



## FCC TEST REPORT FOR

Shanghai SmartPeak Technology Co.,Ltd.

POS Terminal

Test Model: P2000L

Prepared for : Shanghai SmartPeak Technology Co.,Ltd.  
Address : Room 1, No.3 Building, NO.295, Qianqiao Road, Fengxian District, Shanghai, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.  
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park  
Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China  
Tel : (+86)755-82591330  
Fax : (+86)755-82591332  
Web : www.LCS-cert.com  
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : December 10, 2022  
Number of tested samples : 2  
Sample No. : A120822084-1, A120822084-2  
Serial number : Prototype  
Date of Test : December 10, 2022 ~ December 15, 2022  
Date of Report : December 15, 2022



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FCC TEST REPORT	
FCC CFR 47 PART 15 C (15.247)	
Report Reference No. .... : LCSA120822084EA	
Date of Issue ..... : December 15, 2022	
Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.	
Address ..... : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China	
Testing Location/ Procedure..... : Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □	
Applicant's Name ..... : Shanghai SmartPeak Technology Co.,Ltd.	
Address ..... : Room 1, No.3 Building, NO.295, Qianqiao Road, Fengxian District, Shanghai, China	
Test Specification	
Standard..... : FCC CFR 47 PART 15 C (15.247)	
Test Report Form No. .... : LCSEMC-1.0	
TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.	
Master TRF ..... : Dated 2011-03	
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Test Item Description. .... : POS Terminal	
Trade Mark..... : SmartPeak	
Test Model ..... : P2000L	
Ratings ..... : Please Refer to Page 6	
Result ..... : Positive	

Compiled by:

Vera Deng/ Administrator

Supervised by:

Cary Luo/ Technique principal

Approved by:

Gavin Liang / Manager



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**FCC -- TEST REPORT**

<b>Test Report No. :</b> LCSA120822084EA	<u>December 15, 2022</u> Date of issue
--	---

Test Model.....	: P2000L
EUT.....	: POS Terminal
<b>Applicant.....</b>	<b>: Shanghai SmartPeak Technology Co.,Ltd.</b>
Address.....	: Room 1, No.3 Building, NO.295, Qianqiao Road, Fengxian District, Shanghai, China
Telephone.....	: /
Fax.....	: /
<b>Manufacturer.....</b>	<b>: Shanghai SmartPeak Technology Co.,Ltd.</b>
Address.....	: Room 1, No.3 Building, NO.295, Qianqiao Road, Fengxian District, Shanghai, China
Telephone.....	: /
Fax.....	: /
<b>Factory.....</b>	<b>: Shanghai SmartPeak Technology Co.,Ltd.</b>
Address.....	: Room 1, No.3 Building, NO.295, Qianqiao Road, Fengxian District, Shanghai, China
Telephone.....	: /
Fax.....	: /

<b>Test Result</b>	<b>Positive</b>
--------------------	-----------------

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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## Revision History

Report Version	Issue Date	Revision Content	Revised By
000	December 15, 2022	Initial Issue	---



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## 1. GENERAL INFORMATION

### 1.1 Description of Device (EUT)

EUT : POS Terminal

Test Model : P2000L

Power Supply : Input: 5V $\overline{\text{---}}$ 2A  
For Adapter1 Input: 100-240V~, 50/60Hz, 0.40A  
For Adapter1 Output: 5.0V $\overline{\text{---}}$ 2.0A, 10.0W  
For Adapter2 Input: 100-240V~, 50/60Hz, 0.40A  
For Adapter2 Output: 5.0V $\overline{\text{---}}$ 2.0A, 10.0W  
DC 7.4V by Rechargeable Li-ion Battery, 2000mAh

Hardware Version : /

Software Version : /

Bluetooth :

Frequency Range : 2402MHz ~ 2480MHz

Channel Number : 79 channels for Bluetooth V4.1(DSS)  
40 channels for Bluetooth V4.1 (DTS)

Channel Spacing : 1MHz for Bluetooth V4.1 (DSS)  
2MHz for Bluetooth V4.1 (DTS)

Modulation Type : GFSK,  $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.1(DSS)  
GFSK for Bluetooth V4.1 (DTS)

Bluetooth Version : V4.1

Antenna Description : PIFA Antenna, 0.5dBi(Max.)

WIFI(2.4G Band) :

Frequency Range : 2412MHz ~ 2462MHz

Channel Spacing : 5MHz

Channel Number : 11 Channels for 20MHz bandwidth (2412~2462MHz)

Modulation Type : IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)  
IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)  
IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

Antenna Description : PIFA Antenna, 0.5dBi(Max.)

2G :

Support Band : ☐ GSM 900 (EU-Band) ☐ DCS 1800 (EU-Band)  
☒ GSM 850 (U.S.-Band) ☒ PCS 1900 (U.S.-Band)

Release Version : R99

GPRS Class : Class 12

EGPRS Class : Class 12

Type Of Modulation : GMSK for GSM/GPRS; GMSK/8PSK for EGPRS

Antenna Description : PIFA Antenna  
0.5dBi (max.) For GSM 850  
0.5dBi (max.) For PCS 1900

3G :



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Support Band : ☒ WCDMA Band II (U.S.-Band)  
☒ WCDMA Band V (U.S.-Band)  
☐ WCDMA Band IV (U.S.-Band)  
☐ WCDMA Band I (EU-Band)  
☐ WCDMA Band VIII (EU-Band)

Release Version : R9

Type Of Modulation : QPSK, 16QAM

Antenna Description : PIFA Antenna  
0.5dBi (max.) For WCDMA Band II  
0.5dBi (max.) For WCDMA Band V

LTE :

Support Band : ☒ E-UTRA Band 2(U.S.-Band)  
☒ E-UTRA Band 4(U.S.-Band)  
☒ E-UTRA Band 7(U.S.-Band)

LTE Release Version : R9

Type Of Modulation : QPSK/16QAM

Antenna Description : PIFA Antenna  
0.5dBi (max.) For E-UTRA Band 2  
0.5dBi (max.) For E-UTRA Band 4  
0.5dBi (max.) For E-UTRA Band 7

Power Class : Class 3

NFC :

Operating Frequency : 13.56MHz

Modulation Type : ASK

Antenna Description : PCB Antenna, 0.5dBi(Max.)

