FCC Test Report

Report No.:	RWAP202400195A
Applicant:	Eski Inc.
Address:	103 Louvain O. Montreal QC H2N 1A3 Canada
Product Name:	NOVA Plus LUXX Plus
Product Model:	NOVA Plus LUXX Plus
Multiple Models:	N/A
Trade Mark:	PIXMOB
FCC ID:	2ADS4-LUXXPLUS
Standards:	FCC CFR Title 47 Part 15F (§15.517)
Test Date:	2024-02-27 to 2024-03-20
Test Result:	Complied
Report Date:	2024-03-25

Reviewed by: Frank Yin — 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

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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.

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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	*2024-03-25*	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	Eski Inc.
Address:	103 Louvain O. Montreal QC H2N 1A3 Canada
Manufacturer:	Pixmob
Address:	103 Louvain O. Montreal QC H2N 1A3 Canada

1.2 Product Description of EUT

The EUT is NOVA Plus LUXX that contains UWB radio, this report covers the full testing of the UWB radio.

Sample Serial Number	64-1 for CE test, 64-2 for RE test(assigned by WATC)
Sample Received Date	2024-02-21
Sample Status	Good Condition
Frequency Range	Channel 5: 6489.6MHz Channel 9: 7987.2MHz
Maximum Peak Output Power	Channel 5: -4.81dBm/50MHz Channel 9: -2.39dBm/50MHz
Modulation Technology	BPM+BPSK
Spatial Streams	SIMO (1TX, 3RX)
Antenna Gain#	Channel 5: 0.9dBi Channel 9: 2.7dBi (ANT0 TX)
Power Supply	DC 12V from adapter
Operating temperature#	0 deg.C to +45 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 UWB antenna is internal antenna which cannot replace by end-user, please see product internal photos for details.

1.4 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: *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.*

1.5 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.

1.6 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15F

KDB 393764 D01 UWB FAQ v02r01

ANSI C63.10-2020

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
5	6489.6	9	7987.2	/	/
According to ANSI C63.10-2020 chapter 5.6.1 Table 11 requirement, all channels listed above were tested.					

Test Mode:			
Transmitting mode:	Keep the EUT in continuous transmitting with modulation		
Exercise software#:	AiLink Local maintain Tool		
Channel	**Mode**	**SP config**	**Power Level Setting#**
5	BPRF(62.4M)	0	3C
		1	3C
		3	3C
	HPRF(124.8M)	0	3C
		1	3C
		3	3C
	HPRF(249.6M)	0	3C
		1	3C
9	BPRF(62.4M)	0	3C
		1	3C
		3	3C
	HPRF(124.8M)	0	3C
		1	3C
		3	3C
	HPRF(249.6M)	0	3C
		1	3C
The exercise software and the maximum power setting that provided by manufacturer.			

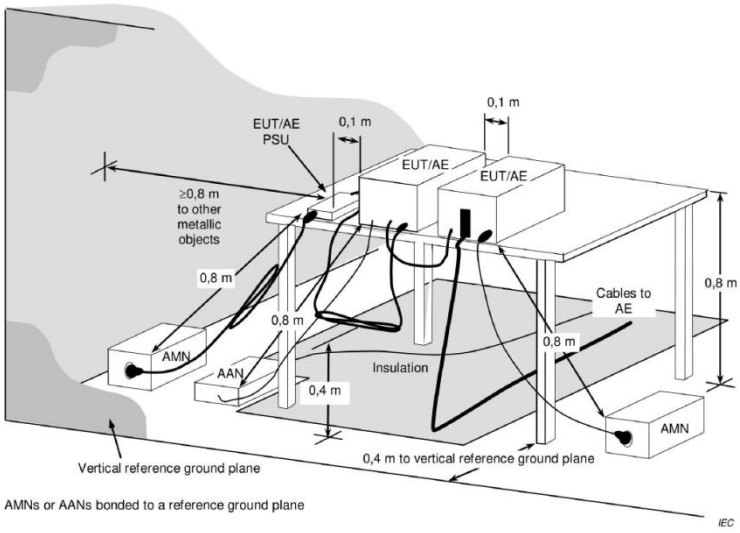
Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report For AC power line conducted emission and radiated emission 9kHz-960MHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario. For radiated emission 960MHz-18GHz, all modes of each channel have pretest, the worst case data of each channel were recorded in report.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
Unknown	Adapter	Unknown	Unknown

2.3 Test Setup

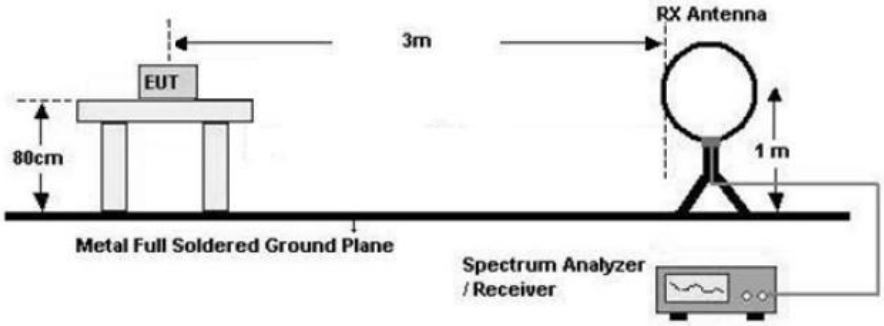
1) Conducted emission measurement:



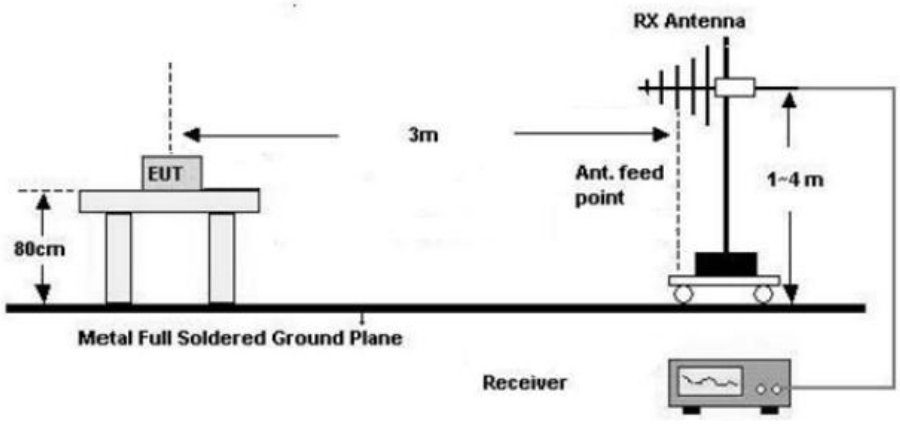
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

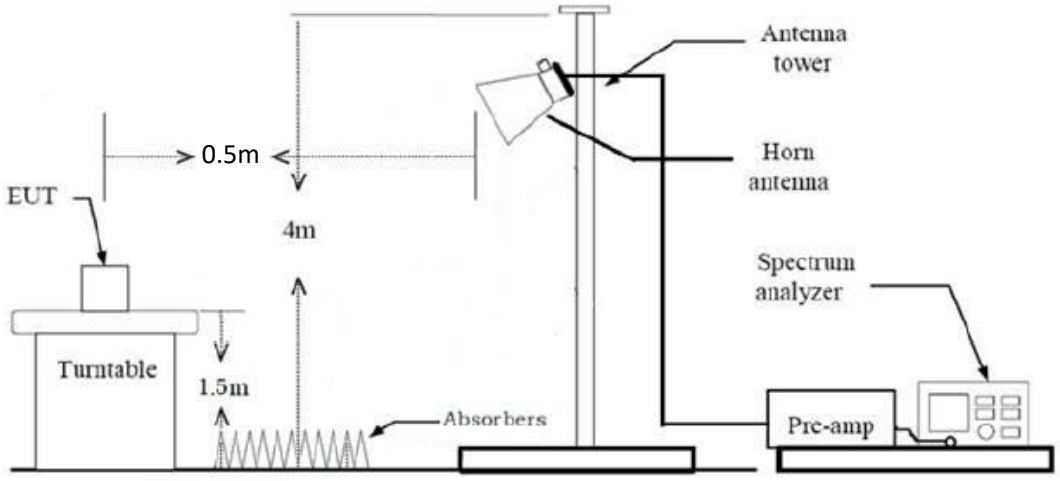
Below 30MHz (3m SAC)



30MHz-960MHz (3m SAC)



960MHz-40GHz(3m FAC)



2.4 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-960Hz:

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 960MHz:

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 0.5 m.
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 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.

UWB Bandwidth Test:

1. Use the same setup for radiated above 1GHz, found the maximum fundamental level.
2. Change the spectrum analyzer setting for bandwidth testing
3. Test the -10dBc bandwidth and record the result

Maximum Peak Power Test:

1. Use the same setup for radiated above 1GHz, found the maximum fundamental level.
2. Change the spectrum analyzer setting for Peak Power testing
3. Use the peak mark function found the highest emission on the range and convert it to 50MHz RBW result

2.5 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2020 Section 6.2
UWB Bandwidth	ANSI C63.10-2020 Section 10.1
Radiated emissions at or below 960 MHz	ANSI C63.10-2020 Section 10.2
Radiated emissions above 960 MHz	ANSI C63.10-2020 Section 10.3
Maximum Peak Power	ANSI C63.10-2020 Section 10.3.5&10.3.6

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE& SCHWARZ	EMI TEST RECEIVER	ESR	101817	2023/7/3	2024/7/2
R&S	LISN	ENV216	101748	2023/8/1	2024/7/31
N/A	Coaxial Cable	NO.12	N/A	2023/7/3	2024/7/2
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
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
ETS	Horn antenna	3115	2347	2023/9/6	2024/9/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2024/7/9
Ducommun technologies	Horn Antenna	ARH-2823-02	1007726-03	2023/7/10	2024/7/9
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	/	/

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
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.517 (a)	General Requirement	Compliance
§15.503 §15.517 (b)	UWB Bandwidth	Compliance
§ 15.209 §15.517 (c)	Radiated emissions at or below 960 MHz	Compliance
§15.517 (c)&(d)	Radiated emissions above 960 MHz	Compliance
§15.517 (e)	Maximum Peak Power	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>UWB Bandwidth</td><td>UWB(-10dB) Bandwidth⩾500MHz or fractional bandwidth⩾0.2
The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz</td></tr>
<tr><td>Radiated emissions at or below 960 MHz</td><td>Radiated emissions at or below 960 MHz shall not exceed the emission levels in § 15.209
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009–0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490–1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705–30.0</td><td>30</td><td>30</td></tr>
<tr><td>30–88</td><td>100 **</td><td>3</td></tr>
<tr><td>88–216</td><td>150 **</td><td>3</td></tr>
<tr><td>216–960</td><td>200 **</td><td>3</td></tr>
</table></td></tr>
<tr><td>Radiated emissions above 960 MHz</td><td>The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:
<table>
<tr><th>Frequency in MHz</th><th>EIRP in dBm</th></tr>
<tr><td>960–1610</td><td>−75.3</td></tr>
<tr><td>1610–1990</td><td>−53.3</td></tr>
<tr><td>1990–3100</td><td>−51.3</td></tr>
<tr><td>3100–10600</td><td>−41.3</td></tr>
<tr><td>Above 10600</td><td>−51.3</td></tr>
</table>
In addition to the radiated emission limits specified in the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:
<table>
<tr><th>Frequency in MHz</th><th>EIRP in dBm</th></tr>
<tr><td>1164–1240</td><td>−85.3</td></tr>
<tr><td>1559–1610</td><td>−85.3</td></tr>
</table></td></tr>
<tr><td>Maximum Peak Power</td><td>0 dBm/50 MHz EIRP</td></tr>
</table>

3.3 FCC § 15.517 (a) General Requirement

Test Date:	2024-03-20	Test By:	Luke Li
Environment condition:	Temperature: 22.8°C; Relative Humidity: 48%; ATM Pressure: 101.6kPa		

Operation under the provisions of this section is limited to UWB transmitters employed solely for indoor operation.

(1) Indoor UWB devices, by the nature of their design, must be capable of operation only indoors. The necessity to operate with a fixed indoor infrastructure, e.g., a transmitter that must be connected to the AC power lines, may be considered sufficient to demonstrate this.

Judgment: The applicant declared the EUT was only for indoor use, detail please refer to user manual.

(2) The emissions from equipment operated under this section shall not be intentionally directed outside of the building in which the equipment is located, such as through a window or a doorway, to perform an outside function, such as the detection of persons about to enter a building.

Judgment: The applicant declared the EUT was only for indoor use, detail please refer to user manual.

(3) The use of outdoor mounted antennas, e.g., antennas mounted on the outside of a building or on a telephone pole, or any other outdoors infrastructure is prohibited.

