Logitech, Inc.

F-0361A

October 19, 2004

Report No. LABT0103

Report Prepared By:

NORTHWEST EMC

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

Test Report

NORTHWEST EMC

Certificate of Test
Issue Date: October 19, 2004
Logitech, Inc.
Model: F-0361A

	Emissions		
Specification	**Test Method**	**Pass**	**Fail**
FCC 15.247(a) Occupied Bandwidth:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(b) Output Power:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(c) Band Edge Compliance:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(c) Spurious Conducted Emissions:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(c) Spurious Radiated Emissions:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(d) Power Spectral Density:2003	ANSI C63.4:2001	☒	☐
FCC 15.207 AC Power Line Conducted Emissions	ANSI C63.4:2001	☒	☐

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:

Don Facteau, IS Manager

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

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

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

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

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

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

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

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

VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Nos. - Hillsboro: C-1071 and R-1025, Irvine: C-2094 and R-1943, Newberg: C-1877 and R-1760, Sultan: R-871, C-1784 and R-1761)*

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

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

SCOPE
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/scope.asp

How important is it to understand performance criteria?

It is the responsibility of the test laboratory to observe the results of the tests that are performed and to accurately report those results. As the responsible party (manufacturer, importer, etc) it is your responsibility to take those results, compare them against the specifications and standards, then, if appropriate make a declaration of conformity. As the responsible party it makes sense that you are fully aware of the requirements, how your device performs when tested to those requirements, and what information is being used to declare conformity.

To better assist you in making those conformity decisions, Northwest EMC has adopted a very simple, yet very clear performance assessment procedure. The following criteria is used when performing immunity or susceptibility tests:

Performance Criteria 1:

- ❑ The EUT exhibited no change in performance when operating as specified by the manufacturer. In this case no changes were observed during the test.
- ❑ In most cases this would be equivalent to Performance Criteria A. When operating the equipment in the modes or configurations specified by the responsible party, monitoring the parameters specified, no changes were observed. Basically nothing happened.

Performance Criteria 2:

- ❑ The EUT exhibited a change in performance when operating as specified by the manufacturer. In this case the equipment recovered without any operator intervention. The data sheets will detail the exact phenomena observed.
- ❑ In most cases this would be equivalent to Performance Criteria B. When operating the equipment in the modes or configurations specified by the responsible party, monitoring the parameters specified, changes were observed. The EUT was able to recover from those changes without any operator intervention.

Performance Criteria 3:

- ❑ The EUT exhibited a change in performance when operating as specified by the manufacturer. In this case the equipment required some operator intervention in order to recover. This intervention may be in the form of reducing the test levels, changing parameters, or even resetting the system. The data sheets will detail the exact phenomena observed.
- ❑ In most cases this would be equivalent to Performance Criteria C. When operating the equipment in the modes or configurations specified by the responsible party, monitoring the parameters specified, changes were observed. The EUT required some sort of operator intervention to recover. There was no permanent damage and the EUT appeared to function normally after completion test.

Performance Criteria 4:

- ❑ The EUT exhibited a change in performance when operating as specified by the manufacturer. In this case the equipment was damaged and would not recover. The data sheets will detail the exact phenomena observed.
- ❑ In most cases there is no specific criterion to compare this to, it typically ends the test. When operating the equipment in the modes or configurations specified by the responsible party, monitoring the parameters specified, changes were observed. There was no recovery; the equipment would no longer function as intended.

Each of the standards and specifications has unique performance criteria. In order to make an accurate assessment, one must compare the test results provided with the specific performance criteria. **To ensure that a responsible party is compliant with the specifications, one must read and understand those specifications. Provided below is a sample performance criteria, taken from EN 50082-1.**

EN 50082-1 Performance Criteria

Performance Criteria A: *The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.*

Performance Criteria B: *The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.*

Performance Criteria C: *Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of controls.*

How should a device perform in order for a declaration of conformity to be made?

As already stated, it is the responsible party that must interpret and understand the results in such a way that a declaration of conformity is made. Having said that, we are often asked to render our opinion as to how a device should perform. Our recommendation simply follows the standards, as can be referenced below. Most of the standards and specifications offer the same performance criterion shown below as their requirements.

| Test	Performance Criteria typically specified by the Standard	Equivalent Northwest EMC Performance Criteria
ESD	Performance Criteria B	Performance Criteria 1 or 2
Radiated RF	Performance Criteria A	Performance Criteria 1
EFT/Burst	Performance Criteria B	Performance Criteria 1 or 2
Surge	Performance Criteria B	Performance Criteria 1 or 2
Conducted RF	Performance Criteria A	Performance Criteria 1
Magnetic Field	Performance Criteria A	Performance Criteria 1
Voltage Dips and Variations	Performance Criteria B & C	Performance Criteria 1, 2, or 3

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.
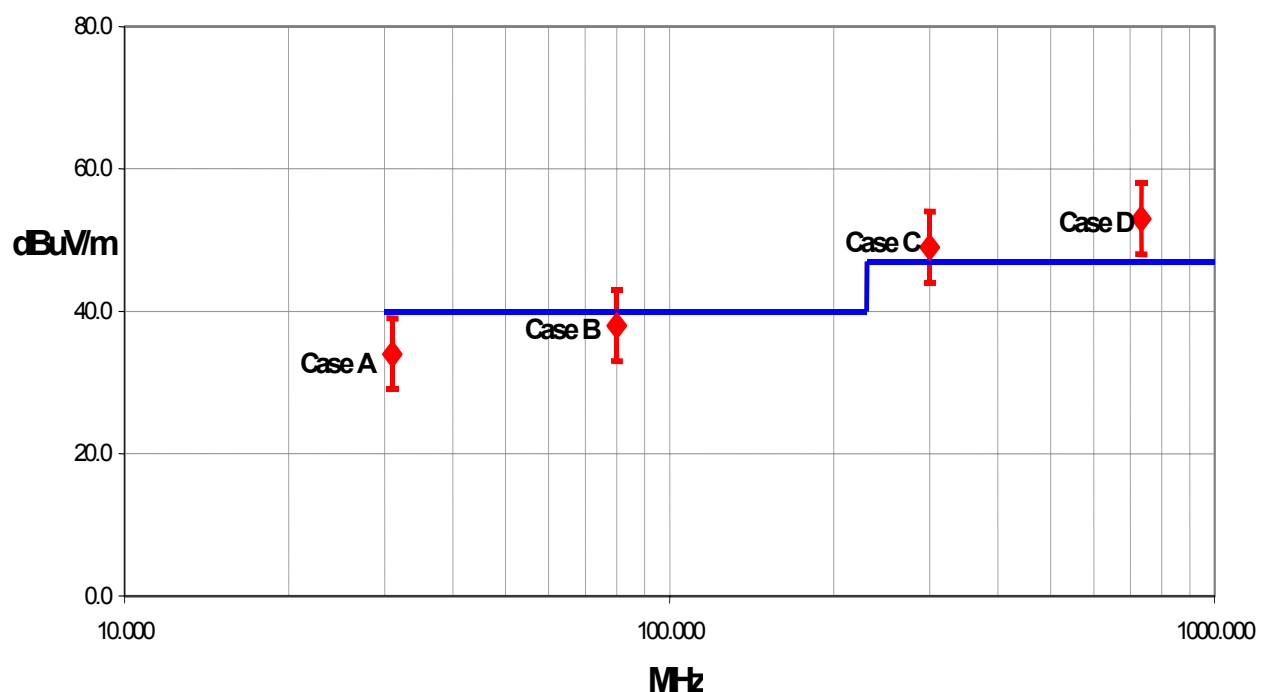
Test Result Scenarios:

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

Radiated Emissions > 1 GHz	Value (dB)		
	Probability Distribution	Without High Pass Filter	With High Pass Filter
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25	+ 1.38 - 1.35
Expanded uncertainty U (level of confidence ≈ 95%)	normal (k=2)	+ 2.57 - 2.51	+ 2.76 - -2.70

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

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

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

Legend

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

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

California

Orange County Facility

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

Oregon

Evergreen Facility

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

Oregon

Trails End Facility

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

Washington

Sultan Facility

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

Party Requesting the Test	
Company Name:	Logitech, Inc.
Address:	1499 SE Tech Center Place Suite 350
City, State, Zip:	Vancouver, WA 98683
Test Requested By:	Mitchell Phillipi
Model:	F-0361A
First Date of Test:	September 29, 2004
Last Date of Test:	October 10, 2004
Receipt Date of Samples:	September 29, 2004
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	12 MHz, 2402 – 2480 MHz
I/O Ports:	DC

Functional Description of the EUT (Equipment Under Test):
Bluetooth headset with integral antenna.

Client Justification for EUT Selection:
Not Provided

Client Justification for Test Selection:
Not Provided

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	AC Powerline Conducted Emissions	09/29/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
2	Occupied bandwidth	10/01/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
3	Band Edge Compliance	10/05/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
4	Spurious Conducted Emissions	10/05/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
5	Power Spectral Density	10/05/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
6	Spurious Radiated Emissions	10/08/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
7	Output Power	10/10/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT returned to client.

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.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

Transmitting data; 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

Operating system	Unknown	Version	Unknown
Exercise software	Zeevo Test	Version	(v0.1.7)
Description			

The system was tested using special software developed to test all functions of the device during the test. The software put the carrier in a no-hop modulated mode and allowed the low, mid, and high channels to be selected.

EUT and Peripherals in Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Headset	Logitech, Inc.	F-0361A	N/A
AC Adapter	Logitech, Inc.	P925BW05050ABD3	D42711252

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary.			

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.0	PA	EUT - Headset	AC Adapter
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
LISN	Solar	9252-50-24-BNC	LIA	12/16/2003	13 mo
LISN	Solar	9252-50-R-24-BNC	LIQ	12/17/2003	13 mo
Spectrum Analyzer	Hewlett Packard	8593E	AAP	03/22/2004	13 mo
Receiver	Schaffner	SCR 3101	ARC	04/28/2003	24 mo

Test Description

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.
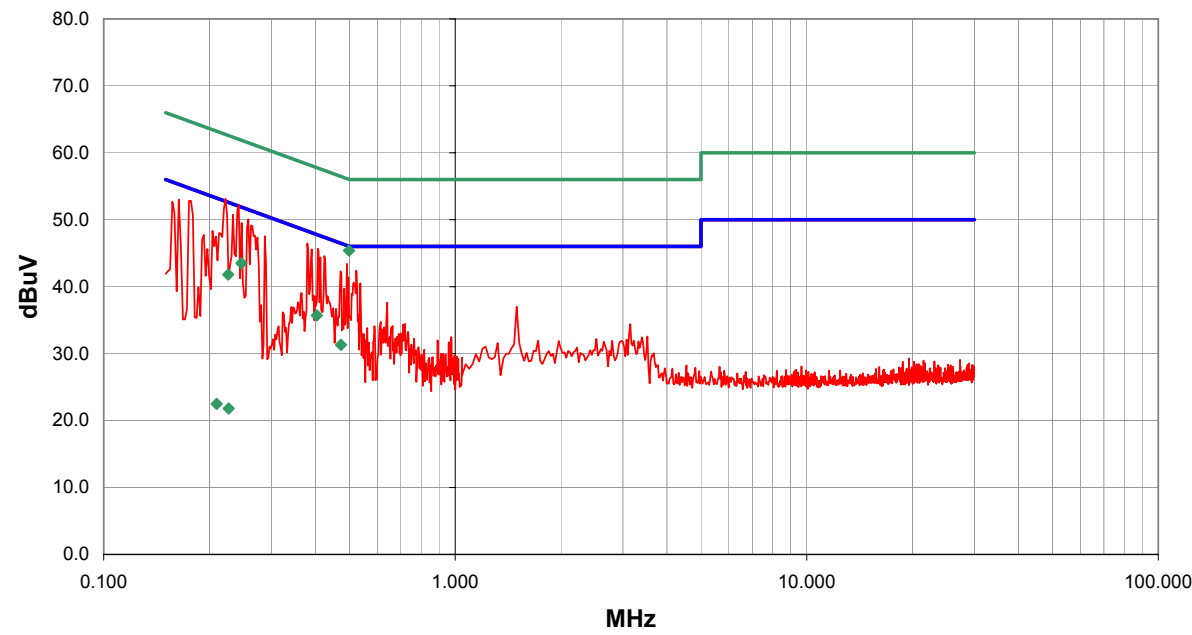
Measurement Bandwidths

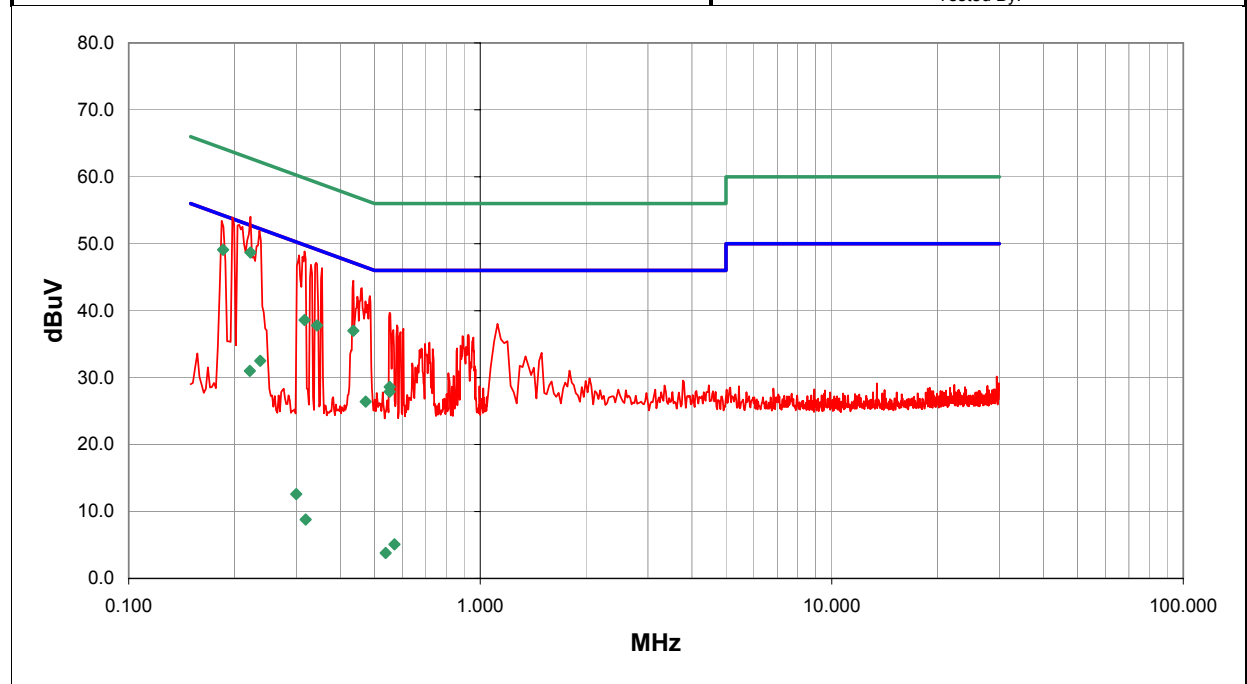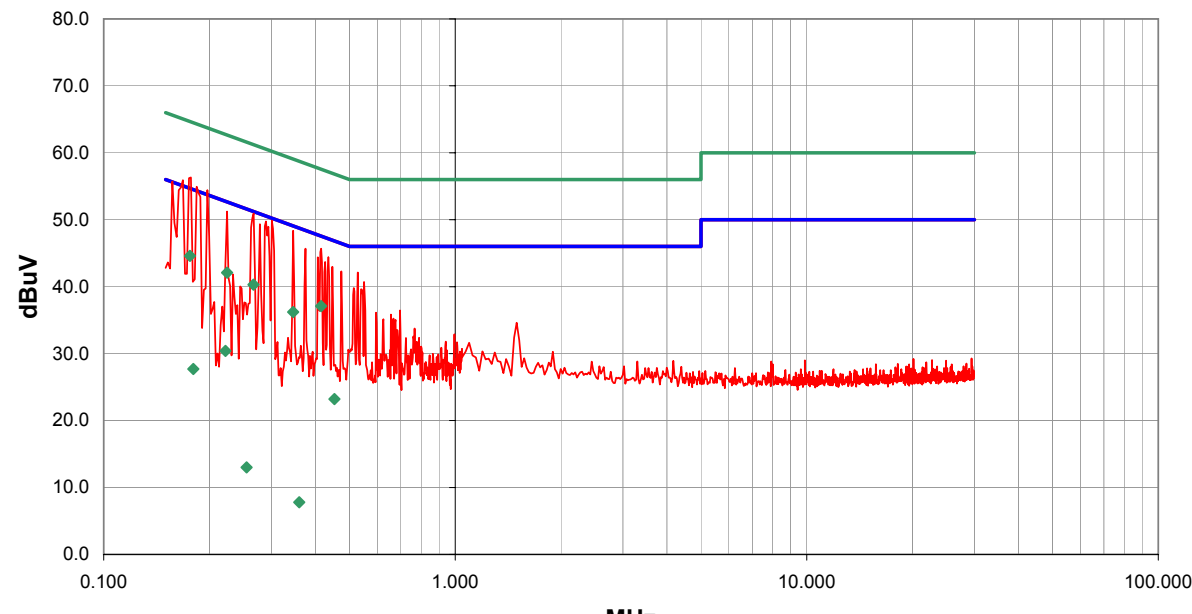| Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

Completed by:

CONDUCTED EMISSIONS DATA SHEET

REV
df4.3
09/20/2004

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	0%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.207	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting - Low Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Line** | **Run #**

Pass | **L1** | **1**

Other

Tested By:

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)
0.499	25.4			0.0	0.0	20.0		QP		45.4	56.0	-10.6
0.473	11.3			0.0	0.0	20.0		AV		31.3	46.5	-15.2
0.246	23.5			0.0	0.0	20.0		QP		43.5	61.9	-18.4
0.226	21.8			0.0	0.0	20.0		QP		41.8	62.6	-20.8
0.404	15.7			0.0	0.0	20.0		QP		35.7	57.8	-22.1
0.210	2.5			0.0	0.0	20.0		AV		22.5	53.2	-30.7
0.227	1.8			0.0	0.0	20.0		AV		21.8	52.6	-30.8

NORTHWEST EMC — CONDUCTED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	0%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.207	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting - Low Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Line	Run #
Pass	N	2

Other

Tested By:

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)
0.222	28.7			0.0	0.0	20.0		QP		48.7	62.7	-14.0
0.185	29.1			0.0	0.0	20.0		QP		49.1	64.2	-15.1
0.237	12.5			0.0	0.0	20.0		AV		32.5	52.2	-19.7
0.472	6.4			0.0	0.0	20.0		AV		26.4	46.5	-20.1
0.436	17.0			0.0	0.0	20.0		QP		37.0	57.1	-20.1
0.317	18.6			0.0	0.0	20.0		QP		38.6	59.8	-21.2
0.343	17.8			0.0	0.0	20.0		QP		37.8	59.1	-21.3
0.221	11.0			0.0	0.0	20.0		AV		31.0	52.8	-21.8
0.553	8.6			0.0	0.0	20.0		QP		28.6	56.0	-27.4
0.553	7.9			0.0	0.0	20.0		QP		27.9	56.0	-28.1
0.300	-7.4			0.0	0.0	20.0		AV		12.6	50.3	-37.7
0.570	-14.9			0.0	0.0	20.0		AV		5.1	46.0	-40.9
0.319	-11.2			0.0	0.0	20.0		AV		8.8	49.7	-40.9
0.538	-16.2			0.0	0.0	20.0		AV		3.8	46.0	-42.2

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	0%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.207	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting - Mid Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

