

Logitech, Inc.

Cordless Dongle for X-Box Model A-0363B

November 10, 2004

Report No. LABT0109 Rev 01

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

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EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: November 10, 2004

Logitech, Inc.

Model: A-0363B Cordless Dongle for X-Box

Emissions			
Specification	Test Method	Pass	Fail
FCC 15.207 AC Powerline Conducted Emissions:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a) Occupied Bandwidth: 2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(b) Output Power: 2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Band Edge Compliance: 2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Spurious Conducted Emissions: 2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Spurious Radiated Emissions: 2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(e) Power Spectral Density: 2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Modifications made to the product

See the Modifications section of this report

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 and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Greg Kiemel, Director of Engineering

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. 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
01	Changed EUT Model number per client request	11/23/04	Entire report

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, 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. 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.



NVLAP: Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada. Accreditation has been granted to Northwest EMC, Inc. under Certificate Numbers: 200629-0, 200630-0, and 200676-0.



Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.



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



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. USA0401C



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.



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. (NVLAP)



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. - Hillsboro: C-1071 and R-1025, Irvine: C-2094 and R-1943, Newberg: C-1877 and R-1760, Sultan: R-871, C-1784 and R-1761*)



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.



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



SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/scope.asp>

What is measurement uncertainty?

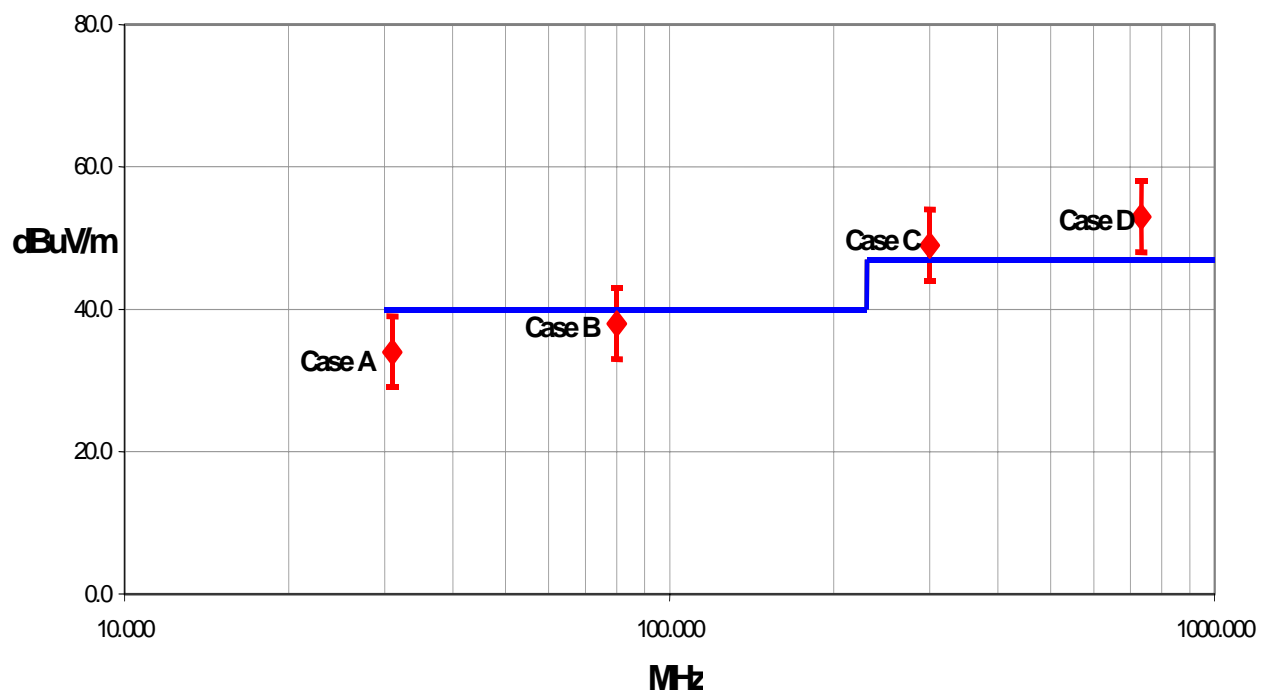
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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	+ 1.38 - 1.35	+ 1.29 - 1.25	+ 1.38 - 1.35
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 2.57 - 2.51	+ 2.76 - 2.70	+ 2.57 - 2.51	+ 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

**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:	A-0363B Cordless Dongle for X-Box
First Date of Test:	10-06-2004
Last Date of Test:	10-23-2004
Receipt Date of Samples:	10-06-2004
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided.
I/O Ports:	None

Functional Description of the EUT (Equipment Under Test):

Dongle for Xbox.

Client Justification for EUT Selection:

Not Provided

Client Justification for Test Selection:

Not Provided

EUT Photo

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Peak Output Power	10/21/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
2	Spurious Conducted Emissions	10/21/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
3	Band Edge Compliance	10/21/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
4	Power Spectral Density	10/21/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
5	Occupied Bandwidth	10/21/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
6	AC Powerline Conducted Emissions	10/21/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
7	Spurious Radiated Emissions	10/23/2004	No EMI suppression devices were added or modified during this test.	Using unit without the direct connect.	EUT remained at Northwest EMC.

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:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Unknown	Version	Unknown
Description			
The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest, a middle, and the highest channels in the operating band.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Bluetooth Dongle for Game Pad	Logitech, Inc.	A-0363B Dongle	none
Video Game System	Microsoft, Inc	Xbox	412407321303
Xbox Game Pad	Microsoft	X08-17160	047355112

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Game Pad	PA	1.9	PA	Xbox Game Pad	Video Game System
AC Power	No	2.0	Yes	Video Game System	AC Mains

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

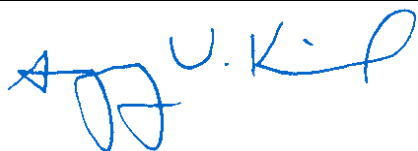
Requirement: Per an FCC Interpretation # 20021209-001, "Bluetooth devices may apply under the rules in 15.247 as either a Digital Transmission System (DTS), a Frequency Hopping System (FHSS), or a Hybrid System whichever provides an advantage to the grantee as long as all the requirements are met... The hopping function (*of a hybrid*) must be a true hopping system, as described in Section 15.247(a)(1)."


As a DTS system, the minimum 6 dB bandwidth is 500 kHz.

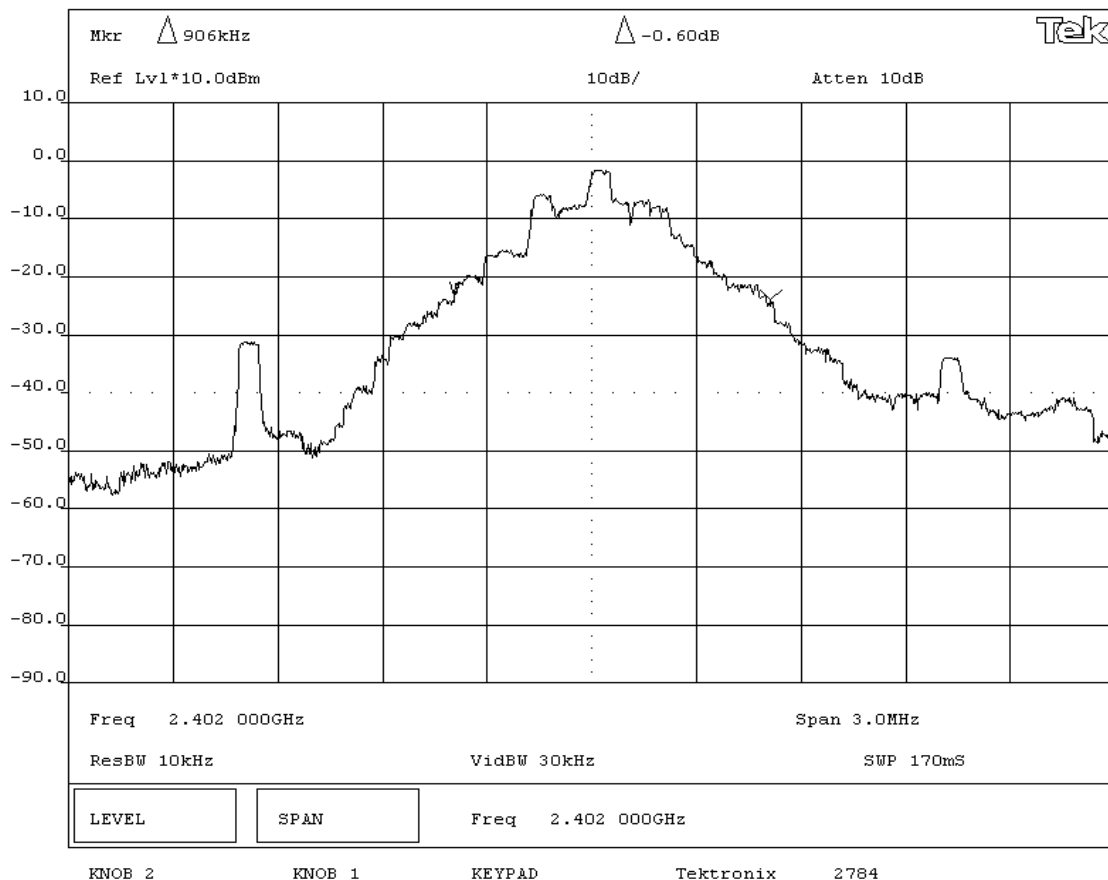
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation (see 47 CFR 15.247(a)(1)). For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.

As a Hybrid, it must meet the FHSS requirement as described above.