GPS function : Support and only RX

Extreme temp. : -30°C to +50°C

Tolerance

Extreme vol. Limits : 6.4VDC to 8.4VDC (nominal: 7.4VDC)



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## 1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Shenzhen Sorghum red Electronics Technology Co.,Ltd	ADAPTER1	GLH50D2000HW	---	FCC
Shenzhen Sorghum red Electronics Technology Co., Ltd	ADAPTER2	GLH50A2000HW	---	FCC

## 1.3 External I/O Cable

I/O Port Description	Quantity	Cable
DC IN Port	1	N/A
Micro USB Port	1	N/A

## 1.4 Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10:2013 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

## 1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

## 1.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Radiation Uncertainty	9KHz~30MHz	3.10dB	(1)
	30MHz~200MHz	2.96dB	(1)
	200MHz~1000MHz	3.10dB	(1)
	1GHz~26.5GHz	3.80dB	(1)
	26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	150kHz~30MHz	1.63dB	(1)
Power disturbance	30MHz~300MHz	1.60dB	(1)

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



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## 1.7 Description of Test Modes

Bluetooth operates in the unlicensed ISM Band at 2.4GHz. With basic data rate feature, the data rates can be up to 1 Mb/s by modulating the RF carrier using GFSK techniques. The EUT works in the X-axis, Y-axis, Z-axis. The following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Mode of Operations	Frequency Range (MHz)	Data Rate (Mbps)
BT 4.1	2402	1/2/3
	2441	1/2/3
	2480	1/2/3
For Conducted Emission		
Test Mode	TX Mode/Hopping Mode	
For Radiated Emission		
Test Mode	TX Mode/Hopping Mode	

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was determined to be TX (1Mbps-Middle Channel).

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was determined to be TX (1Mbps-Middle Channel).

Pre-test AC conducted emission at charge from 1Mbps-Middle Channel mode, recorded worst case.

Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/60Hz, recorded worst case.



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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR PART 15C 15.207, 15.209 and 15.247.

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

The EUT was operated in the normal operating mode for Hopping Numbers and Dwell Time test and a continuous transmits mode for other tests.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209, 15.247 under the FCC Rules Part 15 Subpart C.

### 2.3 General Test Procedures

#### 2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.1.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz and 1.5 m above ground plane above 1GHz. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.4 of ANSI C63.10-2013

### 2.4. Test Sample

The application provides 2 samples to meet requirement;

Sample Number	Description
Sample 1(A120822084-1)	Engineer sample – continuous transmit
Sample 2(A120822084-2)	Normal sample – Intermittent transmit



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### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

The system was configured for testing in a continuous transmits condition.

#### 3.2 EUT Exercise Software

The system was configured for testing in a continuous transmits condition and change test channels by software (\*\*1##) provided by application.

#### 3.3 Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
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#### 3.4 Block Diagram/Schematics

Please refer to the related document.

#### 3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

#### 3.6 Test Setup

Please refer to the test setup photo.





#### 4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart C				
FCC Rules	Description of Test	Test Sample	Result	Remark
§15.209(a)	Radiated Spurious Emissions	Sample 1 Sample 2	Compliant	Note 1
§15.207(a)	AC Mains Conducted Emissions	Sample 2	Compliant	Note 1
§15.247(i)§1.1310 §15.247(i)§2.1093	RF Exposure	N/A	Compliant	Note 2

**Remark:**

1. Note 1 – Test results inside test report;
2. Note 2 – Test results in other test report (SAR Report);





## 5. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Meter	R&S	NRVS	100444	2022-06-16	2023-06-15
2	Power Sensor	R&S	NRV-Z81	100458	2022-06-16	2023-06-15
3	Power Sensor	R&S	NRV-Z32	10057	2022-06-16	2023-06-15
4	Test Software	Tonscend	JS1120-2	/	N/A	N/A
5	RF Control Unit	Tonscend	JS0806-2	N/A	2022-10-29	2023-10-28
6	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2022-10-29	2023-10-28
7	DC Power Supply	Agilent	E3642A	N/A	2022-10-29	2023-10-28
8	EMI Test Software	AUDIX	E3	/	N/A	N/A
9	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2022-06-16	2023-06-15
10	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
11	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2021-08-29	2024-08-28
12	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
13	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
14	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2021-08-29	2024-08-28
15	Broadband Preamplifier	SCHWARZBECK	BBV9719	9719-025	2022-06-16	2023-06-15
16	EMI Test Receiver	R&S	ESR 7	101181	2022-06-16	2023-06-15
17	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2022-10-29	2023-10-28
18	Broadband Preamplifier	/	BP-01M18G	P190501	2022-06-16	2023-06-15
19	6dB Attenuator	/	100W/6dB	1172040	2022-06-16	2023-06-15
20	3dB Attenuator	/	2N-3dB	/	2022-10-29	2023-10-28
21	EMI Test Receiver	R&S	ESPI	101940	2022-08-18	2023-08-17
22	Artificial Mains	R&S	ENV216	101288	2022-06-16	2023-06-15
23	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-00 32	2022-06-16	2023-06-15
24	EMI Test Software	Farad	EZ	/	N/A	N/A



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## 6. MEASUREMENT RESULTS

### 6.1. Restricted Band Emission Limit

#### 6.1.1. Standard Applicable

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2\)
13.36-13.41			

\1\ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

\2\ Above 38.6

According to §15.247 (d): 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

#### 6.1.2. Measuring Instruments and Setting

Please refer to of equipment list in this report. The following table is the setting of spectrum analyzer and receiver.



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Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 <sup>th</sup> carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

### 6.1.3. Test Procedures

#### 1) Sequence of testing 9 kHz to 30 MHz

##### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

##### Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.0 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

##### Final measurement:

- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.



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## 2) Sequence of testing 30 MHz to 1 GHz

### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

### Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 4 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

### Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.



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### 3) Sequence of testing 1 GHz to 18 GHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 4 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

#### Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.



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#### 4) Sequence of testing above 18 GHz

##### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

##### Premeasurement:

- The antenna is moved spherical over the EUT in different polarizations of the antenna.