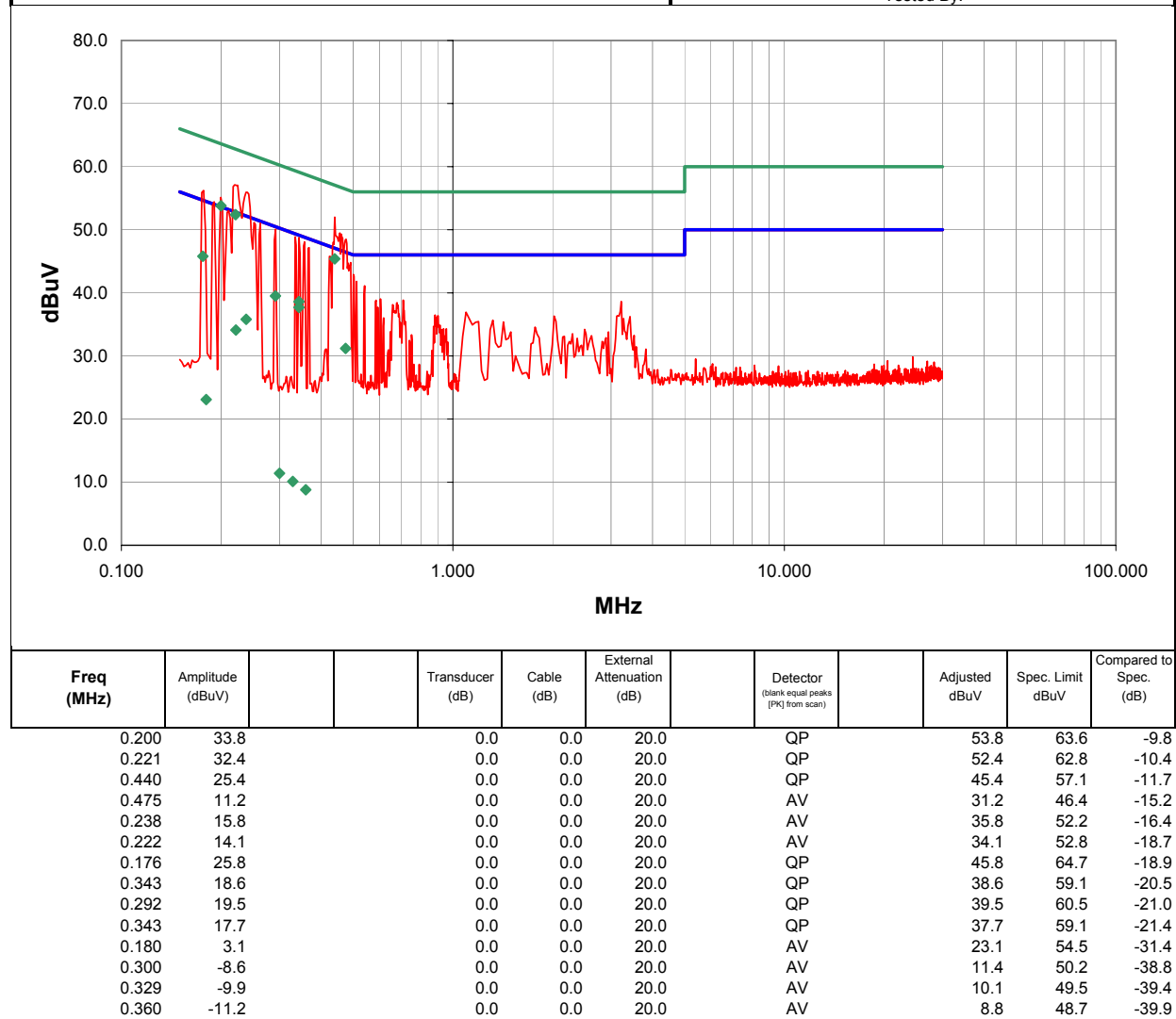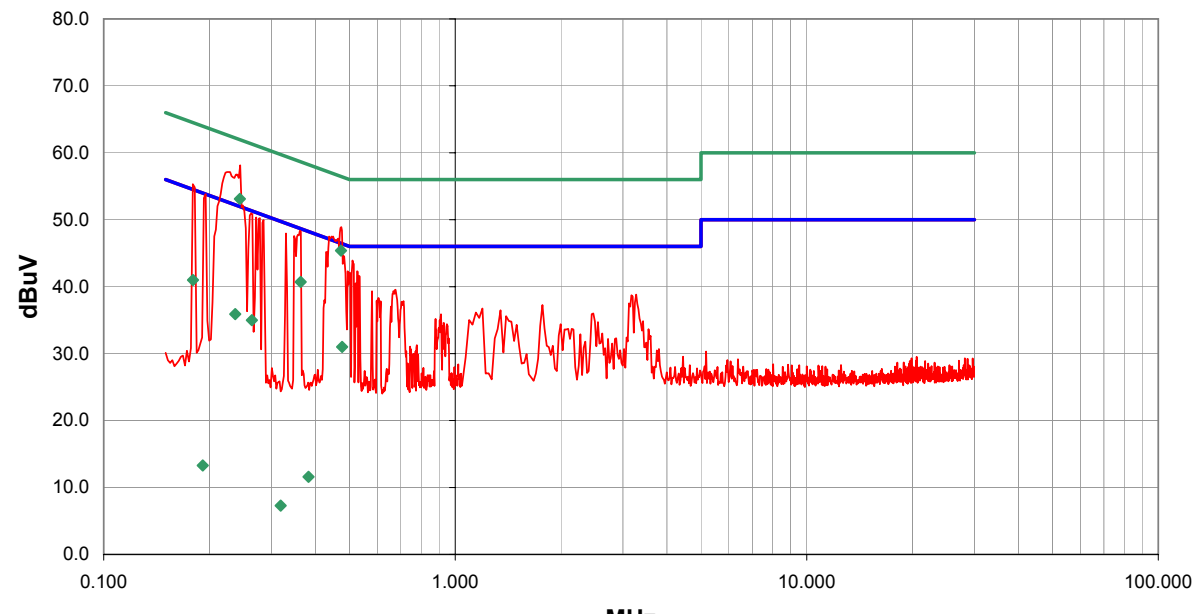|	Line	Run #
Pass	N	3

Other

Tested By:

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)
0.176	24.6			0.0	0.0	20.0		QP		44.6	64.7	-20.1
0.415	17.1			0.0	0.0	20.0		QP		37.1	57.5	-20.4
0.224	22.1			0.0	0.0	20.0		QP		42.1	62.7	-20.6
0.267	20.3			0.0	0.0	20.0		QP		40.3	61.2	-20.9
0.222	10.4			0.0	0.0	20.0		AV		30.4	52.7	-22.3
0.346	16.2			0.0	0.0	20.0		QP		36.2	59.1	-22.9
0.453	3.2			0.0	0.0	20.0		AV		23.2	46.8	-23.6
0.180	7.7			0.0	0.0	20.0		AV		27.7	54.5	-26.8
0.255	-7.0			0.0	0.0	20.0		AV		13.0	51.6	-38.6
0.360	-12.2			0.0	0.0	20.0		AV		7.8	48.7	-40.9

CONDUCTED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	0%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.207	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting - Mid Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Line** | **Run #**

Pass | **L1** | **4**

Other

Tested By:

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)
0.200	33.8			0.0	0.0	20.0		QP		53.8	63.6	-9.8
0.221	32.4			0.0	0.0	20.0		QP		52.4	62.8	-10.4
0.440	25.4			0.0	0.0	20.0		QP		45.4	57.1	-11.7
0.475	11.2			0.0	0.0	20.0		AV		31.2	46.4	-15.2
0.238	15.8			0.0	0.0	20.0		AV		35.8	52.2	-16.4
0.222	14.1			0.0	0.0	20.0		AV		34.1	52.8	-18.7
0.176	25.8			0.0	0.0	20.0		QP		45.8	64.7	-18.9
0.343	18.6			0.0	0.0	20.0		QP		38.6	59.1	-20.5
0.292	19.5			0.0	0.0	20.0		QP		39.5	60.5	-21.0
0.343	17.7			0.0	0.0	20.0		QP		37.7	59.1	-21.4
0.180	3.1			0.0	0.0	20.0		AV		23.1	54.5	-31.4
0.300	-8.6			0.0	0.0	20.0		AV		11.4	50.2	-38.8
0.329	-9.9			0.0	0.0	20.0		AV		10.1	49.5	-39.4
0.360	-11.2			0.0	0.0	20.0		AV		8.8	48.7	-39.9

CONDUCTED EMISSIONS DATA SHEET

REV
df4.3
09/20/2004

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	0%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.207	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting - High Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Line** | **Run #**

Pass | **L1** | **5**

Other

Tested By:

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)
0.244	33.1			0.0	0.0	20.0		QP		53.1	62.0	-8.9
0.473	25.4			0.0	0.0	20.0		QP		45.4	56.5	-11.1
0.476	11.0			0.0	0.0	20.0		AV		31.0	46.4	-15.4
0.237	15.9			0.0	0.0	20.0		AV		35.9	52.2	-16.3
0.363	20.7			0.0	0.0	20.0		QP		40.7	58.7	-18.0
0.179	21.0			0.0	0.0	20.0		QP		41.0	64.5	-23.5
0.264	15.0			0.0	0.0	20.0		QP		35.0	61.3	-26.3
0.383	-8.4			0.0	0.0	20.0		AV		11.6	48.2	-36.6
0.191	-6.7			0.0	0.0	20.0		AV		13.3	54.0	-40.7
0.319	-12.7			0.0	0.0	20.0		AV		7.3	49.7	-42.4

CONDUCTED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	0%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.207	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting - High Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS		**Line**	**Run #**
Pass		N	6

Other

Tested By:
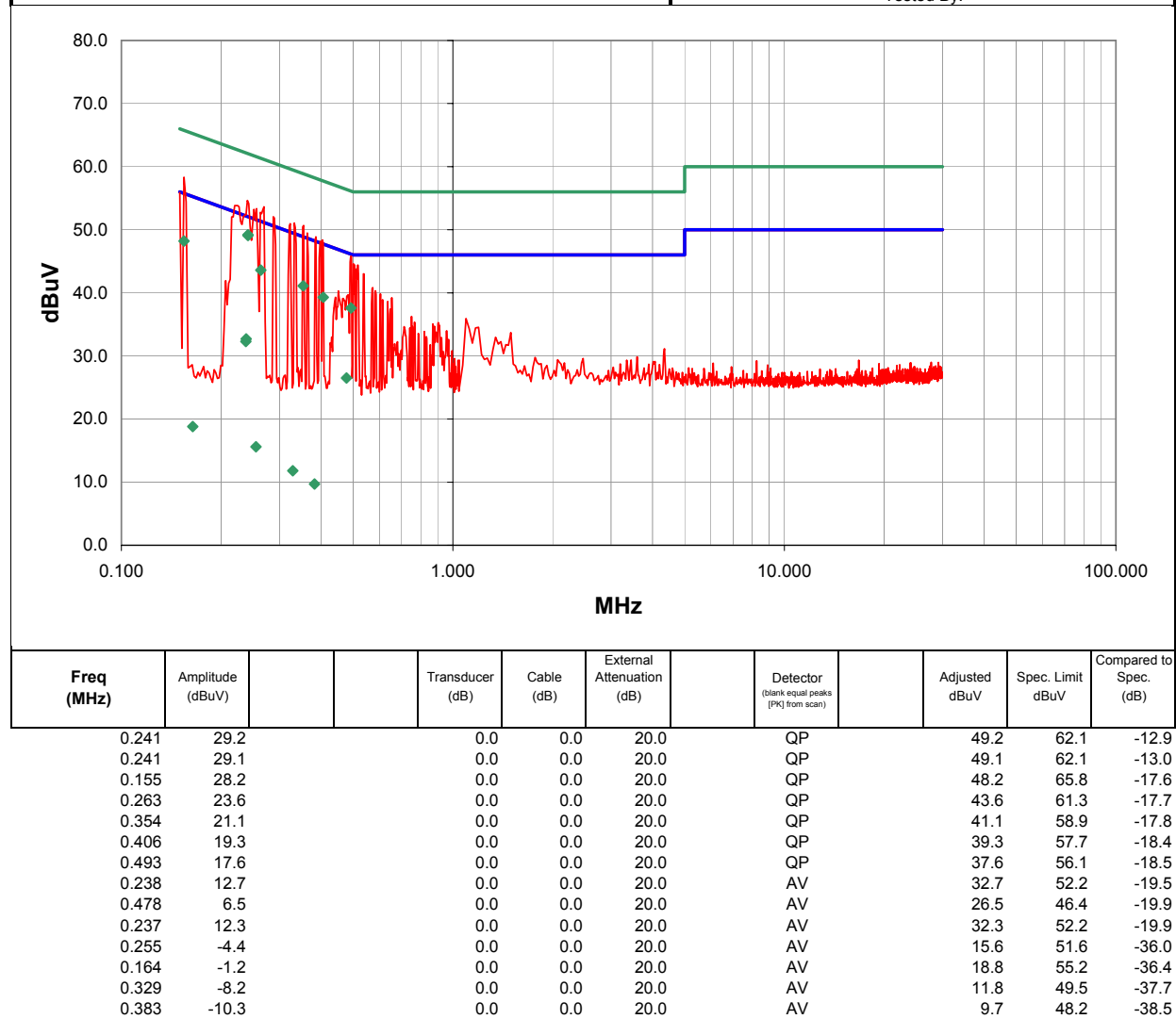
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.241	29.2			0.0	0.0	20.0		QP		49.2	62.1	-12.9
0.241	29.1			0.0	0.0	20.0		QP		49.1	62.1	-13.0
0.155	28.2			0.0	0.0	20.0		QP		48.2	65.8	-17.6
0.263	23.6			0.0	0.0	20.0		QP		43.6	61.3	-17.7
0.354	21.1			0.0	0.0	20.0		QP		41.1	58.9	-17.8
0.406	19.3			0.0	0.0	20.0		QP		39.3	57.7	-18.4
0.493	17.6			0.0	0.0	20.0		QP		37.6	56.1	-18.5
0.238	12.7			0.0	0.0	20.0		AV		32.7	52.2	-19.5
0.478	6.5			0.0	0.0	20.0		AV		26.5	46.4	-19.9
0.237	12.3			0.0	0.0	20.0		AV		32.3	52.2	-19.9
0.255	-4.4			0.0	0.0	20.0		AV		15.6	51.6	-36.0
0.164	-1.2			0.0	0.0	20.0		AV		18.8	55.2	-36.4
0.329	-8.2			0.0	0.0	20.0		AV		11.8	49.5	-37.7
0.383	-10.3			0.0	0.0	20.0		AV		9.7	48.2	-38.5

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, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
High

Operating Modes Investigated:

Transmitting data; No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Internal Battery

Software\Firmware Applied During Test

Operating system	Unknown	Version	Unknown
Exercise software	Zeevo Test	Version	(v0.1.7)
Description			
The system was tested using special software developed to test all functions of the device during the test. The software put the carrier in a no-hop modulated mode and allowed the low, mid, and high channels to be selected.			

EUT and Peripherals in Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Headset	Logitech, Inc.	F-0361A	N/A

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary.			

Band Edge Compliance

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
SMA	PA	0.1	No	EUT - Headset	Zeevo Chipset Console

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8593E	AAA	01/05/2004	12 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20 dB 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:

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

aximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental
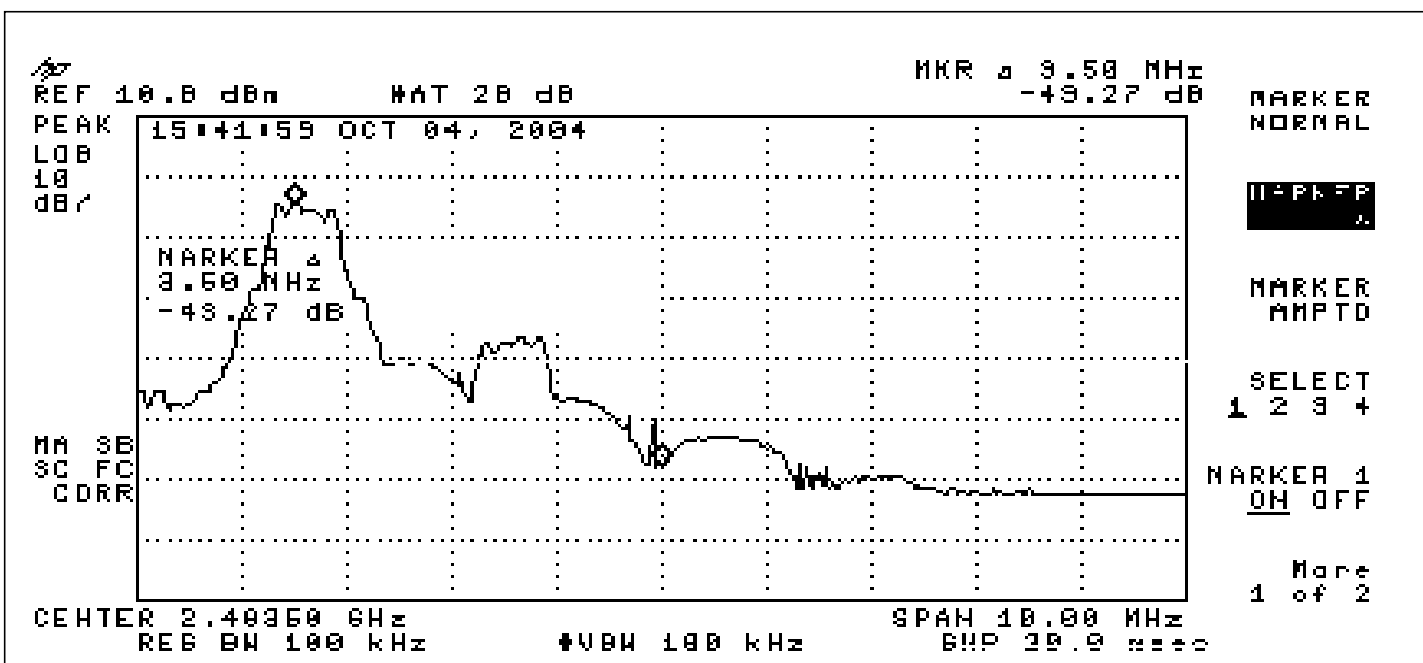
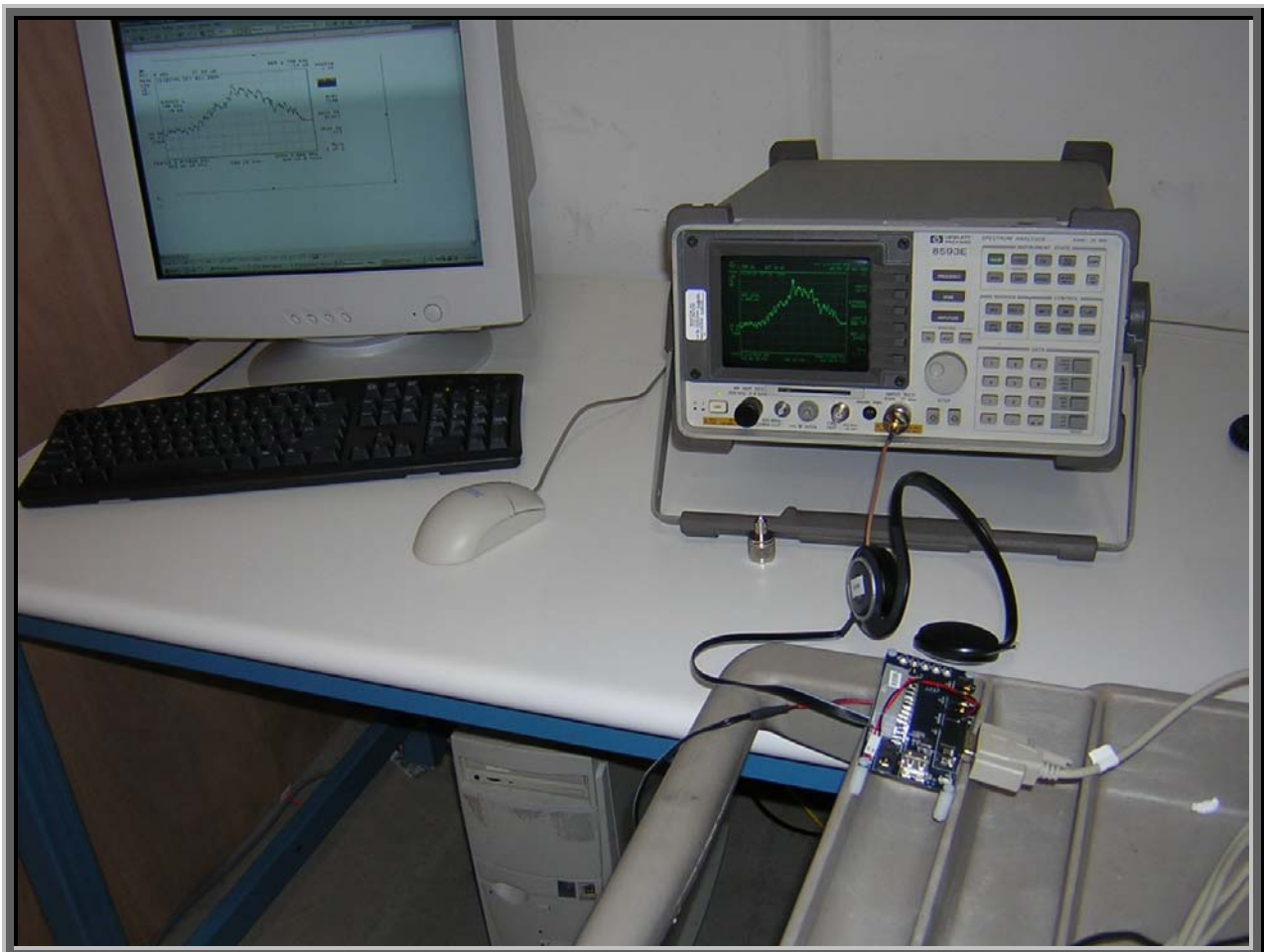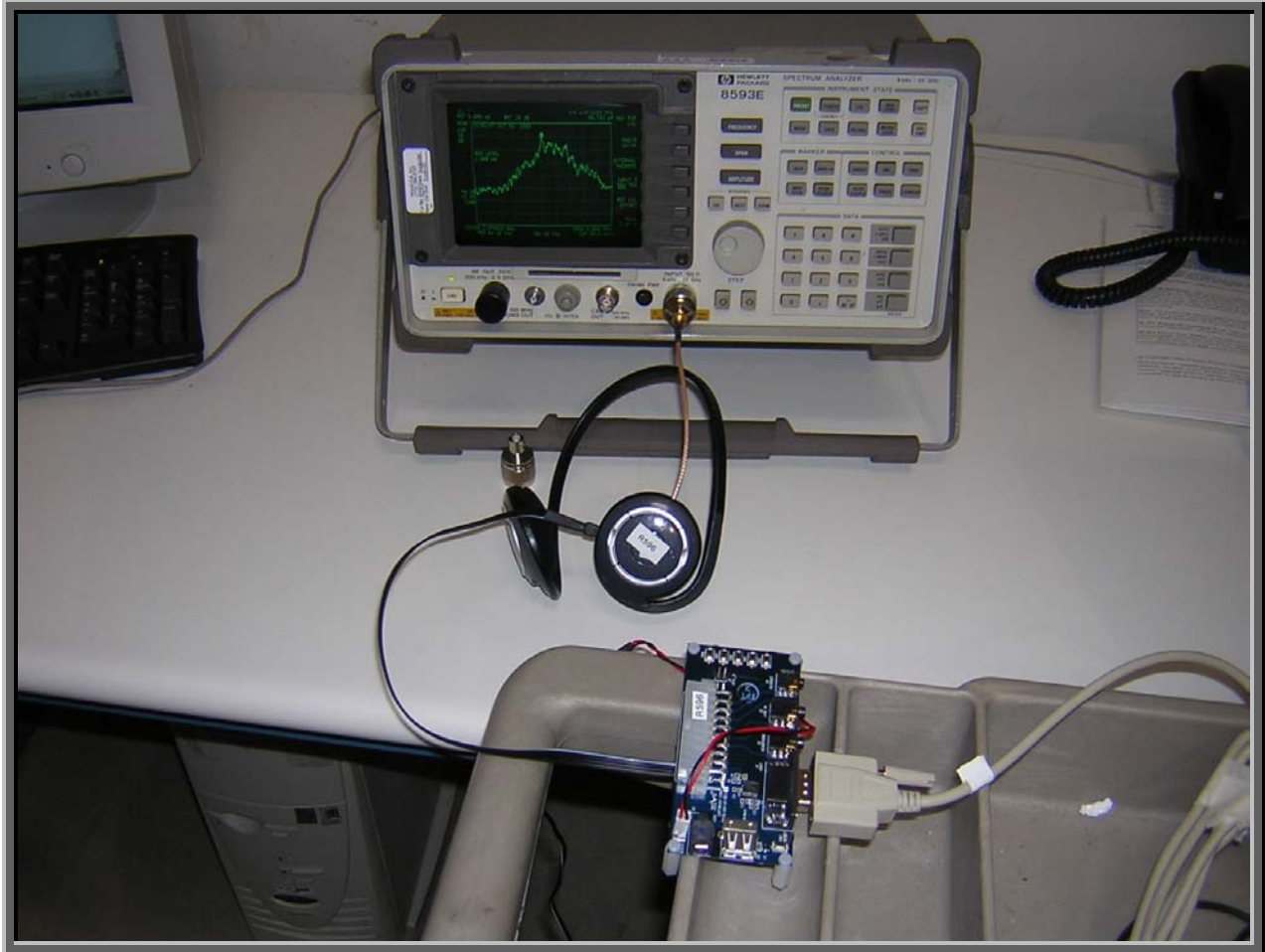| RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Band Edge Compliance - Low Channel

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

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

RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

_____
Tested By:

DESCRIPTION OF TEST

Band Edge Compliance - High Channel

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. 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:

Transmitting data; No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Internal Battery

Software\Firmware Applied During Test

Operating system	Unknown	Version	Unknown
Exercise software	Zeevo Test	Version	(v0.1.7)

Description
The system was tested using special software developed to test all functions of the device during the test. The software put the carrier in a no-hop modulated mode and allowed the low, mid, and high channels to be selected.

