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

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446
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	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

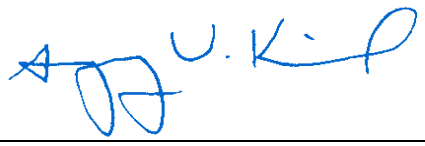
Test Description

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

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

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

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

Completed by:


NORTHWEST EMC

POWER SPECTRAL DENSITY

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	71 °F
Attendees:	None	Tested by:	Greg Kiemel	Humidity:	41% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(e)	Year:	2005-04	Method:	FCC 97-114, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

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

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

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

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

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

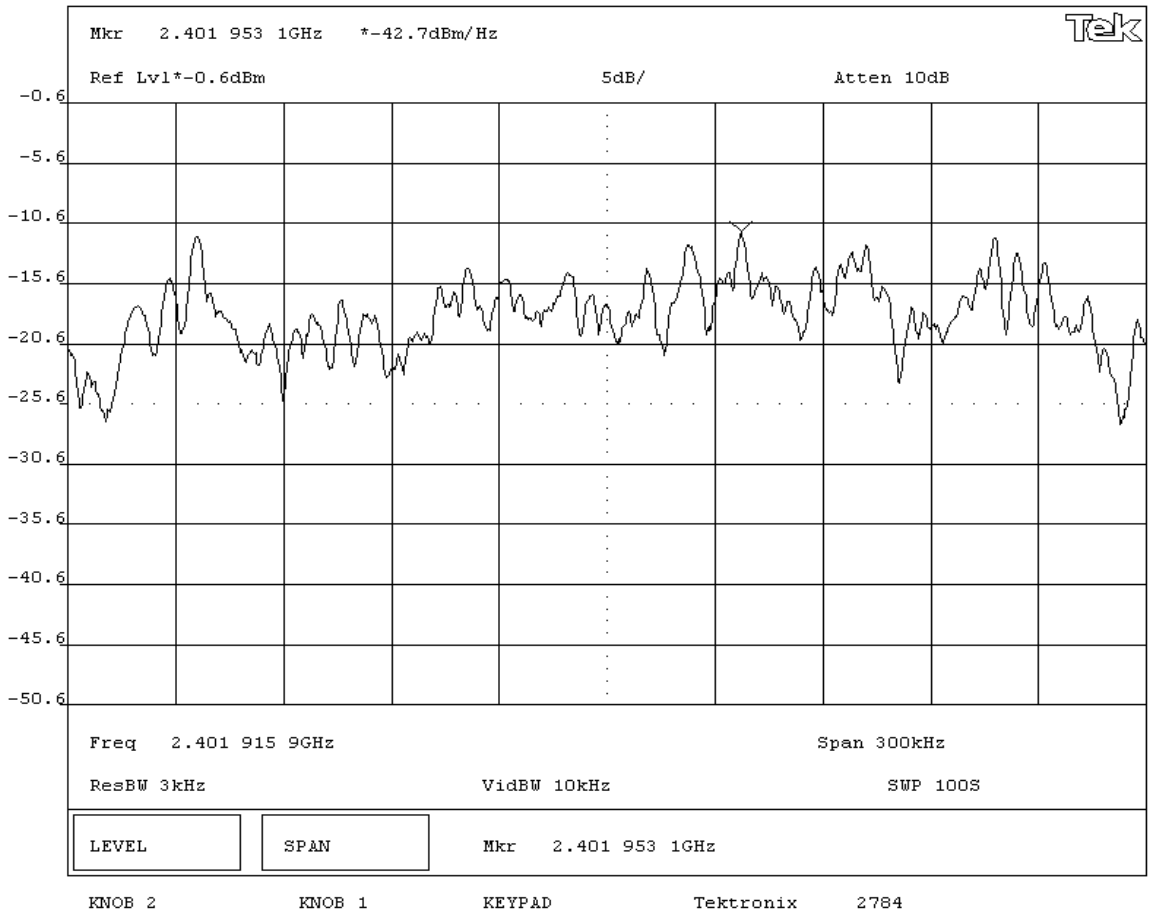
RESULTS	AMPLITUDE
Pass	Power Spectral Density = -7.9 dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Low Channel



NORTHWEST EMC

POWER SPECTRAL DENSITY

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	71 °F
Attendees:	None	Tested by:	Greg Kiemel	Humidity:	41% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(e)	Year:	2005-04	Method:	FCC 97-114, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

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

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

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

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

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

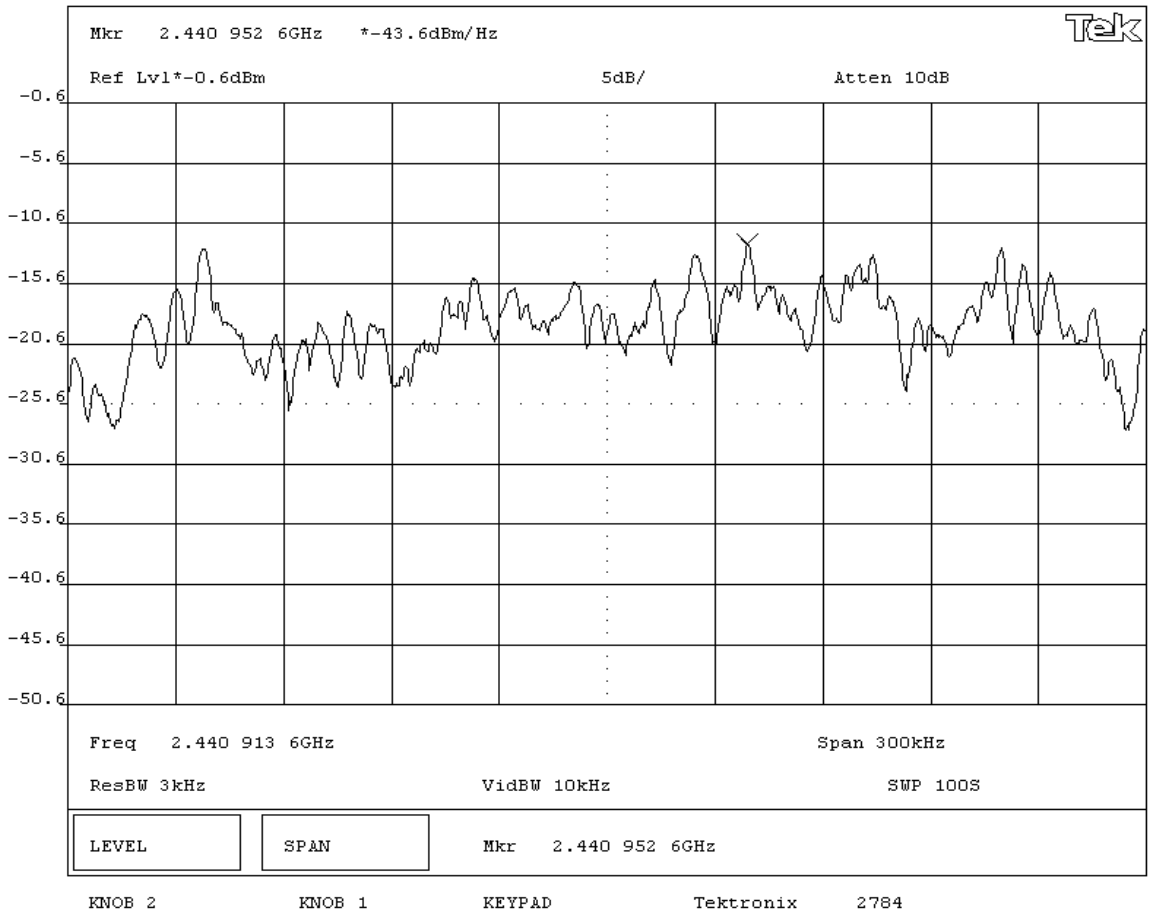
RESULTS	AMPLITUDE
Pass	Power Spectral Density = -8.8 dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Mid Channel



NORTHWEST EMC

POWER SPECTRAL DENSITY

Rev BETA 01/30/01

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	71 °F
Attendees:	None	Tested by:	Greg Kiemel	Humidity:	41% RH
Customer Ref. No.:	None	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(e)	Year:	2005-04	Method:	FCC 97-114, ANSI C63.4	Year:	2003

SAMPLE CALCULATIONS

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

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

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

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

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

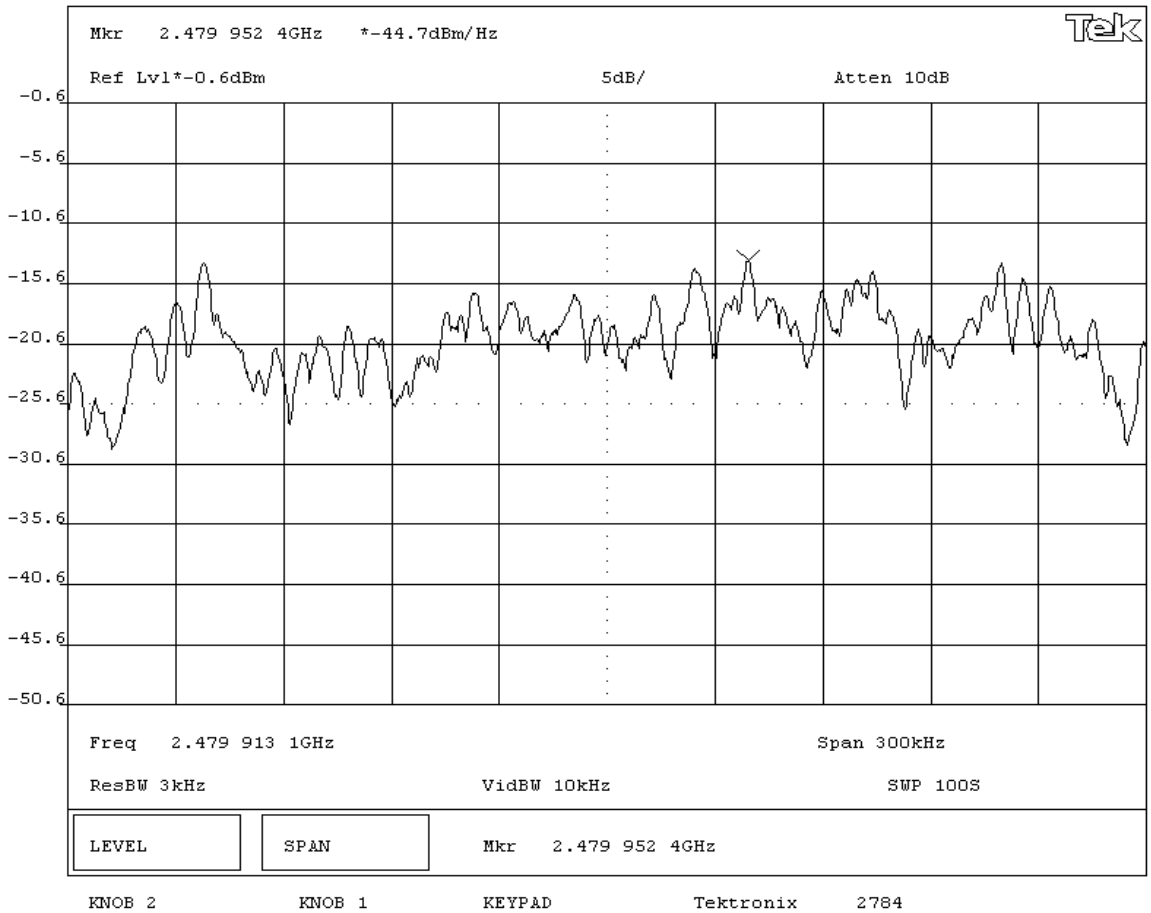
RESULTS	AMPLITUDE
Pass	Power Spectral Density = -9.9 dBm / 3kHz

