



TEST REPORT

APPLICANT : Shenzhen Jingwah Information Technology Co., Ltd.
PRODUCT NAME : Laptop
MODEL NAME : N141A, N14500
BRAND NAME : PACKARD BELL
STANDARD(S) : 47 CFR Part 15 Subpart B
TEST DATE : 2017-12-20 to 2018-01-05
ISSUE DATE : 2018-01-09

Tested by: Wang Dalong
Wang Dalong(Test Engineer)
Approved by: Andy Yeh
Andy Yeh(Technical Director)

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Change History		
Issue	Date	Reason for change
1.0	2018-01-09	First edition



1. Technical Information

Note: Provide by applicant

1.1. Applicant and Manufacturer Information

Applicant:	Shenzhen Jingwah Information Technology Co., Ltd.
Applicant Address:	4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District, Shenzhen, China
Manufacturer:	Shenzhen Jingwah Information Technology Co., Ltd.
Manufacturer Address:	4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District, Shenzhen, China

1.2. Equipment Under Test (EUT) Description

EUT Type:	Laptop	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	EM_A8316C_178B_V1.0	
Software Version:	windows 10 home	
Tx Frequency:	Bluetooth: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11 a/n: 5.150GHz- 5.250GHz;5.25 GHz -5.35 GHz; 5.47 GHz -5.725 GHz;5.725GHz- 5.850GHz	
Rx Frequency:	Bluetooth: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11 a/n: 5.150GHz- 5.250GHz;5.25 GHz -5.35 GHz; 5.47 GHz -5.725 GHz;5.725GHz- 5.850GHz	
Ancillary Equipment:	AC Adapter	
	Brand Name:	FJ
	Model No.:	FJ-SW12020000U
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	~ 100-240V, 50/60Hz, 0.4A
	Rated Output:	=12V,2A
	Battery	
	Brand Name:	Noveo
	Model No.:	NV-3482133-2S
	Serial No.:	(N/A, marked #1 by test site)
Capacity:	5000mAh	



	Rated Voltage:	7.6V
	Charge Limit:	8.7V

Note:

1. According to the designer, Shenzhen Jingwah Information Technology Co., Ltd., they hereby declare the difference between the product model name for commercial. The others are the same. The main measuring model is N141A, only the results for N141A were recorded in this report.
2. 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	2018.01.06	Wang Dalong	PASS
2	15.109	Radiated Emission	2018.01.05	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

Test Item	
Radiated Emission	
Mode 1	: EUT + Adapter + HDMI Line + TV
Conducted Emission	
Mode 1	: EUT + Adapter + HDMI Line + TV

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).

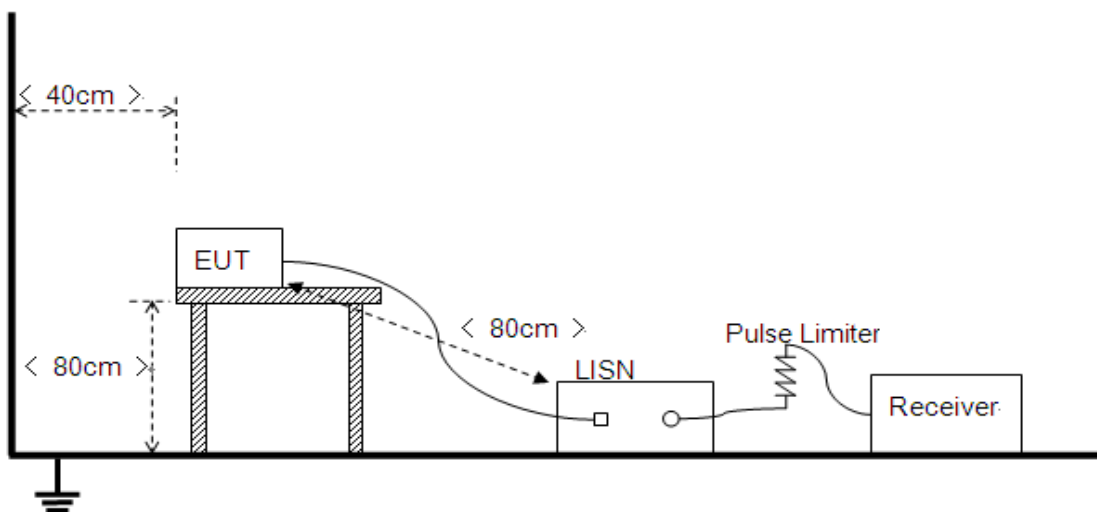
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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.





