



FCC PART 15.247 TEST REPORT

On Behalf of
Shenzhen Bingsen Technology Co., Ltd.

Shenzhen Shi Longhua Xinqu Longhua Jiedao Sanlian Lu Xinyuan B Dong 303 Shi

FCC ID: 2BTCG-ZK8

Model: ZK8

Dec. 02, 2025

This Report Concerns: ☒ Original Report	Equipment Type: Wifi Mini Camera
Test Engineer:	Fan Yang / <i>Fan Yang</i>
Report Number:	QCT25JR-0255E-02
Test Date:	Oct. 23~Dec. 02, 2025
Test Result:	Pass
Reviewed By:	Vincent Yang / <i>Vincent Yang</i>
Approved By:	Kendy Wang / <i>Kendy Wang</i>
Prepared By:	Shenzhen QC Testing Laboratory Co., Ltd. East of 1/F., Building E, Xinghong Science Park, No.111, Shuiku Road, Fenghuanggang, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China Tel: 0755-23008269 Fax: 0755-23726780





Table of Contents

1. GENERAL INFORMATION.....	5
1.1 Product Description for Equipment under Test (EUT)	5
1.2 System Test Configuration	6
1.3 Test Facility	7
1.4 Measurement Uncertainty	7
2. SUMMARY OF TEST RESULTS	8
3. LIST OF TEST AND MEASUREMENT INSTRUMENTS	9
3.1 Conducted Emission Test	9
3.2 Radiated Emission Test	9
3.3 RF Conducted test	10
4. ANTENNA REQUIREMENT.....	11
5. CONDUCTED EMISSIONS.....	12
5.1 Applicable Standard	12
5.2 Limit	12
5.3 Test setup.....	12
5.4 EMI Test Receiver Setup.....	12
5.5 Test procedure	12
5.6 Test Data	12
6. CONDUCTED PEAK OUTPUT POWER.....	15
6.1 Applicable Standard	15
6.2 Limit	15
6.3 Test setup.....	15
6.4 Test Procedure	15
6.5 Test Data	16
7. CHANNEL BANDWIDTH & 99% OCCUPIED BANDWIDTH	18
7.1 Applicable Standard	18
7.2 Limit	18
7.3 Test setup.....	18
7.4 Test Procedure	18
7.5 Test Data	18
8. POWER SPECTRAL DENSITY	32
8.1 Applicable Standard	32
8.2 Limit	32
8.3 Test setup.....	32
8.4 Test Procedure	32
8.5 Test Data	32



9. SPURIOUS EMISSION IN NON-RESTRICTED & RESTRICTED BANDS..... 40

9.1 Conducted Emission Method40

9.2 Radiated Emission Method65



Report Number

Description

Issued Date

QCT25JR-0255E-02

Initial Issue

2025-12-02



1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Description	Wifi Mini Camera
Model No.	ZK8, ZH8, ZM8, KU8, KM8, KY8, KX8, HM8, HX8, MZ8
Model Difference:	PCB board, structure and internal of these model(s) are the same, Just different model names
Tested Model	ZK8
Sample(s) Status	Engineer sample
Operation Frequency:	802.11b/802.11g/802.11n(HT20): 2412MHz~2462MHz /802.11n(HT40): 2412MHz~2452MHz
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11 802.11n(HT40): 9
Channel separation:	5MHz
Modulation type:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(HT20)/802.11n(HT40): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Patch antenna
Antenna gain*1:	3.85 dBi
Power supply:	Input: DC 5V
Trade Mark:	/
Applicant:	Shenzhen Bingsen Technology Co., Ltd.
Address:	Shenzhen Shi Longhua Xinqu Longhua Jiedao Sanlian Lu Xinyuan B Dong 303 Shi
Manufacturer:	Shenzhen Bingsen Technology Co., Ltd.
Address:	Shenzhen Shi Longhua Xinqu Longhua Jiedao Sanlian Lu Xinyuan B Dong 303 Shi
Sample No.:	Y25A0255E01WC

Note: *1This information provided by Manufacturer, SZ QC Lab is not responsible for the accuracy of this information.

1.2 System Test Configuration

1.2.1 Channel List

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)	
	802.11b/802.11g/802.11n(HT20)	
Lowest channel	2412MHz	
Middle channel	2437MHz	
Highest channel	2462MHz	
Test channel	Frequency (MHz)	
	802.11n(HT40)	
Lowest channel	2422MHz	
Middle channel	2437MHz	
Highest channel	2452MHz	

1.2.2 EUT Exercise Software

"adb" exercise software was made to the EUT tested, The power level is 60. The software and power level was provided by the applicant.

1.2.3 Support Equipment

Manufacturer	Description	Model	Serial Number
MI	Adapter	MDY-11-EF	/

1.2.4 Test mode and test voltage

Transmitting mode: Keep the EUT in continuously transmitting.

Test voltage: DC 5V (Powered by adapter)



1.3 Test Facility

Test Firm : Shenzhen QC Testing Laboratory Co., Ltd.

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS – Registration No.: L8464

The EMC Laboratory has been accredited by CNAS, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

A2LA Certificate Number: 6759.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 561109

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 29628

CAB identifier: CN0141

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.4 Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 1.42 \times 10^{-4}\%$
RF output power, conducted	$\pm 1.06\text{dB}$
Power Spectral Density, conducted	$\pm 1.06\text{dB}$
Unwanted Emissions, conducted	$\pm 2.51\text{dB}$
AC Power Line Conducted Emission	$\pm 1.80\text{dB}$
Radiated Spurious Emission test (9kHz-30MHz)	$\pm 2.66\text{dB}$
Radiated Spurious Emission test (30MHz-1000MHz)	$\pm 4.04\text{dB}$
Radiated Spurious Emission test (1000MHz-18000MHz)	$\pm 4.70\text{ dB}$
Radiated Spurious Emission test (18GHz-40GHz)	$\pm 4.80\text{dB}$
Temperature	$\pm 0.8^{\circ}\text{C}$
Humidity	$\pm 3.2\%$
DC and low frequency voltages	$\pm 0.1\%$
Time	$\pm 5\%$
Duty cycle	$\pm 5\%$

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



2. Summary of Test Results

Test Item	Section	Result
Antenna Requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% Occupied Bandwidth	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emissions	FCC part 15.205/15.209	Pass

- Note:
1. Pass: The EUT complies with the essential requirements in the standard.
 2. Test according to ANSI C63.10:2020
 - 3.. All indications of Pass/Fail in this report are opinions expressed by Shenzhen QC Testing Laboratory Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



3. List of Test and Measurement Instruments

3.1 Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	Rohde&Schwarz	ESIB 7	2277573376	2025.03.17	2026.03.16
2	EMI Test Receiver	Rohde&Schwarz	ESCI3	101820	2025.08.05	2026.08.04
3	Artificial Mains Network	SCHWARZBECK	NSLK8126	8126200	2025.08.05	2026.08.04
4	PULSE LIMITER	Rohde&Schwarz	ESH3-Z2	100058	2025.03.18	2026.03.17

Conducted Emission Measurement Software: TS+ JS32-CE Ver 5.0.0

3.2 Radiated Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	EMI Test Receiver	Rohde&Schwarz	ESIB 7	2277573376	2025.03.17	2026.03.16
2.	EMI Test Receiver	Rohde&Schwarz	ESPI	101131	2025.03.17	2026.03.16
3.	Spectrum Analyzer	Rohde&Schwarz	FSV 40	101458	2025.03.18	2026.03.17
4.	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9168	VULB9168-588	2025.03.22	2026.03.21
5.	Loop Antenna	EMCO	6502	2133	2025.03.19	2026.03.18
6.	horn antenna	SCHWARZBECK	BBHA9120D	2069	2024.08.10	2026.08.09
7.	Horn Antenna	COM-MW	ZLB7-18-40G-950	12221225	2024.08.10	2026.08.09
8.	Pre-amplifier	MITEQ	TTA0001-18	2063645	2025.03.17	2026.03.16
9.	Pre-amplifier	COM-MW	DLAN-18000-40000-02	10229104	2025.03.17	2026.03.16
10.	966 Camber	ZhongYU	9*6*6	/	2025.05.08	2026.05.07
11	Bandstop filter	Kangmaiwei	ZBSF6-C2400-2483.5	11210688	2025.03.13	2026.03.14
12	High frequency cable	TIMES Microwave Ststems	SFT205-NMRA NM 18G	20202030-001	/	/
13	Low frequency cable	TIMES Microwave Ststems	SFT205PUR-N MRANM	558700-0001	/	/

Radiated Emission Measurement Software: EZ_EMC Ver QCT03A2 RE+



3.3 RF Conducted test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Wideband Radio Communication Tester	Rohde & Schwarz	CW500	151583	2025.03.13	2026.03.14
2.	MXA Signal Analyzer	Keysight	N9020A	MY51281805	2025.03.13	2026.03.14
3.	Signal Generator	Agilent	N5182A	MY50141563	2025.03.13	2026.03.14
4.	RF Automatic Test System	MW	MW100-RFCB/ MW100-PSB	MW2007004	2025.03.13	2026.03.14
RF Conducted Measurement Software: MTS 8310 Ver 2.0.0.0						



4. Antenna requirement

Standard requirement: FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

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, 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.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

EUT Antenna: The Antenna is Patch Antenna, the best case gain of the antenna is 3.85dBi, reference to the Internal photo for details.

5. Conducted Emissions

5.1 Applicable Standard

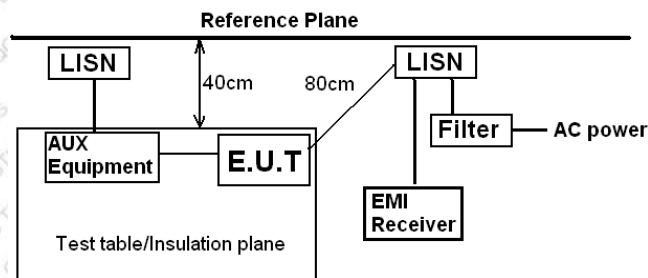
FCC Part15 C Section 15.207

5.2 Limit

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

Note *: The level decreases linearly with the logarithm of the frequency.

5.3 Test setup



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height=0.8m

5.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.
RBW=9 kHz, VBW=30 kHz, Sweep time=auto

5.5 Test procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

5.6 Test Data

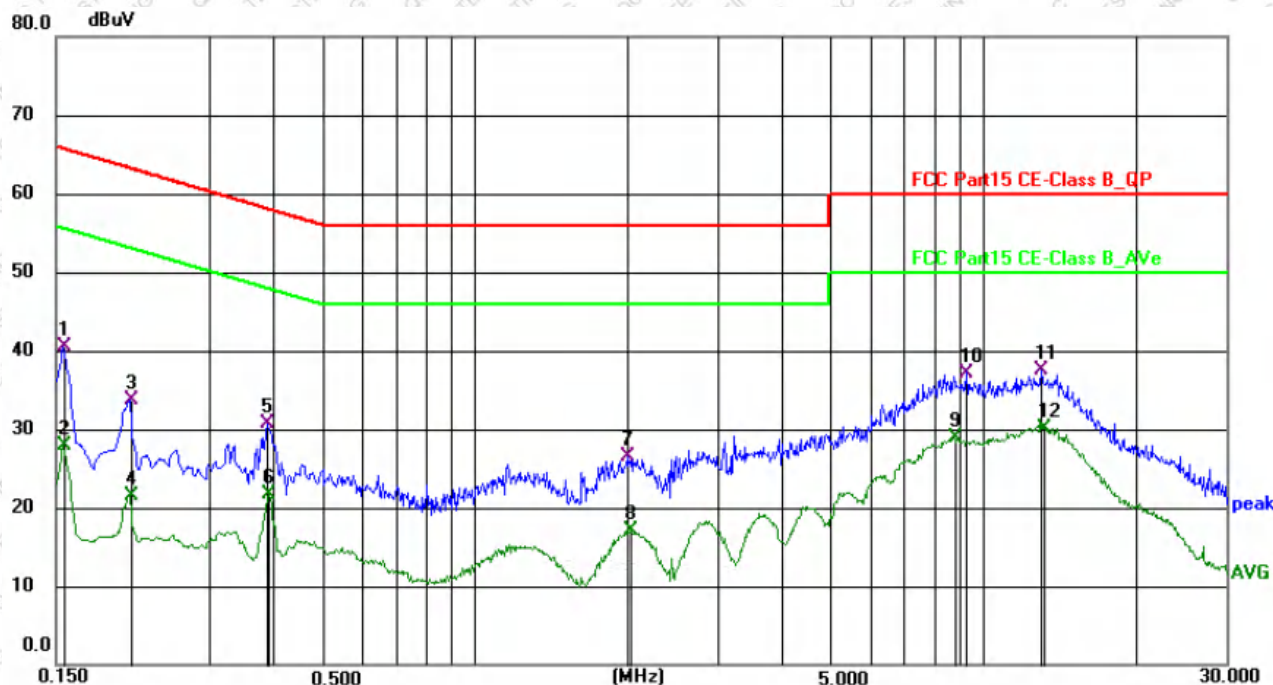
Temperature	26 °C	Humidity	54%
ATM Pressure	101.1kPa	Antenna Gain	3.85dBi
Test by	Fan Yang	Test result	PASS



Measurement data:

Pre-scan all test modes, found worst case at 11b 2412MHz, and so only show the test result of 11b 2412MHz

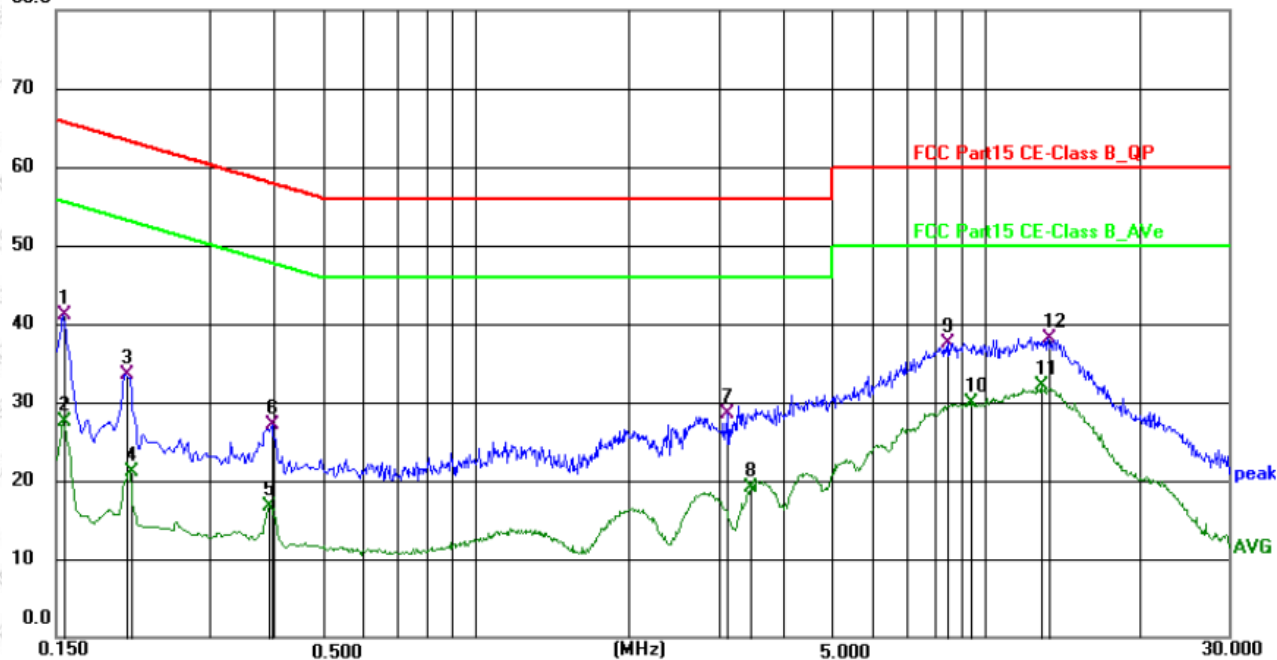
Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1545	29.89	10.58	40.47	65.75	-25.28	QP
2	0.1545	17.26	10.58	27.84	55.75	-27.91	AVG
3	0.2085	23.08	10.55	33.63	63.26	-29.63	QP
4	0.2085	10.98	10.55	21.53	53.26	-31.73	AVG
5	0.3885	20.02	10.61	30.63	58.10	-27.47	QP
6	0.3930	11.05	10.61	21.66	48.00	-26.34	AVG
7	1.9950	15.87	10.69	26.56	56.00	-29.44	QP
8	2.0264	6.38	10.69	17.07	46.00	-28.93	AVG
9	8.7755	18.05	10.79	28.84	50.00	-21.16	AVG
10	9.2795	26.39	10.81	37.20	60.00	-22.80	QP
11	13.0060	26.53	10.90	37.43	60.00	-22.57	QP
12 *	13.1860	19.28	10.90	30.18	50.00	-19.82	AVG

Neutral:

80.0 dBuV



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1545	30.55	10.58	41.13	65.75	-24.62	QP
2	0.1545	17.01	10.58	27.59	55.75	-28.16	AVG
3	0.2040	22.92	10.55	33.47	63.45	-29.98	QP
4	0.2085	10.56	10.55	21.11	53.26	-32.15	AVG
5	0.3930	6.09	10.61	16.70	48.00	-31.30	AVG
6	0.3975	16.44	10.61	27.05	57.91	-30.86	QP
7	3.1290	17.73	10.82	28.55	56.00	-27.45	QP
8	3.4710	8.28	10.82	19.10	46.00	-26.90	AVG
9	8.4920	26.68	10.87	37.55	60.00	-22.45	QP
10	9.3695	19.07	10.91	29.98	50.00	-20.02	AVG
11 *	12.8575	21.10	11.00	32.10	50.00	-17.90	AVG
12	13.2760	27.05	11.01	38.06	60.00	-21.94	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

6. Conducted Peak Output Power

6.1 Applicable Standard

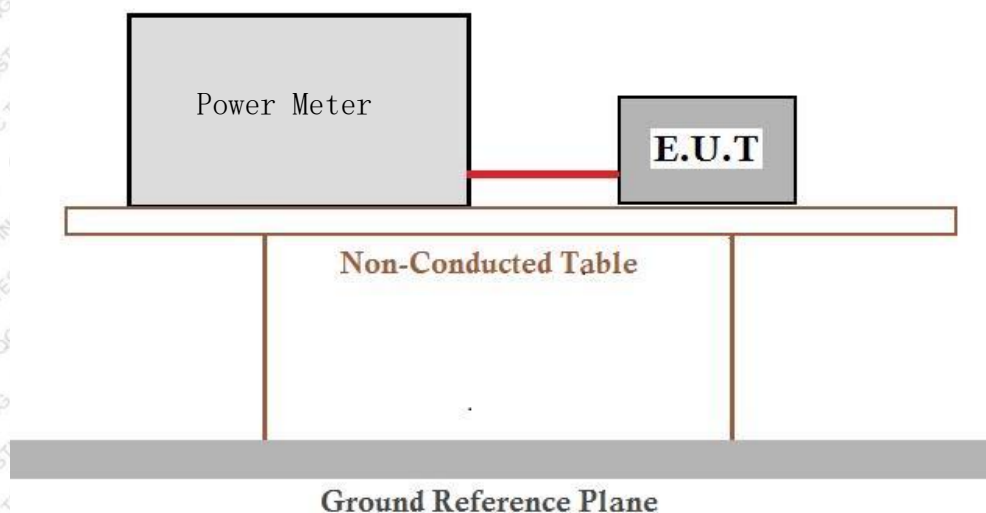
FCC Part15 C Section 15.247 (b)(3)

6.2 Limit

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.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling 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 transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

6.3 Test setup



6.4 Test Procedure

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.



