



REPORT No.: SZ18090337E01

TEST REPORT

APPLICANT : Jiangsu SEUIC Technology Co.,Ltd.

PRODUCT NAME : Portable Data Collection Terminal

MODEL NAME : CRUISE 1

BRAND NAME : CRUISE/SEUIC

FCC ID : 2AC68-CRUISE1P

STANDARD(S) : 47 CFR Part 15 Subpart B

RECEIPT DATE : 2018-10-15

TEST DATE : 2018-10-27 to 2018-10-29

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Edited by:

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Andy Yeh(Technical Director)

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Change History		
Version	Date	Reason for change
1.0	2018-12-18	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Jiangsu SEUIC Technology Co.,Ltd.
Applicant Address:	NO.15 Xinghuo Road,Nanjing New & High Technology Industry Development Zone,210061,Nanjing City,Jiangsu Province,China
Manufacturer:	Jiangsu SEUIC Technology Co.,Ltd.
Manufacturer Address:	NO.15 Xinghuo Road,Nanjing New & High Technology Industry Development Zone,210061,Nanjing City,Jiangsu Province,China

1.2. Equipment Under Test (EUT) Description

EUT Type:	Portable Data Collection Terminal
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	SLB761_MB_V1.02_PCB
Software Version:	D700P_I_V1.1.5
SIM Cards Description:	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test
Tx Frequency:	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz Bluetooth: 2402 MHz ~ 2480 MHz 802.11b/g/n-20: 2412 MHz ~ 2462 MHz 802.11n-40: 2422 MHz ~ 2452 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz;5745MHz ~ 5825 MHz; NFC: 13.56MHz
Rx Frequency:	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz WCDMA Band II: 1930 MHz ~ 1990 MHz WCDMA Band V: 869 MHz ~ 894 MHz LTE Band 2: 1930 MHz ~ 1990 MHz

	LTE Band 4: 2110 MHz ~ 2155 MHz LTE Band 5: 869 MHz ~ 894 MHz LTE Band 7: 2620 MHz ~ 2690 MHz Bluetooth: 2402 MHz ~ 2480 MHz 802.11b/g/n-20: 2412 MHz ~ 2462 MHz 802.11n-40: 2422 MHz ~ 2452 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz; 5745MHz ~ 5825 MHz; NFC: 13.56MHz	
Ancillary Equipment:	Battery	
	Brand Name:	N/A
	Model No.:	BT01700CRUISE
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	4500mAh
	Rated Voltage:	3.8V
	Charge Limit:	4.35V
	AC Adapter	
	Brand Name:	SHENZHEN TIANYIN ELECTRONICS CO.,LTD
	Model No.:	TPA-23A050200UU01
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V ~ 50/60Hz 0.3A
	Rated Output:	5V $\overline{\text{---}}$ 2.0A

Note:

1. The Portable Data Collection Terminal supports GSM850MHz, 1900MHz, GPRS, EDGE, WCDMA Band II, Band V, HSDPA, HSUPA, HSPA+, LTE Band 2/4/5/7, WIFI and NFC.
2. The EUT is equipped with a T-Flash card slot, two SIM card slots and a Micro USB port which can be connected to ancillary equipments.
3. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer



2. Test Results

2.1. Applied Reference Documents

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

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

No.	Section	Description	Test Date	Test Engineer	Result
1	15.107	Conducted Emission	2018.10.27	Wang Dalong	PASS
2	15.109	Radiated Emission	2018.10.29	Wang Dalong	PASS

NOTE: The tests were performed according to the method of measurements prescribed in ANSI C63.4-2014.



2.2. EUT Setup and Operating Conditions

Frequency range was investigated: Conducted emission test: from 150 KHz to 30 MHz; Radiated emission test: from 30 MHz to 6000 MHz.

