



中认信通

CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)



TEST REPORT

Applicant: Long Range Solutions, LLC

Address: 9525 Forest View Street, Dallas, Texas 75243 United States

FCC ID: 2AB6ORXCS8

Product Name: COASTER

Model Number: RX-CS8, RX-CS8-Alpha

**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: CR221260516-00

Date Of Issue: 2023/4/20

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
1.2.1 EUT Operation Condition:	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	7
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
4. TEST DATA AND RESULTS	14
4.1 AC LINE CONDUCTED EMISSIONS	14
4.2 RADIATION SPURIOUS EMISSIONS	17

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR221260516-00	Original Report	2023/4/20

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	COASTER
EUT Model:	RX-CS8
Multiple Models:	RX-CS8-Alpha
Highest Operation Frequency:	467.75 MHz
Receiver Operation Frequency:	467.75 MHz
Receiver Modulation Type:	FSK
Rated Input Voltage:	DC 12V charging from charger base or DC 3.7V from battery
Serial Number:	1UWW-1(RX-CS8), 1UWX-2(RX-CS8-Alpha)
EUT Received Date:	2022/12/12
EUT Received Status:	Good
Note: The Multiple models are electrically identical with the test model. Please refer to the declaration letter for more detail, which was provided by manufacturer.	

Accessory Information:

Accessory Description	Manufacturer	Model
/	/	/

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: Charging(RX-CS8& RX-CS8-Alpha) M2: Operating(Receiving) with RX-CS8 M3: Operating(Receiving) with RX CS8-Alpha
Equipment Modifications:	No
EUT Exercise Software:	No

1.2.2 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DEE VAN ENTERPRISE	Adapter	DSA-50PFB-12	2120400A
Long Range Systems,Inc.	DC Charger Base	1020	800.437.4996
Long Range	Transmitter	Unknown	1UWY-3

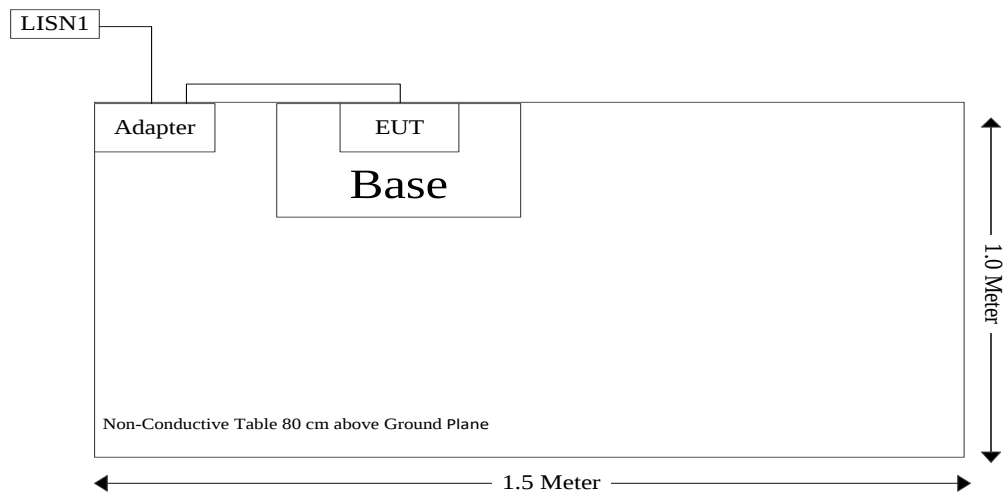
1.2.3 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Power Cable	No	No	2	Adapter	LISN
Power Cable	No	Yes	2	Adapter	Base

1.2.4 Block Diagram of Test Setup

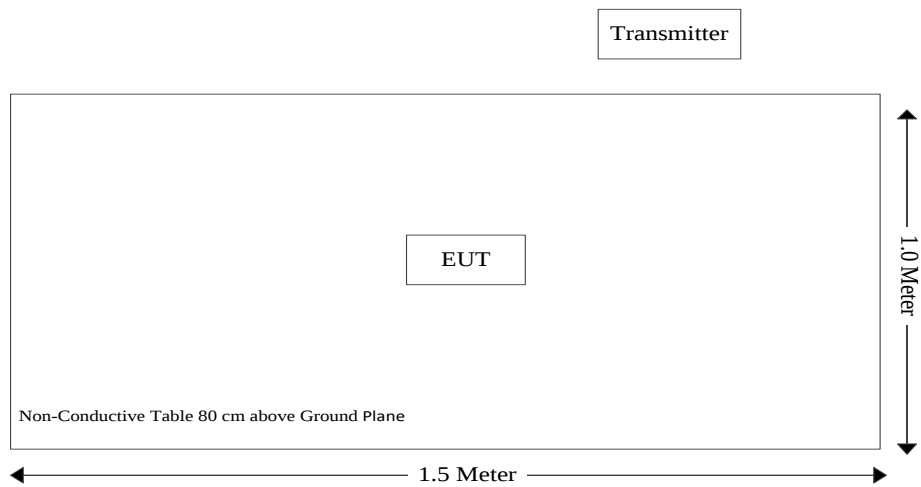
Conducted emissions:

M1:



Radiated emissions:

M2/M3:



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)

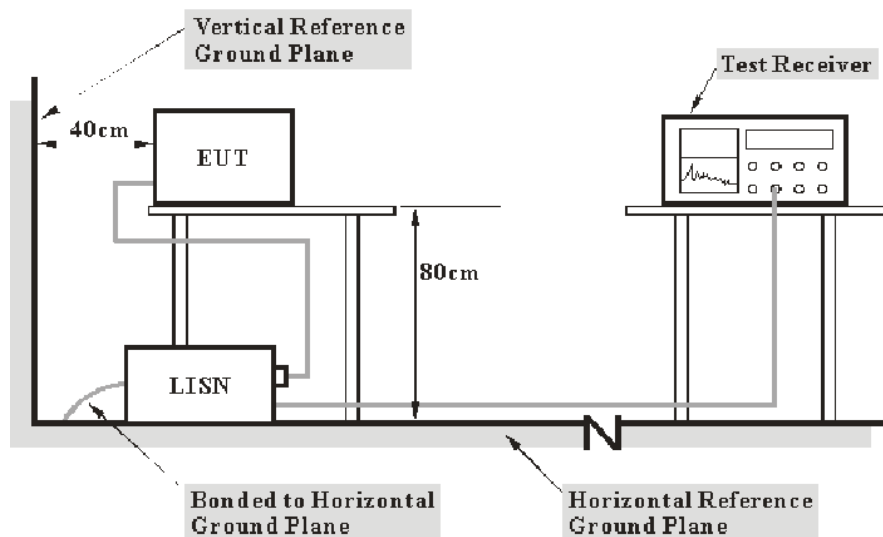
2. SUMMARY OF TEST RESULTS

Standard(s) Section	Description of Test	Result
§15.107	Conducted emissions	Compliant
§15.109	Radiated emissions	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