EUT and Peripherals in Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Headset	Logitech, Inc.	F-0361A	N/A

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A

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
SMA	PA	0.1	No	EUT - Headset	Zeevo Chipset Console

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8593E	AAA	01/05/2004	12 mo

Test Description

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

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

Completed by:

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/01/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)(1)(iii) Occupied Bandwidth	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

TX - Low Channel; Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum 20dB bandwidth of the hopping channel is 1 MHz.

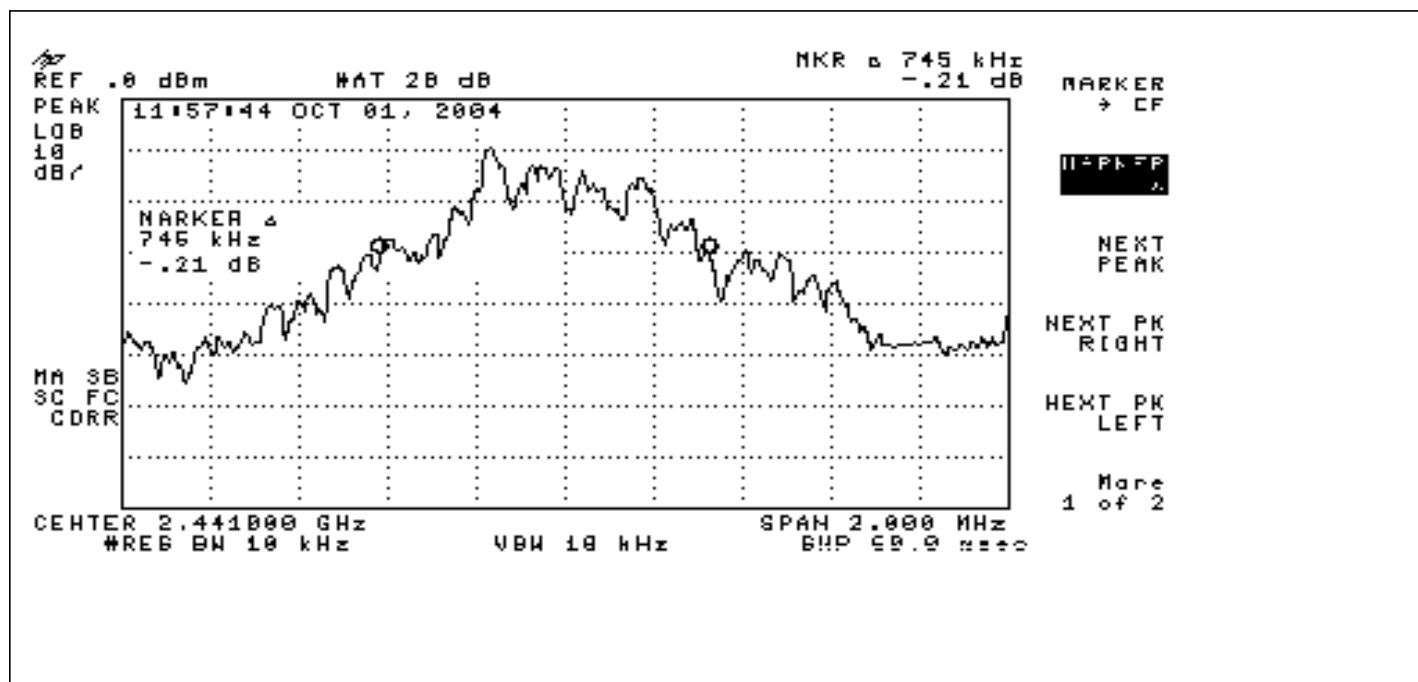| RESULTS	BANDWIDTH
Pass	735 kHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

20 dB Bandwidth - Low Channel

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/01/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)(1)(iii) Occupied Bandwidth	**Year:** 2003
Method:	DA 00-705 ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
TX - Mid Channel; Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

REQUIREMENTS
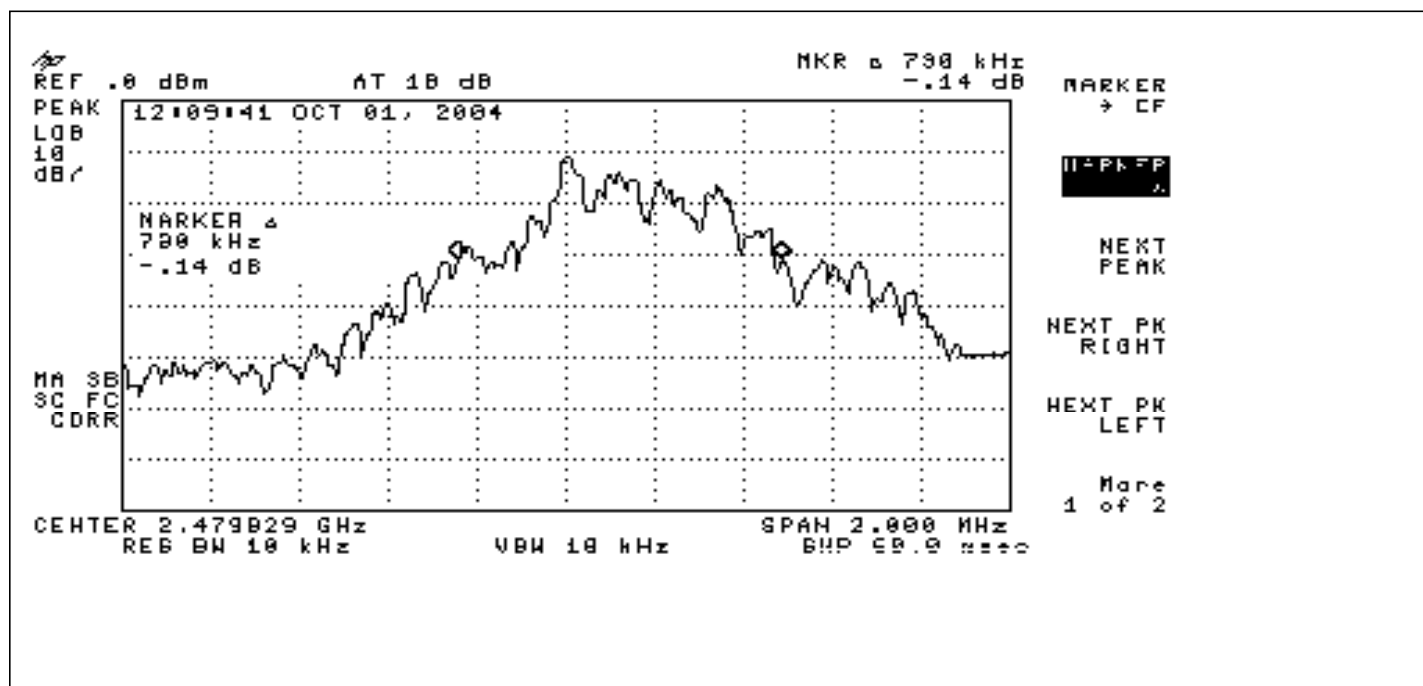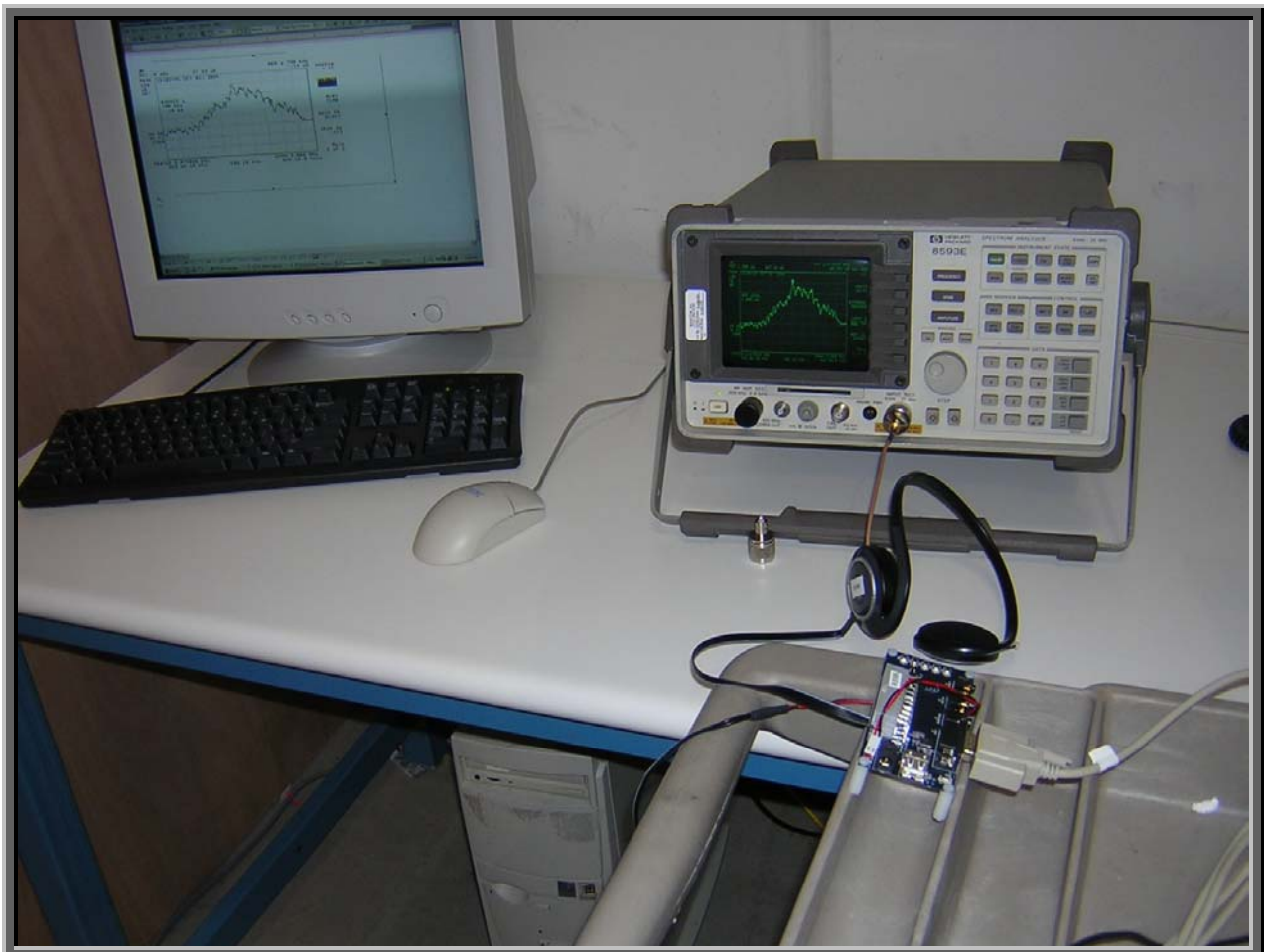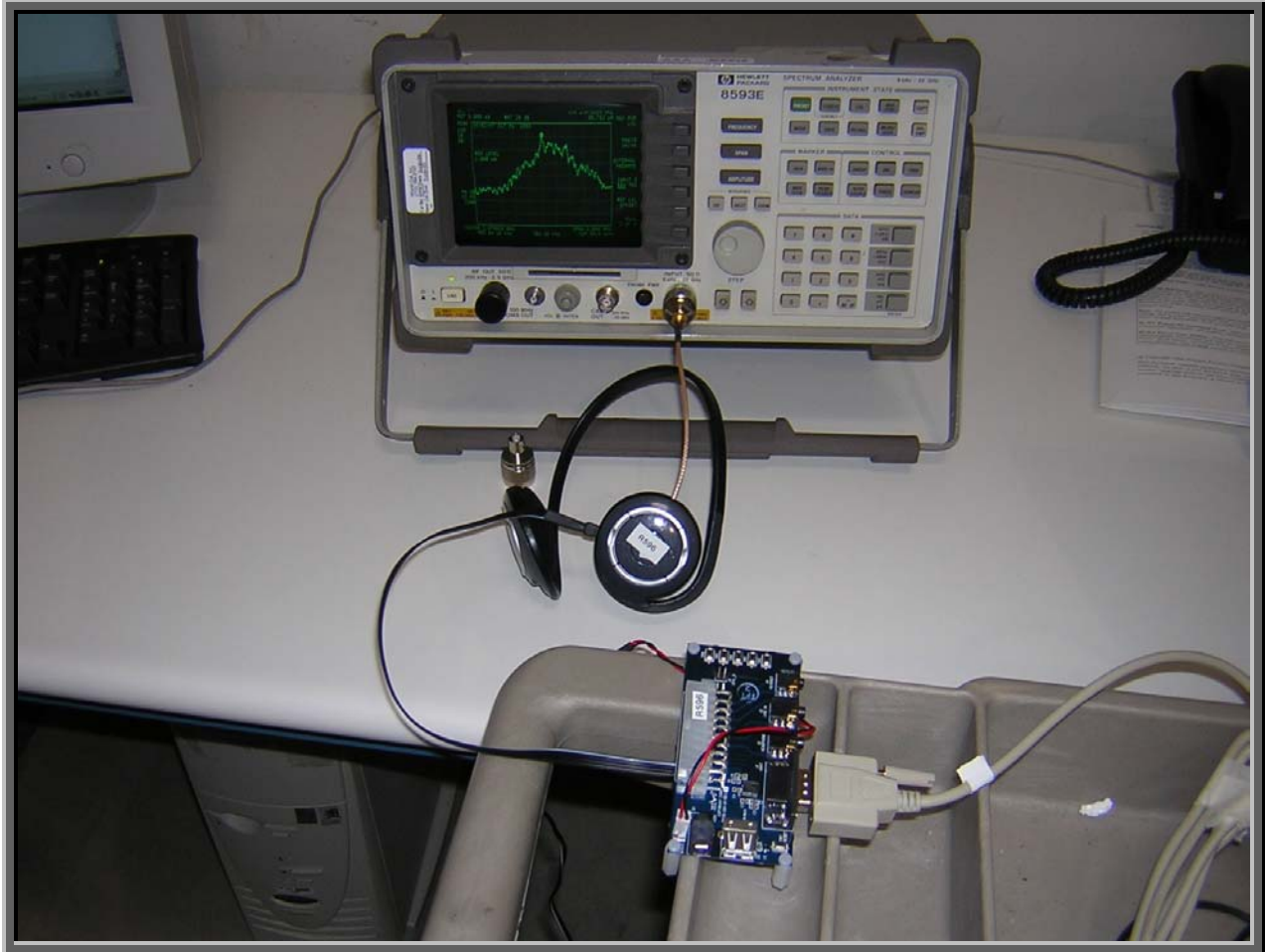The maximum 20dB bandwidth of the hopping channel is 1 MHz.

RESULTS	BANDWIDTH
Pass	745 kHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

20 dB Bandwidth - Mid Channel

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/01/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)(1)(iii) Occupied Bandwidth	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
TX - High Channel; Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

REQUIREMENTS
The maximum 20dB bandwidth of the hopping channel is 1 MHz.

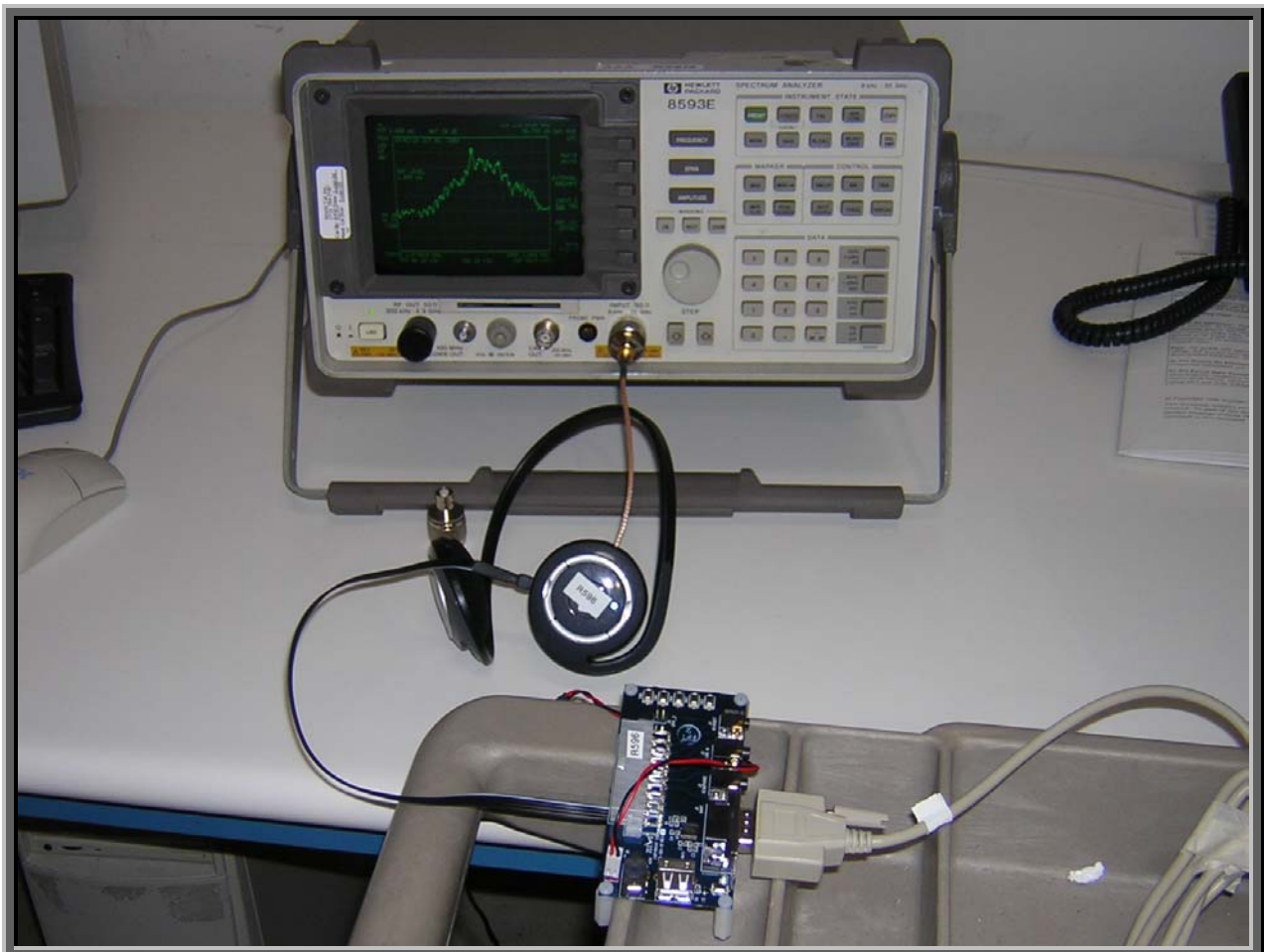| RESULTS	BANDWIDTH
Pass	738 kHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

20 dB Bandwidth - High Channel

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, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

Transmitting data; No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Internal Battery

Software\Firmware Applied During Test

Operating system	Unknown	Version	Unknown
Exercise software	Zeevo Test	Version	(v0.1.7)

Description

The system was tested using special software developed to test all functions of the device during the test. The software put the carrier in a no-hop modulated mode and allowed the low, mid, and high channels to be selected.

