Logitech, Inc.

F-0439A
Nokia Model HS-34W

EMC Test Report

September 21, 2005

Report No. LABT0155

Report Prepared By

NORTHWEST EMC

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

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: September 21, 2005
Logitech, Inc.
Model: F-0439A (Nokia Model HS-34W)

Emissions			
Specification	**Test Method**	**Pass**	**Fail**
FCC 15.207 AC Powerline Conducted Emissions:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(a) Occupied Bandwidth:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(b) Output Power:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(d) Band Edge Compliance:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.209(d) Spurious Radiated Emissions :2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(d) Spurious Conducted Emissions:2005-04	ANSI C63.4:2003	☒	☐
FCC 15.247(e) Power Spectral Density:2005-04	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

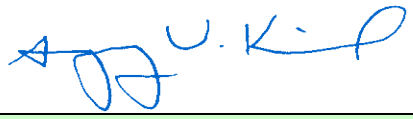
Test Facility

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:



Greg Kiemel, Director of Engineering

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

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

Revision Number	Description	Date	Page Number
00	None		

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

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

200629-0
200630-0
200676-0

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

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

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

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

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

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

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

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

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

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

SCOPE

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

What is measurement uncertainty?

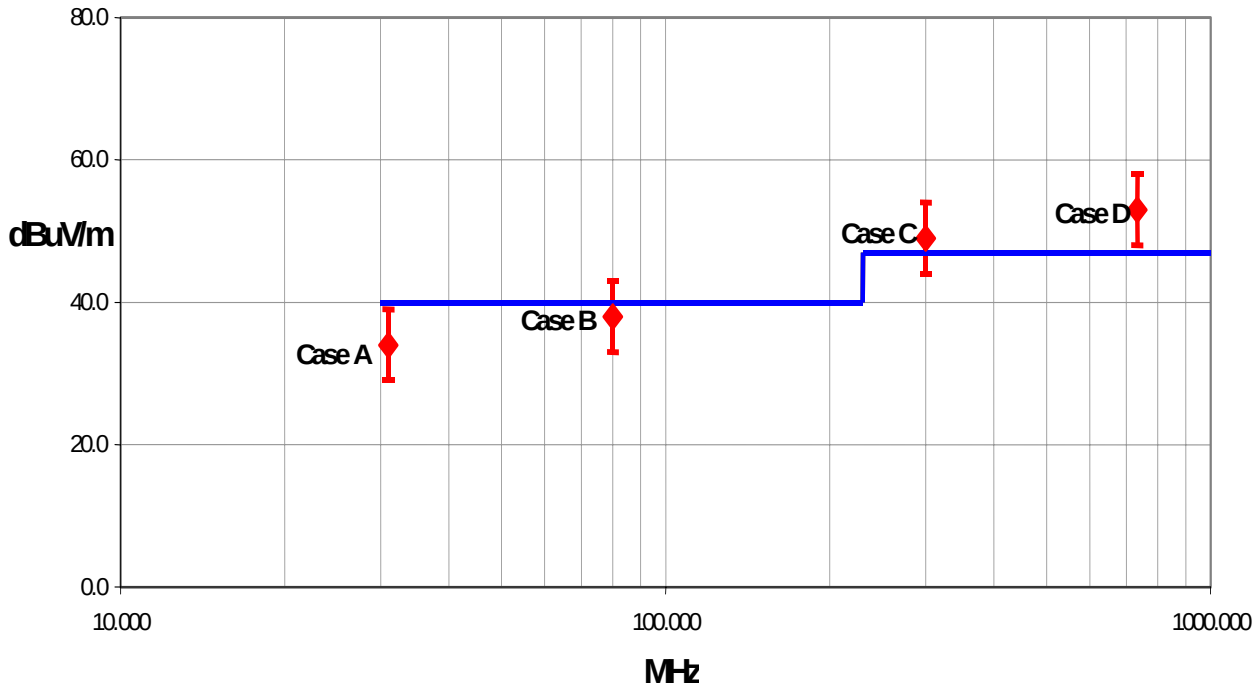
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:
Case A: Product complies.
Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.
Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.
Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz		Value (dB)					
	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
Test Distance		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25
Expanded uncertainty ***U*** (level of confidence ≈ 95%)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 -2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49

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

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

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

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

Legend

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

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

California

Orange County Facility

Labs OC01 – OC13

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

Oregon

Evergreen Facility

Labs EV01 – EV10

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

Oregon

Trails End Facility

Labs TE01 – TE03

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

Washington

Sultan Facility

Labs SU01 – SU07

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

Party Requesting the Test	
Company Name:	Logitech, Inc.
Address:	1499 SE Tech Center Place Suite 350
City, State, Zip:	Vancouver, WA 98683
Test Requested By:	Mitchell Phillipi
Model:	F-0439A (Nokia Model HS-34W)
First Date of Test:	August 27, 2005
Last Date of Test:	September 12, 2005
Receipt Date of Samples:	August 26, 2005
Equipment Design Stage:	Engineering sample
Equipment Condition:	No visual damage

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not Provided
I/O Ports:	Not Provided

Functional Description of the EUT (Equipment Under Test):
The F-0439A is a Bluetooth stereo headset for use with Nokia mobile phones.

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.

EUT Photo

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Spurious Radiated Emissions	08/27/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
2	Band Edge Compliance	09/01/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
3	Occupied Bandwidth	09/01/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
4	Output Power	09/01/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
5	Spurious Conducted Emissions	09/01/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
6	Radiated Emissions	09/06/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
7	Power Spectral Density	09/07/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
8	AC Powerline Conducted	09/07/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
9	Radiated Emissions	09/12/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.

Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

Operating Modes Investigated:
No Hop

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
120VAC/60Hz

Software\Firmware Applied During Test			
Exercise software	Simple Term	**Version**	Unknown
Description			
The system was tested using standard serial communications software to test all functions of the device during the test. The software 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.	F-0439A (Nokia Model HS-34W)	Unknown
AC Adapter	Nokia	AC-4U	0675379
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446

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

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

Test Description

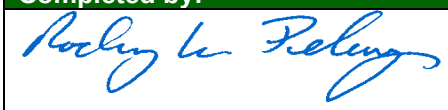
Requirement: Per 47 CFR 15.247(a)(1), the 20 dB bandwidth of a hopping channel must be less than or equal to the channel separation. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have 20 dB bandwidths up to 1.5 times the channel separation, provided the systems operate with an output power no greater than 125 mW.

Per 47 CFR 15.247(a)(1)(I-iii), the maximum 20 dB bandwidth for frequency hopping systems operating in the 902-928 MHz band is 500 kHz.

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

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

Completed by:



NORTHWEST EMC

OCCUPIED BANDWIDTH

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.

As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.

As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

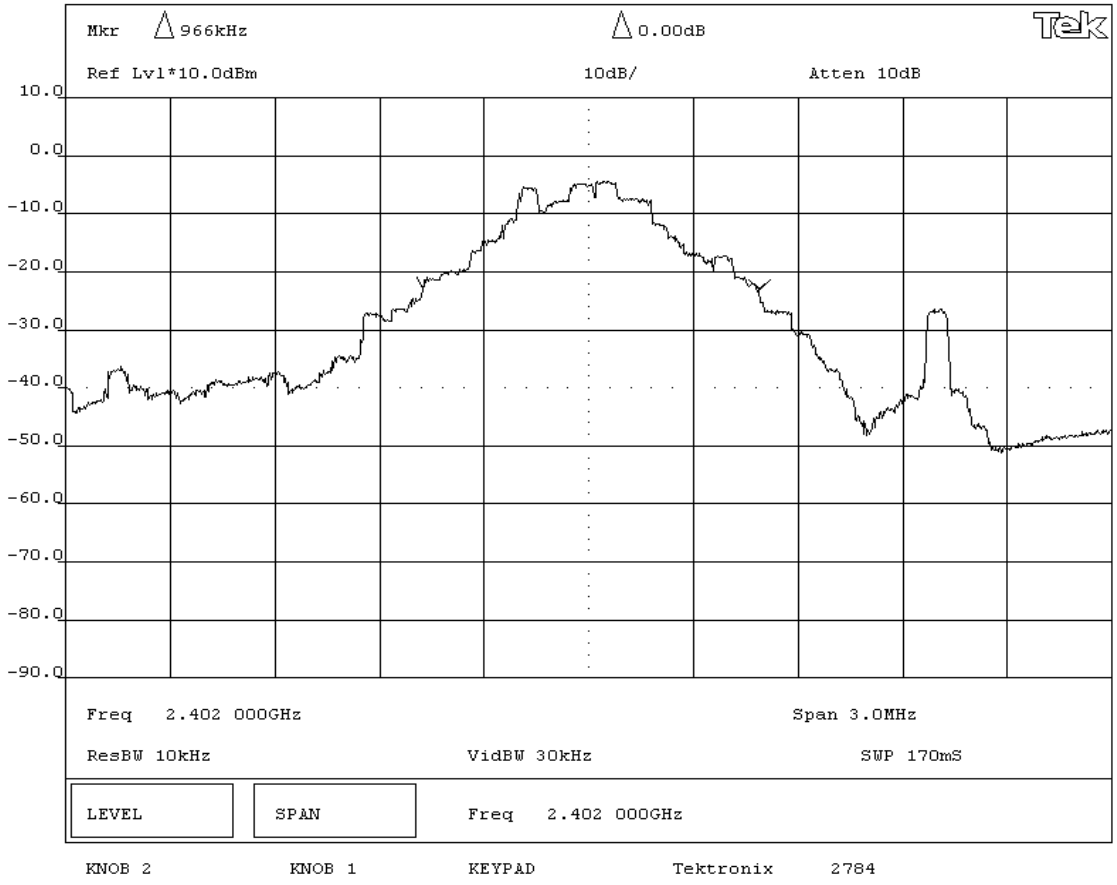
RESULTS	BANDWIDTH
Pass	0.966 MHz

SIGNATURE

Tested By: Rodney Le Peloquin

DESCRIPTION OF TEST

20dB Bandwidth - Low Channel



NORTHWEST EMC

OCCUPIED BANDWIDTH

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.
As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

