TEST REPORT

Applicant Name:	Alford Industries Ltd.
Address:	Suite 1603A, Tower2, Nina Tower 8 Yeung UK Road, Tsuen Wan,N.T. Hong Kong China
Report Number:	2401A111119E-RF-00
FCC ID:	2BMUJ-MDZ500BU

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type:	Color Night Vision Baby Monitor
Model No.:	MDZ500
Multiple Model(s) No.:	N/A
Trade Mark:	N/A
Date Received:	2024/12/18
Issue Date:	2025/03/14

Test Result:	Pass▲

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

Prepared and Checked By:

Ekko. Wu

Ekko Wu
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.
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2401A111119E-RF-00	Original Report	2025/03/14

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Color Night Vision Baby Monitor
Tested Model	MDZ500
Multiple Model(s)	N/A
Frequency Range	2402-2476MHz
Maximum conducted peak output power	16.65 dBm
Modulation Technique	GFSK
Antenna Specification#	-2.52dBi (provided by the applicant)
Voltage Range	DC 5V from adapter
Sample serial number	2W78-3 for RF Conducted Test 2W78-6 for Conducted &Radiated Emissions (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Adapter 1 Model:GLH0501500 Input: 100-240V~50/60Hz 0.4A Output: 5.0V, 1.5A 7.5W Adapter 2 Model:PS12L050K1500UD Input: 100-240V~50/60Hz 0.35A Max Output: 5.0V, 1.5A 7.5W

Objective

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

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

Test Methodology

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

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

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		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	0.009MHz~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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

Channel list

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	**2402**	11	2422	21	2442	31	2462
2	2404	12	2424	24	2444	32	2464
3	2406	13	2426	23	2446	33	2466
4	2408	14	2428	24	2448	34	2468
5	2410	15	2430	25	2450	35	2470
6	2412	16	2432	26	2452	36	2472
7	2414	17	2434	27	2454	37	2474
8	2416	18	2436	28	2456	38	**2476**
9	2418	19	2438	29	2458	/	/
10	2420	20	**2440**	30	2460	/	/

Channel 1, 20, 38 was tested.

EUT Exercise Software

"SecureCRT"# exercise software was used and the power level is Default#. The software and power level was provided by the applicant.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

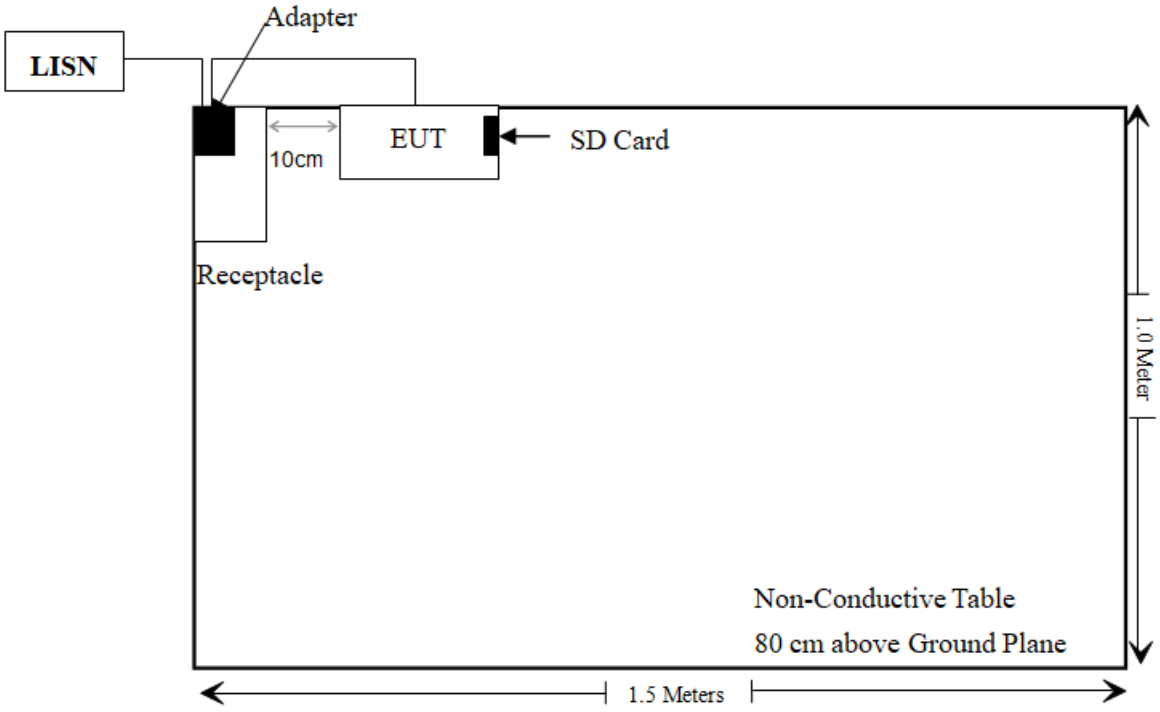
Manufacturer	Description	Model	Serial Number
Unknown	SD Card	Unknown	Unknown
OUPU	Receptacle	PDU-OP1606K	6971041358020

External I/O Cable

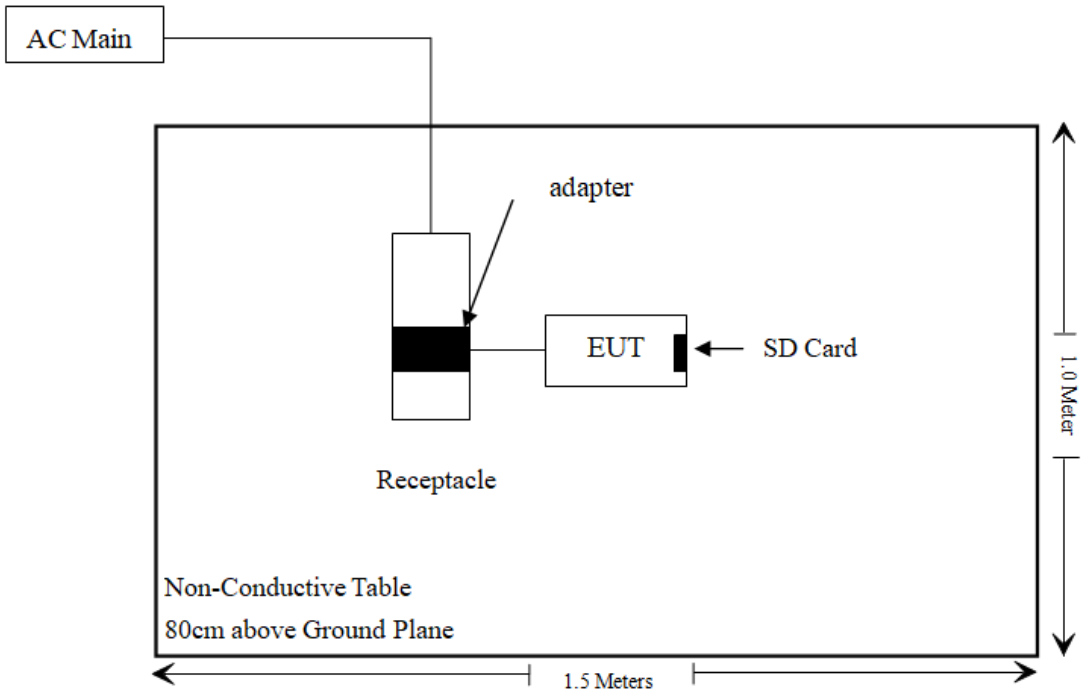
Cable Description	Length (m)	From/Port	To
Unshielded Un-detachable DC cable	2.0	Adapter	EUT
Unshielded Un-detachable AC cable	1.0	Receptacle	LISN/AC Mains

Block Diagram of Test Setup

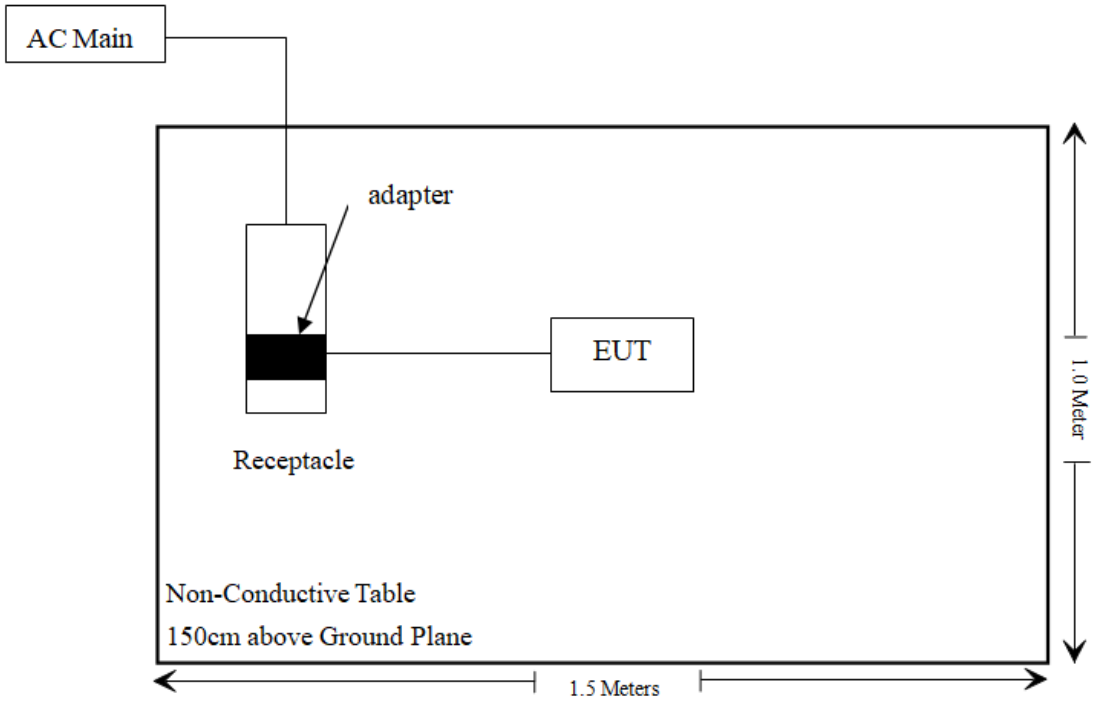
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§15.247 (i), §1.1307 (b) (3) & §2.1091	Maximum Permissible Exposure(MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207(a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliant
§15.247(a)(1)	20dBEmission Bandwidth&99% Occupied Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions 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	2024/03/27	2025/03/26
A.H.System	Preamplifier	PAM-0118P	489	2024/11/15	2025/11/14
The Electro-Mechanics Co.	Horn Antenna	3115	9107-3694	2024/06/06	2027/06/05
Unknown	RF Cable	KMSE	735	2024/12/04	2025/12/03
Unknown	RF Cable	UFA147	219661	2024/12/04	2025/12/03
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
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
A.H.System	Pre-amplifier	PAM-840VH	190	2024/06/18	2025/06/17
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2024/06/18	2025/06/17
Agilent	Signal Generator	N5183A	MY50140588	2024/09/13	2025/09/12
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200982	2024/09/20	2025/09/19
Unknown	10dB Attenuator	Unknown	F-03-EM065	2024/06/27	2025/06/26

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

FCC §15.247 (i) & §1.1307 (b) (3) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance V01

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)(3)(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

Mode	Frequency (MHz)	Tune up conducted power# (dBm)	Antenna Gain#		ERP		Evaluation Distance (m)	ERP Limit (W)
			(dBi)	(dBd)	(dBm)	(W)		
2.4G	2402-2476	17.00	-2.52	-4.67	12.33	0.017	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

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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

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

Antenna Connector Construction

The EUT has one internal (brass) antenna arrangement which was permanently attached and the antenna gain# is -2.52dBi, fulfill the requirement of this section. Please refer to the EUT photos.

