FCC Test Report

Report No.: AGC09770200704FE04

FCC ID	:	2AWVX-VKB3Z
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Ford Ranger/Everest Wireless Charge Mat
BRAND NAME	:	Directed
MODEL NAME	:	VKB3Z-19A464-B
APPLICANT	:	Directed Electronics OE Pty Ltd
DATE OF ISSUE	:	Jul. 27, 2020
STANDARD(S) **TEST PROCEDURE(S)**	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 27, 2020	Valid	Initial Release

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TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY 4

2. GENERAL INFORMATION 5

2.1. PRODUCT DESCRIPTION 5

3. MEASUREMENT UNCERTAINTY 6

4. DESCRIPTION OF TEST MODES 7

5. SYSTEM TEST CONFIGURATION 8

5.1. CONFIGURATION OF EUT SYSTEM 8
5.2. EQUIPMENT USED IN EUT SYSTEM 8
5.3. SUMMARY OF TEST RESULTS 8

6. TEST FACILITY 9

7. RADIATED EMISSION 10

7.1TEST LIMIT 10
7.2. MEASUREMENT PROCEDURE 11
7.3. TEST SETUP 12
7.4. TEST RESULT 13

8. 20DB BANDWIDTH 16

8.1. MEASUREMENT PROCEDURE 16
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 16
8.3. MEASUREMENT RESULTS 17

APPENDIX A: PHOTOGRAPHS OF TEST SETUP 18

APPENDIX B: PHOTOGRAPHS OF EUT 19

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1. VERIFICATION OF CONFORMITY

Applicant	Directed Electronics OE Pty Ltd
Address	115-119 Link Road, Melbourne Airport, Victoria, 3045, Australia
Manufacturer	Directed Electronics OE Pty Ltd
Address	115-119 Link Road, Melbourne Airport, Victoria, 3045, Australia
Factory	Directed Electronics OE Pty Ltd
Address	115-119 Link Road, Melbourne Airport, Victoria, 3045, Australia
Product Designation	Ford Ranger/Everest Wireless Charge Mat
Brand Name	Directed
Test Model	VKB3Z-19A464-B
Date of test	Jul. 07, 2020 to Jul. 27, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with Section 15.207, 15.209, 15.203 of the FCC Part 15, Subpart C Rules.

The results of testing in this report apply to the product/system which was tested only.

Prepared By	Sky Dong (Project Engineer)	Jul. 27, 2020
Reviewed By	Max Zhang (Reviewer)	Jul. 27, 2020
Approved By	Forrest Lei (Authorized Officer)	Jul. 27, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	110-205 kHz
Test Frequency	145kHz
Maximum field strength	67.95dBuV/m(PK)@3m
Modulation	FSK
Number of channels	1
Antenna Gain	0dBi
Antenna Designation	Coil Antenna (Met 15.203 Antenna requirement)
Hardware Version	V1.0
Software Version	V1.0
Power Supply	DC 12V by battery

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3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Wireless charging Mode(Full load)
2	Wireless charging Mode(half load)
3	Wireless charging Mode(Null load)

Note:

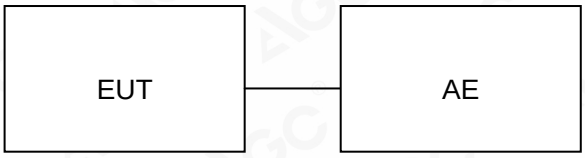
1. The mode 1 was the worst case and only the data of the worst case record in this report.
2. The antenna 1, antenna 2 and antenna 3 can't work at the same time and each antenna has been tested. The antenna 2 is the worst case and recorded in the report.

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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure :



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Ford Ranger/Everest Wireless Charge Mat	VKB3Z-19A464-B	2AWVX-VKB3Z	EUT
2	Battery	N300	DC 12V	AE
3	Wireless Load	N/A	10W	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209	Radiated Emission	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	N/A

Note: The conducted limits are not required for devices which only employ battery power for operation.