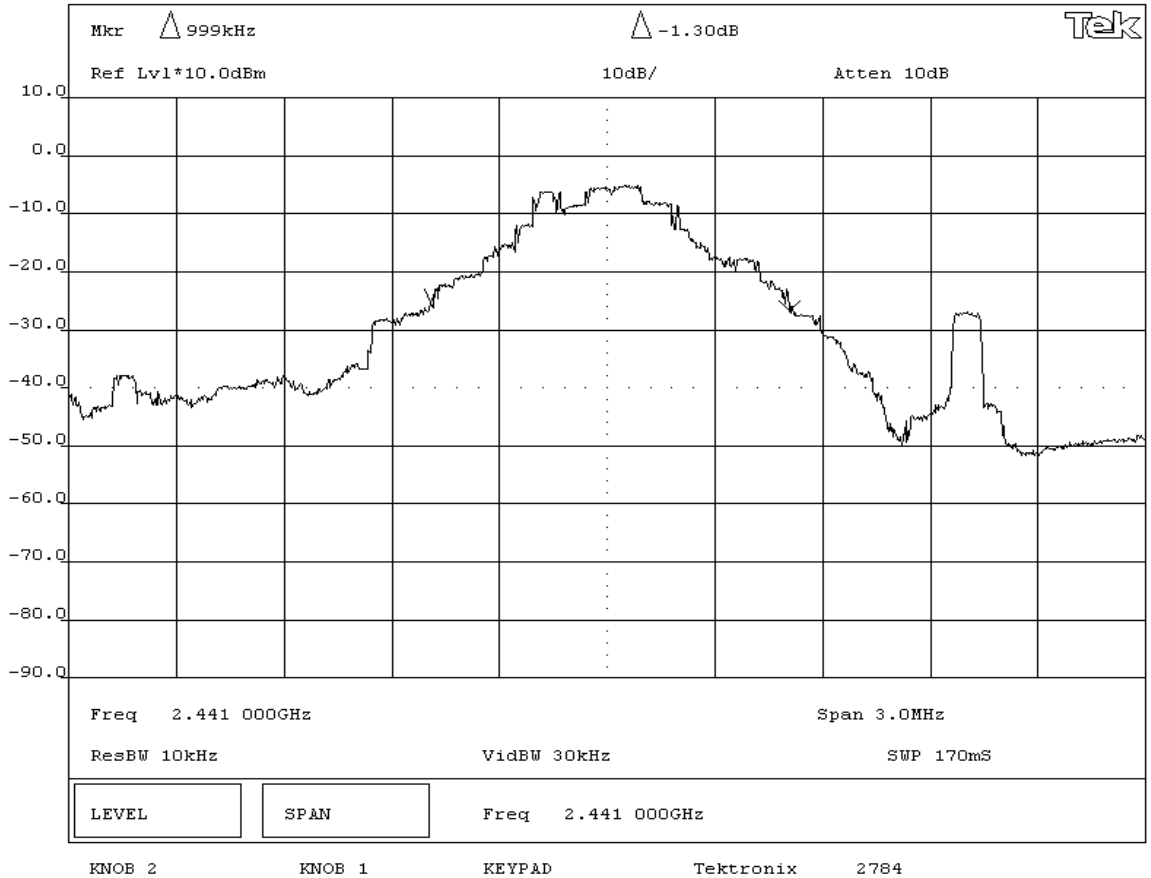
RESULTS	BANDWIDTH
Pass	0.999 MHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

20dB Bandwidth - Mid Channel



NORTHWEST EMC

OCCUPIED BANDWIDTH

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.
As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

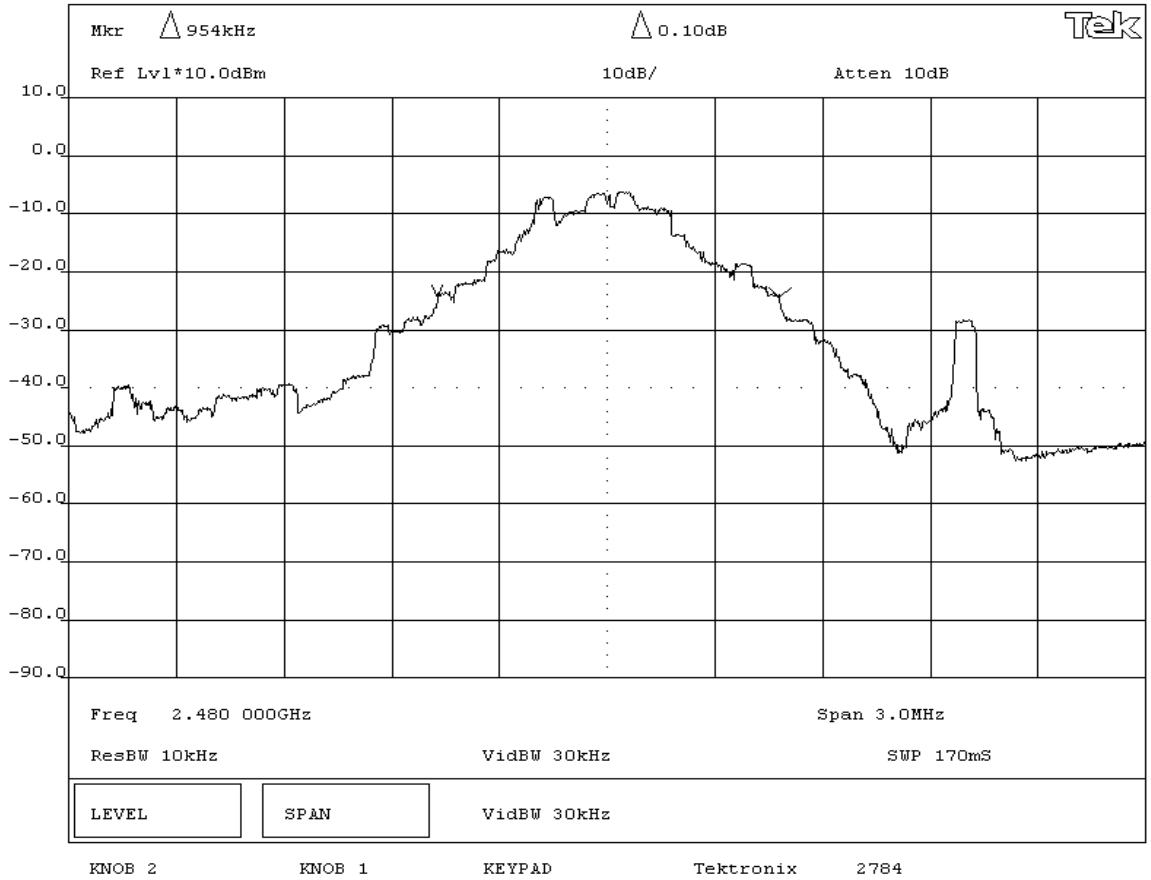
RESULTS	BANDWIDTH
Pass	0.954 MHz

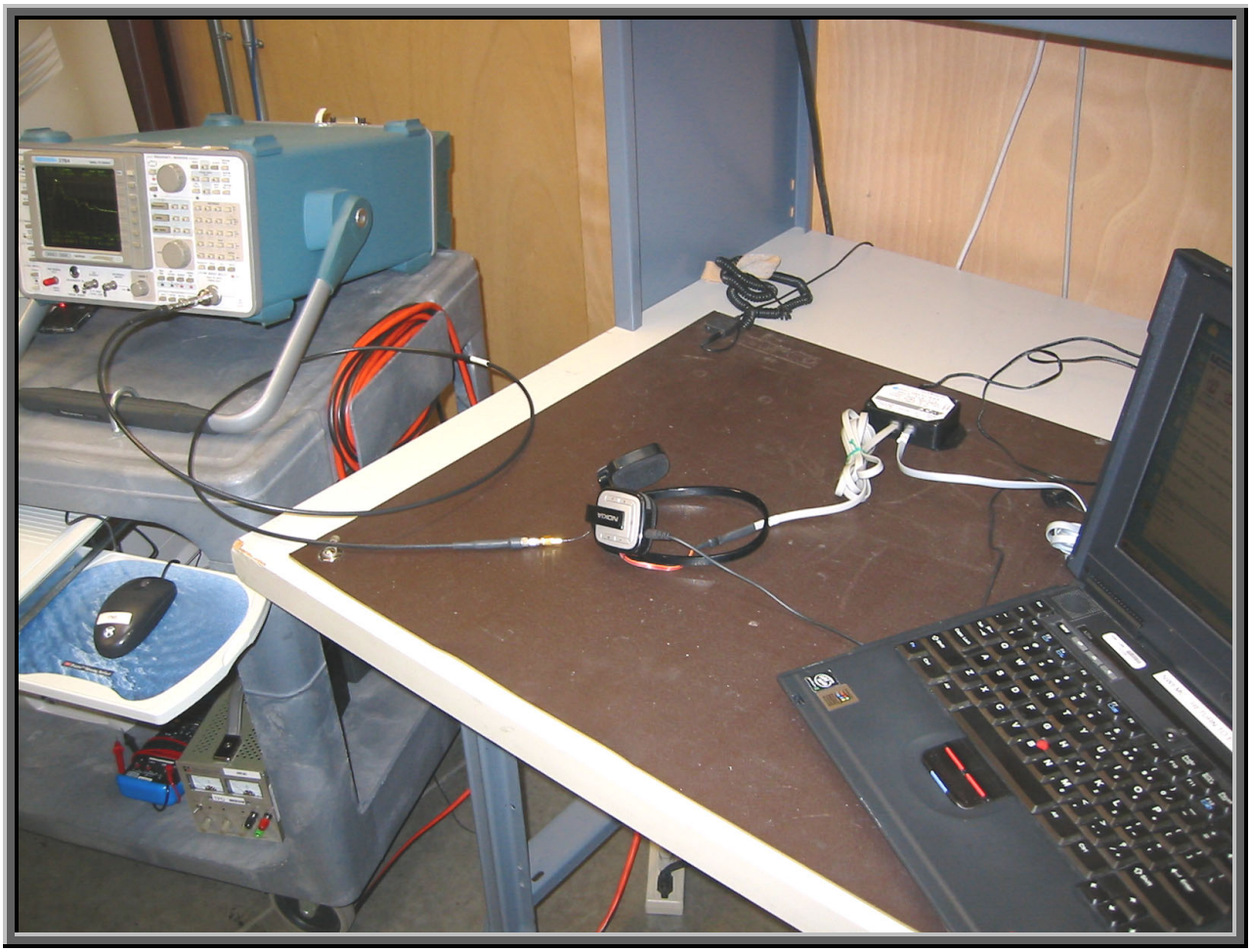
SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

20dB Bandwidth - High Channel





Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

Operating Modes Investigated:
No Hop

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
120VAC/60Hz

Software\Firmware Applied During Test			
Exercise software	Simple Term	**Version**	Unknown
Description			
The system was tested using standard serial communications software to test all functions of the device during the test. The software 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.	F-0439A (Nokia Model HS-34W)	Unknown
AC Adapter	Nokia	AC-4U	0675379
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Serial	No	2.1	PA	Laptop PC	Serial/TTL converter
TTL/CMOS	No	1.2	PA	Serial/TTL converter	EUT - Bluetooth Dongle
DC Leads	No	1.8	PA	AC Adapter	Serial/TTL converter
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	No	2.0	Yes	AC Adapter	Laptop PC
DC Leads	No	1.8	PA	AC Adapter	EUT - Bluetooth Headset
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(b)(1-2), the peak output power shall be measured. For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

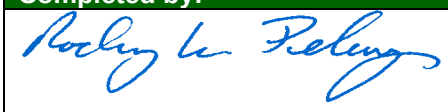
The measurement is made using a spectrum analyzer using the following settings:

- Resolution bandwidth set to greater than the 6 dB bandwidth of the modulated carrier, and
- The video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The peak output power 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 a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

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

Completed by:



NORTHWEST
EMC

OUTPUT POWER

Rev BETA
01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(b)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

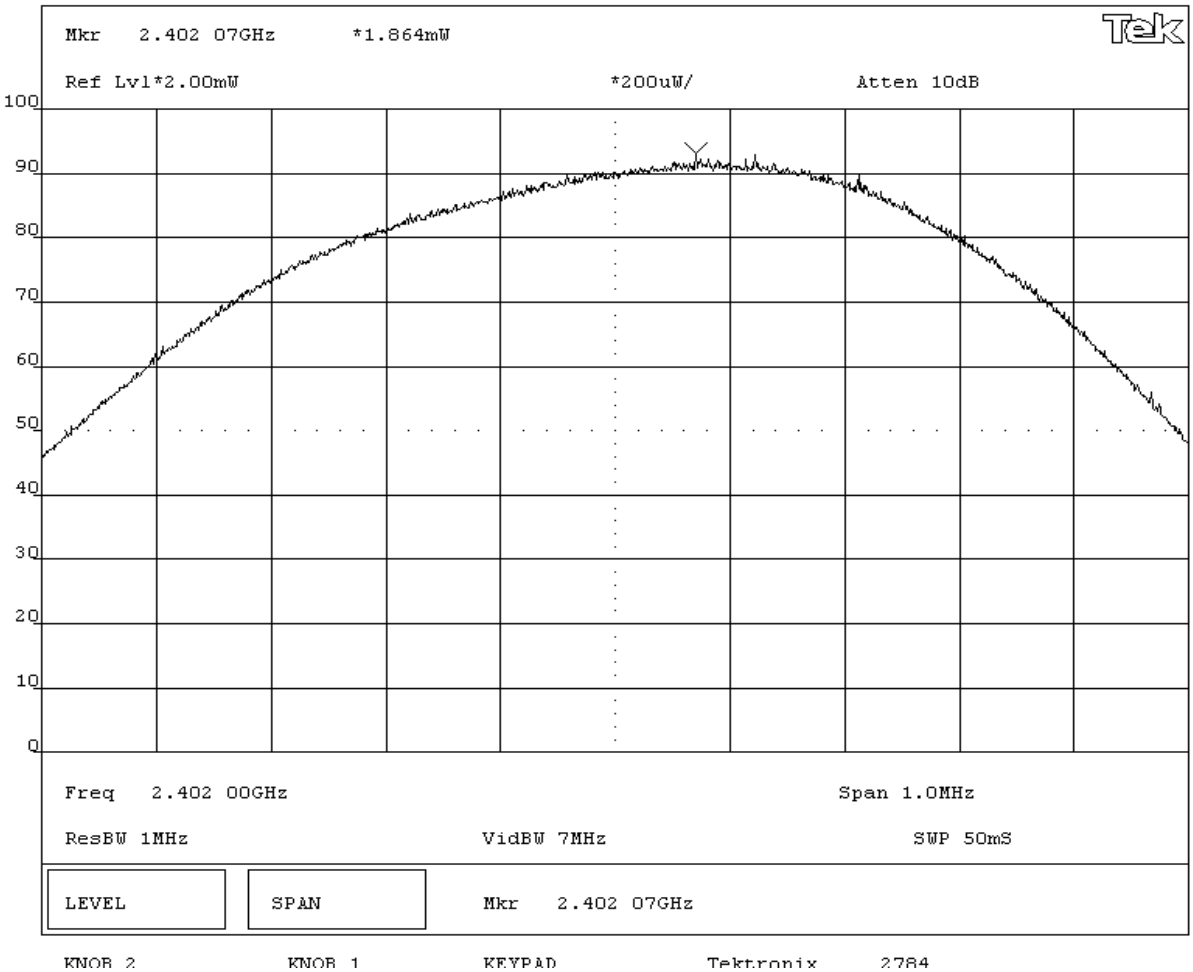
RESULTS	AMPLITUDE
Pass	1.86 mW

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

Output Power



NORTHWEST
EMC

OUTPUT POWER

Rev BETA
01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(b)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

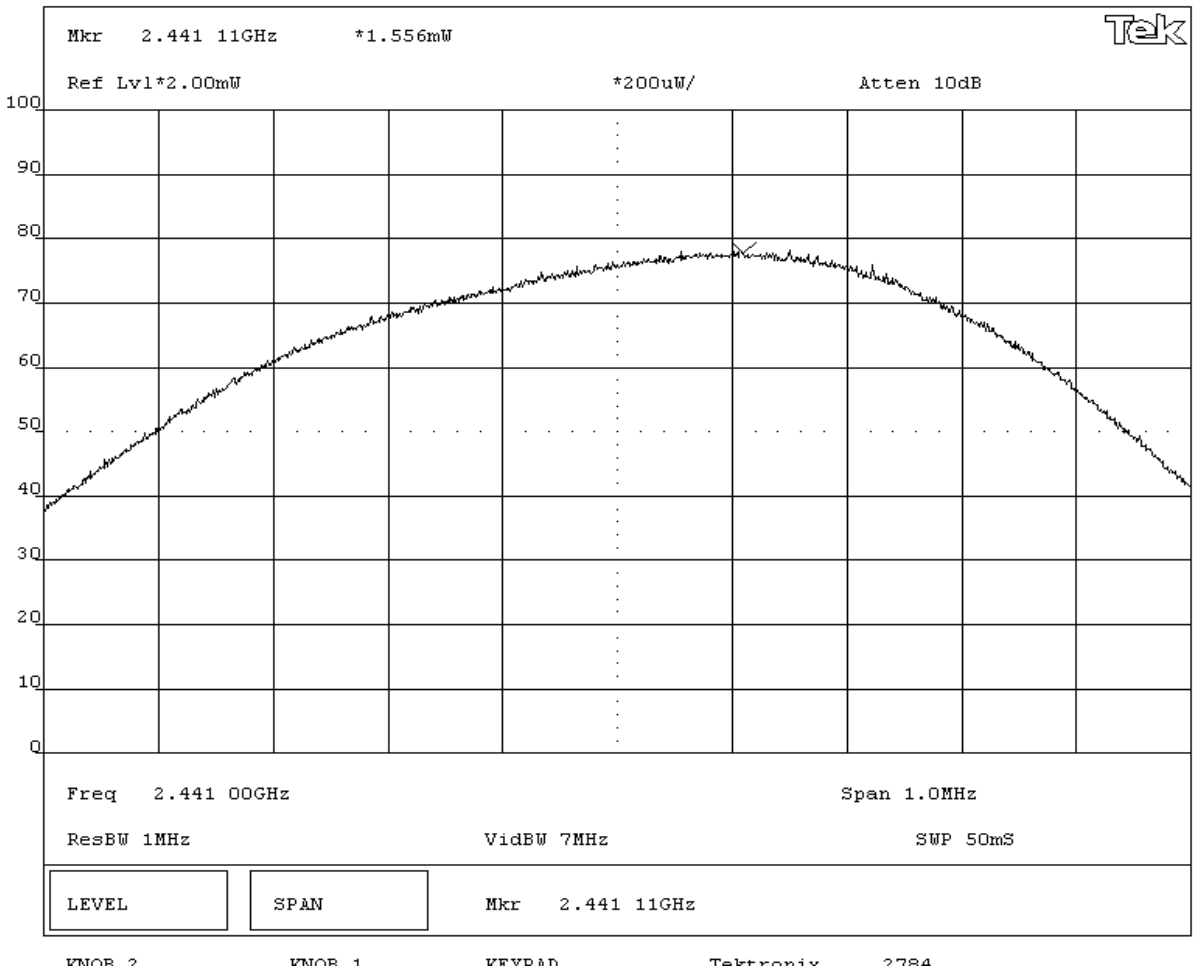
RESULTS	AMPLITUDE
Pass	1.56 mW

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Output Power



NORTHWEST
EMC

OUTPUT POWER

Rev BETA
01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(b)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

