



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



TEST REPORT

Applicant: PO FUNG ELECTRONIC (HK) INTERNATONAL GROUP
COMPANY LIMITED

Address: Room 1508, 15/F, Office Tower II, Grand Plaza, 625 Nathan Road, Kowloon, Hong Kong

FCC ID: 2AJGM-MP31

Product Name: GMRS TWO WAY RADIO

Model Number: MP31, MP31S, MP31X, MP31Pro, MP31Plus

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

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

Report Number: CR21090045-00B

Date Of Issue: 2022-02-24

Reviewed By: Sun Zhong *Sun Zhong*

Title: Manager

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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.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	GMRS TWO WAY RADIO
EUT Model:	MP31
Multiple models:	MP31S, MP31X, MP31Pro, MP31Plus
Highest Operation Frequency:	467.7125MHz
Rated Input Voltage:	DC 3.7V from battery or DC 5V from adapter
Serial Number:	CR21090045-RF-S1
EUT Received Date:	2021.9.29
EUT Received Status:	Good

Note: The Multiple models are electrically identical with Test model, please refer to the declaration letter for more detail, which was provided by manufacturer.

Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
Earphone	PO FUNG ELECTRONIC (HK) INTERNATIONAL GROUP COMPANY LIMITED	Unknown	Unshielding, 1.5m
Charger Base		USB-W31	Input 5V(USB) Output: DC 4.2V 0.5A
Adapter	DEE VAN ENTERPRISE CO., LTD.	DSA-5PF07-05 FUS	Input 100-240V 50/60Hz 0.2A OUTPUT: 5V 1A

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: M1:Receiving 462.6375 MHz M2: Receiving 467.6375 MHz M3: Scanning
Equipment Modifications:	No
EUT Exercise Software:	No

1.2.2 Support Equipment List and Details

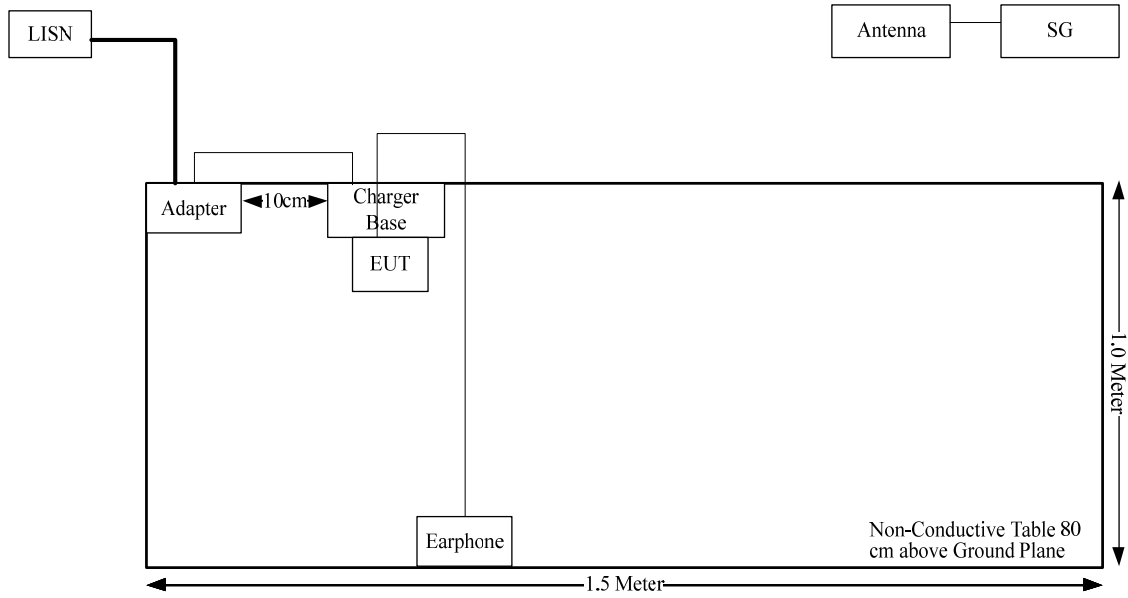
Manufacturer	Description	Model	Serial Number
EMCO	Antenna	3121C	9109-753
MICRO-COAX	Coaxial Cable	UFA210B-0-0720-300300	99G1448
Agilent	Signal Generator	E8247C	MY43321350
Unknown	Earphone	Unknown	Earphone-1

1.2.3 Support Cable List and Details

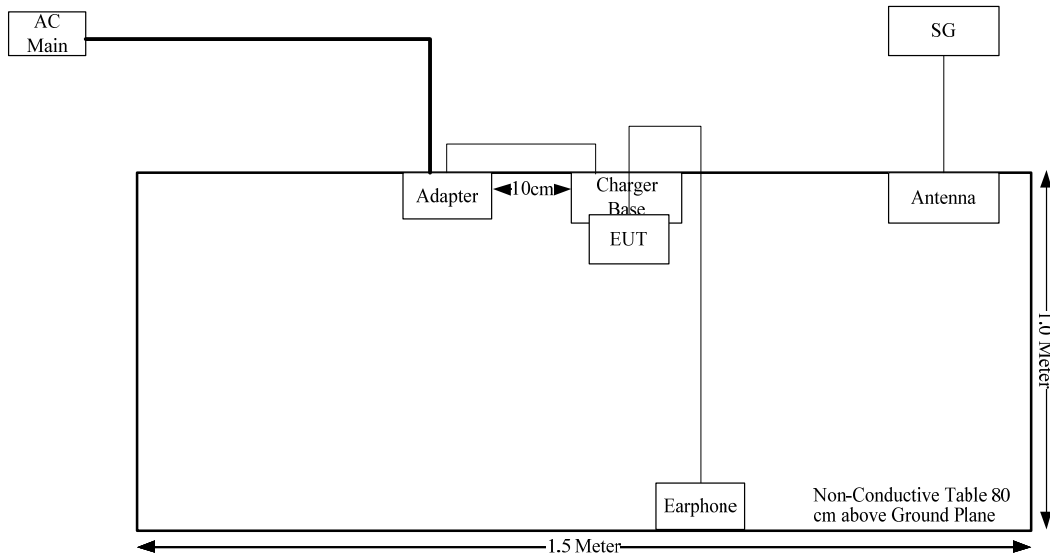
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Audio cable	No	No	1	Earphone	EUT
Adapter Cable	No	No	1.2	Adapter	Charger

1.2.4 Block Diagram of Test Setup

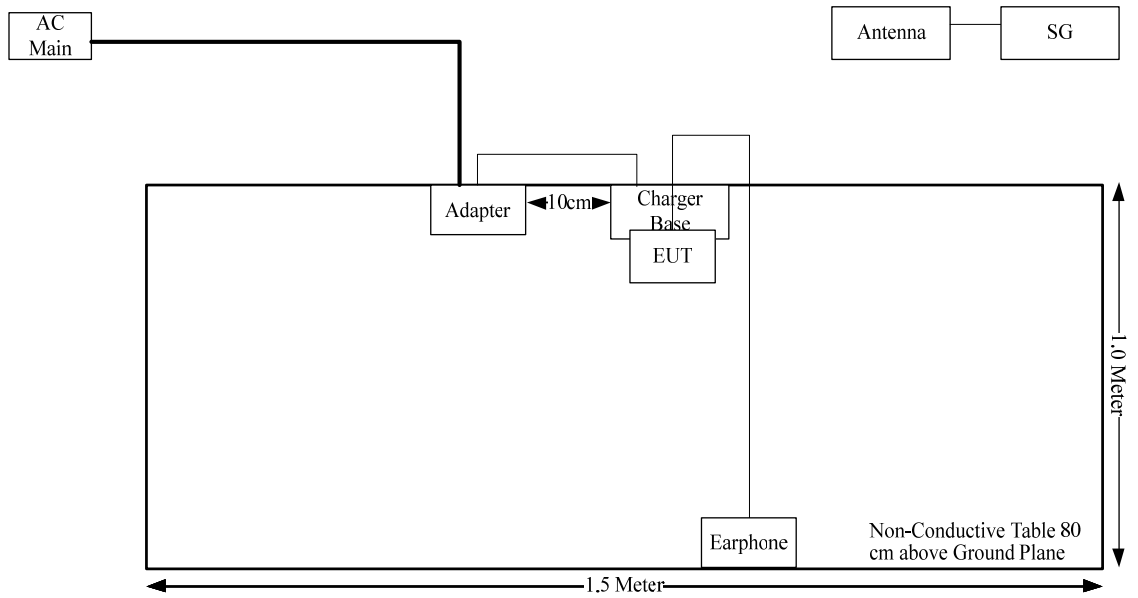
AC Line Conducted Test:



Radiated Emission Test:
Below 1GHz:



Above 1GHz:



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	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

