TEST REPORT

Applicant Name:	Meizhou Guo Wei Electronics Co., Ltd.
Address:	AD1 Section, Economic Development Area, Dongsheng Industrial District, Meizhou, Guangdong, China.
Report Number:	2501R50711E-RFB
FCC ID:	2ARRB-VM75GPBU
IC:	20353-VM75GPBU

Test Standard (s)

FCC PART 15.247; RSS-GEN ISSUE 5, FEBRUARY 2021 AMENDMENT 2; RSS-247 ISSUE 3, AUGUST 2023

Sample Description

Product Type:	Video baby monitor
Model No.:	VM75GPBU
Multiple Model(s) No.:	N/A
Trade Mark:	Motorola
Date Received:	2025/03/31
Issue Date:	2025/09/03

Test Result:	Pass▲

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

Prepared and Checked By:

Bruce Lin

Bruce Lin
RF Engineer

Approved By:

Michelle Zeng

Michelle Zeng
RF Supervisor

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

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

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2501R50711E-RFB	Original Report	2025/09/03

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

HVIN	VM75GPBU
FVIN	N/A
Product	Video baby monitor
Tested Model	VM75GPBU
Multiple Model(s)	N/A
Frequency Range	2405-2475MHz
Maximum conducted Peak output power	15.52 dBm
Modulation Technique	GFSK
Antenna Specification#	2.09dBi (provided by the applicant)
Voltage Range	DC 5V by adapter
Sample number	30MK-1 for RF Conducted Test 30MK-3 for Radiated Emissions (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Adapter 1 Model: AT-538A-050100A Input: AC 100-240V, 50/60Hz 0.2A MAX. Output: DC 5.0V, 1.0A 5.0W Adapter 2 Model: EP04-050100WXLZ Input: AC 100-240V, 50/60Hz 0.2A Max. Output: DC 5.0V, 1.0A 5.0W

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules and RSS-247 Issue 3, August 2023, RSS-GEN Issue 5, Feb. 2021Amendment 2 of the Innovation, Science and Economic Development Canada rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020 + Cor.1-2023▾, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and RSS-247 Issue 3, August 2023, RSS-GEN Issue 5, Feb. 2021 Amendment 2 of the Innovation, Science and Economic Development Canada rules.

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.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		109.2kHz(k=2, 95% level of confidence)
RF Frequency		56.6Hz(k=2, 95% level of confidence)
RF output power, conducted		0.86dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.60dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9 kHz~150 KHz	3.63dB(k=2, 95% level of confidence)
	150 kHz ~30MHz	3.66dB(k=2, 95% level of confidence)
Radiated Emissions	9kHz - 30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.34dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.40dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.64dB(k=2, 95% level of confidence)
Temperature		±1℃
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.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0023.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

Channel list

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2405	9	2424	18	2444	27	2467
1	2407	10	2426	19	2446	28	2469
2	2409	11	2428	20	2450	29	2471
3	2411	12	2430	21	2452	30	2473
4	2413	13	2433	22	2454	31	2475
5	2415	14	2435	23	2456	/	/
6	2418	15	2437	24	2458.5	/	/
7	2420	16	2439	25	2460.5	/	/
8	2422	17	2441	26	2462.5	/	/
Note: EUT was test in channel 0, 16, 31.							

EUT Exercise Software

Test in the engineering mode and the power level is Default#. The power level was provided by the manufacturer.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

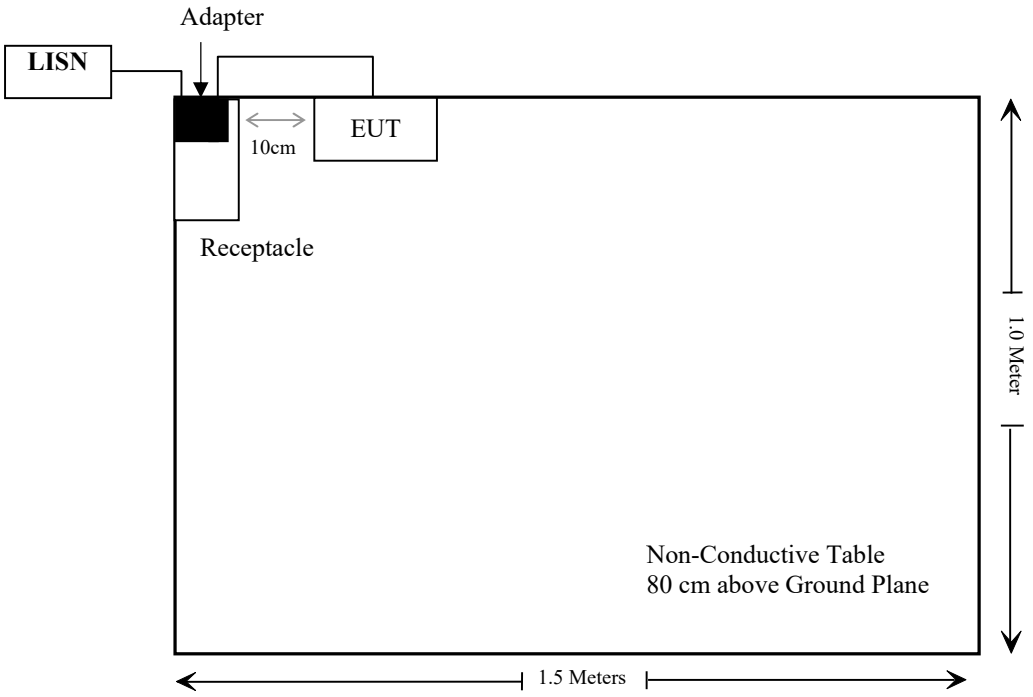
Manufacturer	Description	Model	Serial Number
OUPU	Receptacle	PDU-OP1606K	6971041358020

External I/O Cable

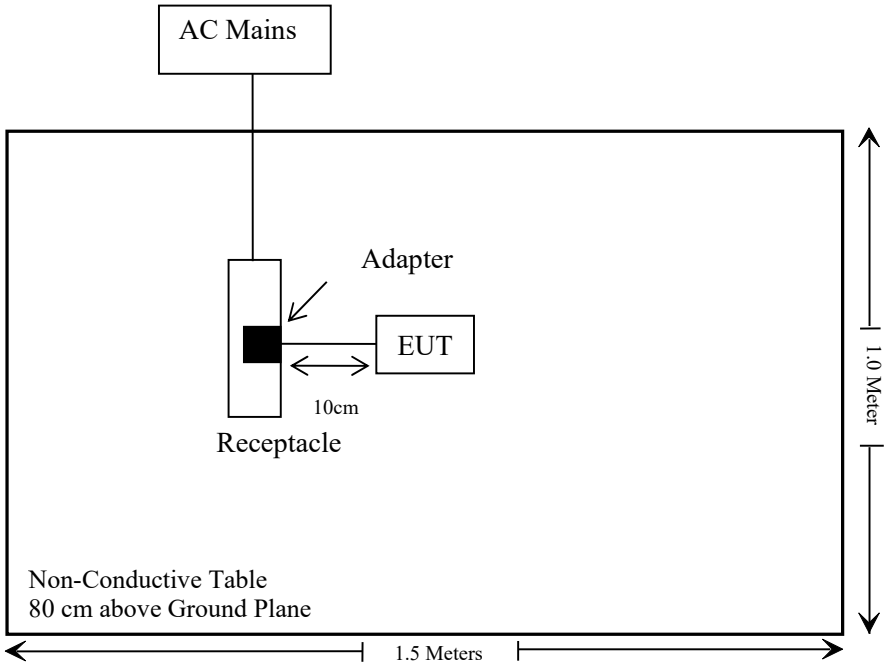
Cable Description	Length (m)	From Port	To
Un-shielded detachable AC cable	1.2	AC mains/LISN	Receptacle
Un-shielded Un-detachable DC cable	1.2	Adapter	EUT

Block Diagram of Test Setup

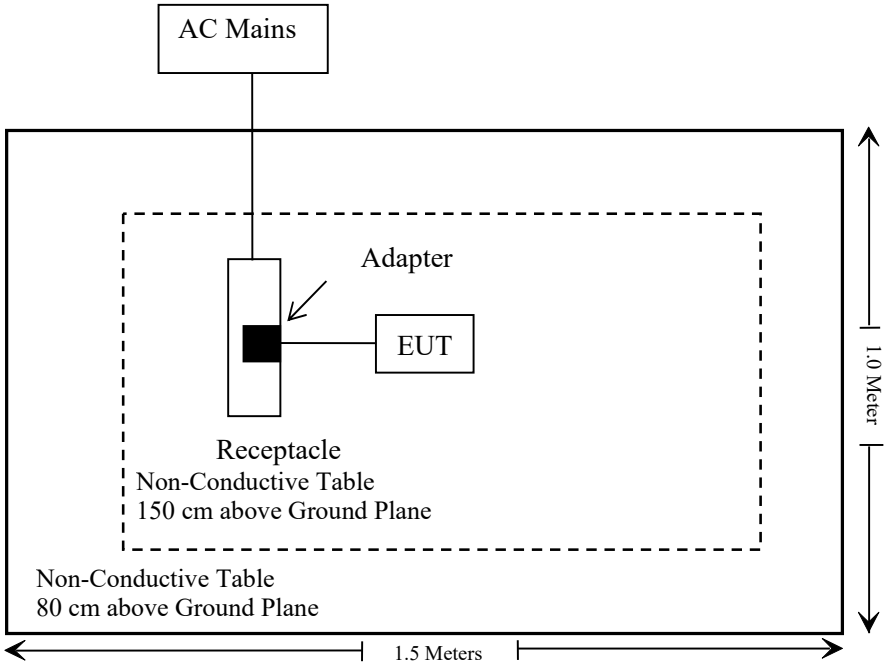
For Conducted Emission



For Radiated Emission below 1GHz



For Radiated Emission above 1GHz



SUMMARY OF TEST RESULTS

FCC Rules	ISEDC Rules	Description of Test	Result
§2.1091	/	MPE-Based Exemption	Compliant
/	RSS-102 § 6.6	Field reference level exposure exemption limits	Compliant
§15.203	RSS-Gen §6.8	Antenna Requirement	Compliant
§15.207(a)	RSS-Gen §8.8	AC Line Conducted Emissions	Compliant
§15.205, §15.209 & §15.247(d)	RSS-247 § 5.5	Radiated Emissions	Compliant
§15.247(a)(1)	RSS- Gen§6.7, RSS-247 § 5.1 (a)	99% Occupied Bandwidth & 20 dB Emission Bandwidth	Compliant
§15.247(a)(1)	RSS-247 § 5.1 (b)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	RSS-247 § 5.1 (d)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	RSS-247 § 5.1 (d)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	RSS-247 § 5.1(b) &§ 5.4(b)	Peak Output Power Measurement	Compliant
§15.247(d)	RSS-247 § 5.5	Band edges	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/12/04	2025/12/03
Rohde & Schwarz	LISN	ENV216	101613	2024/12/04	2025/12/03
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2024/05/21	2025/05/20
Unknown	CE Cable	Unknown	UF A210B-1-0720-504504	2024/05/21	2025/05/20
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2025/03/26	2026/03/25
A.H.System	Preamplifier	PAM-0118P	489	2024/11/15	2025/11/14
Schwarzbeck	Horn Antenna	BBHA9120D (1201)	1143	2023/07/26	2026/07/25
Unknown	RF Cable	KMSE	735	2024/12/06	2025/12/05
Unknown	RF Cable	UFA147	219661	2024/12/06	2025/12/05
Unknown	RF Cable	XH750A-N	J-10M	2024/12/06	2025/12/05
JD	Filter Switch Unit	DT7220FSU	DS79906	2024/09/09	2025/09/08
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2024/09/09	2025/09/08
A.H.System	Pre-amplifier	PAM-1840VH	190	2024/06/18	2025/06/17
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
Audix	EMI Test software	E3	191218(V9)	NCR	NCR

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2024/12/04	2025/12/03
Unknown	10dB Attenuator	Unknown	F-03-EM190	2024/06/27	2025/06/26

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

FCC 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 v01 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^2f.
1,500-100,000	19.2R^2.

Ris the minimum separation distance in meters
f = frequency in MHz

Result

Frequency (MHz)	Tune up conducted power# (dBm)	Antenna Gain#		ERP		Evaluation Distance (m)	ERP Limit (W)
		(dBi)	(dBd)	(dBm)	(W)		
2405-2475	16	2.09	-0.06	15.94	0.039	0.2	0.768

Note: The tune up conducted power# and antenna gain# were declared by the applicant.

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

Result: Compliant

RSS-102 § 6.6 - FIELD REFERENCE LEVEL EXPOSURE EXEMPTION LIMITS

Applicable Standard

According to RSS-102 Issue 6§6.6:

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 1 W (adjusted for tune-up tolerance)

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz

- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance)

- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834} W$ (adjusted for tune-up tolerance), where f is in MHz

- at or above 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 5 W (adjusted for tune-up tolerance) In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the EIRP was derived.

Test Result:

For worst case:

Mode	Frequency (MHz)	Gain# (dBi)	Max tune-up conducted power# (dBm)	Max tune-up EIRP# (dBm)	Max tune-up EIRP# (W)	Distance (m)	Exemption Limit (W)	SAR Evaluation Exemption
GFSK	2405-2475	2.09	16.0	18.09	0.064	0.2	2.679	Yes

Note: The tune up conducted power# and antenna gain# were declared by the applicant.

Result: Compliant

FCC §15.203 & RSS-GEN §6.8 - ANTENNA REQUIREMENT

Applicable Standard

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

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer. The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:
This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

Antenna Connector Construction

The EUT has one internal antenna arrangements which were permanently attached and fulfill the requirement of this section. Please refer to the EUT photos.