Judgment: The EUT with an internal antenna, it will never use the outdoor mounted antennas, please refer to the EUT photo

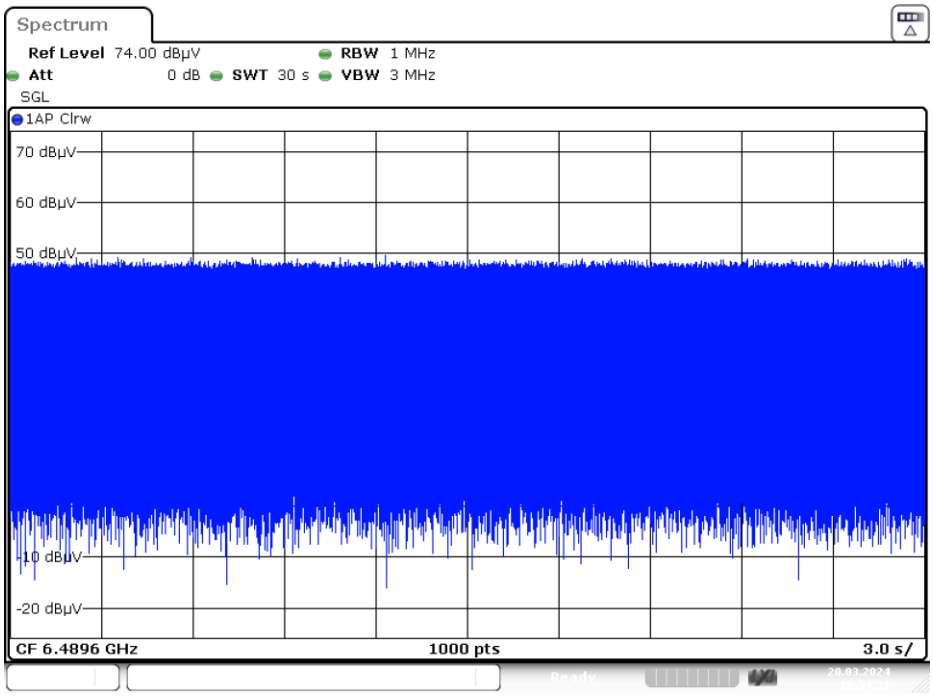
(4) Field disturbance sensors installed inside of metal or underground storage tanks are considered to operate indoors provided the emissions are directed towards the ground.

Judgment: The EUT is not a Field disturbance sensors.

(5) A communications system shall transmit only when the intentional radiator is sending information to an associated receiver.

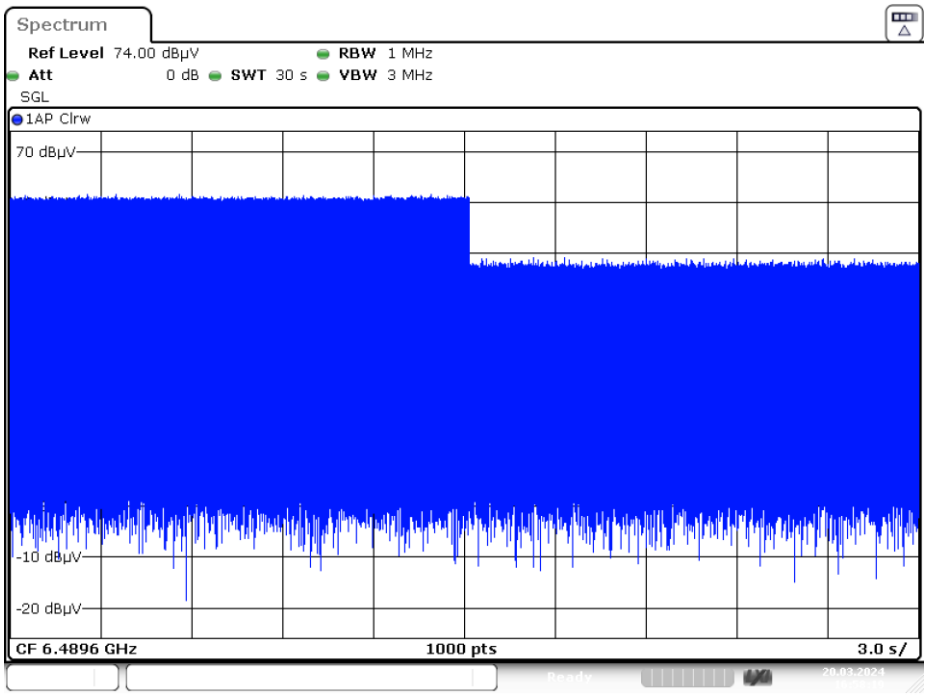
Result: the EUT only transmit when connect to companion device, when turn the companion device off, the EUT will stop transmit, please refer below plot

When the EUT on and the companion device off



On plot indicate there no transmit

When the EUT connect to the companion device, after a time, turn the companion device off



On plot indicate there has transmit initially, after the companion device off, transmit stop

3.4 UWB Bandwidth Test Data

Test Date:	2024-03-14~2024-03-20	Test By:	Luke Li
Environment condition:	Temperature: 22.5~23.2°C; Relative Humidity: 48~68%; ATM Pressure: 101.0~101.8kPa		

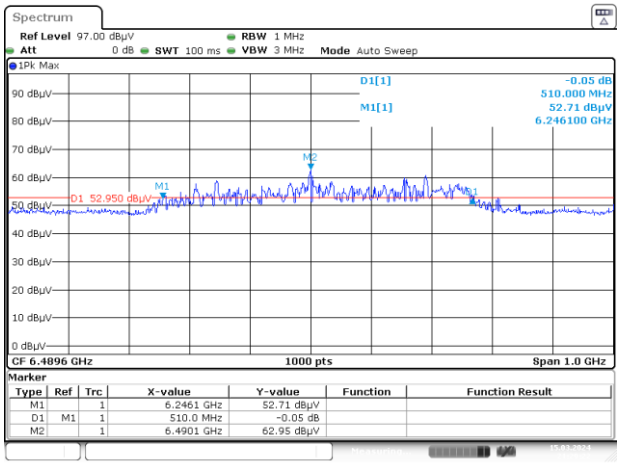
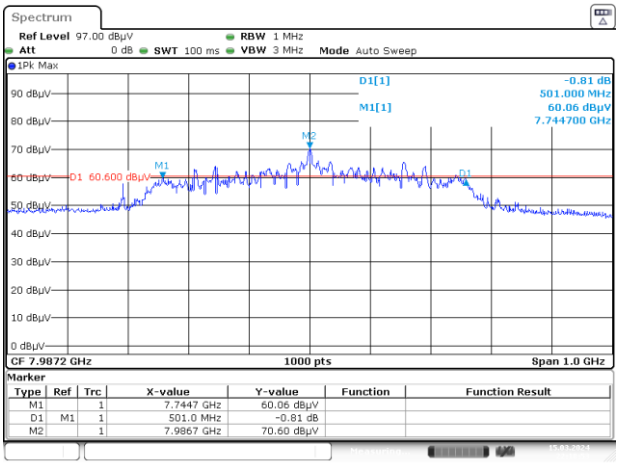
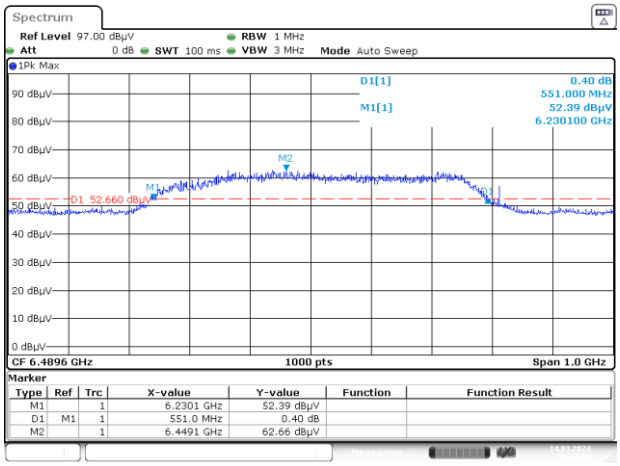
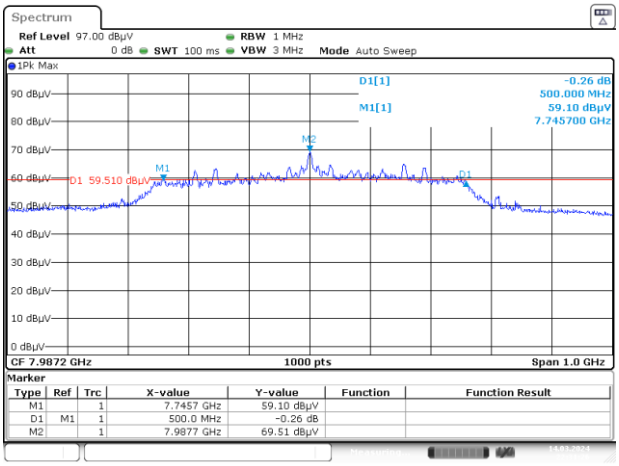
Channel	Mode	SP config	f_M [MHz]	f_L [MHz]	f_L Limit [MHz]	f_H [MHz]	f_H Limit [MHz]	f_C [MHz]	-10dB BW [MHz]	-10dB BW Limit [MHz]	Verdict
5	BPRF (62.4M)	0	6490.1	6246.1	＞3100	6756.1	＜10600	6501.1	510	≥500	pass
		1	6449.1	6230.1	＞3100	6781.1	＜10600	6505.6	551	≥500	pass
		3	6429.1	6230.1	＞3100	6780.1	＜10600	6505.1	550	≥500	pass
	HPRF (124.8M)	0	6374.1	6251.1	＞3100	6763.1	＜10600	6507.1	512	≥500	pass
		1	6427.1	6242.1	＞3100	6778.1	＜10600	6510.1	536	≥500	pass
		3	6427.1	6241.1	＞3100	6779.1	＜10600	6510.1	538	≥500	pass
	HPRF (249.6M)	0	6357.1	6246.1	＞3100	6771.1	＜10600	6508.6	525	≥500	pass
		1	6427.1	6238.1	＞3100	6787.1	＜10600	6512.6	549	≥500	pass
9	BPRF (62.4M)	0	7986.7	7744.7	＞3100	8245.7	＜10600	7995.2	501	≥500	pass
		1	7987.7	7745.7	＞3100	8245.7	＜10600	7995.7	500	≥500	pass
		3	8050.7	7701.7	＞3100	8266.7	＜10600	7984.2	565	≥500	pass
	HPRF (124.8M)	0	8077.7	7707.7	＞3100	8265.7	＜10600	7986.7	558	≥500	pass
		1	8044.7	7706.7	＞3100	8266.7	＜10600	7986.7	560	≥500	pass
		3	8049.7	7703.7	＞3100	8266.7	＜10600	7985.2	563	≥500	pass
	HPRF (249.6M)	0	8087.7	7724.7	＞3100	8252.7	＜10600	7988.7	528	≥500	pass
		1	8049.7	7715.7	＞3100	8265.7	＜10600	7990.7	550	≥500	pass

Note:

-10dB BW = $f_H - f_L$

$f_C = (f_H - f_L)/2$

Test Plot:

CH5-BPRF(62.4M)-SP0	CH9-BPRF(62.4M)-SP0
	
CH5-BPRF(62.4M)-SP1	CH9-BPRF(62.4M)-SP1
	
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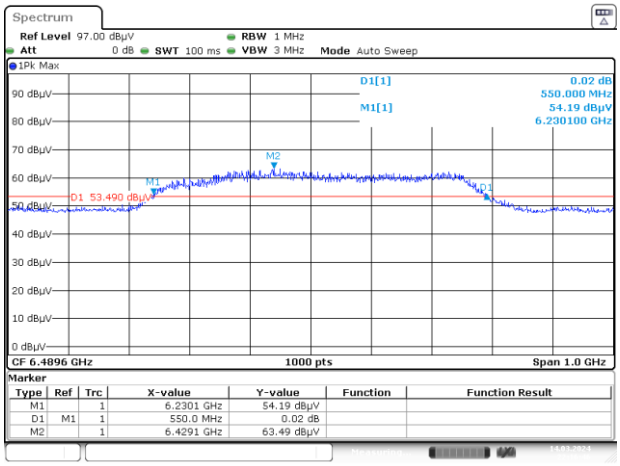
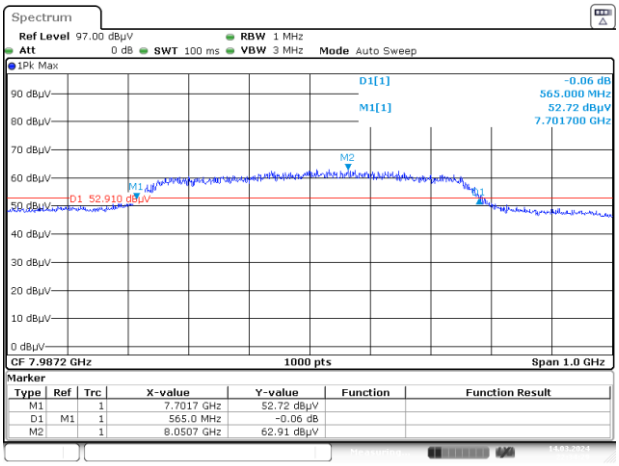
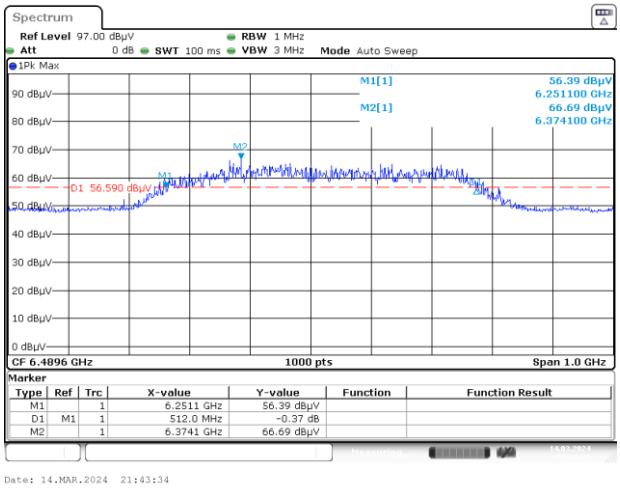
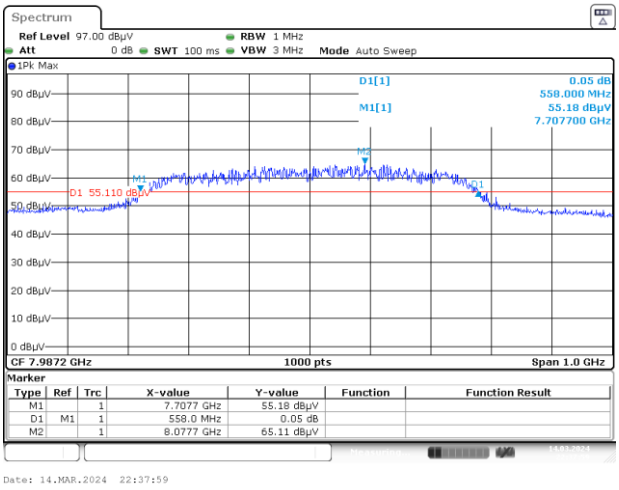
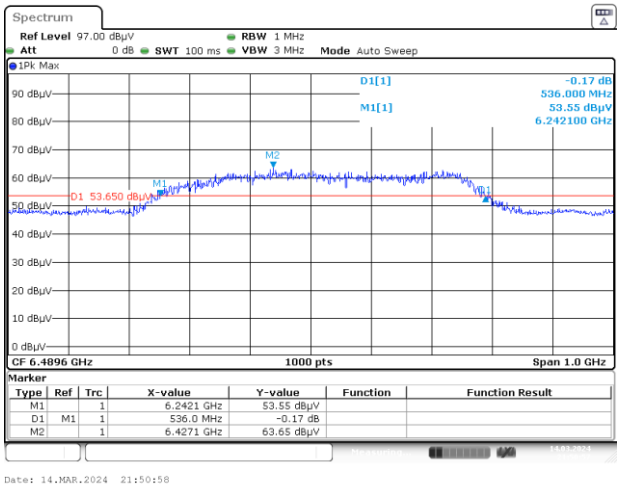
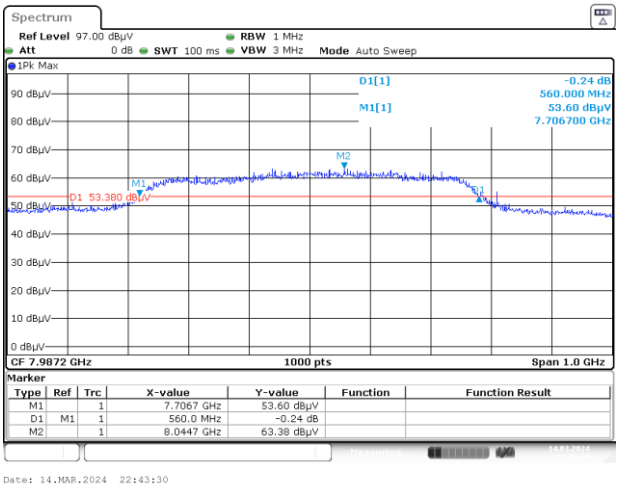
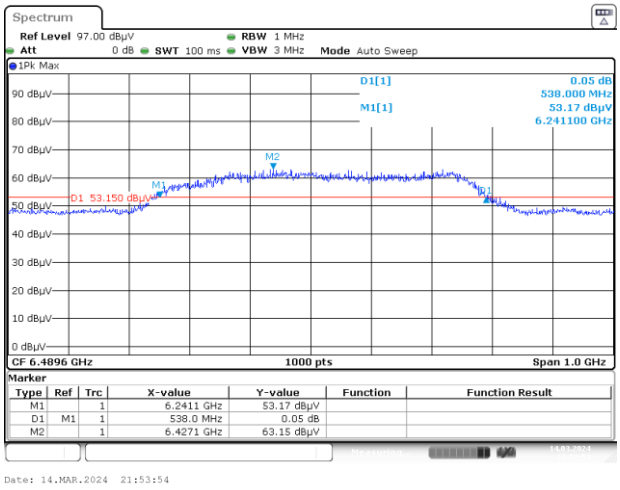
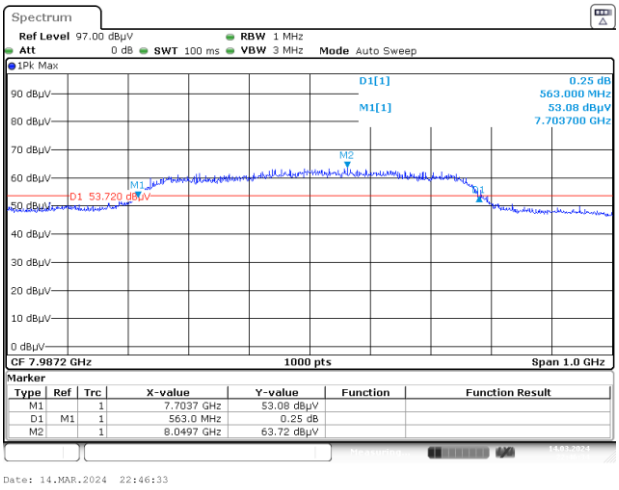
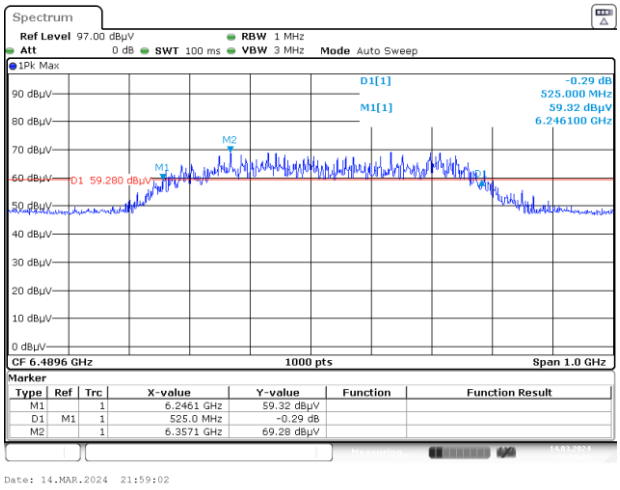
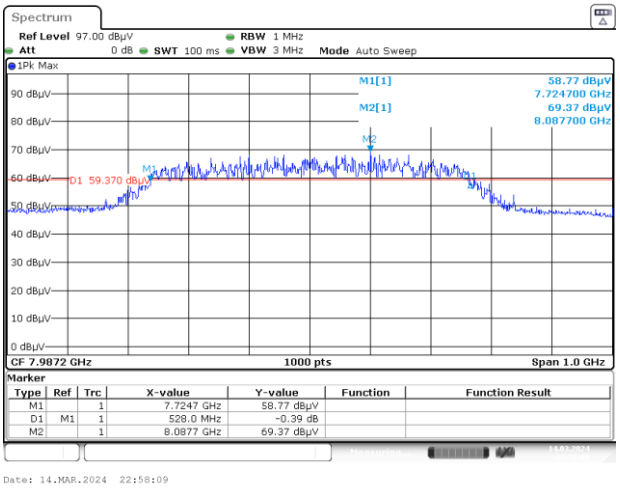
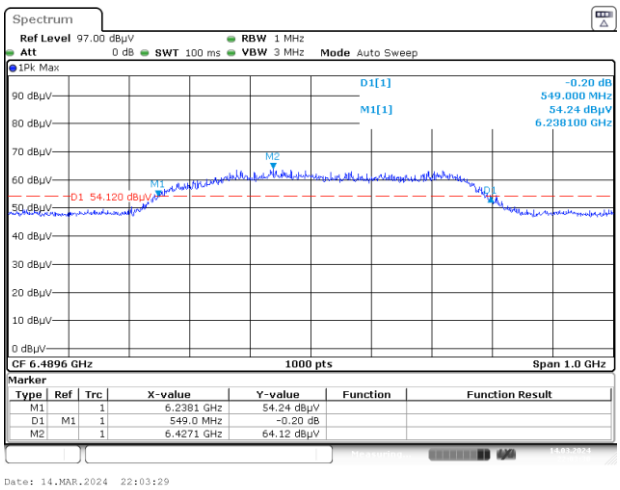
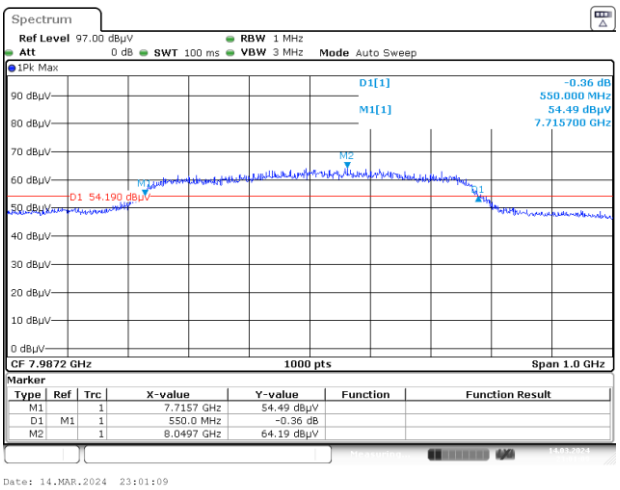
	

CH5-HPRF(124.8M)-SP0	CH9-HPRF(124.8M)-SP0
	
CH5-HPRF(124.8M)-SP1	CH9-HPRF(124.8M)-SP1
	
CH5-HPRF(124.8M)-SP3	CH9-HPRF(124.8M)-SP3
	

CH5-HPRF(249.6M)-SP0	CH9-HPRF(249.6M)-SP0
	
CH5-HPRF(249.6M)-SP1	CH9-HPRF(249.6M)-SP1
	

3.5 Radiated emission Test Data

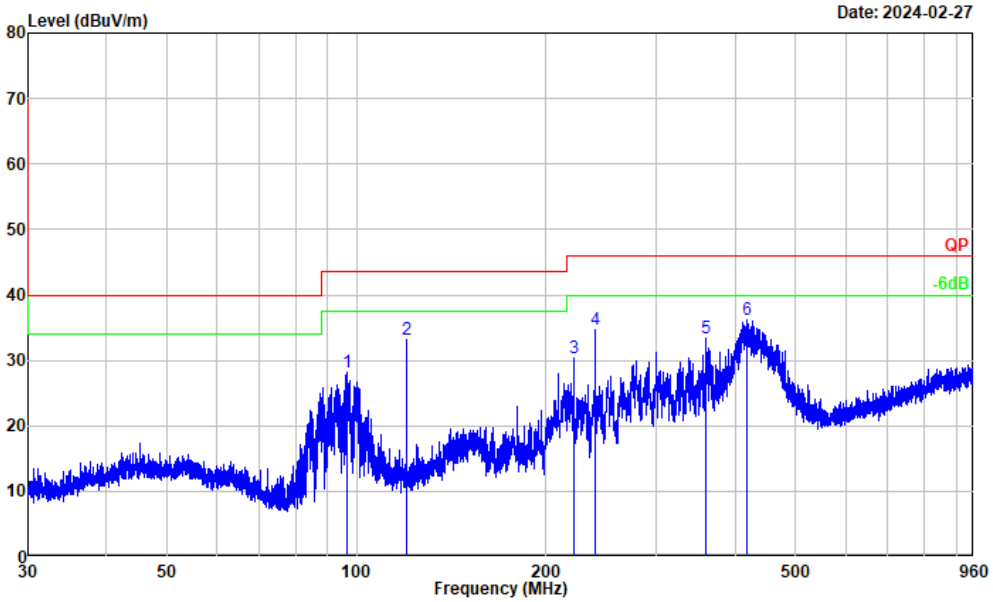
9 kHz-30MHz:

Test Date:	2024-02-27	**Test By:**	Bard Huang
Environment condition:	Temperature: 22.2°C; Relative Humidity:47%; ATM Pressure: 101.7kPa		

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

30MHz-960MHz:

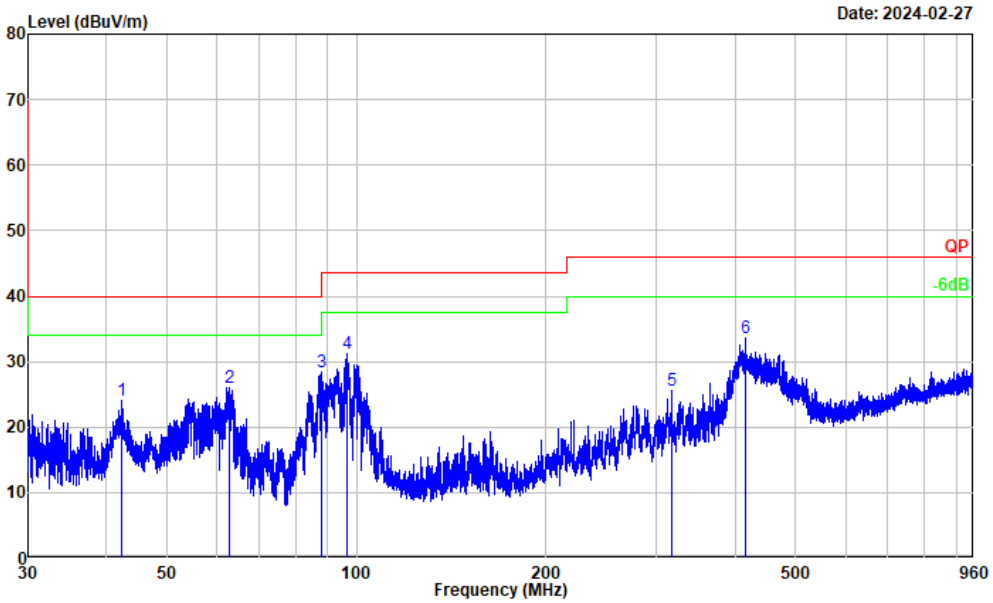
Test Date:	2024-02-27	Test By:	Bard Huang
Environment condition:	Temperature: 22.2°C; Relative Humidity:47%; ATM Pressure: 101.7kPa		



