TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

Test Report Serial No:
RFI/RPTE1/RP49345JD09A

This Test Report Is Issued Under The Authority Of Michael Derby, Radio Performance Service Leader: 	
Tested By: Nirav Modi 	**Checked By: Michael Derby** 
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Registered in England and Wales. Company number:2117901

Test of: GN A/S
Jabra BT8040, 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 20 dB Bandwidth	Section 2.1049	Antenna	**Complied**
Transmitter Carrier Frequency Separation	Section 15.247(a)(1)	Antenna	**Complied**
Transmitter Average Time of Occupancy	Section 15.247(a)(1)(iii)	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.

Table of Contents

1. Client Information

Company Name:	GN A/S
Address:	Alfred Nobels Vej 21B Aalborg O DK-9220 Denmark
Contact Name:	Mt T Ringtved

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

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:	BT8040
Serial Number:	Sample 1: RAD3 Sample 2: TA5
Hardware Version Number:	28-01288
Software Version Number:	21F
FCC ID Number:	BCE-BT8040
Country of Manufacture:	China
Date of Receipt:	10 July 2007

Notes:

1. *Sample 1 was used for the transmitter tests and was in Bluetooth Test Mode*
2. *Sample 2 was used for the receiver tests and was in a normal operating mode*

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	Charger
Brand Name:	Jabra
Model Name or Number:	FW7600/05
Serial Number:	2407B
Cable Length and Type:	1.5m, Multicore
Connected to Port	Mini-USB

2.5. Support Equipment

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

Description:	*Bluetooth* Headset
Brand Name:	Anritsu
Model Name or Number:	MT8852A
Serial Number:	6K00001529 (RFI Asset No. M1149)
Connection to EUT:	Air link

2.6. Additional Information Related to Testing

Power Supply Requirement:	Internal Battery Supply of 3.7 V		
Equipment Category:	*Bluetooth*		
Type of Unit:	Portable Transceiver		
Channel Spacing:	1 MHz		
Power Characteristics:	4.6 dBm (maximum) EIRP		
Modulation Type:	GFSK, Π/4 DQPSK and 8DPSK		
Data Rate:	1 Mb/s, 2 Mb/s or 3 Mb/s		
Temperature Range:	-20ºC to +55ºC		
Transmit Frequency Range:	2402 to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480
Receive Frequency Range:	2402 to 2480 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

2.7. Port Identification

Port	Description
1	Charging – Mini USB

3. Test Specification, Methods and Procedures

3.1. Test Specification

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.

4. Deviations from the Test Specification

There were no deviations from the test specification.

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

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

Transmitting on the Top, Middle and Bottom channels or hopping on all channels, as required.

Idle/Receiver Mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

Connection of the charger causes the EUT to cease transmission; therefore all transmitter tests were performed without the charger connected.

AC conducted emissions tests to part 15.107 were performed with the charger connected.

During transmitter tests the EUT was communicating via a wireless link with a *Bluetooth* Test Set.

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

6.3. Test Results

Idle Mode AC Conducted Spurious Emissions: Section 15.107

Temperature (°C):	19	Relative Humidity (%):	56

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Results
0.150000	Live	49.0	66.0	17.0	Complied
0.174000	Live	43.4	64.8	21.4	Complied
0.206000	Live	38.8	63.4	24.6	Complied
0.226000	Live	37.3	62.6	25.3	Complied
0.330000	Live	34.0	59.5	25.5	Complied
0.338000	Live	34.8	59.3	24.5	Complied
0.394000	Live	32.5	58.0	25.5	Complied
0.458000	Live	25.7	56.7	31.0	Complied
0.670000	Live	23.5	56.0	32.5	Complied
3.242000	Neutral	29.6	56.0	26.4	Complied

Average Detector Measurements on Live and Neutral Lines

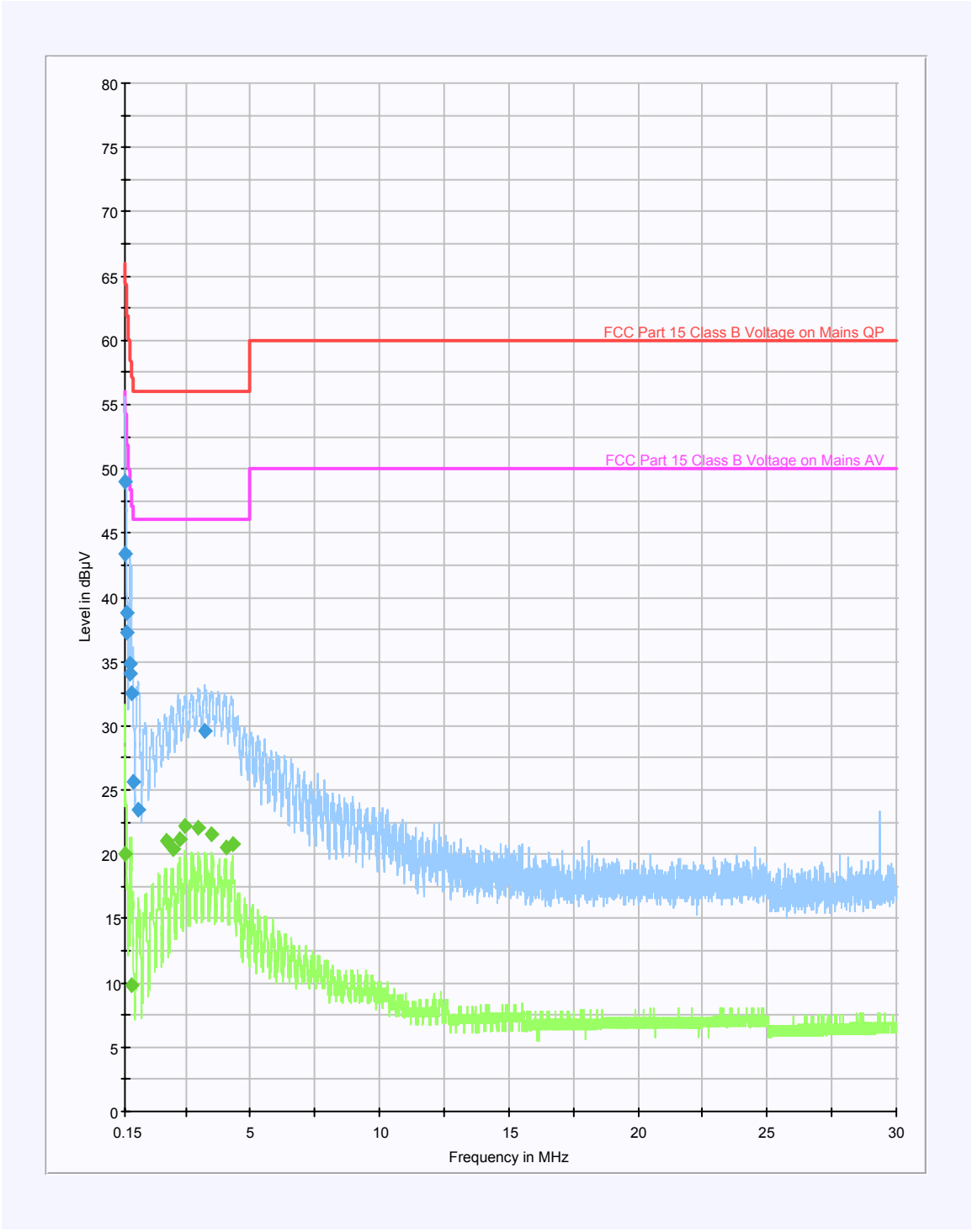
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Results
0.154000	Live	20.1	55.8	35.7	Complied
0.402000	Live	9.8	47.8	38.0	Complied
1.742000	Neutral	21.0	46.0	25.0	Complied
2.022000	Neutral	20.4	46.0	25.6	Complied
2.270000	Neutral	21.1	46.0	24.9	Complied
2.494000	Neutral	22.2	46.0	23.8	Complied
3.010000	Neutral	22.1	46.0	23.9	Complied
3.510000	Neutral	21.5	46.0	24.5	Complied
4.062000	Neutral	20.5	46.0	25.5	Complied
4.302000	Neutral	20.8	46.0	25.2	Complied

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

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

Graph(s):



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

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109

Temperature (°C):	22	Relative Humidity (%):	47

Results:

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)
850.461	Horizontal	31.2	46.0	14.8	1

Note(s):