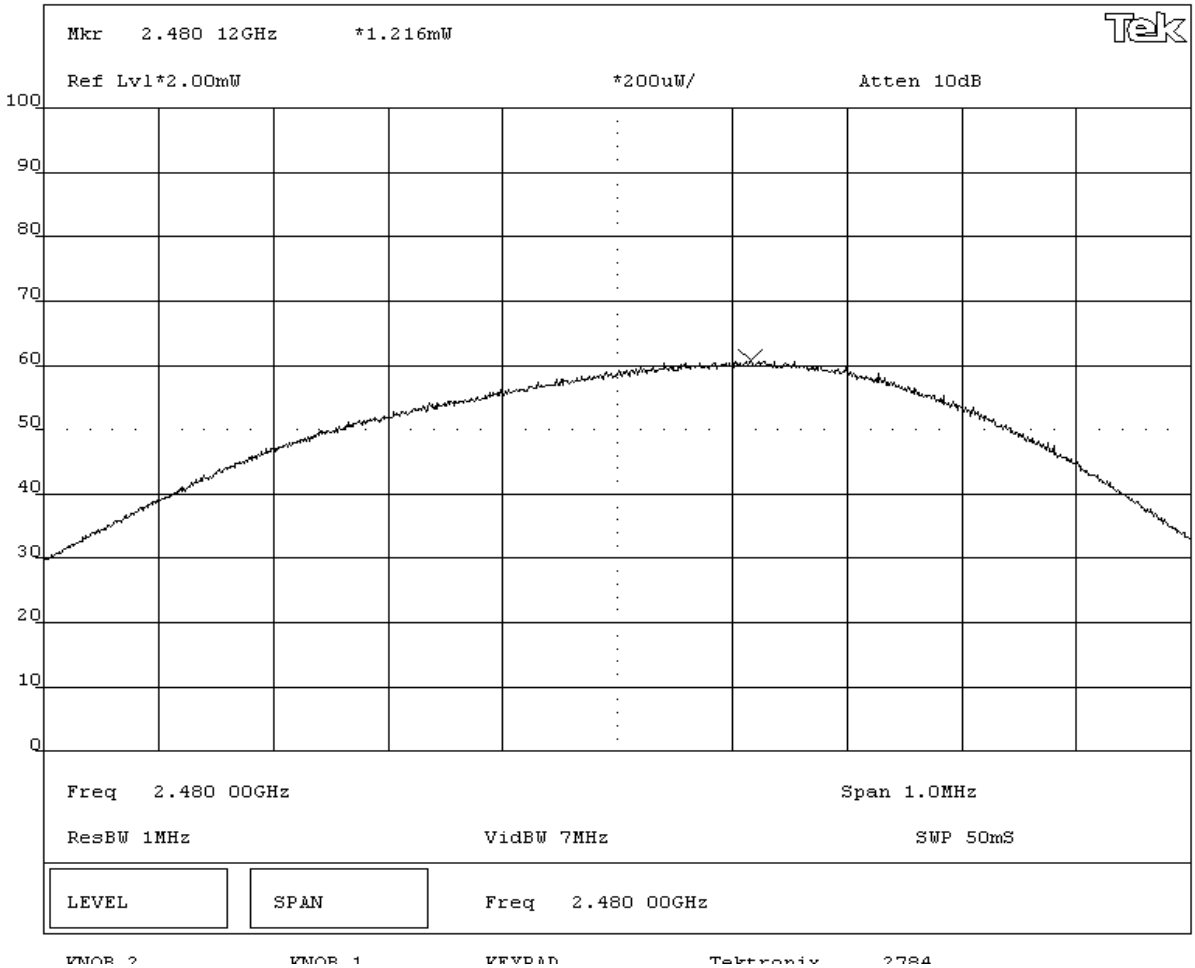
RESULTS	AMPLITUDE
Pass	1.22 mW

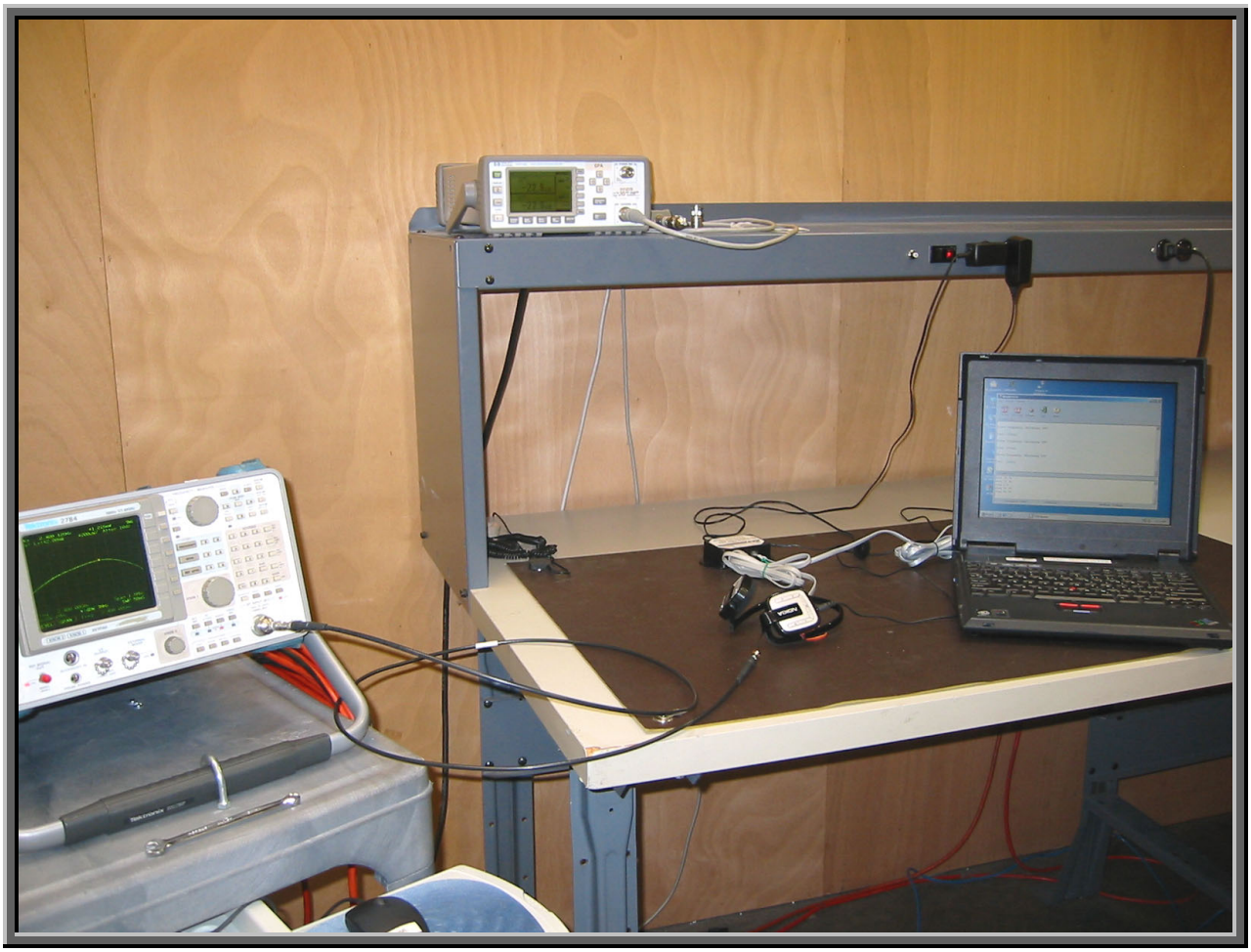
SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

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:
120VAC/60Hz

Software\Firmware Applied During Test			
Exercise software	Simple Term	**Version**	Unknown
Description			
The system was tested using standard serial communications software to test all functions of the device during the test. The software 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.	F-0439A (Nokia Model HS-34W)	Unknown
AC Adapter	Nokia	AC-4U	0675379
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446

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

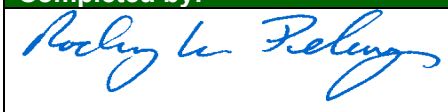
Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

Test Description

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

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

Completed by:



NORTHWEST EMC

BAND EDGE COMPLIANCE

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	36% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

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

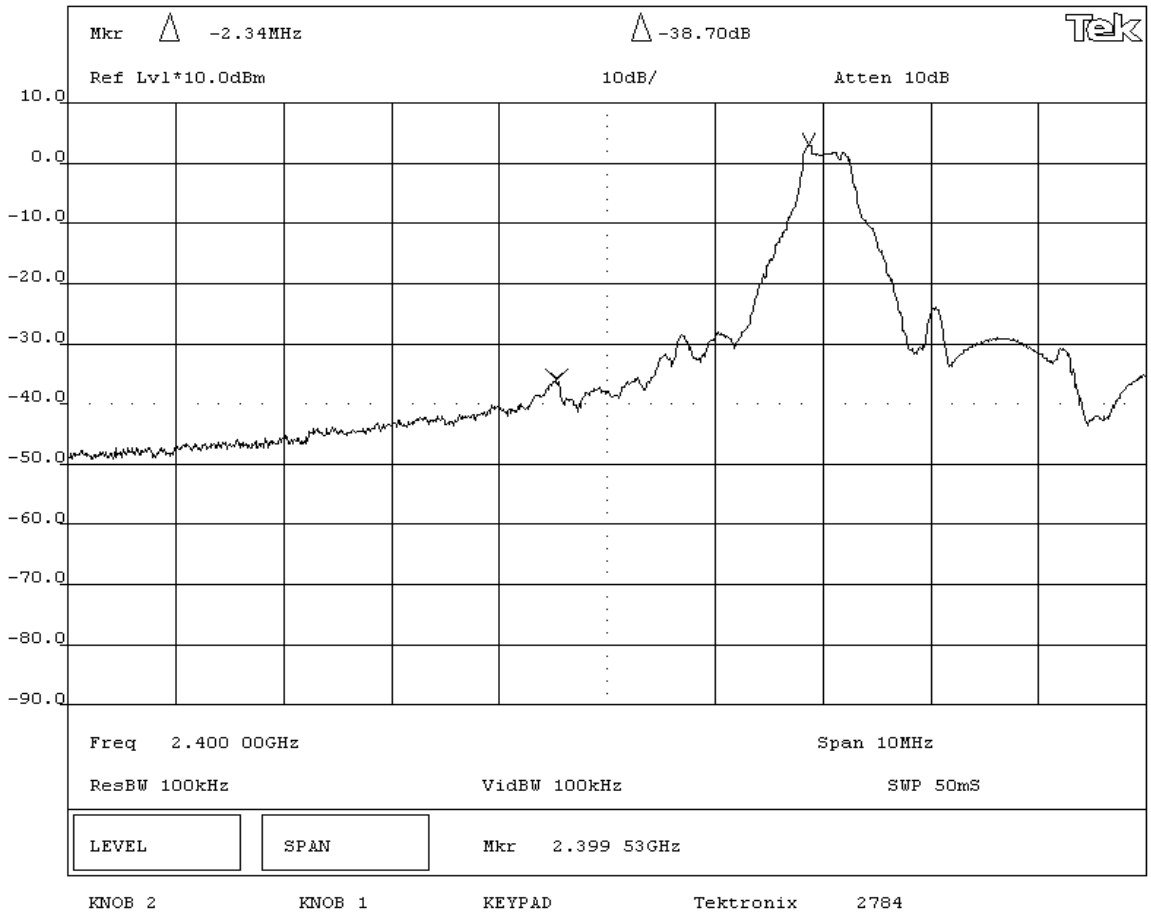
RESULTS	AMPLITUDE
Pass	-38.7 dB

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Band Edge Compliance - Low Channel



NORTHWEST
EMC

BAND EDGE COMPLIANCE

Rev BETA
01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	36% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005-06	Method:	DA 00-705, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

