

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

Test Report Serial No:
RFI/RPTE1/RP49055JD12A

This Test Report Is Issued Under The Authority
Of Michael Derby, Wireless Radio Performance Group Leader:



Tested By: Ian Watch



Checked By: Tony Henriques



Report Copy No: PDF01

Issue Date: 02 April 2007

Test Dates: 26 March 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

RFI GLOBAL SERVICES LTD

Test Report

Serial No: RFI/RPTE1/RP49055JD12A

Page: 2 of 22

Issue Date: 02 April 2007

**Test of: GN A/S
Jabra ACW003B-05 Charger**

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

This page has been left intentionally blank.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

Table of Contents

1. Client Information	4
2. Equipment Under Test (EUT).....	5
3. Test Specification, Methods and Procedures	6
4. Deviations from the Test Specification	7
5. Operation and Configuration of the EUT during Testing	8
6. Summary of Test Results.....	9
7. Measurements, Examinations and Derived Results.....	10
8. Measurement Uncertainty	15
9. Measurement Methods.....	16
Appendix 1. Test Equipment Used.....	19
Appendix 2. Test Configuration Drawings	20

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

1. Client Information

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

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

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 AC Charger for a *Bluetooth* headset.

2.2. Identification of Equipment Under Test (EUT)

Description:	Charger
Brand Name:	Jabra / Sunfone
Model Name or Number:	ACW003B-05
Serial Number:	No 2
Country of Manufacture:	China
Date of Receipt:	26 March 2007

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Support Equipment

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

Description:	<i>Bluetooth</i> Headset
Brand Name:	Jabra
Model Name or Number:	OTE 1
Serial Number:	Norm 2

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	FCC Part 15 Subpart B: 2006 (Sections 15.107 & 15.109)
Title:	Code of Federal Regulations, Part 15 (47CFR215) Radio Frequency Devices

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.

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 of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

4. Deviations from the Test Specification

There were no deviations from the test specification.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

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.

Charging

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

Bluetooth headset powered down but being charged by the EUT

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

6. Summary of Test Results

Range of Measurements	Specification Section Reference	Port Type	Compliance Status
Idle Mode AC Conducted Emissions	Section 15.107	AC Mains	Complied
Idle Mode Radiated Spurious Emissions	Section 15.109	Antenna	Complied

6.1. 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

FCC Site Registration Number: 90895

IC Site Registration Number: 3485

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

7. Measurements, Examinations and Derived Results

7.1. 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.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

7.2. Test Results

7.2.1. AC Conducted Spurious Emissions: Section 15.107

The EUT was configured for AC conducted emission measurements, as described in Section 9 of this report.

Tests were performed to identify the maximum emission levels present on the ac mains line of the EUT.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.154000	Neutral	43.5	65.8	22.3	Complied
0.174000	Neutral	38.0	64.8	26.8	Complied
0.182000	Live	33.3	64.4	31.1	Complied
0.190000	Neutral	30.4	64.0	33.6	Complied
0.222000	Live	34.1	62.7	28.7	Complied
0.226000	Neutral	33.9	62.6	28.7	Complied
0.246000	Live	29.8	61.9	32.1	Complied
0.290000	Live	27.9	60.5	32.6	Complied
0.298000	Live	27.6	60.3	32.7	Complied
0.346000	Neutral	21.5	59.1	37.6	Complied

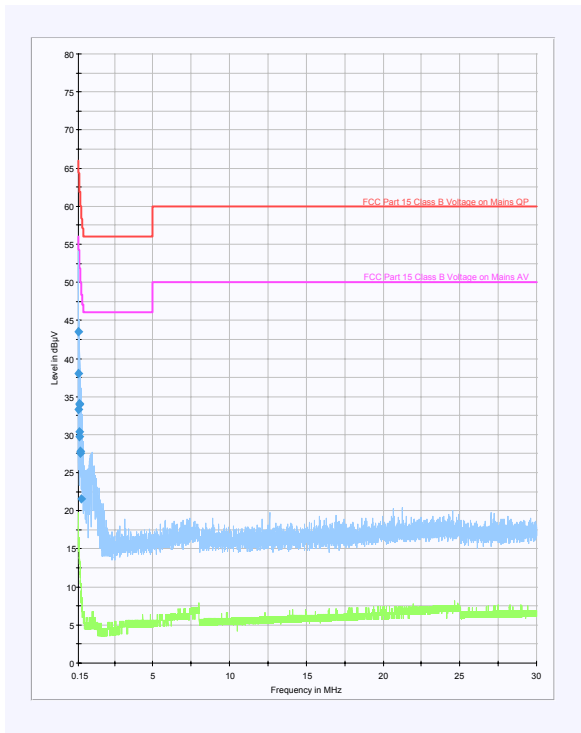
Note(s):

1. All quasi-peak emissions levels were >10 dB below the average limit therefore no average measurements were performed.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

AC Conducted Spurious Emissions: Section 15.107 (Continued)



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

Test of: GN A/S
 Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

7.2.2. Radiated Spurious Emissions: Section 15.109

The EUT was configured for radiated emission testing, as described in section 9 of this report. Tests were performed to identify the maximum receiver or standby radiated emission levels.

