FCC Test Report

Report No.:	2405S70990EA
Applicant:	Shenzhen VanTop Technology & Innovation Co., Ltd.
Address:	506, BLDG 4, Pingshan minQi Technology Park, No. 65 Lishan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China
Product Name:	REMOTE
Product Model:	DR-STE51B
Multiple Models:	N/A
Trade Mark:	SNAPTAIN, AMETA
FCC ID:	2AQ3A-STE51BR2425
Standards:	FCC CFR Title 47 Part 15C (§15.249)
Test Date:	2024-04-19 to 2024-09-25
Test Result:	Complied
Report Date:	2024-09-25

Reviewed by: Abel Chen — Project Engineer

Approved by: Jacob Kong — Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

NVLAP TESTING NVLAP LAB CODE 600335-0

ilac-MRA

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Announcement

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2. The results in this report apply only to the sample tested.

3. This sample tested is in compliance with the limits of the above regulation.

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

5. 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.

Revision History

Version No.	Issued Date	Description
00	*2024-09-25*	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	Shenzhen VanTop Technology & Innovation Co., Ltd.
Address:	506, BLDG 4, Pingshan minQi Technology Park, No. 65 Lishan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen VanTop Technology & Innovation Co., Ltd.
Address:	506, BLDG 4, Pingshan minQi Technology Park, No. 65 Lishan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China

1.2 Product Description of EUT

The EUT is REMOTE that contains a 2.4G SRD radio, this report covers the full testing of the 2.4G SRD radio.

Sample Serial Number	2JZD-1 for RE test, 2JZD-3 for RF test (assigned by WATC)
Sample Received Date	2024-04-18
Sample Status	Good Condition
Frequency Range	2440-2475MHz
Maximum E-field Strength:	100.90dBμV/m @3m
Modulation Technology	GFSK
Antenna Gain#	0.58dBi
Spatial Streams#	SI (1TX)
Power Supply	DC 4.5V from battery
Operating temperature#	0 deg.C to +40 deg.C
Adapter Information	N/A
Modification	Sample No Modification by the test lab

1.3 Antenna information

15.203 requirement:

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

Device Antenna information:	

The antenna is an internal antenna which cannot replace by end-user. Please see product internal photos for details.

1.4 Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

1.5 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Emissions, Radiated	Below 30MHz	±2.78dB
	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Bandwidth		0.34%

Note 1: 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.

Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

1.6 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

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. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.7 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15

ANSI C63.10-2013

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2440	18	2457	36	2475
2	2441	19	2458	/	/
…	…	…	…	/	/
17	2456	…	…	/	/

According to ANSI C63.10-2013 chapter 5.6.1 Table 11 requirement, select lowest/middle/highest frequency in the frequency range in which device operates for testing. The detailed frequency points are as follows:

Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2440	18	2457	36	2475

Test Mode:			
Transmitting mode:	Keep the EUT in continuous transmitting with modulation		
Exercise software#:	Engineering mode, EUT was configured to test mode by applicant		
Mode	**Power Level Setting#**		
	Low Channel	**Middle Channel**	**High Channel**
SRD	Default	Default	Default
The exercise software and the maximum power setting that provided by manufacturer.			

Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report For radiated emission 9kHz-30MHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Interconnecting Cables

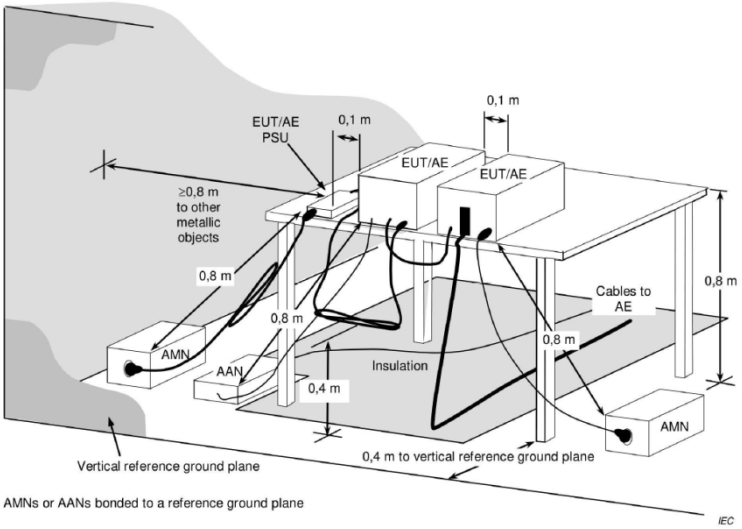
Manufacturer	Description	Length(m)	From	To
/	/	/	/	/

2.4 Block Diagram of Connection between EUT and AE

Note: for reference only, the actual connection setup used for testing please refer to the test photos.

2.5 Test Setup

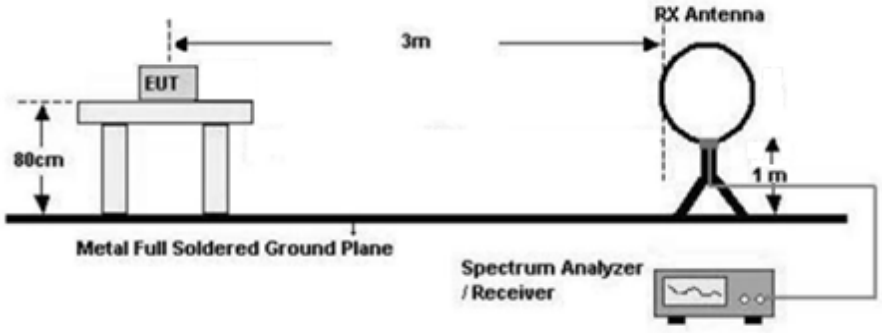
1) Conducted emission measurement:



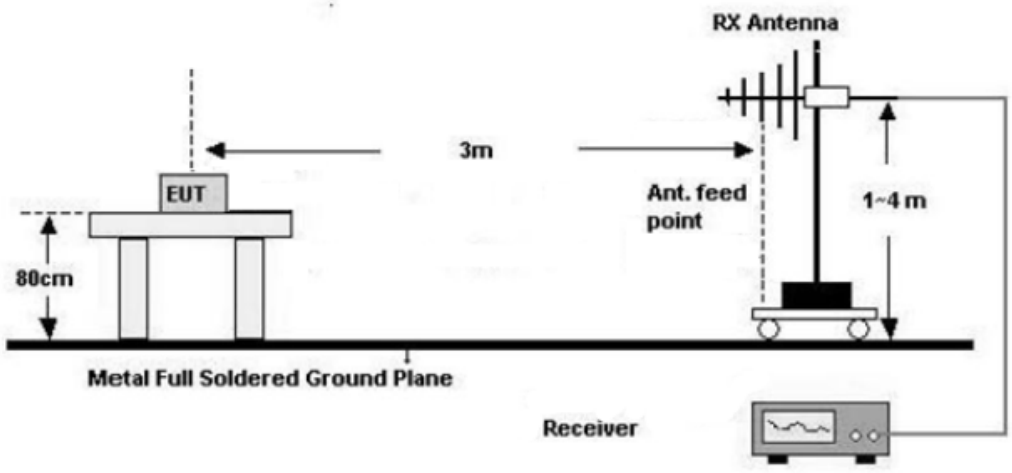
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