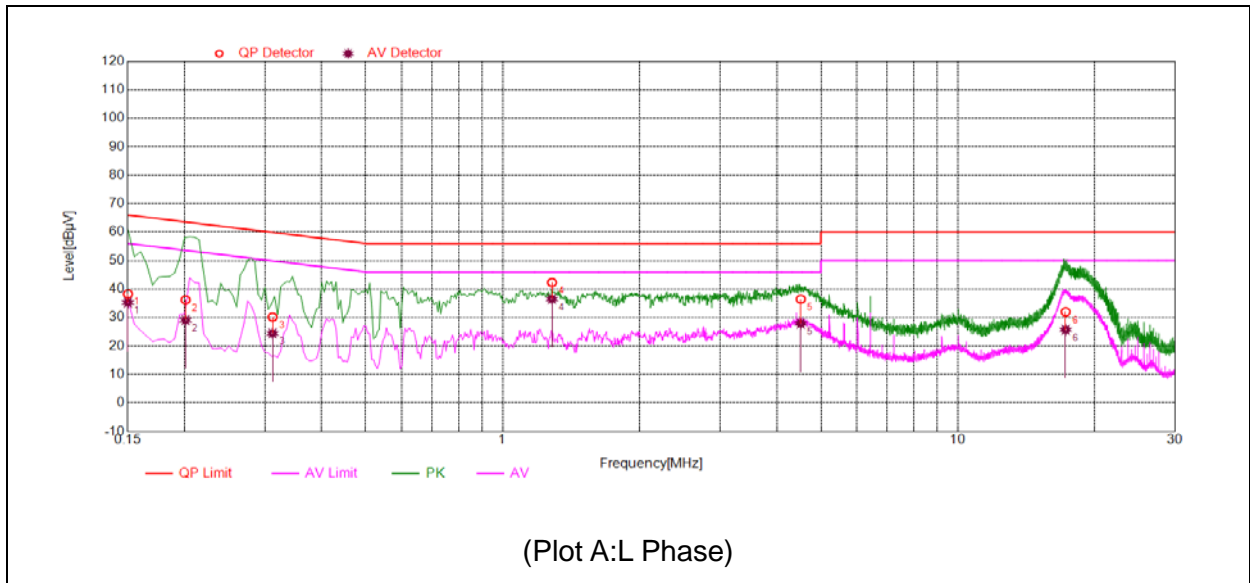
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. A Pulse Limiter is 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.

