



# RADIO TEST REPORT

Report No: STS1511036F03

Issued for

CHAORAN DEVELOPMENT CO. LIMITED

ROOM 911,9/F,TOWER B,NEW MANDARIN PLAZA,14  
SCIENCE MUSEUM ROAD,TST EAST,KOWLOON,HONG  
KONG

Product Name:	Smart watch
Brand Name:	SG (SMARTGO)
Model No.:	SW-02
Series Model:	SW-01,SW-03,SW-04, SW-05,ATSW100,A8
FCC ID:	2AGFMSW-02
Test Standard:	FCC Part 15.225

Any reproduction of this document must be done in full. No single part of this document may be reproduced without permission from STS, All Test Data Presented in this report is only applicable to presented Test sample.

Shenzhen STS Test Services Co., Ltd.  
1/F., Building B, Zhuoke Science Park, No.190,Chongqing Road,  
Fuyong Street, Bao'an District, Shenzhen, Guangdong,China  
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com





## TEST RESULT CERTIFICATION

**Applicant's name** ..... : CHAORAN DEVELOPMENT CO. LIMITED  
**Address** ..... : ROOM 911,9/F,TOWER B,NEW MANDARIN PLAZA,14 SCIENCE MUSEUM ROAD,TST EAST,KOWLOON,HONG KONG  
**Manufacturer's Name** ..... : CHAORAN POWER ELECTRONICS ( SHENZHEN ) CO. LTD.  
**Address** ..... : 2/F,BUILDING A,XUTAI INDUSTRIAL ZONE, DAWO VILLAGE, KENGZI TOWN, PINGSHAN DISTRICT,SHENZHEN, CHINA

### Product description

**Product name** ..... : Smart watch  
**Model and/or type reference** : SW-02, SW-01,SW-03,SW-04,SW-05,ATSW100,A8

**Standards** ..... : FCC Part15.225

**Test procedure** ..... : ANSI C63.10: 2013  
ANSI C63.4: 2014

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

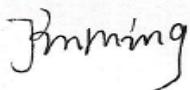
This report shall not be reproduced except in full, without the written approval of STS, this document may be altered or revised by STS, personal only, and shall be noted in the revision of the document.

**Date of Test** ..... :

**Date (s) of performance of tests** ..... : 05 Nov. 2015 ~10 Nov. 2015

**Date of Issue** ..... : 11 Nov. 2015

**Test Result** ..... : **Pass**

Testing Engineer : 

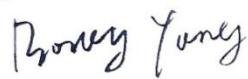
(Jin Ming)

Technical Manager : 

(Vita Li)



Authorized Signatory :



(Bovey Yang)



Table of Contents	Page
<b>1. SUMMARY OF TEST RESULTS</b>	<b>5</b>
1.1 TEST FACTORY	5
1.2 MEASUREMENT UNCERTAINTY	5
<b>2. GENERAL INFORMATION</b>	<b>6</b>
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF TEST MODES	7
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	8
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	9
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	10
<b>3. EMC EMISSION TEST</b>	<b>11</b>
3.1 CONDUCTED EMISSION MEASUREMENT	11
3.2 TEST PROCEDURE	12
3.3 TEST SETUP	12
3.4 EUT OPERATING CONDITIONS	12
3.5 TEST RESULTS	13
<b>4. RADIATED EMISSION MEASUREMENT</b>	<b>15</b>
4.1 RADIATED EMISSION LIMITS	15
4.2 TEST PROCEDURE	16
4.3 TEST SETUP	17
4.4 EUT OPERATING CONDITIONS	17
4.5 TEST RESULTS	18
<b>5. FREQUENCY TOLERANCE</b>	<b>21</b>
5.1 REQUIREMENT	21
5.2 TEST PROCEDURE	21
5.3 TEST SETUP	21
5.4 EUT OPERATION CONDITIONS	21
5.5 TEST RESULTS	22
<b>6. 20DB BANDWIDTH</b>	<b>23</b>
6.1 APPLIED PROCEDURES / LIMIT	23
6.2 TEST PROCEDURE	23
6.3 TEST SETUP	23
6.4 EUT OPERATION CONDITIONS	23
6.5 TEST RESULTS	24



Table of Contents	Page
<b>7. ANTENNA REQUIREMENT</b>	<b>25</b>
<b>7.1 STANDARD REQUIREMENT</b>	<b>25</b>
<b>7.2 EUT ANTENNA</b>	<b>25</b>
<b>8. EUT TEST PHOTO</b>	<b>26</b>





## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.225) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.209 15.225(a)(b)(c)(d)	Radiated Emission	PASS	--
15.225(e)	Frequency Tolerance	PASS	--
15.203	Antenna Requirement	PASS	--
15.215	20dB Bandwidth	PASS	--

### NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

### 1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,  
Fuyong Street, Bao'an District, Shenzhen, Guangdong,China  
CNAS Registration No.: L7649;

FCC Registration No.: 842334; IC Registration No.: 12108A-1

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$  , providing a level of confidence of approximately 95 % 。

