



# EMC TEST REPORT

**Report No.:** 20240117G01085X-W1

**Product Name:** Cobra-SC250

**FCC ID:** BBOSC250

**IC ID:** 906A-SC250

**HVIN:** SC250

**Model No. :** SC 250, SC 250C, SC 250R, SC 250CR

**Applicant:** Cobra Electronics Corporation

**Address:** 1701 Golf Road Suite 3-900, Rolling Meadows, IL 60008, United States.

**Received Date:** 2024.01.15

**Dates of Testing:** 2024.01.17-2024.01.29

**Issued by:** CCIC Southern Testing Co., Ltd.

**Lab Location:** Electronic Testing Building, No. 43 Shahe Road, Xili Street,  
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## Test Report

**Product Name**..... Cobra-SC250

**HVIN**..... SC250

**Model No.** ..... SC 250, SC 250C, SC 250R, SC 250CR

**Trade name**..... Cobra

**Applicant**..... Cobra Electronics Corporation

**Applicant Address**..... 1701 Golf Road Suite 3-900, Rolling Meadows, IL 60008, United States.

**Manufacturer** ..... Cobra Electronics Corporation

**Manufacturer Address** .... 1701 Golf Road Suite 3-900, Rolling Meadows, IL 60008, United States.

**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-SC250
Trade Name.....	Cobra
Brand Name.....	Cobra
Hardware Version.....	90100000002820
Software Version .....	C11-GPS-4K V1.7 20231019
Maximum Operating frequency:	5825MHz

*Note1:* The EUT is a Cobra-SC250;

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

*Note3:* Model: SC 250, SC 250C, SC 250R, SC 220CR have the same PCB board, electromagnetic emissions and electromagnetic compatibility characteristics. The below table show differences:

Model No.	Differences
SC 250	Master
SC 250C	Master + Interior camera
SC 250R	Master + Rear camera
SC 250CR	Master + Interior camera + Rear 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 <sub>not3</sub>
2	ICES 003 Issue 7 Section3.2.2	Radiated Emission	PASS
3	15.107	Conducted Emission	N.A <sub>not3</sub>
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);

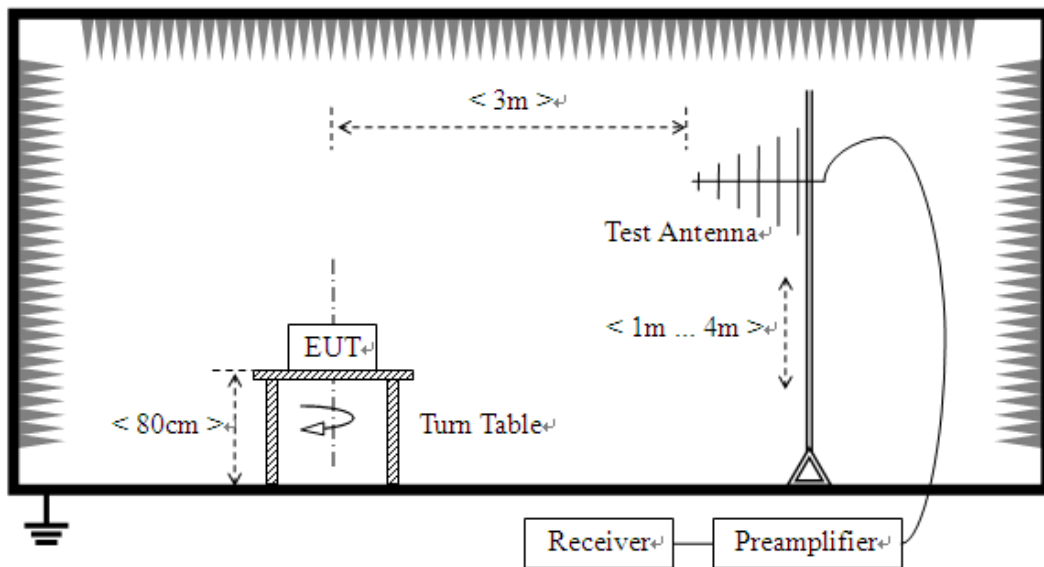
Note1: All models were tested and the worst results only were provided for main tested model SC 250CR in the report.