6.5 Test Data

Temperature	23.8 °C	Humidity	52%
ATM Pressure	101.1kPa	Antenna Gain	3.85dBi
Test by	Fan Yang	Test result	PASS

Please refer to following table and plots.

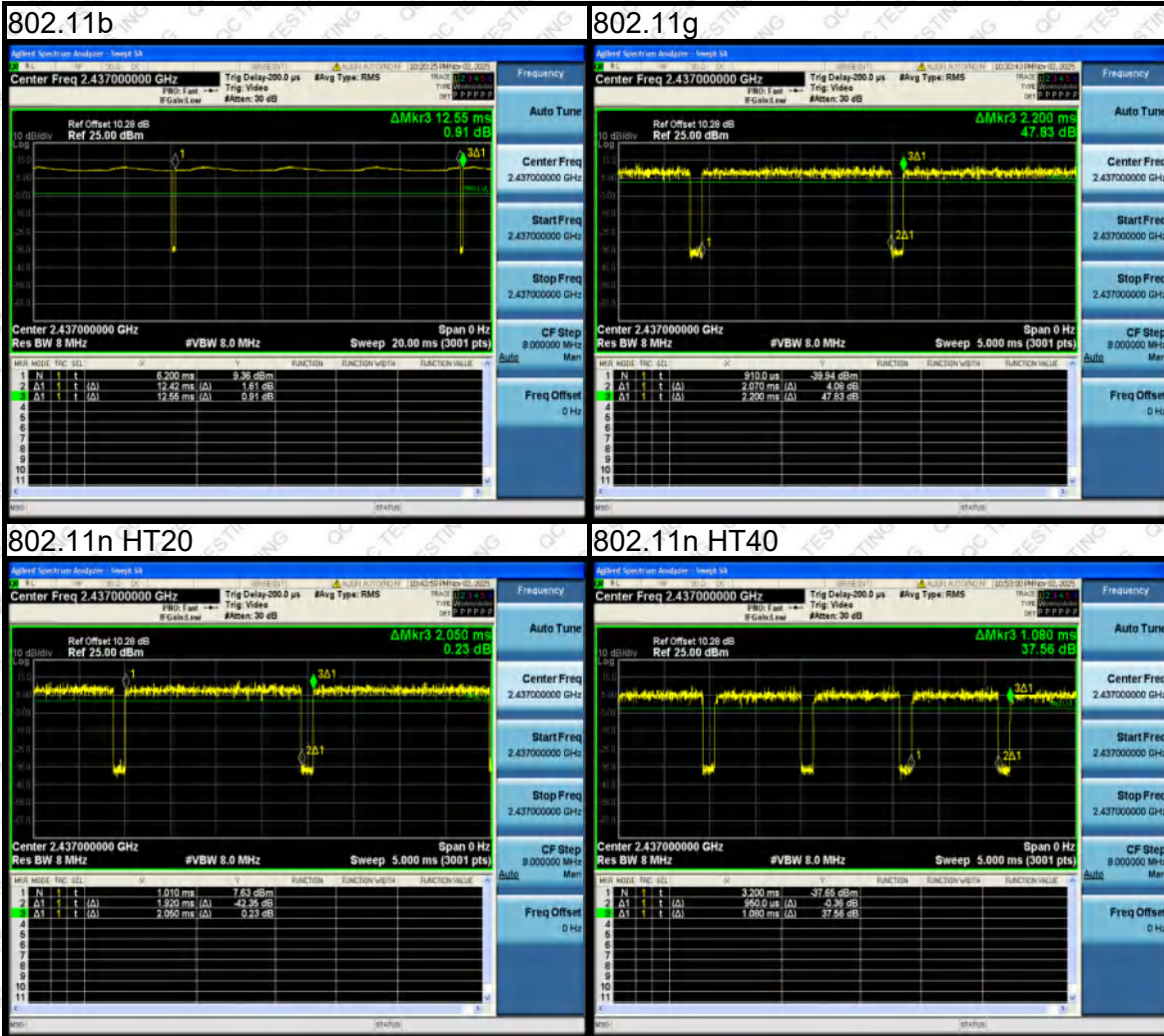
Output Power:

Modulation	CH No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
802.11b	01	2412	7.98	≤30	PASS
	06	2437	8.54	≤30	PASS
	11	2462	8.64	≤30	PASS
802.11g	01	2412	13.26	≤30	PASS
	06	2437	13.41	≤30	PASS
	11	2462	14.11	≤30	PASS
802.11 n(HT20)	01	2412	13.38	≤30	PASS
	06	2437	13.45	≤30	PASS
	11	2462	13.92	≤30	PASS
802.11 n(HT40)	03	2422	13.52	≤30	PASS
	06	2437	13.57	≤30	PASS
	09	2452	13.38	≤30	PASS



Duty cycle:

Test Mode	Antenna	Channel	Total Time (Ton) [ms]	Test Period(Tp) [ms]	Duty Cycle [%]
11B	Ant1	2437	12.42	12.55	98.96
11G	Ant1	2437	2.07	2.20	94.09
11N20SISO	Ant1	2437	1.92	2.05	93.66
11N40SISO	Ant1	2437	0.95	1.08	87.96



7. Channel Bandwidth & 99% Occupied Bandwidth

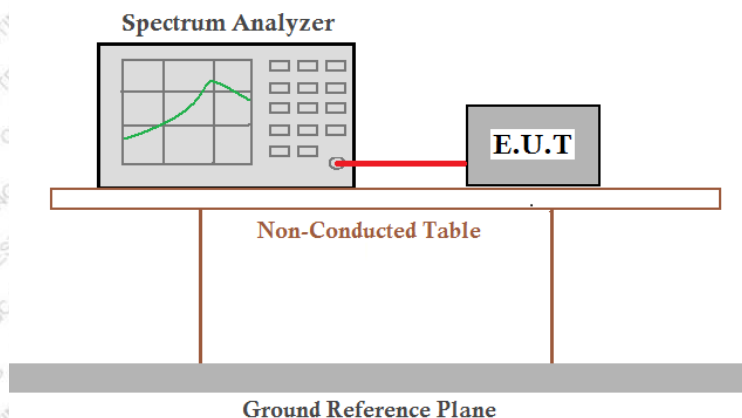
7.1 Applicable Standard

FCC Part15 C Section 15.247 (a)(2)

7.2 Limit

The minimum 6 dB bandwidth shall be 500 kHz.

7.3 Test setup



7.4 Test Procedure

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

7.5 Test Data

Temperature	23.8 °C	Humidity	52%
ATM Pressure	101.1kPa	Antenna Gain	3.85dBi
Test by	Fan Yang	Test result	PASS

Please refer to following table and plots.



DTS Bandwidth:

Modulation	CH No.	Frequency (MHz)	DTS Bandwidth (MHz)	Limit (MHz)	Verdict
802.11b	01	2412	10.040	0.5	PASS
	06	2437	10.120	0.5	PASS
	11	2462	10.080	0.5	PASS
802.11g	01	2412	16.360	0.5	PASS
	06	2437	16.360	0.5	PASS
	11	2462	16.320	0.5	PASS
802.11n(HT20)	01	2412	17.280	0.5	PASS
	06	2437	17.480	0.5	PASS
	11	2462	17.320	0.5	PASS
802.11n(HT40)	03	2422	35.040	0.5	PASS
	06	2437	35.600	0.5	PASS
	09	2452	35.600	0.5	PASS

99% Occupied Bandwidth:

Modulation	CH No.	Frequency (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Verdict
802.11b	01	2412	14.436	---	PASS
	06	2437	14.419	---	PASS
	11	2462	14.459	---	PASS
802.11g	01	2412	16.536	---	PASS
	06	2437	16.689	---	PASS
	11	2462	16.642	---	PASS
802.11n(HT20)	01	2412	17.731	---	PASS
	06	2437	17.690	---	PASS
	11	2462	17.634	---	PASS
802.11n(HT40)	03	2422	35.810	---	PASS
	06	2437	35.798	---	PASS
	09	2452	35.911	---	PASS



DTS Bandwidth:

-6dB Bandwidth NVNT 11B Ant1 2412



-6dB Bandwidth NVNT 11B Ant1 2437



-6dB Bandwidth NVNT 11B Ant1 2462



-6dB Bandwidth NVNT 11G Ant1 2412





-6dB Bandwidth NVNT 11G Ant1 2437



-6dB Bandwidth NVNT 11G Ant1 2462



-6dB Bandwidth NVNT 11N20 Ant1 2412



-6dB Bandwidth NVNT 11N20 Ant1 2437

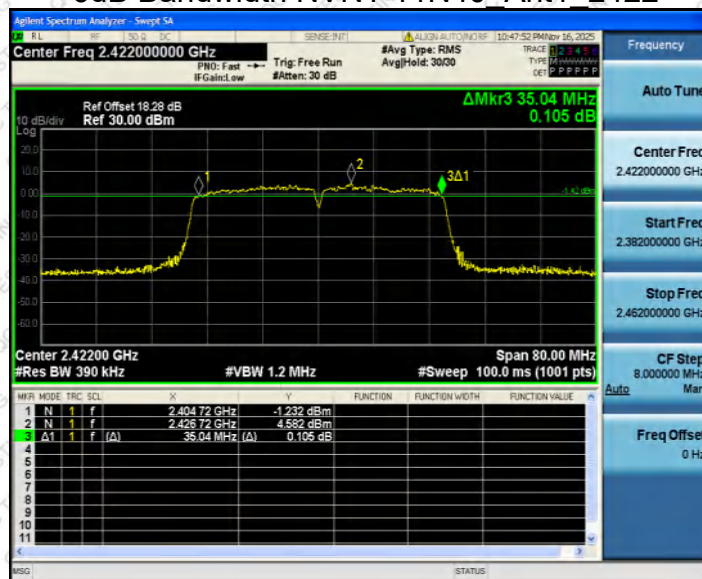




-6dB Bandwidth NVNT 11N20 Ant1 2462



-6dB Bandwidth NVNT 11N40 Ant1 2422





-6dB Bandwidth NVNT 11N40 Ant1 2437



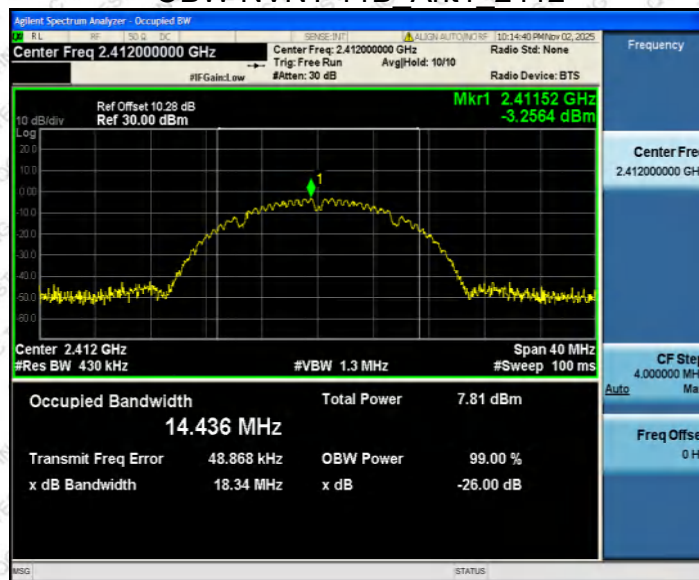
-6dB Bandwidth NVNT 11N40 Ant1 2452



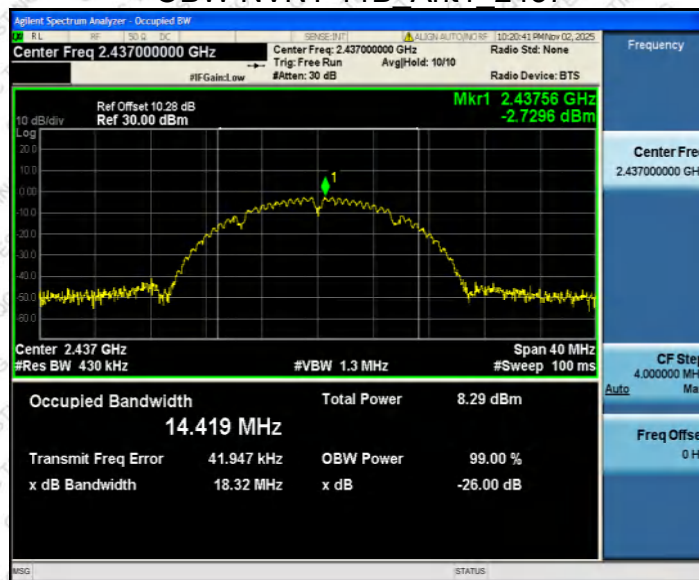


99% Occupied Bandwidth:

OBW NVNT 11B Ant1 2412



OBW NVNT 11B Ant1 2437

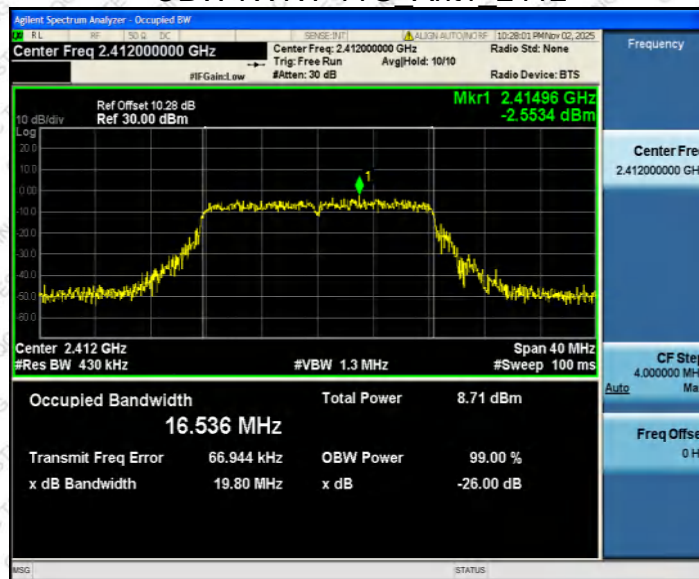




OBW NVNT 11B_Ant1 2462

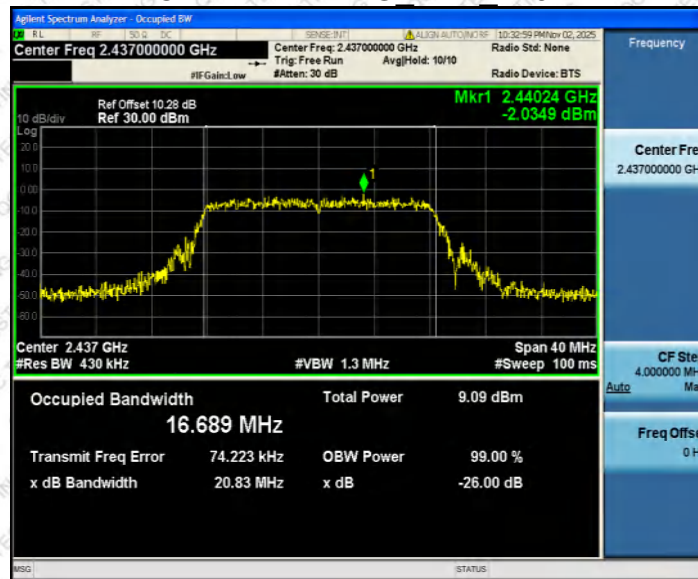


OBW NVNT 11G_Ant1 2412

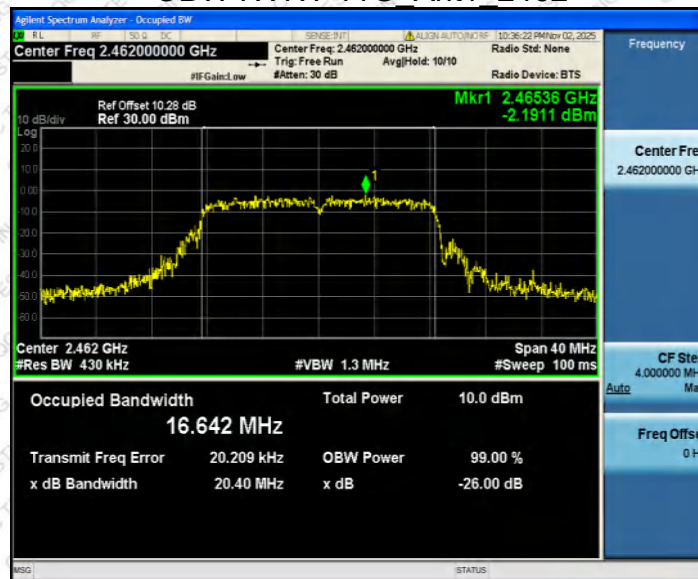




OBW NVNT 11G Ant1 2437

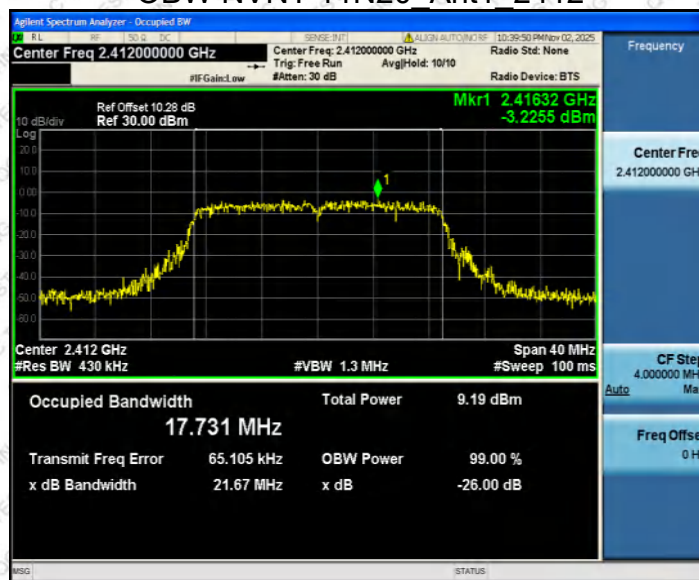


OBW NVNT 11G Ant1 2462

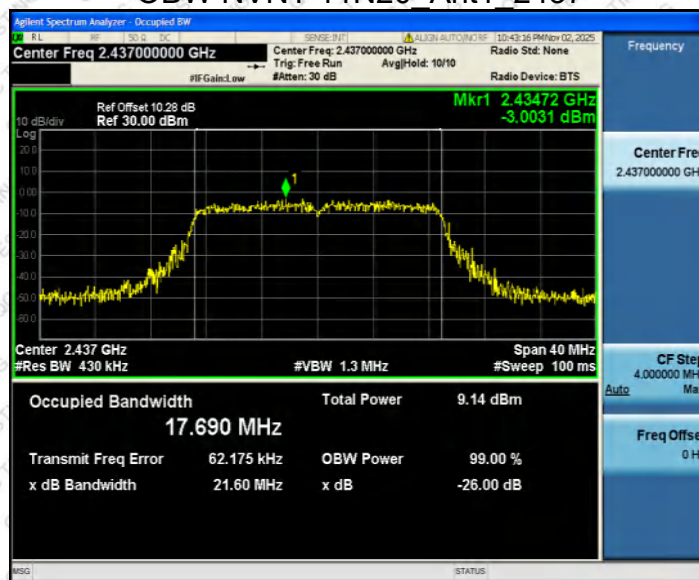




OBW NVNT 11N20 Ant1 2412

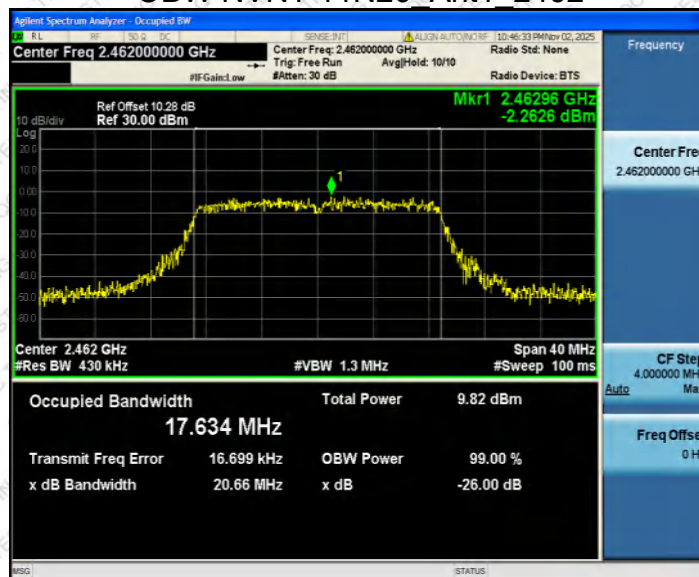


OBW NVNT 11N20 Ant1 2437





OBW NVNT 11N20 Ant1 2462

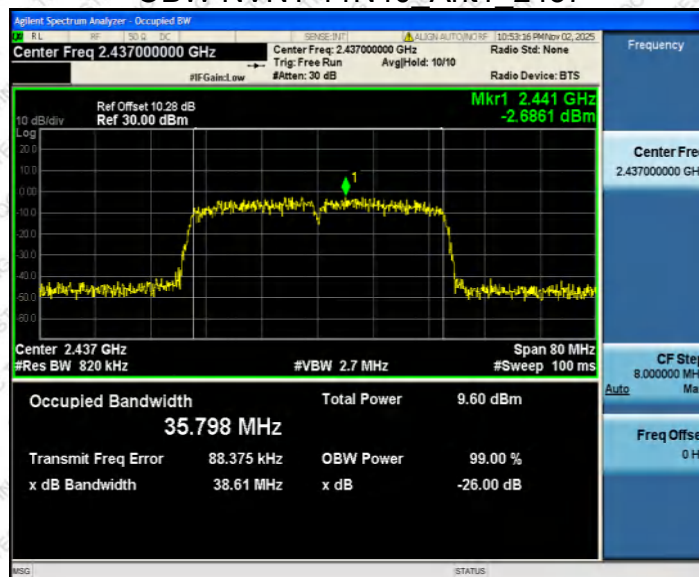


OBW NVNT 11N40 Ant1 2422

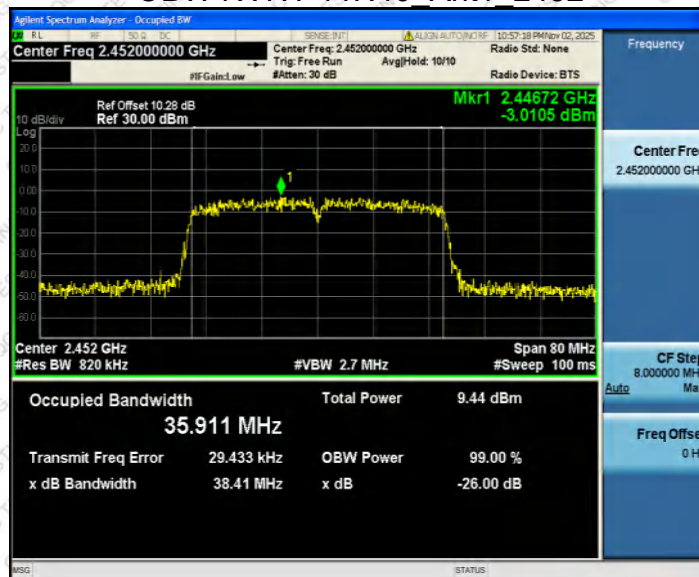




OBW NVNT 11N40 Ant1 2437



OBW NVNT 11N40 Ant1 2452



8. Power Spectral Density

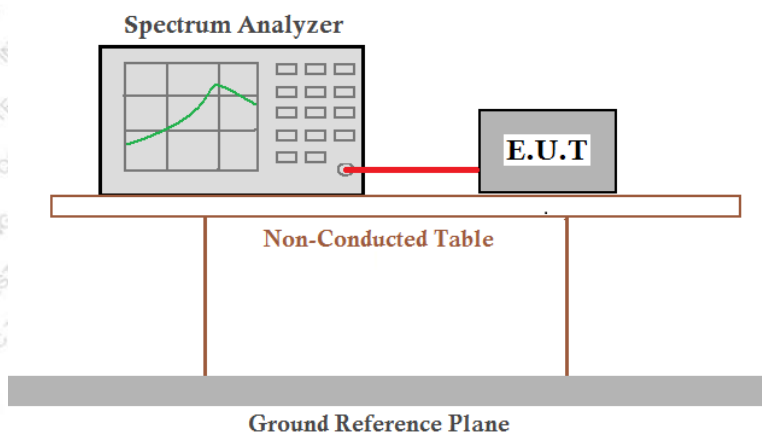
8.1 Applicable Standard

FCC Part15 C Section 15.247 (e)

8.2 Limit

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.

8.3 Test setup



8.4 Test Procedure

Refer to KDB558074 D01 15.247 Meas Guidance v05r02

8.5 Test Data

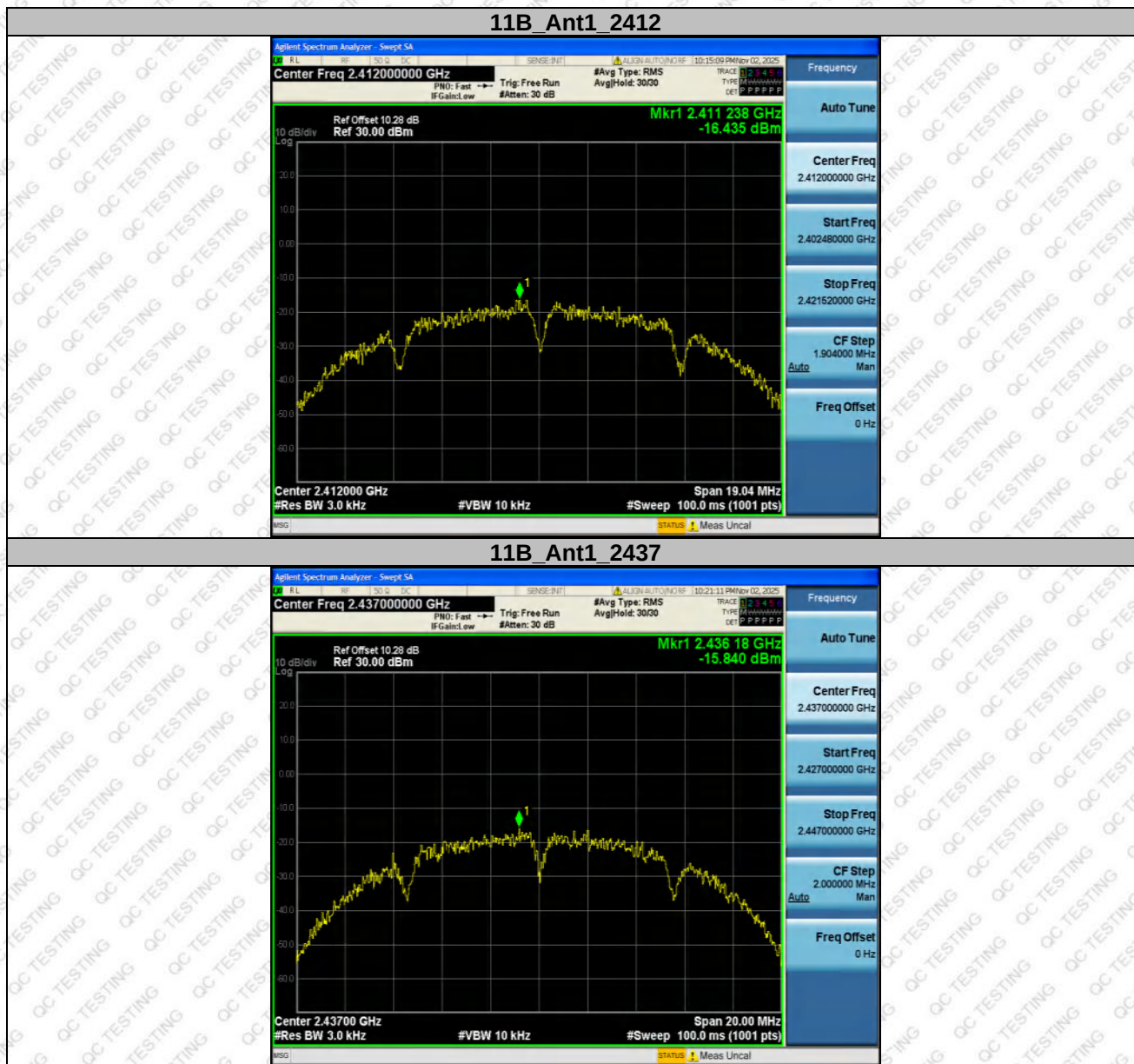
Temperature	23.8 °C	Humidity	52%
ATM Pressure	101.1kPa	Antenna Gain	3.85dBi
Test by	Fan Yang	Test result	PASS

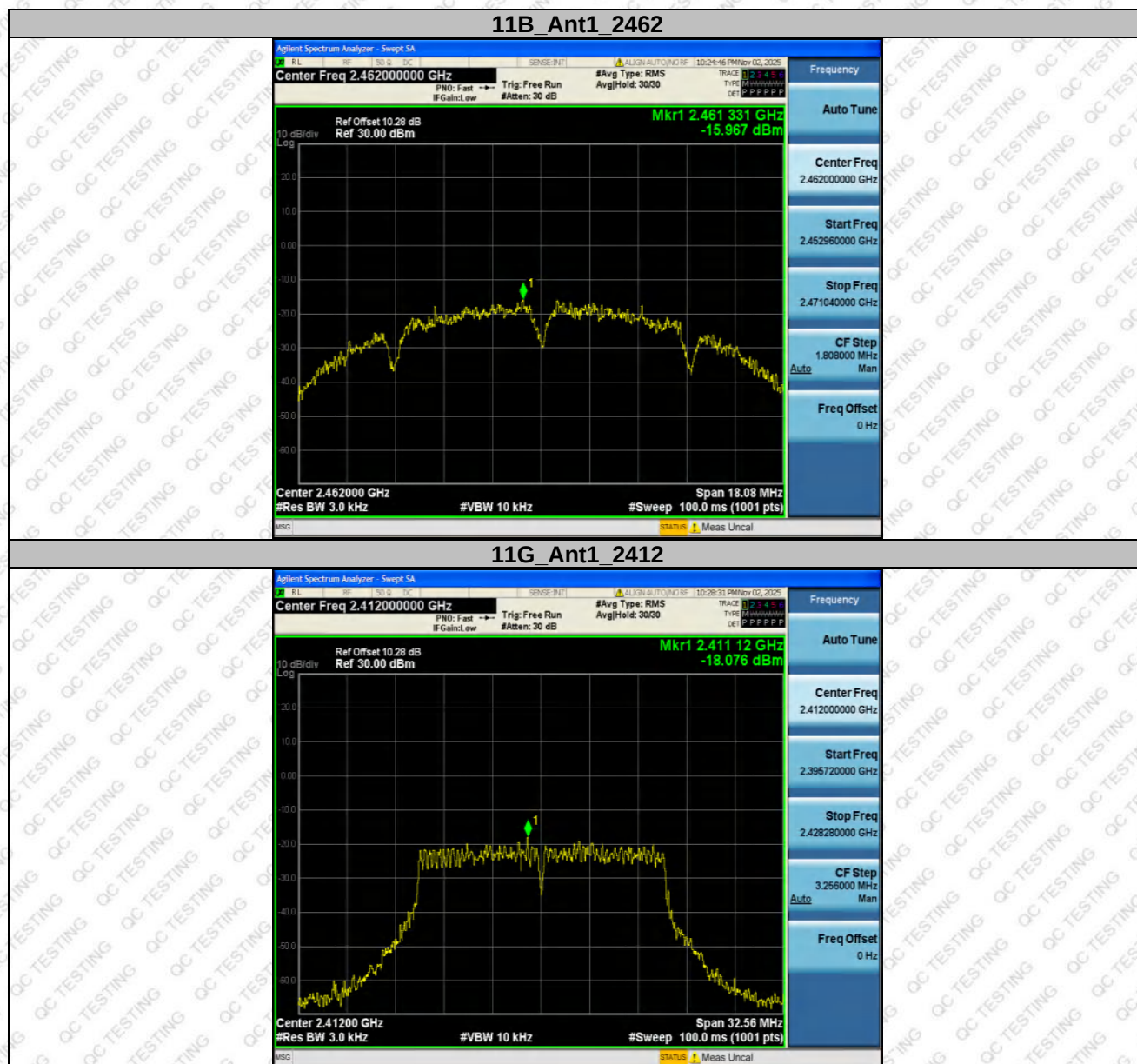
Please refer to following table and plots.

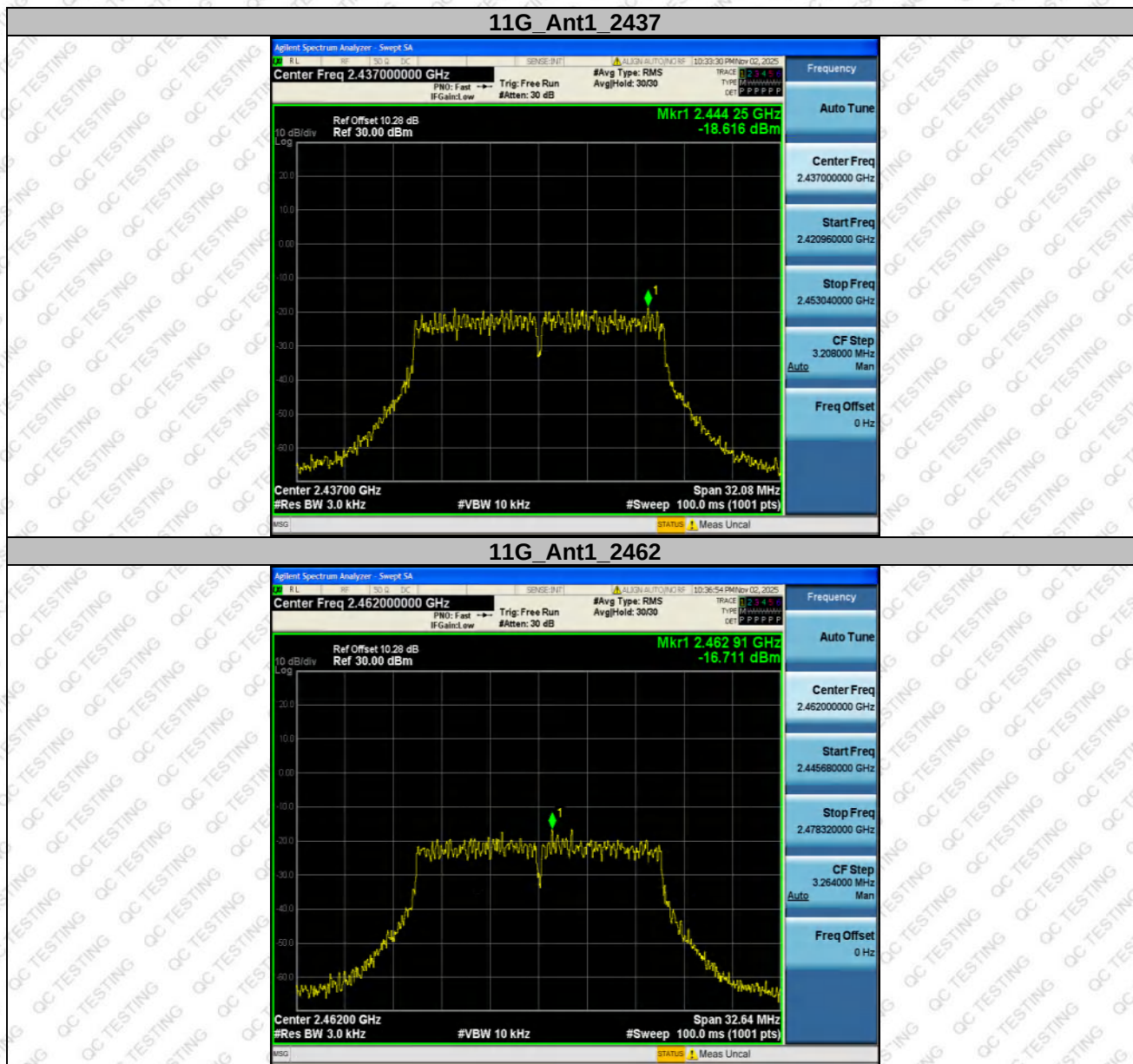


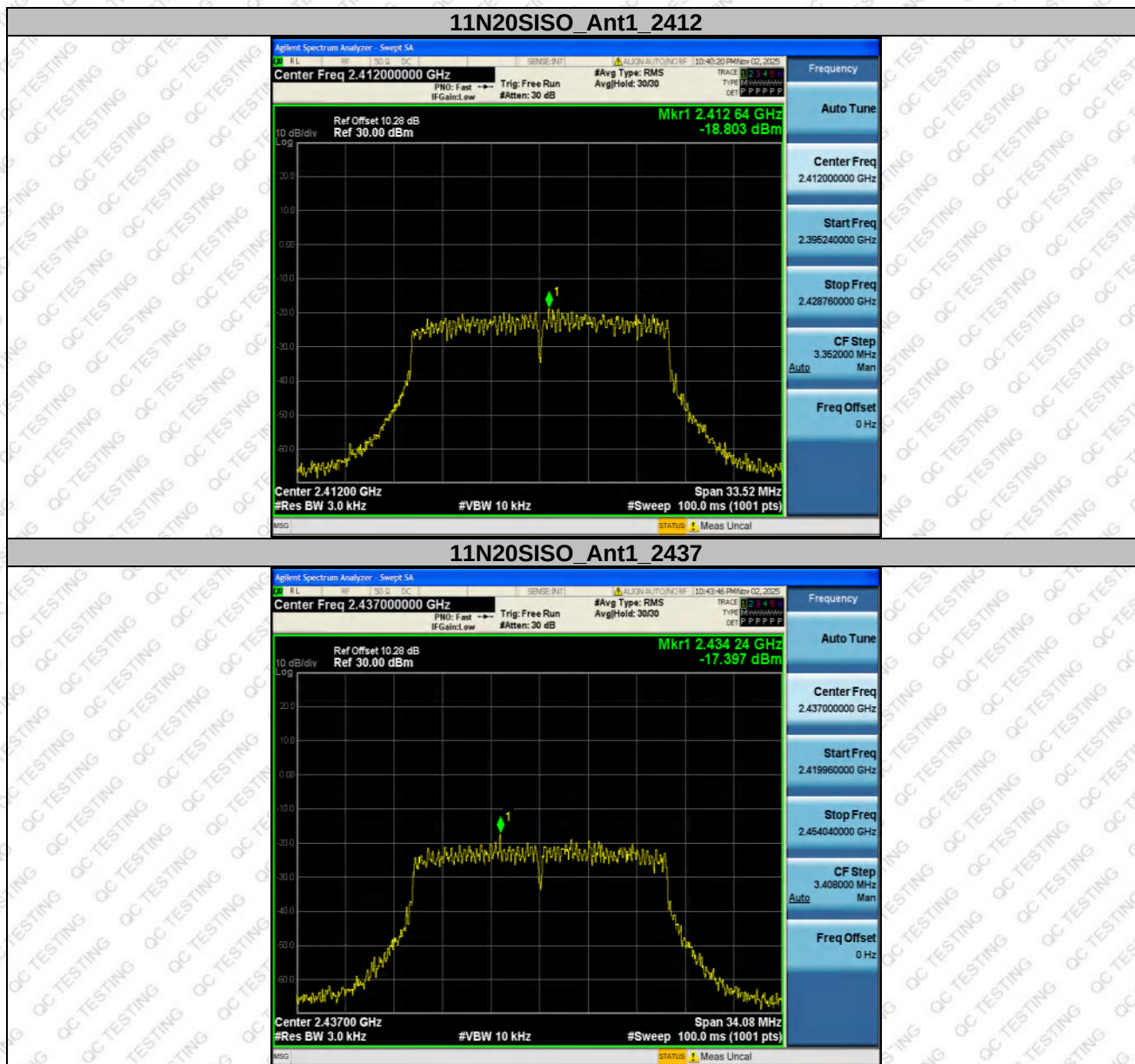
Power Spectral Density:

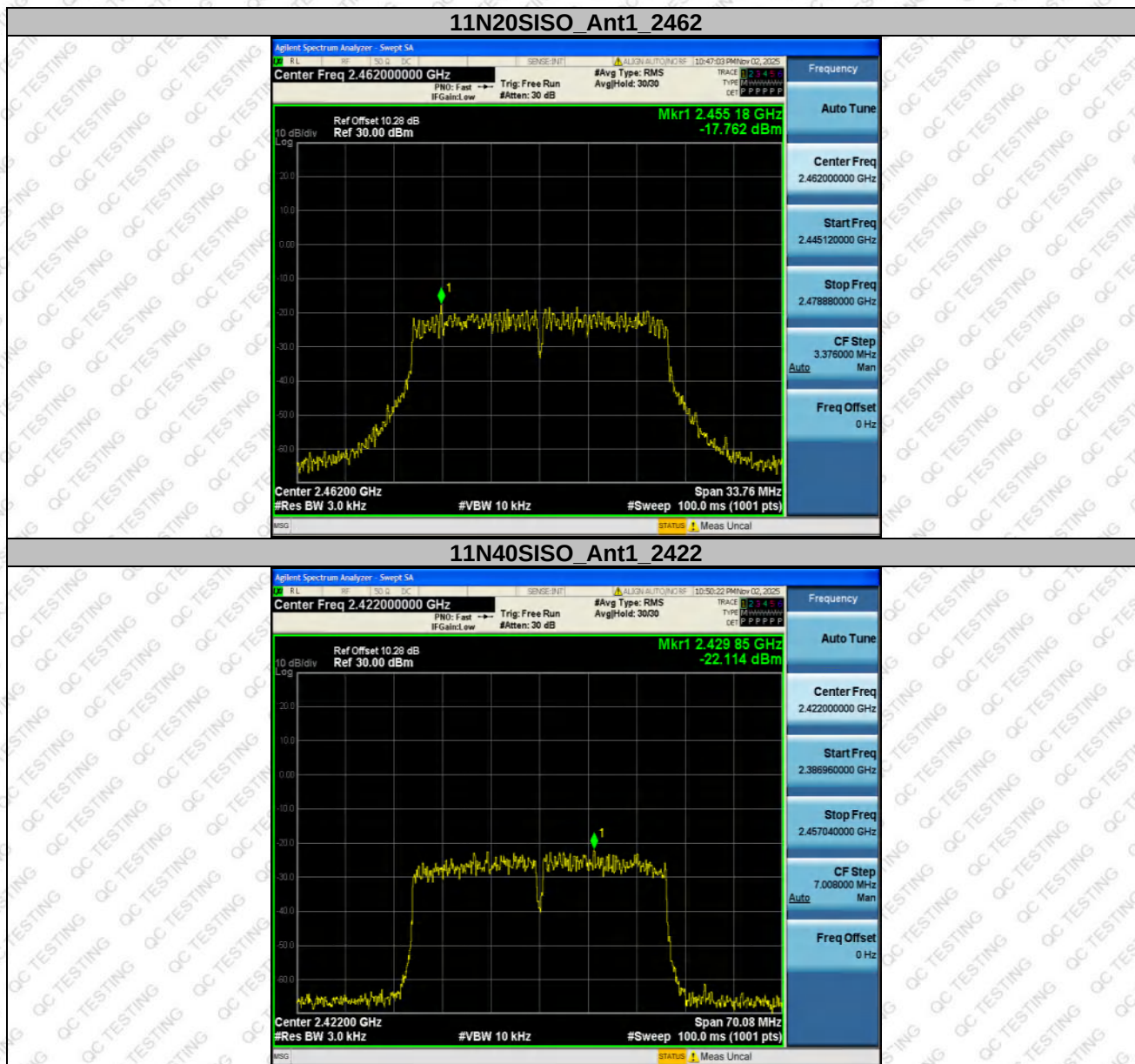
Modulation	Frequency (MHz)	Max PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-16.44	≤8
	2437	-15.84	≤8
	2462	-15.97	≤8
802.11g	2412	-18.08	≤8
	2437	-18.62	≤8
	2462	-16.71	≤8
802.11 n(HT20)	2412	-18.80	≤8
	2437	-17.40	≤8
	2462	-17.76	≤8
802.11 n(HT40)	2422	-22.11	≤8
	2437	-21.20	≤8
	2452	-22.74	≤8

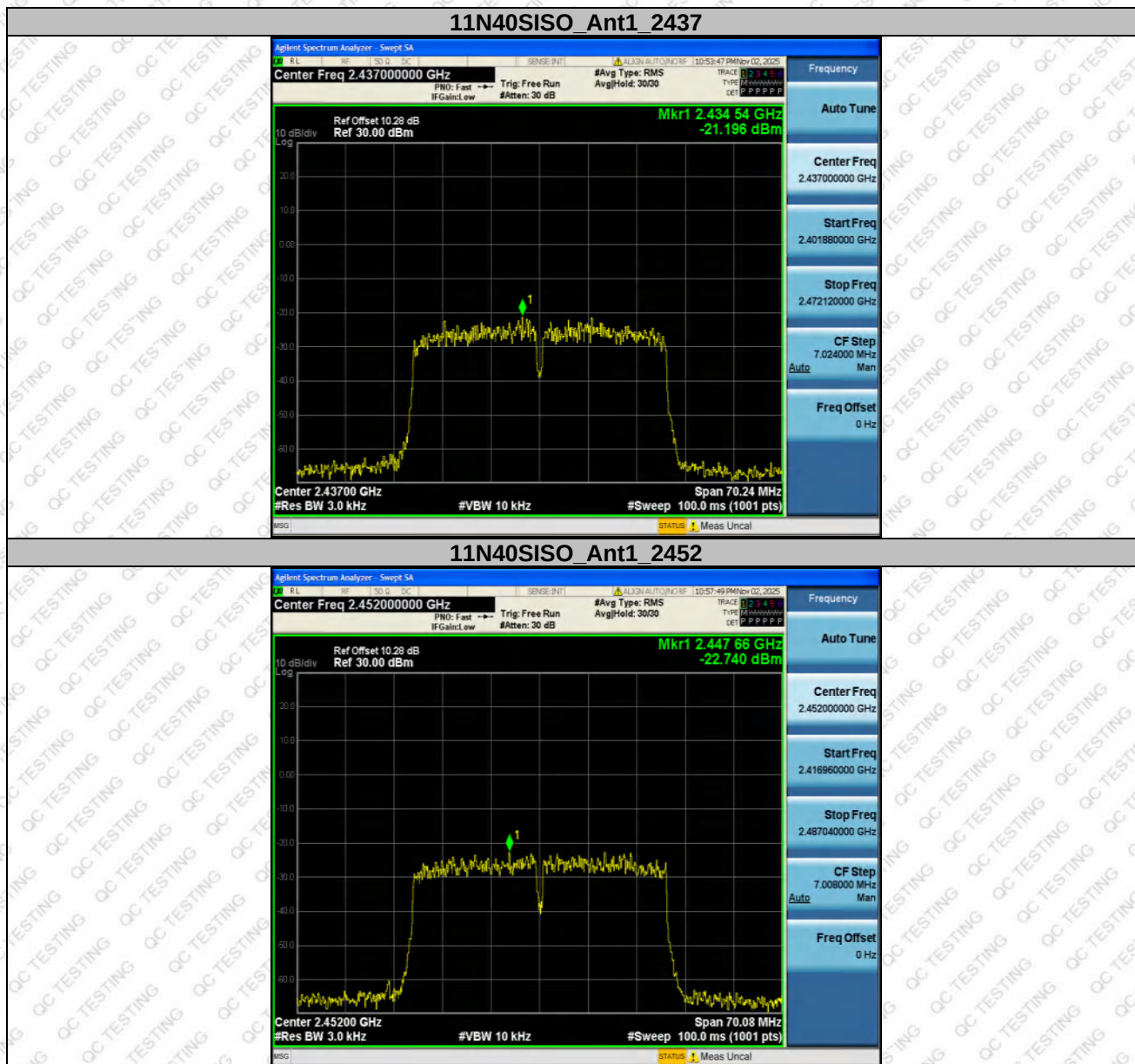












9. Spurious Emission in Non-restricted & restricted Bands

9.1 Conducted Emission Method

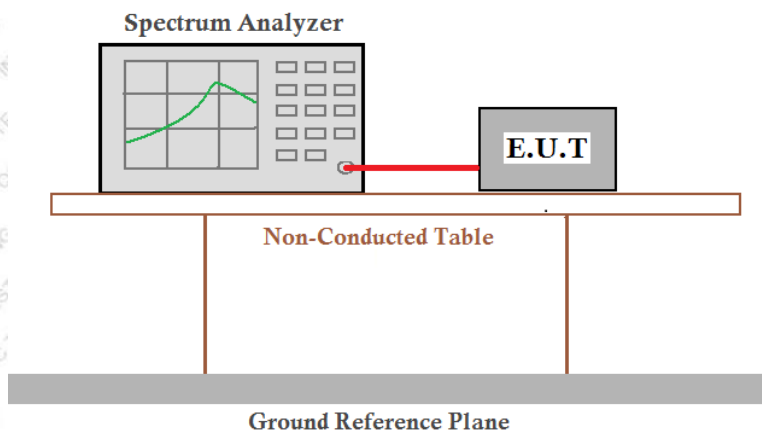
9.1.1 Applicable Standard

FCC Part15 C Section 15.247 (d)

9.1.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

9.1.3 Test setup



9.1.4 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- 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.
- 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.
- Repeat above procedures until all measured frequencies were complete.

9.1.5 Test Data

Temperature	23.8 °C	Humidity	52%
ATM Pressure	101.1kPa	Antenna Gain	3.85dBi
Test by	Fan Yang	Test result	PASS

Please refer to following plots.

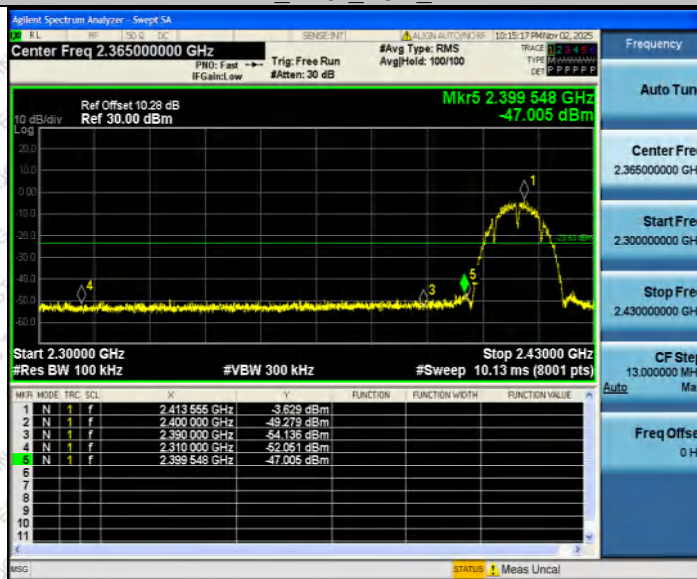


Band Edge:

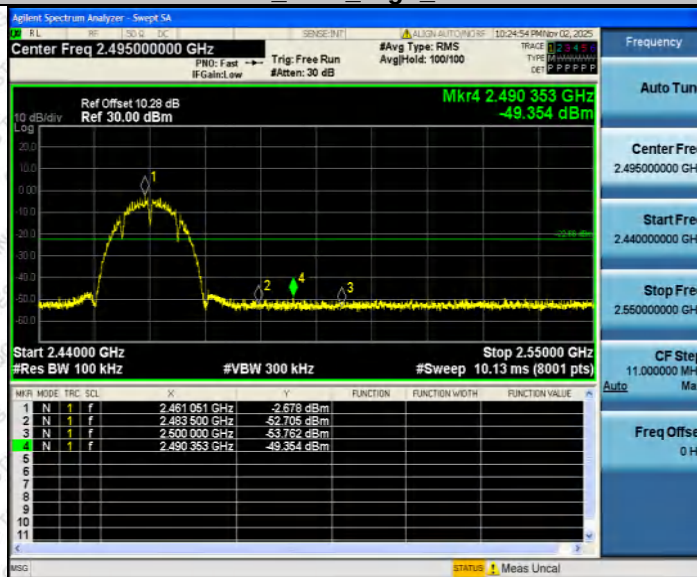
Modulation	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
b	2412	-50.63	-20	Pass
b	2462	-52.03	-20	Pass
g	2412	-50.20	-20	Pass
g	2462	-53.83	-20	Pass
n20	2412	-49.19	-20	Pass
n20	2462	-53.91	-20	Pass
N40	2422	-56.96	-20	Pass
N40	2452	-57.84	-20	Pass



