



FCC 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-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. 16, 2020, and testing was started from Oct. 29, 2020 and completed on Oct. 29, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications 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 report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sin Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.107	AC Power Port Conducted Emission	N/A	Note
4	15.109	Radiated Emission below 1GHz	PASS	Under limit 9.55 dB at 174.53 MHz
4	15.109	Radiated Emission above 1GHz	PASS	Under limit 3.07 dB at 25.38405 GHz

Note: It was supplied power by DC-Powered (vehicle battery) for EUT; it's not necessary to apply to AC Power-line Conducted Emissions test.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

None

Reviewed by: Sin Chang

Report Producer: Viola Huang



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-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 EUT's highest operating frequency is 77GHz.
2. Accessories

Others				
Item	Equipment Name	Brand	Model	Remark
1	Controller	Cub	C001-007NA1	*1
2	Info cable 1	Cub	25-300065-01	Non-shielded*1, 0.5m
3	Info cable 2	Cub	25-360139-01	Non-shielded*1, 0.5m
4	Cable 1	Cub	25-360	Non-shielded*1, 4.5m
5	Cable 2	Cub	25-360047-01	Non-shielded*1, 6m
6	Cable 3	Cub	25-300066-01	Non-shielded*1, 4.5m
7	Buzzer	Cub	44-1000	Non-shielded*1, 4m
8	Switch	Cub	A009-004NA1-A2	Non-shielded*1, 0.2m
9	Indicator_BSD	Cub	C200-00	Non-shielded*2, 1.5m
10	Indicator_turn	Cub	C200-006NA1-A0	Non-shielded*1, 1.5m

Note: 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.



3. Table for Multiple Listing

EUT No.	Model Name	Amount of Module	Description
1	B122-009NA1-A3	1	
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	All the models are identical excepting the exterior of EUT, the housing of EUT, and the amount of module, the different model served as a marketing strategy.

Note 1: From the above EUTs, EUT 1~EUT 4 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. 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 / DC 12V
2	Normal Link - EUT 1 + EUT 2 + EUT 3 + EUT 4 / DC 24V

For Radiated Emission test below 1GHz:
Mode 2 generated the worst test result, so it was recorded in this report.
For Radiated Emission test above 1GHz:
Mode 2 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	Battery	YUASA	38B19L-MF	N/A

