E-RF
Note : BLE
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.02	33.42	15.33	48.75	122.33	-73.58	Peak
2	0.02	31.40	17.39	48.79	120.63	-71.84	Peak
3	0.05	24.14	18.13	42.27	114.51	-72.24	Peak
4	0.05	22.84	18.52	41.36	113.33	-71.97	Peak
5	0.07	20.07	18.79	38.86	110.42	-71.56	Peak
6	0.09	18.06	17.01	35.07	108.54	-73.47	Peak



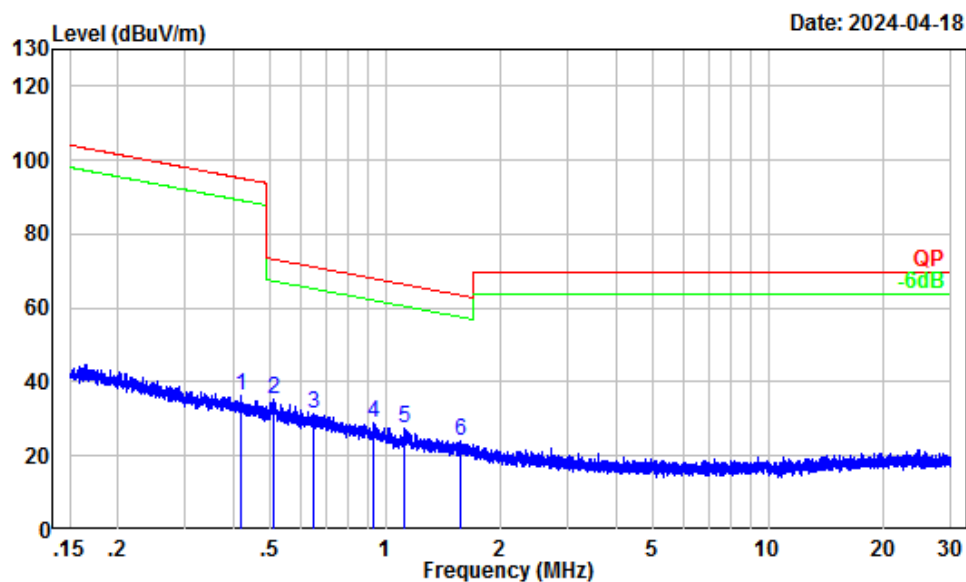
Site : Chamber A
 Condition : 3m
 Project Number: SZ1240308-11533E-RF
 Note : BLE
 Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.51	3.37	32.12	35.49	73.46	-37.97	Peak
2	0.63	1.91	29.75	31.66	71.55	-39.89	Peak
3	0.73	0.72	29.77	30.49	70.25	-39.76	Peak
4	0.93	-1.10	29.81	28.71	68.09	-39.38	Peak
5	1.02	-1.64	29.32	27.68	67.33	-39.65	Peak
6	1.13	-2.03	29.34	27.31	66.42	-39.11	Peak

2.4G Wi-Fi: (maximum output power mode, 802.11n40 High channel)

Site : Chamber A
Condition : 3m
Project Number: SZ1240308-11533E-RF
Note : 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	0.02	31.40	17.39	48.79	120.63	-71.84	Peak
2	0.03	28.74	16.49	45.23	118.81	-73.58	Peak
3	0.04	24.89	16.78	41.67	115.19	-73.52	Peak
4	0.05	22.84	18.52	41.36	113.33	-71.97	Peak
5	0.07	20.07	18.79	38.86	110.42	-71.56	Peak
6	0.09	18.06	17.01	35.07	108.54	-73.47	Peak

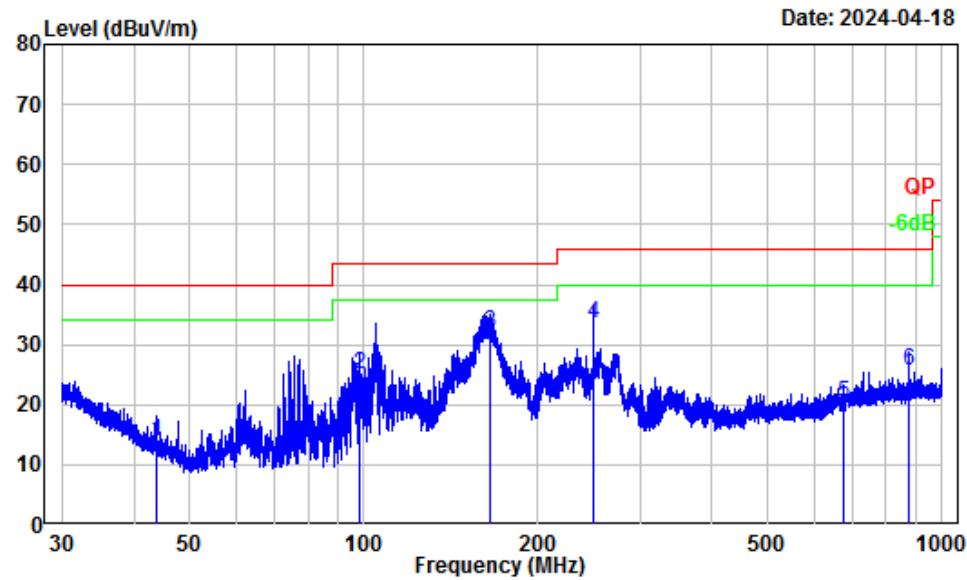


Site : Chamber A
 Condition : 3m
 Project Number: SZ1240308-11533E-RF
 Note : 2.4G WIFI
 Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.42	5.19	30.92	36.11	95.15	-59.04	Peak
2	0.51	3.37	32.12	35.49	73.46	-37.97	Peak
3	0.65	1.67	29.92	31.59	71.28	-39.69	Peak
4	0.93	-1.10	29.81	28.71	68.09	-39.38	Peak
5	1.13	-2.03	29.34	27.31	66.42	-39.11	Peak
6	1.57	-3.58	27.80	24.22	63.47	-39.25	Peak

30MHz-1GHz:
BLE: (maximum output power mode BLE 2M High channel)

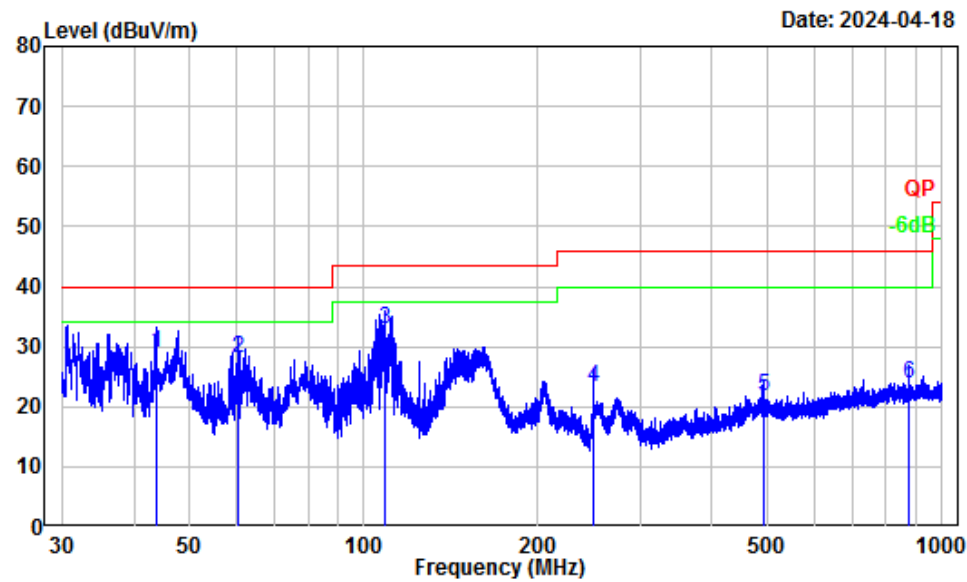
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: SZ1240308-11533E-RF
Note : BLE
Tester : Anson Su

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	43.75	-13.91	27.86	13.95	40.00	-26.05 QP
2	98.44	-15.87	40.86	24.99	43.50	-18.51 QP
3	165.12	-14.13	46.14	32.01	43.50	-11.49 QP
4	249.97	-14.53	48.13	33.60	46.00	-12.40 QP
5	673.73	-6.43	26.72	20.29	46.00	-25.71 QP
6	875.25	-4.63	30.19	25.56	46.00	-20.44 QP

Vertical

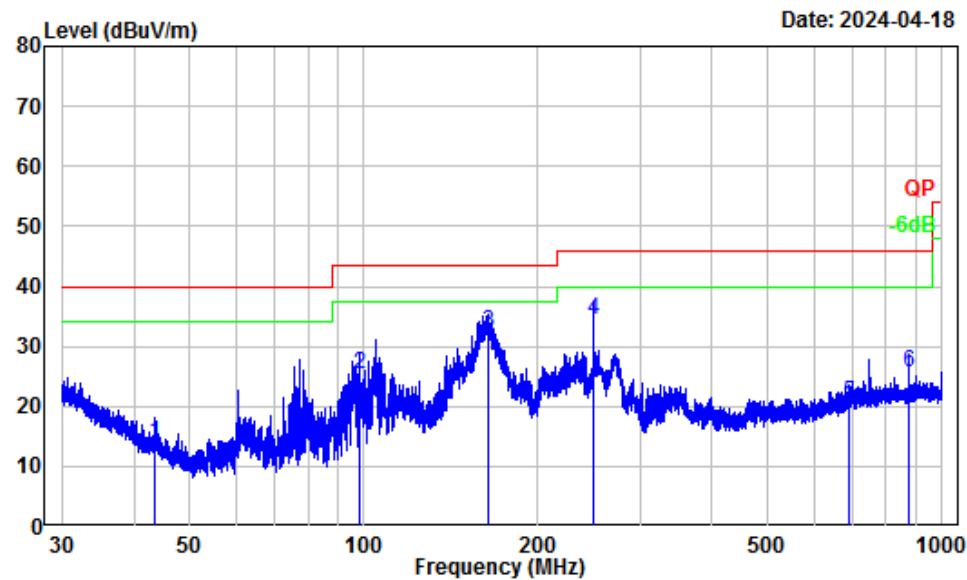


Site : Chamber A
Condition : 3m Vertical
Project Number: SZ1240308-11533E-RF
Note : BLE
Tester : Anson Su

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	Line	Limit	
1	43.77	-15.15	44.24	29.09	40.00	-10.91	QP
2	60.73	-18.85	46.81	27.96	40.00	-12.04	QP
3	108.79	-14.60	47.42	32.82	43.50	-10.68	QP
4	249.97	-14.93	38.24	23.31	46.00	-22.69	QP
5	490.31	-8.78	30.46	21.68	46.00	-24.32	QP
6	875.25	-4.98	28.77	23.79	46.00	-22.21	QP

2.4G Wi-Fi: (maximum output power mode 802.11n40 High channel)

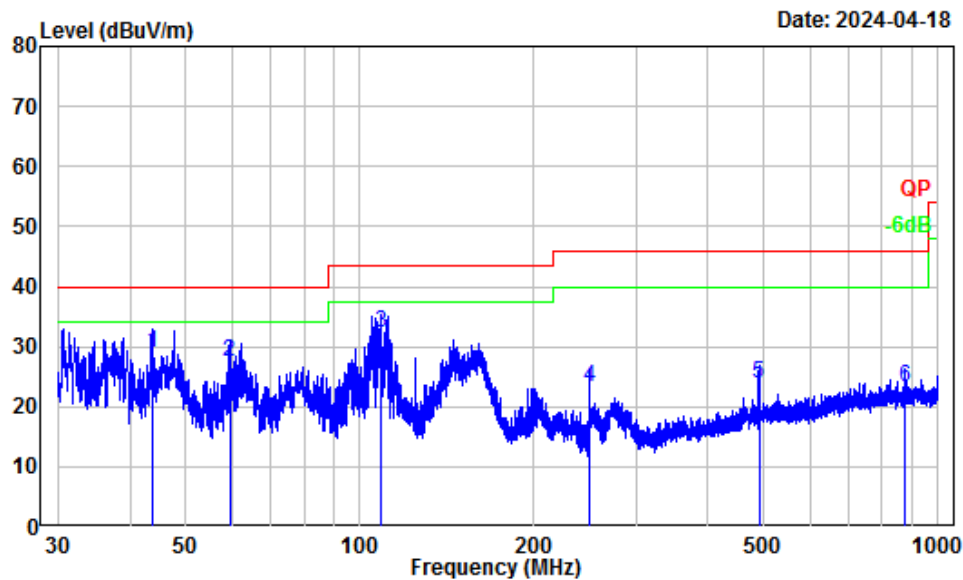
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: SZ1240308-11533E-RF
Note : 2.4G WIFI
Tester : Anson Su

	Freq Factor		Read		Limit	Over	Remark
	MHz	dB/m	Level	Level	Line	Limit	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	43.47	-13.72	27.69	13.97	40.00	-26.03	QP
2	98.40	-15.88	41.37	25.49	43.50	-18.01	QP
3	164.19	-14.10	46.39	32.29	43.50	-11.21	QP
4	249.97	-14.53	48.81	34.28	46.00	-11.72	QP
5	691.08	-6.26	26.85	20.59	46.00	-25.41	QP
6	875.25	-4.63	30.21	25.58	46.00	-20.42	QP

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number: SZ1240308-11533E-RF
Note : 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	43.77	-15.15	44.11	28.96	40.00	-11.04 QP
2	59.49	-18.85	46.18	27.33	40.00	-12.67 QP
3	108.79	-14.60	46.89	32.29	43.50	-11.21 QP
4	249.97	-14.93	38.19	23.26	46.00	-22.74 QP
5	490.10	-8.79	32.73	23.94	46.00	-22.06 QP
6	875.25	-4.98	28.16	23.18	46.00	-22.82 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/Ave					
BLE 1M							
Low Channel 2402MHz							
2374.08	54.69	PK	H	-2.93	51.76	74	-22.24
2374.08	42.05	AV	H	-2.93	39.12	54	-14.88
2373.55	54.83	PK	V	-2.93	51.90	74	-22.10
2373.55	42.12	AV	V	-2.93	39.19	54	-14.81
4804.00	46.76	PK	H	2.42	49.18	74	-24.82
4804.00	33.37	AV	H	2.42	35.79	54	-18.21
4804.00	46.54	PK	V	2.42	48.96	74	-25.04
4804.00	33.18	AV	V	2.42	35.60	54	-18.40
Middle Channel 2440MHz							
4880.00	46.52	PK	H	2.58	49.10	74	-24.90
4880.00	33.18	AV	H	2.58	35.76	54	-18.24
4880.00	46.34	PK	V	2.58	48.92	74	-25.08
4880.00	32.99	AV	V	2.58	35.57	54	-18.43
High Channel 2480MHz							
2483.84	55.86	PK	H	-3.17	52.69	74	-21.31
2483.84	42.53	AV	H	-3.17	39.36	54	-14.64
2483.59	56.08	PK	V	-3.17	52.91	74	-21.09
2483.59	42.75	AV	V	-3.17	39.58	54	-14.42
4960.00	46.35	PK	H	2.68	49.03	74	-24.97
4960.00	33.01	AV	H	2.68	35.69	54	-18.31
4960.00	46.17	PK	V	2.68	48.85	74	-25.15
4960.00	32.86	AV	V	2.68	35.54	54	-18.46

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
BLE 2M							
Low Channel 2402MHz							
2378.75	54.69	PK	H	-2.93	51.76	74	-22.24
2378.75	42.45	AV	H	-2.93	39.52	54	-14.48
2380.56	54.87	PK	V	-2.93	51.94	74	-22.06
2380.56	42.58	AV	V	-2.93	39.65	54	-14.35
4804.00	46.87	PK	H	2.42	49.29	74	-24.71
4804.00	34.09	AV	H	2.42	36.51	54	-17.49
4804.00	46.65	PK	V	2.42	49.07	74	-24.93
4804.00	33.92	AV	V	2.42	36.34	54	-17.66
Middle Channel 2440MHz							
4880.00	46.48	PK	H	2.58	49.06	74	-24.94
4880.00	33.85	AV	H	2.58	36.43	54	-17.57
4880.00	46.27	PK	V	2.58	48.85	74	-25.15
4880.00	33.69	AV	V	2.58	36.27	54	-17.73
High Channel 2480MHz							
2483.82	57.42	PK	H	-3.17	54.25	74	-19.75
2483.82	44.32	AV	H	-3.17	41.15	54	-12.85
2483.55	57.87	PK	V	-3.17	54.70	74	-19.30
2483.55	44.57	AV	V	-3.17	41.40	54	-12.60
4960.00	46.12	PK	H	2.68	48.80	74	-25.20
4960.00	33.58	AV	H	2.68	36.26	54	-17.74
4960.00	45.97	PK	V	2.68	48.65	74	-25.35
4960.00	33.45	AV	V	2.68	36.13	54	-17.87

Note:

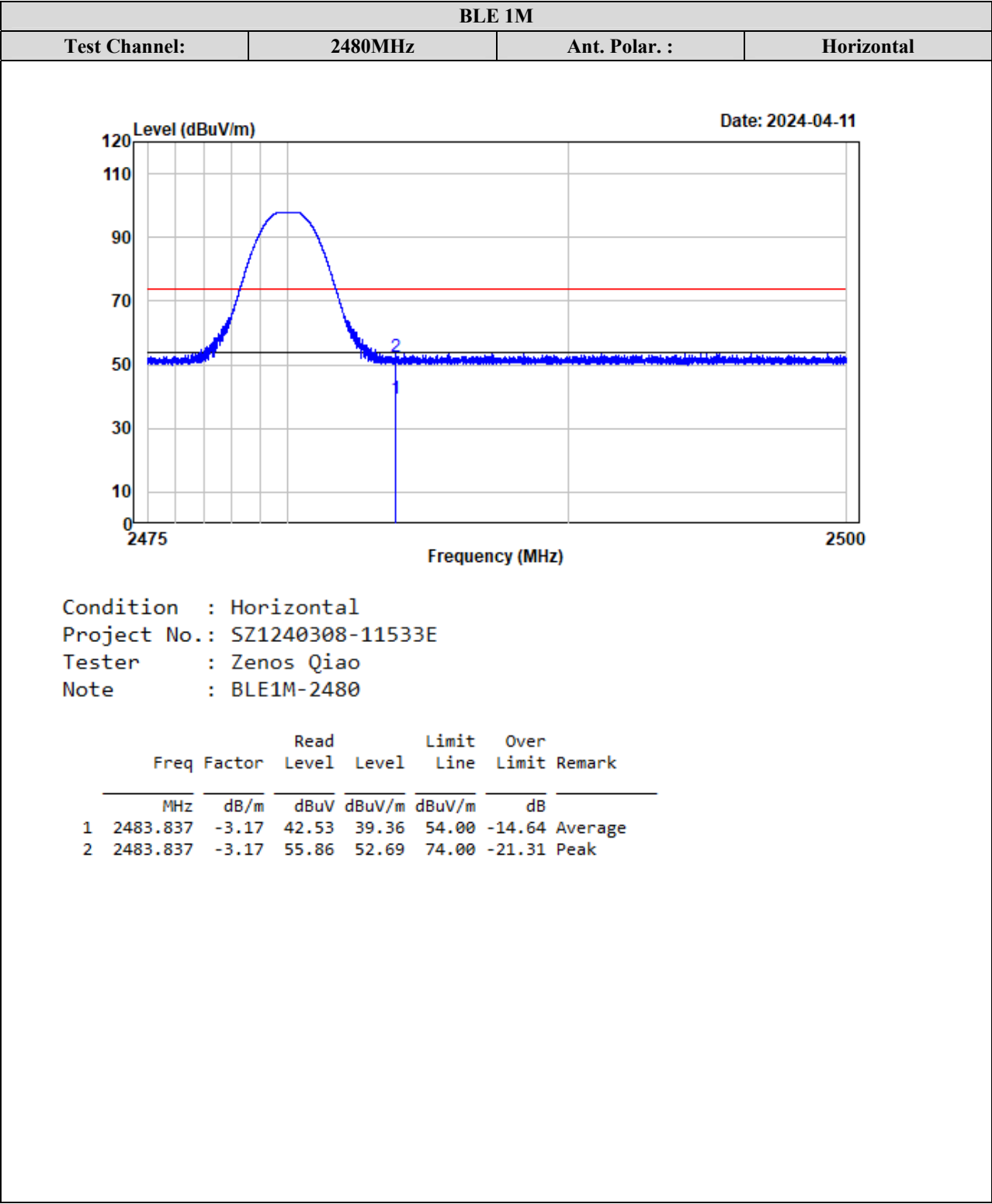
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

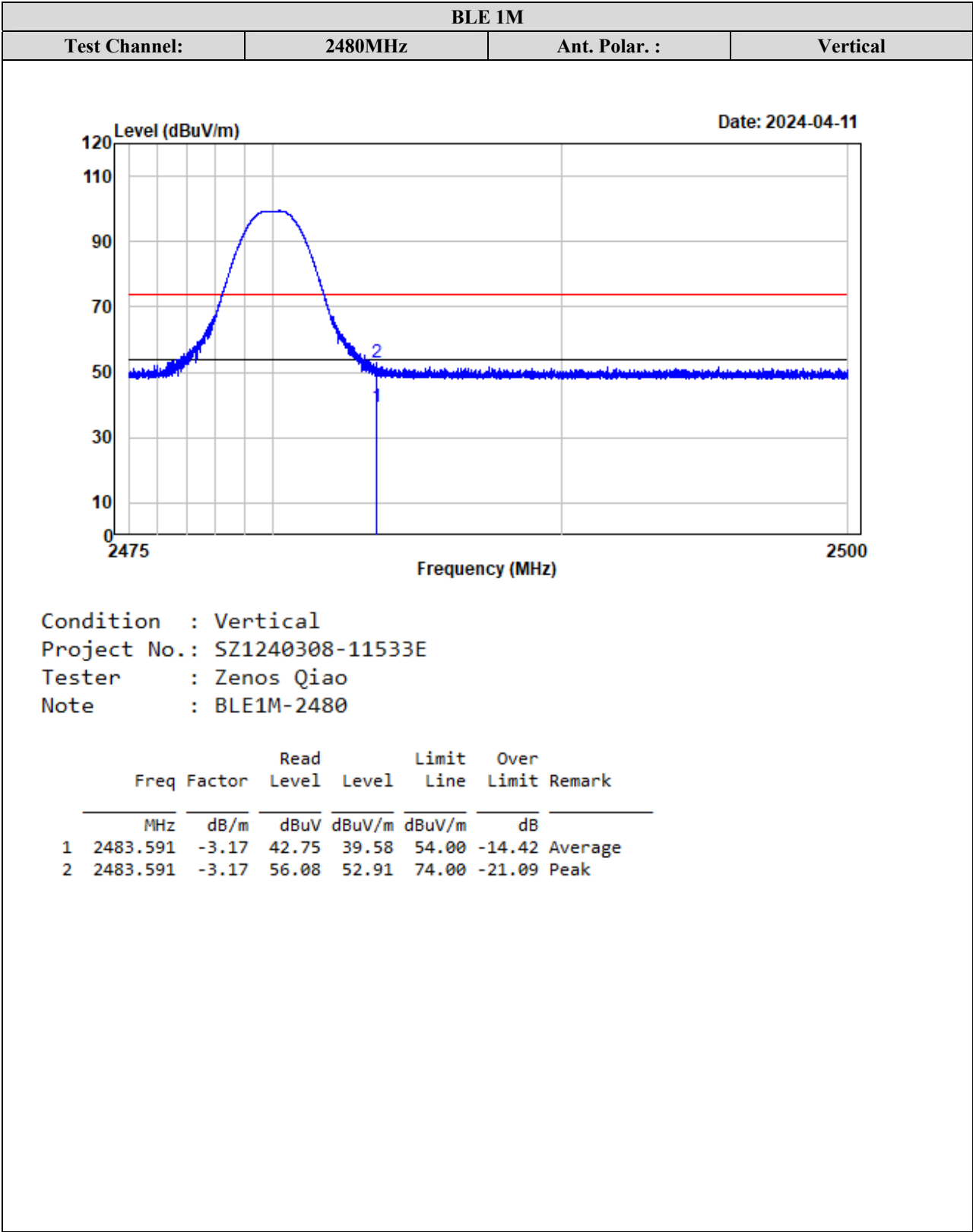
Corrected Amplitude = Corrected Factor + Reading

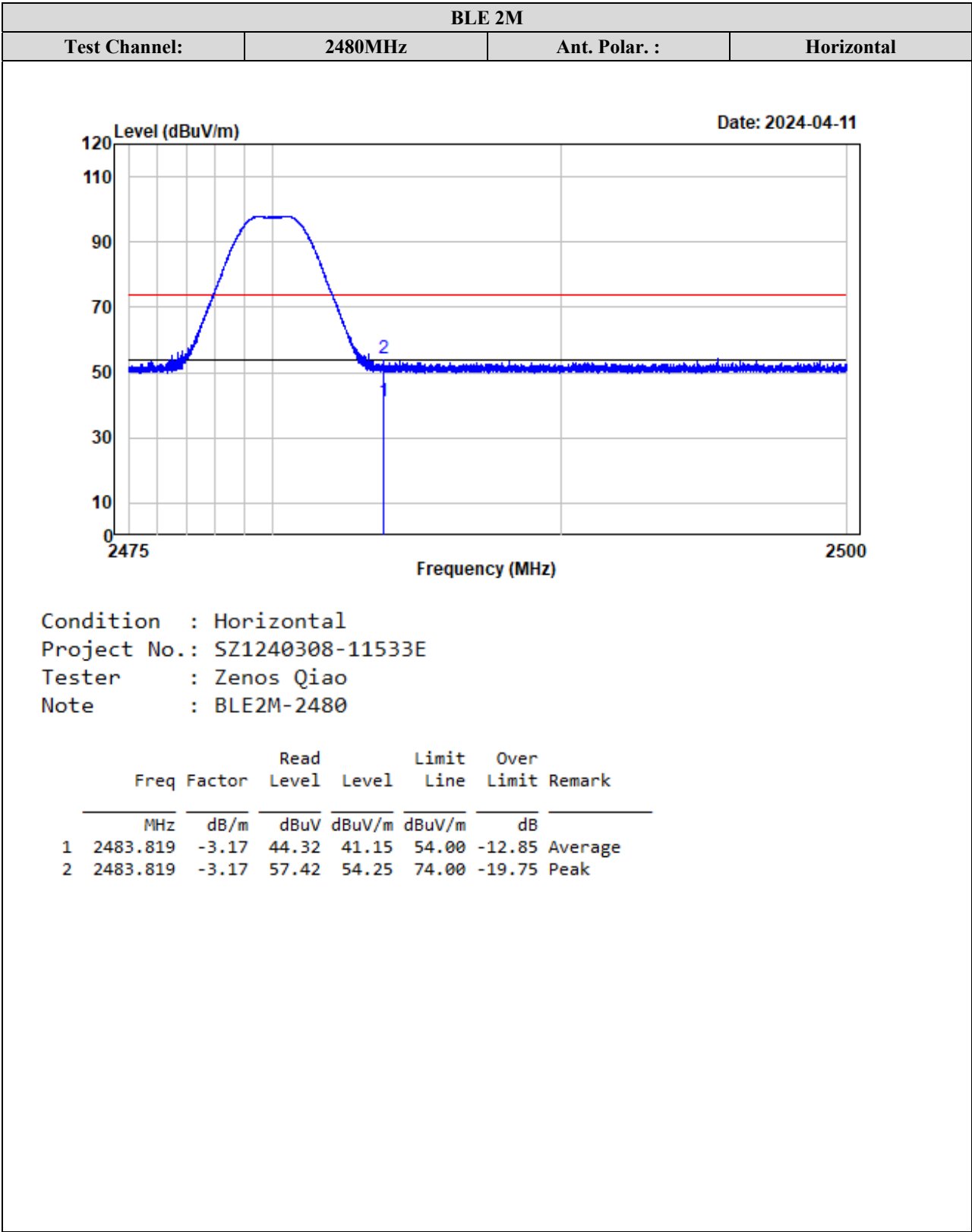
Margin = Corrected. Amplitude - Limit

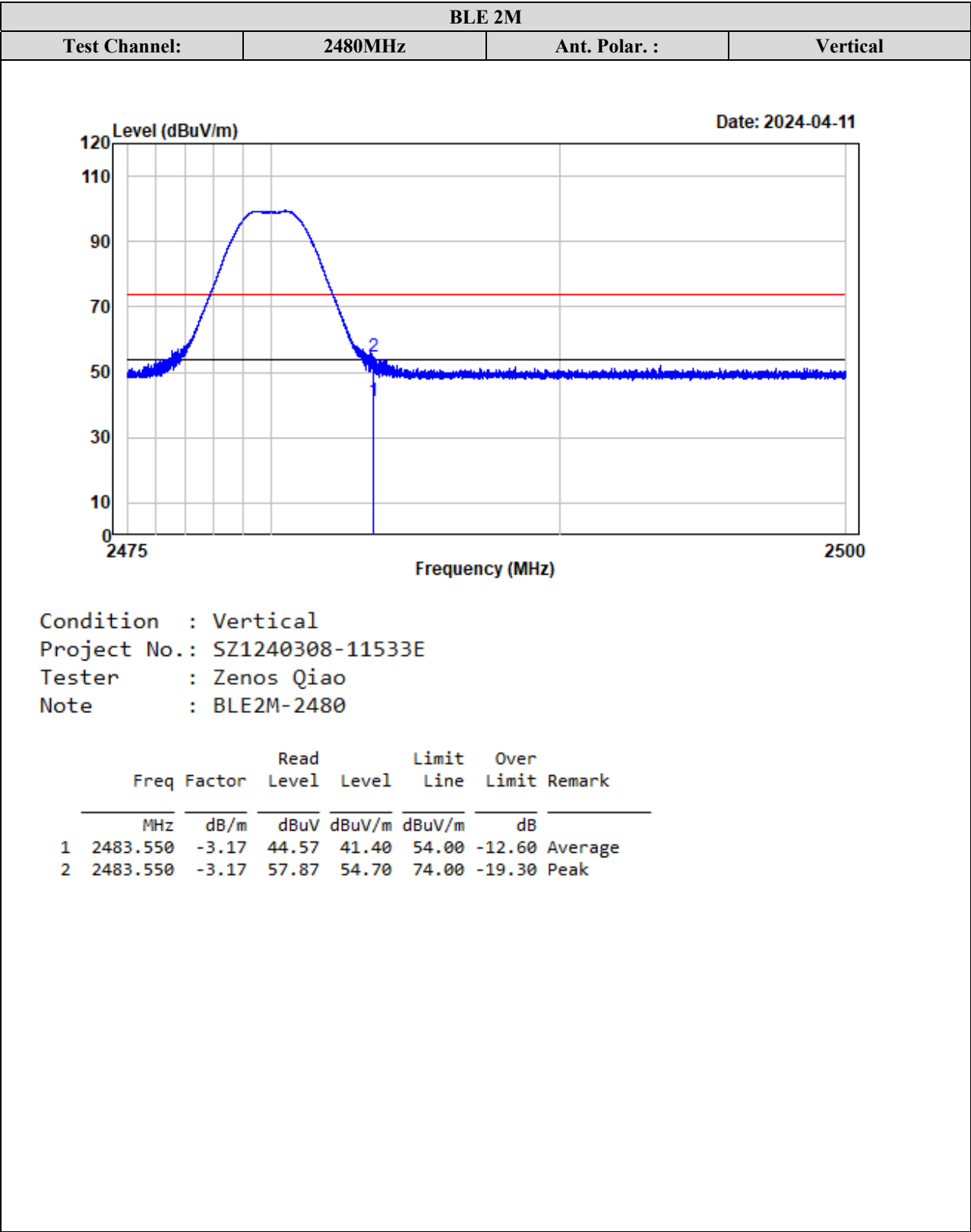
The other spurious emission which is in the noise floor level was not recorded.

