FCC TEST REPORT

FCC ID : UH5M09156HR

Applicant : **National Electronics & Watch Co., Ltd**
Address :15/F, Shing Dao Ind. Bldg. 232 Aberdeen Main Road Aberdeen,Hongkong

Equipment Under Test (EUT) :

Product description : Heart Rate Watch

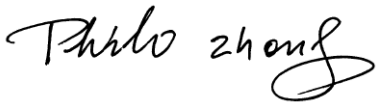
Model No. : M08-729D & M09-156

Modulation : GFSK

Standards : FCC 15 Paragraph 15.249

Date of Test : Jan. 14,2010

Test Engineer **:** Olic.huang

Reviewed By **:** 

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2 Contents

3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 25GHz)	FCC PART 15: 2009	ANSI C63.4: 2009	N/A	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2009	ANSI C63.4: 2009	Class B	N/A
Band-edge	FCC PART 15: 2009	ANSI C63.4: 2009	N/A	Comply
20dB-Bandwidth	FCC PART 15: 2009	ANSI C63.4: 2009	N/A	Comply

4 General Information

4.1 Client Information

Applicant:	**National Electronics & Watch Co., Ltd.**
Address of Applicant:	15/F, Shing Dao Ind. Bldg. 232 Aberdeen Main Road Aberdeen,Hongkong
Manufacturer:	**National Electronics & Watch Co., Ltd.**
Address:	15/F, Shing Dao Ind. Bldg. 232 Aberdeen Main Road Aberdeen,Hongkong

4.2 General Description of E.U.T.

Product description:	Heart Rate Watch
Model No.:	M08-729D & M09-156
Operating frequency:	2410MHz to 2475MHz
Channel separation:	1MHz
Antenna Gian:	0 dBi
Antenna Type:	PCB Layout

4.3 Details of E.U.T.

Power Supply:	DC 3.0V

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Heart Rate Watch. The standards used were FCC 15 Paragraph 15.249, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35 and Part 2.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **IC – Registration No.: 7760A**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration7760A, July 24, 2008

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, June 24, 2008.

4.7 Test Location

The Emission test was performed at:-

Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building, West Baima Rd.,Songgang Street, Baoan District, Shenzhen, China.

5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug-09	Aug-10	Wws20081596	±1dB
Trilog Broadband Antenne 30-3000 MHz	SCHWARZBECK MESS-ELEKTROM/ VULB9163	336	W2008002	30-3000 MHz	Aug-09	Aug-10		±1dB
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM/ VULB9163	667	W2008003		Aug-09	Aug-10		f＜10 GHz：±1dB 10GHz＜f＜18 GHz：±1.5dB
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM/ BBV 9718	9718-148	W2008004		Aug-09	Aug-10		±1.2dB
10m Coaxial Cable with N-male Connectors usable up to 25GHz,	SCHWARZBECK MESS-ELEKTROM/ AK 9515 H	-	-	-	Aug-09	Aug-10		-
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connector	SCHWARZBECK MESS-ELEKTROM/ AK 9513				Aug-09	Aug-10		
Positioning Controller	C&C LAB/ CC-C-IF				N/A	N/A		
Color Monitor	SUNSPO/ SP-14C				N/A	N/A		

6 Conducted Emission Test

Product Name:	Heart Rate Watch
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	…….
Frequency Range:	150 kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9 kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 Test Equipment

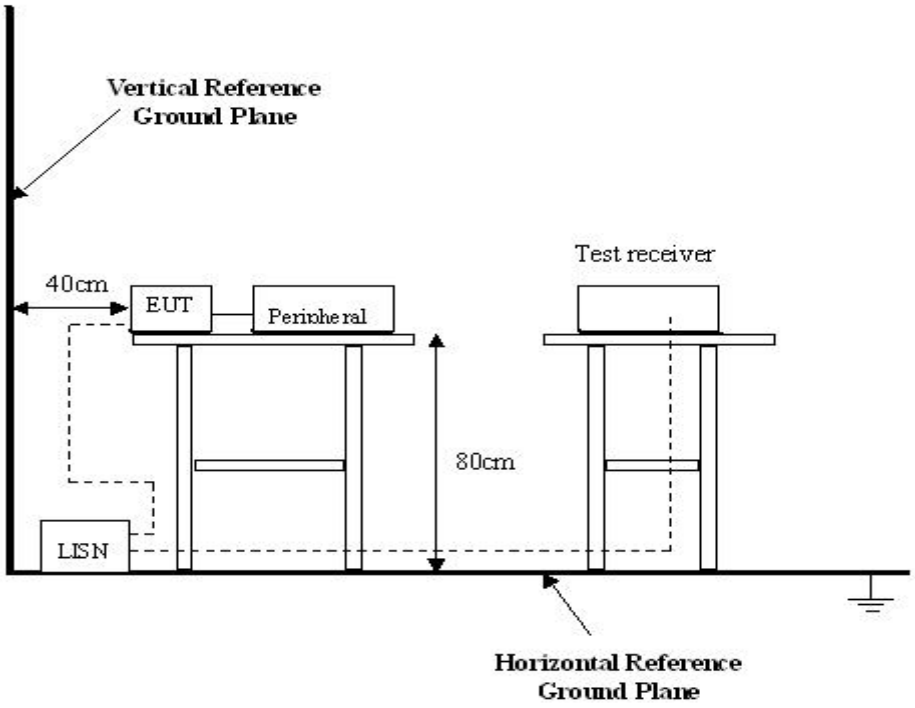
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4: 2009. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

