



FCC Test Report

APPLICANT : Trackunit Aps
EQUIPMENT : M7 4G LTE Vehicle Telematics Unit
MODEL NAME : M7MG
FCC ID : ZMF-M7MG
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Jan. 06, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC1N2320	Rev. 01	Initial issue of report	Feb. 11, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.107	AC Conducted Emission	< 15.107 limits	Not Applicable	-
3.1	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.02 dB at 49.400 MHz for Quasi-Peak

Not Applicable means after assessing, test items are not necessary to carry out.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1. General Description

1.1. Applicant

Trackunit Aps

Gasvaerksvej 24,4 sal.Aalborg Denmark

1.2. Manufacturer

Positioning Universal.

4660 La Jolla Village Drive, Suite 1100, San Diego, CA92122

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	M7 4G LTE Vehicle Telematics Unit
Model Name	M7MG
FCC ID	ZMF-M7MG
EUT supports Radios application	GSM/LTE Category M1 Bluetooth LE, GNSS
HW Version	P7
SW Version	M7PUI MAIN MCU V3.10
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850MHz ~ 1910MHz LTE Category M1: LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 25 : 1850 MHz ~ 1915 MHz LTE Band 26 : 814 MHz ~ 849 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 85: 698 MHz ~ 716 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Rx Frequency	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz LTE Category M1: LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 25 : 1930 MHz ~ 1995 MHz LTE Band 26 : 859 MHz ~ 894 MHz LTE Band 66 : 2110 MHz~ 2180 MHz LTE Band 85: 728 MHz ~ 746 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz GNSS : 1559 MHz ~ 1610 MHz
Antenna Type	WWAN : FPC Antenna Bluetooth : FPC Antenna GNSS: FPC Antenna
Type of Modulation	GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK LTE Category M1: QPSK / 16QAM Bluetooth LE : GFSK GNSS : BPSK

1.5. Modification of EUT

No modifications are made to the EUT during all test items.

1.6. Test Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS	CN1257	314309

1.7. Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

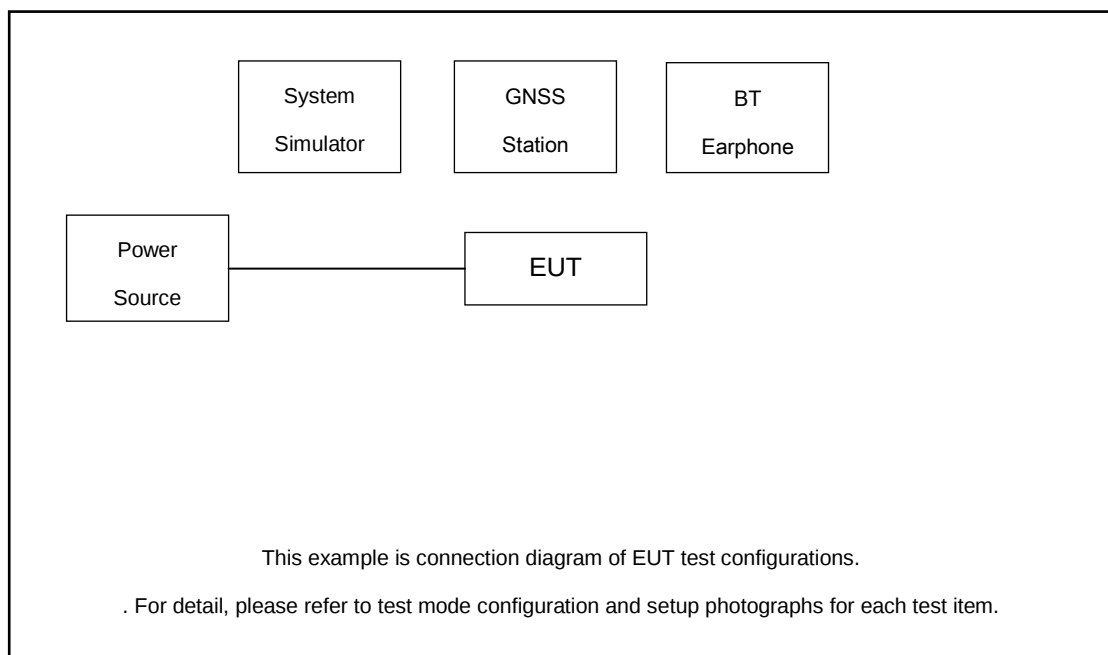
2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
Radiated Emissions	Mode 1: GPRS 850 Rx(Middle) Bluetooth Idle + GPS Rx + Power From DC
	Mode 2: LTE Band 85 Rx(High) Cat M1 + Bluetooth Idle + GPS Rx + Power From DC
	Mode 3: LTE Band 13 Rx(High) Cat M1 + Bluetooth Idle + GPS Rx + Power From DC
	Mode 4: LTE Band 26 Rx(High) Cat M1 + Bluetooth Idle + GPS Rx + Power From DC
Remark: 1. The worst case of RE is mode 1; only the test data of this mode is reported. 2. Pre-scanned Low/Middle/High channel, the worst channel was recorded in this report. 3. The device supports for 12Vdc only.	