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2022
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
ANTENNA	SCHWARZBECK	VULB9168	D69250	Jan. 09, 2019	Jan. 08, 2021
Test software	FARA	EZ_EMC (Ver.RA-03A)	N/A	N/A	N/A

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7. RADIATED EMISSION

7.1TEST LIMIT

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark: (1) Emission level dB μ V = 20 log Emission level μ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

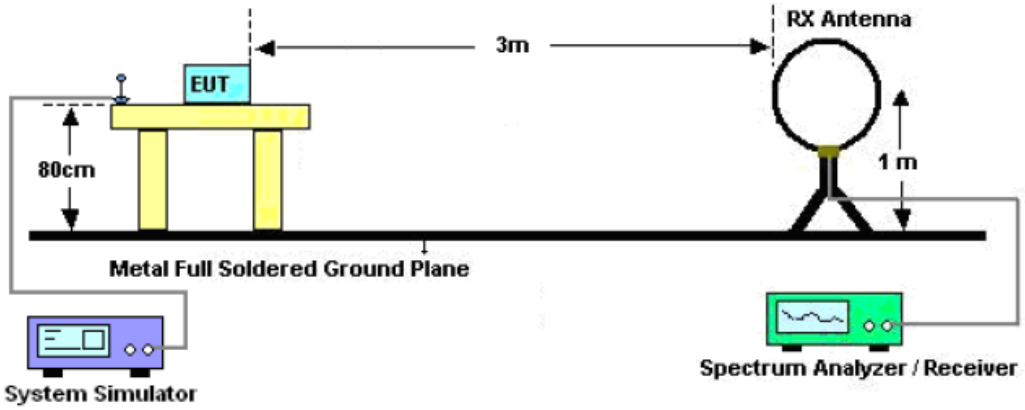
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

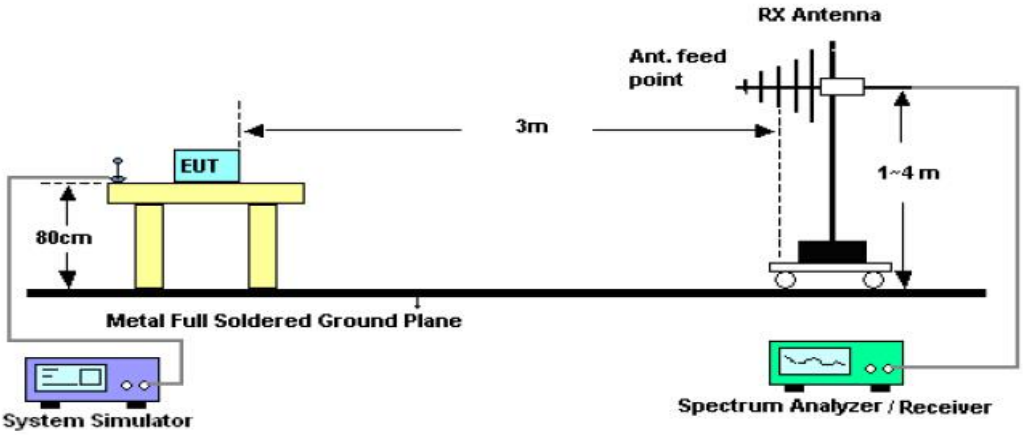
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7.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



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7.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

Frequency MHz	Polarization	Reading dB(uV) PK	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) AV	Margin dB	Pass/Fail
0.145	Face	57.55	10.40	67.95	104.38	-36.43	Pass
0.145	Side	51.94	10.40	62.34	104.38	-42.04	Pass

Note1: The result of the lowest internal use/generated frequency to 30MHz is 20dB less than the limit. The peak level of the emission is less than the average limit, so the average level shall be less than the limit without test.