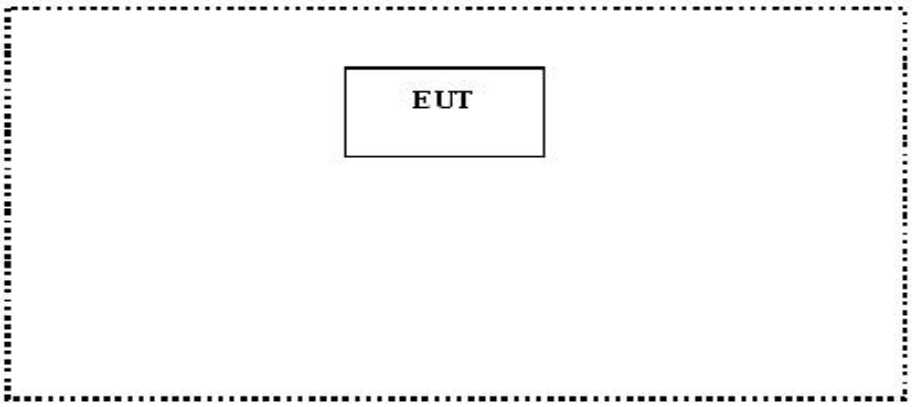
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2009, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4: 2009.

A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.



6.5 Conducted Emission Limits

66-56 dBμV between 0.15MHz & 0.5MHz

56 dBμV between 0.5MHz & 5MHz

60 dBμV between 5MHz & 30MHz

Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Result

Owing to the DC operation of EUT, this test is not performed.

7 Radiation Emission Test

Product Name:	Heart Rate Watch
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	Jan.14, 2010
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth)
	Quasi-Peak if maximised peak within 6dB of limit

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase centre variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

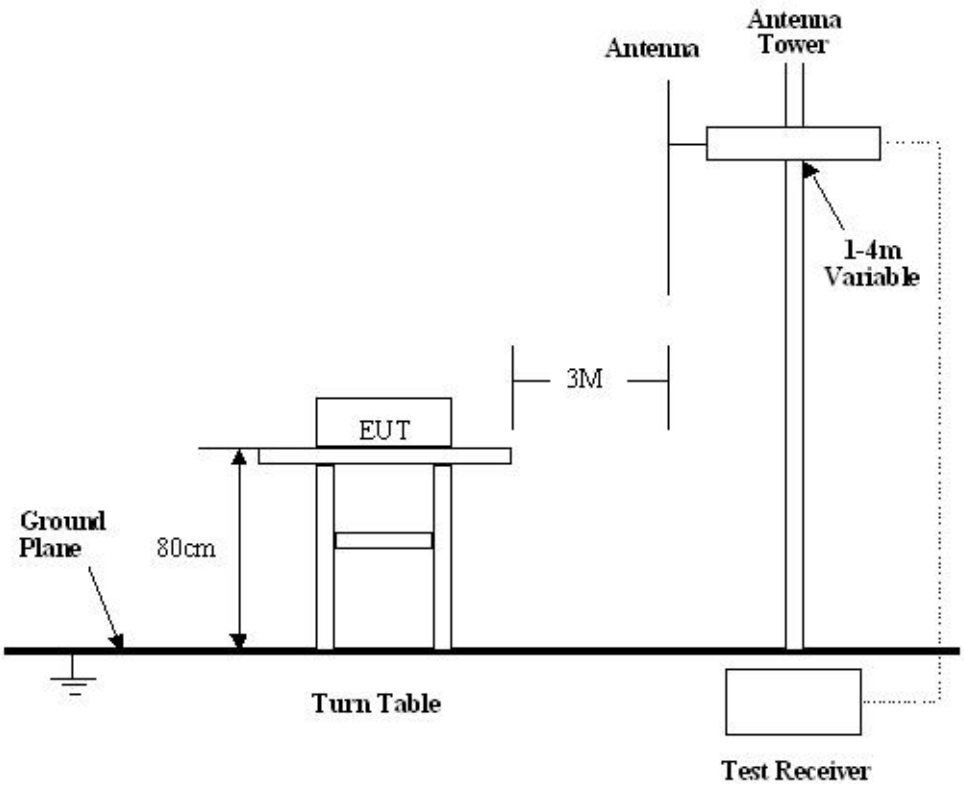
Based on ANSI C63.4: 2009, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at SGS EMC Lab is +4.0 dB.

7.3 Test Procedure

1. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
2. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "Qp" in the data table.
3. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2009, The specification used in this report was the FCC Part15 Paragraph 15.249 and Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.249 Rules, the system was tested to 25000 MHz.

Below 1GHz

Start Frequency..... 30 MHz
Stop Frequency..... 1000 MHz
Sweep Speed Auto
IF Bandwidth..... 120 KHz
Video Bandwidth..... 100KHz
Quasi-Peak Adapter Bandwidth ..... 120 KHz
Quasi-Peak Adapter Mode ..... Normal
Resolution Bandwidth 100KHz

Above 1GHz

Start Frequency..... 1000 MHz
Stop Frequency..... 25000 MHz
Sweep Speed Auto
IF Bandwidth..... 1 MHz
Video Bandwidth..... 1 MHz
Resolution Bandwidth 1MHz

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.249 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

Note: (1) RF Voltage(dBuV)=20 log RF Voltage(uV)

(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

(3)The emission limit in this paragraph is based on measurement instrumentaion employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.