COMMENTS

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

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

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

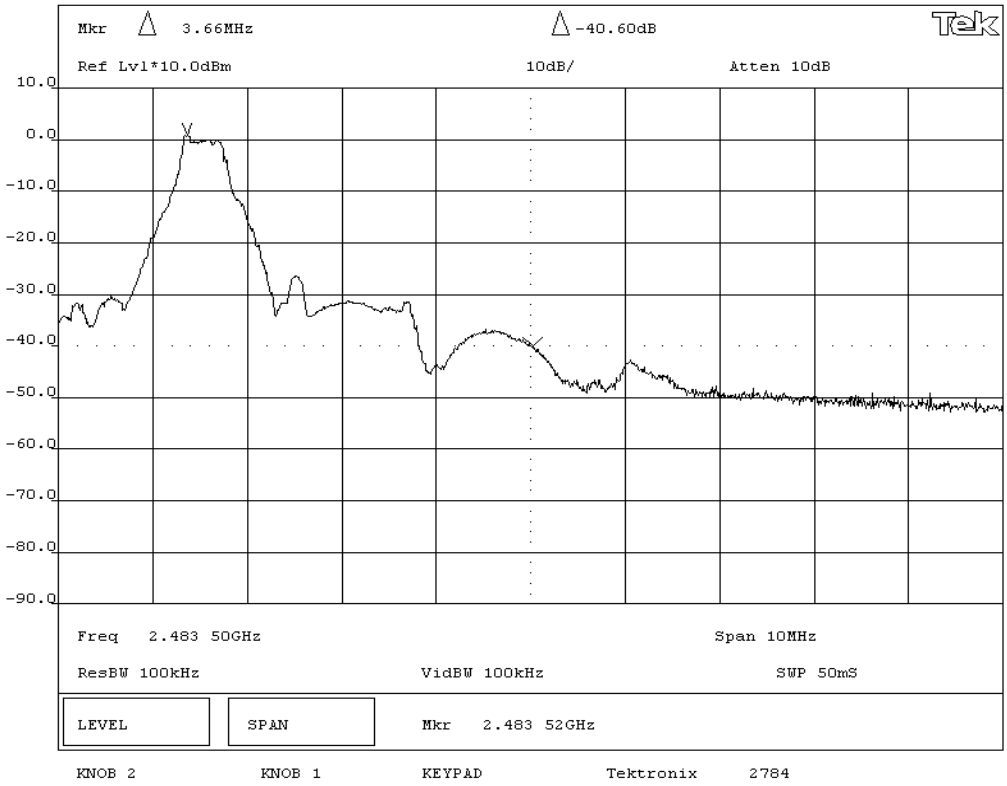
RESULTS	AMPLITUDE
Pass	-40.6 dB

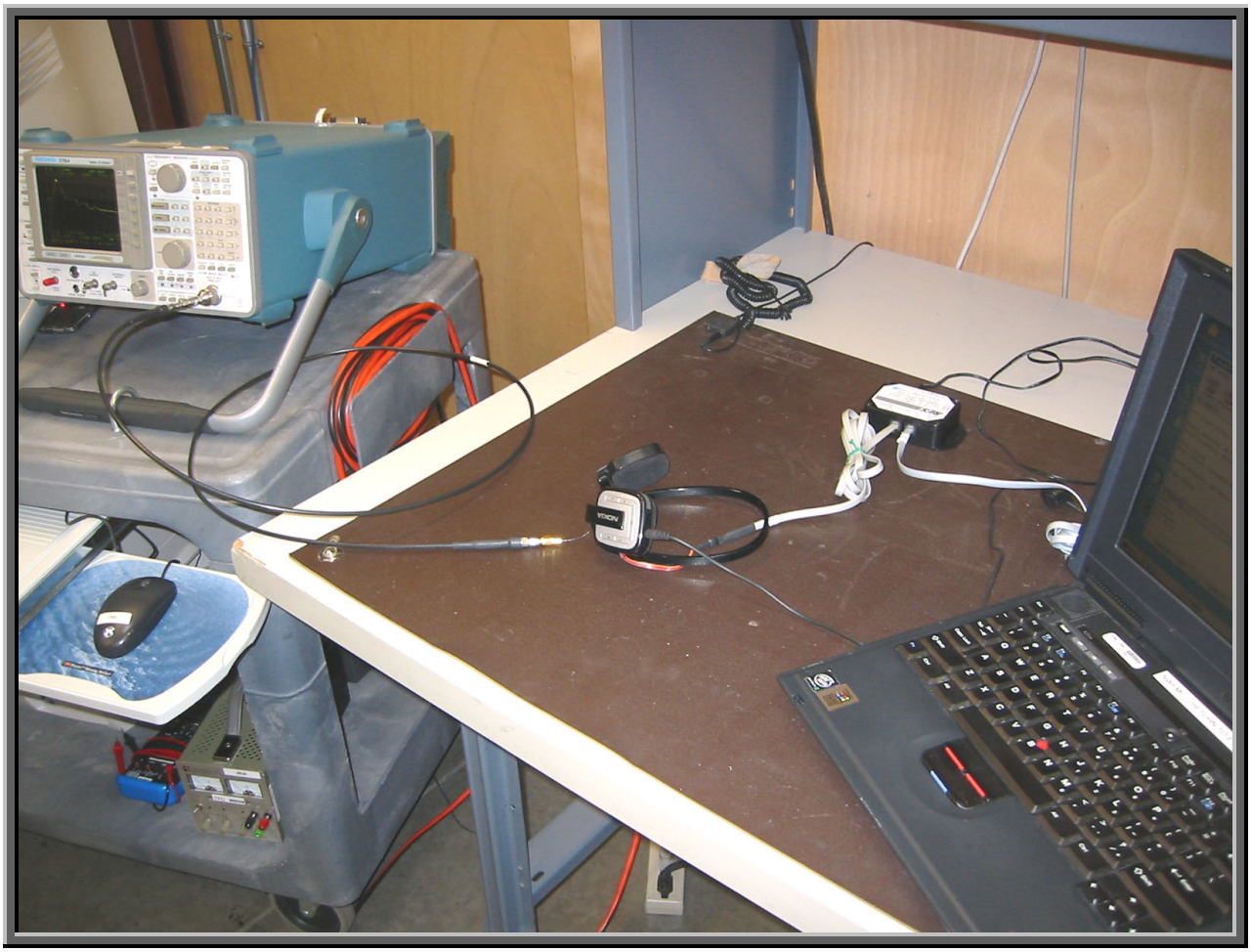
SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

Band Edge Compliance - High Channel





Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

Operating Modes Investigated:
No Hop

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
120VAC/60Hz

Software\Firmware Applied During Test			
Exercise software	Simple Term	**Version**	Unknown
Description			
The system was tested using standard serial communications software to test all functions of the device during the test. The software 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.	F-0439A (Nokia Model HS-34W)	Unknown
AC Adapter	Nokia	AC-4U	0675379
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446

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

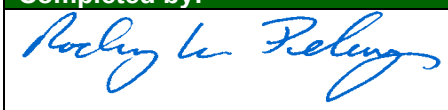
Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

Test Description

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

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

Completed by:



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

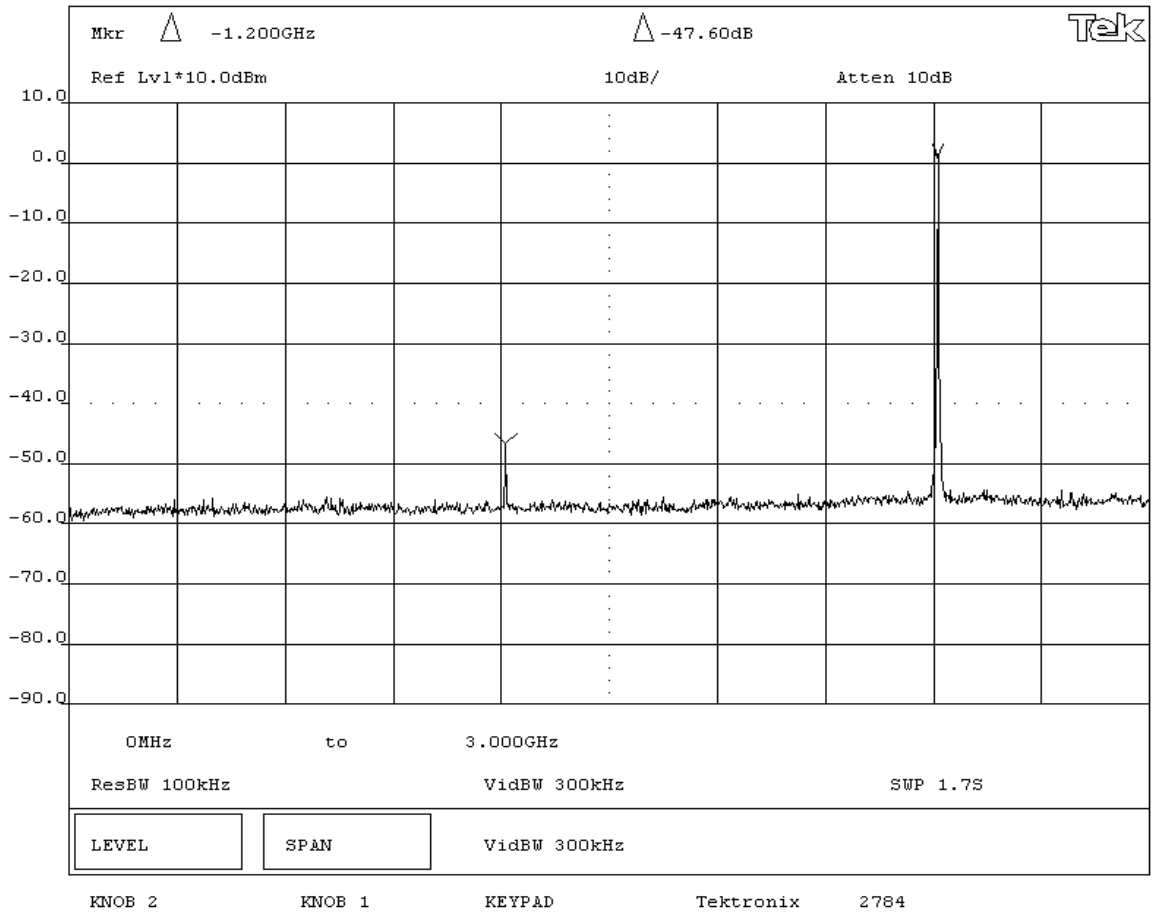
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

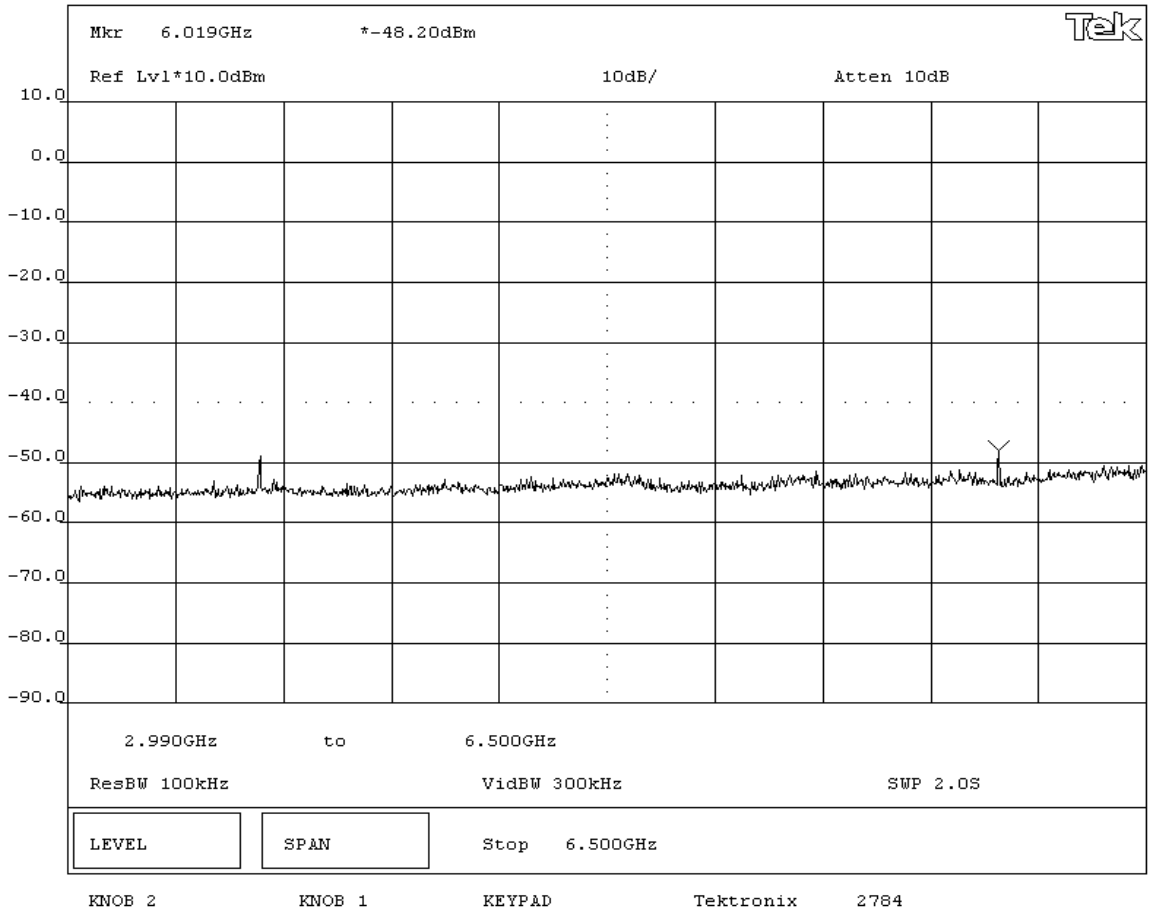
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

