中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **LedgeTech LLC**

Address: 1091 E Bayaud Ave, Unit W2609, Denver, CO, 80209, United States

FCC ID: **2ATSN-RT5WV1**

Product Name: **GMRS RADIO WITH NOAA**

Standard(s): **47 CFR Part 15 Subpart B**
ANSI C63.4-2014

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR230313114-00B**

Date Of Issue: **2023/5/8**

Reviewed By: **Sun Zhong** Sun Zhong

Title: Manager

Test Laboratory: **China Certification ICT Co., Ltd (Dongguan)**
No. 113, Pingkang Road, Dalang Town, Dongguan,
Guangdong, China
Tel: +86-769-82016888

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

This report cannot be reproduced except in full, without prior written approval of the Company.

This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

CONTENTS

TEST FACILITY 2
DECLARATIONS 2

DOCUMENT REVISION HISTORY 4

1. GENERAL INFORMATION 5
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 5
1.2 DESCRIPTION OF TEST CONFIGURATION 6
1.2.2 Support Equipment List and Details 6
1.2.3 Support Cable List and Details 6
1.2.4 Block Diagram of Test Setup 6
1.3 MEASUREMENT UNCERTAINTY 8

2. SUMMARY OF TEST RESULTS 9

3. REQUIREMENTS AND TEST PROCEDURES 10
3.1 AC LINE CONDUCTED EMISSIONS 10
3.1.1 EUT Setup 10
3.1.2 EMI Test Receiver Setup 10
3.1.3 Test Procedure 11
3.1.4 Corrected Amplitude & Margin Calculation 11
3.2 RADIATION SPURIOUS EMISSIONS 12
3.2.1 EUT Setup 12
3.2.2 EMI Test Receiver Setup 13
3.2.3 Test Procedure 13
3.2.4 Corrected Amplitude & Margin Calculation 13
3.3 ANTENNA POWER CONDUCTION LIMITS FOR RECEIVERS 14
3.3.1 Applicable Standard 14
Test Procedure 14

4. TEST DATA AND RESULTS 15
4.1 AC LINE CONDUCTED EMISSIONS 15
4.2 RADIATION SPURIOUS EMISSIONS 18
4.3 ANTENNA POWER CONDUCTION LIMITS FOR RECEIVERS 27

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR230313114-00B	Original Report	2023/5/8

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	GMRS RADIO WITH NOAA
EUT Model:	RT-5W
Highest Operation Frequency:	467.7250 MHz
Rated Input Voltage:	DC 7.4V from battery or DC 5V from Adapter
Serial Number:	23FD_1
EUT Received Date:	2023.03.22
EUT Received Status:	Good

Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
Adapter	LedgeTech LLC	CG-Q0510	Input: AC 100-240V 50/60Hz 0.2A Output: DC 5V 1.0A

Operation Frequency And Test Channel:

Operation Modes	Operation Frequency Range (MHz)	Test Frequency (MHz)
NOAA Receiving	161.65-162.550	162.000
462MHz Receiving	462.5500-462.7250	462.6375
467MHz Receiving	467.5500-467.7250	467.6375

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Typical Use Mode, which was provided by the manufacturer. Test Mode: Receiving
Equipment Modifications:	No
EUT Exercise Software:	No

1.2.2 Support Equipment List and Details

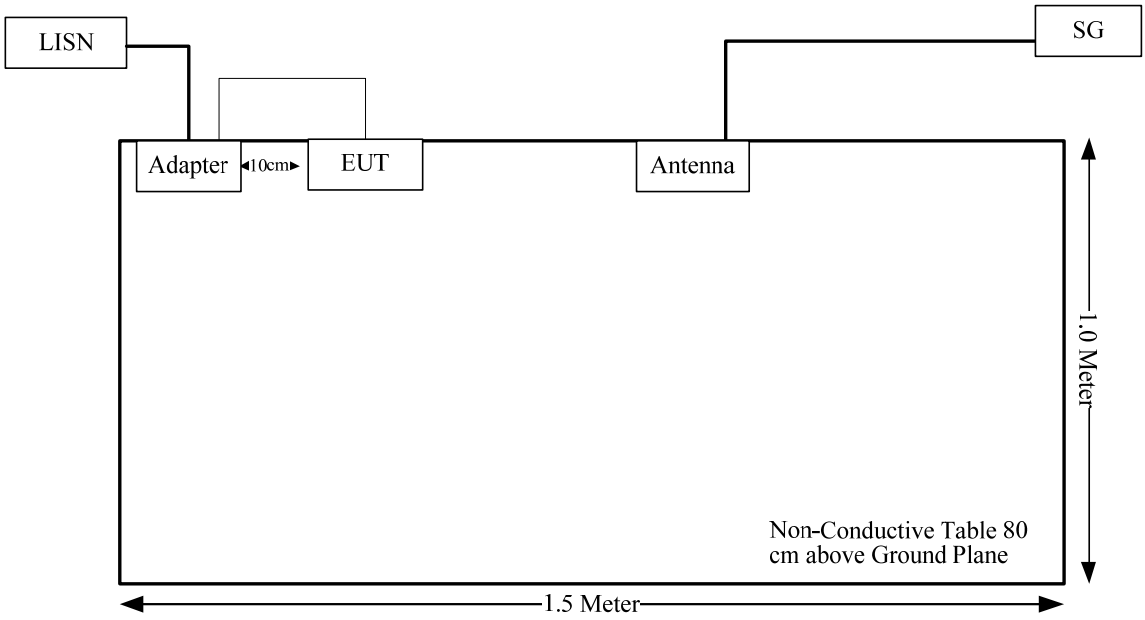
Manufacturer	Description	Model	Serial Number
Agilent	MXG Vector Signal Generator	N5182B	MY51350142