Test Item	
Radiated Emission	
Mode 1	: EUT + USB Cable + Adapter + Battery + SIM Card + Earphone + Camera + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle
Mode 2	: EUT + USB Cable + Adapter + Battery + SIM Card + Earphone + MP4 + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle
Mode 3	: EUT + USB Cable + Battery + Earphone + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle + NFC
Mode 4	: EUT + USB Cable + PC + Battery + Earphone + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle
Conducted Emission	
Mode 1	: EUT + USB Cable + Adapter + Battery + SIM Card + Earphone + Camera + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle
Mode 2	: EUT + USB Cable + Adapter + Battery + SIM Card + Earphone + MP4 + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle
Mode 3	: EUT + USB Cable + Battery + Earphone + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle + NFC
Mode 4	: EUT + USB Cable + PC + Battery + Earphone + GSM Idle + WCDMA Idle + LTE Idle + Bluetooth Idle + WIFI Idle
Remark: The above test modes in boldface (Mode 5) were the worst cases of conducted emission, radiated emission tests; only the test data of these modes was reported.	

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106

3. 47 CFR Part 15B Requirements

3.1. Conducted Emission

3.1.1. Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

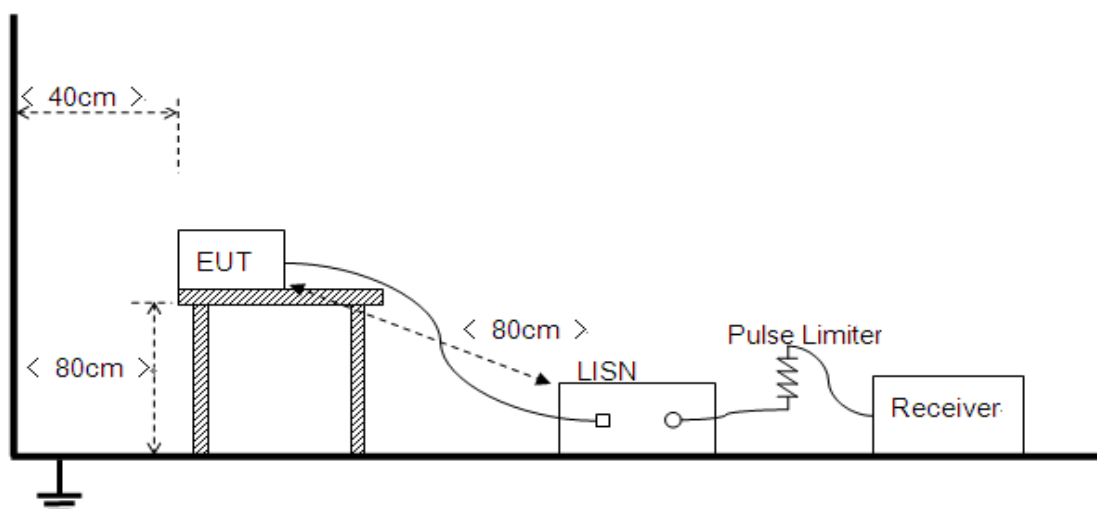
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- The limit subjects to the Class B digital device.
- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

3.1.2. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.