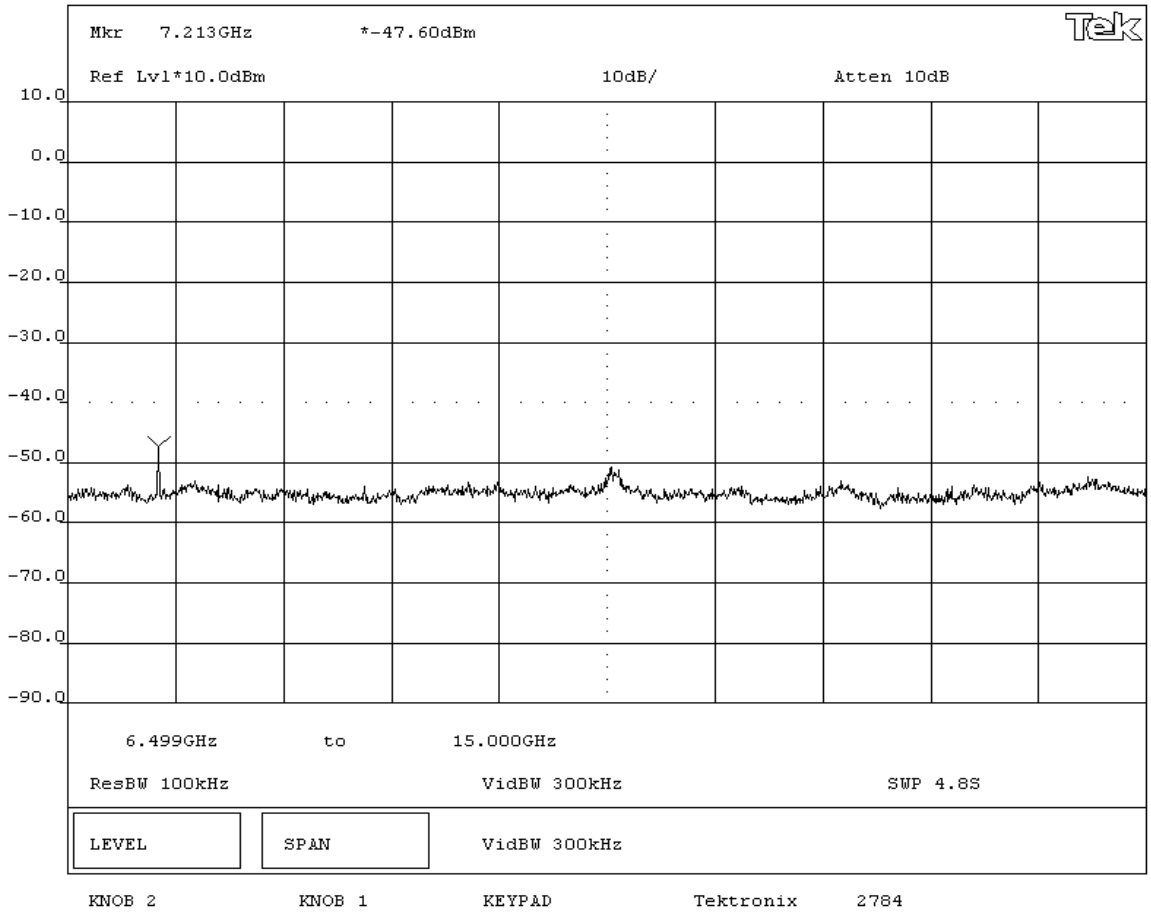
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

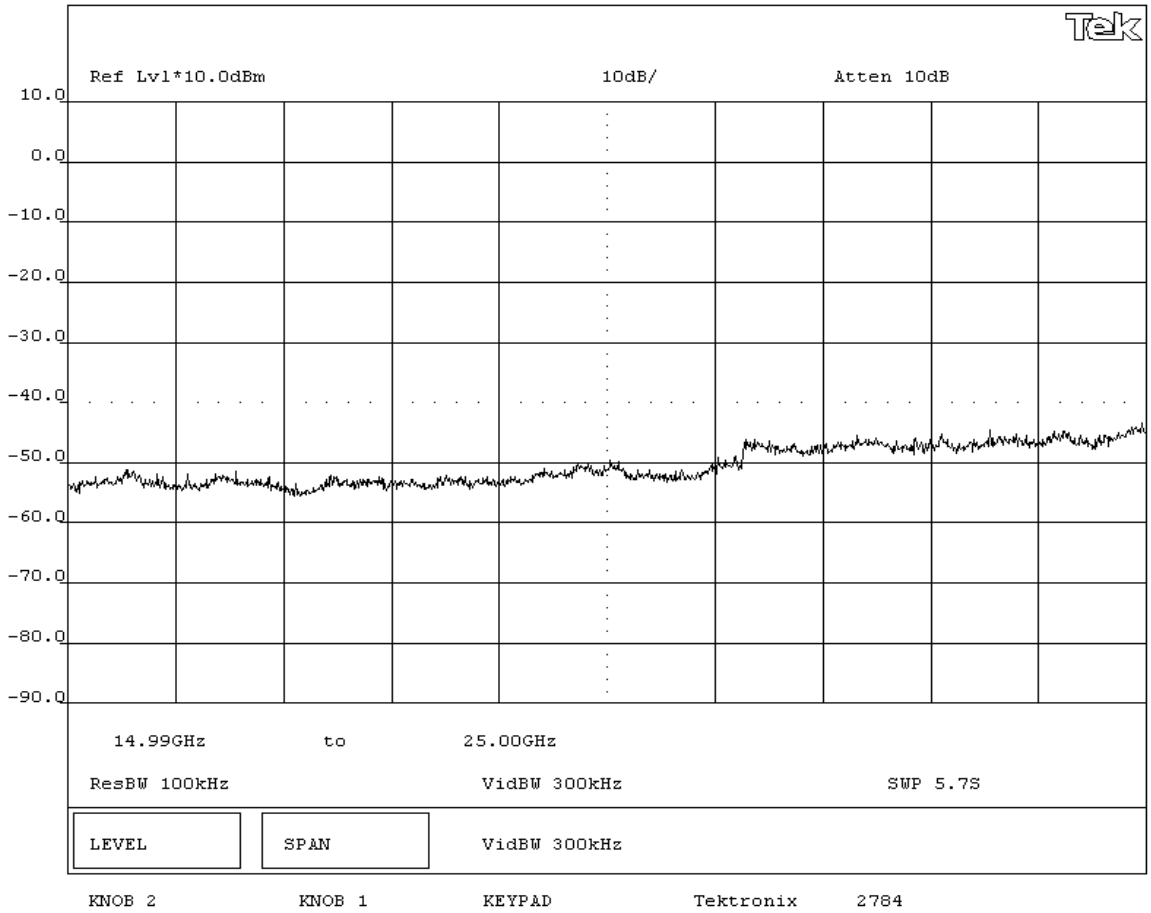
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