EUT and Peripherals in Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Headset	Logitech, Inc.	F-0361A	N/A

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A

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
SMA	PA	0.1	No	EUT - Headset	Zeevo Chipset Console

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Power Meter	Hewlett Packard	E4418A	SPA	07/23/2004	24 mo
Power Sensor	Hewlett-Packard	8481H	SPB	07/23/2004	24 mo
Signal Generator	Hewlett Packard	8341B	TGN	01/23/2004	13 mo
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA
Oscilloscope	Tektronix	TDS 3052	TOF	07/21/2004	12 mo
Multimeter	Tektronix	DMM912	MMH	05/27/2004	12 mo

Test Description

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

Configuration: The output power was measured with the EUT set to low, mid, and high transmit frequencies. The peak 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 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

Completed by:

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/10/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:		**Barometric Pressure:**	29.96
Tester:	Greg Kiemel	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(b)(1)	**Year:** 2003	**Method:** DA 00-705, ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Transmitting - High - Mid - Low Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

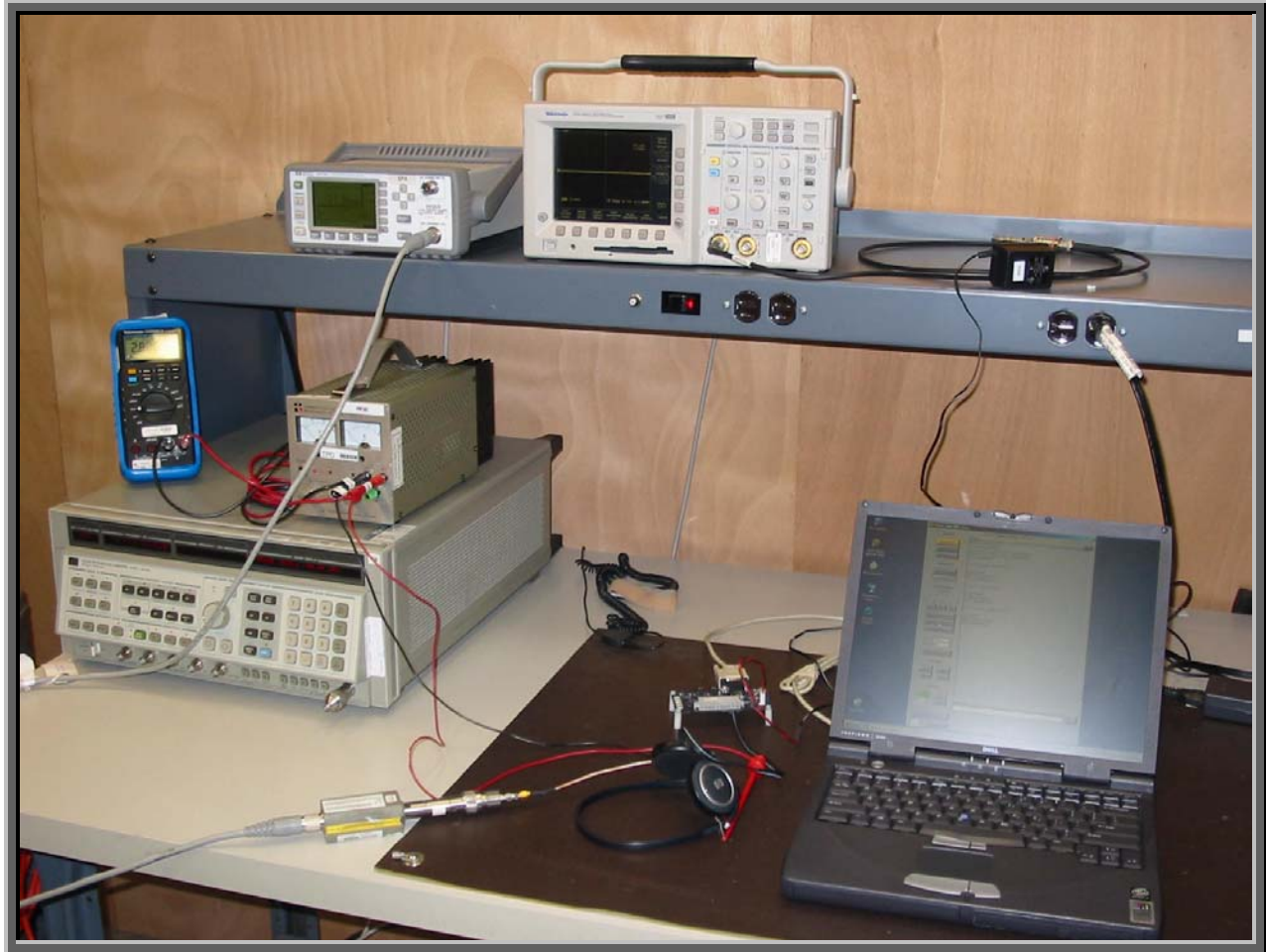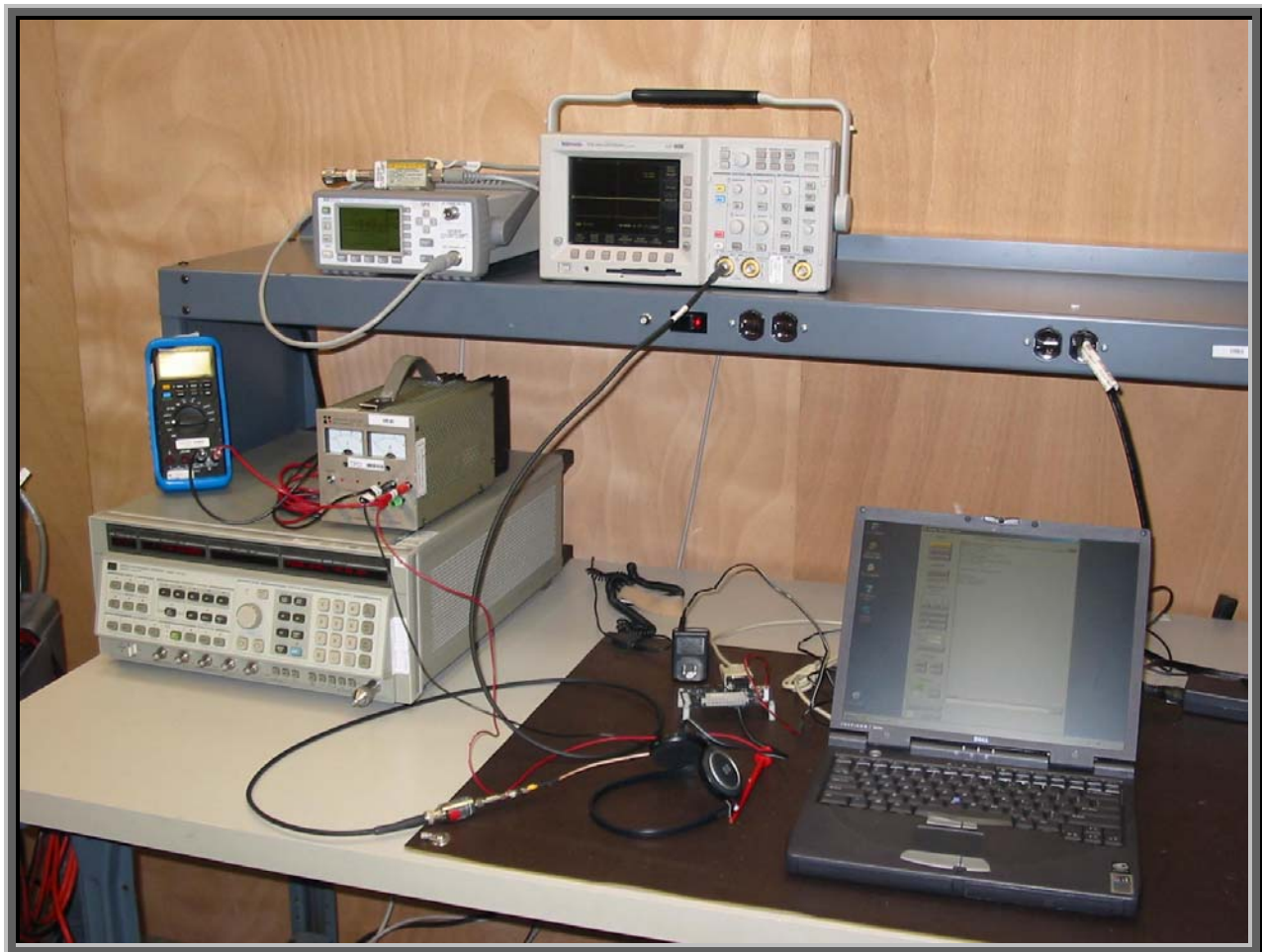| **REQUIREMENTS**	**AMPLITUDE**
Maximum peak conducted output power does not exceed 1 Watt	See Data Below

RESULTS

Pass

SIGNATURE

_____
Tested By

DESCRIPTION OF TEST

Output Power

Frequency (MHz)	Peak Power Measured w/ Diode Detector (dBm)	Peak Power Measured w/ Diode Detector (mW)
2402.0	0.2	1.05
2441.0	-1.2	0.758
2480.0	-2.7	0.537

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 Modulated

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Internal Battery

Software\Firmware Applied During Test

Operating system	Unknown	Version	Unknown
Exercise software	Zeevo Test	Version	(v0.1.7)

Description

The system was tested using special software developed to test all functions of the device during the test. The software put the carrier in a no-hop modulated mode and allowed the low, mid, and high channels to be selected.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Headset	Logitech, Inc.	F-0361A	N/A

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A
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
SMA	PA	0.1	No	EUT - Headset	Zeevo Chipset Console
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	Hewlett-Packard	8593E	AAA	01/05/2004	12 mo

Test Description

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

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

> The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be 1.5 x 106 ÷ 3 x 103 = 500 seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

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

Completed by:

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

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

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

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

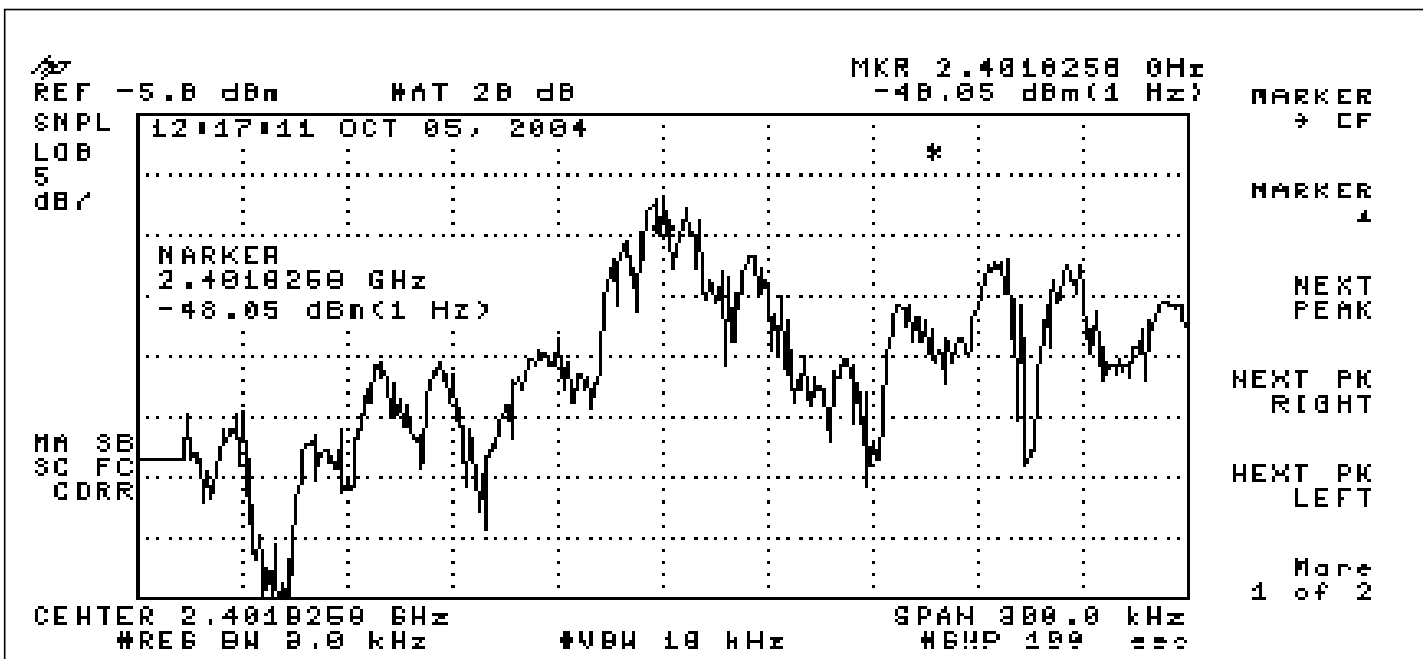| RESULTS	AMPLITUDE
Pass	Power Spectral Density = -13.25 dBm/3kHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Power Spectral Density - Low Channel

NORTHWEST EMC

EMISSIONS DATA SHEET

REV
df1.0
11/17/2003

EUT:	F-0361A Stereo Bluetooth Headphones		**Work Order:**	LABT0103
Serial Number:	None		**Date:**	10/05/04
Customer:	Logitech, Inc.		**Temperature:**	22 °C
Attendees:	none		**Humidity:**	44%
Customer Ref. No.:	N/A		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

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

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

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

RESULTS | AMPLITUDE

Pass
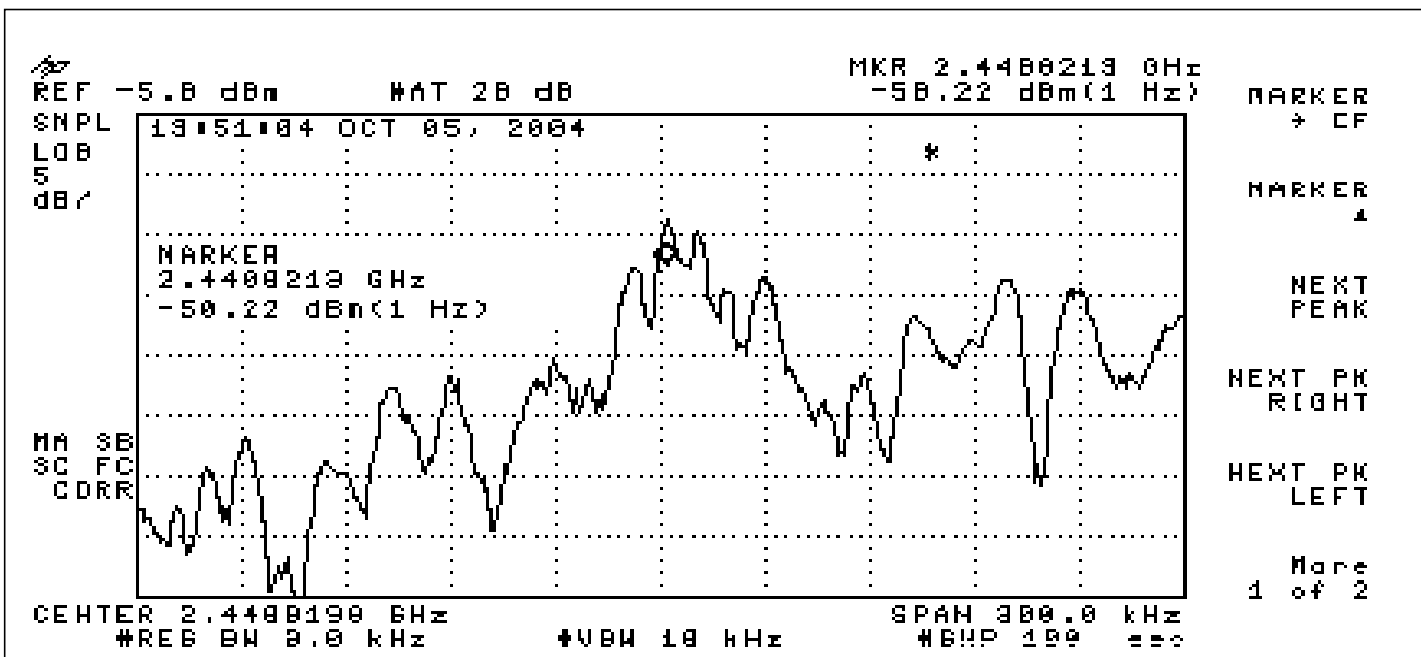
Power Spectral Density = -15.4 dBm/3kHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Power Spectral Density - Mid Channel

