# Logitech, Inc.

# MN: A-0363C Cordless Headset MN: F-0444A Mobile Pro Headset

September 18, 2005

Report No. LABT0149

Report Prepared By



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

© 2005 Northwest EMC, Inc



## Certificate of Test Issue Date: September 18, 2005 Logitech, Inc. MN: A-0363C Cordless Headset MN: F-0444A Mobile Pro Headset

Emissions					
Specification	Test Method	Pass	Fail		
FCC 15.247(a) Occupied Bandwidth:2005-04	ANSI C63.4:2003				
FCC 15.247(b) Output Power:2005-04	ANSI C63.4:2003				
FCC 15.247(d) Band Edge Compliance:2005-04	ANSI C63.4:2003	$\square$			
FCC 15.247(d) Spurious Conducted Emissions:2005-04	ANSI C63.4:2003				
FCC 15.247(d) Spurious Radiated Emissions:2005-04	ANSI C63.4:2003	$\boxtimes$			
FCC 15.247(e) Power Spectral Density:2005-04	ANSI C63.4:2003	$\square$			
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003				
FCC 15.107 Class B:2005-04 AC Powerline Conducted Emissions	ANSI C63.4:2003				
FCC 15.109(g) (CISPR 22:1997) Class B:2005-04 Radiated Emissions	ANSI C63.4:2003				

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

#### Test Facility

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

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

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

Approved By:
ADU.K.P
Greg Kiemel, Director of Engineering

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

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



Revision Number	Description	Date	Page Number
00	None		



**FCC:** Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

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

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

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

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

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









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

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

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

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

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

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

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











Revision 03/18/05

NEMKO





#### What is measurement uncertainty?

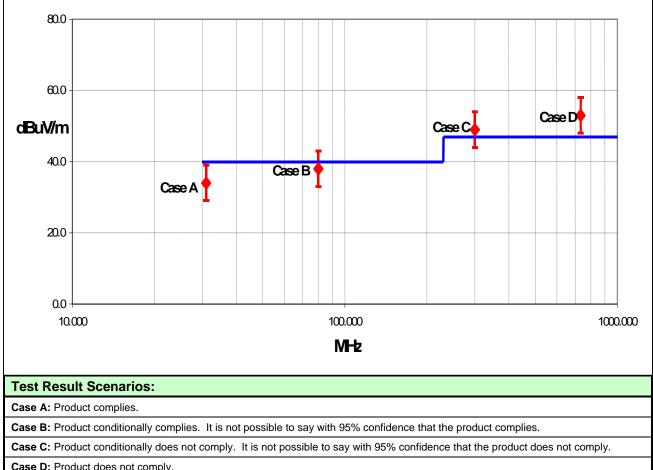
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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.



Case D: Product does not comply.



Radiated Emissions ≤ 1 GHz		Value (	dB)				
	Probability	Probability Biconical		Log Pe	eriodic	D	ipole
	Distribution	Distribution Antenna		Ante	enna	An	tenna
Test Distance		3m	10m	3m	10m	3m	10m
Combined standard	normal	+ 1.86	+ 1.82	+ 2.23	+ 1.29	+ 1.31	+ 1.25
uncertainty <i>u<sub>c</sub>(y)</i>		- 1.88	- 1.87	- 1.41	- 1.26	- 1.27	- 1.25
Expanded uncertainty <b>U</b>	normal (k=2)	+ 3.72	+ 3.64	+ 4.46	+ 2.59	+ 2.61	+ 2.49
(level of confidence $\approx$ 95%)		- 3.77	- 3.73	-2.81	- 2.52	- 2.55	- 2.49

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

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

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

Conducted Immunity		
	Probability	Value
	Distribution	(+/- dB)
Combined standard uncertainty <i>uc(y</i> )	normal	1.05
Expanded uncertainty <b>U</b> (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%.



# **Facilities**



## California

Orange County Facility Labs OC01 – OC13

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



# Oregon

Evergreen Facility Labs EV01 – EV10

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



## Oregon

Trails End Facility Labs TE01 – TE03

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



### Washington

# Sultan Facility

# Labs SU01 – SU07

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

Party Requesting the Test		
Company Name:	Logitech, Inc.	
Address:	1499 SE Tech Center Place Suite 350	
City, State, Zip:	Vancouver, WA 98683	
Test Requested By:	Mitchell Phillipi	
Model:	MN: A-0363C Cordless Headset	
Wodel.	MN: F-0444A Mobile Pro Headset	
First Date of Test: August 11, 2005		
Last Date of Test:	September 8, 2005	
Receipt Date of Samples:	August 11, 2005	
Equipment Design Stage:	Pre-Production	
Equipment Condition:	No visual damage.	

#### Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided.
I/O Ports:	Combination power and I/O port

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

The Logitech A-0363C Bluetooth® Headset is a low power, cordless transceiver which is designed to have two-way transmission with the Logitech A-0363D Bluetooth dongle. The A-0363C and the F-0444A are identical to each other, but they have different firmware. The headset is designed to work off of a battery, and it can be charged using an AC Adapter. It will not transmit while recharging.

#### **Client Justification for EUT Selection:**

The product is an engineering sample, representative of the final product.

#### **Client Justification for Test Selection:**

These tests satisfy the requirements of FCC 15.247.

We are also using this same headset as a refresh to our older Bluetooth headset. Only difference is firmware, hardware is identical. Thus, we have added this model number to the report: MN: F-0444A Mobile Pro Headset.

#### **EUT Photo**





# **Modifications**

	Equipment modifications						
Item	Test	Date	Modification	Note	Disposition of EUT		
1	Band Edge Compliance	08/11/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.		
2	Occupied Bandwidth	08/11/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.		
3	Spurious Conducted Emissions	08/11/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.		
4	Power Spectral Density	08/11/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.		
5	Output Power	08/11/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.		
6	Spurious Radiated Emissions	08/14/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.		
7	Radiated Emissions (DoC)	08/30/2005	No EMI suppression devices were added or modified during this test.	Dongle and Headset operating side by side. 230V testing.	EUT remained at Northwest EMC.		
8	AC Powerline Conducted Emissions	08/31/2005	No EMI suppression devices were added or modified during this test.	Headset only.	EUT remained at Northwest EMC.		
9	Radiated Emissions (DoC)	09/08/2005	No EMI suppression devices were added or modified during this test.	Dongle and Headset operating side by side. 120V testing.	EUT remained at Northwest EMC.		



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

Operating Modes Investigated:	
Loop back Mode	
Headset Charging	
Operating Mode used for Final Test:	
Loop back Mode	

Power Input Settings Investigated:
230 VAC, 50 Hz to Xbox, 230VAC to charging headset
230 VAC, 50 Hz to Xbox, Headset on battery
120 VAC, 60 Hz to Xbox, 120VAC to charging headset
120 VAC, 60 Hz to Xbox, Headset on battery
Input Power Setting used for Final Test:
230 VAC, 50 Hz to Xbox, Headset on battery
120 VAC, 60 Hz to Xbox, Headset on battery

Frequency Range Inves	tigated		
Start Frequency	30 MHz	Stop Frequency	1 GHz

Software\Firmware Applied During Test							
Operating system	Unknown	Version	Unknown				
Exercise software	Voice Loop back Software	Version	Unknown				
Description							
The system was tested using Voice Loop back Software on the Xbox 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 - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown				
Bluetooth Dongle	Logitech, Inc.	A-0363D	Unknown				
Controller	Microsoft	Unknown	751412929A				
Xbox - EU	Microsoft	Unknown	412407321303				
Television	Thomson	418X-TX807C	3244480104088				
US AC Adapter (used during headset charging mode)	Logitech, Inc.	AU055V150T	Unknown				
EU AC Adapter (used during headset charging mode)	Logitech, Inc.	P925BW05050ABD3	Unknown				
Xbox – US	Microsoft	Unknown	393229733206				

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.4	No	Xbox	AC Mains
AC Power	No	2.0	No	Television	AC Mains
Video	No	2.0	No	Xbox	Television
Control	No	2.6	Yes	Controller	Xbox
DC Power (used only during charging mode)	No	1.2	No	EU AC Adapter	Headset
DC Power (used only during charging mode)	No	1.4	No	US AC Adapter	Headset
PA = Cable is permanently	attached to the	device. Shielding	g and/or prese	ence of ferrite may be	unknown.

Measurement Equipment								
Description	Manufacturer	Model	Identifier	Last Cal	Interval			
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo			
Pre-Amplifier	Miteq	AM-1616-1000	AOL	08/02/2005	13 mo			
Spectrum Analyzer	Agilent	E4446A	AAQ	04/08/2005	13 mo			

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

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

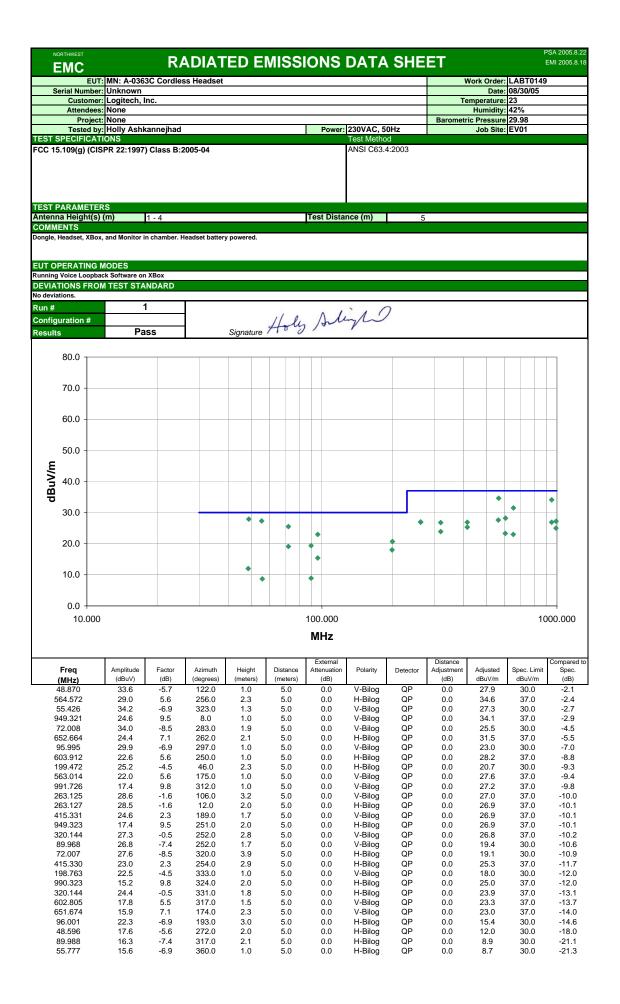
Note: The specified distance is the horizontal separation between the closest periphery of the EUT and the center of the axis of the elements of the receiving antenna. However, if the receiving antenna is a log-periodic array, the specified distance shall be the distance between the closest periphery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

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



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

Completed by: Holy Arling



	NORTHWEST		R/	ADIAT	ED EI	MISS	IONS	DATA	SHE	ET			PSA 2005.8.22 EMI 2005.8.31
		T: MN: A-0363	3C Cordle	ss Headset						V	Nork Order:	LABT0149	)
S		er: Unknown										09/08/05	
		er: Logitech, li	nc.							Te	emperature:		
	Attendee	t: None								Barometr	Humidity: ic Pressure		
	Tested b	y: Holly Ashk	annejhad				Power:	120VAC, 6			Job Site:		
	SPECIFICA							Test Metho					
		ISPR 22:1997)	) Class B::	2005-04				ANSI C63.	4:2003				
	PARAMETE		1 - 4				Test Dista	nce (m)	5				
	MENTS	5) (III)	1 - 4				Test Dista	nce (m)		)			
		ox, and Monitor in	n chamber. H	leadset batter	y powered.								
EUT C	PERATING	MODES											
		ack Software on	XBox										
		OM TEST STA	NDARD										
No devi				1				12	_				
Run #		2				,/ 0	, Sile	IN C	)				
	guration #					Holy	John	y~					
Result	ts	Pa	SS		Signature	11 0							
	80.0												
	70.0												
	70.0												
	60.0												
	50.0												
E													
≥	40.0												
dBuV/m	40.0												
ρ													
	30.0												•
									•				•
							•		•				
	20.0												
	10.0				•								
	0.0 +												
	10.00	0					100.000					10	000.000
							MHz						
		<u> </u>					External			Distance		<u> </u>	Compared to
	Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.
L	(MHz) 201.748	(dBuV) 31.8	(dB)	(degrees) 148.0	(meters)	(meters)	(dB)		QP	(dB)	dBuV/m	dBuV/m	(dB)
	201.748 96.778	31.8 30.9	-4.4 -6.8	148.0 27.0	1.0 3.8	5.0 5.0	0.0 0.0	V-Bilog H-Bilog	QP QP	0.0 0.0	27.4 24.1	30.0 30.0	-2.6 -5.9
	201.708	27.4	-4.4	190.0	3.0	5.0	0.0	H-Bilog	QP	0.0	23.0	30.0	-7.0
9	992.889	19.6	9.7	218.0	1.2	5.0	0.0	H-Bilog	QP	0.0	29.3	37.0	-7.7
	603.354	21.0	5.6	163.0	1.0	5.0	0.0	V-Bilog	QP	0.0	26.6	37.0	-10.4
	992.901 603.920	16.8 20.7	9.7 5.6	234.0 232.0	2.1 2.6	5.0	0.0	V-Bilog	QP QP	0.0	26.5 26.3	37.0	-10.5 -10.7
	51.575	20.7 17.0	5.6 -6.2	232.0 28.0	2.6 3.0	5.0 5.0	0.0 0.0	H-Bilog H-Bilog	QP QP	0.0 0.0	26.3 10.8	37.0 30.0	-10.7 -19.2
						2.0			<u> </u>			- 0.0	





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

Channels in Specified Band Investigated:
Low
Mid
High

**Operating Modes Investigated:** No Hop

Data Rates Investigated: Maximum

Output Power Setting(s) Investigated: Maximum

Power Input Settings Investigated: Battery

 Software/Firmware Applied During Test

 Exercise software
 BlueCore-Audio
 Version
 1.0

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

EUT and Peripherals							
Description	Manufacturer	Model/Part Number	Serial Number				
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown				
Development Module	Cambridge Silicon Radio, Ltd.	BCES301199/1	7467 08 08 03				
AC Adapter	Egston	N2GFSW3	42251				

Remote Equipment Outside of Test Setup Boundary							
Description Manufacturer Model/Part Number Serial Number							
Laptop PC	IBM	A21M	IS108				
AC Adapter IBM 02K6657 None							
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary							

Cables							
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2		
Serial	No	2.1	No	Laptop PC	Development Module		
I/O	No	1.2	No	Development Module	EUT - Bluetooth Headset		
DC Leads	No	1.8	PA	AC Adapter	Development Module		
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.							

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

**<u>Requirement</u>:** Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System. As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz. The measurement is made with the spectrum analyzer's resolution bandwidth set to  $\geq$ 1% of the 20dB bandwidth, and the video bandwidth set to greater than or equal to the resolution bandwidth.