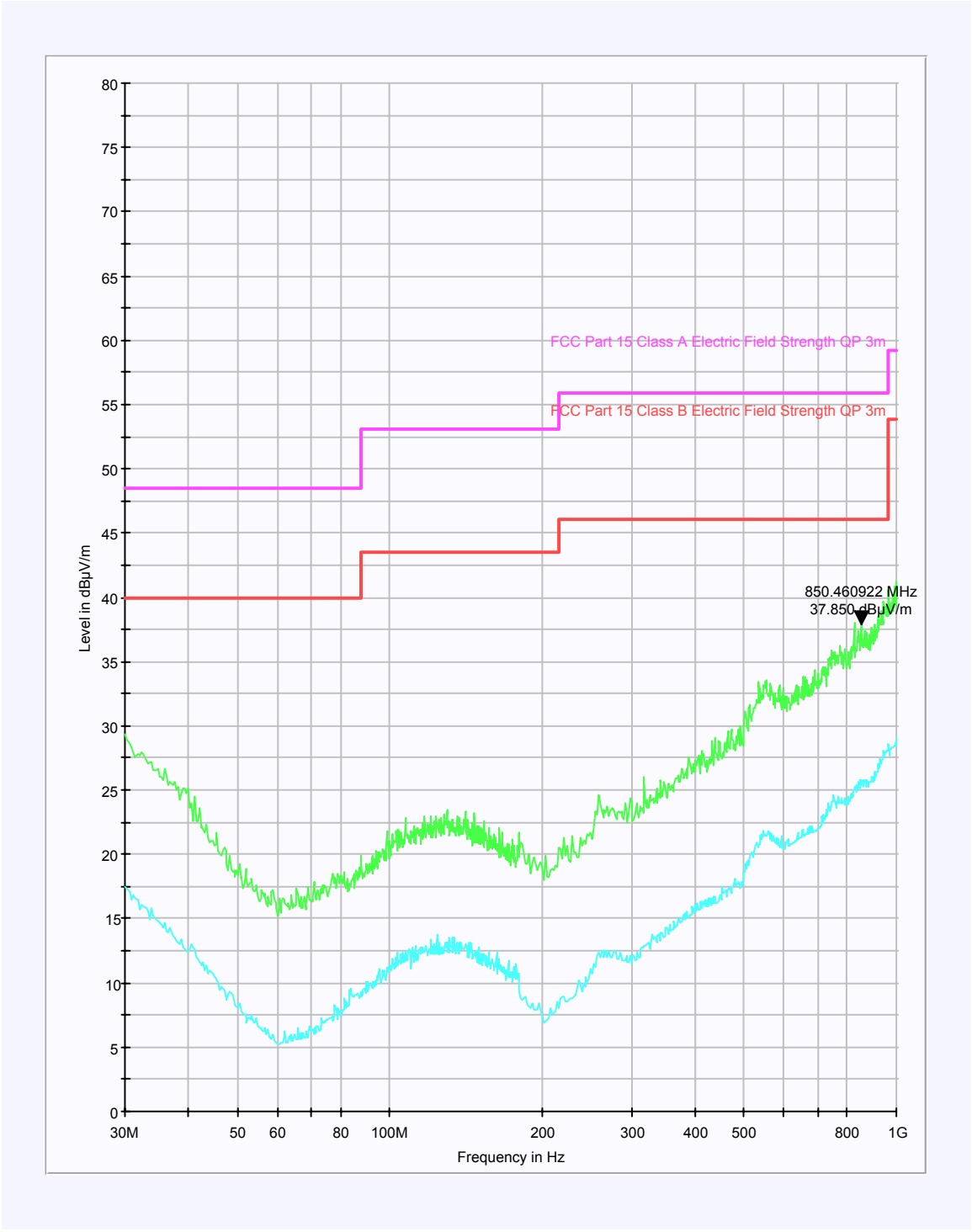
1. *No emissions were observed above the system noise floor, therefore the highest level of noise was measured peak and is compared here to the quasi-peak limit.*

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Graph(s):



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

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Temperature (°C):	18	Relative Humidity (%):	60

Results:

Electric Field Strength Measurements (Frequency Range: 1 GHz to 12.75 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)
1.651052	Horizontal	54.6	-7.1	47.5	74.0	26.5	Complied

Highest Average Level:

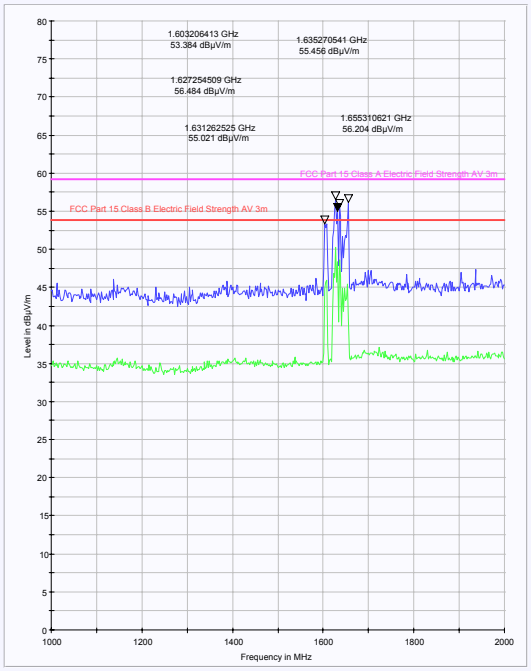
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.653690	Horizontal	52.3	-7.1	45.2	54.0	8.8	Complied

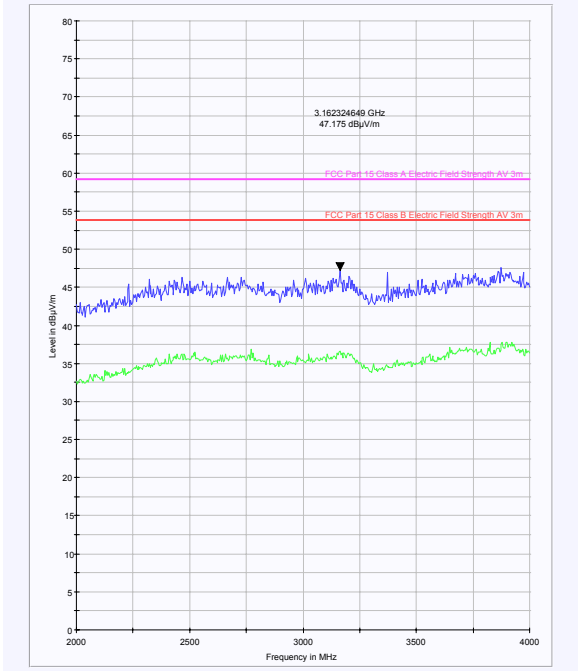
Test of: GN A/S
Jabra BT8040, Bluetooth Headset

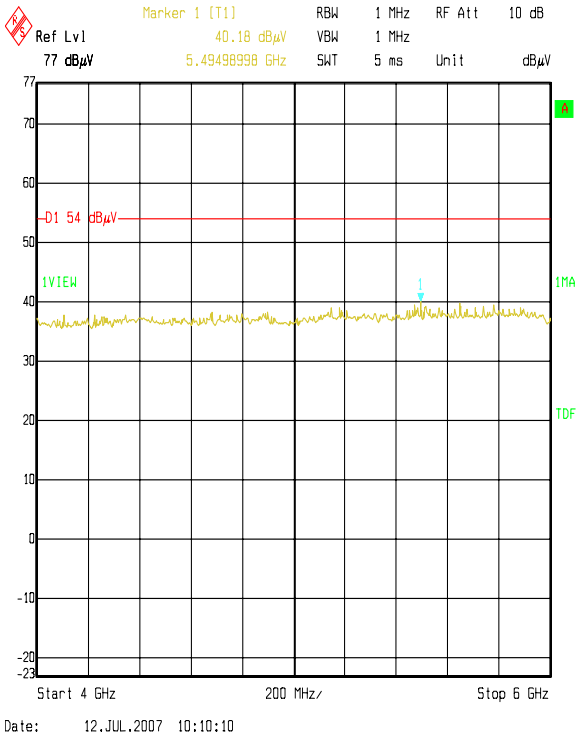
To: FCC Part 15.247: 2006 (Subpart C)

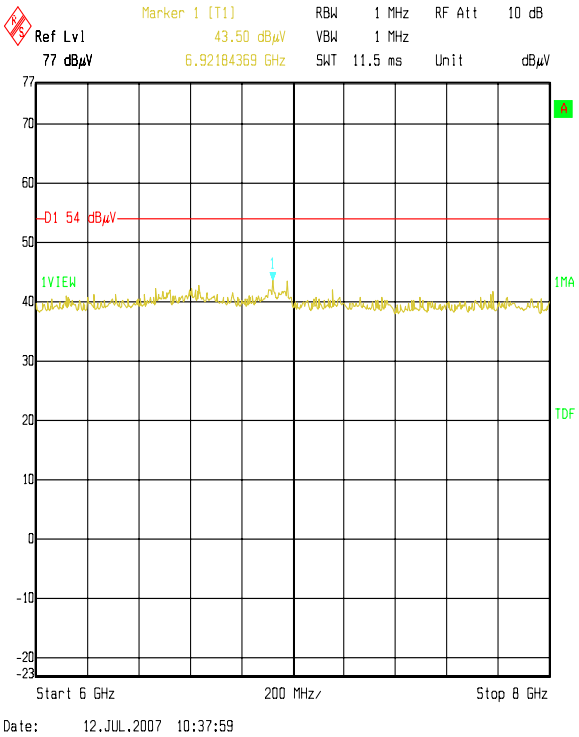
Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Graph(s):