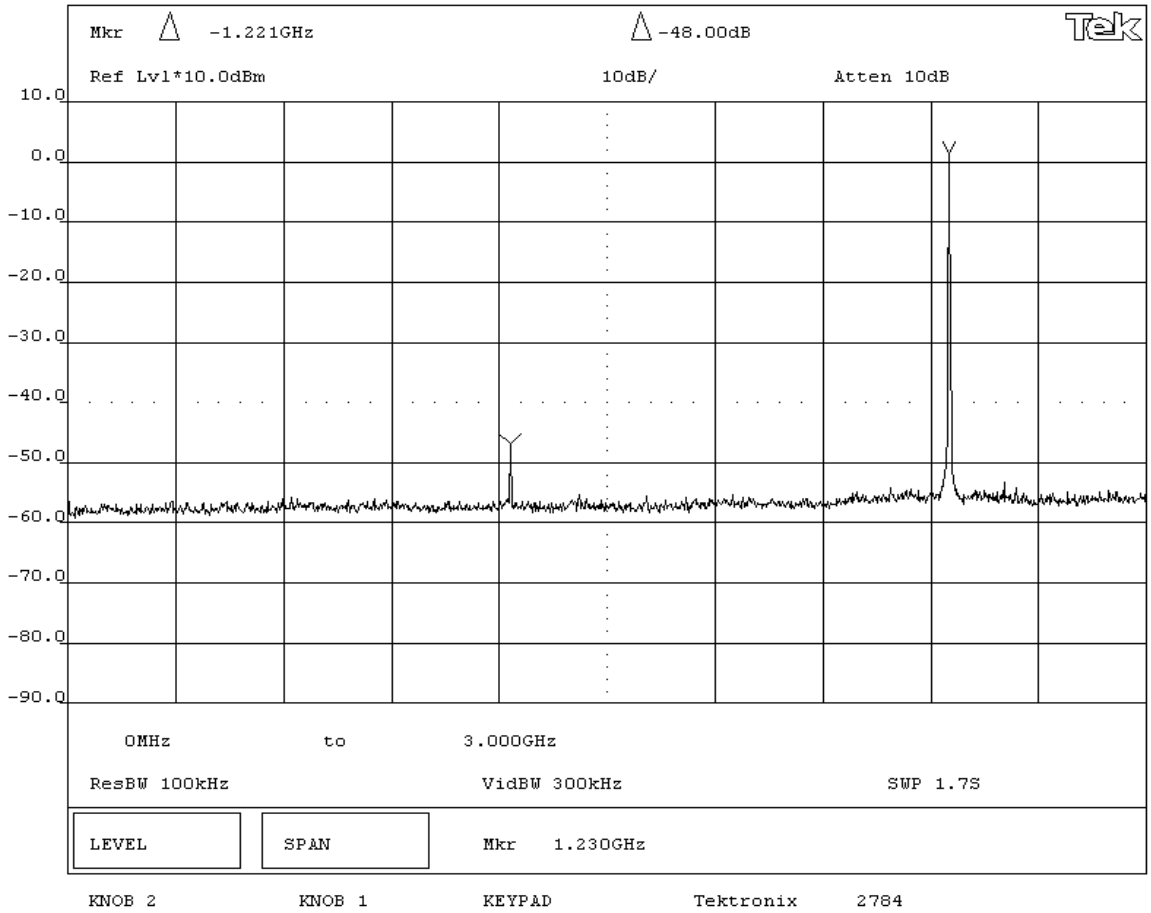
Pass

SIGNATURE

Tested By. _____

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

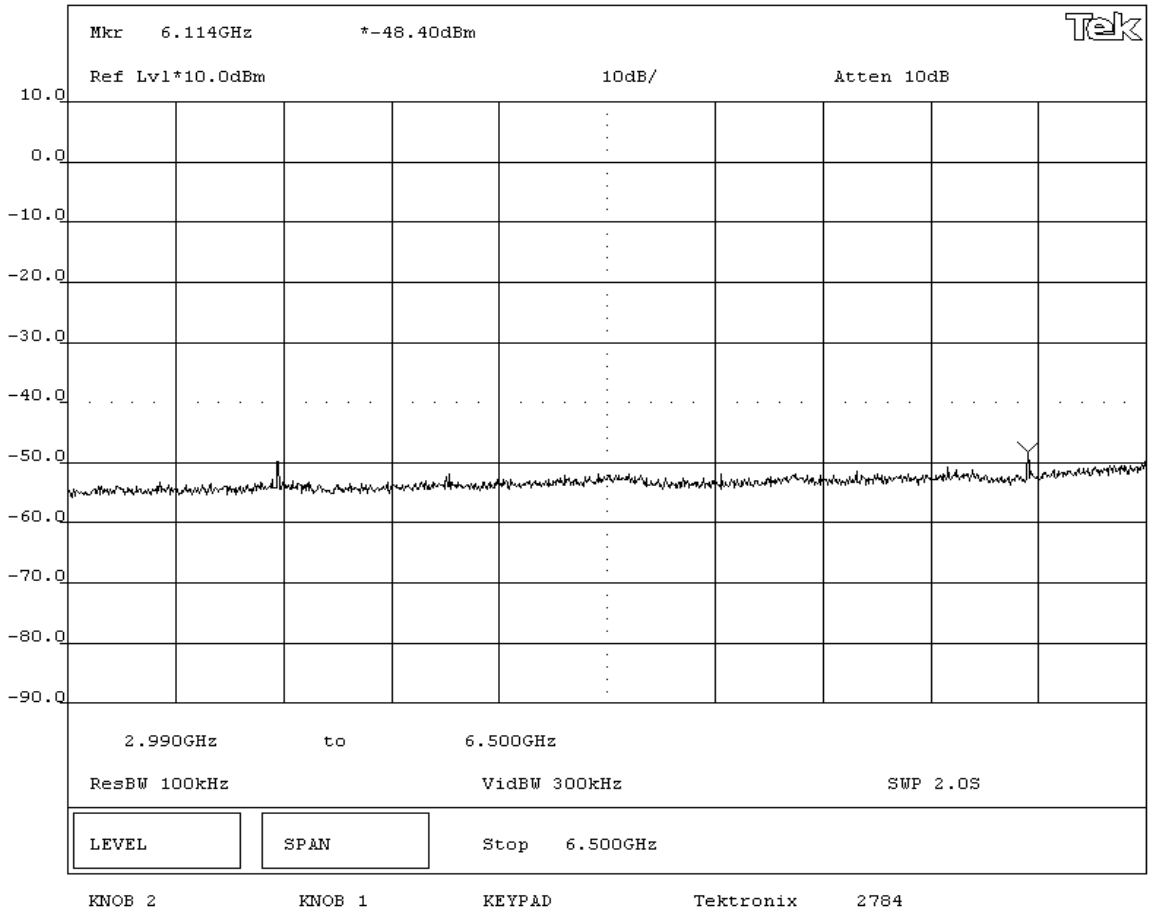
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

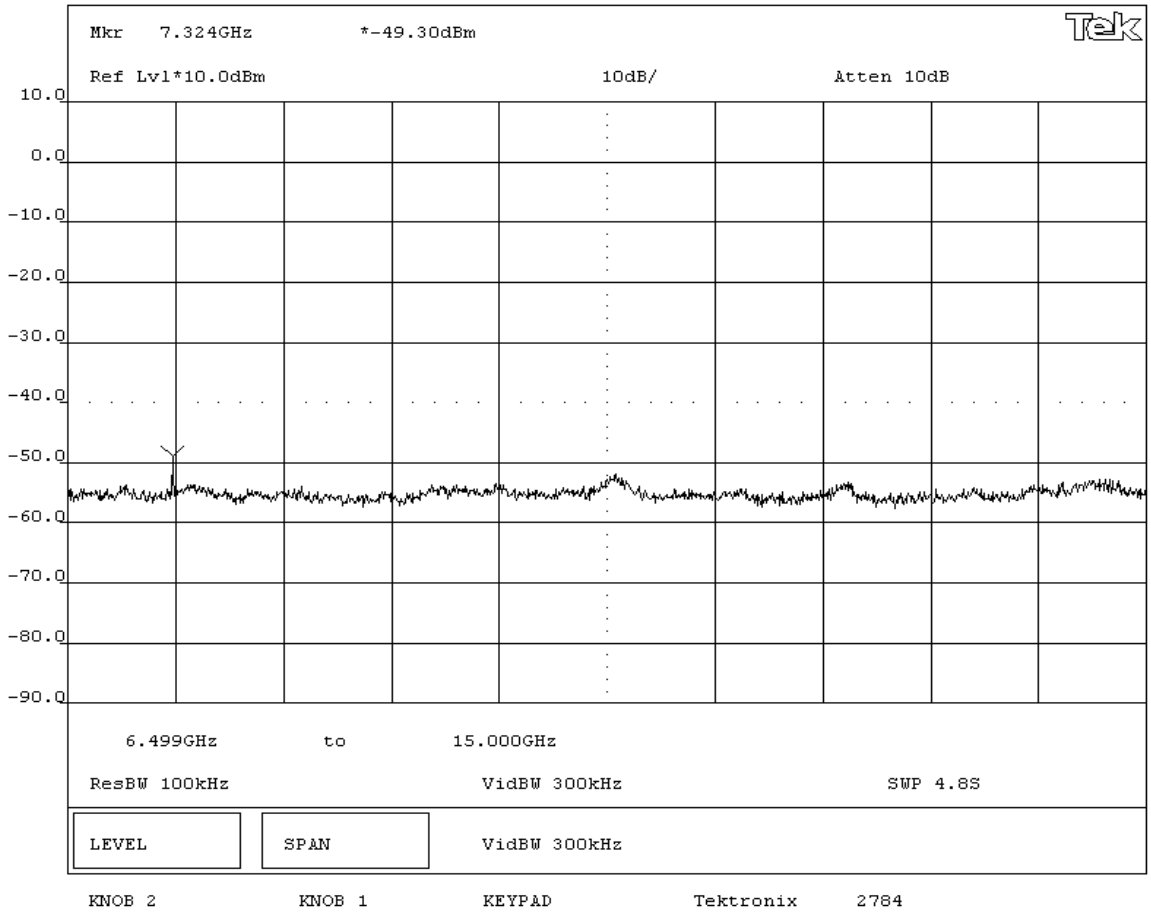
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

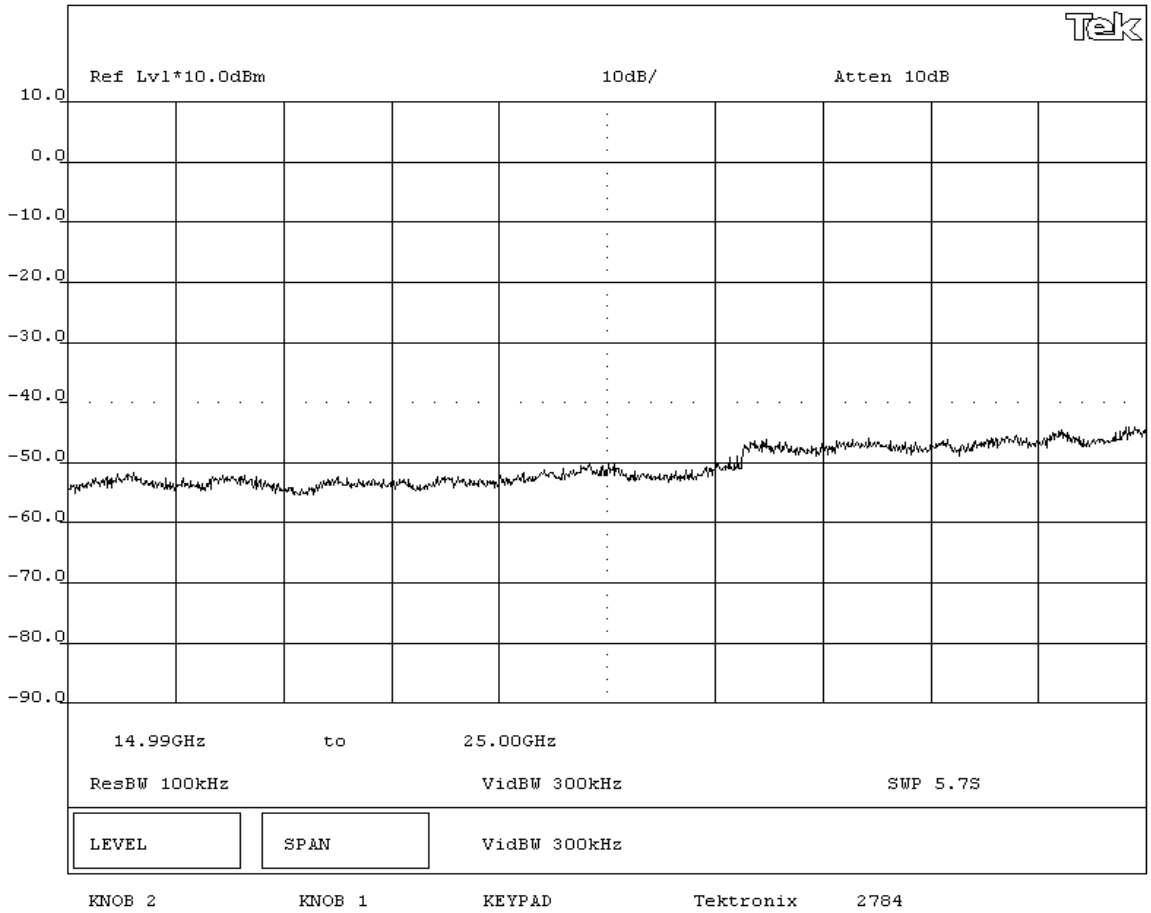
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