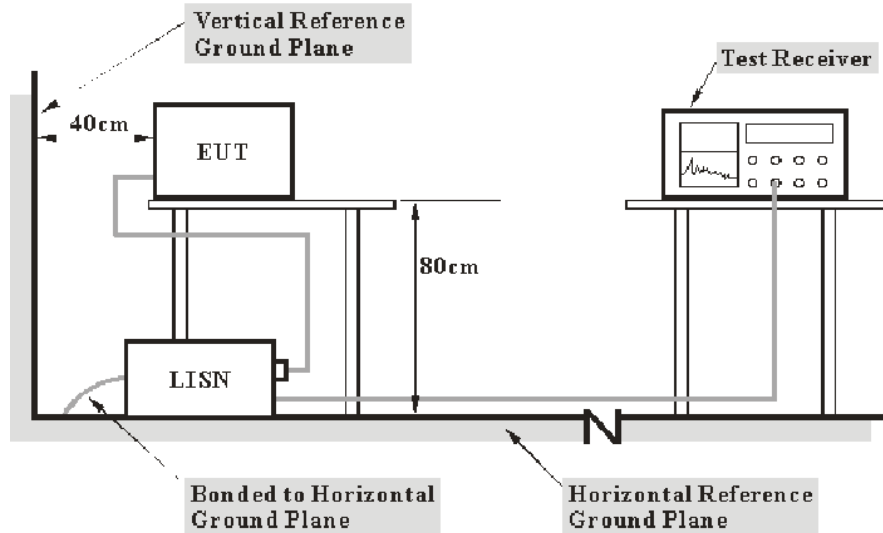
2. SUMMARY OF TEST RESULTS

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

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 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

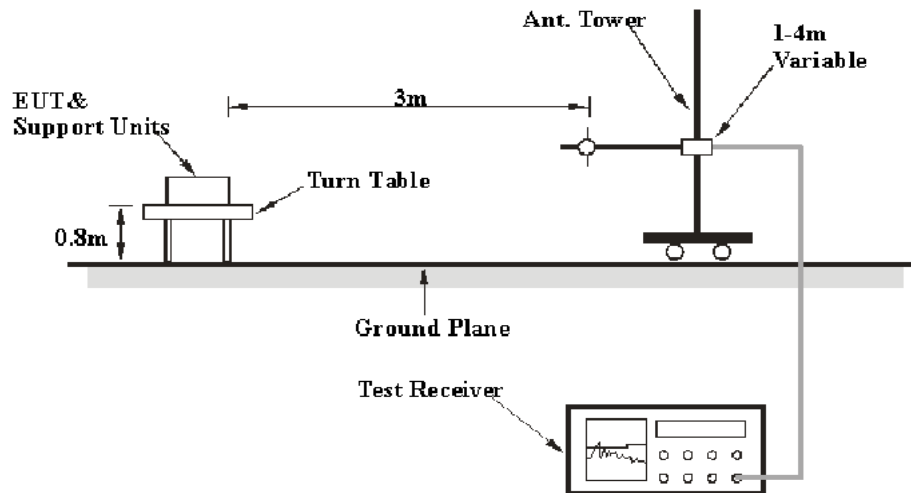
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

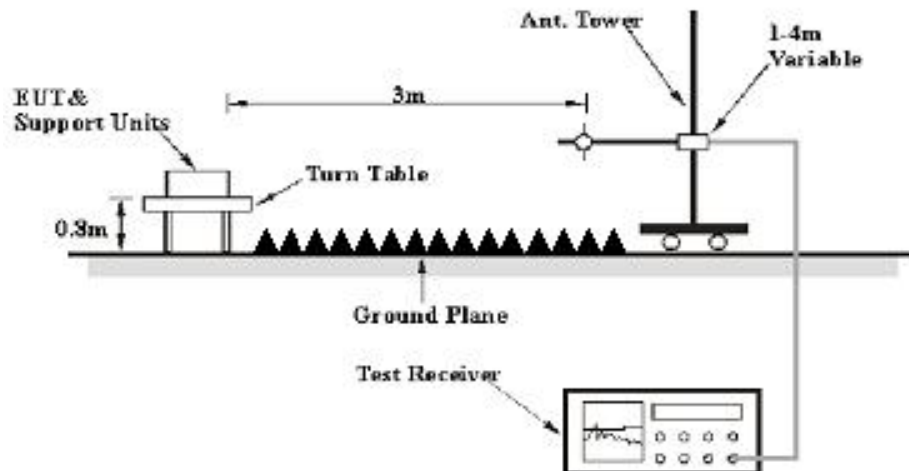
3.2 Radiation Emissions

3.2.1 EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission 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, peak and average detection mode above 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

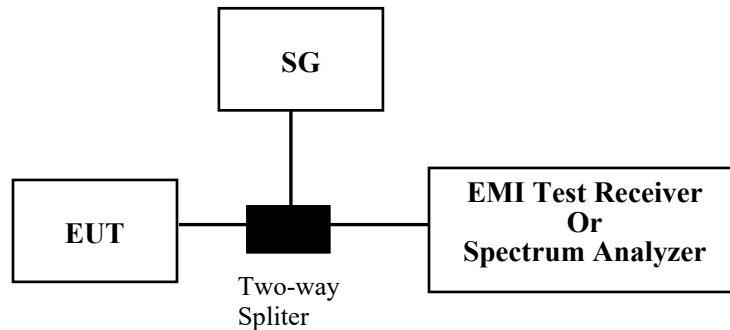
3.3 Antenna power conduction limits for receivers

3.3.1 Applicable Standard

(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.

(b) CB receivers and receivers that operate (tune) in the frequency range 30 to 960 MHz that are provided only with a permanently attached antenna shall comply with the radiated emission limitations in this part, as measured with the antenna attached

3.3.2 EUT Setup



3.3.3 Test Procedure

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW=1kHz(9-150kHz), 10kHz(150kHz-30MHz), 100 kHz(30MHz-1GHz), 1MHz(Above 1GHz).
- c) Set the VBW $\geq [3 \times \text{RBW}]$.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	CR21090045-RF-S1	Test Date:	2021-11-05
Test Site:	CE	Test Mode:	M1~M3
Tester:	Nick Tang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	25.4	Relative Humidity: (%)	70	ATM Pressure: (kPa)	100.9
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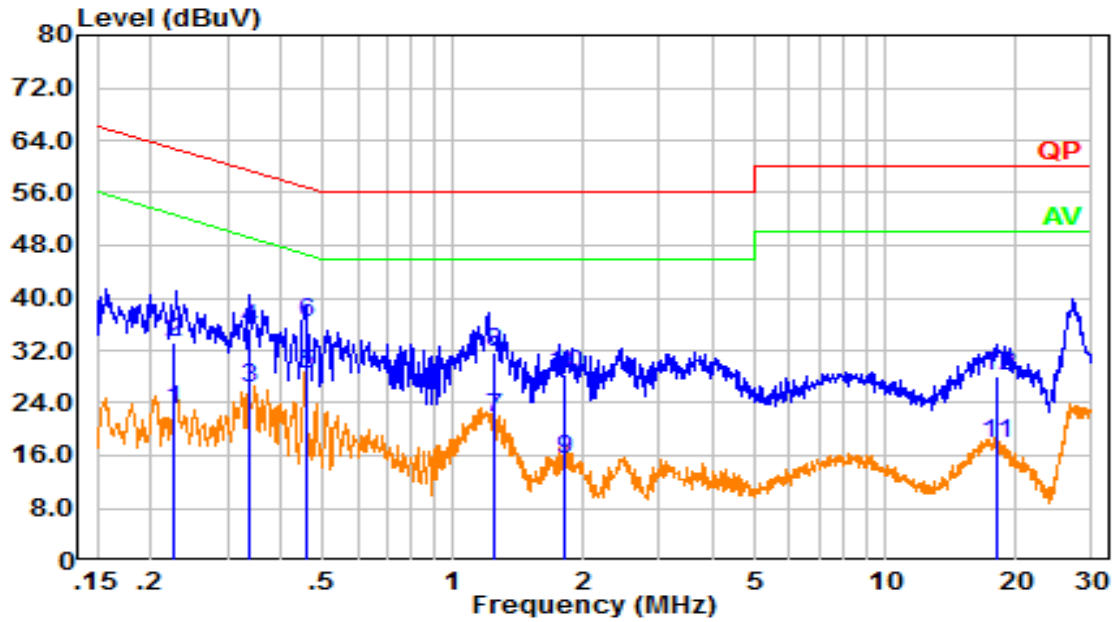
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101132	2021-04-25	2022-04-24
R&S	EMI Test Receiver	ESR3	102726	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2021-08-08	2022-08-07
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).*