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	$\pm 2.88\text{dB}$
2	Conducted Emission (150KHz-30MHz)	$\pm 2.67\text{dB}$
3	RF power,conducted	$\pm 0.70\text{dB}$
4	Spurious emissions,conducted	$\pm 1.19\text{dB}$
5	All emissions,radiated(<1G) 30MHz-200MHz	$\pm 2.83\text{dB}$
6	All emissions,radiated(<1G) 200MHz-1000MHz	$\pm 2.94\text{dB}$
8	Temperature	$\pm 0.5^\circ\text{C}$
9	Humidity	$\pm 2\%$



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Smart watch				
Trade Name	SG (SMARTGO)				
Model Name	SW-02				
Series Model	SW-01,SW-03,SW-04,SW-05,ATSW100,A8				
Model Difference	Just different appearance and model number				
Product Description	The EUT is a Smart watch				
	Operation Frequency:	13.56MHz			
	Modulation Type:	FSK			
	Antenna Designation:	Please see Note 3.			
	Antenna Gain (dBi)	0 dbi			
Channel List	Please refer to the Note 2.				
Adapter	Input: AC100-240V, 200mA, 50/60 Hz Output: DC 5V, 1A				
Battery	Rated Voltage: 3.7V capacity :350mAh				
Hardware version number	L99 V1.3				
Software versioning number	V3.1				
Connecting I/O Port(s)	Please refer to the User's Manual				

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

### 2. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	SG (SMARTGO)	SW-02	PIFA Antenna	N/A	0	ANT



## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode

For Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

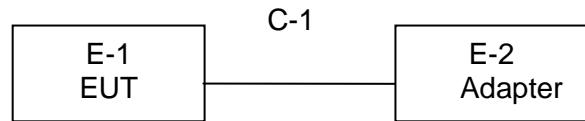
For Radiated Emission	
Final Test Mode	Description
Mode 1	TX Mode

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported



## 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





## 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	Smart watch	SG (SMARTGO)	SW-02	N/A	EUT
E-2	Adapter	Mingxin power	MX510-05010000U	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	unshielded	NO	121cm	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Test Receiver	R&S	ESCI	101427	2015.10.25	2016.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.11.25	2015.11.24
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.06	2016.03.05
Loop Antenna	EMCO	6502	9003-2485	2015.03.06	2016.03.05
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.06	2016.06.05
PreAmplifier	Agilent	8449B	60538	2015.10.25	2016.10.24
Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2015.10.25	2016.10.24
STS-E048	MXA SIGNAL Analyzer	Agilent	N9020A	2015.10.25	2016.10.24

### Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	102086	2014.11.20	2015.11.19
LISN	R&S	ENV216	101242	2015.10.25	2016.10.24
LISN	EMCO	3810/2NM	000-23625	2015.10.25	2016.10.24



### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

operating frequency Smart watch. In case the emission fall within the restricted Smart watch specified on Part 15. 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the Smart watch edges.
- (2) The limit of " \* " marked Smart watch means the limitation decreases linearly with the logarithm of the frequency in the range.

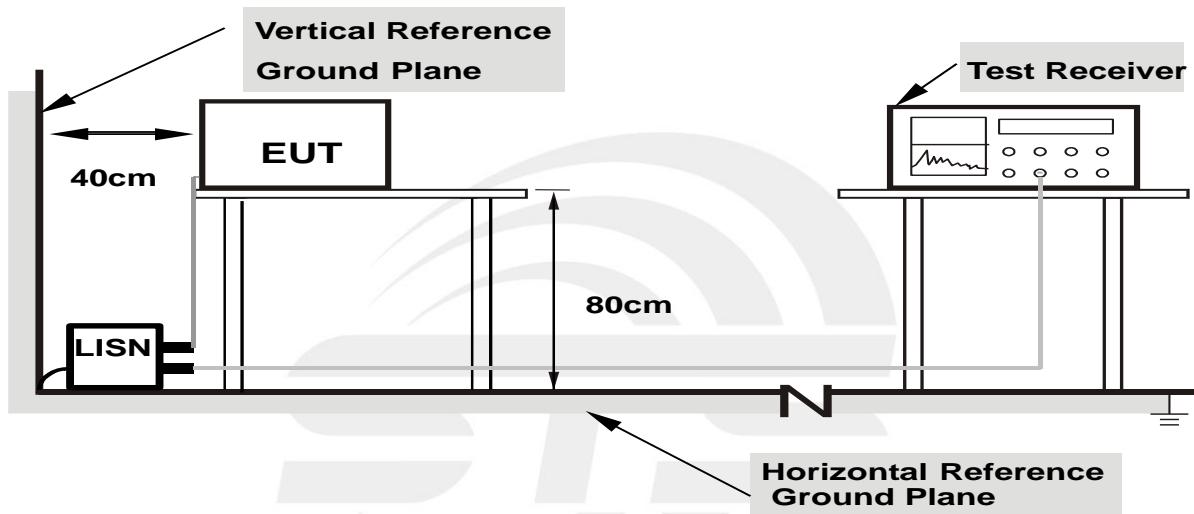
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