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

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

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

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

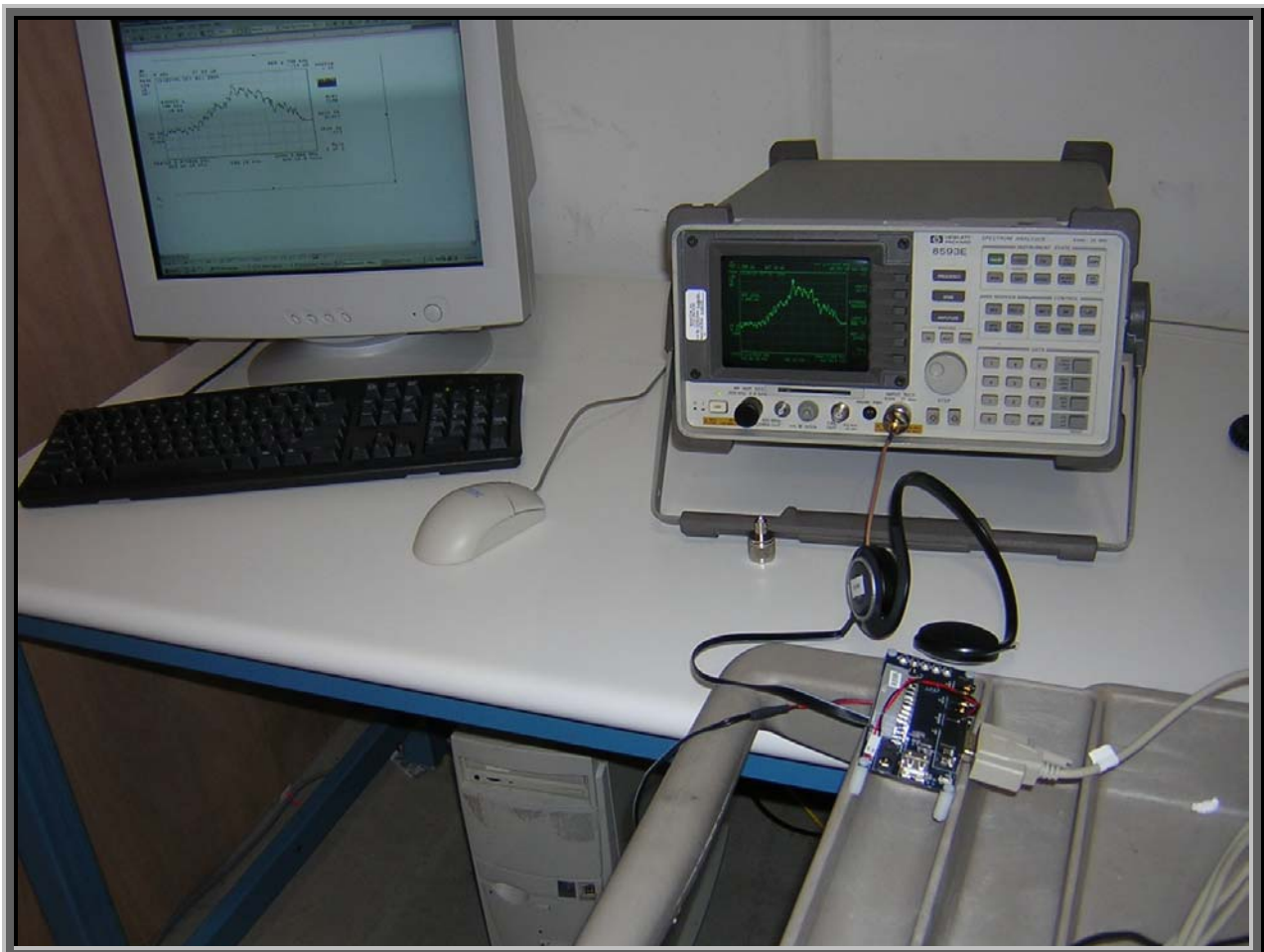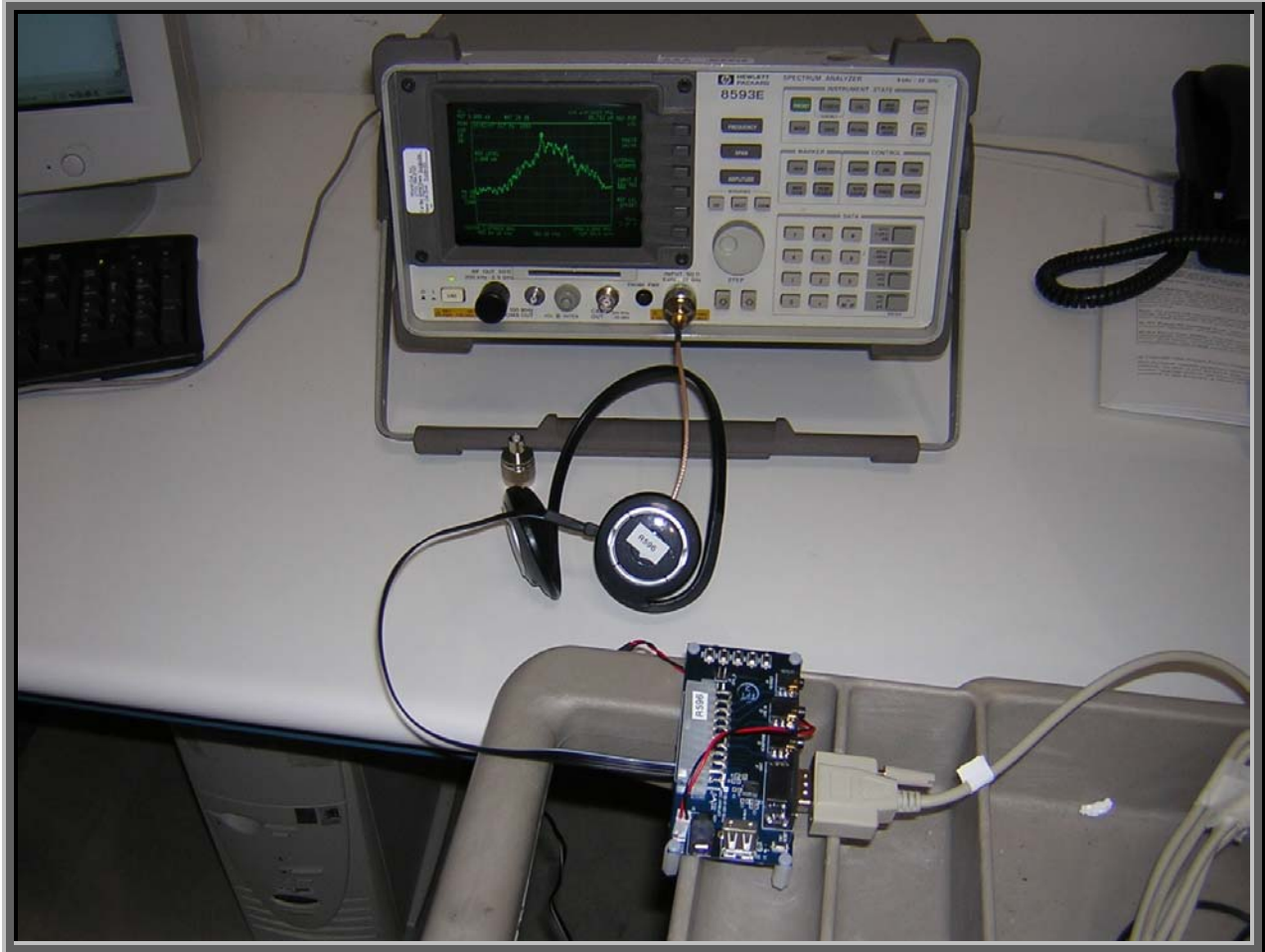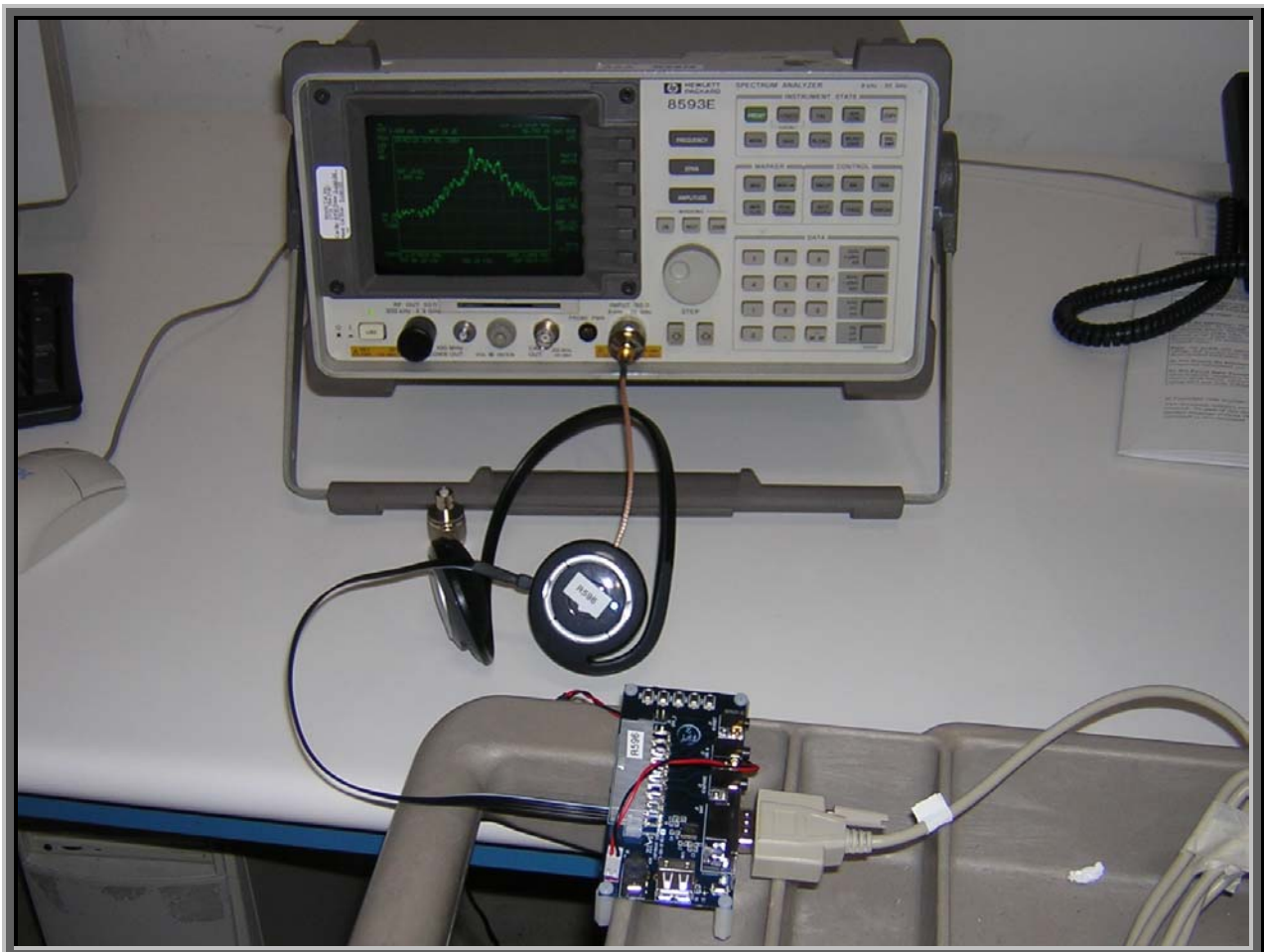| RESULTS	AMPLITUDE
Pass	Power Spectral Density = -15.2 dBm/3kHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Power Spectral Density - High Channel
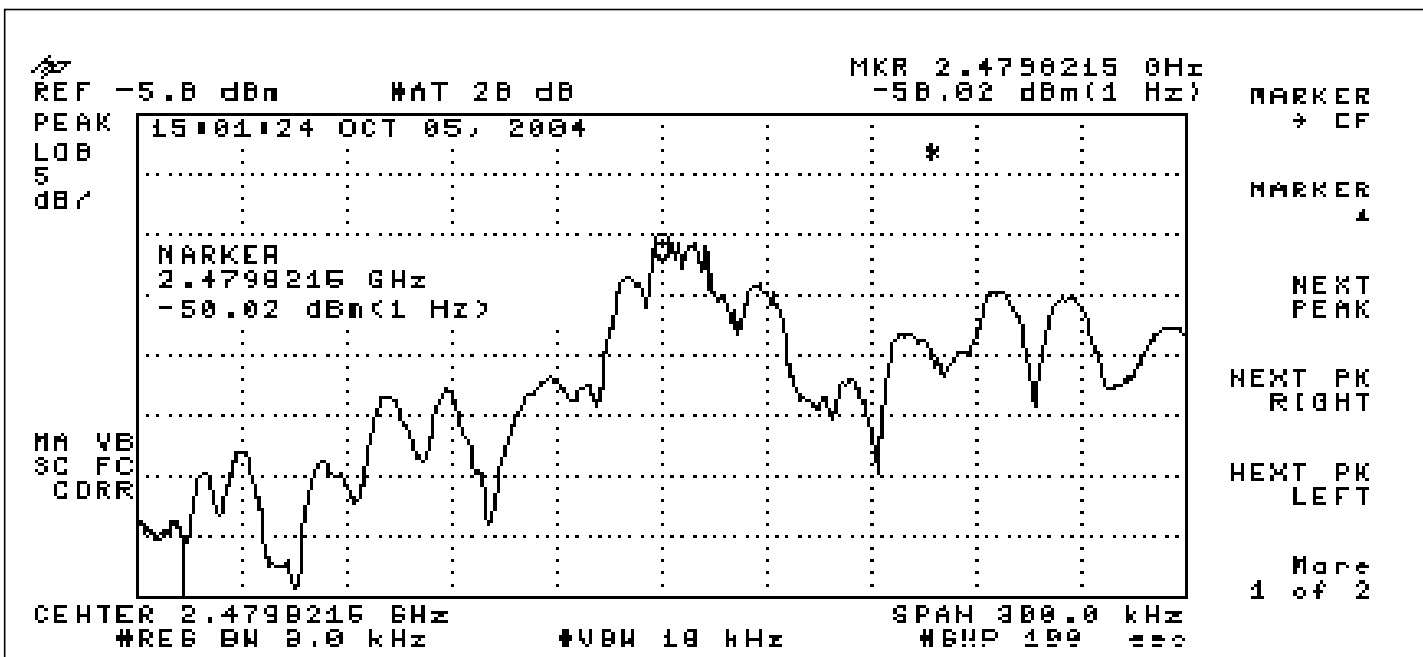
Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the conducted 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:
Transmitting data; No Hop

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
Internal Battery

Software\Firmware Applied During Test
Operating system	Unknown	Version	Unknown
Exercise software	Zeevo Test	Version	(v0.1.7)
Description			

The system was tested using standard operating production software to exercise the functions of the device during the testing.

EUT and Peripherals in Test Setup Boundary
Description	Manufacturer	Model/Part Number	Serial Number
EUT - Headset	Logitech, Inc.	F-0361A	N/A

Remote Equipment Outside of Test Setup Boundary
Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A

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**
SMA	PA	0.1	No	EUT - Headset	Zeevo Chipset Console

Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Hewlett-Packard	8593E	AAA	01/05/2004	12 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20 dB 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 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. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

Completed by:

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.
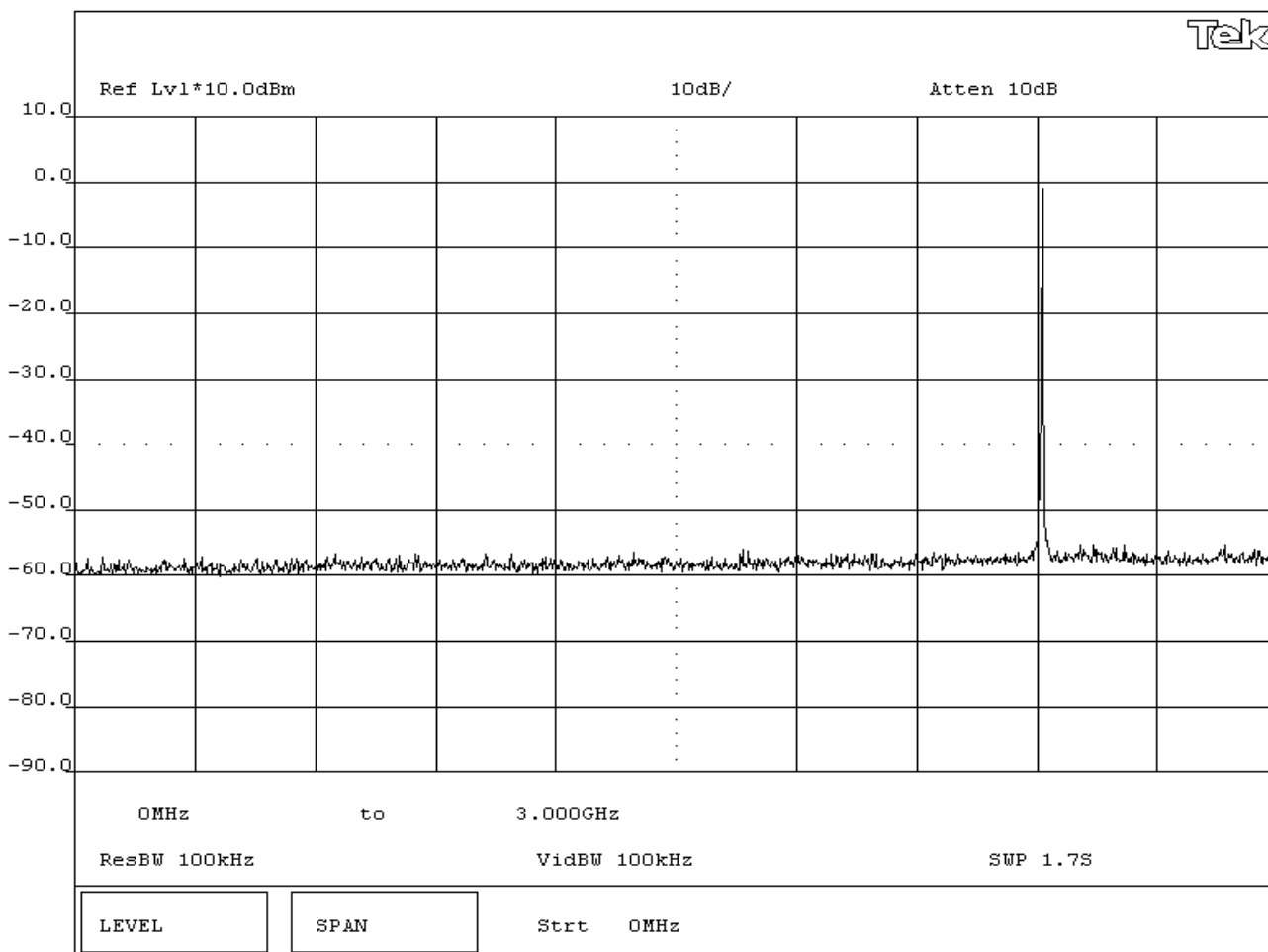
RESULTS | **AMPLITUDE**
Pass | > 20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Low Channel 0 MHz - 3 GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones		**Work Order:**	LABT0103
Serial Number:	None		**Date:**	10/05/04
Customer:	Logitech, Inc.		**Temperature:**	22 °C
Attendees:	none		**Humidity:**	44%
Customer Ref. No.:	N/A		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

REQUIREMENTS
The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.
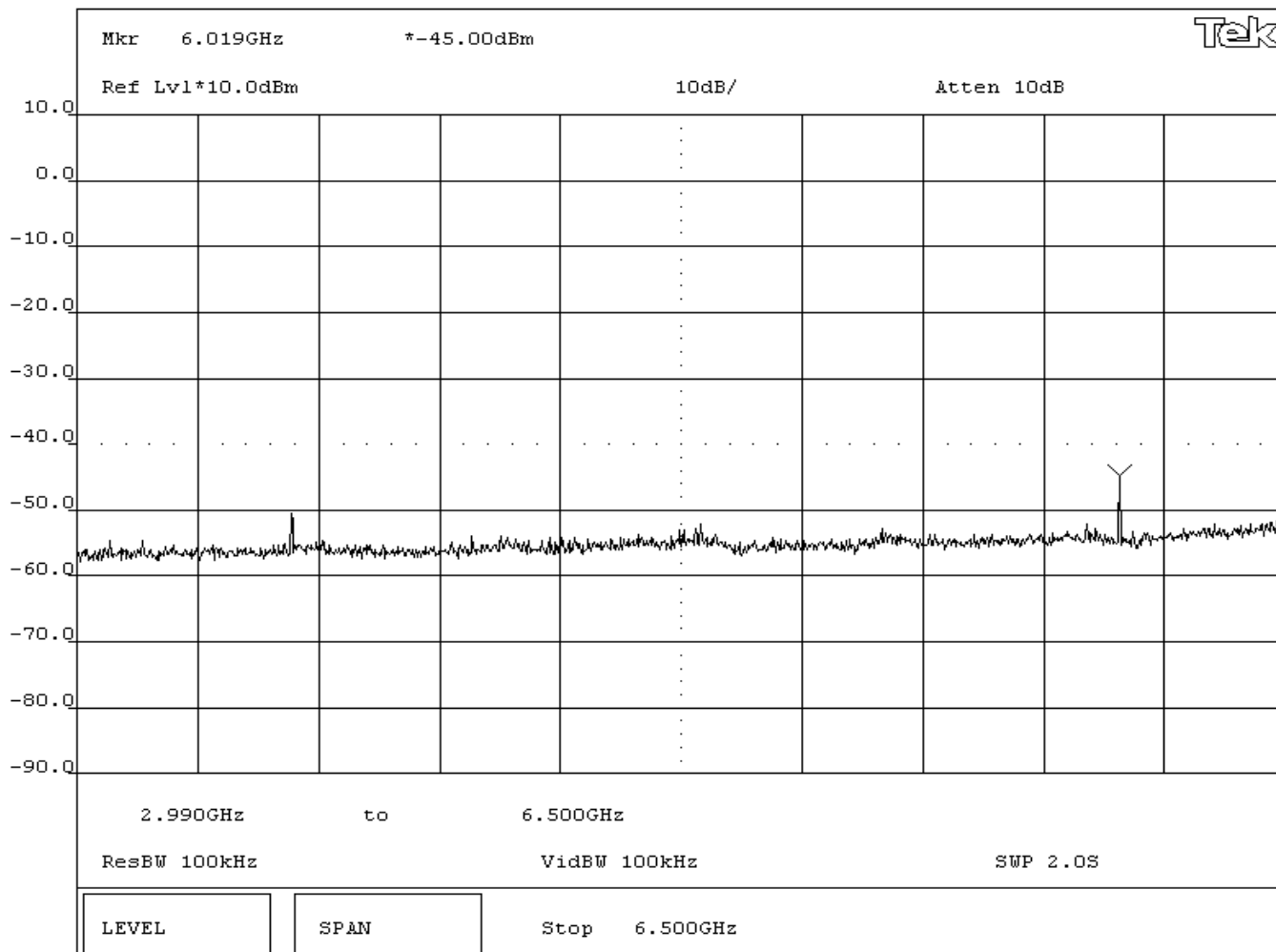
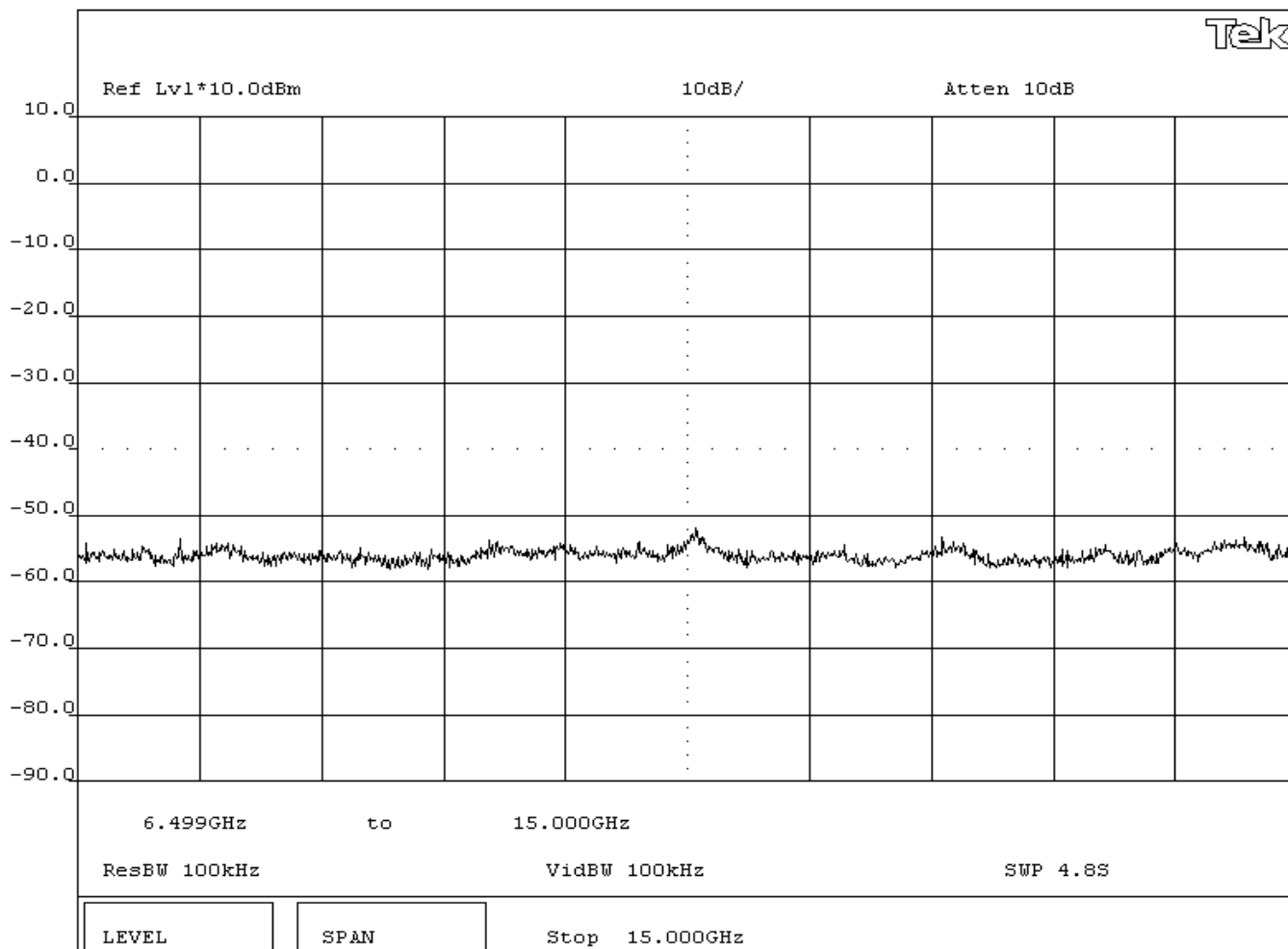| RESULTS	AMPLITUDE
Pass	> 20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Low Channel 3.0 GHz - 6.5 GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones		**Work Order:**	LABT0103
Serial Number:	None		**Date:**	10/05/04
Customer:	Logitech, Inc.		**Temperature:**	22 °C
Attendees:	none		**Humidity:**	44%
Customer Ref. No.:	N/A		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

