4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17159, Korea
Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests:
November 09 – November 14, 2022
Test Report N/O: LR500122211S
Test Site : LTA Co., Ltd.

EMC TEST REPORT

Model No. **IET10RC1**

APPLICANT **SJI Co., Ltd**

Equipment name	:	**Asset Tracker**
Manufacturer	:	**SJI Co., Ltd**
Model name	:	**IET10RC1**
Test Device Serial No.	:	**Identical prototype**
ETSI Rule Part(s)	:	**ETSI EN 301 489-1 V2.2.3 (2019-11)** **ETSI EN 301 489-3 V2.1.1 (2019-03)** **ETSI EN 301 489-17 V3.2.4 (2020-09)**
Frequency Range	:	**2.4 GHz (2,402 ~ 2,480) MHz**
Date of issue	:	**November 16, 2022**

This test report is issued under the authority of:

Young Kyu Shin, Technical Manager

The test was supervised by:

Hyun Young Ahn, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. This test report is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.

NVLAP® TESTING NVLAP LAB CODE 200723-0

Revision history

Revision	Date of issue	Test report No.	Description
0	16.11.2022	LR500122211S	Initial

TABLE OF CONTENTS

1. General information's

1-1 Test Performed

Company name	:	LTA Co., Ltd.
Address	:	4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17159, Korea
Web site	:	http://www.ltalab.com
E-mail	:	chahn@ltalab.com
Telephone	:	+82-31-323-6008
Facsimile	:	+82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2023-09-30	ECT accredited Lab.
RRA	KOREA U.S.A CANADA	KR0049	- 2023-04-08 2024-08-15	RRA accredited Lab.
VCCI	JAPAN	C-14948 T-12416 R-14483 G-10847	2023-09-10 2023-09-10 2023-10-15 2024-12-13	VCCI registration
KOLAS	KOREA	KT551	2025-10-12	KOLAS accredited Lab.

2. Information's about test item

2-1 Client / Manufacturer

Company name	:	SJI Co., Ltd.
Address	:	54-33, Dongtanhana 1-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea
Telephone / Facsimile	:	+82-31-239-8194

Factory

Company name	:	SJI Co., Ltd.
Address	:	54-33, Dongtanhana 1-gil, Hwaseong-si, Gyeonggi-do, Republic of Korea

2-2 Equipment Under Test (EUT)

Class	:	A
Equipment name	:	Asset Tracker
Model name	:	IET10RC1
Serial number	:	Identification
Date of receipt	:	October 26, 2022
EUT condition	:	Pre-production, not damaged
Interface ports	:	DC IN
Power Source	:	DC 3 V

2-3 Modification

- NONE

2-4 Model Specification

- NONE

2-5 Tested Condition

Temp. / Humid. / Pressure	:	(22 - 24) ℃ / (39 - 49) % R.H. / (100) kPa
Tested Model	:	IET10RC1
Test mode	:	Bluetooth LE mode, GPS mode, Sigfox mode, Wifi mode
Tested Voltage	:	DC 3 V

2-6 List of EUT and ACCESSORY

EUT				
Equipment Name	**Model Name**	**Serial No.**	**Manufacturer**	**Remarks**
Asset Tracker	**IET10RC1**	**N/A**	**SJI Co., Ltd**	**-**
ACCESSORY				
Equipment Name	**Model Name**	**Serial No.**	**Manufacturer**	**Remarks**
Wireless AP	P450S	N/A	PISnet.	-
Wireless AP ADAPTER	FJ-SW0755000	N/A	SHENZHEN FUJIA APLLIANCE CO.,LTD	-
GPS ANTENNA	N/A	N/A	N/A	-
GPS SIGNAL GENERATOR	MSG-2051	N/A	MEGURO	-
SDR Dongle	0000223C	N/A	Sigfox	-
NOTEBOOK	NT900X4D	N/A	Samsung	-
NOTEBOOK ADAPTER	PA-1400-24	N/A	Samsung	-
MOBILE PHONE	SM930K	N/A	Samsung	-
ANTENNA	N/A	N/A	N/A	-

2-7 Cable List

Cable List (MODE : BlueTooth LE mode)						
From		**To**		**Length (m)**	**Shielding**	
Type	**I/O Port**	**Type**	**I/O Port**		**Cable**	**backshell**
EUT	DC IN	BATTERY	DC OUT	-	-	-
MOBILE PHONE	-	-	-	-	-	-

Cable List (MODE : Sig fox mode)						
From		**To**		**Length (m)**	**Shielding**	
Type	**I/O Port**	**Type**	**I/O Port**		**Cable**	**backshell**
EUT	DC IN	BATTERY	DC OUT	-	-	-
MOBILE PHONE	-	-	-	-	-	-
NOTEBOOK	DC IN	NOTEBOOK ADAPTER	DC OUT	1.0	NO	Plastic
NOTEBOOK ADAPTER	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO	Plastic
NOTEBOOK	USB	SDR Donggle	USB	1.0	NO	Plastic
SDR Donggle	RF IN	ANTENNA	-	-	-	-

Cable List (MODE : GPS mode)						
From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	DC IN	BATTERY	DC OUT	-	-	-
MOBILE PHONE	-	-	-	-	-	-
GPS SIGNAL GENERATOR	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO	Plastic
GPS SIGNAL GENERATOR	RF IN	GPS ANTENNA	-	10.0	YES	Metal

Cable List (MODE : Wifi mode)						
From		To		Length (m)	Shielding	
Type	I/O Port	Type	I/O Port		Cable	backshell
EUT	DC IN	BATTERY	DC OUT	-	-	-
MOBILE PHONE	-	-	-	-	-	-
Wireless AP	DC IN	Wireless AP ADAPTER	DC OUT	1.0	NO	Plastic
Wireless AP ADAPTER	AC IN	AC POWER SOURCE	3 PIN AC LINE	1.0	NO	Plastic
Wireless AP	LAN	외부 LAN	WAN	3.0	NO	Plastic

3. Test Report

3.1 Summary of tests

Reference	Parameter	Status (note)
I. Emission **ETSI EN 301 489-1 V2.2.3 (2019-11),** **ETSI EN 301 489-3 V2.1.1 (2019-03), ETSI EN 301 489-17 V3.2.4 (2020-09)**		
Conducted Emissions	EN 55032:2015/A11:2020	NA
Conducted Emissions (Telecommunication port)	EN 55032:2015/A11:2020	NA
Radiated Emissions	EN 55032:2015/A11:2020	C
Harmonic Current Emission	EN IEC 61000-3-2:2019	NA
Voltage Fluctuations and Flicker	EN 61000-3-3:2013/A1:2019	NA
II. Immunity **ETSI EN 301 489-1 V2.2.3 (2019-11),** **ETSI EN 301 489-3 V2.1.1 (2019-03), ETSI EN 301 489-17 V3.2.4 (2020-09)**		
Electrostatic Discharge	EN 61000-4-2:2009	C
RF Electromagnetic Field	EN 61000-4-3:2006/A1:2008/A2:2010	C
Electrical Fast Transients	EN 61000-4-4:2012	NA
Surges	EN 61000-4-5:2014/A1:2017	NA
Conducted Disturbances, Induced by Radio-Frequency Fields	EN 61000-4-6:2014/AC:2015	NA
Voltage dips and Interruptions	EN 61000-4-11:2004/A1:2017	NA
C=Complies NC=Not Complies NA=Not Applicable		

Note 1 The sample was tested according to the following specification:

ETSI Standards; ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-3 V2.1.1 (2019-03),

ETSI EN 301 489-17 V3.2.4 (2020-09)

Note 2 The following table shows the highest frequency up to which Radiated Emissions measurements shall be performed.

Required highest frequency for radiated measurement

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
108 MHz < $F_x \leq 500$ MHz	2 GHz
500 MHz < $F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	5 x F_x up to a maximum of 6 GHz
Note 1 For FM and TV Broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. Note 2 Fx is defined in 3.1.18. Note 3 For outdoor units of home satellite receiving systems highest measured frequency shall be 18 GHz.	

Where F_x is unknown, the Radiated Emissions measurements shall be performed up to 6 GHz.

3.2 EMISSION

3.2.1 Radiated Emissions

Definition:

The test assesses the ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

We were performed the test according to LTA procedure LTA-QI-04.

Test method	:	ETSI EN 301 489-1 V2.2.3 (2019-11) EN 55032:2015/A11:2020
Measuring Distance	:	10 m below 1 GHz / 3 m above 1 GHz
Measurement Frequency range	:	30 MHz – 6 000 MHz
Measurement RBW	:	120 kHz @ 10 m / 1 MHz @ 3 m
Test Location	:	10 m Chamber
Test mode	:	Bluetooth LE mode, GPS mode, Sigfox mode, Wifi mode
Result	:	Complies

Measurement Data:

- Refer to the Next page (Maximum emission configuration)

Limit of 10 m below 1 GHz

CLASS A

Frequency Range	EN 55032 @ 10 m (Quasi-peak)
(30 – 230) MHz	40 dBµV/m
(230 – 1 000) MHz	47 dBµV/m
NOTE: The lower limit applies at the transition frequency.	

CLASS B

Frequency Range	EN 55032 @ 10 m (Quasi-peak)
(30 – 230) MHz	30 dBµV/m
(230 – 1 000) MHz	37 dBµV/m
NOTE: The lower limit applies at the transition frequency.	

Limit of 3 m above 1 GHz

CLASS A

Frequency Range	Average Limit @ 3 m (dBµV/m)	Peak limit @ 3 m (dBµV/m)
(1 000 – 3 000) MHz	56	76
(3 000 – 6 000) MHz	60	80

NOTE: The lower limit applies at the transition frequency.

CLASS B

Frequency Range	Average Limit @ 3 m (dBµV/m)	Peak limit @ 3 m (dBµV/m)
(1 000 – 3 000) MHz	50	70
(3 000 – 6 000) MHz	54	74

NOTE: The lower limit applies at the transition frequency.

Radiated Emissions (Below 1 GHz) / V

MODE : Bluetooth LE mode

LTA

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Yongin-si, Gyeonggi-do, Korea
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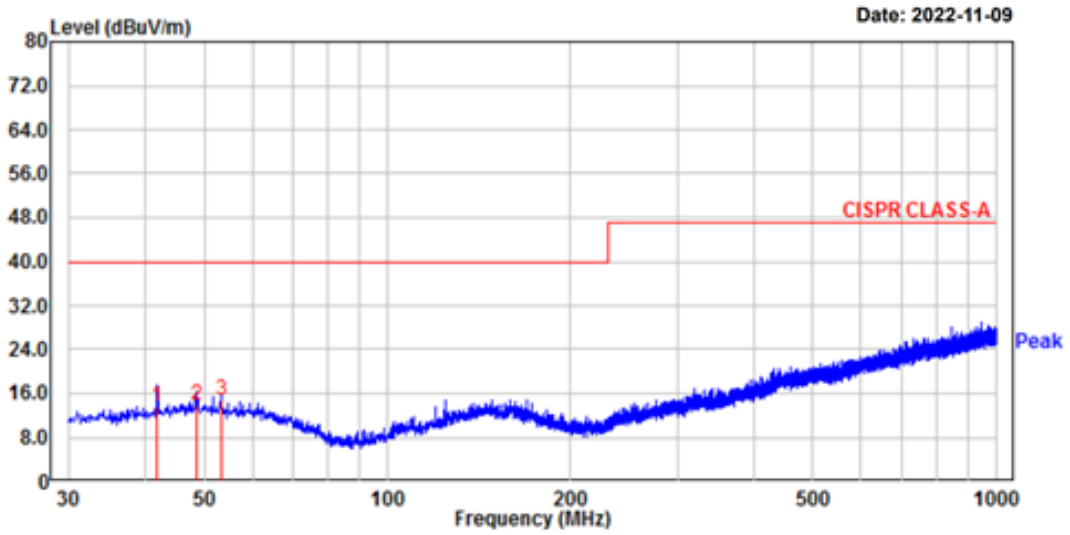
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 22 'C / 39 % R.H.

Test Mode : Bluetooth LE mode Tested by: AHN H Y

Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	41.88	25.39	-11.68	13.71	40.00	26.29	100	190	vertical
2.	48.55	24.90	-11.14	13.76	40.00	26.24	150	60	vertical
3.	53.28	25.80	-11.13	14.67	40.00	25.33	130	2	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / H

LTA

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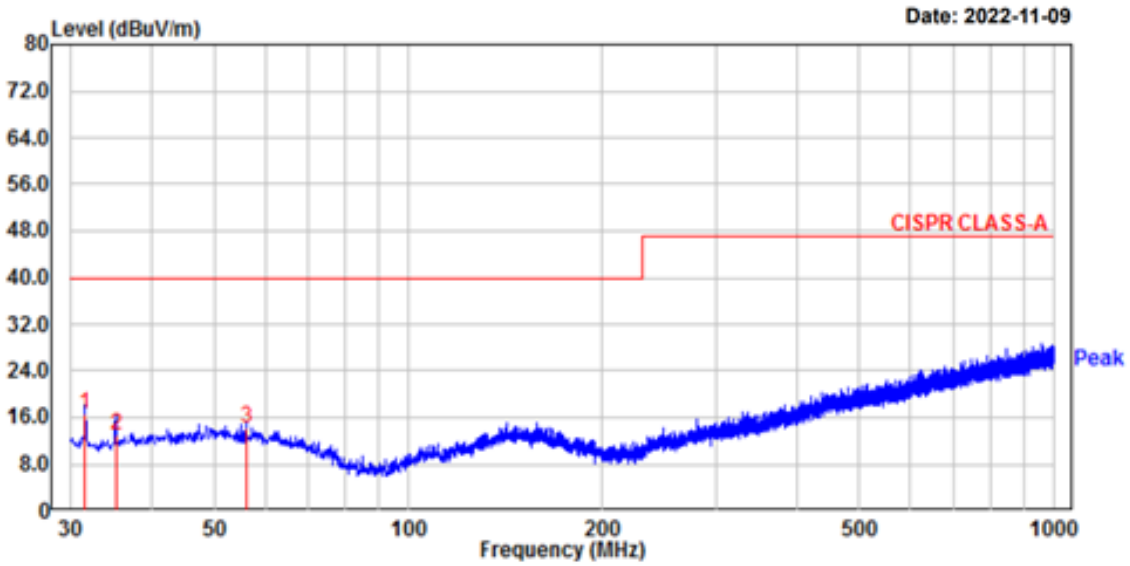
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 22 'C / 39 % R.H.

Test Mode : Bluetooth LE mode Tested by: AHN H Y

Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	31.58	29.80	-13.14	16.66	40.00	23.34	130	8	horizontal
2.	35.21	25.70	-12.79	12.91	40.00	27.09	111	7	horizontal
3.	56.19	25.61	-11.30	14.31	40.00	25.69	230	9	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / V

MODE : GPS mode

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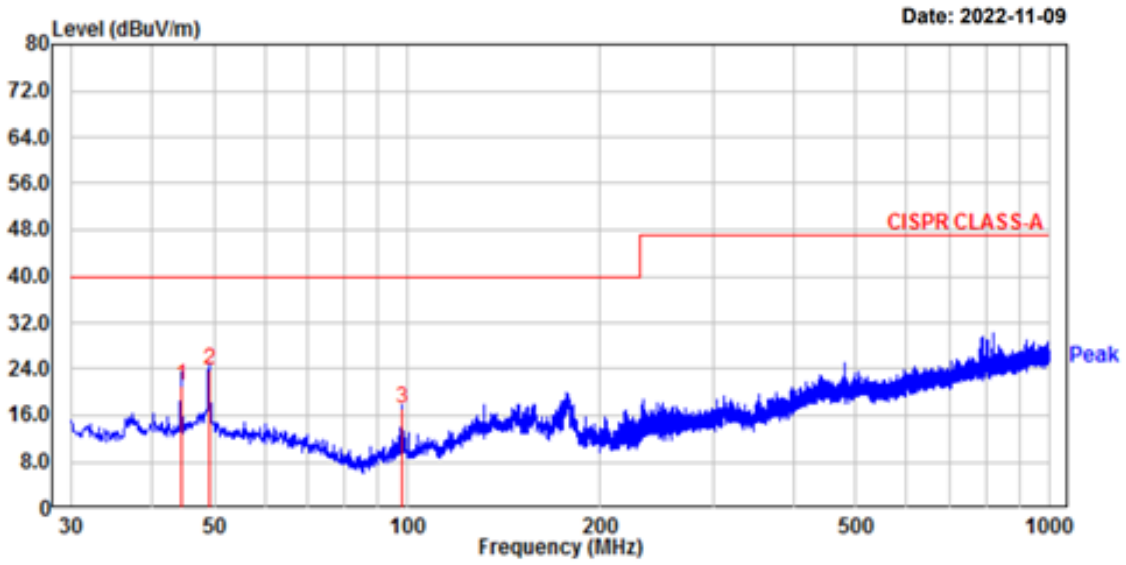
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.

