



# **FCC RADIO TEST REPORT**

## **FCC ID: N7P-R450**

## **IC: 10274A-R450**

**Product :** R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts

**Trade Name :** Life Trak

**Model Name :** R450

**Serial Model :** LTK7R45002R, LTK7R45004R, LTK7R45005R, R450 E

**Report No. :** BZT-2014NT0925271F

### **Prepared for**

Salutron Inc.

47787 Fremont Blvd, Fremont, California 94538, United States

### **Prepared by**

BZT Testing Technology Co., Ltd

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

## TEST RESULT CERTIFICATION

**Applicant's name** ..... Salutron Inc.

Address ..... 47787 Fremont Blvd, Fremont, California 94538, United States

**Manufacture's Name** ..... Fairlegend Electronics, Ltd.

Address ..... Shang Cun, Yuan Shan Industrial Zone B, Gongming, Guangming New District, Shenzhen, China

**Product description**

Product name ..... R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts

Model and/or type  
reference ..... R450

Serial Model ..... LTK7R45002R, LTK7R45004R, LTK7R45005R, R450 E

DIFF ..... All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: R450

**Standards** ..... FCC Part15.247  
RSS 210 ISSUE 8

Test procedure ..... ANSI C63.4-2003

This device described above has been tested by BZT, 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 BZT, this document may be altered or revised by BZT, personal only, and shall be noted in the revision of the document.

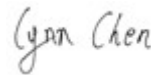
**Date of Test** .....

Date (s) of performance of tests ..... 25 August. 2014 ~29 August. 2014

Date of Issue ..... 30 August. 2014

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

Testing Engineer :



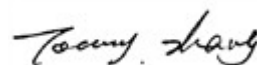
(Lynn Chen)

Technical Manager :



(Carlen Liu)

Authorized Signatory :



(Tommy zhang)

**Table of Contents**

	<b>Page</b>
<b>1 . SUMMARY OF TEST RESULTS</b>	<b>5</b>
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
<b>2 . GENERAL INFORMATION</b>	<b>7</b>
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	9
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	11
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	12
<b>3 . EMC EMISSION TEST</b>	<b>13</b>
3.1 CONDUCTED EMISSION MEASUREMENT	13
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
3.1.2 TEST PROCEDURE	14
3.1.3 DEVIATION FROM TEST STANDARD	14
3.1.4 TEST SETUP	14
3.1.5 EUT OPERATING CONDITIONS	14
3.1.6 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	16
3.2.1 RADIATED EMISSION LIMITS	16
3.2.2 TEST PROCEDURE	17
3.2.3 DEVIATION FROM TEST STANDARD	17
3.2.4 TEST SETUP	18
3.2.5 EUT OPERATING CONDITIONS	18
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	19
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	20
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)	22
3.2.9 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)	25
<b>4 . POWER SPECTRAL DENSITY TEST</b>	<b>29</b>
4.1 APPLIED PROCEDURES / LIMIT	29
4.1.1 TEST PROCEDURE	29
4.1.2 DEVIATION FROM STANDARD	29
4.1.3 TEST SETUP	29
4.1.4 EUT OPERATION CONDITIONS	29
4.1.5 TEST RESULTS	30
<b>5 . BANDWIDTH TEST</b>	<b>32</b>
5.1 APPLIED PROCEDURES / LIMIT	32

**Table of Contents**

	<b>Page</b>
5.1.1 TEST PROCEDURE	32
5.1.2 DEVIATION FROM STANDARD	32
5.1.3 TEST SETUP	32
5.1.4 EUT OPERATION CONDITIONS	32
5.1.5 TEST RESULTS	33
<b>6 . PEAK OUTPUT POWER TEST</b>	<b>36</b>
6.1 APPLIED PROCEDURES / LIMIT	36
6.1.1 TEST PROCEDURE	36
6.1.2 DEVIATION FROM STANDARD	36
6.1.3 TEST SETUP	36
6.1.4 EUT OPERATION CONDITIONS	36
6.1.5 TEST RESULTS	37
<b>7 . ANTENNA REQUIREMENT</b>	<b>38</b>
7.1 STANDARD REQUIREMENT	38
7.2 EUT ANTENNA	38
<b>8 . EUT TEST PHOTO</b>	<b>39</b>
<b>APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS</b>	

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>FCC Part15 (15.247) , Subpart C RSS 210 ISSUE 8</b>			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

**NOTE:**

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

### 1.1 TEST FACILITY

BZT Testing Technology Co., Ltd

Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC Registration No.: 701733

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded 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 Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	
Trade Name	Life Trak	
Model Name	R450	
Serial Model	LTK7R45002R, LTK7R45004R, LTK7R45005R, R450 E	
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: R450	
Product Description	The EUT is a R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	
	Operation Frequency:	2402MHz-2480MHz
	Modulation Type:	GFSK
	Number Of Channel	40CH
	Antenna Designation:	Please see Note 3.
	Peak Output Power(Conducted):	-6.22dBm
	Antenna Gain (dBi)	0 dBi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Ratings	DC 3V from battery	
Adapter	N/A	
Battery	DC 3.0V from battery	
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.

Channel List for 802.11b/g/n(20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	Integral Antenna	N/A	0	N/A



## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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	CH1/ CH20/ CH40
Mode 2	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 1	Link Mode

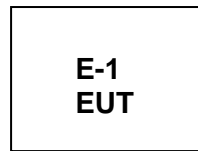
For Radiated Emission	
Final Test Mode	Description
Mode 1	CH1/ CH20/ CH40
Mode 2	Link Mode

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

**2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**

Radiated Measurement:



## 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.	Series No.	Note
E-1	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	N/A	R450	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

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

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.05	2015.07.04	1 year
2	Test Receiver	R&S	ESPI	101318	2014.07.05	2015.07.04	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.22	2015.07.21	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.07.05	2015.07.04	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2014.07.05	2015.07.04	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.22	2015.07.21	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.22	2015.07.21	1 year
8	Amplifier	EM	EM-30180	060538	2014.07.05	2015.07.04	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2014.07.22	2015.07.21	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.05	2015.07.04	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.06.20	2015.06.19	1 year

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2014.07.05	2015.07.04	1 year
2	LISN	R&S	ENV216	101313	2014.07.05	2015.07.04	1 year
3	LISN	EMCO	3816/2	00042990	2014.07.05	2015.07.04	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.07.05	2015.07.04	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.07.05	2015.07.04	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2014.07.05	2015.07.04	1 year

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band 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

