EMC TEST REPORT

Applicant	iSmartWays Technology Inc.
FCC ID	2AQQ3IM2RSE
Product	Road Side Equipment
Brand	Mokar
Model	I-Master
Report No.	R1808A0352-E1V1
Issue Date	October 9, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2018)/ ANSI C63.4 (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Wei Liu

Performed by: Wei Liu/ Manager

Guangchang Fan

Approved by: Guangchang Fan/ Director

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Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	15.107, ANSI C63.4-2014	NA
Test Date: July 18, 2018 ~ August 15, 2018			

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

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1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
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Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

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2 General Description of Equipment under Test

2.1 Client Information

Applicant	iSmartWays Technology Inc.
Applicant address	1-500, 10230 Jasper Ave, Edmonton
Manufacturer	iSmartWays Technology Inc.
Manufacturer address	B101, Building B1, Chuanggu, 18 Shenlong Ave, Wuhan Economic Development Zone, Wuhan, Hubei, China

2.2 General information

EUT Description	
Device Type:	Portable Device
Model Number:	I-Master
IMEI:	861107033430761
HW Version:	V1.0
SW Version:	V3.8
Antenna Type:	External Antenna
Test Mode:	Transfer Data Mode
EUT Accessory	
GPS+Bdexternal antenna	Manufacturer: Wuhan WeiAnTong Model: 1575.42/1561MHz
DSRC Omnidirectional antenna	Manufacturer: Tianmin Communication Model: TMQ5850-05V50G
LTE Omnidirectional antenna	Manufacturer: Tianmin Communication Model: TMQ6927-02.5V70A
WIFI Omnidirectional antenna	Manufacturer: Tianmin Communication Model: TMQ8027-02V70A
Waterproof Ethernet Connector	Manufacturer: LINKO Model: YT-RJ45-CPE-10-001
Mounting Bracket	Manufacturer: Easylinkin Model: RSE-V4-JG-AZ-01
Screw	Manufacturer: / Model: M6*20
Mounting Hoop	Manufacturer: XingWangWuJin Model: HG-12*1000
Note: The information of the EUT is declared by the manufacturer.	

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2.3 Applied Standards

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

Test standards
FCC Code CFR47 Part15B (2018)
ANSI C63.4 (2014)

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2.4 Test Mode

Test Mode	
Mode 1	Adapter + EUT +Idle

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3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.
The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.
Set the spectrum analyzer in the following:
Below 1GHz:
RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=1Hz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

