EMC Test Report

Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15 Subpart C

Model: Falcon X3

IC CERTIFICATION #:	3862C-FALX3
FCC ID:	U4SFALX3
APPLICANT:	Datalogic Mobile Inc. 1505 Westec Drive Eugene, OR 97402
TEST SITE(S):	Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-4
REPORT DATE:	June 22, 2010
FINAL TEST DATES:	April 14, April 19, April 28 and May 27, 2010

AUTHORIZED SIGNATORY:

Mark Briggs

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Staff Engineer
Elliott Laboratories

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	June 22, 2010	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Datalogic Mobile Inc. model Falcon X3, pursuant to the following rules:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "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 Elliott Laboratories 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 Datalogic Mobile Inc. model Falcon X3 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "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 Datalogic Mobile Inc. model Falcon X3 and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Kalina of Datalogic Mobile 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)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (a) (1)	RSS 210 A8.1 (1)	20dB Bandwidth	1192 kHz	Channel spacing > 2/3 x 20dB BW	Complies
		Channel Separation	1000 kHz		Complies
15.247 (a) (1) (ii)	RSS 210 A8.1 (4)	Number of Channels	Minimum: 20 Maximum: 79	15 or more	Complies
15.247 (a) (1) (ii)	RSS 210 A8.1 (4)	Channel Dwell Time (*average time of occupancy)*	0.4 seconds within a period of 0.4 x number of channels	≤0.4 second within a period of 0.4 x number of channels	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	3.8 dBm (0.0024 Watts) EIRP = 0.005 W Note 1	*0.125 Watts (EIRP < ???)*	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	46.7dBµV/m @ 2483.7MHz (-7.3dB)	15.207 in restricted bands, all others < -20dBc	Complies
15.247 (a) (1)	RSS 210 A8.1(2)	Receiver bandwidth	Refer to operational description[1]	Shall match the channel bandwidth	Complies
Note 1: EIRP calculated using antenna gain of 3dBi.					

[1] Operational description for the Bluetooth module shows adjacent channel rejection ratio of 0dB, indicating the receiver bandwidth is matched to the signal bandwidth.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Integral antenna	Integral antenna or unique connector	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	45.8dBµV/m @ 1111.5MHz	Refer to page 18	Complies (8.2dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	37.0dBµV @ 3.106MHz	Refer to standard	Complies (19.0dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR report and RSS 102 declaration	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Statement is in the manual (Regulatory Statements section)	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	1132kHz	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 Datalogic Mobile Inc. model Falcon X3 is a portable data terminal that is designed for warehouse use. The device contains a Bluetooth transmitter and a Wi-Fi 802.11abg transmitter.

The Bluetooth transmitter, which is covered by the scope of this test report, is implemented via a single chip solution and uses a integral antenna. It supports EDR (2Mb/s, 3Mb/s) and legacy (1Mb/s) data rates and can operate with adaptive frequency hopping to use a minimum of 20 of the 79 channels.

The Wi-Fi radio is implemented through a plug-in radio module. Although the module has its own FCC approval the integration of the device utilizes a different set of antennas than those approved with the module. Additionally, the device can be body worn and the modular approval only allows for use in mobile rf exposure conditions, therefore the application covers both Bluetooth and WiFi devices in this host system.

Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.7 V DC, 120m Amps. The electrical rating of the AD/DC adaptor is 100-240 Volts, 60/50 Hz, 0.5 Amps.

The sample was received on April 15, 2010 and tested on April 14, April 19, April 28 and May 27, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Datalogic Mobile	Falcon x3	Portable Data Terminal	Sample #1 Sample #2	U4SFALX3

ANTENNA SYSTEM

The antenna system consists of an internal dipole antenna

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 9 cm wide by 6 cm deep by 23 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing the Bluetooth device:

Company	Model	Description	Serial Number	FCC ID
HP	NC600	Laptop	-	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Serial	Laptop	Serial	Shielded	2.0
mini USB	Laptop	USB Cable	Unshielded	2.0
AC Power	AC/DC Adaptor	Power cable	Unshielded	2.0

EUT OPERATION

During testing for spurious emissions, power and signal bandwidth the EUT configured to transmit continuously on a single channel using a DH1 (1Mb/s), DH3 (3Mb/s) or DH5 (5Mb/s) packet. Additional measurements to determine the number of channels and confirm the hopping rate was 1600 hops per second were performed with the device hopping across all 79 channels.

Measurements at the antenna port were made on a second sample which had the antenna replaced by a coaxial connector to facilitate a direct connection to the measurement instrumentation.

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 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435

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 C63.4:2003. 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.

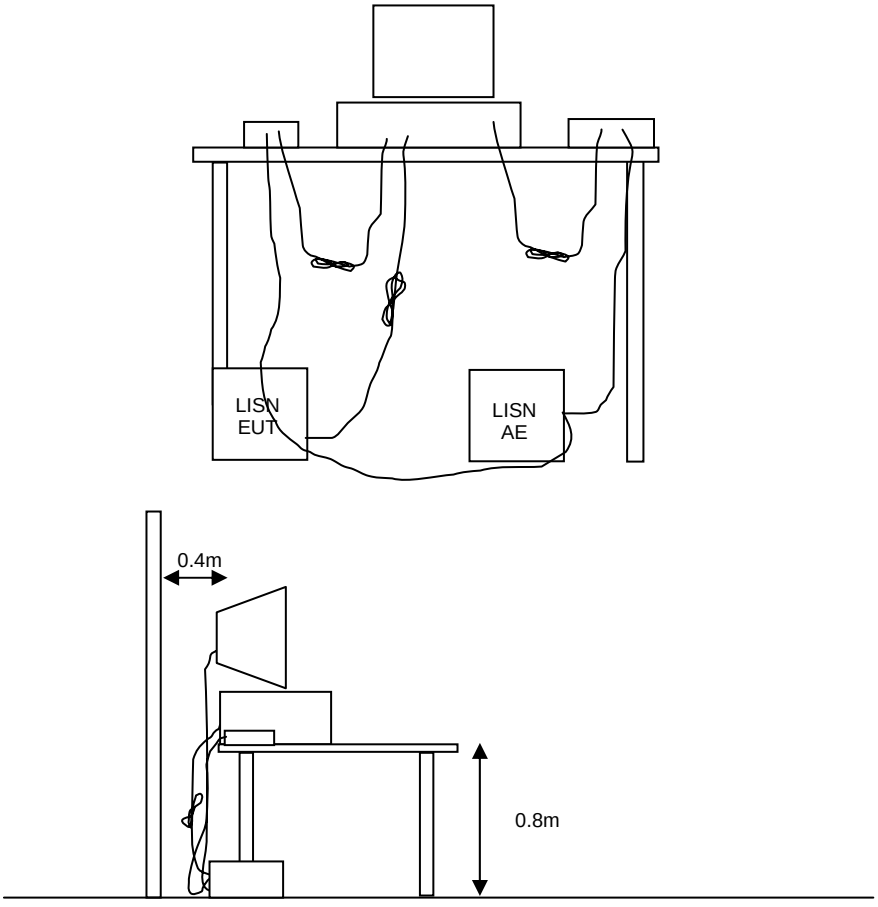
TEST PROCEDURES

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.



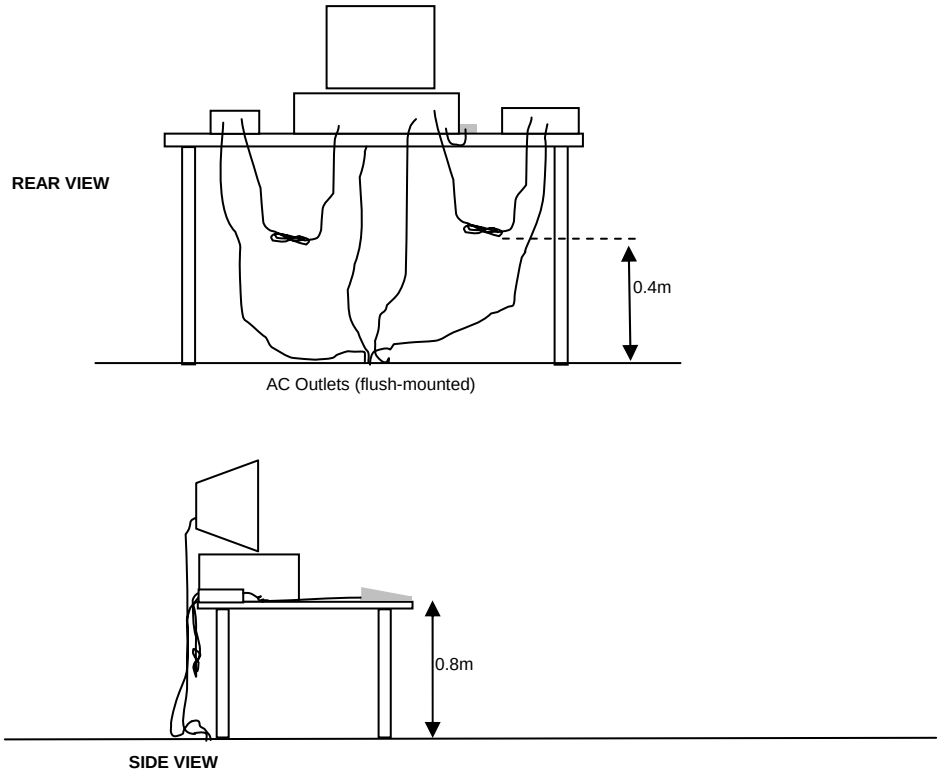
RADIATED EMISSIONS

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.

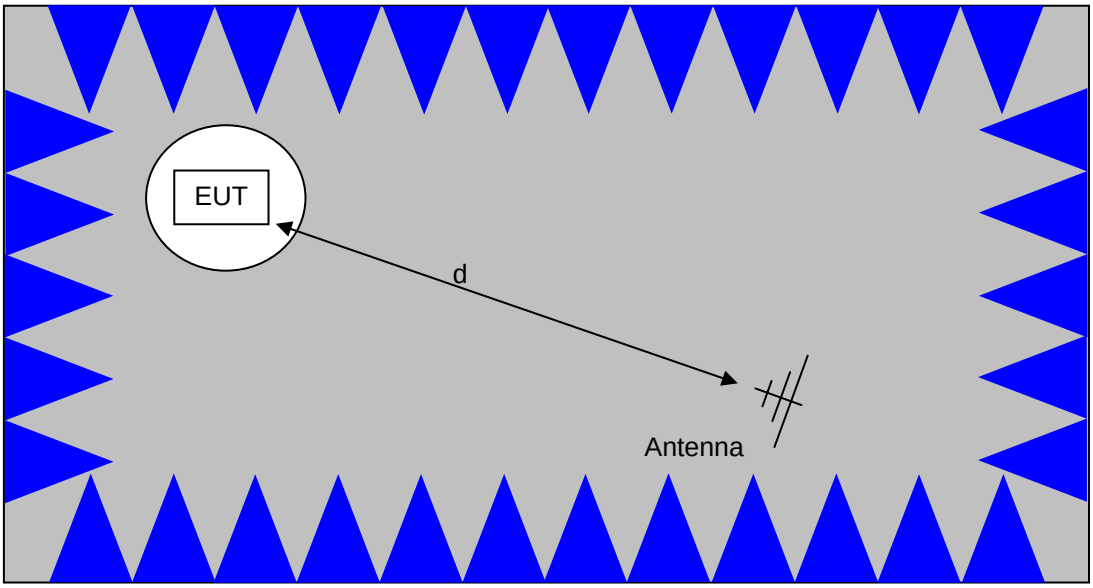
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

