Elliott Laboratories Inc.
www.elliotlabs.com
684 West Maude Avenue
Sunnyvale, CA 94085-3518
408-245-7800 Phone
408-245-3499 Fax

Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to FCC Part 15, Subpart C and RSS 210 Specifications for an Intentional Radiator on the Gyration, Inc.

Model: ***Desktop RF Keyboard part number AS00263***

FCC ID:	JJ4-AS00263
GRANTEE:	Gyration, Inc. 12930 Saratoga Avenue, Suite C-1 Saratoga, CA. 95070
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	April 25, 2003
FINAL TEST DATE:	April 18 and April 21, 2003
AUTHORIZED SIGNATORY:	Mark Briggs Director of Engineering

ACCREDITED

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SCOPE

An electromagnetic emissions test has been performed on the Gyration, Inc. Desktop RF Keyboard part number AS00263 pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC 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.

The test results recorded herein are based on a single type test of the Gyration, Inc. Desktop RF Keyboard part number AS00263 and therefore apply only to the tested sample. The sample was selected and prepared by Daryl McMurrin of Gyration, Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators and receivers. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their 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.

STATEMENT OF COMPLIANCE

The tested sample of Gyration, Inc. Desktop RF Keyboard part number AS00263 complied with the requirements of Subpart C of Part 15 of the FCC Rules and section 8 of RSS 210 for low power intentional radiators.

Maintenance of FCC 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.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Gyration, Inc. Desktop RF Keyboard part number AS00263. The actual test results are contained in an exhibit of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The conducted emissions requirements of FCC Rules Part 15 Section 15.207 and section 6.6 of RSS 210 did not apply to the equipment under test as it is battery powered and does not connect, directly or indirectly, to an AC power source.

LIMITS OF RADIATED FIELD STRENGTH –INTENTIONAL RADIATOR

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.235 and RSS 210 section 8, Standards for LPDs Identified as Category II Equipment.

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an exhibit of this report.

30 – 1000 MHz

Frequency MHz	Level dBuV/m	Pol v/h	FCC 15.235 / RSS 210 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
49.825	67.2	h	80.0	-12.8	Avg	214	3.2	Fundamental
99.650	30.9	h	43.5	-12.6	QP	0	1.0	Highest Spurious Emission

MEASUREMENT UNCERTAINTIES

ISO Guide 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 NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Gyration, Inc. Desktop RF Keyboard part number AS00263 is a wireless keyboard. The EUT is designed to operate in the US at 49.82-49.9 MHz band and Europe at 40MHz band using FSK. This test report is for the US/Canada version of the Keyboard.

Normally, the EUT would be located on a tabletop during operation. The EUT was, treated as table-top equipment during testing to simulate the end user environment.

The sample was received on April 18, 2003 and tested on April 18 and April 21, 2003. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Gyration, Inc. Desktop RF Keyboard part number AS00263	s/n T1#84, T1#88

ENCLOSURE

The keyboard enclosure is primarily constructed of plastic. It measures approximately 5 cm high by 10 cm deep by 40 cm long. The receiver enclosure is primarily constructed of plastic. It measures approximately 5 cm high by 10 cm deep by 40 cm long.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

No support equipment was used during emissions testing.

EXTERNAL I/O CABLING

The device has no I/O ports.

EUT OPERATION

The EUT was transmitting continually at 49.825 MHz (center channel). Additional measurements were made on the top and bottom channels to verify that the signal level within 10kHz of the band edges was more than 26dB below the fundamental signal level and the signal level more than 10kHz from either band edge was below the field strength limit of 15.209

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on April 18 and April 21, 2003 at the Elliott Laboratories Open Area Test Site #3 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. 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. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 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.

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.

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 biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

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.

ANSI C63.4 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 FCC requires 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, 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

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

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. 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. Emissions, which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

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, SECTION 15.207

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

RADIATED EMISSIONS SPECIFICATION LIMIT – FUNDAMENTAL SIGNAL

The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters when measured with an average detector. The peak level of the signal shall not exceed the average limit by more than 20dB. The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in Section 15.209, whichever permits the higher emission levels.

RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

Spurious emissions separated by more than 10-kHz form the allocated band are subject to the limits detailed in the table below:

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

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, 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

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

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 1000 MHz, 11-Apr-03
Engineer: Jay

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Biconical Antenna, 30-300 MHz	3110B	363	12	5/28/2002	5/28/2003
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12	12/27/2002	12/27/2003

Radiated Emissions, 30 - 1000 MHz, 18-Apr-03
Engineer: Chris

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Biconical Antenna, 30-300 MHz	3110B	1320	12	6/3/2002	6/3/2003
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	12	10/30/2002	10/30/2003
Rohde & Schwarz	Test Receiver, 20-1300MHz	ESVP	213	12	7/22/2002	7/22/2003
Hewlett Packard	Spectrum Analyzer, 9KHz - 26.5GHz	8563E	1141	12	3/19/2003	3/19/2004