(4) Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 94dBuvV/m,According to Part15.35(b) and average is 54dBuvV/m.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: (1) RF Voltage(dBuV)=20 log RF Voltage(uV)

(2) In the Above Table,the tighter limit applies at the band edges.

(3) Distance refers to the distance in meters between the measuring instrument antenna.

7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding
The meter reading of the spectrum analyzer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared in terms of dB. The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz)	Meter Reading +ACF=FS
33	20dBuV+10.36dB=30.36dBuV/m @3m

Radiated Emission Test Data

Test Voltage:	DC 3.0V
Test Mode:	TX On
Temperature:	25.5 °C
Humidity:	51%RH
Test Result:	PASS

Remarks: 30-1000MHz radiation test no significant emissions above the equipment noise floor were detected.

1GHz-25GHz Radiated Emission Data

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC Part15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency							
2410	AV	Vertical	87.58	94.00	6.42	1.1	120
4820	AV	Vertical	41.02	54.00	13.98	1.2	10
7230	AV	Vertical	35.23	54.00	19.73	1.1	120
9640	AV	Vertical	32.52	54.00	21.48	1.2	60
12050	AV	Vertical	31.25	54.00	22.75	1.2	90
14460	AV	Vertical	31.01	54.00	22.99	1.3	120
16870	AV	Vertical	30.02	54.00	23.98	1.1	60
19280	AV	Vertical	30.67	54.00	23.33	1.1	110
21690	AV	Vertical	29.63	54.00	24.34	1.1	110
24100	AV	Vertical	29.01	54.00	24.99	1.2	45
2410	AV	Horizontal	84.63	94.00	9.37	1.2	110
4820	AV	Horizontal	41.12	54.00	12.88	1.2	10
7230	AV	Horizontal	36.21	54.00	17.79	1.1	120
9640	AV	Horizontal	34.25	54.00	19.75	1.2	10
12050	AV	Horizontal	33.21	54.00	20.79	1.2	45
14460	AV	Horizonta	31.25	54.00	22.75	1.2	120
16870	AV	Horizontal	30.74	54.00	23.26	1.1	110
19280	AV	Horizontal	32.01	54.00	21.99	1.1	160
21690	AV	Horizontal	31.53	54.00	22.47	1.2	10
24100	AV	Horizontal	30.01	54.00	23.99	1.0	90
2410	PK	Vertical	96.68	114.00	17.32	1.1	110
4820	PK	Vertical	45.21	74.00	29.64	1.1	30
7230	PK	Vertical	40.01	74.00	33.99	1.1	110
9640	PK	Vertical	37.42	74.00	36.58	1.2	100
12050	PK	Vertical	36.21	74.00	37.79	1.2	10
14460	PK	Vertical	32.01	74.00	41.99	1.2	60
16870	PK	Vertical	33.21	74.00	40.79	1.4	90
19280	PK	Vertical	30.10	74.00	43.90	1.2	30
21690	PK	Vertical	29.01	74.00	44.99	1.1	120
24100	PK	Vertical	29.01	74.00	44.99	1.4	45
2410	PK	Horizontal	91.23	114.00	22.77	1.1	110
4820	PK	Horizontal	42.24	74.00	31.76	1.1	160

7230	PK	Horizontal	38.25	74.00	35.75	1.1	110
9640	PK	Horizontal	36.98	74.00	37.02	1.2	180
12050	PK	Horizontal	35.69	74.00	38.31	1.2	60
14460	PK	Horizontal	35.62	74.00	38.38	1.2	90
16870	PK	Horizontal	33.35	74.00	40.65	1.1	150
19280	PK	Horizontal	33.01	74.00	40.99	1.1	120
21690	PK	Horizontal	30.21	74.00	43.79	1.2	110
24100	PK	Horizontal	30.01	74.00	43.99	1.2	10
Middle frequency							
2442	AV	Vertical	86.34	94.00	7.66	1.1	10
4884	AV	Vertical	39.02	54.00	14.98	1.2	190
7326	AV	Vertical	35.21	54.00	18.71	1.0	90
9768	AV	Vertical	33.33	54.00	20.67	1.2	30
12210	AV	Vertical	32.02	54.00	21.98	1.2	0
14652	AV	Vertical	32.01	54.00	21.99	1.2	150
17094	AV	Vertical	30.26	54.00	23.74	1.5	10
19536	AV	Vertical	30.01	54.00	23.99	1.5	210
21978	AV	Vertical	29.02	54.00	24.98	1.8	0
24420	AV	Vertical	28.23	54.00	25.77	1.2	90
2442	AV	Horizontal	83.68	94.00	10.32	1.0	120
4884	AV	Horizontal	35.69	54.00	18.31	1.0	90
7326	AV	Horizontal	34.25	54.00	19.75	1.5	250
9768	AV	Horizontal	33.52	54.00	20.48	1.2	120
12210	AV	Horizontal	31.21	54.00	22.79	1.2	150
14652	AV	Horizontal	30.25	54.00	23.75	1.4	180
17094	AV	Horizontal	29.25	54.00	24.75	1.6	135
19536	AV	Horizontal	28.36	54.00	25.64	1.4	90
21978	AV	Horizontal	28.02	54.00	25.98	1.2	150
24420	AV	Horizontal	28.02	54.00	25.98	1.7	120
2442	PK	Vertical	94.66	114.00	29.34	1.0	0
4884	PK	Vertical	44.21	74.00	29.79	1.1	90
7326	PK	Vertical	38.25	74.00	35.75	1.4	100
9768	PK	Vertical	37.94	74.00	36.06	1.3	120
12210	PK	Vertical	37.87	74.00	36.13	1.7	180
14652	PK	Vertical	36.10	74.00	38.90	1.2	0
17094	PK	Vertical	32.03	74.00	41.97	1.4	0
19536	PK	Vertical	30.21	74.00	43.79	1.2	120

