

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

**Test Report No.** : OT-247-RED-081  
**Reception No.** : 2406002227  
**Applicant** : SJIT Co.,Ltd  
**Address** : 54-11, Dongtanhana 1-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea  
**Manufacturer** : SJIT Co.,Ltd  
**Address** : 54-11, Dongtanhana 1-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea  
**Type of Equipment** : Asset Tracker  
**Model Name** : IET10MO  
**FCC ID.** : N/A  
**Multiple Model Name** : N/A  
**Serial number** : N/A  
**Total page of Report** : 15 pages (including this page)  
**Date of Incoming** : July 10, 2024  
**Date of Issuing** : July 24, 2024

## SUMMARY

The equipment complies with the requirement of *Canadian Standard ICES-003:Issue 7*.

This test report contains only the results of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

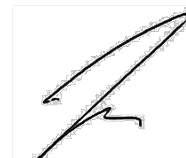
This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.

Reviewed by:



Min-Ho, Won / Senior Project Engineer  
EMC Testing Div.  
ONETECH Corp.

Approved by:



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EMC Testing Div.  
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## CONTENTS

Page

<b>1. VERIFICATION OF COMPLIANCE .....</b>	<b>4</b>
<b>2. TEST FACILITY.....</b>	<b>5</b>
<b>3. PRODUCT INFORMATION.....</b>	<b>6</b>
<b>3.1 DESCRIPTION OF EUT.....</b>	<b>6</b>
<b>3.2 MODEL DIFFERENCES.....</b>	<b>6</b>
<b>3.3 SUPPORT EQUIPMENT .....</b>	<b>7</b>
<b>3.4 SYSTEM CONFIGURATION.....</b>	<b>7</b>
<b>3.5 CABLE DESCRIPTION FOR THE EUT .....</b>	<b>7</b>
<b>3.6 EQUIPMENT MODIFICATIONS .....</b>	<b>7</b>
<b>4. DESCRIPTION OF TESTS.....</b>	<b>8</b>
<b>4.1 TEST STANDARDS AND RESULT .....</b>	<b>8</b>
<b>4.2 TEST CONDITION.....</b>	<b>8</b>
<b>4.3 CONDUCTED EMISSION .....</b>	<b>9</b>
<b>4.4 RADIATED EMISSION.....</b>	<b>9</b>
<b>5. FINAL RESULT OF MEASUREMENT.....</b>	<b>10</b>
<b>5.1 RADIATED EMISSION TEST .....</b>	<b>10</b>
<b>5.1.1 Operating Environment .....</b>	<b>10</b>
<b>5.1.2 Test Setup .....</b>	<b>10</b>
<b>5.1.3 Measurement uncertainty.....</b>	<b>10</b>
<b>5.1.4 Limit .....</b>	<b>10</b>
<b>5.1.5 Test Equipment used.....</b>	<b>11</b>
<b>5.1.6 Test Data .....</b>	<b>12</b>
<b>6. SAMPLE CALCULATIONS.....</b>	<b>15</b>
 <b>APPENDIX A – TEST SET-UP PHOTOGRAPHS</b>	
<b>APPENDIX B – EXTERNAL PHOTOGRAPHS</b>	
<b>APPENDIX C – INTERNAL PHOTOGRAPHS</b>	
<b>APPENDIX D – LABELLING REQUIREMENTS / INFORMATION TO THE USER IN USER’S MANUAL</b>	

**Revision History**

Rev. No.	Issued Report No.	Issued Date	Revisions	Section Affected
0	OT-247-RED-081	July 24, 2024	Initial Issue	All

\* Please contact us (e-mail: [info@onetech.co.kr](mailto:info@onetech.co.kr)) for verification of this test report.

## 1. VERIFICATION OF COMPLIANCE

-. Applicant : SJIT Co.,Ltd  
 -. Address : 54-11, Dongtanhana 1-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea  
 -. Manufacturer : SJIT Co.,Ltd  
 -. Address : 54-11, Dongtanhana 1-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea  
 -. Model Name : IET10MO  
 -. Serial Number : N/A  
 -. Brand/Trade Name : N/A  
 -. Date : July 24, 2024

EQUIPMENT CLASS	Class B Digital Device
E.U.T. DESCRIPTION	Asset Tracker
MEASUREMENT PROCEDURES	CAN/CSA-CISPR32:17
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	ICES-003 Issue 7 Class B Apparatus
STANDARDS	Canadian Standard ICES-003 Issue 7
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	10 m semi anechoic chamber

ONETECH Corp. tested the above equipment in accordance with the requirements set forth in the above standard. The test results show that equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