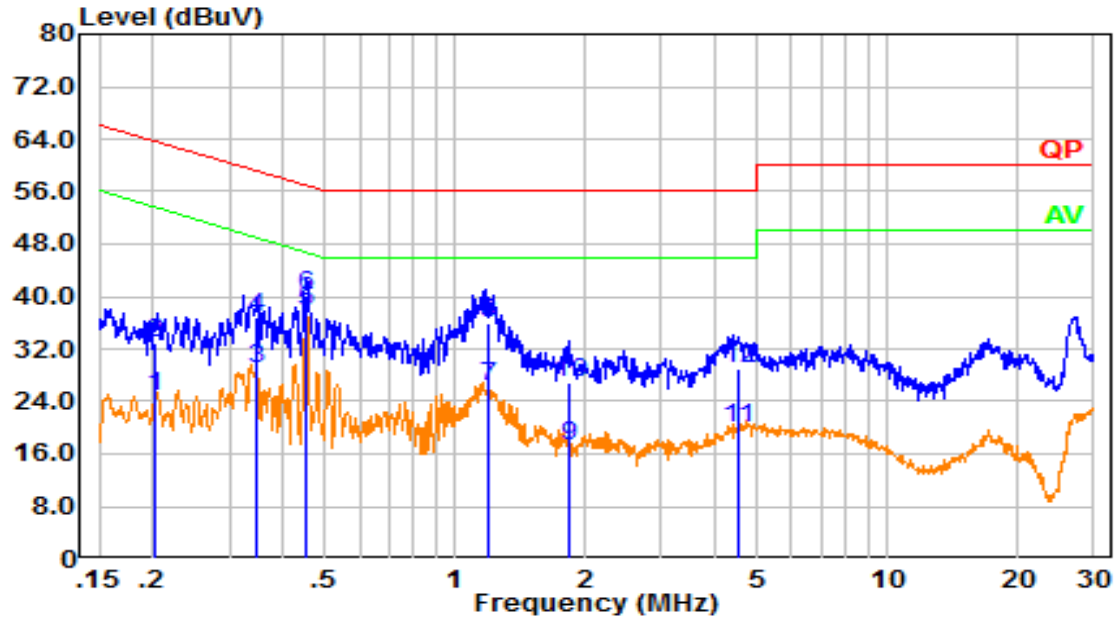
Test Mode: M1(Worst of M1&M2)

Line:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Detector
1	0.226	13.27	9.61	22.88	52.59	29.71	Average
2	0.226	23.67	9.61	33.28	62.59	29.30	QP
3	0.336	16.51	9.61	26.12	49.29	23.18	Average
4	0.336	25.72	9.61	35.33	59.29	23.97	QP
5	0.456	18.70	9.61	28.31	46.77	18.46	Average
6	0.456	26.52	9.61	36.13	56.77	20.64	QP
7	1.240	12.19	9.62	21.81	46.00	24.19	Average
8	1.240	22.15	9.62	31.77	56.00	24.23	QP
9	1.801	5.67	9.63	15.30	46.00	30.70	Average
10	1.801	18.71	9.63	28.33	56.00	27.67	QP
11	18.021	7.93	9.75	17.68	50.00	32.32	Average
12	18.021	18.42	9.75	28.17	60.00	31.83	QP

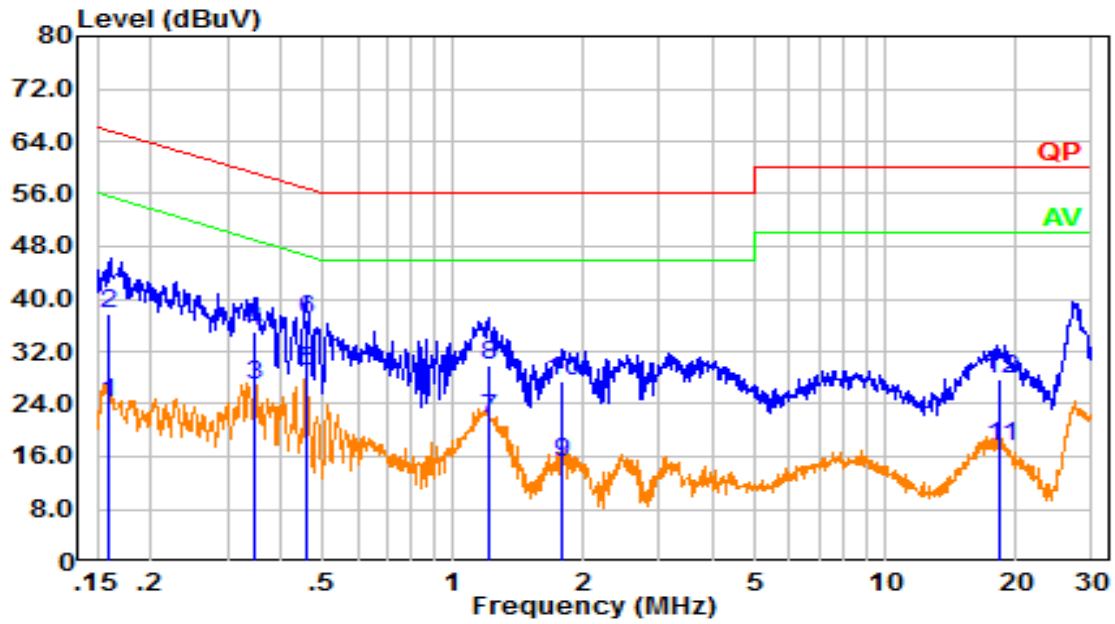
Neutral:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Detector
1	0.203	15.08	9.61	24.69	53.50	28.81	Average
2	0.203	23.27	9.61	32.88	63.50	30.62	QP
3	0.348	19.33	9.61	28.94	49.01	20.07	Average
4	0.348	27.32	9.61	36.93	59.01	22.07	QP
5	0.454	28.06	9.61	37.67	46.80	9.13	Average
6	0.454	30.60	9.61	40.21	56.80	16.59	QP
7	1.193	16.52	9.62	26.14	46.00	19.86	Average
8	1.193	26.28	9.62	35.90	56.00	20.10	QP
9	1.840	7.55	9.63	17.18	46.00	28.82	Average
10	1.840	17.38	9.63	27.01	56.00	28.99	QP
11	4.514	10.22	9.66	19.88	46.00	26.12	Average
12	4.514	19.40	9.66	29.05	56.00	26.95	QP

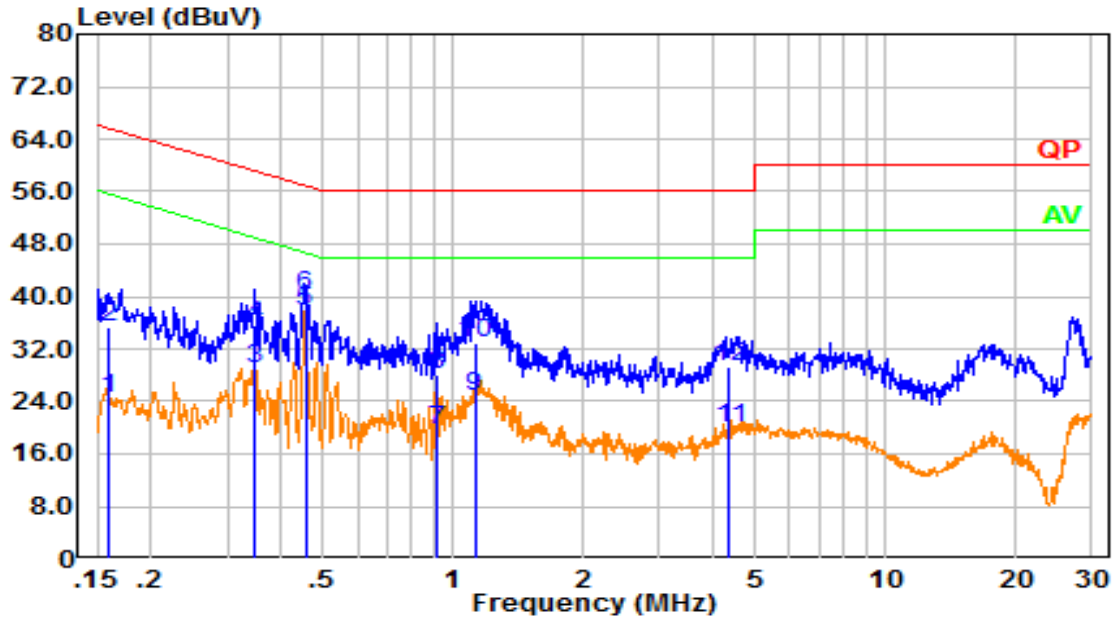
Test Mode: M3

Line:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Detector
1	0.159	14.40	9.61	24.01	55.52	31.51	Average
2	0.159	28.19	9.61	37.80	65.52	27.72	QP
3	0.347	17.11	9.61	26.72	49.02	22.31	Average
4	0.347	25.51	9.61	35.12	59.02	23.91	QP
5	0.457	19.36	9.61	28.97	46.75	17.77	Average
6	0.457	27.09	9.61	36.70	56.75	20.05	QP
7	1.206	12.05	9.62	21.67	46.00	24.33	Average
8	1.206	20.18	9.62	29.80	56.00	26.20	QP
9	1.783	5.61	9.63	15.24	46.00	30.76	Average
10	1.783	17.80	9.63	27.43	56.00	28.57	QP
11	18.462	7.65	9.76	17.41	50.00	32.59	Average
12	18.462	18.16	9.76	27.92	60.00	32.08	QP

