EMC Test Report

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

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, 2845B-5
REPORT DATE:	June 22, 2010
FINAL TEST DATES:	January 14, 2010, April 15, and 19, 2010

AUTHORIZED SIGNATORY:

Mark Briggs

Mark Briggs
Staff Engineer
Elliott Laboratories

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

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

TABLE OF CONTENTS

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 E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002)

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
FCC UNII test procedure 2002-08 DA-02-2138, August 2002

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:

RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart E requirements for UNII Devices

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

UNII / LELAN DEVICES

Operation in the 5.15 – 5.25 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)		Indoor operation only	Device is not designed for outdoor use.	Indoor use only	Complies
15.407 (a) (1)	A9.2(1)	Output Power	10.8 dBm (0.012 W)	17dBm	Complies
15.407 (a) (1)	-	Power Spectral Density	-0.8 dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			5.2 dBm/MHz	Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	49.2dBµV/m @ 5147.0MHz	Refer to page 20	Complies (4.8dB)

Operation in the 5.25 – 5.35 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)	A9.2(2)	Output Power	10.3 dBm (0.011 W)	17dBm (50mW)	Complies
15.407(a) (2))	-	Power Spectral Density	3.4 dBm/MHz	11.0 dBm/MHz	Complies
-	A9.2(2)	Power Spectral Density		8.6 dBm / MHz[1]	Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	49.2dBµV/m @ 10640.1MHz	Refer to page 20	Complies (4.8dB)

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)	A9.2(2)	Output Power	10.5 dBm (0.011 W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	1.5 dBm/MHz	11.0 dBm/MHz	Complies
	A9.2(2)	Power Spectral Density		10.1 dBm / MHz[2]	Complies
KDB	A9	Non-operation in 5600 – 5650 MHz sub band	Device cannot operate in the 5600 – 5650 MHz band as it is a client-only device. Also refer to Attestation Statement regarding passive scanning		Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	49.2dBµV/m @ 5458.4MHz	Refer to page 20	Complies (4.8dB)

[1] Reduced from 11dBm because highest value exceeded the average value by more than 3dB
[2] Reduced from 11dBm because highest value exceeded the average value by more than 3dB

Requirements for all U-NII/LELAN bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407	A9.5a	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	Host system is a class A digital device and fully evaluated for radiated emissions below 1GHz against Class A limits. No emissions related to the operation of the 802.11abg module were observed below 1GHz.		N/A
15.407(a)(6)	-	Peak Excursion Ratio	12.9	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	Complies
15			Measurements on three channels in each band		
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information (Refer to Operational Description – System Overview)	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 10ppm		Complies
15.407 (h1)	A9.4	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection	Refer to separate test report; reference R78278		
	A9.9g	User Manual information	Statements are in the manual (Regulatory Statements section)		Complies
15.203	-	RF Connector	Antenna system is integral to the device	Integral antenna required	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	47.2dBµV/m @ 3466.7MHz	Refer to page	Complies (6.8 dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	37.0dBµV @ 3.106MHz	Refer to page 18	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	17100 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 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 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, which is covered by the scope of this test report, 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 of the Falcon X3, which was used to evaluate the radiated emissions from the 802.11abg radio, was received on April 12, 2010 and tested on April 15 and 19, 2010.

Antenna port measurements (power, bandwidth and spurious emissions) were made on a sample of the SDC-MSD30AG 802.11abg module. This module was received on January 8, 2010 and tested on January 14, 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	U4SFALX3
Summit Data Communications Inc.	SDC-MSD30AG	802.11AG Mini Compact Flash Module with antenna connectors	-	

ANTENNA SYSTEM

The antenna system consists of a pair of dipole antennas (a main antenna and a second antenna to provide spatial diversity) integrated into the host system

ENCLOSURE

The Falcon X3 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:

Company	Model	Description	Serial Number	FCC ID
HP	NC600	Laptop	-	-
Hewlett Packard	iPAQ	Handheld Computer	-	DoC

EUT INTERFACE PORTS

The I/O cabling configuration during testing of the Falcon X3 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

The I/O cabling configuration for measurements at the antenna port of the 802.11abg module was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
iPAQ Power	AC Mains	2wire	Unshielded	1.5
Flash Module	iPAQ Module Port	-	-	-

EUT OPERATION

During testing the EUT was configured to transmit on the low, middle, and high channels in each of the operating bands. Testing performed at a data rate of 6Mbs for as this was known to produce the highest output power for all data rates.

Tests were also performed with the 802.11abg radio in receive mode, tuned to the center channel in each operating band.

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
Chamber 5	211948	2845B-5	

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.

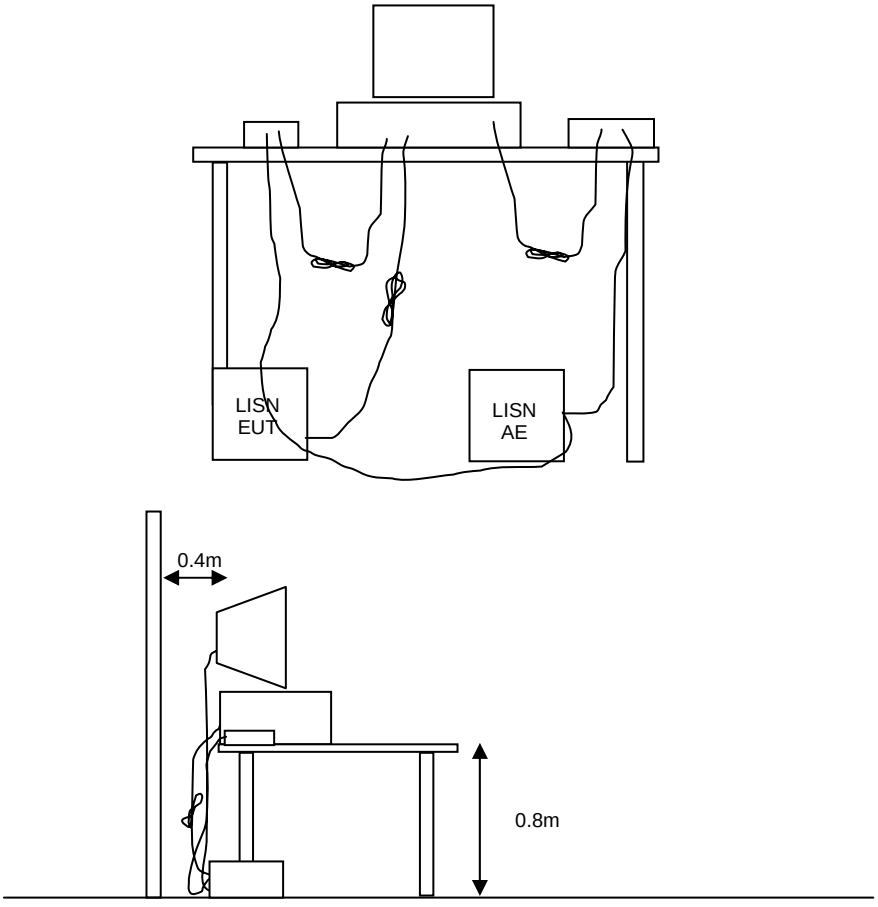
TEST PROCEDURES

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.



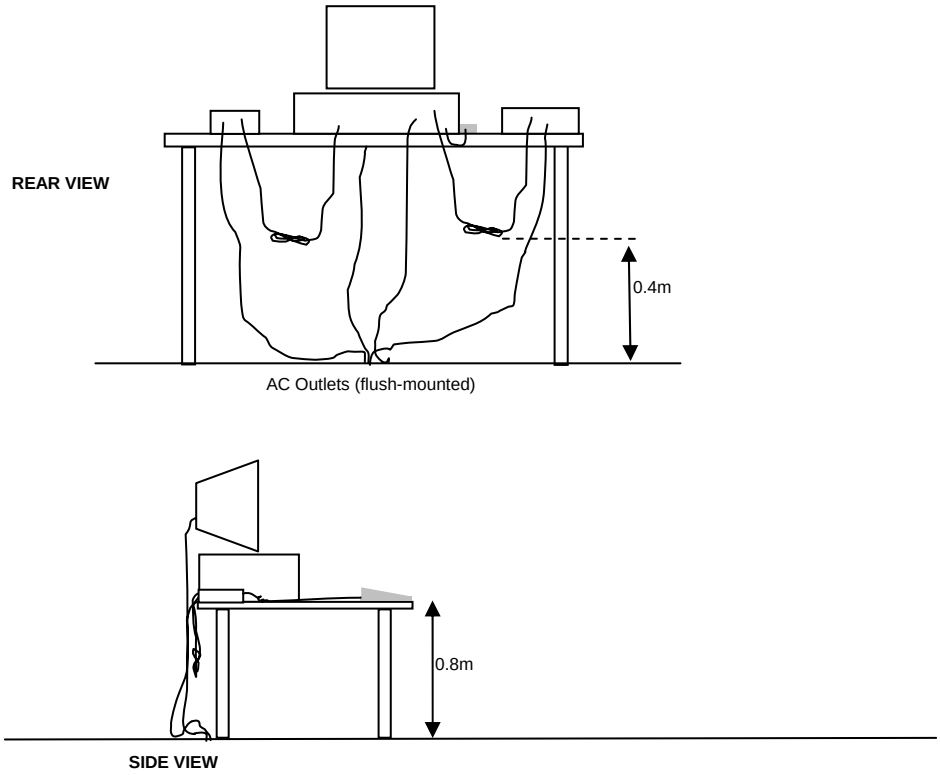
RADIATED EMISSIONS

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.

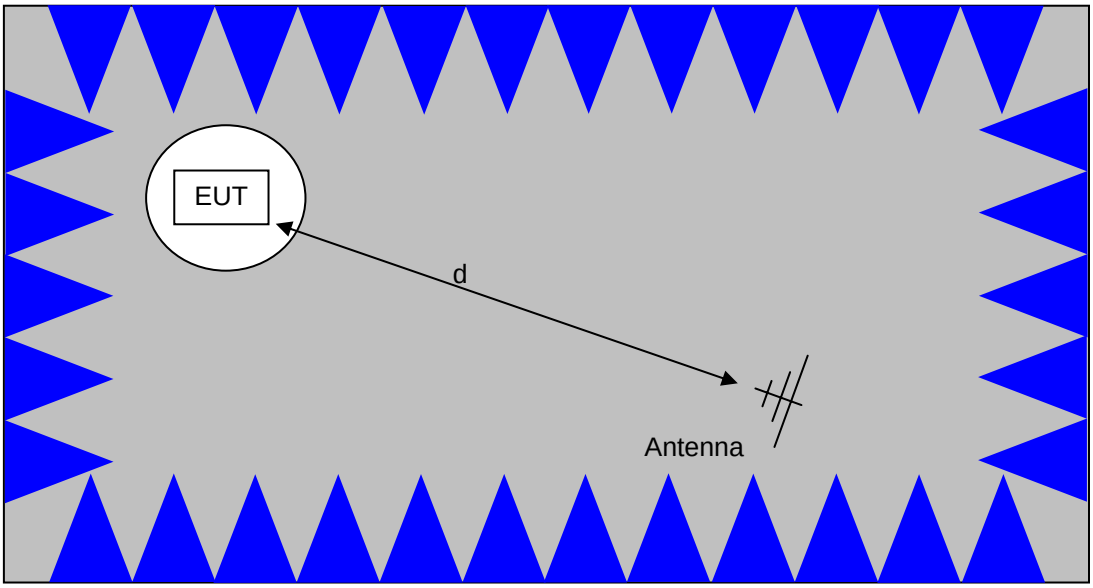
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

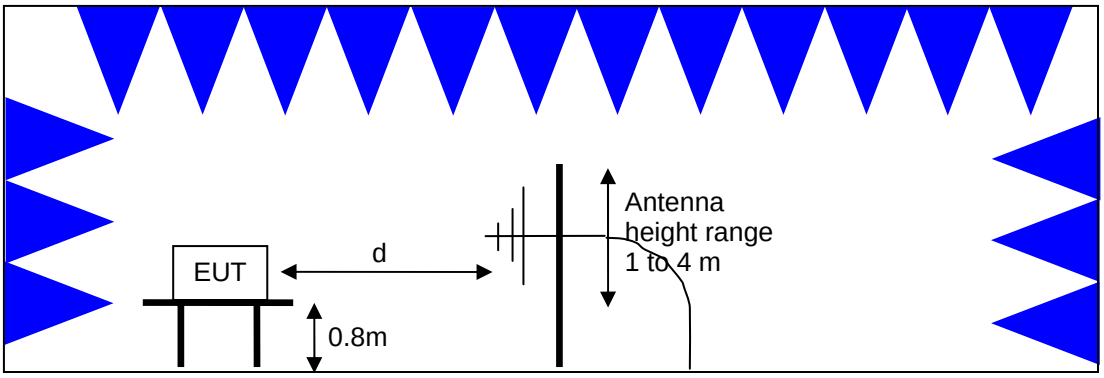


Typical Test Configuration for Radiated Field Strength Measurements



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.

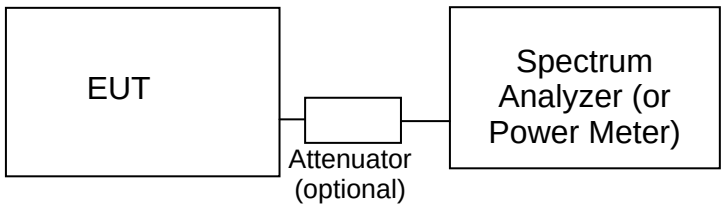
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

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 Elliott'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:

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[3] (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

FCC 15.407 (a) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	50mW (17 dBm)	4 dBm/MHz
5250 – 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

The peak excursion envelope is limited to 13dB.

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

OUTPUT POWER LIMITS –LELAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 210. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 – 5350	250 mW (24 dBm)[4] 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm)[5] 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

In addition, the power spectral density limit shall be reduced by 1dB for every dB the highest power spectral density exceeds the "average" power spectral density) by more than 3dB. The "average" power spectral density is determined by dividing the output power by 10log(EBW) where EBW is the 99% power bandwidth.