21978	PK	Vertical	28.30	74.00	45.70	1.1	135
24420	PK	Vertical	28.30	74.00	45.70	1.2	120
2442	PK	Horizontal	90.36	114.00	23.64	1.0	30
4884	PK	Horizontal	43.56	74.00	30.44	1.1	100
7326	PK	Horizontal	41.51	74.00	32.49	1.1	90
9768	PK	Horizontal	40.14	74.00	33.86	1.2	60
12210	PK	Horizontal	39.36	74.00	34.64	1.4	130
14652	PK	Horizontal	37.44	74.00	36.56	1.2	150
17094	PK	Horizontal	34.21	74.00	39.79	1.1	120
19536	PK	Horizontal	38.86	74.00	35.14	1.2	130
21978	PK	Horizontal	34.21	74.00	39.79	1.1	0
24420	PK	Horizontal	33.33	74.00	40.67	1.1	120
High frequency							
2475	AV	Vertical	87.79	94.00	6.21	1.0	100
4950	AV	Vertical	36.25	54.00	17.75	1.2	45
7425	AV	Vertical	32.25	54.00	21.75	1.2	120
9900	AV	Vertical	30.26	54.00	23.74	1.4	60
12375	AV	Vertical	30.55	54.00	23.45	1.5	135
14850	AV	Vertical	30.34	54.00	23.66	1.1	120
17325	AV	Vertical	30.62	54.00	23.38	1.1	100
19800	AV	Vertical	30.13	54.00	23.87	1.1	60
22275	AV	Vertical	30.27	54.00	23.73	1.4	0
24750	AV	Vertical	28.25	54.00	25.75	1.5	60
2475	AV	Horizontal	85.36	94.00	8.64	1.0	10
4950	AV	Horizontal	34.56	54.00	19.44	1.1	120
7425	AV	Horizontal	30.35	54.00	23.65	1.2	60
9900	AV	Horizontal	31.47	54.00	22.53	1.5	100
12375	AV	Horizontal	31.89	54.00	22.11	1.2	60
14850	AV	Horizontal	32.42	54.00	21.58	1.2	120
17325	AV	Horizontal	31.17	54.00	22.83	1.4	100
19800	AV	Horizontal	32.55	54.00	21.45	1.1	100
22275	AV	Horizontal	32.86	54.00	21.14	1.3	100
24750	AV	Horizontal	33.25	54.00	20.75	1.1	110
2475	PK	Vertical	96.35	114.00	17.65	1.1	20
4950	PK	Vertical	44.21	74.00	29.79	1.2	60
7425	PK	Vertical	35.62	74.00	38.38	1.8	90
9900	PK	Vertical	35.35	74.00	38.65	1.5	180

12375	PK	Vertical	35.56	74.00	38.44	1.4	60
14850	PK	Vertical	34.21	74.00	39.79	1.2	60
17325	PK	Vertical	33.54	74.00	40.46	1.2	135
19800	PK	Vertical	36.26	74.00	37.74	1.2	120
22275	PK	Vertical	36.73	74.00	37.27	1.6	60
24750	PK	Vertical	30.21	74.00	43.99	1.4	90
2475	PK	Horizontal	91.33	114.00	22.67	1.1	60
4950	PK	Horizontal	42.58	74.00	31.42	1.4	0
7425	PK	Horizontal	38.64	74.00	35.36	1.5	60
9900	PK	Horizontal	35.37	74.00	38.63	1.3	0
12375	PK	Horizontal	35.52	74.00	38.48	1.2	30
14850	PK	Horizontal	35.26	74.00	38.74	1.1	0
17325	PK	Horizontal	36.41	74.00	37.59	1.1	0
19800	PK	Horizontal	32.41	74.00	41.59	1.5	60
22275	PK	Horizontal	31.11	74.00	42.89	1.1	10
24750	PK	Horizontal	28.21	74.00	45.79	1.0	20

Note: Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 74dBuvV/m,According to Part15.35(b) and average is 54dBuvV/m.