## 2. TEST FACILITY

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at:

- 1) 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea
- 2) 12-5, Jinsaegol-gil 75 beon-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

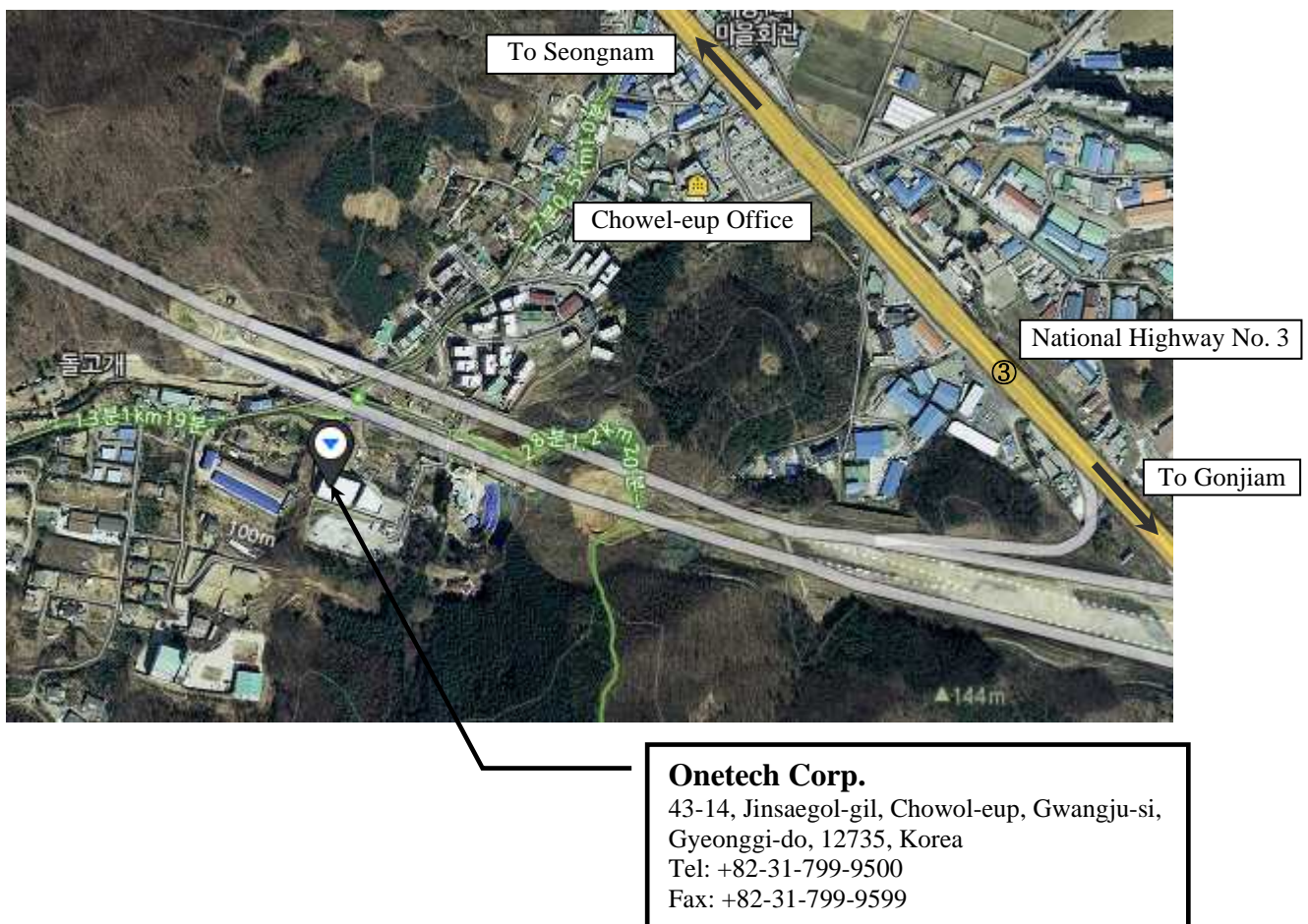
KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation No. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

These measurement tests were conducted at Onetech Corp.

The 10 m semi anechoic chamber and conducted measurement facilities are located on at 12-5, Jinsaegol-gil 75 beon-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.



### 3. PRODUCT INFORMATION

#### 3.1 Description of EUT

The SJIT Co.,Ltd, Model IET10MO (referred to as the EUT in this report) is an Asset Tracker. Product specification described herein was obtained from product data sheet or user's manual.

