Testing Laboratory
3787

EMI TEST REPORT

Filing Type	:	**Certification**
FCC ID	:	**ZPNB122009B122010**
Equipment	:	**Blind Spot Detection and Turn Assist System**
Brand Name	:	**Cub**
Model Name	:	**B122-009NA1-A2, B122-009NA1-A3, B122-010NA1-A2, B122-010NA1-A3, B122-073NA1-A0, B122-072NA1-A0, B122-075NA1-A0, B122-074NA1-A0, B122-XXXXXX-XX, A009-XXXXXX-XXX (Refer to section 1.1 for more details)**
Applicant	:	**CUB ELECPARTS INC** **No.6,Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County, Taiwan 506**
Manufacturer	:	**CUB ELECPARTS INC** **No.6,Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County, Taiwan 506**
Standard	:	**47 CFR FCC Rules and Regulations Part 15 Subpart B Class B Digital Device**

The product was received on Oct. 11, 2023, and testing was started from Nov. 29, 2023 and completed on Nov. 30, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2014 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sin Chang

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

TEL : 886-3-656-9065
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Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FC0O1350-01	01	Initial issue of report	Dec. 26, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
4	15.109	Radiated Emission below 1GHz	PASS	Under limit 3.27 dB at 145.43 MHz
4	15.109	Radiated Emission above 1GHz	PASS	Under limit 5.38 dB at 9.50812 GHz

Conformity Assessment Condition:
The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. Please refer to each test results in the chapter "Measurement Uncertainty" for measurement uncertainty.
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sin Chang

Report Producer: Cathy Chiu

1. General Description of Equipment under Test

Product Detail	
Equipment Name	Blind Spot Detection and Turn Assist System
Model Name	B122-009NA1-A2, B122-009NA1-A3, B122-010NA1-A2, B122-010NA1-A3, B122-073NA1-A0, B122-072NA1-A0, B122-075NA1-A0, B122-074NA1-A0, B122-XXXXXX-XX, A009-XXXXXX-XXX (Refer to section 1.1 for more details)
Brand Name	Cub
Power Supply	From DC power supply (12V or 24V)

1.1. Feature of Equipment under Test

1. The maximum operating frequency: 77 GHz
2. Accessories

Accessories				
Item	**Equipment Name**	**Brand**	**Model**	**Remark**
1	Controller 1	Cub	C001-007NA1	*1
2	Controller 2	Cub	C001-025NA1-A0	*1
3	Controller 3	Cub	C001-022NA1-A0	*1
4	Info cable 1	Cub	25-300065-01	Non-shielded*1, 0.5m
5	Info cable 2	Cub	25-360139-01	Non-shielded*1, 0.5m
6	Cable 1	Cub	25-360	Non-shielded*1, 4.5m
7	Cable 2	Cub	25-360047-01	Non-shielded*1, 6m
8	Cable 3	Cub	25-300066-01	Non-shielded*1, 4.5m
9	Cable 4	Cub	25-360287	Non-shielded*1, 4.5m
10	Cable 5	Cub	25-360286	Non-shielded*1, 4.5m
11	Cable 6	Cub	25-360302-00	Non-shielded*1, 3m
12	Cable 7	Cub	25-360301-20	Non-shielded*1, 12m
13	Cable 8	Cub	25-360276	Non-shielded*1, 4.5m
14	Cable 9	Cub	TA25-300032	Non-shielded*1, 4.2m
15	Cable 10	Cub	25-300657-00	Non-shielded*1, 0.2m
16	Cable 11	Cub	25-360277	Non-shielded*1, 3m
17	Cable 12	Cub	250360278	Non-shielded*1, 3.5m
18	Cable 13	Cub	TA25-360003	Non-shielded*1, 12m
19	Buzzer 1	Cub	44-1000	Non-shielded*1, 4m
20	Buzzer 2	Cub	44-100008-01	Non-shielded*1, 0.1m
21	Switch	Cub	A009-004NA1-A2	Non-shielded*1, 0.2m
22	Indicator_BSD 1	Cub	C200-00	Non-shielded*2, 1.5m
23	Indicator_BSD 2	Cub	C200-012NA1-A0	Non-shielded*2, 2m
24	Indicator_BSD 3	Cub	C200-0010NA-A1	Non-shielded*1, 1.5m
25	Indicator_BSD 4	Cub	C200-0010NA-A2	Non-shielded*1, 1.5m
26	Indicator_turn 1	Cub	C200-006NA1-A0	Non-shielded*1, 1.5m
27	Indicator_turn 2	Cub	C200-006NA4-A0	Non-shielded*1, 2.5m
28	Light sensor	Cub	C901-001NA1-A0	Non-shielded*1, 2m

Note: For accessories set 1: The difference between info cable 1 & info cable 2 is only I/O port, there is only info cable 2 tested and recorded in this report.