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. This is an average limit so the peak value of the emission may not exceed –7dBm/MHz (68.3dBuV/m/MHz at a distance of 3m). For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10Mhz of the allocated band is increased to –17dBm/MHz.

[4] If EIRP exceeds 500mW the device must employ TPC
[5] If EIRP exceeds 500mW the device must employ TPC

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 Antenna Port (Power and Spurious Emissions), January 2010

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Weinschel Corp	Attenuator, 10dB , 50 ohms, 25W, DC-18 GHz	SA18N-10	2099	N/A
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	10/22/2010
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts	NRV-Z32	1423	10/23/2010
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	1/28/2010

Radio Spurious Emissions, April 2010

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
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/2/2010
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	6/22/2010
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1728	2/1/2011
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/25/2010
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	9/25/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	9/17/2010

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

Appendix B Test Data

T78990 (Radiated emissions, AC Power port conducted emissions)	22 Pages
T79612 (Antenna port measurements)	12 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:	A

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: 4/19/2010
Test Engineer: Suhaila Khushzad
Test Location: Fremont Chamber #4

Config. Used: 1
Config Change: None
EUT Voltage: 230V/50Hz & 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: 20 °C
Rel. Humidity: 50 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	Class B	Pass	42.4dBµV @ 3.110MHz (-13.6dB)
2	CE, AC Power,120V/60Hz	Class B	Pass	37.0dBµV @ 3.106MHz (-19.0dB)

Modifications Made During Testing

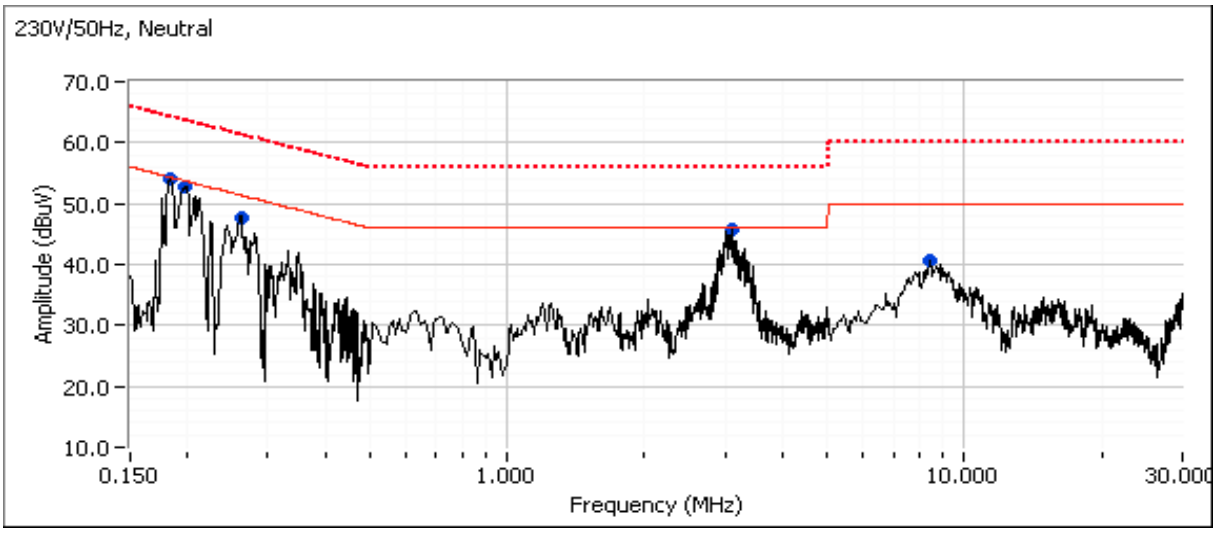
No modifications were made to the EUT during testing

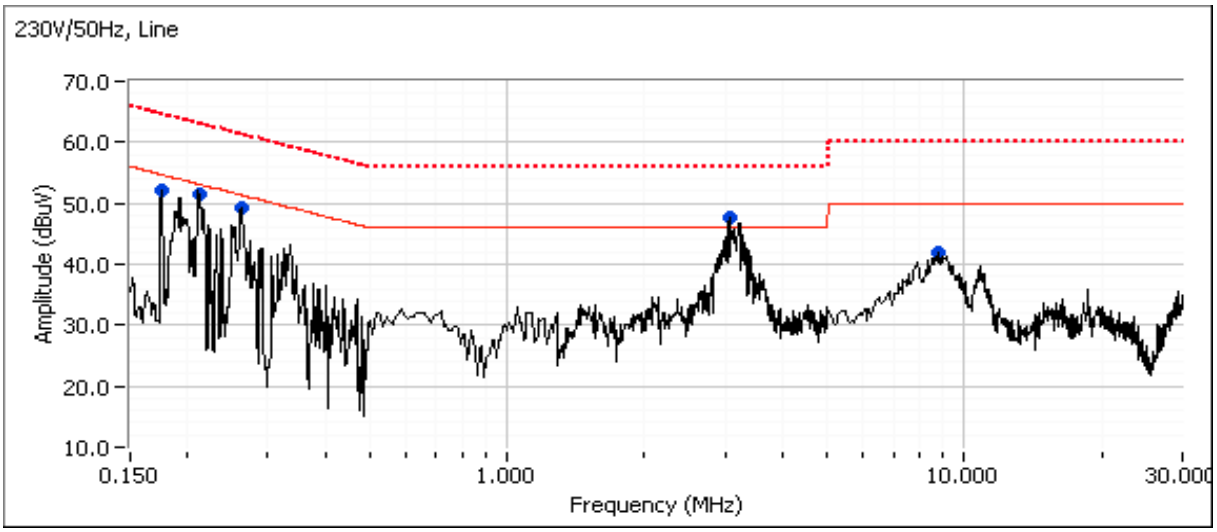
Deviations From The Standard

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 #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





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

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

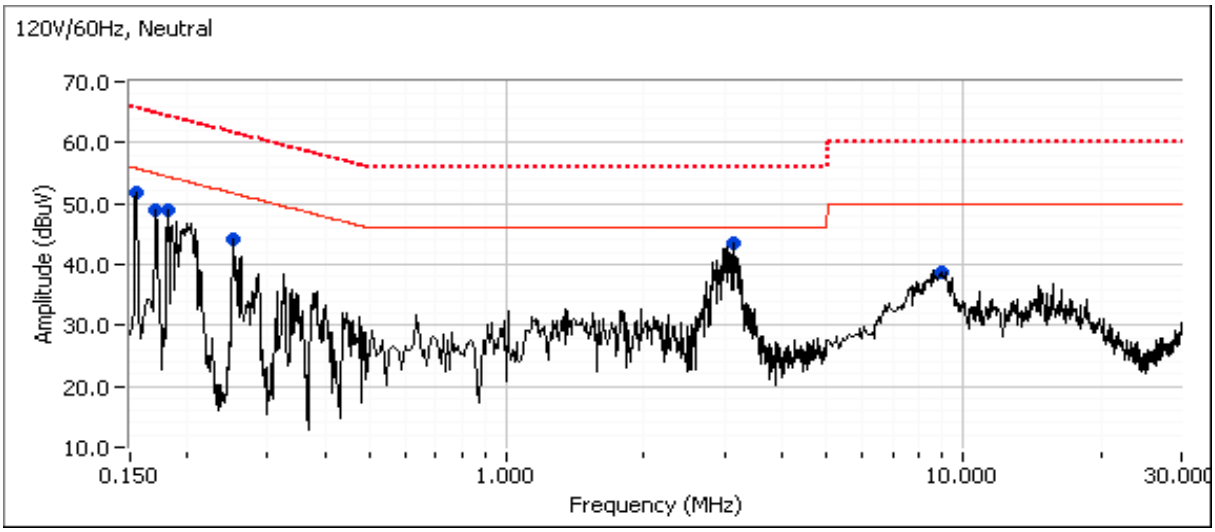
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
3.110	47.6	Line	46.0	1.6	Peak	
3.097	45.8	Neutral	46.0	-0.2	Peak	
0.184	54.0	Neutral	54.3	-0.3	Peak	
0.198	52.8	Neutral	53.7	-0.9	Peak	
0.213	51.6	Line	53.1	-1.5	Peak	
0.266	49.1	Line	51.3	-2.2	Peak	
0.176	52.1	Line	54.7	-2.6	Peak	
0.264	47.8	Neutral	51.3	-3.5	Peak	
8.681	41.9	Line	50.0	-8.1	Peak	
8.407	40.5	Neutral	50.0	-9.5	Peak	

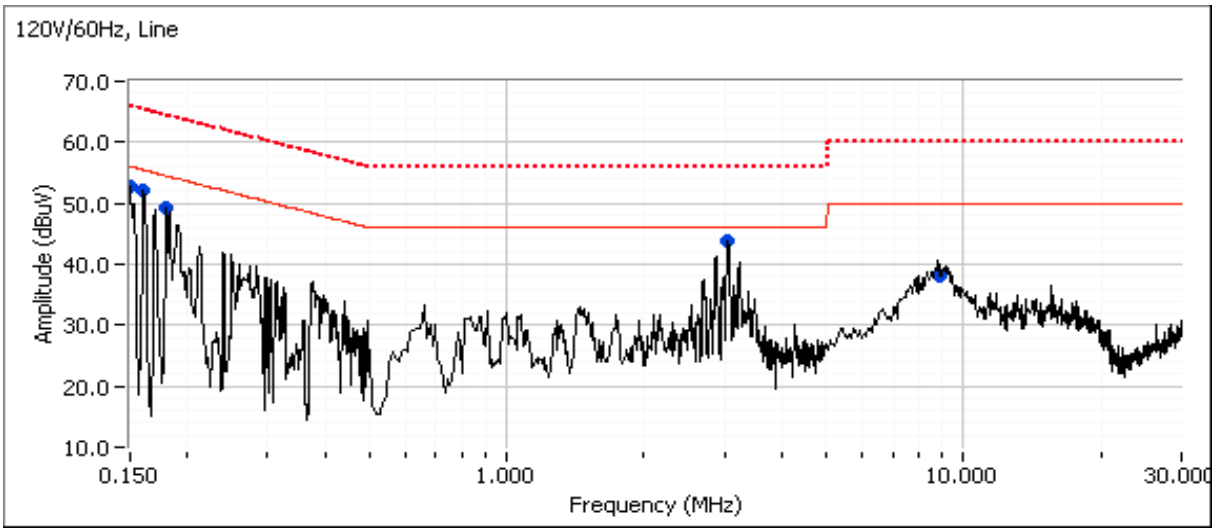
Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
3.110	42.4	Line	56.0	-13.6	QP	QP (1.00s)
0.184	50.6	Neutral	64.3	-13.7	QP	QP (1.00s)
0.184	38.3	Neutral	54.3	-16.0	AVG	AVG (0.10s)
0.213	47.0	Line	63.1	-16.1	QP	QP (1.00s)
3.097	39.8	Neutral	56.0	-16.2	QP	QP (1.00s)
0.266	44.0	Line	61.2	-17.2	QP	QP (1.00s)
0.198	46.3	Neutral	63.7	-17.4	QP	QP (1.00s)
3.110	28.3	Line	46.0	-17.7	AVG	AVG (0.10s)
0.176	45.6	Line	64.7	-19.1	QP	QP (1.00s)
8.681	30.4	Line	50.0	-19.6	AVG	AVG (0.10s)
3.097	26.4	Neutral	46.0	-19.6	AVG	AVG (0.10s)
0.264	41.0	Neutral	61.3	-20.3	QP	QP (1.00s)
0.266	30.1	Line	51.2	-21.1	AVG	AVG (0.10s)
8.407	28.3	Neutral	50.0	-21.7	AVG	AVG (0.10s)
0.198	31.6	Neutral	53.7	-22.1	AVG	AVG (0.10s)
0.213	30.3	Line	53.1	-22.8	AVG	AVG (0.10s)
8.681	36.8	Line	60.0	-23.2	QP	QP (1.00s)
8.407	35.5	Neutral	60.0	-24.5	QP	QP (1.00s)
0.264	25.4	Neutral	51.3	-25.9	AVG	AVG (0.10s)
0.176	25.5	Line	54.7	-29.2	AVG	AVG (0.10s)

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





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

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	
3.066	43.9	Line	46.0	-2.1	Peak	
3.106	43.4	Neutral	46.0	-2.6	Peak	
0.151	52.7	Line	56.0	-3.3	Peak	
0.162	52.0	Line	55.4	-3.4	Peak	
0.151	51.9	Neutral	55.8	-3.9	Peak	
0.181	49.2	Line	54.5	-5.3	Peak	
0.185	49.0	Neutral	54.4	-5.4	Peak	
0.168	48.8	Neutral	54.9	-6.1	Peak	
0.251	44.3	Neutral	51.7	-7.4	Peak	
8.800	38.7	Neutral	50.0	-11.3	Peak	
8.746	38.1	Line	50.0	-11.9	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
3.106	37.0	Neutral	56.0	-19.0	QP	QP (1.00s)
0.185	45.0	Neutral	64.3	-19.3	QP	QP (1.00s)
0.151	46.0	Neutral	65.9	-19.9	QP	QP (1.00s)
3.066	36.0	Line	56.0	-20.0	QP	QP (1.00s)
0.151	45.7	Line	65.9	-20.2	QP	QP (1.00s)
0.162	44.2	Line	65.4	-21.2	QP	QP (1.00s)
0.168	43.8	Neutral	65.1	-21.3	QP	QP (1.00s)
8.746	28.6	Line	50.0	-21.4	AVG	AVG (0.10s)
0.181	42.3	Line	64.4	-22.1	QP	QP (1.00s)
3.066	23.7	Line	46.0	-22.3	AVG	AVG (0.10s)
3.106	22.3	Neutral	46.0	-23.7	AVG	AVG (0.10s)
8.800	26.1	Neutral	50.0	-23.9	AVG	AVG (0.10s)
0.251	37.6	Neutral	61.7	-24.1	QP	QP (1.00s)
8.746	35.1	Line	60.0	-24.9	QP	QP (1.00s)
8.800	34.8	Neutral	60.0	-25.2	QP	QP (1.00s)
0.185	28.4	Neutral	54.3	-25.9	AVG	AVG (0.10s)
0.251	22.5	Neutral	51.7	-29.2	AVG	AVG (0.10s)
0.181	24.0	Line	54.4	-30.4	AVG	AVG (0.10s)
0.151	22.5	Neutral	55.9	-33.4	AVG	AVG (0.10s)
0.162	21.5	Line	55.4	-33.9	AVG	AVG (0.10s)
0.168	20.9	Neutral	55.1	-34.2	AVG	AVG (0.10s)
0.151	21.5	Line	55.9	-34.4	AVG	AVG (0.10s)

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 15.407 (UNII) 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.