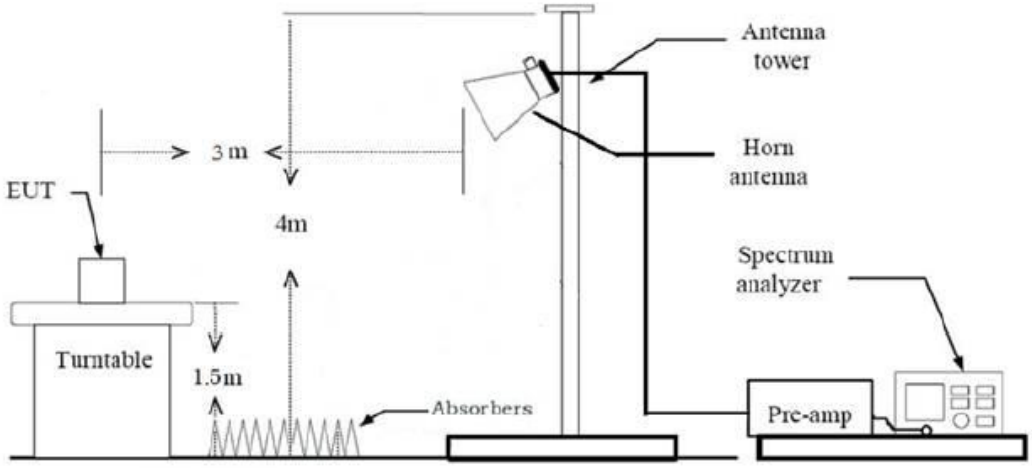
Below 30MHz (3m SAC)



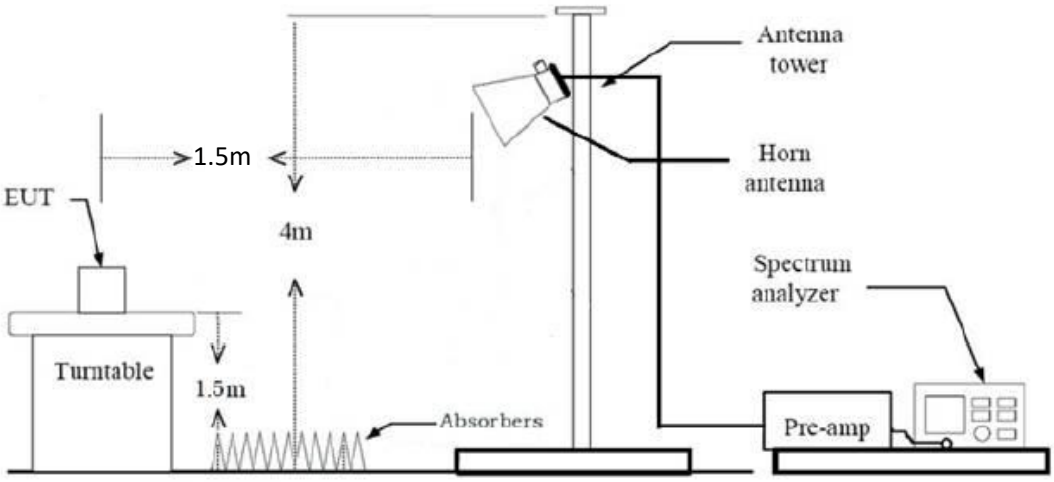
30MHz-1GHz (3m SAC)



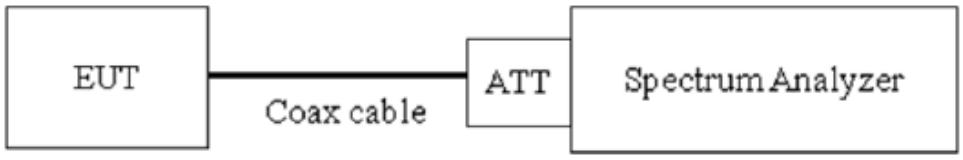
1GHz-18GHz(3m FAC)



Above 18GHz (3m FAC)



3) RF Conducted Test



2.6 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For below 30MHz

1. All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz- 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).
2. Loop antenna use, investigation was done on the three antenna orientations (parallel, perpendicular, gound-parallel)

b) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

c) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-18GHz) and 1.5 m (above 18GHz).
2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
4. Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

Bandwidth Test:

1. The antenna port of EUT was connected to the RF port of the Spectrum analyzer through Attenuator and RF cable.
2. The EUT is keeping in continuous transmission mode.
3. Test the bandwidth and record the result

2.7 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2013 Section 6.2
20dB Emission Bandwidth	ANSI C63.10-2013 Section 6.9.2
Field strength of fundamental and Radiated emission	ANSI C63.10-2013 Section 6.3&6.4&6.5&6.6&7.5

2.8 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
COM-POWER	Amplifier	PAM-840A	461306	2023/8/8	2024/8/7
BACL	Loop Antenna	1313-1A	4010611	2024/2/7	2027/2/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2024/7/9
Oulitong	Band Reject Filter	OBSF-2400-2483.5-50N	OE02103119	2023/9/15	2024/9/14
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSU-26	200680/026	2023/7/12	2024/7/11

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
FCC §15.203	Antenna Requirement	Compliance
FCC §15.207(a)	AC Line Conducted Emissions	N/A
FCC §15.215(c)	20dB Emission Bandwidth	Compliance
FCC §15.205, §15.209, §15.249	Field strength of fundamental and Radiated emission	Compliance

3.2 Limit

<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Line Conducted Emissions</td><td>See details §15.207 (a)</td></tr>
<tr><td>Field strength of fundamental and Radiated emission</td><td>The field strength of fundamental and harmonic emissions measured at 3 m shall not exceed the limits as below:
<table>
<tr><th>Fundamental frequency</th><th>Field strength of fundamental (millivolts/meter)</th><th>Field strength of harmonics (microvolts/meter)</th></tr>
<tr><td>902–928 MHz</td><td>50</td><td>500</td></tr>
<tr><td>2400–2483.5 MHz</td><td>50</td><td>500</td></tr>
<tr><td>5725–5875 MHz</td><td>50</td><td>500</td></tr>
<tr><td>24.0–24.25 GHz</td><td>250</td><td>2500</td></tr>
</table>
The field strength shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.
For frequencies above 1000 MHz, the field strength limits in above table are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.</td></tr>
</table>

3.3 AC Line Conducted Emissions Test Data

Not applicable, the device only powered by battery

3.4 Radiated emission Test Data

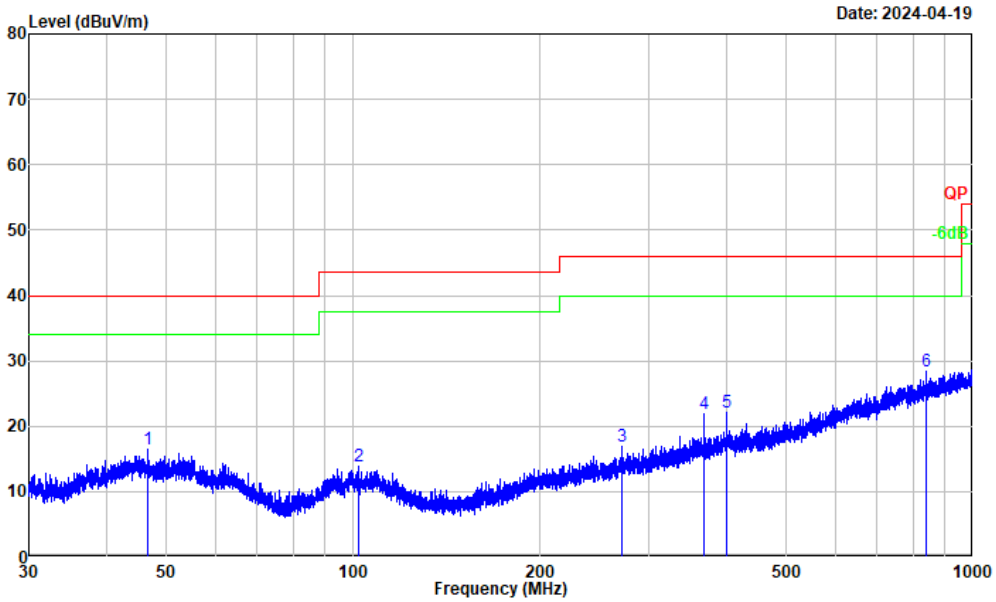
9 kHz-30MHz:

Test Date:	2024-04-19	**Test By:**	Luke Li
Environment condition:	Temperature: 22.4°C; Relative Humidity:69%; ATM Pressure: 100.1kPa		

For radiated emissions below 30MHz, there were no emissions found within 20dB of limit.