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: A-0363B		Work Order: LABT0109			
Serial Number:		Date: 10/28/04			
Customer: Logitech, Inc.		Temperature: 70 °F			
Attendees: None		Tested by: Greg Kiemel		Humidity: 43% RH	
Customer Ref. No.:		Power: 120VAC/60Hz		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)		Year: 2004		Method: DA 00-705, ANSI C63.4	
				Year: 2003	
SAMPLE CALCULATIONS					
COMMENTS					
Measured with a direct connection between the RF output and a spectrum analyzer.					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.					
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.					
As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.					
RESULTS		BANDWIDTH			
Pass		0.906 MHz			
SIGNATURE					
<div style="display: flex; justify-content: space-between; align-items: center;"> <div>Tested By: _____</div> <div></div> </div>					
DESCRIPTION OF TEST					
20dB Bandwidth - Low Channel					



NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT: A-0363B	Work Order: LABT0109
Serial Number:	Date: 10/28/04
Customer: Logitech, Inc.	Temperature: 70 °F
Attendees: None	Tested by: Greg Kiemel
Customer Ref. No.:	Power: 120VAC/60Hz
	Humidity: 43% RH
	Job Site: EV06

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(a)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS**COMMENTS**

Measured with a direct connection between the RF output and a spectrum analyzer.

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.

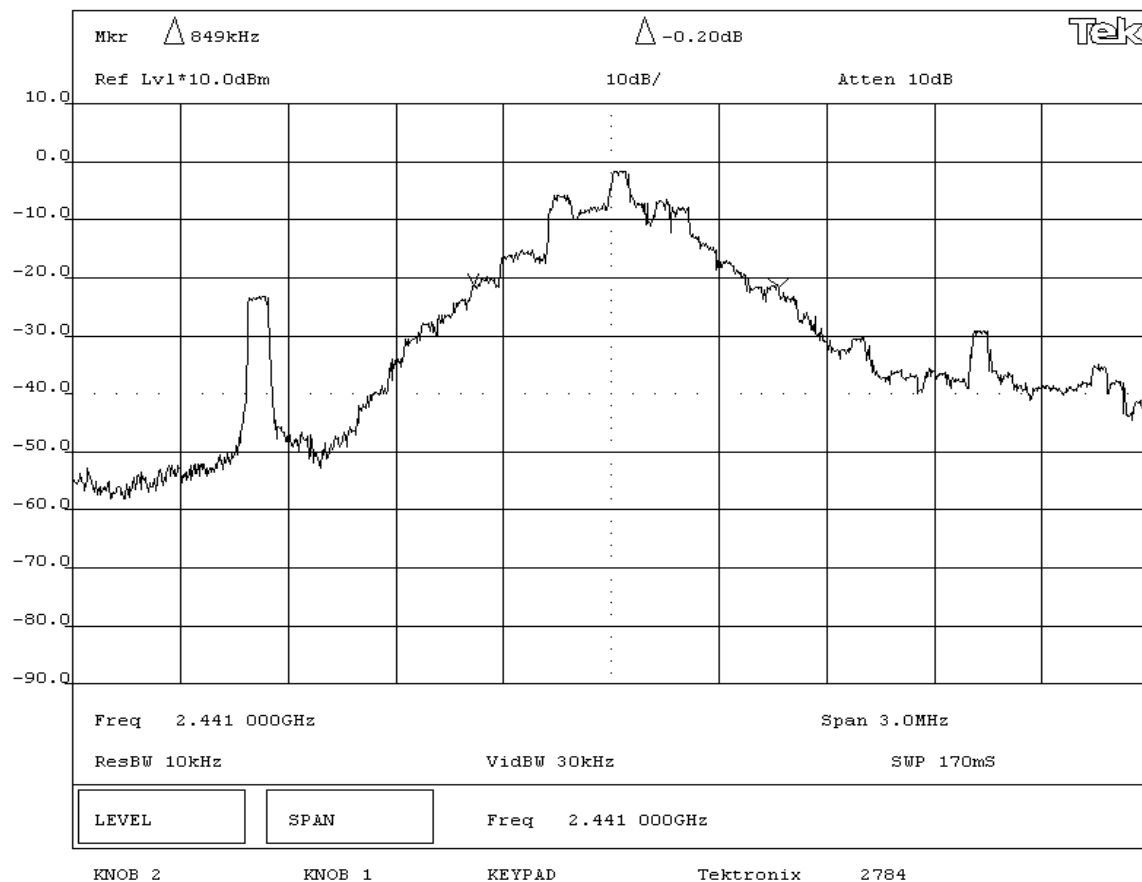
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.

As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

RESULTS**BANDWIDTH**

Pass

0.849 MHz

SIGNATURETested By: **DESCRIPTION OF TEST****20dB Bandwidth - Mid Channel**

NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT:	A-0363B	Work Order:	LABT0109
Serial Number:		Date:	10/28/04
Customer:	Logitech, Inc.	Temperature:	70 °F
Attendees:	None	Tested by:	Greg Kiemel
Customer Ref. No.:		Power:	120VAC/60Hz
		Humidity:	43% RH
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)	Year:	2004	Method:	DA 00-705, ANSI C63.4	Year:	2003
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SAMPLE CALCULATIONS**COMMENTS**

Measured with a direct connection between the RF output and a spectrum analyzer.

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.

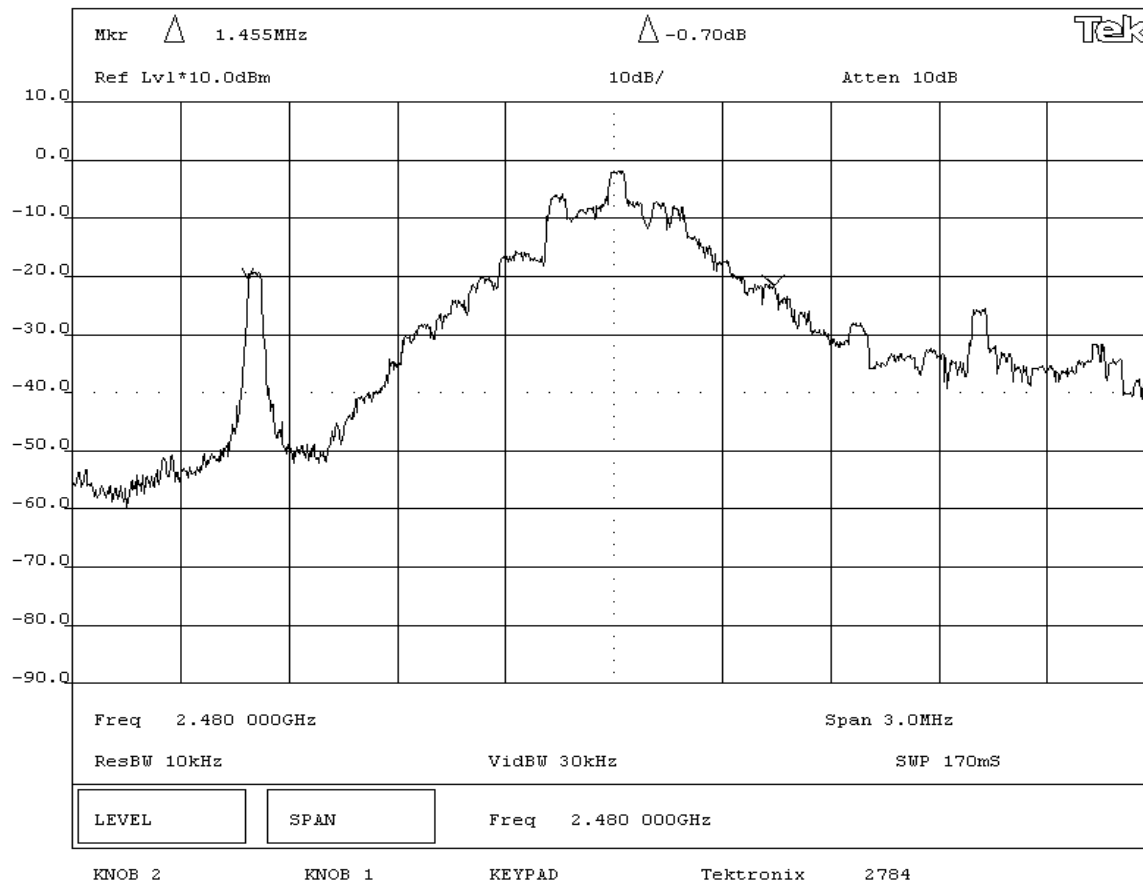
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.