Device Type	Asset Tracker	
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1 MHz)	32.768 kHz, 26 MHz, 32 MHz	
Electrical Rating	DC 3.6 V, 50 mA/5 400 mAh	
RF Spec.	Sig Fox	902.137 5 MHz ~ 904.662 5 MHz (RC2) 920.737 5 MHz ~ 923.262 5 MHz (RC4)
	GPS	1 559 MHz ~ 1 610 MHz
	Bluetooth LE	2 402 MHz ~ 2 480 MHz
	WLAN 2.4 GHz	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))
EXTERNAL CONNECTOR	-	

#### 3.2 Model Differences

-. The following lists consist of the added model and their differences.: None

### 3.3 Support Equipment

The model numbers for all the equipment that were used in the tested system is:

Model	Manufacturer	Description	Connected to
IET10MO	SJIT Co.,Ltd	Asset Tracker (EUT)	-
N/A	N/A	Lithium Battery	-
80QD	LENOVO	Notebook PC	BT Jig
NEXT-1265WBTA	NEXTU	BT Jig	Notebook PC
GSS7000	Spirent Communications Plc	Signal Generator	-

### 3.4 System Configuration

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Asset Tracker	SJIT Co.,Ltd	IET10MO	-

### 3.5 Cable Description for the EUT

Port name	Shielded	Ferrite Bead	Metal Shell	Length (m)	Connected to
-	-	-	-	-	-

### 3.6 Equipment Modifications

-. None

## 4. DESCRIPTION OF TESTS

### 4.1 Test standards and result

Test Items	Applied Standards	Results
Conducted Emission	CAN/CSA-CISPR 32:17	N/A(See Note 1)
Radiated Emission	CAN/CSA-CISPR 32:17	C
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

Note 1: This test was not performed because EUT was equipment that operates on battery.

### 4.2 Test Condition

The test conditions of the noted test mode(s) in this test report are;

- . Checked the GPS reception status.
- . Input power conditions during the measurements was DC 3.6 V Lithium Battery
- . Test Mode(s)

Operating Mode	GPS
----------------	-----



### 4.3 Conducted Emission

The EUT was placed on a non-conductive 1.0 m × 1.5 m table, which is 0.8 m in height above the reference ground plane and 0.4 m away from the vertical conducting plane (over 2 m × 2 m) that is bonded to the reference ground plane.

The power of EUT is fed through a 50 Ω/ 50 μH + 5 Ω LISN and all support equipment is powered from another LISN. Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver.

Exploratory measurements were conducted to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Exploratory measurements were scanned using Peak mode of EMI Test receiver from 150 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and CISPR-Average mode.

The bandwidth of EMI Test Receiver was set to 9 kHz. Interface cables were connected to the available interface ports of the test unit. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

### 4.4 Radiated Emission

Exploratory Radiated measurements were conducted at the 3m or 10 m semi anechoic chamber in order to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Final measurements were made at 10 m semi anechoic chamber that complies with CISPR 16/ANSI C63.4.

Exploratory measurements were scanned using Peak mode of EMI Test receiver and final measurements were measured with Quasi-Peak mode (Below 1 GHz) and Peak & CISPR-Average mode (Above 1 GHz).

The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

## 5. FINAL RESULT OF MEASUREMENT

Exploratory measurement was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 Radiated Emission Test

#### 5.1.1 Operating Environment

Temperature : 22.4 °C  
Relative humidity : 55.9 % R.H.

#### 5.1.2 Test Setup

The radiated emissions measurements were on the 3 m distance, in 10 m semi anechoic chamber. The EUT and all local support equipments were placed on a non-conductive turntable approximately 0.8 m above the ground plane.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

#### 5.1.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 1 000 MHz : 4.5 dB  
Radiated emission electric field intensity, 1 GHz ~ 18 GHz : 5.8 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor,  $k = 2$ .

#### 5.1.4 Limit

-. ICES-003

Frequency of Emission (MHz)	Resolution bandwidth	Field strength @ 3 m (dB $\mu$ V/m)	Field strength @ 10 m (dB $\mu$ V/m)
30 ~ 88 88 ~ 216 216 ~ 230 230 ~ 960 960 ~ 1 000	120 kHz	Quasi-peak	Quasi-peak
		40.0	30.0
		43.6	33.1
		46.0	35.6
		47.0	37.0
		54.0	43.5
Frequency of Emission (MHz)	Resolution bandwidth	Field strength @ 3 m (dB $\mu$ V/m)	
> 1 000	1 MHz	Peak Limit	CISPR Average Limit
		74.0	54.0