Test plots for Band Edge Measurements (Radiated):









2.4G Wi-Fi

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
802.11b							
Low Channel 2412MHz							
2387.97	59.69	PK	H	-2.93	56.76	74	-17.24
2387.97	51.36	AV	H	-2.93	48.43	54	-5.57
2388.21	60.12	PK	V	-2.93	57.19	74	-16.81
2388.21	52.27	AV	V	-2.93	49.34	54	-4.66
4824.00	48.37	PK	H	2.45	50.82	74	-23.18
4824.00	39.26	AV	H	2.45	41.71	54	-12.29
4824.00	49.08	PK	V	2.45	51.53	74	-22.47
4824.00	40.65	AV	V	2.45	43.10	54	-10.90
Middle Channel 2437MHz							
4874.00	48.12	PK	H	2.56	50.68	74	-23.32
4874.00	39.15	AV	H	2.56	41.71	54	-12.29
4874.00	48.73	PK	V	2.56	51.29	74	-22.71
4874.00	40.28	AV	V	2.56	42.84	54	-11.16
High Channel 2462MHz							
2487.41	58.53	PK	H	-3.17	55.36	74	-18.64
2487.41	47.62	AV	H	-3.17	44.45	54	-9.55
2483.81	61.10	PK	V	-3.17	57.93	74	-16.07
2483.81	50.92	AV	V	-3.17	47.75	54	-6.25
4924.00	47.54	PK	H	2.63	50.17	74	-23.83
4924.00	39.06	AV	H	2.63	41.69	54	-12.31
4924.00	48.17	PK	V	2.63	50.80	74	-23.20
4924.00	39.91	AV	V	2.63	42.54	54	-11.46

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
802.11g							
Low Channel 2412MHz							
2389.83	66.54	PK	H	-2.93	63.61	74	-10.39
2389.83	51.46	AV	H	-2.93	48.53	54	-5.47
2388.94	67.07	PK	V	-2.93	64.14	74	-9.86
2388.94	52.83	AV	V	-2.93	49.90	54	-4.10
4824.00	46.13	PK	H	2.45	48.58	74	-25.42
4824.00	32.27	AV	H	2.45	34.72	54	-19.28
4824.00	46.54	PK	V	2.45	48.99	74	-25.01
4824.00	32.59	AV	V	2.45	35.04	54	-18.96
Middle Channel 2437MHz							
4874.00	46.08	PK	H	2.56	48.64	74	-25.36
4874.00	32.25	AV	H	2.56	34.81	54	-19.19
4874.00	46.49	PK	V	2.56	49.05	74	-24.95
4874.00	32.56	AV	V	2.56	35.12	54	-18.88
High Channel 2462MHz							
2484.21	68.34	PK	H	-3.10	65.24	74	-8.76
2484.21	52.64	AV	H	-3.10	49.54	54	-4.46
2484.13	69.21	PK	V	-3.10	66.11	74	-7.89
2484.13	53.83	AV	V	-3.10	50.73	54	-3.27
4924.00	46.05	PK	H	2.63	48.68	74	-25.32
4924.00	32.23	AV	H	2.63	34.86	54	-19.14
4924.00	46.37	PK	V	2.63	49.00	74	-25.00
4924.00	32.54	AV	V	2.63	35.17	54	-18.83

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
802.11n20							
Low Channel 2412MHz							
2389.94	65.36	PK	H	-2.93	62.43	74	-11.57
2389.94	50.47	AV	H	-2.93	47.54	54	-6.46
2389.71	66.12	PK	V	-2.93	63.19	74	-10.81
2389.71	51.26	AV	V	-2.93	48.33	54	-5.67
4824.00	46.02	PK	H	2.45	48.47	74	-25.53
4824.00	32.15	AV	H	2.45	34.60	54	-19.40
4824.00	46.76	PK	V	2.45	49.21	74	-24.79
4824.00	32.49	AV	V	2.45	34.94	54	-19.06
Middle Channel 2437MHz							
4874.00	46.08	PK	H	2.56	48.64	74	-25.36
4874.00	31.97	AV	H	2.56	34.53	54	-19.47
4874.00	46.54	PK	V	2.56	49.10	74	-24.90
4874.00	32.41	AV	V	2.56	34.97	54	-19.03
High Channel 2462MHz							
2484.27	67.53	PK	H	-3.10	64.43	74	-9.57
2484.27	51.06	AV	H	-3.10	47.96	54	-6.04
2483.61	68.62	PK	V	-3.10	65.52	74	-8.48
2483.61	52.23	AV	V	-3.10	49.13	54	-4.87
4924.00	46.19	PK	H	2.63	48.82	74	-25.18
4924.00	31.93	AV	H	2.63	34.56	54	-19.44
4924.00	46.35	PK	V	2.63	48.98	74	-25.02
4924.00	32.37	AV	V	2.63	35.00	54	-19.00

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
802.11n40							
Low Channel 2422MHz							
2389.94	60.16	PK	H	-2.93	57.23	74	-16.77
2389.94	48.71	AV	H	-2.93	45.78	54	-8.22
2389.91	61.52	PK	V	-2.93	58.59	74	-15.41
2389.91	49.43	AV	V	-2.93	46.50	54	-7.50
4844.00	45.31	PK	H	2.47	47.78	74	-26.22
4844.00	33.02	AV	H	2.47	35.49	54	-18.51
4844.00	45.96	PK	V	2.47	48.43	74	-25.57
4844.00	33.28	AV	V	2.47	35.75	54	-18.25
Middle Channel 2437MHz							
4874.00	45.83	PK	H	2.56	48.39	74	-25.61
4874.00	33.16	AV	H	2.56	35.72	54	-18.28
4874.00	46.32	PK	V	2.56	48.88	74	-25.12
4874.00	33.54	AV	V	2.56	36.10	54	-17.90
High Channel 2452MHz							
2486.71	66.53	PK	H	-3.10	63.43	74	-10.57
2486.71	52.35	AV	H	-3.10	49.25	54	-4.75
2484.23	67.12	PK	V	-3.10	64.02	74	-9.98
2484.23	53.24	AV	V	-3.10	50.14	54	-3.86
4904.00	46.07	PK	H	2.64	48.71	74	-25.29
4904.00	33.23	AV	H	2.64	35.87	54	-18.13
4904.00	46.59	PK	V	2.64	49.23	74	-24.77
4904.00	33.68	AV	V	2.64	36.32	54	-17.68

Note:

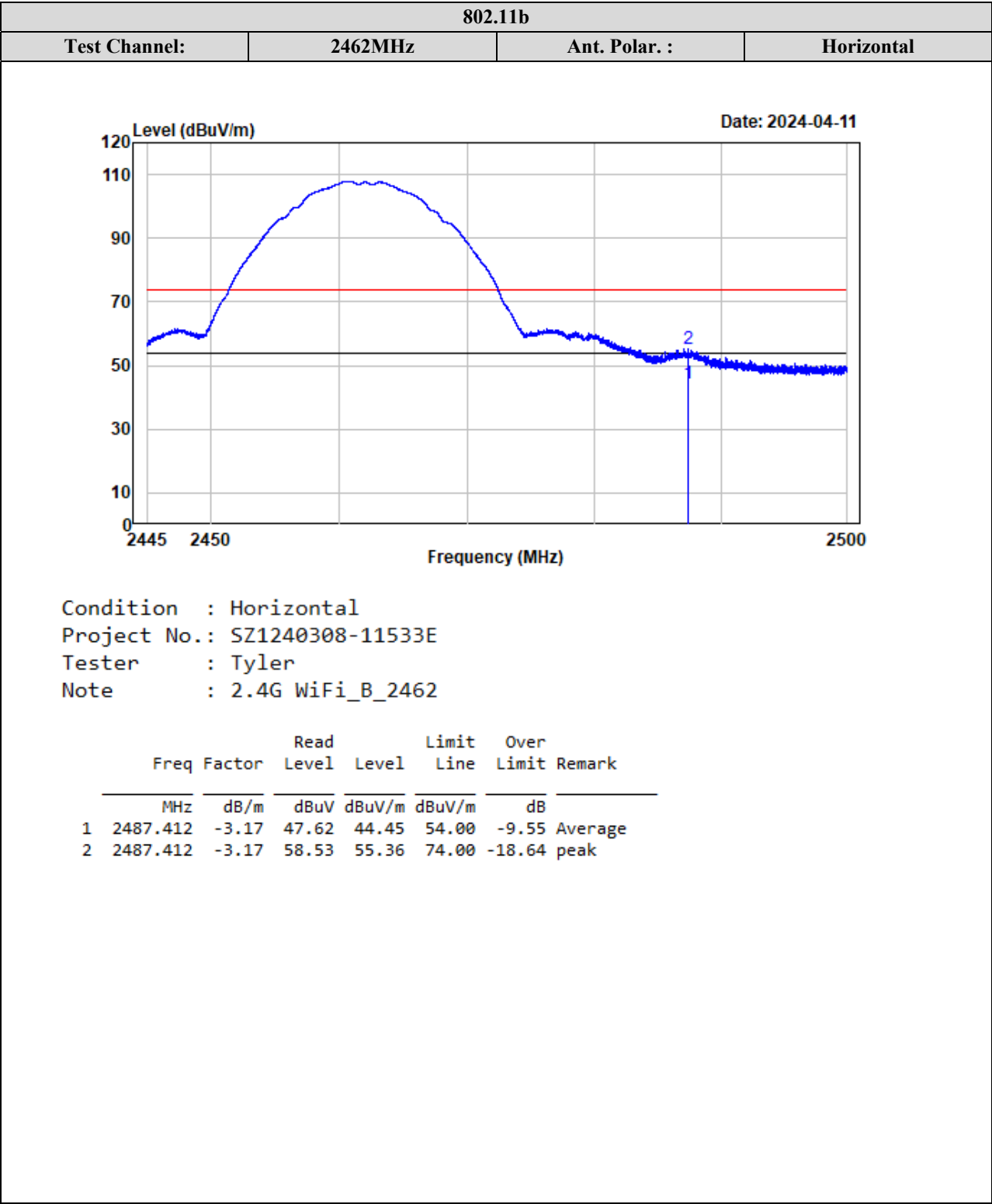
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

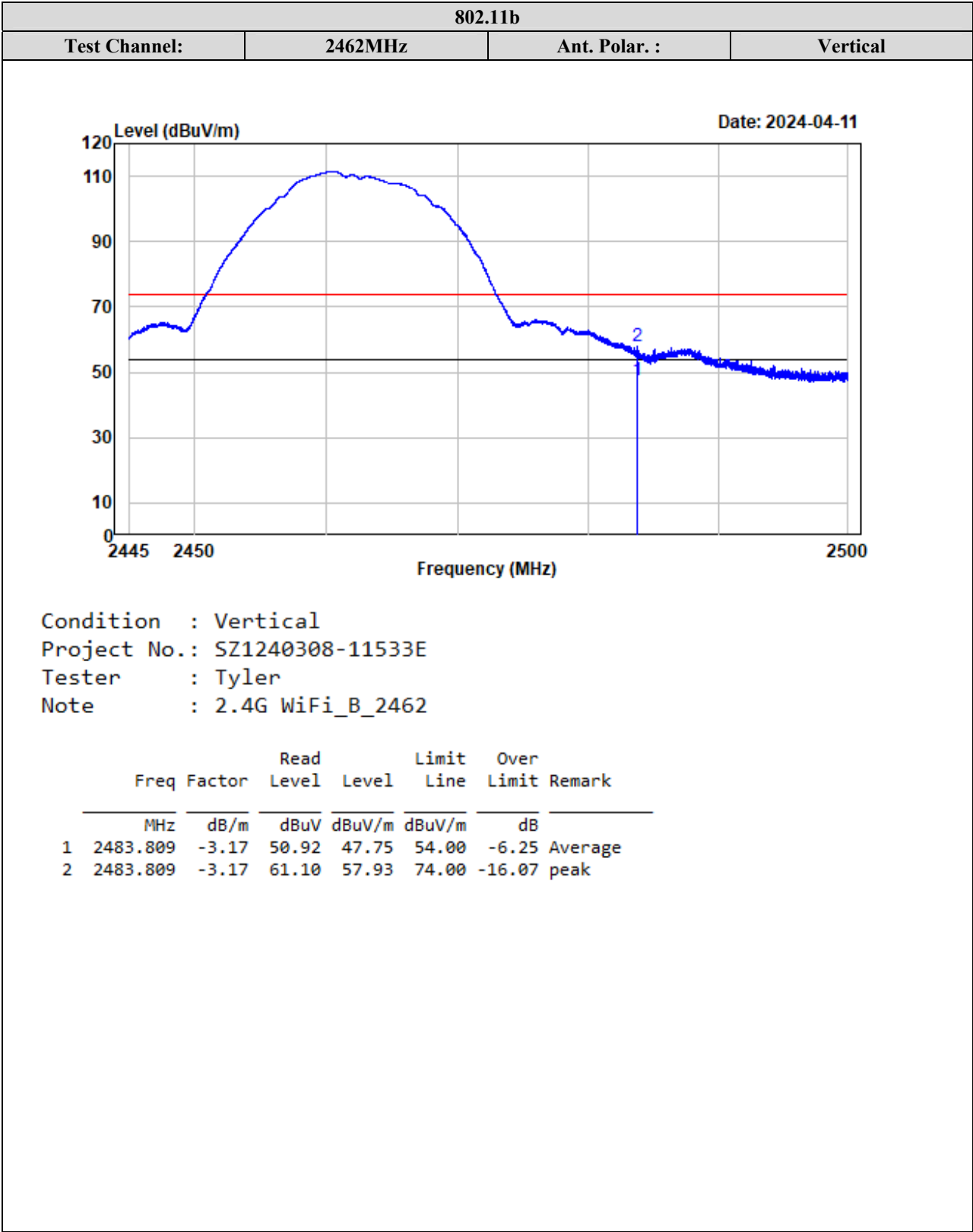
Corrected Amplitude = Factor + Reading

Margin = Corrected. Amplitude - Limit

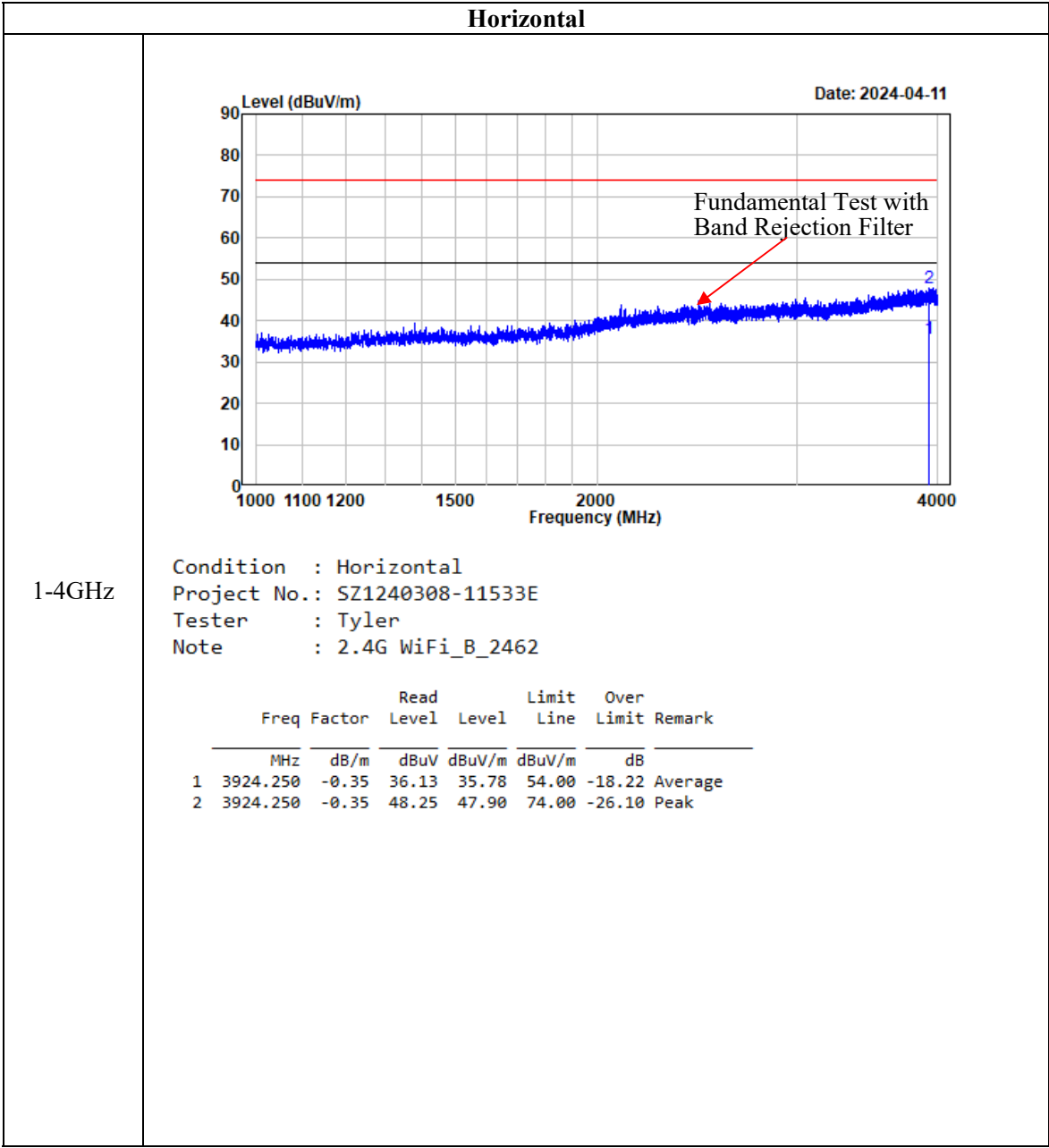
The other spurious emission which is in the noise floor level was not recorded.

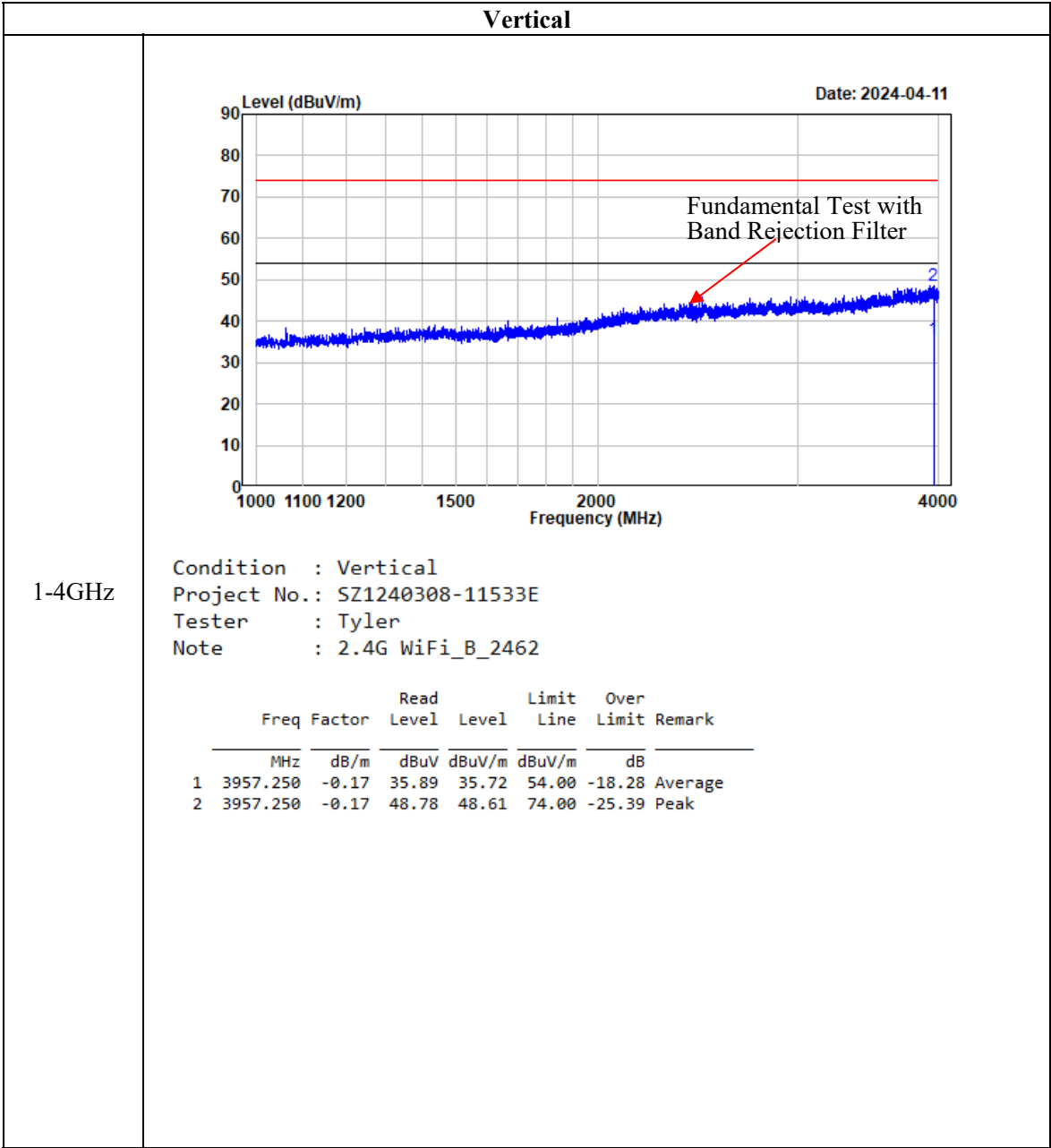
Test plots for Band Edge Measurements (Radiated):