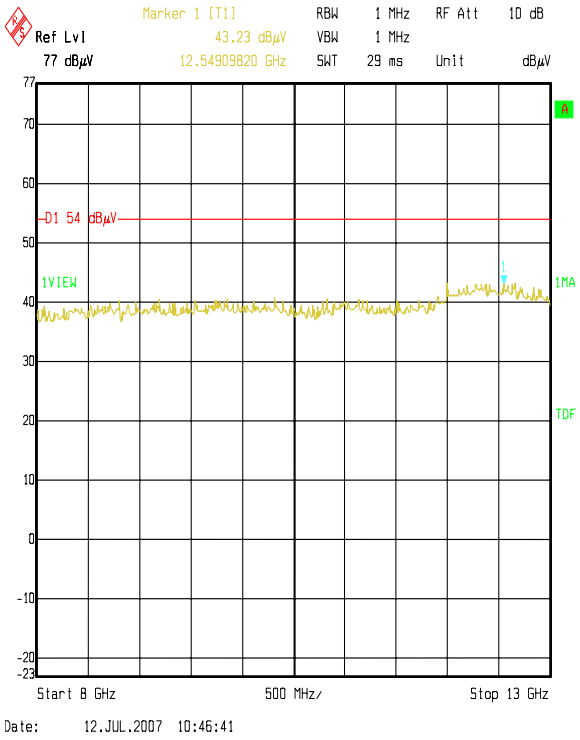




These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Graph(s):



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

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

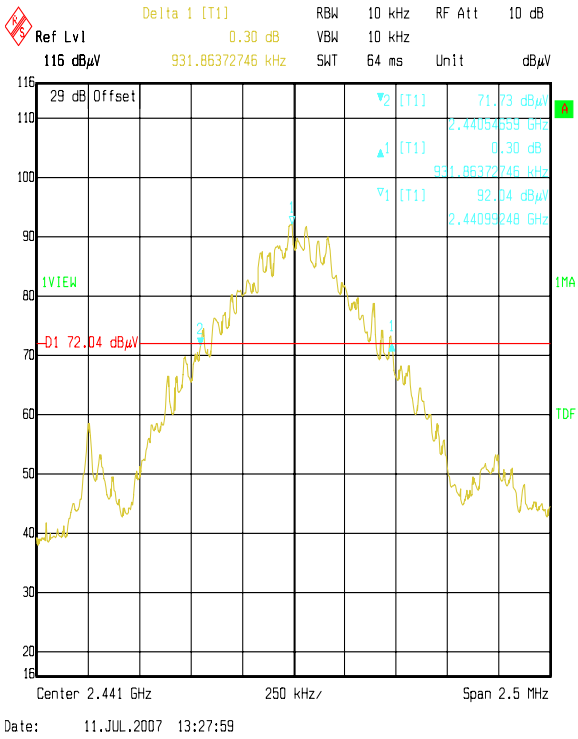
Transmitter 20 dB Bandwidth: Section 15.247(a)(1)

Temperature (°C):	17	Relative Humidity (%):	68

Results:

Transmitter 20 dB Bandwidth (kHz)	Limit (kHz)
931.863727	None specified

Graph(s):



Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

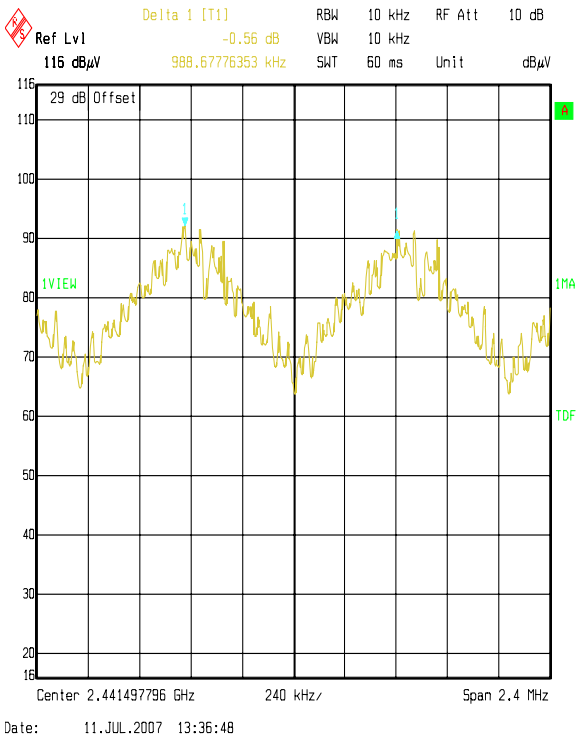
Transmitter Carrier Frequency Separation: Section 15.247(a)(1)

Temperature (°C):	17	Relative Humidity (%):	68

Results:

Transmitter Carrier Frequency Separation (kHz)	Limit (> $^2/_3$ of 20 dB BW) (kHz)	Margin (kHz)	Note(s)
988.677764	621.242	367.436	Complied

Graph(s):



Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

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

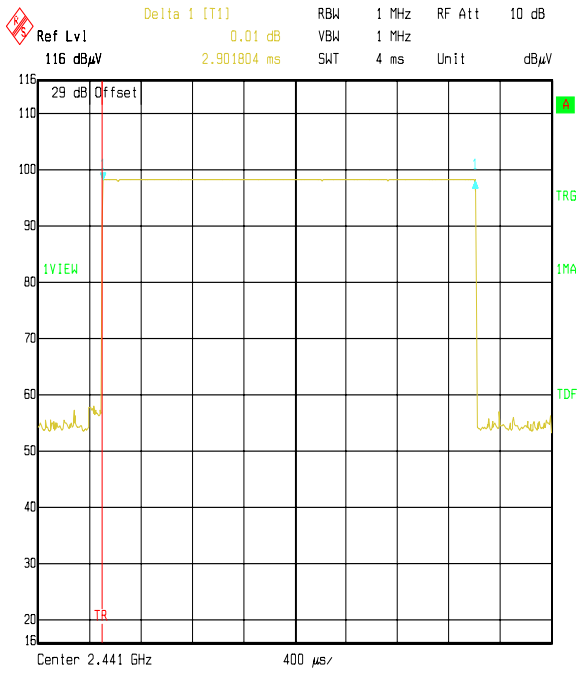
Temperature (°C):	17	Relative Humidity (%):	68

Results:

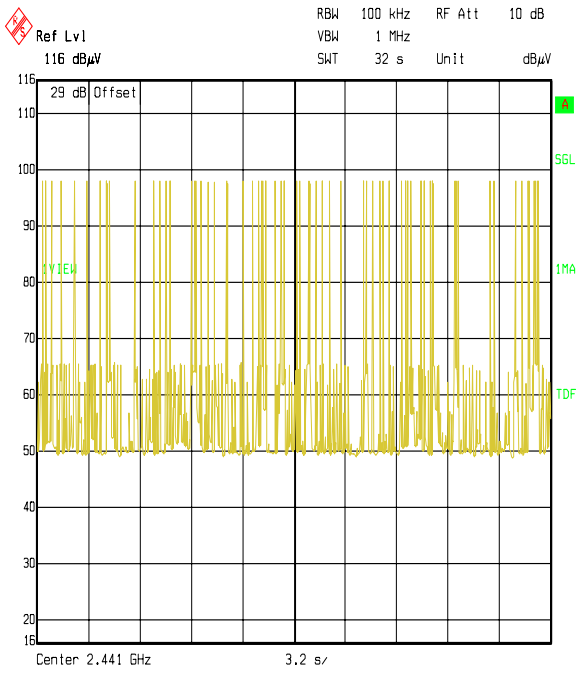
Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Note(s)
2901.804	70	0.203	0.4	0.197	Complied

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

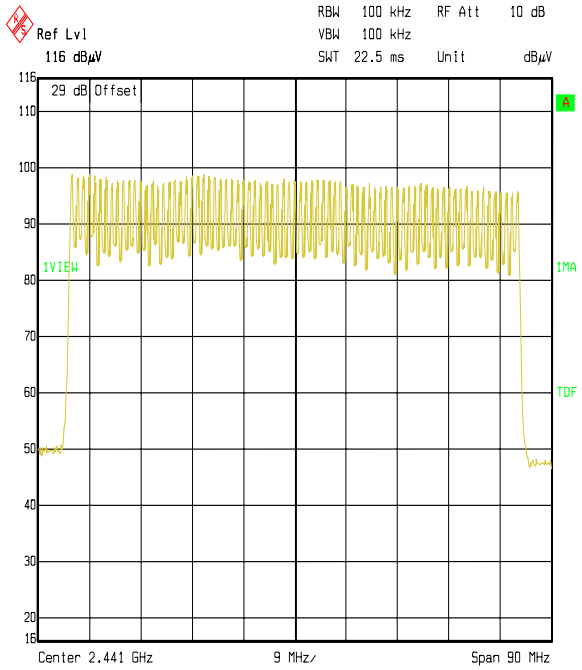
Graph(s):



