



EMC TEST REPORT

Report No.: 20240117G01087X -W1

Product Name: Cobra-SC220

FCC ID: BBOSC220

IC ID: 906A-SC220

HVIN: SC220

Model No. : SC 220, SC 220C

Applicant: COBRA ELECTRONICS CORPORATION

Address: Cedar Electronics Holdings Corp, 1701 Golf Rd, Ste 3-900, Rolling Meadows, IL 60008-4261

Received Date: 2024.01.15

Dates of Testing: 2024.01.17~2024.01.23

Issued by: CCIC Southern Testing Co., Ltd.

Lab Location: Electronic Testing Building, No. 43 Shahe Road, Xili Street,
Nanshan District, Shenzhen, Guangdong, China.

Tel: 86-755-26627338 **E-Mail:** manager@ccic-set.com

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Test Report

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Trade name..... Cobra

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Manufacturer COBRA ELECTRONICS CORPORATION

Manufacturer Address Cedar Electronics Holdings Corp,1701 Golf Rd, Ste 3-900,
Rolling Meadows, IL 60008-4261

Test Standards..... ICES-003 Issue 7
47 CFR Part 15 Subpart B

Test Result..... PASS

Tested by Sun Jiaohui
Sun Jiaohui Test Engineer 2024.05.20

Reviewed by Chris You
Chris You Senior Engineer 2024.05.20

Approved by Yang Fan
2024.05.20
Yang Fan, Manager



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Change History		
Issue	Date	Reason for change
1.0	2024.05.20	First edition



1. GENERAL INFORMATION

1.1 EUT Description

EUT Name	Cobra-SC220
Trade Name.....	Cobra
Brand Name.....	Cobra
Hardware Version.....	90100S00002704
Software Version	C11-GPS-4K V1.7 20231019
Maximum Operating frequency:	5825MHz

Note1: The EUT is a Cobra-SC220;

Note2: For a more detailed description, please refer to Specification or User’s Manual supplied by the applicant and/or manufacturer.

Note3: Model: SC 220, SC 220C have the same PCB board, electromagnetic emissions and electromagnetic compatibility characteristics. The below table show differences:

Model No.	Differences
SC 220	Master
SC 220C	Master + Interior camera



1.2 Test Standards and Results

The objective of the report is to perform testing according to ICES-003 Issue 7:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart B	Radio Frequency Devices
2	ICES-003 Issue 7	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	ICES 003 Issue 7 Section3.2.1	Conducted Emission	N.A
2	ICES 003 Issue 7 Section3.2.2	Radiated Emission	PASS
3	15.107	Conducted Emission	N.A
4	15.109	Radiated Emission	PASS

NOTE:

- (1) The EUT has been tested according to 47 CFR Part 15 Subpart B, Class B. The test procedure is according to ANSI C63.4:2014.
- (2) The EUT has been tested according to ICES 003 Issue 7. The test procedure is according to ANSI C63.4:2014.
- (3) AC conduction is not applicable because the product is 5V DC power supply.



1.3 Facilities and Accreditations

1.3.1 Facilities

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun 30, 2025.

ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Jun 30, 2025.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 °C - 35 °C
Relative Humidity (%):	25% -75%
Atmospheric Pressure (kPa):	86kPa-106kPa

1.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	Uc = 2.6 dB (k=2)
Uncertainty of Radiated Emission: (30MHz~1GHz)	Uc = 3.91 dB (k=2)
Uncertainty of Radiated Emission: (1~18GHz)	Uc = 4.5 dB (k=2)
Uncertainty of Radiated Emission: (18~40GHz)	Uc = 4.9 dB (k=2)



2. TEST CONDITIONS SETTING

2.1 Test Peripherals

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Support Equipment:

Description	Brand name	Model	Serial No.	FCCID
/	/	/	/	/

Support Cable:

Description	Shield Type	Ferrite Core	Length
DC Power Cable	Un- shielding	/	2.0m
Data Connection Cable	Un- shielding	/	6m

