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EMC Test Report

Application for Grant of Equipment Authorization

Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8
FCC Part 15 Subpart C

Model: HC170

IC CERTIFICATION #:	109AN-HC170
FCC ID:	UZ7HC170
APPLICANT:	Motorola Solutions, Inc. One Motorola Plaza Holtsville, NY 11742-1300
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3
REPORT DATE:	April 24, 2013
REISSUE DATE:	May 7, 2013
FINAL TEST DATES:	February 11 and 12, and April 1, and May 6, 2013
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Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	04-24-2013	First release	
1.0	05-07-2013	Added AC conducted emissions for optional battery charging condition.	MEH

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SCOPE

An electromagnetic emissions test has been performed on the Motorola Solutions, Inc. model HC170, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
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 C63.4:2003
FHSS test procedure DA 00-0705A1, March 2000

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 Motorola Solutions, Inc. model HC170 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
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 Motorola Solutions, Inc. model HC170 and therefore apply only to the tested sample. The sample was selected and prepared by Larry Zhou of Motorola Solutions, 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, less than 75 channels or more)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (a) (1)	RSS 210 A8.1 (1)	20dB Bandwidth	GFSK: 952 kHz EDR: 1362 kHz	Channel spacing > 2/3rds 20dB BW	Complies
		Channel Separation	1000 kHz		Complies
15.247 (a) (1) (iii)	RSS 210 A8.1 (4)	Channel Dwell Time (*average time of occupancy)*	Device complies with Bluetooth 2.1 specification 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)	RSS 210 A8.1 (4)	Number of Channels		15 or more	Complies
15.247 (a) (1)	RSS 210 A8.1 (1)	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)	RSS 210 A8.4 (2)	Output Power (multipoint systems)	GFSK: 0.5 dBm (1.1mW) EDR: 2.2 dBm (1.7mW) EIRP = 3.5 mW [Note 1] Max Avg: -0.1dBm	0.125W	Complies
15.247(c)	RSS 210 A8.5	Spurious Emissions – 30MHz – 25GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 25GHz	46.7 dBµV/m @ 1500.0 MHz (-7.3 dB)	15.207 in restricted bands, all others < -20dBc	Complies
15.247 (a) (1)	RSS 210 A8.1(2)	Receiver bandwidth	Refer to operational description	Shall match the channel bandwidth	Complies
Note 1: EIRP calculated using antenna gain of 3.2 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 connection is non-accessible	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	57.7 dBµV @ 0.152 MHz (-8.2 dB)	Refer to standard	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	-	-	N/A
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to KDB 196803	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	GFSK: 866 kHz EDR: 1227 kHz	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 Motorola Solutions, Inc. model HC170 is a mobile computer that is designed to be worn on the head. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The EUT is powered from a rechargeable Lithium-ion 1950 or 4800mAh minimum (3.7V) battery

The sample was received on February 2, 2013 and tested on February 11 and 12, and April 1, and May 6, 2013. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Motorola	HC170	Head Mounted Computer	NTS sample: 2013-3415 (antenna port measurements)	UZ7HC170
Motorola	HC170	Head Mounted Computer	NTS sample: 2013-2342 (radiated port measurements)	UZ7HC170
Motorola	86-14000-249R	AC/DC adapter	11Sep12006L	N/A
Motorola	KT-CRDHC1X-01R	Charge Module	-	N/A

OTHER EUT INFORMATION

The EUT supports the following:
802.11bg, on channels 1 – 13
Bluetooth 2.1
Simultaneous transmission of Bluetooth and 802.11 is not possible

ANTENNA SYSTEM

The antenna system consists of an embedded IFA Antenna model number EMM00028-MT1 with a gain of 3.2dBi.

ENCLOSURE

The EUT enclosure measures approximately 24cm by 29cm by 5.5cm. It is primarily constructed of uncoated plastic

MODIFICATIONS

No modifications were made to the EUT during the time the product was at National Technical Systems - Silicon Valley.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Manufacturer	Model	Description	Serial Number	FCC ID
HP	Pavilion	Laptop	CNF73411TQ	DoC
HP	PPP009L	AC/DC adapter	592C40ELTUW5A1	N/A

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	Laptop	USB	Shielded	1

AC conducted emissions

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	Laptop	USB	Shielded	1
EUT	Charge Module	Direct Connection	-	-
Charge Module	AC/DC adapter	2wire	Unshielded	1.5
AC/DC Adapter	AC Mains	2wire	Unshielded	1.5

EUT OPERATION

The EUT was configured to transmit continuously on the desired channel at the maximum output power. Testing was performed in both Basic and EDR modes.

During AC conducted emissions testing, the EUT was configured to continuously transmit on channel 6, 802.11b mode, at maximum output power, as this represented worse case condition.

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	Registration Numbers		Location
	FCC	Canada	
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	A2LA accreditation	2845B-7	

ANSI C63.4:2003 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 C63.4:2003.

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 C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

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 C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. 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. 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 C63.4:2003, 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.

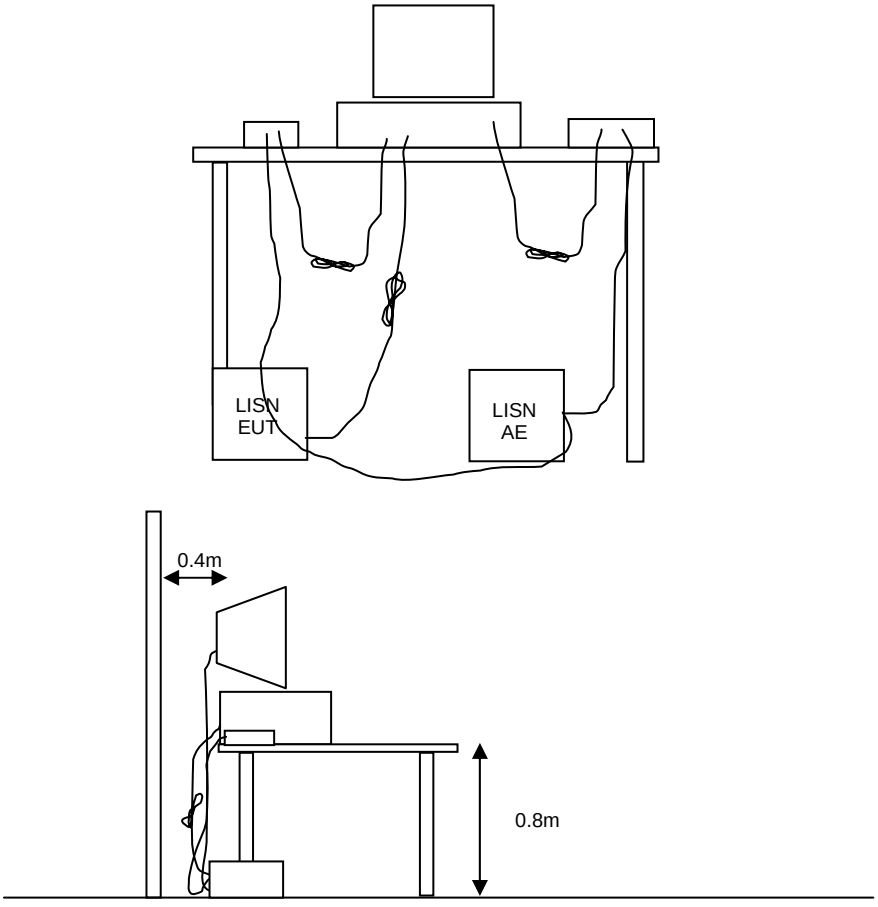


Figure 1 Typical Conducted Emissions Test Configuration

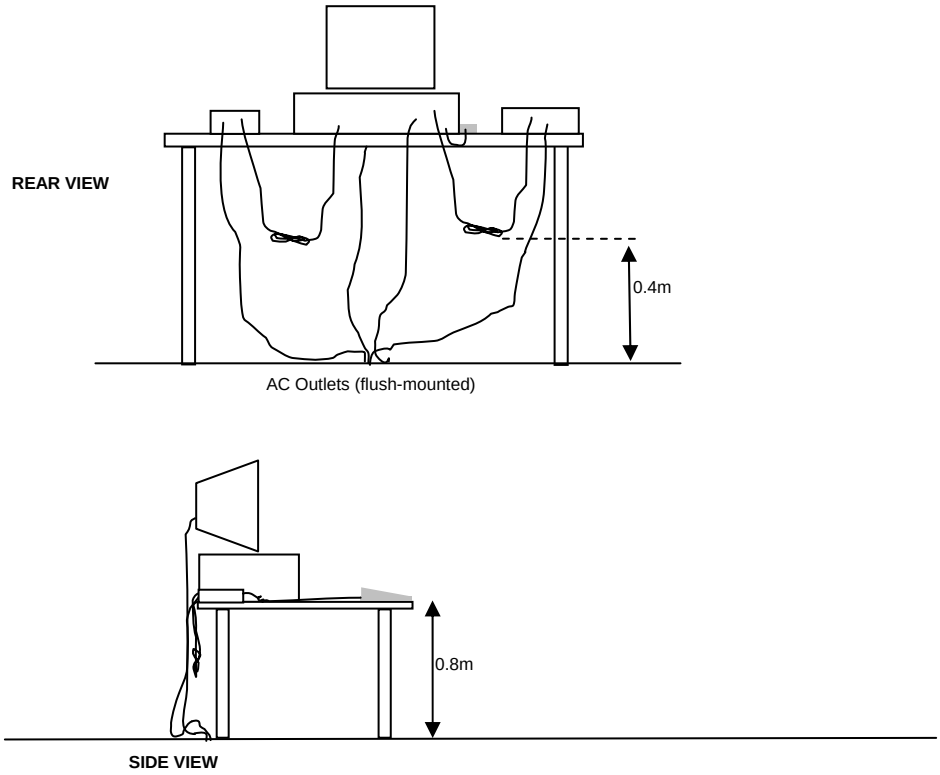
RADIATED EMISSIONS

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.

