TEST REPORT
FROM
RADIO FREQUENCY
INVESTIGATION LTD.

Test Of: Brain Boxes Ltd.
BL-510

To: F.C.C. Part 15 Subpart C: 2001
(Intentional Radiators)
Section 15.247

Test Report Serial No:
RFI/EMCB1/RP44012JD09A

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	**Checked By:** 
Tested By: 	**Release Version No:** **PDF01**
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Table of Contents

1. Client Information

Company Name:	Brain Boxes Limited
Address:	Unit 3C Wavertree Boulevard South Wavertree Technology Park Liverpool L7 9PF
Contact Name:	Mr Peter Gray

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification Of Equipment Under Test (EUT)

Sample 1:

Brand Name:	Bluetooth RS232 Adapter
Model Name or Number:	Bluetooth Class 2 Module with Antenna Port
Unique Type Identification:	BL-510
Serial Number:	None
Country of Manufacture:	UK
FCC ID Number:	Not applicable
Date of Receipt:	10 October 2002

Sample 2:

Brand Name:	Bluetooth RS232 Adapter
Model Name or Number:	Bluetooth Class 2 Module with Antenna
Unique Type Identification:	BL-510
Serial Number:	None
Country of Manufacture:	UK
FCC ID Number:	Not applicable
Date of Receipt:	10 October 2002

Sample 3:

Brand Name:	Bluetooth RS232 Adapter
Model Name or Number:	Bluetooth Class 2 Module with Antenna
Unique Type Identification:	BL-510
Serial Number:	None
Country of Manufacture:	UK
FCC ID Number:	Not applicable
Date of Receipt:	10 October 2002

2.2. Description Of EUT

The equipment under test is a RS232 Bluetooth Adaptor.

2.3. Modifications Incorporated In EUT

Prior to testing the samples were modified by moving the resistor 0402 so that the receiver was powered from the AUX_DAC pin. This modification was necessary to make the sample representative of the latest manufactured design.

Sample 1 was modified by the manufacturer to include a 50 Ohm connector at the antenna ports.

Sample 3 was an unmodified unit with the resistor 0402 in place.

2.4. Additional Information Related To Testing

Power Supply Requirement:	Nominal 115 V, 60 Hz AC Mains Supply 13 Amp (max)
Intended Operating Environment:	Commercial, Light Industry
Weight:	46 g
Dimensions:	90 x 50 x 20 mm
Interface Ports:	RS232 USB (programmable)

2.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Digital
Model Name or Number:	Hi Note Ultra II
Serial Number:	SR61600226
Cable Length And Type:	3 Meters
Connected to Port:	DC

Description:	Mains Power Adapter
Brand Name:	Digital
Model Name or Number:	FR-PCP8H-AD
Serial Number:	02101724
Cable Length And Type:	2m Mains, 1.5m Mains
Connected to Port:	AC

Description:	Laptop PC
Brand Name:	Toshiba
Model Name or Number:	Tegra 8100
Serial Number:	60237337G ST810-0
Cable Length And Type:	3 Meters
Connected to Port:	DC

Support Equipment (continued)

Description:	Mains Power Adaptor
Brand Name:	Toshiba
Model Name or Number:	PA2444V
Serial Number:	0005A 0441198
Cable Length And Type:	2m Mains, 1.5m 2 Core
Connected to Port:	AC

3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	FCC Part 15 Subpart C: 2001 (Section 15.247)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Digital Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

Reference:	FCC Part 15 Subpart B: 2001 (Section 15.107 and 15.109)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Radio Frequency Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

3.2. Methods And Procedures

The methods and procedures used were as detailed in:

FCC Code of Federal Regulations 47.
Telecommunication. Parts 0 to 19, October 2001.

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)
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.

4. Deviations From The Test Specification

None.

5. Operation Of The EUT During Testing

5.1. Operating Conditions

The EUT was tested in a normal laboratory environment.

During testing, the EUT was powered by a 110 V, 60 Hz AC Mains supply.

5.2. Operating Modes

The EUT was tested in the following operating modes:

Transmitting on Top, Middle or Bottom channels, hopping over the full operating frequency range or in receive mode.

The reason for choosing these modes was that the client defined it as being likely to be the worst case with regards EMC.

5.3. Configuration And Peripherals

The EUT was tested in the following configuration:

During all tests the EUT was connected to and controlled by a laptop personal computer, containing the appropriate software.

NB Section 2 of this report contains a full list of support equipment used and Appendix 3 contains a schematic diagram of the test configuration.

6. Summary Of Test Results

Range Of Measurements	Specification Reference	Port Type	Compliancy Status
Receiver Conducted Emissions (AC Mains)	C.F.R. 47 FCC Part 15: 2001 Section 15.107	AC Mains	Complied
Receiver Radiated Emissions	C.F.R. 47 FCC Part 15: 2001 Section 15.109	Antenna	Complied
Transmitter Conducted Emissions (AC Mains)	C.F.R. 47 FCC Part 15: 2001 Section 15.207	AC Mains Terminals	Complied
Transmitter Carrier Frequency Separation	C.F.R. 47 FCC Part 15: 2001 Section 15.247(a)(1)	Antenna Terminals	Complied
Transmitter 20dB Bandwidth	C.F.R. 47 FCC Part 15: 2001 Section 15.247(a)(1)	Antenna Terminals	Complied
Transmitter Average Time of Occupancy	C.F.R. 47 FCC Part 15: 2001 Section 15.247(a)(1)(iii)	Antenna Terminals	Complied
Transmitter Maximum Peak Output Power	C.F.R. 47 FCC Part 15: 2001 Section 15.247(b)(1)	Antenna Terminals	Complied
Transmitter Maximum Peak Output Power EIRP	C.F.R. 47 FCC Part 15: 2001 Section 15.247(b)(1)	Antenna Terminals	Complied
Transmitter Conducted Emissions	C.F.R. 47 FCC Part 15: 2001 Section 15.247 (c)	Antenna Terminals	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 15: 2001 Section 15.247(c) Section 15.209(a)	Antenna	Complied
Transmitter Band Edge Conducted Emissions	CFR 47: 2001, Section 15.247(c)	Antenna Terminals	Complied
Transmitter Band Edge Radiated Emission	CFR 47: 2001, Section 15.247(c) Section 15.209(a)	Antenna	Complied