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

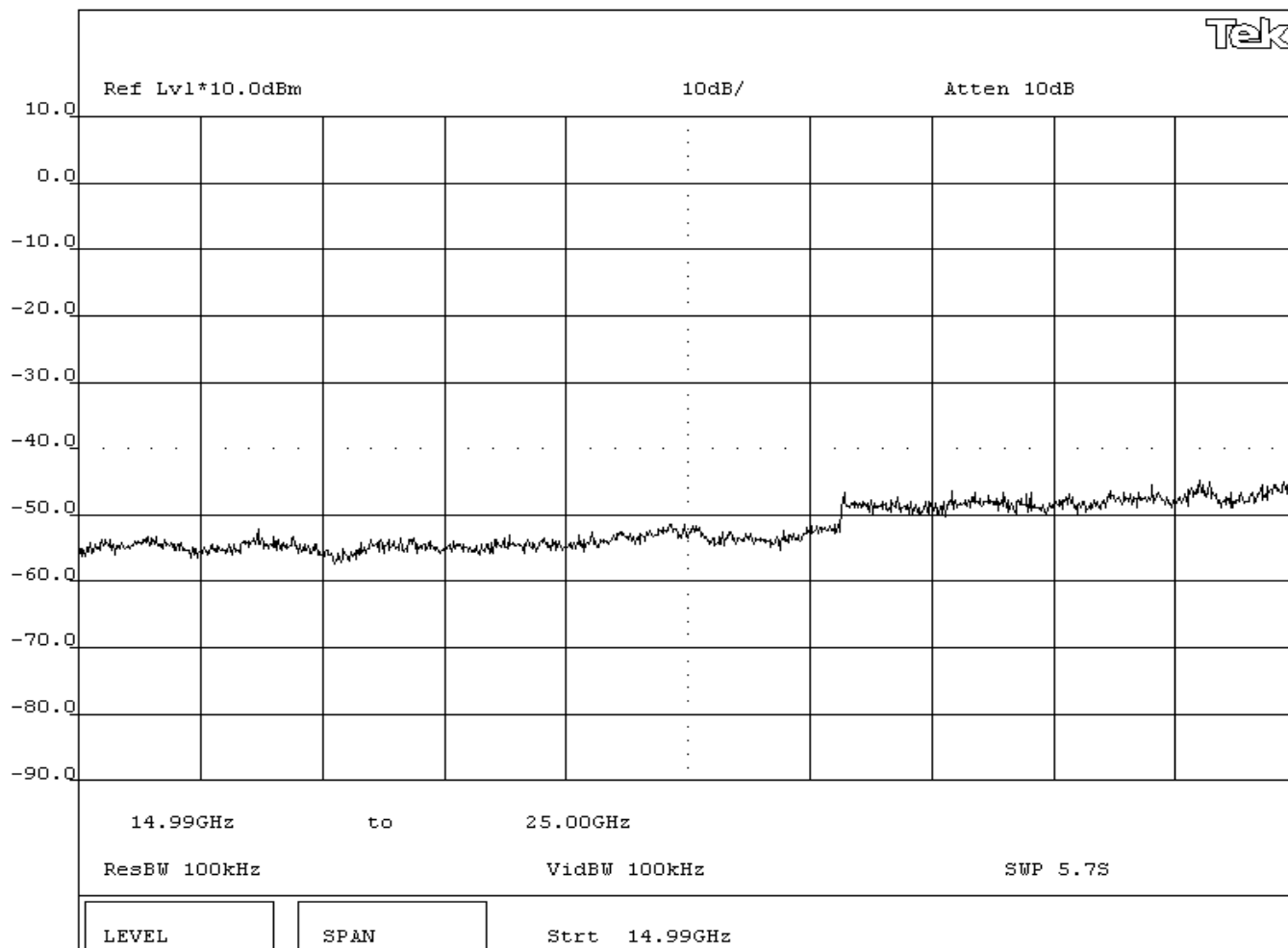| RESULTS	AMPLITUDE
Pass	> 20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Low Channel 6.5 GHz - 15.0 GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.

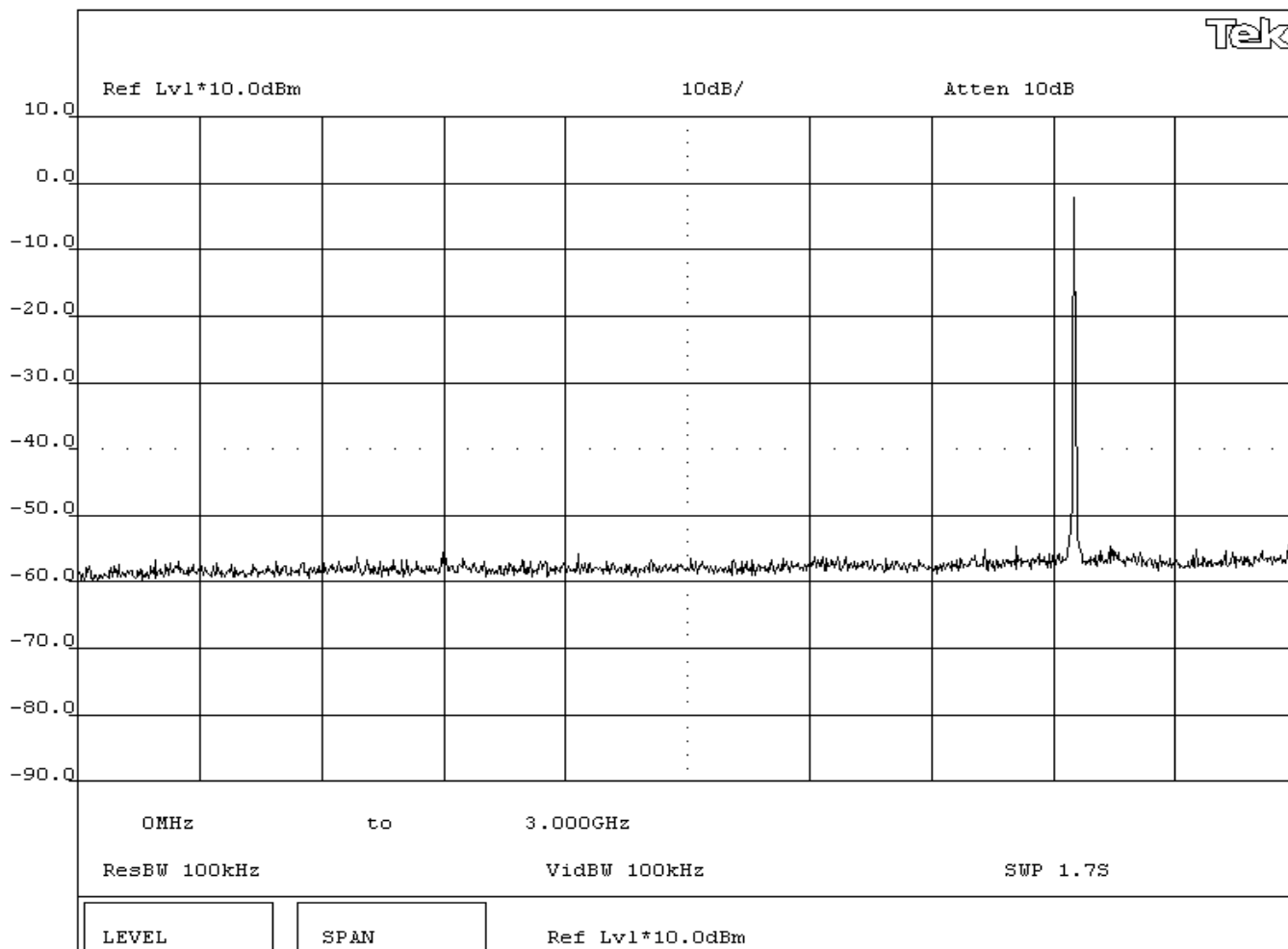| RESULTS	AMPLITUDE
Pass	> 20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Low Channel 15.0 GHz - 25.0 GHz

NORTHWEST
EMC
EMISSIONS DATA SHEET
REV
df1.0
11/17/2003

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.

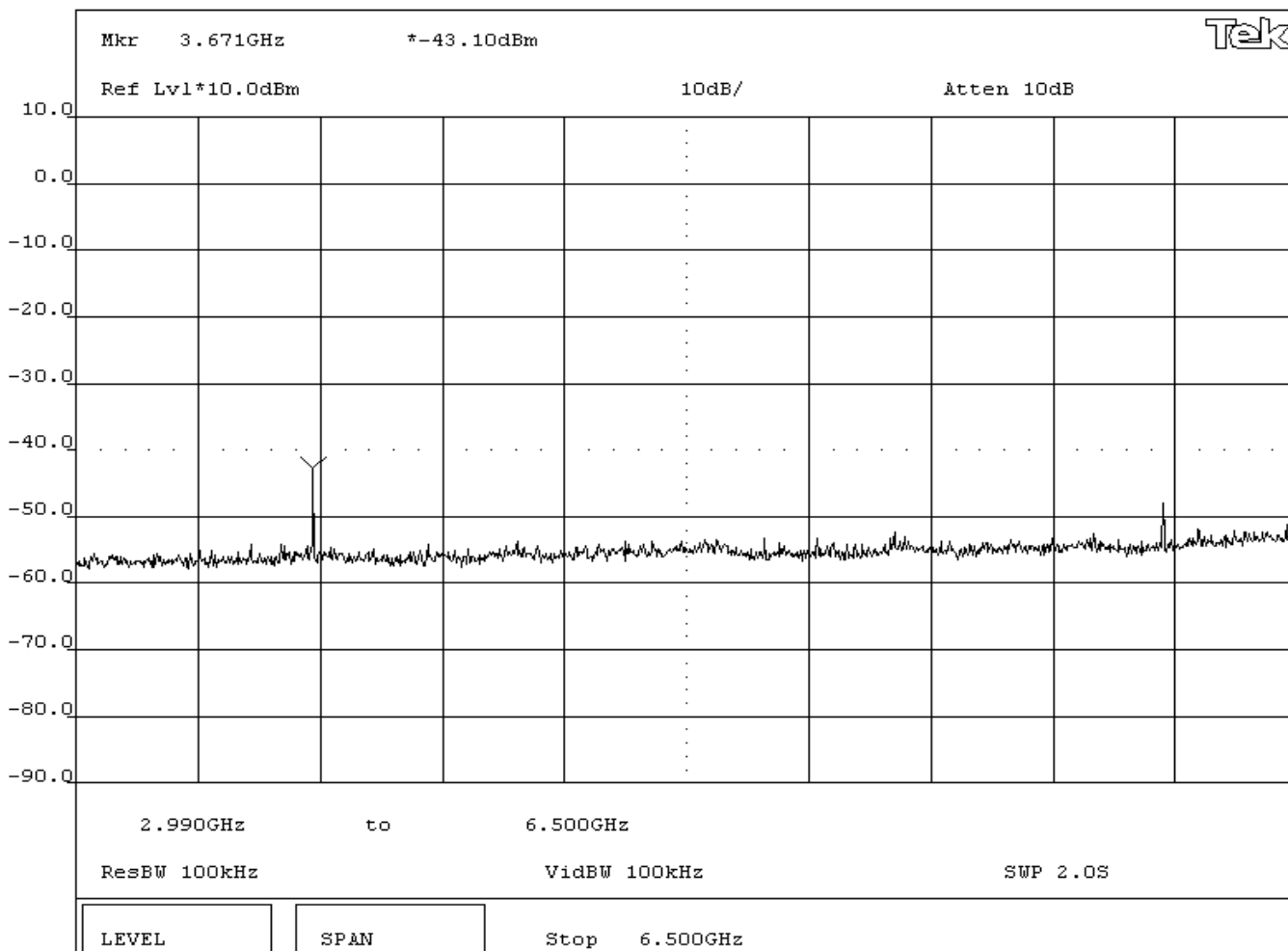| **RESULTS**	**AMPLITUDE**
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Mid Channel 0 MHz - 3 GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.
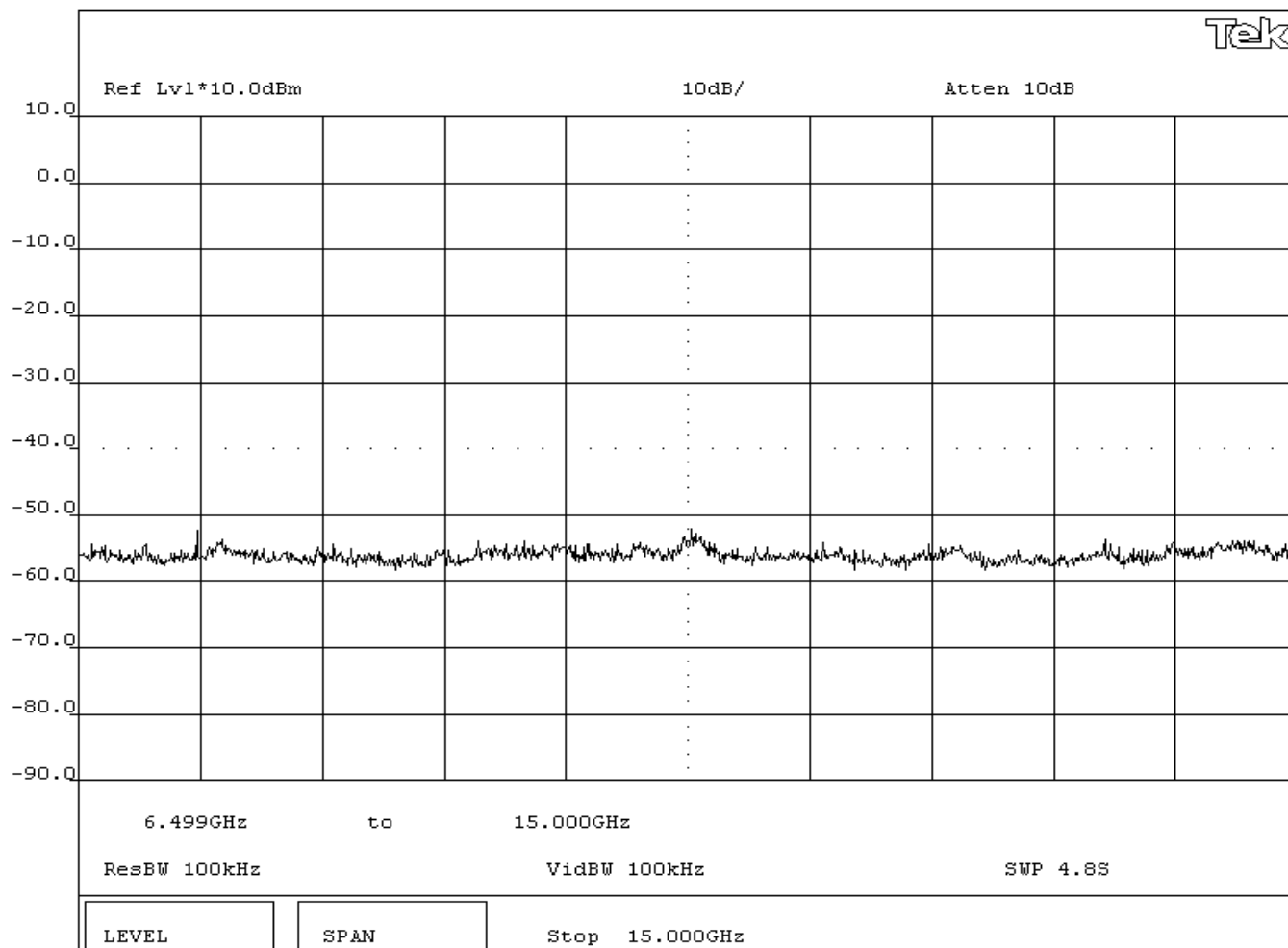
RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Mid Channel 3 GHz - 6.5 GHz

Mkr   3.671GHz   *-43.10dBm

Ref Lvl*10.0dBm   10dB/   Atten 10dB

2.990GHz   to   6.500GHz

ResBW 100kHz   VidBW 100kHz   SWP 2.0S

| LEVEL | SPAN | Stop   6.500GHz |

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.
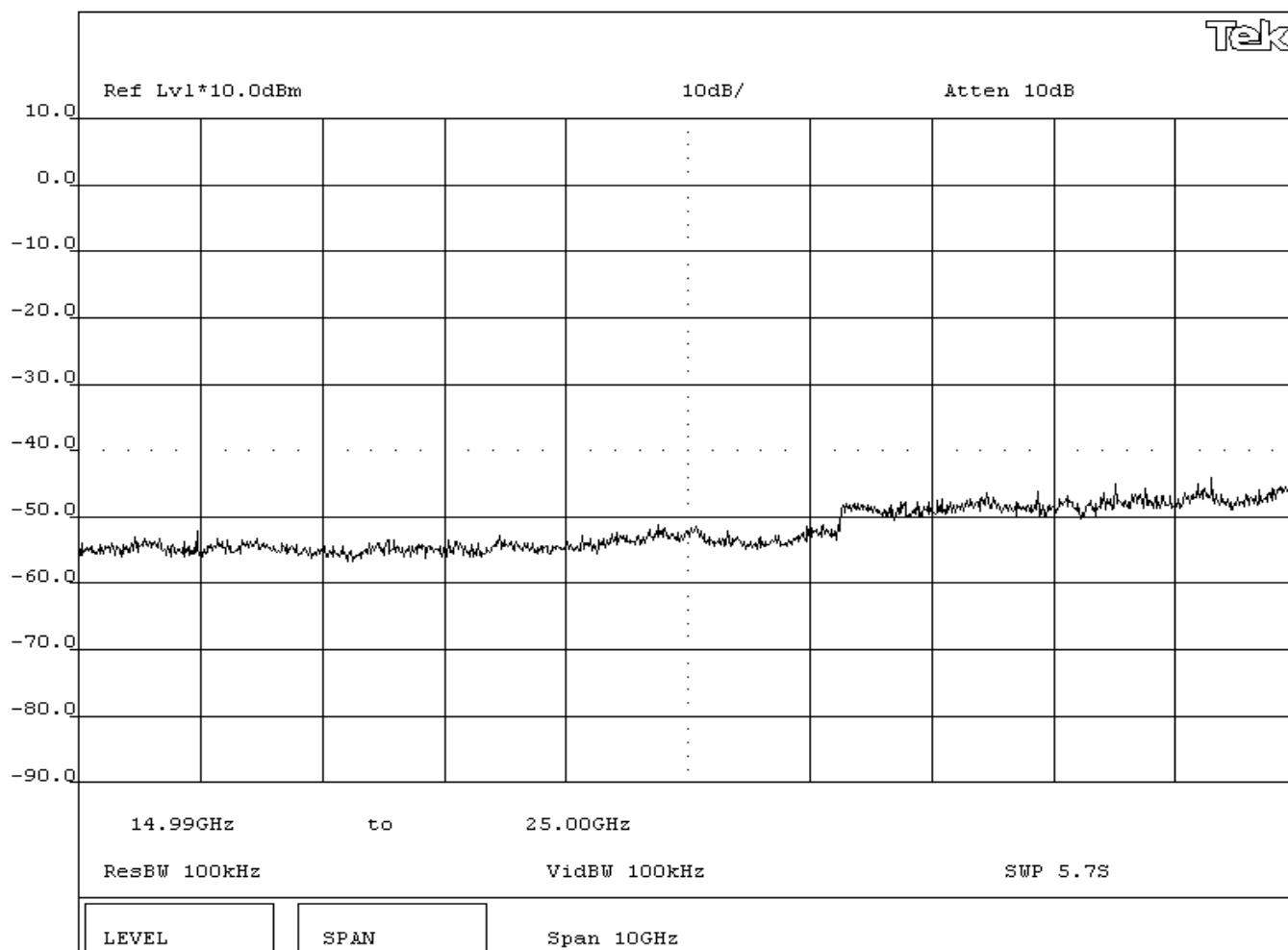
RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Mid Channel 6.5 GHz - 15 GHz


```
Ref Lvl*10.0dBm              10dB/            Atten 10dB

 10.0
  0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0

     6.499GHz      to      15.000GHz

     ResBW 100kHz          VidBW 100kHz           SWP 4.8S

  LEVEL          SPAN          Stop  15.000GHz
```

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

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

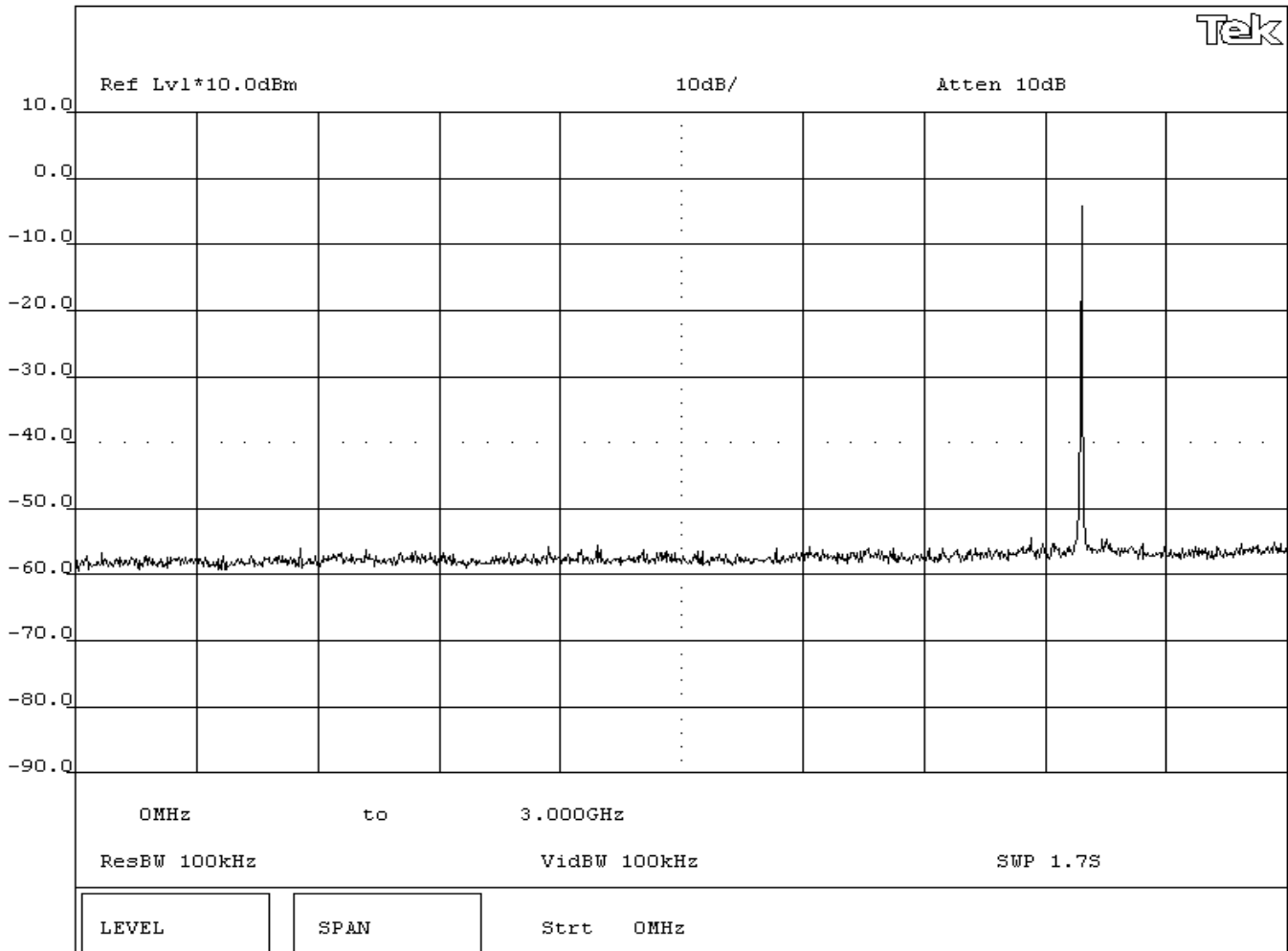| RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - Mid Channel 15 GHz - 25 GHz