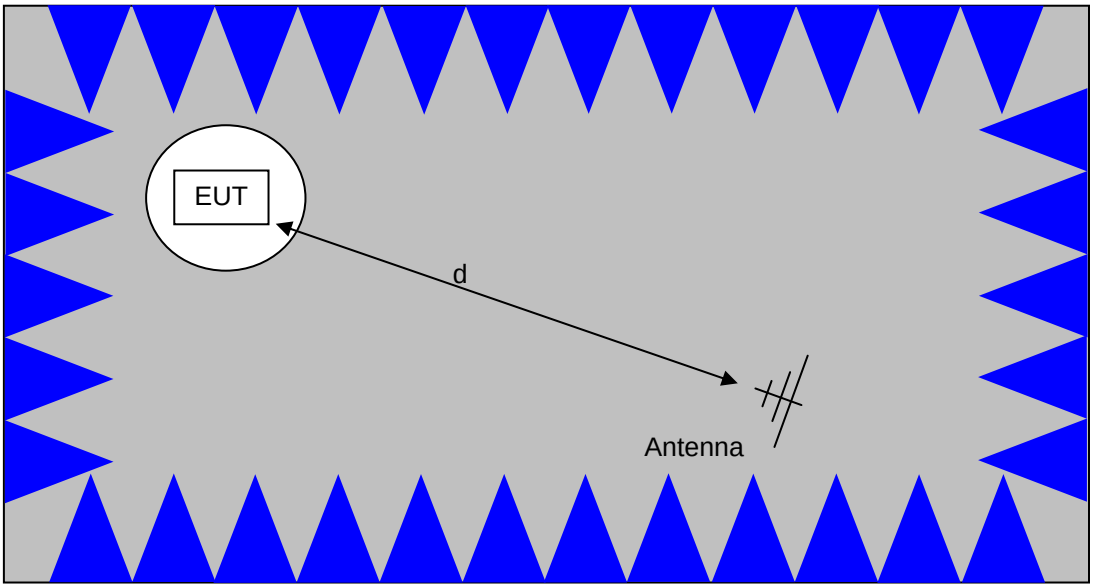
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

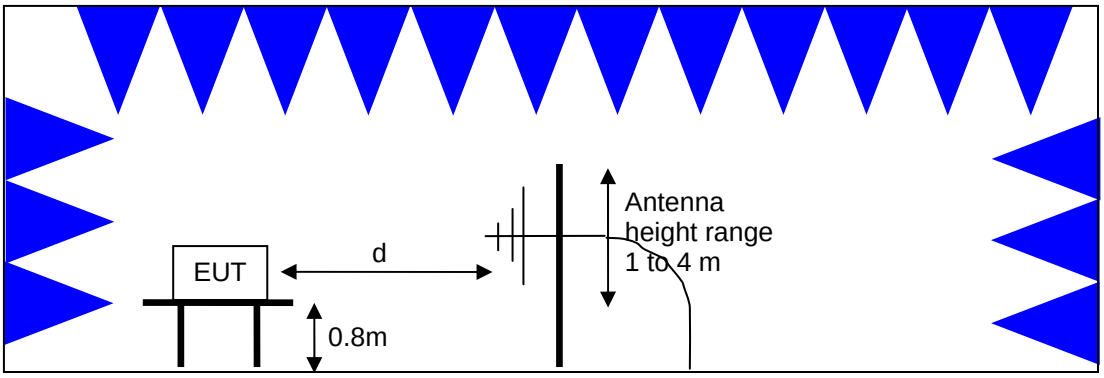


Typical Test Configuration for Radiated Field Strength Measurements



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.

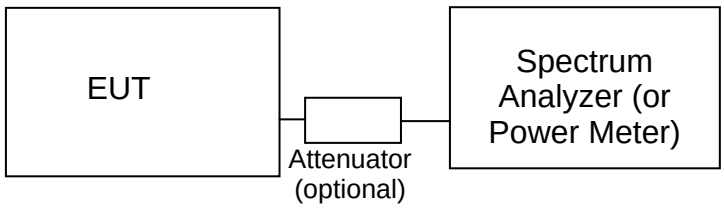
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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 National Technical Systems - 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 and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in 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:

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

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

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
902 – 928	≥ 50	1 Watt (30 dBm)
902 – 928	25 to 49	0.25 Watts (24 dBm)
2400 – 2483.5	≥ 75	1 Watt (30 dBm)
2400 – 2483.5	< 75	0.125 Watts (21 dBm)
5725 – 5850	75	1 Watt (30 dBm)

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

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 210. 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).

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

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Cal Due
Radio Antenna Port (Power and Spurious Emissions), 11_12-Feb-13				
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	12/12/2013
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1539	9/7/2013
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radiated Emissions, 1000 - 26,500 MHz, 02-Apr-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Conducted Emissions, AC Power, 06-May-13				
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	02/14/14
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	05/22/13
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	05/21/13
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2671	05/25/13

Appendix B Test Data

T90507 Pages 24 - 52

Client:	Motorola Solutions	Job Number:	J89057
Product	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Emissions Standard(s):	FCC 15.247 / RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Motorola Solutions

Product

HC170 Head Mounted Computer

Date of Last Test: 5/6/2013

Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) 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. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature:	23 °C
Rel. Humidity:	44 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	GFSK (Basic)	low	Pwr13_Ser B07	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	32.3 dBµV/m @ 2389.2 MHz (-21.7 dB)
1b	GFSK (Basic)	high	Pwr13_Ser B07	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	41.8 dBµV/m @ 2483.5 MHz (-12.2 dB)
2a	8PSK (EDR)	low	Pwr13_Ser B06	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	32.8 dBµV/m @ 2389.9 MHz (-21.2 dB)
2b	8PSK (EDR)	high	Pwr13_Ser B06	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	43.0 dBµV/m @ 2483.5 MHz (-11.0 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:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Notes

Sample: NTS tag - 2013-2342
Software: HCI_BTS

EUT only supports BT2.0 (basic/EDR) operation

Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

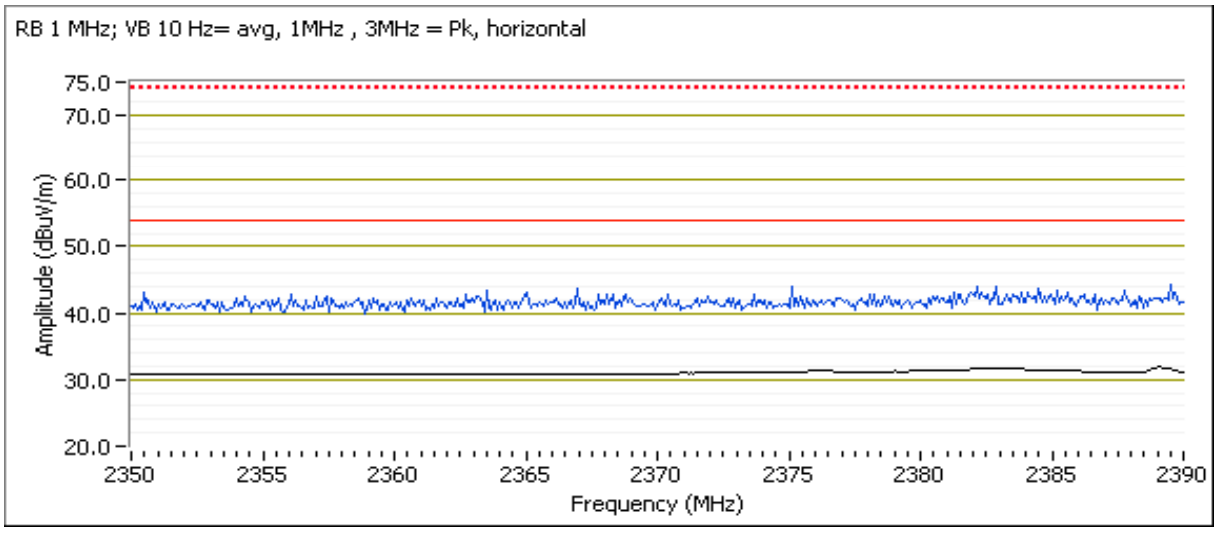
Run #1: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: GFSK (Basic)

Date of Test: 4/1/2013
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#3

Run #1a: Low Channel @ 2402 MHz

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	
2389.200	32.3	H	54.0	-21.7	AVG	234	1.1	POS; RB 1 MHz; VB: 10 Hz
2385.990	43.6	H	74.0	-30.4	PK	234	1.1	POS; RB 1 MHz; VB: 3 MHz
2389.120	31.5	V	54.0	-22.5	AVG	311	1.4	POS; RB 1 MHz; VB: 10 Hz
2356.170	42.9	V	74.0	-31.1	PK	311	1.4	POS; RB 1 MHz; VB: 3 MHz

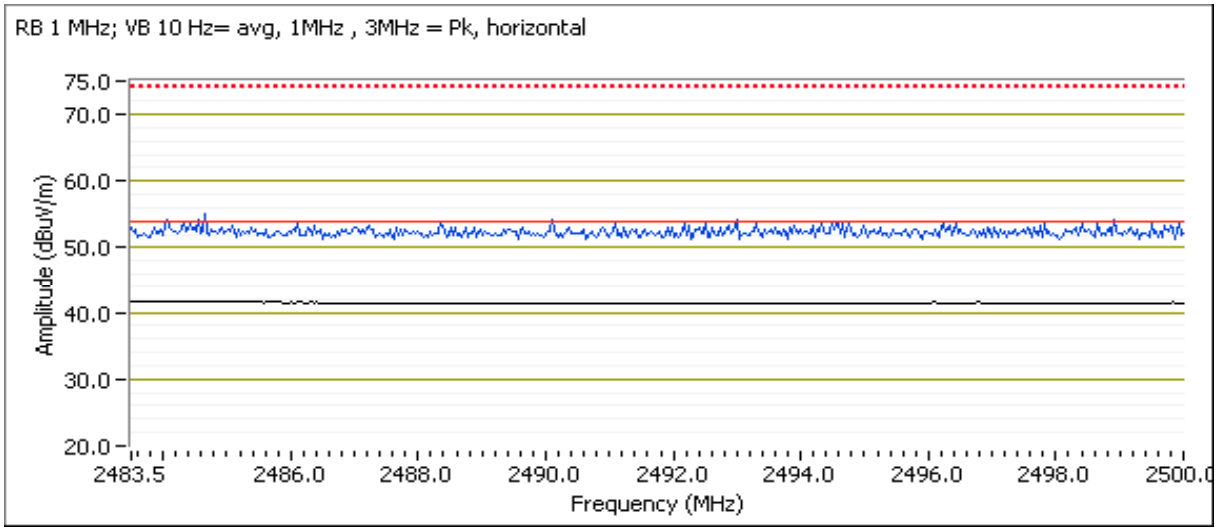


Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Run #1b: High Channel @ 2480 MHz

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	
2483.500	41.8	H	54.0	-12.2	AVG	245	1.1	POS; RB 1 MHz; VB: 10 Hz
2499.800	53.8	H	74.0	-20.2	PK	245	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	32.9	V	54.0	-21.1	AVG	310	1.0	POS; RB 1 MHz; VB: 10 Hz
2499.740	45.0	V	74.0	-29.0	PK	310	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

