



**TEST REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: Paxton Access Ltd
PROXIMITY Long Range Reader

To: FCC Part 15.107: 2007, Part 15.109: 2007 and
Part 15.249: 2007 (Subpart C)

Test Report Serial No:
RFI/RPTE2/RP49342JD08A

Supersedes Test Report Serial No:
RFI/RPTE1/RP49342JD08A

This Test Report Is Issued Under The Authority Of Steve Flooks, Service Leader RPG:		pp Brian Watson 
Checked By: Tony Henriques 	Report Copy No: PDF01	
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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

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1. Client Information

Company Name:	Paxton Access Ltd
Address:	Paxton House Home Farm Brighton Sussex BN1 9HU
Contact Name:	Mr B Glass

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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)

Description:	Hands Free Access Control Reader
Brand Name:	PROXIMITY Long Range Reader
Model Name or Number:	313-110
Serial Number:	None Stated
FCC ID Number:	USE313110
Country of Manufacture:	UK
Date of Receipt:	12 November 2007

2.2. Description of EUT

The equipment under test was a Hands Free Access Control Reader.

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

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2.4. Additional Information Related to Testing

Power Supply Requirement:	DC Supply of 12V DC		
Equipment Category:	IEEE 802.15.4		
Type of Unit:	Base Station (Fixed use) Transceiver		
Channel Spacing:	5MHz Spacing for 2.4GHz		
Power Characteristics:	1mW (maximum rating)		
Modulation Type:	Amplitude Modulation (12KHz, DSSS (2.4GHz))		
Data Rate:	600 μ s		
Temperature Range:	-20°C to 55°C		
Transmit Frequency Range:	2405MHz to 2480MHz 125KHz Single Channel		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	11	2405
	Middle	18	2440
	Top	26	2480
Receive Frequency Range:	2405MHz to 2480MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	11	2405
	Middle	18	2440
	Top	26	2480

2.5. Support Equipment

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

Description:	1 door ACU with 2A PSU in plastic cabinet
Brand Name:	Net2 1 door ACU with 2A PSU in plastic cabinet
Model Name or Number:	411-501
Serial Number:	None Stated
Cable Length and Type:	Reader Signal Cable / 6m
Connected to Port:	ACU reader Port to readers Hands Free Interface Port

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3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	FCC Part 15: 2007 (Sections 15.107 and 15.109) Class B
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices.

Reference:	FCC Part 15.249: 2007 (Subpart C)
Title:	Code of Federal Regulations, Part 15 (47CFR15) 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 (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

There were no deviations from the test specification.

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5. Operation of the EUT During Testing

5.1. Operating Modes

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

- Idle mode.
- Continuous read mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- The reader was connected to a Net2 ACU contained inside a 2A PSU. The reader was powered by the same power supply.

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6. Summary of Test Results

125 kHz Mode of Operation

Range of Measurements	Section Reference	Port Type	Compliance Status
AC Conducted Spurious Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2007 Section 15.207 Class B	AC Mains	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 2: 2007 Section 2.1049	Antenna	Not Applicable (Note 1)
Transmitter Radiated Spurious Emissions (30 MHz to 1 GHz)	C.F.R. 47 FCC Part 15: 2007 Section 15.209 Class B	Enclosure	Complied

Note(s):

1. There is no limit for the Transmitter 20 dB Bandwidth test and therefore there is no compliance status.

FCC Part 15.249: 2007 – 2400 MHz Mode of Operation

Range of Measurements	Section Reference	Port Type	Compliance Status
Transmitter Radiated Spurious Emissions (30 MHz to 25 GHz)	C.F.R. 47 FCC Part 15: 2007 Section 15.249(a)(d)(e) & 15.209	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, England.

FCC Site Registration Number: 90895

IC Site Registration Number: 3485

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7. Measurements, Examinations and Derived Results

7.1. General Comments

7.1.1. This section contains test results only.

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.