2.2 Test Mode

The EUT have the following typical setups during the test:

Setup1: EUT camera recoding + DC power supply (Car charger);

Setup2: EUT +BT/WIFI working+ DC power supply (Car charger);

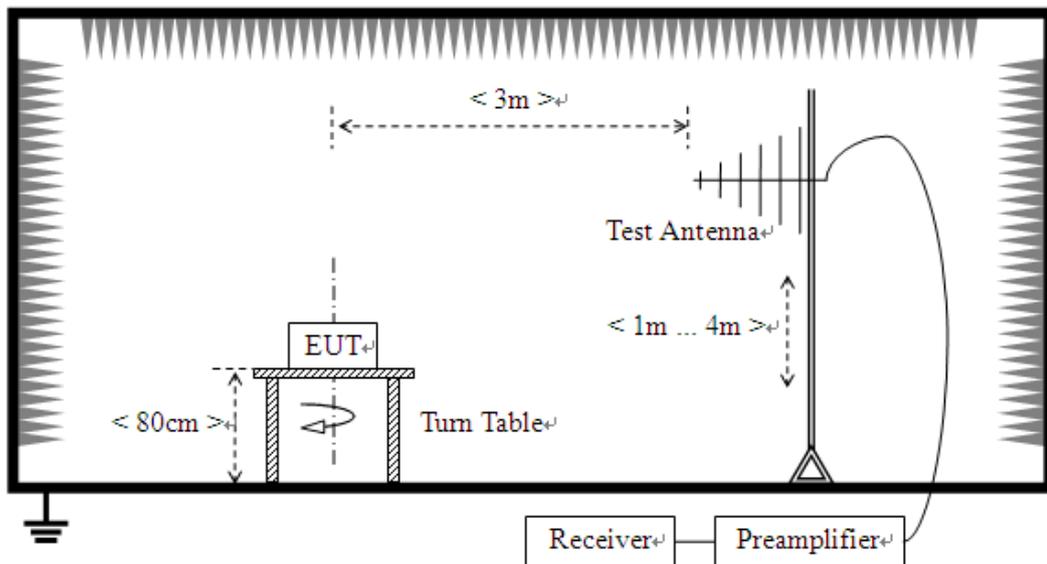
Note1: All models were tested and the worst results only were provided for main tested model SC 220C in the report.