Type	Antenna Gain#	Impedance
Monopole	2.09dBi	50Ω

Result: Compliant

FCC §15.207 (a) & RSS-GEN §8.8 - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a) & RSS-Gen §8.8

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 µH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Table 4 - AC Power Lines Conducted Emission Limits		
Frequency range (MHz)	Conducted limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56[1]	56 to 46[1]
0.5 – 5	56	46
5 – 30	60	50

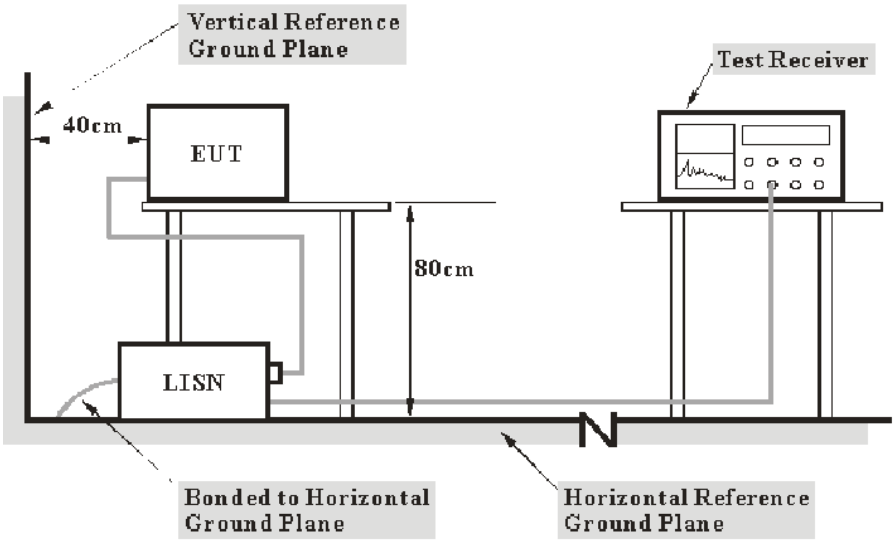
Note 1: The level decreases linearly with the logarithm of the frequency.

For an EUT with a permanent or detachable antenna operating between 150 kHz and 30 MHz, the AC power-line conducted emissions must be measured using the following configurations:

(a) Perform the AC power-line conducted emissions test with the antenna connected to determine compliance with the limits of table 4 outside the transmitter's fundamental emission band.

(b) Retest with a dummy load instead of the antenna to determine compliance with the limits of table 4 within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network that simulates the antenna in the fundamental frequency band.

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 measurement procedure of EUT setup is according with ANSI C63.10-2020. The related limit was specified in FCC Part 15.207 and RSS-Gen limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

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	RBW
150 kHz – 30 MHz	9 kHz

Test Procedure

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:

Factor = LISN VDF + 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:

Over Limit = Level – Limit
Level = Read Level + Factor

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

Test Data

Environmental Conditions

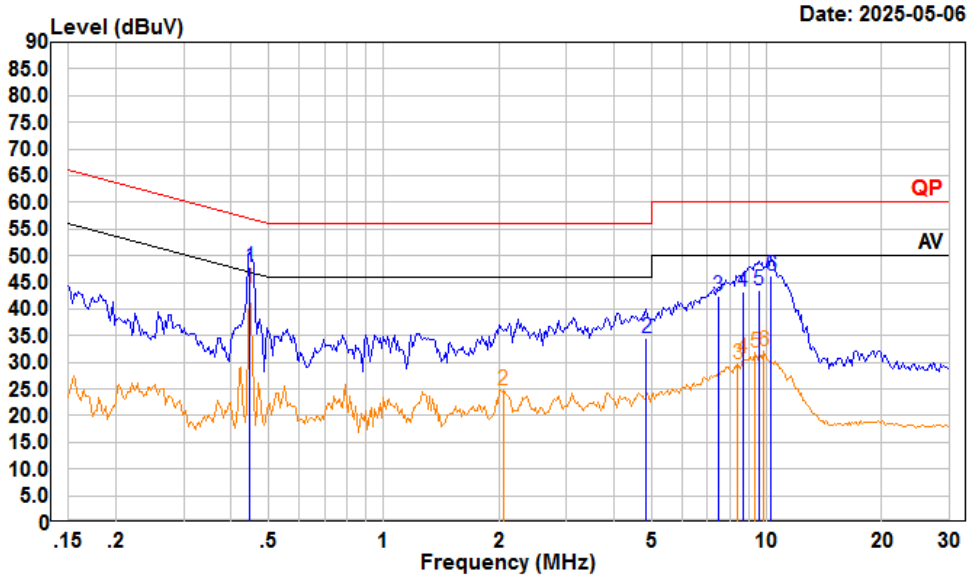
Temperature:	28.1 ℃
Relative Humidity:	64 %
ATM Pressure:	100.1 kPa

The testing was performed by Macy Shi on 2025-05-06.

EUT operation mode: Transmitting (with maximum output power mode, high channel)

For Adapter 1

AC 120V/60 Hz, Line



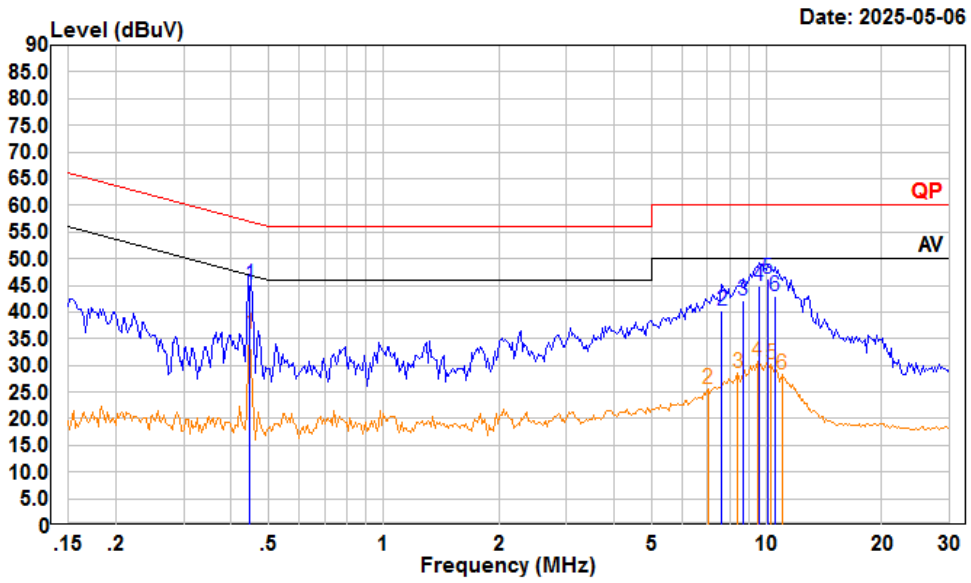
Trace: 1

Condition: Line
Project : 2501R50711E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.447	27.30	47.94	10.52	10.12	56.93	-8.99	QP
2	4.848	13.60	34.58	10.80	10.18	56.00	-21.42	QP
3	7.486	21.61	42.34	10.54	10.19	60.00	-17.66	QP
4	8.683	22.60	43.22	10.42	10.20	60.00	-16.78	QP
5	9.552	23.10	43.65	10.34	10.21	60.00	-16.35	QP
6	10.288	25.80	46.31	10.30	10.21	60.00	-13.69	QP

	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.447	23.09	43.73	10.52	10.12	46.93	-3.20	Average
2	2.055	3.56	24.84	11.09	10.19	46.00	-21.16	Average
3	8.412	9.12	29.77	10.45	10.20	50.00	-20.23	Average
4	8.683	10.15	30.77	10.42	10.20	50.00	-19.23	Average
5	9.352	11.35	31.92	10.36	10.21	50.00	-18.08	Average
6	9.861	11.51	32.03	10.31	10.21	50.00	-17.97	Average

AC 120V/60 Hz, Neutral



Trace: 1

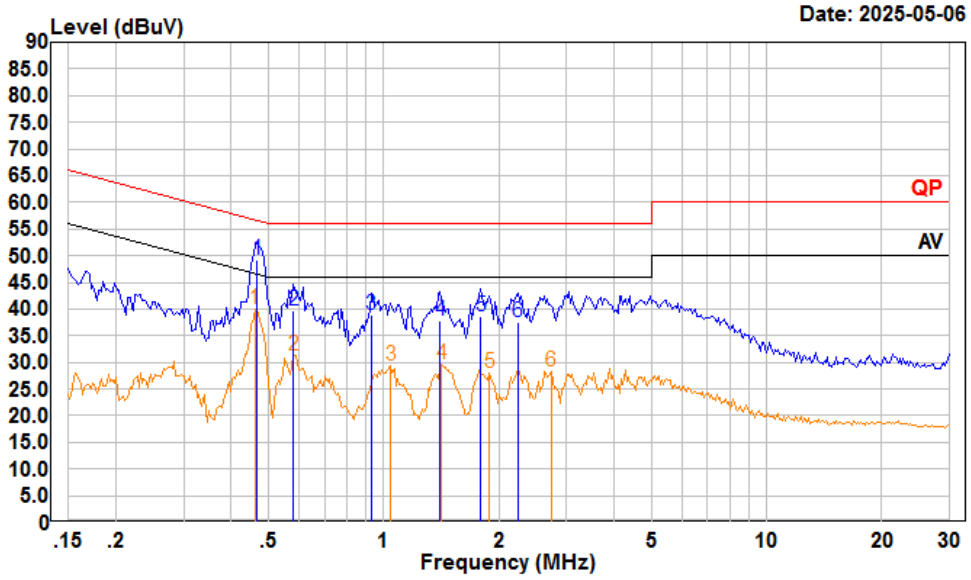
Condition: Neutral
Project : 2501R50711E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.447	24.50	45.16	10.54	10.12	56.93	-11.77	QP
2	7.646	19.50	40.27	10.58	10.19	60.00	-19.73	QP
3	8.683	21.50	42.24	10.54	10.20	60.00	-17.76	QP
4	9.552	24.10	44.82	10.51	10.21	60.00	-15.18	QP
5	10.072	25.40	46.11	10.50	10.21	60.00	-13.89	QP
6	10.508	22.40	43.09	10.48	10.21	60.00	-16.91	QP

	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.447	15.26	35.92	10.54	10.12	46.93	-11.01	Average
2	7.025	4.74	25.53	10.60	10.19	50.00	-24.47	Average
3	8.412	7.76	28.51	10.55	10.20	50.00	-21.49	Average
4	9.451	9.99	30.72	10.52	10.21	50.00	-19.28	Average
5	10.288	9.45	30.15	10.49	10.21	50.00	-19.85	Average
6	10.963	7.56	28.22	10.45	10.21	50.00	-21.78	Average

For Adapter 2

AC 120V/60 Hz, Line



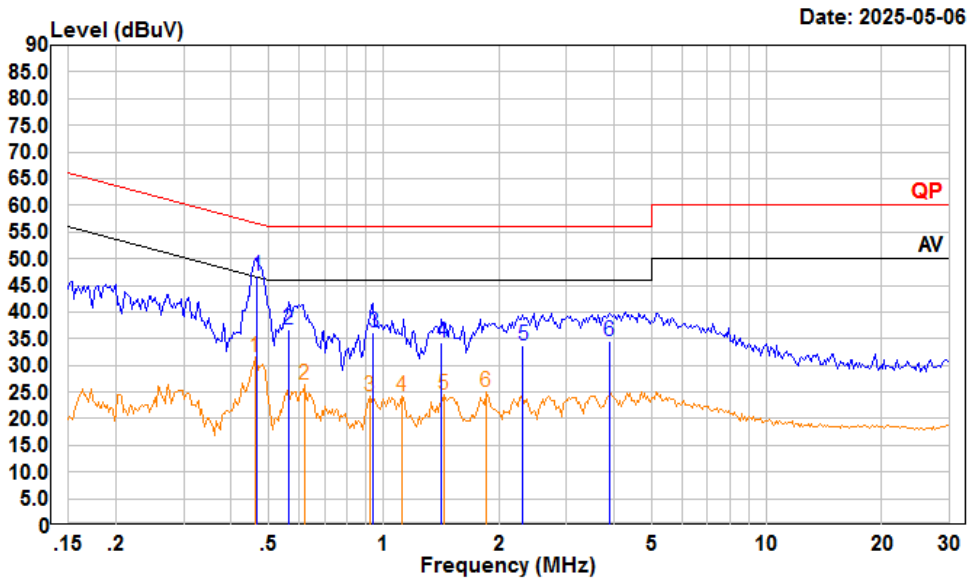
Trace: 1

Condition: Line
Project : 2501R50711E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.466	28.49	49.14	10.52	10.13	56.58	-7.44	QP
2	0.582	18.80	39.60	10.68	10.12	56.00	-16.40	QP
3	0.928	18.11	38.87	10.66	10.10	56.00	-17.13	QP
4	1.403	16.81	37.80	10.84	10.15	56.00	-18.20	QP
5	1.790	17.30	38.50	11.02	10.18	56.00	-17.50	QP
6	2.237	16.40	37.65	11.07	10.18	56.00	-18.35	QP

	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.461	19.27	39.91	10.52	10.12	46.67	-6.76	Average
2	0.582	10.53	31.33	10.68	10.12	46.00	-14.67	Average
3	1.043	8.49	29.24	10.63	10.12	46.00	-16.76	Average
4	1.418	8.69	29.69	10.85	10.15	46.00	-16.31	Average
5	1.888	6.76	28.00	11.06	10.18	46.00	-18.00	Average
6	2.736	7.21	28.39	11.01	10.17	46.00	-17.61	Average

AC 120V/60 Hz, Neutral



Trace: 1

Condition: Neutral
Project : 2501R50711E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz

	Freq	Read Level	LISN Level	Cable Factor	Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.466	26.20	46.85	10.52	10.13	56.58	-9.73	QP
2	0.564	15.99	36.66	10.54	10.13	56.00	-19.34	QP
3	0.938	15.41	36.27	10.76	10.10	56.00	-19.73	QP
4	1.418	13.40	34.30	10.75	10.15	56.00	-21.70	QP
5	2.309	12.90	33.84	10.76	10.18	56.00	-22.16	QP
6	3.881	13.39	34.59	10.99	10.21	56.00	-21.41	QP

	Freq	Read Level	LISN Level	Cable Factor	Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.461	10.93	31.58	10.53	10.12	46.67	-15.09	Average
2	0.621	5.67	26.36	10.56	10.13	46.00	-19.64	Average
3	0.918	3.41	24.26	10.75	10.10	46.00	-21.74	Average
4	1.111	3.24	24.15	10.78	10.13	46.00	-21.85	Average
5	1.433	3.52	24.43	10.75	10.16	46.00	-21.57	Average
6	1.848	4.10	24.99	10.71	10.18	46.00	-21.01	Average