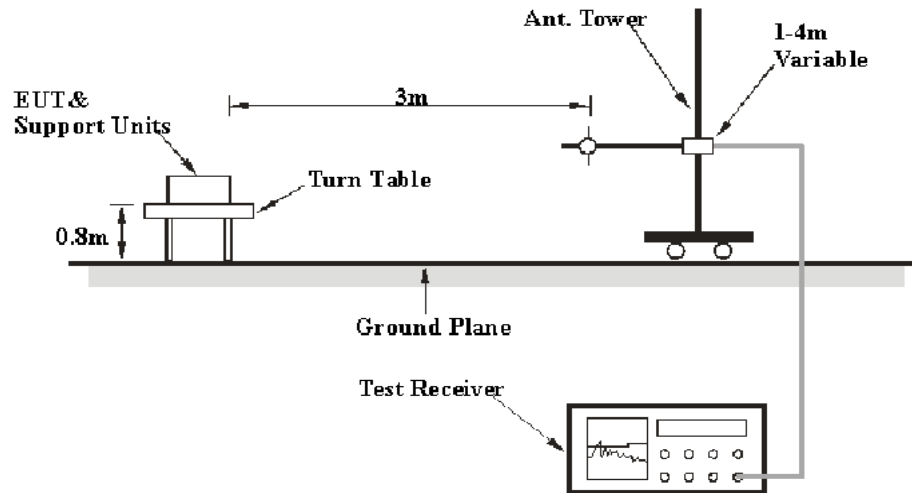
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

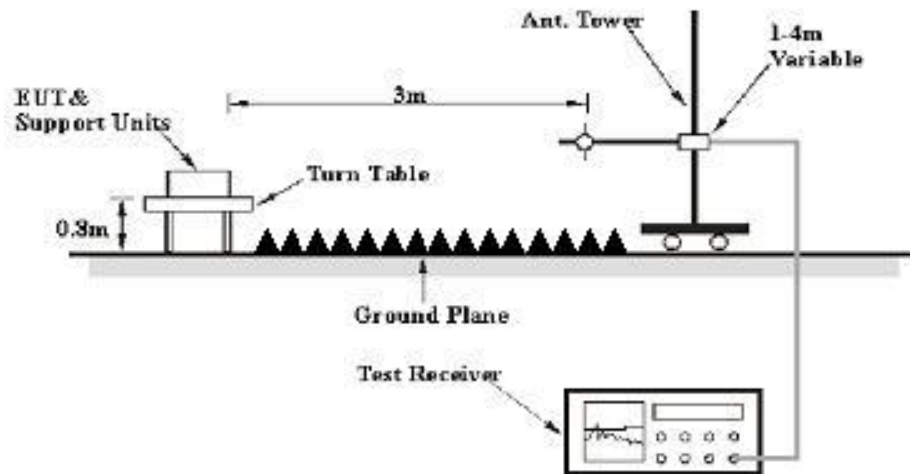
3.2 Radiation Spurious Emissions

3.2.1 EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission was 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	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	3 MHz	/	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

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	1UWW-1, 1UWX-2	Test Date:	2022/12/28
Test Site:	CE	Test Mode:	Charging
Tester:	Vic Du	Test Result:	Pass

Environmental Conditions:

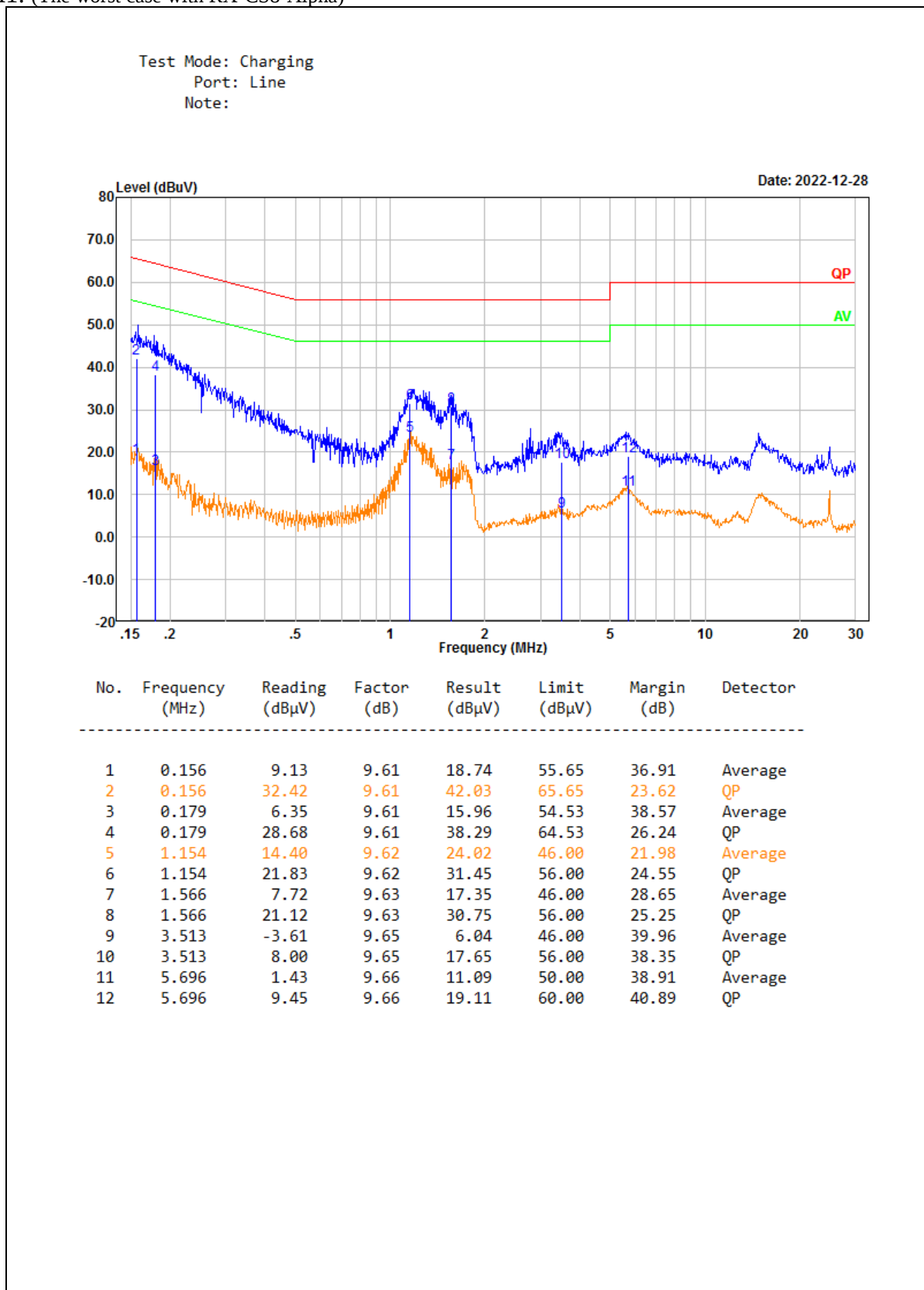
Temperature: (°C)	20.1	Relative Humidity: (%)	50	ATM Pressure: (kPa)	101.7
----------------------	------	------------------------------	----	------------------------	-------