Date of Test: 4/15/2010 17:48
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #5

Config. Used: 1
Config Change: None
EUT Voltage: 3.7Vdc

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: 19.2 °C
Rel. Humidity: 38 %

Test Notes

The EUT has been verified in all orientations and upright is the worst for 5GHz, therefore, all tests in 5GHz were performed in an upright orientation.

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

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a Chain A	5150-5250 Low-5180	100%	-	Restricted Band Edge at 5150 MHz	15.209	49.2dBµV/m @ 5147.0MHz (-4.8dB)
	802.11a Chain A	5150-5250 Low-5180	100%	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	38.6dBµV/m @ 4794.9MHz (-15.4dB)
	802.11a Chain A	5150-5250 Center-5200	100%	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.3dBµV/m @ 20800.1MHz (-14.7dB)
	802.11a Chain A	5150-5250 High-5240	100%	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.2dBµV/m @ 20961.8MHz (-9.8dB)
2	802.11a Chain A	5250-5350 Low-5260	100%	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.3dBµV/m @ 21040.7MHz (-7.7dB)
	802.11a Chain A	5250-5350 Center-5300	100%	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.3dBµV/m @ 10602.0MHz (-5.7dB)
	802.11a Chain A	5250-5350 High-5320	100%	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.2dBµV/m @ 10640.1MHz (-4.8dB)
	802.11a Chain A	5250-5350 High-5320	100%	-	Restricted Band Edge at 5350 MHz	15.209	48.6dBµV/m @ 5350.0MHz (-5.4dB)
3	802.11a Chain A	5470-5725 Low-5500	100%	-	Restricted Band Edge at 5460 MHz	15.209	49.2dBµV/m @ 5458.4MHz (-4.8dB)
	802.11a Chain A	5470-5725 Low-5500	100%	-	Band Edge 5460 - 5470 MHz	15E	49.6dBµV/m @ 5469.9MHz (-18.7dB)
	802.11a Chain A	5470-5725 Low-5500	100%		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.8dBµV/m @ 11001.2MHz (-13.2dB)
	802.11a Chain A	5470-5725 Center-5580	100%		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	43.6dBµV/m @ 3733.4MHz (-10.4dB)
	802.11a Chain A	5470-5725 High-5700	100%	-	Band Edge 5725MHz	15E	50.0dBµV/m @ 5725.0MHz (-18.3dB)
	802.11a Chain A	5470-5725 High-5700	100%		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.2dBµV/m @ 3800.0MHz (-7.8dB)

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, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5150-5250 MHz Band

Date of Test: 4/15/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

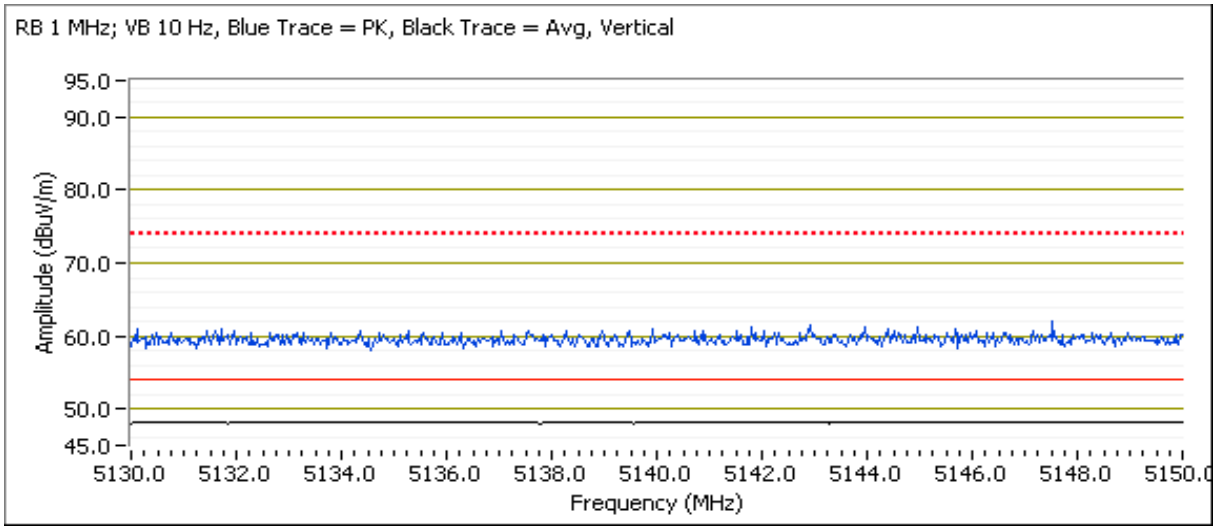
Run #1a: Low Channel

Fundamental Signal 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	
5174.870	98.2	V	-	-	AVG	130	1.0	RB 1 MHz; VB: 10 Hz
5173.470	106.7	V	-	-	PK	130	1.0	RB 1 MHz; VB: 1 MHz
5173.070	88.2	H	-	-	AVG	21	1.2	RB 1 MHz; VB: 10 Hz
5173.400	95.7	H	-	-	PK	21	1.2	RB 1 MHz; VB: 1 MHz

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.020	49.2	V	54.0	-4.8	AVG	147	1.0	RB 1 MHz; VB: 10 Hz
5149.120	60.8	V	74.0	-13.2	PK	147	1.0	RB 1 MHz; VB: 1 MHz
5147.000	49.1	H	54.0	-4.9	AVG	139	1.4	RB 1 MHz; VB: 10 Hz
5147.620	60.2	H	74.0	-13.8	PK	139	1.4	RB 1 MHz; VB: 1 MHz

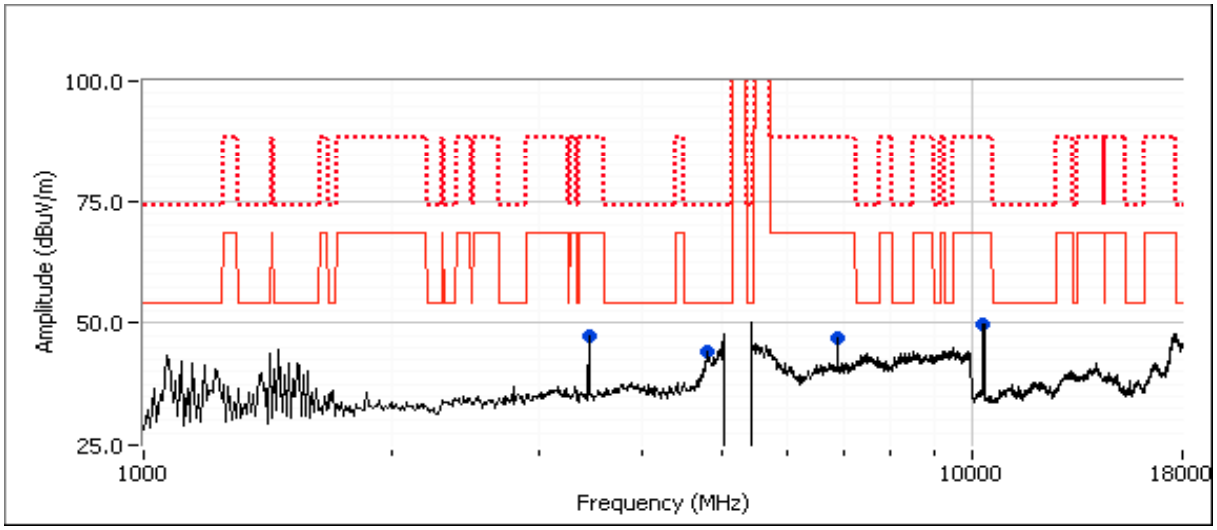


Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4794.870	38.6	V	54.0	-15.4	AVG	48	1.0	RB 1 MHz; VB: 10 Hz
4792.130	49.9	V	74.0	-24.1	PK	48	1.0	RB 1 MHz; VB: 1 MHz
3447.500	47.3	H	68.3	-21.0	Peak	348	1.0	RB 1 MHz; VB: 1 MHz
6908.330	47.0	V	68.3	-21.3	Peak	110	1.3	RB 1 MHz; VB: 1 MHz
10346.670	49.6	H	68.3	-18.7	Peak	327	1.0	RB 1 MHz; VB: 1 MHz
20719.970	37.3	H	54.0	-16.7	AVG	58	1.0	RB 1 MHz; VB: 10 Hz
20722.200	49.4	H	74.0	-24.6	PK	58	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 average limit was set to -27dBm/MHz (~68dBuV/m).



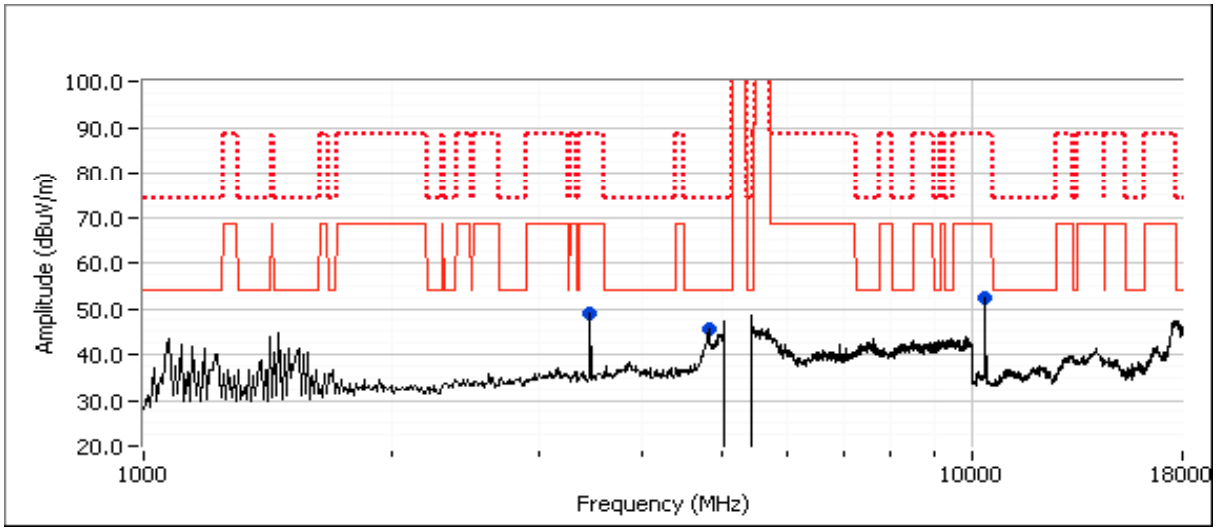
Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #1b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
20800.130	39.3	H	54.0	-14.7	AVG	62	1.0	RB 1 MHz; VB: 10 Hz
20801.900	52.7	H	74.0	-21.3	PK	62	1.0	RB 1 MHz; VB: 1 MHz
4814.150	37.7	V	54.0	-16.3	AVG	29	1.0	RB 1 MHz; VB: 10 Hz
4802.710	48.8	V	74.0	-25.2	PK	29	1.0	RB 1 MHz; VB: 1 MHz
10400.220	46.7	H	68.3	-21.6	AVG	324	1.0	RB 1 MHz; VB: 10 Hz
10401.880	58.5	H	88.3	-29.8	PK	324	1.0	RB 1 MHz; VB: 1 MHz
3466.810	48.9	H	68.3	-19.4	Peak	360	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 **average** limit was set to -27dBm/MHz (~68dBuV/m).



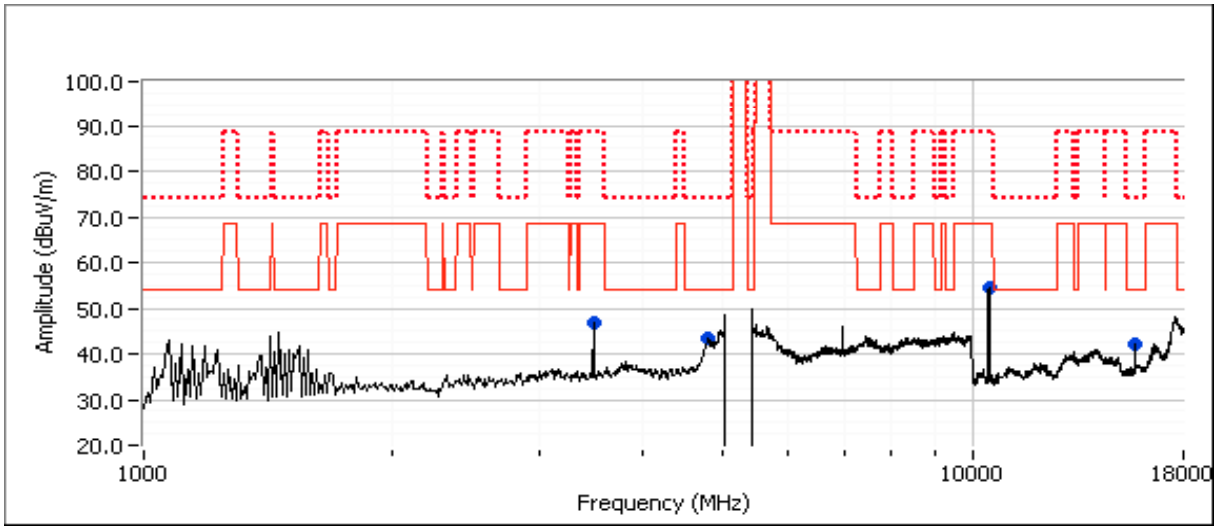
Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #1c: High Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
20961.770	44.2	H	54.0	-9.8	AVG	66	1.0	RB 1 MHz; VB: 10 Hz
20961.870	57.8	H	74.0	-16.2	PK	66	1.0	RB 1 MHz; VB: 1 MHz
4816.160	39.6	V	54.0	-14.4	AVG	24	1.3	RB 1 MHz; VB: 10 Hz
4816.620	50.6	V	74.0	-23.4	PK	24	1.3	RB 1 MHz; VB: 1 MHz
10480.190	49.3	H	68.3	-19.0	AVG	326	1.0	RB 1 MHz; VB: 10 Hz
10481.360	60.9	H	88.3	-27.4	PK	326	1.0	RB 1 MHz; VB: 1 MHz
15722.200	34.7	V	54.0	-19.3	AVG	343	1.0	RB 1 MHz; VB: 10 Hz
15721.330	47.2	V	74.0	-26.8	PK	343	1.0	RB 1 MHz; VB: 1 MHz
3493.450	46.7	H	68.3	-21.6	Peak	355	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 average limit was set to -27dBm/MHz (~68dBuV/m).