### 5.1.5 Test Equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESR	Rohde & Schwarz	EMI Test Receiver	101470	Jun.13, 2024 (1Y)
■ -	ESCI	Rohde & Schwarz	EMI Test Receiver	101013	Mar. 12, 2024 (1Y)
■ -	HLP-2008	TDK RF Solutions	Hybrid Antenna	131313	Apr. 05, 2023 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	295	Mar. 12, 2024 (1Y)
■ -	SA18N-06	Fairview Microwave Inc.	6 dB Fixed Attenuator	N/A	Apr. 05, 2023 (2Y)
■ -	310N	SONOMA INSTRUMENT	AMPLIFIER	312545	Mar. 11, 2024 (1Y)
■ -	PAM-118A	Com-Power	Pre-Amplifier	18040158	Oct. 04, 2023 (1Y)
■ -	PAM-840A	Com-Power	Pre-Amplifier	461339	Oct. 16, 2023 (1Y)
■ -	DT5000	Innco Systems GmbH	Turn Table	N/A	N/A
■ -	MA4640-XPET	Innco Systems GmbH	Antenna Master	MA4000/509	N/A

All test equipment used is calibrated on a regular basis.

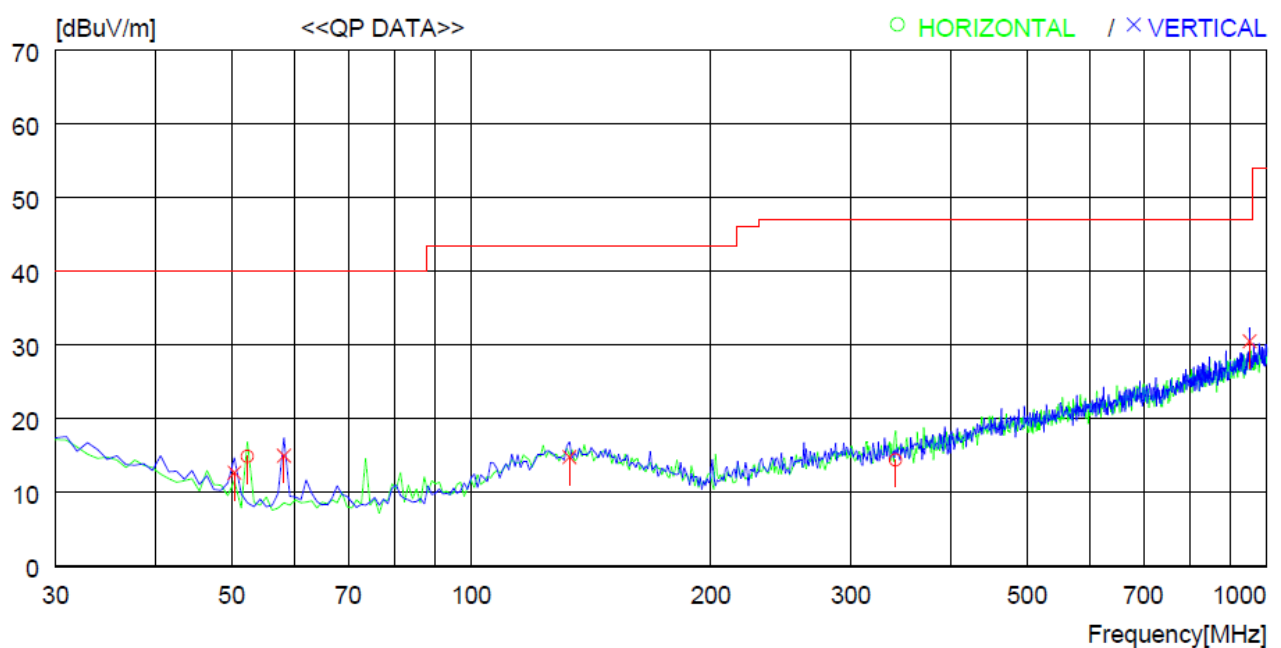
## 5.1.6 Test Data

-. Test Result : Pass

한기건

Tested by: Jae-Yeon, Kim / Senior Project Engineer

Operating Mode 1			
Frequency range	: 30 MHz ~ 1 000 MHz	Applied Standards	: ICES-003 Issue 7
Resolution bandwidth	: 120 kHz	Test Date	: July 18, 2024
Detector Mode	: Quasi-Peak	Measurement distance	: 3 m



