



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: GN A/S (Netcom A/S) Jabra OTE1 Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

Test Report Serial No: RFI/RPTE2/RP49117JD07A

Supersedes Test Report Serial No: RFI/RPTE1/RP49117JD07A

This Test Report Is Issued Under The Authority Of Michael Derby, Wireless Radio Performance Gro	up Leader:
Tested By: Petr Hajek	Checked By: Michael Derby
Mr Ho	May.
Report Copy No: PDF01	
Issue Date: 16 May 2007	Test Dates: 24 April 2007 to 01 May 2007

"The *Bluetooth*® word mark and logos are owned by the *Bluetooth* SIG, Inc. and any use of such marks by RFI Global Services Ltd. is under license. Other trademarks and trade names are those of their respective owners."

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may be copied in full. The results in this report apply only to the sample(s) tested.

RFI Global Services Ltd

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001 Email: info@rfi-global.com Website: www.rfi-global.com

Serial No: RFI/RPTE2/RP49117JD07A

Page: 2 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

Executive Summary

RFI Global Services Ltd (RFI) was commissioned to perform an independent series on conformance tests to assess compliance with the FCC Part 15.247: 2006 (Subpart C)

Summary of Results

Range of Measurements	Clause Reference	Port Type	Compliancy Status
Idle Mode AC Conducted Emissions (150 kHz to 30 MHz)	Section 15.107	AC Mains	Complied
Idle Mode Radiated Spurious Emissions	Section 15.109	Antenna	Complied
Transmitter AC Conducted Emissions (150 kHz to 30 MHz)	Section 15.207	AC Mains	Not tested Note1
Transmitter Minimum 6 dB Bandwidth	Section 15.247(a)(2)	Antenna	Complied
Transmitter 20 dB Bandwidth	Section 2.1049	Antenna	Complied
Transmitter Maximum Peak Output Power	Section 15.247(b)(3)	Antenna	Complied
Transmitter Radiated Emissions	Sections 15.247(d) & 15.209(a)	Antenna	Complied
Transmitter Band Edge Radiated Emissions	Sections 15.247(d) & 15.209(a)	Antenna	Complied

Key to Compliance Colours used in this report:

Colour	Definition
	Compliant
	Indeterminate*
	Not compliant

^{*} Indeterminate because the measurements were within measurement uncertainty.

Note(s):

- 1. This mode is not supported by the EUT. When connected to the AC charger, the EUT ceases to transmit. Idle Mode AC Conducted Emissions were performed to part 15.107.
- 2. The EUT had an integral antenna and no antenna port.

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 3 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Table of Contents

1. Client Information	4
2. Equipment Under Test (EUT)	5
3. Test Specification, Methods and Procedures	8
4. Deviations from the Test Specification	9
5. Operation and Configuration of the EUT during Testing	10
6. Measurements, Examinations and Derived Results	11
7. Measurement Uncertainty	46
8. Measurement Methods	47
Appendix 1. Test Configuration Drawings	55

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 4 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

1. Client Information

Company Name:	GN A/S (Netcom A/S)
Address:	Lautrupbjerg 7 Ballerup DK-2750 Denmark
Contact Name:	Mr T Ringtved

Serial No: RFI/RPTE2/RP49117JD07A

Page: 5 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

2. Equipment Under Test (EUT)

The following information (with the exception of the date of receipt) has been supplied by the customer:

2.1. Description of EUT

To:

The equipment under test is a *Bluetooth* Headset.

2.2. Identification of Equipment Under Test (EUT)

Description:	Bluetooth Headset
Brand Name:	Jabra
Model Name or Number:	OTE1
Serial Number:	Alpha 1 Q 057 / Alpha 1 Q 089
Hardware Version Number:	28-00975
Software Version Number:	21f
FCC ID Number:	BCE-OTE1
Country of Manufacture:	China
Date of Receipt:	24 April 2007

2.3. Modifications Incorporated in the EUT

The EUT was not modified during the test.

2.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	Charger
Brand Name:	Jabra / Sunfone
Model Name or Number:	ACW003B-05U
Serial Number:	GP-ACW003B-05U
Cable Length and Type:	1.5 m, multi-core with MINI-USB connector
Connected to Port	Mini-USB
Country of Manufacture:	China

Serial No: RFI/RPTE2/RP49117JD07A

Page: 6 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

2.5. Support Equipment

To:

The following support equipment was used to exercise the EUT during testing:

Description:	Bluetooth tester
Brand Name:	Anritsu
Serial Number:	RFI asset number M1149

Description:	Horn antenna
Serial Number:	RFI asset number A1515

Serial No: RFI/RPTE2/RP49117JD07A

Page: 7 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

2.6. Additional Information Related to Testing

Intended Operating Environment:	Commercial Residential		
Equipment Category:	Portable		
Type of Unit:	Bluetooth		
Power Supply Requirement:	Internal battery of 3V		
Maximum Power Output (ERP)	+2.8 dBm (measured	i)	
Transmit Frequency Range:	2400 MHz to 2483.5 M	MHz	
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Тор	78	2480
Receive Frequency Range:	2400 MHz to 2483.5 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Тор	78	2480

2.7. Port Identification

Port	Description
1	Mini-USB for charging

Serial No: RFI/RPTE2/RP49117JD07A

Page: 8 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

3. Test Specification, Methods and Procedures

3.1. Test Specification

To:

Reference:	FCC Part 15.247: 2006 Subpart C
Title:	Code of Federal Regulations, Part 15.247 (47CFR15) (Intentional Radiators operating within the band 2400 MHz to 2483.5 MHz)

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

DA00-705 (2000)

Title: Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 9 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

4. Deviations from the Test Specification

There were no deviations from the test specification.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 10 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

To:

The EUT was tested in the following operating modes, unless otherwise stated:

For Transmitter tests, the EUT was set to transmit on the bottom, middle or top channel and hopping on all channels.

For Receiver tests, the EUT was in Discovery mode, waiting for a *Bluetooth* signal.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

For Transmitter tests, the EUT was tested as a stand-alone device.

For Receiver tests, the EUT was connected through the MINI-USB cable and charger to the AC mains supply.

