

# Logitech, Inc.

## **Cordless Dongle for X-Box Model A-0363B**

November 10, 2004

Report No. LABT0109 Rev 01

Report Prepared By



[www.nwemc.com](http://www.nwemc.com)  
1-888-EMI-CERT

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EMC Test Report

**Certificate of Test**  
**Issue Date: November 10, 2004**  
**Logitech, Inc.**  
**Model: A-0363B Cordless Dongle for X-Box**

<b>Specification</b>	<b>Emissions</b>		<b>Pass</b>	<b>Fail</b>
	<b>Test Method</b>			
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 TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV'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 LAC0196. 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?

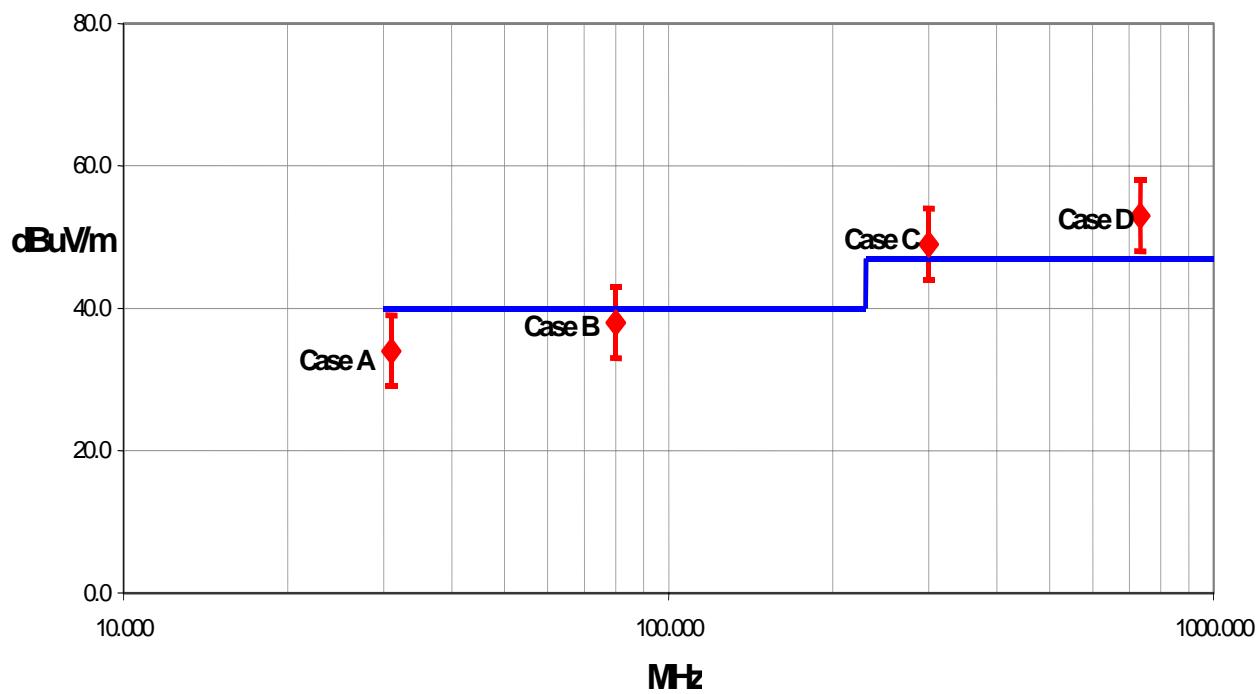
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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 $\leq 1$ GHz		Value (dB)							
Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna		3m	10m
		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)			
	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	
Expanded uncertainty $U$ (level of confidence $\approx 95\%$ )	normal (k=2)		+ 2.57 - 2.51	+ 2.76 - 2.70	

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

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

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

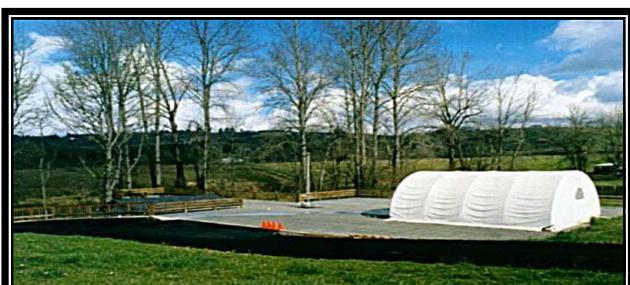
Legend		
$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties		
$U$ = combined standard uncertainty multiplied by the coverage factor: $k$ . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 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, $uc(y)$ yields a confidence level of only 68%.		

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

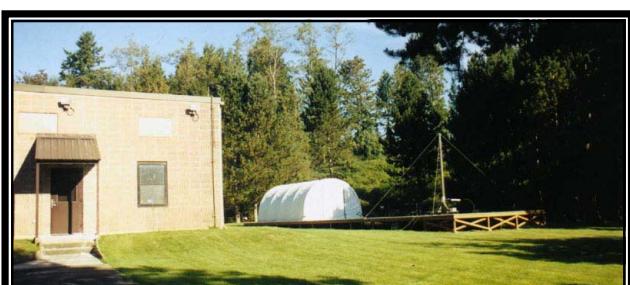
41 Tesla Ave.  
Irvine, CA 92618  
(888) 364-2378  
FAX (503) 844-3826

**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 339<sup>th</sup> Ave. SE  
Sultan, WA 98294  
(888) 364-2378  
FAX (360) 793-2536

**Party Requesting the Test**

<b>Company Name:</b>	Logitech, Inc.
<b>Address:</b>	1499 SE Tech Center Place Suite 350
<b>City, State, Zip:</b>	Vancouver, WA 98683
<b>Test Requested By:</b>	Mitchell Phillipi
<b>Model:</b>	A-0363B Cordless Dongle for X-Box
<b>First Date of Test:</b>	10-06-2004
<b>Last Date of Test:</b>	10-23-2004
<b>Receipt Date of Samples:</b>	10-06-2004
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No visual damage.

**Information Provided by the Party Requesting the Test**

<b>Clocks/Oscillators:</b>	Not provided.
<b>I/O Ports:</b>	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	Humidity:	43% RH
Customer Ref. No.:		Power:	120VAC/60Hz
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

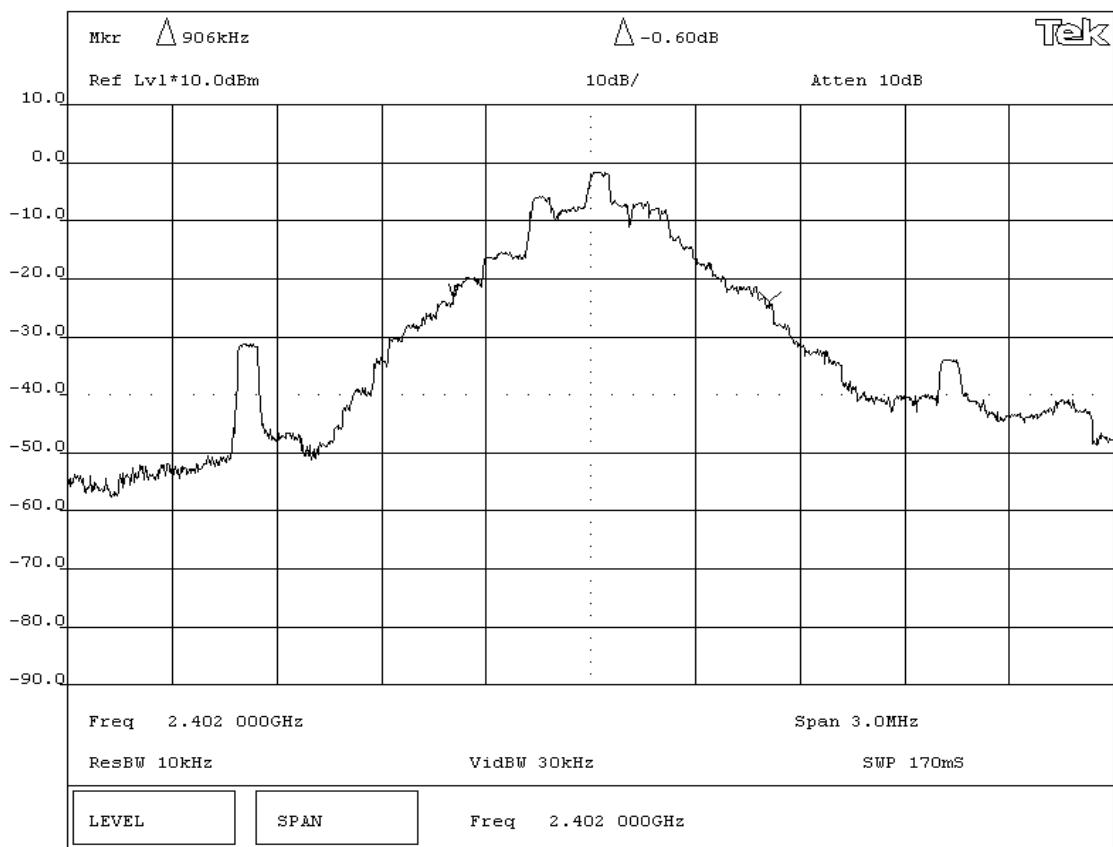
## SIGNATURE



Tested By: \_\_\_\_\_

## DESCRIPTION OF TEST

20dB Bandwidth - Low Channel



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: 10/28/04

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.