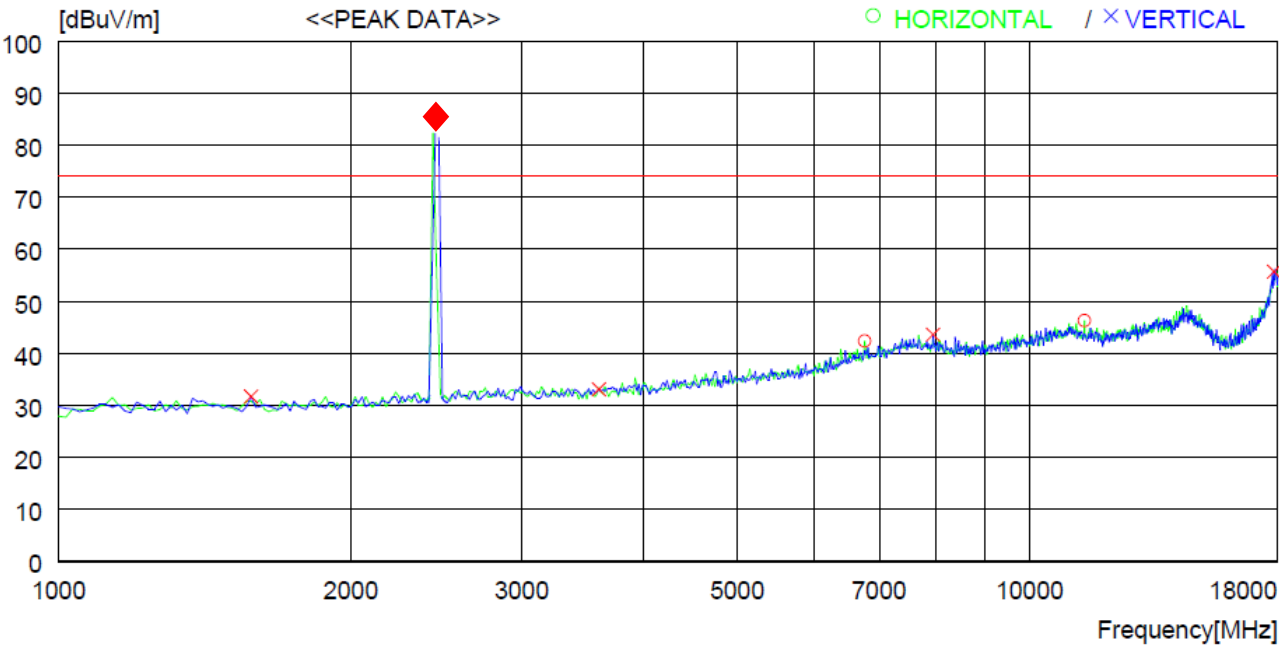
No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]
----- Horizontal -----										
1	52.310	34.2	12.6	1.1	33.0	14.9	40.0	25.1	155	184
2	341.370	24.7	19.7	3.0	33.0	14.4	47.0	32.6	247	168
----- Vertical -----										
3	50.370	31.5	13.1	1.1	33.0	12.7	40.0	27.3	355	293
4	58.130	34.5	12.3	1.2	33.0	15.0	40.0	25.0	122	317
5	132.820	26.8	19.2	1.8	33.0	14.8	43.5	28.7	355	339
6	951.487	29.2	28.2	5.0	31.9	30.5	47.0	16.5	123	352

Remark: Margin (dB) = Limit – Result

Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Operating Mode 1			
Frequency range	: 1 GHz ~ 18 GHz	Test Date	: July 18, 2024
Resolution bandwidth	: 1 MHz	Measurement distance	: 3 m
Detector Mode	: Peak		



No.	FREQ [MHz]	READING [dBuV]	ANT PEAK FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	6763.000	40.3	35.0	11.1	44.0	42.4	74.0	31.6	184	359
2	11387.000	35.8	39.7	14.5	43.7	46.3	74.0	27.7	142	286
----- Vertical -----										
3	1578.000	43.1	25.4	5.1	41.9	31.7	74.0	42.3	155	146
4	3601.000	40.5	28.9	7.8	44.1	33.1	74.0	40.9	136	288
5	7953.000	37.0	37.1	12.0	42.5	43.6	74.0	30.4	148	81
6	17847.000	27.9	49.7	18.5	40.4	55.7	74.0	18.3	174	0

