REPORT No.: SZ16070074W01

FCC RF TEST REPORT

APPLICANT	:	Shanghai Mobvoi Information Technology Company Limited
PRODUCT NAME	:	Smart Watch
MODEL NAME	:	WE12016
TRADE NAME	:	ticwatch
BRAND NAME	:	ticwatch
FCC ID	:	2AHEA-WE12016
STANDARD(S)	:	47 CFR Part 15 Subpart C
ISSUE DATE	:	2016-08-08

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2016-08-08	First edition

TEST REPORT DECLARATION

Applicant	Shanghai Mobvoi Information Technology Company Limited
Applicant Address	Building 2-106, 1690 Cailun Road, China (Shanghai) free trade area, China
Manufacturer	Shanghai Mobvoi Information Technology Company Limited
Manufacturer Address	Building 2-106, 1690 Cailun Road, China (Shanghai) free trade area, China
Product Name	Smart Watch
Model Name	WE12016
Brand Name	ticwatch
HW Version	2.0
SW Version	5.1
Test Standards	47 CFR Part 15 Subpart C
Test Date	2016-08-01 to 2016-08-02
Test Result	PASS

Tested by : Zou Jian

Zou Jian

Reviewed by : Qiu Xiaojun

Qiu Xiaojun

Approved by : Peng Huarui

Peng Huarui

1. TECHNICAL INFORMATION

Note: Provide by applicant.

1.1 Applicant Information

Company:	Shanghai Mobvoi Information Technology Company Limited
Address:	Building 2-106, 1690 Cailun Road, China (Shanghai) free trade area, China

1.2 Equipment under Test (EUT) Description

Brand Name:	ticwatch
Trade Name:	ticwatch
Model Name:	WE12016
Frequency Range:	The frequency range used is 2402MHz - 2480MHz (40 channels, at intervals of 2MHz);
Modulation Type:	GFSK
Bluetooth Version:	BT4.1(BLE)
Antenna Type:	Dedicated Antenna
Antenna Gain:	-8.98 dBi

NOTE:

The EUT is a Smart Watch, it contain Bluetooth 4.1(BLE) operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth 4.1(BLE) is F(MHz)=2402+2*n (0<=n<=39). The lowest, middle, highest channel numbers of the Bluetooth EUT used and tested in this report are separately 0 (2402MHz), 19 (2440MHz) and 39 (2480MHz).

1. The EUT powered by battery. During the test, the EUT powered by a new battery.
2. The EUT connected to the serial port of the computer with a serial communication cable, and then use the dedicated software to control the EUT into the test mode.

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

1.2.1 Identification of all used EUTs

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
01	2.0	5.1

1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-15 Edition)	Radio Frequency Devices

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

No.	Section	Description	Test Date	Result
1	15.247(d)	Restricted Frequency Bands	Aug 01, 2016	**PASS**
2	15.209 ,15.247(d)	Radiated Emission	Aug 02, 2016	**PASS**

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013.