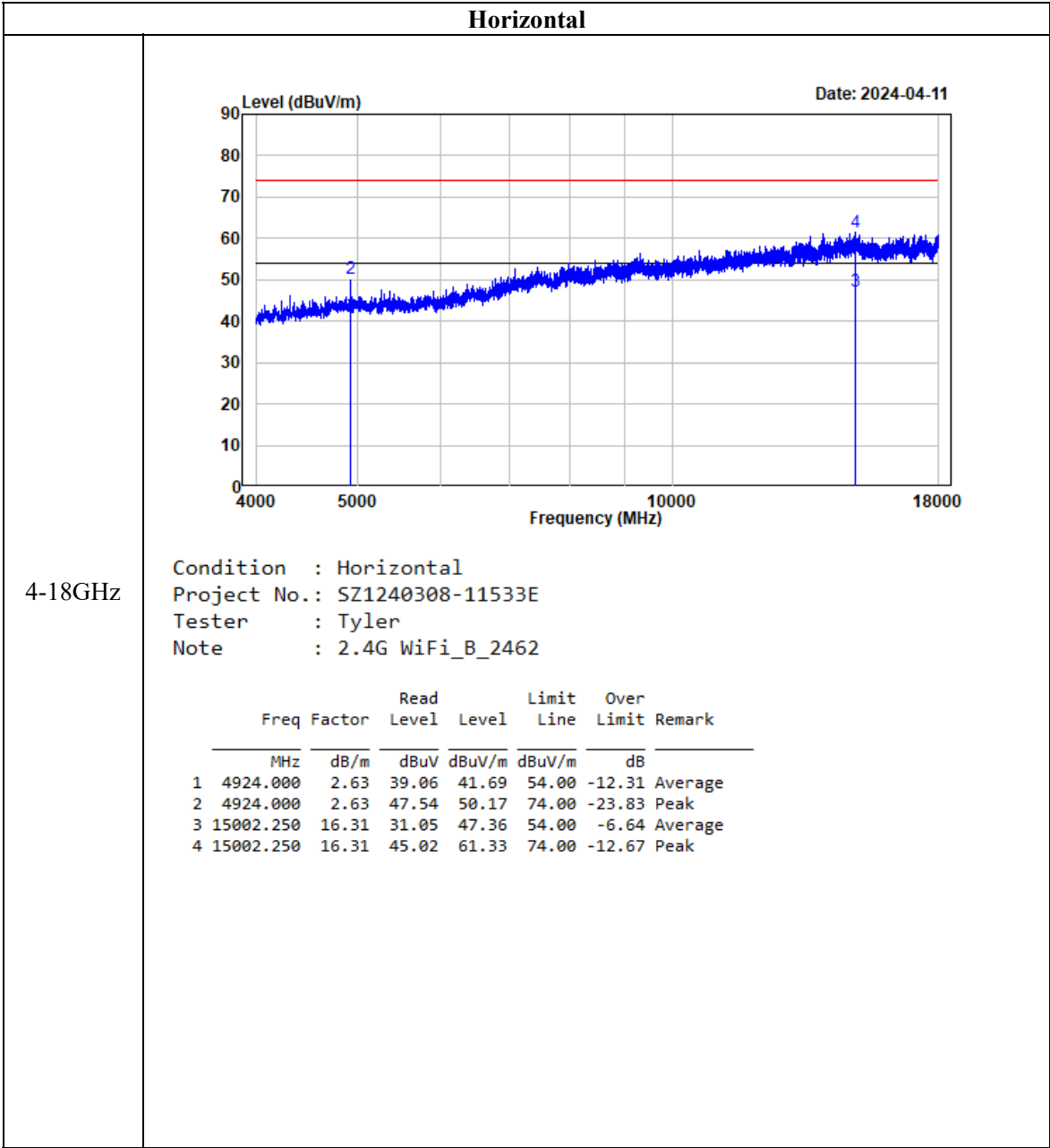


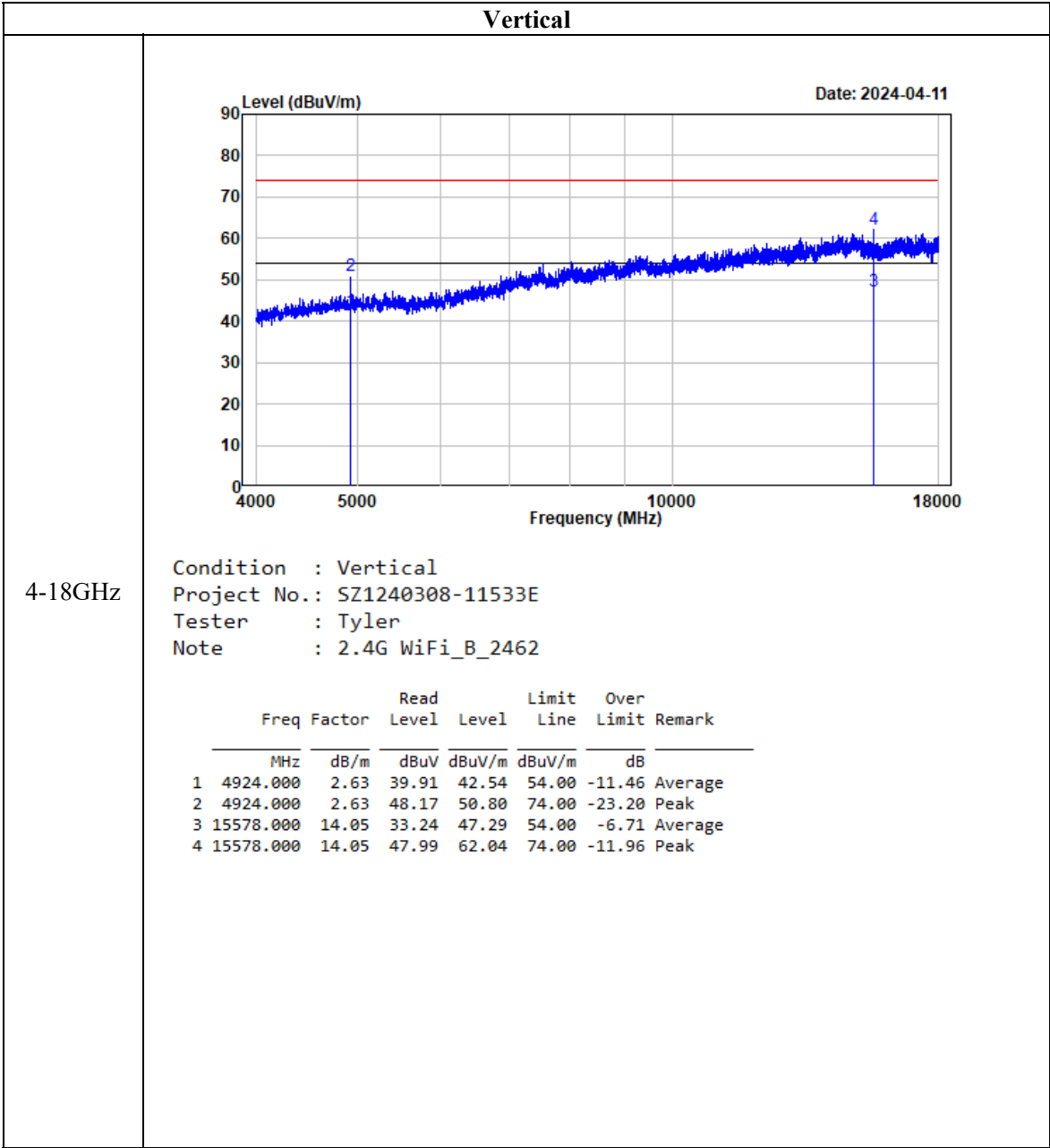


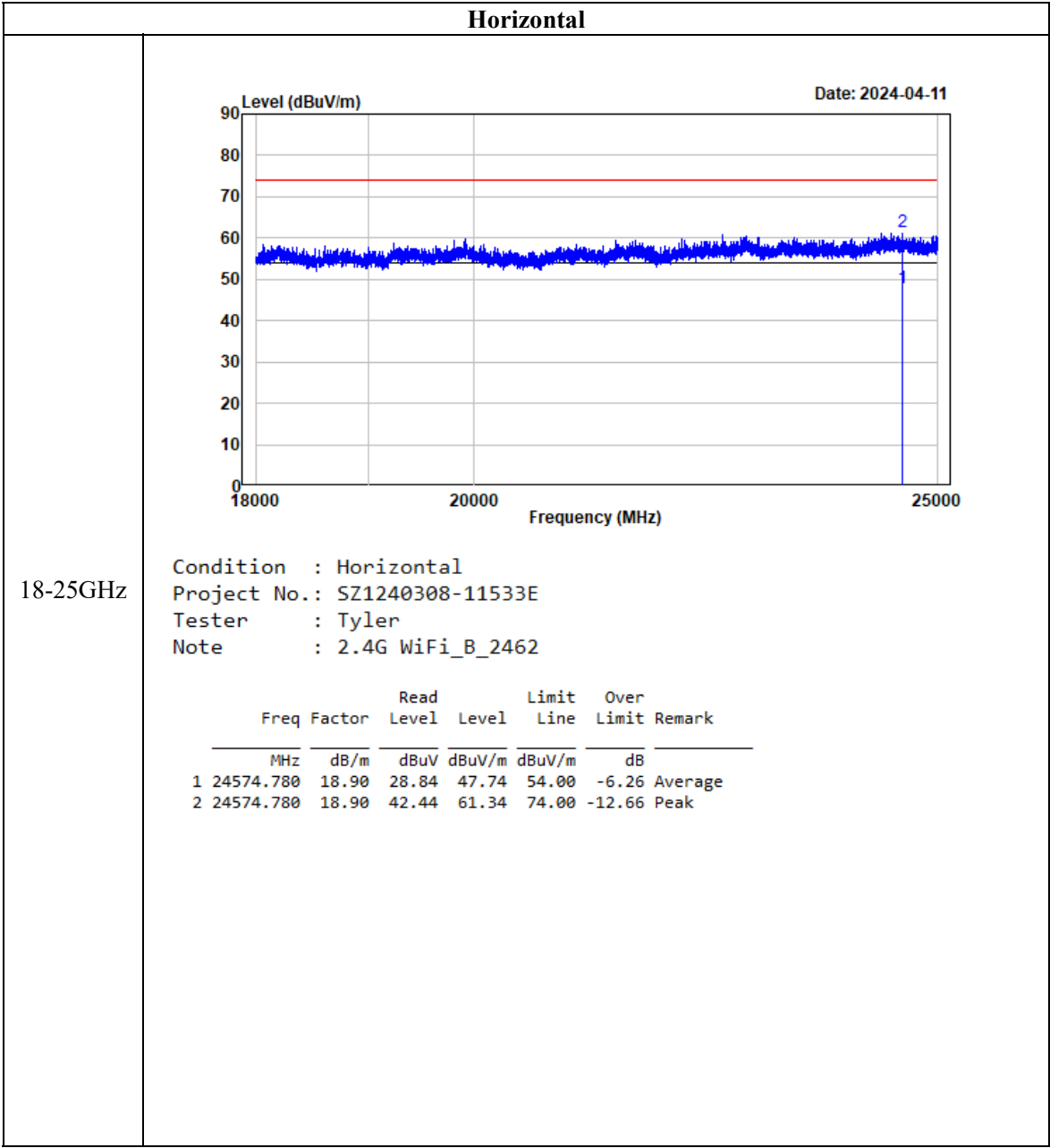
Test plots for Harmonic Measurements: (802.11b High Channel)

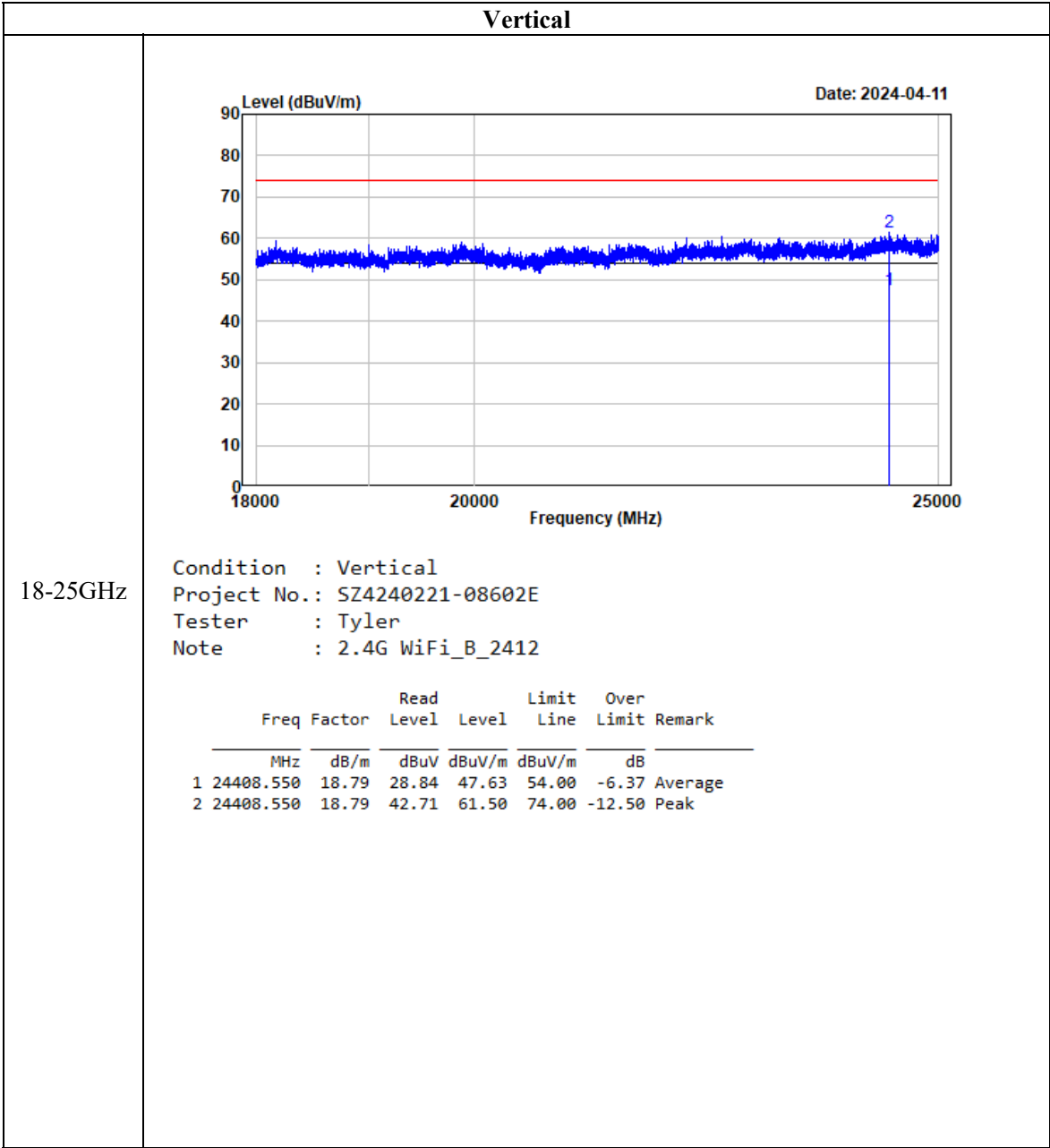












FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

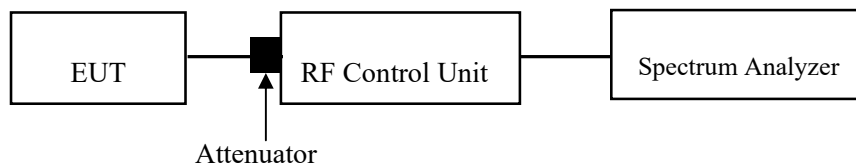
According to FCC §15.247(a) (2)

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:	25 °C
Relative Humidity:	48 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-04-03.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

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

Applicable Standard

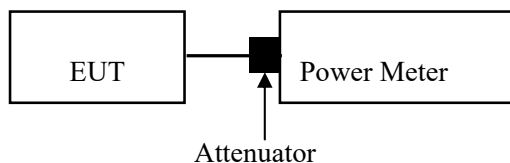
According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted 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

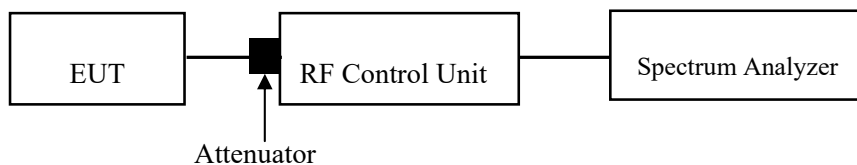
Test Method: ANSI C63.10-2013 Clause 11.9.1.1 for BLE & Clause 11.9.1.3 for Wi-Fi

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.

For Wi-Fi mode:



For BLE mode:



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	48 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-04-03.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

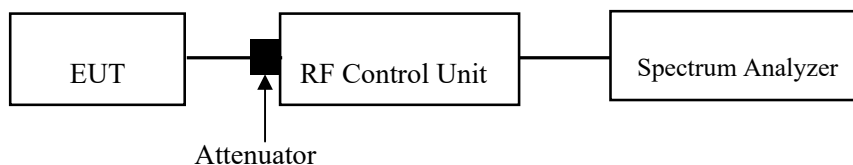
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**Applicable Standard**

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:	25 °C
Relative Humidity:	48 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-04-03.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

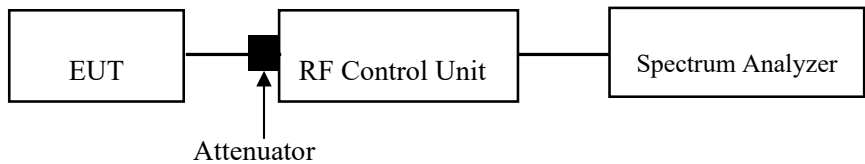
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of 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:	25 °C
Relative Humidity:	48 %
ATM Pressure:	101 kPa

The testing was performed by Tom Tan on 2024-04-03.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

EUT PHOTOGRAPHS

Please refer to the attachment SZ1240308-11533E-RF External photo and SZ1240308-11533E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment SZ1240308-11533E-RFA Test Setup photo.

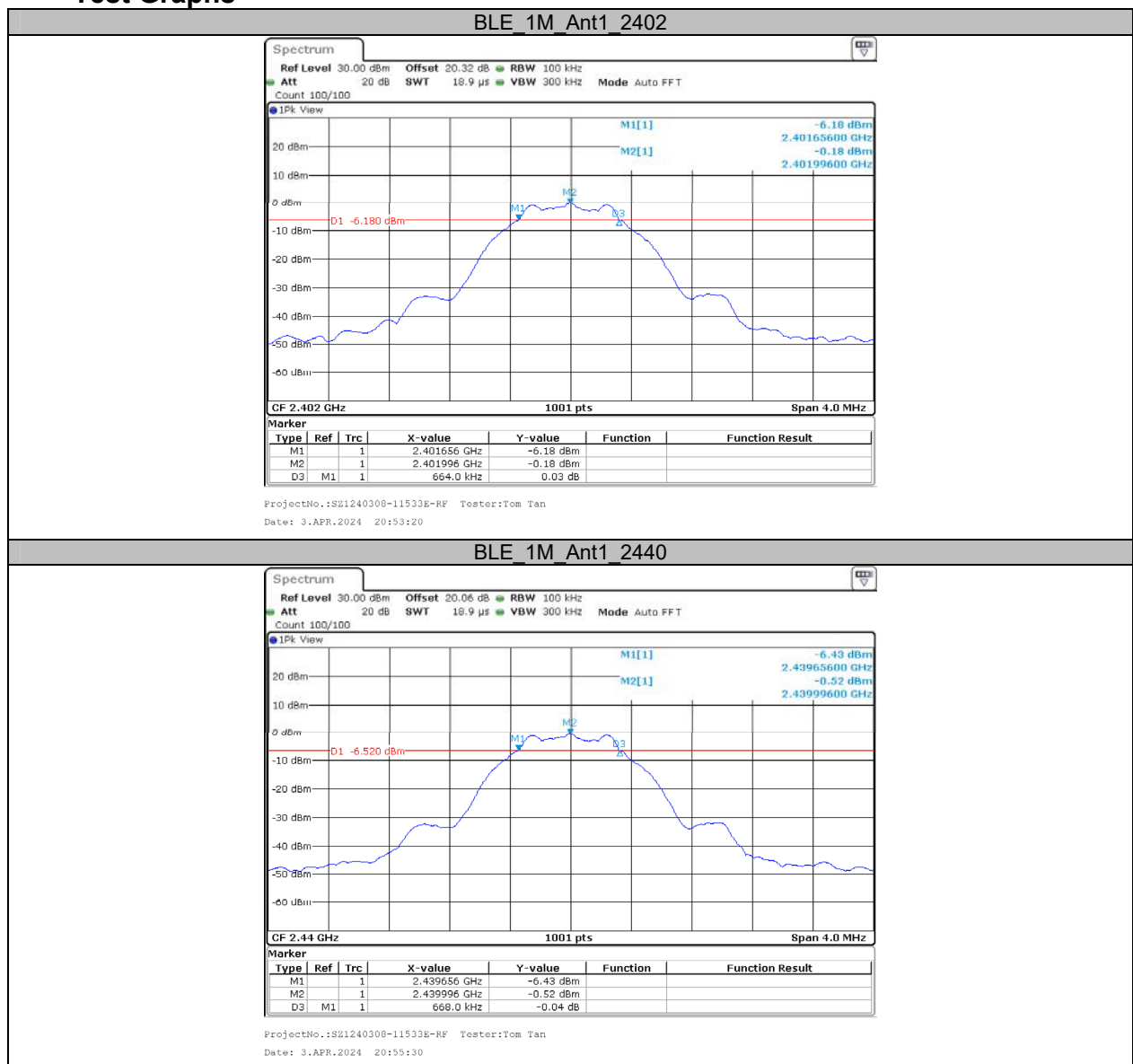
APPENDIX-BLE

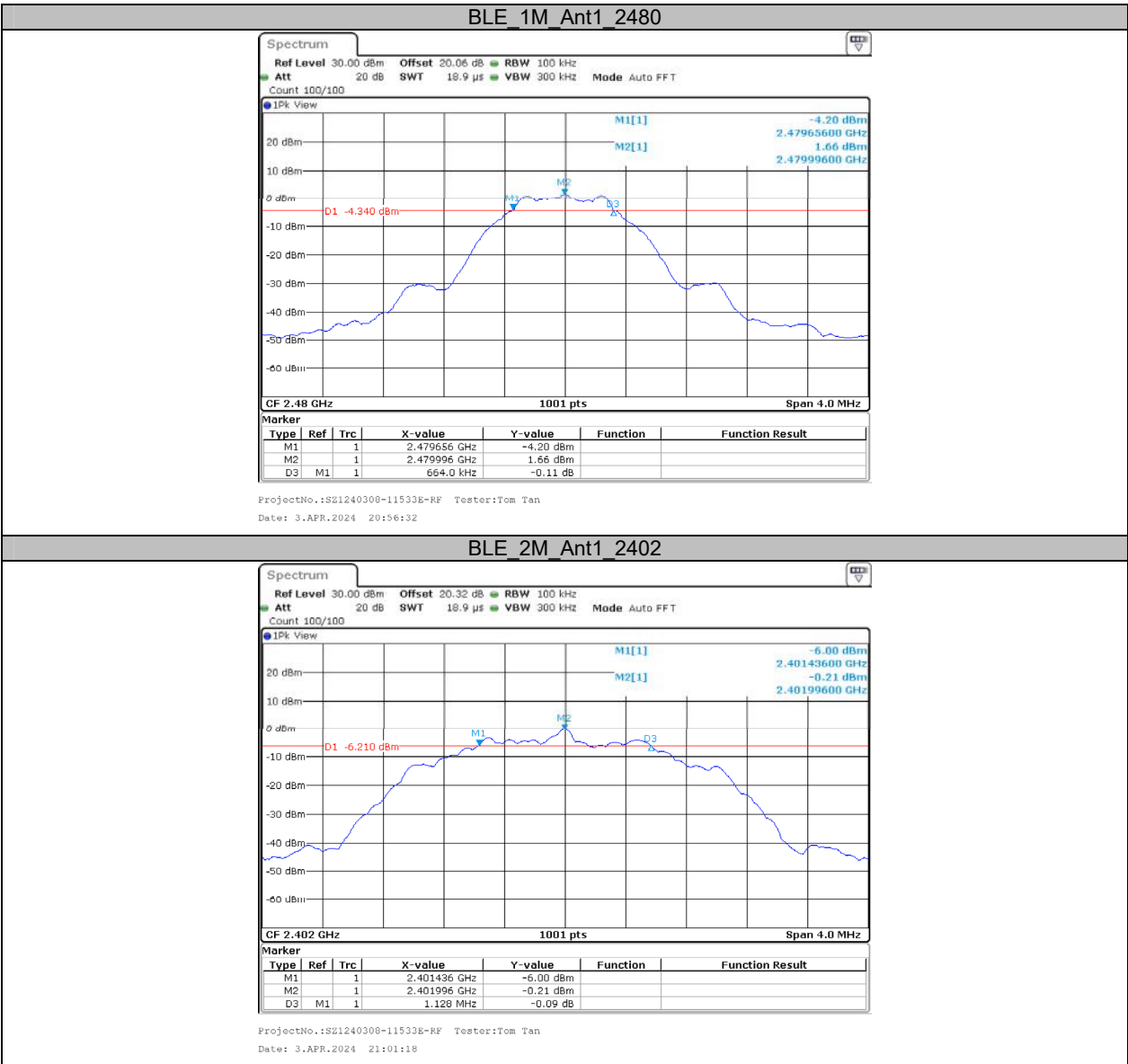
Appendix A: DTS Bandwidth

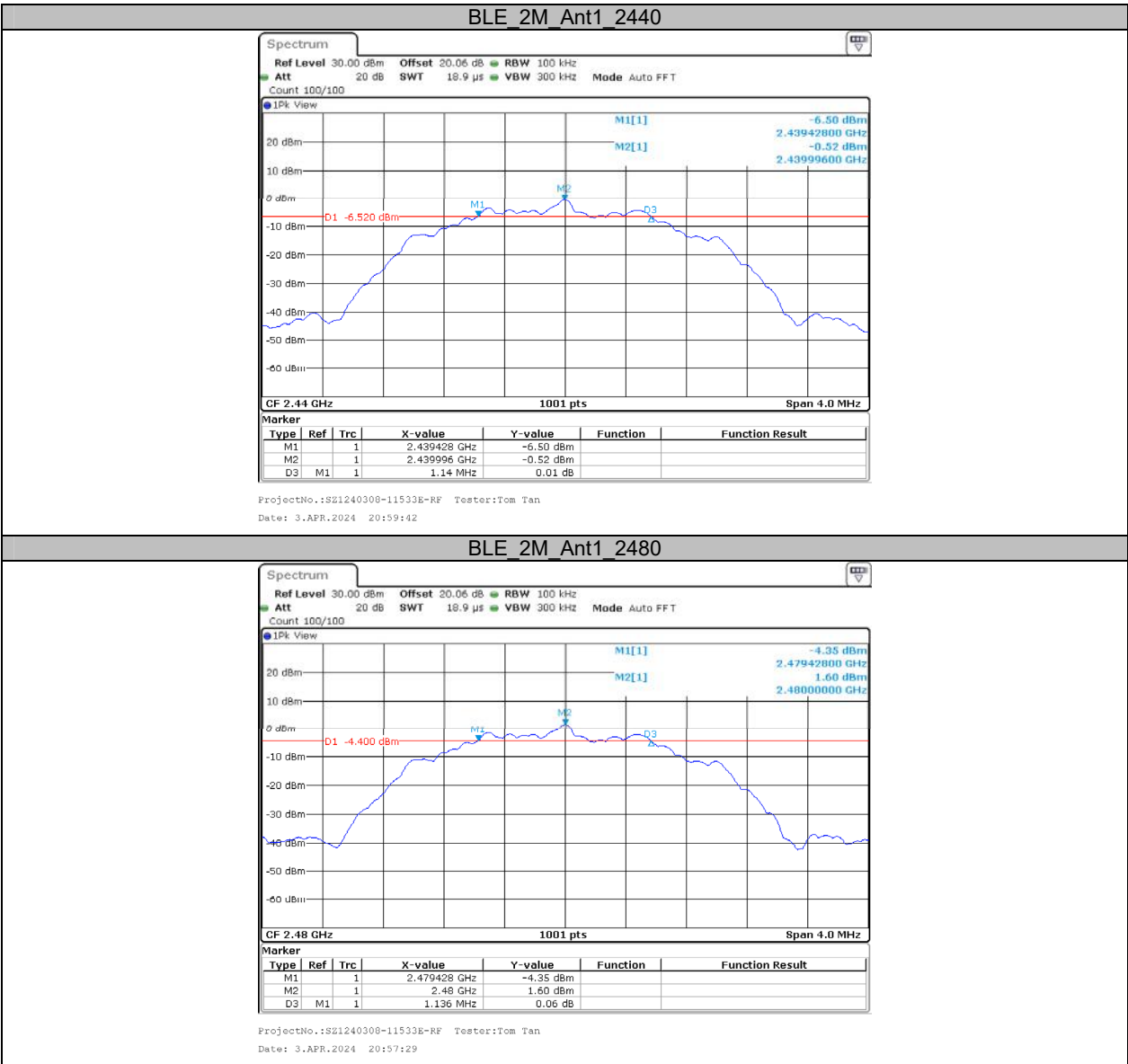
Test Result

Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.66	0.5	PASS
		2440	0.67	0.5	PASS
		2480	0.66	0.5	PASS
BLE_2M	Ant1	2402	1.13	0.5	PASS
		2440	1.14	0.5	PASS
		2480	1.14	0.5	PASS