Project No. : RWAP202400195
Test Mode : transmitting
Test Voltage : DC 12V
Environment : 22.2℃/47%R.H./101.7kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	96.577	42.88	-14.63	28.25	43.50	-15.25	Peak
2	119.982	49.08	-15.85	33.23	43.50	-10.27	Peak
3	221.739	43.95	-13.54	30.41	46.00	-15.59	Peak
4	240.050	47.29	-12.70	34.59	46.00	-11.41	Peak
5	360.086	42.92	-9.57	33.35	46.00	-12.65	Peak
6	417.412	44.53	-8.37	36.16	46.00	-9.84	Peak

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



Project No. : RWAP202400195
Test Mode : transmitting
Test Voltage : DC 12V
Environment : 22.2℃/47%R.H./101.7kPa
Tested by : Bard Huang
Polarization : vertical
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	42.230	36.47	-12.48	23.99	40.00	-16.01	Peak
2	62.684	40.13	-14.01	26.12	40.00	-13.88	Peak
3	87.813	44.67	-16.37	28.30	40.00	-11.70	Peak
4	96.662	45.83	-14.62	31.21	43.50	-12.29	Peak
5	317.934	36.44	-10.88	25.56	46.00	-20.44	Peak
6	416.499	41.98	-8.38	33.60	46.00	-12.40	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 960MHz:

Test Date:	2024-03-19~2024-03-20	**Test By:**	Luke Li
Environment condition:	Temperature: 22.5~22.8°C; Relative Humidity:48~62%; ATM Pressure: 101.2~101.6kPa		

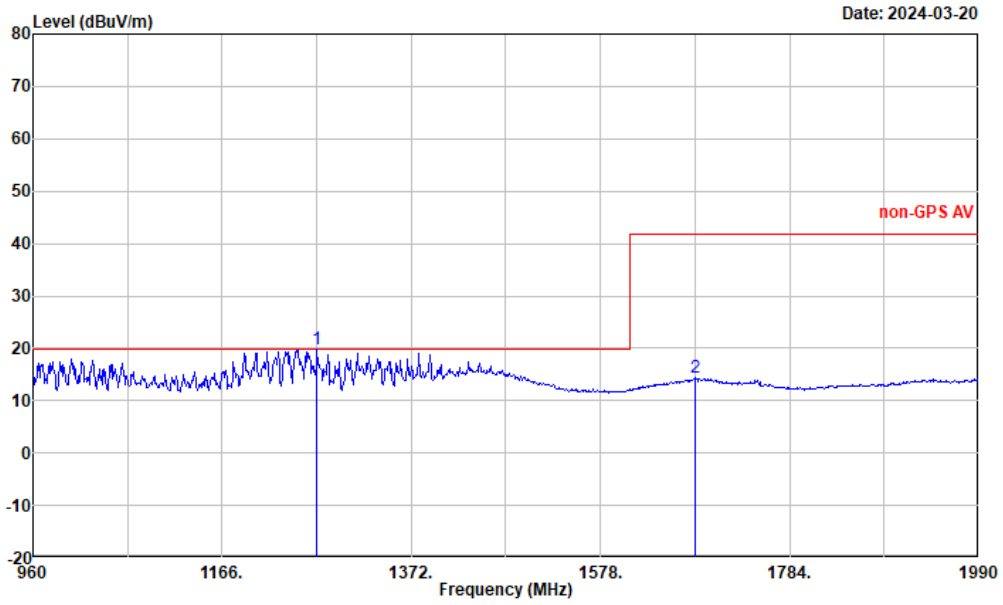
Limit conversion:

According to ANSI C63.10-2020 section 10.3.9, E(dBuV/m) = EIRP(dBm)+95.2 for a specified distance of 3m, so the apply limit of EIRP can convert to E-field strength at specified distance of 3m as below:

Frequency Range [MHz]	Limit		RBW
	EIRP [dBm]	E-field strength@3m [dBuV/m]	
960-1610	-75.3	19.9	1MHz
1610-1990	-53.3	41.9	1MHz
1990-3100	-51.3	43.9	1MHz
3100-10600	-41.3	53.9	1MHz
Above 10600	-51.3	43.9	1MHz
1164-1240	-85.3	9.9	⩾1kHz*
1559-1610	-85.3	9.9	⩾1kHz*

Note*: a 10kHz RBW was used for the measurement in this report

Channel:	Channel 5	Test Frequency Range:	960~1990MHz

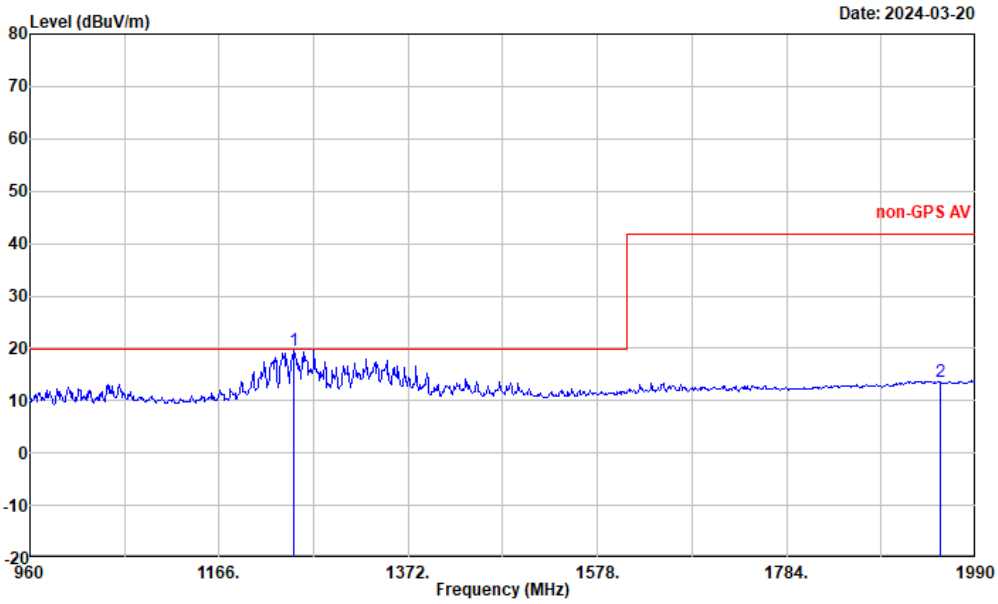


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : horizontal
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1269.300	47.46	-27.70	19.76	19.90	-0.14	Peak
2	1680.700	40.57	-26.26	14.31	41.90	-27.59	Average

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

Channel:	Channel 5	Test Frequency Range:	960~1990MHz

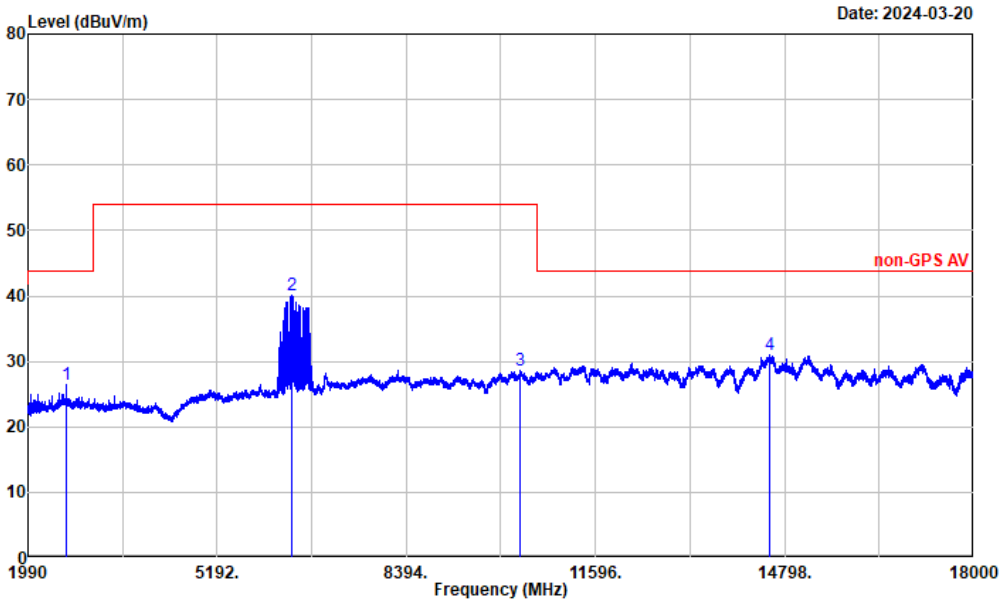


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : vertical
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1247.279	47.42	-27.78	19.64	19.90	-0.26	Average
2	1950.962	38.41	-24.71	13.70	41.90	-28.20	Average

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

Channel:	Channel 5	Test Frequency Range:	1990MHz~18GHz

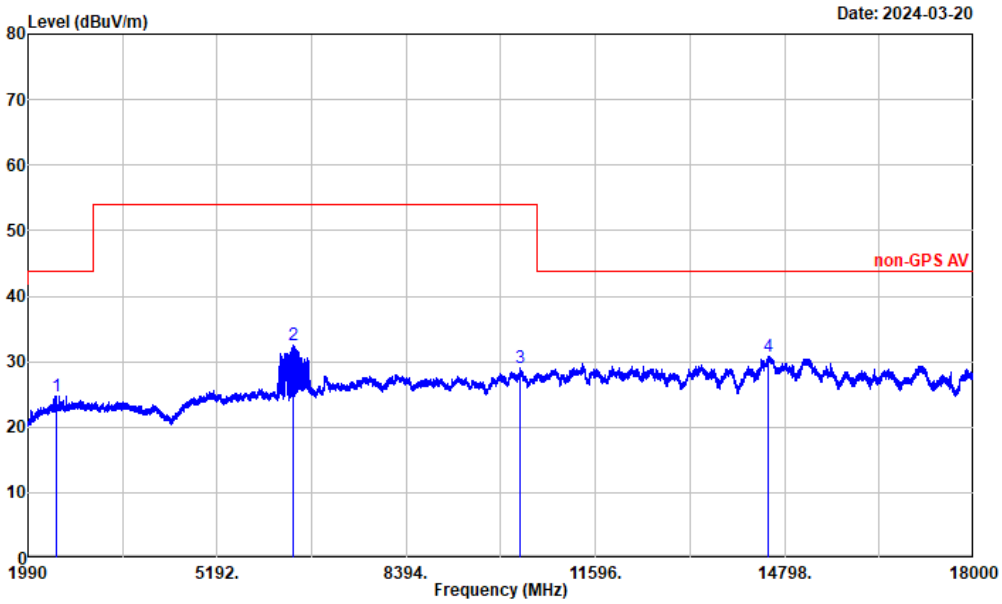


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : horizontal
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	2640.041	43.59	-17.21	26.38	43.90	-17.52	Average
2	6453.279	52.78	-12.71	40.07	53.90	-13.83	Average
3	10320.520	38.92	-10.30	28.62	53.90	-25.28	Average
4	14550.780	37.21	-6.15	31.06	43.90	-12.84	Average

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

Channel:	Channel 5	Test Frequency Range:	1990MHz~18GHz

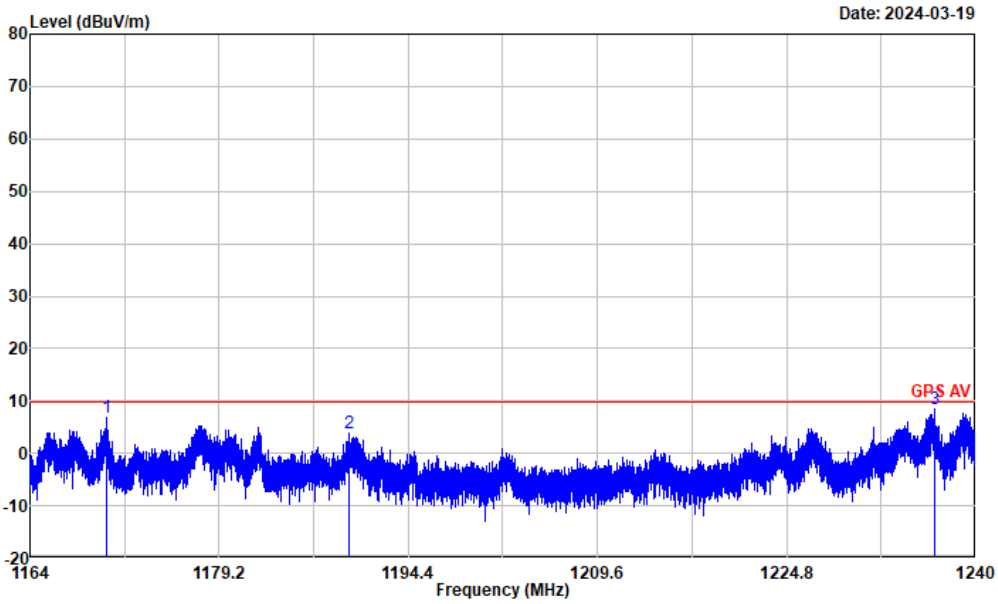


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : vertical
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2465.030	42.14	-17.37	24.77	43.90	-19.13	Average
2	6490.281	45.13	-12.60	32.53	53.90	-21.37	Average
3	10320.520	39.28	-10.30	28.98	53.90	-24.92	Average
4	14521.780	36.86	-6.15	30.71	43.90	-13.19	Average

