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EMC Test Report

Application for Grant of Equipment Authorization

Industry Canada RSS-Gen Issue 4 / RSS 247 Issue 1
FCC Part 15 Subpart C

Model: FB502

IC CERTIFICATION #:	8542A-FB502
FCC ID:	XRAFB502
APPLICANT:	Fitbit, Inc. 405 Howard Street, Suite 550 San Francisco, CA 94105
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-7
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REVISION HISTORY

Rev#	Date	Comments	Modified By
	October 8, 2015	First release	
1	December 14, 2015	Revised to update EUT Description. Updated Occupied bandwidth results in the summary.	David Guidotti

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SCOPE

An electromagnetic emissions test has been performed on the Fitbit, Inc. model FB502, pursuant to the following rules:

Industry Canada RSS-Gen Issue 4
RSS 247 Issue 1 "Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices"
FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2013
FHSS test procedure DA 00-0705A1

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label

indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Fitbit, Inc. model FB502 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 4
RSS 247 Issue 1 "Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices"
FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Fitbit, Inc. model FB502 and therefore apply only to the tested sample. The sample was selected and prepared by Sachin Sawalapurkar of Fitbit, Inc.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY

FREQUENCY HOPPING SPREAD SPECTRUM (2400 – 2483.5 MHz, 15 channels or more)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (a) (1)	5.1 (2)	20dB Bandwidth	1299 kHz	Channel spacing > 2/3 of 20dB bandwidth	Complies
		Channel Separation	1029 kHz		Complies
15.247 (a) (1) (iii)	5.1 (4)	Channel Dwell Time (*average time of occupancy)*	Device complies with Bluetooth specifications with a minimum of 20 hopping channels	<0.4 second within a period of 0.4 x number of channels	Complies
15.247 (a) (1) (iii)	5.1 (4)	Number of Channels		15 or more	Complies
15.247 (a) (1)	5.1 (4)	Channel Utilization	The system uses the BlueTooth algorithm and, therefore, meets all requirements for channel utilization.	All channels shall, on average, be used equally	Complies
15.247 (b) (3)	5.1 (2)	Output Power (multipoint systems)	Basic: 5.7dBm (3.7mW) EDR: 2.2dBm (1.7mW) EIRP = 2.9mW Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(c)	5.5	Spurious Emissions – 30MHz – 25GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	5.5 RSS GEN Table 3	Radiated Spurious Emissions 30MHz – 25GHz	53.9 dBµV/m @ 4960.1 MHz (-0.1 dB)	15.207 in restricted bands, all others < -20dBc	Complies
15.247 (a) (1)	-	Receiver bandwidth	Refer to operational description	Shall match the channel bandwidth	Complies
Note 1: EIRP calculated using antenna gain of -1.15 dBi					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antenna is internal	Unique or integral antenna required	Complies
15.207	RSS GEN Table 3	AC Conducted Emissions	47.5 dBµV @ 0.153 MHz (-18.3 dB)	Refer to page 18	Complies (- 18.3 dB)
15.247 (b) (5)	RSS 102	RF Exposure Requirements	Refer to SAR exclusion calculations in separate exhibit and RSS 102 declaration	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSS GEN 8.3	User Manual	-	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 6.6	Occupied Bandwidth	Basic:0.956MHz EDR: 1.299MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Fitbit, Inc. model FB502 is a wearable fitness tracker. The EUT was treated as handheld equipment during testing to simulate the end-user environment. The EUT is powered via a rechargeable Li battery.

The sample was received on July 27, 2015 and tested on August 4, 6, 7, 10, 11 and 14, 2015. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Fitbit, Inc.	FB502	Fitness tracker	EVT2-181	
Fitbit, Inc.	NA	USB charge cable	NA	

OTHER EUT DETAILS

The following EUT details should be noted: in normal use, the USB connection is used only to charge the EUT's internal battery.

ANTENNA SYSTEM

Internal Antenna, -1.15dBi

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 3.5 cm wide by 1.2 cm deep by 3.2 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Lenovo	T430	Laptop Computer	A2113440	DoC
Lenovo	42T4418	AC/DC Adapter	11S42T4418Z1ZGW G25C49K	N/A

No remote support equipment was used during testing.

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Lenovo Laptop - USB	EUT	Multiconductor	Shielded	0.86

Additional on Support Equipment

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Lenovo Laptop - Ethernet	Remote Switch	CAT5	Unshielded	10
Lenovo Laptop - DC In	AC/DC Adapter	Multiconductor	Shielded	1.5
Lenovo AC/DC Adapter	AC Mains	2wire	Unshielded	1

EUT OPERATION

During emissions testing the EUT was continuously transmitting at maximum power on the channel called out in the individual test. The modulation used was noted for each test.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 7	US0027	2845B-7	41039 Boyce Road Fremont, CA 94538-2435

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 1.5m for measurements above 1GHz, and 0.8m for measurements below 1GHz. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

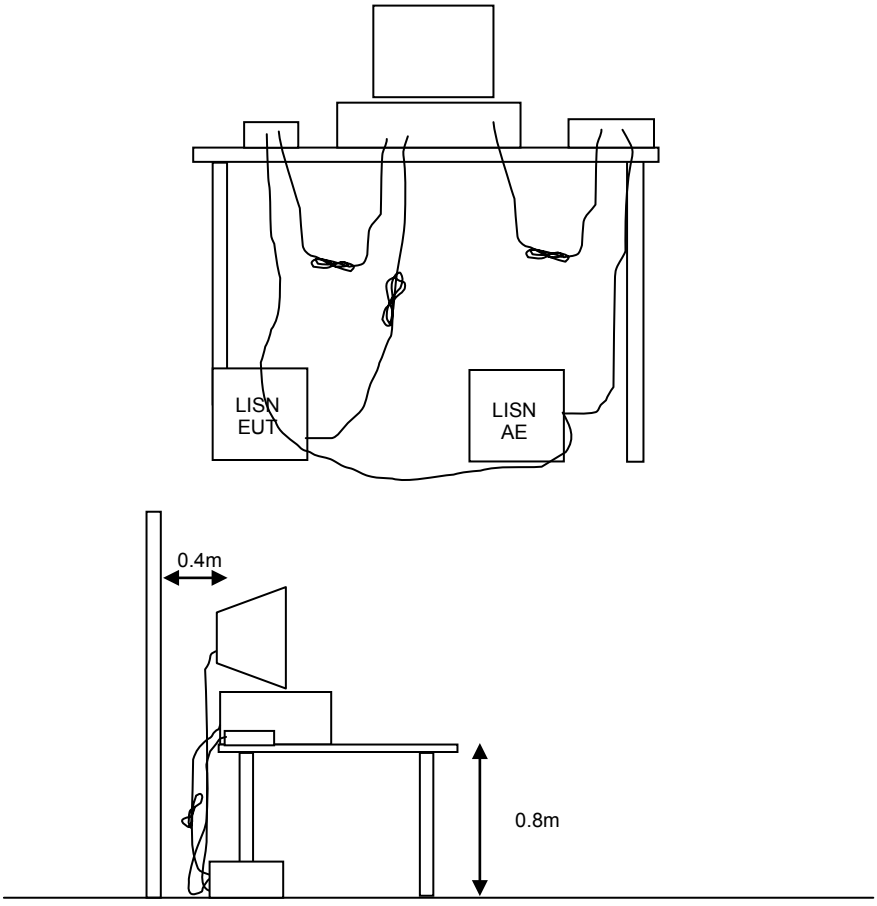


Figure 1 Typical Conducted Emissions Test Configuration

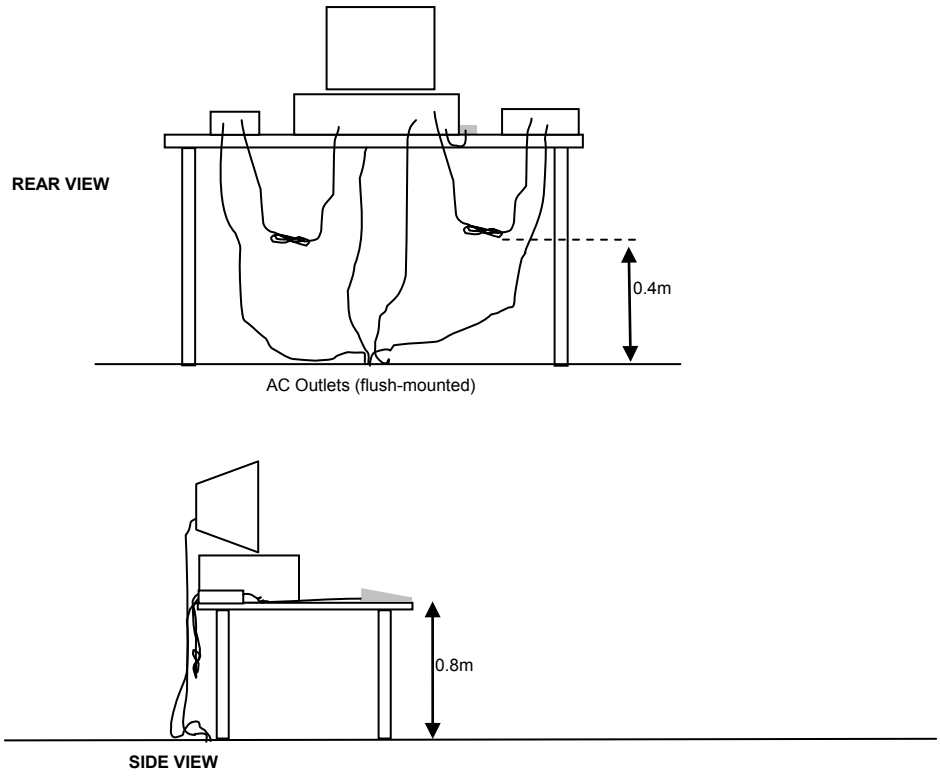
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

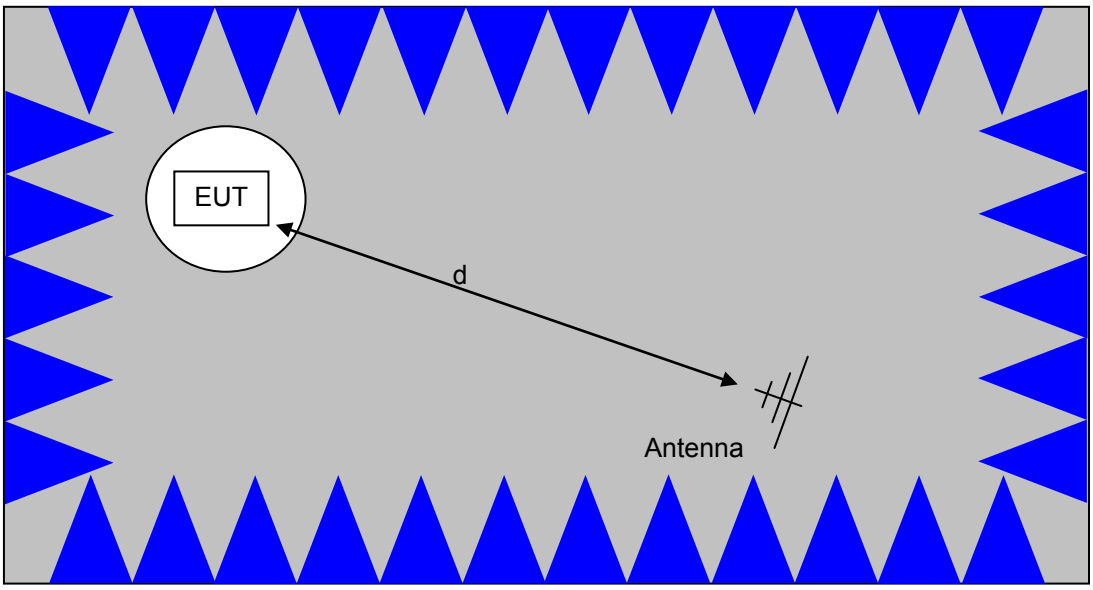
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

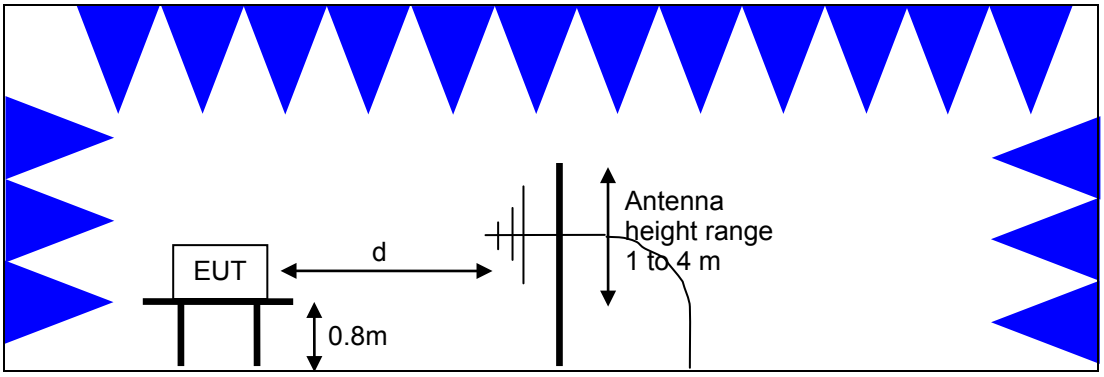


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

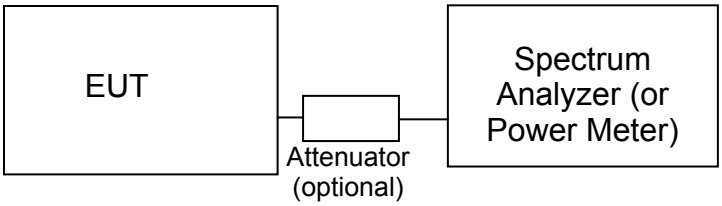
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1].

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

OUTPUT POWER LIMITS – FHSS SYSTEMS

The table below shows the limits for output power based on the number of channels available for the hopping system.

Operating Frequency (MHz)	Number of Channels	Output Power
2400 – 2483.5	< 75	0.125 Watts (21 dBm)

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 247. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

[1] The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_C = Corrected Reading in dBuV/m

L_S = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 1000 - 25,000 MHz, 04-Aug-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	7/1/2015	7/17/2016
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
A. H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	9/2/2014	9/2/2015
Radiated Emissions, 1000 - 18,000 MHz, 06-Aug-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Radiated Spurious Emissions, 1000 - 25,000 MHz, 07-Aug-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
A. H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	9/2/2014	9/2/2015
Miteq, Inc.	HF Amplifier, 18-40 GHz (with 1145) Red	TTA1840-45-5P-HG-S	3169	7/1/2015	2/1/2016
Radiated Spurious Emissions, 1000 - 25,000 MHz, 10-Aug-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
A. H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	9/2/2014	9/2/2015
Miteq, Inc.	HF Amplifier, 18-40 GHz (with 1145) Red	TTA1840-45-5P-HG-S	3169	7/1/2015	2/1/2016
Radiated Spurious Emissions, 30 - 1,000 MHz, 11-Aug-15					
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/20/2014	12/20/2015
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	6/2/2015	6/2/2017
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	9/16/2014	9/16/2015

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	3/4/2015	3/5/2016
Conducted Emissions - AC Power Ports, 14-Aug-15					
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	6/2/2015	6/2/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/20/2014	12/20/2015
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/14/2015	5/14/2016
Radiated Emissions, Metal Band, 14-Aug-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/3/2014	10/3/2015
Radiated Emissions, Substitutions, 14-Aug-15					
Agilent Technologies	USB Average Power Sensor	U2001A	2442	12/19/2014	12/19/2015
EMCO	Antenna, Horn, 1-18 GHz	3115	2733	11/18/2014	11/18/2016
Agilent Technologies	PSG, Vector Signal Generator, (250kHz - 20MHz)	E8267D	3011	1/8/2015	1/8/2016
Radio Antenna Port (Power and Spurious Emissions), 14-Aug-15					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016
Radiated Emissions, 1,000 - 6,500 MHz, 20-Aug-15					
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/26/2014	6/26/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	3/7/2015	3/7/2016
Radiated Emissions, 1,000 - 6,500 MHz, 21-Aug-15					
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/26/2014	6/26/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	3/7/2015	3/7/2016
Radiated Emissions, 1,000 - 10,000 MHz, 04-Sep-15					
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/26/2014	6/26/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/29/2015	7/29/2017
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	3/7/2015	3/7/2016

Appendix B Test Data

T98212 Pages 25 - 67

Client:	Fitbit, Inc.	Job Number:	J97928
Product	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Emissions Standard(s):	FCC 15.247, IC RSS-247, LP 0002	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Fitbit, Inc.