### 3.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.3 TEST SETUP



**Note:** 1. Support units were connected to second LISN.  
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 3.5 TEST RESULTS

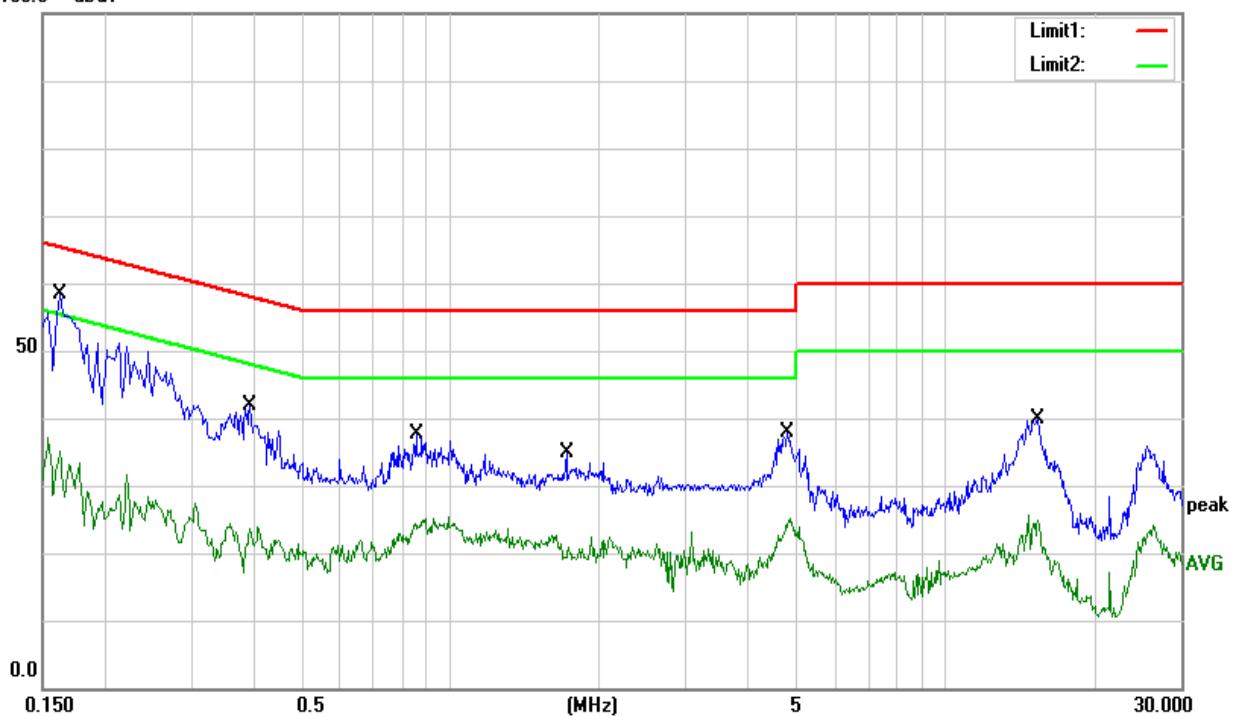
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 3.7V	Test Mode :	Mode 1

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1621	48.27	10.00	58.27	65.36	-7.09	QP
0.1621	25.06	10.00	35.06	55.36	-20.30	AVG
0.3940	31.61	10.18	41.79	57.98	-16.19	QP
0.3940	14.10	10.18	24.28	47.98	-23.70	AVG
0.8540	27.68	9.95	37.63	56.00	-18.37	QP
0.8540	14.96	9.95	24.91	46.00	-21.09	AVG
1.7220	24.95	9.97	34.92	56.00	-21.08	QP
1.7220	12.56	9.97	22.53	46.00	-23.47	AVG
4.8180	27.75	10.20	37.95	56.00	-18.05	QP
4.8180	14.80	10.20	25.00	46.00	-21.00	AVG
15.4020	29.49	10.34	39.83	60.00	-20.17	QP
15.4020	14.55	10.34	24.89	50.00	-25.11	AVG

#### Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBuV





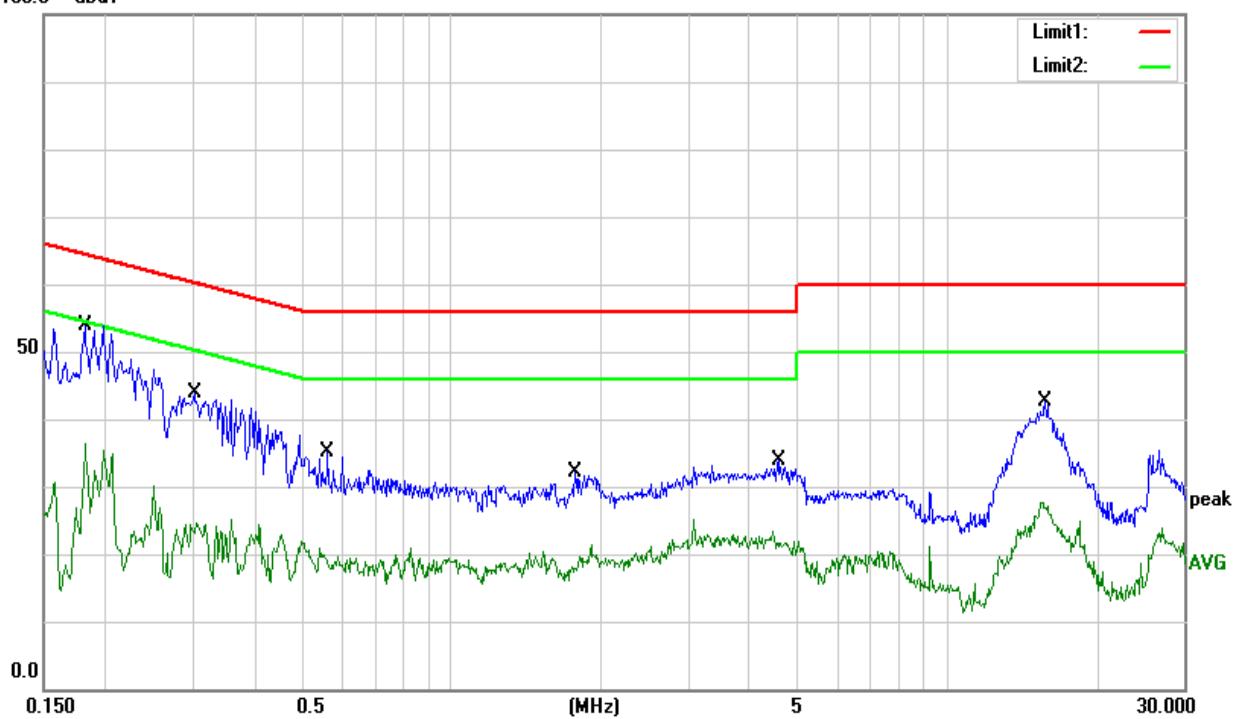
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from Adapter AC120V/60Hz	Test Mode :	Mode 2

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1820	43.95	10.00	53.95	64.39	-10.44	QP
0.1820	26.46	10.00	36.46	54.39	-17.93	AVG
0.3020	33.87	9.90	43.77	60.19	-16.42	QP
0.3020	14.84	9.90	24.74	50.19	-25.45	AVG
0.5620	25.09	9.93	35.02	56.00	-20.98	QP
0.5620	9.97	9.93	19.90	46.00	-26.10	AVG
1.7780	22.05	10.00	32.05	56.00	-23.95	QP
1.7780	8.09	10.00	18.09	46.00	-27.91	AVG
4.5540	23.63	10.20	33.83	56.00	-22.17	QP
4.5540	11.53	10.20	21.73	46.00	-24.27	AVG
15.7340	32.16	10.34	42.50	60.00	-17.50	QP
15.7340	17.28	10.34	27.62	50.00	-22.38	AVG

**Remark:**

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBuV





## 4. RADIATED EMISSION MEASUREMENT

### 4.1 RADIATED EMISSION LIMITS

(a) The field strength of any emissions within the Smart watch 13.567-13.710 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

#### Radiated Emission <30MHz (9KHz-30MHz, H-field)

According to FCC section 15.225, for <30MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 30 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring Smart watchwidth was set to 10KHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT) There was no detected Restricted Smart watchs and Radiated suprious emission below 30MHz. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;

$$3 \text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(15,848) + 40\log(30/3) = 124 \text{ dBuV}$$

$$3 \text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(334) + 40\log(30/3) = 90.47 \text{ dBuV}$$

$$3 \text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(106) + 40\log(30/3) = 80.506 \text{ dBuV}$$

$$3 \text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(30) + 40\log(30/3) = 69.54 \text{ dBuV}$$

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:

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Frequency Range 9kHz-1000MHz)

Frequency range (MHz)	Field Strength@30m		Field Strength@3m
	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$
Below 13.110	30	29.5	69.5
13.110 ~ 13.410	106	40.5	80.5
13.410 ~ 13.553	334	50.5	90.5
13.553 ~ 13.617	15.848	84	124
13.617 ~ 13.710	334	50.5	90.5
13.710 ~ 14.010	106	40.5	80.5
Above 14.010	30	29.5	69.5

#### NOTE:

- Field Strength ( $\text{dB}\mu\text{V}/\text{m}$ ) =  $20 * \log[\text{Field Strength } (\mu\text{V}/\text{m})]$ .
- In the emission tables above, the tighter limit applies at the Smart watch edges.