Test Mode : GPS mode Tested by: AHN H Y

Power : 220 V / 60 Hz



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	44.43	32.61	-11.42	21.19	40.00	18.81	157	0	vertical
2.	49.16	34.90	-11.11	23.79	40.00	16.21	100	299	vertical
3.	98.26	32.81	-15.56	17.25	40.00	22.75	400	14	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / H

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Yongin-si, Gyeonggi-do, Korea
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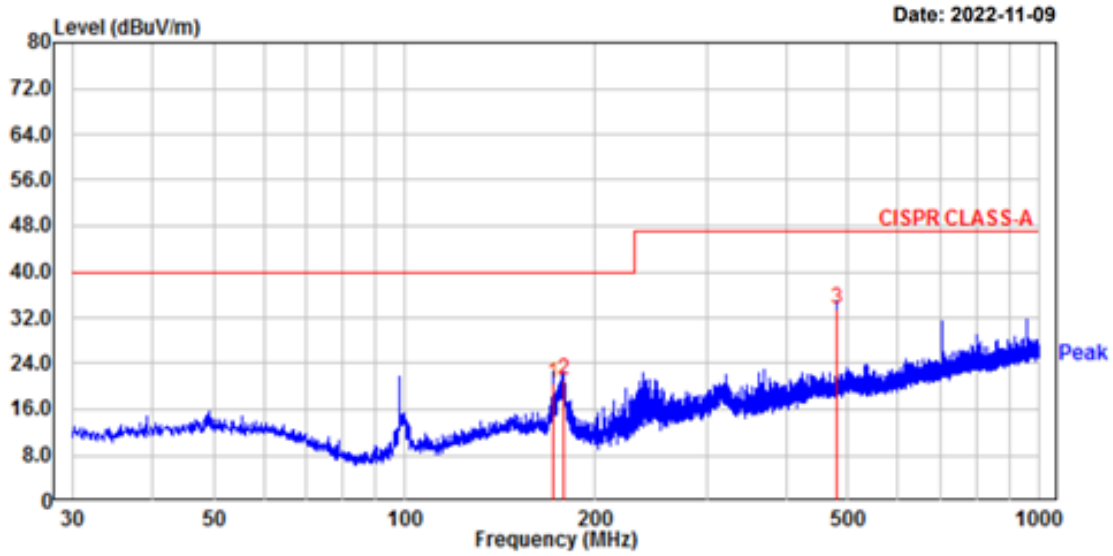
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.

Test Mode : GPS mode Tested by: AHN H Y

Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	171.98	31.51	-11.12	20.39	40.00	19.61	300	230	horizontal
2.	178.17	32.60	-11.49	21.11	40.00	18.89	400	232	horizontal
3.	479.96	36.70	-3.21	33.49	47.00	13.51	200	271	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / V

MODE : Sigfox mode

LTA

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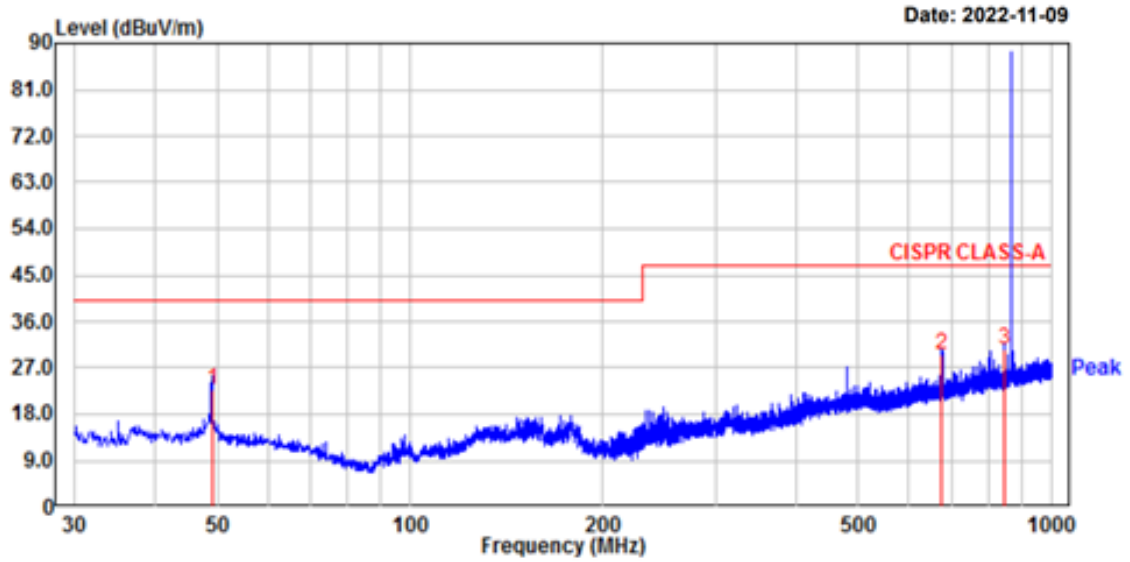
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.

Test Mode : Sigfox mode Tested by: AHN H Y

Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	49.16	33.90	-11.11	22.79	40.00	17.21	100	335	vertical
2.	676.14	28.57	0.87	29.44	47.00	17.56	130	5	vertical
3.	846.74	26.70	3.87	30.57	47.00	16.43	200	183	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

※ 869.13 MHz is EUT's Sigfox frequency.

Radiated Emissions (Below 1 GHz) / H

LTA

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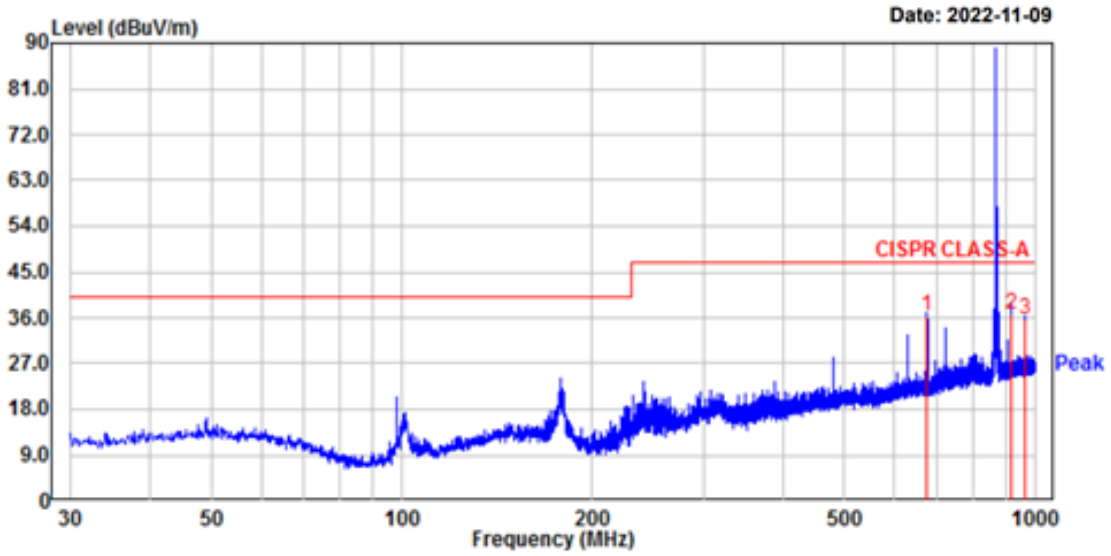
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Sigfox mode Tested by: AHN H Y
Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	676.14	35.41	0.87	36.28	47.00	10.72	130	8	horizontal
2.	916.22	31.60	5.01	36.61	47.00	10.39	111	7	horizontal
3.	964.23	29.81	5.72	35.53	47.00	11.47	170	8	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

※ 869.13 MHz is EUT's Sigfox frequency.

Radiated Emissions (Below 1 GHz) / V

MODE：Wifi mode

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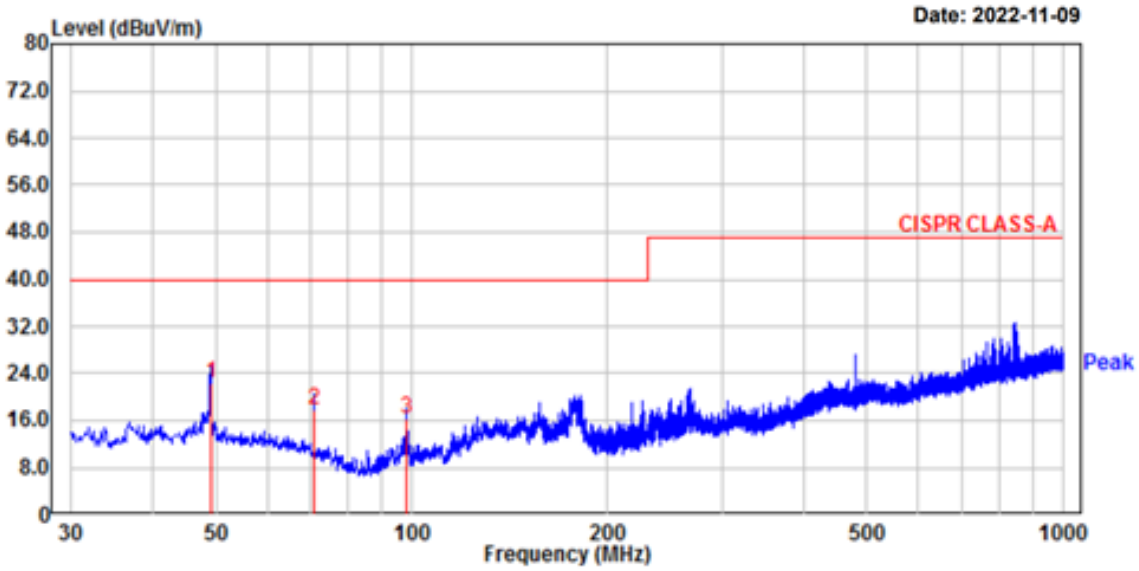
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Wifi mode Tested by: AHN H Y
Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	49.16	33.40	-11.11	22.29	40.00	17.71	100	296	vertical
2.	70.86	31.00	-13.31	17.69	40.00	22.31	120	0	vertical
3.	98.26	31.91	-15.56	16.35	40.00	23.65	400	51	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) / H

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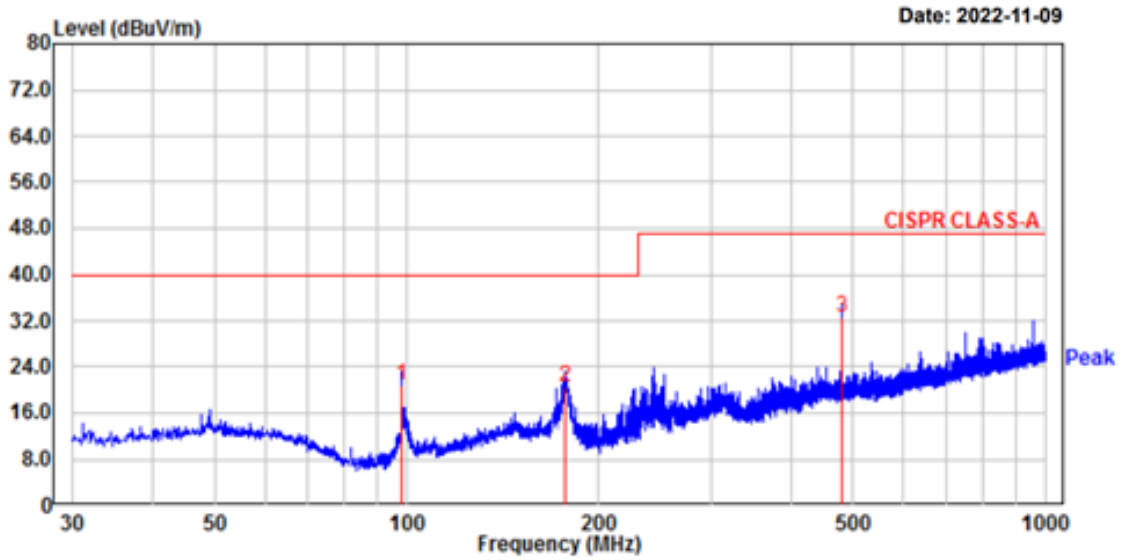
EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Wifi mode Tested by: AHN H Y
Power : BATTERY 3 V



No.	Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	
1.	98.26	36.51	-15.56	20.95	40.00	19.05	390	0	horizontal
2.	177.20	31.90	-11.40	20.50	40.00	19.50	300	212	horizontal
3.	480.08	35.80	-3.21	32.59	47.00	14.41	100	307	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) / V

MODE : Bluetooth LE mode

LTA

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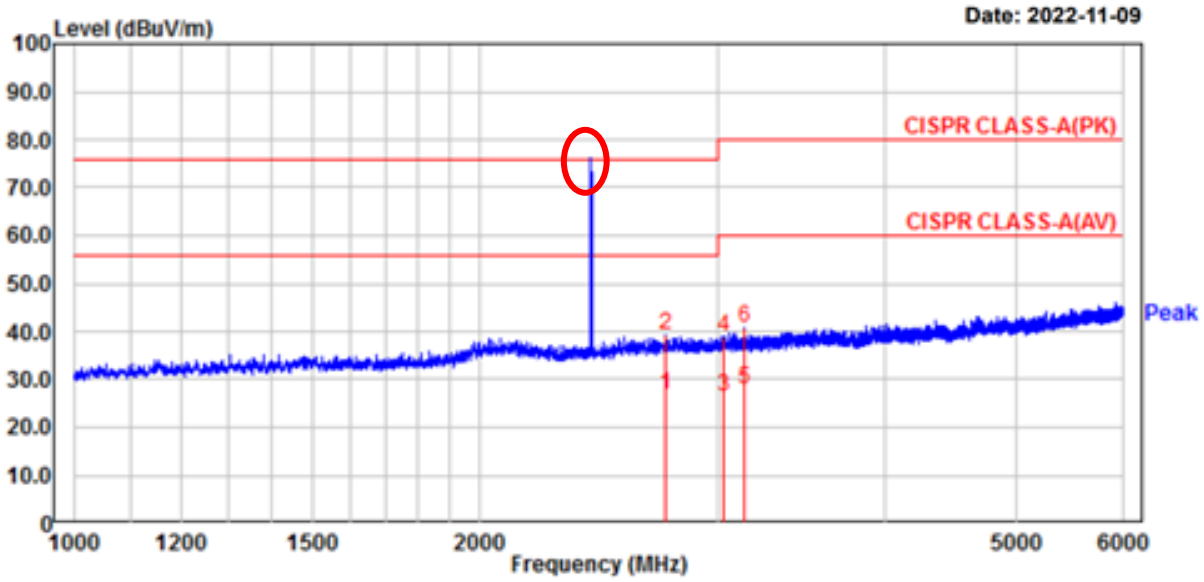
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 22 'C / 39 % R.H.

Test Mode : Bluetooth LE mode Tested by: AHN H Y

Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.