11B Ant1 Low 2412

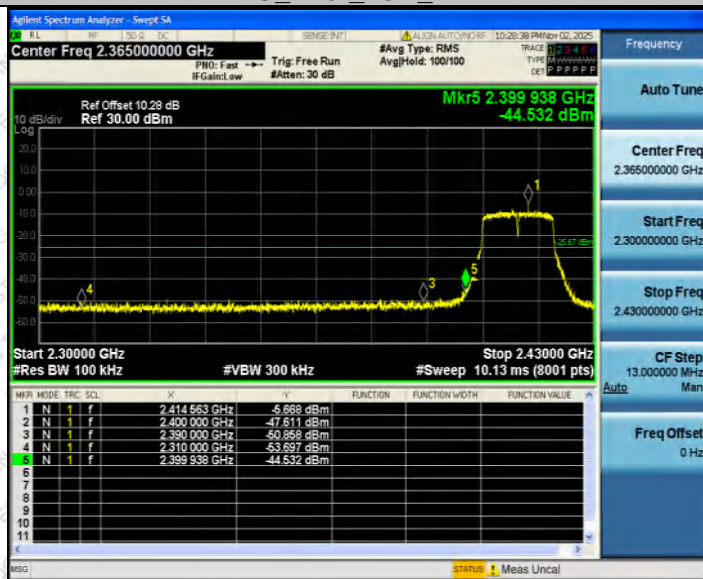


11B Ant1 High 2462

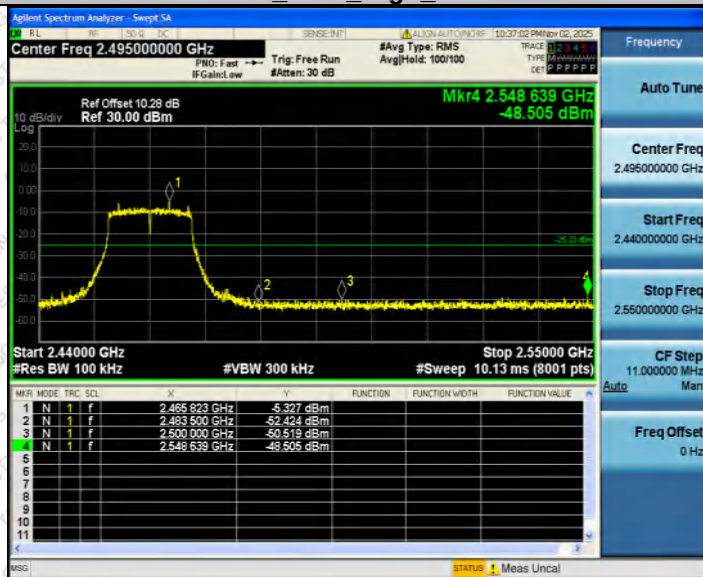




11G Ant1 Low 2412

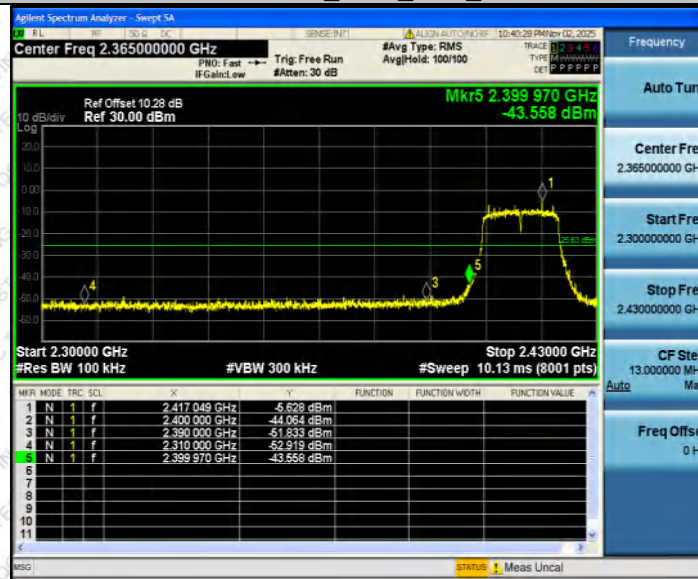


11G Ant1 High 2462

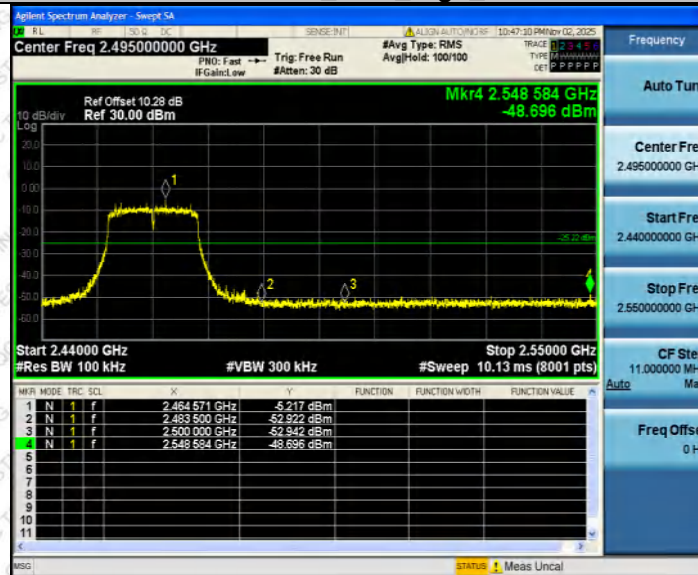




11N20SISO Ant1 Low 2412

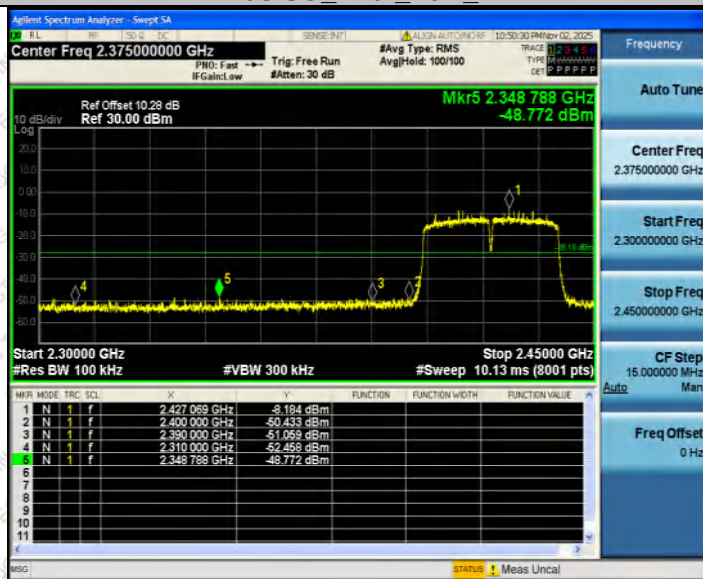


11N20SISO Ant1 High 2462

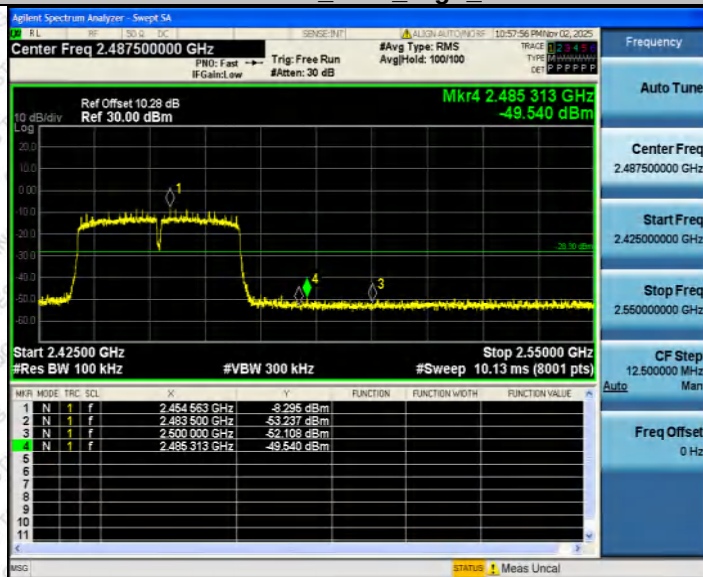




11N40SISO Ant1 Low 2422



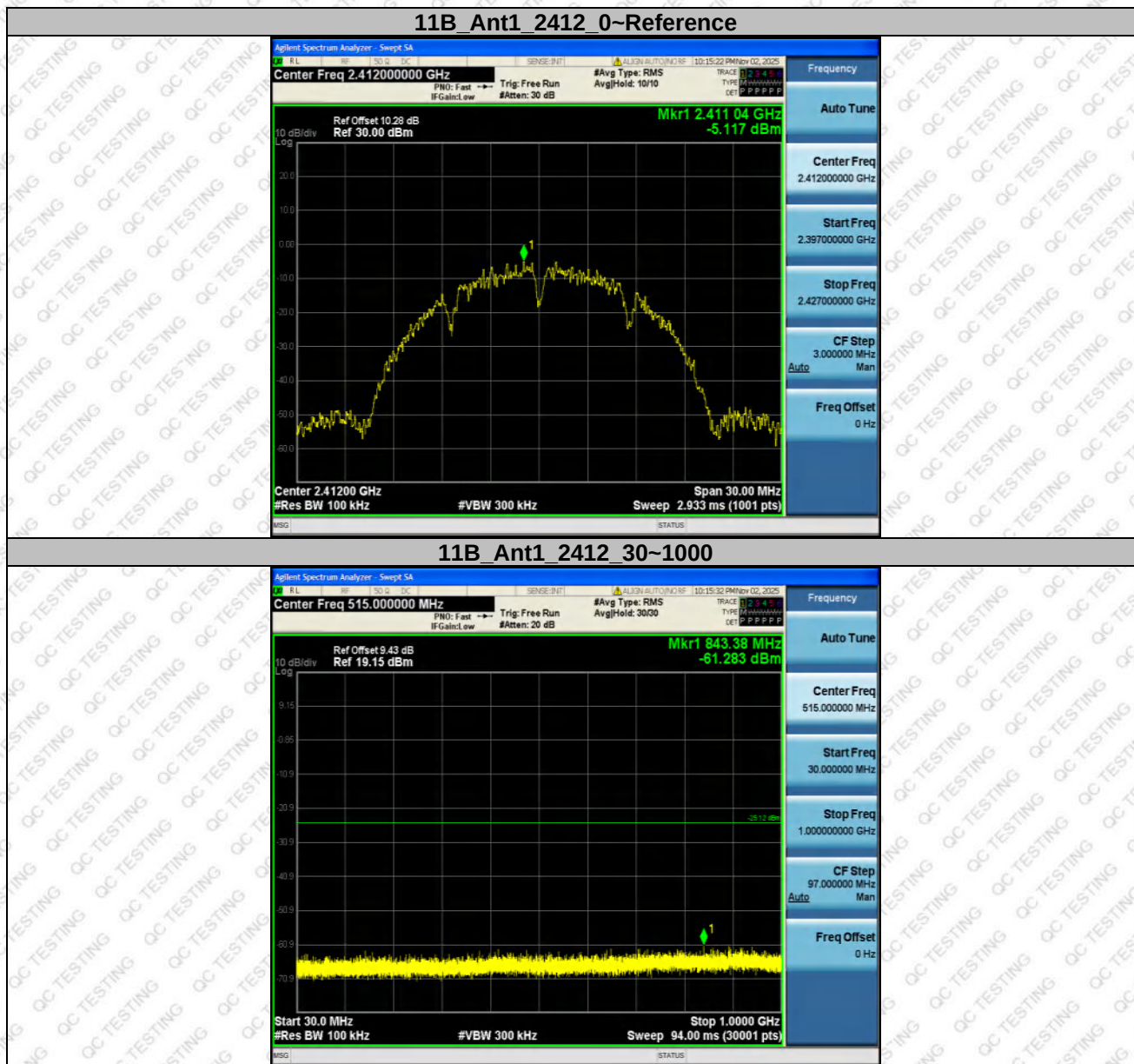
11N40SISO Ant1 High 2452





Conducted RF Spurious Emission:

Modulation	Frequency (MHz)	FreqRange (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
b	2412	30~1000	-61.28	-20	Pass
		1000~26500	-38.68	-20	Pass
	2437	30~1000	-61.23	-20	Pass
		1000~26500	-37.95	-20	Pass
	2462	30~1000	-61.3	-20	Pass
		1000~26500	-38.88	-20	Pass
g	2412	30~1000	-60.42	-20	Pass
		1000~26500	-38.57	-20	Pass
	2437	30~1000	-61.24	-20	Pass
		1000~26500	-38.04	-20	Pass
	2462	30~1000	-53.32	-20	Pass
		1000~26500	-38.46	-20	Pass
n20	2412	30~1000	-61.19	-20	Pass
		1000~26500	-38.71	-20	Pass
	2437	30~1000	-61.20	-20	Pass
		1000~26500	-38.07	-20	Pass
	2462	30~1000	-61.38	-20	Pass
		1000~26500	-37.81	-20	Pass
n40	2422	30~1000	-60.85	-20	Pass
		1000~26500	-38.62	-20	Pass
	2437	30~1000	-61.51	-20	Pass
		1000~26500	-38.27	-20	Pass
	2452	30~1000	-61.54	-20	Pass
		1000~26500	-38.90	-20	Pass