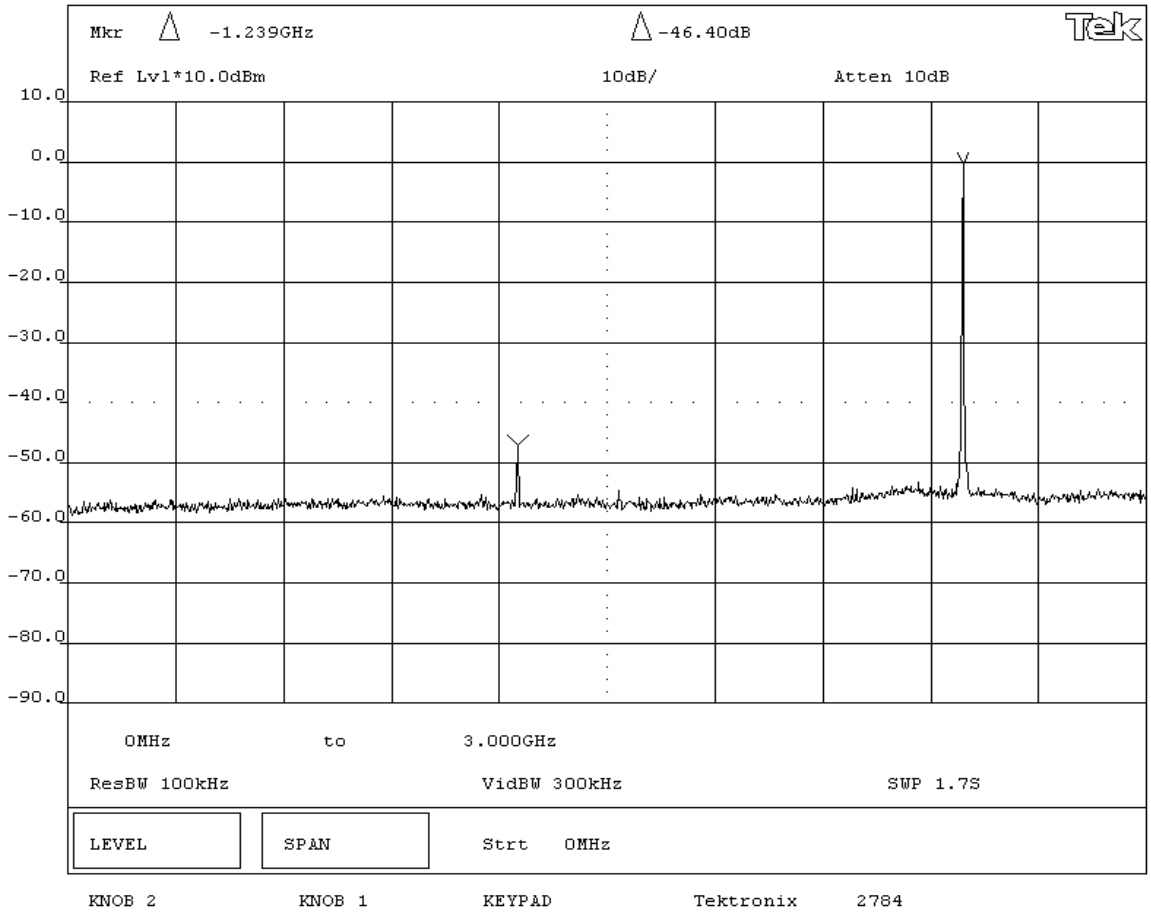
Pass

SIGNATURE

Tested By: Rodney L. Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

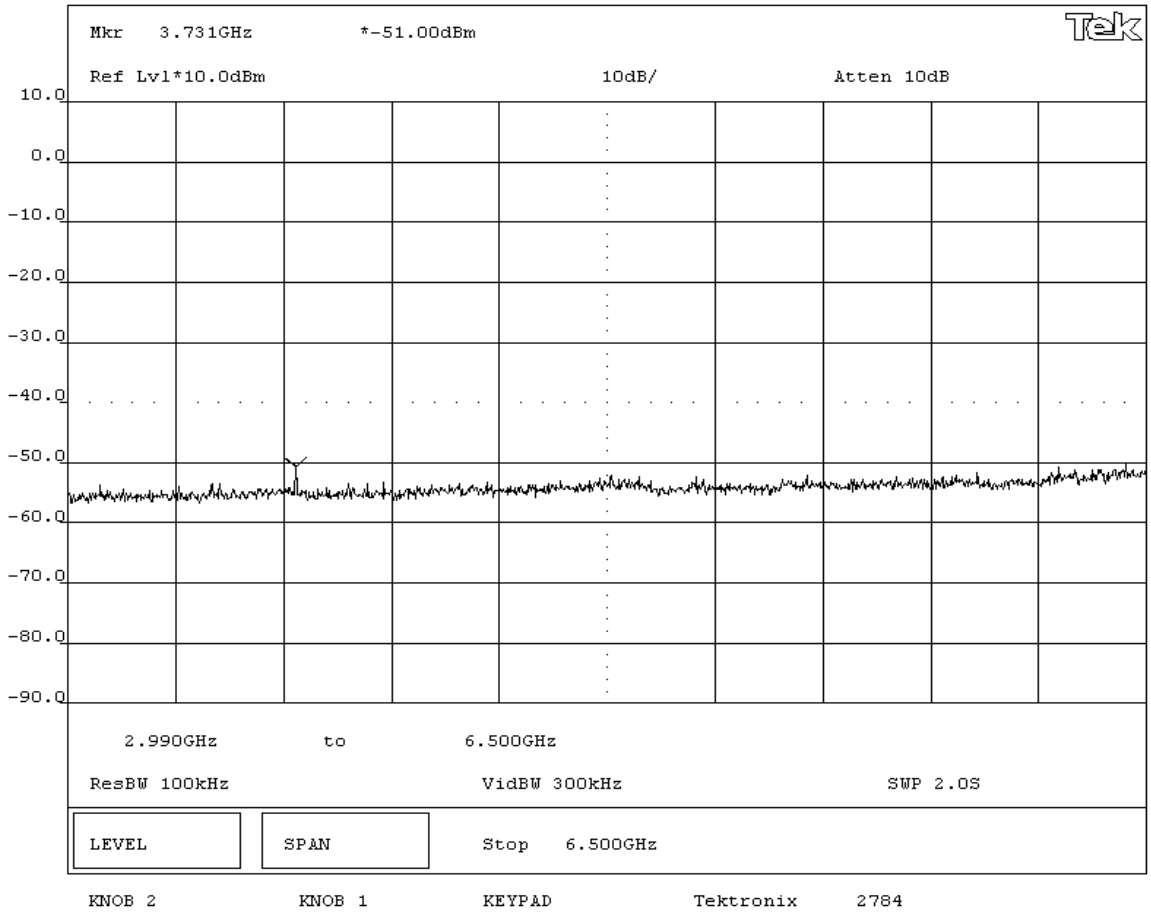
Pass

SIGNATURE

Tested By: Rodney Lee Peloquin

DESCRIPTION OF TEST

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



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

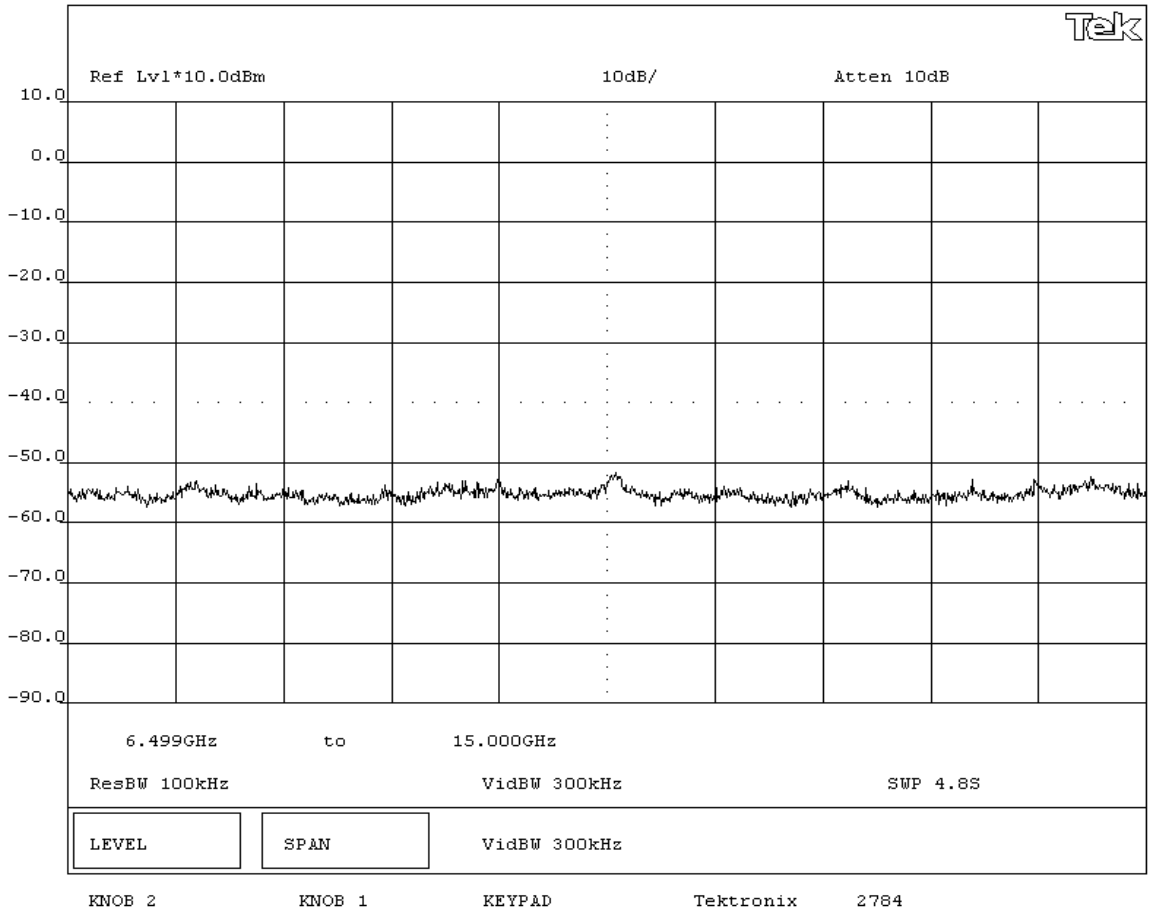
Pass

SIGNATURE

Tested By: Rodney La Peloquin

DESCRIPTION OF TEST

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



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/01/05
Customer:	Logitech, Inc.			Temperature:	73 °F
Attendees:	None	Tested by:	Rod Peloquin	Humidity:	42% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	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

Pass

SIGNATURE

Tested By: Rodney Le Peloquin

DESCRIPTION OF TEST

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