30MHz-1GHz:

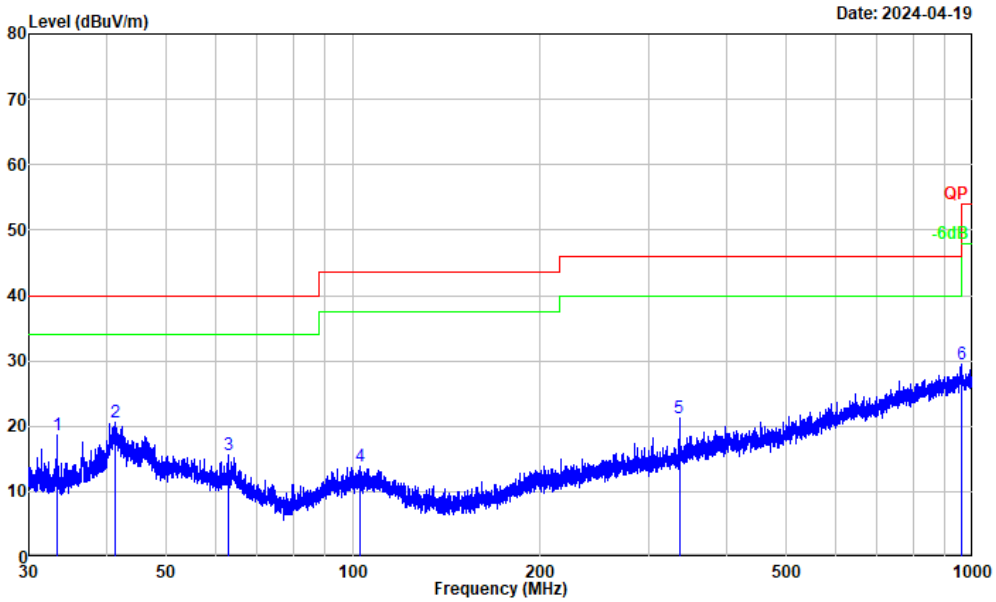
Test Date:	2024-04-19~2024-04-25	Test By:	Luke Li
Environment condition:	Temperature: 22.4~23.8°C; Relative Humidity:65~69%; ATM Pressure: 100.1~101.1kPa		



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2440MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	46.771	28.64	-12.18	16.46	40.00	-23.54	Peak
2	101.972	27.86	-14.07	13.79	43.50	-29.71	Peak
3	271.995	28.90	-11.99	16.91	46.00	-29.09	Peak
4	368.066	31.18	-9.36	21.82	46.00	-24.18	Peak
5	400.035	30.68	-8.54	22.14	46.00	-23.86	Peak
6	839.531	30.01	-1.52	28.49	46.00	-17.51	Peak

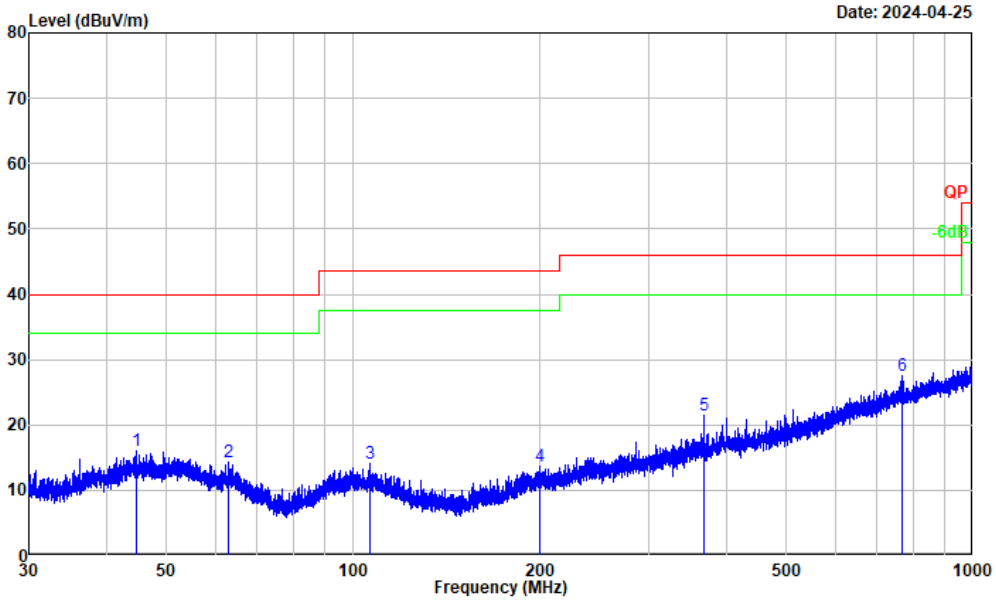
Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2440MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	33.328	33.86	-15.12	18.74	40.00	-21.26	Peak
2	41.314	33.21	-12.72	20.49	40.00	-19.51	Peak
3	62.849	29.74	-14.02	15.72	40.00	-24.28	Peak
4	102.600	28.00	-14.07	13.93	43.50	-29.57	Peak
5	335.989	31.47	-10.20	21.27	46.00	-24.73	Peak
6	958.789	29.10	0.40	29.50	46.00	-16.50	Peak

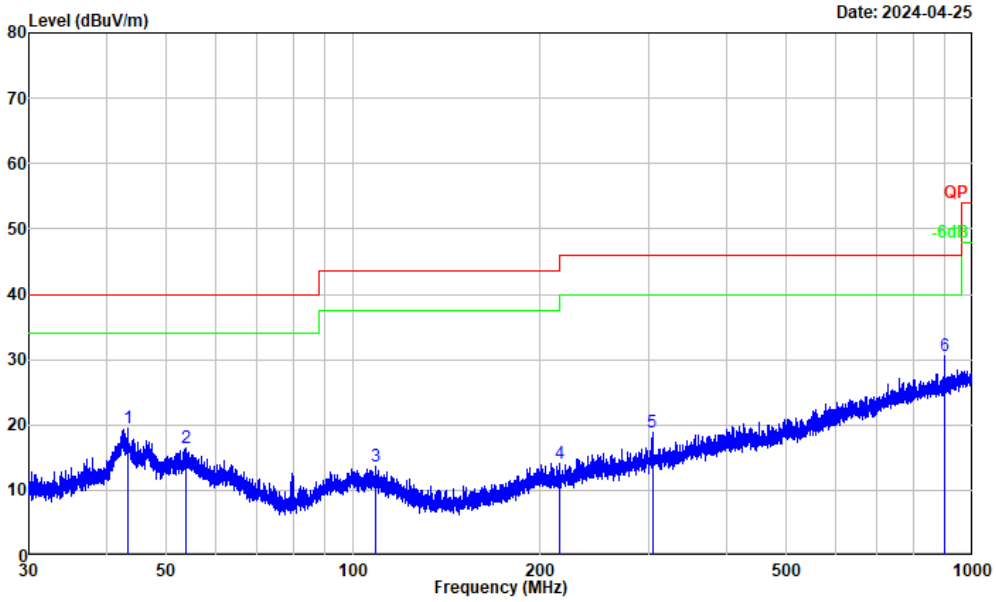
Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 23.8℃/65%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2457MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	44.687	28.27	-12.23	16.04	40.00	-23.96	Peak
2	62.849	28.31	-14.02	14.29	40.00	-25.71	Peak
3	106.402	28.07	-13.99	14.08	43.50	-29.42	Peak
4	199.858	27.50	-13.81	13.69	43.50	-29.81	Peak
5	368.066	30.80	-9.36	21.44	46.00	-24.56	Peak
6	767.040	29.68	-2.25	27.43	46.00	-18.57	Peak

