



# **CERTIFICATION TEST REPORT** **CLASS II PERMISSIVE CHANGE**

**Report Number. :** 12231847-E1V2

**Applicant :** FITBIT INC.  
199 FREMONT ST, 14TH FLOOR  
SAN FRANCISCO,  
CA 94105, U.S.A

**Model :** FB505, FB504

**FCC ID :** XRAFB505, XRAFB504

**IC :** 8542A-FB505, 8542A-FB504

**EUT Description :** SMART WATCH

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-247 ISSUE 2  
INDUSTRY CANADA RSS-GEN ISSUE 4

**Date Of Issue:**

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**Prepared by:**

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	3/28/2018	Initial Issue	--
V2	4/10/2018	Added model FB504, paragraph of models differences description added	Tina Chu

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** FITBIT INC.  
199 FREMONT ST, 14TH FLOOR  
SAN FRANCISCO,  
CA 94105, U.S.A

**EUT DESCRIPTION:** SMART WATCH

**MODEL:** FB505 (Tested Model), FB504

**SERIAL NUMBER:** B2-A1-1367P (CONDUCTED)

**DATE TESTED:** MARCH 28, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
INDUSTRY CANADA RSS-247 Issue 2	Complies
INDUSTRY CANADA RSS-GEN Issue 4	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of U.S. government.

Approved & Released For  
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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01 v04, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 2.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)
<input type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)
	<input type="checkbox"/> Chamber G (IC:22541-4)
	<input type="checkbox"/> Chamber H (IC:22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned}\text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m}\end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Radiated Disturbance, 26000 to 40000 MHz	5.24 dB
Occupied Channel Bandwidth	±0.39 %

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The equipment under test is a Smart Watch.

### 5.2. MODELS DIFFERENCES DESCRIPTION

FCC ID: XRAFB504 / IC: 8542A-FB504 (model: FB504) has the same board design and mechanical design as FCC ID: XRAFB505 / IC: 8542A-FB505 (model: FB505). The difference is that the Model: FB504 does not have the NFC controller and antenna is depopulated. Only model: FB505 output power was tested in this test report. Model: FB504 output power test results are leveraged from model: FB505 for this Class II Permissive Change application.

### 5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

802.11b mode average output power was decreased.

### 5.4. MAXIMUM OUTPUT POWER

The transmitter has a maximum average conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412-2472	802.11b	16.68	46.56
	802.11g	18.98	79.07
	802.11n HT20	18.90	77.62

### 5.5. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Peak Gain (dBi)
2.4	-11.30

### 5.6. SOFTWARE AND FIRMWARE

The test utility software used during testing was Tera Term Ver 4.93.  
The firmware installed in the EUT during testing was Version 32.3.125.8.



## **5.7. WORST-CASE CONFIGURATION AND MODE**

802.11b mode average output power was decreased. Only 802.11b mode output power was re-measured. 802.11g mode and 802.11HT20 average output power results were from FCC ID: XRAFB505 / IC: 8542A-FB505 (model: FB505) original report "11981280-E3V1" for reference purpose only in this report.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps  
802.11g mode: 6 Mbps  
802.11n HT20 mode: MCS0

BT and Wifi bands do not transmit simultaneously.

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop AC/DC Adapter	Lenovo	ADLX45DLCC2A	11S36200283ZZ10051KU2U	NA
Laptop	Lenovo	ThinkPad X1 Carbon	R9-OG4NPM 15/06	NA
AC/DC Adapter	Homespot	S005AYU0500100	N/A	NA