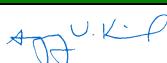
## RESULTS

## BANDWIDTH

Pass

0.849 MHz

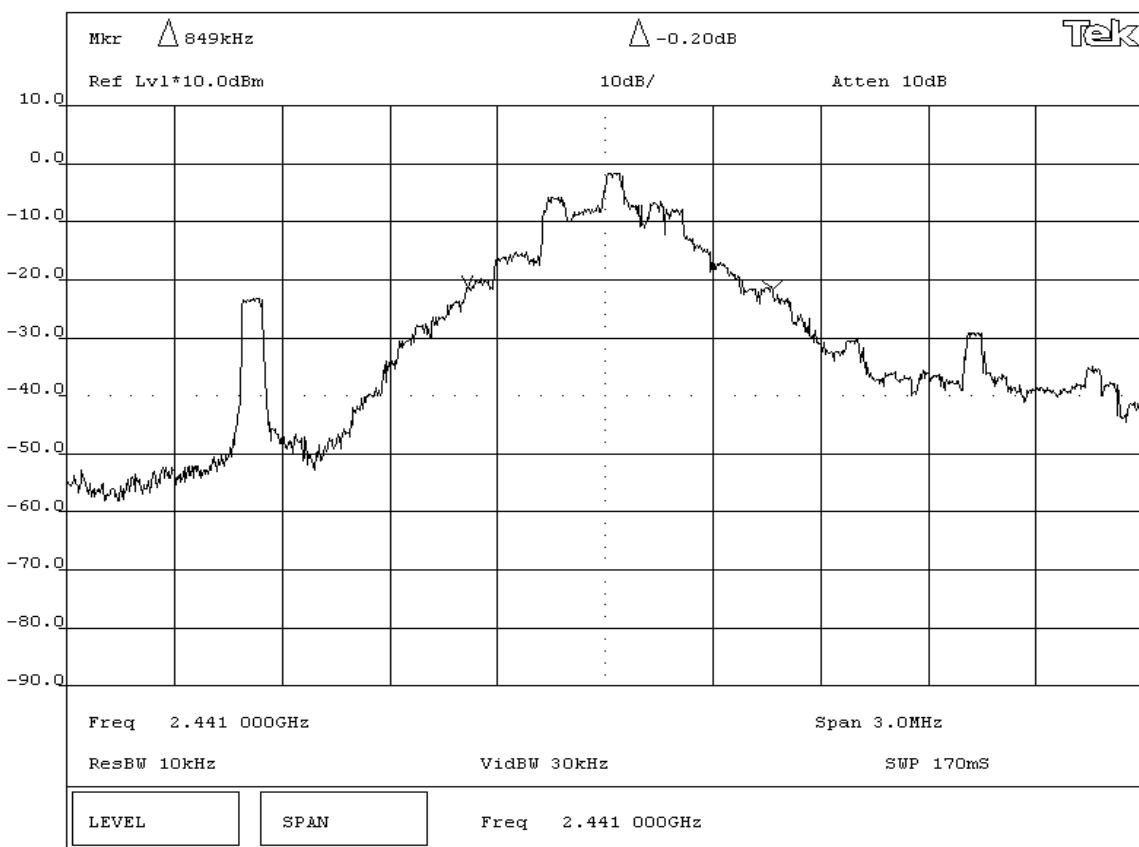
## SIGNATURE



Tested By: \_\_\_\_\_

## DESCRIPTION OF TEST

20dB Bandwidth - Mid Channel



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:	10/28/04
Customer:	Logitech, Inc.	Temperature:	70 °F
Attendees:	None	Humidity:	43% RH
Customer Ref. No.:		Power:	120VAC/60Hz