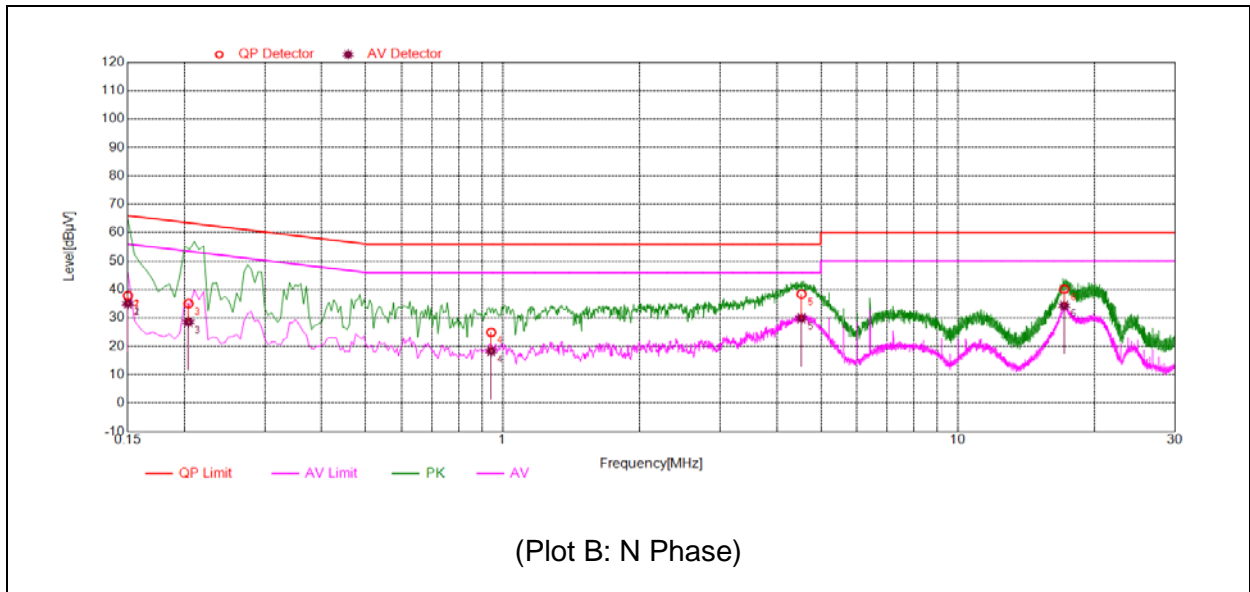
3.1.3. Test Result

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	0.15	38.30	35.27	66.00	56.00	Line	PASS
2	0.2008	36.20	29.12	63.58	53.58		PASS
3	0.3118	30.17	24.44	59.92	49.92		PASS
4	1.2826	42.31	36.51	56.00	46.00		PASS
5	4.5162	36.46	27.90	56.00	46.00		PASS
6	17.255	32.00	25.70	60.00	50.00		PASS



NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.15	37.84	35.06	66.00	56.00	Neutral	PASS
2	0.16	37.88	35.09	66.00	56.00		PASS
3	0.2038	35.09	28.59	63.45	53.45		PASS
4	0.9428	24.95	18.34	56.00	46.00		PASS
5	4.5322	38.38	29.90	56.00	46.00		PASS
6	17.127	40.11	34.31	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	
	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
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 $\text{dB}\mu\text{V/m}$ is calculated by $20\log$ Emission Level($\mu\text{V/m}$).

