



TEST REPORT

Reference No...... : WTX23X12264039W001
Applicant : Descartes System Group Inc
Address : 105 Trafalgar Street, Floor 2 Floor 2, Nelson, 7010 New Zealand
Manufacturer : The same as Applicant
Address : The same as Applicant
Product Name : COREInsight BLE Beacon Tag
Model No...... : STD004
Standards : **FCC PART15 SUBPART B**
Date of Receipt sample : 2023-12-12
Date of Test..... : 2023-12-12 to 2023-12-23
Date of Issue : 2023-12-23
Test Report Form No. : WTX_FCC PART15B_001
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

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Tested by:

Approved by:

Mike Shi

Silin Chen

**TABLE OF CONTENTS**

1. GENERAL INFORMATION.....	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
1.2 TEST STANDARDS.....	5
1.3 TEST METHODOLOGY.....	5
1.4 TEST FACILITY.....	5
1.5 EUT SETUP AND OPERATION MODE.....	6
1.6 MEASUREMENT UNCERTAINTY.....	7
1.7 TEST EQUIPMENT LIST AND DETAILS.....	8
2. SUMMARY OF TEST RESULTS.....	10
3. RADIATED EMISSION.....	11
3.1 TEST PROCEDURE.....	11
3.2 BLOCK DIAGRAM OF TEST SETUP.....	11
3.3 TEST RECEIVER SETUP.....	12
3.4 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	12
3.5 ENVIRONMENTAL CONDITIONS.....	12
3.6 SUMMARY OF TEST RESULTS.....	12
EXHIBIT 1 - PRODUCT LABELING.....	17
PROPOSED FCC LABEL FORMAT.....	17
PROPOSED LABEL LOCATION ON EUT.....	17
EXHIBIT 2 - EUT PHOTOGRAPHS.....	18
EXHIBIT 3 - EUT INTERNAL PHOTOGRAPHS.....	21
EXHIBIT 4 - TEST SETUP PHOTOGRAPHS.....	24
EXHIBIT 5 - USERS MANUAL.....	26



Report version

Version No.	Date of issue	Description
Rev.00	2023-12-23	Original
/	/	/

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	COREInsight BLE Beacon Tag
Trade Name:	/
Model No.:	STD004
Adding Model(s):	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	Battery:DC3.6V
Battery Capacity:	2700mAh
Rated Power:	/
Power Adapter Model:	/
Lowest Internal Frequency:	32MHz
Highest Internal Frequency:	2480MHz
Classification of ITE:	Class B



1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15 Subpart B: Unintentional Radiators.

ANSI C63.4-2014: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.



1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List			
Test Mode	Description	Remark	Power Supply Mode
TM1	Normal working	The EUT was powered by battery; it was communicating with the IoT Gateway	/

EUT Cable List and Details				
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite	With / Without Chip
/	/	/	/	/

Special Cable List and Details				
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite	With / Without Chip
/	/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Monitor	ASUSTeK	VG28U	/
IoT Gateway	Descartes System Group Inc	RDR001	/



1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Radiated Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

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1.7 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
☐ Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☐ Chamber A: Above 1GHz					
Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
☐ Chamber B: Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
Amplifier	Agilent	8447D	2944A10457	2023-02-25	2024-02-24
☒ Chamber C: Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
Amplifier	HP	8447F	2944A03869	2023-02-25	2024-02-24
☒ Chamber C: Above 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
Amplifier	Tonscend	TAP01018050	AP22E806235	2023-02-25	2024-02-24
DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
☐ Conducted Room 1#					
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2023-02-25	2024-02-24



AC LISN	Schwarz beck	NSLK8126	8126-279	2023-02-25	2024-02-24
☒ Conducted Room 2#					
EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2023-02-25	2024-02-24
LISN	Rohde & Schwarz	ENV 216	100097	2023-02-25	2024-02-24

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission Room 1#)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission Room 2#)*	SKET	EMC-I	V2.0

*Remark: indicates software version used in the compliance certification testing.

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2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.107(a) Conducted Emission	N/A
§15.109(a) Radiated Emission	Compliant

N/A: not applicable

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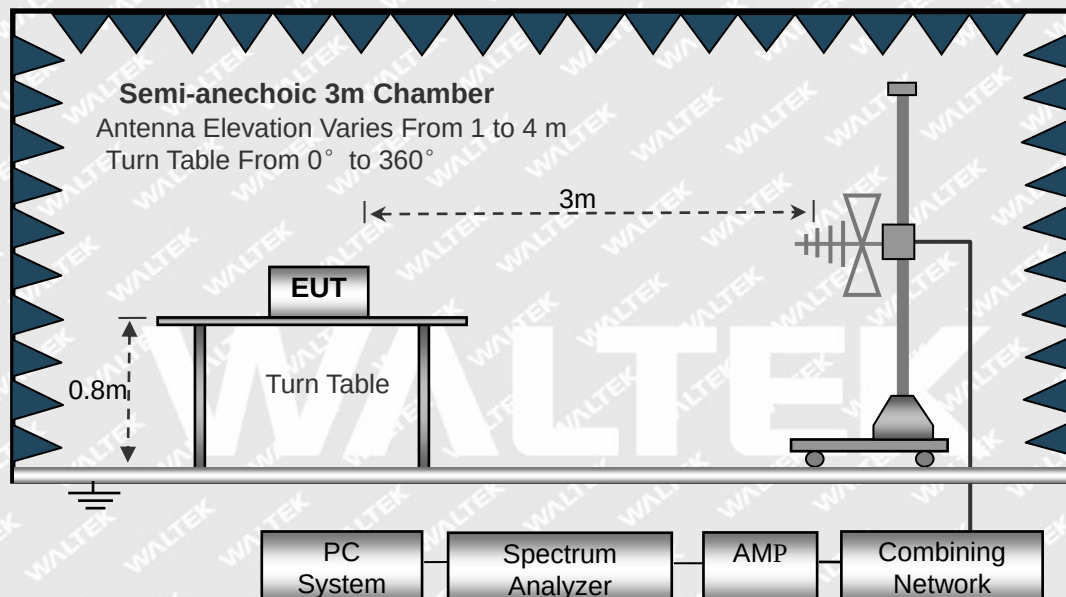
3. RADIATED EMISSION

3.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

3.2 Block Diagram of Test Setup





3.3 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

3.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Correct} \\ \text{Correct} = \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

