Logitech, Inc.

Bluetooth Dongle for Generic MP3 Players MN: F-0415A
Bluetooth Dongle for iPod MN: F-0397A

June 14, 2005

Report No. LABT0125

Report Prepared By

NORTHWEST EMC

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

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: June 14, 2005
Logitech, Inc.
Bluetooth Dongle for Generic MP3 Players MN: F-0415A
Bluetooth Dongle for iPod MN: F-0397A

Emissions			
Specification	**Test Method**	**Pass**	**Fail**
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(a) Occupied Bandwidth:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(b) Output Power:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(d) Band Edge Compliance:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(d) Spurious Conducted Emissions:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(e) Power Spectral Density:2005-04	ANSI C63.4:2003	☒	☐

Modifications made to the product
See the Modifications section of this report

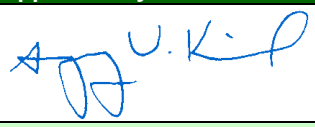
Test Facility

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
00	None		

Accreditations and Authorizations

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, and 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.

200629-0
200630-0
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 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 Numbers. - 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?

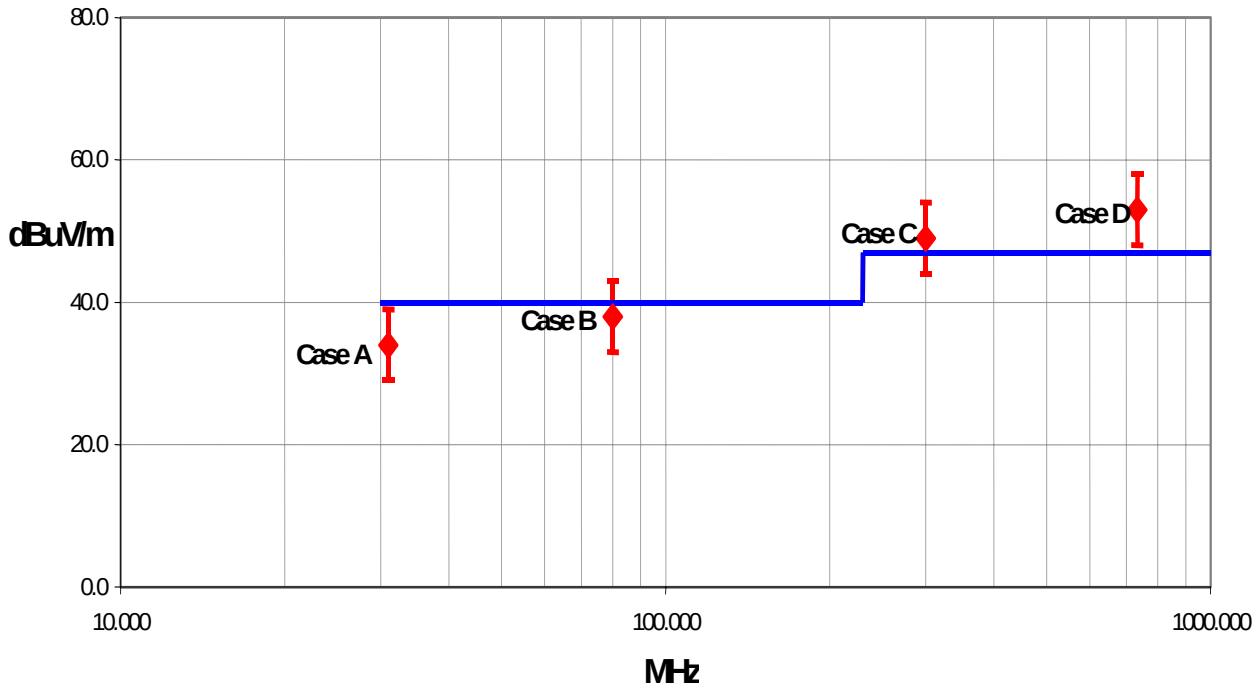
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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 3m	Biconical Antenna 10m	Log Periodic Antenna 3m	Log Periodic Antenna 10m	Dipole Antenna 3m	Dipole Antenna 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 ≈ 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
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25	+ 1.38 - 1.35
Expanded uncertainty ***U*** (level of confidence ≈ 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 ≈ 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 ≈ 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 ≈ 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

Labs OC01 – OC13

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

Oregon

Evergreen Facility

Labs EV01 – EV10

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

Oregon

Trails End Facility

Labs TE01 – TE03

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

Washington

Sultan Facility

Labs SU01 – SU07

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:	Bluetooth Dongle for Generic MP3 Players MN: F-0415A Bluetooth Dongle for iPod MN: F-0397A
First Date of Test:	5-16-2005
Last Date of Test:	6-07-2005
Receipt Date of Samples:	5-16-2005
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided.
I/O Ports:	audio, TTL/power

Functional Description of the EUT (Equipment Under Test):

The F-0415A is a Bluetooth dongle that connects to any MP3 player. The F-0397A is a Bluetooth dongle that only connects to Apple Computer's iPod MP3 player. Both dongles provide wireless connectivity to Bluetooth headphones. Both models are identical except for the geometry of the audio connector that interfaces to the host device.

Client Justification for EUT Selection:

The dongles are representative production samples. Radiated spurious emissions and AC powerline conducted emissions were performed on both units. Since the radios are identical, the antenna port direct connect measurements were only performed on the F-0397A.

Client Justification for Test Selection:

The tests are required for the FCC certification of the radios to FCC 15.247 requirements.

EUT Photo

F-0415A

F-0397A

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Occupied Bandwidth	05/16/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
2	Band Edge Compliance	05/16/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
3	Spurious Conducted Emissions	05/16/2005	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	05/17/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
5	Output Power	05/17/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
6	Spurious Radiated Emissions	05/21/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
7	AC Powerline Conducted Emissions	06/07/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	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:
Battery

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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
Serial/TTL converter	RES	RS232IT	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

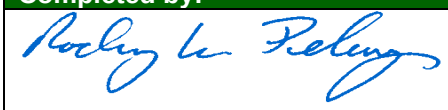
Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

Test Description

Requirement: 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. The measurement is made with the spectrum analyzer's resolution bandwidth set to ≥1% of the 20dB bandwidth, and the video bandwidth set to greater than or equal to the resolution bandwidth.

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

Completed by:



NORTHWEST EMC

OCCUPIED BANDWIDTH

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	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.

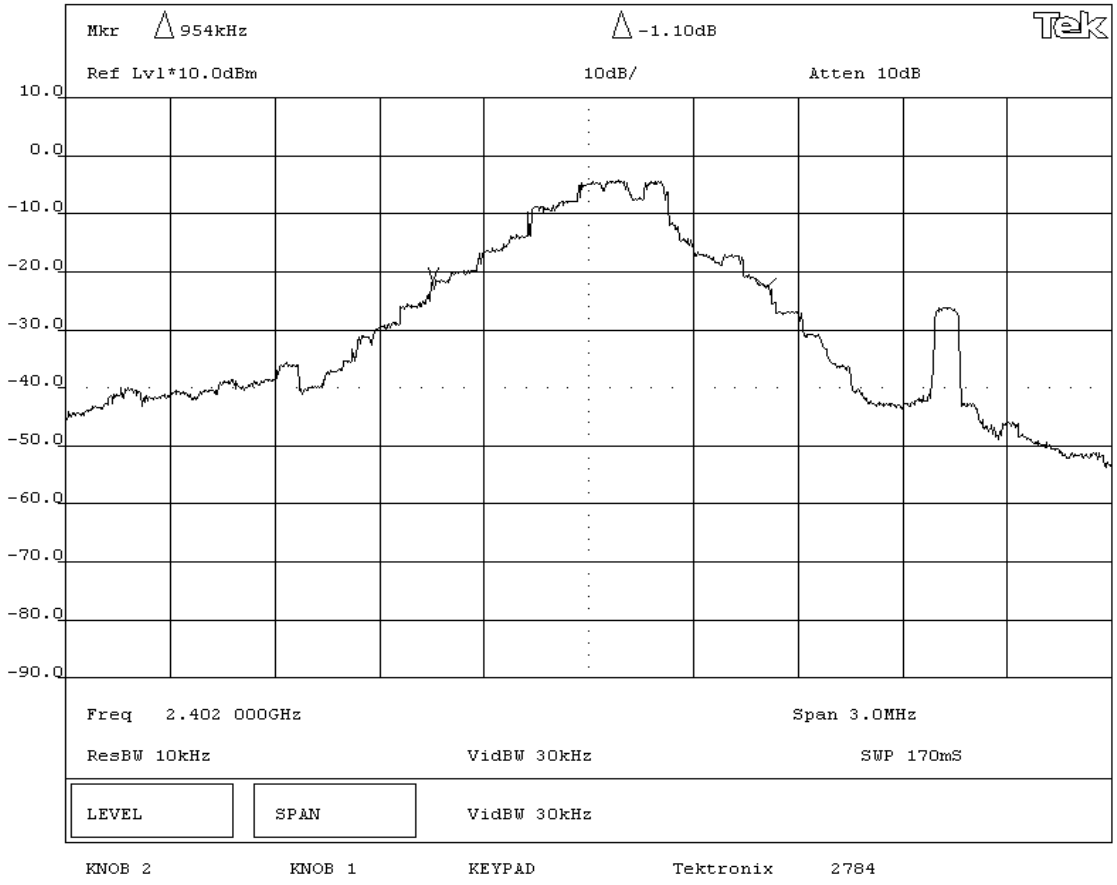
RESULTS	BANDWIDTH
Pass	0.954 MHz

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

20dB Bandwidth - Low Channel



NORTHWEST EMC

OCCUPIED BANDWIDTH

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	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.

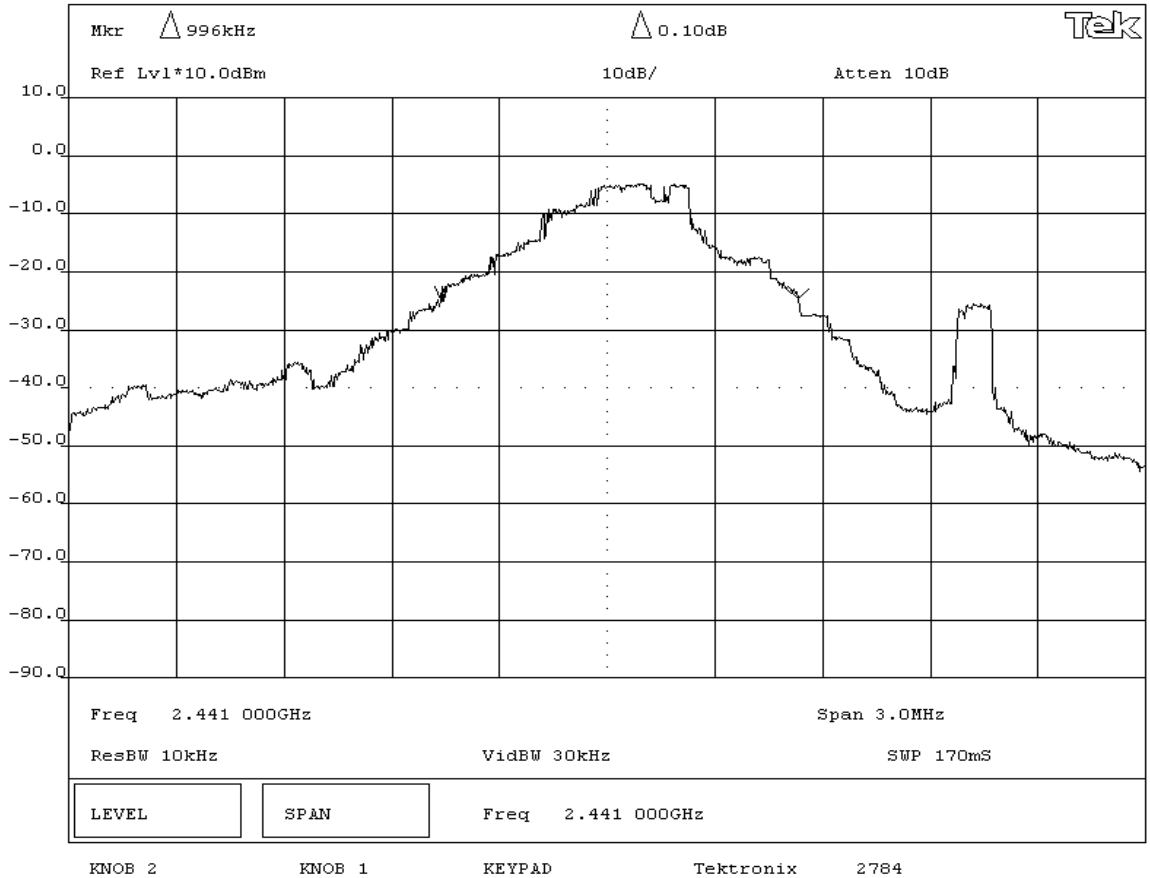
RESULTS	BANDWIDTH
Pass	0.996 MHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

20dB Bandwidth - Mid Channel



NORTHWEST EMC

OCCUPIED BANDWIDTH

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	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.

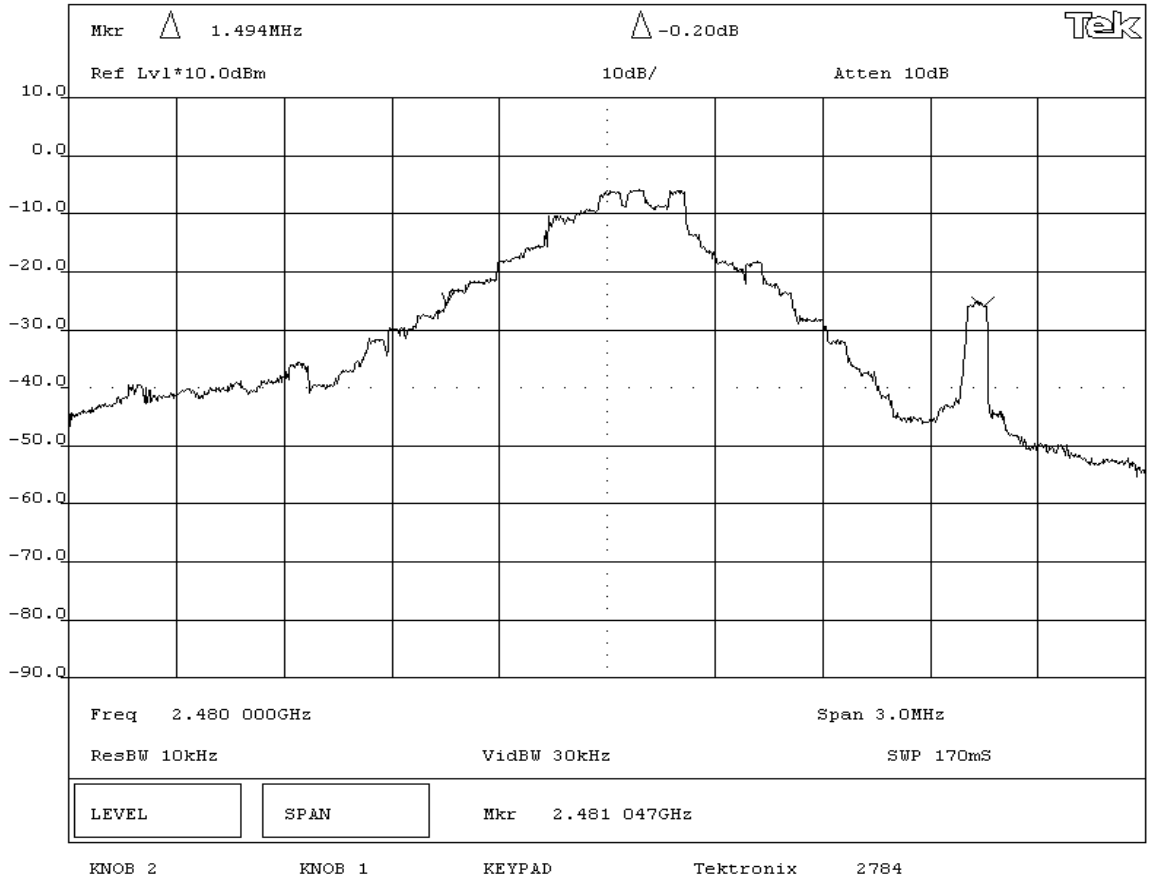
RESULTS	BANDWIDTH
Pass	1.494 MHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

20dB Bandwidth - High Channel




DELL

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:
Battery

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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
Serial/TTL converter	RES	RS232IT	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
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
Oscilloscope	Tektronix	TDS 3052	TOF	12/02/2004	13 mo
Signal Generator	Hewlett Packard	8341B	TGN	02/07/2005	13 mo
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA

Test Description

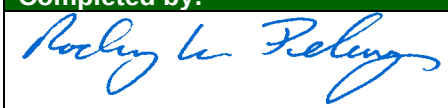
Requirement: Per 47 CFR 15.247(b)(3), the maximum peak output power must not exceed 1 Watt.

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 data rate of the radio was varied to determine the level that produced the highest 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

OUTPUT POWER

Rev BETA
01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/17/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	45% RH
Customer Ref. No.:		Power:	3.7 VDC	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(b)	Year:	2005	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	2.87mW

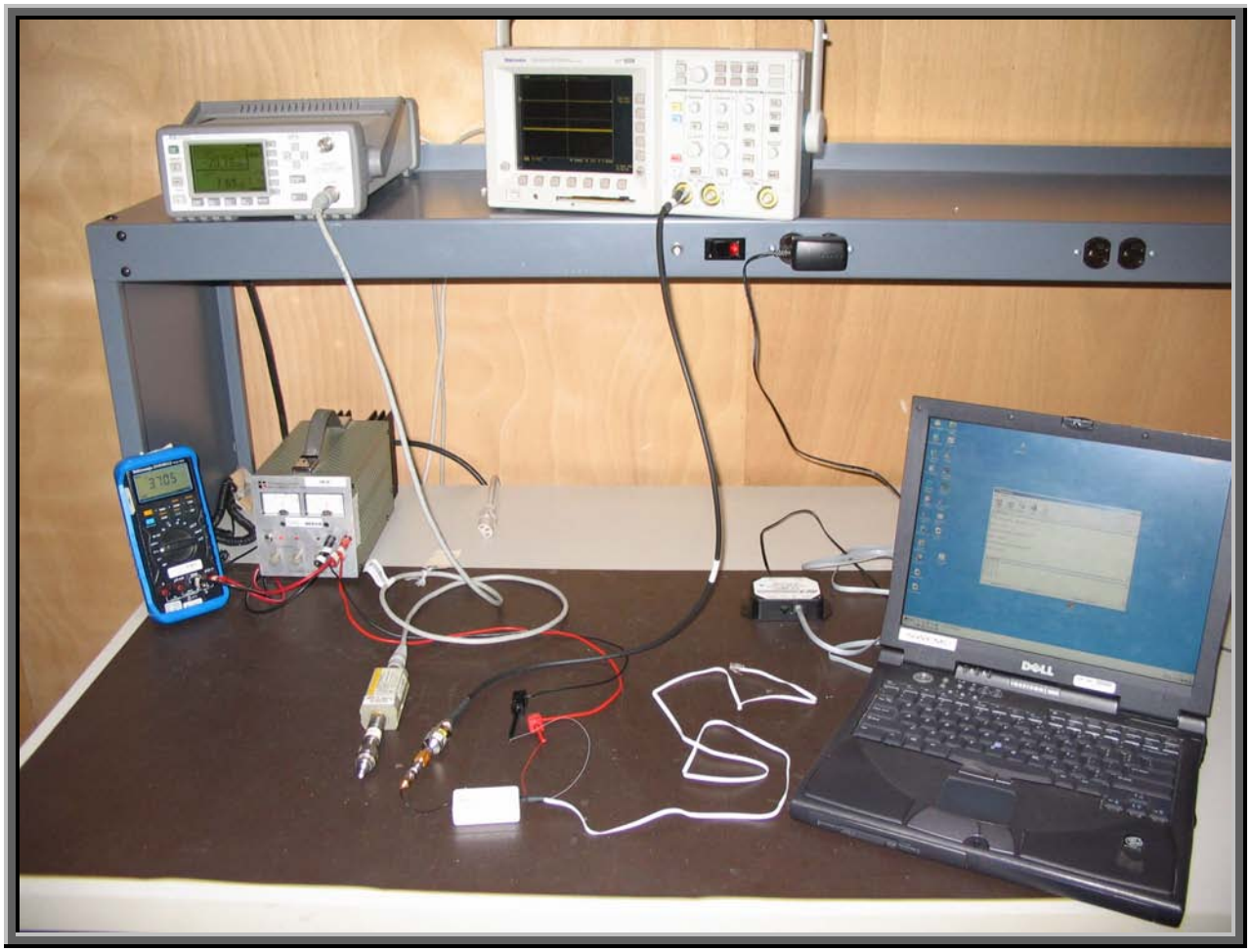
SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Output Power

Frequency (MHz)	Peak Power Measured w/ Diode Detector (dBm)	Peak Power (mW)	Spec (mW)
2402.0	4.58	2.87	1000.0
2441.0	4.27	2.67	1000.0
2480.0	3.33	2.15	1000.0


3705
DELL

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:
Battery

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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
Serial/TTL converter	RES	RS232IT	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

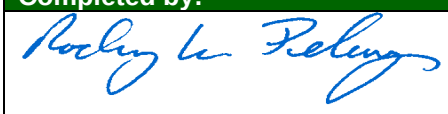
Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

Test Description

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

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

Completed by:



NORTHWEST EMC

BAND EDGE COMPLIANCE

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

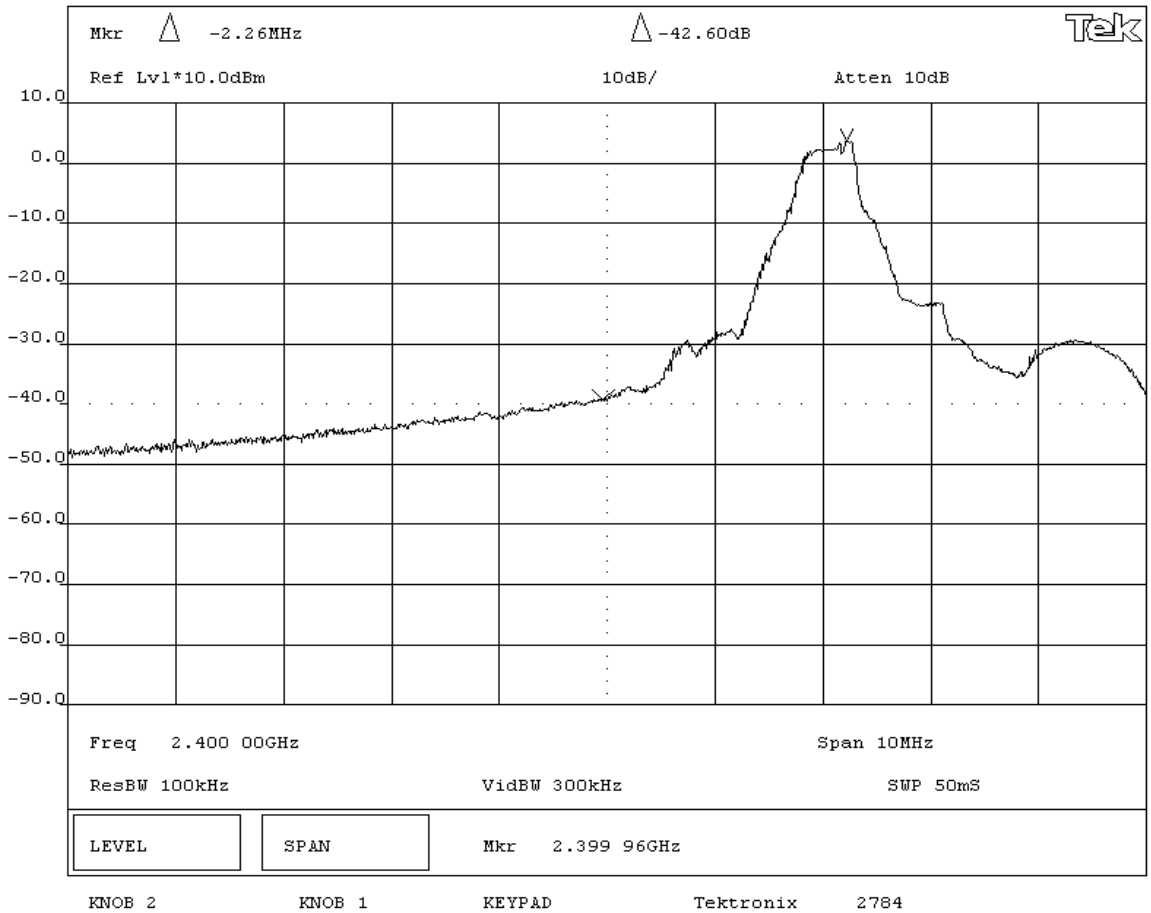
RESULTS	AMPLITUDE
Pass	-42.6 dB

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Band Edge Compliance - Low Channel