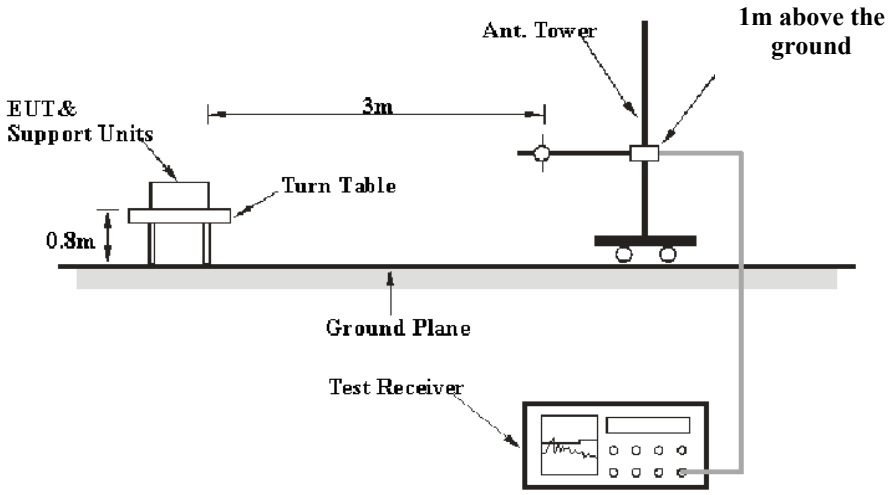
FCC §15.205, §15.209 & §15.247(d) & RSS-247§ 5.5 - RADIATED EMISSIONS

Applicable Standard

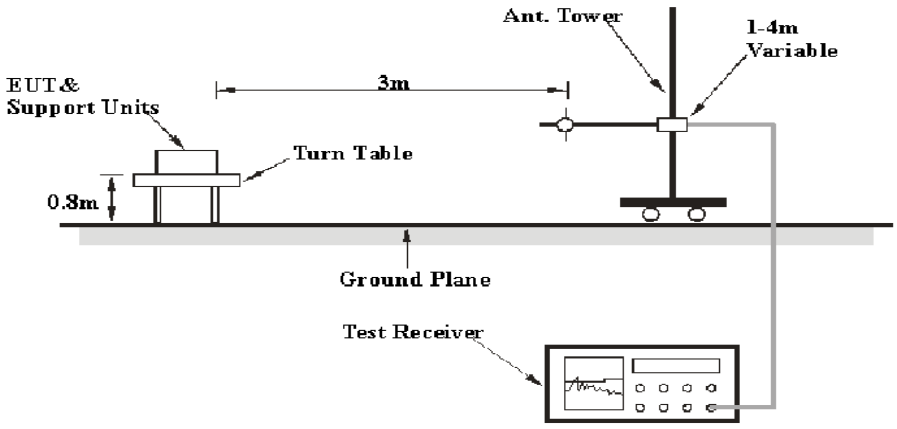
FCC §15.205; §15.209; §15.247(d) and RSS-247§ 5.5; RSS-GEN § 8.10

EUT Setup

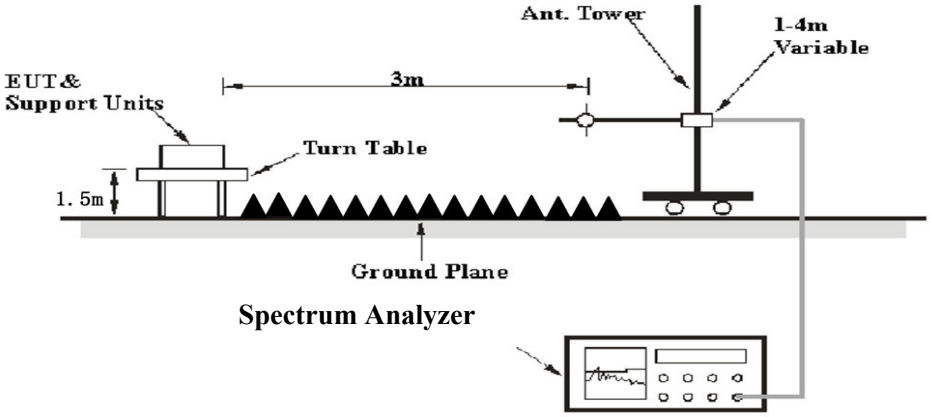
9 kHz-30MHz:



30MHz-1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209, FCC 15.247 limits and RSS-247/RSS-Gen limits.

EMI Test Receiver & Spectrum Analyzer Setup

The EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement	Detector
9 kHz – 150 kHz	/	/	200 Hz	QP	QP
	300 Hz	1 kHz	/	PK	Peak
150 kHz – 30 MHz	/	/	9 kHz	QP	QP
	10 kHz	30 kHz	/	PK	Peak
30 MHz – 1000 MHz	/	/	120 kHz	QP	QP
	100 kHz	300 kHz	/	PK	Peak
Above 1 GHz	Harmonics				
	1MHz	3 MHz	/	PK	Peak
	Average Emission Level=Peak Emission Level+20*log(Duty cycle)				
	Band Edge & Other Emissions				
	1MHz	3 MHz	/	PK	Peak
	1MHz	≥10 Hz	/	Average	Peak

For Duty cycle measurement:

Use the duty cycle factor correction factor method per 15.35(c).
Duty cycle=On time/100milliseconds, On time=N1*L1+N2*L2+…Nn-1*Ln-1+Nn*Ln,
Where N1 is number of type 1 pulses, L1 is length of type 1 pulse, etc.

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.

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.

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:

Factor = Antenna Factor + Cable Loss - 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:

Over Limit/Margin = Level/Corrected Amplitude – Limit
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	21.0~25.3 ℃
Relative Humidity:	46~62 %
ATM Pressure:	100.9~101.1 kPa

The testing was performed by Anson Su on 2025-05-15 for below 1GHz and Wing K Ji on 2025-06-11 for above 1GHz.

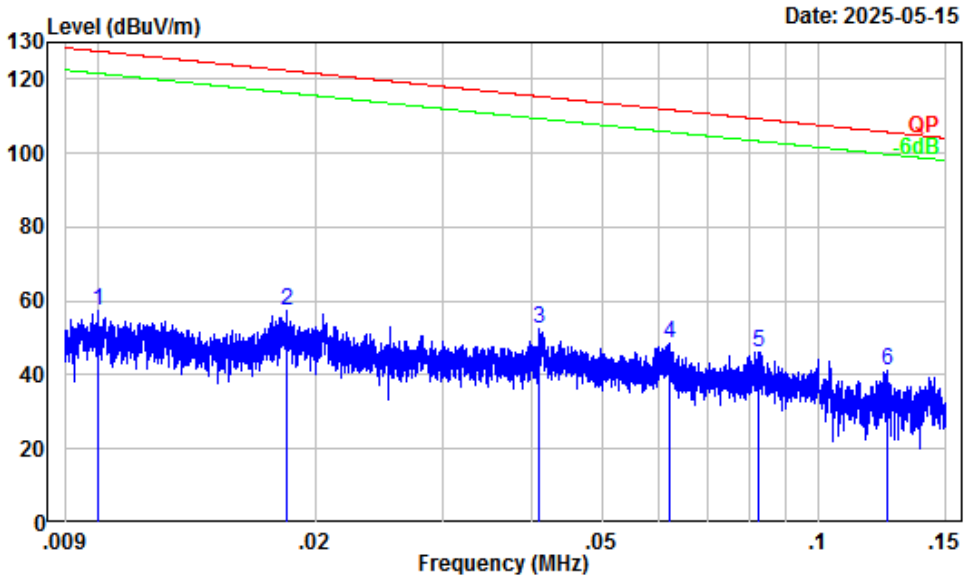
EUT operation mode: Transmitting

1. Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axis of orientation was recorded.
2. The spurious emission from 9 kHz-30MHz of IC RSS-Gen standard, the unit of final result on the test plots are dBμV/m, so the limit should be added by 51,5 dB from dBμA/m to dBμV/m.
3. For 9kHz-1GHz, when the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

For Adapter 1

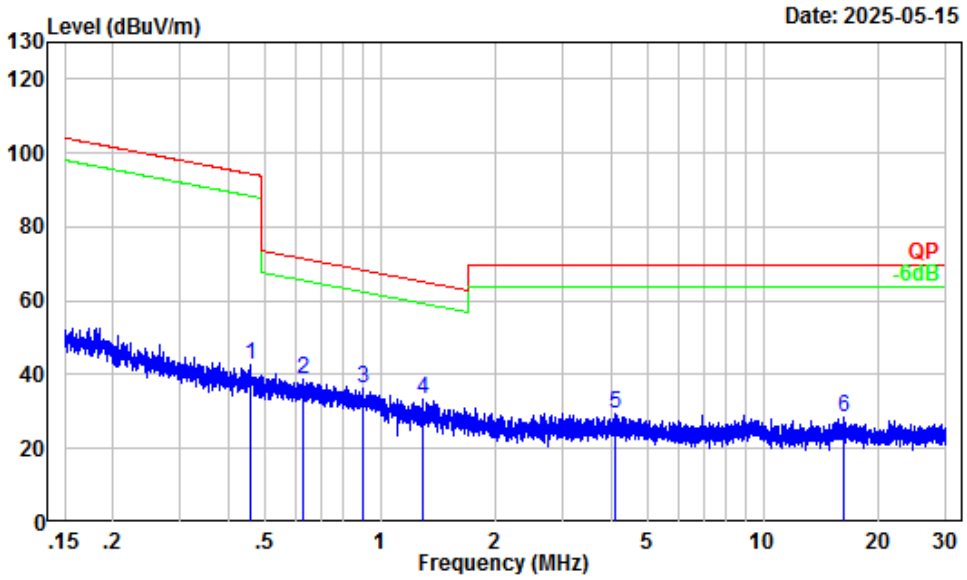
9 kHz-30MHz: *(with maximum output power mode, high channel)*