3.5 Environmental Conditions

Temperature:	22.5 °C
Relative Humidity:	52 %
ATM Pressure:	1011 mbar

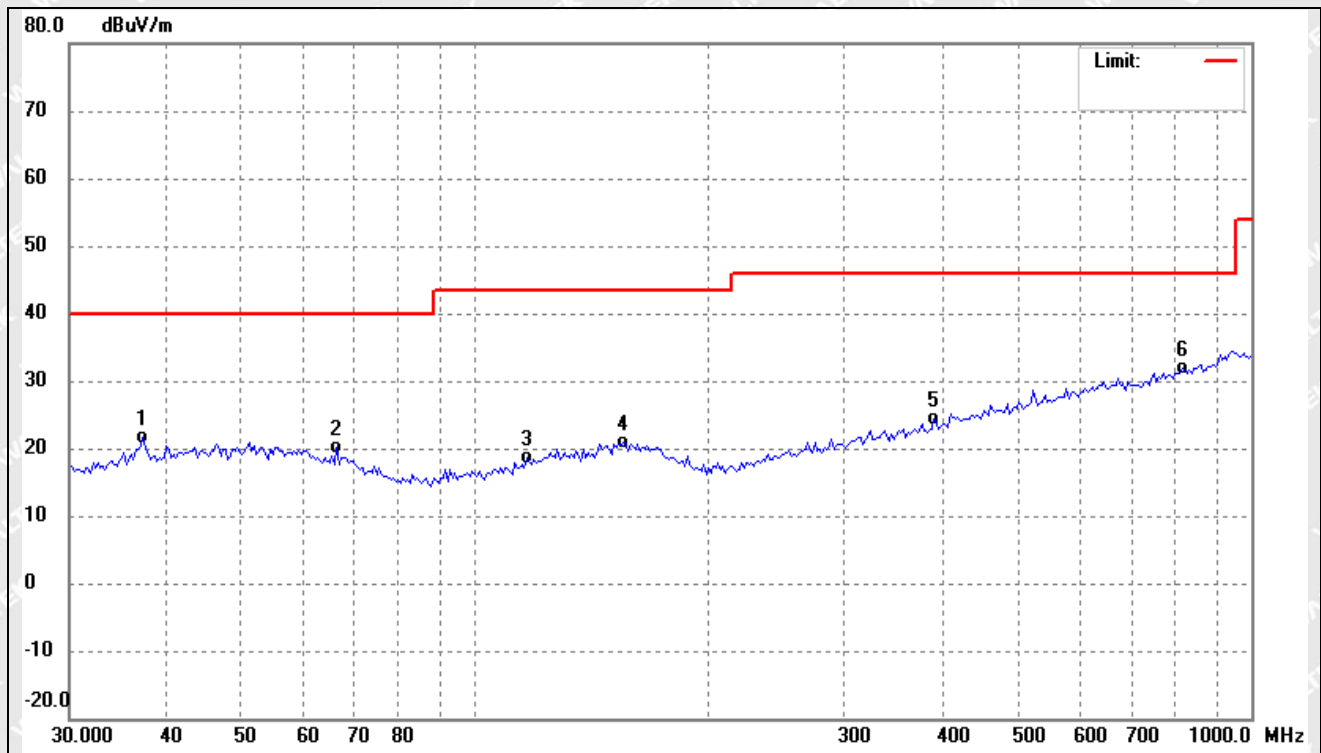
3.6 Summary of Test Results

Please find the results below:



Below 1GHz

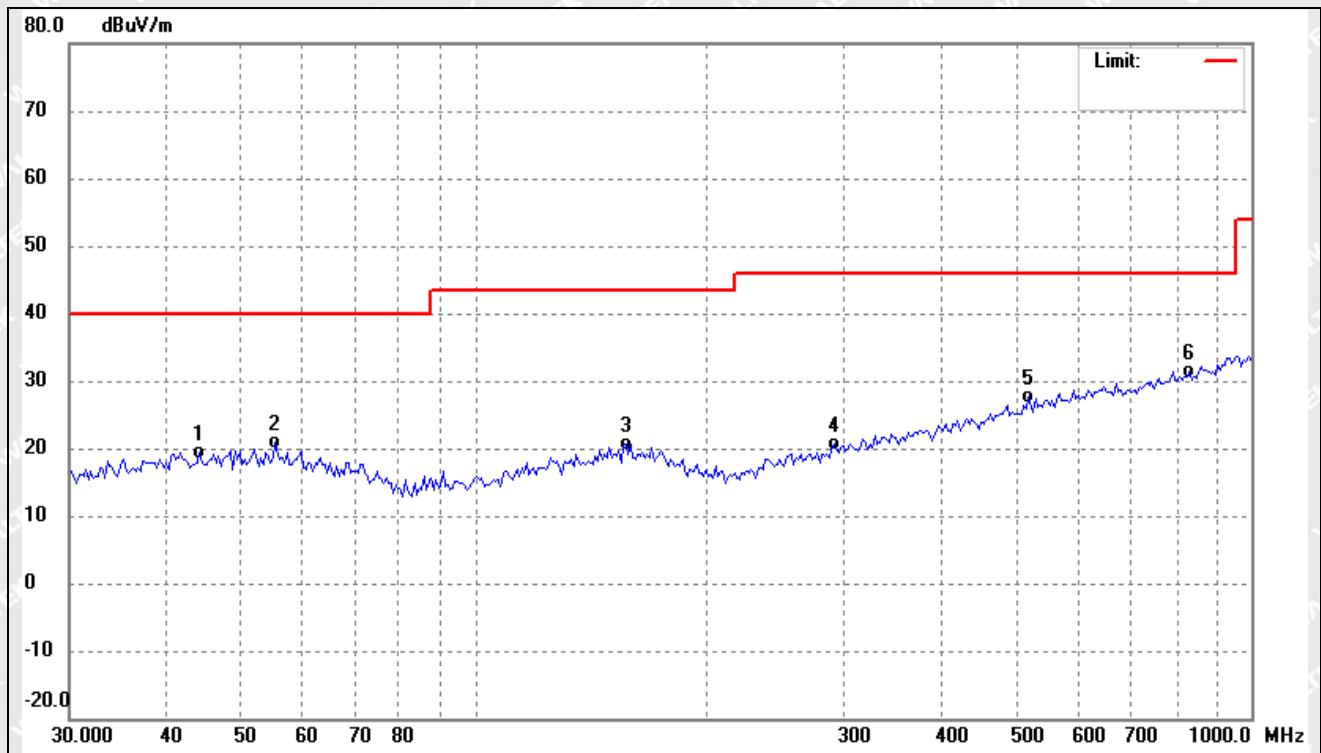
Test mode:	TM1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.3017	30.64	-9.06	21.58	40.00	-18.42	-	-	QP
2	66.3715	30.15	-10.11	20.04	40.00	-19.96	-	-	QP
3	116.4476	29.61	-10.90	18.71	43.50	-24.79	-	-	QP
4	155.3305	29.42	-8.61	20.81	43.50	-22.69	-	-	QP
5	389.9874	30.60	-6.16	24.44	46.00	-21.56	-	-	QP
6	815.6353	31.48	0.44	31.92	46.00	-14.08	-	-	QP