Remark 1: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

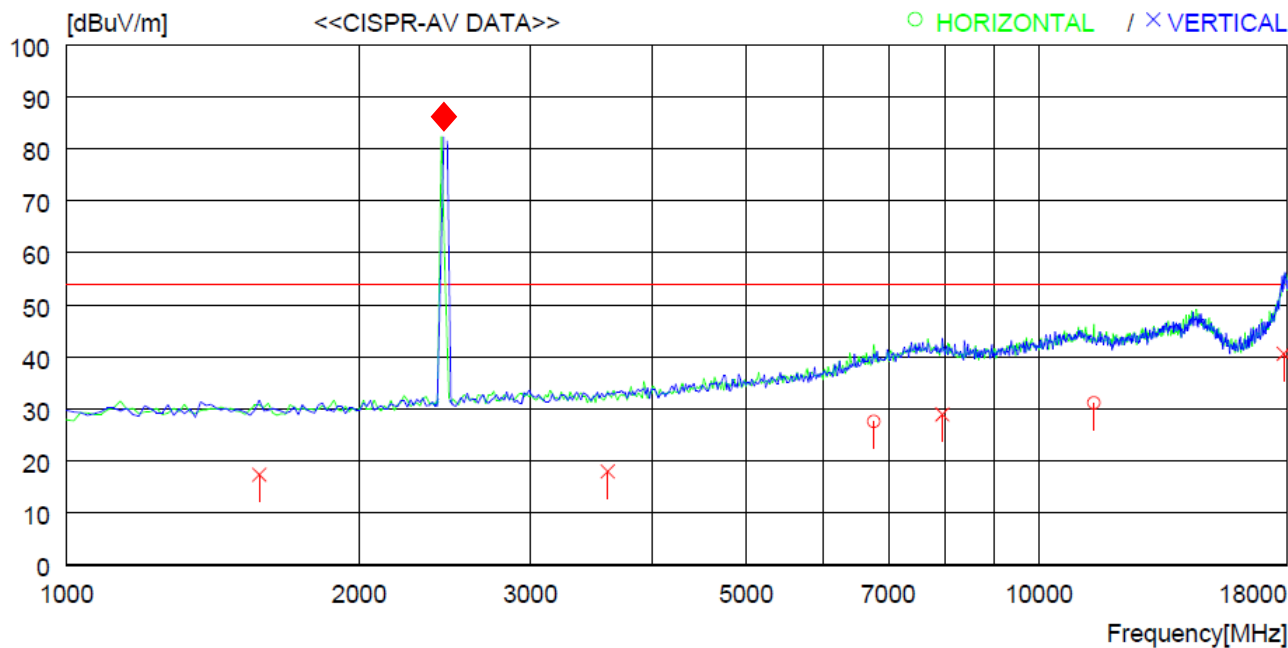
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Remark 2: Radiated emissions (Tx/Rx frequencies) from the transceiver shall be ignored.

Bluetooth – (2 402 ~ 2 480) MHz

Remark 3: ◆ - Exclusion band Carrier Frequency

Operating Mode 1			
Frequency range	: 1 GHz ~ 18 GHz	Test Date	: July 18, 2024
Resolution bandwidth	: 1 MHz	Measurement distance	: 3 m
Detector Mode	: CISPR-Average		



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
		CAV	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	6763.048	25.5	35.0	11.1	44.0	27.6	54.0	26.4	123	38
2	11387.120	20.7	39.7	14.5	43.7	31.2	54.0	22.8	144	124
----- Vertical -----										
3	1578.788	28.8	25.4	5.1	41.9	17.4	54.0	36.6	155	22
4	3601.038	25.4	28.9	7.8	44.1	18.0	54.0	36.0	127	124
5	7953.353	22.4	37.1	12.0	42.5	29.0	54.0	25.0	138	255
6	17847.040	12.8	49.7	18.5	40.4	40.6	54.0	13.4	127	55

Remark 1: Margin (dB) = Limit – Result and Result = Reading CISPR-Average + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Remark 2: Radiated emissions (Tx/Rx frequencies) from the transceiver shall be ignored.

Bluetooth – (2 402 ~ 2 480) MHz

Remark 3: ◆ - Exclusion band Carrier Frequency

\* Reading value was measured on manual as changing at the height of antenna and the angle of table.