Product

FB502

Date of Last Test: 9/29/2015

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Duty Cycle

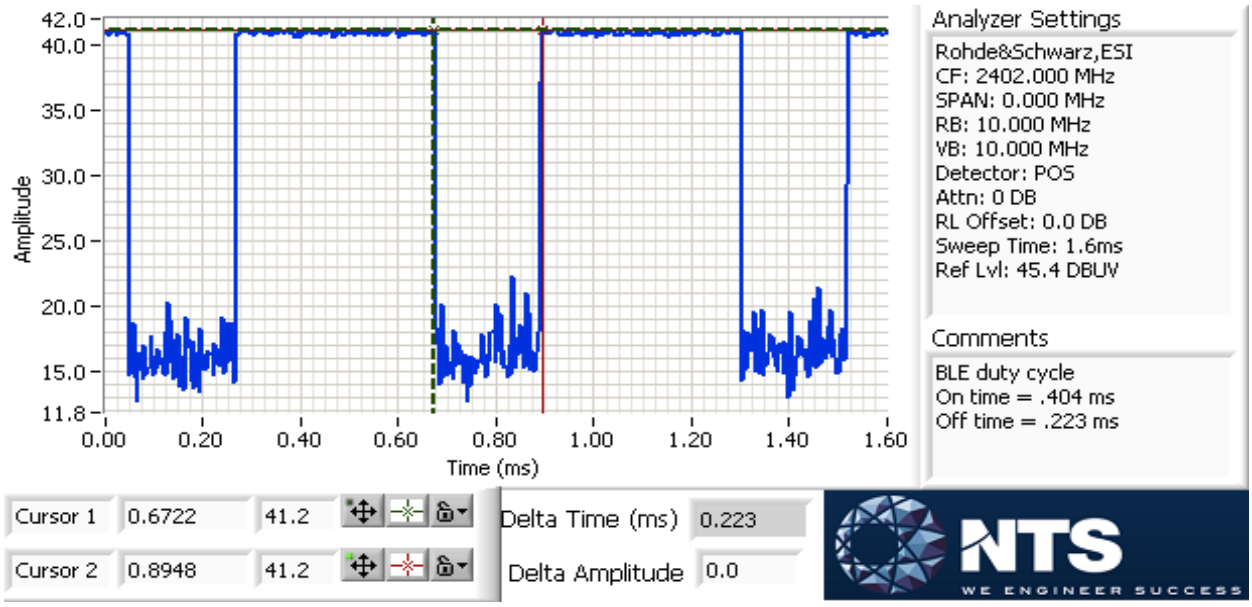
Date of Test: 8/3/2015
Test Engineer: John Caizzi
Test Location: Chamber 7

Duty cycle measurements performed on the worse case data rate for power.

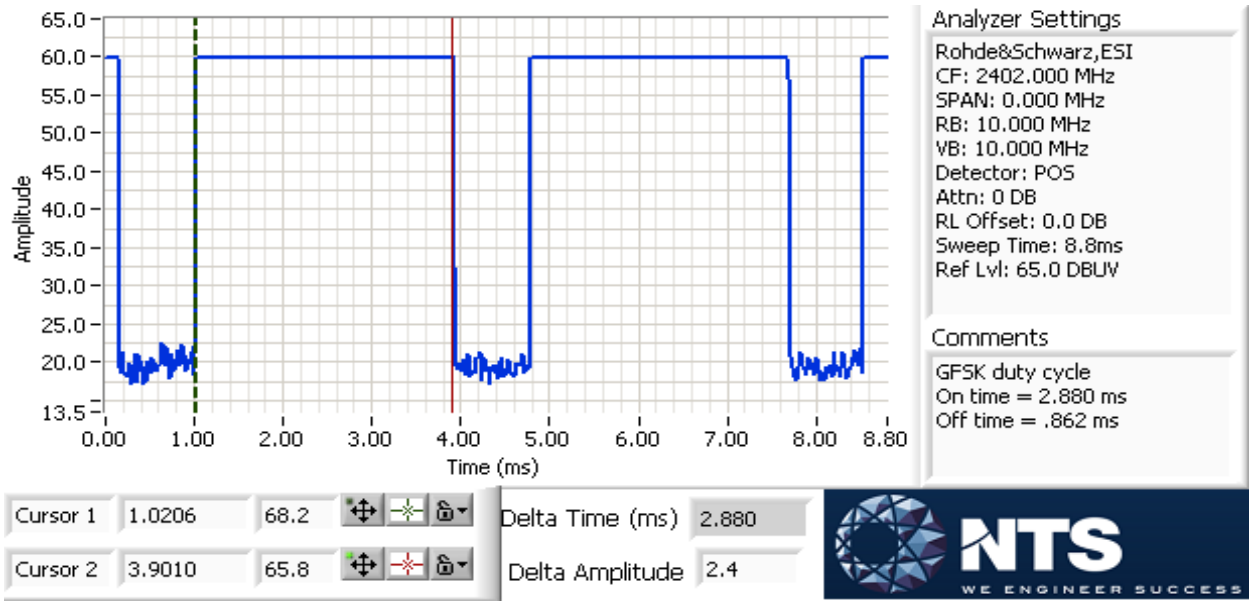
Notes: Measurements taken with maximum RBW/VBW settings allowed.

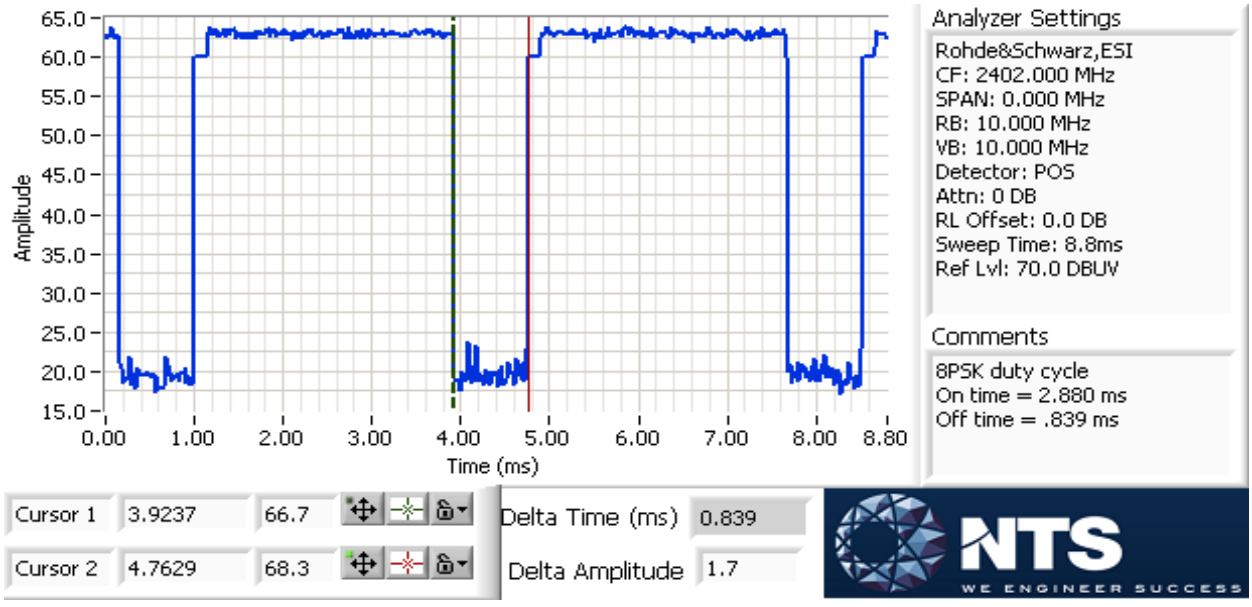
Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
BLE	1Mbs	0.64	Yes	0.404	1.9	3.8	2475
BT - GFSK	1Mbs	0.77	Yes	2.88	1.1	2.3	347
BT - 8PSK	3Mbs	0.77	Yes	2.88	1.1	2.2	347

* Correction factor when using RMS/Power averaging - 10*log(1/x)
** Correction factor when using linear voltage average - 20*log(1/x)
T = Minimum transmission duration



Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

RSS 247 and FCC 15.247 (DSS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 34 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
1	GFSK	2402MHz	6	6	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	31.8 dBµV/m @ 2375.9 MHz (-22.2 dB)
		2480MHz		6	Restricted Band Edge (2483.5 MHz)		31.6 dBµV/m @ 2483.6 MHz (-22.4 dB)
2	8PSK	2402MHz		6	Restricted Band Edge (2390 MHz)		30.8 dBµV/m @ 2386.7 MHz (-23.2 dB)
		2480MHz		6	Restricted Band Edge (2483.5 MHz)		33.9 dBµV/m @ 2483.6 MHz (-20.1 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Sample Notes

Sample S/N: EVT2-181
Driver: v17.7.0.10
Antenna: internal

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
BT - GFSK	1Mbs	0.77	Yes	2.88	1.1	2.3	347
BT - 8PSK	3Mbs	0.77	Yes	2.88	1.1	2.2	347

Measurement Specific Notes:

Note 4:	Emission has duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 6:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Run #1: Radiated Bandedge Measurements

Date of Test: 8/3/2015 0:00
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: 1
Config Change: none
EUT Voltage: USB

Channel: 2402MHz
Tx Chain: Main

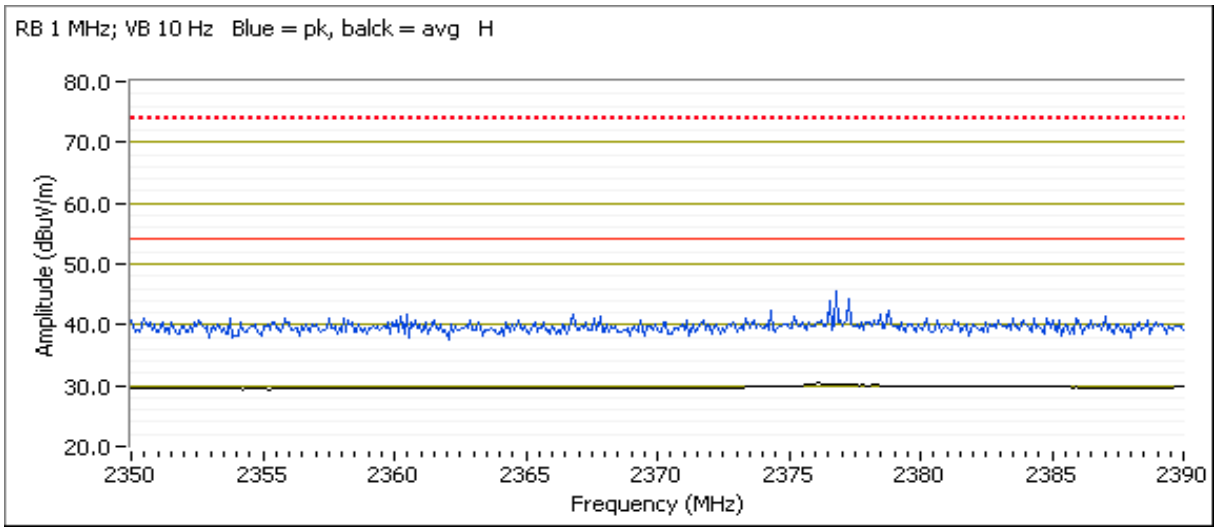
Mode: GFSK
Data Rate: 1Mbs

Orientation:

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT horizontal								
2377.010	31.6	H	54.0	-22.4	AVG	123	2.08	RB 1 MHz; VB: 3 kHz, note 4
2350.080	43.4	H	74.0	-30.6	PK	123	2.08	
2383.430	31.3	V	54.0	-22.7	AVG	264	2.09	RB 1 MHz; VB: 3 kHz, note 4
2377.410	41.9	V	74.0	-32.1	PK	264	2.09	
EUT vertical								
2376.370	31.6	V	54.0	-22.4	AVG	185	1.49	RB 1 MHz; VB: 3 kHz, note 4
2360.660	42.6	V	74.0	-31.4	PK	185	1.49	
2381.020	31.4	H	54.0	-22.6	AVG	53	1.42	RB 1 MHz; VB: 3 kHz, note 4
2360.980	42.1	H	74.0	-31.9	PK	53	1.42	
EUT side								
2375.890	31.8	H	54.0	-22.2	AVG	216	1.57	RB 1 MHz; VB: 3 kHz, note 4
2376.930	44.3	H	74.0	-29.7	PK	216	1.57	
2375.570	31.5	V	54.0	-22.5	AVG	0	1.69	RB 1 MHz; VB: 3 kHz, note 4
2386.390	41.9	V	74.0	-32.1	PK	0	1.69	

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

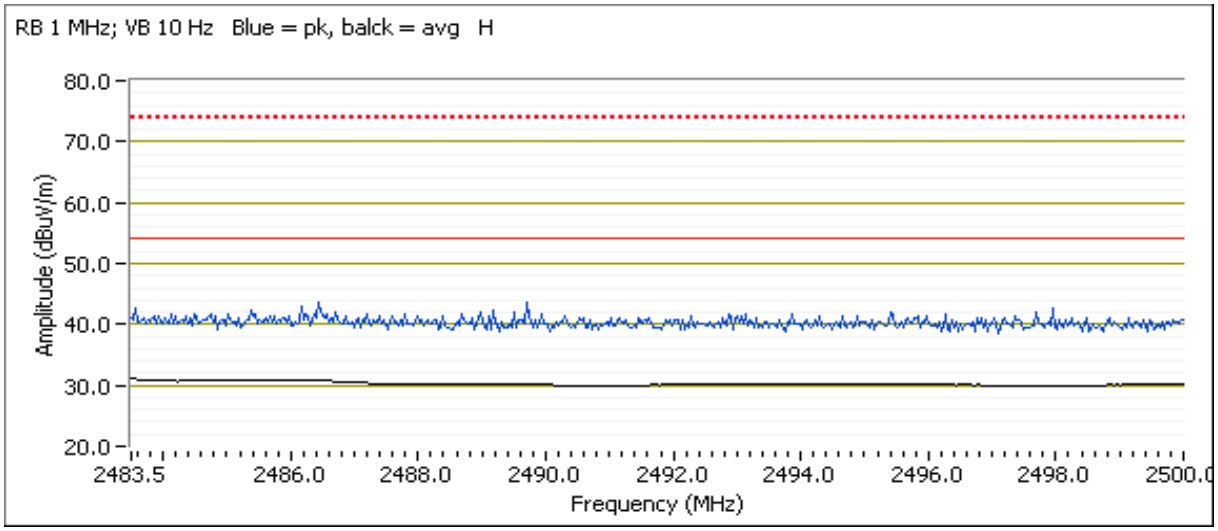


Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Channel: 2480MHz Mode: GFSK
Tx Chain: Main Data Rate: 1Mbs

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.600	31.6	H	54.0	-22.4	AVG	216	1.79	RB 1 MHz; VB: 500 Hz, note 4
2489.550	43.0	H	74.0	-31.0	PK	216	1.79	
2483.570	31.5	V	54.0	-22.5	AVG	339	2.07	RB 1 MHz; VB: 500 Hz, note 4
2484.430	42.5	V	74.0	-31.5	PK	339	2.07	



Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Run #2: Radiated Bandedge Measurements