1.2.3 Support Cable List and Details

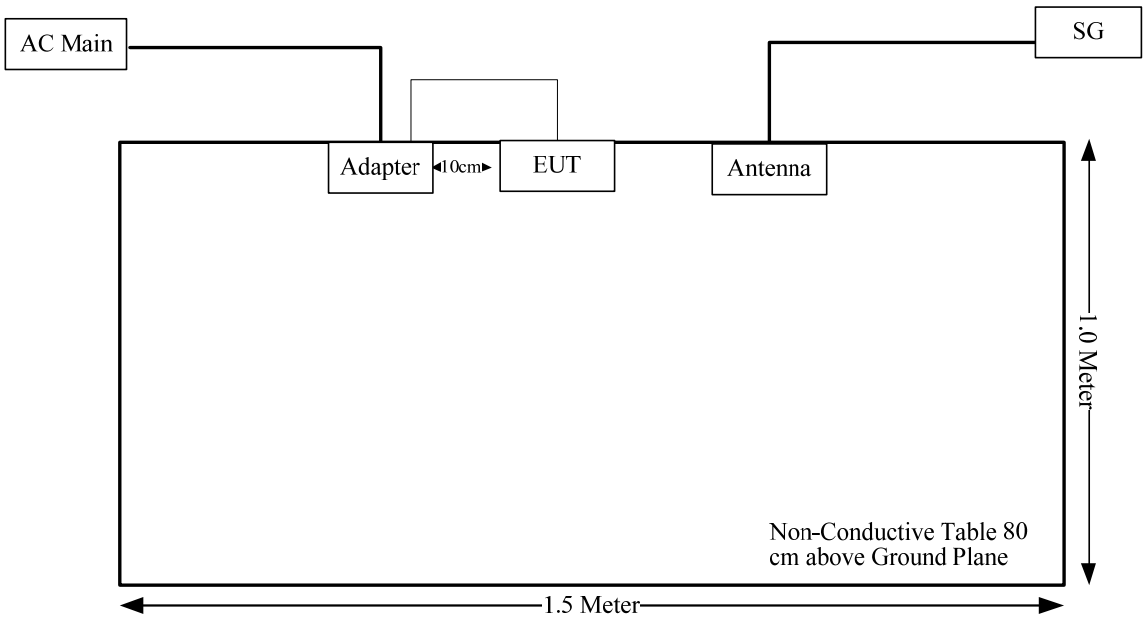
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	0.8	Adapter	EUT
Coaxial Cable	No	No	1.5	Antenna	N5182B

1.2.4 Block Diagram of Test Setup

AC line conducted emissions:



Radiated emissions:



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Temperature	±1℃
Humidity	±5%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)
Unwanted Emissions, conducted	±1.26 dB

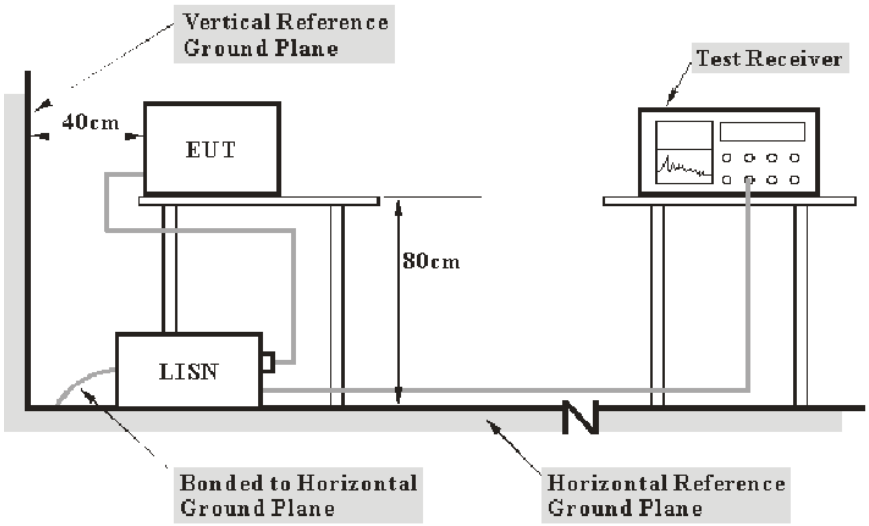
2. SUMMARY OF TEST RESULTS

Standard(s) Section	Description of Test	Result
§15.107	Conducted emissions	Compliant
§15.109	Radiated emissions	Compliant
§15.111	Antenna power conduction limits for receivers	Compliant

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

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

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

3.1.2 EMI Test Receiver Setup

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

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

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

3.1.3 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT, the report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

All data was recorded in the Quasi-peak and average detection mode.

The report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

3.1.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

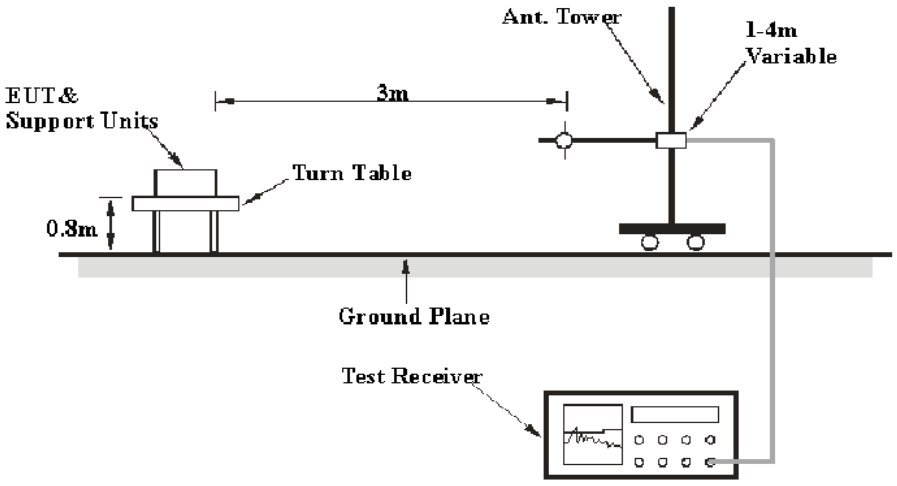
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