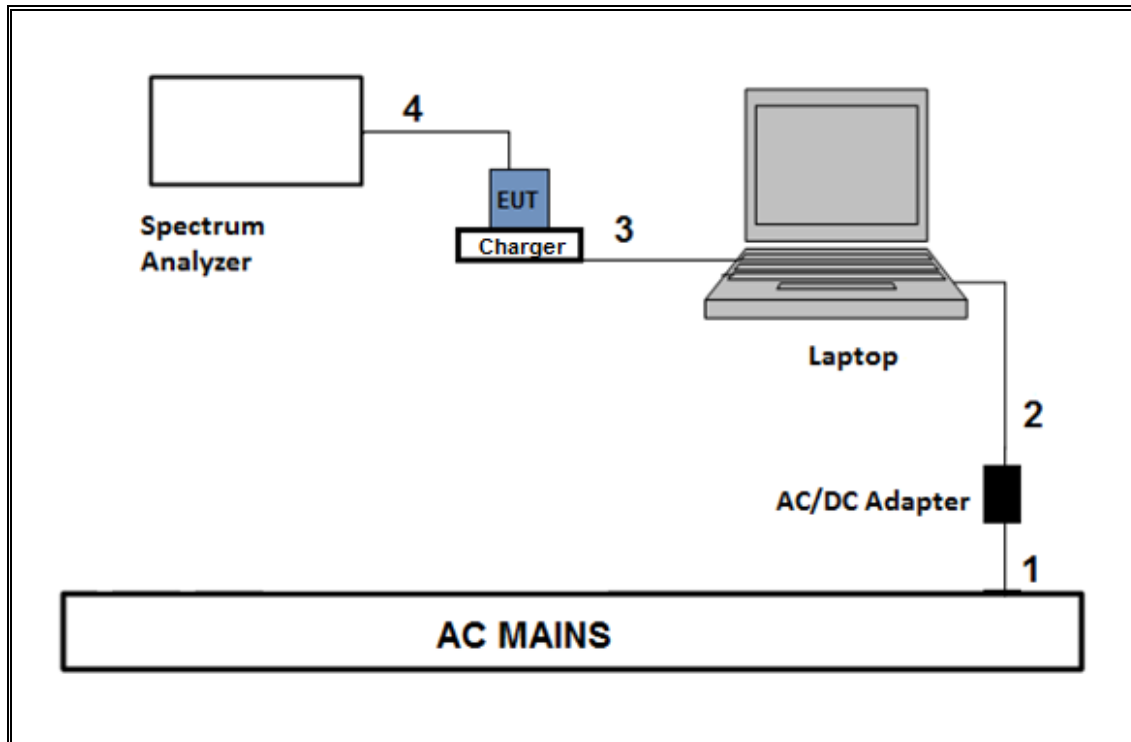
### I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	1	AC Mains to AC/DC Adapter
2	DC	1	DC	Unshielded	1.5	AC/DC Adapter to Laptop
3	USB	1	USB	Unshielded	1	Laptop to EUT
4	Antenna	1	SMA	Unshielded	0.2	To spectrum analyzer

### TEST SETUP-CONDUCTED TEST

The EUT was placed in charger and powered by host laptop. Test software exercised the EUT.

### SETUP DIAGRAM



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Power Meter, P-series single channel	Keysight	N1912A	T1245	05/12/2018
Power Sensor	Keysight	N1921A	T413	06/22/2018

### **NOTES:**

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

## 7. MEASUREMENT METHODS

Output Power: KDB 558074 D01 v04, Section 9.2.3.2.

## 8. ANTENNA PORT TEST RESULTS

### 8.1. 11b MODE IN THE 2.4GHz BAND

#### 8.1.1. OUTPUT POWER

##### LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

##### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

##### RESULTS

<b>ID:</b>	10629	<b>Date:</b>	03/27/18
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##### Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
CH1	2412	-11.30	30.00	30	36	30.00
CH6	2437	-11.30	30.00	30	36	30.00
CH11	2462	-11.30	30.00	30	36	30.00
CH12	2467	-11.30	30.00	30	36	30.00
CH13	2472	-11.30	30.00	30	36	30.00

##### Results

Channel	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
CH1	2412	16.68	30.00	-13.32
CH6	2437	16.58	30.00	-13.42
CH11	2462	16.48	30.00	-13.52
CH12	2467	16.45	30.00	-13.55
CH13	2472	13.27	30.00	-16.73

## 8.2. 11g MODE IN THE 2.4GHz BAND

### 8.2.1. OUTPUT POWER

#### LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

#### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

#### RESULTS

<b>ID:</b>	10629	<b>Date:</b>	02/01/18
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#### Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
CH1	2412	-11.30	30.00	30	36	30.00
CH2	2417	-11.30	30.00	30	36	30.00
CH6	2437	-11.30	30.00	30	36	30.00
CH10	2457	-11.30	30.00	30	36	30.00
CH11	2462	-11.30	30.00	30	36	30.00
CH12	2467	-11.30	30.00	30	36	30.00
CH13	2472	-11.30	30.00	30	36	30.00

#### Results

Channel	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
CH1	2412	16.9	30.00	-13.10
CH2	2417	18.97	30.00	-11.03
CH6	2437	18.98	30.00	-11.02
CH10	2457	17.9	30.00	-12.10
CH11	2462	16.93	30.00	-13.07
CH12	2467	14.13	30.00	-15.87
CH13	2472	1.5	30.00	-28.50

### 8.3. 11n HT20 MODE IN THE 2.4GHz BAND

#### 8.3.1. OUTPUT POWER

##### LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

##### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

##### RESULTS

<b>ID:</b>	10629	<b>Date:</b>	02/01/18
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##### Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
CH1	2412	-11.30	30.00	30	36	30.00
CH2	2417	-11.30	30.00	30	36	30.00
CH6	2437	-11.30	30.00	30	36	30.00
CH10	2457	-11.30	30.00	30	36	30.00
CH11	2462	-11.30	30.00	30	36	30.00
CH12	2467	-11.30	30.00	30	36	30.00
CH13	2472	-11.30	30.00	30	36	30.00

##### Results

Channel	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
CH1	2412	16.79	30.00	-13.21
CH2	2417	18.83	30.00	-11.17
CH6	2437	18.9	30.00	-11.10
CH10	2457	17.64	30.00	-12.36
CH11	2462	15.84	30.00	-14.16
CH12	2467	13.93	30.00	-16.07
CH13	2472	1.33	30.00	-28.67