NORTHWEST
EMC

BAND EDGE COMPLIANCE

Rev BETA
01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

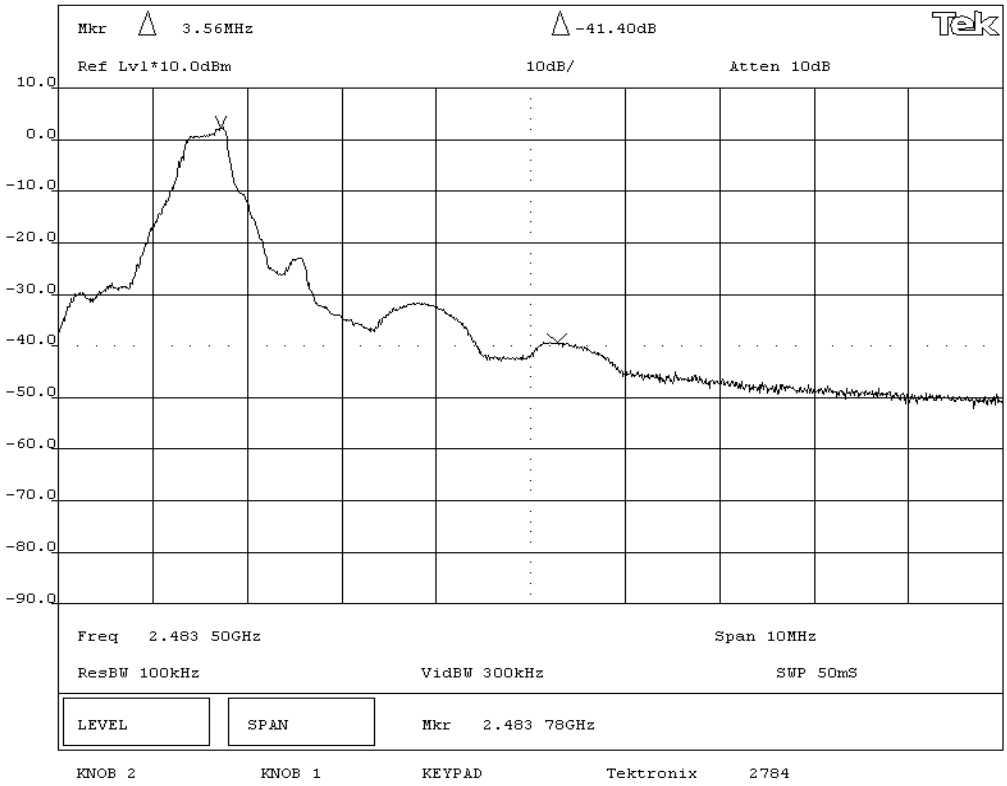
RESULTS	AMPLITUDE
Pass	-41.4 dB

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

Band Edge Compliance - High Channel




DELL

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:
Battery

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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
Serial/TTL converter	RES	RS232IT	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

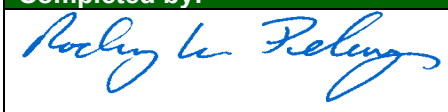
Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

Test Description

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

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

Completed by:



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

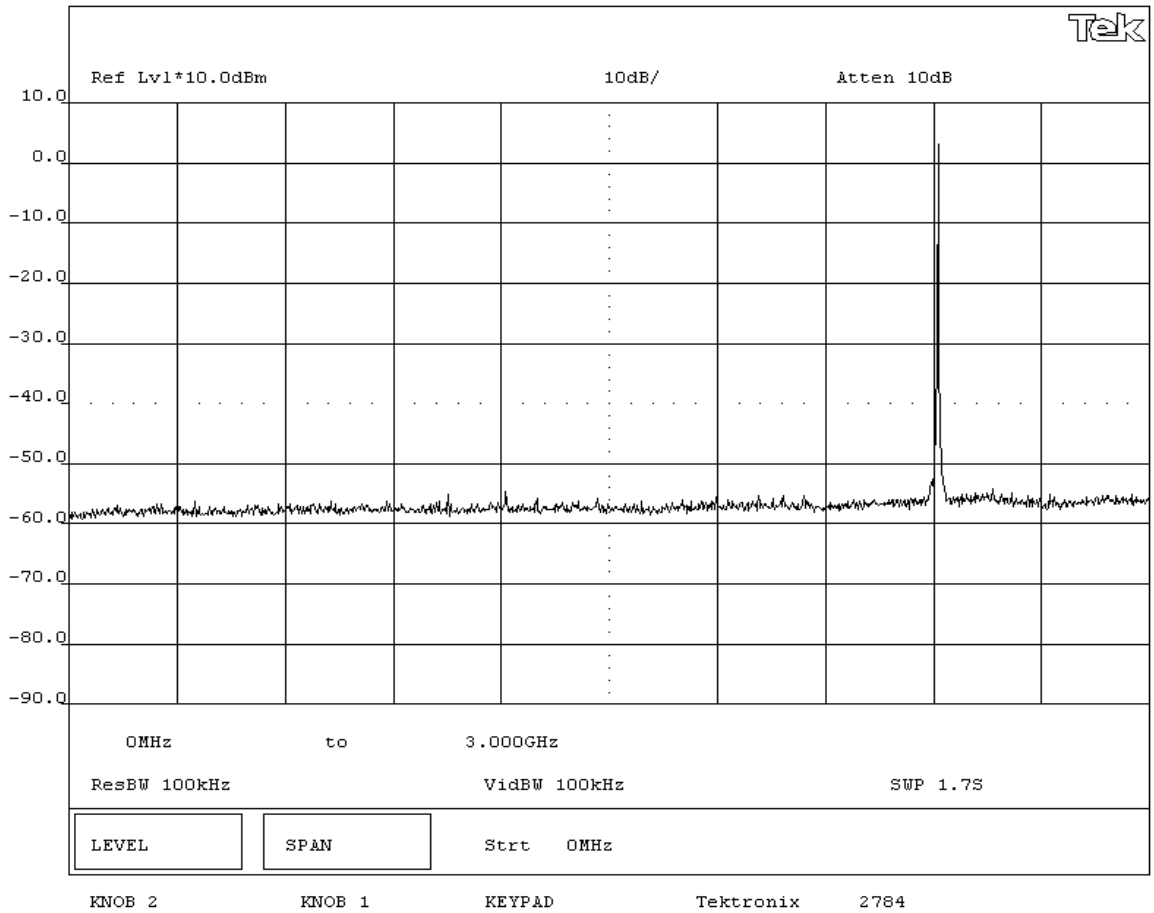
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

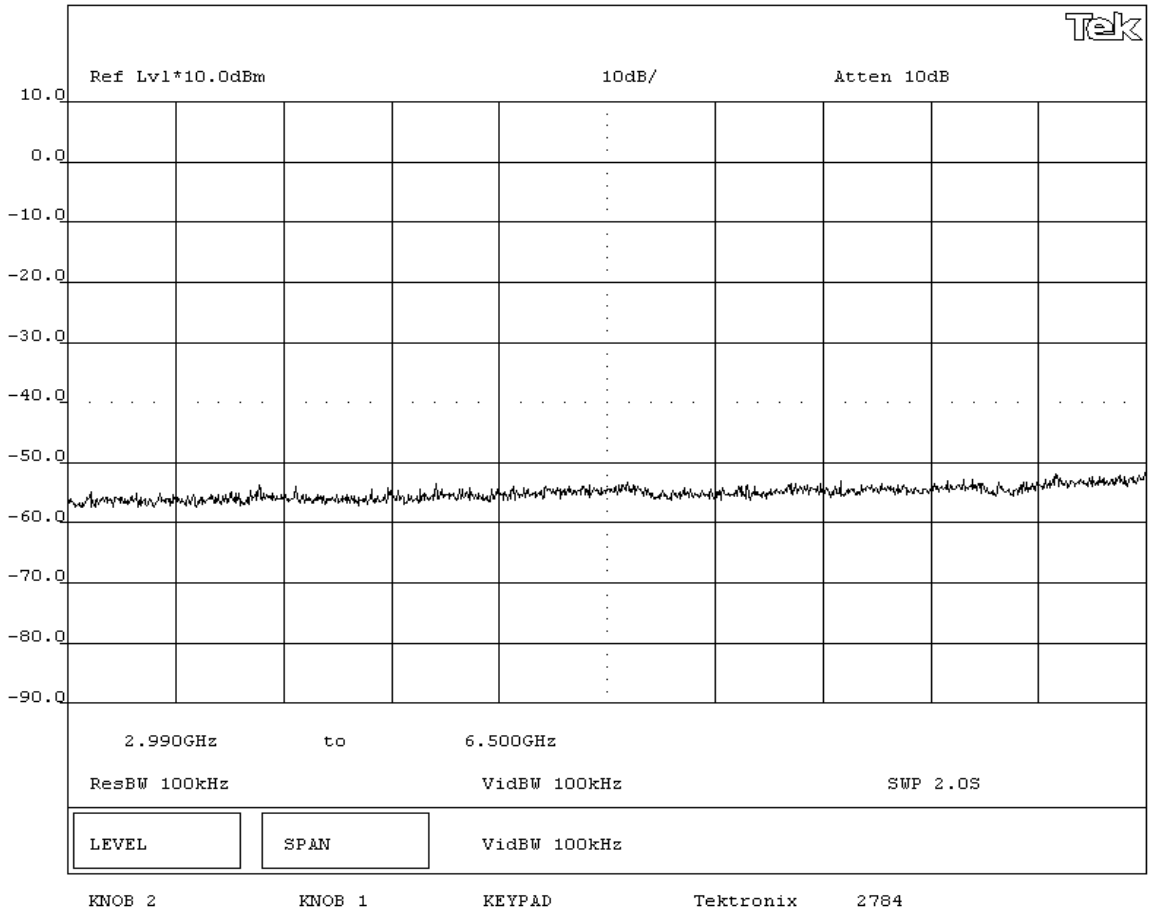
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

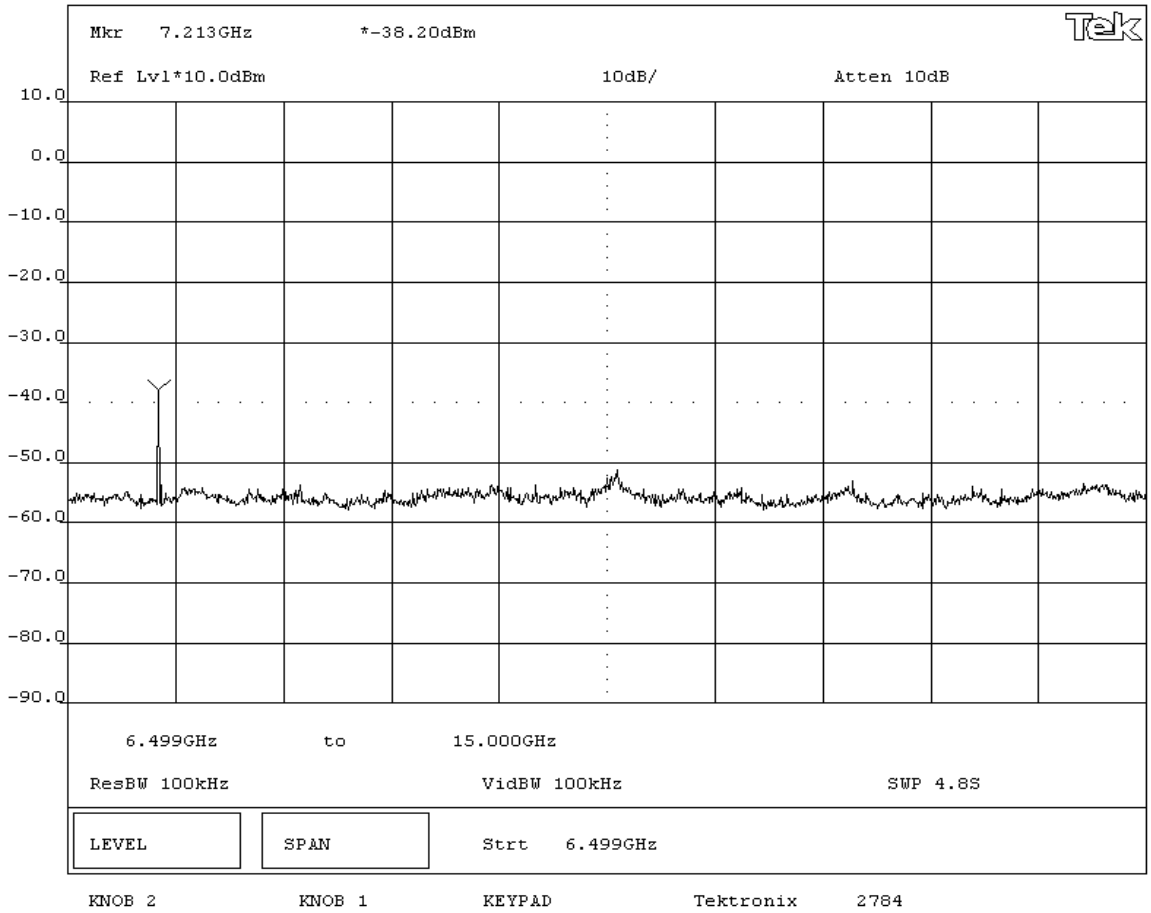
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

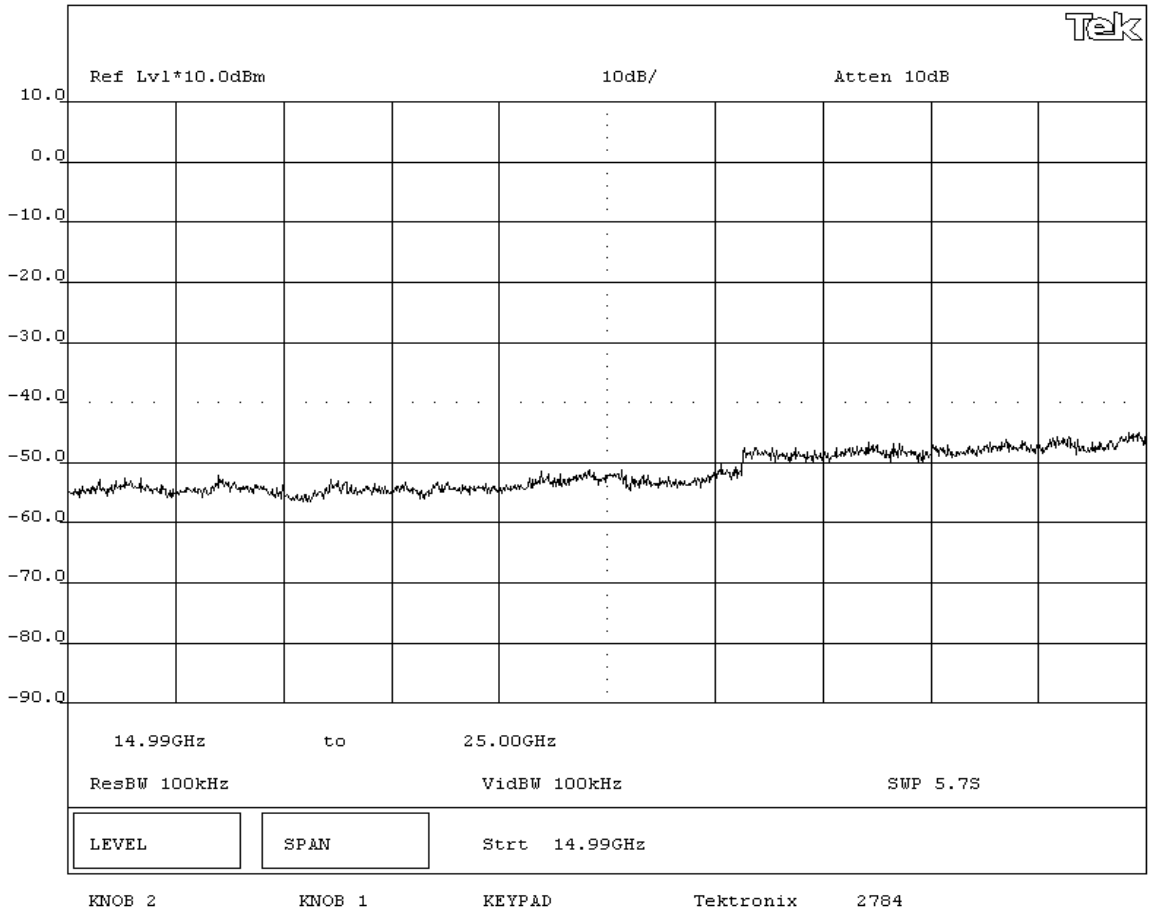
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

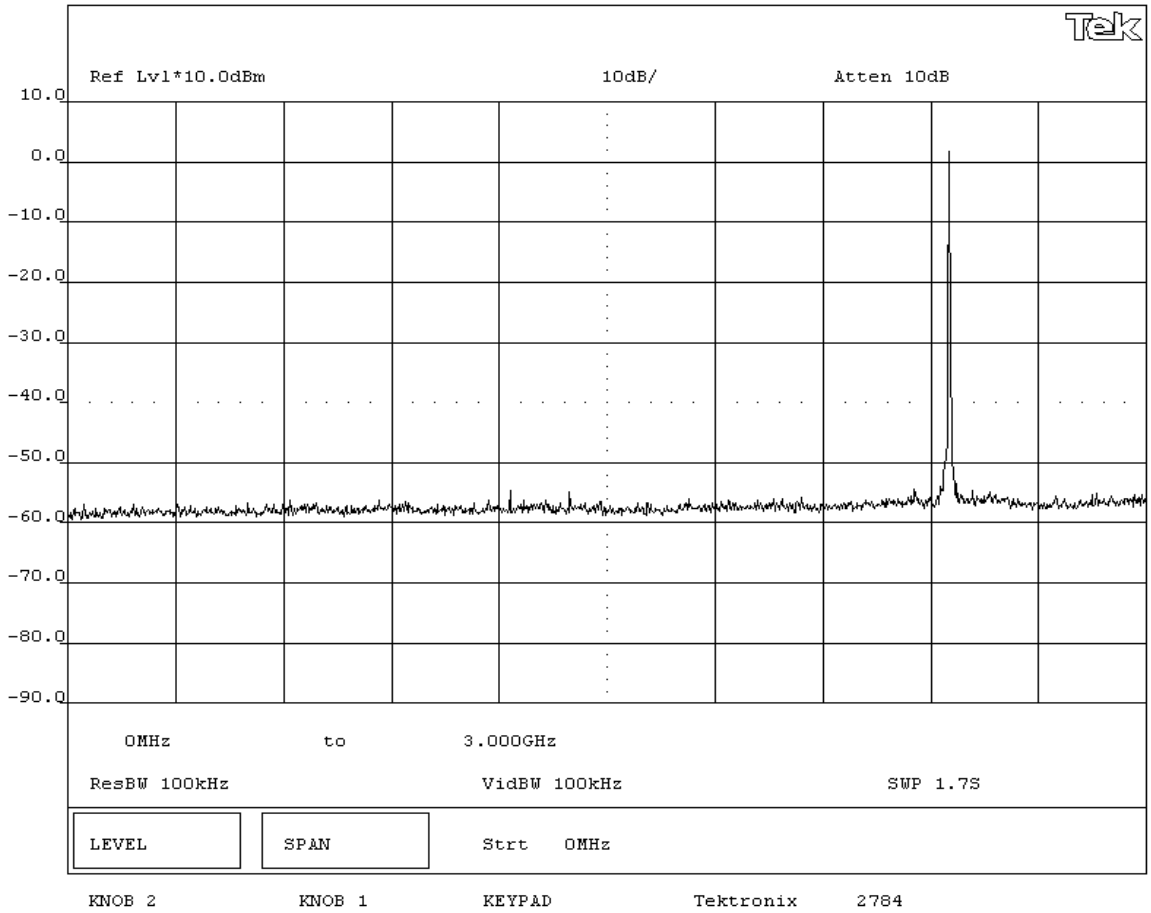
Pass

SIGNATURE

Tested By.

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

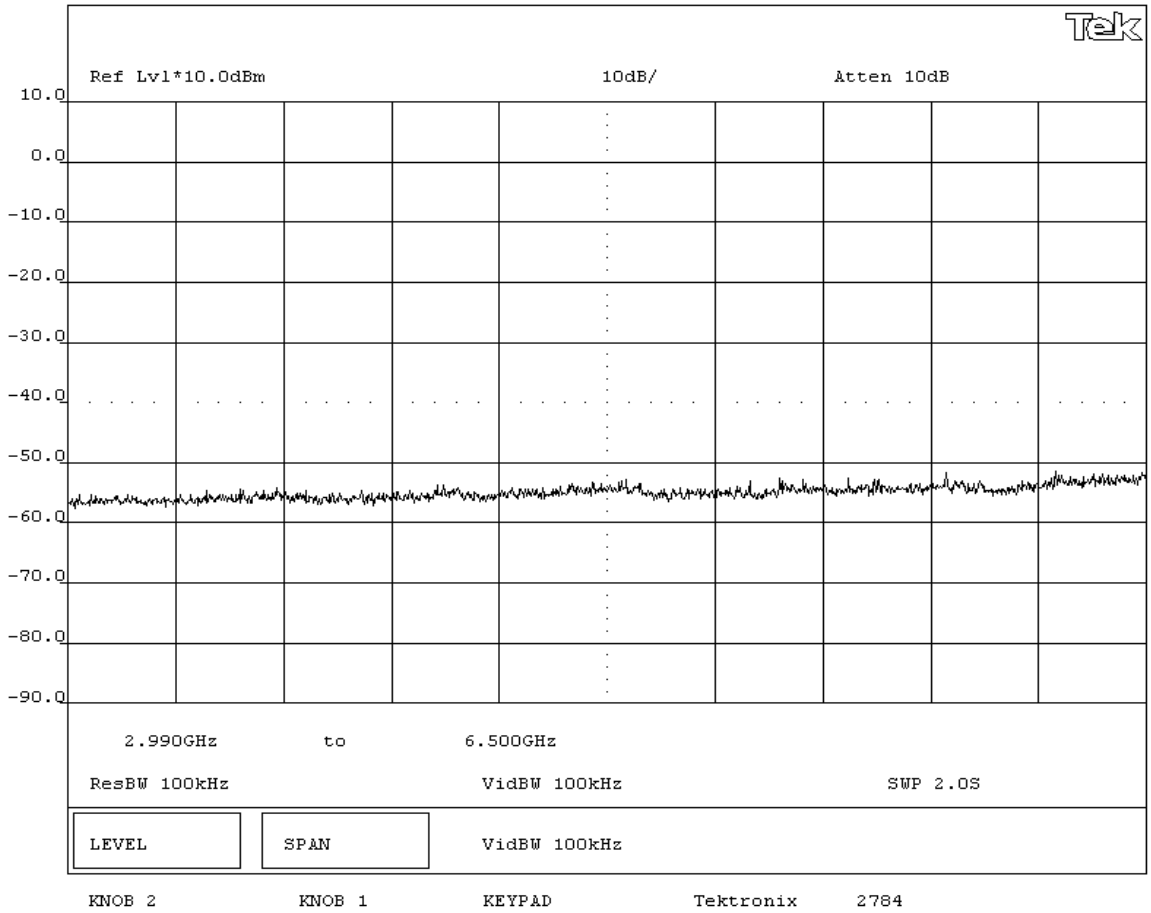
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