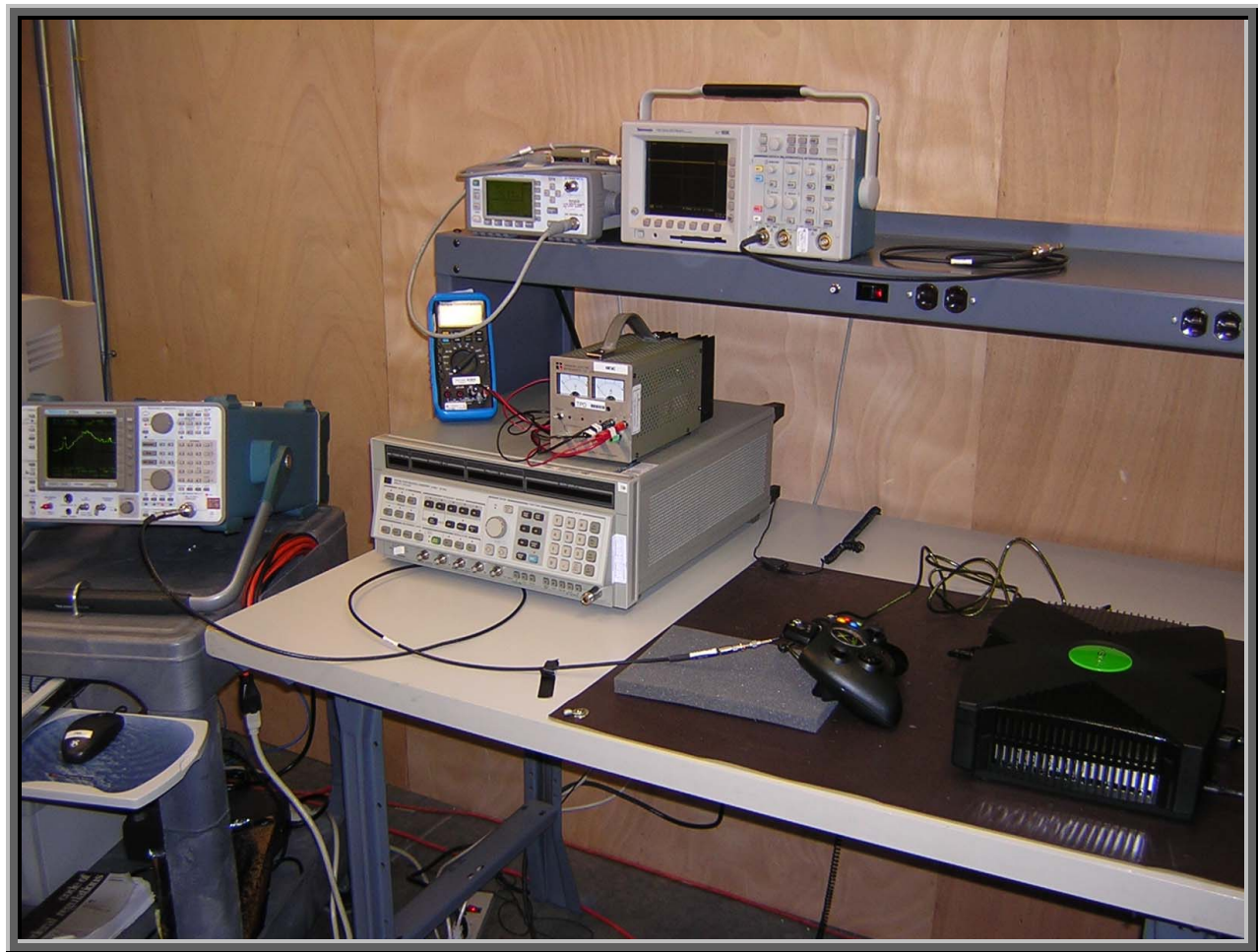
As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

RESULTS**BANDWIDTH**

Pass

1.455 MHz

SIGNATURETested 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:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Unknown	Version	Unknown
Description			
The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest, a middle, and the highest channels in the operating band.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Bluetooth Dongle for Game Pad	Logitech, Inc.	A-0363B Dongle	none
Video Game System	Microsoft, Inc	Xbox	412407321303
Xbox Game Pad	Microsoft	X08-17160	047355112

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Game Pad	PA	1.9	PA	Xbox Game Pad	Video Game System
AC Power	No	2.0	Yes	Video Game System	AC Mains
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
Power Meter	Hewlett Packard	E4418A	SPA	07/23/2004	24 mo
Power Sensor	Hewlett-Packard	8481H	SPB	07/23/2004	24 mo
Signal Generator	Hewlett Packard	8341B	TGN	01/23/2004	13 mo
Oscilloscope	Tektronix	TDS 3052	TOF	07/21/2004	12 mo
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA

Test Description

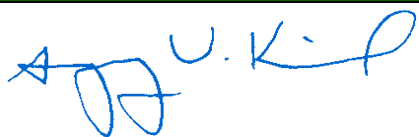
Requirement: Per 47 CFR 15.247(b), the maximum peak output power must not exceed 1 Watt.


Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The EUT was transmitting at its maximum output power.

The measurement was made using a direct connection between the RF output of the EUT and a RF detector diode. The DC output of the diode was measured with the oscilloscope. The signal generator, tuned to the transmit frequency, was then substituted for the EUT. The CW output of the signal generator was adjusted until the DC output of the RF detector diode match the peak level produced when connected to the EUT. To further reduce measurement error, the power meter and sensor were then used to measure the output power level of the signal generator.

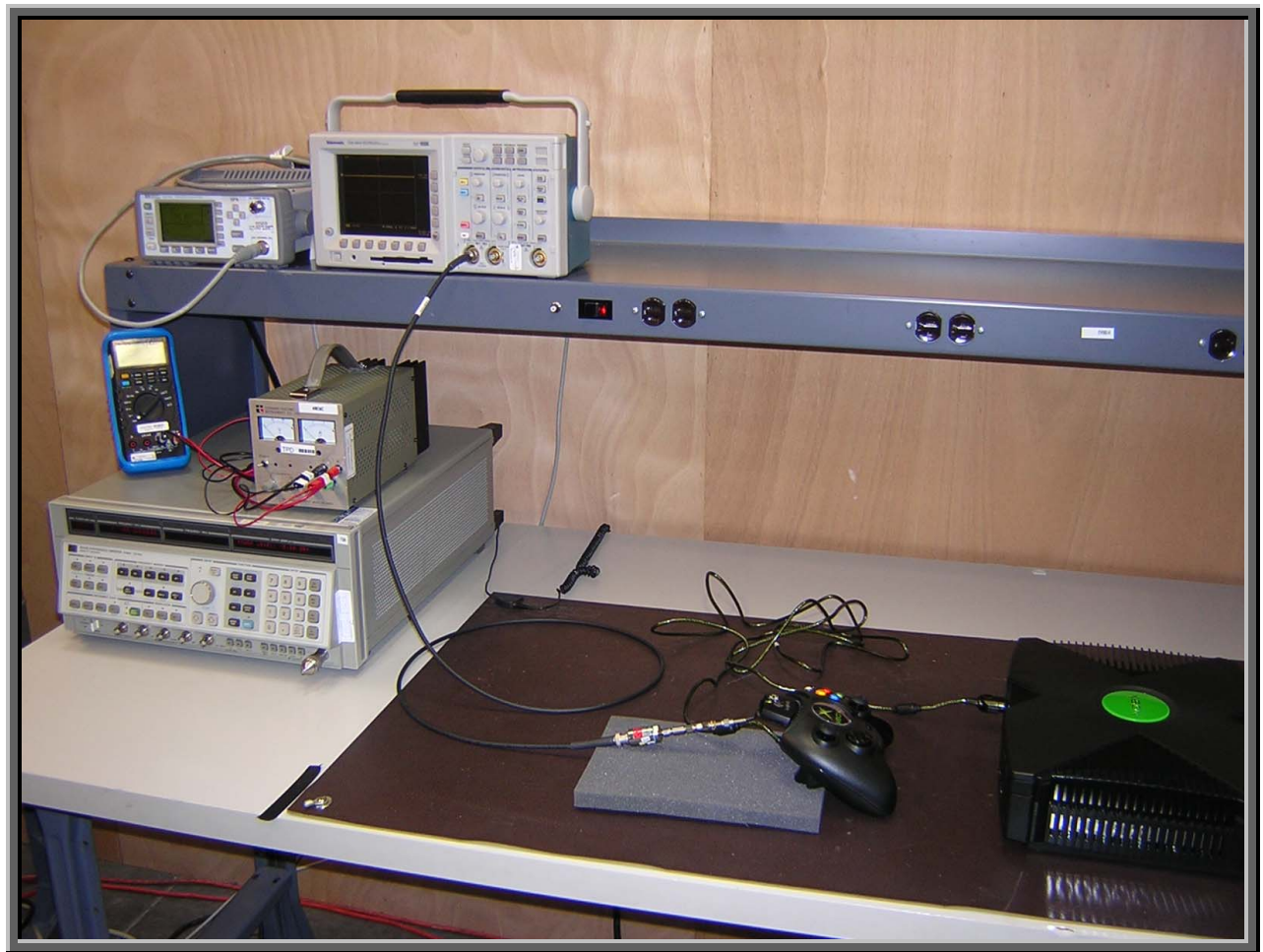
De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

Completed by:



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT:	A-0363B			Work Order:	LABT0109
Serial Number:				Date:	10/21//2004
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Greg Kiemel	Humidity:	47% RH
Customer Ref. No.:		Power:	120VAC/60Hz	Job Site:	EV06
TEST SPECIFICATIONS					
Specification:	47 CFR 15.247(b)	Year:	2004	Method:	DA 00-705, ANSI C63.4
		Year:	2003		
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		2.41 mW			
SIGNATURE					
<div style="text-align: center;">  </div>					
Tested By: _____					
DESCRIPTION OF TEST					
Output Power					

Frequency (MHz)	Peak Power Measured w/ Diode Detector (dBm)	Peak Power (mW)	Spec (mW)
2402.0	3.82	2.41	1000.0
2441.0	3.80	2.40	1000.0
2480.0	3.77	2.38	1000.0



Justification

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Low

High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Unknown	Version	Unknown
Description			
The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest, a middle, and the highest channels in the operating band.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Bluetooth Dongle for Game Pad	Logitech, Inc.	A-0363B Dongle	none
Video Game System	Microsoft, Inc	Xbox	412407321303
Xbox Game Pad	Microsoft	X08-17160	047355112

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Game Pad	PA	1.9	PA	Xbox Game Pad	Video Game System
AC Power	No	2.0	Yes	Video Game System	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

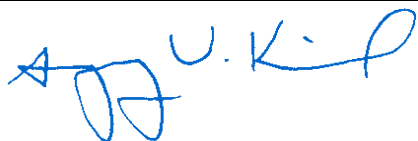
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(d), 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: A-0363B		Work Order: LABT0109	
Serial Number:		Date:	10/21//2004
Customer:	Logitech, Inc.	Temperature:	70 °F
Attendees:	None	Tested by:	Greg Kiemel
Customer Ref. No.:		Power:	120VAC/60Hz
		Humidity:	47% RH
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2004	Method:	DA 00-705, ANSI C63.4	Year:	2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