## 2.3 Test Setup and Equipment List

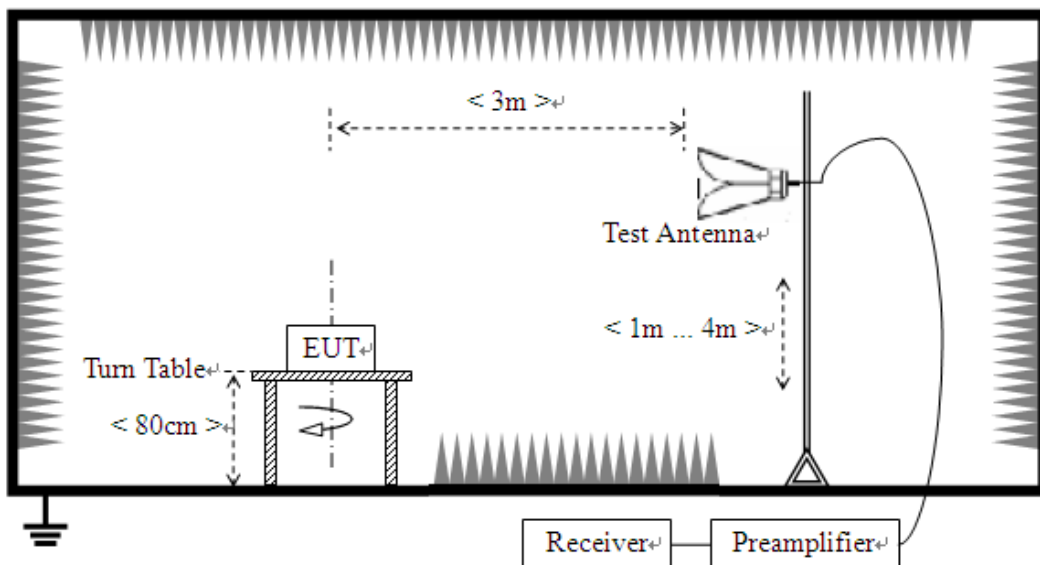
### 2.3.1 Radiated Emission

#### 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)

- 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.
- 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 range.
- 2) Limitation expressed in dBuV/m is calculated by  $20\log \text{Emission Level}(\mu\text{V/m})$ .
- 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

$$Ld1 = L1 = 30\mu\text{V/m} * (10)^2 = 100 * 30\mu\text{V/m}.$$

### 3.1.2 Test Description

See section 2.3.2 of this report.