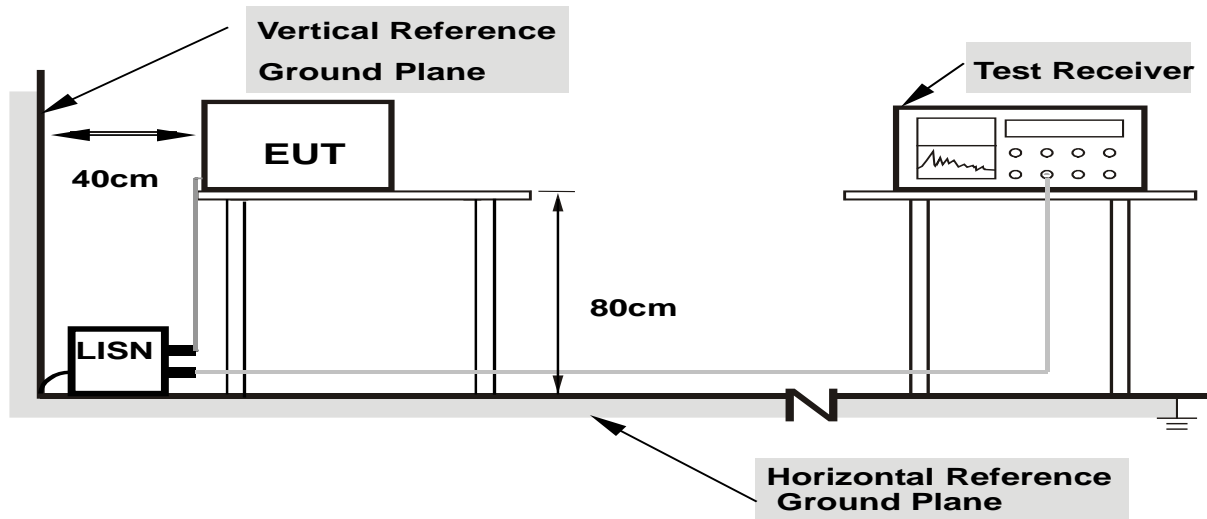
### 3.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 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 from other units and other metal planes**

### 3.1.5 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.

**3.1.6 TEST RESULTS**

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name. :	R450
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N/A
Test Voltage :	N/A	Test Mode :	N/A
Note: EUT power supply by battery, so the test not applicable.			

### 3.2 RADIATED EMISSION MEASUREMENT

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

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

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



**3.2.2 TEST PROCEDURE**

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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.
- e. 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.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

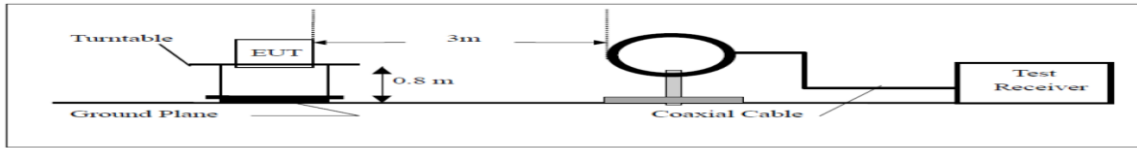
Both horizontal and vertical antenna polarities were tested  
and performed pretest to three orthogonal axis. The worst case emissions were reported