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, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band

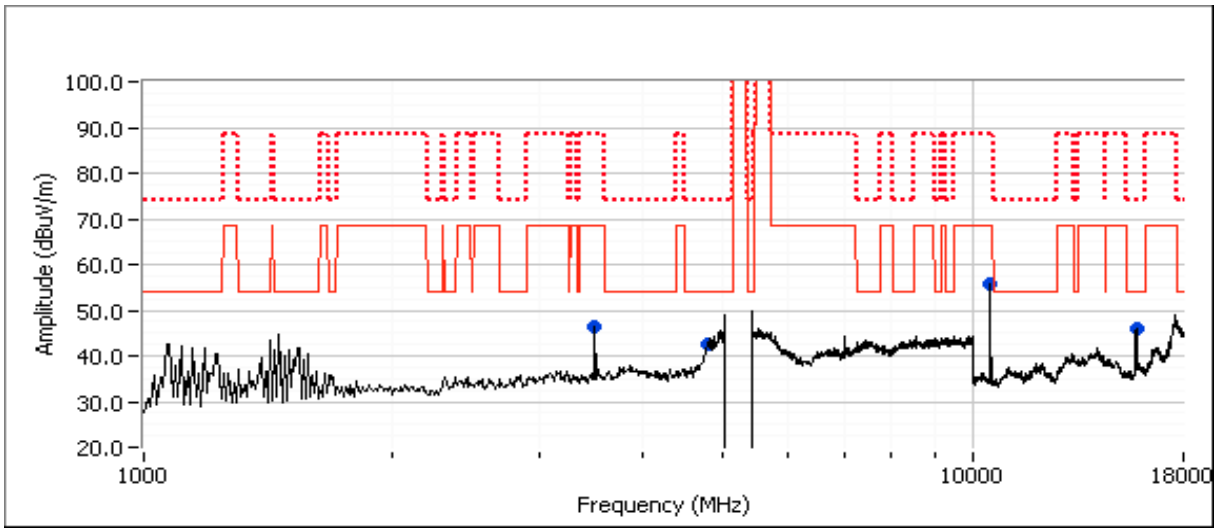
Date of Test: 4/15/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

Run #2a: Low Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
21040.670	46.3	H	54.0	-7.7	AVG	63	1.0	RB 1 MHz; VB: 10 Hz
21046.200	59.2	H	74.0	-14.8	PK	63	1.0	RB 1 MHz; VB: 1 MHz
15779.240	39.5	V	54.0	-14.5	AVG	336	1.0	RB 1 MHz; VB: 10 Hz
15782.100	52.0	V	74.0	-22.0	PK	336	1.0	RB 1 MHz; VB: 1 MHz
10520.090	49.9	H	68.3	-18.4	AVG	326	1.0	RB 1 MHz; VB: 10 Hz
10516.290	61.7	H	88.3	-26.6	PK	326	1.0	RB 1 MHz; VB: 1 MHz
3506.890	46.5	H	68.3	-21.8	Peak	354	1.0	RB 1 MHz; VB: 1 MHz
4802.150	37.6	V	54.0	-16.4	AVG	48	1.0	RB 1 MHz; VB: 10 Hz
4813.010	48.9	V	74.0	-25.1	PK	48	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 average limit was set to -27dBm/MHz (~68dBuV/m).



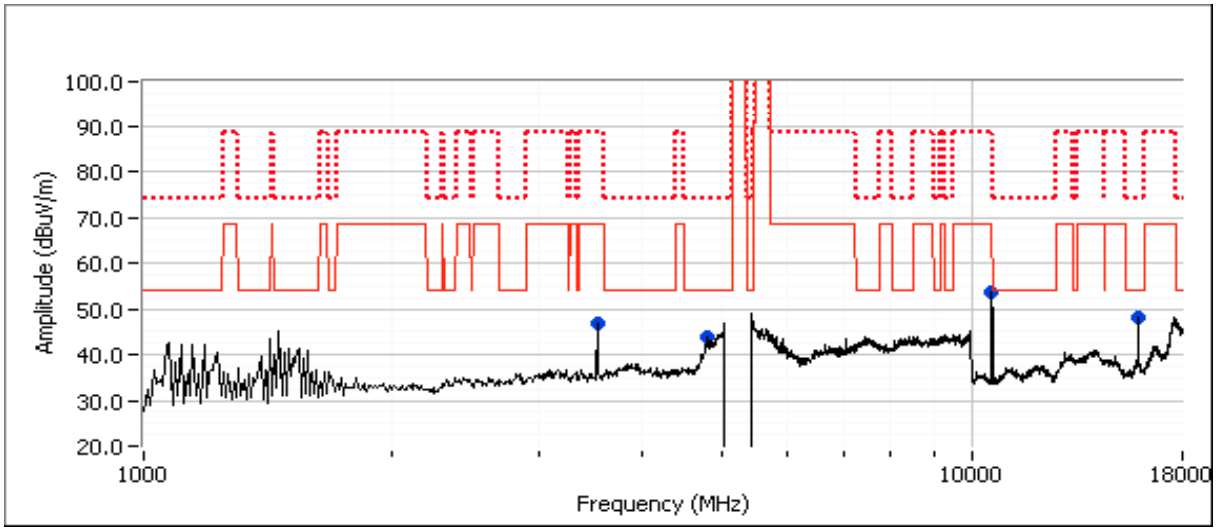
Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

Run #2b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10601.980	48.3	H	54.0	-5.7	AVG	320	1.0	RB 1 MHz; VB: 10 Hz
10602.460	61.0	H	74.0	-13.0	PK	320	1.0	RB 1 MHz; VB: 1 MHz
21201.530	46.3	H	54.0	-7.7	AVG	65	1.0	RB 1 MHz; VB: 10 Hz
21201.670	60.3	H	74.0	-13.7	PK	65	1.0	RB 1 MHz; VB: 1 MHz
15899.160	41.6	V	54.0	-12.4	AVG	339	1.0	RB 1 MHz; VB: 10 Hz
15901.690	54.1	V	74.0	-19.9	PK	339	1.0	RB 1 MHz; VB: 1 MHz
4800.450	38.6	V	54.0	-15.4	AVG	26	1.1	RB 1 MHz; VB: 10 Hz
4811.650	50.4	V	74.0	-23.6	PK	26	1.1	RB 1 MHz; VB: 1 MHz
3533.540	46.8	H	68.3	-21.5	Peak	334	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).



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

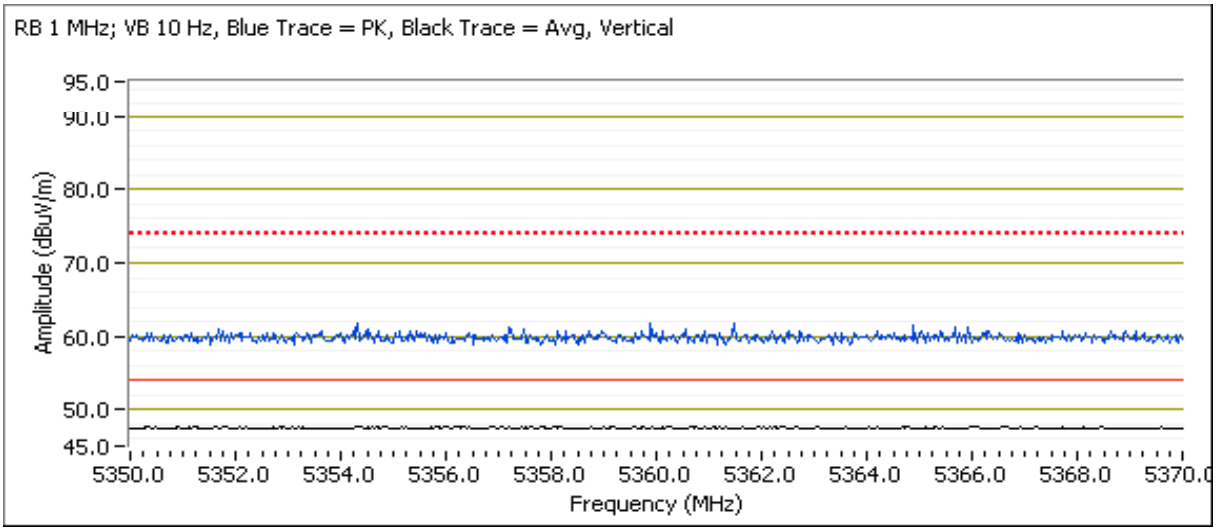
Run #2c: High Channel

Fundamental Signal 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	
5314.830	97.3	V	-	-	AVG	131	1.0	RB 1 MHz; VB: 10 Hz
5314.200	105.1	V	-	-	PK	131	1.0	RB 1 MHz; VB: 1 MHz
5325.130	86.7	H	-	-	AVG	26	1.0	RB 1 MHz; VB: 10 Hz
5324.270	94.5	H	-	-	PK	26	1.0	RB 1 MHz; VB: 1 MHz

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	48.6	V	54.0	-5.4	AVG	238	1.8	RB 1 MHz; VB: 10 Hz
5352.320	60.0	V	74.0	-14.0	PK	238	1.8	RB 1 MHz; VB: 1 MHz
5350.000	48.5	H	54.0	-5.5	AVG	352	1.0	RB 1 MHz; VB: 10 Hz
5351.630	60.1	H	74.0	-13.9	PK	352	1.0	RB 1 MHz; VB: 1 MHz



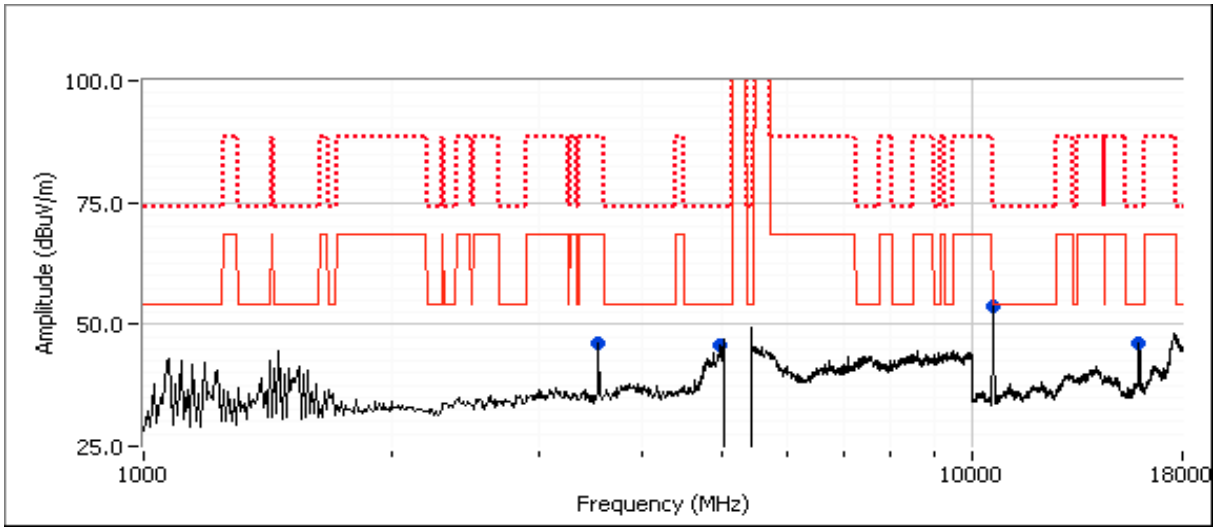
Client:	DATALOGIC MOBILE INC	Job Number:	J77585
Model:	Falcon x3 Portable Data Terminal(System Approval)	T-Log Number:	T78990
		Account Manager:	Christine Krebill
Contact:	Jerry Kalina		
Standard:	FCC Part 15 Subpart B,E, 15.209 / 15.247, RSS-210,	Class:	N/A