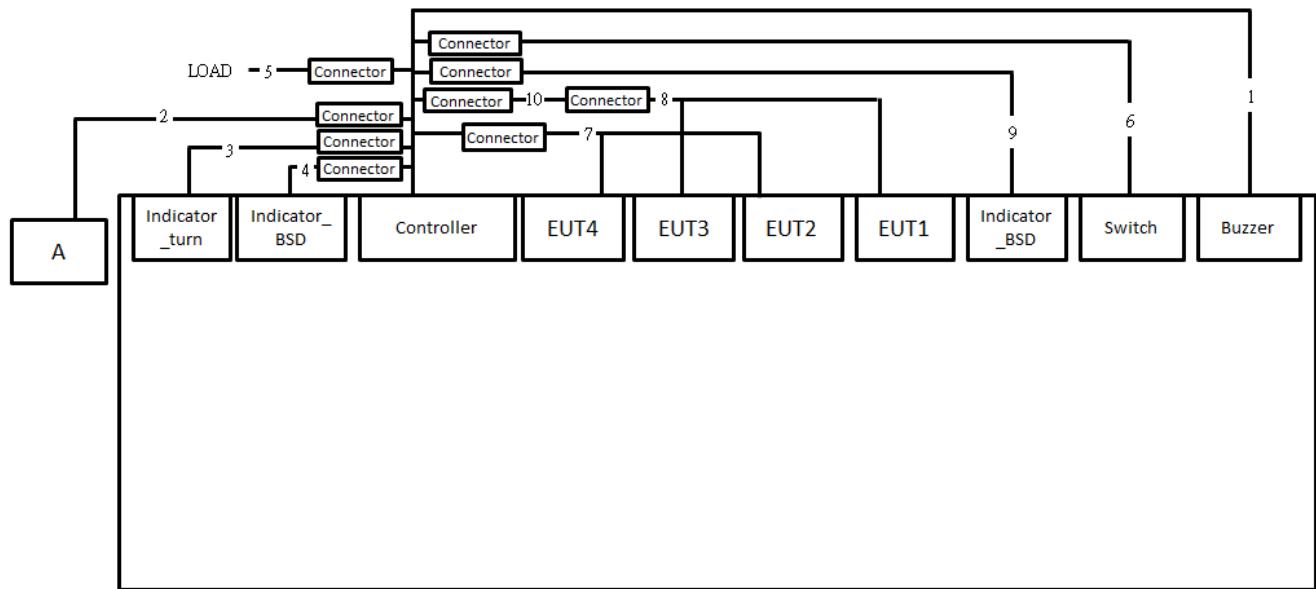
2.3. EUT Operation Condition

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	Buzzer	No	4m
2	Crocodile clip cable*2	No	1.5m
3	Indicator_turn	No	1.5m
4	Indicator_BSD	No	1.5m
5	Info cable 2	No	0.5m
6	Switch	No	0.2m
7	Cable 3	No	4.5m
8	Cable 1	No	4.5m
9	Indicator_BSD	No	1.5m
10	Cable 2	No	6m



3. General Information of Test

3.1. Test Facility

EMI	
JHU BEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. 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	03CH05-CB	Welson Chen	23.6~25.1	57~59	-	Oct. 29, 2020	-
Radiated Emission above 1GHz	03CH05-CB	Welson Chen	23.6~25.1	57~59	-	Oct. 29, 2020	-



3.3. Test Voltage

Power Type	Test Voltage
DC Power Supply	12V, 24V / 60 Hz

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

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.