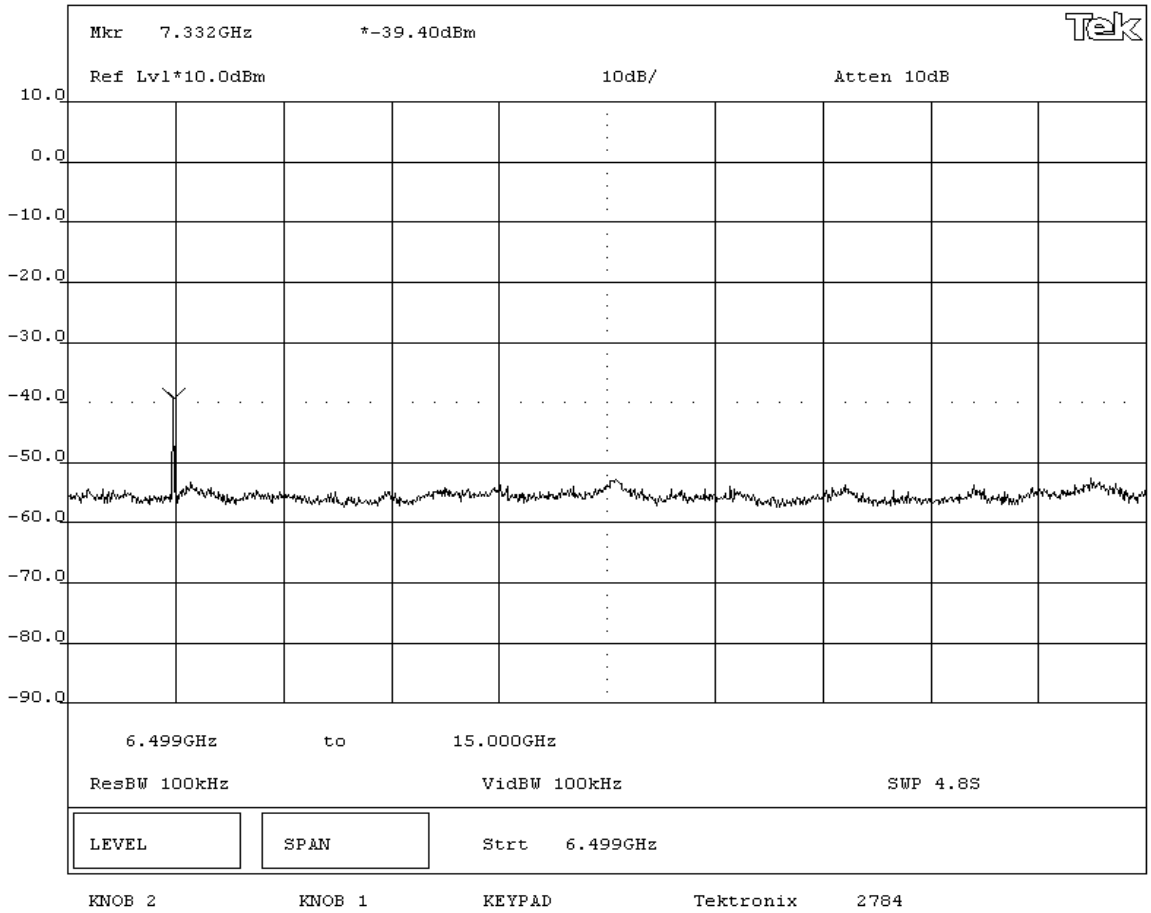
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

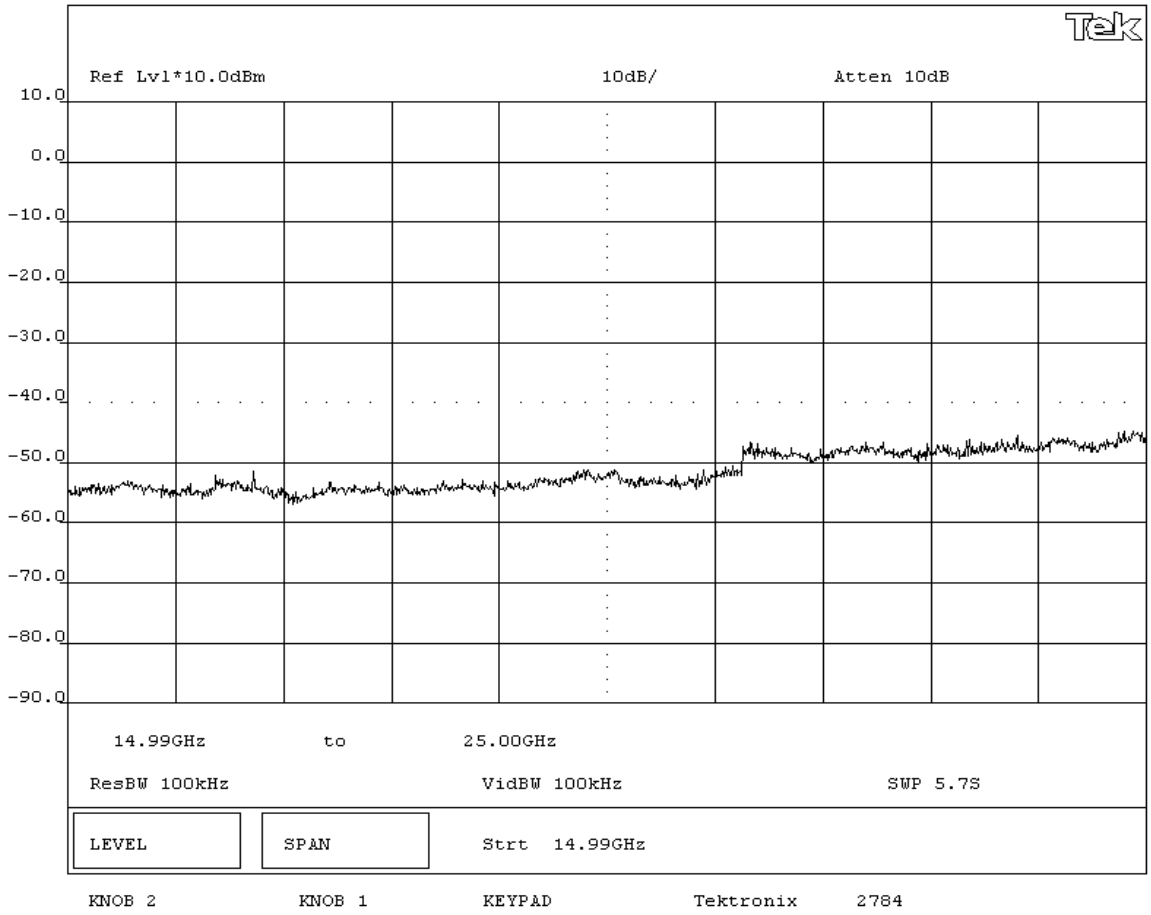
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

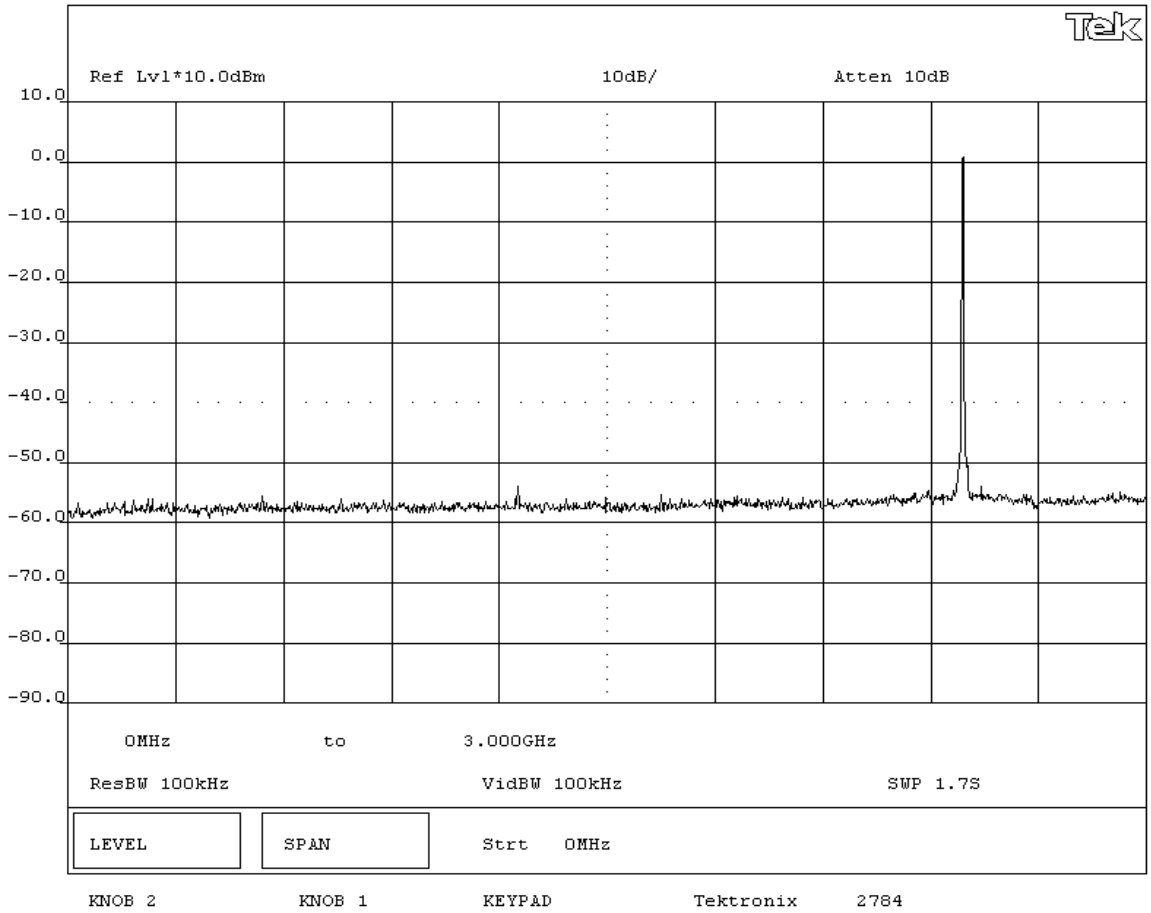
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

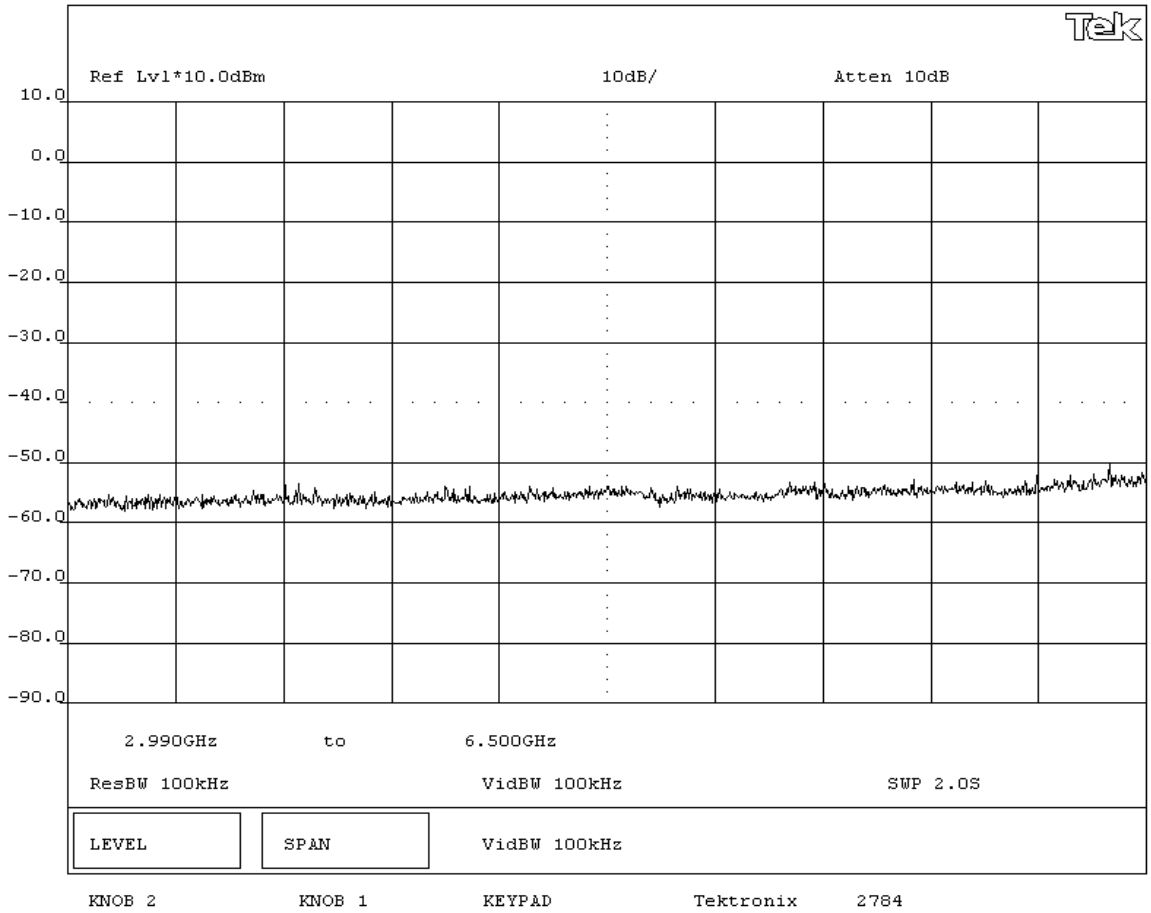
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

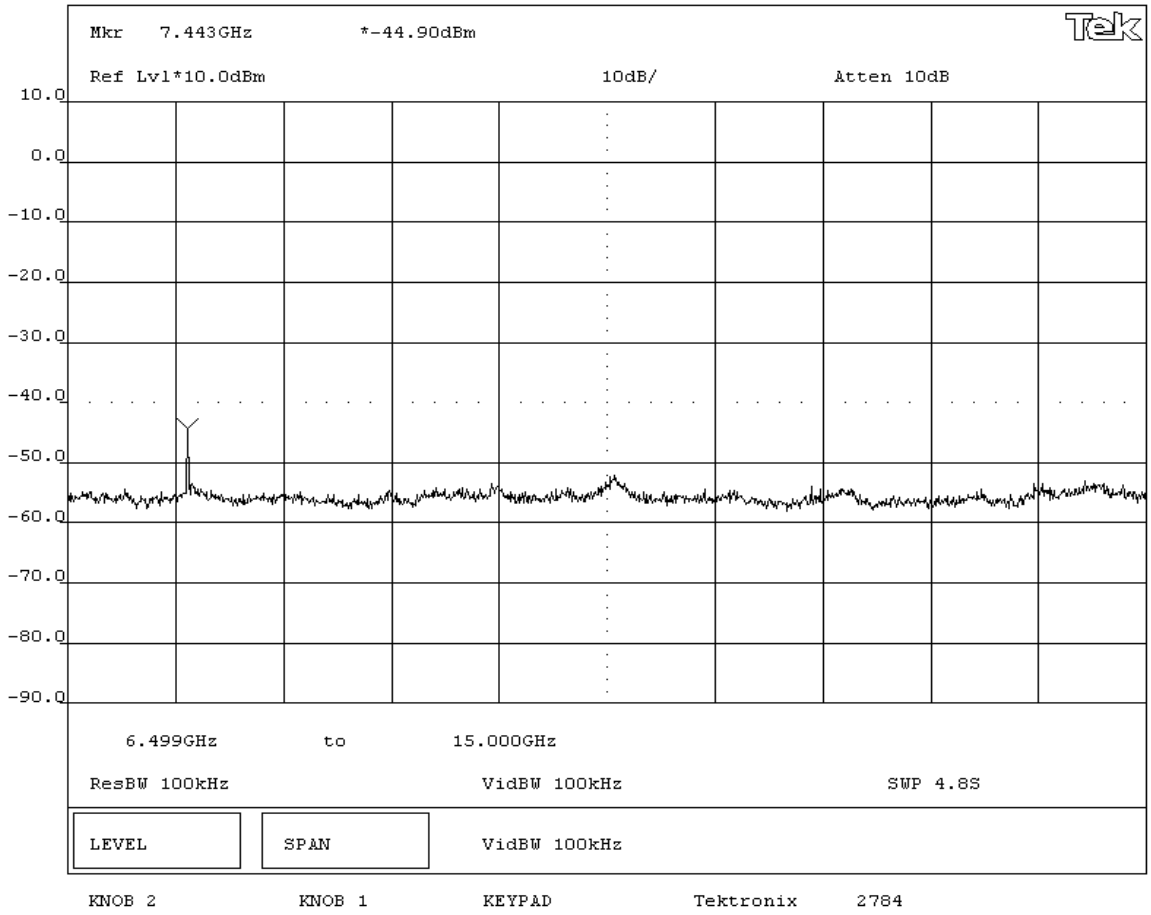
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/16/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	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

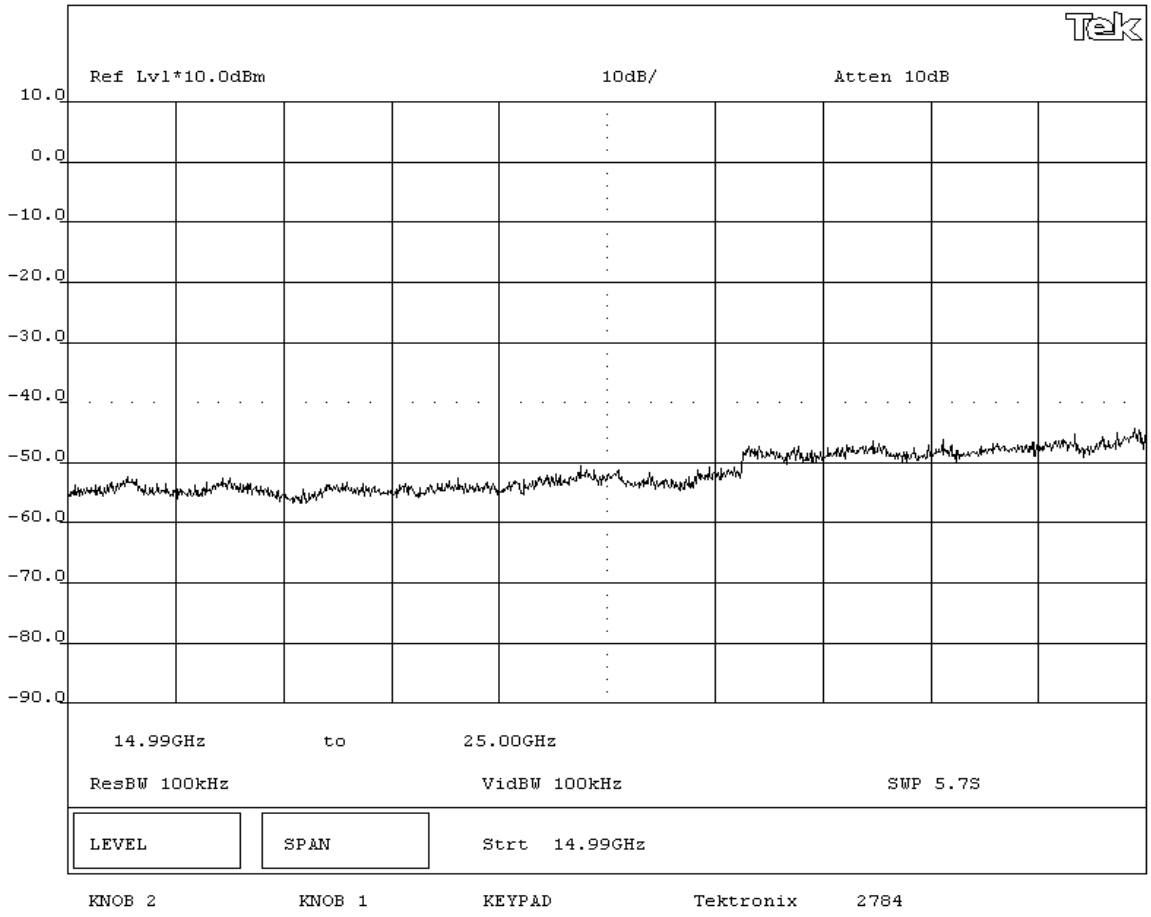
Pass

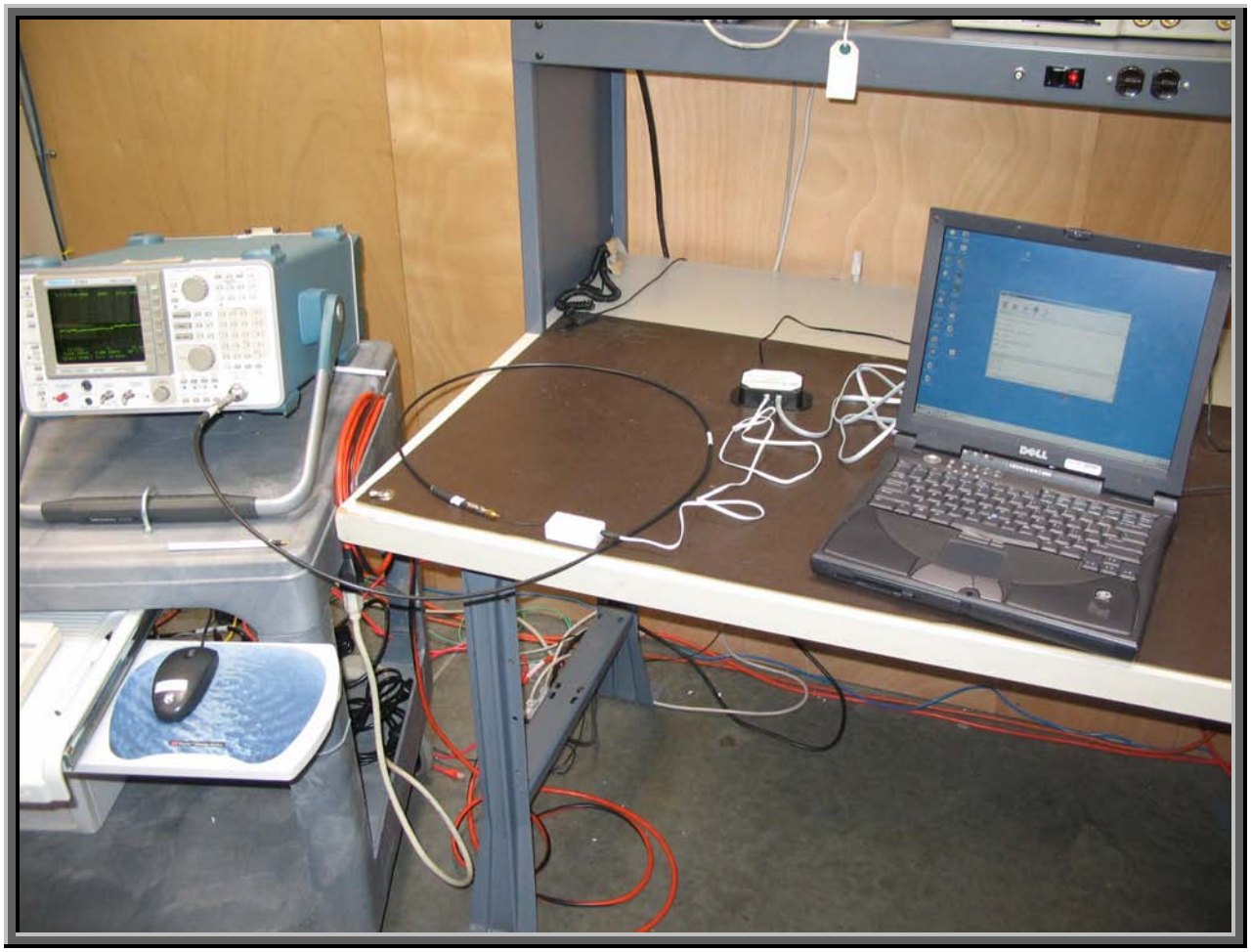
SIGNATURE

Tested By: Rodney Le Peloquin

DESCRIPTION OF TEST

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




DELL

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:
Battery

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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
Serial/TTL converter	RES	RS232IT	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
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	01/02/2005	12 mo

Test Description

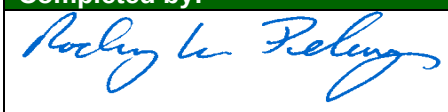
Requirement: Per 47 CFR 15.247(e), the peak power spectral density conducted from the antenna port of a direct sequence transmitter must not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

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

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

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

Completed by:



NORTHWEST EMC

POWER SPECTRAL DENSITY

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/17/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(e)	Year:	2005	Method:	FCC 97-114, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation.
Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.
Bandwidth Correction Factor = 10*log(3kHz/1Hz) = 34.8 dB