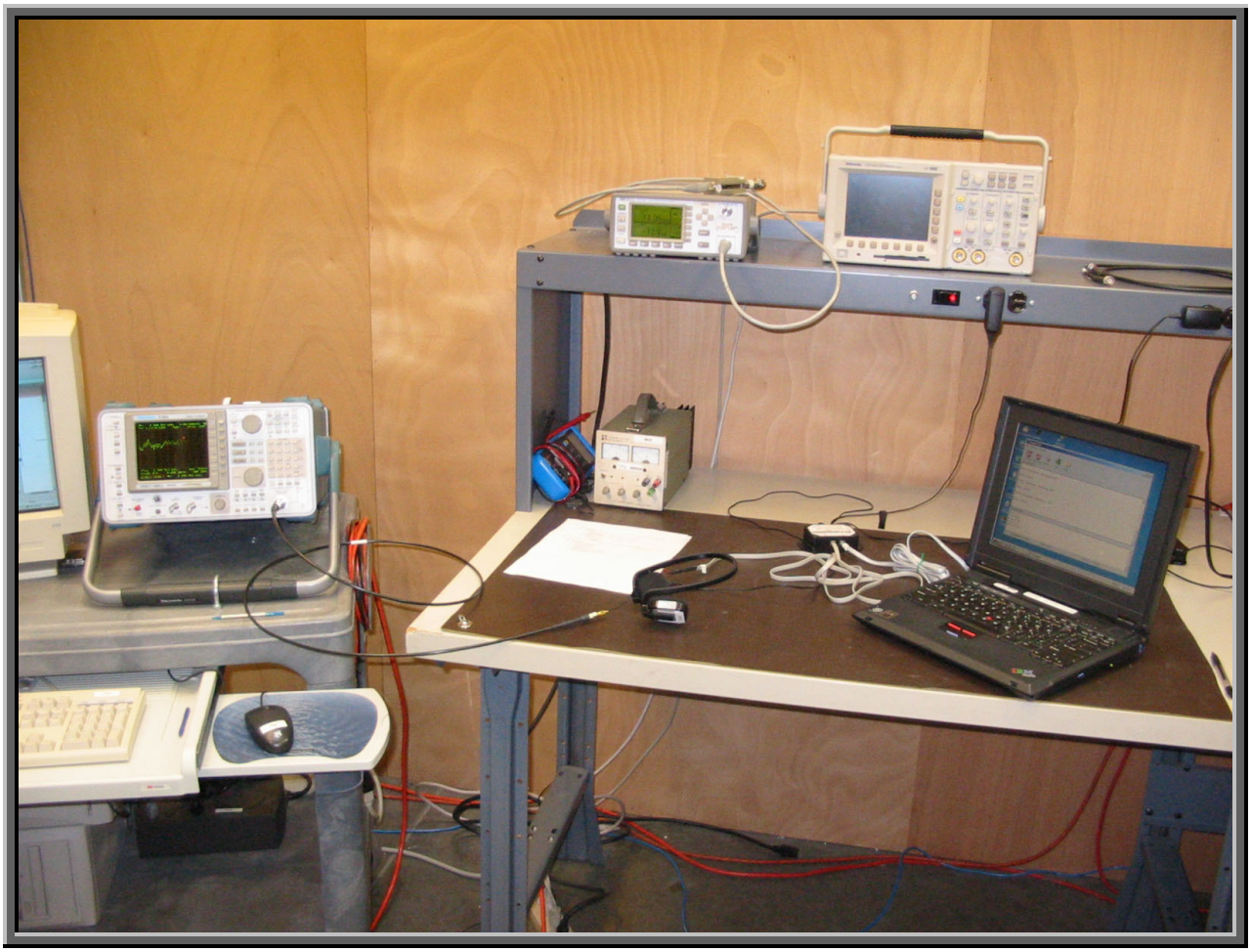
SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - High Channel





Justification

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

Channels in Specified Band Investigated:
Low
Mid
High

Operating Modes Investigated:
No Hop

Antennas Investigated:
Integral

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
120VAC/60Hz

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

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

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
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
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	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	Agilent	E4446A	AAQ	06/15/2005	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Antenna, Horn	EMCO	3115	AHJ	05/20/2005	24 mo
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AM-1616-1000	AOL	08/02/2005	13 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	08/02/2005	13 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	02/17/2005	13 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	02/15/2005	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	03/09/2005	13 mo

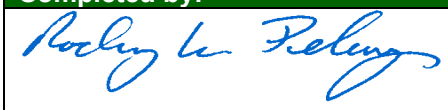
Test Description

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

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

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

Completed by:



NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.18

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:	Unknown	Date:	08/27/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:	None	Humidity:	36%
Project:	None	Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

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

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

COMMENTS

EUT OPERATING MODES

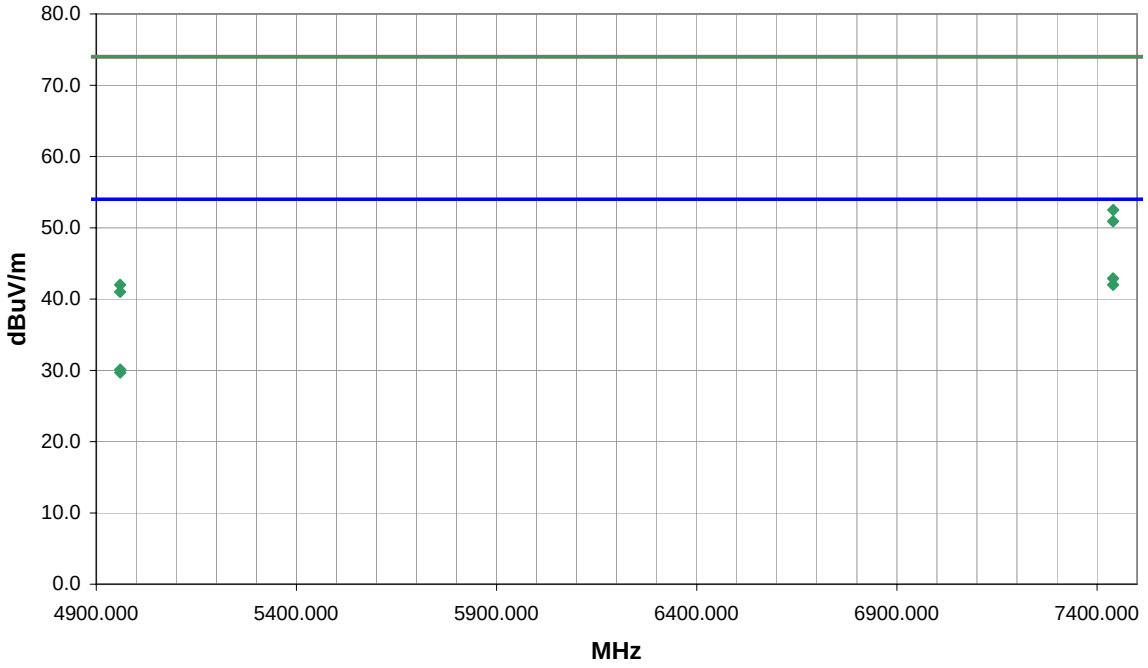
No hop, High channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7440.001	28.7	14.2	180.0	1.0	3.0	0.0	V-Horn	AV	0.0	42.9	54.0	-11.1
7439.918	27.8	14.2	201.0	2.2	3.0	0.0	H-Horn	AV	0.0	42.0	54.0	-12.0
7440.364	38.3	14.2	181.0	1.0	3.0	0.0	V-Horn	PK	0.0	52.5	74.0	-21.5
7440.235	36.7	14.2	203.0	2.2	3.0	0.0	H-Horn	PK	0.0	50.9	74.0	-23.1
4959.960	23.1	7.0	304.0	1.0	3.0	0.0	V-Horn	AV	0.0	30.1	54.0	-23.9
4959.918	22.7	7.0	153.0	2.1	3.0	0.0	H-Horn	AV	0.0	29.7	54.0	-24.3
4959.560	35.0	7.0	304.0	1.0	3.0	0.0	V-Horn	PK	0.0	42.0	74.0	-32.0
4959.520	34.0	7.0	153.0	2.1	3.0	0.0	H-Horn	PK	0.0	41.0	74.0	-33.0

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.18

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:	Unknown	Date:	08/27/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:	None	Humidity:	36%
Project:	None	Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

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

TEST PARAMETERS

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

COMMENTS

EUT OPERATING MODES

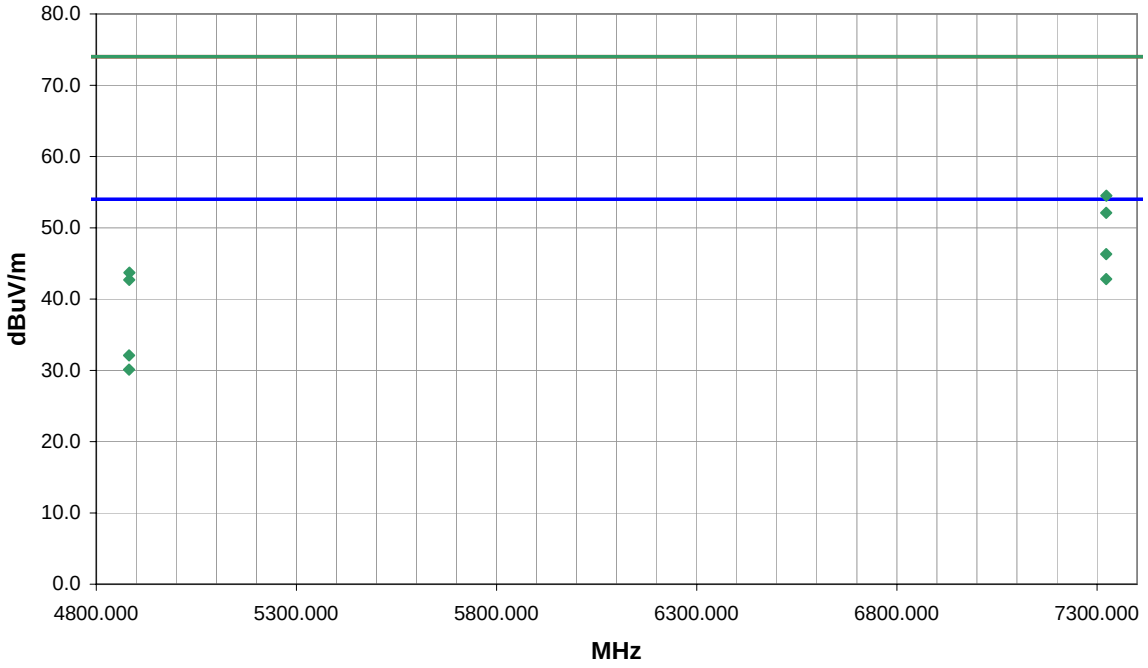
No hop, mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	3
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7322.920	32.5	13.8	140.0	1.7	3.0	0.0	V-Horn	AV	0.0	46.3	54.0	-7.7
7322.891	29.0	13.8	224.0	2.2	3.0	0.0	H-Horn	AV	0.0	42.8	54.0	-11.2
7323.107	40.7	13.8	139.0	1.7	3.0	0.0	V-Horn	PK	0.0	54.5	74.0	-19.5
4881.972	25.2	6.9	276.0	1.0	3.0	0.0	V-Horn	AV	0.0	32.1	54.0	-21.9
7322.890	38.3	13.8	223.0	2.2	3.0	0.0	H-Horn	PK	0.0	52.1	74.0	-21.9
4881.891	23.2	6.9	114.0	1.4	3.0	0.0	H-Horn	AV	0.0	30.1	54.0	-23.9
4882.823	36.8	6.9	277.0	1.0	3.0	0.0	V-Horn	PK	0.0	43.7	74.0	-30.3
4882.275	35.8	6.9	113.0	1.4	3.0	0.0	H-Horn	PK	0.0	42.7	74.0	-31.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.18

