

Logitech Inc.

F-0179A

July 20, 2003

Report No. LABT0059

Report Prepared By:



1-888-EMI-CERT

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Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test
Issue Date: July 20, 2003
Logitech Inc.
Model : F-0179A

Emissions

Description	Pass	Fail
FCC 15.247, Spurious Radiated Emissions	☒	☐
FCC 15.247, Spurious Conducted Emissions	☒	☐
FCC 15.247, Band Edge Compliance	☒	☐
FCC 15.247, Power Spectral Density	☒	☐
FCC 15.247, Occupied Bandwidth	☒	☐
FCC 15.247, Output Power	☒	☐

The equipment was tested in the configuration and mode(s) of operation provided by the client. The specific tests and test levels were specified by the client. Any additional tests, or product configurations that should be tested are the responsibility of the client. Product compliance is the responsibility of the client.

Modifications made to the product

- See the modifications page of the report

Deviations to the test standard

- No deviations were made to the test standard

Test Facility

- The measurement facility used to collect the data is located at:

Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with the FCC (Federal Communications Commission), and accepted by the FCC in a letter maintained in our files.

Approved By:

Don Facteau, IS Manager

This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: The Open Area Test Sites, and conducted measurement facilities, have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files.

TCB: Northwest EMC has been accredited by ANSI to ISO/IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



A2LA: Accreditation has been granted to Northwest EMC, Inc. to perform the Electromagnetic Compatibility (EMC) tests described in the Scope of Accreditation. Assessment performed to ISO/IEC 17025. Certificate Number: 1936-01, Certificate Number: 1936-02, Certificate Number 1936-03



Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body. (A2LA)



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0302C



TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



Industry Canada: Accredited by Industry Canada for performance of radiated measurements. Our open area test sites comply with RSP 100, Issue 7, section 3.3.



VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Nos. - Evergreen: C-1071 and R-1025, Trails End: C-694 and R-677, Sultan: C-905, R-871 and R-1172, North Sioux City C-1246, R-1185 and R-1217)



BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.



CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement



GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



	FCC	NIST	TUV PS	TUV Rheinland	Nemko	Technology International	Industry Canada	BSMI	VCCI	GOST	NATA
IEC 1000-4-2			✓	✓	✓	✓					
IEC 1000-4-3			✓	✓	✓	✓					
IEC 1000-4-4			✓	✓	✓	✓					
IEC 1000-4-5			✓	✓	✓	✓					
IEC 1000-4-6			✓	✓	✓	✓					
IEC 1000-4-8			✓	✓	✓	✓					
IEC 1000-4-11			✓	✓	✓	✓					
IEC 1000-3-2			✓	✓	✓	✓					
IEC 1000-3-3			✓	✓	✓	✓					
AS/NZS 3548											✓
CNS 13438								✓			
ISO/IEC Guide 25			✓	✓	✓	✓		✓			
ISO/IEC17025			✓	✓	✓	✓					
Radiated Emissions			✓	✓	✓	✓	✓	✓	✓	✓	
Conducted Emissions			✓	✓	✓	✓	✓	✓	✓	✓	
OATS Sites	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Hillsboro 5-Meter Chamber (EV01)	✓		✓	✓	✓	✓	✓	✓	✓	✓	
TCB for Licensed Transmitters	✓										
TCB for un-Licensed Transmitters	✓										
Cab for R&TTE		✓									
CAB for EMC		✓									

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

NORTHWEST EMC
Evergreen Facility
22975 NW Evergreen Pkwy #400
Hillsboro, OR 97124
David Tolman Phone: 503 844 4066

ELECTRICAL (EMC)

Valid until: July 31, 2004

Certificate Number: 1936-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC) tests:

EMC StandardsTitle*Radiated & Conducted Emissions*

CFR 47, FCC Part 15 using ANSI C63.4

American National Standard for methods of measurement of radio-noise emissions for low-voltage electrical and electronic equipment in the range of 9 kHz to 40GHz.

CISPR 22

Limits and methods of measurement of radio disturbance characteristics of information technology equipment.

CNS 13438

Limits and methods of measurement of radio interference characteristics of information technology equipment.

EN 55022

Limits and methods of measurement of radio disturbance characteristics of information technology equipment.

Canada ICES-003

Digital apparatus

AS/NZS 3548

Australian/New Zealand Standard Limits and methods of measurement of radio disturbance characteristics of information technology equipment

Canada ICES-001

Industrial, scientific and medical radio frequency generators

CNS 13803

Industrial, Scientific and Medical Instrument

(A2LA Cert. No. 1936.01) 06/28/02

AS/NZS 2064	Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
EN 61000-6-3	Electromagnetic capability – Generic emission standard. Part 1: Residential, commercial and light industry. (I.S.)
EN 61000-6-4	Electromagnetic compatibility – Generic emission standard. Part 2: Industrial environment
VCCI V-3/99.05	Technical Requirements
VCCI V-4/99.05	Instruction for Test Conditions for Requirement under Test
CISPR 11	Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
EN 55011	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
EN 55103-1	Electromagnetic Compatibility – Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1: Emission
EN 61000-3-2	Electromagnetic compatibility (EMC). Part 3: Limits Section 2: Limits for harmonic current emissions
EN 61000-3-3	Electromagnetic compatibility (EMC). Part 3: Limits Section 2: Limitation of voltage fluctuations and flicker in low-voltage supply systems.
GR-1089 Section 3 (excluding analog voice band)	Bellcore electromagnetic compatibility and electrical safety – Generic criteria for network telecommunications equipment.
<i>Immunity</i>	
EN 61000-4-2 AS/NZS 61000-4-2	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 2: Electrostatic discharge immunity test – Basic EMC Publication
EN 61000-4-3 AS/NZS 61000-4-3	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 3: Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4 AS/NZS 61000-4-4	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 4: Electrical fast transient/burst immunity test – Basic EMC publication

EN 61000-4-5 AS/NZS 61000-4-5	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques. Section 5: Surge immunity test.
EN 61000-4-6 AS/NZS 61000-4-6	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 6: Immunity to conducted disturbances, induce by radio-frequency fields.
EN 61000-4-8	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 8: Power frequency magnetic field immunity test.
EN 61000-4-11	Electromagnetic Compatibility (EMC) Part 4: Testing and measurement techniques. Section 11: Voltage dips, short interruptions and voltage. Variations immunity tests.
EN 61000-6-1	Electromagnetic Compatibility (EMC)- Part 6: Generic standards- Section 1: Immunity for residential, commercial and light-industrial environments
EN 61000-6-2	Electromagnetic Compatibility (EMC)- Part 6: Generic standards- Section 2: Immunity for industrial environments
IEEE/ANSI C62.41	IEEE recommended practice on surge voltages in low-voltage AC power circuits
<i>Product Standards</i>	
GR-1089 Section 3 (excluding voice band)	Bellcore electromagnetic compatibility and electrical safety – Generic criteria for network telecommunications equipment.
EN 61326	Electrical equipment for measurement, control and laboratory use – EMC requirements
EN 60601-1-2	Medical electrical equipment Part 1: general requirements for safety Section 2: Collateral standard: Electromagnetic compatibility – requirements and tests
EN 50130-4	Alarm Systems. Part 4: Electromagnetic compatibility. Product family standard: Immunity requirements for components of fire, intruder and social alarm systems.
EN 55103-2	Electromagnetic Compatibility – Product family standard for audio, video, audio-visual and entertainment lighting control professional use. Part 2: Immunity
EN 55024	Immunity Requirements for Information Technology Equipment – ITE Immunity

Other Standards

ETS 300 220	Electromagnetic compatibility and Radio spectrum matters (ERM); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Parameters intended for regulatory purposes; Part 2: Supplementary parameters not intended for regulatory Purposes
ETS 300 224	Electro Magnetic Compatability and Radio Spectrum Matters; Paging Services; Technical characteristics and test methods for on site paging service devices.
ETS 300 328	Radio Equipment and Systems (RES); Wideband transmission systems; Technical characteristics and test conditions for data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques
ETS 300 489-1	Electro Magnetic Compatability and Radio Spectrum Matters; Common Technical Requirements
ETS 300 489-2	Specific conditions for radio paging equipment
ETS 300 489-3	Specific conditions for Short Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
Canadian RSS-102	Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields
Canadian RSS-119	Land Mobile and Fixed Radio Transmitters and Receivers, 27.41 to 960 MHz
Canadian RSS-123	Low Power Licensed Radiocommunication Devices
Canadian RSS-139	Licensed Radiocommunications Devices in the Band 2400- 2483.5 MHz
Canadian RSS-210	Industry Canada – Low power license-exempt radio communication devices
SAE J1113-41	Radiated and conducted emissions.
SAE J1113-21	Radiated immunity absorber lined chamber (200 MHz – 1 GHz)
SAE J1113-23	Radiated immunity stripline method (only 10 kHz – 200 MHz @ 80 V/m)

SAE J1113-4
(only substitution method)

Conducted immunity Bulk Current Injection

SAE J1113-13

ESD

FCC 47 Parts 22
(Cellular), 24, 25, 26 & 27

TCB Scope B1 (Excluding SAR testing)

FCC 47 Parts 22
(Non-Cellular), 73, 74, 90, 95 & 97

TCB Scope B2 (Excluding SAR testing)

FCC 47 Parts 80 & 87

TCB Scope B3 (Excluding SAR testing)

FCC 47 Parts 21, 74, 101

TCB Scope B4 (Excluding SAR testing)

Onsite Testing

EN61000-6-2

Generic Immunity Standard for Industrial Applications

EN61000-6-4

Generic Emissions Standard for Industrial Applications

What is measurement uncertainty?

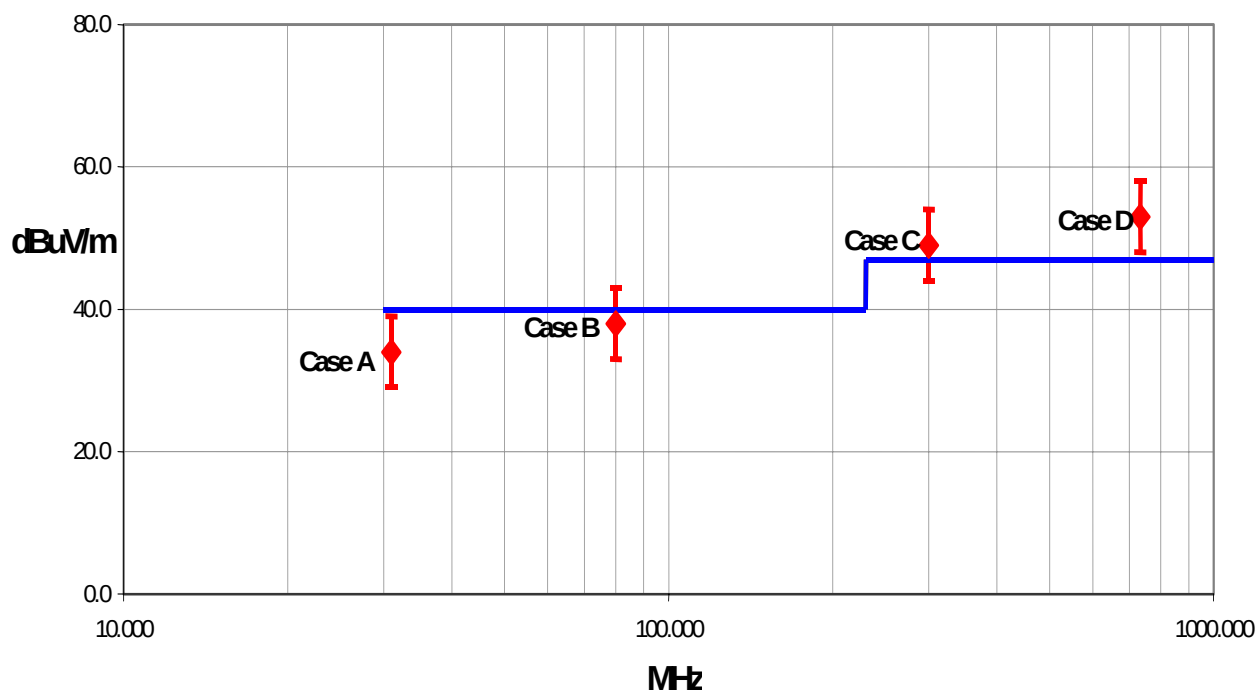
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:

Case A: Product complies.

Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz

Value (dB)

Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 - 2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49

Radiated Emissions > 1 GHz

Value (dB)

Test Distance	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25	+ 1.29 - 1.25	+ 1.38 - 1.35	+ 1.38 - 1.35
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 2.57 - 2.51	+ 2.57 - 2.51	+ 2.76 - 2.70	+ 2.76 - 2.70

Conducted Emissions

Test Distance	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.48
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.97

Radiated Immunity

Test Distance	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.11

Conducted Immunity

Test Distance	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.10

Legend

$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties

U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then $k=3$ (CL of 99.7%) can be used. Please note that with a coverage factor of one, $u_c(y)$ yields a confidence level of only 68%.

**California****Orange County Facility**

41 Tesla Ave.
Irvine, CA 92618
(888) 364-2378
FAX (503) 844-3826

**Oregon****Evergreen Facility**

22975 NW Evergreen Pkwy.,
Suite 400
Hillsboro, OR 97124
(503) 844-4066
FAX (503) 844-3826

**Oregon****Trails End Facility**

30475 NE Trails End Lane
Newberg, OR 97132
(503) 844-4066
FAX (503) 537-0735

**South Dakota****North Sioux City Facility**

745 N. Derby Lane
P.O. Box 217
North Sioux City, SD 57049
(605) 232-5267
FAX (605) 232-3873

**Washington****Sultan Facility**

14128 339th Ave. SE
Sultan, WA 98294
(888) 364-2378
FAX (360) 793-2536

Party Requesting the Test

Company Name:	Logitech Inc.
Address:	1499 SE Tech Center Place Suite 350
City, State, Zip:	Vancouver, WA 98683
Test Requested By:	Mitchell Phillipi
Model:	F-0179A
First Date of Test:	06-23-2003
Last Date of Test:	07-03-2003
Receipt Date of Samples:	06-23-2003
Equipment Design Stage:	Pre-production
Equipment Condition:	Edge of headset was cut into, electrical tape holding unit together

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	2402MHz, 2441MHz, 2480MHz
I/O Ports:	No I/O Ports

Functional Description of the EUT (Equipment Under Test):

Bluetooth™ enabled headset. Battery operated with no provision for transmitting while powered from the AC mains, or while recharging.