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7.2. Test Results – 125 kHz Mode of Operation

7.2.1. AC Conducted Spurious Emissions: Section 15.207

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

7.2.1.2. Tests were performed to identify the maximum emission levels on the AC mains line of the EUT.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

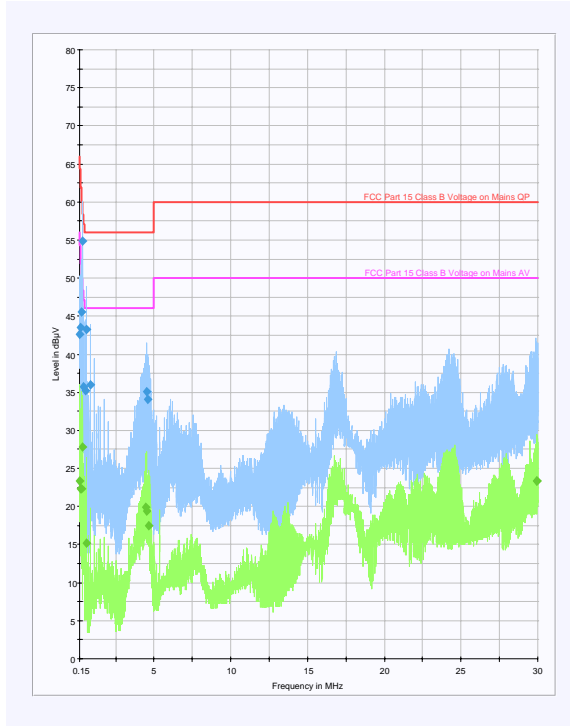
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.166000	Live	42.6	65.2	22.6	Complied
0.194000	Live	43.5	63.9	20.4	Complied
0.250000	Live	45.6	61.8	16.2	Complied
0.374000	Live	54.8	58.4	3.6	Complied
0.394000	Live	35.8	58.0	22.2	Complied
0.506000	Live	35.2	56.0	20.8	Complied
0.626000	Live	43.3	56.0	12.7	Complied
0.874000	Neutral	36.0	56.0	20.0	Complied
4.526000	Neutral	35.1	56.0	20.9	Complied
4.586000	Live	34.1	56.0	21.9	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.166000	Live	23.3	55.2	31.9	Complied
0.194000	Live	22.3	53.9	31.6	Complied
0.254000	Neutral	22.3	51.6	29.3	Complied
0.374000	Live	27.8	48.4	20.6	Complied
0.622000	Neutral	15.2	46.0	30.8	Complied
4.474000	Live	19.9	46.0	26.1	Complied
4.538000	Neutral	19.4	46.0	26.6	Complied
4.674000	Live	17.4	46.0	28.6	Complied
29.938000	Neutral	23.4	50.0	26.6	Complied
29.966000	Neutral	23.4	50.0	26.6	Complied

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AC Conducted Spurious Emissions: Section 15.207 (Continued)



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

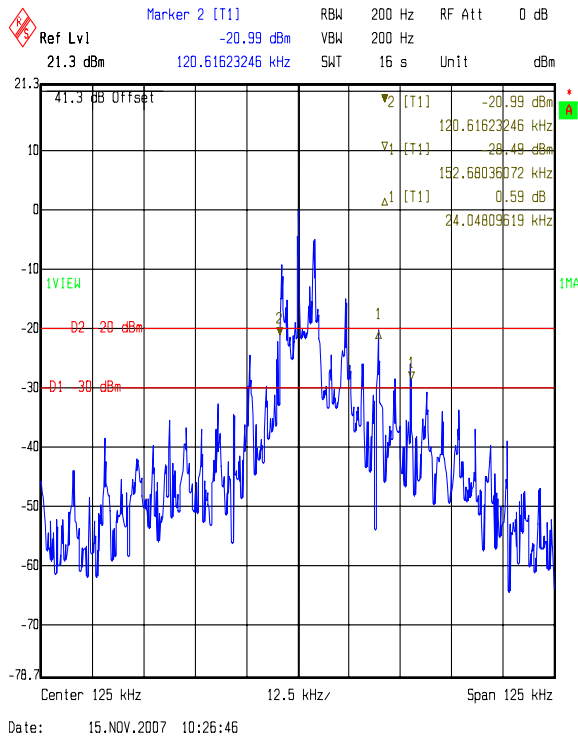
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7.3. Transmitter 20 dB Bandwidth

The EUT was configured as for 20 dB bandwidth measurements as described in Section 9 of this report. Tests were performed to identify the 20 dB bandwidth.