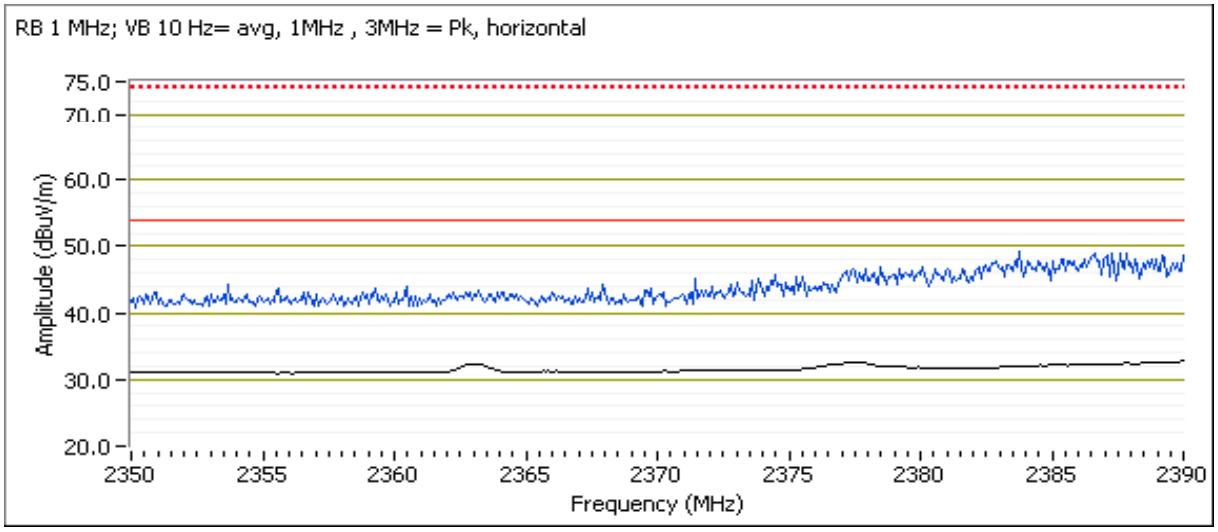
Run #2: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: 8PSK (EDR)

Date of Test: 4/1/2013
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#3

Run #2a: Low Channel @ 2402 MHz

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	
2389.920	32.8	H	54.0	-21.2	AVG	235	1.1	POS; RB 1 MHz; VB: 10 Hz
2386.790	47.6	H	74.0	-26.4	PK	235	1.1	POS; RB 1 MHz; VB: 3 MHz
2389.920	32.0	V	54.0	-22.0	AVG	310	1.4	POS; RB 1 MHz; VB: 10 Hz
2378.140	45.8	V	74.0	-28.2	PK	310	1.4	POS; RB 1 MHz; VB: 3 MHz

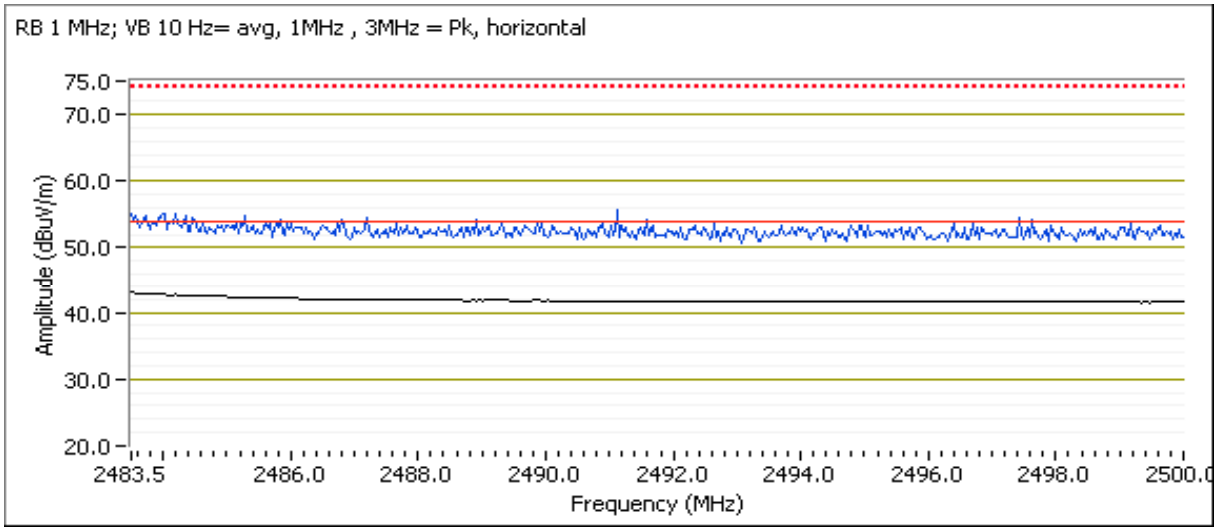


Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Run #2b: High Channel @ 2480 MHz

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	
2483.500	43.0	H	54.0	-11.0	AVG	234	1.1	POS; RB 1 MHz; VB: 10 Hz
2486.940	54.7	H	74.0	-19.3	PK	234	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	36.8	V	54.0	-17.2	AVG	308	1.3	POS; RB 1 MHz; VB: 10 Hz
2483.730	48.9	V	74.0	-25.1	PK	308	1.3	POS; RB 1 MHz; VB: 3 MHz



Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) 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. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature:	23 °C
Rel. Humidity:	44 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	GFSK (Basic)	low	Pwr13_Ser B07	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.4 dBµV/m @ 1500.0 MHz (-7.6 dB)
1b	GFSK (Basic)	center	Pwr13_Ser B07	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.2 dBµV/m @ 1500.0 MHz (-8.8 dB)
1c	GFSK (Basic)	high	Pwr13_Ser B07	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.7 dBµV/m @ 1500.0 MHz (-7.3 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.

Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Notes

Sample: NTS tag - 2013-2342
Software: HCI_BTS
Testing performed on GFSK mode only, as this was the worse case mode identified in preliminary testing
No radio related emissions observed below 1GHz.
EUT only supports BT2.0 (basic/EDR) operation

Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: GFSK (Basic)

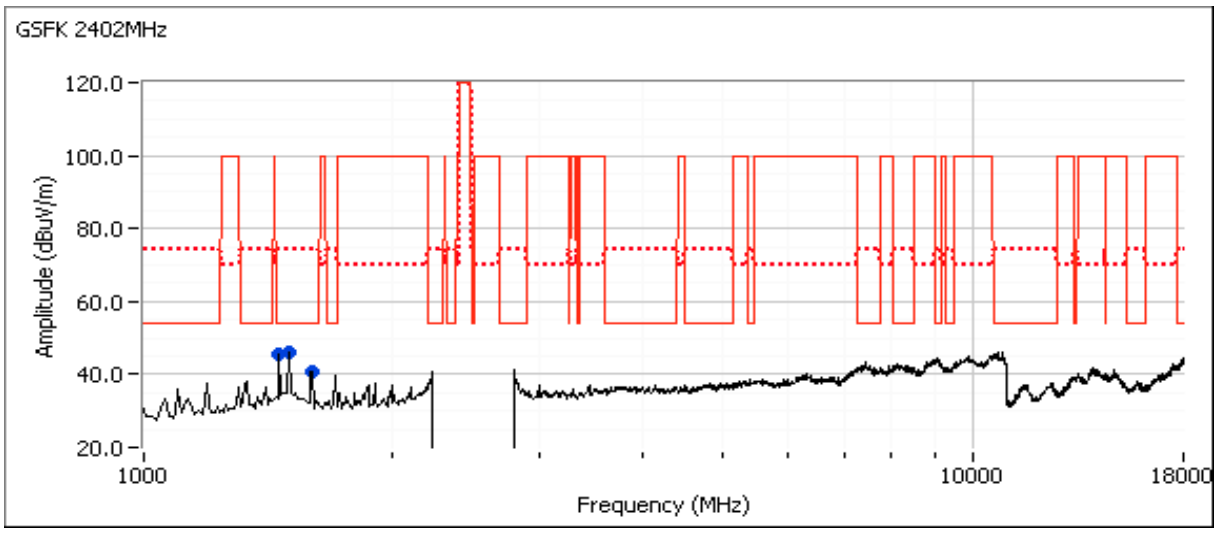
Date of Test: 4/1/2013
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#3

Run #1a: Low Channel @ 2402 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.030	46.4	V	54.0	-7.6	AVG	248	1.0	RB 1 MHz;VB 10 Hz;Peak
1457.510	44.8	V	54.0	-9.2	AVG	36	1.0	RB 1 MHz;VB 10 Hz;Peak
1600.280	33.0	V	54.0	-21.0	AVG	150	1.0	RB 1 MHz;VB 10 Hz;Peak
1600.800	51.4	V	74.0	-22.6	PK	150	1.0	RB 1 MHz;VB 3 MHz;Peak
1500.080	50.6	V	74.0	-23.4	PK	248	1.0	RB 1 MHz;VB 3 MHz;Peak
1457.680	48.6	V	74.0	-25.4	PK	36	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range.

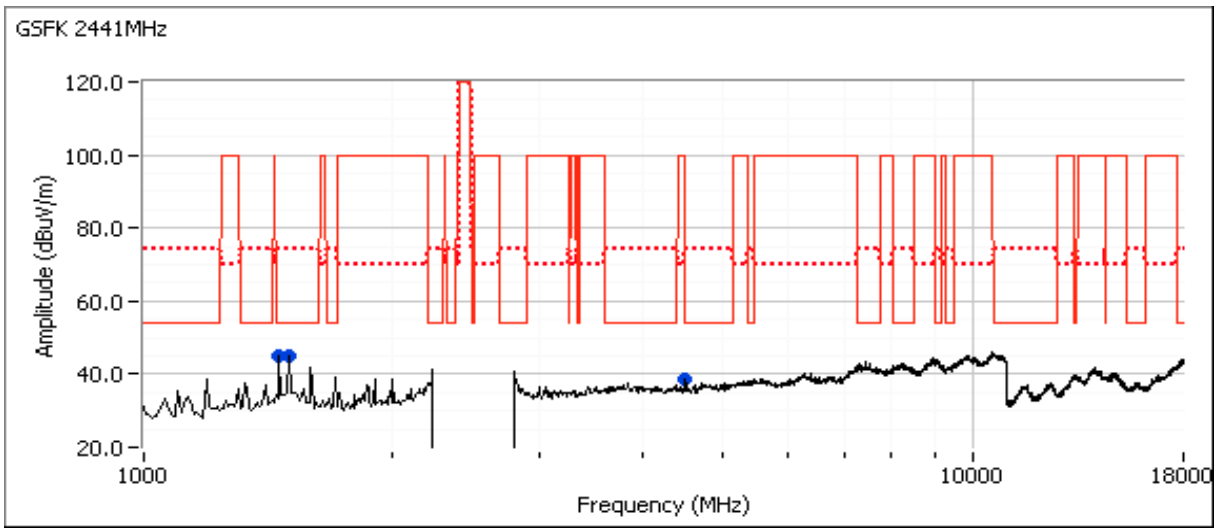


Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Run #1b: Center Channel @ 2441 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.030	45.2	V	54.0	-8.8	AVG	260	1.0	RB 1 MHz;VB 10 Hz;Peak
1457.540	44.1	V	54.0	-9.9	AVG	271	1.0	RB 1 MHz;VB 10 Hz;Peak
1192.560	39.9	V	54.0	-14.1	AVG	235	1.3	RB 1 MHz;VB 10 Hz;Peak
1500.290	51.1	V	74.0	-22.9	PK	260	1.0	RB 1 MHz;VB 3 MHz;Peak
1457.480	48.4	V	74.0	-25.6	PK	271	1.0	RB 1 MHz;VB 3 MHz;Peak
1192.520	43.9	V	74.0	-30.1	PK	235	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range.