During transmitter tests, the EUT was communicating via a wireless link with a *Bluetooth* test set.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 11 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

6. Measurements, Examinations and Derived Results

6.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

6.2. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, UK.

FCC Site Registration Number: 90895 IC Site Registration Number: 3485

Serial No: RFI/RPTE2/RP49117JD07A

Page: 12 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

6.3. Test Results

Idle Mode AC Conducted Spurious Emissions: Section 15.107

Temperature (°C):	18	Relative Humidity (%):	53

Results:

To:

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Note(s)
0.150000	Live	40.0	66.0	26.0	Complied
0.190000	Live	26.7	64.0	37.3	Complied
0.198000	Live	28.7	63.7	35.0	Complied
0.314000	Live	22.2	59.9	37.7	Complied
0.746000	Live	19.9	56.0	36.1	Complied
0.810000	Live	21.0	56.0	35.0	Complied
0.874000	Live	22.0	56.0	34.0	Complied
0.934000	Live	21.4	56.0	34.6	Complied
1.002000	Live	22.2	56.0	33.8	Complied
1.058000	Live	22.2	56.0	33.8	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Note(s)
0.194000	Live	15.6	53.9	38.3	Complied
0.566000	Live	6.1	46.0	39.9	Complied
0.626000	Live	5.3	46.0	40.7	Complied
0.754000	Live	6.1	46.0	39.9	Complied
0.810000	Live	6.8	46.0	39.2	Complied
0.874000	Live	6.8	46.0	39.2	Complied
0.934000	Live	6.8	46.0	39.2	Complied
1.002000	Live	6.8	46.0	39.2	Complied
1.066000	Live	6.8	46.0	39.2	Complied
1.126000	Live	6.8	46.0	39.2	Complied

Serial No: RFI/RPTE2/RP49117JD07A

Page: 13 of 58

Issue Date: 16 May 2007

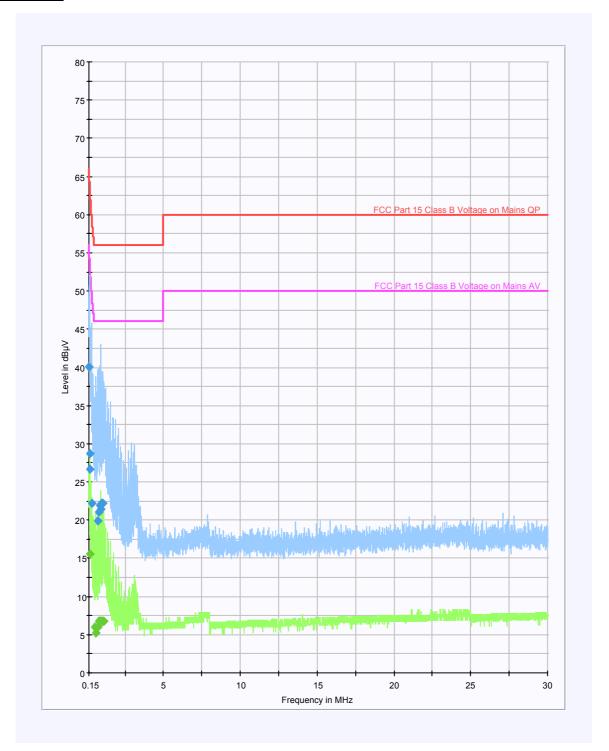
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Idle Mode AC Conducted Spurious Emissions: Section 15.107(Continued)

Graph(s):

To:



This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 14 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/01 2	09 Feb 2007	12
A1830	N-Type Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	Cal before use	-
C1268	7.5m BNC Coaxial Cable	Rosenberger	FA210A007 5008080	49356-1	Cal before use	-
C363	3m Cable	Rosenberger	RG142	None	Cal before use	-
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S212	Emissions Screened Room	RFI	12		Not required	-

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 15 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109

Temperature (°C):	17	Relative Humidity (%):	56%	
Tomporataro (O).	• •	(,,,		

Results:

To:

Electric Field Strength Measurements (Frequency Range: 30 MHz to 1000 MHz)

Frequency (MHz)	Antenna Polarity	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
196.428	Vertical	24.8	43.5	18.7	-
930.981	Vertical	35.5	46.0	10.5	-

Note(s):

1. No emissions were observed above the noise floor of the measurement receiver so two points are shown here, measured with a peak detector and compared to the quasi-peak limit.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 16 of 58

Issue Date: 16 May 2007

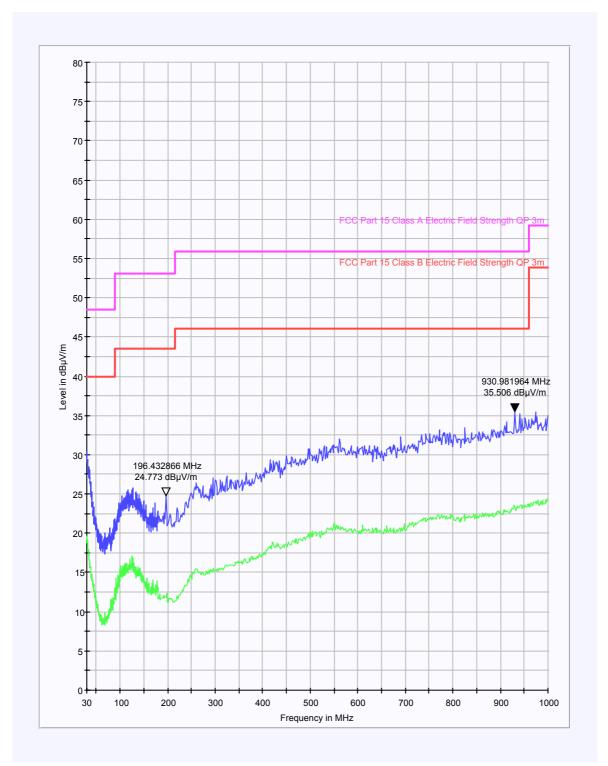
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109(Continued)

Graph(s):

To:



This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 17 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A028	9188-2 Horn Antenna 1-2 GHz	Eaton	91888-2	304	08 Jun 2006	36
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1037	Green Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	20 Sep 2006	12
C151	Cable	Rosenberger	UFA210A-1- 1181-70x70	None	Cal before use	-
C160	Cables	Rosenberger	UFA210A-1- 1181-70x70	None	Cal before use	-
C348	Cable (was C527)	Rosenberger	UFA210A-1- 1181-70x70	2993	Cal before use	-
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S212	Emissions Screened Room	RFI	12		Not required	-

Serial No: RFI/RPTE2/RP49117JD07A

Page: 18 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Temperature (°C): 15 Relative Humidity (%): 56
--

Results:

To:

Electric Field Strength Measurements (Frequency Range: 1 GHz to 12.5 GHz)

Highest Peak Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
10.687825	Horizontal	53.7	+3.8	57.5	74.0	16.5	Note 2.