6.1. Location Of Tests

All the measurements described in this report were performed at the premises of Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

7. Measurements, Examinations And Derived Results

7.1. General Comments

7.1.1. This section contains test results only. Details of the test methods and procedures can be found in Appendix 2 of this report.

7.1.2. 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.

7.2. Receiver Conducted Emissions: AC Mains - Section 15.107

7.2.1. Quasi-Peak Detector Measurements On Live And Neutral Lines

7.2.1.1. The following table lists results for AC conducted emissions.

7.2.1.2. Preliminary AC conducted spurious scans were performed with the EUT set to receive mode.

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

7.2.1.4. Plots of all the initial scans can be found in the accompanying graphical results document.

7.2.1.5. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector:

Results

Frequency (MHz)	Line	Q-P Level (dBµV)	Q-P Limit (dBµV)	Margin (dB)	Result
0.51709	Live/Neutral	55.17	48.0	-7.17	*See Note
0.77209	Live/Neutral	49.61	48.0	-1.61	*See Note
1.03038	Live/Neutral	45.70	48.0	2.3	Complied
4.54936	Live/Neutral	49.00	48.0	-1.0	*See Note
6.62487	Live/Neutral	56.67	48.0	4.33	*See Note
6.92233	Live/Neutral	55.48	48.0	5.72	*See Note

***Note:** These measurements were made and found to be over the specified limit. As a result, measurements were made in line with FCC Part 15.207 (b) which states that if an emission exceeds the limit specified in FCC Part 15.207 (a) then the measurement procedure specified in part (b) may be applied. Using this method, the emissions in question were measured and were found to be more than 6 dB below the QP measured value. They were thus deemed wideband. The QP measurements can thus be reduced by 13 dB as specified in FCC Part 15.207 (b). The following table shows the above noted levels measured using an average detector and the corresponding corrected level after subtracting 13 dB. The levels measured can now be seen to show compliance.

7.2.2. Quasi-Peak Detector Measurements On Live And Neutral Lines (continued)

Freq (MHz)	Line	Q-P Level (dBµV)	Av. Level (dBµV)	Q-P – Av. Margin (dB)	Q-P Level –13 (dBµV)	Q-P Limit (dBµV)	Margin (dB)	Result
0.51709	Live/ Neutral	55.17	40.29	14.88	42.17	48.0	5.83	Complied
0.77209	Live/ Neutral	49.61	32.34	17.27	36.61	48.0	11.39	Complied
4.54936	Live/ Neutral	49.00	36.89	12.11	36.00	48.0	12.00	Complied
6.62487	Live/ Neutral	56.67	40.77	15.90	43.67	48.0	4.33	Complied
6.92233	Live/ Neutral	55.48	39.35	16.13	42.48	48.0	5.52	Complied

7.3. Receiver Radiated Emissions: Section 15.109

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

7.3.1.1. The following table indicates measured results with the EUT operated in receive mode to the limits specified in Part 15.109.

7.3.1.2. Plots of the initial scans can be found in the accompanying graphical results document.

7.3.1.3. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3m (results incorporate antenna factors and cable losses):

Frequency (MHz)	Ant. Pol.	Q-P Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
47.604	Vert.	21.4	40.0	18.5	Complied
54.993	Vert.	19.7	40.0	20.3	Complied
61.104	Vert.	22.8	40.0	17.2	Complied
100.861	Vert.	26.8	43.5	16.7	Complied
120.003	Vert.	32.7	43.5	10.8	Complied
128.109	Vert.	26.5	43.5	17.0	Complied
280.009	Vert.	15.5	46.0	30.5	Complied
400.028	Horiz.	21.8	46.0	24.2	Complied
533.164	Horiz.	29.1	46.0	16.9	Complied
600.061	Horiz.	27.4	46.0	18.6	Complied
734.817	Vert.	23.1	46.0	22.9	Complied
807.570	Vert.	26.4	46.0	19.6	Complied
866.724	Vert.	25.7	46.0	20.3	Complied

7.4. Receiver Radiated Emissions: Section 15.109

7.4.1. Electric Field Strength Measurements (Frequency Range: 1.0 to 12.5 GHz)

7.4.1.1. The following table indicates results measured in the receive mode to the limits specified in Part 15.109.

7.4.1.2. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 12.5 GHz.

7.4.1.3. Preliminary Radiated spurious scans were performed with final measurements being taken for any emission within 20dB of the limit.

7.4.1.4. Due to dynamic range limitations of the measuring receiver, scans at high frequencies above 12 GHz were performed at 1 metre measurement distances, with an corrected limit line for the reduced test distances.