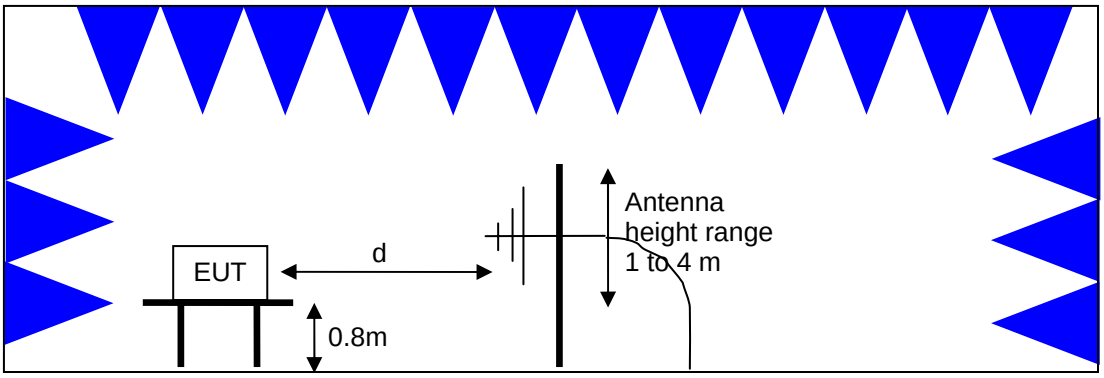


Typical Test Configuration for Radiated Field Strength Measurements



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

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:

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[2] (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

[2] 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

Radio Spurious Emissions, 14-Apr-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	6/3/2010
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/10/2010
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	5/12/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010
A.H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	1/19/2011

Conducted Emissions - AC Power Ports, 19-Apr-10

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	3/12/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	10/15/2010
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1593	6/9/2010

Radio Spurious Emissions, 28-Apr-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	6/3/2010
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	7/15/2010
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	5/12/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010

Radio Antenna Port (Power and Spurious Emissions), 27-May-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	6/12/2010
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	10/15/2010

Appendix B Test Data

T78990 30 Pages

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3	T-Log Number:	T78990
	Portable Data Terminal(System Approval)	Account Manager:	Christine Krebill
Contact:	Jerry Kalina		-
Emissions Standard(s):	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	A
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

DATALOGIC MOBILE INC

Model

Falcon x3
Portable Data Terminal(System Approval)

Date of Last Test: 6/1/2010

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 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: 5/27/2010
Test Engineer: Mehran Birgani
Test Location: Fremont Chamber #4

Config. Used: 1
Config Change: None
EUT Voltage: 230V/50Hz

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: 20 °C
Rel. Humidity: 50 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	15.247(b) (0.125 Watts)	Pass	3.80 dBm (2.4 mW)
2	20dB Bandwidth	15.247(a)	Pass	1192kHz
2	99% bandwidth	15.247(a)	Pass	1132kHz
2	Channel Spacing	15.247(a) (≥ 2/3rds 20dB BW)	Pass	1000kHz
2	Channel Occupancy	15.247(a)	Pass	≤ 0.4s over a period equal to the number of channels multiplied by 0.4s.
2	Number of Channels	15.247(a) (> 15)	Pass	Max: 78 Min: 20
3	30 - 26500 MHz Spurious Emissions, Conducted	15.247(a) (-20dBc)	Pass	> 20dB below the limit

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:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #1: 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.

As the device can use Adaptive frequency Hopping the minimum number of channels used is 20, therefore the maximum allowed power is 0.125 Watts.

Maximum antenna gain: 3 dBi

Channel	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
1Mbps					
Low	2402	2MHz	3.67	0.002	0.005
Mid	2441	2MHz	3.80	0.0024	0.005
High	2480	2MHz	2.13	0.002	0.003
EDR3					
Low	2402	2MHz	2.63	0.002	0.004
Mid	2441	2MHz	2.30	0.002	0.003
High	2480	2MHz	0.80	0.001	0.002
EDR2					
Low	2402	2MHz	2.63	0.002	0.004
Mid	2441	2MHz	2.30	0.002	0.003
High	2480	2MHz	0.80	0.001	0.002

Note 1:	Power measured using a spectrum analyzer using RB = 2MHz, VB = 3MHz (VB > RB) .

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Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

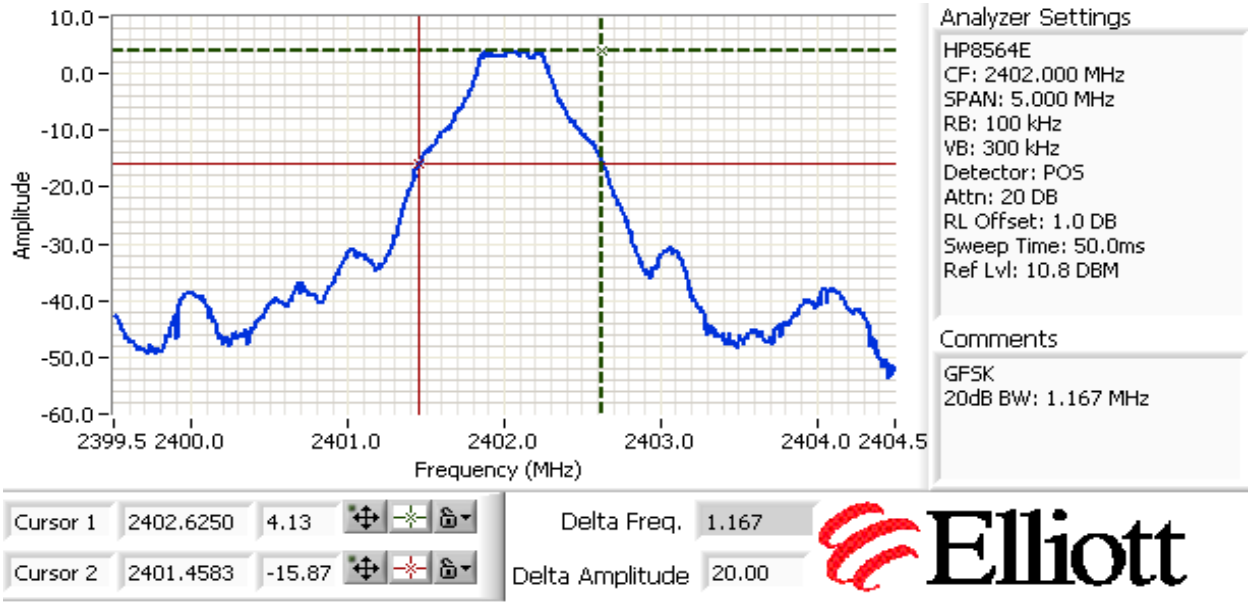
Run #2: Bandwidth, Channel Occupancy, Spacing and Number of Channels

Date of Test: 5/27/2010
Test Engineer: Mehran Birgani
Test Location: Chamber #4

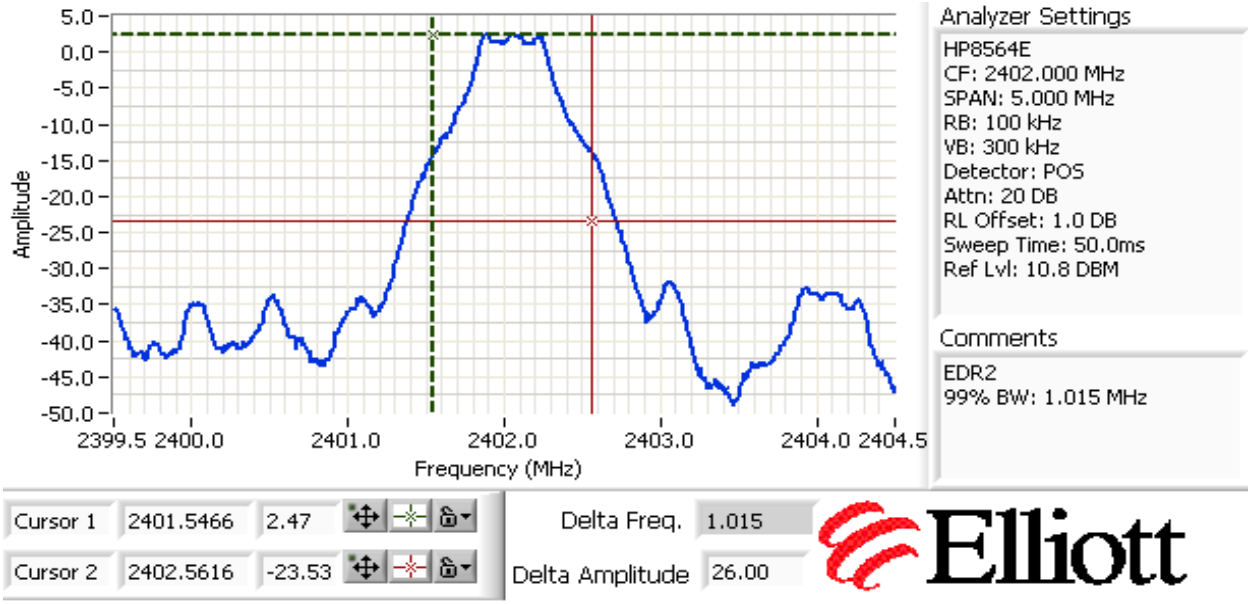
Run #2a: Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	20dB Bandwidth (kHz)	Resolution Bandwidth	99% Bandwidth (kHz)
Basic Rate - GFSK					
Low	2402	100k	1167	100k	1007
Mid	2441	100k	1158	100k	1007
High	2480	100k	1167	100k	998
EDR2 (1Mb/s) - DQPSK					
Low	2402	100k	1158	100k	1015
Mid	2441	100k	1158	100k	998
High	2480	100k	1150	100k	998
EDR3 (3Mb/s) - 8DPSK					
Low	2402	100k	1158	100k	998
Mid	2441	100k	1158	100k	998
High	2480	100k	1158	100k	998

Note 1:	20dB bandwidth measured using RB = 100kHz, VB = 300kHz (VB > RB) - see sample plot below
Note 2:	99% bandwidth measured using RB = 100kHz, VB = 300kHz (VB >=3RB) - see sample plot on next page



Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #2b: Channel Occupancy, Spacing and Number of Channels

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.)

Bandwidth and Channel Spacing

Maximum 20dB bandwidth:	1167 kHz		
Channel spacing:	1000 kHz	Pass	(Shall be at least 2/3 of the bandwidth)

Dell Time Per Hop (based on bluetooth specification of 1600 hops per second)

Dwell time per hop:	0.625 ms	From BT specification, 1DHx packet	
Dwell time per hop:	1.875 ms	From BT specification, 5DHx packet	
Dwell time per hop:	3.125 ms	From BT specification, 5DHx packet	
Number of channels (N):	79	Pass	See plot on next page
# of channels, Adaptive Frequency Hopping enabled:	20	Pass	

Period for evaluating Channel occupancy (N x 400ms)

The evaluation period is determined by number of hops (N) multiplied by 0.4 seconds:

All channels enabled:	31.6 seconds
Minimum of 20 channels enabled:	8.0 seconds

Hops per Channel Occupancy Evaluation Period

The number of hops during the evaluation period can be calculated from the dwell time per hop:

total number of hops = Evaluation time / Dwell time

	5DHx	3DHx	1DHx
All channels enabled:	10112	16853	50560
Minimum of 20 channels enabled:	2560	4267	2560

As the device complies with the Bluetooth specification all channels, on average, are used equally. As the number of hops in the evaluation period is significantly more than the total number of channels the number of hops per channel during the evaluation period can be calculated from:

number of hops per channel = total number of hops / N

The dwell time per channel over the evaluation period then becomes the number of times the channel is used multiplied by the dwell time per channel:

dwell time per channel = Dwell time x total number of hops / N
= Dwell time x (Evaluation time / Dwell time) / N
= Dwell time x Evaluation time / N

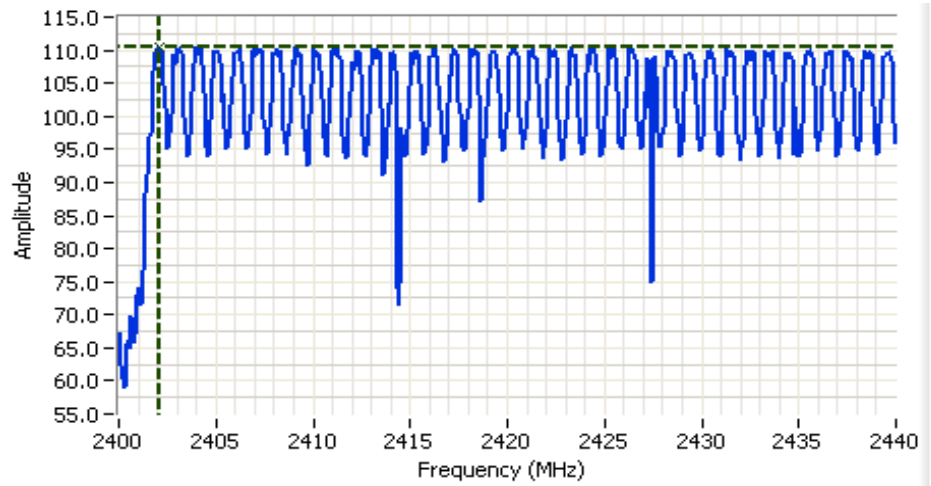
As the evaluation time is N * 0.4 the dwell time per channel becomes:

dwell time per channel = N x 0.4 N = 0.4

Therefore the system complies with the maximum allowed dwell time of 0.4 seconds in the evaluation period.