### 3.1.3 Test Result

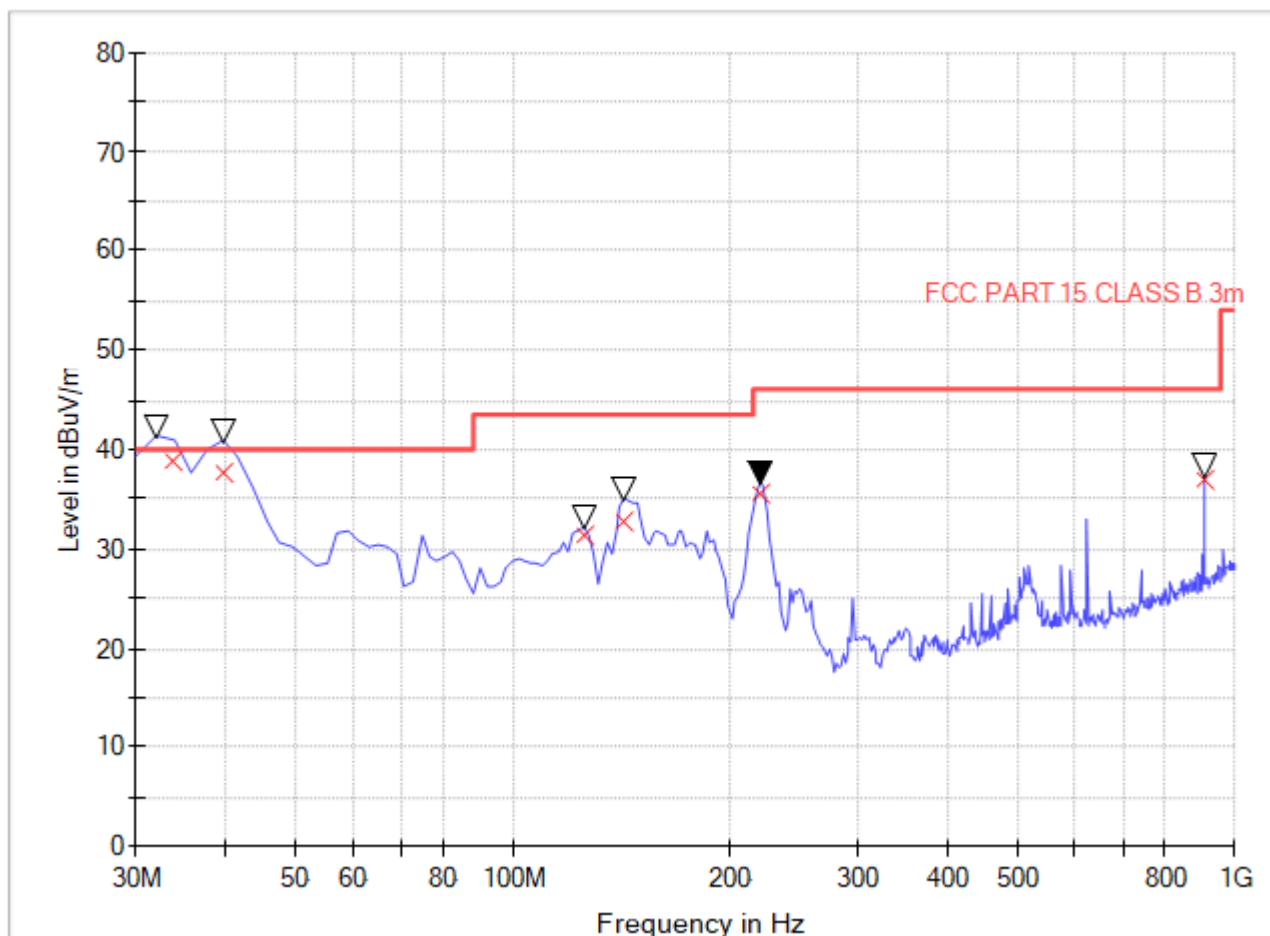
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