Client Justification for EUT Selection:

Not Provided

Client Justification for Test Selection

These tests satisfy the requirements for FCC 15.247 radios.

Equipment modifications				
Item #	Test	Date	Modification	Note
1	Spurious Radiated Emissions	06-23-2003, 06-26-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
2	Spurious Conducted Emissions	06-27-2003, 7-03-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
3	Band Edge Compliance	06-27-2003, 7-03-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
4	Output Power	06-27-2003, 7-03-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
5	Occupied Bandwidth	06-27-2003, 7-03-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
6	Power Spectral Density	06-27-2003, 7-03-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High
Mid
Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software	Special Test Software	Version	Unknown
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Description

The system was tested using special software developed to test all functions of the device during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Headset (low channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (mid channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (high channel)	Logitech Inc.	F-0179A	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

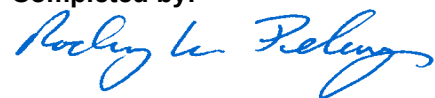
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

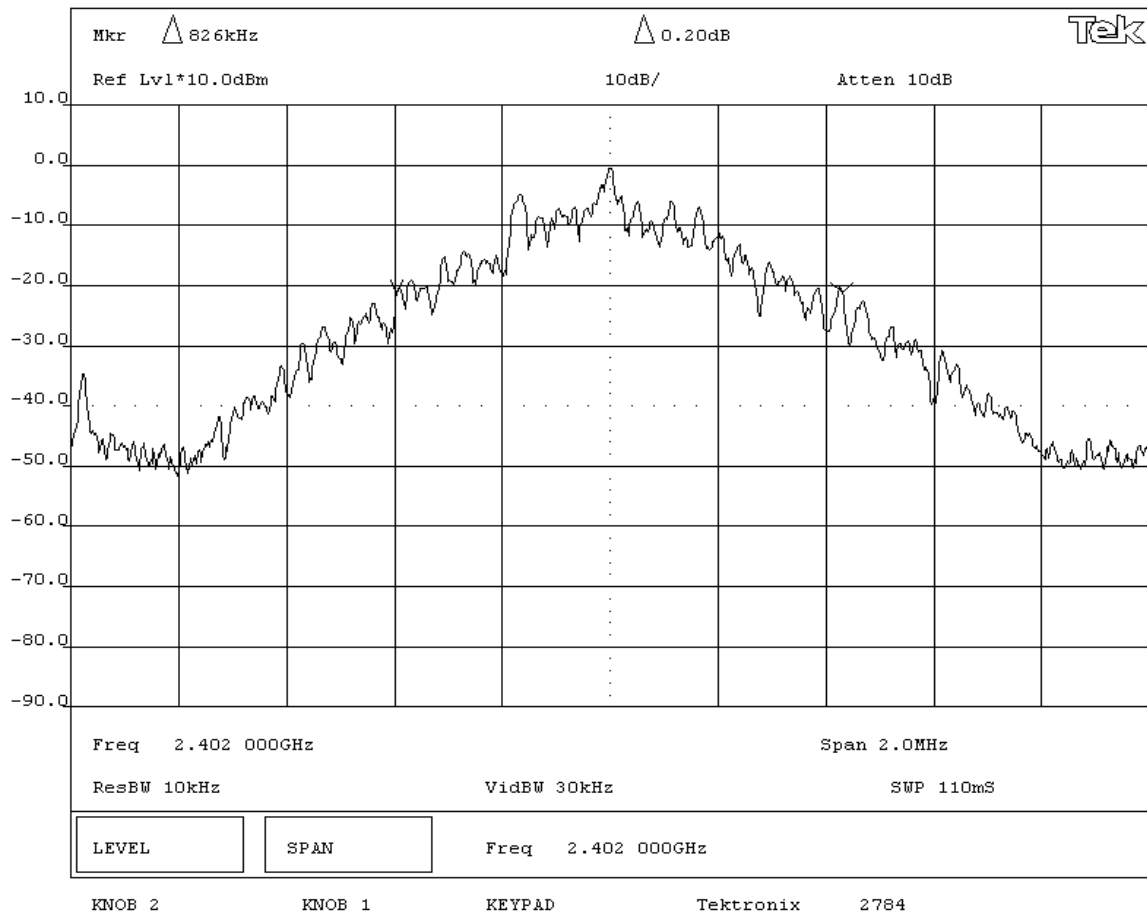
Requirement: Per an FCC Interpretation sent to TCBs on October 8, 2002, frequency hoppers in the 2.4 GHz band operating under 15.247 are required to use a minimum of 15 non-overlapping channels. The hopping channel bandwidth can be wider than 1 MHz as long as the channels do not overlap and all emissions stay within the 2400-2483.5 MHz band. For example, a system that uses the minimum 15 channels can have hopping channel bandwidth that are up to 5 MHz wide. The measurement is made with the spectrum analyzer's resolution bandwidth set to $\geq 1\%$ of the 20dB bandwidth, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

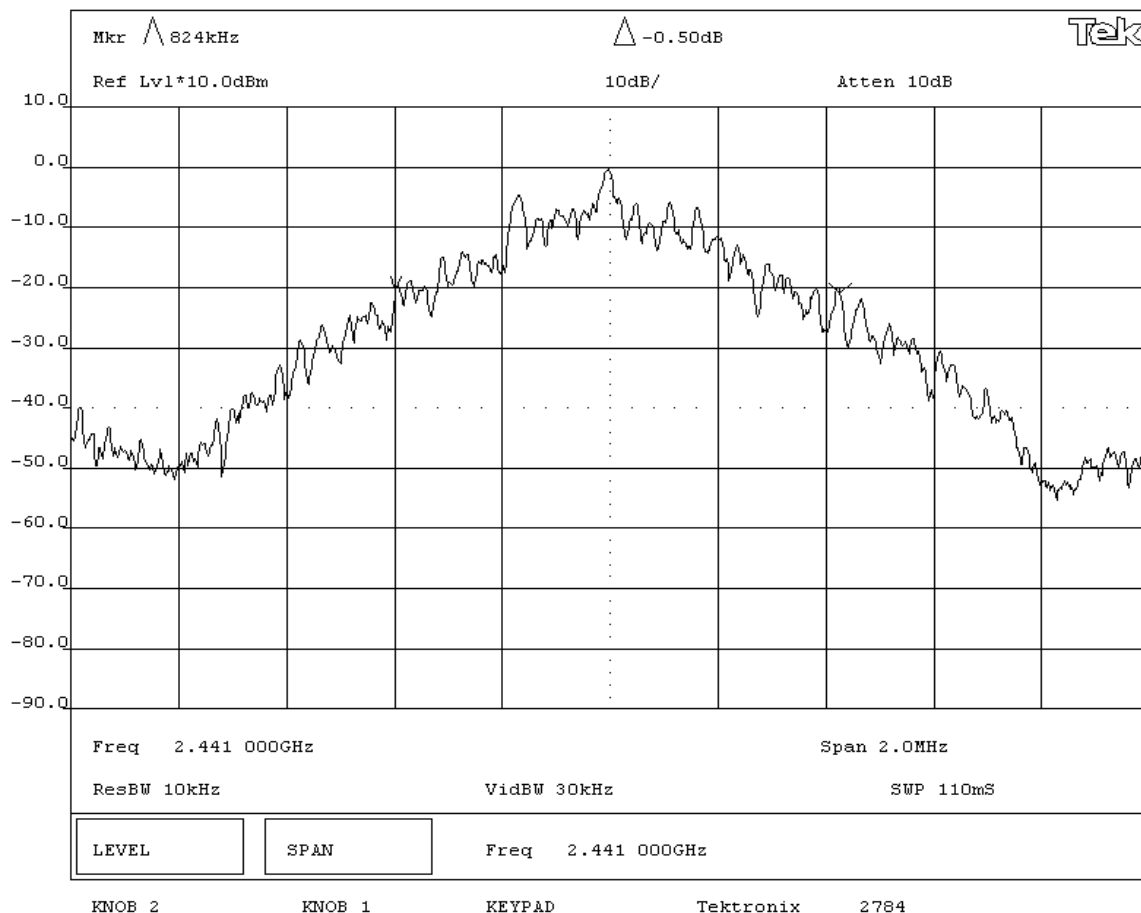
Completed by:



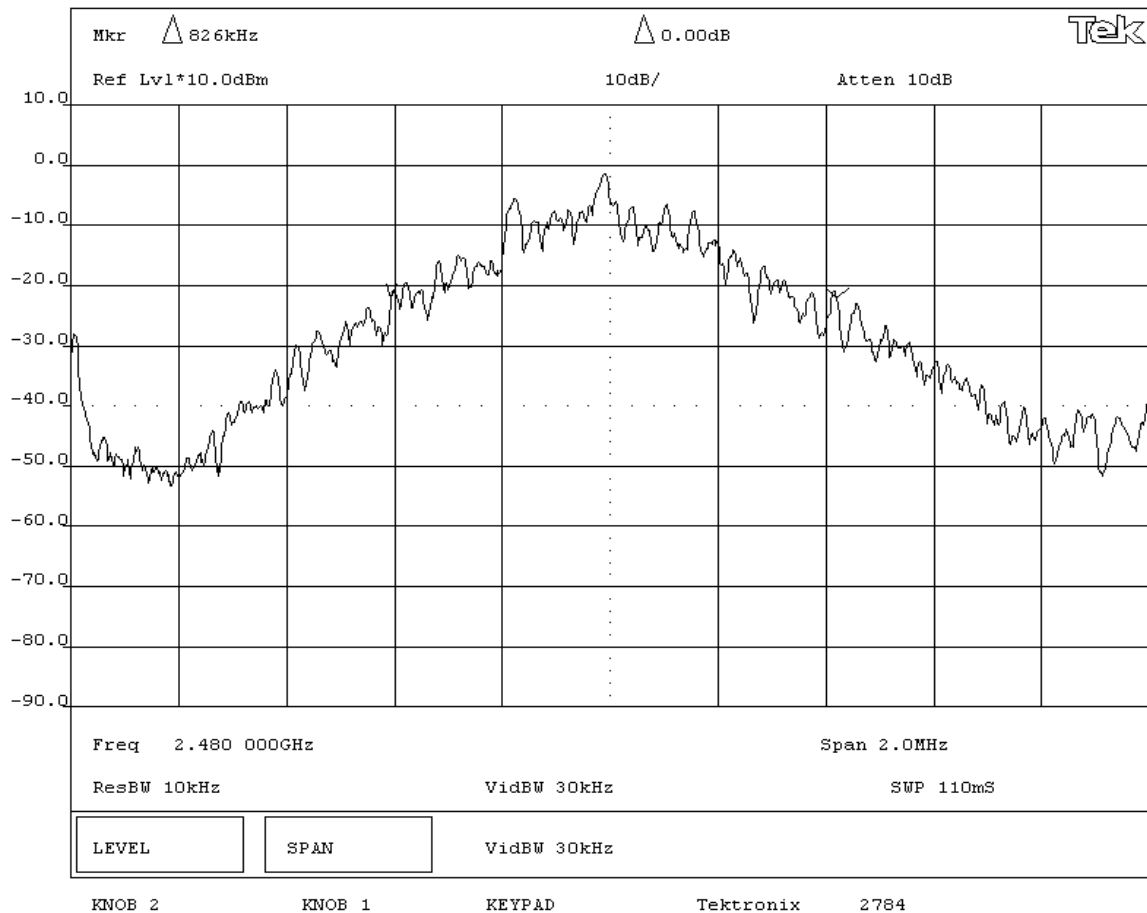
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)(1)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
The maximum 20dB bandwidth of the hopping channel is 1 MHz					
RESULTS					
Pass			BANDWIDTH 826 kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
20dB Bandwidth - Low Channel					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)(1)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
The maximum 20dB bandwidth of the hopping channel is 1 MHz					
RESULTS					
Pass			BANDWIDTH 824 kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
20dB Bandwidth - Mid Channel					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)(1)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
The maximum 20dB bandwidth of the hopping channel is 1 MHz					
RESULTS					
Pass			BANDWIDTH 826 kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
20dB Bandwidth - High Channel					



Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software	Special Test Software	Version	Unknown
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Description

The system was tested using special software developed to test all functions of the device during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Headset (low channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (mid channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (high channel)	Logitech Inc.	F-0179A	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(b)(1), the maximum peak output power must not exceed 1 Watt. The measurement is made using a spectrum analyzer using the following settings:

- Resolution bandwidth set to greater than the 6 dB bandwidth of the modulated carrier, and
- The video bandwidth set to greater than or equal to the resolution bandwidth.

