

# Logitech, Inc.

## Z-5450 MN: S0181A Multimedia Speaker System

September 07, 2005

Report No. LABT0140

Report Prepared By



[www.nwemc.com](http://www.nwemc.com)

1-888-EMI-CERT

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**EMC Test Report**



22975 NW Evergreen Parkway  
Suite 400  
Hillsboro, Oregon 97124

### Certificate of Test

Issue Date: September 07, 2005

Logitech, Inc.

Model: Z-5450 MN: S0181A Multimedia Speaker System

Emissions			
Specification	Test Method	Pass	Fail
FCC 15.247(a) Occupied Bandwidth:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a)(1) Channel Spacing:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a)(1) Dwell Time:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a)(1) Number of Hopping Frequencies:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(b) Output Power:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Band Edge Compliance:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Spurious Conducted Emissions:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.207 Class B:2005-04 AC Powerline Conducted Emissions	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.107 Class B:2005-04 AC Powerline Conducted Emissions	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.109(g) (CISPR 22:1997) Class B:2005-04 Radiated Emissions	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

#### Test Facility

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

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

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Greg Kiemel, Director of Engineering

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

*Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.*

Revision Number	Description	Date	Page Number
00	None		

**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 TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories, available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0401C.



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



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



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



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



**VCCI:** Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration 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?

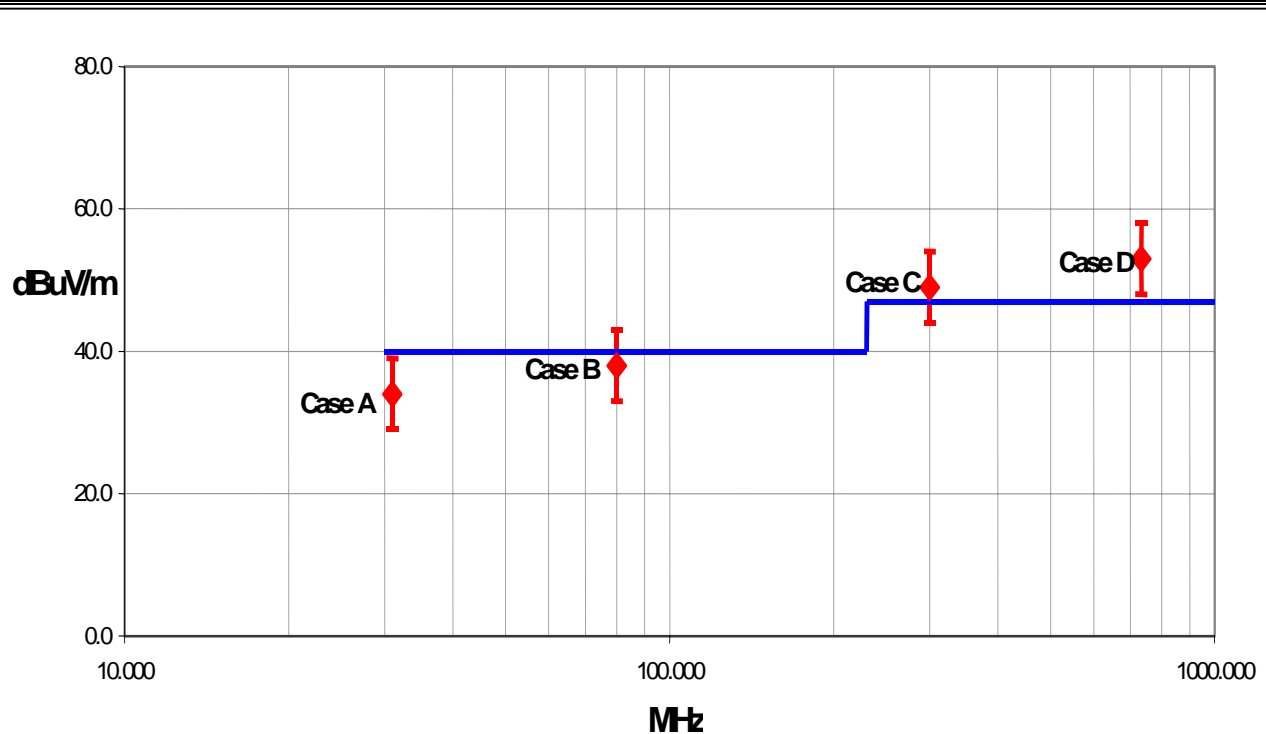
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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		Log Periodic Antenna		Dipole Antenna	
		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86	+ 1.82	+ 2.23	+ 1.29	+ 1.31	+ 1.25
		- 1.88	- 1.87	- 1.41	- 1.26	- 1.27	- 1.25
Expanded uncertainty $U$ (level of confidence ≈ 95%)	normal (k=2)	+ 3.72	+ 3.64	+ 4.46	+ 2.59	+ 2.61	+ 2.49
		- 3.77	- 3.73	- 2.81	- 2.52	- 2.55	- 2.49

**Radiated Emissions > 1 GHz**

Value (dB)

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

**Conducted Emissions**

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

**Radiated Immunity**

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

**Conducted Immunity**

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	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,  $u_c(y)$  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 339<sup>th</sup> Ave. SE  
Sultan, WA 98294  
(888) 364-2378  
FAX (360) 793-2536



**Party Requesting the Test**

<b>Company Name:</b>	Logitech, Inc.
<b>Address:</b>	1499 SE Tech Center Place Suite 350
<b>City, State, Zip:</b>	Vancouver, WA 98683
<b>Test Requested By:</b>	Mitchell Phillippi
<b>Model:</b>	Z-5450 MN: S-0181A Multimedia Speaker System
<b>First Date of Test:</b>	July 15, 2005
<b>Last Date of Test:</b>	August 8, 2005
<b>Receipt Date of Samples:</b>	July 15, 2005
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No visual damage.

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

<b>Clocks/Oscillators:</b>	49.152MHz
<b>I/O Ports:</b>	Fiber optic, Coax, Audio, Control

**Functional Description of the EUT (Equipment Under Test):**

The S-0181A is a stand-alone, surround sound audio system with wireless rear satellite speakers. The wireless connection is achieved using frequency-hopping spread-spectrum (FHSS) radios in the front-located control pod and in the rear satellite speakers. The system consists of a control pod, amplifier/subwoofer assembly, three passive speaker systems, and a pair of wireless rear speakers. The Surround Sound Speaker system is to be used in a home or office environment, and connected to information technology equipment for audio entertainment purposes.

**Client Justification for EUT Selection:**

The product is a representative production sample.

**Client Justification for Test Selection:**

These tests satisfy the requirements of FCC 15.247 for FHSS devices.

The radios in the control pod and rear satellite speakers are identical except for their host devices. So radiated spurious emissions testing was performed on both the control pod and rear speakers, and antenna port direct connect measurements were made on only one configuration. AC Powerline Conducted emissions testing was also performed on both the control pod and rear speakers.

<b>Equipment modifications</b>					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Radiated Emissions	07/15/2005	Internal antenna cable shortened and re-routed.	Modified from delivered configuration. Modifications made by Mitchell Phillipi.	EUT remained at Northwest EMC.
2	Dwell Time	07/15/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
3	Spurious Radiated Emissions	07/17/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
4	Radiated Emissions	07/19/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
5	Band Edge Compliance	08/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
6	Number of Hopping Channels	08/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
7	Channel Spacing	08/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
8	Occupied Bandwidth	08/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
9	Spurious Conducted Emissions	08/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
10	Spurious Radiated Emissions	08/04/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
11	Output Power	08/05/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
12	Spurious Radiated Emissions	08/07/2005	No EMI suppression devices were added or modified during this test.	Same configuration as previous test.	EUT remained at Northwest EMC.
13	AC Powerline Conducted Emissions	08/08/2005	No EMI suppression devices were added or modified during this test.	Same configuration as 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:**

15 channel frequency hopping set called out in script provided by customer

**Operating Modes Investigated:**

Frequency hopping

**Data Rates Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC/60 Hz

**Software\Firmware Applied During Test**

Exercise software	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod

**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(a)(1), the hopping channel carrier frequencies must be separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The measurement is made with the spectrum analyzer's resolution bandwidth set to greater than or equal to 1% of the span, and the video bandwidth set to greater than or equal to the resolution bandwidth.

**Configuration:** The carrier frequency separation was measured between two hopping channels in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

**Completed by:**

# CHANNEL SPACING

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(1)	Year: 2005	Method: FCC DA 00-705, ANSI C63.4	Year: 2000, 2004

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

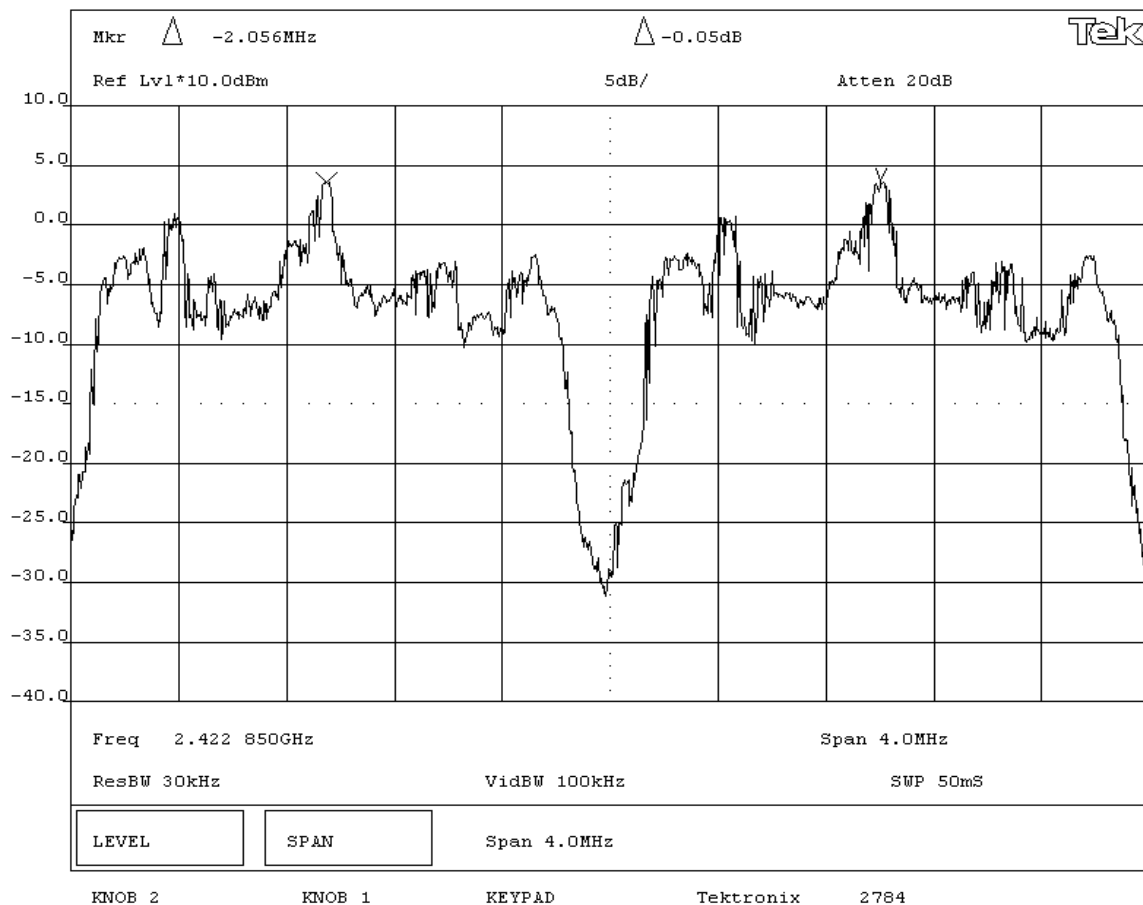
**DEVIATIONS FROM TEST STANDARD**  
None

**REQUIREMENTS**  
Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.

<b>RESULTS</b>	<b>CHANNEL SPACING</b>
Pass	2.056 MHz

**SIGNATURE**  
*Rod Peloquin*  
Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**Channel Spacing**





**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:**

15 channel frequency hopping set called out in script provided by customer

**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	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod

**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(a)(1), the average dwell time per hopping channel is measured.

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.


The measurement is made with the spectrum analyzer's span set to zero, the resolution bandwidth set to 1 MHz, and the video bandwidth set to 100 kHz. The measurement is made in two steps. First, the sweep speed is adjusted to capture the pulse width or dwell time of a single transmission. Then, the sweep speed is set to 6 seconds to count the number of transmissions during that period. The dwell time of a single transmission multiplied by the number of transmissions during a 6 second period equals the average time of occupancy during a 30 second period.

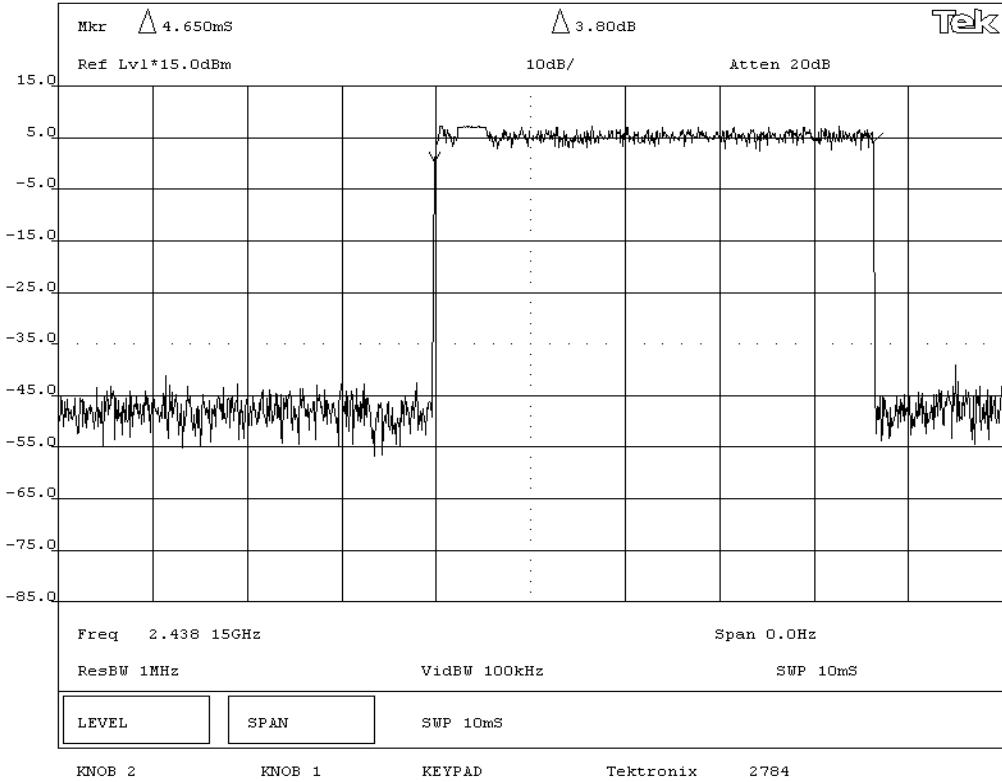
Dwell time = (single transmission (4.65 mS)) X (number of channels(15) x 0.4S) = .3627 Seconds


**Configuration:** The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

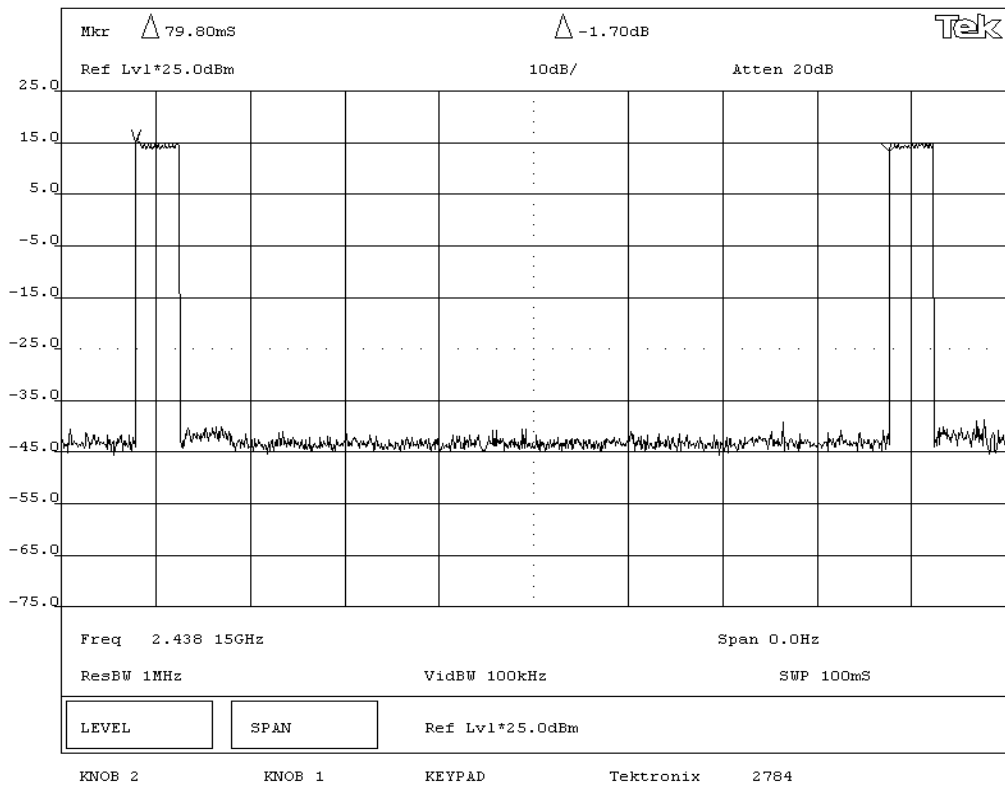
**Completed by:**




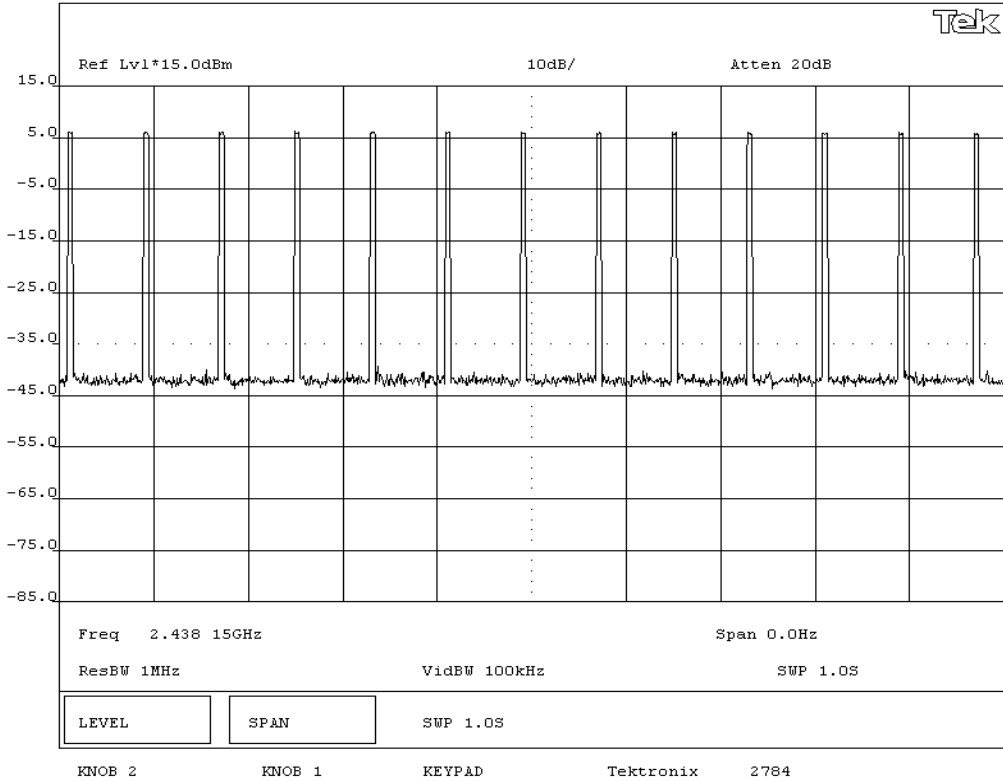
NORTHWEST		<b>EMC</b>		<b>DWELL TIME</b>		Rev BETA 01/30/01	
EUT: Z-5450 MN: S-0181A Multimedia Speaker System				Work Order: LABT0140			
Serial Number: Unknown				Date: 07/15/05			
Customer: Logitech, Inc.				Temperature:			
Attendees: None				Tested by: Rod Peloquin		Humidity: 45% RH	
Customer Ref. No.: None				Power: 120VAC/60Hz		Job Site: EV06	
<b>TEST SPECIFICATIONS</b>							
Specification: 47 CFR 15.247(a)(1)(ii)		Year: 2005		Method: DA 00-705, ANSI C63.4		Year: 2003	
<b>SAMPLE CALCULATIONS</b>							
Total Dwell time = (Dwell Time during a single transmission(4.65 mS)) X (Number of channels(15) x 0.4S) = .3627 Seconds							
<b>COMMENTS</b>							
<b>EUT OPERATING MODES</b>							
Modulated by PRBS at maximum data rate. Hopping carrier.							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
<b>REQUIREMENTS</b>							
Average time of occupancy on any channel shall not be greater than 0.4 seconds in a period of 0.4 seconds multiplied times the number of channels used.							
<b>RESULTS</b>				<b>DWELL TIME DURING A SINGLE TRANSMISSION</b>			
Pass				4.65 mS			
<b>SIGNATURE</b>							
 Tested By: _____							
<b>DESCRIPTION OF TEST</b>							
<b>Time of Occupancy (Dwell Time) - Single Transmission</b>							




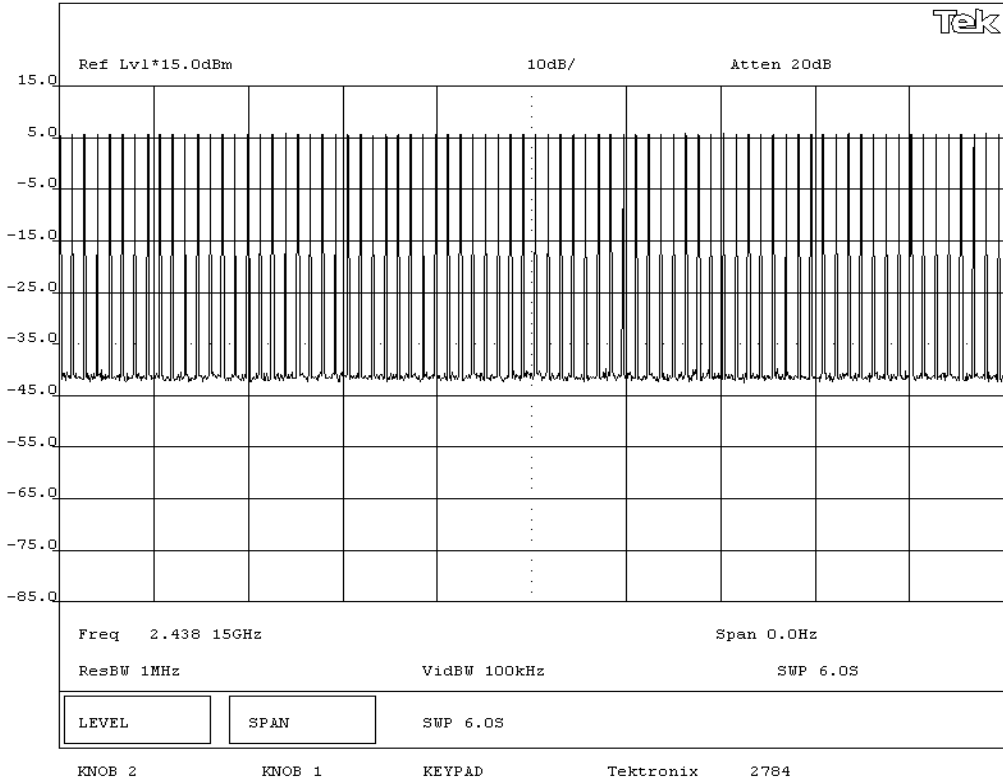
NORTHWEST		<b>EMC</b>		<b>DWELL TIME</b>		Rev BETA 01/30/01	
EUT: Z-5450 MN: S-0181A Multimedia Speaker System				Work Order: LABT0140			
Serial Number: Unknown				Date: 07/15/05			
Customer: Logitech, Inc.				Temperature:			
Attendees: None				Tested by: Rod Peloquin		Humidity: 45% RH	
Customer Ref. No.: None				Power: 120VAC/60Hz		Job Site: EV06	
<b>TEST SPECIFICATIONS</b>							
Specification: 47 CFR 15.247(a)(1)(ii)		Year: 2005		Method: DA 00-705, ANSI C63.4		Year: 2003	
<b>SAMPLE CALCULATIONS</b>							
Total Dwell time = (Dwell Time during a single transmission(4.65 mS)) X (Number of channels(15) x 0.4S) = .3627 Seconds							
<b>COMMENTS</b>							
EUT OPERATING MODES							
Modulated by PRBS at maximum data rate. Hopping carrier.							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
<b>REQUIREMENTS</b>							
Average time of occupancy on any channel shall not be greater than 0.4 seconds multiplied times the number of channels used.							
<b>RESULTS</b>				<b>PERIOD</b>			
Pass				79.8 mS			
<b>SIGNATURE</b>							
 Tested By: _____							
<b>DESCRIPTION OF TEST</b>							
<b>Time of Occupancy (Dwell Time) - Period</b>							



NORTHWEST		<b>EMC</b>		<b>DWELL TIME</b>		Rev BETA 01/30/01	
EUT: Z-5450 MN: S-0181A Multimedia Speaker System				Work Order: LABT0140			
Serial Number: Unknown				Date: 07/15/05			
Customer: Logitech, Inc.				Temperature:			
Attendees: None				Tested by: Rod Peloquin		Humidity: 45% RH	
Customer Ref. No.: None				Power: 120VAC/60Hz		Job Site: EV06	
<b>TEST SPECIFICATIONS</b>							
Specification: 47 CFR 15.247(a)(1)(ii)		Year: 2005		Method: DA 00-705, ANSI C63.4		Year: 2003	
<b>SAMPLE CALCULATIONS</b>							
Total Dwell time = (Dwell Time during a single transmission(4.65 mS)) X (Number of channels(15) x 0.4S) = .3627 Seconds							
<b>COMMENTS</b>							
<b>EUT OPERATING MODES</b>							
Modulated by PRBS at maximum data rate. Hopping carrier.							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
<b>REQUIREMENTS</b>							
Average time of occupancy on any channel shall not be greater than 0.4 seconds in a period of 0.4 seconds multiplied times the number of channels used.							
<b>RESULTS</b>				<b>NUMBER OF TRANSMISSIONS DURING A 1 SECOND PERIOD</b>			
Pass				13			
<b>SIGNATURE</b>							
 Tested By: _____							
<b>DESCRIPTION OF TEST</b>							
<b>Time of Occupancy (Dwell Time) - Number of transmissions during a 1 second period</b>							



NORTHWEST		<b>DWELL TIME</b>		Rev BETA 01/30/01
<b>EMC</b>		EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown				Date: 07/15/05
Customer: Logitech, Inc.				Temperature:
Attendees: None		Tested by: Rod Peloquin		Humidity: 45% RH
Customer Ref. No.: None		Power: 120VAC/60Hz		Job Site: EV06
<b>TEST SPECIFICATIONS</b>				
Specification: 47 CFR 15.247(a)(1)(ii)	Year: 2005	Method: DA 00-705, ANSI C63.4	Year: 2003	
<b>SAMPLE CALCULATIONS</b>				
Total Dwell time = (Dwell Time during a single transmission(4.65 mS)) X (Number of channels(15) x 0.4S) = .3627 Seconds				
<b>COMMENTS</b>				
EUT OPERATING MODES				
Modulated by PRBS at maximum data rate. Hopping carrier.				
<b>DEVIATIONS FROM TEST STANDARD</b>				
None				
<b>REQUIREMENTS</b>				
Average time of occupancy on any channel shall not be greater than 0.4 seconds in a period of 0.4 seconds multiplied times the number of channels used.				
<b>RESULTS</b>		NUMBER OF TRANSMISSIONS DURING A 6 SECOND PERIOD		
Pass		78		
<b>SIGNATURE</b>				
Tested By: 				
<b>DESCRIPTION OF TEST</b>				
Time of Occupancy (Dwell Time) - Number of transmissions during a 1 second period				





**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:**

15 channel frequency hopping set called out in script provided by customer

**Operating Modes Investigated:**

Frequency Hopping

**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	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod

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(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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 number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

Completed by:



# NUMBER OF HOPPING FREQUENCIES

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(a)(1)(i)	Year: 2005	Method: FCC DA 00-705, ANSI C63.4	Year: 2000, 2004
<b>SAMPLE CALCULATIONS</b>			

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

**EUT OPERATING MODES**  
Modulated at maximum data rate, at maximum output power

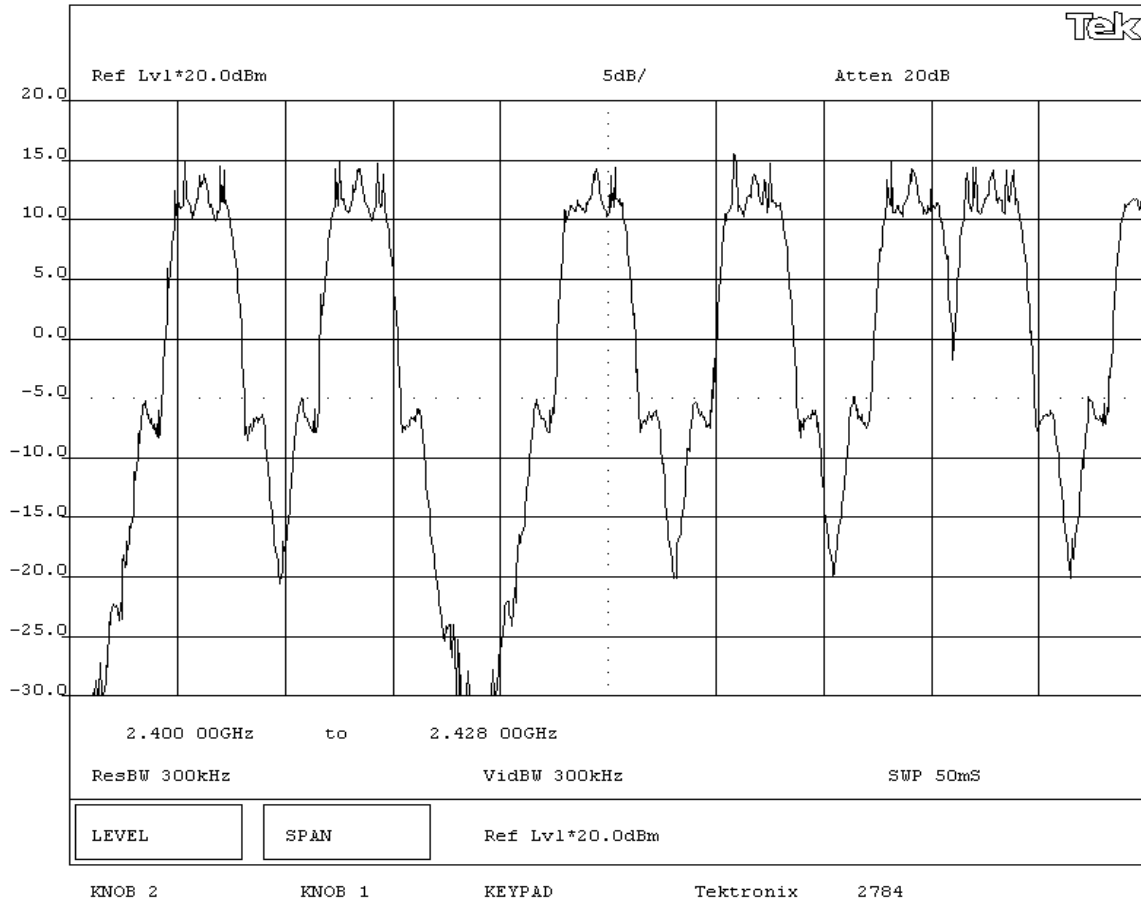
**DEVIATIONS FROM TEST STANDARD**  
None

**REQUIREMENTS**  
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

<b>RESULTS</b>	<b>NUMBER OF HOPPING FREQUENCIES</b>
Pass	15

**SIGNATURE**  
*Rodney L. Peloquin*  
Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**Number of Hopping Frequencies - Plot 1**





# NUMBER OF HOPPING FREQUENCIES

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(1)(i)	Year: 2005	Method: FCC DA 00-705, ANSI C63.4	Year: 2000, 2004
SAMPLE CALCULATIONS			