**3.2.3 DEVIATION FROM TEST STANDARD**

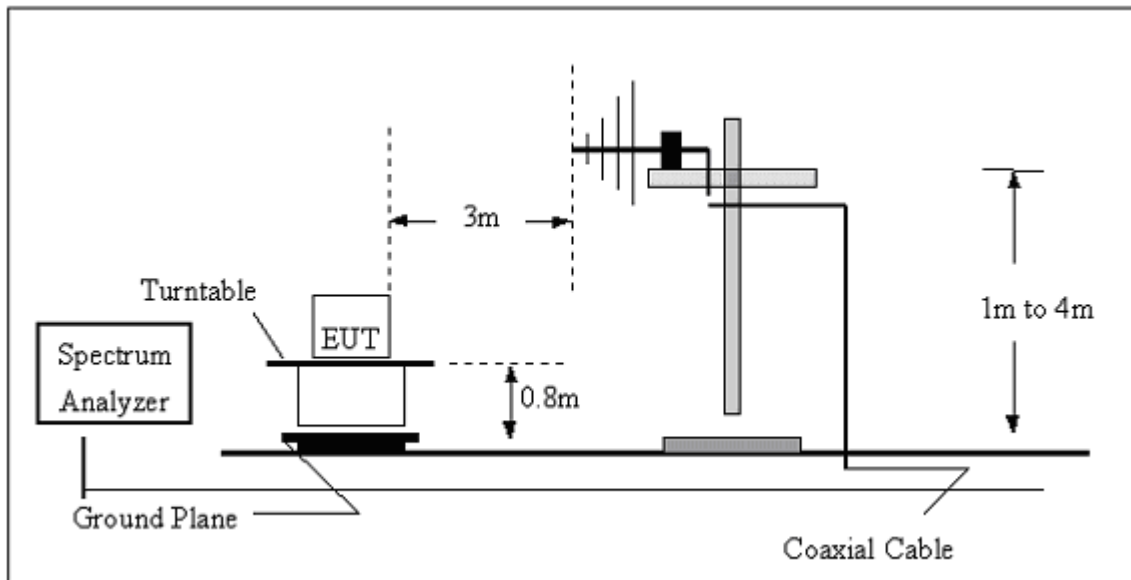
No deviation

### 3.2.4 TEST SETUP

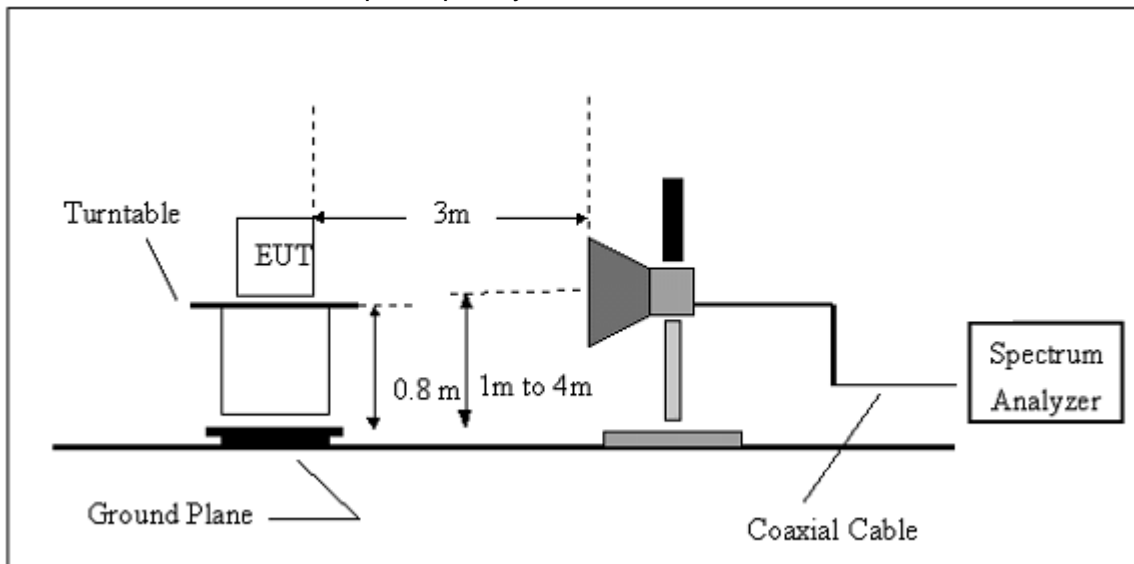
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



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



#### (C) Radiated Emission Test-Up Frequency Above 1GHz



### 3.2.5 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.

### 3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name. :	R450
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	Link mode	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

#### NOTE:

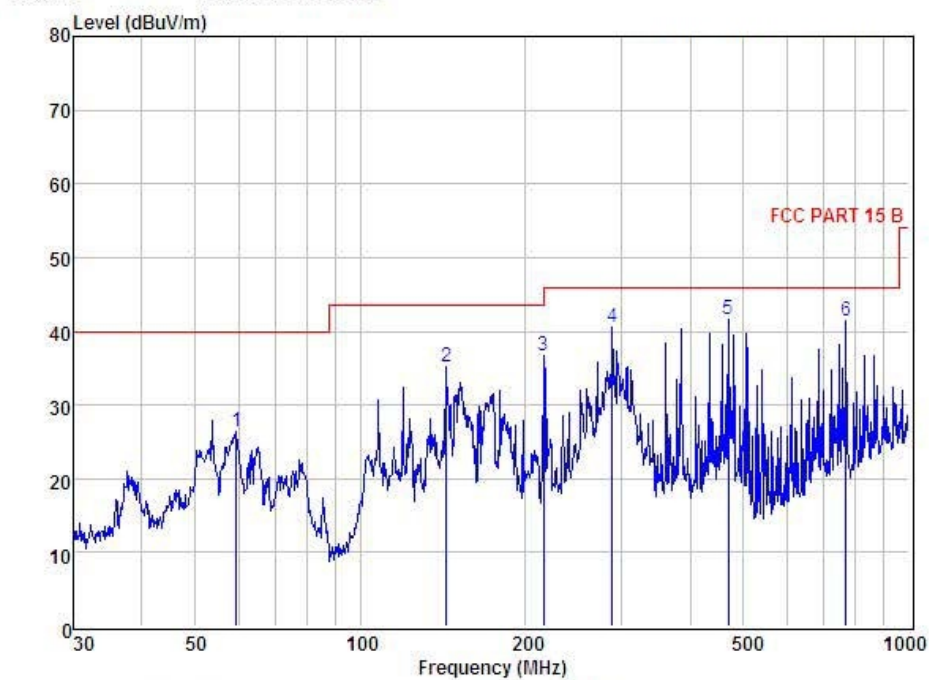
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance/test distance})(\text{dB})$ ;

Limit line = specific limits(dBuv) + distance extrapolation factor.

### 3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

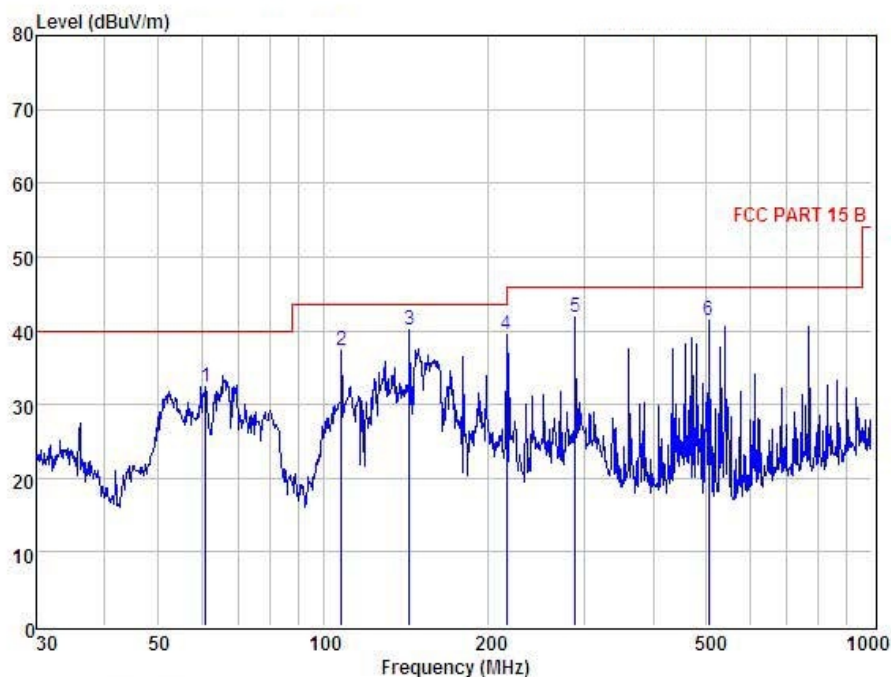
EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	Link mode	Polarization :	Horizontal



Condition		: FCC PART 15 B			3m	POL: HORIZONTAL				
Item	Freq	Read	Antenna	Preamp	Cable	Level	Limit	Margin	Remark	
	MHz	Level	Factor	Factor	Loss					
		dBuV	dB	dB	dB	dBuV	dBuV	dBuV		
1	59.44	41.17	12.75	27.87	0.32	26.37	40.00	-13.63	QP	
2	143.83	47.85	13.77	26.90	0.38	35.10	43.50	-8.40	QP	
3	216.02	52.77	10.41	27.05	0.55	36.68	46.00	-9.32	QP	
4	287.99	51.43	12.54	24.17	0.66	40.46	46.00	-5.54	QP	
5	468.88	49.26	16.15	24.53	0.77	41.65	46.00	-4.35	QP	
6	768.75	45.35	20.47	25.68	1.30	41.44	46.00	-4.56	QP	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	Link mode	Polarization :	Vertical