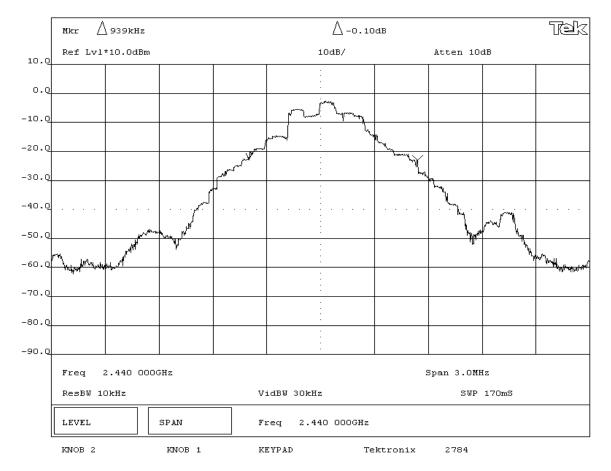
<u>Configuration</u>: The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

Completed by:	
Rochy Le	Pelen

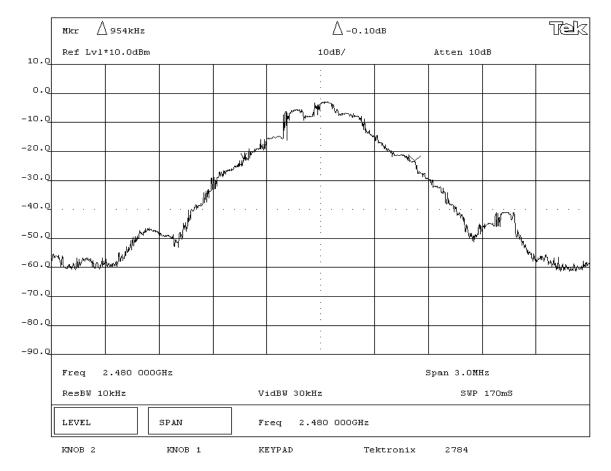
EMC OCCUPIED BANDWIDTH						
EUT: MN: A-0363C Cordless Headset			Work Order:			
Serial Number: Unknown				08/11/05		
Customer: Logitech, Inc.			Temperature:			
Attendees: None		Tested by: Rod Peloquin	Humidity:			
Customer Ref. No.: None	Job Site:	EV06				
TEST SPECIFICATIONS						
Specification: 47 CFR 15.247(a)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003		
SAMPLE CALCULATIONS						
COMMENTS						
Measured with a direct connection between the RF output	it and a spectrum analyzer.					
EUT OPERATING MODES						
Modulated by PRBS at maximum data rate						
DEVIATIONS FROM TEST STANDARD						
None						
REQUIREMENTS						
Bluetooth can be authorized as either a Frequency Hopp						
As a FHSS, the maximum 20dB bandwidth of the hopping maximum 20 dB bandwidth is 1.5 MHz.			paration for Bluetooth is	s 1 MHz, therefore the		
As a DTS system, the minimum 6 dB bandwidth is 500 kl	Hz. As a Hybrid, it must meet the	FHSS requirement as described above.				
RESULTS		BANDWIDTH				
Pass		0.897 MHz				
SIGNATURE						
Rochy ter Pielings						
DESCRIPTION OF TEST						
20dB Bandwidth - Low Channel						

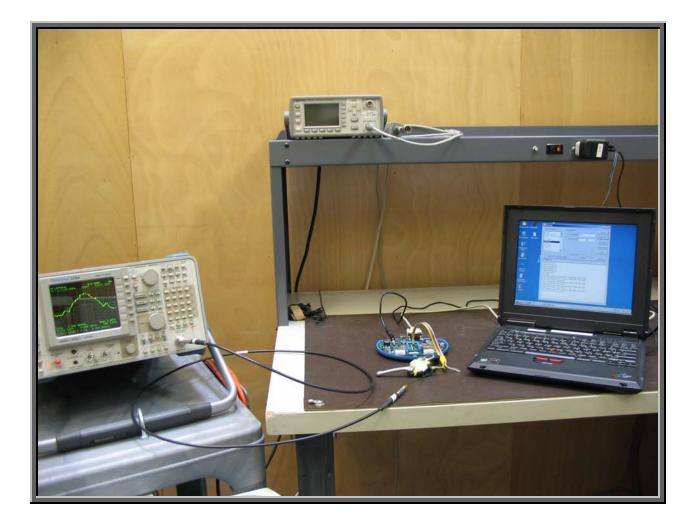
#### Tek ∆о.оодв **∆** 897kHz Mkr Ref Lvl\*10.0dBm 10dB/ Atten 10dB 10.Q 0.0 -10.0 -20.Q -30.Q -40.0 -50.0 TUAN NAME OF -60.0 -70.Q -80.Q -90.0 Freq 2.402 000GHz Span 3.0MHz ResBW 10kHz VidBW 30kHz SWP 170mS LEVEL SPAN Span 3.0MHz KNOB 2 KNOB 1 KEYPAD Tektronix 2784

NORTHWEST EMC							
EUT: MN: A-	0363C Cordless Headset				Work Order:	LABT0149	
Serial Number: Unkno	wn				Date:	08/11/05	
Customer: Logited		Temperature:	73 °F				
Attendees: None				Rod Peloquin	Humidity:		
Customer Ref. No.: None			Power:	Battery	Job Site:	EV06	
TEST SPECIFICATIONS							
Specification: 47 CFF	R 15.247(a)	Year: 2005-04	Method:	DA 00-705, ANSI C63.4	Year:	2003	
SAMPLE CALCULATIONS							
COMMENTS							
Measured with a direct conne	etion between the RE eutro	ut and a anastrum analyzar					
EUT OPERATING MODES	ction between the KF outp	ut and a spectrum analyzer.					
Modulated by PRBS at maxim	um data rata						
DEVIATIONS FROM TEST ST							
None	ANDARD						
REQUIREMENTS							
	as either a Frequency Honr	oing System (FHSS), a Digital Tr	anemission System (DTS	) or a Hybrid System			
		ig channel is equal to 1.5 times			enaration for Bluetoot	h is 1 MHz	
therefore the maximum 20 dB		ig onaments equal to 1.5 times	the onumer separation.	of example, enamers	eparation for Bractool		
		Hz. As a Hybrid, it must meet th	e FHSS requirement as o	described above.			
RESULTS			BANDWIDTH				
Pass			0.939 MHz				
SIGNATURE							
Rocky to Relens							
DESCRIPTION OF TEST							
20dB Bandwidth - Mid Channel							



NORTHWEST EMC							
EUT: M	N: A-0363C Cordless Headset				Work Order:	LABT0149	
Serial Number: U	nknown				Date:	08/11/05	
Customer: Logitech, Inc.					Temperature:	73 °F	
Attendees: No	one		Tested by:	Rod Peloquin	Humidity:		
Customer Ref. No.: No.	one		Power:	Battery	Job Site:	EV06	
TEST SPECIFICATIONS							
Specification: 47		Year: 2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003	
SAMPLE CALCULATION	IS						
COMMENTS							
	onnection between the RF outp	ut and a anastrum analyzer					
EUT OPERATING MODE		ut and a spectrum analyzer.					
Modulated by PRBS at m							
DEVIATIONS FROM TES							
None	TSTANDARD						
REQUIREMENTS							
	ized as either a Frequency Honr	oing System (FHSS), a Digital Tra	nemission System (DTS	) or a Hybrid System			
		g channel is equal to 1.5 times t			enaration for Bluetoot	h is 1 MHz	
	20 dB bandwidth is 1.5 MHz.		ie onanner separation.	of example, enamers			
		Hz. As a Hybrid, it must meet th	e FHSS requirement as o	described above.			
RESULTS		•	BANDWIDTH				
Pass			0.954 MHz				
SIGNATURE							
Rocky te Releys							
DESCRIPTION OF TEST							
20dB Bandwidth - High Channel							







# **Output Power**

#### Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

**Operating Modes Investigated:** No Hop

Data Rates Investigated: Maximum

Output Power Setting(s) Investigated: Maximum

Power Input Settings Investigated: Battery

 Software/Firmware Applied During Test

 Exercise software
 BlueCore-Audio
 Version
 1.0

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

EUT and Peripherals						
Description	Manufacturer	Model/Part Number	Serial Number			
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown			
Development Module	Cambridge Silicon Radio, Ltd.	BCES301199/1	7467 08 08 03			
AC Adapter	Egston	N2GFSW3	42251			

Remote Equipment Outside of Test Setup Boundary					
Description Manufacturer Model/Part Number Serial Number					
Laptop PC	IBM	A21M	IS108		
AC Adapter IBM 02K6657 None					
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary					

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	No	2.1	No	Laptop PC	Development Module
I/O	No	1.2	No	Development Module	EUT - Bluetooth Headset
DC Leads	No	1.8	PA	AC Adapter	Development Module
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		
Oscilloscope	Tektronix	TDS 3052	TOF	12/02/2004	13 mo		
Power Meter	Hewlett Packard	E4418A	SPA	07/23/2004	24 mo		
Power Sensor	Hewlett-Packard	8481H	SPB	07/23/2004	24 mo		
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA		
Signal Generator	Hewlett Packard	8341B	TGN	02/07/2005	13 mo		

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

<u>Configuration</u>: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The EUT was transmitting at its maximum output power. The data rate of the radio was varied to determine the level that produced the highest output power.

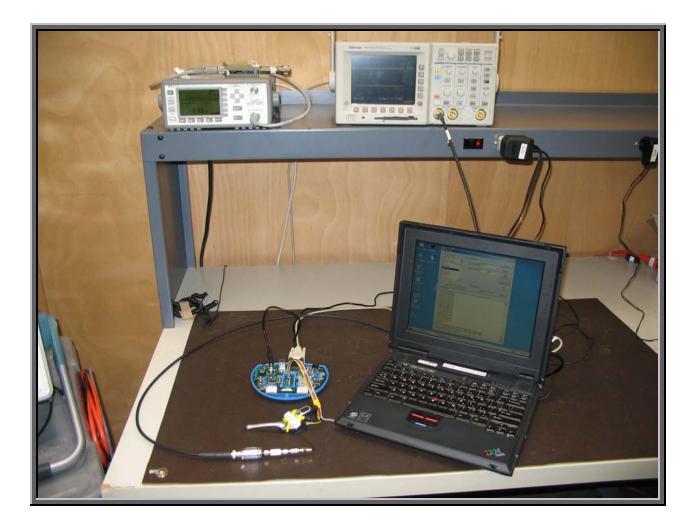
The measurement was made using a direct connection between the RF output of the EUT and a RF detector diode. The DC output of the diode was measured with the oscilloscope. The signal generator, tuned to the transmit frequency, was then substituted for the EUT. The CW output of the signal generator was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

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

Completed by:	
Rochington	Reling
$\mathcal{O}$	

NORTHWEST EMC		OUTPUT	POWER			Rev BETA
						01/30/01
	MN: A-0363C Cordless Headset				Work Order	
Serial Number:						: 08/11/05
	Logitech, Inc.				Temperature	: 73 °F : 42% RH
Attendees:						
Customer Ref. No.:	None		Power:	3.7 VDC	Job Site:	EV06
TEST SPECIFICATION	NS					
Specification:	47 CFR 15.247(b)	Year: 2005-06	Method:	DA 00-705, ANSI C63.4	4 Year:	2003
SAMPLE CALCULATI	IONS					
COMMENTS						
EUT OPERATING MO	DES					
Modulated by PRBS a	at maximum data rate					
DEVIATIONS FROM T	EST STANDARD					
None						
REQUIREMENTS						
Maximum peak condu	ucted output power does not exce	ed 1 Watt				
RESULTS			AMPLITUDE			
Pass			2.38 mW			
SIGNATURE						
Nochy te Fielings						
DESCRIPTION OF TE	ST					
Output Power						

Frequency (MHz)	Peak Power Measured w/ Diode Detector (dBm)	Peak Power (mW)	Spec (mW)
2402.0	3.74	2.37	1000.0
2441.0	3.42	2.20	1000.0
2480.0	3.76	2.38	1000.0





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

Channels in Specified Band Investigated:
Low
High

**Operating Modes Investigated:** No Hop

Data Rates Investigated: Maximum

Output Power Setting(s) Investigated: Maximum

Power Input Settings Investigated: Battery

Software\Firmware Applied During Test							
Exercise softwareBlueCore-AudioVersion1.0							
Description							
The system was tested using special software developed to test all functions of the device during the test.							
The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were							
selectable between the lowest and the highest channels in the operating band.							

EUT and Peripherals			
Description	Manufacturer	Model/Part Number	Serial Number
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown
Development Module	Cambridge Silicon Radio, Ltd.	BCES301199/1	7467 08 08 03
AC Adapter	Egston	N2GFSW3	42251

Remote Equipment Outside of Test Setup Boundary								
Description Manufacturer Model/Part Number Serial Number								
Laptop PC	IBM	A21M	IS108					
AC Adapter IBM 02K6657 None								
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary								

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	No	2.1	No	Laptop PC	Development Module
I/O	No	1.2	No	Development Module	EUT - Bluetooth Headset
DC Leads	No	1.8	PA	AC Adapter	Development Module
PA = Cable is p	permanently	y attached to the	e device. S	hielding and/or presence of	f ferrite may be unknown.

Measurement Equipment	1				
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

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

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

Completed by:	
Rocky la	Peling

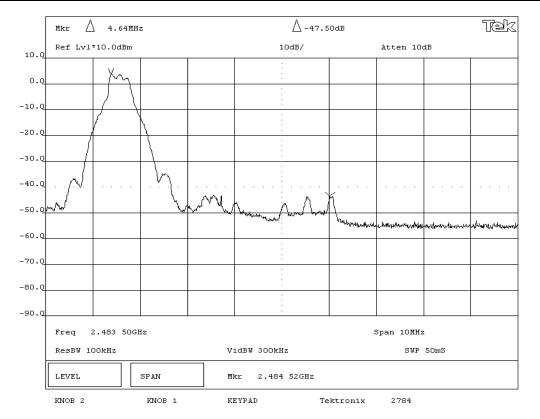
NORTHWEST BAND EDGE COMPLIANCE Rev BETA							
EMC	BAND EDGE	COMPLIANCE		Rev BETA 01/30/01			
EUT: MN: A-0363C Cordless Headse	ət		Work Order:	LABT0149			
Serial Number: Unknown			Date:	08/11/05			
Customer: Logitech, Inc.			Temperature:	73 °F			
Attendees: None	lone Tested by: Rod Peloquin						
Customer Ref. No.: None		Power: Battery	Job Site:	EV06			
TEST SPECIFICATIONS							
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003			
SAMPLE CALCULATIONS							
COMMENTS							
EUT OPERATING MODES							
Modulated by PRBS at maximum data rate							
DEVIATIONS FROM TEST STANDARD							
None							
REQUIREMENTS							
Maximum level of any spurious emission at the edge	of the authorized band is 20 dB dow	n from the fundamental					
RESULTS		AMPLITUDE					
Pass		-53.10 dB					
SIGNATURE							
Rocky to Feling Tested By:							
DESCRIPTION OF TEST							
	Band Edge Compli	ance - Low Channel					

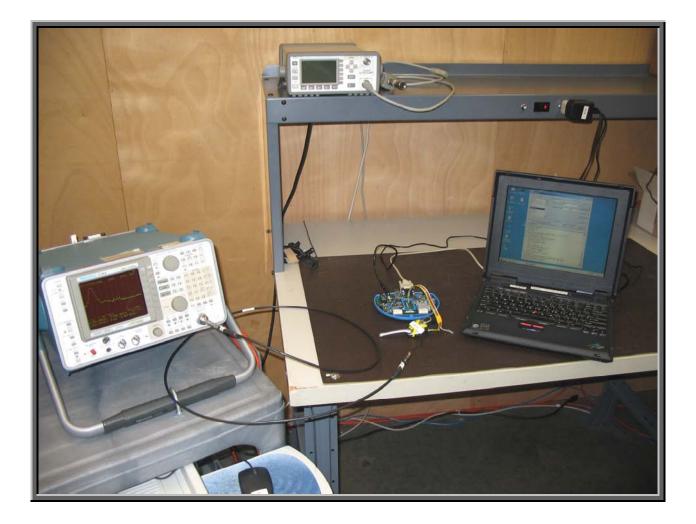


	Mkr 🛆	-2.33MHz						
10.0	Ref Lvl*1	LO.OdBm		10dB/		Atten 100	1B	
0.0					х	n,		
-10.0								
-20.0						1		
-30.0								
						V	~	
-40.0					/ v		human	~~~
-50.0	verylowinglighter	- Manager warman a transmission	ware proved the ward	How MAL Month Marken Audres			-Mu- A	
-70.0				· · · · · · · · · · · · · · · · · · ·				
-80.0				· · · · · · · · · · · · · · · · · · ·				
-90.Q								
	Freq 2.	400 OOGHz			\$	õpan 10MHz		
	ResBW 100	)kHz	v	idBW 300kHz		SWP	50mS	
	LEVEL	SPAN	s	WP 50mS				
-	KNOB 2	KNOB	1 K	EYPAD T	ektronix	2784		