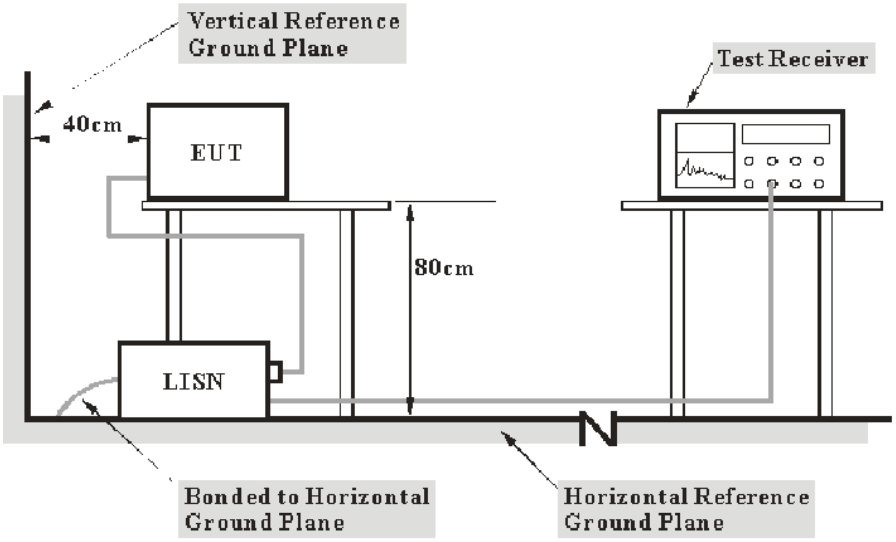
Result: Compliant

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

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 C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

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

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

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

Test Procedure

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

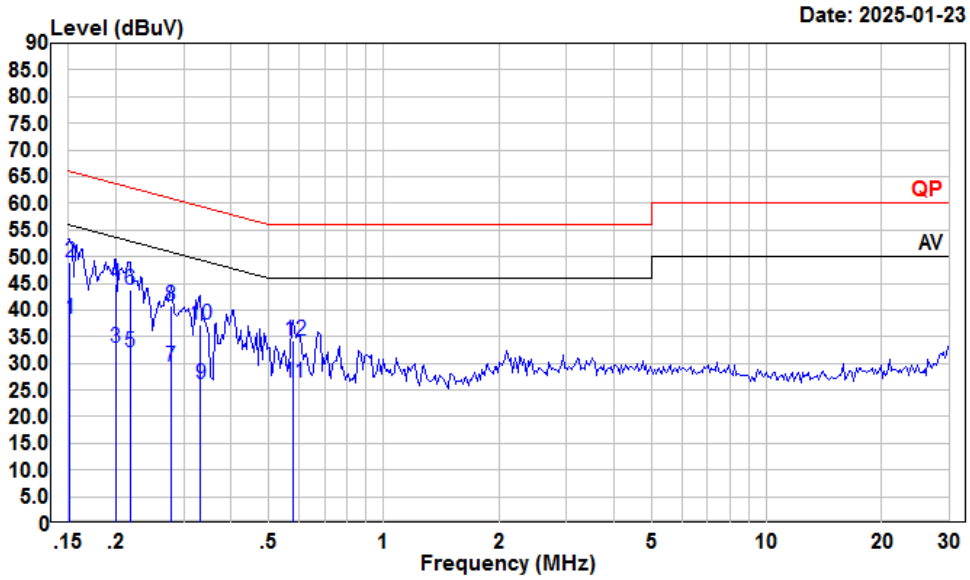
Temperature:	21.5 ℃
Relative Humidity:	39 %
ATM Pressure:	101.3kPa

The testing was performed by Macy Shi on 2025-01-23.

EUT operation mode: Transmitting (Maximum output power, low channel)

For Adapter 1

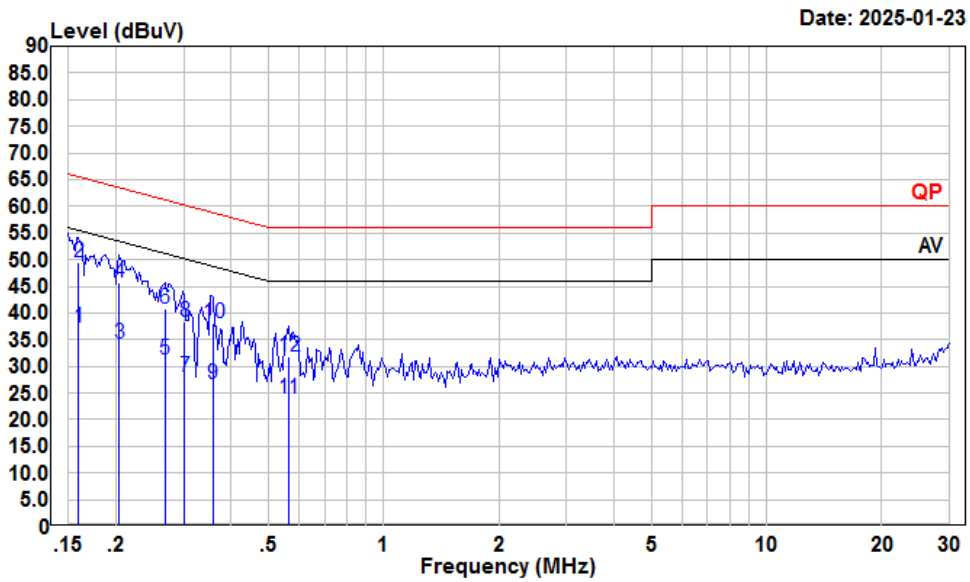
AC 120V/60 Hz, Line



Condition: Line
Project : 2401A111119E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz VBW:30KHz Detector Peak

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.152	17.71	38.25	10.41	10.13	55.91	-17.66	Average
2	0.152	28.31	48.85	10.41	10.13	65.91	-17.06	QP
3	0.200	12.13	32.92	10.70	10.09	53.62	-20.70	Average
4	0.200	24.20	44.99	10.70	10.09	63.62	-18.63	QP
5	0.217	11.40	32.17	10.68	10.09	52.92	-20.75	Average
6	0.217	23.10	43.87	10.68	10.09	62.92	-19.05	QP
7	0.277	8.60	29.33	10.63	10.10	50.90	-21.57	Average
8	0.277	20.10	40.83	10.63	10.10	60.90	-20.07	QP
9	0.332	5.32	26.03	10.59	10.12	49.40	-23.37	Average
10	0.332	16.67	37.38	10.59	10.12	59.40	-22.02	QP
11	0.582	5.53	26.33	10.68	10.12	46.00	-19.67	Average
12	0.582	13.55	34.35	10.68	10.12	56.00	-21.65	QP

AC 120V/60 Hz, Neutral

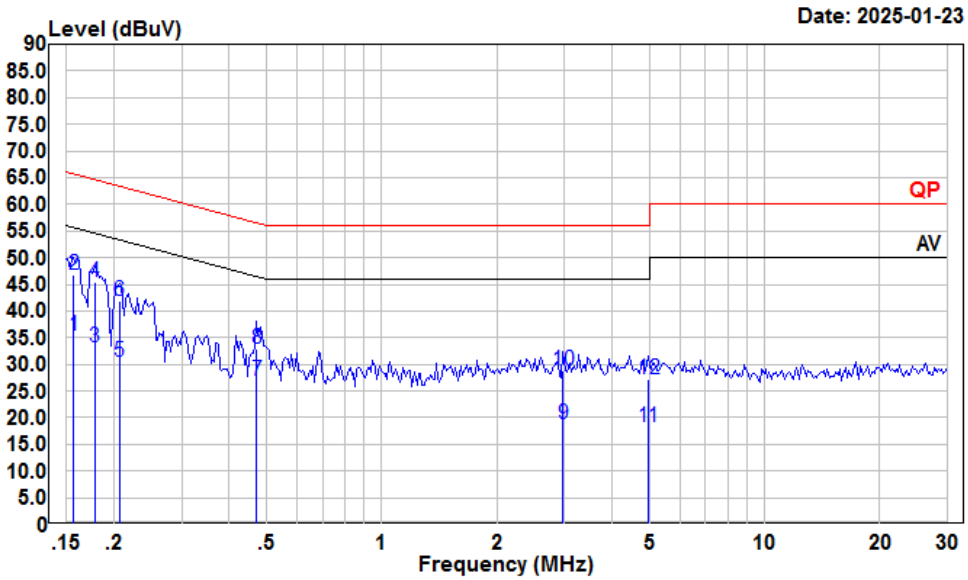


Condition: Neutral
Project : 2401A111119E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz VBW:30KHz Detector Peak

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.160	16.71	37.32	10.49	10.12	55.47	-18.15	Average
2	0.160	28.90	49.51	10.49	10.12	65.47	-15.96	QP
3	0.204	13.43	34.31	10.79	10.09	53.45	-19.14	Average
4	0.204	24.95	45.83	10.79	10.09	63.45	-17.62	QP
5	0.269	10.40	31.19	10.70	10.09	51.16	-19.97	Average
6	0.269	20.10	40.89	10.70	10.09	61.16	-20.27	QP
7	0.302	7.25	28.03	10.67	10.11	50.19	-22.16	Average
8	0.302	17.51	38.29	10.67	10.11	60.19	-21.90	QP
9	0.358	5.90	26.63	10.61	10.12	48.78	-22.15	Average
10	0.358	17.40	38.13	10.61	10.12	58.78	-20.65	QP
11	0.564	3.27	23.94	10.54	10.13	46.00	-22.06	Average
12	0.564	11.03	31.70	10.54	10.13	56.00	-24.30	QP

For Adapter 2

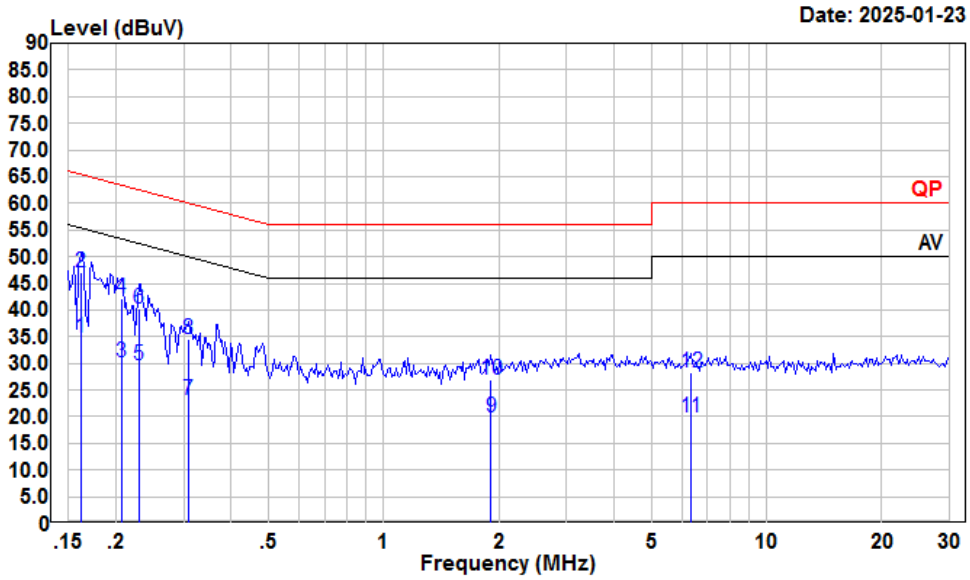
AC 120V/60 Hz, Line



Condition: Line
Project : 2401A111119E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz VBW:30KHz Detector Peak

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.156	14.67	35.23	10.44	10.12	55.65	-20.42	Average
2	0.156	26.32	46.88	10.44	10.12	65.65	-18.77	QP
3	0.178	12.59	33.27	10.58	10.10	54.59	-21.32	Average
4	0.178	24.69	45.37	10.58	10.10	64.59	-19.22	QP
5	0.206	9.76	30.54	10.69	10.09	53.36	-22.82	Average
6	0.206	21.11	41.89	10.69	10.09	63.36	-21.47	QP
7	0.471	6.22	26.86	10.51	10.13	46.49	-19.63	Average
8	0.471	12.16	32.80	10.51	10.13	56.49	-23.69	QP
9	2.978	-2.29	18.88	10.99	10.18	46.00	-27.12	Average
10	2.978	7.75	28.92	10.99	10.18	56.00	-27.08	QP
11	4.952	-2.62	18.35	10.79	10.18	46.00	-27.65	Average
12	4.952	6.23	27.20	10.79	10.18	56.00	-28.80	QP

AC 120V/60 Hz, Neutral



Condition: Neutral
Project : 2401A111119E-RF
tester : Macy.shi Note:Transmitting
Setting : RBW:9kHz VBW:30KHz Detector Peak

	Freq	Read Level	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.162	14.17	34.78	10.50	10.11	55.38	-20.60	Average
2	0.162	26.51	47.12	10.50	10.11	65.38	-18.26	QP
3	0.206	9.36	30.24	10.79	10.09	53.36	-23.12	Average
4	0.206	21.40	42.28	10.79	10.09	63.36	-21.08	QP
5	0.229	8.80	29.64	10.76	10.08	52.48	-22.84	Average
6	0.229	19.40	40.24	10.76	10.08	62.48	-22.24	QP
7	0.308	2.22	22.99	10.66	10.11	50.02	-27.03	Average
8	0.308	13.69	34.46	10.66	10.11	60.02	-25.56	QP
9	1.908	-0.98	19.91	10.71	10.18	46.00	-26.09	Average
10	1.908	6.16	27.05	10.71	10.18	56.00	-28.95	QP
11	6.319	-1.01	19.85	10.67	10.19	50.00	-30.15	Average
12	6.319	7.40	28.26	10.67	10.19	60.00	-31.74	QP