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

**EUT OPERATING MODES**  
Modulated at maximum data rate, at maximum output power

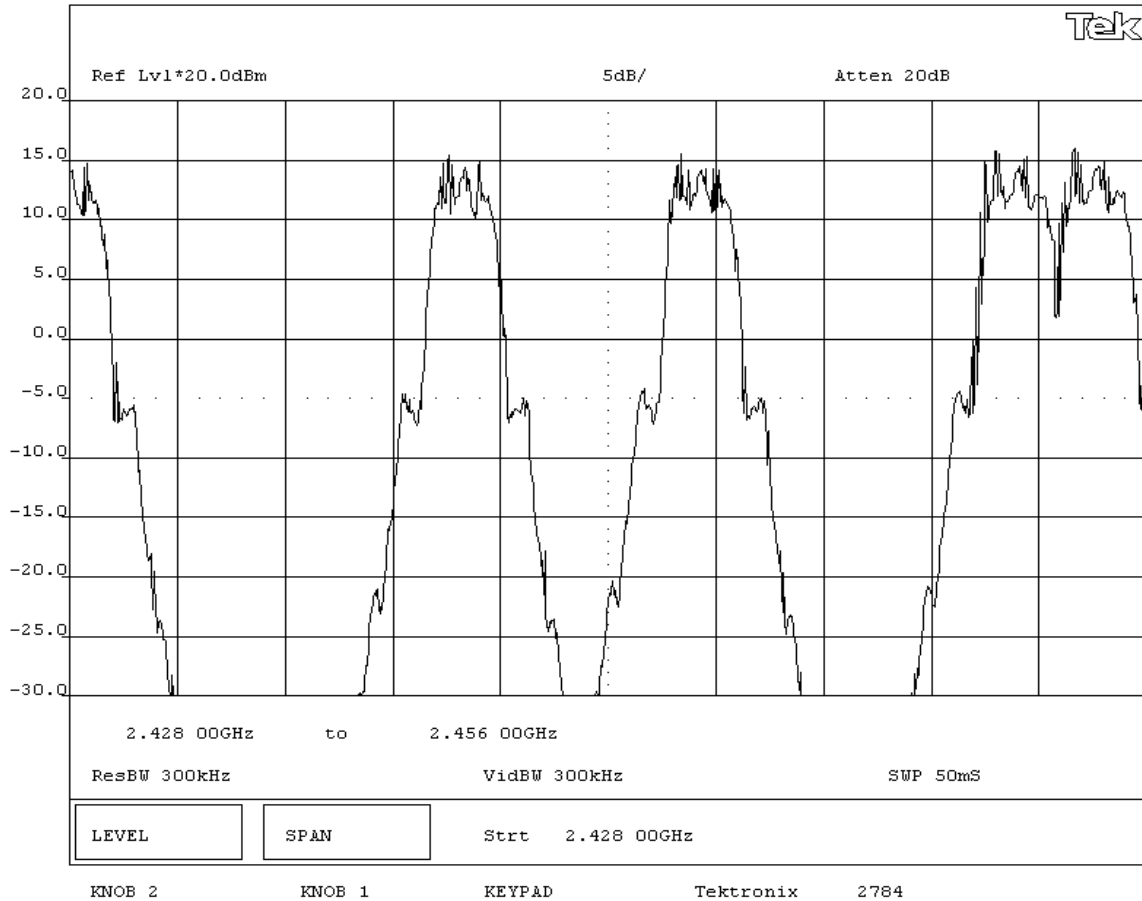
**DEVIATIONS FROM TEST STANDARD**  
None

**REQUIREMENTS**  
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

RESULTS	NUMBER OF HOPPING FREQUENCIES
Pass	15

**SIGNATURE**  
*Rod Peloquin*  
Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**Number of Hopping Frequencies - Plot 2**



NORTHWEST  
**EMC**

# NUMBER OF HOPPING FREQUENCIES

Rev BETA  
01/30/01

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(1)(i)	Year: 2005	Method: FCC DA 00-705, ANSI C63.4	Year: 2000, 2004
SAMPLE CALCULATIONS			

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

**EUT OPERATING MODES**  
Modulated at maximum data rate, at maximum output power

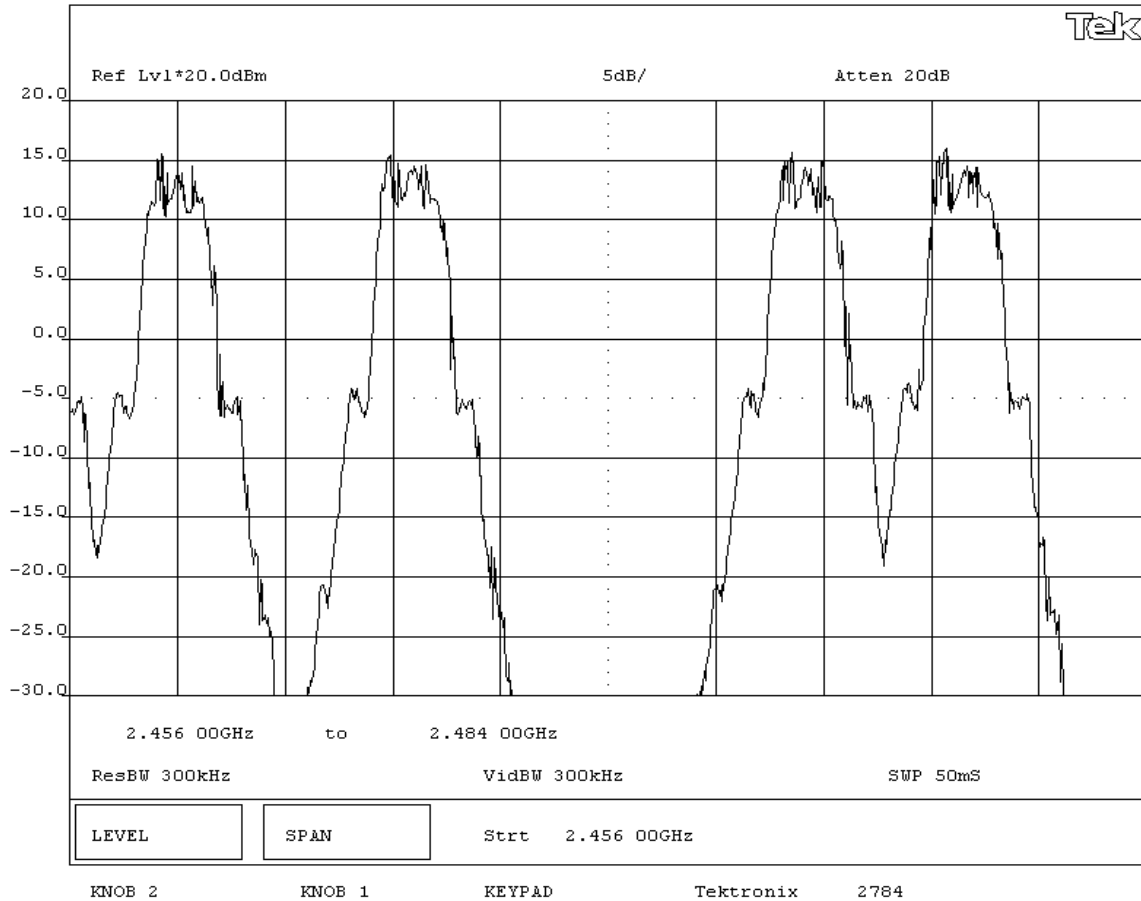
**DEVIATIONS FROM TEST STANDARD**  
None

**REQUIREMENTS**  
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

<b>RESULTS</b>	<b>NUMBER OF HOPPING FREQUENCIES</b>
Pass	15

**SIGNATURE**  
  
Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**Number of Hopping Frequencies - Plot 3**





**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

**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	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod
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

### Test Description

#### Requirement:

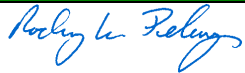
Per 47 CFR 15.247(a)(1), the hopping channel carrier frequencies must be separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

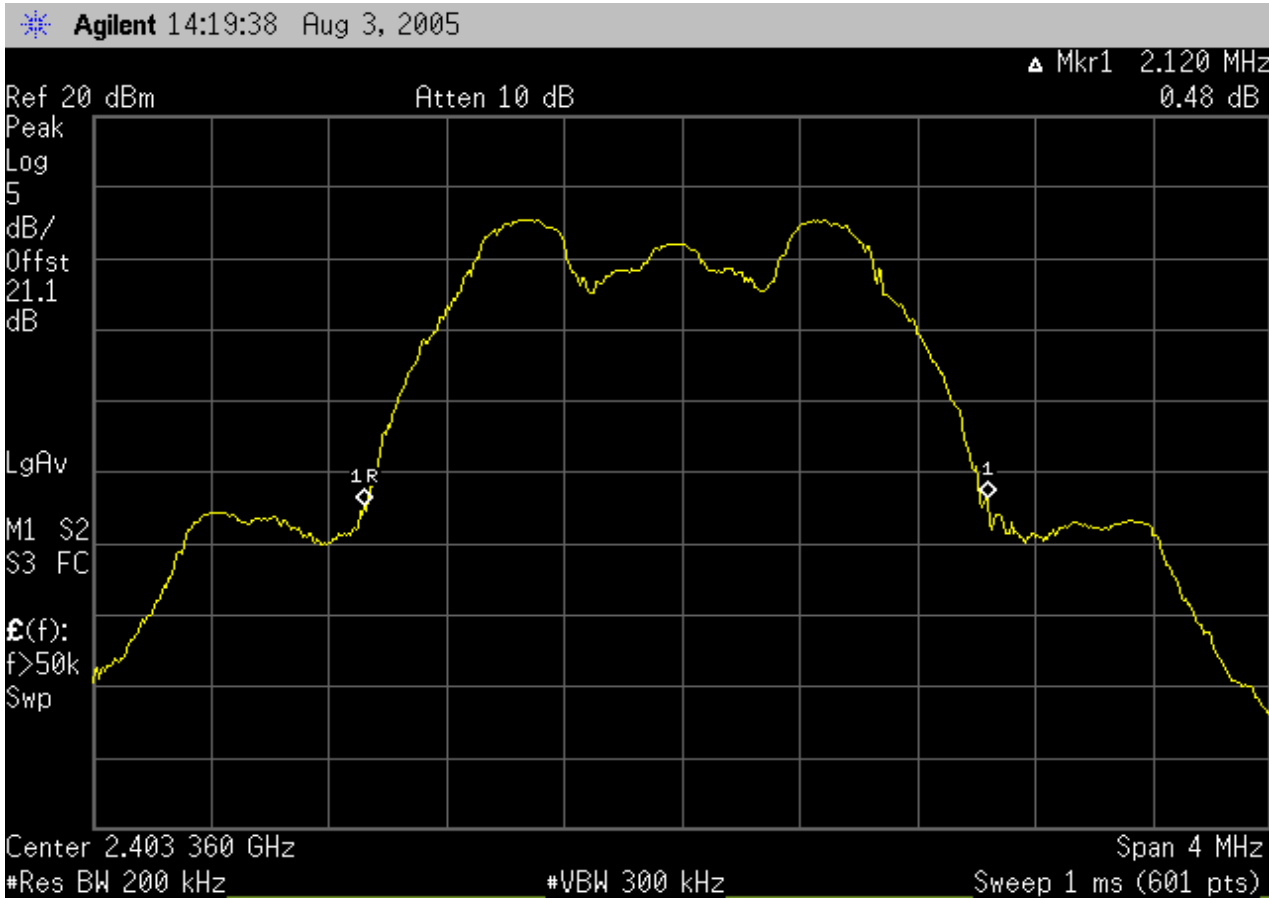
Per an FCC Interpretation sent to TCBs on October 8, 2002, frequency hoppers in the 2.4 GHz band operating under 15.247 are required to use a minimum of 15 non-overlapping channels. The hopping channel bandwidth can be wider than 1 MHz as long as the channels do not overlap and all emissions stay within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

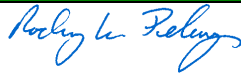
**Configuration:** The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

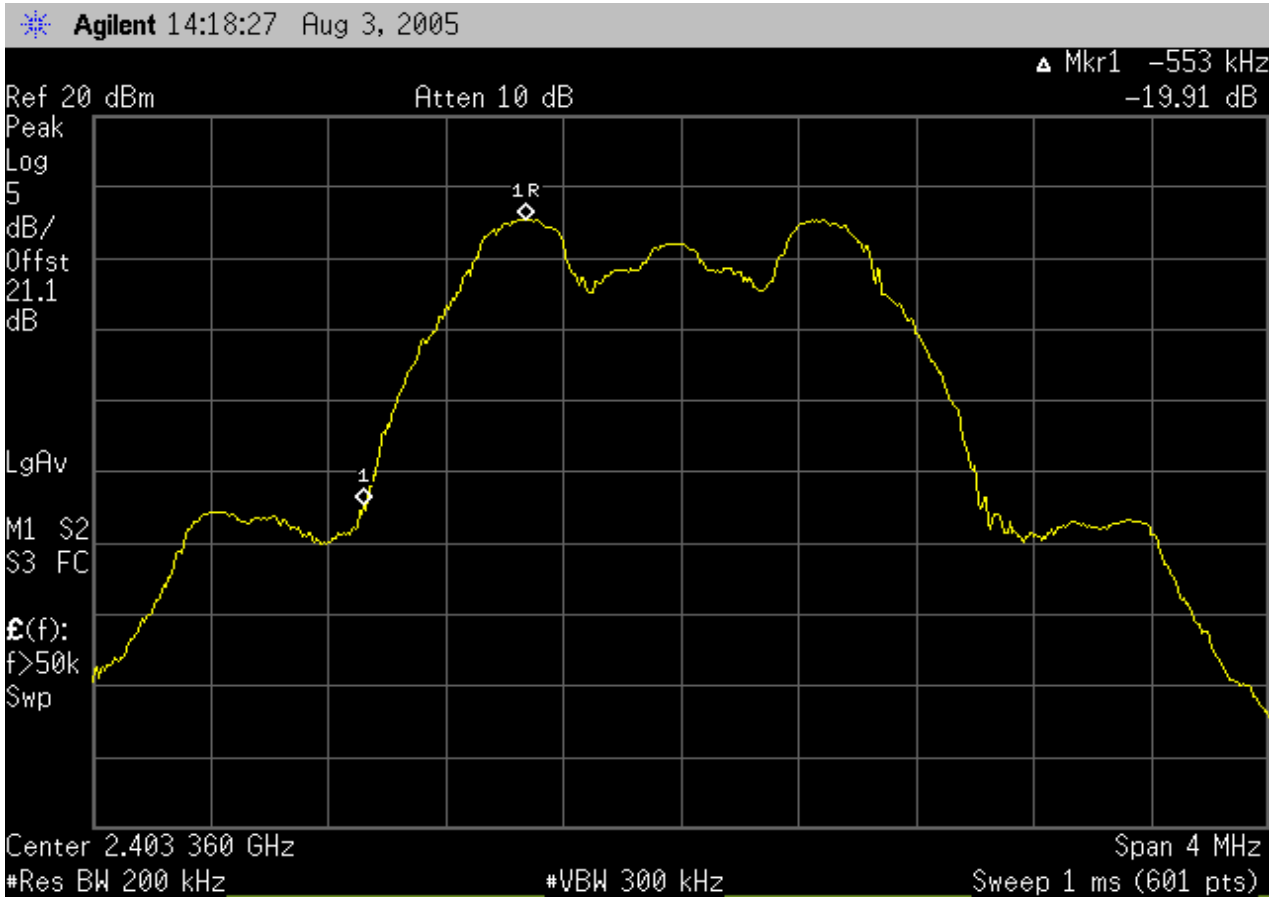
#### Completed by:



NORTHWEST EMC		OCCUPIED BANDWIDTH		Rev BETA 01/30/01	
EUT: Z-5450 MN: S-0181A Multimedia Speaker System			Work Order: LABT0140		
Serial Number: Unknown			Date: 08/03/05		
Customer: Logitech, Inc.			Temperature: 70 °F		
Attendees: None		Tested by: Rod Peloquin		Humidity: 43% RH	
Customer Ref. No.: None		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)		Year: 2005-04	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					
Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.					
RESULTS			BANDWIDTH		
Pass			2.12 MHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
20dB Bandwidth - Low Channel					



NORTHWEST EMC		OCCUPIED BANDWIDTH		Rev BETA 01/30/01	
EUT: Z-5450 MN: S-0181A Multimedia Speaker System			Work Order: LABT0140		
Serial Number: Unknown			Date: 08/03/05		
Customer: Logitech, Inc.			Temperature: 70 °F		
Attendees: None		Tested by: Rod Peloquin		Humidity: 43% RH	
Customer Ref. No.: None		Power: Battery		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)		Year: 2005-04		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					
Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.					
RESULTS			BANDWIDTH		
Pass			2.12 MHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
20dB Bandwidth - Low Channel					



**EMC** **OCCUPIED BANDWIDTH** Rev BETA 01/30/01

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

TEST SPECIFICATIONS	Specification: 47 CFR 15.247(a)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS

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

EUT OPERATING MODES  
Modulated by PRBS at maximum data rate

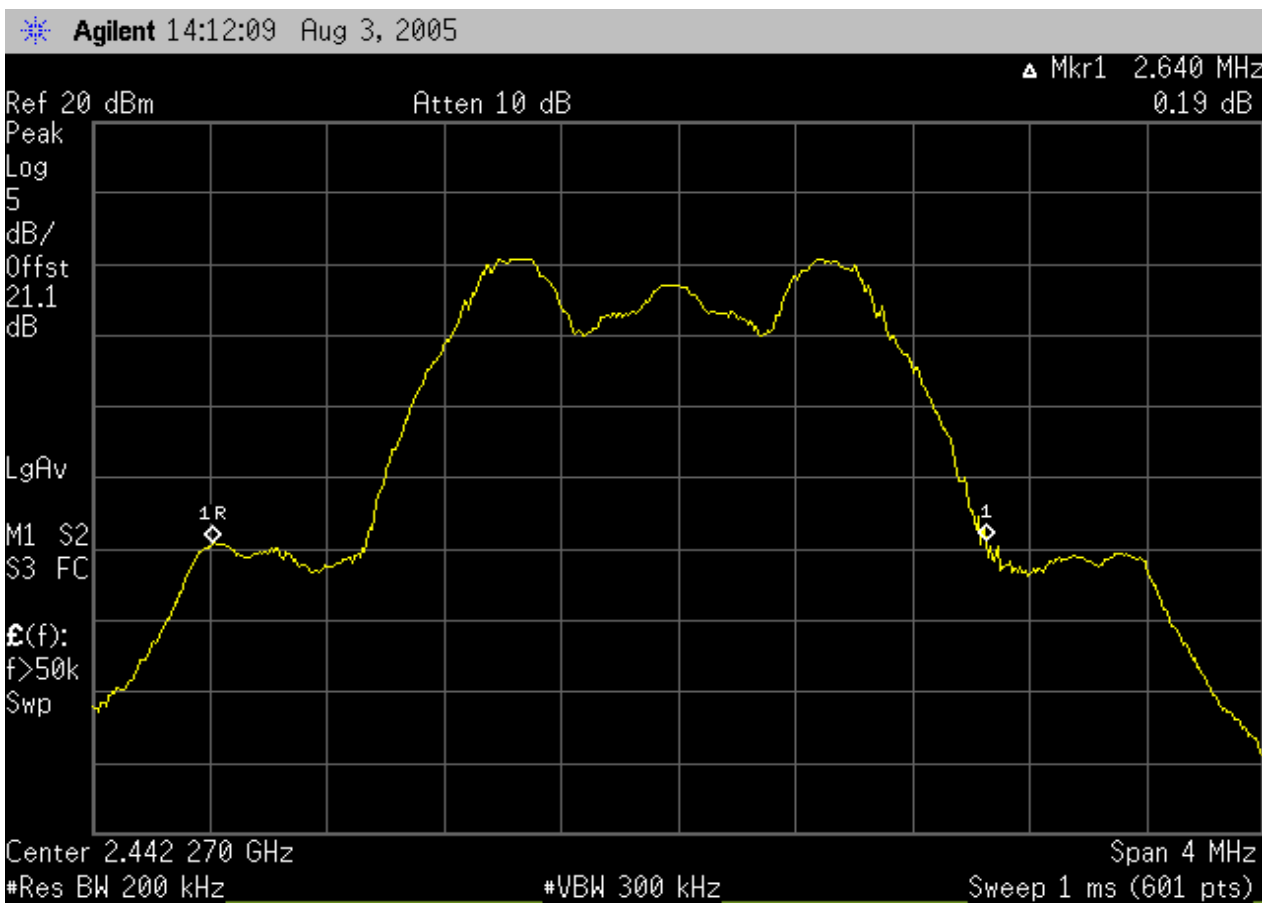
DEVIATIONS FROM TEST STANDARD  
None

REQUIREMENTS  
Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.

RESULTS	BANDWIDTH
Pass	2.64 MHz

SIGNATURE  
*Rod Peloquin*  
Tested By: \_\_\_\_\_

DESCRIPTION OF TEST  
**20dB Bandwidth - Mid Channel**





**EMC** **OCCUPIED BANDWIDTH** Rev BETA 01/30/01

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

TEST SPECIFICATIONS	Specification: 47 CFR 15.247(a)	Year: 2005-04	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

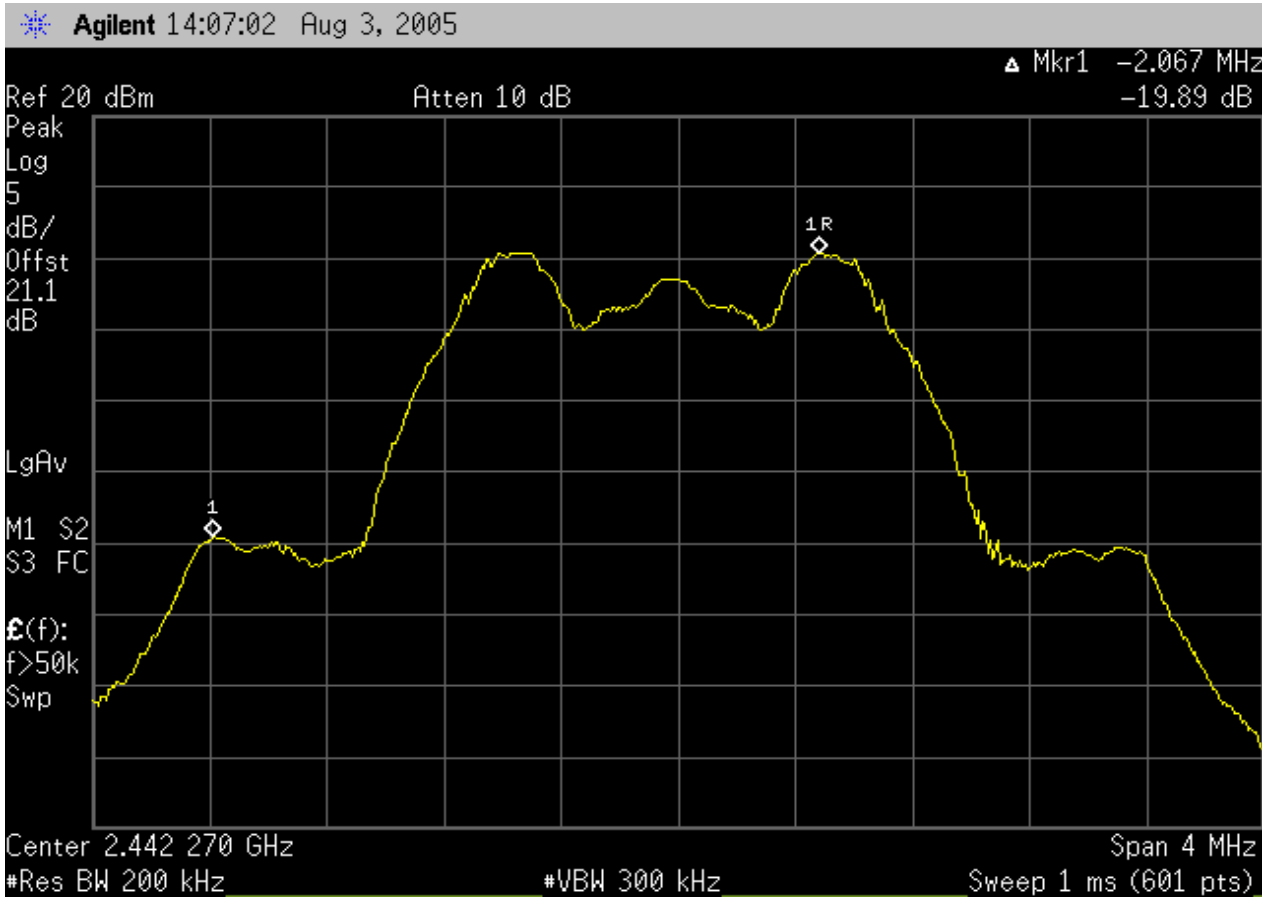
**DEVIATIONS FROM TEST STANDARD**  
 None

**REQUIREMENTS**  
 Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.

<b>RESULTS</b>	<b>BANDWIDTH</b>
Pass	2.64 MHz

**SIGNATURE**  
  
 Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**20dB Bandwidth - Mid Channel**



**EMC** **OCCUPIED BANDWIDTH** Rev BETA 01/30/01

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(a)	Year: 2005-04	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

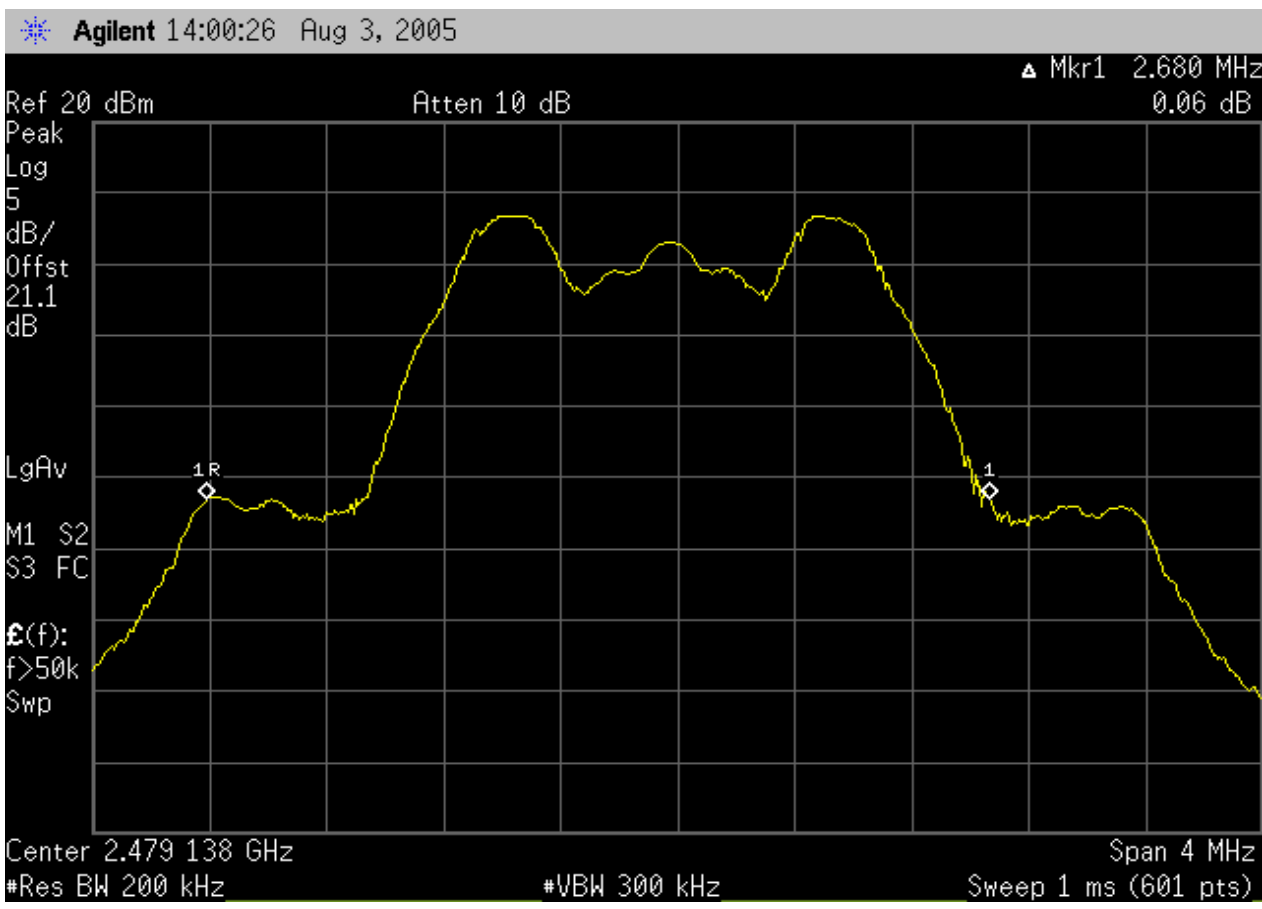
**DEVIATIONS FROM TEST STANDARD**  
None

**REQUIREMENTS**  
Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.

<b>RESULTS</b>	<b>BANDWIDTH</b>
Pass	2.68 MHz

**SIGNATURE**  
*Rod Peloquin*  
Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**20dB Bandwidth - High Channel**



**EMC** **OCCUPIED BANDWIDTH** Rev BETA 01/30/01

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: Battery	Job Site: EV06

Specification: 47 CFR 15.247(a)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003
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**SAMPLE CALCULATIONS**

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

**EUT OPERATING MODES**  
Modulated by PRBS at maximum data rate

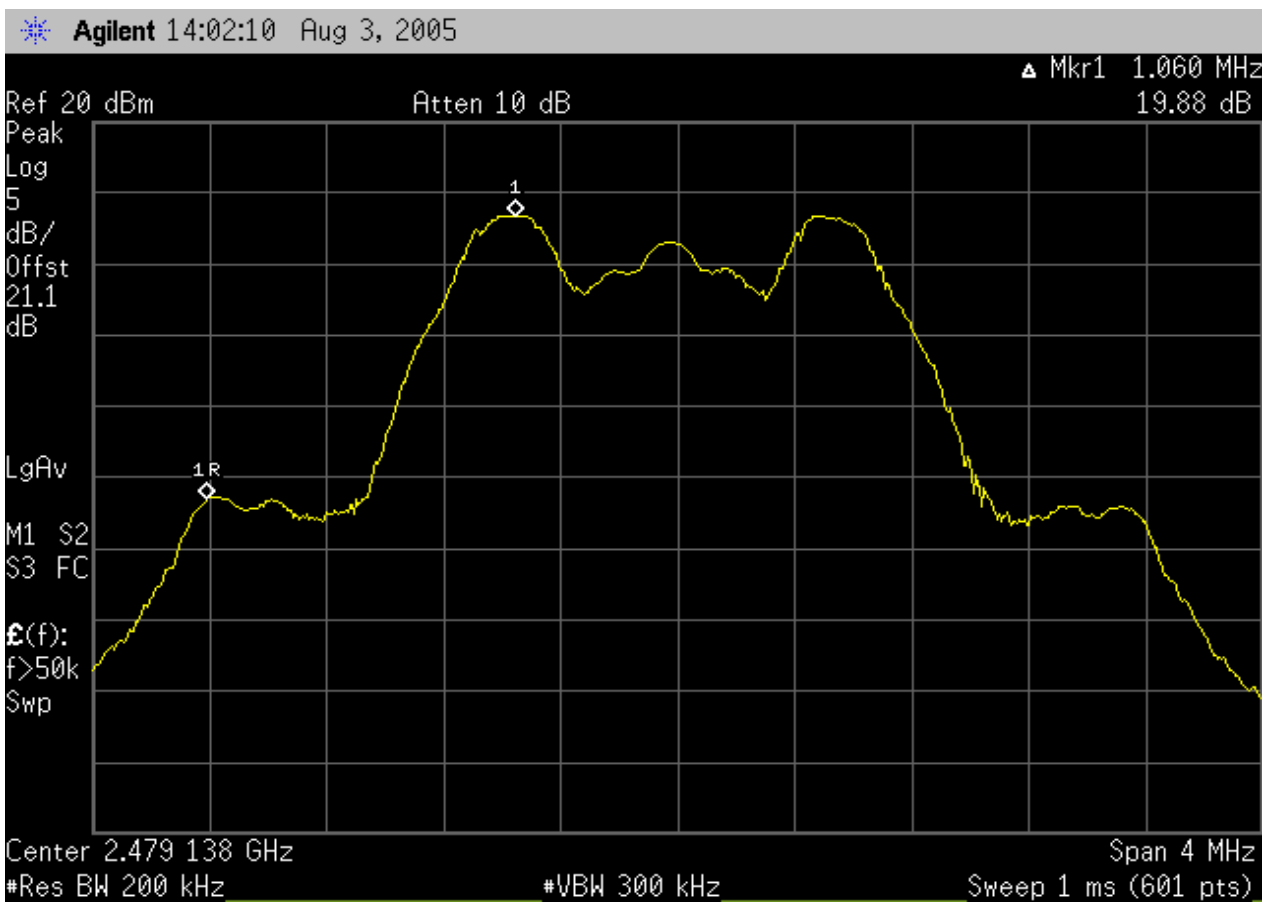
**DEVIATIONS FROM TEST STANDARD**  
None