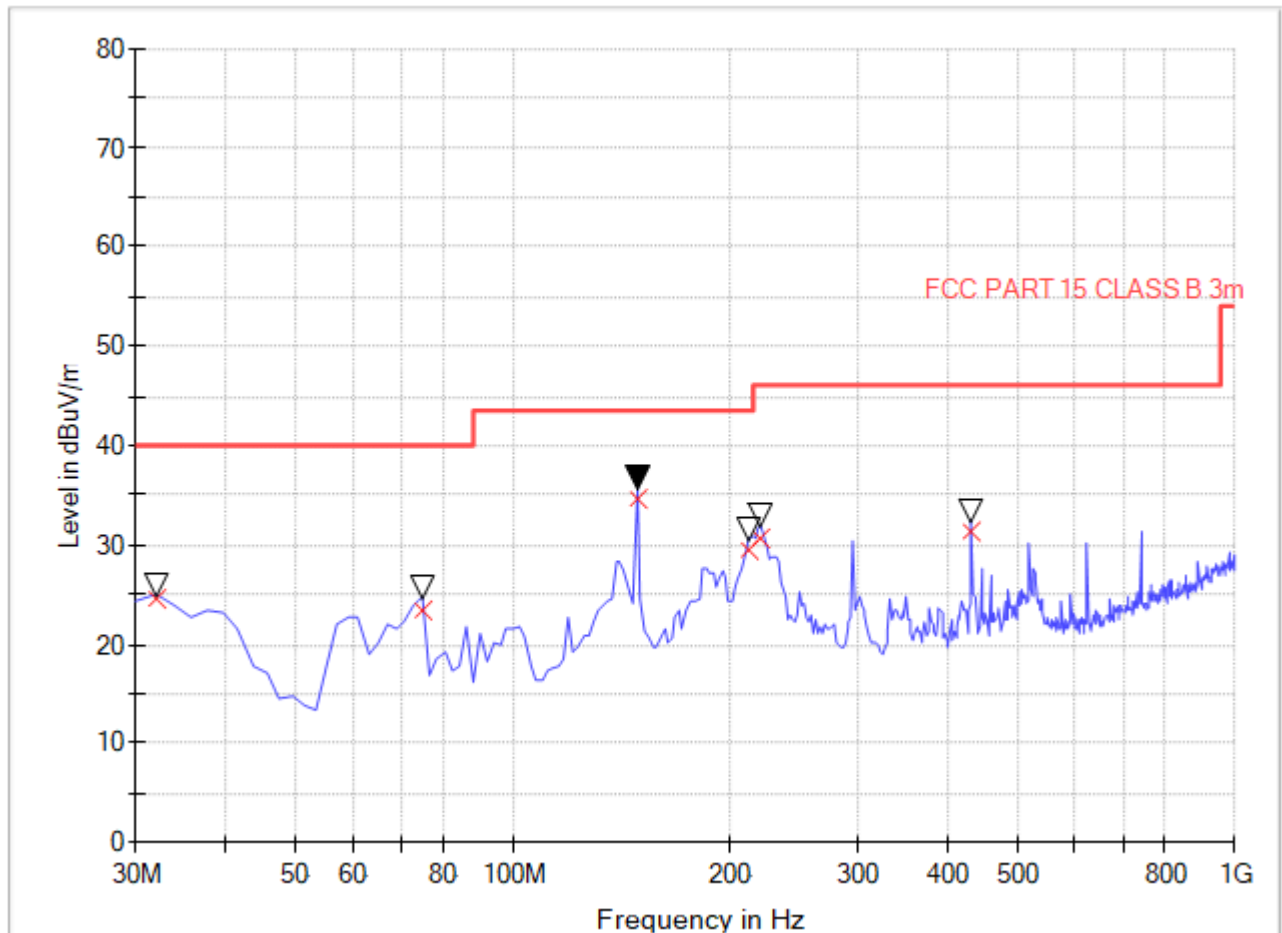
## A. Radiation disturbances, antenna polarization: Vertical, Setup1



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

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB )	Verdict
33.80	38.77	120.000	102	40.00	1.23	Vertical	0.5	16.7	Pass
39.72	36.90	120.000	106	40.00	3.10	Vertical	0.5	13.8	Pass
125.24	29.95	120.000	105	43.50	13.55	Vertical	1.0	11.4	Pass
142.76	34.26	120.000	101	43.50	9.24	Vertical	1.0	11.5	Pass
220.52	36.16	120.000	103	46.00	9.84	Vertical	1.2	10.6	Pass
908.64	37.08	120.000	107	46.00	8.92	Vertical	2.3	22.4	Pass