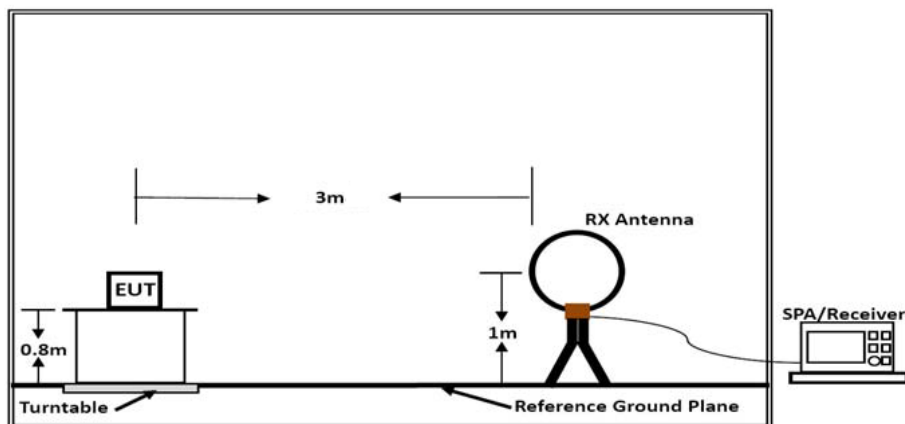
##### Final measurement:

- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

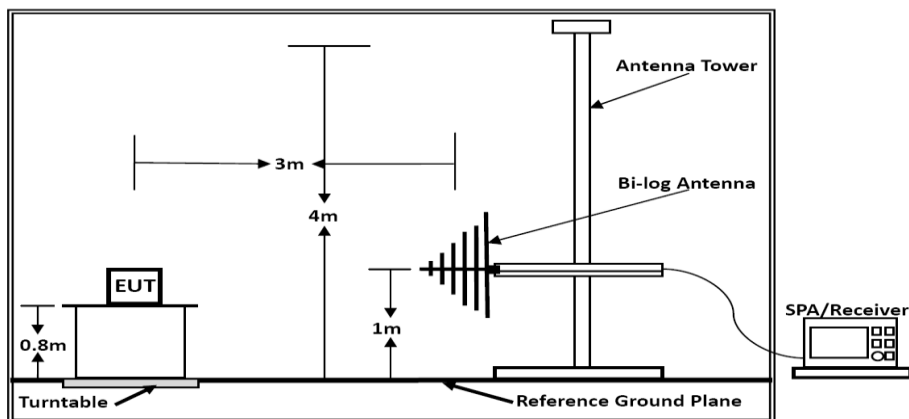




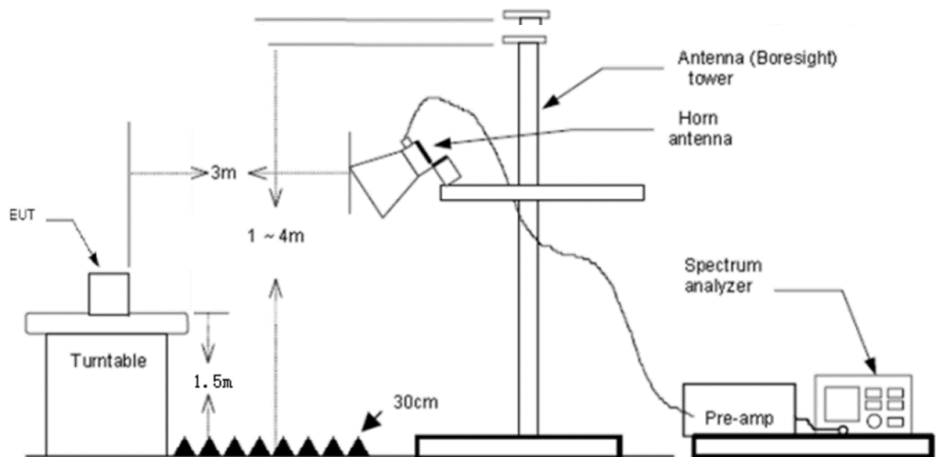
## 6.1.4. Test Setup Layout



Below 30MHz



Below 1GHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.



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#### 6.1.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 6.1.6. Results of Radiated Emissions (9 KHz~30MHz)

Temperature	23.8℃	Humidity	52.1%
Test Engineer	Nick Peng	Configurations	BT

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 6.1.7. Results of Radiated Emissions (30 MHz~1000 MHz)

Temperature	23.8℃	Humidity	52.1%
Test Engineer	Nick Peng	Configurations	BT

**PASS.**

Only record the worst test result in this report.

The test data please refer to following page.



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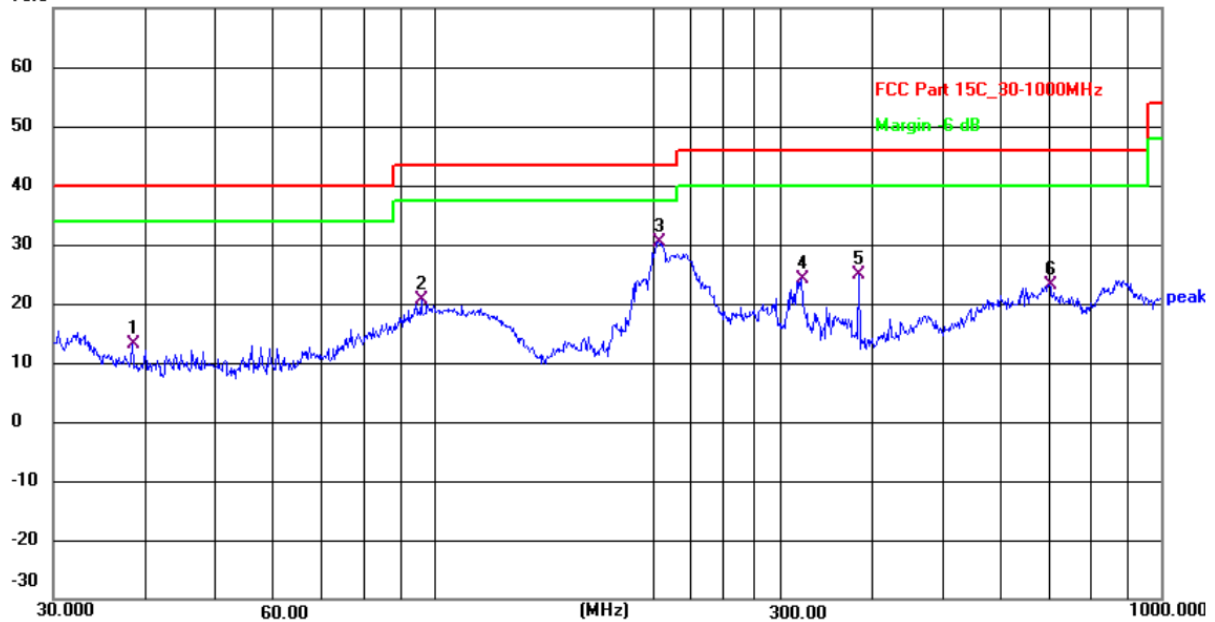
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Below 1GHz  
ADAPTER 1  
Horizontal  
70.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.4809	30.79	-17.62	13.17	40.00	-26.83	QP
2	96.0985	39.11	-18.45	20.66	43.50	-22.84	QP
3	203.5227	47.67	-17.31	30.36	43.50	-13.14	QP
4	319.9369	38.54	-14.48	24.06	46.00	-21.94	QP
5	383.9318	39.61	-14.63	24.98	46.00	-21.02	QP
6	701.7610	34.00	-10.89	23.11	46.00	-22.89	QP