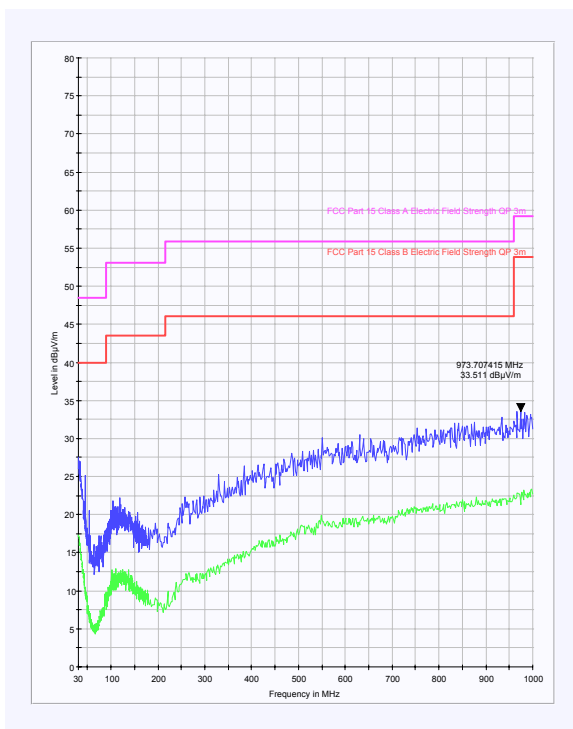
Results:

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

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
973.707	Vertical	33.5	54.0	20.5	Complied

Note(s):

- *Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.



Test of: GN A/S
 Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

7.2.3. Radiated Spurious Emissions: Section 15.109

Results:

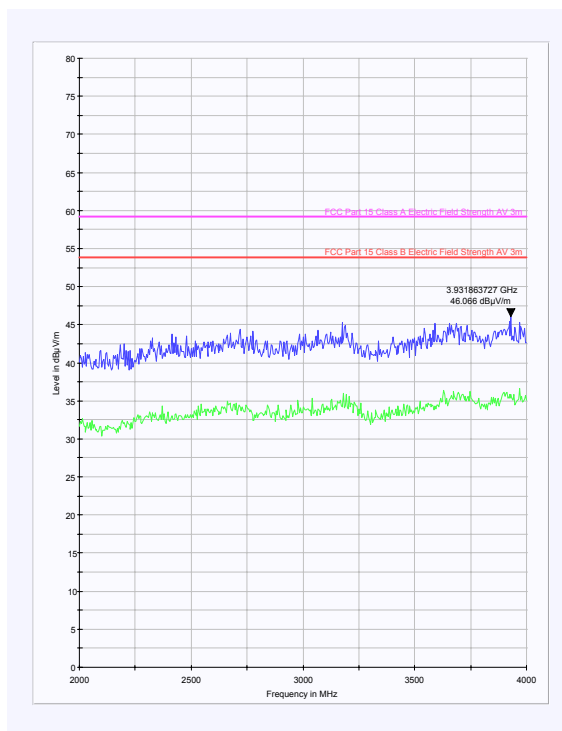
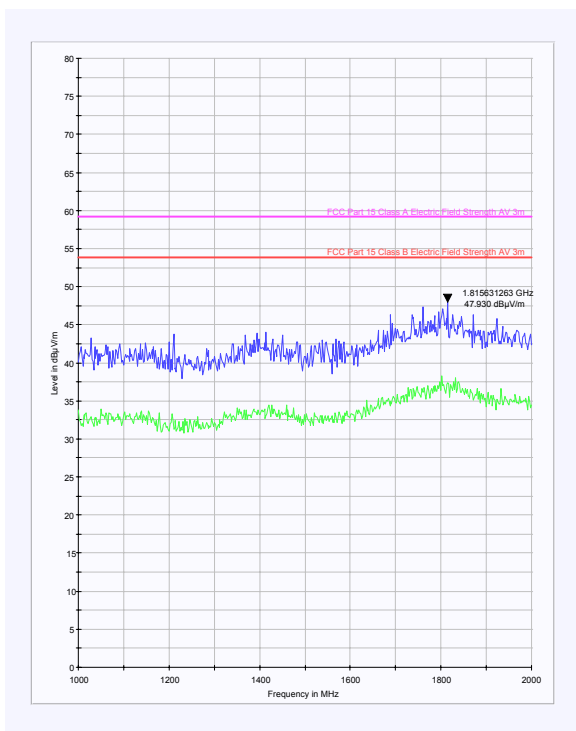
Electric Field Strength Measurements (Frequency Range: 1 GHz to 4 GHz)

Highest Peak Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Results
3.931863	V	43.6	2.5	46.1	54.0	7.9	Complied

Note(s):

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.