NORTHWEST	MC BAND EDGE COMPLIANCE							
EUT:	MN: A-0363C Cordless Headset				We	ork Order:	LABT0149	
Serial Number:	Unknown			Date:	08/11/05			
Customer:	Logitech, Inc.				Ten	nperature:	73 °F	
Attendees:			Tested by:	Rod Peloquin		Humidity:		
Customer Ref. No.:	None		Power:	Battery		Job Site:	EV06	
TEST SPECIFICATION								
Specification:	: 47 CFR 15.247(d)	Year: 2005-06	Method:	DA 00-705, ANSI C63.4		Year:	2003	
SAMPLE CALCULATIO	ONS							
COMMENTS								
EUT OPERATING MOD								
Modulated by PRBS at	t maximum data rate							
DEVIATIONS FROM TE	EST STANDARD							
None								
REQUIREMENTS								
	spurious emission at the edge of t	the authorized band is 20 dB down	from the fundamental					
RESULTS			AMPLITUDE					
Pass			-47.5 dB					
SIGNATURE								
Tested By:	Porty le Feling							
DESCRIPTION OF TES	БТ							
		Band Edge Complia	ance - High C	hannel				









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

Channels in Specified Band Investigated:
Low
Mid
High

**Operating Modes Investigated:** No Hop

Data Rates Investigated: Maximum

Output Power Setting(s) Investigated: Maximum

Power Input Settings Investigated: Battery

 Software/Firmware Applied During Test

 Exercise software
 BlueCore-Audio
 Version
 1.0

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

EUT and Peripherals							
Description	Manufacturer	Model/Part Number	Serial Number				
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown				
Development Module	Cambridge Silicon Radio, Ltd.	BCES301199/1	7467 08 08 03				
AC Adapter	Egston	N2GFSW3	42251				

Remote Equipment Outside of Test Setup Boundary						
Description	Manufacturer	Model/Part Number	Serial Number			
Laptop PC	IBM	A21M	IS108			
AC Adapter	IBM	02K6657	None			
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary						

Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
Serial	No	2.1	No	Laptop PC	Development Module	
I/O	No	1.2	No	Development Module	EUT - Bluetooth Headset	
DC Leads	No	1.8	PA	AC Adapter	Development Module	
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.						

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

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

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

Completed by:	
Rolyte	Peling

NORTHWEST	EMISSIONS [	DATA SHEET		Rev BETA 01/30/01				
EUT: MN: A-0363C Cordless Headset			Work Order:					
Serial Number: Unknown				08/11/05				
Customer: Logitech, Inc.			Temperature:	73 °F				
Attendees: None		Tested by: Rod Peloquin	Humidity:	42% RH				
Customer Ref. No.: None		Power: Battery	Job Site:	EV06				
TEST SPECIFICATIONS								
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003				
SAMPLE CALCULATIONS								
COMMENTS EUT OPERATING MODES Modulated by PRBS at maximum data rate DEVIATIONS FROM TEST STANDARD None	EUT OPERATING MODES Modulated by PRBS at maximum data rate DEVIATIONS FROM TEST STANDARD							
REQUIREMENTS								
Maximum level of any spurious emission outside of the auth	norized band is 20 dB down from	the fundamental						
RESULTS								
Pass								
SIGNATURE Rochy le Pielengs Tested By:								
DESCRIPTION OF TEST								
Antenna Condu	cted Spurious Emi	ssions - Low Channel 0MH	z-3GHz					

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

								Tek
10.0	Ref Lvl*10.	OdBm		10dB,	/	Atten 100	łВ	
0.0							I	
				· ·				
-10.Q				:				
-20.Q								
-30.Q								
-40.Q								
-50.Q				:				
-60.Q	un personal second and a second s	or the state the state of the s	hoursender	Henry ward ward ward	www.withitedations	wy on Anine and resident	hunnerighen	yldenentendendenden
-70.0								
-80.Q				· · · · · · · · · · · · · · · · · · ·				
-90.0								
	OMHz ResBW 100kH	to		000GHz /idBW 300kHz		SWP	1.75	
	LEVEL	SPAN	v	/idBW 300kHz				
	KNOB 2	KNOB	1 K	KEYPAD	Tektronix	2784		

NORTHWEST EMC		<b>EMISSIONS</b>	DATA SHEET		Rev BETA	
	MN: A-0363C Cordless Headset			Work Order:	01/30/01	
Serial Number:					08/11/05	
	Logitech, Inc.			Temperature:		
Attendees:			Tested by: Rod Peloquin	Humidity:		
Customer Ref. No.:			Power: Battery	Job Site:		
TEST SPECIFICATION			Tower. Buttery	005 0110.	2000	
	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003	
SAMPLE CALCULATI				Tour	2000	
COMMENTS						
EUT OPERATING MOI	DES					
Modulated by PRBS a	t maximum data rate					
DEVIATIONS FROM T	EST STANDARD					
None						
REQUIREMENTS						
	spurious emission outside of the	authorized band is 20 dB down fr	om the fundamental			
RESULTS						
Pass						
SIGNATURE Rochy le Pieleng Tested By:						
DESCRIPTION OF TES	ST					
	Antenna Condu	cted Spurious Emis	ssions - Low Channel 3GH	lz-6.5GHz		

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

										Tek
10.0	Ref Lvl*10	0.OdBm				10dB/		Atten 10	dB	
0.0						· ·				
-10.Q						· · · · · · · · · · · · · · · · · · ·				
-20.Q						:				
-30.Q						:				
-40.Q						· · · ·				
-50.Q										
						i ikini.	المرام المراجع		ا . ا ا مه ا	and the second state of th
-60.0	have a station of the state of	ward shadyberg	Normany's Association	ahan manana	L. Wheek and the set	halen Anthertigten standartige	and the second	n fandere ander de la serie	who have been	analang/a-wa-denimany
-60.0		ninnt sentyberry	theimenet-developmene	uhan Manahakan	L. W. A. B. W. B.	holen dividente per anno anno anno anno anno anno anno ann	and the second	n den der der det der vollense	hurber Namester, John W	4,443,649,64,494,4974,9974,9974,9974,9977
-60.Q		ninnt-1/2n-ty/d/14	themasin despised and	admann direction and the		nden Andreas :	ereleningenteringenteringen 		forthere per dare	4,44,4,64,49,44,444,444,444,444,444,444,
-60.Q -70.Q -80.Q		,000000/06-ty/044	Mainawin-duantanya	admundustration	,	habaalalikatipa waa waaqa	etalani na dae Witsen	n	hand the west of the second	
-60.Q			to				99.00000	n-ganden det te southere	4,006,47 Manupika, Jahon V	nnth-gh-an-gratur-1
-60.Q -70.Q -80.Q		Hz		6.5			99.00000		2.0S	γ,ητβ
-60.Q -70.Q -80.Q	2.990GI	Hz kHz		6.5 V:	OOGHz idBW 30		99.000.00.0000000000000000000000000000			

NORTHWEST		<b>EMISSIONS I</b>	DATA SHEET		Rev BETA		
	MN: A-0363C Cordless Headset			Work Order:	01/30/01		
Serial Number:					08/11/05		
	Logitech, Inc.			Temperature:			
Attendees:			Tested by: Rod Peloquin	Humidity			
Customer Ref. No.:			Power: Battery	Job Site:			
TEST SPECIFICATION							
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C6	3.4 Year:	2003		
SAMPLE CALCULATI							
COMMENTS							
EUT OPERATING MO	DES						
Modulated by PRBS a	t maximum data rate						
<b>DEVIATIONS FROM T</b>	EST STANDARD						
None							
REQUIREMENTS							
Maximum level of any	spurious emission outside of the	authorized band is 20 dB down fro	om the fundamental				
RESULTS							
Pass							
SIGNATURE							
Porting ter Reling							
DESCRIPTION OF TES							
	Antenna Conduc	ted Spurious Emis	sions - Low Channel 6.5	GHz-15GHz			

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

					Tek
10.0	Ref Lvl*10.0d	Bm	10dB/	Atten 10	dB
0.0					
-10.0			· · · · · · · · · · · · · · · · · · ·		
-20.0			 		
-30.0					
-40.0					
-50.0					
-60.Q	Aprilia parte a la la la la seconda a la la la la la seconda de la la seconda de la seconda de la seconda de la	leranna an	warnesser all all and a second and a second and a second	man and the second and the second and the	and the state of t
-70.0					
-80.0					
-90.0	6.499GHz	to	15.000GHz	1 1	1
	ResBW 100kHz		VidBW 300kHz	SWP	4.85
	LEVEL	SPAN	VidBW 300kHz		
	KINOB 2	KNOB 1	KEYPAD	Tektronix 2784	

NORTHWEST EMC		<b>EMISSIONS</b>	DATA SHEET		Rev BETA 01/30/01		
	MN: A-0363C Cordless Headset			Work Order: L			
Serial Number:				Date: 0			
	Logitech, Inc.			Temperature: 7			
Attendees:			Tested by: Rod Peloquin	Humidity: 4			
Customer Ref. No.:			Power: Battery	Job Site: E			
TEST SPECIFICATION	NS						
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2	003		
SAMPLE CALCULATI							
COMMENTS							
EUT OPERATING MO							
Modulated by PRBS a							
DEVIATIONS FROM T	EST STANDARD						
None							
REQUIREMENTS							
-	v spurious emission outside of the	authorized band is 20 dB down fr	om the fundamental				
RESULTS							
Pass							
SIGNATURE							
Tested By:							
DESCRIPTION OF TE							
DESCRIPTION OF TE		to d Onemiano Emia					
	Antenna Conducted Spurious Emissions - Low Channel 15GHz - 25GHz						

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

								Tek
10.0	Ref Lvl*10.0dBn	n		10dB/		Atten 100	1B	
0.0				•				
				•				
-10.0				•				
-20.0				:				
-30.0								
-40.0								
-50.0				•	formander	white and the	manyoperative	ward not be a farment
	manual and a state of the state	dream and the second second	per black of the second of the second of the	the and the second second	A44441			
-60.0				•				
-70.0				•				
-80.0		_		•				
-90.0				•				
	14.99GHz	to	25.00GHz					
	ResBW 100kHz		VidBW 300k	Hz		SWP	5.75	
	LEVEL	SPAN	VidBW 300k	Hz				
	KNOB 2	KNOB 1	KEYPAD	Te	ktronix	2784		

NORTHWEST	EMISSIONS I	DATA SHEET		Rev BETA 01/30/01			
EUT: MN: A-0363C Cordless Headset			Work Order:				
Serial Number: Unknown			Date:	08/11/05			
Customer: Logitech, Inc.			Temperature:	73 °F			
Attendees: None		Tested by: Rod Peloquin	Humidity:	42% RH			
Customer Ref. No.: None		Power: Battery	Job Site:	EV06			
TEST SPECIFICATIONS							
Specification: 47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003			
SAMPLE CALCULATIONS							
COMMENTS EUT OPERATING MODES Modulated by PRBS at maximum data rate DEVIATIONS FROM TEST STANDARD							
None							
REQUIREMENTS							
Maximum level of any spurious emission outside of the	authorized band is 20 dB down fro	om the fundamental					
RESULTS							
Pass SIGNATURE							
Kochen her Fielings Tested By.							
DESCRIPTION OF TEST							
Antenna Conde	ucted Spurious Em	Antenna Conducted Spurious Emissions - Mid Channel 0MHz-3GHz					

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

,										
										Tek
10.0	Ref Lvl <sup>;</sup>	*10.OdBm			10	dB/		Atten 100	dB	
10.0					:					
0.0										
-10.0										
-20.0					:					
-30.0					:					
-40.0										
					· · · · · ·					
-50.0										
-60.0	yan a have have	hand or a second second	www.agerauallyuiger	Previllenceronaution	at man and and and and a second	handhandhadha	Warthhashing a province	hadrodiate	ad hourseneeding	alphates and the second
					:					
-70.0					•					
-80.0										
-90.0							<u> </u>	<u> </u>	1	
	OMHz		to		OOGHz					
	ResBW 10	OokHz		V	idBW 300kHz			SWP	1.75	
	LEVEL		SPAN	v	idBW 300kHz					
'	KINOB 2		KNOB 1	K	EYPAD	Te	ktronix	2784		

EMIS	SIONS DATA SHEET	Rev BETA				
EUT: MN: A-0363C Cordless Headset		01/30/01 Work Order: LABT0149				
Serial Number: Unknown		Date: 08/11/05				
Customer: Logitech, Inc.		Temperature: 73 °F				
Attendees: None	Tested by: Rod Pelog					
Customer Ref. No.: None	Power: Battery	Job Site: EV06				
TEST SPECIFICATIONS						
Specification: 47 CFR 15.247(d) Year: 2005	-04 Method: DA 00-705	ANSI C63.4 Year: 2003				
SAMPLE CALCULATIONS						
COMMENTS						
EUT OPERATING MODES						
Modulated by PRBS at maximum data rate						
DEVIATIONS FROM TEST STANDARD						
None						
REQUIREMENTS Maximum level of any spurious emission outside of the authorized band	is 20 dB down from the fundamental					
RESULTS	IS 20 GB down from the fundamental					
Pass						
SIGNATURE						
Rocky le Relenge						
DESCRIPTION OF TEST						
Antenna Conducted Spurious Emissions - Mid Channel 3GHz-6.5GHz						

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

					Tek
10.0	Ref Lv1*10.0d	lBm	10dB/	Atten 10	dB
0.0					
-10.0			· · ·		
-20.0					
-30.0					
-40.0					
-50.0			hander and a second and a second s	here was the way of the second	where the week we we we wanted a start way to
-60.0	ŊĸĊĸĹĊſŊĸġĊĸĸĨĸĊŔĬŔŔĸĸĸĸĸĸŧĸĸĬŊĸĬŔĬŔĸĬŎ	and see a second about with a finite days			
-70.0					
-80.0					
-90.0					
	2.990GHz	to	6.500GHz		
	ResBW 100kHz		VidBW 300kHz	SWP	2.05
	LEVEL	SPAN	Stop 6.500GHz		
	KNOB 2	KNOB 1	KEYPAD Te	ektronix 2784	

NORTHWEST EMC		<b>EMISSIONS</b>	DATA SHEET		Rev BETA 01/30/01		
	MN: A-0363C Cordless Headset			Work Order:			
Serial Number:					08/11/05		
	Logitech, Inc.			Temperature: 7			
Attendees:			Tested by: Rod Peloquin	Humidity: 4			
Customer Ref. No.:			Power: Battery	Job Site: I			
TEST SPECIFICATION	NS						
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year: 2	2003		
SAMPLE CALCULATI	ONS						
COMMENTS							
EUT OPERATING MO	DES						
Modulated by PRBS a	t maximum data rate						
DEVIATIONS FROM T	EST STANDARD						
None							
REQUIREMENTS							
Maximum level of any	spurious emission outside of the	authorized band is 20 dB down fr	om the fundamental				
RESULTS							
Pass							
SIGNATURE							
Portry le Felenzy							
DESCRIPTION OF TE	st						
	Antenna Conducted Spurious Emissions - Mid Channel 6.5GHz-15GHz						

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

						Tek
10.0	Ref Lv1*10.0	dBm	10dB/		Atten 10dB	
0.0						
-10.Q			· · ·			
-20.Q						
-30.Q						
-40.Q						
-50.Q						
-60.Q	Werthough Lyong and the share	n the set we wanted a state of the set	warment we have all all and and	water and the second and an and	and and a second and the second second	have been made and the
-70.0						
-80.0						
-90.0			:			
	6.499GHz	to	15.000GHz			
	ResBW 100kHz		VidBW 300kHz		SWP 4.8S	
	LEVEL	SPAN	VidBW 300kHz			
	KNOB 2	KNOB 1	KEYPAD	Tektronix	2784	