Accessories Set	Content of Accessories	Remark
1	Controller 1, Info cable 1, Info cable 2, Cable 1, Cable 2, Cable 3, Buzzer 1, Switch, Indicator_BSD 1 and Indicator_turn 1	Used for EUT 1~4
2	Controller 2, Cable 4, Cable 5, Cable 6, Cable 7 and Indicator_BSD 2	Used for EUT 1~4
3	Controller 3, Info cable 1, Cable 8, Cable 9, Cable 10, Cable 11, Cable 12, Cable 13, Buzzer 2, Switch, Indicator_BSD 3, Indicator_BSD 4, Indicator_turn 2 and Light sensor	Used for EUT 5~8

3. Table for Multiple Listing

EUT No.	Model Name	Amount of Module	Accessories	Description
1	B122-009NA1-A3	1	Equip with the same accessories.	All the models are identical except for the exterior of EUT, the housing of EUT, amount of modules, accessories, and the different models served as a marketing strategy.
2	B122-010NA1-A3	2		
3	B122-009NA1-A2	1		
4	B122-010NA1-A2	2		
-	B122-XXXXXX-XX, A009-XXXXXX-XXX (Where X may be any alpha character “a”-“z”, ”A”-“Z”, or numeric character “0”-“9”,or -, (,) , or blank or combination of alpha and numeric characters.)	1 or 2		
5	B122-073NA1-A0	1	Equip with the same accessories.	
6	B122-072NA1-A0	2		
7	B122-075NA1-A0	1		
8	B122-074NA1-A0	2		

Note 1: From the above EUTs, EUT 1~EUT 8 were selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

4. Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FC0O1350
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding EUT 5 ~ 8. (Please refer to section 1.1 point 3 for detail information.) 2. Adding accessories and combining as accessories set 2 and set 3. (Please refer to section 1.1 point 2 for detail information.) 3. Adding model names as below and combining as EUT 5~8: B122-073NA1-A0, B122-072NA1-A0, B122-075NA1-A0, B122-074NA1-A0.	Radiated Emissions test

5. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.2. Modification of EUT

Please refer to the technical specifications of EUT.

2. Test Configuration of Equipment under Test

2.1. Test Mode

The following table is a list of the test modes shown in this test report.

Radiated Emissions	
Test Mode	Description
1	Normal Link - EUT 1 + EUT 2 + EUT 3 + EUT 4 + accessories set 2 / DC 12V
2	Normal Link - EUT 1 + EUT 2 + EUT 3 + EUT 4 + accessories set 2 / DC 24V
3	Normal Link - EUT 5 + EUT 6 + EUT 7 + EUT 8 + accessories set 3 / DC 12V
4	Normal Link - EUT 5 + EUT 6 + EUT 7 + EUT 8 + accessories set 3 / DC 24V
For Radiated Emission test below 1GHz: Mode 3 generated the worst test result, so it was recorded in this report. For Radiated Emission test above1GHz: Mode 3 generated the worst test result for Radiated emission below 1GHz test, thus the measurement for Radiated emission above 1GHz test will follow this same test configuration.	

Note: The EUT can only be used at Y axis position.