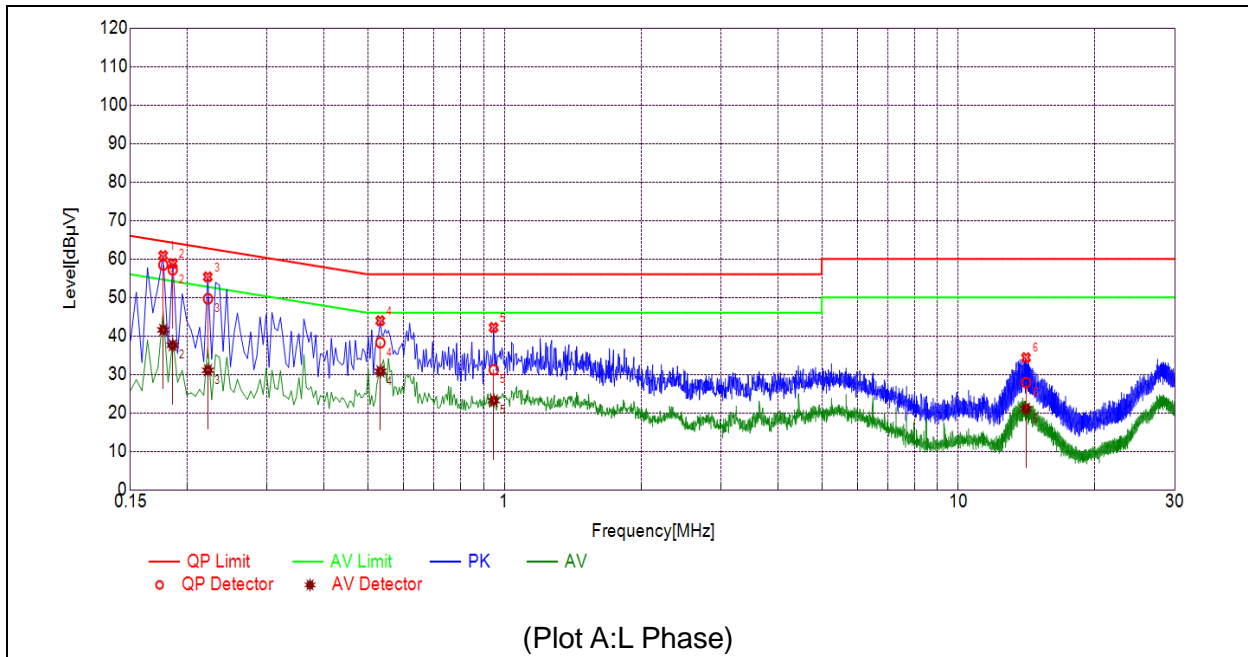
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument. A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

The power strip or extension cord has been investigated to make sure that the LISN integrity is maintained with respect to the impedance characteristics as prescribed in ANSI C63.4-2014 at Clause 4.3.