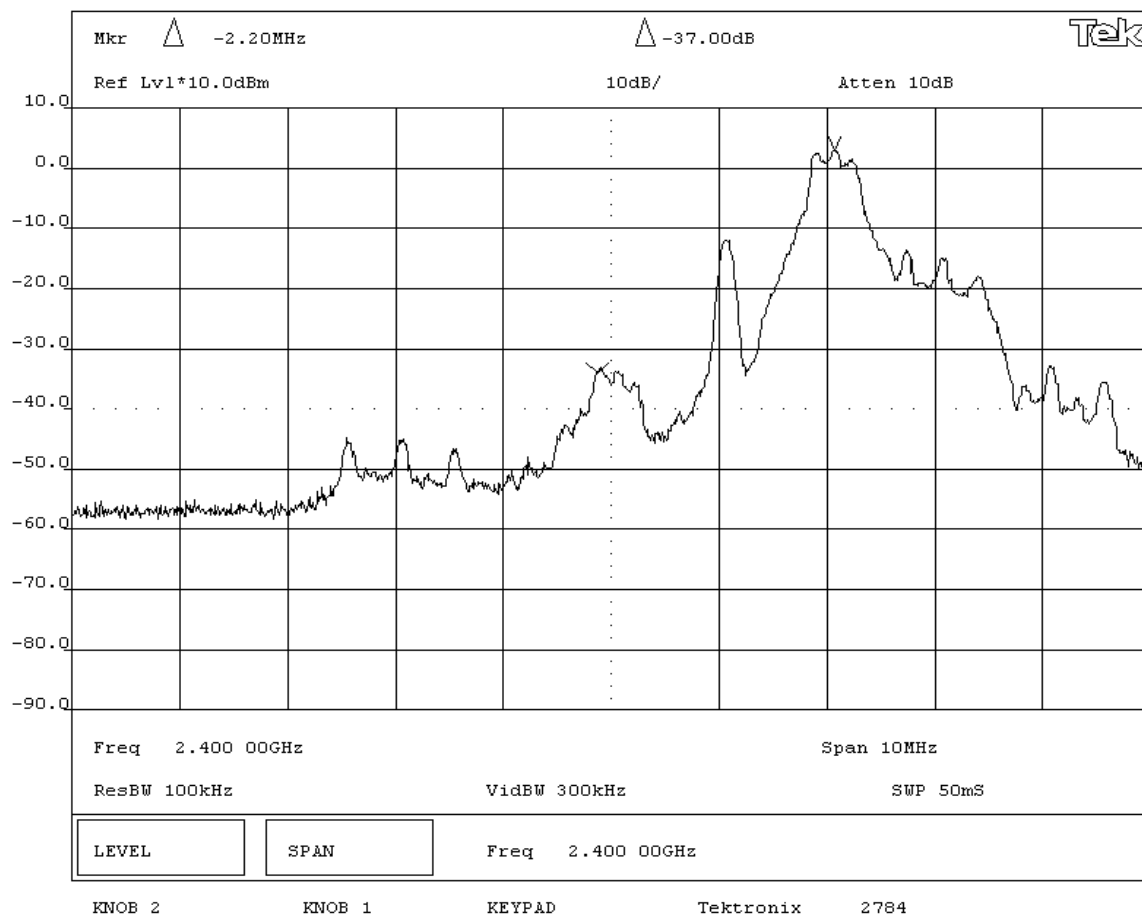
None


REQUIREMENTS

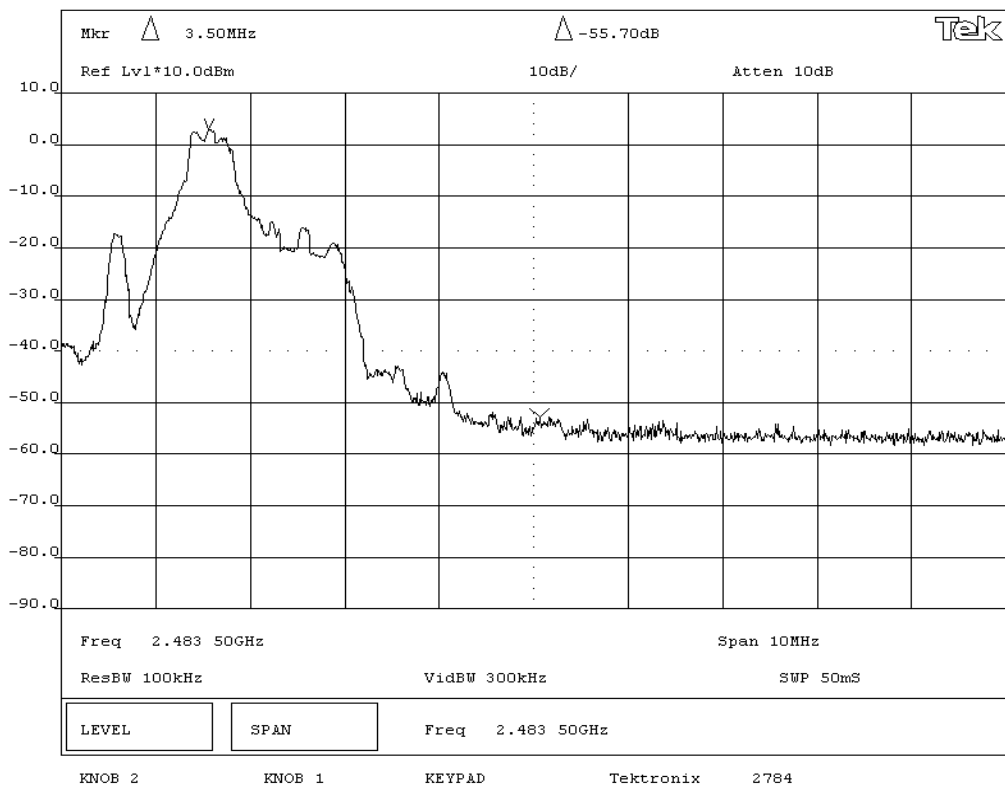
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS**AMPLITUDE**

Pass -37.0 dB

SIGNATURETested By: **DESCRIPTION OF TEST****Band Edge Compliance - Low Channel**

NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: A-0363B				Work Order: LABT0109	
Serial Number:				Date: 10/21/2004	
Customer: Logitech, Inc.				Temperature: 70 °F	
Attendees: None				Humidity: 47% RH	
Customer Ref. No.:				Power: 120VAC/60Hz	Job Site: EV06
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003		
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			AMPLITUDE		
Pass			-55.7 dB		
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:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Unknown	Version	Unknown
Description			
The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest, a middle, and the highest channels in the operating band.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Bluetooth Dongle for Game Pad	Logitech, Inc.	A-0363B Dongle	none
Video Game System	Microsoft, Inc	Xbox	412407321303
Xbox Game Pad	Microsoft	X08-17160	047355112

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Game Pad	PA	1.9	PA	Xbox Game Pad	Video Game System
AC Power	No	2.0	Yes	Video Game System	AC Mains

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), 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:	A-0363B	Work Order:	LABT0109
Serial Number:		Date:	10/21/2004
Customer:	Logitech, Inc.	Temperature:	70 °F
Attendees:	None	Tested by:	Greg Kiemel
Customer Ref. No.:		Power:	120VAC/60Hz
		Humidity:	47% RH
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2004	Method:	DA 00-705, ANSI C63.4	Year:	2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

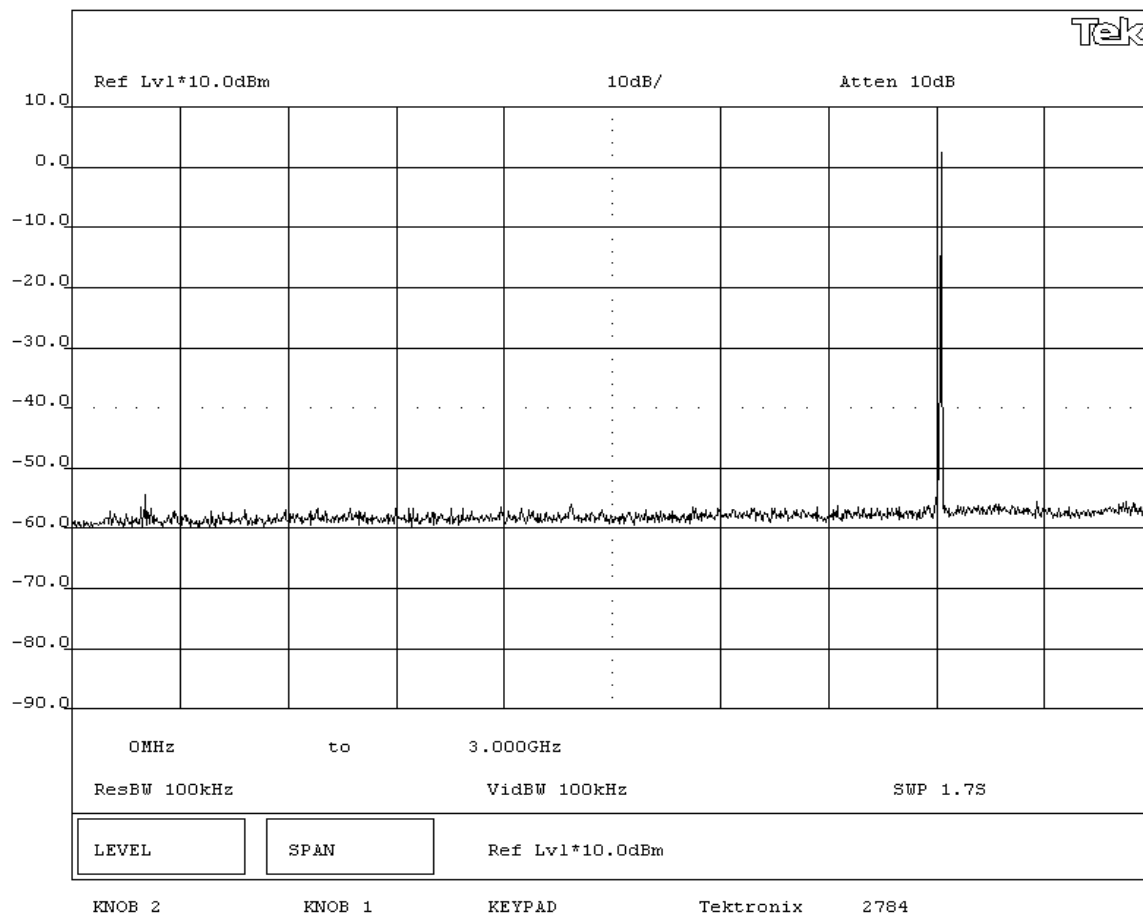
None

REQUIREMENTS

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

RESULTS

Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - Low Channel 0MHz-3GHz**

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: A-0363B		Work Order: LABT0109	
Serial Number:		Date: 10/21//2004	
Customer: Logitech, Inc.		Temperature: 70 °F	
Attendees: None		Tested by: Greg Kiemel	Humidity: 47% RH
Customer Ref. No.:		Power: 120VAC/60Hz	Job Site: EV06