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Plots showing a total of 79 channels from 2402 MHz to 2480MHz
Chanel spacing = 1 MHz

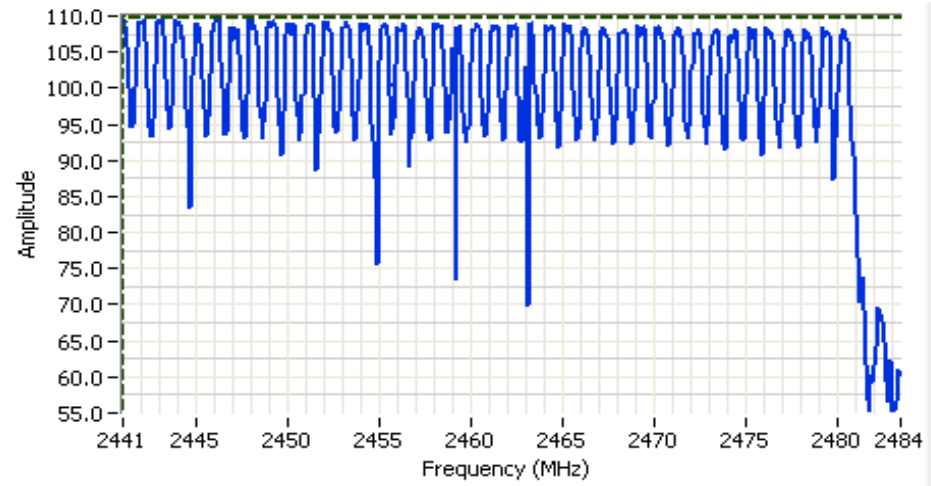


Analyzer Settings
HP8564E
CF: 2420.000 MHz
SPAN: 40.000 MHz
RB: 100 kHz
VB: 300 kHz
Detector: POS
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 50.0ms
Ref Lvl: 117.0 DBUV

Comments

Cursor 1 2402.0667 110.33
0.0000 0.00

Elliott



Analyzer Settings
HP8564E
CF: 2462.250 MHz
SPAN: 42.500 MHz
RB: 100 kHz
VB: 300 kHz
Detector: POS
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 50.0ms
Ref Lvl: 117.0 DBUV

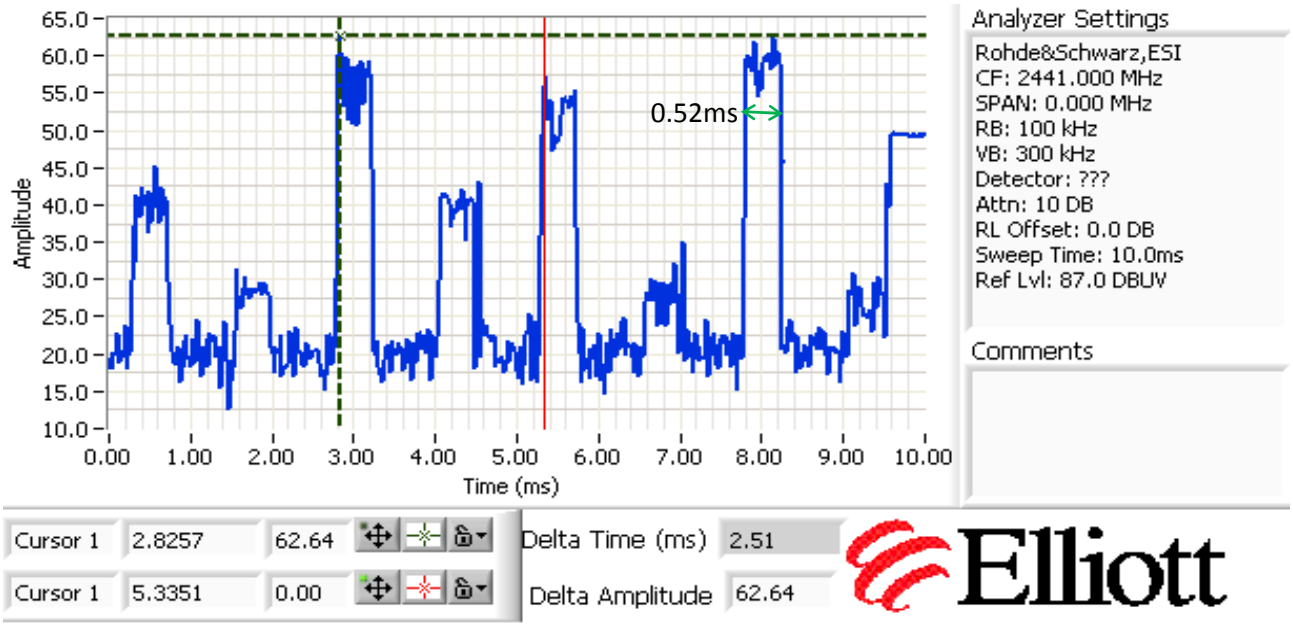
Comments

Cursor 1 2441.0000 109.67
0.0000 0.00

Elliott

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Transmit time on a single time slot:



Transmit time on a single time slot is 0.52ms
Dwell time on a single time slot for Bluetooth device is 0.625ms (hopping rate is 1600/second)
The difference between the measured value and the theoretical dwell time is due to the fact that the device requires some time to set its frequency on the hopping channel and so the transmit time is always less than the dwell time.
The maximum time a device can dwell on a channel is when transmitting a 5DHx packet which occupies 5 time slots.
Maximum dwell time on a single channel = 5 x 0.625ms = 3.125ms

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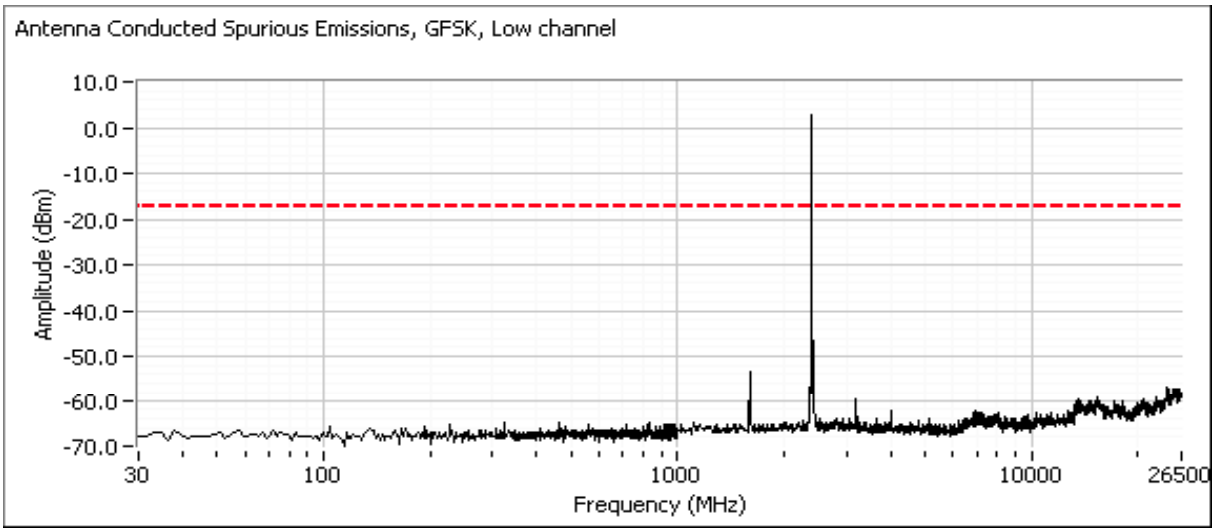
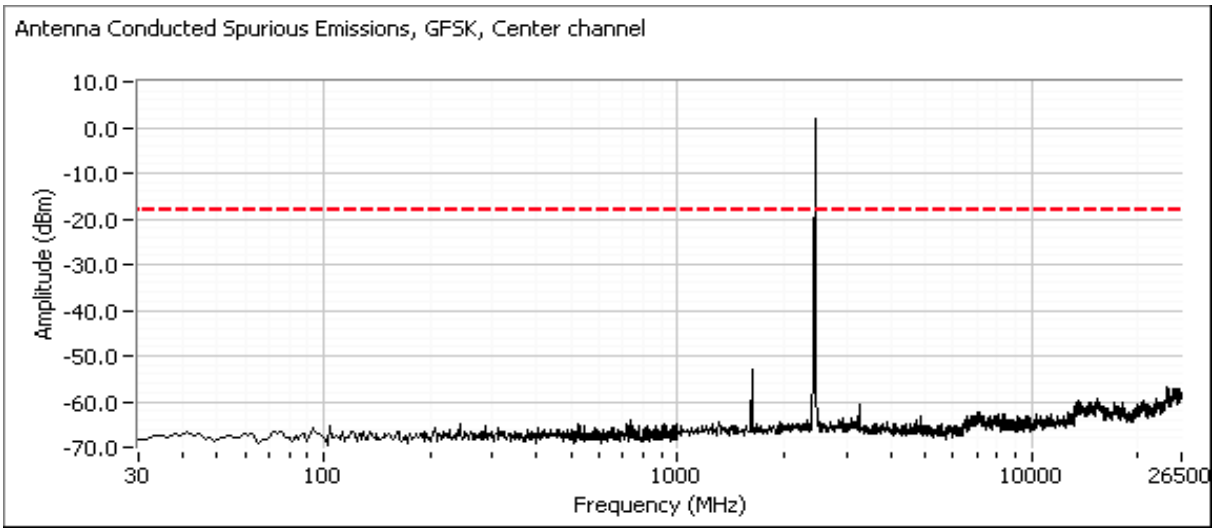
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