7.4.1.5. Plots of all the initial scans can be found in the accompanying graphical results document.

7.4.1.6. The following results are for the EUT configured with an internal antenna connected and operating.

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Result
1.23444	Vert.	2.7	21.6	0.9	25.20	54.0	28.80	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Result
1.23444	Vert.	15.26	21.6	0.9	37.76	74.0	36.24	Complied

7.5. Transmitter Conducted Emissions: AC Mains - Section 15.207

7.5.1. Quasi-Peak Detector Measurements On Live And Neutral Lines

7.5.1.1. The following table lists results for AC conducted emissions.

7.5.1.2. Preliminary AC conducted spurious scans were performed with the EUT set to the Top, Middle, Bottom channels as requested in FCC Part 15.31(m).

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

7.5.1.4. Plots of all the initial scans can be found in the accompanying graphical results document.

7.5.1.5. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector:

Results

Frequency (MHz)	Line	Q-P Level (dBµV)	Q-P Limit (dBµV)	Margin (dB)	Result
0.51709	Live/Neutral	55.17	48.0	-7.17	*See Note
0.77209	Live/Neutral	49.61	48.0	-1.61	*See Note
1.03038	Live/Neutral	45.70	48.0	2.3	Complied
4.54936	Live/Neutral	49.00	48.0	-1.0	*See Note
6.62487	Live/Neutral	56.67	48.0	4.33	*See Note
6.92233	Live/Neutral	55.48	48.0	5.72	*See Note

***Note:** These measurements were made and found to be over the specified limit. As a result, measurements were made in line with FCC Part 15.207 (b) which states that if an emission exceeds the limit specified in FCC Part 15.207 (a) then the measurement procedure specified in part (b) may be applied. Using this method, the emissions in question were measured and were found to be more than 6 dB below the QP measured value. They were thus deemed wideband. The QP measurements can thus be reduced by 13 dB as specified in FCC Part 15.207 (b). The following table shows the above noted levels measured using an average detector and the corresponding corrected level after subtracting 13 dB. The levels measured can now be seen to show compliance.

7.5.2. Quasi-Peak Detector Measurements On Live And Neutral Lines (continued)

Freq (MHz)	Line	Q-P Level (dBµV)	Av. Level (dBµV)	Q-P – Av. Margin (dB)	Q-P Level –13 (dBµV)	Q-P Limit (dBµV)	Margin (dB)	Result
0.51709	Live/ Neutral	55.17	40.29	14.88	42.17	48.0	5.83	Complied
0.77209	Live/ Neutral	49.61	32.34	17.27	36.61	48.0	11.39	Complied
4.54936	Live/ Neutral	49.00	36.89	12.11	36.00	48.0	12.00	Complied
6.62487	Live/ Neutral	56.67	40.77	15.90	43.67	48.0	4.33	Complied
6.92233	Live/ Neutral	55.48	39.35	16.13	42.48	48.0	5.52	Complied

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

7.6.1. Tests were performed to identify the carrier frequency separation as per FCC Part 15.247(a)(1).

7.6.2. Section 15.247 (a)(1) specifies that the channels should be separated by at least 25kHz or the 20dB bandwidth of the channel.

7.6.3. A graphical plot of the characteristics of two adjacent channels was obtained. The following results were noted:

Result:

Transmitter Carrier Frequency Separation (kHz)	Graph
1006	GPH/44012JD09/CE012

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

7.7.1. Tests were performed to identify the 20dB bandwidth as per FCC Part 15.247(a)(1).

7.7.2. A graphical plot of the 20dB was obtained. The following results were noted:

Result:

Transmitter 20dB Bandwidth (kHz)	Graph
826	GPH/44012JD09/CE011

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

7.8.1. Tests were performed to identify the average time occupancy as per FCC Part 15.247(a)(1)(iii).

7.8.2. Section 15.247 (a)(1)(iii) specifies that the average time occupancy shall not be greater than 0.4 seconds.

7.8.3. The time occupancy of the system was tested on a single carrier. The maximum packet length was measured and multiplied by the number of transmissions within a 30 second period. The result was noted as being the average time of occupancy.

Result:

Packet Width (μs)	Number of Transmissions in 30 Seconds	Average Time of Occupancy (s)	Graph
527	200	0.105	GPH/44012JD09/CE014

7.9. Transmitter Peak Output Power: Section 15.247(b)(1)

7.9.1. Tests were performed to identify the maximum transmit power in accordance with FCC Part 15.247(b)(1).

7.9.2. The client has provided a temporary antenna port to allow a direct connection to be made.

7.9.3. The client has specified that the EUT employs frequency hopping with 79 hopping channels. Therefore the maximum transmitter power level under FCC Part 15.247(b)(1) is 1 Watt.

7.9.4. Results are shown for the EUT set to Top, Middle and Bottom channels as stated in FCC Part 15.31 (m) and section 5.2 of this report. Graphical measurements are shown for the transmit power levels within the accompanying graphical results document.

7.9.5. Measurements were performed on the Top, Middle and Bottom channels for the specified extremes of input voltages:

Results:

Number of Hopping Channels Employed	Graph
79	GPH/44012JD09/CE010

Channel	Input Voltage (AC)	Maximum Transmitter Output Level (Watts)	Limit (Watts)	Margin	Result
Bottom	93	0.018246	1.0	0.981754	Complied
Bottom	110	0.018246	1.0	0.981754	Complied
Bottom	126.5	0.018059	1.0	0.981941	Complied
Middle	93	0.016993	1.0	0.983007	Complied
Middle	110	0.017153	1.0	0.982847	Complied
Middle	126.5	0.016993	1.0	0.983007	Complied
Top	93	0.015279	1.0	0.984721	Complied
Top	110	0.015265	1.0	0.984735	Complied
Top	126.5	0.015279	1.0	0.984721	Complied

7.10. Radiated Transmitter Peak Output Power: Transmit Mode

7.10.1.Effective Isotropic Radiated Power

Tests were performed to identify the maximum transmit power in accordance with FCC Part 15.247(b)(1).7.10.1.1. and with Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

7.10.1.2. The client has specified that the EUT employs frequency hopping with 79 hopping channels. Therefore the maximum transmitter power level under FCC Part 15.247(b)(1) is 1 Watt.