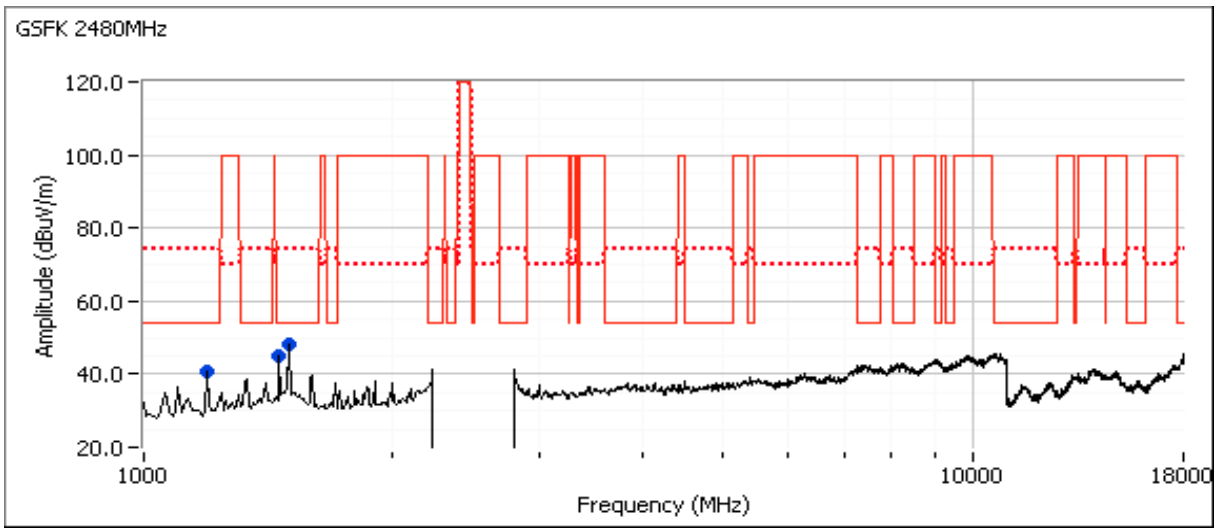
Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Run #1c: High Channel @ 2480 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.030	46.7	V	54.0	-7.3	AVG	260	1.0	RB 1 MHz;VB 10 Hz;Peak
1457.540	44.1	V	54.0	-9.9	AVG	271	1.0	RB 1 MHz;VB 10 Hz;Peak
1192.560	39.9	V	54.0	-14.1	AVG	235	1.3	RB 1 MHz;VB 10 Hz;Peak
1500.290	51.1	V	74.0	-22.9	PK	260	1.0	RB 1 MHz;VB 3 MHz;Peak
1457.480	48.4	V	74.0	-25.6	PK	271	1.0	RB 1 MHz;VB 3 MHz;Peak
1192.520	43.9	V	74.0	-30.1	PK	235	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range.



Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

FCC 15.247 FHSS - Power, 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: 2/11/2013, 2/12/2013
Test Engineer: Deniz Demirci
Test Location: FT Lab# 4b

Config. Used: 1
Config Change: None
EUT Voltage: 4 VDC

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, 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: 21 °C
Rel. Humidity: 34 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
3	30 - 26000 MHz - Transmitter Conducted Spurious Emissions	FCC Part 15.247(c)	Pass	> 20 dB
4	Output Power	15.247(b)	Pass	GFSK: 0.5 dBm (0.00112 W) EDR: 2.2 dBm (0.00166 W)
5	20dB Bandwidth	15.247(a)	Pass	GFSK: 952 kHz EDR: 1362 kHz
5	99% bandwidth	15.247(a)	Pass	GFSK: 866 kHz EDR: 1227 kHz
5	Channel Spacing	15.247(a)	Pass	1000 kHz
5	Number of Channels	15.247(a)	Pass	79 channels

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

Sample: Elliott tag - 2012-3415
Software: HCI_BTS
EUT only supports BT2.0 (basic/EDR) operation

Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Run #3: Antenna Conducted Spurious Emissions, 30 - 26000 MHz.