11B Ant1 2412 1000-26500

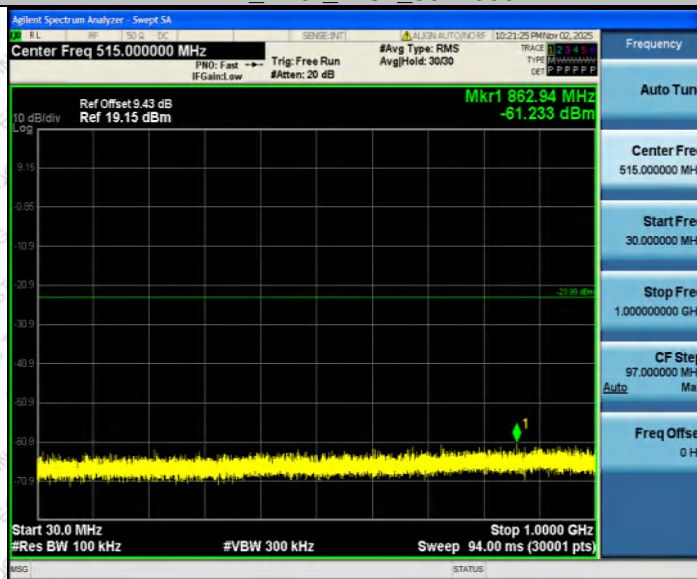


11B Ant1 2437 0-Reference

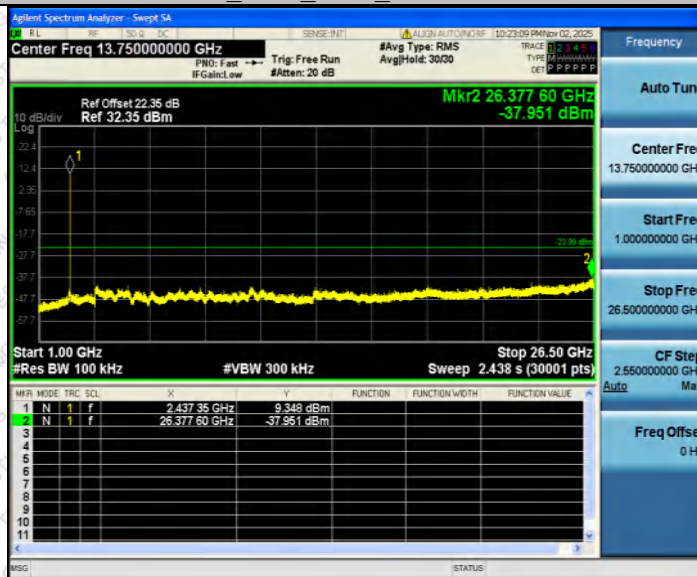




11B Ant1 2437 30~1000



11B Ant1 2437 1000~26500

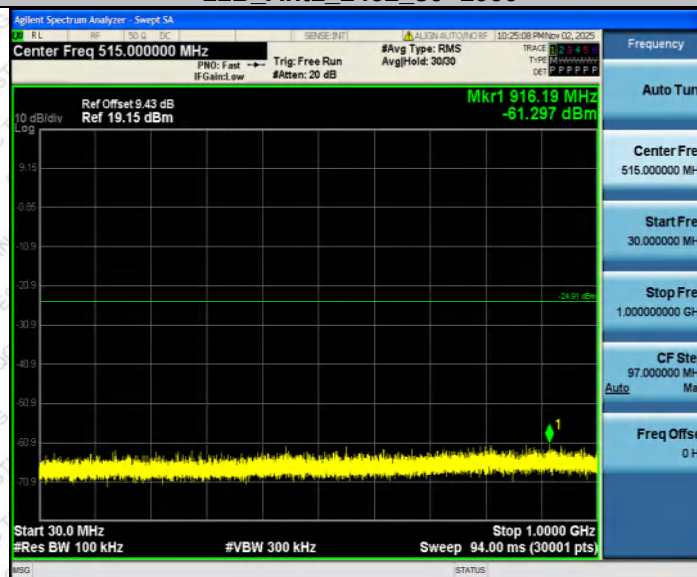




11B Ant1 2462 0~Reference

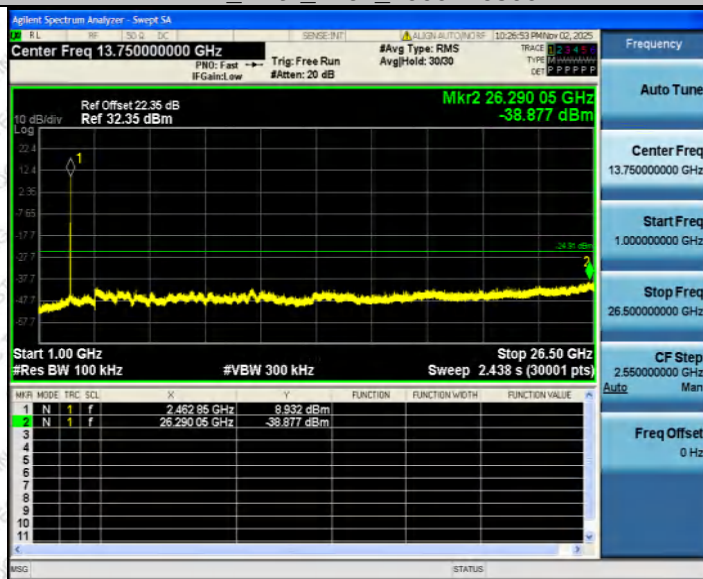


11B Ant1 2462 30~1000

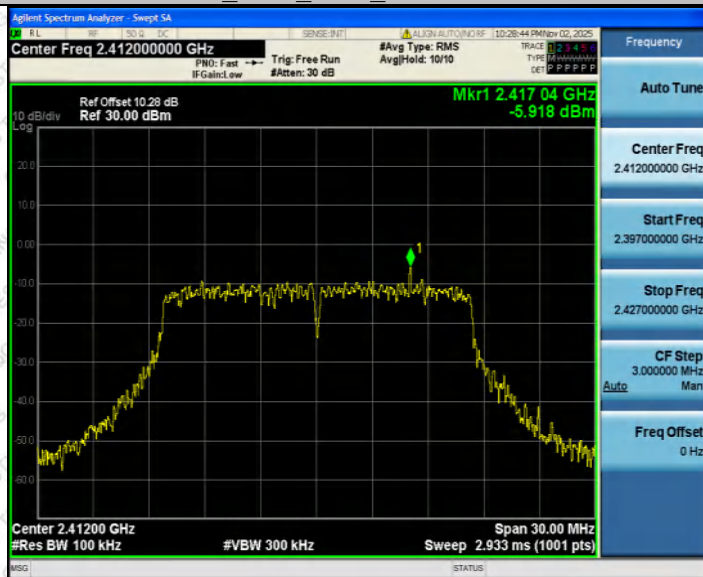




11B Ant1 2462 1000-26500

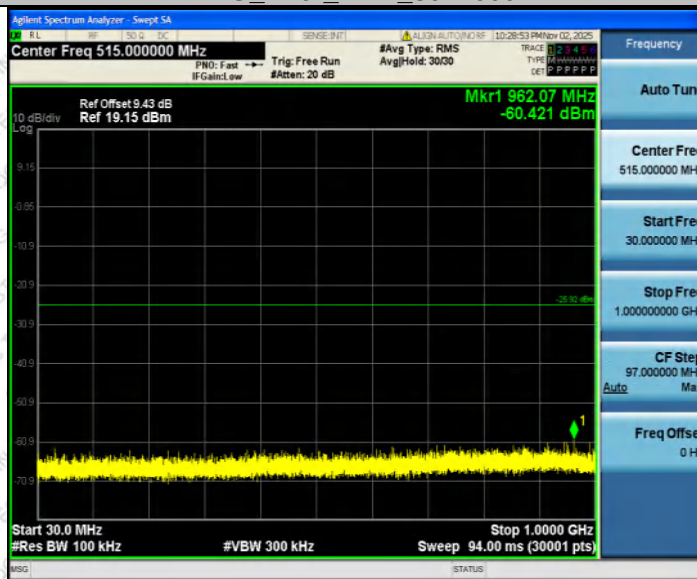


11G Ant1 2412 0-Reference

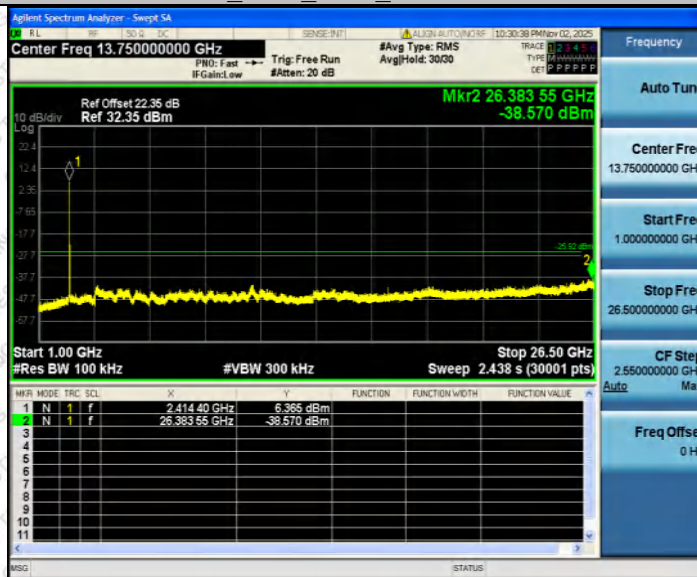




11G Ant1 2412 30~1000



11G Ant1 2412 1000~26500

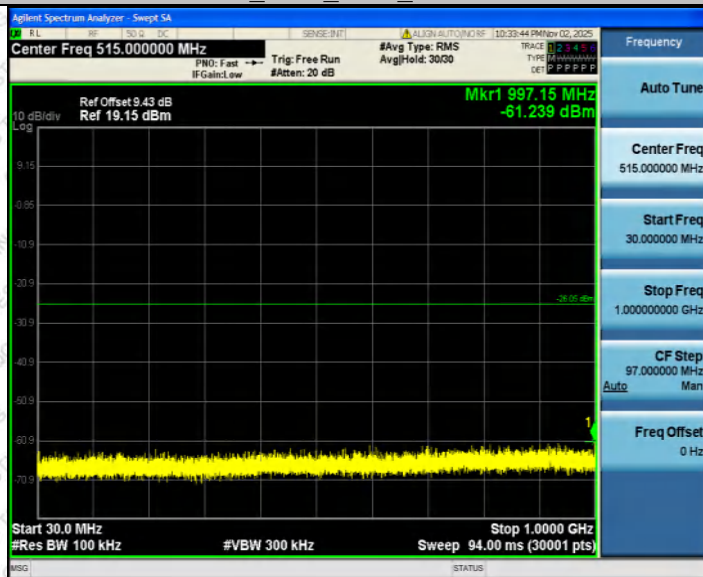


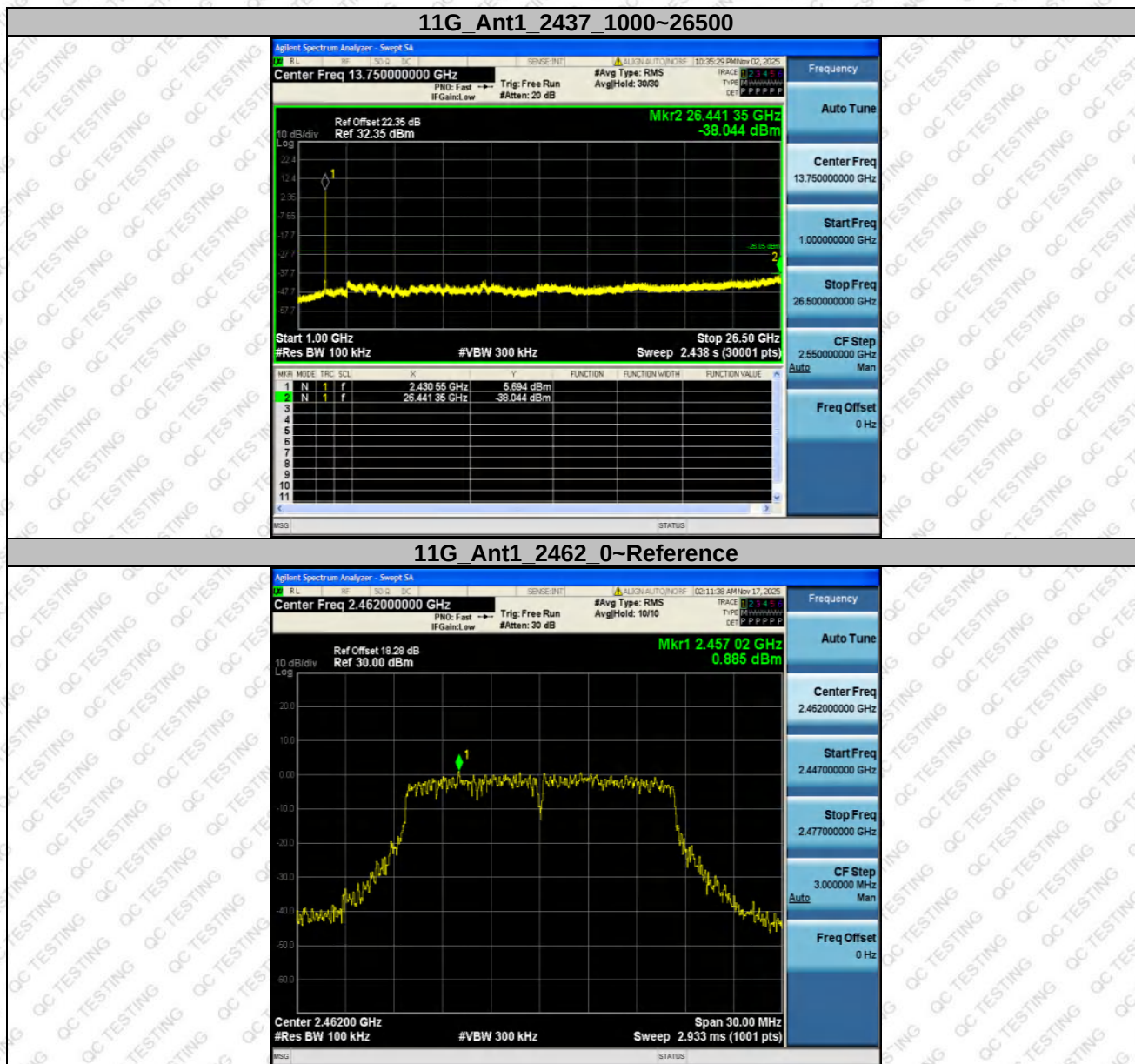


11G Ant1 2437 0~Reference



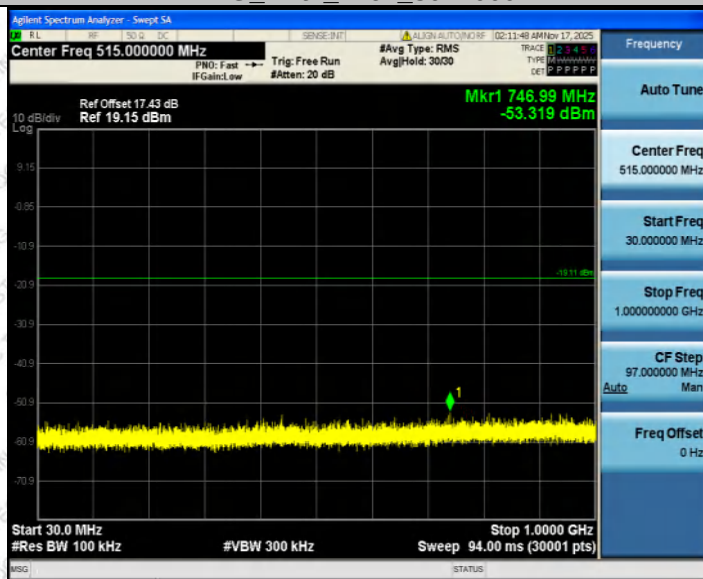
11G Ant1 2437 30~1000



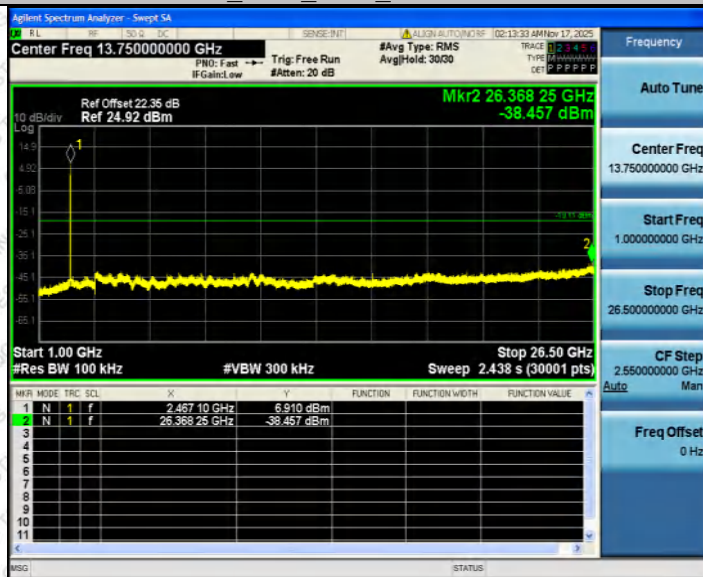


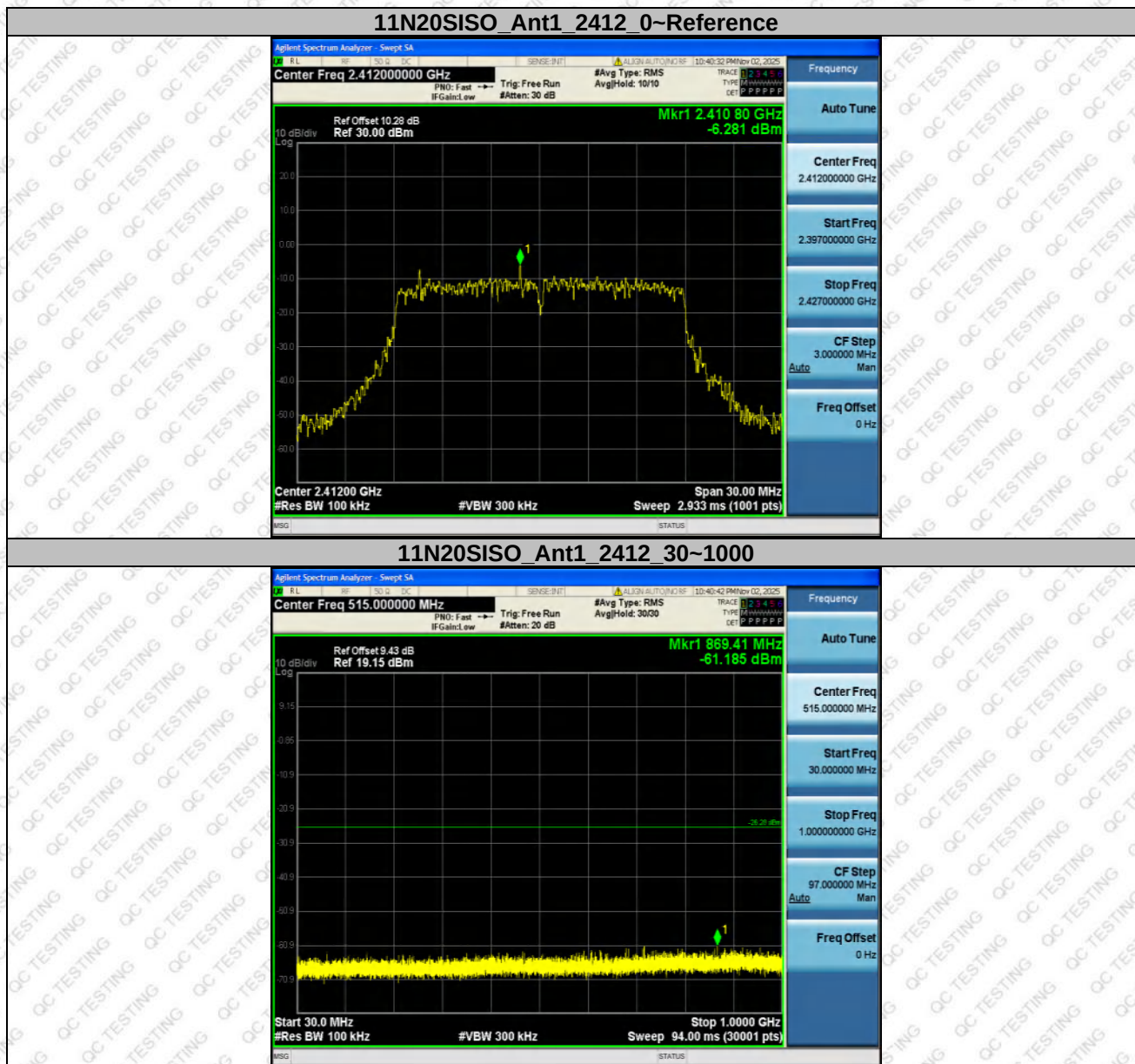


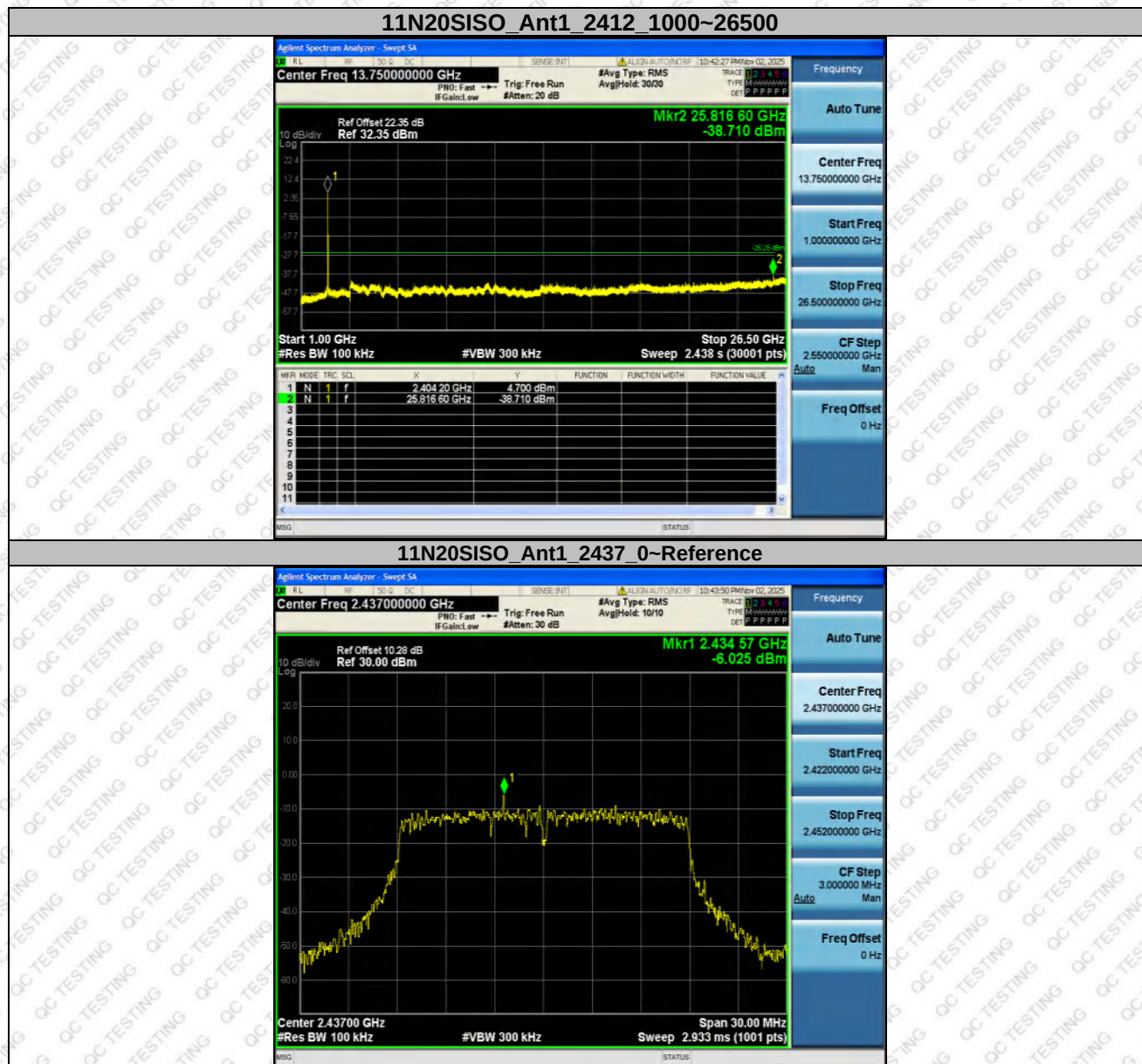
11G Ant1 2462 30~1000

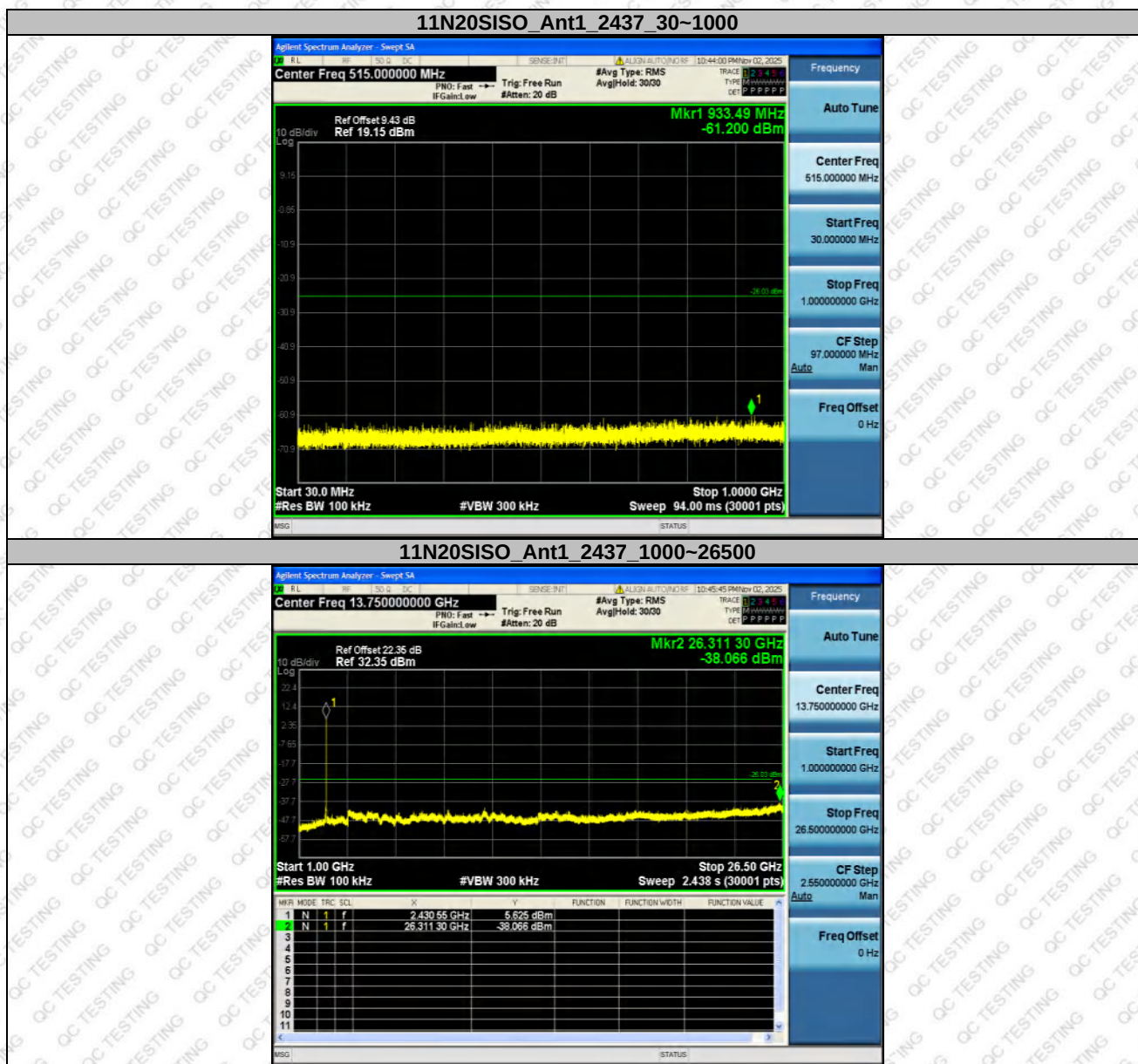


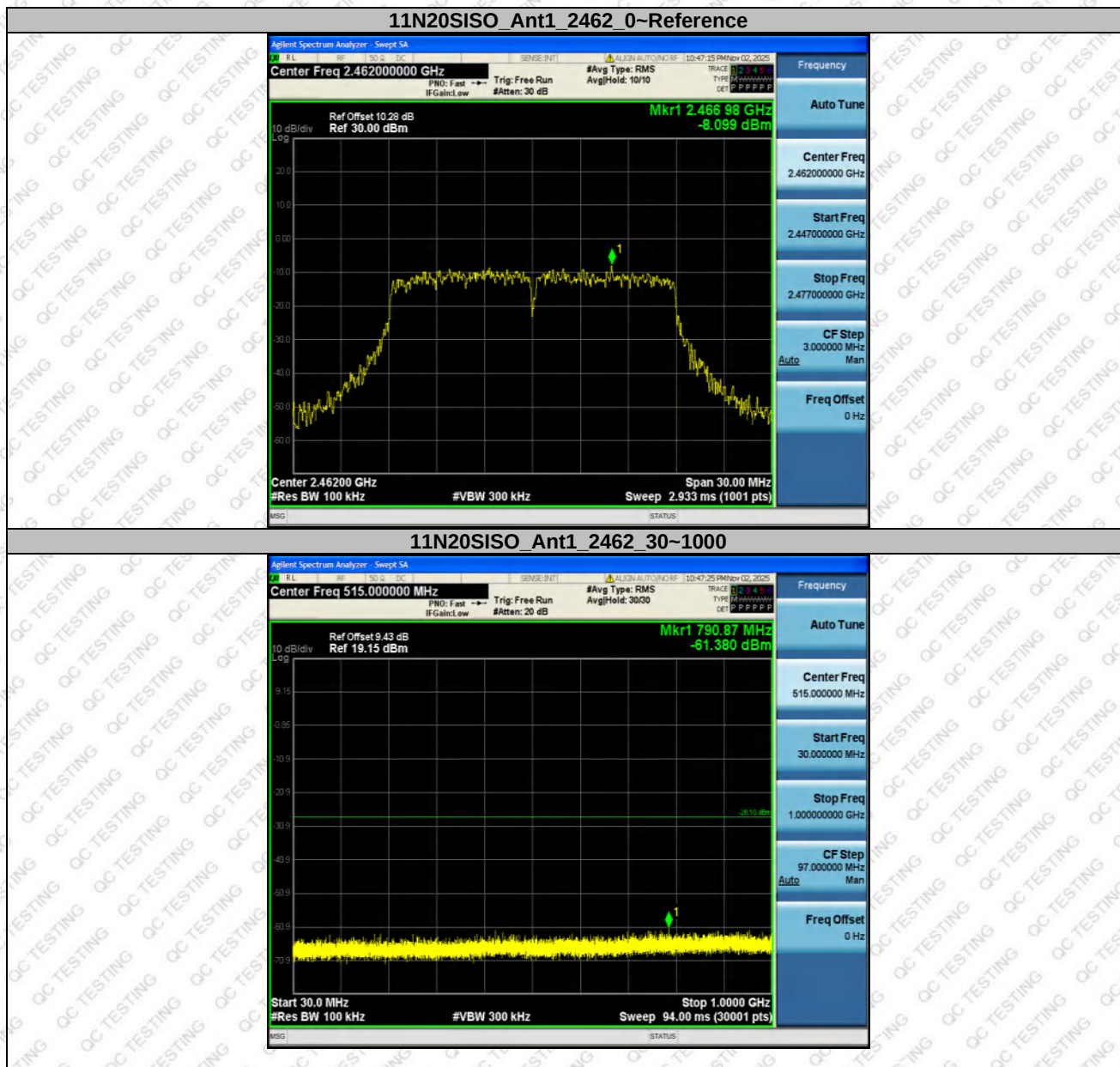
11G Ant1 2462 1000~26500

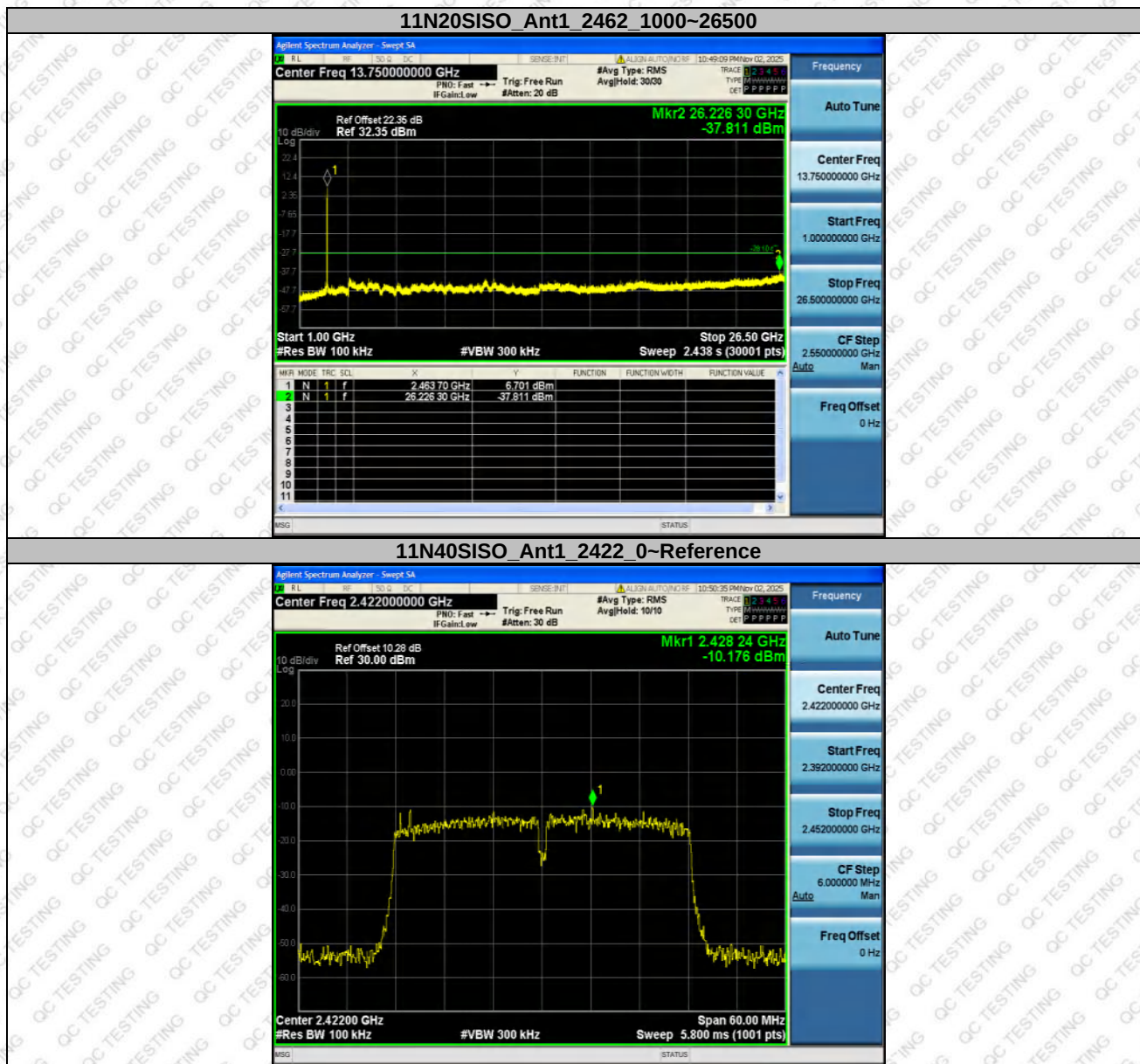


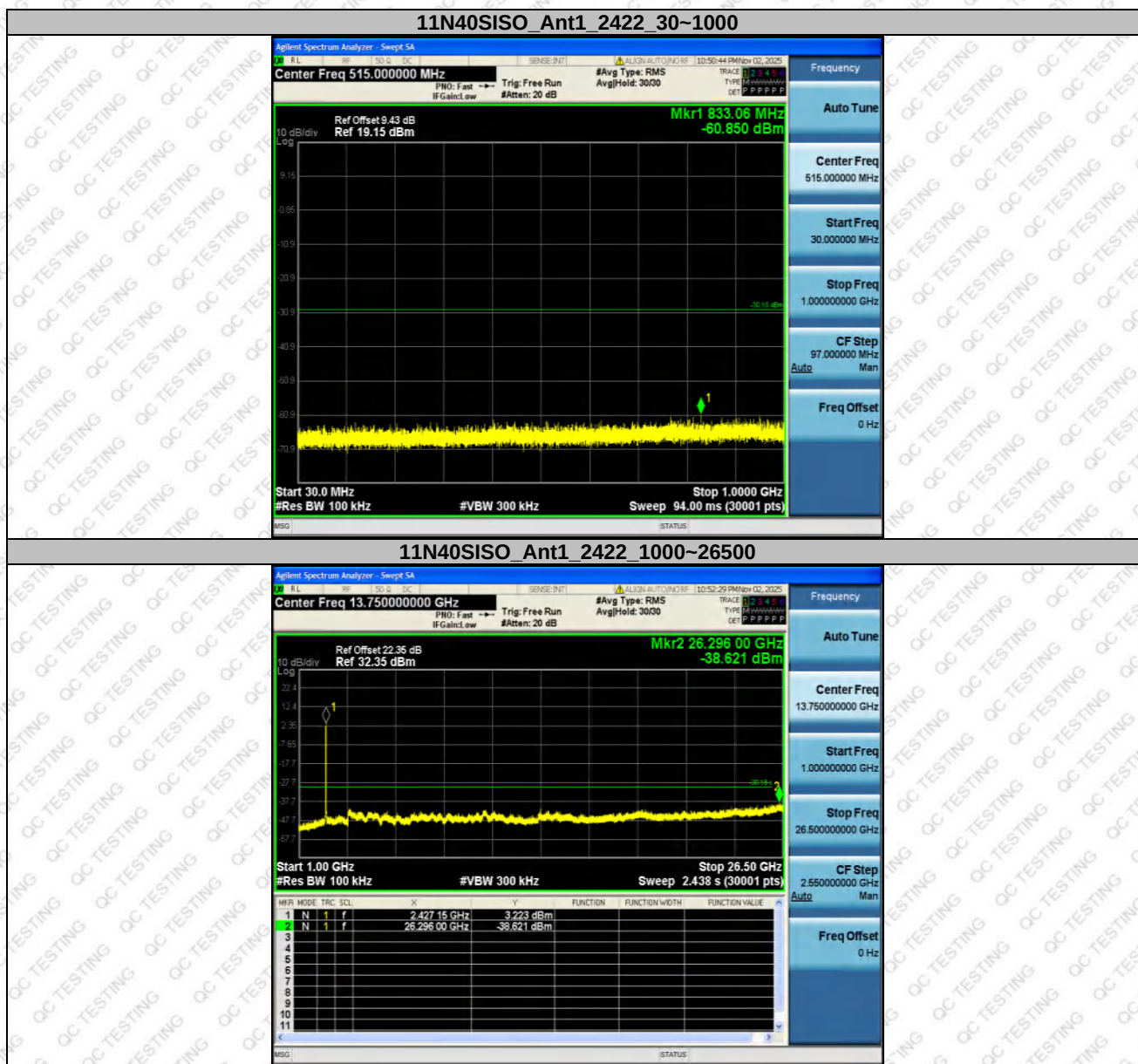


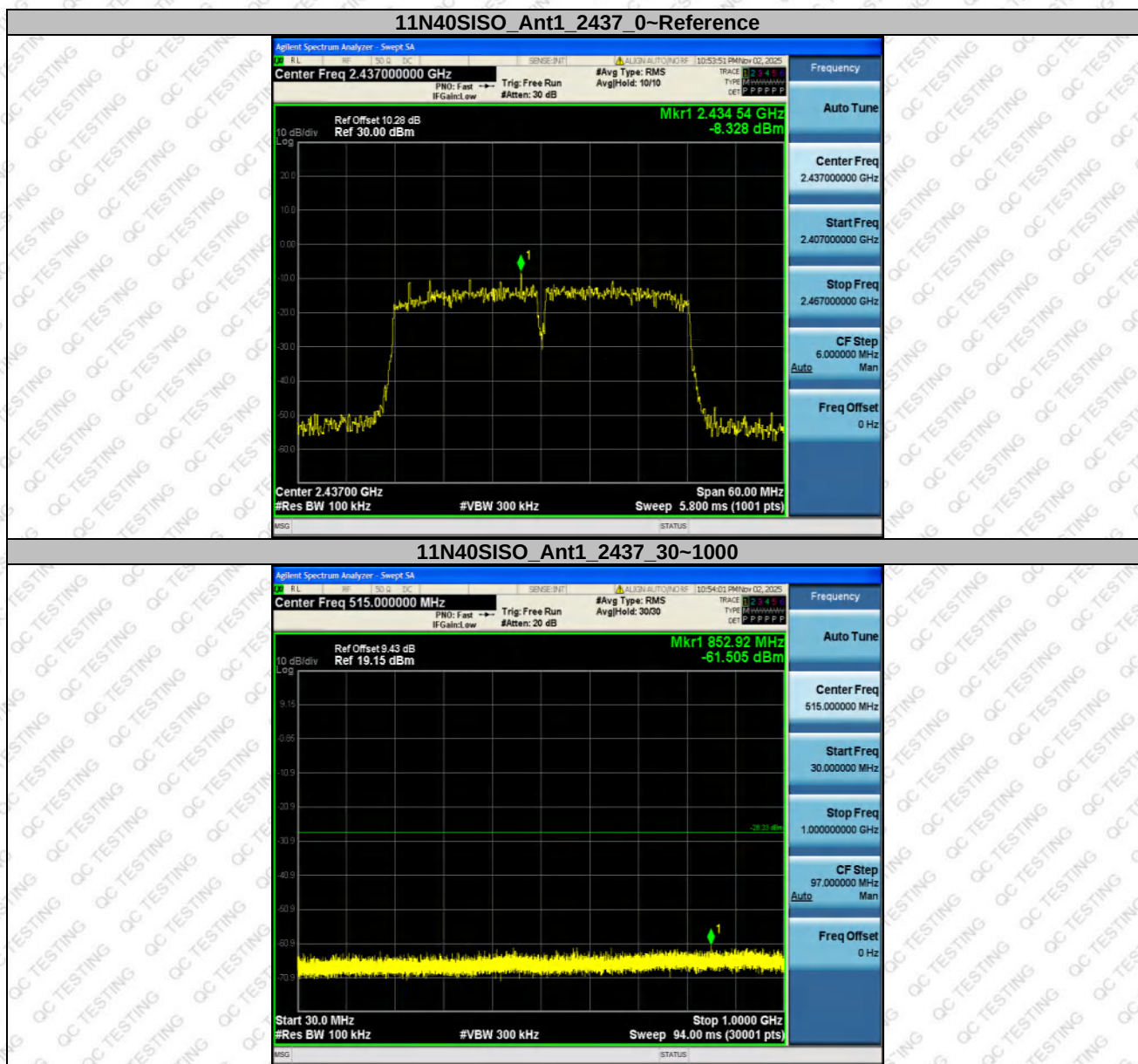


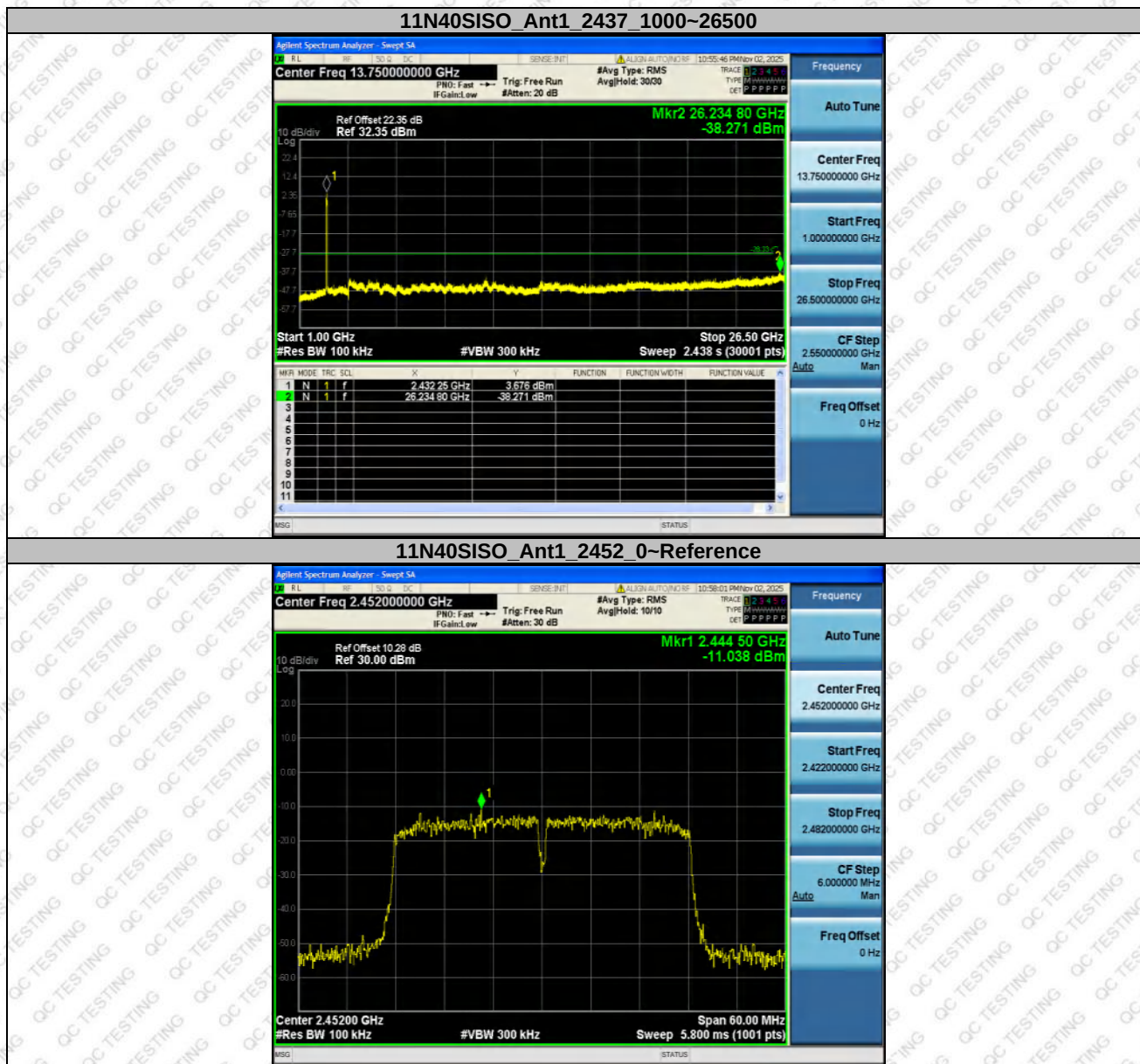


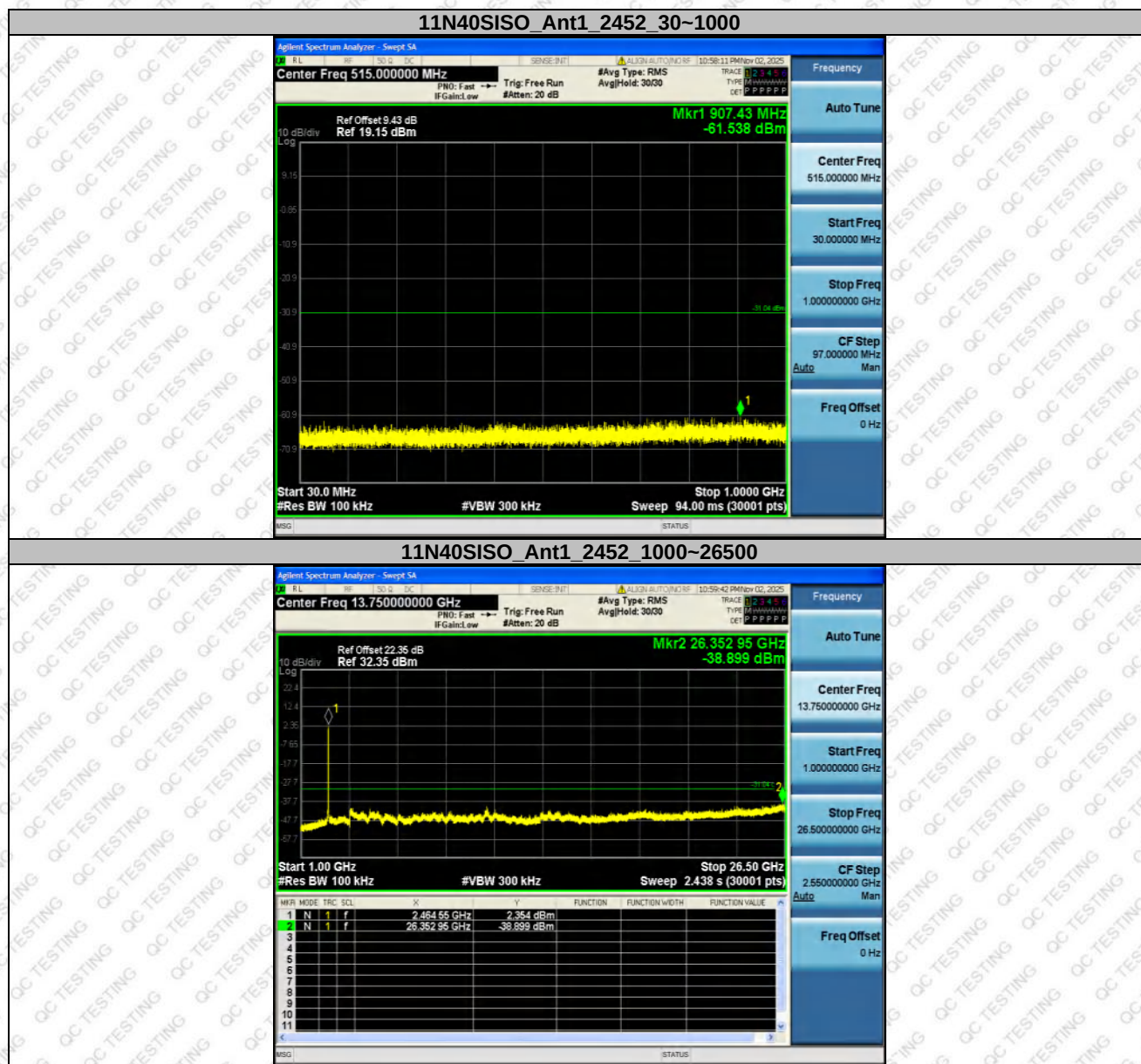












9.2 Radiated Emission Method

9.2.1 Applicable Standard

FCC Part15 C Section 15.209 and 15.205

9.2.2 Limit

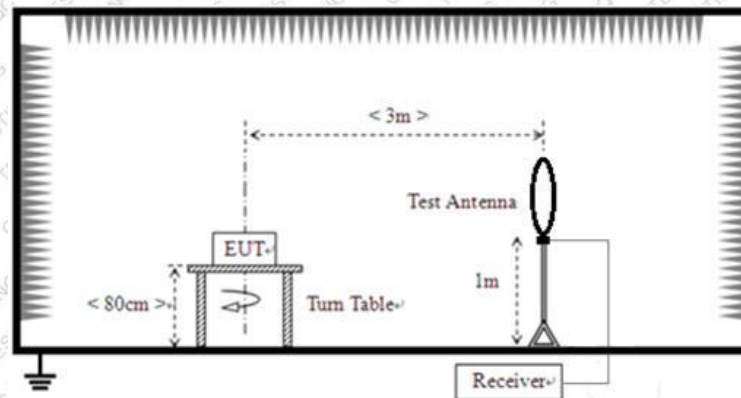
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
1.705MHz-30MHz	30	QP	30m

Frequency	Field Strengths Limits (uV/m at 3 m)	Field Strengths Limits (dBuV/m at 3 m)	Remark
30 – 88	100	40.0	Quasi-peak
88 – 216	150	43.5	Quasi-peak
216 – 960	200	46.0	Quasi-peak
Above 960	500	54.0	Quasi-peak
Above 1GHz	/	54.0	Peak
		74.0	Average

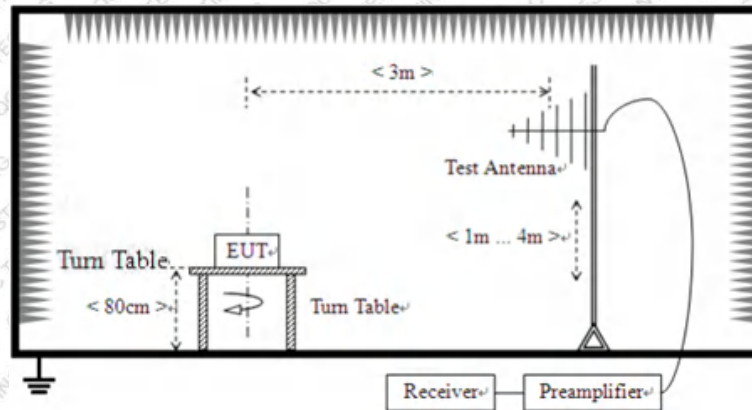
Note: dBuV/m = 20log(uV/m)

9.2.3 Test setup

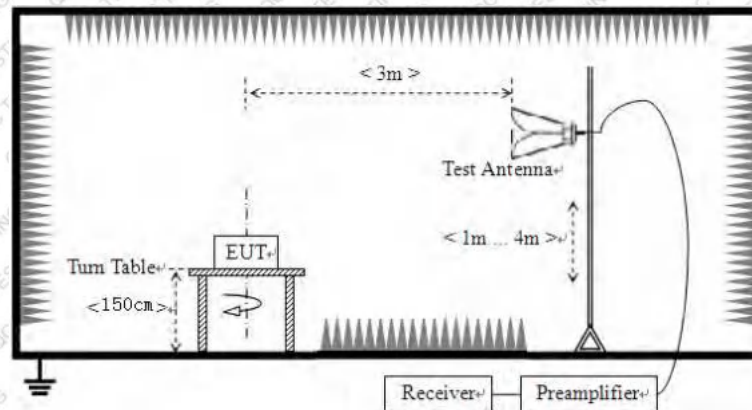
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



9.2.4 EMI Test Receiver Setup

Frequency	RBW	VBW	IF B/W	Measurement
9KHz-150KHz	200Hz	600Hz	/	QP
150KHz-30MHz	9KHz	30KHz	/	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz	/	Average

Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.

9.2.5 Test procedure

- The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna



are set to make the measurement.

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

9.2.6 Test Data

Temperature	25-26 °C	Humidity	49-54 %
ATM Pressure	101.1kPa	Antenna Gain	3.85dBi
Test by	Fan Yang	Test result	PASS

Remarks:

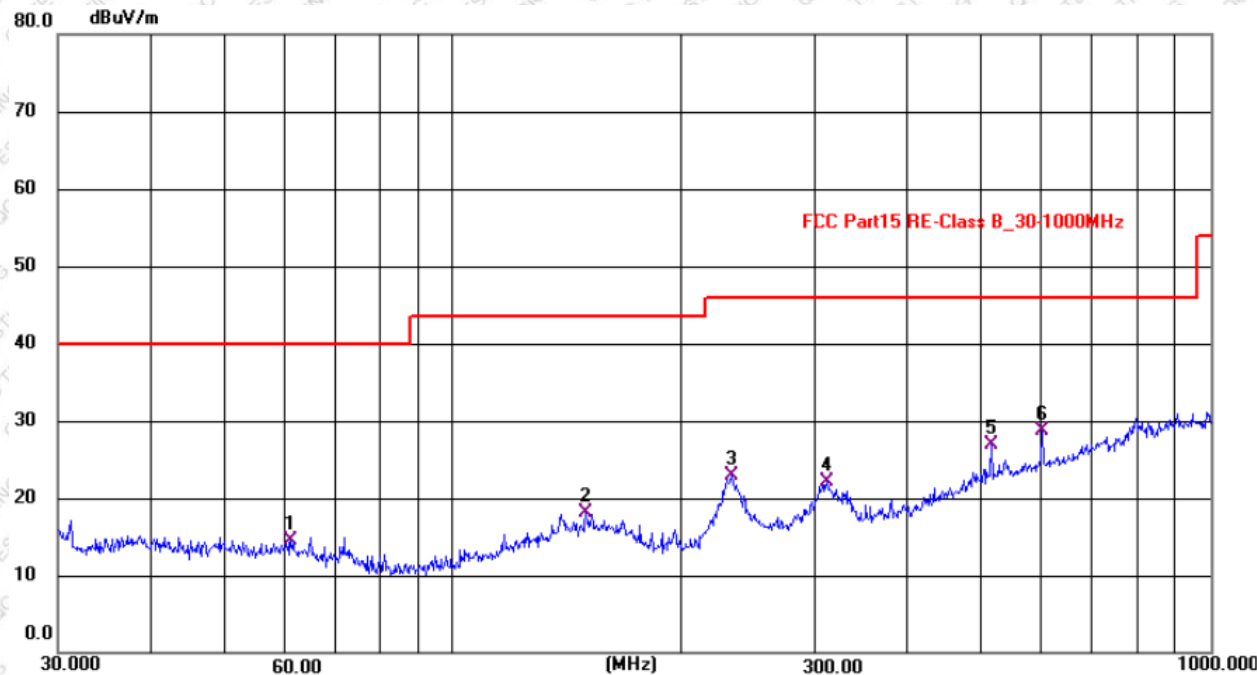