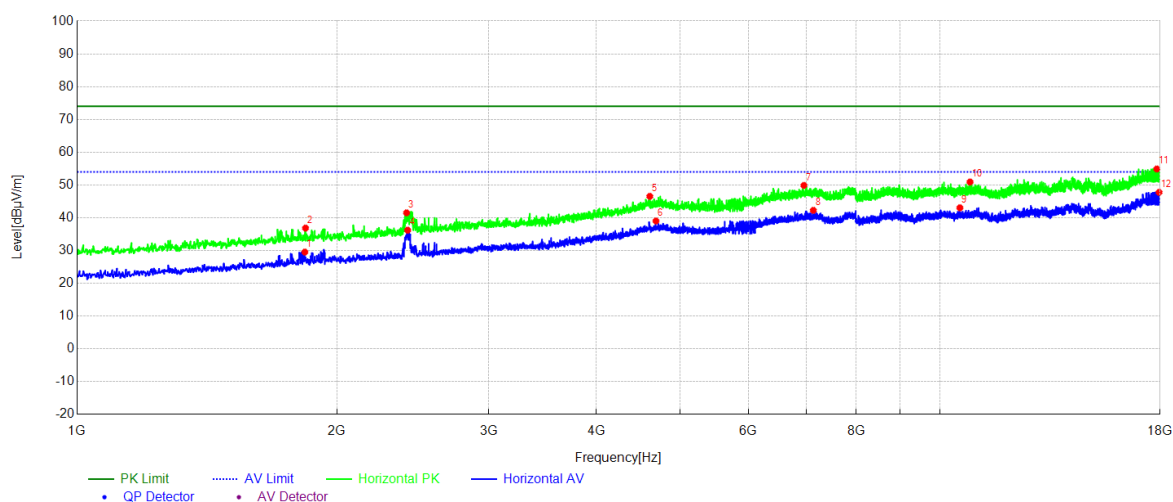
## B. Radiation disturbances, antenna polarization: Horizontal, Setup1



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

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
31.96	26.73	120.000	102	40.00	13.27	Horizontal	0.5	18.6	Pass
74.72	25.50	120.000	104	40.00	14.50	Horizontal	0.8	7.2	Pass
148.56	36.33	120.000	101	43.50	7.17	Horizontal	1.0	11.5	Pass
212.72	31.37	120.000	105	43.50	12.13	Horizontal	1.2	10.8	Pass
220.52	31.29	120.000	107	46.00	14.71	Horizontal	1.2	10.6	Pass
432.40	30.50	120.000	103	46.00	15.50	Horizontal	1.5	16.8	Pass

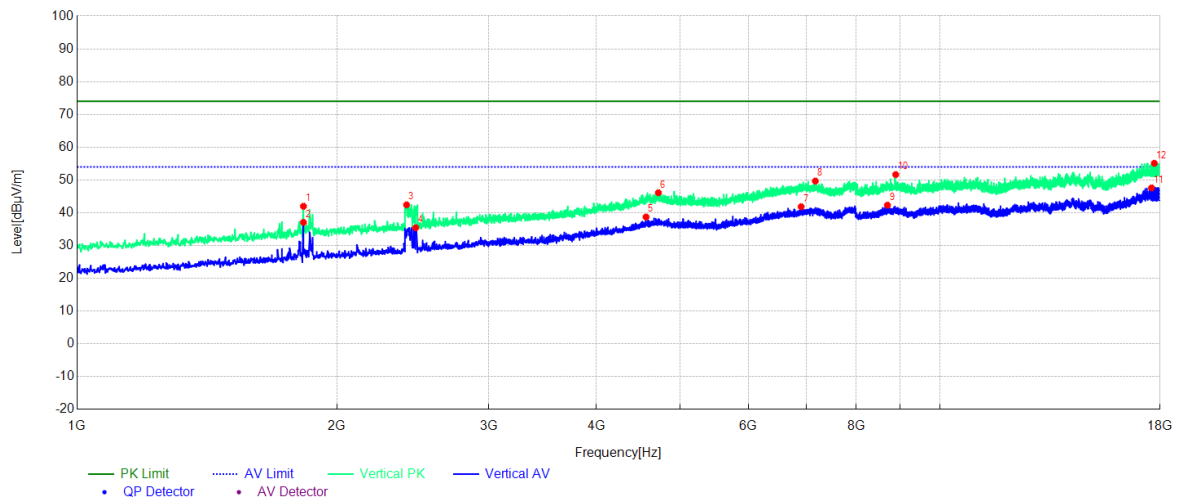
## A. Radiation disturbances, antenna polarization: Horizontal, Setup1