NORTHWEST							
EMC					Rev BETA 01/30/01		
EUT:	MN: A-0363C Cordless Headset			Work Order:	LABT0149		
Serial Number:	Unknown			Date:	08/11/05		
Customer:	Logitech, Inc.		Temperature:	73 °F			
Attendees:	None Tested by: Rod Peloquin			Humidity:	42% RH		
Customer Ref. No.:	None		Power: Battery	Job Site:	EV06		
TEST SPECIFICATION	IS						
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003		
SAMPLE CALCULATI	ONS						
COMMENTS							
EUT OPERATING MO							
Modulated by PRBS a							
DEVIATIONS FROM T	EST STANDARD						
None							
REQUIREMENTS							
	spurious emission outside of the	authorized band is 20 dB down fro	om the fundamental				
RESULTS							
Pass							
SIGNATURE							
	Portug la Reling						
Tested By:	Tested By:						
DESCRIPTION OF TE	ST						
	Antenna Conducted Spurious Emissions - Mid Channel 15GHz-25GHz						

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

								Tek
10.0	Ref Lvl*10.0dB	3m	10	dB/		Atten 100	1B	
0.0								
-10.0			· ·					
-20.0								
-30.Q								
-40.0								
-50.0			Your Man and a second		11th way to have	بعالواده وسرور والمعالية	hanger og van staten van de state	warder had warder and here was a start of the second start of the
	weiner winner with the second	www.mananananananananananananananananananan	your man have have a partitude of the	wednesdown	μγγ-N			
-60.Q			· · ·					
-70.0								
-80.0								
-90.Q								
	14.99GHz	to	25.00GHz					
	ResBW 100kHz		VidBW 300kHz			SWP	5.75	
	LEVEL	SPAN	VidBW 300kHz					
	KNOB 2	KNOB 1	KEYPAD	Te	ktronix	2784		

NORTHWEST		<b>EMISSIONS</b>	DATA SHEET		Rev BETA	
	1			1	01/30/01	
	MN: A-0363C Cordless Headset			Work Order:		
Serial Number:					08/11/05	
	Logitech, Inc.	Temperature:				
Attendees:					42% RH	
Customer Ref. No.:			Power: Battery	Job Site:	EV06	
TEST SPECIFICATION						
	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63	.4 Year:	2003	
SAMPLE CALCULATI	ONS					
COMMENTS						
COMMENTS						
EUT OPERATING MO	DES					
Modulated by PRBS a	t maximum data rate					
DEVIATIONS FROM T	EST STANDARD					
None						
REQUIREMENTS						
Maximum level of any	spurious emission outside of the	authorized band is 20 dB down fr	om the fundamental			
RESULTS						
Pass						
SIGNATURE						
Rochy to Pelings Tested By:						
DESCRIPTION OF TES						
Antenna Conducted Spurious Emissions - High Channel 0MHz-3GHz						

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

						Tek
10.0	Ref Lvl*10.0	dBm	10dB	/	Atten 10dB	
0.0						
-10.0			:			
-20.0						
-30.0			· · · · · · · · · · · · · · · · · · ·			
-40.0						
-50.0			:			
-60.0	en luin million and	wanted particulation and an	: เอาสองกรุการการการการการการการการการการการการการก	an garante the second	have we have a second	A more way a hope way
-70.0						
-80.0						
-90.0	OMHz	to	3.000GHz	1	<u> </u>	1
	ResBW 100kHz		VidBW 300kHz		SWP 1	.75
	LEVEL	SPAN	VidBW 300kHz			
	KNOB 2	KNOB 1	KEYPAD	Tektronix	2784	

		<b>FMISSIONS</b>	DATA SHEET		Rev BETA			
EMC			DATAGHEET		01/30/01			
	MN: A-0363C Cordless Headset			Work Order:				
Serial Number:	Unknown				08/11/05			
Customer:	Logitech, Inc.			Temperature:				
Attendees:			Tested by: Rod Peloquin	Humidity:				
Customer Ref. No.:			Power: Battery	Job Site:	EV06			
TEST SPECIFICATION								
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003			
SAMPLE CALCULATI	ONS							
COMMENTS								
	250							
EUT OPERATING MO Modulated by PRBS a								
DEVIATIONS FROM T None	EST STANDARD							
REQUIREMENTS								
	spurious emission outside of the	authorized band is 20 dB down fr	om the fundamental					
RESULTS	spurious emission outside of the	autionzed band is 20 dB down int						
Pass								
SIGNATURE								
SIGNATORE								
Korling ter Pieleng								
	and a comp							
Tested By:								
DESCRIPTION OF TES	ST							
DESCRIPTION OF TEX		ated Coursians Emis	sions High Channel 201					
	Antenna Conducted Spurious Emissions - High Channel 3GHz-6.5GHz							

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

								Tek
10.0	Ref Lvl*10.0d	Bm	10	)dB/		Atten 100	1B	
0.0								
0.0			:					
-10.0								
-20.0								
-30.0								
-40.0								
-50.Q								and a state of the state
-60.0	normanical advanting of the second	and for the second and a second second	hourself war and a second second	erren en fan fan gereksen de	and an an an an an	⋴⋪ <b>⋹</b> ⋖⋇⋹∊∊ <b>⋖∊⋏⋫⋪</b> ⋖⋪⋭⋟⋏∕	lysatensentae <sub>eel</sub> sieriste	
-70.0								
			:					
-80.0								
-90.Q								
	2.990GHz ResBW 100kHz	to	6.500GHz VidBW 300kH:	z		នាក	2.05	
			1					
	LEVEL	SPAN	Stop 6.500	)GHz				
	KNOB 2	KNOB 1	KEYPAD	Te	ktronix	2784		

NORTHWEST								
EMC		LINISSIONS			01/30/01			
EUT:	MN: A-0363C Cordless Headset			Work Order:	LABT0149			
Serial Number:	: Unknown			Date:	08/11/05			
Customer:	: Logitech, Inc.			Temperature:	73 °F			
Attendees:	None		Tested by: Rod Peloquin	Humidity:	42% RH			
Customer Ref. No.:			Power: Battery	Job Site:	EV06			
TEST SPECIFICATION								
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003			
SAMPLE CALCULATI	ONS							
COMMENTS								
EUT OPERATING MO								
Modulated by PRBS a								
DEVIATIONS FROM T	EST STANDARD							
None								
REQUIREMENTS	y spurious emission outside of the	authorized hand is 20 dB down fr	om the fundamental					
RESULTS	/ spurious emission outside of the	authorized band is 20 up down inc	om the fundamental					
Pass								
Pass								
SIGNATURE								
	Porting te Reling							
Tested By:								
DESCRIPTION OF TES	ST							
	Antenna Conducted Spurious Emissions - High Channel 6.5GHz-15GHz							

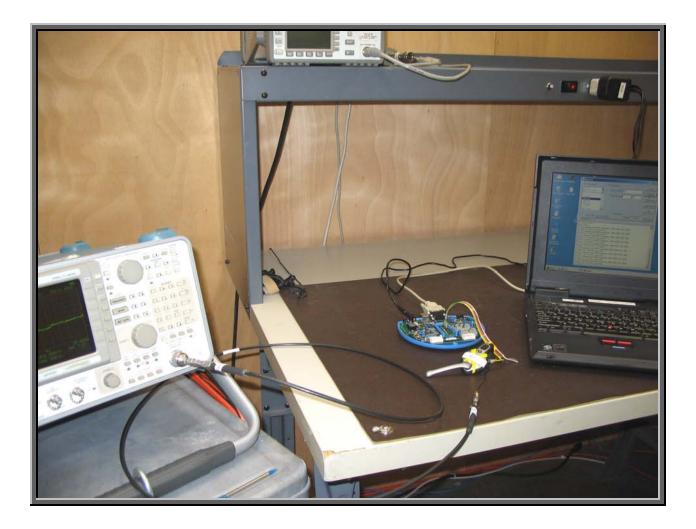
Antenna Conducted Spurious Emissions - High Channel 6.5GHz-15GHz

										Tek
10.0	Ref Lvl	*10.0dBm			1	.0dB/		Atten 100	1B	
0.0										
0.0										
-10.0					· · · · · · · · · · · · · · · · · · ·					
-20.0										
-30.Q										
-40.0					· · · · · ·					
-50.0					-					
-60.Q	enderlift, where a grading to	and the second state	all more bolic from the	nter the state of	40.2000 ALAN - THE	<sup>and</sup> glaseedeerstheydere	vere and sugar and an all	whith the way a provide the second	ngthe hand a spectra property	\$** <sub>V</sub> +\$*4¥*****
-70.0										
-80.0										
-90.0										
	6.499	ƏGHz	to	15.0	OOGHz					
	ResBW 10	OOkHz		V:	idBW 300kH	z		SWP	4.85	
	LEVEL		SPAN	v:	idBW 300kH	z				
	KINOB 2		KNOB 1	KI	EYPAD	Te	ktronix	2784		

NORTHWEST								
EMC		EMISSIONS I	DATA SHEET		Rev BETA 01/30/01			
EUT:	MN: A-0363C Cordless Headset			Work Order:	LABT0149			
Serial Number:	Unknown			Date:	08/11/05			
Customer:	Logitech, Inc.			Temperature:	73 °F			
Attendees:	None		Tested by: Rod Peloquin	Humidity:	42% RH			
Customer Ref. No.:	None		Power: Battery	Job Site:	EV06			
TEST SPECIFICATION	IS							
Specification:	47 CFR 15.247(d)	Year: 2005-04	Method: DA 00-705, ANSI C63.4	Year:	2003			
SAMPLE CALCULATI	ONS							
COMMENTS	COMMENTS							
EUT OPERATING MO								
Modulated by PRBS a	t maximum data rate							
<b>DEVIATIONS FROM T</b>	EST STANDARD							
None								
REQUIREMENTS								
Maximum level of any	spurious emission outside of the	authorized band is 20 dB down fro	om the fundamental					
RESULTS								
Pass								
SIGNATURE								
Rochy Le Relenge								
DESCRIPTION OF TE	ST							
	Antenna Conducted Spurious Emissions - High Channel 15GHz-25GHz							

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

							Tek
10.0	Ref Lvl*10.0dBn	n	10d	в/	Atten 10d	В	
0.0							
			· · · · · · · · · · · · · · · · · · ·				
-10.0							
-20.Q			· · ·				
-30.Q							
-40.Q			· · · · · · · · · · · · ·				
-50.0				port when the second	a wat with work a well of	engraphy and the other	wood and the state of the state
	har and the alternation of the second	herper ad the service service and the or	on when and down down when the day the state	1924-99-42-98-40-9-94-19-98-9			
-60.Q							
-70.0							
-80.Q							
-90.Q							
	14.99GHz	to	25.00GHz				
	ResBW 100kHz		VidBW 300kHz		SWP !	5.78	
	LEVEL	SPAN	VidBW 300kHz				
·	KINOB 2	KNOB 1	KEYPAD	Tektronix	2784		





#### Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

**Operating Modes Investigated:** No Hop

Data Rates Investigated: Maximum

Output Power Setting(s) Investigated: Maximum

Power Input Settings Investigated: Battery

 Software/Firmware Applied During Test

 Exercise software
 BlueCore-Audio
 Version
 1.0

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

EUT and Peripherals							
Description	Manufacturer	Model/Part Number	Serial Number				
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown				
Development Module	Cambridge Silicon Radio, Ltd.	BCES301199/1	7467 08 08 03				
AC Adapter	Egston	N2GFSW3	42251				

Remote Equipment Outside of Test Setup Boundary							
Description	Manufacturer	Model/Part Number	Serial Number				
Laptop PC	IBM	A21M	IS108				
AC Adapter IBM 02K6657 None							
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary							

Cables							
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2		
Serial	No	2.1	No	Laptop PC	Development Module		
I/O	No	1.2	No	Development Module	EUT - Bluetooth Headset		
DC Leads No 1.8 PA AC Adapter Development Module							
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.							

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

#### **Test Description**

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

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

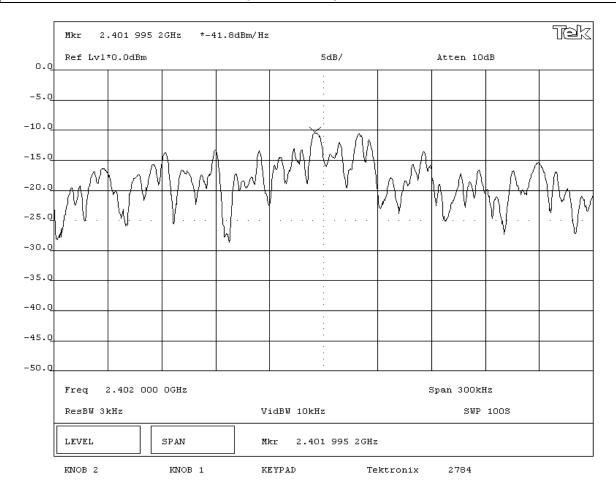
The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span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

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

Completed by:	
Rocky la	Peleng

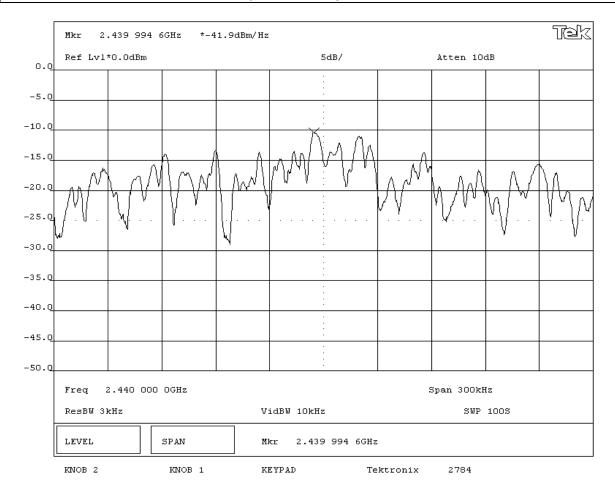
NORTHWEST	D	OWER SPEC		VTIPI		Rev BETA		
EMC						01/30/01		
EUT:	MN: A-0363C Cordless Headset				Work Order:	LABT0149		
Serial Number:	Unknown				Date:	08/11/05		
Customer:	Customer: Logitech, Inc. Temperature: 73 °F							
Attendees:	ttendees: None Tested by: Rod Peloquin Humidity: 42% RH							
Customer Ref. No.:	None		Power:	Battery	Job Site:	EV06		
TEST SPECIFICATION	IS							
Specification:	47 CFR 15.247(e)	Year: 2005-06	Method:	FCC 97-114, ANSI C63.4	Year:	2003		
SAMPLE CALCULATION	ONS							
• .		nsated for cable loss and external						
Power Spectral Densit	ty per 3kHz bandwidth = Power Sp	ectral Density per 1 Hz bandwidth	+ Bandwidth Correction	on Factor.				
Bandwidth Correction	Factor = 10*log(3kHz/1Hz) = 34.8	dB						
COMMENTS								
EUT OPERATING MOD								
Modulated by PRBS a	t maximum data rate							
DEVIATIONS FROM T	EST STANDARD							
None								
REQUIREMENTS								
	spectral density conducted from	a DSSS transmitter does not exce	,	band				
RESULTS			AMPLITUDE					
Pass	Pass Power Spectral Density = -7.0dBm / 3kHz							
SIGNATURE								
Tested By:	Porting le Felings							
DESCRIPTION OF TES	ST							