Date of Test: 8/3/2015 0:00
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: 1
Config Change: none
EUT Voltage: USB

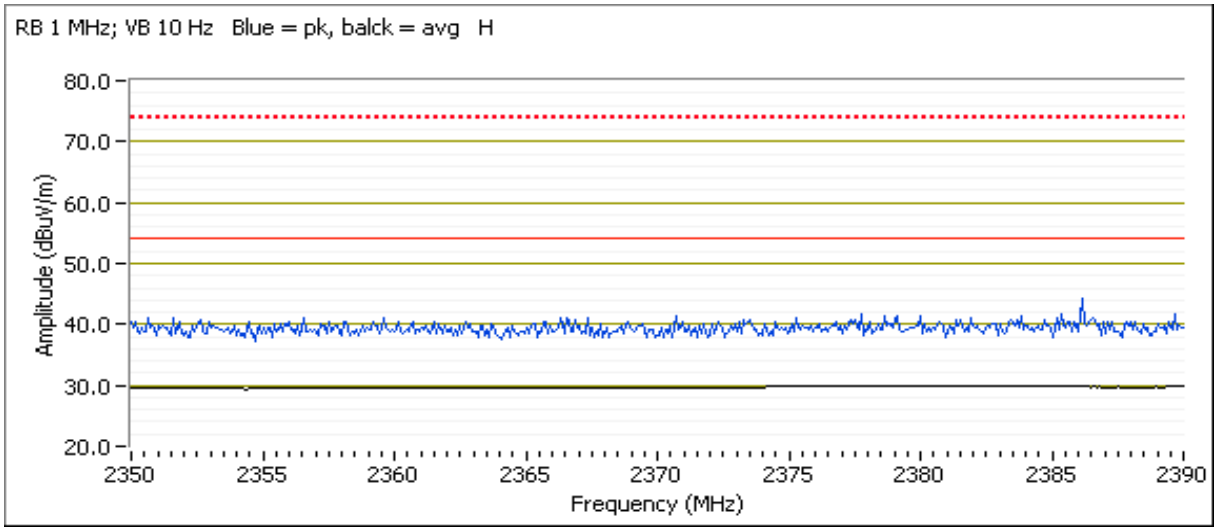
Channel: 2402MHz
Tx Chain: Main

Mode: 8PSK
Data Rate: 3Mbs

Orientation: Side (worst case from GFSK above)

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.710	30.8	H	54.0	-23.2	AVG	234	1.42	RB 1 MHz; VB: 500 Hz, note 4
2376.290	45.0	H	74.0	-29.0	PK	234	1.42	
2379.340	30.6	V	54.0	-23.4	AVG	248	1.67	RB 1 MHz; VB: 500 Hz, note 4
2362.910	44.6	V	74.0	-29.4	PK	248	1.67	

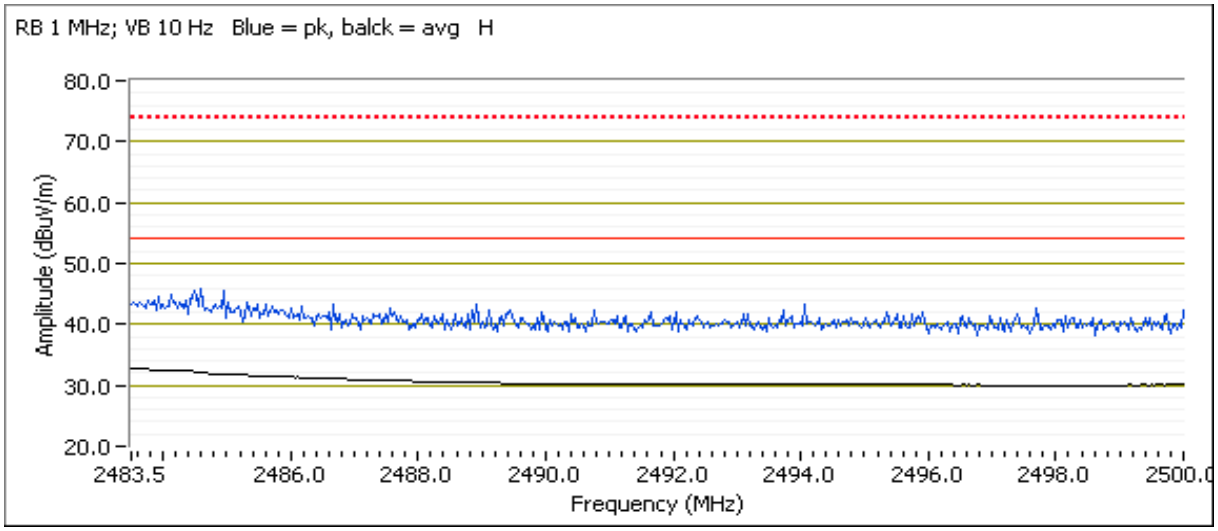


Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Channel: 2480MHz Mode: 8PSK
Tx Chain: Main Data Rate: 3Mbs

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.600	33.9	H	54.0	-20.1	AVG	217	1.94	RB 1 MHz; VB: 500 Hz, note 4
2485.420	46.1	H	74.0	-27.9	PK	217	1.94	
2483.530	33.8	V	54.0	-20.2	AVG	270	1.78	RB 1 MHz; VB: 500 Hz, note 4
2483.500	46.3	V	74.0	-27.7	PK	270	1.78	



Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

RSS 247 and FCC 15.247 (DSS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 39 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
1	GFSK	2402 MHz	6	6	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 7206.1 MHz (-0.4 dB)
		2440 MHz		6			53.4 dBµV/m @ 7323.3 MHz (-0.6 dB)
		2480 MHz		6			53.9 dBµV/m @ 7440.2 MHz (-0.1 dB)
2	8PSK	2402 MHz		1			52.6 dBµV/m @ 4804.0 MHz (-1.4 dB)
		2440 MHz		1			52.3 dBµV/m @ 4882.3 MHz (-1.7 dB)
		2480 MHz		3			53.9 dBµV/m @ 4960.1 MHz (-0.1 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Sample Notes

Sample S/N: EVT2-181
Driver: v17.7.0.10
Antenna: internal

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.
2.4GHz band reject filter used

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
GFSK	1Mb/s	0.77	Yes	2.88	1.137113	2.2742259	347
8PSK	3Mb/s	0.77	Yes	2.88	1.1103369	2.2206738	347

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 4:	Emission has duty cycle < 98% and is NOT constant, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Worst case EUT orientation was determined from BLE spurious measurements. This orientation was used for all testing on this sheet.
Note 6:	Emission in non-restricted band, evaluated during conducted antenna port measurements.

Note - Preliminary testing was performed to determine worse case orienation.

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz.

Date of Test: 8/6/2015, 8/7/15, 8/10/15
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: 1
Config Change: USB wall charger substituted for laptop.
EUT Voltage: USB

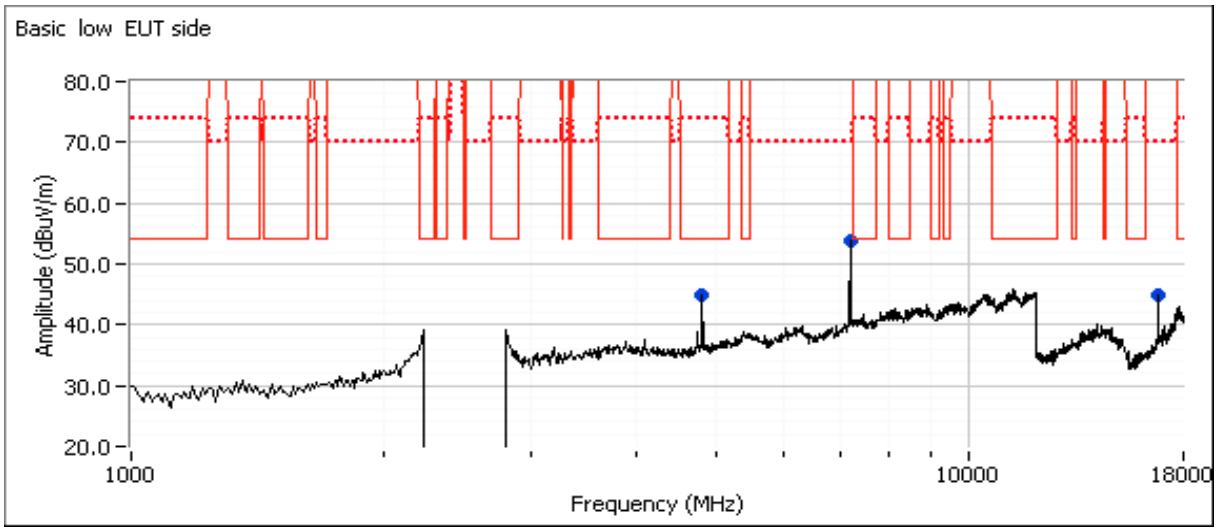
Run #1a: Low Channel

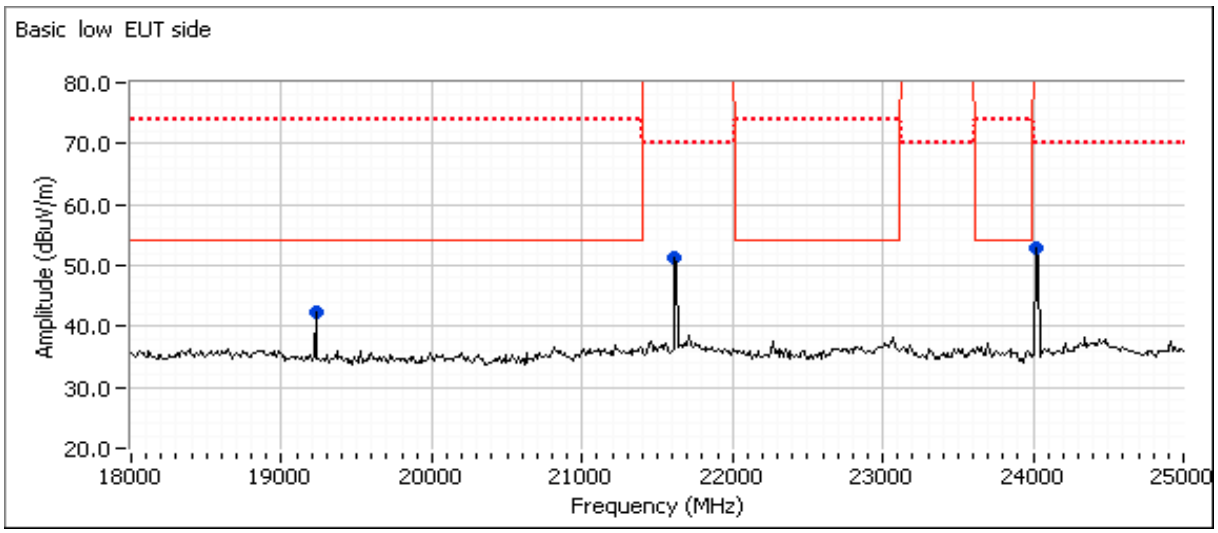
Channel: 2402 MHz
Tx Chain: Main

Mode: GFSK
Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.080	45.8	H	54.0	-8.2	AVG	171	1.66	RB 1 MHz;VB 1 kHz, note 4
4803.880	50.8	H	74.0	-23.2	PK	171	1.66	
7206.100	53.6	H	54.0	-0.4	AVG	211	1.18	RB 1 MHz;VB 1 kHz. Note 1,4
7206.500	57.5	H	74.0	-16.5	PK	211	1.18	Note 1
19217.300	43.9	H	54.0	-10.1	AVG	317	1.45	RB 1 MHz;VB 1 kHz. Note 1,4
19216.940	53.9	H	74.0	-20.1	PK	317	1.45	
16810.000	44.8	H	-	-	Peak	142	1.5	Note 6
21616.670	51.2	H	-	-	Peak	343	1.5	Note 6
24020.000	52.9	H	-	-	Peak	343	1.5	Note 6

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





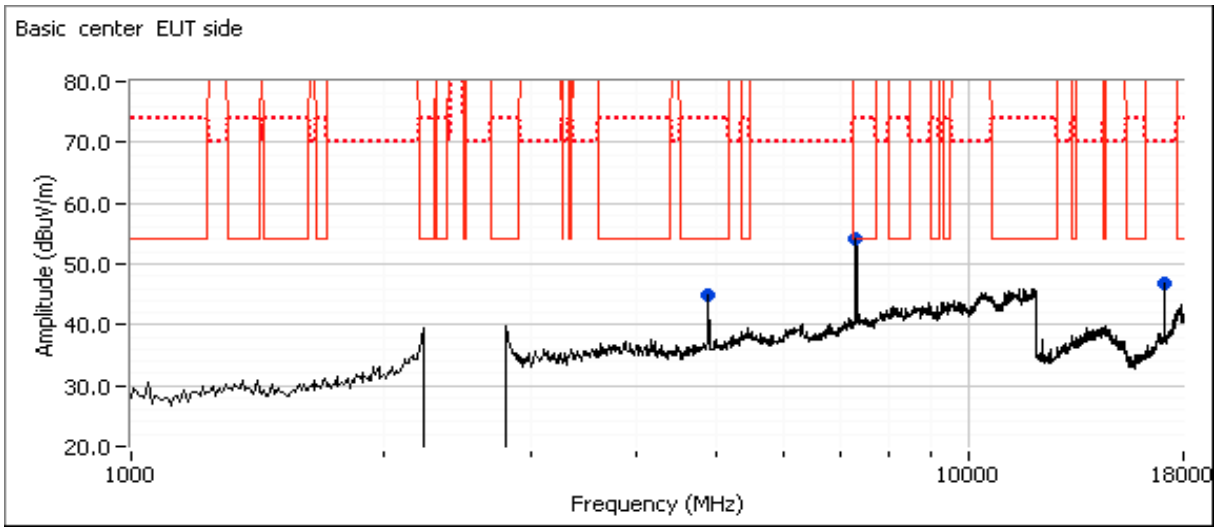
Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

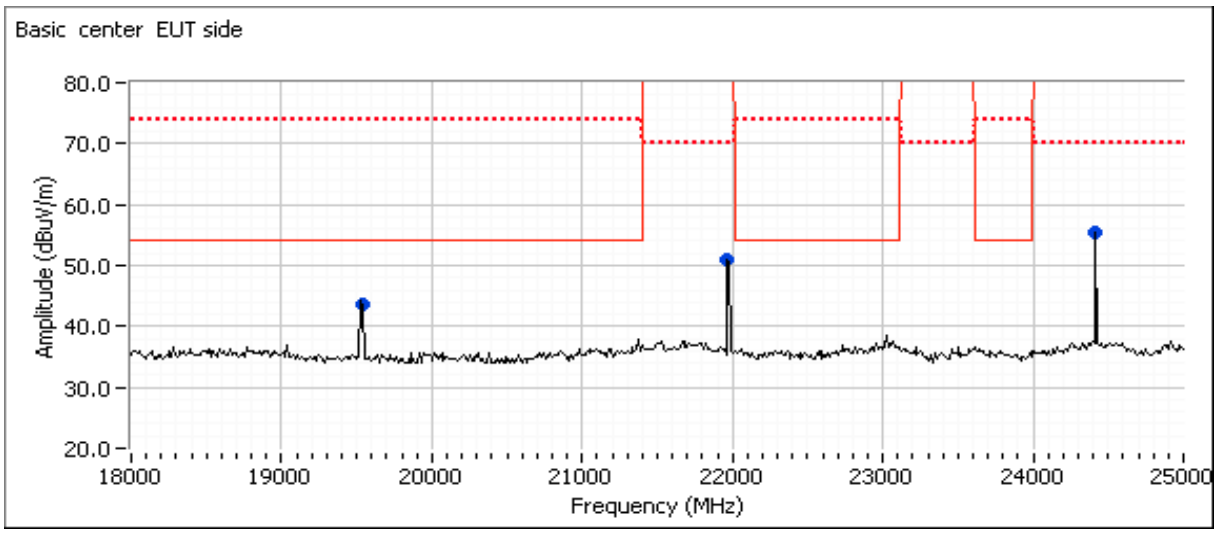
Run #1b: Center Channel

Channel: 2441 MHz Mode: GFSK
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4882.100	47.4	H	54.0	-6.6	AVG	173	1.20	RB 1 MHz;VB 1 kHz, note 4
4882.160	51.4	H	74.0	-22.6	PK	173	1.20	
7323.270	53.4	V	54.0	-0.6	AVG	160	1.00	RB 1 MHz;VB 1 kHz, note 4
7323.150	57.6	V	74.0	-16.4	PK	160	1.00	
19526.900	45.0	H	54.0	-9.0	AVG	317	1.24	RB 1 MHz;VB 1 kHz, note 4
19526.820	54.7	H	74.0	-19.3	PK	317	1.24	
17080.000	46.8	H	-	-	Peak	177	1.5	Note 6
21966.670	51.1	H	-	-	Peak	346	1.5	Note 6
24416.670	55.4	H	-	-	Peak	321	1.5	Note 6