1.3.1 Test Environment Conditions

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

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

2. 47 CFR PART 15C REQUIREMENTS

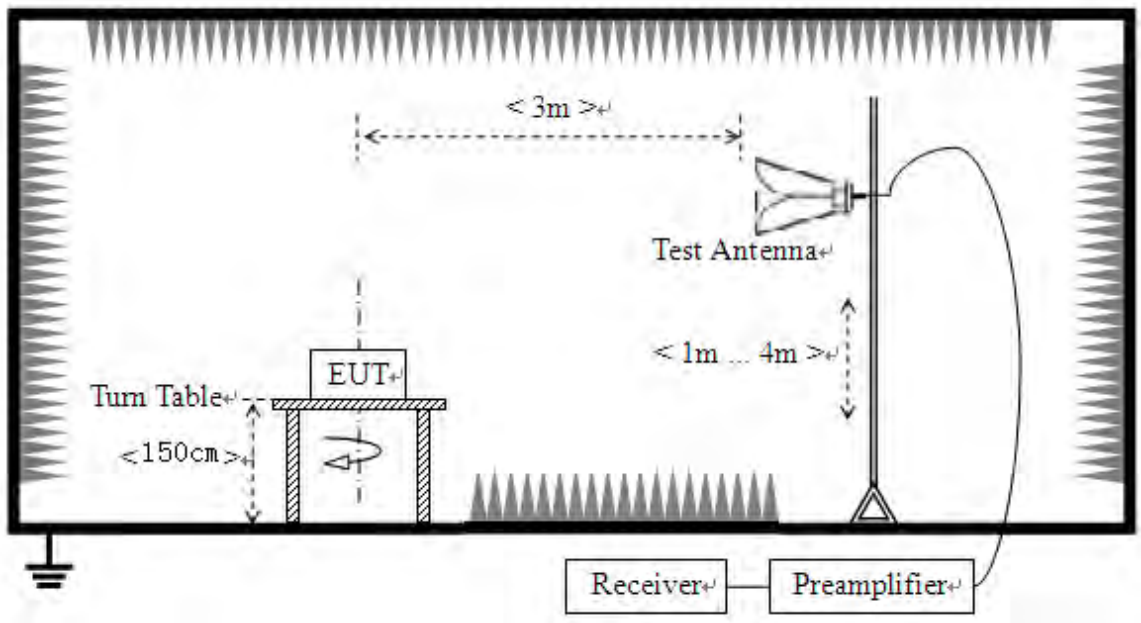
2.1 Restricted Frequency Bands

2.1.1 Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.1.2 Test Description

A. Test Setup



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

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.

B. Equipments List:

Please reference ANNEX A(1.5).

2.1.3 Test Result

The lowest and highest channels are tested to verify the Restricted Frequency Bands.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