## 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	1.455 MHz

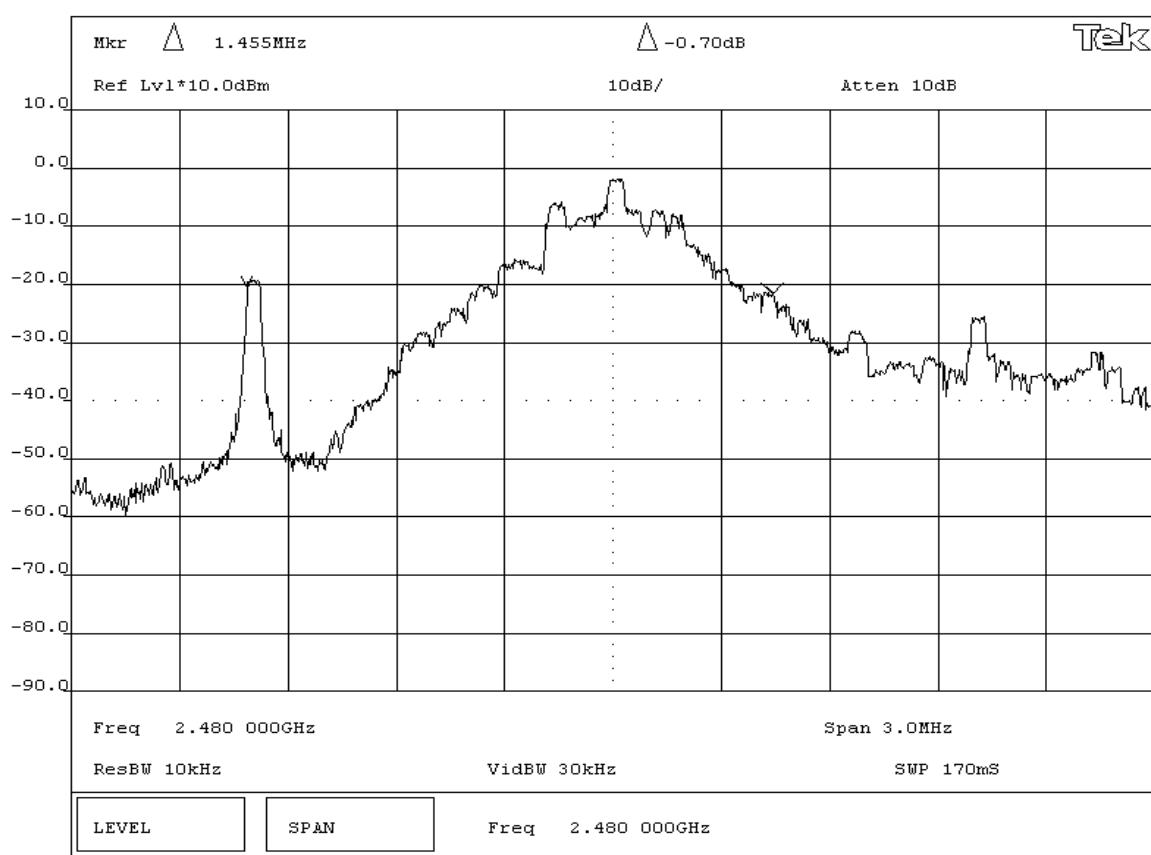
## SIGNATURE

*Greg Kiemel*

Tested By: \_\_\_\_\_

## DESCRIPTION OF TEST

20dB Bandwidth - High Channel

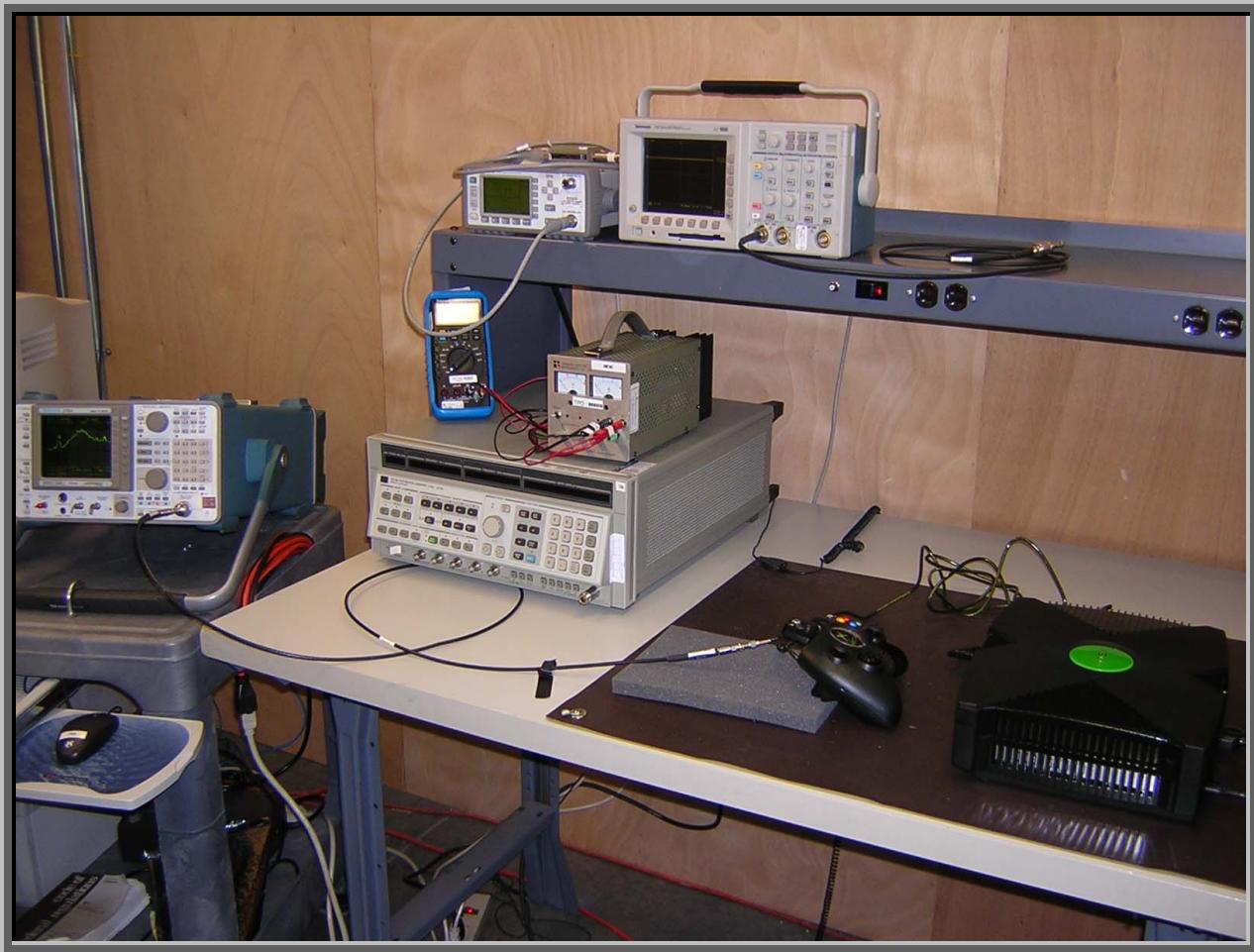


KNOB 2

KNOB 1

KEYPAD

Tektronix 2784



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

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:

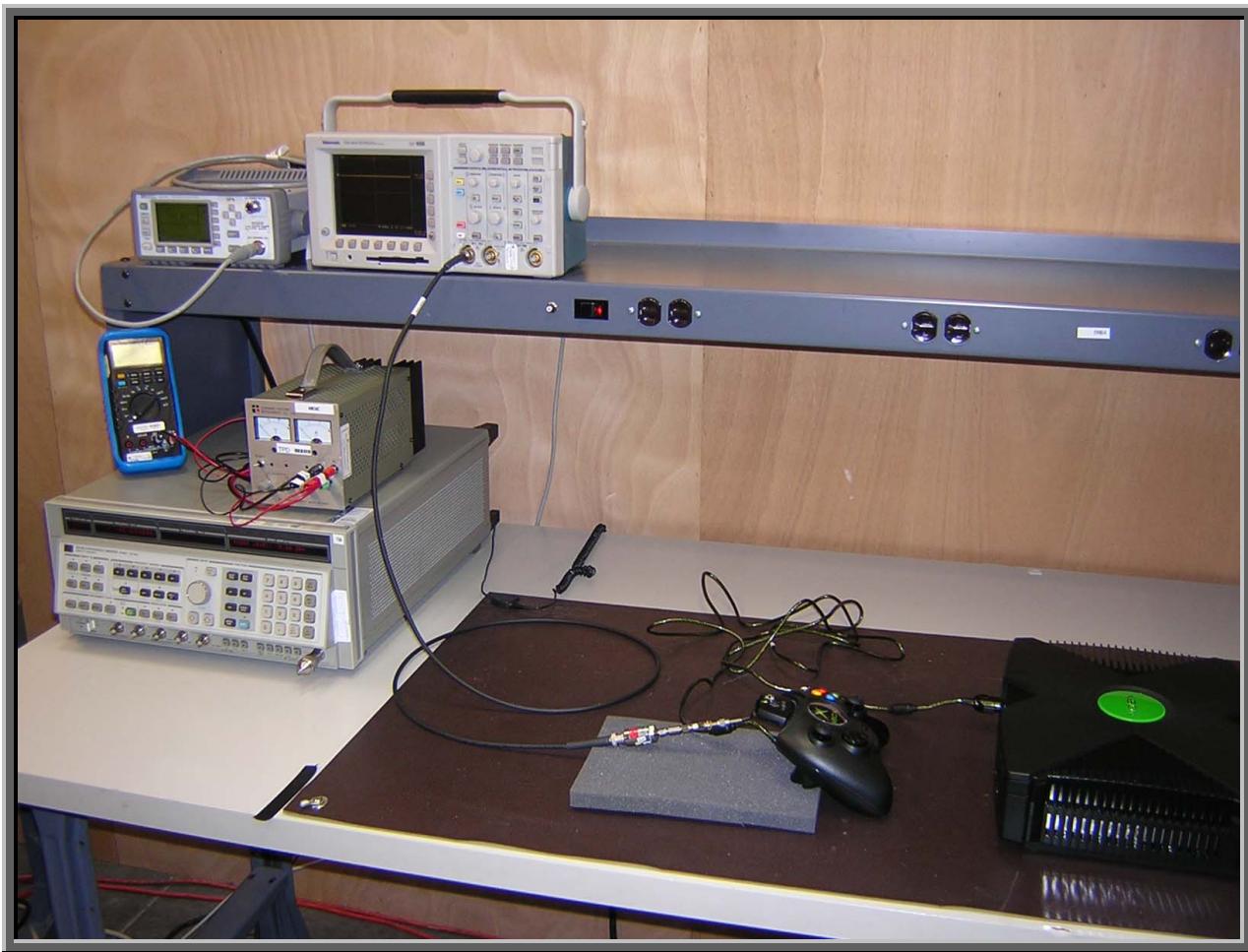
NORTHWEST  
EMC

## 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		
<b>TEST SPECIFICATIONS</b>									
Specification:		47 CFR 15.247(b)	Year:	2004	Method:	DA 00-705, ANSI C63.4		Year:	2003
<b>SAMPLE CALCULATIONS</b>									
<b>COMMENTS</b>									
<b>EUT OPERATING MODES</b>									
Modulated by PRBS at maximum data rate									
<b>DEVIATIONS FROM TEST STANDARD</b>									
None									
<b>REQUIREMENTS</b>									
Maximum peak conducted output power does not exceed 1 Watt									
<b>RESULTS</b>		<b>AMPLITUDE</b>							
Pass		2.41 mW							
<b>SIGNATURE</b>									
 Tested By: _____									
<b>DESCRIPTION OF TEST</b>									
<b>Output Power</b>									

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**

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

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	Humidity:	47% RH
Customer Ref. No.:		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 at the edge of the authorized band is 20 dB down from the fundamental