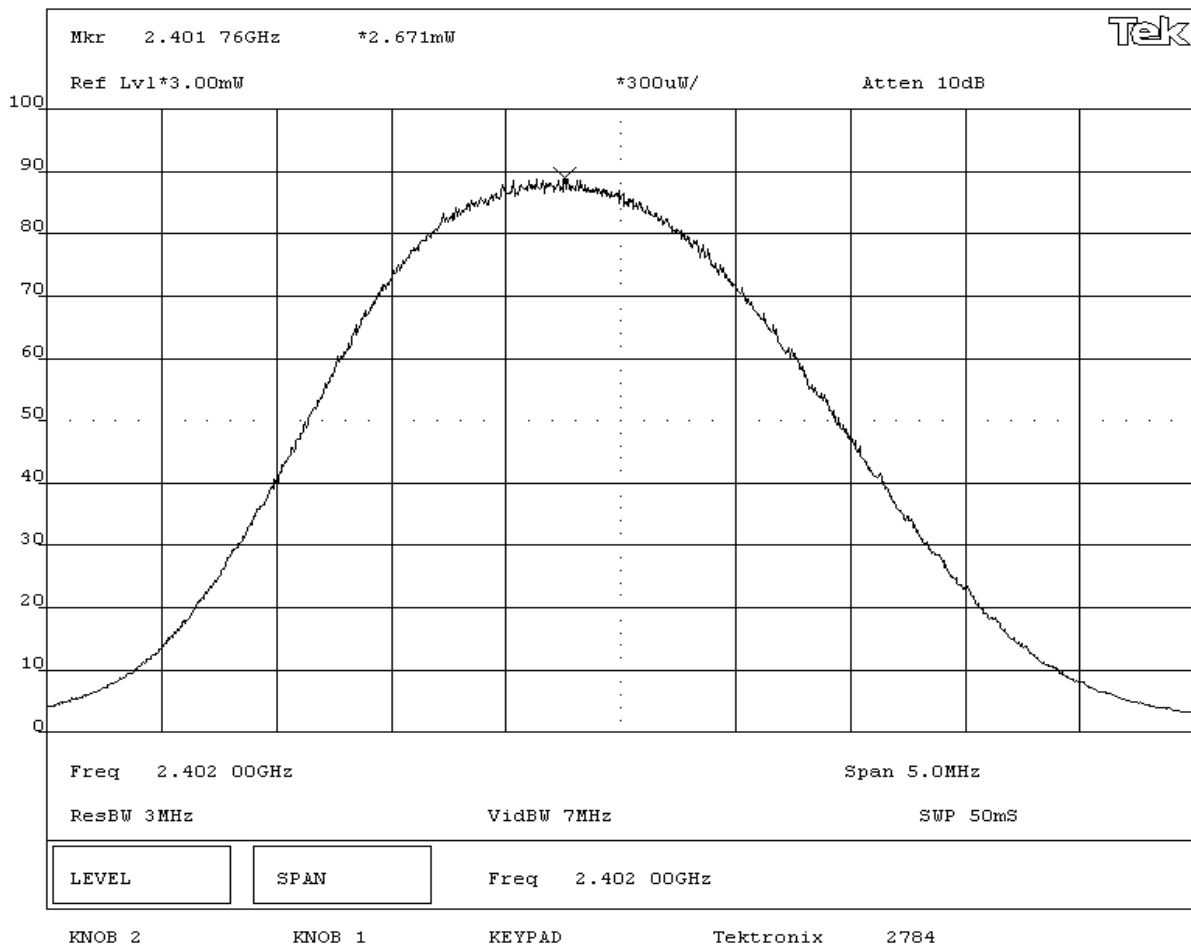
Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

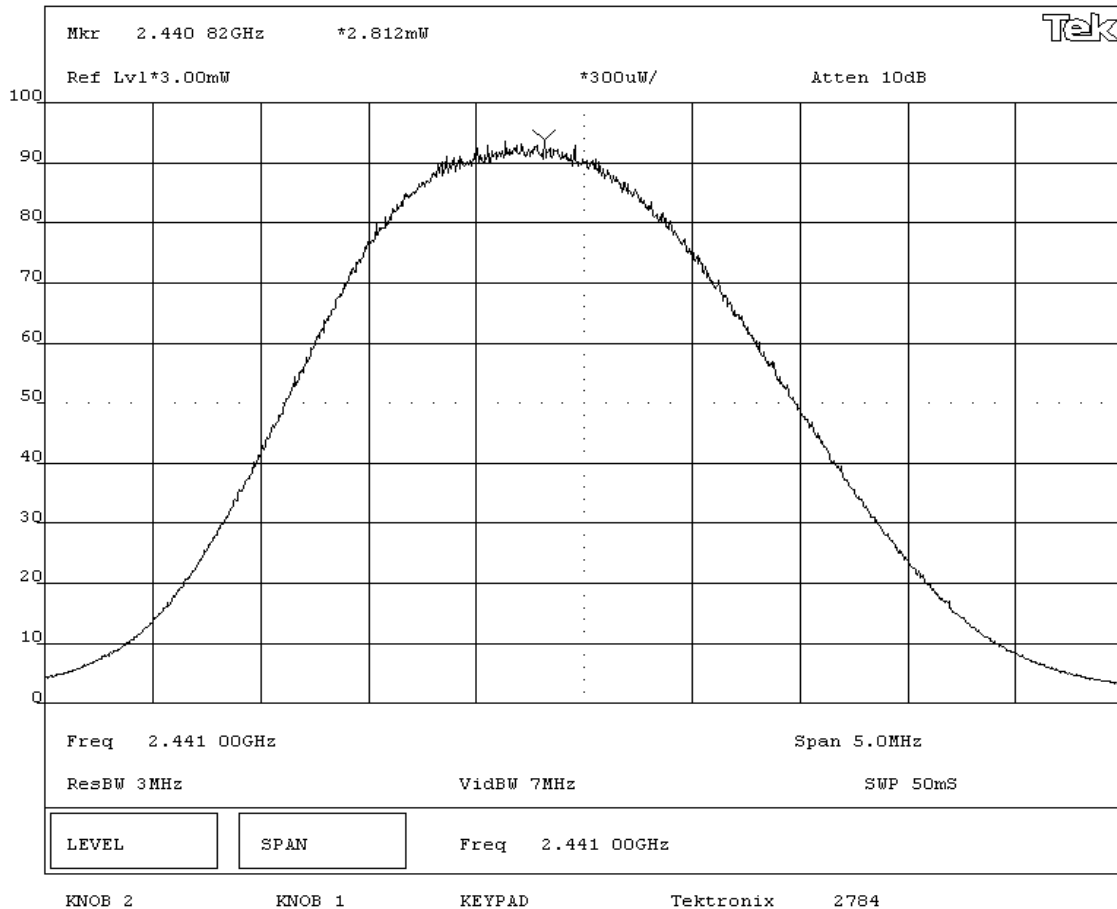
Completed by:



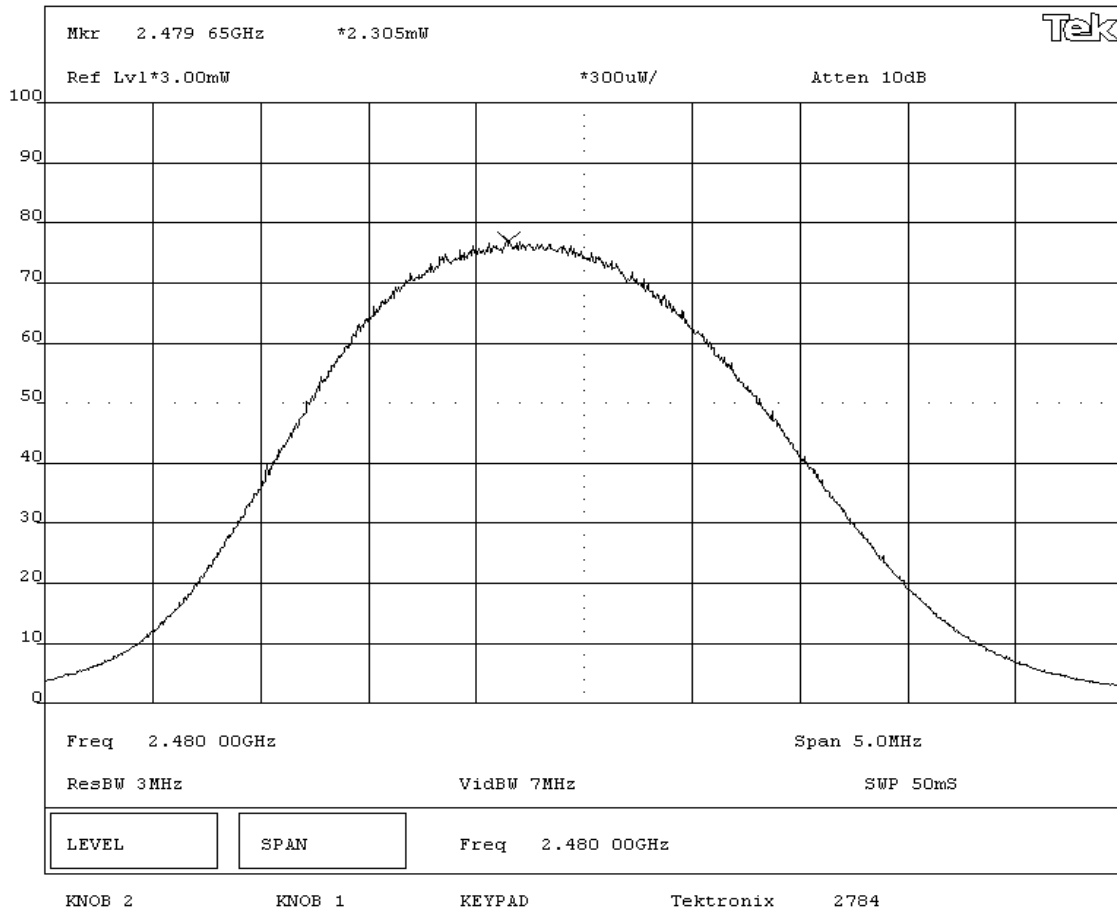
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT:	F-0179A	Work Order:	LABT0059		
Serial Number:	none	Date:	07/03/03		
Customer:	Logitech, Inc.	Temperature:	73 F		
Attendees:	Mitch Phillipi	Tested by:	Greg Kiemel	Humidity:	35% RH
Customer Ref. No.:	N/A	Power:	Battery	Job Site:	EV06
TEST SPECIFICATIONS					
Specification:	47 CFR 15.247(b)(1)	Year:	2003	Method:	DA 00-705, ANSI C63.4
		Year:	1992		
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak conducted output power does not exceed 1 Watt					
RESULTS		AMPLITUDE			
Pass		2.67 mW			
SIGNATURE					
Tested By: _____ 					
DESCRIPTION OF TEST					
Output Power - Low Channel					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(b)(1)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak conducted output power does not exceed 1 Watt					
RESULTS			AMPLITUDE		
Pass			2.81 mW		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Output Power - Mid Channel					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(b)(1)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak conducted output power does not exceed 1 Watt					
RESULTS			AMPLITUDE		
Pass			2.31 mW		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Output Power - High Channel					



Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software

Special Test Software

Version

Unknown

Description

The system was tested using special software developed to test all functions of the device during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Headset (low channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (mid channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (high channel)	Logitech Inc.	F-0179A	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

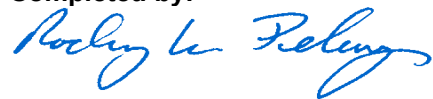
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

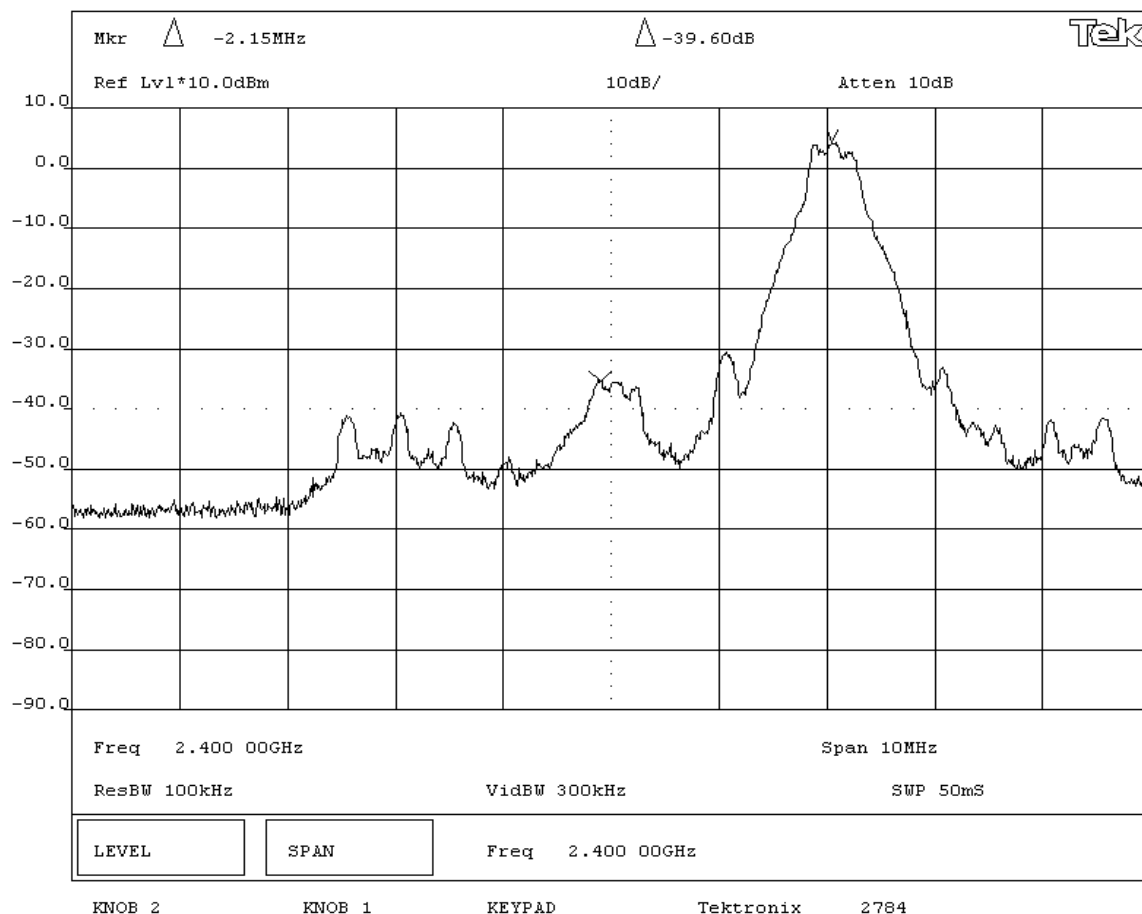
Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

Completed by:



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass			AMPLITUDE -39.6 dBc		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Band Edge Compliance - Low Channel					



EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	F-0179A	Work Order:	LABT0059
Serial Number:	none	Date:	07/03/03
Customer:	Logitech, Inc.	Temperature:	73 F
Attendees:	Mitch Phillipi	Tested by:	Greg Kiemel
Customer Ref. No.:	N/A	Power:	Battery
		Humidity:	35% RH
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	Year:	2003	Method:	DA 00-705, ANSI C63.4	Year:	1992
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SAMPLE CALCULATIONS