Condition : FCC PART 15 B 3m POL: VERTICAL									
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	61.13	47.54	12.36	27.65	0.17	32.42	40.00	-7.58	QP
2	107.89	52.82	10.93	26.85	0.44	37.34	43.50	-6.16	QP
3	143.83	52.81	13.77	26.90	0.38	40.06	43.50	-3.44	QP
4	216.02	55.62	10.41	27.05	0.55	39.53	46.00	-6.47	QP
5	287.99	52.76	12.54	24.17	0.66	41.79	46.00	-4.21	QP
6	504.71	48.56	16.61	24.63	0.91	41.45	46.00	-4.55	QP

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

### 3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	CH1 /2402	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.00	45.92	10.44	56.36	74	-17.64	peak
4804.00	30.67	10.44	41.11	54	-12.89	AVG
7306.00	45.08	12.39	57.47	74	-16.53	peak
7306.00	29.83	12.39	42.22	54	-11.78	AVG

Remark:

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

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	CH1 /2402	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.00	44.03	10.4	54.43	74	-19.57	peak
4804.00	30.36	10.4	40.76	54	-13.24	AVG
7306.00	42.57	12.75	55.32	74	-18.68	peak
7306.00	29.36	12.75	42.11	54	-11.89	AVG

Remark:

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

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	CH20 /2440	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.00	45.04	10.4	55.44	74	-18.56	peak
4880.00	31.91	10.4	42.31	54	-11.69	AVG
7320.00	44.03	12.75	56.78	74	-17.22	peak
7320.00	30.71	12.75	43.46	54	-10.54	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	CH20 /2440	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.00	44.25	10.39	54.64	74	-19.36	peak
4880.00	29.82	10.44	40.26	54	-13.74	AVG
7320.00	42.7	12.68	55.38	74	-18.62	peak
7320.00	28.57	12.68	41.25	54	-12.75	AVG

Remark:  
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
2. No emission detected above 18GHz

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	CH40 /2480	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.00	45.18	10.39	55.57	74	-18.43	peak
4960.00	30.33	10.39	40.72	54	-13.28	AVG
7440.00	43.81	12.68	56.49	74	-17.51	peak
7440.00	30.84	12.68	43.52	54	-10.48	AVG

Remark:

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

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	CH40 /2480	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.00	44.24	10.39	54.63	74	-19.37	peak
4960.00	30.36	10.39	40.75	54	-13.25	AVG
7440.00	44.84	12.68	57.52	74	-16.48	peak
7440.00	32.11	12.68	44.79	54	-9.21	AVG

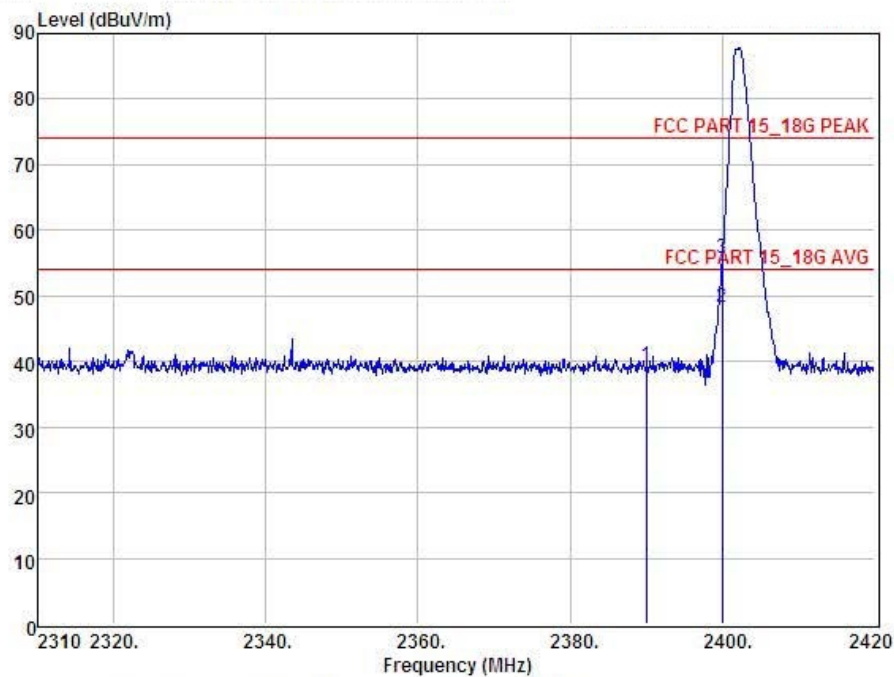
Remark:

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



### 3.2.9 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

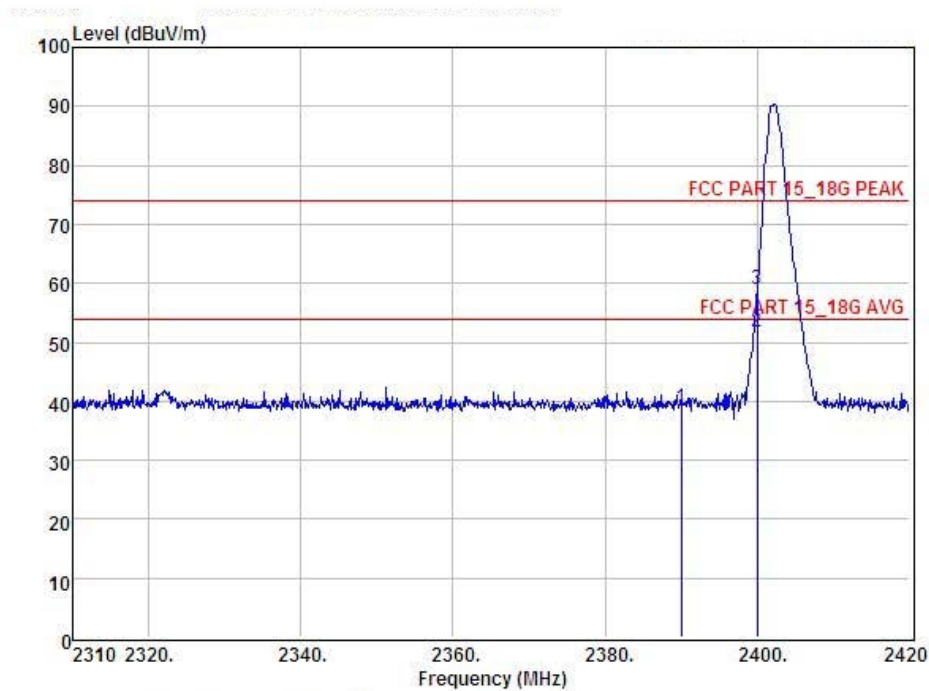
EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V FROM BATTERY
Test Mode :	CH1	Polarization :	Horizontal