Highest Average Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dB _μ V/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
10.687825	Horizontal	31.8	+3.8	35.6	54.0	18.4	Note 2

Note(s):

1. The emission was found to be an ambient signal.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 19 of 58

Issue Date: 16 May 2007

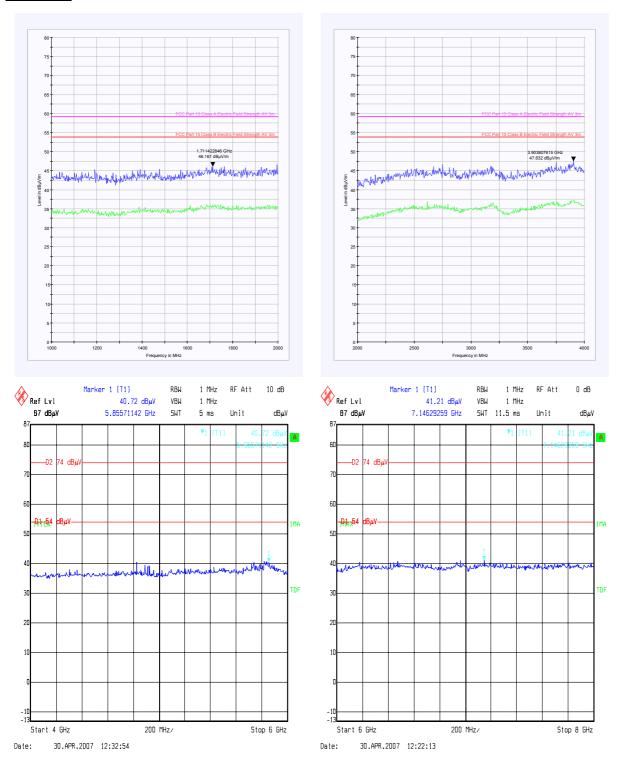
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Graph(s):

To:



These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 20 of 58

Issue Date: 16 May 2007

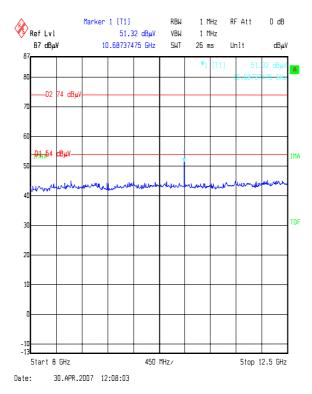
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Graph(s):

To:



This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 21 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A028	9188-2 Horn Antenna 1- 2 GHz	Eaton	91888-2	304	08 Jun 2006	36
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1037	Green Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	20 Sep 2006	12
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	-
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519	17 Nov 2006	36
A256	WG 18 Microwave Horn	Flann Microwave	18240-20	400	17 Nov 2006	36
A436	WG 20 Microwave Horn Antenna	Flann	20240-20	330	24 Apr 2006	36
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A10 20M5050	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A10 30007070	43190-01	Cal before use	-
C1194	1 m, 40 GHz coax cable	Utiflex	FA147A10 15M2020	3502 27138- 07	05 May 2006	12
C151	Cable	Rosenberger	UFA210A- 1-1181- 70x70	None	Cal before use	-
C160	Cables	Rosenberger	UFA210A- 1-1181- 70x70	None	Cal before use	-
C348	Cable	Rosenberger	UFA210A- 1-1181- 70x70	2993	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12
S212	Emissions Screened Room	RFI	12		Not required	-

Serial No: RFI/RPTE2/RP49117JD07A

Page: 22 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter 20 dB Bandwidth: Section 15.247(a)(1)

|--|

Results:

To:

Transmitter 20 dB Bandwidth (kHz)	Limit (kHz)
921.843	None specified

Graph(s):



Serial No: RFI/RPTE2/RP49117JD07A

Page: 23 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter 20 dB Bandwidth: Section 15.247(a)(1) (Continued)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	-
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A 1020M5 050	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A 1030007 070	43190-01	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12

Serial No: RFI/RPTE2/RP49117JD07A

Page: 24 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Carrier Frequency Separation: Section 15.247(a)(1)

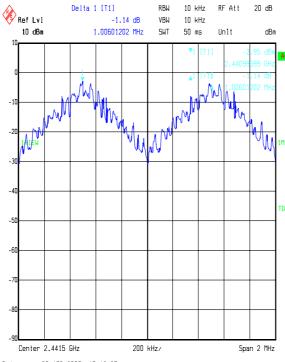
|--|

Results:

To:

Transmitter Carrier Frequency Separation (kHz)	Limit (> ² / ₃ of 20 dB BW) (kHz)	Margin (kHz)	Note(s)
1006.012	614.562	391.450	-

Graph(s):



Date: 30.APR.2007 15:12:27

Serial No: RFI/RPTE2/RP49117JD07A

Page: 25 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Carrier Frequency Separation: Section 15.247(a)(1) (Continued)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	-
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A 1020M5 050	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A 1030007 070	43190-01	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 26 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Average Time of Occupancy: Section 15.247(a)(1)(iii)

Temperature (°C): 17	Relative Humidity (%):	56
----------------------	------------------------	----

Results:

Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Note(s)
2885.772	77	0.222	0.4	0.178	-