Test Graphs

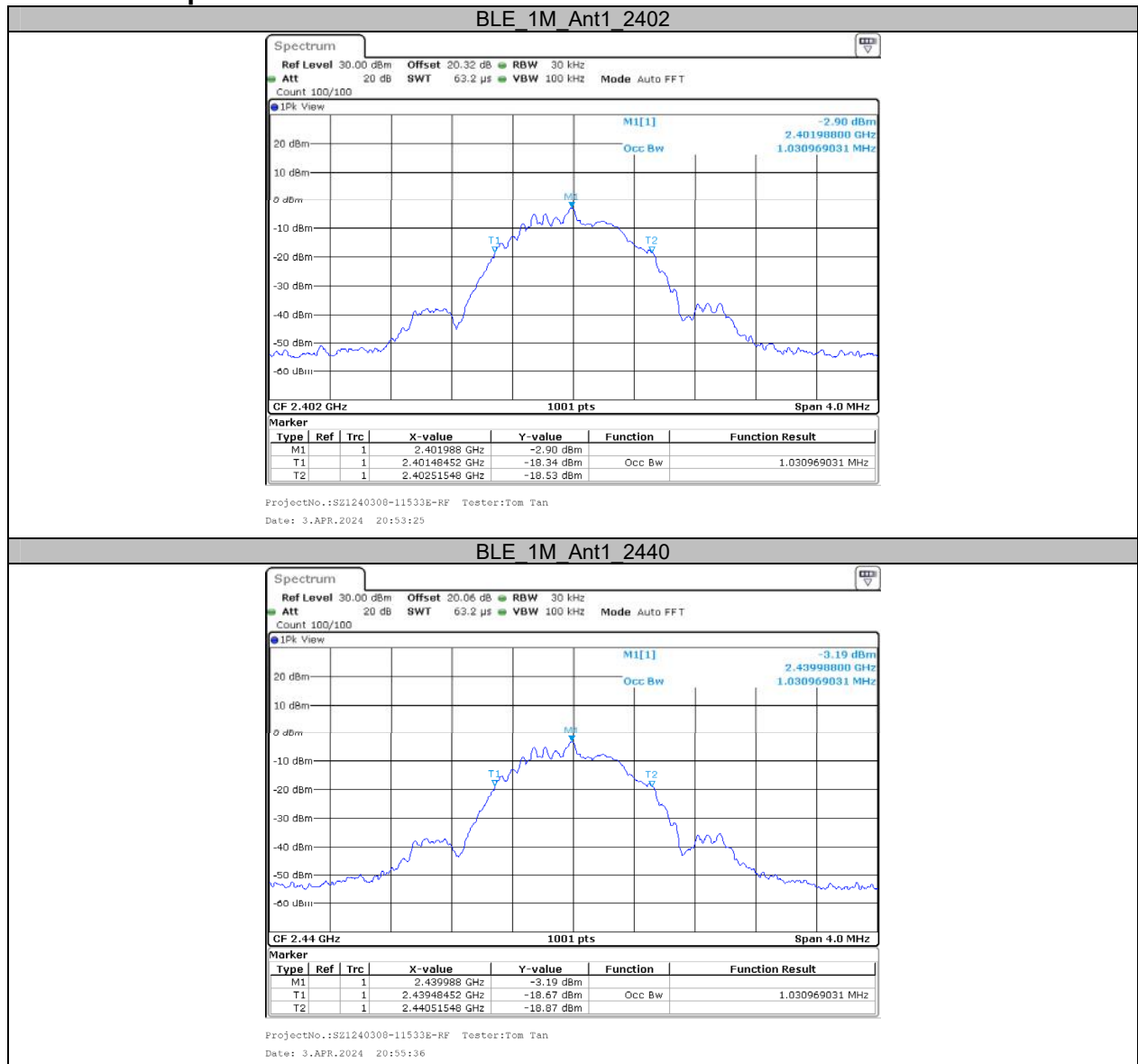


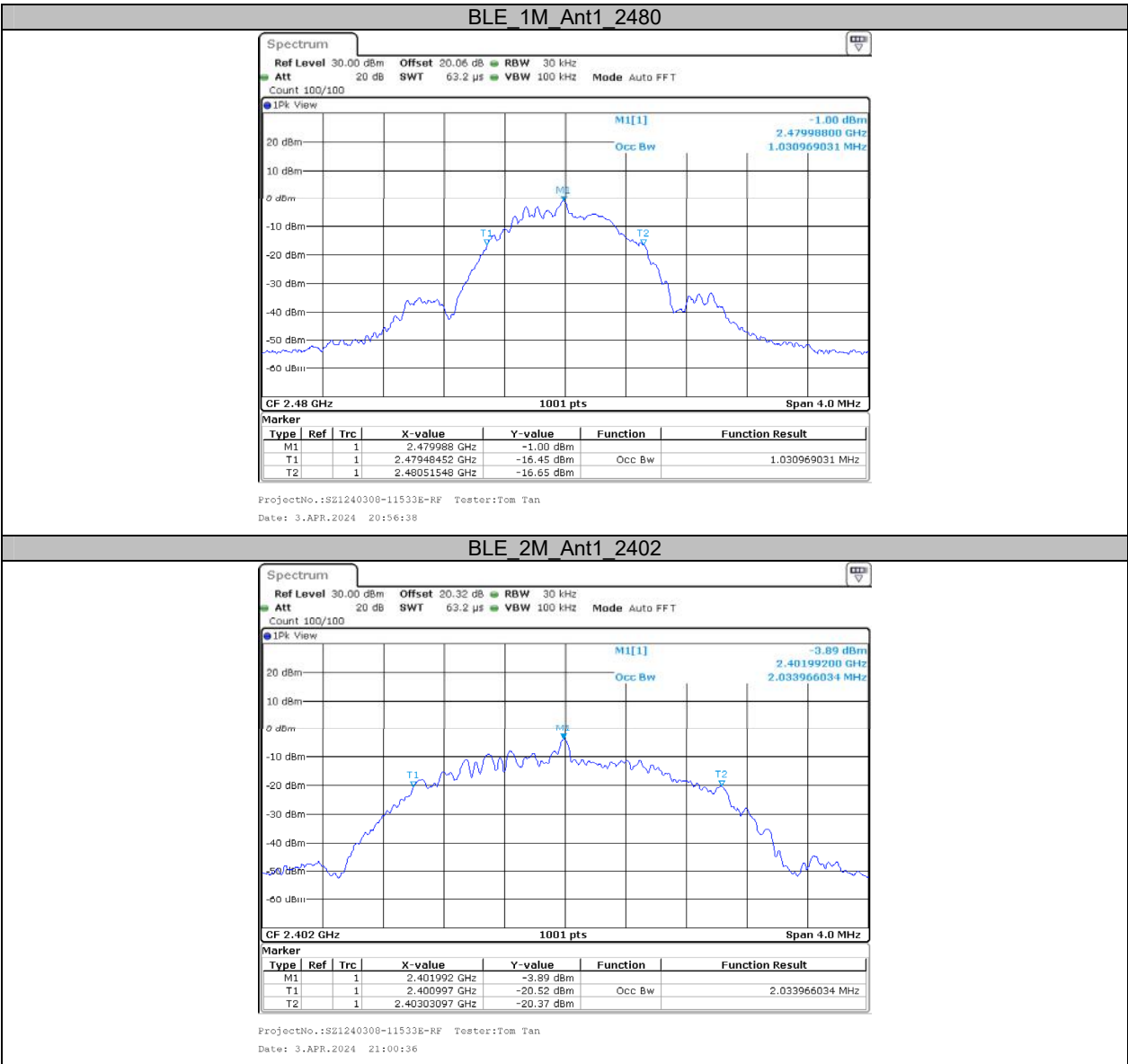


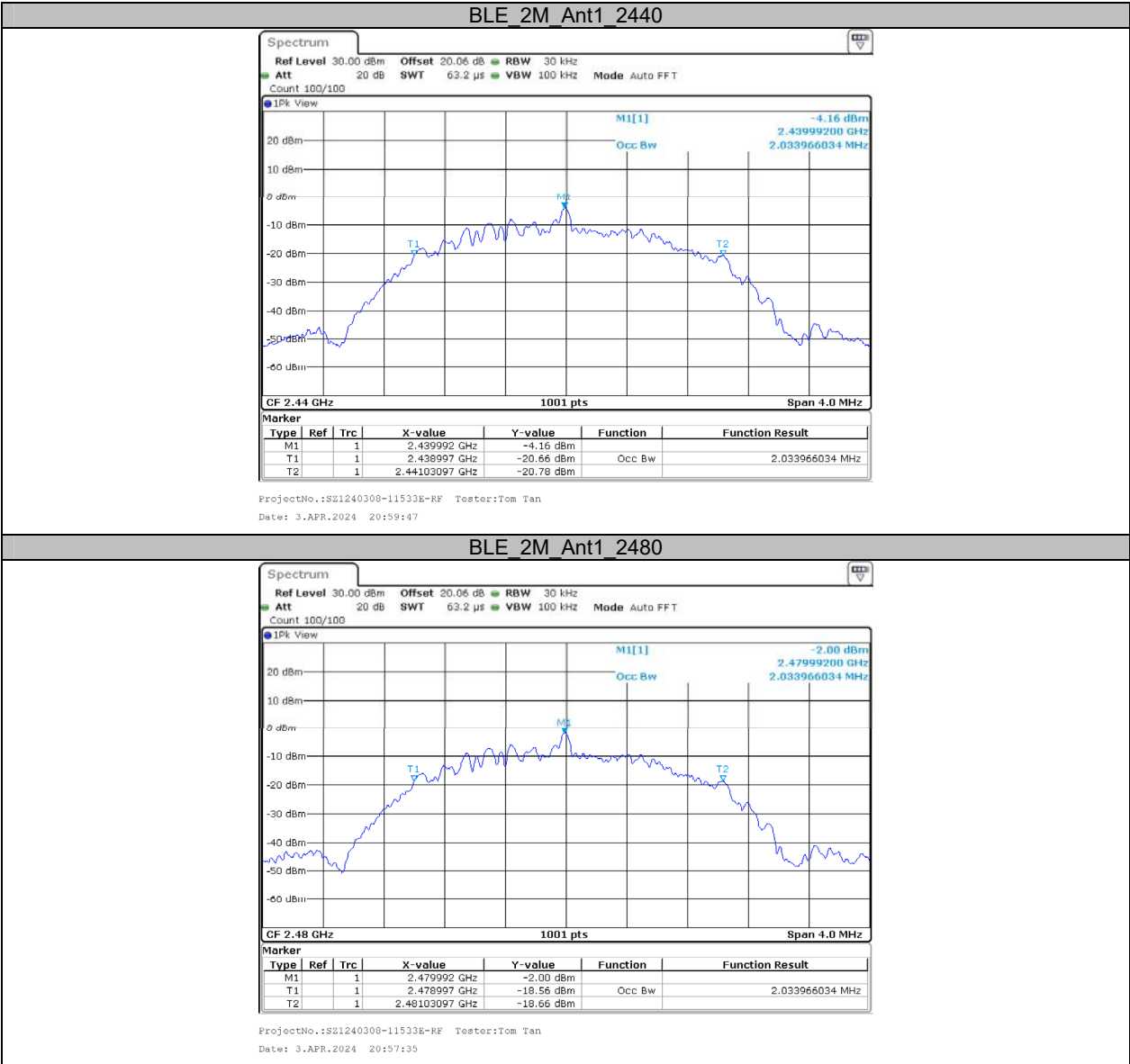


Appendix B: Occupied Channel Bandwidth**Test Result**

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.031	---	---
		2440	1.031	---	---
		2480	1.031	---	---
BLE_2M	Ant1	2402	2.034	---	---
		2440	2.034	---	---
		2480	2.034	---	---

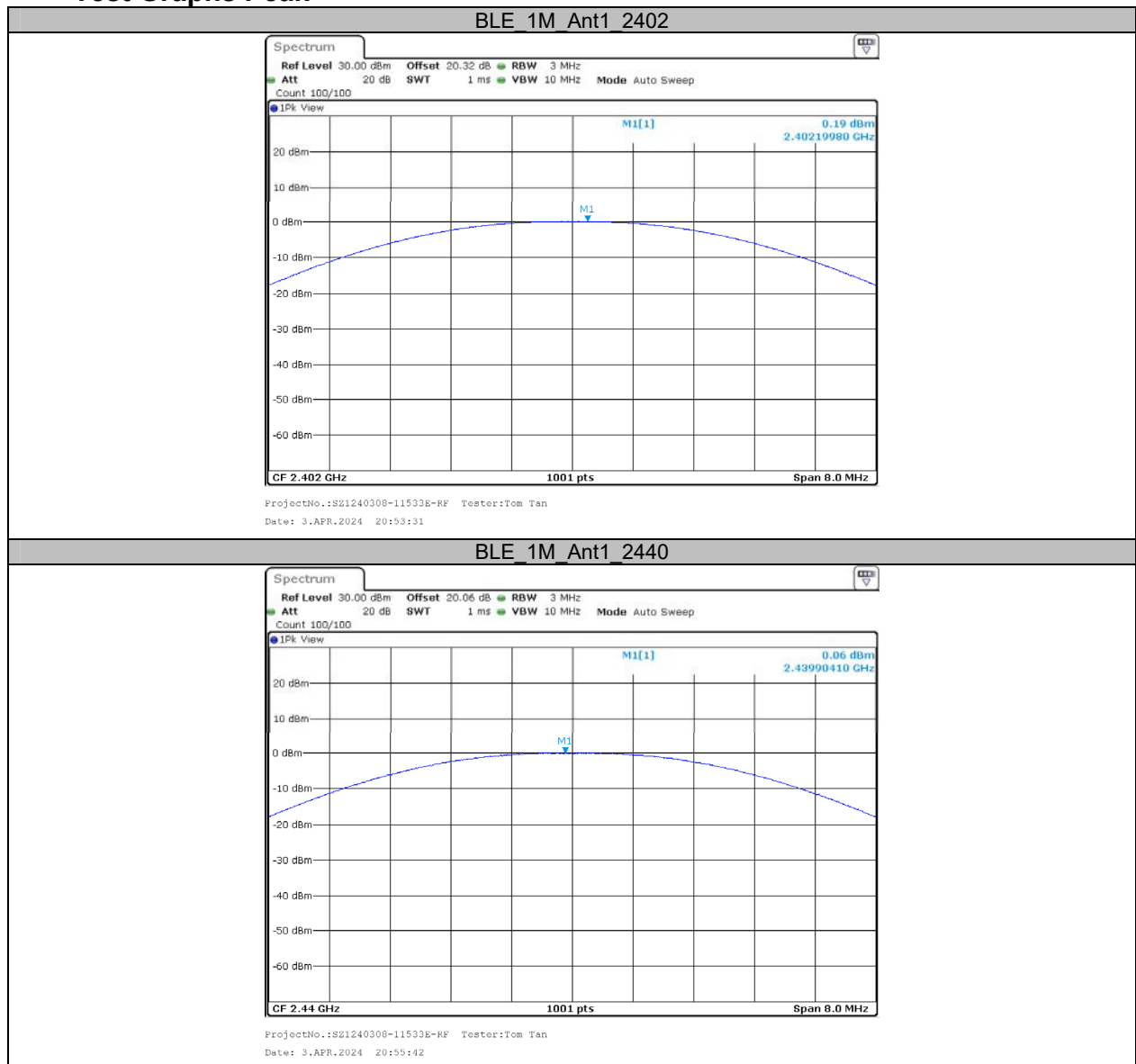
Test Graphs

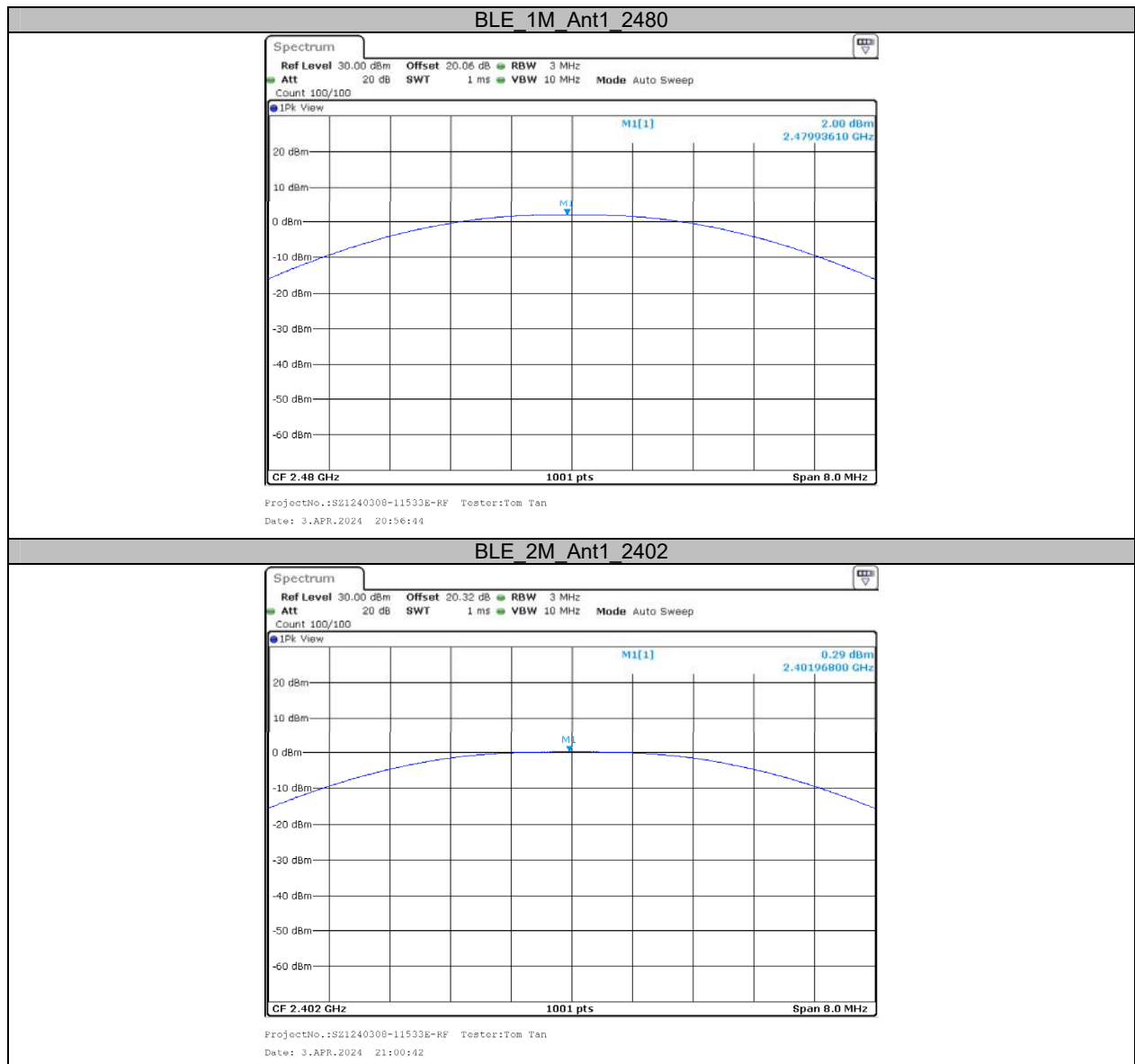


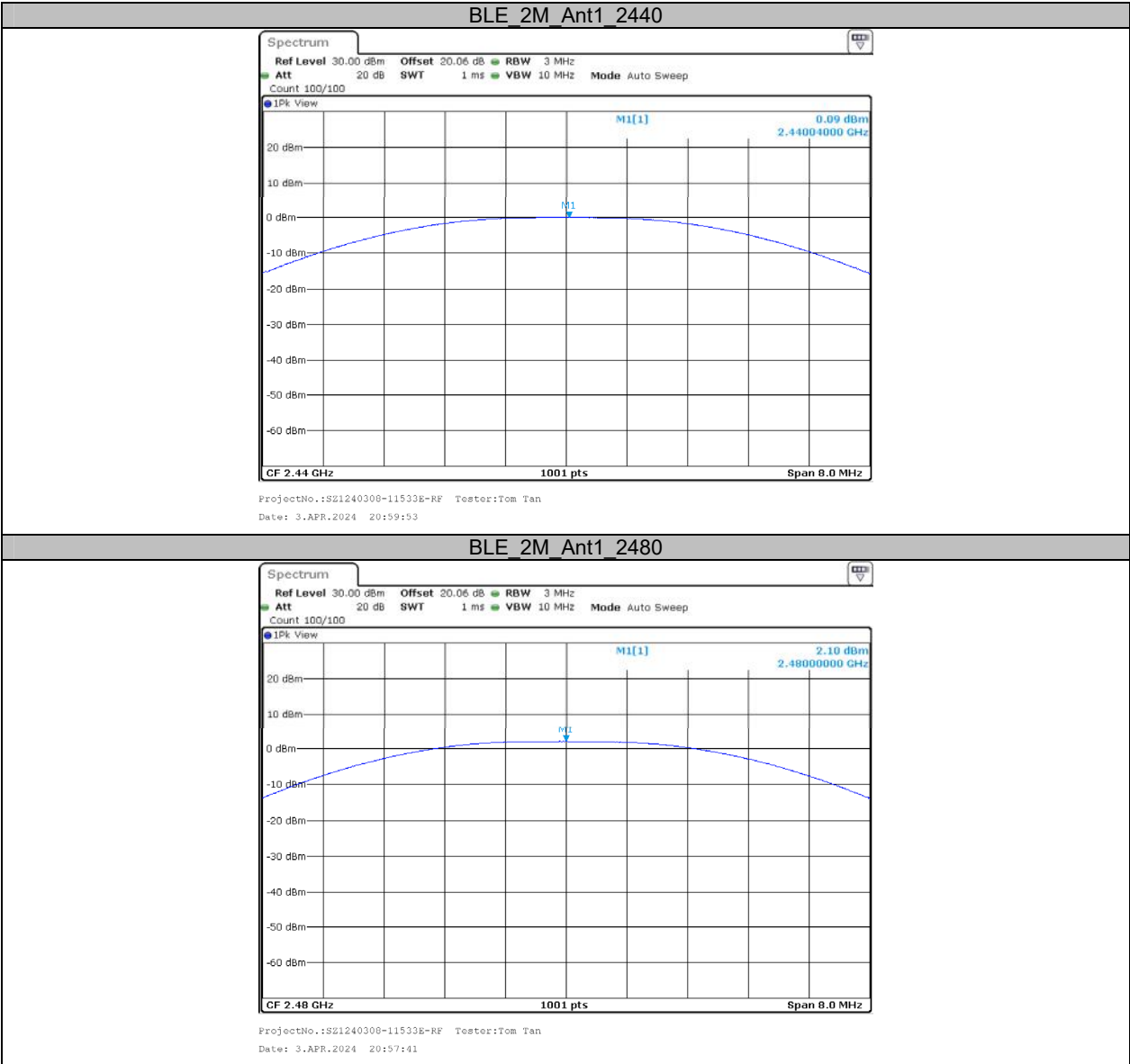


Appendix C: Maximum Conducted Output Power**Test Result Peak**

Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.19	≤30	PASS
		2440	0.06	≤30	PASS
		2480	2.00	≤30	PASS
BLE_2M	Ant1	2402	0.29	≤30	PASS
		2440	0.09	≤30	PASS
		2480	2.10	≤30	PASS