## RESULTS

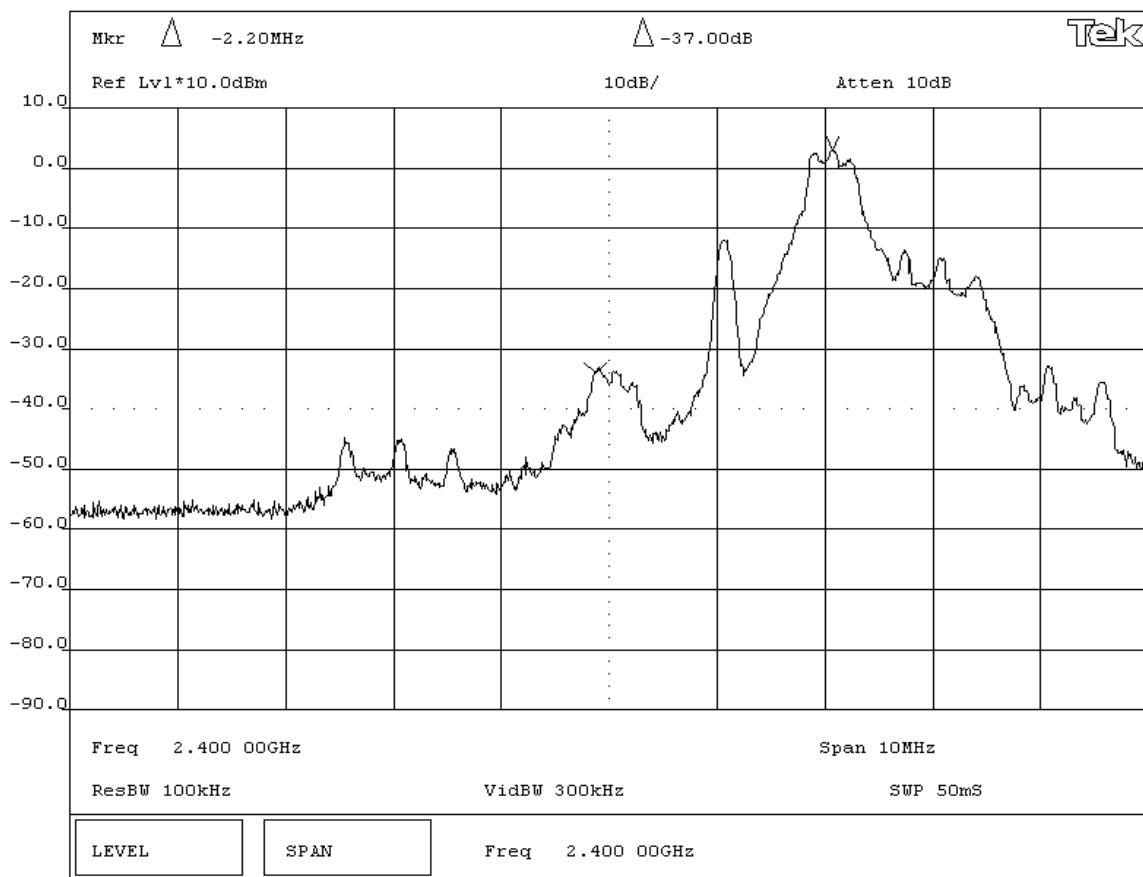
Pass	AMPLITUDE
	-37.0 dB

## SIGNATURE

*Greg Kiemel*  
Tested By: \_\_\_\_\_

## DESCRIPTION OF TEST

## Band Edge Compliance - Low Channel



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.:		Power:	120VAC/60Hz
<b>TEST SPECIFICATIONS</b>		Job Site: EV06	

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**

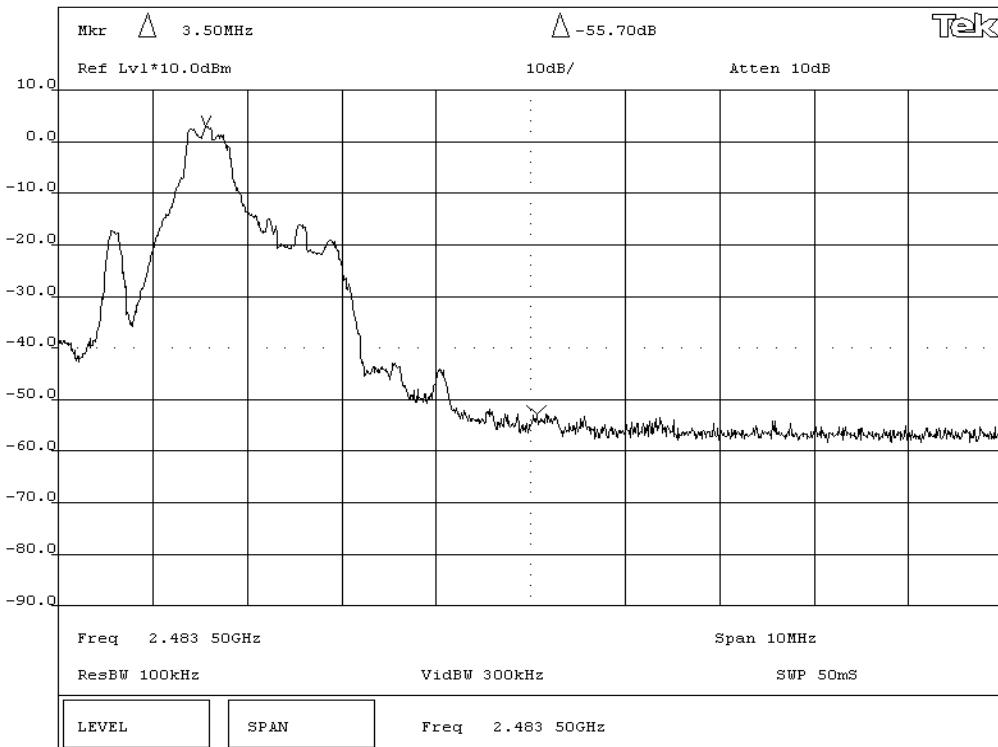
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	AMPLITUDE
---------	-----------

Pass	-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:

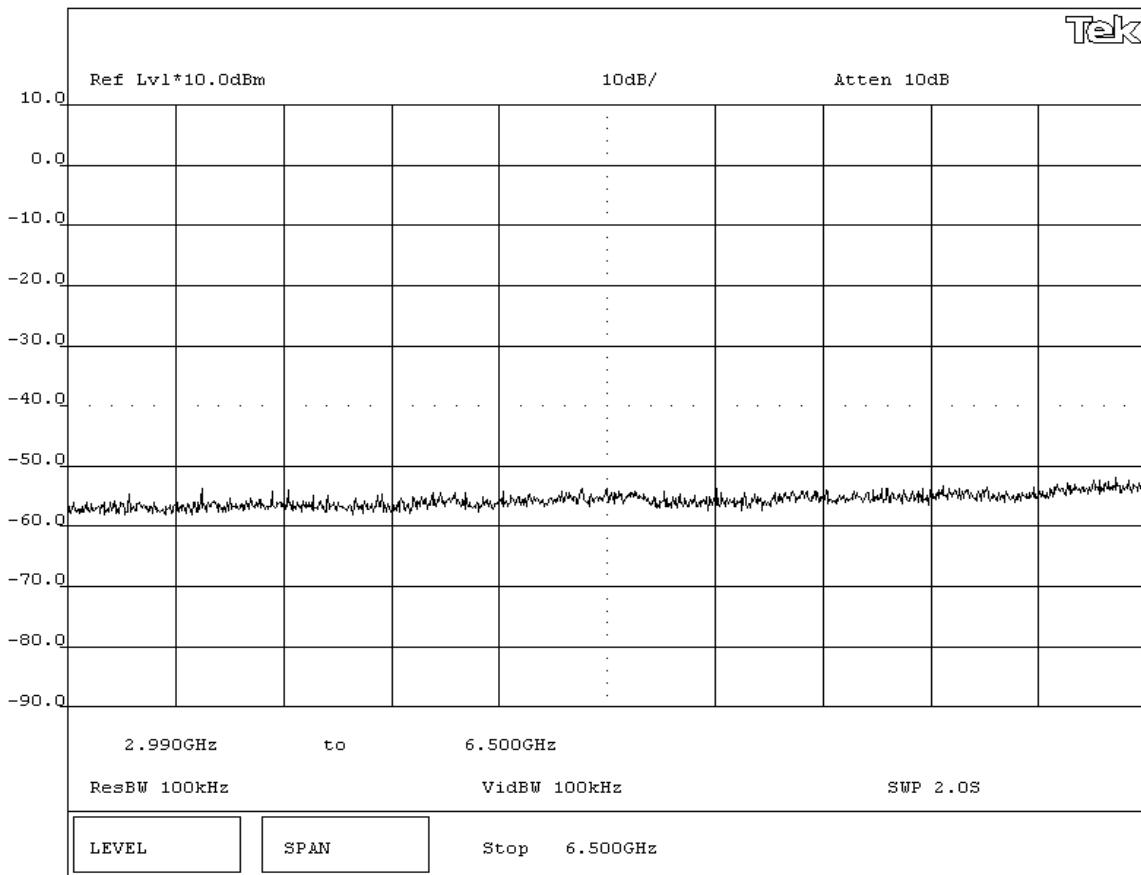


NORTHWEST  
EMC

## 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		
TEST SPECIFICATIONS				Humidity: 47% RH		
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						
Tested By: <u>Greg Kiemel</u>						
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.:		Power:	120VAC/60Hz
		Job Site:	EV06