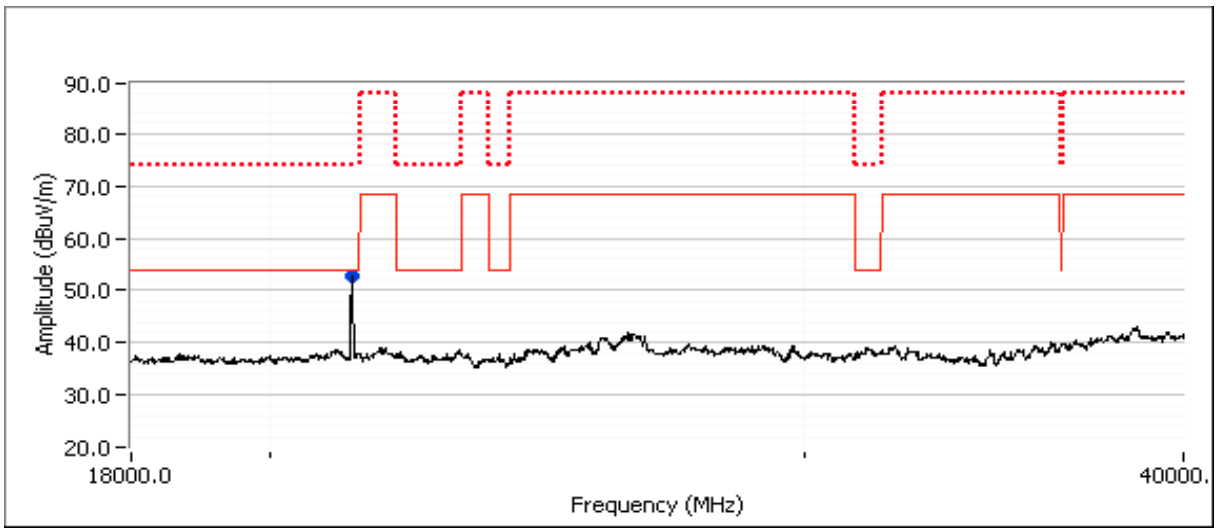
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Upright								
10640.140	49.2	H	54.0	-4.8	AVG	331	1.0	RB 1 MHz; VB: 10 Hz
10636.370	61.0	H	74.0	-13.0	PK	331	1.0	RB 1 MHz; VB: 1 MHz
15957.380	40.5	V	54.0	-13.5	AVG	343	1.0	RB 1 MHz; VB: 10 Hz
15959.450	53.2	V	74.0	-20.8	PK	343	1.0	RB 1 MHz; VB: 1 MHz
3546.860	46.2	H	68.3	-22.1	Peak	330	1.0	RB 1 MHz; VB: 1 MHz
4986.630	45.6	V	54.0	-8.4	Peak	162	1.0	RB 1 MHz; VB: 1 MHz
4976.630	40.4	V	54.0	-13.6	AVG	144	1.0	RB 1 MHz; VB: 10 Hz
4979.400	51.6	V	74.0	-22.4	PK	144	1.0	RB 1 MHz; VB: 1 MHz
21280.000	46.6	H	54.0	-7.4	AVG	64	1.0	RB 1 MHz; VB: 10 Hz
21282.000	61.0	H	74.0	-13.0	PK	64	1.0	RB 1 MHz; VB: 1 MHz
EUT Side								
10639.970	49.0	V	54.0	-5.0	AVG	56	1.1	RB 1 MHz; VB: 10 Hz
10640.330	64.0	V	74.0	-10.0	PK	56	1.1	RB 1 MHz; VB: 1 MHz
10640.230	48.8	H	54.0	-5.2	AVG	324	1.0	RB 1 MHz; VB: 10 Hz
10641.770	59.8	H	74.0	-14.2	PK	324	1.0	RB 1 MHz; VB: 1 MHz
EUT Flat								
10640.200	48.4	V	54.0	-5.6	AVG	140	1.1	RB 1 MHz; VB: 10 Hz
10642.300	60.1	V	74.0	-13.9	PK	140	1.1	RB 1 MHz; VB: 1 MHz
10640.170	44.7	H	54.0	-9.3	AVG	158	1.0	RB 1 MHz; VB: 10 Hz
10642.400	56.2	H	74.0	-17.8	PK	158	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 average limit was set to -27dBm/MHz (~68dBuV/m).

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 #3, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5470-5725 MHz Band

Date of Test: 4/15/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

Run #3a: Low Channel

Fundamental Signal Field Strength

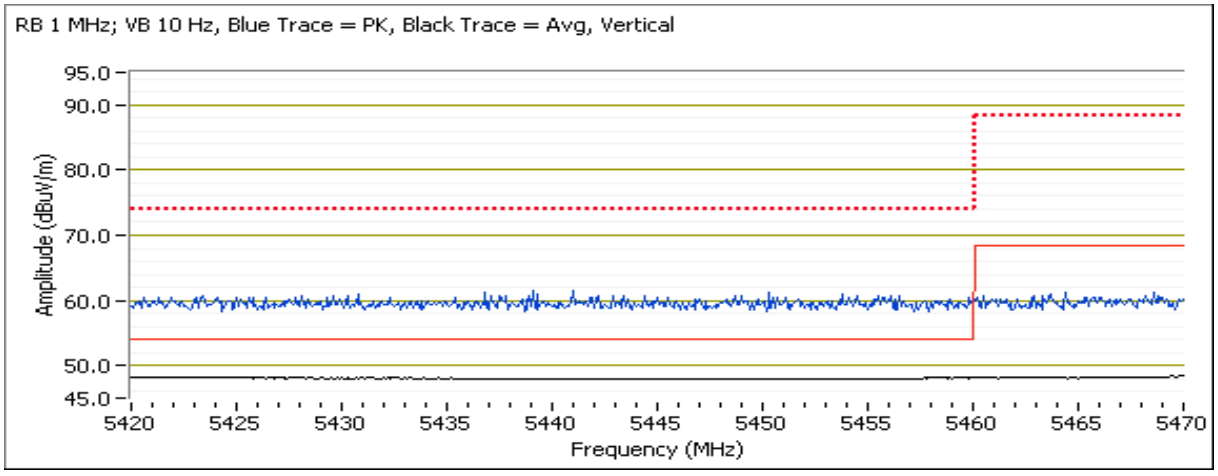
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5493.130	96.7	V	-	-	AVG	115	1.1	. MHz; VB: 10 Hz
5496.130	104.9	V	-	-	PK	115	1.1	MHz; VB: 1 MHz
5492.830	87.0	H	-	-	AVG	302	1.0	. MHz; VB: 10 Hz
5493.430	95.4	H	-	-	PK	302	1.0	MHz; VB: 1 MHz

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

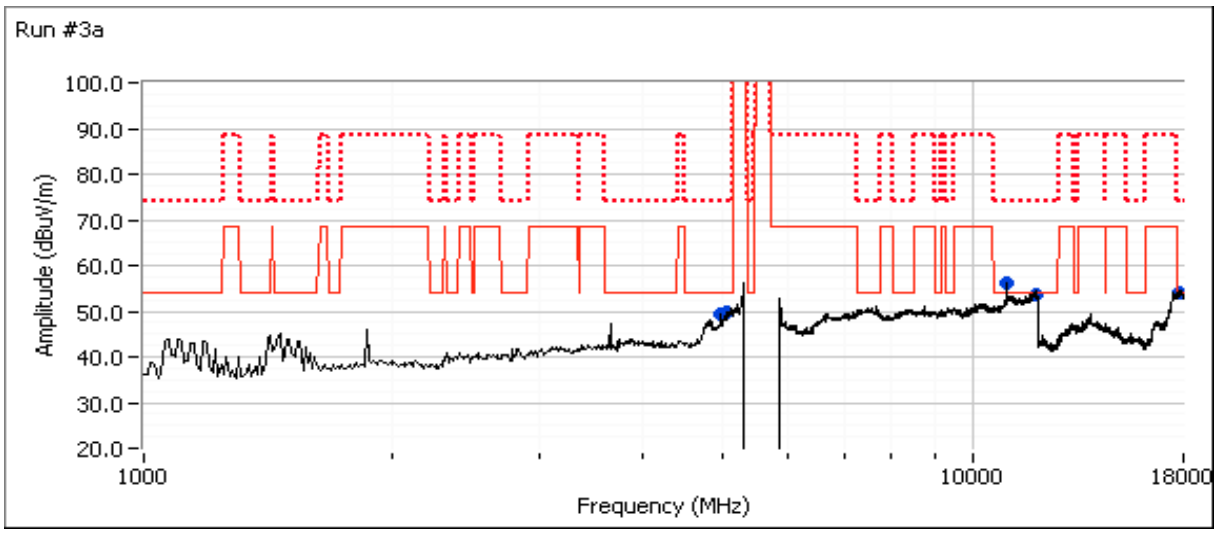
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5458.350	49.2	V	54.0	-4.8	AVG	159	1.0	. MHz; VB: 10 Hz
5459.280	60.6	V	74.0	-13.4	PK	159	1.0	MHz; VB: 1 MHz
5458.380	48.8	H	54.0	-5.2	AVG	294	1.0	. MHz; VB: 10 Hz
5459.740	60.8	H	74.0	-13.2	PK	294	1.0	MHz; VB: 1 MHz

5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.880	49.6	V	68.3	-18.7	AVG	159	1.0	. MHz; VB: 10 Hz
5467.170	61.1	V	88.3	-27.2	PK	159	1.0	MHz; VB: 1 MHz
5467.340	48.9	H	68.3	-19.4	AVG	294	1.0	. MHz; VB: 10 Hz
5467.300	60.4	H	88.3	-27.9	PK	294	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



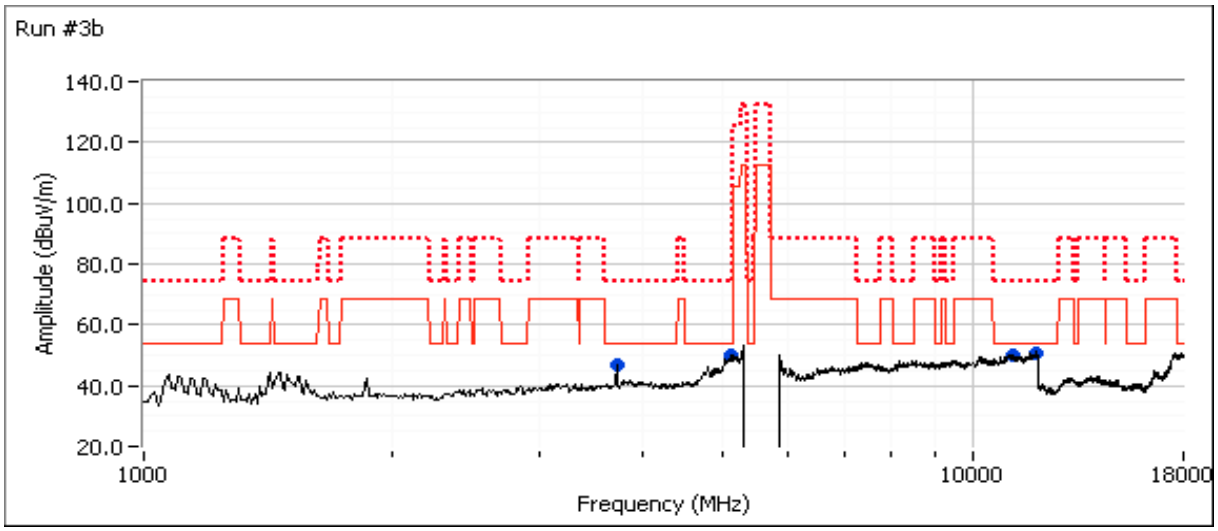
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11001.200	40.8	V	54.0	-13.2	AVG	222	1.0	MHz; VB: 10 Hz
22000.000	32.3	H	68.3	-36.0	AVG	47	1.0	MHz; VB: 10 Hz
22001.630	45.7	H	88.3	-42.6	PK	47	1.0	MHz; VB: 1 MHz
17776.800	39.6	H	54.0	-14.4	AVG	182	1.0	MHz; VB: 10 Hz
5058.390	37.9	V	54.0	-16.1	AVG	308	1.0	MHz; VB: 10 Hz
11000.150	56.2	V	74.0	-17.8	PK	222	1.0	MHz; VB: 1 MHz
4980.980	34.9	V	54.0	-19.1	AVG	351	1.3	MHz; VB: 10 Hz
17777.290	54.3	H	74.0	-19.7	PK	182	1.0	MHz; VB: 1 MHz
11926.120	53.5	H	74.0	-21.5	PK	167	1.0	MHz; VB: 1 MHz
5058.670	49.3	V	74.0	-24.7	PK	308	1.0	MHz; VB: 1 MHz
11926.120	29.1	H	54.0	-24.9	AVG	167	1.0	MHz; VB: 10 Hz
4980.300	46.8	V	74.0	-27.2	PK	351	1.3	MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).

