



Report No.SH16010038E01

FCC EMC TEST REPORT

Issued to

PQ Labs Inc

For

iStick

Model Name : A300
Trade Name : PQ Labs
Brand Name : PQ Labs
Standard : 47 CFR Part 15 Subpart B
FCC ID : 2AHL7-PQA300
Test date : Mar.18,2016 to Mar.19,2016
Issue date : Mar.22,2016

Shanghai MORLAB Communication Technology Co., Ltd.



Tested by Wu Hongfei

Approved by Guo Jing

Review by Fang Min

CTIA Authorized Test Lab
LAB CODE 20081223-00
IEEE 1725

OFTA
電訊管理局



TAF
Testing Laboratory
2030

GCF
Official Observer of
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Bluetooth
BQTF

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DIRECTORY

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Change History

Issue	Date	Reason for change
1.0	Mar.22,2016	First edition

1. General Information

1.1 Applicant

PQ Labs Inc

2150 Trade Zone Blvd,Suite 104,San Jose,CA95131,USA

1.2 Manufacturer

Ttrivo (Taicang) Technologies

Building 10A, Taicang Foreign Industry Park, No.105 East Shanghai Road.Taicang, Jiangsu, China

1.3 Description of EUT

EUT Type: iStick
Brand Name.....: PQ Labs
Trade Name: PQ Labs
Model Name: A300
Hardware Version: PQ5300_A300
Software Version: rk3188-eng 4.4.4 KTU 84Q eng.kernel.20150317.135814 test-keys
Antenna type.....: Ceramic Chip Antenna
Antenna gain.....: 3.1 dBi
Frequency Range.....: 2.412GHz - 2.462GHz (at interval of 5 MHz)
Modulation Type: DSSS (802.11b), OFDM (802.11g/n)
Power Adapter: Brand Name: HUONIU
Model No.: HND050200X
Input: AC 100-240V 50/60Hz 0.35A
Output: DC 5V 2A
Manufacturer: Shenzhen Huoniu Technology Co., LTD.

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

2. Facilities and Accreditations

2.1 Test Facility

Shanghai Morlab Communications Technology Co., Ltd. Morlab Laboratory is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6644. A 9*6*6(m) fully anechoic chamber was used for the radiated spurious emissions test.

2.2 Environmental Conditions

Ambient temperature: 15~35°C

Relative humidity: 30~60%

Atmosphere pressure: 86-106kPa

2.3 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: $\pm 1.76\text{dB}$

Uncertainty of Radiated Emission: $\pm 3.16\text{dB}$

2.4 List of Equipments Used

Description	Manufacturer	Model	Serial No.	Expiry Date
Shielding Room	CHENGYU	5m×4m×3m	CR	2017.09.13
EMI Test Receiver	R&S	ESCI7	100787	2017.02.24
Artificial Mains Network	TESEQ	NNB 51	33285	2017.02.24
3m Semi-anechoic Chamber	CHENGYU	9.2×6.25×6.15m	SAR	2017.09.13
Broadband Log Antenna	Schwarzbeck	VULB 9163	9163-561	2017.07.24
Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1033	2017.07.24
Power Supplier	NF	ES2000S	9087735	2016.09.25
Laptop	ACER	Aspire 4376ZG	LXPFY0C004935 291221601	/
Laptop Adapter	LITEON	PA-1650-22	9801016502	/
USB Data Cable	/	/	/	/
Keyboard	HP	SK-2885	/	/
Mouse	Logitech	M100	/	/
Display Screen	AOC	280LM00002	/	/

NOTE:

Equipments listed above have been calibrated and are in the period of validation.

2.5 Test Standards and Results

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 (10-1-13 Edition)	Radio Frequency Devices

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

No.	Section	Description	Result
1	15.107	Conducted Emission	PASS
2	15.109	Radiated Emission	PASS
3	ANSI C63.4-2014	Radiated Emission	PASS

3. Test Conditions Setting

3.1 Test Mode

Mode 1: Transferring and Charging Mode

During the measurement of traffic operating mode, a communication link was established between the EUT and PC, and maintained during the measurement.

NOTE:

All configurations and test modes are performed, only the worst case is recorded in this report.

4. Emission Tests

4.1 Conducted Emission Measurement

4.1.1 Limits of Conducted Emission:

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 (MHz)	CLASS B (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:

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

4.1.2 Test Procedure

The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

EUT connected to Class B Computer/Laptop via USB data cable and data exchange mode. The Computer/Laptop installed by US power 120V/60Hz, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.