8 Antenna Requirement.

According to the RSS-210, 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. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section

9 20-dB Bandwidth

Product Name:	Heart Rate Watch
Test Voltage:	DC 3.0V
Test Mode:	TX On
Temperature:	25.5°C
Humidity:	51%RH

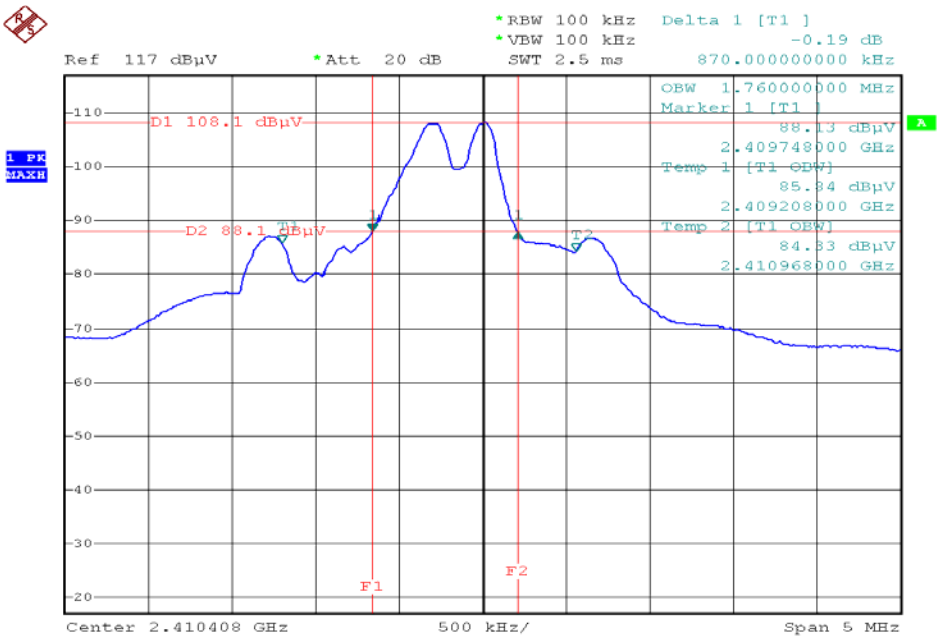
Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 100KHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

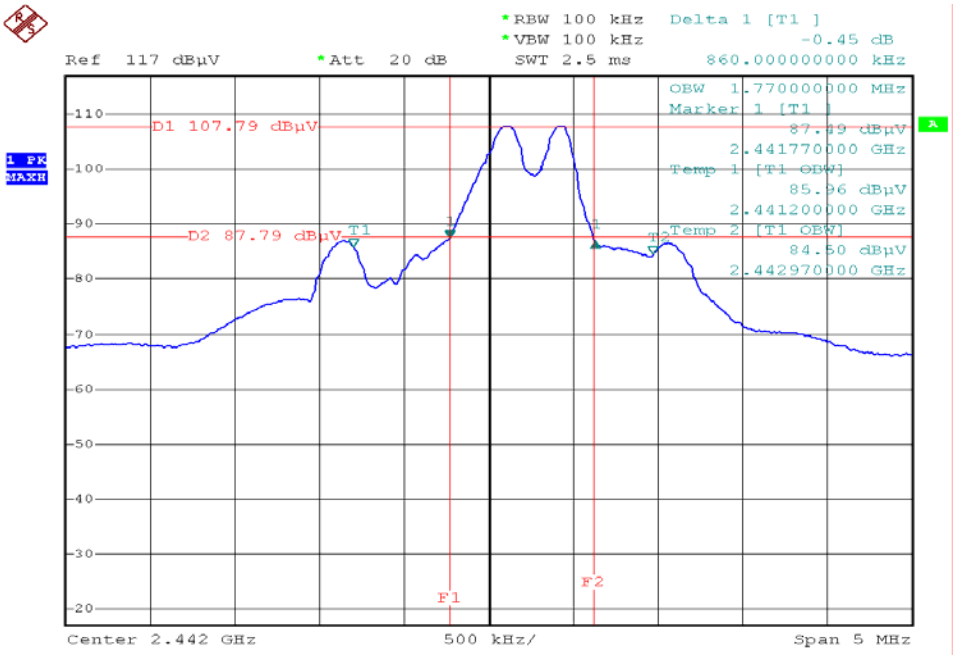
Test Result

Please refer the graph as below:

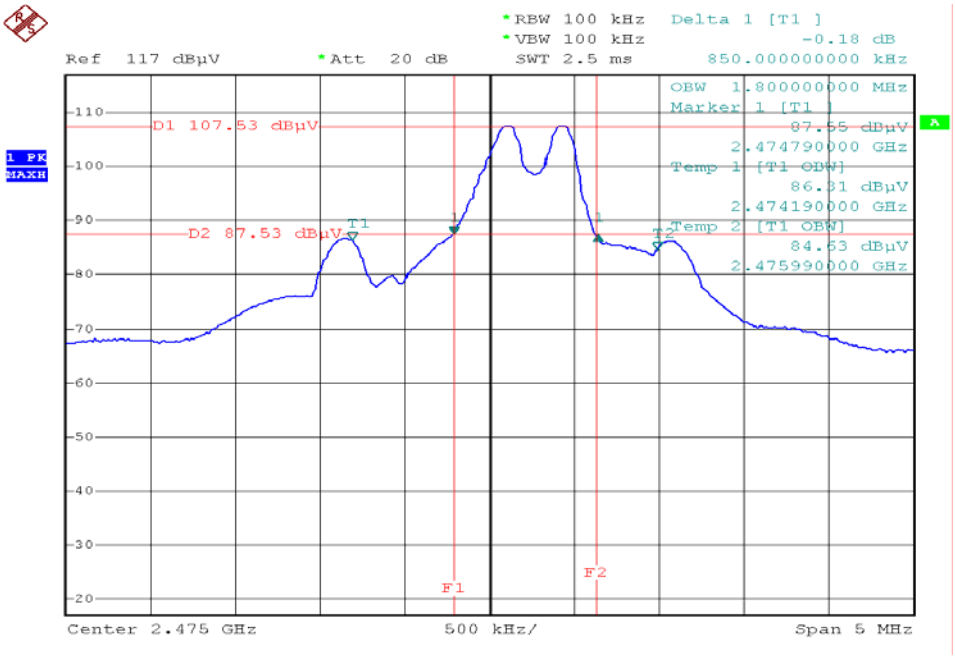
Lower Channel 2410MHz



Middle Channel 2442MHz



Upper Channel 2475MHz



10 Band Edge

10.1 Test Equipment

Please refer to Section 5 this report.