Test mode:	TM1	Polarity:	Vertical
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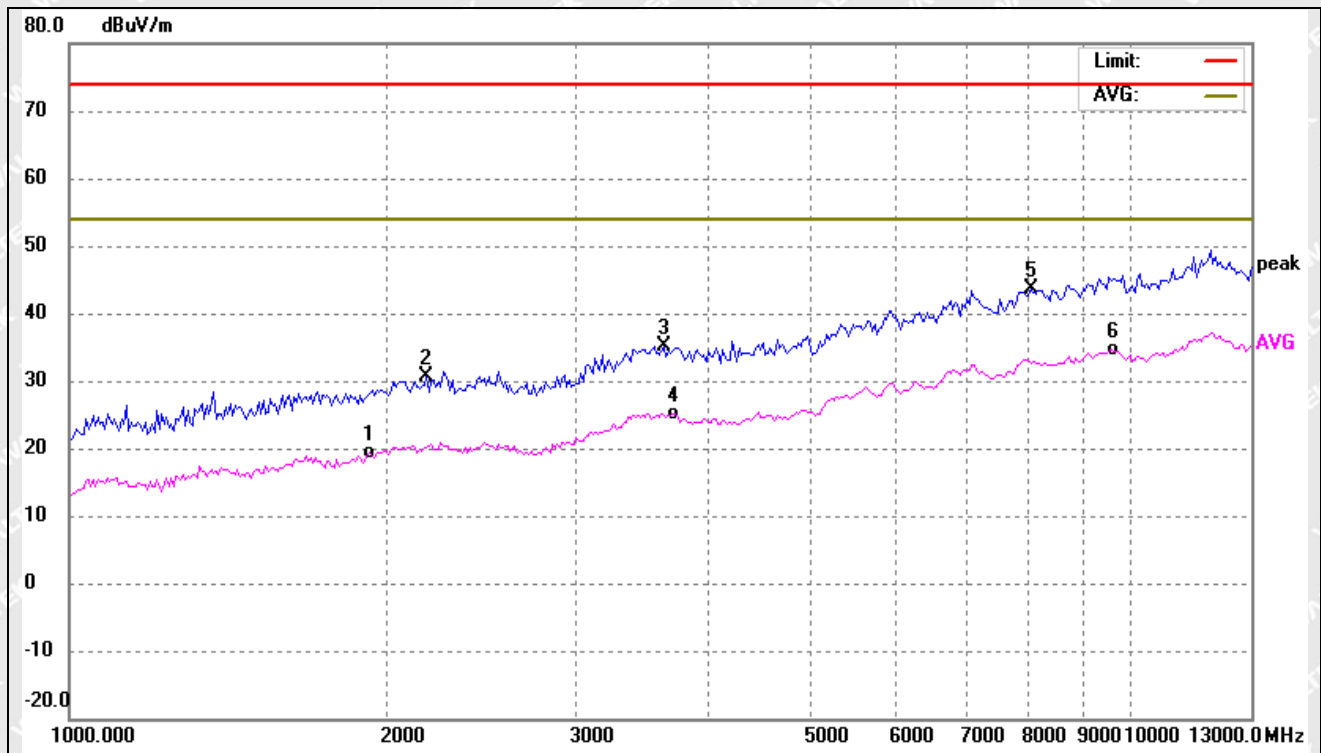


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	44.1544	27.90	-8.47	19.43	40.00	-20.57	-	-	QP
2	55.2883	29.46	-8.64	20.82	40.00	-19.18	-	-	QP
3	156.4259	29.27	-8.60	20.67	43.50	-22.83	-	-	QP
4	290.3170	29.24	-8.58	20.66	46.00	-25.34	-	-	QP
5	516.5651	31.24	-3.65	27.59	46.00	-18.41	-	-	QP
6	833.0127	30.87	0.59	31.46	46.00	-14.54	-	-	QP