Neutral:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Detector
1	0.159	14.93	9.61	24.54	55.51	30.97	Average
2	0.159	25.66	9.61	35.27	65.51	30.24	QP
3	0.347	19.24	9.61	28.85	49.03	20.17	Average
4	0.347	26.02	9.61	35.63	59.03	23.39	QP
5	0.455	28.20	9.61	37.81	46.79	8.98	Average
6	0.455	30.68	9.61	40.29	56.79	16.50	QP
7	0.917	9.97	9.62	19.59	46.00	26.41	Average
8	0.917	18.58	9.62	28.20	56.00	27.80	QP
9	1.121	15.19	9.62	24.81	46.00	21.19	Average
10	1.121	23.39	9.62	33.01	56.00	22.99	QP
11	4.357	10.18	9.65	19.83	46.00	26.17	Average
12	4.357	19.60	9.65	29.25	56.00	26.75	QP

4.2 Radiation Spurious Emissions

Serial Number:	CR21090045-RF-S1	Test Date:	2021-11-12~2021-11-16
Test Site:	966-1, 966-2	Test Mode:	M1~M3
Tester:	Great Qiao, Carl Liang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.9~24.6	Relative Humidity: (%)	49~62	ATM Pressure: (kPa)	100.7~101.5
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Test Equipment List and Details:

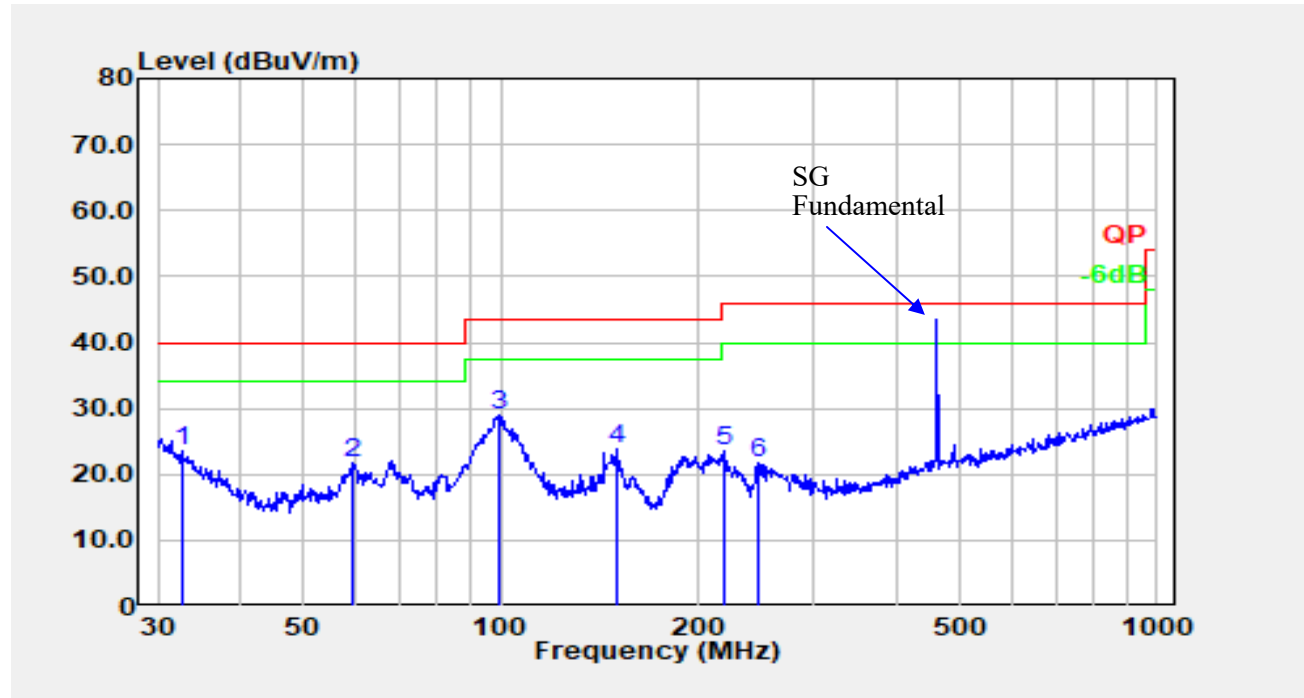
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020-10-19	2023-10-18
R&S	EMI Test Receiver	ESR3	102724	2021-07-22	2022-07-21
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2021-07-18	2022-07-17
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2021-07-18	2022-07-17
Sonoma	Amplifier	310N	186165	2021-07-18	2022-07-17
Audix	Test Software	E3	201021 (V9)	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020-10-13	2023-10-12
R&S	Spectrum Analyzer	FSV40	101591	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2021-08-08	2022-08-07
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2021-08-08	2022-08-07
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2021-11-10	2022-11-09

* 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:

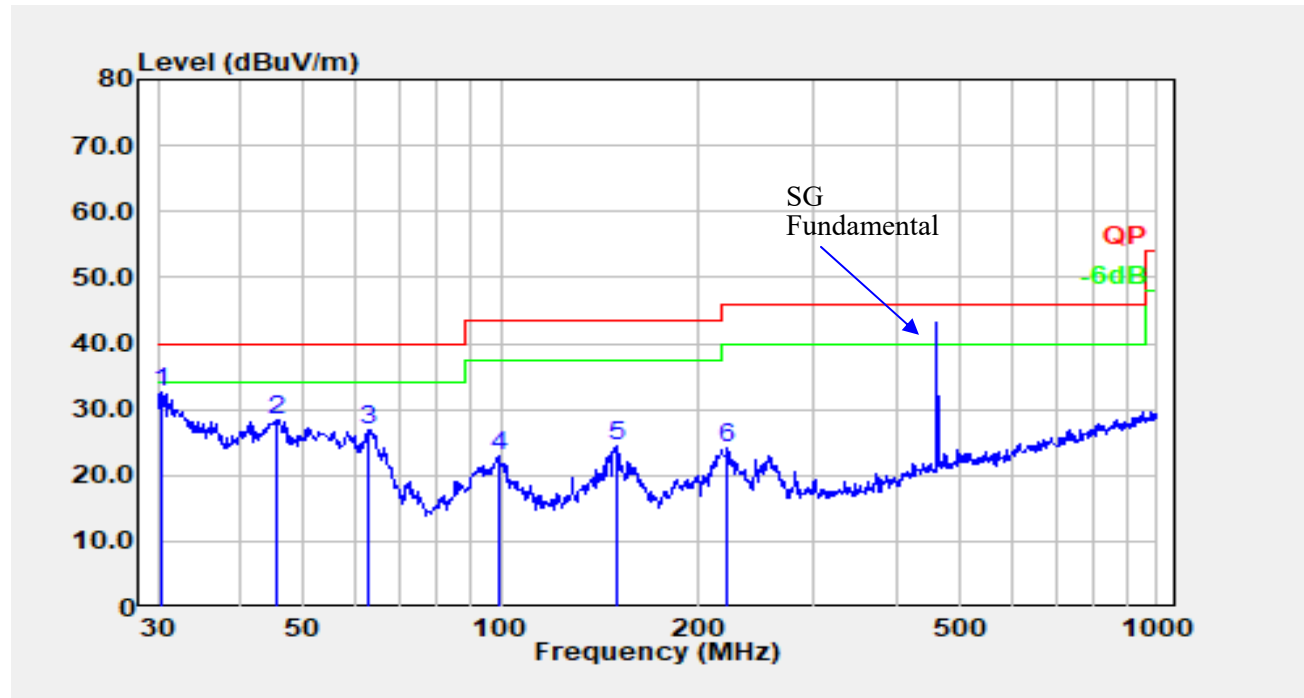
Test Mode: M1(Worst of M1&M2)

Horizontal:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1	32.634	29.34	-5.83	23.51	40.00	16.49	Peak
2	59.649	39.39	-17.63	21.76	40.00	18.24	Peak
3	99.528	43.58	-14.69	28.89	43.50	14.61	Peak
4	150.011	36.26	-12.26	24.00	43.50	19.50	Peak
5	219.845	36.56	-12.96	23.61	46.00	22.39	Peak
6	245.951	35.02	-13.15	21.87	46.00	24.13	Peak