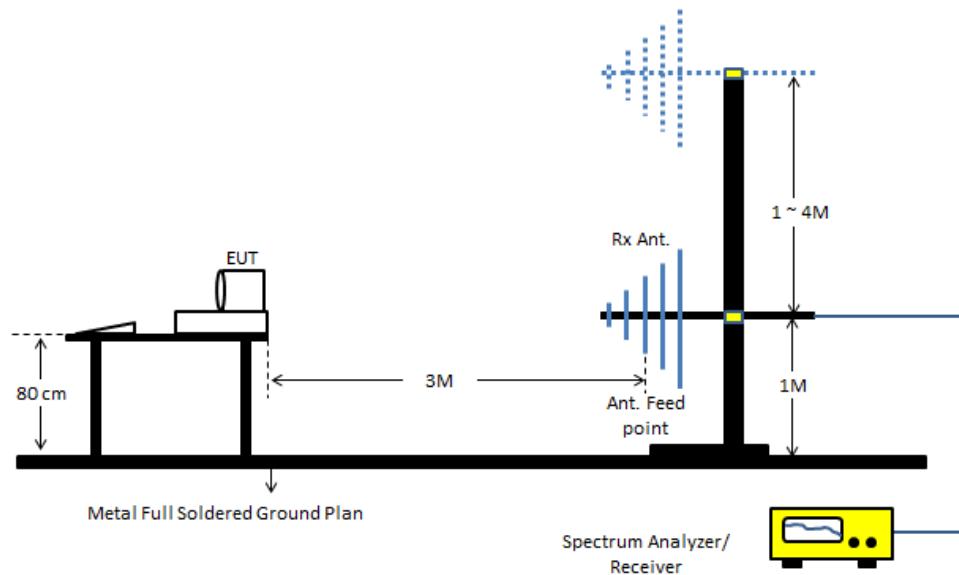
4.3. Measurement Results Calculation

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

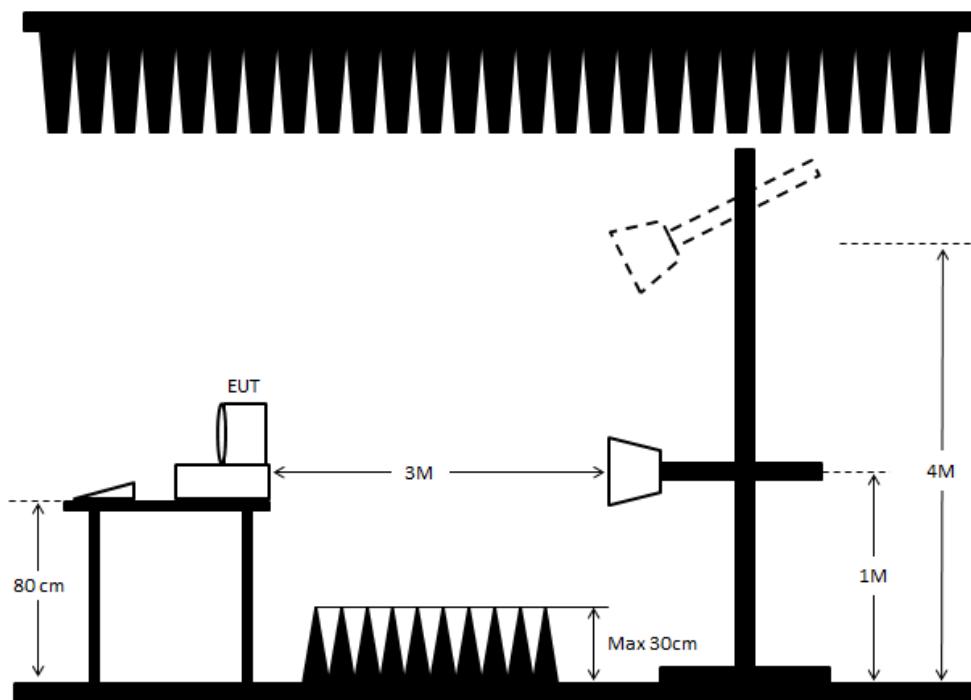
4.4. Typical Test Setup Layout of Radiated Emission

<Below 1 GHz>:



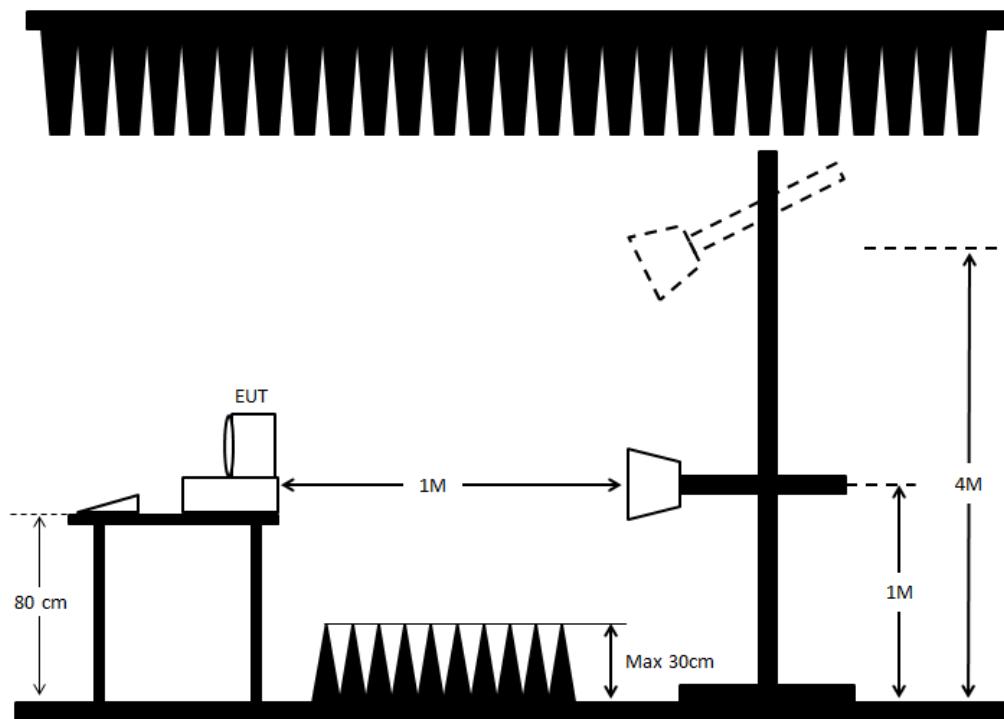
<Above 1 GHz>:

1,000~18,000 MHz





18,000~40,000 MHz





4.5. Test Result of Radiated Emission below 1 GHz

Refer as Appendix A

4.6. Test Result of Radiated Emission above 1 GHz

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	03CH05-CB	30 MHz ~ 1 GHz	Aug. 10, 2020	Aug. 09, 2021	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH05-CB	1GHz ~18GHz 3m	Nov. 09, 2019	Nov. 08, 2020	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 27, 2020	Mar. 26, 2021	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120 D-1291	1GHz~18GHz	Sep. 05, 2020	Sep. 04, 2021	Radiation (03CH05-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 28, 2020	Apr. 27, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz – 26.5GHz	Jul. 03, 2020	Jul. 02, 2021	Radiation (03CH05-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH05-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	May 12, 2020	May 11, 2021	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)

※ Calibration Interval of instruments listed above is one year.

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



6. Uncertainty of Test Site

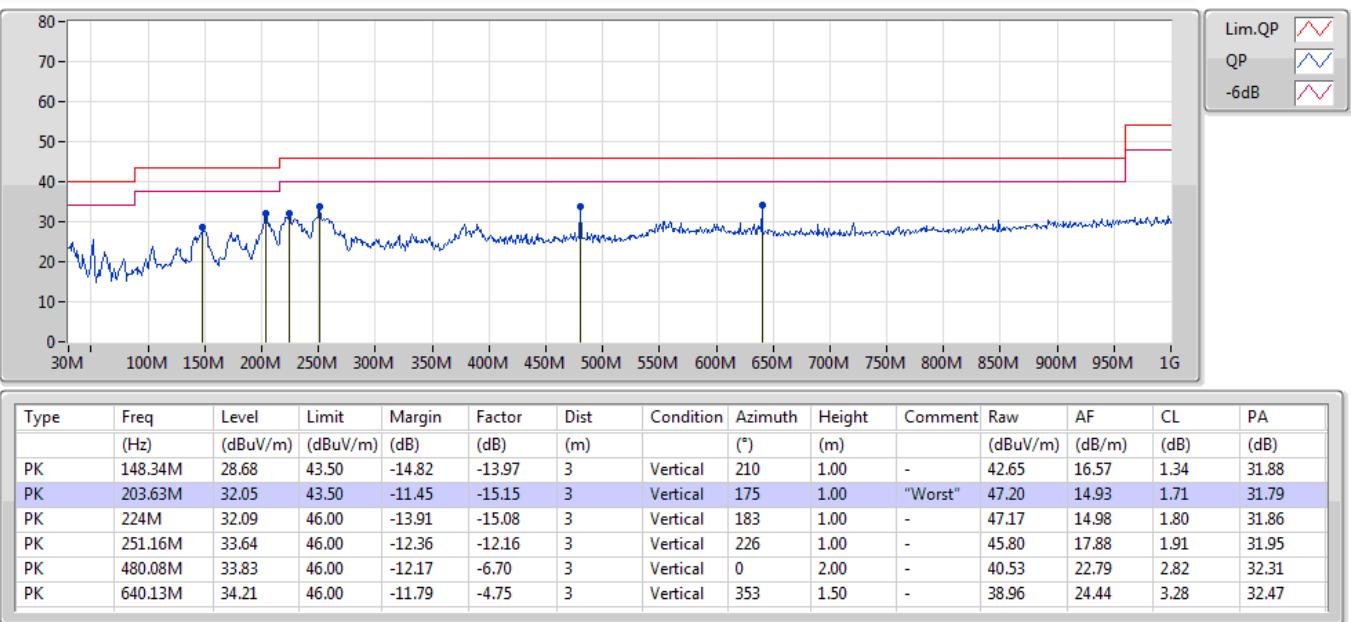
Test Items	Uncertainty	Remark
Radiated Emissions below 1GHz	4.3 dB	Confidence levels of 95%
Radiated Emissions 1GHz ~ 18GHz	4.3 dB	Confidence levels of 95%
Radiated Emissions 18GHz ~ 40GHz	5.1 dB	Confidence levels of 95%