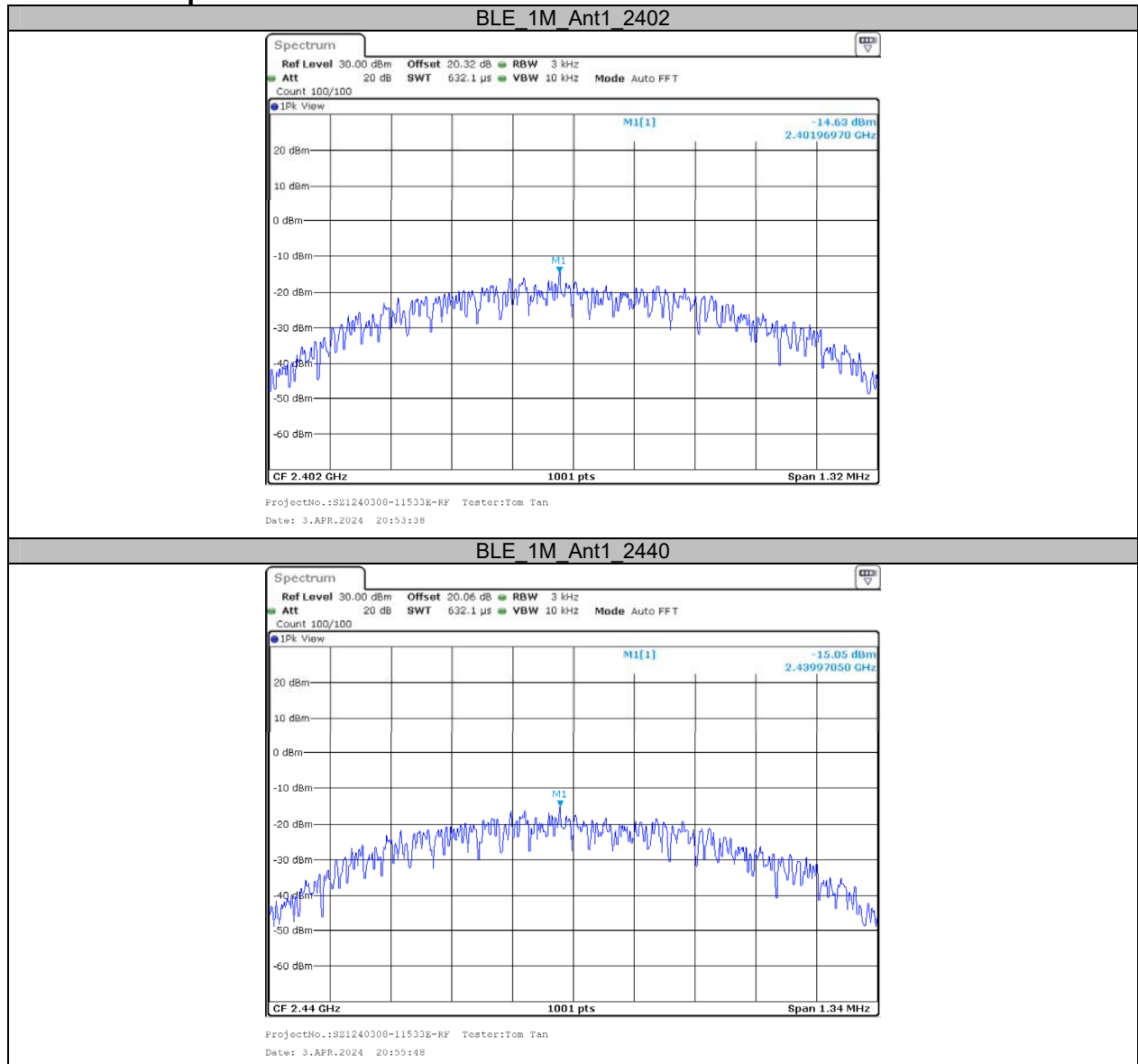
Test Graphs Peak

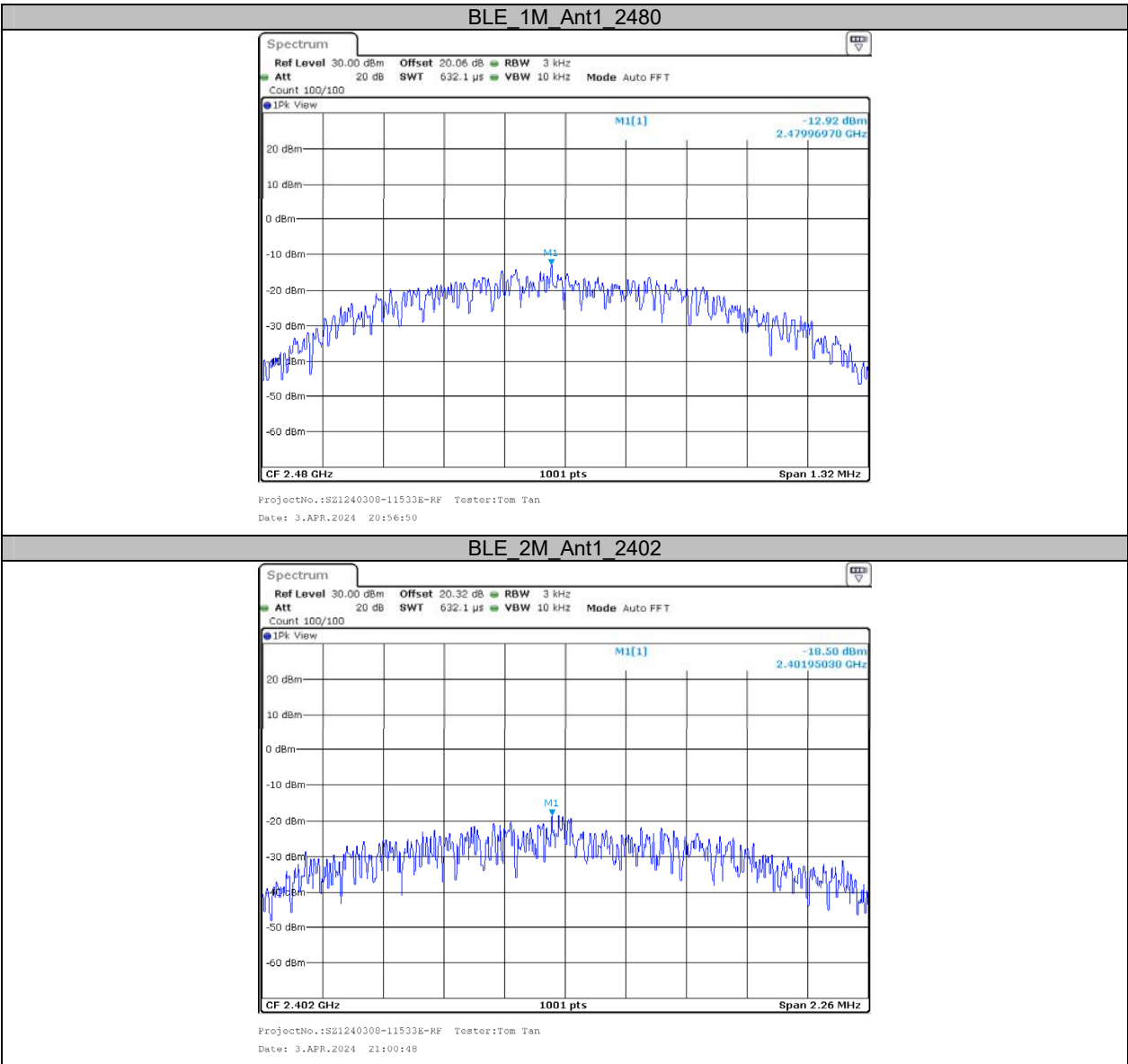


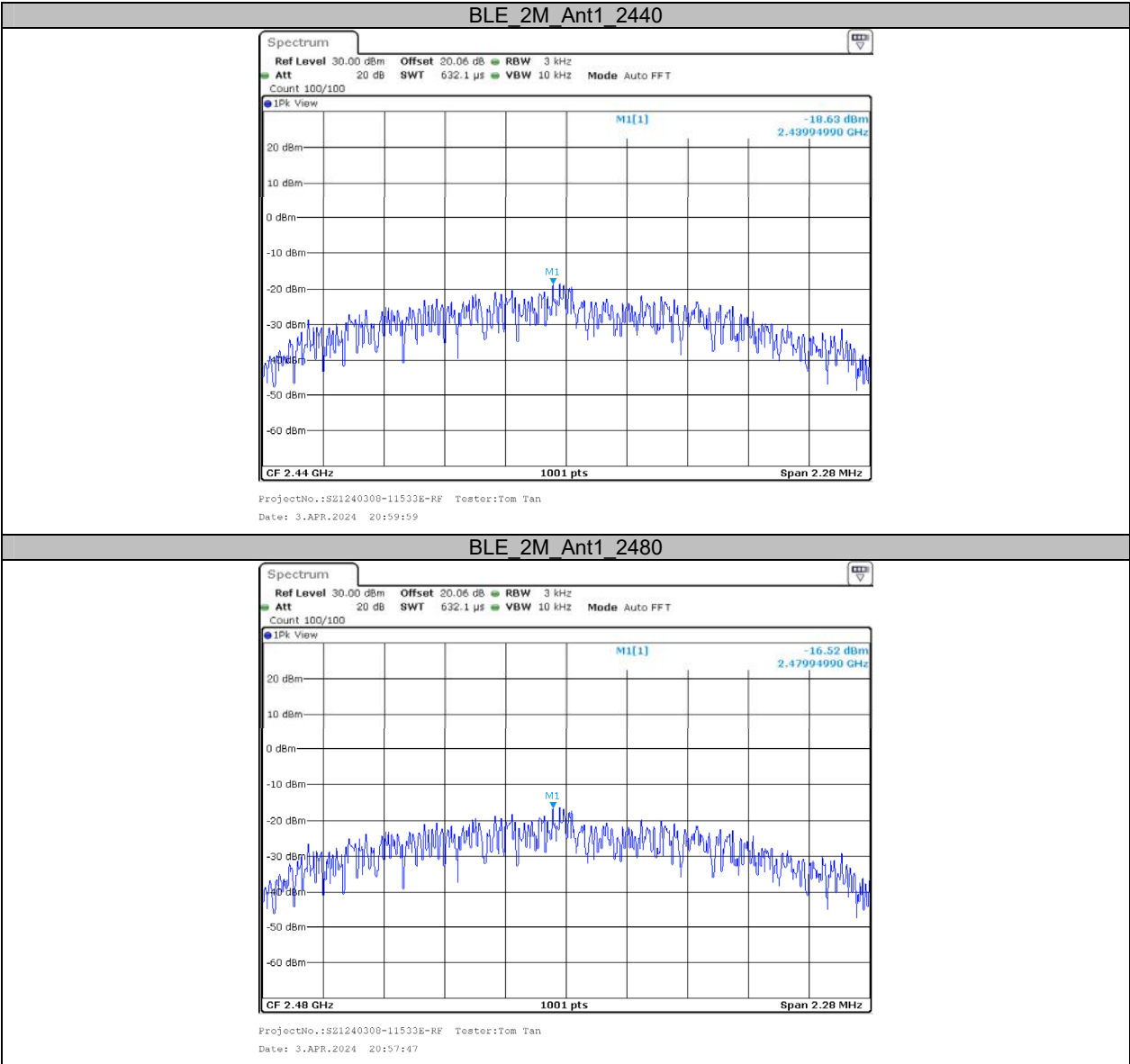


Appendix D: Maximum Power Spectral Density**Test Result**

Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.63	≤8.00	PASS
		2440	-15.05	≤8.00	PASS
		2480	-12.92	≤8.00	PASS
BLE_2M	Ant1	2402	-18.50	≤8.00	PASS
		2440	-18.63	≤8.00	PASS
		2480	-16.52	≤8.00	PASS

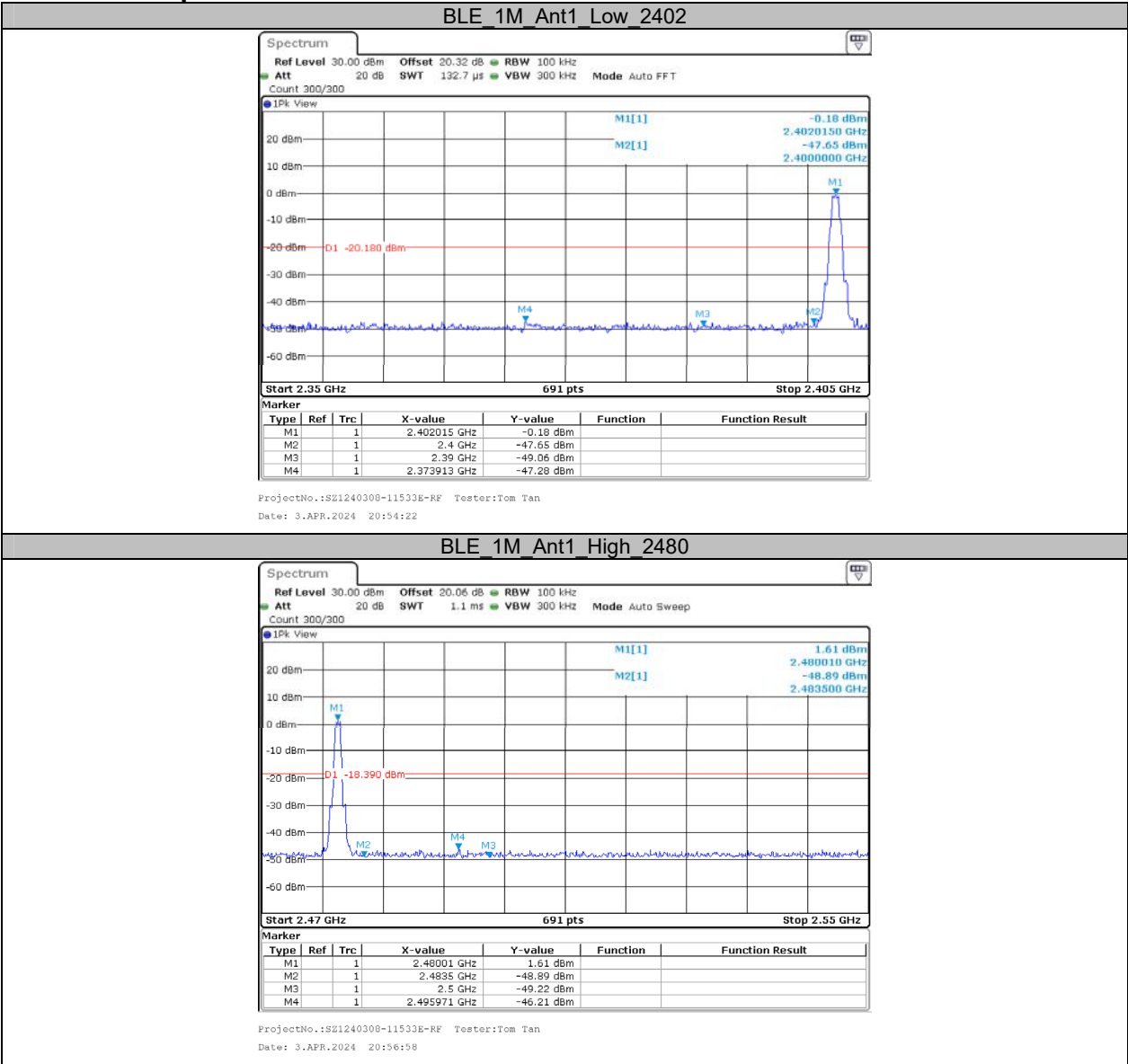
Test Graphs

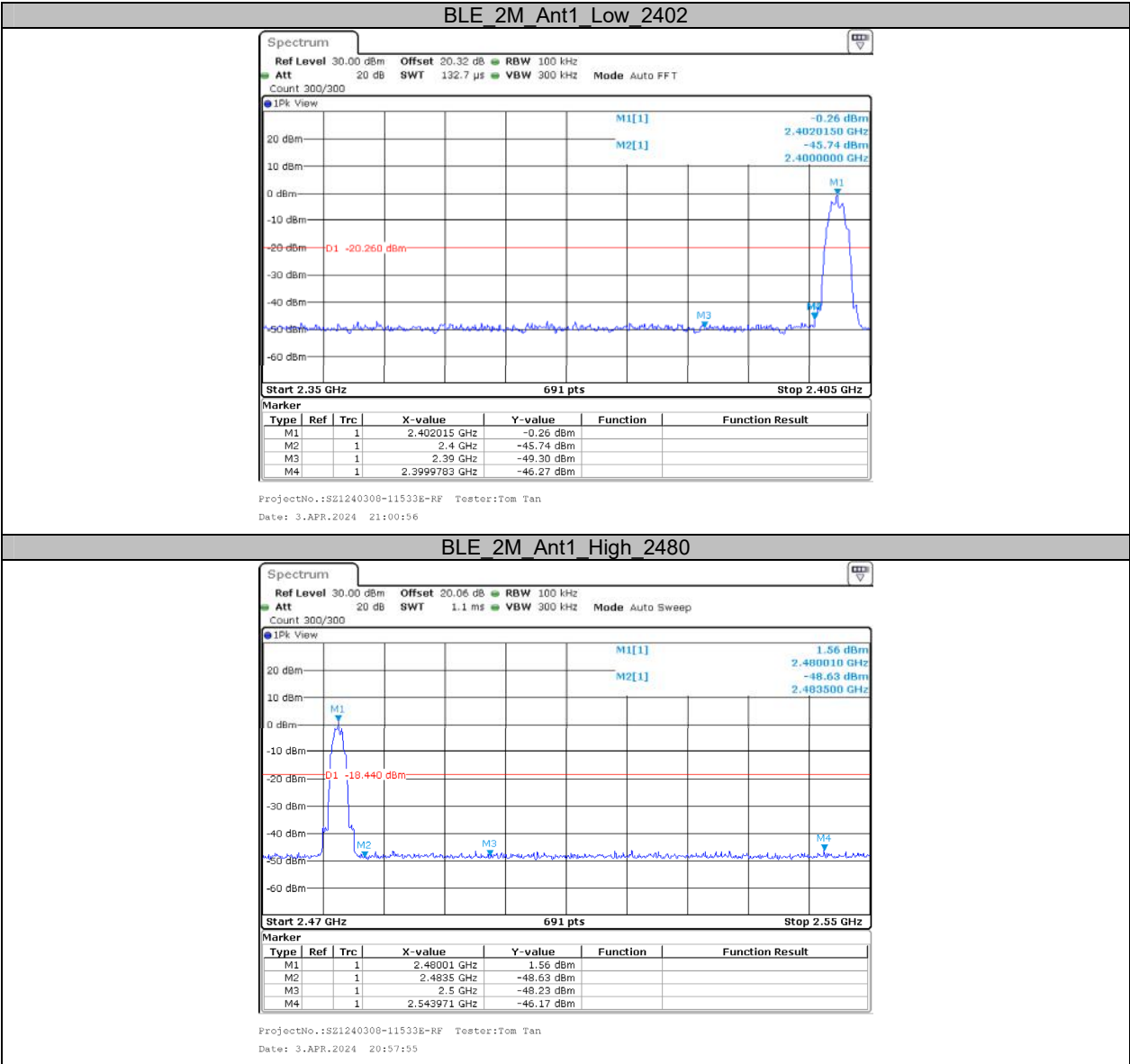




Appendix E: Band Edge Measurements

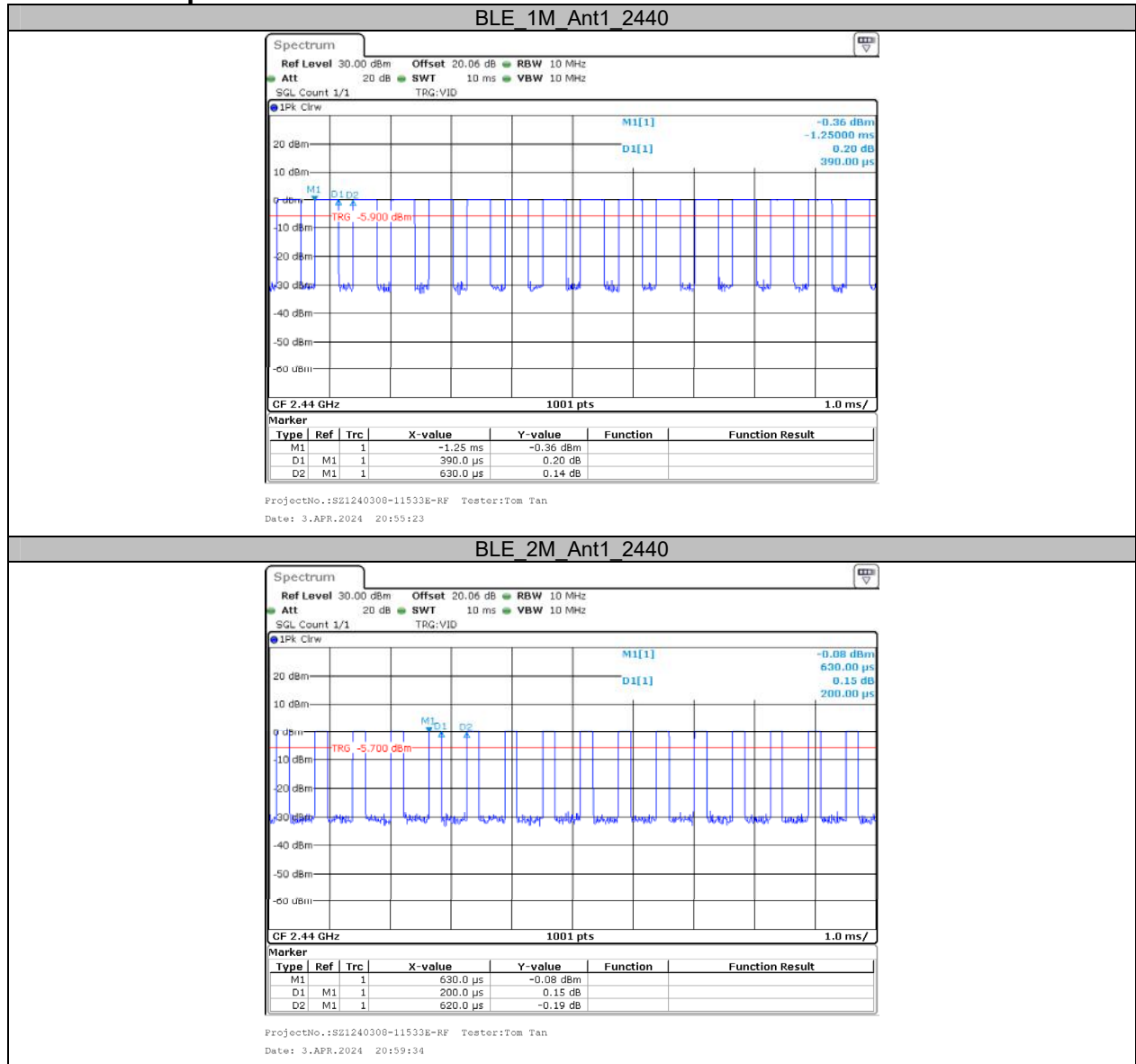
Test Graphs





Appendix F: Duty Cycle**Test Result**

Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	1/T [Hz]	VBW Setting [kHz]
BLE_1M	Ant1	2440	0.39	0.63	61.90	2564	3
BLE_2M	Ant1	2440	0.20	0.62	32.26	5000	5