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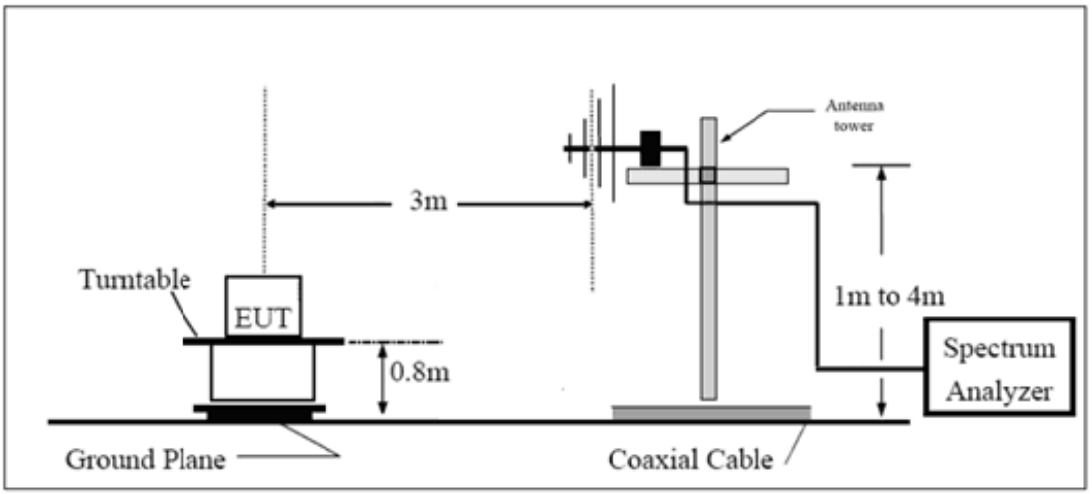
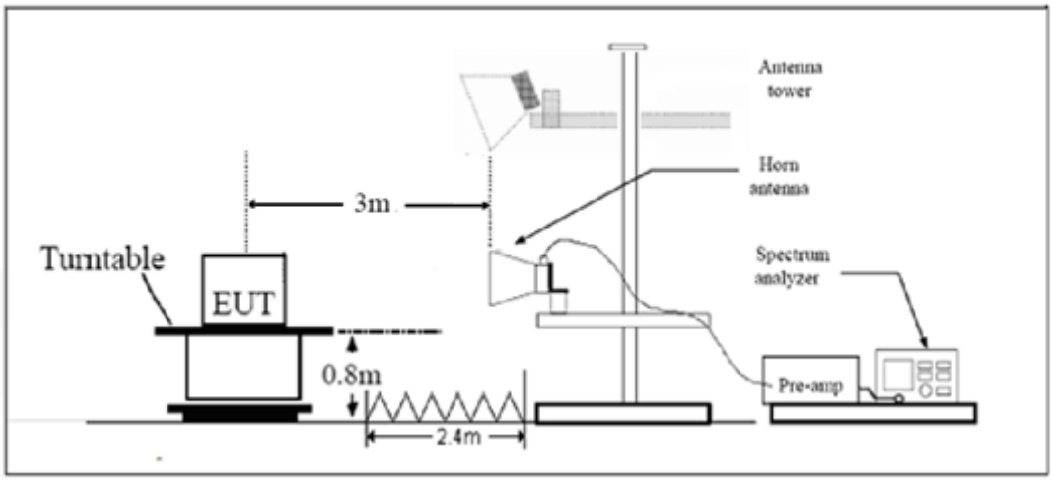
Test Setup

Below 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

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Limits

Frequency (MHz)	Field Strength (dBμV/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5th harmonic of the highest frequency or 40GHz,which is lower	54 74	Average Peak

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 3.704 dB.

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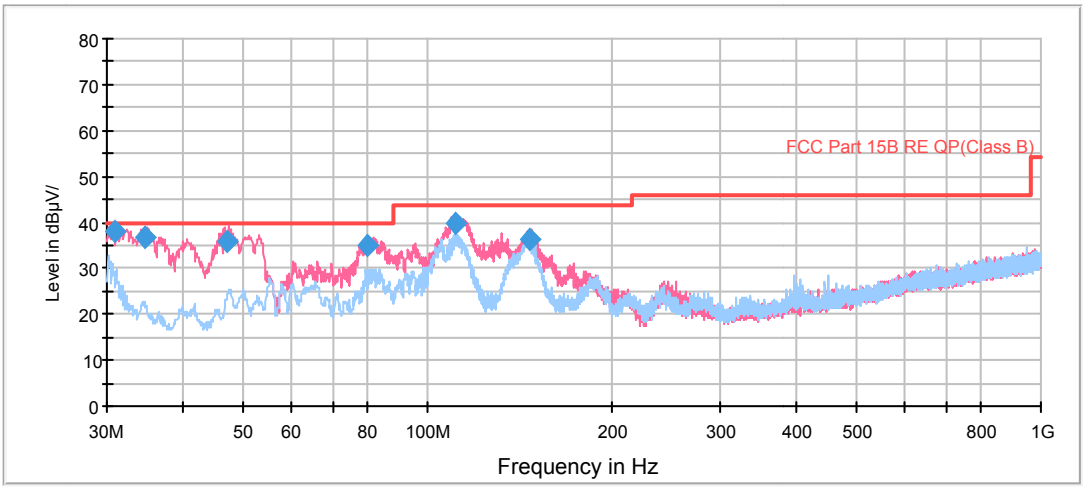
Test Results