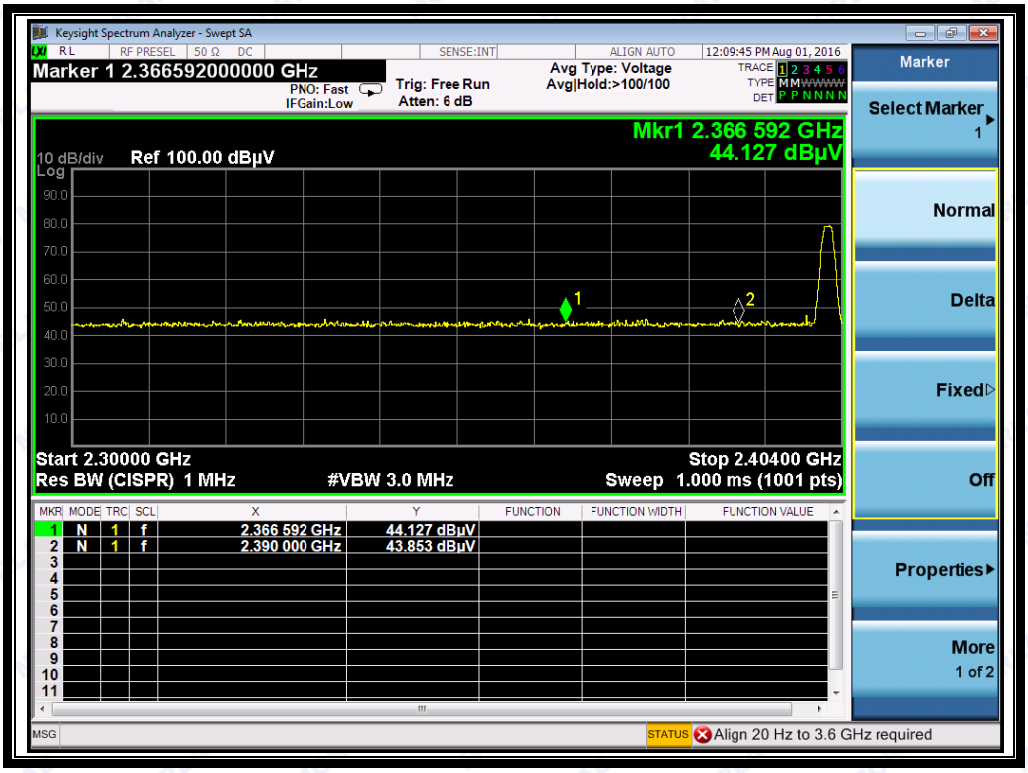
A_{Factor}: Antenna Factor at 3m

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

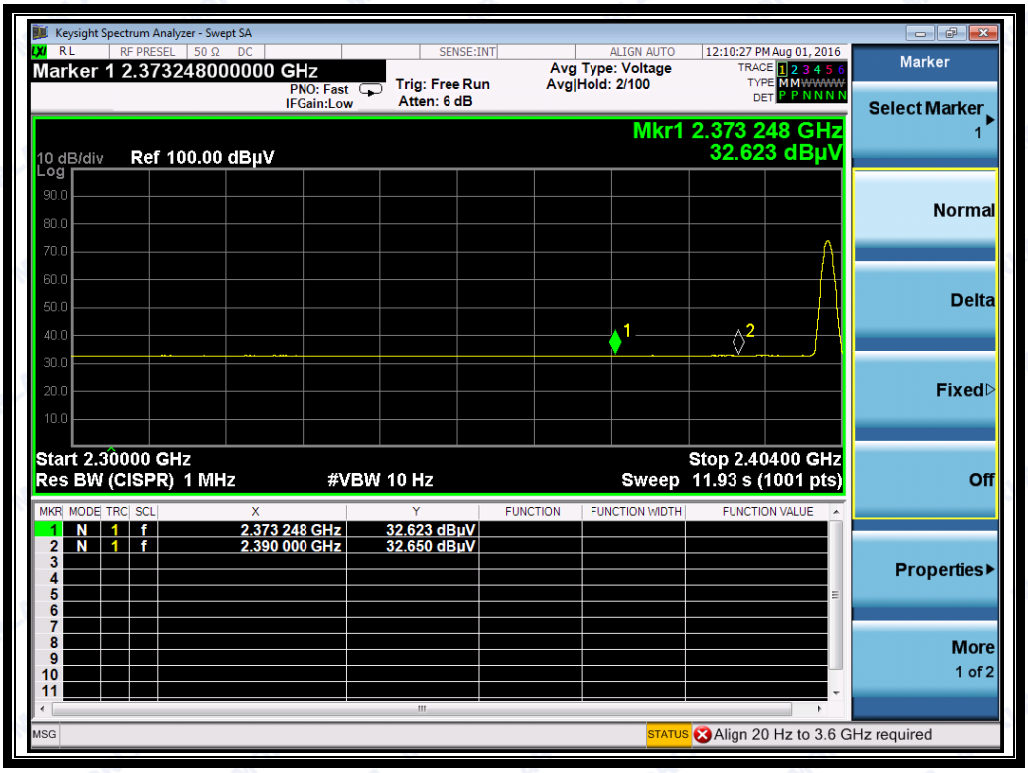
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
0	2366.692	PK	44.13	-33.63	32.56	43.06	74	Pass
0	2373.248	AV	32.62	-33.63	32.56	31.55	54	Pass
39	2484.93	PK	43.89	-33.18	32.5	43.21	74	Pass
39	2486.7	AV	32.72	-33.18	32.5	32.04	54	Pass