Conducted Emissions, 18-Apr-03
Engineer: volivas

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Elliott Laboratories	FCC / CISPR LISN	LISN-4, O/	362	12	4/19/2002	4/30/2003
Elliott Laboratories	LISN 2 x (Solar 8028 LISN + 6512 Cap	LISN-5,Su	379	12	8/20/2002	8/20/2003
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	12	7/18/2002	7/18/2003
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	274	12	1/24/2003	1/24/2004

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T50837 6 Pages

Elliott

EMC Test Data

Client:	Gyration	Job Number:	J50774
Model:	Desktop RF Keyboard and USB Mini Dual Receiver	T-Log Number:	T50837
		Account Manager:	Rob Holt
Contact:	Daryl McMurrin		
Emissions Spec:	FCC 15.235	Class:	B
Immunity Spec:	-	Environment:	

EMC Test Data

For The

Gyration

Model

Desktop RF Keyboard and USB Mini Dual Receiver

Date of Last Test: 4/21/2003

Client:	Gyration	Job Number:	J50774
Model:	Desktop RF Keyboard and USB Mini Dual Receiver	T-Log Number:	T50837
		Account Mangager:	Rob Holt
Contact:	Daryl McMurrin		
Emissions Spec:	FCC 15.235	Class:	B
Immunity Spec:	-	Environment:	

EUT INFORMATION

General Description

The EUT is a wireless keyboard. The EUT is designed to operate in the US at 49.82-49.9 MHz band and Europe at 40MHz band using FSK. Normally, the EUT would be located on a tabletop during operation. The EUT was, treated as table-top equipment during testing to simulate the end user environment.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Gyration	RF Keyboard part number AS-00263-001	wireless keyboard	s/n T1#84, T1#88	
Gyration	Desktop RF Keyboard part number AS00263	wireless keyboard	s/n T1 61	
Gyration	USB Mini Dual Receiver part number AS-00262-001	Receiver	17	

Other EUT Details

EUT Enclosure

The keyboard enclosure is primarily constructed of plastic. It measures approximately 5 cm high by 10 cm deep by 40 cm long. The receiver enclosure is primarily constructed of plastic. It measures approximately 5 cm high by 10 cm deep by 40 cm long.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

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EMC Test Data

Client:	Gyration	Job Number:	J50774
Model:	Desktop RF Keyboard and USB Mini Dual Receiver	T-Log Number:	T50837
		Account Manager:	Rob Holt
Contact:	Daryl McMurrin		
Emissions Spec:	FCC 15.235	Class:	B
Immunity Spec:	-	Environment:	

Test Configuration #1 (Transmitter)

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

The device has no I/O ports

EUT Operation During Emissions

The EUT was transmitting continually at 49.825 MHz

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EMC Test Data

Client:	Gyration	Job Number:	J50774
Model:	Desktop RF Keyboard and USB Mini Dual Receiver	T-Log Number:	T50837
		Account Manager:	Rob Holt
Contact:	Daryl McMurrin		
Spec:	FCC 15.235	Class:	B

Radiated Emissions

Test Specifics

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: 4/18/2003
Test Engineer: Chris Byleckie
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: Battery powered

General Test Configuration

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

On the OATS, the measurement antenna was located 3 meters from the EUT for the measurement range 30 - 1000 MHz.

Ambient Conditions:

Temperature: 16 °C
Rel. Humidity: 49 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE Fundamental Signal Level	15.235	Pass	-12.8dB @ 49.825MHz
2	RE, Maximized Radiated Emissions 30 -1000MHz	15.209	Pass	-34.4dB @ 348.775MHz
3	RE, Band Edge	15.235	Pass	See Plots

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.

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EMC Test Data

Client:	Gyration	Job Number:	J50774
Model:	Desktop RF Keyboard and USB Mini Dual Receiver	T-Log Number:	T50837
		Account Manager:	Rob Holt
Contact:	Daryl McMurrin		
Spec:	FCC 15.235	Class:	B

S/N 88

Run #1: Fundamental Signal Level

Frequency	Level	Pol	15.235		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
49.825	67.2	h	80.0	-12.8	Avg	214	3.2	
49.825	60.1	v	80.0	-19.9	Avg	300	1.0	
49.825	67.7	h	100.0	-32.3	Pk	214	1.2	
49.825	61.0	v	100.0	-39.0	Pk	300	1.0	