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

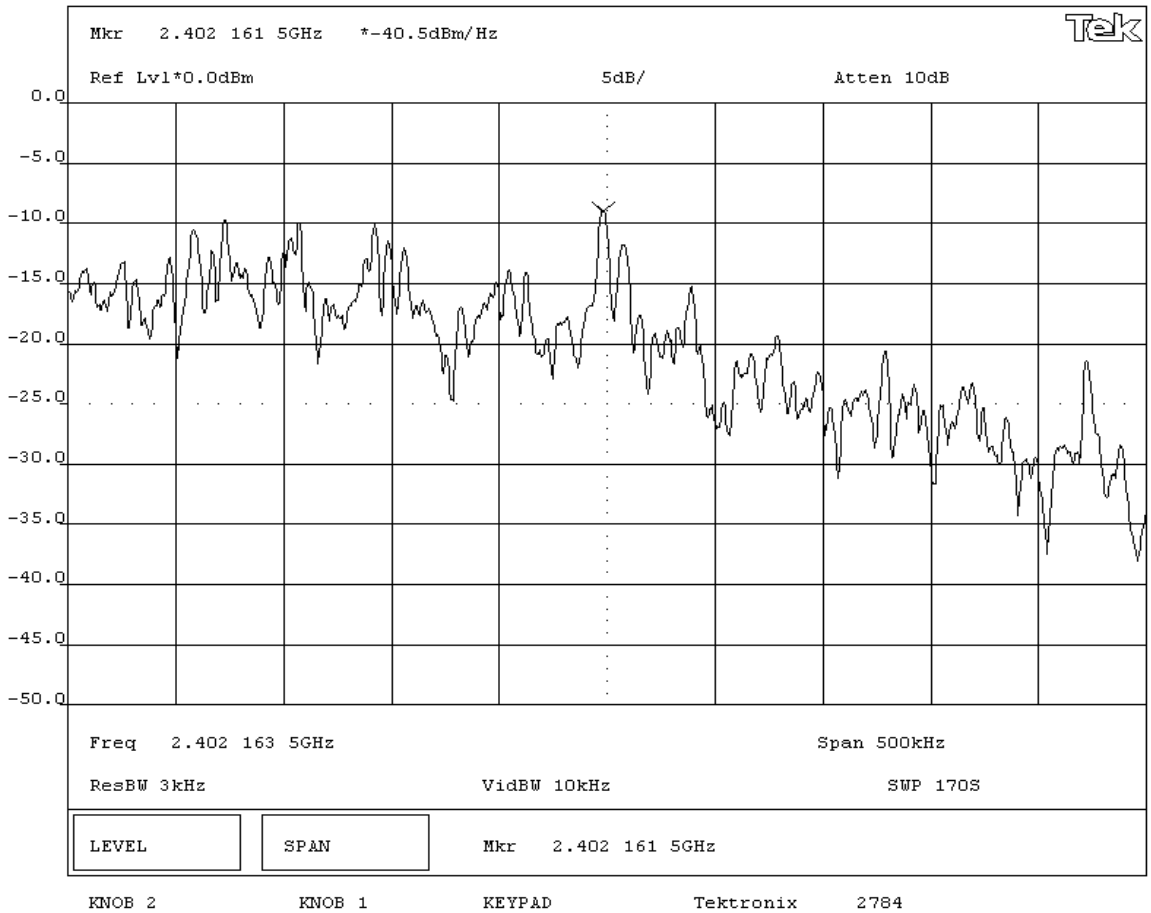
RESULTS	AMPLITUDE
Pass	Power Spectral Density = -5.7dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Low Channel



NORTHWEST EMC

POWER SPECTRAL DENSITY

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/17/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(e)	Year:	2005	Method:	FCC 97-114, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = 10*log(3kHz/1Hz) = 34.8 dB

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

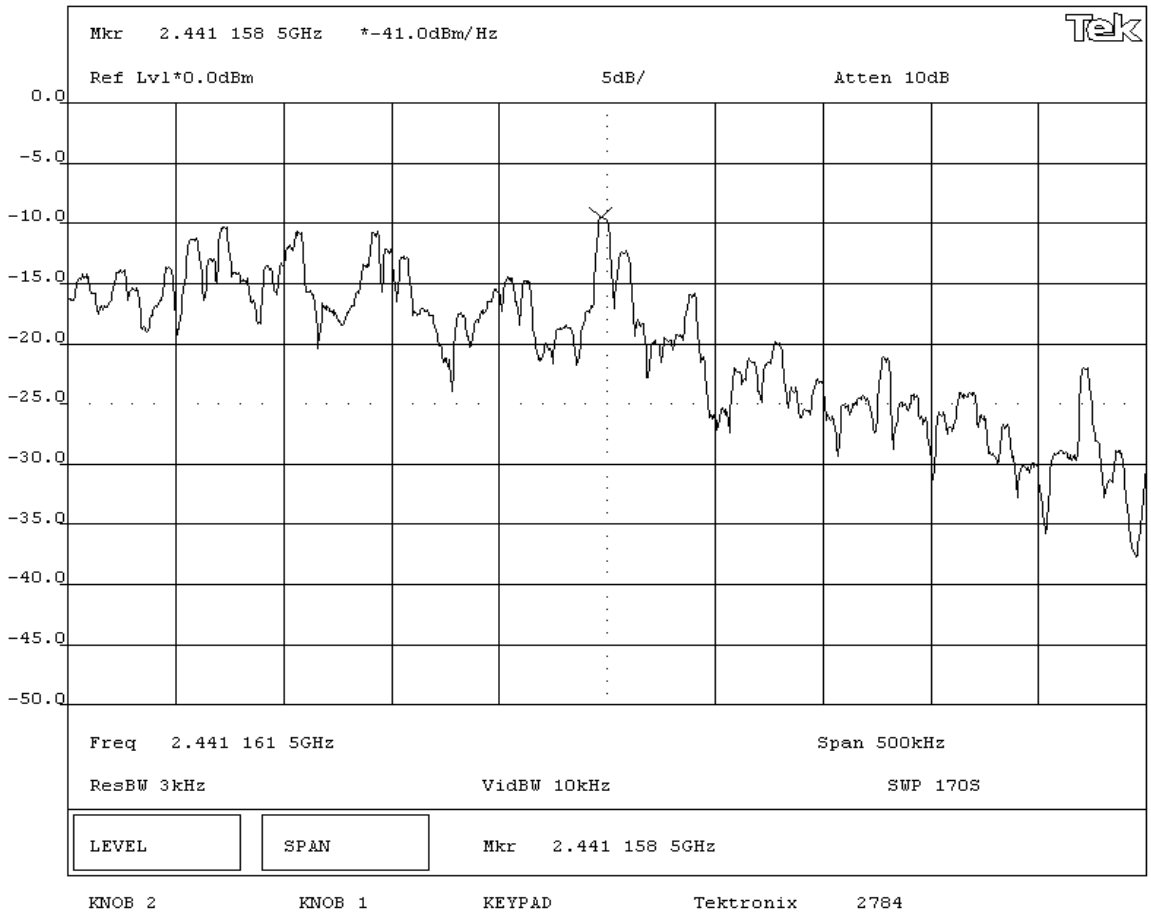
RESULTS	AMPLITUDE
Pass	Power Spectral Density = -6.2dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Mid Channel



NORTHWEST EMC

POWER SPECTRAL DENSITY

Rev BETA 01/30/01

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/17/05
Customer:	Logitech, Inc.			Temperature:	70 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	43% RH
Customer Ref. No.:		Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(e)	Year:	2005	Method:	FCC 97-114, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = 10*log(3kHz/1Hz) = 34.8 dB

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

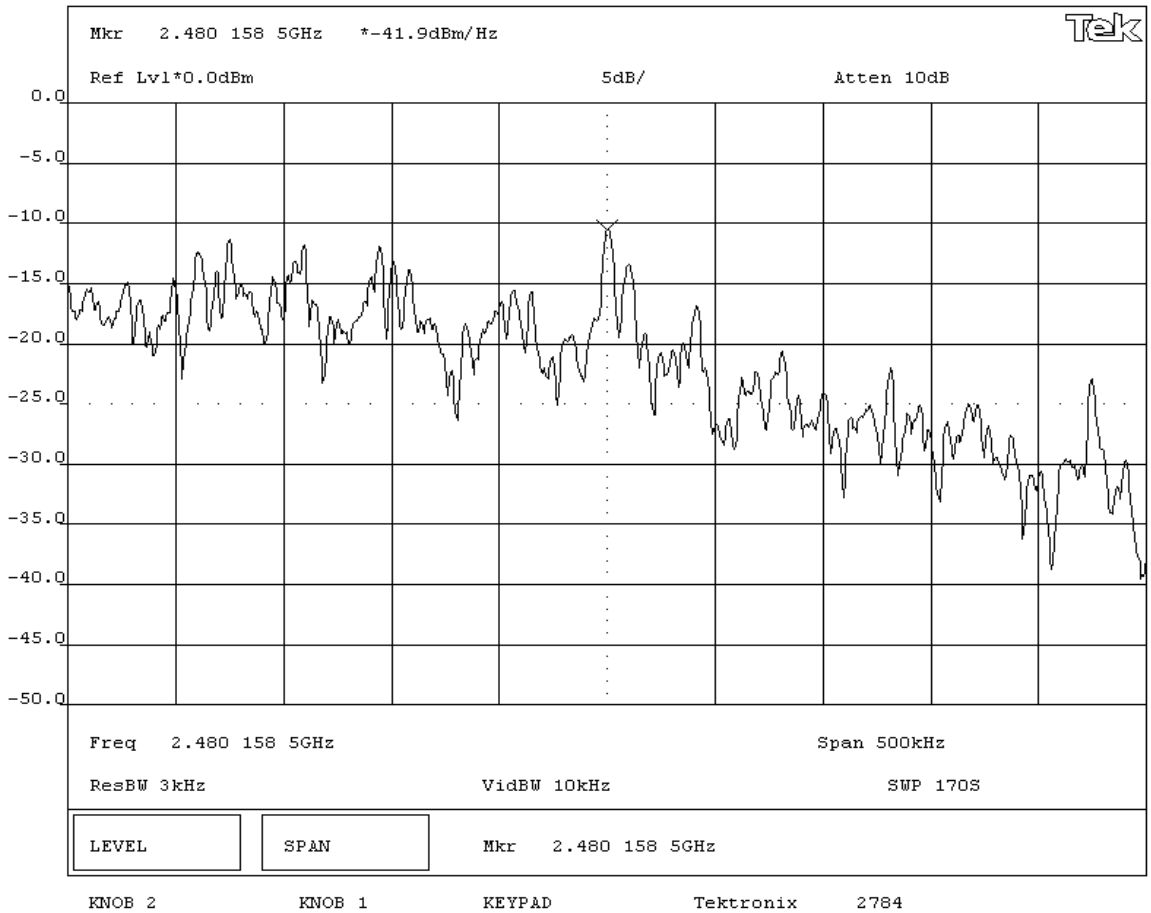
RESULTS	AMPLITUDE
Pass	Power Spectral Density = -7.1dBm / 3kHz

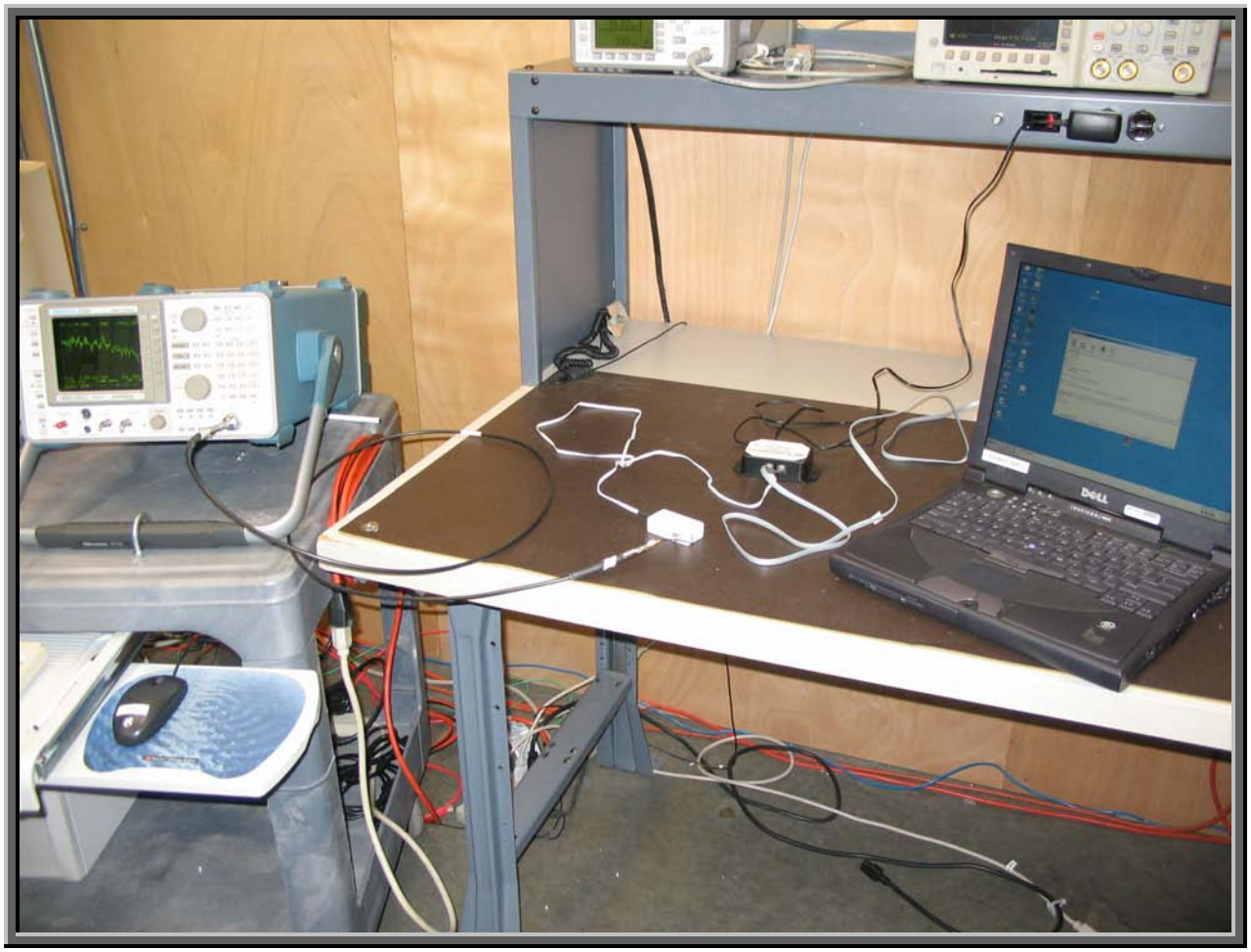
SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - High Channel




DELL

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.

Frequency Range Investigated			
Start Frequency	30 MHz	**Stop Frequency**	26 GHz

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**
AC Adapter	Fairway Electronic, Co.	WN05-060	None
EUT-Bluetooth Dongle for MP3 Players MN: F-0415A	Logitech, Inc.	F-0415A	None
CD Discman	Sony	D-171	8010567
AC Adapter	Cardio Theater	35-6-200 D	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058
Serial/ TTL converter	RES	RS232IT	None
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS (connected only during set-up)	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0415A
DC Leads	No	2.2	No	CD Discman	AC Adapter
DC Leads	No	1.5	No	EUT-Bluetooth Dongle for MP3 Players MN: F-0415A	AC Adapter
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**
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	02/15/2005	13 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	02/17/2005	13 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Amplifier Research	LN1000A	APS	03/01/2005	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	05/05/2005	3 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/02/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	03/09/2005	13 mo
Attenuator	Coaxicom	66702 5910-20	RBJ	02/25/2005	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/02/2004	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/02/2004	13 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	04/08/2005	13 mo

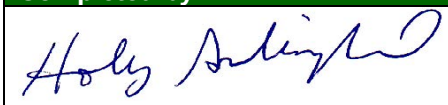
Test Description

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

Configuration: The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

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

Completed by:



NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI 2005.5.05

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	05/20/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	42%
Cust. Ref. No.:				Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT connected to CD Discman.

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, low channel.

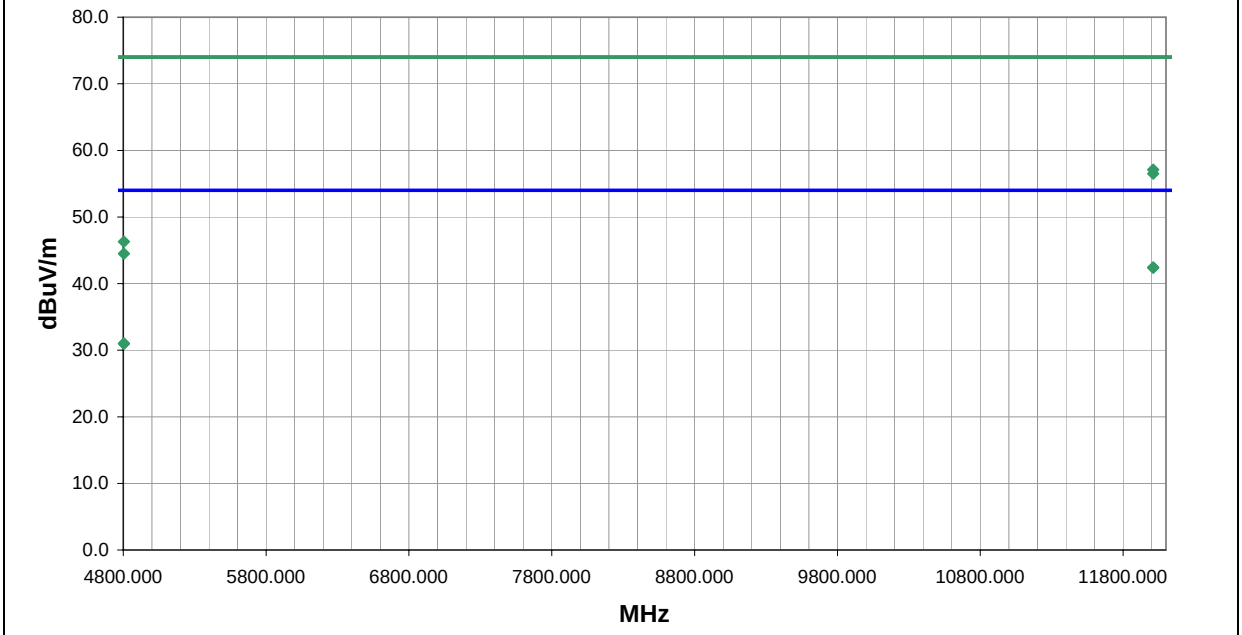
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	4

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12010.000	25.1	17.3	282.0	1.3	3.0	0.0	V-Horn	AV	0.0	42.4	54.0	-11.6
12010.000	25.1	17.3	221.0	3.4	3.0	0.0	H-Horn	AV	0.0	42.4	54.0	-11.6
12010.000	39.8	17.3	221.0	3.4	3.0	0.0	H-Horn	PK	0.0	57.1	74.0	-16.9
12010.000	39.2	17.3	282.0	1.3	3.0	0.0	V-Horn	PK	0.0	56.5	74.0	-17.5
4804.000	25.2	5.8	360.0	1.7	3.0	0.0	H-Horn	AV	0.0	31.0	54.0	-23.0
4804.000	25.2	5.8	3.0	2.2	3.0	0.0	V-Horn	AV	0.0	31.0	54.0	-23.0
4804.000	40.5	5.8	3.0	2.2	3.0	0.0	V-Horn	PK	0.0	46.3	74.0	-27.7
4804.000	38.7	5.8	360.0	1.7	3.0	0.0	H-Horn	PK	0.0	44.5	74.0	-29.5

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI 2005.5.05

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	05/21/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	42%
Cust. Ref. No.:				Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT connected to CD Discman.

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, mid channel.

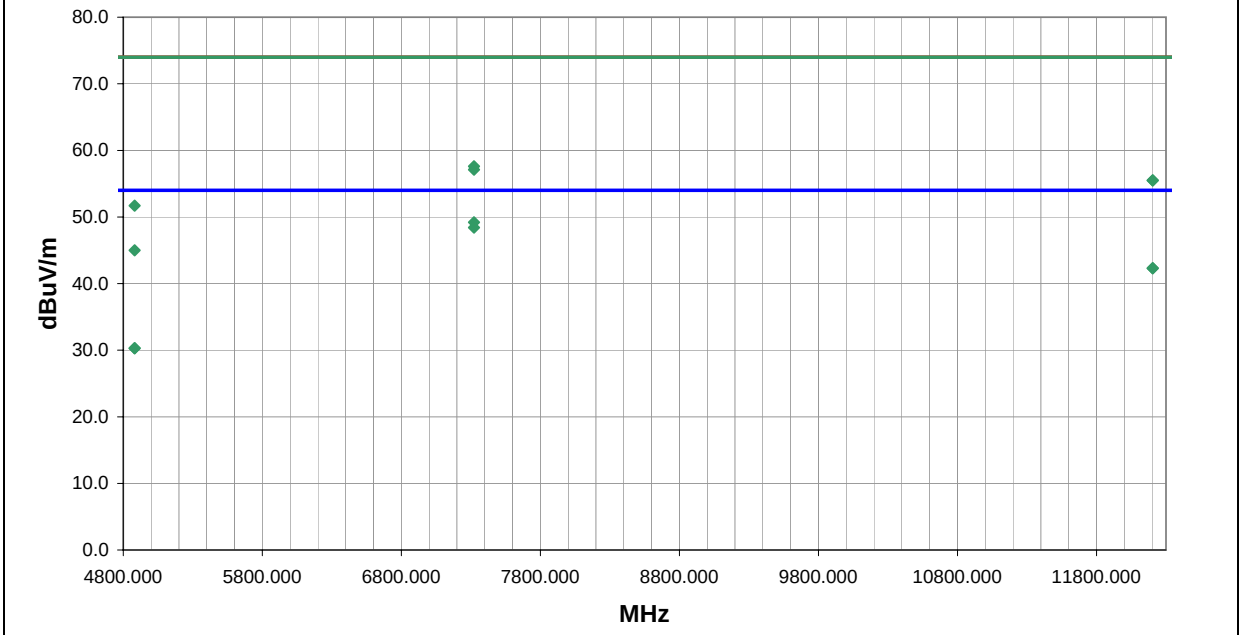
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	5

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7323.030	37.4	11.8	22.0	1.3	3.0	0.0	V-Horn	AV	0.0	49.2	54.0	-4.8
7323.030	36.6	11.8	148.0	1.8	3.0	0.0	H-Horn	AV	0.0	48.4	54.0	-5.6
12205.000	25.2	17.1	309.0	2.3	3.0	0.0	H-Horn	AV	0.0	42.3	54.0	-11.7
12205.000	25.2	17.1	204.0	3.7	3.0	0.0	V-Horn	AV	0.0	42.3	54.0	-11.7
7323.030	45.8	11.8	148.0	1.8	3.0	0.0	H-Horn	PK	0.0	57.6	74.0	-16.4
7323.030	45.3	11.8	22.0	1.3	3.0	0.0	V-Horn	PK	0.0	57.1	74.0	-16.9
12205.000	38.4	17.1	309.0	2.3	3.0	0.0	H-Horn	PK	0.0	55.5	74.0	-18.5
12205.000	38.4	17.1	204.0	3.7	3.0	0.0	V-Horn	PK	0.0	55.5	74.0	-18.5
4882.000	45.5	6.2	137.0	2.1	3.0	0.0	V-Horn	PK	0.0	51.7	74.0	-22.3
4882.000	24.1	6.2	328.0	2.0	3.0	0.0	H-Horn	AV	0.0	30.3	54.0	-23.7
4882.000	24.1	6.2	137.0	2.1	3.0	0.0	V-Horn	AV	0.0	30.3	54.0	-23.7
4882.000	38.8	6.2	328.0	2.0	3.0	0.0	H-Horn	PK	0.0	45.0	74.0	-29.0

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI A2.13

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A	Work Order:	LABT0125
Serial Number:		Date:	05/21/05
Customer:	Logitech, Inc.	Temperature:	23
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT connected to CD Discman.

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, high channel.

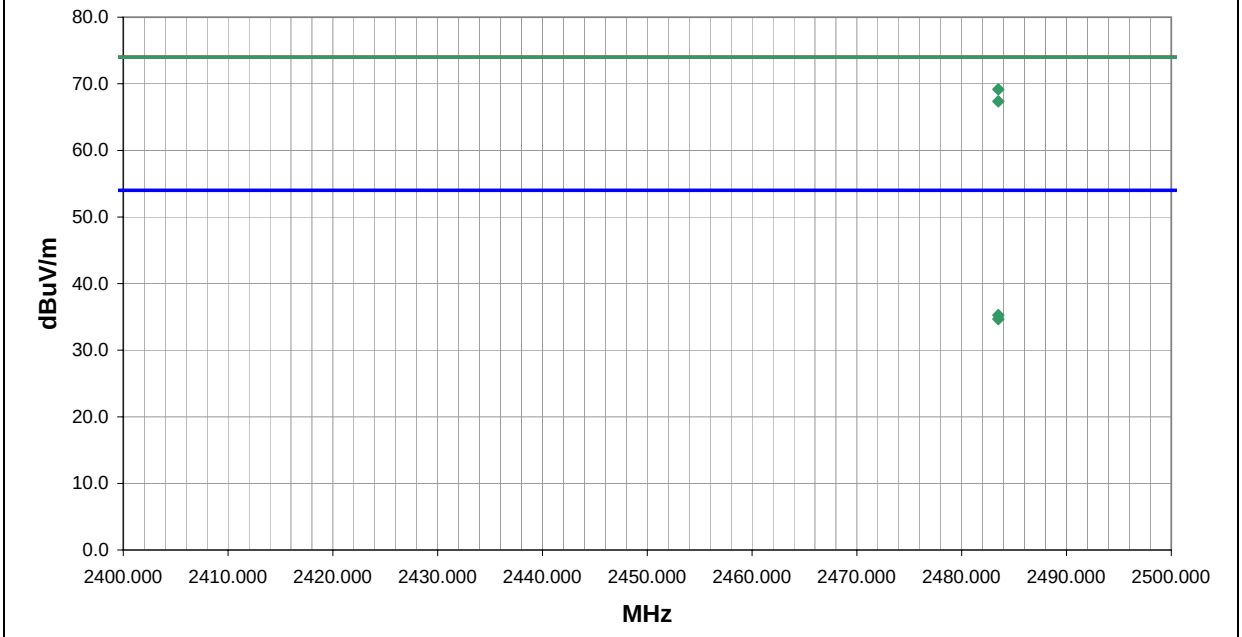
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	6

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	48.3	30.4	-1.0	1.1	1.0	0.0	H-Horn	PK	-9.5	69.2	74.0	-4.8
2483.500	46.5	30.4	32.0	1.1	1.0	0.0	V-Horn	PK	-9.5	67.4	74.0	-6.6
2483.500	14.4	30.4	-1.0	1.1	1.0	0.0	H-Horn	AV	-9.5	35.3	54.0	-18.7
2483.500	13.8	30.4	32.0	1.1	1.0	0.0	V-Horn	AV	-9.5	34.7	54.0	-19.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI 2005.5.05

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A	Work Order:	LABT0125
Serial Number:		Date:	05/21/05
Customer:	Logitech, Inc.	Temperature:	23
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2005-04	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT connected to CD Discman.