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 #3b: Center Channel



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3733.370	43.6	H	54.0	-10.4	AVG	175	1.0	. MHz; VB: 10 Hz
5128.570	40.0	V	54.0	-14.0	AVG	307	1.0	. MHz; VB: 10 Hz
11158.870	39.7	V	54.0	-14.3	AVG	246	1.3	. MHz; VB: 10 Hz
11923.030	39.2	H	54.0	-14.8	AVG	291	2.2	. MHz; VB: 10 Hz
5129.920	51.2	V	74.0	-22.8	PK	307	1.0	MHz; VB: 1 MHz
22330.000	30.4	H	54.0	-23.6	AVG	45	1.0	. MHz; VB: 10 Hz
22330.870	41.6	H	74.0	-32.4	PK	45	1.0	MHz; VB: 1 MHz
11160.800	50.8	V	74.0	-23.2	PK	246	1.3	MHz; VB: 1 MHz
11925.170	50.7	H	74.0	-23.3	PK	291	2.2	MHz; VB: 1 MHz
3733.410	47.1	H	74.0	-26.9	PK	175	1.0	MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

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

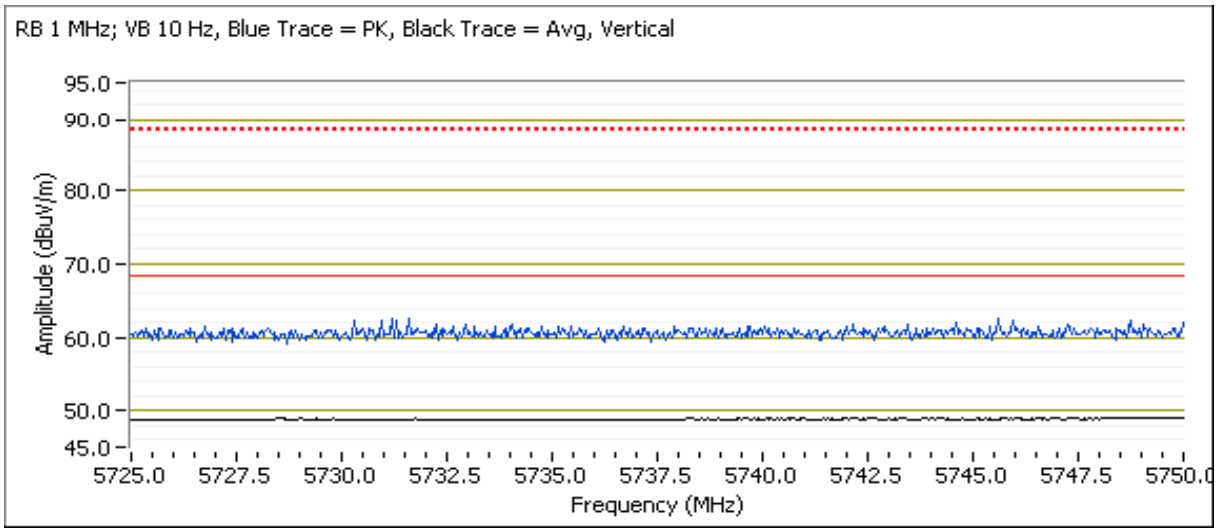
Run #3c: High Channel

Fundamental Signal Field Strength

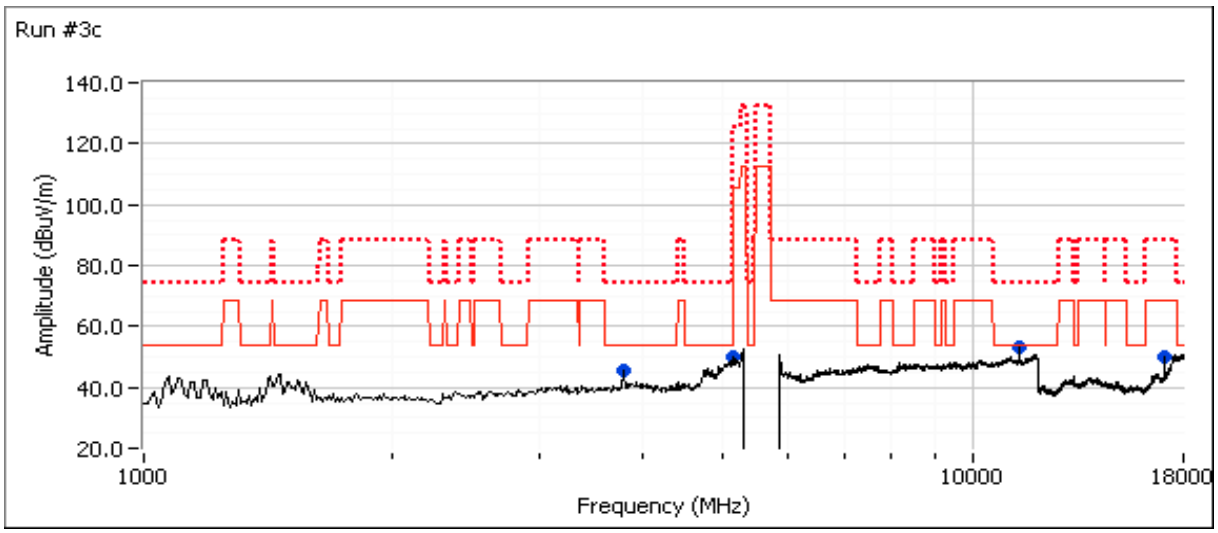
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5696.630	97.8	V	-	-	AVG	120	1.0	. MHz; VB: 10 Hz
5696.230	105.7	V	-	-	PK	120	1.0	MHz; VB: 1 MHz
5706.270	93.2	H	-	-	AVG	8	1.0	. MHz; VB: 10 Hz
5703.530	101.2	H	-	-	PK	8	1.0	MHz; VB: 1 MHz

5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.000	50.0	V	68.3	-18.3	AVG	217	1.0	. MHz; VB: 10 Hz
5726.650	62.2	V	88.3	-26.1	PK	217	1.0	MHz; VB: 1 MHz
5725.710	50.0	H	68.3	-18.3	AVG	217	1.8	. MHz; VB: 10 Hz
5727.350	61.1	H	88.3	-27.2	PK	217	1.8	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



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3800.020	46.2	H	54.0	-7.8	AVG	151	1.1	MHz; VB: 10 Hz
11400.040	45.7	H	54.0	-8.3	AVG	220	1.2	MHz; VB: 10 Hz
5141.160	40.5	V	54.0	-13.5	AVG	303	1.0	MHz; VB: 10 Hz
11400.610	57.4	H	74.0	-16.6	PK	220	1.2	MHz; VB: 1 MHz
5139.190	52.0	V	74.0	-22.0	PK	303	1.0	MHz; VB: 1 MHz
3800.030	49.7	H	74.0	-24.3	PK	151	1.1	MHz; VB: 1 MHz
17099.950	40.6	H	68.3	-27.7	AVG	280	1.0	MHz; VB: 10 Hz
17099.960	53.3	H	88.3	-35.0	PK	280	1.0	MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15 E/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications/Data Logic

Model

SDC-MSD30AG / Falcon X3

Date of Last Test: 1/15/2010

Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, 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.

Ambient Conditions:

Temperature: 10-15 °C
Rel. Humidity: 30-50 %

Date of Test: 1/14/2010
Test Engineer: Mehran Birgani
Test Location: FT Chamber #5

Config. Used: 1
Config Change: None
Host Unit Voltage 120V/ 60Hz

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 and cables used.

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	10.8dBm (0.012W)
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	10.3dBm (0.011W)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	10.5dBm (0.011W)
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	-0.8 dBm/MHz
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	3.4 dBm/MHz
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	1.5 dBm/MHz
1	26dB Bandwidth	15.407	-	27.6 MHz
1	99% Bandwidth	RSS 210	-	17.1 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	12.9 dBm/ MHz
3	Antenna Conducted Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

Module: 00000002A **DRIVER** V3.00.50 SCU: V2.03.18

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:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

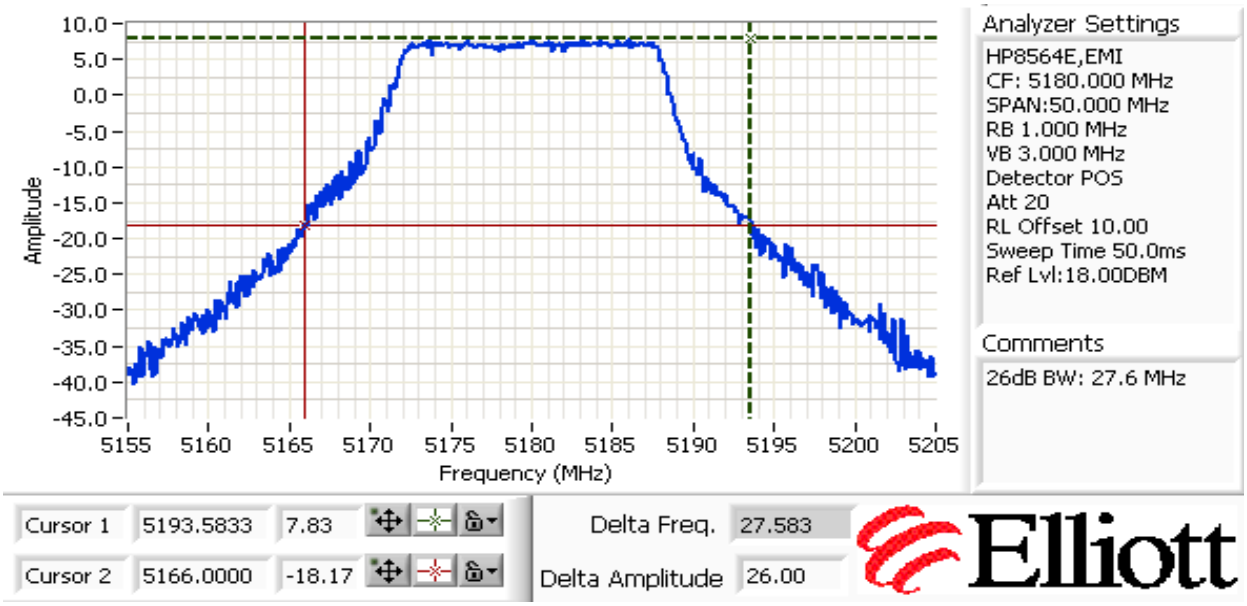
Run #1: Bandwidth, Output Power and Power spectral Density

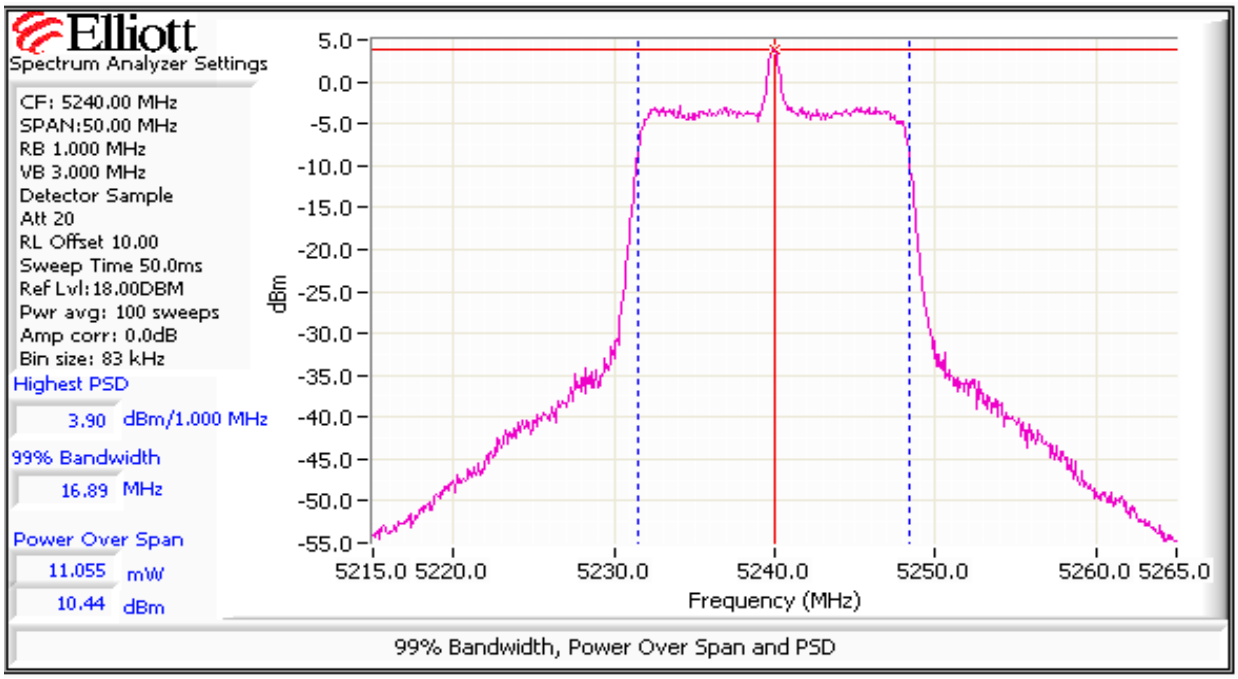
Antenna Gain (dBi): 4.8

Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
5180	18.0	27.6	16.9	10.8	17.0	0.012	-1.7	4.0	5.2	Pass
5200	18.0	28.3	16.9	10.3	17.0	0.011	-2.0	4.0	5.2	Pass
5240	17.0	26.0	16.6	10.6	17.0	0.011	-0.8	4.0	5.2	Pass
5260	18.0	26.2	16.9	10.3	24.0	0.011	3.4	11.0	8.6	Pass
5300	18.0	27.8	17.0	10.0	24.0	0.010	-1.5	11.0	11.0	Pass
5320	18.0	25.8	17.1	9.1	24.0	0.008	1.1	11.0	9.6	Pass
5500	18.0	27.6	17.1	10.5	24.0	0.011	1.5	11.0	10.7	Pass
5580	18.0	26.3	16.9	9.9	24.0	0.010	1.5	11.0	10.1	Pass
5700	18.0	27.6	17.1	10.5	24.0	0.011	0.9	11.0	11.0	Pass

