

Radio Test Report

47 CFR Part 15.247

Applicant's name : Invanti (Beijing) Technology Co., Ltd.
Address : Building 1, Yard 2, Ronghua South Road, Beijing Economic and Technological Development Zone, 2004, Beijing, 100176, China
Manufacture's Name : Invanti (Beijing) Technology Co., Ltd.
Address : Building 1, Yard 2, Ronghua South Road, Beijing Economic and Technological Development Zone, 2004, Beijing, 100176, China

Product description

Trader mark : N/A
Product Name: : Electric Scooter
Model and/or type reference : F02
Serial Model : X01
Rating(s) : DC36V, 350W

Standards : 47 CFR Part 15.247

FCC ID : 2BG9J-F02

The EUT described above has been tested by us with the listed standards and found in compliance with the FCC requirements. It is possible to use FCC marking to demonstrate the compliance with this FCC requirements.

Note: This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen VOP Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen VOP Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Date of Test

Date (s) of performance of tests : 2026-03-31 ~ 2026-04-25
Date of Issue : 2026-04-25
Test Result : **Pass**

Prepared by:



Project Engineer

Reviewed by:



Project Supervisor

Approved by:



Technical Director



REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2026-04-25	Valid	Initial Release



Contents

Contents	3
1. TEST SUMMARY	5
2. MEASUREMENT UNCERTAINTY	5
3. TEST FACILITY	6
3.1. Deviation from Standard	6
3.2. Abnormalities from Standard Conditions	6
4. GENERAL INFORMATION	7
4.1. General Description of EUT	7
4.2. EUT Test Mode	8
4.3. Auxiliary Equipment Used During Test	8
5. EQUIPMENTS LIST FOR ALL TEST ITEMS	9
6. TEST RESULTS	10
6.1. Antenna requirement	10
6.1.1. Conclusion:	10
6.2. Conducted Emission at AC power line	11
6.2.1. EUT Operation	11
6.2.2. Test Setup Diagram:	12
6.2.3. Test Data	13
6.3. 6dB Bandwidth	15
6.3.1. EUT Operation	15
6.3.2. Test Setup Diagram:	16
6.3.3. Test Data	16
6.4. Maximum Conducted Output Power	17
6.4.1. EUT Operation	17
6.4.2. Test Setup Diagram:	18
6.4.3. Test Data	18
6.5. Power Spectral Density	19
6.5.1. EUT Operation	19
6.5.2. Test Setup Diagram:	20
6.5.3. Test Data	20
6.6. Emissions in non-restricted frequency bands	21
6.6.1. EUT Operation	21
6.6.2. Test Setup Diagram:	22
6.6.3. Test Data	22
6.7. Band edge emissions (Radiated)	23
6.7.1. EUT Operation	24
6.7.2. Test Setup Diagram:	24
6.7.3. Test Data	25
6.8. Emissions in frequency bands (below 1GHz)	29
6.8.1. EUT Operation	29
6.8.2. Test Setup Diagram:	30
6.8.3. Test Data	31
6.9. Emissions in frequency bands (above 1GHz)	33

6.9.1. EUT Operation	34
6.9.2. Test Setup Diagram:	34
6.9.3. Test Data	35
7. TEST SETUP PHOTOS	47
8. Appendix Report.....	49



1. TEST SUMMARY

No.	Test Item	Basic Standard	Requirement	Result
1	Antenna requirement	47 CFR Part 15.247	47 CFR 15.203	PASS
2	Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	PASS
3	6dB Bandwidth	47 CFR Part 15.247	47 CFR 15.247(a)(2)	PASS
4	Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(3)	PASS
5	Power Spectral Density	47 CFR Part 15.247	47 CFR 15.247(e)	PASS
6	Emissions in non-restricted frequency bands	47 CFR Part 15.247	47 CFR 15.247(d)	PASS
7	Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	PASS
8	Emissions in frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	PASS
9	Emissions in frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	PASS

2. MEASUREMENT UNCERTAINTY

The report uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

No.	Item	Uncertainty
1	Conducted Emission (150KHz - 30MHz)	$\pm 2.54\text{dB}$
2	Occupied Channel Bandwidth	$\pm 3.5\%$
3	RF output power, conducted	$\pm 1.19\text{dB}$
4	Power Spectral Density, Conducted	$\pm 0.72\text{dB}$
5	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
6	All emissions, radiated (1GHz - 18GHz)	$\pm 4.66\text{dB}$
7	All emissions, radiated (30MHz - 1GHz)	$\pm 3.94\text{dB}$
8	All emissions, radiated (18GHz - 40GHz)	$\pm 4.31\text{dB}$

3. TEST FACILITY

Shenzhen VOP Testing Technology Co., Ltd.

Add:103, Building 5, Wanyan Industrial Park Qiaotou Community, Fuhai Street, Baoan District Shenzhen, Guangdong
People's Republic of China

FCC :Designation Number:CN1438,Certificate Number: 7579.01

3.1. Deviation from Standard

None

3.2. Abnormalities from Standard Conditions

None



4. GENERAL INFORMATION

4.1. General Description of EUT

Manufacturer:	Invanti (Beijing) Technology Co., Ltd.
Manufacturer Address:	Building 1, Yard 2, Ronghua South Road, Beijing Economic and Technological Development Zone, 2004, Beijing, 100176, China
EUT Name:	Electric Scooter
Model No:	F02
Serial Model:	X01
Difference Description:	All models are identical to each other except for model name and appearance.
Brand Name:	N/A
Difference Description:	N/A
Operation Frequency:	2402MHz to 2480MHz
Number of channels:	40
data rate:	1Mbps,2Mbps
Modulation Type:	GFSK
Antenna type:	PCB antenna
Bluetooth Version:	N/A
Antenna Gain:	1.7dBi
Hardware Version:	670
Software Version:	BSW02002001V01
Power Supply:	DC36V, 350W
Maximum Output Power:	-13.15dBm

Note:

1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2.The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report. Due to the incorrect antenna information, a series of problems such as the accuracy of the test results will be borne by the customer.

3.Channel List:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448

04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

4.2. EUT Test Mode

TM1	GFSK
Channel	CH00
	CH19
	CH39
Test software Version	Test program:sscom v5.13.1
Frequency	2402MHz,2440MHz,2480MHz
Power Setting of Software	0
Note:All above mode have been measurement, only worst data was reported.	

4.3. Auxiliary Equipment Used During Test

No.	Equipment	Manufacturer	Model No.	Serial No.	Remark
1	HP laptop	HP	DESKTOP-G3N DKR3	N/A	N/A

5. EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted Emission at AC power line						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI test receiver ESCI	R&S	ESCI-3	100503	2026-03-17	2028-03-16
2	LISN	R&S	ENV216	103017	2025-09-10	2026-09-09
3	10dB limiter	Schwarzbeck	VTSD 9561	102834	2026-03-17	2028-03-16

6dB Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in non-restricted frequency bands						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	spectrum analyzer	Agilent	N9020A	MY51287427	2025-07-07	2026-07-06
2	RF automatic control unit	TST	CBOX-Full	2752539	2025-07-14	2026-07-13

Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	preamplifier	QUANJUDA	LNA18	2503130032	2025-07-07	2026-07-06
2	High frequency antenna	Schwarzbeck	9120D-1141	03260	2025-10-19	2026-10-18
3	High-frequency horn antenna	Schwarzbeck	HA-018040L	25098408	2025-10-31	2026-10-30
4	preamplifier	HCT	HC180400-50 G25	25098401	2025-09-19	2026-09-18
5	spectrum analyzer	R&S	FSV40	101373	2025-12-24	2026-12-23

Emissions in frequency bands (below 1GHz)						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI test receiver ESCI	R&S	ESPI-7	100754	2026-03-17	2028-03-16
2	Log periodic antenna	SCHWARZBECK	VULB9163	01790	2025-10-24	2026-10-23
3	preamplifier	SCHWARZBECK	8447D	2944A08081	2026-03-17	2028-03-16

6. TEST RESULTS

6.1. Antenna requirement

Test Requirement:	Refer to 47 CFR Part 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.
Test Method:	---

6.1.1. Conclusion:

The EUT Antenna is PCB Antenna. It conforms to the standard requirements.



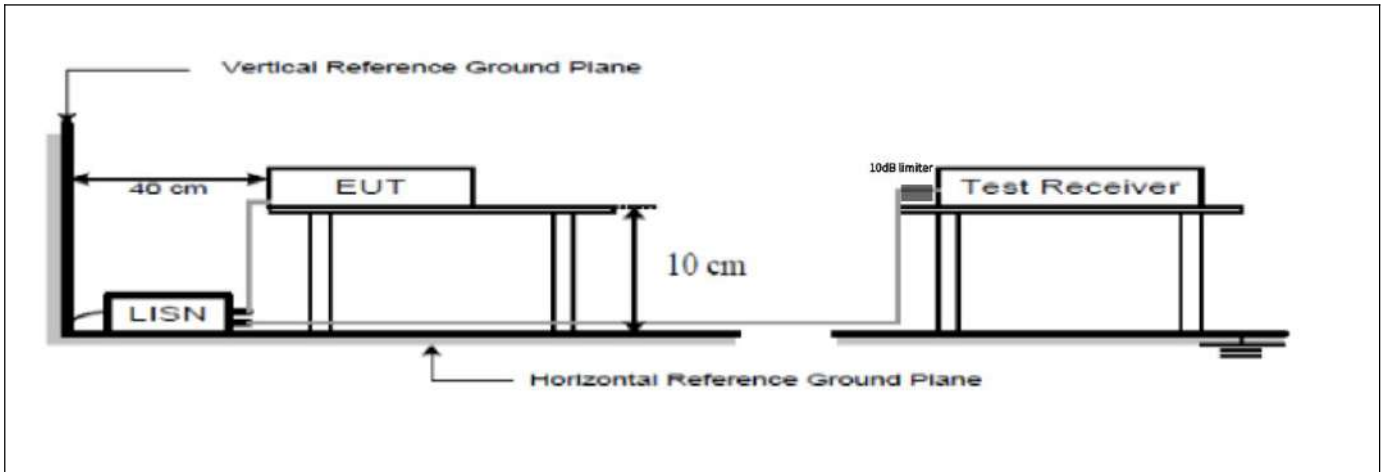
6.2. Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
*Decreases with the logarithm of the frequency.			
Test Method:	ANSI C63.10-2020 section 6.2		
Procedure:	Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting	
	RBW	9KHz	
	VBW	9KHz	
	Start frequency	150KHz	
	Stop frequency	30MHz	
	Sweep Time	Auto	
	Detector	Peak/AVG	
	Trace Mode	Max Hold	

6.2.1. EUT Operation

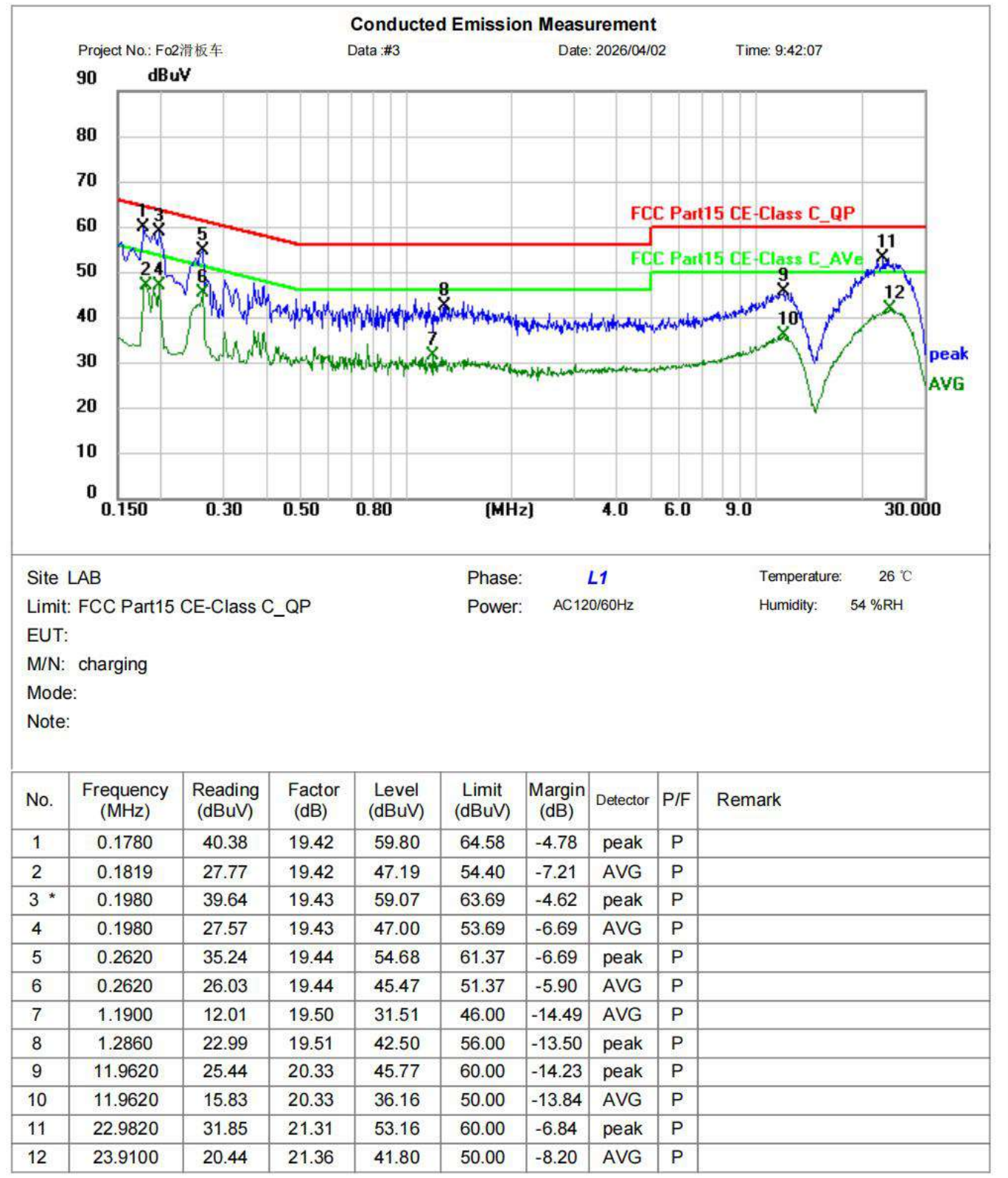
Operating Environment:				
Temperature:	23.9 °C	Humidity:	55.2 %	Atmospheric Pressure: 102.3 kPa
Pre test mode:	TM1			
Final test mode:	TM1			

6.2.2. Test Setup Diagram:

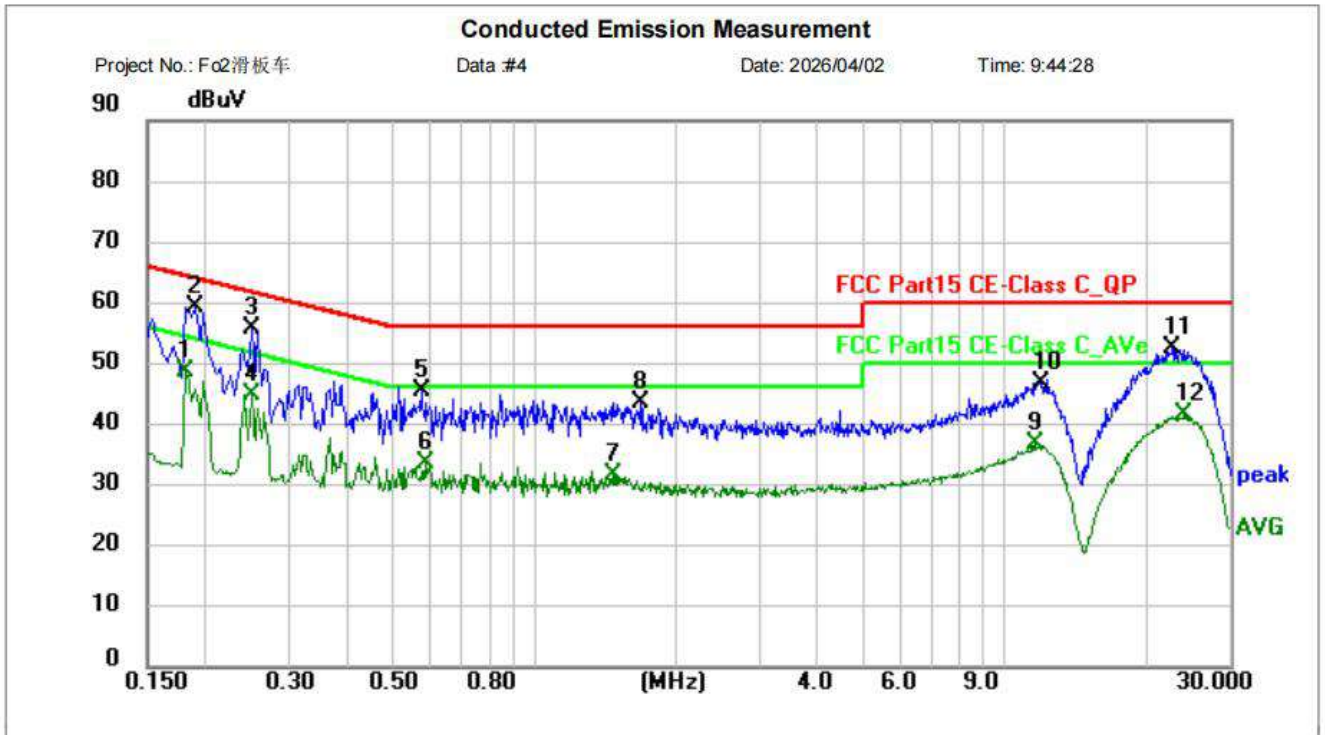


6.2.3. Test Data

TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1



TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1



Site LAB

Phase: **N**

Temperature: 26 °C

Limit: FCC Part15 CE-Class C_QP

Power: AC120/60Hz

Humidity: 54 %RH

EUT:

M/N: charging

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1819	29.39	19.41	48.80	54.40	-5.60	AVG	P	
2 *	0.1900	39.76	19.41	59.17	64.04	-4.87	peak	P	
3	0.2500	36.22	19.43	55.65	61.76	-6.11	peak	P	
4	0.2500	25.44	19.43	44.87	51.76	-6.89	AVG	P	
5	0.5740	25.87	19.46	45.33	56.00	-10.67	peak	P	
6	0.5860	14.25	19.46	33.71	46.00	-12.29	AVG	P	
7	1.4740	12.06	19.50	31.56	46.00	-14.44	AVG	P	
8	1.6860	23.93	19.52	43.45	56.00	-12.55	peak	P	
9	11.5740	16.35	20.33	36.68	50.00	-13.32	AVG	P	
10	11.8780	26.33	20.36	46.69	60.00	-13.31	peak	P	
11	22.6620	31.24	21.30	52.54	60.00	-7.46	peak	P	
12	24.0340	20.41	21.37	41.78	50.00	-8.22	AVG	P	

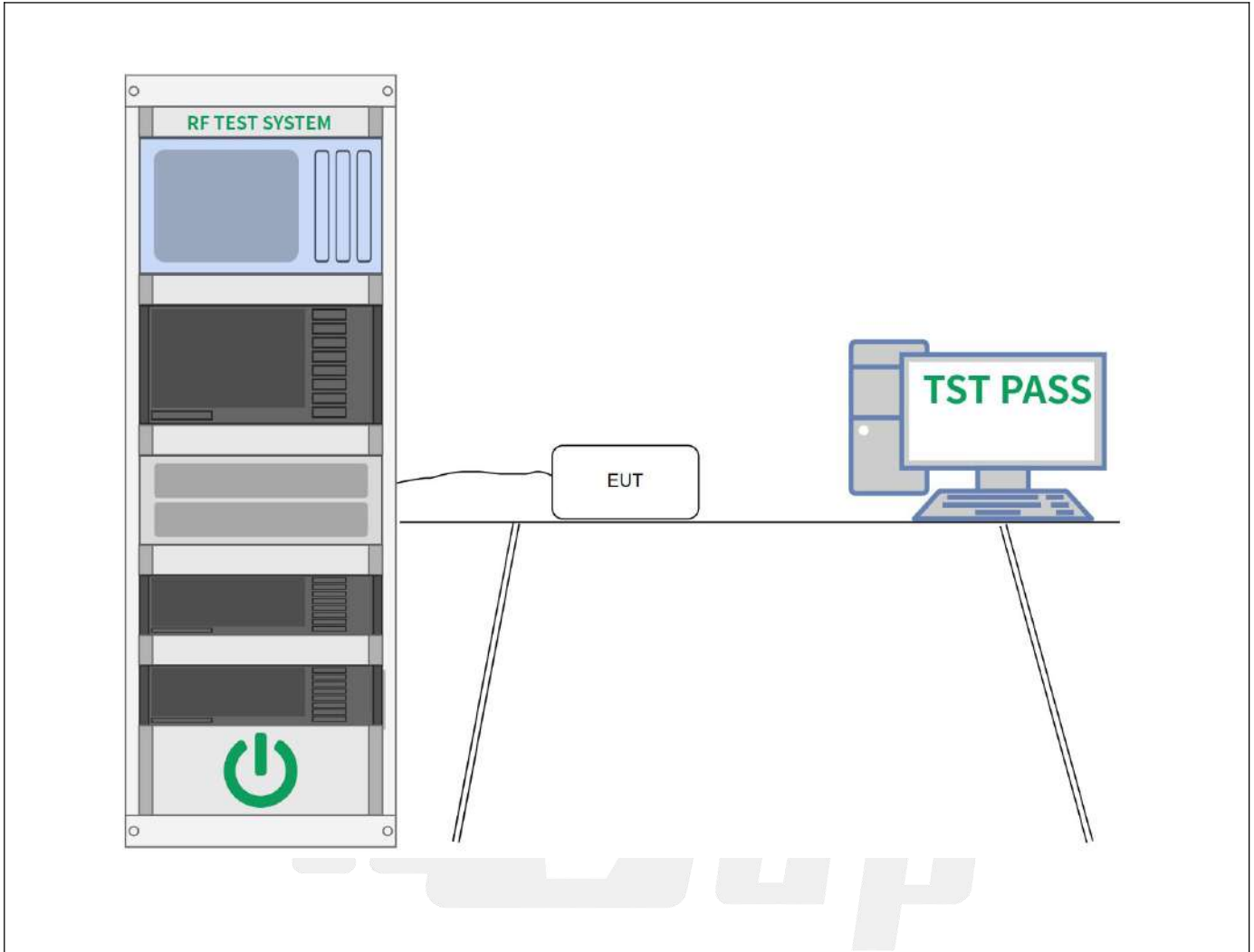
6.3. 6dB Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)	
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.	
Test Method:	ANSI C63.10-2020, section 11.8	
Procedure:	11.8.1 Option 1 The steps for the first option are as follows: a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz. b) Set the VBW $\geq [3 \times \text{RBW}]$. c) Detector = peak. d) Trace mode = max-hold. e) Sweep = No faster than coupled (auto) time. f) Allow the trace to stabilize. g) Measure the maximum width of the emission by placing 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 “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value. 11.8.2 Option 2 The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW $\geq 3 \times \text{RBW}$, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.	
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting
	RBW	100KHz
	VBW	300KHz
	Span	3MHz
	Sweep Time	Auto
	Detector	Peak
	Trace Mode	Max Hold

6.3.1. EUT Operation

Operating Environment:					
Temperature:	22 °C	Humidity:	55.8 %	Atmospheric Pressure:	101.4 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

6.3.2. Test Setup Diagram:



6.3.3. Test Data

Please Refer to Appendix for Details.

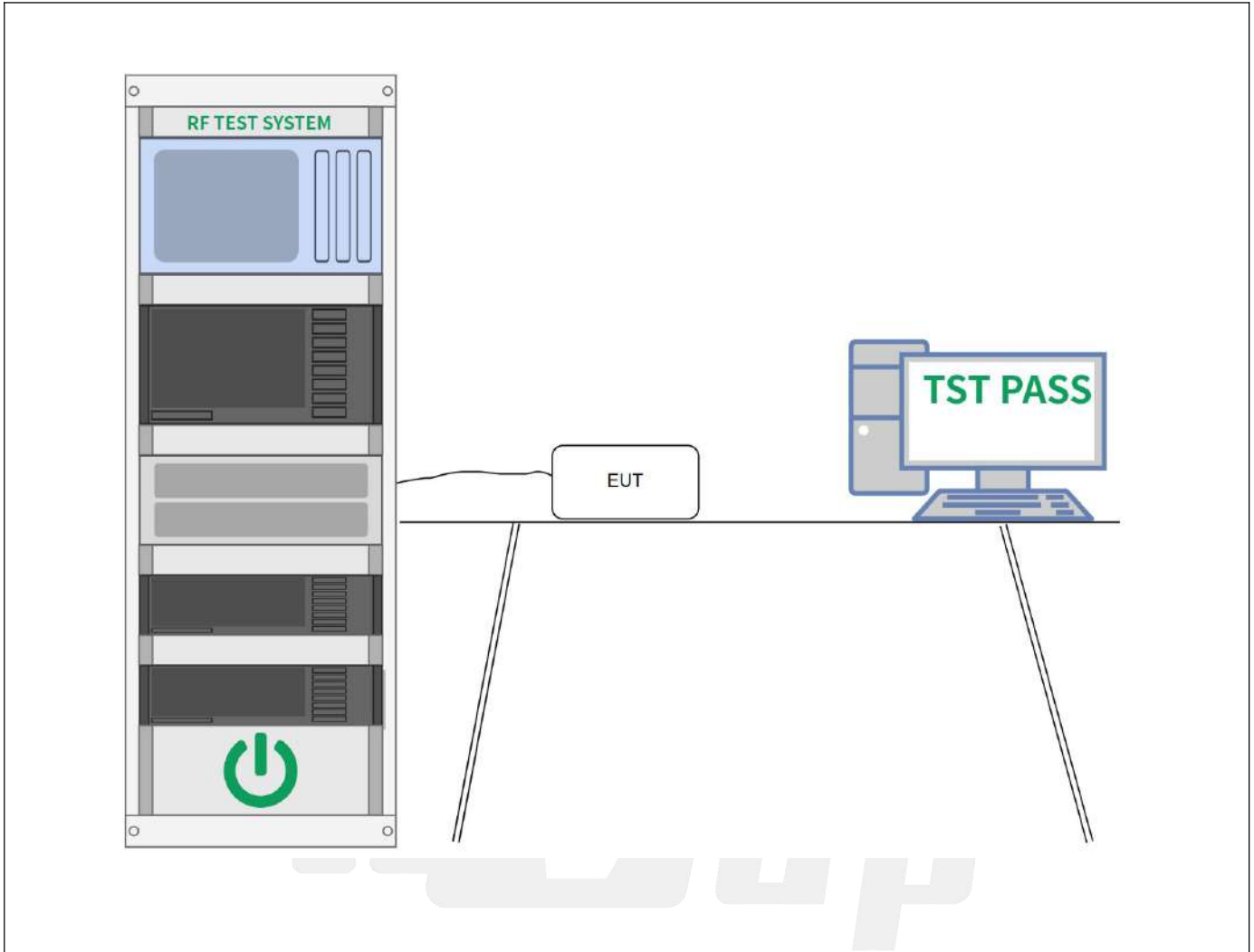
6.4. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)	
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.	
Test Method:	ANSI C63.10-2020 section 11.9.1	
Procedure:	ANSI C63.10-2020, section 11.9.1 Maximum peak conducted output power	
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting
	RBW	>DTS Bandwidth
	VBW	3*RBW
	Span	>3*DTS Bandwidth
	Sweep Time	Auto
	Detector	Peak
	Trace Mode	Max Hold

6.4.1. EUT Operation

Operating Environment:					
Temperature:	22.7 °C	Humidity:	49.2 %	Atmospheric Pressure:	101.4 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

6.4.2. Test Setup Diagram:



6.4.3. Test Data

Please Refer to Appendix for Details.