The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.

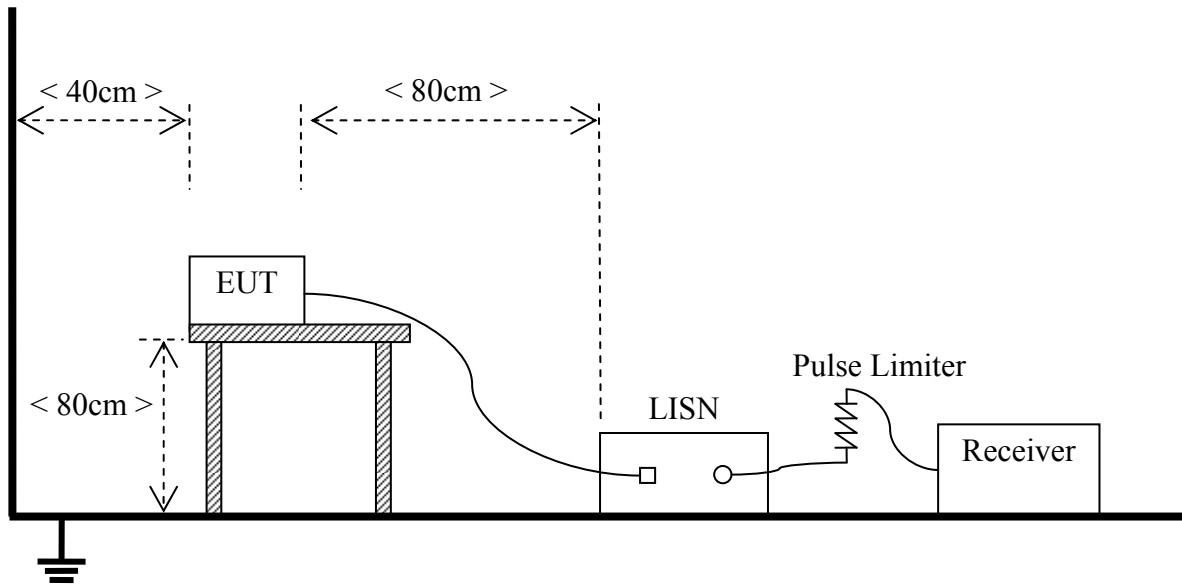
During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in Item 3.1 were scanned during the preliminary test.

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

4.1.3 Test Setup



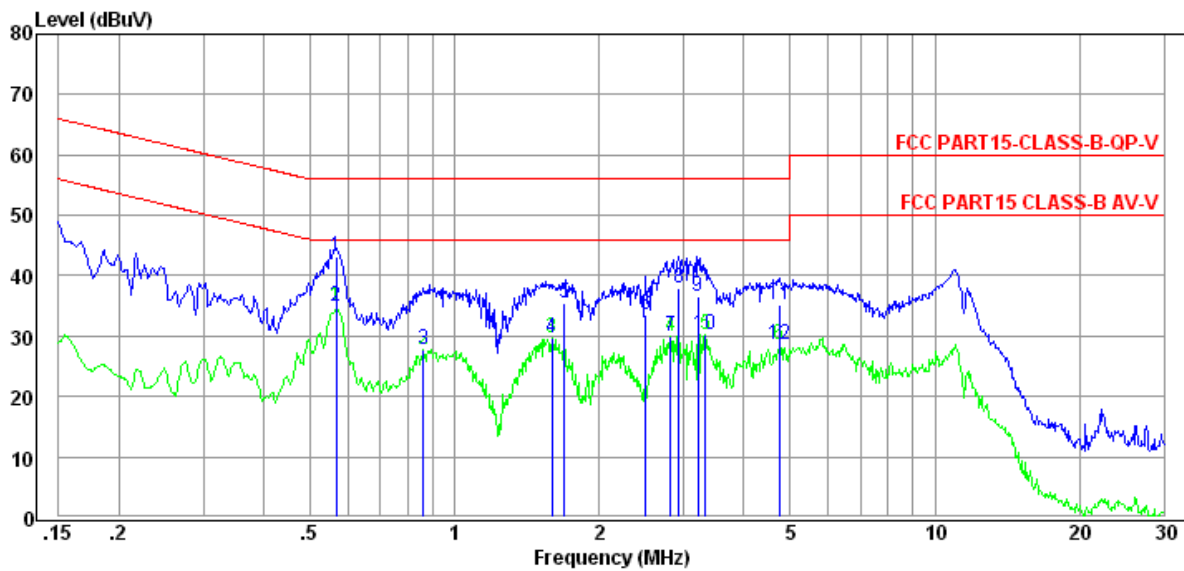
4.1.4 Test Result

Test Verdict Recorded for Suspicious Points:

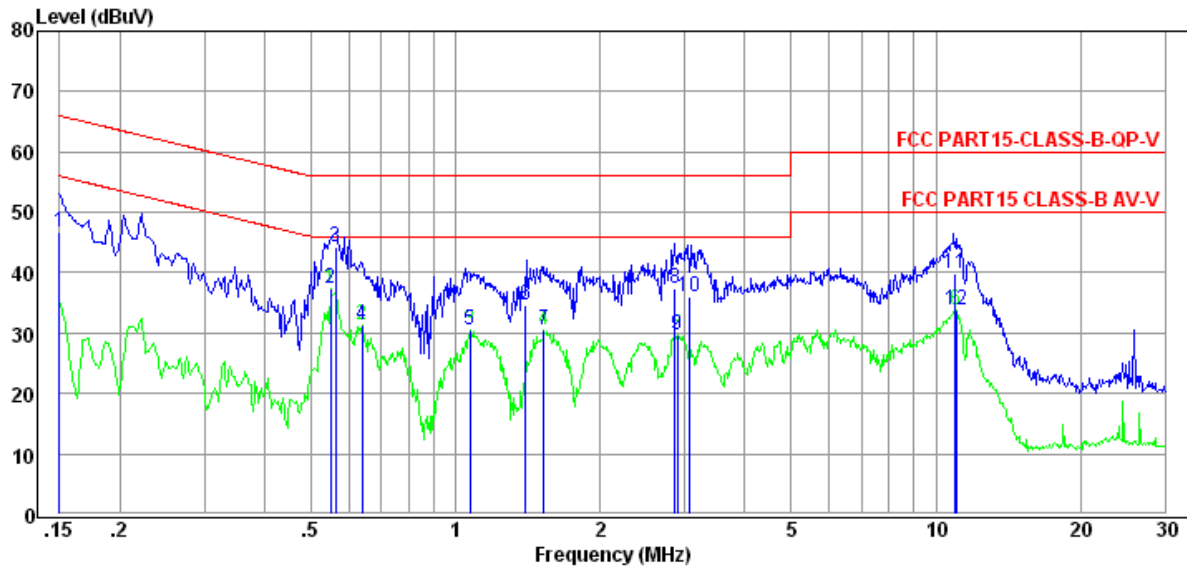
Line	Freq MHz	Result dBuV	Limit dBuV	Margin dB
QP	0.57	43.14	56.00	12.86
Average	0.57	34.93	46.00	11.07
Average	0.86	27.81	46.00	18.19
Average	1.60	29.60	46.00	16.40
QP	1.70	35.54	56.00	20.46
QP	2.51	33.42	56.00	22.58
Average	2.82	30.08	46.00	15.92
QP	2.94	37.97	56.00	18.03
QP	3.21	36.49	56.00	19.51
Average	3.33	30.32	46.00	15.68
QP	4.75	35.20	56.00	20.80
Average	4.75	28.59	46.00	17.41

Neutral	Freq MHz	Result dBuV	Limit dBuV	Margin dB
QP	0.15	46.81	66.00	19.19
Average	0.55	37.33	46.00	8.67
QP	0.56	44.26	56.00	11.74
Average	0.64	31.30	46.00	14.70
Average	1.07	30.48	46.00	15.52
QP	1.40	34.72	56.00	21.28
Average	1.53	30.60	46.00	15.40
QP	2.86	37.49	56.00	18.51
Average	2.90	29.60	46.00	16.40
QP	3.07	36.04	56.00	19.96
QP	10.92	39.94	60.00	20.06
Average	11.02	33.76	50.00	16.24

Test Plot:



(Plot A: L Phase)



(Plot B: N Phase)

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission

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

Frequency (MHz)	Field Strength CLASS B (at 3m)	
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

NOTE:

(1) Field Strength ($\text{dB}\mu\text{V/m}$) = $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$.

(2) In the emission tables above, the tighter limit applies at the band edges.

Frequency range of radiated measurements (For unintentional radiators)

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.