Condition		: FCC PART 15_18G PEAK 3m					POL: HORIZONTAL			
Item	Freq	Read	Antenna	Preamp	Cable	Level	Limit	Margin	Remark	
	MHz	dBuV	Factor	Factor	Loss	dBuV	dBuV	dBuV		
			dB	dB	dB					
1	2390.00	42.75	27.62	34.97	3.92	39.32	74.00	-34.68	Peak	
2	2400.00	51.70	27.62	34.97	3.94	48.29	54.00	-5.71	Average	
3	2400.00	59.14	27.62	34.97	3.94	55.73	74.00	-18.27	Peak	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

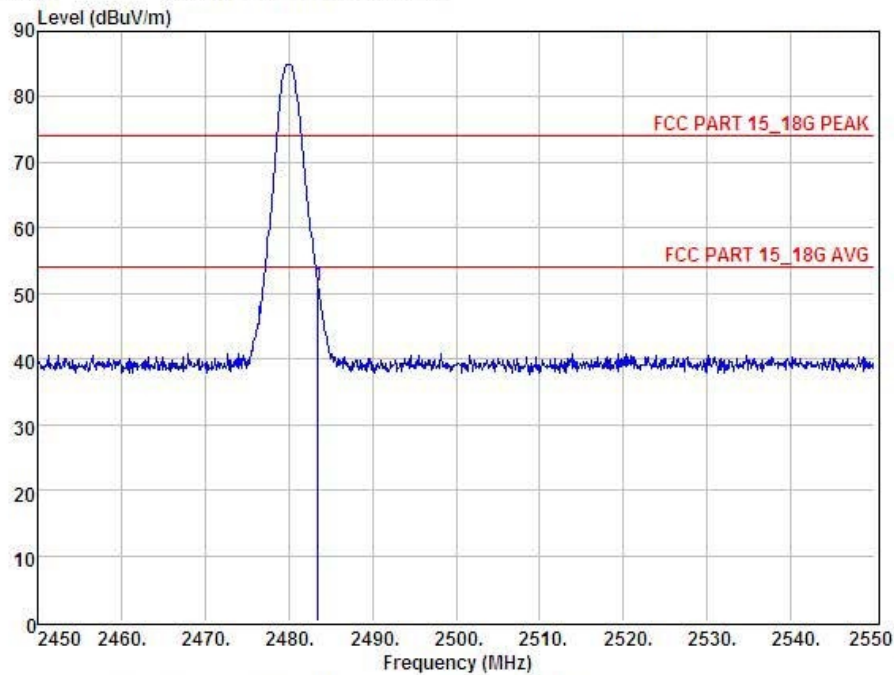
EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V FROM BATTERY
Test Mode :	CH1	Polarization :	Vertical



Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL									
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2390.00	42.35	27.62	34.97	3.92	38.92	74.00	-35.08	Peak
2	2400.00	55.27	27.62	34.97	3.94	51.86	54.00	-2.14	Average
3	2400.00	62.45	27.62	34.97	3.94	59.04	74.00	-14.96	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

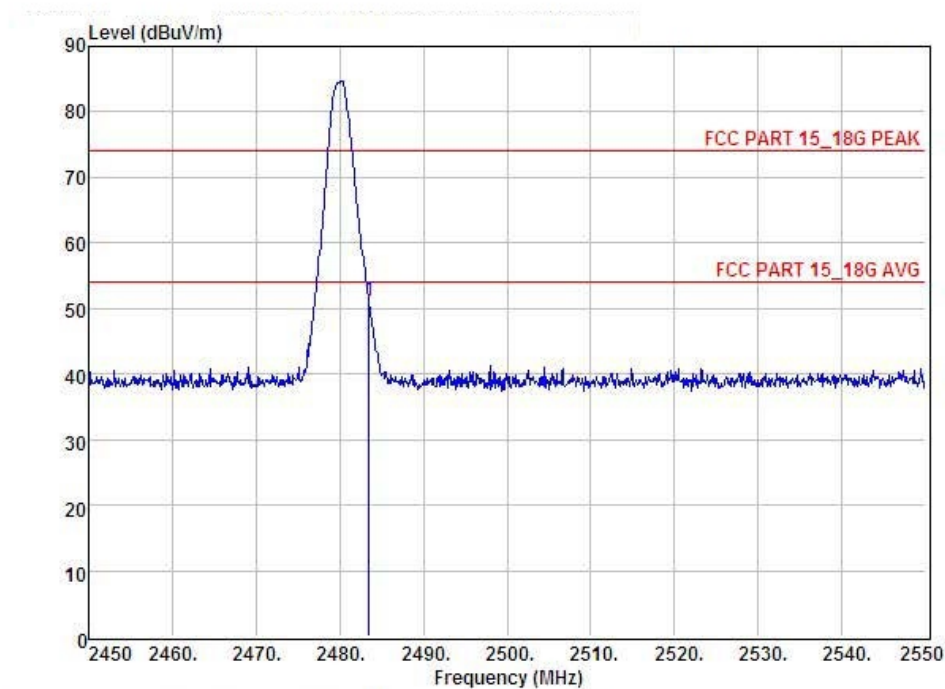
EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V FROM BATTERY
Test Mode :	CH40	Polarization :	Horizontal



Condition		: FCC PART 15_18G PEAK 3m				POL: HORIZONTAL			
Item	Freq	Read	Antenna	Preamp	Cable	Level	Limit	Margin	Remark
	MHz	dBuV	Factor	Factor	Loss	dBuV	dBuV	dBuV	
			dB	dB	dB				
1	2483.50	54.64	27.59	34.97	4.00	51.26	74.00	-22.74	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V FROM BATTERY
Test Mode :	CH40	Polarization :	Vertical



Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL									
Item	Freq	Read	Antenna	Preamp	Cable	Level	Limit	Margin	Remark
	MHz	Level	Factor	Factor	Loss	dBuV	dBuV	dBuV	
		dBuV	dB	dB	dB				
1	2483.50	54.52	27.59	34.97	4.00	51.14	74.00	-22.86	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

#### 4. POWER SPECTRAL DENSITY TEST

##### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

##### 4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW  $\geq 3$  kHz.
4. Set the VBW  $\geq 3 \times$  RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

##### 4.1.2 DEVIATION FROM STANDARD

No deviation.