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

Channel:	Channel 5	Test Frequency Range:	1164~1240MHz

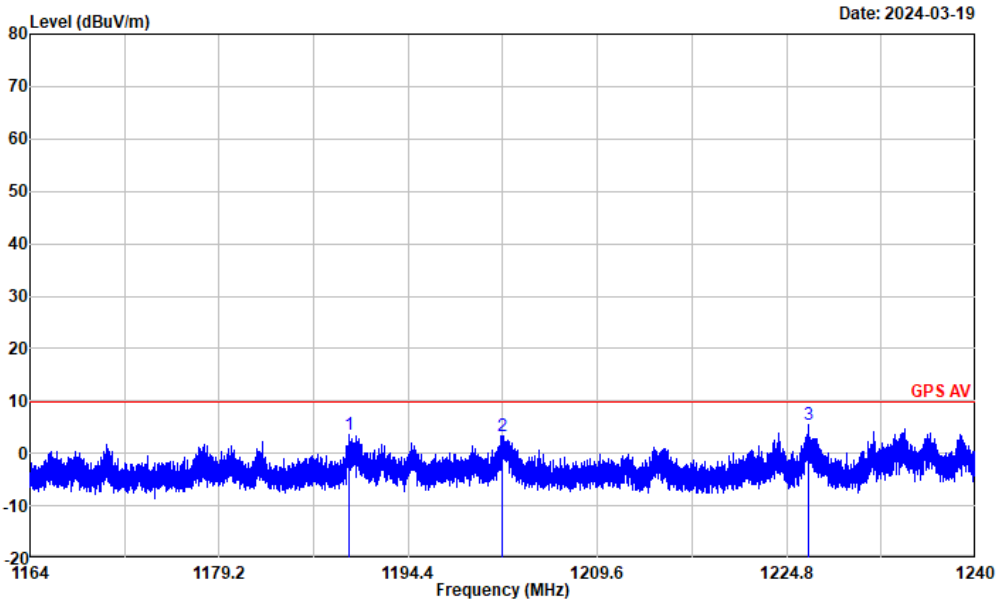


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Horizontal
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1170.120	27.80	-21.07	6.73	9.90	-3.17	Average
2	1189.662	24.88	-21.01	3.87	9.90	-6.03	Average
3	1236.655	29.16	-20.79	8.37	9.90	-1.53	Average

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

Channel:	Channel 5	Test Frequency Range:	1164~1240MHz

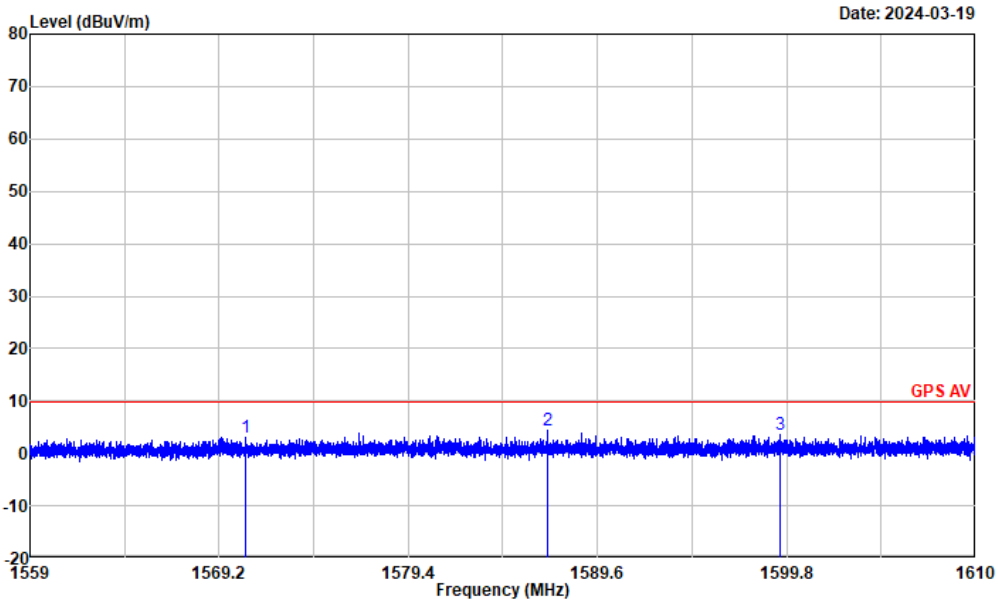


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Vertical
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1189.687	24.53	-21.01	3.52	9.90	-6.38	Average
2	1201.963	24.25	-20.97	3.28	9.90	-6.62	Average
3	1226.599	26.35	-20.84	5.51	9.90	-4.39	Average

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

Channel:	Channel 5	Test Frequency Range:	1559~1610MHz

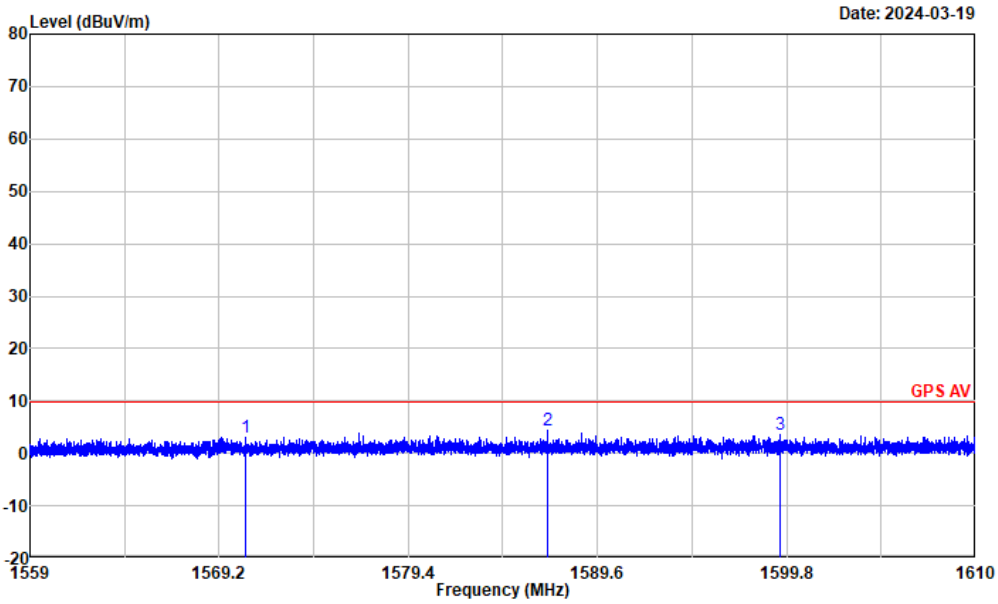


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Horizontal
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1570.644	21.82	-18.66	3.16	9.90	-6.74	Average
2	1586.899	22.78	-18.51	4.27	9.90	-5.63	Average
3	1599.477	21.93	-18.41	3.52	9.90	-6.38	Average

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

Channel:	Channel 5	Test Frequency Range:	1559~1610MHz

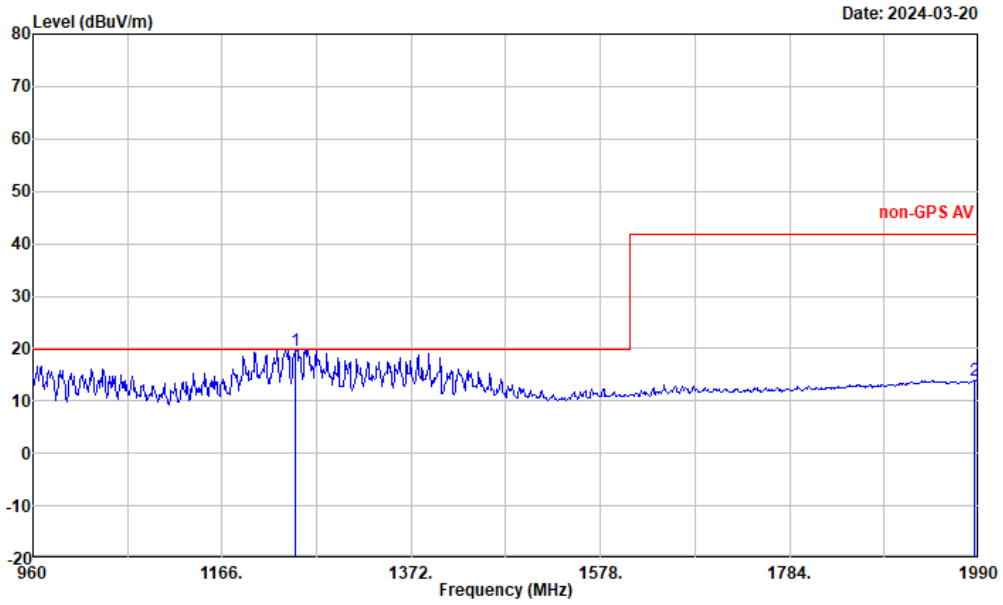


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Vertical
Remark : CH5-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1570.644	21.82	-18.66	3.16	9.90	-6.74	Average
2	1586.899	22.78	-18.51	4.27	9.90	-5.63	Average
3	1599.477	21.93	-18.41	3.52	9.90	-6.38	Average

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

Channel:	Channel 9	Test Frequency Range:	960~1990MHz

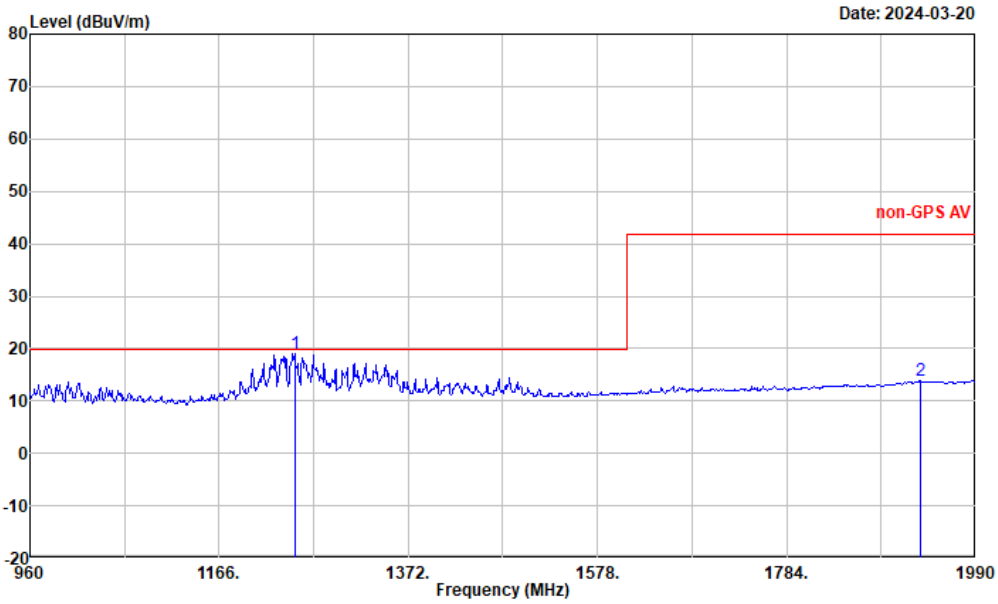


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : Horizontal
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1246.278	572.69	-553.03	19.66	19.90	-0.24	Peak
2	1984.995	566.51	-552.58	13.93	41.90	-27.97	Average

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

Channel:	Channel 9	Test Frequency Range:	960~1990MHz

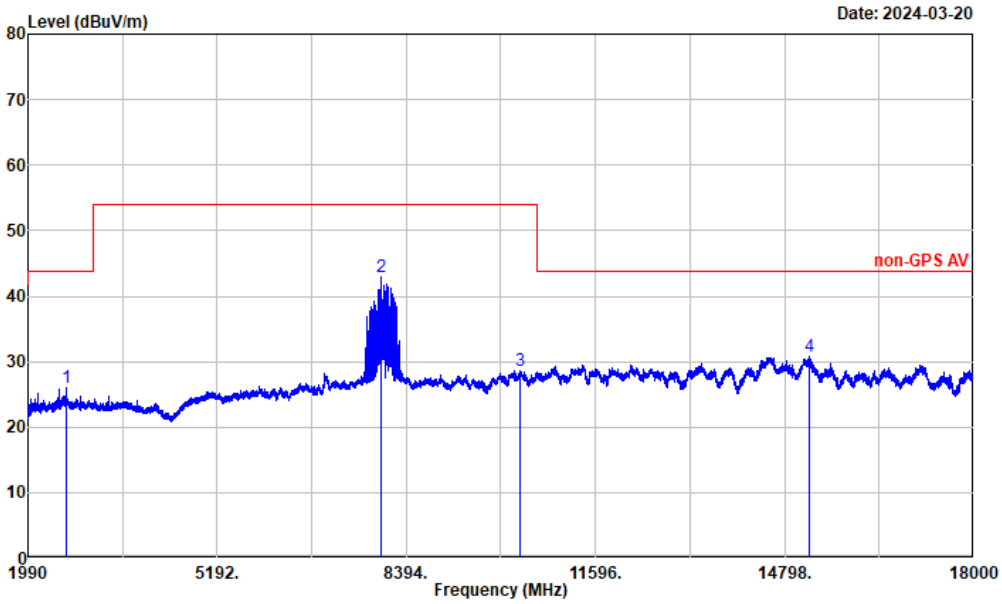


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : vertical
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1248.280	46.91	-27.77	19.14	19.90	-0.76	Average
2	1929.942	38.60	-24.80	13.80	41.90	-28.10	Average