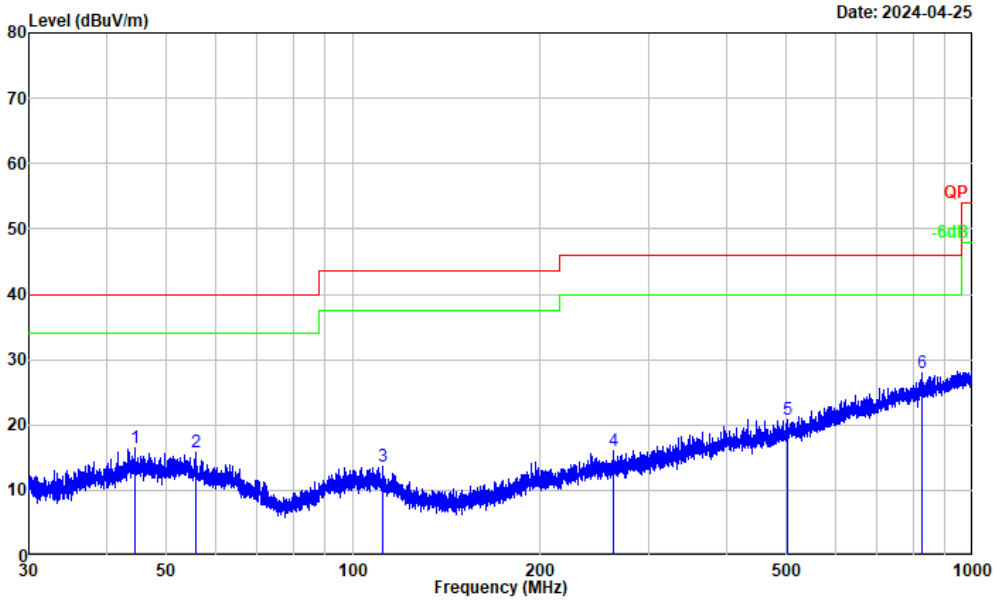
Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 23.8℃/65%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2457MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	43.412	31.98	-12.37	19.61	40.00	-20.39	Peak
2	53.674	28.99	-12.42	16.57	40.00	-23.43	Peak
3	108.712	27.68	-14.10	13.58	43.50	-29.92	Peak
4	215.793	27.96	-13.80	14.16	43.50	-29.34	Peak
5	304.031	30.08	-11.24	18.84	46.00	-27.16	Peak
6	899.741	31.42	-0.75	30.67	46.00	-15.33	Peak

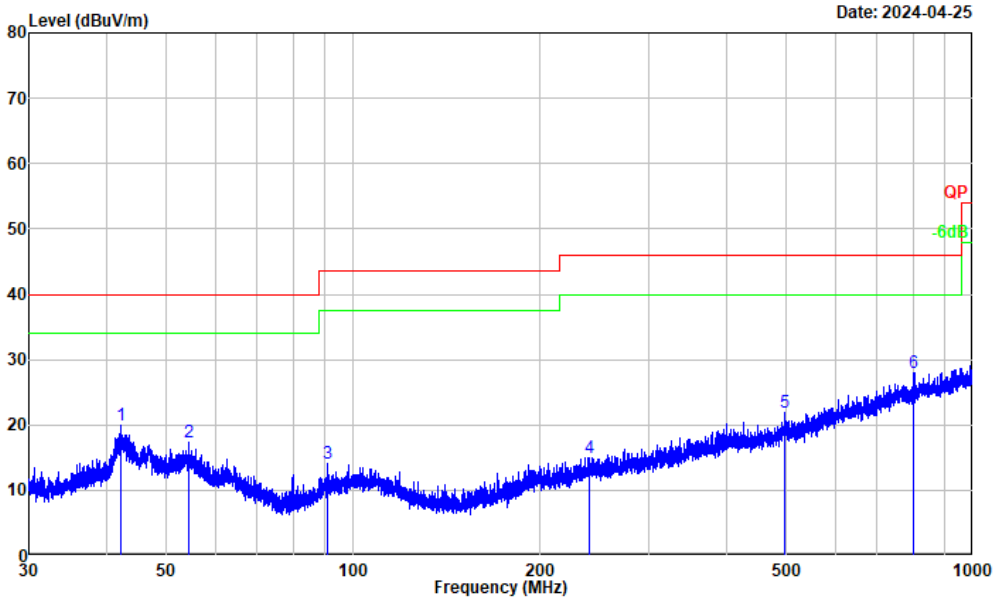
Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 23.8℃/65%R.H./101.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2475MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	44.452	28.74	-12.25	16.49	40.00	-23.51	Peak
2	55.809	28.60	-12.86	15.74	40.00	-24.26	Peak
3	111.805	28.09	-14.49	13.60	43.50	-29.90	Peak
4	263.313	28.19	-12.17	16.02	46.00	-29.98	Peak
5	502.456	27.96	-7.15	20.81	46.00	-25.19	Peak
6	826.024	29.66	-1.65	28.01	46.00	-17.99	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 23.8℃/65%R.H./101.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2475MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	42.286	32.48	-12.47	20.01	40.00	-19.99	Peak
2	54.360	29.97	-12.57	17.40	40.00	-22.60	Peak
3	90.749	29.60	-15.54	14.06	43.50	-29.44	Peak
4	240.682	27.67	-12.67	15.00	46.00	-31.00	Peak
5	496.326	29.21	-7.24	21.97	46.00	-24.03	Peak
6	803.876	29.95	-1.96	27.99	46.00	-18.01	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

Above 1GHz:

Test Date:	2024-04-19	Test By:	Luke Li
Environment condition:	Temperature: 22.4°C; Relative Humidity:69%; ATM Pressure: 100.1kPa		

Frequency (MHz)	Reading level (dBμV)	Polar	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
Low Channel							
2440.000	102.68	horizontal	-1.78	100.90	114.00	-13.10	Peak
2440.000	94.21	vertical	-1.78	92.43	114.00	-21.57	Peak
2400.000	49.30	horizontal	-1.76	47.54	74.00	-26.46	Peak
2400.000	48.54	vertical	-1.76	46.78	74.00	-27.22	Peak
4880.000	55.38	horizontal	0.44	55.82	74.00	-18.18	Peak
7320.000	53.20	horizontal	3.04	56.24	74.00	-17.76	Peak
4880.000	55.43	vertical	0.44	55.87	74.00	-18.13	Peak
7320.000	51.54	vertical	3.04	54.58	74.00	-19.42	Peak
Middle Channel							
2457.000	101.57	horizontal	-1.79	99.78	114.00	-14.22	Peak
2457.000	95.26	vertical	-1.79	93.47	114.00	-20.53	Peak
4914.000	56.22	horizontal	0.62	56.84	74.00	-17.16	Peak
7371.000	51.62	horizontal	3.10	54.72	74.00	-19.28	Peak
4914.000	56.68	vertical	0.62	57.30	74.00	-16.70	Peak
7371.000	51.47	vertical	3.10	54.57	74.00	-19.43	Peak
High Channel							
2475.000	100.82	horizontal	-1.76	99.06	114.00	-14.94	Peak
2475.000	94.43	vertical	-1.76	92.67	114.00	-21.33	Peak
2483.500	48.87	horizontal	-1.75	47.12	74.00	-26.88	Peak
2483.500	49.47	vertical	-1.75	47.72	74.00	-26.28	Peak
4950.000	56.60	horizontal	0.87	57.47	74.00	-16.53	Peak
7425.000	51.13	horizontal	3.10	54.23	74.00	-19.77	Peak
4950.000	56.80	vertical	0.87	57.67	74.00	-16.33	Peak
7425.000	51.03	vertical	3.10	54.13	74.00	-19.87	Peak

Remark:
Corrected Amplitude= Reading level + corrected Factor
Corrected Factor = Antenna factor + Cable loss – Amplifier gain
Margin = Corrected Amplitude – Limit

The emission levels of other frequencies that were lower than the limit 20dB not show in test report.
For emissions in 18GHz-25GHz range, all emissions were investigated and in the noise floor level.