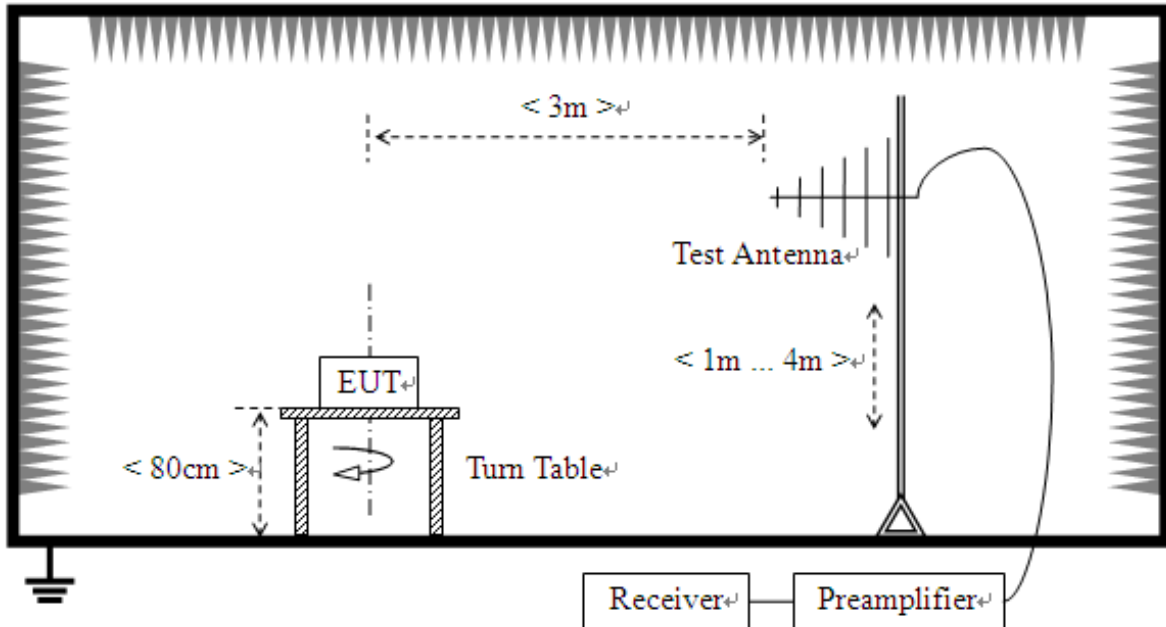
3.2.2. Frequency range of measurement

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

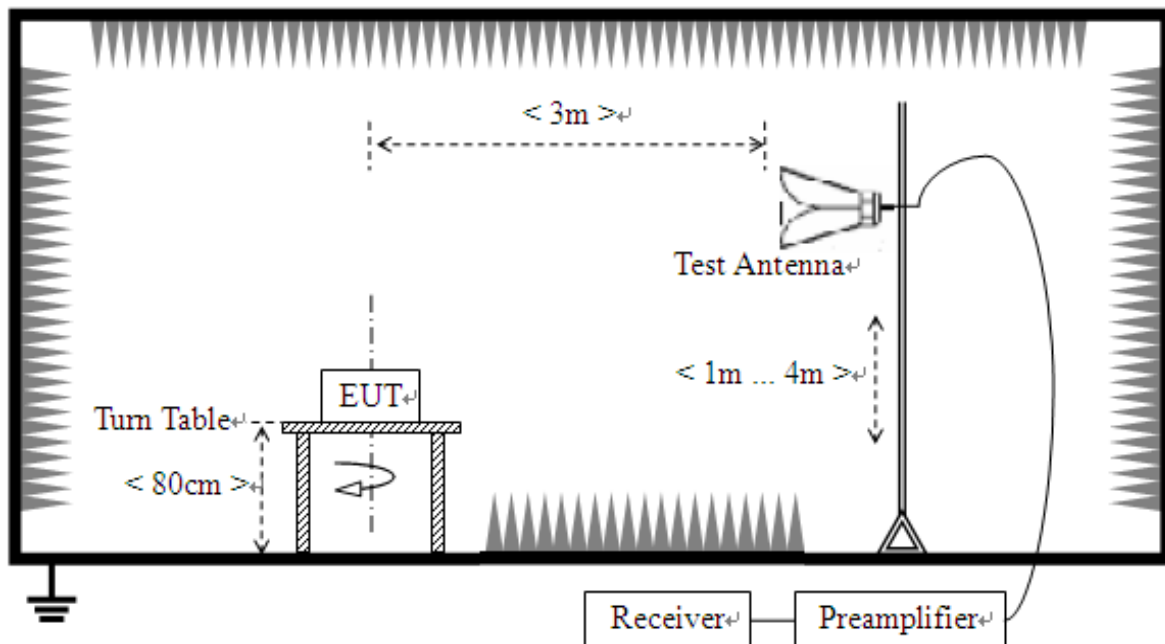
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705–108	1000.
108–500	2000.
500–1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

3.2.3. Test Setup

- 1) For radiated emissions from 30MHz to1GHz



- 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:

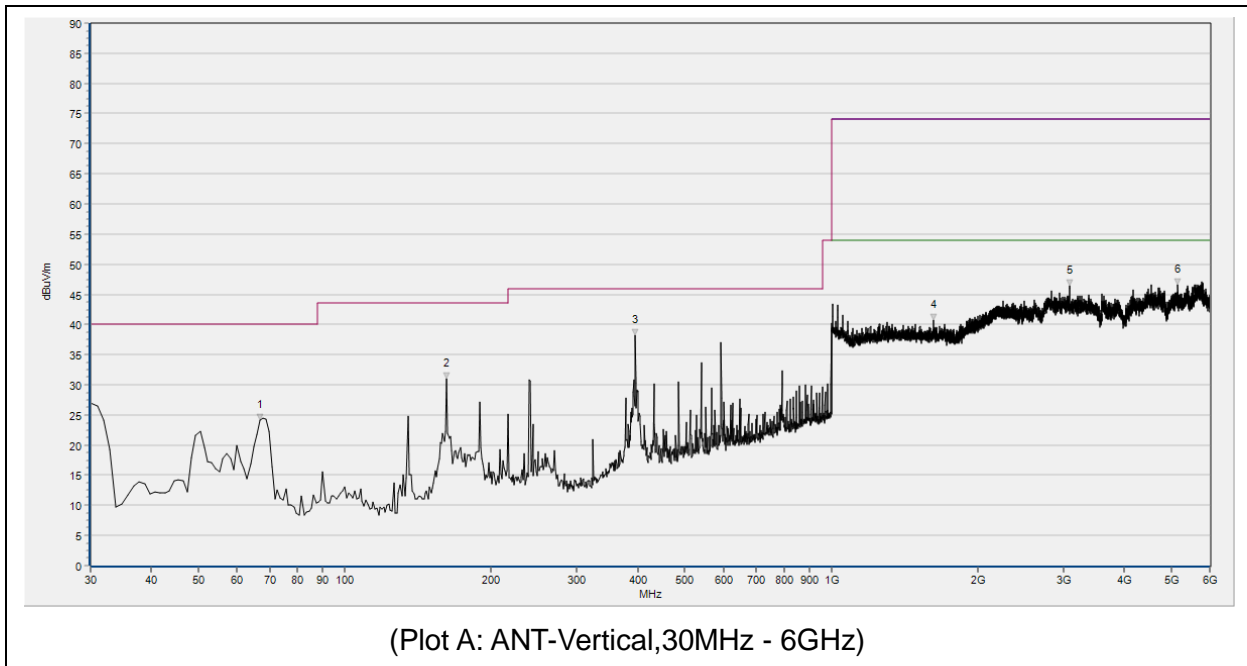
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal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