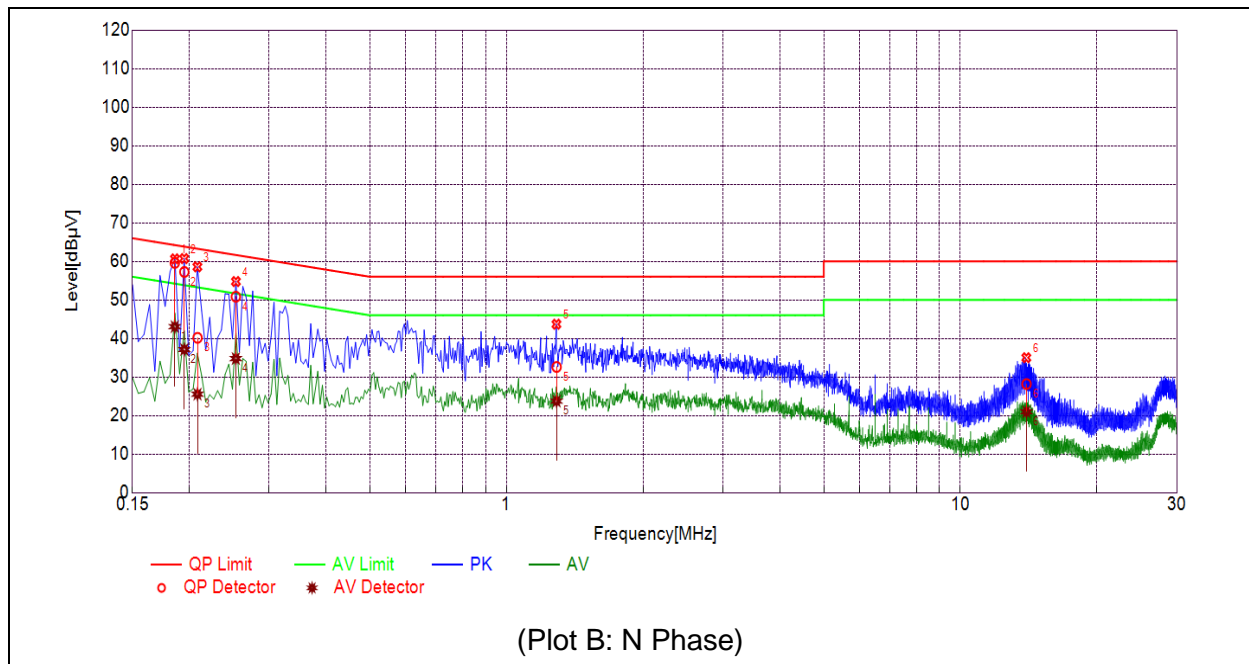
3.1.3. Test Result

The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

A. Test Plot and Suspicious Points:



NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1771	58.44	41.57	64.62	54.62	Line	PASS
2	0.1858	57.18	37.57	64.22	54.22		PASS
3	0.2222	49.64	31.07	62.74	52.74		PASS
4	0.5329	38.25	30.80	56.00	46.00		PASS
5	0.9474	31.20	23.18	56.00	46.00		PASS
6	14.093	27.86	21.05	60.00	50.00		PASS



NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1859	59.60	43.06	64.22	54.22	Neutral	PASS
2	0.1951	57.26	37.12	63.82	53.82		PASS
3	0.2086	40.16	25.54	63.26	53.26		PASS
4	0.2534	50.83	34.78	61.65	51.65		PASS
5	1.2895	32.61	23.73	56.00	46.00		PASS
6	13.984	28.17	20.97	60.00	50.00		PASS

3.2. Radiated Disturbance

3.2.1. Requirement

According to FCC section 15.109 (a), 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	
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)
30.0 - 88.0	100	20log 100
88.0 - 216.0	150	20log 150
216.0 - 960.0	200	20log 200
Above 960.0	500	20log 500

As shown in FCC section 15.35(b), 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.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in dB $\mu\text{V/m}$ is calculated by 20log Emission Level($\mu\text{V/m}$).

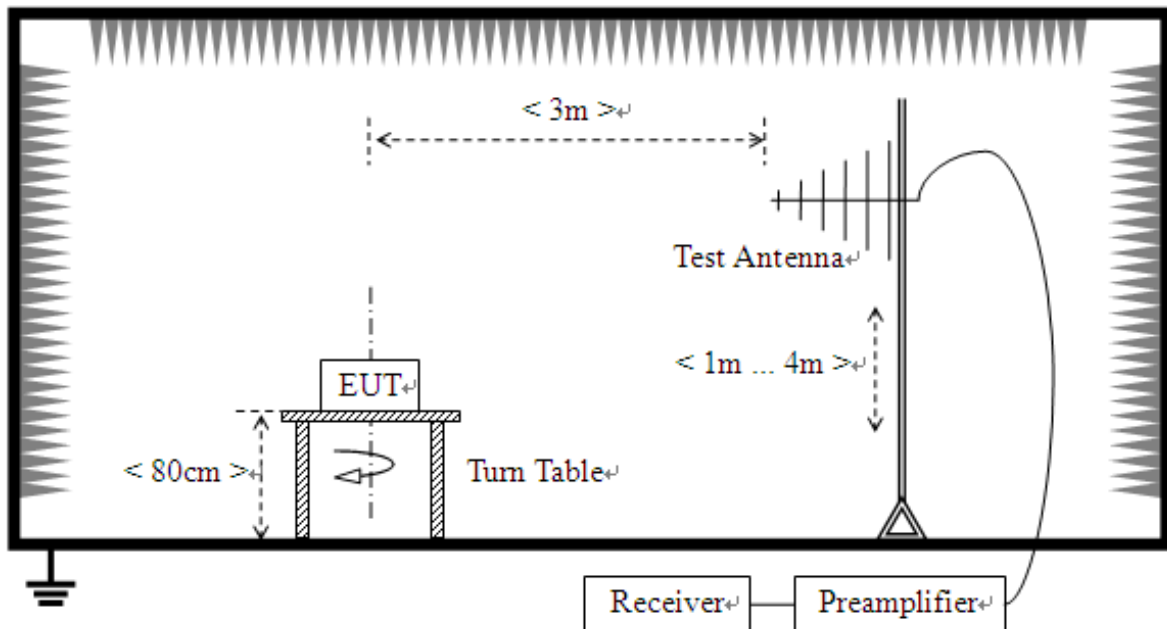
3.2.2. Frequency range of measurement

According to 15.33(b)(1), the frequency range of radiated measurement for the EUT is listed in the following table:

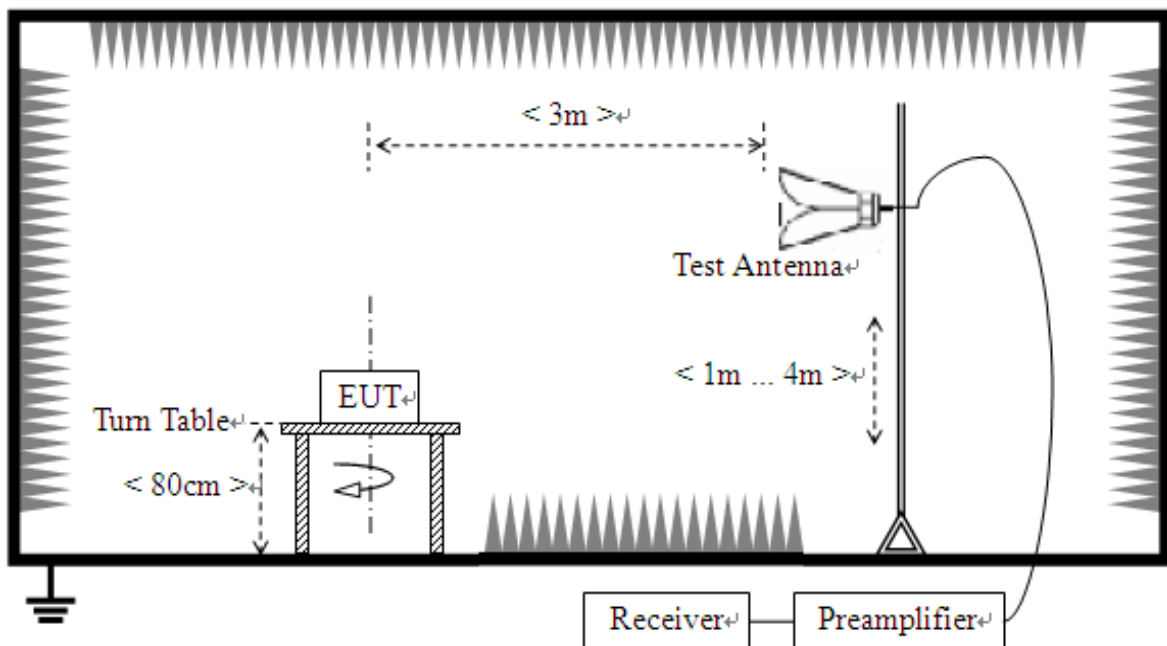
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

3.2.3. Test Setup

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



- 2) For radiated emissions above 1GHz





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:

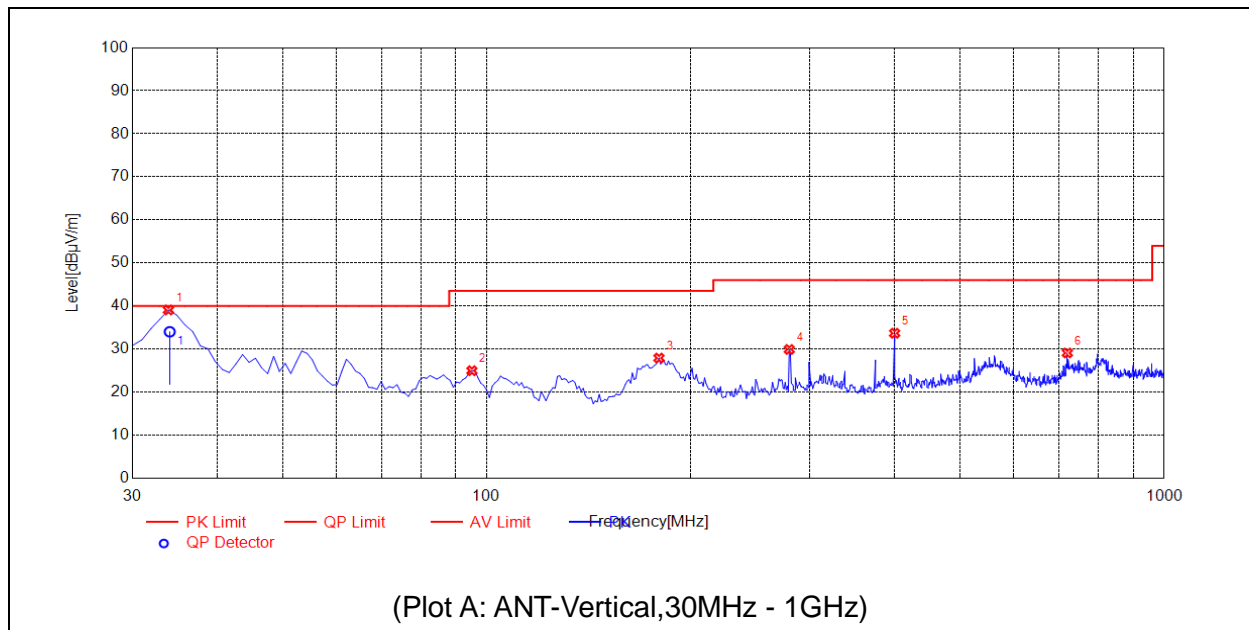
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal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

3.2.4. Test Result

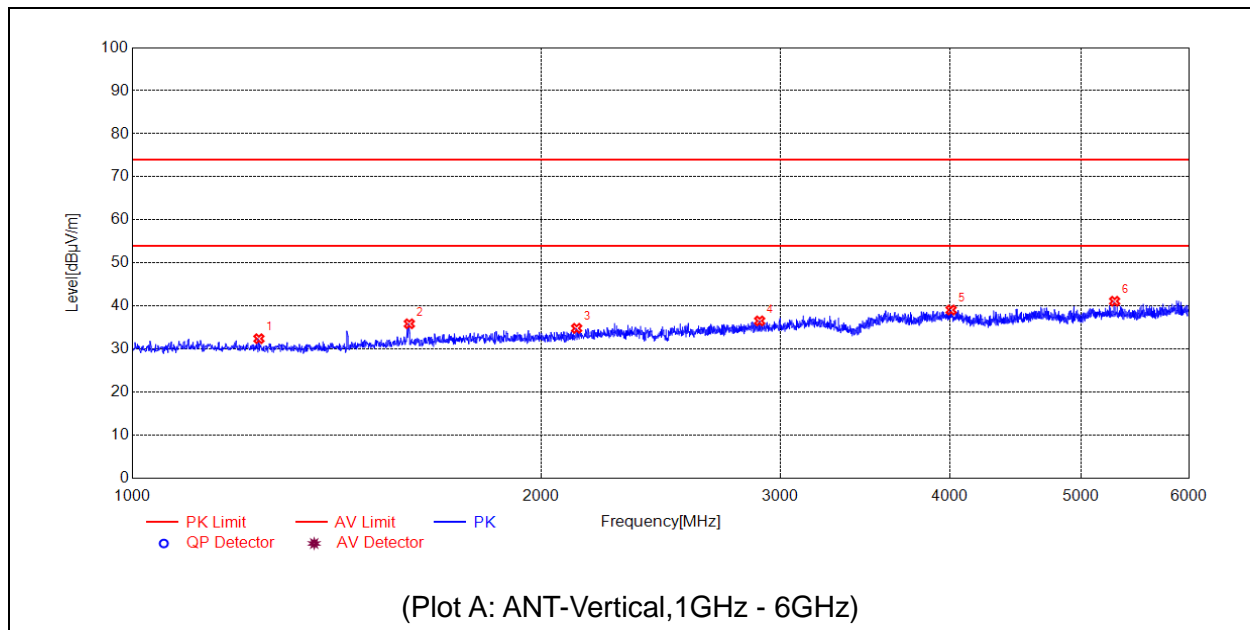
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

The amplitude of emissions (6GHz-30GHz) which are attenuated more than 20 dB below the permissible value need not be reported.