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, high channel.

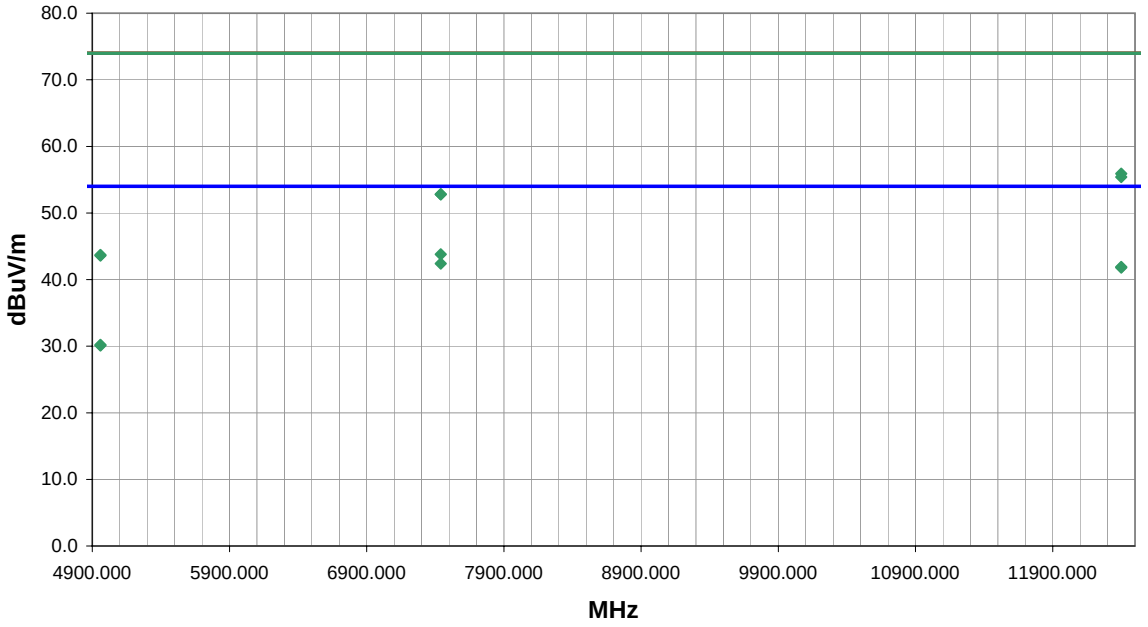
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	8

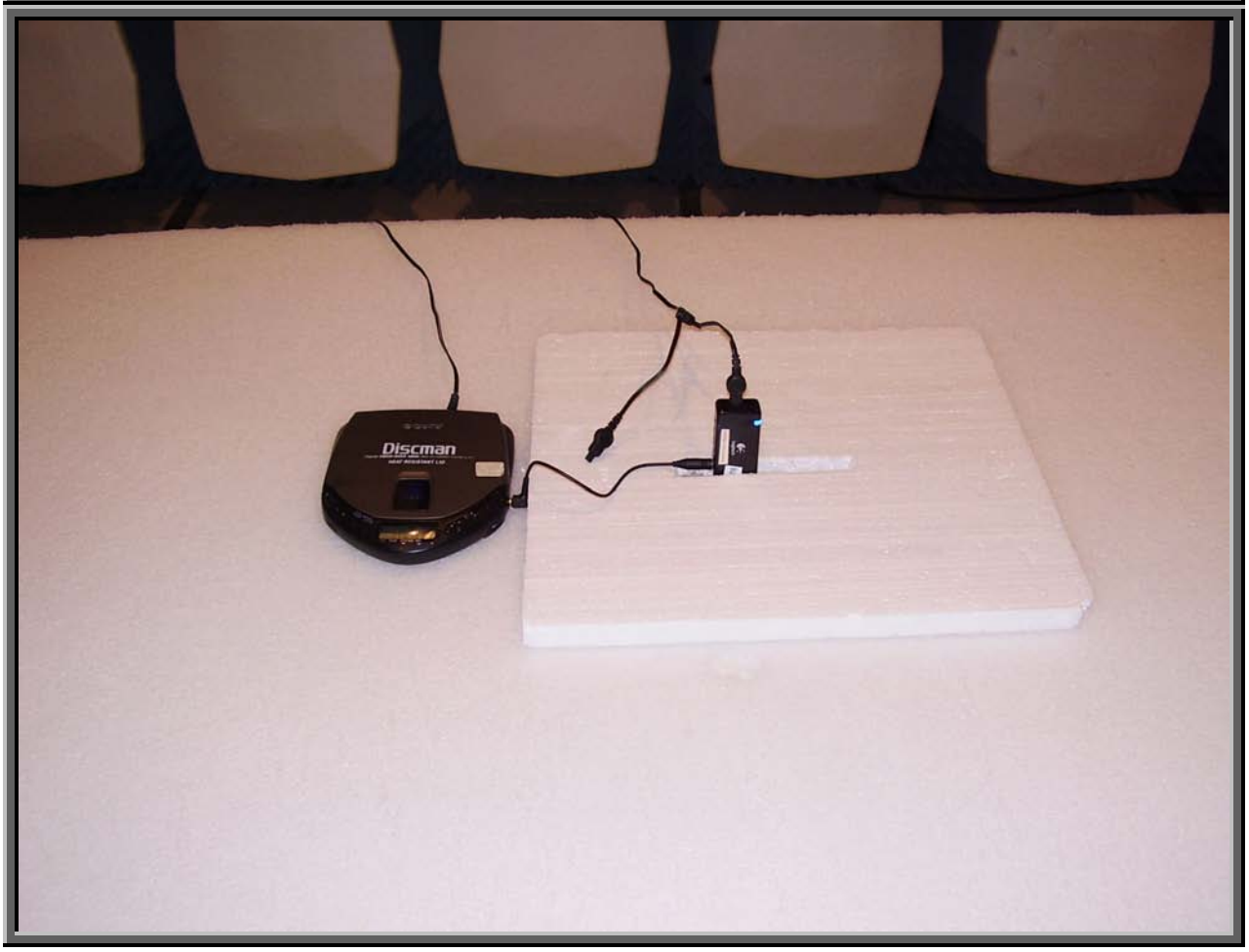
Other

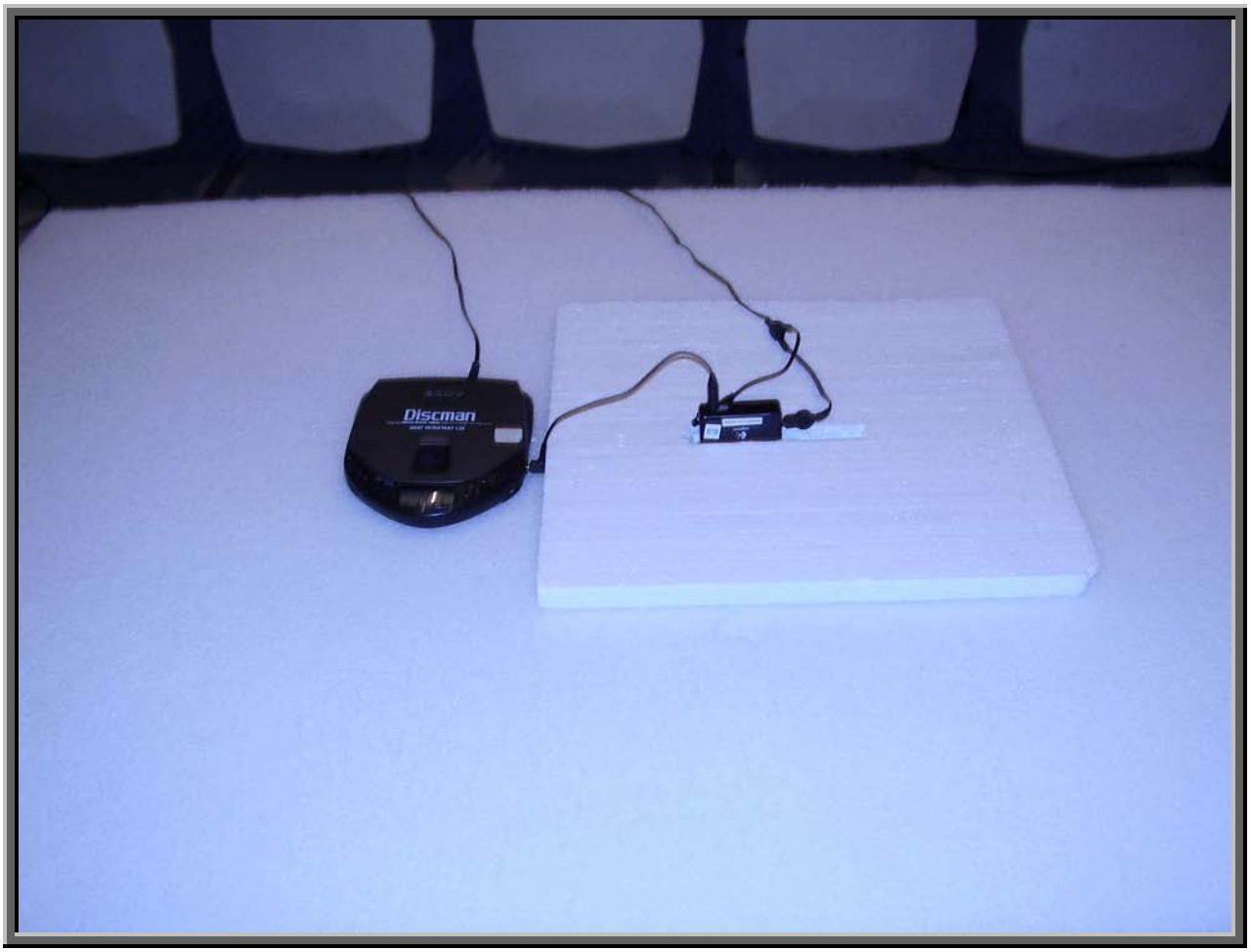
Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7440.116	31.8	12.0	180.0	1.1	3.0	0.0	H-Horn	AV	0.0	43.8	54.0	-10.2
7440.116	30.4	12.0	190.0	2.2	3.0	0.0	V-Horn	AV	0.0	42.4	54.0	-11.6
12400.000	24.8	17.1	305.0	2.3	3.0	0.0	V-Horn	AV	0.0	41.9	54.0	-12.1
12400.000	24.7	17.1	332.0	3.8	3.0	0.0	H-Horn	AV	0.0	41.8	54.0	-12.2
12400.000	38.8	17.1	332.0	3.8	3.0	0.0	H-Horn	PK	0.0	55.9	74.0	-18.1
12400.000	38.3	17.1	305.0	2.3	3.0	0.0	V-Horn	PK	0.0	55.4	74.0	-18.6
7440.116	40.8	12.0	180.0	1.1	3.0	0.0	H-Horn	PK	0.0	52.8	74.0	-21.2
7440.116	40.8	12.0	190.0	2.2	3.0	0.0	V-Horn	PK	0.0	52.8	74.0	-21.2
4960.000	23.8	6.4	236.0	1.2	3.0	0.0	H-Horn	AV	0.0	30.2	54.0	-23.8
4960.000	23.7	6.4	138.0	1.2	3.0	0.0	V-Horn	AV	0.0	30.1	54.0	-23.9
4960.000	37.3	6.4	236.0	1.2	3.0	0.0	H-Horn	PK	0.0	43.7	74.0	-30.3
4960.000	37.2	6.4	138.0	1.2	3.0	0.0	V-Horn	PK	0.0	43.6	74.0	-30.4


Discman
HEAT RESISTANT LID


Discman


Discman

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.

Frequency Range Investigated			
Start Frequency	30 MHz	**Stop Frequency**	26 GHz

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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
iPod	Apple	A1051	JQS14909S44

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop PC	Dell	Inspiron 8000	2T7CM01
AC Adapter	Dell	PA-6	12761-0A4-2058
Serial/ TTL converter	RES	RS232IT	None
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS (connected only during set-up)	No	1.2	PA	Serial/TTL converter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
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**
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	02/15/2005	13 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	02/17/2005	13 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Amplifier Research	LN1000A	APS	03/01/2005	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	05/05/2005	3 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/02/2004	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/02/2004	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/02/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	03/09/2005	13 mo
Attenuator	Coaxicom	66702 5910-20	RBJ	02/25/2005	13 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	04/08/2005	13 mo

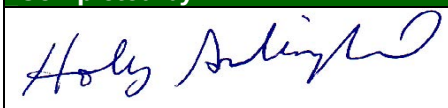
Test Description

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

Configuration: The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

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

Completed by:



NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI 2005.5.05

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/20/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	42%
Cust. Ref. No.:				Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT on Ipod Mini

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, high channel.

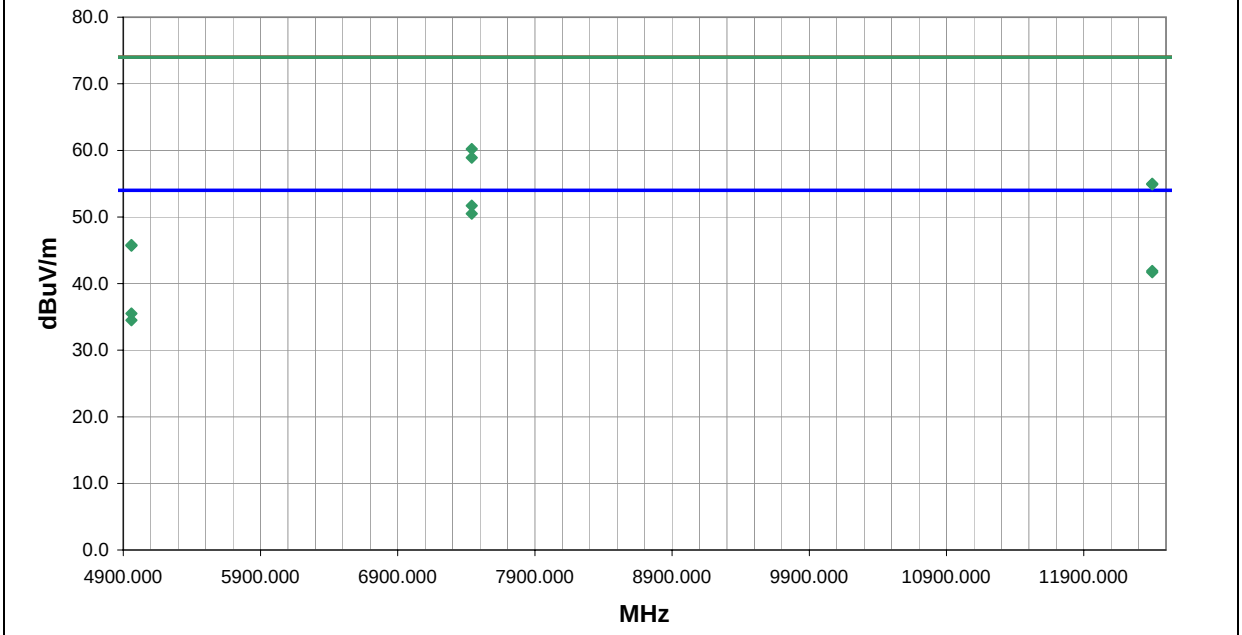
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	1

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7440.050	39.7	12.0	249.0	1.8	3.0	0.0	V-Horn	AV	0.0	51.7	54.0	-2.3
7440.050	38.5	12.0	124.0	1.8	3.0	0.0	H-Horn	AV	0.0	50.5	54.0	-3.5
12400.000	24.8	17.1	96.0	2.5	3.0	0.0	V-Horn	AV	0.0	41.9	54.0	-12.1
12400.000	24.6	17.1	35.0	2.9	3.0	0.0	H-Horn	AV	0.0	41.7	54.0	-12.3
7440.050	48.2	12.0	249.0	1.8	3.0	0.0	V-Horn	PK	0.0	60.2	74.0	-13.8
7440.050	46.9	12.0	124.0	1.8	3.0	0.0	H-Horn	PK	0.0	58.9	74.0	-15.1
4960.000	29.1	6.4	253.0	1.4	3.0	0.0	V-Horn	AV	0.0	35.5	54.0	-18.5
12400.000	37.9	17.1	35.0	2.9	3.0	0.0	H-Horn	PK	0.0	55.0	74.0	-19.0
12400.000	37.8	17.1	96.0	2.5	3.0	0.0	V-Horn	PK	0.0	54.9	74.0	-19.1
4960.000	28.1	6.4	343.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.5	54.0	-19.5
4960.000	39.4	6.4	253.0	1.4	3.0	0.0	V-Horn	PK	0.0	45.8	74.0	-28.2
4960.000	39.3	6.4	343.0	1.3	3.0	0.0	H-Horn	PK	0.0	45.7	74.0	-28.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI 2005.5.05

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A	Work Order:	LABT0125
Serial Number:		Date:	05/20/05
Customer:	Logitech, Inc.	Temperature:	23
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT on Ipod Mini

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, mid channel.

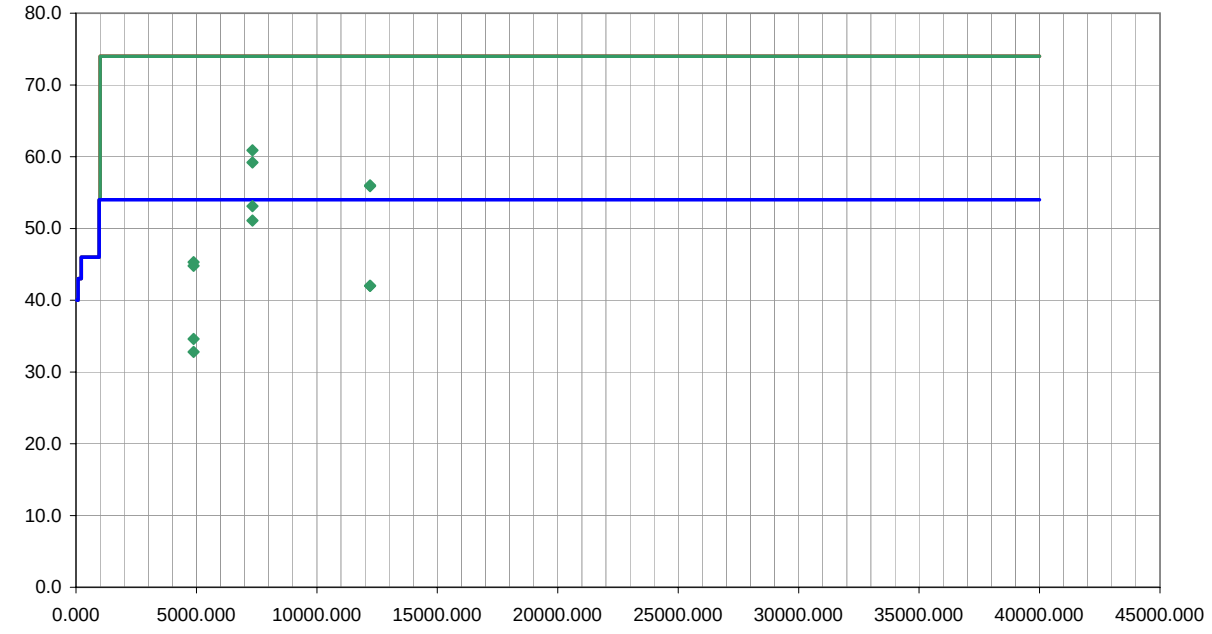
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	2

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7322.920	41.3	11.8	239.0	1.6	3.0	0.0	V-Horn	AV	0.0	53.1	54.0	-0.9
7322.920	39.3	11.8	120.0	1.9	3.0	0.0	H-Horn	AV	0.0	51.1	54.0	-2.9
12205.000	24.9	17.1	201.0	1.3	3.0	0.0	H-Horn	AV	0.0	42.0	54.0	-12.0
12205.000	24.9	17.1	108.0	2.7	3.0	0.0	V-Horn	AV	0.0	42.0	54.0	-12.0
7322.920	49.1	11.8	239.0	1.6	3.0	0.0	V-Horn	PK	0.0	60.9	74.0	-13.1
7322.920	47.4	11.8	120.0	1.9	3.0	0.0	H-Horn	PK	0.0	59.2	74.0	-14.8
12205.000	38.9	17.1	201.0	1.3	3.0	0.0	H-Horn	PK	0.0	56.0	74.0	-18.0
12205.000	38.8	17.1	108.0	2.7	3.0	0.0	V-Horn	PK	0.0	55.9	74.0	-18.1
4882.000	28.4	6.2	326.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.6	54.0	-19.4
4882.000	26.6	6.2	230.0	1.3	3.0	0.0	V-Horn	AV	0.0	32.8	54.0	-21.2
4882.000	39.1	6.2	230.0	1.3	3.0	0.0	V-Horn	PK	0.0	45.3	74.0	-28.7
4882.000	38.6	6.2	326.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.8	74.0	-29.2

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI 2005.5.05

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	05/20/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	42%
Cust. Ref. No.:				Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT on Ipod Mini

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, low channel.

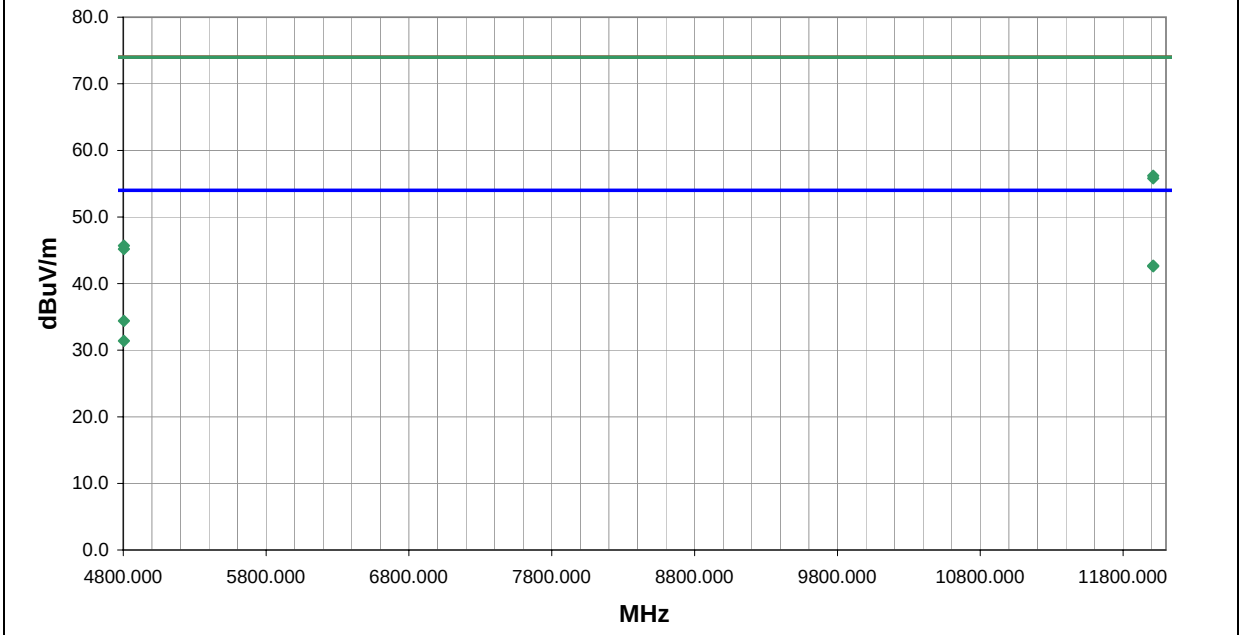
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	3

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12010.000	25.4	17.3	264.0	1.2	3.0	0.0	V-Horn	AV	0.0	42.7	54.0	-11.3
12010.000	25.3	17.3	100.0	1.3	3.0	0.0	H-Horn	AV	0.0	42.6	54.0	-11.4
12010.000	38.9	17.3	100.0	1.3	3.0	0.0	H-Horn	PK	0.0	56.2	74.0	-17.8
12010.000	38.5	17.3	264.0	1.2	3.0	0.0	V-Horn	PK	0.0	55.8	74.0	-18.2
4804.000	28.6	5.8	246.0	1.7	3.0	0.0	V-Horn	AV	0.0	34.4	54.0	-19.6
4804.000	25.6	5.8	326.0	3.5	3.0	0.0	H-Horn	AV	0.0	31.4	54.0	-22.6
4804.000	39.9	5.8	246.0	1.7	3.0	0.0	V-Horn	PK	0.0	45.7	74.0	-28.3
4804.000	39.4	5.8	326.0	3.5	3.0	0.0	H-Horn	PK	0.0	45.2	74.0	-28.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

ACQ 2005.1.4
EMI A2.13

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A	Work Order:	LABT0125
Serial Number:		Date:	05/21/05
Customer:	Logitech, Inc.	Temperature:	23
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure	29.85
Tested by:	Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Spurious Radiated Emissions:2004	Method:	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT connected to iPod.