Test Equipment List and Details:

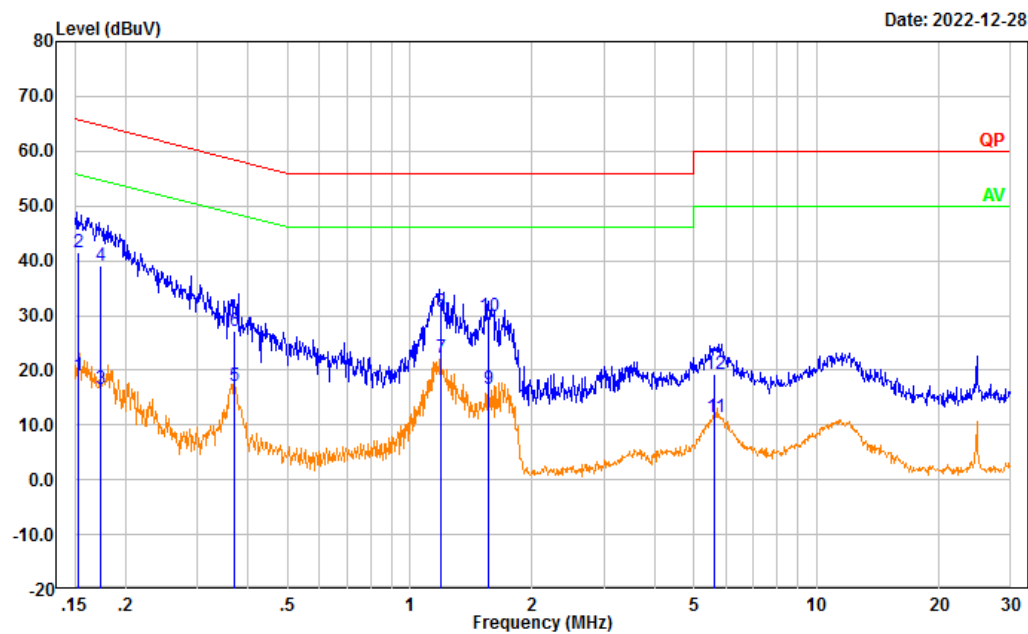
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2022/04/01	2023/03/31
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

** 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).*

M1: (The worst case with RX-CS8-Alpha)



Test Mode: Charging
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.154	9.41	9.61	19.02	55.80	36.78	Average
2	0.154	31.89	9.61	41.50	65.80	24.30	QP
3	0.173	6.84	9.61	16.45	54.80	38.35	Average
4	0.173	29.40	9.61	39.01	64.80	25.79	QP
5	0.369	7.57	9.61	17.18	48.52	31.34	Average
6	0.369	17.46	9.61	27.07	58.52	31.45	QP
7	1.192	12.54	9.62	22.16	46.00	23.84	Average
8	1.192	20.97	9.62	30.59	56.00	25.41	QP
9	1.565	6.94	9.63	16.57	46.00	29.43	Average
10	1.565	20.22	9.63	29.85	56.00	26.15	QP
11	5.625	1.77	9.66	11.43	50.00	38.57	Average
12	5.625	9.55	9.66	19.21	60.00	40.79	QP

4.2 Radiation Spurious Emissions

Serial Number:	1UWW-1, 1UWX-2	Test Date:	2022/12/29~2023/1/5
Test Site:	966-1, 966-2	Test Mode:	M1, M2, M3
Tester:	Carl Xue, Mack Huang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	21.4~22.3	Relative Humidity: (%)	40~54	ATM Pressure: (kPa)	100.9~102.4
----------------------	-----------	------------------------------	-------	------------------------	-------------

Test Equipment List and Details:

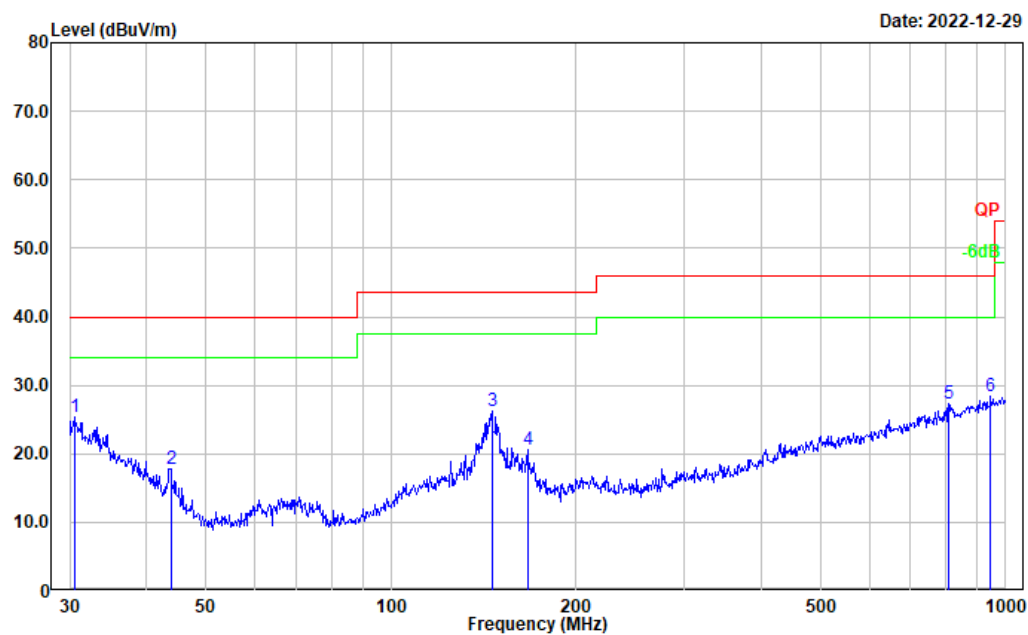
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2022/07/15	2023/07/14
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2022/07/17	2023/07/16
TIMES MICROWAVE	Coaxial 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
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