#### Radiated Emission >30MHz (30MHz-1GHz, E-field)

According to FCC section 15.205, the field strength of radiated emissions from intentiona radiators at a distance of 3 meters shall not exceed the following values:

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3



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

#### 4.2 TEST PROCEDURE

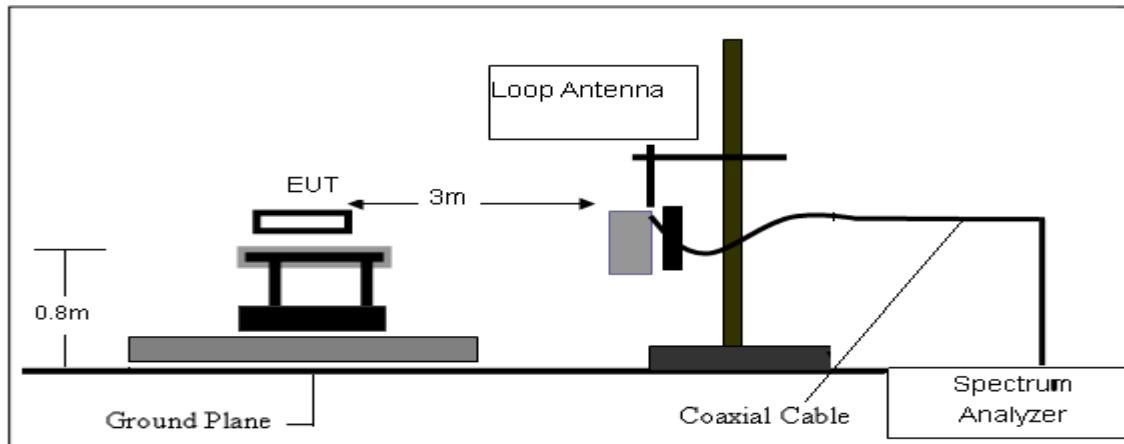
- a. The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower. For the test Antenna
- b. 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.
- c. In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) 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.
- f. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- h. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

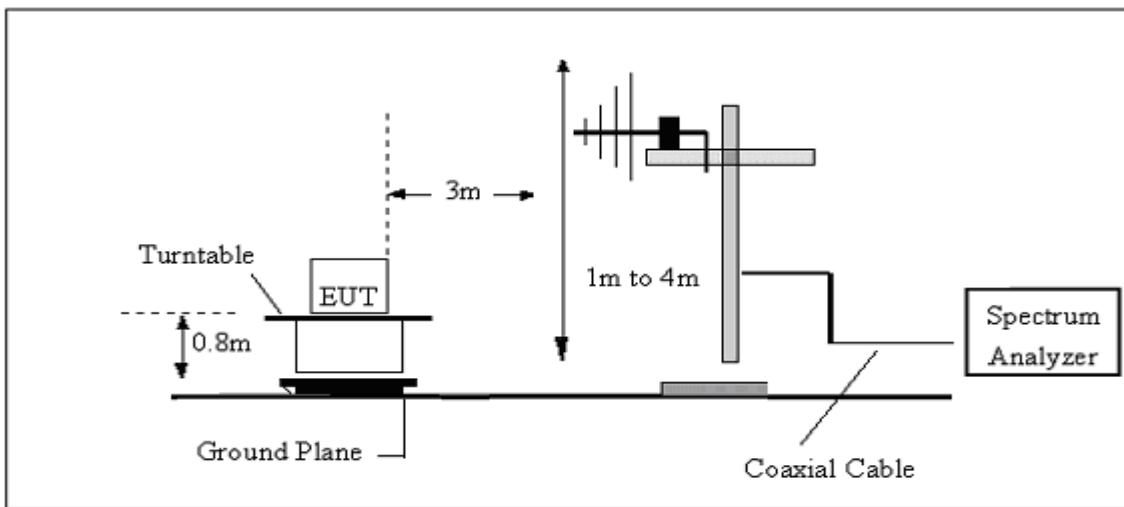
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 4.3 TEST SETUP

##### (A) Radiated Emission Test-Up Frequency Below 30MHz



##### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



#### 4.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



#### 4.5 TEST RESULTS

(Radiated Emission<30MHz (9KHz-30MHz, H-field))

Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1	Polarization :	--

Not: Vertical level have a test this is the worst.

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
				P/F
13.555	40.13	69.542	-29.412	PASS
13.560	85.18	124.01	-38.83	PASS
13.564	62.25	90.472	-28.222	PASS
13.585	50.18	80.505	-30.325	PASS
13.724	40.19	69.543	-29.353	PASS

#### NOTE:

.Distance extrapolation factor =40 log (specific distance/test distance)(dB);  
Limit line = specific limits(dBuv) + distance extrapolation factor.