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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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

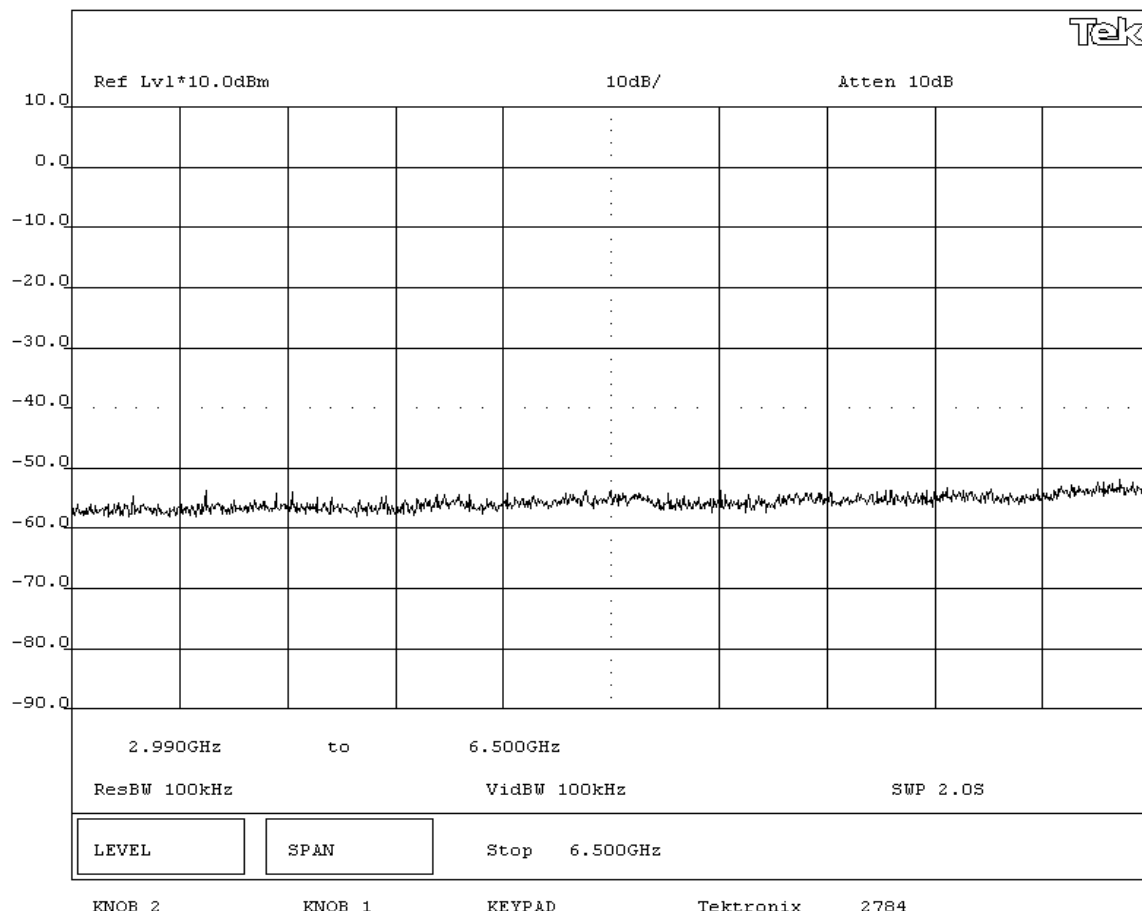
Pass

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 3GHz-6.5GHz



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT: A-0363B			Work Order: LABT0109		
Serial Number:			Date: 10/21//2004		
Customer: Logitech, Inc.			Temperature: 70 °F		
Attendees: None			Humidity: 47% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Greg Kiemel			Power: 120VAC/60Hz		

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

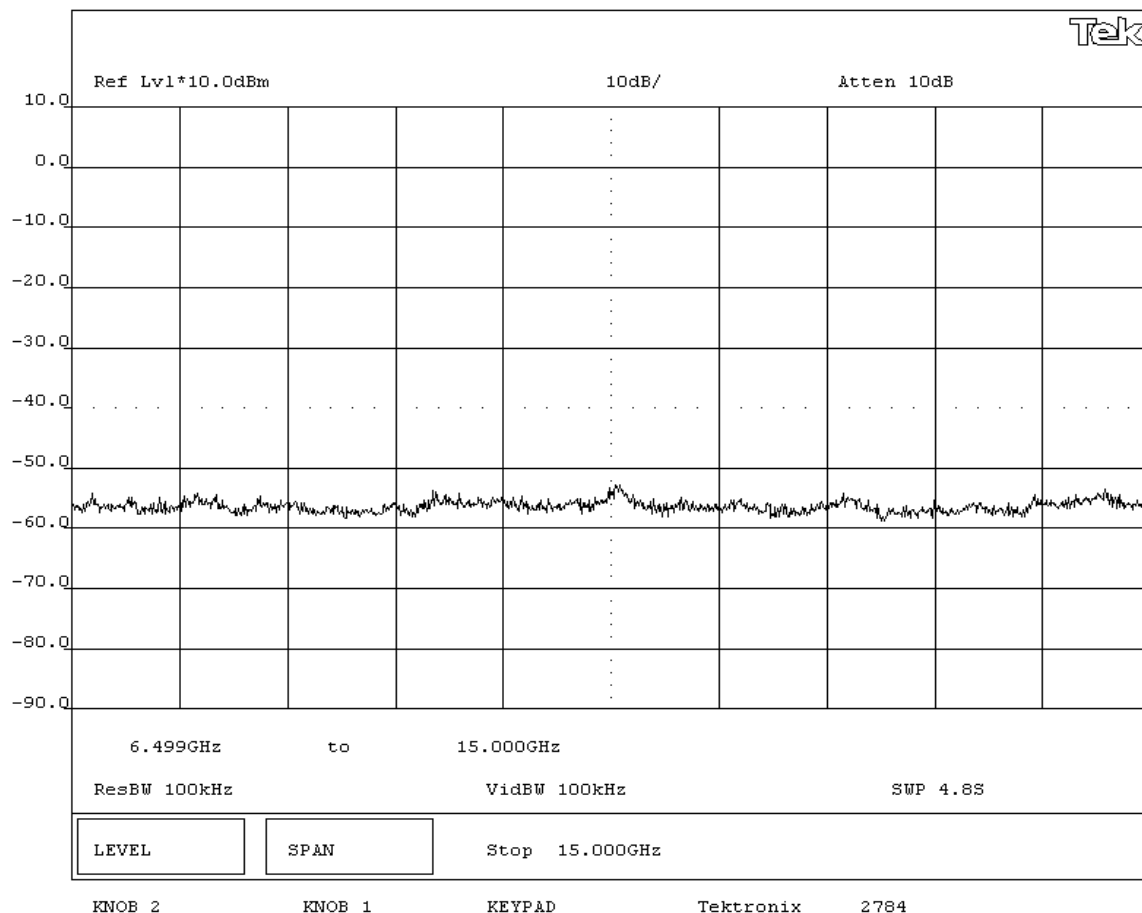
None

REQUIREMENTS

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

RESULTS

Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - Low Channel 6.5GHz-15GHz**

NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT: A-0363B		Work Order: LABT0109
Serial Number:		Date: 10/21//2004
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Greg Kiemel	Humidity: 47% RH
Customer Ref. No.:	Power: 120VAC/60Hz	Job Site: EV06