Serial No: RFI/RPTE2/RP49117JD07A

Page: 27 of 58

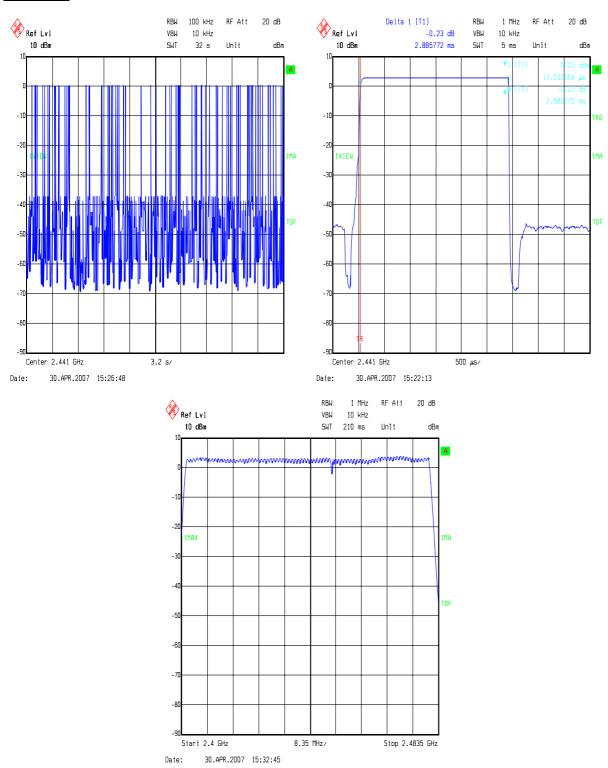
Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Average Time of Occupancy: Section 15.247(a)(1)(iii) (Continued)

Graph(s):



Serial No: RFI/RPTE2/RP49117JD07A

Page: 28 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Average Time of Occupancy: Section 15.247(a)(1)(iii) (Continued)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	-
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A 1020M5 050	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A 1030007 070	43190-01	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 29 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(1)

Temperature (°C): 16	Relative Humidity (%):	56
----------------------	------------------------	----

Results:

To:

Battery Powered Devices

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Note(s)
Bottom	2.6	30.0	27.4	-
Middle	2.7	30.0	27.3	-
Тор	2.8	30.0	27.2	-

Note(s):

1. These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 30 of 58

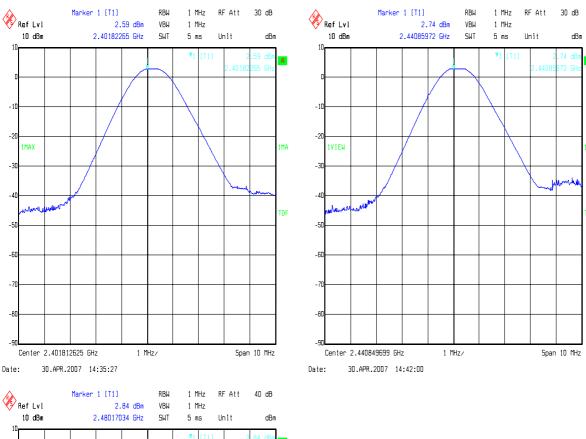
Issue Date: 16 May 2007

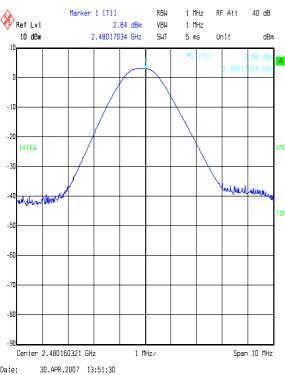
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(1) (Continued)

Graph(s):





Serial No: RFI/RPTE2/RP49117JD07A

Page: 31 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(1) (Continued)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	-
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A 1020M5 050	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A 1030007 070	43190-01	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12

Serial No: RFI/RPTE2/RP49117JD07A

Page: 32 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

Temperature (°C):	18	Relative Humidity (%):	55
-------------------	----	------------------------	----

Results:

To:

<u>Electric Field Strength Measurements: 30 MHz to 1000 MHz</u> (emissions occurring in the restricted bands)

Top Channel

Frequency (MHz)	Antenna Polarity	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
73.316	Vertical	37.7	40.0	2.3	-
113.336	Horizontal	29.4	43.5	14.1	-
126.662	Horizontal	33.9	43.5	9.6	-
133.356	Horizontal	40.5	43.5	3.0	-

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz for each channel of operation, therefore final radiated emissions measurements were performed with the EUT set to the top channel only.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 33 of 58

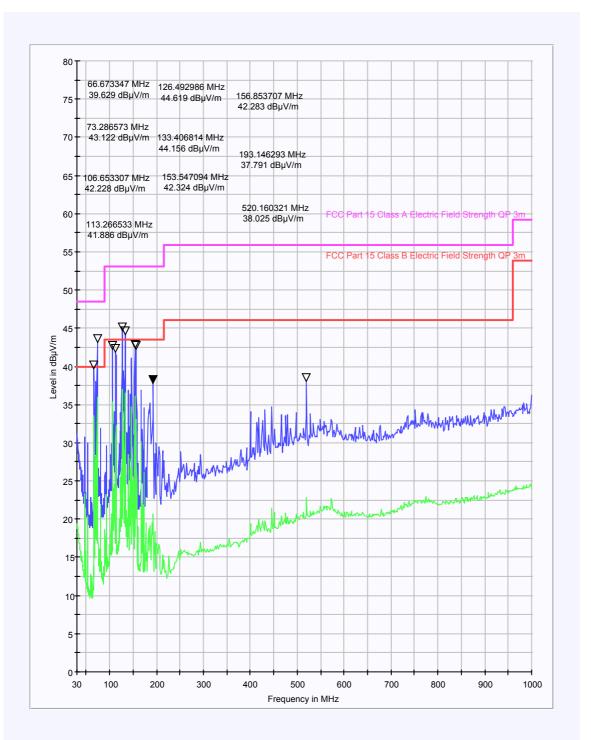
Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Graph(s):