1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y- axis which it is worse case.
2. Data of measurement within frequency range 9kHz-30MHz, 18-26GHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report.



Below 1GHz

Pre-scan all test modes, found worst case at 802.11g mode 2412MHz, and so only show the test result of 802.11g mode 2412MHz

Horizontal:

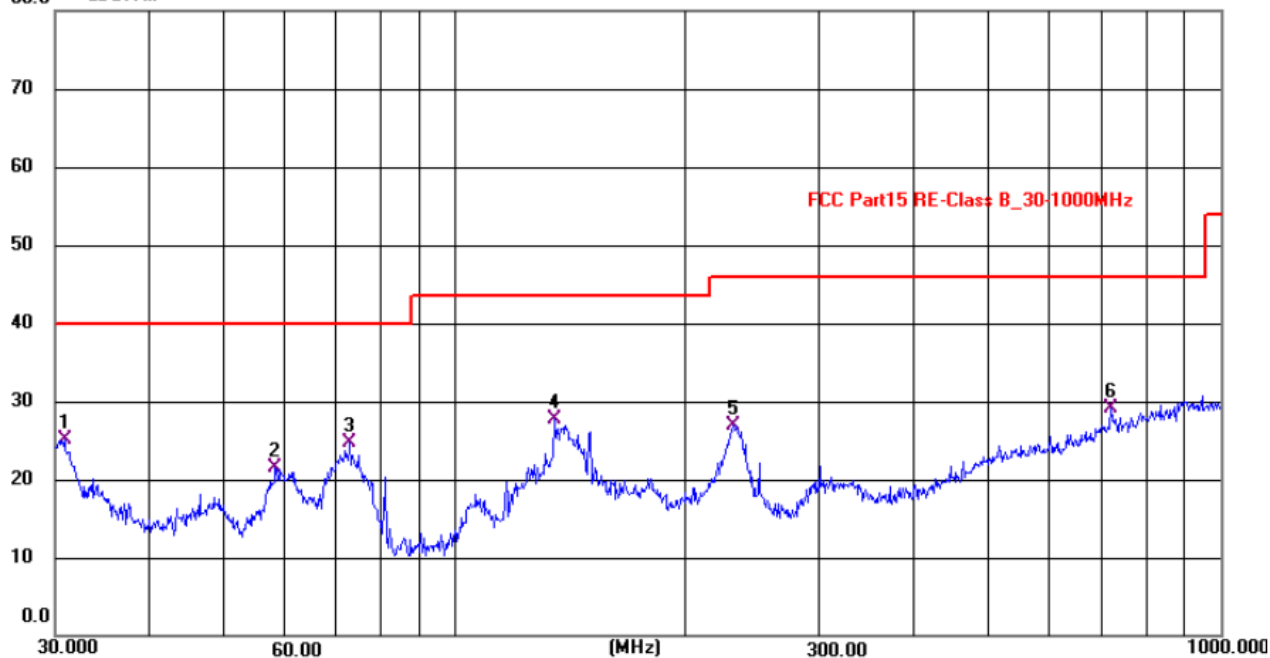


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	60.9496	30.19	-15.70	14.49	40.00	-25.51	QP
2	149.9845	31.60	-13.43	18.17	43.50	-25.33	QP
3	232.9399	38.81	-15.96	22.85	46.00	-23.15	QP
4	311.4687	35.72	-13.62	22.10	46.00	-23.90	QP
5	514.3541	35.85	-8.85	27.00	46.00	-19.00	QP
6 *	600.0573	35.90	-7.14	28.76	46.00	-17.24	QP



Vertical:

80.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.8914	39.79	-14.78	25.01	40.00	-14.99	QP
2	58.2949	36.80	-15.36	21.44	40.00	-18.56	QP
3	72.9617	42.70	-17.96	24.74	40.00	-15.26	QP
4	135.0319	42.18	-14.54	27.64	43.50	-15.86	QP
5	231.0688	42.94	-16.01	26.93	46.00	-19.07	QP
6	720.4616	33.73	-4.70	29.03	46.00	-16.97	QP



Above 1GHz

Frequency (MHz)	Read Level (dBμV)	polarization	Factor (dB/m)	Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector
11b Low Channel							
2310	46.79	H	0.94	47.73	74	-26.27	peak
2310	52.33	V	0.92	53.25	74	-20.75	peak
2390	57.43	H	1.16	58.59	74	-15.41	peak
2390	41.31	H	1.16	42.47	54	-11.53	AVG
2390	53.16	V	1.1	54.26	74	-19.74	peak
2390	42.55	V	1.1	43.65	54	-10.35	AVG
2400	57.89	H	-5.61	52.28	74	-21.72	peak
2400	53.88	V	-5.61	48.27	74	-25.73	peak
4824	46.79	H	0.94	47.73	74	-26.27	peak
4824	52.33	V	0.92	53.25	74	-20.75	peak
11b Middle Channel							
4874	55.44	H	-5.47	49.97	74	-24.03	peak
4874	62.31	V	-5.47	56.84	74	-17.16	peak
11b High Channel							
2483.5	59.16	H	1.4	60.56	74	-13.44	peak
2483.5	43.22	H	1.4	44.62	54	-9.38	AVG
2483.5	48.77	V	1.3	50.07	74	-23.93	peak
2500	50.13	H	1.43	51.56	74	-22.44	peak
2500	53.16	V	1.33	54.49	74	-19.51	peak
4924	50.13	H	-5.32	44.81	74	-29.19	peak
4924	54.33	V	-5.32	49.01	74	-24.99	peak



11g Low Channel							
2310	46.33	H	0.94	47.27	74	-26.73	peak
2310	55.63	V	0.92	56.55	74	-17.45	peak
2390	54.77	H	1.16	55.93	74	-18.07	peak
2390	41.33	H	1.16	42.49	54	-11.51	AVG
2390	56.16	V	1.1	57.26	74	-16.74	peak
2390	36.79	V	1.1	37.89	54	-16.11	AVG
2400	54.16	H	-5.61	48.55	74	-25.45	peak
2400	53.16	V	-5.61	47.55	74	-26.45	peak
4824	45.19	H	0.94	46.13	74	-27.87	peak
4824	51.39	V	0.92	52.31	74	-21.69	peak
11g Middle Channel							