Model : IET10RC1

TEST mode : Bluetooth LE mode

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2022-11-09	21.00	40.00	3.8

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle deg	Polarity H/V
2743.75	38.32	26.15	2.79	41.11	28.94	76.00	56.00	34.89	27.06	100	354	V
3031.88	37.53	24.94	3.55	41.08	28.49	80.00	60.00	38.92	31.51	100	240	V
3144.38	38.55	25.85	4.17	42.72	30.02	80.00	60.00	37.28	29.98	100	354	V

※ (2,402 ~ 2,480) MHz is BlueTooth frequency.

(Above 1 GHz) / H

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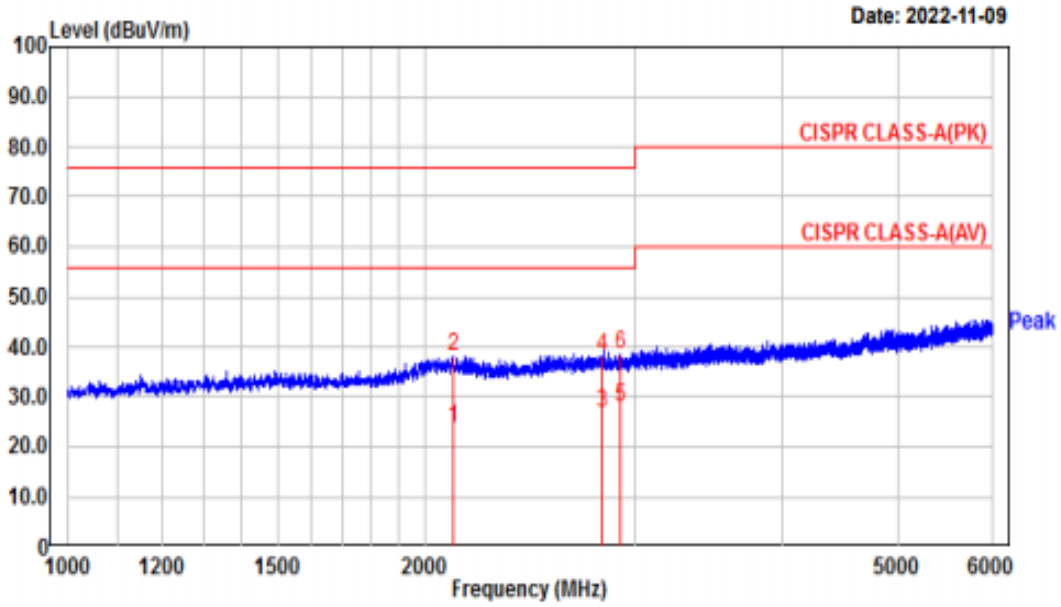
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 22 'C / 39 % R.H.
Test Mode : Bluetooth LE mode Tested by: AHN H Y
Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.	Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
Model : IET10RC1	2022-11-09	21.00	40.00	3.8
TEST mode : Bluetooth LE mode				

Frequency	Reading(PK)	Reading(AV)	C.F	Result(PK)	Result(AV)	Limit(PK)	Limit(AV)	Margin(PK)	Margin(AV)	Height	Angle	Polarity
MHz	dBuV	dBuV	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	cm	249	H/V
2109.38	38.88	24.86	1.14	40.02	26.00	76.00	56.00	35.98	30.00	100	19	H
2820.00	37.35	25.95	2.82	40.17	28.77	76.00	56.00	35.83	27.23	100	0	H
2914.38	37.58	26.85	3.00	40.58	29.85	76.00	56.00	35.42	26.15	100	121	H

※ (2,402 ~ 2,480) MHz is BlueTooth frequency.

Radiated Emissions (Above 1 GHz) / V

MODE：GPS mode

LTA

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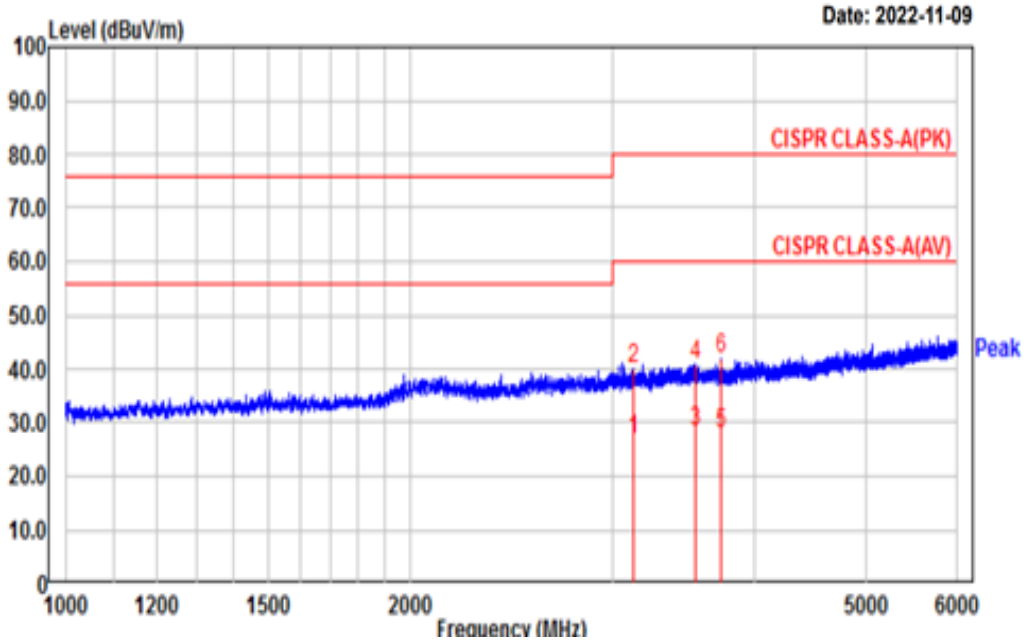
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.

Test Mode : GPS mode Tested by: AHN H Y

Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.

Model : IET10RC1

TEST mode : GPS mode

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2022-11-09	21.00	40.00	3.8

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle deg	Polarity H/V
3135.63	37.80	24.65	4.12	41.92	28.77	80.00	60.00	38.08	31.23	100	214	V
3546.25	37.32	24.75	5.60	42.92	30.35	80.00	60.00	37.08	29.65	100	355	V
3733.75	37.77	23.96	6.08	43.85	30.04	80.00	60.00	36.15	29.96	100	0	V

(Above 1 GHz) / H

4, Songjuro 236Beon-gil, yanggi-myeon,
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Fax : +82-31-3236010
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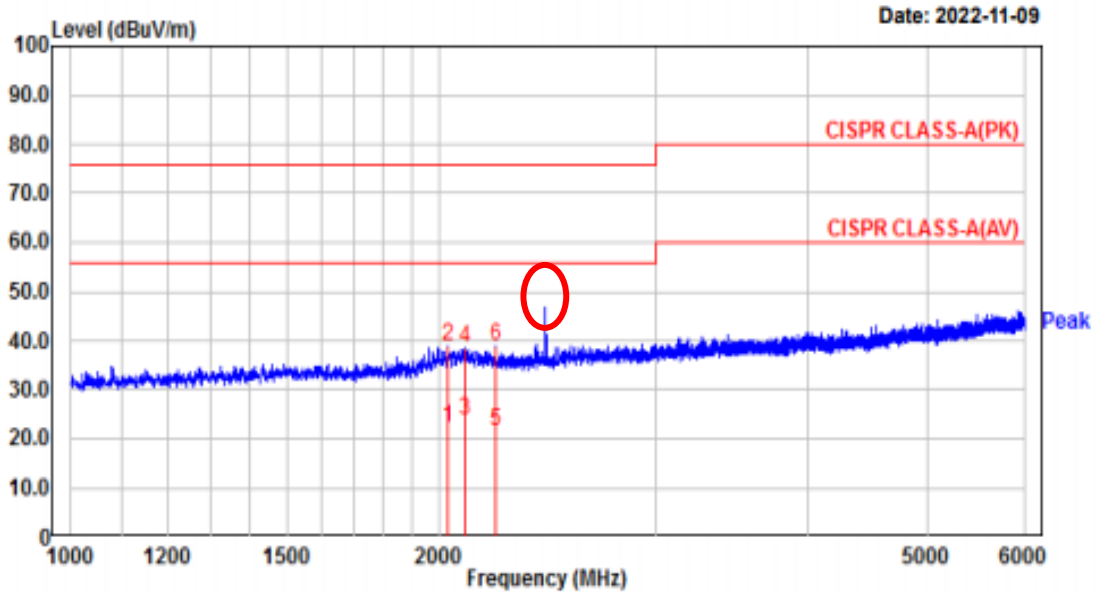
EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : GPS mode Tested by: AHN H Y
Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.
Model : IET10RC1
TEST mode : GPS mode

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2022-11-09	21.00	40.00	3.8

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle 249	Polarity H/V
2028.75	40.08	23.46	0.71	40.79	24.17	76.00	56.00	35.21	31.83	100	0	H
2097.50	39.17	24.65	1.18	40.35	25.83	76.00	56.00	35.65	30.17	100	47	H
2219.38	40.26	22.94	0.55	40.81	23.49	76.00	56.00	35.19	32.51	100	0	H

※ (2,402 ~ 2,480) MHz is BlueTooth frequency.

Radiated Emissions (Above 1 GHz) / V

MODE : Sigfox mode

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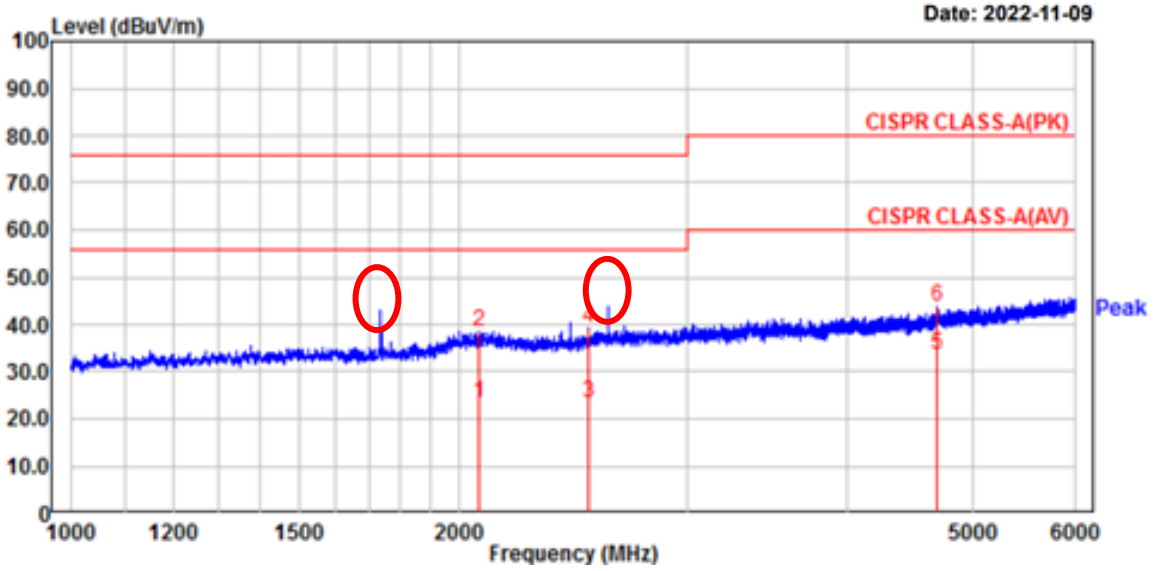
www.ltalab.com

EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Sigfox mode Tested by: AHN H Y
Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.	Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
Model : IET10RC1	2022-11-09	21.00	40.00	3.8
TEST mode : Sigfox mode				

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle deg	Polarity H/V
2070.63	39.55	24.45	1.05	40.60	25.50	76.00	56.00	35.40	30.50	100	211	V
2517.50	39.44	23.94	1.68	41.12	25.62	76.00	56.00	34.88	30.38	100	196	V
4688.75	36.15	25.65	9.85	46.00	35.50	80.00	60.00	34.00	24.50	100	77	V

※ 1738.26, 2607.39 MHz is Sigfox frequency.

(Above 1 GHz) / H

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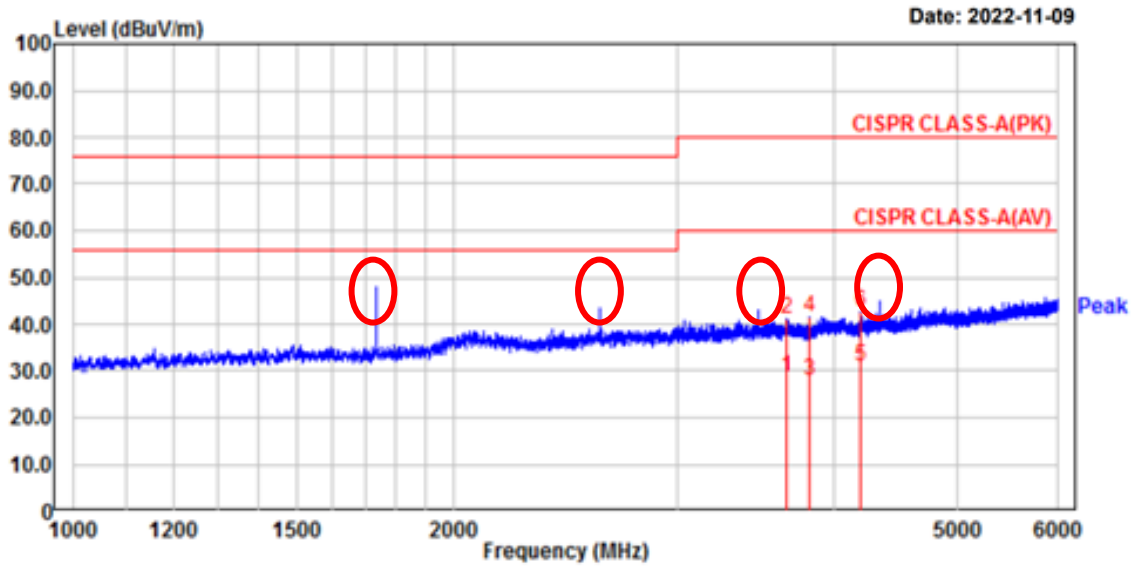
EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Sigfox mode Tested by: AHN H Y
Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.
Model : IET10RC1
TEST mode : Sigfox mode

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2022-11-09	21.00	40.00	3.8

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle 249	Polarity H/V
3666.25	37.33	24.86	5.82	43.15	30.68	80.00	60.00	36.85	29.32	100	249	H
3818.13	37.20	23.65	6.46	43.66	30.11	80.00	60.00	36.34	29.89	100	20	H
4185.63	36.48	24.94	8.04	44.52	32.98	80.00	60.00	35.48	27.02	100	0	H

※ 1738.26, 2607.39, 3476.52, 4345.65 MHz is Sigfox frequency.