Parallel (worst case)




```
Site                    : Chamber A
Condition               : 3m
Project Number          : 2501R50711E-RF
Test Mode               : Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester                  : Anson Su
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	32.30	25.05	57.35	127.61	-70.26	Peak
2	0.02	30.72	26.61	57.33	122.36	-65.03	Peak
3	0.04	27.35	25.00	52.35	115.35	-63.00	Peak
4	0.06	25.20	23.51	48.71	111.75	-63.04	Peak
5	0.08	23.23	23.09	46.32	109.28	-62.96	Peak
6	0.12	20.55	20.65	41.20	105.70	-64.50	Peak

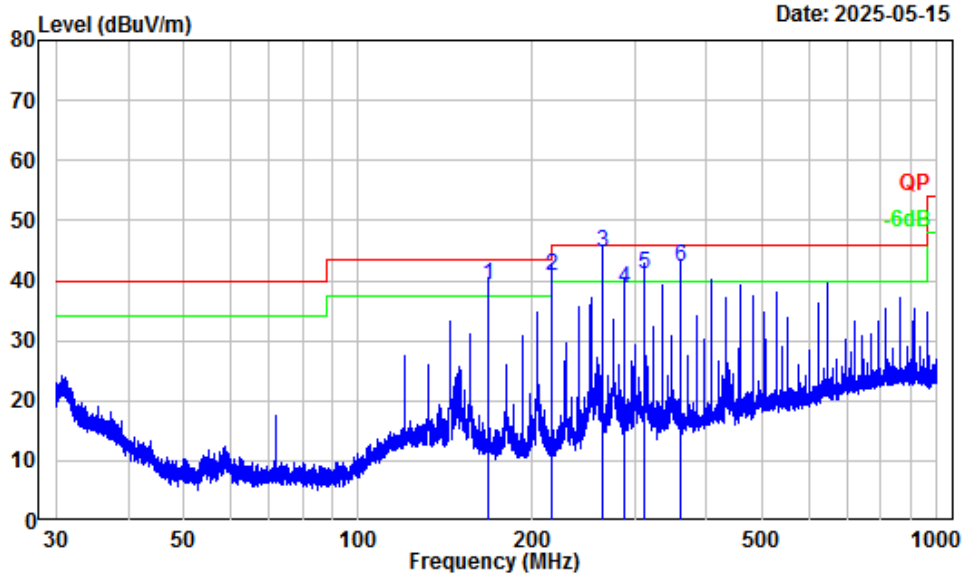


Site : Chamber A
Condition : 3m
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.46	7.19	35.36	42.55	94.38	-51.83	Peak
2	0.63	4.82	33.88	38.70	71.59	-32.89	Peak
3	0.90	1.94	34.23	36.17	68.40	-32.23	Peak
4	1.29	0.40	32.77	33.17	65.24	-32.07	Peak
5	4.11	-2.71	31.97	29.26	69.54	-40.28	Peak
6	16.20	-2.36	30.96	28.60	69.54	-40.94	Peak

30MHz-1GHz: (*with maximum output power mode, high channel)*

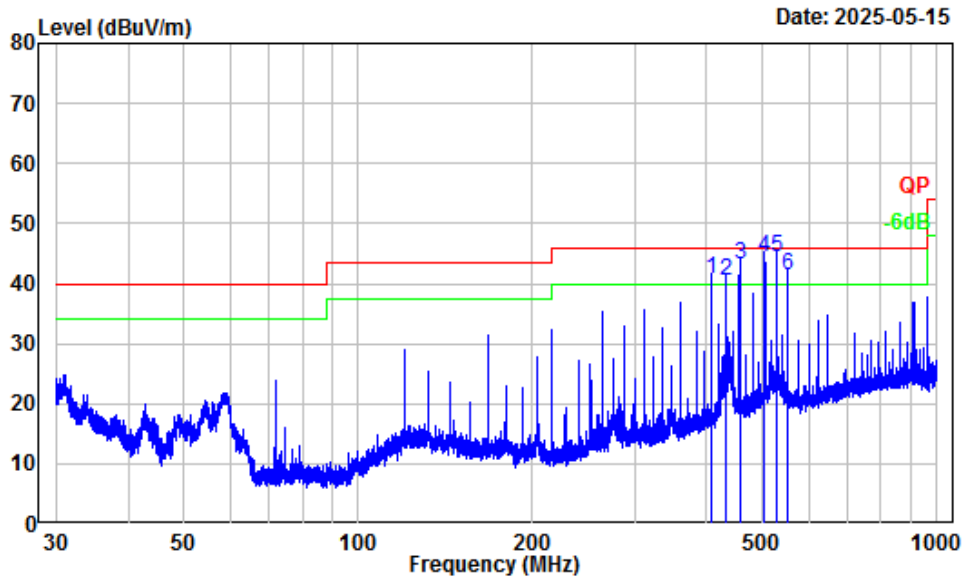
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	168.12	-13.01	52.20	39.19	43.50	-4.31	QP
2	216.02	-14.20	55.09	40.89	46.00	-5.11	QP
3	264.05	-12.35	56.99	44.64	46.00	-1.36	QP
4	287.99	-11.22	50.00	38.78	46.00	-7.22	QP
5	312.04	-11.00	52.10	41.10	46.00	-4.90	QP
6	360.13	-9.88	52.20	42.32	46.00	-3.68	QP

Vertical



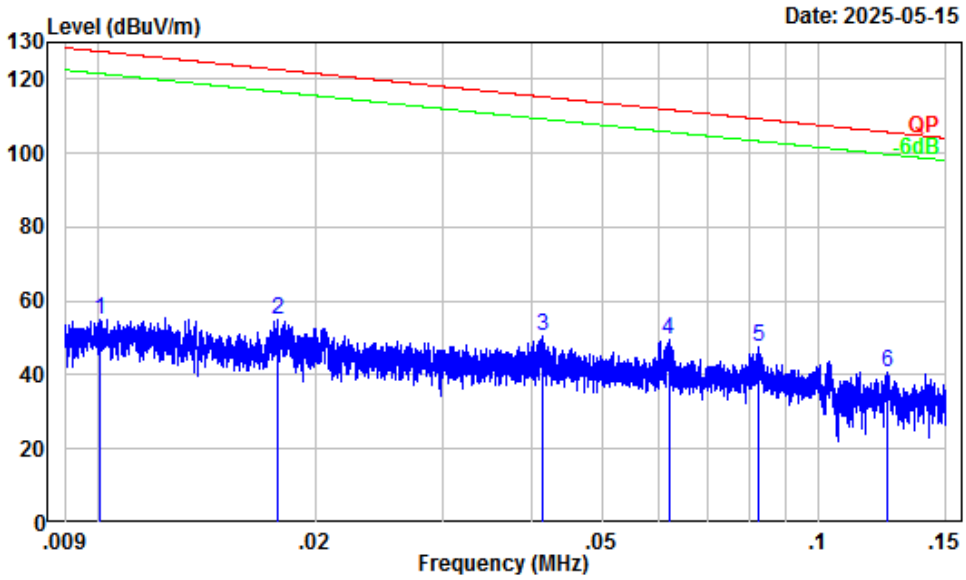
Site : Chamber A
Condition : 3m Vertical
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	408.05	-8.20	48.90	40.70	46.00	-5.30	QP
2	432.17	-7.78	48.20	40.42	46.00	-5.58	QP
3	456.11	-7.24	50.40	43.16	46.00	-2.84	QP
4	504.04	-5.77	50.10	44.33	46.00	-1.67	QP
5	527.78	-5.80	50.20	44.40	46.00	-1.60	QP
6	552.16	-5.39	46.81	41.42	46.00	-4.58	QP

For Adapter 2

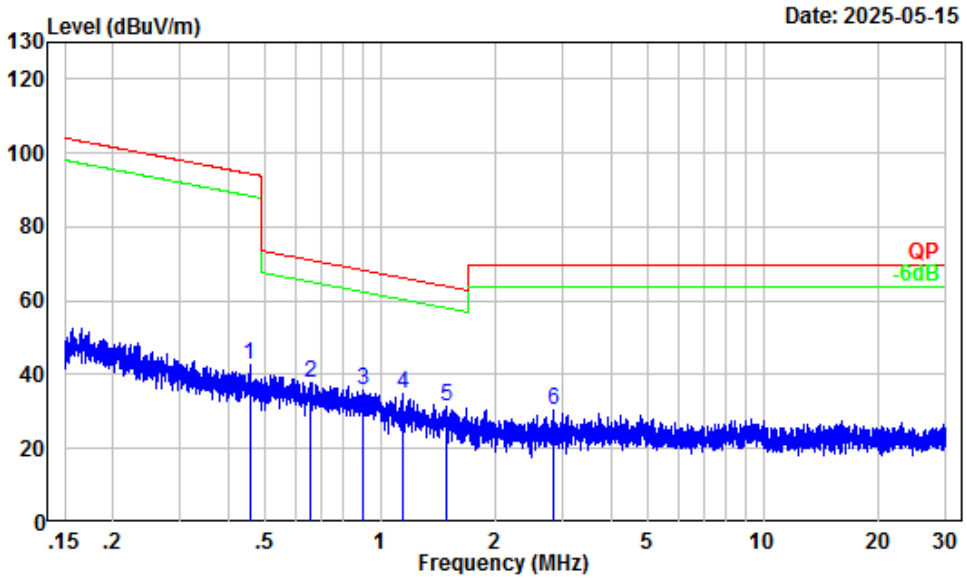
9 kHz-30MHz: *(Maximum output power mode, high channel)*

Parallel (worst case)



Site : Chamber A
Condition : 3m
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	32.28	22.71	54.99	127.53	-72.54	Peak
2	0.02	30.82	24.37	55.19	122.61	-67.42	Peak
3	0.04	27.32	23.09	50.41	115.29	-64.88	Peak
4	0.06	25.21	24.15	49.36	111.77	-62.41	Peak
5	0.08	23.22	24.36	47.58	109.27	-61.69	Peak
6	0.12	20.56	20.26	40.82	105.71	-64.89	Peak

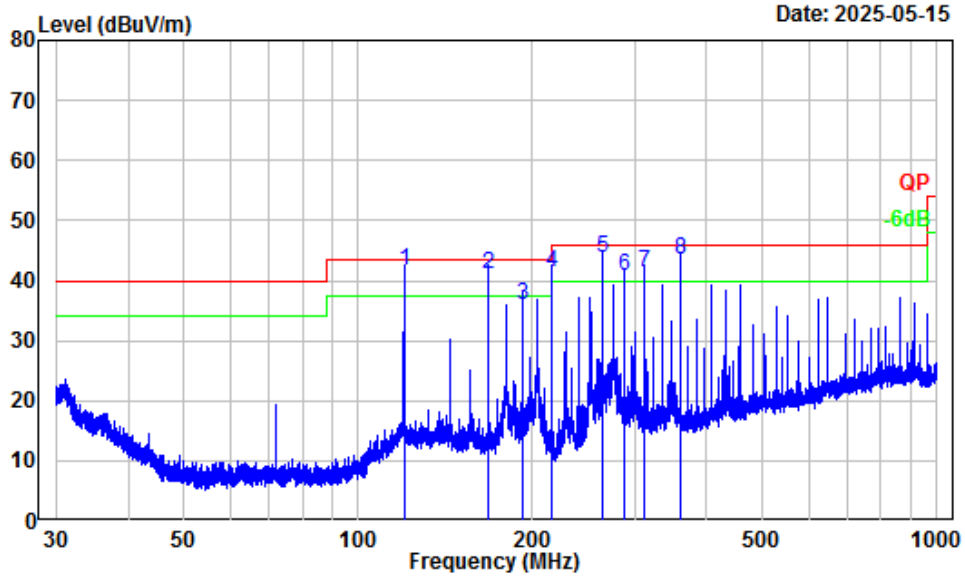


Site : Chamber A
Condition : 3m
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.46	7.25	35.51	42.76	94.44	-51.68	Peak
2	0.65	4.49	33.34	37.83	71.23	-33.40	Peak
3	0.90	1.96	33.75	35.71	68.42	-32.71	Peak
4	1.14	0.80	34.06	34.86	66.28	-31.42	Peak
5	1.49	-0.16	31.35	31.19	63.95	-32.76	Peak
6	2.83	-2.06	32.41	30.35	69.54	-39.19	Peak

30MHz-1GHz: *(Maximum output power mode, high channel)*

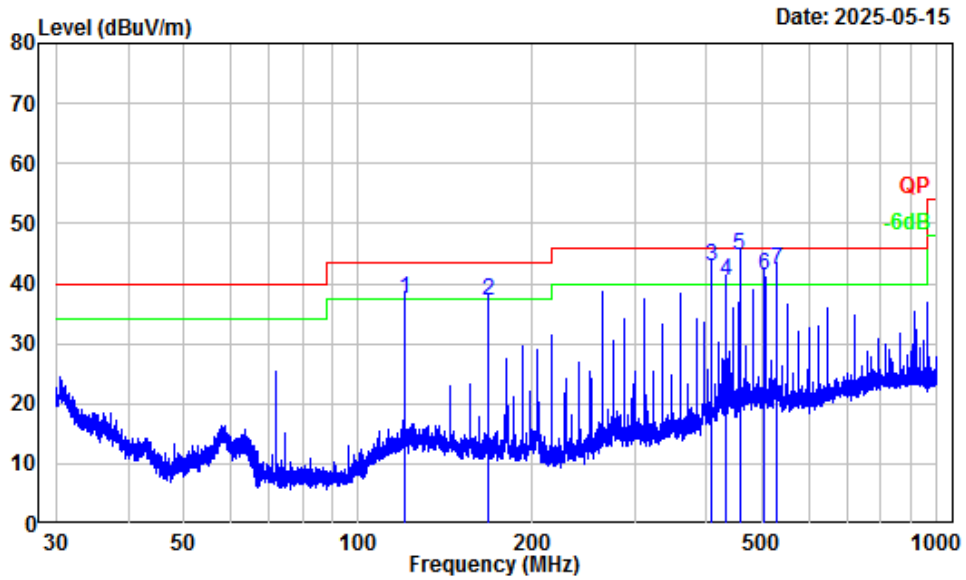
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	120.12	-11.44	53.01	41.57	43.50	-1.93	QP
2	168.05	-13.00	54.09	41.09	43.50	-2.41	QP
3	192.00	-14.01	50.01	36.00	43.50	-7.50	QP
4	216.02	-14.20	55.49	41.29	46.00	-4.71	QP
5	264.17	-12.34	56.19	43.85	46.00	-2.15	QP
6	288.12	-11.22	52.10	40.88	46.00	-5.12	QP
7	312.18	-11.00	52.40	41.40	46.00	-4.60	QP
8	359.97	-9.89	53.30	43.41	46.00	-2.59	QP

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number : 2501R50711E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	120.07	-11.44	49.00	37.56	43.50	-5.94	QP