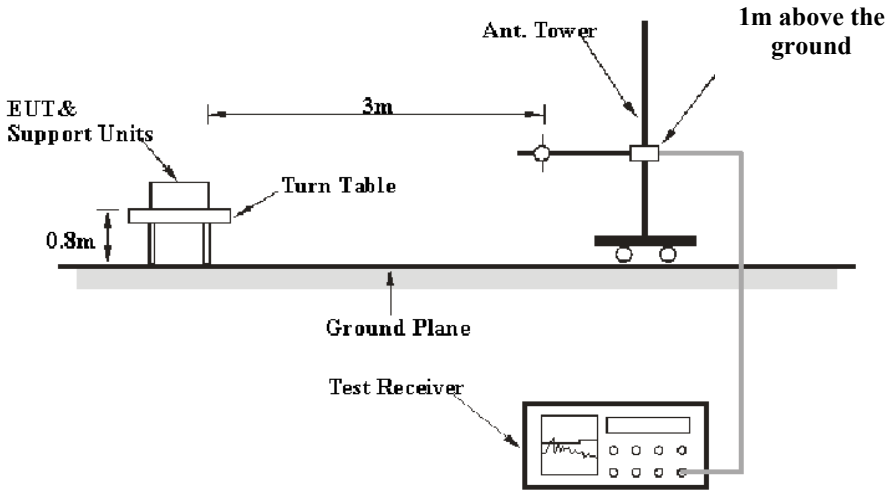
FCC §15.205, §15.209&§15.247(d) – RADIATED EMISSIONS

Applicable Standard

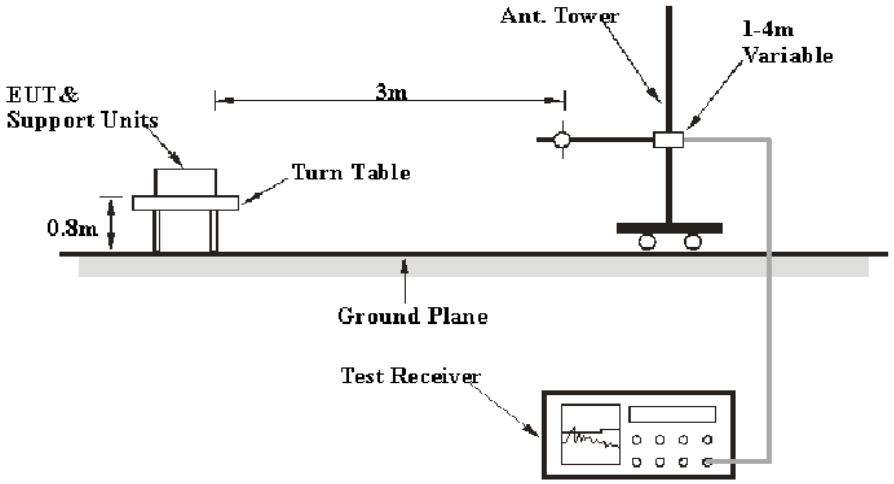
FCC §15.205; §15.209; §15.247(d)

EUT Setup

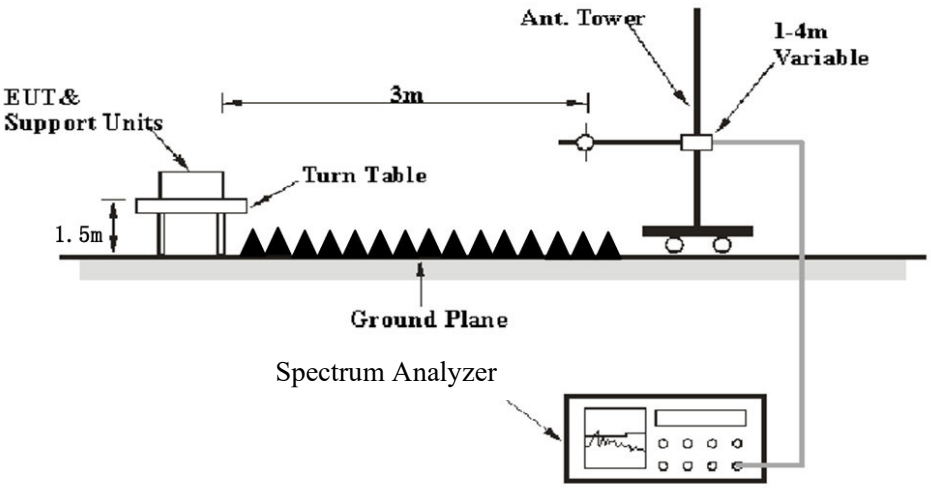
9 kHz-30MHz:



30MHz-1GHz:



Above 1GHz:



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

EMI Test Receiver & Spectrum Analyzer Setup

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

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

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 or 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 margin calculation is as follows:

Margin/Over Limit = Corrected Amplitude/Level-Limit
Corrected Amplitude/Level = Reading + Factor

Test Data

Environmental Conditions

Temperature:	22~23.6 °C
Relative Humidity:	41~47 %
ATM Pressure:	101.0~101.3 kPa

The testing was performed by Anson Su from 2025-01-08 to 2025-02-07 for below 1GHz and Dylan Yang from 2025-01-11 to 2025-01-22 for above 1GHz.

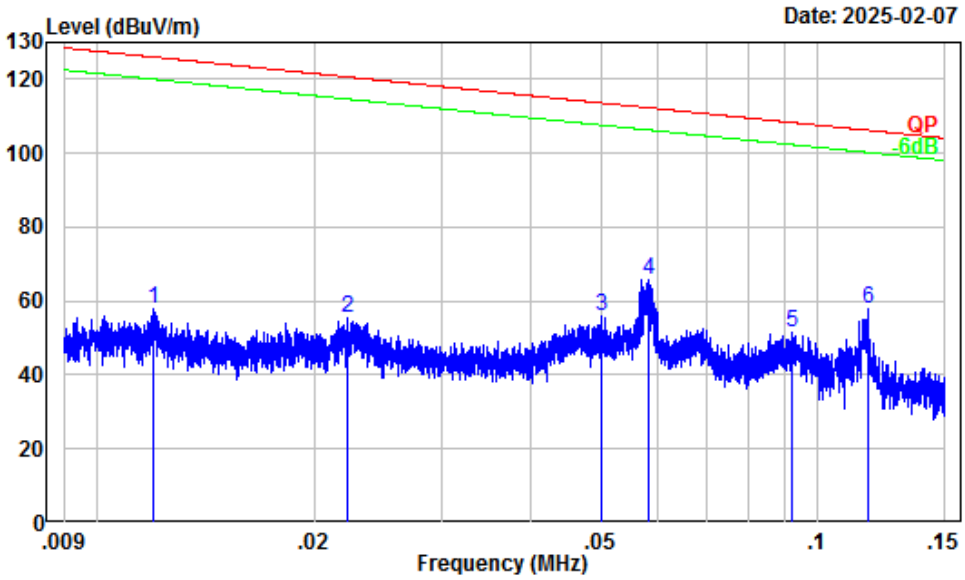
EUT operation mode: Transmitting

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

For Adapter 1

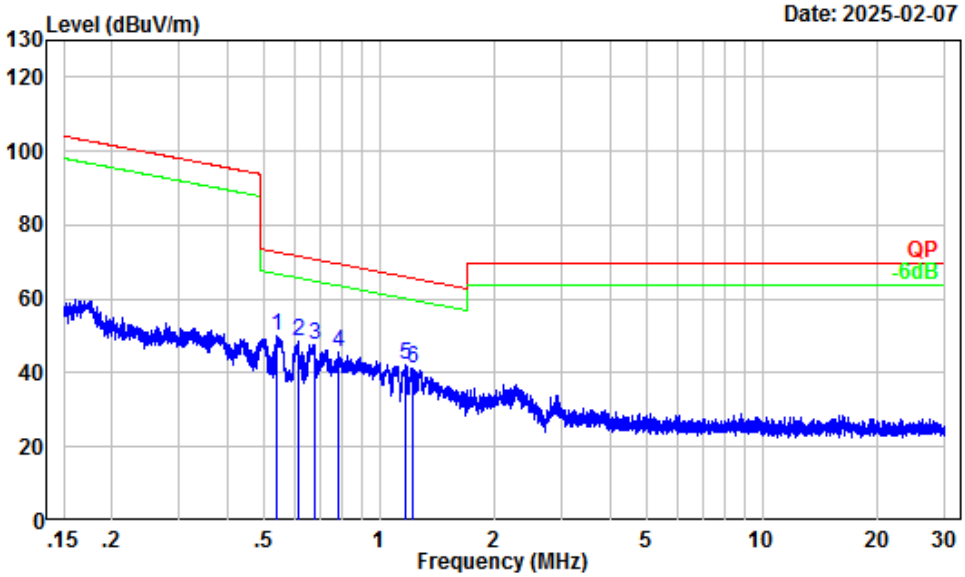
9 kHz-30MHz: (Maximum output power mode, low channel)