7.10.1.3. Results are shown for the EUT set to Top, Middle and Bottom channels as stated in FCC Part 15.31 (m) and section 5.2 of this report. Graphical measurements are shown for the transmit power levels within the accompanying graphical results document.

Results:

Channel	Input Voltage (AC)	Maximum Transmitter Output Level (Watts)	Limit (Watts)	Margin	Result
Bottom	110	0.0027	1.0	0.9973	Complied
Middle	110	0.0017	1.0	0.9983	Complied
Top	110	0.0013	1.0	0.9987	Complied

7.11. Transmitter Conducted Emissions: Section 15.247(c)

7.11.1. Spurious emissions tests on the antenna port were performed in accordance with FCC Part 15.247(c).

7.11.2. Section 15.247(c) specifies that all spurious emissions measured within a 100 kHz bandwidth shall be attenuated by at least 20 dB below the level of the highest fundamental level measured in a 100 kHz bandwidth.

7.11.3. Conducted spurious emission scans were performed between 30 to 26500MHz with the EUT operating at the Top, Middle, Bottom channels as specified within clause 15.31(m). All channels were active and transmitting data.

7.11.4. Plots of the initial scans can be found in the accompanying graphical results document.

Results:

Frequency (MHz)	Ant. Pol.	Q-P Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
30 to 26500	Horiz/Vert	< 20.0	40.0	> 20.0	Complied

7.12. Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a)

7.12.1. Electric Field Strength Measurements: 30 to 1000 MHz.

7.12.1.1. The following table specifies frequencies, which fall close to the restricted bands as specified in section 15.205(a).

7.12.1.2. The client has stated that the highest clock frequency for the EUT was 2.480GHz. Therefore measurements were performed up to 26 GHz.

7.12.1.3. Preliminary Radiated spurious scans were performed with the EUT set to Top, Middle and Bottom channels and with all channels active (transmitting data on pseudo random hopping channels) as stated in section 5.2.

7.12.1.4. Due to dynamic range limitations of the measuring receiver, scans at high frequencies above 12 GHz were performed at a 1 metre measurement distance. The measured value was then corrected by 9.5 dB using the formula 20log(D1/D2) Where D1 was 3 meters and D2 was 1 meter.

7.12.1.5. Plots of the initial scans can be found in the accompanying graphical results document.

7.12.1.6. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3m (results incorporate antenna factors and cable losses):

7.12.1.7. The following results are for the EUT configured with an internal antenna connected and operating.

Bottom Channel

Frequency (MHz)	Ant. Pol.	Q-P Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
47.397	Vert.	17.9	40.0	22.1	Complied
57.736	Vert.	22.8	40.0	17.2	Complied
74.391	Vert.	20.2	40.0	19.8	Complied
80.003	Vert.	27.1	40.0	12.9	Complied
100.861	Vert.	26.8	43.5	16.7	Complied
109.602	Vert.	33.2	43.5	10.3	Complied
117.748	Vert.	34.4	43.5	9.1	Complied
279.993	Vert.	15.7	46.0	30.3	Complied
300.011	Horiz.	27.8	46.0	18.2	Complied
400.031	Horiz.	20.8	46.0	25.2	Complied
503.773	Horiz.	29.8	46.0	16.2	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (continued)

Frequency (MHz)	Ant. Pol.	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
532.471	Horiz.	25.3	46.0	20.7	Complied
603.031	Horiz.	21.6	46.0	24.4	Complied
733.515	Horiz.	26.7	46.0	19.3	Complied
867.310	Vert.	25.6	46.0	20.4	Complied

***Note:** The preliminary scans showed similar emission levels for each mode below 1 GHz, therefore final radiated emissions measurements were performed with the EUT set to the Bottom channel only.

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (continued)

7.12.2. Electric Field Strength Measurements: 1.0 to 26.0 GHz

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Result
1.48024	Vert.	8.01	21.8	1.0	30.81	54.0	23.19	Complied
2.55174	Vert.	11.87	20.5	1.3	33.67	54.0	20.33	Complied
4.80222	Vert.	15.11	22.6	1.8	39.51	54.0	14.49	Complied
7.20524	Vert.	15.33	24.8	2.0	42.13	54.0	11.87	Complied
9.60986	Vert.	4.27	28.4	2.1	34.77	54.0	19.23	Complied

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Result
1.48024	Vert.	39.71	21.8	1.0	62.51	74.0	11.49	Complied
2.55174	Vert.	26.11	20.5	1.3	47.91	74.0	26.09	Complied
4.80222	Vert.	30.67	22.6	1.8	55.07	74.0	18.93	Complied
7.20524	Vert.	30.19	24.8	2.0	56.99	74.0	17.01	Complied
9.60986	Vert.	20.85	28.4	2.1	51.35	74.0	22.65	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (continued)