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 2	Pass	PK	174.53M	33.95	43.50	-9.55	Horizontal

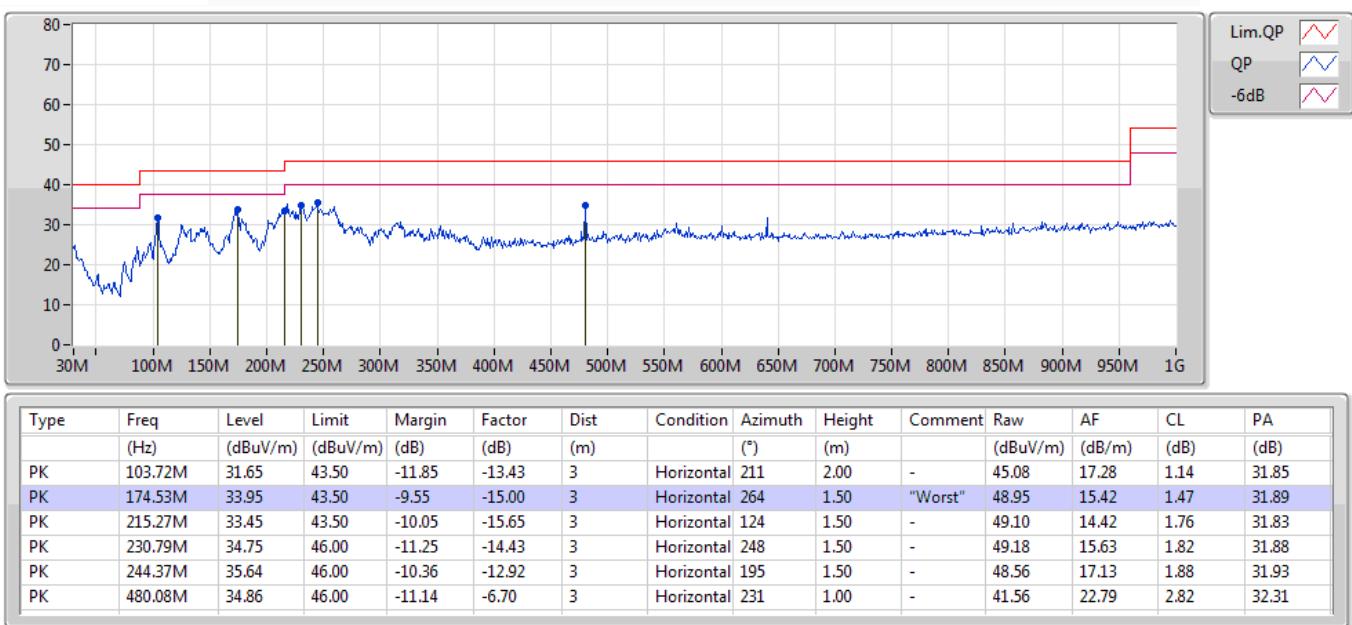
Test Mode 2

29/10/2020



**Test Mode 2**

29/10/2020

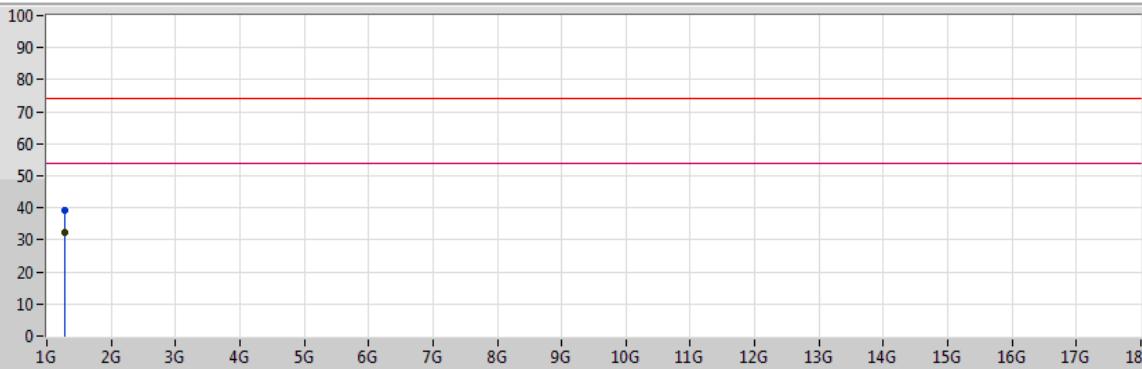


**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 2	Pass	AV	25.38405G	60.47	63.54	-3.07	Horizontal

Test Mode 2