Test Graphs

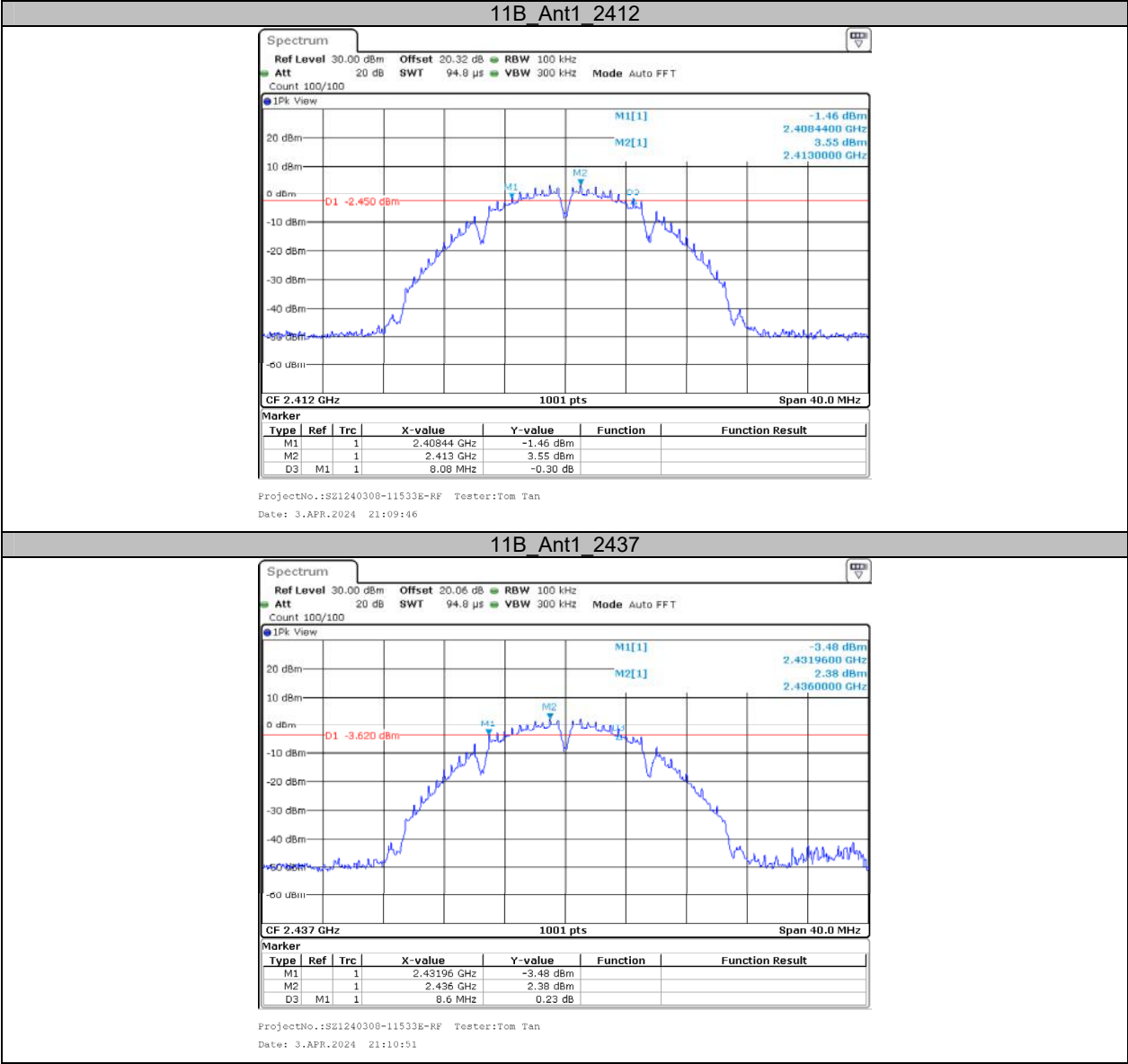
APPENDIX-Wi-Fi

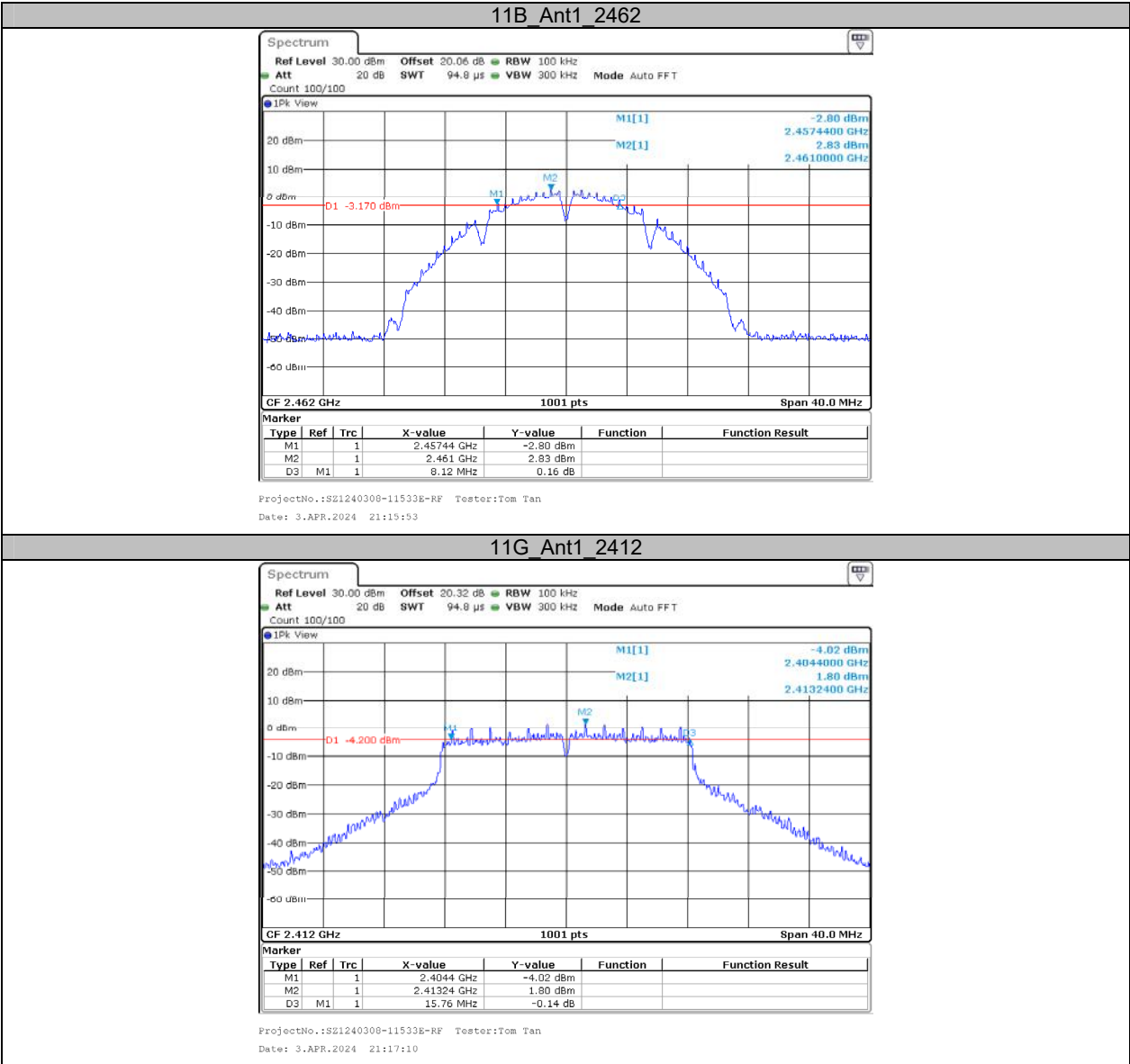
Appendix A: DTS Bandwidth

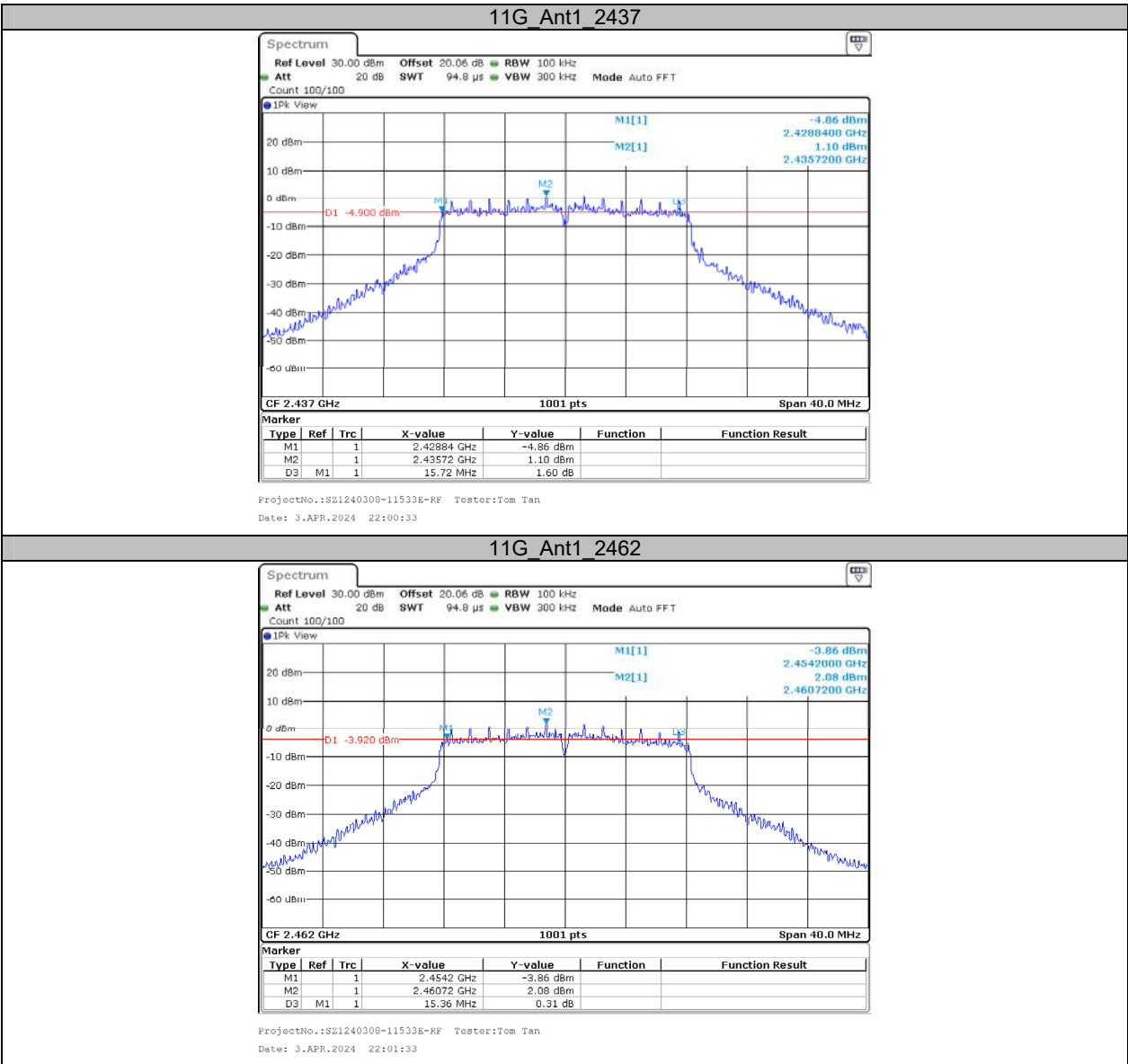
Test Result

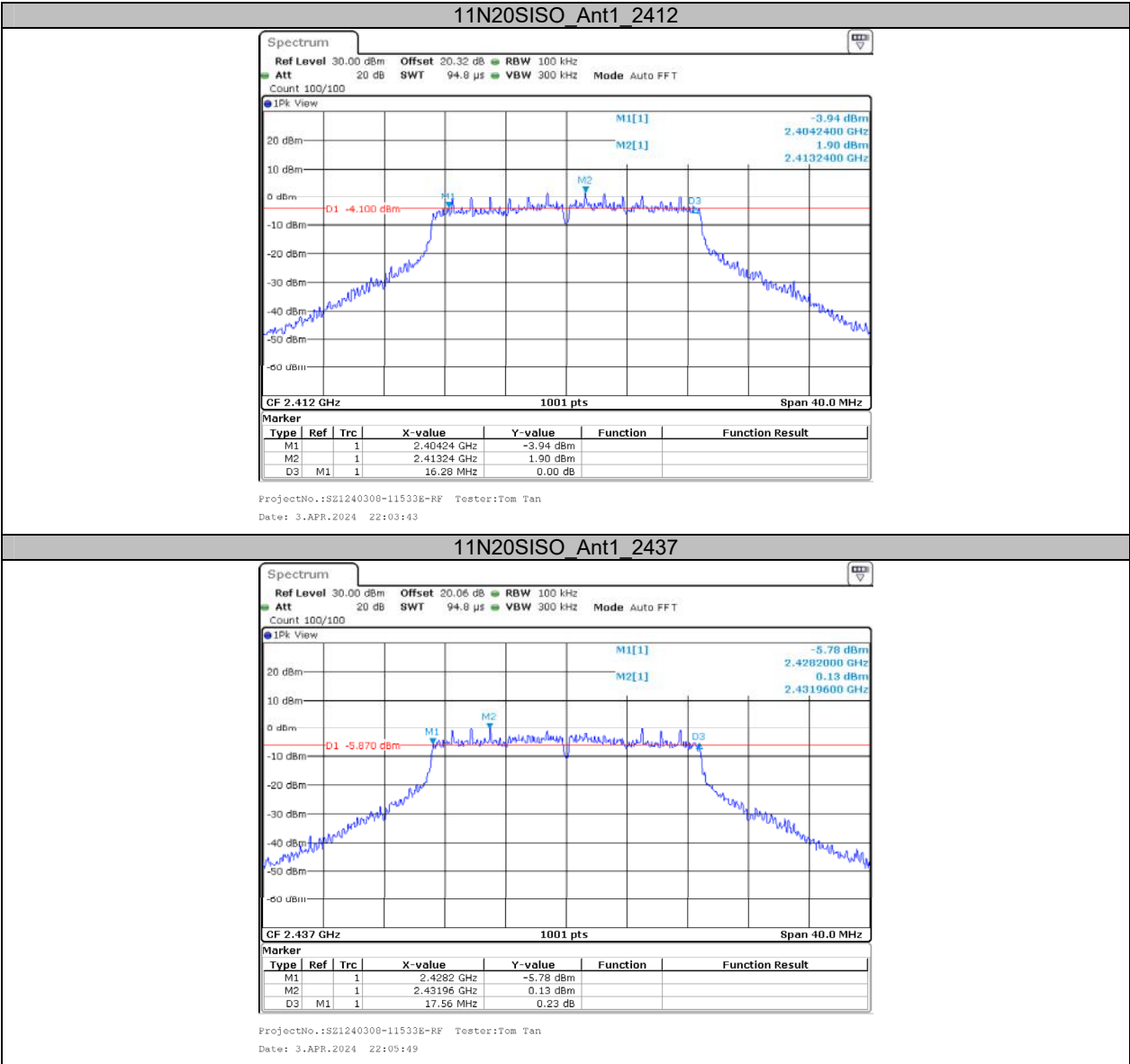
Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.08	0.5	PASS
		2437	8.60	0.5	PASS
		2462	8.12	0.5	PASS
11G	Ant1	2412	15.76	0.5	PASS
		2437	15.72	0.5	PASS
		2462	15.36	0.5	PASS
11N20SISO	Ant1	2412	16.28	0.5	PASS
		2437	17.56	0.5	PASS
		2462	15.16	0.5	PASS
11N40SISO	Ant1	2422	35.12	0.5	PASS
		2437	35.68	0.5	PASS
		2452	35.12	0.5	PASS

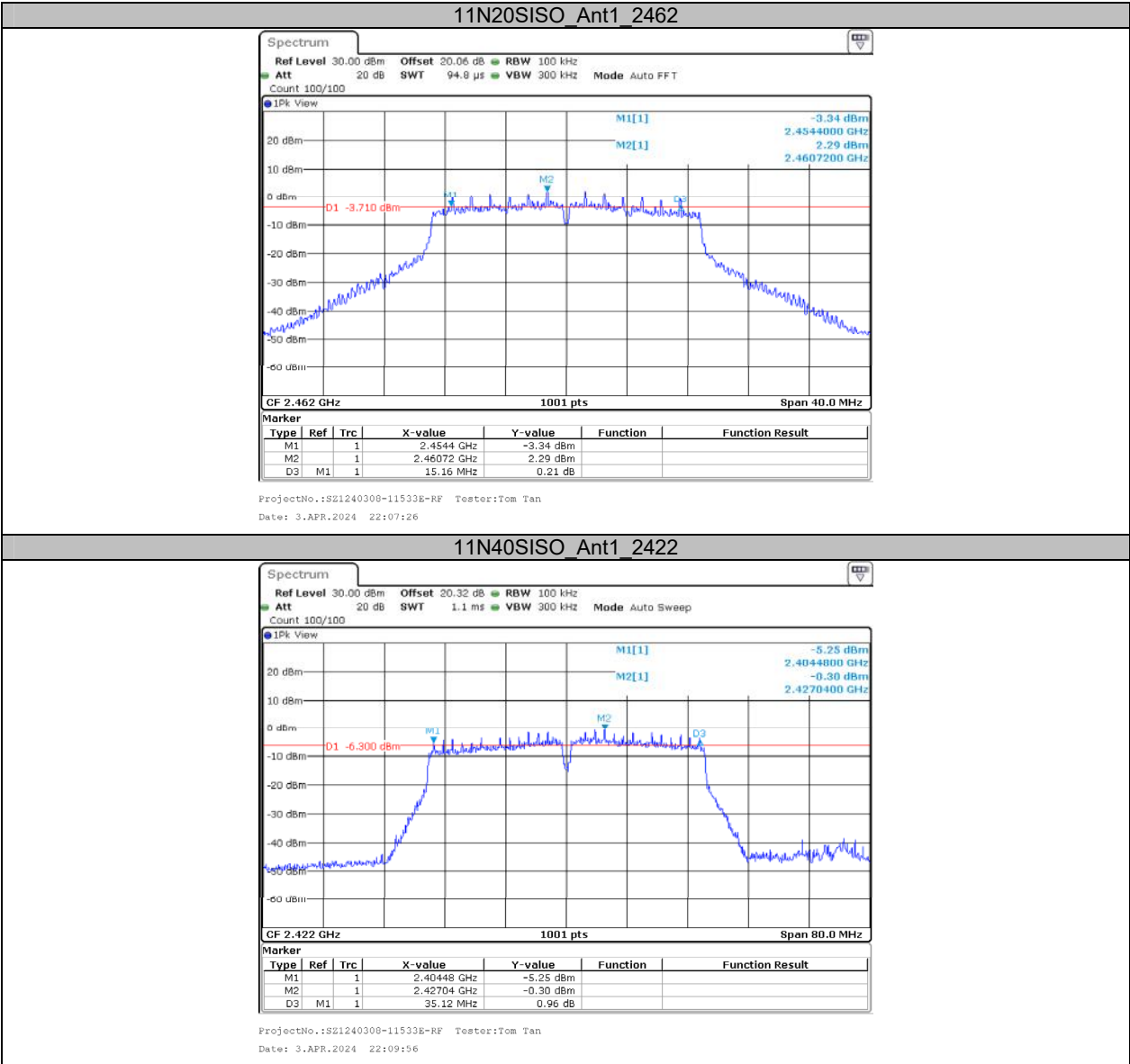
Test Graphs

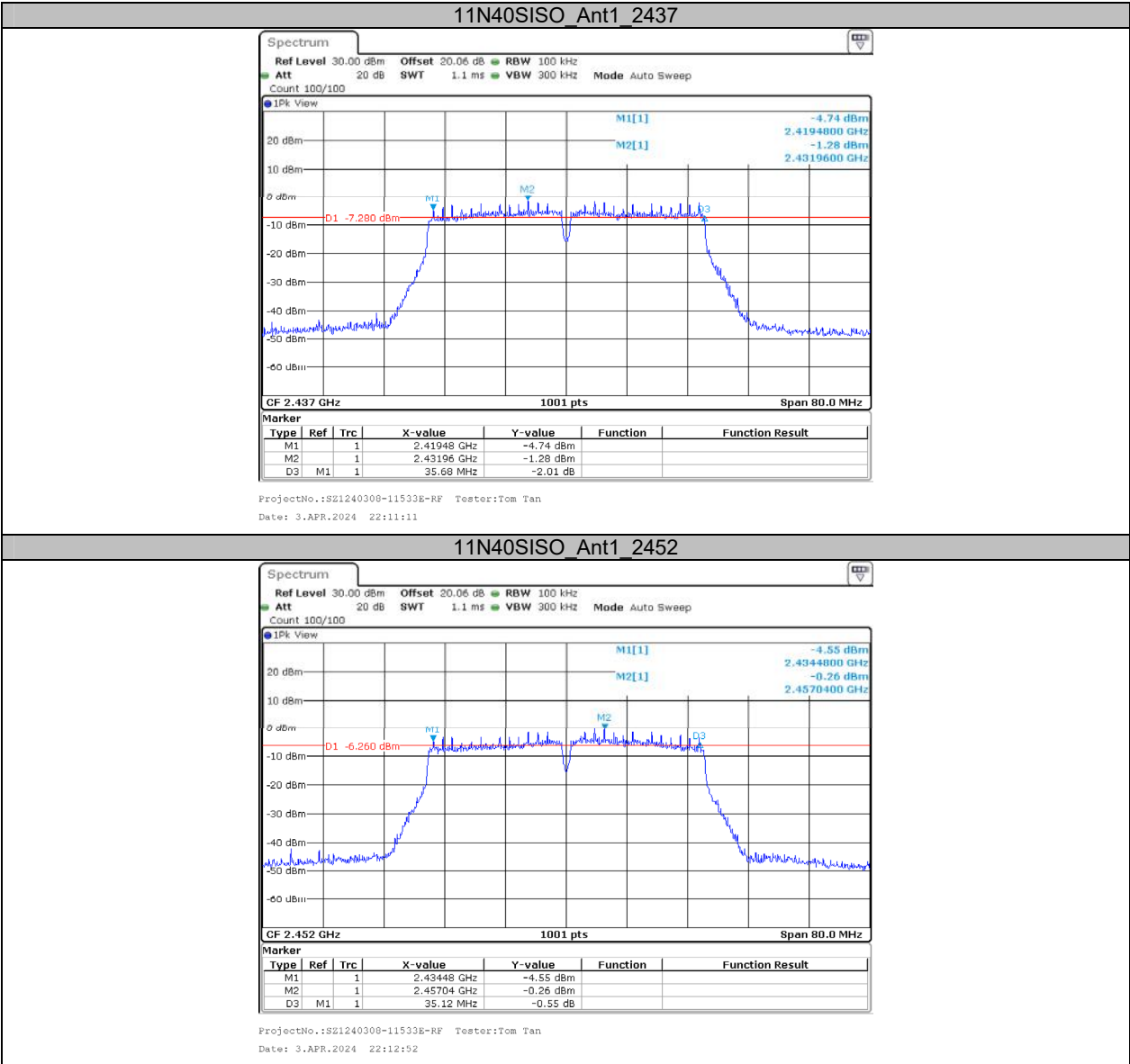








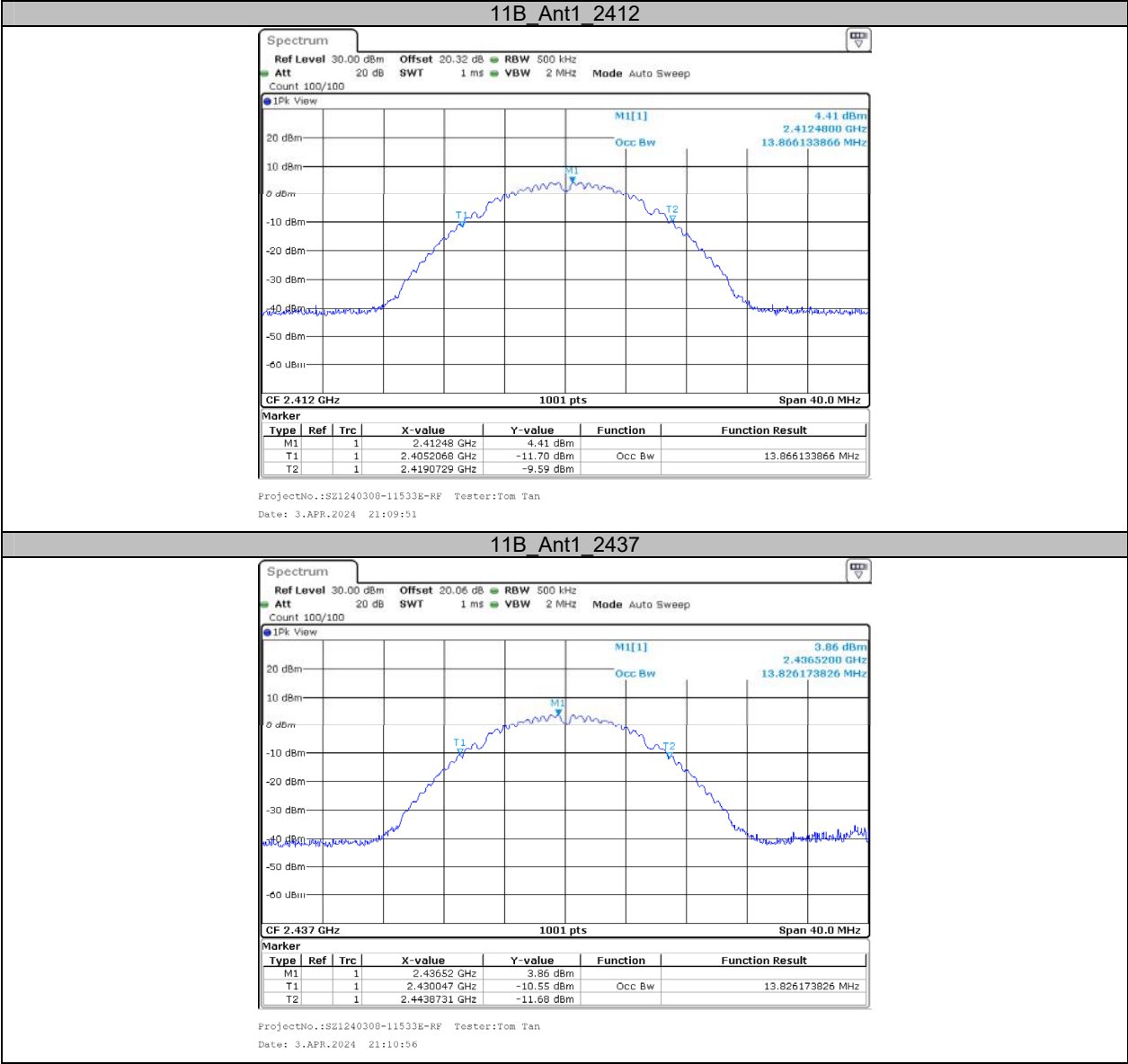


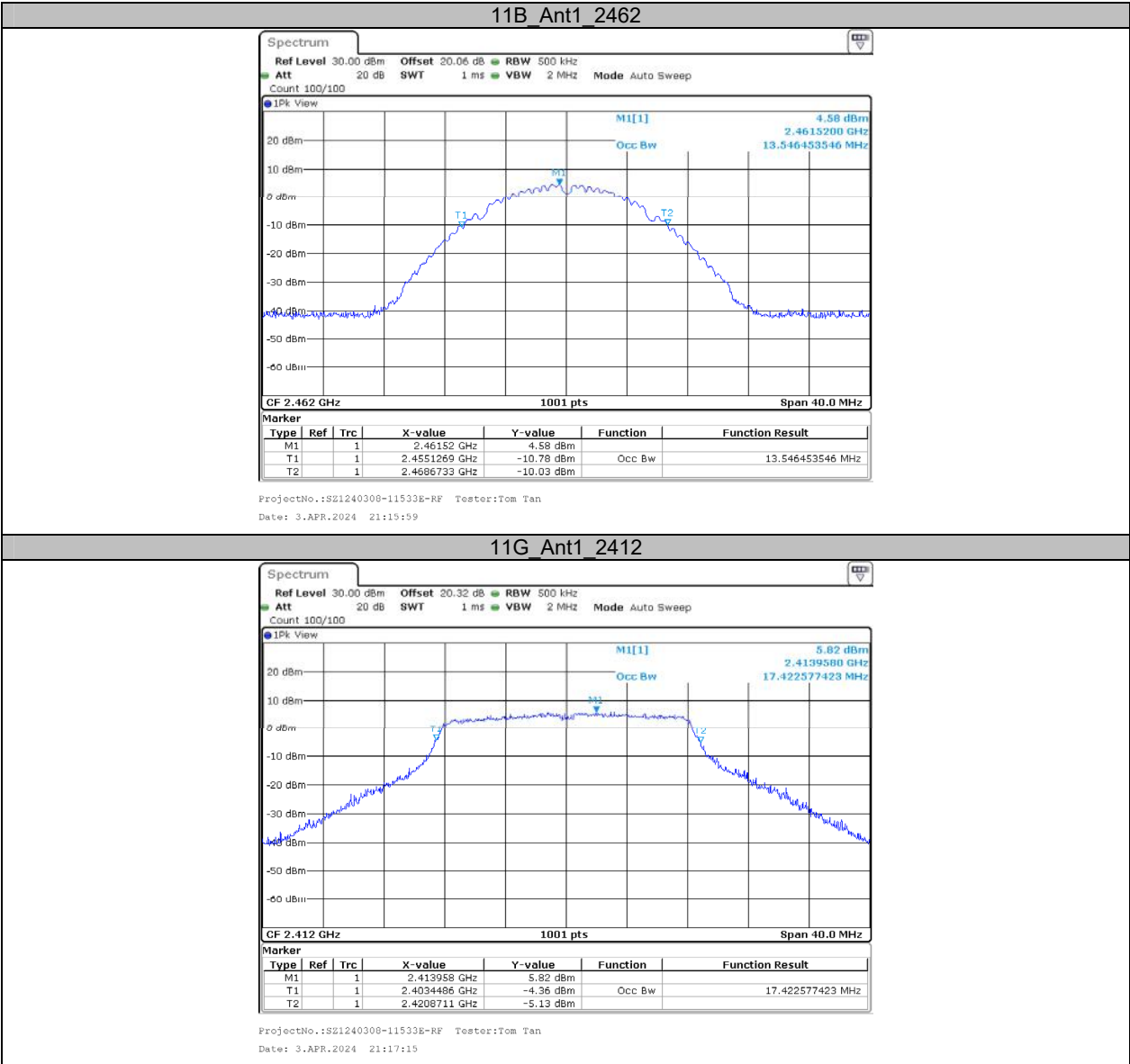


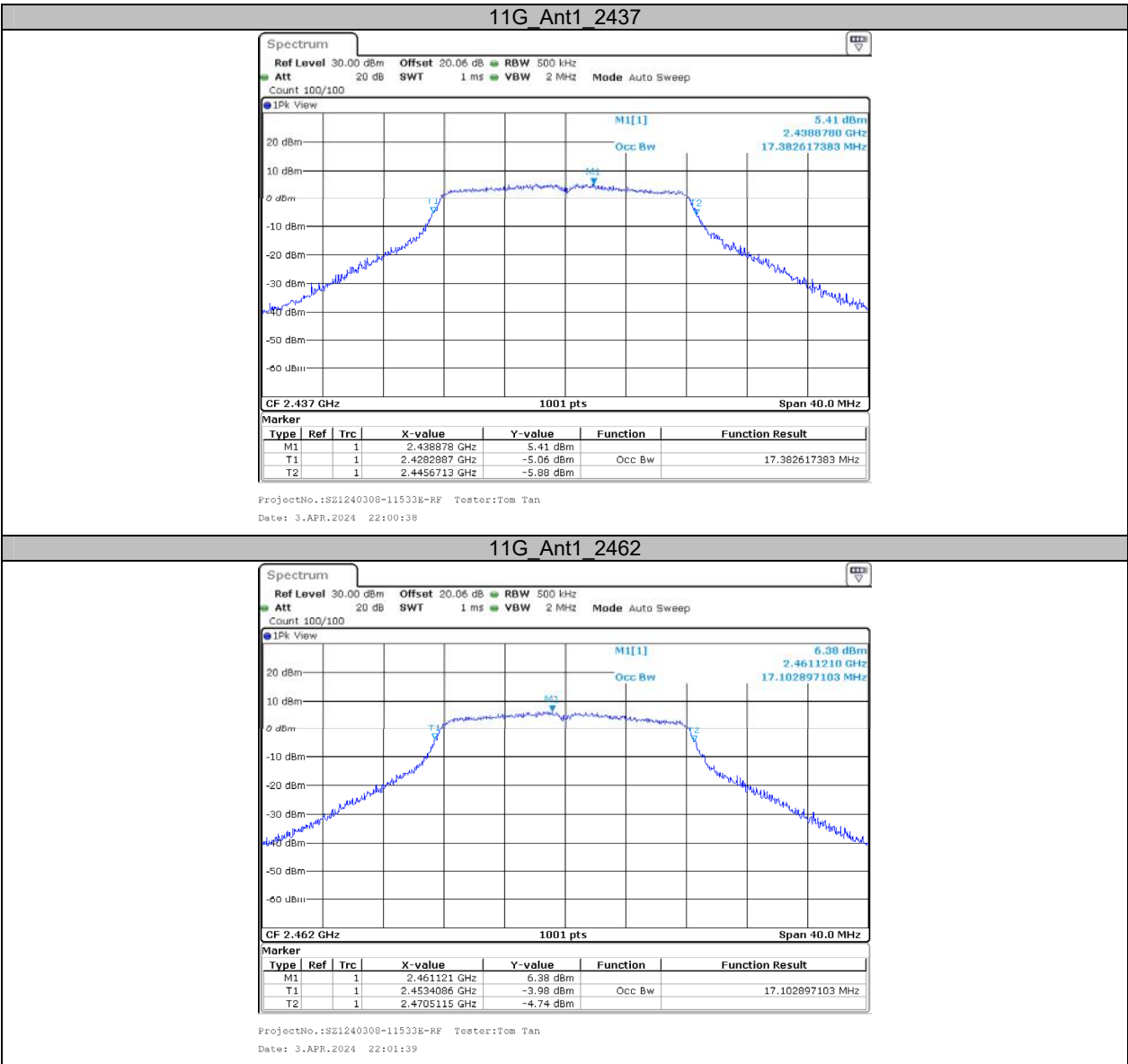
Appendix B: Occupied Channel Bandwidth**Test Result**