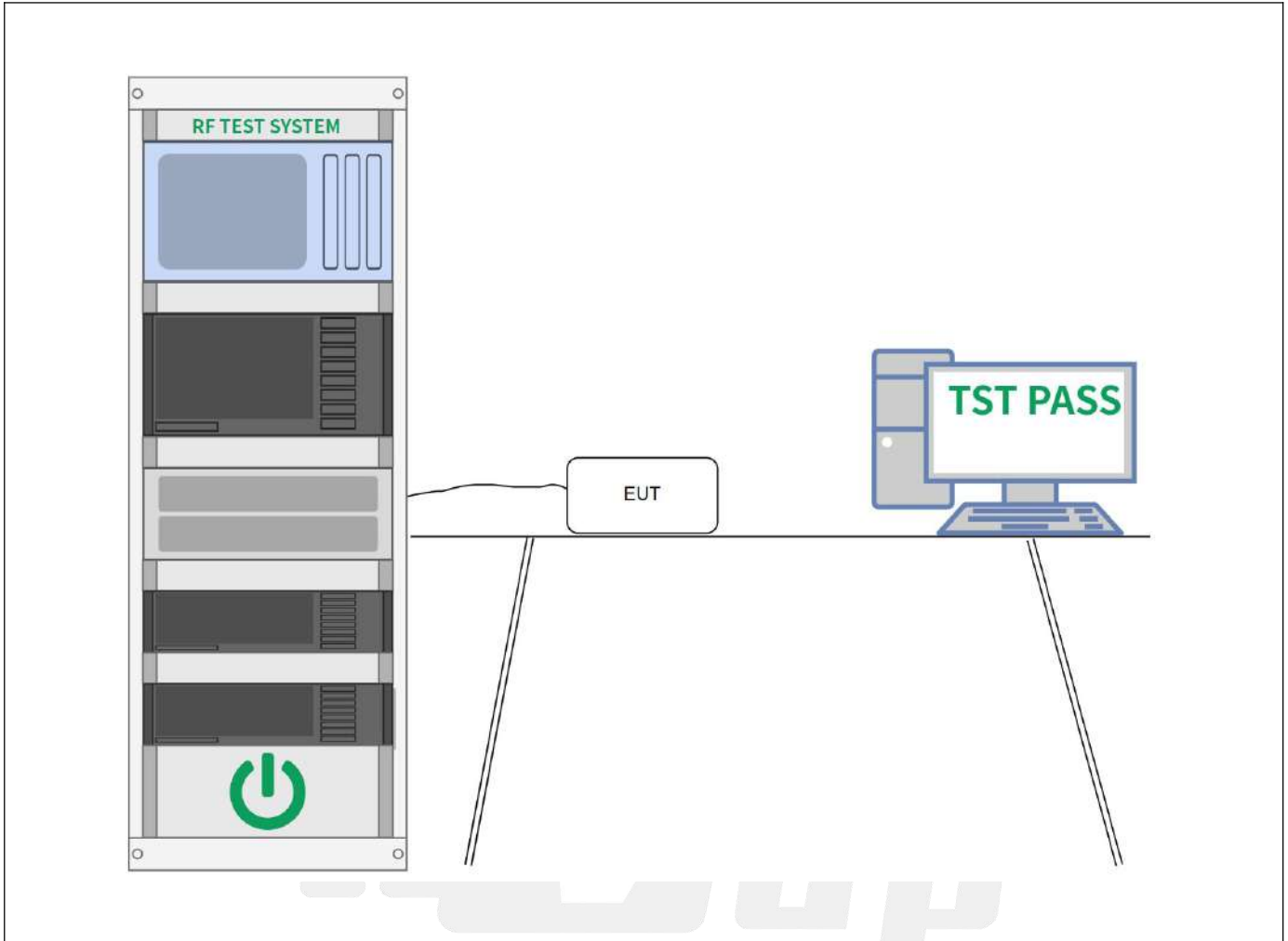
6.5. Power Spectral Density

Test Requirement:	47 CFR 15.247(e)	
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.	
Test Method:	ANSI C63.10-2020, section 11.10	
Procedure:	ANSI C63.10-2020+Cor 1-2023, section 11.10, Maximum power spectral density level in the fundamental emission	
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting
	RBW	3KHz
	VBW	10KHz
	Span	1.5 times the DTS bandwidth
	Sweep Time	Auto
	Detector	Peak
	Trace Mode	Max Hold

6.5.1. EUT Operation

Operating Environment:					
Temperature:	22.6 °C	Humidity:	47.1 %	Atmospheric Pressure:	101.4 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

6.5.2. Test Setup Diagram:



6.5.3. Test Data

Please Refer to Appendix for Details.

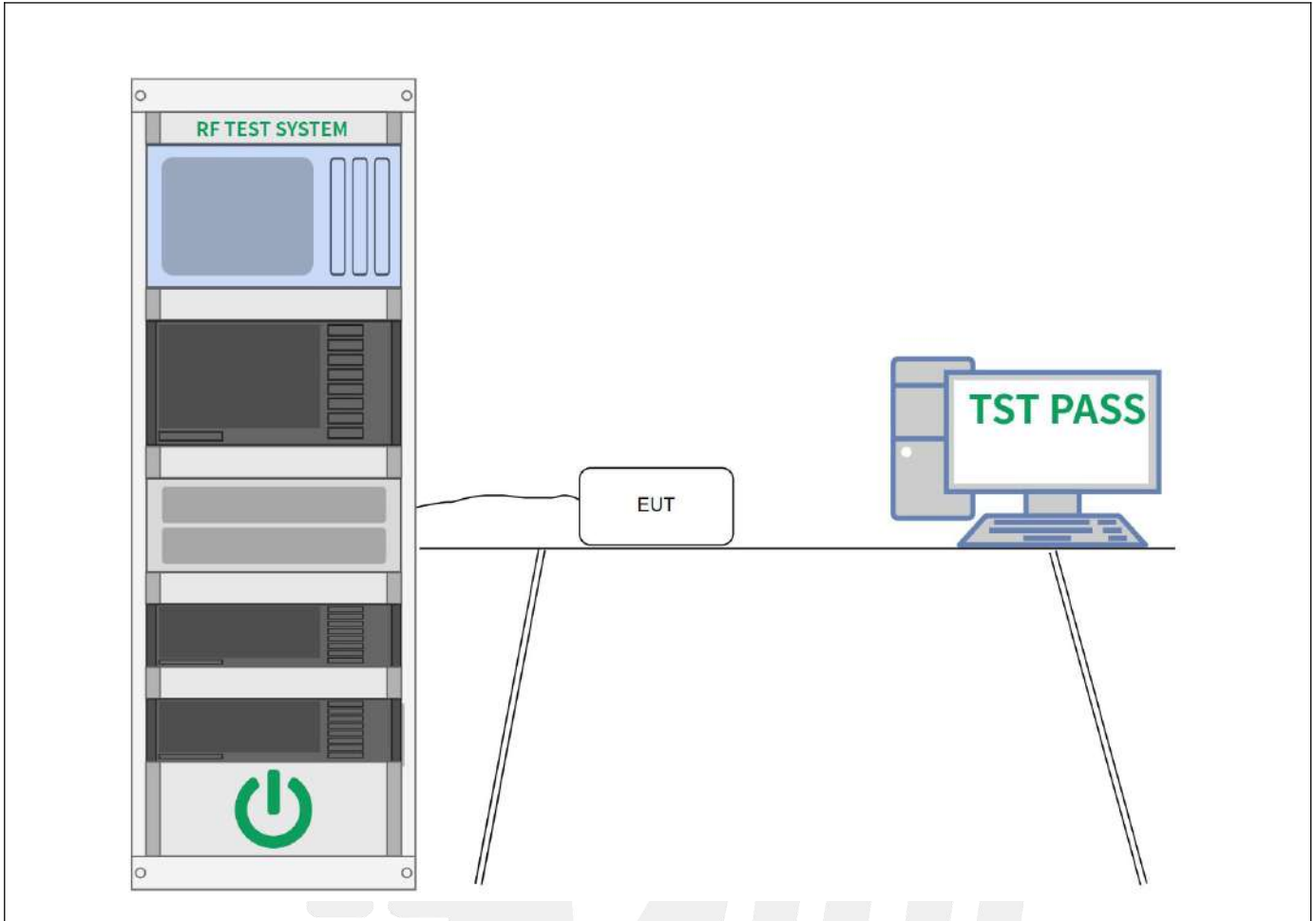
6.6. Emissions in non-restricted frequency bands

Test Requirement:	47 CFR 15.247(d)	
Test Limit:	Refer to 47 CFR 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.	
Test Method:	ANSI C63.10-2020 section 11.11	
Procedure:	ANSI C63.10-2020 Section 11.11.1, Section 11.11.2, Section 11.11.3	
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting
	RBW	100KHz
	VBW	300KHz
	Start frequency	30MHz
	Stop frequency	26.5GHz
	Sweep Time	Auto
	Detector	Peak
	Trace Mode	Max Hold

6.6.1. EUT Operation

Operating Environment:					
Temperature:	23 °C	Humidity:	54.7 %	Atmospheric Pressure:	101.4 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

6.6.2. Test Setup Diagram:



6.6.3. Test Data

Please Refer to Appendix for Details.

6.7. Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), 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 Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.			
Test Method:	ANSI C63.10-2020 section 6.10		
Procedure:	ANSI C63.10-2020 section 6.10.5.2		
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting	
	RBW	1MHz	
	VBW	PEAK Measurement	AVG Measurement
		3MHz	Duty cycle ≥ 98%, VBW=10Hz
			Duty cycle < 98%, VBW ≥ 1/T
	Start frequency	2.35GHz	
	Stop frequency	2.50GHz	
	Sweep Time	Auto	
	Detector	Peak	
	Trace Mode	Max Hold	

6.7.1. EUT Operation

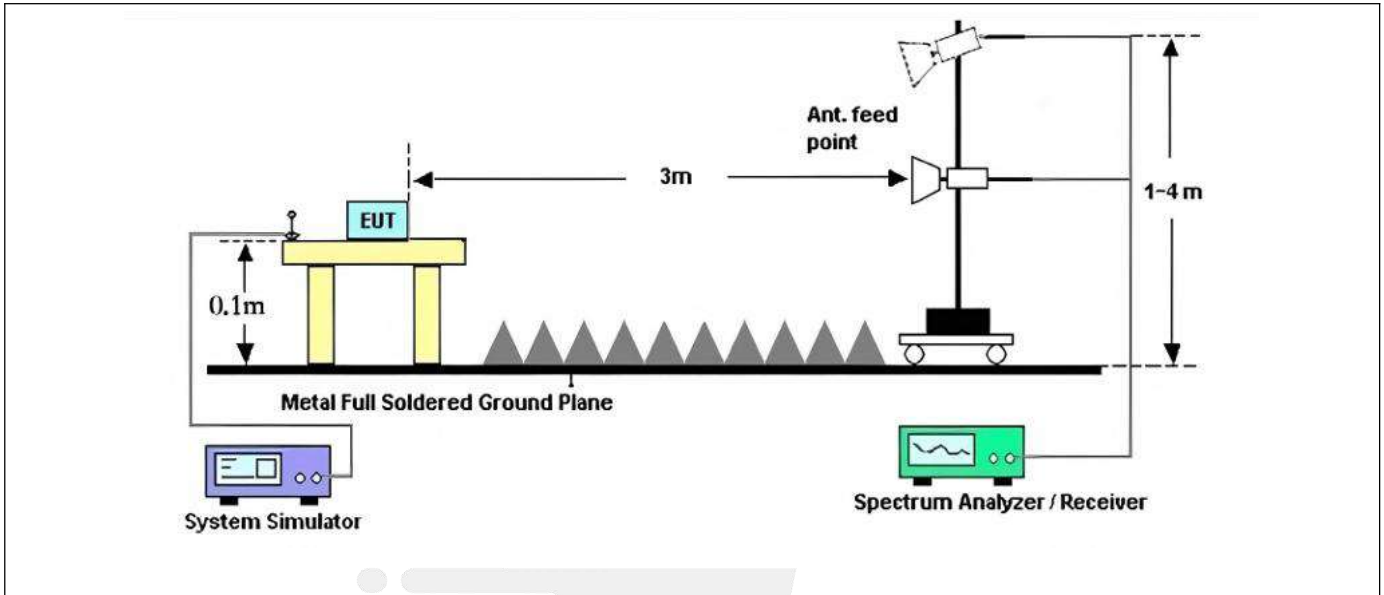
Operating Environment:

Temperature:	23.6 °C	Humidity:	55 %	Atmospheric Pressure:	101.4 kPa
--------------	---------	-----------	------	-----------------------	-----------

Pre test mode:	TM1
----------------	-----

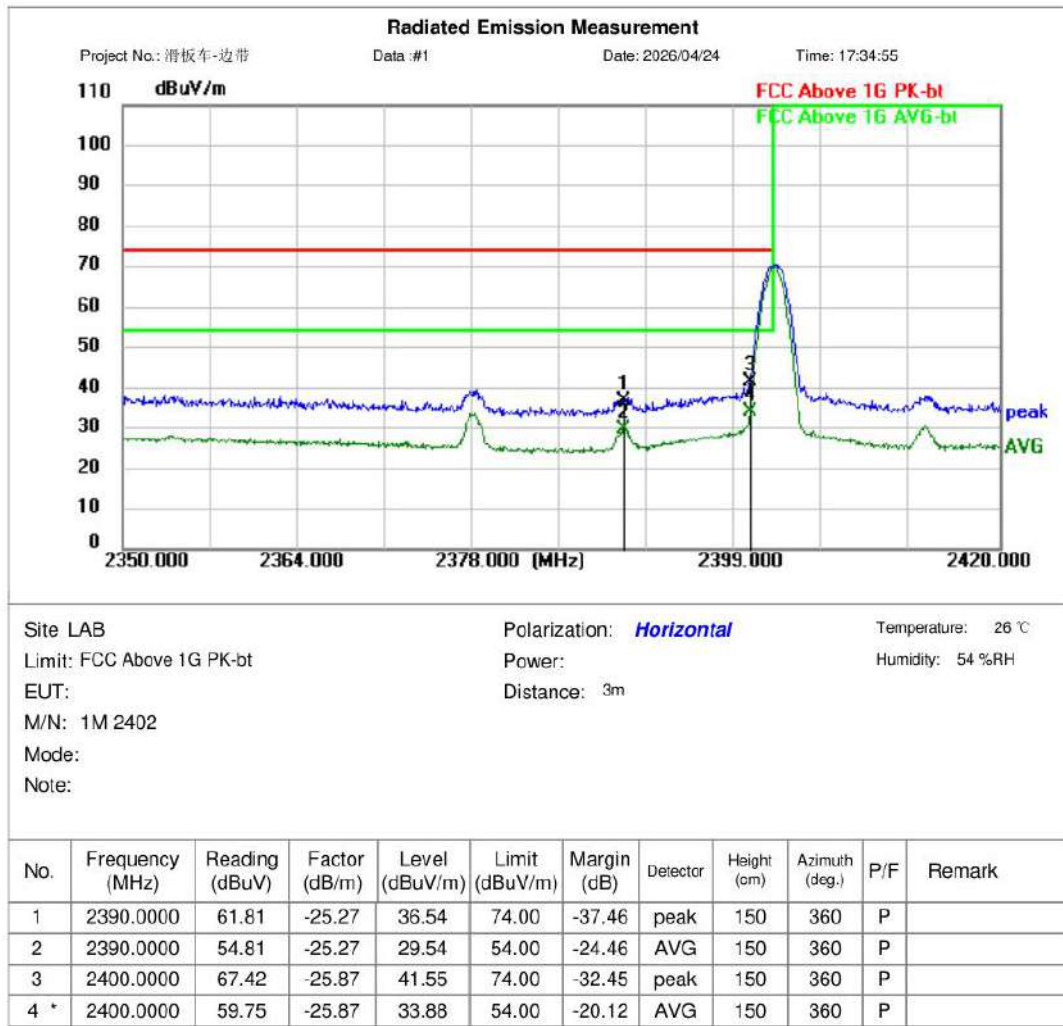
Final test mode:	TM1
------------------	-----

6.7.2. Test Setup Diagram:

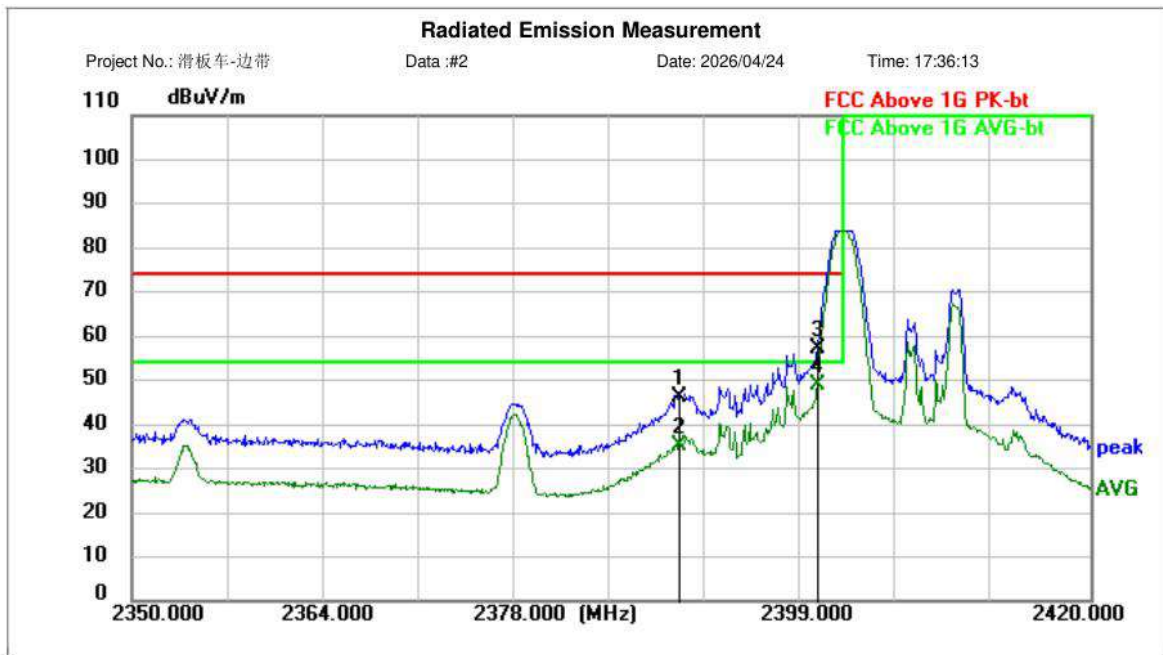


6.7.3. Test Data

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1



TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1



Site LAB

Polarization: **Vertical**

Temperature: 26 ℃

Limit: FCC Above 1G PK-bt

Power:

Humidity: 54 %RH

EUT:

Distance: 3m

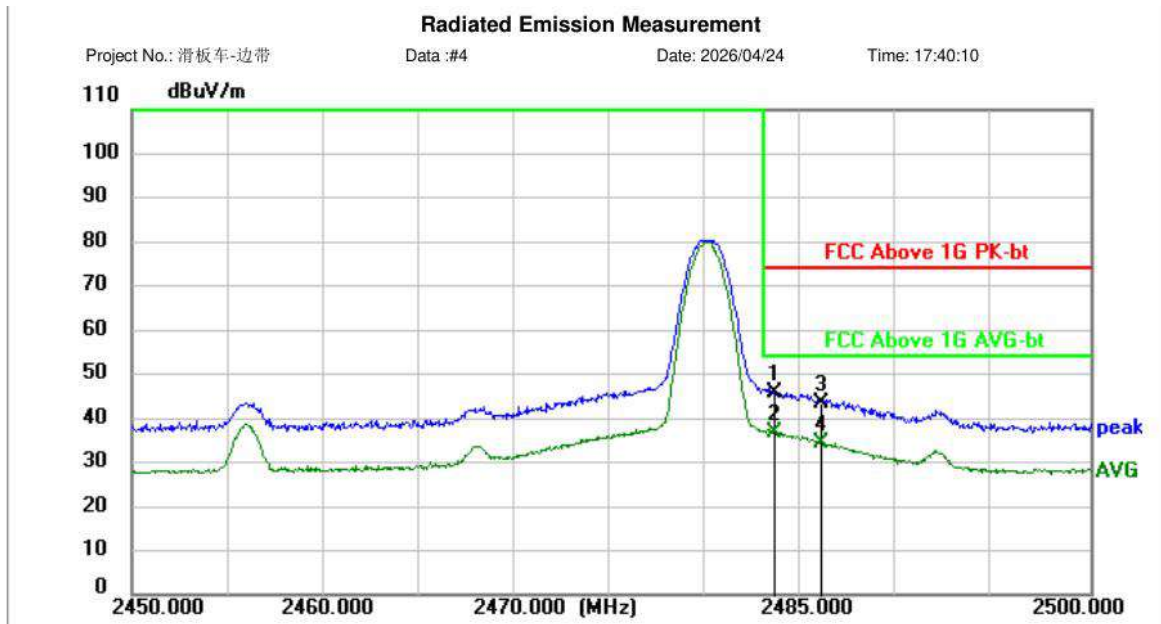
M/N: 1M 2402

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2390.0000	68.85	-22.71	46.14	74.00	-27.86	peak	150	360	P	
2	2390.0000	57.80	-22.71	35.09	54.00	-18.91	AVG	150	360	P	
3	2400.0000	79.65	-22.67	56.98	74.00	-17.02	peak	150	360	P	
4 *	2400.0000	71.75	-22.67	49.08	54.00	-4.92	AVG	150	360	P	

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2



Site LAB

Polarization: **Horizontal**

Temperature: 26 °C

Limit: FCC Above 1G PK-bt

Power:

Humidity: 54 %RH

EUT:

Distance: 3m

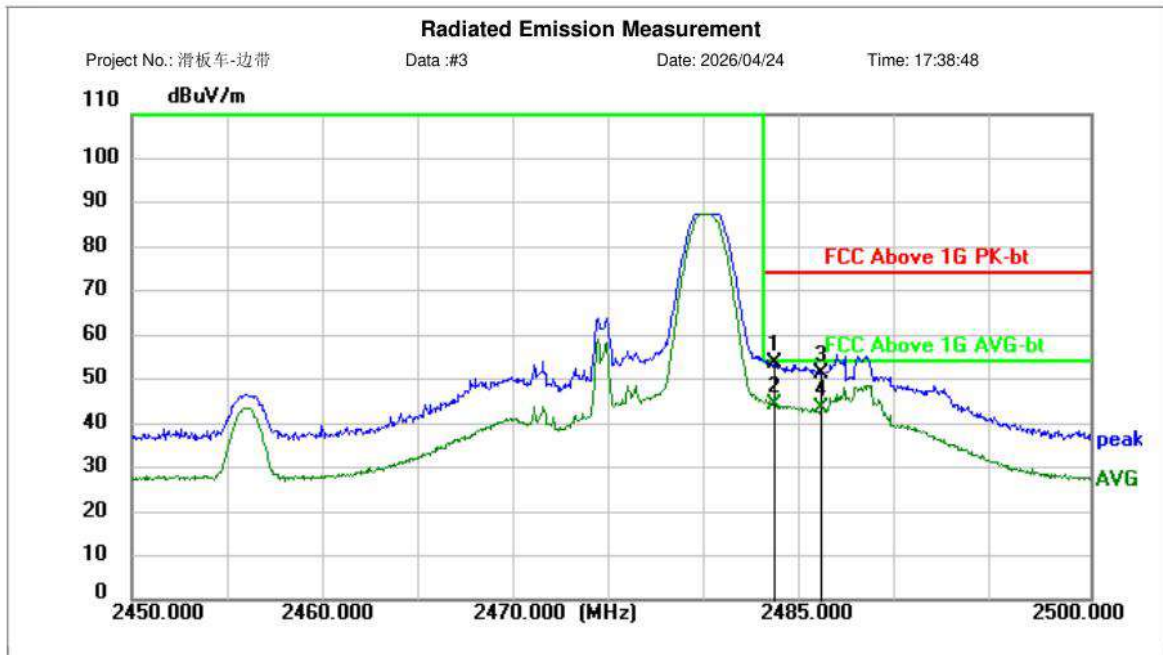
M/N: 1M 2480

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.5000	68.47	-22.81	45.66	74.00	-28.34	peak	150	360	P	
2 *	2483.5000	59.38	-22.81	36.57	54.00	-17.43	AVG	150	360	P	
3	2486.0000	66.17	-22.79	43.38	74.00	-30.62	peak	150	360	P	
4	2486.0000	56.99	-22.79	34.20	54.00	-19.80	AVG	150	360	P	