2.3 Test Setup and Equipments List

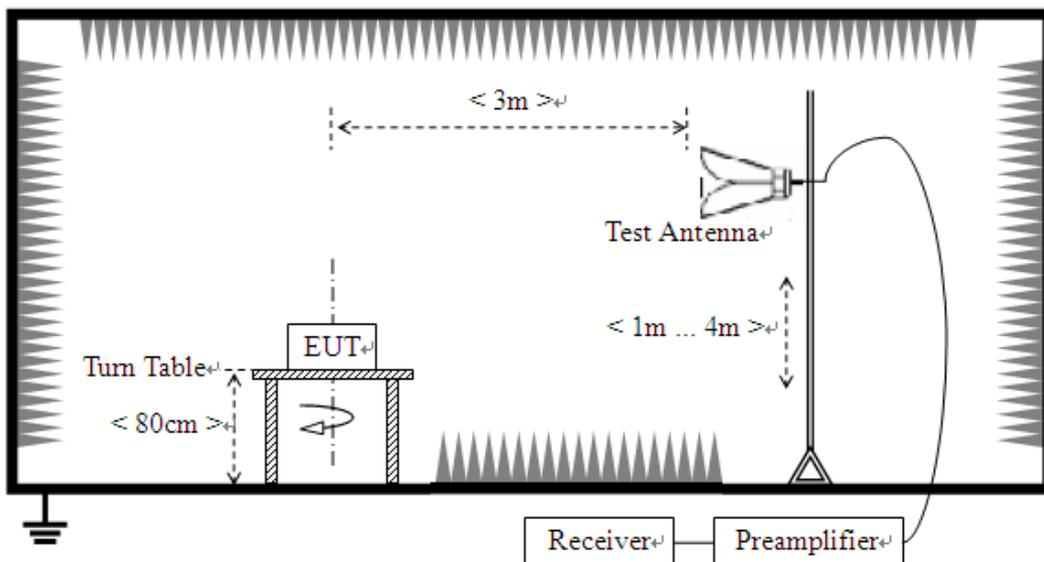
2.3.1 Radiated Emission

A. Test Setup:

- 1) For radiated emissions from 30MHz to 1GHz



- 2) For radiated emissions above 1GHz



**B. Test Procedure**

The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

- 1) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

C. Equipments List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
EMI Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2024.02.28	2025.02.27
Broadband Ant.	ETC	MCTD2786	A150402239	2023.12.27	2024.12.26
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.26
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2023.06.08	2024.06.07
5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2022.03.25	2025.06.07
EMI Horn Ant.	ROHDE&SCHWARZ	HF906	A0304225	2022.04.12	2025.04.11



3. 47 CFR PART 15B REQUIREMENTS

3.1 Radiated Emission

3.1.1 Requirement

According to FCC section 15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength		Field Strength Limitation at 3m Measurement Dist	
	$\mu\text{V/m}$	Dist	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
30.0 - 88.0	100	3m	100	20log 100
88.0 - 216.0	150	3m	150	20log 150
216.0 - 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

According to ICES-003 the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength Limitation at 3m Measurement Dist	
	Class A(3m) QP ($\text{dB}\mu\text{V/m}$)	Class B(3m) QP ($\text{dB}\mu\text{V/m}$)
30 - 88	50.0	40.0
88 - 216	54.0	43.5
216 - 230	56.9	46.0
230 - 960	57.0	47.0
960-1000	60.0	54.0
Frequency range (MHz)	Field Strength Limitation at 3m Measurement Dist	
	Class A(3m) ($\text{dB}\mu\text{V/m}$)	Class B(3m) ($\text{dB}\mu\text{V/m}$)
Above 1G	60(AV) /80(PK)	54(AV) /74(PK)

- a) For frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.
- b) Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above



the ground to determine the maximum value of the field strength.

- c) For below 1G: QP detector RBW 120 kHz, VBW 300 kHz.

For Above 1G: PK detector RBW 1MHz, VBW 3MHz for PK value; AV detector RBW 1MHz, VBW 10Hz for AV value.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency ranges.
- 2) Limitation expressed in dBuV/m is calculated by $20\log$ Emission Level(uV/m).
- 3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $Ld1 = Ld2 * (d2/d1)^2$.

Example:

F.S Limit at 30m distance is 30uV/m, then F.S Limitation at 3m distance is adjusted as

$$Ld1 = L1 = 30uV/m * (10)^2 = 100 * 30uV/m.$$

3.1.2 Test Description

See section 2.3.2 of this report.