## Customer Ref. No.: **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

DEVI  
None

## None

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

## Maximum RESULTS

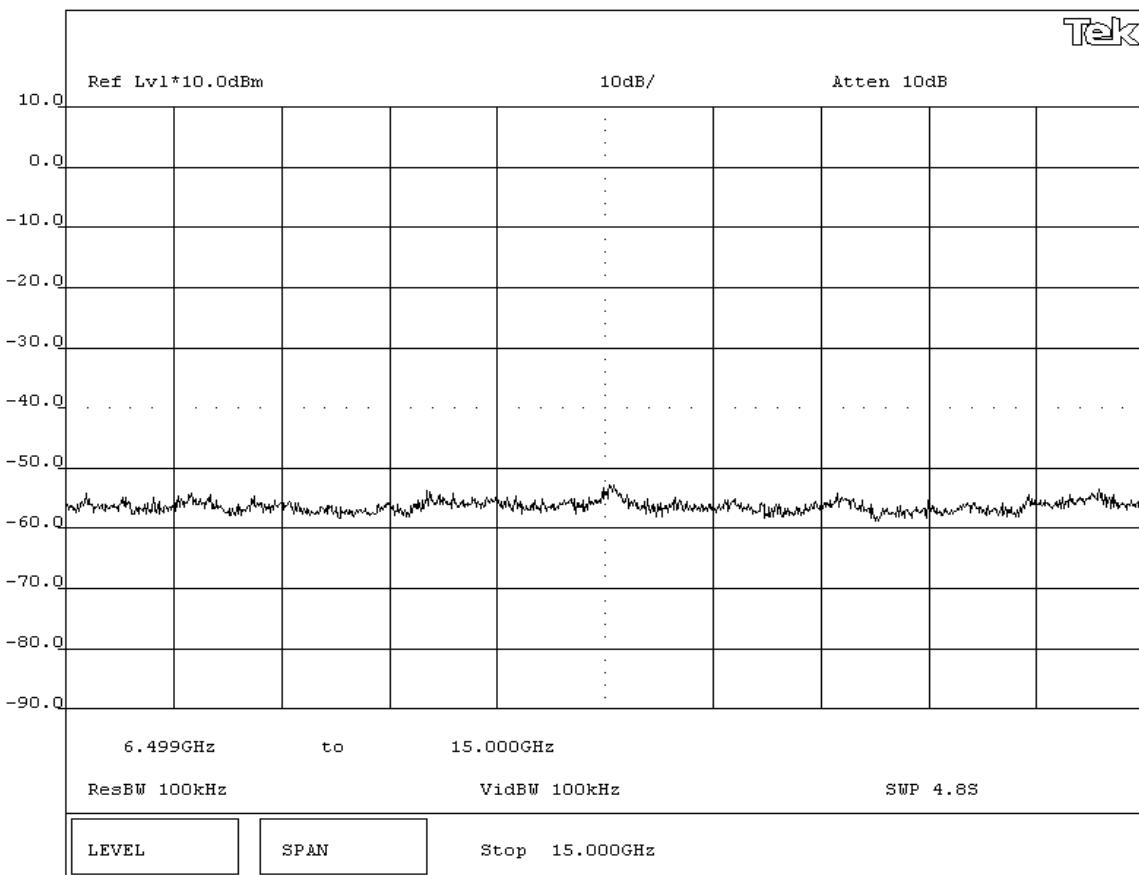
## RESU

Pass

Tested By: 

### DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 6.5GHz-15GHz



KNOB 2

KNOB 1

loop 10.000ms

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.:		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

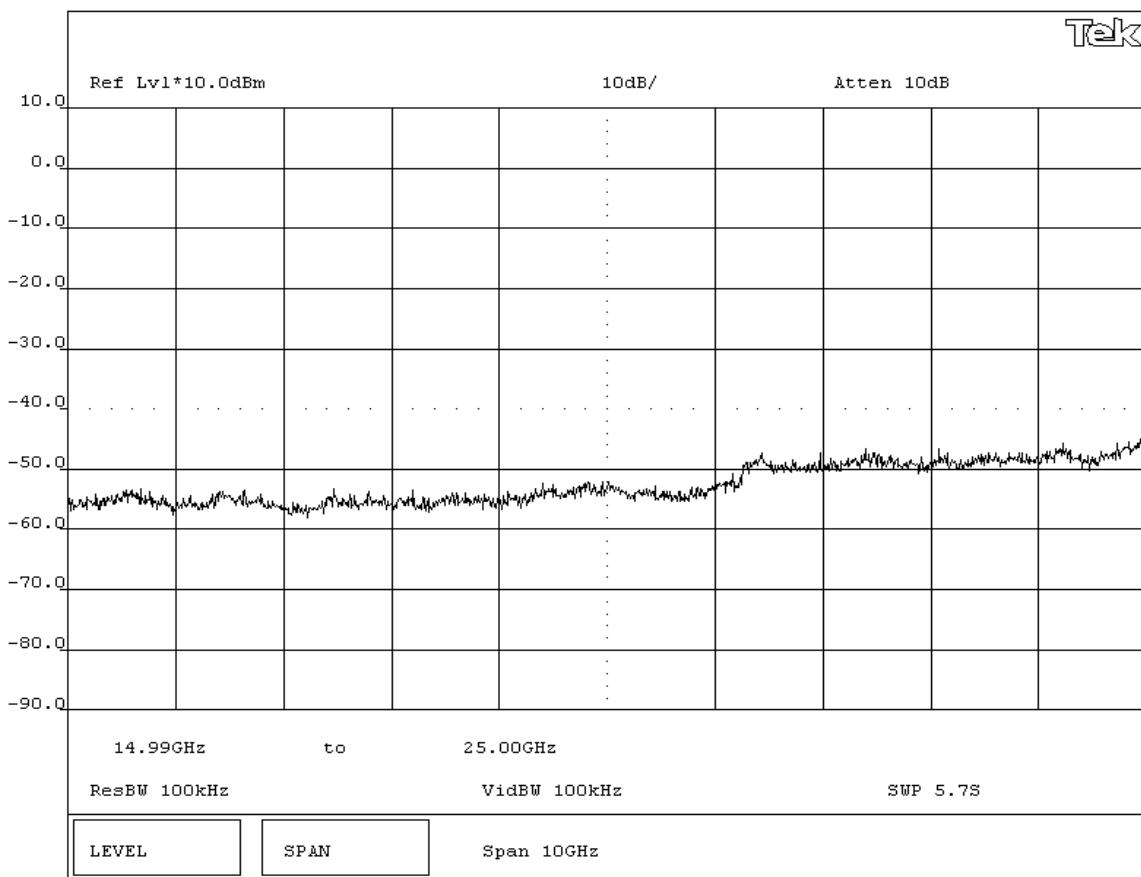
## SIGNATURE

*Greg Kiemel*

Tested By: \_\_\_\_\_

## DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 15GHz - 25GHz



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.: 

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 outside of the authorized band is 20 dB down from the fundamental