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:	Unknown	Date:	08/27/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:	None	Humidity:	36%
Project:	None	Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

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

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

COMMENTS

EUT OPERATING MODES

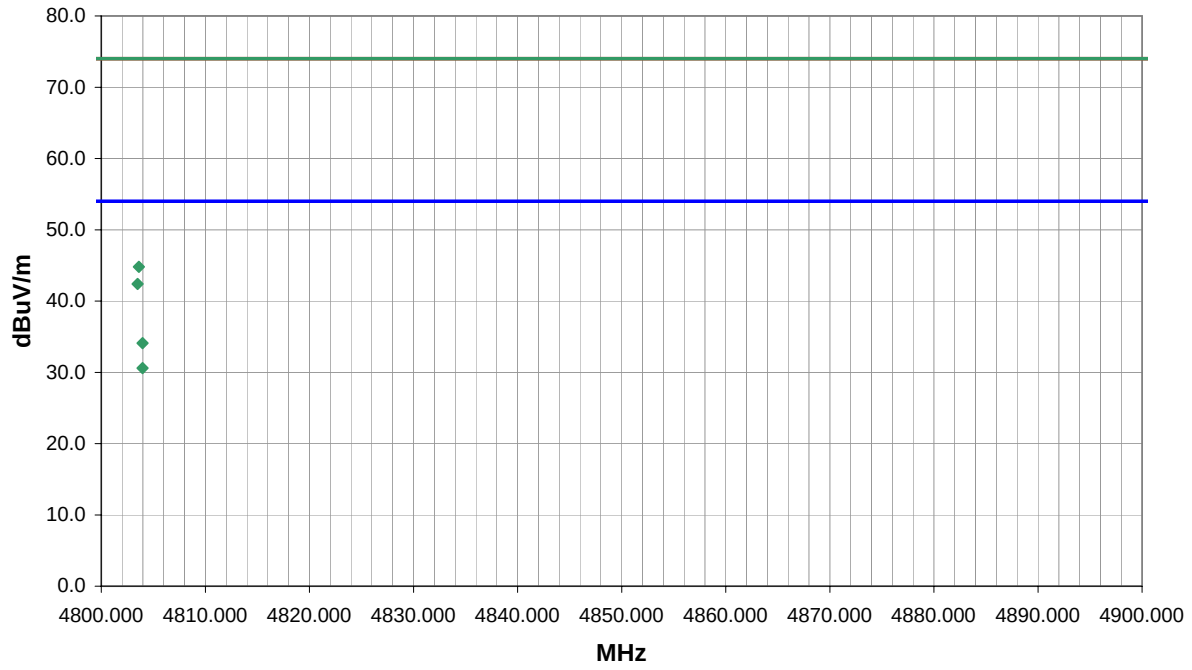
No hop, low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	4
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4803.966	27.5	6.6	175.0	1.0	3.0	0.0	V-Horn	AV	0.0	34.1	54.0	-19.9
4803.966	24.0	6.6	277.0	1.0	3.0	0.0	H-Horn	AV	0.0	30.6	54.0	-23.4
4803.607	38.2	6.6	175.0	1.0	3.0	0.0	V-Horn	PK	0.0	44.8	74.0	-29.2
4803.495	35.8	6.6	277.0	1.0	3.0	0.0	H-Horn	PK	0.0	42.4	74.0	-31.6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NOKIA


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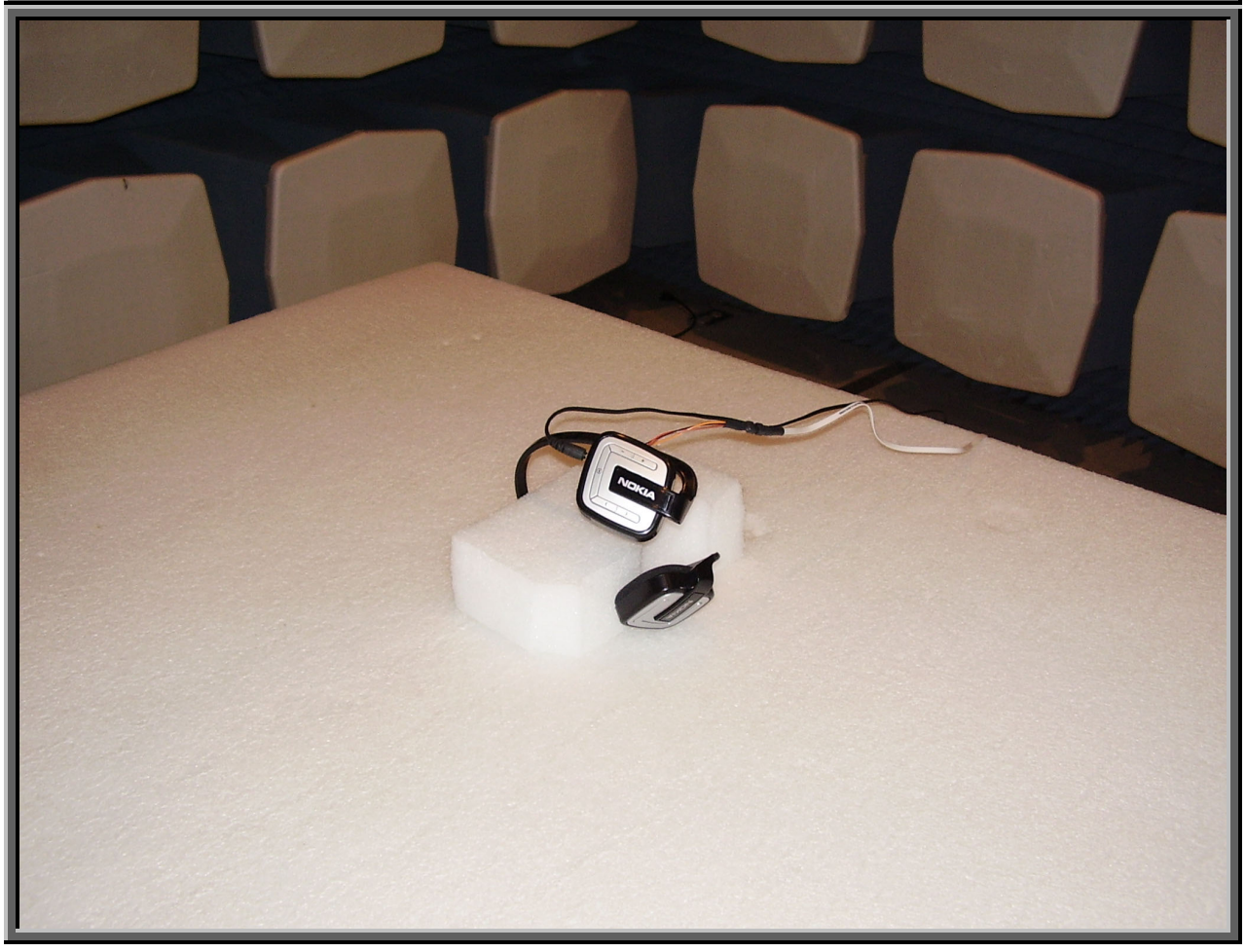

NOKIA

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

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

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

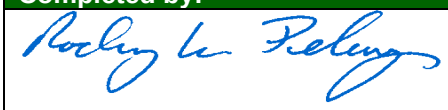
Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Agilent	E4446A	AAQ	06/15/2005	13 mo
LISN	Solar	9252-50-R-24-BNC	LIN	12/29/2004	13 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	12/29/2004	13 mo
Attenuator	Tektronix	011-0059-02	ATH	12/29/2004	13 mo

Test Description

Requirement: Per 47 15.207(c), in addition to devices which are powered directly from the AC power line, conducted emissions measurements shall also be made on battery operated devices that can transmit while charging, as well as on devices that are powered from AC adaptors, or devices that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines. All of these devices shall be tested to demonstrate compliance with the conducted limits of 15.207.

Configuration: The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-2003.

Completed by:



NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

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

TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES

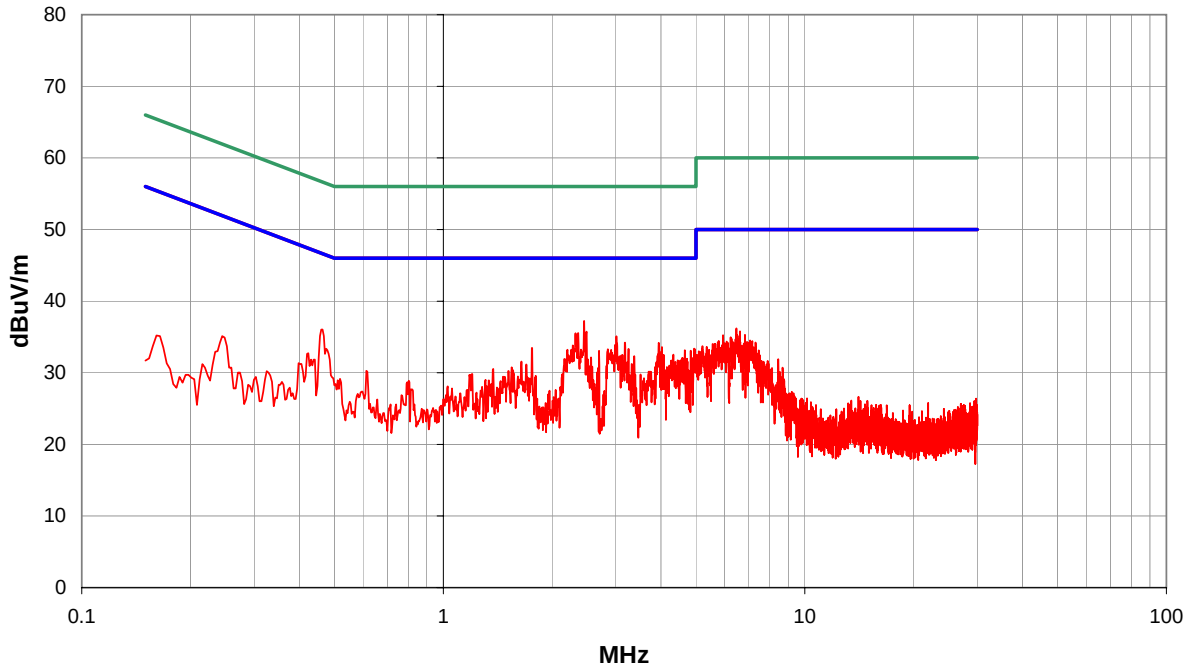
No hop, low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2.453	16.8			0.0	0.4	20.0				37.2	46.0	-8.8
2.490	15.3			0.0	0.4	20.0				35.7	46.0	-10.3
2.362	15.1			0.0	0.4	20.0				35.5	46.0	-10.5
2.322	15.1			0.0	0.4	20.0				35.5	46.0	-10.5
0.463	15.8			0.0	0.2	20.0				36.0	46.6	-10.6
3.014	14.6			0.0	0.5	20.0				35.1	46.0	-10.9
3.182	13.7			0.0	0.5	20.0				34.2	46.0	-11.8
3.944	13.6			0.0	0.6	20.0				34.2	46.0	-11.8
2.985	13.4			0.0	0.5	20.0				33.9	46.0	-12.1
2.282	13.4			0.0	0.4	20.0				33.8	46.0	-12.2
4.024	13.0			0.0	0.6	20.0				33.6	46.0	-12.4
1.761	13.1			0.0	0.4	20.0				33.5	46.0	-12.5
4.942	12.7			0.0	0.7	20.0				33.4	46.0	-12.6
3.255	12.8			0.0	0.5	20.0				33.3	46.0	-12.7
2.850	12.8			0.0	0.5	20.0				33.3	46.0	-12.7
4.654	12.5			0.0	0.7	20.0				33.2	46.0	-12.8
4.833	12.4			0.0	0.7	20.0				33.1	46.0	-12.9
2.697	12.6			0.0	0.5	20.0				33.1	46.0	-12.9
3.962	12.4			0.0	0.6	20.0				33.0	46.0	-13.0

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

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

TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES

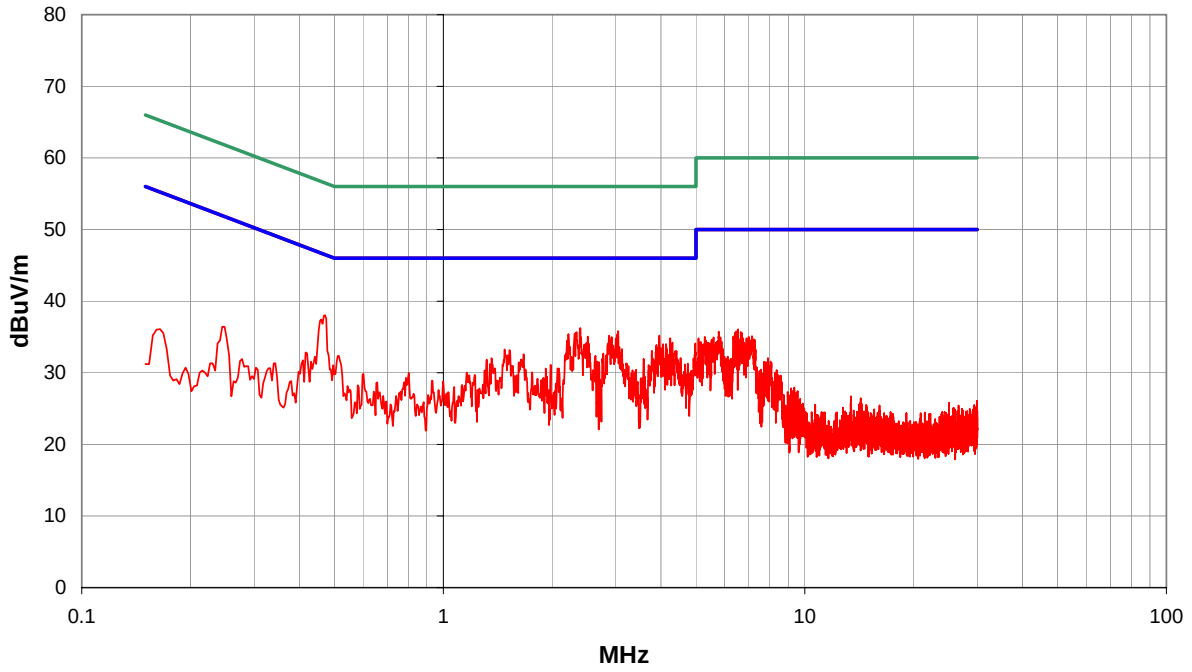
No hop, low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.471	17.8			0.0	0.2	20.0				38.0	46.5	-8.5
2.395	15.8			0.0	0.4	20.0				36.2	46.0	-9.8
3.047	15.3			0.0	0.5	20.0				35.8	46.0	-10.2
2.337	15.2			0.0	0.4	20.0				35.6	46.0	-10.4
2.311	15.0			0.0	0.4	20.0				35.4	46.0	-10.6
2.220	15.0			0.0	0.4	20.0				35.4	46.0	-10.6
3.958	14.6			0.0	0.6	20.0				35.2	46.0	-10.8
2.876	14.7			0.0	0.5	20.0				35.2	46.0	-10.8
2.511	14.6			0.0	0.4	20.0				35.0	46.0	-11.0
2.923	14.5			0.0	0.5	20.0				35.0	46.0	-11.0
4.242	14.2			0.0	0.6	20.0				34.8	46.0	-11.2
3.000	14.3			0.0	0.5	20.0				34.8	46.0	-11.2
2.205	14.1			0.0	0.4	20.0				34.5	46.0	-11.5
4.304	13.6			0.0	0.6	20.0				34.2	46.0	-11.8
2.490	13.7			0.0	0.4	20.0				34.1	46.0	-11.9
4.979	13.4			0.0	0.7	20.0				34.1	46.0	-11.9
2.526	13.6			0.0	0.4	20.0				34.0	46.0	-12.0
4.133	13.4			0.0	0.6	20.0				34.0	46.0	-12.0
4.053	13.4			0.0	0.6	20.0				34.0	46.0	-12.0

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

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

TEST PARAMETERS

Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES

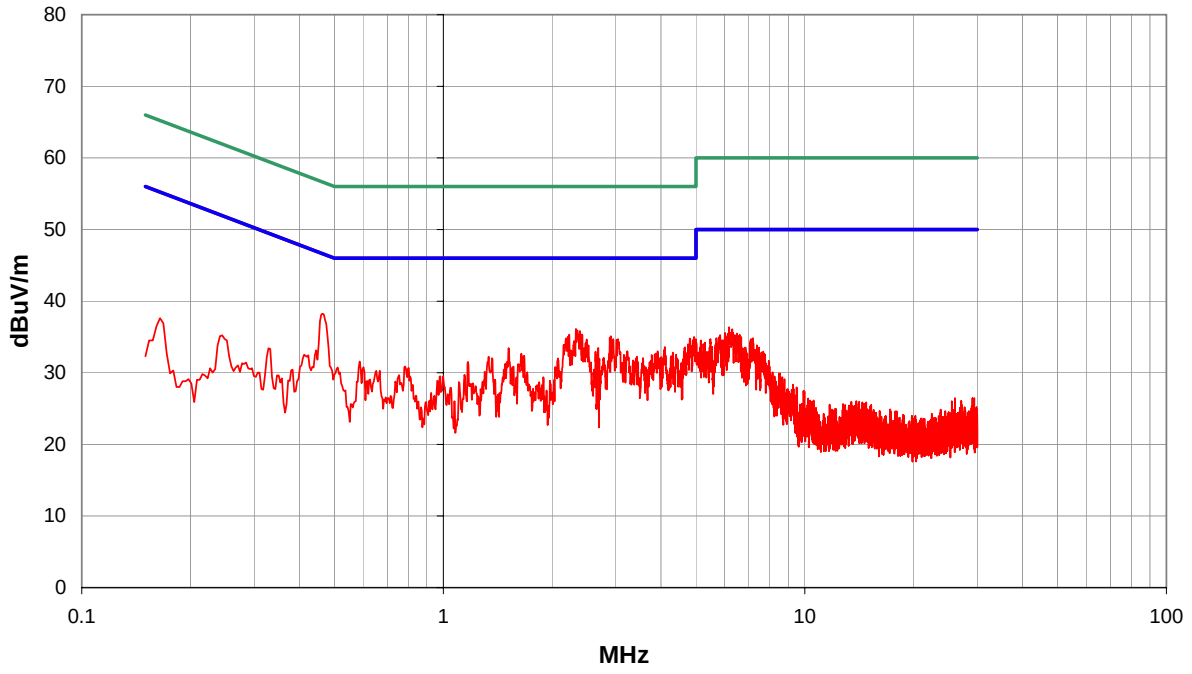
No hop, mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	3
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.463	18.0			0.0	0.2	20.0				38.2	46.6	-8.4
2.329	15.7			0.0	0.4	20.0				36.1	46.0	-9.9
2.388	15.4			0.0	0.4	20.0				35.8	46.0	-10.2
2.420	14.9			0.0	0.4	20.0				35.3	46.0	-10.7
2.231	14.9			0.0	0.4	20.0				35.3	46.0	-10.7
2.909	14.6			0.0	0.5	20.0				35.1	46.0	-10.9
2.213	14.6			0.0	0.4	20.0				35.0	46.0	-11.0
4.942	14.3			0.0	0.7	20.0				35.0	46.0	-11.0
2.887	14.4			0.0	0.5	20.0				34.9	46.0	-11.1
4.804	14.1			0.0	0.7	20.0				34.8	46.0	-11.2
3.044	14.2			0.0	0.5	20.0				34.7	46.0	-11.3
4.997	14.0			0.0	0.7	20.0				34.7	46.0	-11.3
2.952	14.2			0.0	0.5	20.0				34.7	46.0	-11.3
2.493	14.2			0.0	0.4	20.0				34.6	46.0	-11.4
3.018	14.1			0.0	0.5	20.0				34.6	46.0	-11.4
4.906	13.9			0.0	0.7	20.0				34.6	46.0	-11.4
2.300	14.0			0.0	0.4	20.0				34.4	46.0	-11.6
4.753	13.3			0.0	0.7	20.0				34.0	46.0	-12.0
2.519	13.4			0.0	0.4	20.0				33.8	46.0	-12.2