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

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

8. 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%	+/- 3.25 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 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.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

9. Measurement Methods

9.1. 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

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

9.2. 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.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

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 μ 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

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

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	08 Jun 2006	36
A031	Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1037	Bilog Antenna	Chase EMC	CBL6112B	2413	20 Sep 2006	12
A1069	LISN	Rohde & Schwarz	ESH3-Z5	837469/012	09 Feb 2007	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S212	Screened Room	RFI	12		-	-

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

Appendix 2. Test Configuration Drawings

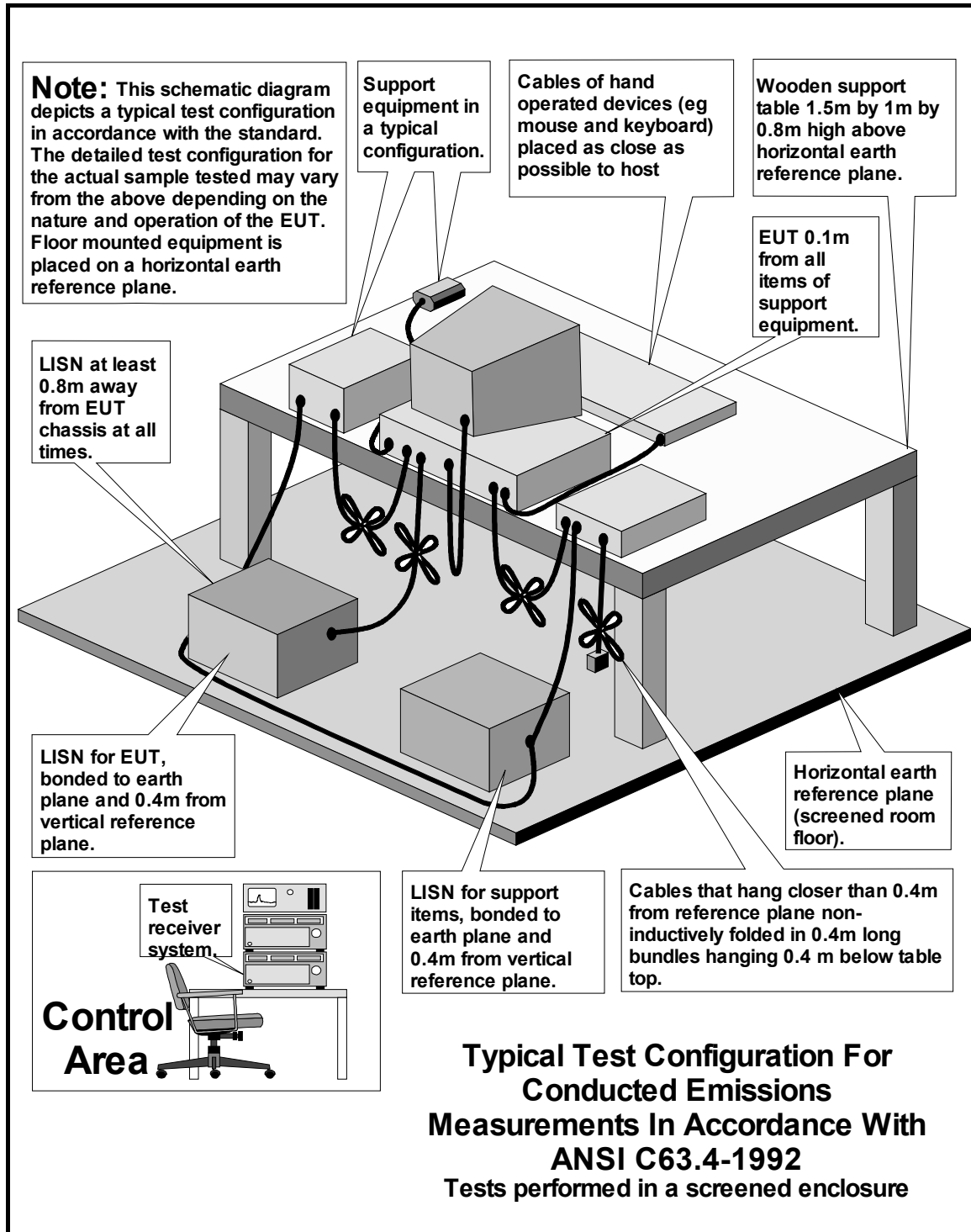
This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49055JD12\EMICON	Test configuration for measurement of conducted emissions.
DRG\49055JD12\EMIRAD	Test configuration for measurement of radiated emissions.

Test of: GN A/S
 Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

DRG\49055JD12\EMICON



Test of: GN A/S
Jabra ACW003B-05 Charger

To: FCC Part 15 Subpart B Clauses 15.107 & 15.109

DRG\49055JD12\EMIRAD