Radiated Emissions (Above 1 GHz) / V

MODE : Wifi mode

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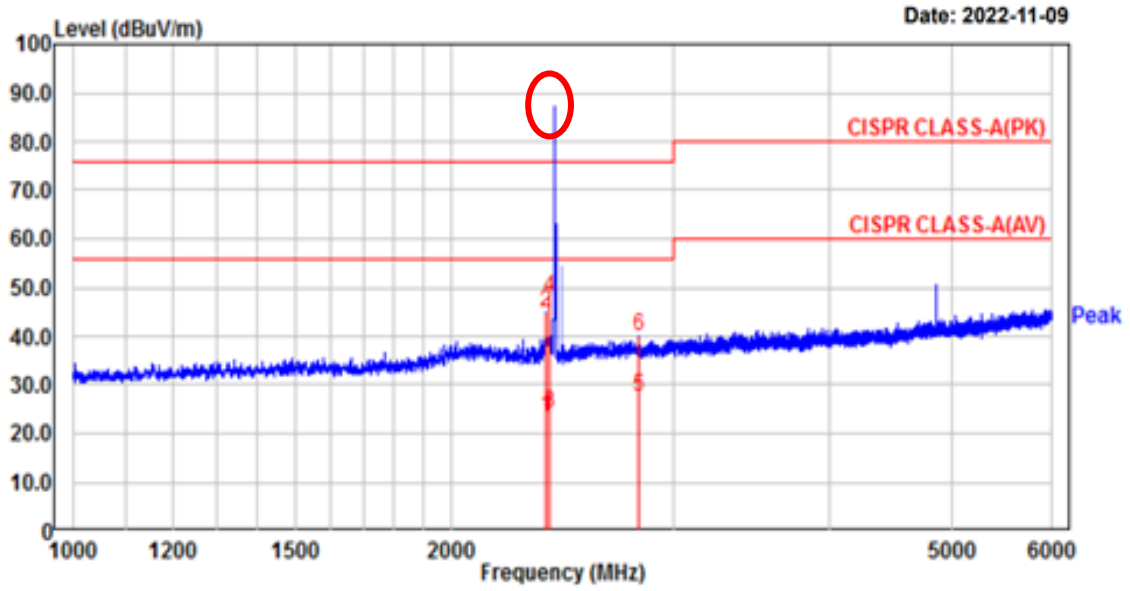
EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Wifi mode Tested by: AHN H Y
Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.
Model : IET10RC1
TEST mode : Wifi mode

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2022-11-09	21.00	40.00	3.8

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle deg	Polarity H/V
2376.25	46.44	24.85	0.59	47.03	25.44	76.00	56.00	28.97	30.56	100	360	V
2393.13	49.38	25.46	0.63	50.01	26.09	76.00	56.00	25.99	29.91	100	360	V
2818.13	39.12	26.95	2.83	41.95	29.78	76.00	56.00	34.05	26.22	1100	138	V

※ (2,412 ~ 2,472) MHz is Wifi frequency.

(Above 1 GHz) / H

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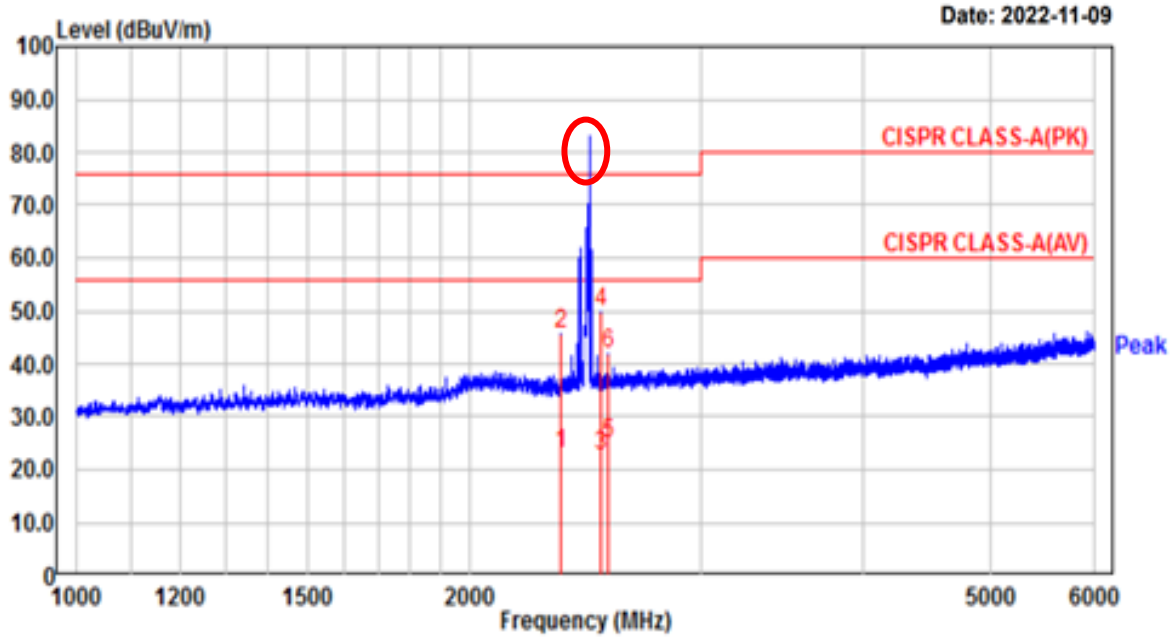
EUT/Model No.: IET10RC1 Temp/Humi: 21 'C / 40 % R.H.
Test Mode : Wifi mode Tested by: AHN H Y
Power : BATTERY 3 V



Manufacture : SJI Co., Ltd.
Model : IET10RC1
TEST mode : Wifi mode

Test Date	Temp.: [℃]	Humidity : [%]	Distance (m)
2022-11-09	21.00	40.00	3.8

Frequency MHz	Reading(PK) dBuV	Reading(AV) dBuV	C.F dB	Result(PK) dBuV/m	Result(AV) dBuV/m	Limit(PK) dBuV/m	Limit(AV) dBuV/m	Margin(PK) dB	Margin(AV) dB	Height cm	Angle deg	Polarity H/V
2346.88	47.25	24.45	0.50	47.75	24.95	76.00	56.00	28.25	31.05	100	39	H
2516.25	50.29	22.94	1.67	51.96	24.61	76.00	56.00	24.04	31.39	100	321	H
2551.25	42.10	24.86	1.91	44.01	26.77	76.00	56.00	31.99	29.23	100	221	H

※ (2,412 ~ 2,472) MHz is Wifi frequency.

3.3 IMMUNITY

3.3.1 Electrostatic Discharge

Definition:

The test assesses the ability of the EUT to operate as intended in the event of an electrostatic discharge.

We were performed the test according to LTA procedure LTA-QI-04.

Test date	:	2022. 11. 14.
Test method	:	EN 61000-4-2:2009
Temperature / Humidity / Pressure	:	24 ℃ / 46 % R.H. / 100 kPa
Discharge Impedance	:	(330 ± 10 %) Ω / (150 ± 10 %) pF
Type of Discharge (air discharge)	:	± 8 kV
Type of Discharge (contact discharge)	:	± 4 kV
Polarity of Output Voltage	:	Positive and Negative
Number of discharges at each point	:	10 of each polarity
Discharge Repetition on Rate	:	1 / sec
Test Location	:	Shielded Room
Test mode	:	Bluetooth LE mode, GPS mode, Sigfox mode, Wifi mode
Performance Criteria	:	A (Refer to the appendix B)
Result	:	Complies

Measurement Data:

ESD Test Point and Result

1. Indirect Discharge

No.	Position	Kind of Discharge	Results	Remarks
1	HCP	Contact	Complies (A)	No reaction recognized
2	VCP	Contact	Complies (A)	No reaction recognized

2. Direct Discharge

Position No.	Position	Kind of Discharge	Result	Remarks
1	Enclosure	Air	Complies (A)	No reaction recognized

ESD TEST POINT

[Air discharge]
[Contact discharge]

3.3.2 RF Electromagnetic Field

Definition:

The test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic field disturbance.

Test date	:	2022. 11. 14.
Test method	:	EN 61000-4-3:2006/A1:2008/A2:2010
Temperature / Humidity / Pressure	:	23 ℃ / 49 % R.H. / 100 kPa
Frequency range	:	80 MHz to 6 GHz
Test level	:	3 V/m (measured unmodulated)
Amplitude Modulation	:	AM, 80 %, 1 kHz Audio signal
Step size	:	1 % of fundamental
Test Location	:	3 m Chamber
Test mode	:	Bluetooth LE mode, GPS mode, Sigfox mode, Wifi mode
Performance Criteria	:	A (Refer to the appendix B)
Result	:	Complies

Measurement Data:

Pol	Side	Result	Remark
Horizontal	Front	Complies (A)	No reaction recognized
	Left	Complies (A)	No reaction recognized
	Rear	Complies (A)	No reaction recognized
	Right	Complies (A)	No reaction recognized
Vertical	Front	Complies (A)	No reaction recognized
	Left	Complies (A)	No reaction recognized
	Rear	Complies (A)	No reaction recognized
	Right	Complies (A)	No reaction recognized

APPENDIX A

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment are identified by the Test Laboratory.

Radiated Emissions – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2023.08.29	1 year
☒	Amplifier	8447D	HP	1937A03453	2022.11.30	1 year
☒	BILOG Antenna	VULB 9168	SCHWARZBECK	775	2023.03.22	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Radiated Emissions – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2023.08.29	1 year
☐	EMI TEST Receiver	ESU	Rohde & Schwarz	100092	2023.08.29	1 year
☒	Amplifier	8449B	Agilent	3008A02126	2023.03.14	1 year
☐	Amplifier	PAM-840A	COM-POWER	461314	2023.03.17	1 year
☐	HORN ANTENNA	3116B	ETS	133350	2024.03.22	2 year
☐	HORN ANTENNA	3116B	ETS	81109	2024.04.25	2 year
☒	HORN ANTENNA	3115	ETS	114105	2023.05.12	2 year
☒	TEST PROGRAM	e3 20181212a (V9)	AUDIX	-	-	-

Electrostatic Discharge

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	ESD Simulator	ESS-2000	NOISEKEN	800C03241	2023.08.31	1 year
☒	ESD GUN	TC-815R	NOISEKEN	ESS0382069	2023.08.31	1 year

RF Electromagnetic Field

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	Signal Generator	E4432B	Agilent	MY41310673	2023.08.29	1 year
☒	Power Meter	E4419B	Agilent	GB38410133	2023.03.15	1 year
☒	Power Sensor	E9300A	Agilent	MY41497992	2023.03.15	1 year
☒	Power Sensor	E9300A	Agilent	MY41497618	2023.03.15	1 year
☒	WIDE BAND HIGH POWER AMPLIFIER	ITA0300KL-500	INFINITECH	0300KL 20 09 001	-	-
☒	RF POWER AMPLIFIER	ITA2000KL-120	INFINITECH	200KL 1507 001	-	-
☒	RF POWER AMPLIFIER	ITA4500KL-70	INFINITECH	4500KL 1507 001	-	-
☒	RF POWER AMPLIFIER	ITA0750KL-300	INFINITECH	0750KL 1507 001	-	-
☒	Log.-Per.Antenna (80 ㎒ ~ 3 ㎓)	K9128	RAPA	NONE	-	-
☒	Signal Generator	E4438C	Agilent	MY42080843	2023.08.29	1 year
☒	HORN ANTENNA	BBHA 9120 A	SCHWARZBECK	BBHA 9120 A 481	-	-

APPENDIX B

PERFORMANCE CRITERIA FOR IMMUNITY

[ETSI EN 301 489-3]

1. Classification of SRD equipment

The product family of Short Range Devices is divided by device type, each having its own set of performance criteria. This classification is based upon the impact on persons and/or goods in case the equipment does not operate above the specified performance level under EMC stress.

Table 3: Risk assessment of communication link performance per device type

Device Type	Risk assessment of communication link performance
1	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person)
2	Medium reliable SRD communication media; e.g. causing inconvenience to persons, which cannot simply be overcome by other means
3	Standard reliable SRD communication media; e.g. inconvenience to persons, which can simply be overcome by other means (e.g. manual)

2. General performance criteria

The performance criteria for SRD equipment with different device types (see table 3) in combination with the different primary function types (see table 1) during and after immunity test are specified in this clause:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria for immunity tests with power interruptions exceeding a certain time are specified in clause 7.2.2, table 6.

The equipment shall meet the performance criteria as specified in the following clauses, for the appropriate device type.

3. Performance table

Table 4: Performance Requirements of Device Types

Device Type 1		
Criteria	**During test**	**After test**
A	Operate as intended No loss of function For equipment with primary function type II the minimum performance shall be 12 dB SINAD No unintentional responses	Operate as intended For equipment with primary function type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Device Type 2		
Criteria	**During test**	**After test**
A	Operate as intended No loss of function For equipment with primary function type II the minimum performance shall be 6 dB SINAD No unintentional responses	Operate as intended For equipment with primary function type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Device Type 3		
Criteria	**During test**	**After test**
A and B	May be loss of function (one or more) No unintentional responses	Operate as intended, for equipment with primary function type II the communication link may be lost, but shall be recoverable by user No degradation of performance Lost functions shall be self-recoverable

4. Performance criteria for Continuous phenomena applied to Transmitters (CT)

For equipment with primary function type I or II including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable device type as given in clause 6.3 shall apply.
For equipment with primary function type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.
Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

5. Performance criteria for Transient phenomena applied to Transmitters (TT)

For equipment with primary function type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable device type as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.
For equipment with primary function type II or III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.
Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

6. Performance criteria for Continuous phenomena applied to Receivers (CR)

For equipment with primary function type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable device type as given in clause 6.3 shall apply.
For equipment with primary function type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.
Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

7. Performance criteria for Transient phenomena applied to Receivers (TR)

For equipment with primary function type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable device type as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment with primary function type II or III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

8. Performance criteria for ancillary equipment tested on a stand alone basis

The provision of EN 301 489-1 [1], clause 6.4, shall apply.

[ETSI EN 301 489-17]
Performance criteria

1. General performance criteria

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

2. Performance table

2.1 Performance criteria overview

Criteria	During test	After test (i.e. as a result of the application of the test)
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.

NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 2.2.

2.2 Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

3 Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

4 Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

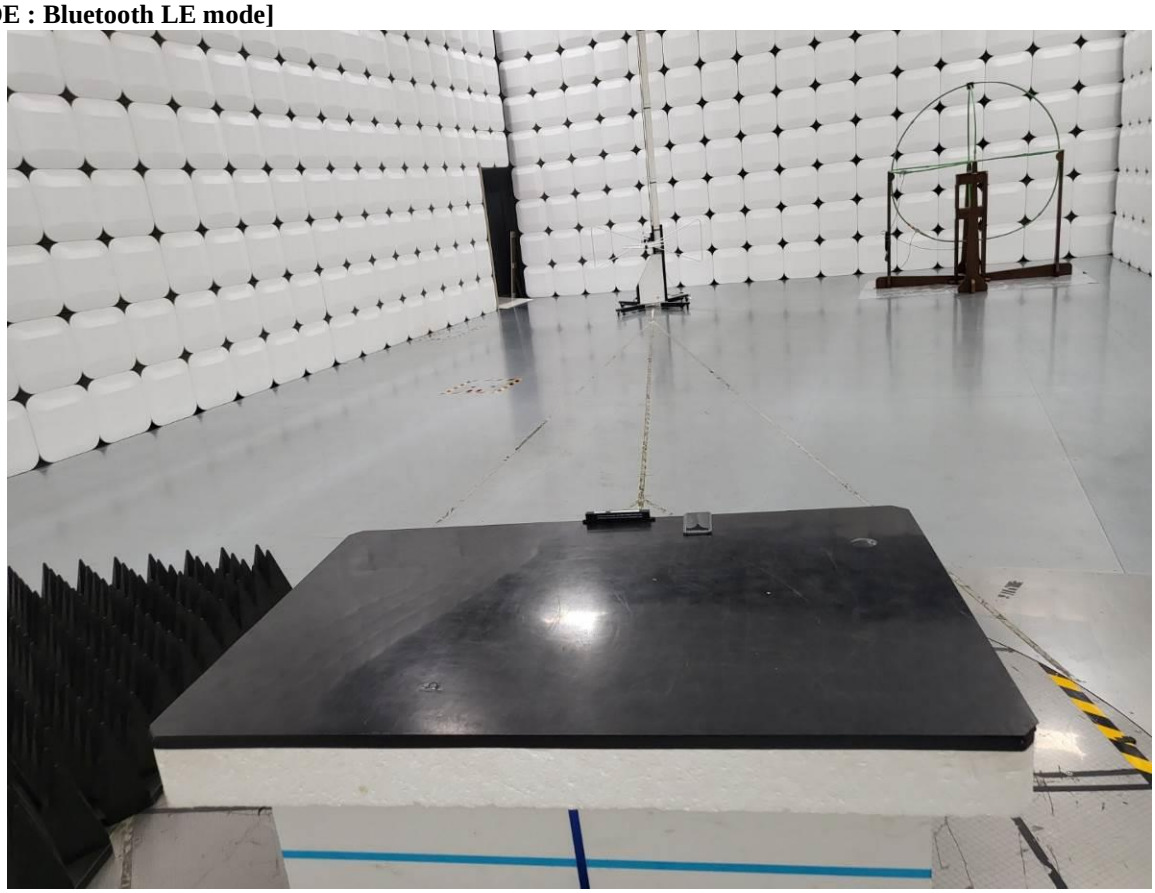
Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