Note 2: Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

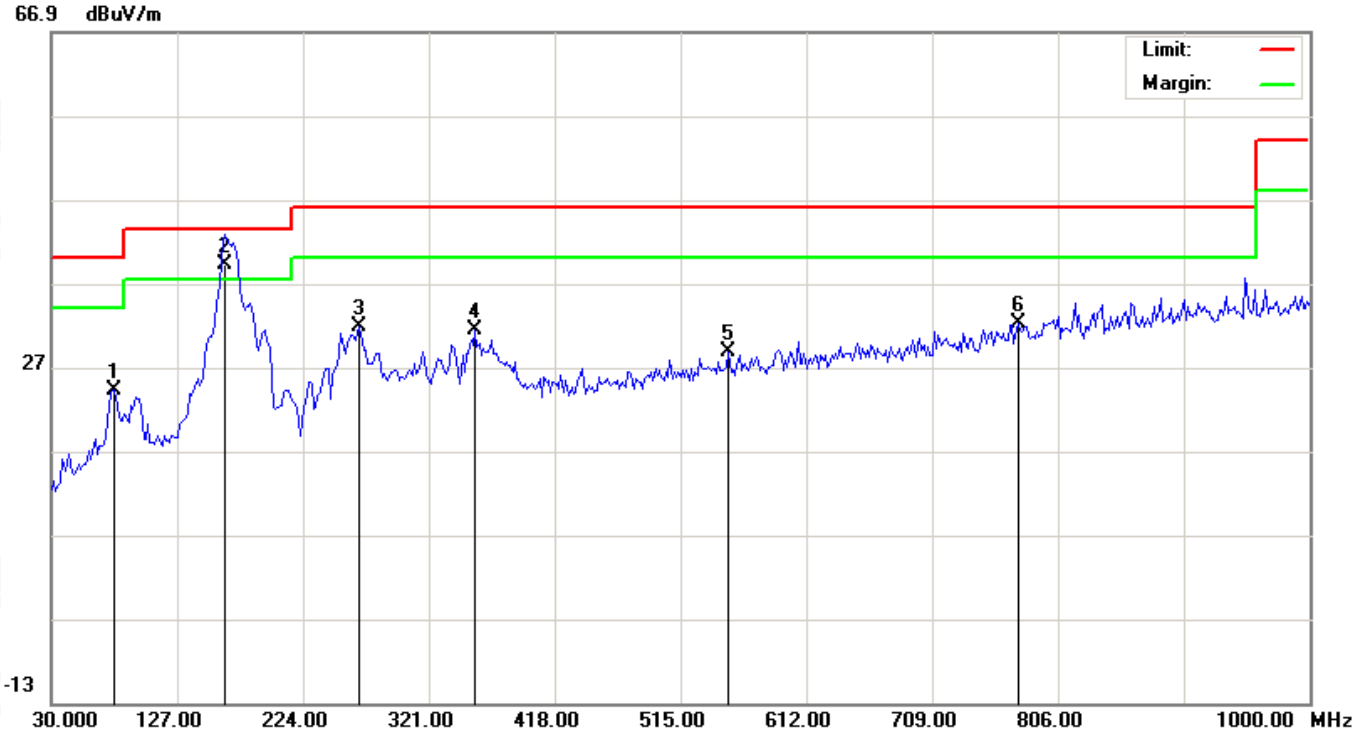
Margin=Level-Limit

Limit(dBuV/m)=20log(2400/F(kHz))+40log(300/3)=104.38dBuV/m.

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RADIATED EMISSION 30MHz- 1GHz

EUT：	Ford Ranger/Everest Wireless Charge Mat	Model Name. ：	VKB3Z-19A464-B
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC12V
Test Mode ：	Mode 1	Polarization :	Horizontal