Parallel (worst case)




```
Site                    : Chamber A
Condition               : 3m
Project Number          : 2401A111119E-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	31.93	25.80	57.73	126.05	-68.32	Peak
2	0.02	29.97	25.37	55.34	120.65	-65.31	Peak
3	0.05	26.39	29.58	55.97	113.60	-57.63	Peak
4	0.06	25.57	39.97	65.54	112.29	-46.75	Peak
5	0.09	22.54	28.98	51.52	108.30	-56.78	Peak
6	0.12	20.97	36.86	57.83	106.20	-48.37	Peak

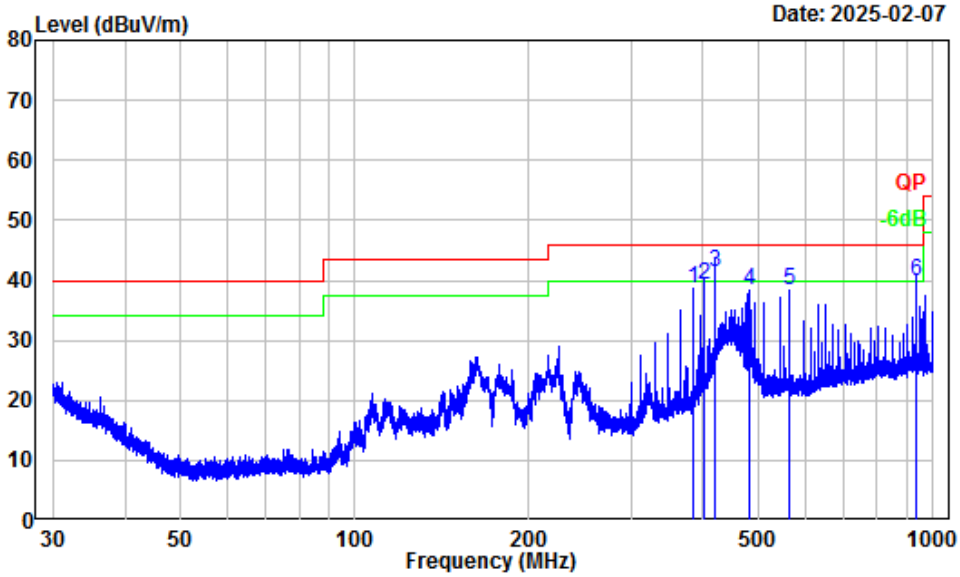


Site : Chamber A
Condition : 3m
Project Number : 2401A111119E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.54	5.93	43.87	49.80	72.97	-23.17	Peak
2	0.61	5.00	43.37	48.37	71.81	-23.44	Peak
3	0.67	4.24	43.44	47.68	70.96	-23.28	Peak
4	0.78	2.94	42.62	45.56	69.67	-24.11	Peak
5	1.18	0.71	41.48	42.19	66.04	-23.85	Peak
6	1.23	0.56	40.75	41.31	65.65	-24.34	Peak

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

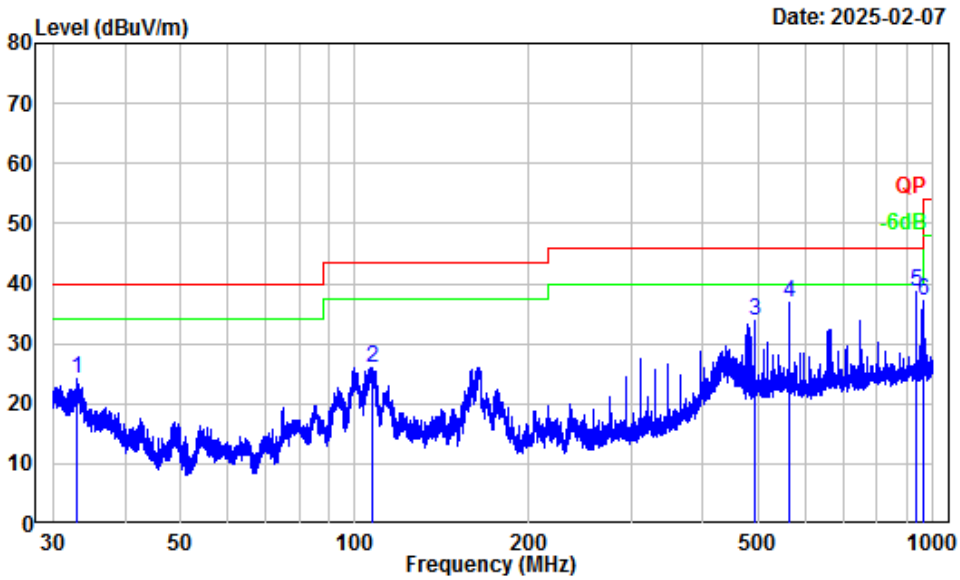
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2401A111119E-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	383.93	-9.04	47.58	38.54	46.00	-7.46	Peak
2	401.84	-8.35	47.50	39.15	46.00	-6.85	QP
3	419.66	-7.96	49.21	41.25	46.00	-4.75	QP
4	480.11	-6.34	44.79	38.45	46.00	-7.55	Peak
5	562.66	-5.24	43.59	38.35	46.00	-7.65	Peak
6	937.60	-1.05	40.78	39.73	46.00	-6.27	QP

Vertical



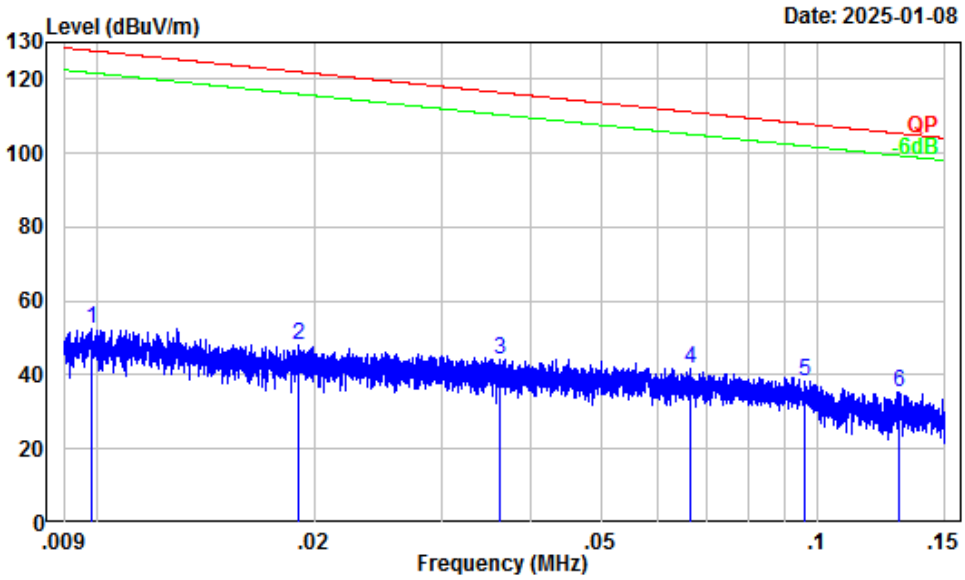
Site : Chamber A
Condition : 3m Vertical
Project Number : 2401A111119E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	32.96	-7.56	31.78	24.22	40.00	-15.78	Peak
2	107.23	-13.77	39.88	26.11	43.50	-17.39	Peak
3	491.18	-5.98	39.77	33.79	46.00	-12.21	Peak
4	562.66	-5.24	41.96	36.72	46.00	-9.28	Peak
5	937.60	-1.05	39.80	38.75	46.00	-7.25	Peak
6	960.06	-0.86	37.95	37.09	54.00	-16.91	Peak

For Adapter 2

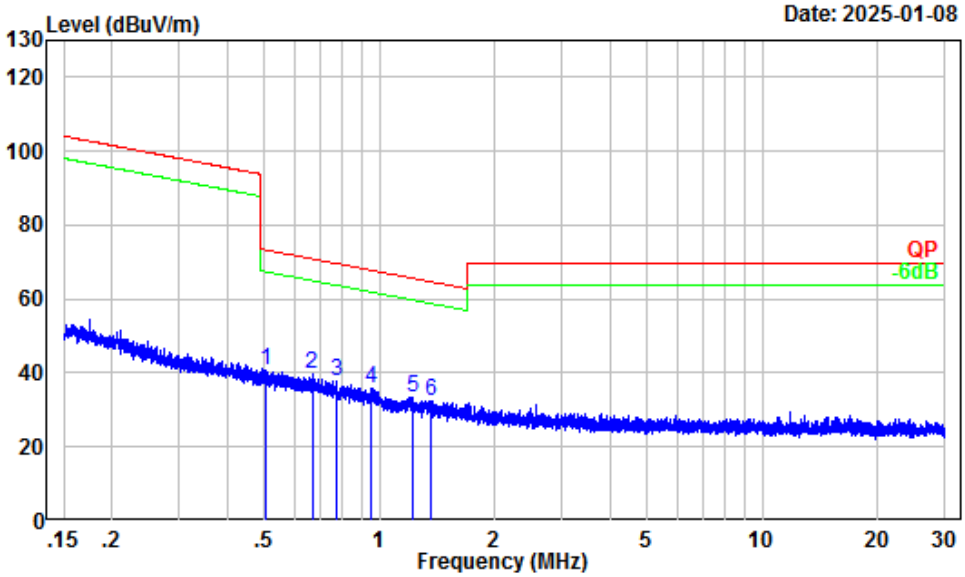
9 kHz-30MHz: (Maximum output power mode, low channel)

Parallel (worst case)




```
Site                    : Chamber A
Condition               : 3m
Project Number          : 2401A111119E-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	32.33	20.28	52.61	127.74	-75.13	Peak
2	0.02	30.59	17.62	48.21	122.03	-73.82	Peak
3	0.04	27.84	16.55	44.39	116.41	-72.02	Peak
4	0.07	24.75	17.03	41.78	111.14	-69.36	Peak
5	0.10	22.27	16.21	38.48	107.95	-69.47	Peak
6	0.13	20.28	15.18	35.46	105.38	-69.92	Peak

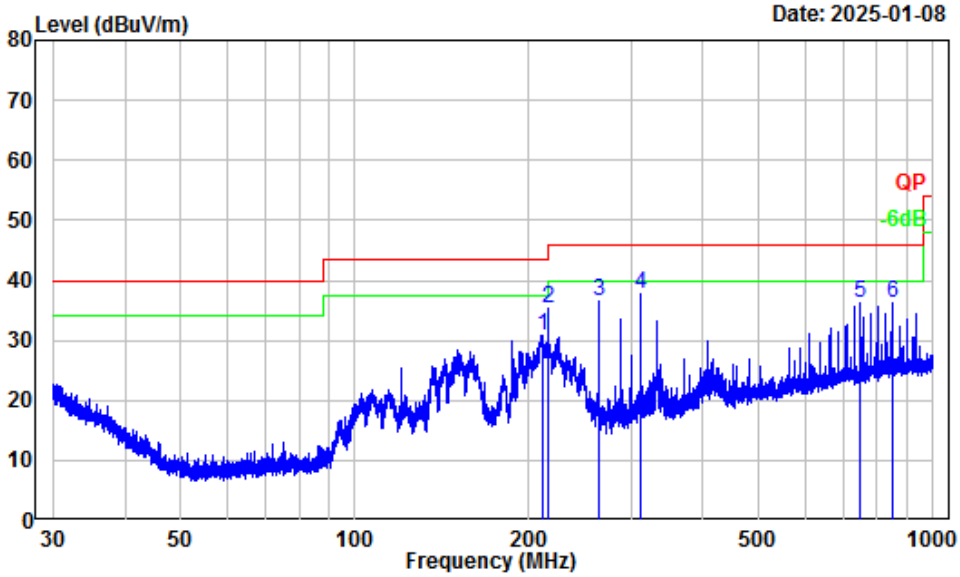


Site : Chamber A
Condition : 3m
Project Number : 2401A111119E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.51	6.33	34.61	40.94	73.53	-32.59	Peak
2	0.67	4.34	35.36	39.70	71.06	-31.36	Peak
3	0.78	3.00	34.72	37.72	69.73	-32.01	Peak
4	0.95	1.58	34.25	35.83	67.94	-32.11	Peak
5	1.22	0.59	32.73	33.32	65.73	-32.41	Peak
6	1.37	0.17	32.29	32.46	64.69	-32.23	Peak

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

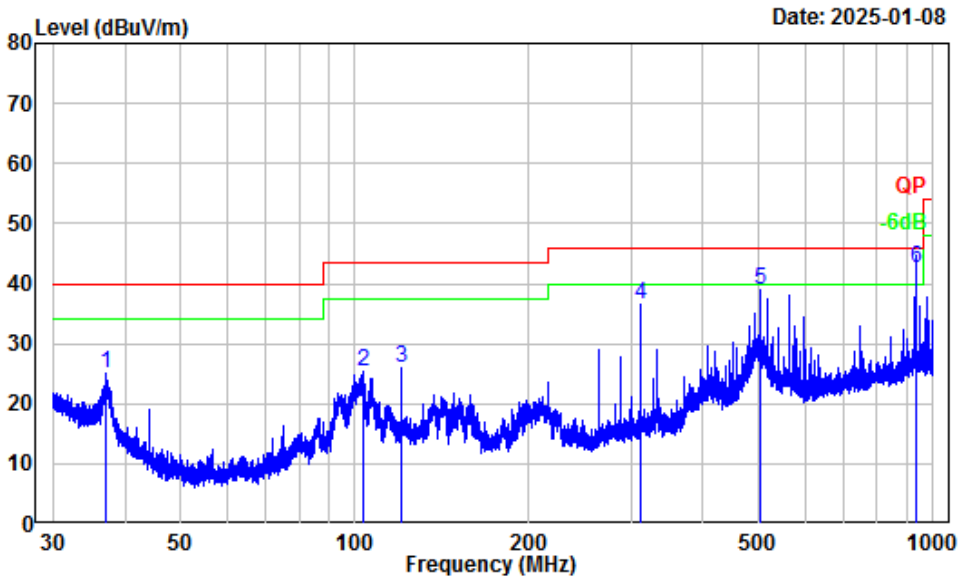
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2401A111119E-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	211.80	-14.09	44.87	30.78	43.50	-12.72	Peak
2	216.02	-14.20	49.63	35.43	46.00	-10.57	Peak
3	264.05	-12.35	48.96	36.61	46.00	-9.39	Peak
4	312.04	-11.00	48.81	37.81	46.00	-8.19	Peak
5	750.11	-2.88	39.22	36.34	46.00	-9.66	Peak
6	852.16	-1.72	37.97	36.25	46.00	-9.75	Peak

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number : 2401A111119E-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	37.12	-10.37	35.48	25.11	40.00	-14.89	Peak
2	103.40	-14.89	40.11	25.22	43.50	-18.28	Peak
3	120.01	-11.45	37.54	26.09	43.50	-17.41	Peak
4	312.04	-11.00	47.39	36.39	46.00	-9.61	Peak
5	504.04	-5.77	44.72	38.95	46.00	-7.05	Peak
6	937.60	-1.05	43.70	42.65	46.00	-3.35	QP

Above 1GHz: (with worst case: adapter 2)