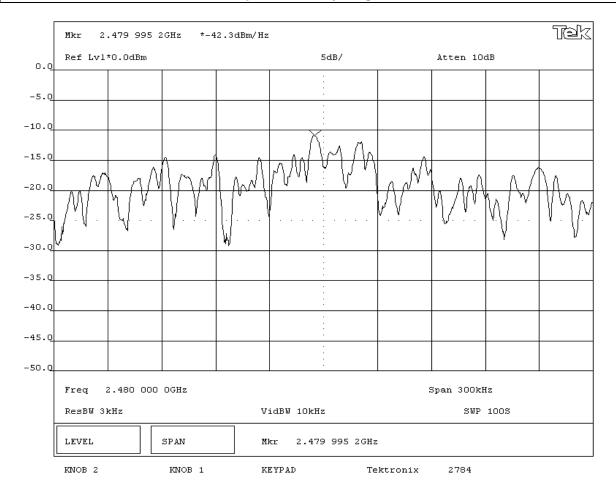
	Р	OWER SPEC		NSITY		Rev BETA		
EMC	<u> </u>					01/30/01		
EUT:	MN: A-0363C Cordless Headset				Work Order:	LABT0149		
Serial Number:	Unknown				Date:	08/11/05		
Customer:	Customer: Logitech, Inc. Temperature: 73 °F							
Attendees:	ttendees: None Tested by: Rod Peloquin Humidity: 42% RH							
Customer Ref. No.:	None		Power:	Battery	Job Site:	EV06		
TEST SPECIFICATION	IS							
Specification:	47 CFR 15.247(e)	Year: 2005-06	Method:	FCC 97-114, ANSI C63.4	Year:	2003		
SAMPLE CALCULATIO	ONS							
Meter reading on spec	ctrum analyzer is internally compe	nsated for cable loss and external	attenuation					
Power Spectral Densit	ty per 3kHz bandwidth = Power Sp	ectral Density per 1 Hz bandwidth	+ Bandwidth Correction	on Factor.				
Bandwidth Correction	Factor = 10*log(3kHz/1Hz) = 34.8	dB						
COMMENTS								
EUT OPERATING MOI	DES							
Modulated by PRBS a	t maximum data rate							
DEVIATIONS FROM T	EST STANDARD							
None								
REQUIREMENTS								
Maximum peak power	spectral density conducted from	a DSSS transmitter does not exce	ed 8 dBm in any 3 kHz	band				
RESULTS			AMPLITUDE					
Pass			Power Spectral Densit	y = -7.1dBm / 3kHz				
SIGNATURE								
Tested By:	Porting to Feling							
DESCRIPTION OF TES	ST							

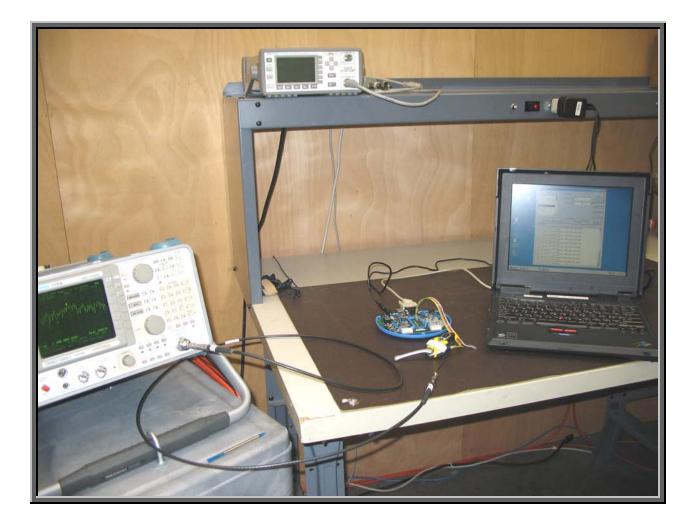




NORTHWEST	D	OWER SPEC		NSITV		Rev BETA		
EMC	F					01/30/01		
EUT:	MN: A-0363C Cordless Headset				Work Order:	LABT0149		
Serial Number:	Unknown				Date:	08/11/05		
Customer:	Customer: Logitech, Inc. Temperature: 73 °F							
Attendees:	ttendees: None Tested by: Rod Peloquin Humidity: 42% RH							
Customer Ref. No.:	None		Power:	Battery	Job Site:	EV06		
TEST SPECIFICATION	IS							
Specification:	47 CFR 15.247(e)	Year: 2005-06	Method:	FCC 97-114, ANSI C63.4	Year:	2003		
SAMPLE CALCULATIO	ONS							
• .	trum analyzer is internally compe							
Power Spectral Densit	ty per 3kHz bandwidth = Power Sp	ectral Density per 1 Hz bandwidth	+ Bandwidth Correction	on Factor.				
Bandwidth Correction	Factor = 10*log(3kHz/1Hz) = 34.8	dB						
COMMENTS								
EUT OPERATING MOD								
Modulated by PRBS at								
DEVIATIONS FROM T	EST STANDARD							
None								
REQUIREMENTS								
	spectral density conducted from	a DSSS transmitter does not exce	,	band				
RESULTS			AMPLITUDE					
Pass	Pass Power Spectral Density = -7.5dBm / 3kHz							
SIGNATURE								
Tested By:	Porting le Reling							
DESCRIPTION OF TES	T							









#### Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

Operating Modes Investigated: No Hop

Data Rates Investigated:	
Maximum	

	Output Power Setting(s) Investigated:	
Maximum	Maximum	

Power Input Settings Investigated: Battery

Frequency Range Investigated						
Start Frequency	30 MHz	Stop Frequency	26 GHz			

Software\Firmware Applied During Test						
Exercise software BlueCore-Audio Version 1.0						
Description						
The system was tested using special software developed to test all functions of the device during the test.						
The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were						
selectable between the low	vest, a middle, and the hi	ghest channels in the operat	ing band.			

EUT and Peripherals			
Description	Manufacturer	Model/Part Number	Serial Number
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown

Remote Equipment Outside of Test Setup Boundary							
Description	Manufacturer	Model/Part Number	Serial Number				
Laptop PC	IBM	A21M	IS108				
AC Adapter	IBM	02K6657	None				
Development Module	Cambridge Silicon Radio, Ltd.	BCES301199/1	7467 08 08 03				
AC Adapter	Egston	N2GHSW3	42251				
Equipment isolated from the EU	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
Serial	No	2.1	No	Laptop PC	Development Module
I/O	No	1.2	No	Development Module	EUT - Bluetooth Headset
DC Leads	No	1.8	PA	AC Adapter	Development Module
DC Leads	No	1.8	PA	AC Adapter	Laptop PC
AC Power	No	2.0	No	AC Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment							
Description	Manufacturer	Model	Identifier	Last Cal	Interval		
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo		
Pre-Amplifier	Miteq	AM-1616-1000	AOL	08/02/2005	13 mo		
Spectrum Analyzer	Agilent	E4446A	AAQ	04/08/2005	13 mo		
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo		
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	08/02/2005	13 mo		
High Pass Filter	Micro-Tronics	HPM50111	HFO	03/09/2005	13 mo		
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA		
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	02/17/2005	13 mo		
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA		
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	02/15/2005	13 mo		

### **Test Description**

**<u>Requirement</u>**: 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.

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



Bandwidths Used for Mea	surements		
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 ma	de using the bandwidth	s and detectors specified. No	video filter was used.

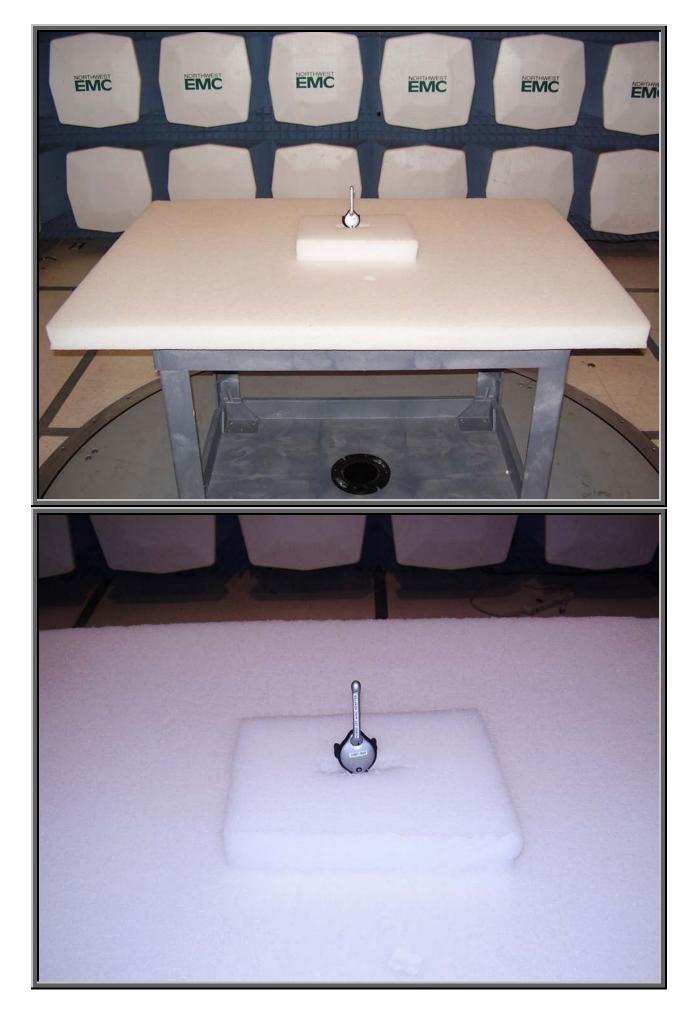
Completed by: Holy Arlingh

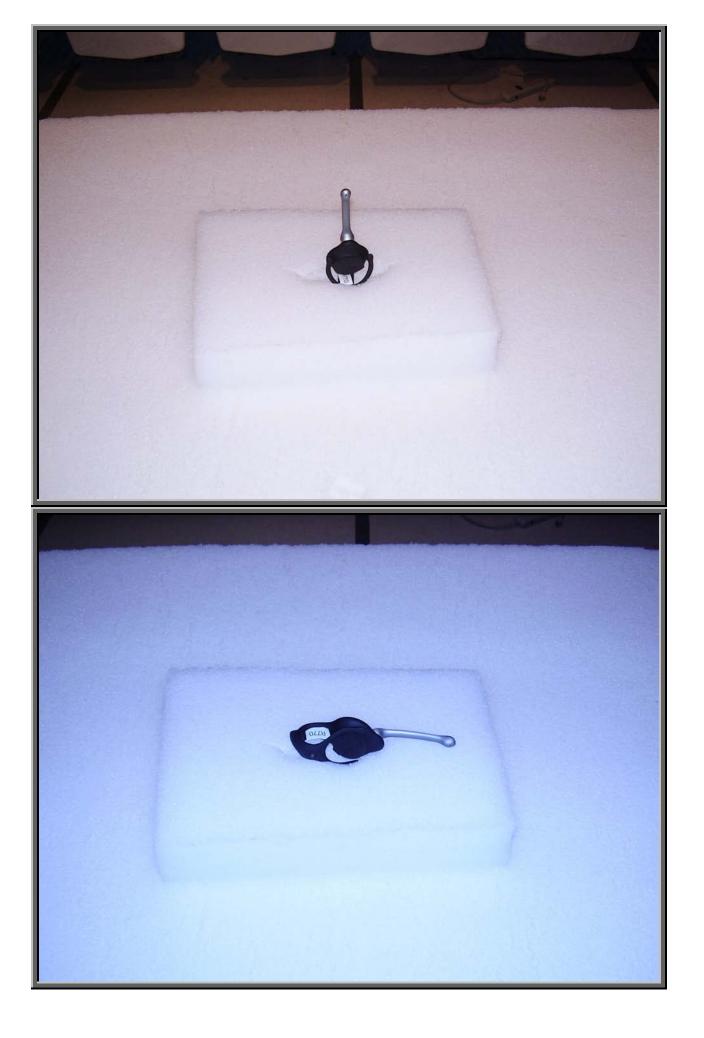
4804.042         33.4         6.4         100.0         1.4         3.0         0.0         H-Horn         AV         0.0         39.8         54.0         -14.2         EU           4804.001         32.1         6.4         59.0         1.4         3.0         0.0         V-Horn         AV         0.0         38.5         54.0         -15.5         EU           12012.220         22.1         16.0         210.0         1.0         3.0         0.0         V-Horn         AV         0.0         38.1         54.0         -15.9         EU						R	AD	DIA	TE	D	EI	MI	SS	SIC	)N	S	D	٩T	Ά	Sł	ΗE	E1								SA 2005.7. EMI 2005.8			
Custome:         Description           Attended:         None           Project:         None           Proje		EU				Cordle	ss H	eads	et															Wo									
Atlandees         None         Brower	S																							_				14/0	)5				
Project         Barometic Pressure					, Inc.																							6					
Test specificAtions         Test Method           FCC 15.247(d) Spurious Radiated Emissions:2005-04         INSI C63.42003           Inst C63.42003         Inst C63.42003           Test PARAMETERS         Inst C63.42003           Antenna Height[0] (m)         Inst C63.42003           Commercial Height[0] (m)         Inst C63.42003           Commercial Height[0] (m)         Inst C63.42003           Results         Inst C63.42003           Commercial Height[0] (m)         Inst C63.42003           Results         Inst C63.42003           Commercial Height[0] (m)         Inst C63.42003           Results         Pass           Signature         How Muthon           Results         Pass           Signature         How Muthon           Gould         Inst C63.42003           Guide																						В	arome										
FCC 15.247(d) Spurious Radiated Emissions:2005-04           ANSI C63.4:2003           TEST PARAMETERS           Ansigna Meight(p)(m)         1 - 4         Test Distance (m)         3           COMMETERS           UT OPERATING MODES           Transmitting low channed           Configuration #           Results         Pass           Signature         Add Model           Signature         Add Model           Model         Configuration #           Results         Pass         Signature           Model         Configuration #           Add Add         Configuration #           Configuration #         Configuration #           Add					hkanı	nejhad									Ро	wer:									Job	Site:	EV	01					
TEST PARAMETERS           COMMENT           Comment <th< td=""><td></td><td></td><td></td><td></td><td></td><td>E</td><td></td><td>.0005</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>						E		.0005																									
Antenna Height(s) (m)         1 - 4         Test Distance (m)         3           ColMMENTS         Headest         3         3         3           EUT OPERATING MODES           Transmitting low chanest         OPERATING MODES           Configuration #         Pass           Signature         Add Model           Results         Pass           Signature         Add Model           80.0         0		5.247(u) 5p	unous	Rau	lateu	LIIIS	10115	.2005	-04									51 00	55.4.	2003													
ColMENTS           Verdest:           UT OPERTING MODES           Transmitting low to datanet           DEVIATIONS FROM TEST STANDARD           Onfiguration #           Result           Signature Add Markov           Onfiguration #           Result           Operation #           Operation # <th cols<="" td=""><td></td><td></td><td></td><td></td><td>1.</td><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Ш</td><td>est l</td><td>)ista</td><td>nce</td><td>(m)</td><td></td><td></td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th>	<td></td> <td></td> <td></td> <td></td> <td>1.</td> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Ш</td> <td>est l</td> <td>)ista</td> <td>nce</td> <td>(m)</td> <td></td> <td></td> <td>2</td> <td></td>					1.	4								Ш	est l	)ista	nce	(m)			2											
UTOPERATING MODES           Transmitting low channel           DEVIATIONS FROM TEST STANDARD           No doubling in a family in a f			, (iii)		1.5	4									,ot 2	1010	noc	(111)			5												
Transmitting to we channel           Viol of stance           On of stance           On of stance           On of stance           On of stance           Viol of stance           On of stance         On of stance           On of stance         On of stance           On of stance         On of stance<	Headset.	•																															
DEVLATIONS FROM TEST STANDARD           Run #         1           Configuration #         Pass         Signature         Additional #           Results         Pass         Signature         Additional #         Configuration #           Results         Pass         Signature         Additional #         Configuration #         Configuration #           80.0         0         70.0         0	EUT OI	PERATING	MODI	≣S																													
Run #         1         Adjusted         Signature           80.0         0	DEVIA	TIONS FRO		ST ST	AND	ARD																											
$ \frac{1}{12012220} 222, 1 \\ 64, \\ 59, 0 \\ 12202 \\ 221, \\ 16, 0 \\ 21, 1 \\ 64, \\ 59, 0 \\ 100 \\ 1201, 220 \\ 221, \\ 16, 0 \\ 211, \\ 100 \\ 140 \\ 100 \\ 140 \\ 100 \\ 140 \\ 100 \\ 140 \\ 100 \\ 140 \\ 100 \\ $	_	ations.			1		T								22	,	•	,	0												7		
80.0 <td></td> <td>uration #</td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td>11</td> <td>l</td> <td>-</td> <td>A</td> <td>l</td> <td>m</td> <td>1</td> <td>2</td> <td></td>		uration #					1					11	l	-	A	l	m	1	2														
80.0         0				Р	ass		1		S	ignat	ure	H	ou	2.	/		1																
Treg         Amplitude         Factor         Azimuth         Height         Distance         Attenuation         Pointy         Descint         Adjusted         Spec. Limit         Sp									-																						-		
60.0         7000.000         8000.000         9000.000         10000.000         10000.000         12000.000           MHz           Freq         Amplitude         Factor         Azimuth         Height         Distance         External         Adjusted         Spec. Linit         Compared to Spec.         Spec.         Compared to Spec.		80.0																												]			
60.0         60.0 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+</td><td></td><td></td></th<>																														+			
$ \frac{1}{4004042} = \frac{1}{32.1} = \frac{1}{6.4} + \frac{1}{100.0} = \frac{1}{1.4} + \frac{1}{3.0} = \frac{1}{0.0} + \frac{1}{1.4} + \frac{1}{3.0} = \frac{1}{0.0} + \frac{1}{1.4} + \frac{1}{3.0} = \frac{1}{0.0} + \frac{1}{1.4} + \frac{1}{0.0} + \frac{1}{0.0$		70.0															-		-		-		_					-		-			
Image         40.0         Image		60.0																												_			
40.0         40.0 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td>•</td><td></td><td>+</td><td></td><td></td></th<>								_				-									+							•		+			
30.0       30.0	_	50.0																															
30.0       30.0	/m																																
30.0       30.0	<sup>2</sup>	40.0		<u>+</u>																	_									-			
20.0	dBi																																
IO.0         IIO.0         IIO.0         IIO.0         IIO.0         IIO.0         IIIO.0         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		30.0																															
Freq (MHz)         Amplitude (dB)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Distance Adjustment (dB)         Distance dBUV/m         Compared to Spec. Limit dBUV/m         Compared to Spec. (dB)           4804.042         33.4         6.4         100.0         1.4         3.0         0.0         H-Horn AV         AV         0.0         38.5         54.0         -14.2         EU 12012.2220         22.1         16.0         210.0         1.0         3.0         0.0         V-Horn AV         0.0         38.1         54.0         -15.5         EU		20.0						_													_							_		-			
Freq (MHz)         Amplitude (dB)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Distance Adjustment (dB)         Distance dBUV/m         Compared to Spec. Limit (dB)         Compared to Spec. (dB)           4804.042         33.4         6.4         1000.0         1.4         3.0         0.0         H-Horn AV         AV         0.0         38.5         54.0         -11.5         EU           12012.2220         22.1         16.0         210.0         1.0         3.0         0.0         V-Horn AV         0.0         38.1         54.0         -15.5         EU		10.0																															
4000.000         5000.000         6000.000         7000.000         8000.000         9000.000         10000.000         11000.000         12000.000         12000.000           Freq (MHz)         Amplitude (dBUV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Distance Adjustment (dB)         Adjusted dBUV/m         Spec. Limit GBUV/m         Compared to Spec. (dB)         Compared to Compared to Spec.           4804.042         33.4         6.4         100.0         1.4         3.0         0.0         H-Horn         AV         0.0         38.8         54.0         -14.2         EU           12012.220         22.1         16.0         210.0         1.0         3.0         0.0         V-Horn         AV         0.0         38.1         54.0         -15.9         EU																																	
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Distance Adjustment (dB)         Adjusted BuV/m         Spec. Limit BuV/m         Compared to Spec. (dB)         Compared to Spec. (dB)           4804.001         32.1         6.4         100.0         1.4         3.0         0.0         V-Horn         AV         0.0         38.5         54.0         -14.2         EU           12012.220         22.1         16.0         210.0         1.0         3.0         0.0         V-Horn         AV         0.0         38.1         54.0         -15.9         EU		0.0 🗕												-														-					
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Detector         Distance Adjustment (dB)         Adjusted Adjustment (dB)         Spec. Limit Adjustment (dB)         Compared to Spec. Limit (dB)         Compared to Spec. Limit (dB)         Compared to Adjustment (dB)         Compared to Adjustment		4000.0	00	5000	0.000	) 6	6000	.000	-	7000	0.000	)	80	00.0	00	ç	9000	0.00	0	100	000.0	000	11	000	.000	) ·	120	00.0	000				
Freq (MHz)         Amplitude (dBUV)         Fador (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         Attenuation (dB)         Polarity (dB)         Detector (dB)         Adjustem (dB)         Adjusted (dBUV)         Spec. Limit (dB)         Spec														N	1Hz	Ś																	
4804.042         33.4         6.4         100.0         1.4         3.0         0.0         H-Horn         AV         0.0         39.8         54.0         -14.2         EU           4804.001         32.1         6.4         59.0         1.4         3.0         0.0         V-Horn         AV         0.0         38.5         54.0         -15.5         EU           12012.220         22.1         16.0         210.0         1.0         3.0         0.0         V-Horn         AV         0.0         38.1         54.0         -15.9         EU															ttenu	ation	F	olarity	,	Dete	ctor	Adj	ustmen	nt					imit	Spec.			
4804.001 32.1 6.4 59.0 1.4 3.0 0.0 V-Horn AV 0.0 38.5 54.0 -15.5 EU 12012.220 22.1 16.0 210.0 1.0 3.0 0.0 V-Horn AV 0.0 38.1 54.0 -15.9 EU									)			-					L	Hor		^`												nments Vertica	
12012.220 22.1 16.0 210.0 1.0 3.0 0.0 V-Horn AV 0.0 38.1 54.0 -15.9 EU																																on sid	
12011.630 21.9 16.0 67.0 2.4 3.0 0.0 H-Horn AV 0.0 37.9 54.0 -16.1 EU			2	22.1						1.0																					EUT	on sid	
																																Vertic	
																																on sic Vertic	
																																Vertic	
																																on sid	