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

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

TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES

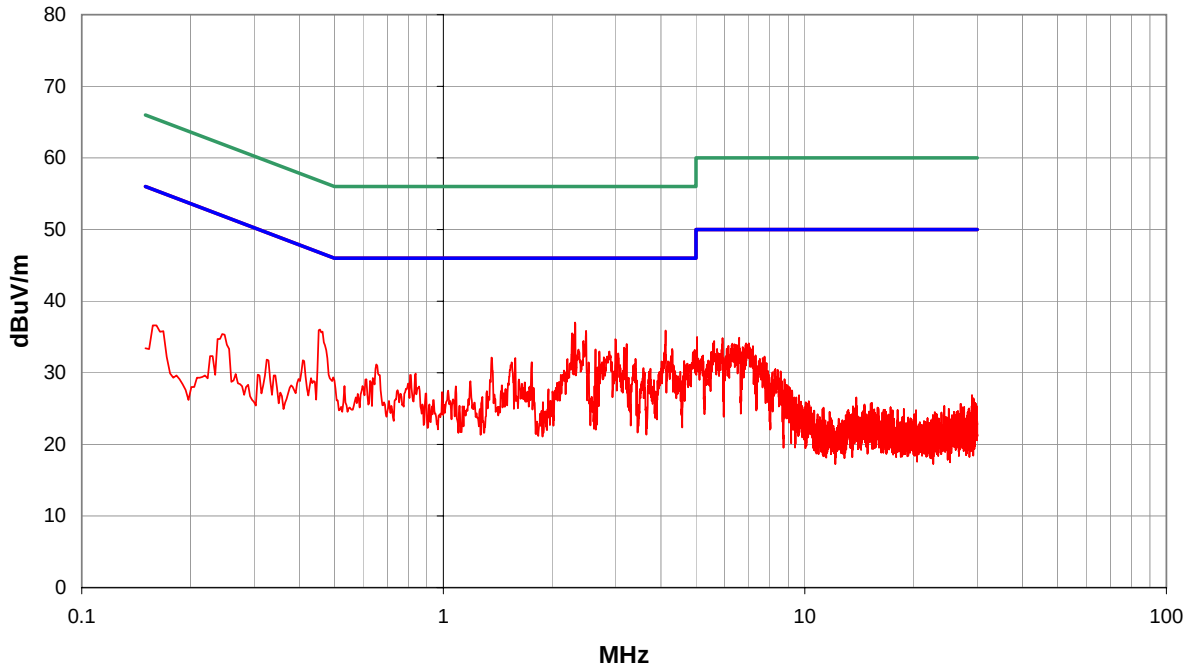
No hop, mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	4
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2.315	16.6			0.0	0.4	20.0				37.0	46.0	-9.0
4.119	15.3			0.0	0.6	20.0				35.9	46.0	-10.1
2.482	15.4			0.0	0.4	20.0				35.8	46.0	-10.2
2.271	15.1			0.0	0.4	20.0				35.5	46.0	-10.5
0.456	15.8			0.0	0.2	20.0				36.0	46.8	-10.7
2.993	14.2			0.0	0.5	20.0				34.7	46.0	-11.3
2.442	14.0			0.0	0.4	20.0				34.4	46.0	-11.6
3.215	13.5			0.0	0.5	20.0				34.0	46.0	-12.0
3.164	13.0			0.0	0.5	20.0				33.5	46.0	-12.5
4.297	12.7			0.0	0.6	20.0				33.3	46.0	-12.7
2.635	12.8			0.0	0.5	20.0				33.3	46.0	-12.7
2.366	12.8			0.0	0.4	20.0				33.2	46.0	-12.8
4.960	12.5			0.0	0.7	20.0				33.2	46.0	-12.8
4.939	12.3			0.0	0.7	20.0				33.0	46.0	-13.0
2.880	12.5			0.0	0.5	20.0				33.0	46.0	-13.0
2.701	12.5			0.0	0.5	20.0				33.0	46.0	-13.0
3.047	12.2			0.0	0.5	20.0				32.7	46.0	-13.3
4.979	11.8			0.0	0.7	20.0				32.5	46.0	-13.5
4.264	11.7			0.0	0.6	20.0				32.3	46.0	-13.7

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

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

TEST PARAMETERS

Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES

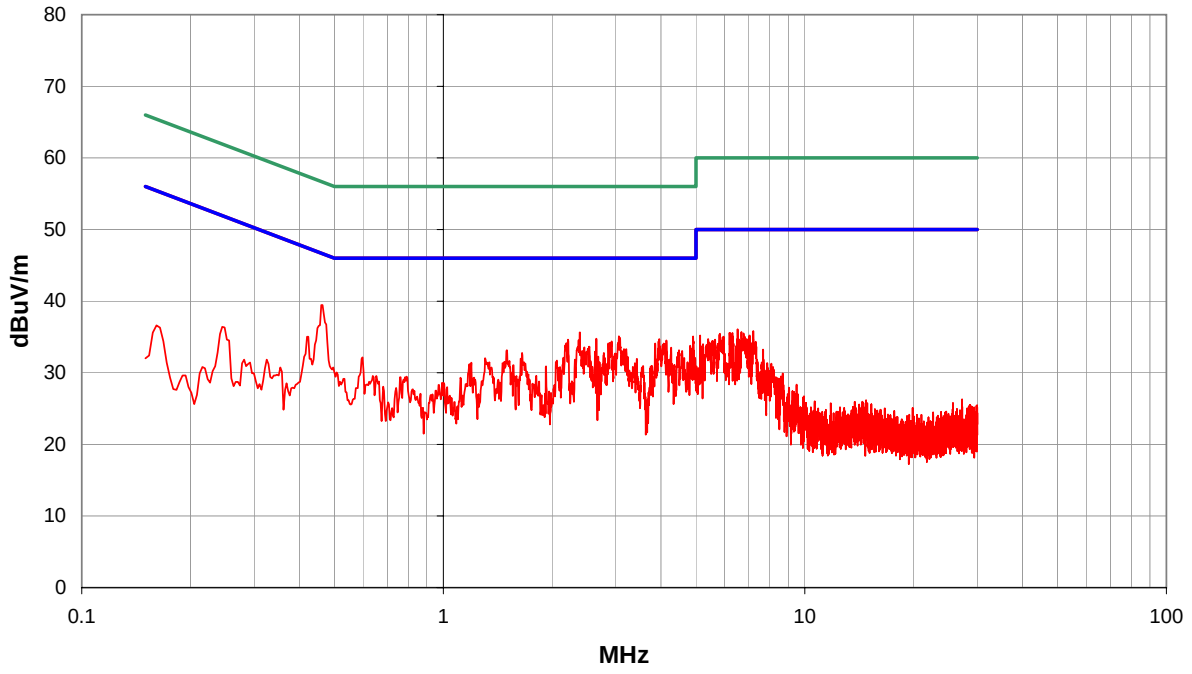
No hop, high channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.463	19.2			0.0	0.2	20.0				39.4	46.6	-7.2
2.388	15.2			0.0	0.4	20.0				35.6	46.0	-10.4
3.058	14.6			0.0	0.5	20.0				35.1	46.0	-10.9
4.909	14.4			0.0	0.7	20.0				35.1	46.0	-10.9
2.650	14.3			0.0	0.5	20.0				34.8	46.0	-11.2
3.958	14.1			0.0	0.6	20.0				34.7	46.0	-11.3
2.213	14.2			0.0	0.4	20.0				34.6	46.0	-11.4
4.140	13.9			0.0	0.6	20.0				34.5	46.0	-11.5
3.940	13.8			0.0	0.6	20.0				34.4	46.0	-11.6
2.923	13.9			0.0	0.5	20.0				34.4	46.0	-11.6
2.191	13.7			0.0	0.4	20.0				34.1	46.0	-11.9
4.071	13.5			0.0	0.6	20.0				34.1	46.0	-11.9
2.861	13.6			0.0	0.5	20.0				34.1	46.0	-11.9
3.856	13.5			0.0	0.6	20.0				34.1	46.0	-11.9
4.818	13.1			0.0	0.7	20.0				33.8	46.0	-12.2
0.423	14.8			0.0	0.2	20.0				35.0	47.4	-12.3
2.537	13.2			0.0	0.5	20.0				33.7	46.0	-12.3
2.457	13.1			0.0	0.4	20.0				33.5	46.0	-12.5
4.268	12.9			0.0	0.6	20.0				33.5	46.0	-12.5

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	09/07/05
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