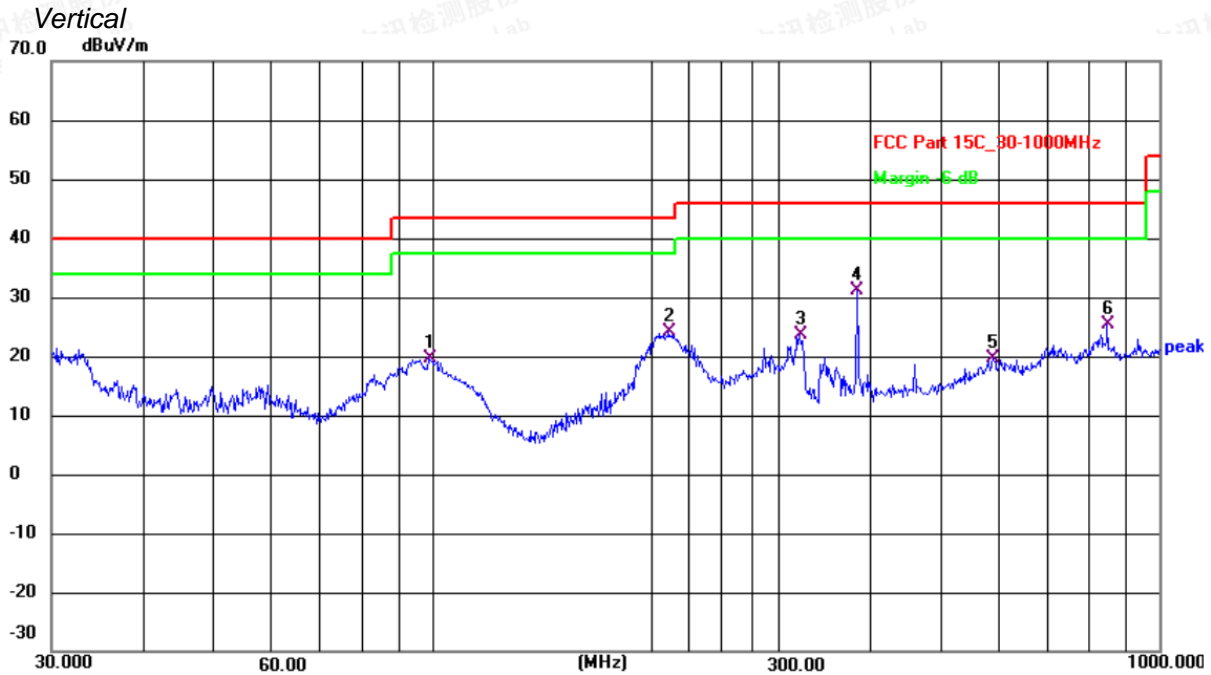


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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	99.1797	37.99	-18.24	19.75	43.50	-23.75	QP
2	211.5264	41.15	-17.09	24.06	43.50	-19.44	QP
3	319.9369	38.15	-14.48	23.67	46.00	-22.33	QP
4	383.9318	45.78	-14.63	31.15	46.00	-14.85	QP
5	590.9737	30.18	-10.58	19.60	46.00	-26.40	QP
6	848.0563	34.32	-8.98	25.34	46.00	-20.66	QP



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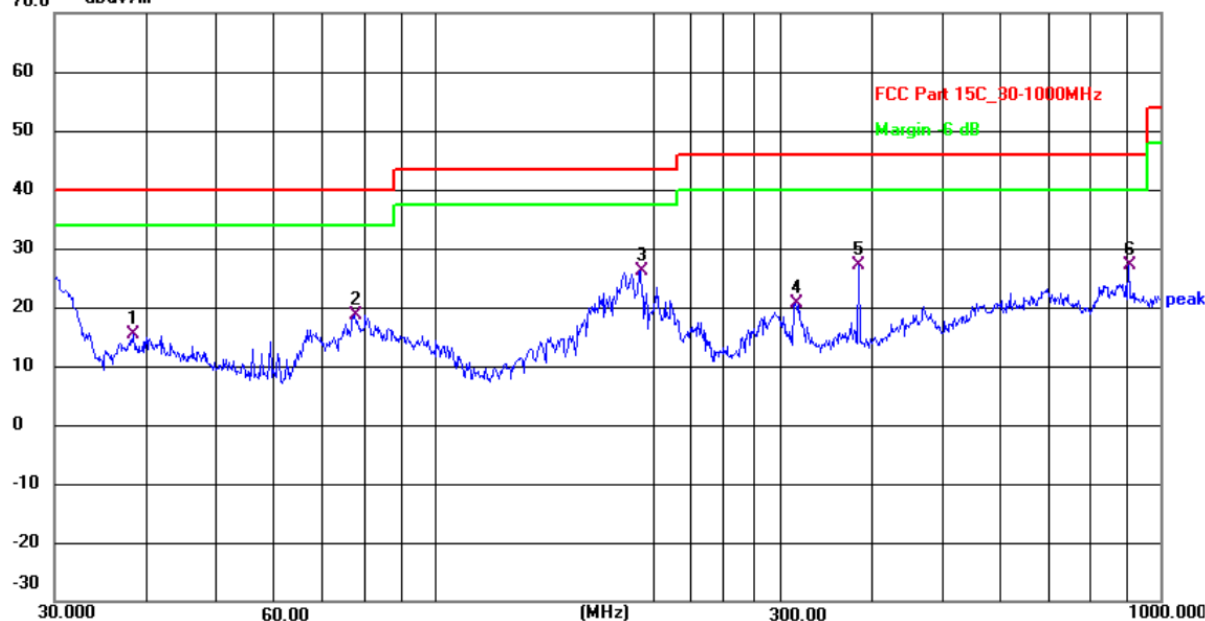
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## ADAPTER 2