2.2.Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded,1.8m
2.	GNSS Station	R&S	SMBV100A	N/A	N/A	Unshielded,1.8m
3.	Bluetooth Earphone	Xiaomi	LYEJ02LM	N/A	N/A	N/A
4.	DC Power	GWINSTEK	PLR36-10	N/A	N/A	Unshielded,1.8m



2.4. EUT Operation Test Setup

The EUT was in GPRS or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone, and the following programs installed in the EUT were programmed during the test.

1. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.

3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.1.2. Measuring Instruments

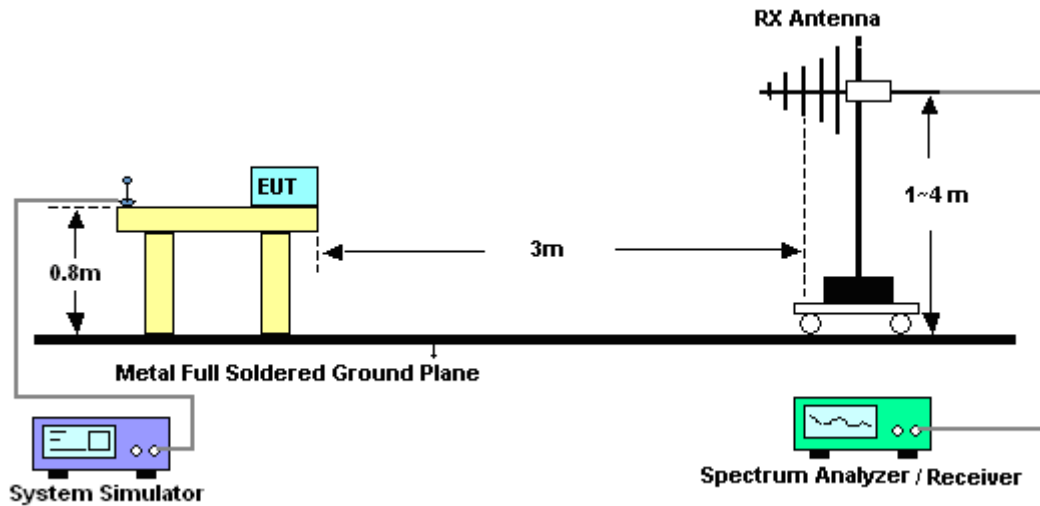
The measuring equipment is listed in the section 4 of this test report.

3.1.3. Test Procedures

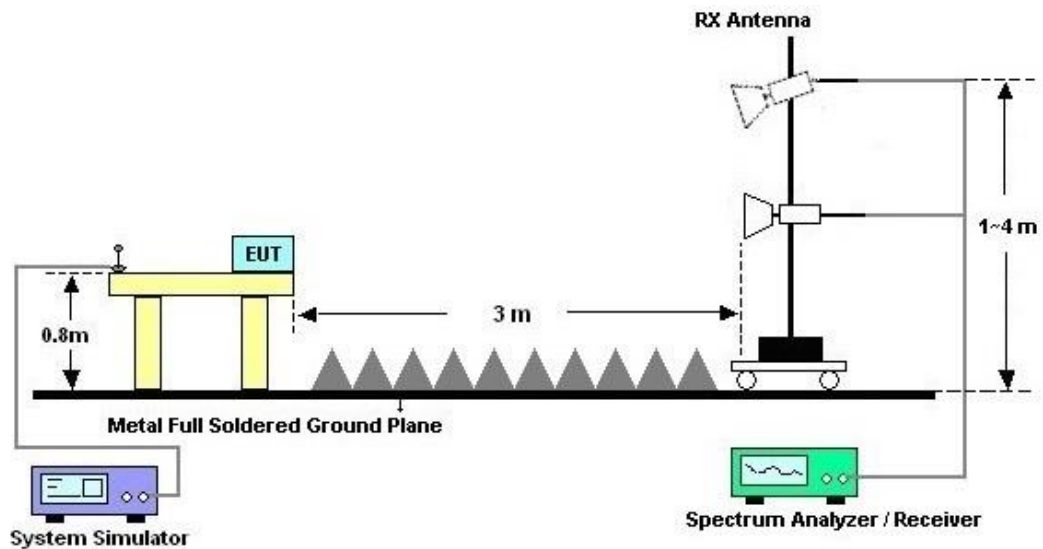
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