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

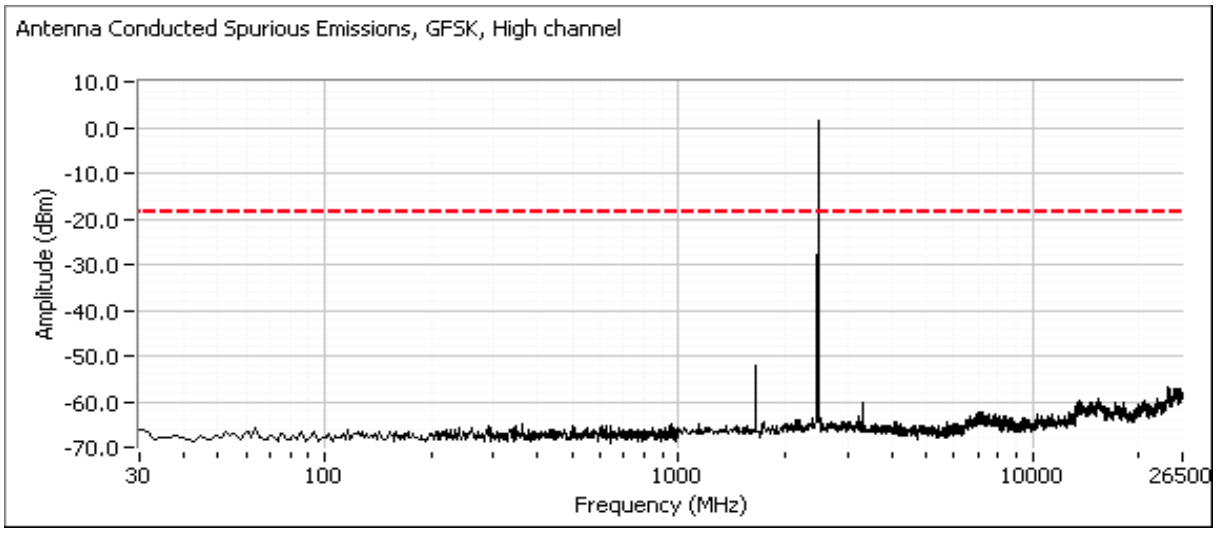
Date of Test:	5/27/2010	Config. Used:	1
Test Engineer:	Mehran Birgani	Config Change:	None
Test Location:	Chamber #4	Host EUT Voltage:	230V/50Hz

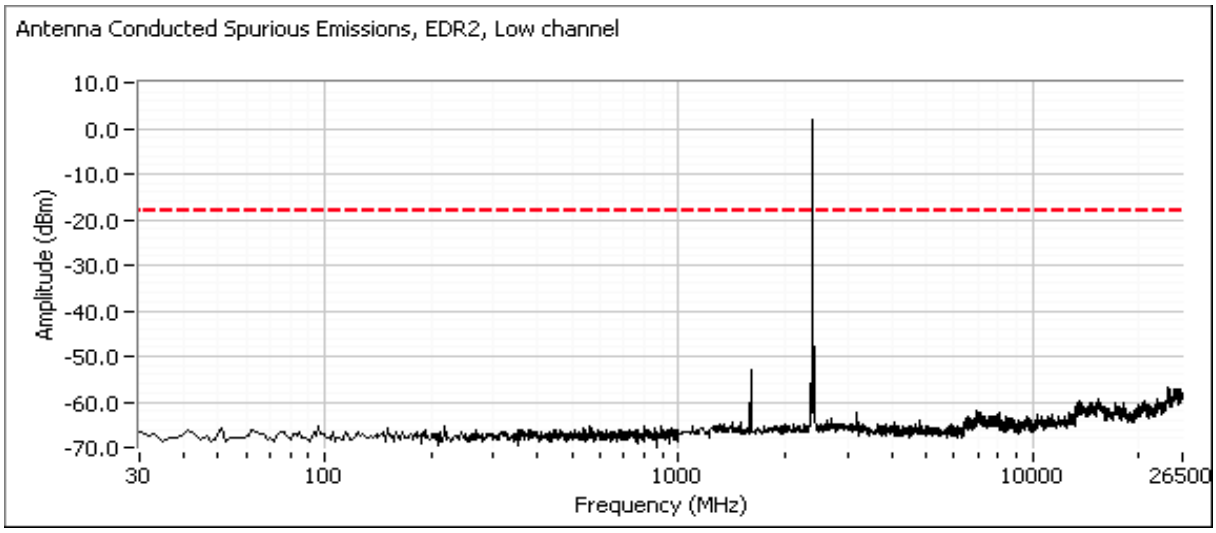
Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.





Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A





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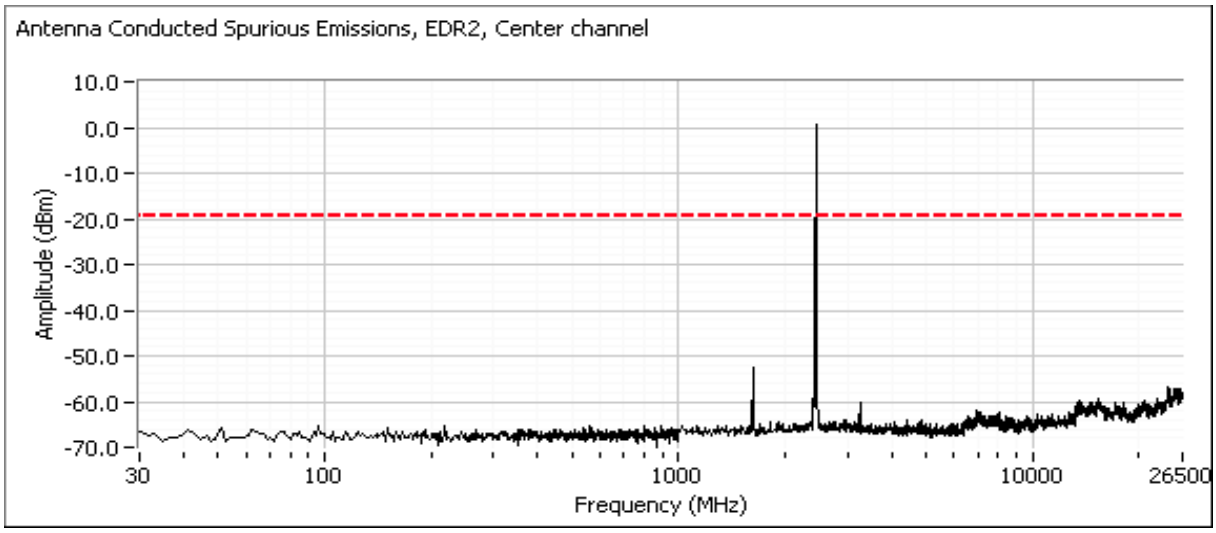
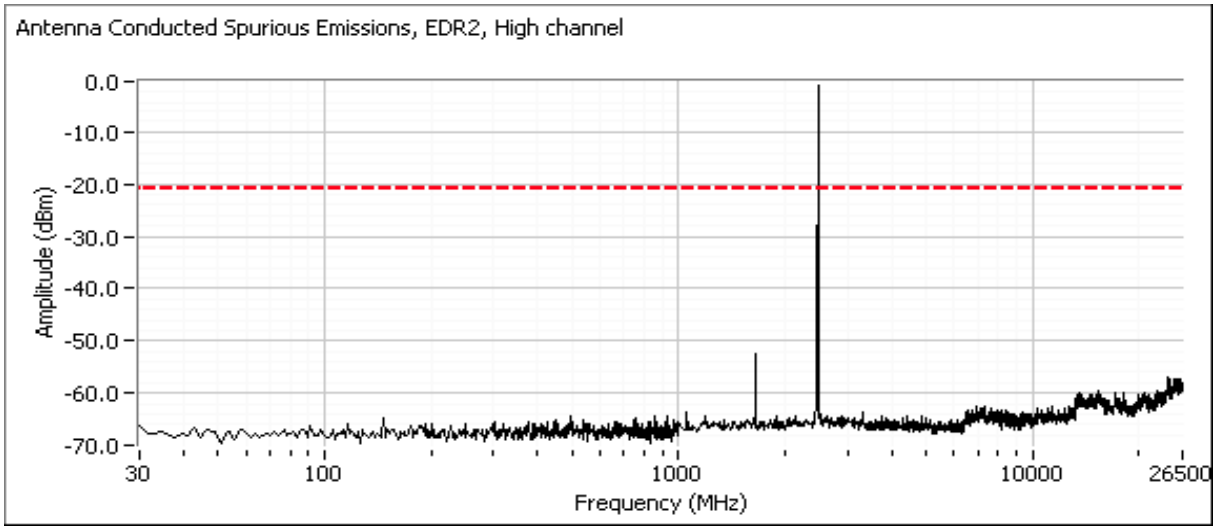
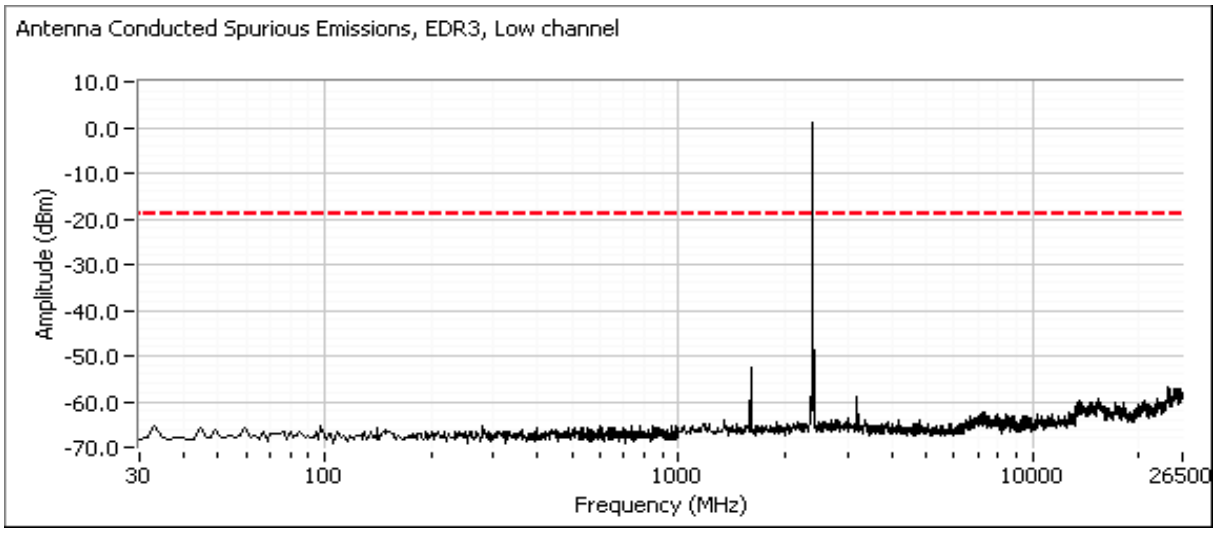
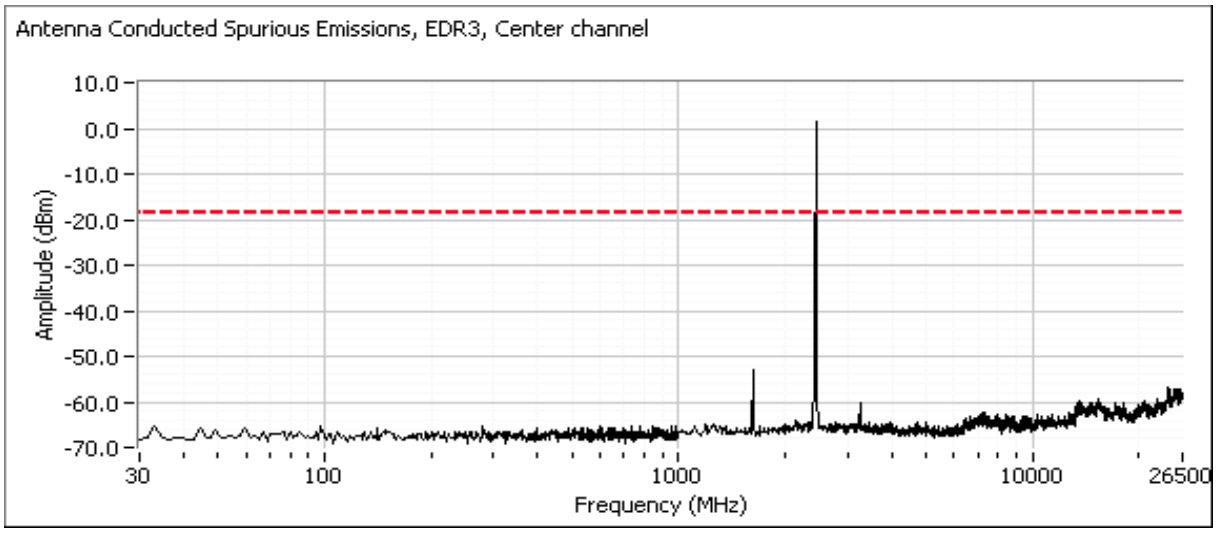
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