**REQUIREMENTS**  
Frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.

RESULTS	BANDWIDTH
Pass	2.68 MHz

**SIGNATURE**  
  
 Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**20dB Bandwidth - High Channel**





**Justification**

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

**Channels in Specified Band Investigated:**

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	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod

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

Measurement Equipment					
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Power Meter	Hewlett Packard	E4418A	SPA	07/23/2004	24 mo
Power Sensor	Hewlett-Packard	8481H	SPB	07/23/2004	24 mo
Signal Generator	Hewlett Packard	8341B	TGN	02/07/2005	13 mo
Oscilloscope	Tektronix	TDS 3052	TOF	12/02/2004	13 mo
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA

### Test Description

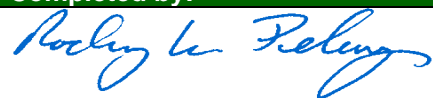
**Requirement:** Per 47 CFR 15.247(a)(1), for this application frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

**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:

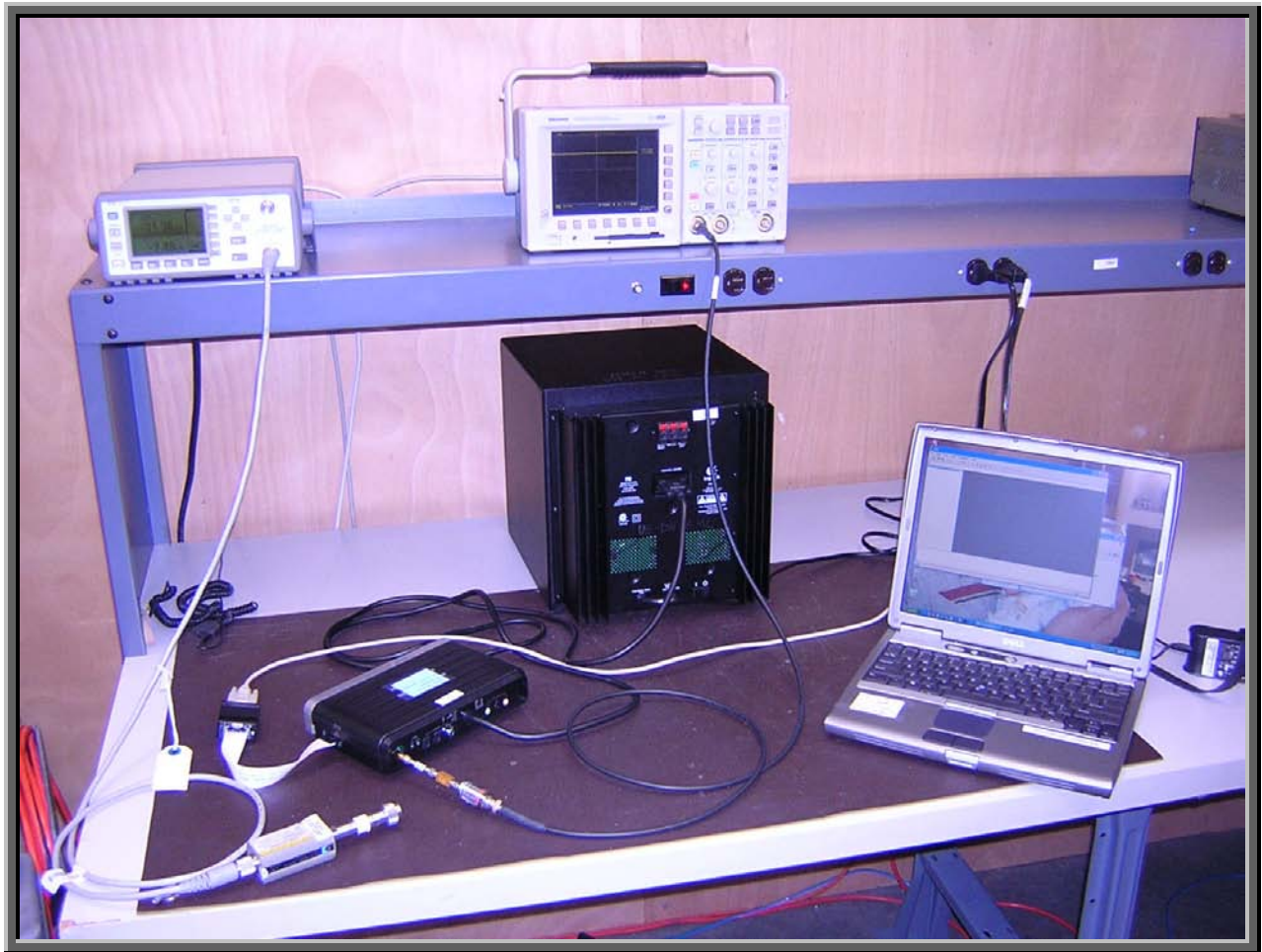


NORTHWEST

**EMC****OUTPUT POWER**Rev BETA  
01/30/01

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System		Work Order:	LABT0140			
Serial Number:	Unknown		Date:	08/05/05			
Customer:	Logitech, Inc.		Temperature:	70 °F			
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	45% RH		
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06		
<b>TEST SPECIFICATIONS</b>							
Specification:	47 CFR 15.247(b)	Year:	2005-04	Method:	DA 00-705, ANSI C63.4	Year:	2003
<b>SAMPLE CALCULATIONS</b>							
<b>COMMENTS</b>							
<b>EUT OPERATING MODES</b>							
Modulated by PRBS at maximum data rate							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
<b>REQUIREMENTS</b>							
frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.							
<b>RESULTS</b>		<b>AMPLITUDE</b>					
Pass		53.58 mW					
<b>SIGNATURE</b>							
 Tested By: _____							
<b>DESCRIPTION OF TEST</b>							
<b>Output Power</b>							

Frequency (MHz)	Peak Power Measured w/ Diode Detector (dBm)	Peak Power (mW)	Spec (mW)
2403.4	15.74	37.50	125.0
2441.0	16.37	43.35	125.0
2480.0	17.29	53.58	125.0





**Justification**

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

**Channels in Specified Band Investigated:**

High
Low

**Operating Modes Investigated:**

No Hop
--------

**Data Rates Investigated:**

Maximum
---------

**Power Input Settings Investigated:**

120 VAC/60 Hz
---------------

**Software\Firmware Applied During Test**

Exercise software	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod

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

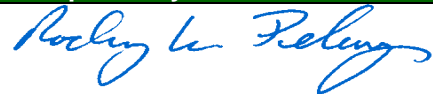
**Measurement Equipment**

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

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

**Completed by:**

NORTHWEST  
**EMC**

# BAND EDGE COMPLIANCE

Rev BETA  
01/30/01

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 70 °F
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	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

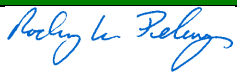
**REQUIREMENTS**

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

**RESULTS** AMPLITUDE

Pass -54.4 dB

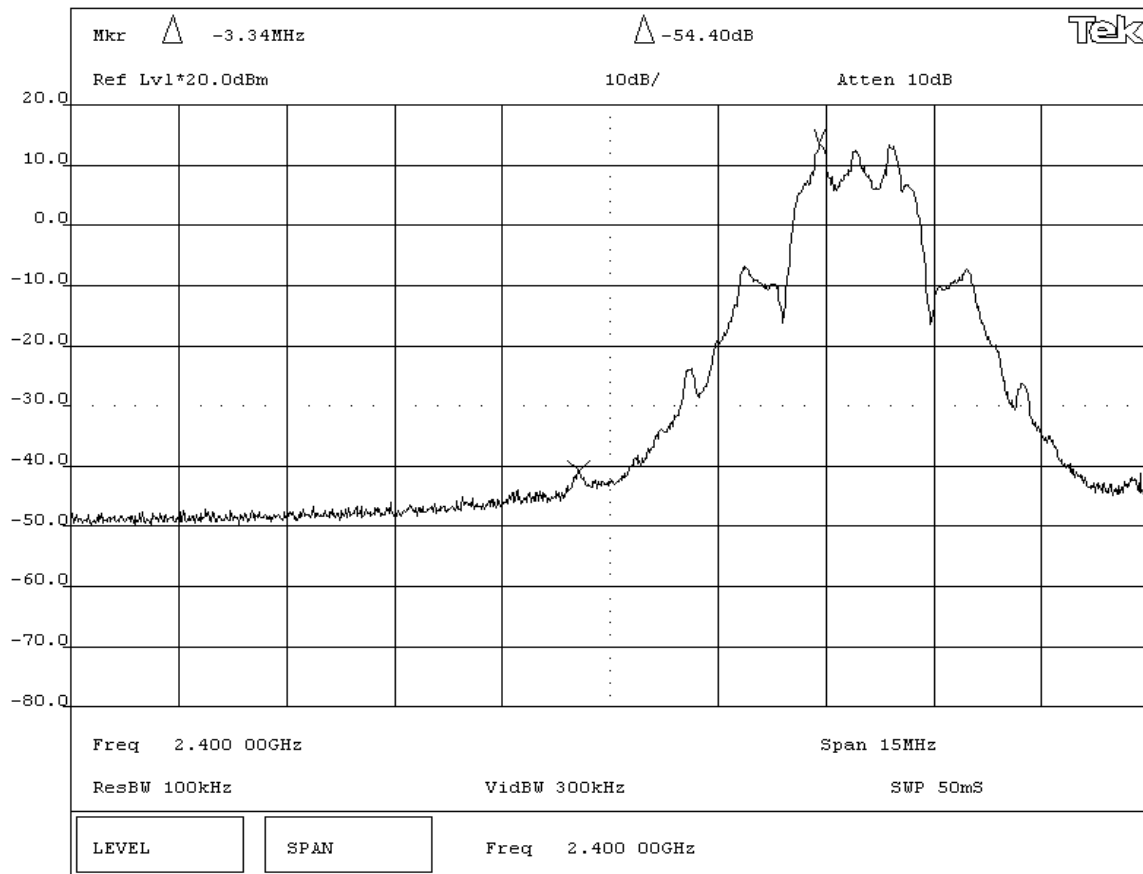
**SIGNATURE**



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

**DESCRIPTION OF TEST**

## Band Edge Compliance - Low Channel




Knob 2

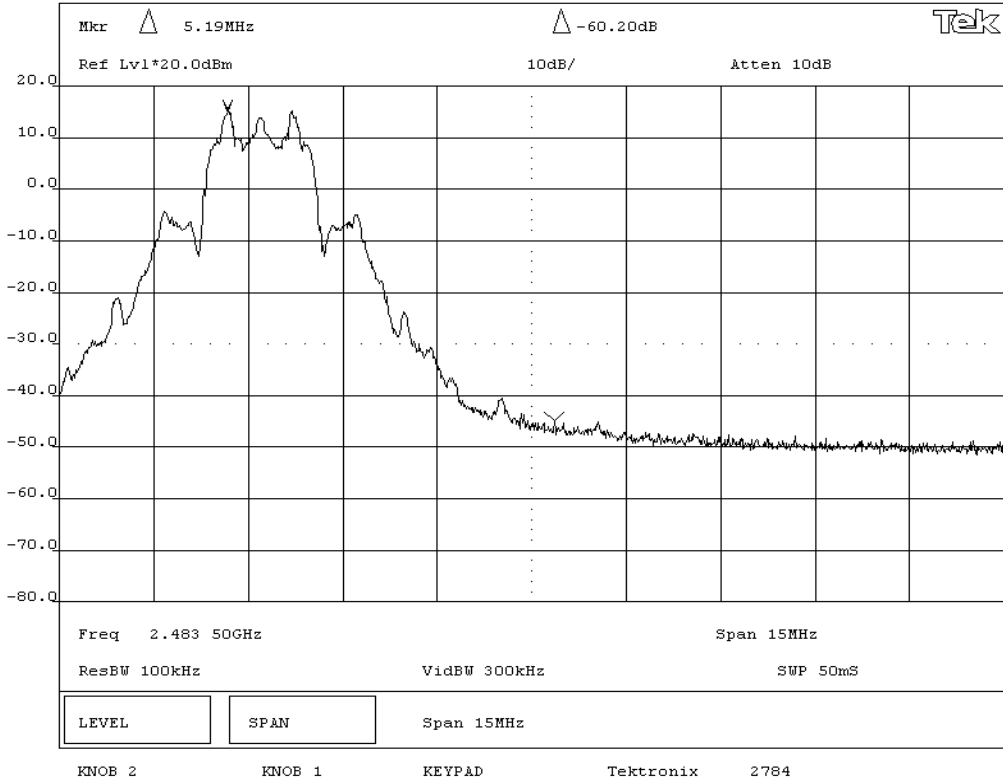
Knob 1

Keypad

Tektronix

2784

NORTHWEST		<b>BAND EDGE COMPLIANCE</b>		Rev BETA 01/20/01
EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140		
Serial Number: Unknown		Date: 08/03/05		
Customer: Logitech, Inc.		Temperature: 70 °F		
Attendees: None	Tested by: Rod Peloquin	Humidity: 43% RH		
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06		
<b>TEST SPECIFICATIONS</b>				
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003	
<b>SAMPLE CALCULATIONS</b>				
<b>COMMENTS</b>				
<b>EUT OPERATING MODES</b>				
Modulated by PRBS at maximum data rate				
<b>DEVIATIONS FROM TEST STANDARD</b>				
None				
<b>REQUIREMENTS</b>				
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental				
<b>RESULTS</b>				
		AMPLITUDE		
Pass		-60.2 dB		
<b>SIGNATURE</b>				
 Tested By: _____				
<b>DESCRIPTION OF TEST</b>				
<b>Band Edge Compliance - High Channel</b>				





**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	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
XPD Module	Logitech, Inc.	Unknown	Unknown

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Serial	Yes	1.5	No	Notebook PC	XPD Module
Ribbon	No	0.2	No	XPD Module	Control Pod

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

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

**Completed by:**


# EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>

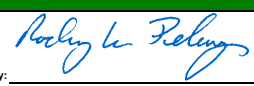
<b>COMMENTS</b>

<b>EUT OPERATING MODES</b>
Modulated by PRBS at maximum data rate

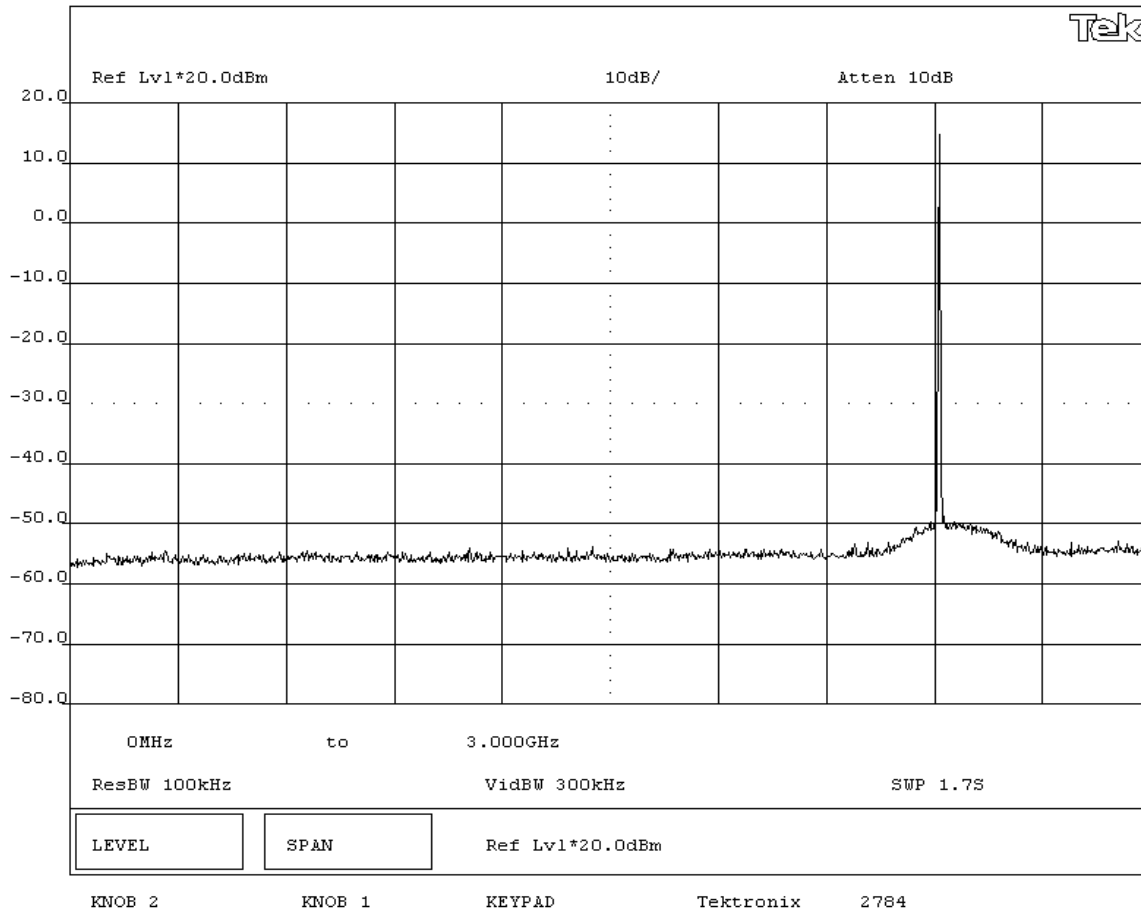
<b>DEVIATIONS FROM TEST STANDARD</b>
None

<b>REQUIREMENTS</b>
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

<b>RESULTS</b>
Pass

<b>SIGNATURE</b>

Tested By: _____

<b>DESCRIPTION OF TEST</b>
<b>Antenna Conducted Spurious Emissions - Low Channel 0MHz-3GHz</b>





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

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	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**

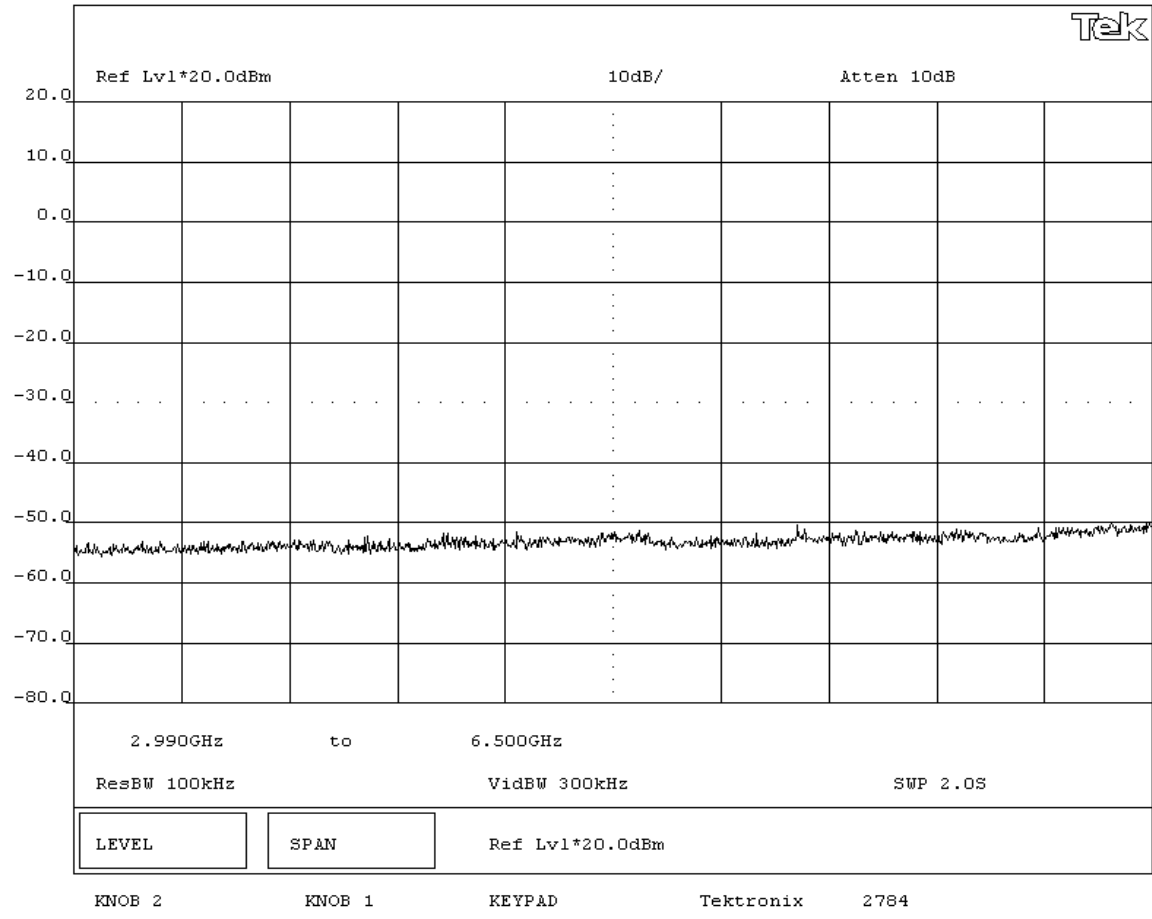
Pass

**SIGNATURE**

Tested By: *Rod Peloquin*

**DESCRIPTION OF TEST**

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



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

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**  
Modulated by PRBS at maximum data rate

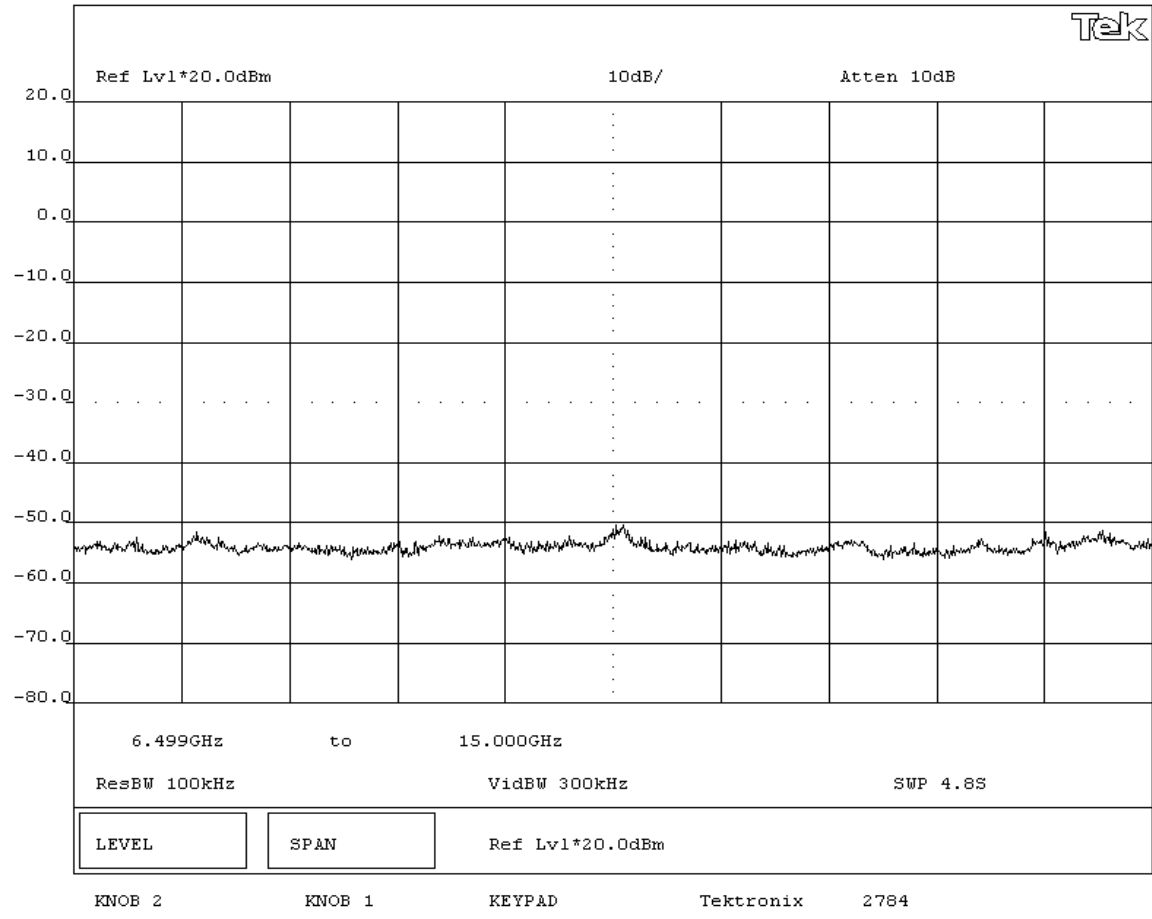
**DEVIATIONS FROM TEST STANDARD**  
None

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

**RESULTS**  
Pass

**SIGNATURE**  
*Rodney W. Peloquin*  
Tested By: \_\_\_\_\_

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



# EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate			

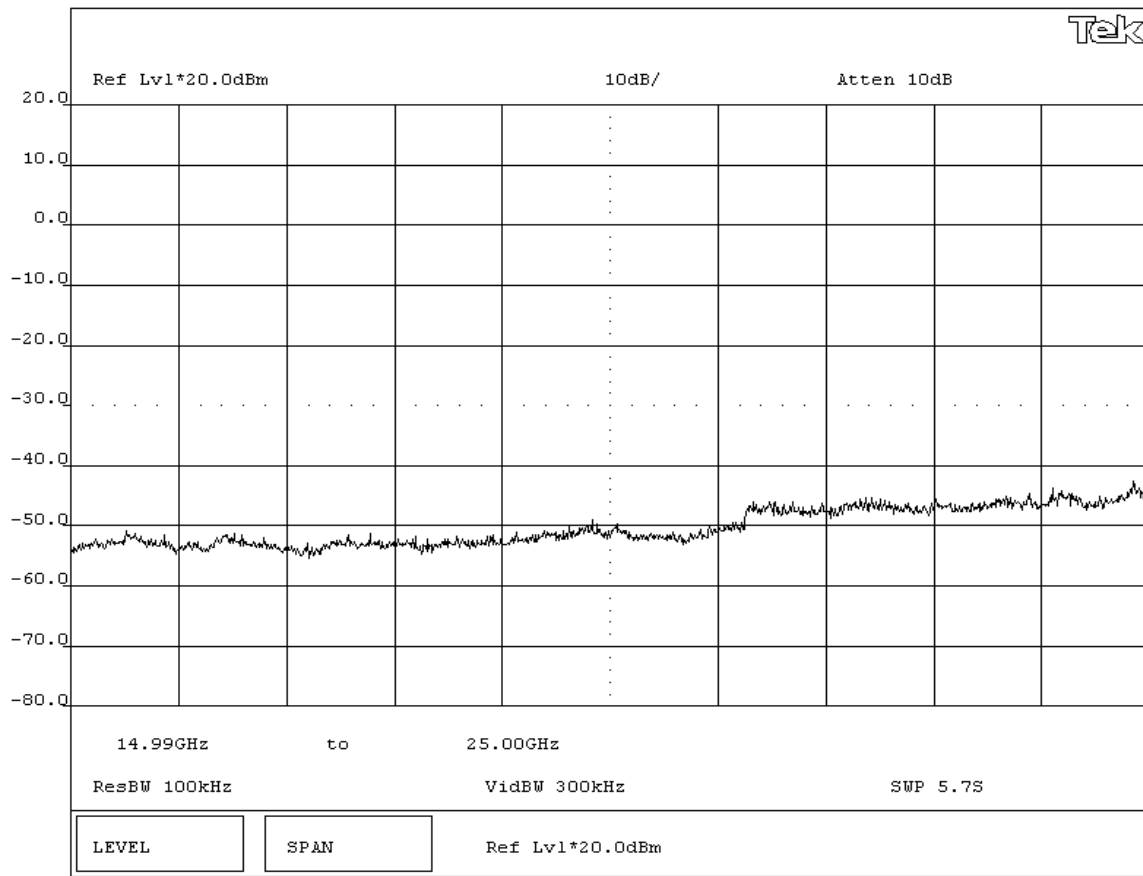
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Antenna Conducted Spurious Emissions - Low Channel 15GHz - 25GHz</b>			



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

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**  
Modulated by PRBS at maximum data rate

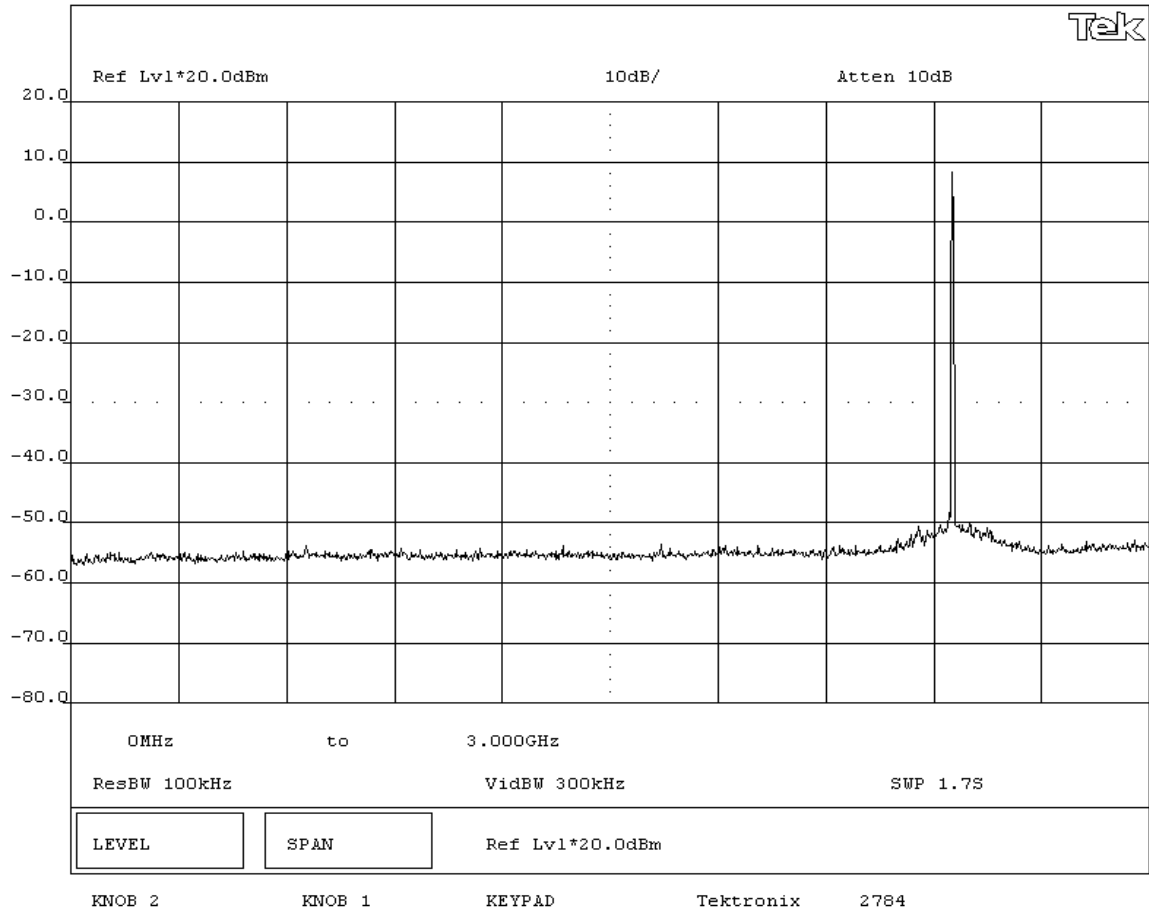
**DEVIATIONS FROM TEST STANDARD**  
None