Above 1GHz

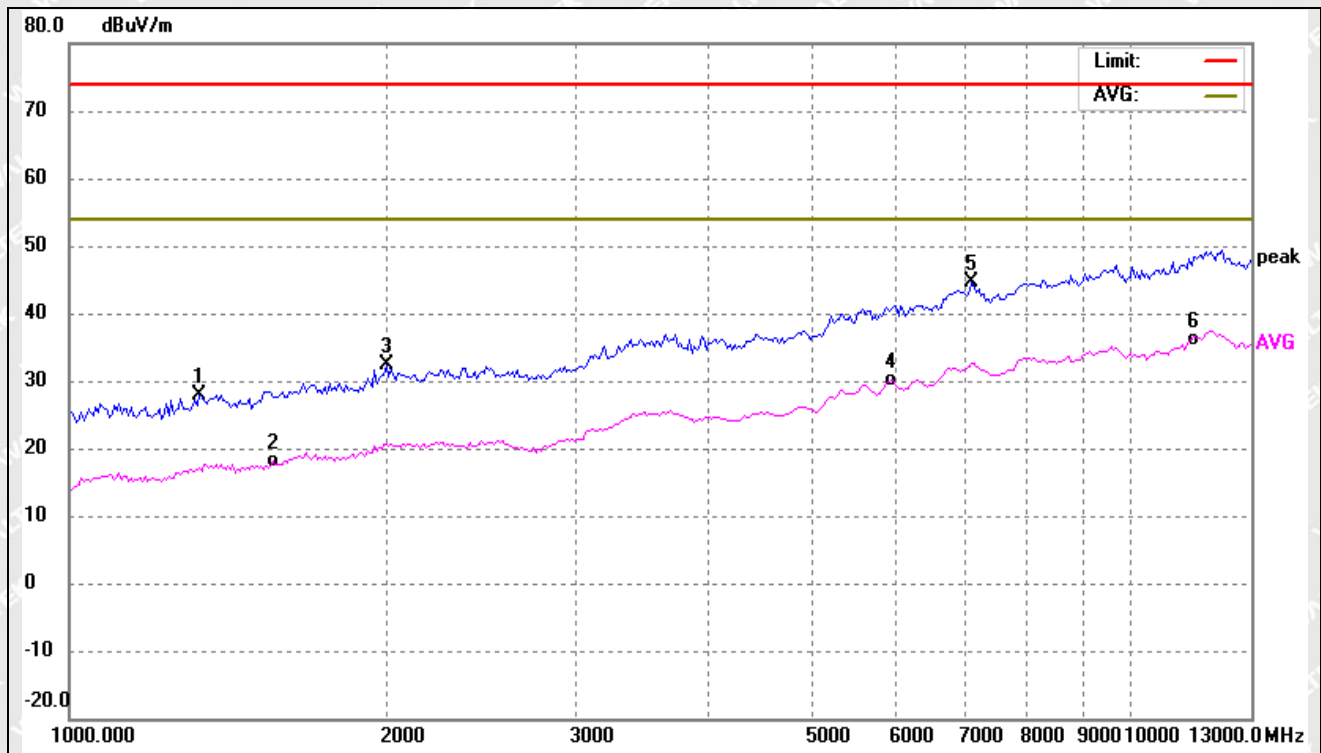
Test mode:	TM1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	1920.917	39.41	-20.10	19.31	54.00	-34.69	-	-	AVG
2	2173.127	49.86	-19.29	30.57	74.00	-43.43	-	-	peak
3	3633.458	49.44	-14.35	35.09	74.00	-38.91	-	-	peak
4	3708.938	39.58	-14.44	25.14	54.00	-28.86	-	-	AVG
5	8059.993	48.59	-5.01	43.58	74.00	-30.42	-	-	peak
6	9599.191	37.90	-3.38	34.52	54.00	-19.48	-	-	AVG



Test mode:	TM1	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	1326.720	51.13	-23.22	27.91	74.00	-46.09	-	-	peak
2	1555.902	40.39	-22.27	18.12	54.00	-35.88	-	-	AVG
3	1991.293	51.96	-19.68	32.28	74.00	-41.72	-	-	peak
4	5951.493	38.89	-8.87	30.02	54.00	-23.98	-	-	AVG
5	7088.036	50.67	-5.92	44.75	74.00	-29.25	-	-	peak
6	11432.325	37.28	-1.09	36.19	54.00	-17.81	-	-	AVG

Remark: '-' Means the test Degree and Height are not recorded by the test software and only show the worst case in the test report.



EXHIBIT 1 - PRODUCT LABELING

Proposed FCC Label Format

Product Label



Packaging Label



Proposed Label Location on EUT

FCC Label Location

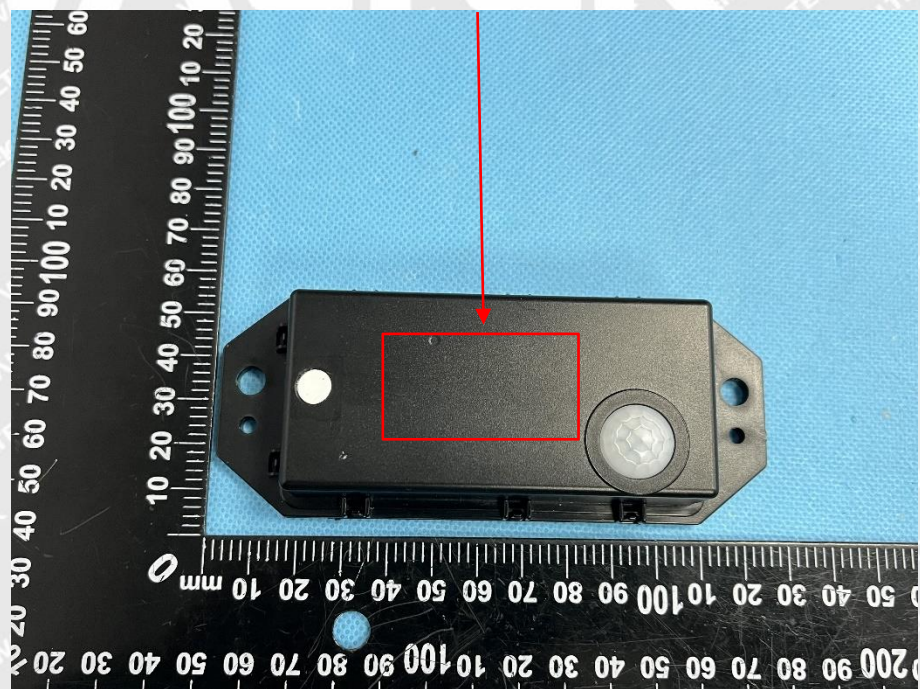
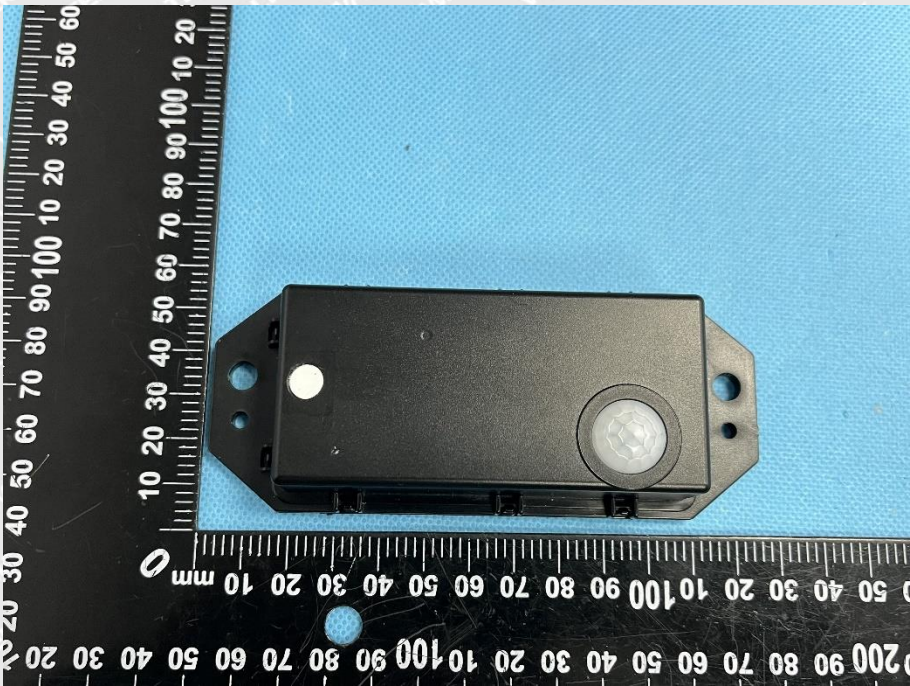