3.1.3 Test Result

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

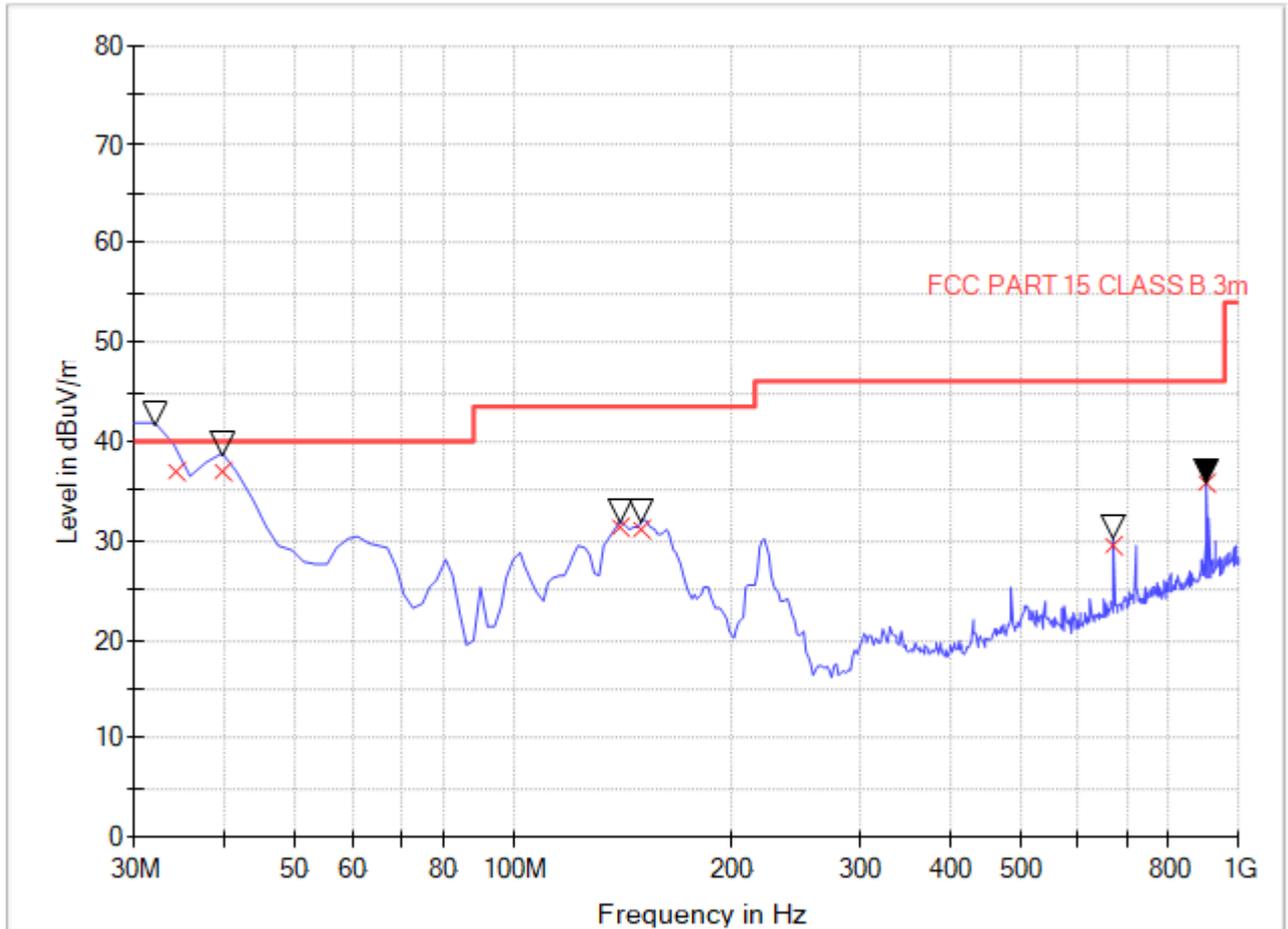
The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Note:

1. All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.
2. For 18G~26.5GHz test data, the amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.