Title: 49345JD09 FCC 15.247
Comment A: AVERAGE TIME OF OCCUPANCY, PULSE LENGTH
Date: 11.JUL.2007 13:53:50



Title: 49345JD09 FCC 15.247
Comment A: AVERAGE TIME OF OCCUPANCY, NUMBER OF HOPS
Date: 12.JUL.2007 08:58:34



Title: 49345JD09 FCC 15.247
Comment A: AVERAGE TIME OF OCCUPANCY, NUMBER OF CHANNELS
Date: 11.JUL.2007 13:46:20

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

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

Temperature (°C):	17	Relative Humidity (%):	68

Results:

Battery Powered Devices

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Results
Bottom	3.1	30.0	26.9	Complied
Middle	2.7	30.0	27.3	Complied
Top	1.8	30.0	28.2	Complied

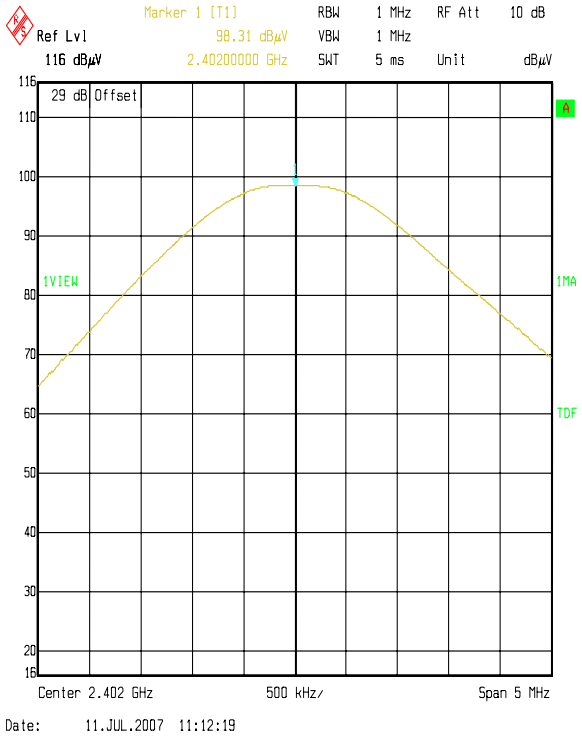
Note(s):

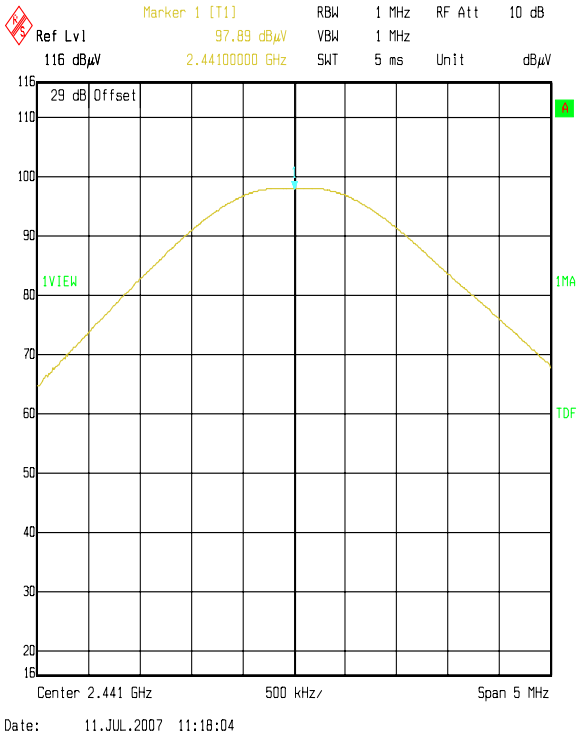
1. *These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.*

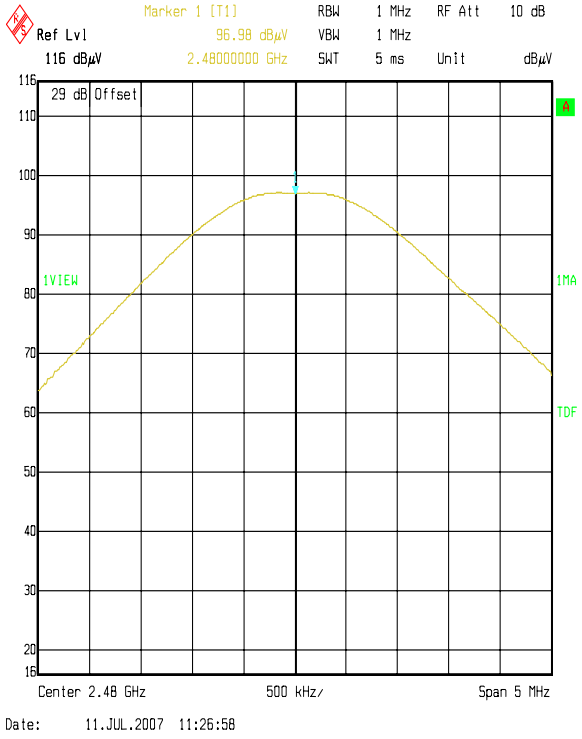
Test of: GN A/S
Jabra BT8040, Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

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

Graph(s):







Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

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

Temperature (°C):	22	Relative Humidity (%):	47

Results:

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

Top Channel

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	-20 dBc Limit (dBµV/m)	Margin (dB)	Note(s)
848.817635	Horizontal	31.5	76.3	44.8	2

Note(s):

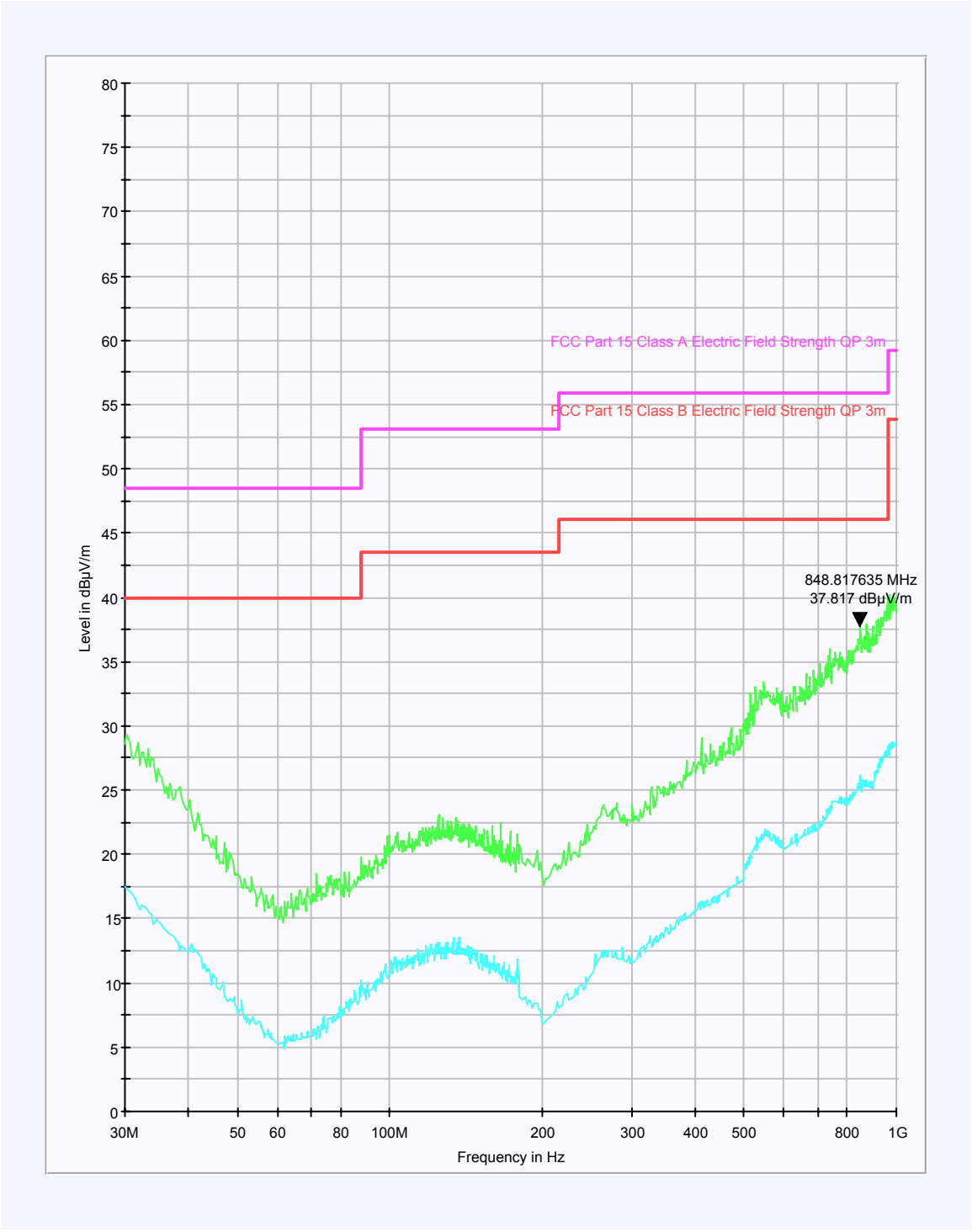
1. *The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.*
2. *No emissions were observed above the system noise floor; therefore the highest level of noise was measured with a peak detector.*

Test of: GN A/S
Jabra BT8040, 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.