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

TEST PARAMETERS

Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES

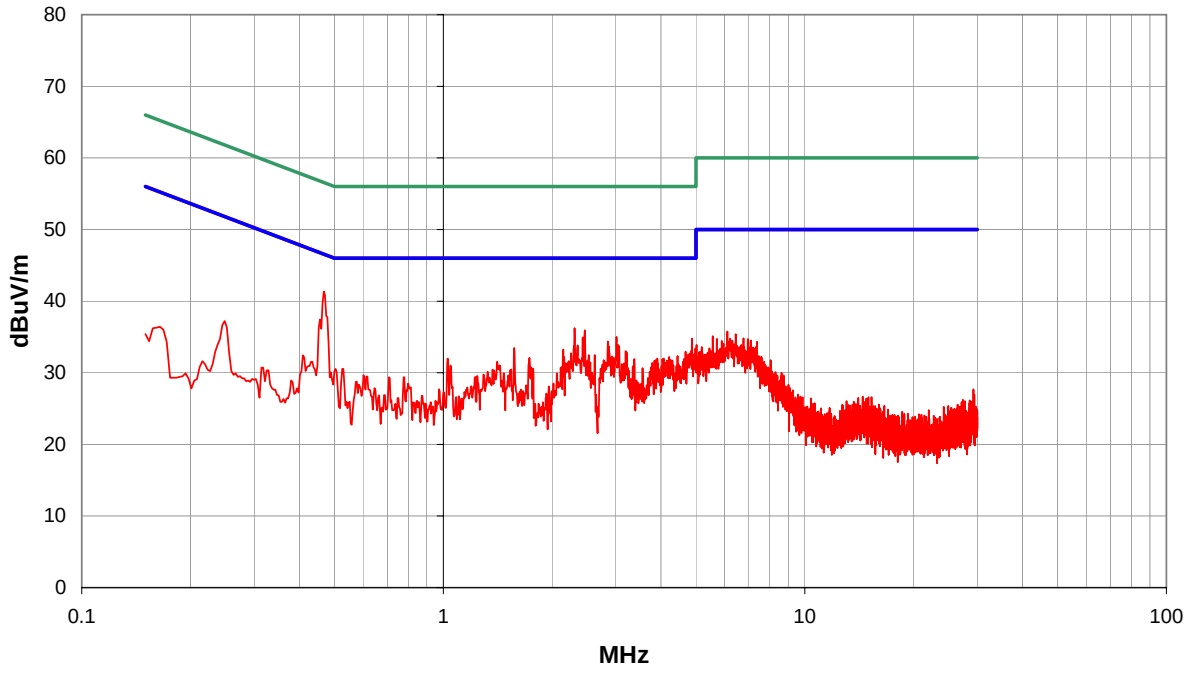
No hop, high channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	6
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
0.467	21.1			0.0	0.2	20.0				41.3	46.6	-5.2
2.307	15.8			0.0	0.4	20.0				36.2	46.0	-9.8
2.464	15.5			0.0	0.4	20.0				35.9	46.0	-10.1
3.014	14.5			0.0	0.5	20.0				35.0	46.0	-11.0
2.431	14.5			0.0	0.4	20.0				34.9	46.0	-11.1
4.873	14.1			0.0	0.7	20.0				34.8	46.0	-11.2
2.850	13.9			0.0	0.5	20.0				34.4	46.0	-11.6
3.044	13.4			0.0	0.5	20.0				33.9	46.0	-12.1
2.351	13.4			0.0	0.4	20.0				33.8	46.0	-12.2
3.062	13.2			0.0	0.5	20.0				33.7	46.0	-12.3
2.872	13.2			0.0	0.5	20.0				33.7	46.0	-12.3
1.571	13.1			0.0	0.4	20.0				33.5	46.0	-12.5
4.982	12.7			0.0	0.7	20.0				33.4	46.0	-12.6
2.147	12.8			0.0	0.4	20.0				33.2	46.0	-12.8
4.858	12.4			0.0	0.7	20.0				33.1	46.0	-12.9
3.197	12.5			0.0	0.5	20.0				33.0	46.0	-13.0
4.680	12.3			0.0	0.7	20.0				33.0	46.0	-13.0
3.218	12.3			0.0	0.5	20.0				32.8	46.0	-13.2
2.256	12.3			0.0	0.4	20.0				32.7	46.0	-13.3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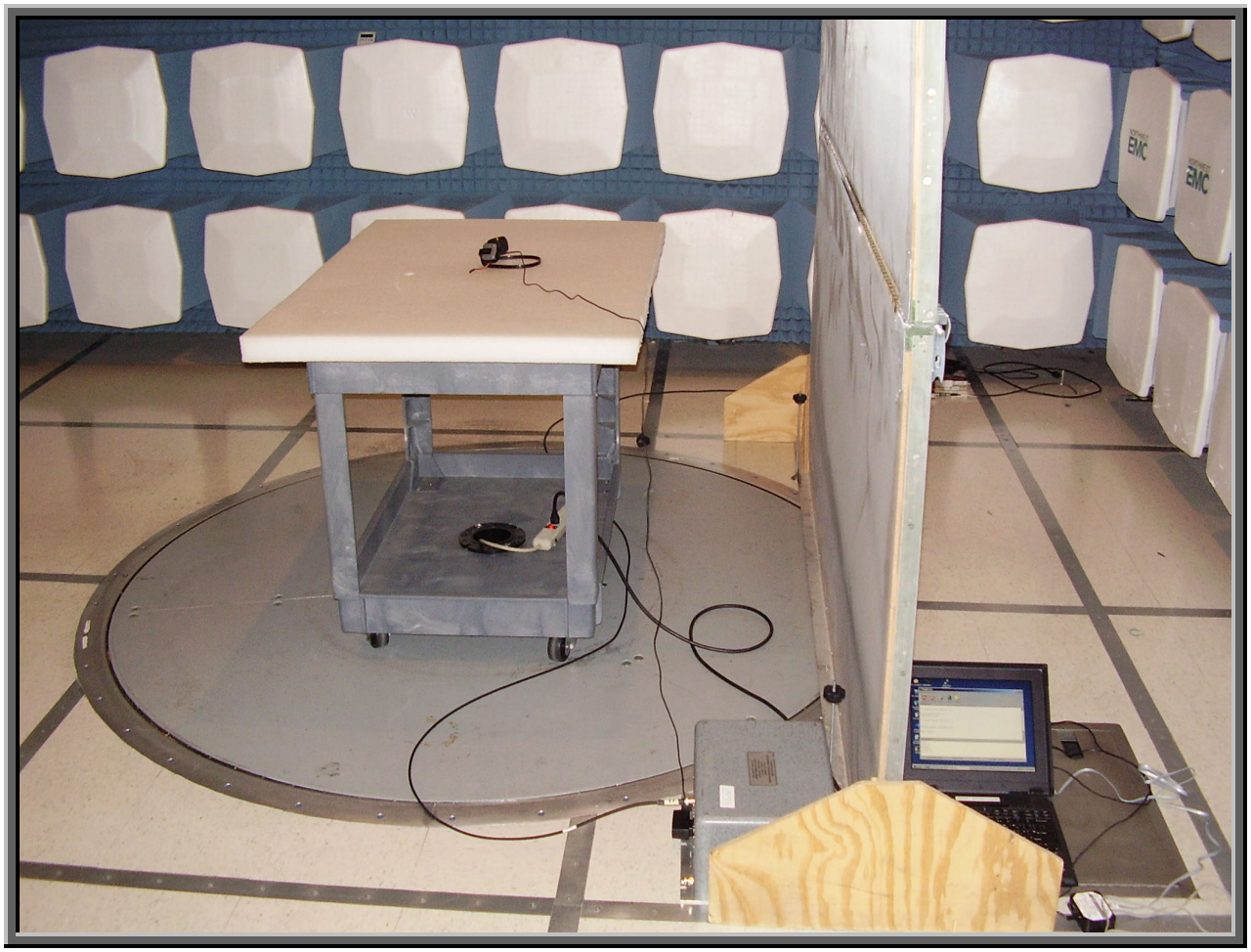

EMC
EMC

Justification

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

Operating Modes Investigated:
Typical operating mode
Operating Mode used for Final Test:
Typical operating mode

Power Input Settings Investigated:
120 VAC, 60 Hz
Input Power Setting used for Final Test:
120 VAC, 60 Hz

Frequency Range Investigated			
Start Frequency	30 MHz	**Stop Frequency**	1 GHz

Software\Firmware Applied During Test			
Operating system	Unknown	**Version**	Unknown
Exercise software	Unknown	**Version**	Unknown
Description			
The system was tested using standard operating production software to exercise the functions of the device during the testing.			

EUT and Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
EUT - Bluetooth Headset	Logitech, Inc.	F-0439A (Nokia Model HS-34W)	Unknown
AC Adapter	Nokia	AC-4U	0675379

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Serial/TTL converter	RES	ASC24TS	None
AC Adapter	Fairway Electronic, Co.	WN05-060	None
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446
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	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	Agilent	E4446A	AAQ	06/15/2005	13 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	08/02/2005	13 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, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Antenna, Horn	EMCO	3115	AHC	08/30/2005	12 mo

Test Description

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

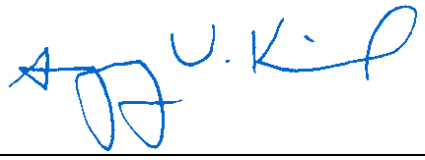
Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated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

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

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

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

Completed by:



NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)			Work Order:	LABT0155
Serial Number:	Unknown			Date:	9/6/2005&9/12/2005
Customer:	Logitech, Inc.			Temperature:	24
Attendees:	None			Humidity:	36%
Project:	None			Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01/TE03

TEST SPECIFICATIONS	Test Method
FCC 15.109(g) (CISPR 22:1997) Class B:2005-04	ANSI C63.4:2003

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

COMMENTS

EUT OPERATING MODES

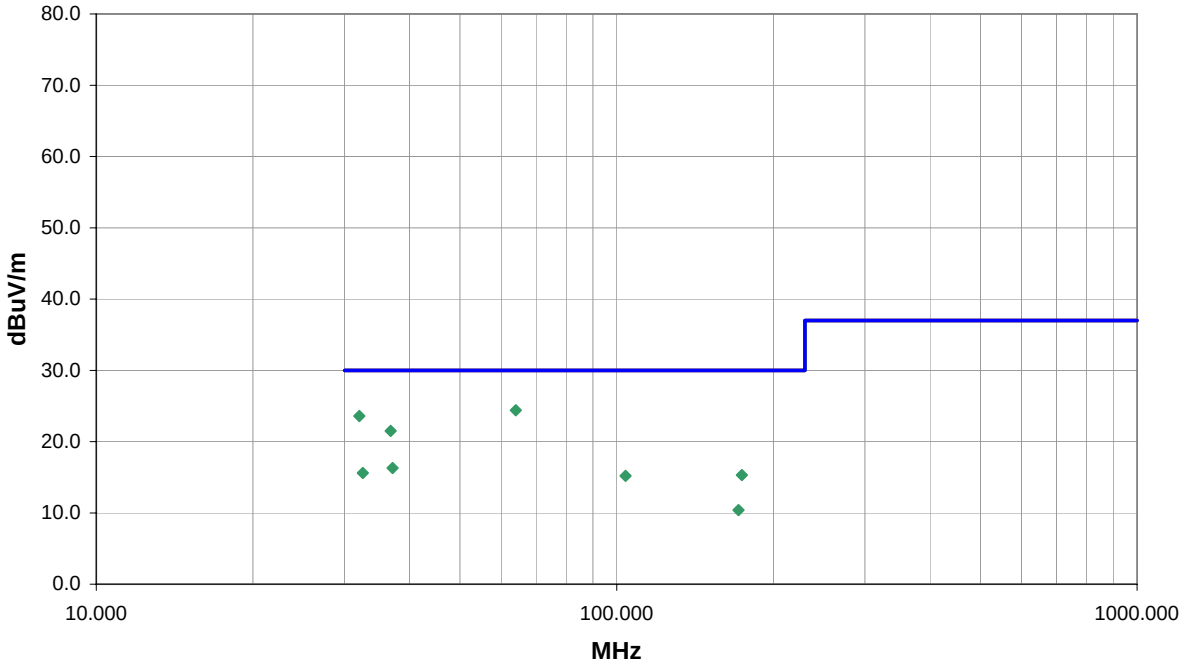
Typical operating mode, Bluetooth connected to remote phone

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
64.011	32.2	-7.8	248.0	2.5	5.0	0.0	V-Bilog	QP	0.0	24.4	30.0	-5.6
32.026	24.3	-0.7	238.0	1.0	10.0	0.0	V-Bicon	QP	0.0	23.6	30.0	-6.4
36.785	22.6	-1.1	0.0	1.0	10.0	0.0	V-Bicon	QP	0.0	21.5	30.0	-8.5
37.111	17.7	-1.4	236.0	3.5	5.0	0.0	H-Bilog	QP	0.0	16.3	30.0	-13.7
32.515	14.6	1.0	170.0	1.2	5.0	0.0	H-Bilog	QP	0.0	15.6	30.0	-14.4
174.008	20.3	-5.0	174.0	1.0	5.0	0.0	V-Bilog	QP	0.0	15.3	30.0	-14.7
104.006	21.9	-6.7	211.0	2.8	5.0	0.0	H-Bilog	QP	0.0	15.2	30.0	-14.8
171.435	15.6	-5.2	169.0	1.0	5.0	0.0	V-Bilog	QP	0.0	10.4	30.0	-19.6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Justification

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

Operating Modes Investigated:
Typical operating mode

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

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.			

EUT and Peripherals in Test Setup Boundary			
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

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Serial/TTL converter	RES	ASC24TS	none
AC Adapter	Fairway Electronic, Co.	WN05-060	none
Laptop PC	IBM	A21M	IS108
AC Adapter	IBM	02K6657	ZOZA083446
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary.			