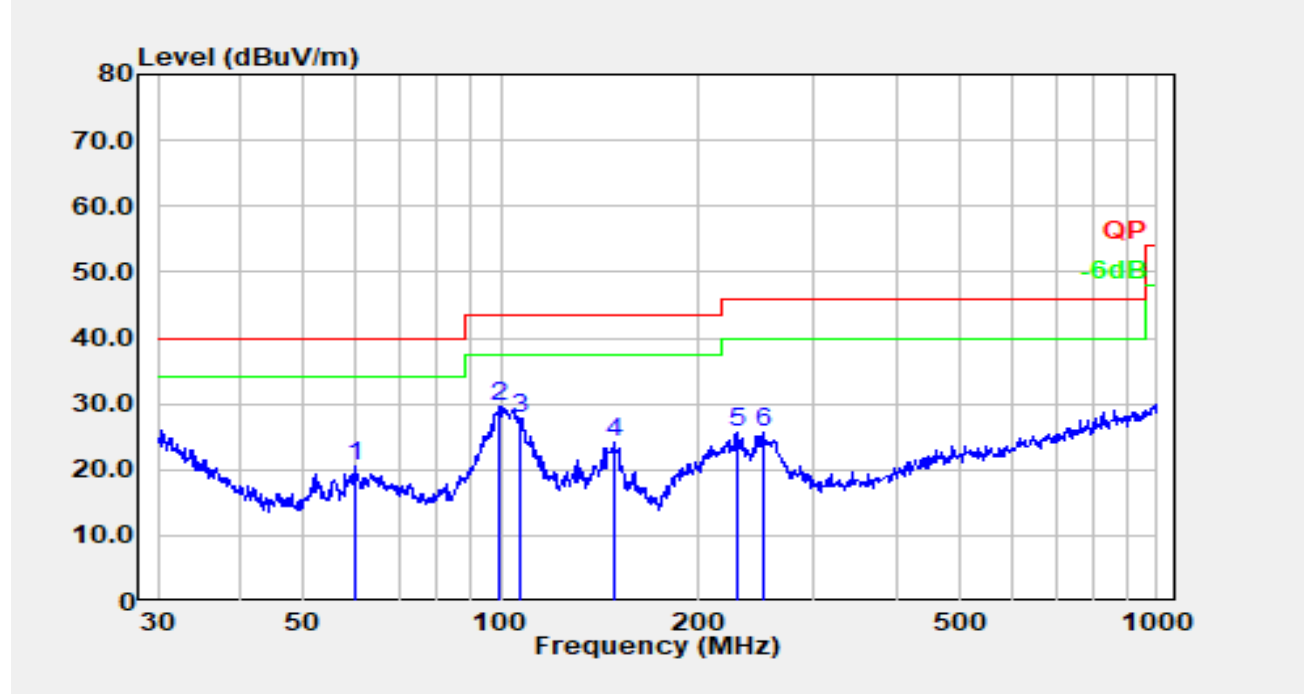
Vertical:



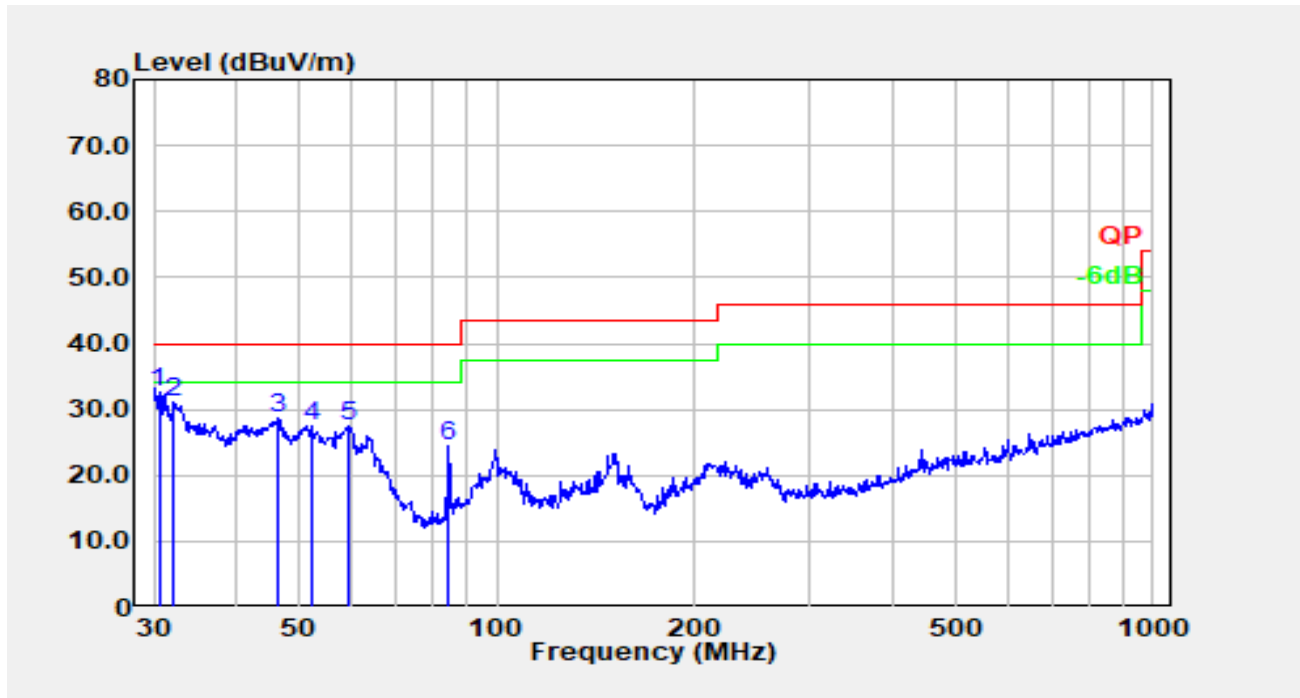
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.424	36.74	-4.12	32.63	40.00	7.37	Peak
2	45.695	43.40	-14.88	28.53	40.00	11.47	Peak
3	62.871	44.33	-17.36	26.97	40.00	13.03	Peak
4	99.180	37.69	-14.77	22.92	43.50	20.58	Peak
5	150.538	36.60	-12.29	24.31	43.50	19.19	Peak
6	221.392	37.22	-12.98	24.24	46.00	21.76	Peak

Test Mode: M3

Horizontal:

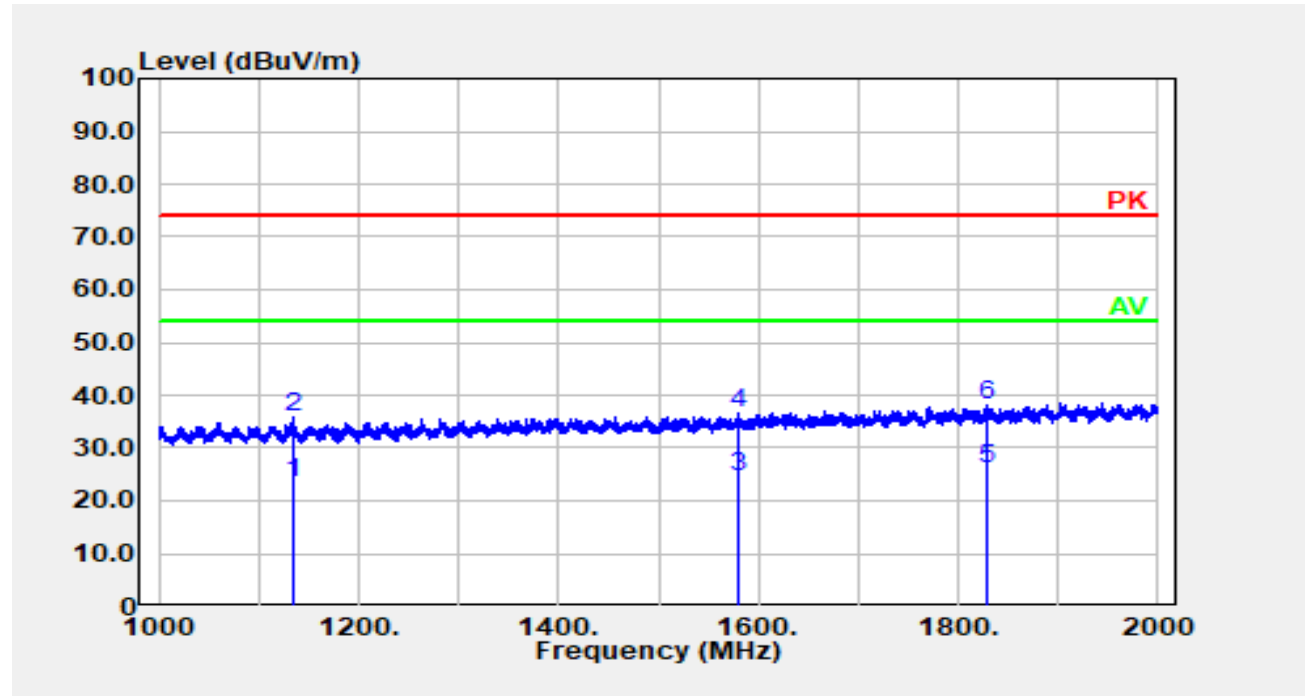


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	59.859	38.10	-17.64	20.46	40.00	19.54	Peak
2	99.528	44.37	-14.69	29.67	43.50	13.83	Peak
3	106.759	41.09	-13.22	27.87	43.50	15.63	Peak
4	148.441	36.35	-12.25	24.10	43.50	19.40	Peak
5	228.490	38.67	-13.12	25.55	46.00	20.45	Peak
6	250.301	38.87	-13.25	25.62	46.00	20.38	Peak