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

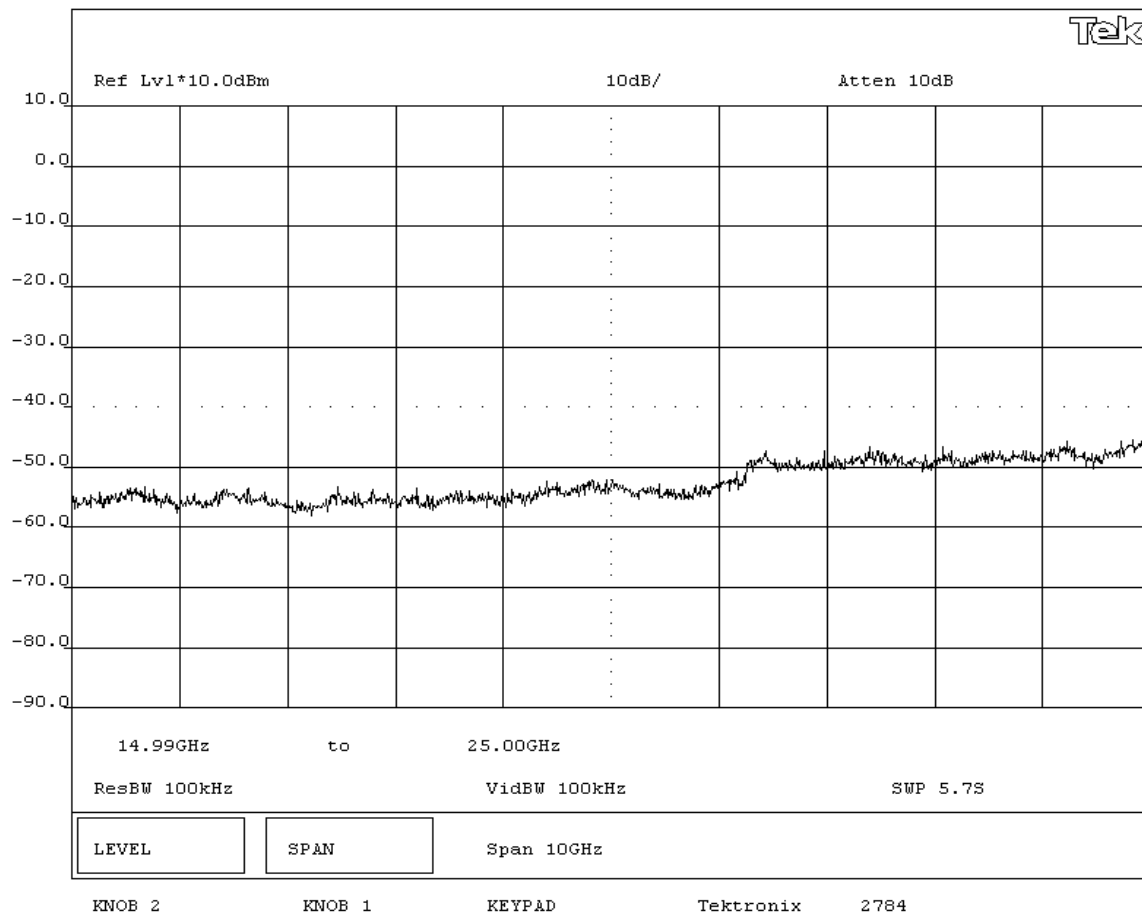
None

REQUIREMENTS

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

RESULTS

Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - Low Channel 15GHz - 25GHz**

NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT: A-0363B			Work Order: LABT0109		
Serial Number:			Date: 10/21//2004		
Customer: Logitech, Inc.			Temperature: 70 °F		
Attendees: None			Humidity: 47% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Greg Kiemel			Power: 120VAC/60Hz		

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

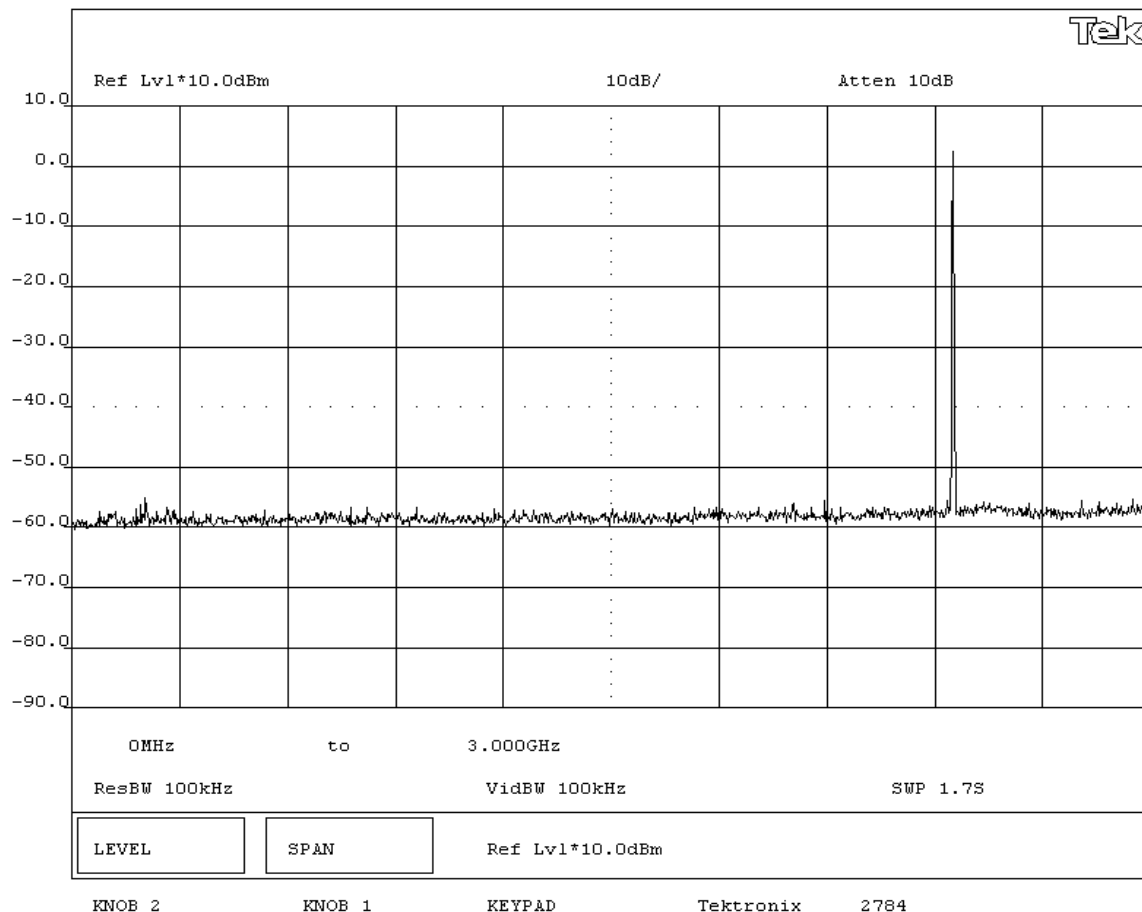
None

REQUIREMENTS

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

RESULTS

Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - Mid Channel 0MHz-3GHz**

NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT: A-0363B		Work Order: LABT0109	
Serial Number:		Date: 10/21//2004	
Customer: Logitech, Inc.		Temperature: 70 °F	
Attendees: None		Tested by: Greg Kiemel	Humidity: 47% RH
Customer Ref. No.:		Power: 120VAC/60Hz	Job Site: EV06

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

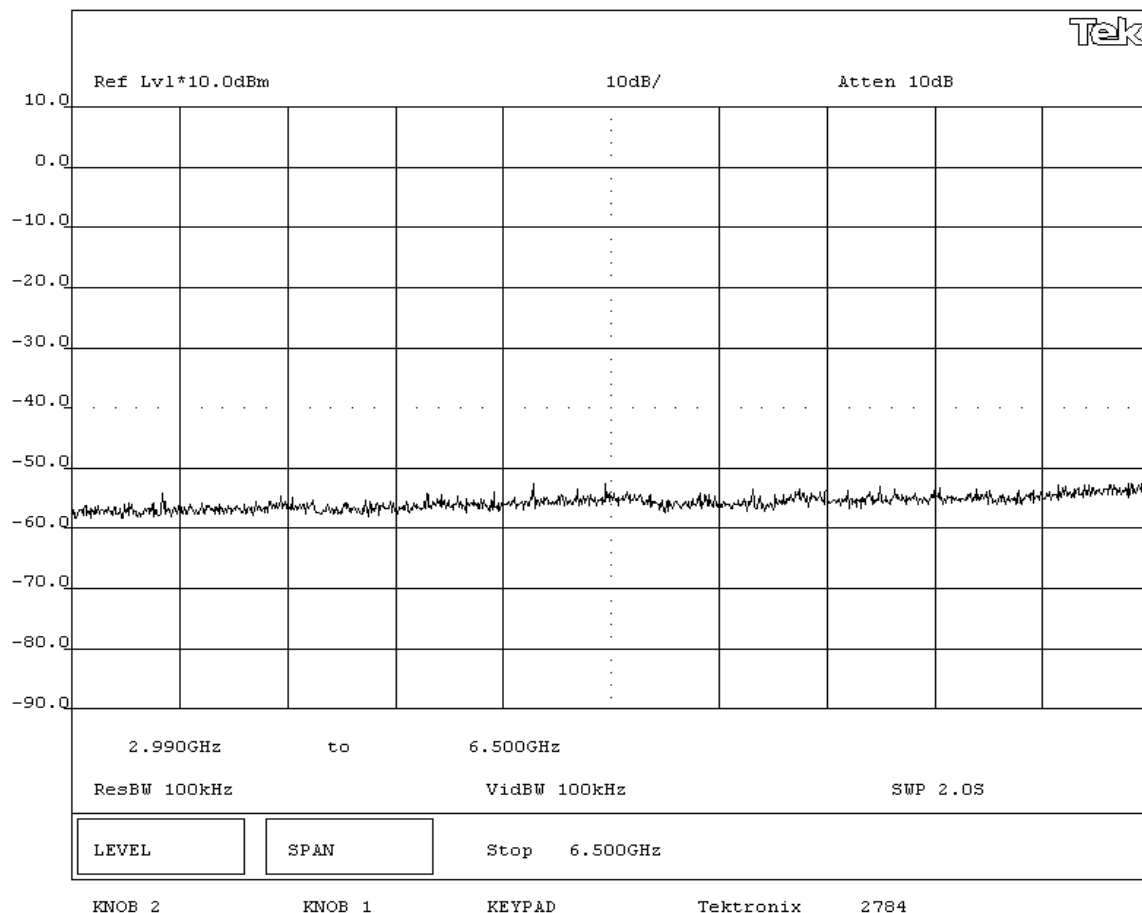
None

REQUIREMENTS

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

RESULTS

Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - Mid Channel 3GHz-6.5GHz**

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: A-0363B			Work Order: LABT0109		
Serial Number:			Date: 10/21//2004		
Customer: Logitech, Inc.			Temperature: 70 °F		
Attendees: None			Humidity: 47% RH		
Customer Ref. No.:			Job Site: EV06		
			Tested by: Greg Kiemel		
			Power: 120VAC/60Hz		