2.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Support Unit	Brand	Model	FCC ID
A	DC Power Supply	MOTECH	LPS-305	N/A

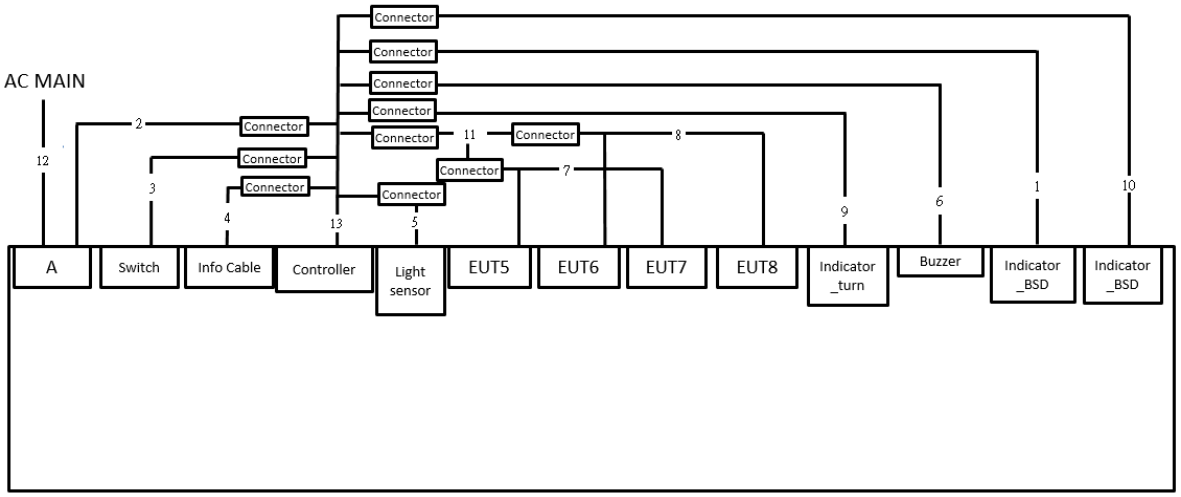
2.3. EUT Operation Condition

No test software was used during testing.

After power on, the light and buzzer were enabled for the test.

2.4. Connection Diagram of Test System

2.4.1. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	Cable 11	No	3m
2	Cable 11	No	3m
3	Cable 12	No	3.5m
4	Cable 12	No	3.5m
5	Cable 12	No	3.5m
6	Cable 11	No	3m
7	Cable 9	No	4.2m
8	Cable 8	No	4.5m
9	Cable 11	No	3m
10	Cable 11	No	3m
11	Cable 10	No	0.2m
12	Power cable	No	1.5m
13	Cable 13	No	12m

3. General Information of Test

3.1. Test Facility

EMI		
Test Lab.：Sporton International Inc. Hsinchu Laboratory		
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)	
(TAF: 3787)	TEL: 886-3-656-9065	FAX: 886-3-656-9085

3.2. Test Environment

Test Items	Test Site No.	Test Engineer	Test Environment			Test Date	Remark
			Temp (°C)	Humidity (%)	Pressure (kPa)		
Radiated Emission below 1GHz	03CH06-CB	Gordon Hong	22.4-23.5	55-58	-	Nov. 29, 2023~ Nov. 30, 2023	-
Radiated Emission above 1GHz	03CH06-CB	Gordon Hong	22.4-23.5	55-58	-	Nov. 29, 2023~ Nov. 30, 2023	-

3.3. Test Voltage

Power Type	Test Voltage
Power Supply	120 V / 60Hz (Vout=12V, 24VDC)

3.4. Standard for Methods of Measurement

ANSI C63.4-2014

3.5. Frequency Range Investigated

Test Items	Frequency Range
Radiated emission test	30 MHz to 40,000 MHz

3.6. Test Distance

Test Items	Test Distance
Radiated emission test below 1 GHz (30 MHz to 1,000 MHz)	3 m
Radiated emission test above 1 GHz (1,000 MHz to 18,000 MHz)	3 m
Radiated emission test above 1 GHz (18,000 MHz to 40,000 MHz)	1 m

4. Test of Radiated Emission

4.1. Limit

Radiated Emission below 1 GHz test at 3 m:

Frequency (MHz)	QP (dBuV/m)
30~88	40
88~216	43.5
216~960	46
Above 960	54

Radiated Emission 1~18 GHz test at 3 m:

Frequency (MHz)	PK (dBuV/m)	AV (dBuV/m)
1,000 to 18,000	74	54

Radiated Emission 18~40 GHz test at 1 m:

Frequency (MHz)	PK (dBuV/m)	AV (dBuV/m)
18,000 to 40,000	83.54	63.54

Based on FCC Part 15 Subpart B 15.109(g), the radiated emission limits of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22,“Information Technology Equipment—Radio Disturbance Characteristics—Limits and Methods of Measurement”