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





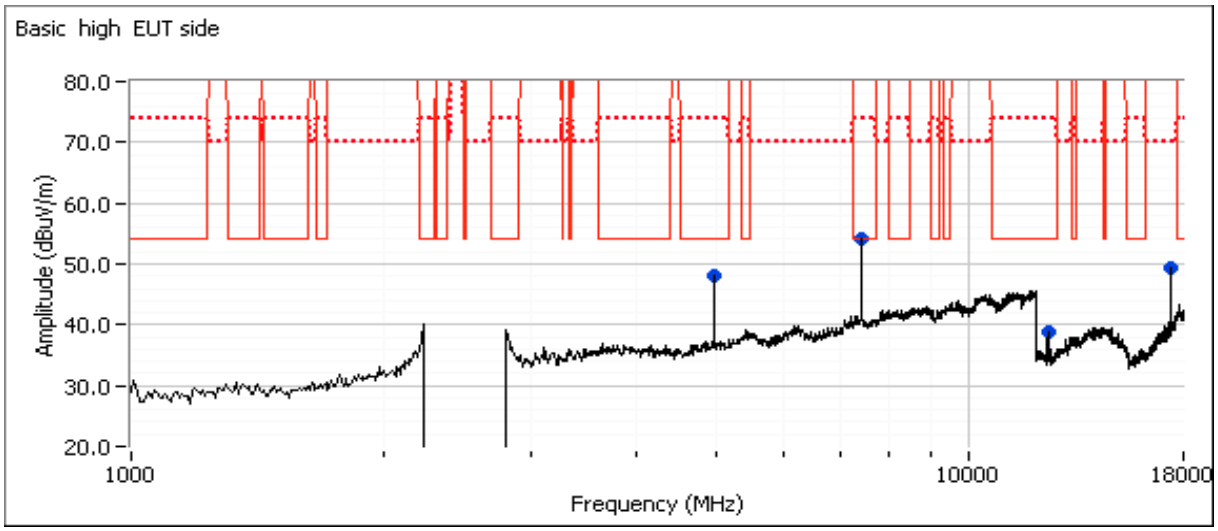
Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

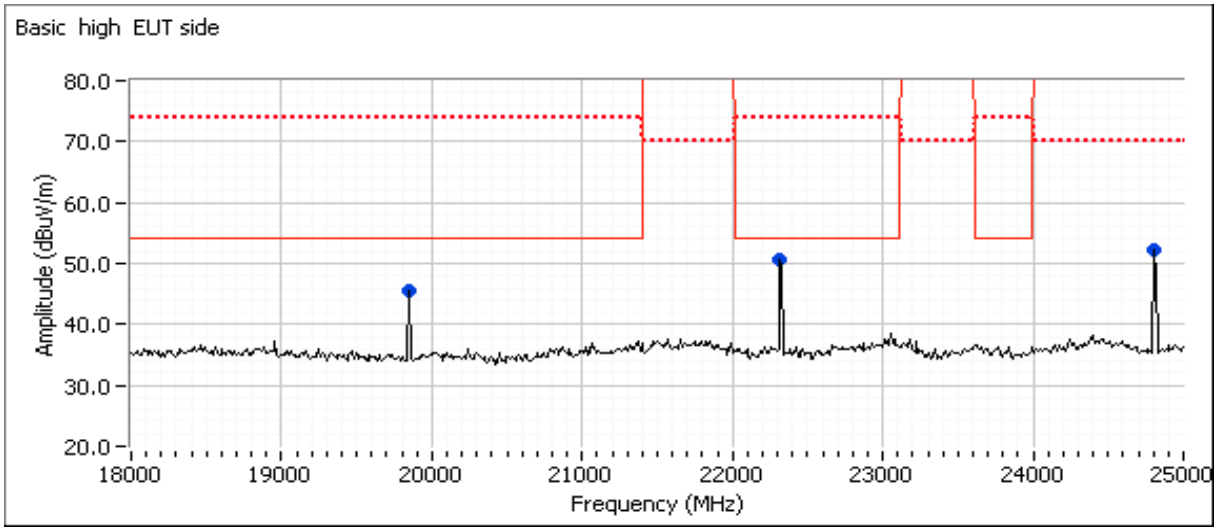
Run #1c: High Channel

Channel: 2480 MHz Mode: GFSK
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4960.130	49.3	H	54.0	-4.7	AVG	172	1.49	RB 1 MHz;VB 1 kHz, note 4
4960.030	53.2	H	74.0	-20.8	PK	172	1.49	
7440.170	53.9	V	54.0	-0.1	AVG	152	1.03	RB 1 MHz;VB 1 kHz, note 4
7439.720	58.3	V	74.0	-15.7	PK	152	1.03	
12400.620	41.7	V	54.0	-12.3	AVG	102	1.00	RB 1 MHz;VB 1 kHz, note 4
12402.900	53.1	V	74.0	-20.9	PK	102	1.00	
19841.150	45.0	H	54.0	-9.0	AVG	323	1.38	RB 1 MHz;VB 1 kHz, note 4
19841.410	55.5	H	74.0	-18.5	PK	323	1.38	
22321.470	49.7	H	54.0	-4.3	AVG	319	1.64	RB 1 MHz;VB 1 kHz, note 4
22318.580	58.3	H	74.0	-15.7	PK	319	1.64	
17350.000	49.5	H	-	-	Peak	144	1.5	Note 6
24801.670	52.2	H	-	-	Peak	327	1.5	Note 6

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 25000 MHz.

Date of Test: 8/6/2015, 8/7/15, 8/10/15
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: 1
Config Change: USB wall charger substituted for laptop.
EUT Voltage: USB

Run #2a: Low Channel.

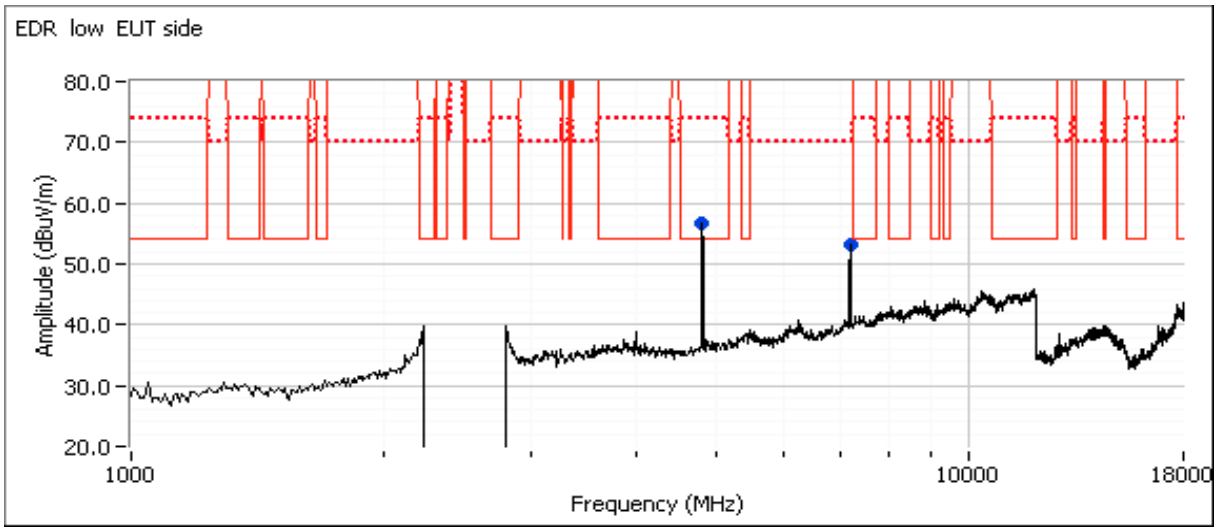
Channel: 2402 MHz
Tx Chain: Main

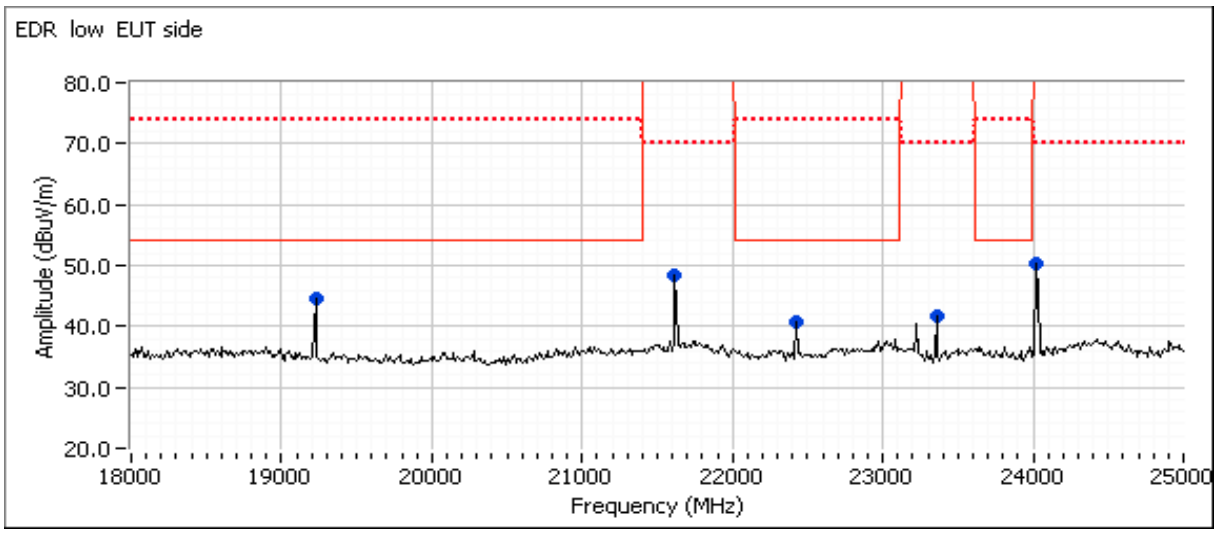
Mode: 8PSK
Data Rate: 3Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.000	52.6	H	54.0	-1.4	AVG	170	1.83	RB 1 MHz;VB 1 kHz, note 4.
4803.970	57.9	H	74.0	-16.1	PK	170	1.83	
19217.200	45.0	H	54.0	-9.0	AVG	321	1.44	RB 1 MHz;VB 1 kHz, note 4.
19216.300	55.9	H	74.0	-18.1	PK	321	1.44	
22423.800	40.9	H	54.0	-13.1	AVG	320	1.51	RB 1 MHz;VB 1 kHz. Note 7
22421.000	52.5	H	74.0	-21.5	PK	320	1.51	Note 7
7210.000	53.1	H	-	-	Peak	204	1.0	Note 6
21616.670	48.4	H	-	-	Peak	353	1.5	Note 6
23355.000	41.6	H	-	-	Peak	353	1.5	Note 6
24020.000	50.4	H	-	-	Peak	336	1.5	Note 6

Note 7	Emission below noise floor of measurement system.

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





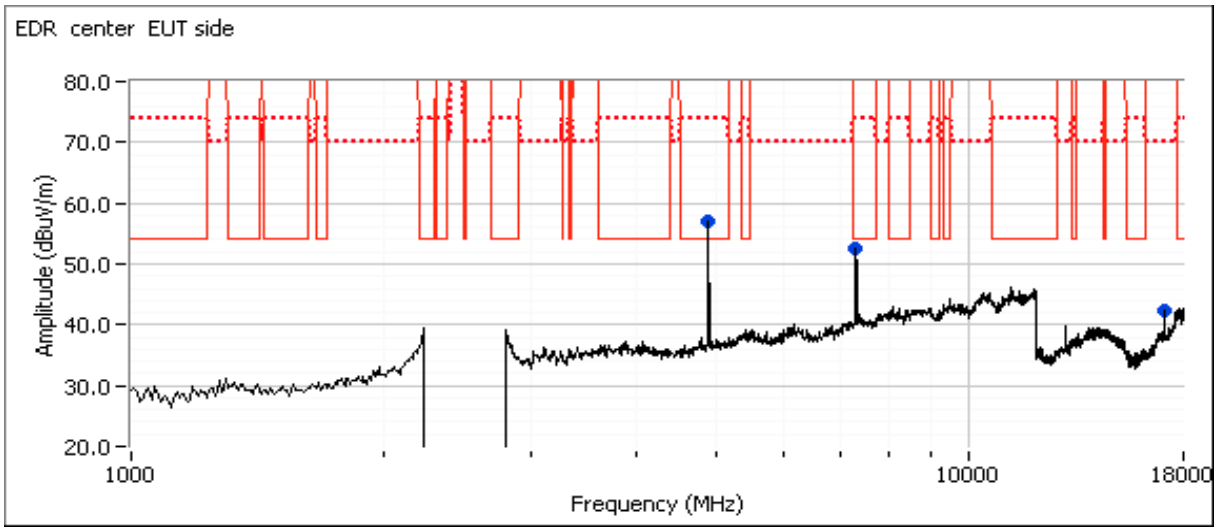
Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

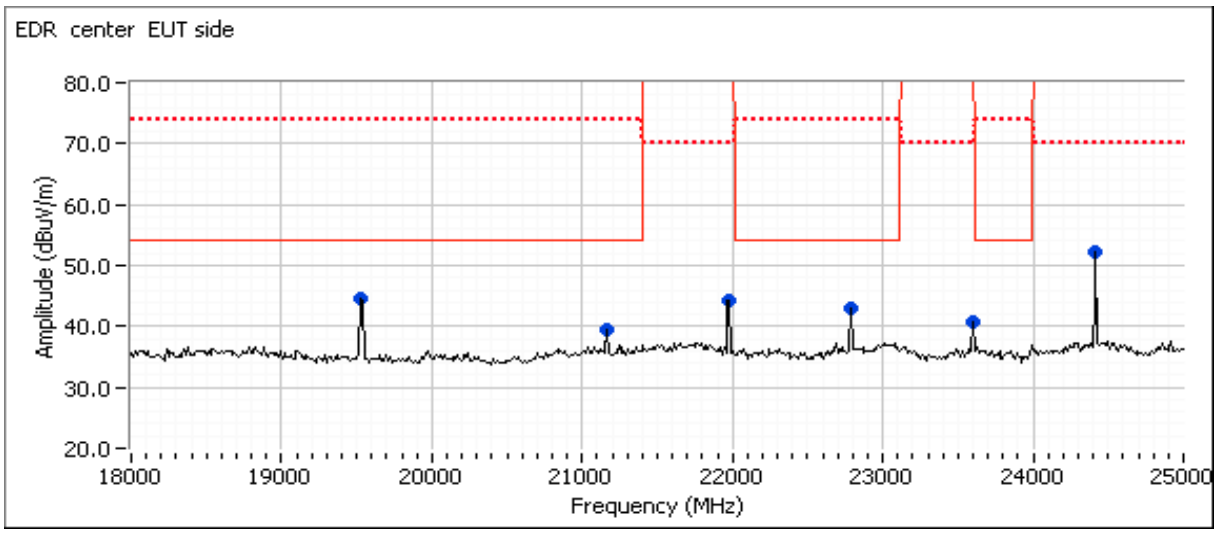
Run #2b: Center Channel.

