

TEST REPORT



Applicant	Sunwoda Electronic Co., Ltd.
Address	1/F,2/F of Area A&B&D,3-9F,Administration Building, No.2, Yihe Rd., Shilong Community Shiyan Street, Bao'an District,SHENZHEN China

Manufacturer or Supplier	Sunwoda Electronic Co., Ltd.
Address	1/F,2/F of Area A&B&D,3-9F,Administration Building, No.2, Yihe Rd., Shilong Community Shiyan Street, Bao'an District,SHENZHEN China
Product	Active Stylus
Brand Name	DELL
Model	SPEN-DEL-01
Additional Model & Model Difference	N/A
Date of tests	Sep. 19, 2019 ~ Sep. 24, 2019

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☒ **FCC Part 15, Subpart C**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Andy Zhu Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
	Date: Oct. 28, 2019

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Test Report No.: RF190919N036

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF190919N036	Original release	Oct. 28, 2019

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	No antenna connector is used.
§15.207	AC Power Conducted Emission	N/A	Powered by Battery
§15.209	Radiated Emission	PASS	Meet the requirement of limit.

The radio of this EUT operates at 18-44KHz. Based on test data in test report, all emissions are at least 40dB below the limit of FCC 15.209 so this device is subject to Suppliers Declaration of Conformity

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	9KHz ~ 30MHz	2.16dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Active Stylus
MODEL NO.	SPEN-DEL-01
FCC ID	2ABWESPEN-DEL-01
ADDITIONAL MODELS	N/A
POWER SUPPLY	DC 1.5V(1.5V*AAAA*1) from Battery
MODULATION TYPE	FSK
OPERATING FREQUENCY	18-44KHz
ANTENNA TYPE	Integral Antenna
VERSION OF HARDWARE	1.0
VERSION OF SOFTWARE	1.0
CABLE SUPPLIED	Refer to user's manual

NOTES:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. The radio of this EUT operates at 18-44KHz. Based on test data in test report, all emissions are at least 40dB below the limit of FCC 15.209 so this device is subject to Suppliers Declaration of Conformity

3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes the final worst mode was marked in boldface and recorded in this report.

FREQUENCY	TEST MODES
25.1105KHz	Transmitting

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

3.4 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.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

4 EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart C, Section 15.209

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

4.1.2 TEST INSTRUMENTS

FREQUENCY 9KHz-30MHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Mar. 12,19	Mar. 11,20
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 28,19	May 27,20
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Apr. 21,19	Apr. 20,20
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A

- NOTES:**
1. The test was performed in 10m Chamber.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 749762.

4.1.3 TEST PROCEDURE

< Below 30MHz >

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. A loop antenna with its open/close/ground-parallel plane is place 3m from the EUT and rotated about its axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.

<30MHz~1GHz >

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTES:

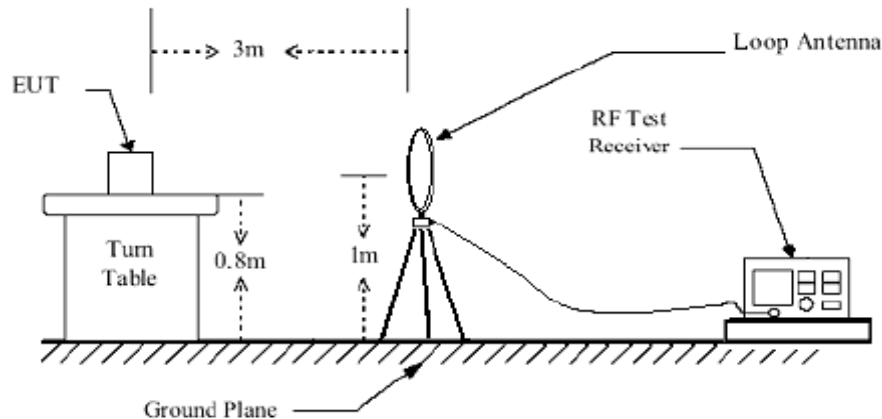
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
4. Margin value = Emission level – Limit value.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP