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A





Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

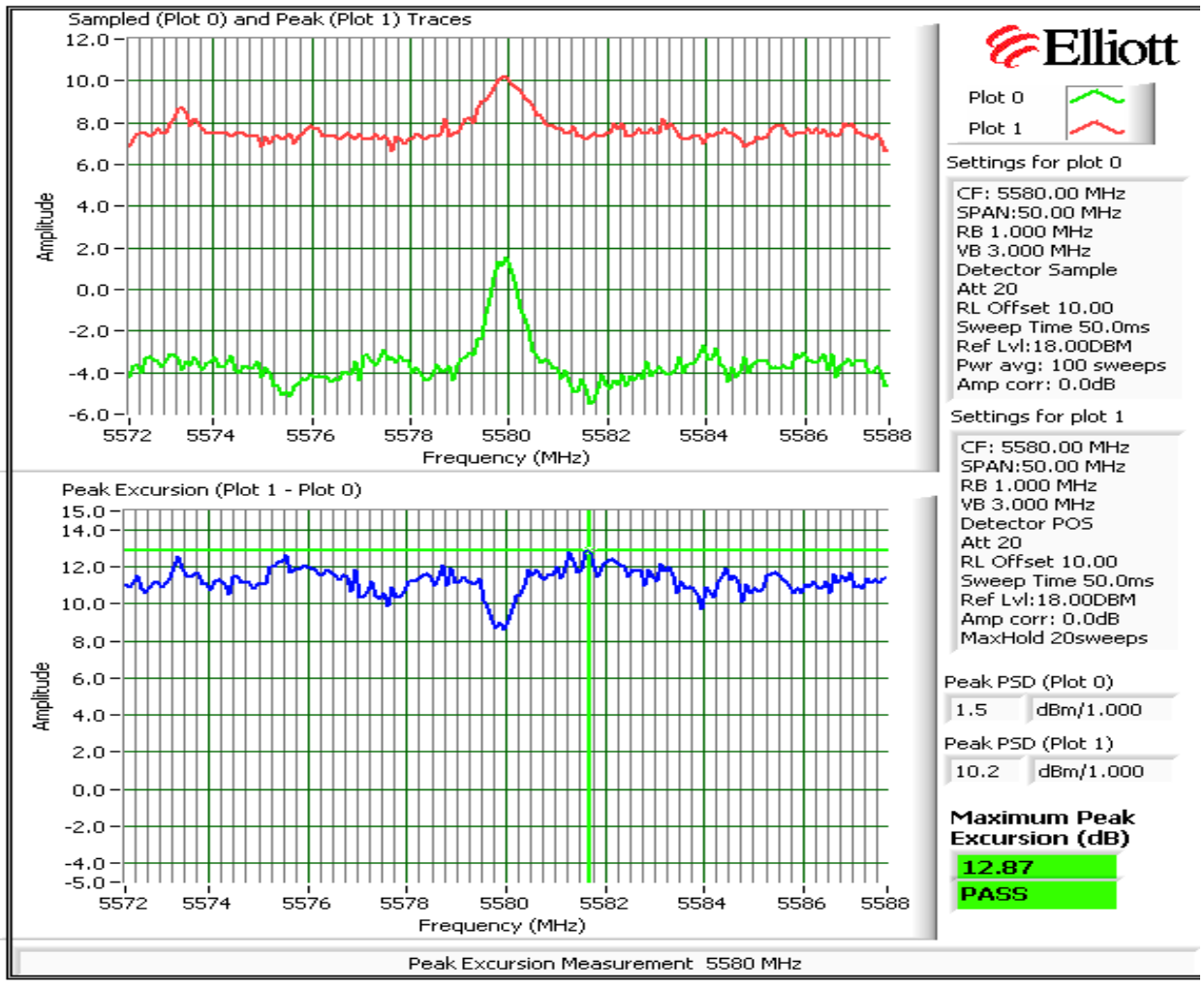
Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	11.3	13.0	5260	10.6	13.0	5500	12.7	13.0
5200	12.4	13.0	5300	11.7	13.0	5580	12.9	13.0
5240	12.8	13.0	5320	12.1	13.0	5700	12.8	13.0

Plots Showing Peak Excursion

Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

Trace B: Same settings as used for power/PSD measurements (RBW = 1 MHz, VBW = 3MHz, Integrated average power)



Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

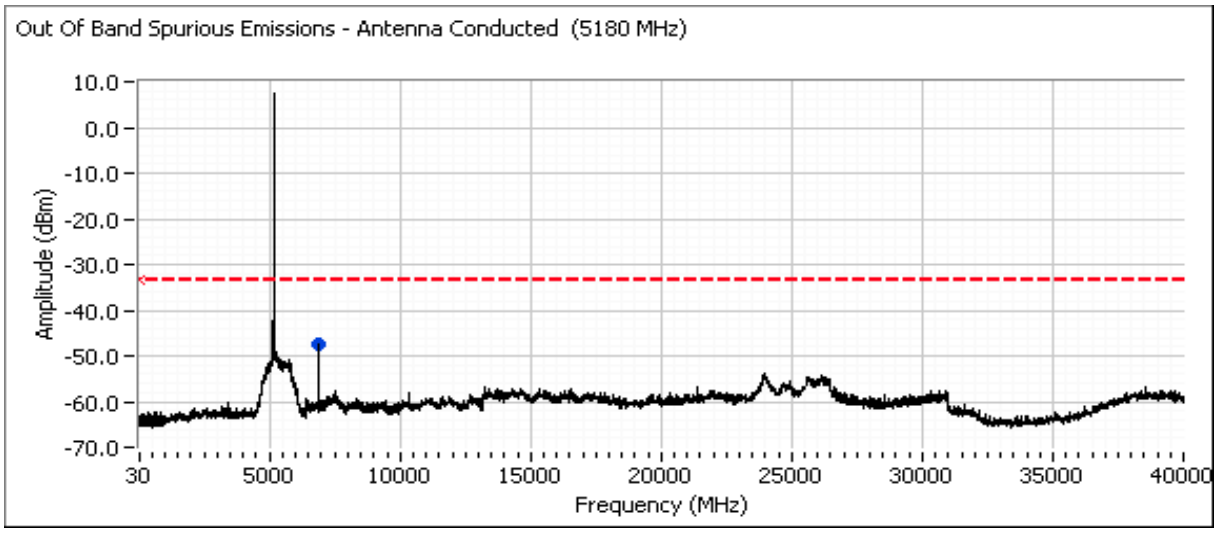
Maximum Antenna Gain:	6.5	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Limit Used On Plots Note 1:	-33.5	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.5	dBm/MHz	Peak Limit (RB=VB=1MHz)

Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
Note 5:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz) with Average Limit of -33.5 dBm

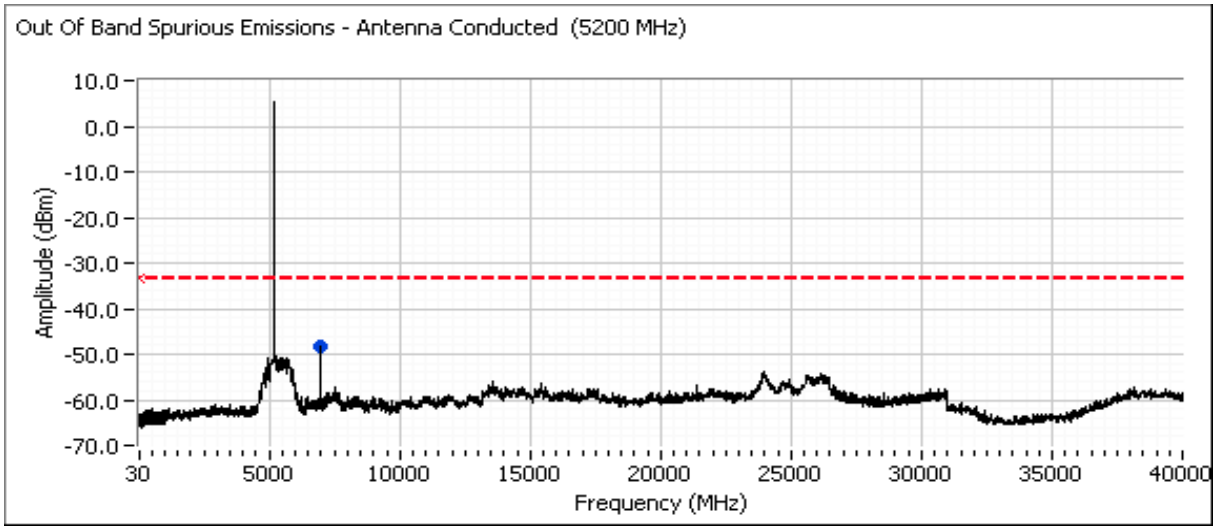
Low channel, 5150 - 5250 MHz Band (channel 36, 5180 MHz)

Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

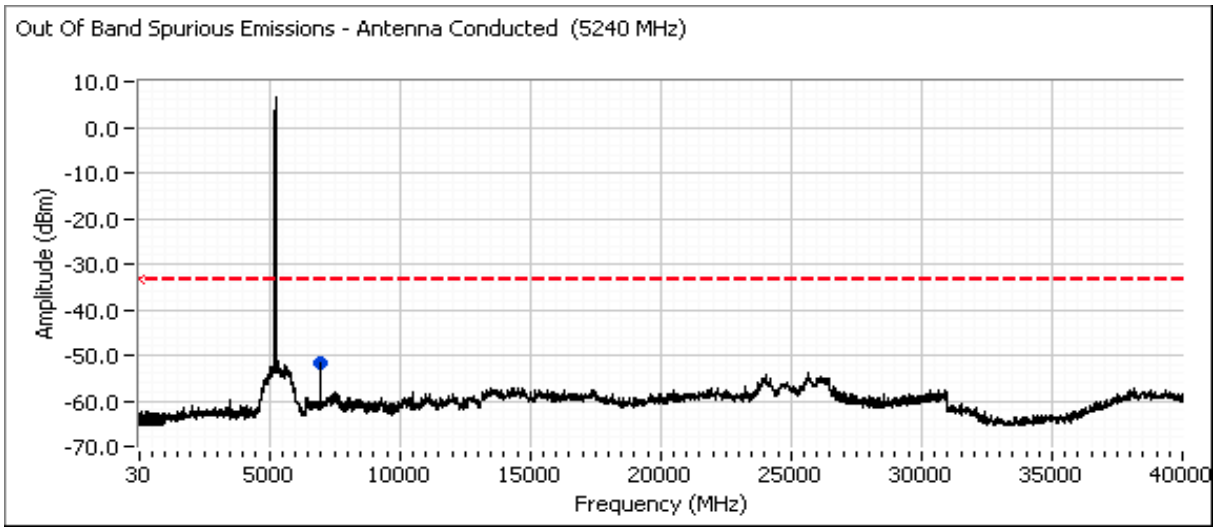


Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

Center channel, 5150 - 5250 MHz Band (Channel 40, 5200 MHz)

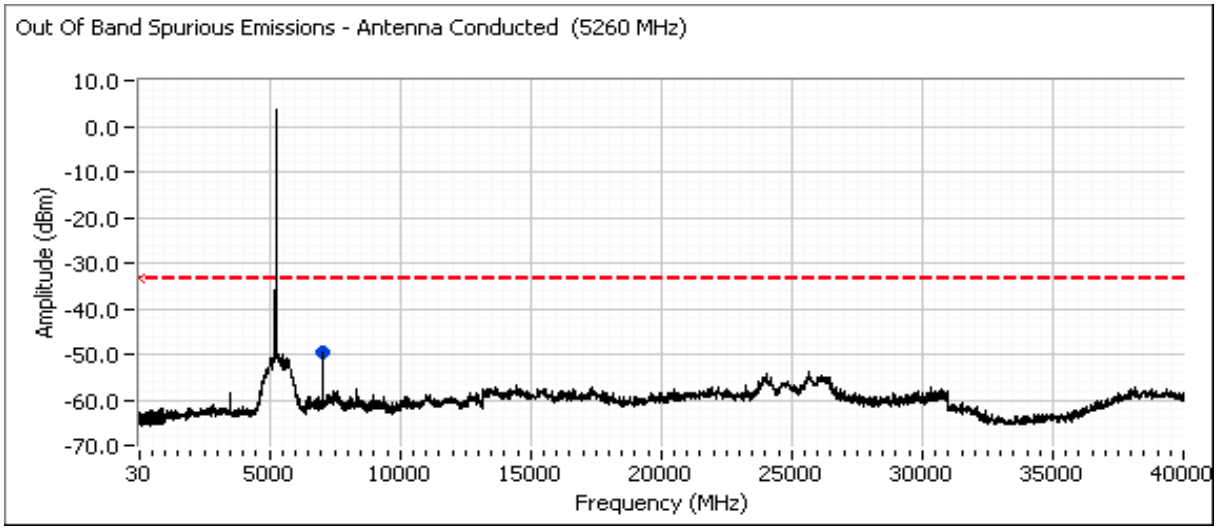


High channel, 5150 - 5250 MHz Band (Channel 48, 5240MHz)

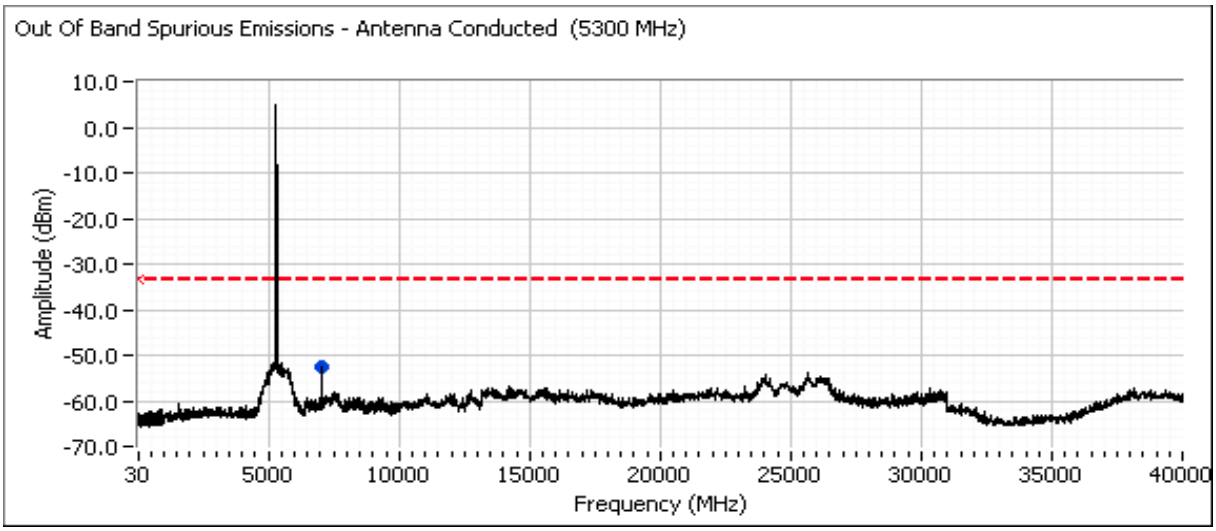


Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

Low channel, 5250 - 5350 MHz Band (Channel 52, 5260MHz)