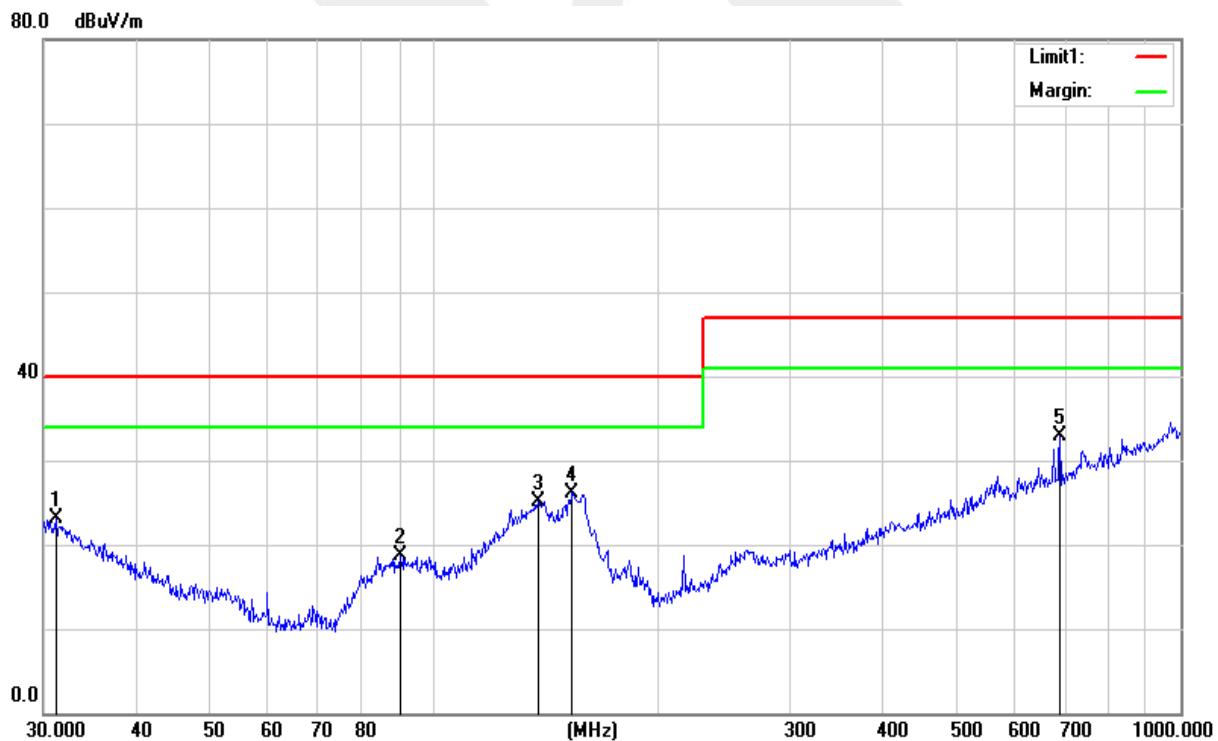
**Between 30-1000MHz**

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	DC 3.7V	Test Mode:	Mode 1

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
31.1798	4.99	18.10	23.09	40.00	-16.91	QP
90.2205	9.09	9.56	18.65	40.00	-21.35	QP
137.9028	13.18	12.00	25.18	40.00	-14.82	QP
153.2004	14.29	11.89	26.18	40.00	-13.82	QP
689.5644	9.62	23.36	32.98	47.00	-14.02	QP
31.1798	4.99	18.10	23.09	40.00	-16.91	QP

## Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



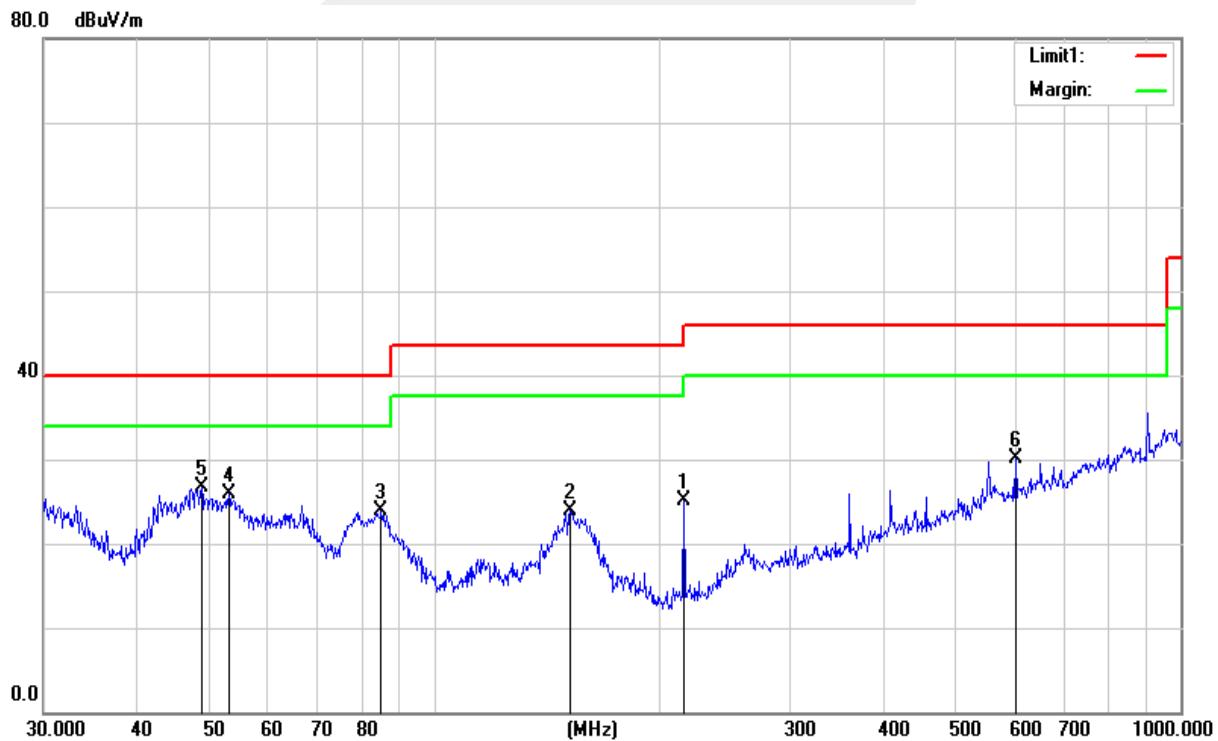


Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	DC 3.7V	Test Mode:	Mode 1

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
216.0240	14.94	10.09	25.03	46.00	-20.97	QP
152.1297	11.98	11.92	23.90	43.50	-19.60	QP
84.9995	15.13	8.79	23.92	40.00	-16.08	QP
53.1313	19.01	6.86	25.87	40.00	-14.13	QP
48.8430	18.01	8.71	26.72	40.00	-13.28	QP
601.4265	7.99	22.19	30.18	46.00	-15.82	QP

## Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



## 5. FREQUENCY TOLERANCE

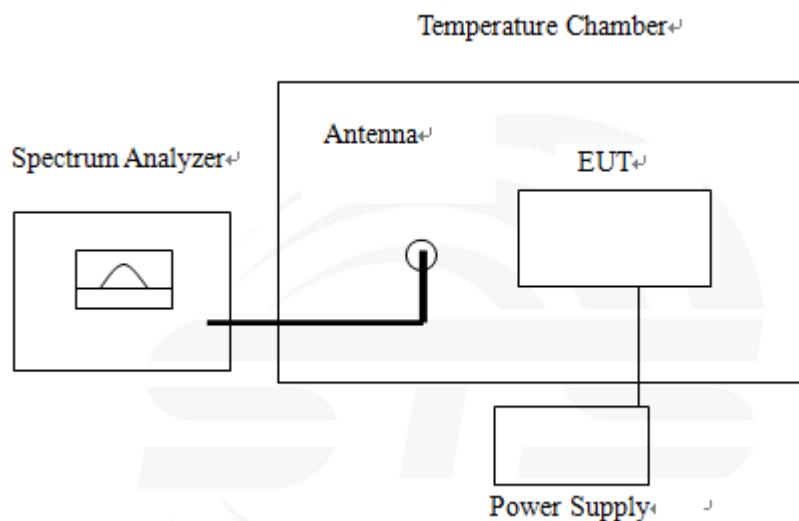
### 5.1 REQUIREMENT

According to FCC section 15.225, the devices operating in the 13.567-13.710 MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20°C to +50°C using an environmental chamber. The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

### 5.2 TEST PROCEDURE

According to FCC section 15.225(e), The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of -20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 5.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

### 5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



## 5.5 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode		

13.56MHz

VOLTAGE(%)	Test Conditions		Frequency(Hz)	Deviation(%)	Limit	Verdict
	Power (VDC)	Temperature (°C)				
100	3.7	+20°C(Ref)	13559460	-0.00398	±0.01%	PASS
100		-20	13559463	-0.00396	±0.01%	
100		-10	13559386	-0.00453	±0.01%	
100		0	13559477	-0.00386	±0.01%	
100		10	13559512	-0.00360	±0.01%	
100		20	13559468	-0.00392	±0.01%	
100		25	13559381	-0.00456	±0.01%	
100		30	13559417	-0.00430	±0.01%	
100		40	13559394	-0.00447	±0.01%	
100		50	13559432	-0.00419	±0.01%	
Battery End Point	3.6	20	13559567	-0.00319	±0.01%	
115	4.2	20	13559430	-0.00420	±0.01%	



## 6. 20DB BANDWIDTH

### 6.1 APPLIED PROCEDURES / LIMIT

According to FCC section 15.215(c), the 20dB Smart watchwidth should be contained within the frequency Smart watch designated in the rule section under which the EUT is operated, it was measured with a spectrum analyzer connected the EUT while the EUT is operating in transmission mode.

### 6.2 TEST PROCEDURE

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §113.567-13.710 and in subpart E of this part, must be designed to ensure that the 20 dB Smart watchwidth of the emission, or whatever Smart watchwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency Smart watch designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission Smart watchwidth may span across multiple contiguous frequency Smart watchs identified in that subpart. The requirement to contain the designated Smart watchwidth of the emission within the specified frequency Smart watch includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted Smart watch in order to minimize the possibility of out-of-Smart watch operation.