This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 34 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Test Equipment Used:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A259	Bilog Antenna	Chase	CBL6111	1513	13 Mar 2007	12
C341	3m cable	Andrews	None	None	Cal before use	-
C461	DC to 18GHz Rosenberger	Rosenberger	UFA210A-1- 1182-704704	98H0305	Cal before use	-
C468	10m Cable	Rosenberger	UFA210A-1- 3937-504504	98L0440	Cal before use	-
M024	EZM Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Cal before use	-
M044	ESVP Receiver	Rohde & Schwarz	ESVP	891 845/026	06 Mar 2007	12
S201	3m & 10m OATS	RFI	1		18 Jul 2006	12

Serial No: RFI/RPTE2/RP49117JD07A

Page: 35 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

Temperature (°C): 22	Relative Humidity (%):	55
----------------------	------------------------	----

Results:

To:

<u>Electric Field Strength Measurements: 30 MHz to 1000 MHz</u> (emissions outside the restricted bands)

Top Channel

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Note(s)
66.680	Vertical	35.9	80.2	44.3	-
106.723	Vertical	30.0	80.2	50.2	-
193.396	Horizontal	22.7	80.2	57.5	-

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz for each channel of operation, therefore final radiated emissions measurements were performed with the EUT set to the top channel only.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 36 of 58

Issue Date: 16 May 2007

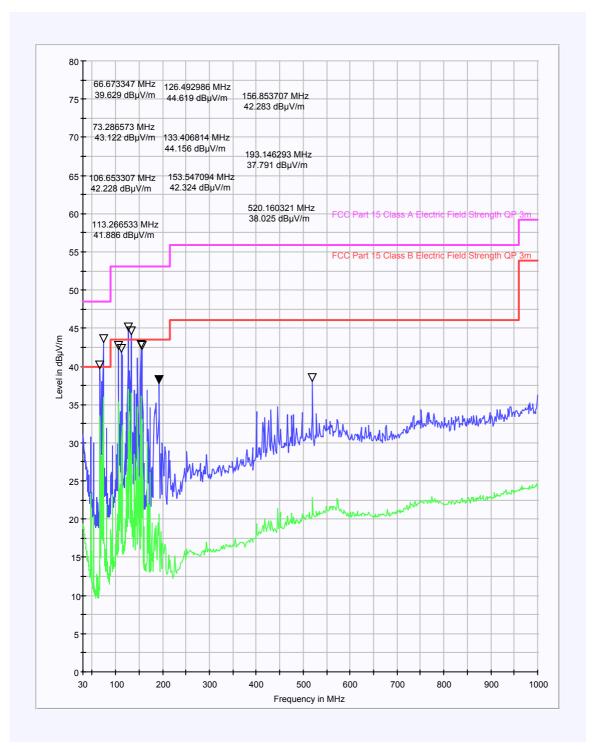
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Graph(s):

To:



This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 37 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Test Equipment Used:

To:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A259	Bilog Antenna	Chase	CBL6111	1513	13 Mar 2007	12
C314	Flex-Twist WG20 Waveguide	Quasar	QFT20PV Z402/402 M750	21350A	Cal before use	-
C461	DC to 18GHz Rosenberger	Rosenberger	UFA210A- 1-1182- 704704	98H0305	Cal before use	-
C468	10m Cable	Rosenberger	UFA210A- 1-3937- 504504	98L0440	Cal before use	-
M024	EZM Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	No calibrated	-
M044	ESVP Receiver	Rohde & Schwarz	ESVP	891 845/026	06 Mar 2007	12
S201	3m & 10m OATS	RFI	1		18 Jul 2006	12

Serial No: RFI/RPTE2/RP49117JD07A

Page: 38 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Temperature (°C): 15 Relative Humidity (%): 56	emperature (°C):
--	------------------

Results:

To:

<u>Electric Field Strength Measurements (Frequency Range: 1 GHz to 25 GHz) (emissions occurring in the restricted bands)</u>

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.804048	Vertical	58.2	-3.3	54.9	74.0	19.1	
10.687825	Horizontal	53.8	+3.7	57.5	74.0	16.5	Note 1.

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.804048	Vertical	58.2	-3.3	48.2	54.0	5.8	
10.687825	Horizontal	31.9	+3.7	35.6	54.0	18.4	Note 1.

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.881767	Vertical	56.7	-3.5	53.2	74.0	20.8	
10.687825	Horizontal	53.8	+3.7	57.5	74.0	16.5	Note 1.

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.881767	Vertical	56.7	-3.5	45.2	54.0	8.8	
10.687825	Horizontal	31.9	+3.7	35.6	54.0	18.4	Note 1.

Note(s):

1. The emission at 10.687825 GHz was found to be an ambient signal.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 39 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Results:

To:

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.960185	Vertical	56.4	-3.8	52.6	74.0	21.4	
10.687825	Horizontal	53.8	+3.7	57.5	74.0	16.5	Note 1.

Highest Average Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.960185	Vertical	56.4	-3.8	45.0	54.0	9.0	
10.687825	Horizontal	31.9	+3.7	35.6	54.0	18.4	Note 1.

Highest Peak Level: Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.830607	Vertical	56.5	-3.5	53.0	74.0	21.0	
10.687825	Horizontal	53.8	+3.7	57.5	74.0	16.5	Note 1.

Highest Average Level: Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dB _μ V/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
4.830607	Vertical	56.5	-3.5	33.2	54.0	20.8	
10.687825	Horizontal	31.9	+3.7	35.6	54.0	18.4	Note 1.