SAMPLE CALCULATIONS

COMMENTS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS

Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS

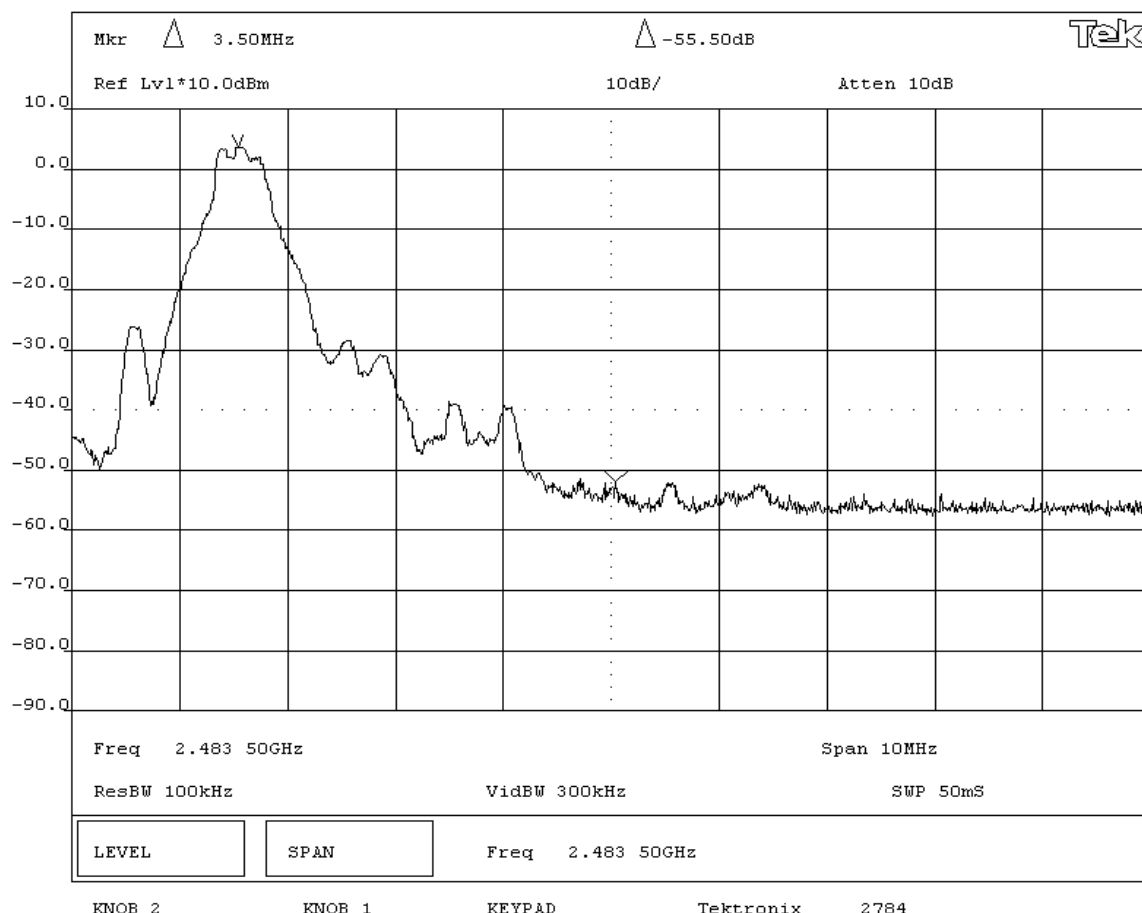
RESULTS	AMPLITUDE
Pass	-55.5 dBc

SIGNATURE _____

Tested By:

DESCRIPTION OF TEST

Band Edge Compliance - High Channel



Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Frequency Range Investigated

Start Frequency	0 MHz	Stop Frequency	25 GHz
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Software\Firmware Applied During Test

Exercise software	Special Test Software	Version	Unknown
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Description

The system was tested using special software developed to test all functions of the device during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Headset (low channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (mid channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (high channel)	Logitech Inc.	F-0179A	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

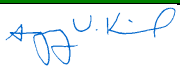
Test Description

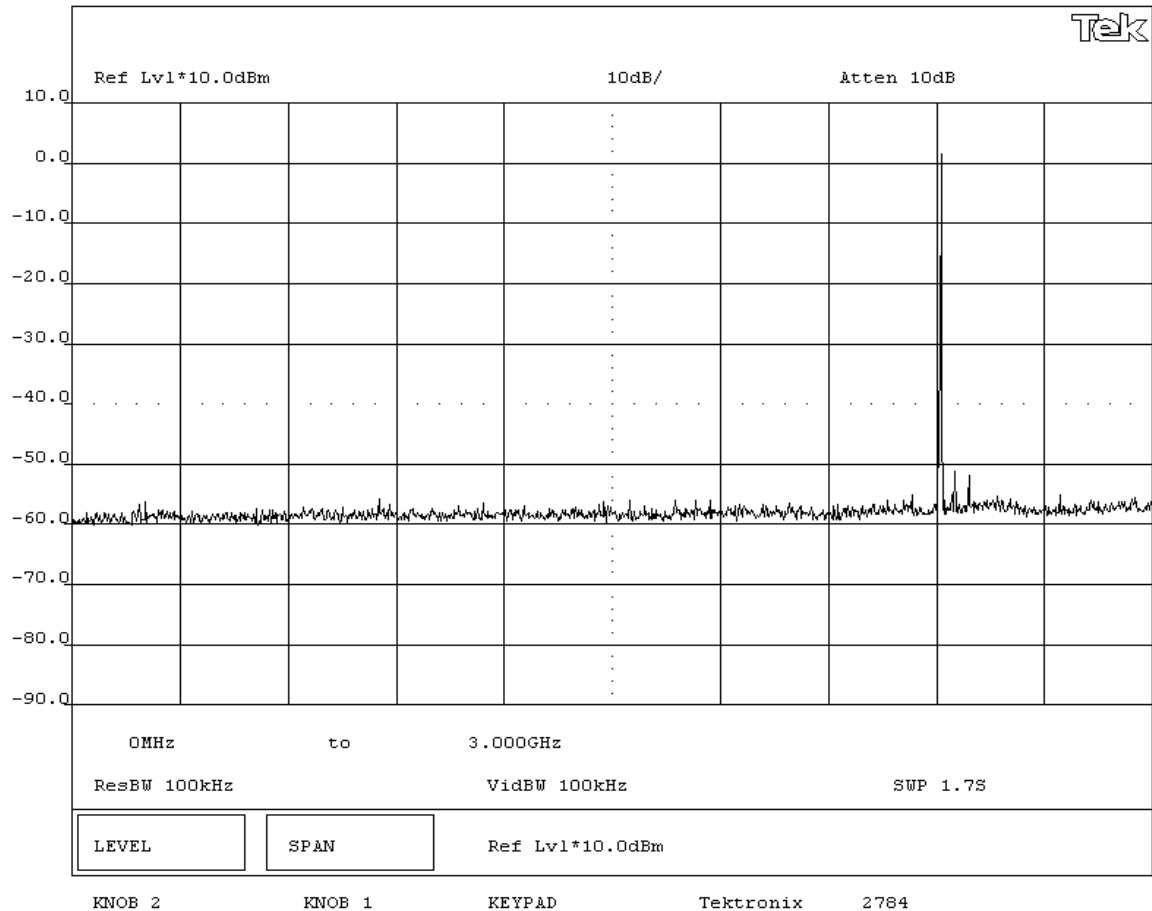
Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

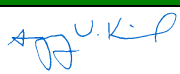
Configuration: The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

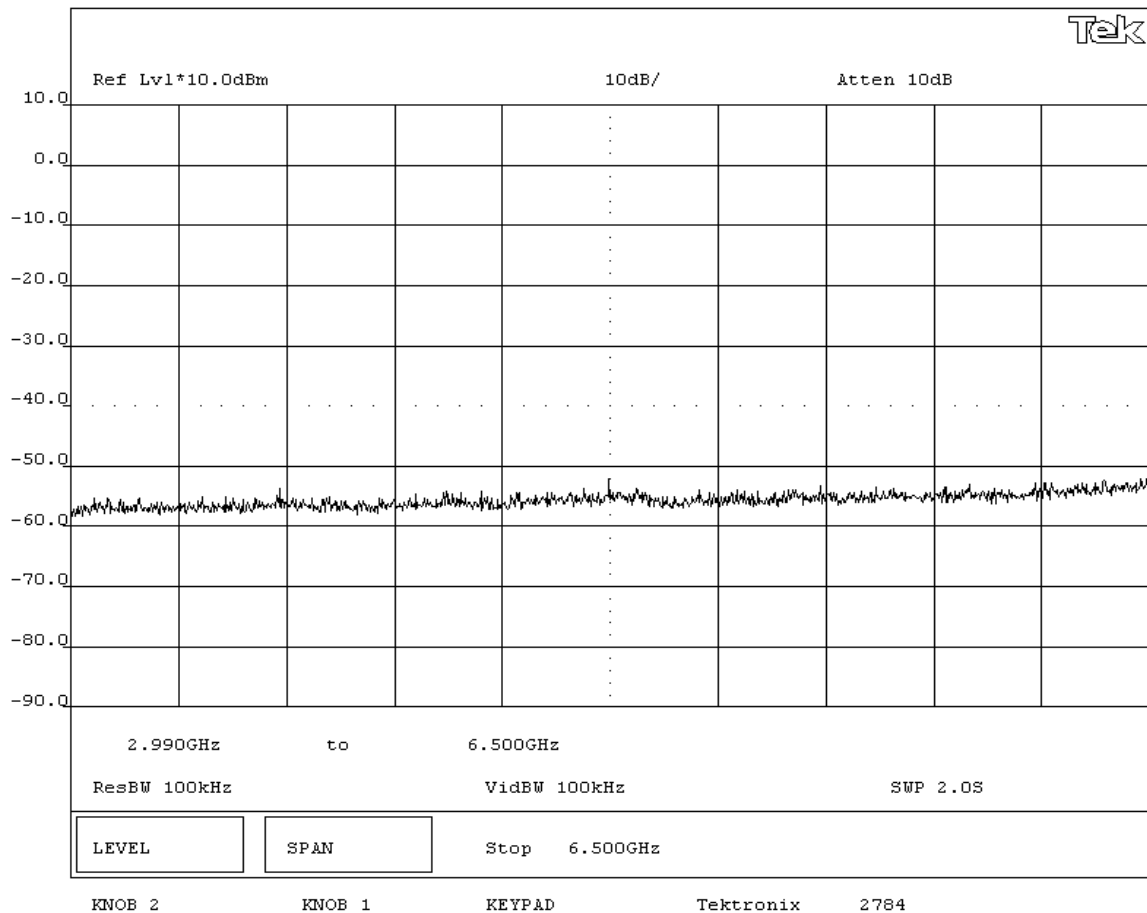
Completed by:



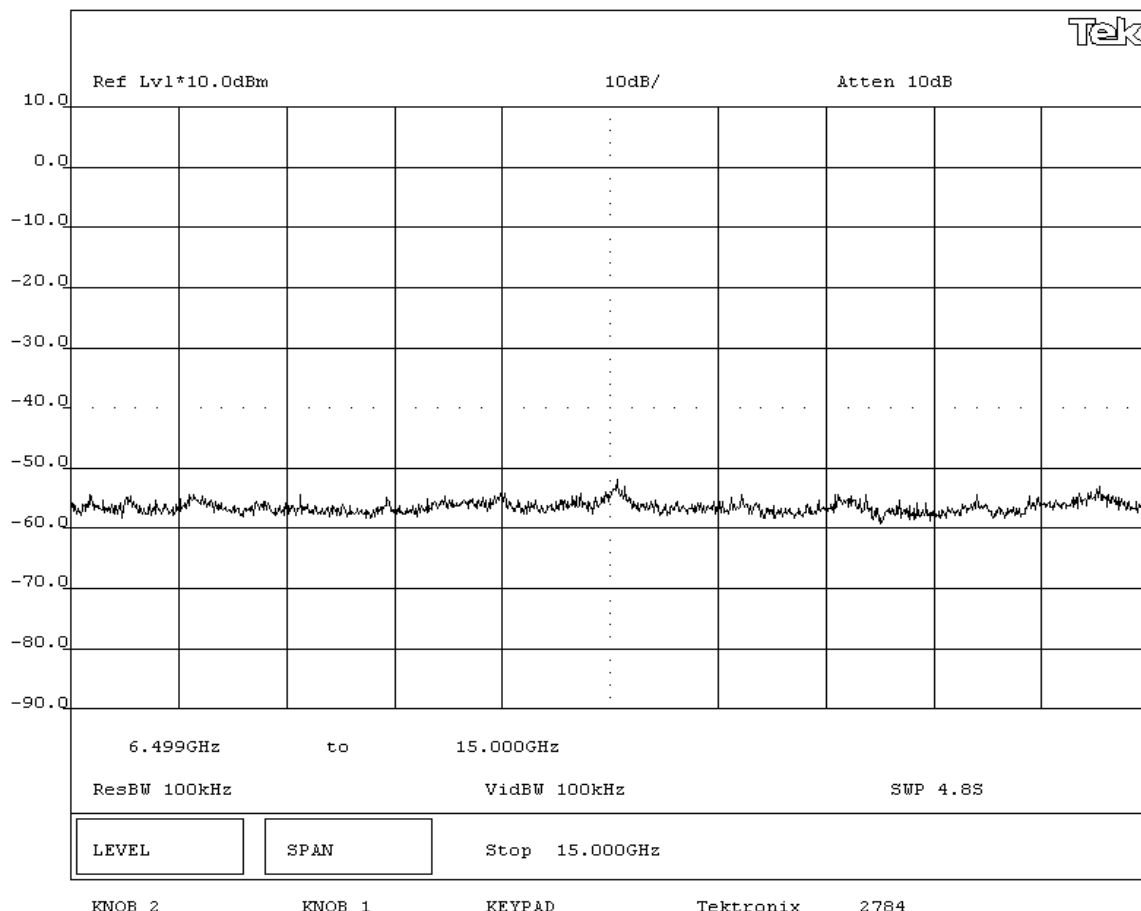
NORTHWEST EMC				EMISSIONS DATA SHEET				Rev BETA 01/30/01	
EUT: F-0179A				Work Order: LABT0059					
Serial Number: none				Date: 07/03/03					
Customer: Logitech, Inc.				Temperature: 73 F					
Attendees: Mitch Phillipi				Tested by: Greg Kiemel				Humidity: 35% RH	
Customer Ref. No.: N/A				Power: Battery				Job Site: EV06	
TEST SPECIFICATIONS									
Specification: 47 CFR 15.247(c)				Year: 2003		Method: DA 00-705, ANSI C63.4		Year: 1992	
SAMPLE CALCULATIONS									
COMMENTS									
EUT OPERATING MODES									
Modulated by PRBS at maximum data rate									
DEVIATIONS FROM TEST STANDARD									
None									
REQUIREMENTS									
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental									
RESULTS									
Pass									
SIGNATURE									
 Tested By: _____									
DESCRIPTION OF TEST									
Antenna Conducted Spurious Emissions - Low Channel 0MHz-3GHz									