A. Radiation disturbances, antenna polarization: Vertical, Setup1

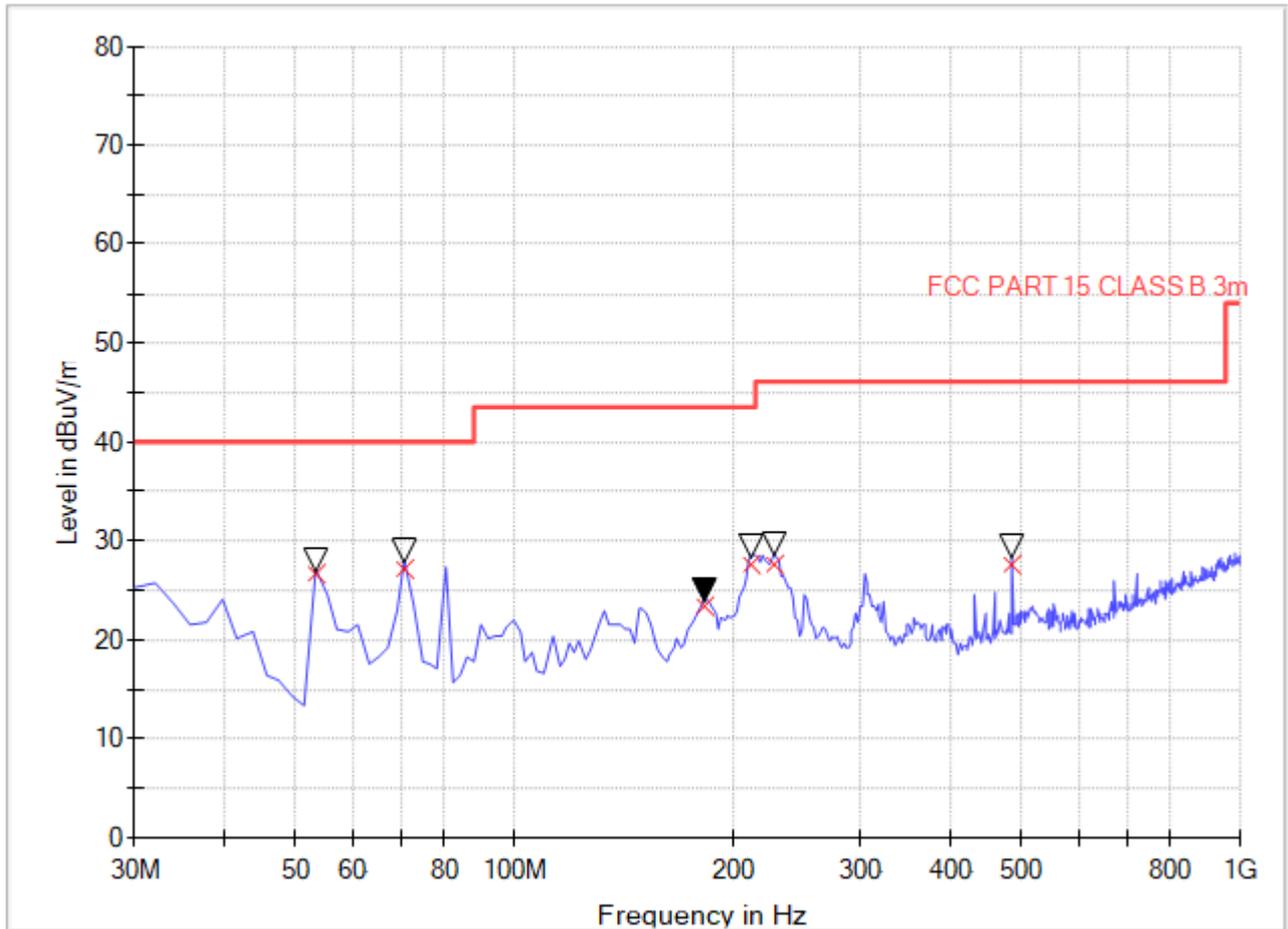


(Plot C: Test Antenna Vertical 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
34.20	36.99	120.000	103	40.00	3.01	Vertical	0.5	17.9	Pass
39.72	36.88	120.000	105	40.00	3.12	Vertical	0.5	14.2	Pass
140.80	31.61	120.000	106	43.50	11.89	Vertical	1.0	11.5	Pass
150.52	31.59	120.000	102	43.50	11.91	Vertical	1.0	11.4	Pass
673.44	30.23	120.000	106	46.00	15.77	Vertical	1.7	20.2	Pass
904.92	36.38	120.000	109	46.00	9.62	Vertical	2.3	22.6	Pass