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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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

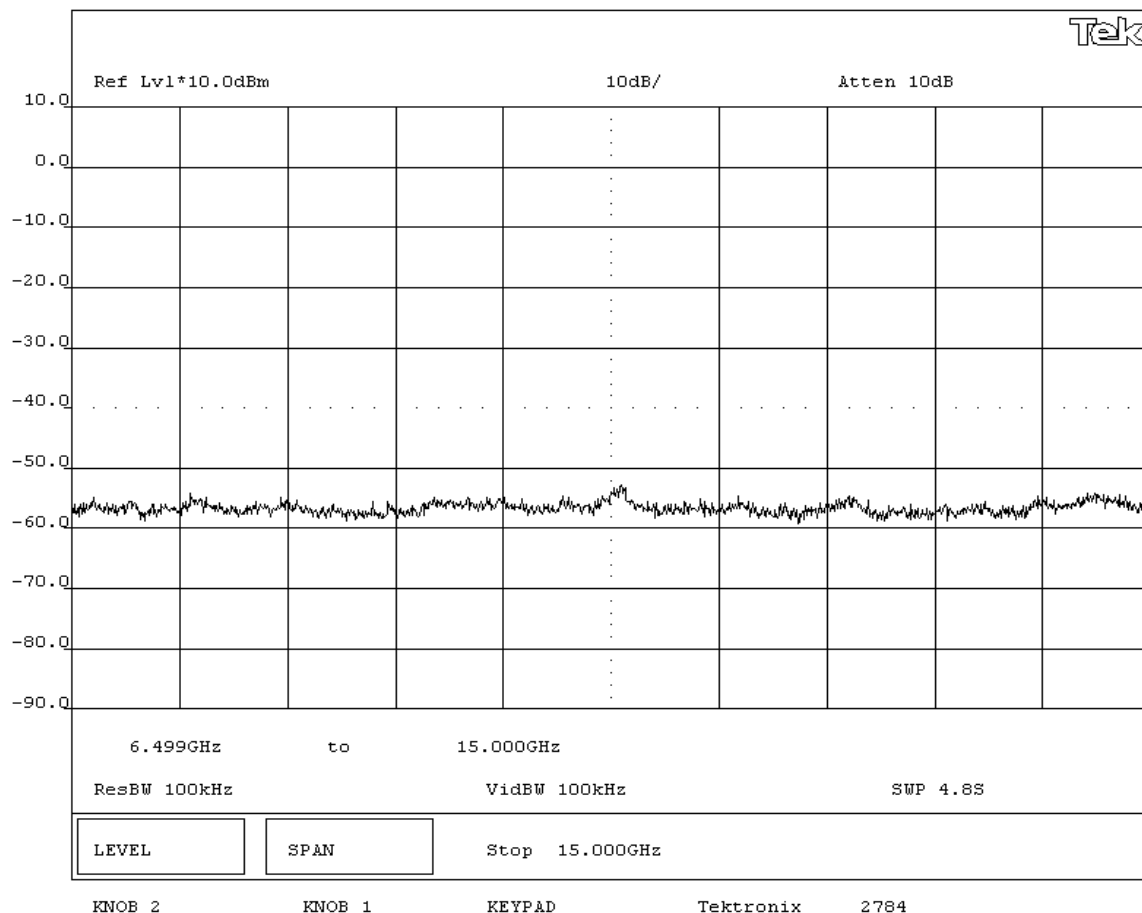
Pass

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: A-0363B		Work Order: LABT0109
Serial Number:		Date: 10/21//2004
Customer:	Logitech, Inc.	Temperature: 70 °F
Attendees:	None	Humidity: 47% RH
Customer Ref. No.:	Tested by: Greg Kiemel	Power: 120VAC/60Hz
		Job Site: EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2004	Method:	DA 00-705, ANSI C63.4	Year:	2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

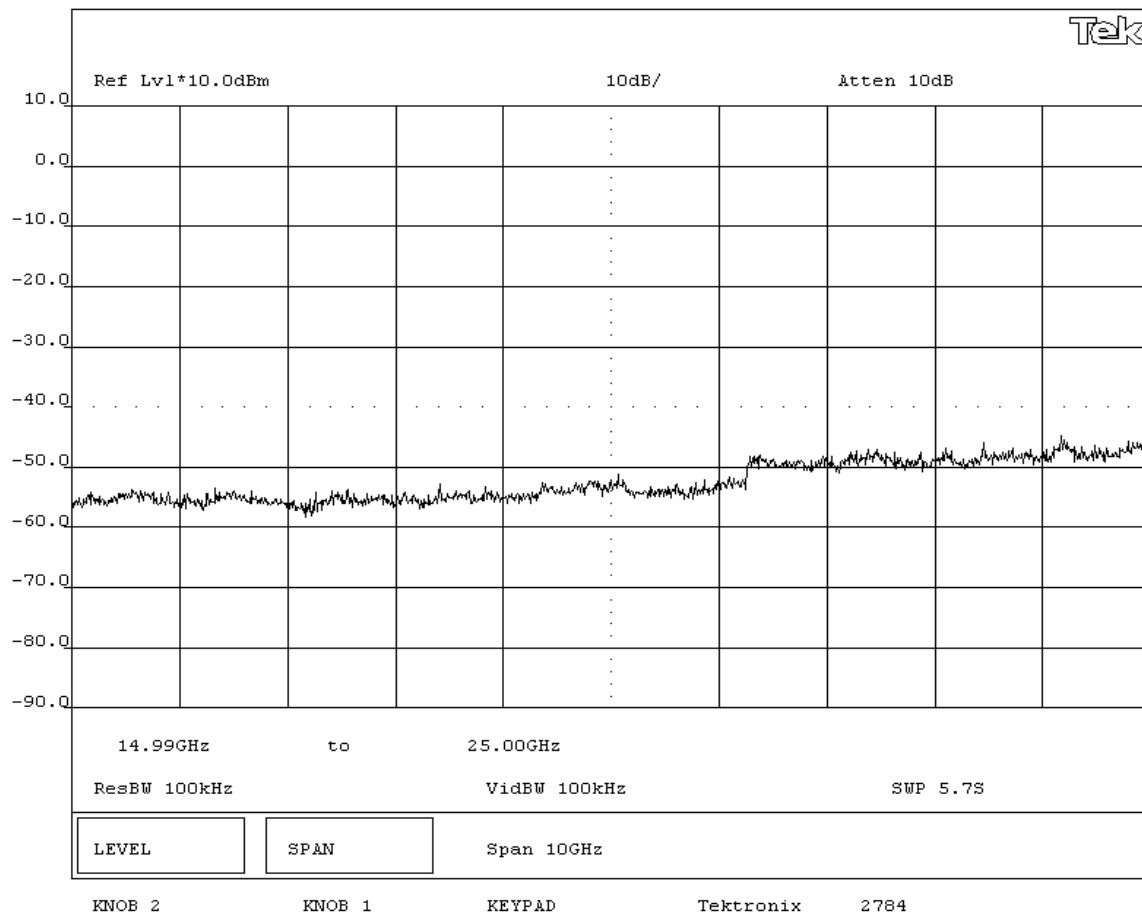
None


REQUIREMENTS

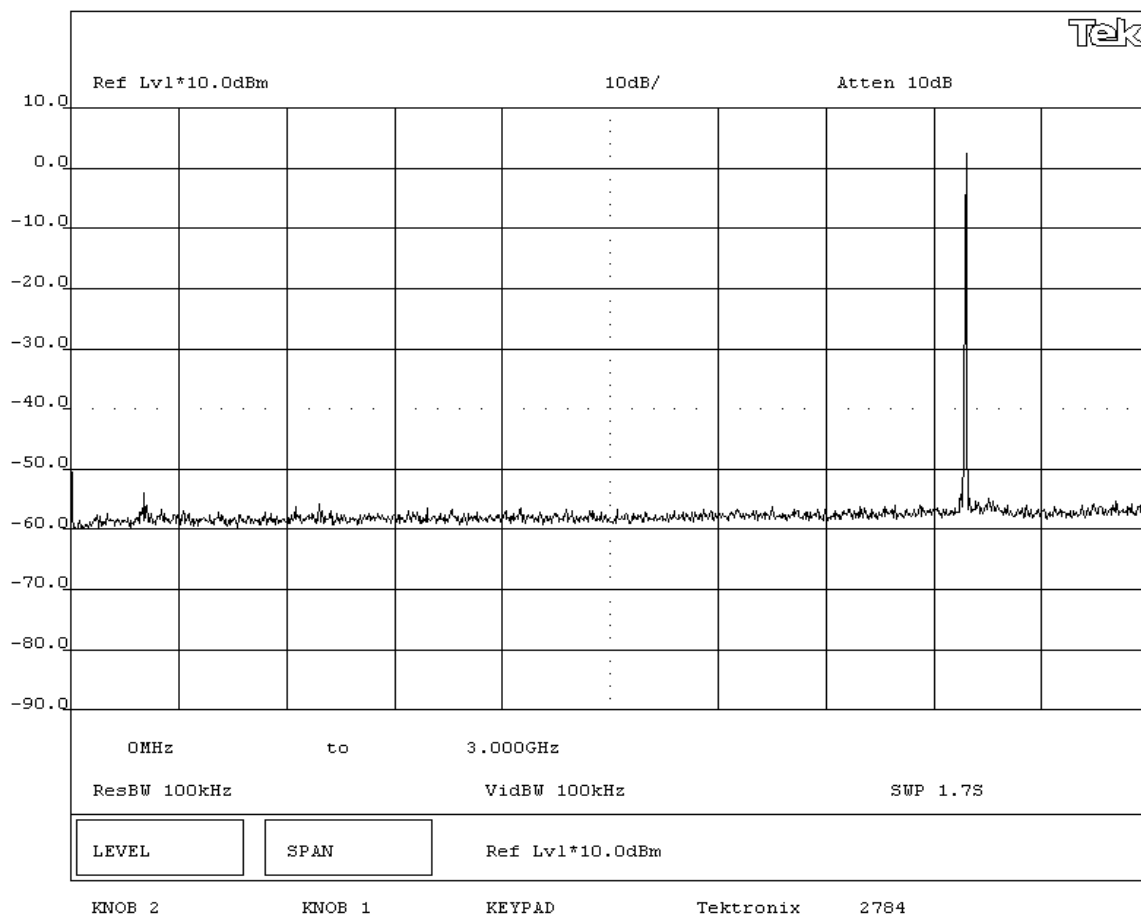
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental


RESULTS

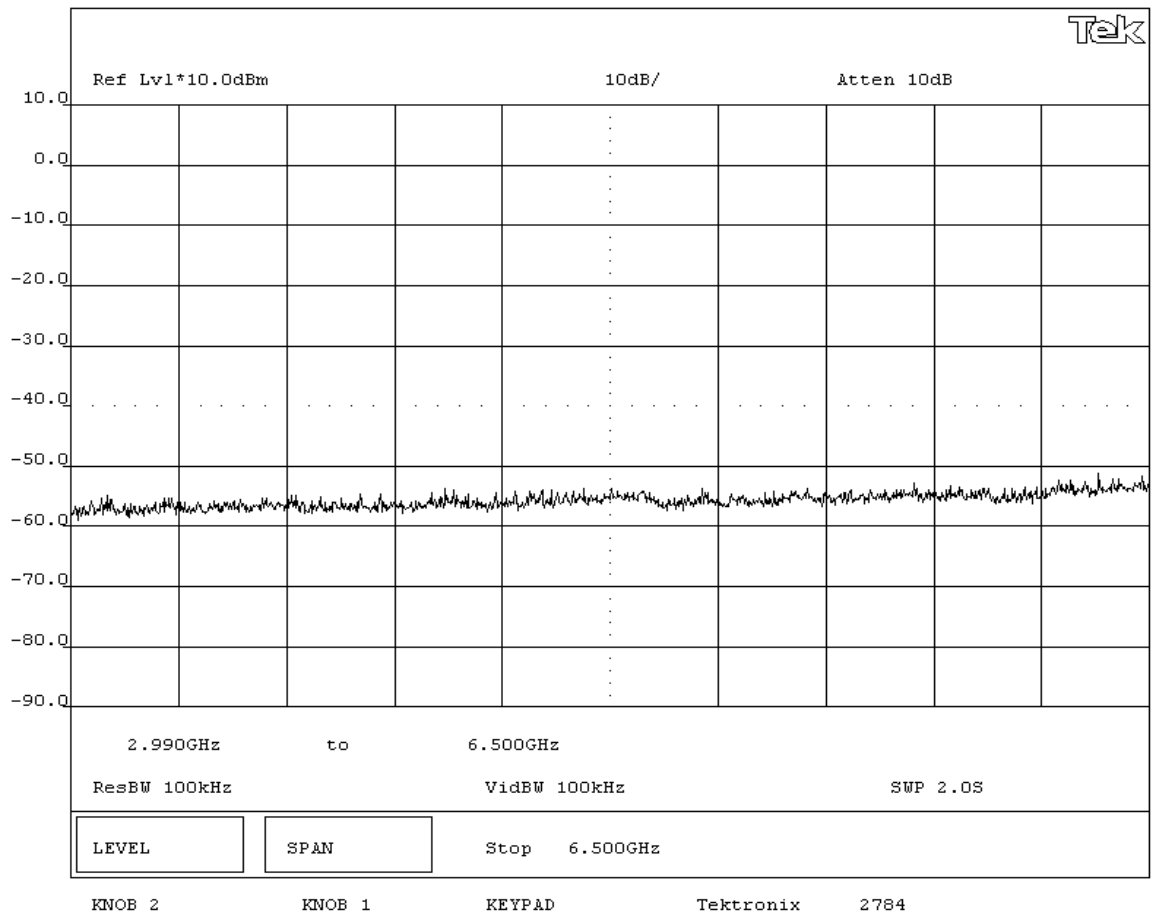
Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - Mid Channel 15GHz-25GHz**

NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: A-0363B				Work Order: LABT0109	
Serial Number:				Date: 10/21//2004	
Customer: Logitech, Inc.				Temperature: 70 °F	
Attendees: None				Humidity: 47% RH	
Customer Ref. No.:				Job Site: EV06	
Tested by: Greg Kiemel				Power: 120VAC/60Hz	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2004		Method: DA 00-705, ANSI C63.4	
				Year: 2003	
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					
<div style="text-align: center;">  Tested By: _____ </div>					
DESCRIPTION OF TEST					
Antenna Conducted Spurious Emissions - High Channel 0MHz-3GHz					



NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: A-0363B				Work Order: LABT0109	
Serial Number:				Date: 10/21//2004	
Customer: Logitech, Inc.				Temperature: 70 °F	
Attendees: None				Humidity: 47% RH	
Customer Ref. No.:				Job Site: EV06	
Tested by: Greg Kiemel				Power: 120VAC/60Hz	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2004		Method: DA 00-705, ANSI C63.4	
				Year: 2003	
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					
<div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1; border-bottom: 1px solid black; margin-left: 10px;"></div> </div>					
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: A-0363B		Work Order: LABT0109
Serial Number:		Date: 10/21//2004
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Greg Kiemel	Humidity: 47% RH
Customer Ref. No.:	Power: 120VAC/60Hz	Job Site: EV06

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS**COMMENTS****EUT OPERATING MODES**

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

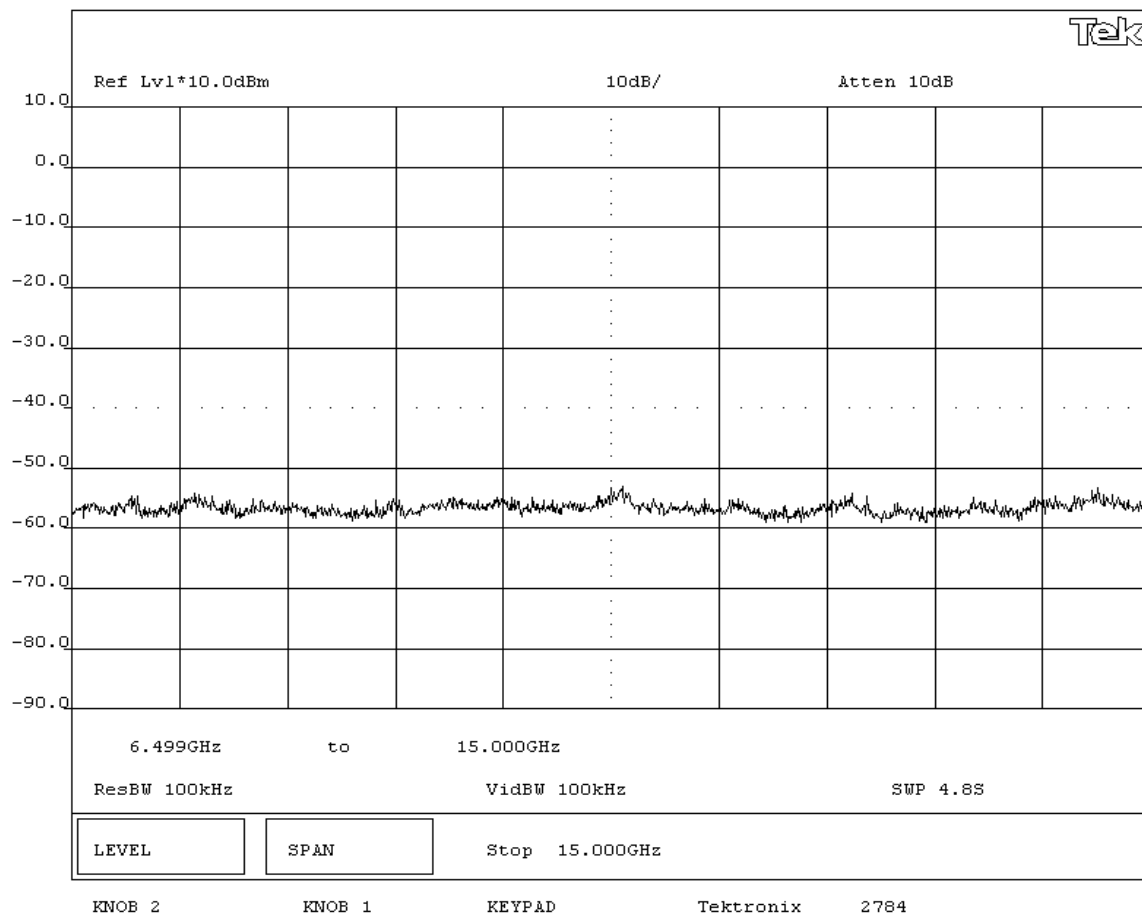
None

REQUIREMENTS

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

RESULTS

Pass

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - High Channel 6.5GHz-15GHz**

NORTHWEST
EMC**EMISSIONS DATA SHEET**Rev BETA
01/30/01

EUT:	A-0363B		Work Order:	LABT0109	
Serial Number:			Date:	10/21//2004	
Customer:	Logitech, Inc.		Temperature:	70 °F	
Attendees:	None	Tested by:	Greg Kiemel	Humidity:	47% RH
Customer Ref. No.:		Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(d)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year: 2003
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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

SIGNATURETested By: **DESCRIPTION OF TEST****Antenna Conducted Spurious Emissions - High Channel 15GHz-25GHz**