Transmitter 20 dB Bandwidth (kHz)
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Transmitter 20 dB Bandwidth (Continued)



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7.3.1. Transmitter Radiated Spurious Emissions: Section 15.209

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

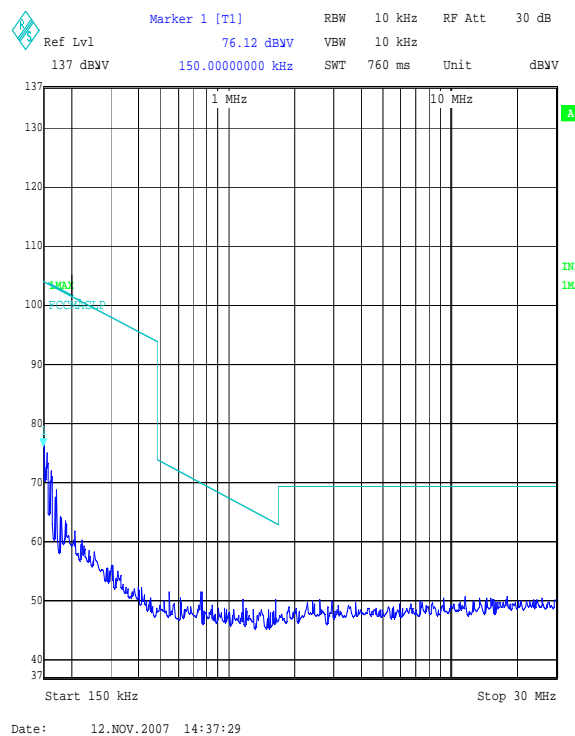
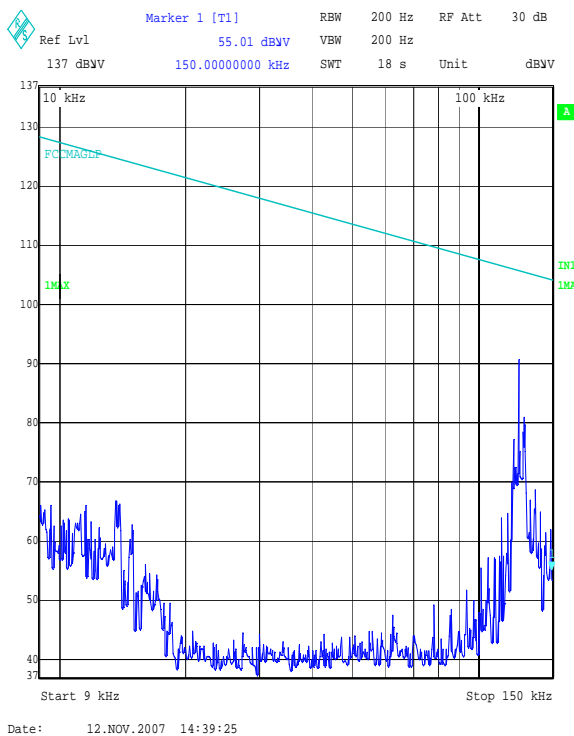
7.3.2.1. The EUT was configured as for radiated emissions testing as described in Section 9 of this report.

7.3.2.2. Tests were performed to identify the maximum radiated spurious emissions levels.

7.3.2.3. The following results from 9 kHz to 1 GHz were the same for both 125 kHz and 2.4 GHz modes and as such the table has been entered only once to reduce duplication.

Results: 9 kHz to 30 MHz

Frequency (MHz)	Antenna Polarity	Level @ 300m (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
0.125	Horizontal	18.7	19.2	0.5	Complied

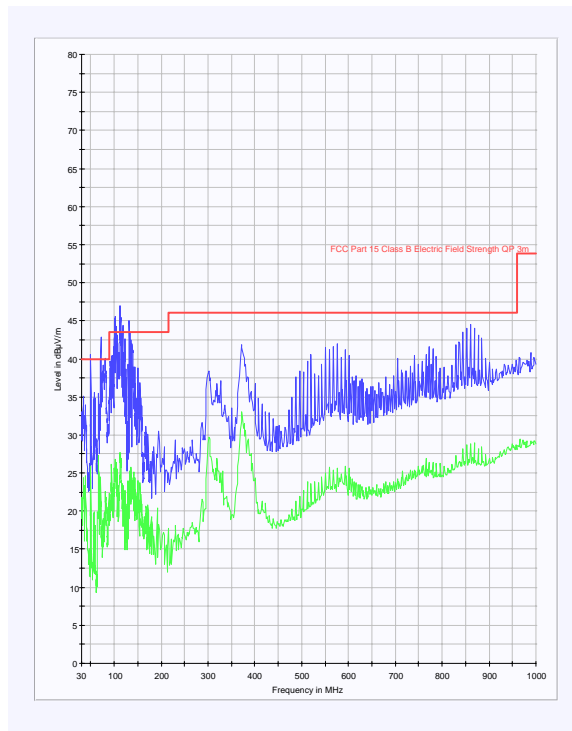


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Transmitter Radiated Spurious Emissions: Section 15.209 (Continued)