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Result
1.48014	Vert.	10.67	21.8	1.0	33.47	54.0	20.53	Complied
2.21283	Vert.	1.98	20.5	1.2	23.68	54.0	30.32	Complied
4.88308	Vert.	12.65	22.6	1.8	37.05	54.0	16.95	Complied
7.32478	Vert.	8.66	24.8	2.0	35.46	54.0	18.54	Complied
11.68664	Vert.	1.91	28.4	2.3	32.61	54.0	21.39	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Result
1.48014	Vert.	36.87	21.8	1.0	59.67	74.0	14.33	Complied
2.21283	Vert.	18.96	20.5	1.2	40.66	74.0	33.34	Complied
4.88308	Vert.	27.52	22.6	1.8	51.92	74.0	22.08	Complied
7.32478	Vert.	25.07	24.8	2.0	51.87	74.0	22.13	Complied
11.68664	Vert.	21.07	28.4	2.3	51.77	74.0	12.23	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (continued)

Highest Average Level: Top Channel

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Result
1.24007	Vert.	11.19	21.8	1.0	33.99	54.0	20.01	Complied
2.24729	Vert.	-1.25	20.5	1.2	20.45	54.0	33.55	Complied
4.96118	Vert.	13.15	22.6	1.8	37.55	54.0	16.45	Complied
7.43929	Vert.	3.7	24.8	2.0	30.50	54.0	23.50	Complied
10.56061	Vert.	2.10	28.4	2.2	32.70	54.0	21.30	Complied

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Result
1.24007	Vert.	19.59	21.8	1.0	42.39	74.0	31.61	Complied
2.24729	Vert.	14.29	20.5	1.2	35.99	74.0	38.01	Complied
4.96118	Vert.	27.76	22.6	1.8	52.16	74.0	21.84	Complied
7.43929	Vert.	17.21	24.8	2.0	44.01	74.0	29.99	Complied
10.56061	Vert.	25.99	28.4	2.2	56.59	74.0	7.41	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (continued)

Highest Average Level: Hopping Mode

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Result
1.48044	Vert.	8.08	21.8	1.0	30.88	54.0	23.12	Complied
2.23349	Vert.	-5.23	20.5	1.2	16.47	54.0	37.53	Complied
4.80691	Vert.	9.07	22.6	1.8	33.47	54.0	20.53	Complied
7.21139	Vert.	2.71	24.8	2.0	29.51	54.0	24.49	Complied
9.61500	Vert.	0.17	28.4	2.1	30.67	54.0	23.33	Complied

Highest Peak Level: Hopping Mode

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBµV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Result
1.48044	Vert.	42.32	21.8	1.0	65.12	74.0	8.88	Complied
2.23349	Vert.	10.08	20.5	1.2	31.78	74.0	42.22	Complied
4.80691	Vert.	29.81	22.6	1.8	54.21	74.0	19.79	Complied
7.21139	Vert.	29.30	24.8	2.0	56.10	74.0	17.90	Complied
9.61500	Vert.	18.65	28.4	2.1	49.15	74.0	24.85	Complied

7.13. Transmitter Band Edge Conducted Emissions FCC 15.247(c)

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

7.13.2.The applicant to allow for conducted measurements provided a temporary antenna port.

7.13.3. A plot of the upper channel and the protected band closest to the upper channel was produced. A marker was set to the peak of the highest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission, whichever is greater). The plots show that the emission complies with the 20dBc limit.

7.13.4. A plot of the lower channel and the protected band closest to the lower channel was produced. A marker was set to the peak of the lowest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission, whichever is greater). The plots show that the emission complies with the 20dBc limit.

7.13.5. Two graphs in total were produced, with the device set to top and bottom channels. The plots can be seen in the accompanying graphical results document.

7.14. Transmitter Band Edge Radiated Emissions

7.14.1. Electric Field Strength Measurements

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

7.14.1.2. A plot of the protected band closest to the upper channel was produced with frequency hopping mode turned off and the device set to transmit on the top channel. A marker was set to the peak of 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, which ever is greater).

7.14.1.3. The highest noted emission was then measured as per the requirements of FCC Part 15.209 for electric field strength measurements.

7.14.1.4. A plot of the protected band closest to the lower channel was then produced with frequency hopping turned off and the device set to transmit on the bottom channel. A marker was set to the peak of 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, which ever is greater).

7.14.1.5. The highest noted emission was then measured as per the requirements of FCC Part 15.209 for electric field strength measurements.

7.14.1.6. Two graphs were produced showing the responses in the limited frequency bands. The plots can be seen in the accompanying graphical results document.

8. Measurement Uncertainty

8.1. 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.

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

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

8.4. 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
Conducted Emissions AC Mains	0.15 MHz to 30 MHz	95%	+/- 3.25 dB
Time Occupancy	Not applicable	95%	+/- 10 %
Channel Separation	Not applicable	95%	+/- 10 %
Occupied Bandwidth	1850 to 1910 MHz	95%	+/- 0.12 %
Effective Isotropic Radiated Power	1.0 GHz to 26 GHz	95%	+/- 1.78 dB
Radiated Emissions at 3.0 metres	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Conducted Emissions Antenna Port	0.009 kHz to 26 GHz	95%	+/- 1.2 dB
Radiated Emissions at 3.0 metres	1 GHz to 26 GHz	95%	+/- 1.78 dB