4.2. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 3m (below 1GHz) / 3m (1GHz-18GHz) / 1m (18GHz-40GHz) meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turn table (from 0 degree to 360 degrees) to find the maximum reading.

f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

4.3. Measurement Results Calculation

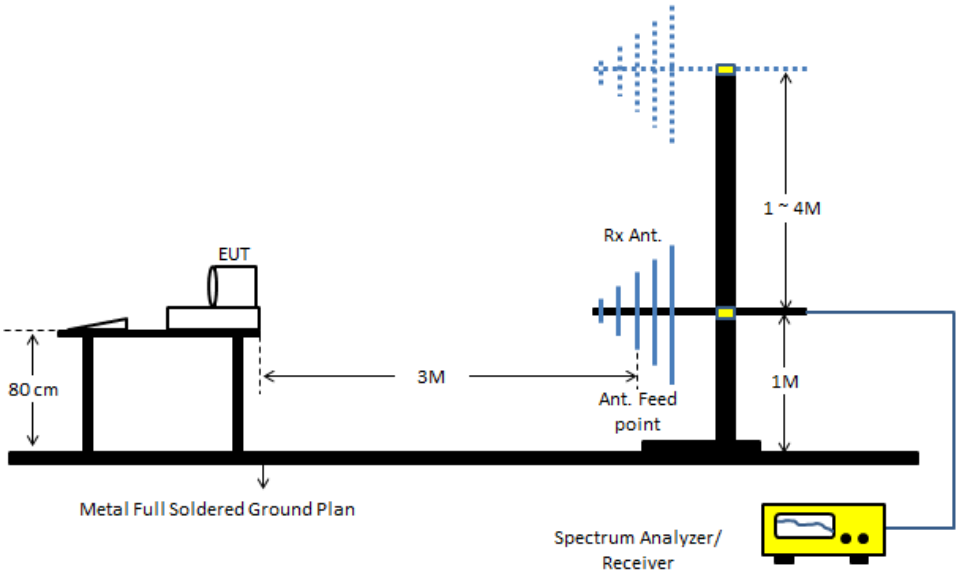
The measured Level is calculated using:

a. Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA) = Level

b. Margin = -Limit + Level

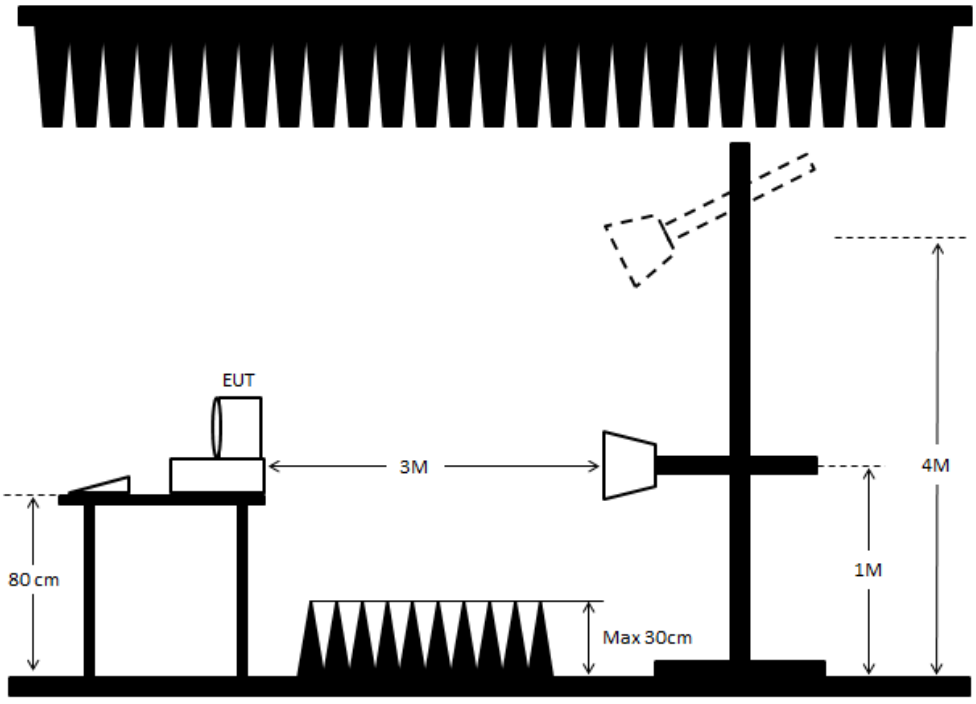
4.4. Typical Test Setup Layout of Radiated Emission