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

**RESULTS**  
Pass

**SIGNATURE**  
*Rod Peloquin*  
Tested By: \_\_\_\_\_

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



# EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate			

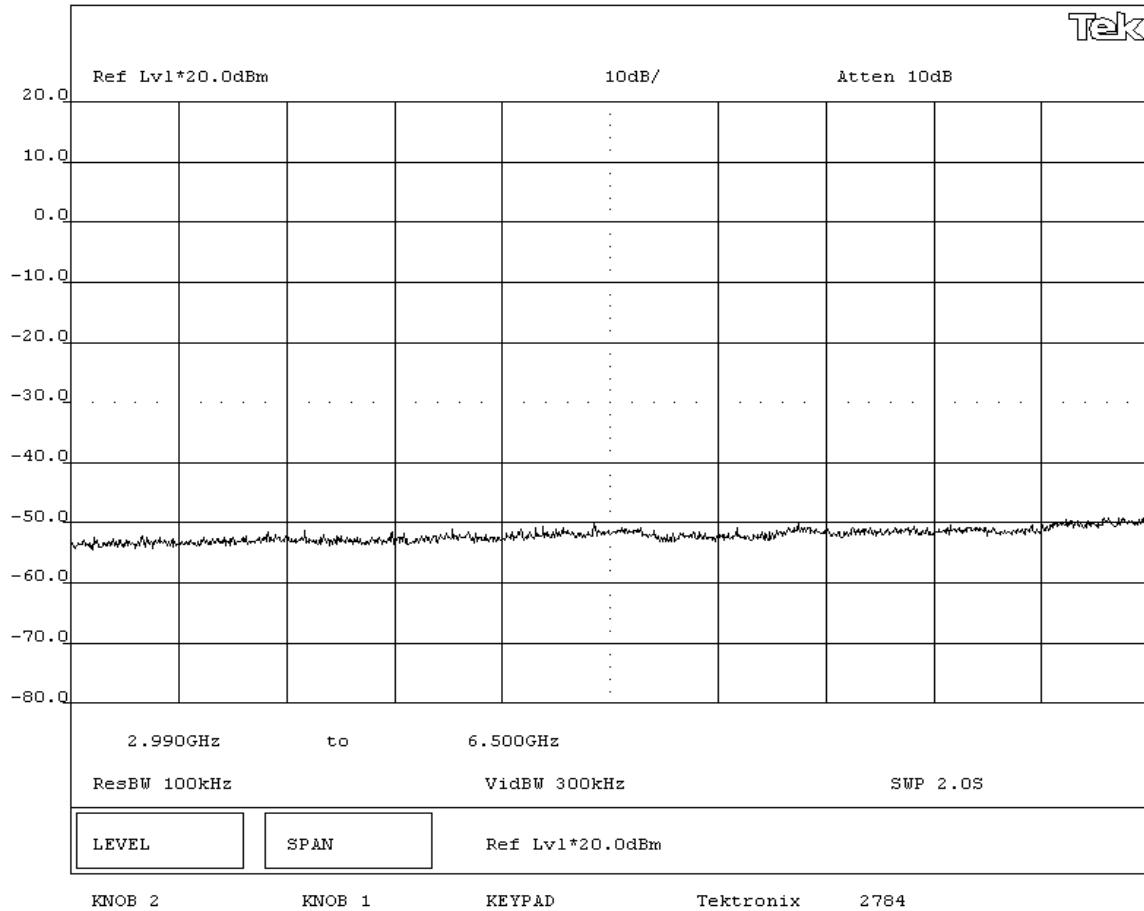
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
			
Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Antenna Conducted Spurious Emissions - Mid Channel 3GHz-6.5GHz</b>			



EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate			

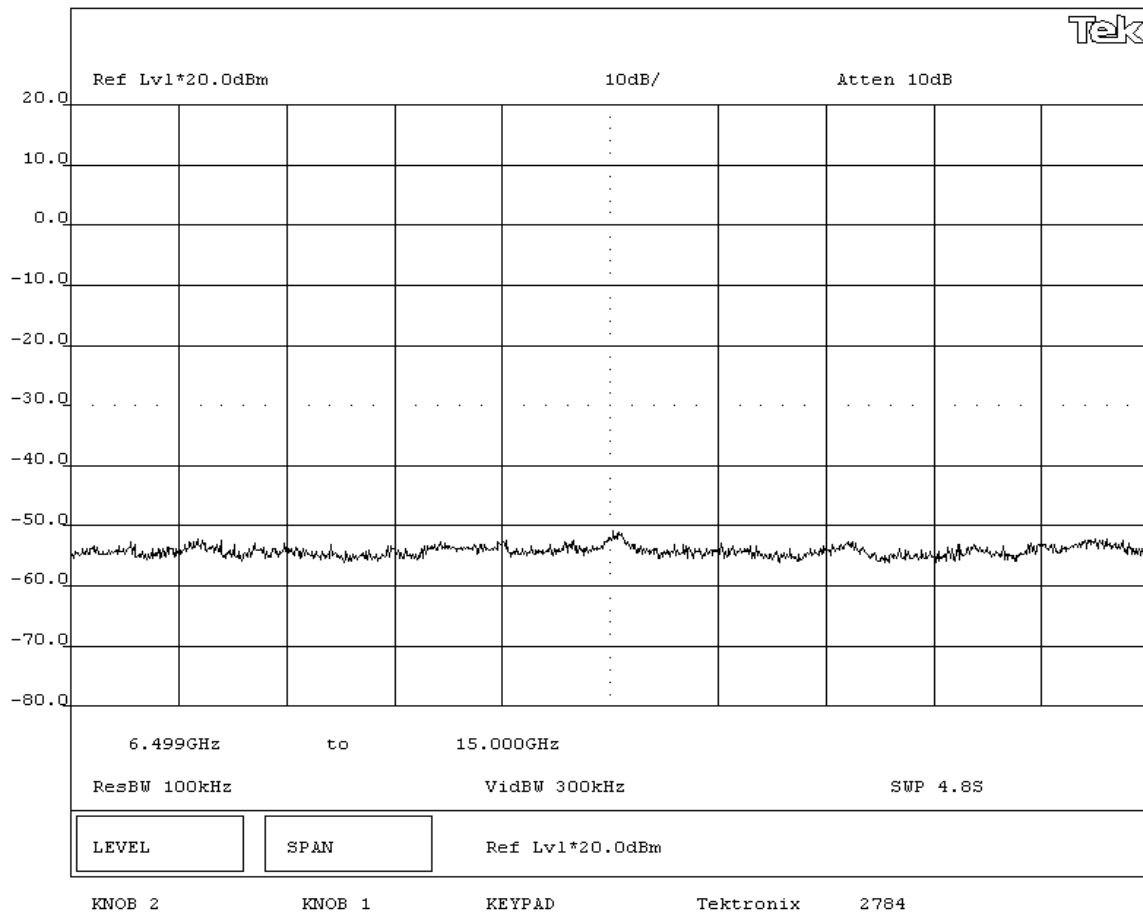
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Antenna Conducted Spurious Emissions - Mid Channel 6.5GHz-15GHz</b>			



# EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate			

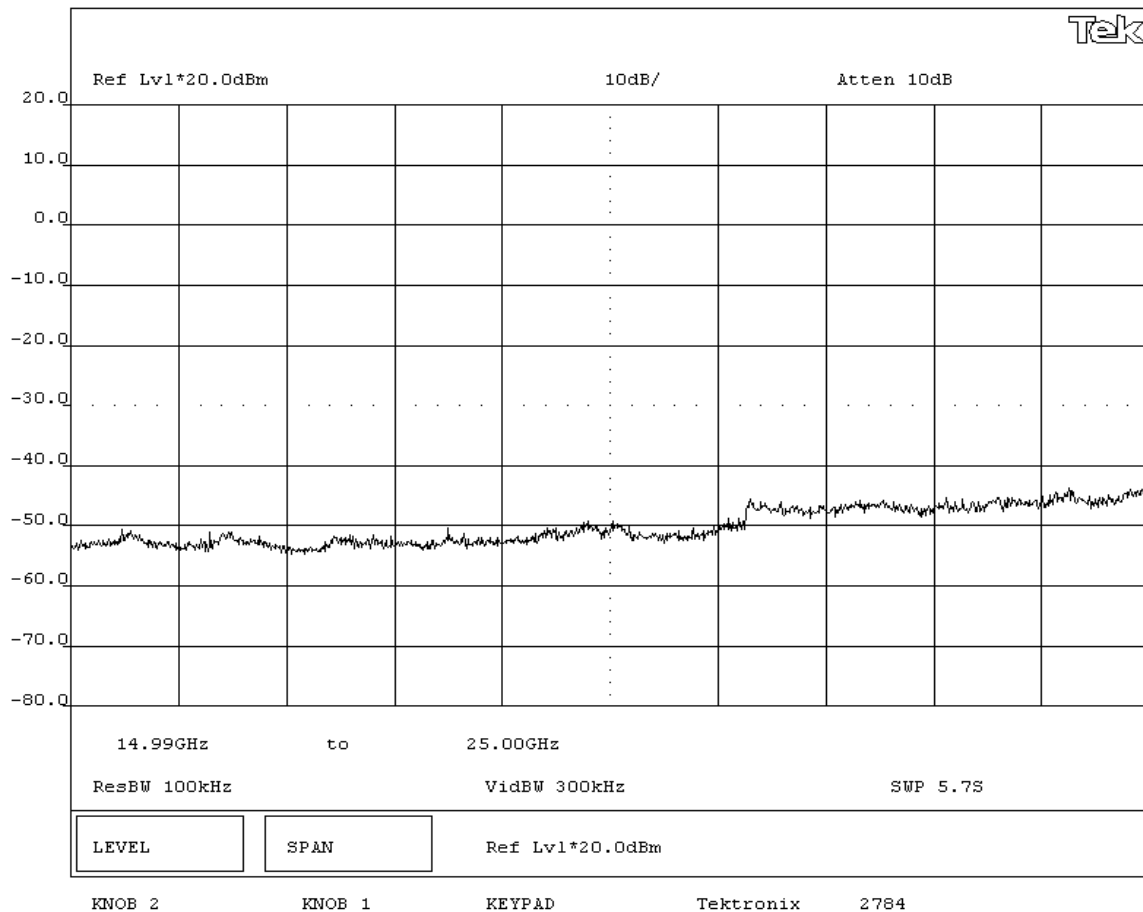
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
			
Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Antenna Conducted Spurious Emissions - Mid Channel 15GHz-25GHz</b>			



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

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003
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**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**  
Modulated by PRBS at maximum data rate

**DEVIATIONS FROM TEST STANDARD**  
None

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

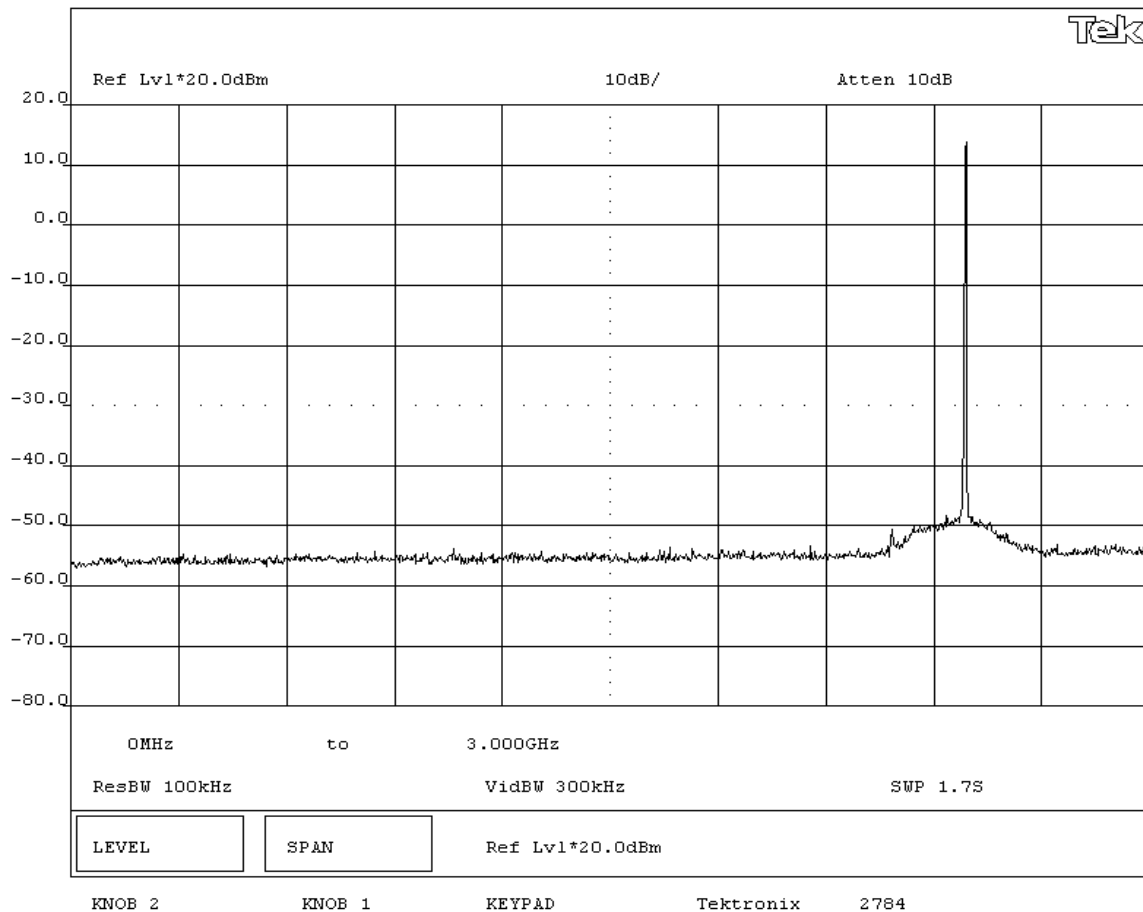
**RESULTS**  
Pass

**SIGNATURE**

*Rod Peloquin*

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

**DESCRIPTION OF TEST**  
**Antenna Conducted Spurious Emissions - High Channel 0MHz-3GHz**





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

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	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

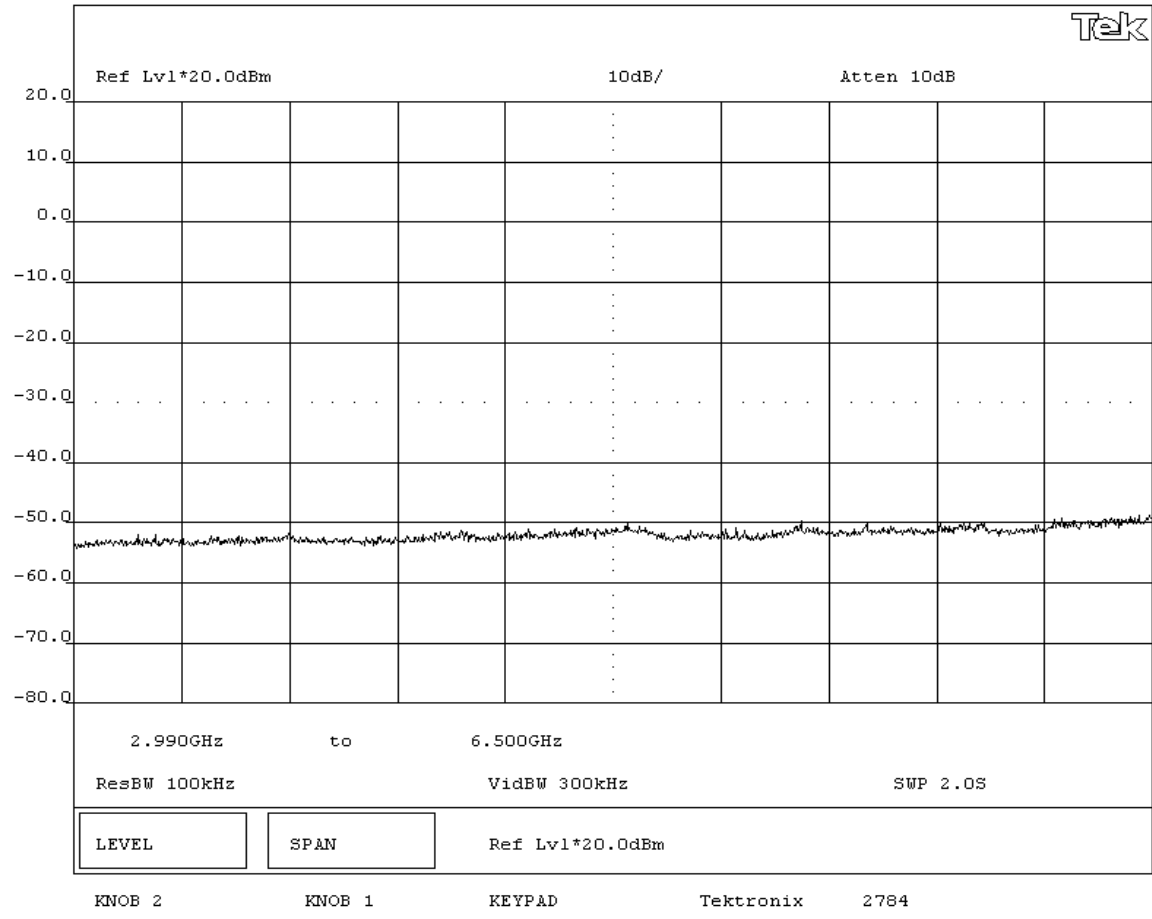
**REQUIREMENTS**  
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

**RESULTS**  
Pass

**SIGNATURE**

Tested By: *Rod Peloquin*

**DESCRIPTION OF TEST**  
**Antenna Conducted Spurious Emissions - High Channel 3GHz-6.5GHz**



# EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate			

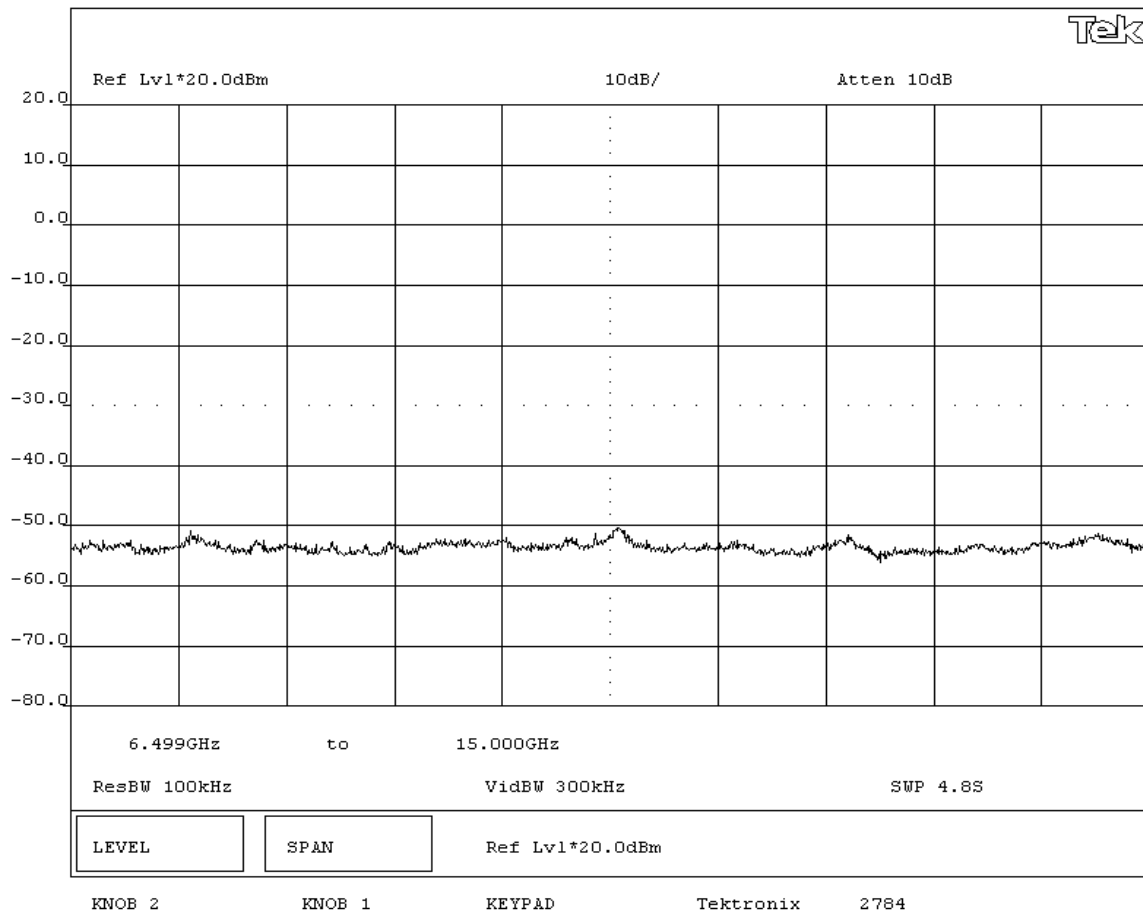
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Antenna Conducted Spurious Emissions - High Channel 6.5GHz-15GHz</b>			



# EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/03/05
Customer: Logitech, Inc.		Temperature: 72°F
Attendees: None	Tested by: Rod Peloquin	Humidity: 45% RH
Customer Ref. No.: None	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate			

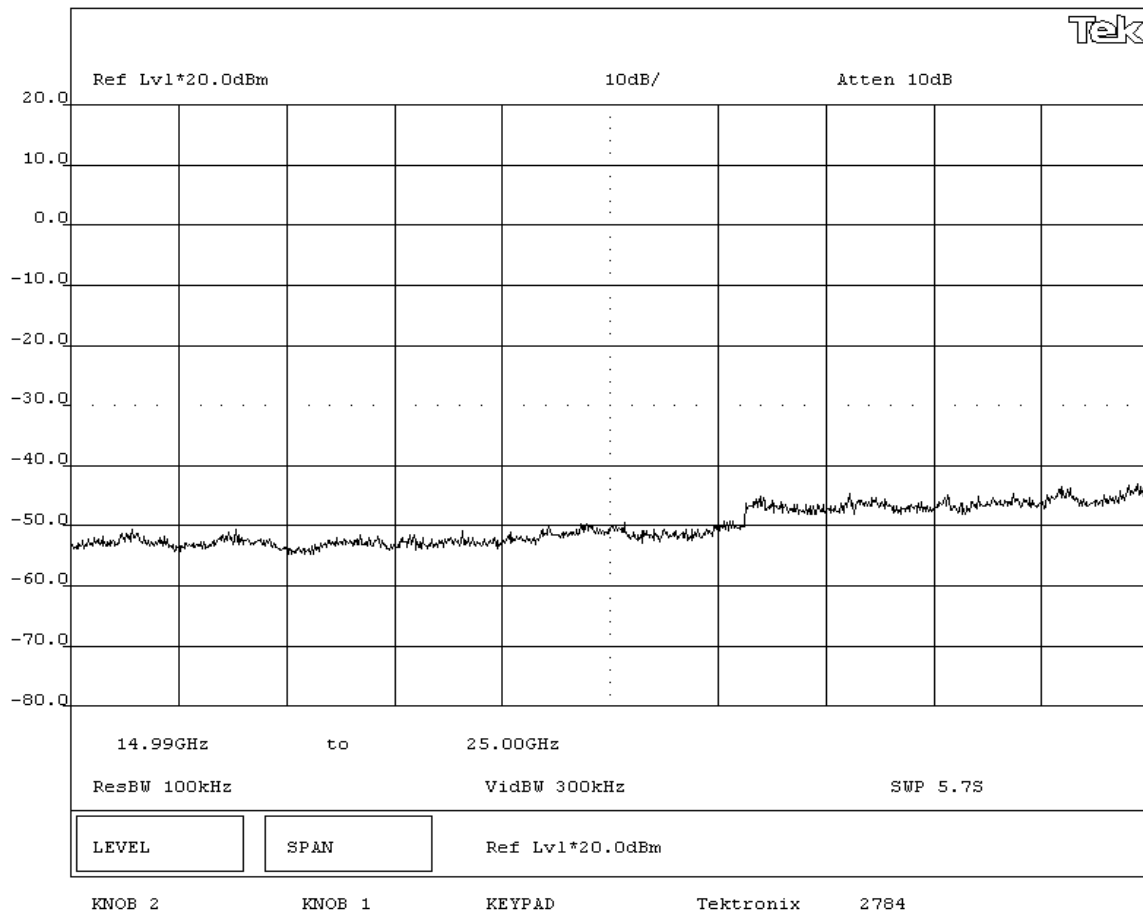
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Antenna Conducted Spurious Emissions - High Channel 15GHz-25GHz</b>			





**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. All of the EUT parameters listed below were investigated. This includes, but may not be limited to, CPU speeds, video resolution settings, operational modes, and input voltages.

**Operating Modes Investigated:**

Playing audio from DVD player
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**Operating Mode used for Final Test:**

Playing audio from DVD player
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**Power Input Settings Investigated:**

120 VAC, 60 Hz on US unit, M/N: S-0118A
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230 VAC, 50 Hz on EU unit, M/N: S-0118A
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230 VAC, 50 Hz on wired EU unit, M/N: S-0118B
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**Input Power Setting used for Final Test:**

120 VAC, 60 Hz on US unit, M/N: S-0118A
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**Units Investigated:**

S-0118A
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S-0118B
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**Unit used for Final Test:**

S-0118A
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**Frequency Range Investigated**

<b>Start Frequency</b>	30 MHz	<b>Stop Frequency</b>	1 GHz
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**Software\Firmware Applied During Test**

<b>Operating system</b>	N/A	<b>Version</b>	N/A
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<b>Exercise software</b>	Standard Production Firmware	<b>Version</b>	Z6DW a0.3.3.1.2.6
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**Description**

The system was tested using standard operating production software to exercise the functions of the device during the testing.
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**EUT and Peripherals in Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Left front speaker	Logitech, Inc.	S-0181A	Unknown
Right front speaker	Logitech, Inc.	S-0181A	Unknown
Center front speaker	Logitech, Inc.	S-0181A	Unknown
Right rear speaker	Logitech, Inc.	S-0181A	Unknown
Left rear speaker	Logitech, Inc.	S-0181A	Unknown
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
DVD Player	Pioneer	DV-578A-S	DDTE 003395 CC

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Audio	No	1.5	No	Subwoofer	Right front speaker
Audio	No	1.4	No	Subwoofer	Center front speaker
Audio	No	1.8	No	Subwoofer	Left front speaker
AC Power	No	1.4	No	Subwoofer	AC Mains
AC Power	No	1.4	No	Left rear speaker	AC Mains
AC Power	No	1.4	No	Right rear speaker	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Audio (x3)	No	1.4	No	Control Pod	DVD Player
Fiber optic	No	1.2	No	Control Pod	DVD Player
Coax	Yes	1.2	No	Control Pod	DVD Player
AC Power	No	1.4	No	DVD Player	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
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/02/2004	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
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	03/01/2005	13 mo

## Test Description

The final radiated emissions test was performed using the parameters described above as worst case. That final test was conducted at a facility that meets the ANSI C63.4 NSA requirements. The frequency range noted in the data sheets was scanned/tested at that facility. Emissions were maximized as specified, by maximizing table azimuth, antenna height, and cable manipulation.

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

*Note: The specified distance is the horizontal separation between the closest periphery of the EUT and the center of the axis of the elements of the receiving antenna. However, if the receiving antenna is a log-periodic array, the specified distance shall be the distance between the closest periphery of the EUT and the front-to-back center of the array of elements.*

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 1 meter, 3 meters, 5 meters, 10 meters, or 30 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

Measurement Bandwidths			
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:



EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 7/15/2005, 7/19/2005
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 43%
Cust. Ref. No.: None		Barometric Pressure: 30.18
Tested by: Holly Ashkannejhad, Jennifer Herrett	Power: 120 V, 60 Hz	Job Site: EV01, TE03

<b>TEST SPECIFICATIONS</b>		
Specification: FCC 15.109(g) (CISPR 22:1997) Class B:2005-04 003 Class B:2004	ICES:	Method: ANSI C63.4:2003 CAN/CSA-CE/IEC CISPR 22:2002

**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**  
 DVD player, system fully configured, playing DVD audio, speakers powered on. Coax input to speakers, digital surround mode.

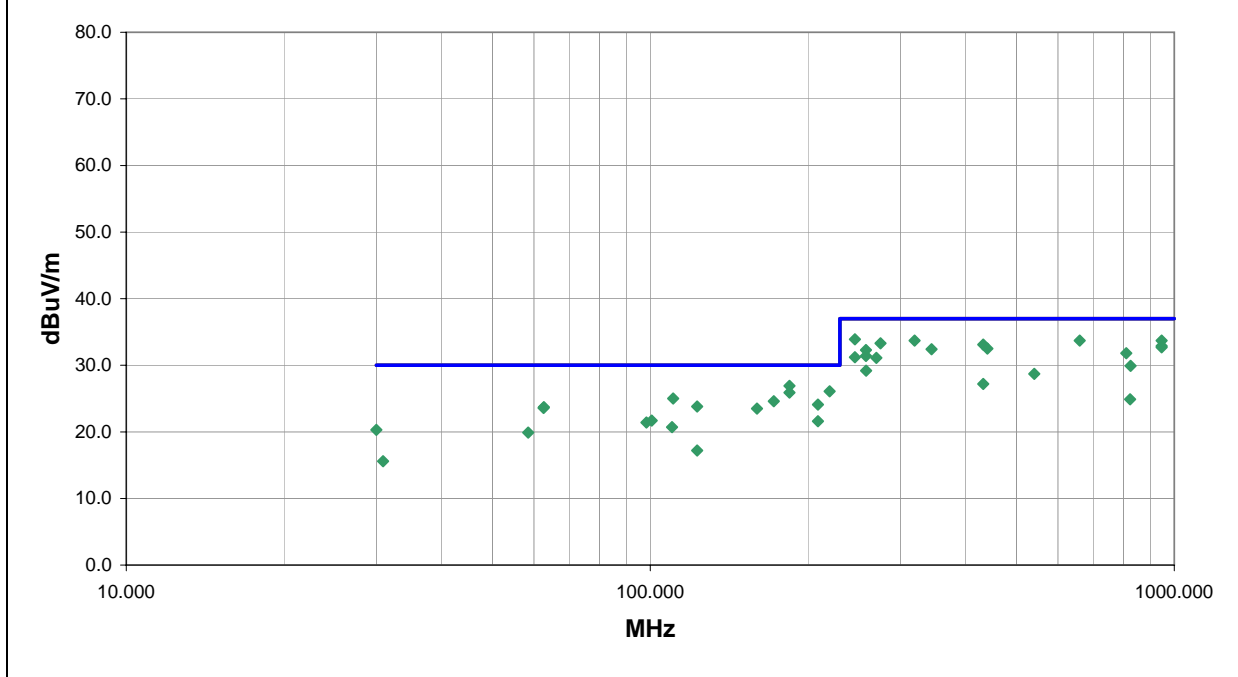
**EUT OPERATING MODES**  
 Playing audio from DVD player.