Channel: 2440 MHz Mode: 8PSK
Tx Chain: Main Data Rate: 3Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4882.280	52.3	H	54.0	-1.7	AVG	169	1.50	RB 1 MHz;VB 1 kHz. Note 4
4882.050	57.5	H	74.0	-16.5	PK	169	1.50	
7322.980	52.1	H	54.0	-1.9	AVG	210	1.15	RB 1 MHz;VB 1 kHz. Note 4
7322.980	59.7	H	74.0	-14.3	PK	210	1.15	
19528.310	46.1	H	54.0	-7.9	AVG	316	1.25	RB 1 MHz;VB 1 kHz. Note 4
19528.380	56.7	H	74.0	-17.3	PK	316	1.25	
21155.650	42.3	H	54.0	-11.7	AVG	320	1.68	RB 1 MHz;VB 1 kHz. Note 4
21157.390	53.7	H	74.0	-20.3	PK	320	1.68	
22782.760	43.3	H	54.0	-10.7	AVG	320	1.81	RB 1 MHz;VB 1 kHz. Note 4
22781.410	55.1	H	74.0	-18.9	PK	320	1.81	
17080.000	42.3	H	-	-	Peak	142	1.5	Note 6
21978.330	44.3	H	-	-	Peak	354	1.5	Note 6
23600.000	40.7	H	-	-	Peak	317	1.5	Note 6
24416.670	52.2	H	-	-	Peak	342	1.5	Note 6

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





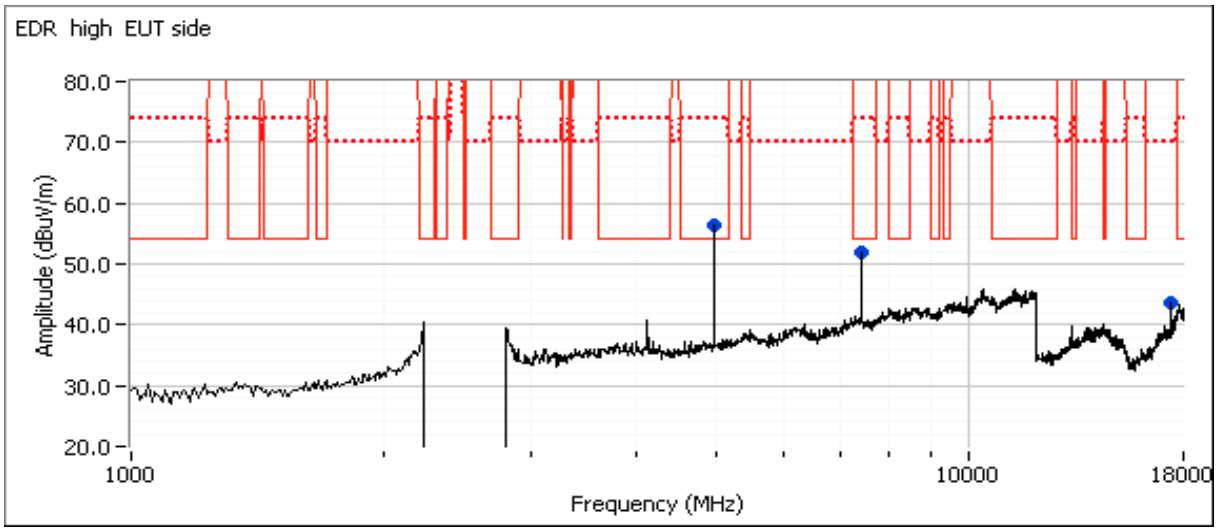
Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

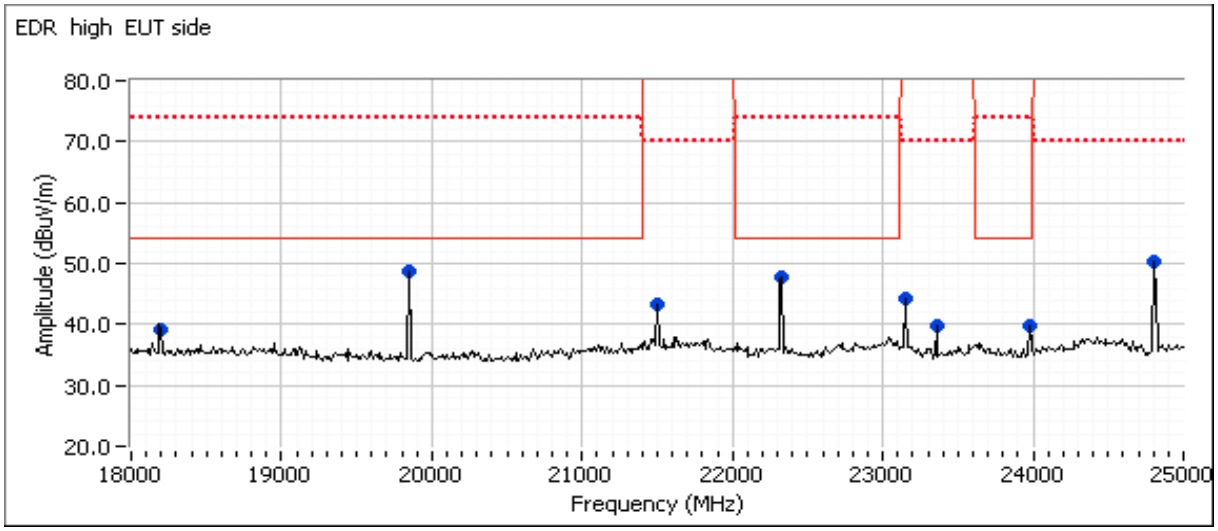
Run #2c: High Channel.

Channel: 2480 MHz Mode: 8PSK
Tx Chain: Main Data Rate: 3Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4960.060	53.9	H	54.0	-0.1	AVG	172	1.61	RB 1 MHz;VB 1 kHz. Note 4
4960.230	58.8	H	74.0	-15.2	PK	172	1.61	
7440.350	52.8	V	54.0	-1.2	AVG	152	1.13	RB 1 MHz;VB 1 kHz. Note 4
7440.050	59.9	V	74.0	-14.1	PK	152	1.13	
18186.760	42.4	H	54.0	-11.6	AVG	92	1.46	RB 1 MHz;VB 1 kHz. Note 4
18185.080	53.9	H	74.0	-20.1	PK	92	1.46	
19840.230	45.8	H	54.0	-8.2	AVG	322	1.38	RB 1 MHz;VB 1 kHz. Note 4
19839.180	56.2	H	74.0	-17.8	PK	322	1.38	
22320.360	47.4	H	54.0	-6.6	AVG	312	1.56	RB 1 MHz;VB 1 kHz. Note 4
22320.810	59.1	H	74.0	-14.9	PK	312	1.56	
23973.730	43.1	H	54.0	-10.9	AVG	333	1.34	RB 1 MHz;VB 1 kHz. Note 4
23973.030	55.2	H	74.0	-18.8	PK	333	1.34	
17350.000	43.5	H	-	-	Peak	144	1.5	Note 6
21500.000	43.2	H	-	-	Peak	330	1.5	Note 6
23145.000	44.4	H	-	-	Peak	336	1.5	Note 6
23355.000	39.9	H	-	-	Peak	336	1.5	Note 6
24801.670	50.2	H	-	-	Peak	320	1.5	Note 6

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

RSS 247 and FCC 15.247 (DSS-FHSS) Antenna Port Measurements

Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 8/17/2015 0:00
Test Engineer: John Caizzi
Test Location: Lab 4A

Config. Used: 1
Config Change: none
EUT Voltage: USB

General Test Configuration

The antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Unless stated otherwise the EUT was operating such that it constantly hopped on either the low, center or high channels.

Ambient Conditions:

Temperature: 22 °C
Rel. Humidity: 33 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
3	30 - 25000 MHz - Transmitter Conducted Spurious Emissions	FCC Part 15.247(c)	Pass	All emissions < -20 dBc
4	Output Power	15.247(b)	Pass	Basic: 5.7 dBm (3.7mW) EDR: 2.2 dBm (1.7mW)
5	20dB Bandwidth	15.247(a)	Pass	Basic: 956 kHz EDR: 1299 kHz
5	99% bandwidth	15.247(a)	Pass	Basic: 878 kHz EDR: 1206 kHz
5	Channel Occupancy	15.247(a)	Pass	Complies with Bluetooth protocol
5	Number of Channels	15.247(a)	Pass	Max: 79 Channels Min: 20

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

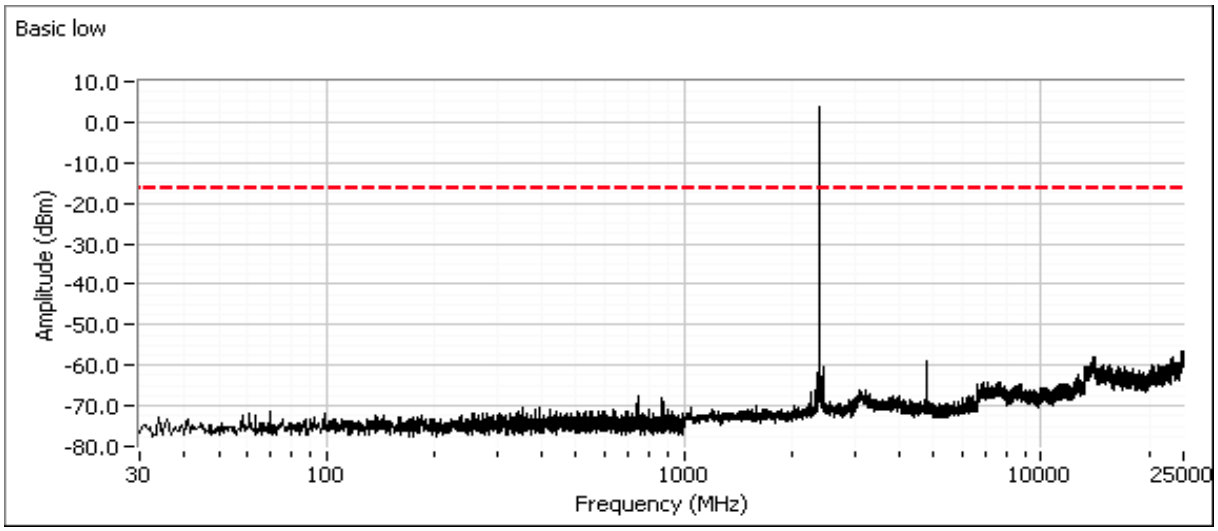
No deviations were made from the requirements of the standard.

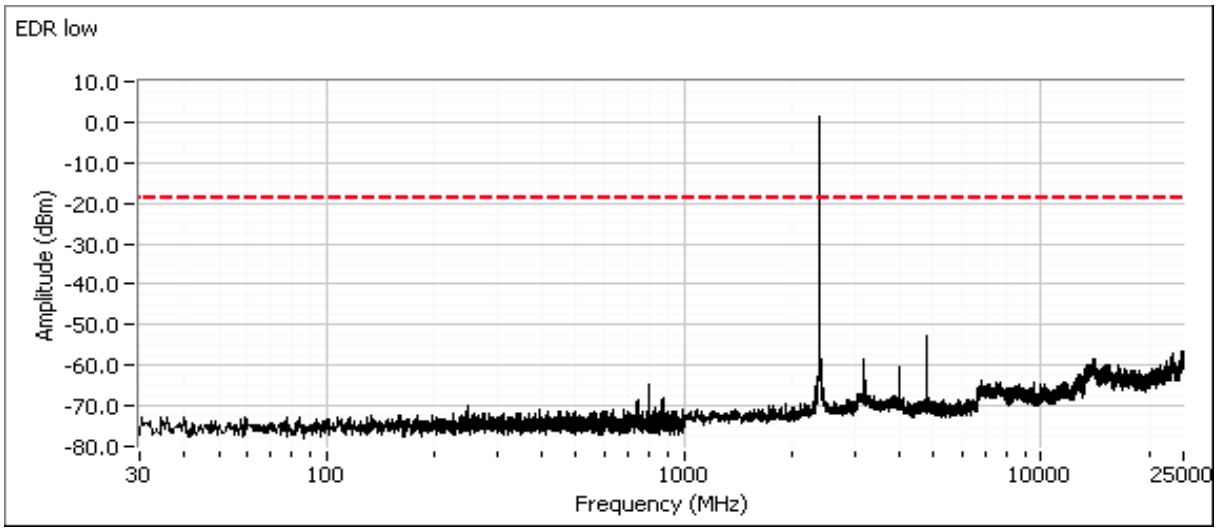
Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Run #3: Antenna Conducted Spurious Emissions, 30 - 25000 MHz.

Refer to plots below. Scans made using RBW=100 kHz, VBW=300 KHz with the limit line set at 20dB below the highest in-band signal level with the hopping feature disabled.