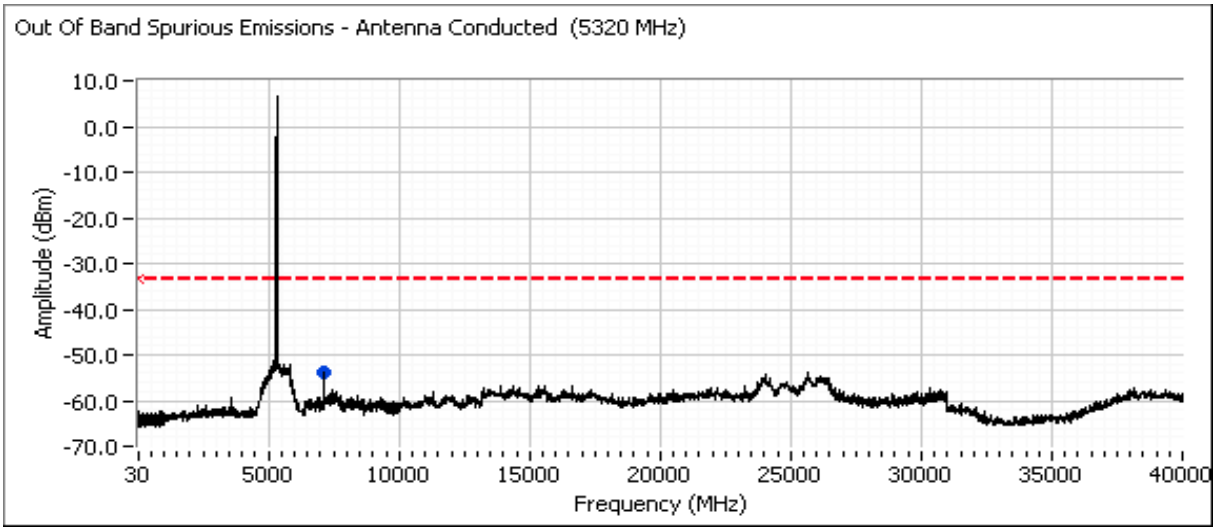
Center channel, 5250 - 5350 MHz Band (Channel 60, 5300MHz)



Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

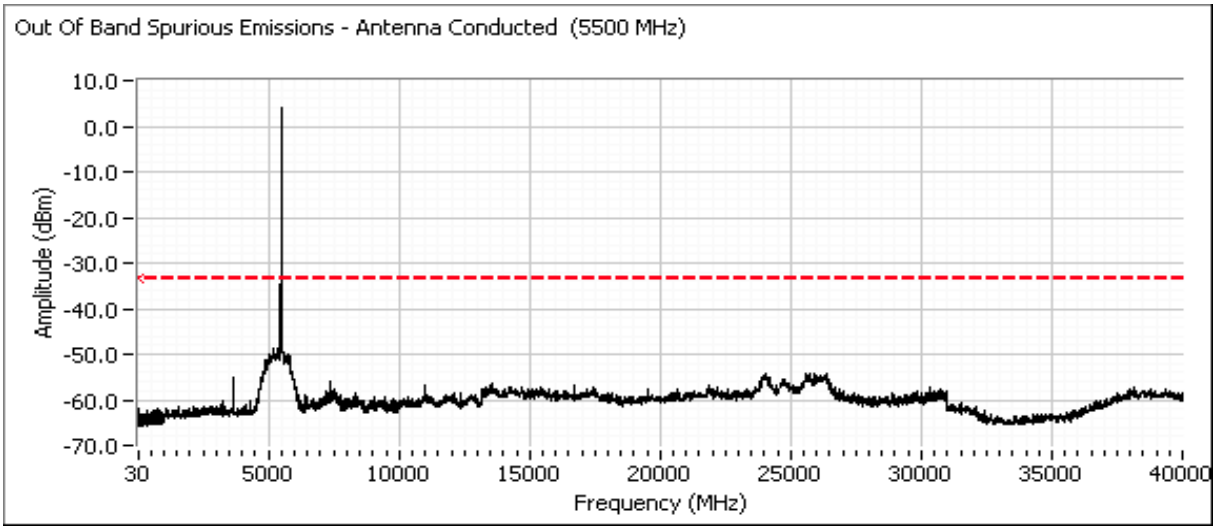
High channel, 5250 - 5350 MHz Band (Channel 64, 5320MHz)

Compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.

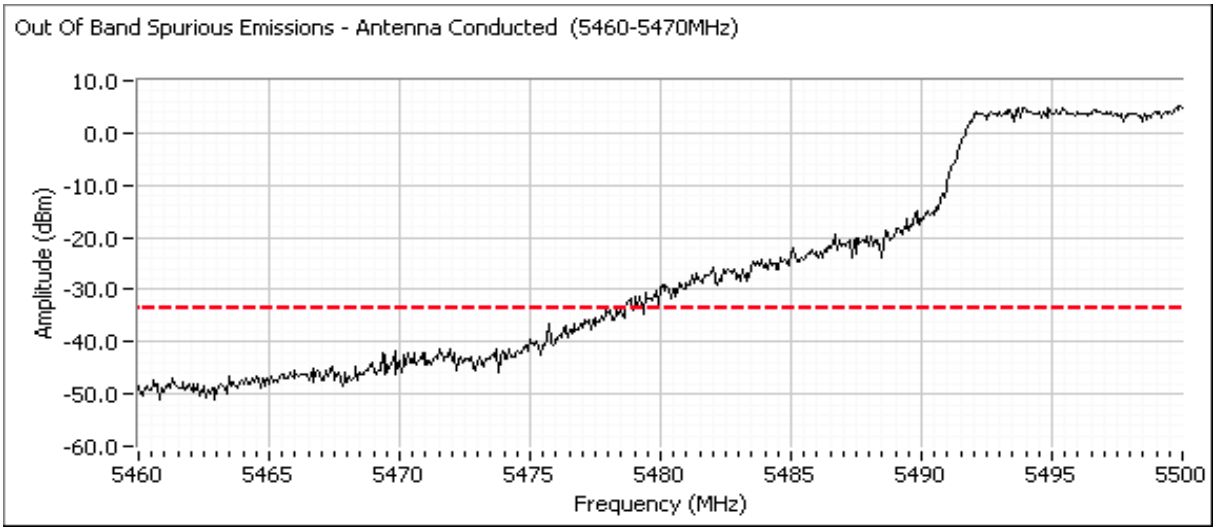


Low channel, 5470 - 5725 MHz Band (Channel 100, 5500MHz)

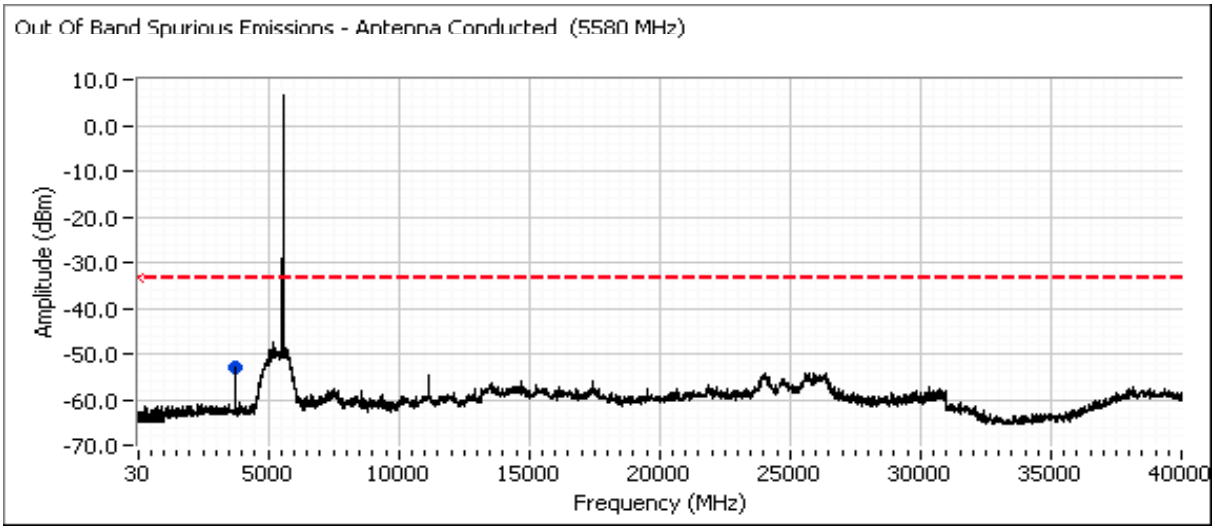
Includes a plot from 5460 - 5500 MHz showing compliance with the limit immediately below the allocated band from 5460-5470 MHz. Compliance with the radiated limits for the restricted band below 5460 MHz is demonstrated through the radiated emissions tests.



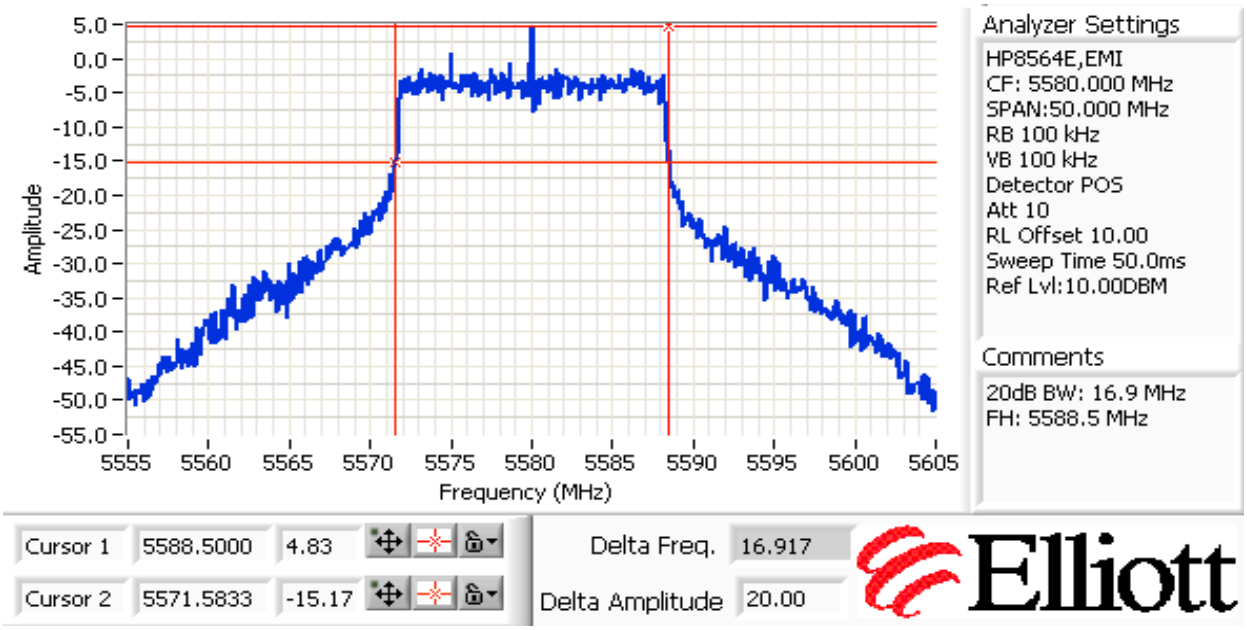
Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A



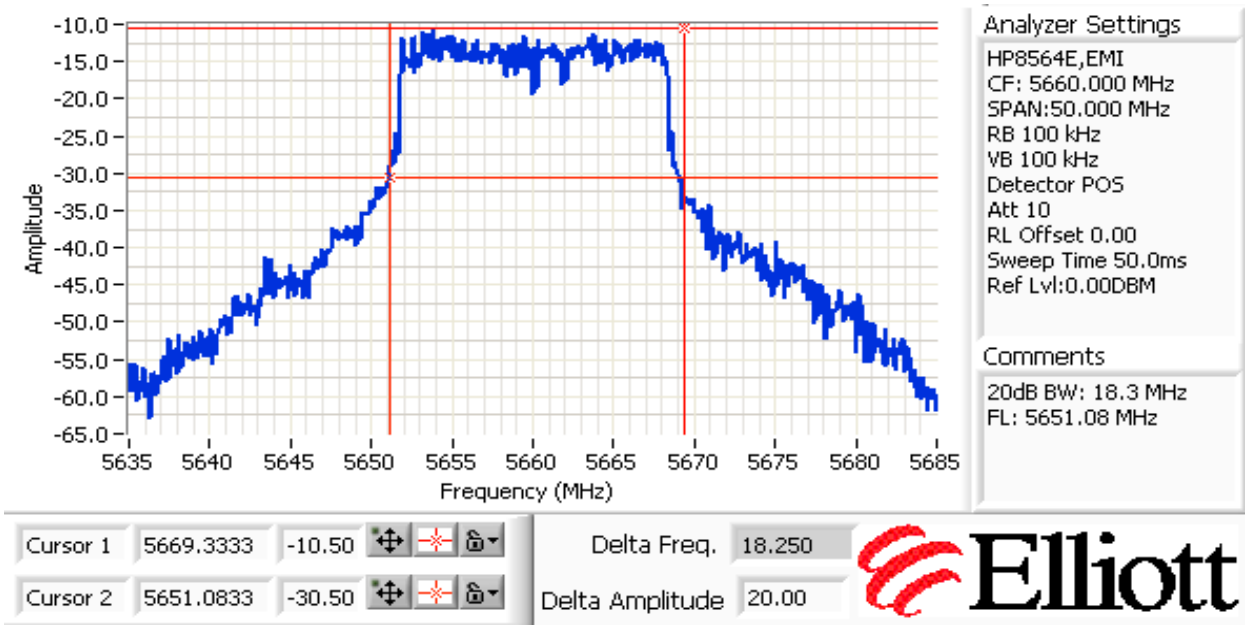
Center channel, 5470 - 5725 MHz Band (Channel 116, 5580MHz)



Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A



Channel adjacent to 5650 MHz



Client:	Summit Data Communications/Data Logic	Job Number:	J77585
Model:	SDC-MSD30AG / Falcon X3	T-Log Number:	T79611
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15 E/RSS 210	Class:	N/A

High channel, 5470 - 5725 MHz Band

Includes a plot from 5700 - 5780 MHz showing compliance with the -27dBm/MHz eirp limit immediately above the allocated band (5725 MHz).