				R	ADIAT	ED E	MISS	IONS	DATA	SHE	ET			SA 2005.7.20 EMI 2005.8.3
					ss Headset						V		LABT0149	
S			Unknown Logitech,								Tr	Date: mperature:	08/14/05	
			None									Humidity:		
			None					1	-		Barometr	ic Pressure		
EST	Teste PECIFI			kannejhad				Power:	Battery Test Metho	d		Job Site:	EV01	
				ated Emiss	ions:2005-0	4			ANSI C63.4					
ntenr	PARAMI Ia Heigi ENTS			1 - 4				Test Dista	nce (m)	3	3			
eadset	PERATI	NG M	ODES											
	ting mid													
EVIA o devia		ROM	TEST ST	ANDARD										
un #				2	1			3						
	uration	#			1		11 0.	Ale	m					
esult			Р	ass	1	Signature	Hory	Ale	1					
					-									
	80.0 -													
														1
	70.0 -													_
	60.0 -													1
														+
	50.0 -												+ + + +	▶
ε						•								
dBuV/m	40.0 -	*												
Bu	-0.0													
σ		•				*								
	30.0 -	•												-
	20.0 -													_
	10.0 -													
	10.0													
	0.0 -	.000	E 0.	00.000	6800.00	0 70	00.000	8800.00	0 0	300.000	10800.	000 4	1800.000	_
	4000	.000	58	00.000	0000.000	J 78	00.000		50 98	000.000	10800.	000 1	1000.000	
								MHz						
					· · · · · · ·		1	1 <u>-</u> · · ·			<b>D</b>			
	Freq		Amplitude	Factor	Azimuth	Height	Distance	External Attenuation	Polarity	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec.
	(MHz)		(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)	-		(dB)	dBuV/m	dBuV/m	(dB)
12	197.870 202.480		20.7 20.3	16.1 16.1	169.0 211.0	3.4 2.4	3.0 3.0	0.0 0.0	V-Horn H-Horn	AV AV	0.0 0.0	36.8 36.4	54.0 54.0	-17.2 -17.6
	202.460 324.841		20.3	13.5	72.0	1.0	3.0	0.0	H-Horn	AV	0.0	35.1	54.0 54.0	-17.0
12	321.691		20.6	13.5	299.0	1.0	3.0	0.0	V-Horn	AV	0.0	34.1	54.0	-19.9
12 7: 7:			27.3	6.7	106.0	1.0	3.0	0.0	V-Horn	AV	0.0	34.0	54.0	-20.0
12 7: 7: 48	381.989		34.3 34.0	16.1 16.1	169.0 211.0	3.4 2.4	3.0 3.0	0.0 0.0	V-Horn H-Horn	PK PK	0.0 0.0	50.4 50.1	74.0 74.0	-23.6 -23.9
12 7: 7: 4! 12	202.840					1.2	3.0	0.0	H-Horn	AV	0.0	28.7	74.0 54.0	-23.9
12 7: 7: 41 12 12			22.0	6.7	121.0	1.2								
12 7: 4! 12 12 4! 7:	202.840 204.820 376.407 323.601			6.7 13.5	299.0	1.0	3.0	0.0	V-Horn	PK	0.0	48.1	74.0	-25.9
12 7: 4! 12 12 4! 7: 7:	202.840 204.820 376.407 323.601 322.803		22.0 34.6 34.2	13.5 13.5	299.0 72.0	1.0 1.0	3.0 3.0	0.0 0.0	V-Horn H-Horn	PK PK	0.0 0.0	48.1 47.7	74.0 74.0	-26.3
12 7: 4i 12 12 4i 7: 7:	202.840 204.820 376.407 323.601		22.0 34.6	13.5	299.0	1.0	3.0	0.0	V-Horn	PK	0.0	48.1	74.0	