## 6. SAMPLE CALCULATIONS

$$\text{dB}\mu\text{V} = 20 \text{ Log}_{10} (\mu\text{V})$$

$$\text{Margin} = \text{Limit} - \text{Result}$$

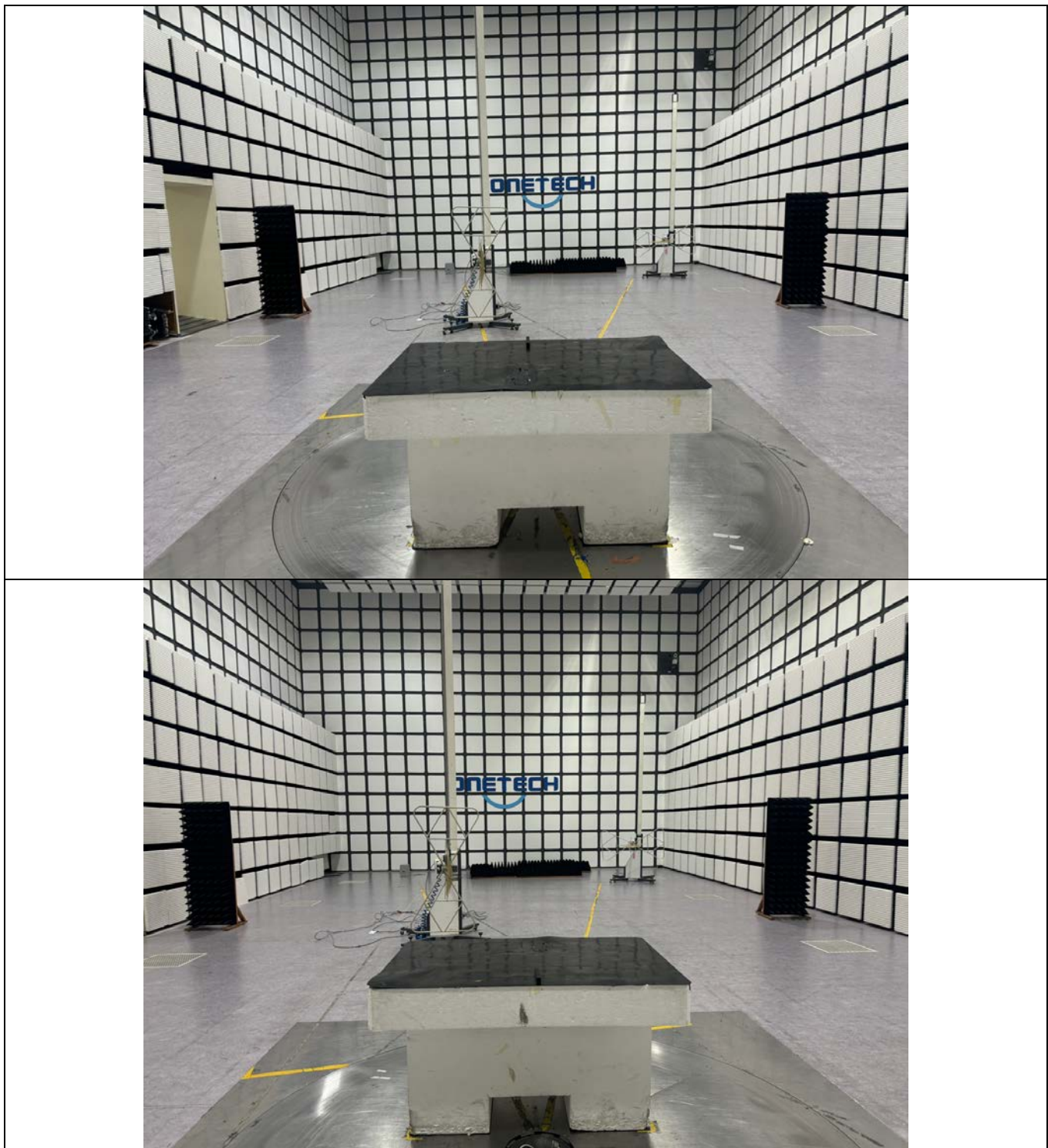
-. Example: 17847.040 MHz

Class B Limit	= 54.0 dB $\mu$ V/m (CISPR-Average)
Reading	= 12.8 dB $\mu$ V
Correction Factor	= Antenna Factor (49.7 dB/m) + Cable Loss (18.5 dB) - Amp. Gain (40.4 dB)
	= 27.8 dB
Total	= 40.6 dB $\mu$ V
Margin	= 54.0 dB $\mu$ V/m – 40.6 dB $\mu$ V/m
	= 13.4 dB