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

Temperature (°C):	18	Relative Humidity (%):	60

Results:

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

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602017	Horizontal	55.9	-7.7	48.2	74.0	25.8	Complied
4.804240	Horizontal	56.4	-3.2	53.2	74.0	20.8	Complied

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602017	Horizontal	49.5	-7.7	41.8	54.0	12.2	Complied
4.804240	Horizontal	50.5	-3.2	47.3	54.0	6.7	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602367	Horizontal	56.0	-7.7	48.3	74.0	25.7	Complied
4.881770	Horizontal	56.8	-3.6	53.2	74.0	20.8	Complied

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602367	Horizontal	49.6	-7.7	41.9	54.0	12.1	Complied
4.881770	Horizontal	49.1	-3.6	45.5	54.0	8.5	Complied

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

Results:

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602433	Horizontal	56.2	-7.7	48.5	74.0	25.5	Complied
4.960520	Horizontal	54.0	-3.7	50.3	74.0	23.7	Complied

Highest Average Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602433	Horizontal	48.6	-7.7	40.9	54.0	13.1	Complied
4.960520	Horizontal	46.1	-3.7	42.4	54.0	11.6	Complied

Highest Peak Level: Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602458	Horizontal	56.0	-7.7	48.3	74.0	25.7	Complied
4.807665	Horizontal	57.9	-3.2	54.7	74.0	19.3	Complied

Highest Average Level: Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
1.602458	Horizontal	42.9	-7.7	35.2	54.0	18.8	Complied
4.807665	Horizontal	45.6	-3.2	42.4	54.0	11.6	Complied

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

Temperature (°C):	18	Relative Humidity (%):	60

Results:

Electric Field Strength Measurements (Frequency Range: 1 GHz to 25 GHz) (emissions outside the restricted bands)

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Note(s)
1.654352	Horizontal	52.1	-7.1	45.0	77.7	32.7	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Note(s)
1.602367	Horizontal	56.0	-7.7	48.3	77.7	29.4	Complied
1.626716	Horizontal	53.0	-7.4	45.6	77.7	32.1	Complied

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Note(s)
1.652588	Horizontal	52.0	-7.1	44.9	77.7	32.8	Complied

Highest Peak Level: Hopping Mode

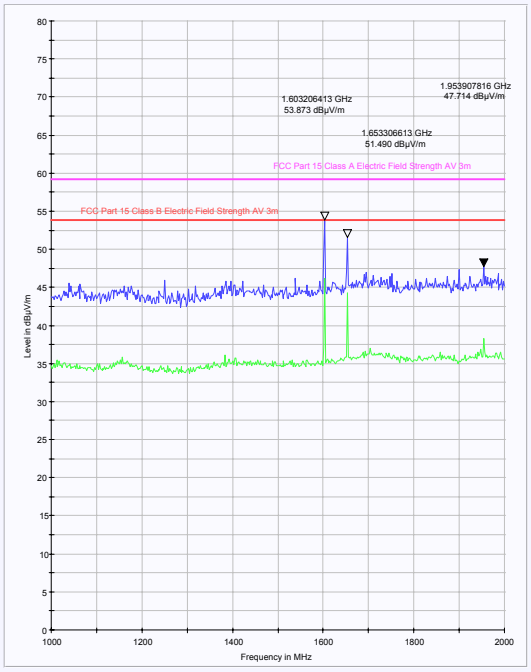
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Note(s)
1.652708	Horizontal	51.6	-7.1	44.5	77.7	33.2	Complied

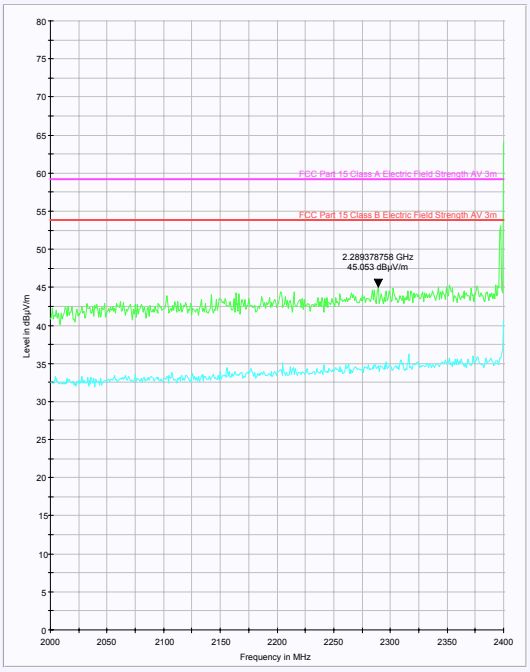
Test of: GN A/S
Jabra BT8040, Bluetooth Headset

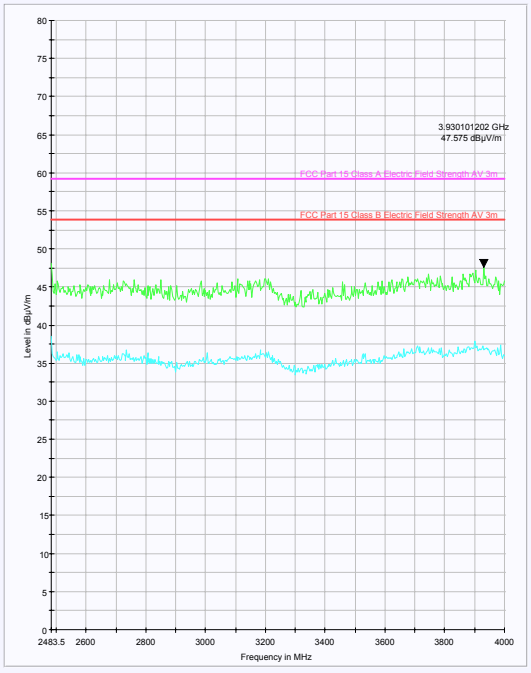
To: FCC Part 15.247: 2006 (Subpart C)

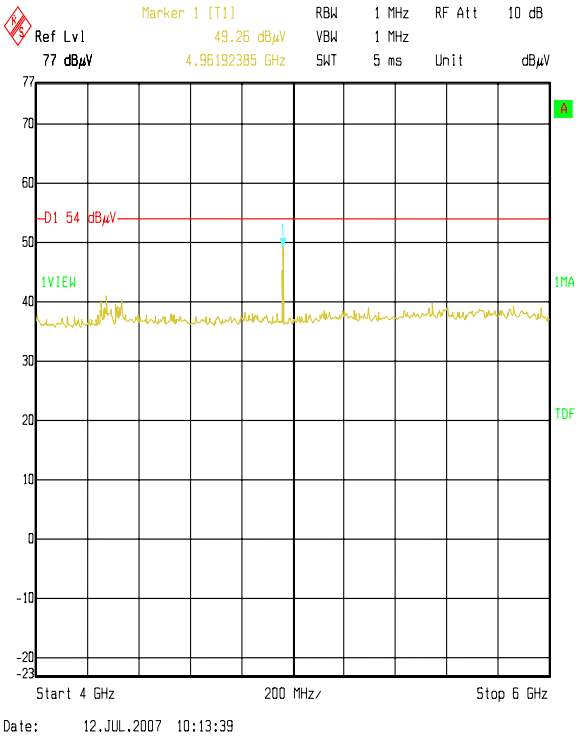
Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Graph(s):









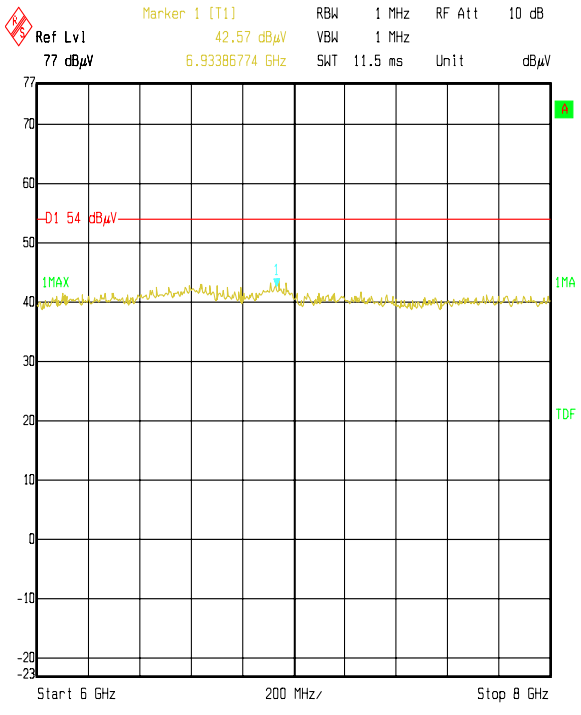
These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