<Below 1 GHz>:

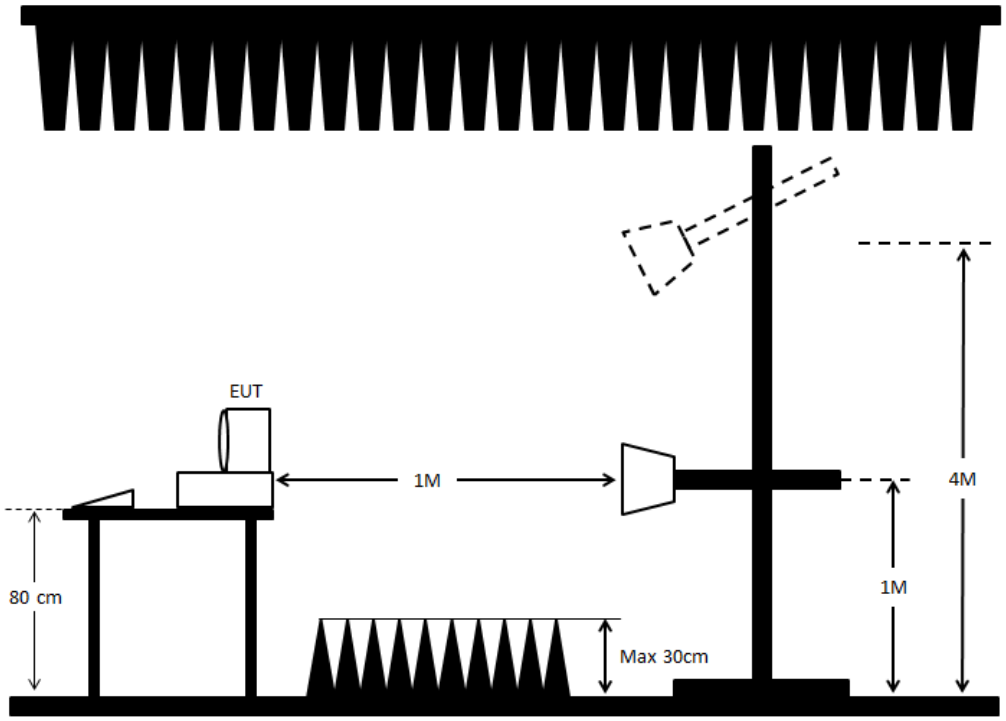


<Above 1 GHz>:

1,000~18,000 MHz



18,000~40,000 MHz



4.5. Test Result of Radiated Emission

Refer as Appendix A

5. List of Measuring Equipment Used

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 03, 2023	Aug. 02, 2024	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Jul. 30, 2023	Jul. 29, 2024	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 31, 2023	Jul. 30, 2024	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 03, 2023	Nov. 02, 2024	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	Aug. 01, 2023	Jul. 31, 2024	Radiation (03CH06-CB)
Pre-Amplifier	SGH	SGH184	20230109-3	18~40GHz	Jan. 13, 2023	Jan. 12, 2024	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 21, 2022	Dec. 20, 2023	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-24+68	30MHz~1GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+68	1GHz~18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)

※ Calibration Interval of instruments listed above is one year.

※ N.C.R. means Non-Calibration required.