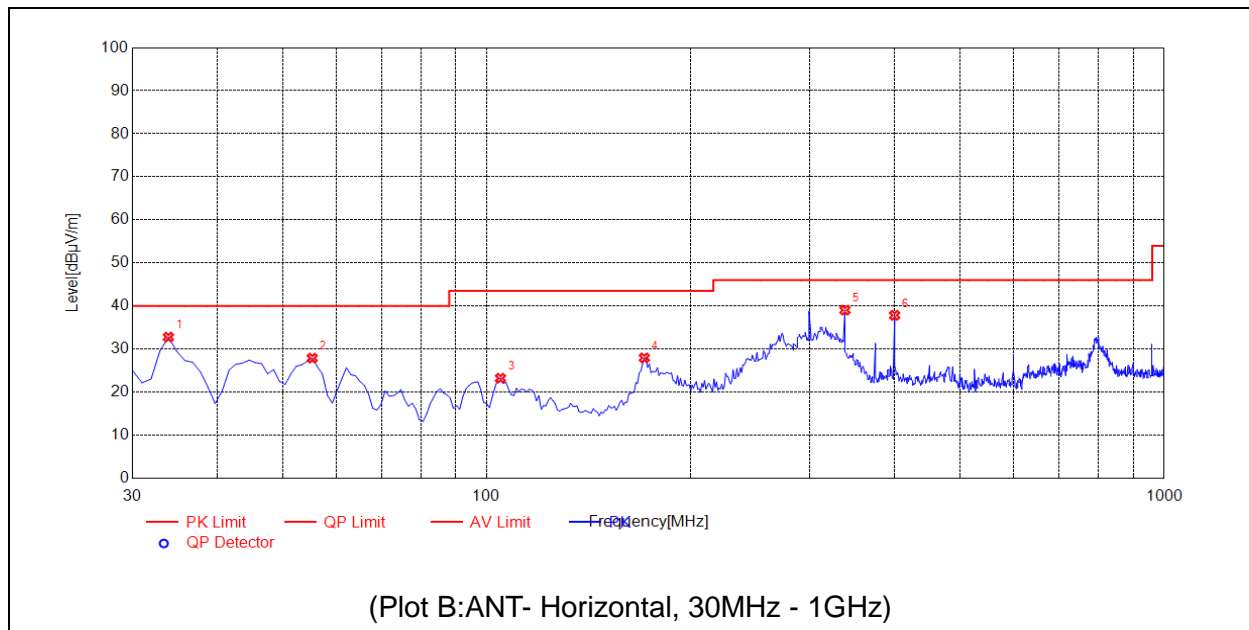
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.