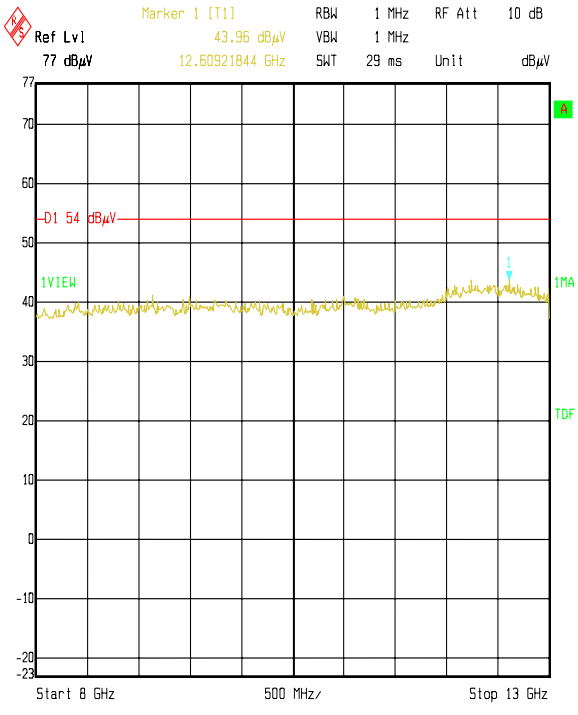
Test of: GN A/S
Jabra BT8040, Bluetooth Headset

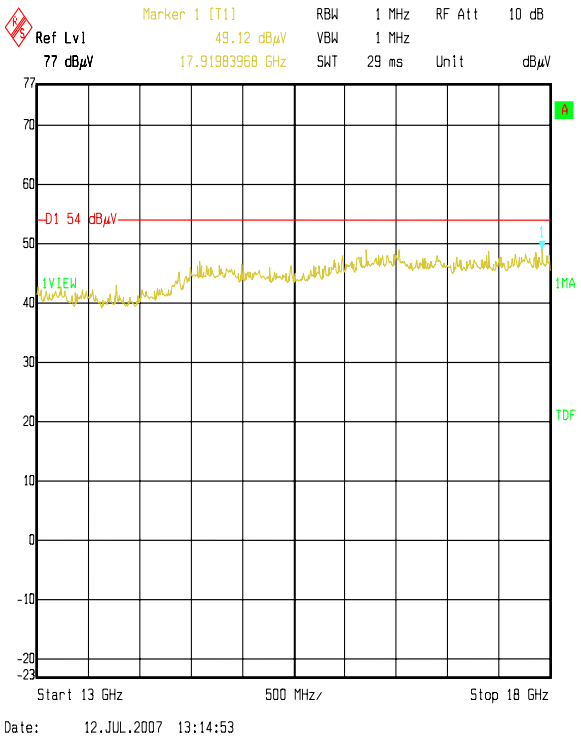
To: FCC Part 15.247: 2006 (Subpart C)

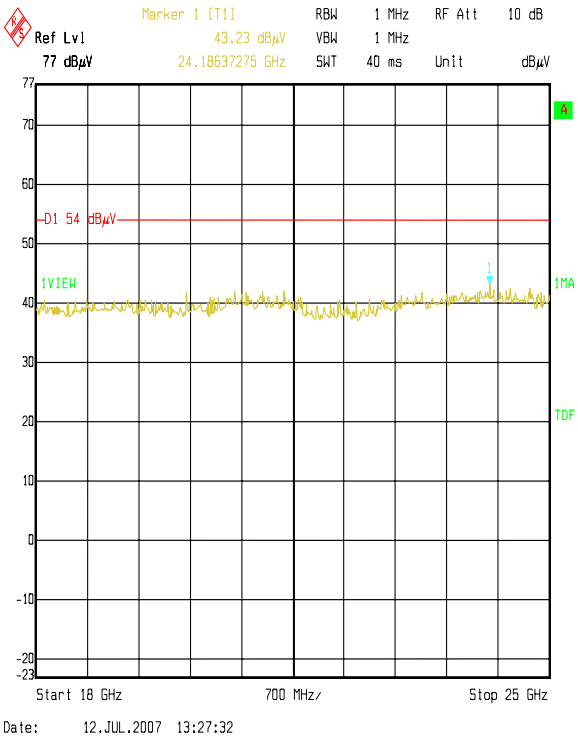
Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Graph(s):









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

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

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

Temperature (°C):	17	Relative Humidity (%):	68

Results:

Electric Field Strength Measurements

Peak Power Level Hopping Mode:

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
2.4000	Vertical	55.4	-6.5	48.9	78.5	29.6	Complied
2.4835	Vertical	61.6	-8.0	53.6	74.0	20.4	Complied

Average Power Level Hopping Mode:

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)
2.4835	Vertical	51.9	-8.0	43.9	54.0	10.1	Complied

Note(s):

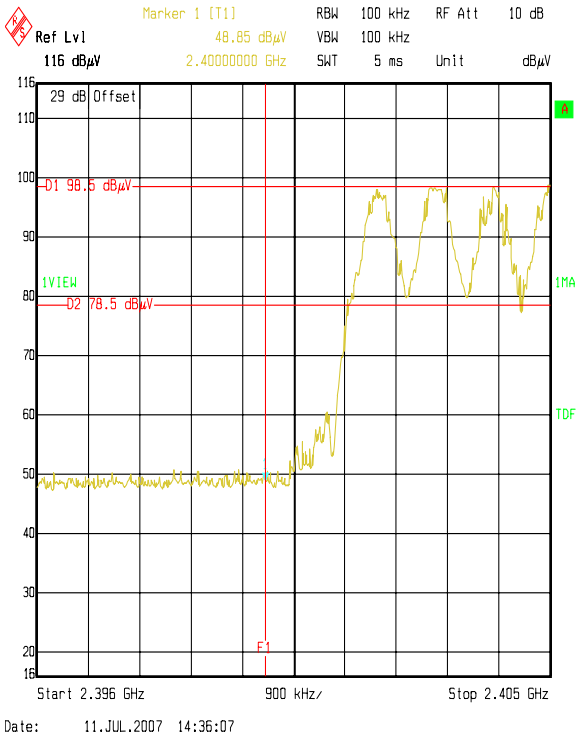
1. *The band edge at 2.4 GHz does not fall within a restricted band; therefore the limit is -20 dBc from the carrier power measured in 100 kHz.*
2. *The band edge at 2.4835 GHz falls within a restricted band; therefore the limits are those of FCC part 15.209.*

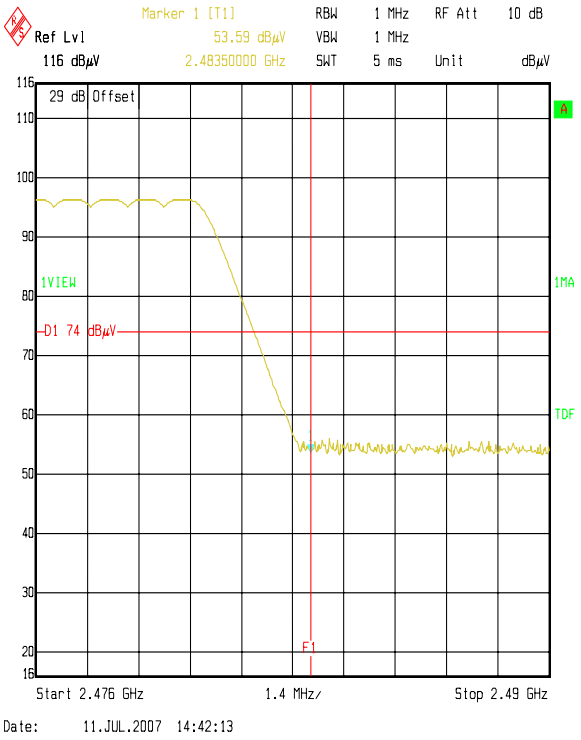
Test of: GN A/S
Jabra BT8040, Bluetooth Headset