##### 4.1.3 TEST SETUP



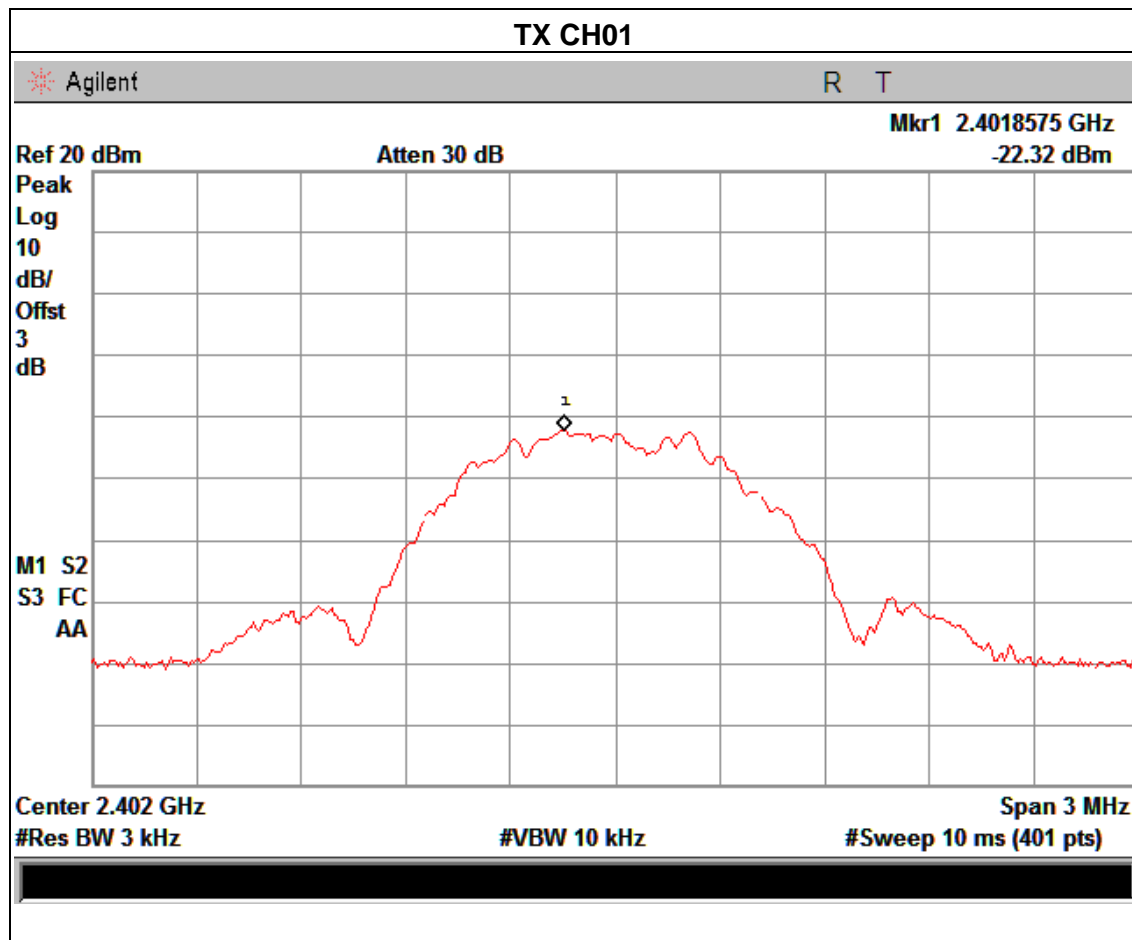
##### 4.1.4 EUT OPERATION CONDITIONS

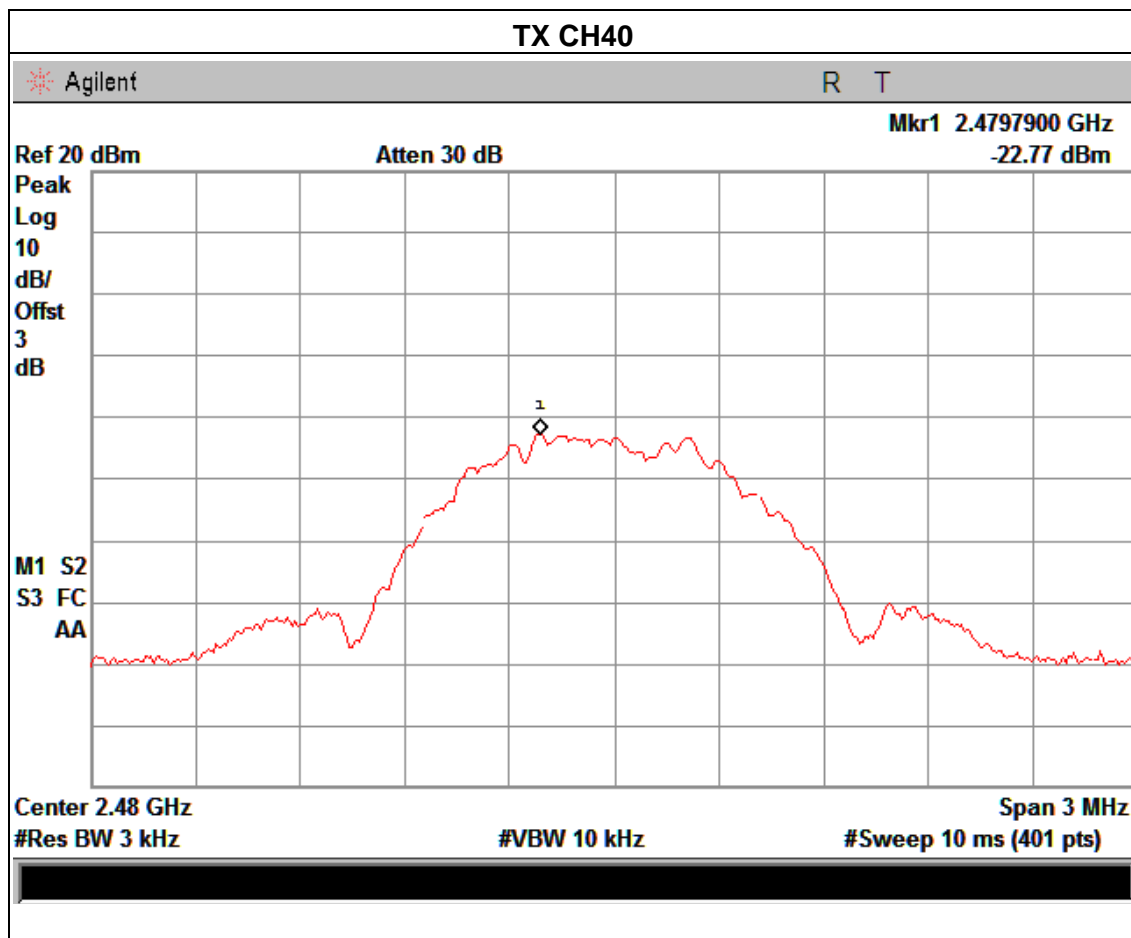
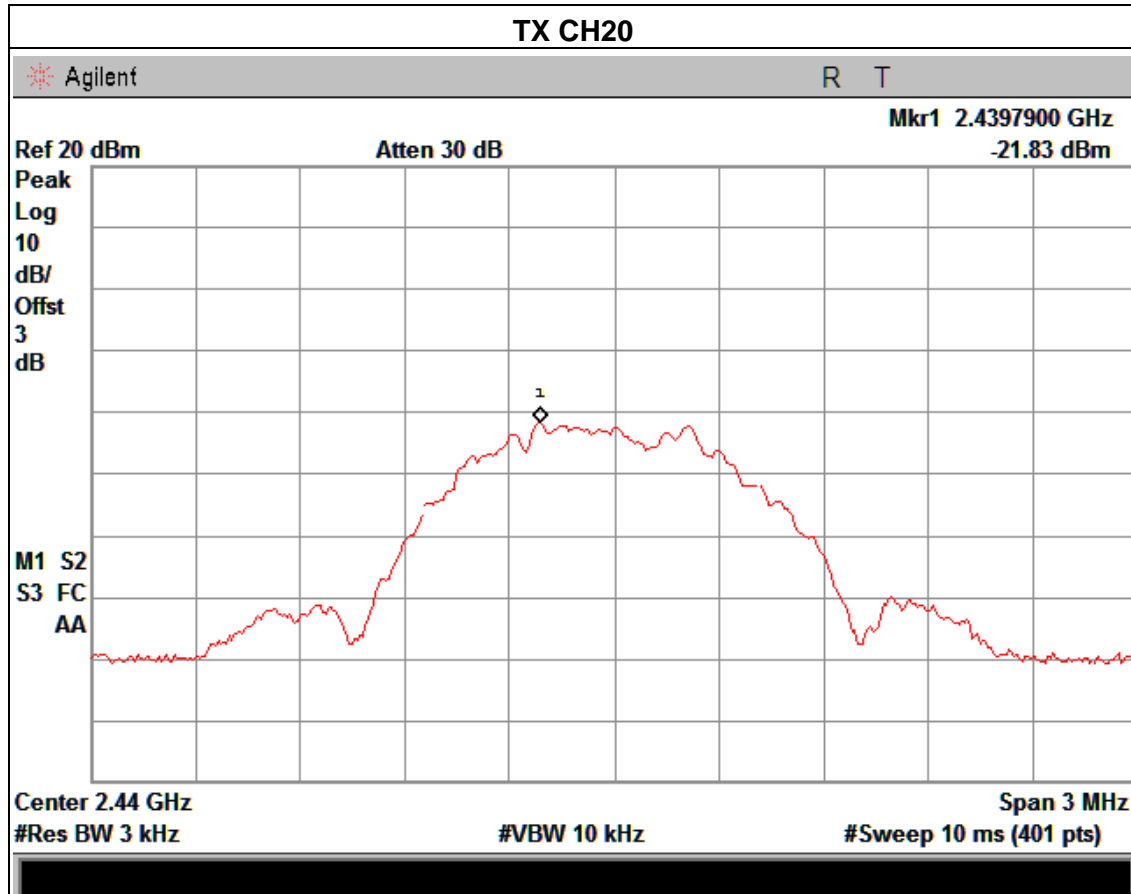
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.1.5 TEST RESULTS

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	TX Mode /CH01, CH20, CH40		

Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2402 MHz	-22.32	8	<b>PASS</b>
2440 MHz	-21.83	8	<b>PASS</b>
2480 MHz	-22.77	8	<b>PASS</b>





## 5. BANDWIDTH TEST

### 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

#### 5.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times \text{RBW}$ .
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.

#### 5.1.2 DEVIATION FROM STANDARD

No deviation.