Date of Test: 2/11/2013, 2/12/2013

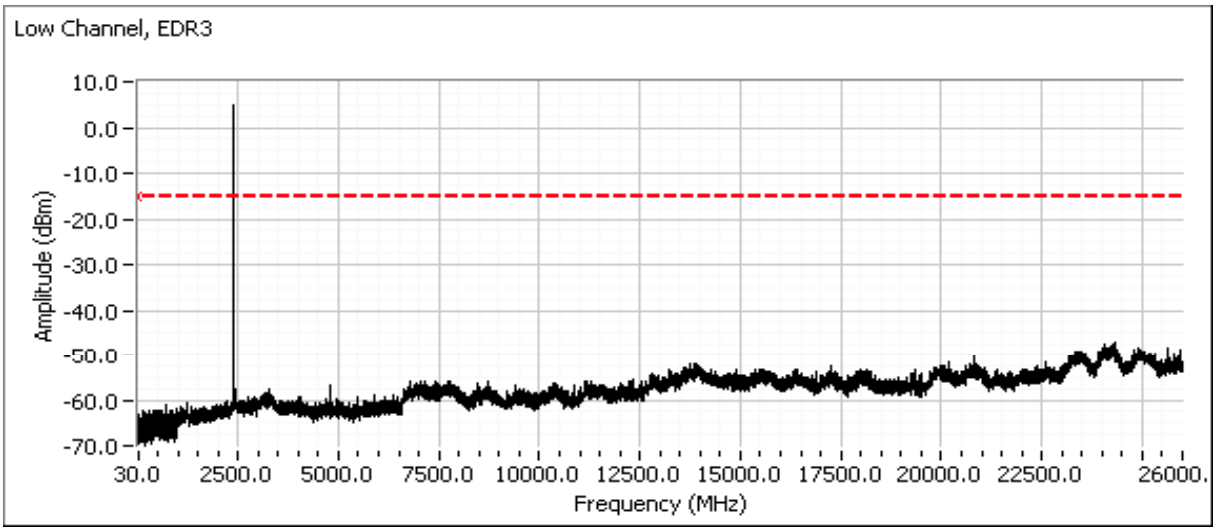
Test Engineer: Deniz Demirci

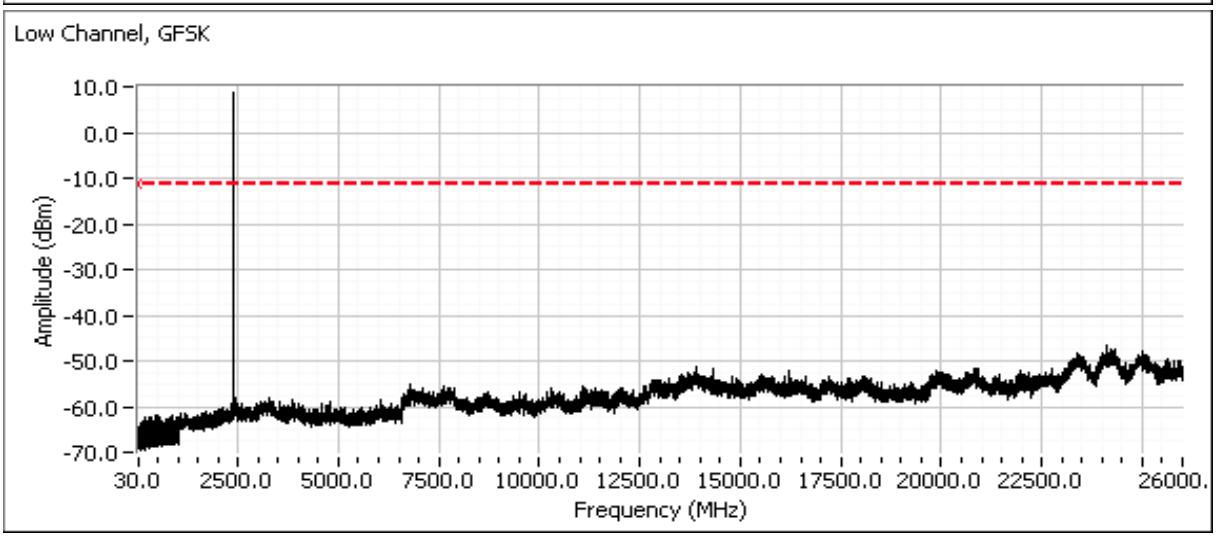
Test Location: FT Lab# 4b

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

Low channel

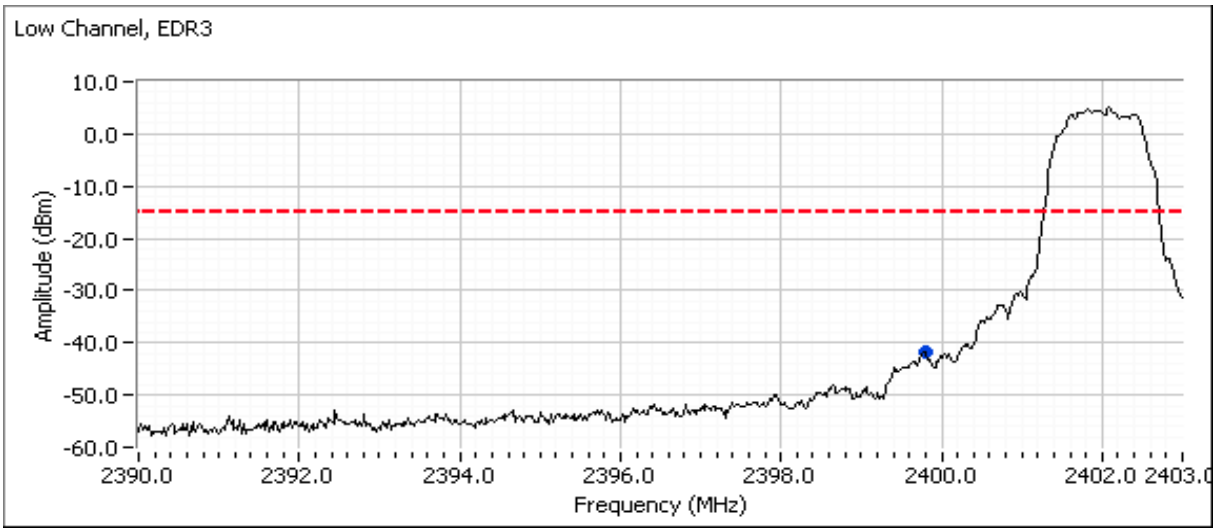
Broadband plots

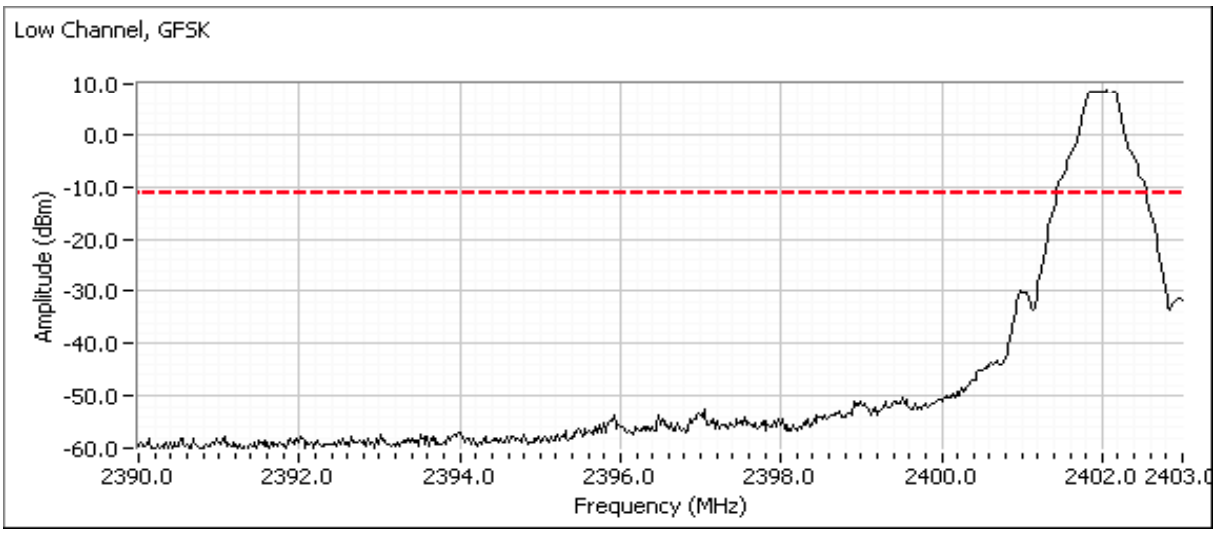




Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

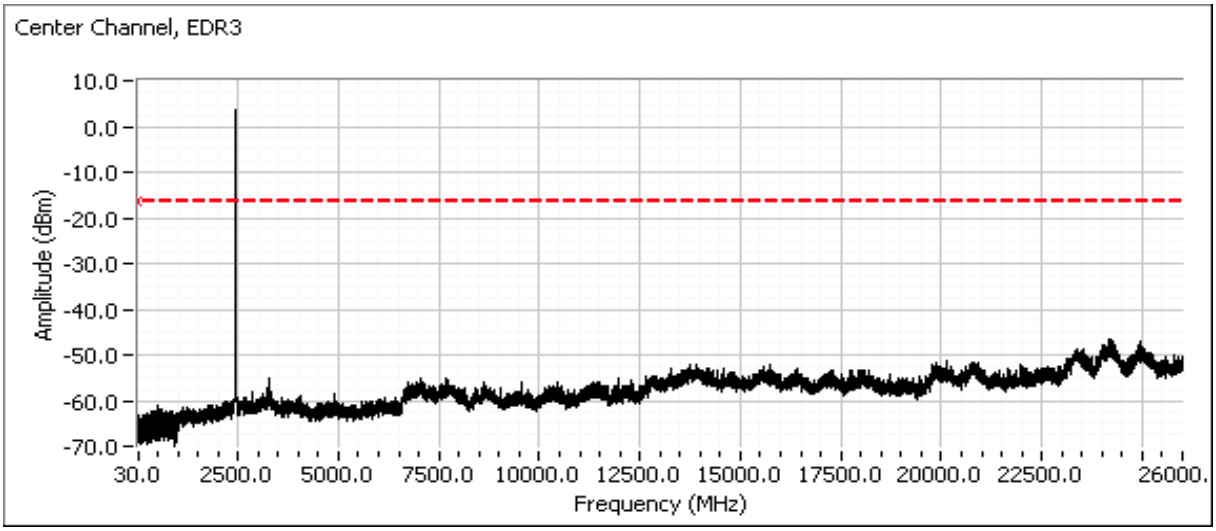
Plots showing -20dBc at the lower band edge

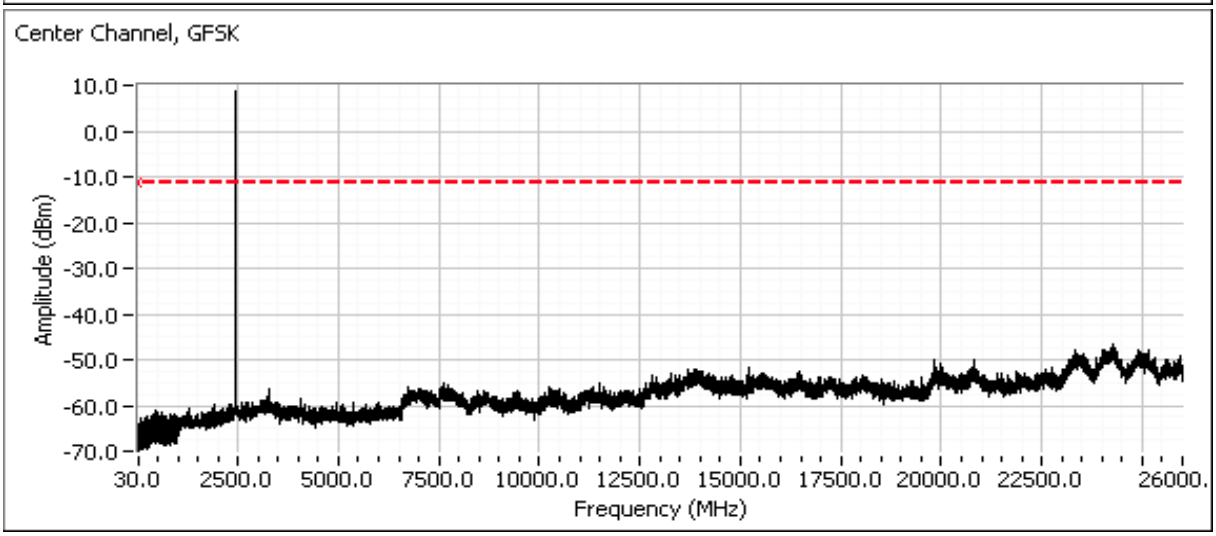




Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Center channel
Broadband plots