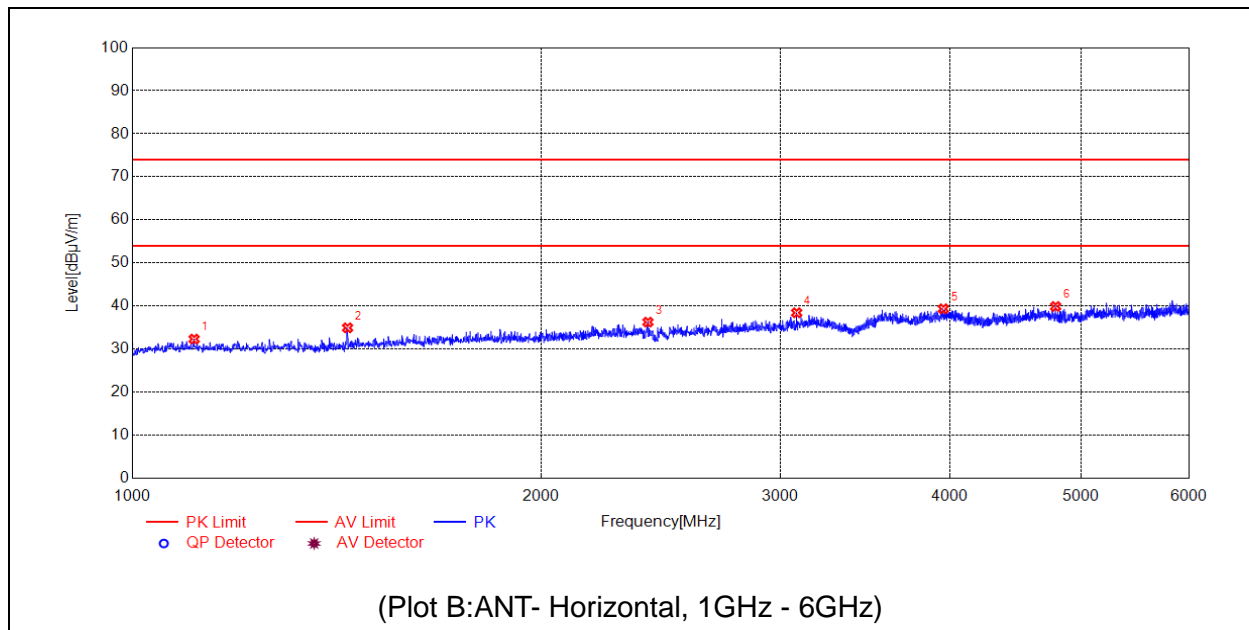
No.	Fre. MHz	Pk dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	34.0299	39.09	34.03	N.A.	N.A.	40.00	N.A.	V	PASS
2	95.0551	24.99	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
3	179.5295	27.93	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
4	279.5395	29.92	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
5	399.9399	33.69	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	719.3894	29.11	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS



No.	Fre. MHz	Pk dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	1239.0478	32.42	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1599.1198	35.88	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2124.2248	34.83	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	2897.3795	36.55	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	4009.6019	39.08	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	5291.8584	41.12	N.A.	N.A.	74.00	N.A.	54.00	V	PASS



No.	Fre. MHz	Pk dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	33.8839	32.79	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	55.2452	27.90	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	104.7648	23.24	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	170.7908	27.97	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	337.7978	39.06	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	399.9399	37.85	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS



No.	Fre. MHz	Pk dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	1110.0220	32.33	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1440.0880	34.94	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2397.2795	36.27	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	3085.4171	38.44	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	3957.5915	39.36	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	4787.7576	39.90	N.A.	N.A.	74.00	N.A.	54.00	H	PASS



Annex A Test 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 Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	9kHz-150kHz	±4.1 dB
	150kHz-30MHz	±3.7dB

Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	±5.06dB
	200MHz-1000MHz	±5.24dB
	1GHz-6GHz	±5.18dB
	6GHz-18GHz	±5.48dB



Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Accreditation Certificate

Accredited Testing Laboratory:	The FCC designation number is CN1192. Test firm registration number is 226174. (Shenzhen Morlab Communications Technology Co., Ltd.)
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4. Test Software Utilized

Model	Version Number	Producer
JS32-RE	Version 2.0.2.0	Tonscend
TS+ -[JS32-CE]	Version2.5.0.0	Tonscend

**5. Test Equipments Utilized**

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2018.08.04	2019.08.03
Test Receiver	R&S	ESPI	101052	2018.08.04	2019.08.03
LISN	Schwarzbeck	NSLK 8127	812744	2018.10.15	2019.04.15
Pulse Limiter (20dB)	VTSD	9561D	9537	2018.10.15	2019.04.15
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-519	2018.05.08	2019.05.07
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	1774	2018.03.03	2019.03.02
Radiated Disturbance Preamplifier	rflight	S020180L320 3	61171/61172	2018.07.12	2019.07.11
Radiated Disturbance Preamplifier	rflight	S10M100L38 02	46732	2018.07.12	2019.07.11
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2017.01.12	2020.01.11
PC	Apple	A1370	C02FQ2PYD DQW	N/A	N/A

————— END OF REPORT —————