29/10/2020

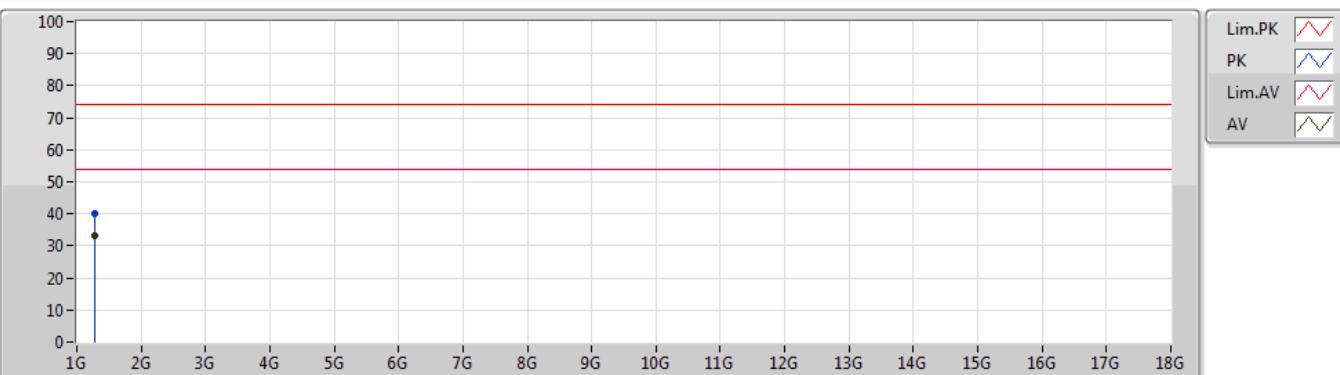


Lim.PK	
PK	
Lim.AV	
AV	

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	1.27996G	39.39	74.00	-34.61	-8.21	3	Vertical	217	1.00	-	47.60	25.48	2.88	36.57
AV	1.27986G	32.30	54.00	-21.70	-8.21	3	Vertical	217	1.00	"Worst"	40.51	25.48	2.88	36.57