2	168.05	-13.00	49.99	36.99	43.50	-6.51	QP
3	408.05	-8.20	51.10	42.90	46.00	-3.10	QP
4	431.98	-7.78	48.10	40.32	46.00	-5.68	QP
5	455.91	-7.25	52.00	44.75	46.00	-1.25	QP
6	504.04	-5.77	47.20	41.43	46.00	-4.57	QP
7	528.01	-5.80	48.20	42.40	46.00	-3.60	QP

Above 1GHz:

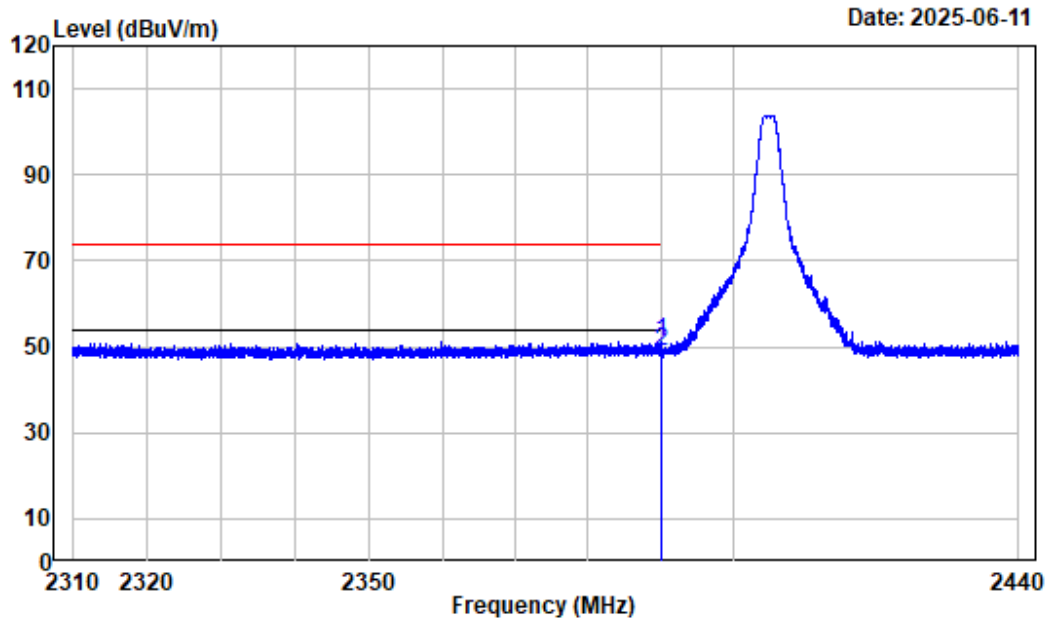
Frequency (MHz)	Reading (dBµV)	PK/AV	Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low Channel							
4810.00	57.92	PK	H	-7.78	50.14	74	-23.86
4810.00	59.19	PK	V	-7.78	51.41	74	-22.59
Middle Channel							
4878.00	60.08	PK	H	-7.60	52.48	74	-21.52
4878.00	59.40	PK	V	-7.60	51.80	74	-22.20
High Channel							
4950.00	59.94	PK	H	-7.63	52.31	74	-21.69
4950.00	58.97	PK	V	-7.63	51.34	74	-22.66

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude/Level = Corrected Factor + Reading
Margin = Corrected Amplitude/Level - Limit
Other emissions which were more than 20dB below limit or on noise floor level was not recorded.
The test result of peak was less than the limit of average, so just peak values were recorded.

Test plots for Band Edge Measurements (Radiated):

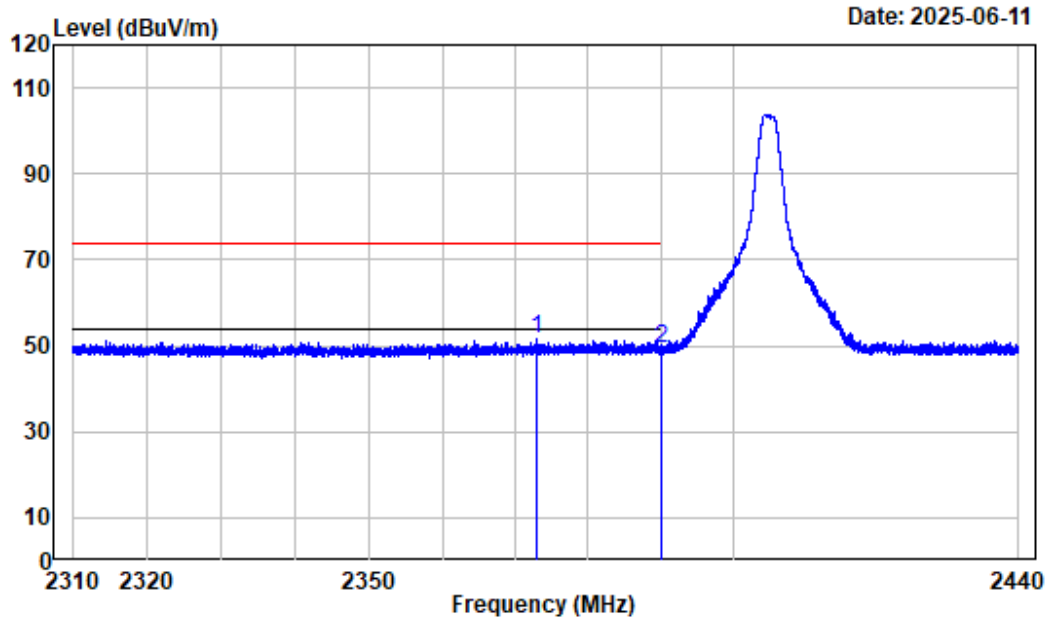
Test Channel:	2405MHz	Ant. Polar. :	Horizontal



Condition : Horizontal
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2405

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2389.976	-10.98	62.30	51.32	74.00	-22.68	Peak
2	2390.000	-10.98	59.97	48.99	74.00	-25.01	Peak

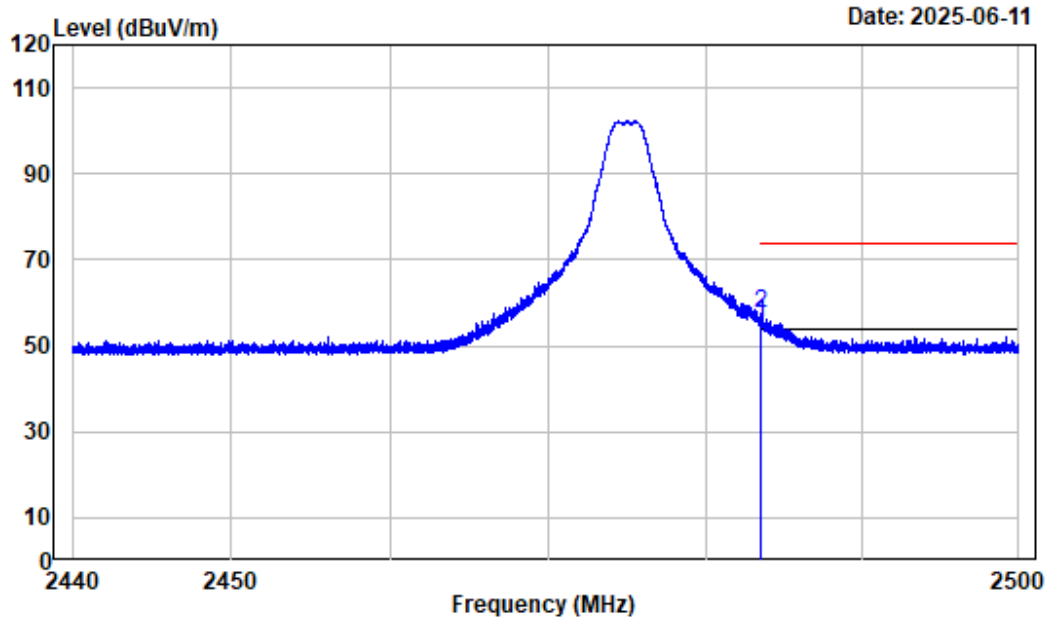
Test Channel:	2405MHz	Ant. Polar. :	Vertical



Condition : Vertical
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2405

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2372.977	-10.95	62.50	51.55	74.00	-22.45	Peak
2	2390.000	-10.98	60.46	49.48	74.00	-24.52	Peak

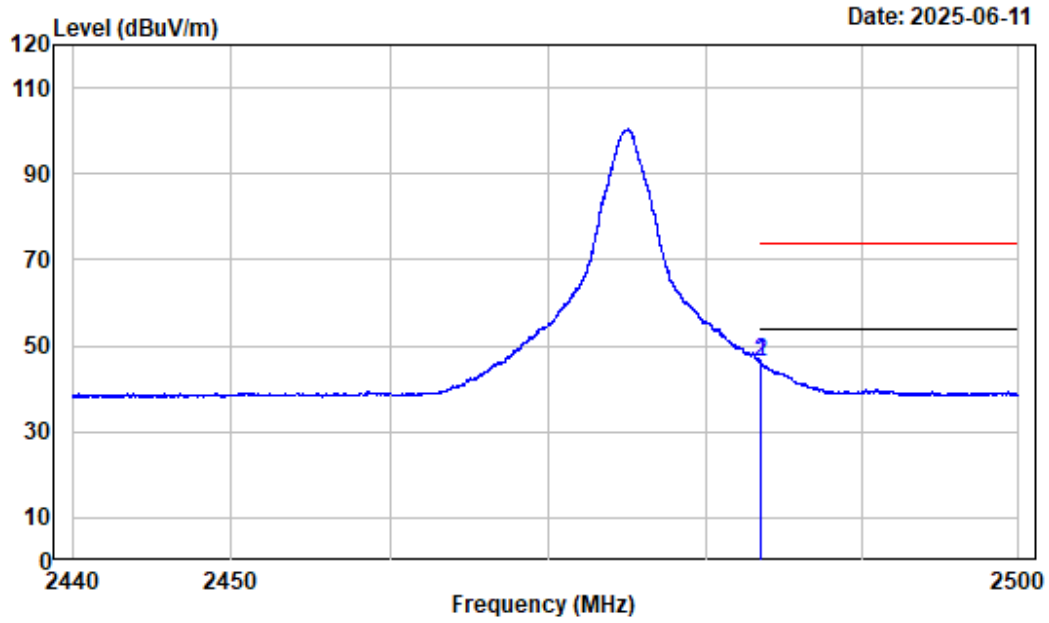
Test Channel:	2475MHz	Ant. Polar. :	Horizontal _Peak



Condition : Horizontal
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2475

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	66.43	55.46	74.00	-18.54	Peak
2	2483.513	-10.97	68.41	57.44	74.00	-16.56	Peak

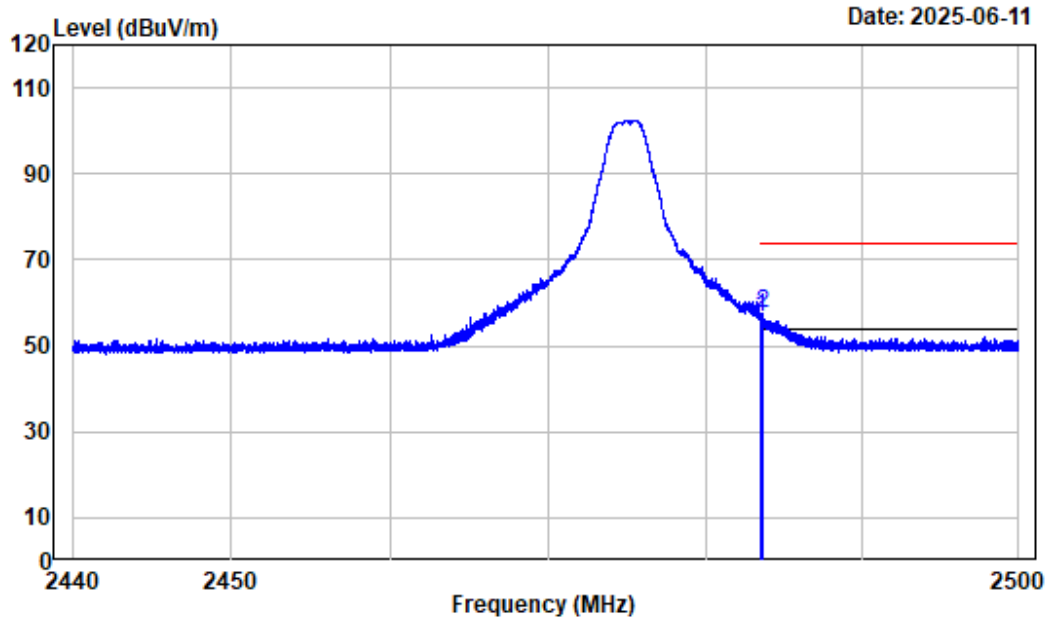
Test Channel:	2475MHz	Ant. Polar. :	Horizontal _Average



Condition : Horizontal
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Average reading: RBW:1MHz VBW:3kHz Detector:Peak
Note : FHSS_2475

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	57.05	46.08	54.00	-7.92	Average
2	2483.551	-10.97	57.26	46.29	54.00	-7.71	Average

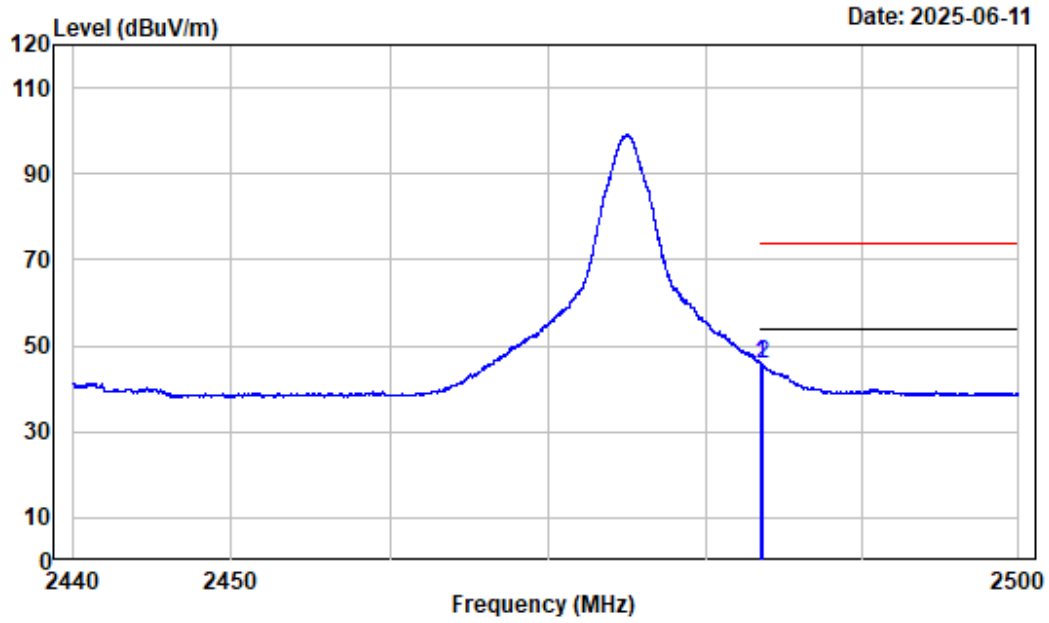
Test Channel:	2475MHz	Ant. Polar. :	Vertical _Peak



Condition : Vertical
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2475

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	67.47	56.50	74.00	-17.50	Peak
2	2483.610	-10.97	68.61	57.64	74.00	-16.36	Peak

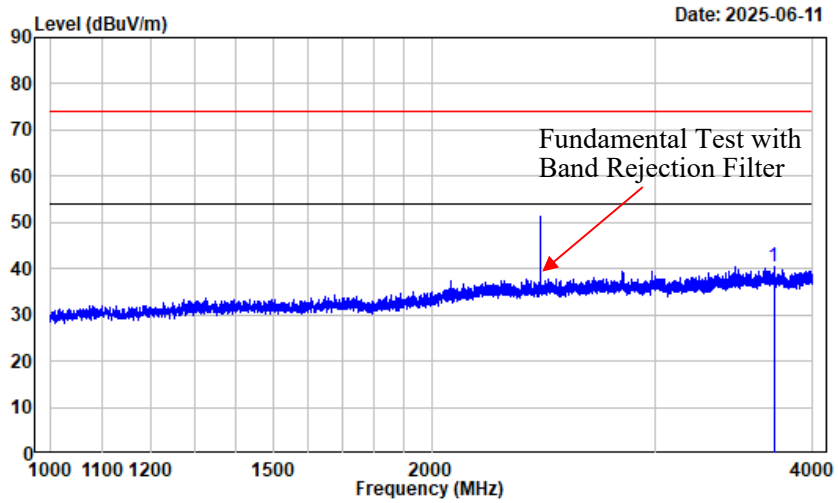
Test Channel:	2475MHz	Ant. Polar. :	Vertical _Average



Condition : Vertical
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Average reading: RBW:1MHz VBW:3kHz Detector:Peak
Note : FHSS_2475

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	56.81	45.84	54.00	-8.16	Average
2	2483.618	-10.97	56.84	45.87	54.00	-8.13	Average

Listed with the worst margin test plot: (middle channel)

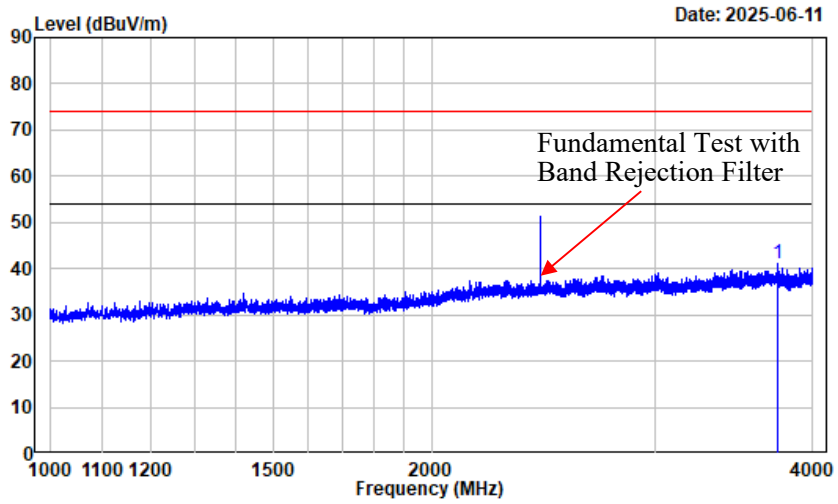
Horizontal	
1-4GHz	