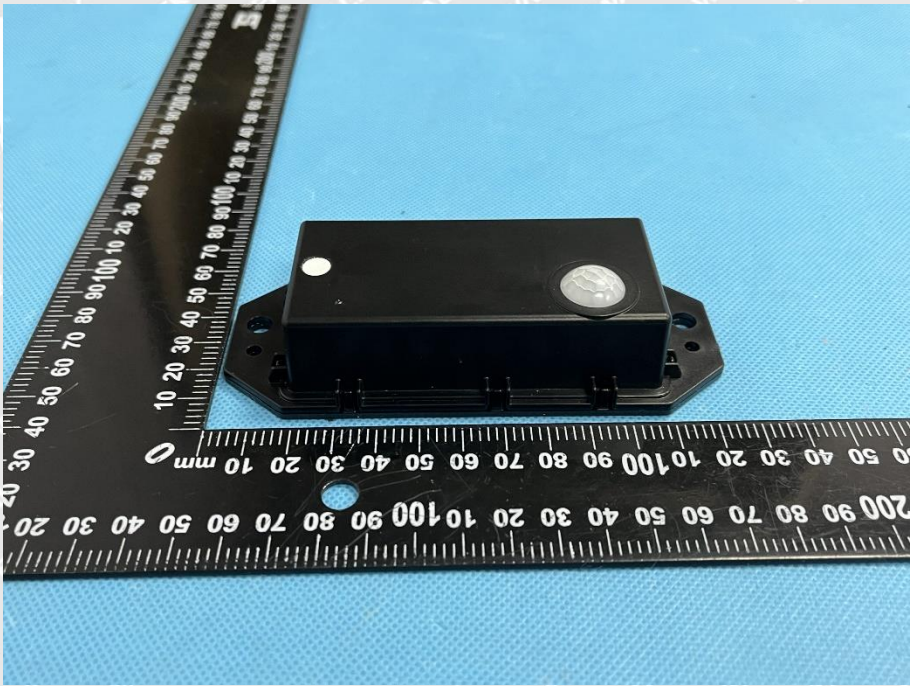


EXHIBIT 2 - EUT PHOTOGRAPHS

EUT View 1

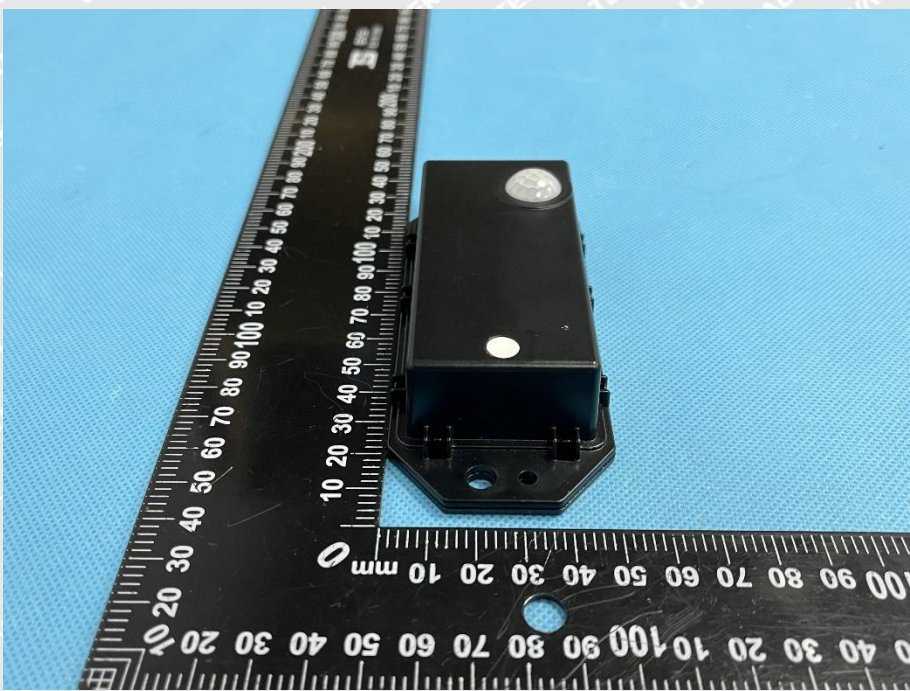


EUT View 2

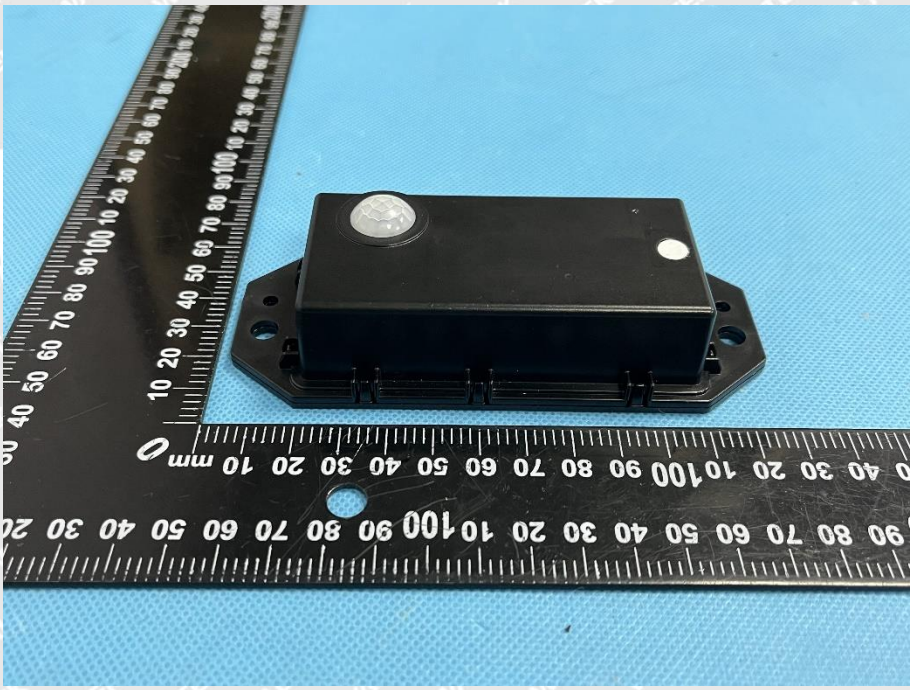




EUT View 3

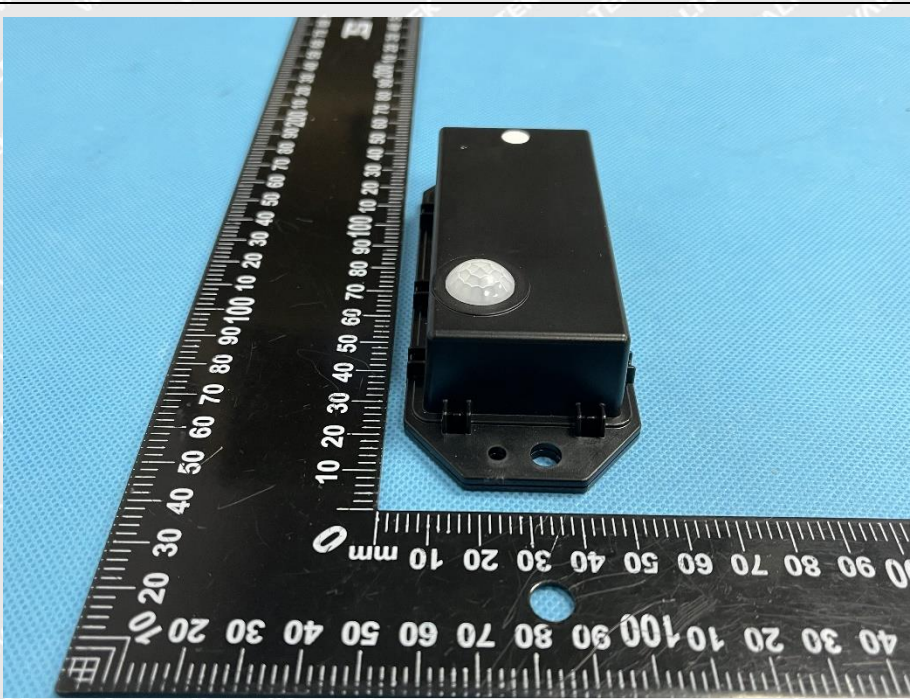


EUT View 4





EUT View 5



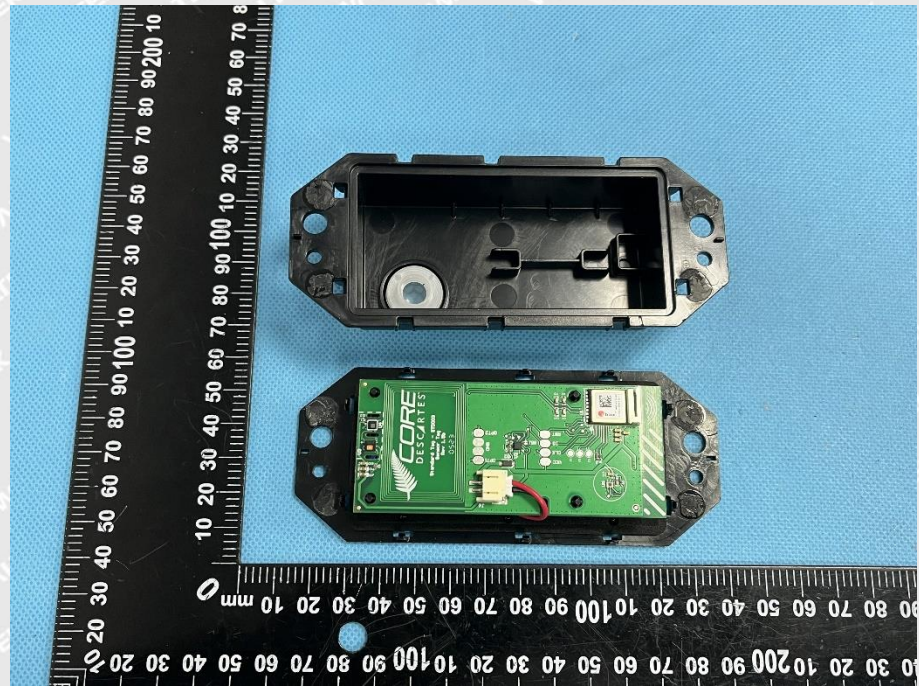
EUT View 6



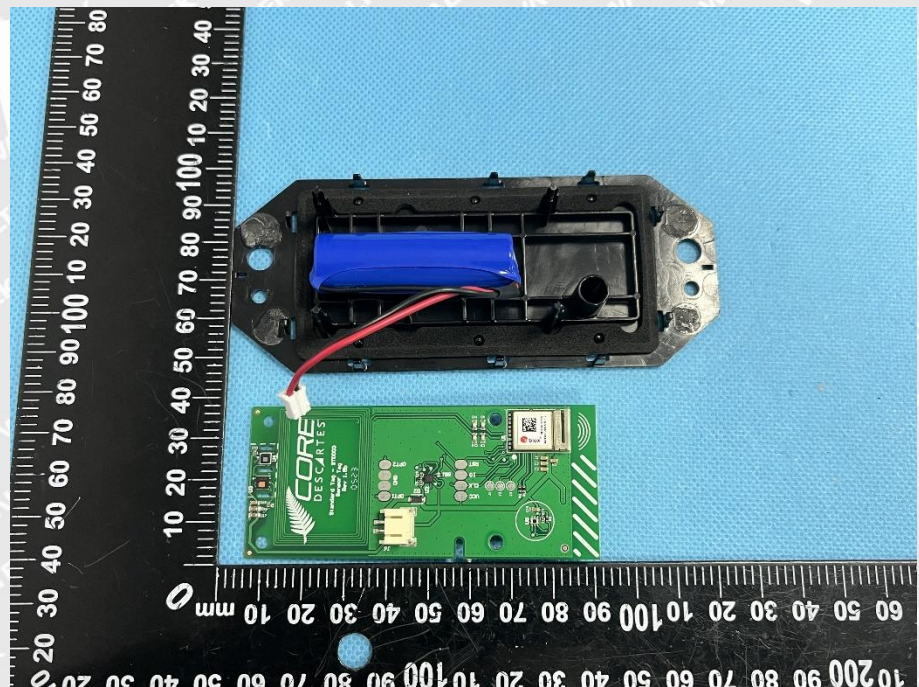