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2



Site LAB

Polarization: **Vertical**

Temperature: 26 °C

Limit: FCC Above 1G PK-bt

Power:

Humidity: 54 %RH

EUT:

Distance: 3m

M/N: 1M 2480

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.5000	76.07	-22.27	53.80	74.00	-20.20	peak	150	360	P	
2 *	2483.5000	66.48	-22.27	44.21	54.00	-9.79	AVG	150	360	P	
3	2486.0000	73.61	-22.26	51.35	74.00	-22.65	peak	150	360	P	
4	2486.0000	65.53	-22.26	43.27	54.00	-10.73	AVG	150	360	P	

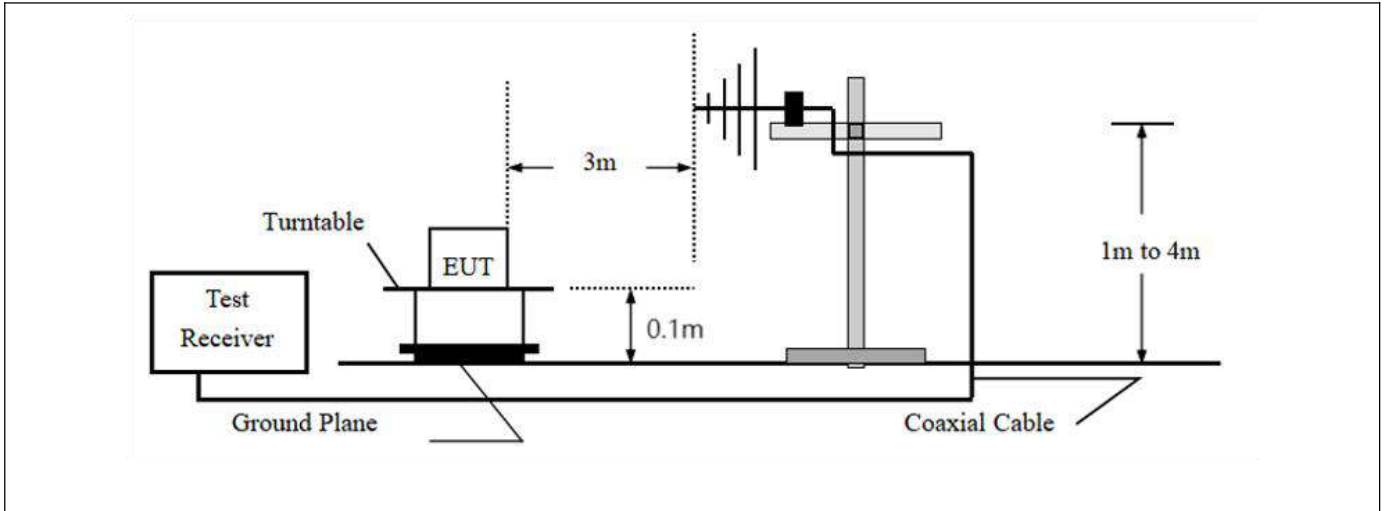
6.8. Emissions in frequency bands (below 1GHz)

Test Requirement:	Refer to 47 CFR 15.247(d), 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 Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.			
Test Method:	ANSI C63.10-2020 section 6.5.4		
Procedure:	ANSI C63.10-2020 section 6.5.4		
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting	
	RBW	120KHz	
	VBW	300KHz	
	Start frequency	30MHz	
	Stop frequency	1GHz	
	Sweep Time	Auto	
	Detector	QP	
	Trace Mode	Max Hold	

6.8.1. EUT Operation

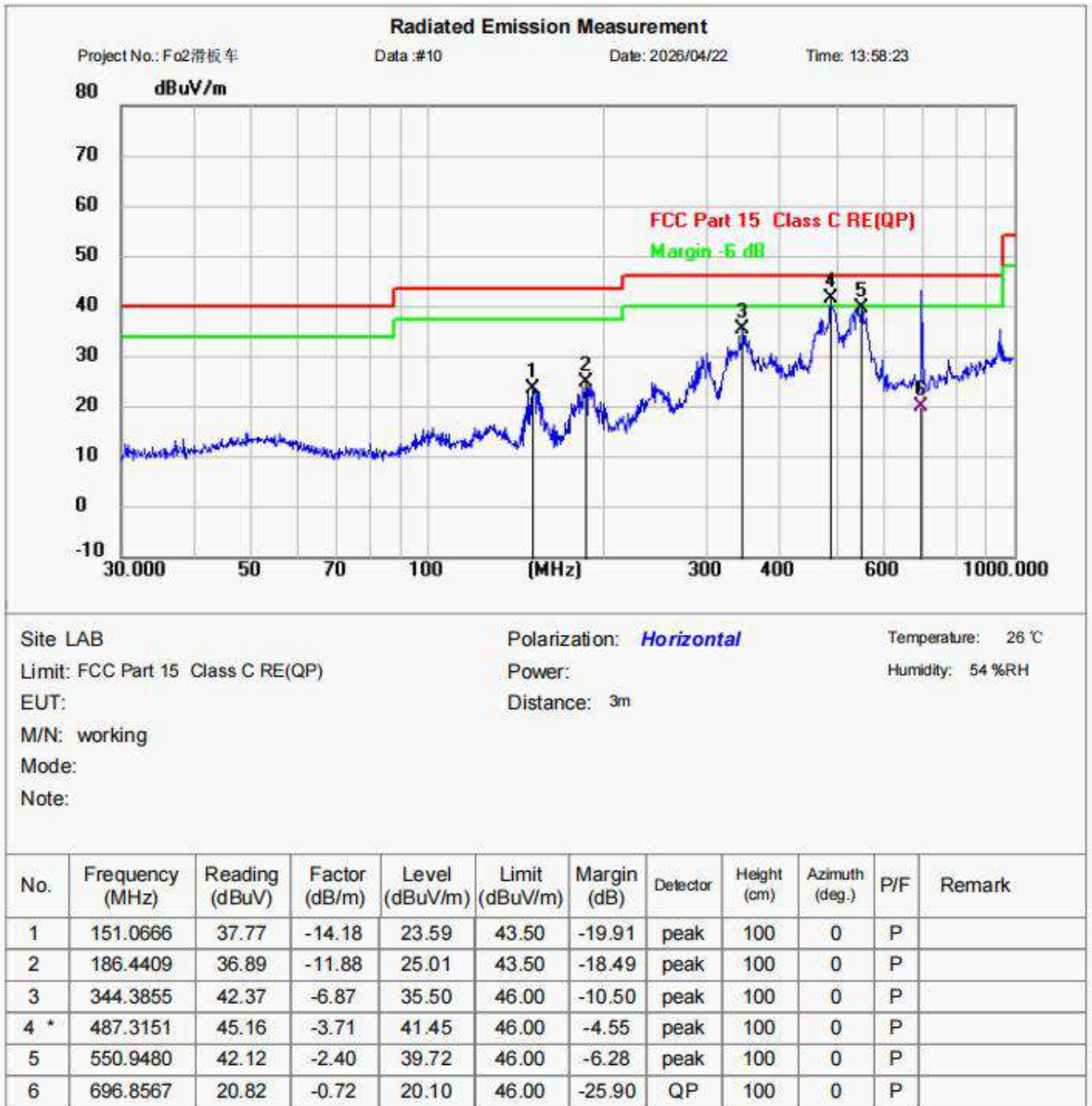
Operating Environment:					
Temperature:	21.8 °C	Humidity:	52 %	Atmospheric Pressure:	102.3 kPa
Pre test mode:		TM1			
Final test mode:		TM1			

6.8.2. Test Setup Diagram:

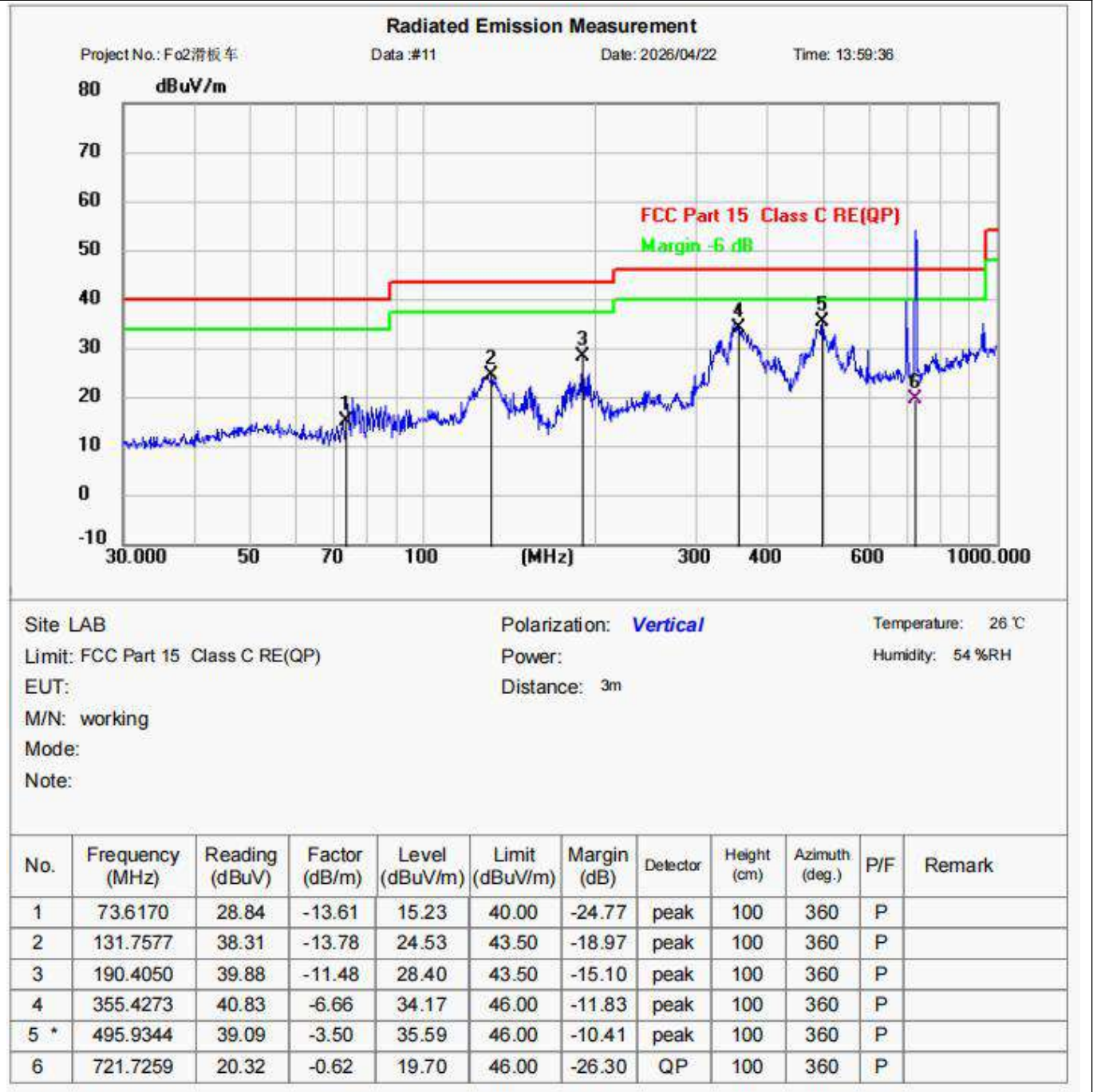


6.8.3. Test Data

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1



TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1



6.9. Emissions in frequency bands (above 1GHz)

Test Requirement:	Refer to 47 CFR 15.247(d), 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 Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.			
Test Method:	ANSI C63.10-2020 section 6.5.4		
Procedure:	ANSI C63.10-2020 section 6.5.4		
Spectrum Analyzer Setting:	Spectrum Analyzer Setting	Setting	
	RBW	1MHz	
	VBW	PEAK Measurement	AVG Measurement
		3MHz	Duty cycle ≥ 98%, VBW=10Hz
			Duty cycle < 98%, VBW ≥ 1/T
	Start frequency	1GHz	
	Stop frequency	40GHz	
	Sweep Time	Auto	
	Detector	Peak	
	Trace Mode	Max Hold	

6.9.1. EUT Operation

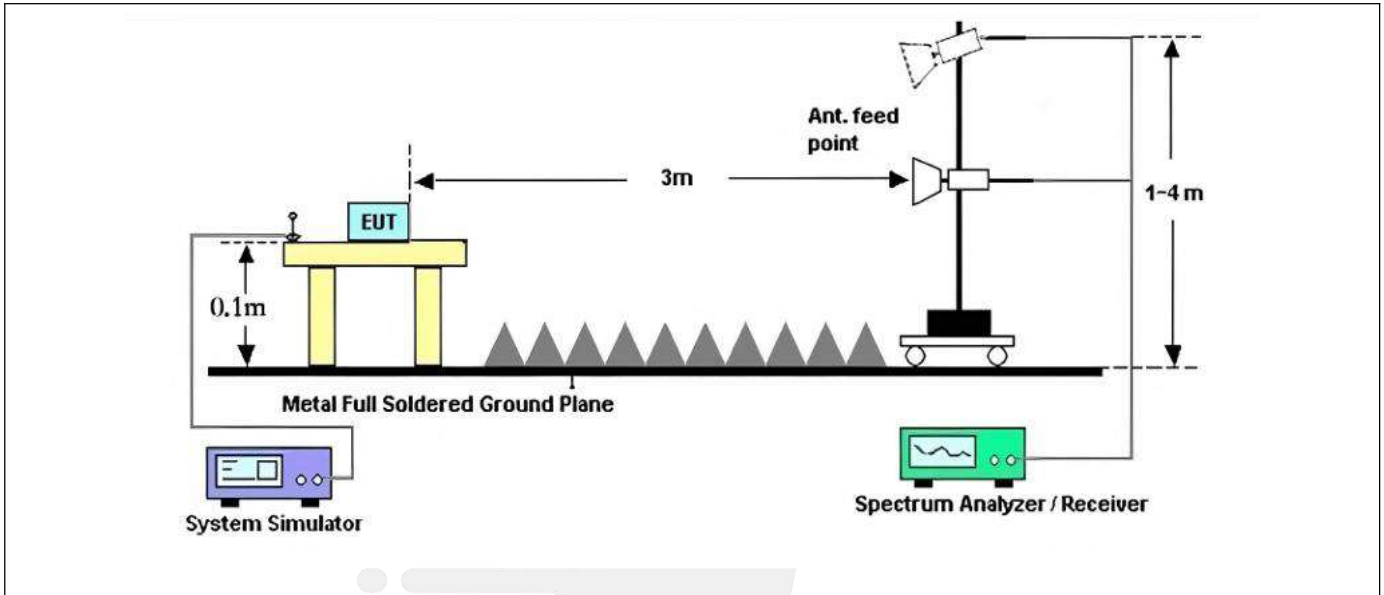
Operating Environment:

Temperature:	21.2 °C	Humidity:	47.2 %	Atmospheric Pressure:	102.3 kPa
--------------	---------	-----------	--------	-----------------------	-----------

Pre test mode:	TM1
----------------	-----

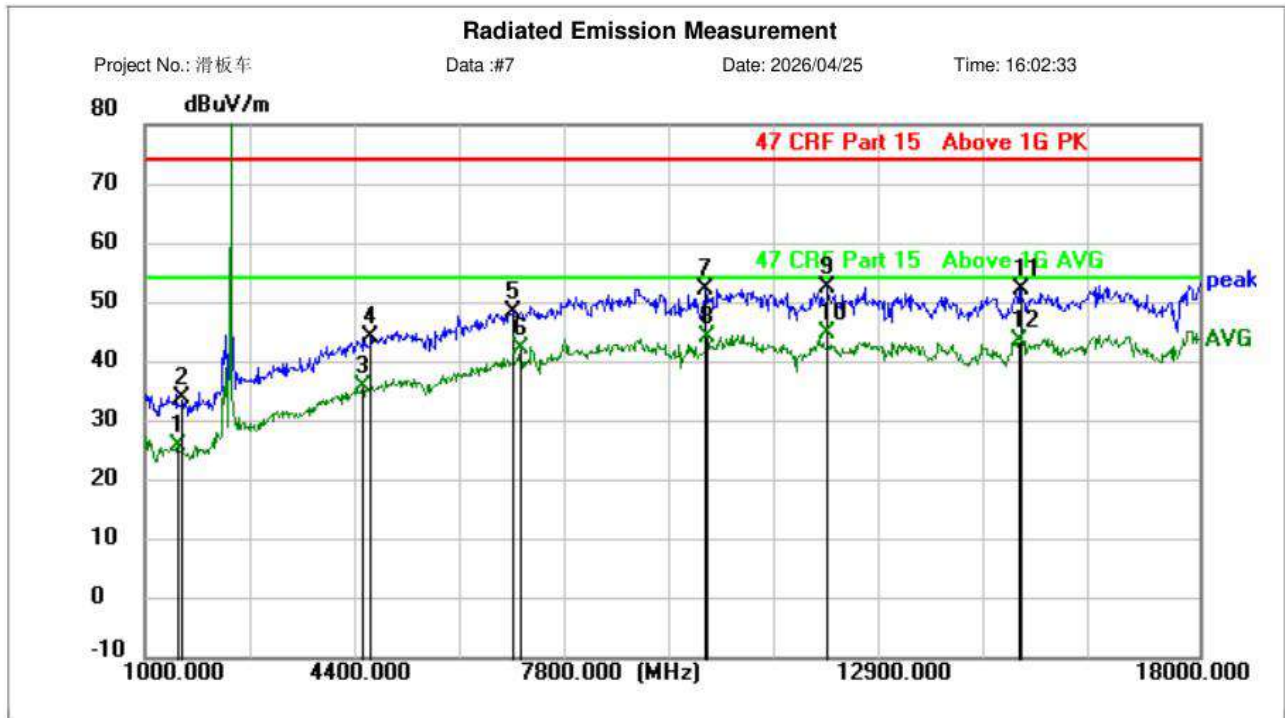
Final test mode:	TM1
------------------	-----

6.9.2. Test Setup Diagram:



6.9.3. Test Data

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1



Site LAB

Limit: 47 CRF Part 15 Above 1G PK

EUT:

M/N: 2402

Mode: GFSK

Note:

Polarization: **Horizontal**

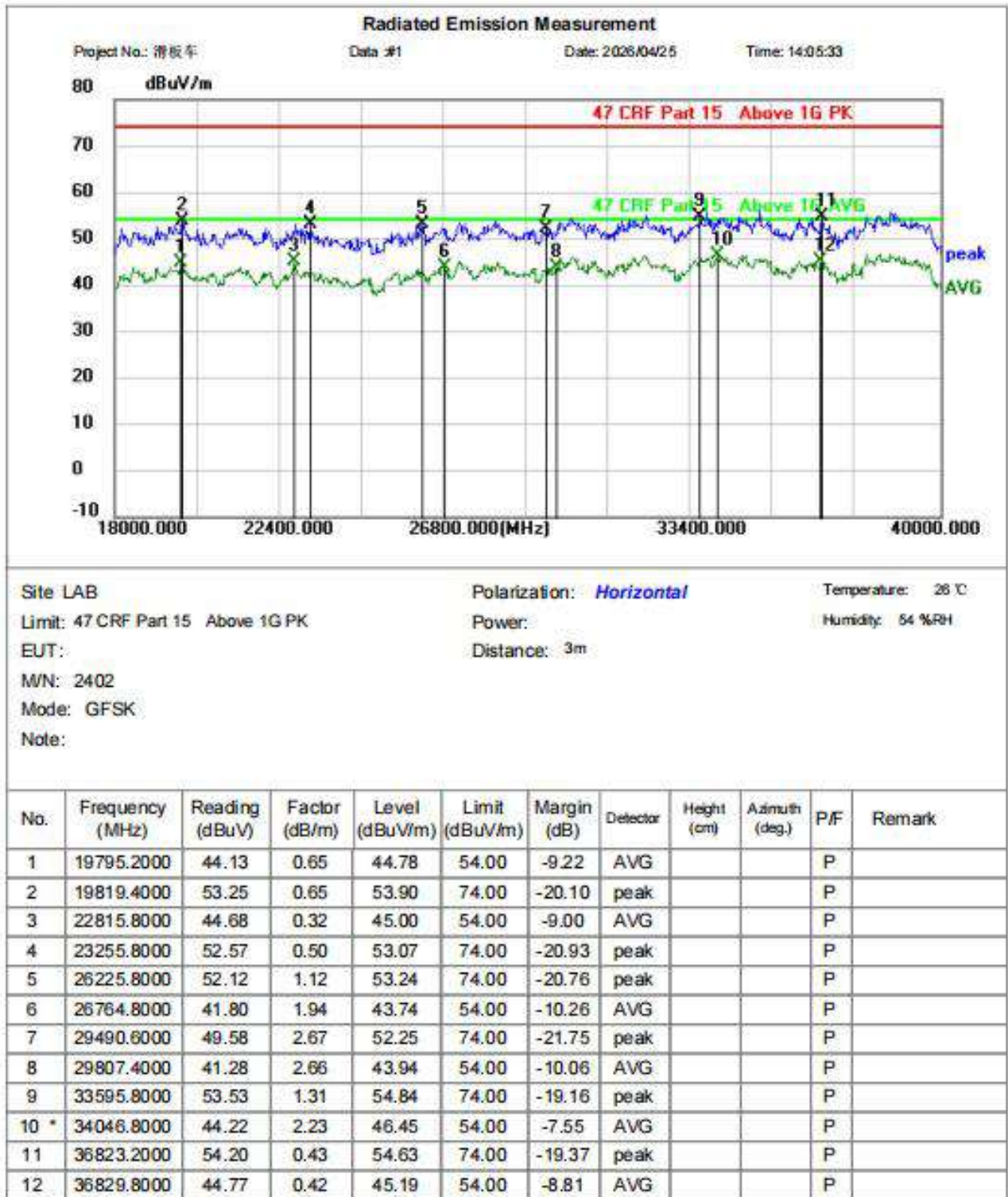
Power:

Distance: 3m

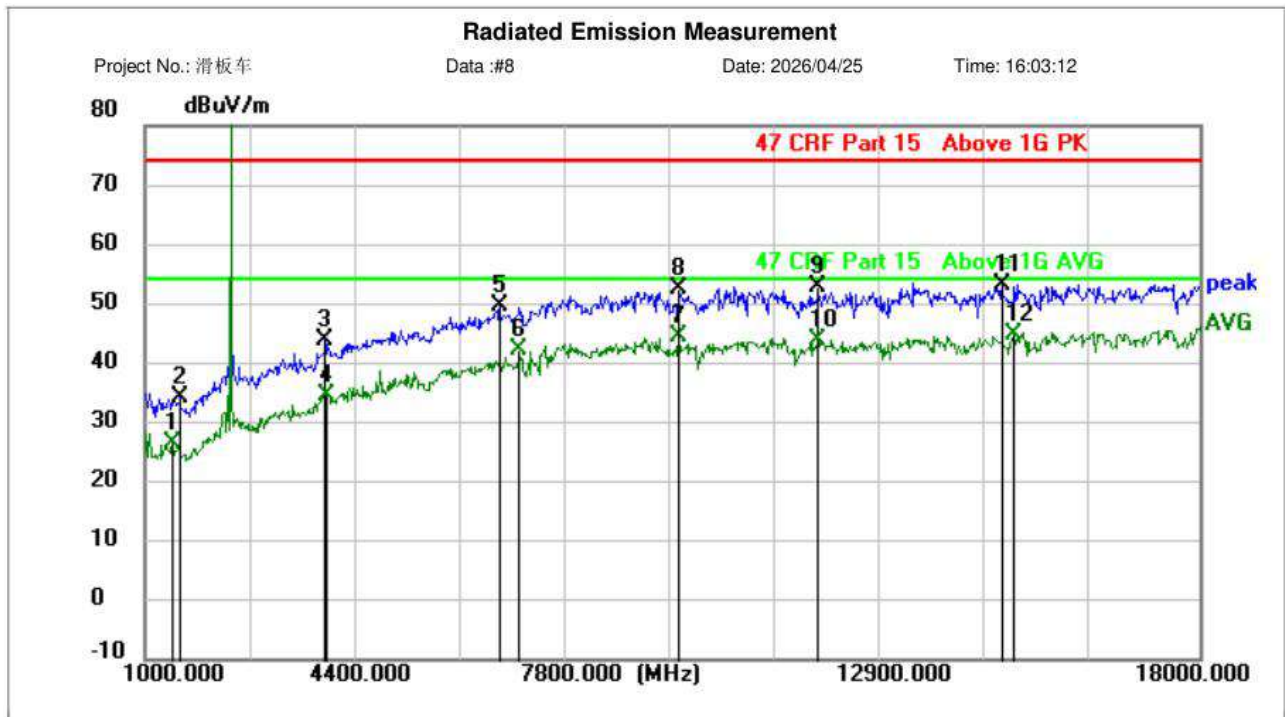
Temperature: 26 °C

Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1544.0000	51.03	-25.18	25.85	54.00	-28.15	AVG			P	
2	1608.6000	59.10	-25.28	33.82	74.00	-40.18	peak			P	
3	4513.9000	53.67	-17.74	35.93	54.00	-18.07	AVG			P	
4	4627.8000	61.84	-17.55	44.29	74.00	-29.71	peak			P	
5	6961.9000	59.62	-11.40	48.22	74.00	-25.78	peak			P	
6	7063.9000	53.28	-11.00	42.28	54.00	-11.72	AVG			P	
7	10049.1000	56.37	-4.23	52.14	74.00	-21.86	peak			P	
8	10084.8000	48.13	-4.07	44.06	54.00	-9.94	AVG			P	
9	12010.9000	54.39	-1.77	52.62	74.00	-21.38	peak			P	
10 *	12010.9000	46.70	-1.77	44.93	54.00	-9.07	AVG			P	
11	15118.5000	52.98	-0.70	52.28	74.00	-21.72	peak			P	
12	15125.3000	44.33	-0.70	43.63	54.00	-10.37	AVG			P	



TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1



Site LAB

Limit: 47 CRF Part 15 Above 1G PK

EUT:

M/N: 2402

Mode: GFSK

Note:

Polarization: **Vertical**

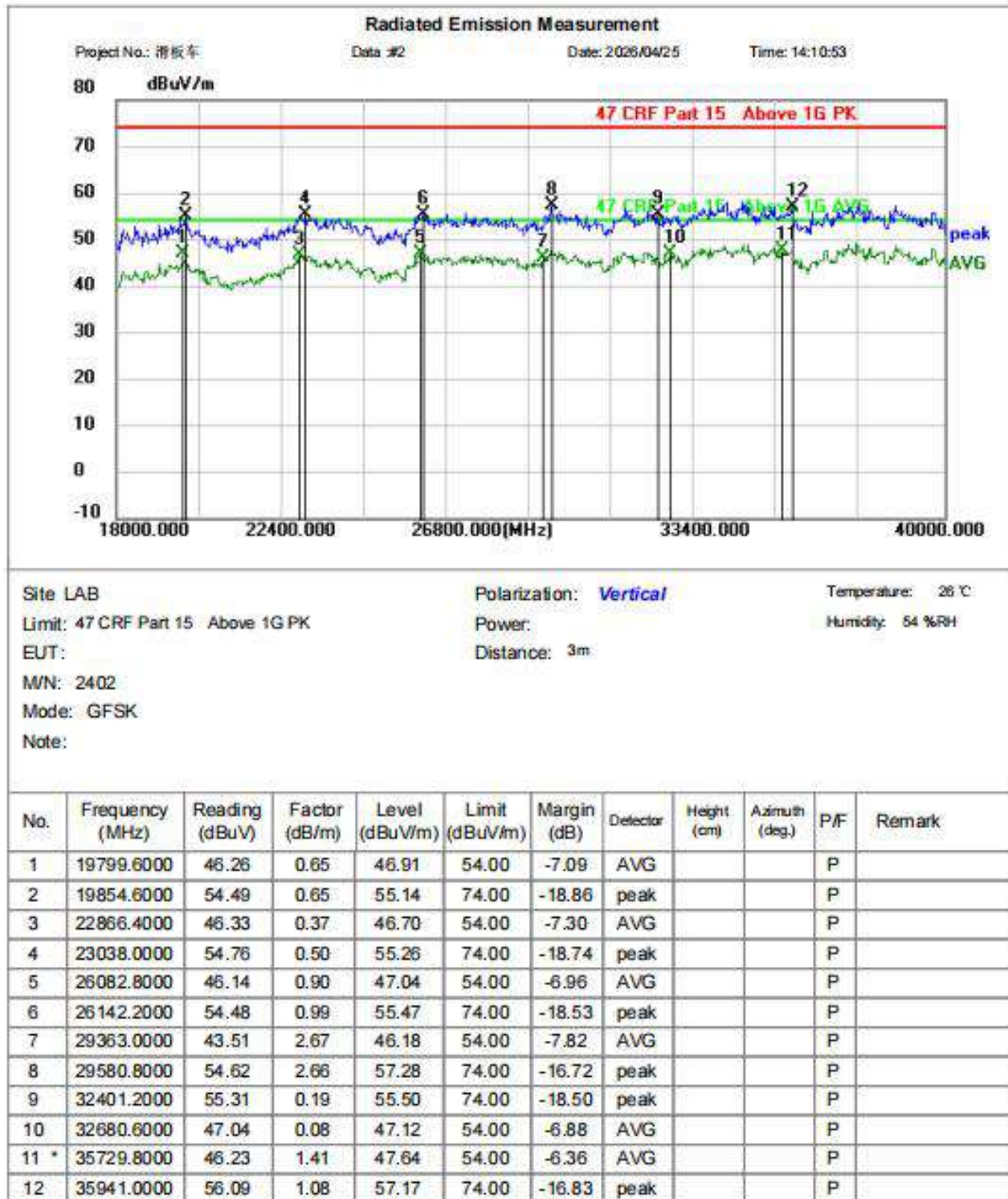
Power:

Distance: 3m

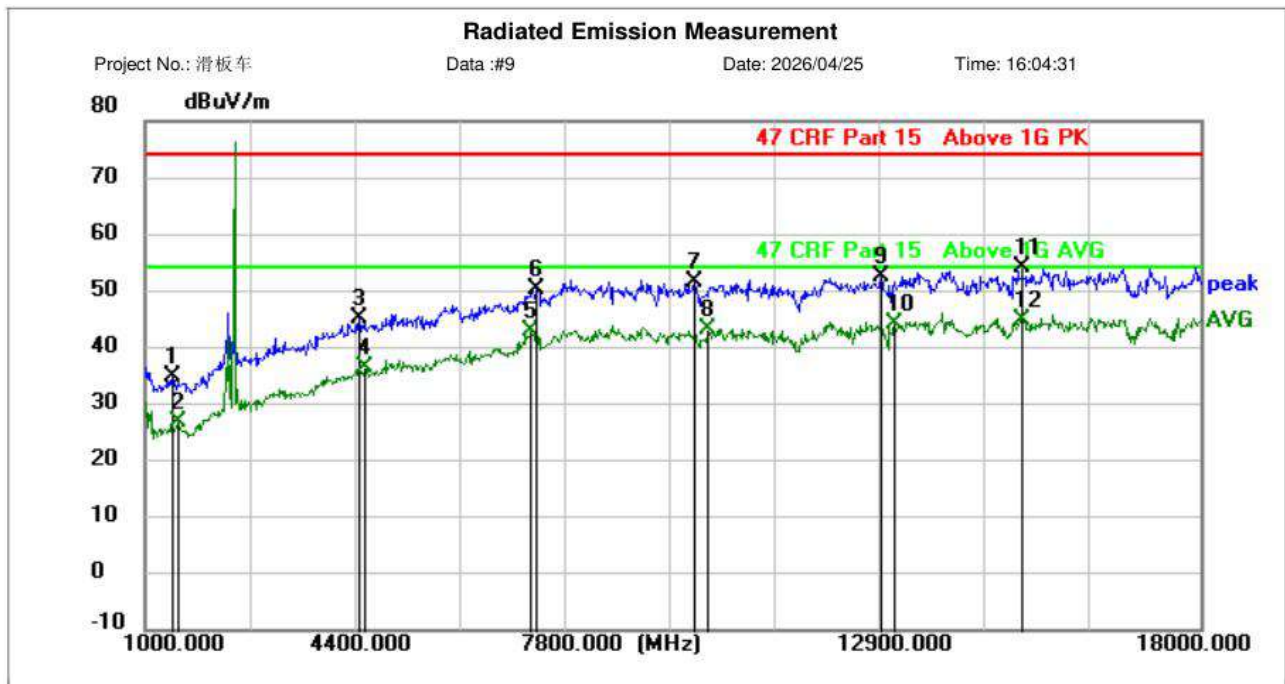
Temperature: 26 °C

Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1443.7000	51.94	-25.31	26.63	54.00	-27.37	AVG			P	
2	1571.2000	59.41	-25.21	34.20	74.00	-39.80	peak			P	
3	3915.5000	62.81	-18.95	43.86	74.00	-30.14	peak			P	
4	3954.6000	53.68	-19.02	34.66	54.00	-19.34	AVG			P	
5	6723.9000	60.96	-11.47	49.49	74.00	-24.51	peak			P	
6	7031.6000	53.25	-11.12	42.13	54.00	-11.87	AVG			P	
7	9607.1000	49.41	-4.81	44.60	54.00	-9.40	AVG			P	
8	9608.8000	57.40	-4.81	52.59	74.00	-21.41	peak			P	
9	11859.6000	54.76	-1.89	52.87	74.00	-21.13	peak			P	
10	11859.6000	45.84	-1.89	43.95	54.00	-10.05	AVG			P	
11	14834.6000	54.06	-0.89	53.17	74.00	-20.83	peak			P	
12 *	14997.8000	45.25	-0.55	44.70	54.00	-9.30	AVG			P	



TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2



Site LAB

Limit: 47 CRF Part 15 Above 1G PK

EUT:

M/N: 2441

Mode: GFSK

Note:

Polarization: **Horizontal**

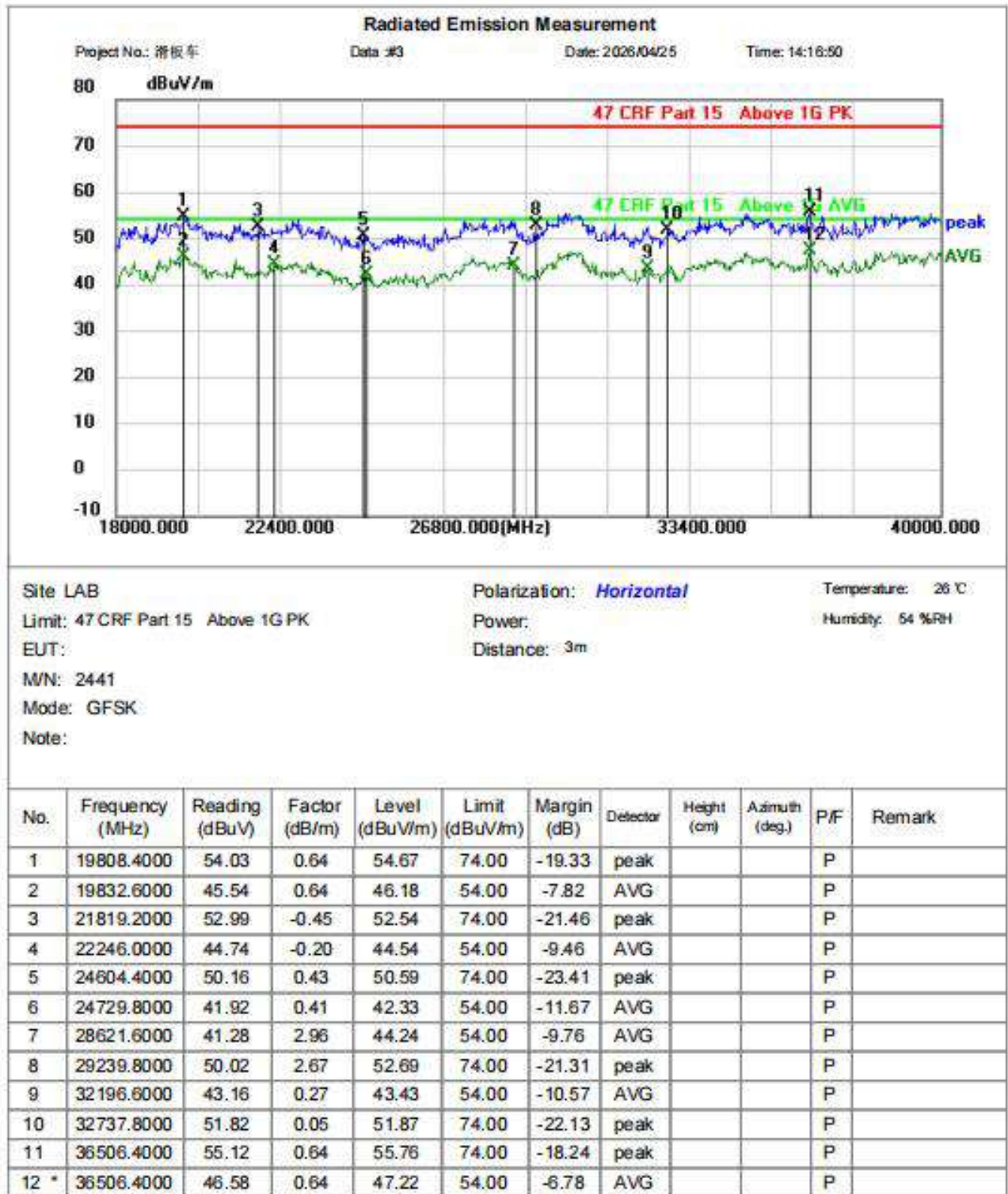
Power:

Distance: 3m

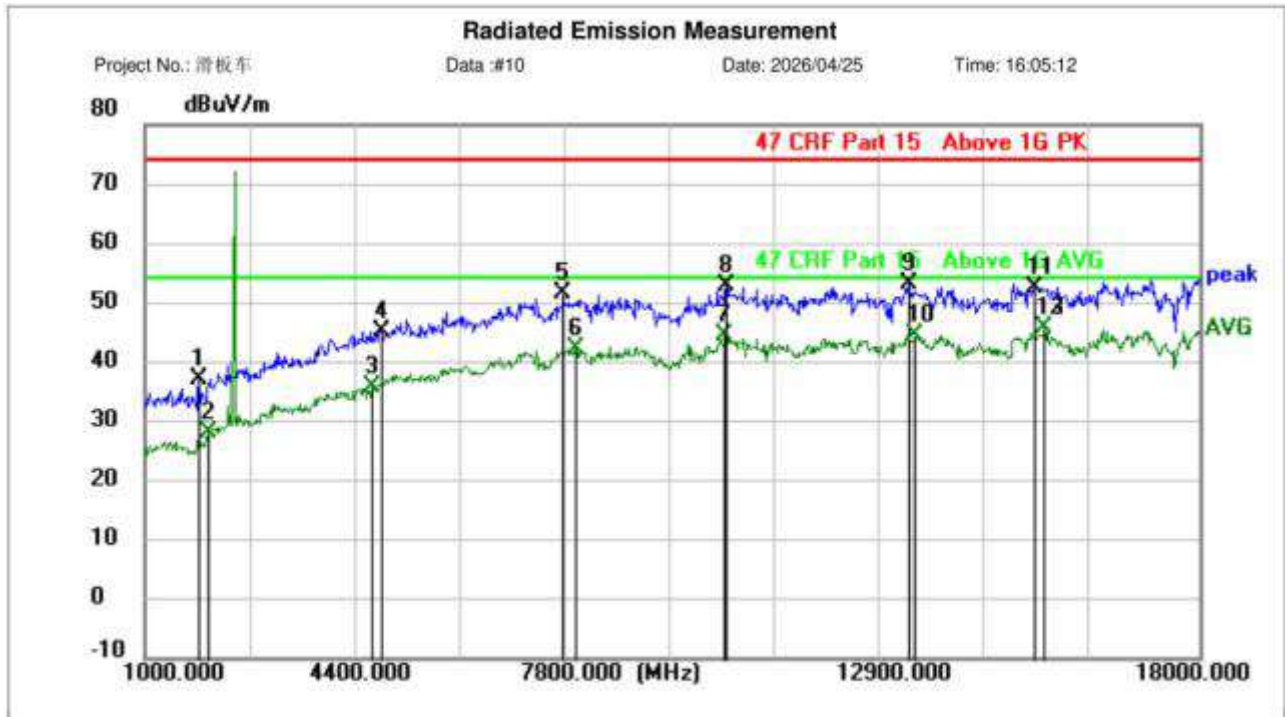
Temperature: 26 °C

Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1455.6000	60.02	-25.30	34.72	74.00	-39.28	peak			P	
2	1535.5000	52.02	-25.18	26.84	54.00	-27.16	AVG			P	
3	4452.7000	62.93	-17.78	45.15	74.00	-28.85	peak			P	
4	4546.2000	54.22	-17.72	36.50	54.00	-17.50	AVG			P	
5	7216.9000	53.14	-10.35	42.79	54.00	-11.21	AVG			P	
6	7318.9000	60.74	-10.36	50.38	74.00	-23.62	peak			P	
7	9850.2000	56.14	-4.72	51.42	74.00	-22.58	peak			P	
8	10093.3000	47.09	-4.03	43.06	54.00	-10.94	AVG			P	
9	12850.7000	55.23	-2.72	52.51	74.00	-21.49	peak			P	
10	13087.0000	47.22	-3.00	44.22	54.00	-9.78	AVG			P	
11	15138.9000	54.87	-0.70	54.17	74.00	-19.83	peak			P	
12 *	15138.9000	45.57	-0.70	44.87	54.00	-9.13	AVG			P	



TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2



Site LAB

Limit: 47 CFR Part 15 Above 1G PK

EUT:

M/N: 2441

Mode: GFSK

Note:

Polarization: **Vertical**

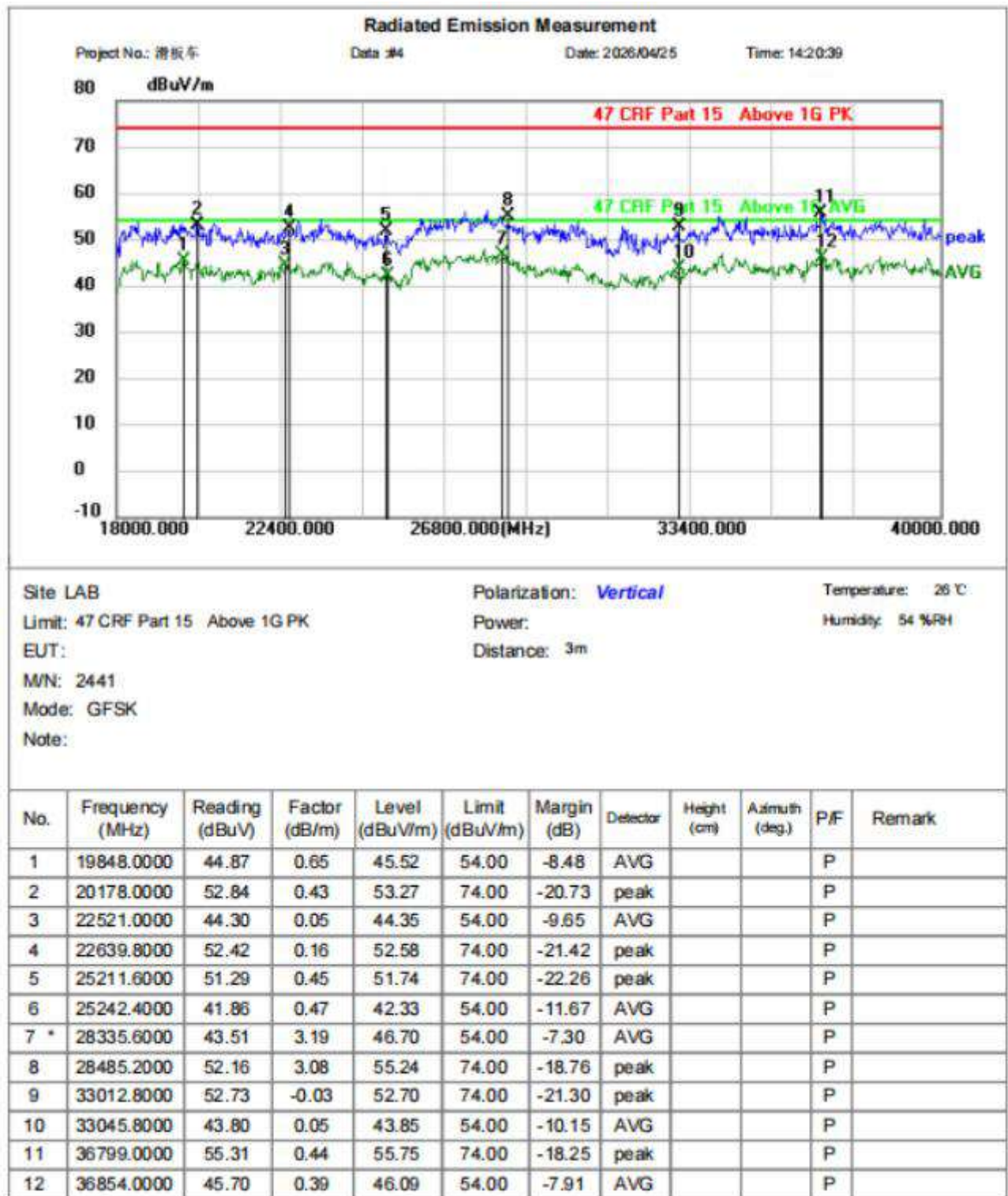
Power:

Distance: 3m

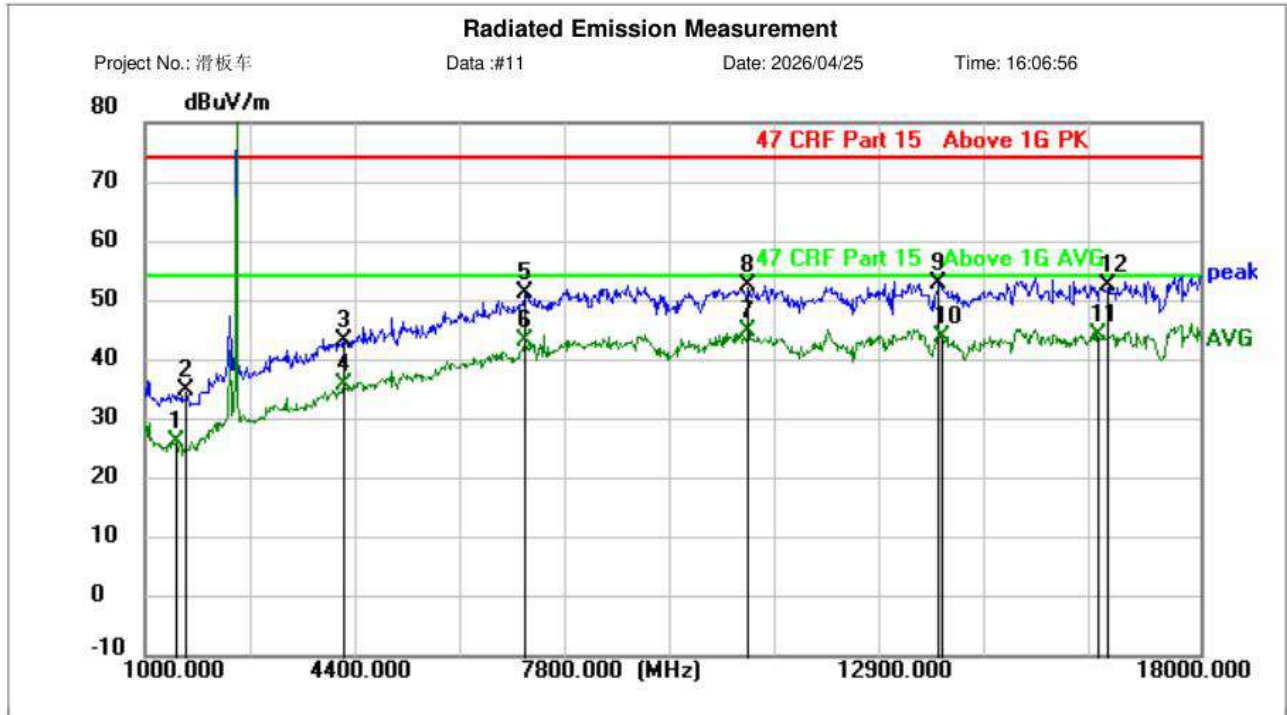
Temperature: 26 °C

Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1875.5000	61.93	-24.98	36.95	74.00	-37.05	peak			P	
2	2028.5000	52.05	-23.86	28.19	54.00	-25.81	AVG			P	
3	4665.2000	53.06	-17.40	35.66	54.00	-18.34	AVG			P	
4	4804.6000	62.12	-16.91	45.21	74.00	-28.79	peak			P	
5	7760.9000	61.74	-10.05	51.69	74.00	-22.31	peak			P	
6	7951.3000	51.54	-9.27	42.27	54.00	-11.73	AVG			P	
7	10363.6000	47.63	-3.27	44.36	54.00	-9.64	AVG			P	
8	10373.8000	55.99	-3.23	52.76	74.00	-21.24	peak			P	
9	13314.8000	55.82	-2.74	53.08	74.00	-20.92	peak			P	
10	13418.5000	47.17	-2.66	44.51	54.00	-9.49	AVG			P	
11	15332.7000	53.61	-0.96	52.65	74.00	-21.35	peak			P	
12 *	15494.2000	46.88	-1.23	45.65	54.00	-8.35	AVG			P	



TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



Site LAB

Limit: 47 CRF Part 15 Above 1G PK

EUT:

M/N: 2480

Mode: GFSK

Note:

Polarization: **Horizontal**

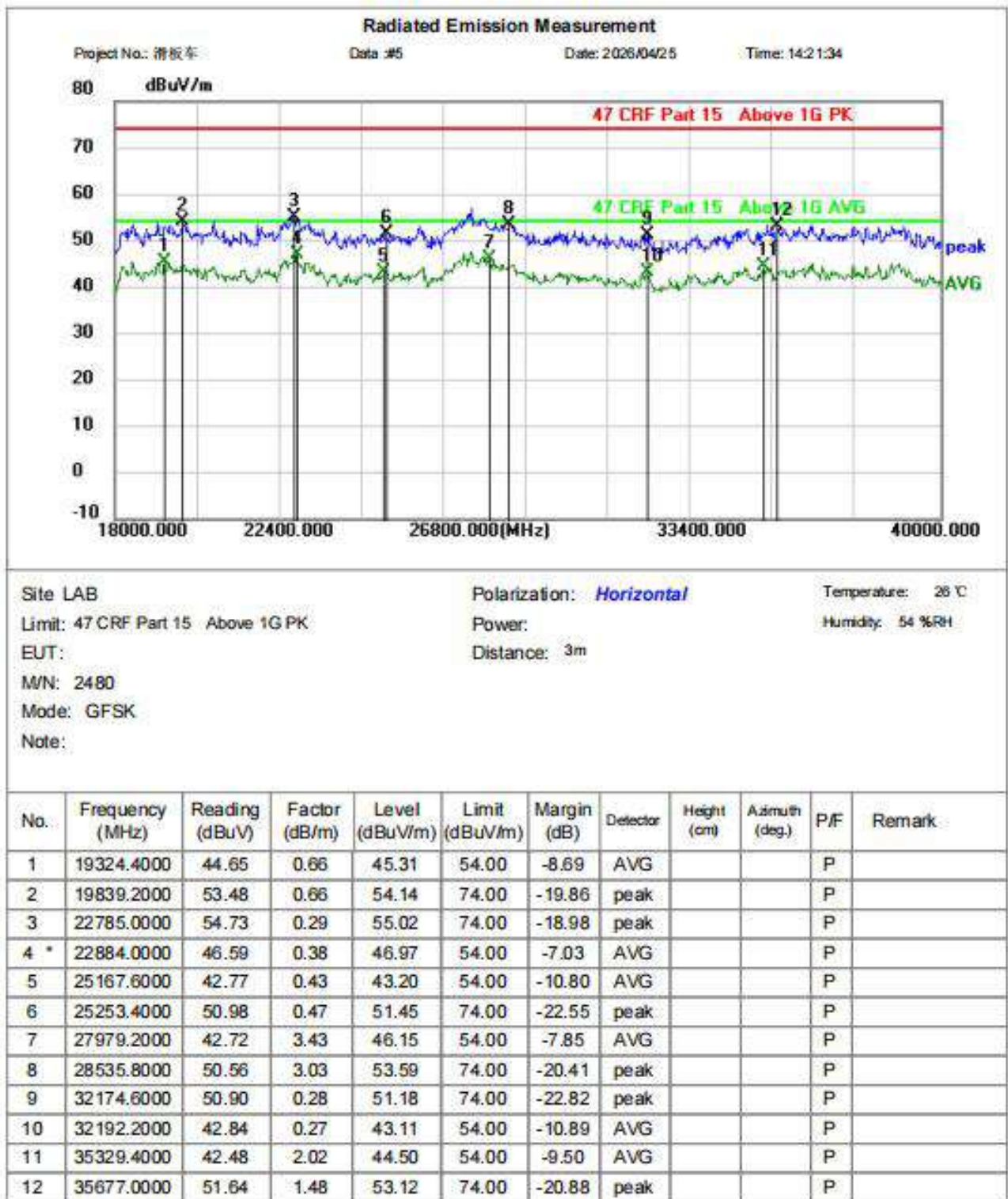
Power:

Distance: 3m

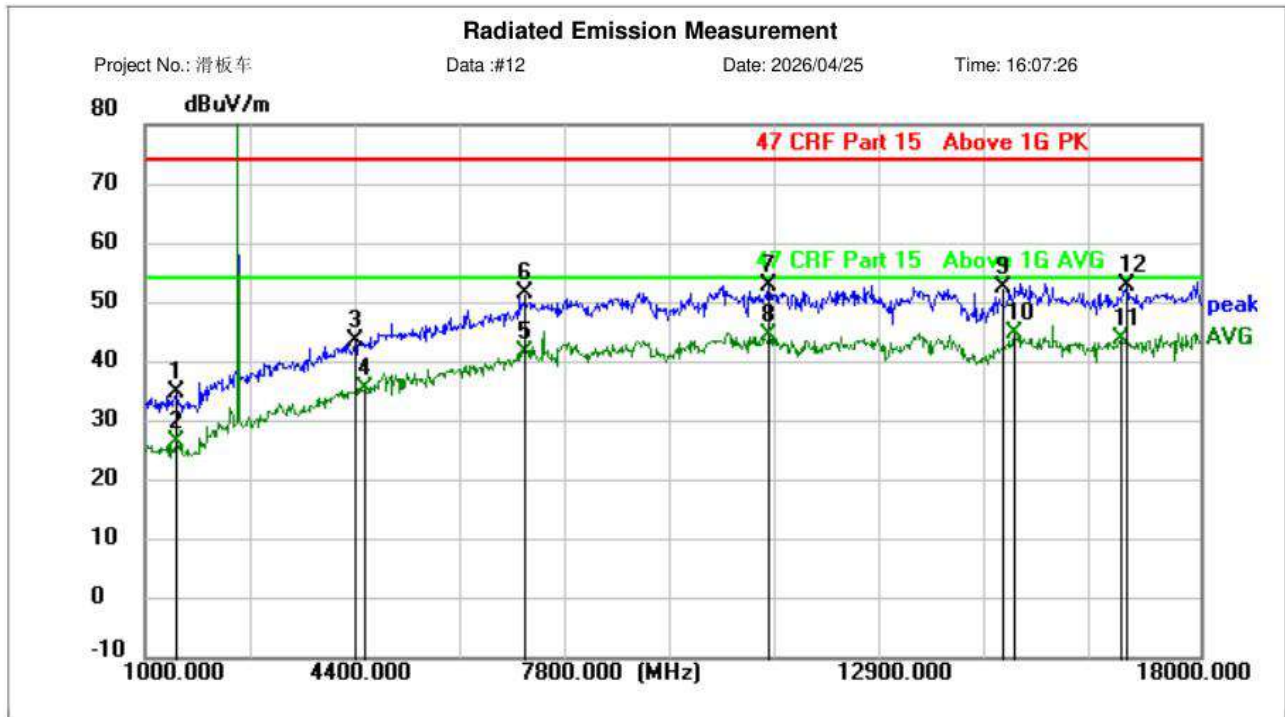
Temperature: 26 °C

Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1494.7000	51.50	-25.21	26.29	54.00	-27.71	AVG			P	
2	1659.6000	60.09	-25.36	34.73	74.00	-39.27	peak			P	
3	4197.7000	61.99	-18.77	43.22	74.00	-30.78	peak			P	
4	4209.6000	54.41	-18.74	35.67	54.00	-18.33	AVG			P	
5	7142.1000	61.86	-10.63	51.23	74.00	-22.77	peak			P	
6	7142.1000	53.77	-10.63	43.14	54.00	-10.86	AVG			P	
7 *	10712.1000	46.95	-2.11	44.84	54.00	-9.16	AVG			P	
8	10739.3000	54.45	-2.01	52.44	74.00	-21.56	peak			P	
9	13801.0000	55.71	-2.76	52.95	74.00	-21.05	peak			P	
10	13862.2000	46.64	-2.84	43.80	54.00	-10.20	AVG			P	
11	16362.9000	45.88	-1.57	44.31	54.00	-9.69	AVG			P	
12	16515.9000	54.06	-1.43	52.63	74.00	-21.37	peak			P	



TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



Site LAB

Polarization: **Vertical**

Temperature: 26 °C

Limit: 47 CRF Part 15 Above 1G PK

Power:

Humidity: 54 %RH

EUT:

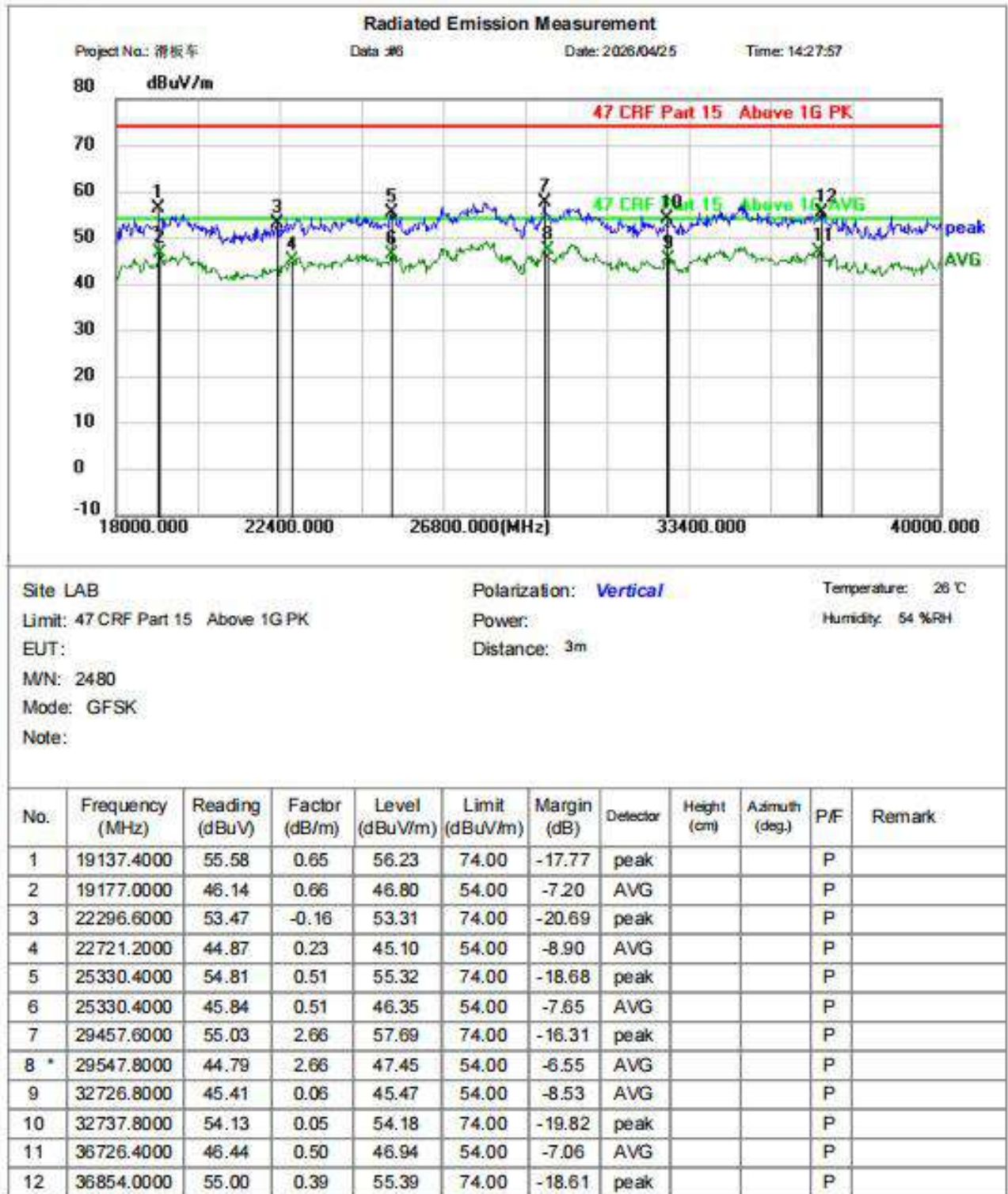
Distance: 3m

M/N: 2480

Mode: GFSK

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1499.8000	59.97	-25.20	34.77	74.00	-39.23	peak			P	
2	1499.8000	51.61	-25.20	26.41	54.00	-27.59	AVG			P	
3	4374.5000	61.53	-18.04	43.49	74.00	-30.51	peak			P	
4	4537.7000	53.36	-17.73	35.63	54.00	-18.37	AVG			P	
5	7113.2000	52.39	-10.77	41.62	54.00	-12.38	AVG			P	
6	7133.6000	62.32	-10.68	51.64	74.00	-22.36	peak			P	
7	11075.9000	54.04	-1.32	52.72	74.00	-21.28	peak			P	
8	11075.9000	45.72	-1.32	44.40	54.00	-9.60	AVG			P	
9	14855.0000	53.37	-0.85	52.52	74.00	-21.48	peak			P	
10 *	15004.6000	45.28	-0.56	44.72	54.00	-9.28	AVG			P	
11	16714.8000	45.19	-1.33	43.86	54.00	-10.14	AVG			P	
12	16804.9000	54.21	-1.28	52.93	74.00	-21.07	peak			P	

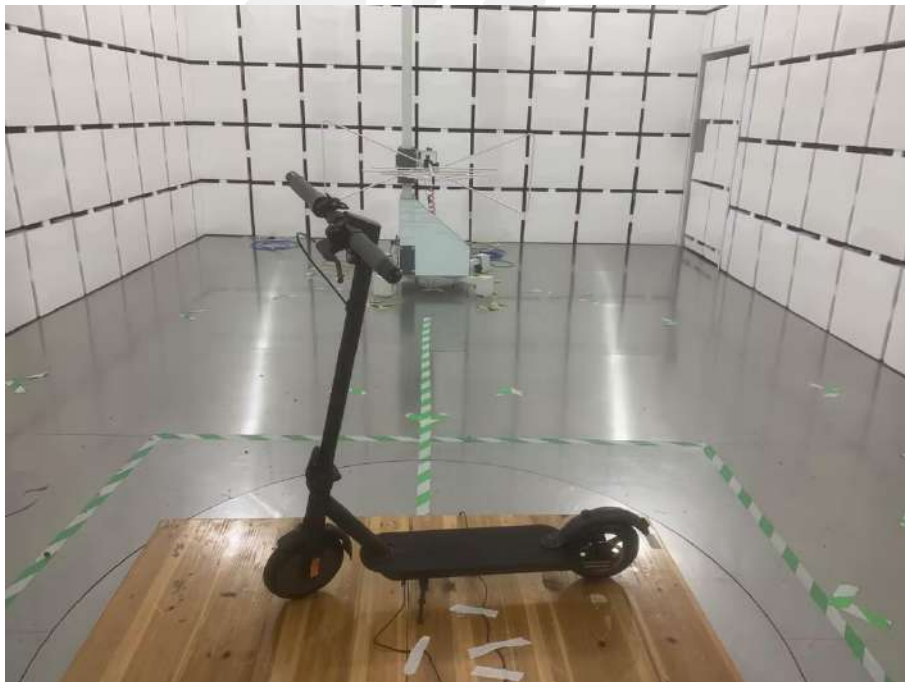


7. TEST SETUP PHOTOS

Conducted Emission at AC power line



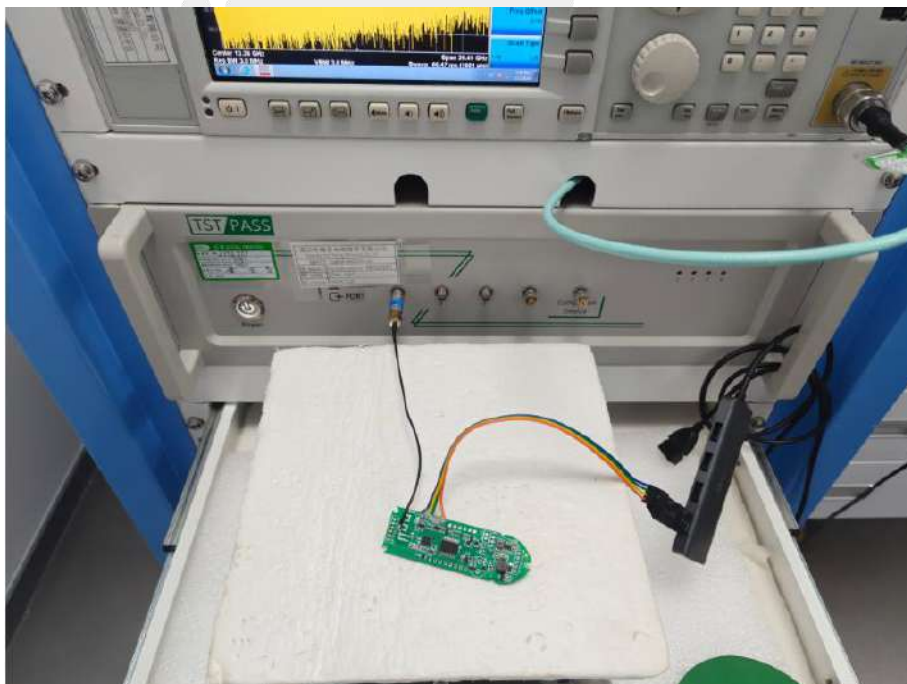
Emissions in frequency bands (below 1GHz)



Emissions in frequency bands (above 1GHz)



RF conducted test



8. Appendix Report

1. Duty Cycle

1.1 Test Result

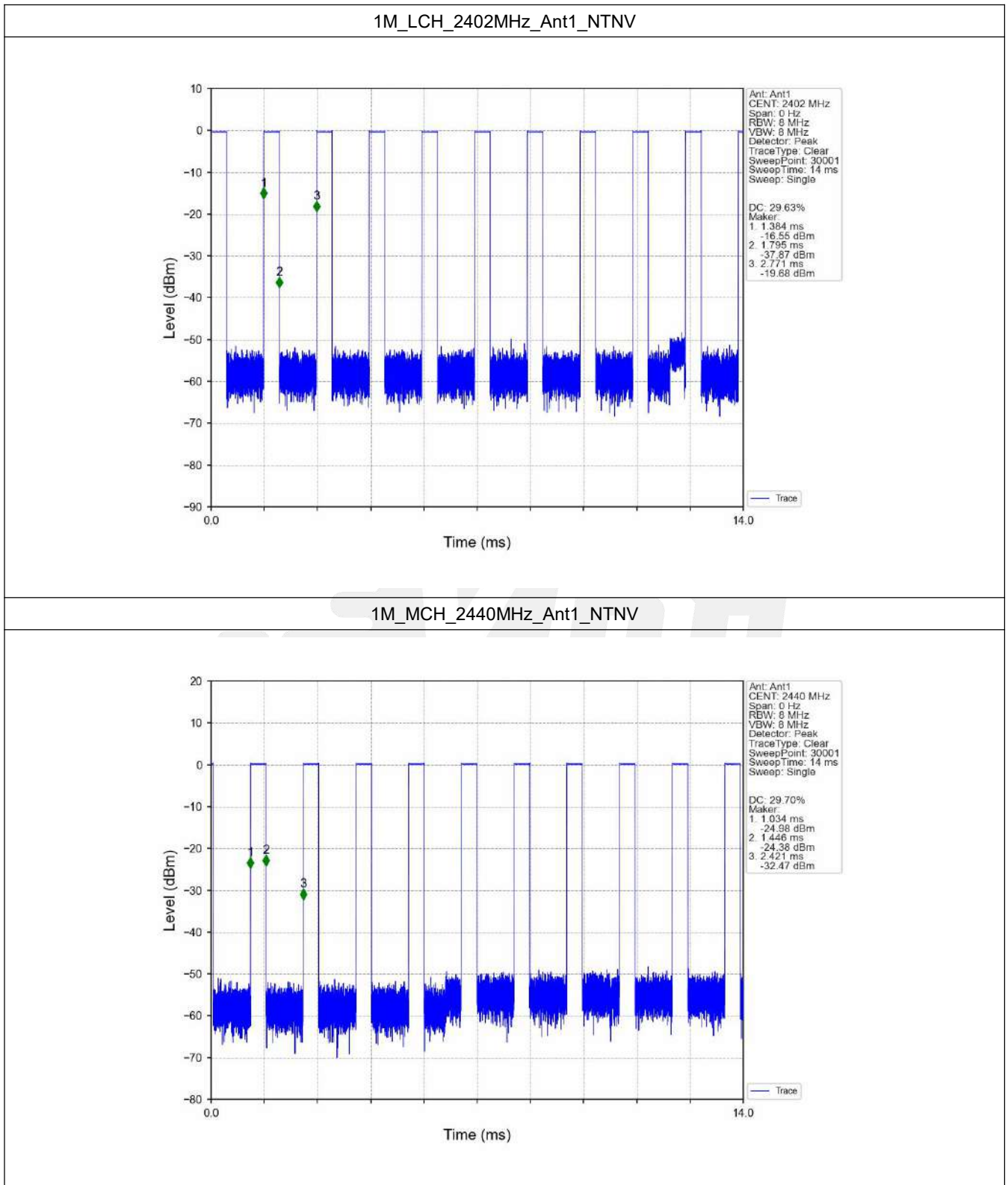
1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	0.411	1.387	29.63	5.28	0.03
		2440	0.412	1.387	29.70	5.27	0.03
		2480	0.412	1.388	29.68	5.27	0.02
2M	SISO	2402	0.219	0.763	28.70	5.42	0.07
		2440	0.220	0.763	28.83	5.40	0.03
		2480	0.220	0.763	28.83	5.40	0.01

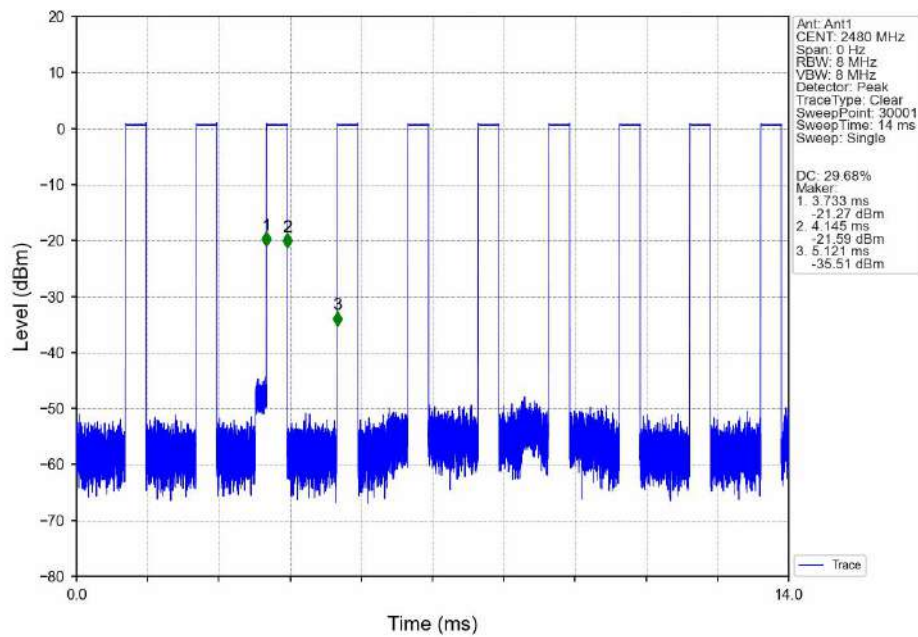


1.2 Test Graph

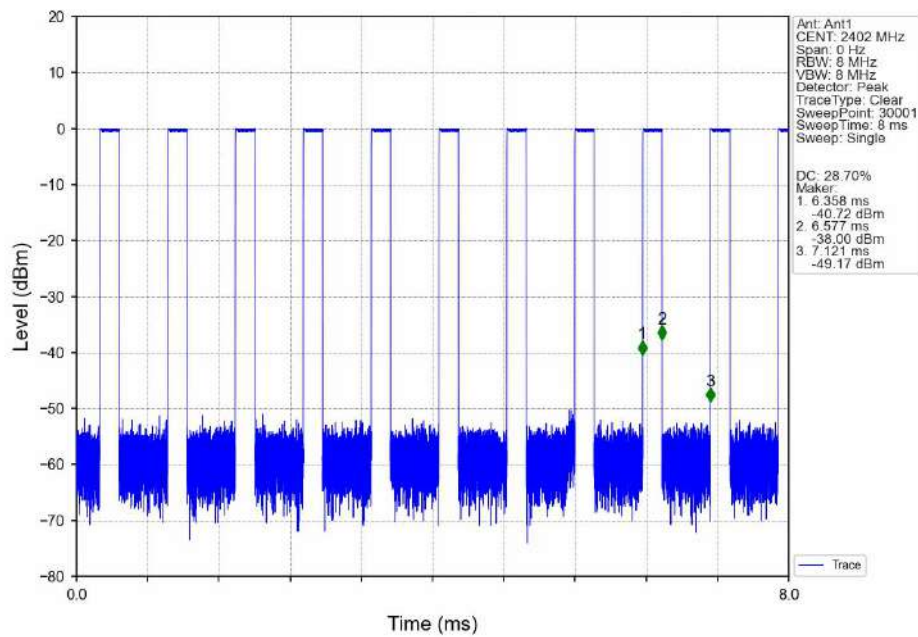
1.2.1 Ant1



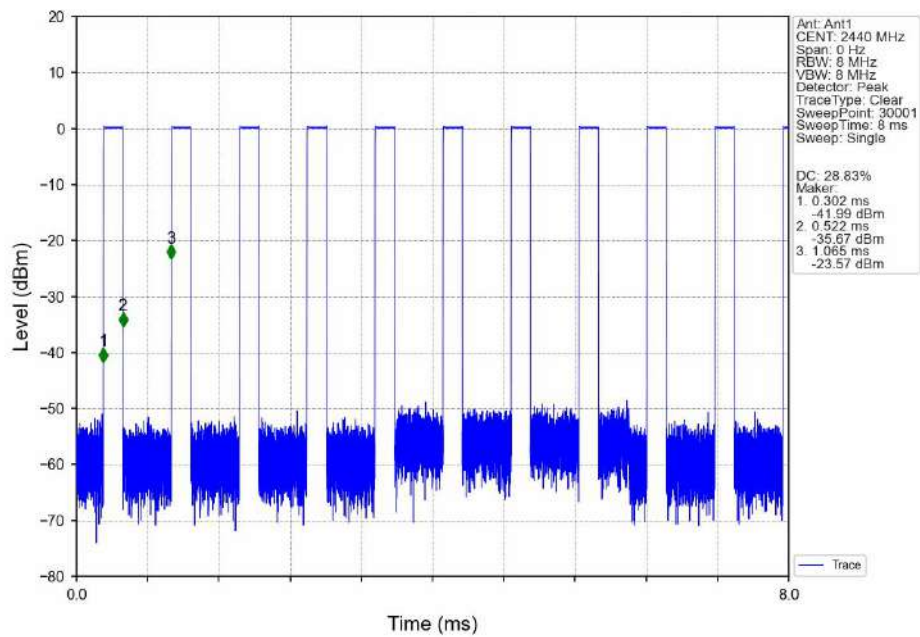
1M_HCH_2480MHz_Ant1_NTNV



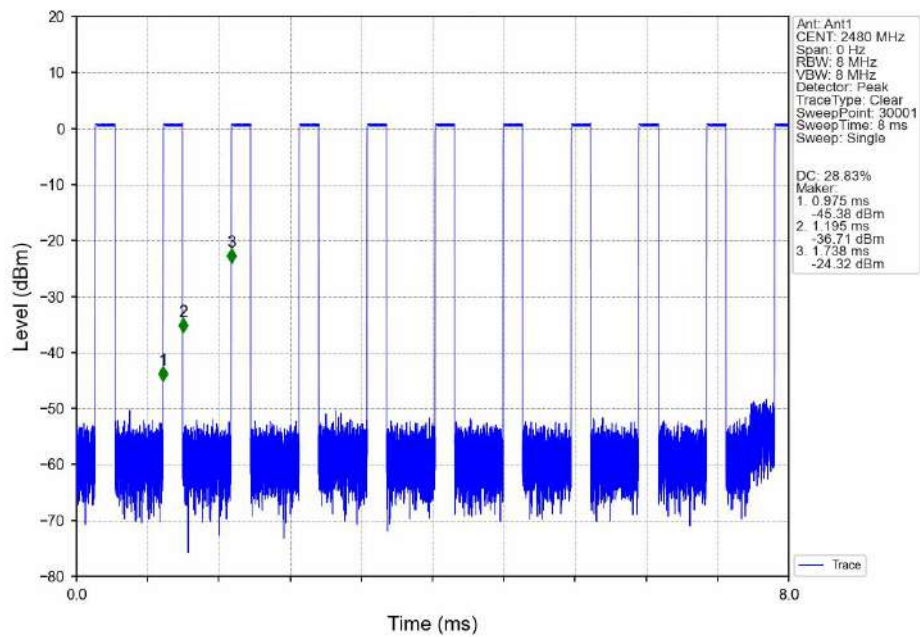
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