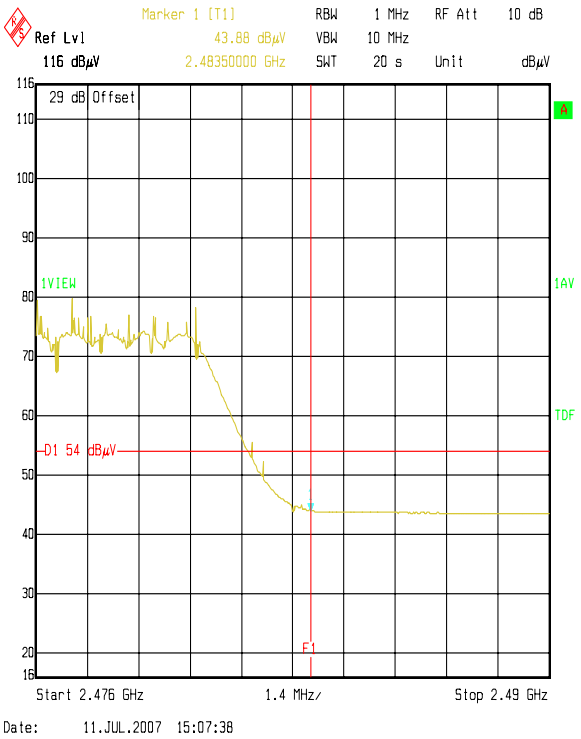
To: FCC Part 15.247: 2006 (Subpart C)

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

Graph(s):







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

Temperature (°C):	17	Relative Humidity (%):	68

Results:

Peak Power Level Static Mode:

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Note(s)
2.4000	Vertical	59.7	-6.5	53.2	79.0	25.8	Complied
2.4835	Vertical	64.6	-8.0	56.6	74.0	17.4	Complied

Average Power Level Static Mode:

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Note(s)
2.4835	Vertical	53.4	-8.0	45.4	54.0	8.6	Complied

Note(s):

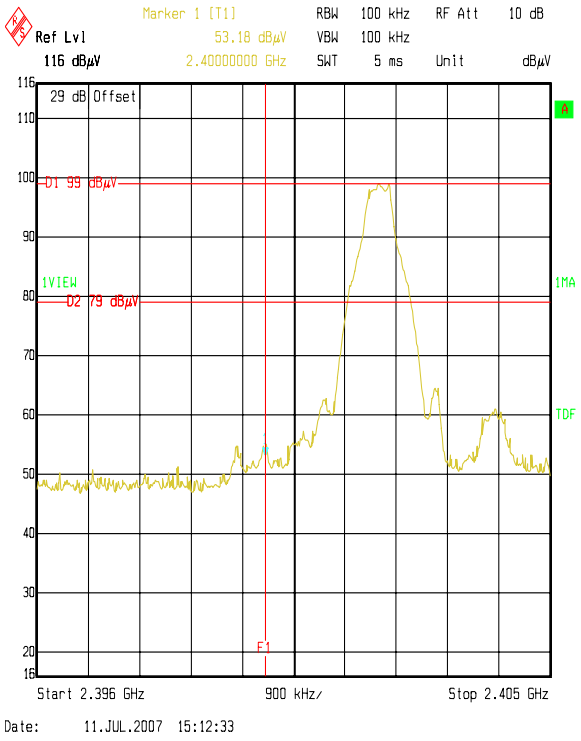
1. *The band edge at 2.4 GHz does not fall within a restricted band; therefore the limit is -20 dBc from the carrier power measured in 100 kHz.*
2. *The band edge at 2.4835 GHz falls within a restricted band; therefore the limits are those of FCC part 15.209.*

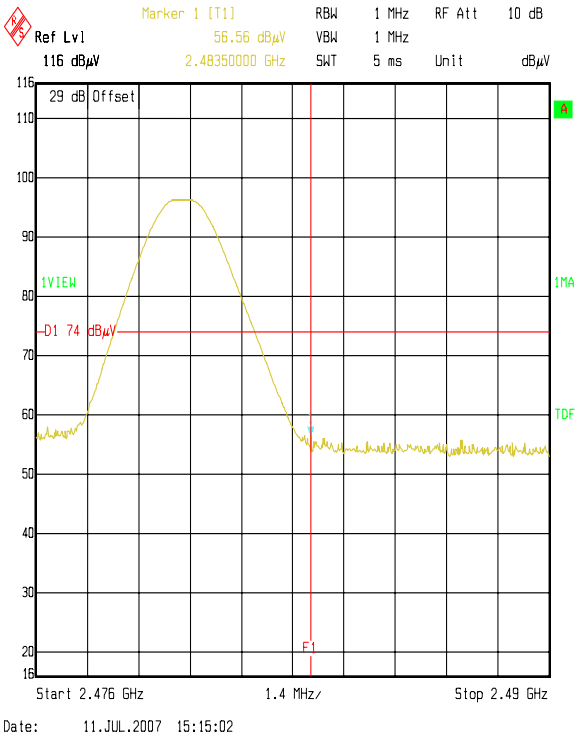
Test of: GN A/S
Jabra BT8040, Bluetooth Headset

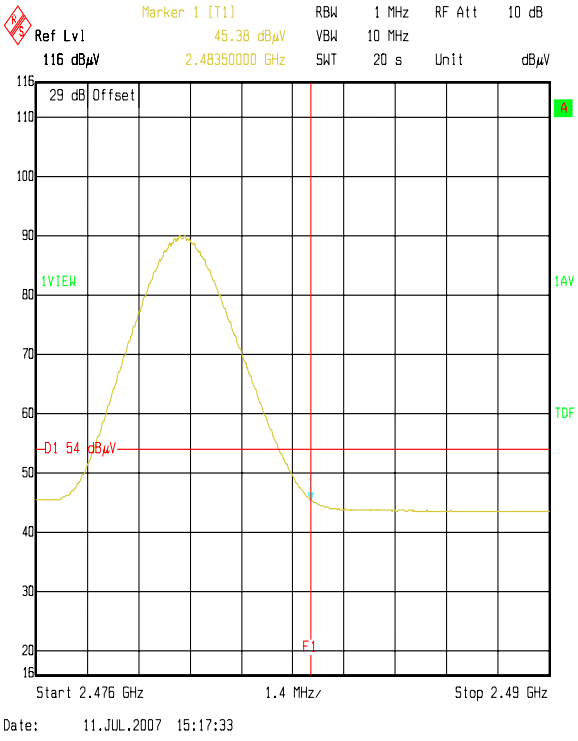
To: FCC Part 15.247: 2006 (Subpart C)

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

Graph(s):







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
Conducted Emissions Antenna Port	30 MHz to 40 GHz	95%	±0.28 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.

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

8.2. Radiated Emissions

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.

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 dBμV 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

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.

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.

8.5. Peak Output Power

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

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency to be measured, the calibrated level of the attenuator and cable were entered as an offset into a spectrum analyser to compensate for the measurement set up.

To determine the transmitter output power, the EUT was operated at maximum power and a result was obtained from the spectrum analyser using peak detector and trace Max Hold.

8.6. Equivalent 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

Equivalent 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 :

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

8.7. 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 >= 1% of the analyser span. The video bandwidth was set to be ≥ 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).

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A028	Horn Antenna	Eaton	91888-2	304	17 Nov 2006	12
A031	Horn Antenna	Eaton	91889-2	557	17 Nov 2006	12
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	23 Apr 2007	12
A1362	Horn Antenna	Stoddart Aircraft Radio	91889-1	N/A	17 Nov 2006	12
A1534	Preamplifier	Hewlett Packard	8449B OPT H02	3008A00405	17 Nov 2006	12
A253	Horn Antenna	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	Horn Antenna	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	Horn Antenna	Flann Microwave	16240-20	519	17 Nov 2006	36
A256	Horn Antenna	Flann Microwave	18240-20	400	17 Nov 2006	36
A259	Bilog Antenna	Chase	CBL6111	1513	13 Mar 2007	12
A436	Horn Antenna	Flann	20240-20	330	24 Apr 2006	36
C1029	Cable	Rosenberger	FA210B-1-010M-30X30	FA00C 7589	31 May 2007	12
C1083	Cable	Rosenberger	001	2799	Cal before use	-
C1165	Cable	Rosenberger	FA210A1020 007070	43189-1	05 Jun 2007	12
C1167	Cable	Rosenberger	FA210A1030 007070	43190-01	05 Jun 2007	12
C1192	Cable	Rosenberger	FA210A1015 M3030	27141-07	31 May 2007	12
C1262	Cable	Rosenberger	FA210A0075 008080	49356-2	Cal before use	-
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Cal before use	-
C160	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Cal before use	-

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
C341	Cable	Andrews	None	None	Cal before use	-
C348	Cable	Rosenberger	UFA210A-1-1181-70x70	2993	Cal before use	-
C454	Cable	Rosenberger	RG142XX-001-RFIB	C454-10081998	Cal before use	-
C461	Cable	Rosenberger	UFA210A-1-1182-704704	98H0305	Cal before use	-
C468	Cable	Rosenberger	UFA210A-1-3937-504504	98L0440	Cal before use	-
C574	Cable	Rosenberger	UFA210A-1-788-50x50	97E0937	Cal before use	-
M024	Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Not calibrated	-
M044	Receiver	Rohde & Schwarz	ESVP	891 845/026	06 Mar 2007	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986_022	08 Sep 2006	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S201	3m & 10m OATS	RFI	1		25 May 2007	12
S202	3m OATS	RFI	2	S202-15011990	17 Nov 2006	12
S209	Screened Room	RFI	9		Not calibrated	-
S212	Screened Room	RFI	12		Not calibrated	-

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule. All equipment was within calibration at the time of the test.