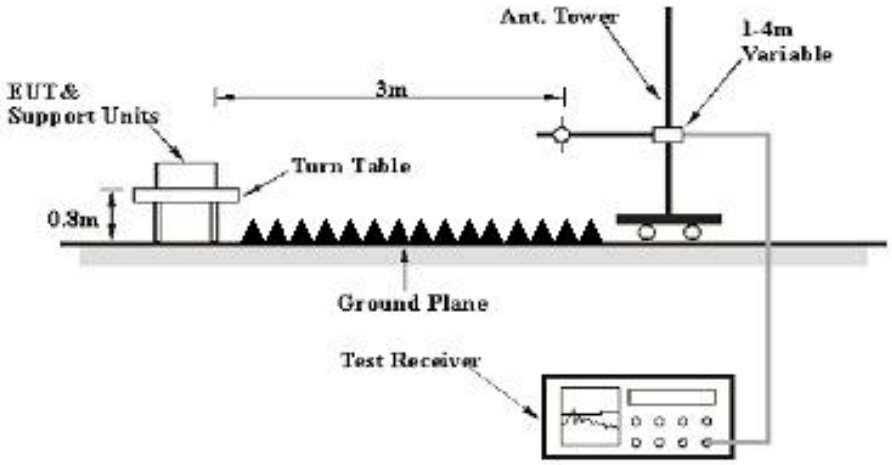
3.2 Radiation Spurious Emissions

3.2.1 EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emissions were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was with the FCC Part 15 B Class B limits.

3.2.2 EMI Test Receiver Setup

The system was investigated from 30 MHz to 2 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	Reduced video bandwidth	/	AVG

If the maximized peak measured value complies with under the limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.3 Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz.

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.3 Antenna Power Conduction Limits for Receivers

3.3.1 Applicable Standard

FCC§15.111.

(a) In addition to the radiated emission limits, receivers that operate (tune) in the frequency range 30 to 960 MHz and CB receivers that provide terminals for the connection of an external receiving antenna may be tested to demonstrate compliance with the provisions of § 15.109 with the antenna terminals shielded and terminated with a resistive termination equal to the impedance specified for the antenna, provided these receivers also comply with the following: With the receiver antenna terminal connected to a resistive termination equal to the impedance specified or employed for the antenna, the power at the antenna terminal at any frequency within the range of measurements specified in § 15.33 shall not exceed 2.0 nanowatts.

Test Procedure

EUT antenna port connected to a spectrum analyzer, the traces were recorded as shown on the data pages.

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	23FD_1	Test Date:	2023/4/14
Test Site:	CE	Test Mode:	Receiving
Tester:	David Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24	Relative Humidity: (%)	67	ATM Pressure: (kPa)	101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2023/04/01	2024/03/31
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

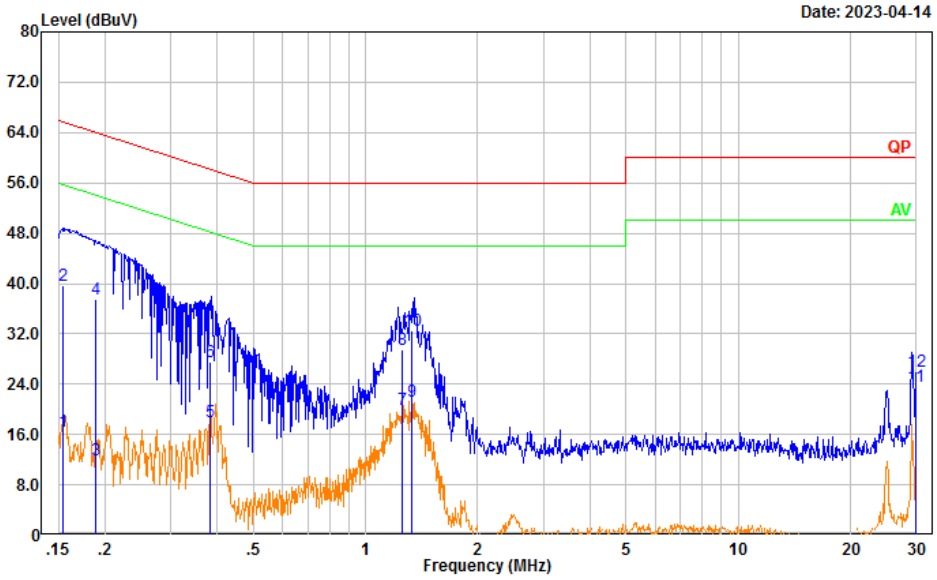
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Note: Worst mode is receiving frequency 462.6375 MHz.

Line:

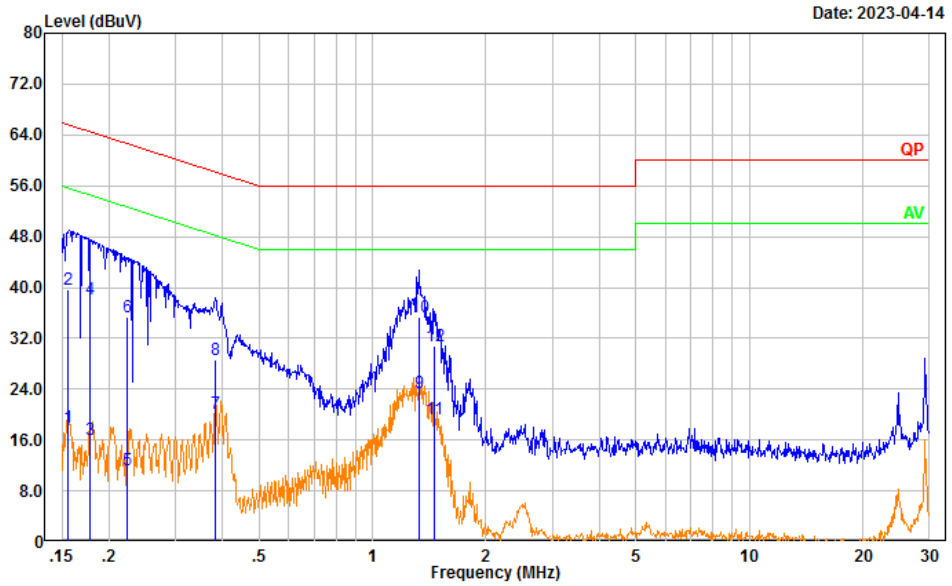
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.154	6.86	9.61	16.47	55.76	39.29	Average
2	0.154	29.98	9.61	39.59	65.76	26.17	QP
3	0.189	2.32	9.61	11.93	54.07	42.14	Average
4	0.189	27.79	9.61	37.40	64.07	26.67	QP
5	0.382	8.37	9.61	17.98	48.23	30.25	Average
6	0.382	17.85	9.61	27.46	58.23	30.77	QP
7	1.254	10.39	9.62	20.01	46.00	25.99	Average
8	1.254	19.94	9.62	29.56	56.00	26.44	QP
9	1.335	11.63	9.62	21.25	46.00	24.75	Average
10	1.335	22.95	9.62	32.57	56.00	23.43	QP
11	29.886	13.78	9.82	23.60	50.00	26.40	Average
12	29.886	16.17	9.82	25.99	60.00	34.01	QP

Neutral:

Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.155	8.38	9.61	17.99	55.71	37.72	Average
2	0.155	30.06	9.61	39.67	65.71	26.04	QP
3	0.178	6.44	9.61	16.05	54.58	38.53	Average
4	0.178	28.51	9.61	38.12	64.58	26.46	QP
5	0.223	1.66	9.61	11.27	52.71	41.44	Average
6	0.223	25.66	9.61	35.27	62.71	27.44	QP
7	0.382	10.53	9.61	20.14	48.24	28.10	Average
8	0.382	19.00	9.61	28.61	58.24	29.63	QP
9	1.327	13.69	9.62	23.31	46.00	22.69	Average
10	1.327	25.75	9.62	35.37	56.00	20.63	QP
11	1.459	9.70	9.62	19.32	46.00	26.68	Average
12	1.459	21.23	9.62	30.85	56.00	25.15	QP

4.2 Radiation Spurious Emissions

Serial Number:	23FD_1	Test Date:	2023/4/20~2023/5/8(Below 1GHz) 2023/4/22(Above 1GHz)
Test Site:	966-2, 966-1	Test Mode:	Receiving
Tester:	Carl Xue, Coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	23.7~27.1	Relative Humidity: (%)	59~64	ATM Pressure: (kPa)	99.8~100.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Below 1GHz					
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2022/07/15	2023/07/14
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2022/07/17	2023/07/16
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2022/07/17	2023/07/16
Sonoma	Amplifier	310N	186165	2022/07/17	2023/07/16
Audix	Test Software	E3	201021 (V9)	N/A	N/A
Above 1GHz					
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020/10/13	2023/10/12
R&S	Spectrum Analyzer	FSV40	101591	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2022/08/07	2023/08/06
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2022/08/07	2023/08/06
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2022/11/09	2023/11/08
Audix	Test Software	E3	201021 (V9)	N/A	N/A
E-Microwave	Band Rejection Filter	2400-2483.5MHz	OE01902424	2022/08/07	2023/08/06
Mini Circuits	High Pass Filter	VHF-6010+	31119	2022/08/07	2023/08/06

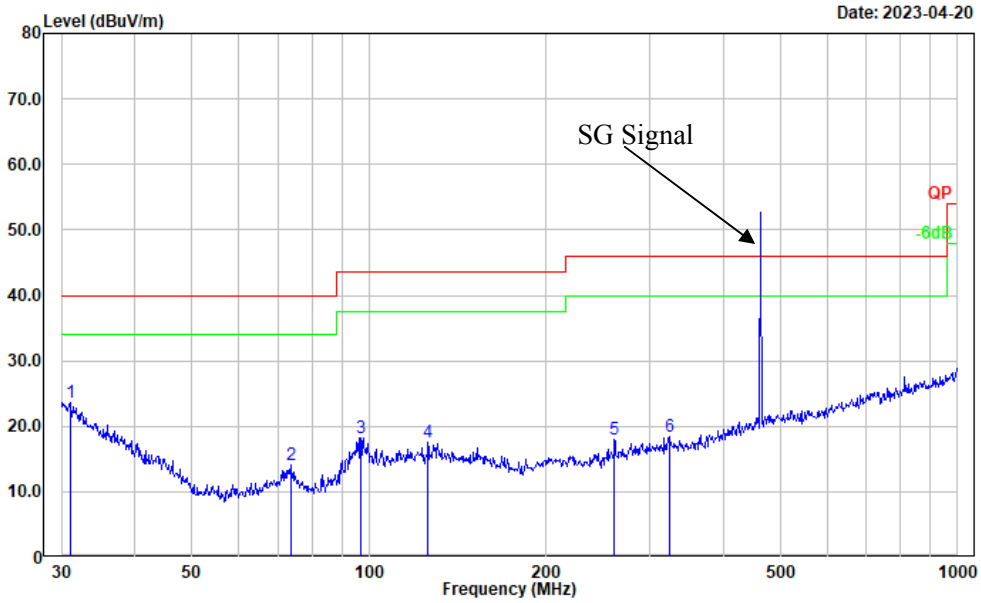
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

1) 30MHz-1GHz:

462.6375 MHz receiving:

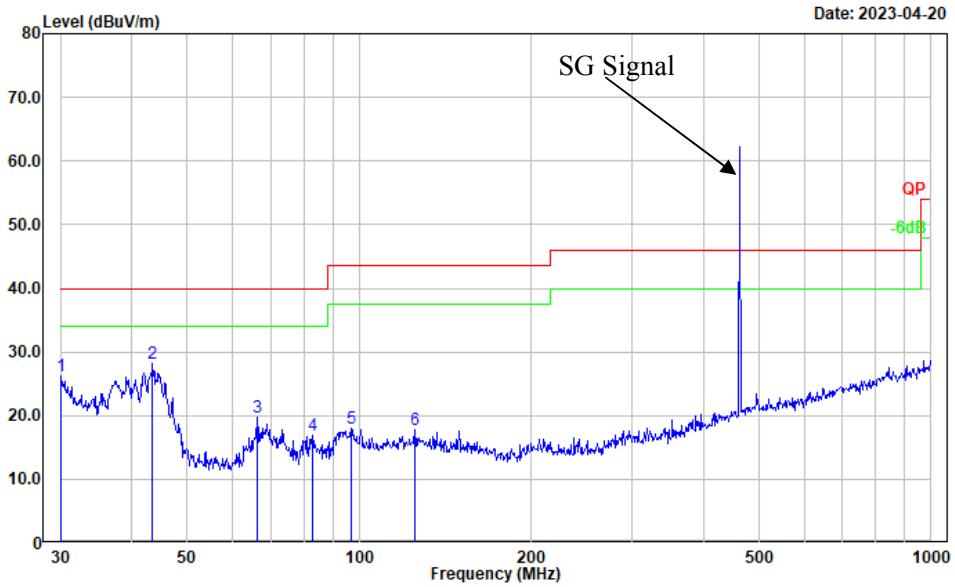
Polarization: horizontal

Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	31.071	27.98	-4.43	23.55	40.00	16.45	Peak
2	73.617	30.87	-16.83	14.04	40.00	25.96	Peak
3	96.775	33.37	-15.13	18.24	43.50	25.26	Peak
4	125.886	28.87	-11.30	17.57	43.50	25.93	Peak
5	261.058	30.39	-12.40	17.99	46.00	28.01	Peak
6	324.456	28.92	-10.41	18.51	46.00	27.49	Peak

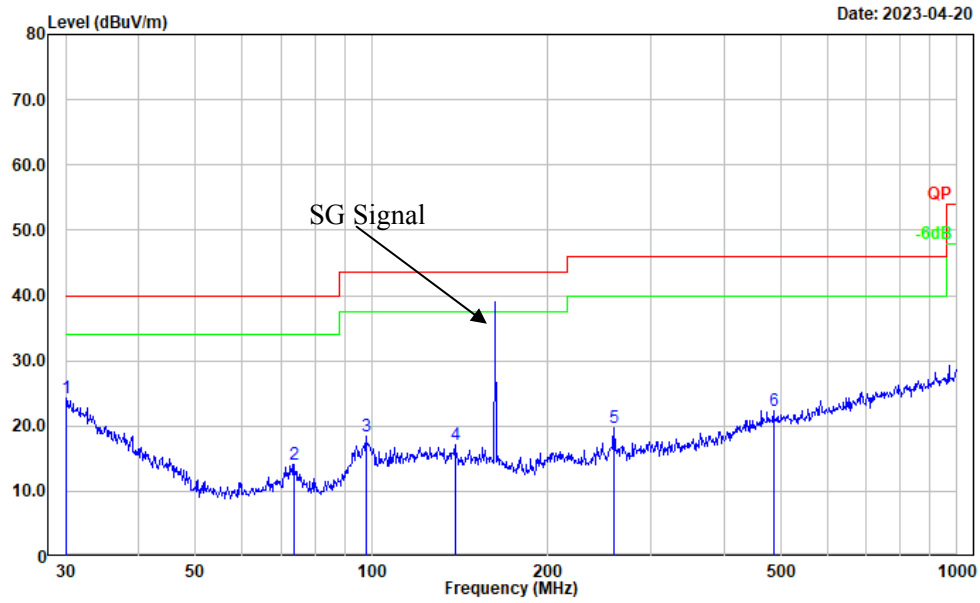
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.000	29.80	-3.60	26.20	40.00	13.80	Peak
2	43.506	41.53	-13.37	28.16	40.00	11.84	Peak
3	66.266	36.64	-16.84	19.80	40.00	20.20	Peak
4	82.648	34.13	-17.28	16.85	40.00	23.15	Peak
5	96.775	33.08	-15.13	17.95	43.50	25.55	Peak
6	125.007	29.19	-11.31	17.88	43.50	25.62	Peak

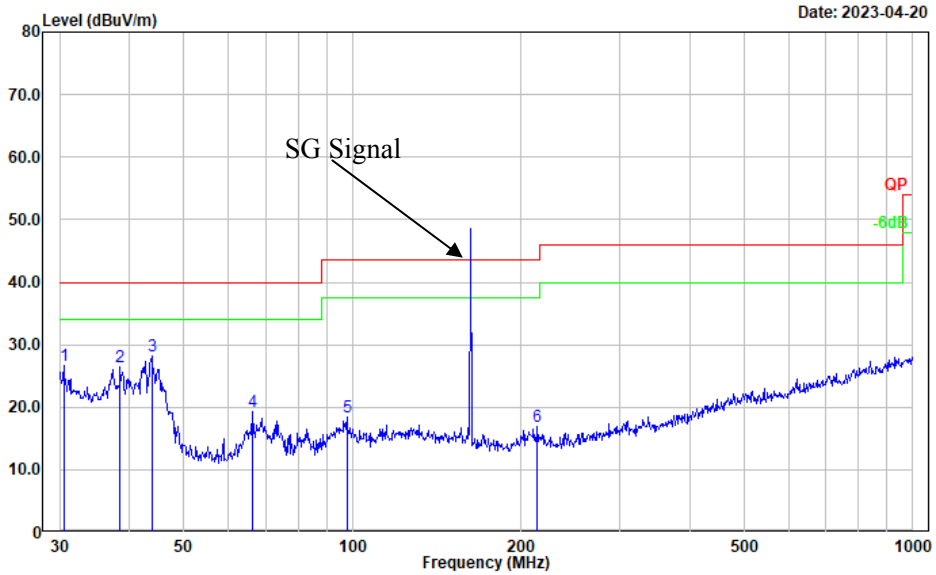
162.000 MHz receiving:

Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.105	27.92	-3.68	24.24	40.00	15.76	Peak
2	73.617	30.85	-16.83	14.02	40.00	25.98	Peak
3	97.798	33.37	-14.85	18.52	43.50	24.98	Peak
4	138.874	28.95	-11.80	17.15	43.50	26.35	Peak
5	259.234	32.20	-12.48	19.72	46.00	26.28	Peak
6	485.609	28.67	-6.29	22.38	46.00	23.62	Peak

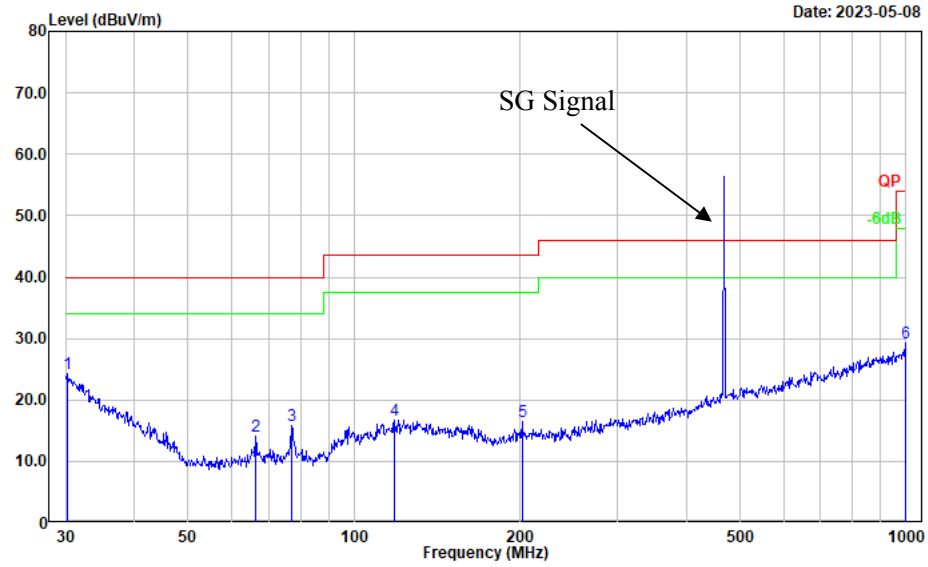
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.531	30.67	-4.00	26.67	40.00	13.33	Peak
2	38.481	36.52	-10.11	26.41	40.00	13.59	Peak
3	43.812	41.67	-13.56	28.11	40.00	11.89	Peak
4	66.266	36.19	-16.84	19.35	40.00	20.65	Peak
5	97.798	33.23	-14.85	18.38	43.50	25.12	Peak
6	213.763	29.41	-12.58	16.83	43.50	26.67	Peak

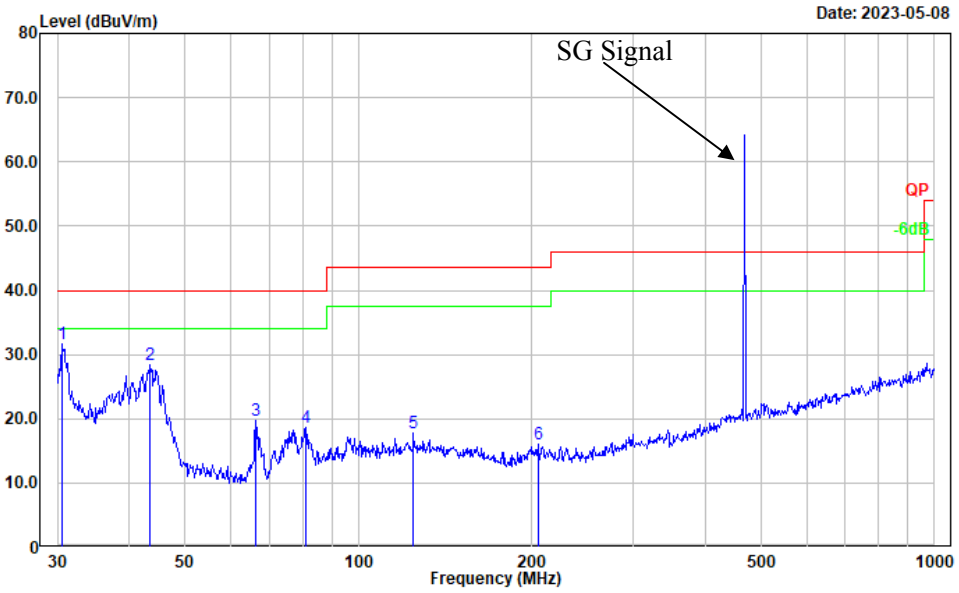
467.6375 MHz receiving:

Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.317	28.09	-3.85	24.24	40.00	15.76	Peak
2	66.266	30.92	-16.84	14.08	40.00	25.92	Peak
3	77.051	33.00	-17.15	15.85	40.00	24.15	Peak
4	118.601	28.36	-11.57	16.79	43.50	26.71	Peak
5	201.393	28.64	-12.25	16.39	43.50	27.11	Peak
6	996.500	28.42	0.94	29.36	54.00	24.64	Peak