4874	58.63	H	-5.47	53.16	74	-20.84	peak
4874	54.13	V	-5.47	48.66	74	-25.34	peak
11g High Channel							
2483.5	53.26	H	1.4	54.66	74	-19.34	peak
2483.5	40.28	H	1.4	41.68	54	-12.32	AVG
2483.5	45.28	V	1.3	46.58	74	-27.42	peak
2500	49.63	H	1.43	51.06	74	-22.94	peak
2500	47.85	V	1.33	49.18	74	-24.82	peak
4924	56.39	H	-5.32	51.07	74	-22.93	peak
4924	54.39	V	-5.32	49.07	74	-24.93	peak



11n20 Low Channel							
2310	48.63	H	0.94	49.57	74	-24.43	peak
2310	44.63	V	0.92	45.55	74	-28.45	peak
2390	45.77	H	1.16	46.93	74	-27.07	peak
2390	36.79	H	1.16	37.95	54	-16.05	AVG
2390	49.31	V	1.1	50.41	74	-23.59	peak
2400	57.36	H	-5.61	51.75	74	-22.25	peak
2400	54.16	V	-5.61	48.55	74	-25.45	peak
4824	60.13	H	0.94	61.07	74	-12.93	peak
4824	50.33	V	0.92	51.25	74	-22.75	peak
2310	49.78	H	1.16	50.94	74	-23.06	peak
2310	36.45	H	1.16	37.61	54	-16.39	AVG
2390	48.77	H	0.94	49.71	74	-24.29	peak
2390	50.12	V	0.92	51.04	74	-22.96	peak
11n20 Middle Channel							
4874	54.12	H	-5.47	48.65	74	-25.35	peak
4874	59.63	V	-5.47	54.16	74	-19.84	peak
11n20 High Channel							
2483.5	54.32	H	1.4	55.72	74	-18.28	peak
2483.5	45.61	H	1.4	47.01	54	-6.99	AVG
2483.5	47.36	V	1.3	48.66	74	-25.34	peak
2500	51.31	H	1.43	52.74	74	-21.26	peak
2500	48.69	V	1.33	50.02	74	-23.98	peak
4924	50.13	H	-5.32	44.81	74	-29.19	peak
4924	53.49	V	-5.32	48.17	74	-25.83	peak



11n40 Low Channel							
2310	53.22	H	0.94	54.16	74	-19.84	peak
2310	47.63	V	0.92	48.55	74	-25.45	peak
2390	49.88	H	1.16	51.04	74	-22.96	peak
2390	56.32	V	1.1	57.42	74	-16.58	peak
2400	48.11	H	1.02	49.13	74	-24.87	peak
2400	50.13	V	1.09	51.22	74	-22.78	peak
4824	43.65	H	-5.61	38.04	74	-35.96	peak
4824	46.33	V	-5.61	40.72	74	-33.28	peak
2310	49.77	H	0.94	50.71	74	-23.29	peak
2310	43.12	V	0.92	44.04	74	-29.96	peak
2390	46.31	H	1.16	47.47	74	-26.53	peak
2390	38.77	H	1.16	39.93	54	-14.07	AVG
11n40 Middle Channel							
4874	54.63	H	-5.47	49.16	74	-24.84	peak
4874	62.33	V	-5.47	56.86	74	-17.14	peak
11n40 High Channel							
2483.5	53.16	H	1.4	54.56	74	-19.44	peak
2483.5	41.19	H	1.4	42.59	54	-11.41	AVG
2483.5	44.36	V	1.3	45.66	74	-28.34	peak
2500	42.58	H	1.43	44.01	74	-29.99	peak
2500	43.18	V	1.33	44.51	74	-29.49	peak
4924	52.33	H	-5.32	47.01	74	-26.99	peak
4924	53.17	V	-5.32	47.85	74	-26.15	peak

Remarks:

1. Level = Receiver Read level + Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. If the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in above table if the peak value complies with average limit.

----- THE END OF TEST REPORT -----