Appendix 2. Test Configuration Drawings

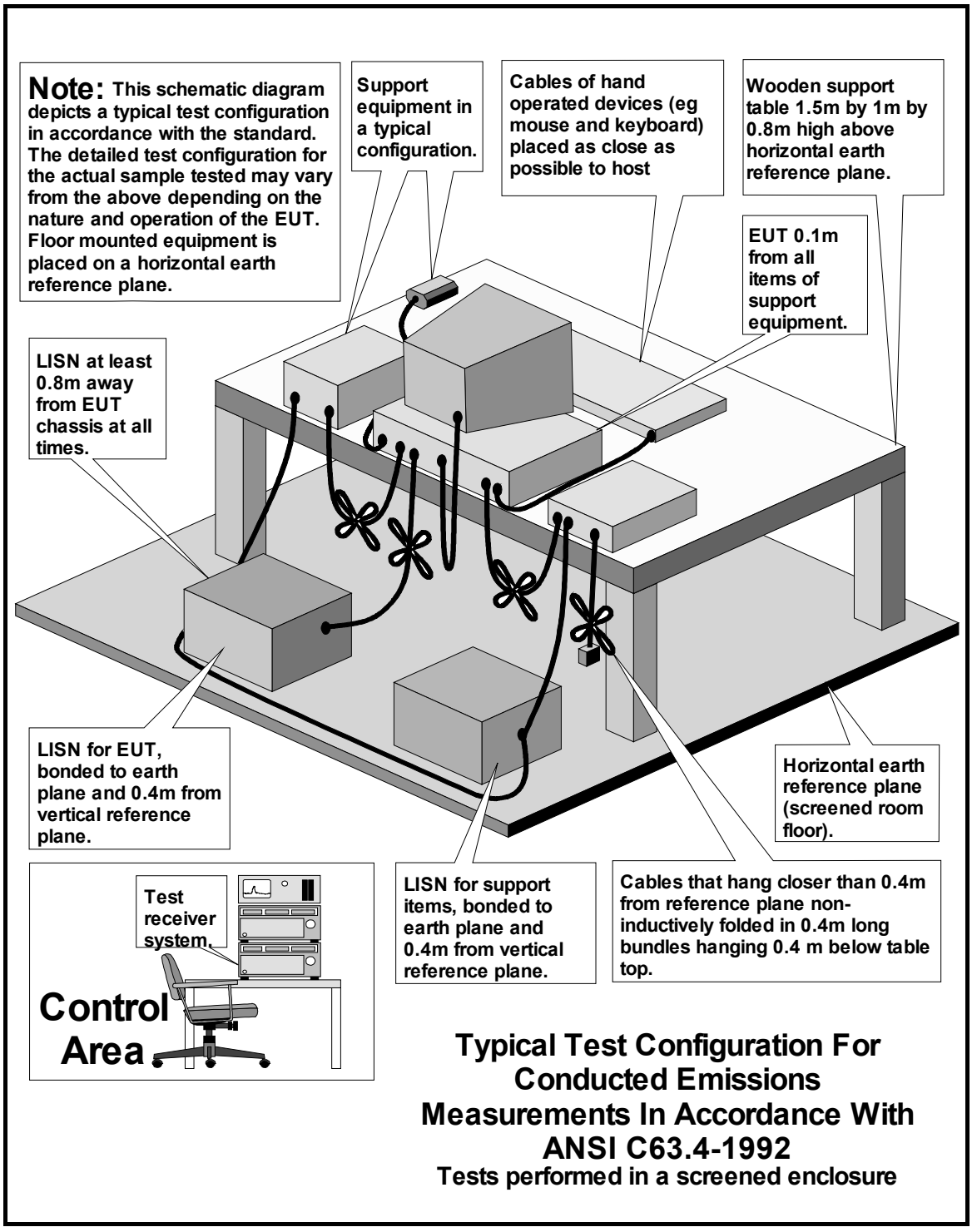
This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49345JD09A\EMICON	Test configuration for measurement of conducted emissions.
DRG\49345JD09A\EMIRAD	Test configuration for measurement of radiated emissions.

Test of: GN A/S
Jabra BT8040, Bluetooth Headset

To: FCC Part 15.247: 2006 (Subpart C)

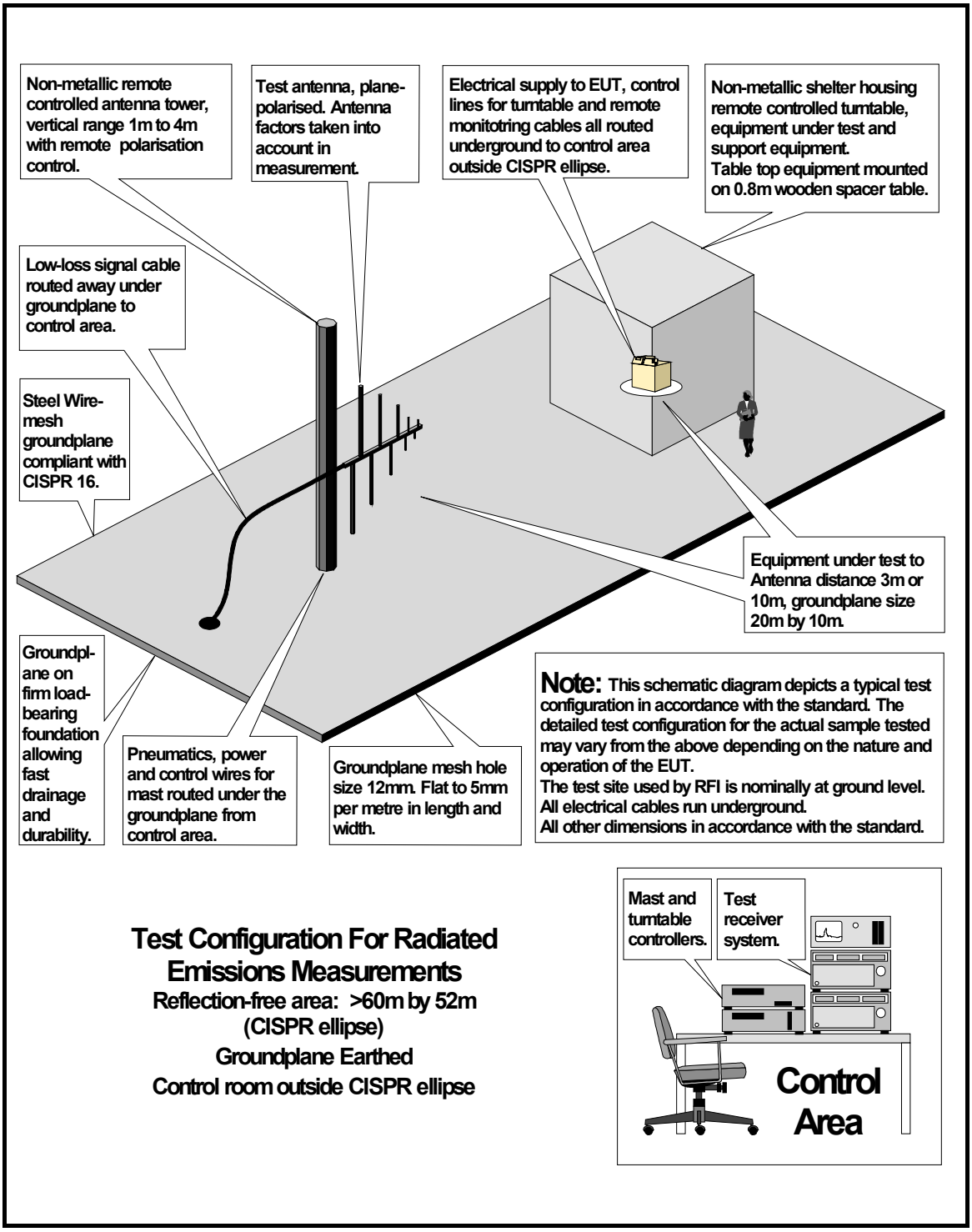
DRG\49345JD09A\EMICON



Note: This diagram is also valid for the latest version of ANSI C63.4-2003

Test of: GN A/S
Jabra BT8040, Bluetooth Headset
To: FCC Part 15.247: 2006 (Subpart C)

DRG\49345JD09A**EMIRAD**



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