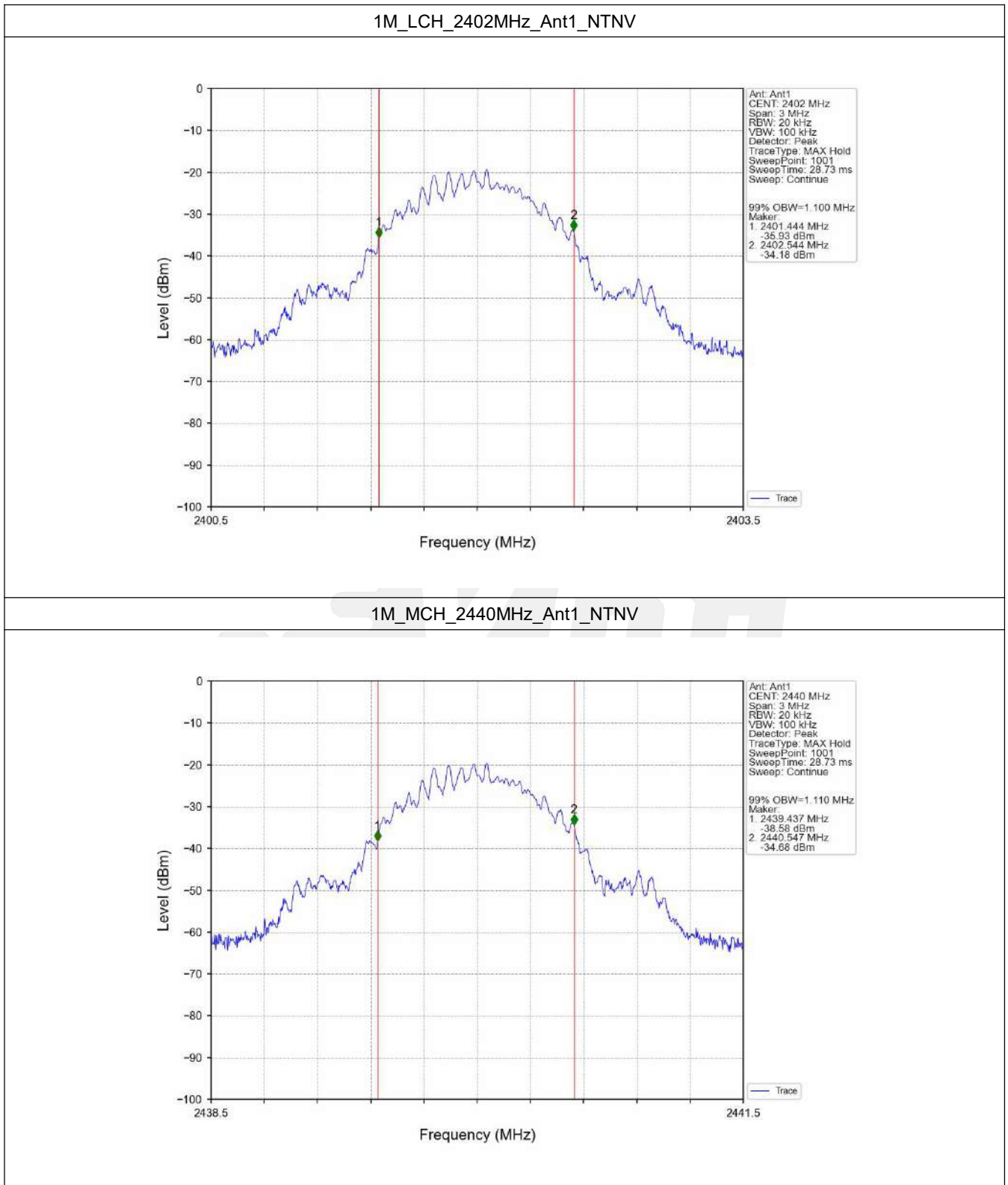
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.100	/	Pass
		2440	1	1.110	/	Pass
		2480	1	1.124	/	Pass
2M	SISO	2402	1	2.995	/	Pass
		2440	1	3.113	/	Pass
		2480	1	3.243	/	Pass

2.1.2 6dB BW

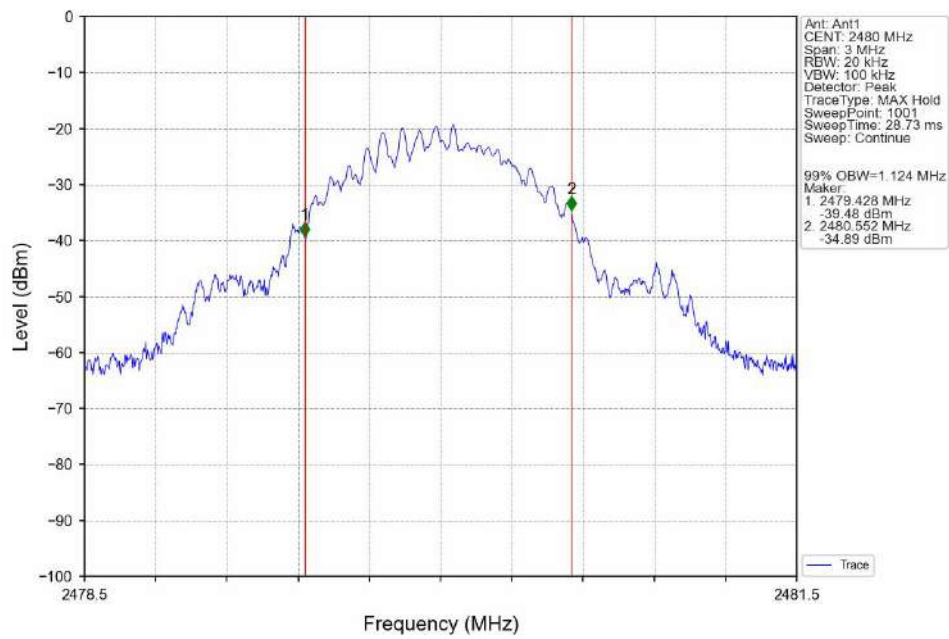
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.689	≥ 0.5	Pass
		2440	1	0.666	≥ 0.5	Pass
		2480	1	0.678	≥ 0.5	Pass
2M	SISO	2402	1	1.368	≥ 0.5	Pass
		2440	1	1.498	≥ 0.5	Pass
		2480	1	1.589	≥ 0.5	Pass

2.2 Test Graph

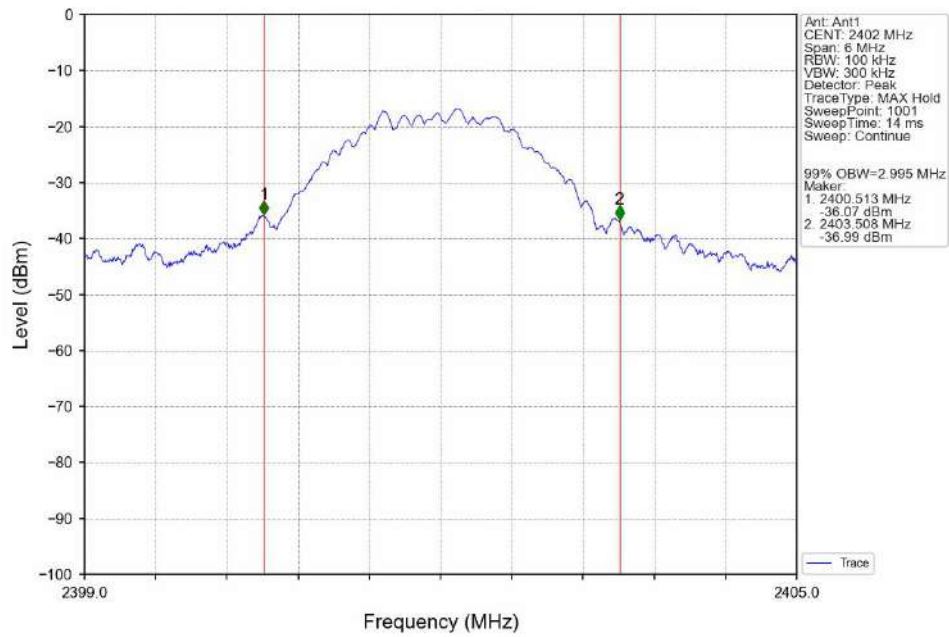
2.2.1 OBW



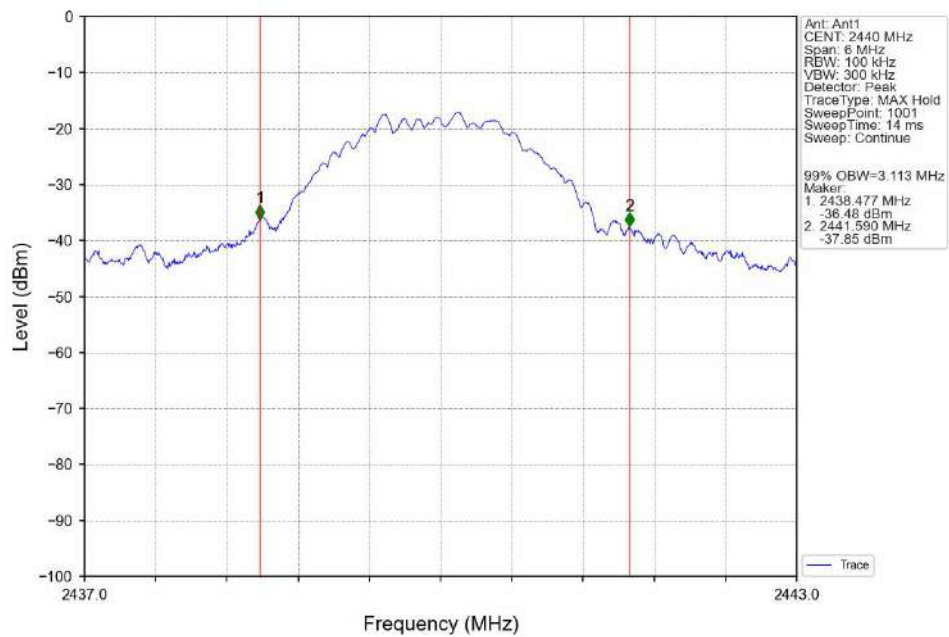
1M_HCH_2480MHz_Ant1_NTNV



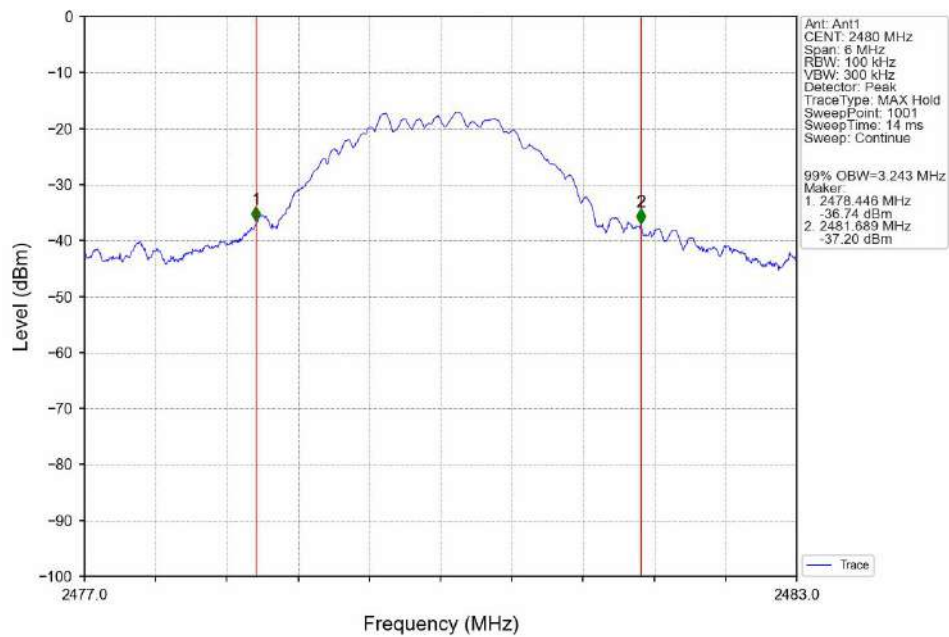
2M_LCH_2402MHz_Ant1_NTNV



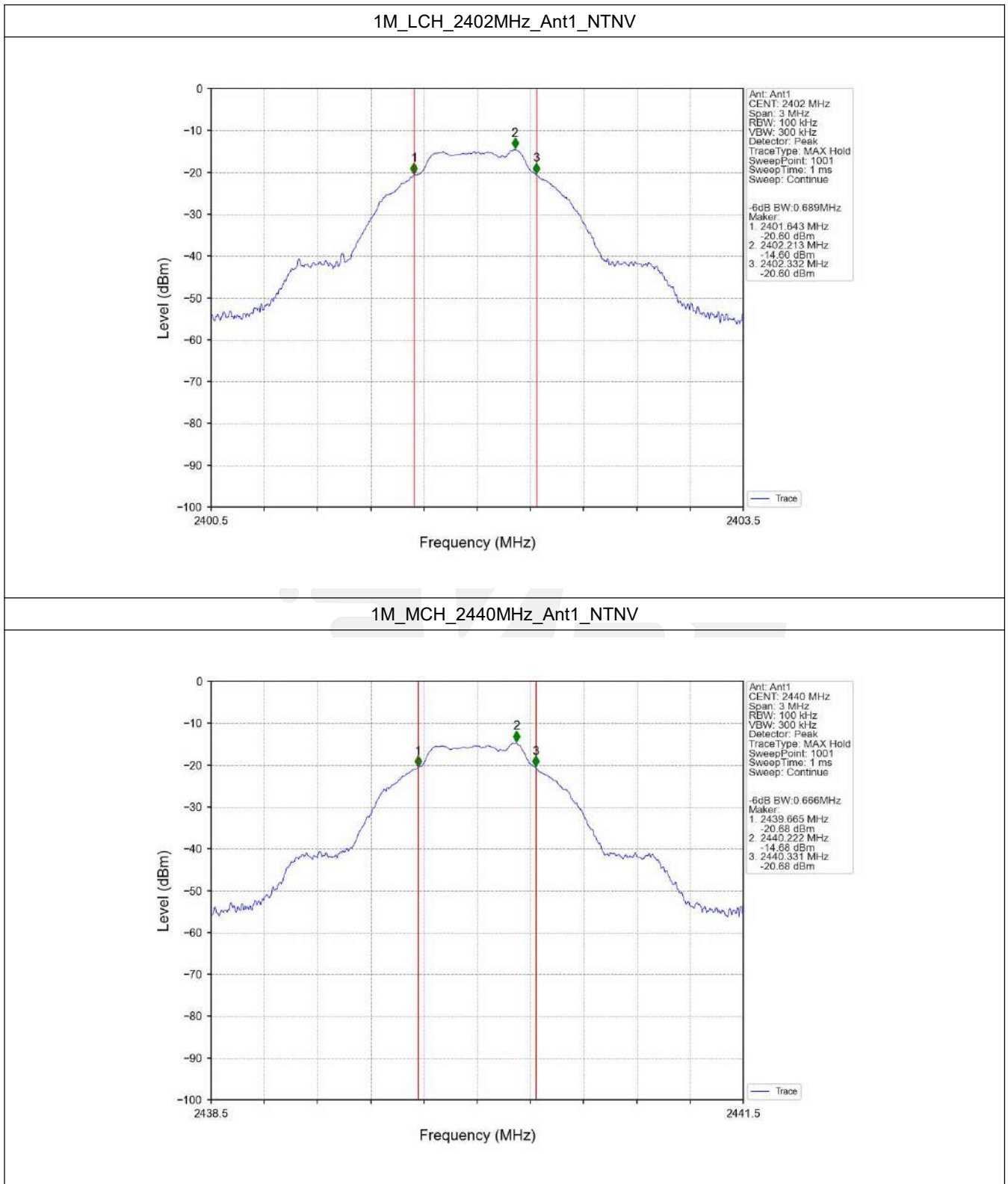
2M_MCH_2440MHz_Ant1_NTNV



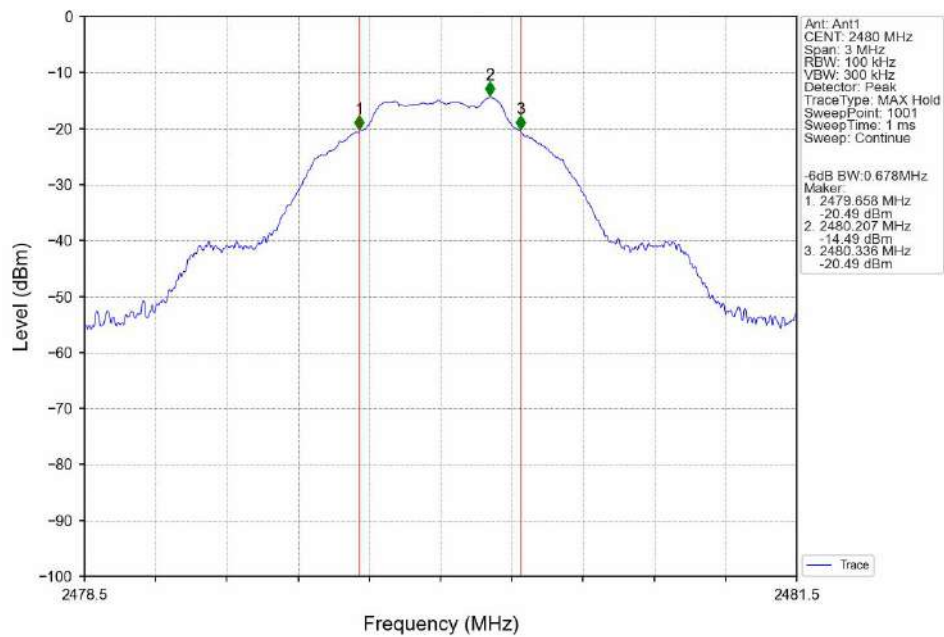
2M_HCH_2480MHz_Ant1_NTNV



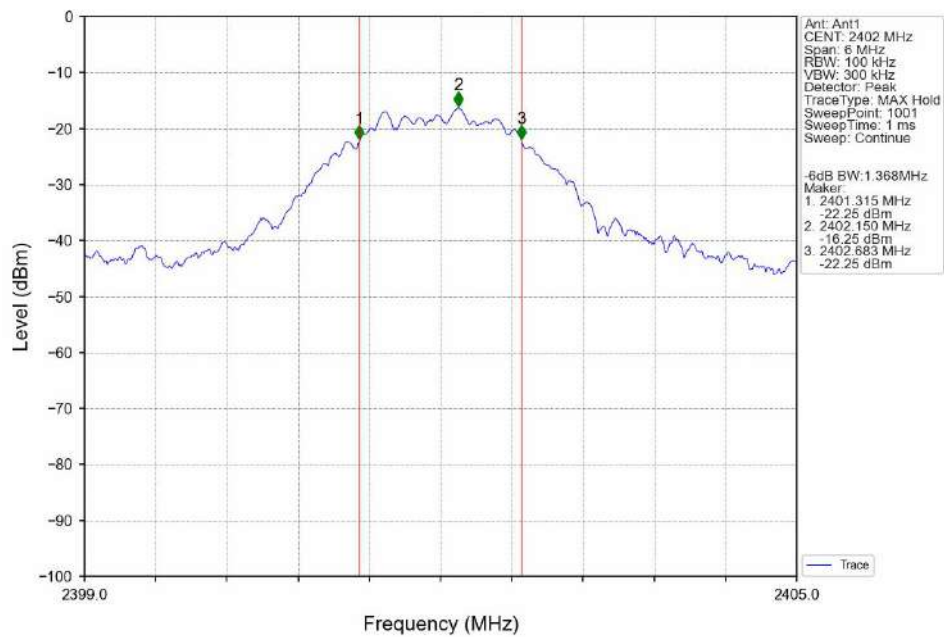
2.2.2 6dB BW



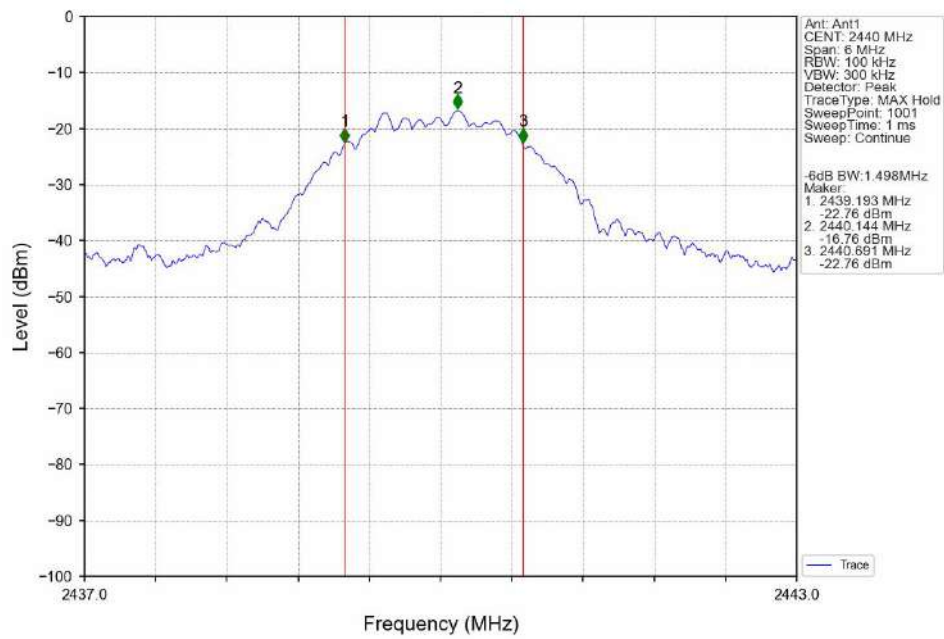
1M_HCH_2480MHz_Ant1_NTNV



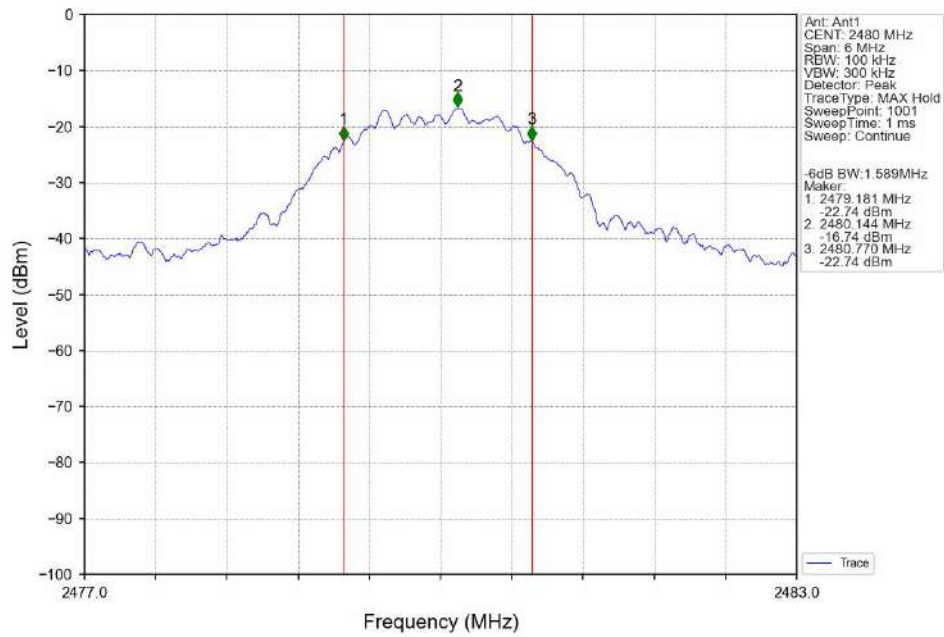
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

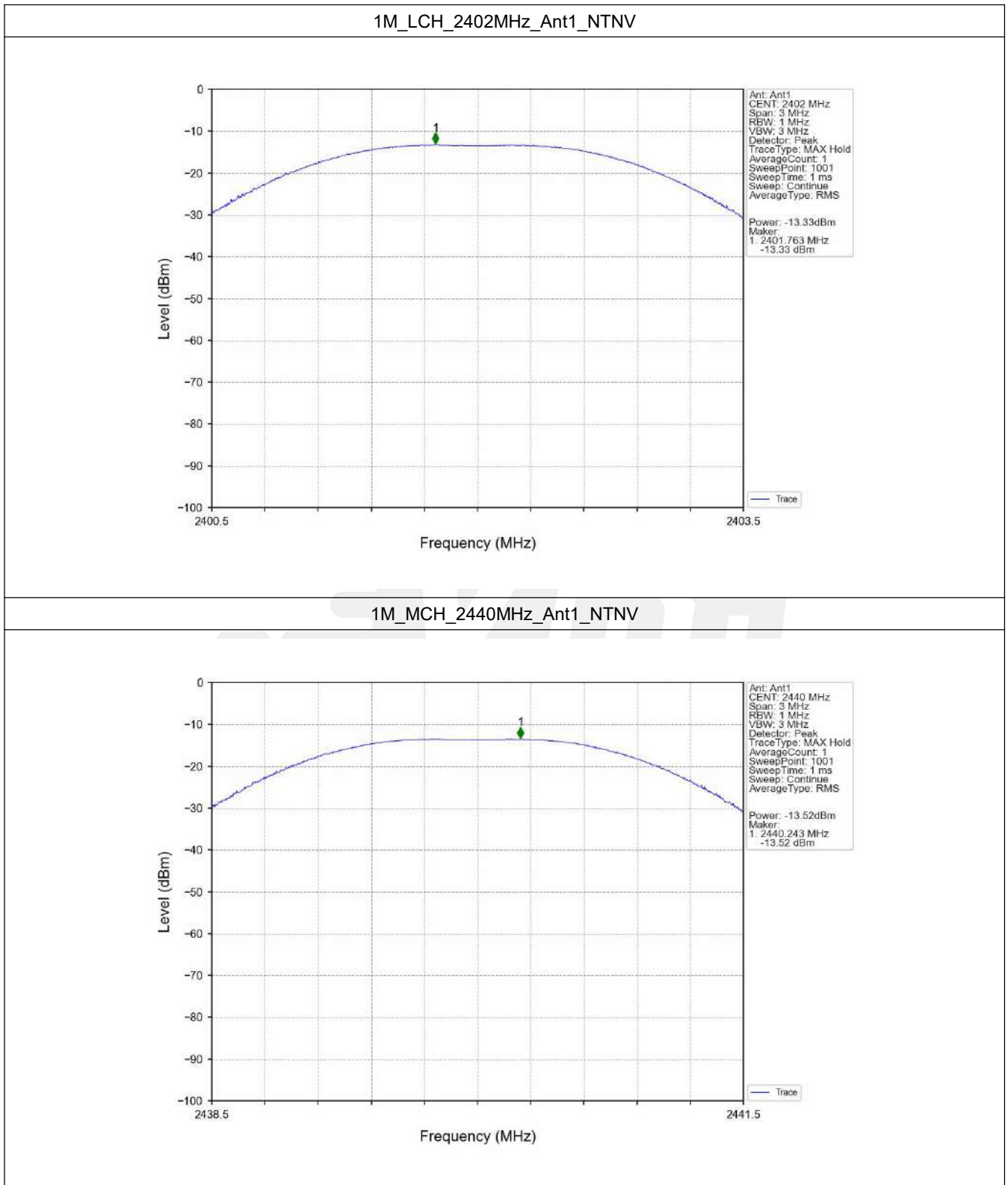
3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	-13.33	<=30	Pass
		2440	-13.52	<=30	Pass
		2480	-13.28	<=30	Pass
2M	SISO	2402	-13.40	<=30	Pass
		2440	-13.52	<=30	Pass
		2480	-13.15	<=30	Pass
Note1: Antenna Gain: Ant1: 1.70dBi;					