<Frequency Range below 30MHz>



4.1.6 EUT OPERATING CONDITIONS

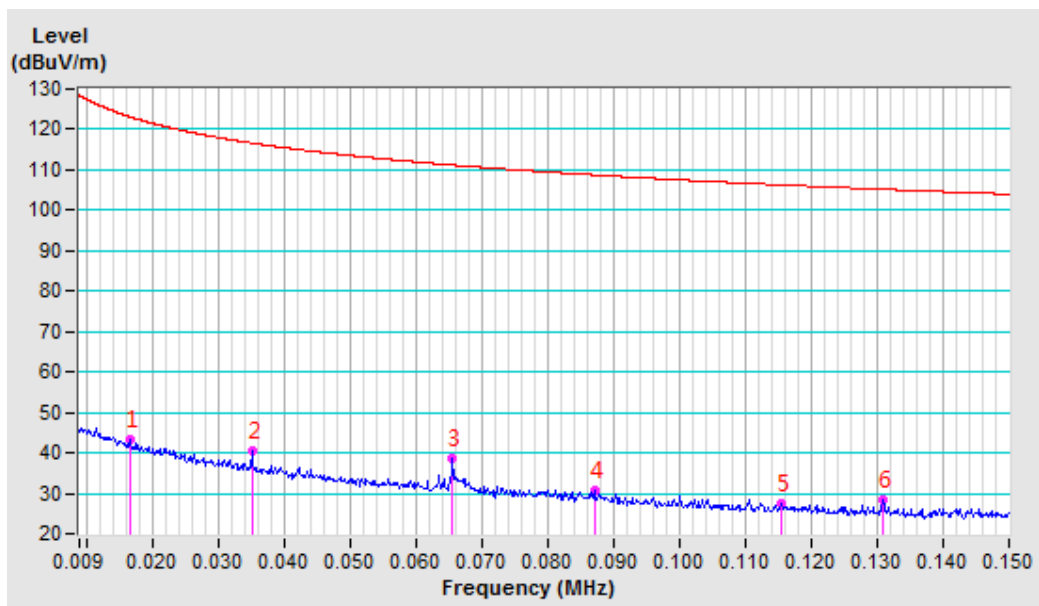
- a. Turn on the power supply of the EUT.
- b. EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

4.1.7 TEST RESULTS

TEST MODE	TX	FREQUENCY RANGE	9 -150KHz
TEST VOLTAGE	DC 1.5V from Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	23deg. C, 54% RH	TESTED BY: Vincent	

ANTENNA POLARITY & TEST DISTANCE: OPEN AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.0166	-11.57	54.85	43.28	123.18	-79.90	100	228
2	0.0352	-12.02	52.61	40.59	116.62	-76.03	100	125
3	0.0655	-11.79	50.46	38.67	111.22	-72.55	100	44
4	0.0871	-11.81	42.51	30.70	108.73	-78.03	100	65
5	0.1155	-11.69	39.20	27.51	106.28	-78.77	100	190
6	0.1310	-11.49	40.10	28.61	105.18	-76.57	100	220

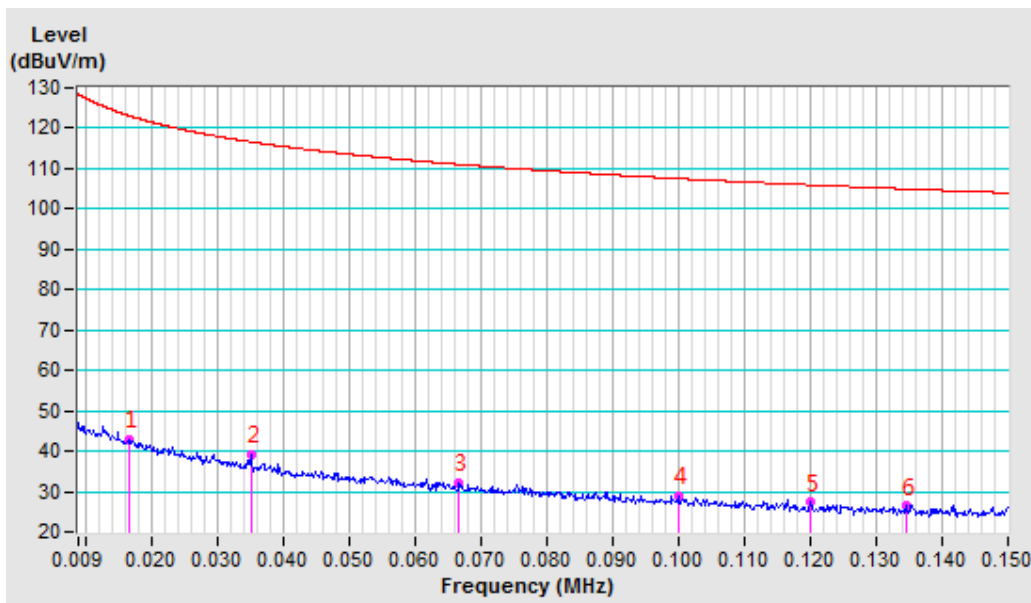
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.009-0.15MHz.
 4. Only emissions significantly above equipment noise floor are reported.
 5. All emissions were greater than 20 dB below the limit