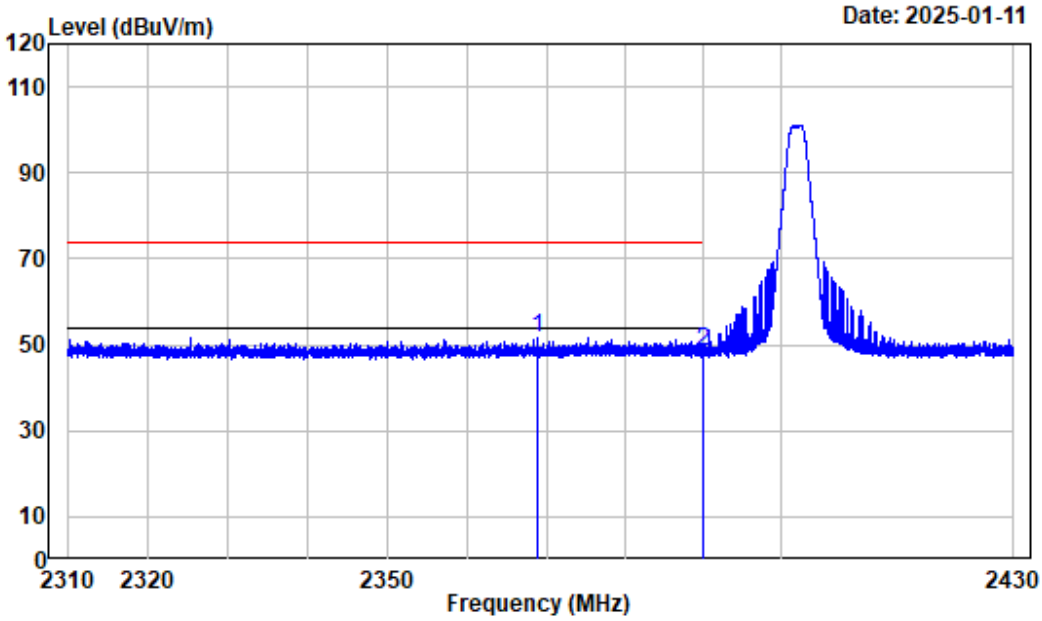
Frequency (MHz)	Reading (dBµV)	Detector (PK/AV)	Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low Channel(2402MHz)							
4804.00	52.72	PK	H	-7.79	44.93	74	-29.07
4804.00	52.07	PK	V	-7.79	44.28	74	-29.72
Middle Channel(2440MHz)							
4880.00	52.41	PK	H	-7.59	44.82	74	-29.18
4880.00	52.26	PK	V	-7.59	44.67	74	-29.33
High Channel(2476MHz)							
4952.00	52.54	PK	H	-7.62	44.92	74	-29.08
4952.00	52.41	PK	V	-7.62	44.79	74	-29.21

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 and the peak value is less than the average limit that can meet the limit of the average value.

Test plots for Band Edge Measurements (Radiated):

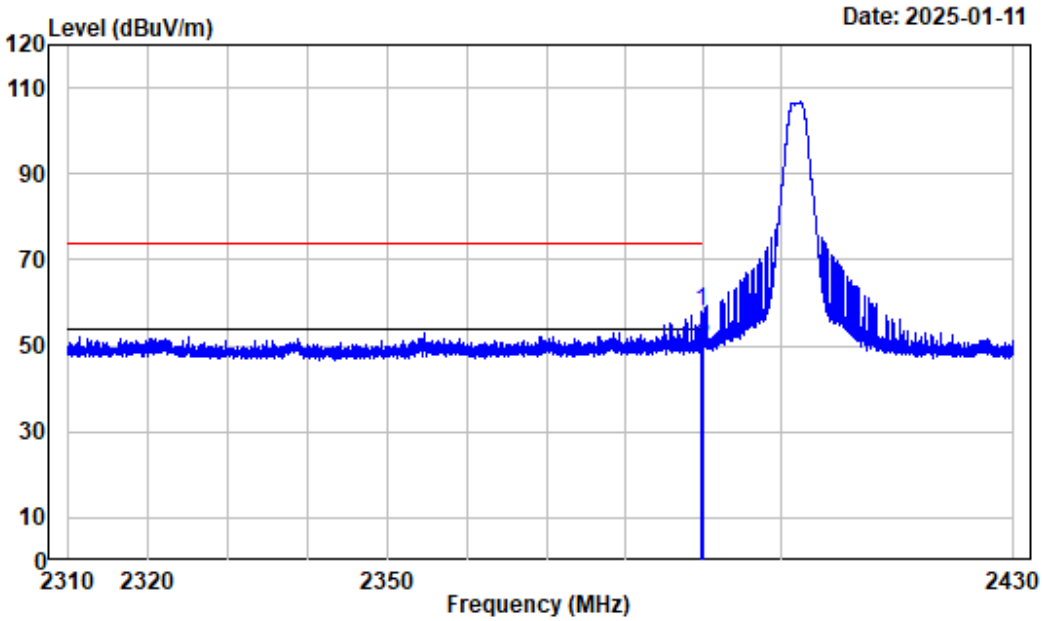
Test Channel:	2402MHz	Ant. Polar. :	Horizontal-Peak



Condition : Horizontal
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2402

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2368.957	-10.94	62.76	51.82	74.00	-22.18	peak
2	2390.000	-10.98	59.59	48.61	74.00	-25.39	Peak

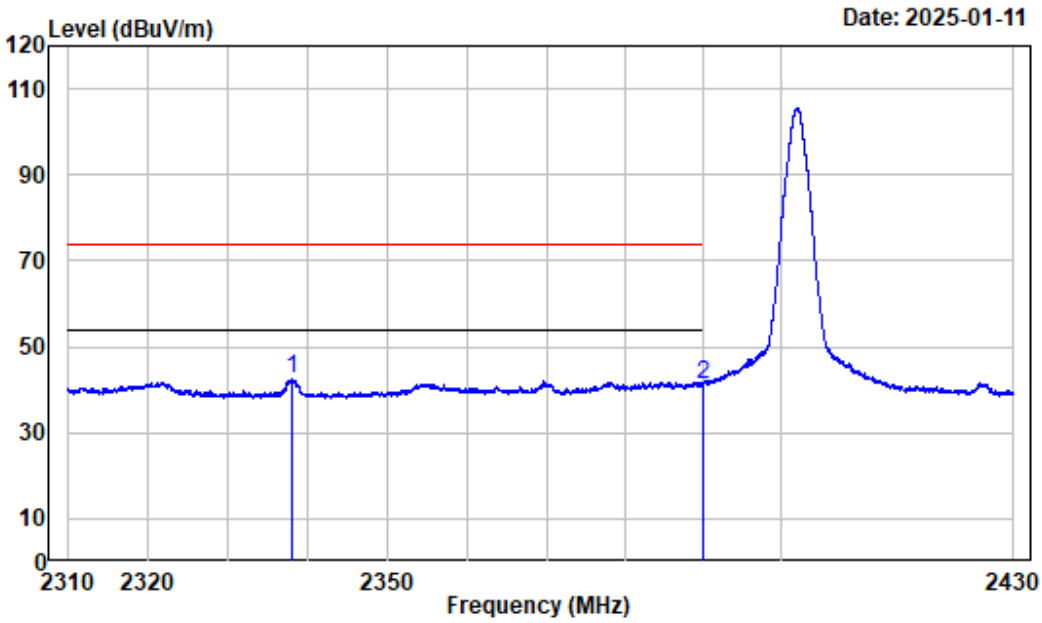
Test Channel:	2402MHz	Ant. Polar. :	Vertical-Peak



Condition : Vertical
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2402

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2389.630	-10.98	68.97	57.99	74.00	-16.01	peak
2	2390.000	-10.98	60.68	49.70	74.00	-24.30	Peak

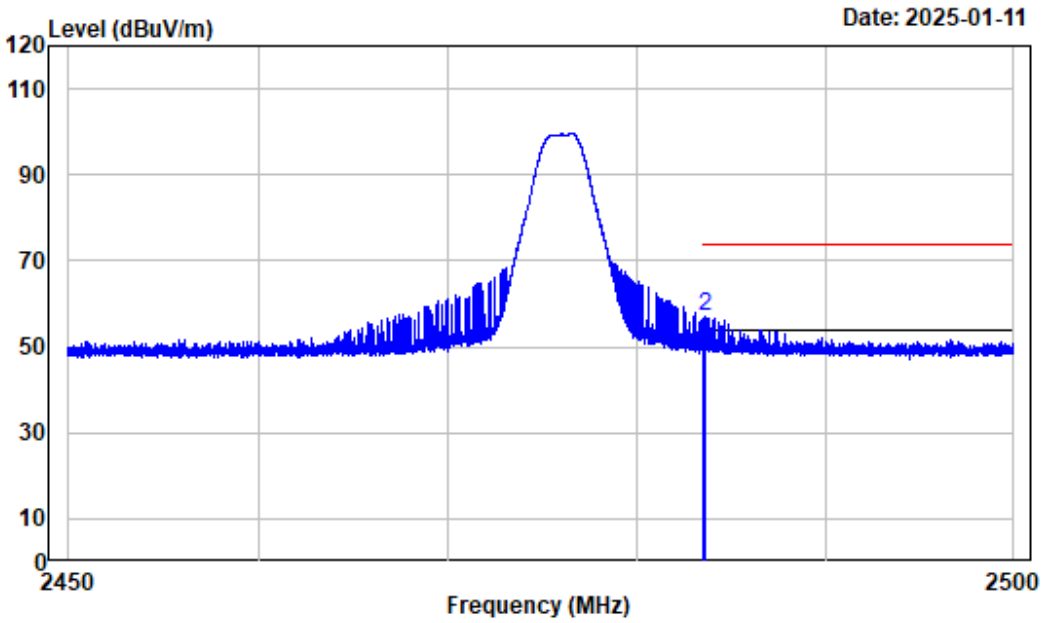
Test Channel:	2402MHz	Ant. Polar. :	Vertical-Average



Condition : Vertical
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Average reading: RBW:1MHz VBW:5kHz Detector:Peak
Note : GFSK_2402

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2337.918	-10.86	53.32	42.46	54.00	-11.54	Average
2	2390.000	-10.98	52.12	41.14	54.00	-12.86	Average

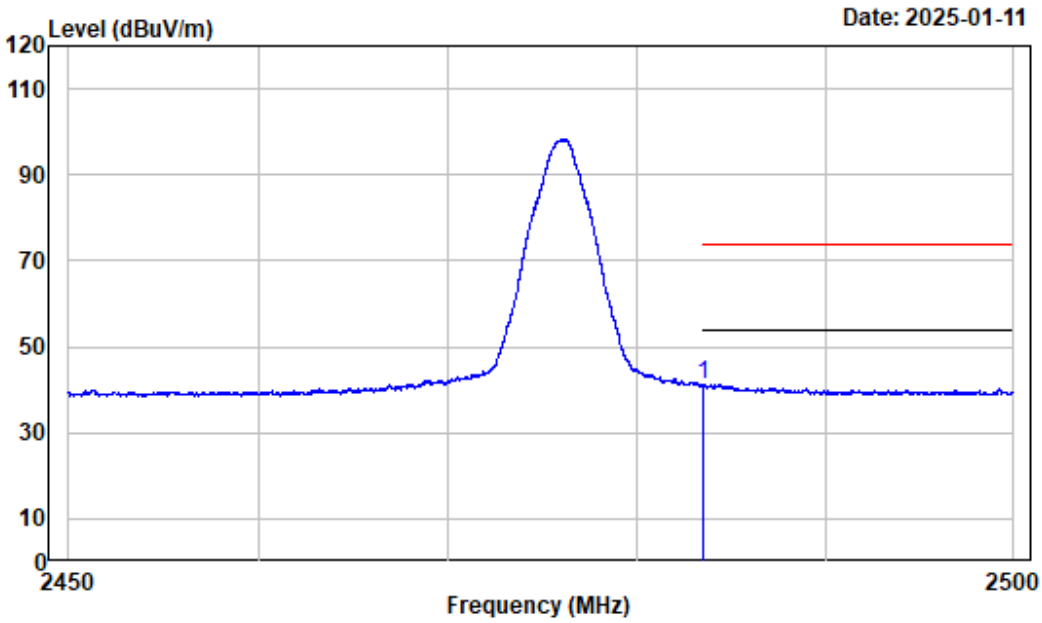
Test Channel:	2476MHz	Ant. Polar. :	Horizontal-Peak



Condition : Horizontal
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2476

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	59.88	48.91	74.00	-25.09	Peak
2	2483.635	-10.97	67.84	56.87	74.00	-17.13	peak