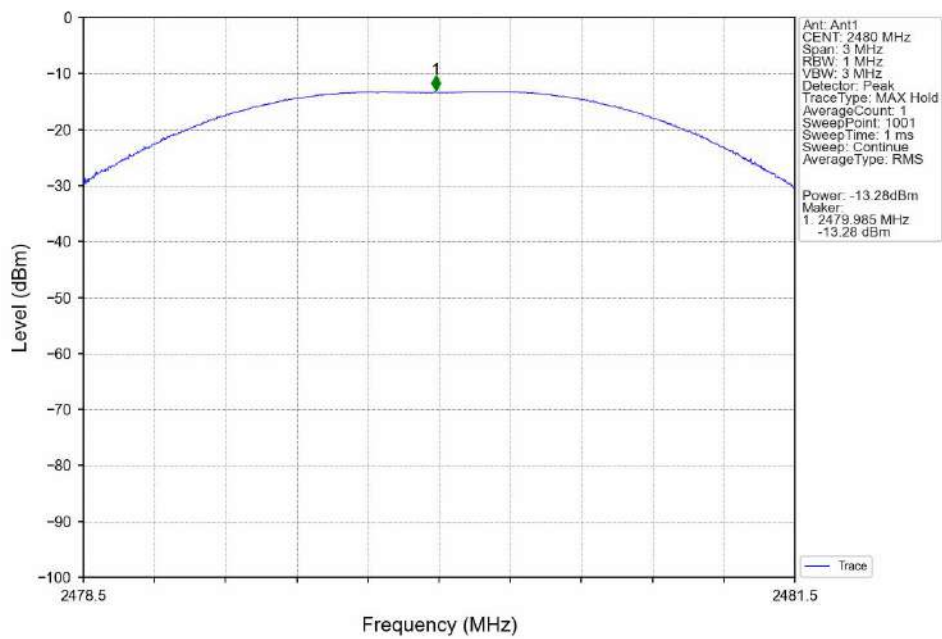


3.2 Test Graph

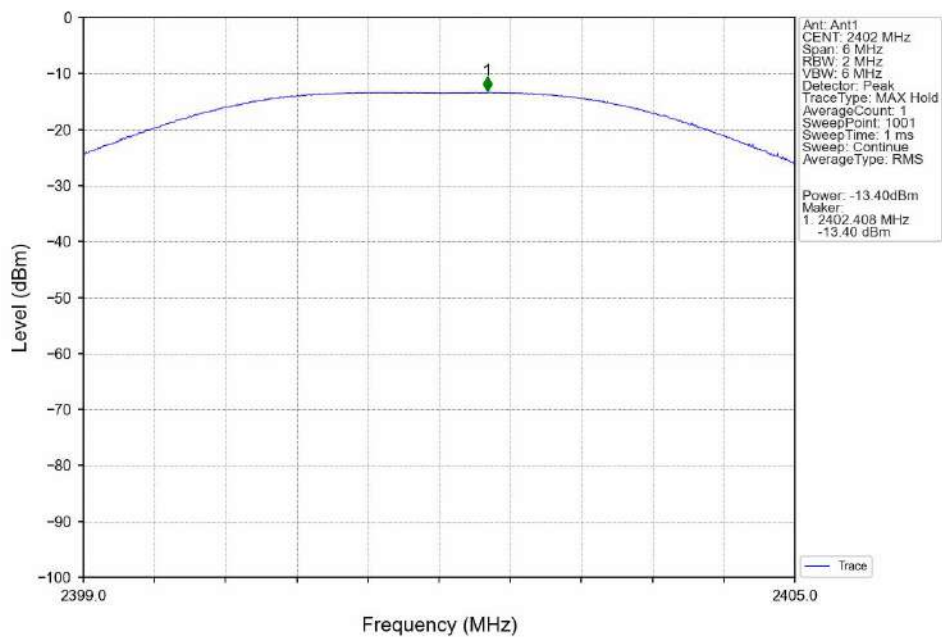
3.2.1 Power



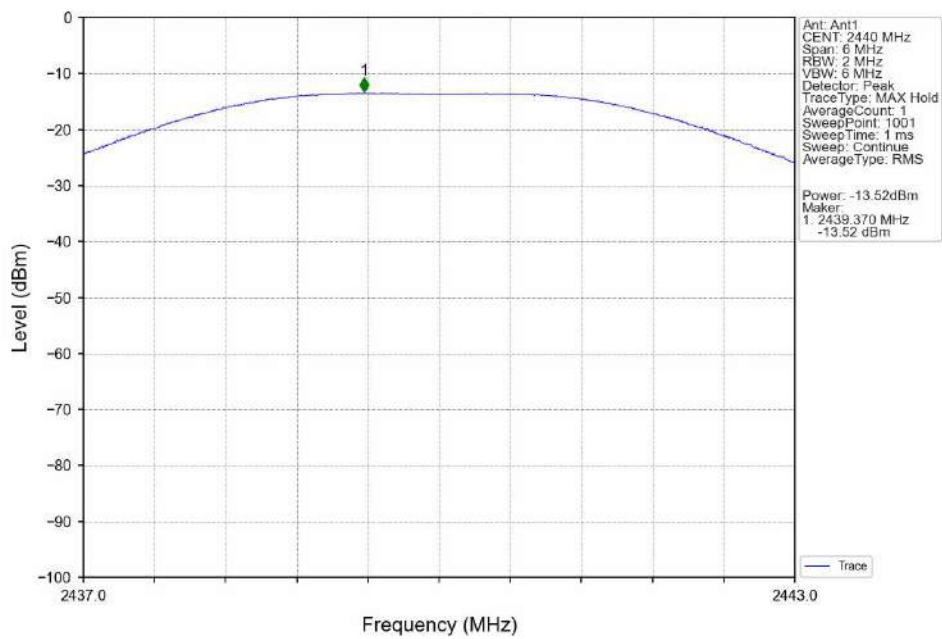
1M_HCH_2480MHz_Ant1_NTNV



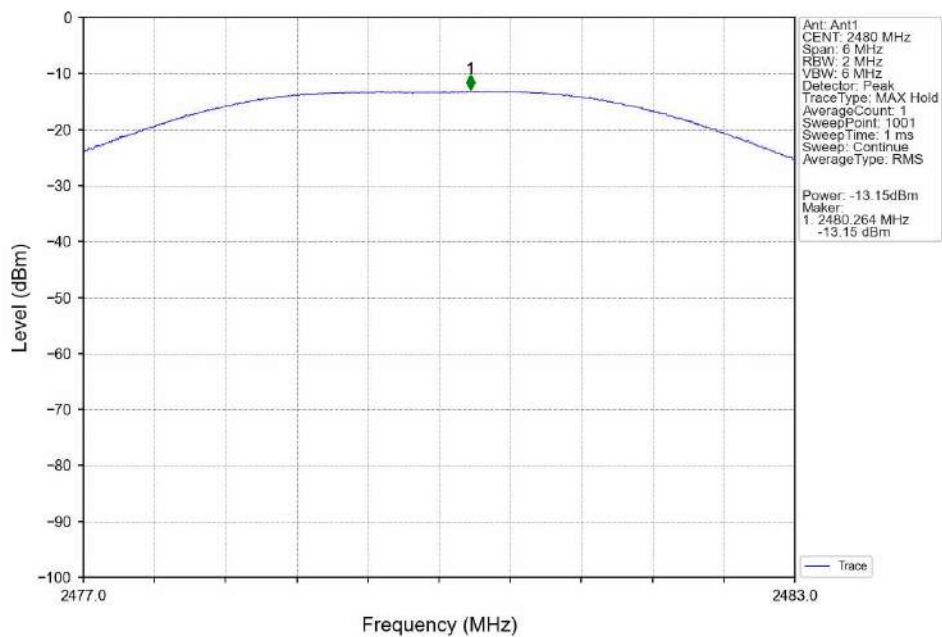
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



4. Maximum Power Spectral Density

4.1 Test Result

4.1.1 PSD

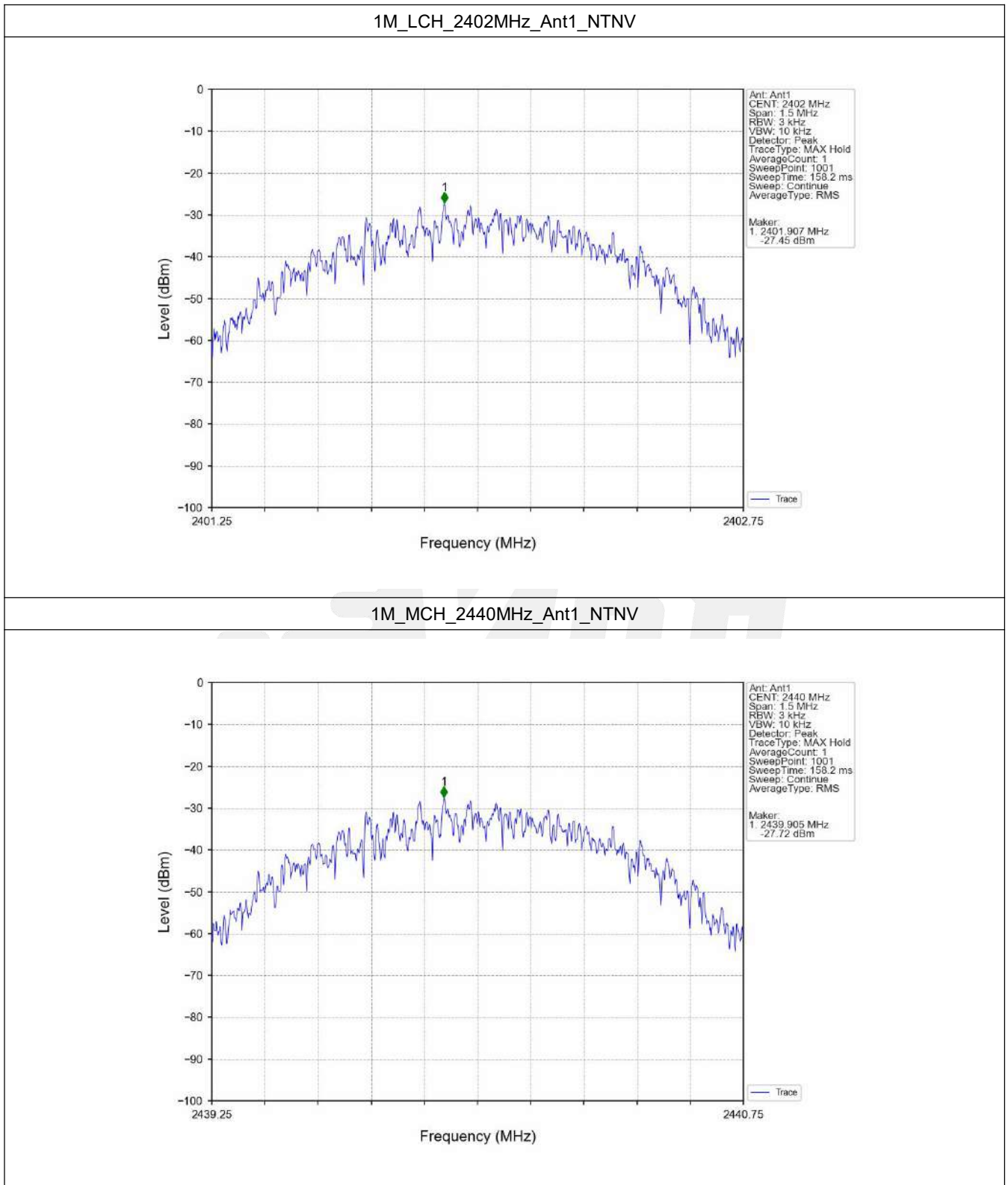
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	-27.45	≤ 8	Pass
		2440	-27.72	≤ 8	Pass
		2480	-27.40	≤ 8	Pass
2M	SISO	2402	-31.23	≤ 8	Pass
		2440	-31.44	≤ 8	Pass
		2480	-31.30	≤ 8	Pass

Note1: Antenna Gain: Ant1: 1.70dBi;

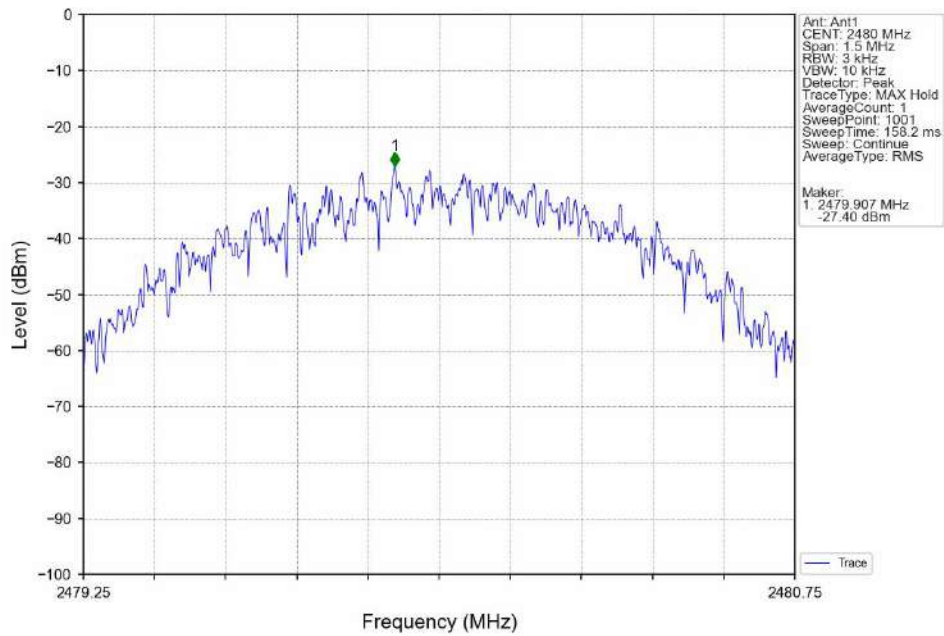


4.2 Test Graph

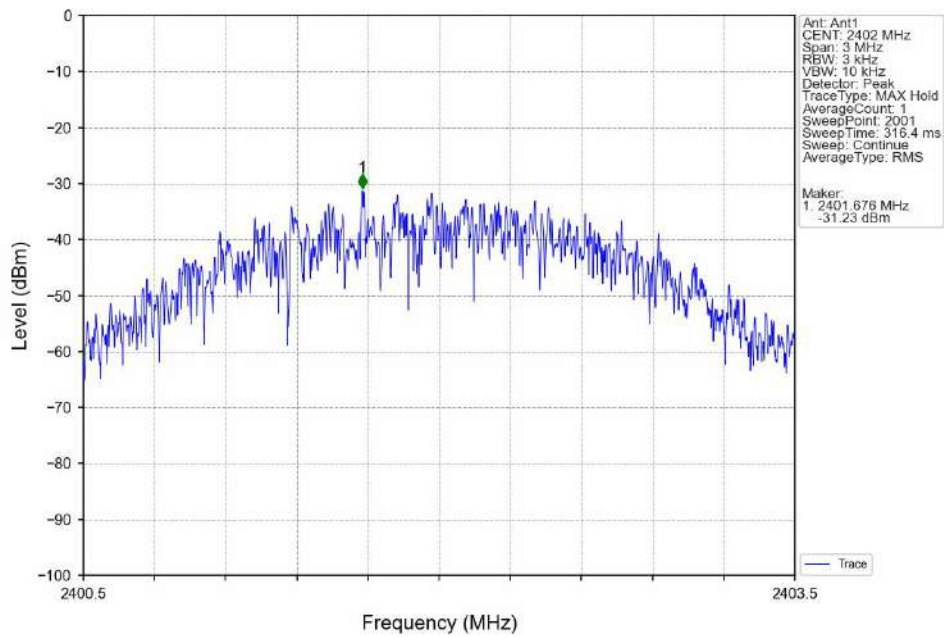
4.2.1 PSD



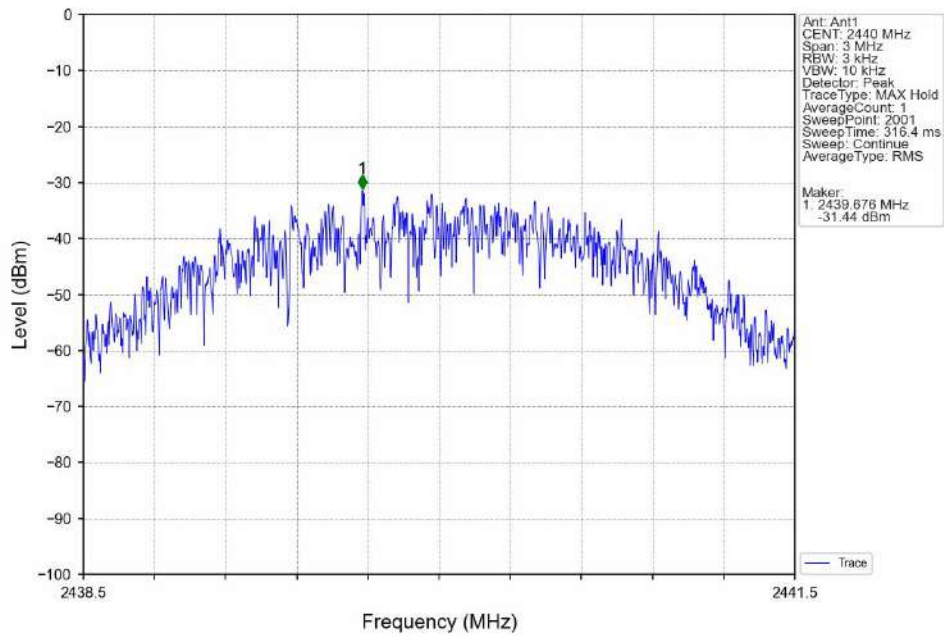
1M_HCH_2480MHz_Ant1_NTNV



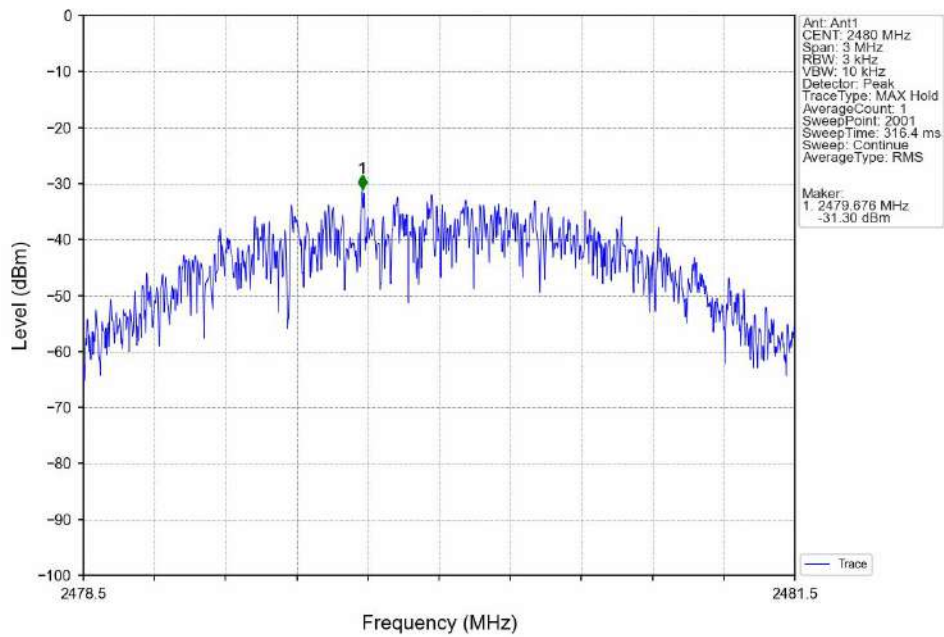
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

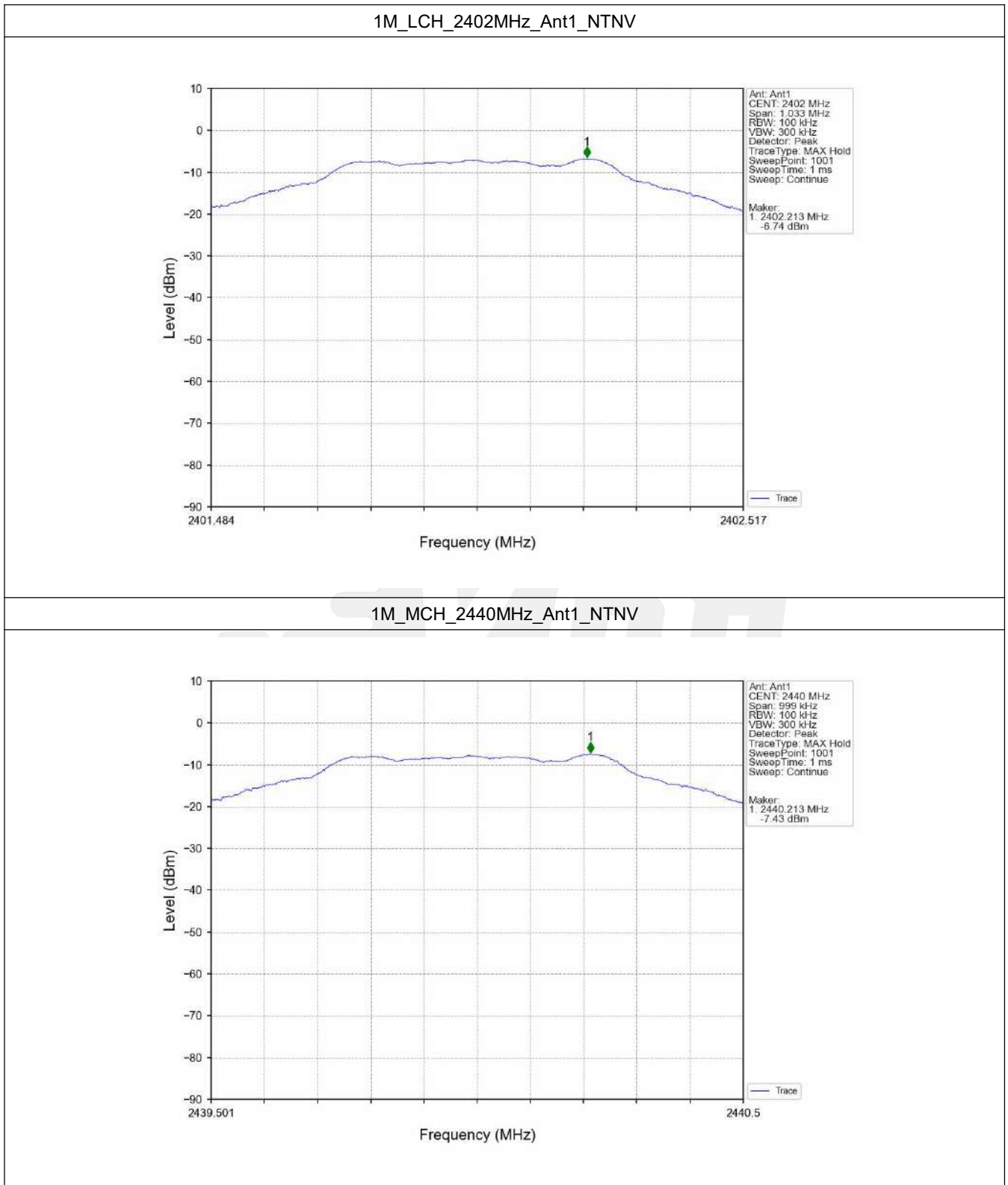
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	-6.74
		2440	1	-7.43
		2480	1	-7.37
2M	SISO	2402	1	-6.20
		2440	1	-7.56
		2480	1	-8.76

5.1.2 CSE

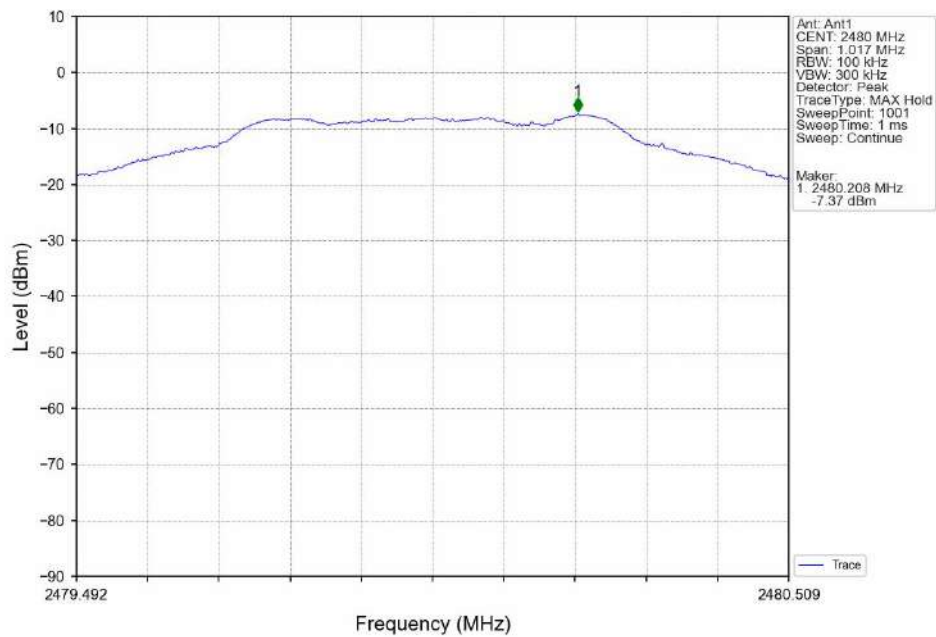
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-6.74	-26.74	Pass
		2440	1	-6.74	-26.74	Pass
		2480	1	-6.74	-26.74	Pass
2M	SISO	2402	1	-6.20	-26.20	Pass
		2440	1	-6.20	-26.20	Pass
		2480	1	-6.20	-26.20	Pass