Field strength of average:

Frequency (MHz)	Peak level (dBμV/m)	Polar (H/V)	Duty Cycle Factor (dB)	Average Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
Low Channel							
2440.000	100.90	horizontal	-31.16	69.74	94	-24.26	Average
2440.000	92.43	vertical	-31.16	61.27	94	-32.73	Average
2400.000	47.54	horizontal	-31.16	16.38	54	-37.62	Average
2400.000	46.78	vertical	-31.16	15.62	54	-38.38	Average
4880.000	55.82	horizontal	-31.16	24.66	54	-29.34	Average
7320.000	56.24	horizontal	-31.16	25.08	54	-28.92	Average
4880.000	55.87	vertical	-31.16	24.71	54	-29.29	Average
7320.000	54.58	vertical	-31.16	23.42	54	-30.58	Average
Middle Channel							
2457.000	99.78	horizontal	-31.16	68.62	94	-25.38	Average
2457.000	93.47	vertical	-31.16	62.31	94	-31.69	Average
4914.000	56.84	horizontal	-31.16	25.68	54	-28.32	Average
7371.000	54.72	horizontal	-31.16	23.56	54	-30.44	Average
4914.000	57.30	vertical	-31.16	26.14	54	-27.86	Average
7371.000	54.57	vertical	-31.16	23.41	54	-30.59	Average
High Channel							
2475.000	99.06	horizontal	-31.16	67.9	94	-26.1	Average
2475.000	92.67	vertical	-31.16	61.51	94	-32.49	Average
2483.500	47.12	horizontal	-31.16	15.96	54	-38.04	Average
2483.500	47.72	vertical	-31.16	16.56	54	-37.44	Average
4950.000	57.47	horizontal	-31.16	26.31	54	-27.69	Average
7425.000	54.23	horizontal	-31.16	23.07	54	-30.93	Average
4950.000	57.67	vertical	-31.16	26.51	54	-27.49	Average
7425.000	54.13	vertical	-31.16	22.97	54	-31.03	Average

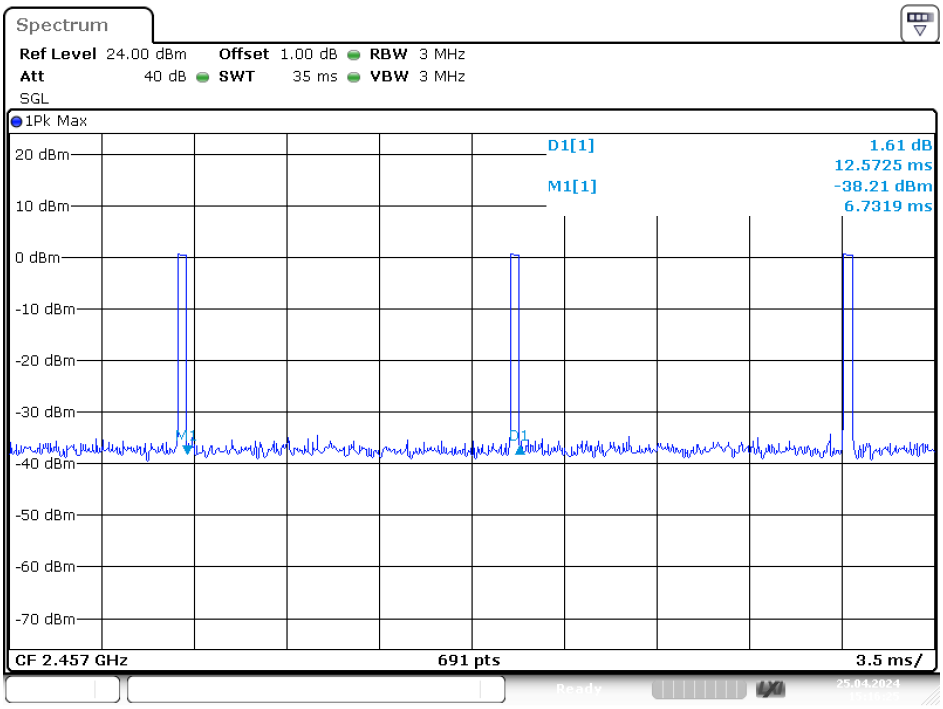
Remark:
Average Amplitude= Peak level + Duty Cycle Factor
Margin= Average Amplitude - Limit

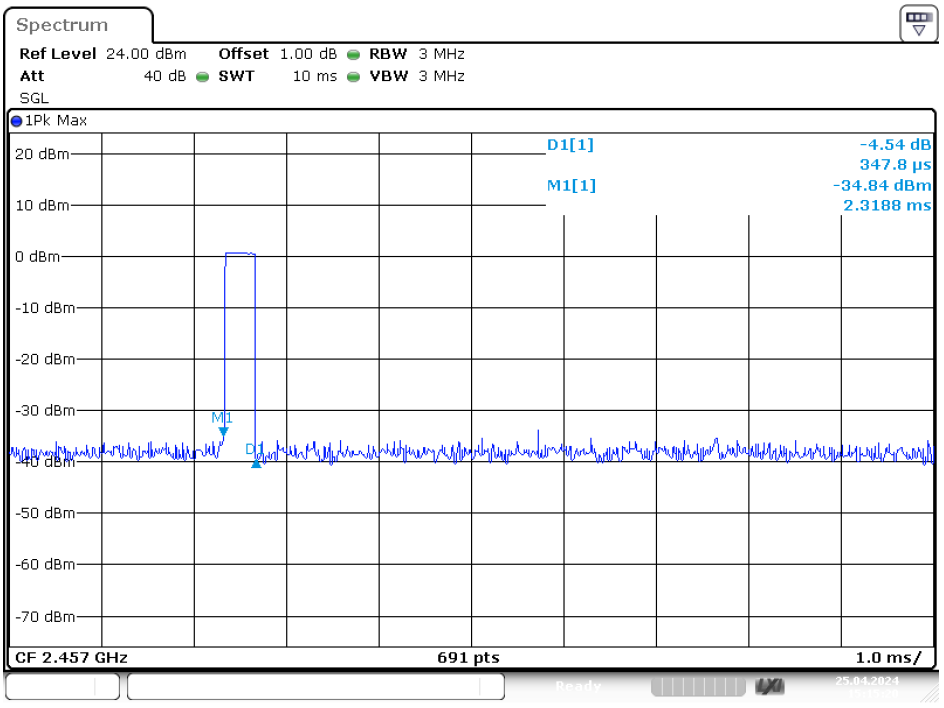
Duty Cycle=Ton/Tp=0.3478/12.5725=2.766%
Duty Cycle Factor=20*log(Duty Cycle)=-31.16

Test plot for duty cycle

Test Date:	2024-04-25	Test By:	Ryan Zhang
Environment condition:	Temperature: 23.6°C; Relative Humidity:66%; ATM Pressure: 101.0kPa		