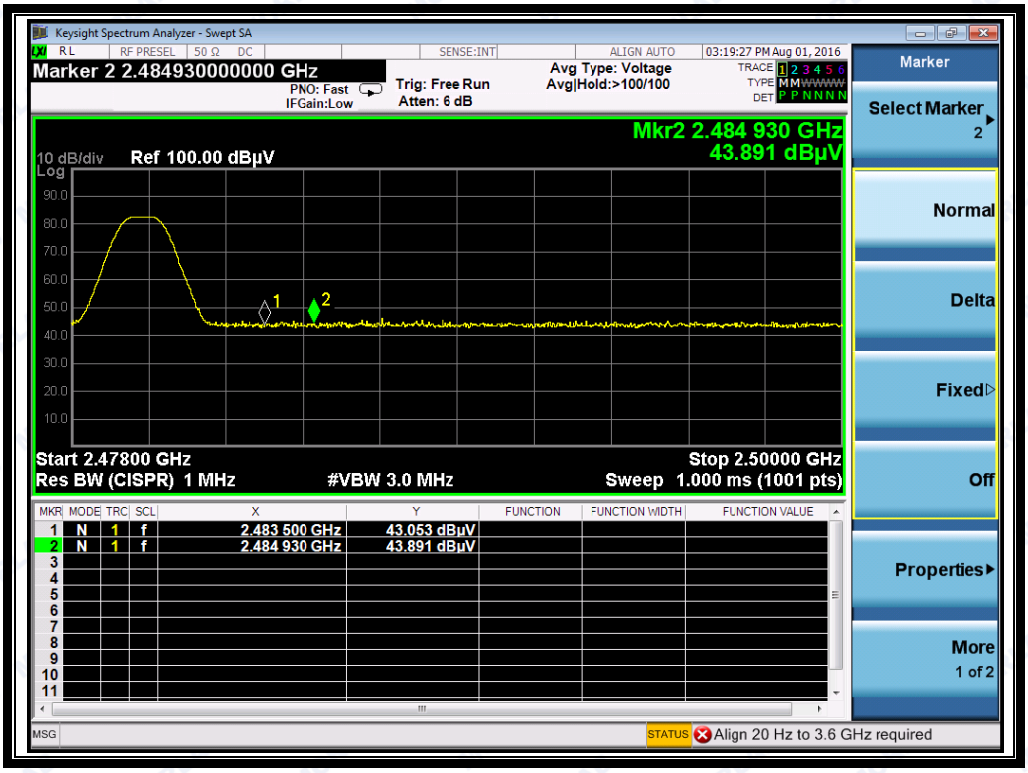
B. Test Plots:



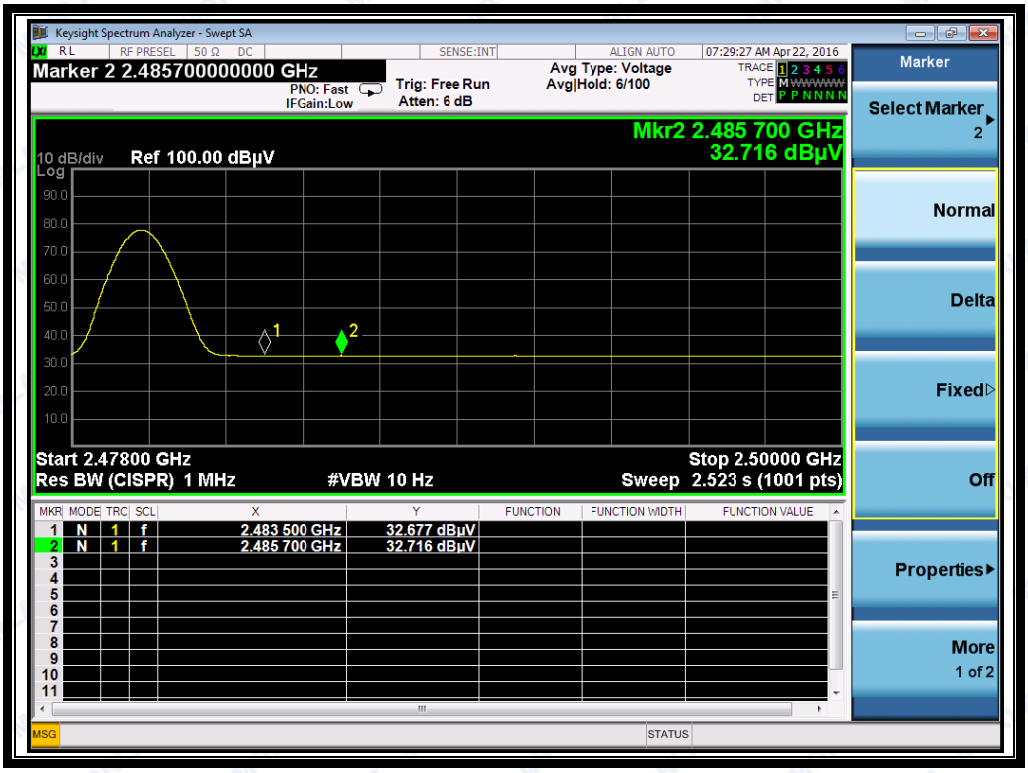
(Plot A1: Channel = 0 PEAK)



(Plot A2: Channel = 0 AVG)



(Plot B1: Channel = 39 PEAK)



(Plot B2: Channel = 39 AVG)

2.2 Radiated Emission

2.2.1 Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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:

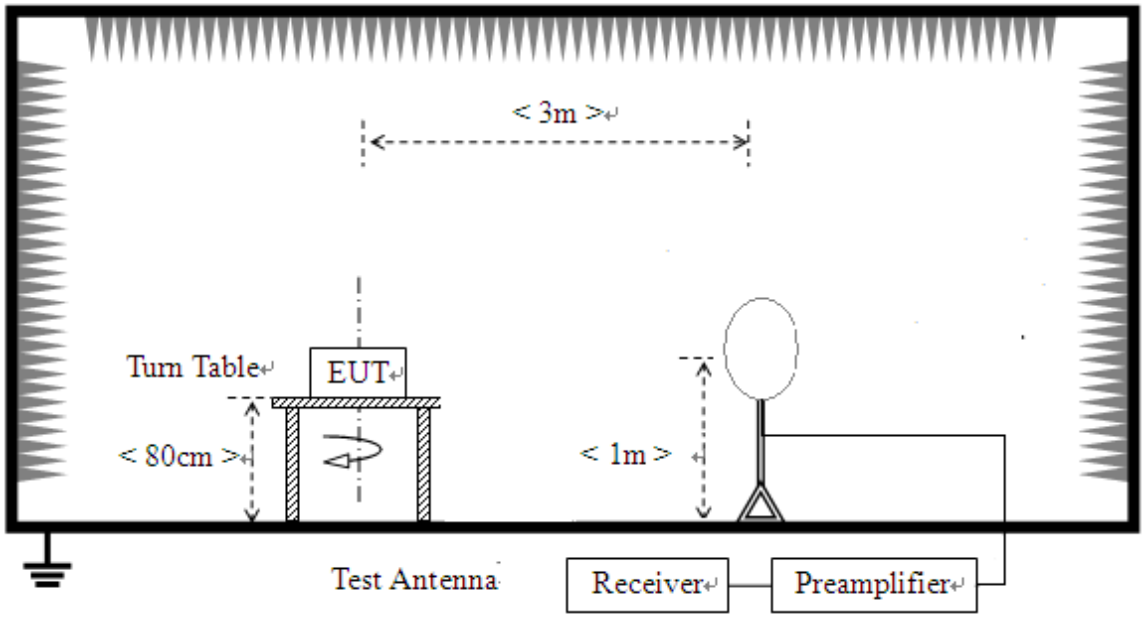
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