3.2.4. Test Result

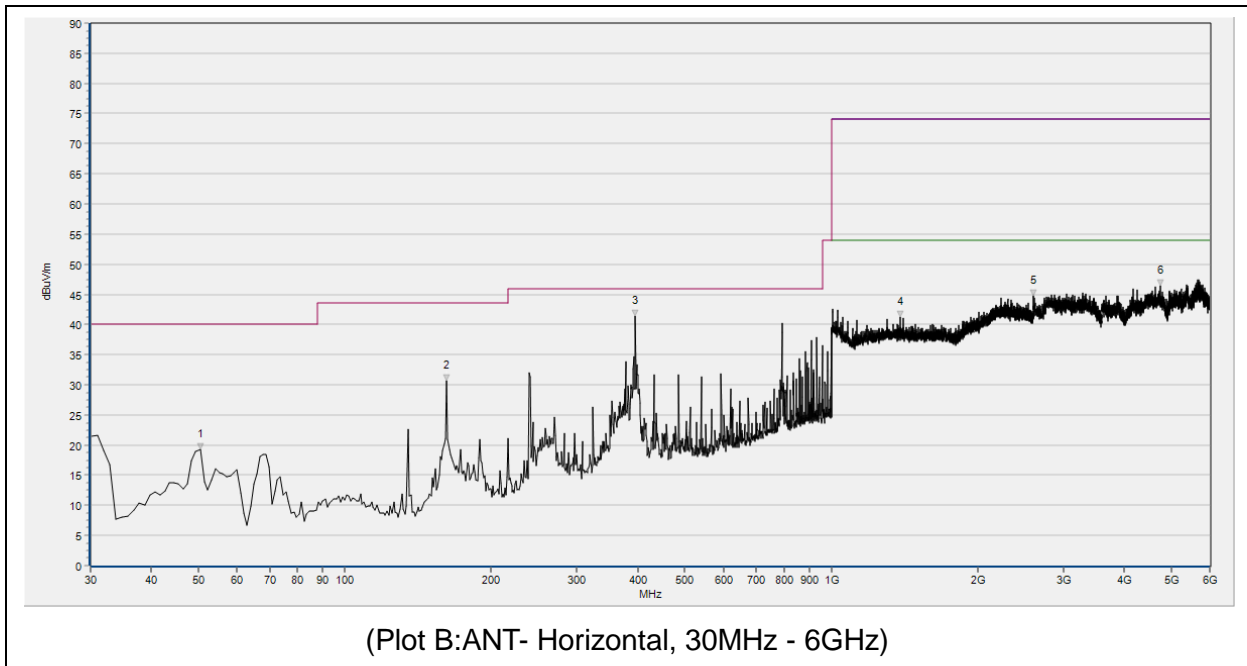
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