EXHIBIT 3 - EUT INTERNAL PHOTOGRAPHS

**EUT Housing and
Board View 1**

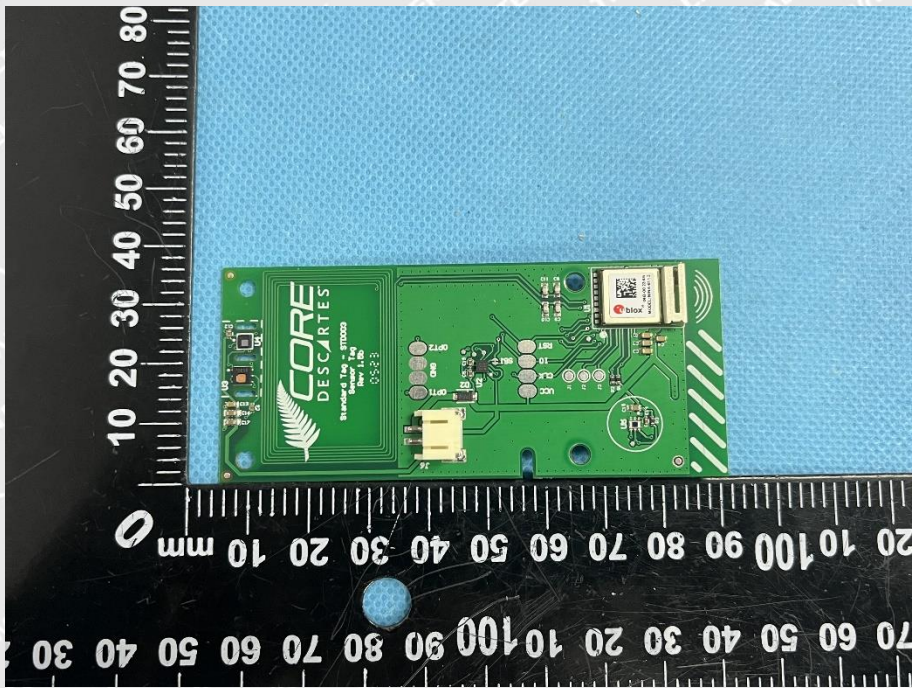


**EUT Housing and
Board View 2**

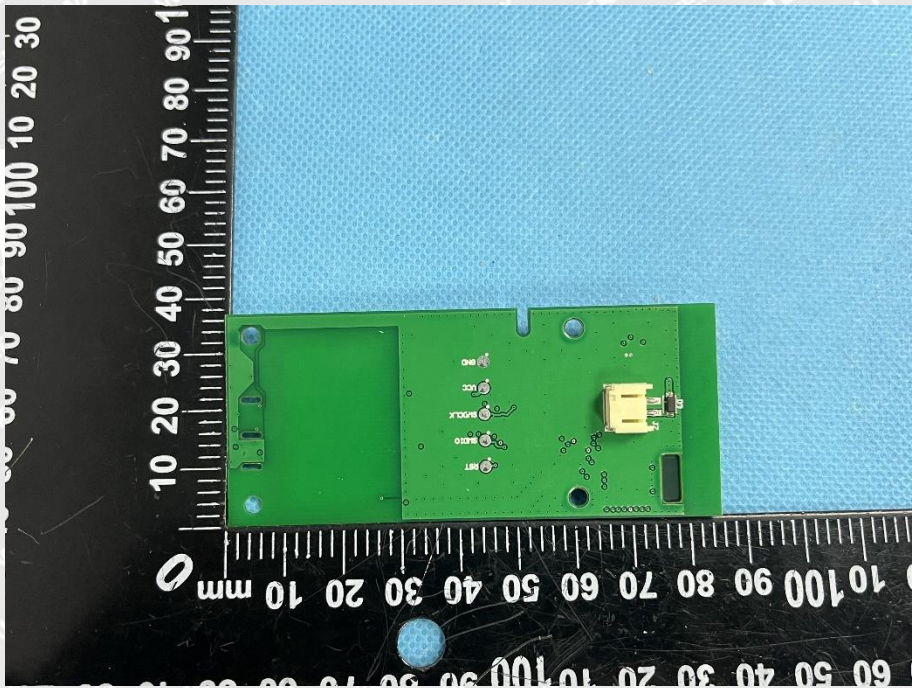




**Solder
Board-Component
View 1**



**Solder
Board-Component
View 2**

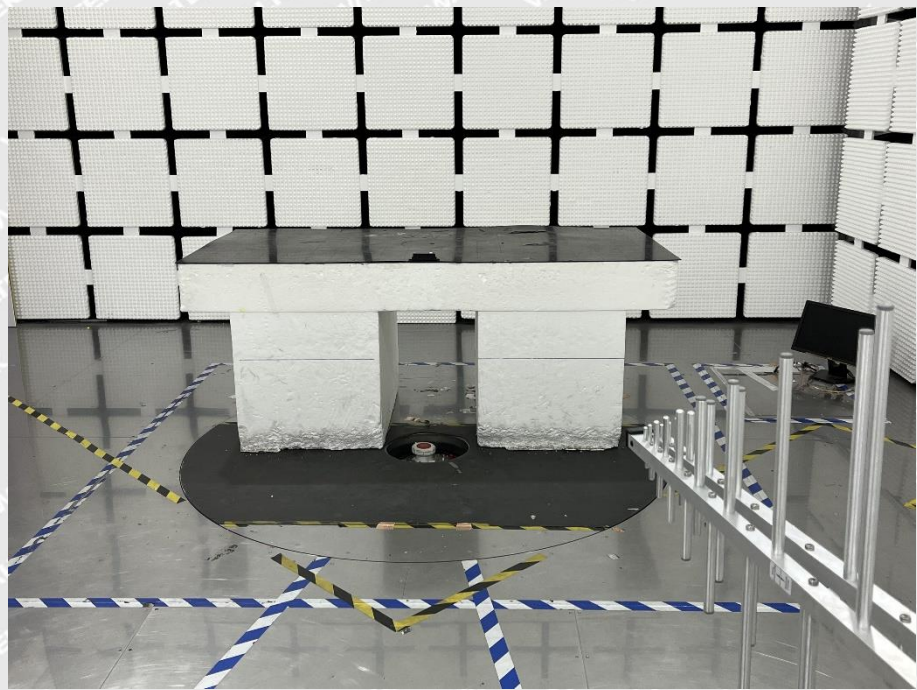


A blue cylindrical battery with the text "JOY ER14505 3.6V 2700mAh" printed on it. It has two wires, one red and one black, extending from one end. The battery is positioned next to a black ruler with white markings for scale. The ruler shows centimeters and millimeters. The battery is approximately 50mm long and 14mm in diameter. The background is a light blue textured surface.