Run #2: Maximized Radiated Emissions 30 - 1000MHz. Sorted by margin

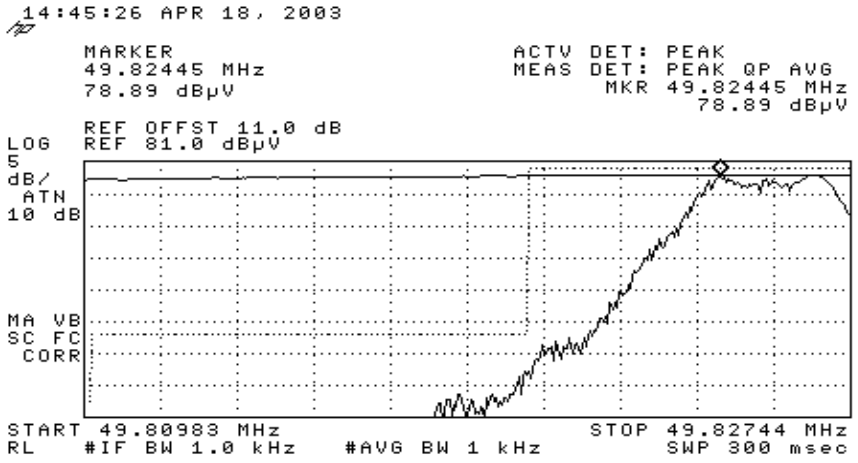
Frequency	Level	Pol	15.235		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
99.650	30.9	h	43.5	-12.6	QP	0	1.0	Signal Substitution
99.650	30.8	v	43.5	-12.7	QP	0	1.0	Signal Substitution
199.300	26.0	h	43.5	-17.5	QP	0	1.0	Signal Substitution
298.950	21.4	h	46.0	-24.6	QP	0	1.1	
199.300	18.5	v	43.5	-25.0	QP	0	1.0	Signal Substitution
149.475	16.2	h	43.5	-27.3	QP	91	2.1	
398.600	18.0	h	46.0	-28.0	QP	32	1.0	
249.125	17.9	h	46.0	-28.1	QP	0	1.2	
298.950	17.3	v	46.0	-28.7	QP	0	1.0	
498.250	16.3	h	46.0	-29.7	QP	0	1.0	
149.475	13.2	v	43.5	-30.3	QP	0	1.0	
498.250	15.7	v	46.0	-30.3	QP	0	1.0	
249.125	15.4	v	46.0	-30.6	QP	0	1.0	
348.775	15.2	h	46.0	-30.8	QP	21	1.0	
448.425	13.5	v	46.0	-32.5	QP	0	1.0	
448.425	13.3	h	46.0	-32.7	QP	0	1.0	
398.600	13.0	v	46.0	-33.0	QP	0	1.0	
348.775	11.6	v	46.0	-34.4	QP	0	1.0	

Client:	Gyration	Job Number:	J50774
Model:	Desktop RF Keyboard and USB Mini Dual Receiver	T-Log Number:	T50837
		Account Manager:	Rob Holt
Contact:	Daryl McMurrin		
Spec:	FCC 15.235	Class:	B

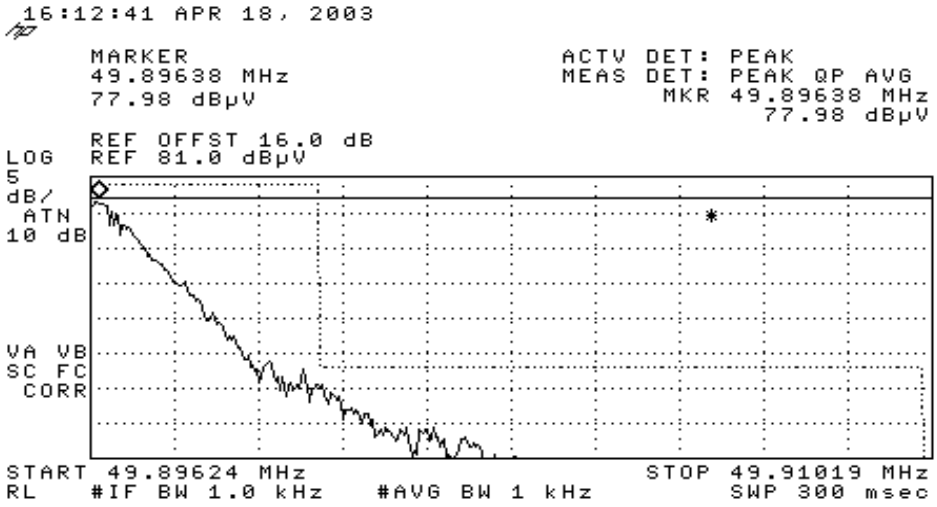
Run #3 Band Edge Considerations:

The following plots were made with the unit operating on the highest and lowest channels. Each plot contains two traces, the first uses a resolution bandwidth of 120kHz to show that the peak level of the modulated and unmodulated signals are the same. The second trace uses a resolution bandwidth of 1kHz to demonstrate that:

- within 10kHz of the band edges, the signal level is more than 26dB below the fundamental signal level
- more than 10kHz from either band edge the signal level is below the field strength limit of 15.209



Lowest channel



Highest Channel