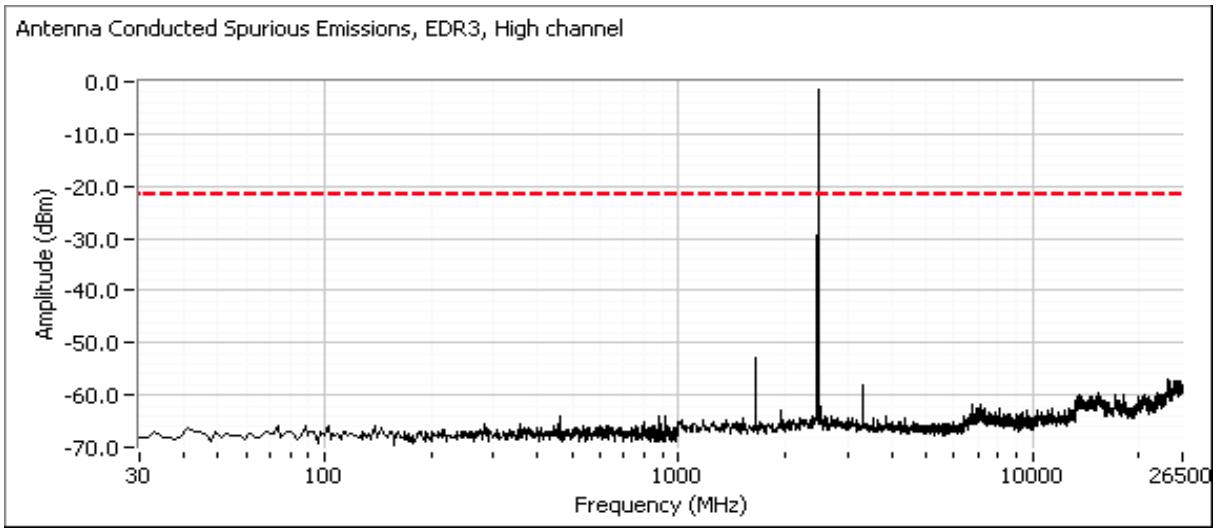


Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A





Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 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.

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

Ambient Conditions:

Temperature: 20 °C

Rel. Humidity: 50 %

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	1Mb/s GMFSK	Low 2402 MHz	100%	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	46.1dBµV/m @ 2362.9MHz (-7.9dB)
			100%	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	40.4dBµV/m @ 4804.2MHz (-13.6dB)
1b	1Mb/s GMFSK	Center 2441 MHz	100%	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	43.6dBµV/m @ 1627.9MHz (-10.4dB)
1c	1Mb/s GMFSK	High 2480 MHz	100%	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	46.5dBµV/m @ 2489.4MHz (-7.5dB)
			100%	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	44.6dBµV/m @ 1654.0MHz (-7.6dB)
2a	3Mb/s 8DPSK	Low 2402 MHz	100%	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	46.4dBµV/m @ 2387.8MHz (-7.6dB)
			100%	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	41.5dBµV/m @ 4804.1MHz (-12.5dB)
2b	3Mb/s 8DPSK	Center 2441 MHz	100%	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	45.0dBµV/m @ 4882.1MHz (-9.0dB)
2c	3Mb/s 8DPSK	High 2480 MHz	100%	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	46.7dBµV/m @ 2483.7MHz (-7.3dB)
			100%	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	43.9dBµV/m @ 4960.0MHz (-10.1dB)

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

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.

Note 1:	Due to duty cycle of the of the signal, all average measurments are taken at using VBW of 1kHz.

Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 1Mb/s GMFSK

Date of Test: 4/28/2010
Test Engineer: Suhaila Khushzad
Test Location: Chamber #4

Run #1a: Low Channel @ 2402 MHz, Power 100%

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

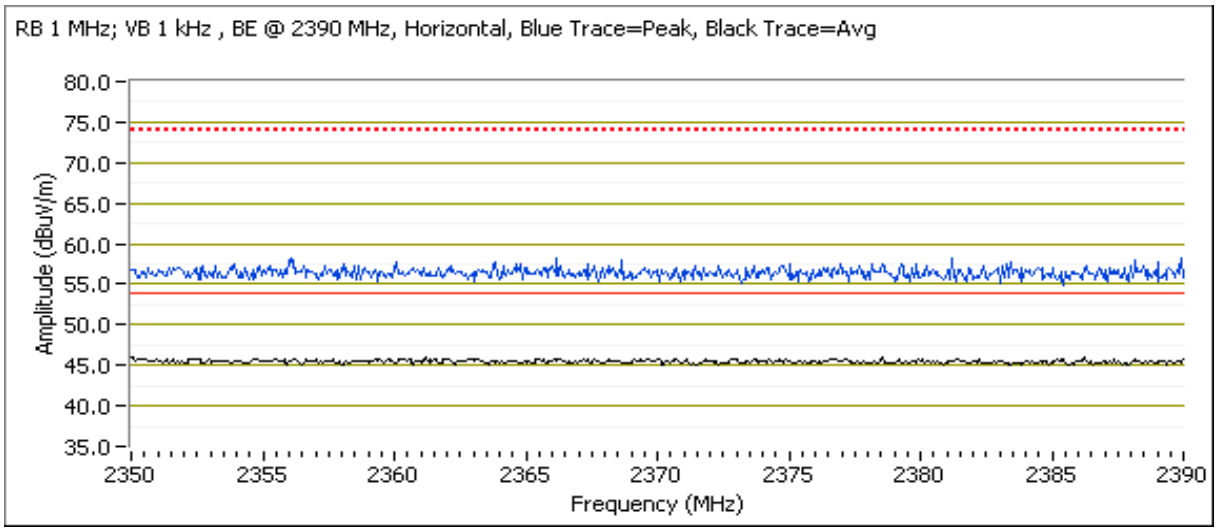
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.280	84.4	H	-	-	PK	240	1.0	RB 1 MHz; VB: 1 MHz
2402.180	81.4	H	-	-	Avg	240	1.0	RB 1 MHz; VB: 1 kHz
2402.180	84.2	H	-	-	PK	240	1.0	RB 100 kHz; VB: 100 kHz
2401.970	82.1	V	-	-	PK	210	1.0	RB 1 MHz; VB: 1 MHz
2402.270	79.1	V	-	-	Avg	210	1.0	RB 1 MHz; VB: 1 kHz
2402.130	81.7	V	-	-	PK	210	1.0	RB 100 kHz; VB: 100 kHz

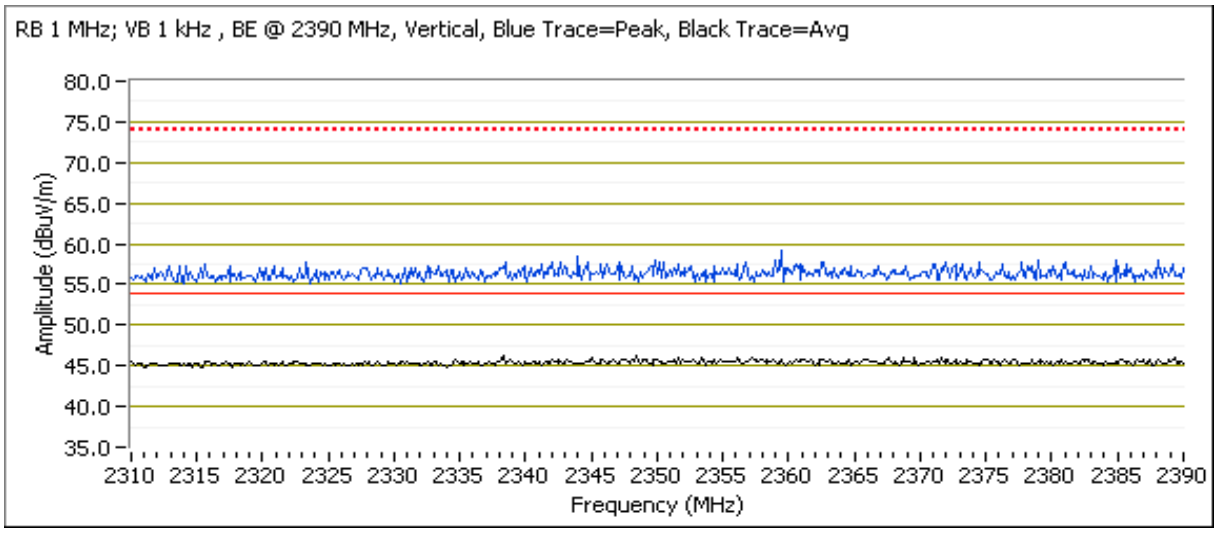
Fundamental emission level @ 3m in 100kHz RBW:	84.2	dBµV/m	
Limit for emissions outside of restricted bands:	64.2	dBµV/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	54.2	dBµV/m	Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

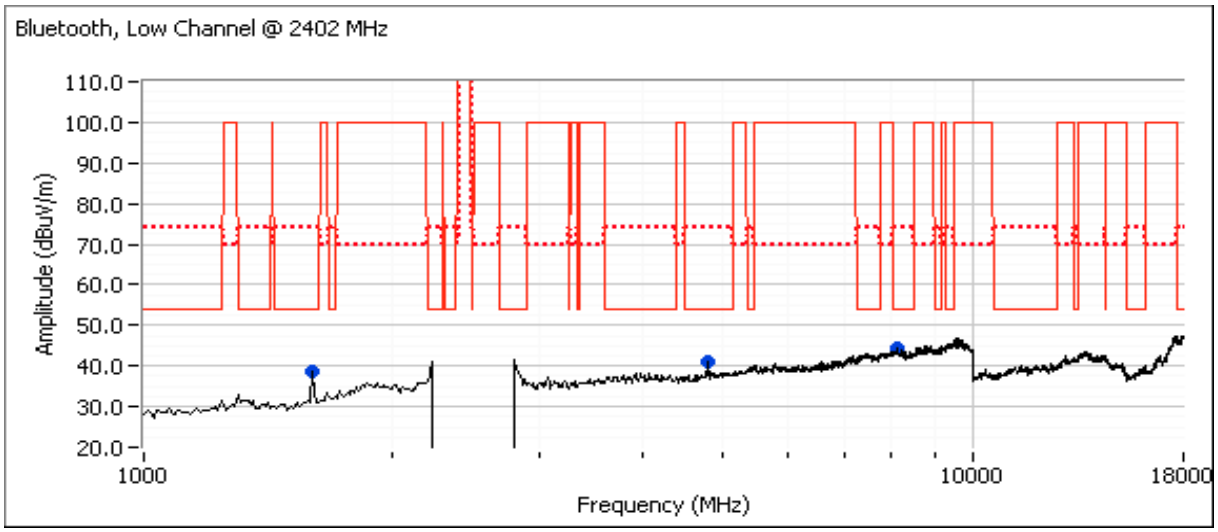
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2362.930	46.1	H	54.0	-7.9	Avg	240	1.0	RB 1 MHz; VB: 1 kHz
2323.730	57.9	H	74.0	-16.1	PK	240	1.0	RB 1 MHz; VB: 1 MHz
2356.130	58.0	V	74.0	-16.0	PK	210	1.0	RB 1 MHz; VB: 1 MHz
2352.130	46.1	V	54.0	-7.9	Avg	210	1.0	RB 1 MHz; VB: 1 kHz