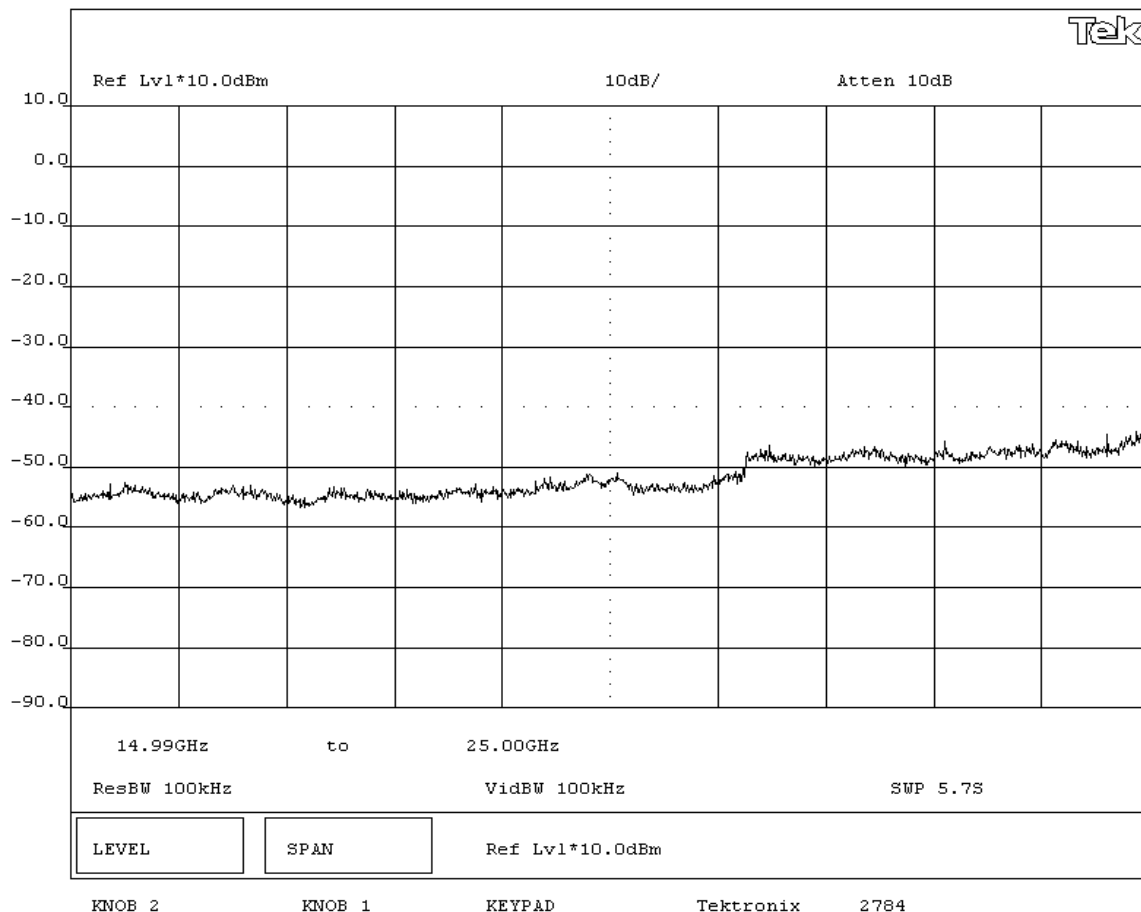
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - Low Channel 3GHz-6.5GHz					



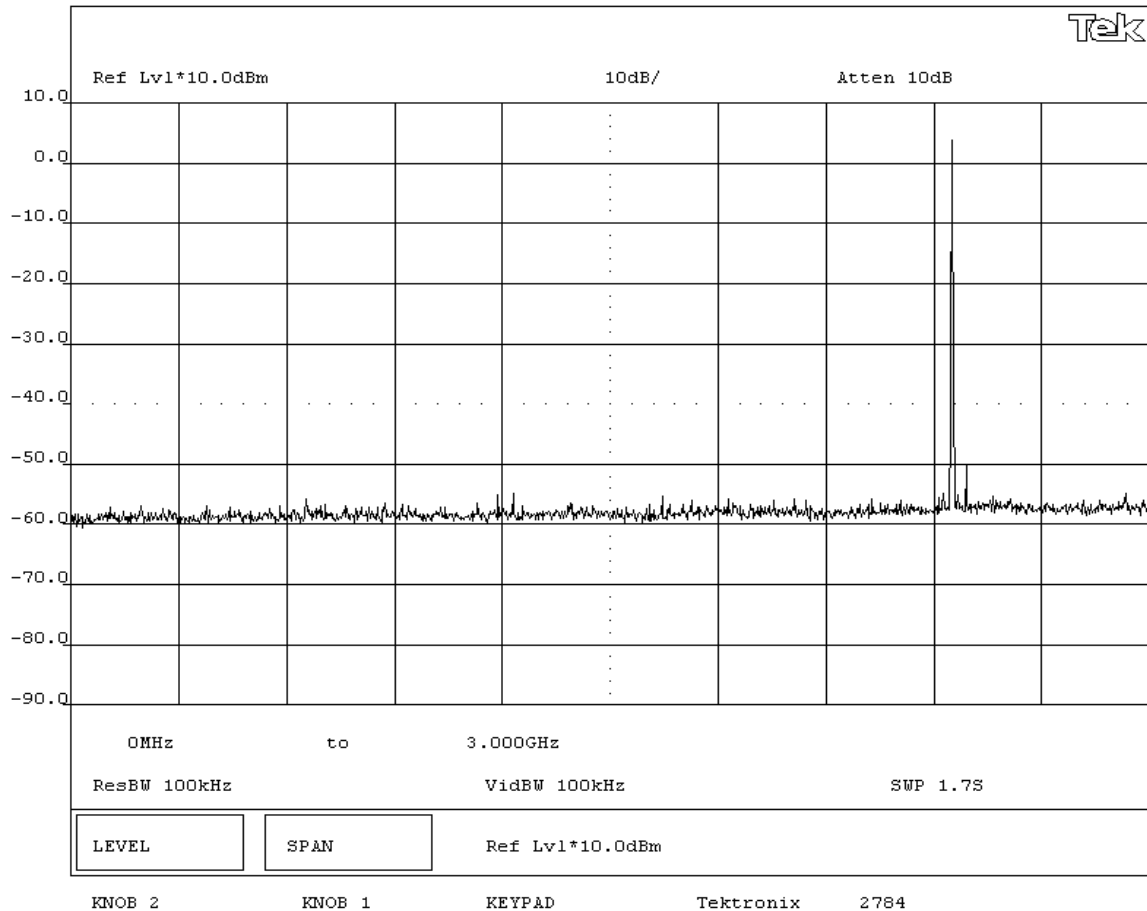
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - Low Channel 6.5GHz-15GHz					



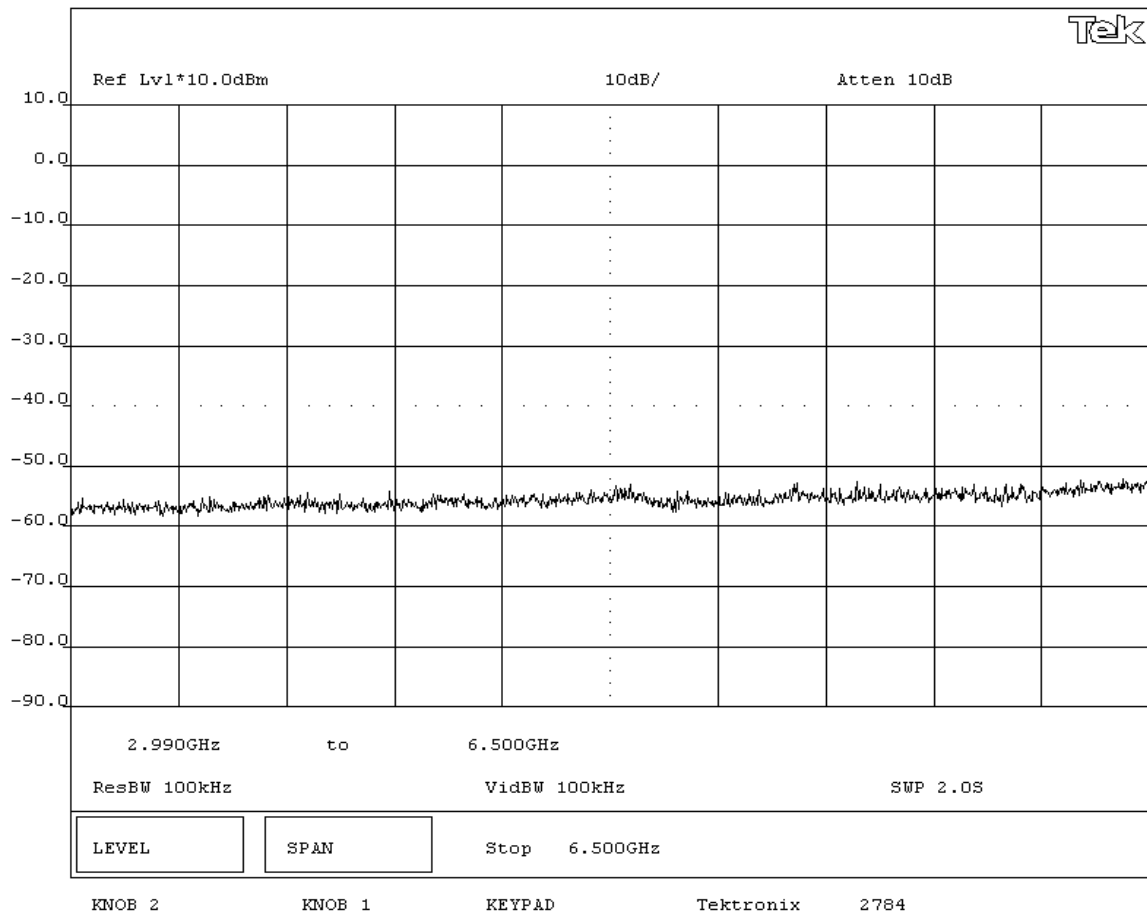
NORTHWEST EMC				EMISSIONS DATA SHEET				Rev BETA 01/30/01	
EUT: F-0179A				Work Order: LABT0059					
Serial Number: none				Date: 07/03/03					
Customer: Logitech, Inc.				Temperature: 73 F					
Attendees: Mitch Phillipi				Tested by: Greg Kiemel				Humidity: 35% RH	
Customer Ref. No.: N/A				Power: Battery				Job Site: EV06	
TEST SPECIFICATIONS									
Specification: 47 CFR 15.247(c)			Year: 2003		Method: DA 00-705, ANSI C63.4			Year: 1992	
SAMPLE CALCULATIONS									
COMMENTS									
EUT OPERATING MODES									
Modulated by PRBS at maximum data rate									
DEVIATIONS FROM TEST STANDARD									
None									
REQUIREMENTS									
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental									
RESULTS									
Pass									
SIGNATURE									
 Tested By: _____									
DESCRIPTION OF TEST									
Antenna Conducted Spurious Emissions - Low Channel 15GHz - 25GHz									



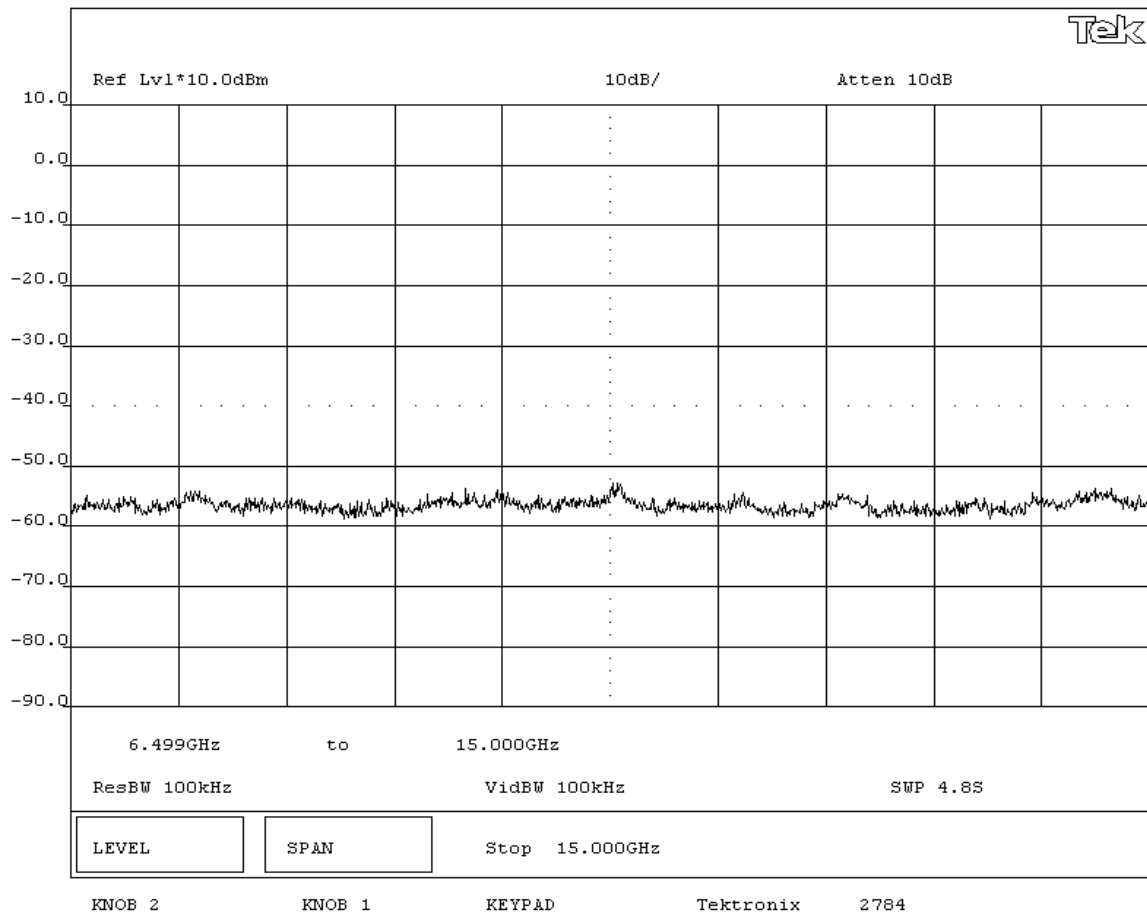
NORTHWEST EMC				EMISSIONS DATA SHEET				Rev BETA 01/30/01	
EUT: F-0179A				Work Order: LABT0059					
Serial Number: none				Date: 07/03/03					
Customer: Logitech, Inc.				Temperature: 73 F					
Attendees: Mitch Phillipi				Tested by: Greg Kiemel				Humidity: 35% RH	
Customer Ref. No.: N/A				Power: Battery				Job Site: EV06	
TEST SPECIFICATIONS									
Specification: 47 CFR 15.247(c)			Year: 2003		Method: DA 00-705, ANSI C63.4			Year: 1992	
SAMPLE CALCULATIONS									
COMMENTS									
EUT OPERATING MODES									
Modulated by PRBS at maximum data rate									
DEVIATIONS FROM TEST STANDARD									
None									
REQUIREMENTS									
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental									
RESULTS									
Pass									
SIGNATURE									
 Tested By: _____									
DESCRIPTION OF TEST									
Antenna Conducted Spurious Emissions - Mid Channel 0MHz-3GHz									