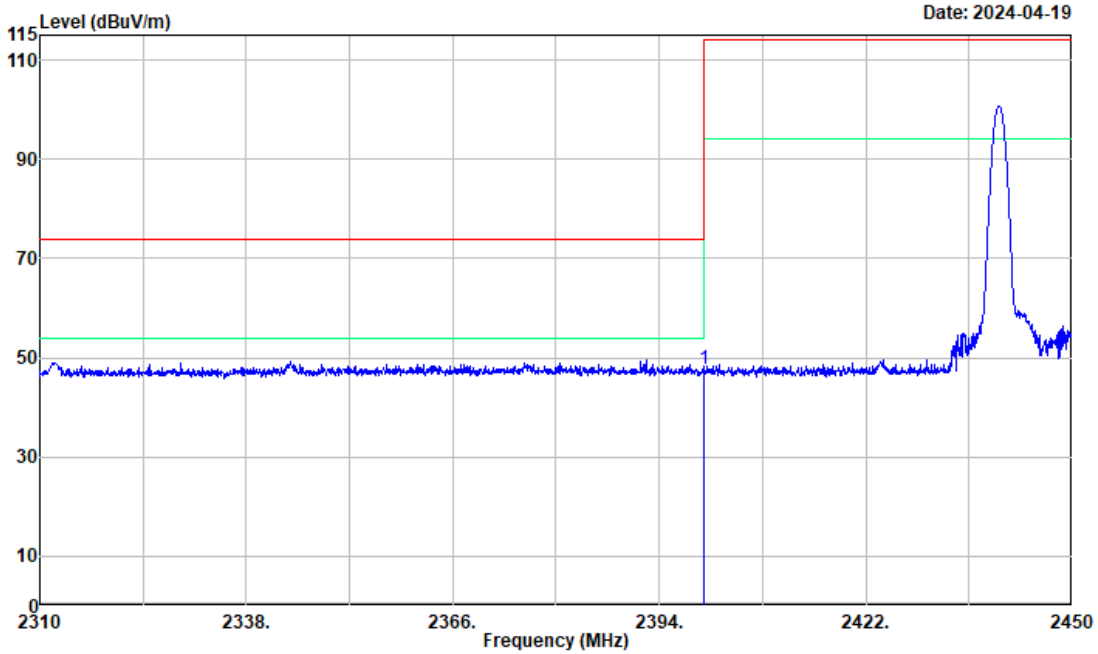
Duty Cycle





Test plot for example as below:

Mode:	SRD	Channel:	2440MHz

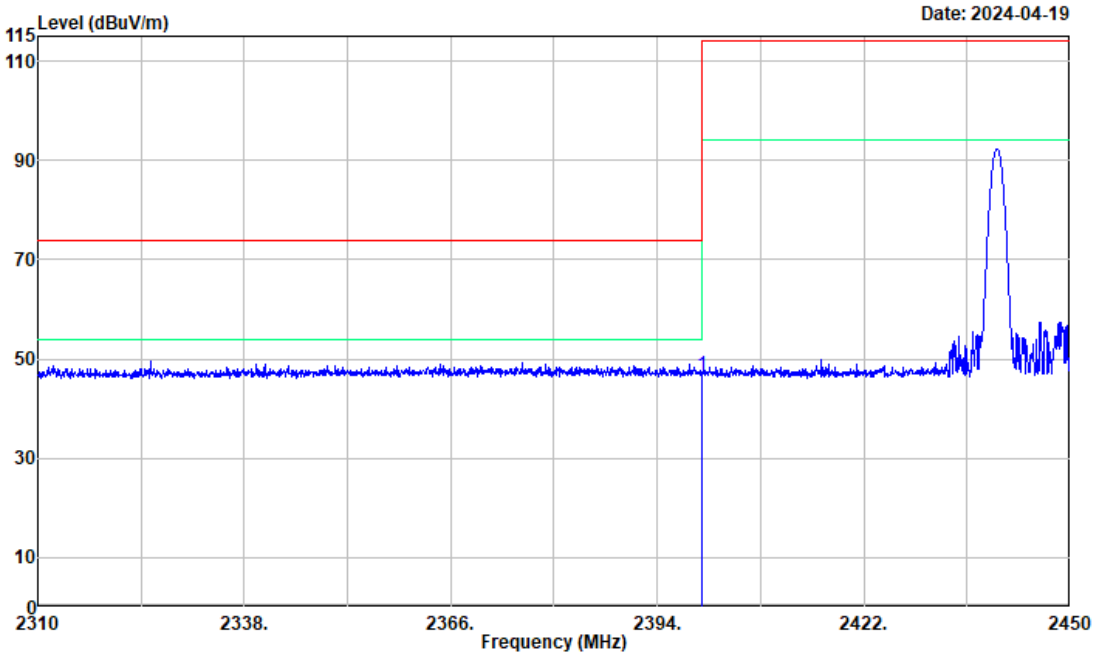


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2440MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2400.000	49.30	-1.76	47.54	74.00	-26.46	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Mode:	SRD	Channel:	2440MHz

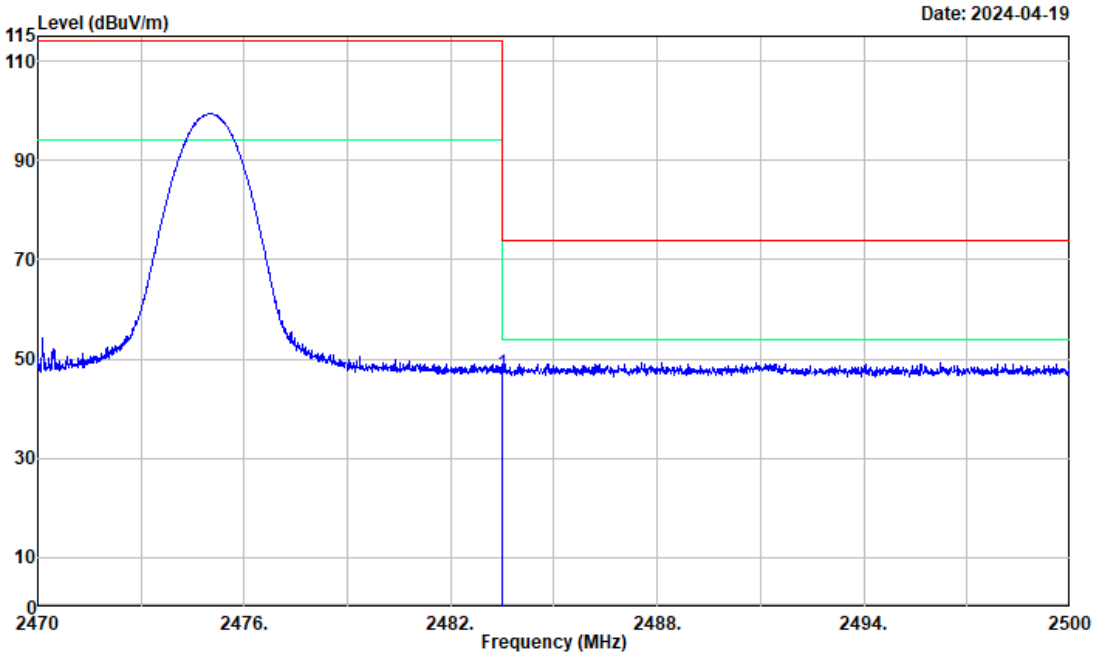


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2440MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2400.000	48.54	-1.76	46.78	74.00	-27.22	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Mode:	SRD	Channel:	2475MHz