10.2 Test Procedure

1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4: 2009.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

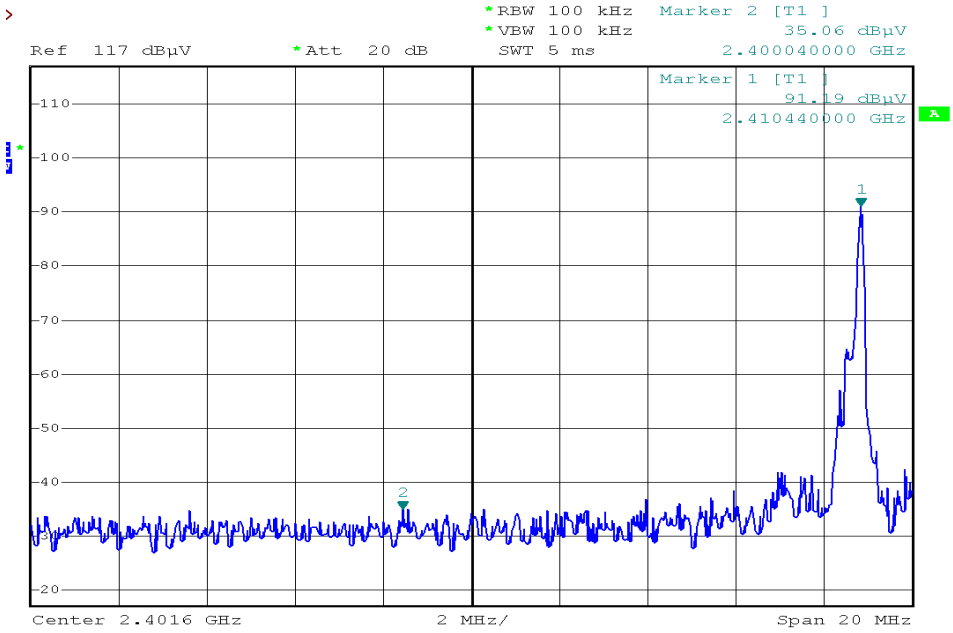
10.3 Band Edge

Requirements: FCC 15.249(d), the emission power at the START and STOP frequencies shall be at least 50dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209.

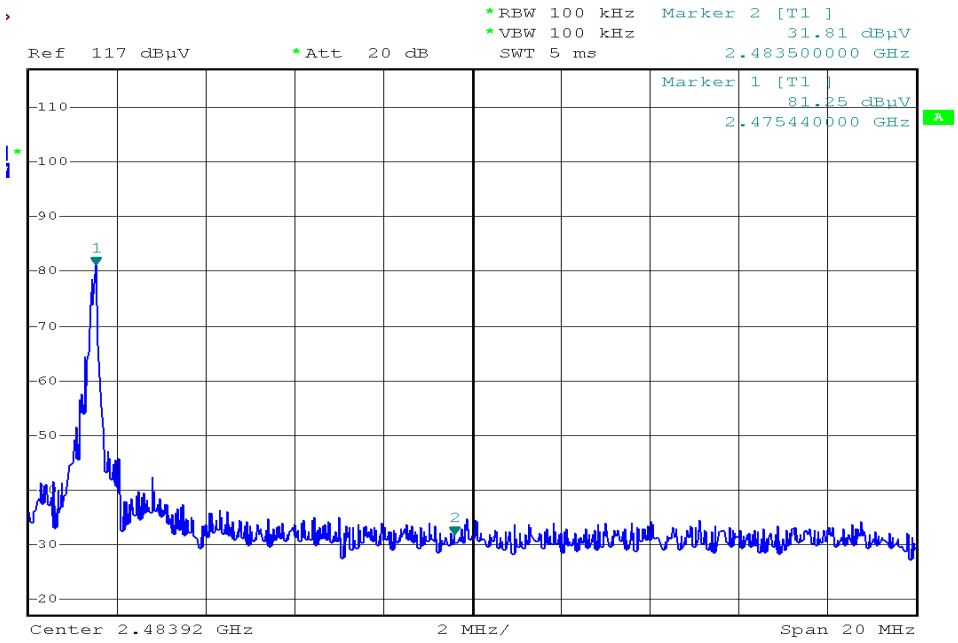
10.4 Band Edge Test Result

Product Name:	Heart Rate Watch
Test Item:	Band Edge Test
Test Voltage:	DC 3.0V
Test Mode:	TX On
Temperature:	25.5 °C
Humidity:	51%RH

Low Frequency(AV Value)



High Frequency(AV Value)