3.1.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

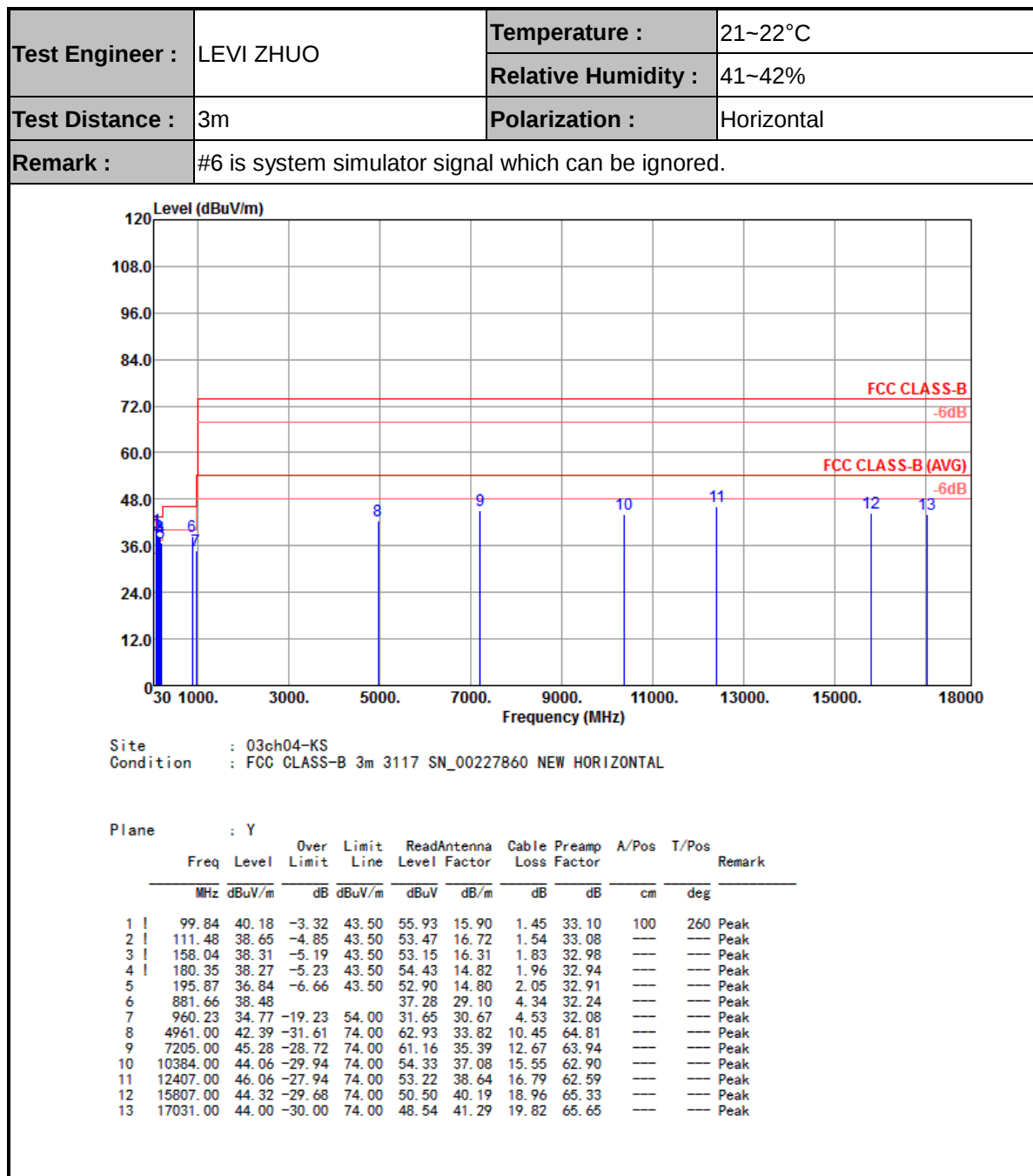


For radiated emissions above 1GHz



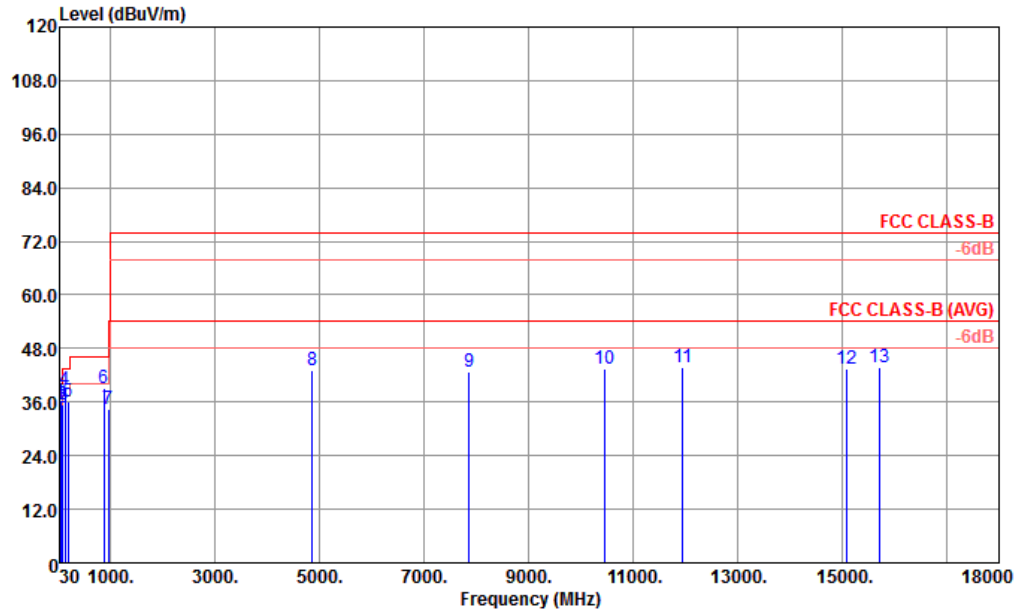


3.1.5. Test Result of Radiated Emission





Test Engineer :	LEVI ZHUO	Temperature :	21~22°C
Test Distance :	3m	Relative Humidity :	41~42%
Remark :	#6 is system simulator signal which can be ignored.		



Site : 03ch04-KS
Condition : FCC CLASS-B 3m 3117 SN_00227860 NEW VERTICAL

Plane : Y		Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	I	49.40	35.98	-4.02	40.00	53.33	14.74	1.01	33.10	100	278 QP
2	I	84.32	34.89	-5.11	40.00	52.65	13.85	1.33	32.94	---	Peak
3		99.84	35.30	-8.20	43.50	51.05	15.90	1.45	33.10	---	Peak
4	I	139.61	38.85	-4.65	43.50	52.87	17.27	1.73	33.02	---	Peak
5		188.11	36.02	-7.48	43.50	52.13	14.81	2.00	32.92	---	Peak
6		881.66	39.24			38.04	29.10	4.34	32.24	---	Peak
7		960.23	34.49	-19.51	54.00	31.37	30.67	4.53	32.08	---	Peak
8		4859.00	43.18	-30.82	74.00	64.02	33.64	10.29	64.77	---	Peak
9		7868.00	42.64	-31.36	74.00	57.97	35.57	13.23	64.13	---	Peak
10		10452.00	43.48	-30.52	74.00	53.60	37.13	15.59	62.84	---	Peak
11		11948.00	43.63	-30.37	74.00	50.89	38.33	16.52	62.11	---	Peak
12		15093.00	43.57	-30.43	74.00	50.93	39.46	18.51	65.33	---	Peak
13		15705.00	43.90	-30.10	74.00	50.32	40.06	18.90	65.38	---	Peak

Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	Keysight	N9038A	MY57290151	3Hz~8.5GHz;Max 30dBm	Jul. 17, 2021	Jan. 06, 2022	Jul. 16, 2022	Radiation (03CH04-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44G,MAX 30dB	Apr. 13, 2021	Jan. 06, 2022	Apr. 12, 2022	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz~1GHz	May 30, 2021	Jan. 06, 2022	May 29, 2022	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 18, 2021	Jan. 06, 2022	Apr. 17, 2022	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 09, 2021	Jan. 06, 2022	Nov. 08, 2022	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 07, 2021	Jan. 06, 2022	Jan. 06, 2022	Radiation (03CH04-KS)
Amplifier	Burgeon	BPA-530	102219	0.01MHz~3000MHz	Oct. 30, 2021	Jan. 06, 2022	Oct. 29, 2022	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 13, 2021	Jan. 06, 2022	Oct. 12, 2022	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 06, 2022	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 06, 2022	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 06, 2022	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

5. Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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