5.2 Test Graph

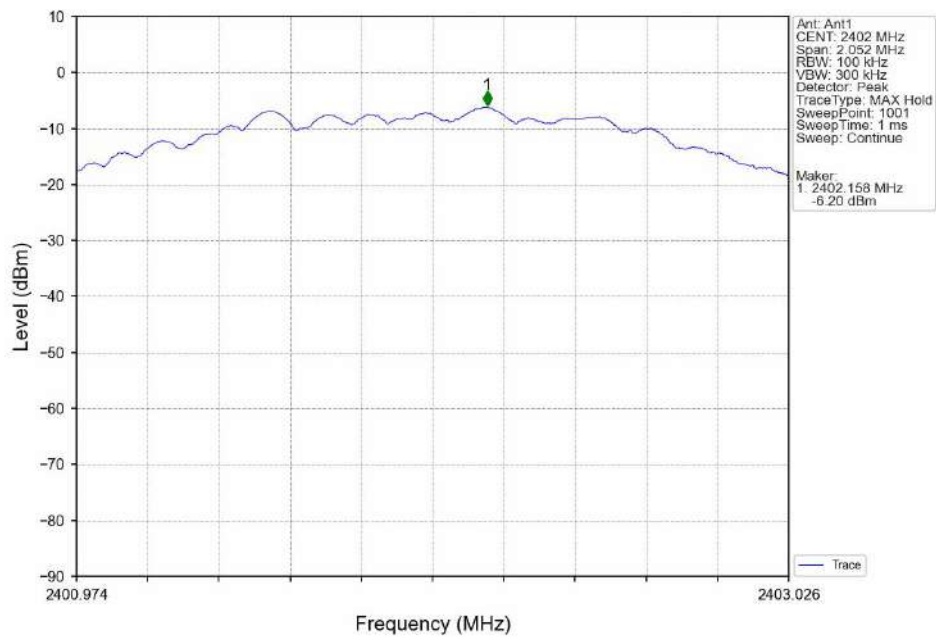
5.2.1 Ref



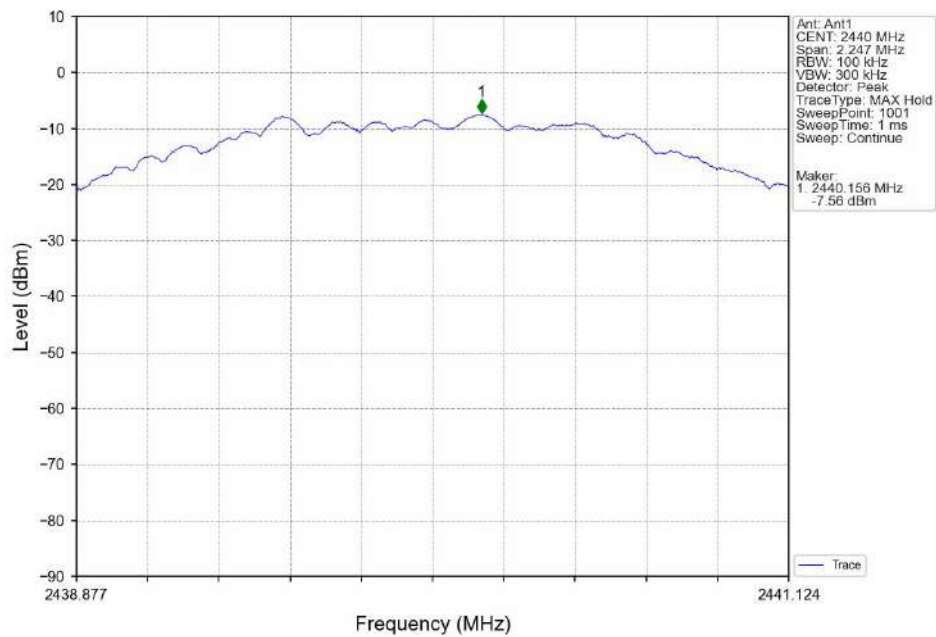
1M_HCH_2480MHz_Ant1_NTNV



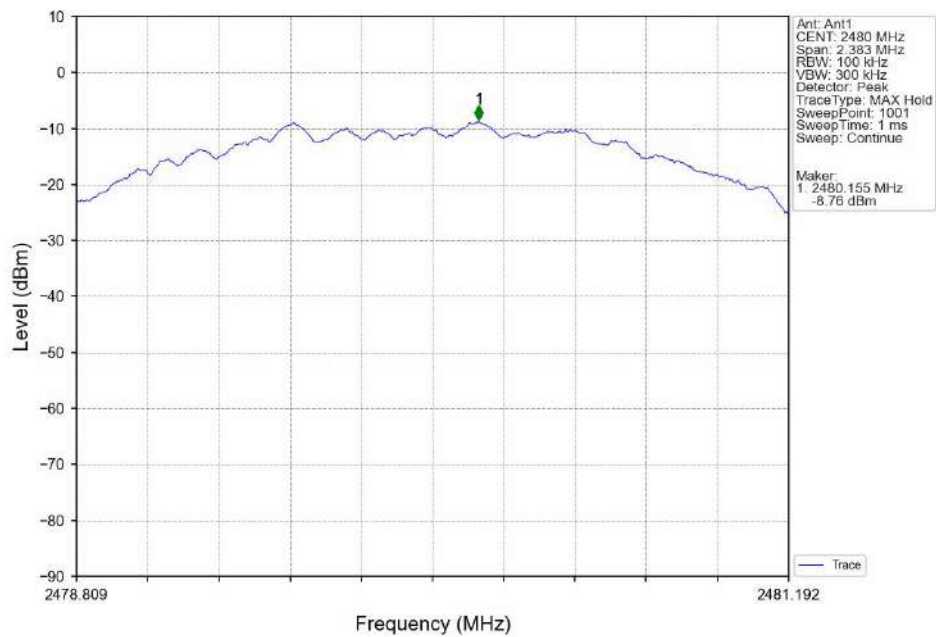
2M_LCH_2402MHz_Ant1_NTNV



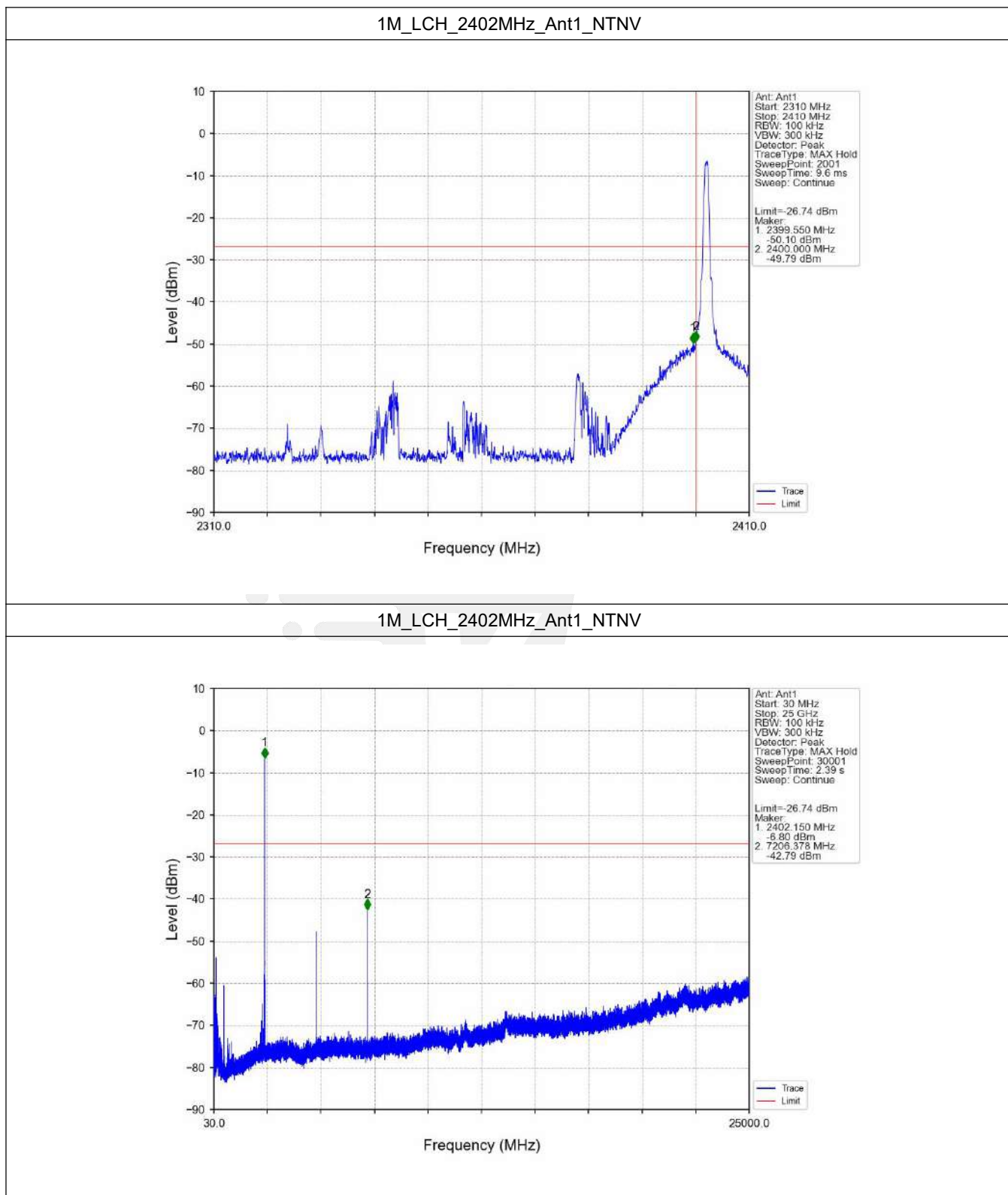
2M_MCH_2440MHz_Ant1_NTNV



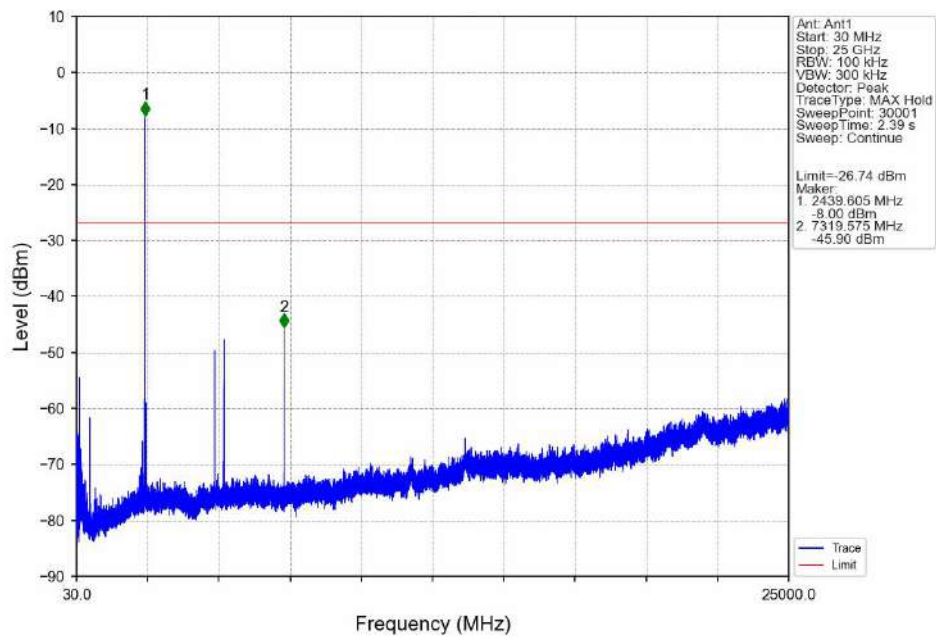
2M_HCH_2480MHz_Ant1_NTNV



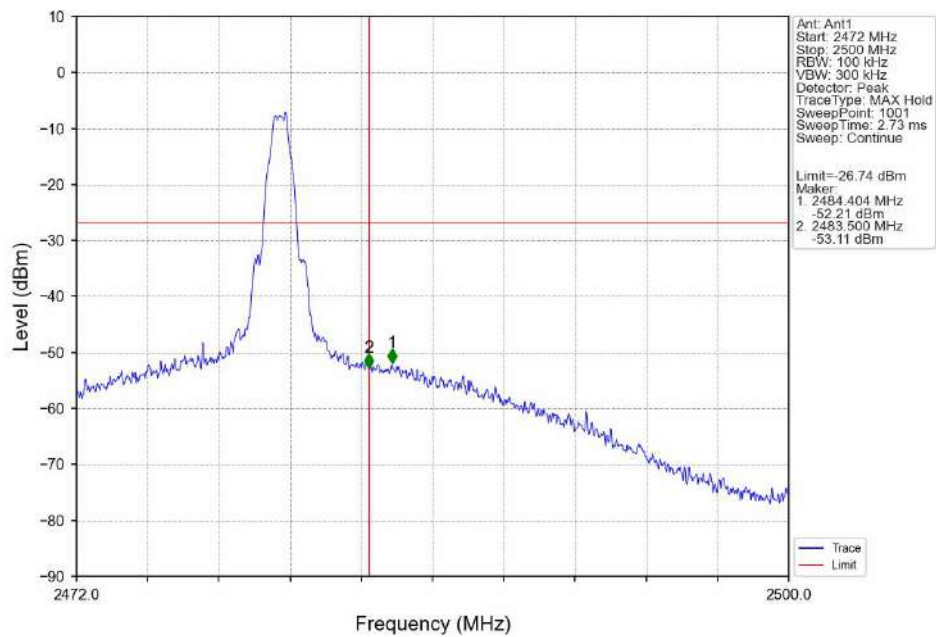
5.2.2 CSE



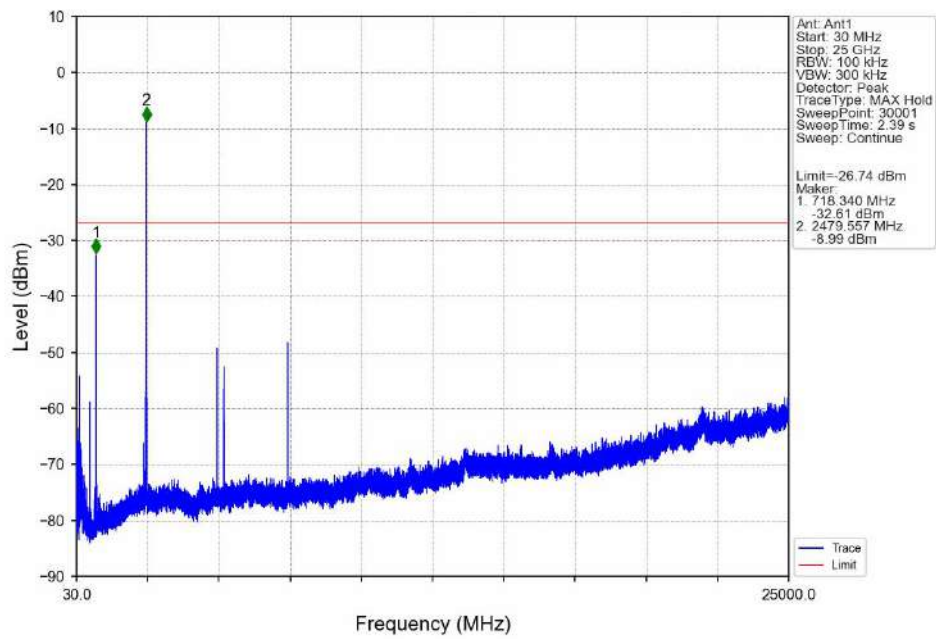
1M_MCH_2440MHz_Ant1_NTNV



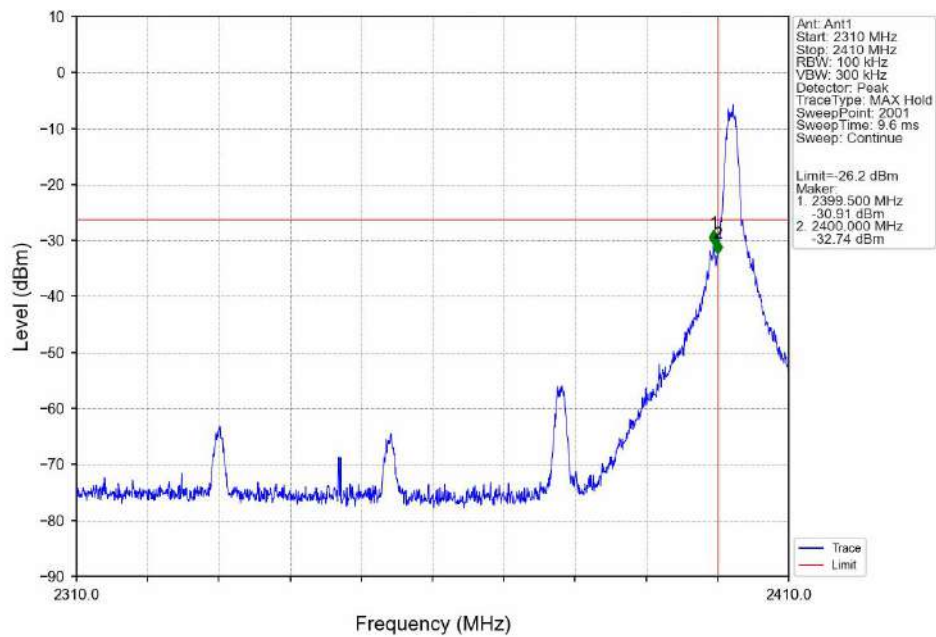
1M_HCH_2480MHz_Ant1_NTNV



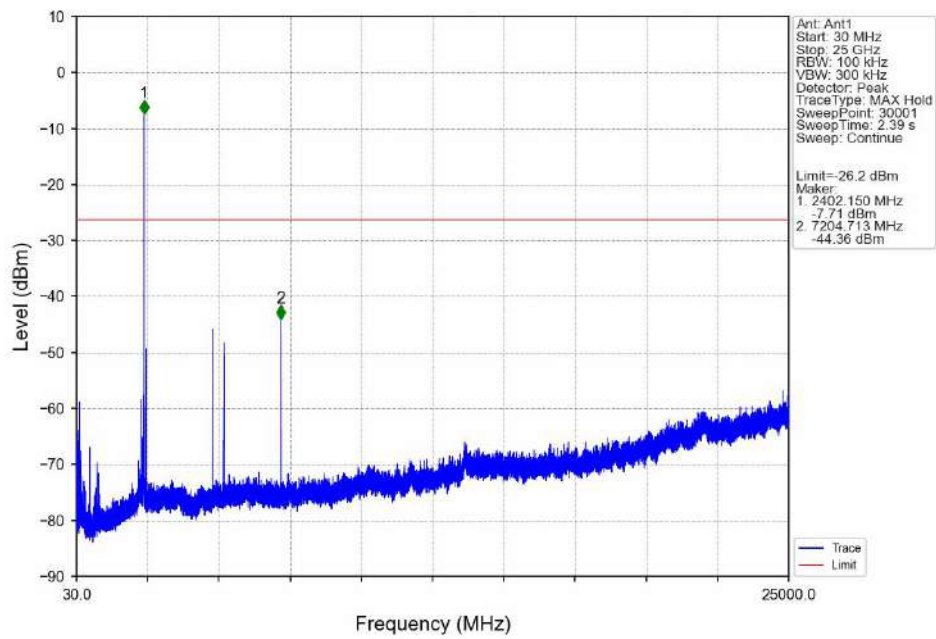
1M_HCH_2480MHz_Ant1_NTNV



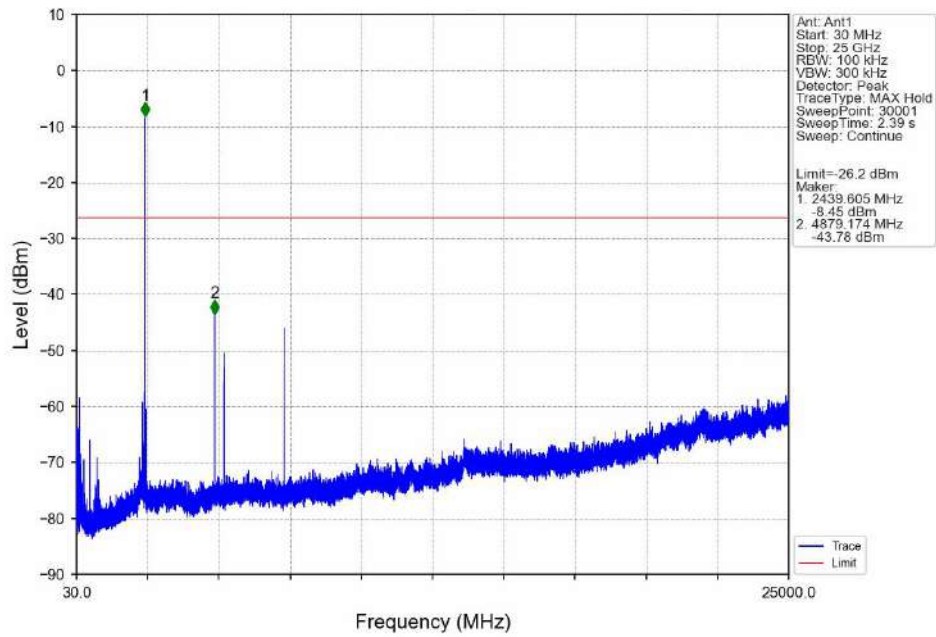
2M_LCH_2402MHz_Ant1_NTNV



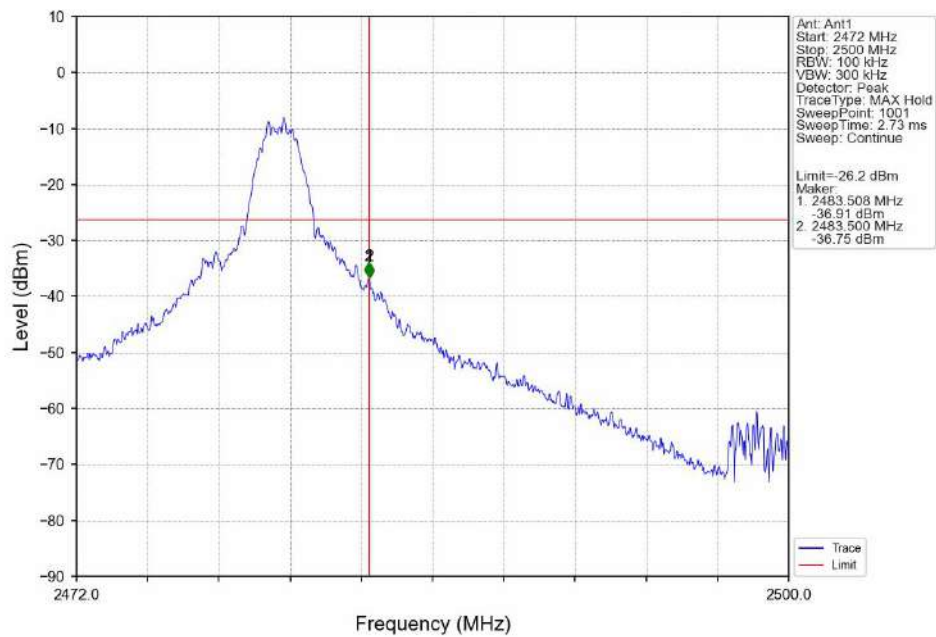
2M_LCH_2402MHz_Ant1_NTNV



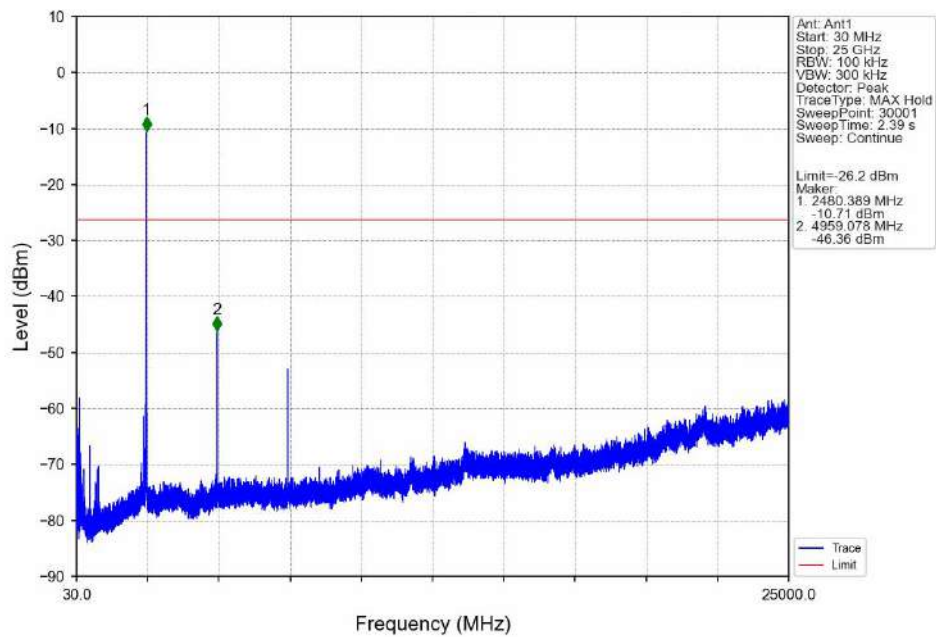
2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



6. Form731

6.1 Test Result

6.1.1 Form731

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.000048	-13.15

****End of the report****