(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	1836.48	29.54	-12.61	54.00	24.46	AV	102	45	Horizontal
2	1839.88	36.85	-12.59	74.00	37.15	PK	104	112	Horizontal
3	2409.44	41.51	-10.64	74.00	32.49	PK	101	303	Horizontal
4	2416.24	36.21	-10.61	54.00	17.79	AV	102	312	Horizontal
5	4611.16	46.54	-1.09	74.00	27.46	PK	103	245	Horizontal
6	4687.66	39.02	-0.82	54.00	14.98	AV	107	37	Horizontal
7	6957.39	49.86	3.35	74.00	24.14	PK	105	223	Horizontal
8	7134.21	42.27	3.49	54.00	11.73	AV	103	267	Horizontal
9	10549.85	43.04	6.28	54.00	10.96	AV	102	283	Horizontal
10	10838.88	50.91	6.58	74.00	23.09	PK	104	88	Horizontal
11	17841.88	54.88	15.33	74.00	19.12	PK	101	325	Horizontal
12	17950.69	47.76	16.07	54.00	6.24	AV	108	19	Horizontal

## B. Radiation disturbances, antenna polarization: Vertical, Setup1



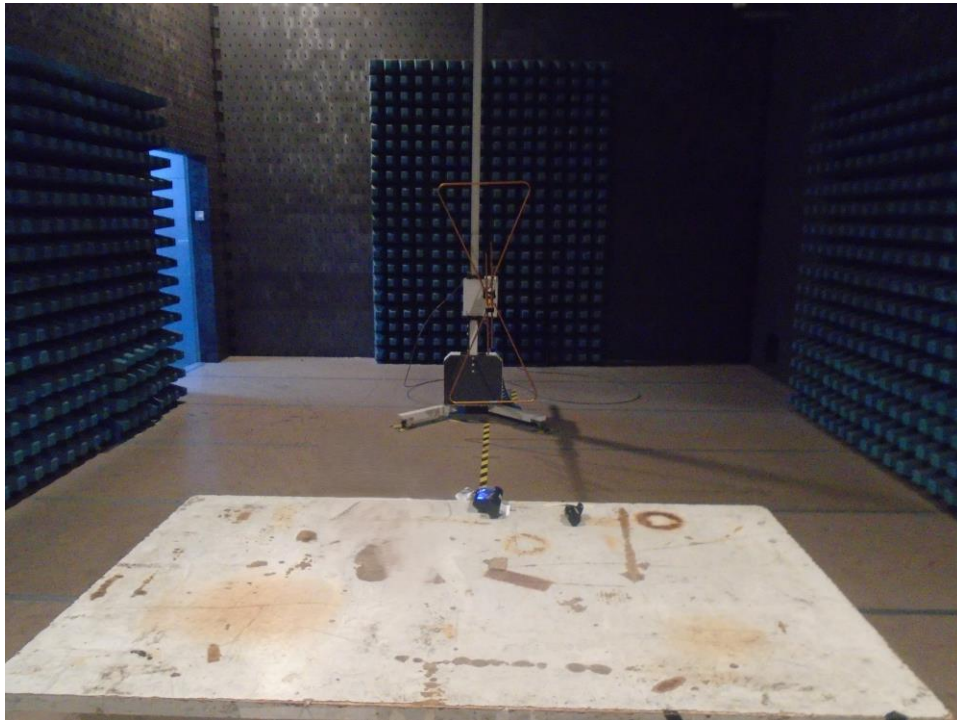
(Plot N: Test Antenna Vertical 1G – 18G)