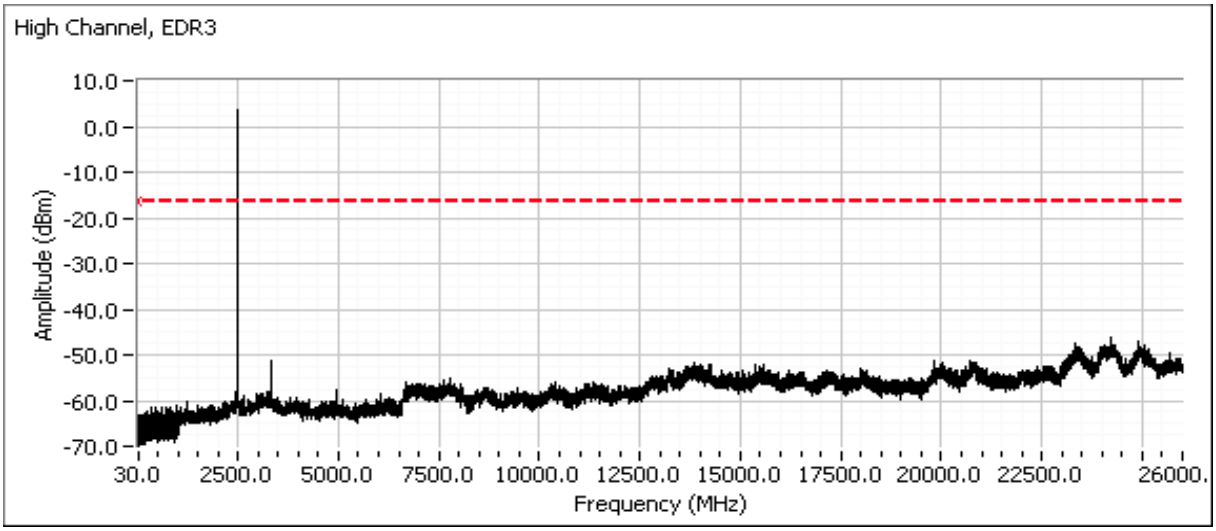


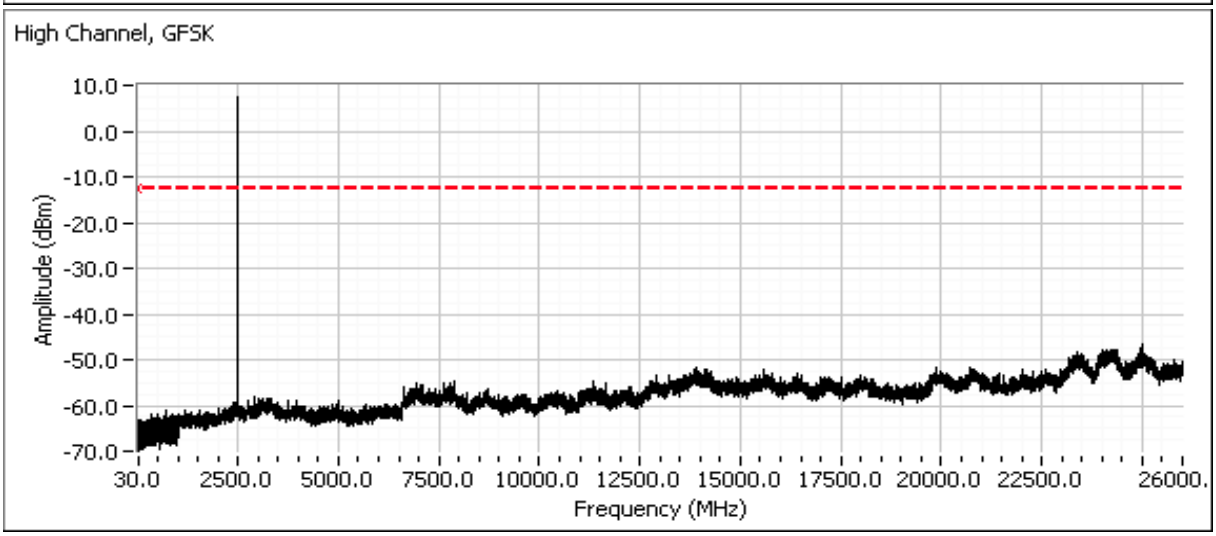


Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

High channel

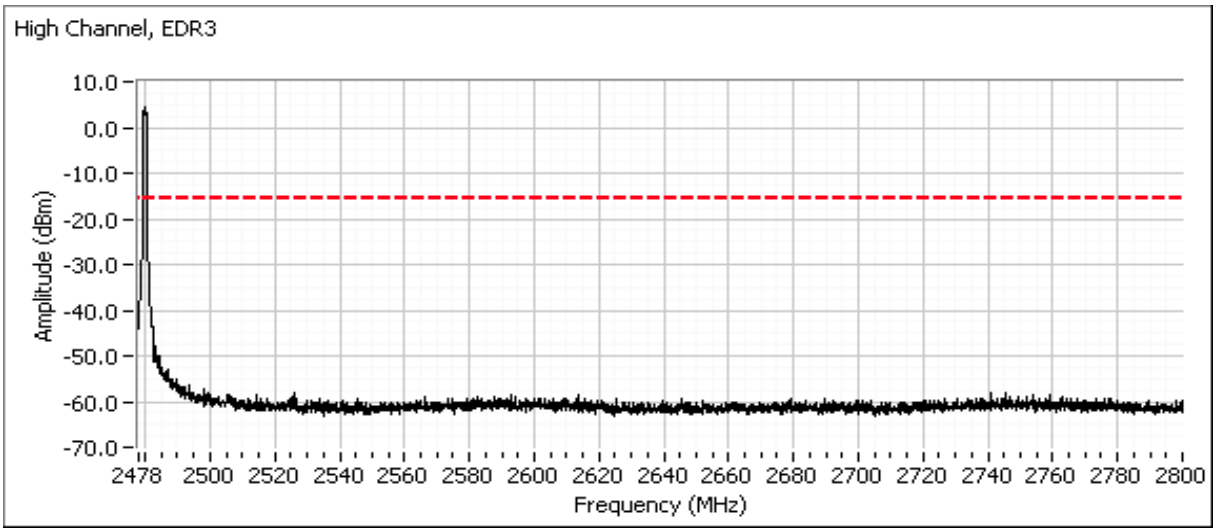
Broadband plot

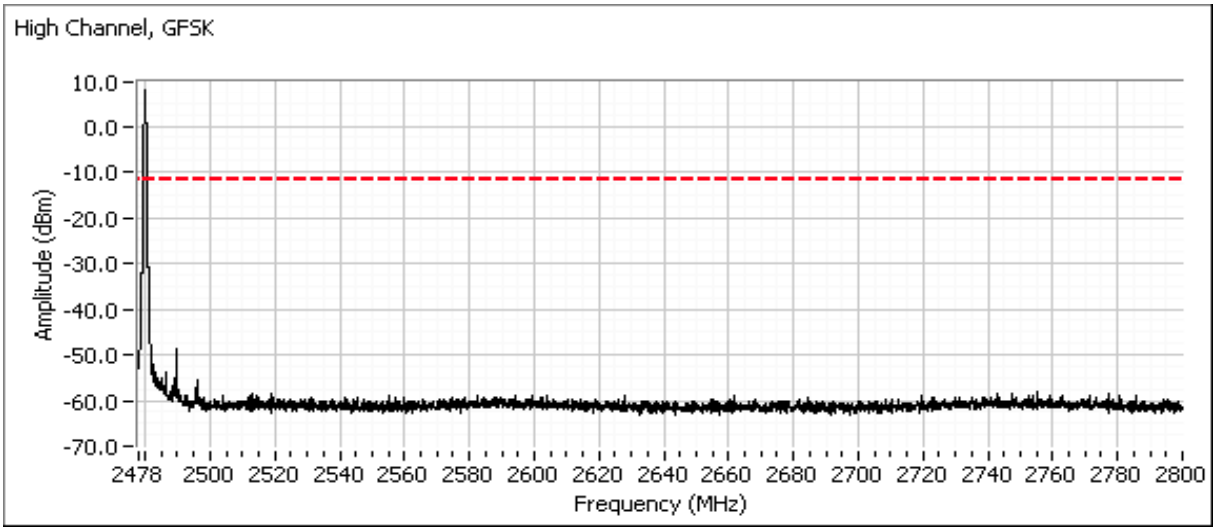




Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Plot showing -20dBc at the upper band edge



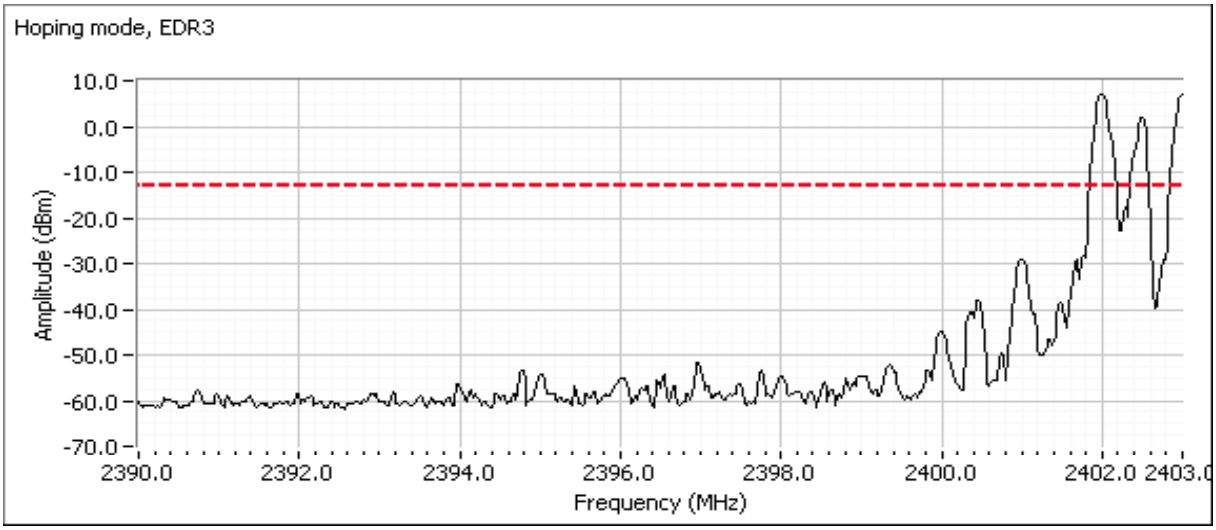


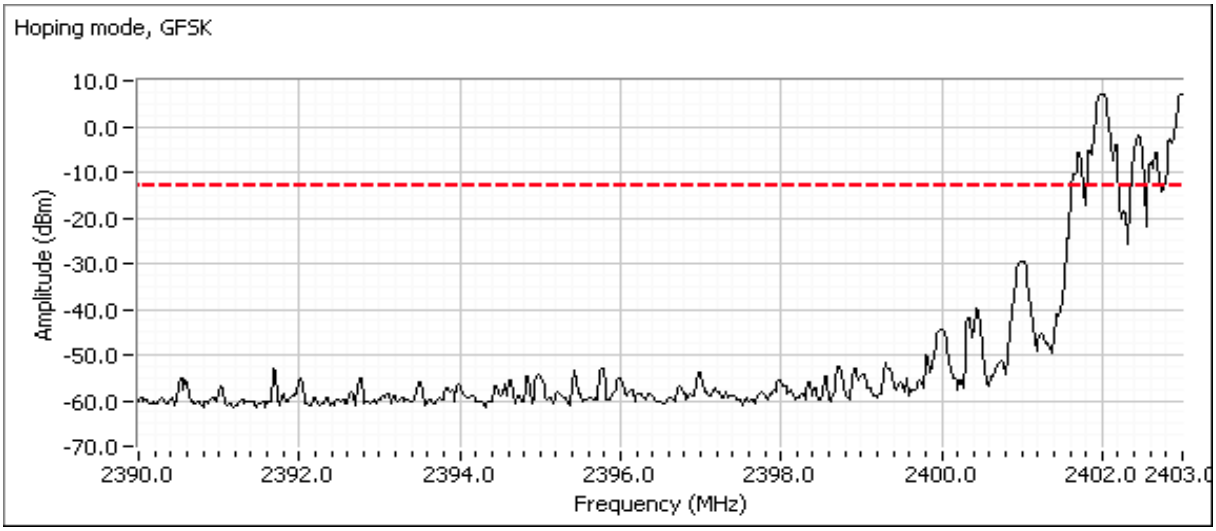
Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Below scans made using RBW= 100 kHz, VB=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.

Low channel, hopping enabled

Plot showing -20dBc at the lower band edge

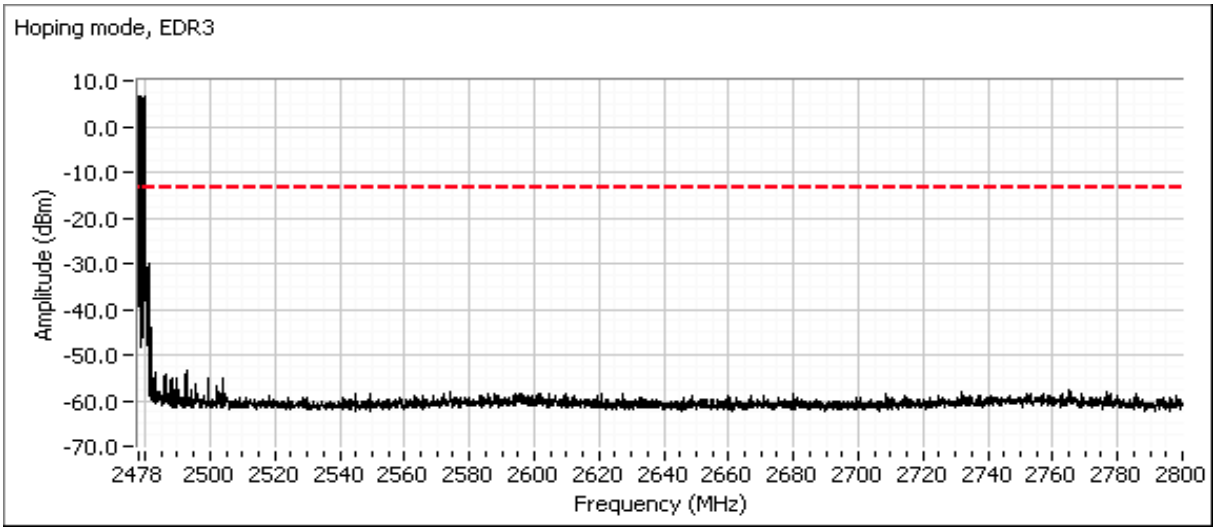


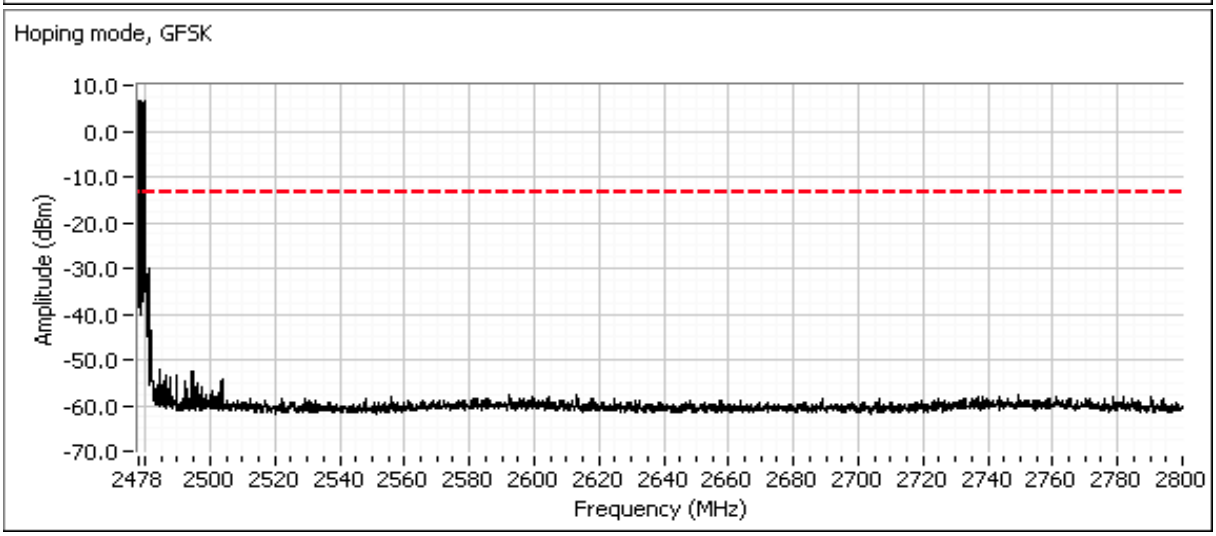


Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

High channel, hopping enabled

Plot showing -20dBc at the upper band edge





Client:	Motorola Solutions	Job Number:	J89057
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Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	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.
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Maximum antenna gain: 3.2 dBi