```
Condition        : Horizontal
Project No.      : 2501R50711E-RF
Tester           : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note             : FHSS_2439
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	3726.966	-9.55	49.89	40.34	74.00	-33.66	Peak

Vertical

1-4GHz

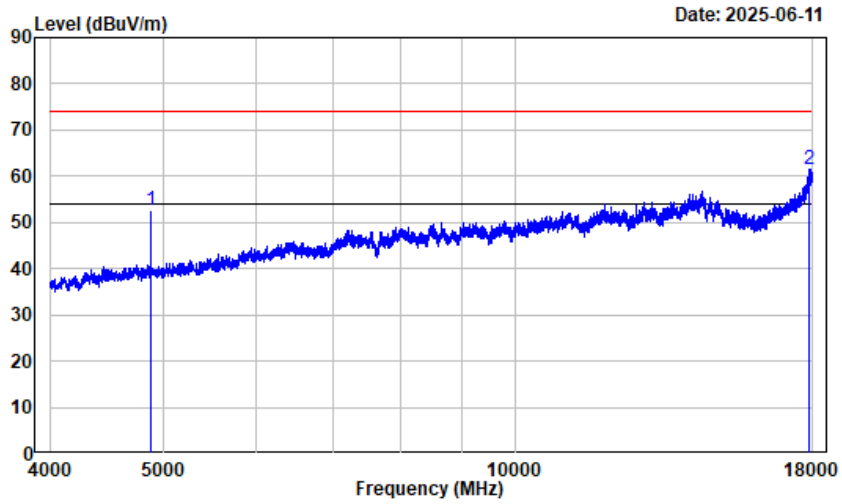



```
Condition         : Vertical
Project No.       : 2501R50711E-RF
Tester            : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note              : FHSS_2439
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	3753.219	-9.61	50.62	41.01	74.00	-32.99	Peak

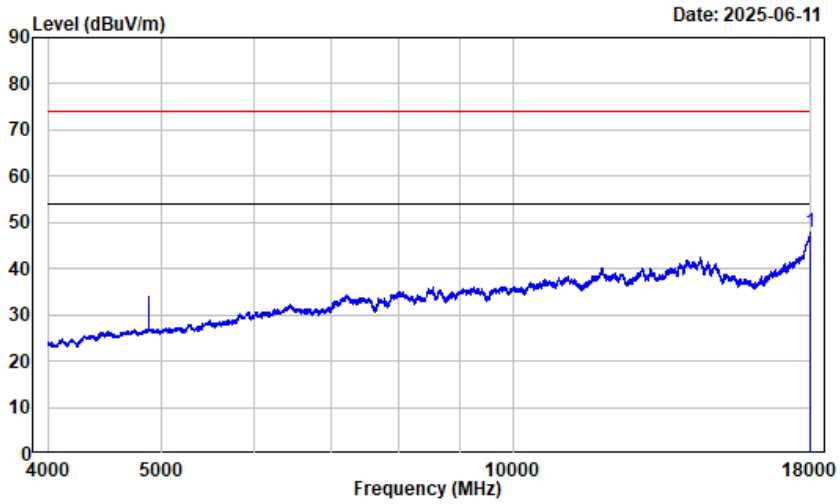
Horizontal _Peak

4-18GHz



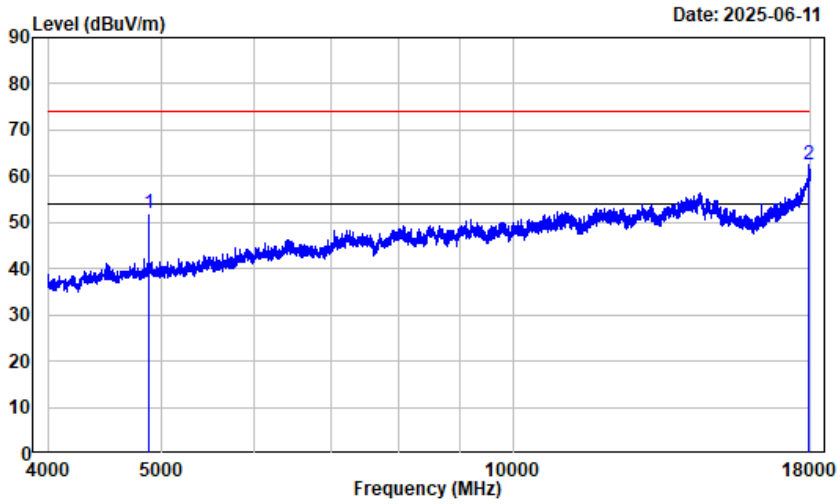
Condition : Horizontal
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2439

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4878.000	-7.60	60.08	52.48	74.00	-21.52	Peak
2	17868.730	12.12	49.46	61.58	74.00	-12.42	Peak

Horizontal _Average	
4-18GHz	 Condition : Horizontal Project No. : 2501R50711E-RF Tester : Wing K Ji Spectrum setting: Average reading: RBW:1MHz VBW:3kHz Detector:Peak Note : FHSS_2439 Freq / Factor / Read Level / Limit Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 17993.000 13.17 34.72 47.89 54.00 -6.11 Average

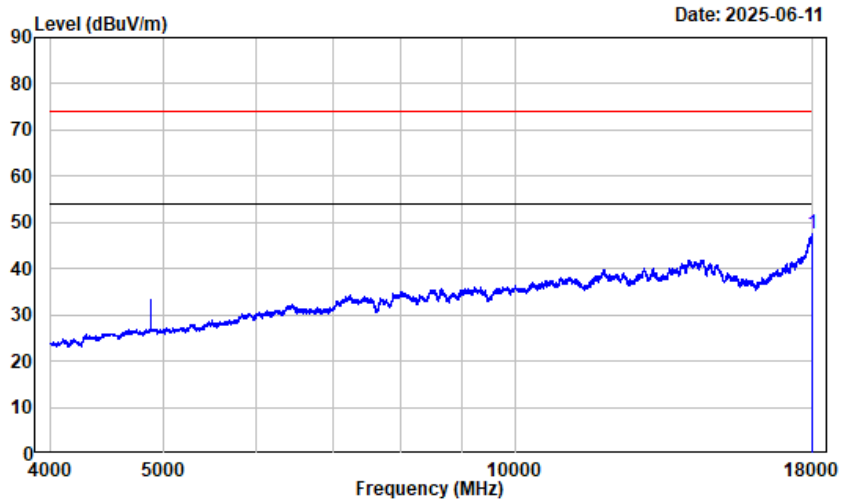
Vertical _Peak

4-18GHz



Condition : Vertical
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2439

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4878.000	-7.60	59.40	51.80	74.00	-22.20	Peak
2	17942.240	12.91	49.53	62.44	74.00	-11.56	Peak

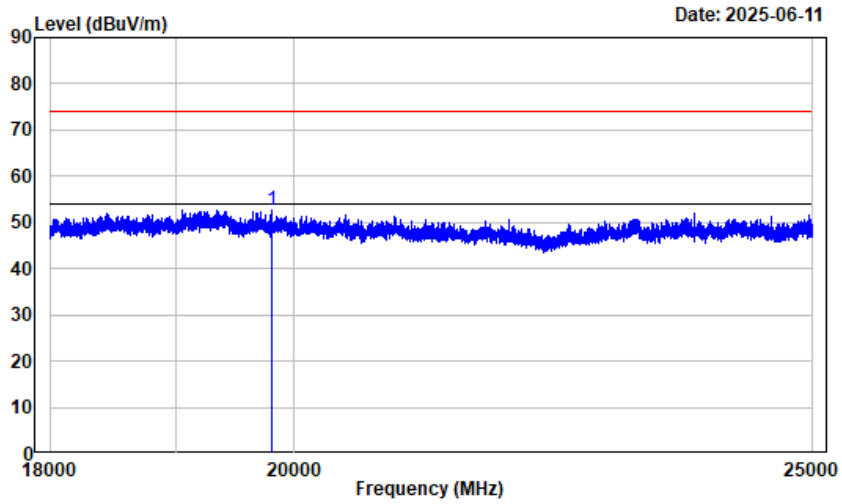
Vertical _Average	
4-18GHz	

Condition : Vertical
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Average reading: RBW:1MHz VBW:3kHz Detector:Peak
Note : FHSS_2439

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	17986.000	13.13	34.58	47.71	54.00	-6.29	Average

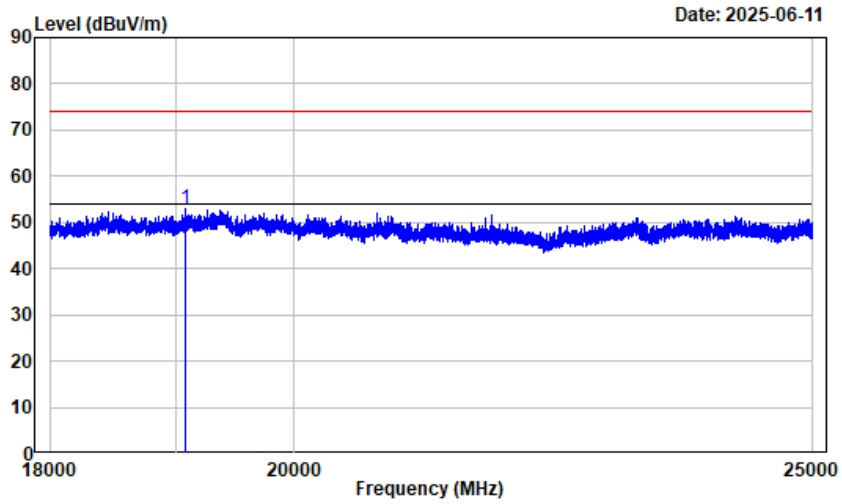
Horizontal

18-25GHz



Condition : Horizontal
Project No. : 2501R50711E-RF
Tester : Wing K Ji
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : FHSS_2439

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	19805.350	15.22	37.52	52.74	74.00	-21.26	peak

Vertical	
18-25GHz	 Condition : Vertical Project No. : 2501R50711E-RF Tester : Wing K Ji Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak Note : FHSS_2439 Freq / Factor / Read Level / Limit Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 19083.380 15.30 37.70 53.00 74.00 -21.00 peak

FCC §15.247(a) (1) & RSS-247 § 5.1 (b) - CHANNEL SEPARATION TEST

Applicable Standard

According to FCC §15.247(a) (1):
Frequency hopping systems (FHSs) shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to RSS-247 § 5.1 (b):
Frequency hopping systems (FHSs) shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.2

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span: Wide enough to capture the peaks of two adjacent channels.

b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

c) Video (or average) bandwidth (VBW) ≥ RBW.

d) Sweep: No faster than coupled (auto) time.

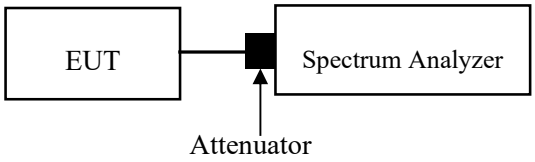
e) Detector function: Peak.

f) Trace: Max-hold.

g) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A spectral plot of the data shall be included in the test report.

Where the device shares the same channel plan (carrier frequencies and number of channels) across multiple data rates or modulation schemes then the carrier separation need only be measured for one of those modulation schemes or data rates.



Note: The limit is 2/3*20 dB bandwidth

Test Data

Environmental Conditions

Temperature:	25.5 ℃
Relative Humidity:	47 %
ATM Pressure:	99.8 kPa

The testing was performed by Rainbow Zhu on 2025-06-11.

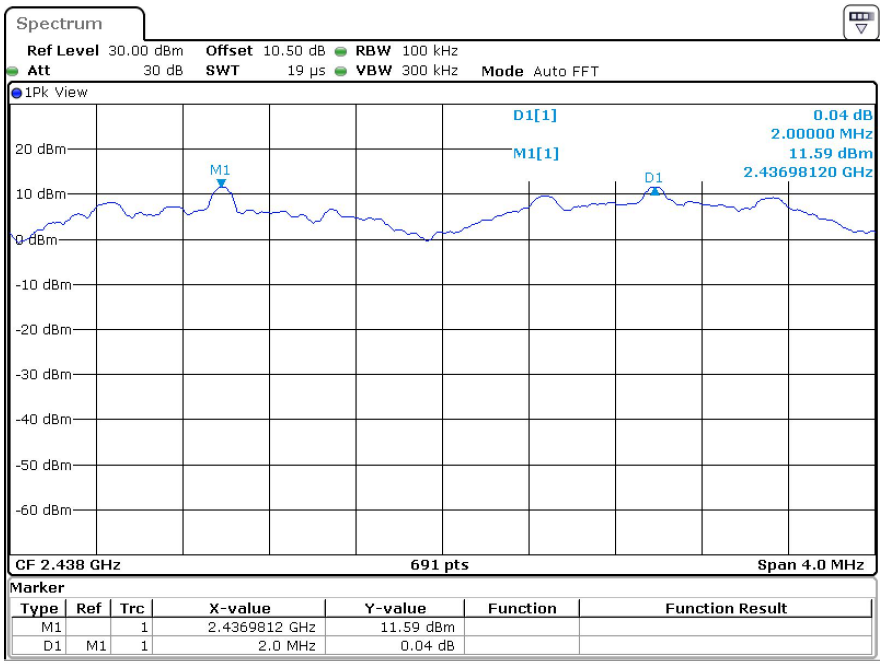
EUT operation mode: Transmitting

Test Result: Compliant

Note: According to frequency table in page 7 and investigating the hopping channel test in page 57, the minimum channel separation is the worst case which was recorded as below:

Test Channel	Test Frequency (MHz)	Channel Separation (MHz)	Limits (MHz)
Middle _Hop	2439	2.000	1.534
Note: Limit= Two-thirds of the 20 dB bandwidth			

Please refer to the below plots:



ProjectNo.:2501R50711E-RF Tester:Rainbow Zhu

Date: 11.JUN.2025 10:46:13

FCC §15.247(a) (1) & RSS-GEN § 6.7 & RSS-247 § 5.1 (a) - 99% OCCUPIED BANDWIDTH & 20 dB EMISSION BANDWIDTH

Applicable Standard