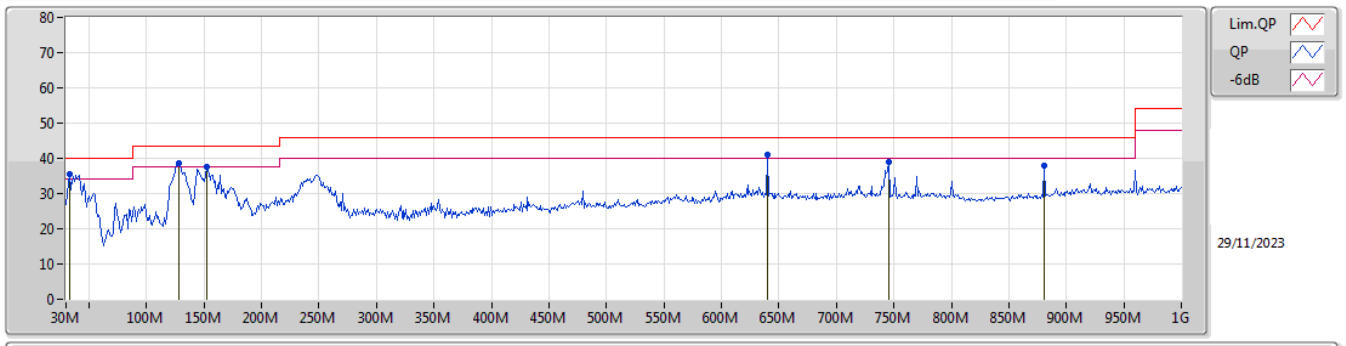
6. Uncertainty of Test Site

Test Items	Uncertainty	Remark
Radiated Emissions below 1GHz	5.1 dB	Confidence levels of 95%
Radiated Emissions 1GHz ~ 18GHz	4.1 dB	Confidence levels of 95%
Radiated Emissions 18GHz ~ 40GHz	4.2 dB	Confidence levels of 95%

Summary

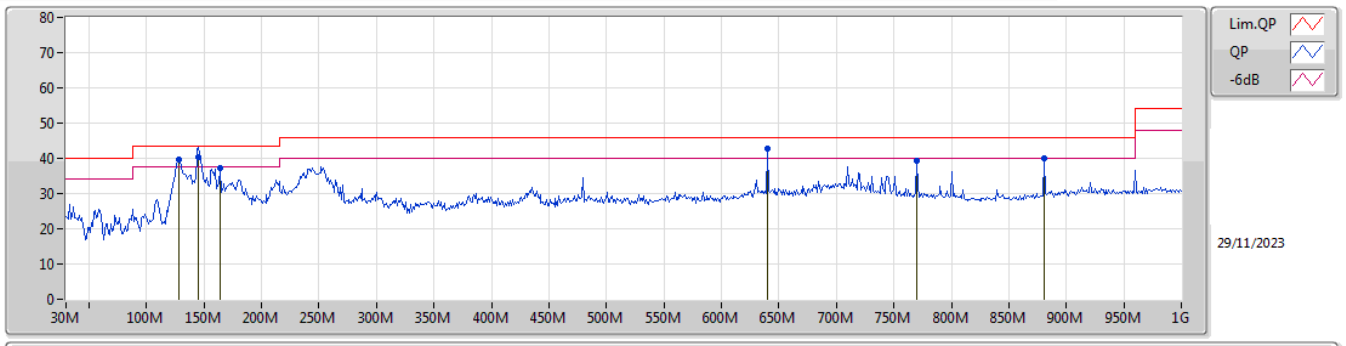
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	QP	145.43M	40.23	43.50	-3.27	Horizontal

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	32.91M	35.43	40.00	-4.57	-8.66	3	Vertical	92	1.00	"Worst"	44.09	22.58	1.17	32.41
PK	127.97M	38.67	43.50	-4.83	-12.26	3	Vertical	218	1.00	-	50.93	18.20	1.83	32.29
PK	152.22M	37.61	43.50	-5.89	-13.84	3	Vertical	225	1.00	-	51.45	16.47	1.95	32.26
PK	640.13M	41.08	46.00	-4.92	-2.62	3	Vertical	202	1.00	-	43.70	25.20	3.66	31.48
PK	745.86M	38.96	46.00	-7.04	-1.98	3	Vertical	137	3.00	-	40.94	25.56	3.92	31.46
PK	880.69M	37.85	46.00	-8.15	-1.16	3	Vertical	169	2.00	-	39.01	26.34	4.26	31.76