Note(s):

1. The emission at 10.687825 GHz was found to be an ambient signal.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 40 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

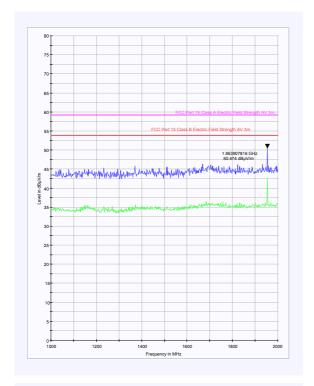
Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

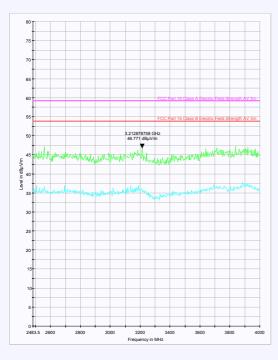
Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

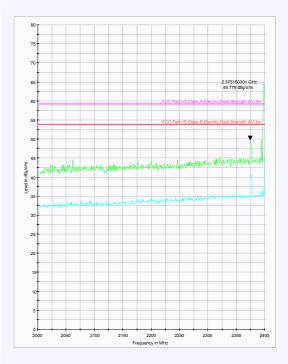
Temperature (°C): 15 Relative Humidity (%): 56
--

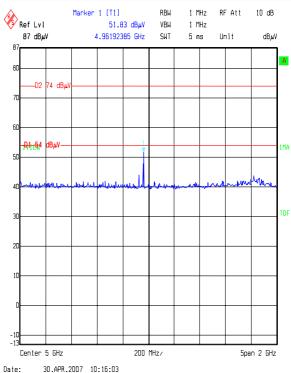
Graph(s):

To:









These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 41 of 58

Issue Date: 16 May 2007

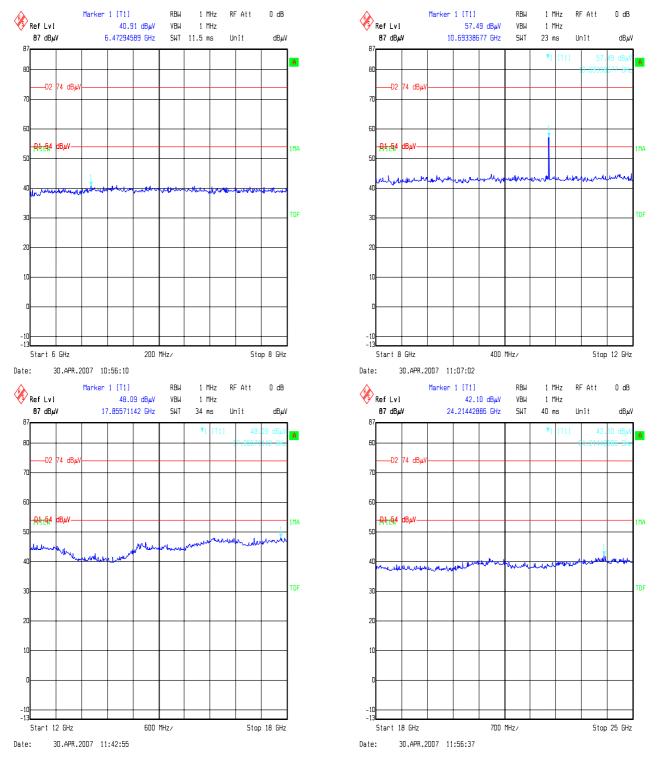
Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Graph(s):

To:



These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 42 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Test Equipment Used:

To:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A028	9188-2 Horn Antenna 1-2 GHz	Eaton	91888-2	304	08 Jun 2006	36
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1037	Green Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	20 Sep 2006	12
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A0040 5	Calibrate Before Use	12
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519	17 Nov 2006	36
A256	WG 18 Microwave Horn	Flann Microwave	18240-20	400	17 Nov 2006	36
A436	WG 20 Microwave Horn Antenna	Flann	20240-20	330	24 Apr 2006	36
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A1020M50 50	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A1030007 070	43190-01	Cal before use	-
C1194	1 mtr 40 GHz coax cable	Utiflex	FA147A1015M20 20	3502 27138-07	05 May 2006	12
C151	Cable	Rosenberger	UFA210A-1- 1181-70x70	None	Cal before use	-
C160	Cables	Rosenberger	UFA210A-1- 1181-70x70	None	Cal before use	-
C348	Cable (was C527)	Rosenberger	UFA210A-1- 1181-70x70	2993	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_02 2	08 Sep 2006	12
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12
S212	Emissions Screened Room	RFI	12		Not required	-

Serial No: RFI/RPTE2/RP49117JD07A

Page: 43 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Temperature (°C):	21	Relative Humidity (%):	35

Results:

To:

Electric Field Strength Measurements

Peak Power Level Hopping Mode:

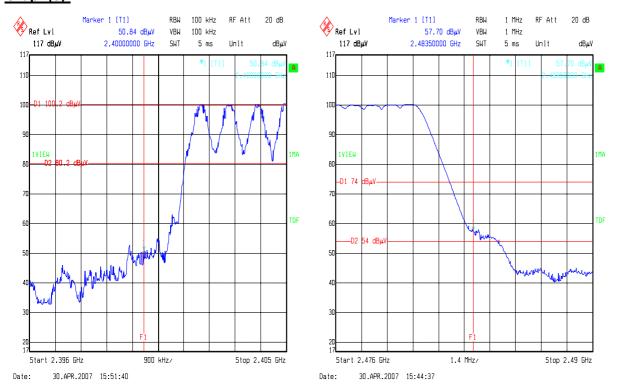
Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
2.4000	Vertical	57.3	-6.5	50.8	80.2*	29.4	-
2.4835	Vertical	65.9	-8.2	57.7	74.0	16.3	-

*Note: -20 dBc limit

Average Power Level Hopping Mode:

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dΒμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
2.4835	Vertical	39.8	-8.2	31.6	54.0	22.4	-

Graph(s):



Serial No: RFI/RPTE2/RP49117JD07A

Page: 44 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Temperature (°C): 1	17	Relative Humidity (%):	56
---------------------	----	------------------------	----

Results:

To:

Peak Power Level Static Mode:

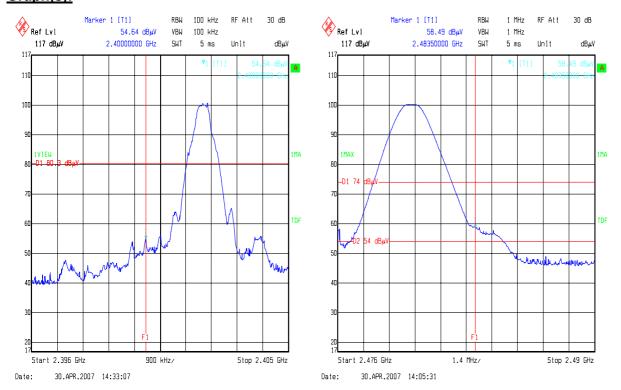
Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
2.4000	Vertical	61.1	-6.5	54.6	80.2*	25.6	-
2.4835	Vertical	66.7	-8.2	58.5	74.0	14.7	-