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin[dB μV/m]	Trace	Height [cm]	Angle [°]	Polarity
1	1829.68	41.98	-12.63	74.00	32.02	PK	104	64	Vertical
2	1829.68	37.08	-12.63	54.00	16.92	AV	102	67	Vertical
3	2409.44	42.42	-10.64	74.00	31.58	PK	105	228	Vertical
4	2468.95	35.44	-10.37	54.00	18.56	AV	106	81	Vertical
5	4565.26	38.70	-1.35	54.00	15.30	AV	108	312	Vertical
6	4718.27	46.10	-0.76	74.00	27.90	PK	104	56	Vertical
7	6906.39	41.84	3.25	54.00	12.16	AV	103	132	Vertical
8	7173.32	49.67	3.50	74.00	24.33	PK	106	87	Vertical
9	8694.97	42.31	4.41	54.00	11.69	AV	105	332	Vertical
10	8888.79	51.64	4.49	74.00	22.36	PK	108	94	Vertical
11	17595.36	47.59	14.19	54.00	6.41	AV	105	185	Vertical
12	17724.57	55.09	15.00	74.00	18.91	PK	101	207	Vertical

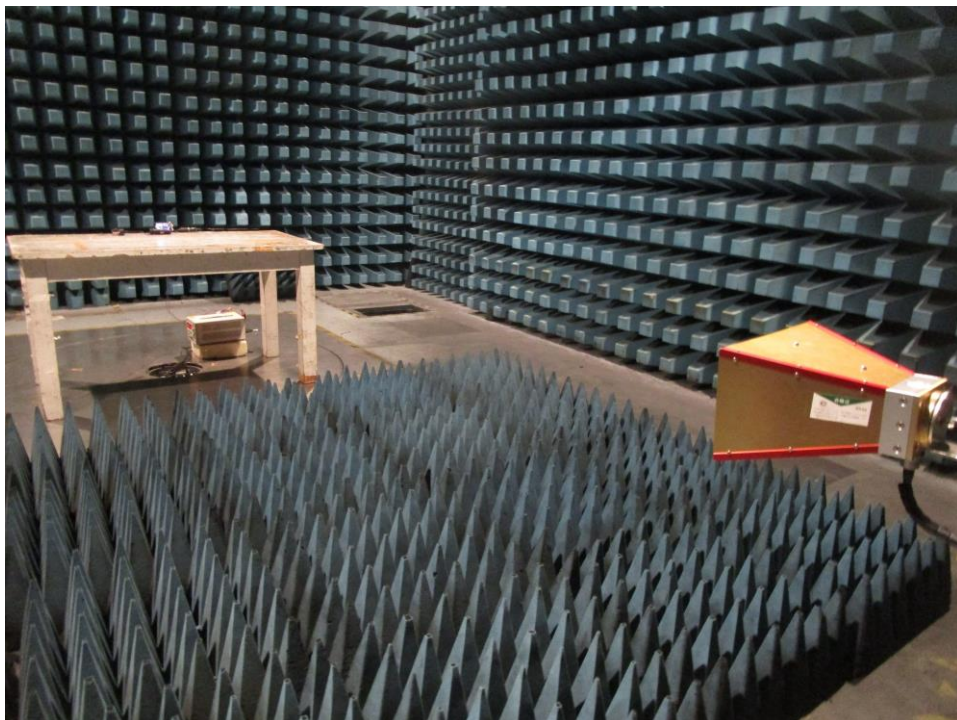


## Appendix II: Photographs of EMC Test Configuration

### 1. Radiated Emission Measurement below 1GHz



### 2. Radiated Emission Measurement above 1GHz



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