Mode 3

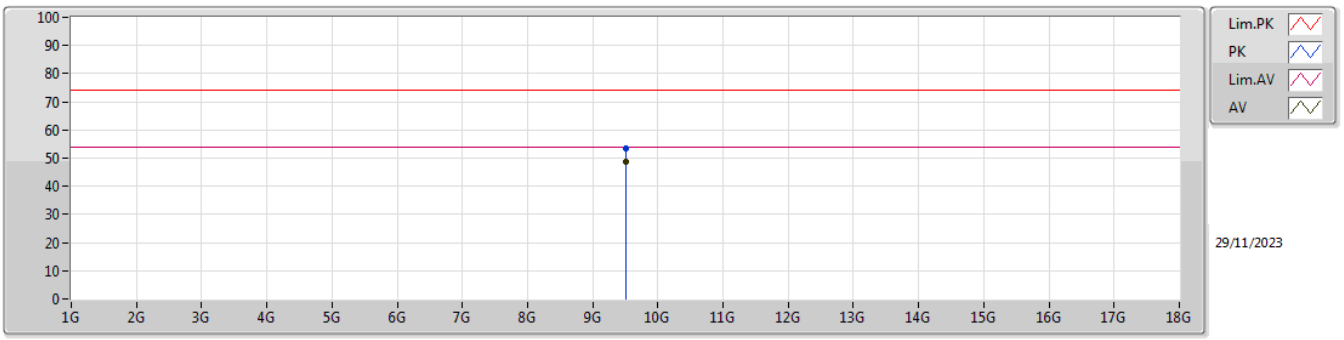


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	127.97M	39.63	43.50	-3.87	-12.26	3	Horizontal	207	3.00	-	51.89	18.20	1.83	32.29
QP	145.43M	40.23	43.50	-3.27	-13.47	3	Horizontal	251	2.00	"Worst"	53.70	16.88	1.92	32.27
PK	163.86M	37.14	43.50	-6.36	-14.26	3	Horizontal	133	2.00	-	51.40	16.03	2.00	32.29
PK	640.13M	42.70	46.00	-3.30	-2.62	3	Horizontal	223	1.50	-	45.32	25.20	3.66	31.48
PK	770.11M	39.38	46.00	-6.62	-1.78	3	Horizontal	32	1.25	-	41.16	25.69	3.98	31.45
PK	880.69M	39.92	46.00	-6.08	-1.16	3	Horizontal	248	1.00	-	41.08	26.34	4.26	31.76

Summary

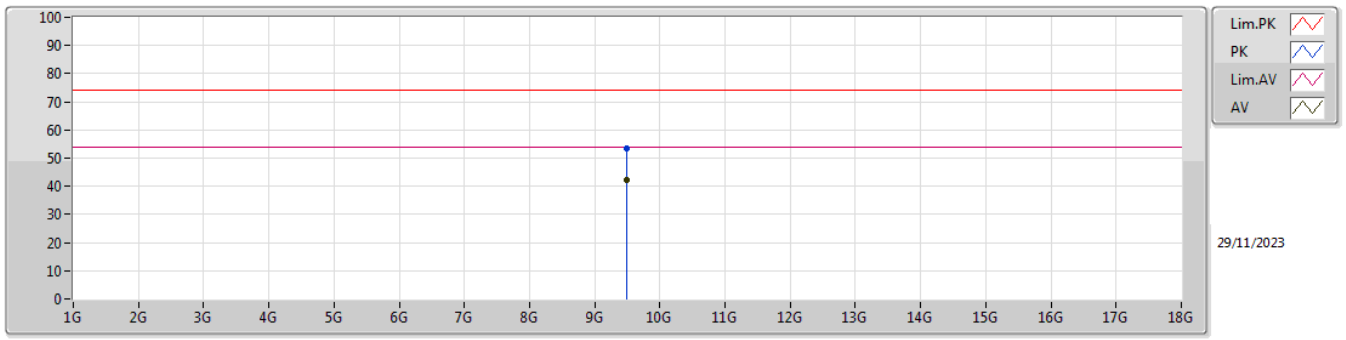
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	AV	9.50812G	48.62	54.00	-5.38	Vertical