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A





Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



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	
4804.160	40.4	H	54.0	-13.6	AVG	112	1.0	RB 1 MHz; VB: 1 kHz
4804.430	46.9	H	74.0	-27.1	PK	112	1.0	RB 1 MHz; VB: 1 MHz
8116.340	38.4	V	54.0	-15.6	AVG	301	1.0	RB 1 MHz; VB: 1 kHz
8113.470	50.0	V	74.0	-24.0	PK	300	1.0	RB 1 MHz; VB: 1 MHz
1602.210	38.5	H	54.0	-15.5	AVG	89	1.0	RB 1 MHz; VB: 1 kHz
1602.010	43.5	H	74.0	-30.5	PK	91	1.0	RB 1 MHz; VB: 1 MHz

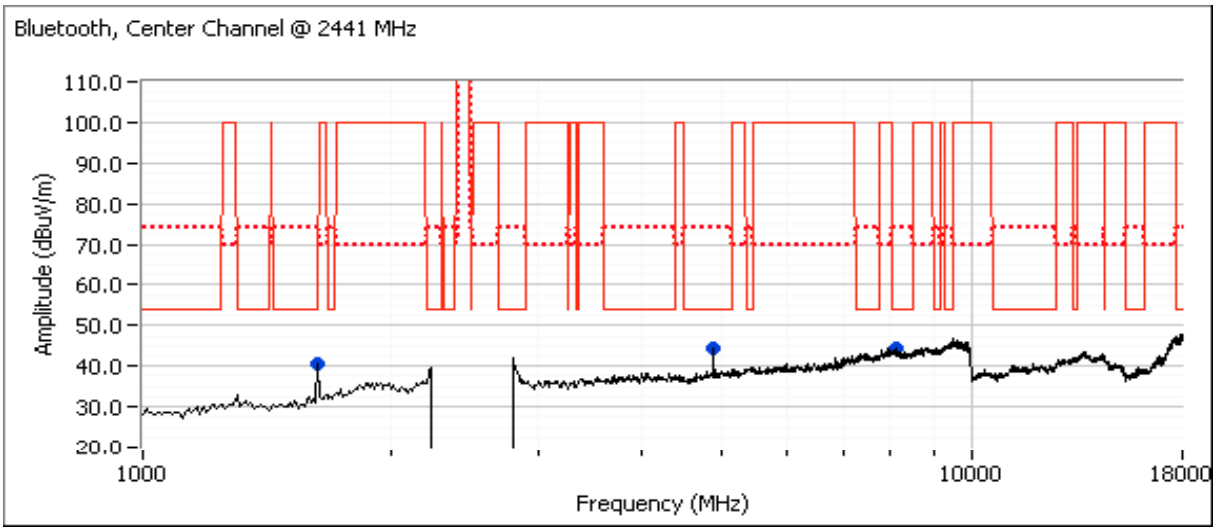
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 1Mb/s GMFSK

Date of Test: 4/28/2010
Test Engineer: Suhaila Khushzad
Test Location: Chamber #4

Run #1b: Center Channel @ 2441 MHz, Power 100%



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		
1627.910	43.6	H	54.0	-10.4	PK	128	1.3	RB 1 MHz; VB: 1 MHz	Note 2
1627.910	39.9	H	74.0	-34.1	AVG	128	1.3	RB 1 MHz; VB: 1 kHz	Note 2
4882.270	48.6	H	74.0	-25.4	PK	111	1.0	RB 1 MHz; VB: 1 MHz	
4881.970	42.2	H	54.0	-11.8	AVG	111	1.0	RB 1 MHz; VB: 1 kHz	
8100.000	50.4	H	74.0	-23.6	PK	286	1.0	RB 1 MHz; VB: 1 MHz	
8105.470	37.8	H	54.0	-16.2	AVG	286	1.3	RB 1 MHz; VB: 1 kHz	

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.

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 1Mb/s GMFSK

Date of Test: 4/28/2010
Test Engineer: Suhaila Khushzad
Test Location: Chamber #4

Run #1c: High Channel @ 2480 MHz, Power 100%

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

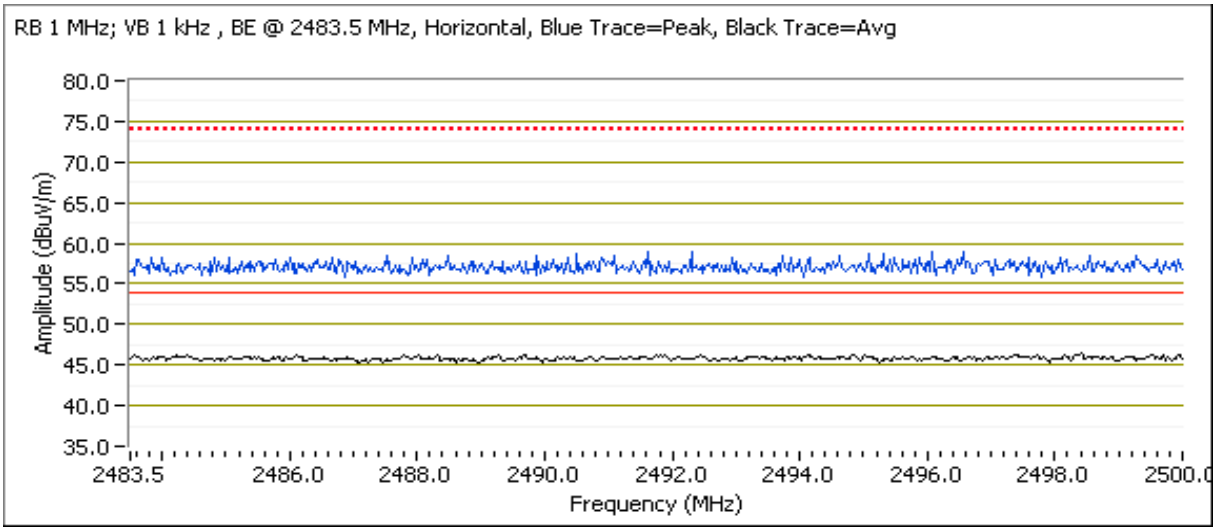
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2480.170	82.6	H	-	-	PK	262	1.0	RB 1 MHz; VB: 1 MHz
2480.030	79.4	H	-	-	Avg	262	1.0	RB 1 MHz; VB: 1 kHz
2480.150	82.1	H	-	-	PK	262	1.0	RB 100 kHz; VB: 100 kHz
2480.280	77.7	V	-	-	PK	103	1.0	RB 1 MHz; VB: 1 MHz
2480.030	73.9	V	-	-	Avg	103	1.0	RB 1 MHz; VB: 1 kHz
2479.920	76.4	V	-	-	PK	103	1.0	RB 100 kHz; VB: 100 kHz

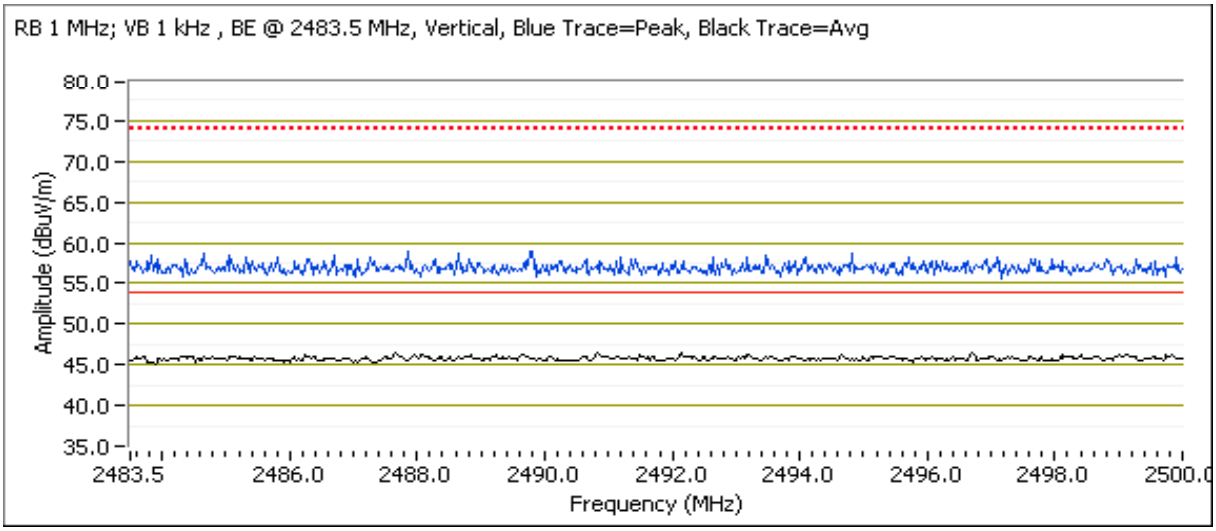
Fundamental emission level @ 3m in 100kHz RBW:	82.1	dBµV/m	
Limit for emissions outside of restricted bands:	62.1	dBµV/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	52.1	dBµV/m	Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

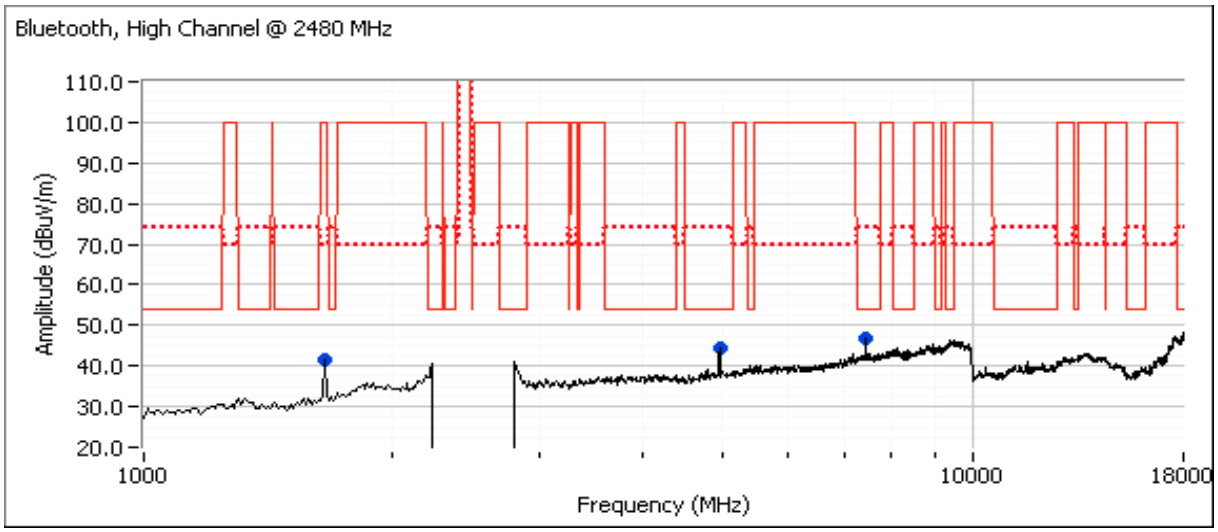
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2489.440	46.5	H	54.0	-7.5	Avg	262	1.0	MHz; VB: 1 kHz
2489.600	58.0	H	74.0	-16.0	PK	262	1.0	MHz; VB: 1 MHz
2492.550	58.0	V	74.0	-16.0	PK	103	1.0	MHz; VB: 1 MHz
2498.570	46.5	V	54.0	-7.5	Avg	103	1.0	MHz; VB: 1 kHz

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A





Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



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	
1653.970	44.6	H	52.2	-7.6	PK	129	1.3	RB 1 MHz; VB: 1 MHz
1654.060	40.8	H	52.2	-11.4	AVG	129	1.3	RB 1 MHz; VB: 1 kHz
4959.650	49.2	H	74.0	-24.8	PK	195	1.0	RB 1 MHz; VB: 1 MHz
4960.010	41.9	H	54.0	-12.1	AVG	193	1.0	RB 1 MHz; VB: 1 kHz
7440.120	51.3	V	74.0	-22.7	PK	162	1.4	RB 1 MHz; VB: 1 MHz
7440.090	43.0	V	54.0	-11.0	AVG	162	1.4	RB 1 MHz; VB: 1 kHz

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.