The following graphs display the maximum values of horizontal and vertical by software.
For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

RE 0.03-1GHz QP Class B



Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
30.920000	37.8	25.7	100.0	V	0.0	12.1	2.2	40.0
34.487500	36.9	25.0	100.0	V	46.0	11.9	3.1	40.0
47.218750	35.6	22.5	100.0	V	348.0	13.1	4.4	40.0
79.555000	34.8	26.2	100.0	V	355.0	8.6	5.2	40.0
111.152500	40.0	27.8	100.0	V	0.0	12.2	3.5	43.5
146.850000	36.4	27.3	100.0	V	210.0	9.1	7.1	43.5

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

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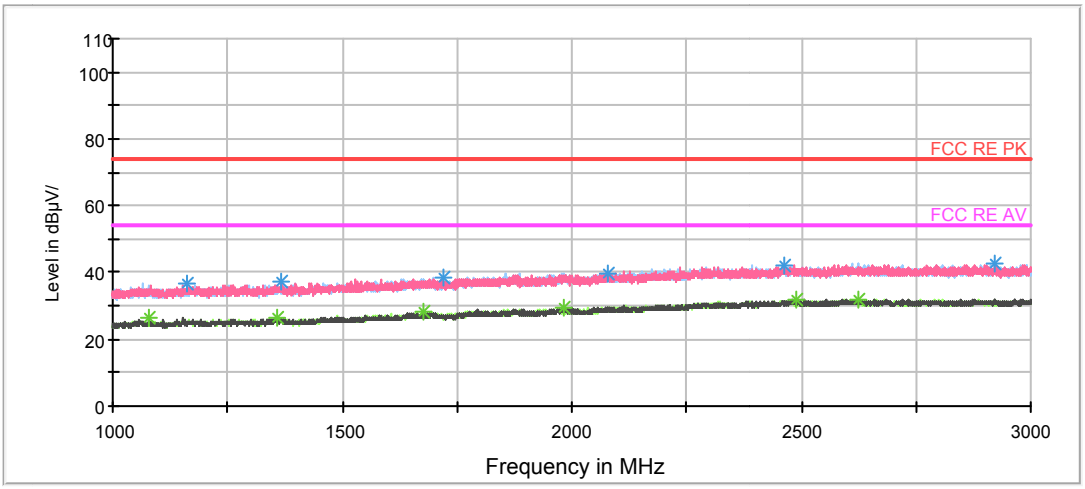
Copy of FCC RE 1G-18GHz PK+AV Class B



Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1161.500000	36.7	48.1	100.0	V	12.0	-11.4	37.3	74
1367.500000	37.1	47.4	200.0	V	104.0	-10.3	36.9	74
1720.500000	38.3	47.3	100.0	H	192.0	-9.0	35.7	74
2077.000000	39.8	46.4	100.0	V	167.0	-6.6	34.2	74
2463.750000	42.0	46.8	200.0	H	9.0	-4.8	32.0	74
2923.250000	42.8	47.0	100.0	V	33.0	-4.2	31.2	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1077.250000	26.2	37.8	100.0	V	2.0	-11.6	27.8	54
1357.000000	26.4	36.8	200.0	V	270.0	-10.4	27.6	54
1677.250000	28.1	37.0	100.0	H	208.0	-8.9	25.9	54
1984.250000	29.7	36.9	100.0	H	264.0	-7.2	24.3	54
2491.000000	31.8	36.5	100.0	H	317.0	-4.7	22.2	54
2624.500000	31.9	36.5	200.0	H	287.0	-4.6	22.1	54