Test Mode 2

29/10/2020

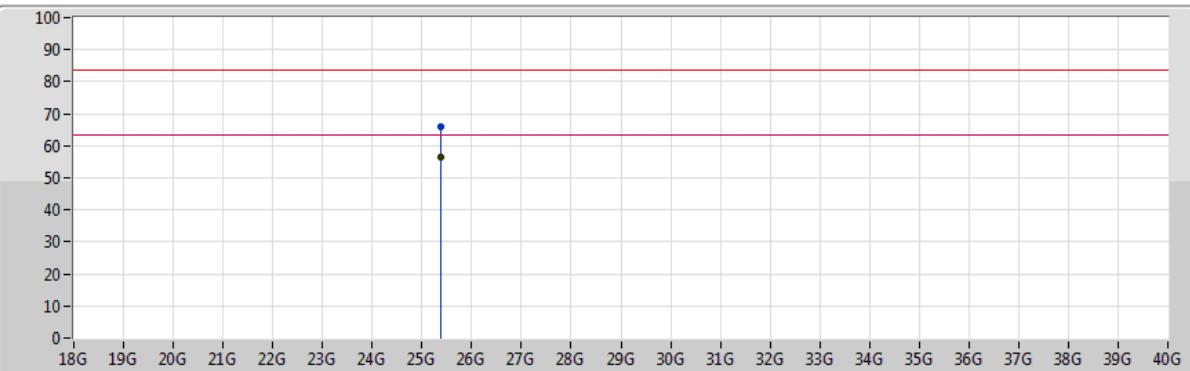


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	1.2801GHz	40.00	74.00	-34.00	-8.21	3	Horizontal	165	1.00	-	48.21	25.48	2.88	36.57
AV	1.27985GHz	33.03	54.00	-20.97	-8.21	3	Horizontal	165	1.00	"Worst"	41.24	25.48	2.88	36.57

Test Mode 2

29/10/2020

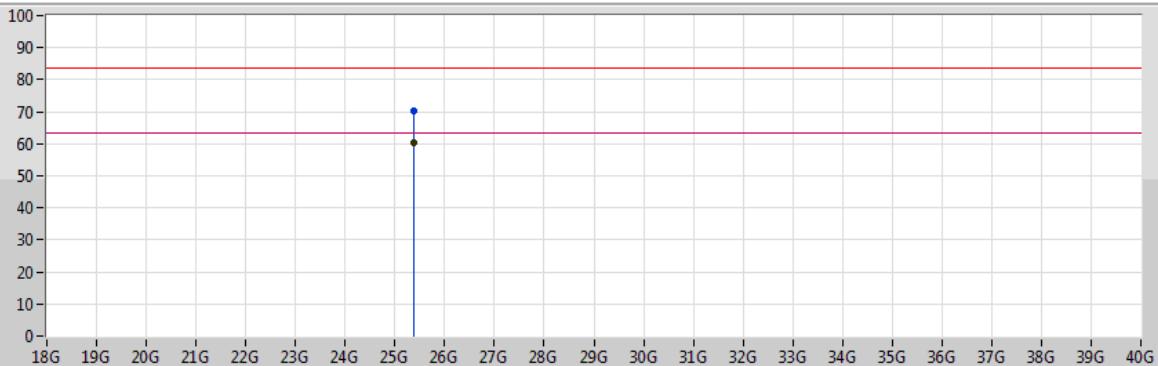
Lim.PK	
PK	
Lim.AV	
AV	



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	25.38398G	66.12	83.54	-17.42	7.89	1	Vertical	13	1.00	-	58.23	39.35	16.37	47.83
AV	25.38403G	56.61	63.54	-6.93	7.89	1	Vertical	13	1.00	"Worst"	48.72	39.35	16.37	47.83

Test Mode 2

29/10/2020



Lim.PK	
PK	
Lim.AV	
AV	

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	25.38412G	70.15	83.54	-13.39	7.89	1	Horizontal	28	1.00	-	62.26	39.35	16.37	47.83
AV	25.38405G	60.47	63.54	-3.07	7.89	1	Horizontal	28	1.00	"Worst"	52.58	39.35	16.37	47.83