Note:

The highest frequency is 2462MHz , So 5th harmonic is 12.31GHz, the frequency range is from 30MHz to 12.5GHz

4.2.2 Test Procedure

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

Support equipment, if needed, was placed as per ANSI C63.4.

All I/O cables were positioned to simulate typical usage as per ANSI C63.4.

The EUT received AC power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.

The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

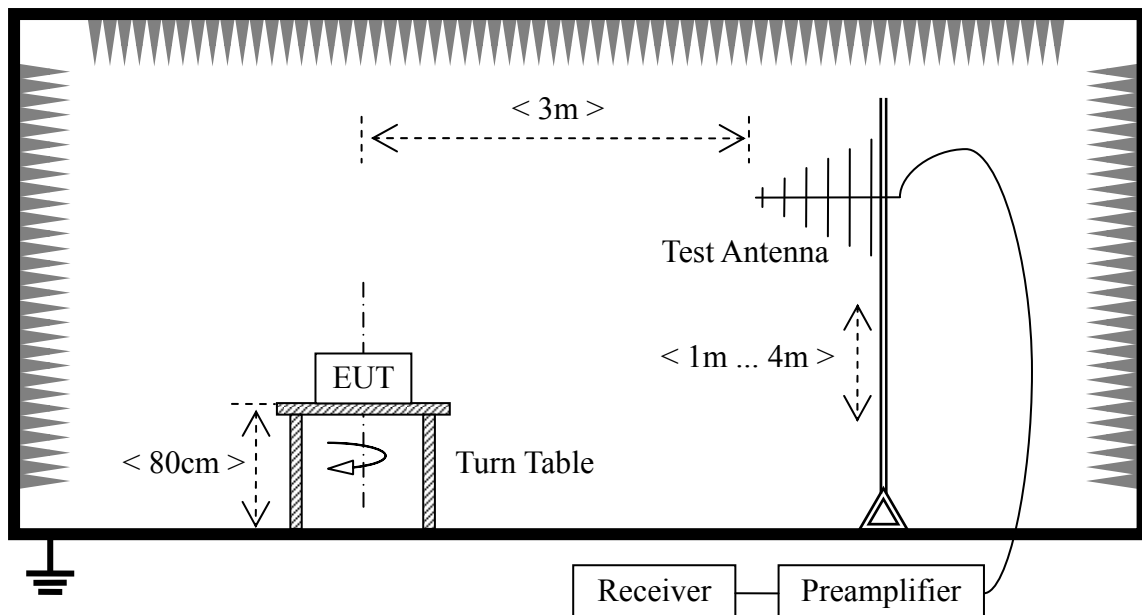
The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The test mode(s) described in Item 3.1 were scanned during the preliminary test:

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test

4.2.3 Test Setup



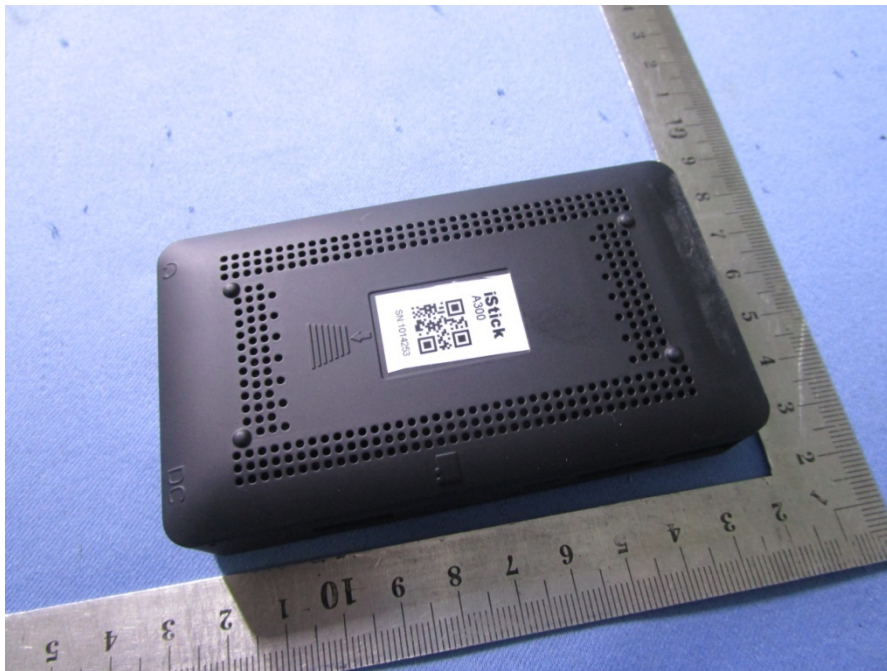
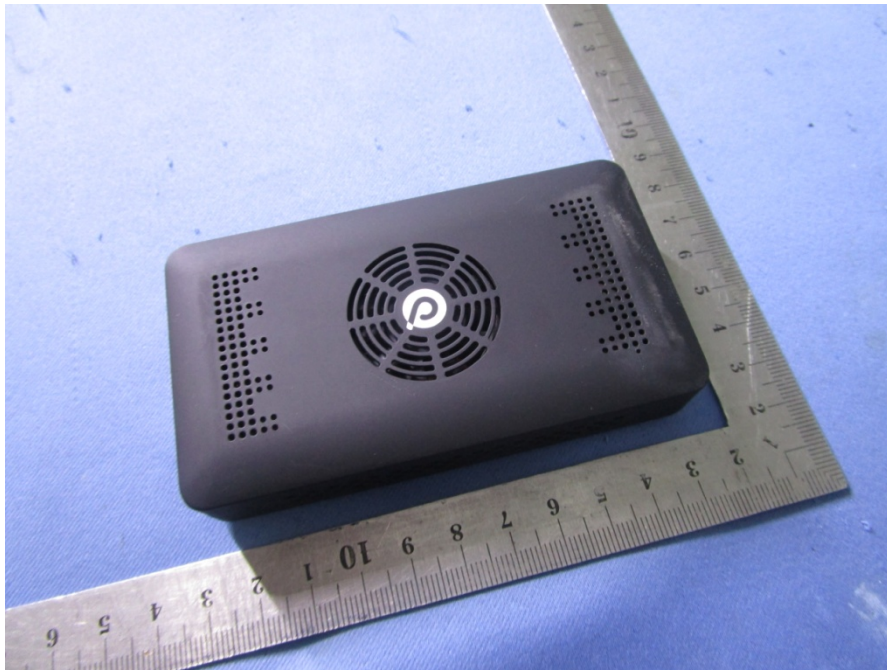
Test Verdict Recorded for Suspicious Points (30MHz~12.5GHz): Antenna Vertical

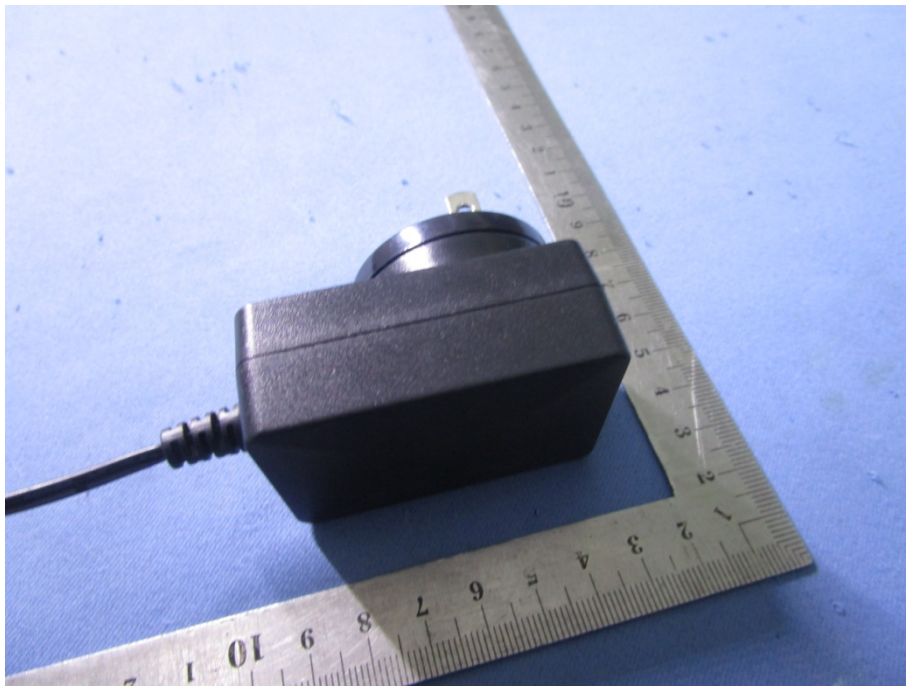
Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Result
31.07	36.20	40.00	3.80	Vertical	PASS
47.00	30.17	40.00	9.83	Vertical	PASS
63.31	33.51	40.00	6.49	Vertical	PASS
78.97	32.31	40.00	7.69	Vertical	PASS
162.04	31.82	43.50	11.68	Vertical	PASS
651.94	36.63	46.00	9.37	Vertical	PASS
1482.60	37.65	54.00	16.35	Vertical	PASS
1732.43	30.00	54.00	24.00	Vertical	PASS
2225.80	38.06	54.00	15.94	Vertical	PASS
2373.95	32.79	54.00	21.21	Vertical	PASS
2890.57	34.83	54.00	19.17	Vertical	PASS
3862.94	30.20	54.00	23.80	Vertical	PASS