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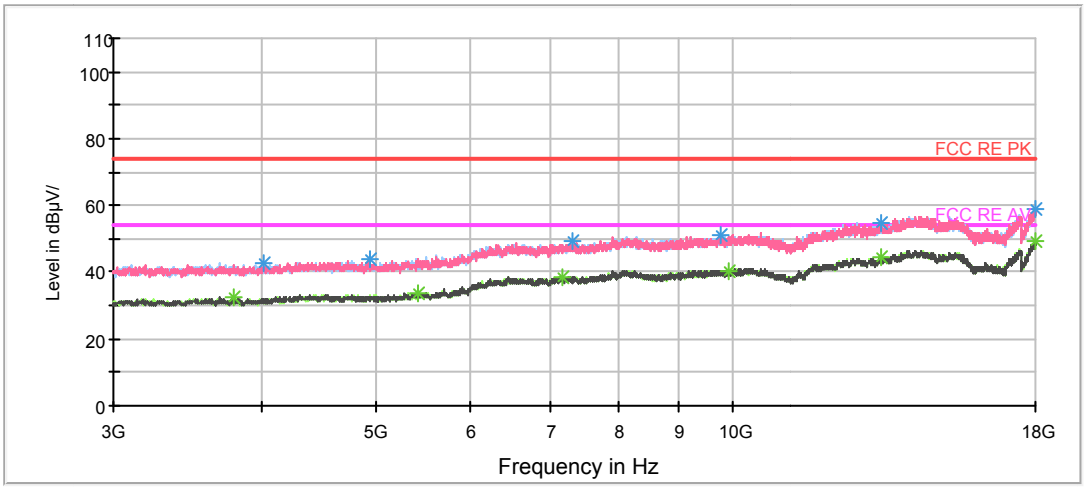
Copy of FCC RE 1G-18GHz PK+AV Class B



Radiated Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4016.250000	42.5	45.8	200.0	H	55.0	-3.3	31.5	74
4931.250000	44.1	46.1	200.0	V	357.0	-2.0	29.9	74
7329.375000	49.0	45.2	100.0	H	0.0	3.8	25.0	74
9783.750000	51.0	44.1	100.0	H	254.0	6.9	23.0	74
13320.000000	54.6	41.1	100.0	H	0.0	13.5	19.4	74
17994.375000	59.1	40.1	100.0	V	20.0	19.0	14.9	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3785.625000	32.3	35.7	100.0	V	212.0	-3.4	21.7	54
5428.125000	33.6	34.6	200.0	H	0.0	-1.0	20.4	54
7183.125000	38.6	34.9	200.0	H	30.0	3.7	15.4	54
9905.625000	40.5	33.4	100.0	V	54.0	7.1	13.5	54
13338.750000	44.4	31.1	200.0	V	355.0	13.3	9.6	54
17998.125000	49.3	30.3	200.0	H	123.0	19.0	4.7	54

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3.2 Conducted Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 2.57 dB.

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Test Results

The equipment doesn't connect to public network, therefore this requirement does not apply.

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4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Last Cal.	Cal. Due Date
Signal Analyzer	R&S	FSV30	100815	2017-12-17	2018-12-16
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
Bore Sight Antenna mast	ETS	2171B	00058752	/	/
Test software	EMC32	R&S	9.26.0	/	/