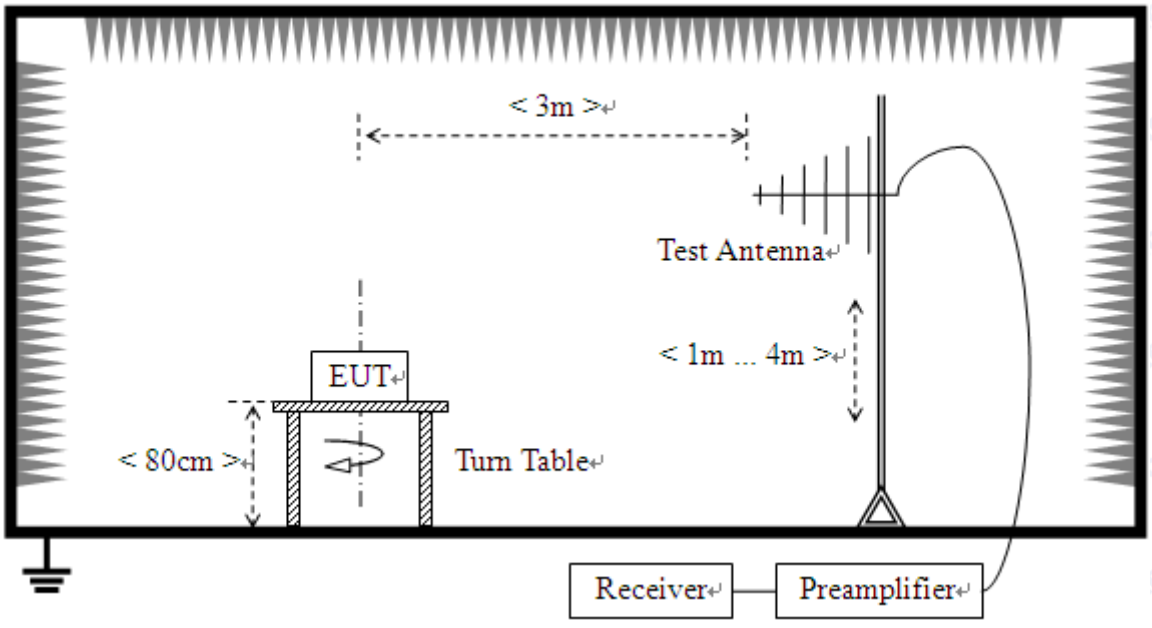
2.2.2 Test Description

A. Test Setup:

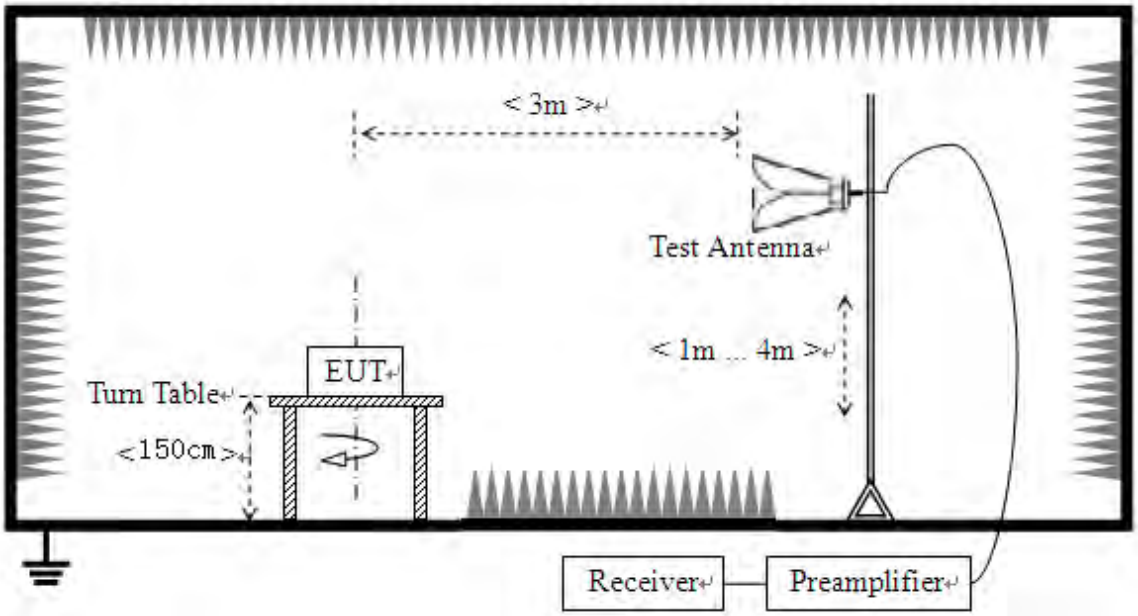
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). For radiated emissions below or equal to 1GHz,The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna.

The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

(b) 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.

B. Equipments List:

Please reference ANNEX A(1.5).

2.2.3 Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

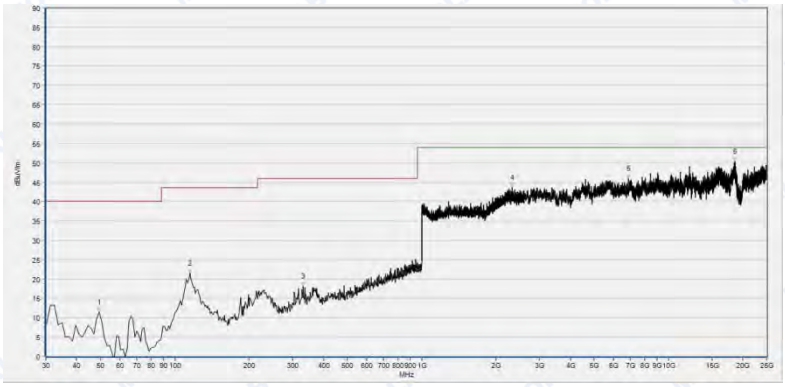
During the test, the total correction Factor A_T and A_{Factor} were built in test software.

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.