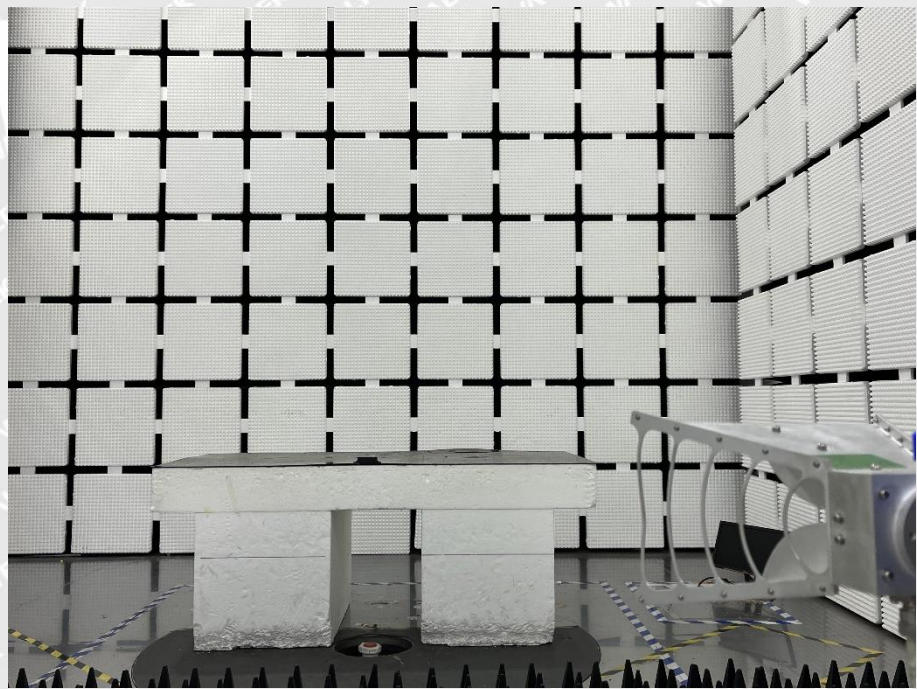


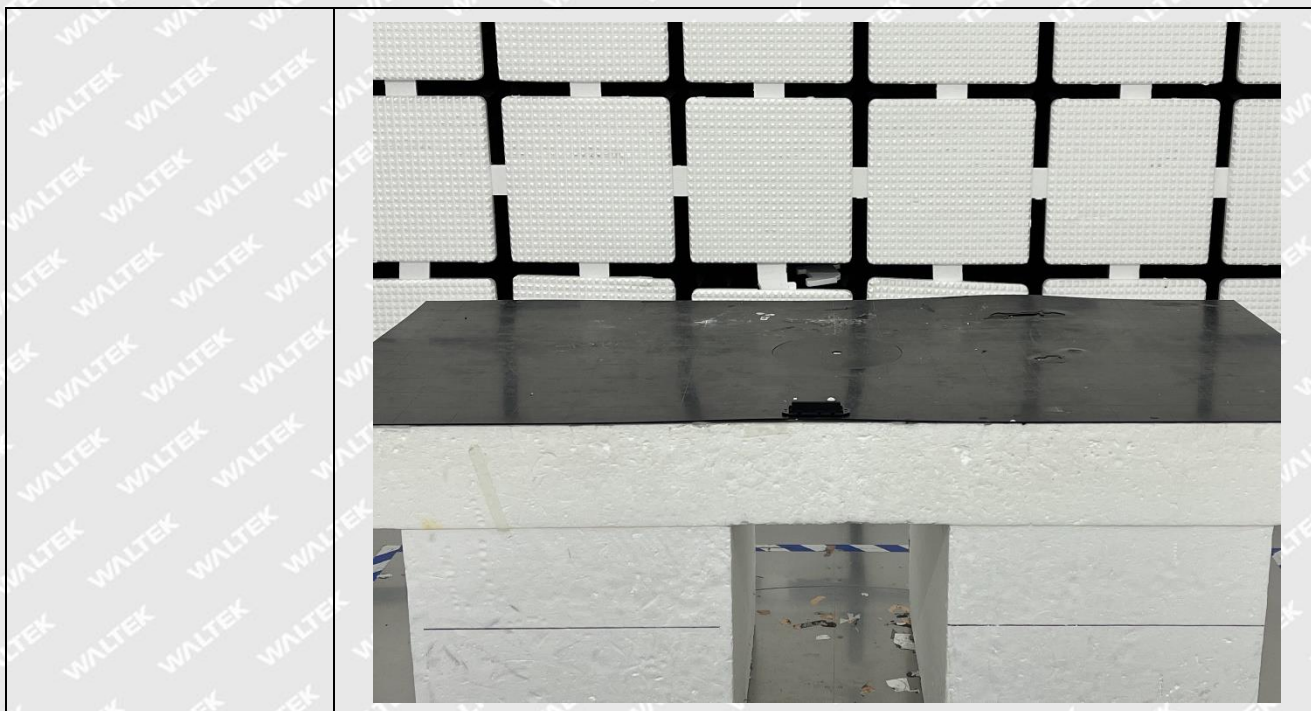
EXHIBIT 4 - TEST SETUP PHOTOGRAPHS

**Radiation Emission
Test View (30MHz to
1GHz)**



**Radiation Emission
Test View (Above
1GHz)**





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EXHIBIT 5 - USERS MANUAL

Information to Users

According to the FCC Part 15.19, 15.21, and 15.105 rules, for this EUT, the instructions or operation manual furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

FCC Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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