#### 5.1.3 TEST SETUP



#### 5.1.4 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.

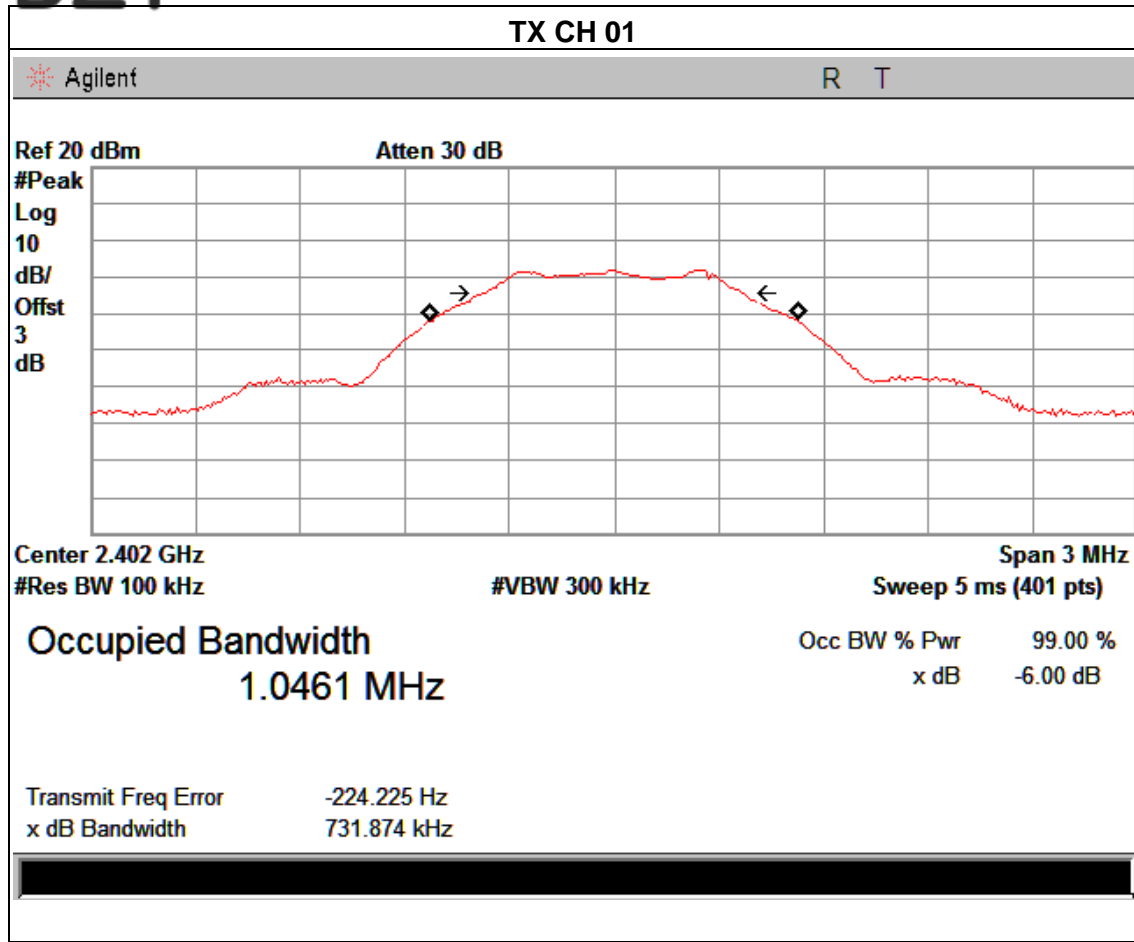


### 5.1.5 TEST RESULTS

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	TX Mode /CH01, CH20, CH40		

Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2402 MHz	0.732	>=500KHz	<b>PASS</b>
2440 MHz	0.735	>=500KHz	<b>PASS</b>
2480 MHz	0.737	>=500KHz	<b>PASS</b>

Frequency	99% Bandwidth (MHz)	Result
2402 MHz	1.0461	<b>PASS</b>
2440 MHz	1.0505	<b>PASS</b>
2480 MHz	1.0514	<b>PASS</b>





## TX CH 20

Agilent

R T

Ref 20 dBm

Atten 30 dB

#Peak

Log

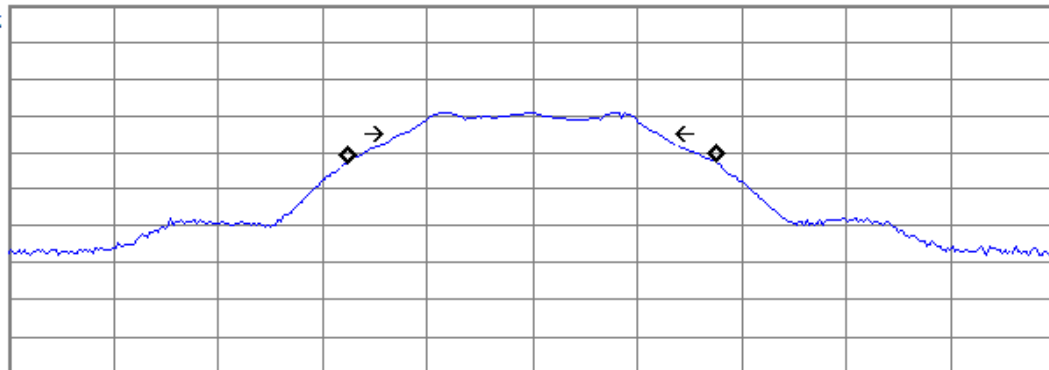
10

dB/

Offst

3

dB



Center 2.44 GHz

Span 3 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 5 ms (401 pts)

Occupied Bandwidth  
1.0505 MHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

Transmit Freq Error 88.181 Hz  
x dB Bandwidth 735.208 kHz

## TX CH 40

Agilent

R T

Ref 20 dBm

Atten 30 dB

#Peak

Log

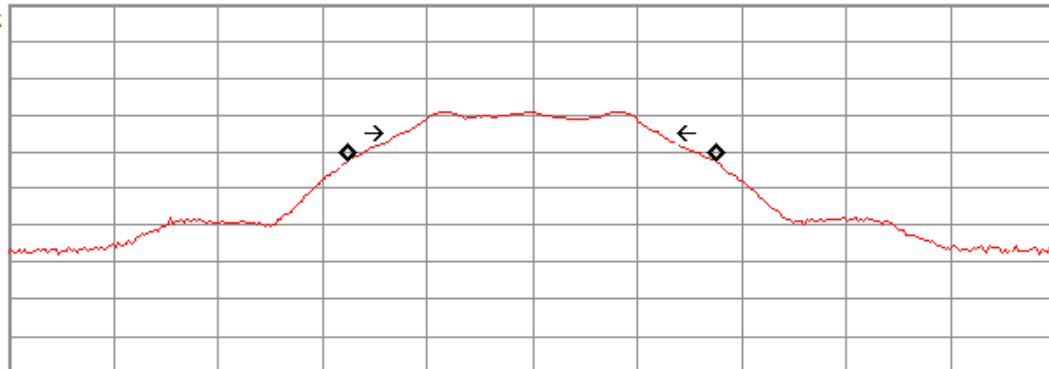
10

dB/

Offst

3

dB



Center 2.48 GHz

Span 3 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 5 ms (401 pts)

Occupied Bandwidth  
1.0514 MHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

Transmit Freq Error -172.484 Hz  
x dB Bandwidth 737.343 kHz

## 6. PEAK OUTPUT POWER TEST

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

#### 6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

#### 6.1.2 DEVIATION FROM STANDARD

No deviation.

#### 6.1.3 TEST SETUP



#### 6.1.4 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.

### 6.1.5 TEST RESULTS

EUT :	R Series Activity & Wellness Monitor with Heart Rate Measurement, Spectral Ambient Light Sensor & Intelligent Alerts	Model Name :	R450
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V from battery
Test Mode :	TX Mode /CH01, CH20, CH40		

TX Mode			
Test Channe	Frequency	Peak Conducted Output Power	LIMIT
	(MHz)	(dBm)	dBm
CH01	2402	-6.22	30
CH20	2440	-6.36	30
CH40	2480	-6.59	30

## **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 Integral Antenna . It comply with the standard requirement.

**8. EUT TEST PHOTO****Radiated Measurement Photos**