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8	PA	AC Adapter	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	Agilent	E4446A	AAQ	06/15/2005	13 mo
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

Test Description

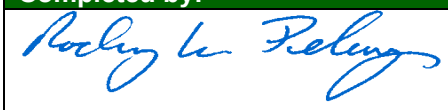
Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to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

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

Completed by:



NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:		Date:	09/06/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:		Humidity:	36%
Project:		Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 230VAC/50Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
EN 55022 (Amds. A1:2000, A2:2003) Class B:1998	CISPR 22:2005

TEST PARAMETERS

Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES

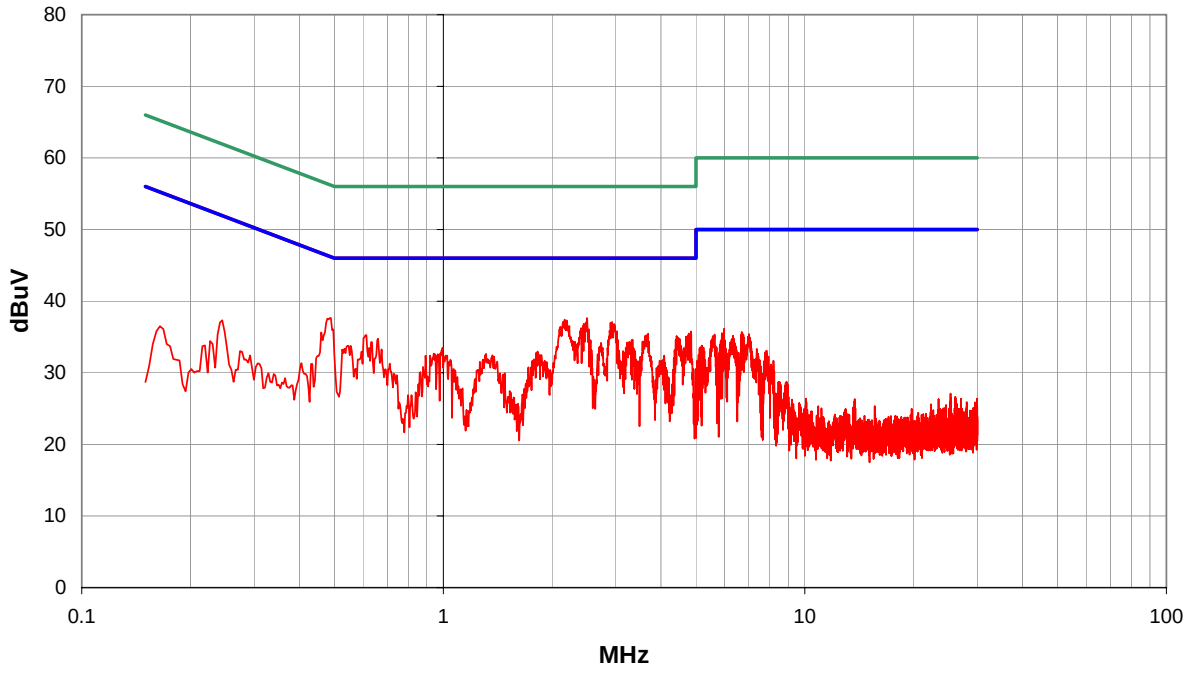
Typical operating mode, Bluetooth connected to remote phone

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
2.497	17.2			0.0	0.4	20.0				37.6	46.0	-8.4
0.489	17.4			0.0	0.2	20.0				37.6	46.2	-8.5
2.165	17.0			0.0	0.4	20.0				37.4	46.0	-8.6
2.931	16.6			0.0	0.5	20.0				37.1	46.0	-8.9
2.901	16.5			0.0	0.5	20.0				37.0	46.0	-9.0
2.446	16.4			0.0	0.4	20.0				36.8	46.0	-9.2
2.435	16.1			0.0	0.4	20.0				36.5	46.0	-9.5
2.406	15.8			0.0	0.4	20.0				36.2	46.0	-9.8
4.840	15.1			0.0	0.7	20.0				35.8	46.0	-10.2
4.775	14.8			0.0	0.7	20.0				35.5	46.0	-10.5
3.685	14.9			0.0	0.6	20.0				35.5	46.0	-10.5
4.786	14.6			0.0	0.7	20.0				35.3	46.0	-10.7
0.613	15.0			0.0	0.3	20.0				35.3	46.0	-10.7
4.421	14.5			0.0	0.6	20.0				35.1	46.0	-10.9
4.691	14.4			0.0	0.7	20.0				35.1	46.0	-10.9
4.720	14.3			0.0	0.7	20.0				35.0	46.0	-11.0
0.660	14.5			0.0	0.3	20.0				34.8	46.0	-11.2
4.505	14.1			0.0	0.6	20.0				34.7	46.0	-11.3
4.818	14.0			0.0	0.7	20.0				34.7	46.0	-11.3

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:		Date:	09/06/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:		Humidity:	36%
Project:		Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 230VAC/50Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
EN 55022 (Amds. A1:2000, A2:2003) Class B:1998	CISPR 22:2005

TEST PARAMETERS

Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES

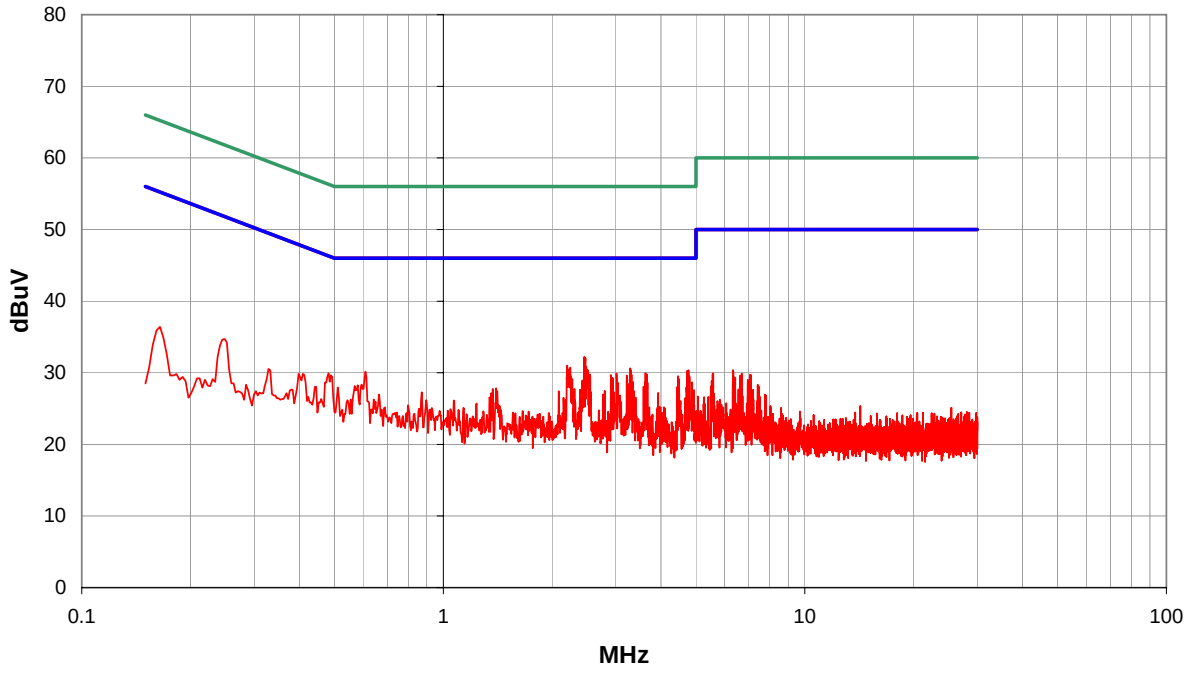
Typical operating mode, Bluetooth connected to remote phone

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
2.457	11.8			0.0	0.4	20.0				32.2	46.0	-13.8
2.471	11.6			0.0	0.4	20.0				32.0	46.0	-14.0
2.202	10.6			0.0	0.4	20.0				31.0	46.0	-15.0
2.486	10.4			0.0	0.4	20.0				30.8	46.0	-15.2
2.245	10.3			0.0	0.4	20.0				30.7	46.0	-15.3
3.288	10.1			0.0	0.5	20.0				30.6	46.0	-15.4
2.209	10.1			0.0	0.4	20.0				30.5	46.0	-15.5
2.497	10.0			0.0	0.4	20.0				30.4	46.0	-15.6
4.767	9.7			0.0	0.7	20.0				30.4	46.0	-15.6
2.515	9.9			0.0	0.4	20.0				30.3	46.0	-15.7
3.306	9.8			0.0	0.5	20.0				30.3	46.0	-15.7
4.749	9.6			0.0	0.7	20.0				30.3	46.0	-15.7
4.727	9.6			0.0	0.7	20.0				30.3	46.0	-15.7
0.609	9.9			0.0	0.3	20.0				30.2	46.0	-15.8
3.627	9.4			0.0	0.6	20.0				30.0	46.0	-16.0
3.014	9.4			0.0	0.5	20.0				29.9	46.0	-16.1
3.656	9.2			0.0	0.6	20.0				29.8	46.0	-16.2
2.544	9.3			0.0	0.5	20.0				29.8	46.0	-16.2
3.317	9.2			0.0	0.5	20.0				29.7	46.0	-16.3

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:		Date:	09/06/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:		Humidity:	36%
Project:		Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
EN 55022 (Amds. A1:2000, A2:2003) Class B:1998	CISPR 22:2005
FCC 15.107 Class B:2005-04	ANSI C63.4:2003

TEST PARAMETERS

Cable or Line Tested	N

COMMENTS

EUT OPERATING MODES

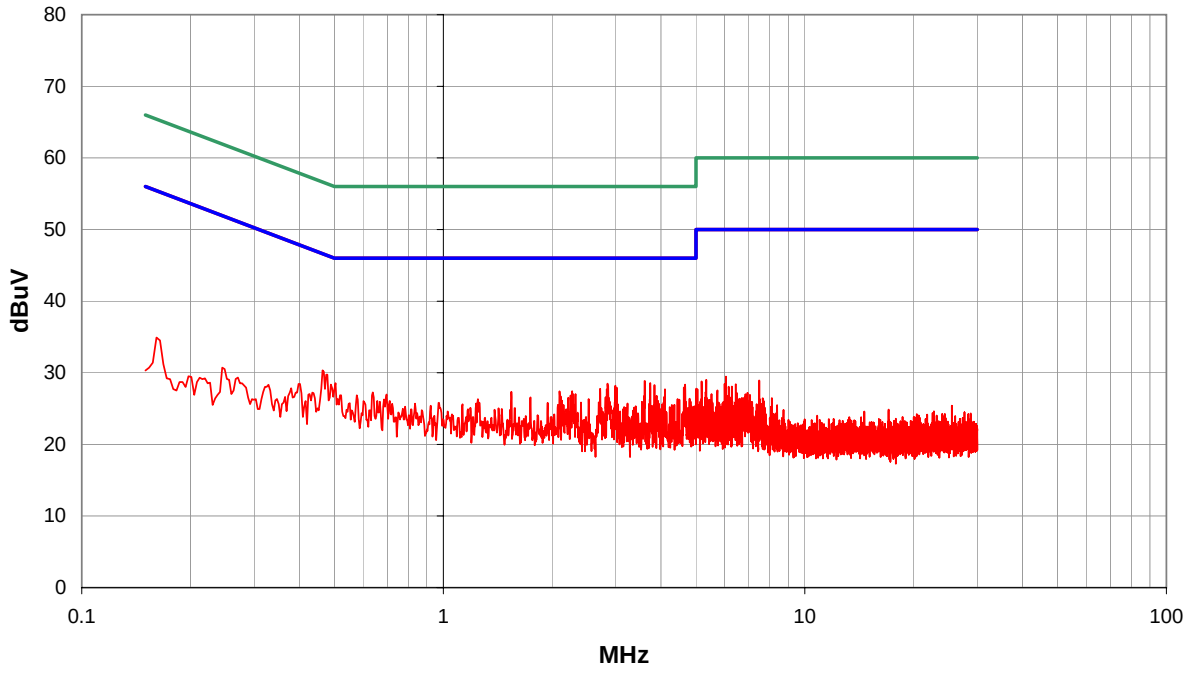
Typical operating mode, Bluetooth connected to remote phone