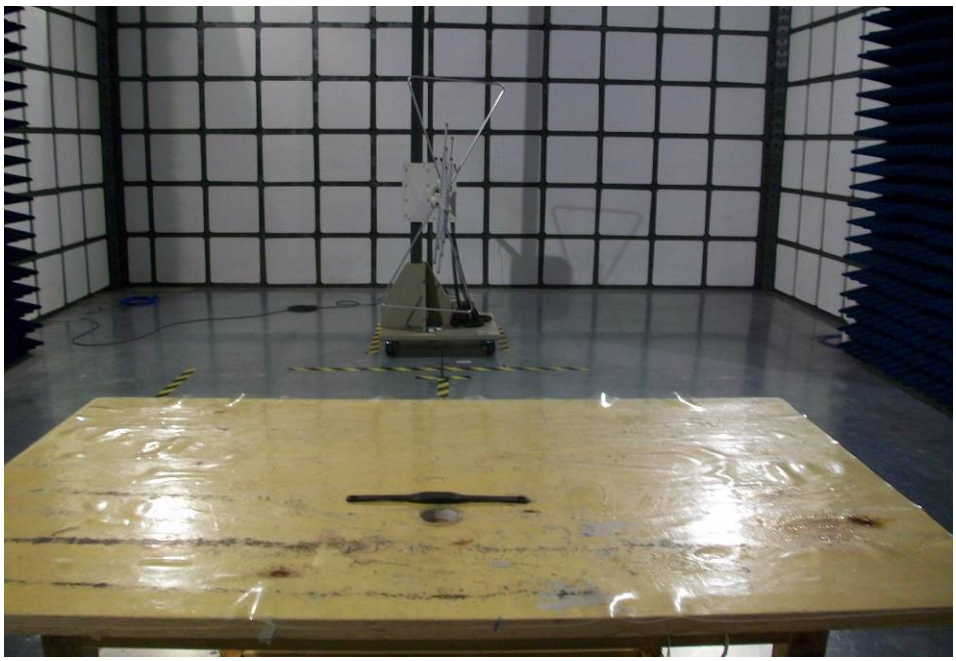


Note: (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.249.

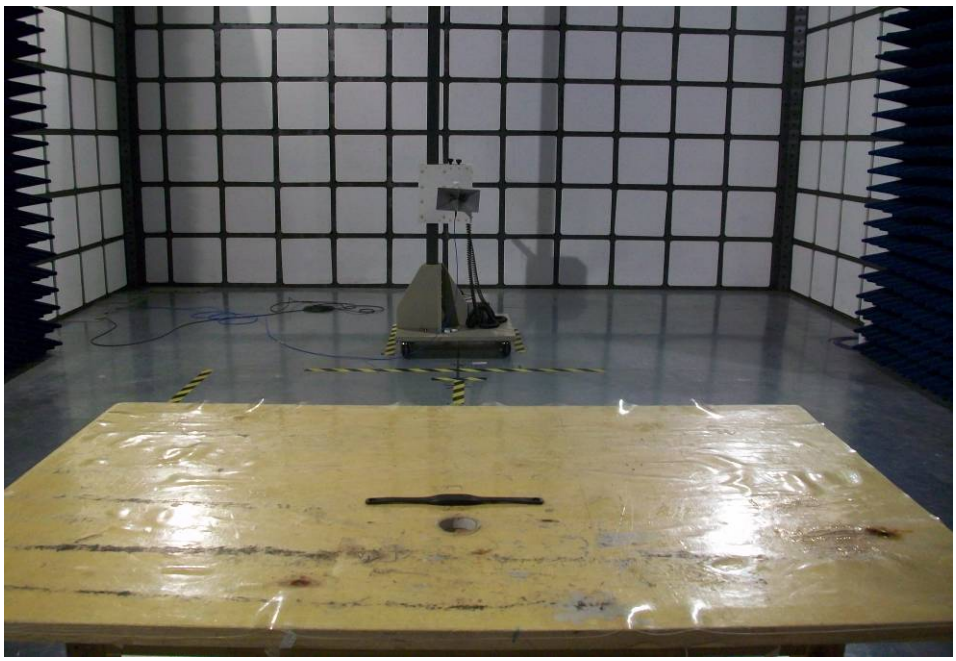
(2) This device does meet the FCC requirement.