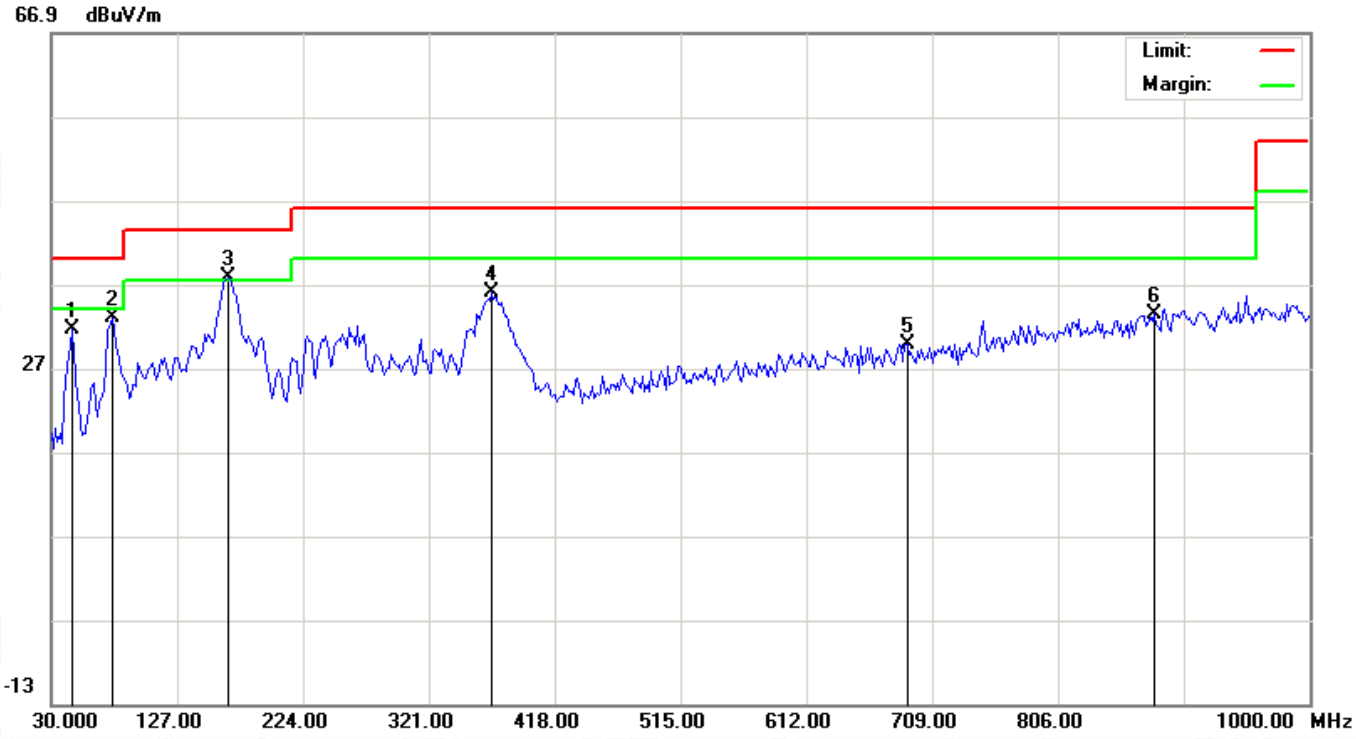


No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		78.5000	9.02	15.27	24.29	40.00	-15.71	peak
2	*	164.1833	20.41	18.76	39.17	43.50	-4.33	QP
3		267.6500	12.82	18.93	31.75	46.00	-14.25	peak
4		356.5667	9.96	21.46	31.42	46.00	-14.58	peak
5		552.1833	2.82	26.01	28.83	46.00	-17.17	peak
6		775.2833	2.44	29.85	32.29	46.00	-13.71	peak

RESULT: PASS

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EUT：	Ford Ranger/Everest Wireless Charge Mat	Model Name. ：	VKB3Z-19A464-B
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC12V
Test Mode ：	Mode 1	Polarization：	Vertical



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		46.1667	17.38	14.25	31.63	40.00	-8.37	peak
2		76.8833	17.43	15.62	33.05	40.00	-6.95	peak
3	*	165.8000	19.23	18.59	37.82	43.50	-5.68	peak
4		369.5000	14.18	21.91	36.09	46.00	-9.91	peak
5		689.6000	1.80	28.02	29.82	46.00	-16.18	peak
6		880.3667	2.00	31.45	33.45	46.00	-12.55	peak