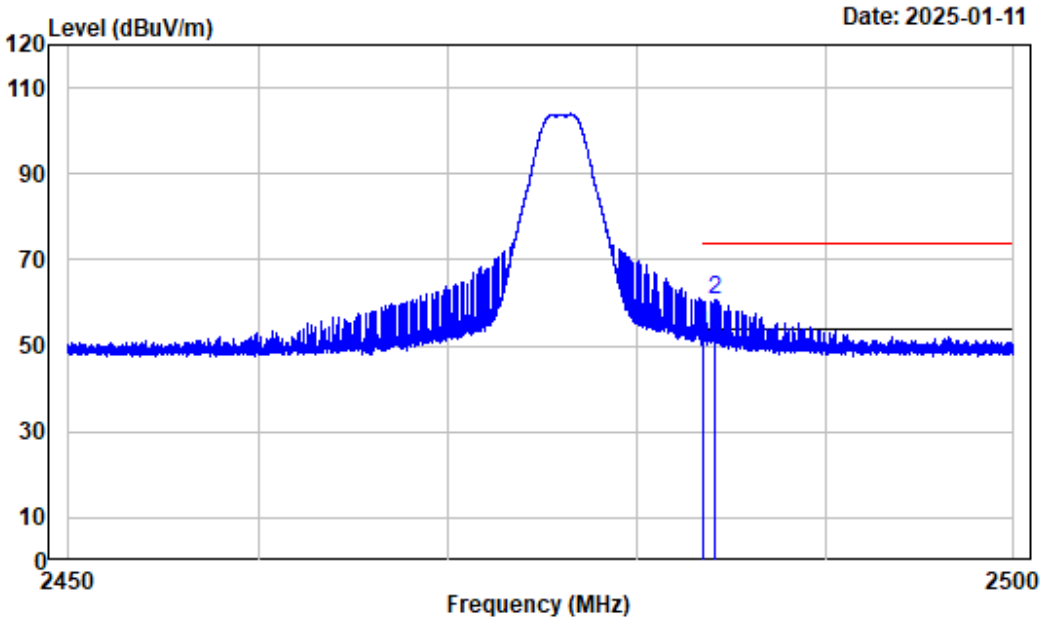
Test Channel:	2476MHz	Ant. Polar. :	Horizontal-Average



Condition : Horizontal
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Average reading: RBW:1MHz VBW:5kHz Detector:Peak
Note : GFSK_2476

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	52.03	41.06	54.00	-12.94	Average

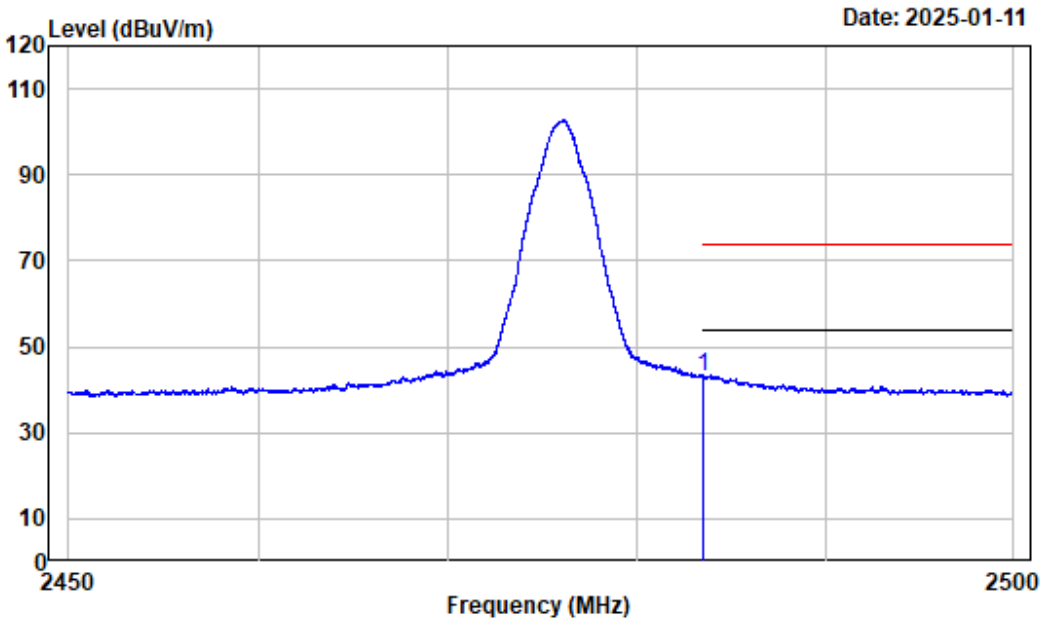
Test Channel:	2476MHz	Ant. Polar. :	Vertical-Peak



Condition : Vertical
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2476

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	63.35	52.38	74.00	-21.62	Peak
2	2484.154	-10.97	71.56	60.59	74.00	-13.41	peak

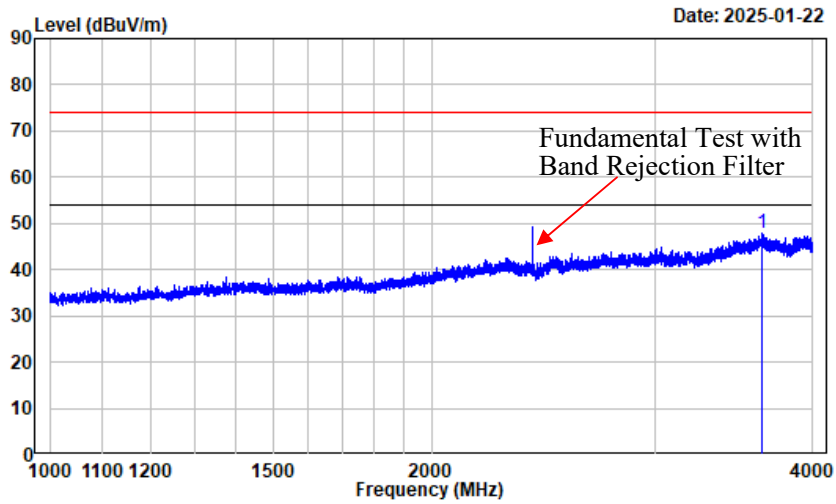
Test Channel:	2476MHz	Ant. Polar. :	Vertical-Average



Condition : Vertical
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Average reading: RBW:1MHz VBW:5kHz Detector:Peak
Note : GFSK_2476

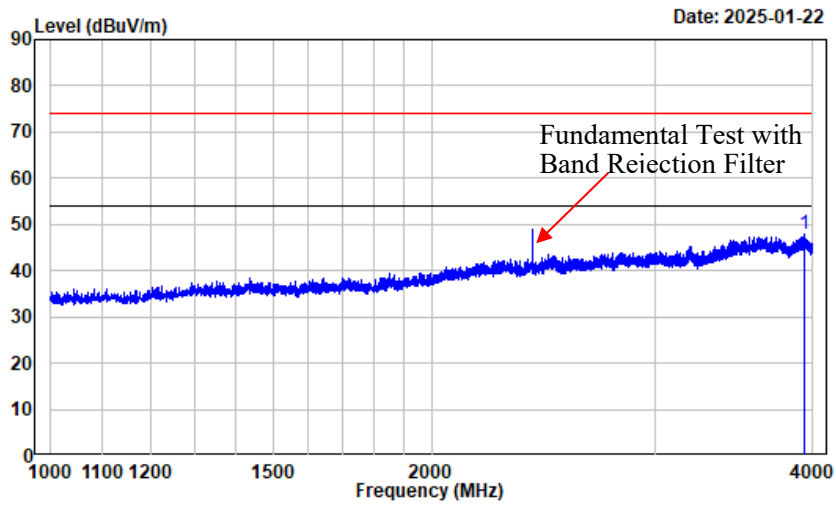
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	54.05	43.08	54.00	-10.92	Average

Listed with the worst harmonic margin test plot:

Horizontal	
1-4GHz	 Condition : Horizontal Project No. : 2401A111119E-RF Tester : Dylan Yang Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak Note : GFSK_2402 Freq Factor Read Level Level Limit Line Over Limit Remark MHz dB/m dBuV dBuV/m dBuV/m dB 1 3650.831 -9.78 57.65 47.87 74.00 -26.13 Peak

Vertical

1-4GHz

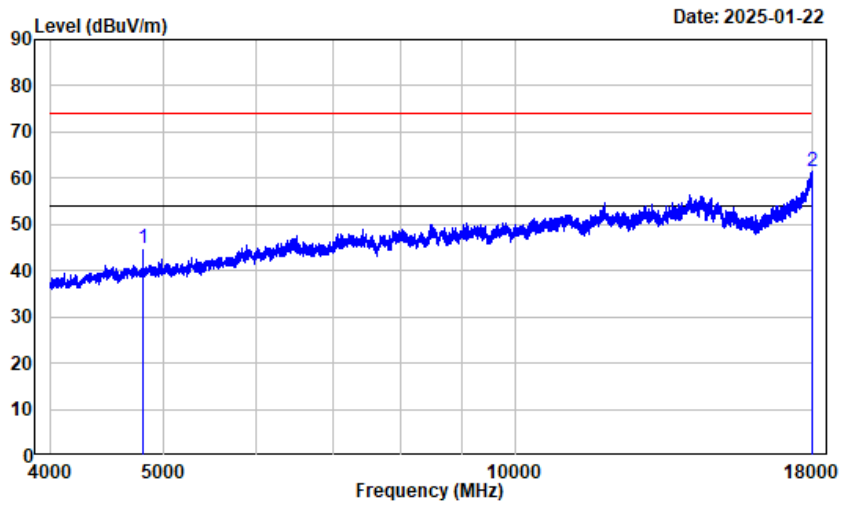



```
Condition        : Vertical
Project No.      : 2401A111119E-RF
Tester           : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note             : GFSK_2402
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	3943.368	-9.39	57.16	47.77	74.00	-26.23	Peak

Horizontal-Peak

4-18GHz

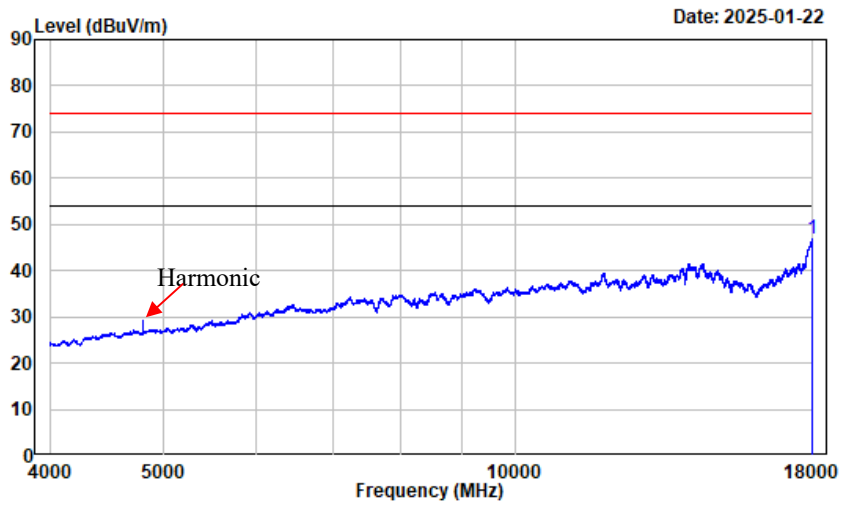


Condition : Horizontal
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2402

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4804.000	-7.79	52.72	44.93	74.00	-29.07	Peak
2	17979.000	13.09	48.25	61.34	74.00	-12.66	Peak

Horizontal-Average

4-18GHz

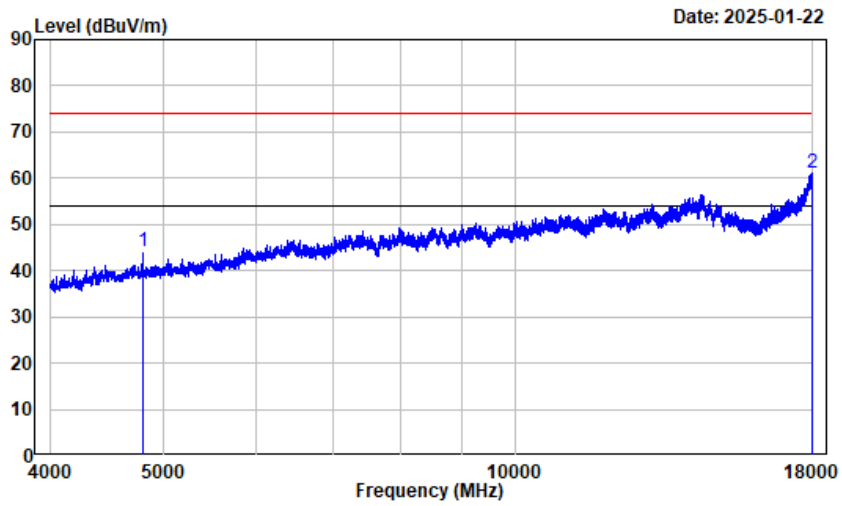



```
Condition        : Horizontal
Project No.      : 2401A111119E-RF
Tester           : Dylan Yang
Spectrum setting: Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note             : GFSK_2402
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	17989.500	13.16	33.86	47.02	54.00	-6.98	Average