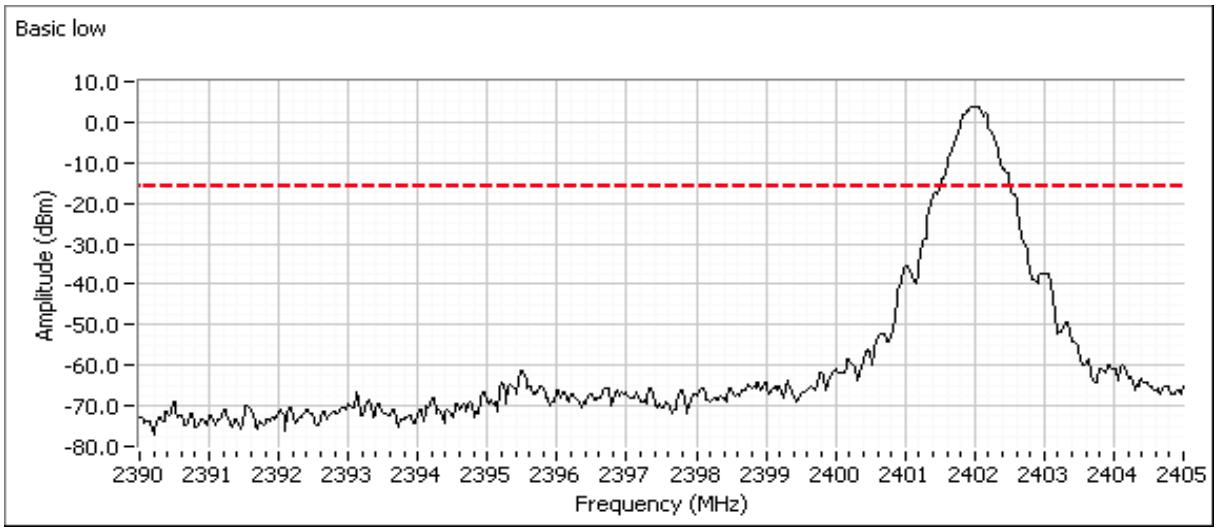
Low channel

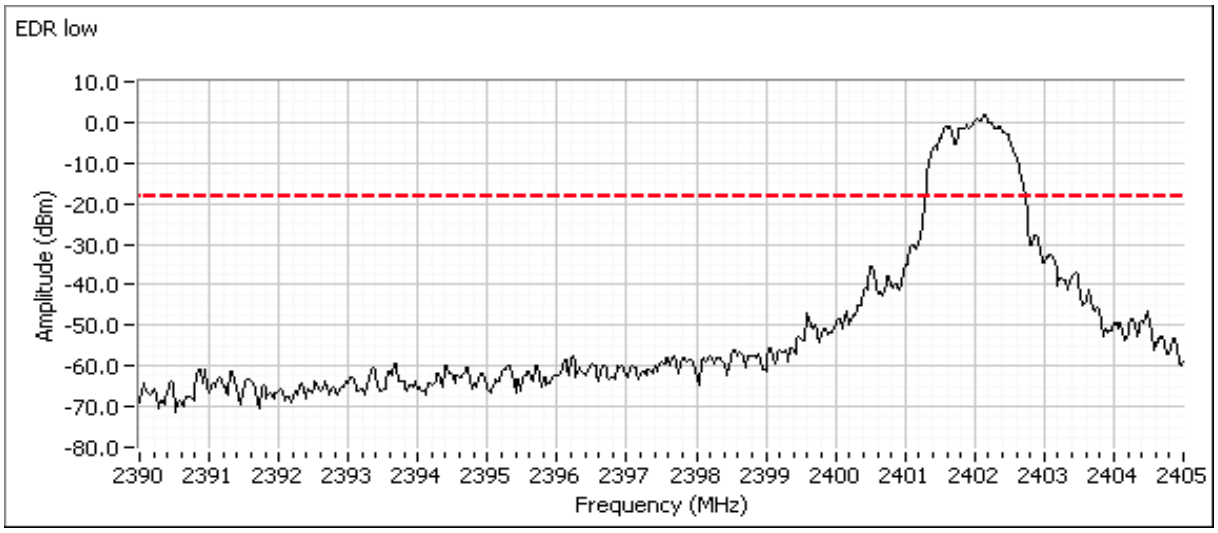




Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

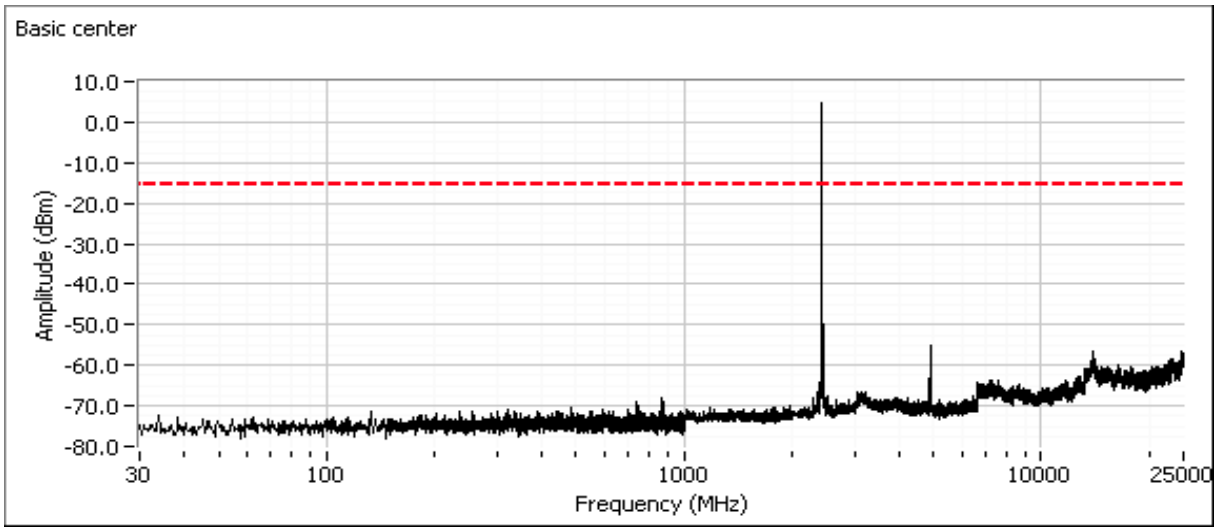
Plot showing -20dBc at the lower band edge

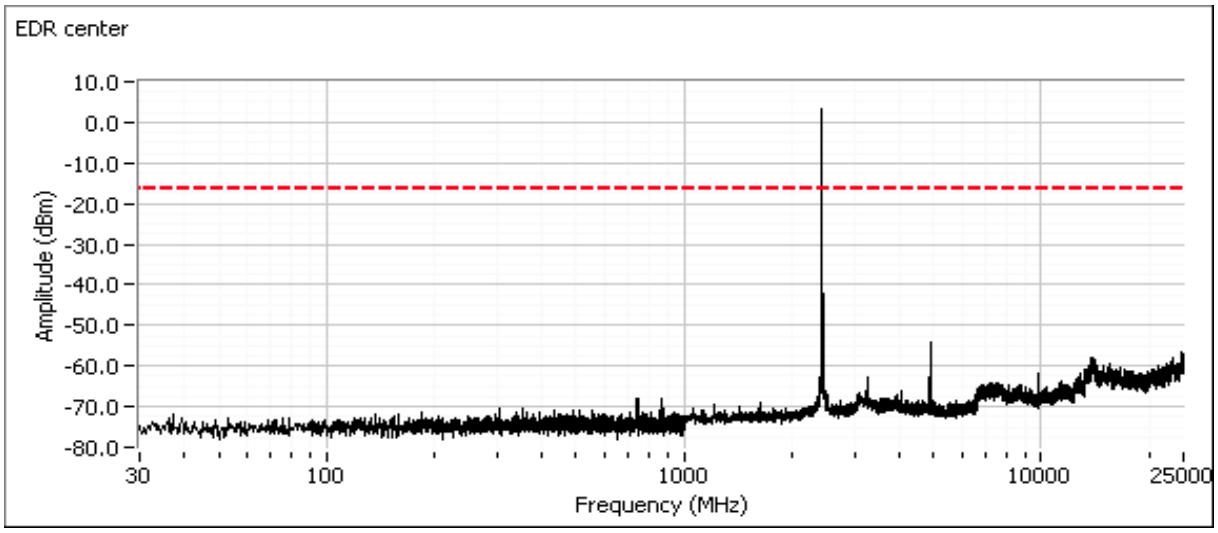




Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

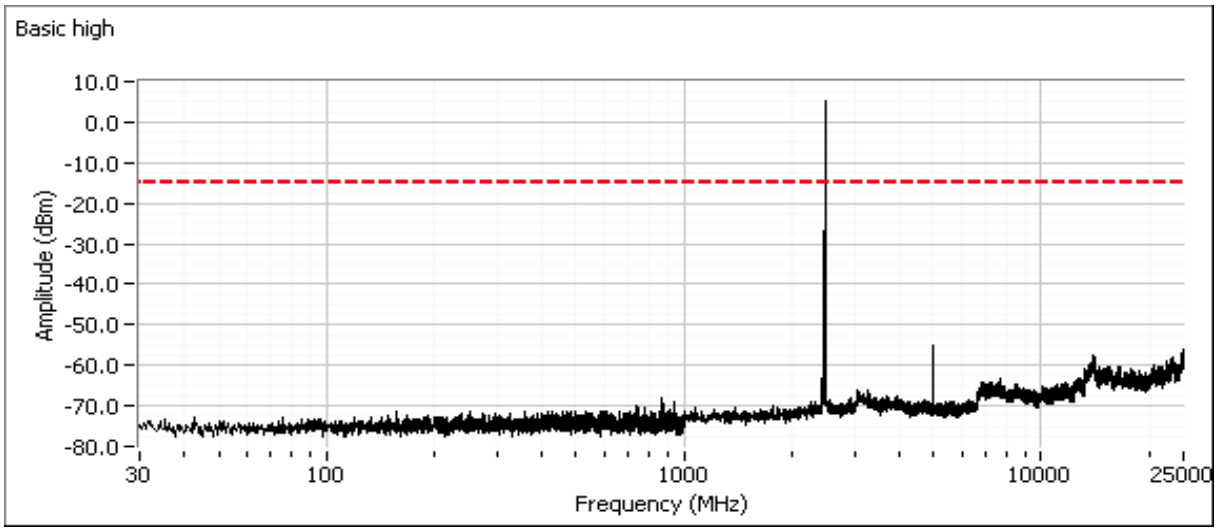
Center channel

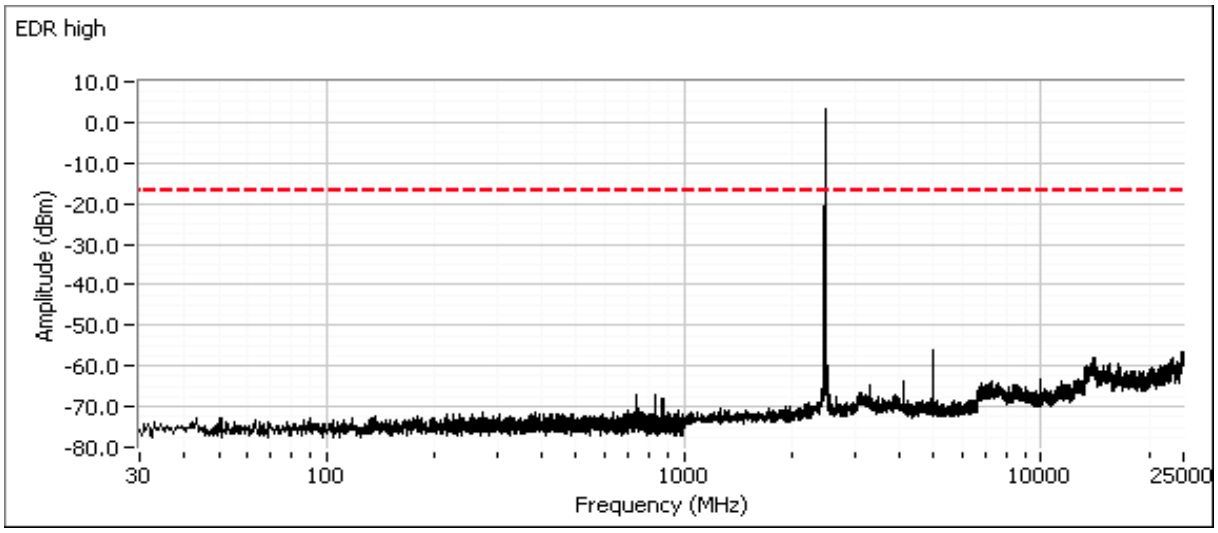




Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

High channel

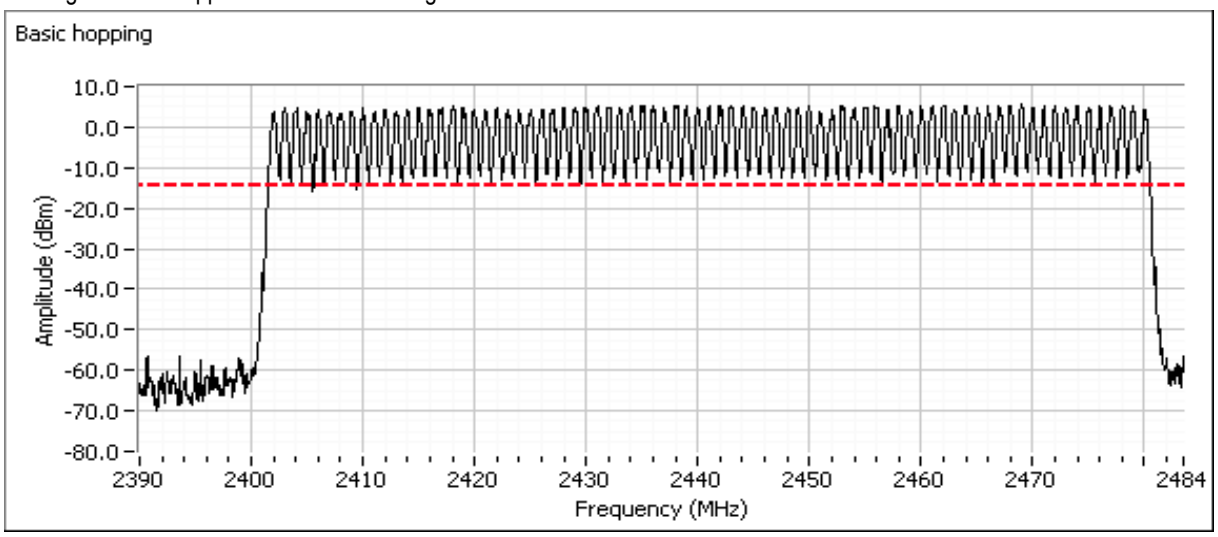


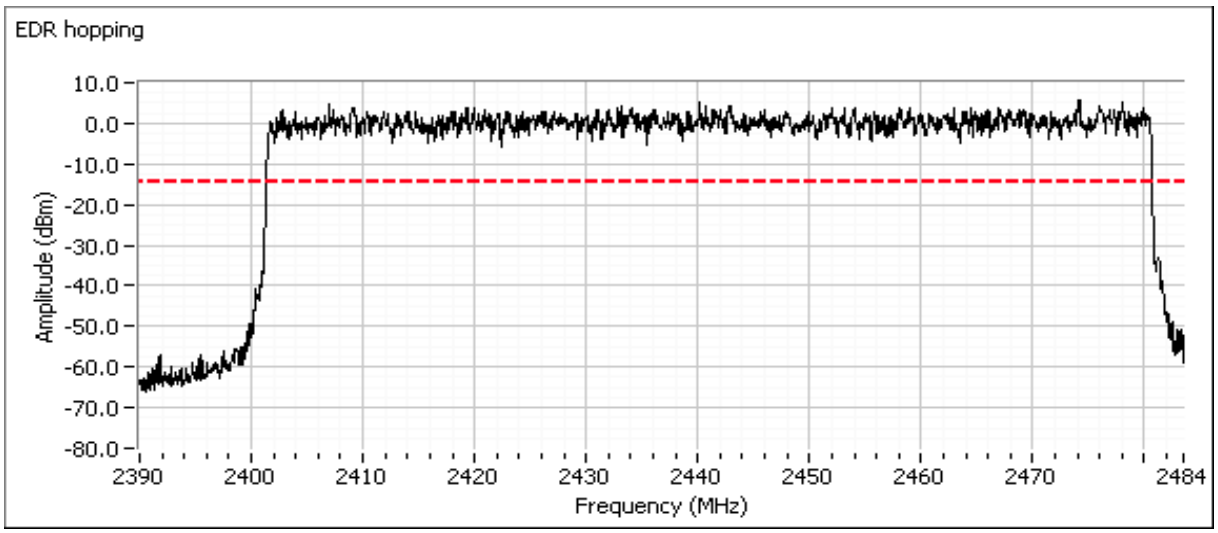


Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Refer to plots below. Scans made using RBW=100 kHz, VBW=300 KHz, with the limit line set at 20dB below the highest in-band signal level with the hopping feature enabled, to show compliance with the -20dBc requirement at the allocated band edge. The spectrum analyzer is left in max hold mode until the trace stabilizes.

Plots showing -20dBc at upper and lower band edges.





Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Run #4: Output Power

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Maximum antenna gain: -1.15 dBi

Channel	Frequency (MHz)	Setting	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
GFSK						
Low	2402	6	Note 1	4.5	0.0028	0.0022
Mid	2441	6		5.7	0.0037	0.0029
High	2480	6		5.7	0.0037	0.0029
8PSK						
Low	2402	1	Note 1	1.9	0.0015	0.0012
Mid	2441	1		2.2	0.0017	0.0013
High	2480	1		2.2	0.0017	0.0013

Note 1:	Power measured with a peak power meter.