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

Channel:	Channel 9	Test Frequency Range:	1990MHz~18GHz

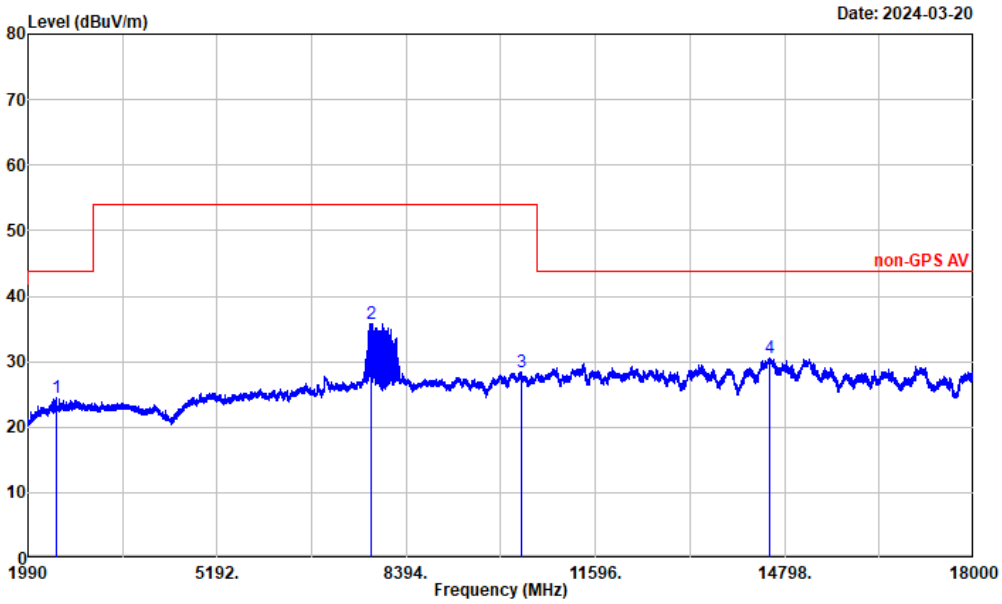


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : horizontal
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2640.041	43.32	-17.21	26.11	43.90	-17.79	Average
2	7973.374	54.72	-11.78	42.94	53.90	-10.96	Average
3	10326.520	38.90	-10.26	28.64	53.90	-25.26	Average
4	15213.830	37.56	-6.86	30.70	43.90	-13.20	Average

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

Channel:	Channel 9	Test Frequency Range:	1990MHz~18GHz

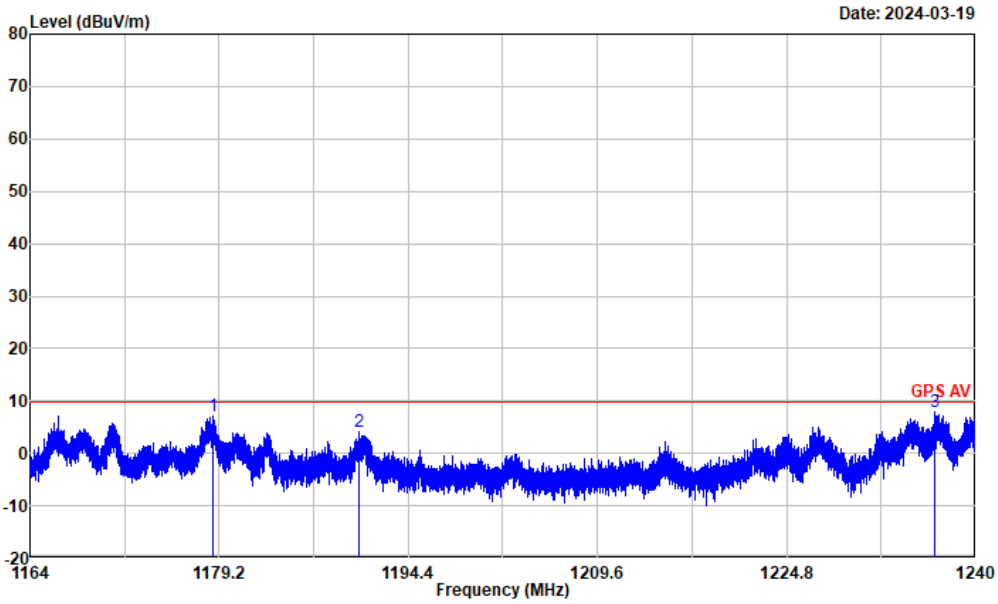


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.8℃/48%R.H./101.6kPa
Tested by : Luke Li
Polarization : vertical
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2480.031	41.82	-17.35	24.47	43.90	-19.43	Average
2	7798.363	47.66	-11.80	35.86	53.90	-18.04	Average
3	10333.520	38.73	-10.24	28.49	53.90	-25.41	Average
4	14548.780	36.81	-6.15	30.66	43.90	-13.24	Average

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

Channel:	Channel 9	Test Frequency Range:	1164~1240MHz

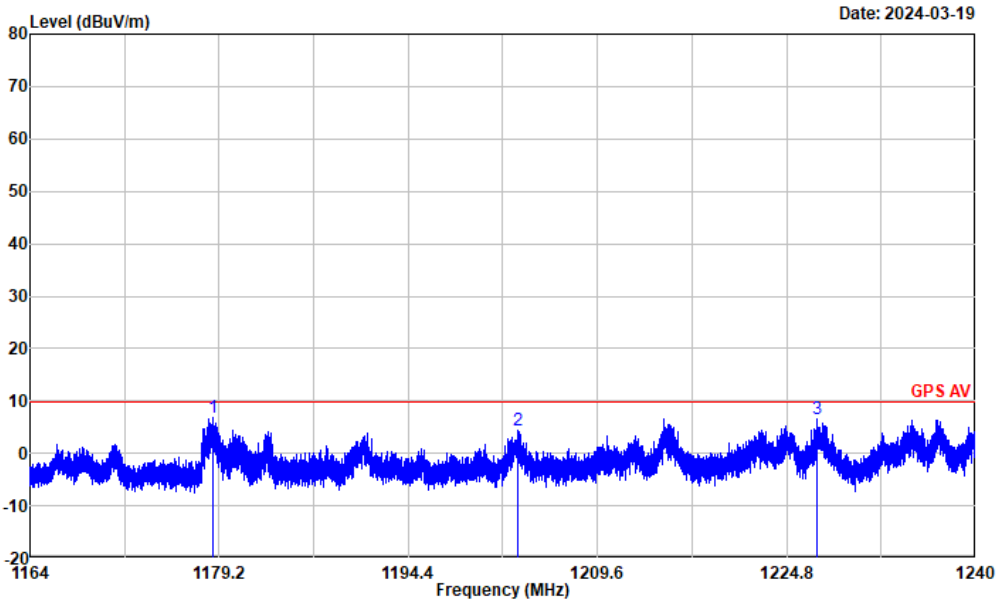


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Horizontal
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1178.696	28.11	-21.05	7.06	9.90	-2.84	Average
2	1190.397	25.09	-21.01	4.08	9.90	-5.82	Average
3	1236.700	28.69	-20.79	7.90	9.90	-2.00	Average

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

Channel:	Channel 9	Test Frequency Range:	1164~1240MHz

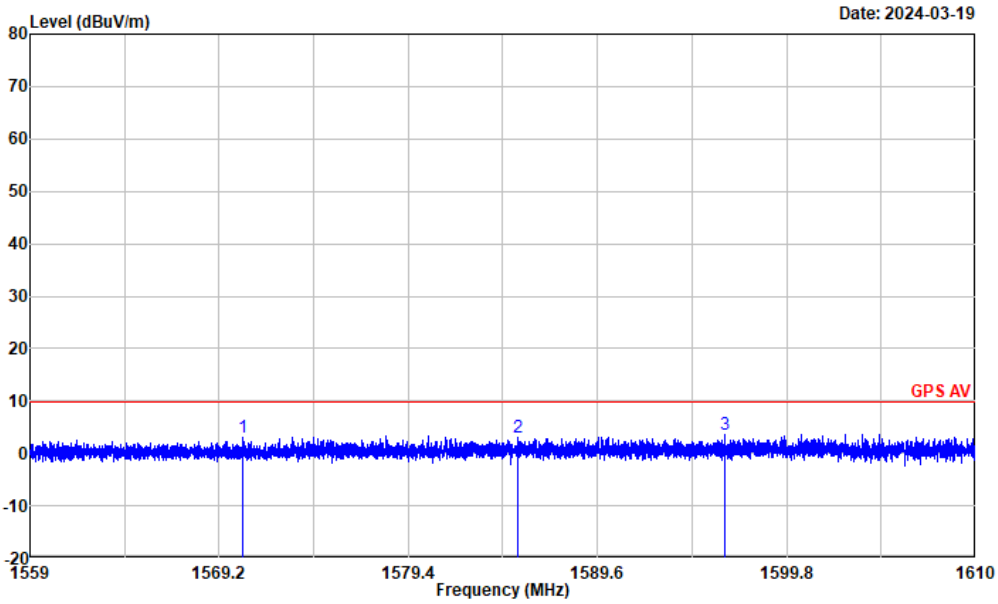


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Vertical
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1178.681	27.94	-21.05	6.89	9.90	-3.01	Average
2	1203.218	25.45	-20.97	4.48	9.90	-5.42	Average
3	1227.239	27.43	-20.84	6.59	9.90	-3.31	Average

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

Channel:	Channel 9	Test Frequency Range:	1559~1610MHz

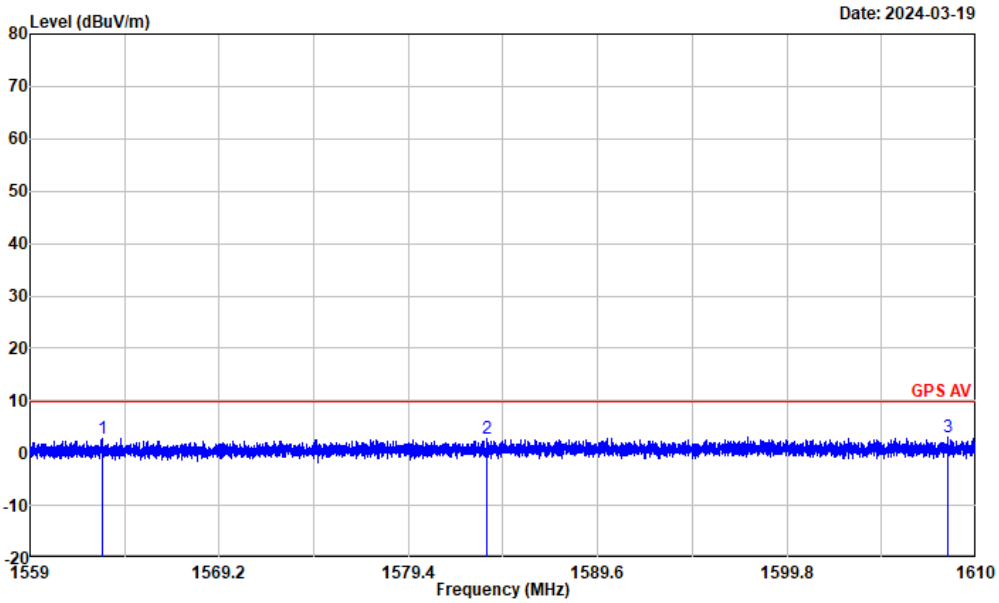


Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Horizontal
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	1570.450	21.72	-18.67	3.05	9.90	-6.85	Average
2	1585.322	21.44	-18.53	2.91	9.90	-6.99	Average
3	1596.470	22.15	-18.44	3.71	9.90	-6.19	Average

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

Channel:	Channel 9	Test Frequency Range:	1559~1610MHz



Project No. : RWAP202400195
Test Mode : Transmitting
Test Voltage : DC 12V
Environment : 22.5℃/62%R.H./101.2kPa
Tested by : Luke Li
Polarization : Vertical
Remark : CH9-BPRF-SP0

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	1562.893	21.57	-18.74	2.83	9.90	-7.07	Average
2	1583.604	21.42	-18.55	2.87	9.90	-7.03	Average
3	1608.497	21.42	-18.36	3.06	9.90	-6.84	Average

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

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain – Distance extrapolate factor

Distance extrapolate factor = 20log(D_{Meas}/$D_{SpecLimit}$)

Where, D_{Meas} is the measurement distance, for the measurement of above 960MHz, D_{Meas} = 0.5m

$D_{SpecLimit}$ is the distance specified by the limit, $D_{SpecLimit}$ = 3m

Over Limit = Result – Limit

For emissions in 18GHz-40GHz range, all emissions were investigated and in the noise floor level.