Vertical-Peak

4-18GHz

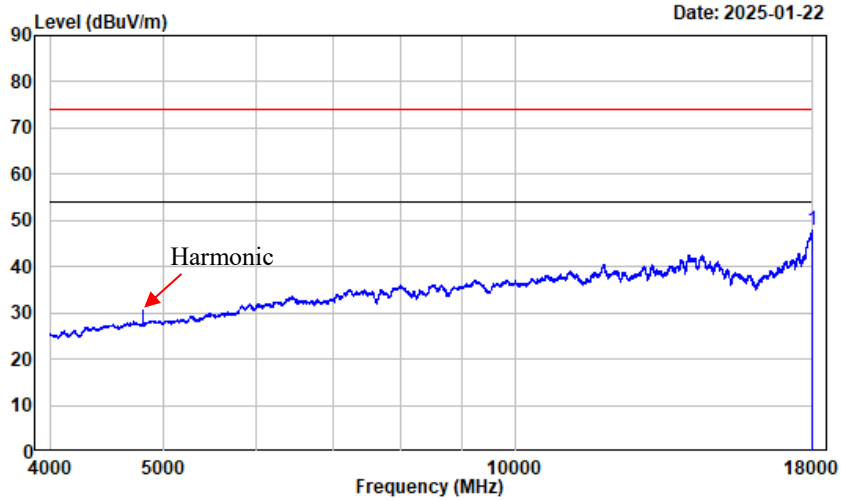


Condition : Vertical
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2402

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4804.000	-7.79	52.07	44.28	74.00	-29.72	Peak
2	17966.750	13.03	47.96	60.99	74.00	-13.01	Peak

Vertical-Average

4-18GHz

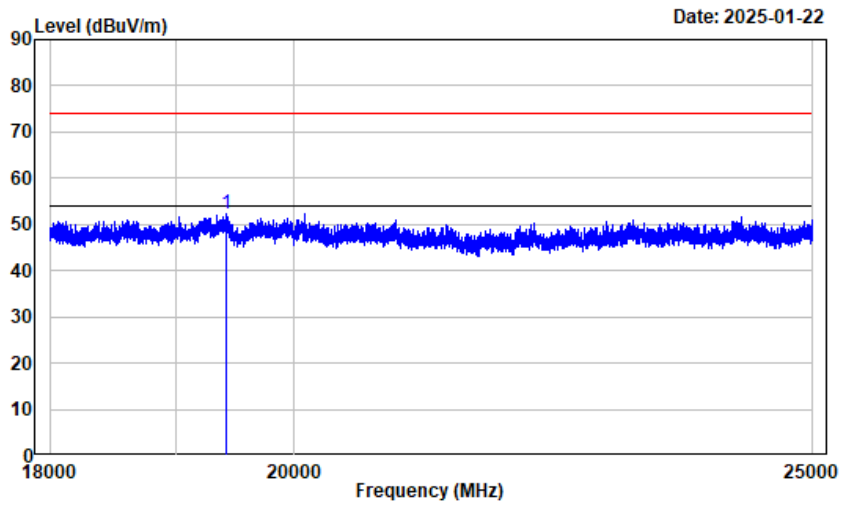



```
Condition        : Vertical
Project No.      : 2401A111119E-RF
Tester           : Dylan Yang
Spectrum setting: Average reading: RBW:1MHz VBW:1kHz Detector:Peak
Note             : GFSK_2402
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	17989.500	13.16	34.83	47.99	54.00	-6.01	Average

Horizontal

18-25GHz

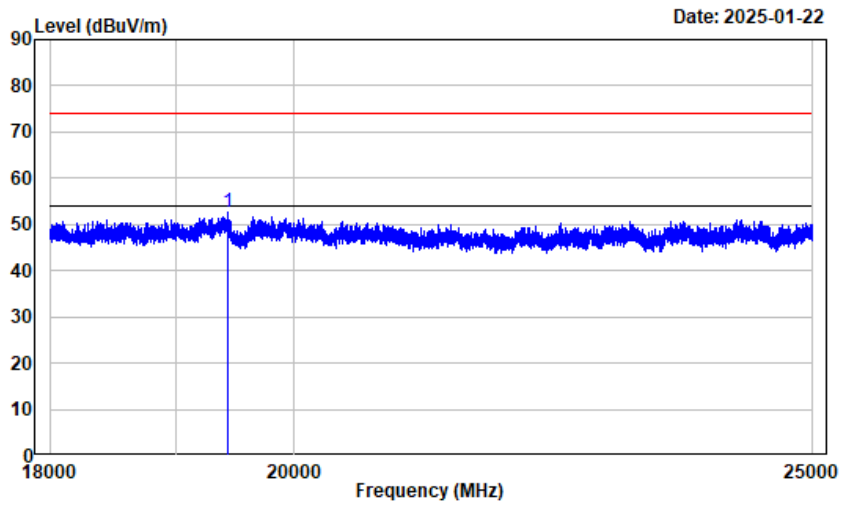


Condition : Horizontal
Project No. : 2401A111119E-RF
Tester : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note : GFSK_2402

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	19416.800	15.11	37.36	52.47	74.00	-21.53	Peak

Vertical

18-25GHz