B. Radiation disturbances, antenna polarization: Horizontal, Setup1

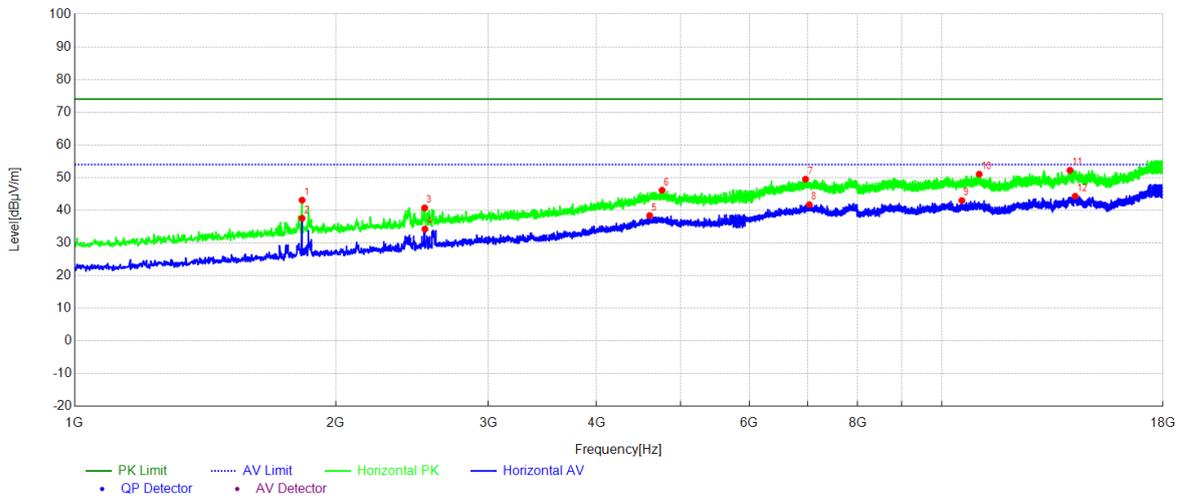


(Plot D: Test Antenna Horizontal 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
53.32	27.08	120.000	104	40.00	12.92	Horizontal	0.6	6.7	Pass
70.84	26.79	120.000	102	40.00	13.21	Horizontal	0.8	7.3	Pass
183.56	23.77	120.000	105	43.50	19.73	Horizontal	1.2	9.3	Pass
212.72	27.39	120.000	101	43.50	16.11	Horizontal	1.2	10.8	Pass
228.28	28.45	120.000	103	46.00	17.55	Horizontal	1.2	10.6	Pass
486.80	28.31	120.000	107	46.00	17.69	Horizontal	1.5	17.6	Pass