## RESULTS

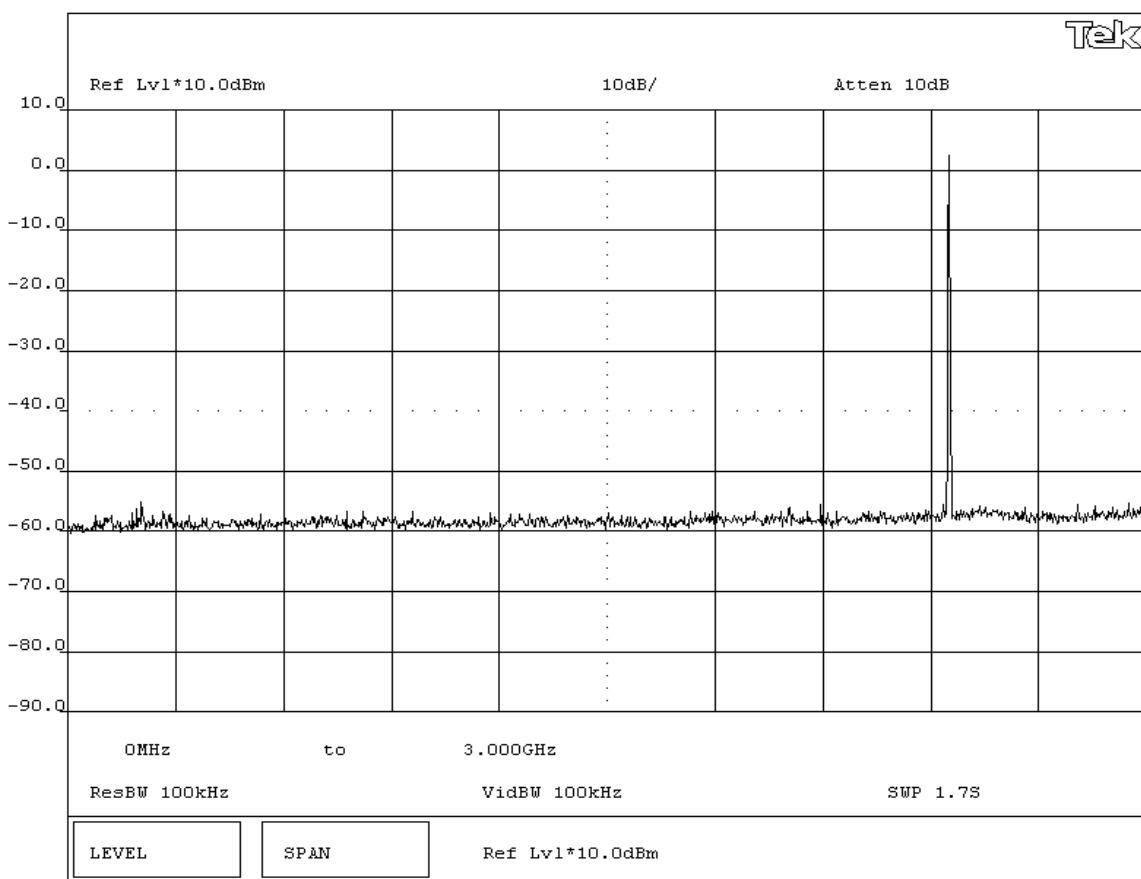
Pass

## SIGNATURE

Tested By: 

## DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Mid Channel 0MHz-3GHz



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.:		Power:	120VAC/60Hz
TEST SPECIFICATIONS		Job Site: EV06	

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

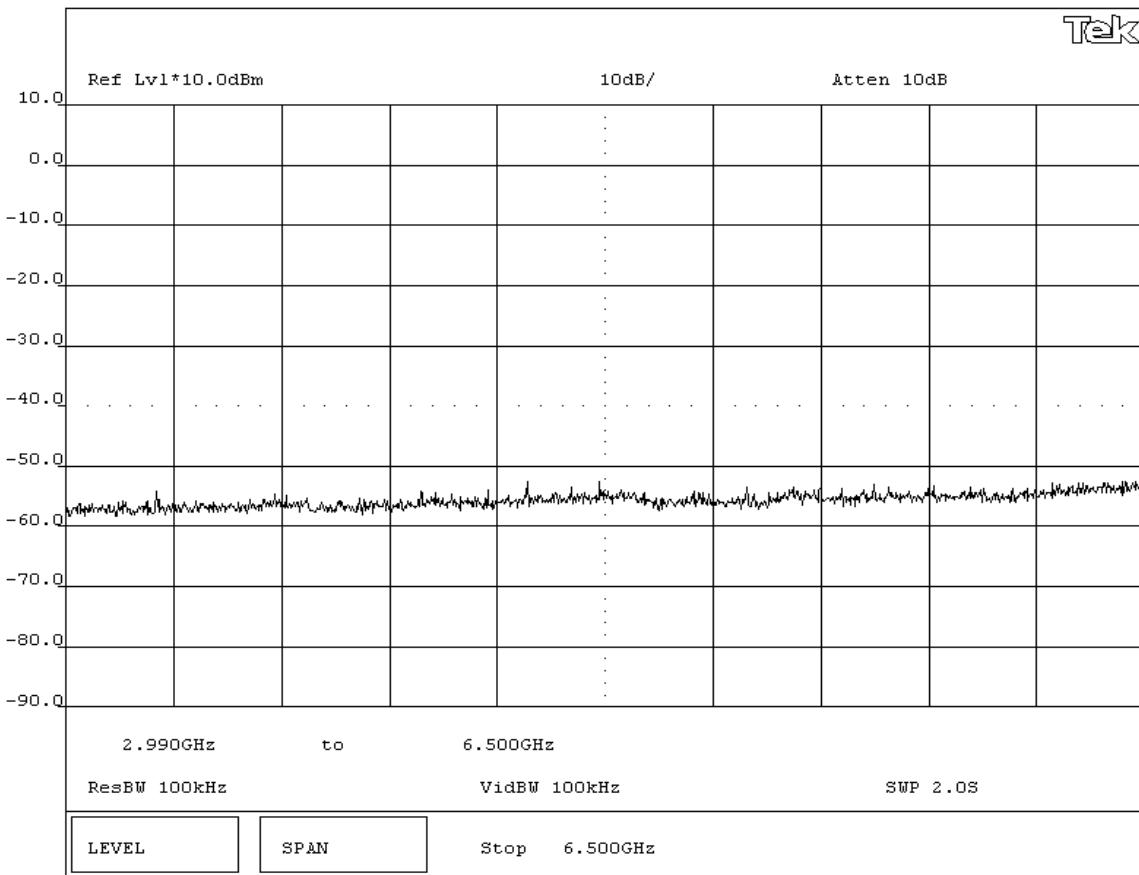
Pass

## SIGNATURE

Tested By: Greg Kiemel

## DESCRIPTION OF TEST

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



KNOB 2

KNOB 1

KEYPAD

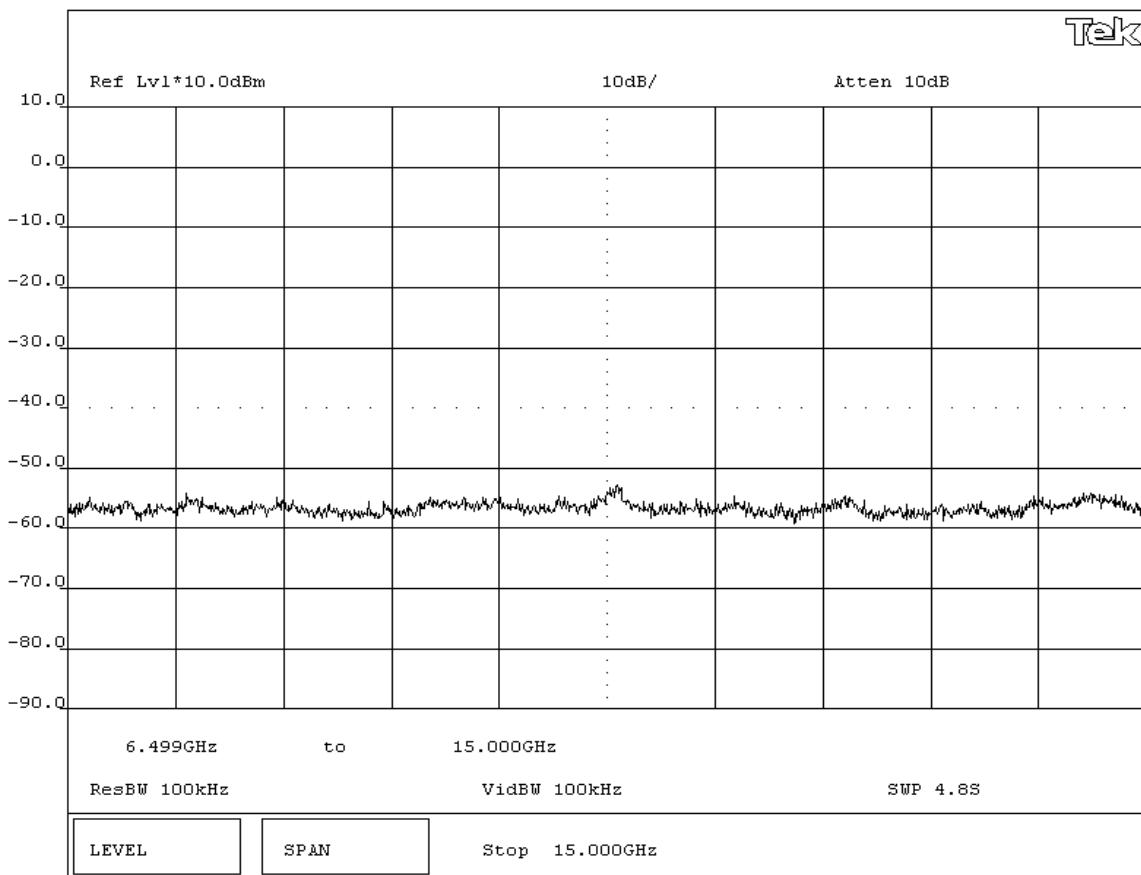
Tektronix 2784

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		Tested by:	Greg Kiemel		
Customer Ref. No.:			Power:	120VAC/60Hz		
TEST SPECIFICATIONS				Humidity: 47% RH		
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						
 Tested By: _____						
DESCRIPTION OF TEST						
Antenna Conducted Spurious Emissions - Mid Channel 6.5GHz-15GHz						



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.:		Power:	120VAC/60Hz
TEST SPECIFICATIONS		Job Site: EV06	