RESULT: PASS

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

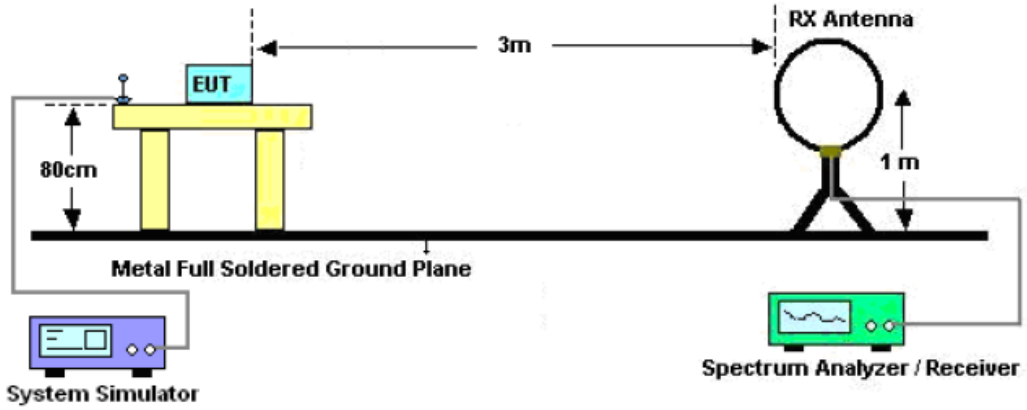
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8. 20DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2, Set the EUT Work on operation frequency.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a channel
   The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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8.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	FSK