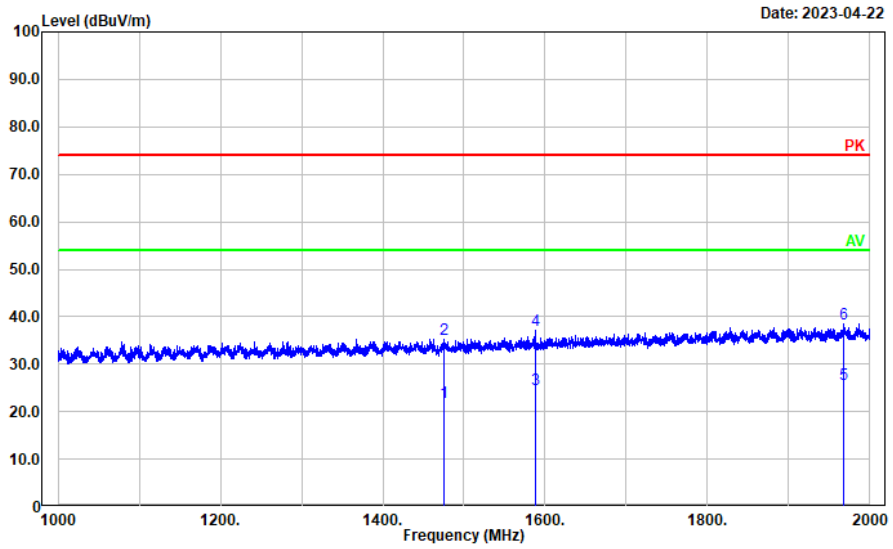
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.531	35.66	-4.00	31.66	40.00	8.34	Peak
2	43.506	41.83	-13.37	28.46	40.00	11.54	Peak
3	66.266	36.62	-16.84	19.78	40.00	20.22	Peak
4	81.212	36.04	-17.38	18.66	40.00	21.34	Peak
5	124.569	29.20	-11.35	17.85	43.50	25.65	Peak
6	204.955	28.50	-12.36	16.14	43.50	27.36	Peak

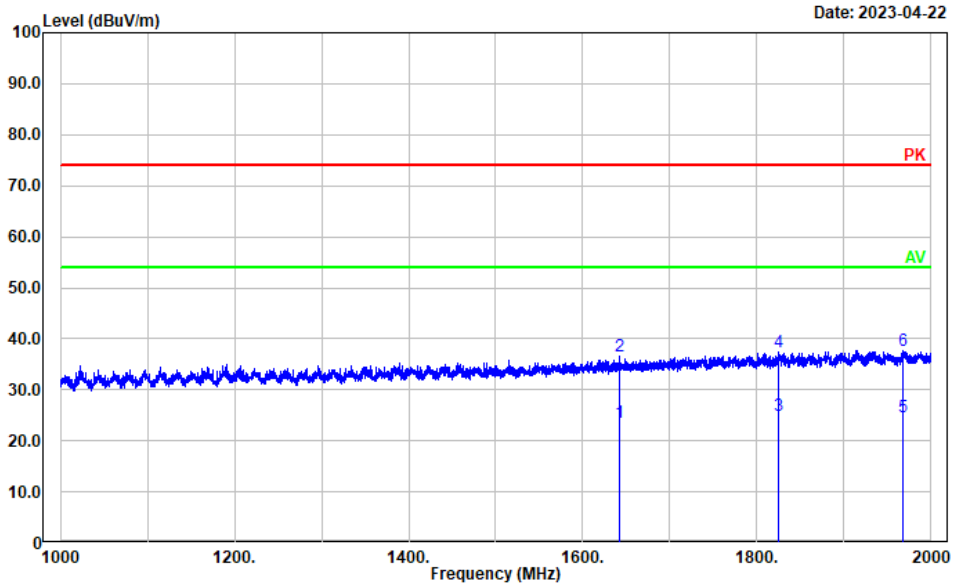
2) Above 1GHz(462.6375 MHz receiving was the worst):

Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1475.095	22.57	-0.57	22.00	54.00	32.00	Average
2	1475.095	35.85	-0.57	35.28	74.00	38.72	Peak
3	1587.517	24.39	0.14	24.53	54.00	29.47	Average
4	1587.517	37.00	0.14	37.14	74.00	36.86	Peak
5	1968.194	23.51	2.17	25.68	54.00	28.32	Average
6	1968.194	36.37	2.17	38.54	74.00	35.46	Peak

Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1642.128	23.15	0.43	23.58	54.00	30.42	Average
2	1642.128	36.16	0.43	36.59	74.00	37.41	Peak
3	1825.165	23.46	1.42	24.88	54.00	29.12	Average
4	1825.165	35.99	1.42	37.41	74.00	36.59	Peak
5	1967.794	22.38	2.17	24.55	54.00	29.45	Average
6	1967.794	35.58	2.17	37.75	74.00	36.25	Peak

4.3 Antenna Power Conduction Limits for Receivers

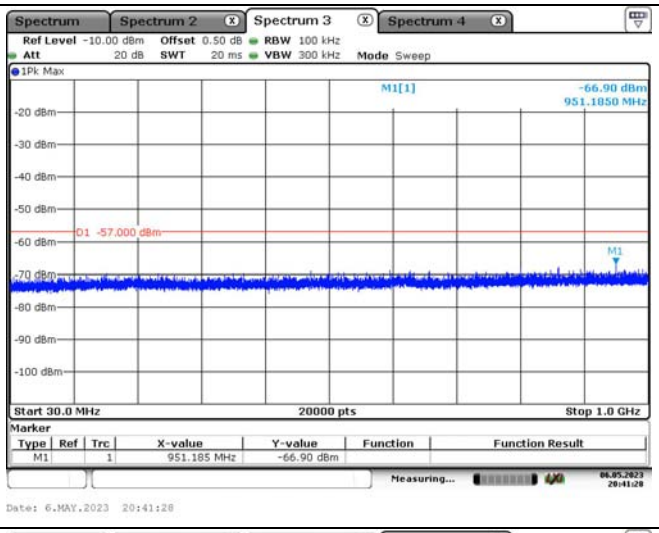
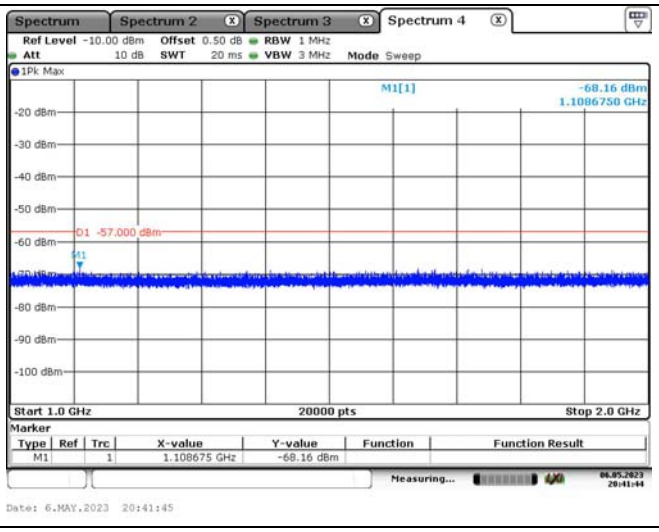
Serial Number:	23FD_1	Test Date:	2023/5/6
Test Site:	RF	Test Mode:	Receiving
Tester:	Morpheus Shi	Test Result:	Pass