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

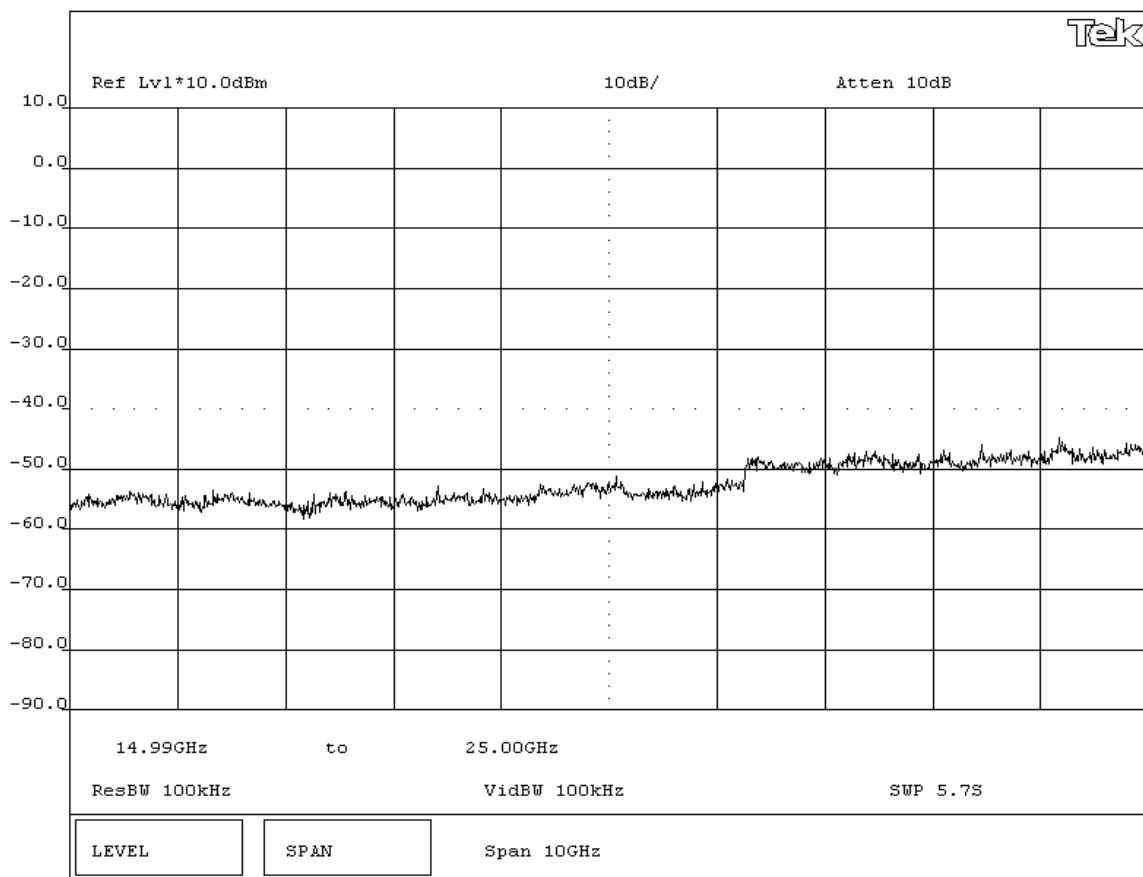
## SIGNATURE

*Greg Kiemel*

Tested By: \_\_\_\_\_

## DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Mid Channel 15GHz-25GHz



KNOB 2

KNOB 1

KEYPAD

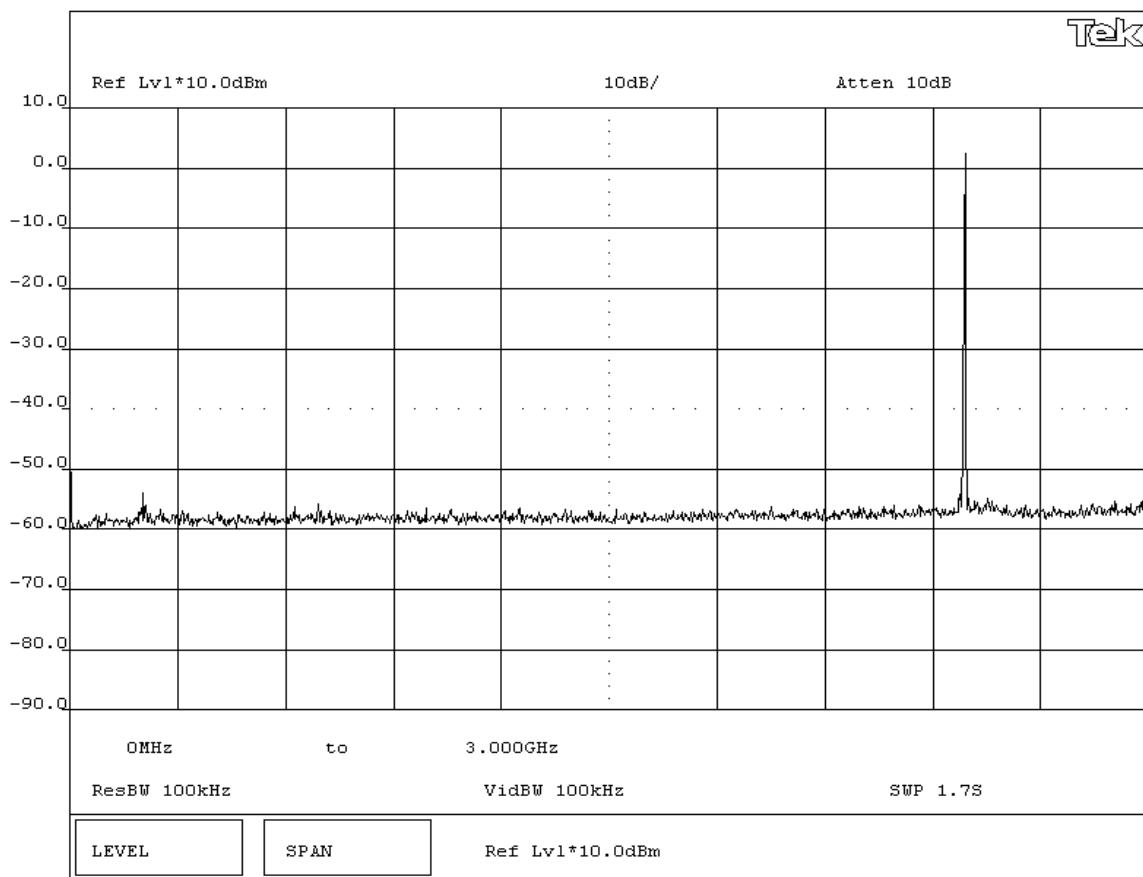
Tektronix 2784

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		Tested by:	Greg Kiemel		
Customer Ref. No.:			Power:	120VAC/60Hz		
TEST SPECIFICATIONS				Humidity: 47% RH		
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						
 Tested By: _____						
DESCRIPTION OF TEST						
Antenna Conducted Spurious Emissions - High Channel 0MHz-3GHz						



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.:		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