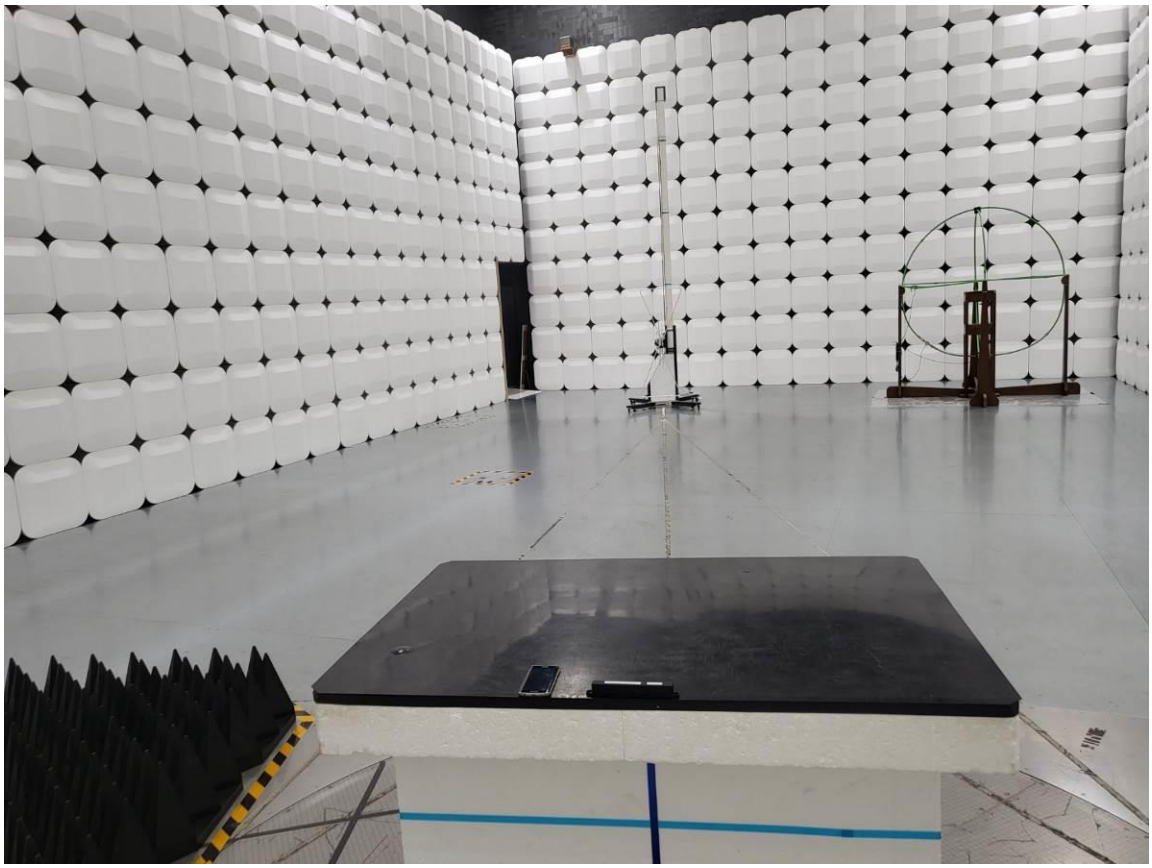
APPENDIX C

PHOTOGRAPHS

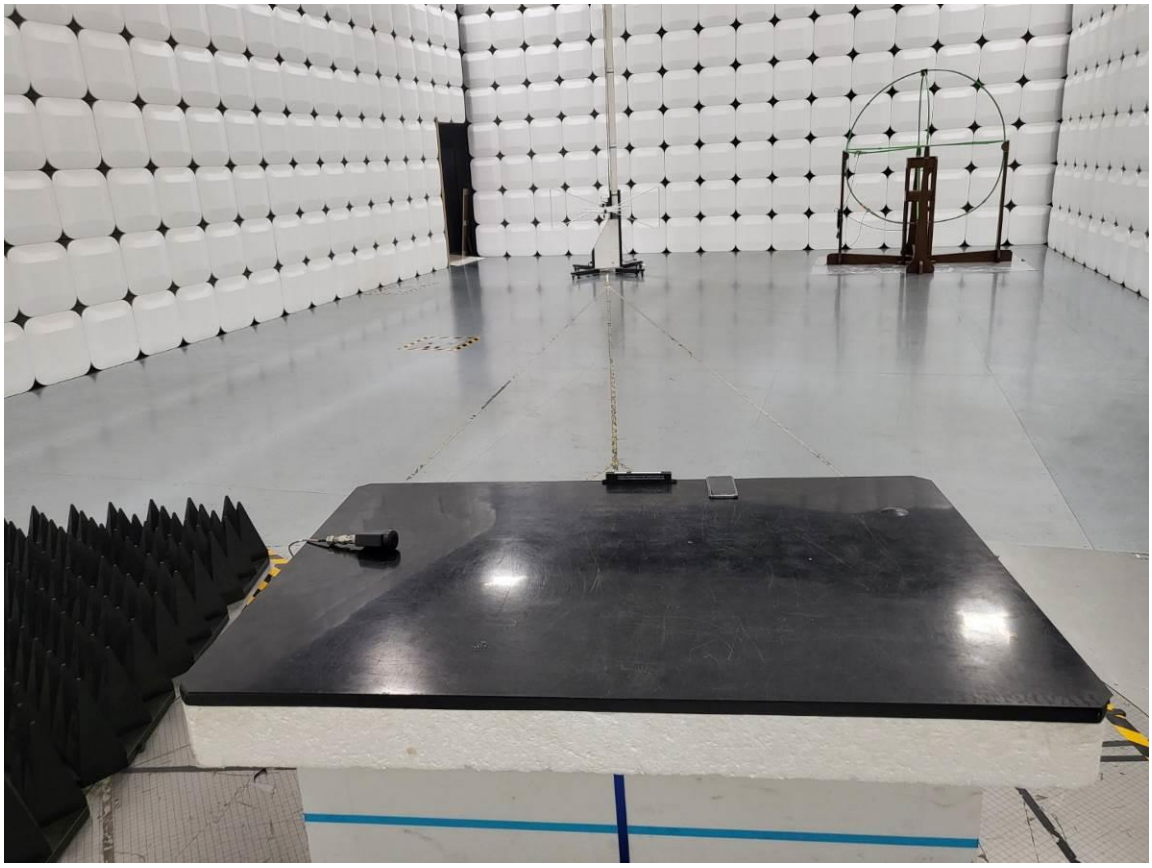
Radiated Emissions - Below 1 GHz

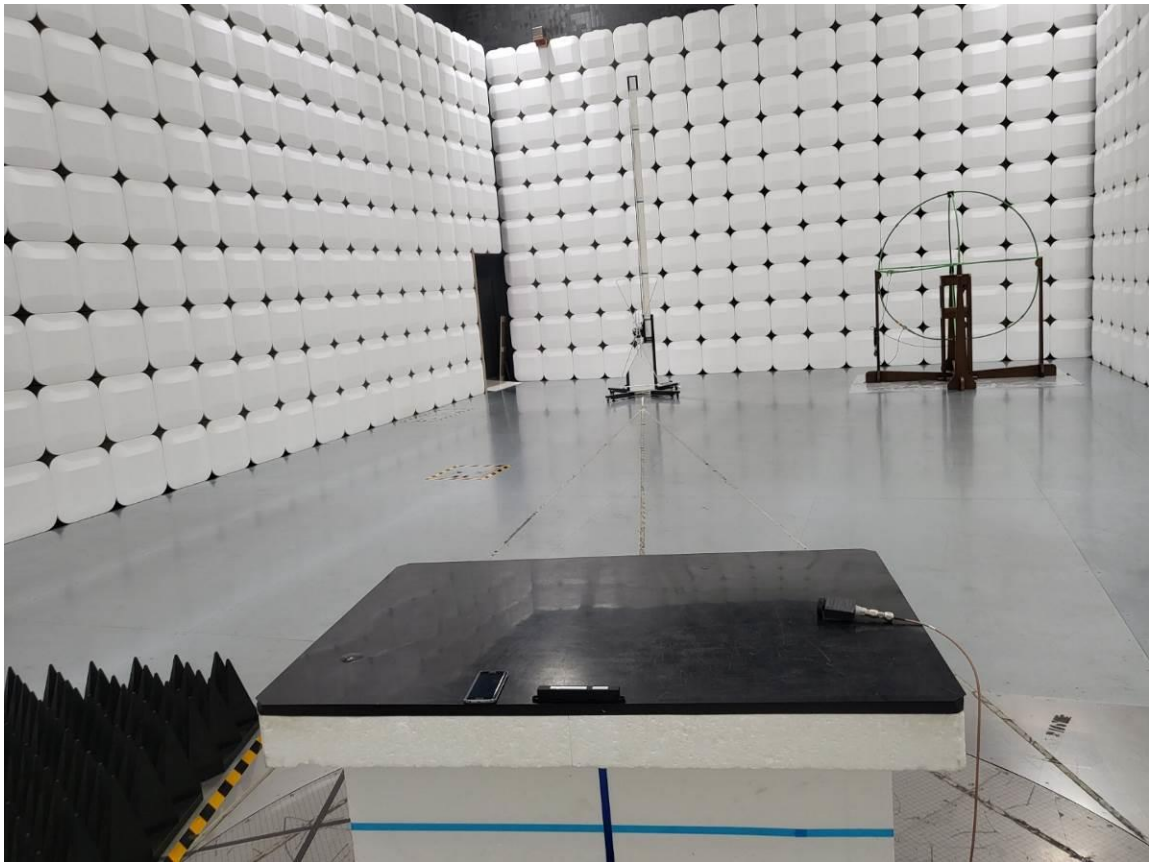
[MODE : Bluetooth LE mode]



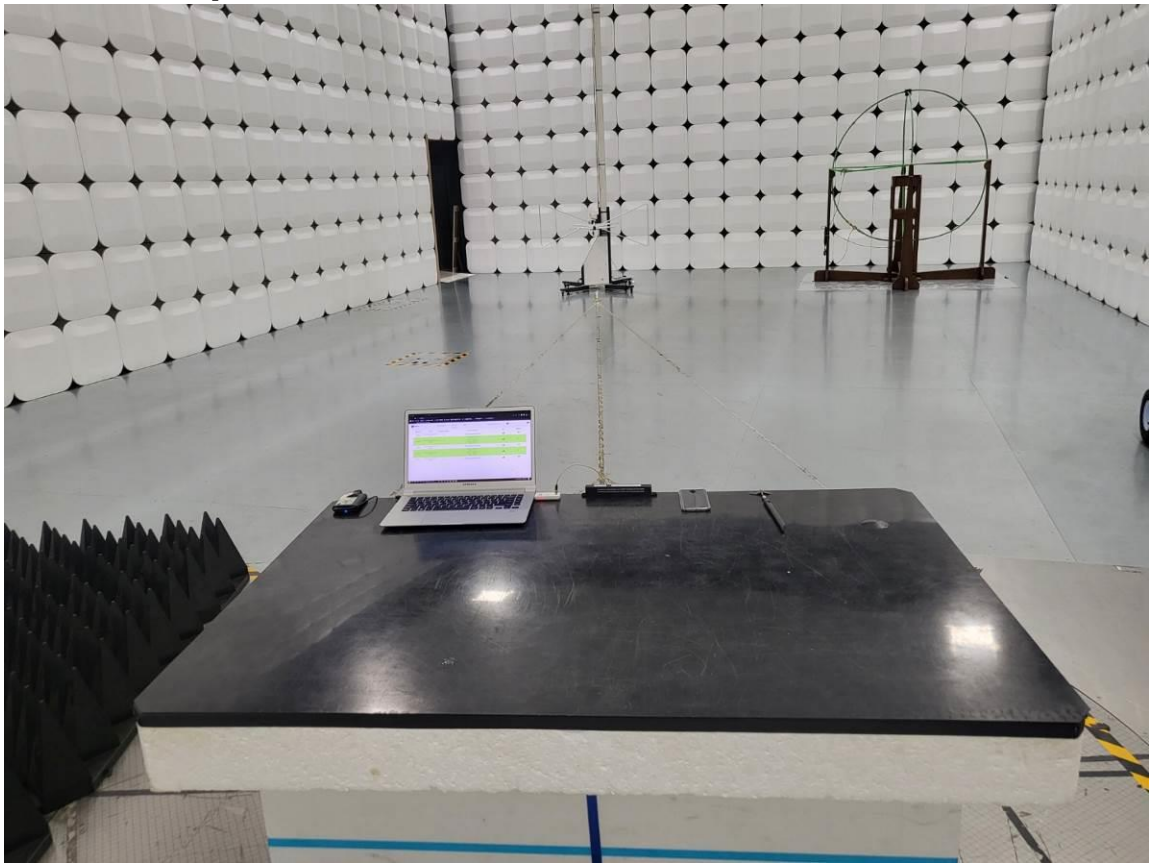


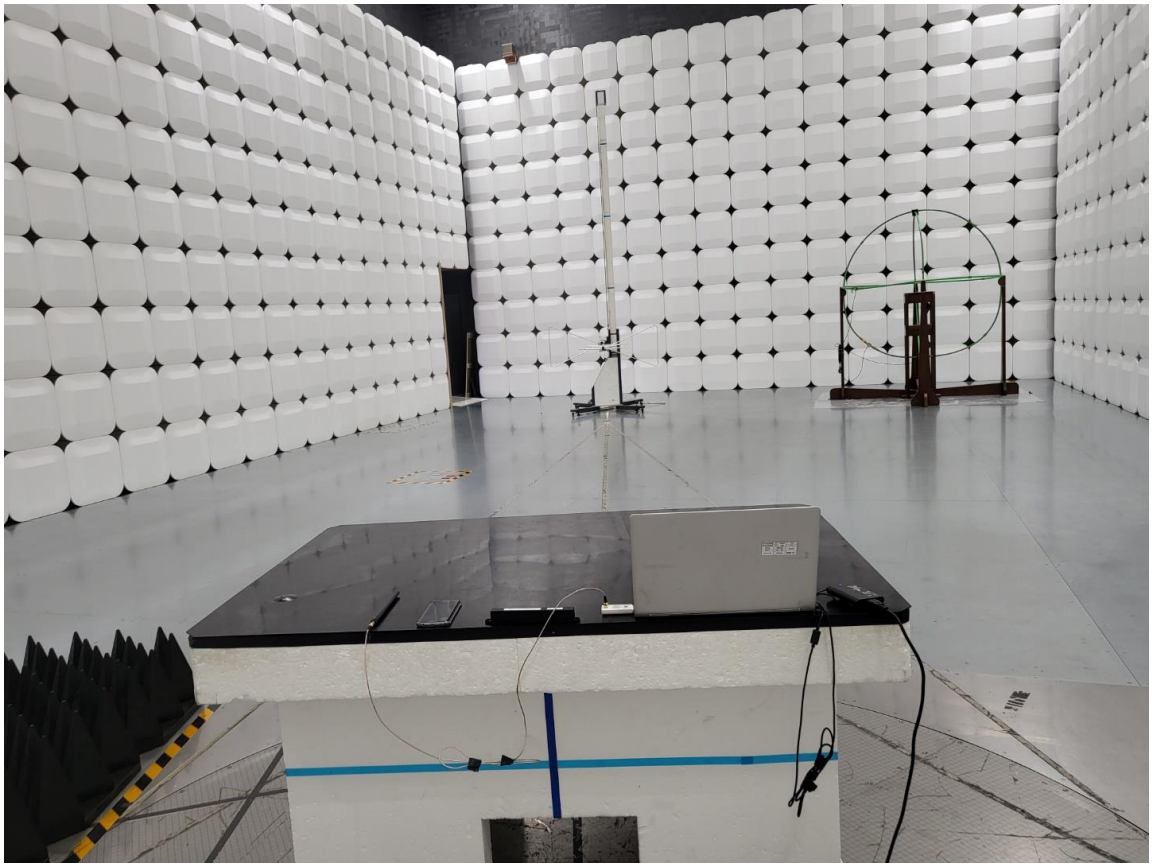
[MODE : GPS mode]