EUT OPERATING MODES

Transmitting Bluetooth, PRBS modulated, high channel.

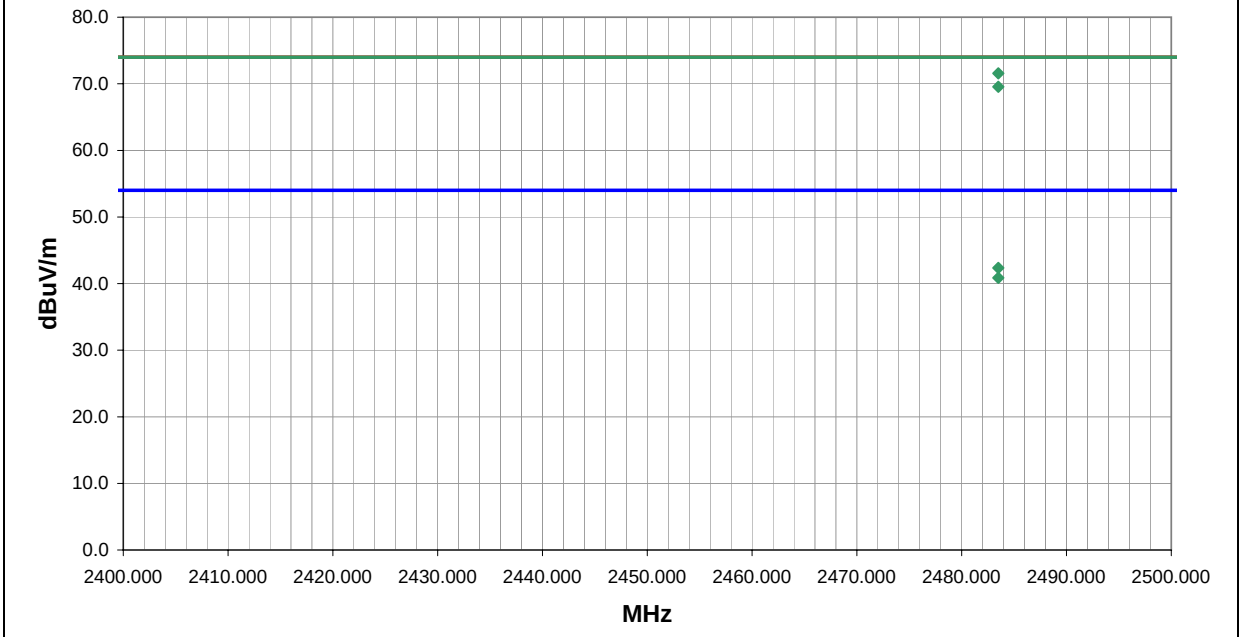
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	7

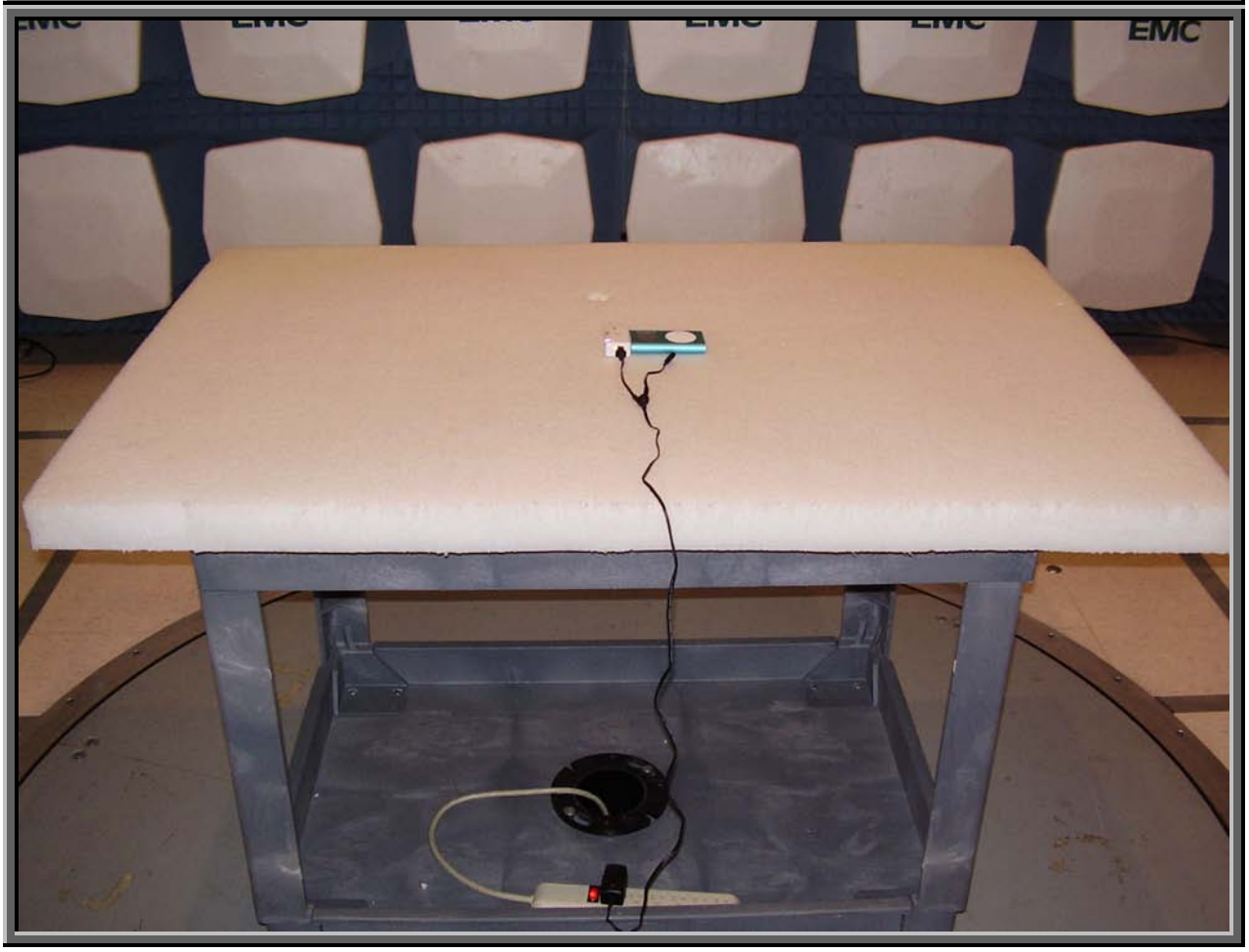
Other

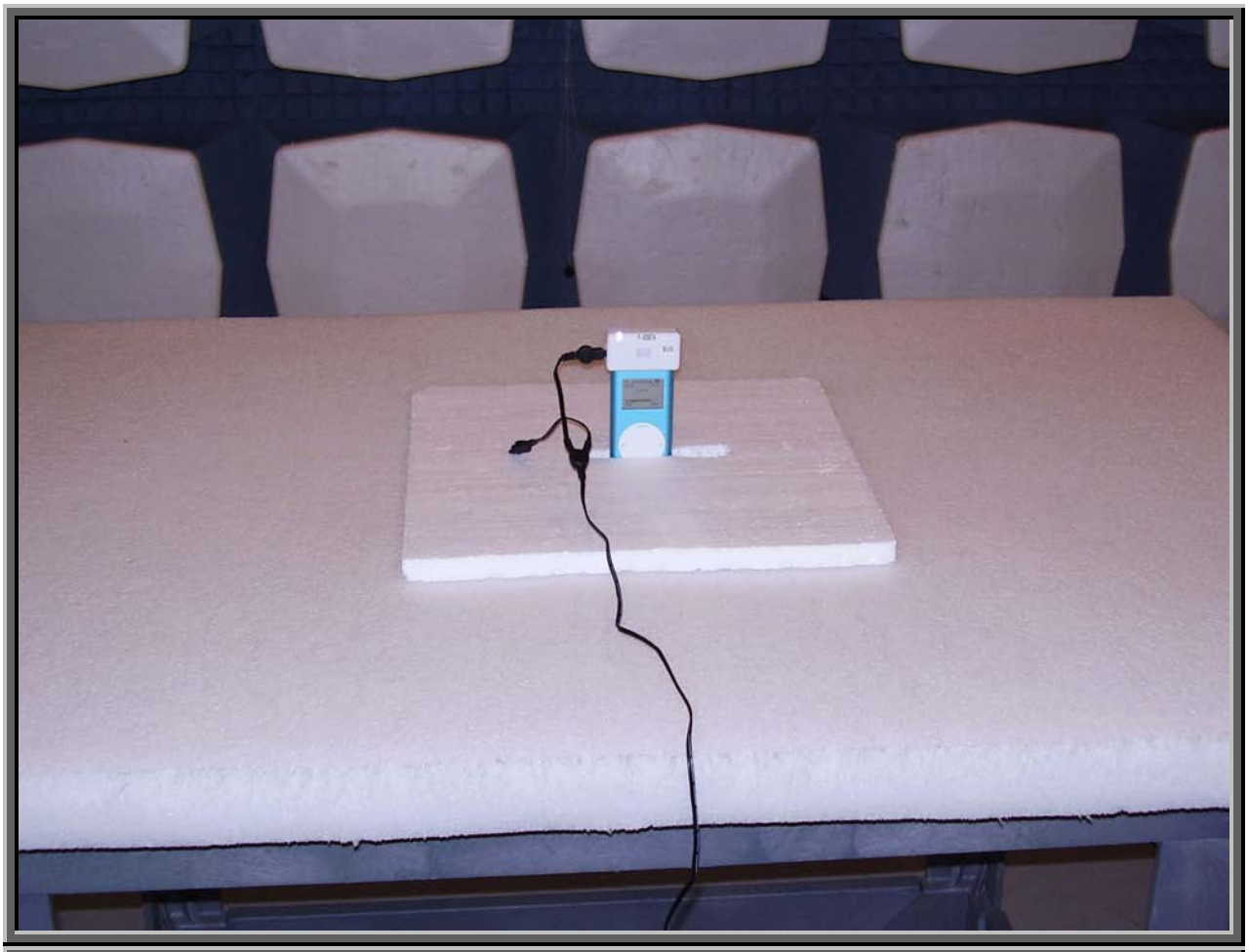
Tested By:

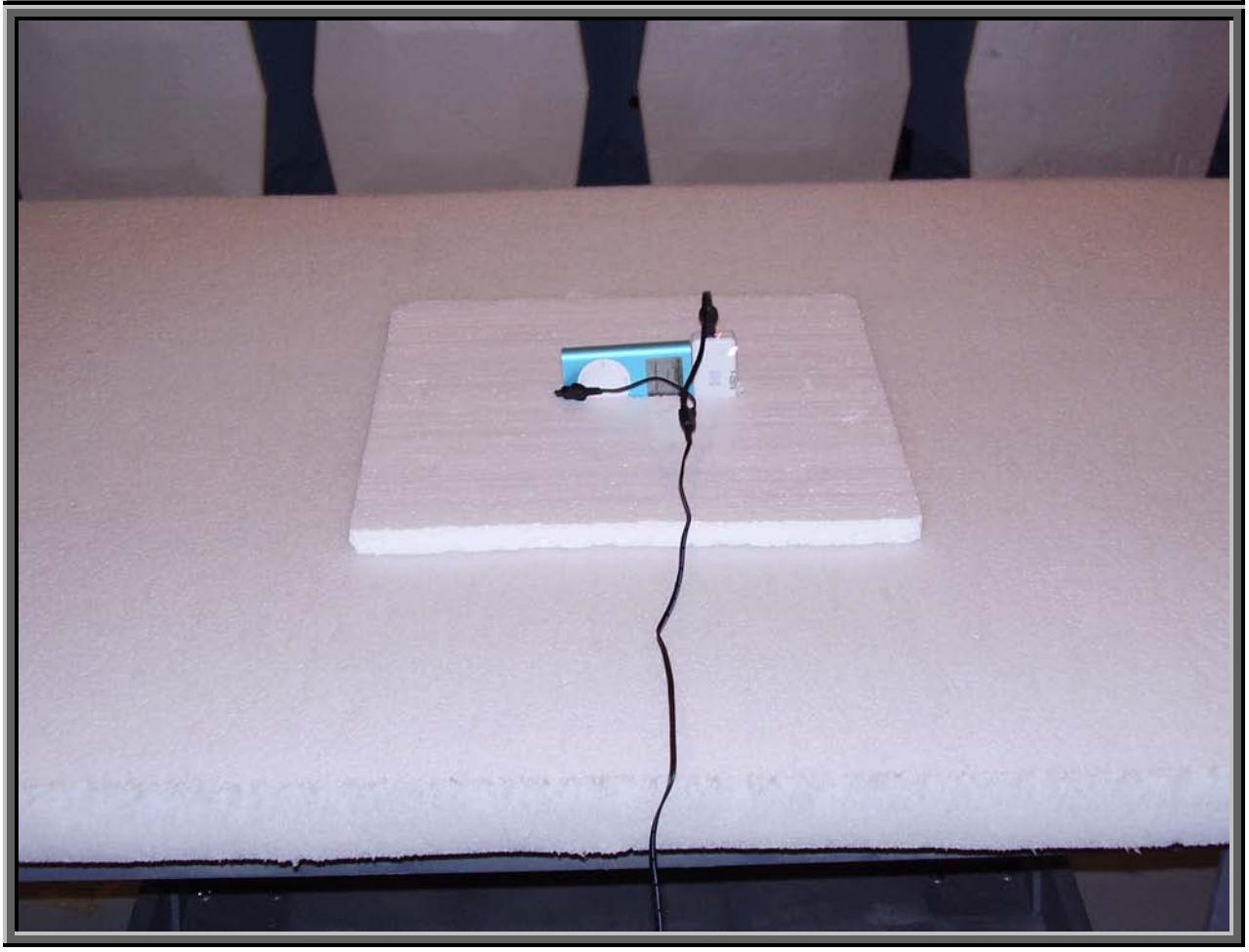


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	50.7	30.4	129.0	1.1	1.0	0.0	H-Horn	PK	-9.5	71.6	74.0	-2.4
2483.500	48.7	30.4	209.0	1.1	1.0	0.0	V-Horn	PK	-9.5	69.6	74.0	-4.4
2483.500	21.5	30.4	129.0	1.1	1.0	0.0	H-Horn	AV	-9.5	42.4	54.0	-11.6
2483.500	20.0	30.4	209.0	1.1	1.0	0.0	V-Horn	AV	-9.5	40.9	54.0	-13.1


NORTHWEST
EMC


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 MP3 Players MN: F-0415A	Logitech, Inc.	F-0415A	None
AC Adapter	Dell	PA-6	12761-0A4-2058
CD Discman	Sony	D-171	8010567

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8	PA	AC Adapter	EUT-Bluetooth Dongle for MP3 Players MN: F-0415A
AC Power	No	2.0	No	AC Adapter	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	Agilent	E4446A	AAQ	04/08/2005	13 mo
LISN	Solar	9252-50-R-24-BNC	LIP	12/29/2004	13 mo

Test Description

Requirement: EN 301 489-1, clause 8.4. If the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits or EN 55022 Class B.

Configuration: The EUT will be powered from a device that could be connected to the AC power line. Therefore, the measurements were made on the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with EN 55022.

Completed by:

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC, 60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with discman. Configuration #3

EUT OPERATING MODES

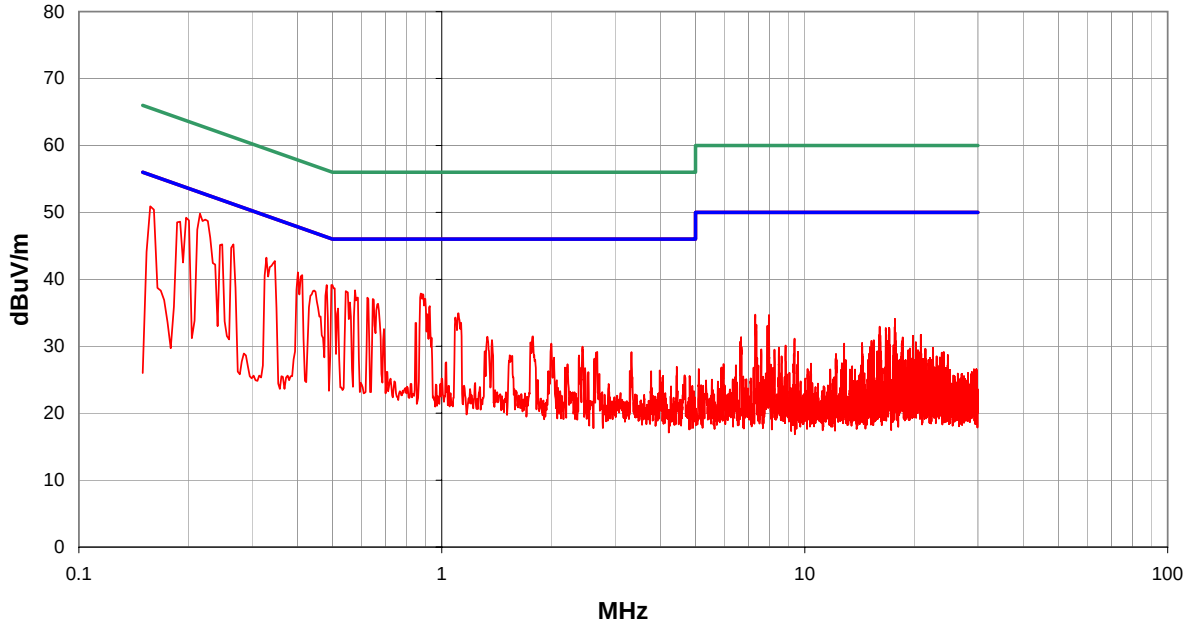
Mid channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	L1
Run #	7
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.216	29.6			0.0	0.2	20.0				49.8	53.0	-3.2
0.197	29.0			0.0	0.2	20.0				49.2	53.7	-4.5
0.157	30.7			0.0	0.2	20.0				50.9	55.6	-4.7
0.190	28.4			0.0	0.2	20.0				48.6	54.0	-5.4
0.267	25.0			0.0	0.2	20.0				45.2	51.2	-6.0
0.329	23.0			0.0	0.2	20.0				43.2	49.5	-6.3
0.347	22.5			0.0	0.2	20.0				42.7	49.0	-6.3
0.248	25.0			0.0	0.2	20.0				45.2	51.8	-6.6
0.401	20.8			0.0	0.2	20.0				41.0	47.8	-6.8
0.500	18.9			0.0	0.2	20.0				39.1	46.0	-6.9
0.412	20.4			0.0	0.2	20.0				40.6	47.6	-7.0
0.482	18.9			0.0	0.2	20.0				39.1	46.3	-7.2
0.576	18.1			0.0	0.3	20.0				38.4	46.0	-7.6
0.544	18.0			0.0	0.3	20.0				38.3	46.0	-7.7
0.875	17.6			0.0	0.3	20.0				37.9	46.0	-8.1
0.445	18.1			0.0	0.2	20.0				38.3	47.0	-8.6
0.624	17.0			0.0	0.3	20.0				37.3	46.0	-8.7
0.646	16.8			0.0	0.3	20.0				37.1	46.0	-8.9
0.558	16.3			0.0	0.3	20.0				36.6	46.0	-9.4

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC, 60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with discman. Configuration #3

EUT OPERATING MODES

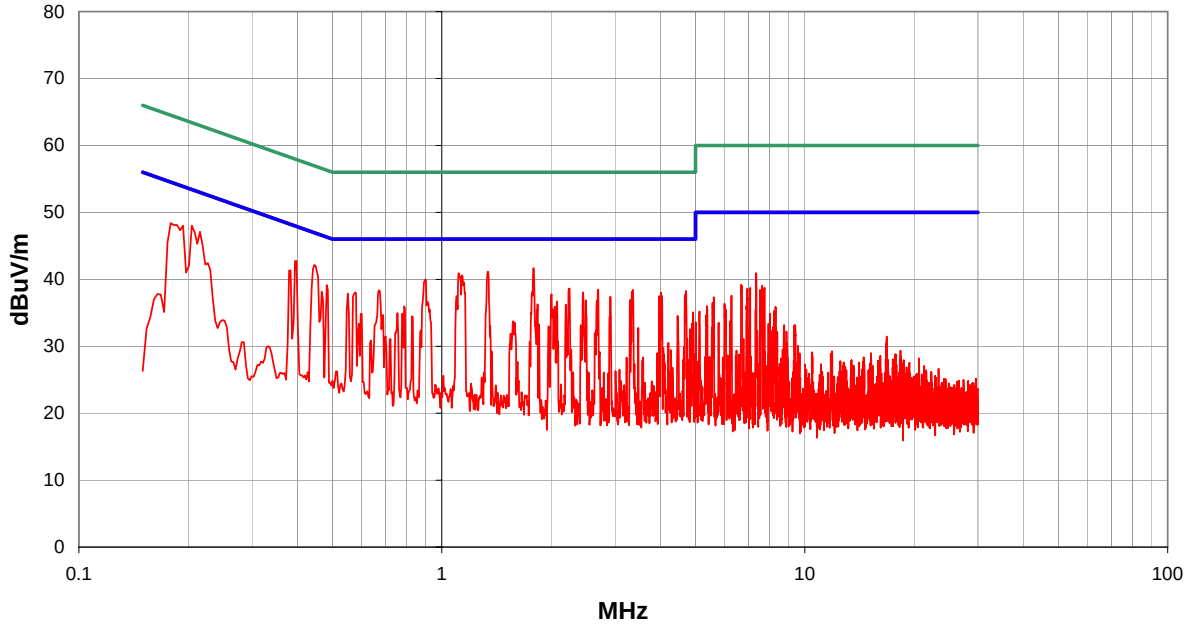
Mid channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	N
Run #	8
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1.790	21.3			0.0	0.4	20.0				41.7	46.0	-4.3
0.445	21.9			0.0	0.2	20.0				42.1	47.0	-4.8
1.342	20.8			0.0	0.3	20.0				41.1	46.0	-4.9
1.112	20.6			0.0	0.3	20.0				40.9	46.0	-5.1
0.398	22.5			0.0	0.2	20.0				42.7	47.9	-5.2
1.138	20.3			0.0	0.3	20.0				40.6	46.0	-5.4
0.205	27.8			0.0	0.2	20.0				48.0	53.4	-5.4
0.901	19.7			0.0	0.3	20.0				40.0	46.0	-6.0
0.179	28.2			0.0	0.2	20.0				48.4	54.5	-6.1
0.383	21.1			0.0	0.2	20.0				41.3	48.2	-6.9
0.482	18.9			0.0	0.2	20.0				39.1	46.3	-7.2
2.249	18.2			0.0	0.4	20.0				38.6	46.0	-7.4
2.697	18.0			0.0	0.5	20.0				38.5	46.0	-7.5
3.364	17.9			0.0	0.5	20.0				38.4	46.0	-7.6
0.671	18.1			0.0	0.3	20.0				38.4	46.0	-7.6
4.709	17.6			0.0	0.7	20.0				38.3	46.0	-7.7
3.342	17.6			0.0	0.5	20.0				38.1	46.0	-7.9
0.576	17.8			0.0	0.3	20.0				38.1	46.0	-7.9
2.453	17.6			0.0	0.4	20.0				38.0	46.0	-8.0

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC, 60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with discman. Configuration #3