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 3Mb/s 8DPSK

Date of Test: 4/28/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

Run #2a: Low Channel @ 2402 MHz, Power 100%

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

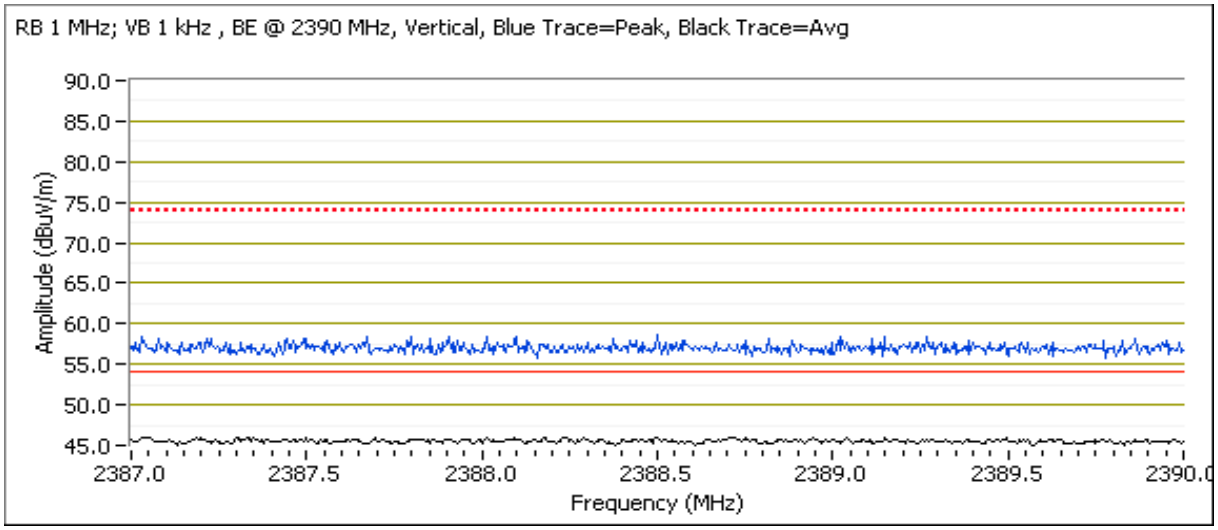
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.040	77.0	V	-	-	Avg	209	1.0	MHz; VB: 1 kHz
2402.060	80.0	V	-	-	PK	209	1.0	MHz; VB: 1 MHz
2401.860	79.5	V	-	-	PK	209	1.0	kHz; VB: 100 kHz
2402.060	78.2	H	-	-	Avg	243	1.0	MHz; VB: 1 kHz
2402.290	81.2	H	-	-	PK	243	1.0	MHz; VB: 1 MHz
2402.060	80.9	H	-	-	PK	243	1.0	kHz; VB: 100 kHz

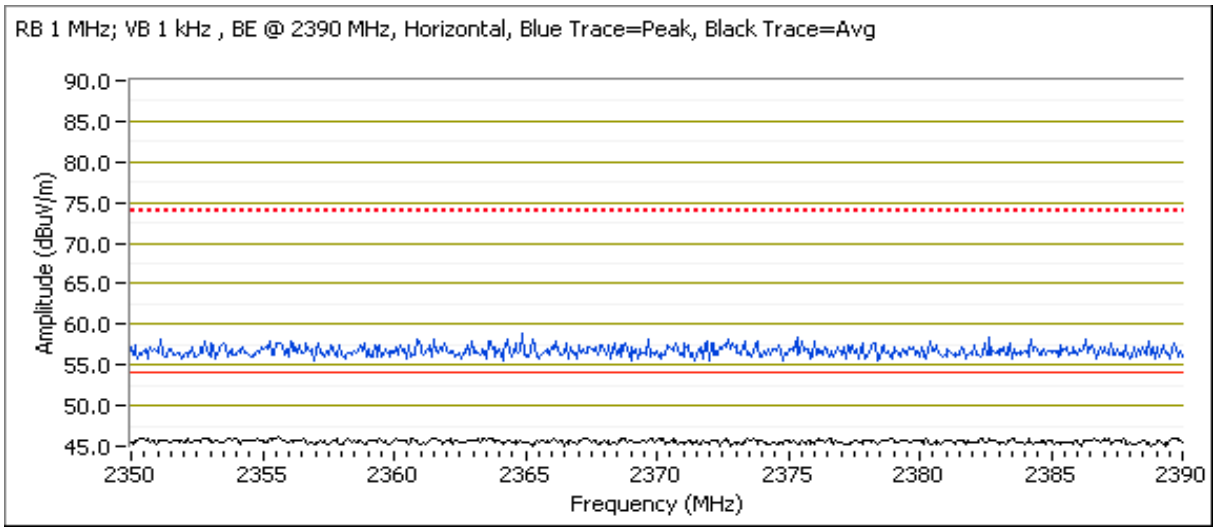
Fundamental emission level @ 3m in 100kHz RBW:	80.9	dBµV/m	
Limit for emissions outside of restricted bands:	60.9	dBµV/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	50.9	dBµV/m	Limit is -30dBc (UNII power measurement)

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	
2387.790	46.4	V	54.0	-7.6	Avg	209	1.0	MHz; VB: 1 kHz
2389.290	57.8	V	74.0	-16.2	PK	209	1.0	MHz; VB: 1 MHz
2387.430	46.1	H	54.0	-7.9	Avg	243	1.0	MHz; VB: 1 kHz
2387.570	58.2	H	74.0	-15.8	PK	243	1.0	MHz; VB: 1 MHz

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



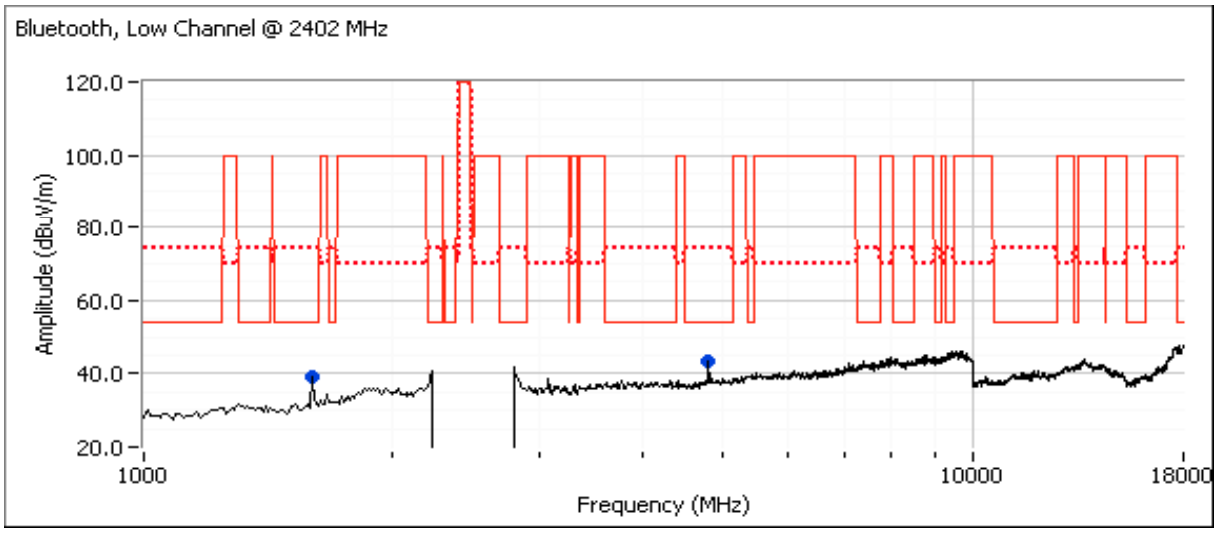


Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

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	
4804.080	41.5	H	54.0	-12.5	Avg	112	1.0	MHz; VB: 1 kHz
4803.900	48.4	H	74.0	-25.6	PK	112	1.0	MHz; VB: 1 MHz
1602.040	39.1	H	54.0	-14.9	AVG	115	1.4	MHz; VB: 10 Hz
1602.110	43.9	H	74.0	-30.1	PK	115	1.4	MHz; VB: 1 MHz

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.

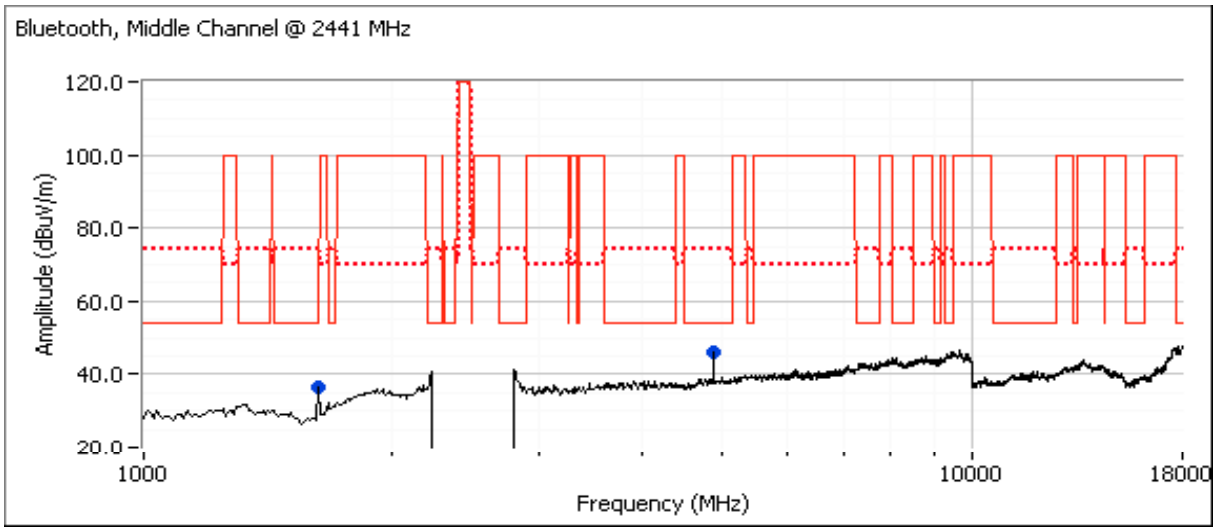


Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 8Mb/s 8DPSK

Date of Test: 4/28/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

Run #2b: Center Channel @ 2441 MHz, Power 100%



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		
4882.080	45.0	H	54.0	-9.0	Avg	114	1.0	MHz; VB: 1 kHz	
4881.790	50.4	H	74.0	-23.6	PK	114	1.0	MHz; VB: 1 MHz	
1628.070	35.9	H	54.0	-18.1	AVG	124	1.3	MHz; VB: 10 Hz	Note 2
1628.190	41.3	H	74.0	-32.7	PK	124	1.3	MHz; VB: 1 MHz	Note 2

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.