*Note: -20 dBc limit

Average Power Level Static Mode:

Frequency (GHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
2.4835	Vertical	54.4	-8.2	46.2	54.0	7.8	-

Graph(s):



RFI GLOBAL SERVICES LTD

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 45 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Test Equipment Used:

To:

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	-
C1081	UFA210A Rosenberger Cable	Rosenberger	FA210A 1020M5 050	28463-2	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A 1030007 070	43190-01	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
S202	3m OATS	RFI	2	S202- 15011990	17 Nov 2006	12

Serial No: RFI/RPTE2/RP49117JD07A

Page: 46 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

7. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.72 dB
Transmitter Maximum Peak Output Power	Not Applicable	95%	±2.94 dB
Transmitter Carrier Frequency Separation	Not Applicable	95%	±11.4 ppm
Transmitter Average Time of Occupancy	Not Applicable	95%	±0.3 ns
20 dB Bandwidth	Not Applicable	95%	± 11.4 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 47 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

8. Measurement Methods

8.1. AC Mains Conducted Emissions

AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 110V 60 Hz ac mains supplied via a line impedance stabilisation network (LISN).

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)/Average
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz	9 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	>1 s
Observation Time:	Not applicable	>15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

Serial No: RFI/RPTE2/RP49117JD07A

Page: 48 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

8.2. Radiated Emissions

To:

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. Any emission within 20 dB of the limit were then measured on the open area test site, except in cases where the noise floor was within 20 dB of the limit, in these cases the highest point of the noise floor was measured.

Where an emission fell inside a restricted band, measurements were made at the appropriate test distance using a measuring receiver with a quasi peak detector for measurements below 1000 MHz and an average and peak detector for measurements above 1000 MHz. A peak detector was used for all other measurements.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2003 Clause 5.4.

All measurements on the open area test site were performed using broadband antennas in both vertical and horizontal polarisations.

On the open area test site, at each frequency where a signal was to be measured, the trace was maximised by rotating a turntable through 360°. The angle at which the maximum signal was observed was locked out. For frequencies below 1000 MHz the test antenna was varied in height between 1 m and 4 m in order to further maximise the target emission.

For frequencies above 1000 MHz where a horn antenna was used, height searching was performed to locate the optimal height of the horn with respect to the EUT. At this point the horn was locked off and the turntable was again rotated through 360° to maximise the target signal. It should be noted that the received signal from the EUT would diminish very quickly after it exits the beam width of the horn antenna, for this reason it may not be necessary to fully height search with the horn antennas.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 49 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Radiated Emissions (Continued)

At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

Scans were performed to the upper frequency limits as stated in section 15.33.

The final field strength was determined as the indicated level in $dB_{\mu}V$ plus cable loss and antenna factor.

The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements <1 GHz	Final Measurements ≥1 GHz
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak / Average
Mode:	Max Hold	Not applicable	Max Hold
Bandwidth:	(120 kHz <1 GHz) (1 MHz ≥1 GHz)	120 kHz	1 MHz
Amplitude Range:	100 dB	100 dB	100 dB
Step Size:	Continuous sweep	Not applicable	Not applicable
Sweep Time:	Coupled	Not applicable	Not applicable

Serial No: RFI/RPTE2/RP49117JD07A

Page: 50 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

8.3. Carrier Frequency Separation / 20 dB Bandwidth

The EUT and spectrum analyser was configured for radiated measurements, and as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

To determine the bandwidth and separation of each transmission channel the measurement analyser was configured to measure two adjacent channels whilst the EUT was in hopping mode. The spectrum analyser was configured with a resolution bandwidth and video bandwidth greater than 1% of the frequency span.

The analyser was set for a maximum hold scan to capture the profile of the signal. The peak points on the two adjacent channels were noted and the separation between them recorded.

To determine the occupied bandwidth, a resolution bandwidth of 10 kHz was used, which is greater than 1% of the 20 dB bandwidth. A video bandwidth of at least the same value was used.

The analyser was set for a maximum hold scan to capture the profile of the signal. The peak level was then determined, and a reference line was drawn 20 dB below the peak level.

The bandwidth was determined at the points where the 20 dB reference line intercepted the power envelope of the emission.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 51 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

8.4. Average Time of Occupancy

The EUT and spectrum analyser was configured for radiated measurements, and as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

First the maximum packet length was determined on the centre channel.

The measurement analyser was configured to the time domain mode by setting the span to zero with a sweep time sufficiently wide enough to measure one pulse.

The EUT was configured to operate in normal mode of operation. The pulse width of one transmission was then recorded. The measurement analyser was then configured in zero span (in the time domain) and the sweep time was set to 32 seconds (the closest allowable setting to 31.6 seconds). This 32 second period was determined by multiplying the number of channels the device operates over (79) by 0.4 seconds.

The number of transmissions within this period was noted and multiplied by the pulse width recorded earlier. This gives the maximum occupancy over 31.6 seconds.

Serial No: RFI/RPTE2/RP49117JD07A

Page: 52 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

8.5. Effective Isotropic Radiated Power (EIRP)

EIRP measurements were performed in accordance with the standard, against appropriate limits.

The EIRP was measured with the EUT arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2003 Clause 5.4. The transmitter was fitted with an integral antenna; therefore all radiated tests were performed with the unit operating into the integral antenna.

The level of the EIRP was measured using a spectrum analyser.