Horizontal

70.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.4809	32.91	-17.62	15.29	40.00	-24.71	QP
2	77.5928	38.50	-19.77	18.73	40.00	-21.27	QP
3	192.4186	43.60	-17.35	26.25	43.50	-17.25	QP
4	314.3765	35.45	-14.80	20.65	46.00	-25.35	QP
5	383.9318	41.79	-14.63	27.16	46.00	-18.84	QP
6	903.3094	35.37	-8.25	27.12	46.00	-18.88	QP

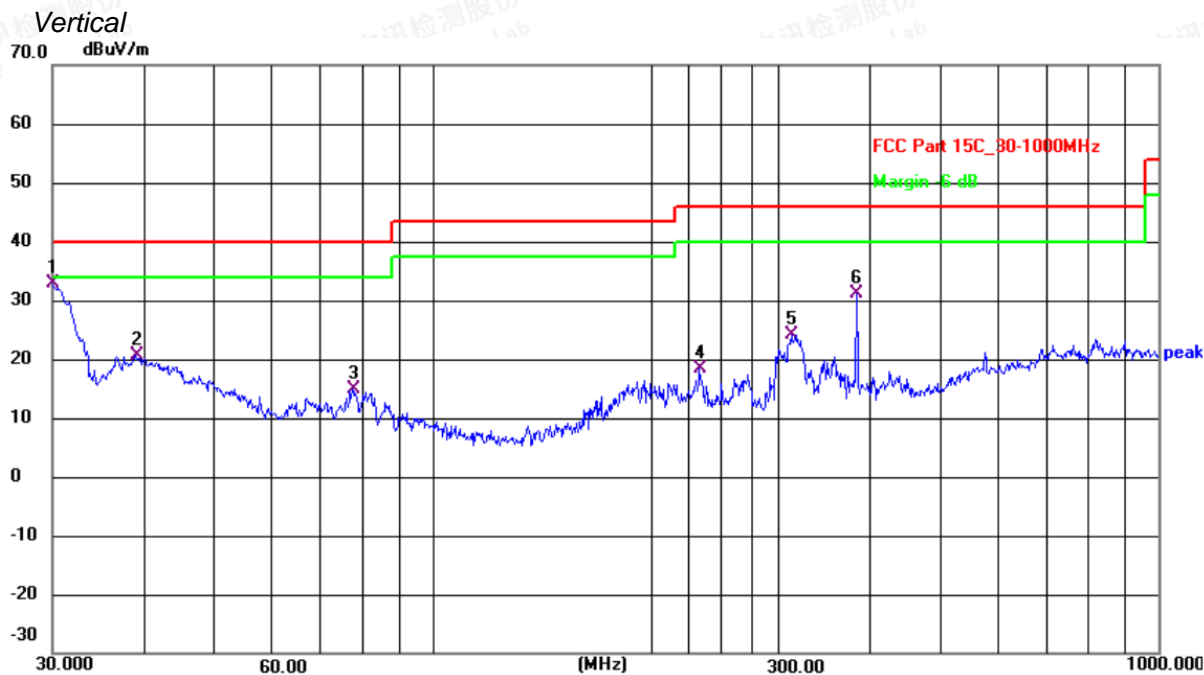


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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.0000	51.40	-18.45	32.95	40.00	-7.05	QP
2	39.0245	38.16	-17.60	20.56	40.00	-19.44	QP
3	77.5928	34.53	-19.77	14.76	40.00	-25.24	QP
4	233.3487	34.78	-16.36	18.42	46.00	-27.58	QP
5	312.1794	39.15	-14.92	24.23	46.00	-21.77	QP
6	383.9318	45.67	-14.63	31.04	46.00	-14.96	QP

Note:

- 1). Pre-scan all modes and recorded the worst case results in this report (1Mbps-Middle Channel).
- 2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3). Level = Reading + Factor, Margin = Level-Limit, Factor = Antenna Factor + Cable Loss - Preamplifier Factor.



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## 6.1.8. Results of Radiated Emissions (1 GHz~26 GHz)

Note: All the modes have been tested and recorded worst mode in the report.

The worst test result for GFSK, Channel 0 / 2402 MHz

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	51.84	33.06	35.04	3.94	53.80	74.00	-20.20	Peak	Horizontal
4804.00	38.75	33.06	35.04	3.94	40.71	54.00	-13.29	Average	Horizontal
4804.00	57.11	33.06	35.04	3.94	59.07	74.00	-14.93	Peak	Vertical
4804.00	42.42	33.06	35.04	3.94	44.38	54.00	-9.62	Average	Vertical

The worst test result for GFSK, Channel 39 / 2441 MHz

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measure d dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4882.00	59.09	33.16	35.15	3.96	61.06	74.00	-12.94	Peak	Horizontal
4882.00	40.53	33.16	35.15	3.96	42.50	54.00	-11.50	Average	Horizontal
4882.00	53.96	33.16	35.15	3.96	55.93	74.00	-18.07	Peak	Vertical
4882.00	43.54	33.16	35.15	3.96	45.51	54.00	-8.49	Average	Vertical

The worst test result for GFSK, Channel 78 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	55.98	33.26	35.14	3.98	58.08	74.00	-15.92	Peak	Horizontal
4960.00	44.20	33.26	35.14	3.98	46.30	54.00	-7.70	Average	Horizontal
4960.00	55.54	33.26	35.14	3.98	57.64	74.00	-16.36	Peak	Vertical
4960.00	40.23	33.26	35.14	3.98	42.33	54.00	-11.67	Average	Vertical