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 3Mb/s 8DPSK

Date of Test: 4/28/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

Run #2c: High Channel @ 2480 MHz, Power 100%

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

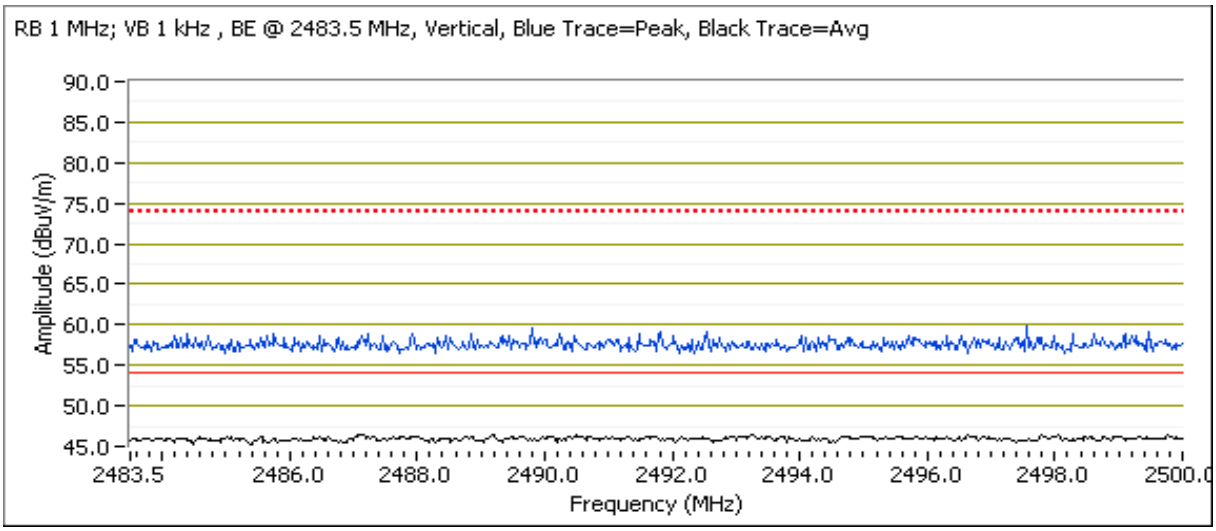
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2480.050	73.7	V	-	-	Avg	102	1.0	MHz; VB: 1 kHz
2479.900	76.7	V	-	-	PK	102	1.0	MHz; VB: 1 MHz
2480.030	76.1	V	-	-	PK	102	1.0	kHz; VB: 100 kHz
2480.000	75.7	H	-	-	Avg	259	1.0	MHz; VB: 1 kHz
2479.780	78.5	H	-	-	PK	259	1.0	MHz; VB: 1 MHz
2479.860	78.2	H	-	-	PK	259	1.0	kHz; VB: 100 kHz

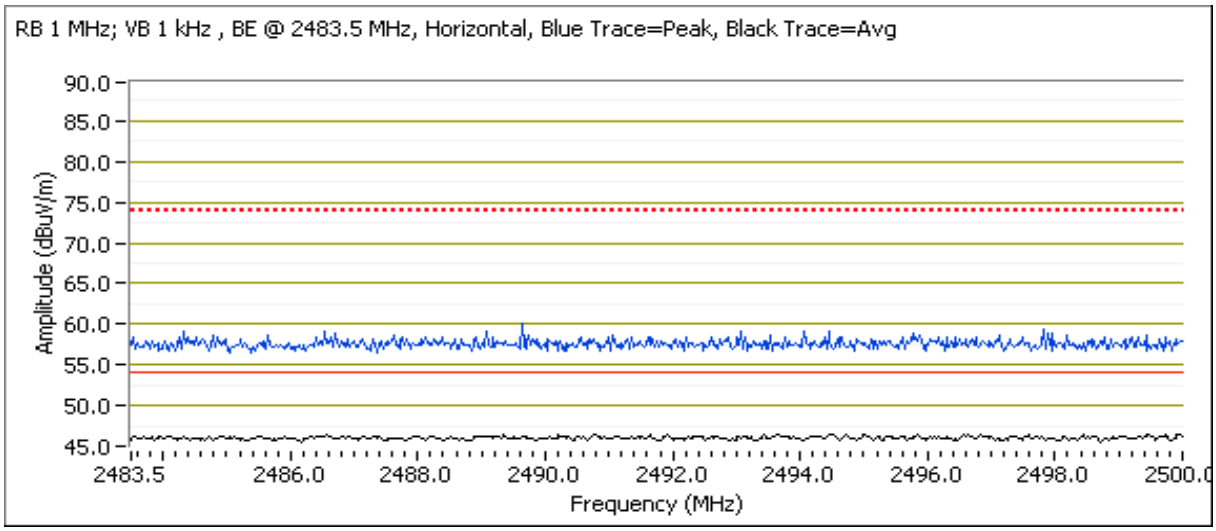
Fundamental emission level @ 3m in 100kHz RBW:	78.2	dBµV/m	
Limit for emissions outside of restricted bands:	58.2	dBµV/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	48.2	dBµV/m	Limit is -30dBc (UNII power measurement)

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	
2483.740	46.7	V	54.0	-7.3	Avg	102	1.0	MHz; VB: 1 kHz
2486.340	58.8	V	74.0	-15.2	PK	102	1.0	MHz; VB: 1 MHz
2483.670	46.6	H	54.0	-7.4	Avg	259	1.0	MHz; VB: 1 kHz
2485.020	58.4	H	74.0	-15.6	PK	259	1.0	MHz; VB: 1 MHz

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A



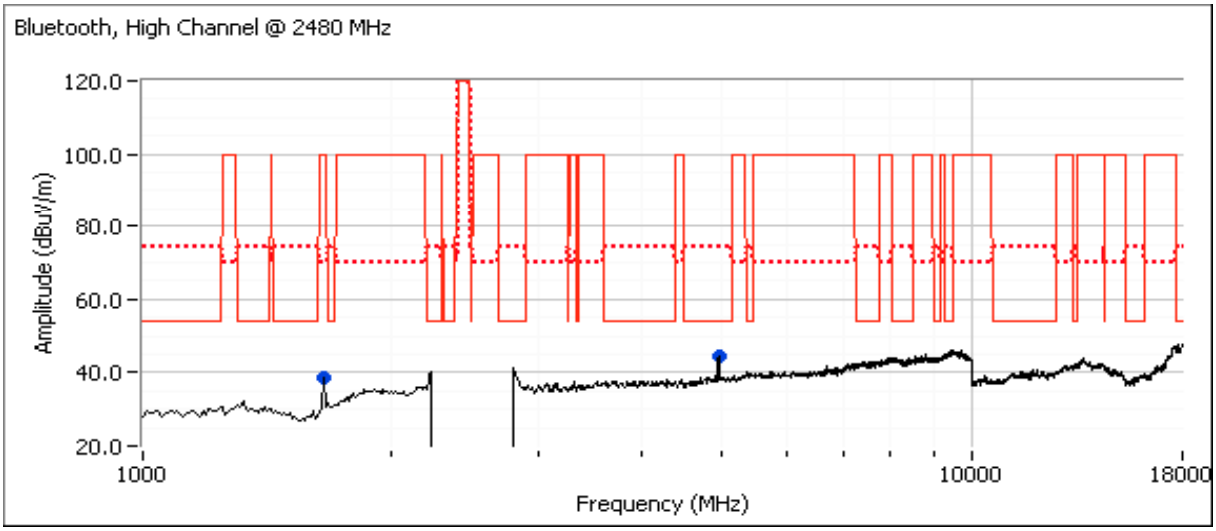


Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

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		
4960.030	43.9	H	54.0	-10.1	Avg	169	1.0	MHz; VB: 1 kHz	
4960.040	50.5	H	74.0	-23.5	PK	169	1.0	MHz; VB: 1 MHz	
1654.060	38.7	H	54.0	-15.3	AVG	127	1.3	MHz; VB: 10 Hz	Note 2
1654.120	42.8	H	74.0	-31.2	PK	127	1.3	MHz; VB: 1 MHz	Note 2

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.



Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	A

Radiated 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: 4/15/2010
Test Engineer: Suhaila Khushzad
Test Location: Fremont Chamber #4

Config. Used: 1
Config Change: None
EUT Voltage: 230V/50Hz

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside 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.

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 indicated 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: 20 °C
Rel. Humidity: 43 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz	-	-	Covered by the digital device emissions tests
2	Radiated Emissions 1 GHz - 7.5 GHz Maximized	RSS 210	Pass	45.8dBµV/m @ 1111.5MHz (-8.2dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

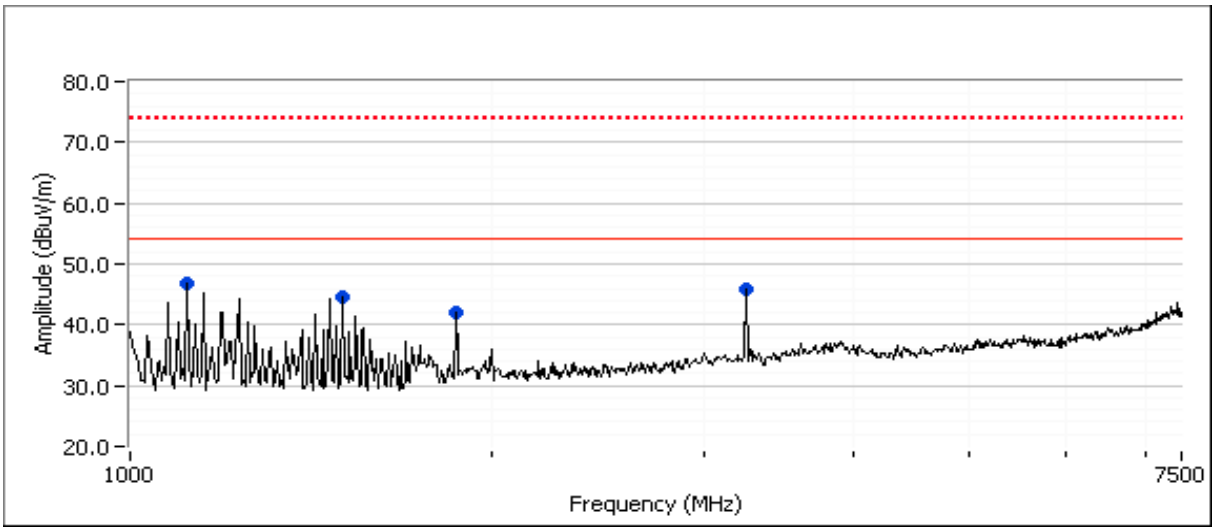
No deviations were made from the requirements of the standard.

Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	A

Run #2: Maximized Readings, 1000 - 7500 MHz

802.11.b, Channel 6 @ 2437 MHz in Rx mode, Bluetooth at 2440MHz in Rx mode

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500 MHz	3	3	0.0



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

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1111.540	46.9	H	54.0	-7.1	Peak	280	1.6	
3249.390	45.8	H	54.0	-8.2	Peak	190	1.0	
1501.510	44.6	V	54.0	-9.4	Peak	160	1.6	
1875.500	42.1	V	54.0	-11.9	Peak	0	1.0	

Final peak and average readings

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1111.540	45.8	H	54.0	-8.2	AVG	242	1.5	RB 1 MHz; VB: 10 Hz
1111.540	47.0	H	74.0	-27.0	PK	242	1.5	RB 1 MHz; VB: 1 MHz
1871.900	26.1	V	54.0	-27.9	AVG	42	1.0	RB 1 MHz; VB: 10 Hz
1889.400	37.5	V	74.0	-36.5	PK	42	1.0	RB 1 MHz; VB: 1 MHz
1501.410	43.9	V	54.0	-10.1	AVG	159	1.5	RB 1 MHz; VB: 10 Hz
1501.310	45.8	V	74.0	-28.2	PK	159	1.5	RB 1 MHz; VB: 1 MHz
3249.290	44.9	H	54.0	-9.1	AVG	179	1.0	RB 1 MHz; VB: 10 Hz
3249.190	47.4	H	74.0	-26.6	PK	179	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	Above 1 GHz, the limit is based on an average measurement. In addition, the peak reading of any emission above 1 GHz can not exceed the average limit by more than 20 dB.