Channel	Frequency (MHz)	Mode	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2402	GFSK	0.3	0.00108	0.00225
Mid	2441	GFSK	0.5	0.00112	0.00234
High	2480	GFSK	0.5	0.00112	0.00234
Low	2402	EDR	2.0	0.00158	0.00331
Mid	2441	EDR	2.2	0.00166	0.00347
High	2480	EDR	2.2	0.00166	0.00347

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Note 1:	Power measured with a peak power meter

For reference only - average power meter measurements

Channel	Frequency (MHz)	Mode	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2402	GFSK	-0.3	0.00093	0.00195
Mid	2441	GFSK	-0.1	0.00098	0.00204
High	2480	GFSK	-0.2	0.00095	0.00200
Low	2402	EDR	-0.8	0.00083	0.00174
Mid	2441	EDR	-0.6	0.00087	0.00182
High	2480	EDR	-0.7	0.00085	0.00178

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Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	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)
Low	2402	30 kHz	952	30 kHz	865
Mid	2441	30 kHz	950	30 kHz	866
High	2480	30 kHz	948	30 kHz	857
Low	2402	30 kHz	1360	30 kHz	1227
Mid	2441	30 kHz	1362	30 kHz	1227
High	2480	30 kHz	1360	30 kHz	1226

Note 1:	20dB bandwidth measured using RB = 30 kHz, VB = 100 kHz (VB > RB)
Note 2:	99% bandwidth measured using RB = 30 kHz, VB = 100 kHz (VB >=3RB)

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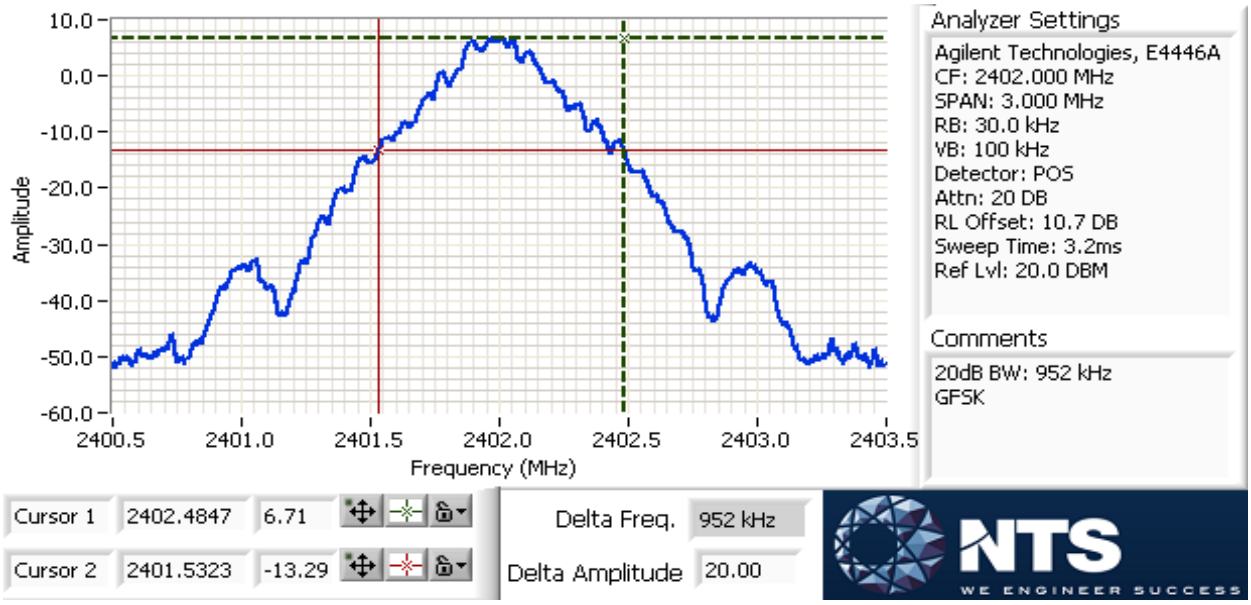
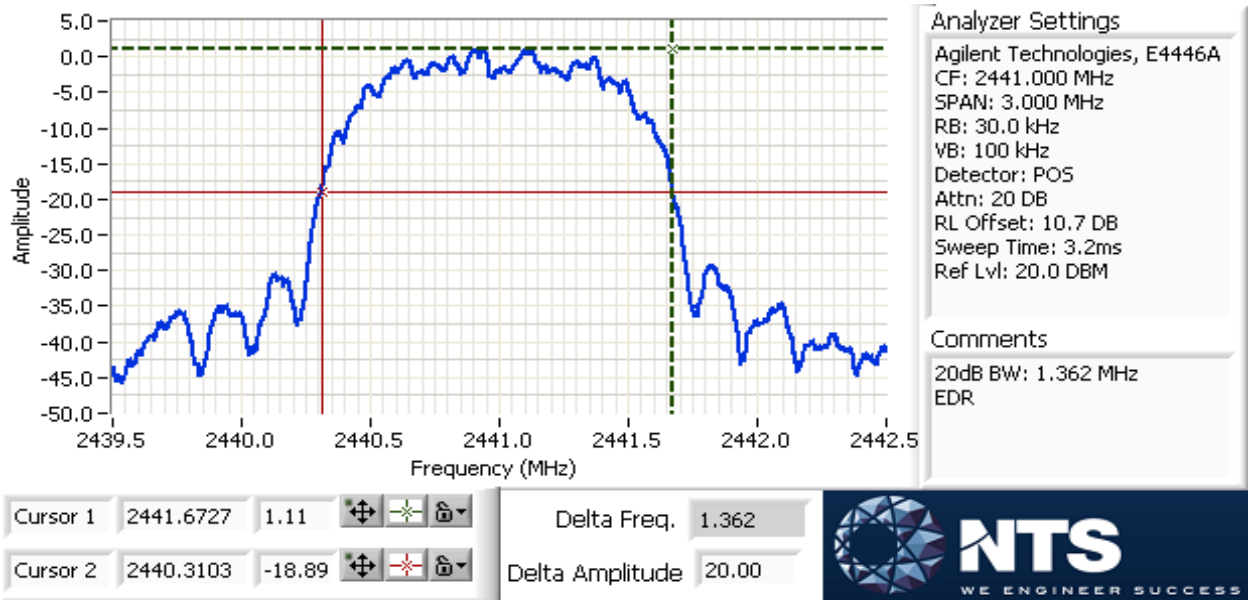
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