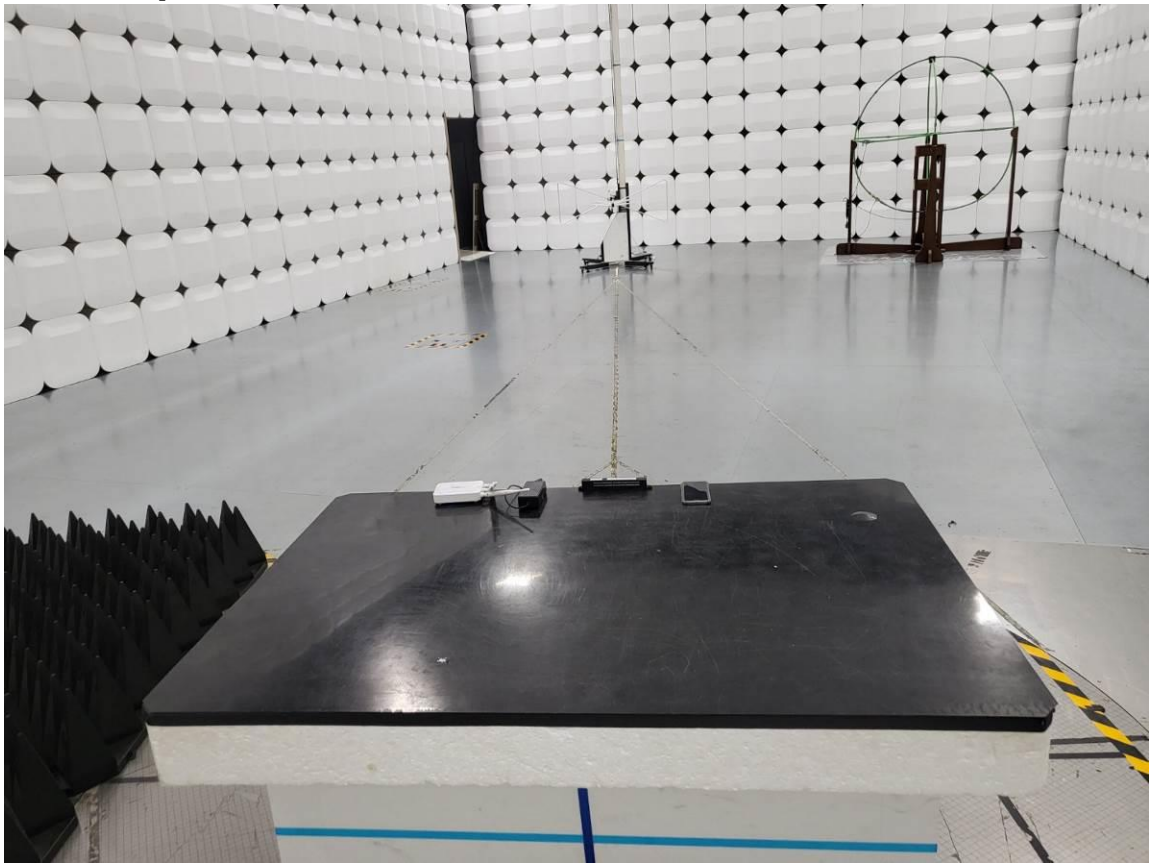


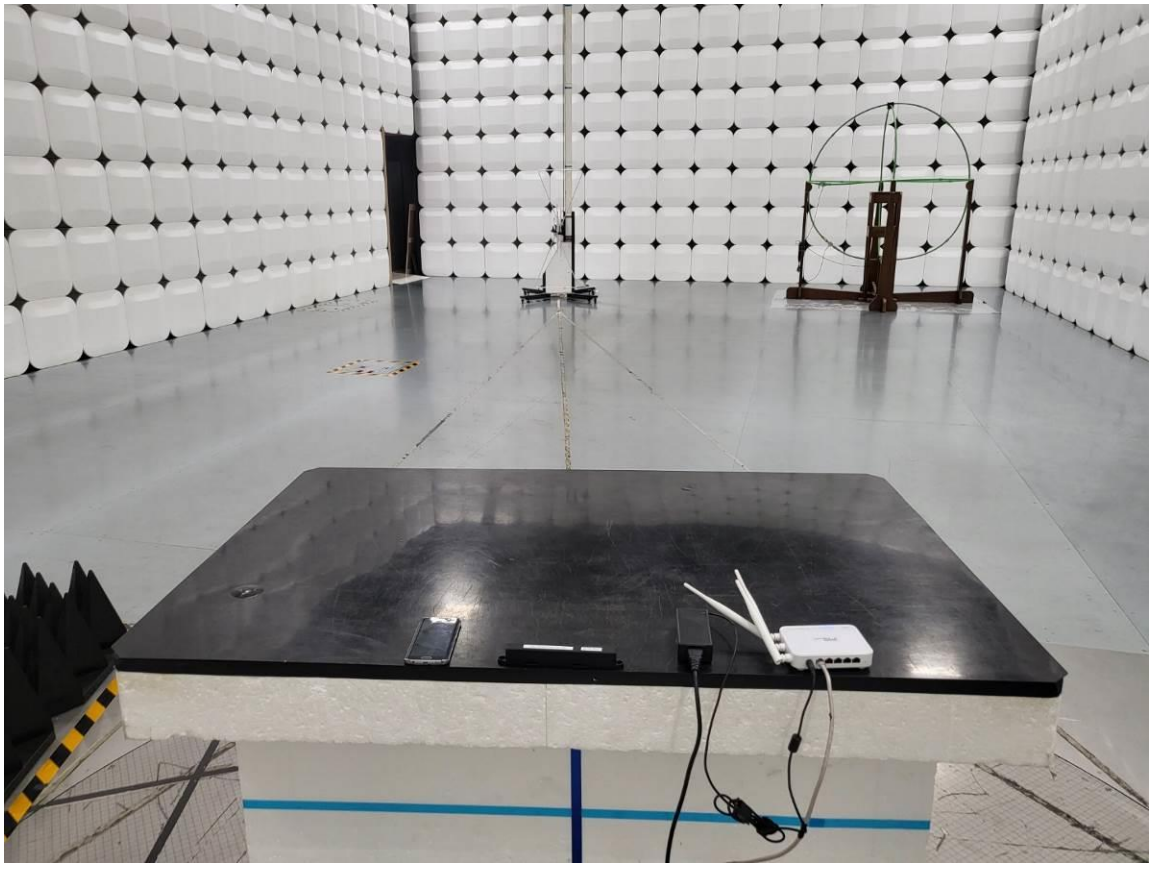
[MODE : SIGFOX mode]





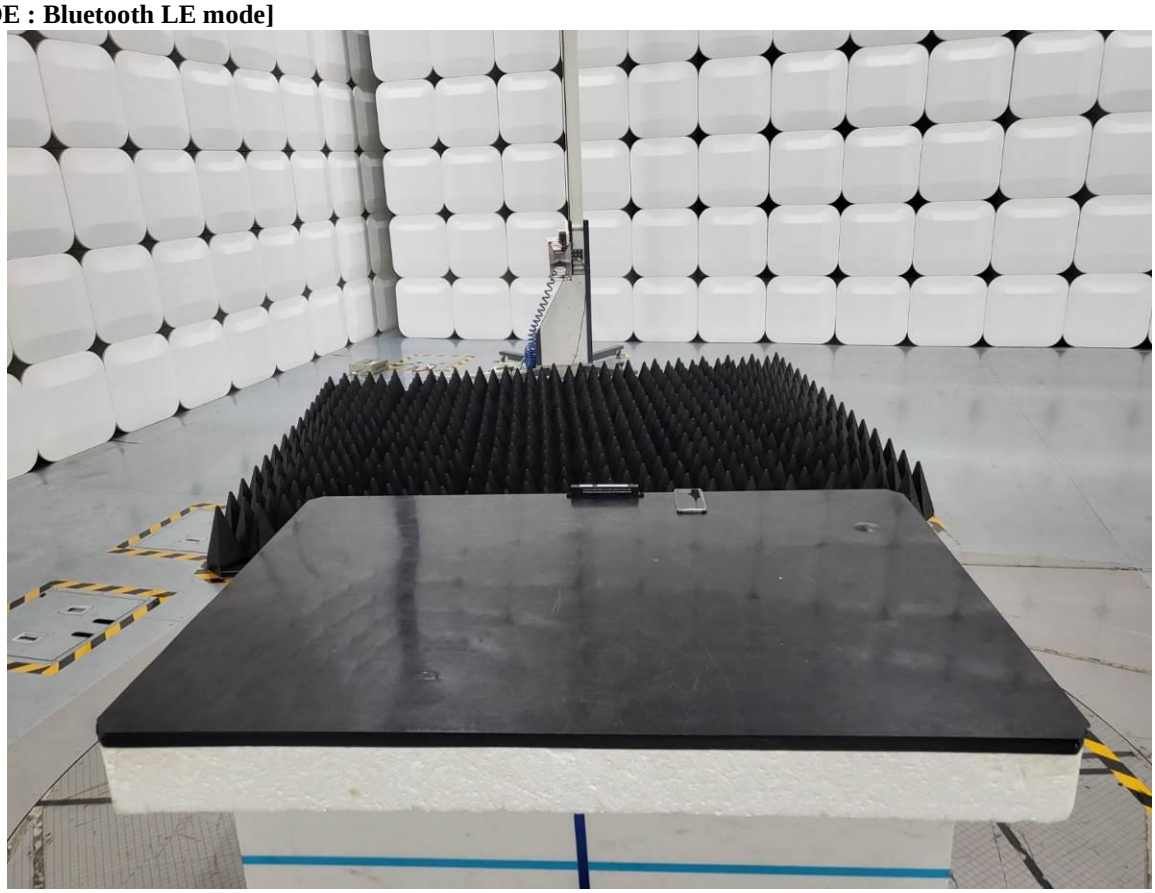
[MODE : Wifi mode]