Average Power measurements for reference purposes only

Channel	Frequency (MHz)	Setting	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
GFSK						
Low	2402	6	Note 1	4.1	0.0026	0.0020
Mid	2441	6		5.3	0.0034	0.0026
High	2480	6		5.3	0.0034	0.0026
8PSK						
Low	2402	1	Note 1	-0.3	0.0009	0.0007
Mid	2441	1		0.2	0.0010	0.0008
High	2480	1		0.4	0.0011	0.0008

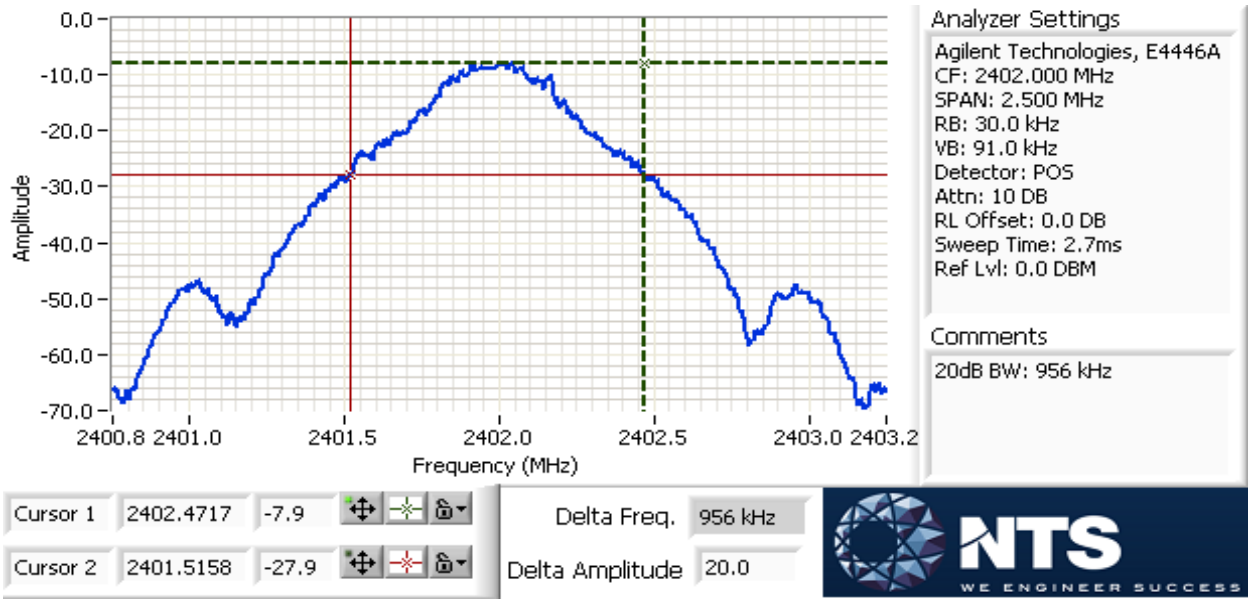
Note 1:	Power measured using a gated average power meter for RF exposure

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

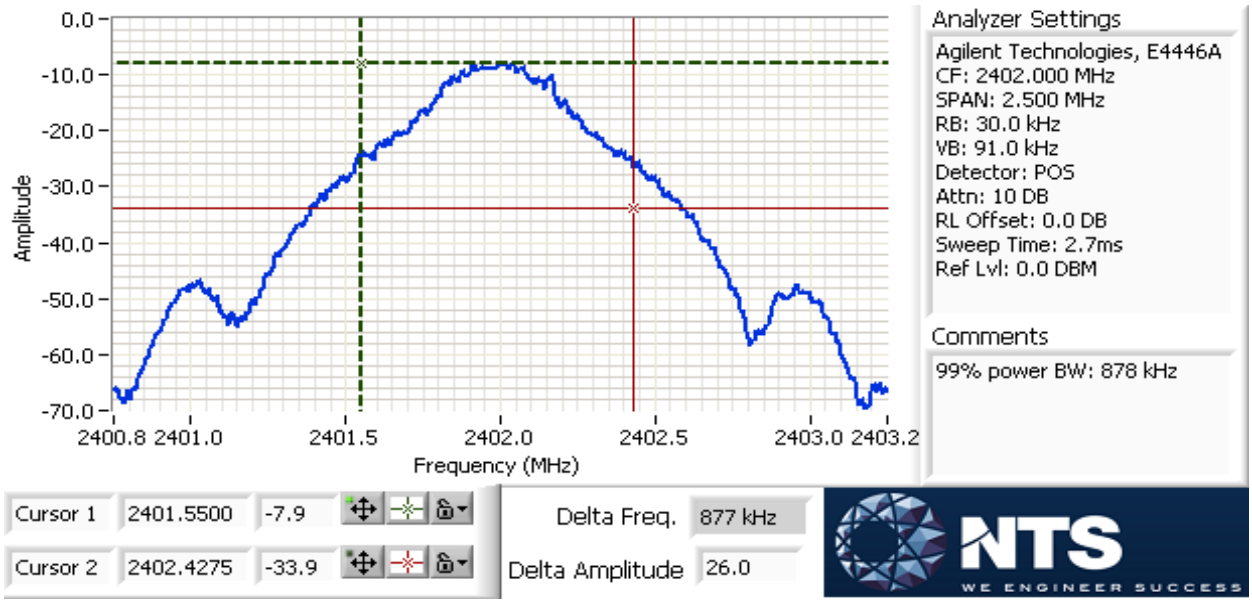
Run #5: Bandwidth, Channel Occupancy, Spacing and Number of Channels

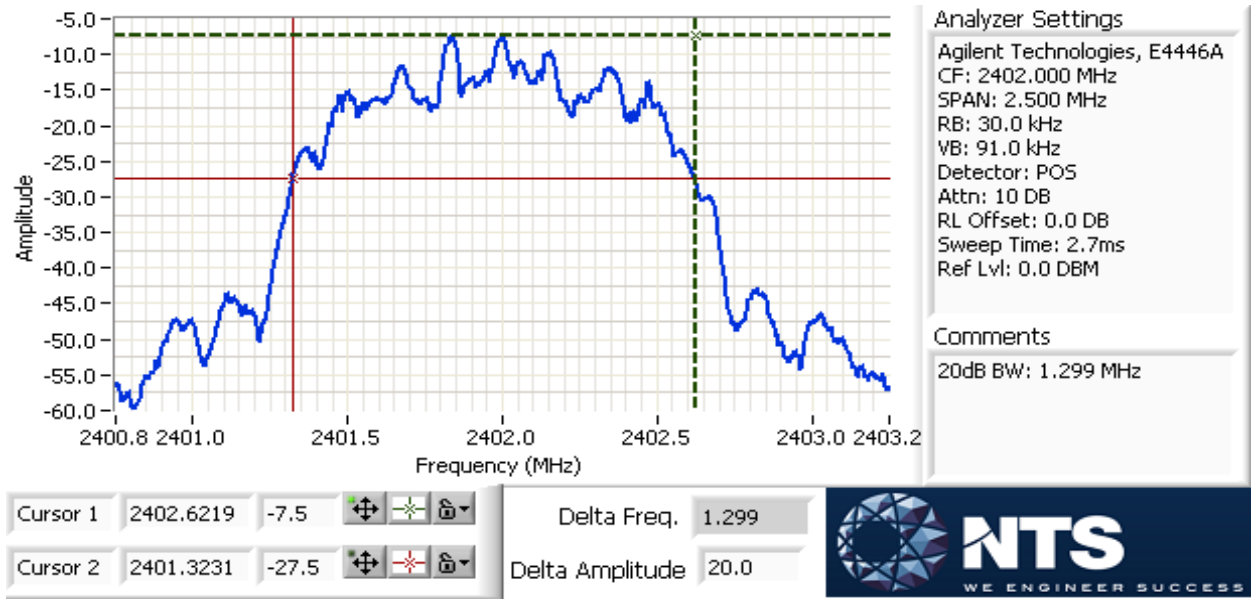
Channel	Frequency (MHz)	Resolution Bandwidth	20dB Bandwidth (kHz)	Resolution Bandwidth	99% Bandwidth (kHz)
GFSK					
Low	2402	30	956	30	878
Mid	2441		861		840
High	2480		888		842
8PSK					
Low	2402	30	1299	30	1195
Mid	2441		1294		1203
High	2480		1294		1206

Note 1:	20dB bandwidth measured using RB = 30 kHz, VB = 91 kHz.
Note 2:	99% bandwidth measured using RB = 30 kHz, VB = 91 kHz.



Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





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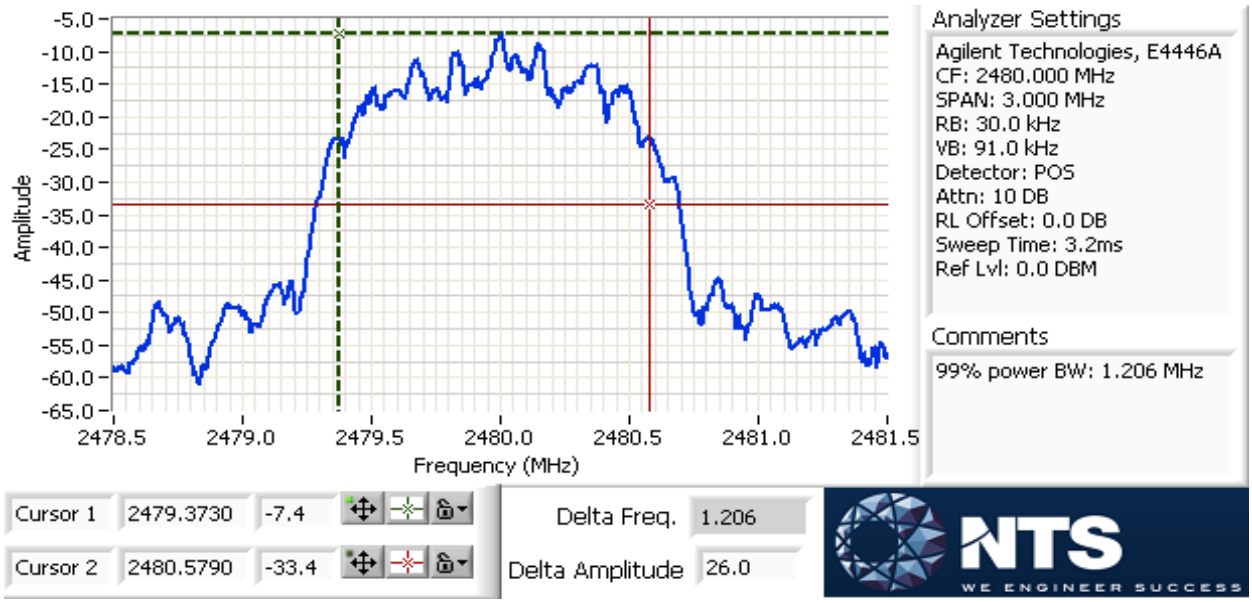
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A



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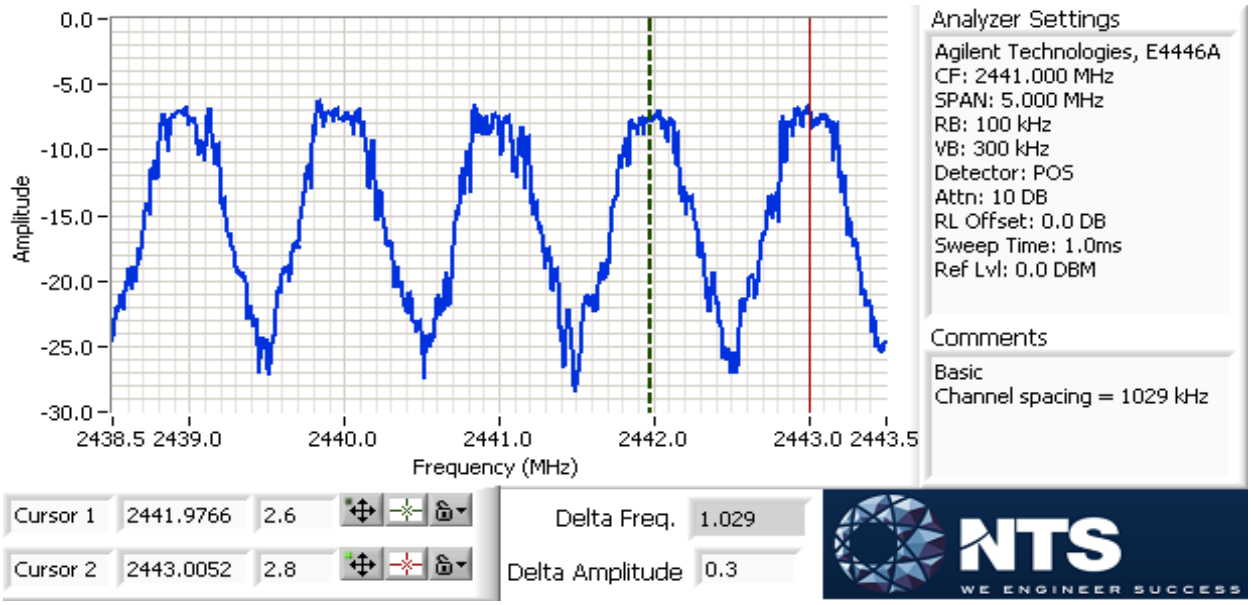
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. (Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.)

The channel dwell time is calculated from the transmit time on a channel multiplied by the number of times a channel could be used in a period of 0.4 times the number of channels, N (i.e. 0.4N divided by the time between successive hops, rounded up to the closest integer), unless the time between successive hops exceeds 0.4N, in which case the channel dwell time is the transmit time on a channel.

The hopping rate is 1600 hops per second although any new channel may be used for a single hop slot, 3 hop slots or 5 hop slots. The dwell time per channel is, therefore either 0.625ms (single slot), 1.875ms (three slot) or 3.125ms (five slot). The average time of occupancy will not exceed 0.4s in any time interval of 0.4s mutliplied by the number of channels being used.

Maximum 20dB bandwidth:	1299	kHz
Channel spacing:	1029	kHz
Transmission time per hop:	2.905	ms
Number of channels (N):	79	
Min Number of channels (N):	20	



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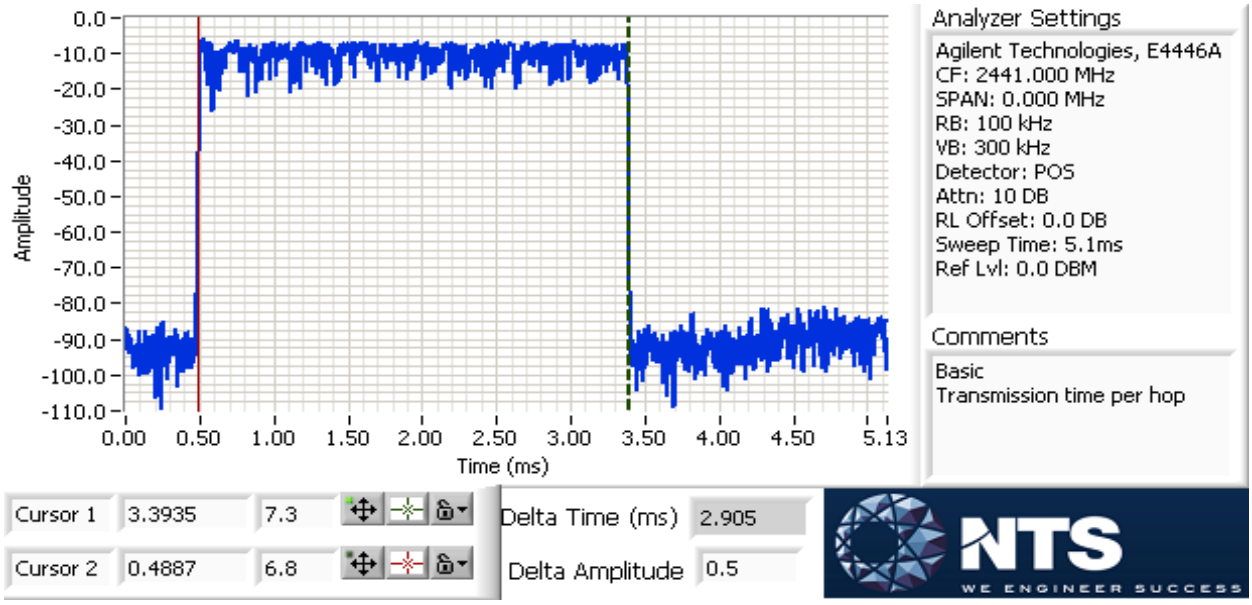
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A