8.5. 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.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A019	1050 Controller	EMCO	1050	1191
A027	Horn Antenna	Eaton	9188-2	301
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557
A1069	ESH3-Z5	Rohde & Schwarz	ESH3-Z5	837469/012
A145	10 dB Attenuator	Narda	None	None
A197	Site 2 Controller SC144	Unknown	SC144	150720
A200	Weinschel 100 W 20 dB Attenuator	Weinschel	WA48-20	385
A217	10 dB attenuator	Narda	769-10	3637
A259	Bilog Antenna	Chase	CBL6111	1513
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	
A427	WG 14 horn	Flann	14240-20	150
A428	WG 12 horn	Flann	12240-20	134
A429	WG 16 horn	Flann	16240-20	561
A430	WG 18 horn	Flann	18240-20	425
A436	WG 20 horn	Flann	20240-20	330
A559	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	357881052
C1065	Rosenberger	Rosenberger	UFA210-1-7872	0985
C160	Cables	Rosenberger	UFA210A-1-1181-70x70	None
C341	Cable	Andrews	None	None
C362	Cable	Rosenberger	UFA210A-1-1181-70x70	1925
C453	Cable	Rosenberger	RG142XX-001-RFIB	C453-10081998
C468	N-Type Coaxial Cable	Rosenberger	UFA210A-1-3937-504504	98L0440
E013	PCN Environmental Chamber	Sanyo	ATMOS chamber	None
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008

Test Equipment Used (continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027
M069	ESMI Spectrum Analyser / Receiver	Rohde & Schwarz	ESMI	829 808/007 (DU) / 827 063/008 (RU)
M072	FSM Spectrum Analyser	Rohde & Schwarz	FSM	862 967/010 (RF) & 863 912/048 (Display)
M088	Receiver / Spectrum Analyser System	Rohde & Schwarz	ESBI	DU:835862/018 RU:835387/006
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016
M173	Turntable Controller	R.H.Electrical Services	RH351	3510020
M198	Thermal Power Sensor	Rohde & Schwarz	NRV-Z52	827 191/003
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075
S003	Power Control	Zen	E08	736699
S201	Site 1	RFI	1	-
S202	Site 2	RFI	2	-
S207	Site 7	RFI	7	98L0440
S212	Site 12	RFI	12	-

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

Appendix 2. Measurement Methods

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 and with the EUT powered via a 60 Hz AC mains supply.

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)*
Mode:	Max Hold	Not applicable
Bandwidth:	9 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

* In some instances an Average detector function may also have been used.

Radiated Field Strength 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, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

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. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested on the open area test site, at the appropriate distance, using a measuring receiver with a Quasi-Peak (below 1000 MHz), Average and Peak (above 1000 MHz) detector, where applicable.

For the main (final) measurements the EUT was arranged on a non-conducting table on an open area test site, as detailed in the specification.

All measurements on the open area test site were performed using broadband antennas.

On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360°. For frequencies below 1000 MHz, the antenna was varied in height between 1 m and 4 m. For frequencies above 1000 MHz, the antenna was fixed at a height of 1.5m. 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.

Once the signal amplitude is determined the EUT is replace with a substitution antenna. A signal generator is connected to the antenna and its level adjusted in order to obtain the same indicated level as that which was observed from the EUT. The receive antenna is then adjusted in height until the signal measured has peaked. The signal generator level is then re-adjusted to regain the original reading. The level on the signal generator – cable losses plus the antenna gain is the recorded ERP.

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

Receiver Function	**Initial Scan Below 1000 MHz**	**Final Measurements Below 1000 MHz**
Detector Type:	Peak	Quasi-Peak (CISPR)
Mode:	Max Hold	Not applicable
Bandwidth:	100 kHz	120 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

Receiver Function	**Initial Scan Above 1000 MHz**	**Final Measurements Above 1000 MHz**
Detector Type:	Peak	Peak/Average
Mode:	Max Hold	Not applicable
Bandwidth:	1 MHz	1 MHz
Amplitude Range:	60 dB	20 dB (typical)
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

Conducted Antenna Port Emissions

Conducted Antenna Port Emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

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

Initial measurements covering the entire measurement band in the form of swept scans were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which measurements were performed. 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, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Due to the design of the EUT, conducted antenna port measurements were common for both the internal and external antenna connection.

To determine the transmitter output power, the EUT was operated as intended with the spectrum analyser operated in a maximum hold mode over the full operating frequency range of the EUT to identify the highest emission within the band.

To determine spurious emissions levels, the EUT was operated as intended with the spectrum analyser operated in a maximum hold mode over selected frequency ranges between 30 MHz and 26 GHz. A reference limit line of 20dB below the maximum output of the transmitter was noted. Levels within 20dB of this limit line were then recorded.

Channel Separation FCC 15.247(1)

The EUT and spectrum analyser was configured as for conducted antenna port 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 analyser was configured to measure two adjacent channels.

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 a 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 20dB below the peak level. The bandwidth was determined at the points where the 20dB reference crossed the profile of the emission.

Occupied Bandwidth FCC 15.247(1)

For channel separation, the analyser was configured with a resolution bandwidth and video bandwidth of at least 1% of the frequency span set on the analyser. The EUT was operated as intended and the analyser set to a maximum hold mode scan to capture the profile of the signals.

The peak points on the two adjacent channels were noted and the separation between them recorded.

The channel separation was then determined as the greater of 25kHz or the 20dB bandwidth.

Average Time of Occupancy FCC 15.247(1)(ii)

The EUT and spectrum analyser was configured as for conducted antenna port measurements

To determine the maximum packet length on any given channel, the analyser was configured in the time domain mode and the EUT was configured to operate as intended.

To determine the average occupancy time on any given channel the analyser was configured in the time domain and a 30 second sweep carried out. The number of times the channel was occupied in any 30 second period multiplied by the maximum packet length will give the total time on the given channel.

Number Of Hopping Frequencies FCC 15.247(a)(1)(ii)

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

To determine the number of hopping frequencies the EUT was set to operate in its normal mode of operation, hopping over all channels that it is intended to operate on.