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Run #
Pass	1

**Other**

  
 Approved 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)
54.162	30.1	-0.3	278.0	2.5	10.0	0.0	V-Bicon	QP	0.0	29.8	30.0	-0.2
809.670	36.8	-0.7	294.0	1.0	5.0	0.0	V-Bilog	QP	0.0	36.1	37.0	-0.9
135.157	27.8	0.5	54.0	1.2	10.0	0.0	V-Bicon	QP	0.0	28.3	30.0	-1.7
159.734	24.0	4.3	18.0	1.0	10.0	0.0	V-Bicon	QP	0.0	28.3	30.0	-1.7
135.202	43.8	-15.7	39.0	3.5	5.0	0.0	H-Bilog	QP	0.0	28.1	30.0	-1.9
220.020	39.5	-11.5	305.0	1.0	5.0	0.0	V-Bilog	QP	0.0	28.0	30.0	-2.0
147.490	43.0	-15.1	116.0	3.3	5.0	0.0	H-Bilog	QP	0.0	27.9	30.0	-2.1
540.706	37.8	-3.0	154.0	1.1	5.0	0.0	H-Bilog	QP	0.0	34.8	37.0	-2.2
294.949	44.6	-9.9	35.0	2.4	5.0	0.0	V-Bilog	QP	0.0	34.7	37.0	-2.3
172.023	23.0	4.2	173.0	1.0	10.0	0.0	V-Bicon	QP	0.0	27.2	30.0	-2.8
439.987	39.8	-5.8	353.0	2.3	5.0	0.0	V-Bilog	QP	0.0	34.0	37.0	-3.0
245.792	44.1	-10.2	112.0	1.9	5.0	0.0	H-Bilog	QP	0.0	33.9	37.0	-3.1
184.353	39.3	-12.4	106.0	2.6	5.0	0.0	H-Bilog	QP	0.0	26.9	30.0	-3.1
946.155	23.1	10.6	7.0	3.0	10.0	0.0	V-LPA	QP	0.0	33.7	37.0	-3.3
319.523	42.4	-8.7	242.0	1.9	5.0	0.0	V-Bilog	QP	0.0	33.7	37.0	-3.3
660.003	35.8	-2.1	50.0	2.0	5.0	0.0	H-Bilog	QP	0.0	33.7	37.0	-3.3
275.020	42.7	-9.4	18.0	1.0	5.0	0.0	V-Bilog	QP	0.0	33.3	37.0	-3.7
432.032	38.7	-5.6	145.0	1.9	5.0	0.0	V-Bilog	QP	0.0	33.1	37.0	-3.9
219.988	33.2	-7.1	24.0	1.2	10.0	0.0	V-LPA	QP	0.0	26.1	30.0	-3.9
184.347	38.3	-12.4	89.0	1.0	5.0	0.0	V-Bilog	QP	0.0	25.9	30.0	-4.1



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)
946.152	22.3	10.6	268.0	3.8	10.0	0.0	H-LPA	QP	0.0	32.9	37.0	-4.1
946.201	32.8	-0.1	190.0	1.2	5.0	0.0	H-Bilog	QP	0.0	32.7	37.0	-4.3
440.002	38.3	-5.8	134.0	1.1	5.0	0.0	H-Bilog	QP	0.0	32.5	37.0	-4.5
344.097	39.6	-7.2	81.0	2.3	5.0	0.0	V-Bilog	QP	0.0	32.4	37.0	-4.6
258.032	37.6	-5.3	127.0	4.0	10.0	0.0	H-LPA	QP	0.0	32.3	37.0	-4.7
110.585	22.8	2.2	215.0	1.1	10.0	0.0	V-Bicon	QP	0.0	25.0	30.0	-5.0
809.665	32.5	-0.7	274.0	1.5	5.0	0.0	H-Bilog	QP	0.0	31.8	37.0	-5.2
172.063	37.8	-13.2	106.0	2.6	5.0	0.0	H-Bilog	QP	0.0	24.6	30.0	-5.4
258.034	36.7	-5.3	10.0	1.0	10.0	0.0	V-LPA	QP	0.0	31.4	37.0	-5.6
245.792	41.4	-10.2	168.0	1.2	5.0	0.0	V-Bilog	QP	0.0	31.2	37.0	-5.8
270.033	40.7	-9.6	338.0	1.0	5.0	0.0	V-Bilog	QP	0.0	31.1	37.0	-5.9
208.929	36.2	-12.1	26.0	3.3	5.0	0.0	H-Bilog	QP	0.0	24.1	30.0	-5.9
122.882	22.6	1.2	106.0	1.5	10.0	0.0	V-Bicon	QP	0.0	23.8	30.0	-6.2
62.673	39.5	-15.8	249.0	3.9	5.0	0.0	H-Bilog	QP	0.0	23.7	30.0	-6.3
62.549	39.4	-15.8	250.0	3.4	5.0	0.0	H-Bilog	QP	0.0	23.6	30.0	-6.4
159.777	37.1	-13.6	74.0	2.2	5.0	0.0	H-Bilog	QP	0.0	23.5	30.0	-6.5
825.362	31.3	-1.4	79.0	1.5	5.0	0.0	H-Bilog	QP	0.0	29.9	37.0	-7.1
258.081	39.0	-9.8	348.0	1.1	5.0	0.0	V-Bilog	QP	0.0	29.2	37.0	-7.8
100.634	36.4	-14.7	149.0	1.1	5.0	0.0	V-Bilog	QP	0.0	21.7	30.0	-8.3
540.704	31.7	-3.0	144.0	2.0	5.0	0.0	V-Bilog	QP	0.0	28.7	37.0	-8.3
208.931	33.7	-12.1	176.0	1.2	5.0	0.0	V-Bilog	QP	0.0	21.6	30.0	-8.4
98.333	36.2	-14.8	279.0	3.8	5.0	0.0	H-Bilog	QP	0.0	21.4	30.0	-8.6
110.036	35.6	-14.9	209.0	2.6	5.0	0.0	H-Bilog	QP	0.0	20.7	30.0	-9.3
30.000	26.5	-6.2	260.0	1.0	5.0	0.0	V-Bilog	QP	0.0	20.3	30.0	-9.7
432.032	32.8	-5.6	131.0	1.4	5.0	0.0	H-Bilog	QP	0.0	27.2	37.0	-9.8
58.474	35.3	-15.4	233.0	4.0	5.0	0.0	H-Bilog	QP	0.0	19.9	30.0	-10.1
823.329	26.2	-1.3	100.0	1.0	5.0	0.0	V-Bilog	QP	0.0	24.9	37.0	-12.1
122.915	33.0	-15.8	306.0	2.6	5.0	0.0	H-Bilog	QP	0.0	17.2	30.0	-12.8
30.903	22.3	-6.7	266.0	1.5	5.0	0.0	H-Bilog	QP	0.0	15.6	30.0	-14.4



**Justification**

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

**Channels in Specified Band Investigated:**

High
Mid
Low

**Operating Modes Investigated:**

Typical
---------

**Data Rates Investigated:**

Maximum
---------

**Power Input Settings Investigated:**

120 VAC, 60 Hz.
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**Other Settings Investigated:**

Control pod transmitting only - Rear speakers unplugged
Rear speaker transmitting only – Control pod not transmitting.

**Frequency Range Investigated**

<b>Start Frequency</b>	30 MHz	<b>Stop Frequency</b>	26 GHz
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**Software\Firmware Applied During Test**

<b>Exercise software</b>	Standard Production Software	<b>Version</b>	Z6DW a0.3.3.1.2.6
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**Description**

The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.

**EUT and Peripherals**

<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Left front speaker	Logitech, Inc.	S-0181A	Unknown
Right front speaker	Logitech, Inc.	S-0181A	Unknown
Center front speaker	Logitech, Inc.	S-0181A	Unknown
Right rear speaker	Logitech, Inc.	S-0181A	Unknown
Left rear speaker	Logitech, Inc.	S-0181A	Unknown
Subwoofer	Logitech, Inc.	S-0181A	Unknown
Control Pod	Logitech, Inc.	S-0181A	Unknown
DVD Player	Pioneer	DV-578A-S	DDTE 003395 CC

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Audio	No	1.5	No	Subwoofer	Right front speaker
Audio	No	1.4	No	Subwoofer	Center front speaker
Audio	No	1.8	No	Subwoofer	Left front speaker
AC Power	No	1.4	No	Subwoofer	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Audio (x3)	No	1.4	No	Control Pod	DVD Player
Fiber optic	No	1.2	No	Control Pod	DVD Player
Coax	Yes	1.2	No	Control Pod	DVD Player
AC Power	No	1.4	No	DVD Player	AC Mains
AC Power	No	1.4	No	Left rear speaker	Unterminated, while testing control pod. AC Mains, while testing rear speaker.
AC Power	No	1.4	No	Right rear speaker	Unterminated

**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	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	02/17/2005	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	05/05/2005	3 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	03/01/2005	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/02/2004	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/02/2004	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/02/2004	13 mo
Attenuator	Coaxicom	66702 5910-20	RBJ	02/25/2005	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	03/09/2005	13 mo
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	02/15/2005	13 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	05/03/2005	13 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	04/08/2005	13 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	ERR	15 mo

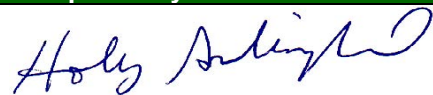
### Test Description

**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
<i>Measurements were made using the bandwidths and detectors specified. No video filter was used.</i>			

Completed by:



EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/04/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 38%
Project: None		Barometric Pressure: 29.94
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

<b>TEST SPECIFICATIONS</b>	Test Method
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003

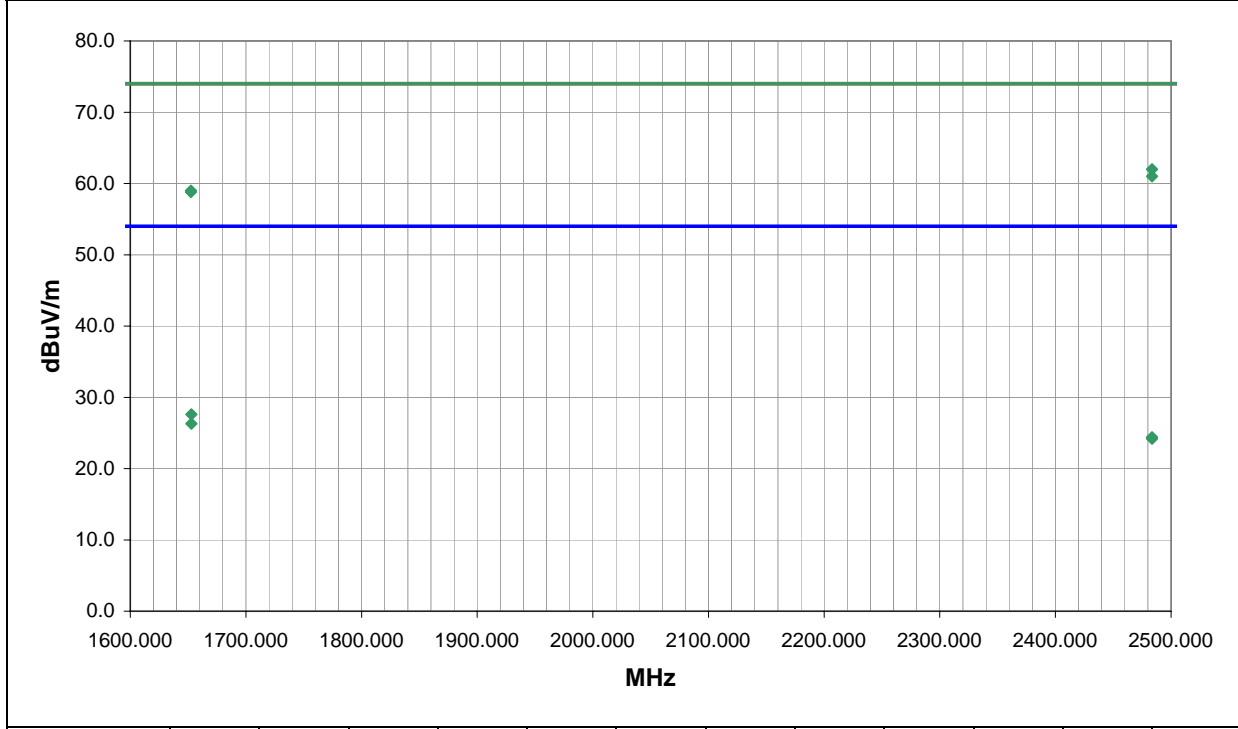
<b>TEST PARAMETERS</b>	
Antenna Height(s) (m)	1 - 4
Test Distance (m)	3

**COMMENTS**

**EUT OPERATING MODES**  
Transmitting high channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

Run #	10	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	41.5	0.5	145.0	1.1	0.0	20.0	V-Horn	PK	0.0	62.0	74.0	-12.0
2483.500	40.5	0.5	223.0	1.1	0.0	20.0	V-Horn	PK	0.0	61.0	74.0	-13.0
1652.451	41.6	-2.6	218.0	1.1	0.0	20.0	V-Horn	PK	0.0	59.0	74.0	-15.0
1652.415	41.4	-2.6	343.0	1.3	0.0	20.0	H-Horn	PK	0.0	58.8	74.0	-15.2
1652.793	34.8	-2.6	343.0	1.3	24.6	20.0	H-Horn	AV	0.0	27.6	54.0	-26.4
1652.858	33.5	-2.6	218.0	1.1	24.6	20.0	V-Horn	AV	0.0	26.3	54.0	-27.7
2483.500	28.5	0.5	223.0	1.1	24.6	20.0	V-Horn	AV	0.0	24.4	54.0	-29.6
2483.500	28.3	0.5	145.0	1.1	24.6	20.0	V-Horn	AV	0.0	24.2	54.0	-29.8

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	08/04/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	38%
Project:	None	Barometric Pressure:	29.94
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS** Test Method

FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003
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**TEST PARAMETERS**

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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**COMMENTS**

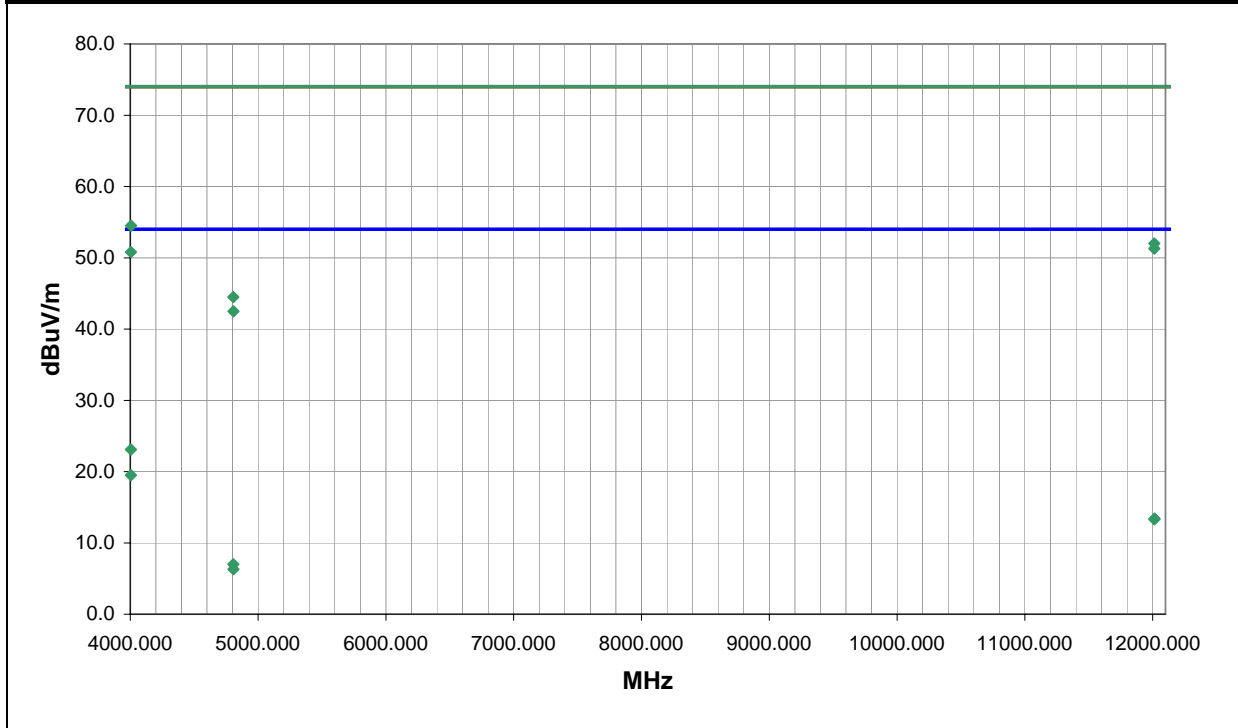
**EUT OPERATING MODES**

Transmitting low channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

Run #	11	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4006.401	48.8	5.7	70.0	1.0	0.0	0.0	H-Horn	PK	0.0	54.5	74.0	-19.5
12012.700	36.0	16.0	162.0	1.3	0.0	0.0	H-Horn	PK	0.0	52.0	74.0	-22.0
12011.810	35.3	16.0	144.0	1.0	0.0	0.0	V-Horn	PK	0.0	51.3	74.0	-22.7
4004.558	45.1	5.7	90.0	1.3	0.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2
4806.849	38.1	6.4	49.0	1.3	0.0	0.0	H-Horn	PK	0.0	44.5	74.0	-29.5
4004.708	42.0	5.7	70.0	1.0	24.6	0.0	H-Horn	AV	0.0	23.1	54.0	-30.9
4807.476	36.1	6.4	87.0	1.0	0.0	0.0	V-Horn	PK	0.0	42.5	74.0	-31.5
4004.680	38.4	5.7	90.0	1.3	24.6	0.0	V-Horn	AV	0.0	19.5	54.0	-34.5
12015.070	22.0	16.0	162.0	1.3	24.6	0.0	H-Horn	AV	0.0	13.4	54.0	-40.6
12011.880	21.9	16.0	144.0	1.0	24.6	0.0	V-Horn	AV	0.0	13.3	54.0	-40.7
4805.850	25.2	6.4	49.0	1.3	24.6	0.0	H-Horn	AV	0.0	7.0	54.0	-47.0
4807.527	24.5	6.4	87.0	1.0	24.6	0.0	V-Horn	AV	0.0	6.3	54.0	-47.7

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/04/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 38%
Project: None		Barometric Pressure: 29.94
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

**TEST SPECIFICATIONS** Test Method

FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003
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**TEST PARAMETERS**

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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**COMMENTS**

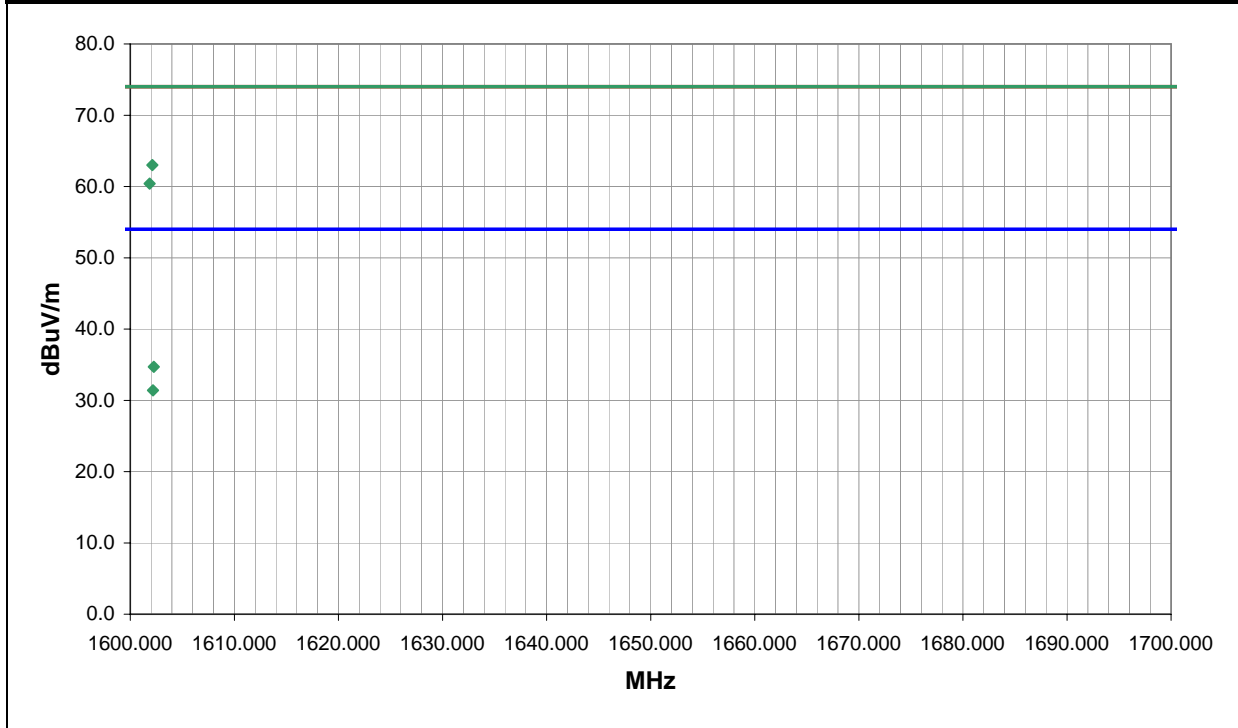
**EUT OPERATING MODES**

Transmitting low channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

Run #	12	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1602.119	45.8	-2.8	159.0	1.2	0.0	20.0	V-Horn	PK	0.0	63.0	74.0	-11.0
1601.857	43.2	-2.8	181.0	2.0	0.0	20.0	H-Horn	PK	0.0	60.4	74.0	-13.6
1602.263	42.1	-2.8	159.0	1.2	24.6	20.0	V-Horn	AV	0.0	34.7	54.0	-19.3
1602.187	38.8	-2.8	181.0	2.0	24.6	20.0	H-Horn	AV	0.0	31.4	54.0	-22.6



EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown	Date: 08/04/05	
Customer: Logitech, Inc.	Temperature: 25	
Attendees: None	Humidity: 38%	
Project: None	Barometric Pressure: 29.94	
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

**TEST SPECIFICATIONS** Test Method

FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003
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**TEST PARAMETERS**

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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**COMMENTS**

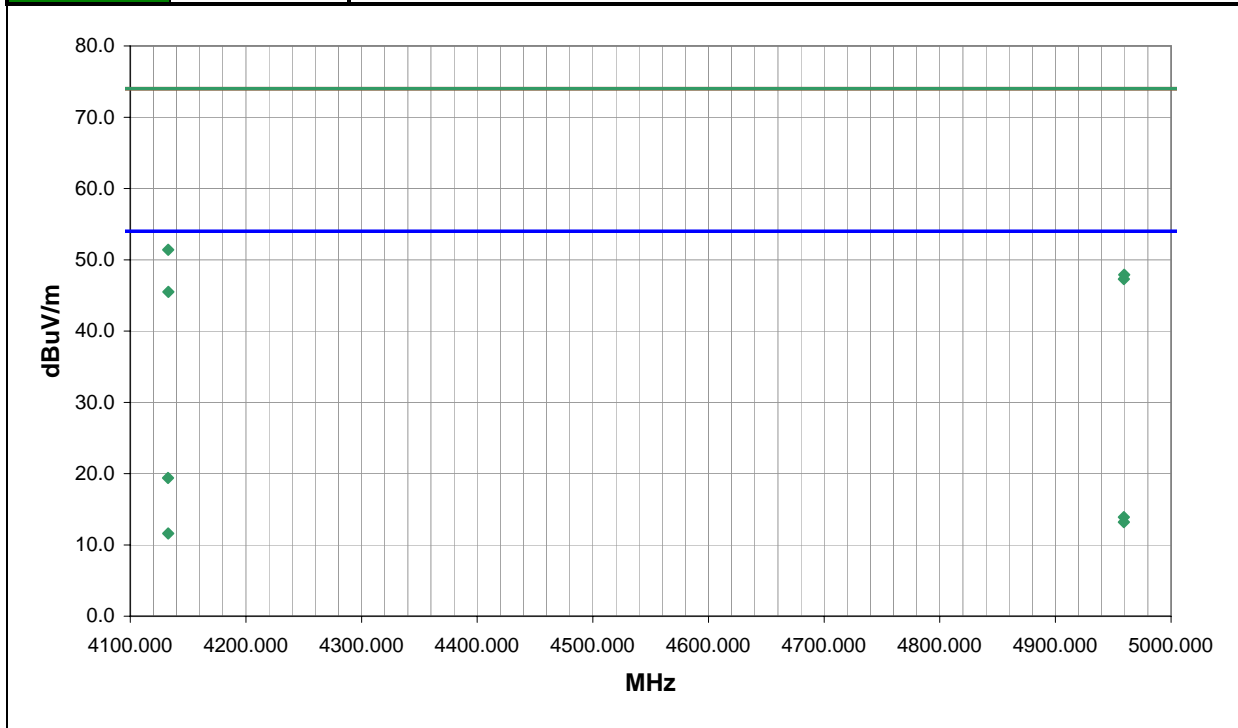
**EUT OPERATING MODES**

Transmitting high channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

Run #	13	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4132.814	45.7	5.7	42.0	1.0	0.0	0.0	H-Horn	PK	0.0	51.4	74.0	-22.6
4959.439	41.1	6.8	42.0	1.0	0.0	0.0	H-Horn	PK	0.0	47.9	74.0	-26.1
4959.201	40.5	6.8	327.0	1.1	0.0	0.0	V-Horn	PK	0.0	47.3	74.0	-26.7
4132.891	39.8	5.7	120.0	1.3	0.0	0.0	V-Horn	PK	0.0	45.5	74.0	-28.5
4132.677	38.3	5.7	42.0	1.0	24.6	0.0	H-Horn	AV	0.0	19.4	54.0	-34.6
4959.223	31.7	6.8	42.0	1.0	24.6	0.0	H-Horn	AV	0.0	13.9	54.0	-40.1
4959.219	31.0	6.8	327.0	1.1	24.6	0.0	V-Horn	AV	0.0	13.2	54.0	-40.8
4132.781	30.5	5.7	120.0	1.3	24.6	0.0	V-Horn	AV	0.0	11.6	54.0	-42.4

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown	Date: 08/07/05	
Customer: Logitech, Inc.	Temperature: 16	
Attendees: None	Humidity: 41%	
Project: None	Barometric Pressure: 29.96	
Tested by: Greg Kiemel	Power: 120 VAC, 60Hz	Job Site: EV01

<b>TEST SPECIFICATIONS</b>	Test Method
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003

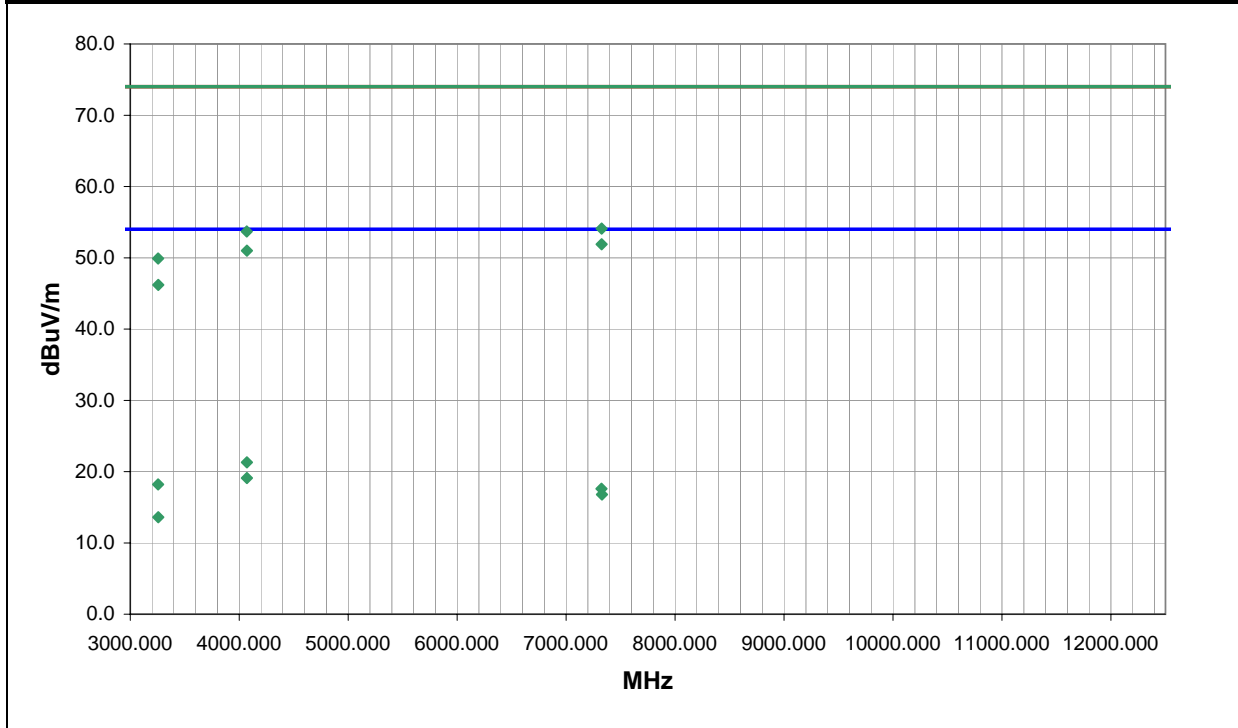
<b>TEST PARAMETERS</b>		
Antenna Height(s) (m)	1 - 4	Test Distance (m)
		3

**COMMENTS**

**EUT OPERATING MODES**  
Transmitting mid channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

Run #	14	Signature <i>Greg Kiemel</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7325.520	40.6	13.5	28.0	1.6	0.0	0.0	H-Horn	PK	0.0	54.1	74.0	-19.9
4069.490	47.9	5.8	14.0	1.3	0.0	0.0	H-Horn	PK	0.0	53.7	74.0	-20.3
7325.130	38.4	13.5	171.0	1.2	0.0	0.0	V-Horn	PK	0.0	51.9	74.0	-22.1
4069.670	45.2	5.8	111.0	1.1	0.0	0.0	V-Horn	PK	0.0	51.0	74.0	-23.0
3255.560	46.6	3.3	99.0	1.3	0.0	0.0	H-Horn	PK	0.0	49.9	74.0	-24.1
3257.035	42.9	3.3	268.0	1.2	0.0	0.0	V-Horn	PK	0.0	46.2	74.0	-27.8
4069.790	40.1	5.8	14.0	1.3	24.6	0.0	H-Horn	AV	0.0	21.3	54.0	-32.7
4069.810	37.9	5.8	111.0	1.1	24.6	0.0	V-Horn	AV	0.0	19.1	54.0	-34.9
3255.780	39.5	3.3	99.0	1.3	24.6	0.0	H-Horn	AV	0.0	18.2	54.0	-35.8
7324.900	28.7	13.5	28.0	1.6	24.6	0.0	H-Horn	AV	0.0	17.6	54.0	-36.4
7328.260	27.9	13.5	171.0	1.2	24.6	0.0	V-Horn	AV	0.0	16.8	54.0	-37.2
3256.705	34.9	3.3	268.0	1.2	24.6	0.0	V-Horn	AV	0.0	13.6	54.0	-40.4

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	07/17/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	42%
Project:	None	Barometric Pressure:	29.97
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	Test Method
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003

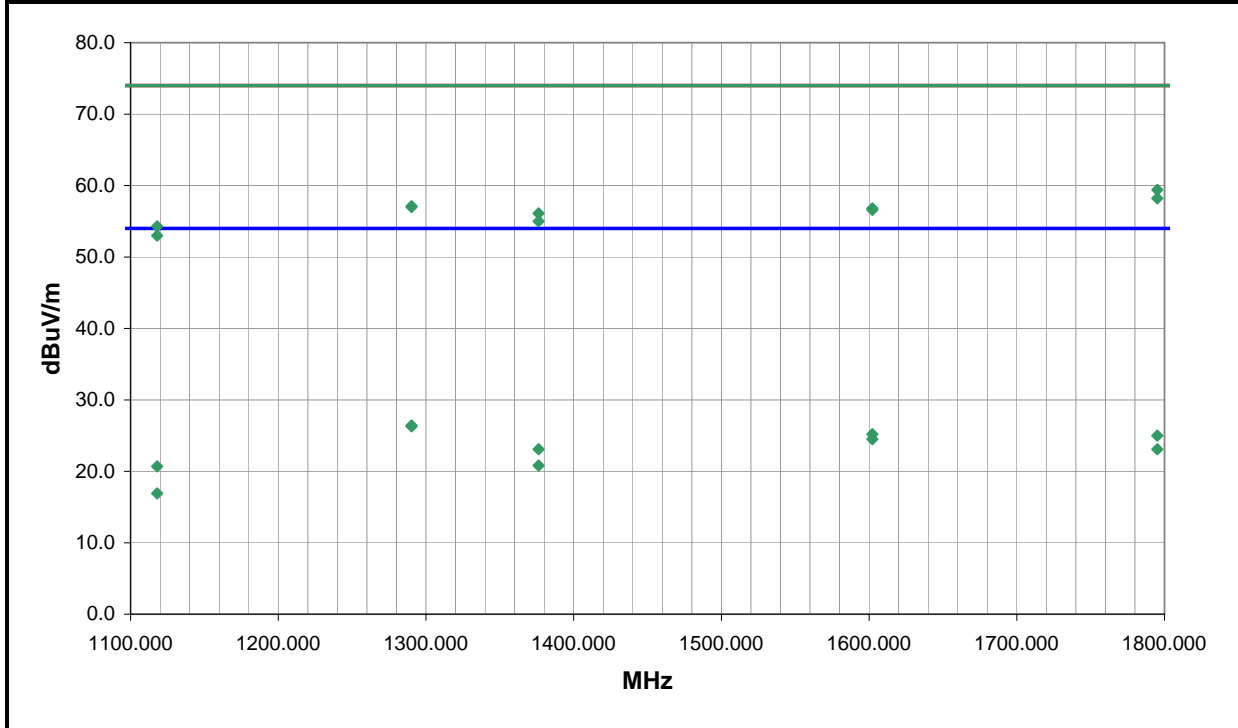
<b>TEST PARAMETERS</b>	
Antenna Height(s) (m) 1 - 4	Test Distance (m) 3

**COMMENTS**  
US unit. Rear speakers unplugged. Coax, fiber, and audio (x3) from control pod to DVD player. Control to subwoofer.