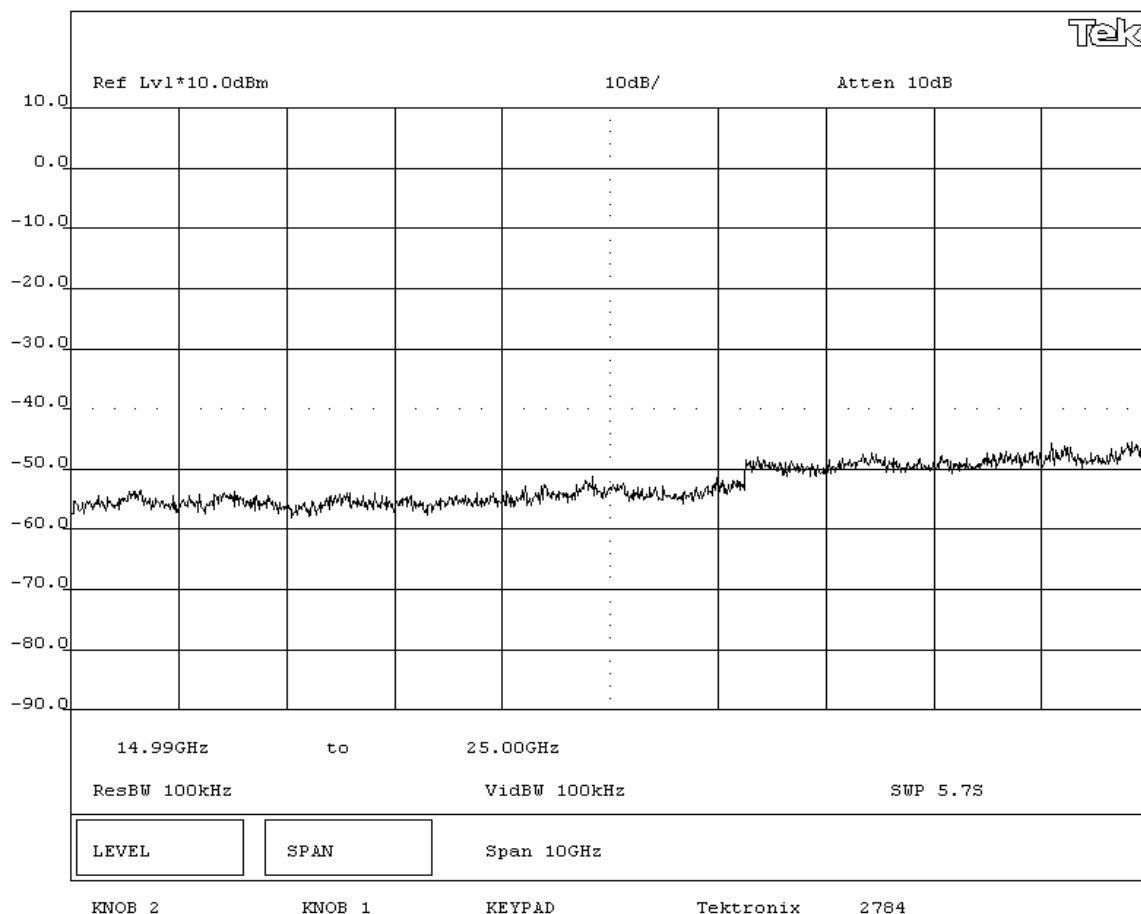
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - Mid Channel 3GHz-6.5GHz					



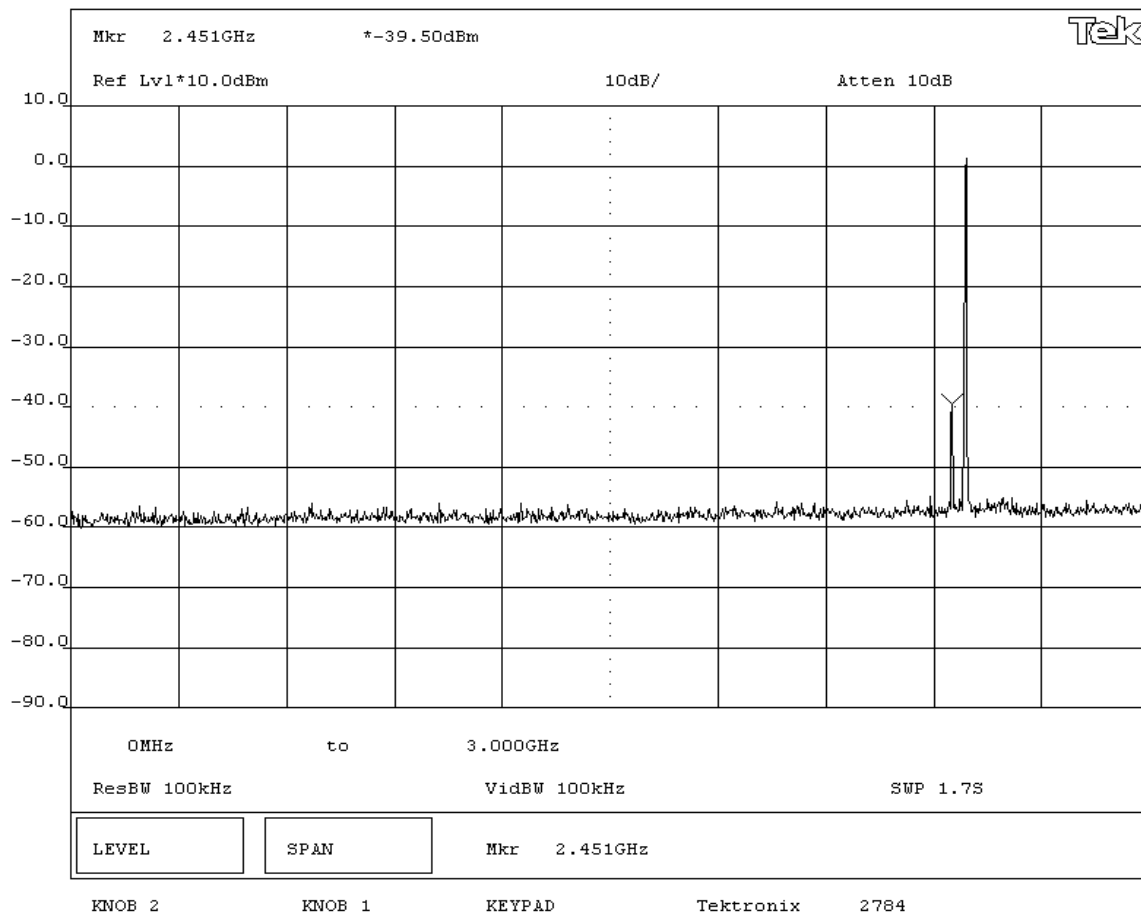
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - Mid Channel 6.5GHz-15GHz					



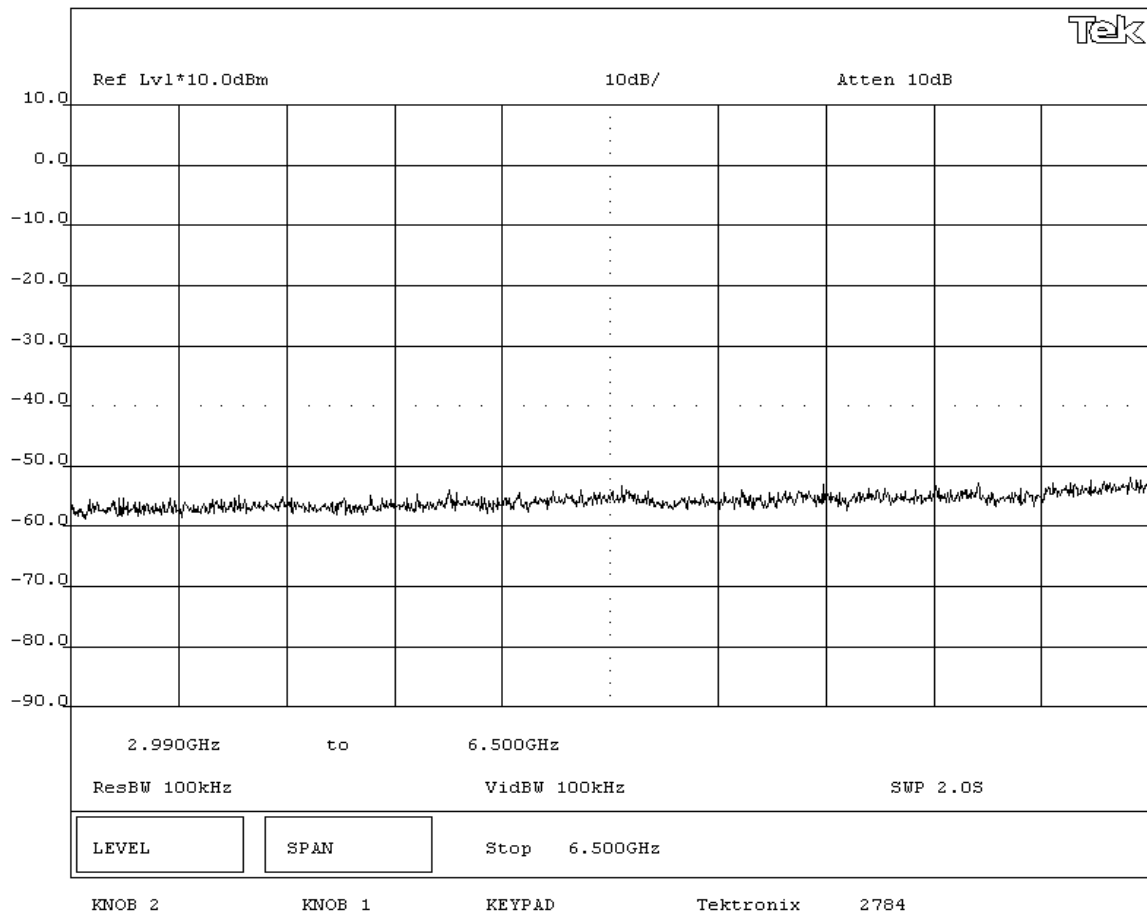
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - Mid Channel 15GHz-25GHz					



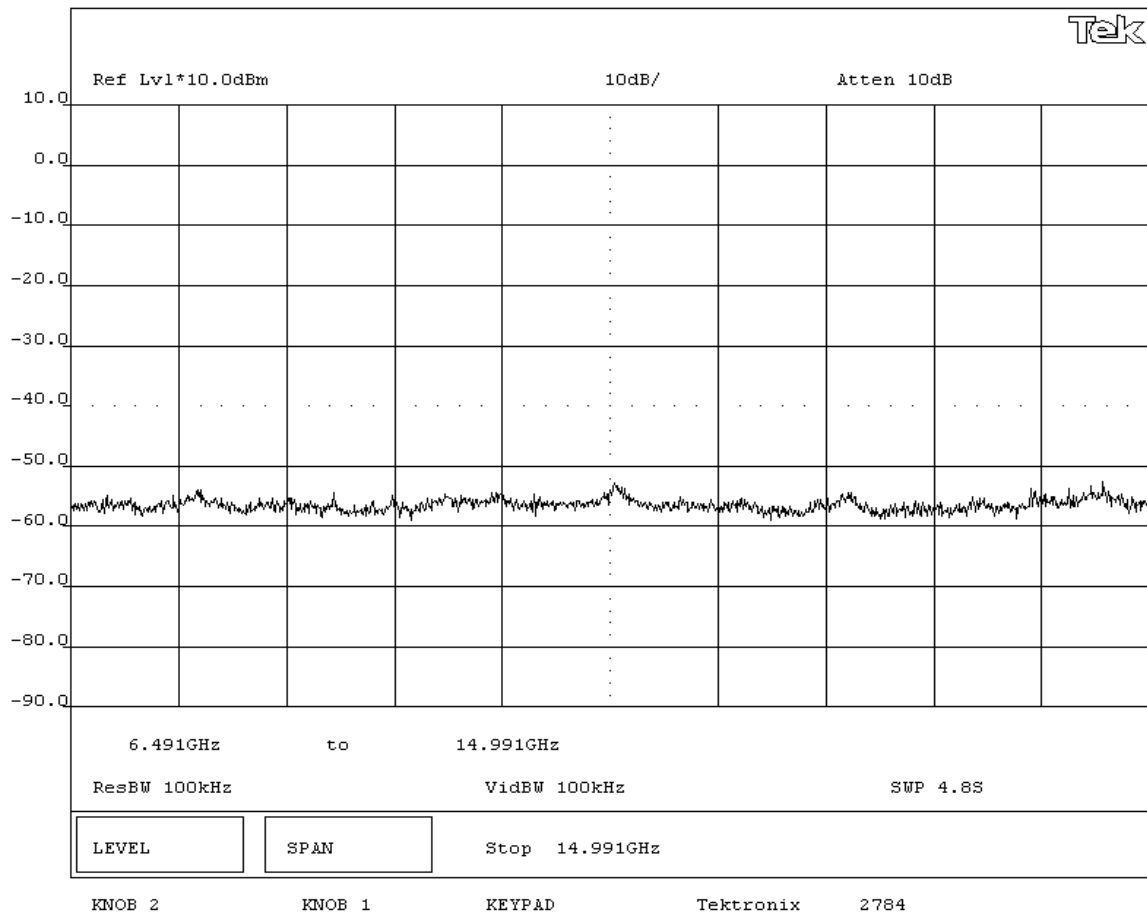
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - High Channel 0MHz-3GHz					