A. Radiation disturbances, antenna polarization: Horizontal, Setup1

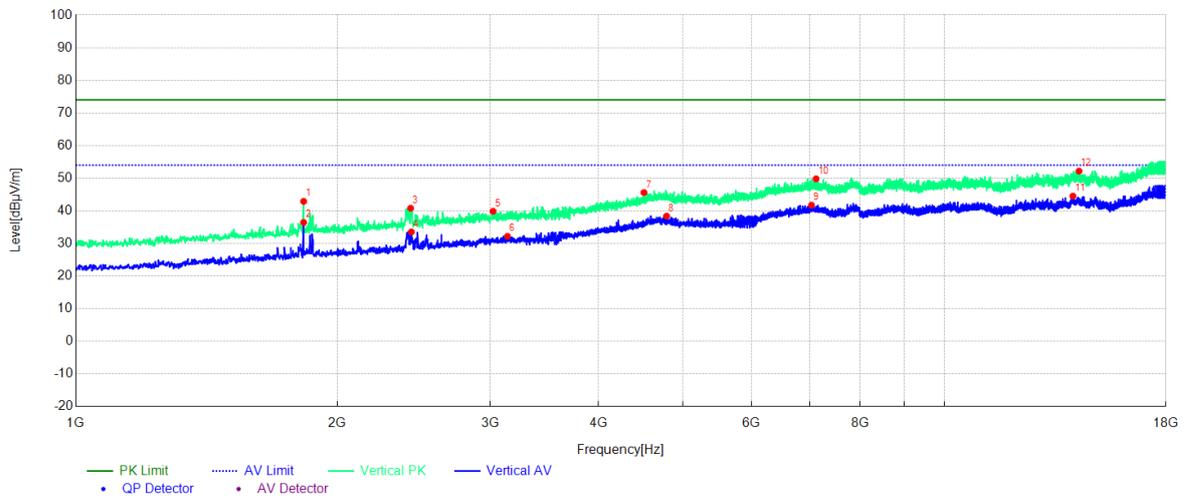


(Plot M: Test Antenna Horizontal 1G – 18G)

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin[dB µV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1829.68	43.10	-12.63	74.00	30.90	PK	102	245	Horizontal
2	1829.68	37.54	-12.63	54.00	16.46	AV	105	203	Horizontal
3	2533.55	40.72	-10.11	74.00	33.28	PK	103	222	Horizontal
4	2535.25	34.25	-10.11	54.00	19.75	AV	104	117	Horizontal
5	4604.36	38.39	-1.11	54.00	15.61	AV	106	204	Horizontal
6	4759.08	46.13	-0.70	74.00	27.87	PK	103	136	Horizontal
7	6965.90	49.50	3.37	74.00	24.50	PK	108	132	Horizontal
8	7035.60	41.70	3.46	54.00	12.30	AV	104	175	Horizontal
9	10548.15	42.97	6.28	54.00	11.03	AV	106	287	Horizontal
10	11048.00	51.05	6.72	74.00	22.95	PK	102	291	Horizontal
11	14060.71	52.22	9.19	74.00	21.78	PK	104	342	Horizontal
12	14252.83	44.31	9.57	54.00	9.69	AV	101	56	Horizontal



B. Radiation disturbances, antenna polarization: Vertical, Setup1

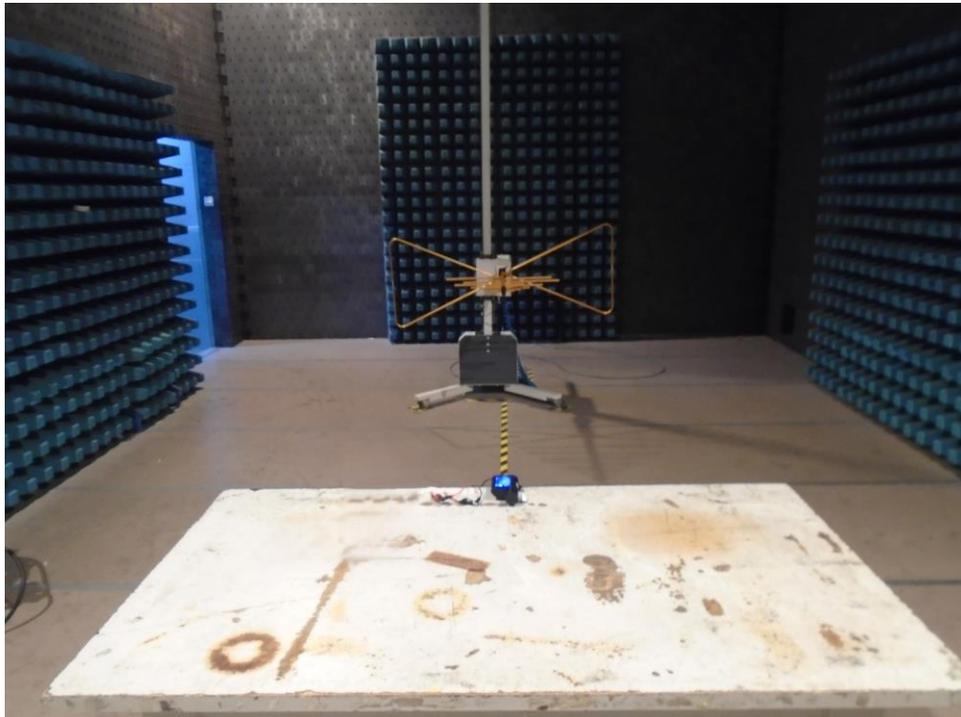


(Plot N: Test Antenna Vertical 1G – 18G)