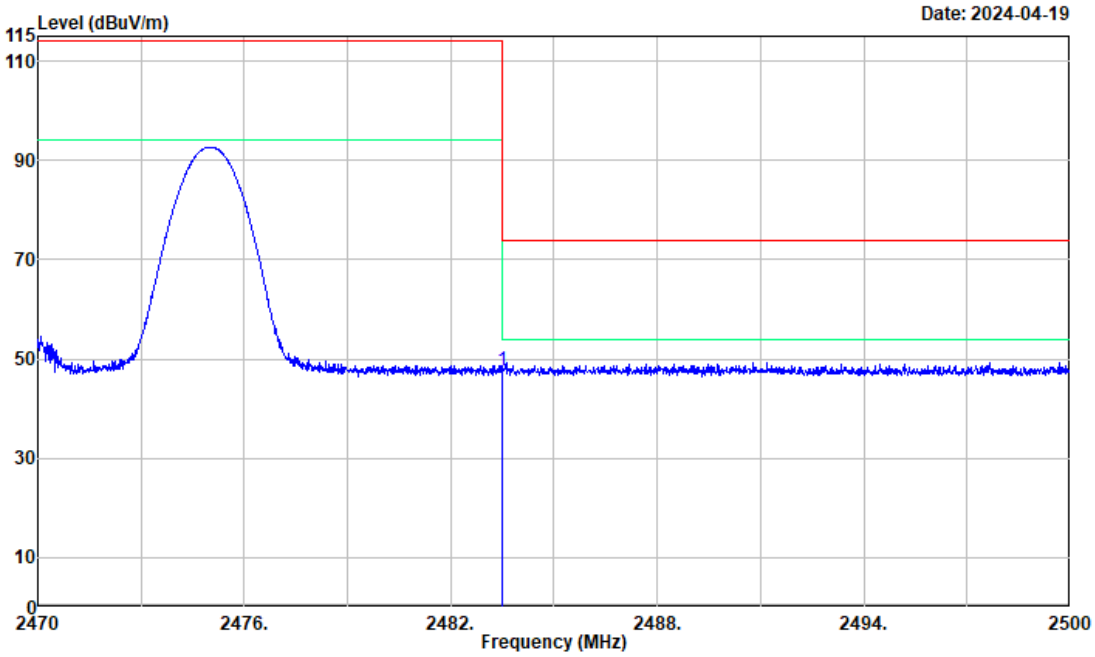


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2475MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.500	48.87	-1.75	47.12	74.00	-26.88	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Mode:	SRD	Channel:	2475MHz

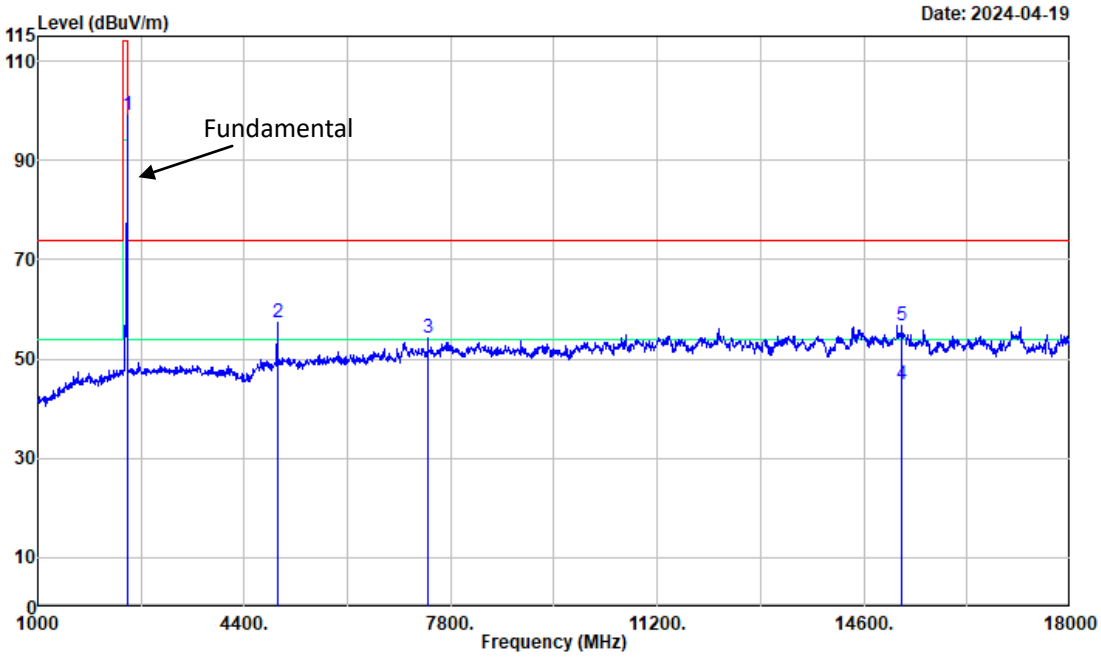


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2475MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2483.500	49.47	-1.75	47.72	74.00	-26.28	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Mode:	SRD	Channel:	2475MHz

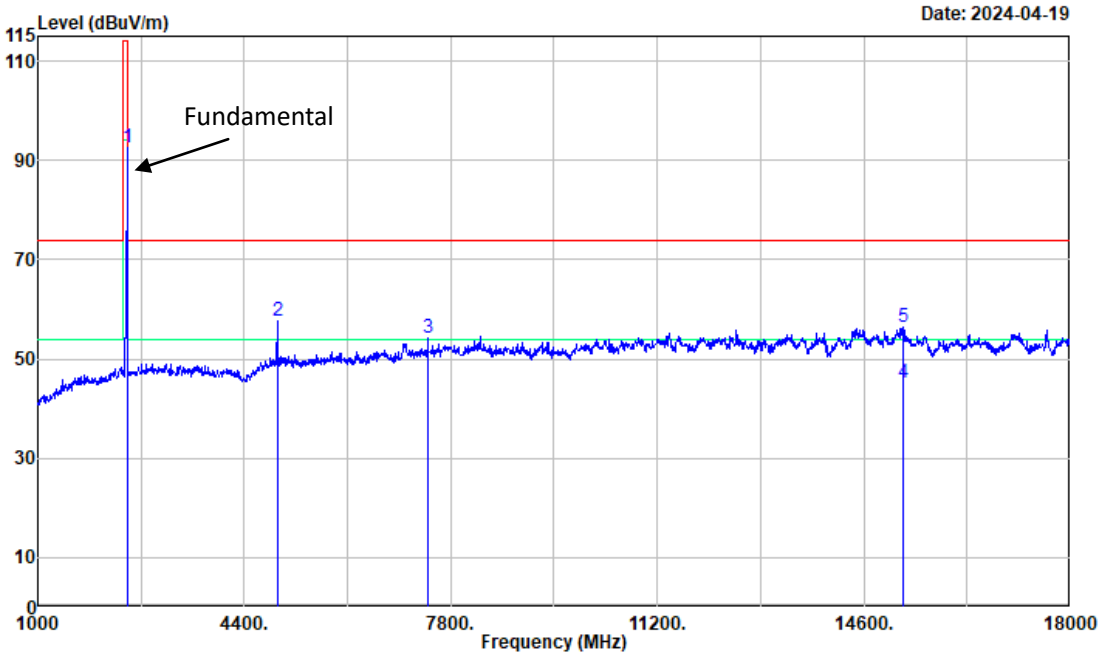


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2475MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2475.000	100.82	-1.76	99.06	114.00	-14.94	Peak
2	4950.000	56.60	0.87	57.47	74.00	-16.53	Peak
3	7425.000	51.13	3.10	54.23	74.00	-19.77	Peak
4	15219.110	36.06	8.75	44.81	54.00	-9.19	Average
5	15219.110	48.04	8.75	56.79	74.00	-17.21	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	SRD	Channel:	2475MHz