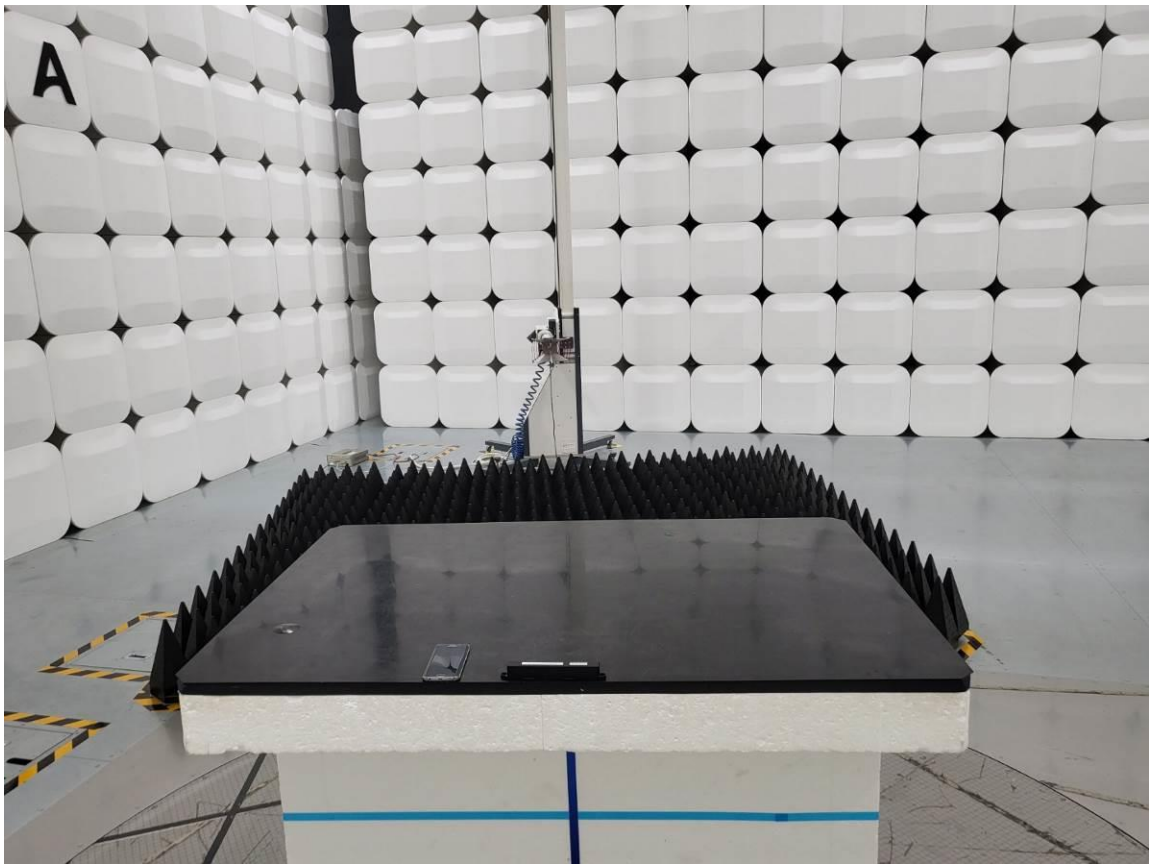




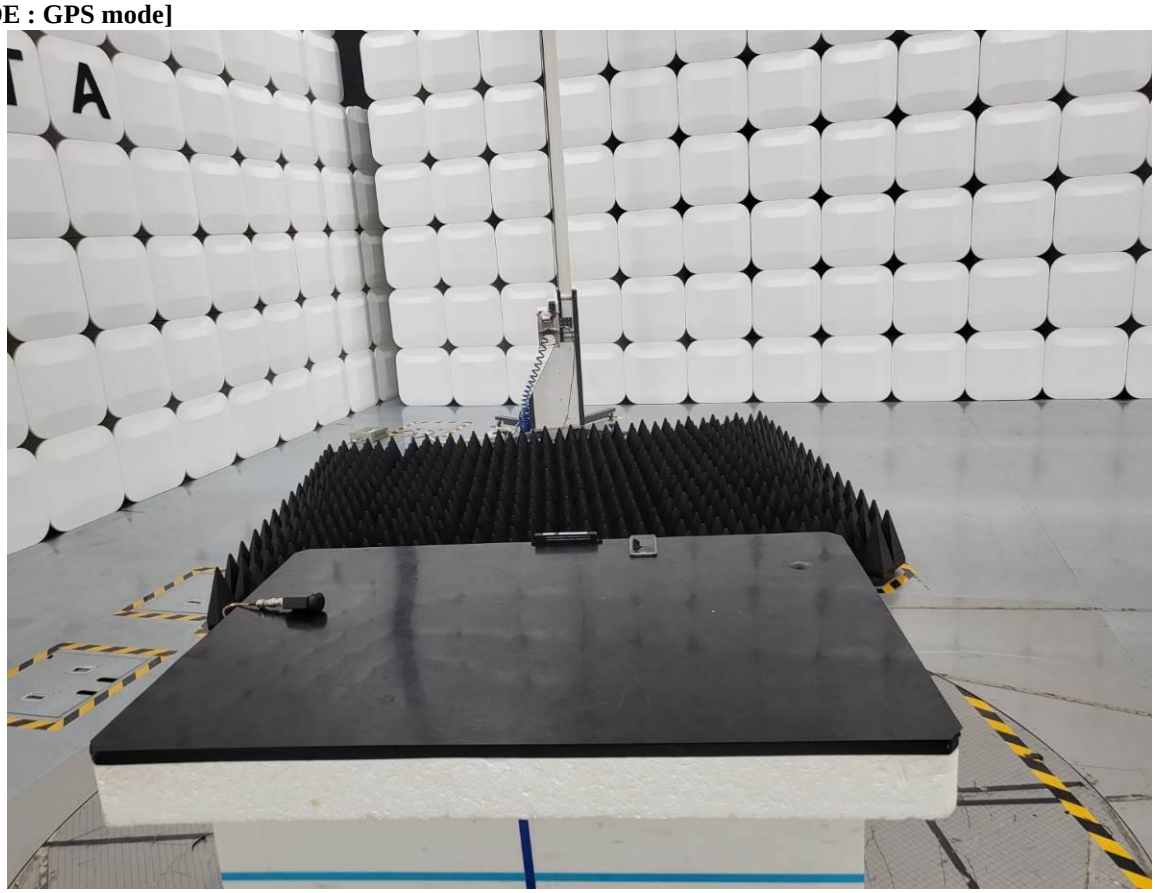
Radiated Emissions - Above 1 GHz

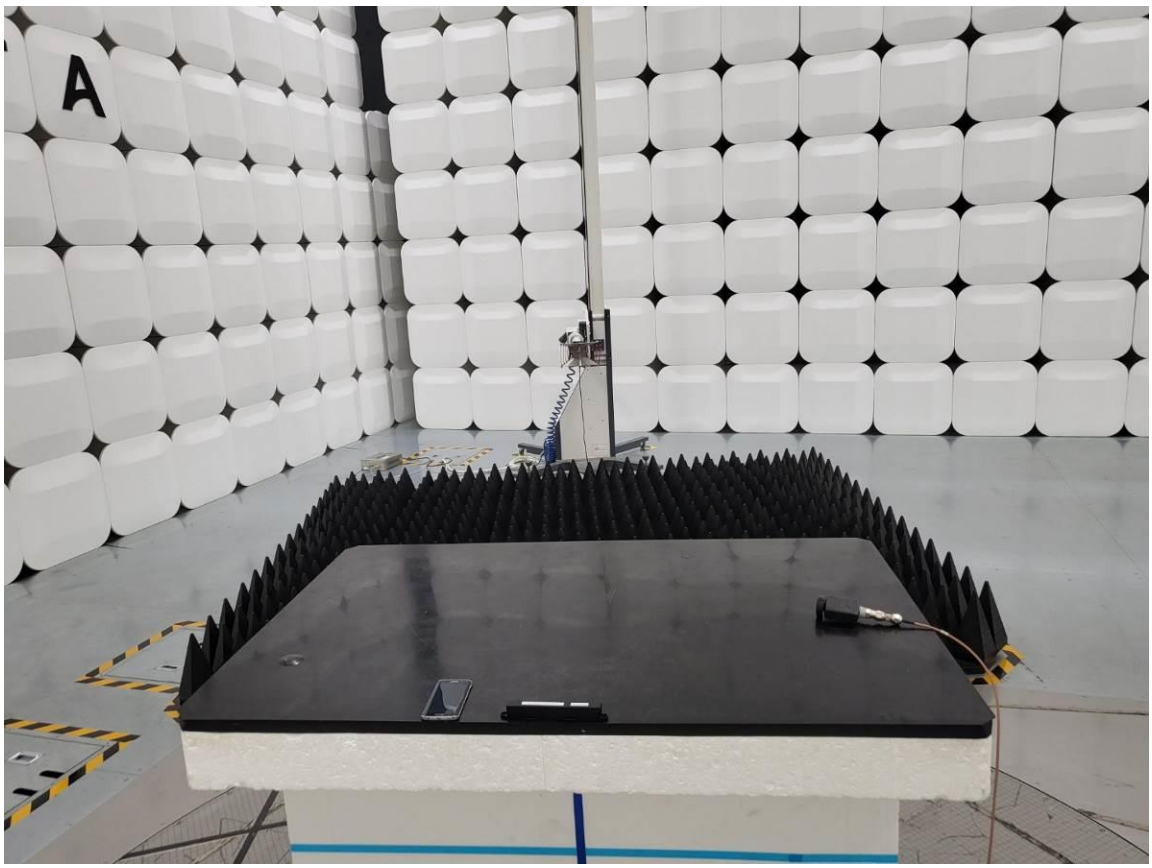
[MODE : Bluetooth LE mode]



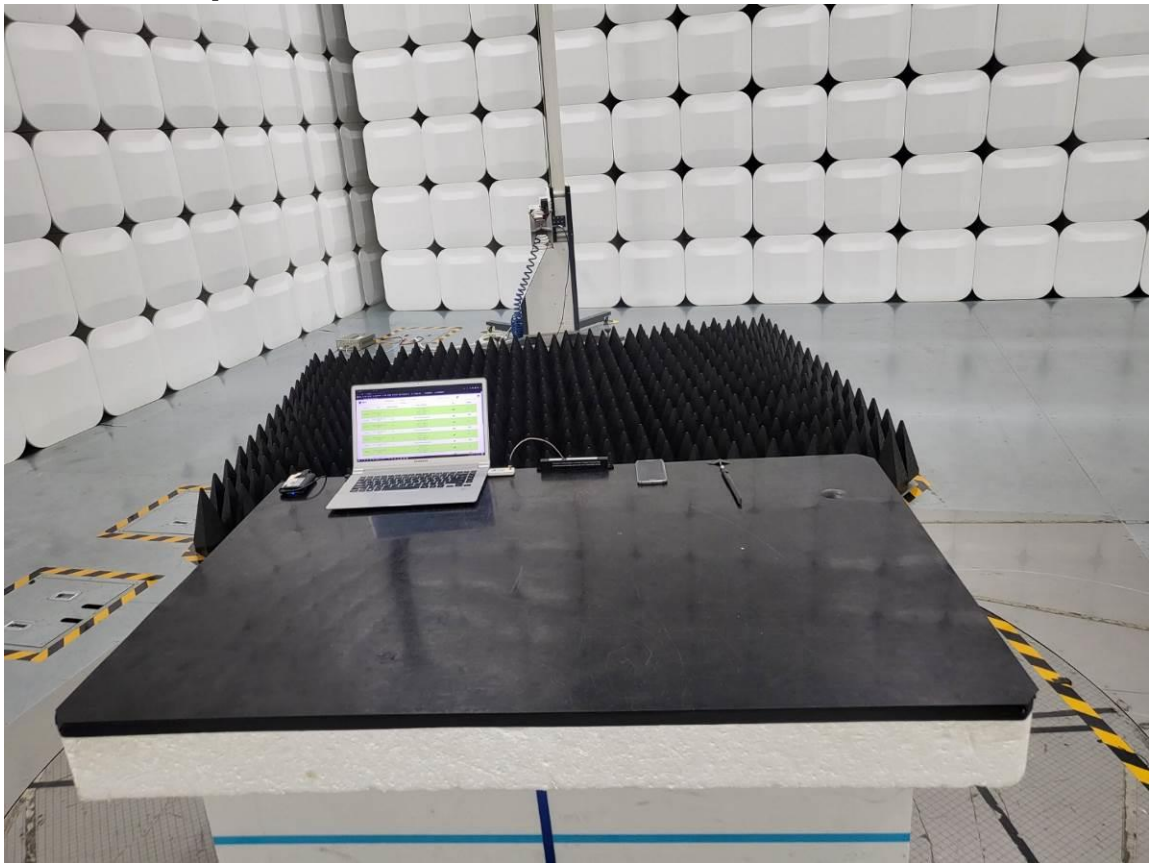


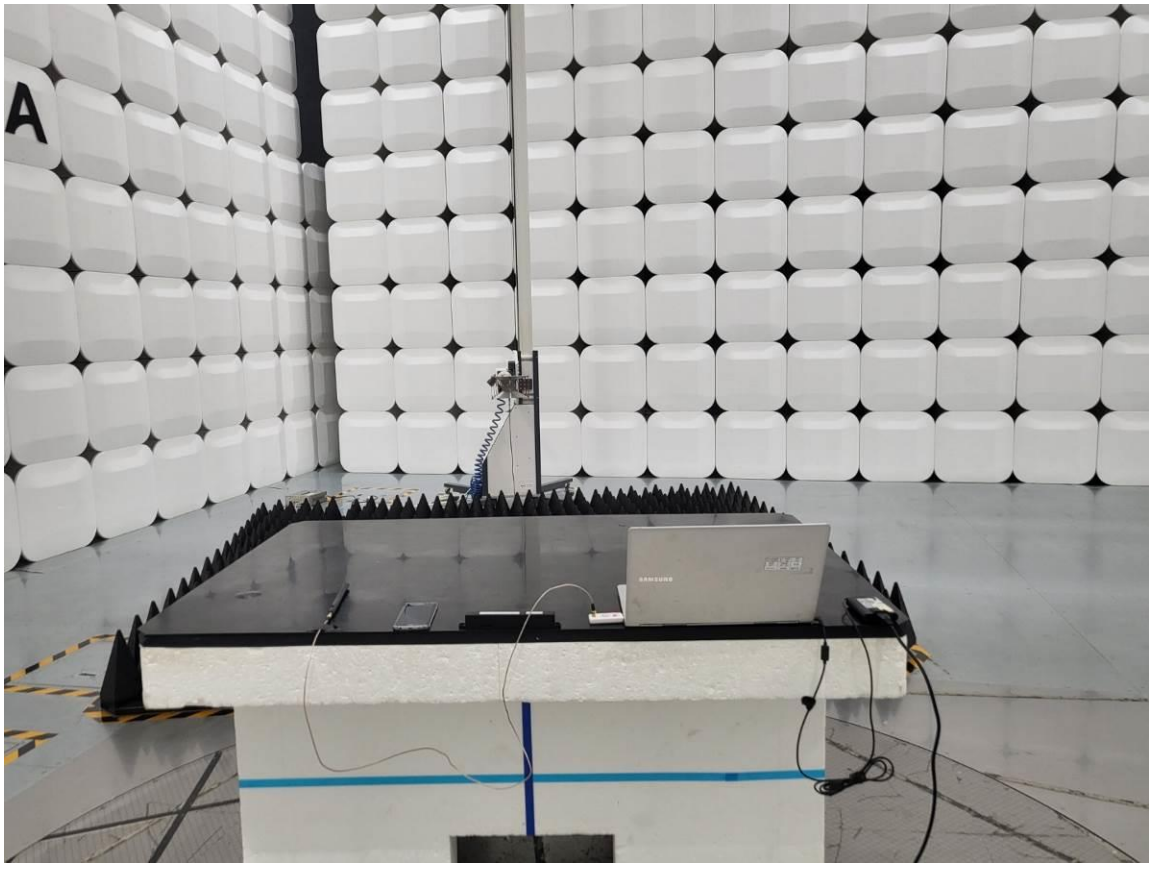
[MODE : GPS mode]



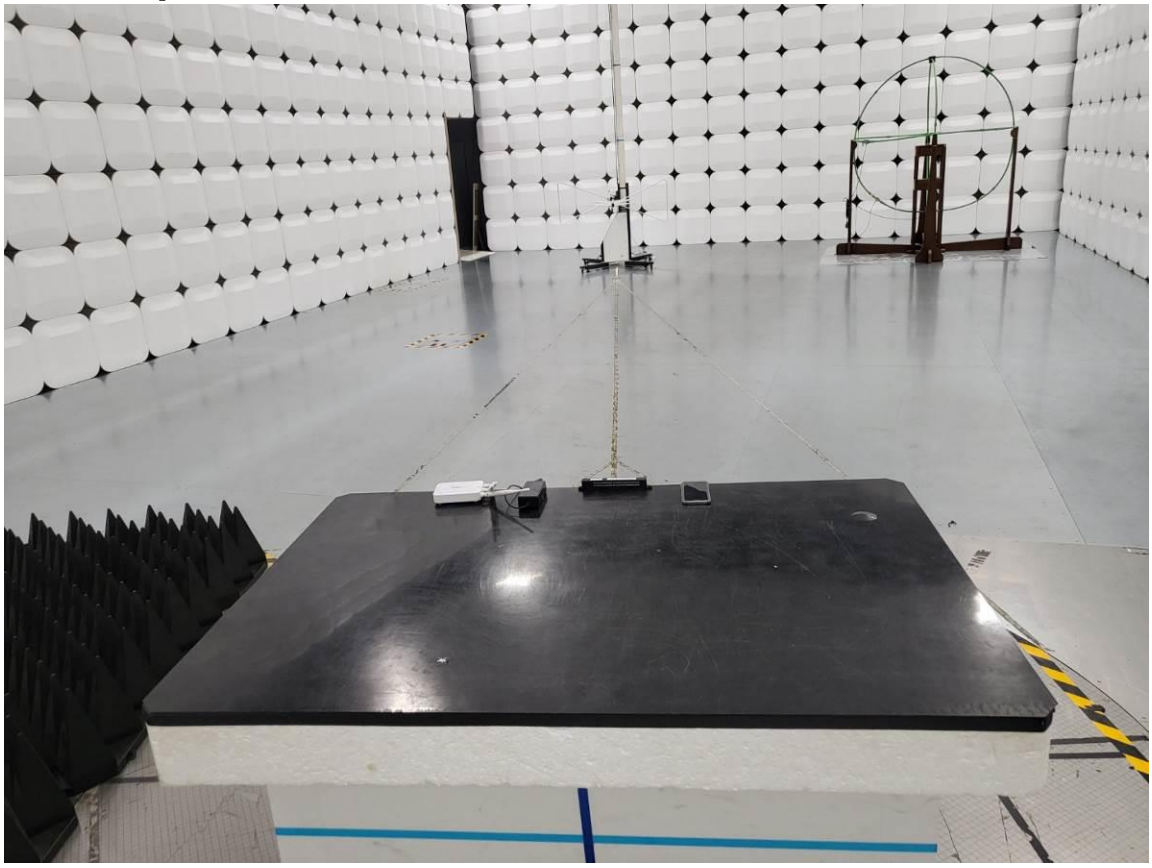


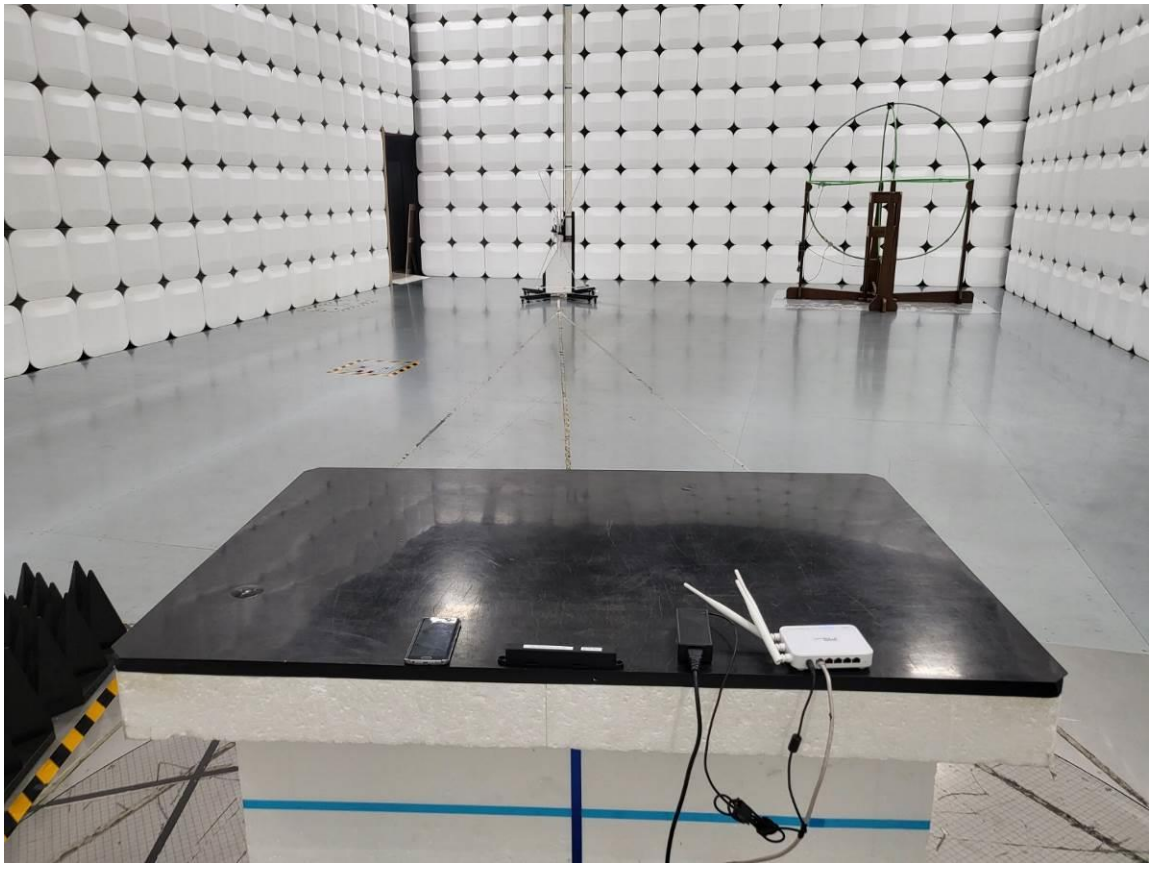
[MODE : SIGFOX mode]