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

## RESULTS

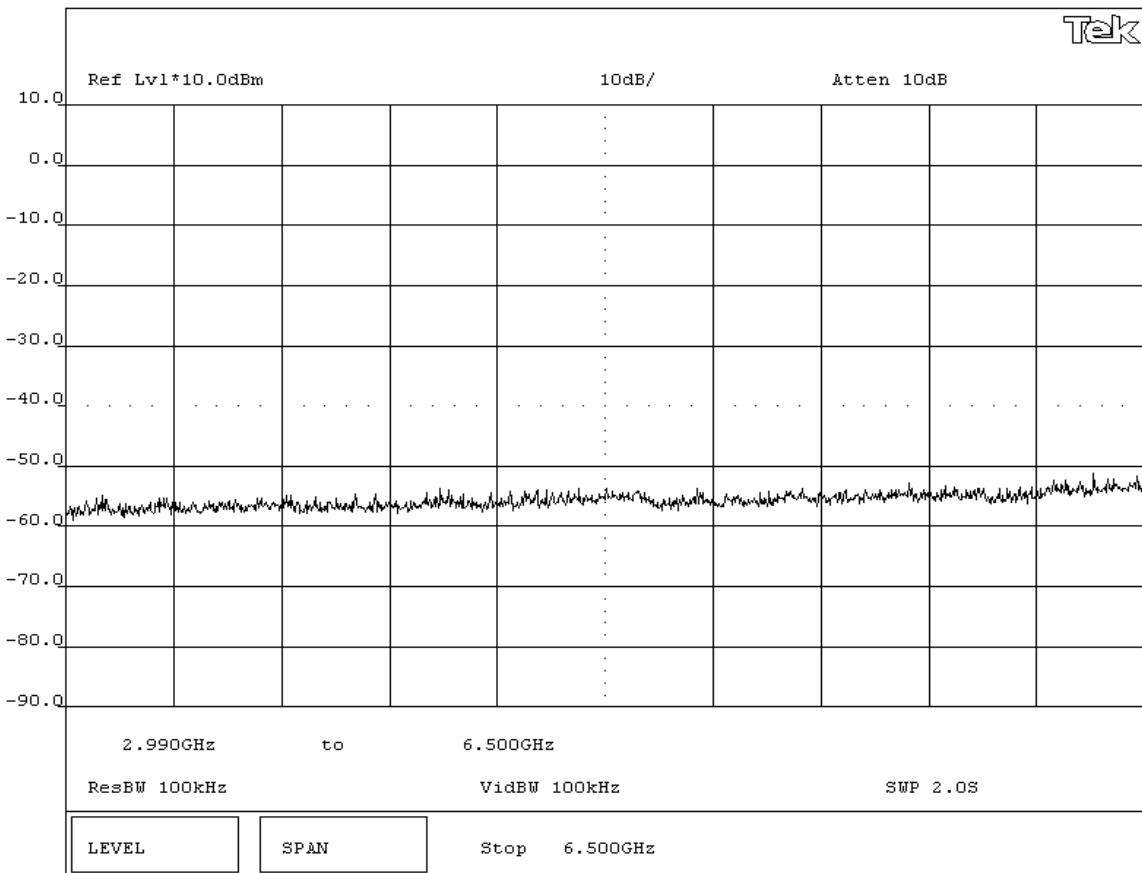
## RESULTS

Pass

Tested By: *[Signature]*

### DESCRIPTION OF TEST

## Antenna Conducted Spurious Emissions - High Channel 3GHz-6.5GHz



KNOB 2

KNOB 1

beep 0.000000

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.:		Power:	120VAC/60Hz
<b>TEST SPECIFICATIONS</b>		Job Site: EV06	

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**

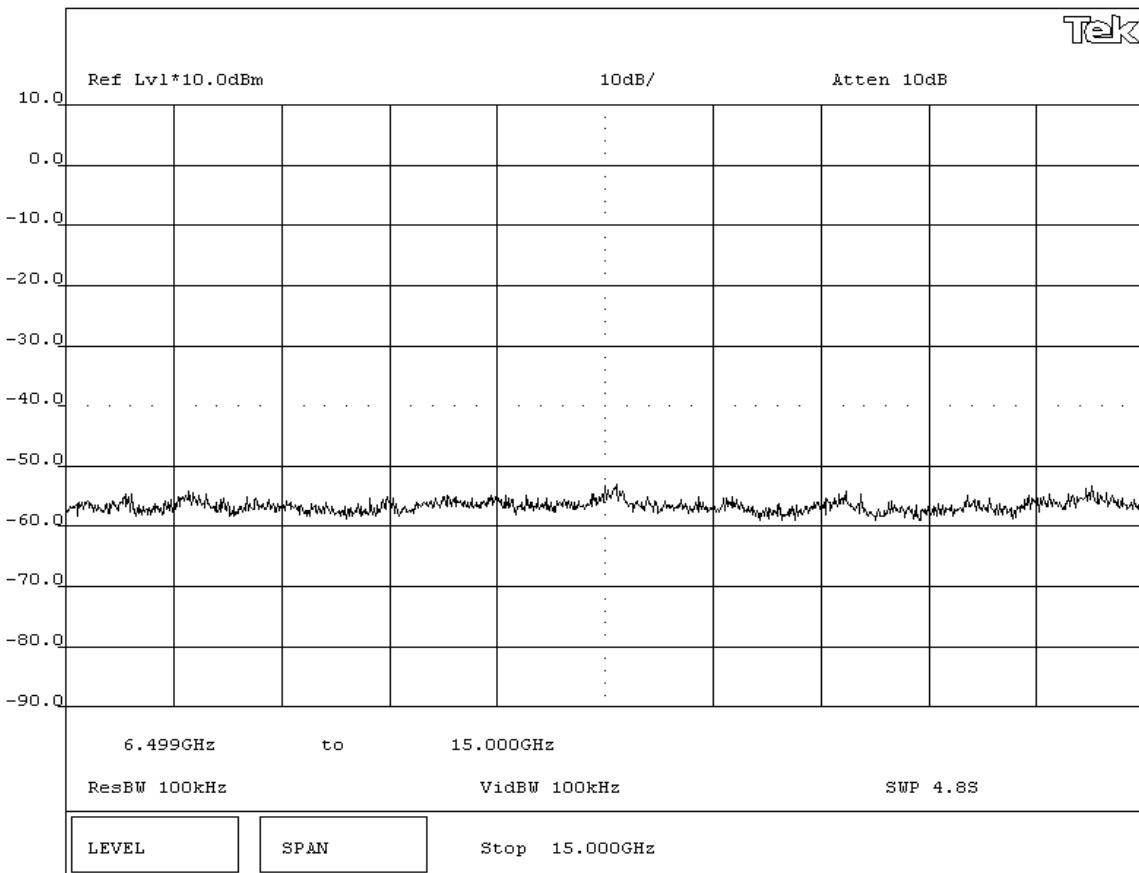
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

**RESULTS**

Pass

**SIGNATURE**

Tested By: \_\_\_\_\_

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

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.:		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

DEVIATION

## None

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

## Maximum RESULTS

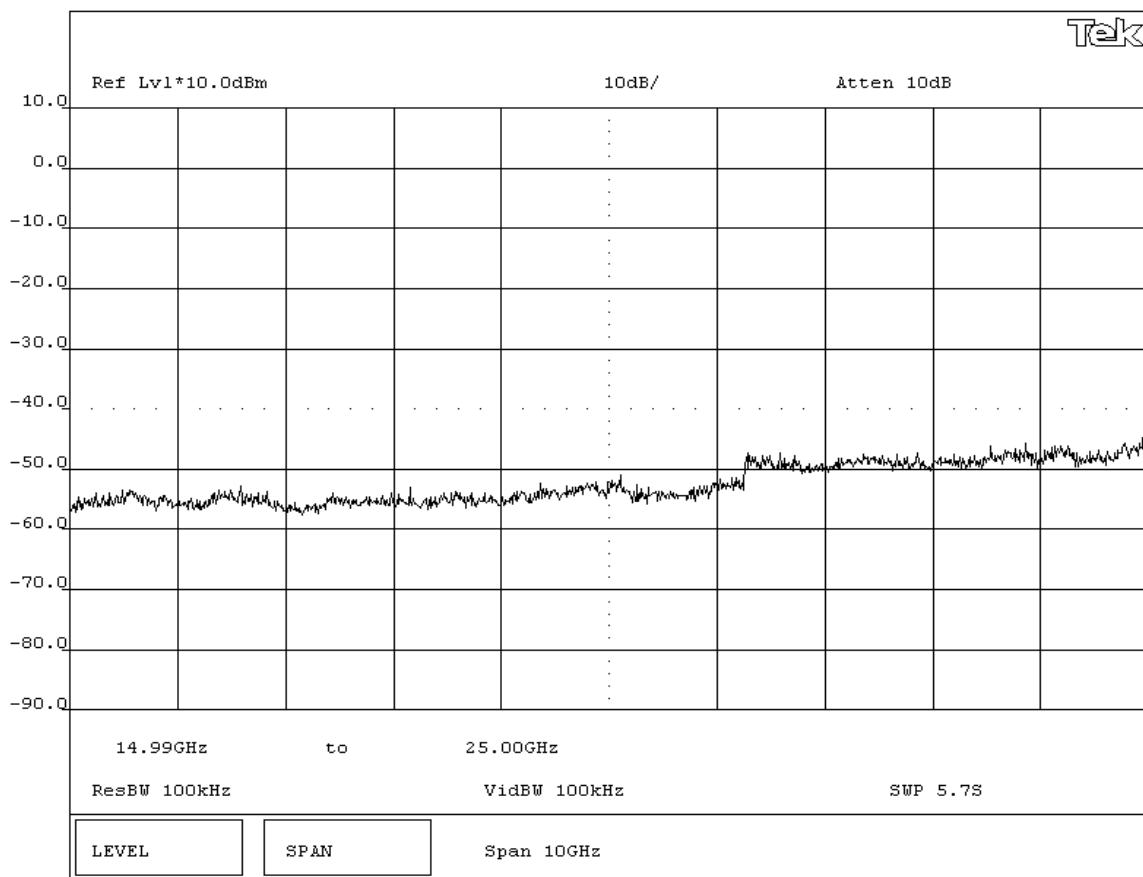
## RESU

Pass

Tested By: 

## DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - High Channel 15GHz-25GHz



KNOB 2

## SPAN

Span 10GHz

Tektronix

2784