Vertical:

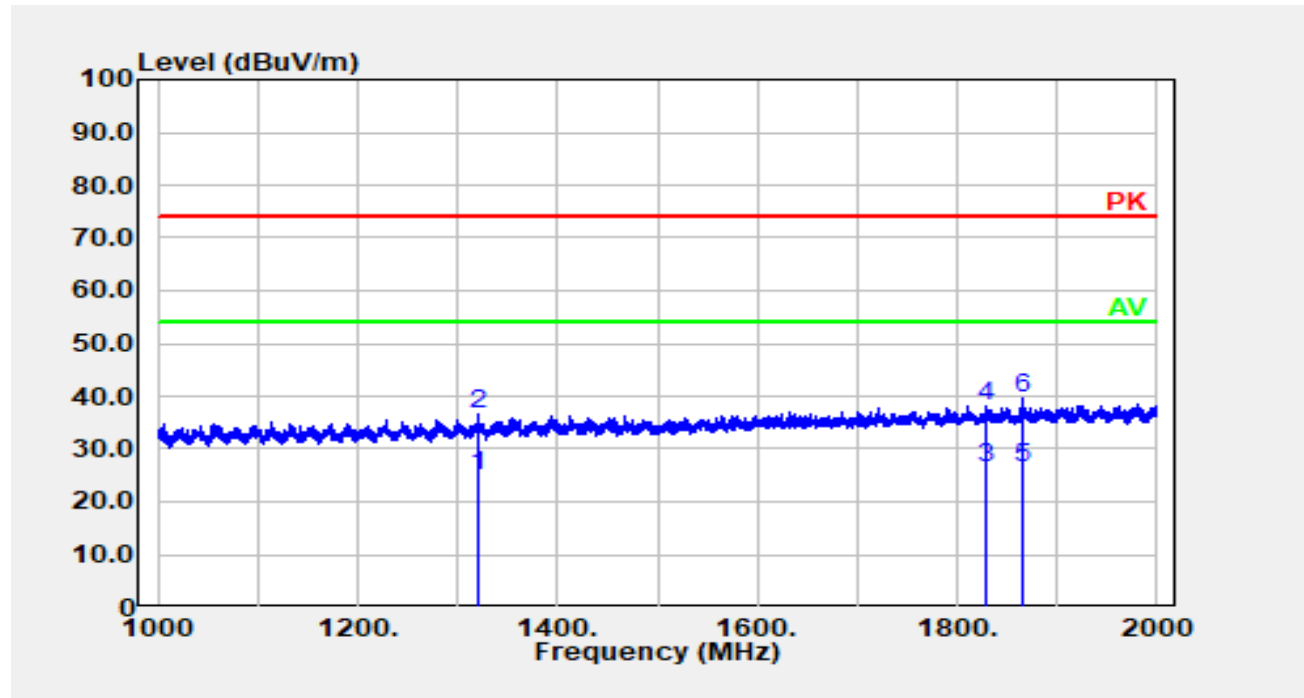
No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1	30.531	36.83	-4.20	32.63	40.00	7.37	Peak
2	32.067	36.36	-5.37	30.99	40.00	9.01	Peak
3	46.178	43.88	-15.17	28.70	40.00	11.30	Peak
4	52.208	44.96	-17.43	27.53	40.00	12.47	Peak
5	59.232	45.12	-17.62	27.50	40.00	12.50	Peak
6	84.405	41.87	-17.47	24.40	40.00	15.60	Peak

2) Above 1GHz

Test Mode: M1(Worst of M1~M3)**Horizontal:**

No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1	1133.427	25.34	-2.12	23.22	54.00	30.78	Average
2	1133.427	37.93	-2.12	35.81	74.00	38.19	Peak
3	1580.116	24.55	0.13	24.68	54.00	29.32	Average
4	1580.116	36.43	0.13	36.56	74.00	37.44	Peak
5	1828.766	24.57	1.63	26.20	54.00	27.80	Average
6	1828.766	36.44	1.63	38.07	74.00	35.93	Peak

Vertical:



No.	Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1	1319.864	25.97	-1.22	24.75	54.00	29.25	Average
2	1319.864	37.82	-1.22	36.60	74.00	37.40	Peak
3	1829.566	24.76	1.63	26.39	54.00	27.61	Average
4	1829.566	36.66	1.63	38.29	74.00	35.71	Peak
5	1866.573	24.79	1.79	26.58	54.00	27.42	Average
6	1866.573	37.72	1.79	39.51	74.00	34.49	Peak

4.3 Antenna power conduction limits for receivers

Serial Number:	CR21090045-RF-S1	Test Date:	2022/02/24
Test Site:	966-1, 966-2	Test Mode:	M1~M3
Tester:	Jack Zou	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	19.8	Relative Humidity: (%)	51	ATM Pressure: (kPa)	102.2
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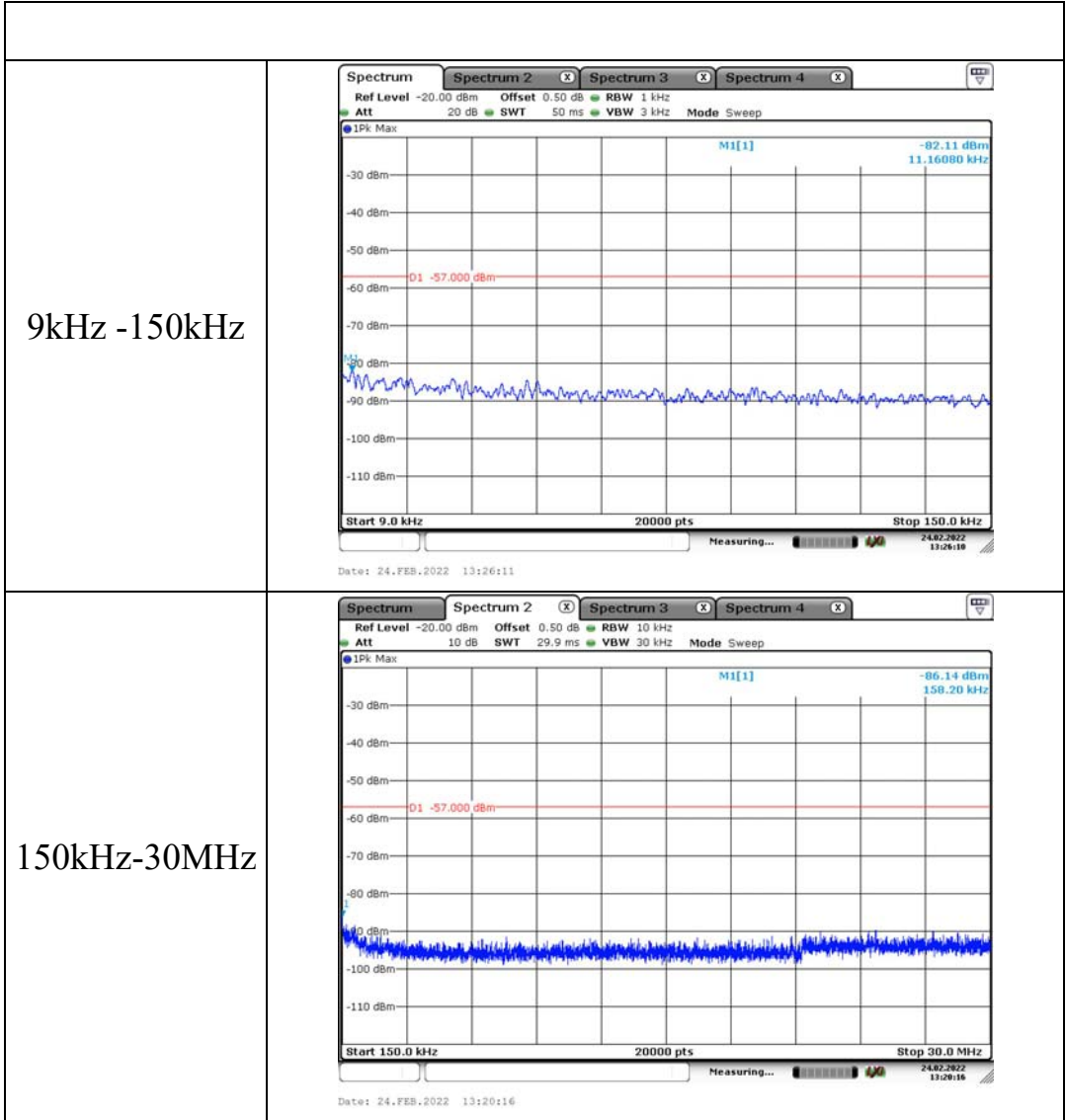
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2021/7/22	2022/7/21
Agilent	Signal Generator	E8247C	MY43321350	2021/04/25	2022/04/24
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	Each Time	N/A
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100001	Each time	N/A