According to FCC §15.247(a) (1):

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

According to RSS-247 § 5.1 (a), RSS-GEN § 6.7:

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the "20 dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated 20 dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 6.9.2

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.

d) Steps a) through c) might require iteration to adjust within the specified tolerances.

e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.

f) Set detection mode to peak and trace mode to max hold.

g) Determine the reference value: Set the EUT to transmit an un-modulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

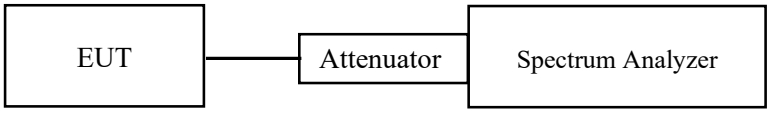
h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

i) If the reference value is determined by an un-modulated carrier, then turn the EUT modulation on, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).

j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "− xx dB down

amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "− xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).



Test Data

Environmental Conditions

Temperature:	25.4 ℃
Relative Humidity:	46 %
ATM Pressure:	99.7 kPa

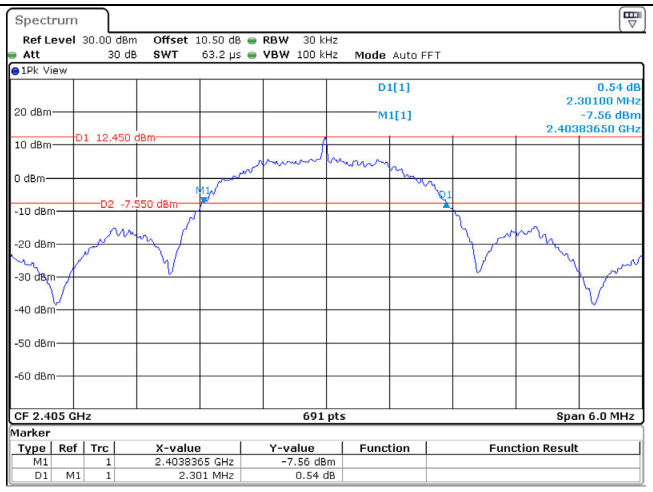
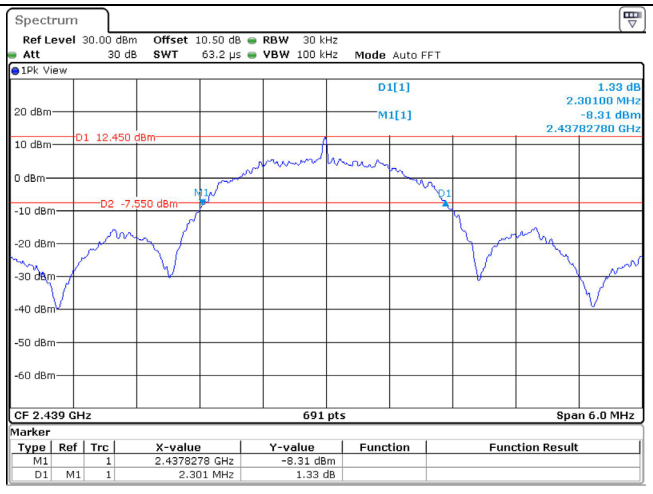
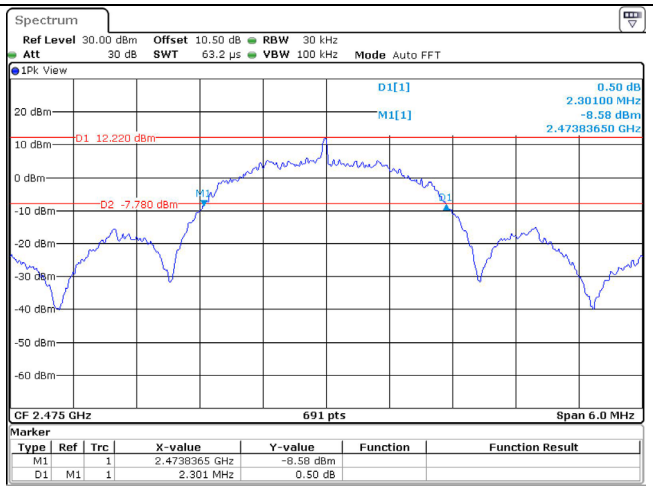
The testing was performed by Rainbow Zhu on 2025-06-10.

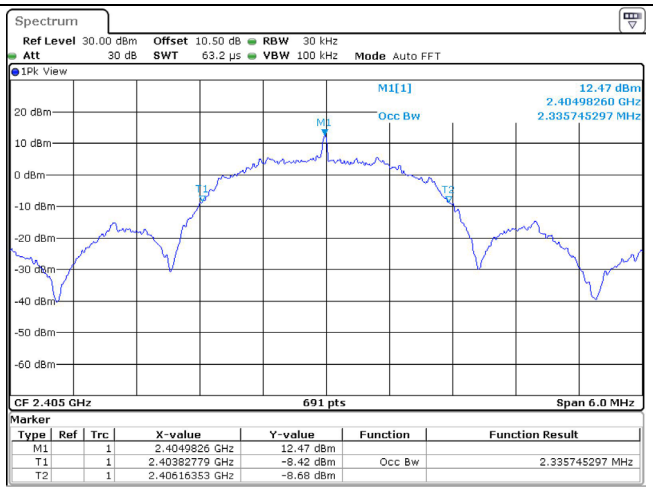
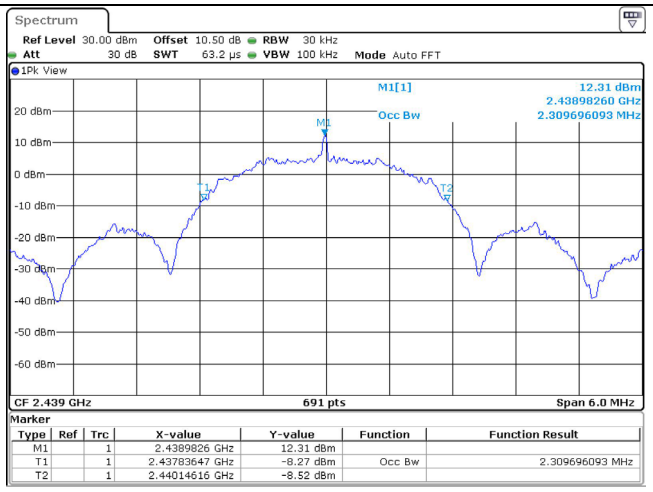
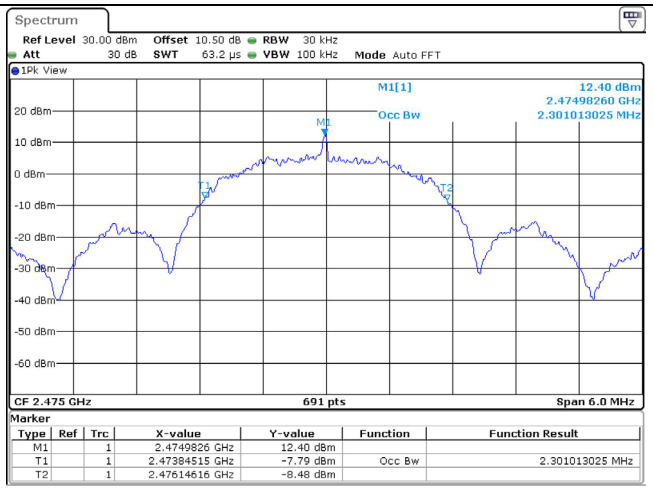
EUT operation mode: Transmitting

Test Result: Compliant

Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)	OBW (MHz)
Low	2405	2.301	2.336
Middle	2439	2.301	2.310
High	2475	2.301	2.301

Please refer to the below plots:

20 dB Bandwidth	
Low Channel	
Middle Channel	
High Channel	

99% Emission Bandwidth	
Low Channel	
Middle Channel	
High Channel	

FCC §15.247(a) (1) (iii) & RSS-247 § 5.1 (d) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

According to FCC §15.247(a) (1) (iii):

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

According to RSS-247 § 5.1 (d):

Frequency hopping systems (FHSS) operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.3
The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.

b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

c) VBW ≥ RBW.

d) Sweep: No faster than coupled (auto) time.

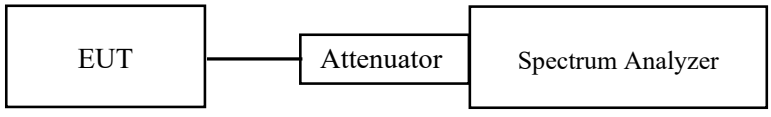
e) Detector function: Peak.

f) Trace: Max-hold.

g) Allow the trace to stabilize.

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.

Where the device shares the same channel plan (carrier frequencies and number of channels) across multiple data rates or modulation schemes then the number of channels need only be measured for one of those modulation schemes or data rates.



Test Data

Environmental Conditions

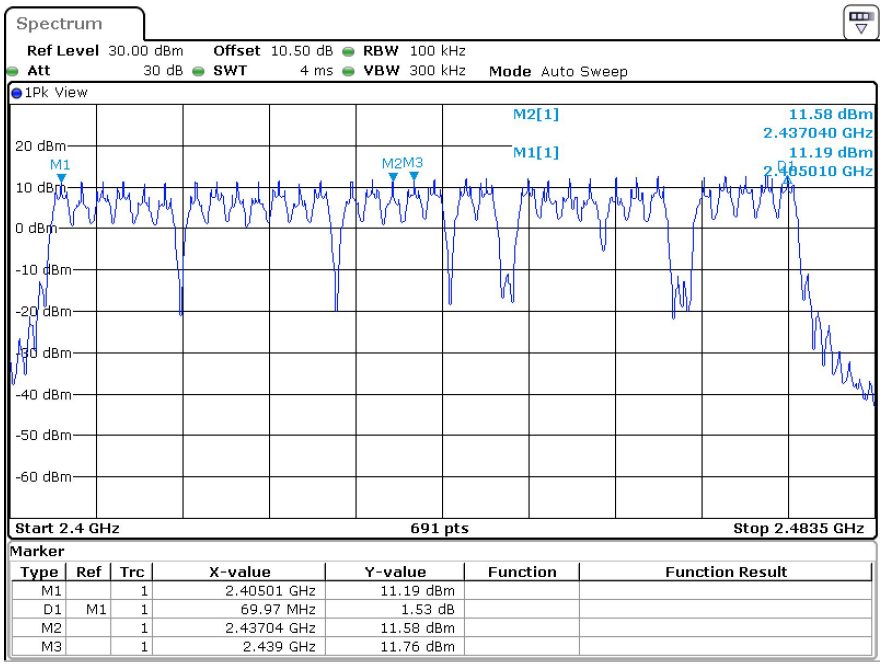
Temperature:	25.5 ℃
Relative Humidity:	47 %
ATM Pressure:	99.8 kPa

The testing was performed by Rainbow Zhu on 2025-06-11.

EUT operation mode: Transmitting

Test Result: Compliant

Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
2400-2483.5	32	≥15



FCC §15.247(a) (1) (iii) & RSS-247 § 5.1 (d) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

According to FCC §15.247(a) (1) (iii):

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

According to RSS-247 § 5.1 (d):

Frequency hopping systems (FHSs) operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.4

Use the following spectrum analyzer settings to determine the dwell time per hop:

a) Span: Zero span, centered on a hopping channel.

b) RBW shall be $\leqslant$ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop.

c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this.

d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel.

e) Detector function: Peak.

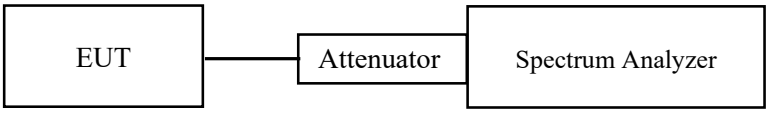
f) Trace: Clear-write, single sweep.

g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.

To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time.

The average number of hops on the same channel within the regulatory observation period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is 3 / 0.5 × 10, or 60 hops.

The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.



Test Data

Environmental Conditions

Temperature:	25.5 ℃
Relative Humidity:	47 %
ATM Pressure:	99.8 kPa