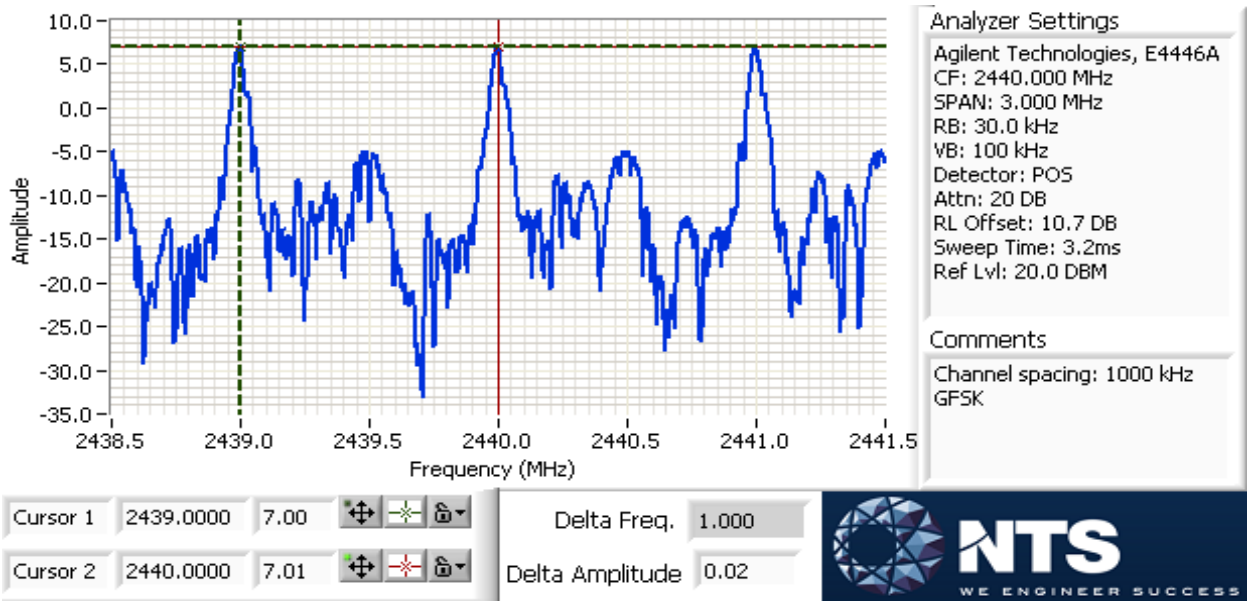




Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A

Spacing and Number of Channels

Channel spacing:	1000 kHz	Pass
Number of channels (N):	79	Pass



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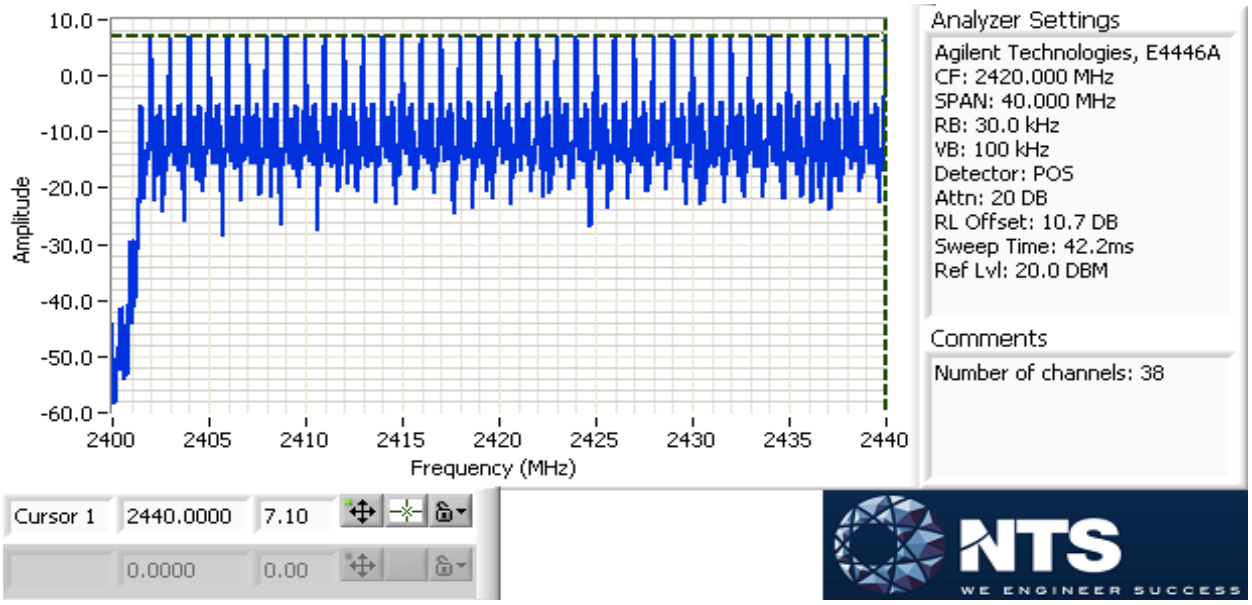
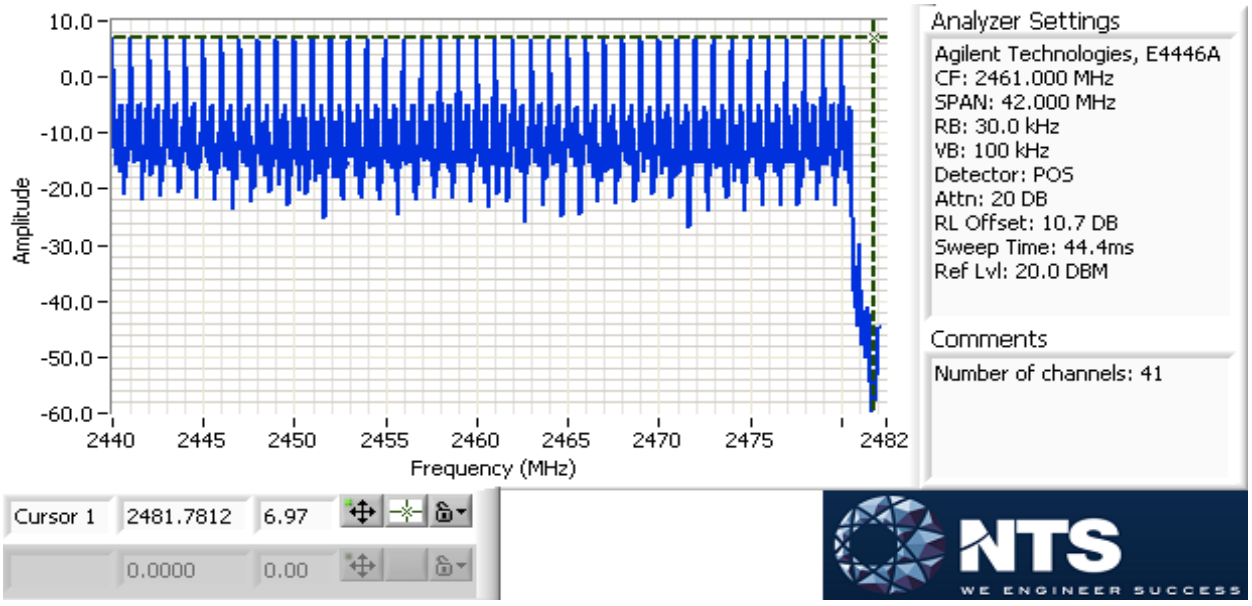
		Account Manager:	Christine Krebill
Contact:	Larry Zhou		
Standard:	FCC 15.247 / RSS-210	Class:	N/A





Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Project Manager:	Christine Krebill
Contact:	Larry Zhou	Project Coordinator:	-
Standard:	FCC 15.247 / RSS-210	Class:	-

Conducted Emissions

(Elliott Laboratories 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: 5/6/2013
Test Engineer: Jack Liu
Test Location: Fremont Chamber #7

Config. Used: 2
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. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	Class B	Pass	57.7 dBµV @ 0.152 MHz (-8.2 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

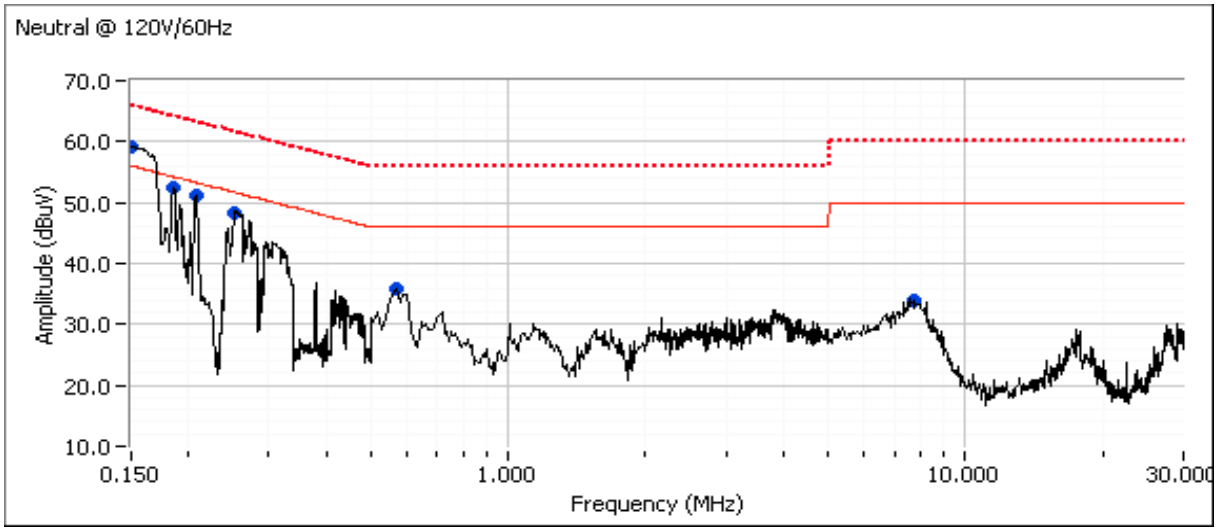
Deviations From The Standard

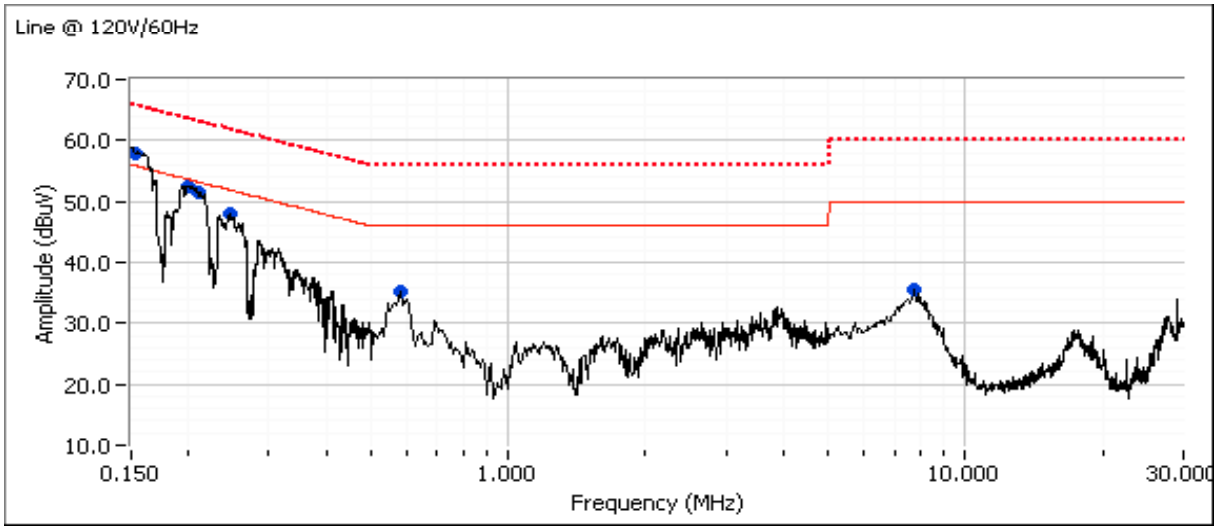
No deviations were made from the requirements of the standard.

EUT: S/N:13049010501369 (NTS: 2013-2342)
Battery: P/N 82-71364-06 (NTS: 2012-3437)
AC Adapter: PWRS14000-149R (NTS: 2013-1140)

Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Project Manager:	Christine Krebill
Contact:	Larry Zhou	Project Coordinator:	-
Standard:	FCC 15.247 / RSS-210	Class:	-

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





Client:	Motorola Solutions	Job Number:	J89057
Model:	HC170 Head Mounted Computer	T-Log Number:	T90507
		Project Manager:	Christine Krebill
Contact:	Larry Zhou	Project Coordinator:	-
Standard:	FCC 15.247 / RSS-210	Class:	-

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
7.771	34.0	Neutral	50.0	-16.0	Peak	
0.595	35.9	Neutral	46.0	-10.1	Peak	
0.152	59.2	Neutral	56.0	3.2	Peak	
0.186	52.3	Neutral	54.2	-1.9	Peak	
0.207	51.3	Neutral	53.3	-2.0	Peak	
0.252	48.4	Neutral	51.7	-3.3	Peak	
7.639	35.6	Line 1	50.0	-14.4	Peak	
0.593	35.2	Line 1	46.0	-10.8	Peak	
0.153	57.9	Line 1	55.8	2.1	Peak	
0.202	52.5	Line 1	53.6	-1.1	Peak	
0.210	51.5	Line 1	53.2	-1.7	Peak	
0.247	47.9	Line 1	51.9	-4.0	Peak	

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Standard:	FCC 15.247 / RSS-210	Class:	-

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.152	57.7	Neutral	65.9	-8.2	QP	
0.186	20.0	Neutral	54.2	-34.2	AVG	
7.771	22.1	Neutral	50.0	-27.9	AVG	
7.771	29.3	Neutral	60.0	-30.7	QP	
0.595	23.0	Neutral	46.0	-23.0	AVG	
0.595	33.2	Neutral	56.0	-22.8	QP	
0.152	39.8	Neutral	55.9	-16.1	AVG	
0.186	45.9	Neutral	64.2	-18.3	QP	
0.207	33.7	Neutral	53.3	-19.6	AVG	
0.207	50.6	Neutral	63.3	-12.7	QP	
0.252	29.2	Neutral	51.7	-22.5	AVG	
0.252	45.6	Neutral	61.7	-16.1	QP	
0.153	57.1	Line	65.8	-8.7	QP	
0.201	32.6	Line	53.6	-21.0	AVG	
7.639	21.7	Line	50.0	-28.3	AVG	
7.639	28.7	Line	60.0	-31.3	QP	
0.593	21.4	Line	46.0	-24.6	AVG	
0.593	31.8	Line	56.0	-24.2	QP	
0.153	38.3	Line	55.8	-17.5	AVG	
0.201	50.3	Line	63.6	-13.3	QP	
0.210	28.2	Line	53.2	-25.0	AVG	
0.210	48.7	Line	63.2	-14.5	QP	
0.247	26.8	Line	51.9	-25.1	AVG	
0.247	45.2	Line	61.9	-16.7	QP	

Note 1: EUT is continuous tranmit on 802.11 b mode CH6

End of Report

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