The test antenna was positioned in the horizontal polarity. The EUT was oriented in the X plane. The test antenna was then raised and lowered until a maximum peak was observed. The turntable was then rotated through 360 degrees and the maximum peak reading obtained. The height search was then repeated to take into consideration the new angular position of the turntable. The maximum reading observed was then recorded. This procedure was then repeated with the EUT oriented in the Y and Z planes. The highest reading taken in all 3 planes was recorded. The entire procedure was then repeated with the test antenna set in the vertical polarity.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a horn antenna. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The EIRP was calculated as:-

EIRP = Signal Generator Level - Cable Loss + Antenna Gain

Serial No: RFI/RPTE2/RP49117JD07A

Page: 53 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Effective Isotropic Radiated Power (EIRP) (Continued)

Circumstances where the signal generator could not produce the desired a power substitution was performed with the signal generator set to 0 dBm. The radiated signal was maximised as previously described. The level indicated on the measuring receiver was noted. The delta between this level and the maximum level for the EUT was calculated and also noted. The EIRP of the signal generator was calculated using the above formulae. The recorded delta was added to the calculated EIRP to obtain the substituted EUT EIRP.

Delta (dB) = EUT - SG

where:

To:

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual EIRP is calculated as:

EIRP SG= Signal Generator Level - Cable Loss + Antenna Gain

The EUT EIRP is calculated as:

EIRP EUT = EIRP SG + Delta.

The test equipment settings for EIRP measurements were as follows:

Receiver Function	Setting	
Detector Type:	Peak	
Mode:	Not applicable	
Bandwidth:	1 MHz	
Amplitude Range:	100 dB	
Sweep Time:	Coupled	

Serial No: RFI/RPTE2/RP49117JD07A

Page: 54 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

8.6. Band Edge Compliance of RF Radiated Emissions

The EUT and spectrum analyser were configured as for radiated measurements and as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

To determine band edge compliance, the analyser resolution bandwidth was set to \geq 1% of the analyser span. The video bandwidth was set to be \geq to the resolution bandwidth. The sweep was set to auto and the detector to peak. The trace was set to max hold and a trace was produced.

A plot of the lower band edge of the allocated frequency band was produced. A marker was set to the level of the highest in band emission with a limit line set to 20 dB below this. The marker was then placed on the highest out of band emission (the specification states that either the band edge level must be measured or the highest out of band emission, whichever is the greater). The plots show that the highest out of band emission complies with the -20 dBc limit.

The above procedure was then repeated for the upper band edge except that, as the upper band edge fell on a restricted band edge (as defined in section 15.205(a)), the limit for the restricted band was applied instead of the -20 dBc limit, i.e. the general limits defined in section 15.209(a).

Final measurements were performed on the worst-case configuration as described in Part 15.31(i).

RFI GLOBAL SERVICES LTD

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 55 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

To:

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

Appendix 1. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49117JD07A\EMICON	Test configuration for measurement of conducted emissions.
DRG\49117JD07A\EMIRAD	Test configuration for measurement of radiated emissions.

Serial No: RFI/RPTE2/RP49117JD07A

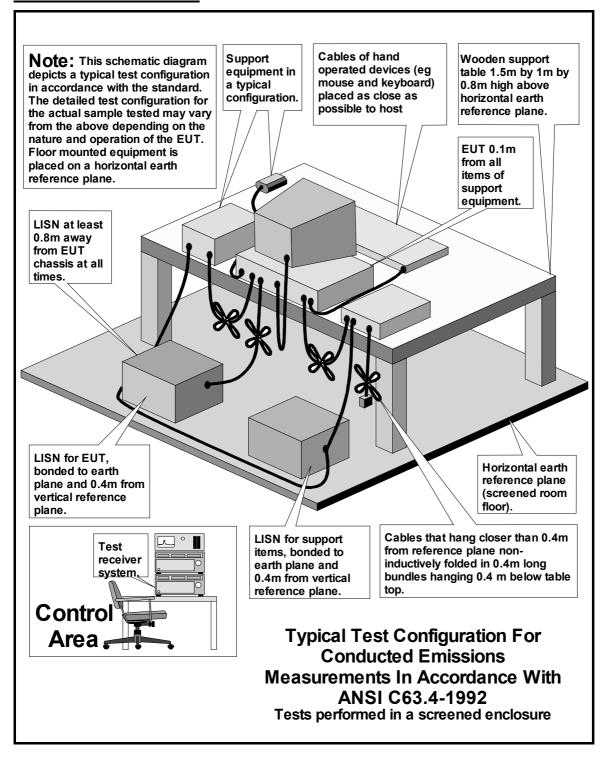
Page: 56 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

DRG\49117JD07A\EMICON



Serial No: RFI/RPTE2/RP49117JD07A

Page: 57 of 58

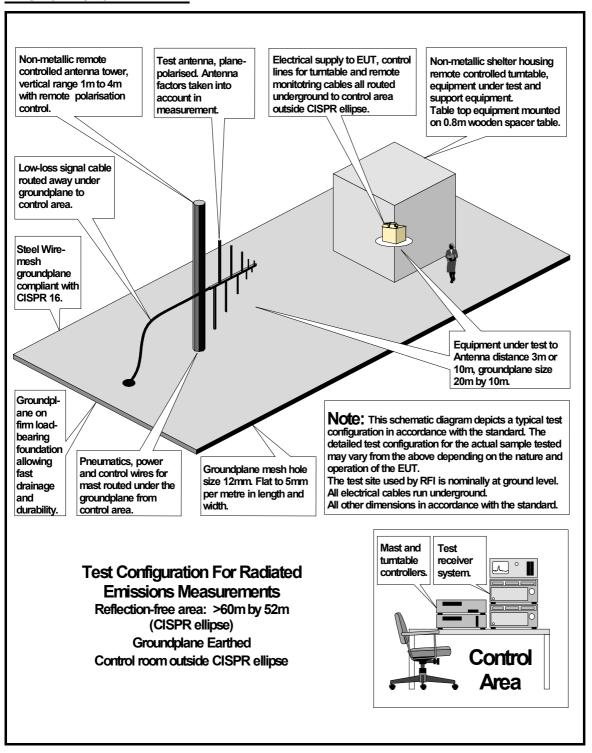
Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset FCC Part 15.247: 2006 (Subpart C)

DRG\49117JD07A\EMIRAD

To:



RFI GLOBAL SERVICES LTD

Test Report

Serial No: RFI/RPTE2/RP49117JD07A

Page: 58 of 58

Issue Date: 16 May 2007

Test of: GN A/S (Netcom A/S)

Jabra OTE1 Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

This page has been left intentionally blank.