```
Condition        : Vertical
Project No.      : 2401A111119E-RF
Tester           : Dylan Yang
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak
Note             : GFSK_2402
```

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	19436.050	15.15	37.62	52.77	74.00	-21.23	Peak

FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems 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.

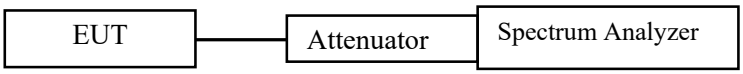
Test Procedure

Test Method: ANSI C63.10-2013 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: Auto.
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.



Test Data

Environmental Conditions

Temperature:	25.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.6 kPa

The testing was performed by Cheeb Huang on 2025-01-13.

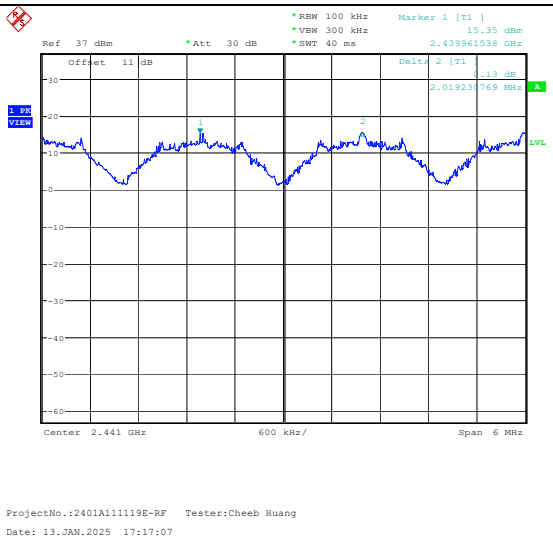
EUT operation mode: Transmitting

Test Result: Compliant

Test Channel	Test Frequency (MHz)	Channel Separation (MHz)	Limits (MHz)
Middle	2440	2.019	1.391

Limit=2/3* maximum 20 dB bandwidth

Please refer to the below plots:

Hop_Middle Channel	

FCC §15.247(a) (1) - 20dBEMISSION BANDWIDTH & 99% OCCUPIED BANDWIDTH

Applicable Standard

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 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 C63.10-2013 Clause 7.8.7 & 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).

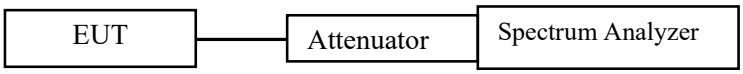
h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

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:	25.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.6 kPa

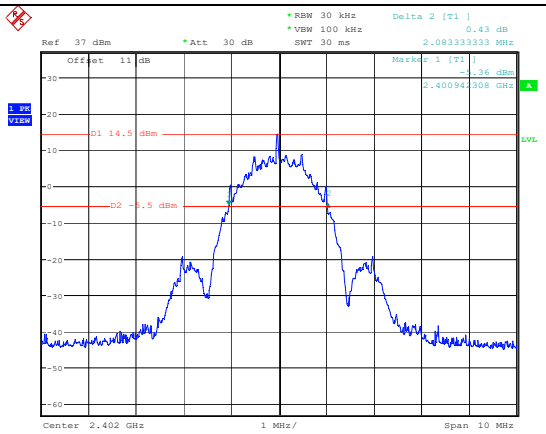
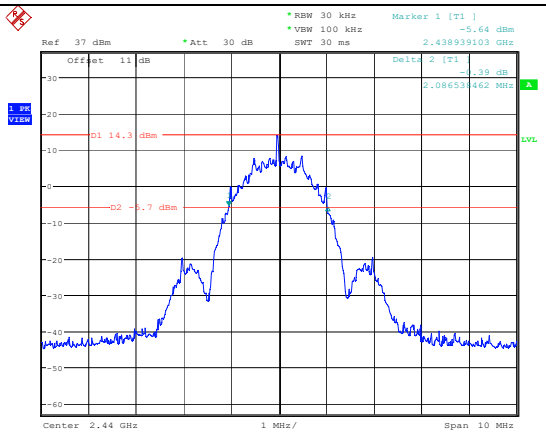
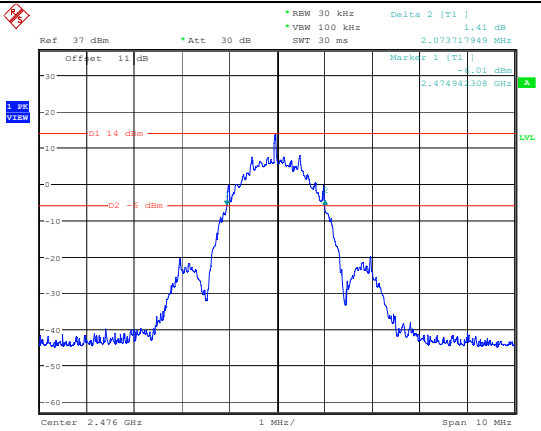
The testing was performed by Cheeb Huang on 2025-01-13.

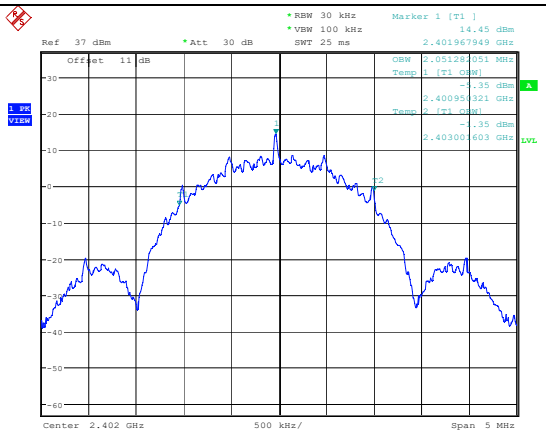
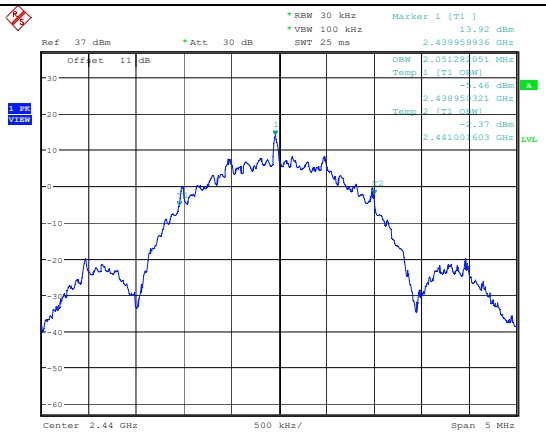
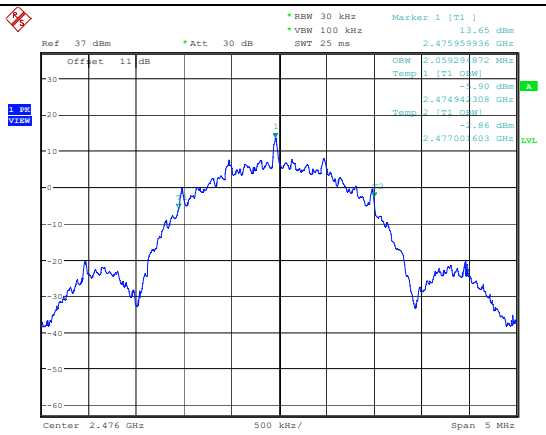
EUT operation mode: Transmitting

Test Result: Compliant

Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	20 dB Emission Bandwidth (MHz)
GFSK	Low	2402	2.051	2.083
	Middle	2440	2.051	2.087
	High	2476	2.059	2.074

Please refer to the below plots:

20 dB Bandwidth	
Low Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:29:19
Middle Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:31:21
High Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:33:09

99% Emission Bandwidth	
Low Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:54:18
Middle Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:53:15
High Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:52:36

FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

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.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 7.8.3

a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may 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.

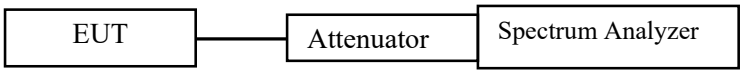
c) VBW ≥ RBW.

d) Sweep: Auto.

e) Detector function: Peak.

f) Trace: Max hold.

It might prove necessary to break the span up into sub ranges 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.



Test Data

Environmental Conditions

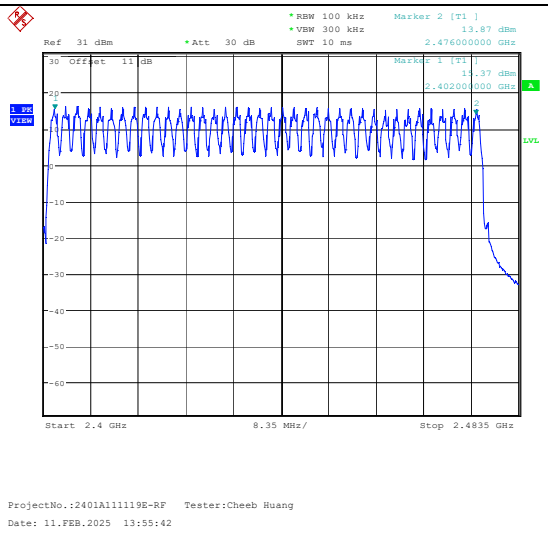
Temperature:	25.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.6 kPa

The testing was performed by Cheeb Huang on 2025-02-11.

EUT operation mode: Transmitting

Test Result: Compliant

Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
GFSK	2400-2483.5	38	≥15

Hopping Channel	
GFSK	

FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

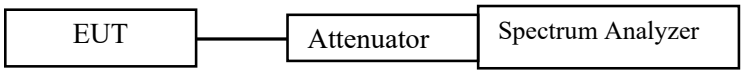
Applicable Standard

Frequency hopping systems (FHSs) 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.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 7.8.4

1. The EUT was worked in channel hopping.
2. Set the RBW to: 1MHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 0Hz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Recorded the time of single pulses



Test Data

Environmental Conditions

Temperature:	25.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.6 kPa

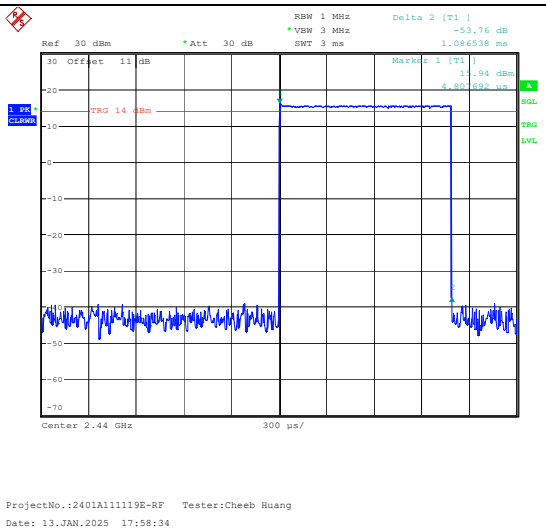
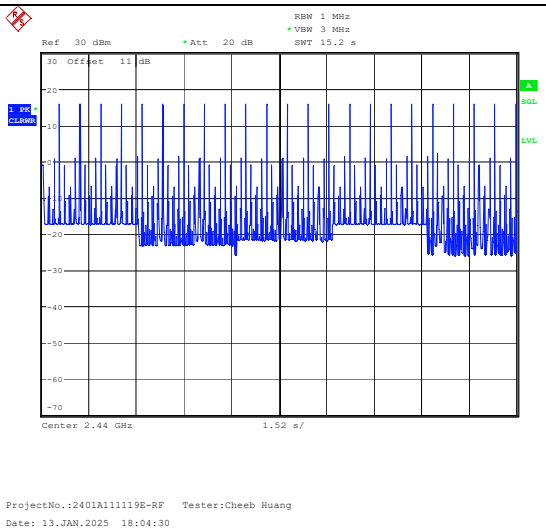
The testing was performed by Cheeb Huang on 2025-01-13.

EUT operation mode: Transmitting

Test Result: Compliant

Test Mode	Test Frequency (MHz)	Pulse width (ms)	Observation time (s)	Hopping Numbers in Observation time	Dwell Time (s)	Limit (s)
GFSK	Hop_2440	1.087	15.2	23	0.025	0.400

Note 1: Observation time= Hopping Channel Number× 0.4
Note 2: Dwell Time = Pulse width *Hopping Numbers in Observation time

GFSK	
Pulse Width	
Hopping Numbers in 15.2s	

FCC §15.247(b) (1) - 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.

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 C63.10-2013 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. The hopping shall be disabled for this test:

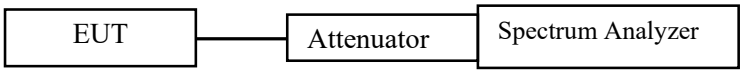
a) Use the following spectrum analyzer settings:

1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
2) RBW > 20 dB bandwidth of the emission being measured.
3) VBW ≥ RBW.
4) Sweep: Auto.
5) Detector function: Peak.
6) Trace: Max hold.

b) Allow trace to stabilize.

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

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



Test Data

Environmental Conditions

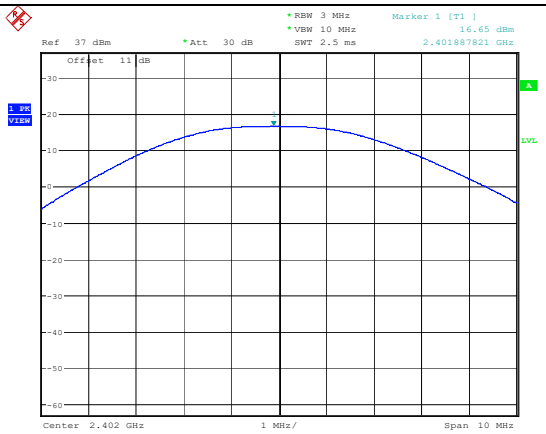
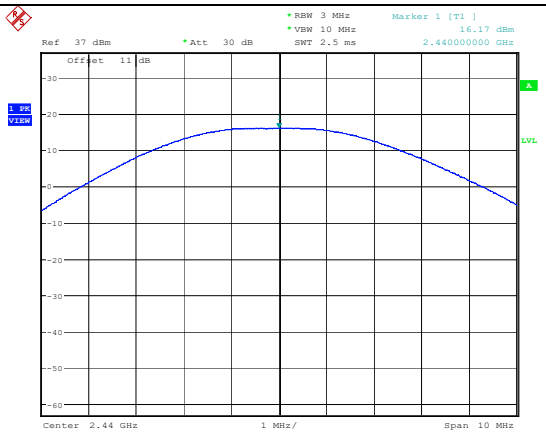
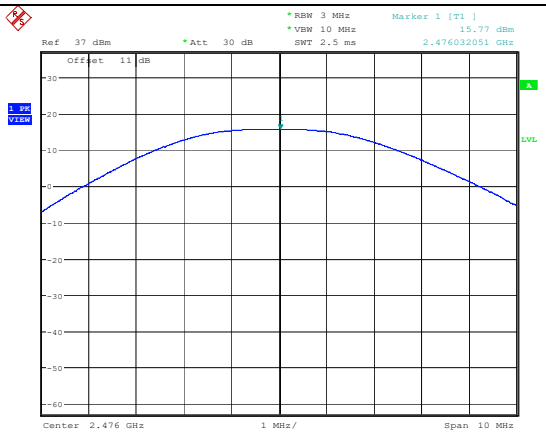
Temperature:	25.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.6 kPa

The testing was performed by Cheeb Huang on 2025-01-13.

EUT operation mode: Transmitting

Test Result: Compliant

Mode	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
GFSK	Low	2402	16.65	21
	Middle	2440	16.17	21
	High	2476	15.77	21

Low Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:50:03
Middle Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:50:46
High Channel	 ProjectNo.:2401A111119E-RF Tester:Cheeb Huang Date: 13.JAN.2025 16:51:14

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

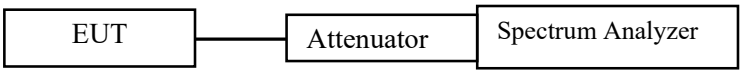
According to FCC §15.247(d)

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)).

Test Procedure

Test Method: ANSI C63.10-2013 Clause 7.8.6 &Clause 6.10

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Data

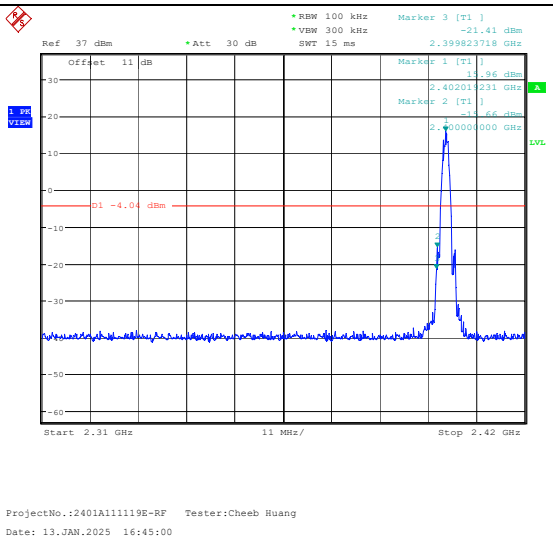
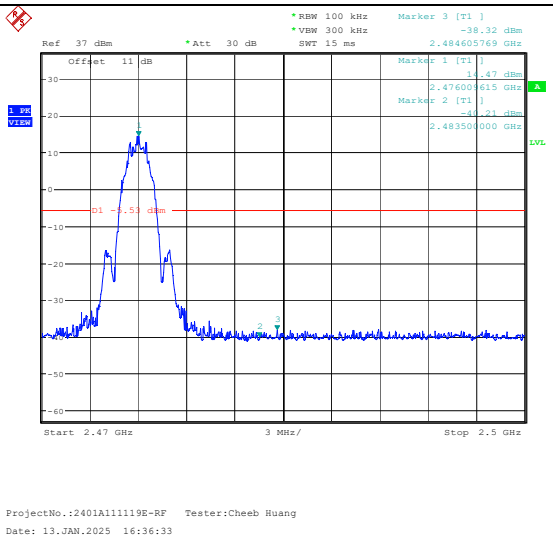
Environmental Conditions

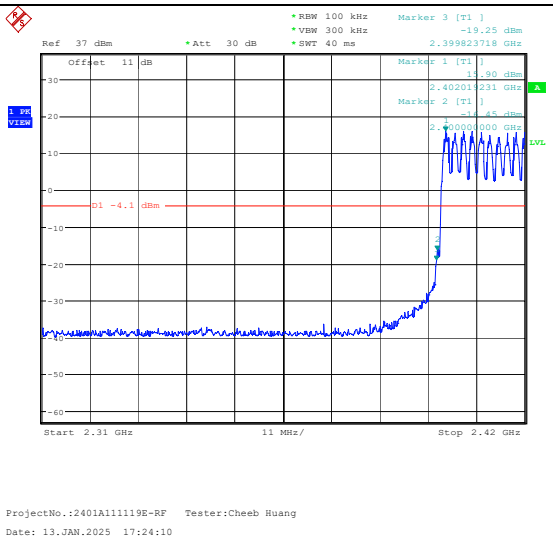
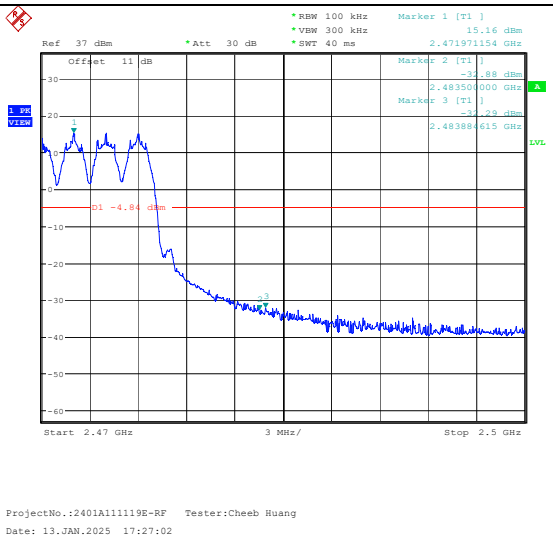
Temperature:	25.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.6 kPa

The testing was performed by Cheeb Huang on 2025-01-13.

EUT operation mode: Transmitting

Test Result: Compliant

Band Edge, Single Channel	
GFSK, Left Side	
GFSK, Right Side	

Band Edge, Hopping Channel	
GFSK, Left Side	
GFSK, Right Side	

EUT PHOTOGRAPHS

Please refer to the attachment 2401A111119E-RF External photo and 2401A111119E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401A111119E-RF Test Setup photo.

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