TEST MODE	TX	FREQUENCY RANGE	9 -150KHz
TEST VOLTAGE	DC 1.5V from Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	23deg. C, 54% RH	TESTED BY: Vincent	

ANTENNA POLARITY & TEST DISTANCE: CLOSE AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.0166	-11.57	54.49	42.92	123.16	-80.24	100	10
2	0.0352	-12.02	51.17	39.15	116.61	-77.46	100	212
3	0.0667	-11.78	44.04	32.26	111.05	-78.79	100	268
4	0.1001	-11.90	40.86	28.96	107.52	-78.56	100	76
5	0.1200	-11.64	38.94	27.30	105.94	-78.64	100	360
6	0.1346	-11.45	37.84	26.39	104.95	-78.56	100	253

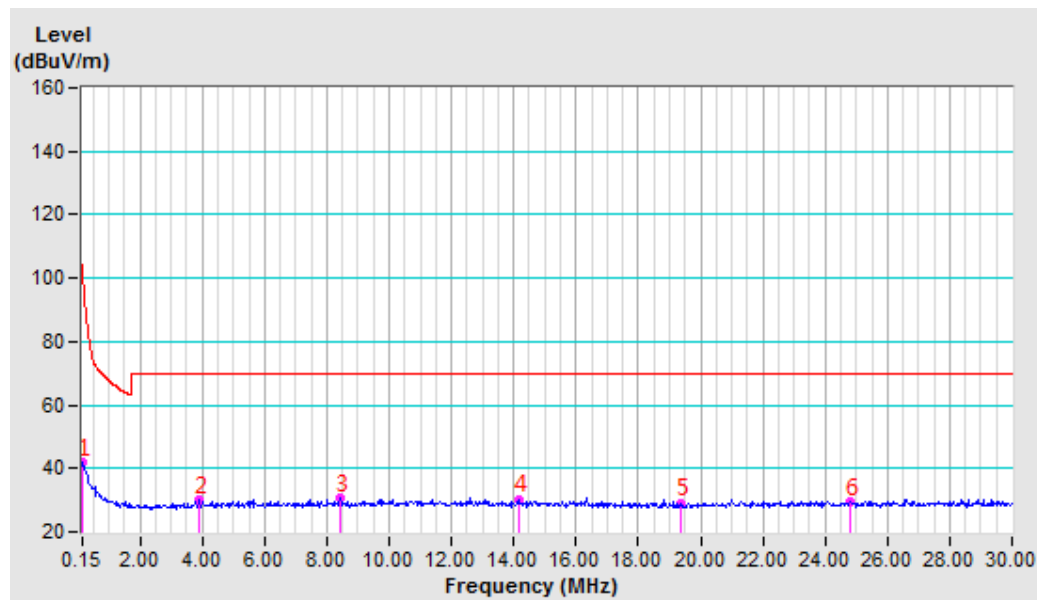
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.009-0.15MHz.
 4. Only emissions significantly above equipment noise floor are reported.
 5. All emissions were greater than 20 dB below the limit



TEST MODE	TX	FREQUENCY RANGE	150KHz-30MHz
TEST VOLTAGE	DC 1.5V from Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	23deg. C, 54% RH	TESTED BY: Vincent	

ANTENNA POLARITY & TEST DISTANCE: OPEN AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.1560	-11.24	53.08	41.84	103.00	-61.16	100	6
2	3.9068	-10.61	39.51	28.90	69.54	-40.64	100	296
3	8.4368	-10.56	39.22	28.66	69.54	-40.88	100	126
4	14.1832	-10.02	39.30	29.28	69.54	-40.26	100	71
5	19.3848	-10.19	39.28	29.09	69.54	-40.45	100	258
6	24.7805	-10.00	39.36	29.36	69.54	-40.18	100	295