The worst test result for  $\pi/4$ -DQPSK, Channel 0 / 2402 MHz

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measure d dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	51.31	33.06	35.04	3.94	53.27	74.00	-20.73	Peak	Horizontal
4804.00	40.24	33.06	35.04	3.94	42.20	54.00	-11.80	Average	Horizontal
4804.00	55.45	33.06	35.04	3.94	57.41	74.00	-16.59	Peak	Vertical
4804.00	38.29	33.06	35.04	3.94	40.25	54.00	-13.75	Average	Vertical

The worst test result for  $\pi/4$ -DQPSK, Channel 39 / 2441 MHz

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measure d dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4882.00	60.53	33.16	35.15	3.96	62.50	74.00	-11.50	Peak	Horizontal
4882.00	43.22	33.16	35.15	3.96	45.19	54.00	-8.81	Average	Horizontal
4882.00	58.78	33.16	35.15	3.96	60.75	74.00	-13.25	Peak	Vertical
4882.00	42.98	33.16	35.15	3.96	44.95	54.00	-9.05	Average	Vertical

The worst test result for  $\pi/4$ -DQPSK, Channel 78 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measure d dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	57.80	33.26	35.14	3.98	59.90	74.00	-14.10	Peak	Horizontal
4960.00	44.49	33.26	35.14	3.98	46.59	54.00	-7.41	Average	Horizontal
4960.00	56.73	33.26	35.14	3.98	58.83	74.00	-15.17	Peak	Vertical
4960.00	40.79	33.26	35.14	3.98	42.89	54.00	-11.11	Average	Vertical



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*The worst test result for 8-DPSK, Channel 0 / 2402 MHz*

Freq. MHz	Reading dBuv	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4804.00	59.69	33.06	35.04	3.94	61.65	74.00	-12.35	Peak	Horizontal
4804.00	41.53	33.06	35.04	3.94	43.49	54.00	-10.51	Average	Horizontal
4804.00	55.24	33.06	35.04	3.94	57.20	74.00	-16.80	Peak	Vertical
4804.00	42.97	33.06	35.04	3.94	44.93	54.00	-9.07	Average	Vertical

*The worst test result for 8-DPSK, Channel 39 / 2441 MHz*

Freq. MHz	Reading dBuv	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4882.00	60.05	33.16	35.15	3.96	62.02	74.00	-11.98	Peak	Horizontal
4882.00	44.70	33.16	35.15	3.96	46.67	54.00	-7.33	Average	Horizontal
4882.00	56.46	33.16	35.15	3.96	58.43	74.00	-15.57	Peak	Vertical
4882.00	44.21	33.16	35.15	3.96	46.18	54.00	-7.82	Average	Vertical

*The worst test result for 8-DPSK, Channel 78 / 2480 MHz*

Freq. MHz	Reading dBuv	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4960.00	57.23	33.26	35.14	3.98	59.33	74.00	-14.67	Peak	Horizontal
4960.00	42.91	33.26	35.14	3.98	45.01	54.00	-8.99	Average	Horizontal
4960.00	59.82	33.26	35.14	3.98	61.92	74.00	-12.08	Peak	Vertical
4960.00	42.20	33.26	35.14	3.98	44.30	54.00	-9.70	Average	Vertical

*Notes:*

- 1). Measuring frequencies from 9 KHz~10th harmonic (ex. 26.5GHz), at least have 20dB margin found between lowest internal used/generated frequency to 30 MHz.
- 2). Radiated emissions measured in frequency range from 9 KHz~10th harmonic (ex. 26.5GHz) were made with an instrument using Peak detector mode.
- 3). 18~25GHz at least have 20dB margin. No recording in the test report.
- 4). Measured Level = Reading Level + Factor, Margin = Measured Level – Limit, Factor = Antenna Factor + Cable Loss - Preamp Factor



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## 6.2. AC Power Line Conducted Emissions

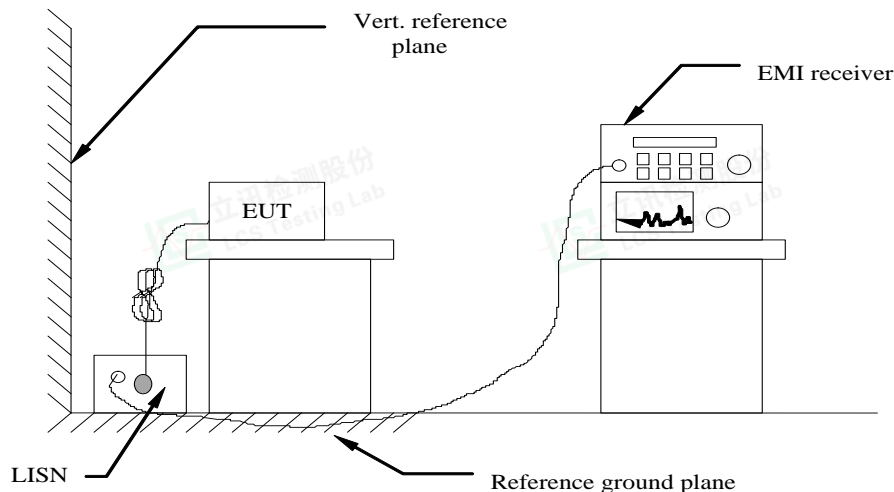
### 6.2.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