Test Data (Hz)		Criteria
Operate Channel	815	PASS

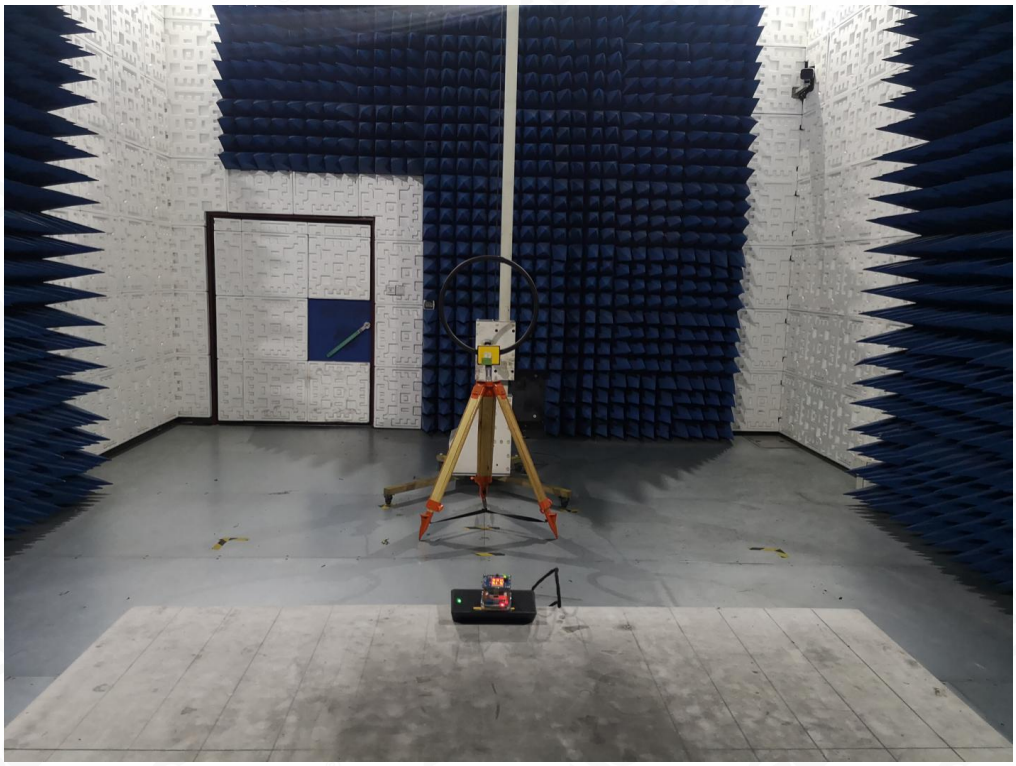
TEST PLOT OF BANDWIDTH

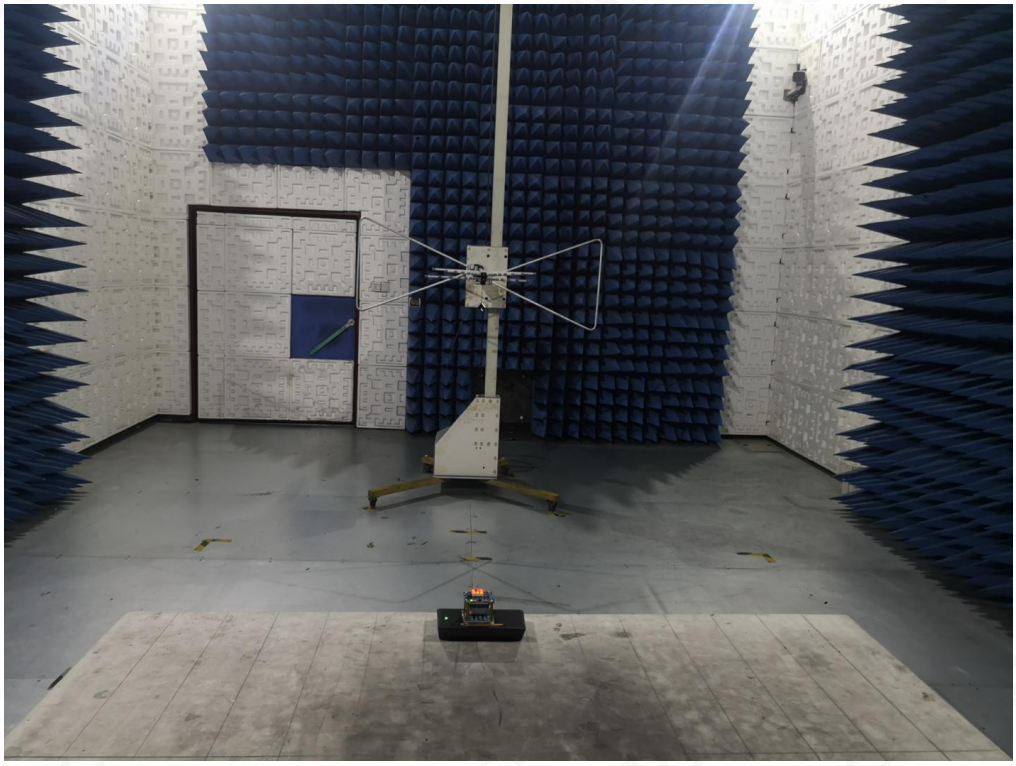


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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ





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APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT



TOP VIEW OF EUT

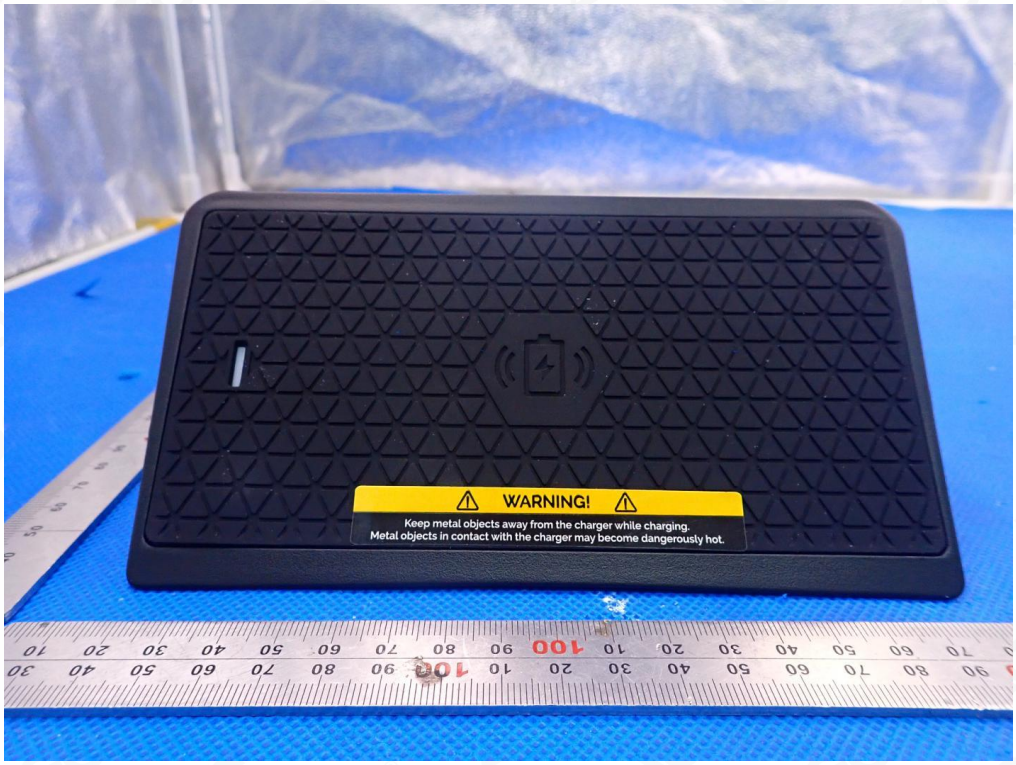


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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT

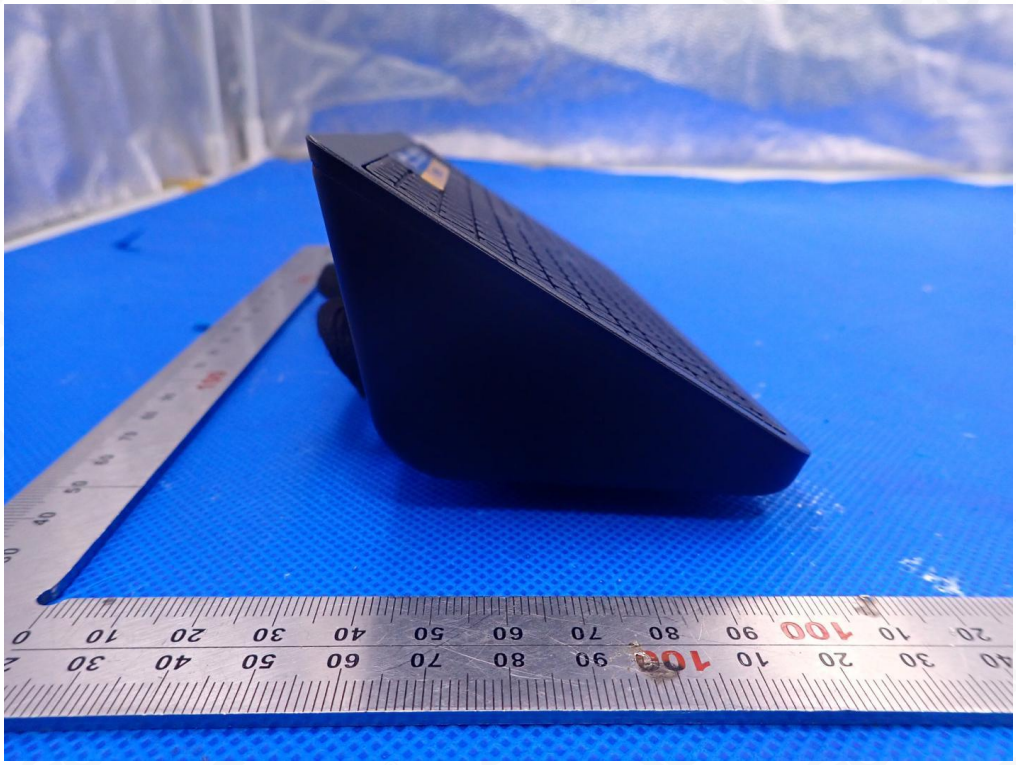


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BACK VIEW OF EUT



LEFT VIEW OF EUT



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