The spectrum analyser had a span set to cover the frequency band of operation. The resolution bandwidth was set to >= 1% of the span. The video bandwidth was set to be no less than the resolution bandwidth. The sweep was set to auto, the detector function to peak and trace to max hold. This test was also performed with the span set to the lower half the operating frequency range and then to the upper half of the operating frequency range for better resolution.

Peak Output Power FCC 15.247(b)

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

The applicant to allow for conducted measurements provided a temporary antenna port.

As the frequency range of operation was greater than 10 MHz, The test was performed on the BOTTOM, MIDDLE and TOP channels as per FCC 15.31(m).

The tests were performed at extremes of voltage of +/- 15%. The test was also performed at 240 Volts + 15% at the applicants request.

The analyser was setup as per FCC Public Notice DA 00-705.

Band Edge Compliance of RF Conducted Emissions FCC 15.247(c)

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

A temporary antenna port was provided by the applicant to allow for conducted measurements.

To determine band-edge compliance, the analyser bandwidth resolution bandwidth was set to >= the analyser span. The video bandwidth was set to be no less than 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 upper channel and the protected band closest to the upper channel was produced. A marker was set to the peak of the highest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission. Which ever is greater). The plots show that the emission complies with the 20 dBc limit.

A Plot of the lower channel and the protected band closest to the lower channel was produced. A marker was set to the peak of the lowest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission. Which ever is greater). The plots show that the emission complies with the 20 dBc limit.

Four plots were produced, Two times top and bottom channels with hopping on and two time top and bottom channels with hopping off.

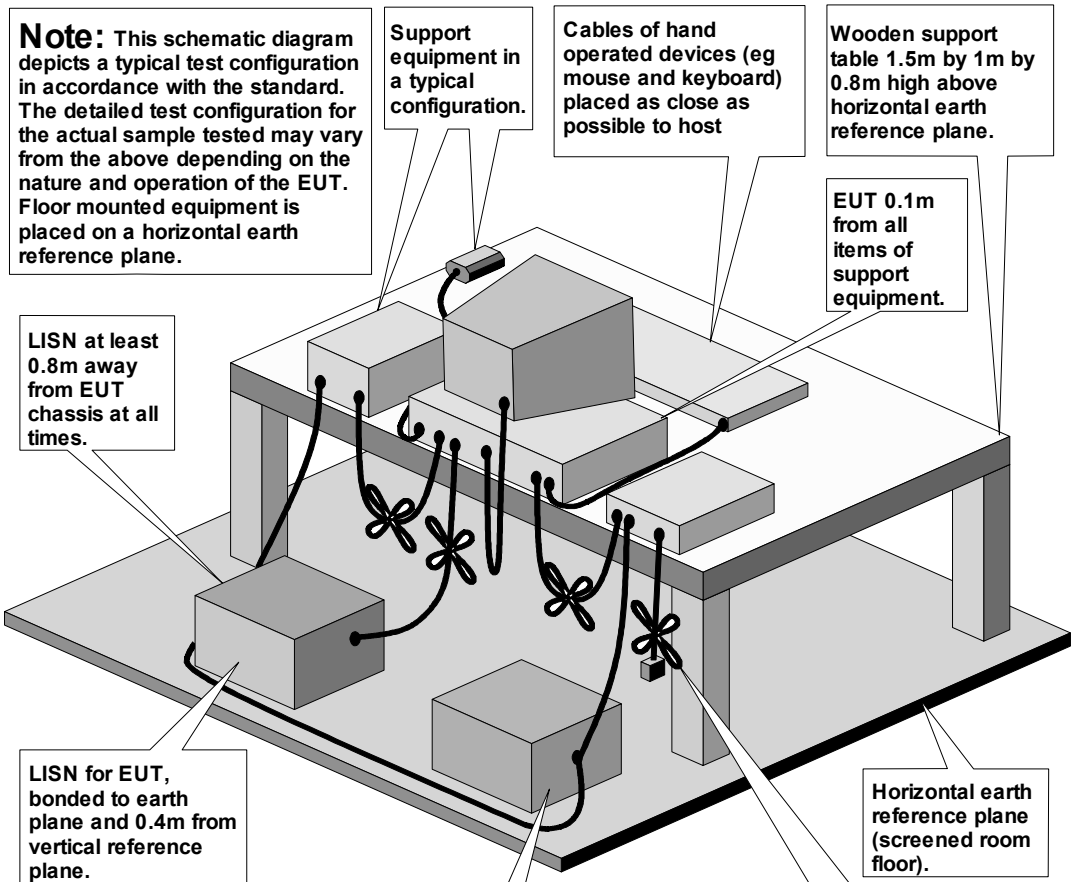
Appendix 3. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\44012JD09\EMICON	Test configuration for measurement of conducted emissions
DRG\44012JD09\EMIRAD	Test configuration for measurement of radiated emissions
DRG\44012JD09\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

Test Of: Brain Boxes Ltd.
BL-510
To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