EUT OPERATING MODES

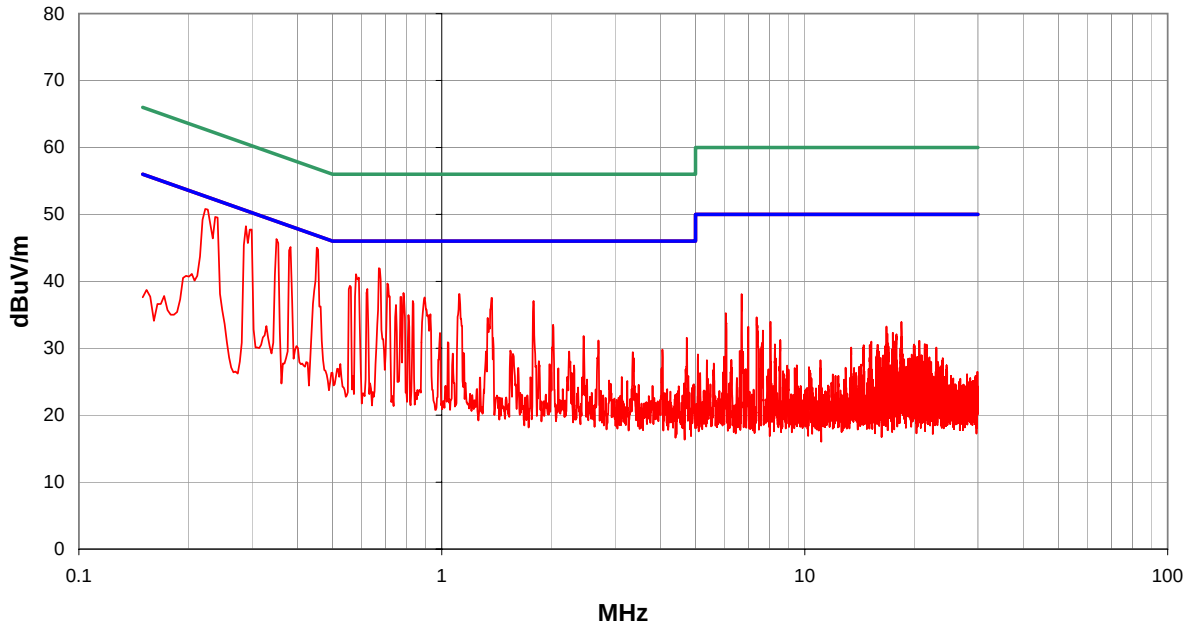
Low channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	L1
Run #	9
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.452	24.8			0.0	0.2	20.0				45.0	46.8	-1.8
0.223	30.6			0.0	0.2	20.0				50.8	52.7	-1.9
0.288	28.0			0.0	0.2	20.0				48.2	50.6	-2.3
0.299	27.5			0.0	0.2	20.0				47.7	50.3	-2.5
0.237	29.4			0.0	0.2	20.0				49.6	52.2	-2.6
0.350	26.1			0.0	0.2	20.0				46.3	49.0	-2.6
0.383	24.9			0.0	0.2	20.0				45.1	48.2	-3.1
0.671	21.7			0.0	0.3	20.0				42.0	46.0	-4.0
0.580	20.8			0.0	0.3	20.0				41.1	46.0	-4.9
0.708	19.4			0.0	0.3	20.0				39.7	46.0	-6.3
0.558	19.1			0.0	0.3	20.0				39.4	46.0	-6.6
0.624	18.6			0.0	0.3	20.0				38.9	46.0	-7.1
0.784	18.0			0.0	0.3	20.0				38.3	46.0	-7.7
1.119	17.8			0.0	0.3	20.0				38.1	46.0	-7.9
0.773	17.4			0.0	0.3	20.0				37.7	46.0	-8.3
0.897	17.3			0.0	0.3	20.0				37.6	46.0	-8.4
1.374	17.2			0.0	0.3	20.0				37.5	46.0	-8.5
0.831	16.8			0.0	0.3	20.0				37.1	46.0	-8.9
1.790	16.7			0.0	0.4	20.0				37.1	46.0	-8.9

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC, 60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with discman. Configuration #3

EUT OPERATING MODES

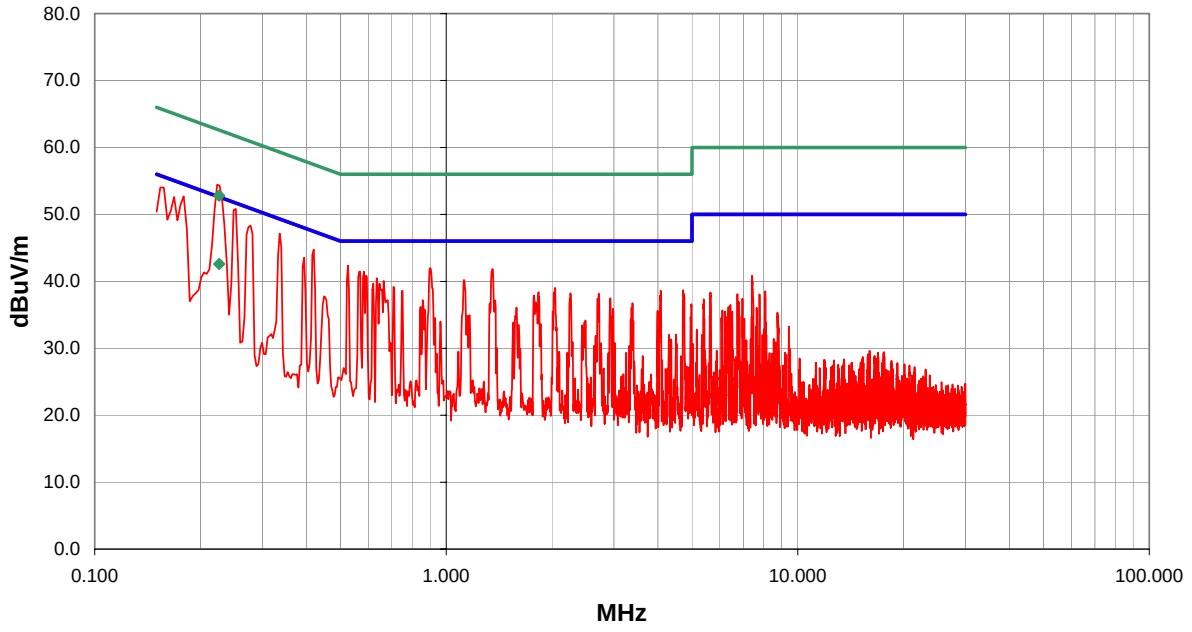
Low channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	N
Run #	10
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.226	32.8			0.0	0.0	20.0		QP		52.8	62.6	-9.8
0.226	22.6			0.0	0.0	20.0		AV		42.6	52.6	-10.0
0.252	30.6			0.0	0.2	20.0				50.8	51.7	-0.9
0.157	33.8			0.0	0.2	20.0				54.0	55.6	-1.6
0.179	32.5			0.0	0.2	20.0				52.7	54.5	-1.8
0.336	26.9			0.0	0.2	20.0				47.1	49.3	-2.2
0.168	32.4			0.0	0.2	20.0				52.6	55.0	-2.4
0.278	28.1			0.0	0.2	20.0				48.3	50.9	-2.6
0.420	24.5			0.0	0.2	20.0				44.7	47.5	-2.7
0.525	22.1			0.0	0.2	20.0				42.3	46.0	-3.7
0.901	21.7			0.0	0.3	20.0				42.0	46.0	-4.0
1.356	21.5			0.0	0.3	20.0				41.8	46.0	-4.2
0.394	23.3			0.0	0.2	20.0				43.5	48.0	-4.4
0.584	21.2			0.0	0.3	20.0				41.5	46.0	-4.5
0.569	21.2			0.0	0.3	20.0				41.5	46.0	-4.5
0.591	20.6			0.0	0.3	20.0				40.9	46.0	-5.1
0.635	20.2			0.0	0.3	20.0				40.5	46.0	-5.5
1.123	19.9			0.0	0.3	20.0				40.2	46.0	-5.8
0.664	19.8			0.0	0.3	20.0				40.1	46.0	-5.9

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC, 60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with discman. Configuration #3

EUT OPERATING MODES

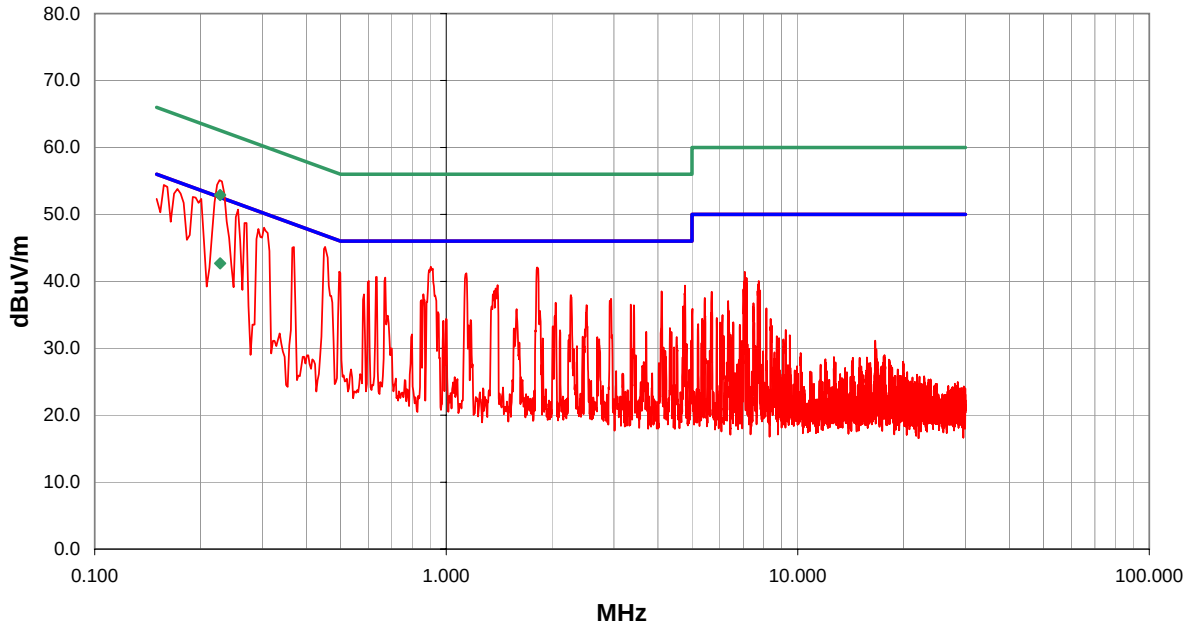
High channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	N
Run #	11
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.228	32.9			0.0	0.0	20.0		QP		52.9	62.5	-9.6
0.228	22.7			0.0	0.0	20.0		AV		42.7	52.5	-9.8
0.256	30.5			0.0	0.2	20.0				50.7	51.6	-0.8
0.172	33.6			0.0	0.2	20.0				53.8	54.9	-1.1
0.157	34.2			0.0	0.2	20.0				54.4	55.6	-1.2
0.190	32.4			0.0	0.2	20.0				52.6	54.0	-1.4
0.452	24.9			0.0	0.2	20.0				45.1	46.8	-1.7
0.303	27.8			0.0	0.2	20.0				48.0	50.2	-2.1
0.270	28.5			0.0	0.2	20.0				48.7	51.1	-2.4
0.369	24.9			0.0	0.2	20.0				45.1	48.5	-3.4
0.904	21.9			0.0	0.3	20.0				42.2	46.0	-3.8
1.815	21.7			0.0	0.4	20.0				42.1	46.0	-3.9
0.496	21.2			0.0	0.2	20.0				41.4	46.1	-4.6
1.141	20.9			0.0	0.3	20.0				41.2	46.0	-4.8
0.635	20.4			0.0	0.3	20.0				40.7	46.0	-5.3
0.671	20.3			0.0	0.3	20.0				40.6	46.0	-5.4
0.602	19.8			0.0	0.3	20.0				40.1	46.0	-5.9
1.400	19.1			0.0	0.3	20.0				39.4	46.0	-6.6
4.778	18.7			0.0	0.7	20.0				39.4	46.0	-6.6

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0415A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC, 60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with discman. Configuration #3

EUT OPERATING MODES

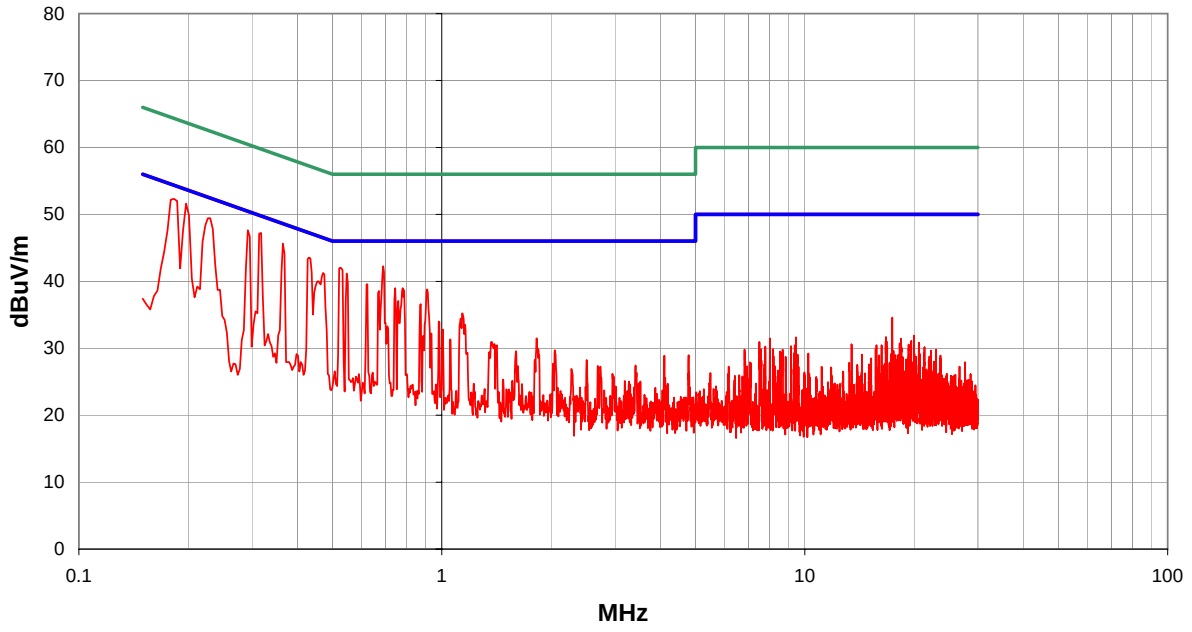
High channel transmitting.

DEVIATIONS FROM TEST STANDARD

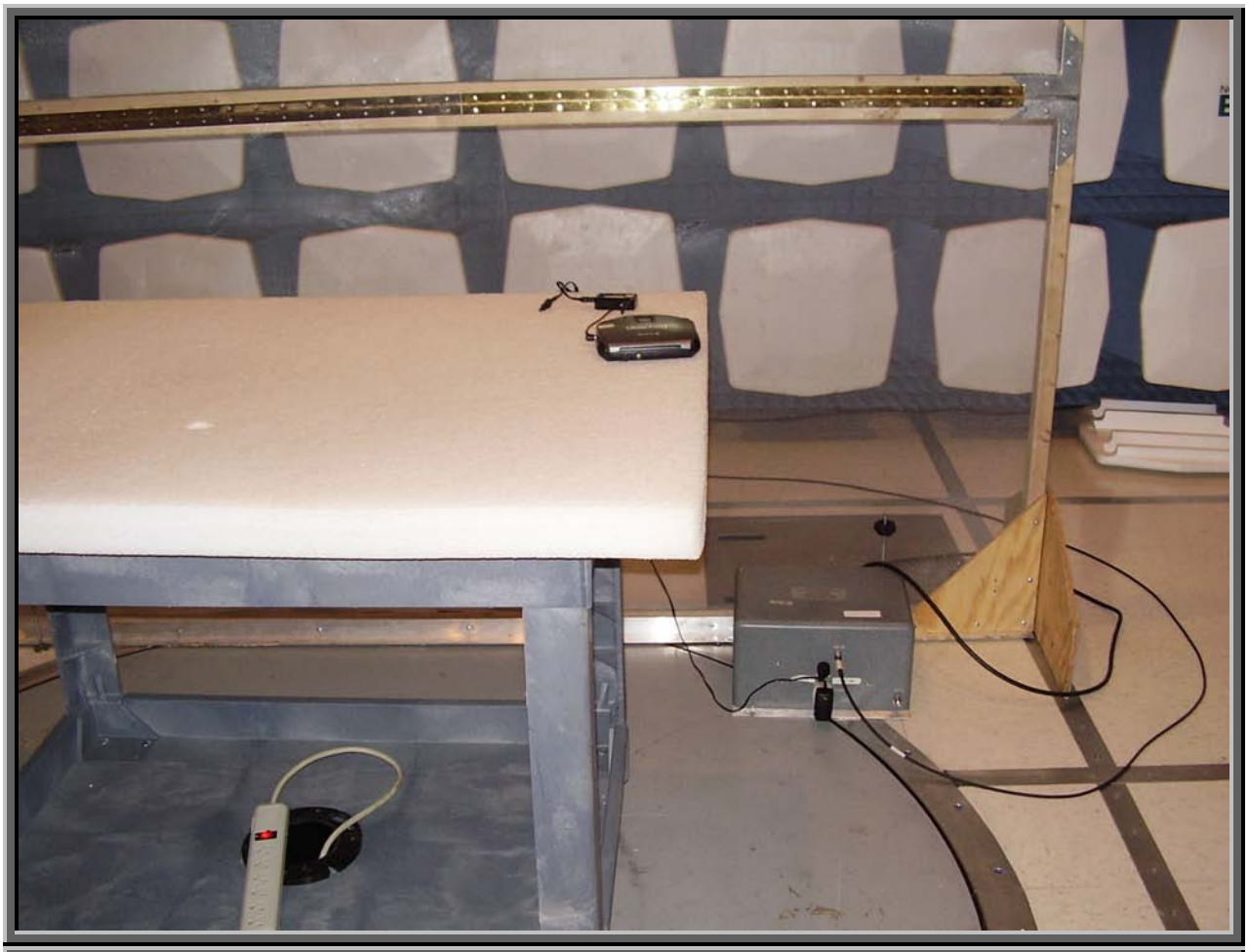
No deviations.

RESULTS	Pass
Line Tested	L1
Run #	12
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.183	32.1			0.0	0.2	20.0				52.3	54.4	-2.0
0.197	31.4			0.0	0.2	20.0				51.6	53.7	-2.1
0.318	27.0			0.0	0.2	20.0				47.2	49.8	-2.5
0.292	27.4			0.0	0.2	20.0				47.6	50.5	-2.8
0.365	25.4			0.0	0.2	20.0				45.6	48.6	-3.0
0.230	29.2			0.0	0.2	20.0				49.4	52.4	-3.0
0.431	23.3			0.0	0.2	20.0				43.5	47.2	-3.7
0.689	22.0			0.0	0.3	20.0				42.3	46.0	-3.7
0.525	21.8			0.0	0.2	20.0				42.0	46.0	-4.0
0.547	20.9			0.0	0.3	20.0				41.2	46.0	-4.8
0.471	21.0			0.0	0.2	20.0				41.2	46.5	-5.3
0.624	19.3			0.0	0.3	20.0				39.6	46.0	-6.4
0.780	18.7			0.0	0.3	20.0				39.0	46.0	-7.0
0.744	18.7			0.0	0.3	20.0				39.0	46.0	-7.0
0.912	18.5			0.0	0.3	20.0				38.8	46.0	-7.2
0.671	18.3			0.0	0.3	20.0				38.6	46.0	-7.4
0.759	16.8			0.0	0.3	20.0				37.1	46.0	-8.9
0.875	16.3			0.0	0.3	20.0				36.6	46.0	-9.4
1.141	14.9			0.0	0.3	20.0				35.2	46.0	-10.8



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 MP3 Players MN: F-0397A	Logitech, Inc.	F-0397A	None
AC Adapter	Dell	PA-6	12761-0A4-2058
iPod	Apple	A1051	JQS14909S44

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8	PA	AC Adapter	EUT-Bluetooth Dongle for MP3 Players MN: F-0397A
AC Power	No	2.0	No	AC Adapter	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	Agilent	E4446A	AAQ	04/08/2005	13 mo
LISN	Solar	9252-50-R-24-BNC	LIP	12/29/2004	13 mo

Test Description

Requirement: EN 301 489-1, clause 8.4. If the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits or EN 55022 Class B.

Configuration: The EUT will be powered from a device that could be connected to the AC power line. Therefore, the measurements were made on the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with EN 55022.

Completed by:

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with iPod. Configuration #2

EUT OPERATING MODES

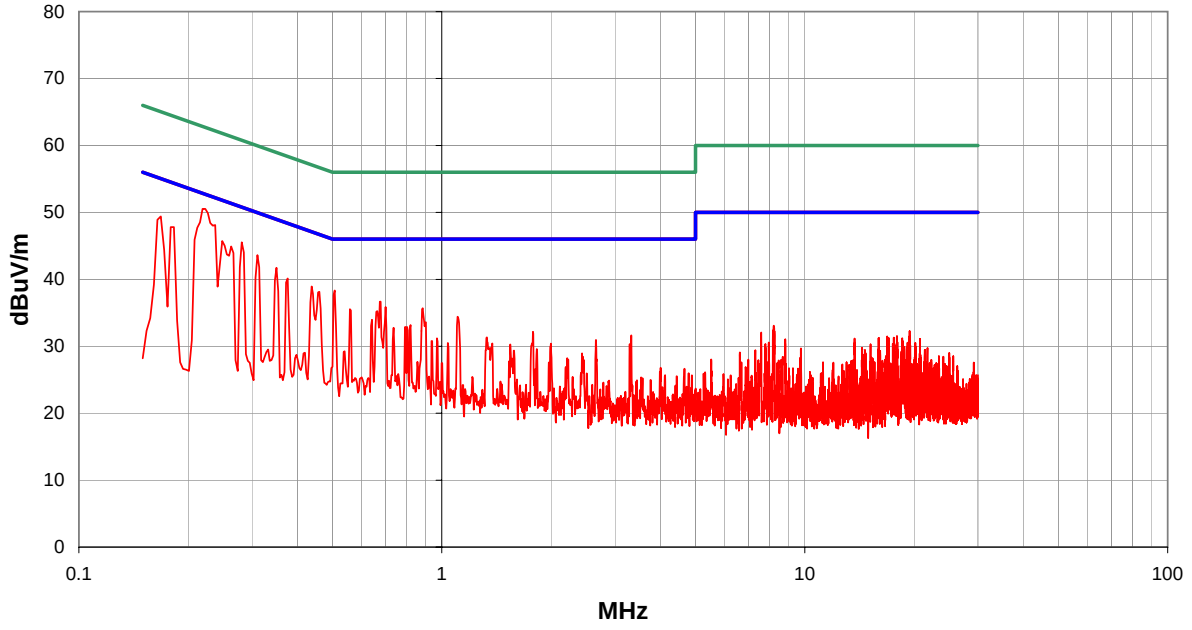
Low channel operation.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	L1
Run #	1
Configuration ID:	Config #2

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.223	30.3			0.0	0.2	20.0				50.5	52.7	-2.2
0.281	25.3			0.0	0.2	20.0				45.5	50.8	-5.3
0.168	29.2			0.0	0.2	20.0				49.4	55.0	-5.6
0.248	25.5			0.0	0.2	20.0				45.7	51.8	-6.1
0.310	23.4			0.0	0.2	20.0				43.6	50.0	-6.3
0.183	27.6			0.0	0.2	20.0				47.8	54.4	-6.5
0.350	21.5			0.0	0.2	20.0				41.7	49.0	-7.2
0.507	18.1			0.0	0.2	20.0				38.3	46.0	-7.7
0.438	18.7			0.0	0.2	20.0				38.9	47.1	-8.2
0.376	19.9			0.0	0.2	20.0				40.1	48.4	-8.2
0.460	17.9			0.0	0.2	20.0				38.1	46.7	-8.6
0.678	16.4			0.0	0.3	20.0				36.7	46.0	-9.3
0.700	15.6			0.0	0.3	20.0				35.9	46.0	-10.1
0.886	15.4			0.0	0.3	20.0				35.7	46.0	-10.3
0.558	15.3			0.0	0.3	20.0				35.6	46.0	-10.4
0.664	15.0			0.0	0.3	20.0				35.3	46.0	-10.7
1.105	14.1			0.0	0.3	20.0				34.4	46.0	-11.6
0.642	13.7			0.0	0.3	20.0				34.0	46.0	-12.0
0.821	12.9			0.0	0.3	20.0				33.2	46.0	-12.8

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120 VAC/60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with iPod. Configuration #2