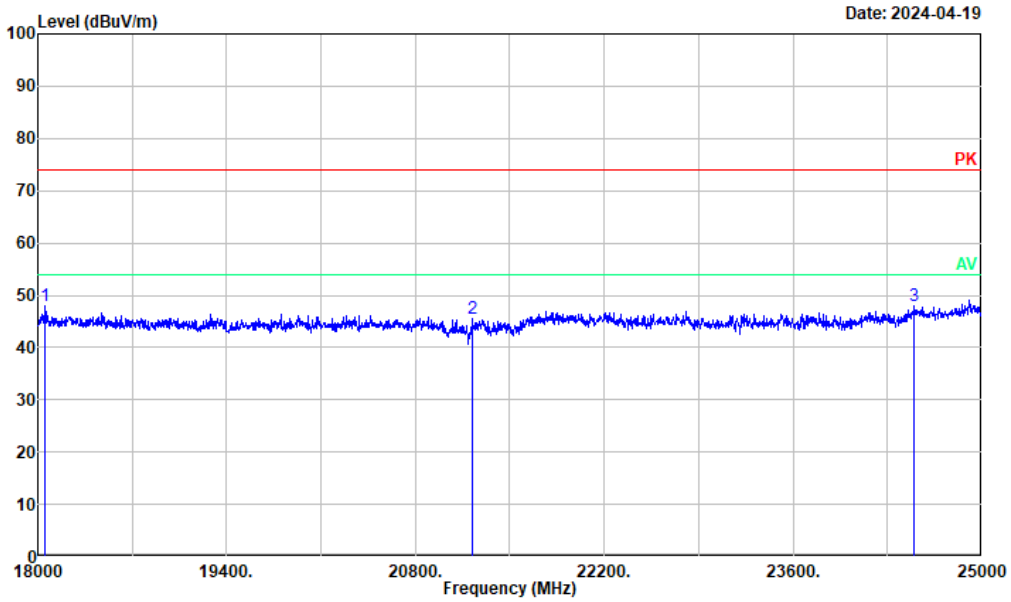


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2475MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2475.000	94.43	-1.76	92.67	114.00	-21.33	Peak
2	4950.000	56.80	0.87	57.67	74.00	-16.33	Peak
3	7425.000	51.03	3.10	54.13	74.00	-19.87	Peak
4	15253.130	36.20	8.84	45.04	54.00	-8.96	Average
5	15253.130	47.48	8.84	56.32	74.00	-17.68	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	SRD	Channel:	2440MHz

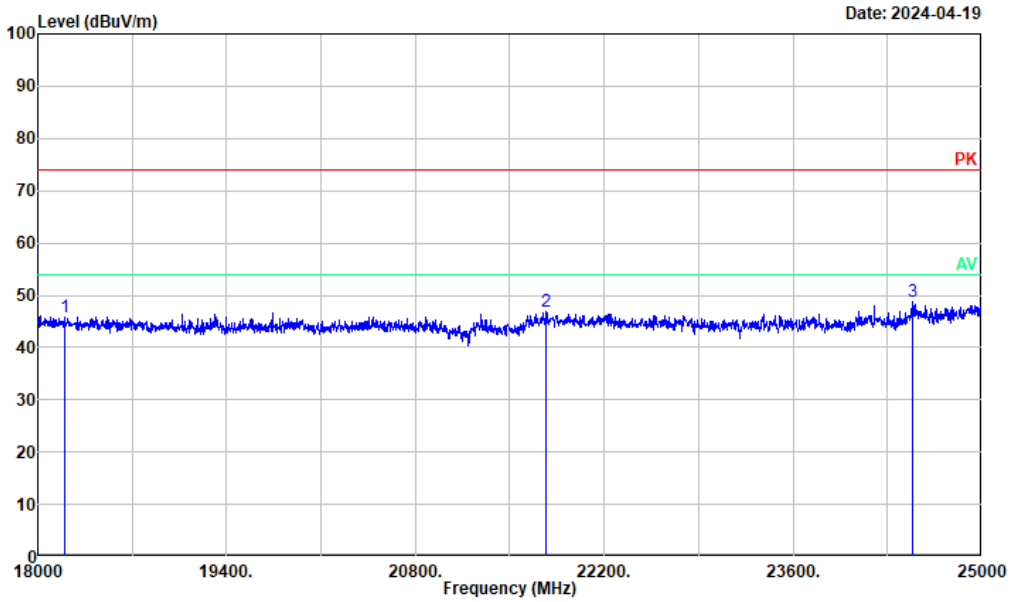


Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 2440MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	18056.030	53.42	-5.49	47.93	74.00	-26.07	Peak
2	21221.610	52.81	-7.38	45.43	74.00	-28.57	Peak
3	24499.250	53.86	-5.76	48.10	74.00	-25.90	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Mode:	SRD	Channel:	2440MHz



Project No. : 2405S70990E
Test Mode : Transmitting
Test Voltage : Power By Battery
Environment : 22.4℃/69%R.H./100.1kPa
Tested by : Luke Li
Polarization : vertical
Remark : 2440MHz

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	18199.600	51.62	-5.72	45.90	74.00	-28.10	Peak
2	21767.880	54.03	-7.03	47.00	74.00	-27.00	Peak
3	24481.740	54.50	-5.76	48.74	74.00	-25.26	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

3.5 Bandwidth Test Data

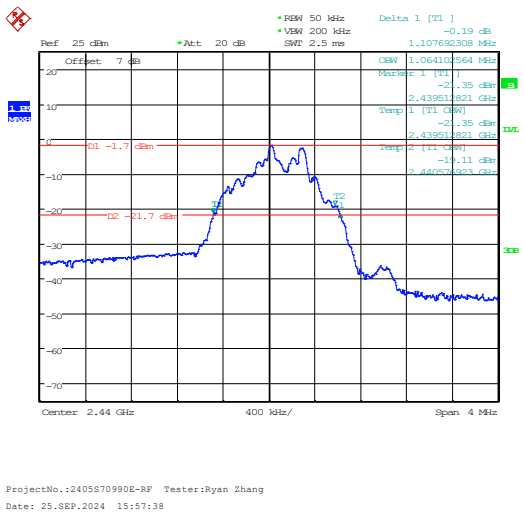
Test Date:	2024-09-25	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.7°C; Relative Humidity:47%; ATM Pressure: 101.2kPa		

Channel	20dB BW [MHz]
Low	1.108
Middle	1.128
High	1.121

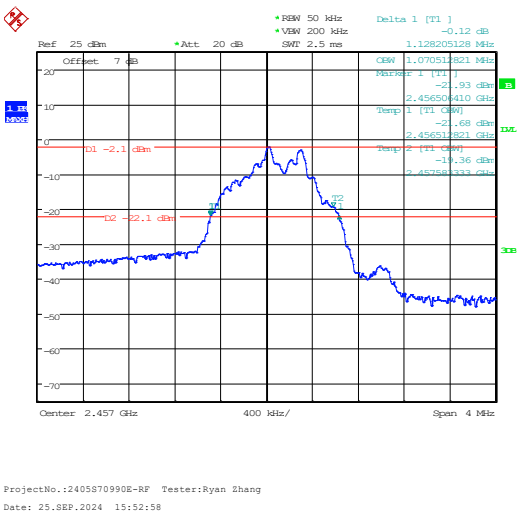
Test Plots:

20dB BW

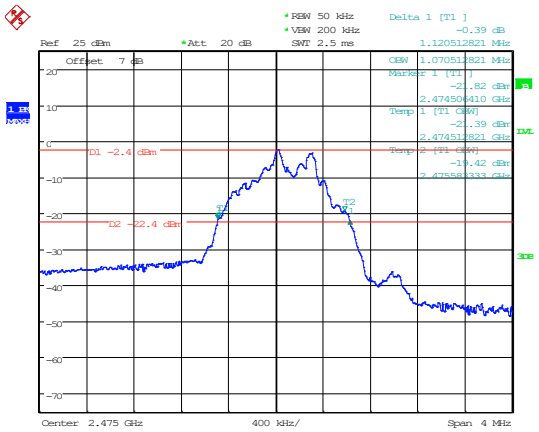
Lowest channel



Middle channel



High channel



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4 Test Setup Photo

Please refer to the attachment 2405S70990E Test Setup photo.

5 E.U.T Photo

Please refer to the attachment 2405S70990E External photo and 2405S70990E Internal photo.

---End of Report---