*****END OF REPORT *****

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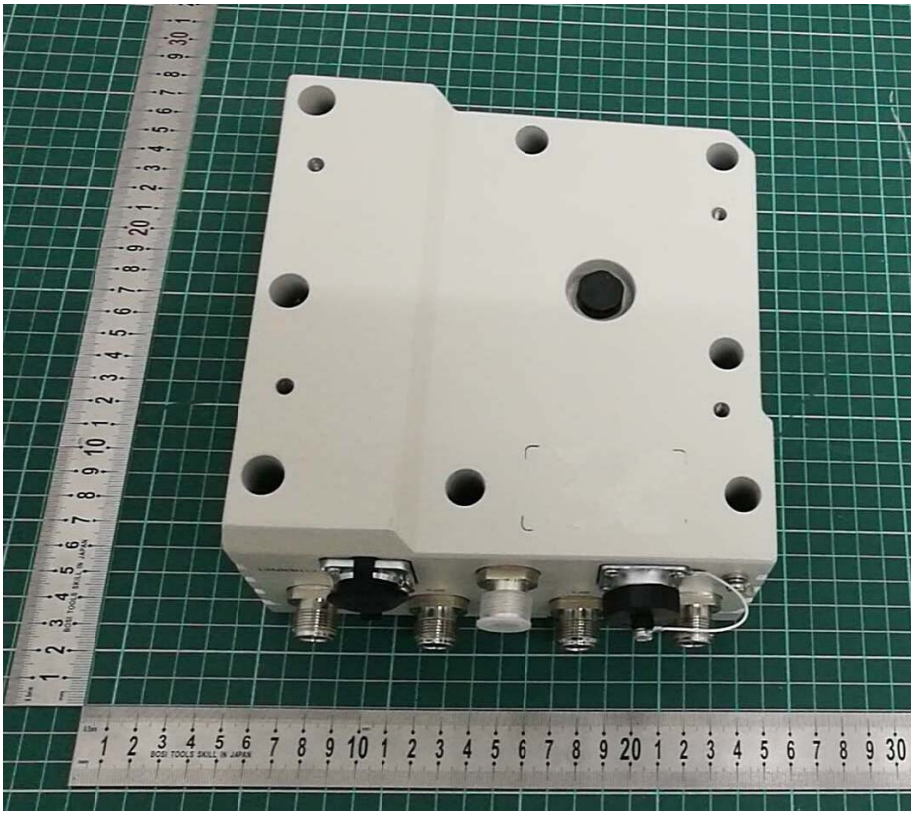
ANNEX A： The EUT Appearance and Test Configuration