\* Decreasing linearly with the logarithm of the frequency

### 6.2.2 Block Diagram of Test Setup



### 6.2.3 Test Results

Temperature	24.5°C	Humidity	53.1%
Test Engineer	Nick Peng	Configurations	BT

**PASS.**

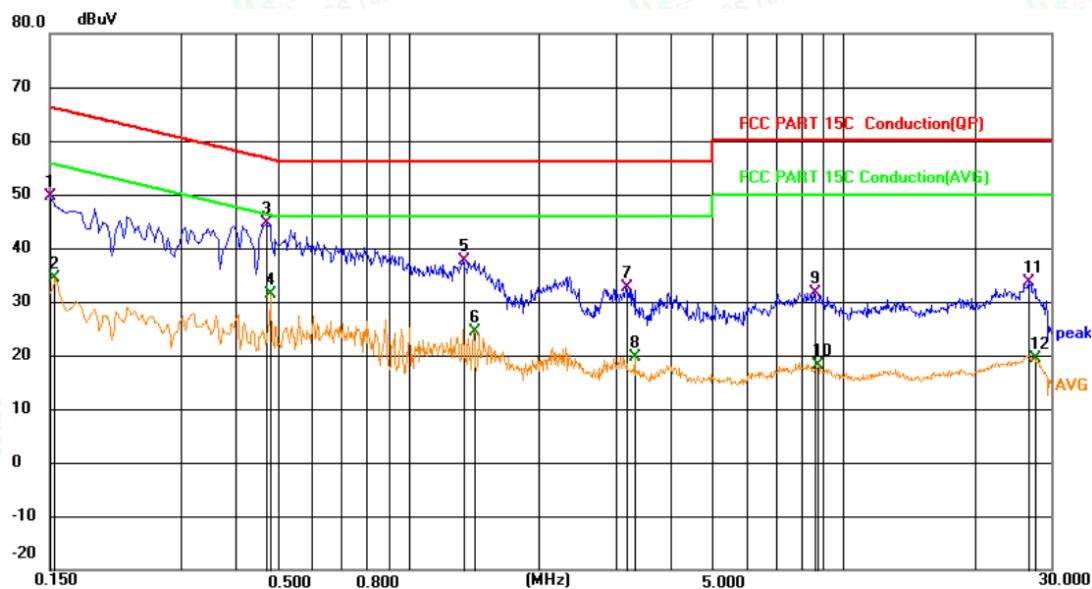
The test data please refer to following page.



**AC Conducted Emission @ AC 120V/60Hz (worst case)**

ADAPTER 1

Line



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	dBuV	Factor	ment			Detector	Comment
1		0.1500	30.09	19.63	49.72	66.00	-16.28	QP	
2		0.1539	14.75	19.63	34.38	55.79	-21.41	AVG	
3	*	0.4736	24.94	19.64	44.58	56.45	-11.87	QP	
4		0.4812	11.76	19.64	31.40	46.32	-14.92	AVG	
5		1.3379	17.93	19.66	37.59	56.00	-18.41	QP	
6		1.4107	4.83	19.66	24.49	46.00	-21.51	AVG	
7		3.1563	12.93	19.70	32.63	56.00	-23.37	QP	
8		3.3105	-0.16	19.70	19.54	46.00	-26.46	AVG	
9		8.5463	11.93	19.79	31.72	60.00	-28.28	QP	
10		8.7293	-1.72	19.80	18.08	50.00	-31.92	AVG	
11		26.6992	13.61	20.04	33.65	60.00	-26.35	QP	
12		27.5616	-0.58	20.05	19.47	50.00	-30.53	AVG	



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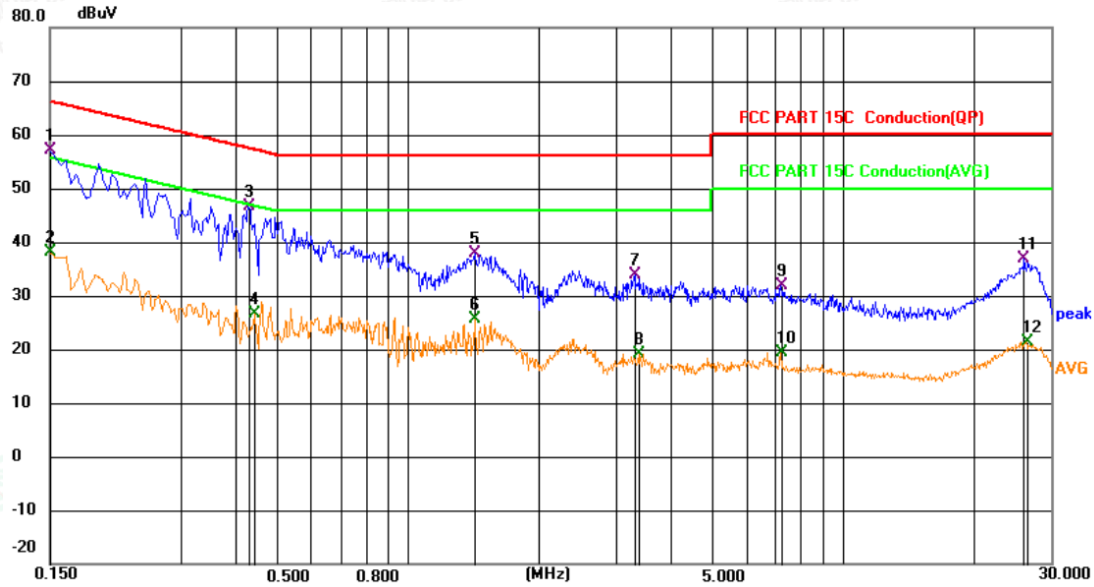
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Neutral



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
		MHz	Level	Factor	ment			
			dBuV	dB	dBuV	dBuV	dB	Detector Comment
1	*	0.1500	37.52	19.63	57.15	66.00	-8.85	QP
2		0.1500	18.47	19.63	38.10	56.00	-17.90	AVG
3		0.4291	26.94	19.63	46.57	57.27	-10.70	QP
4		0.4426	7.06	19.64	26.70	47.01	-20.31	AVG
5		1.4235	18.21	19.66	37.87	56.00	-18.13	QP
6		1.4235	6.08	19.66	25.74	46.00	-20.26	AVG
7		3.3136	14.04	19.77	33.81	56.00	-22.19	QP
8		3.3856	-0.56	19.77	19.21	46.00	-26.79	AVG
9		7.1971	12.02	19.83	31.85	60.00	-28.15	QP
10		7.1971	-0.44	19.83	19.39	50.00	-30.61	AVG
11		26.0791	16.78	20.02	36.80	60.00	-23.20	QP
12		26.3086	1.39	20.03	21.42	50.00	-28.58	AVG