1. Set RBW = 1 kHz.
2. Set the video Smart watchwidth (VBW)  $\geq 3$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.3 TEST SETUP



### 6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

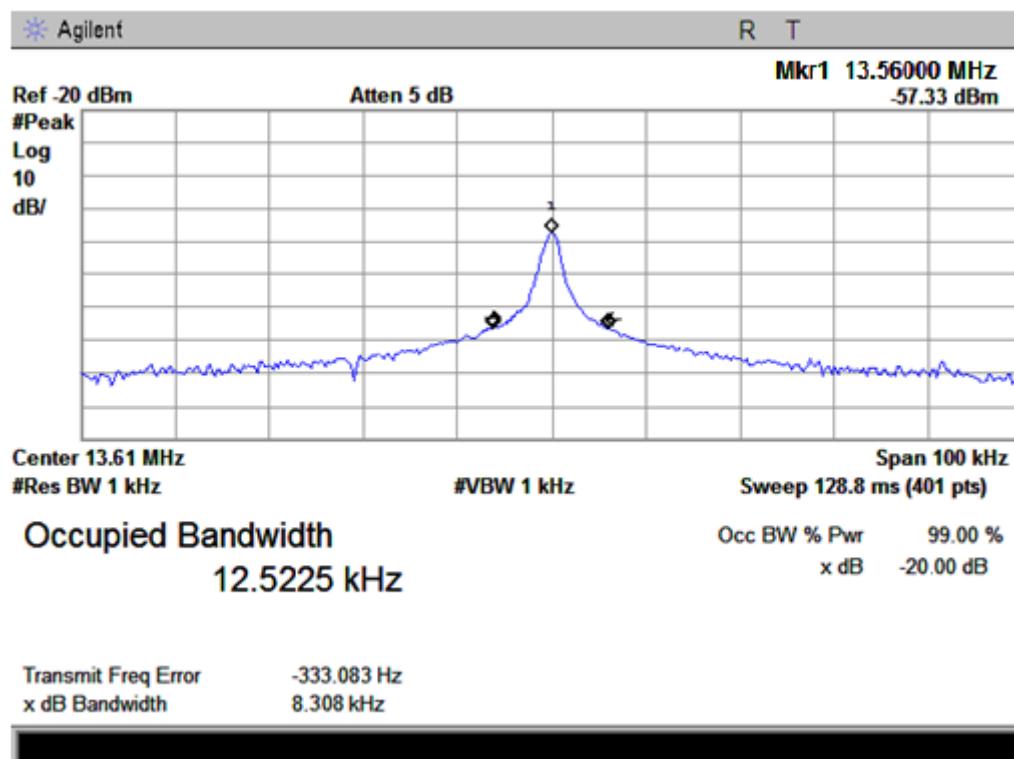


## 6.5 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode		

13.56MH

Centre Frequency	Measurement		
	20dB Bandwidth (KHz)	99% Bandwidth (KHz)	Frequency Range (MHz)
13.56MHz	8.308	12.5225	13.553-13.567





## 7. ANTENNA REQUIREMENT

### 7.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 7.2 EUT ANTENNA

The EUT antenna is PIFA Antenna. It comply with the standard requirement.

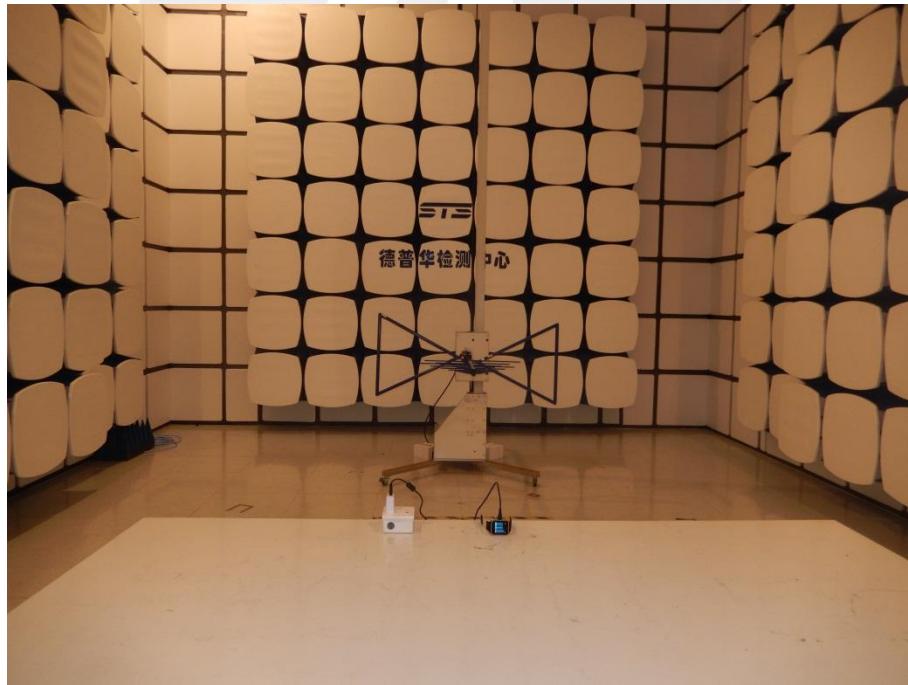


## 8. EUT TEST PHOTO

### Conduction Measurement Photos



### Radiated Measurement Photos



\*\*\*\*\*END OF THE REPORT\*\*\*\*\*