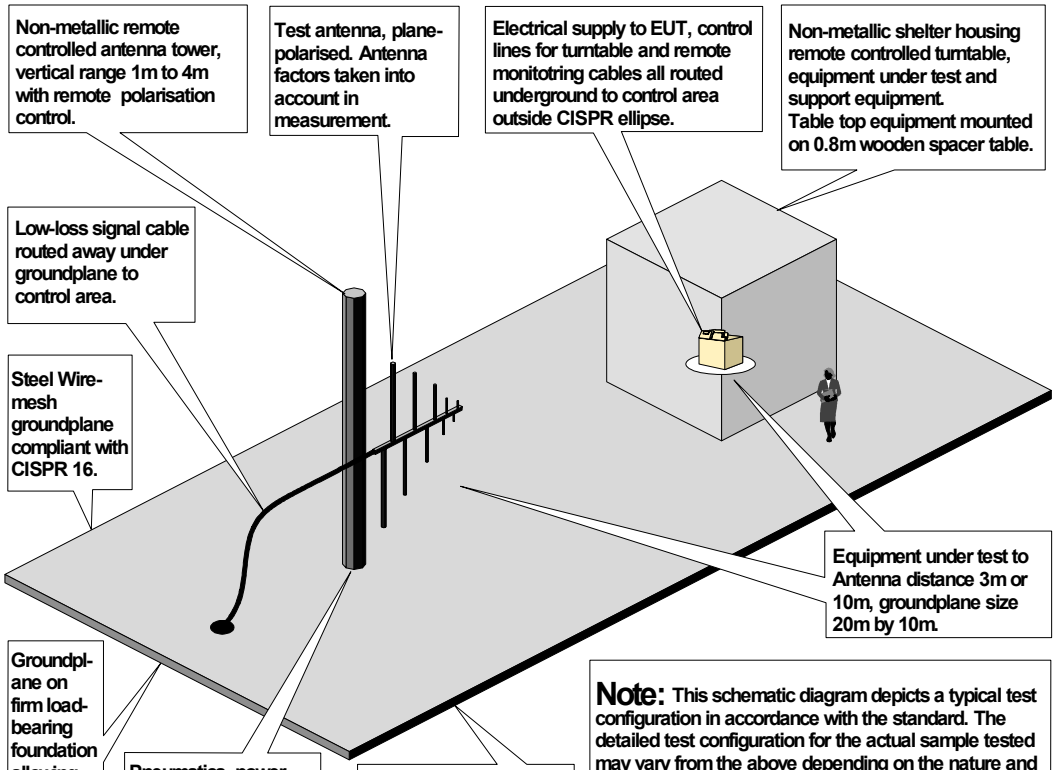
DRG\44012JD09\EMICON



Typical Test Configuration For Conducted Emissions Measurements In Accordance With ANSI C63.4-1992
Tests performed in a screened enclosure

Test Of: **Brain Boxes Ltd.**
BL-510
To: **F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247**

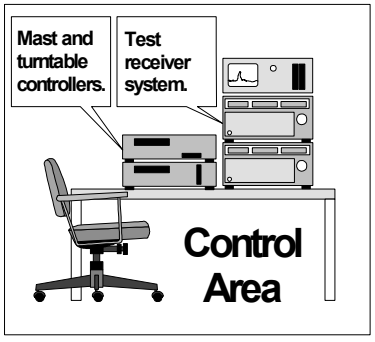
DRG\44012JD09\EMIRAD



Note: This schematic diagram depicts a typical test configuration in accordance with the standard. The detailed test configuration for the actual sample tested may vary from the above depending on the nature and operation of the EUT.
The test site used by RFI is nominally at ground level.
All electrical cables run underground.
All other dimensions in accordance with the standard.

Test Configuration For Radiated Emissions Measurements

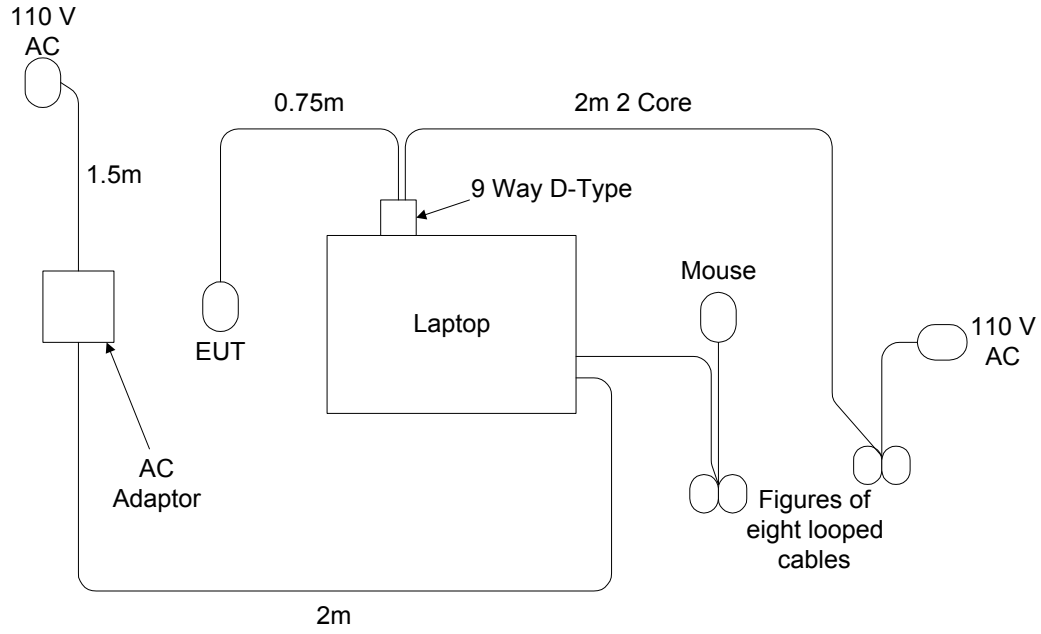
Reflection-free area: >60m by 52m (CISPR ellipse)
Groundplane Earthed
Control room outside CISPR ellipse



Test Of: **Brain Boxes Ltd.**
BL-510
To: **F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247**

DRG\44012JD09\001

Configuration of EUT and Local Support Equipment



Configuration of Remote Support Equipment

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