**EUT OPERATING MODES**  
Transmitting low channel from control pod.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

Run #	5	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1795.087	44.4	-5.0	307.0	1.2	0.0	20.0	H-Horn	PK	0.0	59.4	74.0	-14.6
1795.087	43.2	-5.0	12.0	1.2	0.0	20.0	V-Horn	PK	0.0	58.2	74.0	-15.8
1290.266	44.7	-7.6	181.0	1.1	0.0	20.0	V-Horn	PK	0.0	57.1	74.0	-16.9
1290.266	44.6	-7.6	351.0	1.4	0.0	20.0	H-Horn	PK	0.0	57.0	74.0	-17.0
1602.231	42.9	-6.1	360.0	1.4	0.0	20.0	H-Horn	PK	0.0	56.8	74.0	-17.2
1602.231	42.7	-6.1	330.0	1.2	0.0	20.0	V-Horn	PK	0.0	56.6	74.0	-17.4
1376.222	43.3	-7.2	183.0	1.7	0.0	20.0	V-Horn	PK	0.0	56.1	74.0	-17.9
1376.222	42.2	-7.2	17.0	1.3	0.0	20.0	H-Horn	PK	0.0	55.0	74.0	-19.0
1117.987	42.7	-8.4	139.0	1.2	0.0	20.0	V-Horn	PK	0.0	54.3	74.0	-19.7
1117.987	41.4	-8.4	42.0	1.3	0.0	20.0	H-Horn	PK	0.0	53.0	74.0	-21.0
1290.266	38.6	-7.6	181.0	1.1	24.6	20.0	V-Horn	AV	0.0	26.4	54.0	-27.6
1290.266	38.5	-7.6	351.0	1.4	24.6	20.0	H-Horn	AV	0.0	26.3	54.0	-27.7
1602.231	35.9	-6.1	330.0	1.2	24.6	20.0	V-Horn	AV	0.0	25.2	54.0	-28.8
1795.087	34.6	-5.0	307.0	1.2	24.6	20.0	H-Horn	AV	0.0	25.0	54.0	-29.0
1602.231	35.2	-6.1	360.0	1.4	24.6	20.0	H-Horn	AV	0.0	24.5	54.0	-29.5
1376.222	34.9	-7.2	183.0	1.7	24.6	20.0	V-Horn	AV	0.0	23.1	54.0	-30.9
1795.087	32.7	-5.0	12.0	1.2	24.6	20.0	V-Horn	AV	0.0	23.1	54.0	-30.9
1376.222	32.6	-7.2	17.0	1.3	24.6	20.0	H-Horn	AV	0.0	20.8	54.0	-33.2
1117.987	33.7	-8.4	139.0	1.2	24.6	20.0	V-Horn	AV	0.0	20.7	54.0	-33.3
1117.987	29.9	-8.4	42.0	1.3	24.6	20.0	H-Horn	AV	0.0	16.9	54.0	-37.1

EUT: Z-5450 MN: S-0181A Multimedia Speaker System	Work Order: LABT0140
Serial Number: Unknown	Date: 07/17/05
Customer: Logitech, Inc.	Temperature: 25
Attendees: None	Humidity: 42%
Project: None	Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz
	Job Site: EV01

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

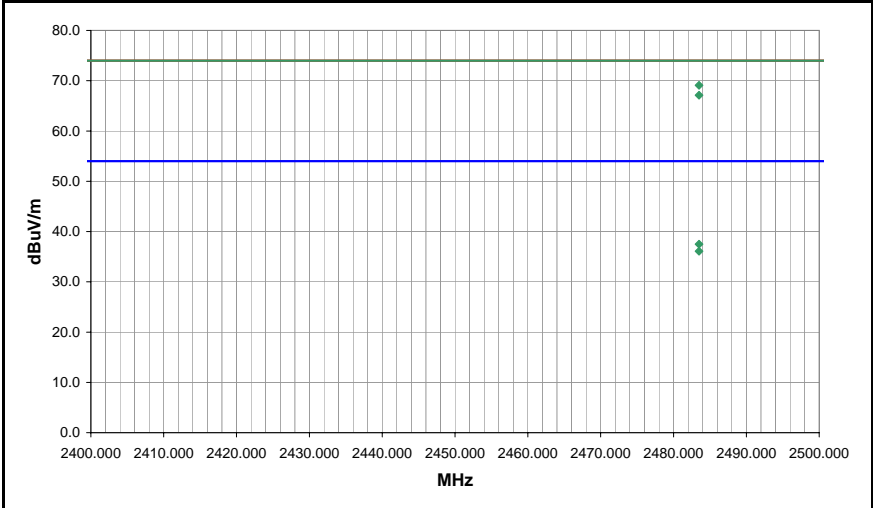
TEST PARAMETERS
Antenna Height(s) (m)   1 - 4   Test Distance (m)   3

COMMENTS  
 US unit. Rear speakers unplugged. Coax, fiber, and audio (x3) from control pod to DVD player. Control to subwoofer.

EUT OPERATING MODES  
 Transmitting high channel from control pod.

DEVIATIONS FROM TEST STANDARD  
 No deviations.

Run #	6	Signature: <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
2483.500	51.4	-2.3	43.0	1.2	0.0	20.0	V-Horn	PK	0.0	69.1	74.0	-4.9	EUT horizontal
2483.500	49.4	-2.3	317.0	1.2	0.0	20.0	H-Horn	PK	0.0	67.1	74.0	-6.9	EUT Vertical
2483.500	44.4	-2.3	43.0	1.2	24.6	20.0	V-Horn	AV	0.0	37.5	54.0	-16.5	EUT horizontal
2483.500	43.0	-2.3	317.0	1.2	24.6	20.0	H-Horn	AV	0.0	36.1	54.0	-17.9	EUT Vertical

# RADIATED EMISSIONS DATA SHEET

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown	Date: 07/17/05	
Customer: Logitech, Inc.	Temperature: 25	
Attendees: None	Humidity: 42%	
Project: None	Barometric Pressure: 29.97	
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

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

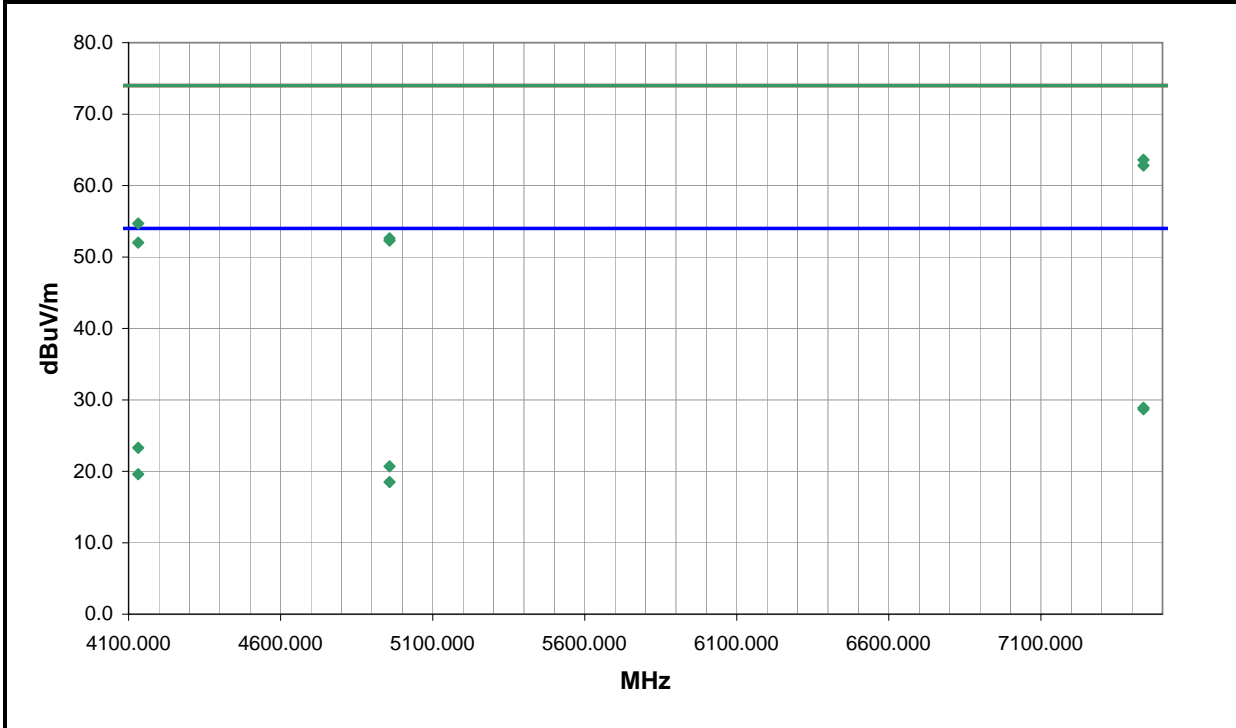
TEST PARAMETERS		
Antenna Height(s) (m)	1 - 4	Test Distance (m)
		3

**COMMENTS**  
US unit. Rear speakers unplugged. Coax, fiber, and audio (x3) from control pod to DVD player. Control to subwoofer.

**EUT OPERATING MODES**  
Transmitting high channel from control pod.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

Run #	7	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7437.374	51.6	12.0	56.0	1.1	0.0	0.0	V-Horn	PK	0.0	63.6	74.0	-10.4
7437.374	50.8	12.0	144.0	1.2	0.0	0.0	H-Horn	PK	0.0	62.8	74.0	-11.2
4131.740	50.6	4.1	338.0	1.2	0.0	0.0	V-Horn	PK	0.0	54.7	74.0	-19.3
4958.197	46.2	6.4	205.0	1.1	0.0	0.0	V-Horn	PK	0.0	52.6	74.0	-21.4
4958.197	45.9	6.4	304.0	1.2	0.0	0.0	H-Horn	PK	0.0	52.3	74.0	-21.7
4131.740	47.9	4.1	178.0	1.1	0.0	0.0	H-Horn	PK	0.0	52.0	74.0	-22.0
7437.374	41.5	12.0	144.0	1.2	24.6	0.0	H-Horn	AV	0.0	28.9	54.0	-25.1
7437.374	41.3	12.0	56.0	1.1	24.6	0.0	V-Horn	AV	0.0	28.7	54.0	-25.3
4131.740	43.8	4.1	338.0	1.2	24.6	0.0	V-Horn	AV	0.0	23.3	54.0	-30.7
4958.197	38.9	6.4	205.0	1.1	24.6	0.0	V-Horn	AV	0.0	20.7	54.0	-33.3
4131.740	40.1	4.1	178.0	1.1	24.6	0.0	H-Horn	AV	0.0	19.6	54.0	-34.4
4958.197	36.7	6.4	304.0	1.2	24.6	0.0	H-Horn	AV	0.0	18.5	54.0	-35.5

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	07/17/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	42%
Project:	None	Barometric Pressure:	29.97
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

TEST SPECIFICATIONS

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

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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COMMENTS

US unit. Rear speakers unplugged. Coax, fiber, and audio (x3) from control pod to DVD player. Control to subwoofer.

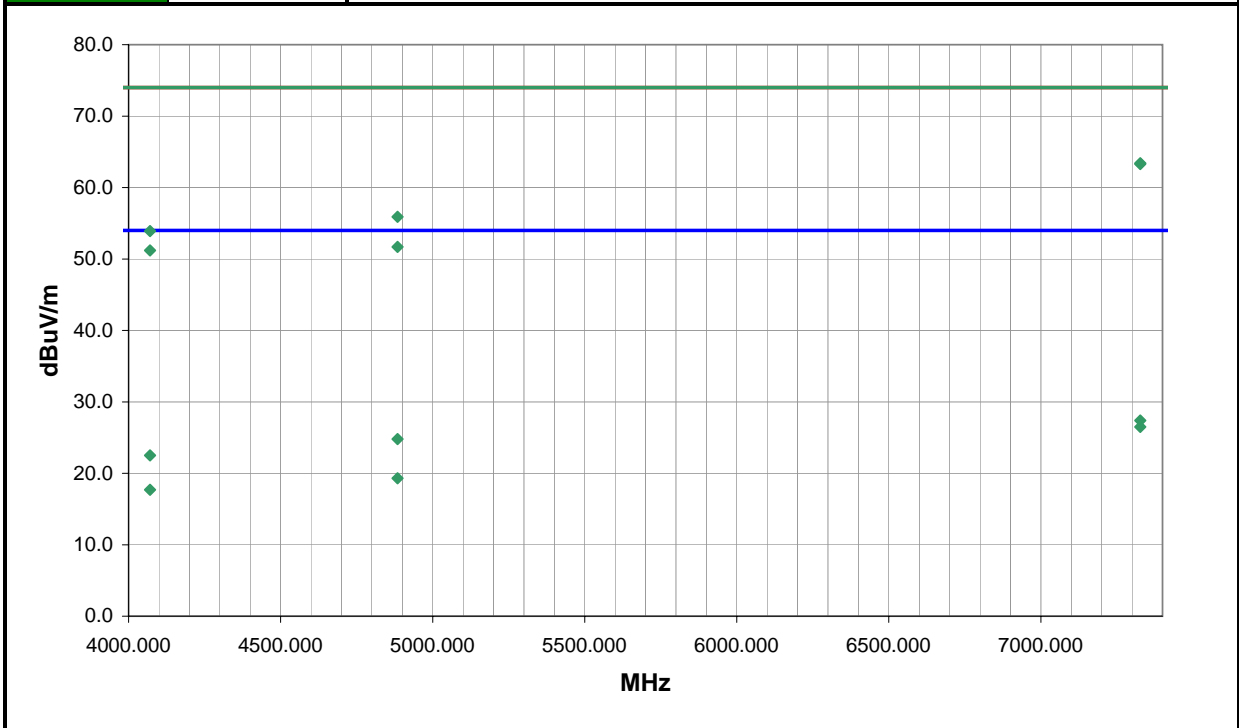
EUT OPERATING MODES

Transmitting mid channel from control pod.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	8	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7326.827	51.6	11.8	322.0	1.8	0.0	0.0	V-Horn	PK	0.0	63.4	74.0	-10.6
7326.827	51.5	11.8	145.0	1.1	0.0	0.0	H-Horn	PK	0.0	63.3	74.0	-10.7
4884.290	49.7	6.2	186.0	1.3	0.0	0.0	H-Horn	PK	0.0	55.9	74.0	-18.1
4070.471	49.8	4.1	348.0	1.2	0.0	0.0	V-Horn	PK	0.0	53.9	74.0	-20.1
4884.290	45.5	6.2	209.0	1.2	0.0	0.0	V-Horn	PK	0.0	51.7	74.0	-22.3
4070.471	47.1	4.1	181.0	1.1	0.0	0.0	H-Horn	PK	0.0	51.2	74.0	-22.8
7326.827	40.2	11.8	322.0	1.8	24.6	0.0	V-Horn	AV	0.0	27.4	54.0	-26.6
7326.827	39.3	11.8	145.0	1.1	24.6	0.0	H-Horn	AV	0.0	26.5	54.0	-27.5
4884.290	43.2	6.2	186.0	1.3	24.6	0.0	H-Horn	AV	0.0	24.8	54.0	-29.2
4070.471	43.0	4.1	348.0	1.2	24.6	0.0	V-Horn	AV	0.0	22.5	54.0	-31.5
4884.290	37.7	6.2	209.0	1.2	24.6	0.0	V-Horn	AV	0.0	19.3	54.0	-34.7
4070.471	38.2	4.1	181.0	1.1	24.6	0.0	H-Horn	AV	0.0	17.7	54.0	-36.3

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	07/17/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	42%
Project:	None	Barometric Pressure:	29.97
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS** Test Method

FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003
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**TEST PARAMETERS**

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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**COMMENTS**

US unit. Rear speakers unplugged. Coax, fiber, and audio (x3) from control pod to DVD player. Control to subwoofer.

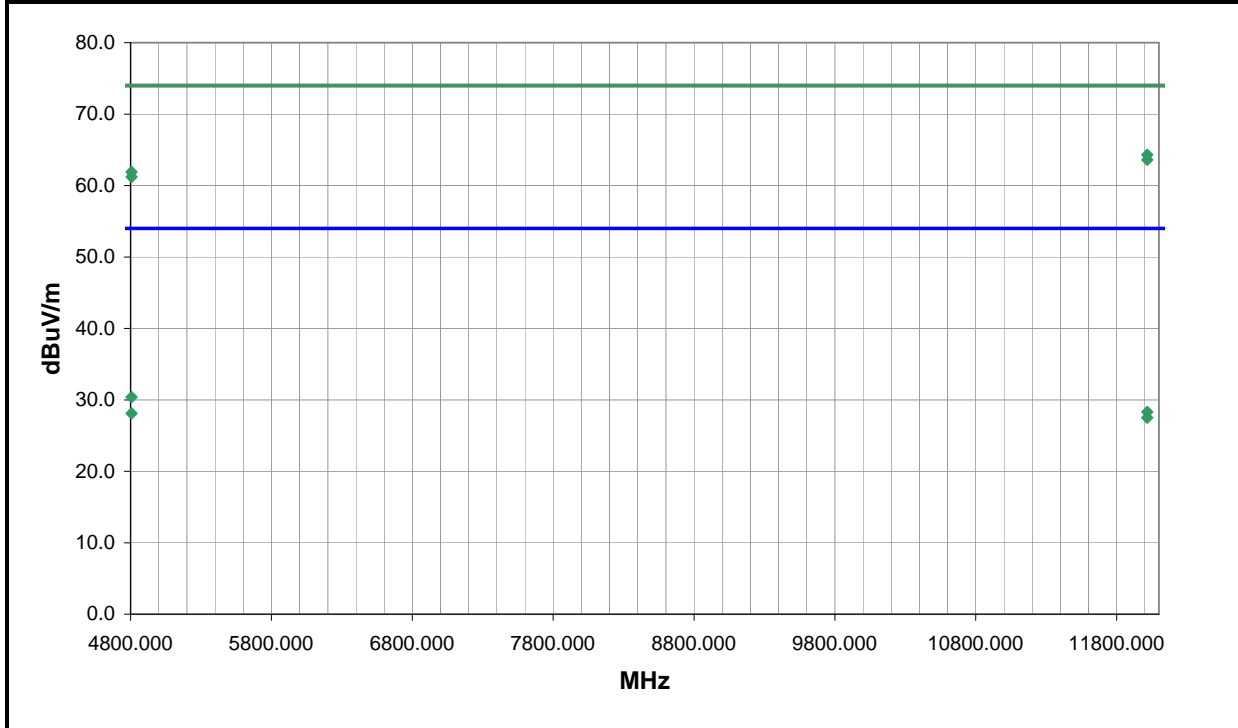
**EUT OPERATING MODES**

Transmitting low channel from control pod.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

Run #	9	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12016.880	47.0	17.3	347.0	1.2	0.0	0.0	V-Horn	PK	0.0	64.3	74.0	-9.7
12016.880	46.3	17.3	133.0	2.1	0.0	0.0	H-Horn	PK	0.0	63.6	74.0	-10.4
4806.550	56.1	5.8	178.0	1.1	0.0	0.0	H-Horn	PK	0.0	61.9	74.0	-12.1
4806.550	55.4	5.8	293.0	1.8	0.0	0.0	V-Horn	PK	0.0	61.2	74.0	-12.8
4806.550	49.2	5.8	178.0	1.1	24.6	0.0	H-Horn	AV	0.0	30.4	54.0	-23.6
12016.880	35.6	17.3	133.0	2.1	24.6	0.0	H-Horn	AV	0.0	28.3	54.0	-25.7
4806.550	46.9	5.8	293.0	1.8	24.6	0.0	V-Horn	AV	0.0	28.1	54.0	-25.9
12016.880	34.8	17.3	347.0	1.2	24.6	0.0	V-Horn	AV	0.0	27.5	54.0	-26.5

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	08/04/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	38%
Project:	None	Barometric Pressure:	29.94
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	Test Method
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003

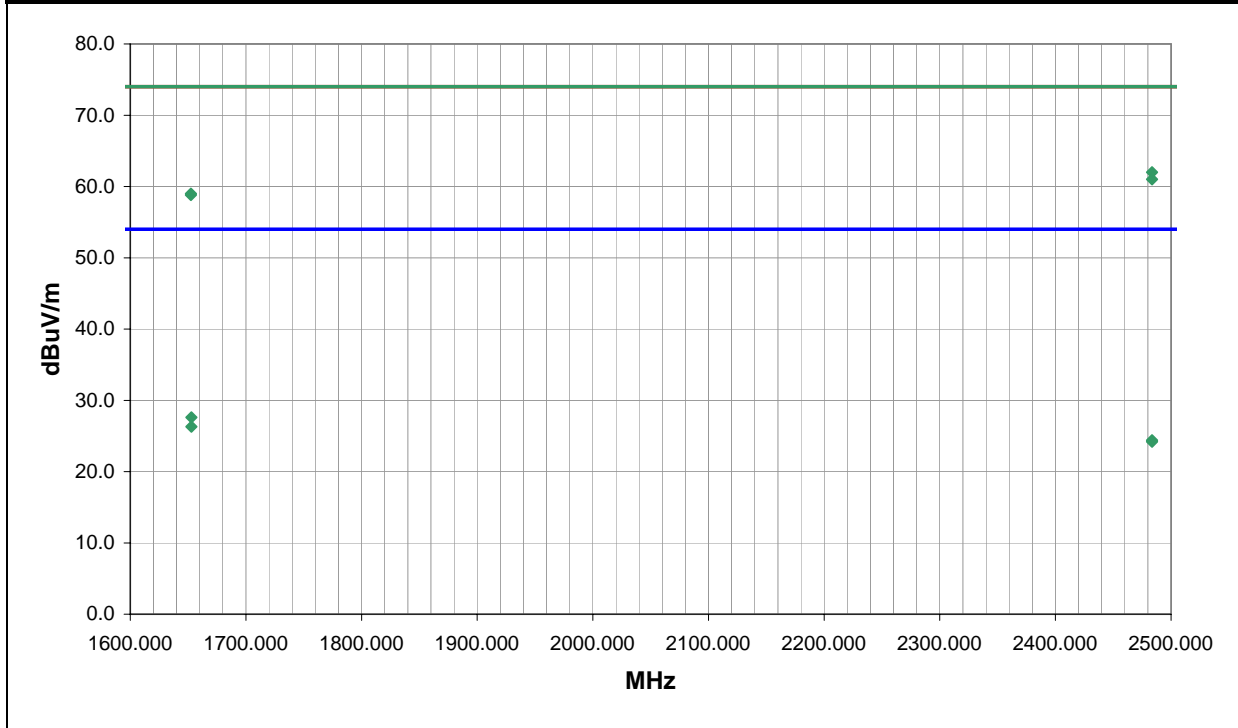
<b>TEST PARAMETERS</b>			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

**COMMENTS**

**EUT OPERATING MODES**  
Transmitting high channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

Run #	10	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	41.5	0.5	145.0	1.1	0.0	20.0	V-Horn	PK	0.0	62.0	74.0	-12.0
2483.500	40.5	0.5	223.0	1.1	0.0	20.0	V-Horn	PK	0.0	61.0	74.0	-13.0
1652.451	41.6	-2.6	218.0	1.1	0.0	20.0	V-Horn	PK	0.0	59.0	74.0	-15.0
1652.415	41.4	-2.6	343.0	1.3	0.0	20.0	H-Horn	PK	0.0	58.8	74.0	-15.2
1652.793	34.8	-2.6	343.0	1.3	24.6	20.0	H-Horn	AV	0.0	27.6	54.0	-26.4
1652.858	33.5	-2.6	218.0	1.1	24.6	20.0	V-Horn	AV	0.0	26.3	54.0	-27.7
2483.500	28.5	0.5	223.0	1.1	24.6	20.0	V-Horn	AV	0.0	24.4	54.0	-29.6
2483.500	28.3	0.5	145.0	1.1	24.6	20.0	V-Horn	AV	0.0	24.2	54.0	-29.8



EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	08/04/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	38%
Project:	None	Barometric Pressure:	29.94
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>		Test Method
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003	

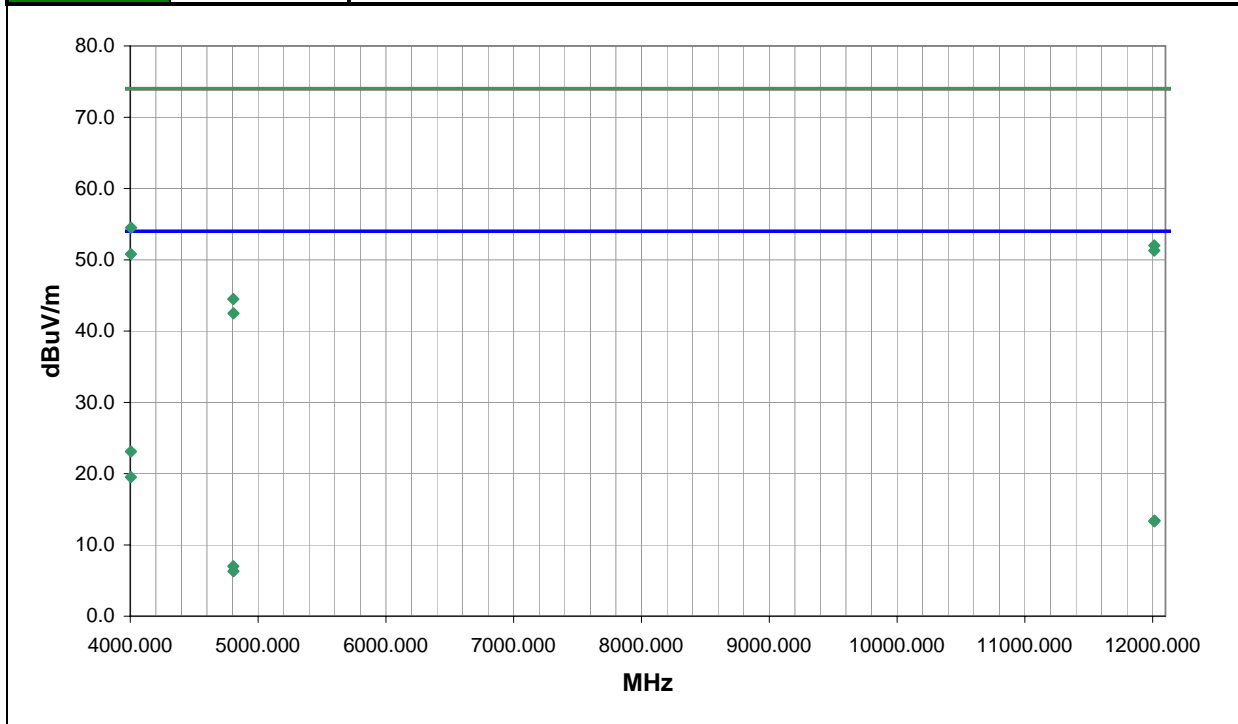
<b>TEST PARAMETERS</b>			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

**COMMENTS**

**EUT OPERATING MODES**  
Transmitting low channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

Run #	11	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4006.401	48.8	5.7	70.0	1.0	0.0	0.0	H-Horn	PK	0.0	54.5	74.0	-19.5
12012.700	36.0	16.0	162.0	1.3	0.0	0.0	H-Horn	PK	0.0	52.0	74.0	-22.0
12011.810	35.3	16.0	144.0	1.0	0.0	0.0	V-Horn	PK	0.0	51.3	74.0	-22.7
4004.558	45.1	5.7	90.0	1.3	0.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2
4806.849	38.1	6.4	49.0	1.3	0.0	0.0	H-Horn	PK	0.0	44.5	74.0	-29.5
4004.708	42.0	5.7	70.0	1.0	24.6	0.0	H-Horn	AV	0.0	23.1	54.0	-30.9
4807.476	36.1	6.4	87.0	1.0	0.0	0.0	V-Horn	PK	0.0	42.5	74.0	-31.5
4004.680	38.4	5.7	90.0	1.3	24.6	0.0	V-Horn	AV	0.0	19.5	54.0	-34.5
12015.070	22.0	16.0	162.0	1.3	24.6	0.0	H-Horn	AV	0.0	13.4	54.0	-40.6
12011.880	21.9	16.0	144.0	1.0	24.6	0.0	V-Horn	AV	0.0	13.3	54.0	-40.7
4805.850	25.2	6.4	49.0	1.3	24.6	0.0	H-Horn	AV	0.0	7.0	54.0	-47.0
4807.527	24.5	6.4	87.0	1.0	24.6	0.0	V-Horn	AV	0.0	6.3	54.0	-47.7

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown	Date: 08/04/05	
Customer: Logitech, Inc.	Temperature: 25	
Attendees: None	Humidity: 38%	
Project: None	Barometric Pressure: 29.94	
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

**TEST SPECIFICATIONS** Test Method

FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003
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**TEST PARAMETERS**

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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**COMMENTS**

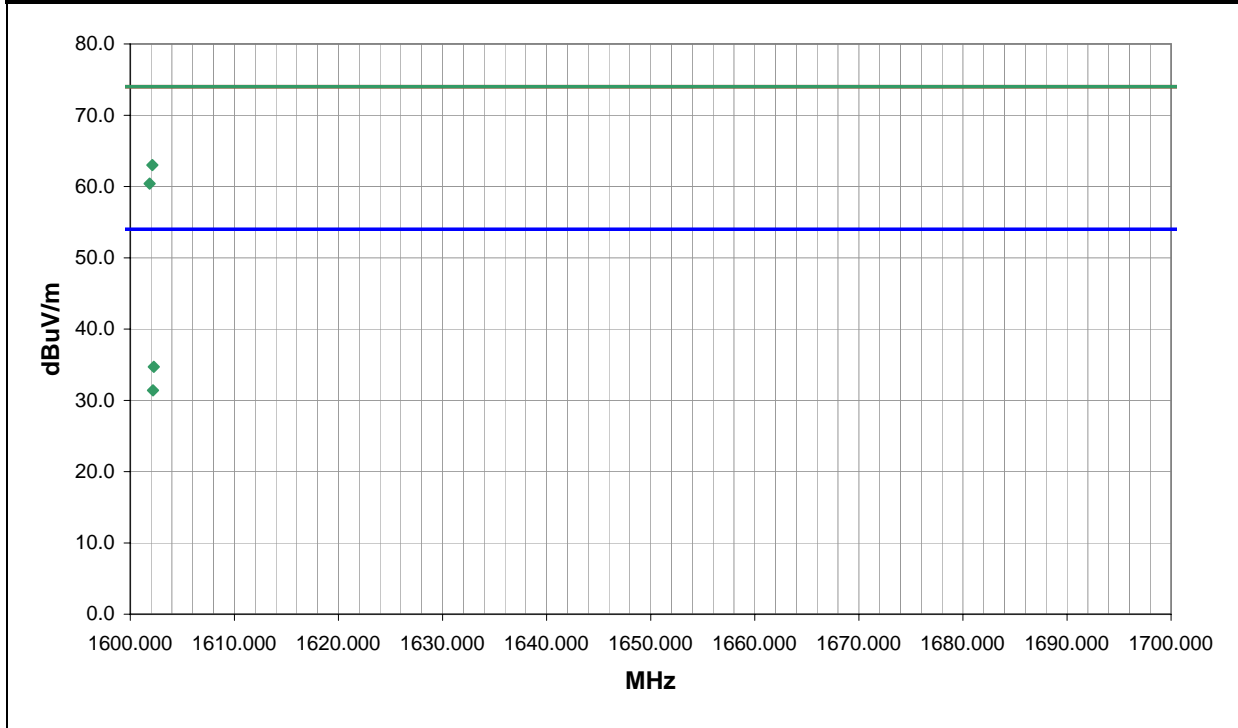
**EUT OPERATING MODES**

Transmitting low channel from rear speaker.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

Run #	12	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1602.119	45.8	-2.8	159.0	1.2	0.0	20.0	V-Horn	PK	0.0	63.0	74.0	-11.0
1601.857	43.2	-2.8	181.0	2.0	0.0	20.0	H-Horn	PK	0.0	60.4	74.0	-13.6
1602.263	42.1	-2.8	159.0	1.2	24.6	20.0	V-Horn	AV	0.0	34.7	54.0	-19.3
1602.187	38.8	-2.8	181.0	2.0	24.6	20.0	H-Horn	AV	0.0	31.4	54.0	-22.6

EUT:	Z-5450 MN: S-0181A Multimedia Speaker System	Work Order:	LABT0140
Serial Number:	Unknown	Date:	08/04/05
Customer:	Logitech, Inc.	Temperature:	25
Attendees:	None	Humidity:	38%
Project:	None	Barometric Pressure:	29.94
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

TEST SPECIFICATIONS

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

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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COMMENTS

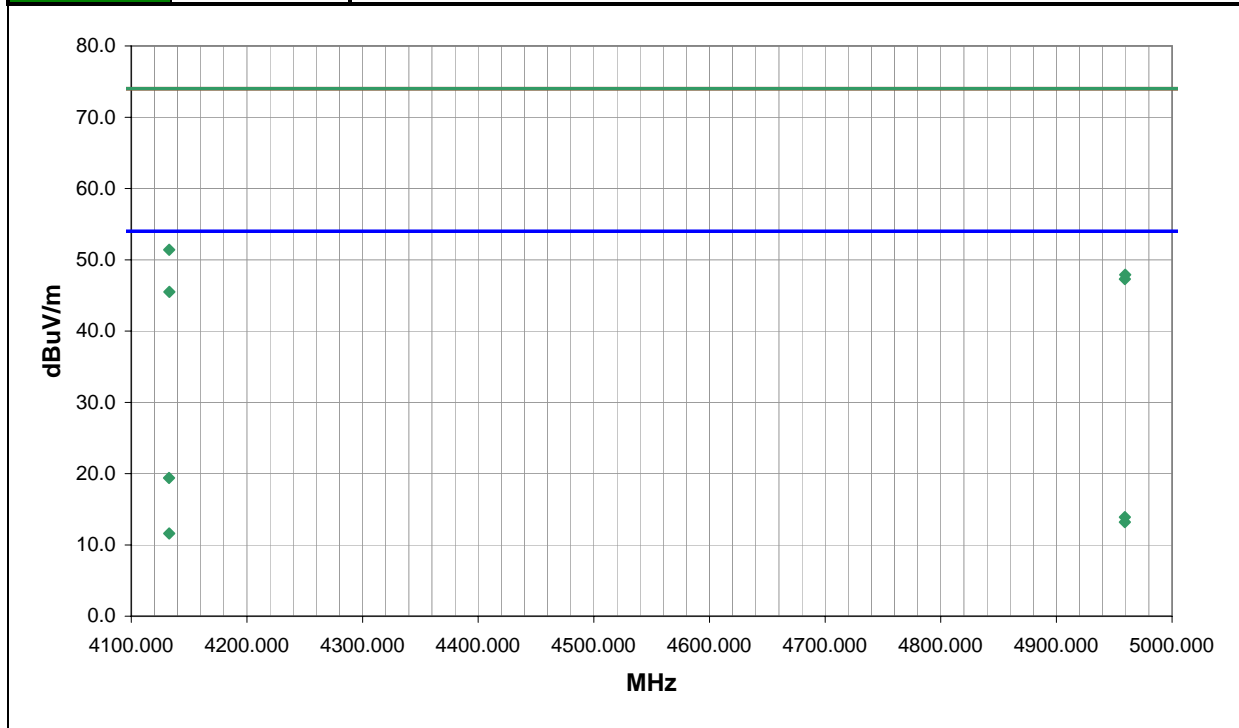
EUT OPERATING MODES

Transmitting high channel from rear speaker.