Radiated Emissions above 1GHz_Mode 3



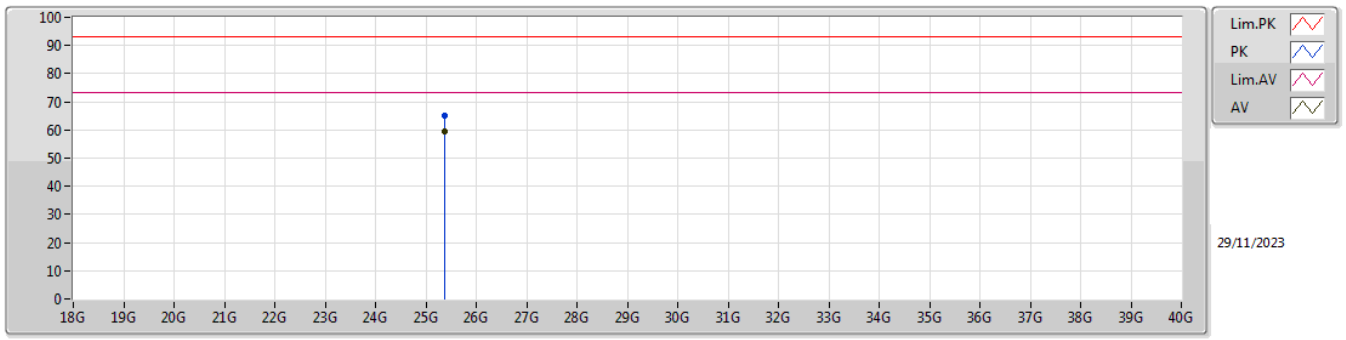
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	9.51831G	53.61	74.00	-20.39	5.63	3	Vertical	70	1.30	-	47.98	38.90	9.57	42.84
AV	9.50812G	48.62	54.00	-5.38	5.63	3	Vertical	70	1.30	"Worst"	42.99	38.90	9.56	42.83

Radiated Emissions above 1GHz_Mode 3



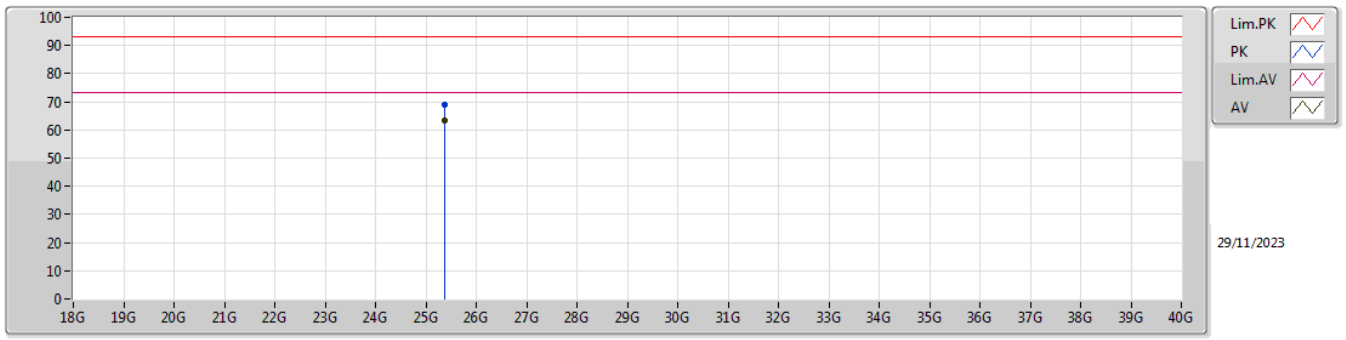
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	9.49183G	53.44	74.00	-20.56	5.64	3	Horizontal	180	2.50	-	47.80	38.92	9.55	42.83
AV	9.49791G	42.11	54.00	-11.89	5.62	3	Horizontal	180	2.50	"Worst"	36.49	38.90	9.55	42.83

Radiated Emissions above 1GHz_Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	25.3846G	65.16	93.08	-27.92	14.43	1	Vertical	356	1.60	-	50.73	39.29	21.59	46.45
AV	25.3843G	59.58	73.08	-13.50	14.43	1	Vertical	356	1.60	"Worst"	45.15	39.29	21.59	46.45

Radiated Emissions above 1GHz_Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	25.38462G	69.07	93.08	-24.01	14.43	1	Horizontal	4	1.15	-	54.64	39.29	21.59	46.45
AV	25.3842G	63.23	73.08	-9.85	14.43	1	Horizontal	4	1.15	"Worst"	48.80	39.29	21.59	46.45