Test Verdict Recorded for Suspicious Points (30MHz~12.5GHz): Antenna Horizontal

Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Result
63.31	27.10	40.00	12.90	Vertical	PASS
104.17	35.26	43.50	8.24	Vertical	PASS
161.47	39.18	43.50	4.32	Vertical	PASS
297.22	37.85	46.00	8.15	Vertical	PASS
446.41	33.58	46.00	12.42	Vertical	PASS
633.91	40.43	46.00	5.57	Vertical	PASS
1483.18	36.49	54.00	17.51	Vertical	PASS
1633.86	30.77	54.00	23.23	Vertical	PASS
2077.24	29.34	54.00	24.66	Vertical	PASS
2227.58	35.04	54.00	18.96	Vertical	PASS
2888.46	35.82	54.00	18.18	Vertical	PASS
5006.77	27.69	54.00	26.31	Vertical	PASS

Annex A Photos of the EUT





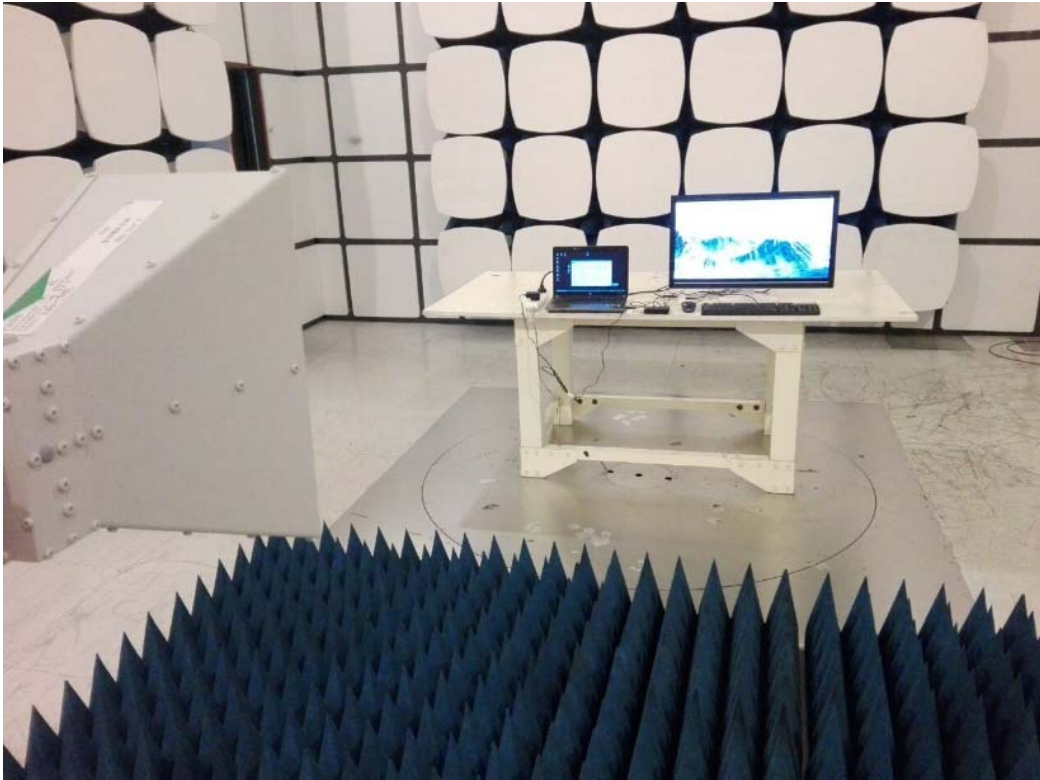
Annex B Photos of Test Setup

1. Conducted Emission



2. Radiated Emission





** END OF REPORT **