DEVIATIONS FROM TEST STANDARD

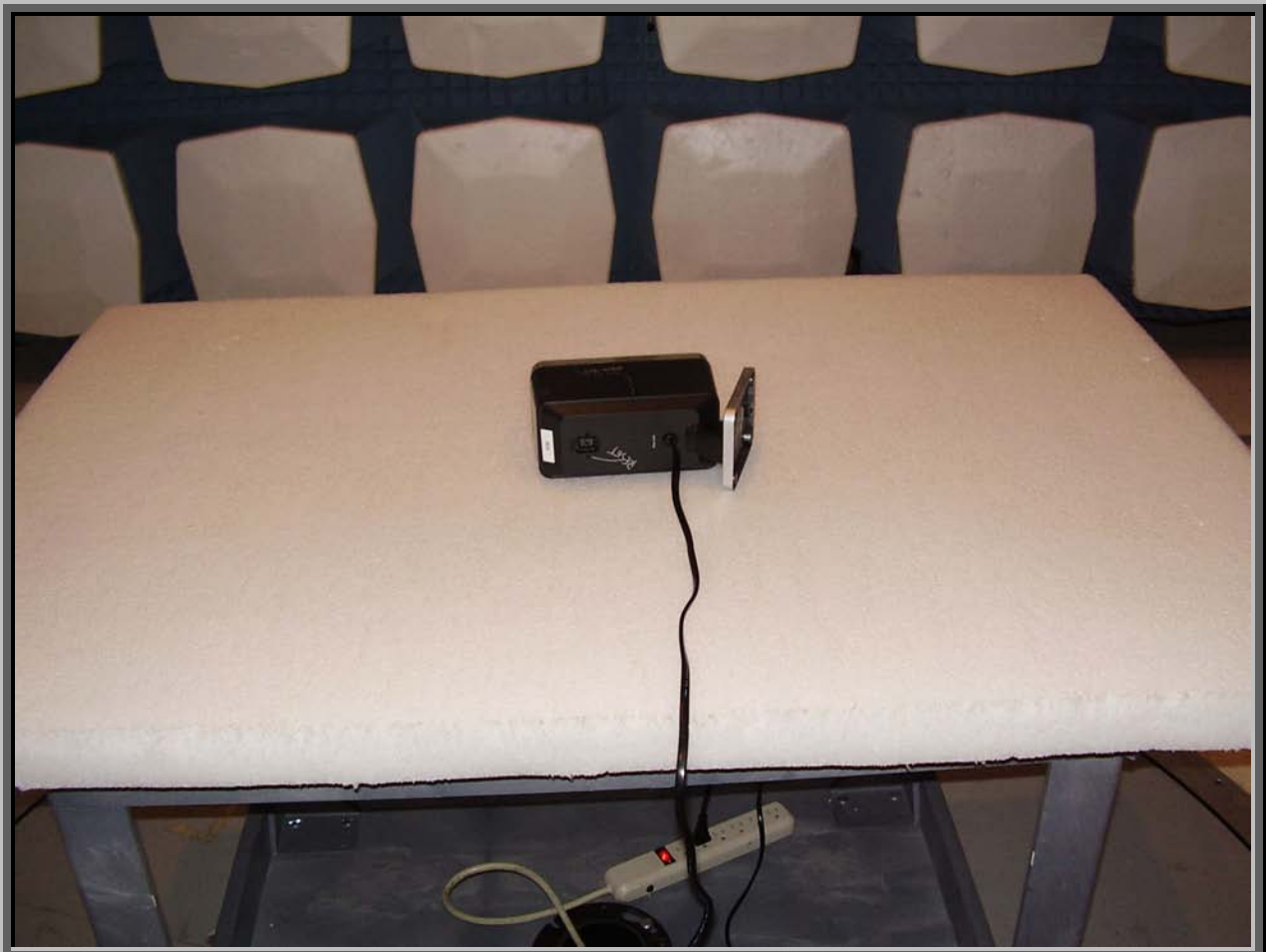
No deviations.

Run #	13	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4132.814	45.7	5.7	42.0	1.0	0.0	0.0	H-Horn	PK	0.0	51.4	74.0	-22.6
4959.439	41.1	6.8	42.0	1.0	0.0	0.0	H-Horn	PK	0.0	47.9	74.0	-26.1
4959.201	40.5	6.8	327.0	1.1	0.0	0.0	V-Horn	PK	0.0	47.3	74.0	-26.7
4132.891	39.8	5.7	120.0	1.3	0.0	0.0	V-Horn	PK	0.0	45.5	74.0	-28.5
4132.677	38.3	5.7	42.0	1.0	24.6	0.0	H-Horn	AV	0.0	19.4	54.0	-34.6
4959.223	31.7	6.8	42.0	1.0	24.6	0.0	H-Horn	AV	0.0	13.9	54.0	-40.1
4959.219	31.0	6.8	327.0	1.1	24.6	0.0	V-Horn	AV	0.0	13.2	54.0	-40.8
4132.781	30.5	5.7	120.0	1.3	24.6	0.0	V-Horn	AV	0.0	11.6	54.0	-42.4









**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

230 VAC, 50 Hz.

**Software\Firmware Applied During Test**

Exercise software	Special Test Software	Version	Z6DW a0.3.3.1.2.6
Description			
The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.			

Description

The system was tested using special test codes on a remote laptop to exercise the functions of the device during the testing.

**EUT and Peripherals in Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Left front speaker	Logitech, Inc.	S-0181A	Unknown
Right front speaker	Logitech, Inc.	S-0181A	Unknown
Center front speaker	Logitech, Inc.	S-0181A	Unknown
Right rear speaker	Logitech, Inc.	S-0181A	Unknown
Left rear speaker	Logitech, Inc.	S-0181A	Unknown
Subwoofer – US Unit	Logitech, Inc.	S-0181A	Unknown
Subwoofer – EU Unit	Logitech, Inc.	S-0181A	Unknown
DVD Player	Pioneer	DV-578A-S	DDTE 003395 CC
Control Pod	Logitech, Inc.	S-0181A	Unknown



## Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Notebook PC	Dell, Inc.	Latitude D600	99XL661
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
Audio	No	1.5	No	Subwoofer	Right front speaker
Audio	No	1.4	No	Subwoofer	Center front speaker
Audio	No	1.8	No	Subwoofer	Left front speaker
AC Power	No	1.4	No	Subwoofer	AC Mains
AC Power	No	1.4	No	Left rear speaker	AC Mains
AC Power	No	1.4	No	Right rear speaker	AC Mains
Control	Yes	1.2	PA	Control Pod	Subwoofer
Audio (x3)	No	1.4	No	Control Pod	DVD Player
Fiber optic	No	1.2	No	Control Pod	DVD Player
Coax	Yes	1.2	No	Control Pod	DVD Player
AC Power	No	1.4	No	DVD Player	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

## Measurement Equipment

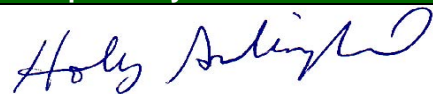
Description	Manufacturer	Model	Identifier	Last Cal	Interval
LISN	Solar	9252-50-R-24-BNC	LIN	12/29/2004	13 mo
LISN	Solar	9252-50-R-24-BNC	LIP	12/29/2004	13 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	12/29/2004	13 mo
Attenuator	Tektronix	011-0059-02	ATH	12/29/2004	13 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	04/08/2005	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:



# CONDUCTED EMISSIONS DATA SHEET

## EMC

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/06/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 42%
Project: None		Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

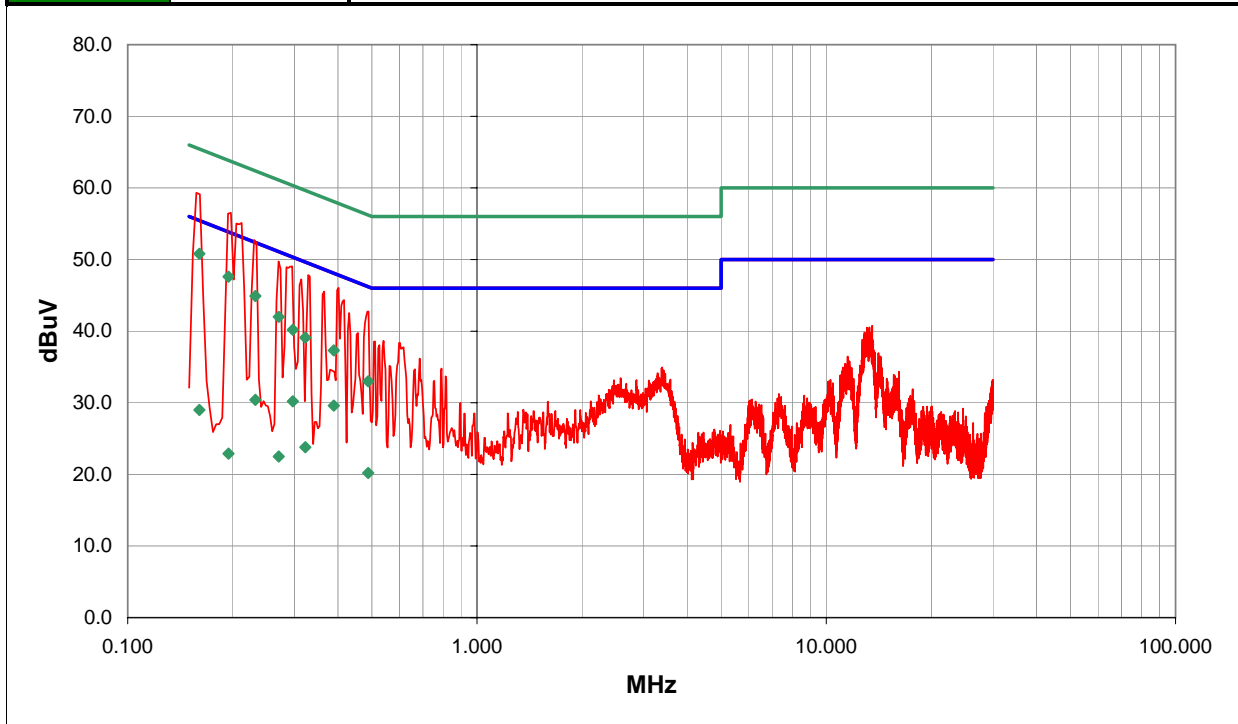
TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES  
Transmitting low channel from rear speaker.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	13	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.160	30.8	0.0	0.0	20.0	QP	50.8	65.4	-14.6
0.194	27.6	0.0	0.0	20.0	QP	47.6	63.9	-16.3
0.232	24.9	0.0	0.0	20.0	QP	44.9	62.4	-17.5
0.389	9.6	0.0	0.0	20.0	AV	29.6	48.1	-18.5
0.271	22.0	0.0	0.0	20.0	QP	42.0	61.1	-19.1
0.297	10.2	0.0	0.0	20.0	AV	30.2	50.3	-20.1
0.297	20.2	0.0	0.0	20.0	QP	40.2	60.3	-20.1
0.323	19.1	0.0	0.0	20.0	QP	39.1	59.6	-20.5
0.389	17.3	0.0	0.0	20.0	QP	37.3	58.1	-20.8
0.232	10.4	0.0	0.0	20.0	AV	30.4	52.4	-22.0
0.488	13.0	0.0	0.0	20.0	QP	33.0	56.2	-23.2
0.323	3.8	0.0	0.0	20.0	AV	23.8	49.6	-25.8
0.488	0.2	0.0	0.0	20.0	AV	20.2	46.2	-26.0
0.160	9.0	0.0	0.0	20.0	AV	29.0	55.4	-26.4
0.271	2.5	0.0	0.0	20.0	AV	22.5	51.1	-28.6
0.194	2.9	0.0	0.0	20.0	AV	22.9	53.9	-31.0
0.296	28.8	0.0	0.2	20.0		49.0	50.4	-1.3
0.270	29.5	0.0	0.2	20.0		49.7	51.1	-1.4
0.329	27.6	0.0	0.2	20.0		47.8	49.5	-1.7

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/06/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 42%
Project: None		Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

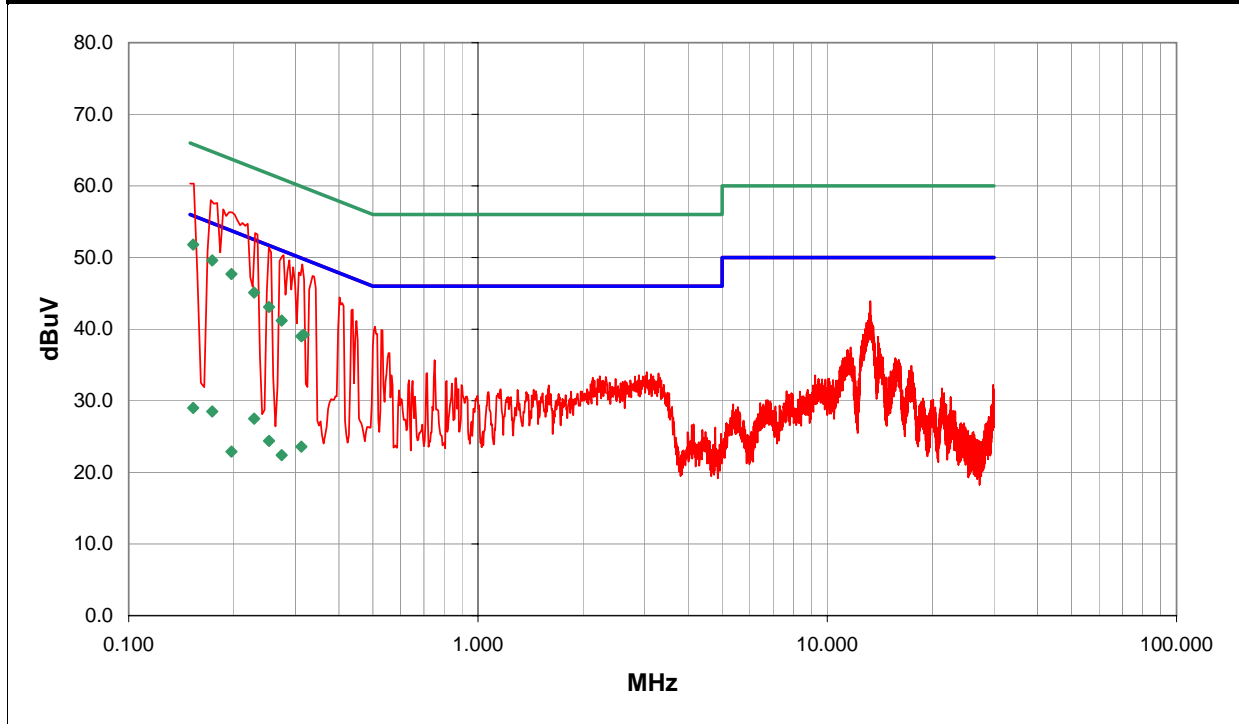
TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES  
Transmitting low channel from rear speaker.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	14	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.153	31.8	0.0	0.0	20.0	QP	51.8	65.8	-14.0
0.173	29.6	0.0	0.0	20.0	QP	49.6	64.8	-15.2
0.197	27.7	0.0	0.0	20.0	QP	47.7	63.7	-16.0
0.229	25.1	0.0	0.0	20.0	QP	45.1	62.5	-17.4
0.252	23.1	0.0	0.0	20.0	QP	43.1	61.7	-18.6
0.274	21.2	0.0	0.0	20.0	QP	41.2	61.0	-19.8
0.317	19.2	0.0	0.0	20.0	QP	39.2	59.8	-20.6
0.312	19.0	0.0	0.0	20.0	QP	39.0	59.9	-20.9
0.229	7.5	0.0	0.0	20.0	AV	27.5	52.5	-25.0
0.173	8.5	0.0	0.0	20.0	AV	28.5	54.8	-26.3
0.312	3.6	0.0	0.0	20.0	AV	23.6	49.9	-26.3
0.153	9.0	0.0	0.0	20.0	AV	29.0	55.8	-26.8
0.252	4.4	0.0	0.0	20.0	AV	24.4	51.7	-27.3
0.274	2.4	0.0	0.0	20.0	AV	22.4	51.0	-28.6
0.197	2.9	0.0	0.0	20.0	AV	22.9	53.7	-30.8
0.252	31.2	0.0	0.2	20.0		51.4	51.7	-0.3
0.278	30.1	0.0	0.2	20.0		50.3	50.9	-0.6
0.314	28.8	0.0	0.2	20.0		49.0	49.9	-0.8
0.288	29.4	0.0	0.2	20.0		49.6	50.6	-0.9

# CONDUCTED EMISSIONS DATA SHEET

## EMC

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/07/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 42%
Project: None		Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

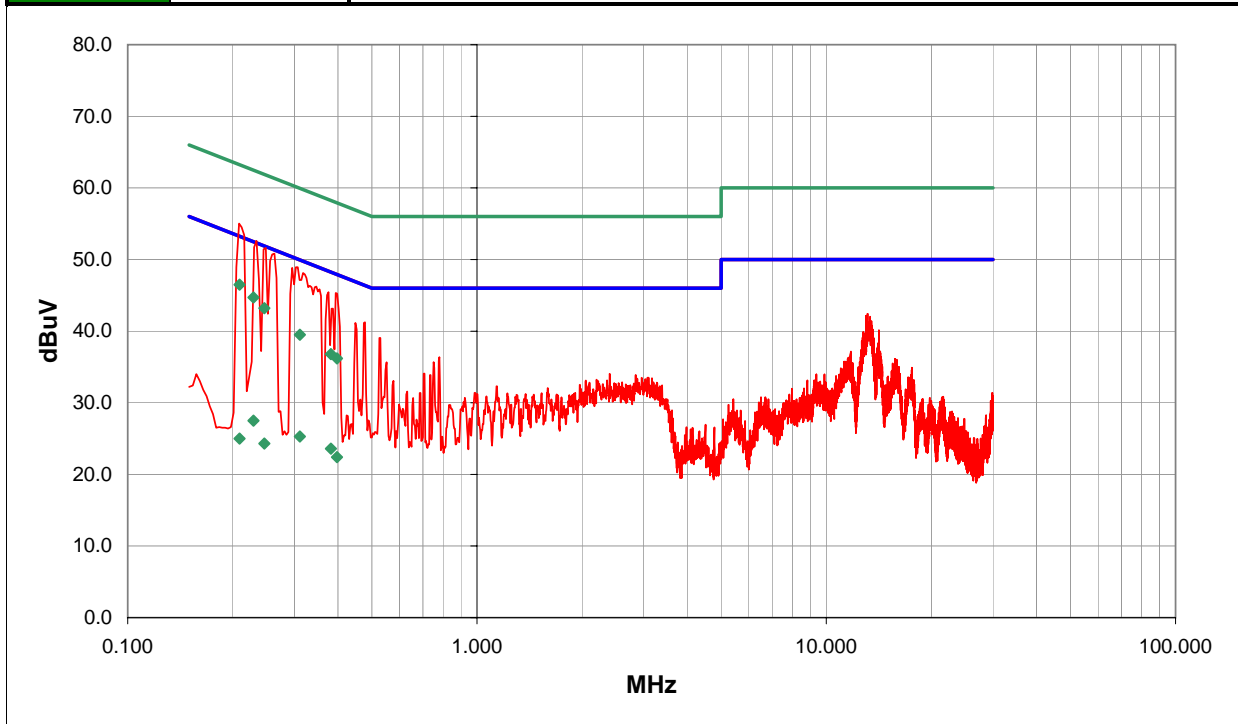
TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES  
Transmitting mid channel from rear speaker.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	15	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.209	26.5	0.0	0.0	20.0	QP	46.5	63.2	-16.7
0.229	24.7	0.0	0.0	20.0	QP	44.7	62.5	-17.8
0.246	23.2	0.0	0.0	20.0	QP	43.2	61.9	-18.7
0.311	19.5	0.0	0.0	20.0	QP	39.5	59.9	-20.4
0.382	16.8	0.0	0.0	20.0	QP	36.8	58.2	-21.4
0.397	16.2	0.0	0.0	20.0	QP	36.2	57.9	-21.7
0.311	5.3	0.0	0.0	20.0	AV	25.3	49.9	-24.6
0.382	3.6	0.0	0.0	20.0	AV	23.6	48.2	-24.6
0.229	7.5	0.0	0.0	20.0	AV	27.5	52.5	-25.0
0.397	2.4	0.0	0.0	20.0	AV	22.4	47.9	-25.5
0.246	4.3	0.0	0.0	20.0	AV	24.3	51.9	-27.6
0.209	5.0	0.0	0.0	20.0	AV	25.0	53.2	-28.2
0.248	31.4	0.0	0.2	20.0		51.6	51.8	-0.2
0.263	30.6	0.0	0.2	20.0		50.8	51.3	-0.5
0.307	28.7	0.0	0.2	20.0		48.9	50.1	-1.1
0.296	28.6	0.0	0.2	20.0		48.8	50.4	-1.5
0.394	25.1	0.0	0.2	20.0		45.3	48.0	-2.6
0.376	25.2	0.0	0.2	20.0		45.4	48.4	-2.9
0.387	22.9	0.0	0.2	20.0		43.1	48.1	-5.0

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/07/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 42%
Project: None		Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

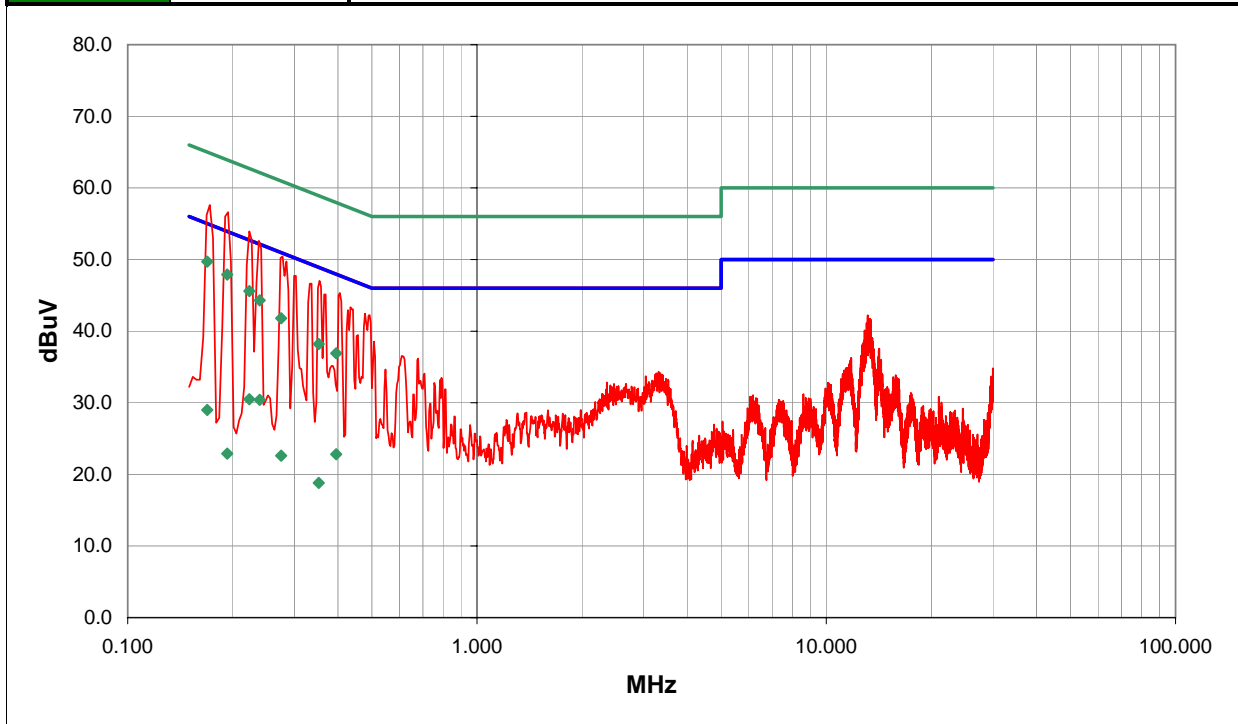
TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES  
Transmitting mid channel from rear speaker.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	16	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.169	29.7	0.0	0.0	20.0	QP	49.7	65.0	-15.3
0.193	27.9	0.0	0.0	20.0	QP	47.9	63.9	-16.0
0.223	25.6	0.0	0.0	20.0	QP	45.6	62.7	-17.1
0.239	24.3	0.0	0.0	20.0	QP	44.3	62.1	-17.8
0.275	21.8	0.0	0.0	20.0	QP	41.8	61.0	-19.2
0.352	18.2	0.0	0.0	20.0	QP	38.2	58.9	-20.7
0.395	16.9	0.0	0.0	20.0	QP	36.9	58.0	-21.1
0.239	10.4	0.0	0.0	20.0	AV	30.4	52.1	-21.7
0.223	10.5	0.0	0.0	20.0	AV	30.5	52.7	-22.2
0.395	2.8	0.0	0.0	20.0	AV	22.8	48.0	-25.2
0.169	9.0	0.0	0.0	20.0	AV	29.0	55.0	-26.0
0.275	2.6	0.0	0.0	20.0	AV	22.6	51.0	-28.4
0.352	-1.2	0.0	0.0	20.0	AV	18.8	48.9	-30.1
0.193	2.9	0.0	0.0	20.0	AV	22.9	53.9	-31.0
0.278	30.2	0.0	0.2	20.0		50.4	50.9	-0.5
0.285	29.5	0.0	0.2	20.0		49.7	50.7	-0.9
0.354	26.8	0.0	0.2	20.0		47.0	48.9	-1.8
0.405	25.1	0.0	0.2	20.0		45.3	47.7	-2.4
0.303	27.5	0.0	0.2	20.0		47.7	50.2	-2.4

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/07/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 42%
Project: None		Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

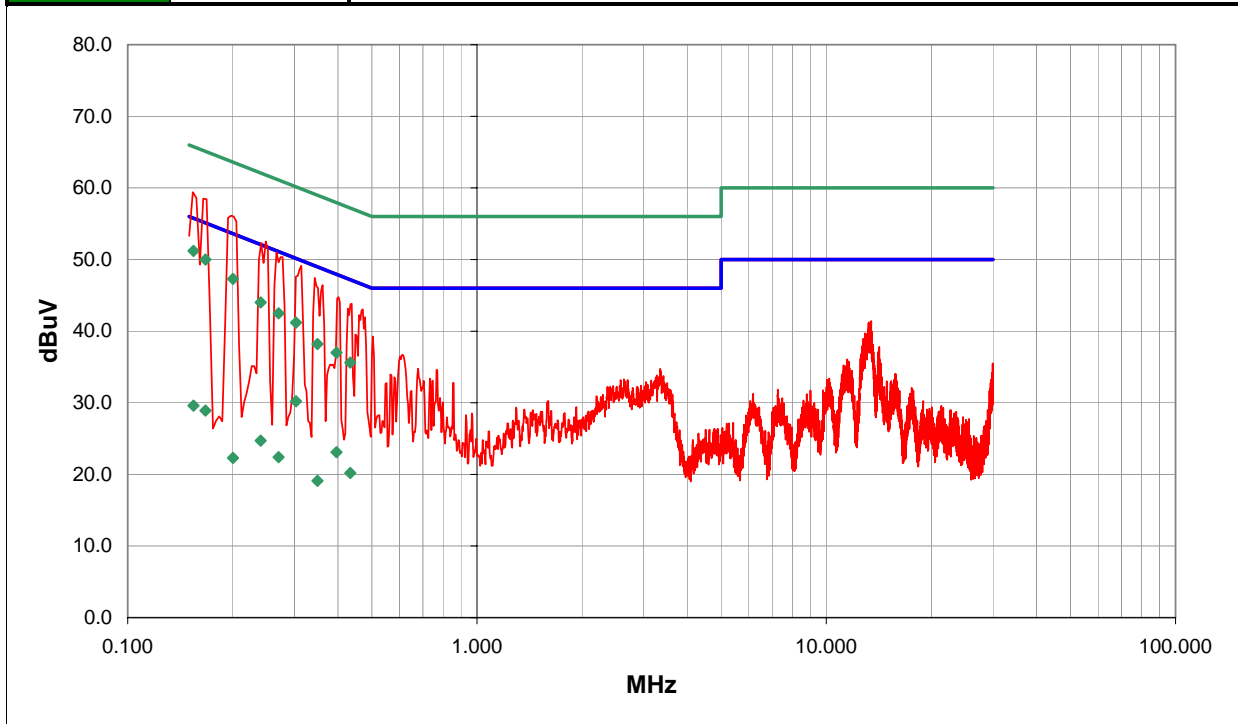
TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES  
Transmitting high channel from rear speaker.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	17	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.154	31.2	0.0	0.0	20.0	QP	51.2	65.8	-14.6
0.167	30.0	0.0	0.0	20.0	QP	50.0	65.1	-15.1
0.200	27.3	0.0	0.0	20.0	QP	47.3	63.6	-16.3
0.240	24.0	0.0	0.0	20.0	QP	44.0	62.1	-18.1
0.270	22.5	0.0	0.0	20.0	QP	42.5	61.1	-18.6
0.303	21.2	0.0	0.0	20.0	QP	41.2	60.1	-18.9
0.303	10.2	0.0	0.0	20.0	AV	30.2	50.1	-19.9
0.349	18.2	0.0	0.0	20.0	QP	38.2	59.0	-20.8
0.396	17.0	0.0	0.0	20.0	QP	37.0	57.9	-20.9
0.434	15.6	0.0	0.0	20.0	QP	35.6	57.2	-21.6
0.396	3.1	0.0	0.0	20.0	AV	23.1	47.9	-24.8
0.154	9.6	0.0	0.0	20.0	AV	29.6	55.8	-26.2
0.167	8.9	0.0	0.0	20.0	AV	28.9	55.1	-26.2
0.434	0.2	0.0	0.0	20.0	AV	20.2	47.2	-27.0
0.240	4.7	0.0	0.0	20.0	AV	24.7	52.1	-27.4
0.270	2.4	0.0	0.0	20.0	AV	22.4	51.1	-28.7
0.349	-0.9	0.0	0.0	20.0	AV	19.1	49.0	-29.9
0.200	2.3	0.0	0.0	20.0	AV	22.3	53.6	-31.3
0.267	30.8	0.0	0.2	20.0		51.0	51.2	-0.2

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/07/05
Customer: Logitech, Inc.		Temperature: 25
Attendees: None		Humidity: 42%
Project: None		Barometric Pressure: 29.97
Tested by: Holly Ashkannejhad	Power: 120VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