* 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:

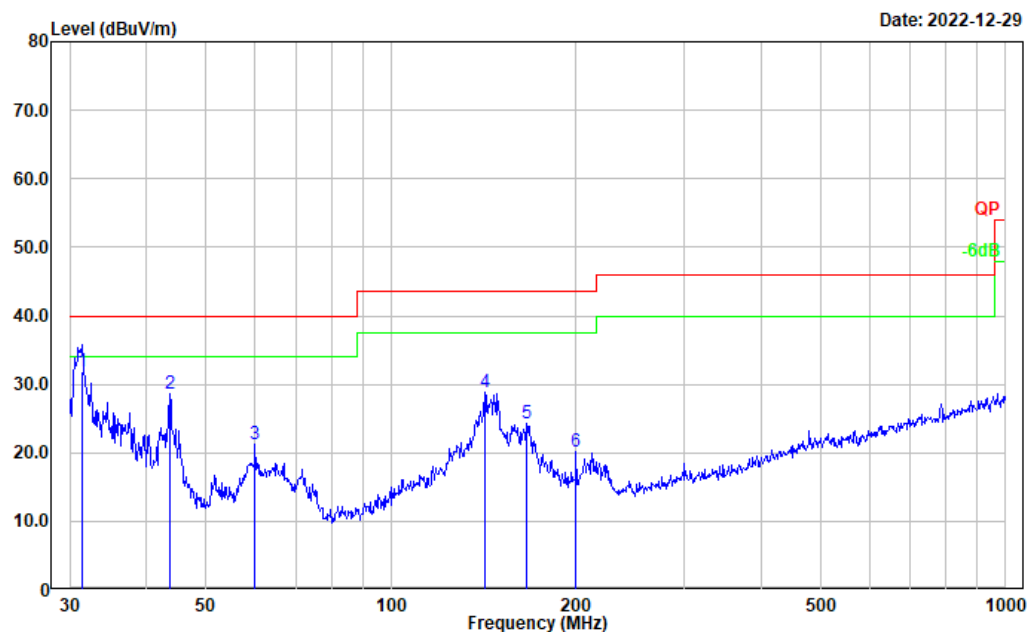
M1: (The worst case with RX-CS8-Alpha)

Test Mode: Charging
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.531	29.40	-4.00	25.40	40.00	14.60	Peak
2	43.812	31.43	-13.56	17.87	40.00	22.13	Peak
3	145.861	38.14	-11.97	26.17	43.50	17.33	Peak
4	166.651	33.19	-12.63	20.56	43.50	22.94	Peak
5	807.429	29.38	-2.05	27.33	46.00	18.67	Peak
6	945.440	28.73	-0.28	28.45	46.00	17.55	Peak

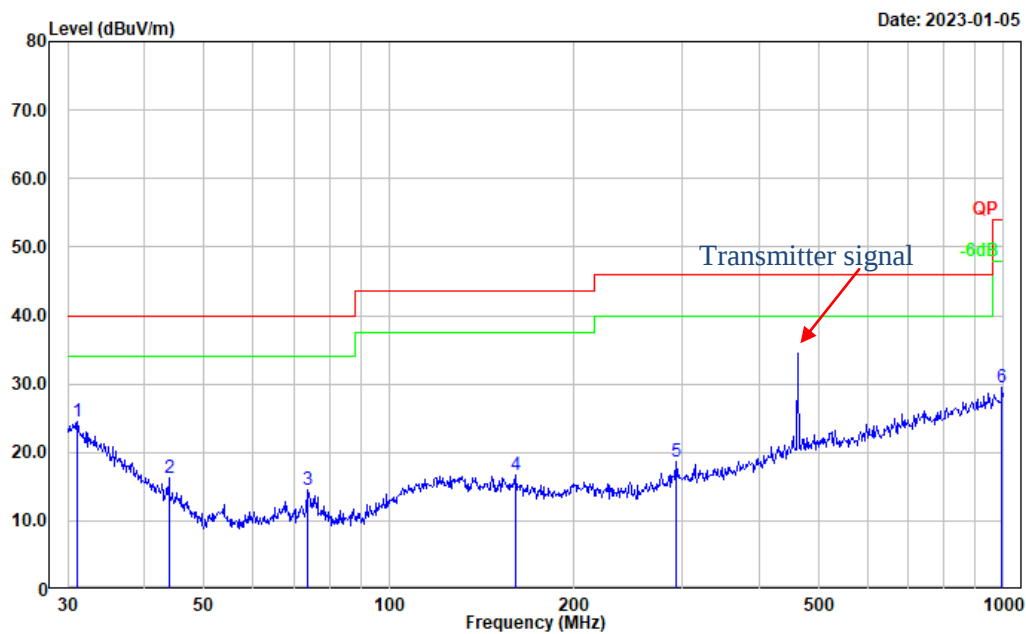
Test Mode: Charging
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	31.420	36.50	-4.69	31.81	40.00	8.19	QP
2	43.659	42.12	-13.46	28.66	40.00	11.34	Peak
3	60.069	38.56	-17.40	21.16	40.00	18.84	Peak
4	141.826	40.71	-11.92	28.79	43.50	14.71	Peak
5	166.068	36.72	-12.54	24.18	43.50	19.32	Peak
6	199.986	32.32	-12.21	20.11	43.50	23.39	Peak