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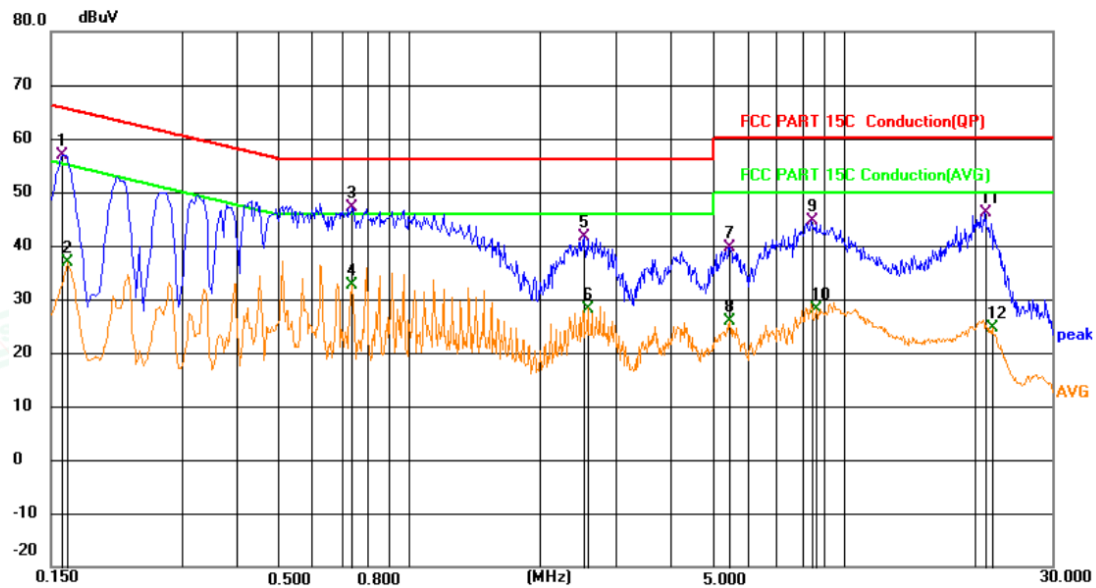
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Temperature	24.4℃	Humidity	53.8%
Test Engineer	Nick Peng	Configurations	BT

## ADAPTER 2

Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1590	37.31	19.63	56.94	65.52	-8.58	QP	
2		0.1635	17.17	19.63	36.80	55.28	-18.48	AVG	
3		0.7395	27.40	19.65	47.05	56.00	-8.95	QP	
4		0.7395	12.89	19.65	32.54	46.00	-13.46	AVG	
5		2.5216	21.83	19.68	41.51	56.00	-14.49	QP	
6		2.5801	8.57	19.68	28.25	46.00	-17.75	AVG	
7		5.4691	19.89	19.70	39.59	60.00	-20.41	QP	
8		5.4691	6.17	19.70	25.87	50.00	-24.13	AVG	
9		8.3941	24.90	19.79	44.69	60.00	-15.31	QP	
10		8.6821	8.41	19.80	28.21	50.00	-21.79	AVG	
11		21.0796	25.95	20.15	46.10	60.00	-13.90	QP	
12		21.8536	4.51	20.10	24.61	50.00	-25.39	AVG	



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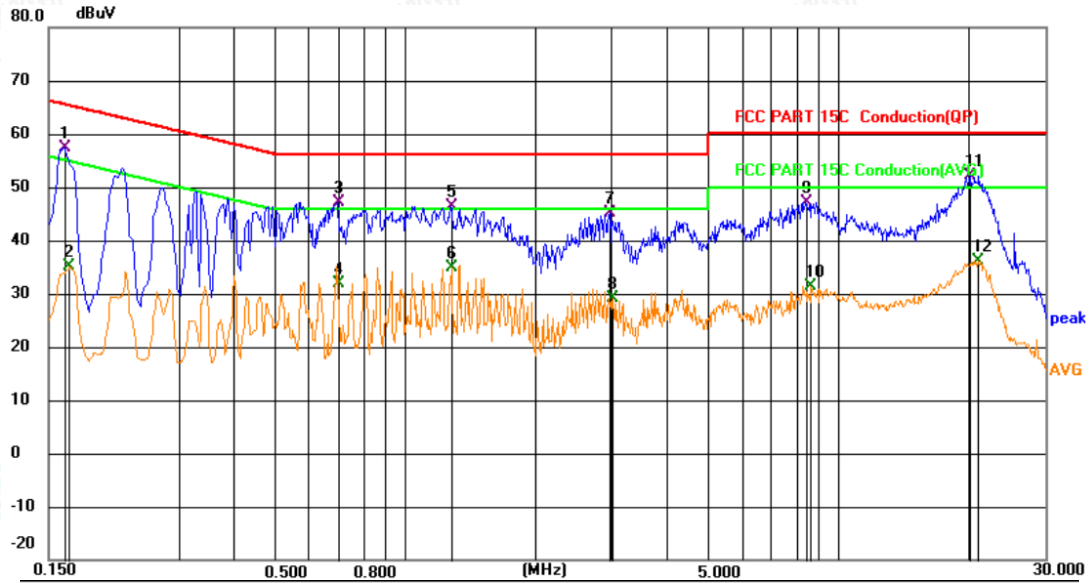
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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Neutral



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.1635	37.76	19.63	57.39	65.28	-7.89	QP	
2		0.1680	15.43	19.63	35.06	55.06	-20.00	AVG	
3		0.6990	27.37	19.65	47.02	56.00	-8.98	QP	
4		0.6990	12.20	19.65	31.85	46.00	-14.15	AVG	
5		1.2705	26.61	19.66	46.27	56.00	-9.73	QP	
6		1.2795	15.14	19.66	34.80	46.00	-11.20	AVG	
7		2.9626	25.38	19.73	45.11	56.00	-10.89	QP	
8		3.0121	9.34	19.75	29.09	46.00	-16.91	AVG	
9		8.3761	27.35	19.84	47.19	60.00	-12.81	QP	
10		8.6506	11.49	19.84	31.33	50.00	-18.67	AVG	
11	*	20.1795	32.04	20.20	52.24	60.00	-7.76	QP	
12		21.0211	16.02	20.15	36.17	50.00	-13.83	AVG	

\*\*\*Note: Pre-scan all modes and recorded the worst case results in this report (1Mbps-Middle Channel).

Measurement = Reading + Correct, Margin = Measurement – Limit.

Correct Factor= Lish Factor+Cable Factor



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## 7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

## 8. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

## 9. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF TEST REPORT-----



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