



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

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NVLAP LAB CODE 200065-0

Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u> | <u>Revised By</u> |
|-------------|-------------------|--|-------------------|
| 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.

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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 |

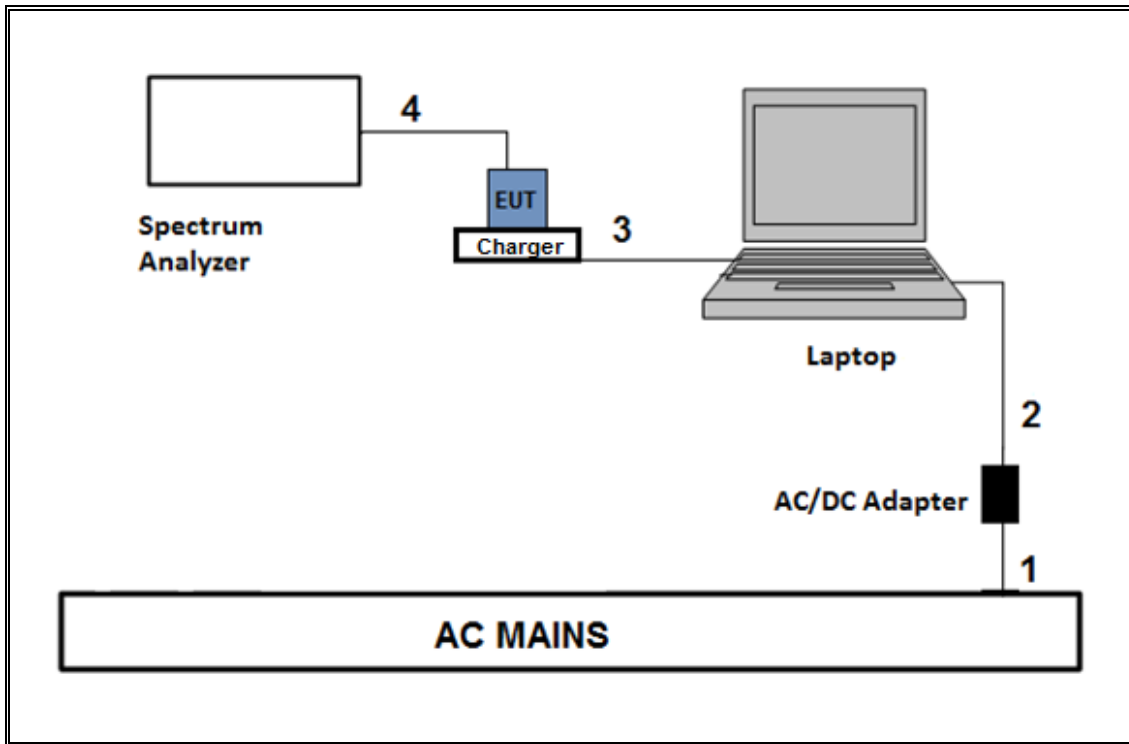
I/O CABLES (CONDUCTED TEST)

| 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

| | | | |
|------------|-------|--------------|----------|
| ID: | 10629 | Date: | 03/27/18 |
|------------|-------|--------------|----------|

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

| | | | |
|------------|-------|--------------|----------|
| ID: | 10629 | Date: | 02/01/18 |
|------------|-------|--------------|----------|

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

| | | | |
|------------|-------|--------------|----------|
| ID: | 10629 | Date: | 02/01/18 |
|------------|-------|--------------|----------|

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 |