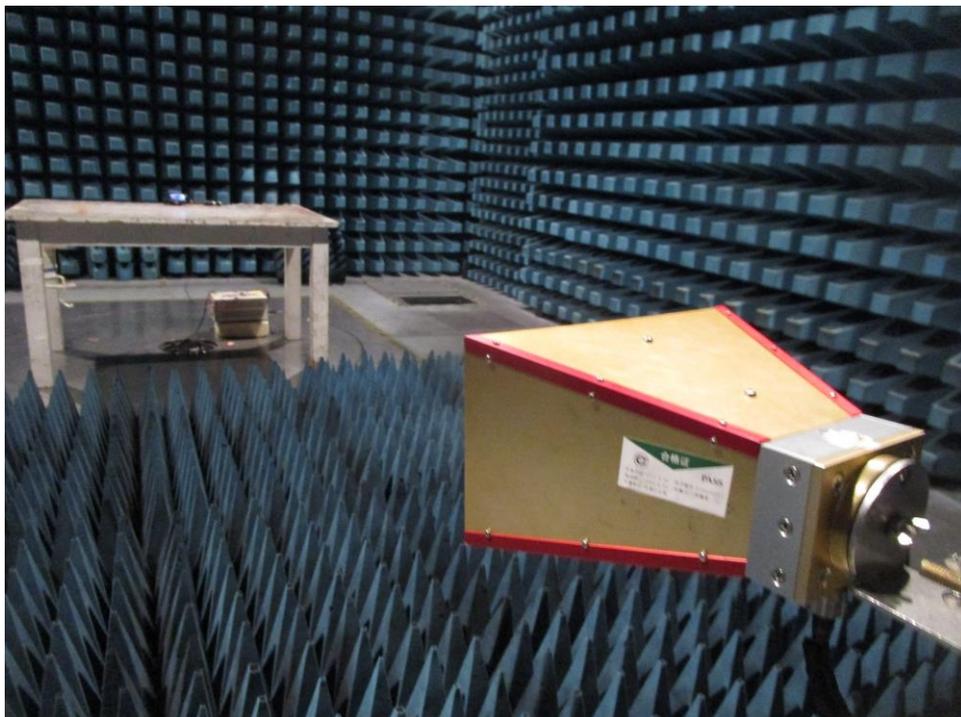
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin[dB µV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1829.68	42.91	-12.63	74.00	31.09	PK	107	344	Vertical
2	1829.68	36.45	-12.63	54.00	17.55	AV	102	332	Vertical
3	2429.84	40.80	-10.55	74.00	33.20	PK	105	187	Vertical
4	2434.94	33.53	-10.52	54.00	20.47	AV	101	95	Vertical
5	3023.20	39.87	-8.05	74.00	34.13	PK	107	318	Vertical
6	3140.51	32.20	-7.75	54.00	21.80	AV	103	91	Vertical
7	4510.85	45.60	-1.72	74.00	28.40	PK	104	187	Vertical
8	4789.68	38.38	-0.64	54.00	15.62	AV	108	354	Vertical
9	7032.20	41.73	3.46	54.00	12.27	AV	103	32	Vertical
10	7118.91	49.81	3.49	74.00	24.19	PK	106	134	Vertical
11	14065.81	44.51	9.18	54.00	9.49	AV	105	61	Vertical
12	14293.63	52.18	9.78	74.00	21.82	PK	109	355	Vertical

Appendix II: Photographs of EMC Test Configuration

1. Radiated Emission Measurement below 1GHz



2. Radiated Emission Measurement above 1GHz



-----End of Report-----