3.6 Maximum Peak Power Test Data

Test Date:	2024-03-14~2024-03-15	Test By:	Luke Li
Environment condition:	Temperature: 23.0°C; Relative Humidity: 55%; ATM Pressure: 101kPa		

CH	Mode	SP config	f_M [MHz]	Reading [dBuV/MHz]	Corr. Factor [dB/m]	Corr. Amplitude [dBuV/MHz]	Corr. Amplitude [dBm/MHz]	Peak Power [dBm/50MHz]	Limit [dBm/50MHz]	Verdict
5	BPRF (62.4M)	0	6490.1	62.95	-12.57	50.38	-44.82	-10.82	<0	pass
		1	6449.1	62.66	-12.69	49.97	-45.23	-11.23	<0	pass
		3	6429.1	63.49	-12.75	50.74	-44.46	-10.46	<0	pass
	HPRF (124.8M)	0	6374.1	66.69	-12.87	53.82	-41.38	-7.38	<0	pass
		1	6427.1	63.65	-12.75	50.90	-44.30	-10.30	<0	pass
		3	6427.1	63.15	-12.75	50.40	-44.80	-10.80	<0	pass
	HPRF (249.6M)	0	6357.1	69.28	-12.89	56.39	-38.81	-4.81	<0	pass
		1	6427.1	64.12	-12.75	51.37	-43.83	-9.83	<0	pass
9	BPRF (62.4M)	0	7986.7	70.60	-11.79	58.81	-36.39	-2.39	<0	pass
		1	7987.7	69.51	-11.79	57.72	-37.48	-3.48	<0	pass
		3	8050.7	62.91	-11.52	51.39	-43.81	-9.81	<0	pass
	HPRF (124.8M)	0	8077.7	65.11	-11.4	53.71	-41.49	-7.49	<0	pass
		1	8044.7	63.38	-11.55	51.83	-43.37	-9.37	<0	pass
		3	8049.7	63.72	-11.52	52.20	-43.00	-9.00	<0	pass
	HPRF (249.6M)	0	8087.7	69.37	-11.36	58.01	-37.19	-3.19	<0	pass
		1	8049.7	64.19	-11.52	52.67	-42.53	-8.53	<0	pass

Note:

Corr. Amplitude = Reading + Corrected Factor

Corr. Factor = Antenna factor + Cable loss – Amplifier gain – Distance extrapolate factor

Distance extrapolate factor = 20log(D_{Meas}/$D_{SpecLimit}$)

Where, D_{Meas} is the measurement distance, for the measurement of above 960MHz, D_{Meas} = 0.5m

$D_{SpecLimit}$ is the distance specified by the limit, $D_{SpecLimit}$ = 3m

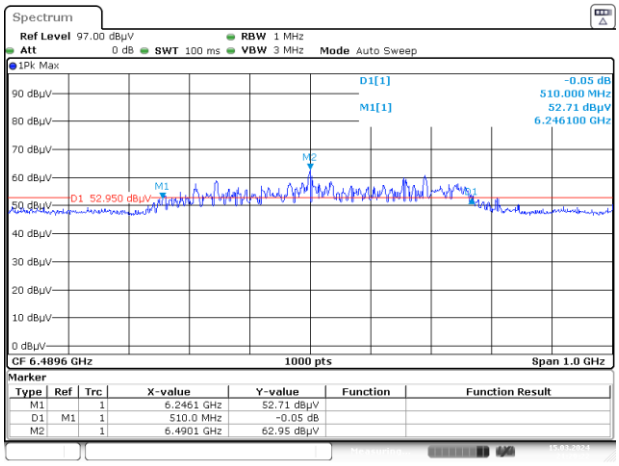
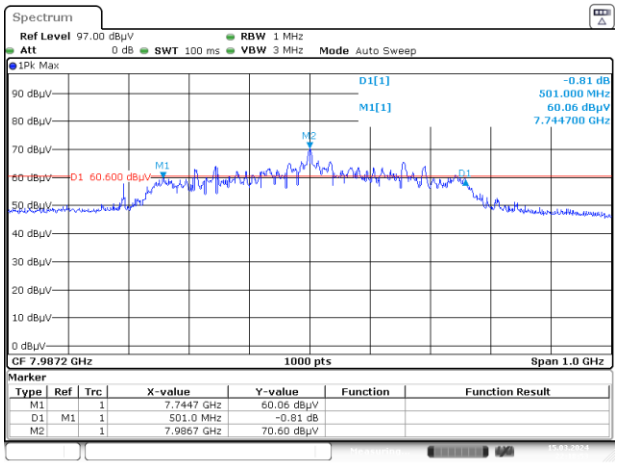
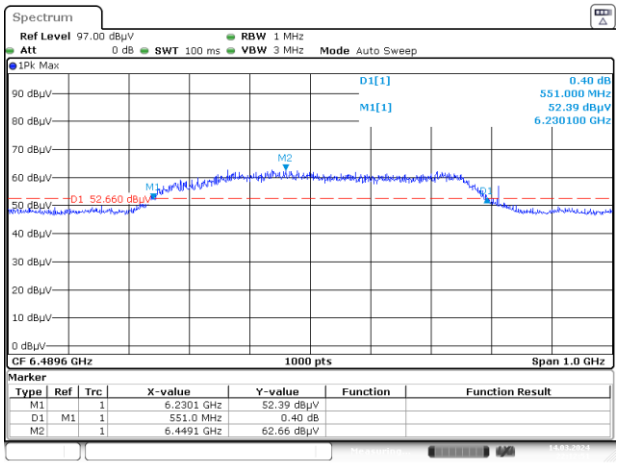
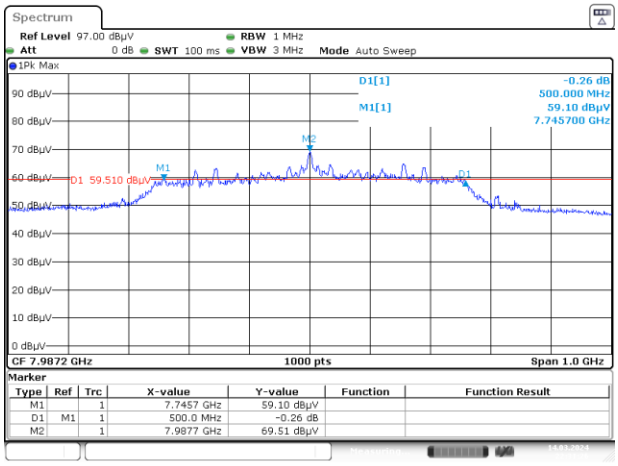
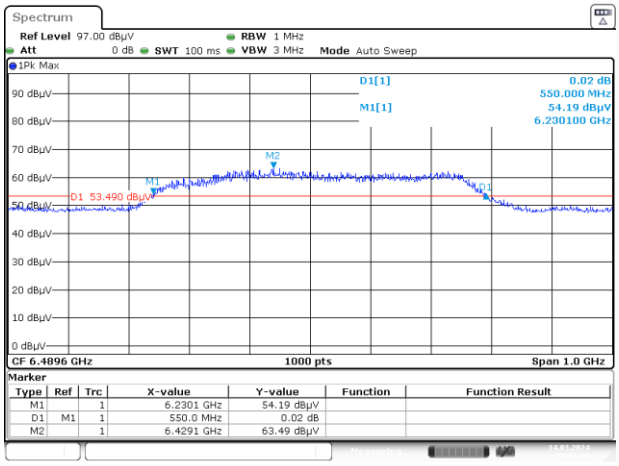
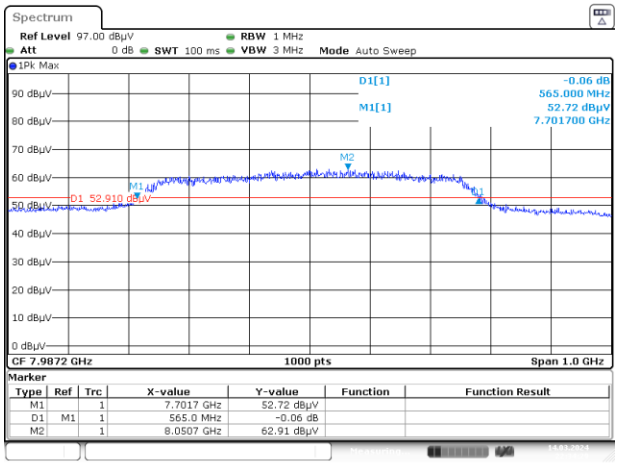
According to FCC §15.521(g), This may be converted to a peak field strength level at 3 meters using E(dBuV/m) = P(dBm EIRP) + 95.2, so:

Corr.Amplitude [dBm/MHz] = Corr. Amplitude [dBuV/MHz] -95.2

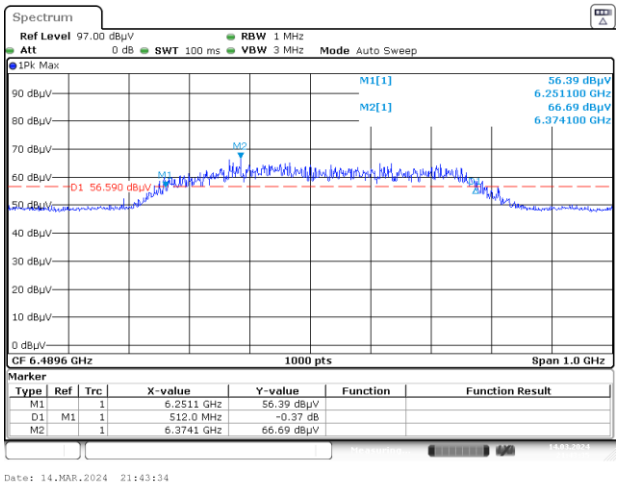
Peak Power [dBm/50MHz] = Corr. Amplitude[dBm/MHz] - Bandwidth conversion factor

Bandwidth conversion factor= 20 log (RBW/50 MHz)= 20 log (1MHz/50MHz)=-34dB

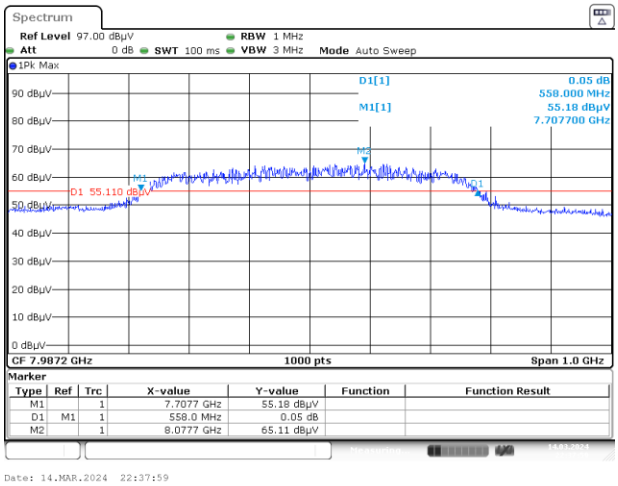
Test Plot:

CH5-BPRF(62.4M)-SP0	CH9-BPRF(62.4M)-SP0
	
CH5-BPRF(62.4M)-SP1	CH9-BPRF(62.4M)-SP1
	
CH5-BPRF(62.4M)-SP3	CH9-BPRF(62.4M)-SP3
	

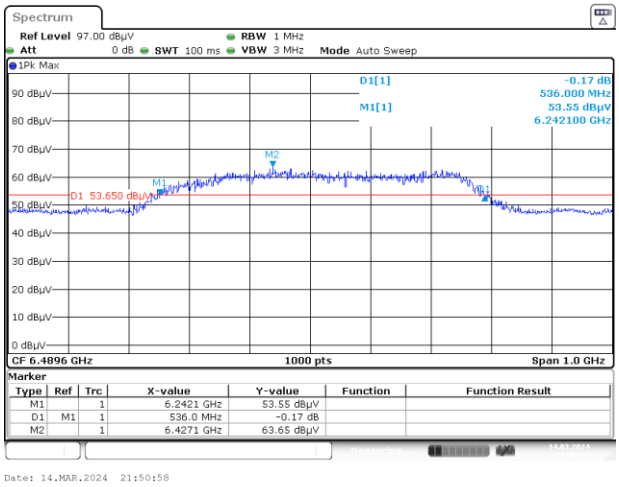
CH5-HPRF(124.8M)-SP0



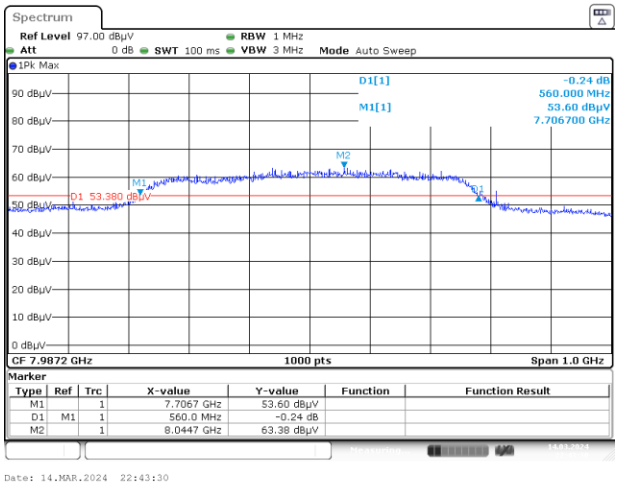
CH9-HPRF(124.8M)-SP0



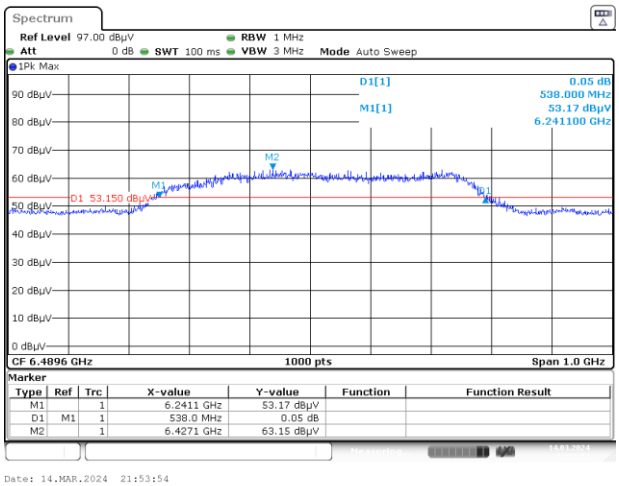
CH5-HPRF(124.8M)-SP1



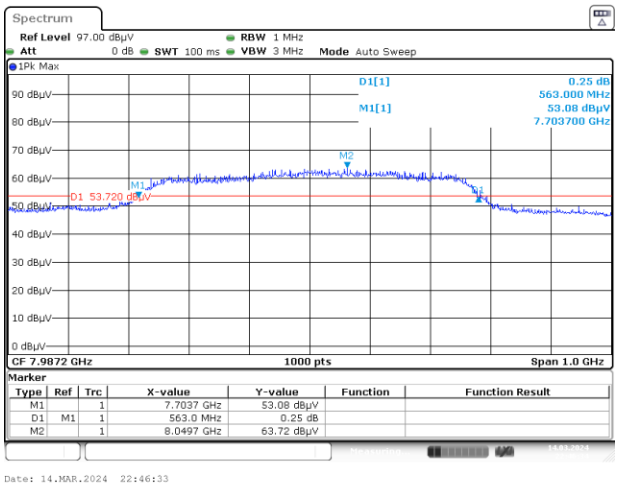
CH9-HPRF(124.8M)-SP1

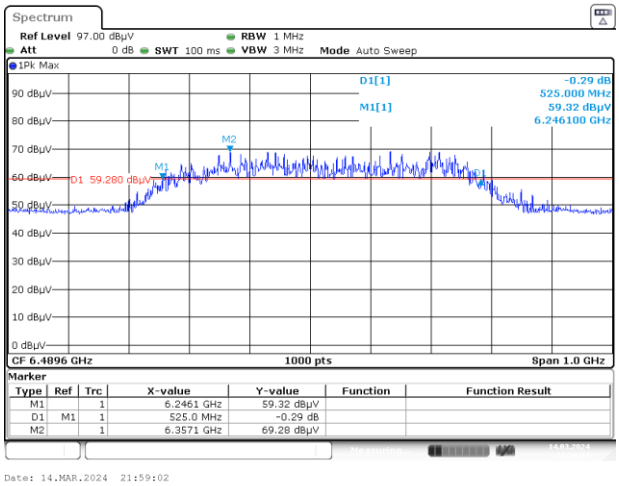
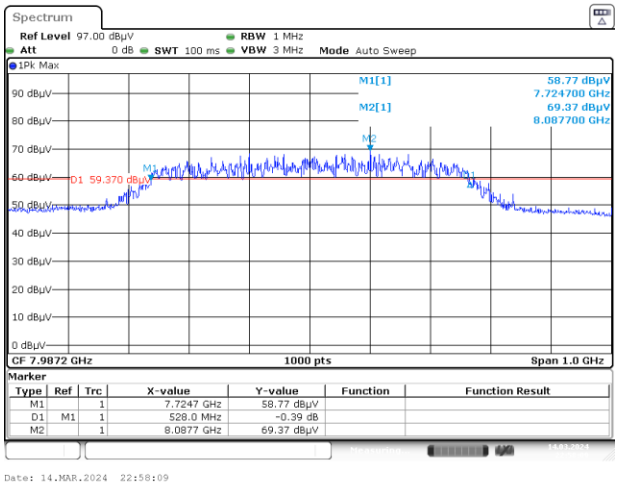
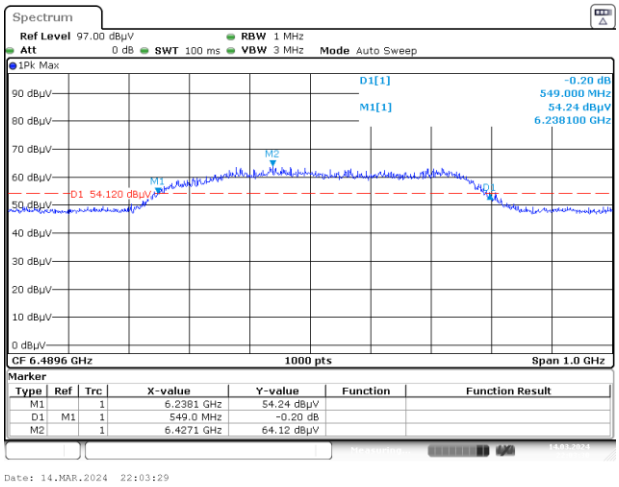
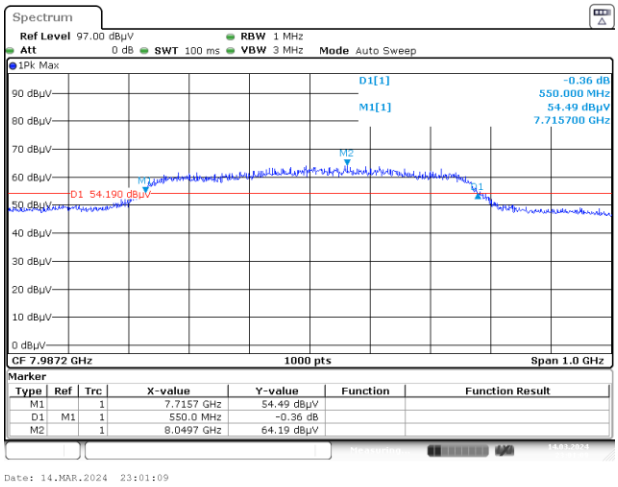


CH5-HPRF(124.8M)-SP3



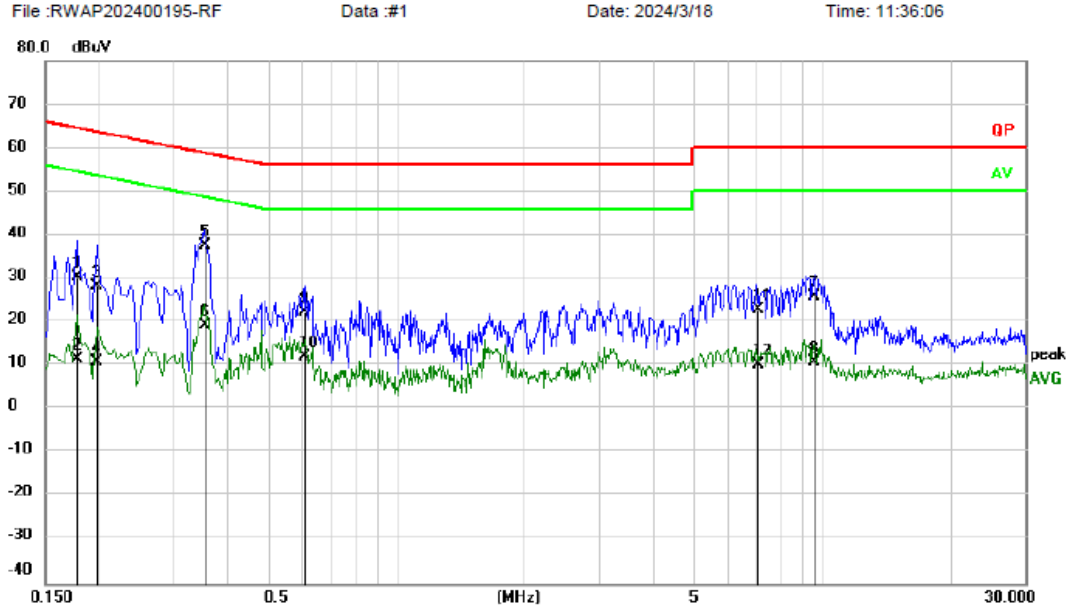
CH9-HPRF(124.8M)-SP3



CH5-HPRF(249.6M)-SP0	CH9-HPRF(249.6M)-SP0
	
CH5-HPRF(249.6M)-SP1	CH9-HPRF(249.6M)-SP1
	

3.7 AC Line Conducted Emissions Test Data

Test Date:	2024-03-18	Test By:	Lirou Li
Environment condition:	Temperature: 24.6°C; Relative Humidity:62%; ATM Pressure: 101.0kPa		



Limit: QP
Mode:transmitting
Note: CH9-BPRF-BP0

Phase: L1
Power: DC 12V

Temperature: 24.6
Humidity: 62 %
Air Pressure: 1010 hpa

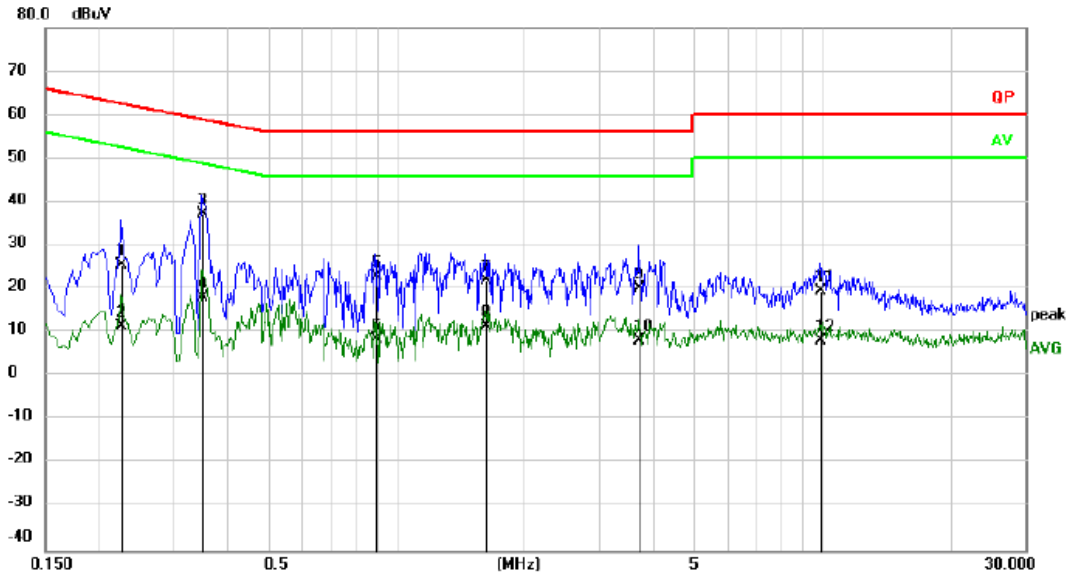
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1780	19.80	10.70	30.50	64.58	-34.08	QP	
2		0.1780	0.65	10.70	11.35	54.58	-43.23	AVG	
3		0.1980	17.63	10.62	28.25	63.69	-35.44	QP	
4		0.1980	0.28	10.62	10.90	53.69	-42.79	AVG	
5	*	0.3540	26.74	10.75	37.49	58.87	-21.38	QP	
6		0.3540	8.44	10.75	19.19	48.87	-29.68	AVG	
7		9.5780	15.35	10.52	25.87	60.00	-34.13	QP	
8		9.5780	0.21	10.52	10.73	50.00	-39.27	AVG	
9		0.6100	11.50	10.84	22.34	56.00	-33.66	QP	
10		0.6100	1.21	10.84	12.05	46.00	-33.95	AVG	
11		7.0260	11.72	11.11	22.83	60.00	-37.17	QP	
12		7.0260	-0.83	11.11	10.28	50.00	-39.72	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Conducted Emission Measurement

File :RWAP202400195-RF Data :#2 Date: 2024/3/18 Time: 11:46:39



Limit: QP Phase: N Temperature: 24.6

Mode:transmitting Power: DC 12V Humidity: 62 %

Note: CH9-BPRF-BP0 Air Pressure: 1010 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2260	15.16	10.45	25.61	62.60	-36.99	QP	
2		0.2260	0.94	10.45	11.39	52.60	-41.21	AVG	
3	*	0.3500	26.65	10.60	37.25	58.96	-21.71	QP	
4		0.3500	7.56	10.60	18.16	48.96	-30.80	AVG	
5		0.8980	12.22	10.64	22.86	56.00	-33.14	QP	
6		0.8980	-2.17	10.64	8.47	46.00	-37.53	AVG	
7		1.6260	11.38	10.68	22.06	56.00	-33.94	QP	
8		1.6260	0.72	10.68	11.40	46.00	-34.60	AVG	
9		3.7140	9.63	10.45	20.08	56.00	-35.92	QP	
10		3.7140	-2.32	10.45	8.13	46.00	-37.87	AVG	
11		9.8660	8.95	10.71	19.66	60.00	-40.34	QP	
12		9.8660	-2.42	10.71	8.29	50.00	-41.71	AVG	

*:Maximum data x:Over limit !:over margin Engineer Signature: Lirou

Remark:

Measurement (dBuV)= Reading Level (dBuV) + Correct Factor(dB)

Correct Factor(dB)= LISN Voltage Division Factor (dB)+ Cable loss(dB)

Over Limit = Measurement – Limit

4 Test Setup Photo

Please refer to the attachment RWAP202400195 Test Setup photo.

5 E.U.T Photo

Please refer to the attachment RWAP202400195 External photo and RWAP202400195 Internal photo.

---End of Report---