EUT OPERATING MODES

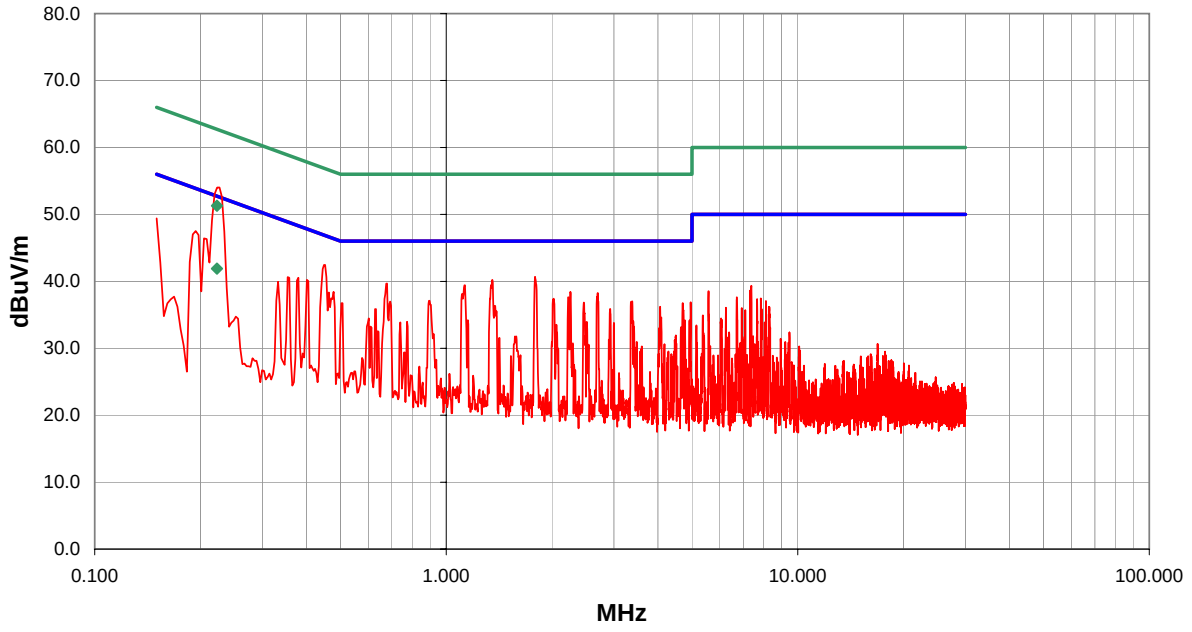
Low channel operation.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	N
Run #	2
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.223	21.9			0.0	0.0	20.0		AV		41.9	52.7	-10.8
0.223	31.3			0.0	0.0	20.0		QP		51.3	62.7	-11.4
0.452	22.2			0.0	0.2	20.0				42.4	46.8	-4.4
1.790	20.3			0.0	0.4	20.0				40.7	46.0	-5.3
1.353	19.9			0.0	0.3	20.0				40.2	46.0	-5.8
0.678	19.4			0.0	0.3	20.0				39.7	46.0	-6.3
0.194	27.3			0.0	0.2	20.0				47.5	53.9	-6.4
1.130	19.1			0.0	0.3	20.0				39.4	46.0	-6.6
0.150	29.2			0.0	0.2	20.0				49.4	56.0	-6.6
0.205	26.2			0.0	0.2	20.0				46.4	53.4	-7.0
2.256	18.0			0.0	0.4	20.0				38.4	46.0	-7.6
0.401	20.0			0.0	0.2	20.0				40.2	47.8	-7.6
2.697	17.8			0.0	0.5	20.0				38.3	46.0	-7.7
0.380	20.3			0.0	0.2	20.0				40.5	48.3	-7.8
0.478	18.2			0.0	0.2	20.0				38.4	46.4	-7.9
0.354	20.4			0.0	0.2	20.0				40.6	48.9	-8.2
0.463	18.1			0.0	0.2	20.0				38.3	46.6	-8.3
2.227	17.2			0.0	0.4	20.0				37.6	46.0	-8.4
2.023	17.0			0.0	0.4	20.0				37.4	46.0	-8.6

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120VAC/60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with iPod. Configuration #2

EUT OPERATING MODES

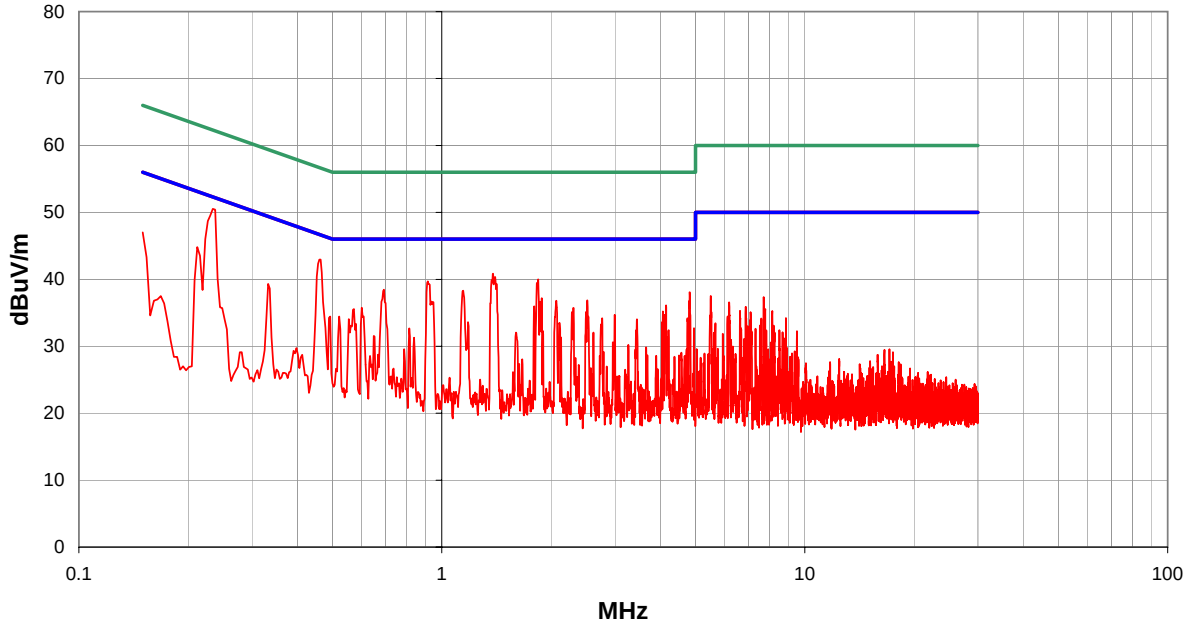
Mid channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	N
Run #	3
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.234	30.3			0.0	0.2	20.0				50.5	52.3	-1.8
0.463	22.7			0.0	0.2	20.0				42.9	46.6	-3.7
1.385	20.5			0.0	0.3	20.0				40.8	46.0	-5.2
1.845	19.6			0.0	0.4	20.0				40.0	46.0	-6.0
0.915	19.4			0.0	0.3	20.0				39.7	46.0	-6.3
0.693	18.2			0.0	0.3	20.0				38.5	46.0	-7.5
1.145	18.0			0.0	0.3	20.0				38.3	46.0	-7.7
4.822	17.4			0.0	0.7	20.0				38.1	46.0	-7.9
0.212	24.6			0.0	0.2	20.0				44.8	53.1	-8.3
1.885	16.8			0.0	0.4	20.0				37.2	46.0	-8.8
0.150	26.8			0.0	0.2	20.0				47.0	56.0	-9.0
2.519	16.4			0.0	0.4	20.0				36.8	46.0	-9.2
2.067	16.4			0.0	0.4	20.0				36.8	46.0	-9.2
1.870	16.2			0.0	0.4	20.0				36.6	46.0	-9.4
4.148	15.5			0.0	0.6	20.0				36.1	46.0	-9.9
1.797	15.6			0.0	0.4	20.0				36.0	46.0	-10.0
0.332	19.1			0.0	0.2	20.0				39.3	49.4	-10.1
0.602	15.5			0.0	0.3	20.0				35.8	46.0	-10.2
2.307	15.3			0.0	0.4	20.0				35.7	46.0	-10.3

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120VAC/60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with iPod. Configuration #2

EUT OPERATING MODES

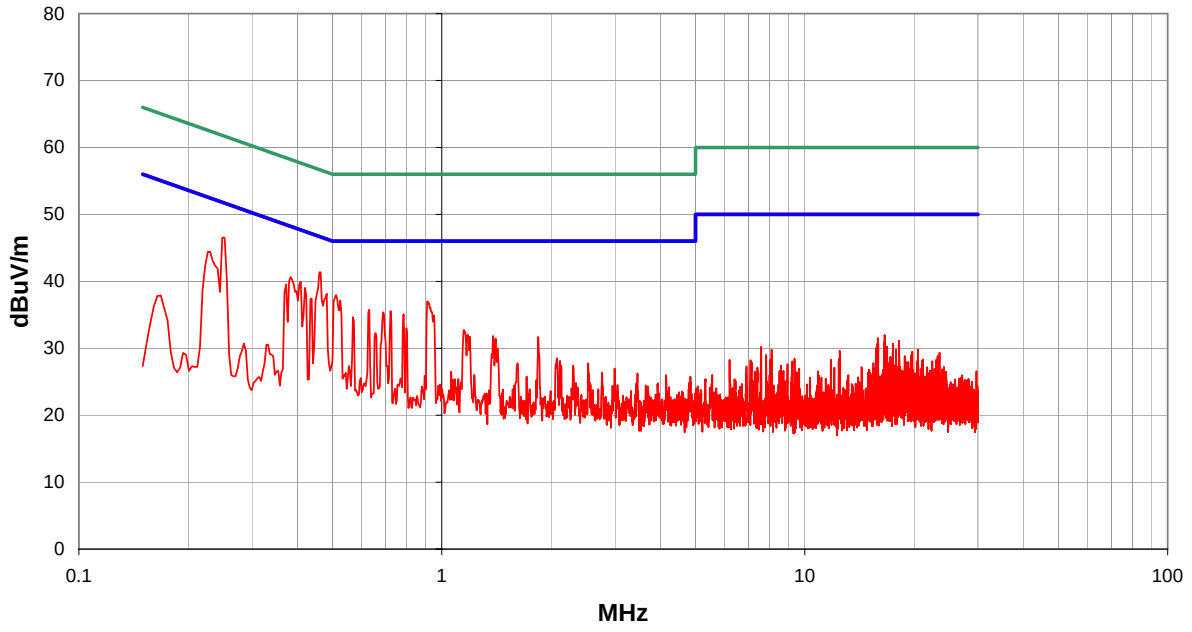
Mid channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	L1
Run #	4
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.252	26.3			0.0	0.2	20.0				46.5	51.7	-5.2
0.463	21.1			0.0	0.2	20.0				41.3	46.6	-5.3
0.383	20.4			0.0	0.2	20.0				40.6	48.2	-7.6
0.409	19.7			0.0	0.2	20.0				39.9	47.7	-7.7
0.230	24.2			0.0	0.2	20.0				44.4	52.4	-8.0
0.511	17.7			0.0	0.2	20.0				37.9	46.0	-8.1
0.420	18.8			0.0	0.2	20.0				39.0	47.5	-8.4
0.372	19.3			0.0	0.2	20.0				39.5	48.4	-8.9
0.915	16.7			0.0	0.3	20.0				37.0	46.0	-9.0
0.438	17.2			0.0	0.2	20.0				37.4	47.1	-9.7
0.631	15.5			0.0	0.3	20.0				35.8	46.0	-10.2
0.722	15.3			0.0	0.3	20.0				35.6	46.0	-10.4
0.689	15.1			0.0	0.3	20.0				35.4	46.0	-10.6
0.784	14.8			0.0	0.3	20.0				35.1	46.0	-10.9
0.569	14.4			0.0	0.3	20.0				34.7	46.0	-11.3
0.799	12.7			0.0	0.3	20.0				33.0	46.0	-13.0
1.152	12.4			0.0	0.3	20.0				32.7	46.0	-13.3
0.657	12.0			0.0	0.3	20.0				32.3	46.0	-13.7
1.181	11.7			0.0	0.3	20.0				32.0	46.0	-14.0

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120VAC/60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with headset and iPod. Configuration #2

EUT OPERATING MODES

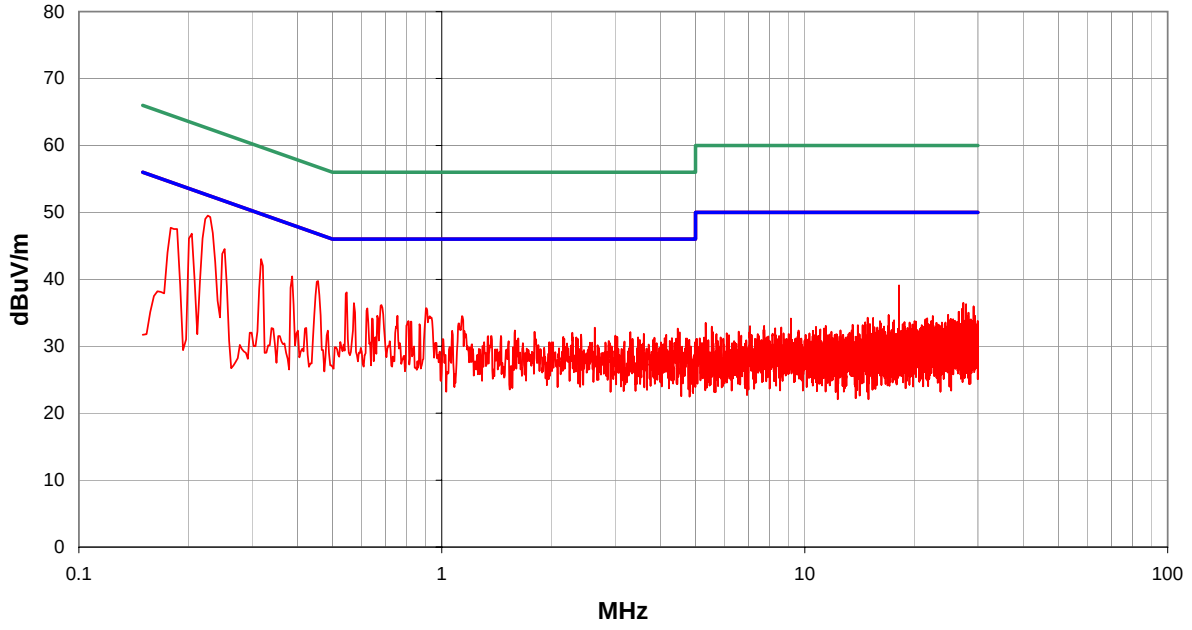
High channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	L1
Run #	5
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.227	29.3			0.0	0.2	20.0				49.5	52.6	-3.1
0.205	26.6			0.0	0.2	20.0				46.8	53.4	-6.6
0.318	22.8			0.0	0.2	20.0				43.0	49.8	-6.7
0.179	27.5			0.0	0.2	20.0				47.7	54.5	-6.8
0.456	19.5			0.0	0.2	20.0				39.7	46.8	-7.0
0.252	24.3			0.0	0.2	20.0				44.5	51.7	-7.2
0.387	20.2			0.0	0.2	20.0				40.4	48.1	-7.7
0.547	17.8			0.0	0.3	20.0				38.1	46.0	-7.9
0.573	16.2			0.0	0.3	20.0				36.5	46.0	-9.5
0.682	15.9			0.0	0.3	20.0				36.2	46.0	-9.8
0.908	15.4			0.0	0.3	20.0				35.7	46.0	-10.3
0.624	15.4			0.0	0.3	20.0				35.7	46.0	-10.3
18.185	17.8			0.0	1.3	20.0				39.1	50.0	-10.9
0.755	14.3			0.0	0.3	20.0				34.6	46.0	-11.4
0.664	14.3			0.0	0.3	20.0				34.6	46.0	-11.4
1.138	14.2			0.0	0.3	20.0				34.5	46.0	-11.5
0.642	13.9			0.0	0.3	20.0				34.2	46.0	-11.8
0.810	13.5			0.0	0.3	20.0				33.8	46.0	-12.2
0.824	13.4			0.0	0.3	20.0				33.7	46.0	-12.3

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.4.26 BETA
EMI 2005.6.7

EUT:	Bluetooth Dongle for MP3 Players MN: F-0397A			Work Order:	LABT0125
Serial Number:				Date:	06/07/05
Customer:	Logitech, Inc.			Temperature:	23
Attendees:	None			Humidity:	43%
Configuration ID:				Barometric Pressure	29.98
Tested by:	Dave Tolman	Power:	120VAC/60 Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Transmit with headset and iPod. Configuration #2

EUT OPERATING MODES

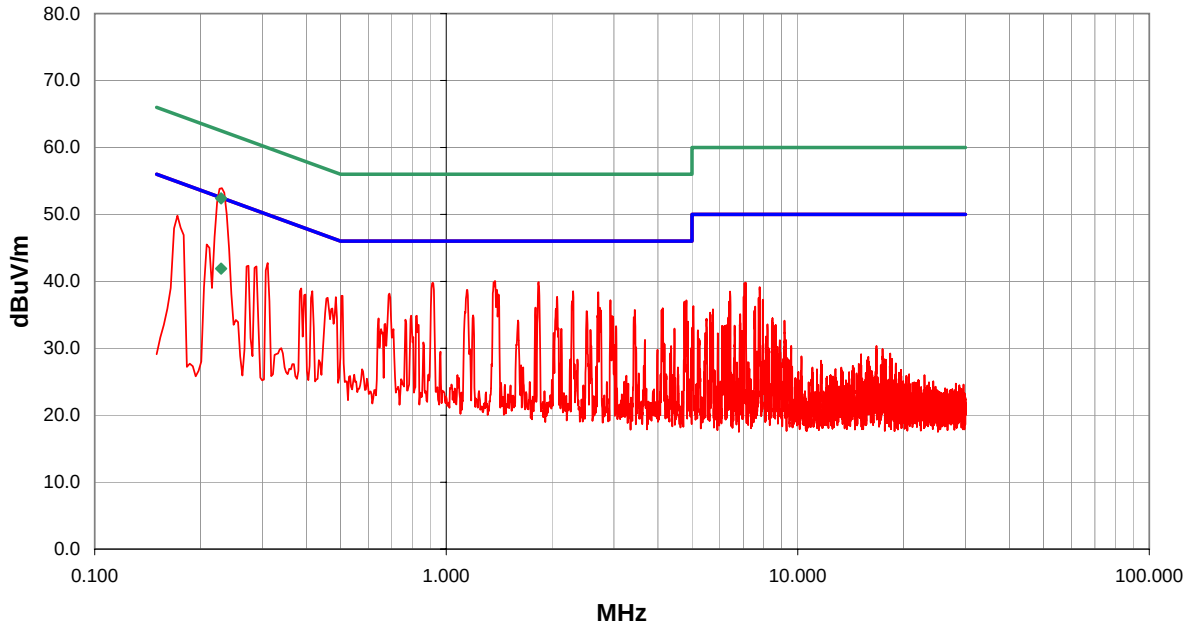
High channel transmitting.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Pass
Line Tested	N
Run #	6
Configuration ID:	

Tested By: Dave Tolman



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.229	32.4			0.0	0.0	20.0		QP		52.4	62.5	-10.1
0.229	21.9			0.0	0.0	20.0		AV		41.9	52.5	-10.6
0.172	29.6			0.0	0.2	20.0				49.8	54.9	-5.1
1.378	19.7			0.0	0.3	20.0				40.0	46.0	-6.0
1.830	19.5			0.0	0.4	20.0				39.9	46.0	-6.1
0.915	19.5			0.0	0.3	20.0				39.8	46.0	-6.2
0.310	22.5			0.0	0.2	20.0				42.7	50.0	-7.2
1.393	18.4			0.0	0.3	20.0				38.7	46.0	-7.3
1.149	18.4			0.0	0.3	20.0				38.7	46.0	-7.3
2.296	18.1			0.0	0.4	20.0				38.5	46.0	-7.5
2.708	17.9			0.0	0.5	20.0				38.4	46.0	-7.6
0.208	25.3			0.0	0.2	20.0				45.5	53.3	-7.8
0.689	17.9			0.0	0.3	20.0				38.2	46.0	-7.8
1.411	17.7			0.0	0.3	20.0				38.0	46.0	-8.0
0.507	17.6			0.0	0.2	20.0				37.8	46.0	-8.2
2.067	17.3			0.0	0.4	20.0				37.7	46.0	-8.3
0.288	22.0			0.0	0.2	20.0				42.2	50.6	-8.3
0.485	17.4			0.0	0.2	20.0				37.6	46.2	-8.6
0.274	22.1			0.0	0.2	20.0				42.3	51.0	-8.7


EMC

BLUETOOTH APPROVALS

FCC Procedure Received from Joe Dichoso on 2-15-02

The following exhibit indicates the FCC Spread Spectrum requirements in Section 15.247 for devices meeting the Bluetooth Specifications in the 2.4 GHz band as of February 2001 operating in the USA. The purpose of this exhibit is to help expedite the approval process for Bluetooth devices. This exhibit provides items that vary for each device and also provides a list of items that are common to Bluetooth devices that explains the remaining requirements. The list of common items can be submitted for each application for equipment authorization. This exhibit only specifies requirements in Section 15.247, requirements in other rule Sections for intentional radiators such as in Section 15.203 or 15.207 must be also be addressed. A Bluetooth device is a FHSS transmitter in the data mode and applies as a Hybrid spread spectrum device in the acquisition mode.

For each individual device, the following items, 1-7 will vary from one device to another and must be submitted.

1) The occupied bandwidth in Section 15.247(a)(1)(ii).
2) Conducted output power specified in Section 15.247(b)(1).
3) EIRP limit in Section 15.247(b)(3).
4) RF safety requirement in Section 15.247(b)(4)
5) Spurious emission limits in Section 15.247(c).
6) Processing gain and requirements for Hybrids in Section 15.247(f) in the acquisition mode.
7) Power spectral density requirement in Section 15.247(f) in the acquisition mode.

For all devices, the following items, 1-12, are common to all Bluetooth devices and will not vary from one device to another. This list can be copied into the filing.

1 Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode is sufficient.

2 Frequency range of a Bluetooth device:

The maximum frequency of the device is: **2402 – 2480 M**Hz.
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for devices which will be operated in the USA. Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification must **not be** supported by the device.

3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organized in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from it's BD address which is unique for every Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4 Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67,
56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59,
72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75,
09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06,
01, 51, 03, 55, 05, 04

5 Equally average use of frequencies in data mode and short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS. The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units, only the offsets are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions, the Bluetooth system has the following behavior:
The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6 Receiver input bandwidth, synchronization and repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz.
In every connection, one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single or multi-slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing is according to the packet type of the connection. Also, the slave of the connection uses these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:
Dwell time = time slot length * hop rate / number of hopping channels *30s
Example for a DH1 packet (with a maximum length of one time slot)
Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period)
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all Bluetooth devices. Therefore, all Bluetooth devices **comply** with the FCC dwell time requirement in the data mode.
This was checked during the Bluetooth Qualification tests.
The Dwell time in hybrid mode is approximately 2.6 mS (in a 12.8s period)

8 Channel Separation in hybrid mode

The nominal channel spacing of the Bluetooth system is 1Mhz independent of the operating mode.
The maximum “initial carrier frequency tolerance” which is allowed for Bluetooth is fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for three frequencies (2402, 2441, 2480 MHz).

9 Derivation and examples for a hopping sequence in hybrid mode

For the generation of the inquiry and page hop sequences the same procedures as described for the data mode are used (see item 5), but this time with different input vectors:
**For the inquiry hop sequence, a predefined fixed address is always used. This results in the same 32 frequencies used by all devices doing an inquiry but every time with a different start frequency and phase in this sequence.
**For the page hop sequence, the device address of the paged unit is used as the input vector. This results in the use of a subset of 32 frequencies which is specific for that initial state of the connection establishment between the two units. A page to different devices would result in a different subset of 32 frequencies.
So it is ensured that also in hybrid mode, the frequency is used equally on average.
Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06, 17, 21, 08, 10, 66, 70, 12, 14, 19, 23
Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18, 58, 56, 20, 53, 60, 62, 55, 06, 66, 64

10 Receiver input bandwidth and synchronization in hybrid mode:

The receiver input bandwidth is the same as in the data mode (1 MHz). When two Bluetooth devices establish contact for the first time, one device sends an inquiry access code and the other device is scanning for this inquiry access code. If two devices have been connected previously and want to start a new transmission, a similar procedure takes place. The only difference is, instead of the inquiry access code, a special access code, derived from the BD_ADDRESS of the paged device will be, will be sent by the master of this connection. Due to the fact that both units have been connected before (in the inquiry procedure) the paging unit has timing and frequency information about the page scan of the paged unit. For this reason the time to establish the connection is reduced.

11 Spread rate / data rate of the direct sequence signal

The Spread rate / Data rate in inquiry and paging mode can be defined via the access code. The access code is the only criterion for the system to check if there is a valid transmission or not. If you regard the presence of a valid access code as one bit of information, and compare it with the length of the access code of 68 bits, the Spread rate / Data rate will be 68/1.

12 Spurious emission in hybrid mode

The Dwell in hybrid mode is shorter than in data mode. For this reason the spurious emissions average level in data mode is worst case. The spurious emissions peak level is the same for both modes.