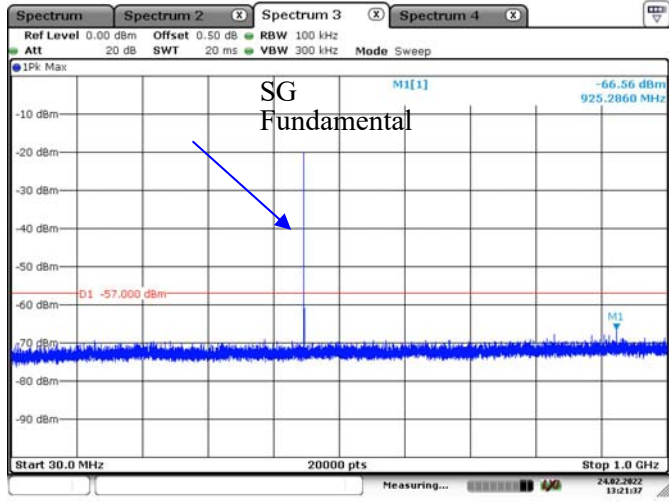
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

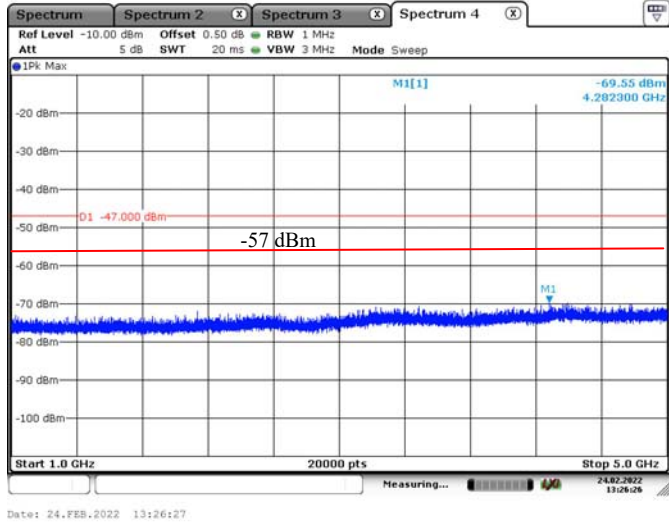
M1:



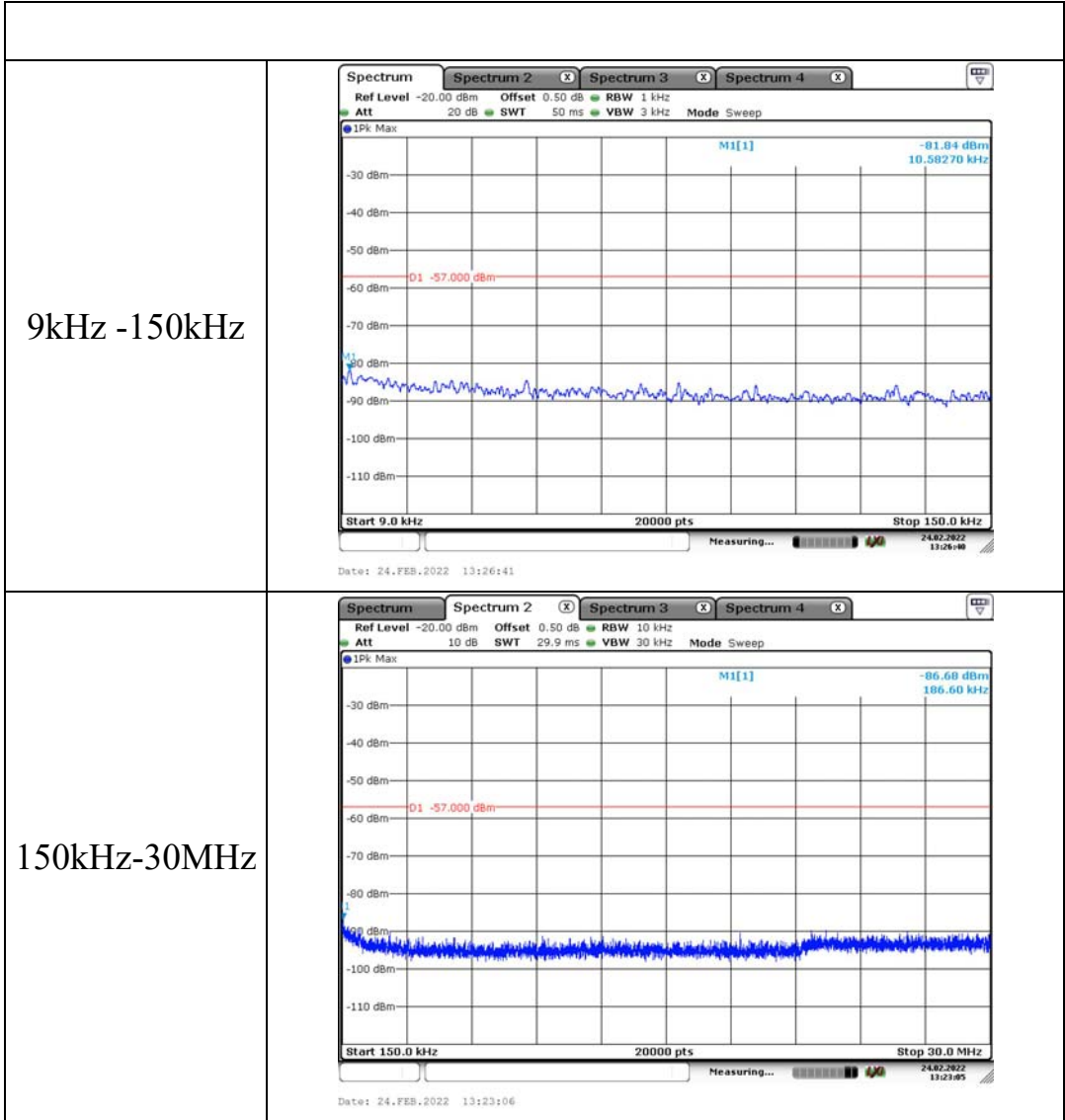
30MHz-1GHz

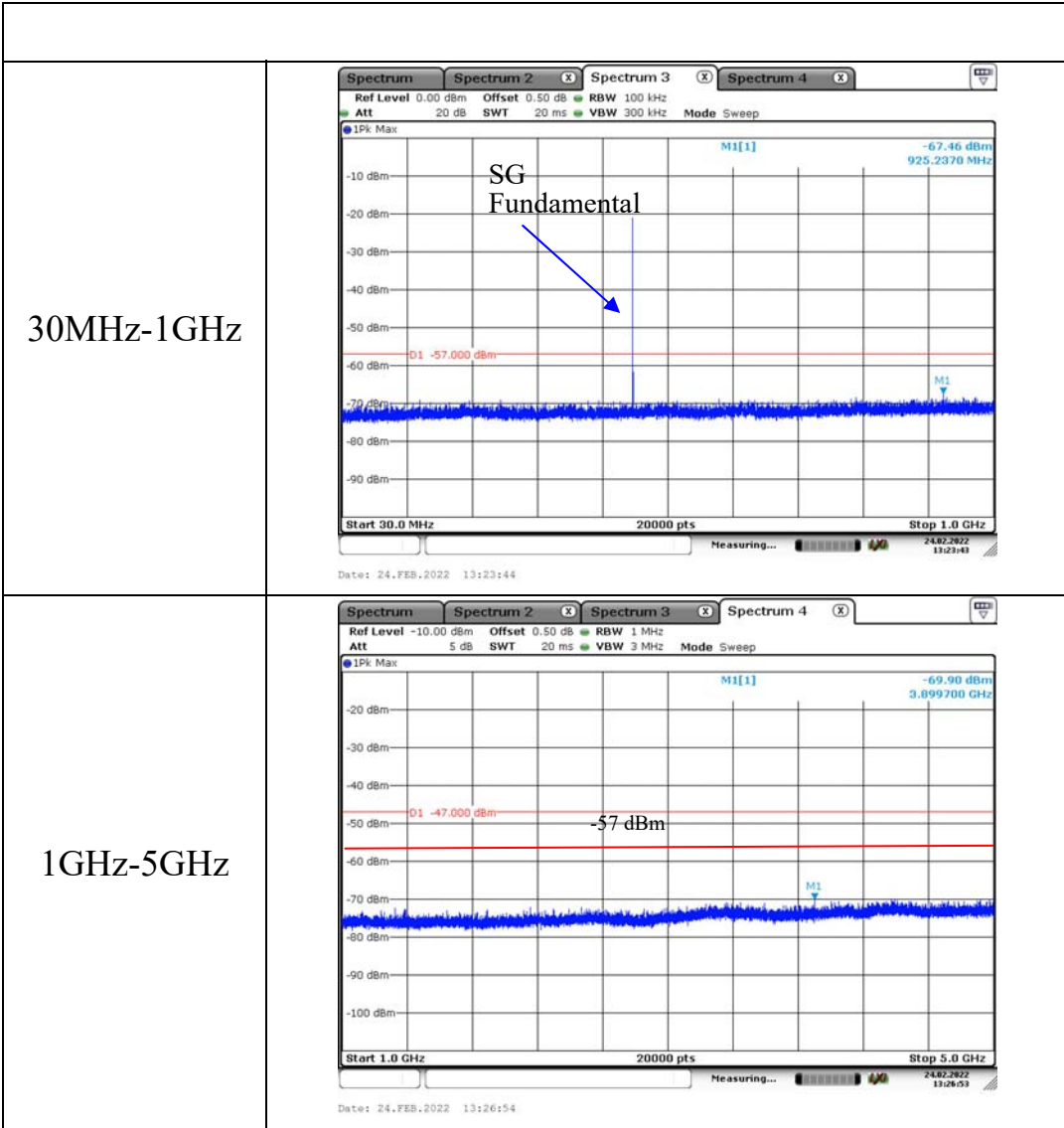


1GHz-5GHz

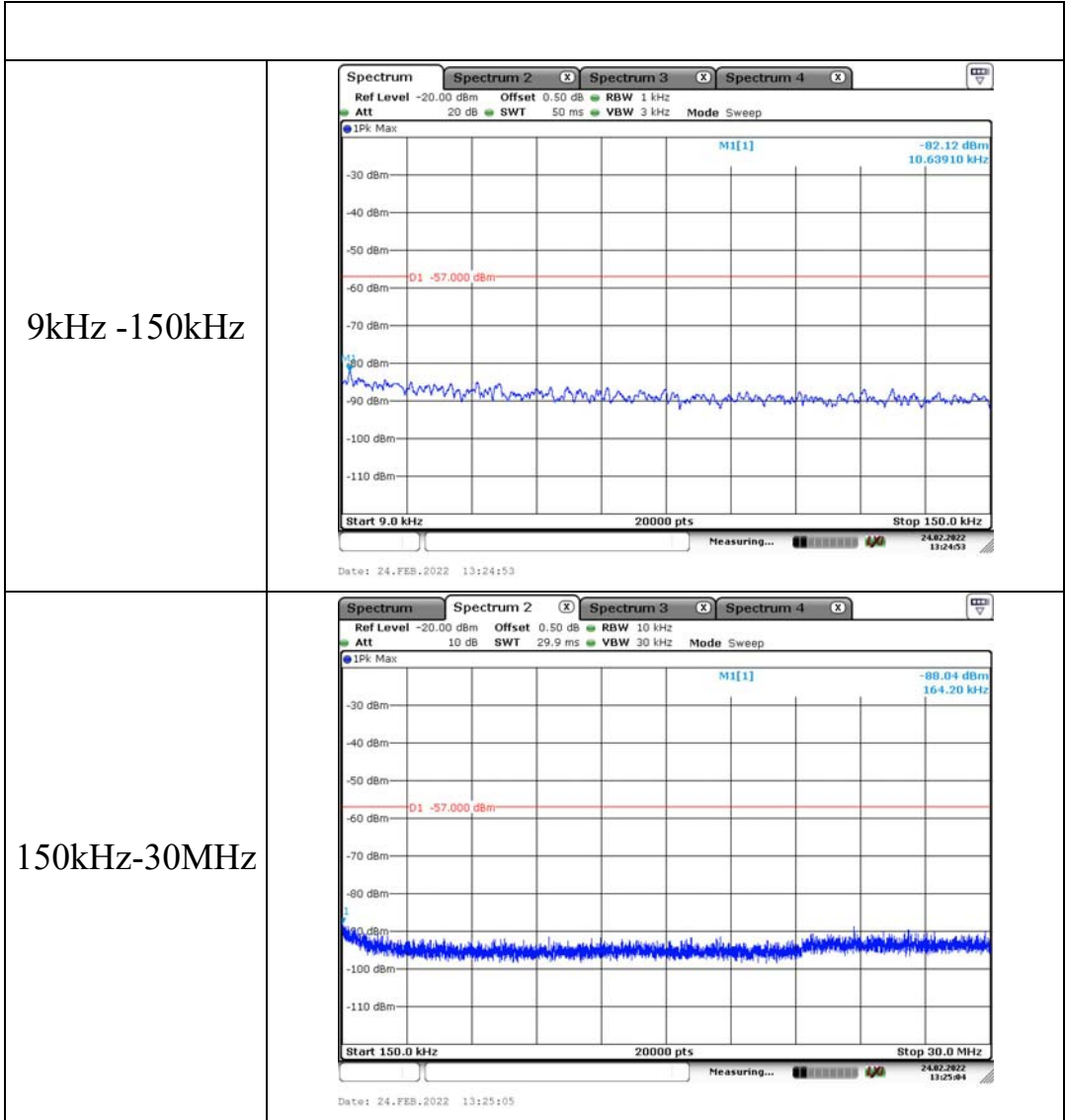


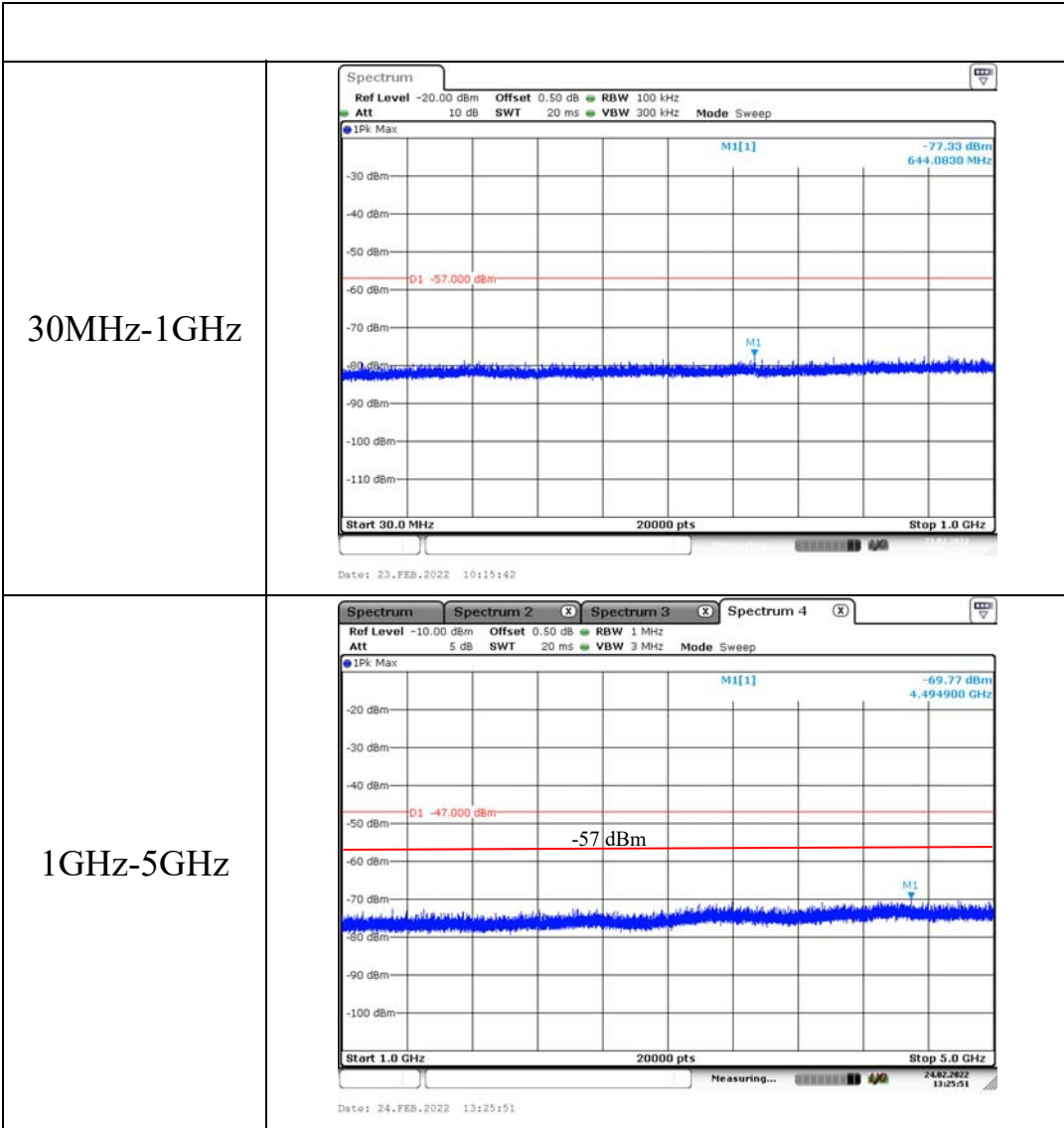
M2:





M3:





==== END OF REPORT ====