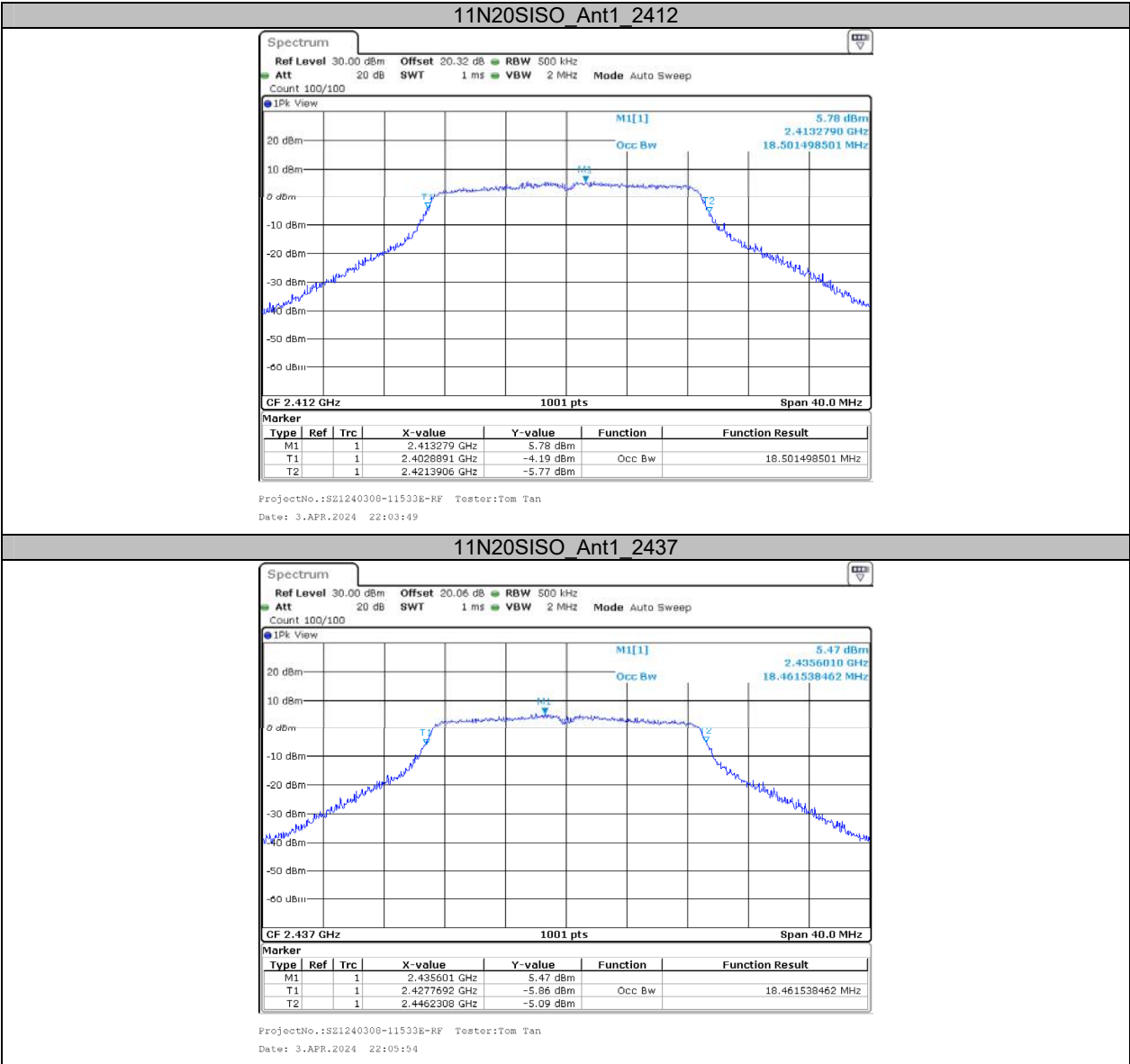
Test Mode	Antenna	Channel Frequency[MHz]	OCB [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.866	---	---
		2437	13.826	---	---
		2462	13.546	---	---
11G	Ant1	2412	17.423	---	---
		2437	17.383	---	---
		2462	17.103	---	---
11N20SISO	Ant1	2412	18.501	---	---
		2437	18.462	---	---
		2462	18.182	---	---
11N40SISO	Ant1	2422	36.444	---	---
		2437	36.603	---	---
		2452	36.364	---	---

Test Graphs

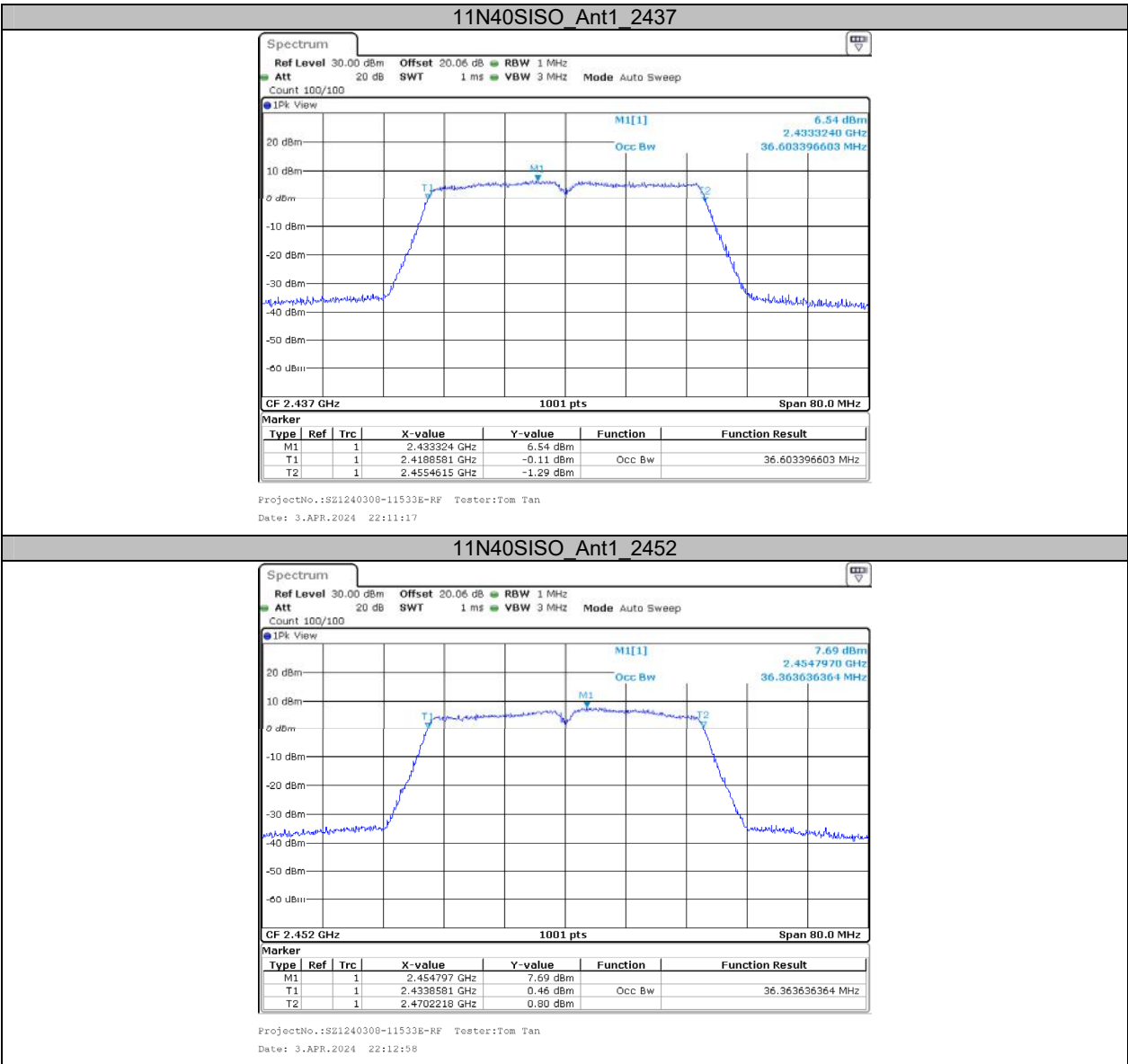












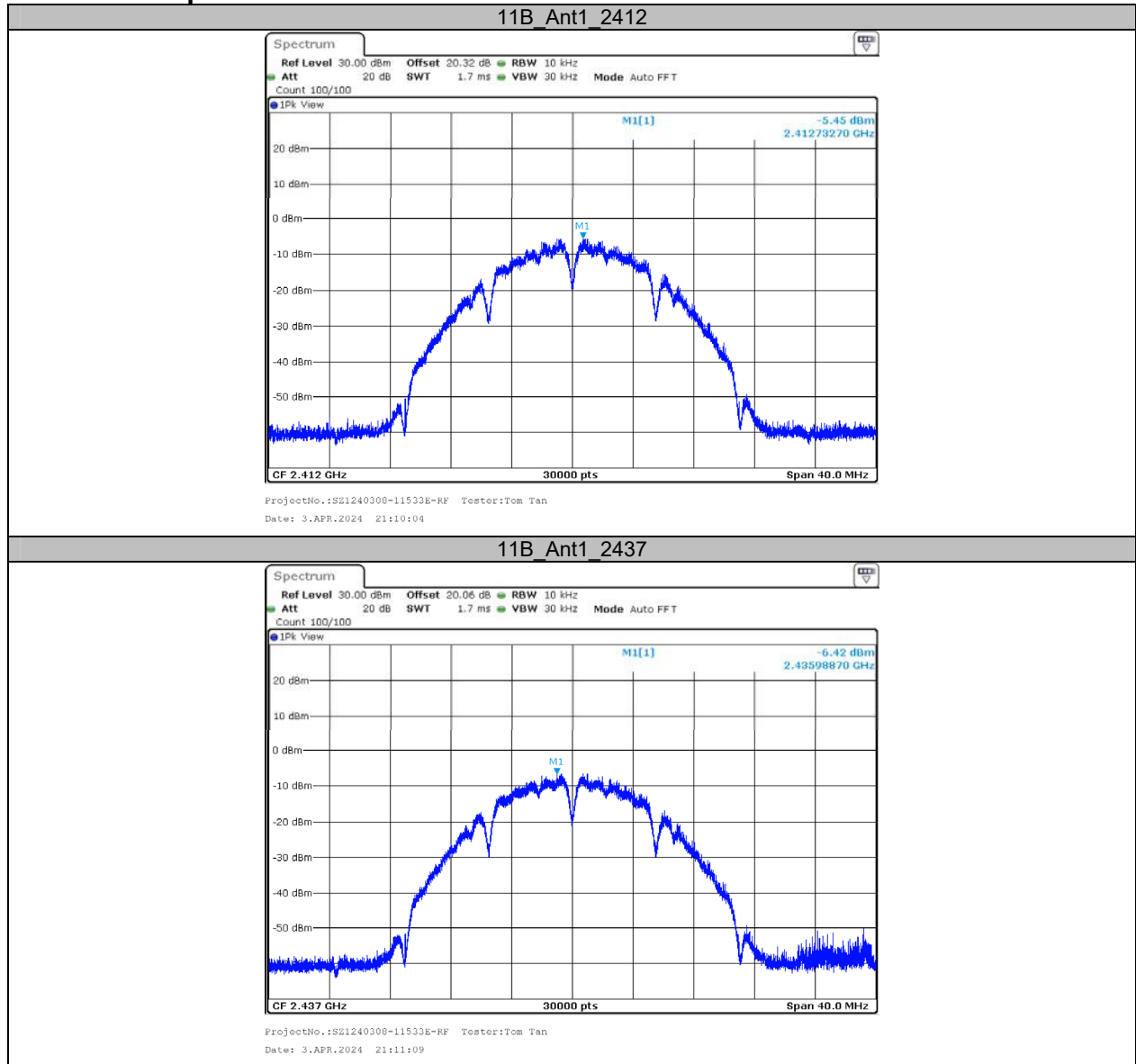
Appendix C: Maximum Conducted Output Power**Test Result**

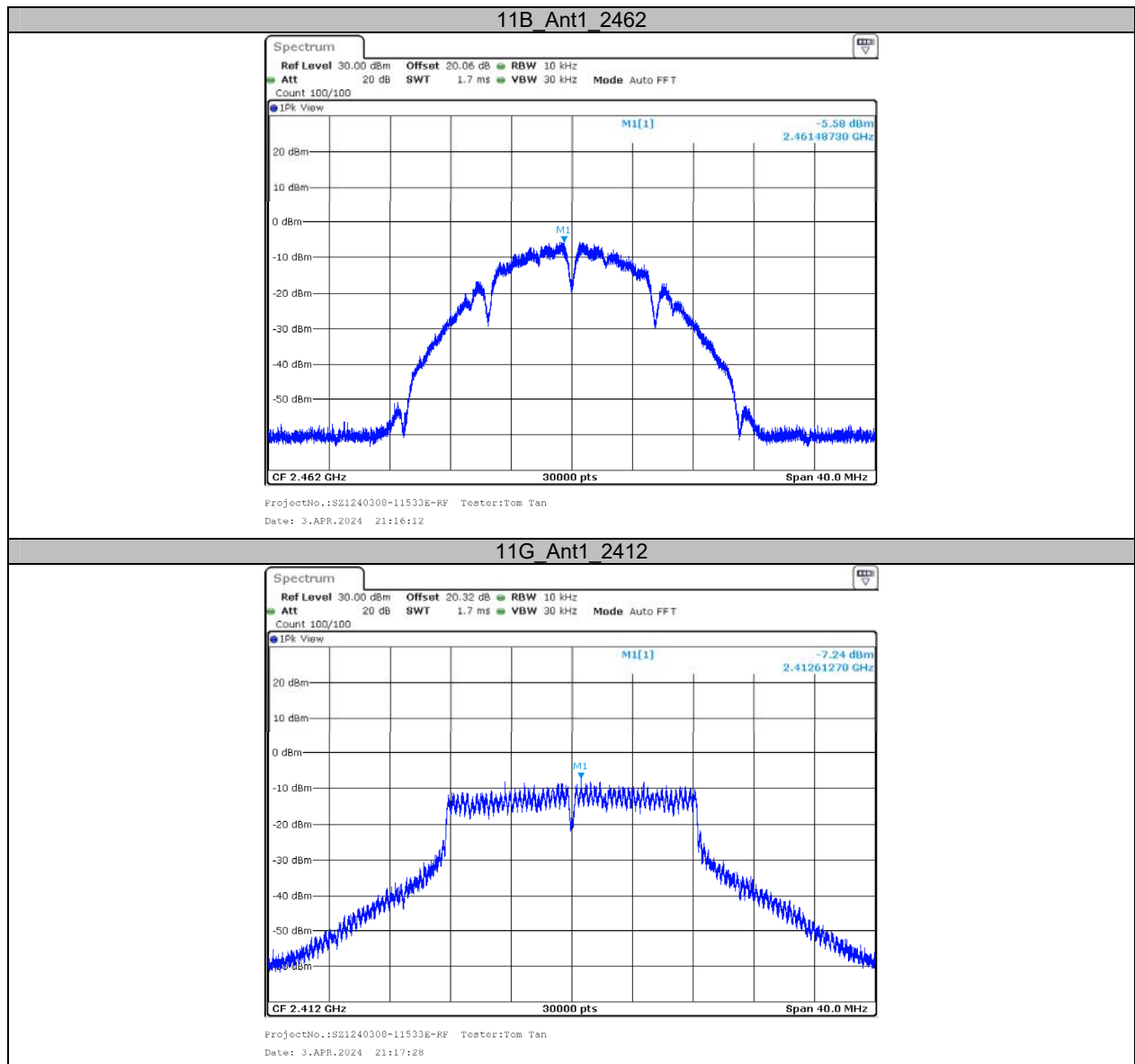
Test Mode	Antenna	Frequency [MHz]	Peak Power[dBm]	Conducted Limit[dBm]	Verdict
11B	Ant1	2412	14.66	≤30.00	PASS
		2437	14.09	≤30.00	PASS
		2462	14.82	≤30.00	PASS
11G	Ant1	2412	19.31	≤30.00	PASS
		2437	18.59	≤30.00	PASS
		2462	19.28	≤30.00	PASS
11N20SISO	Ant1	2412	19.11	≤30.00	PASS
		2437	18.62	≤30.00	PASS
		2462	18.89	≤30.00	PASS
11N40SISO	Ant1	2422	19.84	≤30.00	PASS
		2437	19.60	≤30.00	PASS
		2452	19.97	≤30.00	PASS

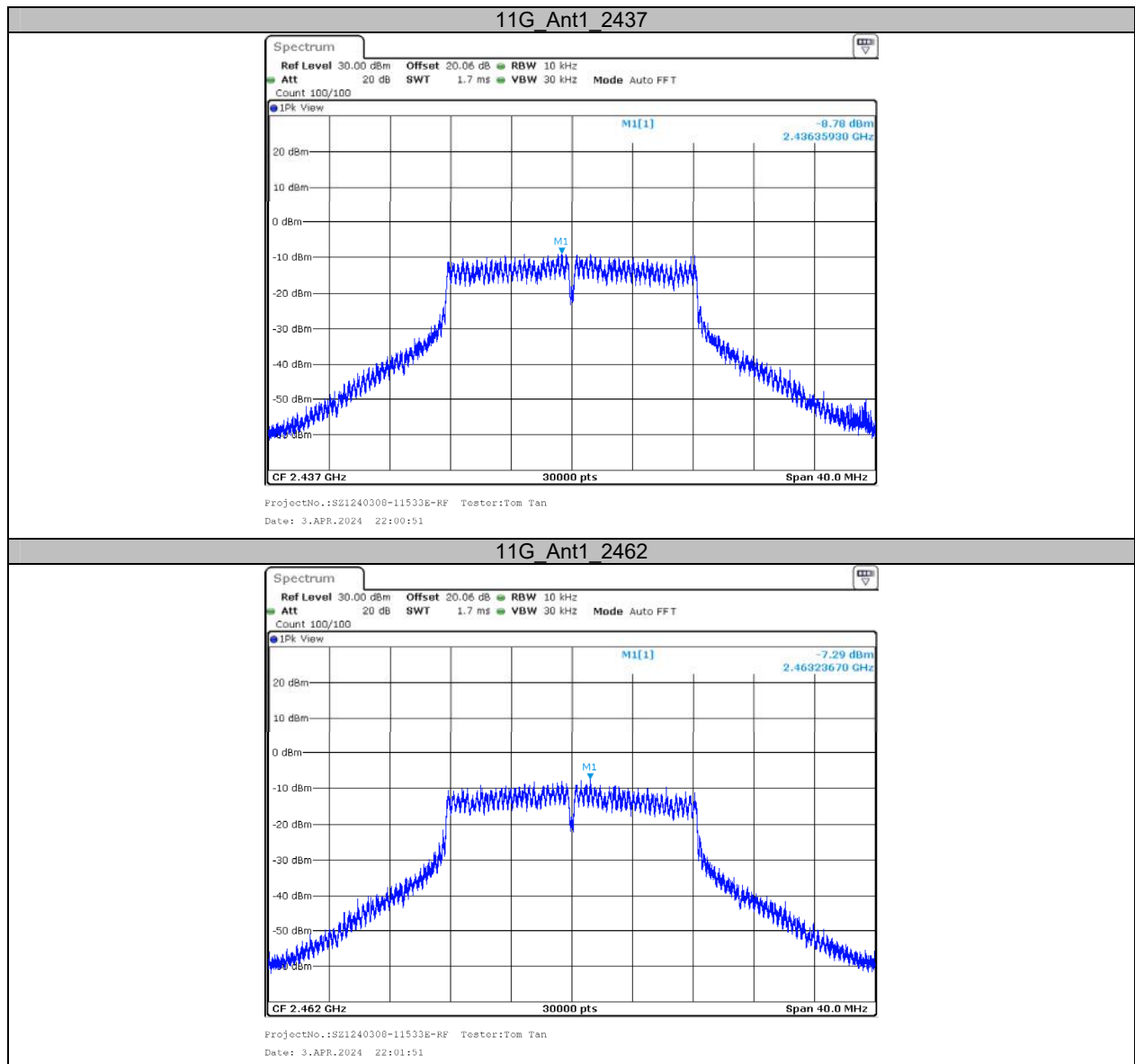
Appendix D: Maximum Power Spectral Density**Test Result**

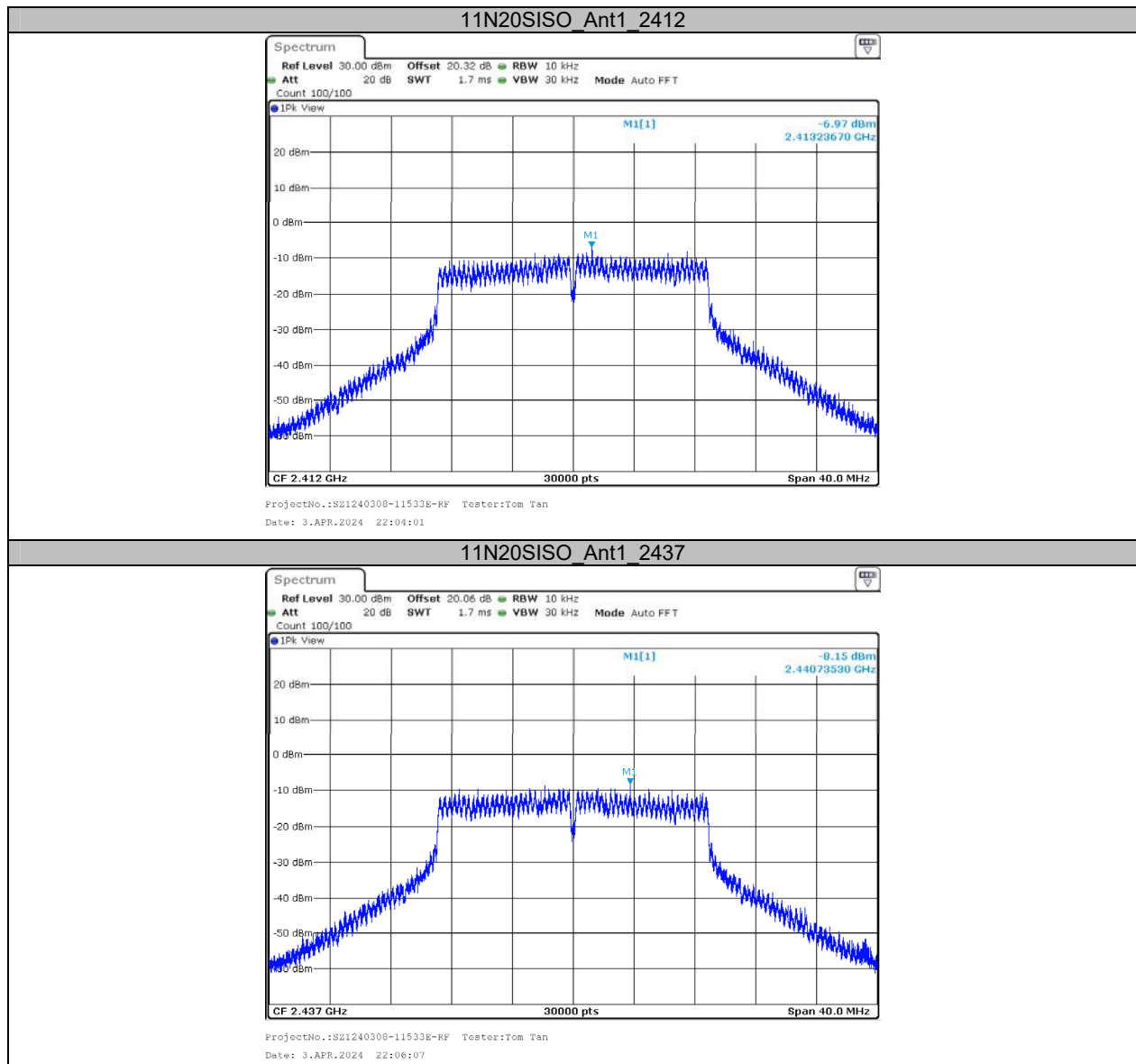
Test Mode	Antenna	Frequency[MHz]	Result[dBm/10kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-5.45	≤8.00	PASS
		2437	-6.42	≤8.00	PASS
		2462	-5.58	≤8.00	PASS
11G	Ant1	2412	-7.24	≤8.00	PASS
		2437	-8.78	≤8.00	PASS
		2462	-7.29	≤8.00	PASS
11N20SISO	Ant1	2412	-6.97	≤8.00	PASS
		2437	-8.15	≤8.00	PASS
		2462	-7.67	≤8.00	PASS
11N40SISO	Ant1	2422	-9.67	≤8.00	PASS
		2437	-10.32	≤8.00	PASS
		2452	-10.55	≤8.00	PASS