LILID         With Ad3G3C Cordiess Headset         Work Order         LABTO143           Service Linknown         Textmodel         Distance         Distance         Distance           Anadoses         Month, Inc.         Textmodel         Distance         Distance           Projecti, None         Textmodel         Distance         Distance         Distance           Projecti, None         Test Method         Job Site (EV)1         Job Site (EV)1           SPECIFICATIONS         Test Method         Job Site (EV)1         Job Site (EV)1           SPECIFICATIONS         Test Method         Job Site (EV)1         Job Site (EV)1           PRAMETERS         Test Method         Job Site (EV)1         Job Site (EV)1           PRENTING MODES         Signature         Job Site (EV)1         Job Site (EV)1           Misso         Pass         Signature         Job Site (EV)1         Job Site (EV)1           Misso         Pass         Signature         Job Site (EV)1         Job Site (EV)1         Job Site (EV)1           Misso         Pass         Signature         Job Site (EV)1         Job Site (EV)1         Job Site (EV)1           Job	NORTHWEST					R/	٩D	AIG	T	ED	Ε	Μ	IS	S	0	NS	5	DA	T/	4	SH	E	ΕT						F	PSA 2005.7.2 EMI 2005.8
Setal Number         Unknown         Date Bill 4005           Attendes: None		-11-24	MAL. A	0265																					M = -1-	Onde		DT	04.40	
Custome:         Digitech, Inc.         Temperature [27           Project:         None         Humidary 35%         Barometic Pressure 28.86           Project:         None         Barometic Pressure 28.86         Barometic Pressure 28.86           Project:         None         Feit Methods         Job Site (EV01           Stack rel:         NNSI C63.42:003         Job Site (EV01         Job Site (EV01           PARAMETERS         Test Day None         3         Job Site (EV01         Job Site (EV01           PARAMETERS         Test Day None         3         Job Site (EV01         Job Site (EV01           PARAMETERS         Test Day None         3         Job Site (EV01         Job Site (EV01           Participation #         Pass         Signature         Hot Site Job Site (EV01         Job Site (EV01           Participation #         Pass         Signature         Hot Site Job Site (EV01         Job Site (EV01           Signature         Hot Site Job Si						braies	55 11	eaus	et																work					,
Attendes:         None         Image: Control of the source 23.86           Tested by:         Fold:         Attendes:         Source 23.86           Tested by:         Fold:         Attendes:         Source 23.86           Statistical by:         Fold:         Attendes:         Source 23.86           Statistical by:         Fold:         Attendes:         Source 23.86           FARAMETERS         Test Minitod         Source 23.87         Source 23.87           FARAMETERS         Test Minitod         Source 23.87         Source 23.87           Fold:         Fold:         Source 23.87         Source 23.87           Fold:         Fold:         Source 23.87         Source 23.87           Fold:         Source 23.87         Source 23.87         Source 23.87           Fold:         Fold:         Source 23.87         Source 23.87           Fold:         Source 23.87         Source 24.00.00         240.000					nc.																			т	empe					
Tested by: Holly Ashkannejhad         Power: [20/AC, 60/tz         Job Site: [EV01           SPECIFICATION         Tested Medicat         Tested Medicat           15.247(d) Spurious Radiated Emissions.2005-04         Inst Medicat         Tested Medicat           PARAMETERS         Tested Medicat         3           Washing Medicat         1         1         1           PREATING MODES         3         3         3           Marcination         4         4         4           Marcination         3         3         3           Marcination         3         3         3         3 <td>Attend</td> <td>lees:</td> <td>None</td> <td></td>	Attend	lees:	None																											
SPECIFIC/ATIONS         Test Method           15.247(d) Spurious Radiated Emissions:2005-04         NNSI C63.4:2003           PARAMETERS         If est Distance (m)         3           ma Height(s) (m)         If - 4         If est Distance (m)         3           et it         3         If est Distance (m)         3           et it         9         3         If est Distance (m)         3           et it         9         3         If est Distance (m)         3           et it         9         10         10         10         10           it         30.0         10.0         10.0         10.0         10.0         10.0         10.0         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000         2400.000																							Ba	romet						
15.247(d) Spurious Radiated Emissions:2005-04         ANSI C63.4:2003         PARAMETERS         Test Enistions: 2005-04         ANSI C63.4:2003         PARAMETERS         Test Enistions: 2005-04         ANSI C63.4:2003         Test Enistions: 2005-04         ANSI C63.4:2003         Test Enistion: 2005-04         Antime Parise         Test Enistion: 2005-04         Antime Parise         Test Enistion: 2005-04         Test Enistion: 2005-04         Antime Parise         Test Enistion: 2005-04         Test Enistion: 2005-04         Antime Parise         Test Enistion: 2005-04         Test Enistion: 2005-04         Mathematic Enistion: 2005-04         Test Enistion: 2005-04         Test Enistion: 2005-04         Antime Parise         Test Enistion: 2005-04         Test Enistion: 2005-04         Mathematic Enistic: 2005-04         Test Enist Enistesin Enistic: 2005-04				Ashk	anne	jhad										Pow	er:				z				Jo	b Site	e: E\	/01		
$\frac{PARAMETERS}{mar Height()(m)} + 1 + 4 \qquad [est Distance (m) ] 3$ $\frac{ParaMeters}{Parameters}$ $\frac{ParaMeters}{Parameters}$ $\frac{ParaMeters}{Parameters}$ $\frac{1 + 4 \qquad [est Distance (m) ] 3}{Parameters}$ $\frac{ParaMeters}{Parameters}$ $\frac{1 + 4 \qquad [est Distance (m) ] 3}{P$				odiot	od Er	minoi	iona	200	5.04												003									
Including (In)       I4       Pest Distance (m)       3         PERATING MODES attraction       3																		-												
MENTS at TPERATING MODES miting high channel ATIONS FROM TEST STANDARD miting high channel B0.0 70.0 60.0																														
nt.		t(s) (I	n)		1 - 4										Tes	t Dis	stai	nce (r	1)			3								
Bit in the second secon	MMENTS Iset.																													
3         3         3           9uration #         Pass         Signature         How MMM           80.0	smitting high o	channe	el	STA	NDAF	RD																								
$ \frac{80.0}{10.0} + \frac{10.0}{10.0} + \frac{10.0}{10.$	#			3			1													0										
$ \frac{80.0}{10.0} + \frac{10.0}{10.0} + \frac{10.0}{10.$		4		-			-					1	1	0	1	٩.	h	ml	~	/										
$ \frac{80.0}{10.0} + \frac{10.0}{10.0} + \frac{10.0}{10.$		ŧ		De			-		,	o		F	10	y	1	on	0	1	-											
$ \frac{1}{1000} + $	ults			Pa	55					Signa	ture	1.1		~	1.0															
$ \frac{1}{1000} + $																														
60.0 50.0 40.0 40.0 30.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 20.0 40.0 20.0	80.0 T																													
60.0 50.0 40.0 40.0 30.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 20.0 40.0 20.0																														
60.0 50.0 40.0 40.0 30.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 40.0 20.0 20.0 40.0 20.0	Î																													
50.0         40.0         2450.000<	70.0 -														1		+												+	
50.0         40.0         2450.000<																														
50.0         40.0         2450.000<																														
40.0 40.0	60.0 +											$\square$																$\uparrow \uparrow$		
40.0 40.0	1																													⊢∔
40.0 40.0	50.0																													
30.0																														
30.0	E																													
30.0	≥ ₄₀₀⊥																													
30.0	<b>m</b> <sup>40.0</sup>																													
20.0	P																													
20.0	30.0																_													
10.0       .0.0	00.0																													
10.0       .0.0																														
0.0         2400.000         2410.000         2420.000         2430.000         2440.000         2450.000         2460.000         2470.000         2480.000         2490.000         2500.000           MHz         Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity         Detector Adjustment (dB)         Distance dBuV/m         Adjust dBuV/m         Spec. Limit dBuV/m         Compared Spec. (dB)           2482.869         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.812         22.6         0.5         310.0         1.0         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.812         22.6         0.5         310.0         1.0         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.909         36.3         0.5         250.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2 <td>20.0 -</td> <td><math>\rightarrow</math></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><math>\left  \right </math></td> <td>_</td> <td><math>\left  \right </math></td> <td>_</td> <td></td> <td>+</td> <td>+</td> <td></td> <td>_</td> <td></td> <td>+</td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td>	20.0 -	$\rightarrow$										$\left  \right $	_	$\left  \right $	_		+	+		_		+		+					_	
0.0         2400.000         2410.000         2420.000         2430.000         2440.000         2450.000         2460.000         2470.000         2480.000         2490.000         2500.000           MHz         Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity         Detector Adjustment (dB)         Distance dBuV/m         Adjust dBuV/m         Spec. Limit dBuV/m         Compared Spec. (dB)           2482.869         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.812         22.6         0.5         310.0         1.0         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.812         22.6         0.5         310.0         1.0         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.909         36.3         0.5         250.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2 <td></td>																														
0.0         2400.000         2410.000         2420.000         2430.000         2440.000         2450.000         2460.000         2470.000         2480.000         2490.000         2500.000           MHz         Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity         Detector Adjustment (dB)         Distance dBuV/m         Adjust dBuV/m         Spec. Limit dBuV/m         Compared Spec. (dB)           2482.869         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.812         22.6         0.5         310.0         1.0         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.812         22.6         0.5         310.0         1.0         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.909         36.3         0.5         250.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2 <td></td>																														
2400.000       2410.000       2420.000       2430.000       2440.000       2450.000       2460.000       2470.000       2480.000       2490.000       2500.000         MHz       MHz       MHz       Distance (dBuV)       Azimuth (dBgrees)       Height (meters)       Distance (meters)       Polarity (dB)       Detector       Distance (dB)       Adjusted dBuV/m       Spec. Limit dBuV/m       Compared 1 Spec. (dB)         2483.669       22.6       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       68.8 <td< td=""><td>10.0 -</td><td>+</td><td></td><td>++</td><td>+</td><td>+</td><td></td><td></td><td>+</td><td></td><td>+</td><td>+</td><td>+</td><td>+</td><td>+</td><td><math>\left  \cdot \right </math></td><td>+</td><td>++</td><td><math>\left  \cdot \right </math></td><td>+</td><td>++</td><td>+</td><td></td><td>+</td><td></td><td></td><td></td><td>+</td><td>-</td><td>+</td></td<>	10.0 -	+		++	+	+			+		+	+	+	+	+	$\left  \cdot \right $	+	++	$\left  \cdot \right $	+	++	+		+				+	-	+
2400.000       2410.000       2420.000       2430.000       2440.000       2450.000       2460.000       2470.000       2480.000       2490.000       2500.000         MHz       MHz       MHz       Distance (dBuV)       Azimuth (dBgrees)       Height (meters)       Distance (meters)       Polarity (dB)       Detector       Distance (dB)       Adjusted dBuV/m       Spec. Limit dBuV/m       Compared 1 Spec. (dB)         2483.669       22.6       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       68.8 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>																														
2400.000       2410.000       2420.000       2430.000       2440.000       2450.000       2460.000       2470.000       2480.000       2490.000       2500.000         MHz       MHz       MHz       Distance (dBuV)       Azimuth (dBgrees)       Height (meters)       Distance (meters)       Polarity (dB)       Detector       Distance (dB)       Adjusted dBuV/m       Spec. Limit dBuV/m       Compared 1 Spec. (dB)         2483.669       22.6       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       43.1       54.0       -10.9         2483.690       36.3       0.5       259.0       2.6       3.0       20.0       V-Horn       AV       0.0       68.8 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>																														
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Detector         Distance Adjusted (dB)         Adjusted dBuV/m         Spec. Limit dBuV/m         Compared Spec. (dB)           2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.690         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.690         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9				+					-			-		1			-			-		-				1				
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Distance Adjustment (dB)         Adjusted dBuV/m         Spec. Limit dBuV/m         Compared Spec. (dB)           2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.990         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2	2400	.000	241	0.00	0 2	420.	.000	24	430.	000	24	140	.000	) 2	2450	0.00	0	246	0.00	0	247	0.00	00 3	2480	000	24	90.0	000	25	500.000
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         External Attenuation (dB)         Polarity (dB)         Distance Adjustment (dB)         Adjusted dBuV/m         Spec. Limit dBuV/m         Compared Spec. (dB)           2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.990         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2															N/1	u														
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         Attenuation (dB)         Polarity (dB)         Detector (dB)         Adjusted (dB)         Adjusted dBuV/m         Spec. Limit dBV/m         Spec. (dB)           2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.690         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.990         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2															IVI	172														
Freq (MHz)         Amplitude (dBuV)         Factor (dB)         Azimuth (degrees)         Height (meters)         Distance (meters)         Attenuation (dB)         Polarity (dB)         Detector (dB)         Adjusted (dB)         Adjusted dBuV/m         Spec. Limit dBV/m         Spec. (dB)           2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.690         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2483.990         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2																														
(MHz)         (dBuV)         (dB)         (degrees)         (meters)         (dB)         (dB)         (dB)         dBuV/m         dBuV/m         (dB)           2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9           2482.812         22.6         0.5         310.0         1.0         3.0         20.0         H-Horn         AV         0.0         43.1         54.0         -10.9           2483.990         36.3         0.5         259.0         2.6         3.0         20.0         H-Horn         PK         0.0         56.8         74.0         -17.2	<b>F</b>		A =		-								2:							T	_						~		1.1	Compared t
2483.669         22.6         0.5         259.0         2.6         3.0         20.0         V-Horn         AV         0.0         43.1         54.0         -10.9         2482.812         22.6         0.5         310.0         1.0         3.0         20.0         H-Horn         AV         0.0         43.1         54.0         -10.9         2483.899         36.3         0.5         259.0         2.6         3.0         20.0         H-Horn         AV         0.0         43.1         54.0         -10.9         2483.8990         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2																	on	Pol	arity		Detect	or								
2482.812         22.6         0.5         310.0         1.0         3.0         20.0         H-Horn         AV         0.0         43.1         54.0         -10.9         2483.990         36.3         0.5         259.0         2.6         3.0         20.0         V-Horn         PK         0.0         56.8         74.0         -17.2												(						\/_L	orn	1	Δ١/									
2483.990 36.3 0.5 259.0 2.6 3.0 20.0 V-Horn PK 0.0 56.8 74.0 -17.2	2483.009																													
	2483.990																													
	2483.726												3.0																	-17.8

	DRTHWEST			R	ADIAT	ED E	MISS	IONS	DATA	SHE	ET			PSA 2005.7.2 EMI 2005.8.
		EUT:	MN: A-03	63C Cordle	ss Headset						V	Vork Order:	LABT014	)
S	erial Nun	nber:	Unknown	ı									08/14/05	
			Logitech	, Inc.							T€	emperature		
	Attend		None								Barometr	Humidity ic Pressure		
				nkannejhad				Power:	120VAC, 6	0Hz	Daromou	Job Site:		
	SPECIFI								Test Metho					
CC 18	5.247(d)	Spur	ious Radi	ated Emiss	ions:2005-0	04			ANSI C63.4	4:2003				
	PARAME na Heigh			1 - 4				Test Dista	nce (m)	3	3			
-	ENTS													
adset														
	PERATI													
	tting high													
devia		ROM	TEST ST	ANDARD										
un #				4	1			100 A.M.		2				
	uration	#		-	1		11 0	A la	mi	/				
esult			P	ass	1	Signature	Hou	, Ale	1					
Juit	3			400		olgriataro								
	80.0 т													
	00.0													
	70.0 -													
	60.0 -													_
	-													
	50.0 -													•
F	•													•
dBuV/m		٠												
'n	40.0 -	-					+							►
巴														
-	30.0 -	٠												
	30.0 7	٠												
	20.0 -													_
	10.0													
	10.0 -													
	0.0													
	4900	.000		5400.	000	590	0.000	64	400.000		6900.000		7400.0	000
								MHz						
			Amplitude	Factor	Azimuth	Height	Distance	External Attenuation	Polarity	Detroto	Distance Adjustment	Adjusted	Spec. Limit	Compared t Spec.
	From		(dBuV)	(dB)	(degrees)	(meters)	(meters)	Attenuation (dB)	Folarity	Detector	(dB)	dBuV/m	dBuV/m	(dB)
	Freq (MHz)		27.4	13.9	341.0	1.0	3.0	0.0	V-Horn	AV	0.0	41.3	54.0	-12.7
	Freq (MHz) 440.003			13.9	318.0	1.1	3.0	0.0	H-Horn	AV	0.0	40.4	54.0	-13.6
74 74	(MHz) 440.003 439.980		26.5					0.0	V-Horn	A\/	0.0	22.4	E4 0	-21.6
74 74 49	(MHz) 440.003 439.980 960.055		25.6	6.8	297.0	1.0	3.0	0.0		AV		32.4	54.0	
74 74 49 74	(MHz) 440.003 439.980 960.055 440.387		25.6 35.1	13.9	318.0	1.1	3.0	0.0	H-Horn	PK	0.0	49.0	74.0	-25.0
74 74 49 74 74	(MHz) 440.003 439.980 960.055 440.387 439.895		25.6 35.1 35.0	13.9 13.9	318.0 341.0			0.0 0.0	H-Horn V-Horn	PK PK		49.0 48.9	74.0 74.0	-25.0 -25.1
74 74 49 74 74 49	(MHz) 440.003 439.980 960.055 440.387		25.6 35.1	13.9	318.0	1.1 1.0	3.0 3.0	0.0	H-Horn	PK	0.0 0.0	49.0	74.0	-25.0







### 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.

<b>Operating Modes Investigated:</b>
Charging mode

Power Input Settings Investigated:	
230 VAC, 50 Hz	
120 VAC, 60 Hz	

Software/Firmware Applied During Test									
Exercise software	BlueCore-Audio	Version	1.0						
Description									
The system was tested	d using special software developed to test all fu	nctions of the	device during the test.						
The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were									
selectable between the lowest, a middle, and the highest channels in the operating band.									

EUT and Peripherals in Test Setup Boundary											
Description	Manufacturer	Model/Part Number	Serial Number								
EUT - Bluetooth Headset	Logitech, Inc.	A-0363C	Unknown								
AC Adapter (US)	Logitech, Inc.	AU055V150T	Unknown								
AC Adapter (EU)	Logitech, Inc.	P925BW05050ABD3	Unknown								

Cables										
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2					
DC Leads	No	1.2	No	AC Adapter (US)	AC Mains					
DC Leads No 1.4 No AC Adapter (EU AC Mains										
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.										

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

#### **Test Description**

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  $\Omega$  measuring port is terminated by a 50  $\Omega$  EMI meter or a 50  $\Omega$  resistive load. All 50  $\Omega$  measuring ports of the LISN are terminated by 50 $\Omega$ .

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: Holy Arlingh

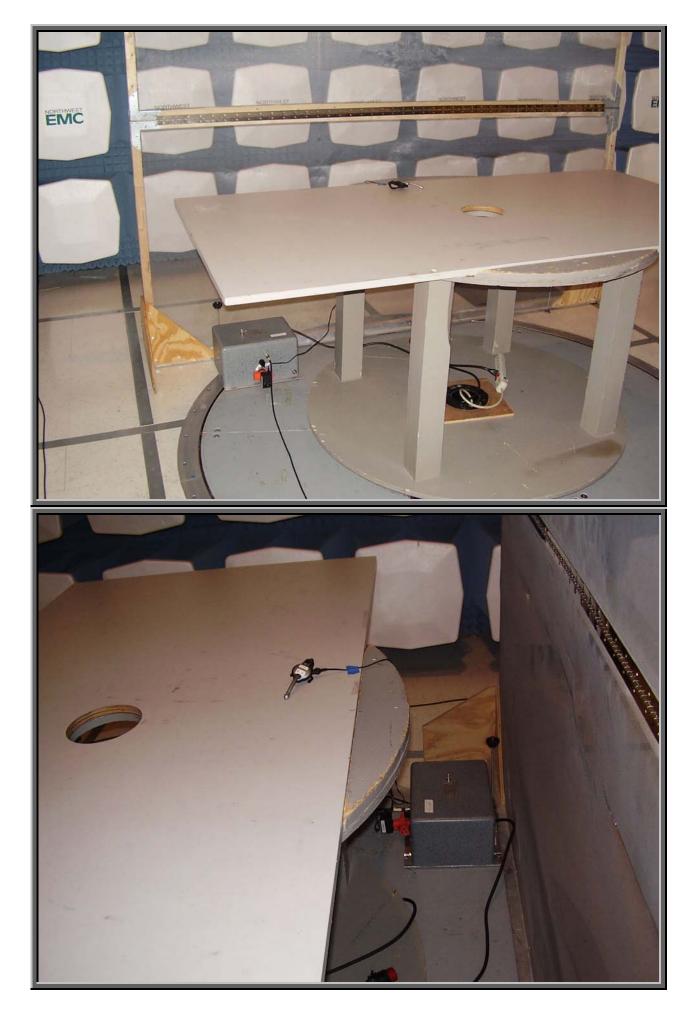
NORTH			CON	NDU	СТ	ED	EMIS	SION	SC	DAT	۲A	SH	EET			PSA 2005.8.22 EMI 2005.8.18
	EUT:	MN: A-0363C	Cordles	s Heads	et								v		LABT0149	)
		Unknown													08/31/05	
	Attendees:	Logitech, Inc. None											Ie	mperature: Humidity:		
	Project:												Barometri	ic Pressure		
		Holly Ashkan	nejhad					Powe	r: 120					Job Site:	EV01	
TEST SPE FCC 15.20									-	t Meth		12				
FCC 15.20										SI C63 SI C63						
TEST PAR Cable or L																
COMMEN US Adapter	TS															
Charging		I TEST STAND	DARD													
No deviation Run #		1									2					
Configura	tion #						Hole	, Al	in	Ľ						
Results		Pass			S	ignature	110 6	, ,								
80	)															
70	)					-										
60	)															
50	)					_										
<b>Angp</b> 40	)	MA				_										
30	)		$M_{\rm M}$	Mildia	J											
20	)			WV TWY	NAMIN	MMM//wh	Mile Antique		lide of	huha						
10	)					_										
C	0.1					1					1	0				100
								MHz								
Fre	eq	Amplitude			т	ransducer	Cable	External Attenuation	n			tector		Adjusted	Spec. Limit	Compared to Spec.
(MF	-	(dBuV)				(dB)	(dB)	(dB)			(blank [PK]	equal peaks from scan)		dBuV	dBuV	(dB)
0.2 0.1		20.0 22.0				0.0 0.0	0.2 0.2	20.0 20.0						40.2 42.2	51.8 55.2	-11.6 -13.0
0.3		15.2				0.0	0.2	20.0						35.4	49.6	-14.2
0.4		13.1				0.0	0.2	20.0						33.3	47.6	-14.3
0.4		11.9				0.0	0.2	20.0						32.1	46.4	-14.3
0.4 0.7		11.6 10.8				0.0 0.0	0.2 0.3	20.0 20.0						31.8 31.1	46.2 46.0	-14.3 -14.9
0.6		10.8				0.0	0.3	20.0						31.0	46.0	-14.9
0.5		10.2				0.0	0.3	20.0						30.5	46.0	-15.5
0.7	59	10.0				0.0	0.3	20.0						30.3	46.0	-15.7
0.2		15.2				0.0	0.2	20.0						35.4	51.2	-15.8
0.5		9.9				0.0	0.3	20.0						30.2	46.0	-15.8
0.3		12.2				0.0	0.2	20.0						32.4	48.4	-15.9
0.5		9.1 8 7				0.0 0.0	0.2	20.0						29.3	46.0 46.0	-16.7
0.6 0.8		8.7 8.5				0.0 0.0	0.3 0.3	20.0 20.0						29.0 28.8	46.0 46.0	-17.0 -17.2
0.8		8.0				0.0	0.3	20.0						28.3	46.0	-17.7
0.8		7.7				0.0	0.3	20.0						28.0	46.0	-18.0
0.8		7.7				0.0	0.3	20.0						28.0	46.0	-18.0