The amplitude of emissions (6GHz-12.5GHz) 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 dB μ V/m	QP dB μ V/m	AV dB μ V/m	Limit-PK dB μ V/m	Limit-QP dB μ V/m	Limit-AV dB μ V/m	ANT	Verdict
1	66.860	N.A.	24.16	N.A.	N.A.	40.00	N.A.	V	PASS
2	161.920	N.A.	31.06	N.A.	N.A.	43.50	N.A.	V	PASS
3	395.690	N.A.	38.27	N.A.	N.A.	46.00	N.A.	V	PASS
4	1625.067	40.65	N.A.	33.18	74.00	N.A.	54.00	V	PASS
5	3086.400	46.40	N.A.	39.24	74.00	N.A.	54.00	V	PASS
6	5161.280	46.54	N.A.	39.31	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	50.370	N.A.	19.25	N.A.	N.A.	40.00	N.A.	H	PASS
2	161.920	N.A.	30.62	N.A.	N.A.	43.50	N.A.	H	PASS
3	395.690	N.A.	41.32	N.A.	N.A.	46.00	N.A.	H	PASS
4	1386.133	41.24	N.A.	34.06	74.00	N.A.	54.00	H	PASS
5	2606.400	44.74	N.A.	37.32	74.00	N.A.	54.00	H	PASS
6	4749.120	46.41	N.A.	39.19	74.00	N.A.	54.00	H	PASS

Annex A Photographs of Test Setup

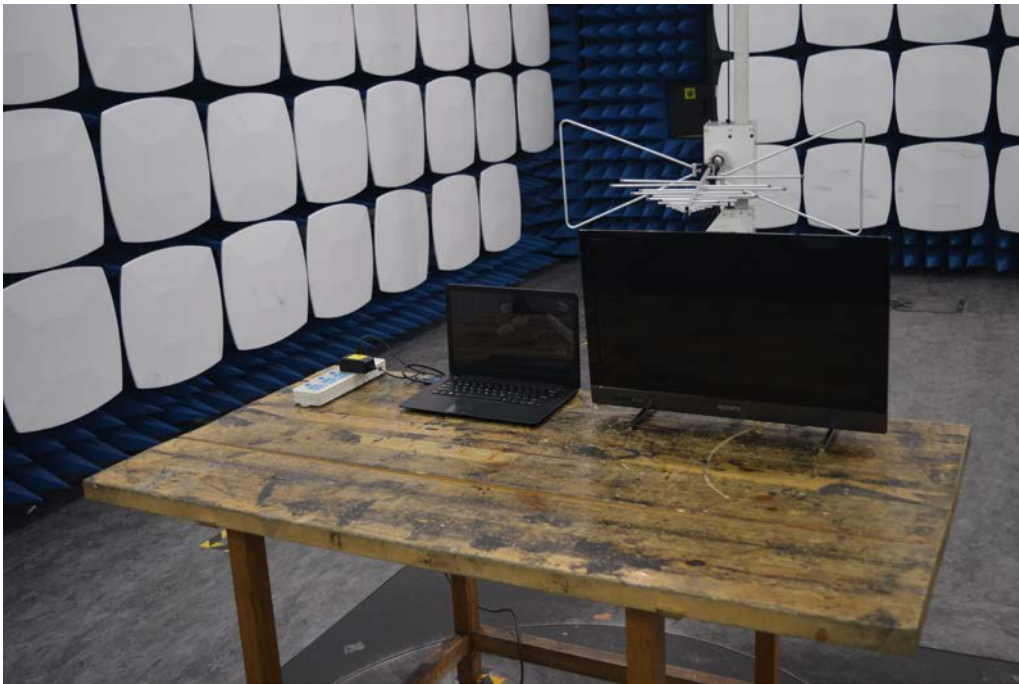
1. Mains Terminal Disturbance Voltage Measurement



2. Conducted emission main's port side view



3. Radiated Field Strength Measurement(30MHz-1GHz)



4. Radiated Field Strength Measurement(above 1GHz)





Annex B 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 C Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.	
Department:	Morlab Laboratory	
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China	
Responsible Test Lab Manager:	Mr. Su Feng	
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. (Shenzhen Morlab Communications Technology Co., Ltd.)
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4. Test Software Utilized

Model	Version Number	Producer
MORLAB EMCR V1.2	Version 1.0	MORLAB
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	2017.05.17	2018.05.16
Receiver	KEYSIGHT	N9038A	MY56400093	2017.07.13	2018.07.12
LISN	Schwarzbeck	NSLK 8127	812744	2017.05.17	2018.05.16
Pulse Limiter (20dB)	VTSD	9561D	9537	2017.05.17	2018.05.16
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-519	2017.05.14	2018.05.13
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	1774	2017.09.13	2018.09.12
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2017.11.19	2020.11.18

————— END OF REPORT —————