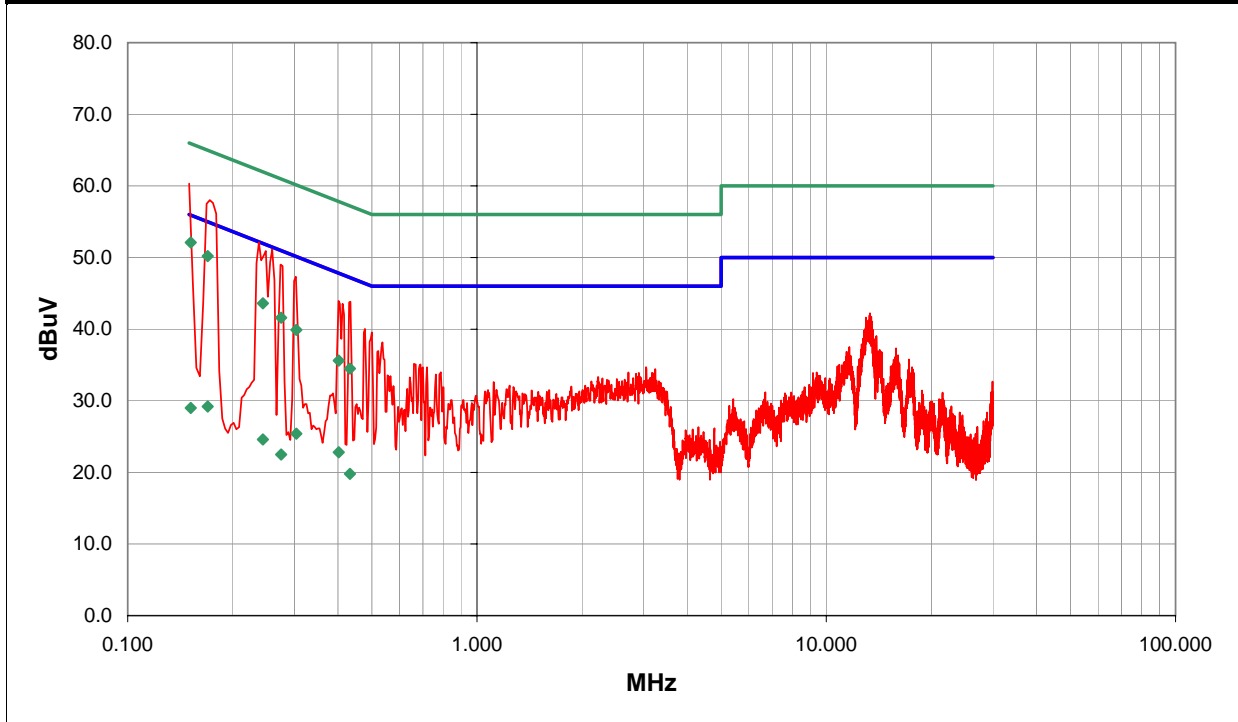
TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES  
Transmitting high channel from rear speaker.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	18	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.152	32.1	0.0	0.0	20.0	QP	52.1	65.9	-13.8
0.169	30.2	0.0	0.0	20.0	QP	50.2	65.0	-14.8
0.244	23.6	0.0	0.0	20.0	QP	43.6	62.0	-18.4
0.275	21.6	0.0	0.0	20.0	QP	41.6	61.0	-19.4
0.304	19.9	0.0	0.0	20.0	QP	39.9	60.1	-20.2
0.402	15.6	0.0	0.0	20.0	QP	35.6	57.8	-22.2
0.433	14.5	0.0	0.0	20.0	QP	34.5	57.2	-22.7
0.304	5.4	0.0	0.0	20.0	AV	25.4	50.1	-24.7
0.402	2.8	0.0	0.0	20.0	AV	22.8	47.8	-25.0
0.169	9.2	0.0	0.0	20.0	AV	29.2	55.0	-25.8
0.152	9.0	0.0	0.0	20.0	AV	29.0	55.9	-26.9
0.244	4.6	0.0	0.0	20.0	AV	24.6	52.0	-27.4
0.433	-0.2	0.0	0.0	20.0	AV	19.8	47.2	-27.4
0.275	2.5	0.0	0.0	20.0	AV	22.5	51.0	-28.5
0.237	31.9	0.0	0.2	20.0		52.1	52.2	-0.1
0.259	30.9	0.0	0.2	20.0		51.1	51.5	-0.3
0.274	28.8	0.0	0.2	20.0		49.0	51.0	-2.0
0.303	27.1	0.0	0.2	20.0		47.3	50.2	-2.8
0.434	23.6	0.0	0.2	20.0		43.8	47.2	-3.3

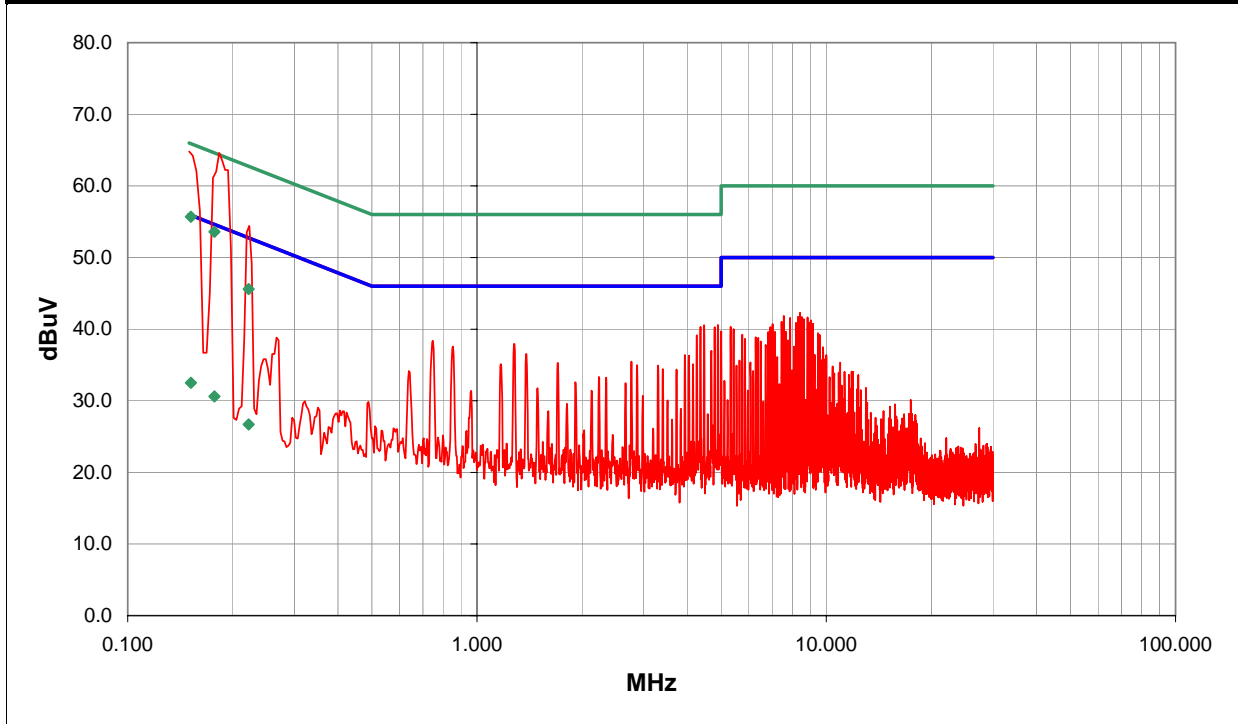
EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/08/05
Customer: Logitech, Inc.		Temperature: 24
Attendees: None		Humidity: 43%
Project: None		Barometric Pressure: 29.92
Tested by: Holly Ashkannejhad	Power: 120 VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

TEST PARAMETERS	
Cable or Line Tested	L1
COMMENTS	

EUT OPERATING MODES	
Control pod transmitting low channel.	
DEVIATIONS FROM TEST STANDARD	
No deviations.	

Run #	28	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.152	35.7	0.0	0.0	20.0	QP	55.7	65.9	-10.2
0.177	33.6	0.0	0.0	20.0	QP	53.6	64.6	-11.0
0.222	25.6	0.0	0.0	20.0	QP	45.6	62.7	-17.1
0.152	12.5	0.0	0.0	20.0	AV	32.5	55.9	-23.4
0.177	10.6	0.0	0.0	20.0	AV	30.6	54.6	-24.0
0.222	6.7	0.0	0.0	20.0	AV	26.7	52.7	-26.0
4.895	19.9	0.0	0.7	20.0		40.6	46.0	-5.4
4.472	19.9	0.0	0.6	20.0		40.5	46.0	-5.5
4.366	19.7	0.0	0.6	20.0		40.3	46.0	-5.7
4.793	19.6	0.0	0.7	20.0		40.3	46.0	-5.7
4.261	18.5	0.0	0.6	20.0		39.1	46.0	-6.9
0.748	18.1	0.0	0.3	20.0		38.4	46.0	-7.6
8.408	21.4	0.0	0.9	20.0		42.3	50.0	-7.7
1.280	17.6	0.0	0.3	20.0		37.9	46.0	-8.1
7.559	21.0	0.0	0.8	20.0		41.8	50.0	-8.2
8.514	20.8	0.0	0.9	20.0		41.7	50.0	-8.3
8.306	20.8	0.0	0.9	20.0		41.7	50.0	-8.3
8.838	20.7	0.0	0.9	20.0		41.6	50.0	-8.4
0.853	17.3	0.0	0.3	20.0		37.6	46.0	-8.4



EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/08/05
Customer: Logitech, Inc.		Temperature: 24
Attendees: None		Humidity: 43%
Project: None		Barometric Pressure: 29.92
Tested by: Holly Ashkannejhad	Power: 120 VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

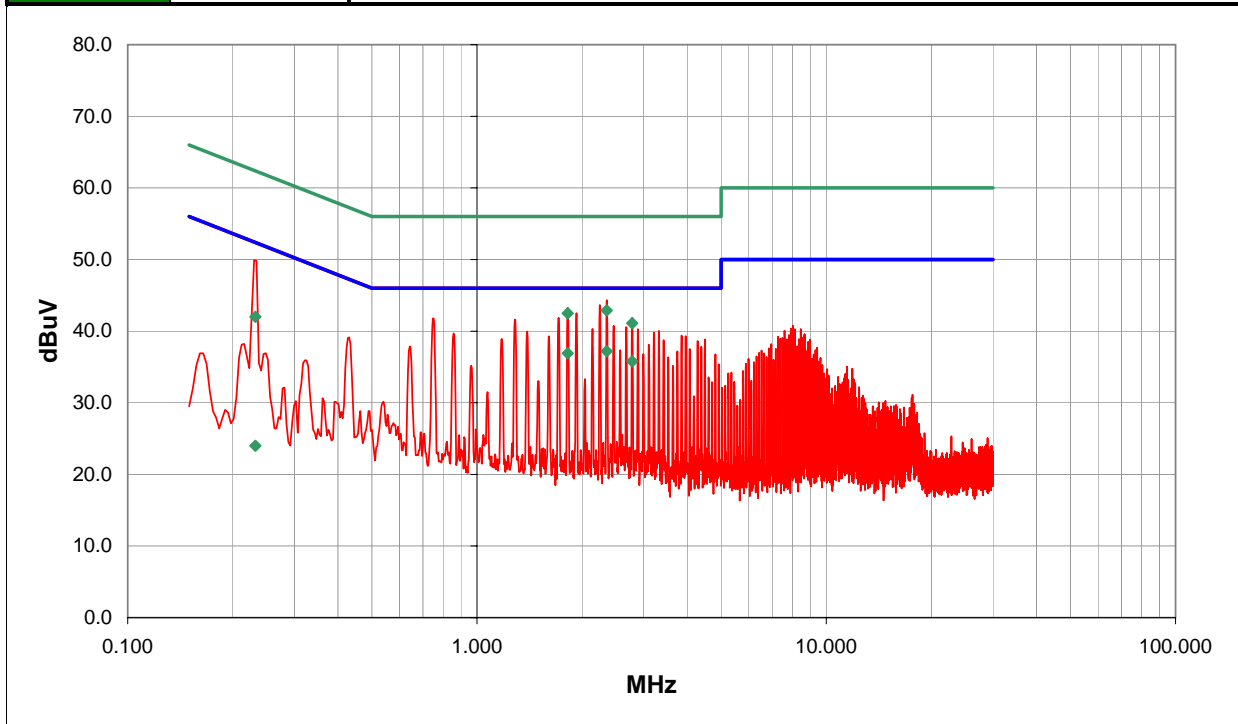
TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES  
Control pod transmitting low channel.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	29	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
2.354	16.8	0.0	0.4	20.0	AV	37.2	46.0	-8.8
1.819	16.5	0.0	0.4	20.0	AV	36.9	46.0	-9.1
2.783	15.4	0.0	0.4	20.0	AV	35.8	46.0	-10.2
2.354	22.5	0.0	0.4	20.0	QP	42.9	56.0	-13.1
1.819	22.1	0.0	0.4	20.0	QP	42.5	56.0	-13.5
2.783	20.7	0.0	0.4	20.0	QP	41.1	56.0	-14.9
0.232	22.0	0.0	0.0	20.0	QP	42.0	62.4	-20.4
0.232	4.0	0.0	0.0	20.0	AV	24.0	52.4	-28.4
2.355	23.9	0.0	0.4	20.0		44.3	46.0	-1.7
2.249	23.2	0.0	0.4	20.0		43.6	46.0	-2.4
0.230	29.7	0.0	0.2	20.0		49.9	52.4	-2.5
1.819	22.9	0.0	0.4	20.0		43.3	46.0	-2.7
1.928	22.1	0.0	0.4	20.0		42.5	46.0	-3.5
2.785	21.4	0.0	0.5	20.0		41.9	46.0	-4.1
1.713	21.5	0.0	0.4	20.0		41.9	46.0	-4.1
0.751	21.5	0.0	0.3	20.0		41.8	46.0	-4.2
1.287	21.3	0.0	0.3	20.0		41.6	46.0	-4.4
2.460	20.3	0.0	0.4	20.0		40.7	46.0	-5.3
2.675	20.1	0.0	0.5	20.0		40.6	46.0	-5.4

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/08/05
Customer: Logitech, Inc.		Temperature: 24
Attendees: None		Humidity: 43%
Project: None		Barometric Pressure: 29.92
Tested by: Holly Ashkannejhad	Power: 120 VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

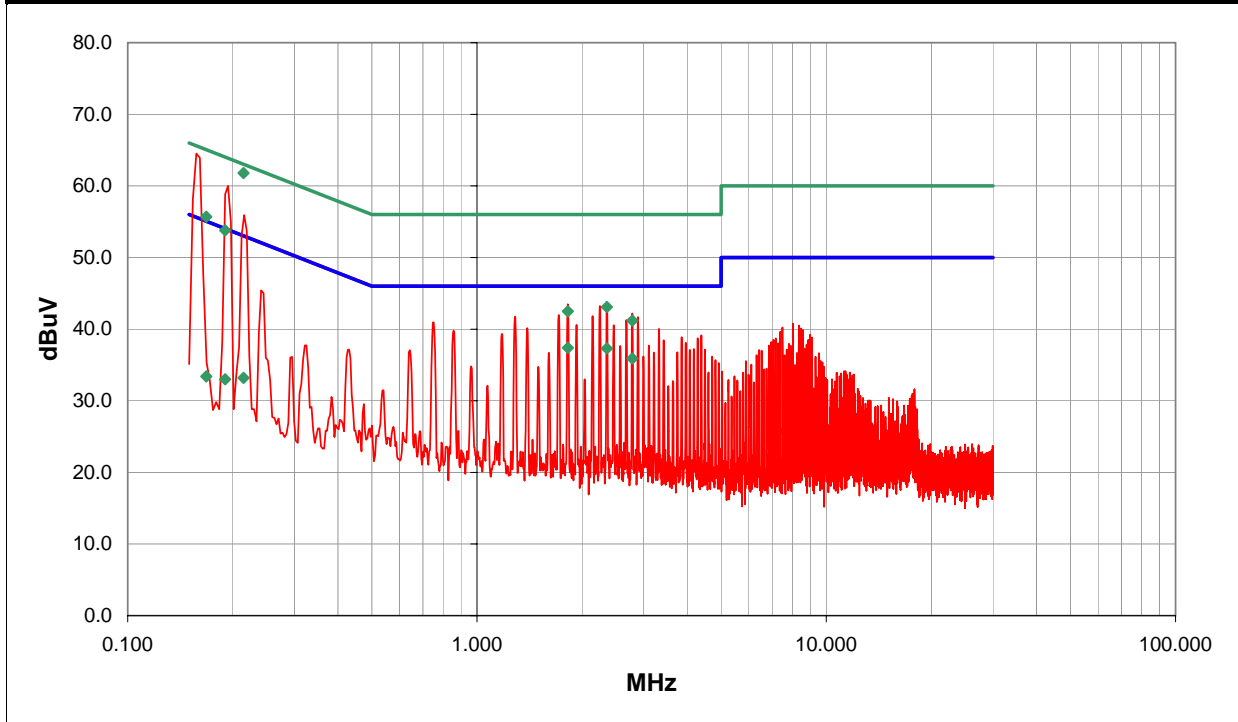
TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES  
Control pod transmitting mid channel.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	30	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.215	41.8	0.0	0.0	20.0	QP	61.8	63.0	-1.2
1.820	17.0	0.0	0.4	20.0	AV	37.4	46.0	-8.6
2.355	16.9	0.0	0.4	20.0	AV	37.3	46.0	-8.7
0.168	35.7	0.0	0.0	20.0	QP	55.7	65.1	-9.4
2.784	15.5	0.0	0.4	20.0	AV	35.9	46.0	-10.1
0.190	33.8	0.0	0.0	20.0	QP	53.8	64.0	-10.2
2.355	22.7	0.0	0.4	20.0	QP	43.1	56.0	-12.9
1.820	22.1	0.0	0.4	20.0	QP	42.5	56.0	-13.5
2.784	20.8	0.0	0.4	20.0	QP	41.2	56.0	-14.8
0.215	13.2	0.0	0.0	20.0	AV	33.2	53.0	-19.8
0.190	13.0	0.0	0.0	20.0	AV	33.0	54.0	-21.0
0.168	13.4	0.0	0.0	20.0	AV	33.4	55.1	-21.7
2.355	23.3	0.0	0.4	20.0		43.7	46.0	-2.3
1.819	23.1	0.0	0.4	20.0		43.5	46.0	-2.5
2.249	22.8	0.0	0.4	20.0		43.2	46.0	-2.8
2.785	21.7	0.0	0.5	20.0		42.2	46.0	-3.8
1.713	21.6	0.0	0.4	20.0		42.0	46.0	-4.0
2.143	21.4	0.0	0.4	20.0		41.8	46.0	-4.2
1.287	21.4	0.0	0.3	20.0		41.7	46.0	-4.3

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/08/05
Customer: Logitech, Inc.		Temperature: 24
Attendees: None		Humidity: 43%
Project: None		Barometric Pressure: 29.92
Tested by: Holly Ashkannejhad	Power: 120 VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

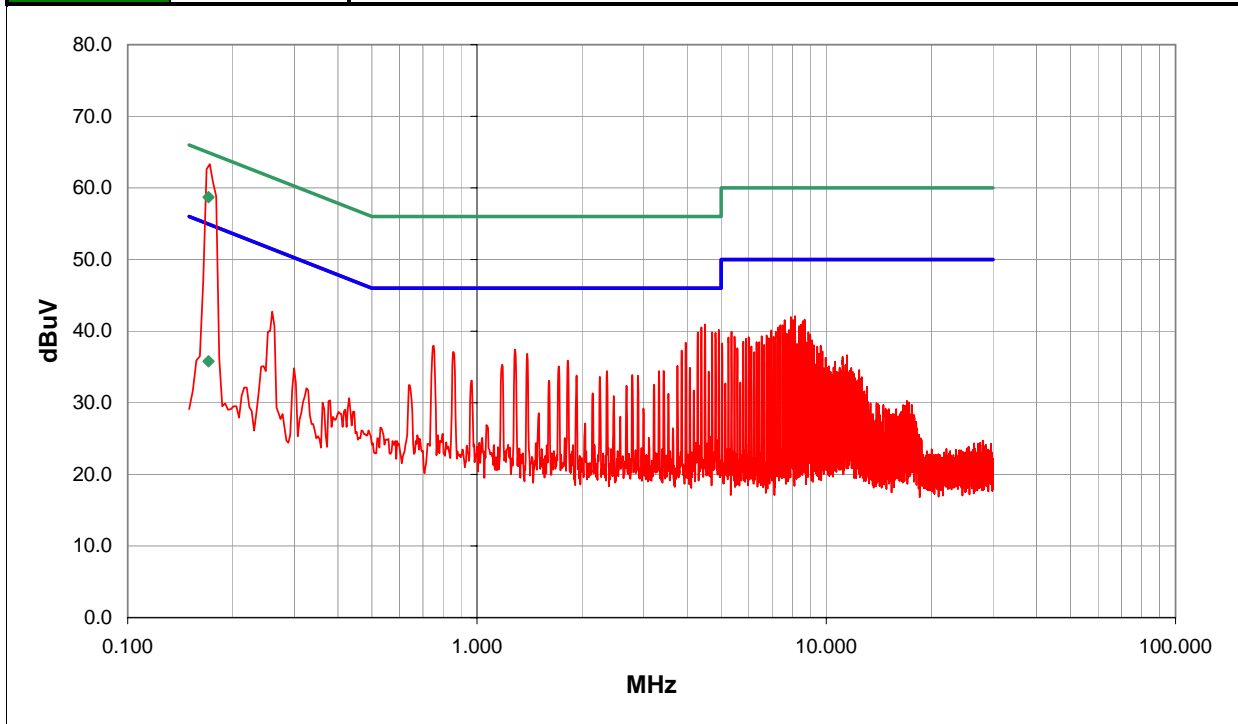
TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES  
Control pod transmitting mid channel.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	31	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.170	38.7	0.0	0.0	20.0	QP	58.7	64.9	-6.2
0.170	15.8	0.0	0.0	20.0	AV	35.8	54.9	-19.1
4.498	20.3	0.0	0.6	20.0		40.9	46.0	-5.1
4.392	19.9	0.0	0.6	20.0		40.5	46.0	-5.5
4.924	19.5	0.0	0.7	20.0		40.2	46.0	-5.8
4.713	19.2	0.0	0.7	20.0		39.9	46.0	-6.1
4.286	19.2	0.0	0.6	20.0		39.8	46.0	-6.2
4.818	19.1	0.0	0.7	20.0		39.8	46.0	-6.2
3.962	17.8	0.0	0.6	20.0		38.4	46.0	-7.6
8.138	21.2	0.0	0.9	20.0		42.1	50.0	-7.9
0.751	17.7	0.0	0.3	20.0		38.0	46.0	-8.0
7.923	21.1	0.0	0.9	20.0		42.0	50.0	-8.0
8.670	20.7	0.0	0.9	20.0		41.6	50.0	-8.4
8.029	20.7	0.0	0.9	20.0		41.6	50.0	-8.4
7.603	20.7	0.0	0.8	20.0		41.5	50.0	-8.5
1.283	17.1	0.0	0.3	20.0		37.4	46.0	-8.6
8.565	20.5	0.0	0.9	20.0		41.4	50.0	-8.6
3.856	16.7	0.0	0.6	20.0		37.3	46.0	-8.7
0.259	22.5	0.0	0.2	20.0		42.7	51.5	-8.7

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/08/05
Customer: Logitech, Inc.		Temperature: 24
Attendees: None		Humidity: 43%
Project: None		Barometric Pressure: 29.92
Tested by: Holly Ashkannejhad	Power: 120 VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

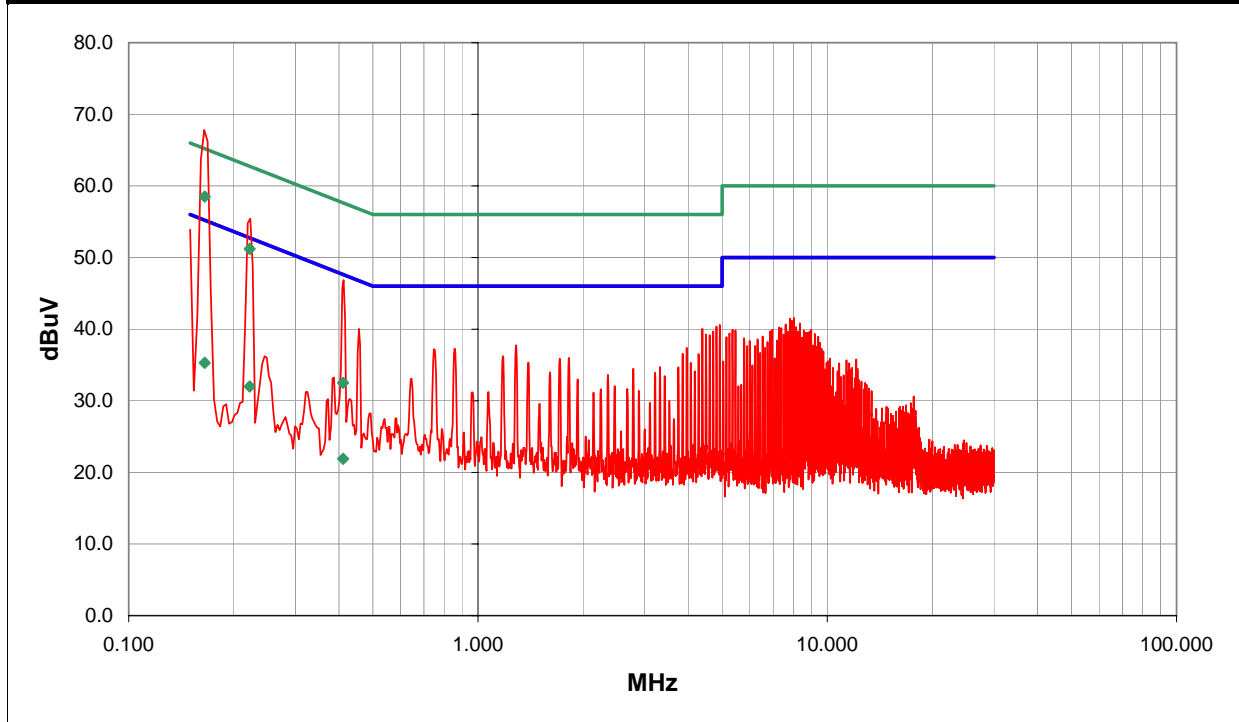
TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES  
Control pod transmitting high channel.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	32	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.165	38.5	0.0	0.0	20.0	QP	58.5	65.2	-6.7
0.222	31.2	0.0	0.0	20.0	QP	51.2	62.7	-11.5
0.165	15.3	0.0	0.0	20.0	AV	35.3	55.2	-19.9
0.222	12.0	0.0	0.0	20.0	AV	32.0	52.7	-20.7
0.411	12.5	0.0	0.0	20.0	QP	32.5	57.6	-25.1
0.411	1.9	0.0	0.0	20.0	AV	21.9	47.6	-25.7
0.412	26.6	0.0	0.2	20.0		46.8	47.6	-0.8
0.150	33.7	0.0	0.2	20.0		53.9	56.0	-2.1
4.924	19.9	0.0	0.7	20.0		40.6	46.0	-5.4
4.818	19.7	0.0	0.7	20.0		40.4	46.0	-5.6
4.392	19.4	0.0	0.6	20.0		40.0	46.0	-6.0
4.716	19.0	0.0	0.7	20.0		39.7	46.0	-6.3
0.456	19.8	0.0	0.2	20.0		40.0	46.8	-6.7
4.498	18.6	0.0	0.6	20.0		39.2	46.0	-6.8
4.607	18.5	0.0	0.7	20.0		39.2	46.0	-6.8
1.287	17.4	0.0	0.3	20.0		37.7	46.0	-8.3
8.029	20.7	0.0	0.9	20.0		41.6	50.0	-8.4
7.818	20.6	0.0	0.9	20.0		41.5	50.0	-8.5
3.962	16.8	0.0	0.6	20.0		37.4	46.0	-8.6

EUT: Z-5450 MN: S-0181A Multimedia Speaker System		Work Order: LABT0140
Serial Number: Unknown		Date: 08/08/05
Customer: Logitech, Inc.		Temperature: 24
Attendees: None		Humidity: 43%
Project: None		Barometric Pressure: 29.92
Tested by: Holly Ashkannejhad	Power: 120 VAC, 60Hz	Job Site: EV01

TEST SPECIFICATIONS		Test Method
FCC 15.207 Class B:2005-04		ANSI C63.4:2003
FCC 15.107 Class B:2005-04		ANSI C63.4:2003

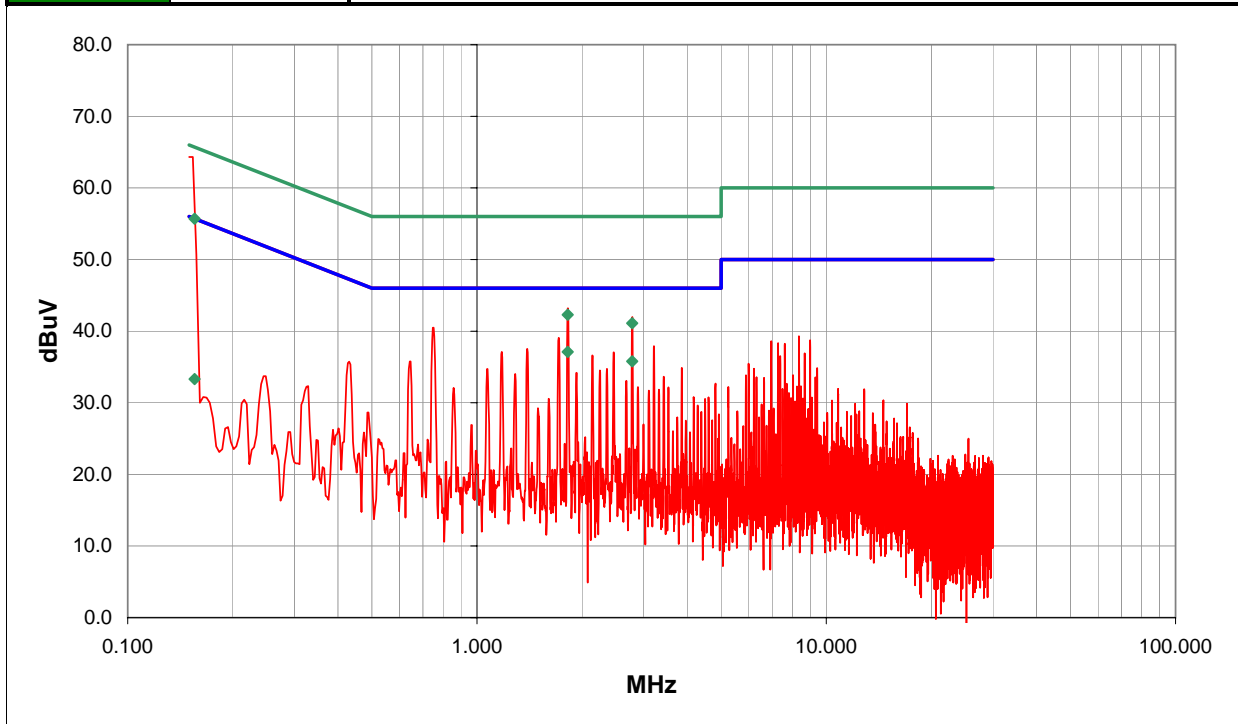
TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES  
Control pod transmitting high channel.

DEVIATIONS FROM TEST STANDARD  
No deviations.

Run #	34	Signature <i>Holly Ashkannejhad</i>
Configuration #		
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
1.820	16.7	0.0	0.4	20.0	AV	37.1	46.0	-8.9
0.155	35.7	0.0	0.0	20.0	QP	55.7	65.7	-10.0
2.783	15.4	0.0	0.4	20.0	AV	35.8	46.0	-10.2
1.820	21.9	0.0	0.4	20.0	QP	42.3	56.0	-13.7
2.783	20.7	0.0	0.4	20.0	QP	41.1	56.0	-14.9
0.155	13.3	0.0	0.0	20.0	AV	33.3	55.7	-22.4
1.823	22.8	0.0	0.4	20.0		43.2	46.0	-2.8
2.785	21.5	0.0	0.5	20.0		42.0	46.0	-4.0
0.751	20.2	0.0	0.3	20.0		40.5	46.0	-5.5
1.713	18.7	0.0	0.4	20.0		39.1	46.0	-6.9
3.211	17.4	0.0	0.5	20.0		37.9	46.0	-8.1
1.393	17.2	0.0	0.3	20.0		37.5	46.0	-8.5
1.178	16.8	0.0	0.3	20.0		37.1	46.0	-8.9
2.464	16.6	0.0	0.4	20.0		37.0	46.0	-9.0
2.140	16.2	0.0	0.4	20.0		36.6	46.0	-9.4
0.646	15.5	0.0	0.3	20.0		35.8	46.0	-10.2
8.353	18.4	0.0	0.9	20.0		39.3	50.0	-10.7
3.860	14.3	0.0	0.6	20.0		34.9	46.0	-11.1
2.355	14.3	0.0	0.4	20.0		34.7	46.0	-11.3