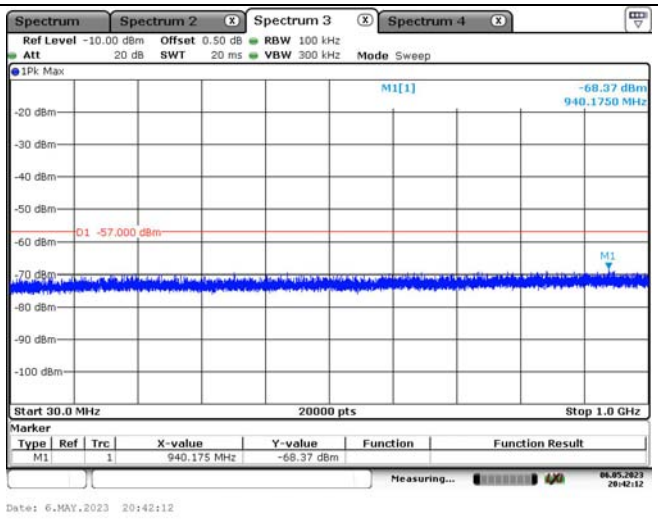
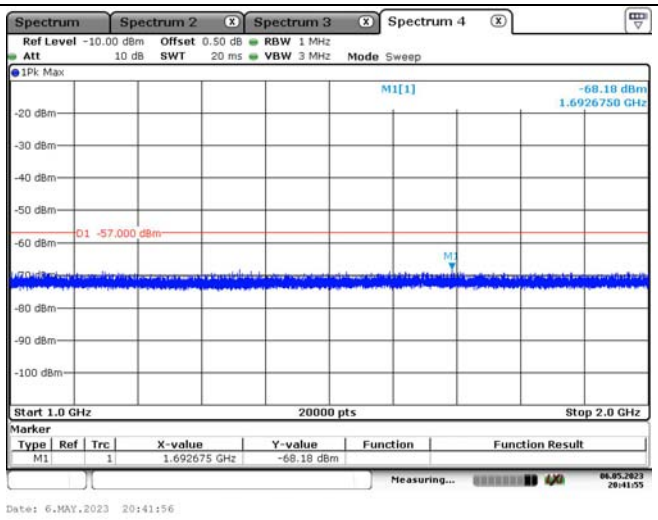
Environmental Conditions:					
Temperature: (℃)	25.5	Relative Humidity: (%)	66	ATM Pressure: (kPa)	100.6

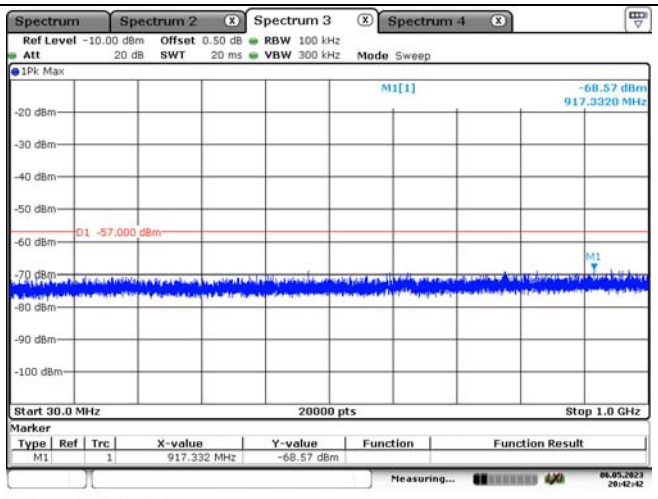
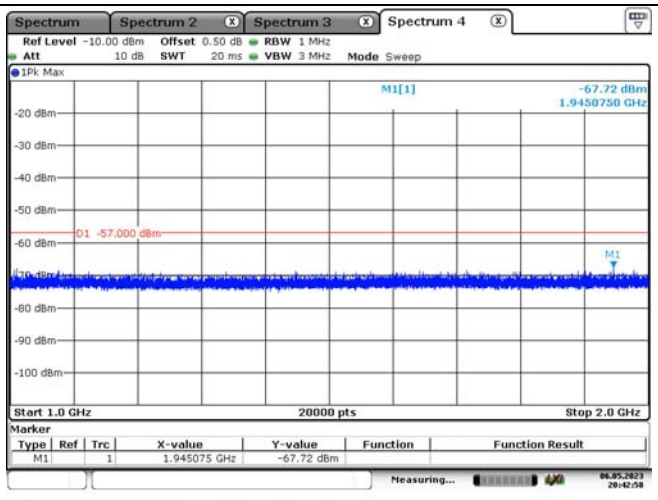
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022/7/15	2023/7/14
YINSAIGE	Coaxial Cable	SS402	SJ0100001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Receiving 462.6375 MHz	
30MHz -1GHz	
1GHz -2GHz	

Receiving 467.6375 MHz	
30MHz -1GHz	
1GHz -2GHz	

Receiving 162.000 MHz	
30MHz -1GHz	
1GHz -2GHz	

===== END OF REPORT =====