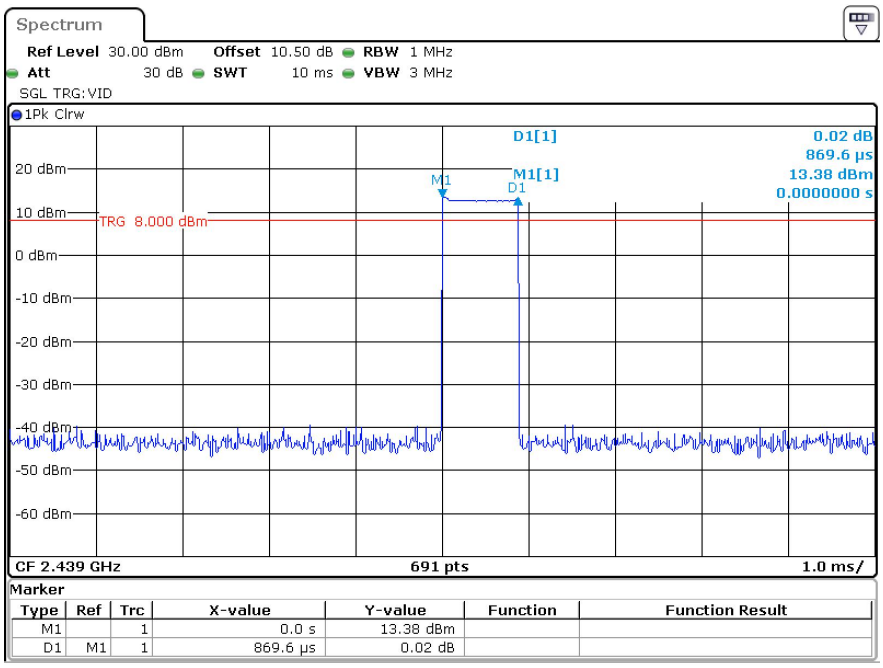
The testing was performed by Rainbow Zhu on 2025-06-11.

EUT operation mode: Transmitting

Test Result: Compliant

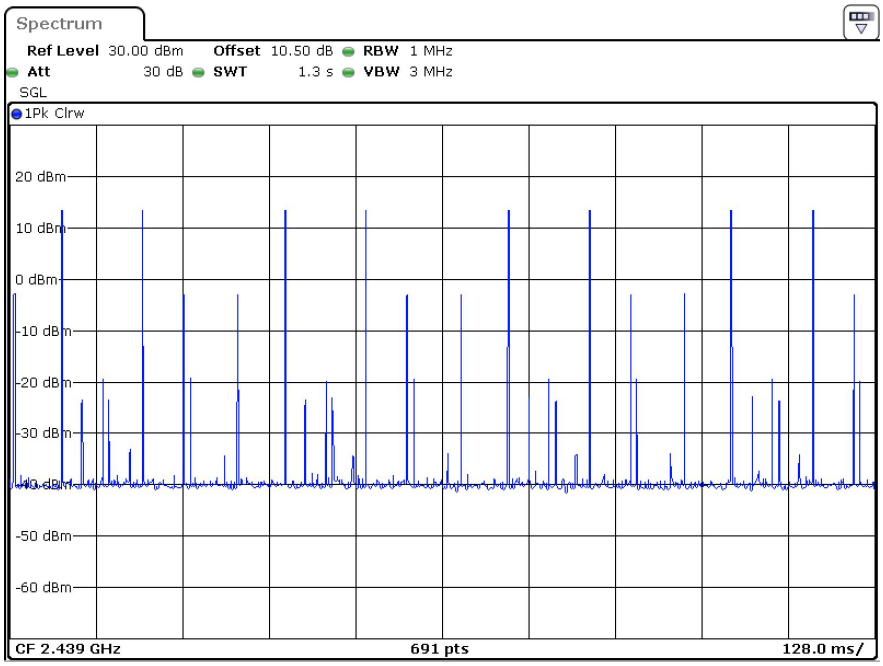
Test Frequency (MHz)	Pulse Width (ms)	Observation time (s)	Hopping Numbers in Observation time	Dwell Time (s)	Limit (s)
2439	0.870	12.8	80	0.0696	0.400
Note: Observation time= Hopping Channel Number× 0.4= 32× 0.4= 12.8 (s) Hopping Numbers in Observation time = Hopping Number in 1.28s*10 Dwell Time = Pulse Width × Hopping Numbers in Observation time					

Pulse Time



ProjectNo.:2501R50711E-RF Tester:Rainbow Zhu
Date: 11.JUN.2025 14:00:16

Hopping Numbers in 1.28s



ProjectNo.:2501R50711E-RF Tester:Rainbow Zhu
Date: 11.JUN.2025 13:57:08

FCC §15.247(b) (1) & RSS-247§ 5.1(b) &§ 5.4(b) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

According to § RSS-247§ 5.4(b), For frequency hopping systems (FHSs) operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W (see Section 5.4(e) for exceptions).

According to § RSS-247§ 5.1(b), Frequency hopping systems (FHSs) shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.5
This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings:

a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.

b) RBW > 20 dB bandwidth of the emission being measured.

c) VBW ≥ RBW.

d) Sweep: No faster than coupled (auto) time.

e) Detector function: Peak.

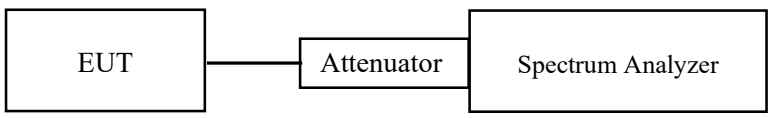
f) Trace: Max-hold.

g) Allow trace to stabilize.

h) Use the marker-to-peak function to set the marker to the peak of the emission.

i) The indicated level is the peak output power, after any corrections for external attenuators and cables.

j) A spectral plot of the test results and setup description shall be included in the test report.



Note: A short RF cable with low cable loss connected to the EUT antenna port, which was provided by client or lab, the cable loss was add with offset into test equipment, the total offset consists of attenuator and/or RF cable loss

Test Data

Environmental Conditions

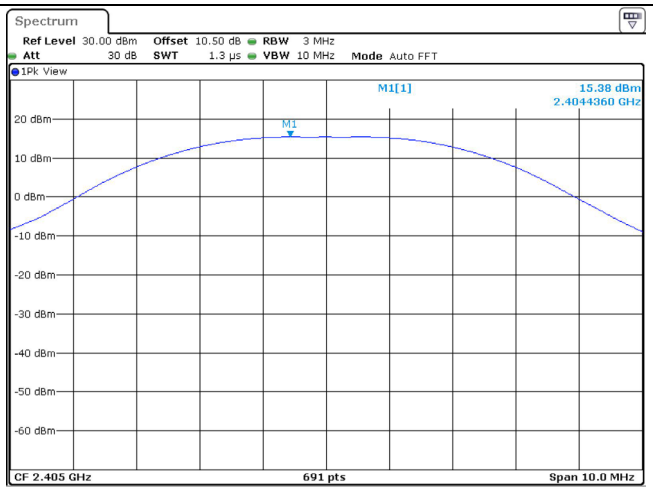
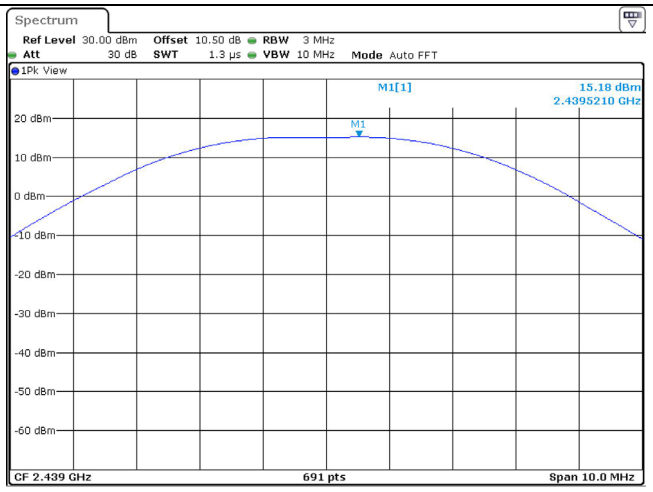
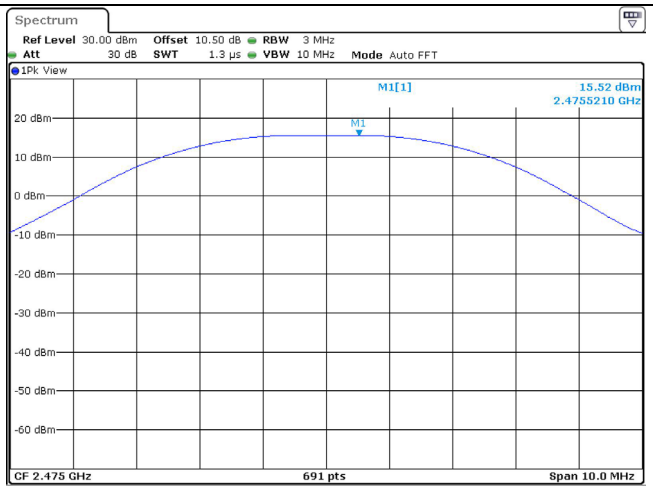
Temperature:	25.5 ℃
Relative Humidity:	47 %
ATM Pressure:	99.8 kPa

The testing was performed by Rainbow Zhu on 2025-06-11.

EUT operation mode: Transmitting

Test Result: Compliant

Mode	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)
Lowest	2405	15.38	21
Middle	2439	15.18	21
Highest	2475	15.52	21
EIRP Limit for RSS-247:36 dBm; The antenna gain=2.09dBi, the maximum EIRP=17.61dBm<36dBm			

Low Channel	
Middle Channel	
High Channel	

FCC §15.247(d) & RSS-247 § 5.5 - BAND EDGES TESTING

Applicable Standard

According to FCC §15.247(d).

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)).

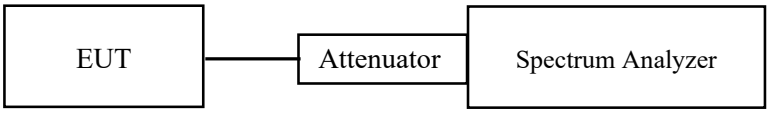
According to RSS-247 § 5.5.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(e), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.7.2 & Clause 6.10

1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products that fall outside of the authorized band of operation.
2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.
3) Attenuation: Auto (at least 10 dB preferred).
4) Sweep time: No faster than coupled (auto) time.
5) Resolution bandwidth: 100 kHz.
6) Video bandwidth: 300 kHz.
7) Detector: Peak.
8) Trace: Max-hold.



Test Data

Environmental Conditions

Temperature:	24.2~25.5 ℃
Relative Humidity:	47~50 %
ATM Pressure:	99.7~99.8 kPa

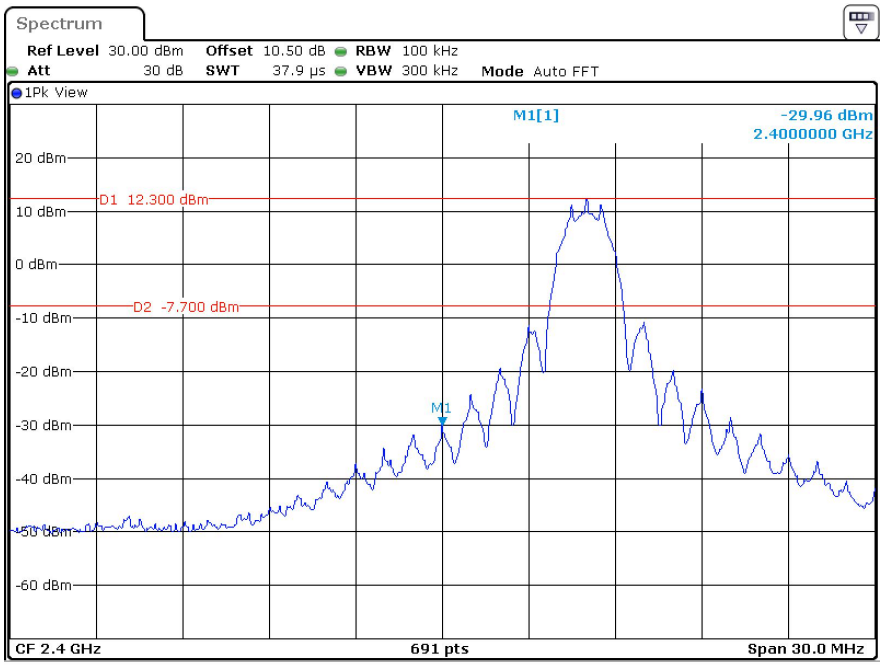
The testing was performed by Rainbow Zhu from 2025-06-11 to 2025-06-25.

EUT operation mode: Transmitting

Test Result: Compliant

Conducted Band Edge Result:

Low Channel



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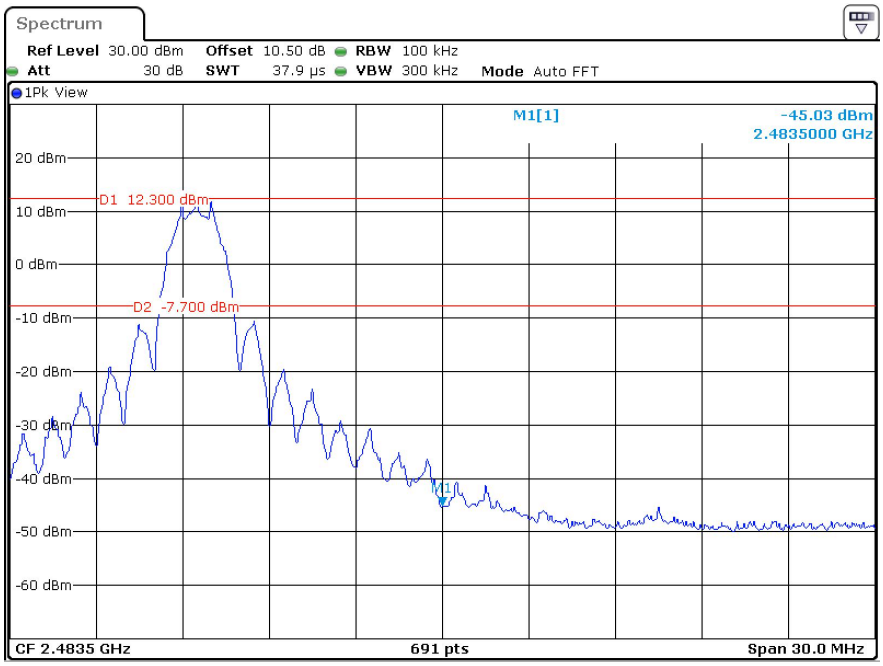
High Channel



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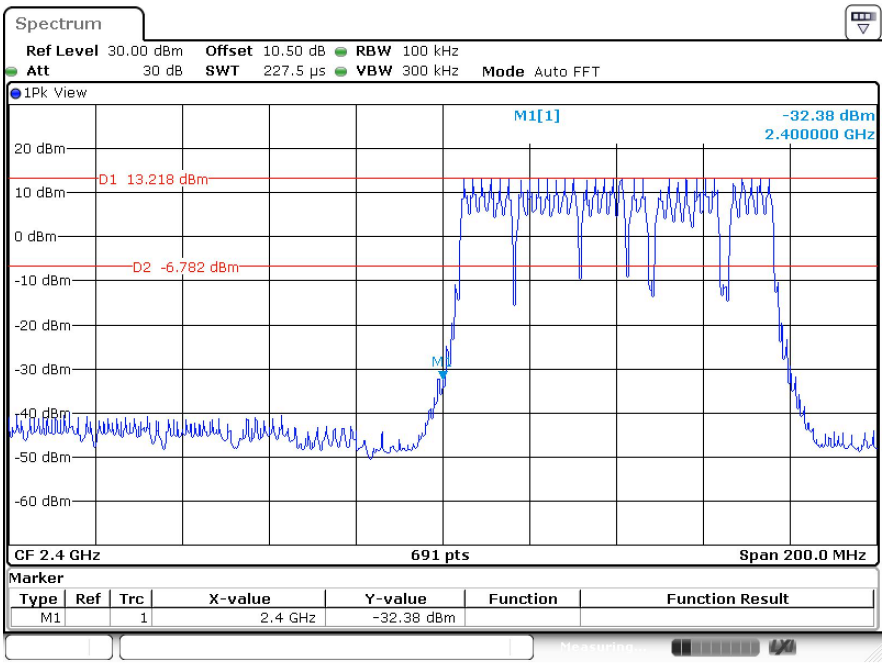
Date: 11.JUN.2025 09:55:48

Hop_Low Channel



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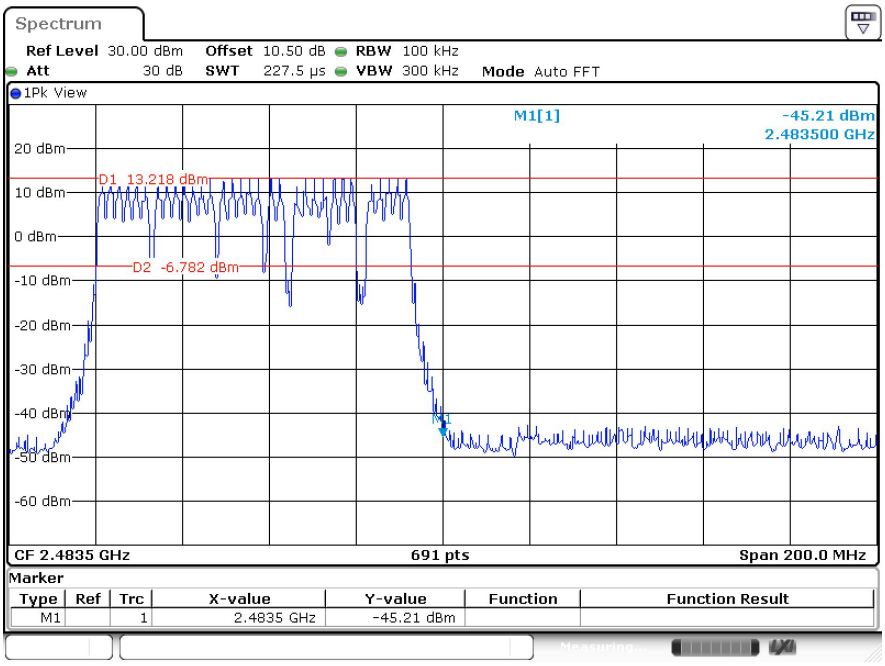
Date: 25.JUN.2025 11:29:17

Hop_High Channel



ProjectNo.: 2501R50711E-RF Tester:Rainbow Zhu
Date: 25.JUN.2025 10:59:56

EUT PHOTOGRAPHS

Please refer to the attachment 2501R50711E-RF External photo and 2501R50711E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501R50711E-RF-TSP Test Setup photo.

******* END OF REPORT *******