**APPENDIX A**  
**[TEST SET UP PHOTOGRAPHS]**



## Radiated Emission Test Set Up (Below 1 GHz)



### Radiated Emission Test Set Up (Above 1 GHz)

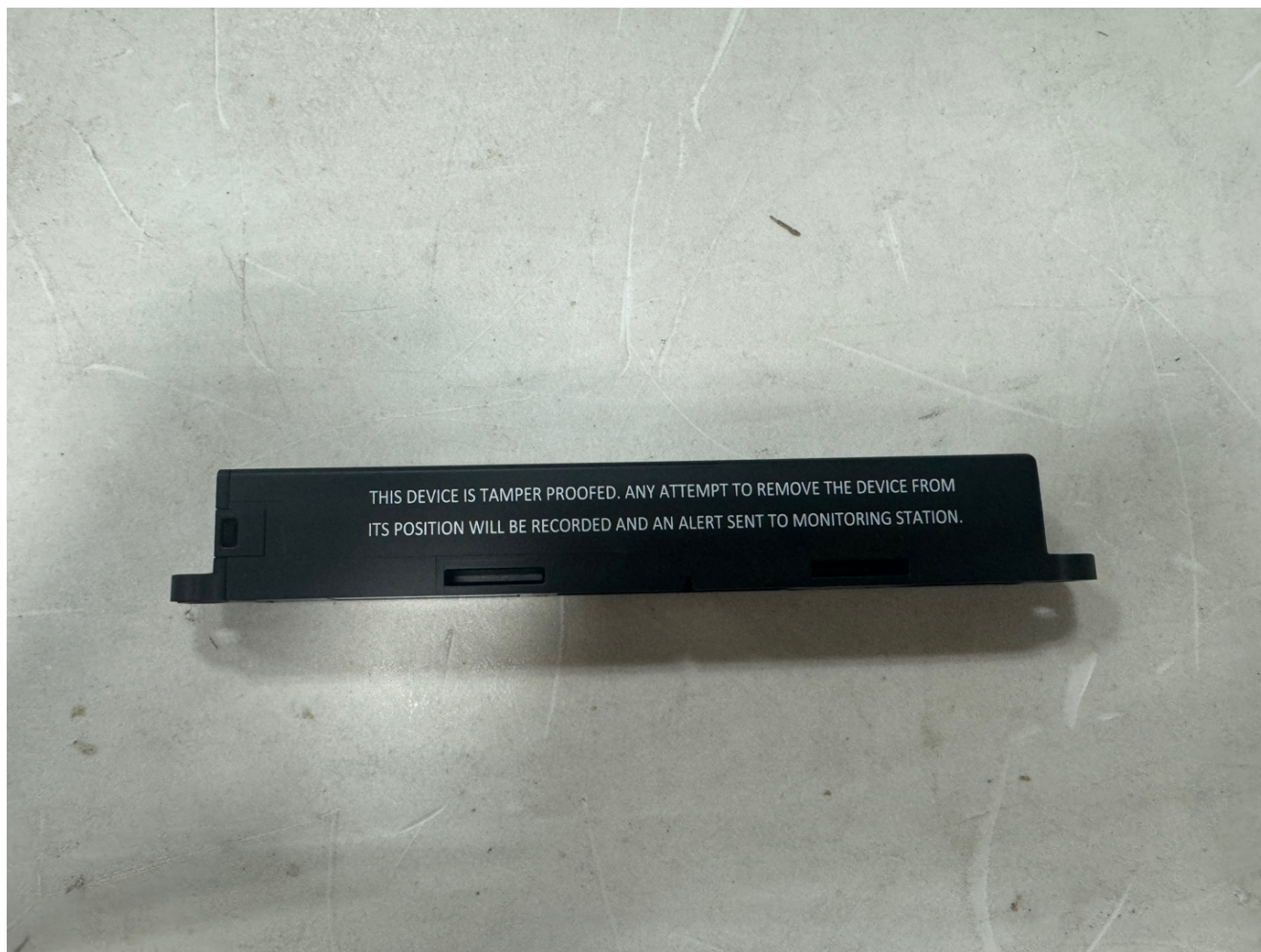


**APPENDIX B**  
**[EXTERNAL PHOTOGRAPHS]**













**APPENDIX C**  
**[INTERNAL PHOTOGRAPHS]**





**APPENDIX D**  
**[LABELLING REQUIREMENTS]**  
**[INFORMATION TO THE USER IN USER'S MANUAL]**

## **LABELLING REQUIREMENTS**

### **For ICES-003**

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section and in Notice 2014-DRS1003 for electronic labelling for every unit:

- i. prior to marketing in Canada, for ITE manufactured in Canada and
- ii. prior to importation into Canada, for imported ITE.

Each unit of an ITE model shall bear a label (see below) that represents the manufacturer's or the importer's SDoC with Innovation, Science and Economic Development Canada's ICES-003. This label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. If the dimensions of the device are too small or if it is not practical to place the label on the ITE and electronic labelling has not been implemented, the label shall be, upon agreement with Innovation, Science and Economic Development Canada, placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

### **Innovation, Science and Economic Development Canada ICES-003 Compliance Label:**

CAN ICES-3 (\*)/NMB-3(\*)

\* Insert either "A" or "B" but not both to identify the applicable Class of ITE.