Ref Lvl*10.0dBm   10dB/   Atten 10dB

14.99GHz   to   25.00GHz

ResBW 100kHz   VidBW 100kHz   SWP 5.7S

LEVEL   SPAN   Span 10GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.
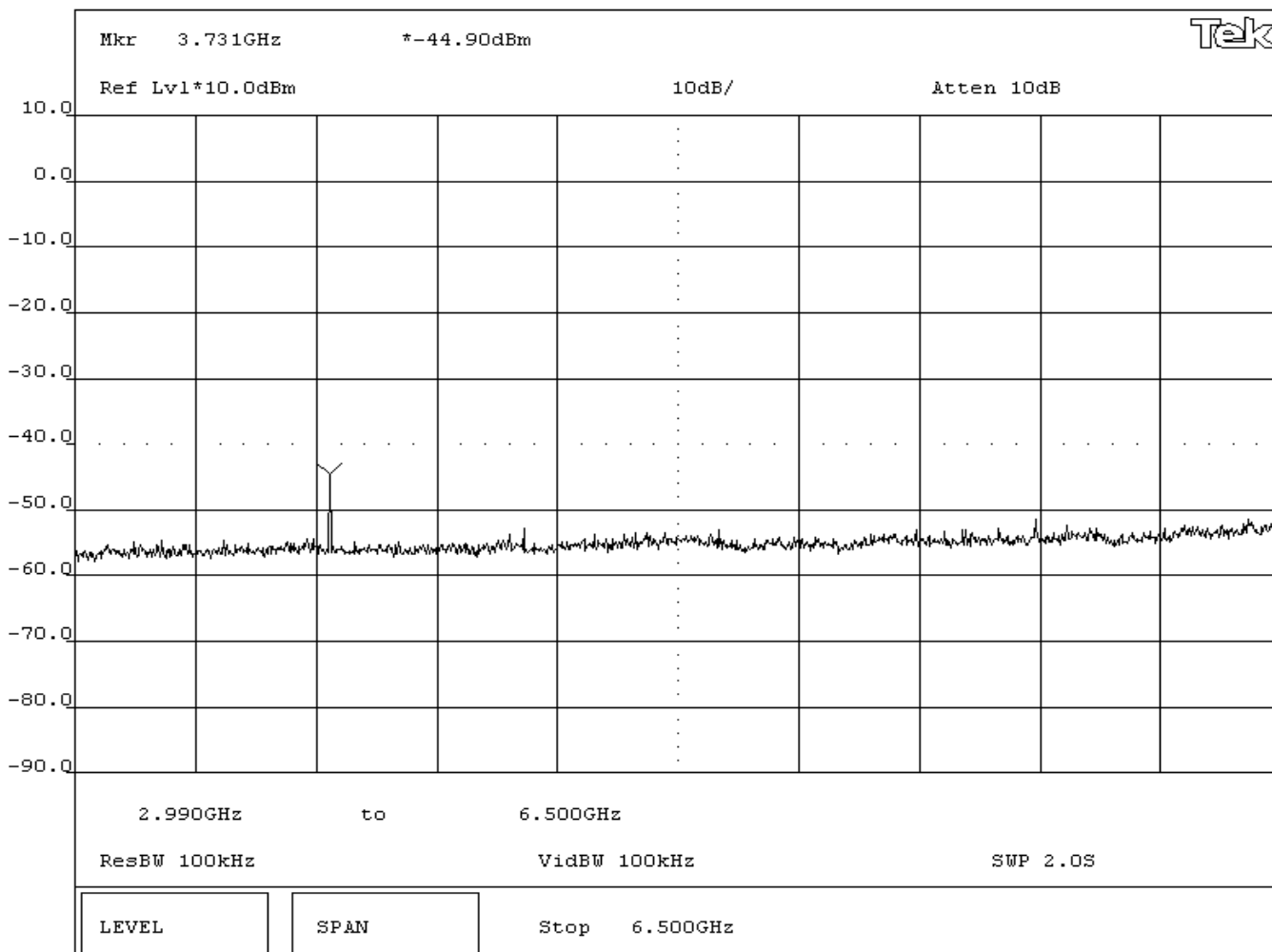
RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - High Channel 0 MHz - 3 GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.

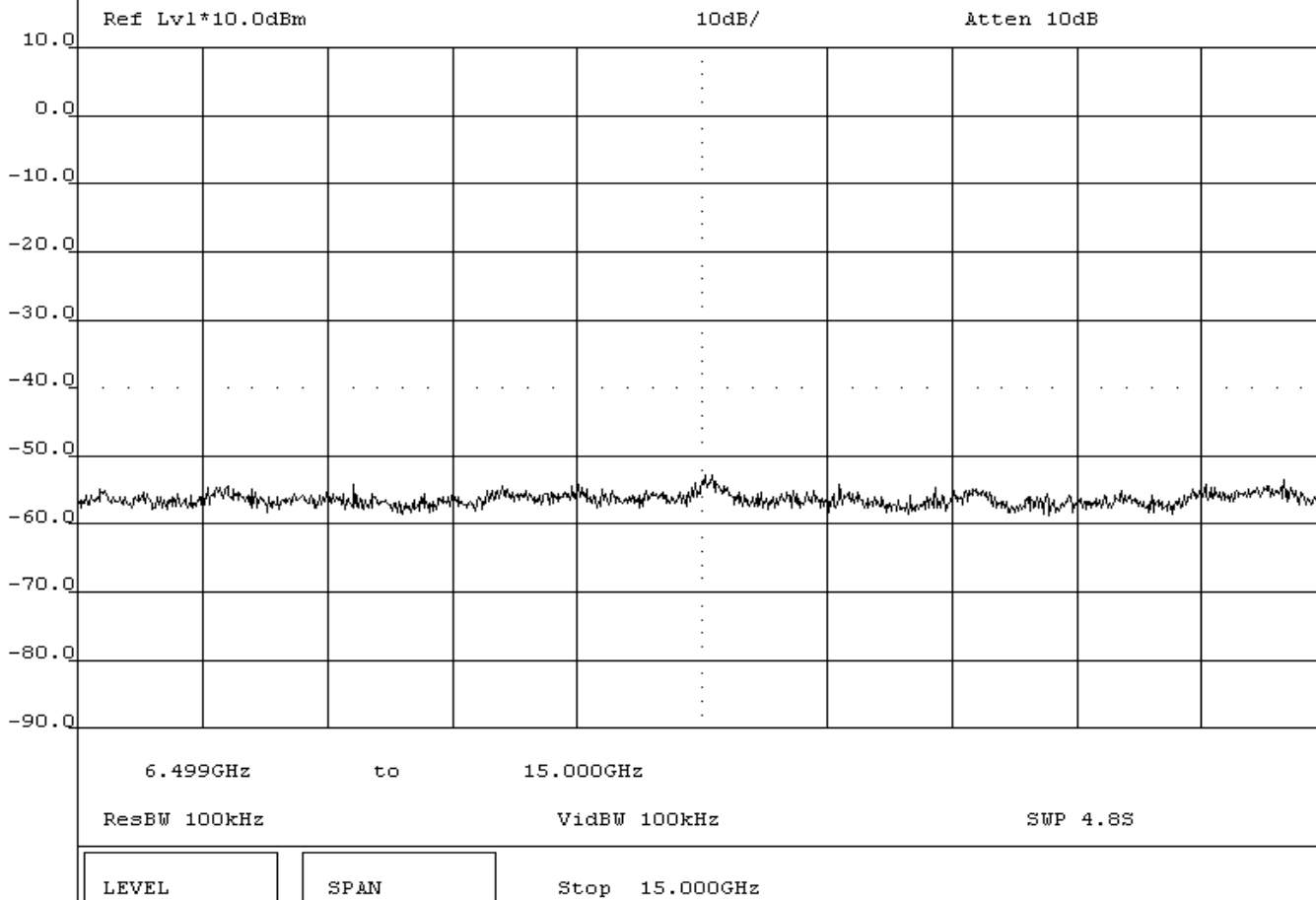| RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - High Channel 3 GHz - 6.5 GHz


```
Mkr   3.731GHz        *-44.90dBm

Ref Lvl*10.0dBm              10dB/            Atten 10dB

  10.0
   0.0
 -10.0
 -20.0
 -30.0
 -40.0
 -50.0
 -60.0
 -70.0
 -80.0
 -90.0

     2.990GHz        to        6.500GHz

  ResBW 100kHz          VidBW 100kHz           SWP 2.0S

  LEVEL       SPAN      Stop   6.500GHz
```

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:** OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS
Maximum Power - Maximum Data Rate

EUT OPERATING MODES
Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD
No deviations.

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

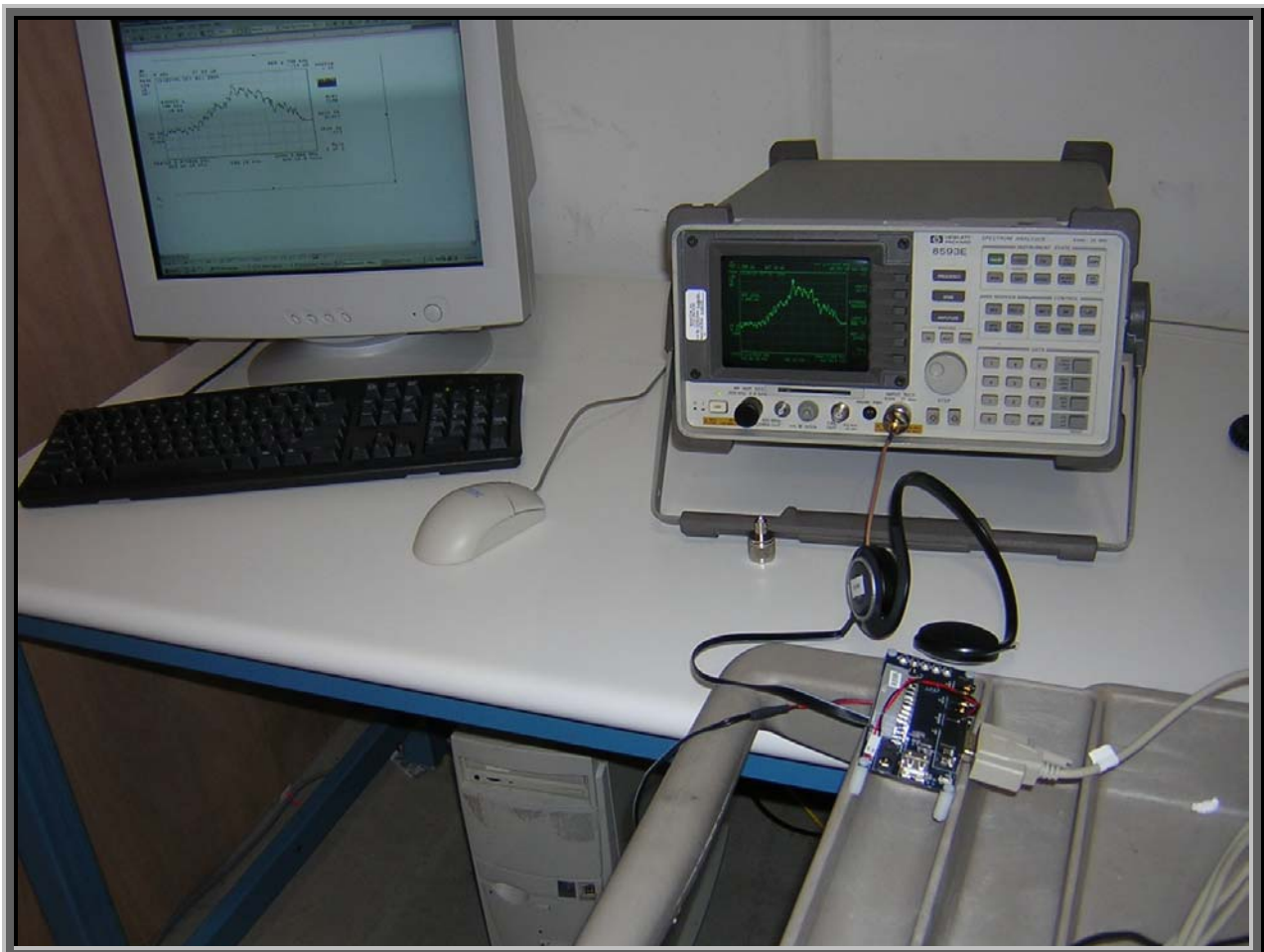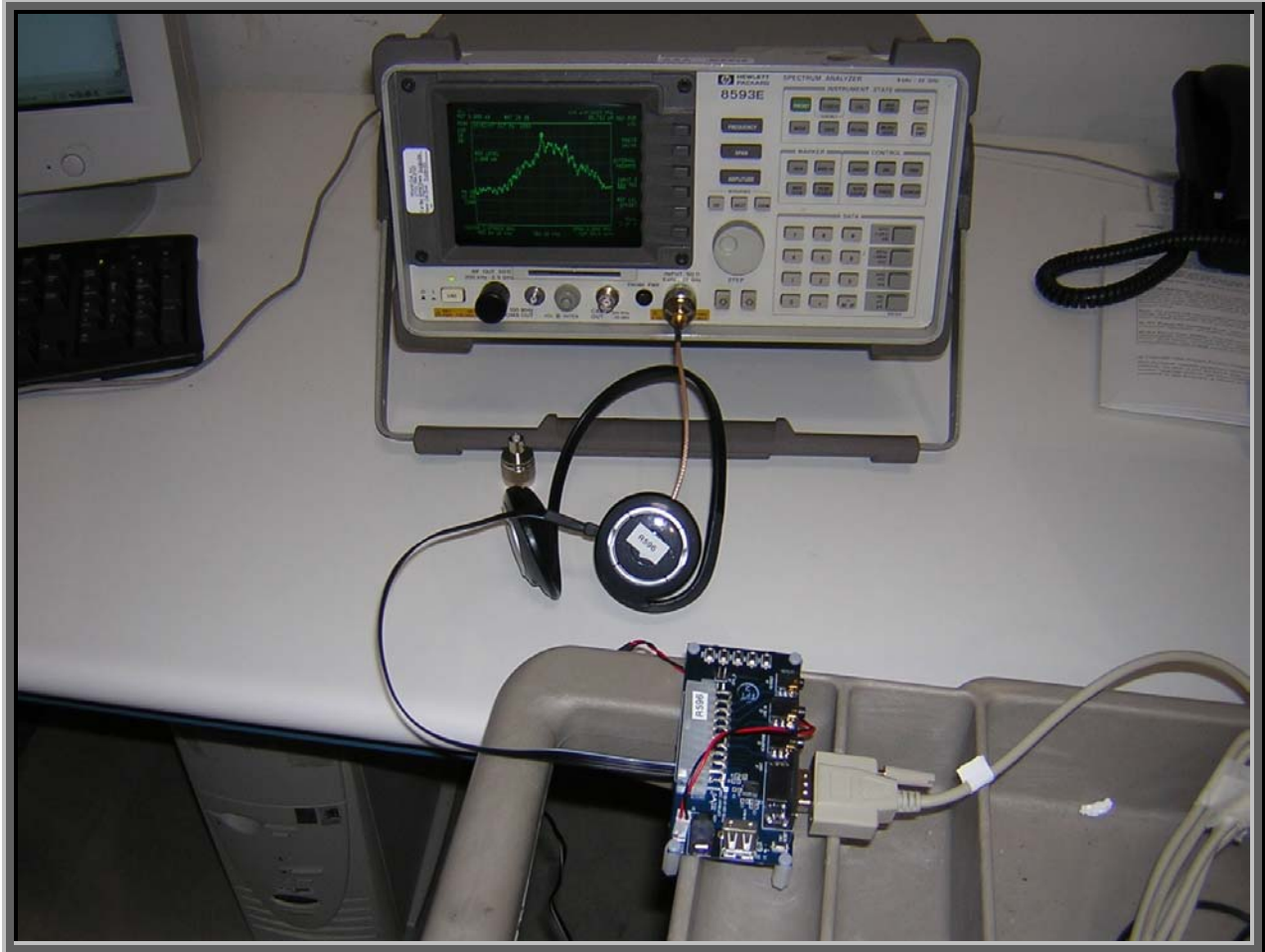| RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - High Channel 6.5 GHz - 15 GHz

EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	10/05/04
Customer:	Logitech, Inc.	**Temperature:**	22 °C
Attendees:	none	**Humidity:**	44%
Customer Ref. No.:	N/A	**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** Internal Battery	**Job Site:**	OC03

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(c)	**Year:**	2003
Method:	DA 00-705 ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

Maximum Power - Maximum Data Rate

EUT OPERATING MODES

Modulated, No Hop Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

REQUIREMENTS

The maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental.

RESULTS	AMPLITUDE
Pass	>20 dB Down

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Conducted Spurious Emissions - High Channel 15.0 GHz - 25.0 GHz
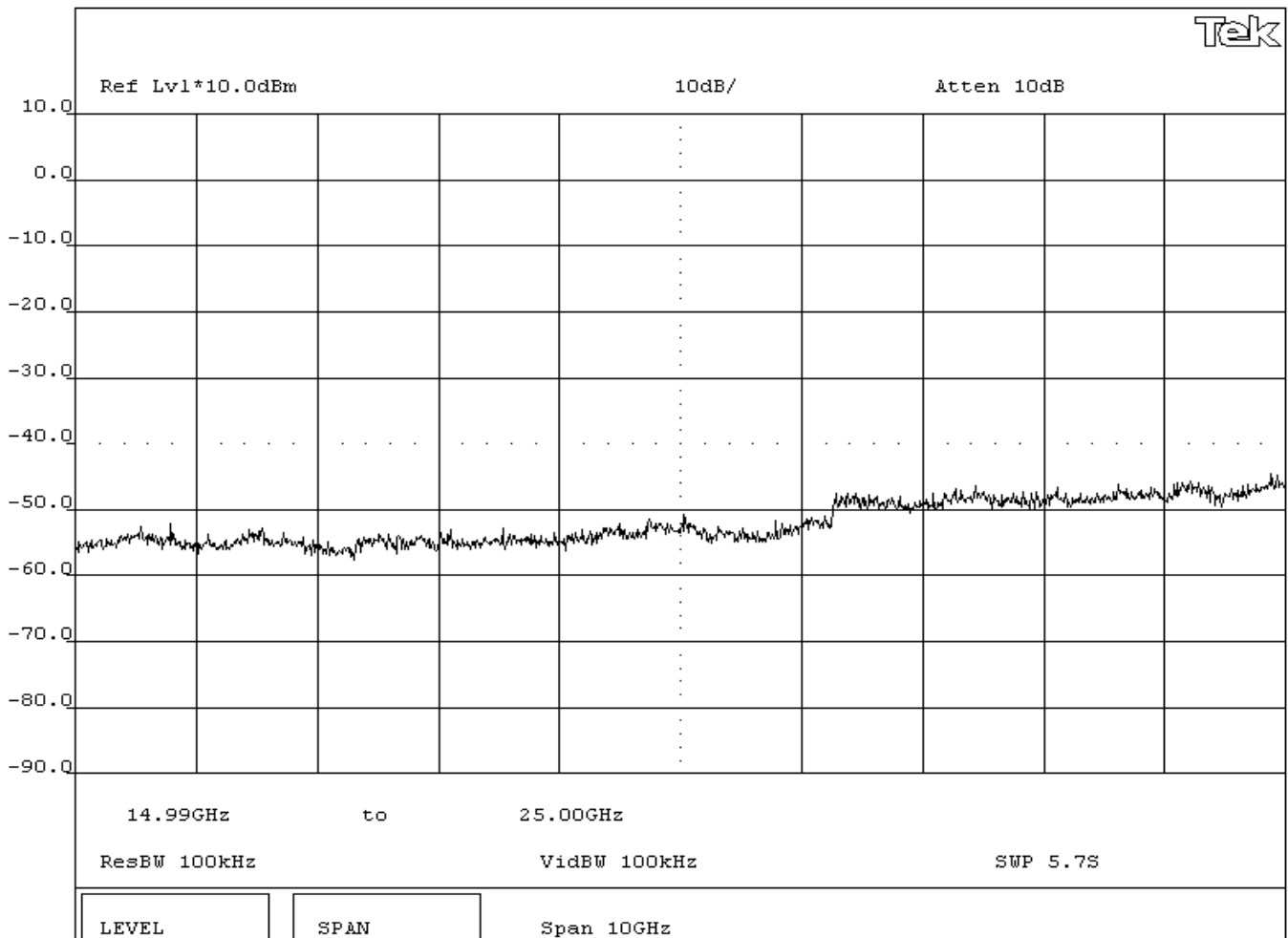
Justification

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

Antennas Investigated:

Integral

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC/60 Hz

Frequency Range Investigated

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

Software\Firmware Applied During Test

Operating system	Unknown	**Version**	Unknown
Exercise software	Zeevo Test	**Version**	(v0.1.7)
Description			

The system was tested using special software developed to test all functions of the device during the test. The software allowed the device to transmit in a continuous no-hop mode with the carrier modulated by a PRBS. The channels could be selected for both transmit and receive modes.