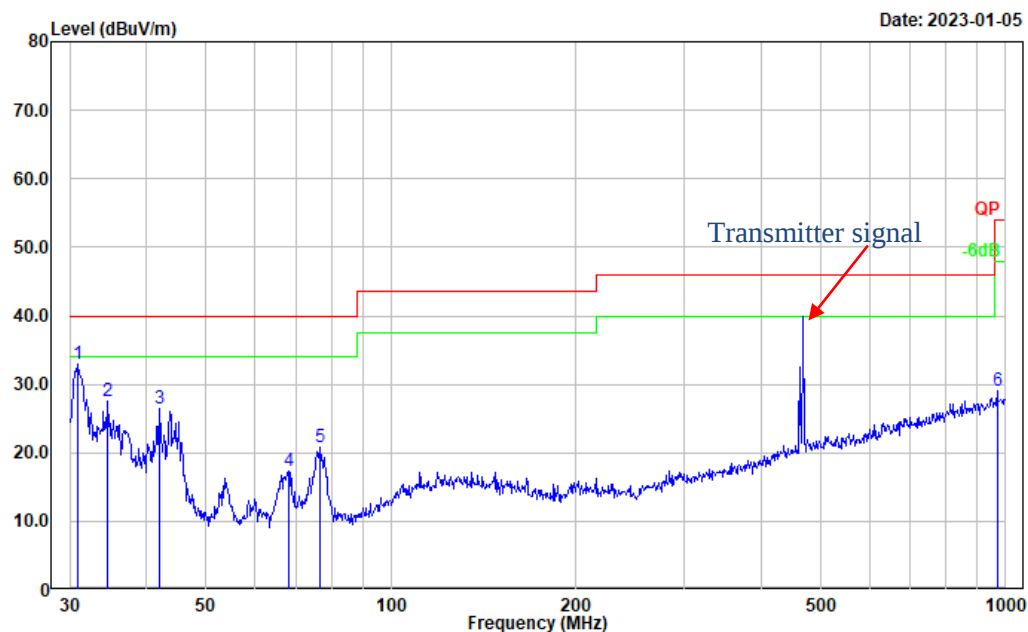
M2

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	31.071	28.97	-4.43	24.54	40.00	15.46	Peak
2	43.812	29.84	-13.56	16.28	40.00	23.72	Peak
3	73.876	31.46	-16.88	14.58	40.00	25.42	Peak
4	160.346	28.75	-12.09	16.66	43.50	26.84	Peak
5	293.084	29.44	-10.87	18.57	46.00	27.43	Peak
6	993.011	28.70	0.82	29.52	54.00	24.48	Peak

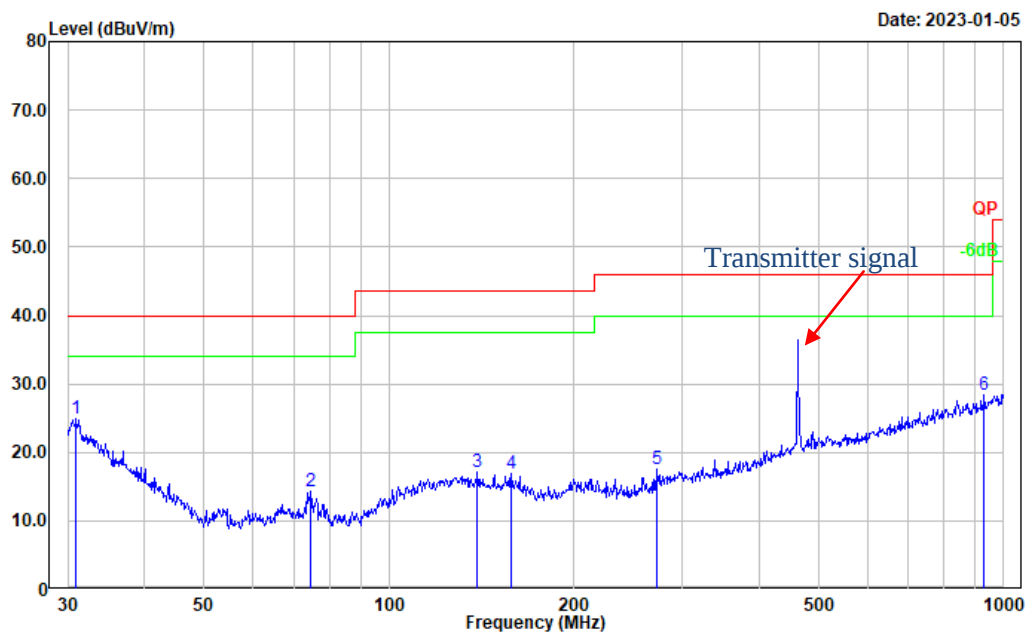
Test Mode: Operating
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.853	37.22	-4.26	32.96	40.00	7.04	Peak
2	34.639	34.77	-7.19	27.58	40.00	12.42	Peak
3	42.007	38.82	-12.45	26.37	40.00	13.63	Peak
4	68.151	34.05	-16.67	17.38	40.00	22.62	Peak
5	76.512	37.94	-17.09	20.85	40.00	19.15	Peak
6	968.934	28.72	0.26	28.98	54.00	25.02	Peak