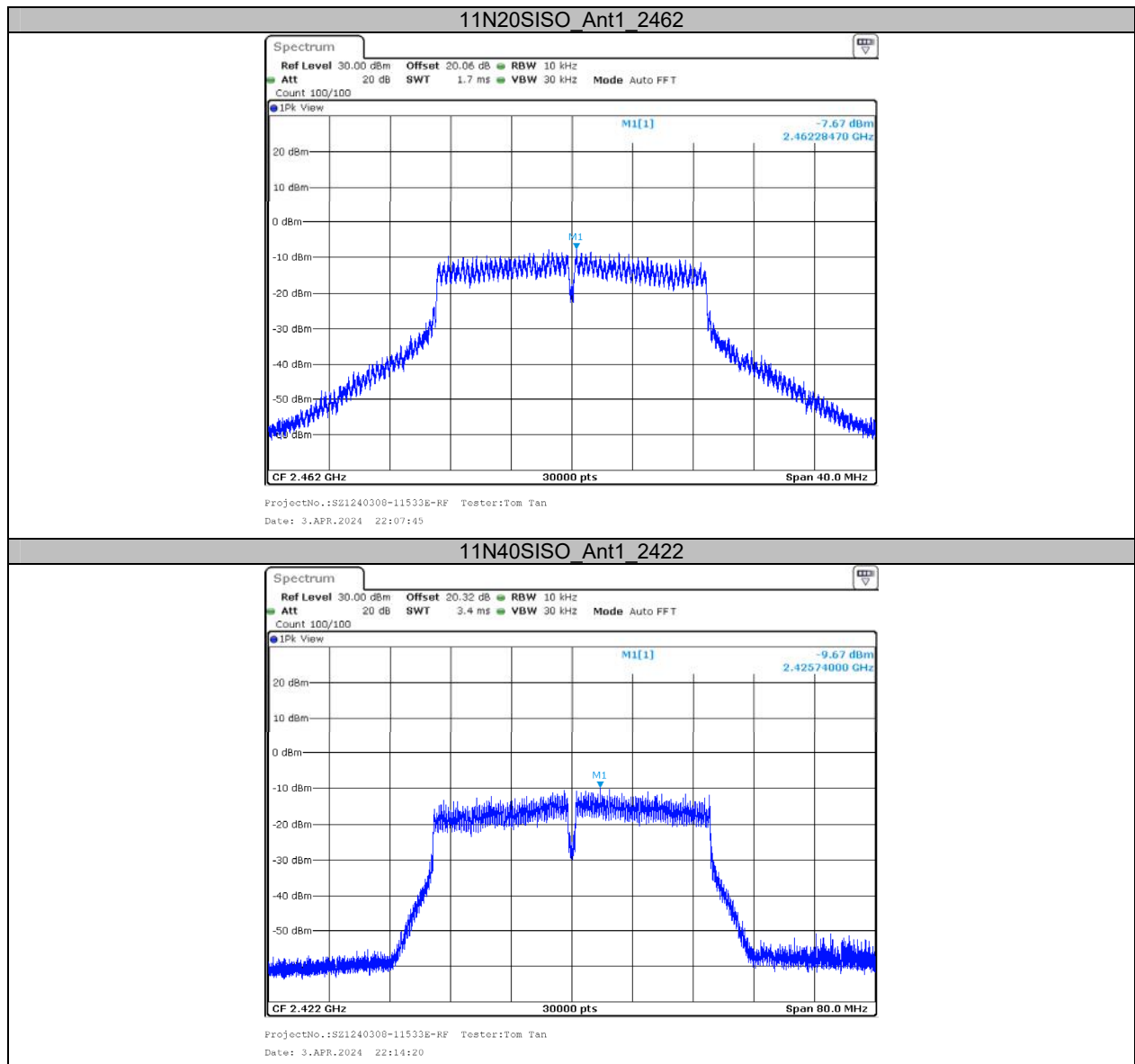
Test Graphs

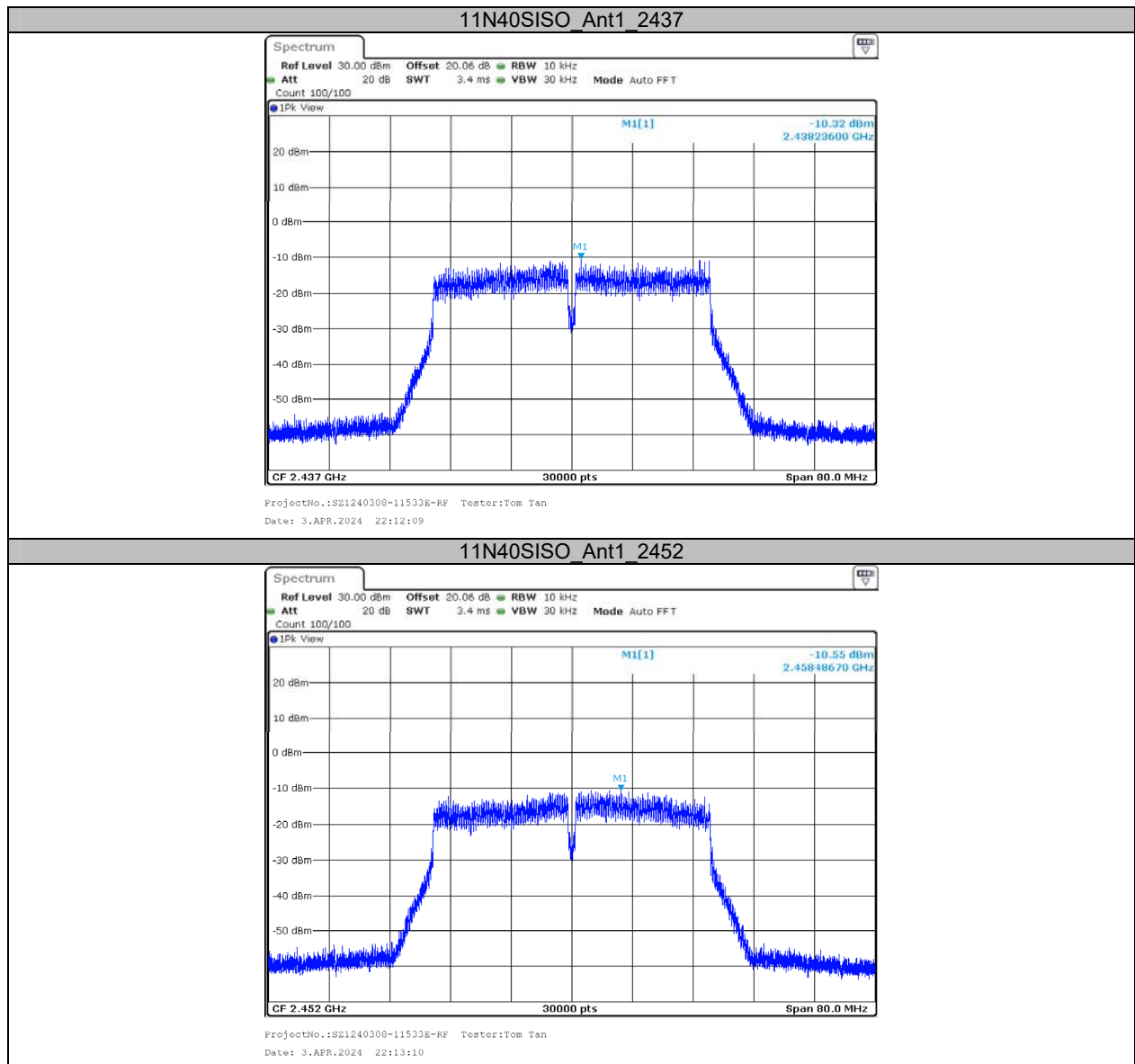






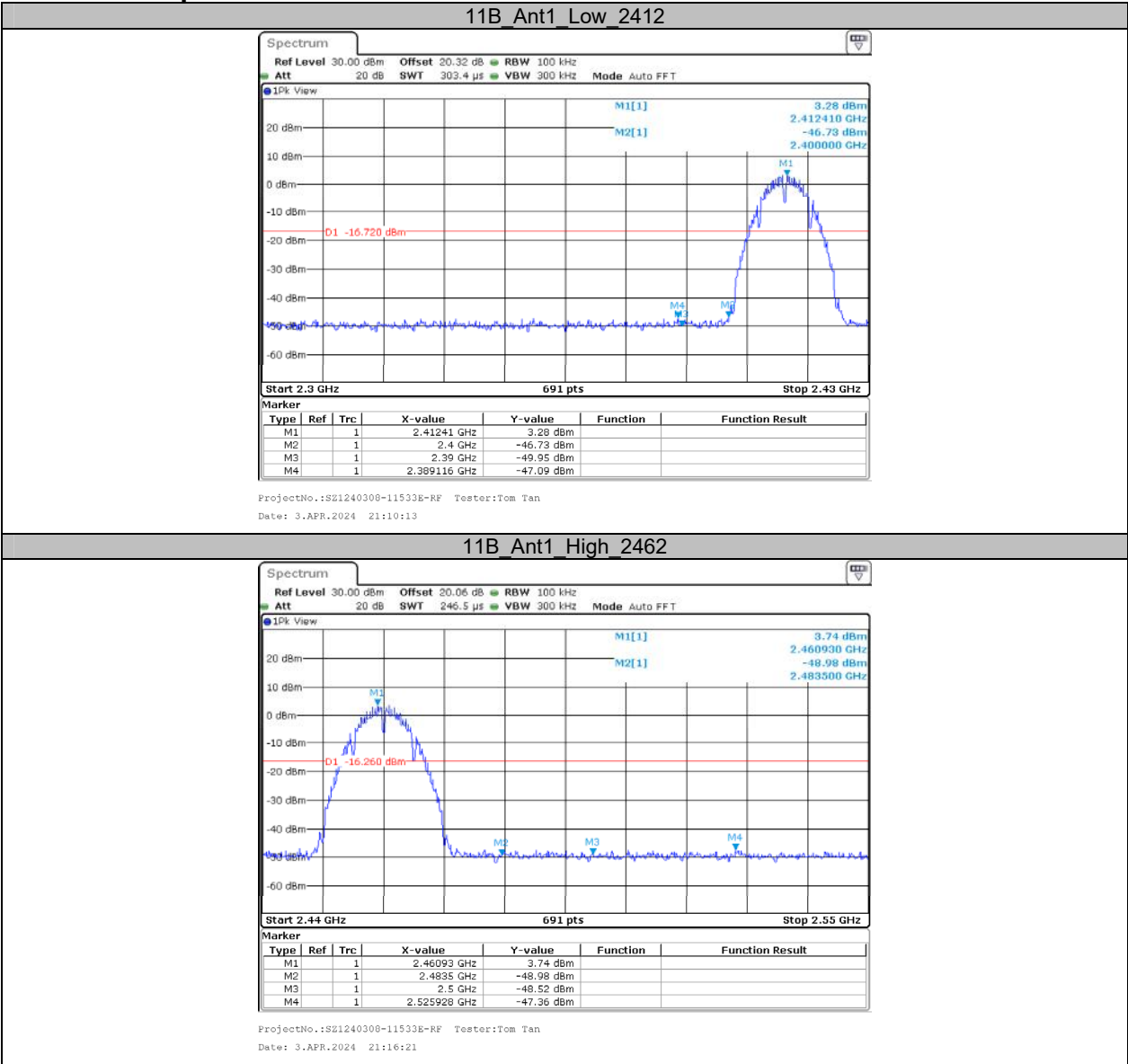


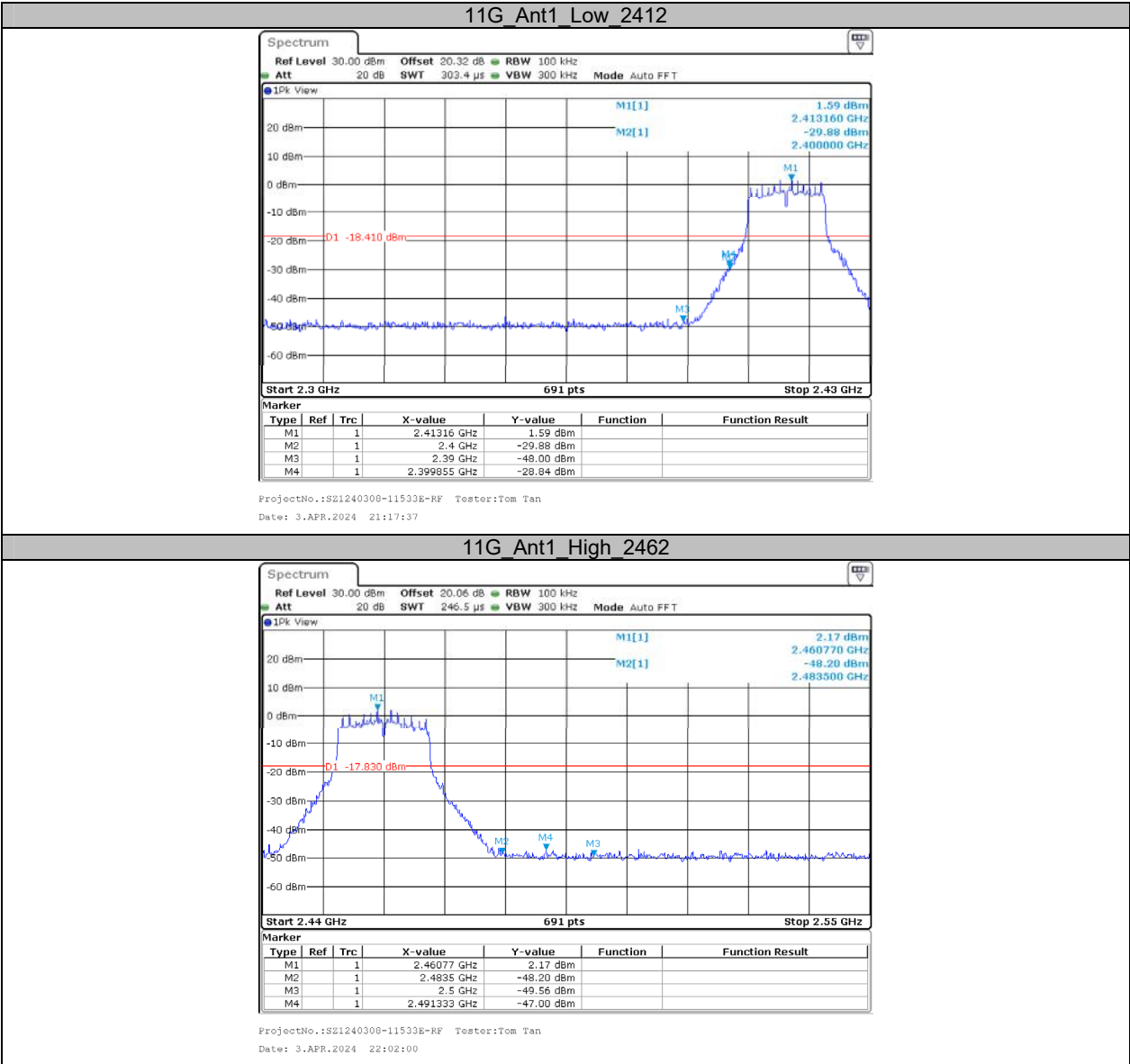


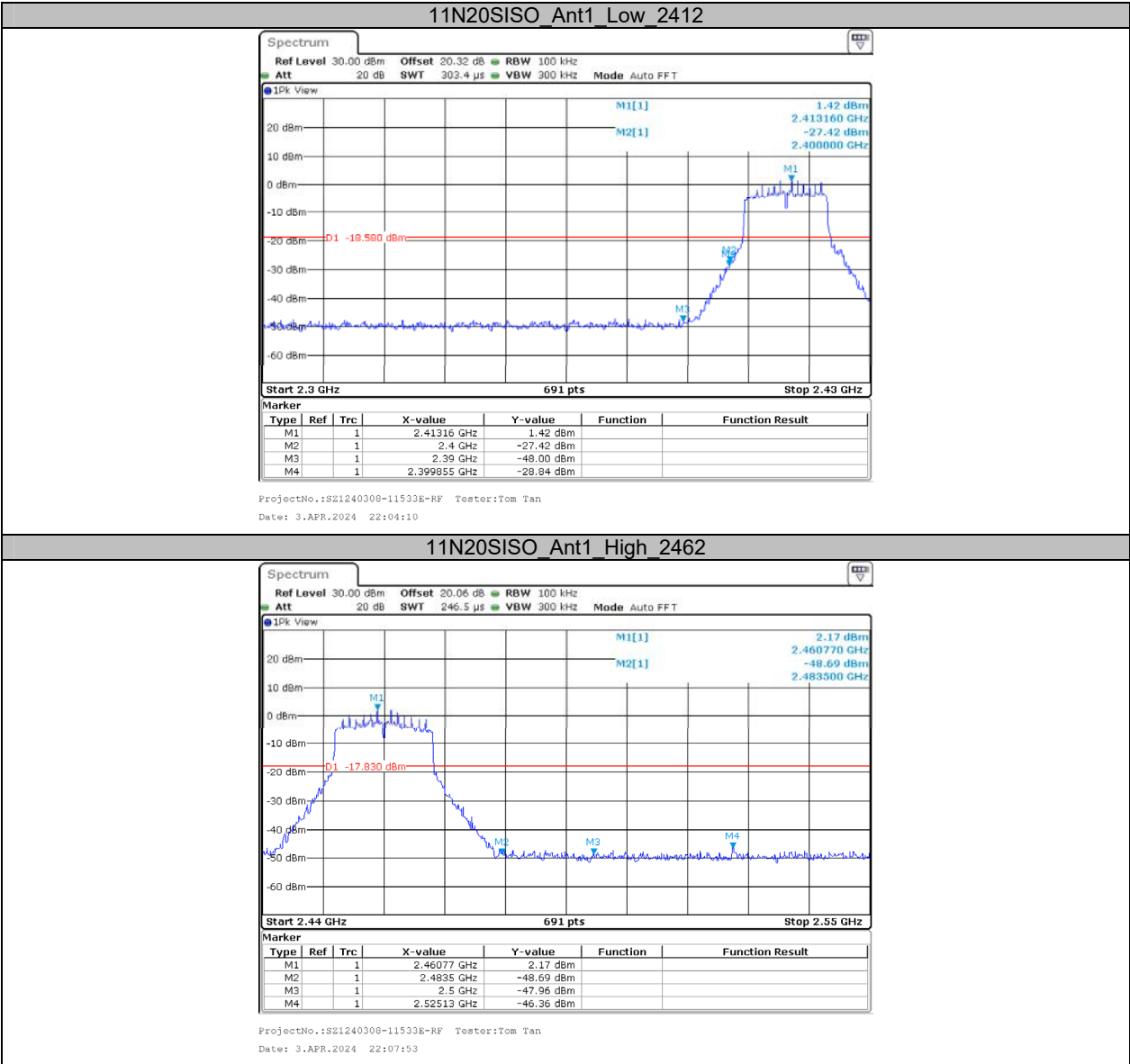


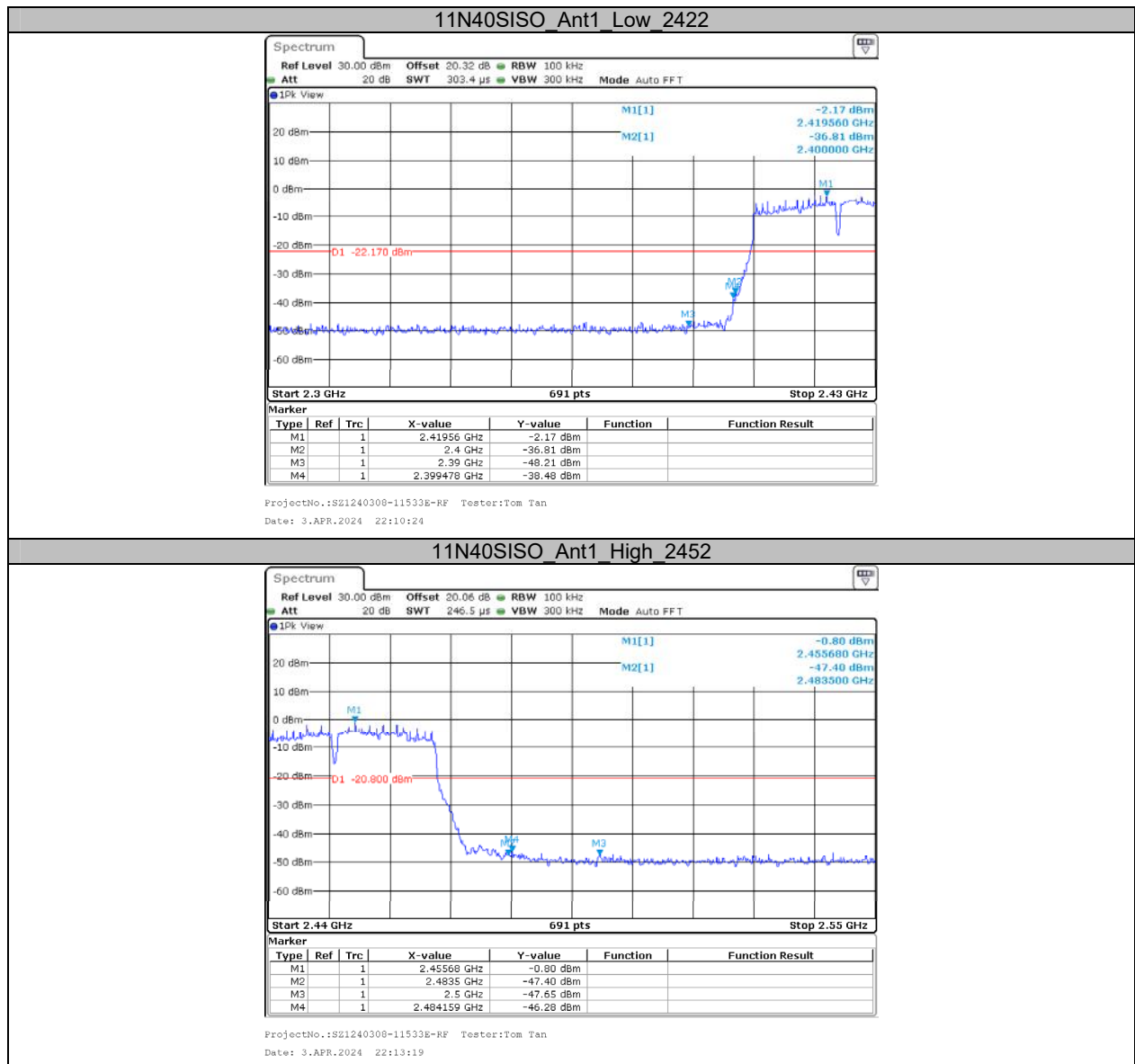
Appendix E: Band Edge Measurements

Test Graphs





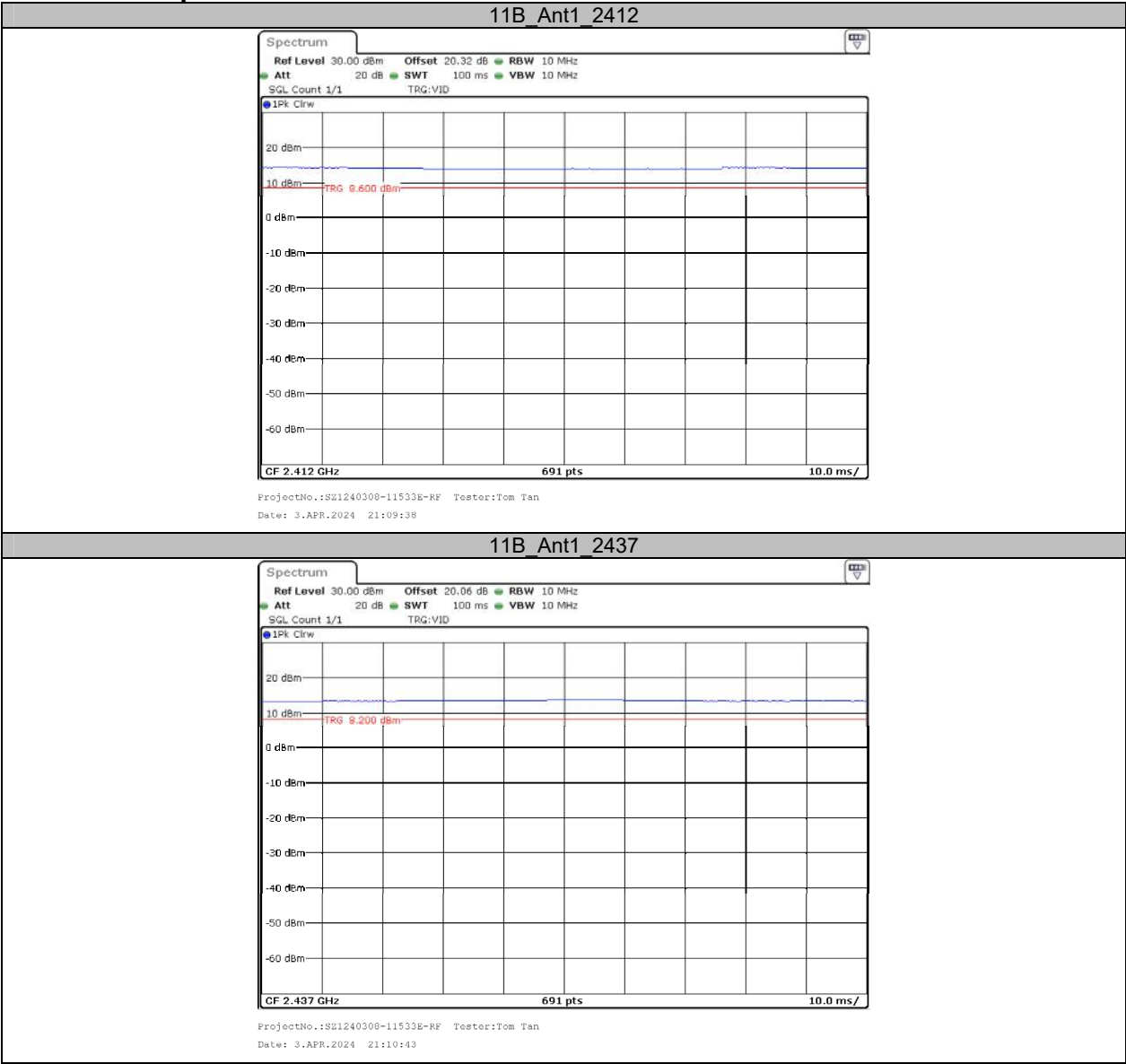


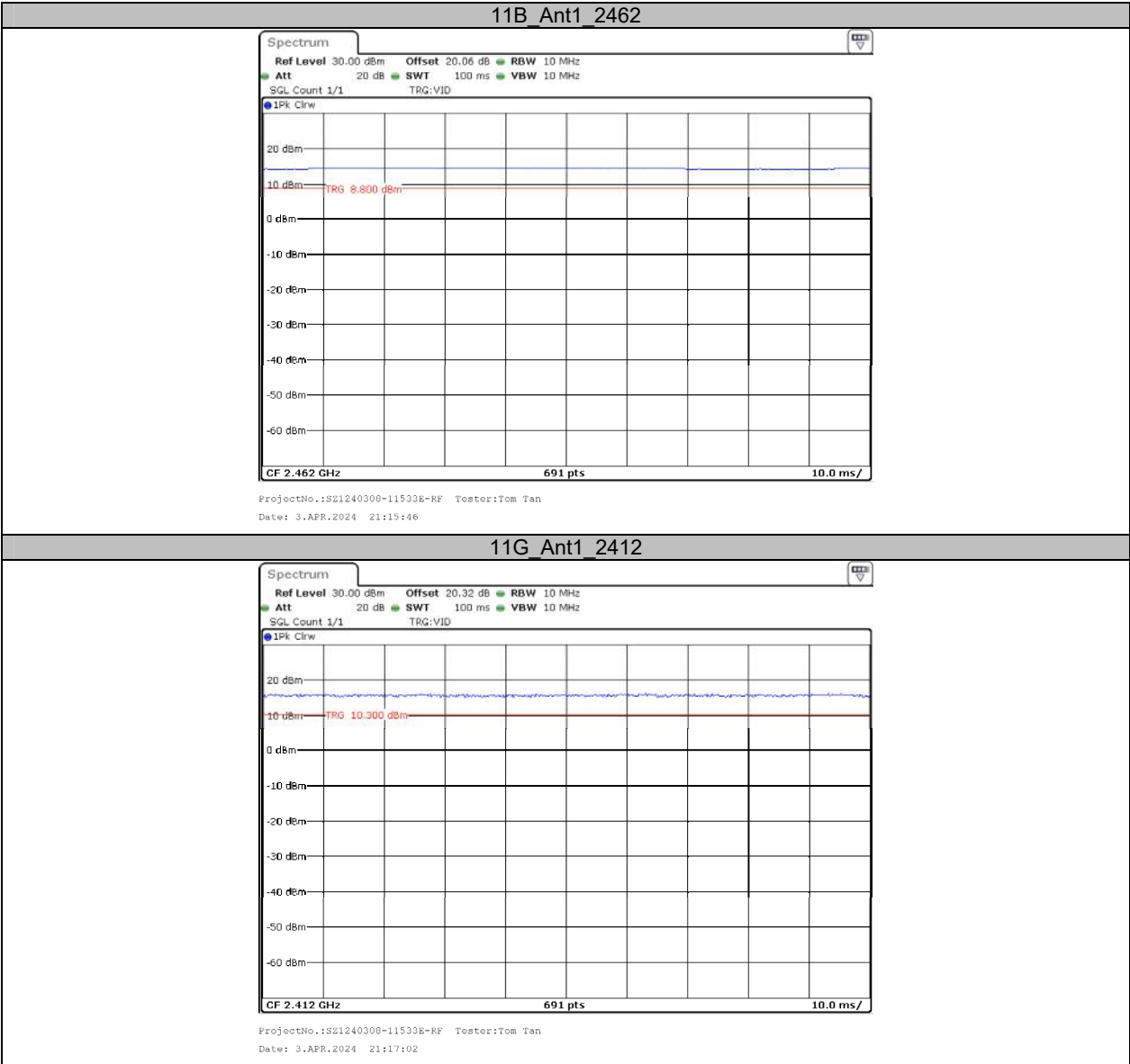


Appendix F: Duty Cycle**Test Result**

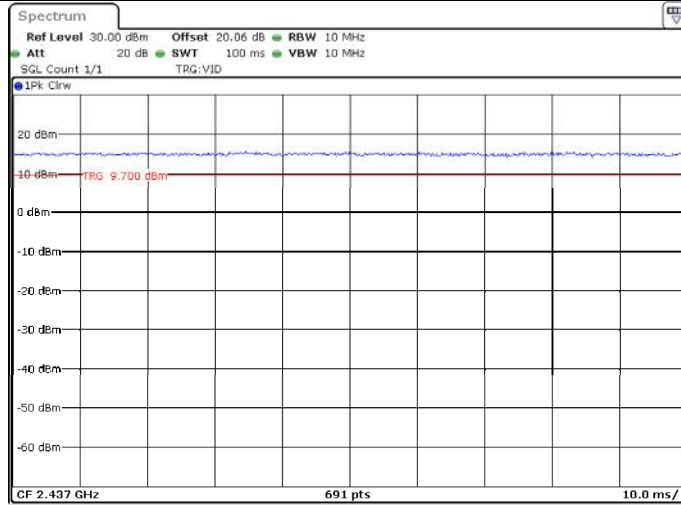
Test Mode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T [Hz]	VBW Setting [Hz]
11B	Ant1	2412	100.00	100.00	100.00	/	10
		2437	100.00	100.00	100.00	/	10
		2462	100.00	100.00	100.00	/	10
11G	Ant1	2412	100.00	100.00	100.00	/	10
		2437	100.00	100.00	100.00	/	10
		2462	100.00	100.00	100.00	/	10
11N20SISO	Ant1	2412	100.00	100.00	100.00	/	10
		2437	100.00	100.00	100.00	/	10
		2462	100.00	100.00	100.00	/	10
11N40SISO	Ant1	2422	100.00	100.00	100.00	/	10
		2437	100.00	100.00	100.00	/	10
		2452	100.00	100.00	100.00	/	10

Test Graphs





11G_Ant1_2437



ProjectNo.:SZ1240308-11533E-RF Tester:Tom Tan
 Date: 3.APR.2024 22:00:25

11G_Ant1_2462



ProjectNo.:SZ1240308-11533E-RF Tester:Tom Tan
 Date: 3.APR.2024 22:01:26