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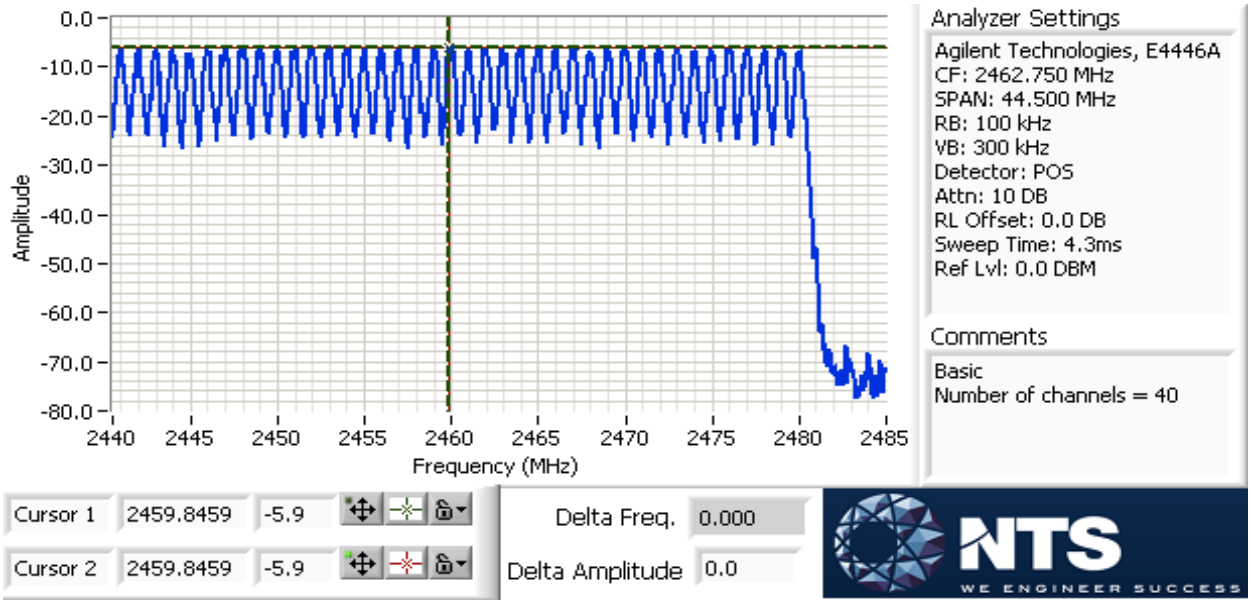
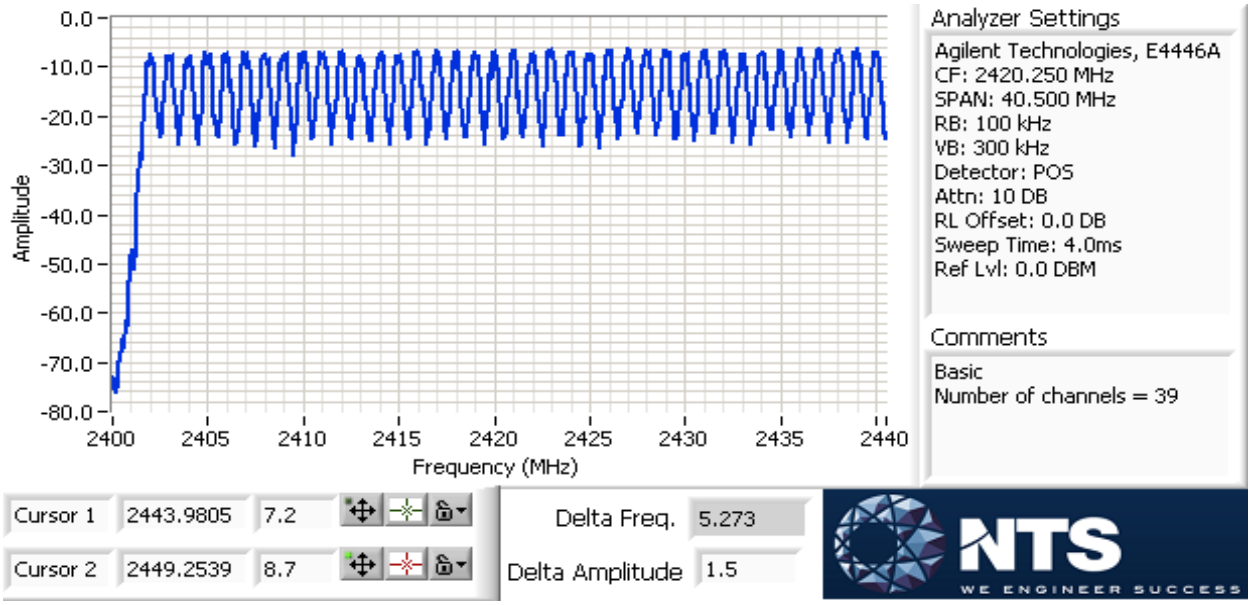
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	N/A





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Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	-

Radiated Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 8/14/2015 0:00
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: 1
Config Change: USB wall charger substituted for laptop.
EUT Voltage: USB

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing.
The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicates that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	Tx - BLE	center	Default	-	Radiated Emissions, 30-1000 MHz	FCC 15.209	24.8 dBµV/m @ 33.43 MHz (-15.2 dB)
2	Rx		-	-		LP 0002 2.8	24.5 dBµV/m @ 31.83 MHz (-15.5 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

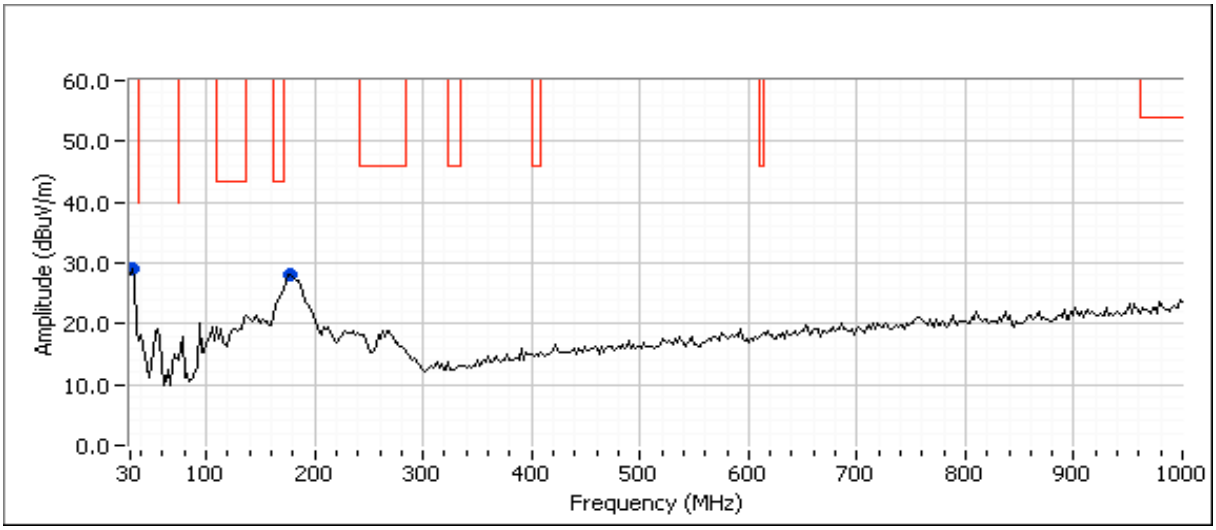
Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	-

Run #1: Radiated Spurious Emissions, 30 - 1000 MHz. Operating Mode: Tx - BLE

Center Channel @ 2440 MHz

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
33.429	24.8	V	40.0	-15.2	QP	223	1.00	Note 1
176.967	26.6	H	43.5	-16.9	QP	178	3.40	Note 1

Note 1:	Emission in non-restricted band, but limit of 15.209 used.

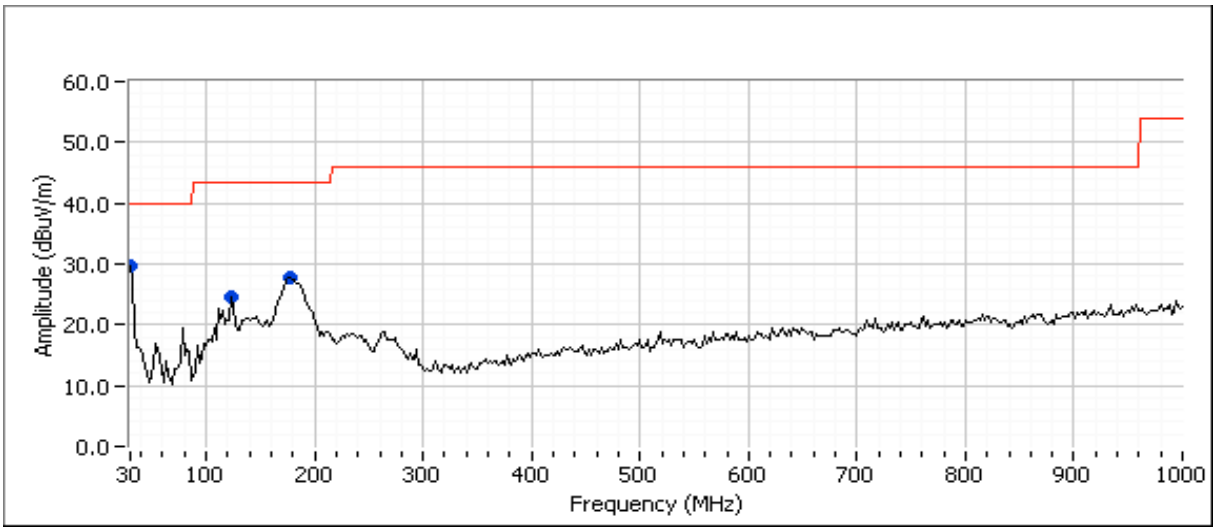


Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	-

Run #2: Radiated Spurious Emissions, 30 - 1000 MHz. Operating Mode: Rx

Center Channel @ 2440 MHz

Frequency	Level	Pol	LP 0002 2.8		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
31.829	24.5	V	40.0	-15.5	QP	360	1.00	
176.577	26.5	H	43.5	-17.0	QP	360	3.41	
124.227	10.5	V	43.5	-33.0	QP	271	1.95	



Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	-

Conducted Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 8/14/2015
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN.

Ambient Conditions:

Temperature: 25 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	FCC 15.207	Pass	47.5 dBµV @ 0.153 MHz (-18.3 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

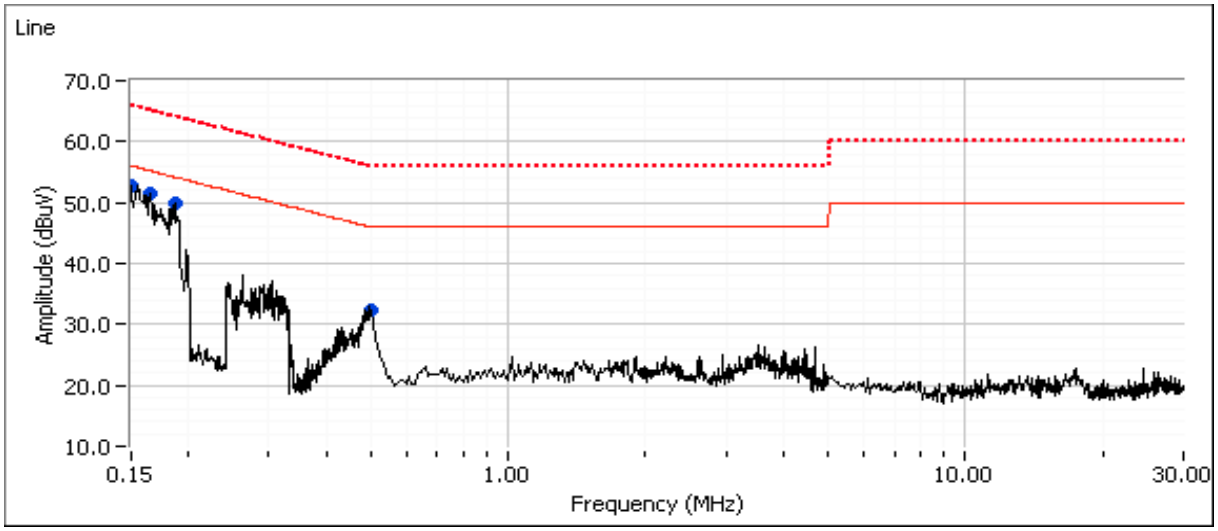
No deviations were made from the requirements of the standard.

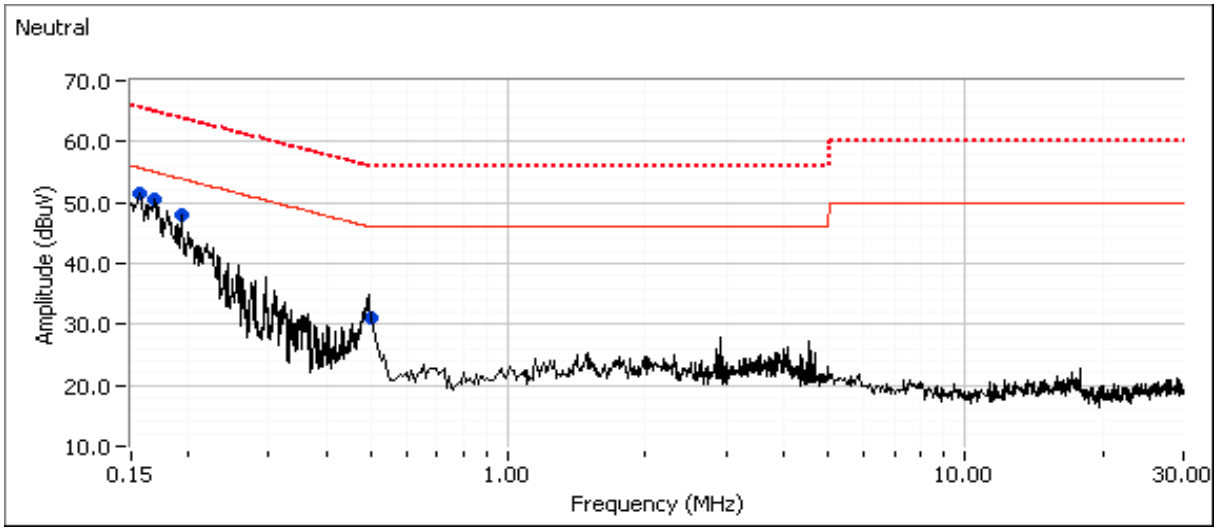
Notes

Radio operation: EUT configured for continuous transmit on 2441MHz, basic rate, maximum power.

Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	-

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	Fitbit, Inc.	Job Number:	J97928
Model:	FB502	T-Log Number:	T98212
		Project Manager:	Deepa Shetty
Contact:	Sachin Sawalapurkar	Project Coordinator:	-
Standard:	FCC 15.247, IC RSS-247, LP 0002	Class:	-

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	AC	FCC 15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.153	52.7	Line	56.0	-3.3	Peak	
0.165	51.4	Line	55.2	-3.8	Peak	
0.182	49.8	Line	54.2	-4.4	Peak	
0.500	*32.3*	*Line*	*46.0*	*-13.7*	*Peak*	
0.151	51.6	Neutral	55.6	-4.0	Peak	
0.167	50.4	Neutral	55.0	-4.6	Peak	
0.192	47.9	Neutral	53.9	-6.0	Peak	
0.500	*31.1*	*Neutral*	*46.0*	*-14.9*	*Peak*	

Final quasi-peak and average readings

Frequency	Level	AC	FCC 15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.153	47.5	Line	65.8	-18.3	QP	
0.151	47.4	Neutral	65.9	-18.5	QP	
0.165	45.7	Line	65.2	-19.5	QP	
0.167	44.3	Neutral	65.1	-20.8	QP	
0.182	43.0	Line	64.4	-21.4	QP	
0.192	41.0	Neutral	63.9	-22.9	QP	
0.151	30.7	Neutral	55.9	-25.2	AVG	
0.153	29.6	Line	55.8	-26.2	AVG	
0.165	28.3	Line	55.2	-26.9	AVG	
0.167	27.5	Neutral	55.1	-27.6	AVG	
0.182	26.3	Line	54.4	-28.1	AVG	
0.192	24.2	Neutral	53.9	-29.7	AVG	

End of Report

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