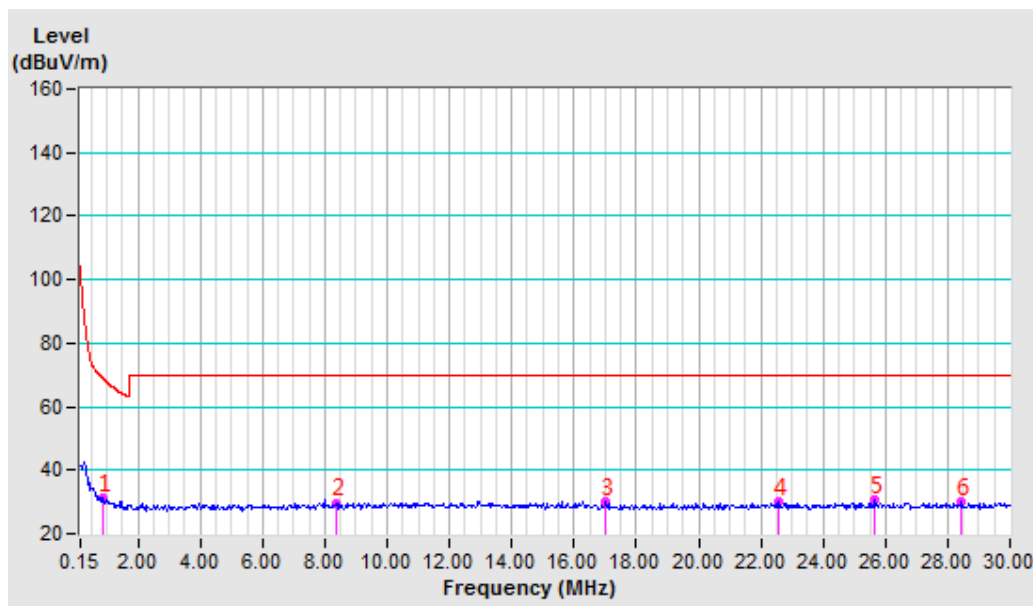
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.15-30MHz.
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 5. All emissions were greater than 20 dB below the limit



TEST MODE	TX	FREQUENCY RANGE	150KHz-30MHz
TEST VOLTAGE	DC 1.5V from Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	23deg. C, 54% RH	TESTED BY: Vincent	

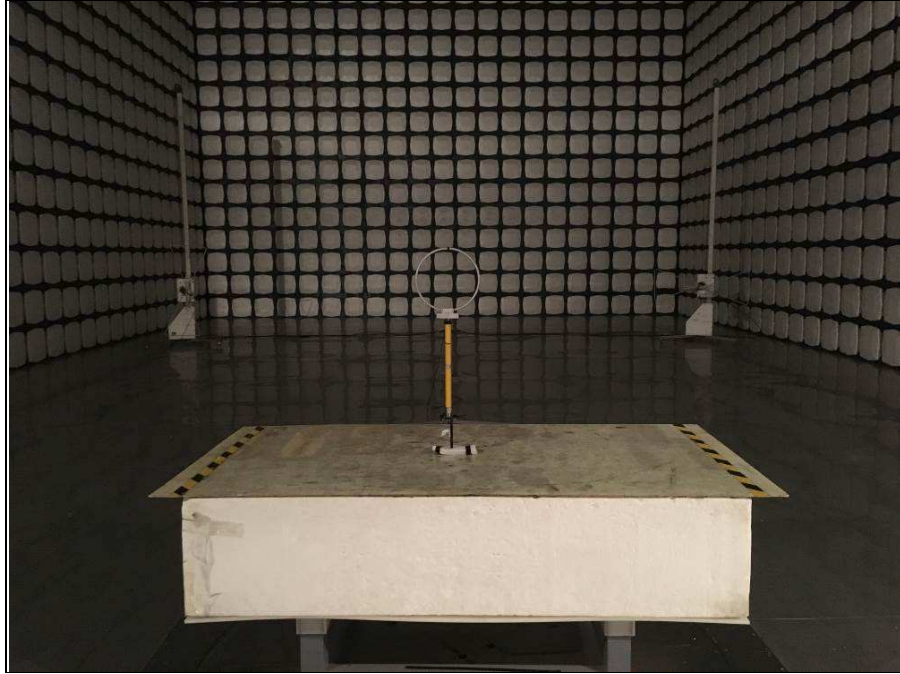
ANTENNA POLARITY & TEST DISTANCE: CLOSE AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.9008	-10.99	39.51	28.52	68.53	-40.01	100	54
2	8.3502	-10.57	39.28	28.71	69.54	-40.83	100	151
3	17.0250	-10.07	39.07	29.00	69.54	-40.54	100	136
4	22.5506	-10.11	39.23	29.12	69.54	-40.42	100	360
5	25.6491	-10.06	39.53	29.47	69.54	-40.07	100	360
6	28.4537	-10.35	39.17	28.82	69.54	-40.72	100	149

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.15-30MHz
 4. Only emissions significantly above equipment noise floor are reported.
 5. All emissions were greater than 20 dB below the limit



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST BELOW 30MHz





Test Report No.: RF190919N036

6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---