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

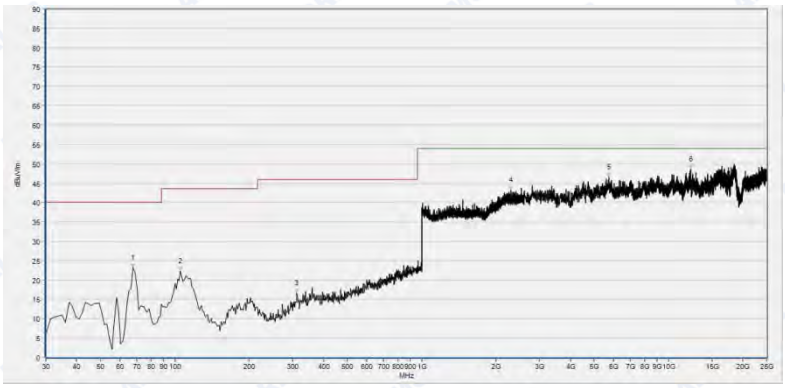
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
49.424	11.32	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
114.981	21.40	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
331.076	18.04	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2323.409	43.56	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS
6893.435	45.93	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS
18543.553	50.31	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS

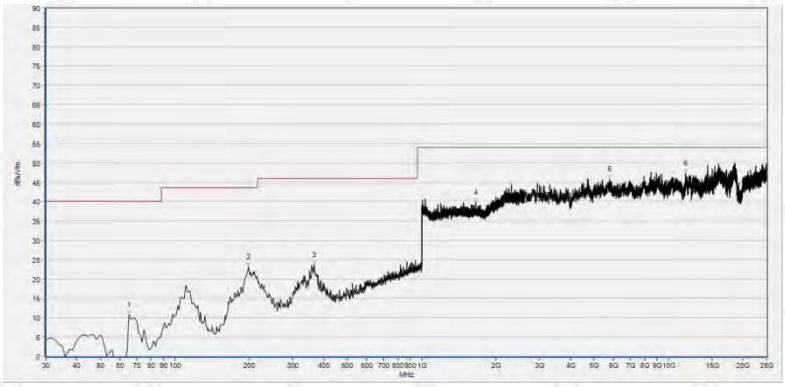
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
67.635	23.05	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
105.269	22.33	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
311.652	16.58	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2295.878	43.19	N.A	N.A	74.0	N.A	54.00	Vertical	PASS
5744.717	46.51	N.A	N.A	74.0	N.A	54.00	Vertical	PASS
12286.707	48.58	N.A	N.A	74.0	N.A	54.00	Vertical	PASS

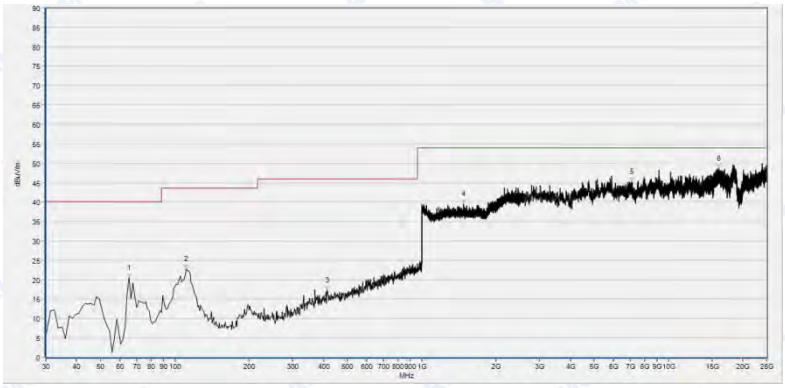
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 19



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
65.207	10.70	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
198.748	23.11	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
366.283	23.58	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
1655.622	39.77	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS
5765.085	45.78	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS
11757.156	47.24	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS

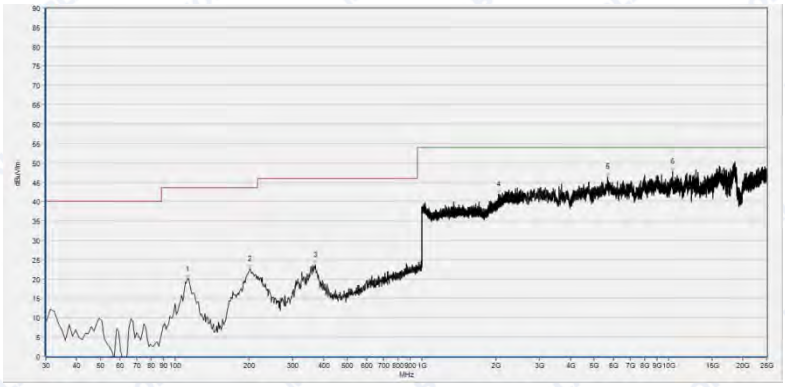
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
65.207	20.44	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
111.339	22.86	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
412.416	17.18	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
1475.710	39.58	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
7076.741	45.20	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
15997.636	48.62	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

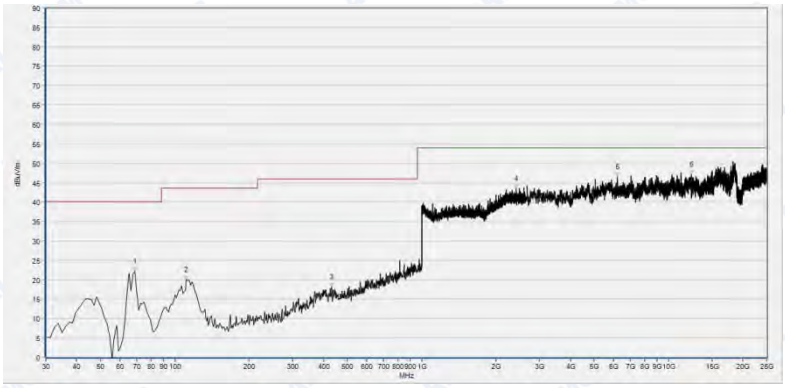
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 39



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
112.553	19.91	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
201.176	22.70	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
371.139	23.65	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2046.819	41.91	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS
5667.321	46.40	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS
10388.471	47.75	N.A	N.A	74.0	N.A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
68.849	22.10	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
111.339	19.86	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
431.840	18.18	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2404.722	43.41	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
6196.872	46.36	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12347.809	47.13	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

ANNEX A GENERAL INFORMATION

1.1 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

1.2 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

1.3 Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10 2013 and CISPR Publication 22; the FCC registration number is 695796.

1.4 Maximum measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Measurements	**Frequency**	**Uncertainty**
Conducted emissions	9KHz~30MHz	2.44dB
Radiated emissions	9KHz~30MHz	2.44dB
	30MHz~200MHz	2.93dB
	200MHz~1000MHz	2.95dB
	1GHz~18GHz	2.26dB
	18GHz~40GHz	1.94dB

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

1.5 Test Equipments Utilized

1.5.1 Radiated Test Equipments

Radiated Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal.Due Date**
1	System Simulator	GB45360846	8960-E5515C	Agilent	2016.03.02	2017.03.01
2	Receiver	MY54130016	N9038A	Agilent	2016.03.02	2017.03.01
3	Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2016.03.02	2017.03.01
4	Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2016.03.02	2017.03.01
5	Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2016.03.02	2017.03.01
6	Test Antenna - Horn	71688	BBHA 9120D	Schwarzbeck	2016.03.02	2017.03.01
7	Coaxial cable(N male)	CB02	EMC02	Morlab	N/A	N/A
8	Coaxial cable(N male)	CB03	EMC03	Morlab	N/A	N/A
9	1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde&Schwarz	2016.03.02	2017.03.01
10	18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde&Schwarz	2016.03.02	2017.03.01

1.5.2 Climate Chamber

Climate Chamber						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Climate Chamber	2004012	HL4003T	Yinhe	2016.03.02	2017.03.01

1.5.3 Vibration Table

Vibration Table						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Vibration Table	N/A	ACT2000-S015L	CMI-COM	2016.03.02	2017.03.01

1.5.4 Anechoic Chamber

Anechoic Chamber

No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Anechoic Chamber	N/A	9m*6m*6m	Changning	2016.03.02	2017.03.01

1.5.5 Auxiliary Test Equipment

Auxiliary Test Equipment						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Computer	N.A	PU500C	Asus	N.A	N.A

***** END OF REPORT *****