A.1 EUT Appearance



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a: EUT

Picture 1 EUT and Accessory

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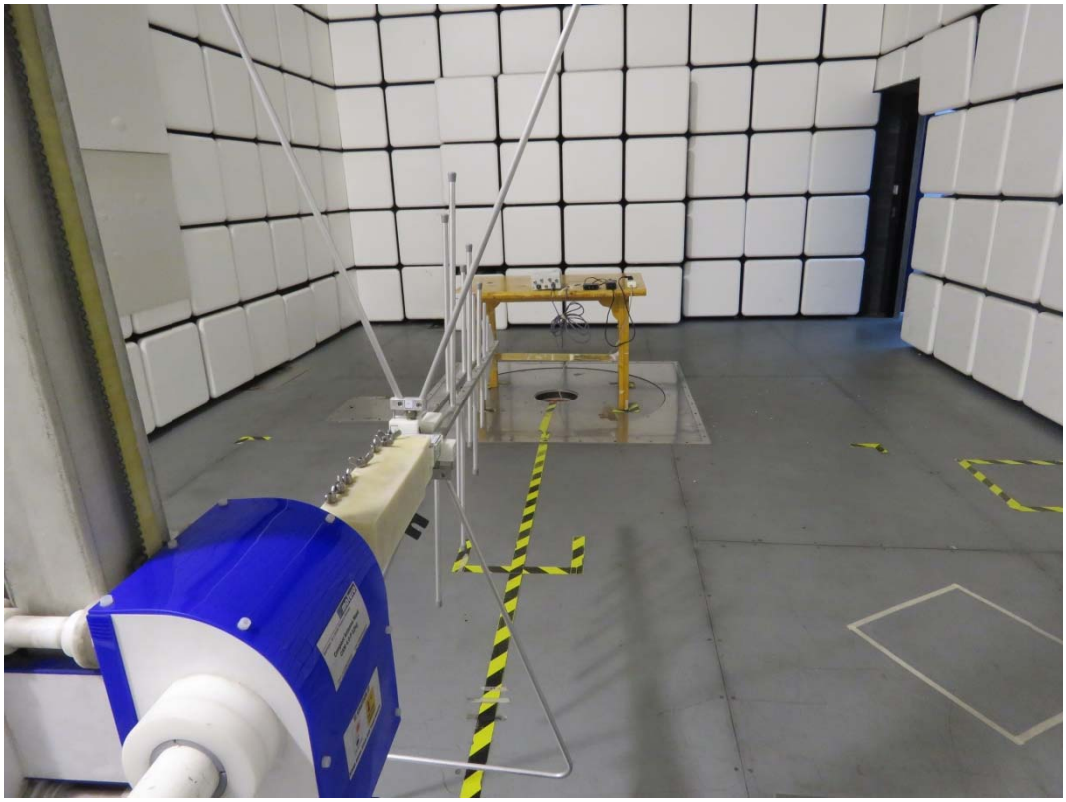
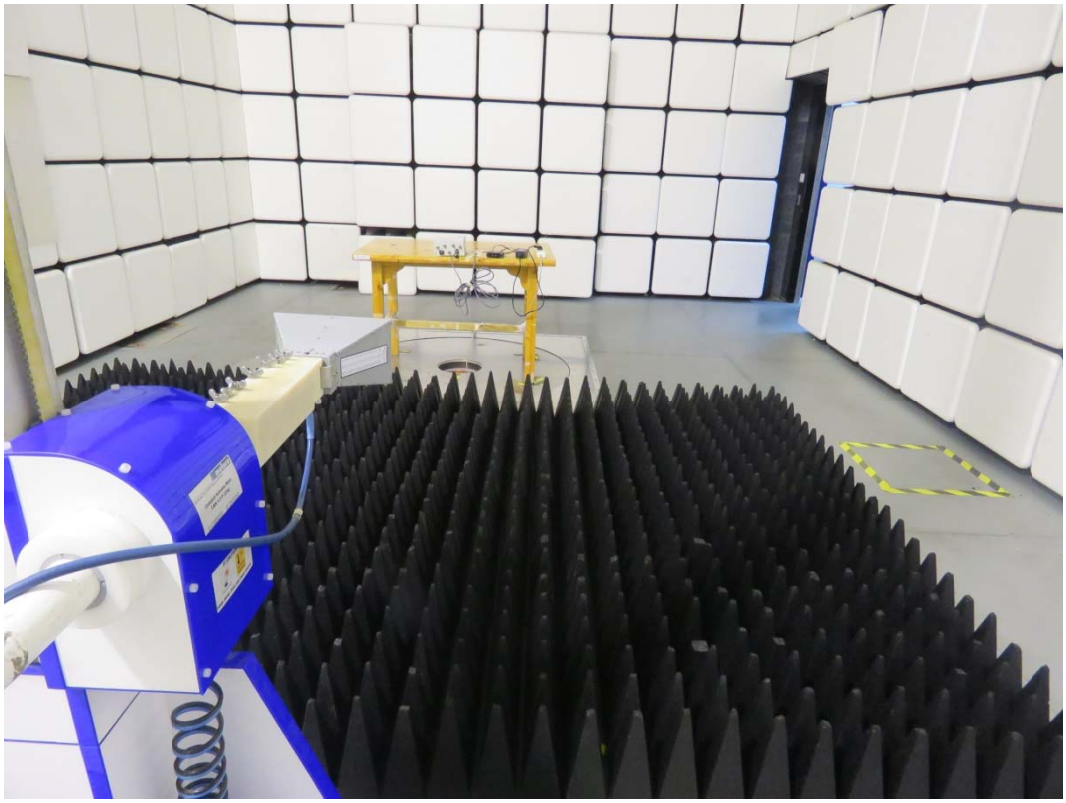
A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

Picture 2 Radiated Emission Test Setup

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