11 Photographs of Testing

11.1 Radiation Emission Test View For 30MHz-1000MHz



11.2 Radiation Emission Test View For 1GHz-25GHz

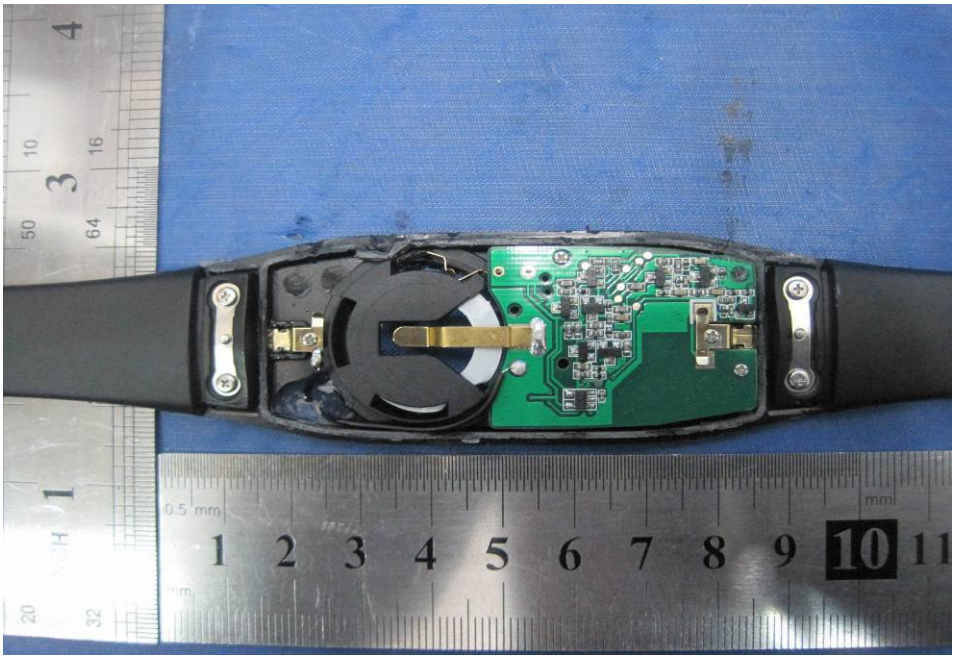


12 Photographs - Constructional Details

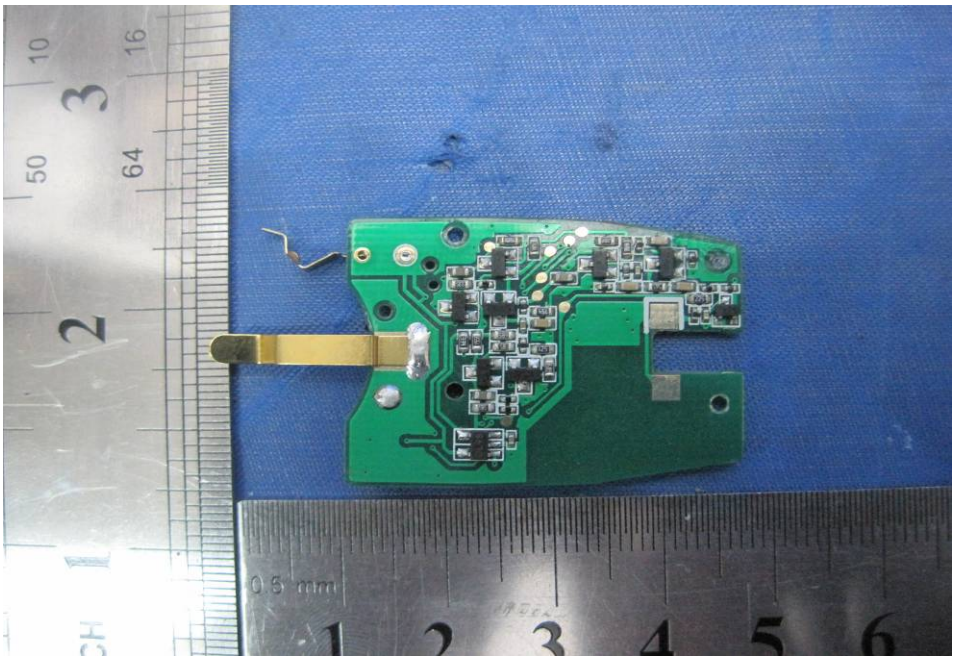
12.1 EUT - Front View

12.2 EUT - Back View

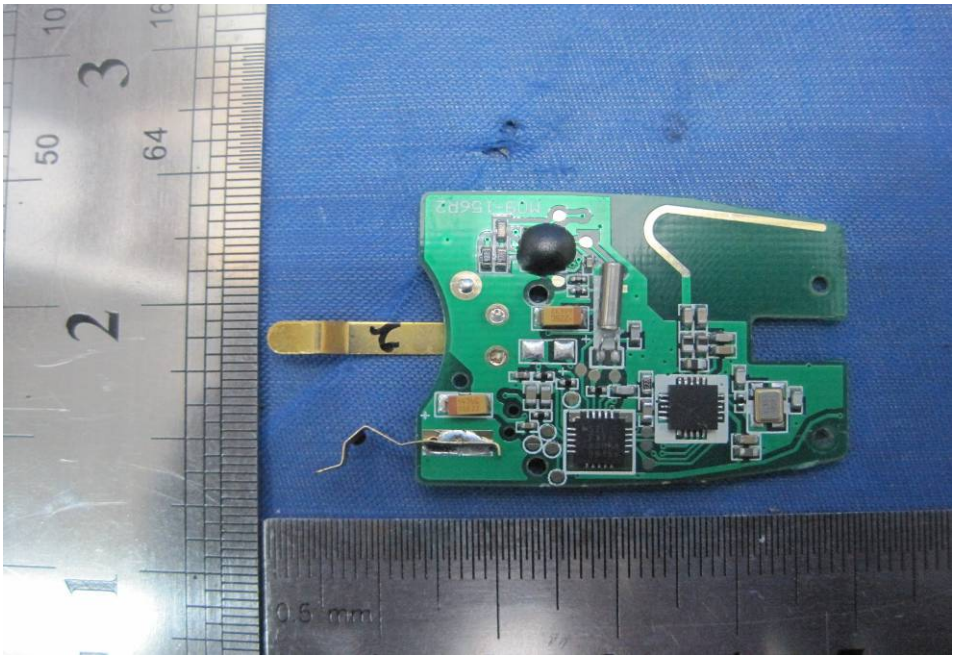
12.3 EUT -Open View



12.4 PCB - Front View



12.5 PCB - Back View



13 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/proposed FCC Mark Location