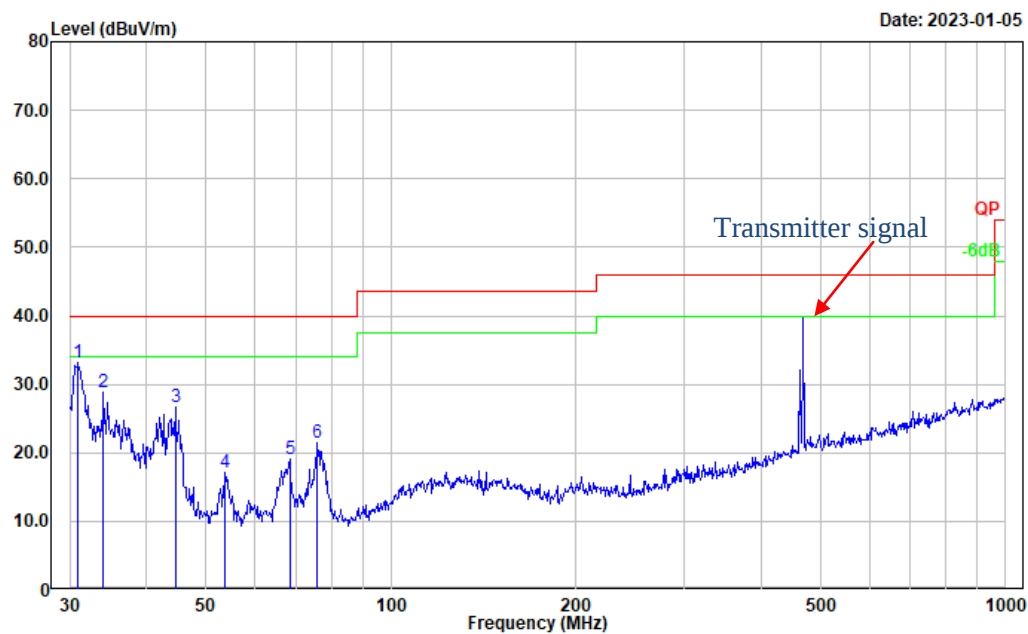
M3

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.962	29.25	-4.34	24.91	40.00	15.09	Peak
2	74.657	31.26	-16.92	14.34	40.00	25.66	Peak
3	139.361	28.97	-11.83	17.14	43.50	26.36	Peak
4	158.112	29.04	-12.06	16.98	43.50	26.52	Peak
5	273.234	29.50	-11.96	17.54	46.00	28.46	Peak
6	929.008	28.90	-0.58	28.32	46.00	17.68	Peak

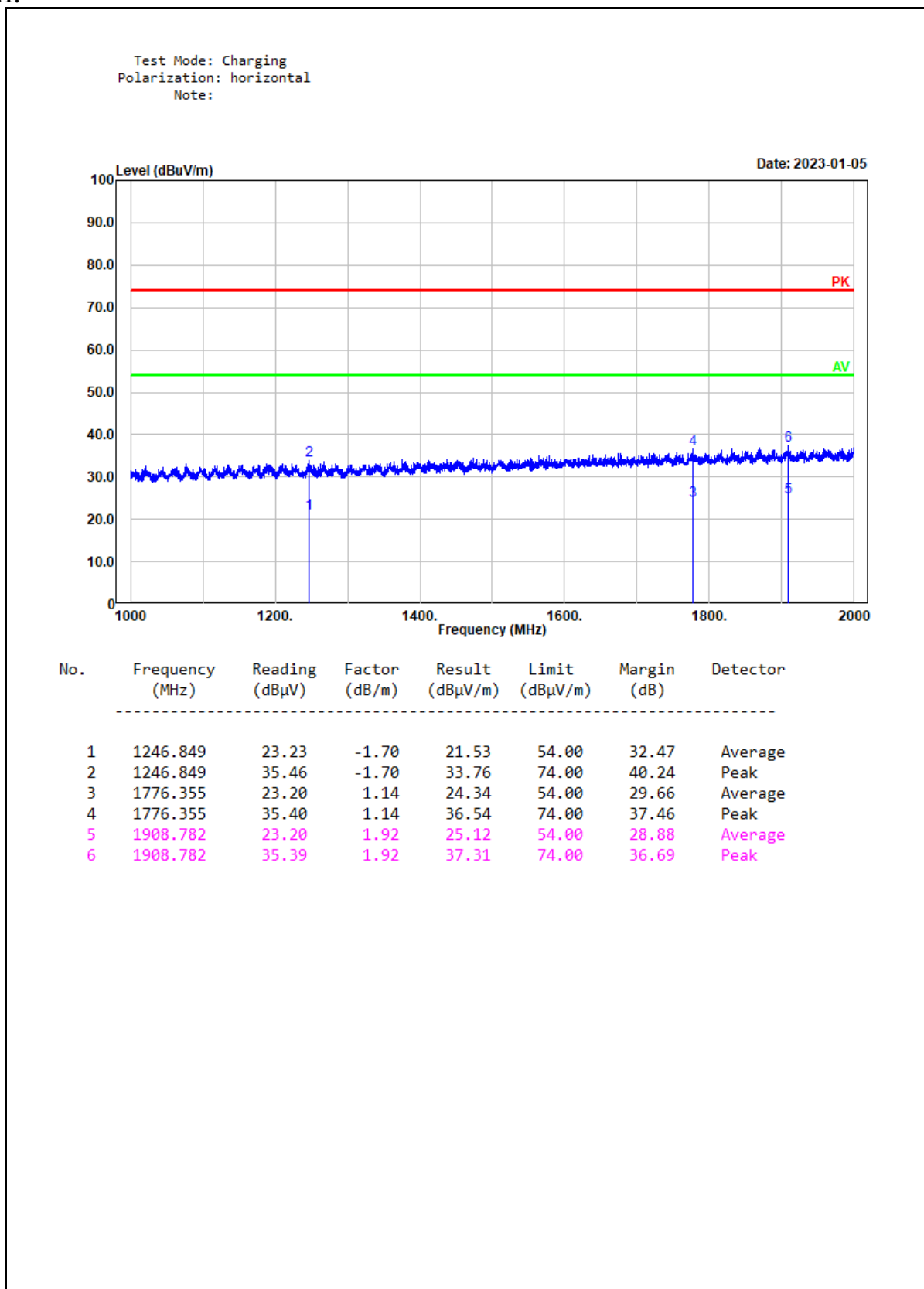
Test Mode: Operating
Polarization: vertical
Note:



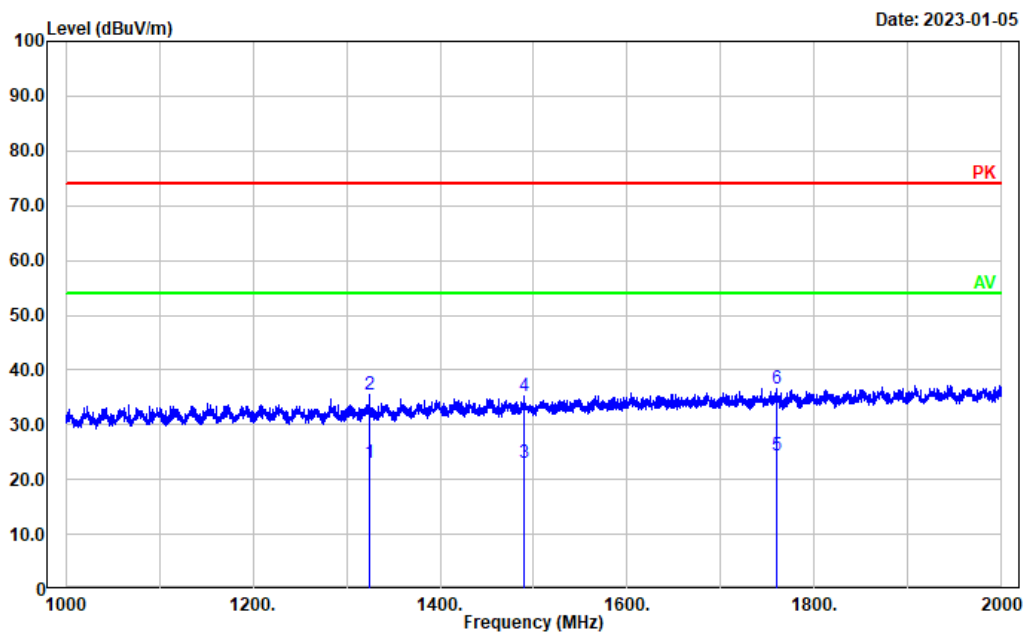
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.962	37.61	-4.34	33.27	40.00	6.73	Peak
2	34.037	35.56	-6.70	28.86	40.00	11.14	Peak
3	44.587	40.75	-14.00	26.75	40.00	13.25	Peak
4	53.693	34.35	-17.25	17.10	40.00	22.90	Peak
5	68.391	35.75	-16.65	19.10	40.00	20.90	Peak
6	75.977	38.42	-17.02	21.40	40.00	18.60	Peak

2) Above 1GHz:

M1:



Test Mode: Charging
Polarization: vertical
Note:

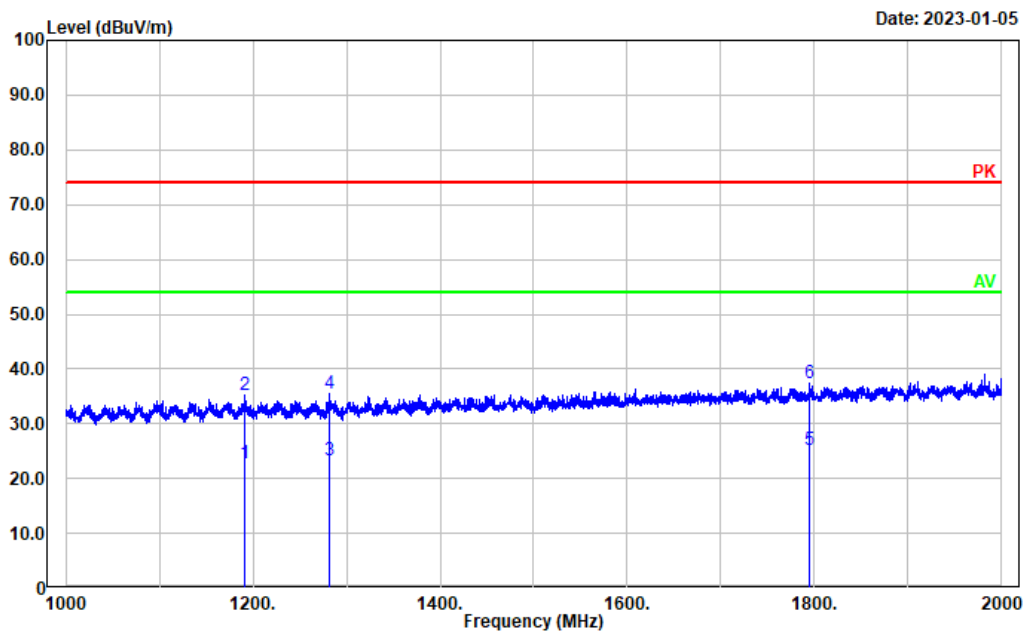


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector

1	1324.465	24.50	-1.48	23.02	54.00	30.98	Average
2	1324.465	36.99	-1.48	35.51	74.00	38.49	Peak
3	1490.098	23.42	-0.51	22.91	54.00	31.09	Average
4	1490.098	35.84	-0.51	35.33	74.00	38.67	Peak
5	1760.352	23.29	1.04	24.33	54.00	29.67	Average
6	1760.352	35.58	1.04	36.62	74.00	37.38	Peak

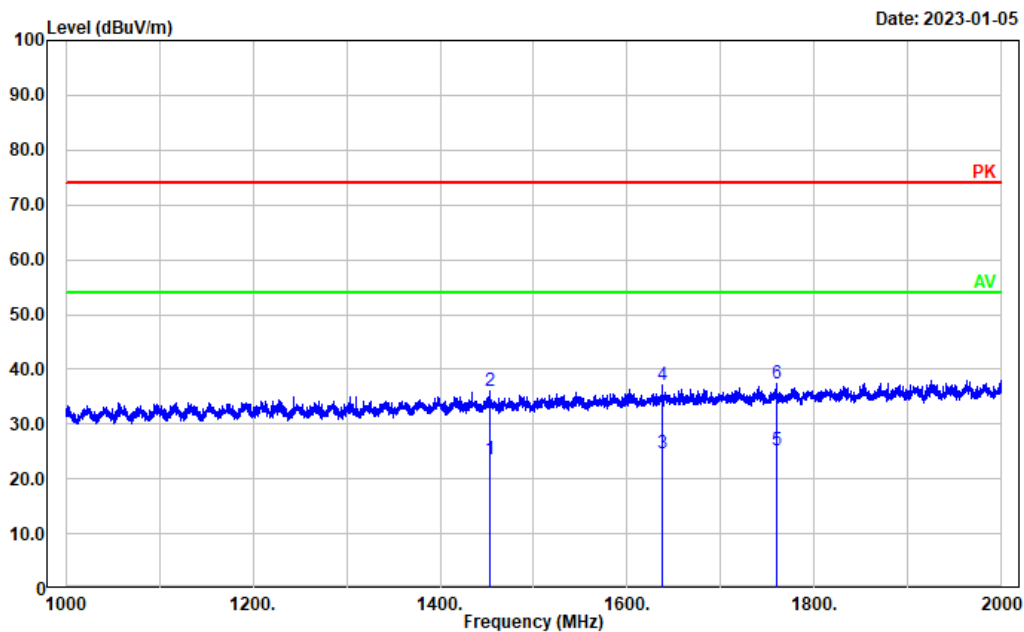
M2:

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1190.838	24.42	-1.74	22.68	54.00	31.32	Average
2	1190.838	36.86	-1.74	35.12	74.00	38.88	Peak
3	1281.856	25.14	-1.72	23.42	54.00	30.58	Average
4	1281.856	37.28	-1.72	35.56	74.00	38.44	Peak
5	1794.159	24.01	1.25	25.26	54.00	28.74	Average
6	1794.159	36.02	1.25	37.27	74.00	36.73	Peak

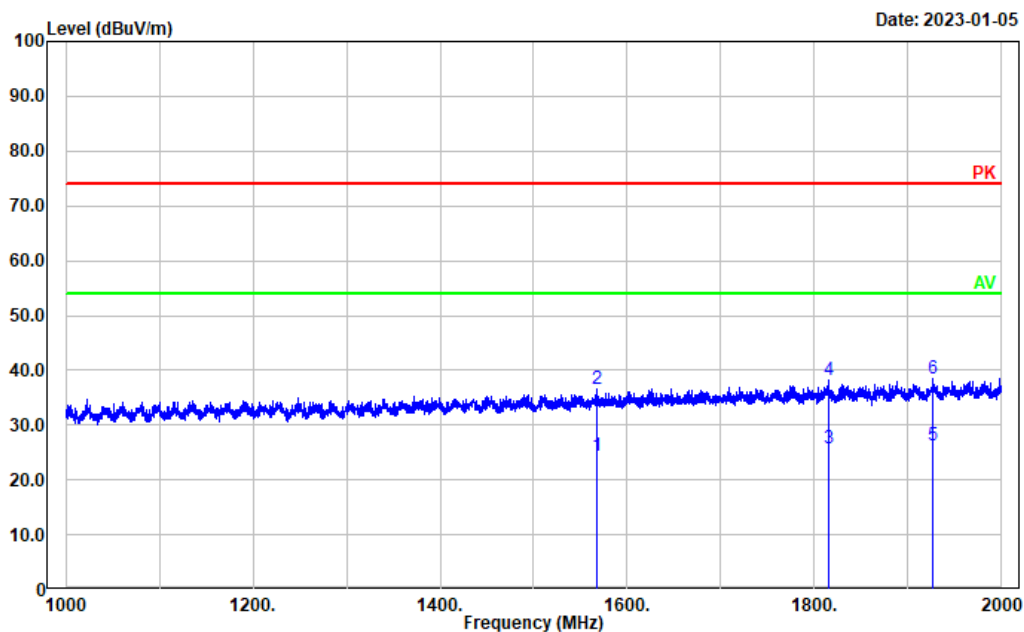
Test Mode: Operating
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1452.490	24.31	-0.68	23.63	54.00	30.37	Average
2	1452.490	36.60	-0.68	35.92	74.00	38.08	Peak
3	1636.927	24.33	0.40	24.73	54.00	29.27	Average
4	1636.927	36.66	0.40	37.06	74.00	36.94	Peak
5	1760.152	24.12	1.04	25.16	54.00	28.84	Average
6	1760.152	36.24	1.04	37.28	74.00	36.72	Peak

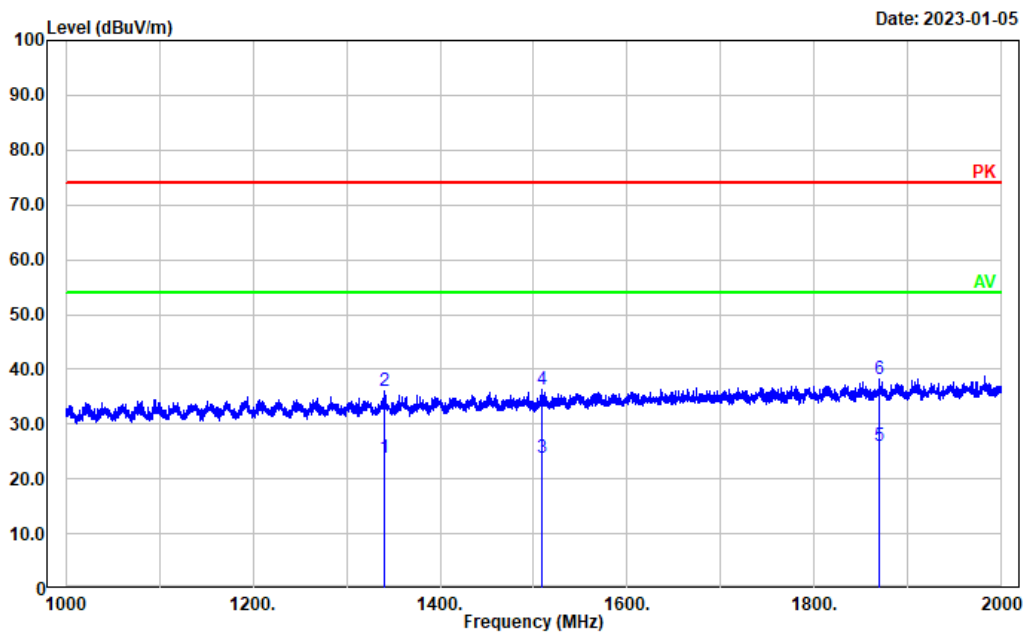
M3:

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1567.313	24.34	-0.01	24.33	54.00	29.67	Average
2	1567.313	36.69	-0.01	36.68	74.00	37.32	Peak
3	1814.563	24.36	1.36	25.72	54.00	28.28	Average
4	1814.563	36.73	1.36	38.09	74.00	35.91	Peak
5	1926.585	24.22	1.99	26.21	54.00	27.79	Average
6	1926.585	36.43	1.99	38.42	74.00	35.58	Peak

Test Mode: Operating
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1339.868	25.15	-1.32	23.83	54.00	30.17	Average
2	1339.868	37.29	-1.32	35.97	74.00	38.03	Peak
3	1509.502	24.30	-0.41	23.89	54.00	30.11	Average
4	1509.502	36.60	-0.41	36.19	74.00	37.81	Peak
5	1869.574	24.32	1.67	25.99	54.00	28.01	Average
6	1869.574	36.64	1.67	38.31	74.00	35.69	Peak

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