[MODE : Wifi mode]



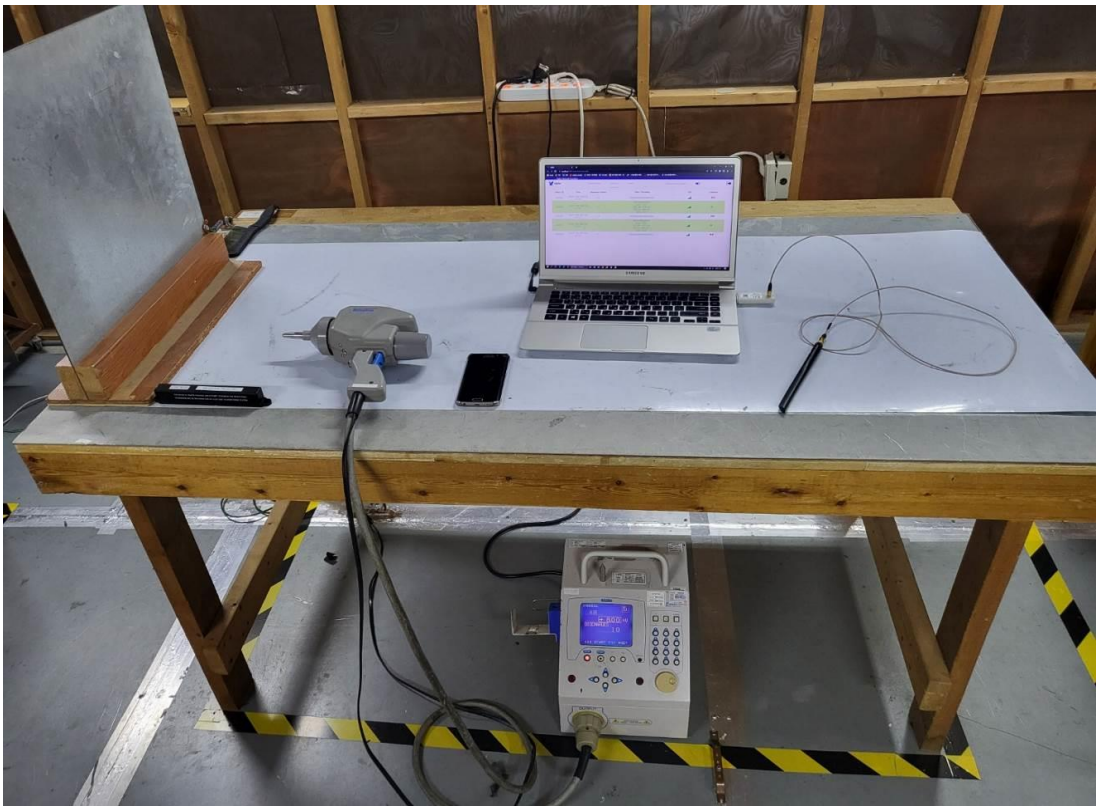


Electrostatic Discharge

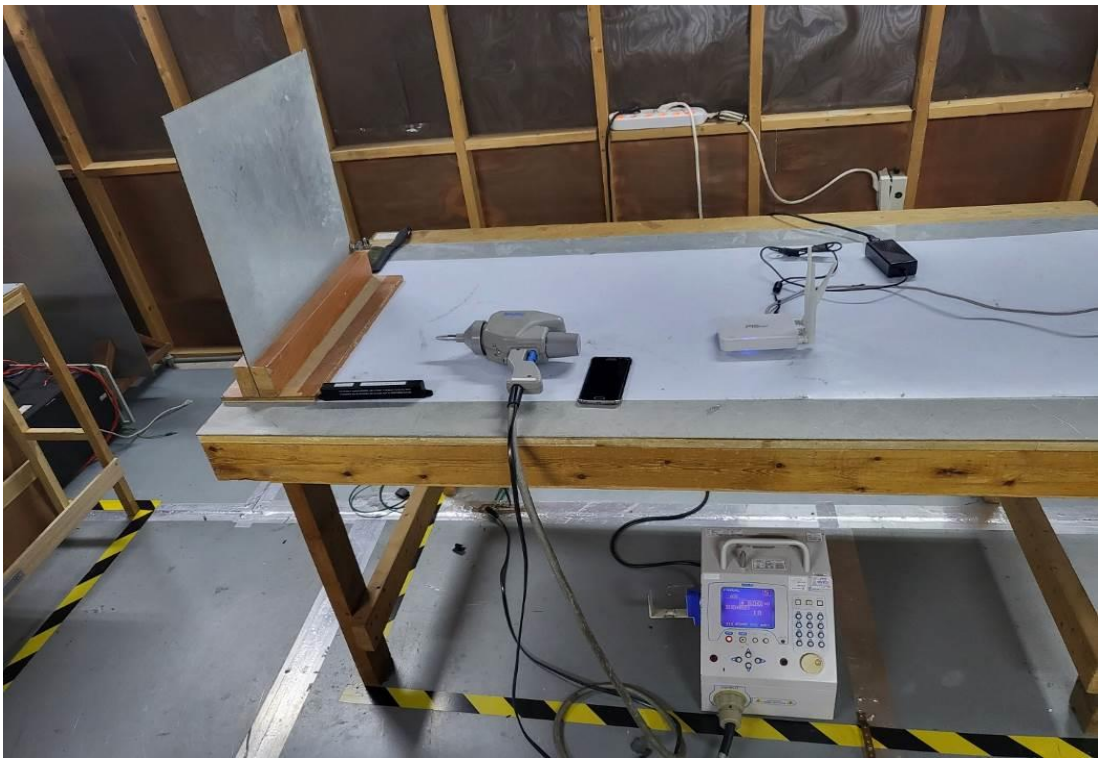
[MODE : Bluetooth LE mode]

[MODE : GPS mode]

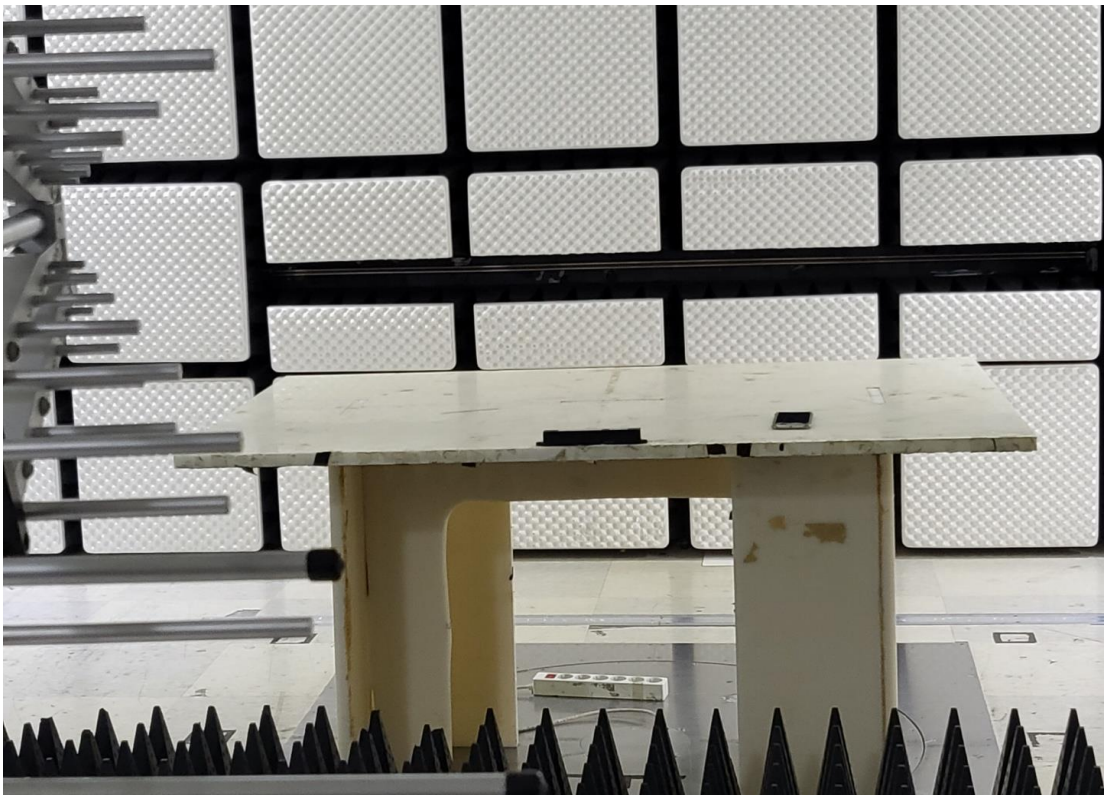
[MODE : SIGFOX mode]



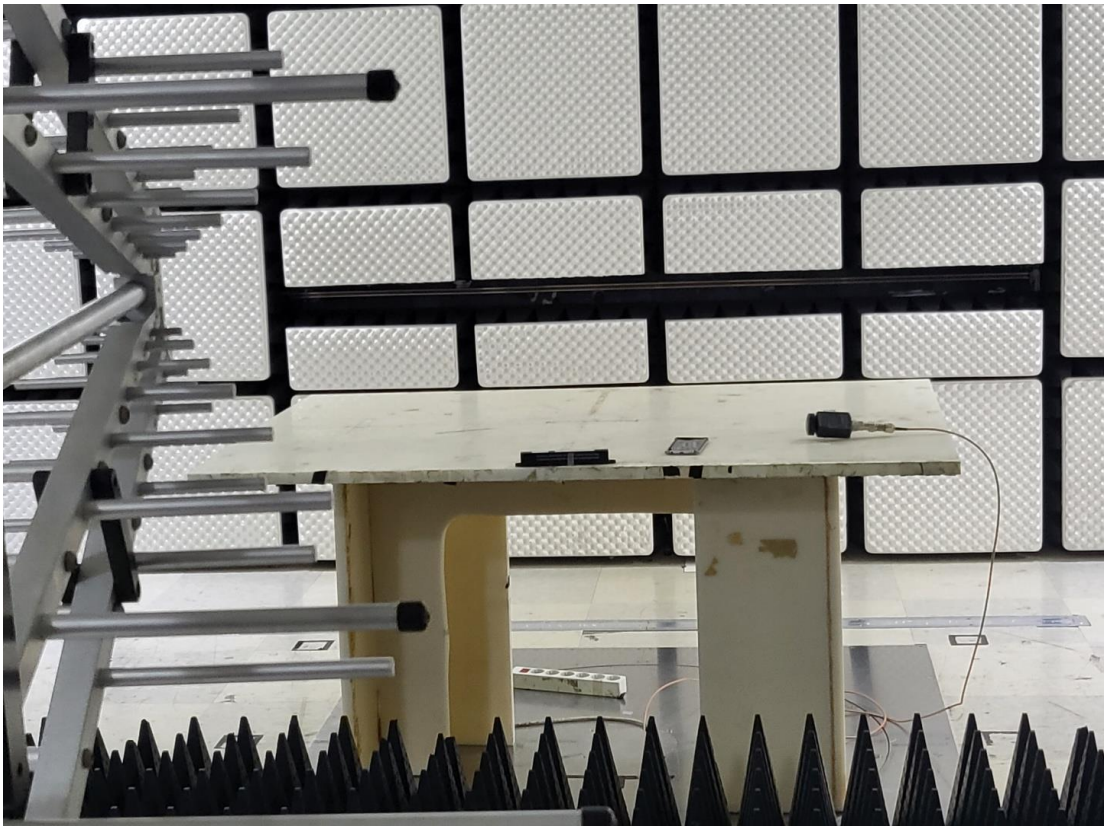
[MODE : Wifi mode]



[MODE : Bluetooth LE mode]

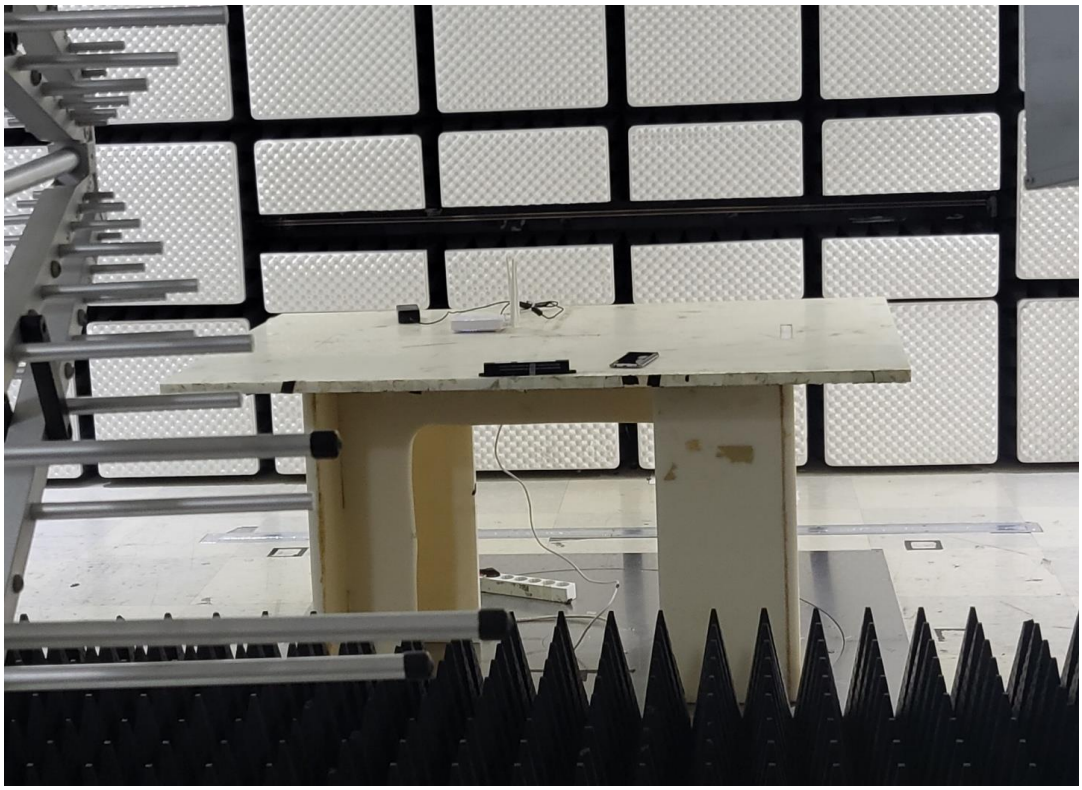


[MODE : GPS mode]



[MODE : SIGFOX mode]

[MODE : Wifi mode]



EUT


028E3B38
DA:E0:EA:79:EC:91
THIS DEVICE IS TAMPER PROOFED. ANY ATTEMPT TO REMOVE THE DEVICE FROM
ITS POSITION WILL BE RECORDED AND AN ALERT SENT TO MONITORING STATION.

EUT


THIS DEVICE IS TAMPER PROOFED. ANY ATTEMPT TO REMOVE THE DEVICE FROM
ITS POSITION WILL BE RECORDED AND AN ALERT SENT TO MONITORING STATION.