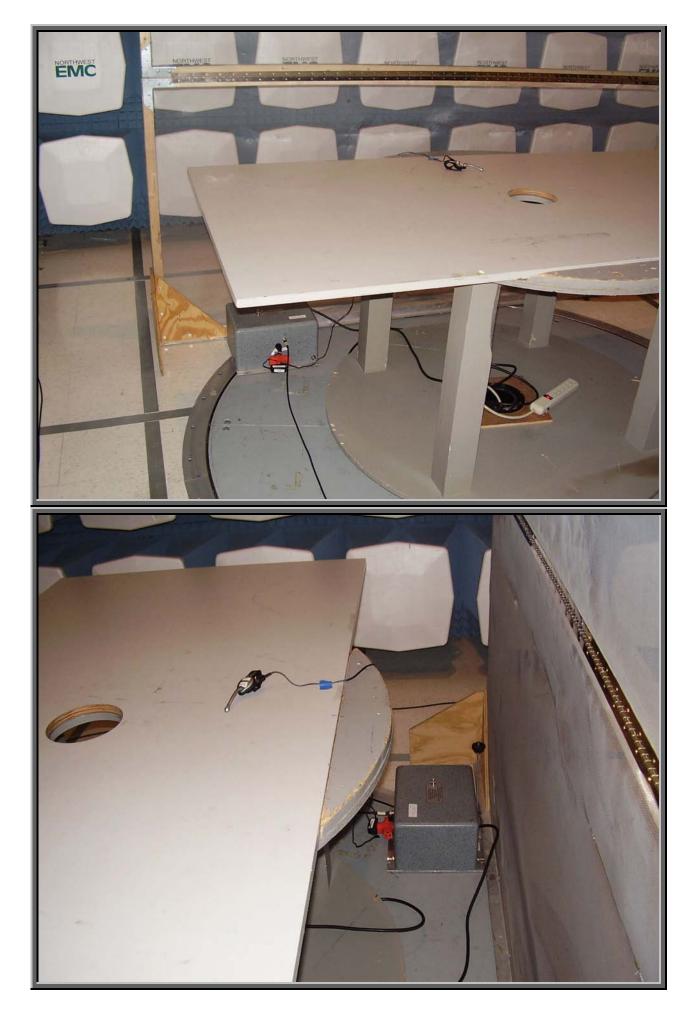
		CONDUC	TED E	MIS	SIONS	DA	TA S	SHEE1			PSA 2005.8.22 EMI 2005.8.18
	EUT: MN: A-0363C	Cordless Headset							Work Order:	LABT0149	)
	umber: Unknown								Date	08/31/05	
	stomer: Logitech, Inc								Temperature:		
	endees: None							De	Humidity:		
	Project: None sted by: Holly Ashkar	neihad			Power	120VAC,	60H7	Baro	metric Pressure Job Site:		
TEST SPECI		inejnaŭ			Power.	Test Met			Job Sile.		
	Class B:2005-04					ANSI C6					
	Class B:2005-04					ANSI C6					
TEST PARA											
COMMENTS											
US Adapter											
EUT OPERA Charging	TING MODES										
	S FROM TEST STAN	DARD									
Run #	2			55			0				
Configuratio	on #	1		11 8,	Ale	-n'	/				
Results	Pass	5	Signature 7	How	10-	1					
Acounto			Signaturo								
80											
70											
60											
50											
<b>Angp</b> 40	M. A										
30	1 Wh	MMMMM									
20						rs, dadapi "qenetapina	terrete talti da Antipi ang terre	ala badi mili bada Mangulari anguna			
10											
0											
0.	1		1		MHz		10				100
Freq (MHz)	Amplitude (dBuV)		Transducer (dB)	Cable (dB)	External Attenuation (dB)		Dete (blank equ	al peaks	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
(11172)	(0201)		(00)	(02)	(02)		[PK] from	n scan)	3201		(32)
0.245		· · ·	0.0	0.2	20.0				40.1	51.9	-11.8
0.157			0.0	0.2	20.0				41.5	55.6	-14.1
0.398			0.0	0.2	20.0				32.7	47.9	-15.2
0.194			0.0 0.0	0.2	20.0				38.5 30.7	53.9 46 1	-15.4 -15.4
0.493 0.544			0.0 0.0	0.2 0.3	20.0 20.0				30.7 29.0	46.1 46.0	-15.4 -17.0
0.544			0.0	0.3	20.0				29.0 35.4	46.0 53.3	-17.0
0.200			0.0	0.2	20.0				31.4	49.6	-18.2
0.573			0.0	0.2	20.0				27.8	46.0	-18.2
0.347			0.0	0.2	20.0				30.3	49.0	-18.7
0.842			0.0	0.2	20.0				27.0	46.0	-19.0
0.711			0.0	0.3	20.0				27.0	46.0	-19.0
0.460			0.0	0.2	20.0				27.5	46.7	-19.2
0.227			0.0	0.2	20.0				33.3	52.6	-19.3
0.795			0.0	0.3	20.0				26.0	46.0	-20.0
0.653			0.0	0.3	20.0				26.0	46.0	-20.0
0.740			0.0	0.3	20.0				25.8	46.0	-20.2
0.278			0.0	0.2	20.0				30.3	50.9	-20.6
1.305	5.0		0.0	0.3	20.0				25.3	46.0	-20.7

NORTHWEST										
E	UT: MN: A-036	3C Cordles	s Headset						LABT0149	)
	ber: Unknown								: 08/31/05	
	ner: Logitech, I	nc.						Temperature		
	ees: None ect: None							Humidity Barometric Pressure		
	by: Holly Ashk	annejhad				Power:	230VAC, 50Hz	Job Site		
TEST SPECIFIC	ATIONS	,					Test Method			
FCC 15.207 Cla							ANSI C63.4:2003			
FCC 15.107 Cla	ss B:2005-04						ANSI C63.4:2003			
TEST PARAME Cable or Line T		N								
COMMENTS	esteu	IN								
EU Adapter										
EUT OPERATIN Charging	IG MODES									
DEVIATIONS F	ROM TEST STA	NDARD								
No deviations.										
Run #	3	5			<b>N</b> 2	. /	10			
Configuration #	:				11-le	All	infi			
Results	Pa	SS		Signature	100		in			
80.0										
70.0										
60.0	M									
60.0		Inn								
		1111111n .								
50.0										
	•									
2		!'  `   ♦								
<b>Angp</b> 40.0		<u>'       </u> ]								
σ	• n/ *									
30.0	"	1	- 11 I M	MI 6.						
30.0		• •	Y M		d. c. de		الشاه الحد			
		•		, III I VIII	<b>HINKAN</b>		المرجا الأقريقية فأنقل الملاجي	هير المترجا والتي فالغوم		
20.0		•				Contraction of the second	A & and the first of the later	1		
								that is a selection of		
10.0										
0.0										
0.0 -				1 0 0 0			10.000			
0.10	00			1.000			10.000		1	00.000
						MHz				
						External				Compared to
Freq	Amplitude			Transducer	Cable	Attenuation	Detector (blank equal peaks	Adjusted	Spec. Limit	Spec.
(MHz)	(dBuV)			(dB)	(dB)	(dB)	(PK) from scan)	dBuV	dBuV	(dB)
0.165	34.8			0.0	0.0	20.0	QP	54.8	65.2	-10.4
0.233	30.0			0.0	0.0	20.0	QP	50.0	62.4	-12.4
0.274	27.7			0.0	0.0	20.0	QP	47.7	61.0	-13.3
0.311	26.2			0.0	0.0	20.0	QP	46.2	59.9	-13.7
0.332 0.233	25.2 18.0			0.0 0.0	0.0 0.0	20.0 20.0	QP AV	45.2 38.0	59.4 52.4	-14.2 -14.4
0.393	23.2			0.0	0.0	20.0	QP	43.2	52.4 58.0	-14.4
0.428	21.8			0.0	0.0	20.0	QP	41.8	57.3	-15.5
0.489	20.3			0.0	0.0	20.0	QP	40.3	56.2	-15.9
0.560	17.5			0.0	0.0	20.0	QP	37.5	56.0	-18.5
0.489 0.165	6.6 15.6			0.0 0.0	0.0 0.0	20.0 20.0	AV AV	26.6 35.6	46.2 55.2	-19.6 -19.6
0.165	7.1			0.0	0.0	20.0	AV	27.1	55.2 48.0	-19.6
0.332	8.3			0.0	0.0	20.0	AV	28.3	49.4	-21.1
0.655	14.8			0.0	0.0	20.0	QP	34.8	56.0	-21.2
0.311	7.5			0.0	0.0	20.0	AV	27.5	49.9	-22.4
0.428 0.274	2.1 5.2			0.0 0.0	0.0 0.0	20.0 20.0	AV AV	22.1 25.2	47.3 51.0	-25.2 -25.8
0.274	-0.2			0.0	0.0	20.0	AV	25.2 19.8	46.0	-25.8
0.655	-0.6			0.0	0.0	20.0	AV	19.4	46.0	-26.6

NORTHWEST EMC	CC	<u>ONDUC</u>	TED	EMIS	SION	S DATA SH	IEET			PSA 2005.8.22 EMI 2005.8.18
	Г: MN: А-0363С Cord	lless Headse	t in the second se					Nork Order:	LABT0149	)
Serial Numbe	r: Unknown							Date:	08/31/05	
	r: Logitech, Inc.						Te	emperature: Humidity:		
Attendee: Projec	t: None						Barometr	Humidity:		
Tested by	: Holly Ashkannejh	ad			Power:	230VAC, 50Hz		Job Site:		
TEST SPECIFICA						Test Method				
FCC 15.207 Class FCC 15.107 Class						ANSI C63.4:2003 ANSI C63.4:2003				
. 55 15.107 61855	5.2000-04					,				
TEST PARAMETE	RS									
Cable or Line Tes										
COMMENTS										
EU Adapter										
EUT OPERATING	MODES									
	M TECTOTANDA									
DEVIATIONS FRC No deviations.	M TEST STANDARD									
Run #	4									
Configuration #	· ·			11 0.	Al	int				
Results	Pass	-	Signature	Hou	Jan	infl				
Results			Signature							
80.0										
70.0			-							
60.0										
00.0										
50.0										
Ang 40.0										
<b>10 1 1 1 1 1 1 1 1 1 1</b>		Ĩ I I I I I I I I I I I I I I I I I I I	1							
0	<b>◆</b> '	' I M 🚛								
30.0	Y V									
		. <b>L</b> . Millik	M HALAN (	When dies.						
	•••	▲ .	n nu diat	TIVY	A President		alay have a start of the second s	ala a		
20.0		**			. a se addidd	Stall and a strategic balls of the	hann an integration			
10.0										
0.0										
0.100			1.000			10.000			1	00.000
					MHz					
<u> </u>					External					Compared to
Freq	Amplitude		Transducer	Cable	Attenuation	Detector		Adjusted	Spec. Limit	Spec.
(MHz)	(dBuV)		(dB)	(dB)	(dB)	(blank equal peaks [PK] from scan)		dBuV	dBuV	(dB)
0.164	33.2	I	0.0	0.0	20.0	QP	1	53.2	65.3	-12.1
0.189	31.9		0.0	0.0	20.0	QP		51.9	64.1	-12.2
0.209	30.3		0.0	0.0	20.0	QP		50.3	63.3	-13.0
0.236 0.271	28.5 26.7		0.0 0.0	0.0 0.0	20.0 20.0	QP QP		48.5 46.7	62.2 61.1	-13.7 -14.4
0.236	17.8		0.0	0.0	20.0	AV		37.8	52.2	-14.4
0.293	25.8		0.0	0.0	20.0	QP		45.8	60.4	-14.6
0.316	24.9		0.0	0.0	20.0	QP		44.9	59.8	-14.9
0.407	21.3		0.0	0.0	20.0	QP		41.3	57.7	-16.4
0.339 0.453	22.6 19.0		0.0 0.0	0.0 0.0	20.0 20.0	QP QP		42.6 39.0	59.2 56.8	-16.6 -17.8
0.407	8.4		0.0	0.0	20.0	AV		39.0 28.4	56.8 47.7	-17.8
0.531	16.6		0.0	0.0	20.0	QP		36.6	56.0	-19.4
0.164	15.4		0.0	0.0	20.0	AV		35.4	55.3	-19.9
0.616	13.7		0.0	0.0	20.0	QP		33.7	56.0	-22.3
0.316 0.339	7.3 4.9		0.0 0.0	0.0 0.0	20.0 20.0	AV AV		27.3 24.9	49.8 49.2	-22.5 -24.3
0.703	11.2		0.0	0.0	20.0	QP		24.9 31.2	49.2 56.0	-24.3
0.453	1.8		0.0	0.0	20.0	AV		21.8	46.8	-25.0
0.293	5.2		0.0	0.0	20.0	AV		25.2	50.4	-25.2

Freq (MHz)	Amplitude (dBuV)	nsducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.189	8.8	0.0	0.0	20.0	AV	28.8	54.1	-25.3
0.531	0.3	0.0	0.0	20.0	AV	20.3	46.0	-25.7
0.271	4.5	0.0	0.0	20.0	AV	24.5	51.1	-26.6
0.209	5.9	0.0	0.0	20.0	AV	25.9	53.3	-27.4
0.703	-1.6	0.0	0.0	20.0	AV	18.4	46.0	-27.6
0.616	-1.7	0.0	0.0	20.0	AV	18.3	46.0	-27.7





# BLUETOOTH APPROVALS

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

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

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

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

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

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

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.

Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode is sufficient.

### 2 Frequency range of a Bluetooth device:

The maximum frequency of the device is: 2402 - 2480 MHz.

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

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

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

4 Example of a hopping sequence in data mode:

### Example of a 79 hopping sequence in data mode:

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

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

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

1. LAP/UAP of the master of the connection

2. Internal master clock

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

Regarding short transmissions, the Bluetooth system has the following behavior: The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5  $\mu$ s). 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  $\mu$ s \* 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  $\mu$ s \* 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.