EUT and Peripherals

Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
EUT - Headset	Logitech, Inc.	F-0361A	N/A
AC Adapter	Logitech, Inc.	P925BW05050ABD3	D42711252

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop Computer - Inspiron 3800	Dell	PPX	N/A
Zeevo Chipset Console	Zeevo	v.0.1.7	N/A

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
SMA	PA	0.1	No	EUT - Headset	Zeevo Chipset Console
DC Leads	PA	2.0	PA	EUT - Headset	AC Adapter

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

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo
Antenna, Horn	EMCO	3115	AHF	03/18/2004	24 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Spurious Radiated Emissions

Test Description
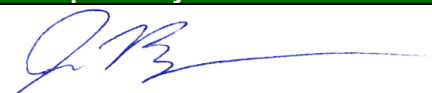
Requirement: The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified 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 EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
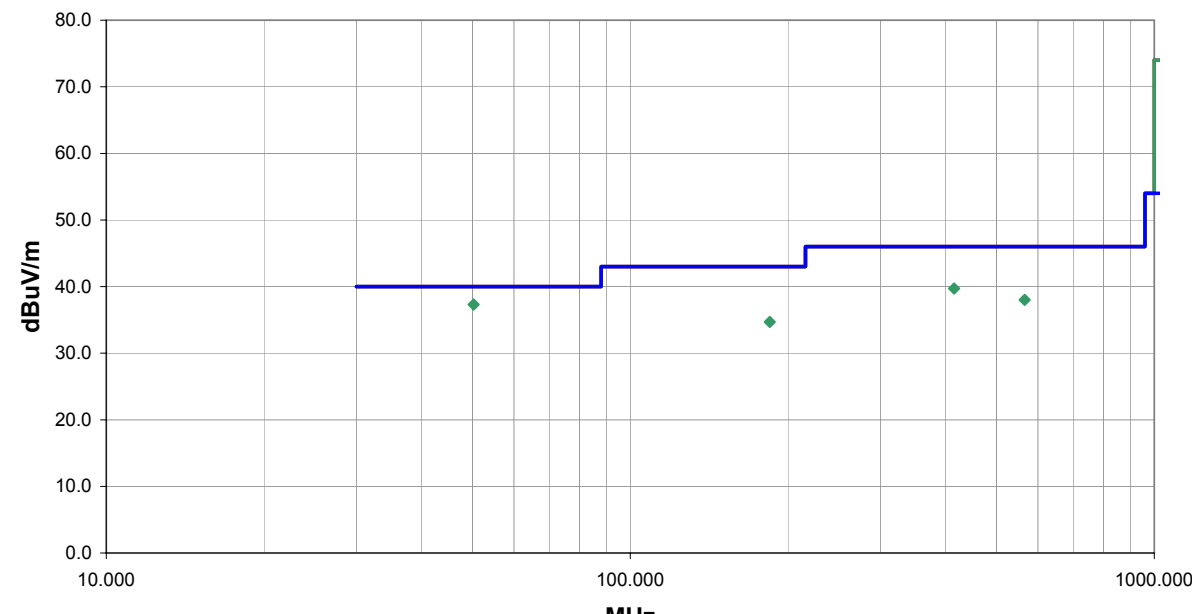
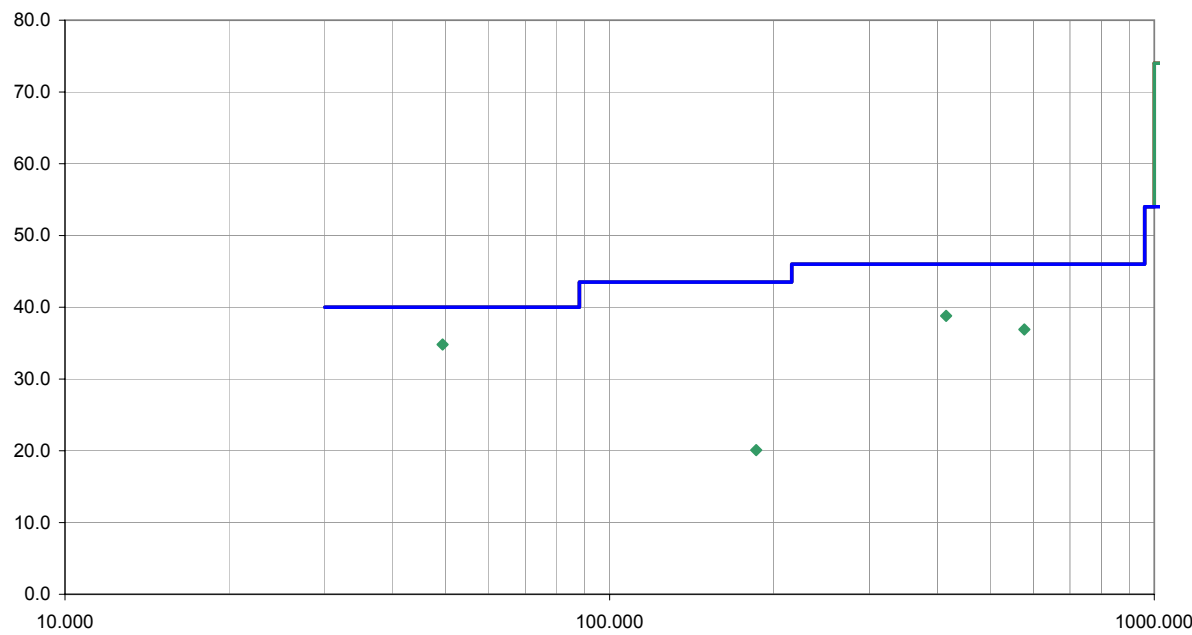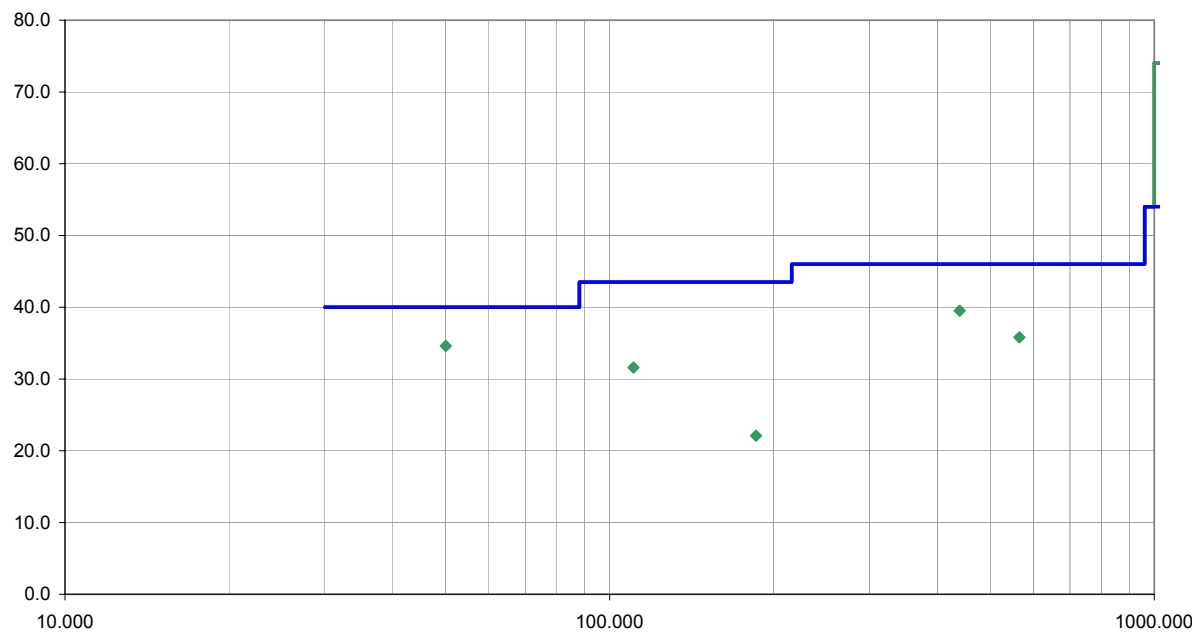| Bandwidths Used for Measurements			
Frequency Range (MHz)	**Peak Data (kHz)**	**Quasi-Peak Data (kHz)**	**Average Data (kHz)**
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

*

Completed by:

RADIATED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	Work Order:	LABT0103
Serial Number:	None	Date:	09/29/04
Customer:	Logitech, Inc.	Temperature:	73
Attendees:	none	Humidity:	44%
Cust. Ref. No.:		Barometric Pressure	29.96
Tested by:	Jonathan Peng	Power: 120 VAC/60 Hz	Job Site: OC10

TEST SPECIFICATIONS

Specification:	FCC 15.209	Year:	2003
Method:	ANSI C63.4	Year:	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected - Maximum Orientation

EUT OPERATING MODES

Transmitting PRBS modulated Bluetooth High Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | Run #

Pass | 2

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
50.250	42.1	-4.8	354.0	1.0	3.0	0.0	V-Bilog	QP	0.0	37.3	40.0	-2.7
415.000	35.6	4.1	97.0	1.6	3.0	0.0	V-Bilog	PK	0.0	39.7	46.0	-6.3
565.957	30.9	7.1	53.0	1.0	3.0	0.0	V-Bilog	PK	0.0	38.0	46.0	-8.0
184.576	38.0	-3.3	138.0	1.6	3.0	0.0	H-Bilog	PK	0.0	34.7	43.0	-8.3

RADIATED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	44%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.209	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected - Maximum Orientation

EUT OPERATING MODES

Transmitting PRBS modulated Bluetooth Mid Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Run #
Pass	1

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
49.354	39.3	-4.5	23.0	1.0	3.0	0.0	V-Bilog	QP	0.0	34.8	40.0	-5.2
414.715	34.7	4.1	98.0	1.6	3.0	0.0	V-Bilog	QP	0.0	38.8	46.0	-7.2
577.544	29.5	7.4	58.0	1.0	3.0	0.0	V-Bilog	PK	0.0	36.9	46.0	-9.1
185.812	23.4	-3.3	89.0	2.2	3.0	0.0	H-Bilog	PK	0.0	20.1	43.5	-23.4

RADIATED EMISSIONS DATA SHEET

REV
df4.3
09/20/2004

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/29/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	44%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by:	Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:** OC10

TEST SPECIFICATIONS

Specification:	FCC 15.209	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected - Maximum Orientation

EUT OPERATING MODES

Transmitting PRBS modulated Bluetooth Low Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

Run #

Pass

2

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
50.040	39.4	-4.8	351.0	1.0	3.0	0.0	V-Bilog	QP	0.0	34.6	40.0	-5.4
439.300	35.1	4.4	10.0	1.4	3.0	0.0	V-Bilog	QP	0.0	39.5	46.0	-6.5
565.250	28.7	7.1	156.0	1.0	3.0	0.0	V-Bilog	PK	0.0	35.8	46.0	-10.2
110.592	36.7	-5.1	108.0	2.2	3.0	0.0	H-Bilog	PK	0.0	31.6	43.5	-11.9
185.633	25.4	-3.3	113.0	2.2	3.0	0.0	H-Bilog	PK	0.0	22.1	43.5	-21.4

RADIATED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:	None	**Date:**	09/30/04
Customer:	Logitech, Inc.	**Temperature:**	73
Attendees:	none	**Humidity:**	44%
Cust. Ref. No.:		**Barometric Pressure**	29.96
Tested by: Jonathan Peng	**Power:** 120 VAC/60 Hz	**Job Site:**	OC10

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Radiated Emissions	**Year:**	2003
Method: ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected

EUT OPERATING MODES

Transmitting PRBS modulated Bluetooth High Channel

DEVIATIONS FROM TEST STANDARD

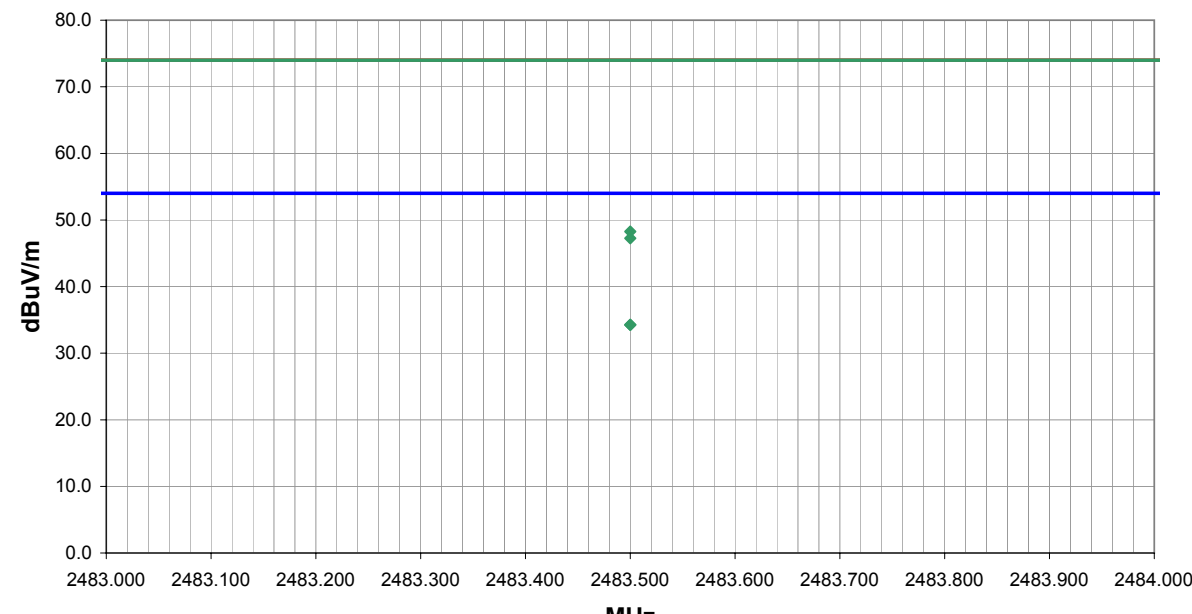No deviations.

RESULTS — **Run #**

Pass — 3

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
7439.675	27.9	3.6	132.0	1.5	3.0	0.0	H-Horn	AV	0.0	31.5	54.0	-22.5	High Channel
7322.525	28.0	3.3	46.0	1.3	3.0	0.0	V-Horn	AV	0.0	31.3	54.0	-22.7	Mid Channel
7440.000	27.4	3.6	0.0	1.5	3.0	0.0	V-Horn	AV	0.0	31.0	54.0	-23.0	High Channel
7322.650	27.3	3.3	28.0	1.3	3.0	0.0	V-Horn	AV	0.0	30.6	54.0	-23.4	Mid Channel
7205.425	27.1	3.0	83.0	1.6	3.0	0.0	V-Horn	AV	0.0	30.1	54.0	-23.9	Low Channel
7322.525	42.3	3.3	46.0	1.3	3.0	0.0	V-Horn	PK	0.0	45.6	74.0	-28.4	Mid Channel
7322.650	42.3	3.3	28.0	1.3	3.0	0.0	H-Horn	PK	0.0	45.6	74.0	-28.4	Mid Channel
7205.105	22.1	3.0	254.0	1.2	3.0	0.0	H-Horn	AV	0.0	25.1	54.0	-28.9	Low Channel
7439.675	41.0	3.6	132.0	1.5	3.0	0.0	H-Horn	PK	0.0	44.6	74.0	-29.4	High Channel
7205.105	41.1	3.0	254.0	1.2	3.0	0.0	H-Horn	PK	0.0	44.1	74.0	-29.9	Low Channel
7440.000	40.0	3.6	0.0	1.5	3.0	0.0	V-Horn	PK	0.0	43.6	74.0	-30.4	High Channel
7205.425	37.5	3.0	83.0	1.6	3.0	0.0	V-Horn	PK	0.0	40.5	74.0	-33.5	Low Channel

RADIATED EMISSIONS DATA SHEET

EUT:	F-0361A Stereo Bluetooth Headphones	**Work Order:**	LABT0103
Serial Number:		**Date:**	10/08/04
Customer:	Logitech, Inc.	**Temperature:**	74
Attendees:	none	**Humidity:**	41%
Cust. Ref. No.:		**Barometric Pressure**	29.9
Tested by:	Holly Ashkannejhad	**Power:** Battery	**Job Site:** EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Spurious Radiated Emissions	**Year:**	2003
Method:	ANSI C63.4	**Year:**	2001

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

Maximum Power - Maximum Data Rate - AC Adapter Connected - Maximum Orientation

EUT OPERATING MODES

Transmitting PRBS modulated Bluetooth high channel.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Run #
Pass	1

Other

Tested By: *Holly Ashkannejhad*

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	11.8	32.0	338.0	1.0	1.0	0.0	H-Horn	AV	-9.5	34.3	54.0	-19.7
2483.500	11.8	32.0	147.0	1.0	1.0	0.0	V-Horn	AV	-9.5	34.3	54.0	-19.7
2483.500	25.8	32.0	147.0	1.0	1.0	0.0	V-Horn	PK	-9.5	48.3	74.0	-25.7
2483.500	24.8	32.0	338.0	1.0	1.0	0.0	H-Horn	PK	-9.5	47.3	74.0	-26.7

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

For each individual device, the following items, 1-7 will vary from one device to another and must be submitted.
1) The occupied bandwidth in Section 15.247(a)(1)(ii).
2) Conducted output power specified in Section 15.247(b)(1).
3) EIRP limit in Section 15.247(b)(3).
4) RF safety requirement in Section 15.247(b)(4)
5) Spurious emission limits in Section 15.247(c).
6) Processing gain and requirements for Hybrids in Section 15.247(f) in the acquisition mode.
7) Power spectral density requirement in Section 15.247(f) in the acquisition mode.

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

1 Output power and channel separation of a Bluetooth device in the different operating modes:
The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode are sufficient.
2 Frequency range of a Bluetooth device:
The maximum frequency of the device is: **2402 – 2480 M**Hz.
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for devices which will be operated in the USA. Other frequency ranges (e.g. for Spain, France, Japan), which are allowed according the Core Specification, must **not be** supported by the device.
3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:
Bluetooth units which want to communicate with other units must be organized in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from it's BD address which is unique for every Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.
4 Example of a hopping sequence in data mode:

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

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

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS. The internal clock of a Bluetooth unit is derived from a free running clock, which is never adjusted and is never turned off. For synchronization with other units, only the offsets are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions, the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmissions is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

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

The input bandwidth of the receiver is 1 MHz.

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

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:

Dwell time = time slot length * hop rate / number of hopping channels *30s

Example for a DH1 packet (with a maximum length of one time slot)

Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period)
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all
Bluetooth devices. Therefore, all Bluetooth devices **comply** with the FCC dwell time
requirement in the data mode.
This was checked during the Bluetooth Qualification tests.
The Dwell time in hybrid mode is approximately 2.6 mS (in a 12.8s period)
8 Channel Separation in hybrid mode
The nominal channel spacing of the Bluetooth system is 1Mhz independent of the
operating mode.
The maximum "initial carrier frequency tolerance" which is allowed for Bluetooth is
fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for
three frequencies (2402, 2441, 2480 MHz).
9 Derivation and examples for a hopping sequence in hybrid mode
For the generation of the inquiry and page hop sequences the same procedures as
described for the data mode are used (see item 5), but this time with different input
vectors:
**For the inquiry hop sequence, a predefined fixed address is always used. This results
in the same 32 frequencies used by all devices doing an inquiry but every time with a
different start frequency and phase in this sequence.
**For the page hop sequence, the device address of the paged unit is used as the input
vector. This results in the use of a subset of 32 frequencies which is specific for that
initial state of the connection establishment between the two units. A page to
different devices would result in a different subset of 32 frequencies.
So it is ensured that also in hybrid mode, the frequency is used equally on average.
Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06,
17, 21, 08, 10, 66, 70, 12, 14, 19, 23
Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18,
58, 56, 20, 53, 60, 62, 55, 06, 66, 64
10 Receiver input bandwidth and synchronization in hybrid mode:
The receiver input bandwidth is the same as in the data mode (1 MHz). When two
Bluetooth devices establish contact for the first time, one device sends an inquiry access
code and the other device is scanning for this inquiry access code. If two devices have
been connected previously and want to start a new transmission, a similar procedure
takes place. The only difference is, instead of the inquiry access code, a special access
code, derived from the BD_ADDRESS of the paged device will be, will be sent by the
master of this connection. Due to the fact that both units have been connected before (in
the inquiry procedure) the paging unit has timing and frequency information about the
page scan of the paged unit. For this reason the time to establish the connection is
reduced.
11 Spread rate / data rate of the direct sequence signal
The Spread rate / Data rate in inquiry and paging mode can be defined via the access
code. The access code is the only criterion for the system to check if there is a valid
transmission or not. If you regard the presence of a valid access code as one bit of
information, and compare it with the length of the access code of 68 bits, the Spread rate
/ Data rate will be 68/1.
12 Spurious emission in hybrid mode

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