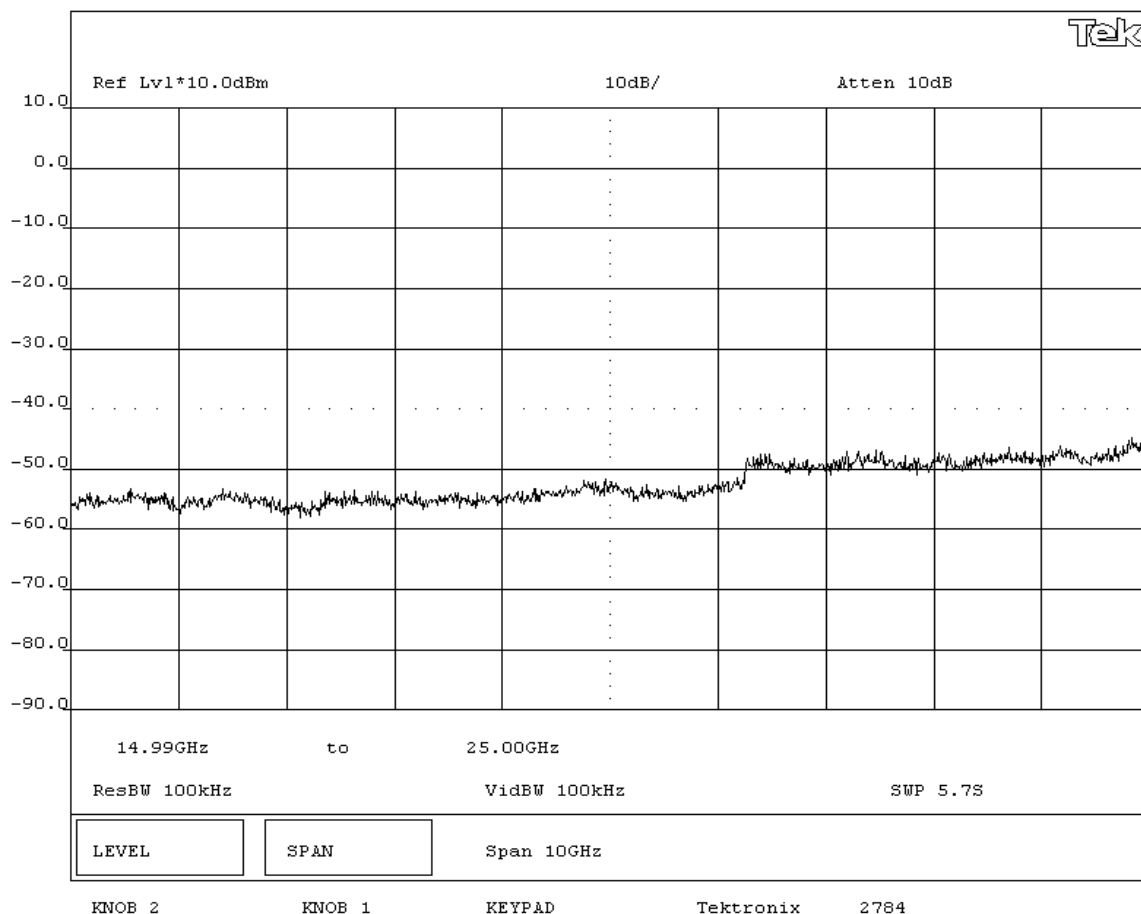
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003		Method: DA 00-705, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - High Channel 3GHz-6.5GHz					



NORTHWEST EMC				EMISSIONS DATA SHEET				Rev BETA 01/30/01	
EUT: F-0179A				Work Order: LABT0059					
Serial Number: none				Date: 07/03/03					
Customer: Logitech, Inc.				Temperature: 73 F					
Attendees: Mitch Phillipi				Tested by: Greg Kiemel				Humidity: 35% RH	
Customer Ref. No.: N/A				Power: Battery				Job Site: EV06	
TEST SPECIFICATIONS									
Specification: 47 CFR 15.247(c)				Year: 2003		Method: DA 00-705, ANSI C63.4		Year: 1992	
SAMPLE CALCULATIONS									
COMMENTS									
EUT OPERATING MODES									
Modulated by PRBS at maximum data rate									
DEVIATIONS FROM TEST STANDARD									
None									
REQUIREMENTS									
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental									
RESULTS									
Pass									
SIGNATURE									
 Tested By: _____									
DESCRIPTION OF TEST									
Antenna Conducted Spurious Emissions - High Channel 6.5GHz-15GHz									



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel	Humidity: 35% RH		
Customer Ref. No.: N/A		Power: Battery	Job Site: EV06		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(c)		Year: 2003	Method: DA 00-705, ANSI C63.4		Year: 1992
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental					
RESULTS					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - High Channel 15GHz-25GHz					



Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software	Special Test Software	Version	Unknown
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Description

The system was tested using special software developed to test all functions of the device during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Headset (low channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (mid channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (high channel)	Logitech Inc.	F-0179A	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

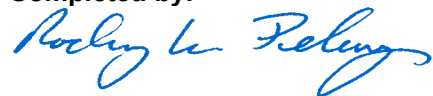
Requirement: Per 47 CFR 15.247(d), the peak power spectral density conducted from the antenna port of a direct sequence transmitter must not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

Configuration: The peak power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. Per the procedure outlined in FCC 97-114, the spectrum analyzer was used as follows:

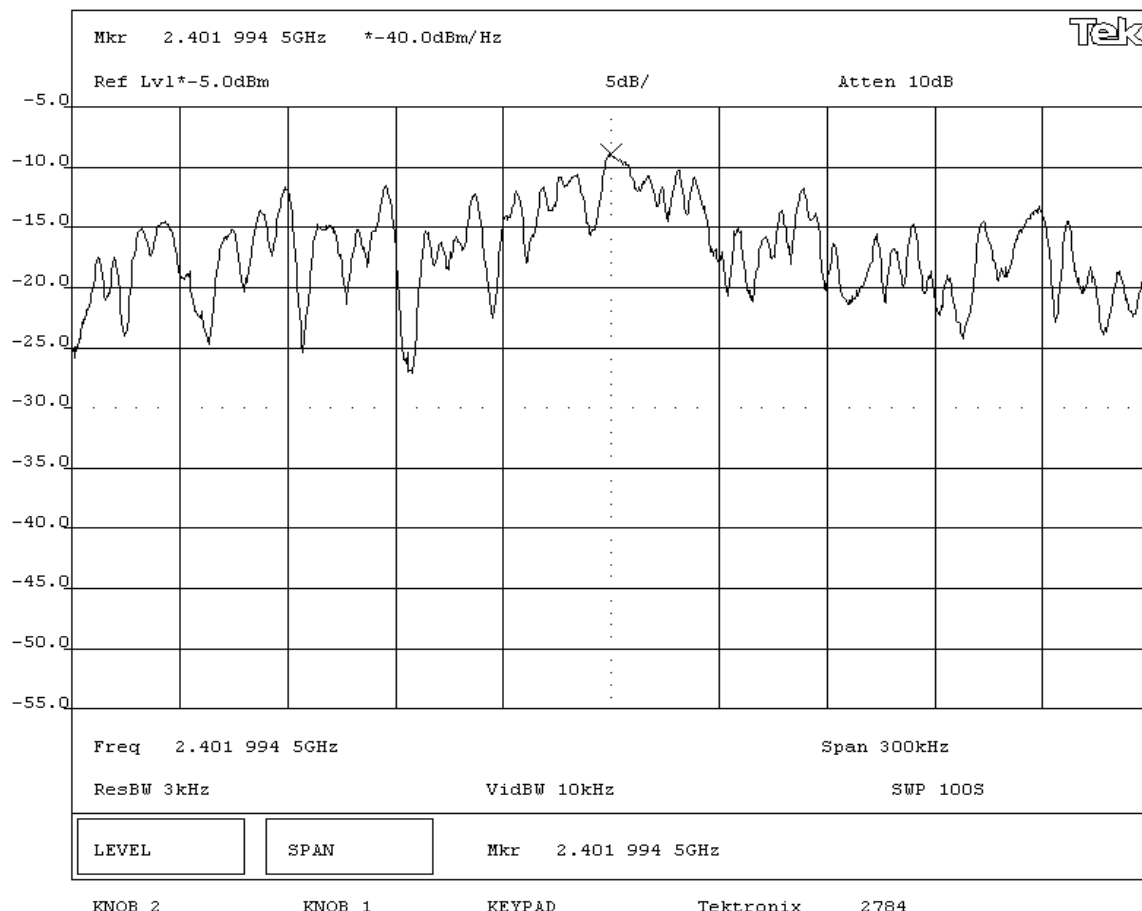
The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

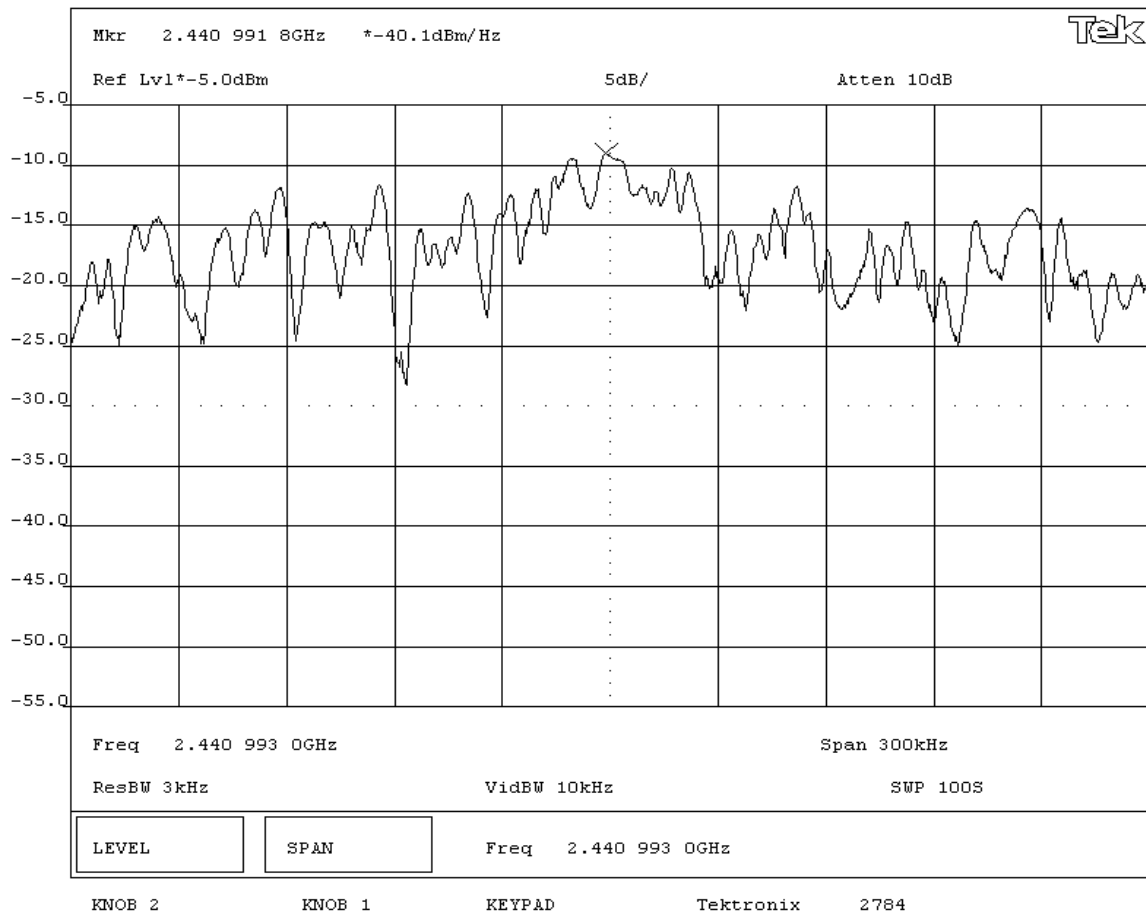
Completed by:



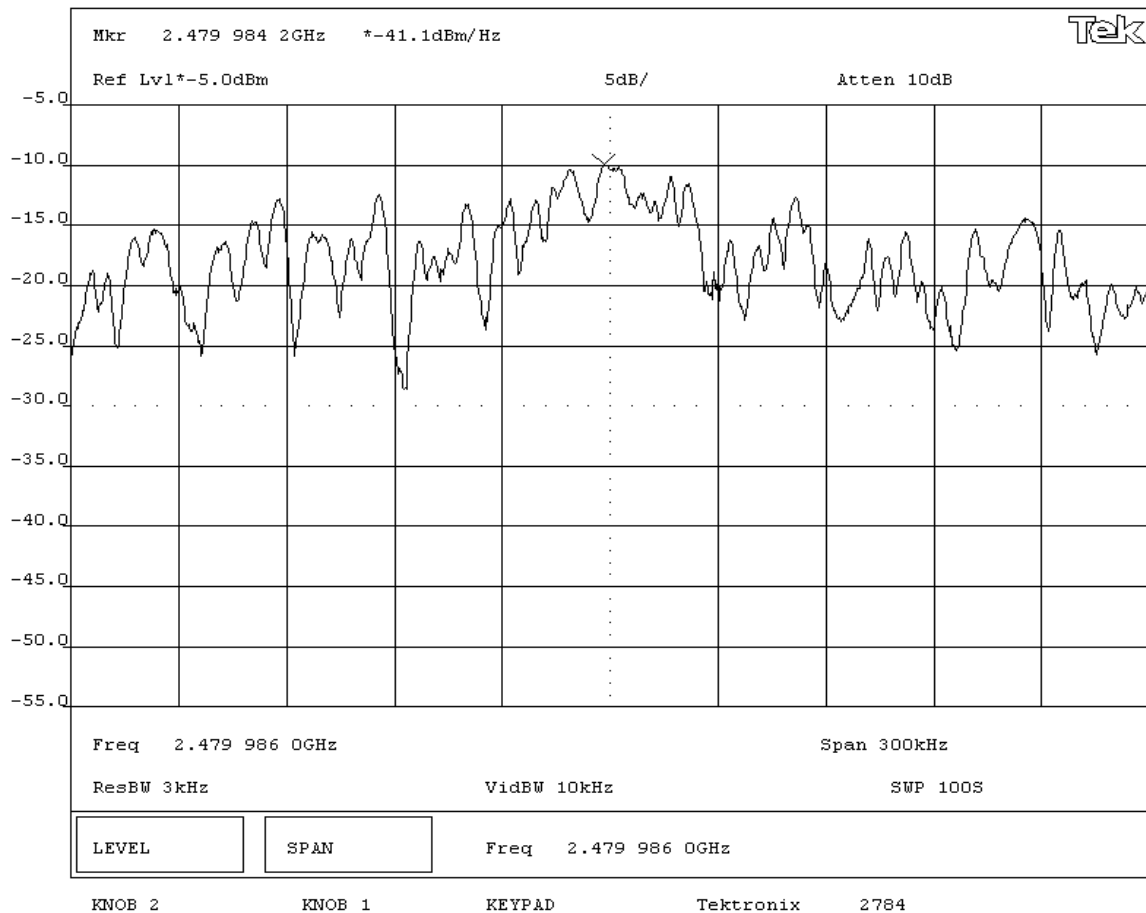
NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2003		Method: FCC 97-114, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation.					
Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.					
Bandwidth Correction Factor = $10 \cdot \log(3\text{kHz}/1\text{Hz})$					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band					
RESULTS			AMPLITUDE		
Pass			Power Spectral Density = -5.2 dBm / 3kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Power Spectral Density - Low Channel					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2003		Method: FCC 97-114, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation					
Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.					
Bandwidth Correction Factor = $10 \cdot \log(3\text{kHz}/1\text{Hz})$					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band					
RESULTS			AMPLITUDE		
Pass			Power Spectral Density = -5.3 dBm / 3kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Power Spectral Density - Mid Channel					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: F-0179A			Work Order: LABT0059		
Serial Number: none			Date: 07/03/03		
Customer: Logitech, Inc.			Temperature: 73 F		
Attendees: Mitch Phillipi		Tested by: Greg Kiemel		Humidity: 35% RH	
Customer Ref. No.: N/A		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2003		Method: FCC 97-114, ANSI C63.4	
				Year: 1992	
SAMPLE CALCULATIONS					
Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation					
Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.					
Bandwidth Correction Factor = $10 \cdot \log(3\text{kHz}/1\text{Hz})$					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band					
RESULTS			AMPLITUDE		
Pass			Power Spectral Density = -6.3 dBm / 3kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Power Spectral Density - High Channel					



Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Frequency Range Investigated

Start Frequency

30 MHz

Stop Frequency

25 GHz

Software\Firmware Applied During Test

Exercise software	N/A	Version	N/A
Description			
The system was tested using standard operating modes that do not require software. The unit was set to transmit at low, mid, and high channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Headset (low channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (mid channel)	Logitech Inc.	F-0179A	N/A
Bluetooth Headset (high channel)	Logitech Inc.	F-0179A	N/A

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	01/07/2003	12 mo
Antenna, Horn	EMCO	3115	AHC	08/12/2002	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	01/06/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/06/2003	12 mo
High Pass Filter	RLC Electronics	F-100-4000-5-R (HPF>4GHz up to	HFF	05/01/2003	12 mo
Antenna, Horn	EMCO	3160-09	AHG	01/15/2003	12 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	01/15/2003	12 mo

Test Description

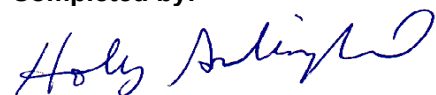
Requirement: The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.

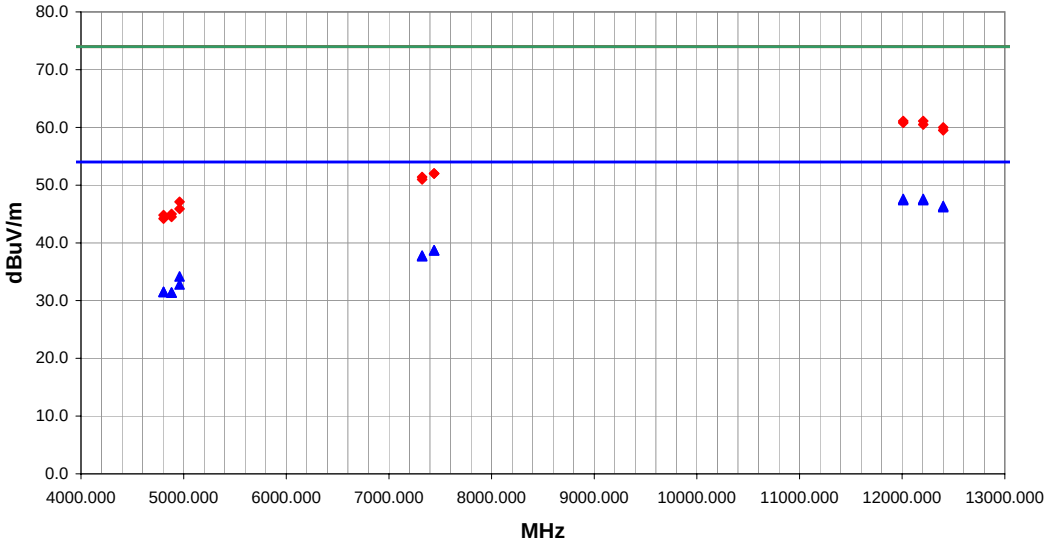
Configuration: The only antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. The EUT was transmitting at its maximum data rate in a no hop mode. For each configuration, the spectrum was scanned from 30 MHz to 25 GHz. In addition, measurements were made in the restricted band of 2.4835 to 2.5 GHz to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

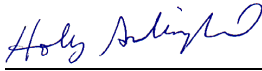
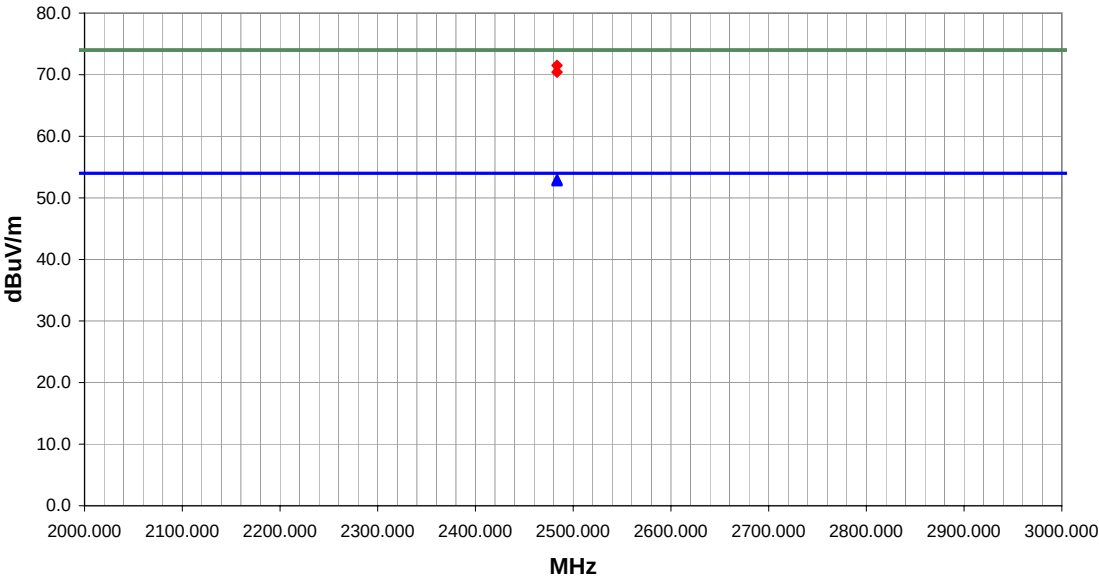
Bandwidths Used for Measurements

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
<i>Measurements were made using the bandwidths and detectors specified. No video filter was used.</i>			

Completed by:



NORTHWEST EMC										OATS DATA SHEET										REV df3.11 06/23/2003	
EUT: F-0179A										Work Order: LABT0059											
Serial Number: none										Date: 06/26/03											
Customer: Logitech Inc.										Temperature: 77											
Attendees:										Humidity: 41%											
Cust. Ref. No.:										Barometric Pressure: 30.11											
Tested by: Holly Ashkannejhad										Power: Battery										Job Site: EV01	
TEST SPECIFICATIONS																					
Specification: FCC Part 15.247(c)															Year: 2003						
Method: ANSI C63.4															Year: 1992						
SAMPLE CALCULATIONS																					
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation																					
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator																					
COMMENTS																					
EUT OPERATING MODES																					
low, mid, and high channel, no hop, modulated at maximum output power																					
DEVIATIONS FROM TEST STANDARD																					
No deviations.																					
RESULTS															Run #						
Pass															6						
Other										 Tested By:											
																					
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments								
12010.000	26.4	21.2	341.0	3.1	3.0	0.0	H-Horn	AV	0.0	47.6	54.0	-6.4	Low channel unit								
12205.000	26.3	21.3	189.0	1.6	3.0	0.0	H-Horn	AV	0.0	47.6	54.0	-6.4	Transmitting mid channel								
12010.000	26.2	21.2	111.0	1.2	3.0	0.0	V-Horn	AV	0.0	47.4	54.0	-6.6	Low channel unit								
12205.000	26.1	21.3	55.0	3.1	3.0	0.0	V-Horn	AV	0.0	47.4	54.0	-6.6	Transmitting mid channel								
12400.000	25.0	21.4	338.0	1.3	3.0	0.0	H-Horn	AV	0.0	46.4	54.0	-7.6	Transmitting high channel								
12399.250	24.8	21.4	166.0	1.2	3.0	0.0	V-Horn	AV	0.0	46.2	54.0	-7.8	Transmitting high channel								
7440.000	27.3	11.4	252.0	2.5	3.0	0.0	H-Horn	AV	0.0	38.7	54.0	-15.3	Transmitting high channel								
7440.000	27.3	11.4	21.0	2.9	3.0	0.0	V-Horn	AV	0.0	38.7	54.0	-15.3	Transmitting high channel								
7323.000	26.8	11.0	111.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.8	54.0	-16.2	Transmitting mid channel								
7323.000	26.7	11.0	169.0	1.3	3.0	0.0	H-Horn	AV	0.0	37.7	54.0	-16.3	Transmitting mid channel								
4960.000	27.8	6.4	154.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.2	54.0	-19.8	Transmitting high channel								
4960.000	26.4	6.4	86.0	1.2	3.0	0.0	V-Horn	AV	0.0	32.8	54.0	-21.2	Transmitting high channel								
4804.000	25.6	5.9	313.0	1.2	3.0	0.0	V-Horn	AV	0.0	31.5	54.0	-22.5	Low channel unit								
4804.000	25.6	5.9	197.0	1.3	3.0	0.0	H-Horn	AV	0.0	31.5	54.0	-22.5	Low channel unit								
4882.000	25.2	6.2	145.0	1.3	3.0	0.0	H-Horn	AV	0.0	31.4	54.0	-22.6	Transmitting mid channel								
4882.000	25.2	6.2	49.0	1.2	3.0	0.0	V-Horn	AV	0.0	31.4	54.0	-22.6	Transmitting mid channel								
12010.000	39.9	21.2	341.0	3.1	3.0	0.0	H-Horn	PK	0.0	61.1	74.0	-12.9	Low channel unit								
12205.000	39.8	21.3	189.0	1.6	3.0	0.0	H-Horn	PK	0.0	61.1	74.0	-12.9	Transmitting mid channel								
12010.000	39.6	21.2	111.0	1.2	3.0	0.0	V-Horn	PK	0.0	60.8	74.0	-13.2	Low channel unit								
12205.000	39.2	21.3	55.0	3.1	3.0	0.0	V-Horn	PK	0.0	60.5	74.0	-13.5	Transmitting mid channel								
12400.000	38.6	21.4	166.0	1.2	3.0	0.0	V-Horn	PK	0.0	60.0	74.0	-14.0	Transmitting high channel								
12400.000	38.1	21.4	338.0	1.3	3.0	0.0	H-Horn	PK	0.0	59.5	74.0	-14.5	Transmitting high channel								
7440.000	40.6	11.4	252.0	2.5	3.0	0.0	H-Horn	PK	0.0	52.0	74.0	-22.0	Transmitting high channel								
7440.000	40.6	11.4	21.0	2.9	3.0	0.0	V-Horn	PK	0.0	52.0	74.0	-22.0	Transmitting high channel								
7323.000	40.4	11.0	111.0	1.2	3.0	0.0	V-Horn	PK	0.0	51.4	74.0	-22.6	Transmitting mid channel								
7323.000	40.0	11.0	169.0	1.3	3.0	0.0	H-Horn	PK	0.0	51.0	74.0	-23.0	Transmitting mid channel								
4960.000	40.7	6.4	154.0	1.3	3.0	0.0	H-Horn	PK	0.0	47.1	74.0	-26.9	Transmitting high channel								
4960.000	39.5	6.4	86.0	1.2	3.0	0.0	V-Horn	PK	0.0	45.9	74.0	-28.1	Transmitting high channel								
4882.000	38.8	6.2	49.0	1.2	3.0	0.0	V-Horn	PK	0.0	45.0	74.0	-29.0	Transmitting mid channel								
4804.000	38.9	5.9	197.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.8	74.0	-29.2	Low channel unit								
4882.000	38.3	6.2	145.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.5	74.0	-29.5	Transmitting mid channel								
4804.000	38.3	5.9	313.0	1.2	3.0	0.0	V-Horn	PK	0.0	44.2	74.0	-29.8	Low channel unit								

NORTHWEST										REV									
EMC										OATS DATA SHEET									
EUT: F-0179A										Work Order: LABT0059									
Serial Number: none										Date: 06/26/03									
Customer: Logitech Inc.										Temperature: 77									
Attendees:										Humidity: 41%									
Cust. Ref. No.:										Barometric Pressure: 30.11									
Tested by: Holly Ashkannejhad										Power: Battery									
Job Site: EV01																			
TEST SPECIFICATIONS																			
Specification: FCC Part 15.247(c)										Year: 2003									
Method: ANSI C63.4										Year: 1992									
SAMPLE CALCULATIONS																			
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation																			
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator																			
COMMENTS																			
EUT OPERATING MODES																			
high channel, no hop, modulated at maximum output power																			
DEVIATIONS FROM TEST STANDARD																			
No deviations.																			
RESULTS															Run #				
Pass															8				
Other																			
										Tested By:									
																			
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments						
2483.500	32.0	1.0	187.0	1.2	3.0	20.0	V-Horn	AV	0.0	53.0	54.0	-1.0	Transmitting high channel						
2483.500	31.8	1.0	189.0	1.4	3.0	20.0	H-Horn	AV	0.0	52.8	54.0	-1.2	Transmitting high channel						
2483.500	50.5	1.0	187.0	1.2	3.0	20.0	V-Horn	PK	0.0	71.5	74.0	-2.5	Transmitting high channel						
2483.500	49.4	1.0	189.0	1.4	3.0	20.0	H-Horn	PK	0.0	70.4	74.0	-3.6	Transmitting high channel						