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	3
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.463	10.1			0.0	0.2	20.0				30.3	46.6	-16.3
0.478	9.5			0.0	0.2	20.0				29.7	46.4	-16.6
3.608	8.3			0.0	0.6	20.0				28.9	46.0	-17.1
3.736	8.0			0.0	0.6	20.0				28.6	46.0	-17.4
0.503	8.3			0.0	0.2	20.0				28.5	46.0	-17.5
2.847	8.0			0.0	0.5	20.0				28.5	46.0	-17.5
4.665	7.7			0.0	0.7	20.0				28.4	46.0	-17.6
3.838	7.7			0.0	0.6	20.0				28.3	46.0	-17.7
2.993	7.7			0.0	0.5	20.0				28.2	46.0	-17.8
4.625	7.3			0.0	0.7	20.0				28.0	46.0	-18.0
3.022	7.4			0.0	0.5	20.0				27.9	46.0	-18.1
2.716	7.3			0.0	0.5	20.0				27.8	46.0	-18.2
4.104	7.1			0.0	0.6	20.0				27.7	46.0	-18.3
2.832	7.2			0.0	0.5	20.0				27.7	46.0	-18.3
2.271	7.0			0.0	0.4	20.0				27.4	46.0	-18.6
2.096	7.0			0.0	0.4	20.0				27.4	46.0	-18.6
1.542	7.0			0.0	0.4	20.0				27.4	46.0	-18.6
0.638	7.0			0.0	0.3	20.0				27.3	46.0	-18.7
2.322	6.6			0.0	0.4	20.0				27.0	46.0	-19.0

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

PSA 2005.8.22
EMI 2005.8.31

EUT:	F-0439A (Nokia Model HS-34W)	Work Order:	LABT0155
Serial Number:		Date:	09/06/05
Customer:	Logitech, Inc.	Temperature:	24
Attendees:		Humidity:	36%
Project:		Barometric Pressure	29.95
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
EN 55022 (Amds. A1:2000, A2:2003) Class B:1998	CISPR 22:2005
FCC 15.107 Class B:2005-04	ANSI C63.4:2003

TEST PARAMETERS

Cable or Line Tested	L1

COMMENTS

EUT OPERATING MODES

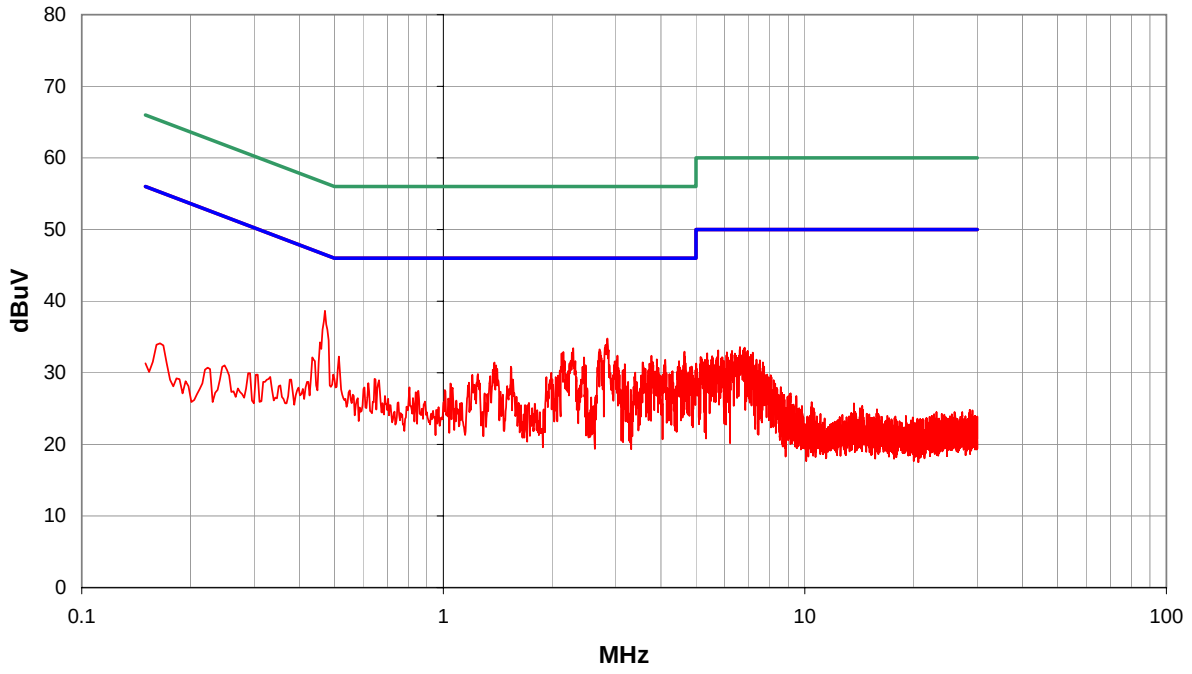
Typical operating mode, Bluetooth connected to remote phone

DEVIATIONS FROM TEST STANDARD

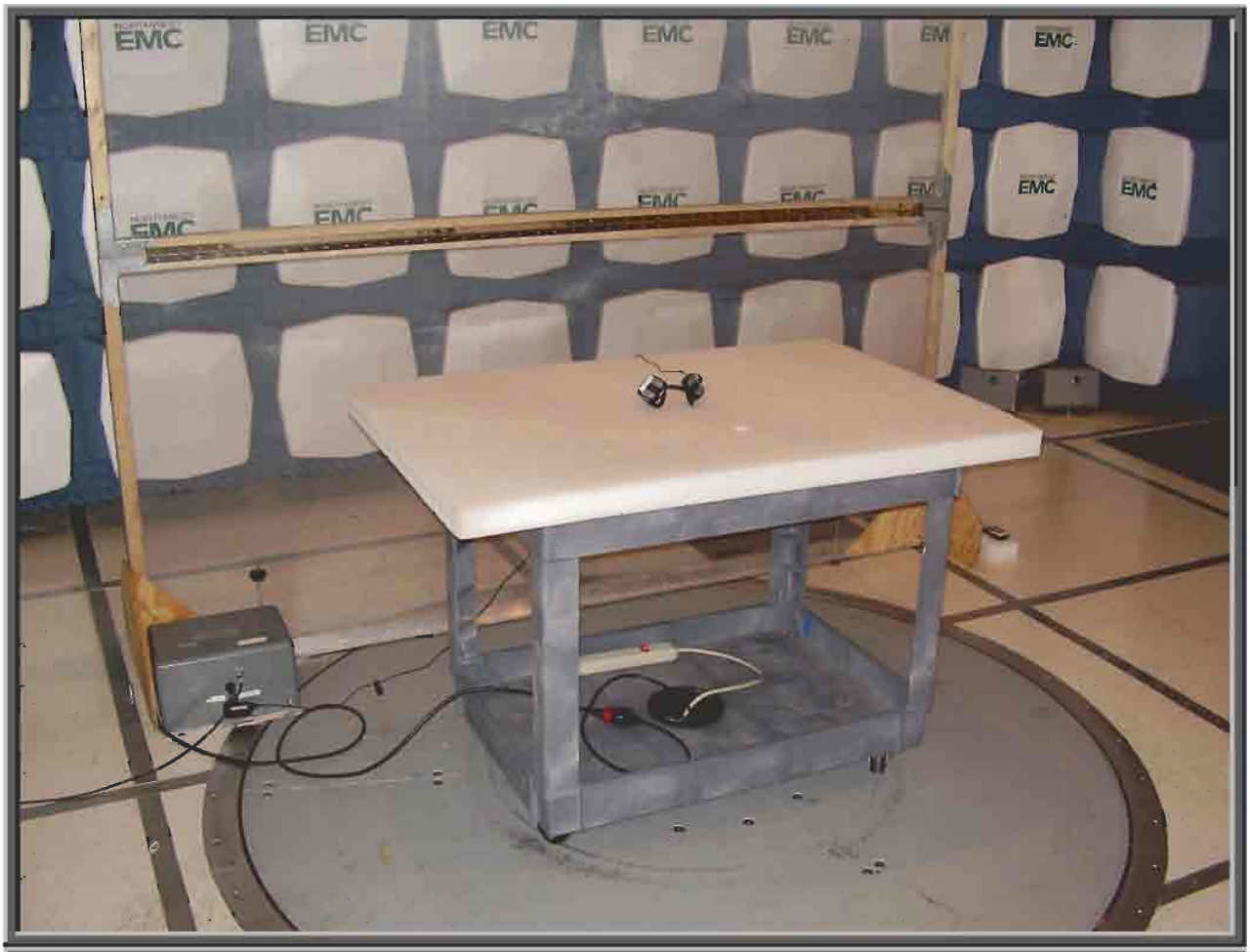
No deviations.

Run #	4
Configuration #	
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.471	18.4			0.0	0.2	20.0				38.6	46.5	-7.9
2.843	14.3			0.0	0.5	20.0				34.8	46.0	-11.2
2.289	13.0			0.0	0.4	20.0				33.4	46.0	-12.6
2.708	12.8			0.0	0.5	20.0				33.3	46.0	-12.7
4.647	12.3			0.0	0.7	20.0				33.0	46.0	-13.0
2.147	12.5			0.0	0.4	20.0				32.9	46.0	-13.1
2.697	12.4			0.0	0.5	20.0				32.9	46.0	-13.1
2.125	12.3			0.0	0.4	20.0				32.7	46.0	-13.3
3.033	11.9			0.0	0.5	20.0				32.4	46.0	-13.6
3.765	11.8			0.0	0.6	20.0				32.4	46.0	-13.6
4.658	11.6			0.0	0.7	20.0				32.3	46.0	-13.7
0.514	12.0			0.0	0.2	20.0				32.2	46.0	-13.8
2.132	11.8			0.0	0.4	20.0				32.2	46.0	-13.8
2.450	11.7			0.0	0.4	20.0				32.1	46.0	-13.9
3.896	11.3			0.0	0.6	20.0				31.9	46.0	-14.1
4.111	11.2			0.0	0.6	20.0				31.8	46.0	-14.2
3.014	11.2			0.0	0.5	20.0				31.7	46.0	-14.3
2.774	11.2			0.0	0.5	20.0				31.7	46.0	-14.3
4.487	11.0			0.0	0.6	20.0				31.6	46.0	-14.4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BLUETOOTH APPROVALS

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

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

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

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

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

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

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

2 Frequency range of a Bluetooth device:

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

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

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

4 Example of a hopping sequence in data mode:

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

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

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

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

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

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

7 Dwell time in data mode

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

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

8 Channel Separation in hybrid mode

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

9 Derivation and examples for a hopping sequence in hybrid mode

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

10 Receiver input bandwidth and synchronization in hybrid mode:

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

11 Spread rate / data rate of the direct sequence signal

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

12 Spurious emission in hybrid mode

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