Results: 30 MHz to 1 GHz

Frequency (MHz)	Antenna Polarity	Level @ 3m (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
33.759	Horizontal	36.0	40.0	4.0	Complied
49.924	Horizontal	40.0	40.0	0.0	Complied
71.136	Horizontal	30.6	40.0	9.4	Complied
116.623	Horizontal	37.6	43.5	5.9	Complied
133.377	Horizontal	43.0	43.5	0.5	Complied
268.847	Horizontal	34.7	46.0	11.3	Complied
301.933	Horizontal	40.7	46.0	5.3	Complied
371.953	Horizontal	45.8	46.0	0.2	Complied
559.969	Horizontal	40.5	46.0	5.5	Complied
811.994	Horizontal	41.2	46.0	4.8	Complied



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

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Transmitter Radiated Spurious Emissions: Section 15.209 (Continued)

7.3.3. Electric Field Strength Measurements: 1.0 to 25 GHz

The following data is only applicable to the 2.4 GHz mode.

Highest Peak Level:

Frequency (MHz)	Antenna Polarity (H/V)	Peak Detector level (dB μ V)	Transducer factor (dB)	Actual Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Result
4957.915	Horizontal	48.3	-3.8	44.5	74.0	29.5	Complied

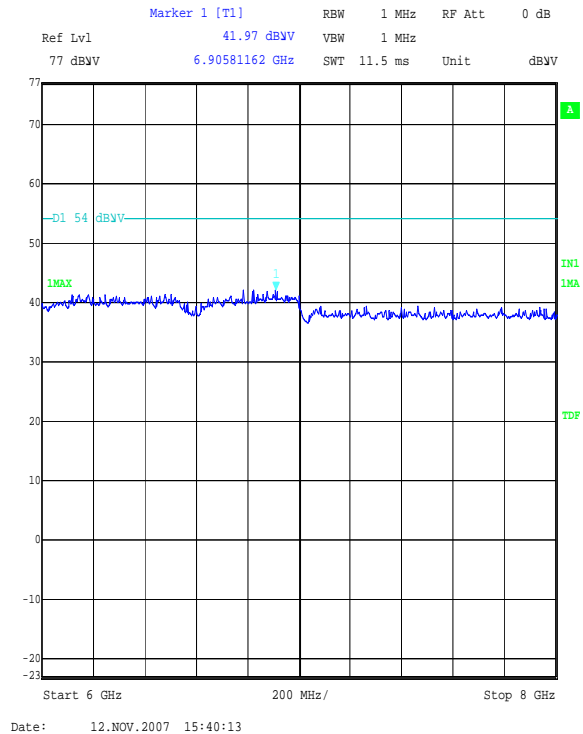
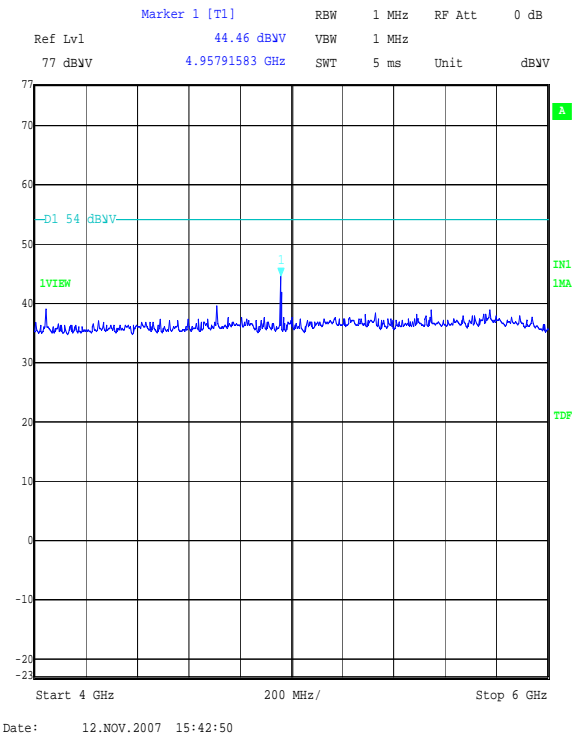
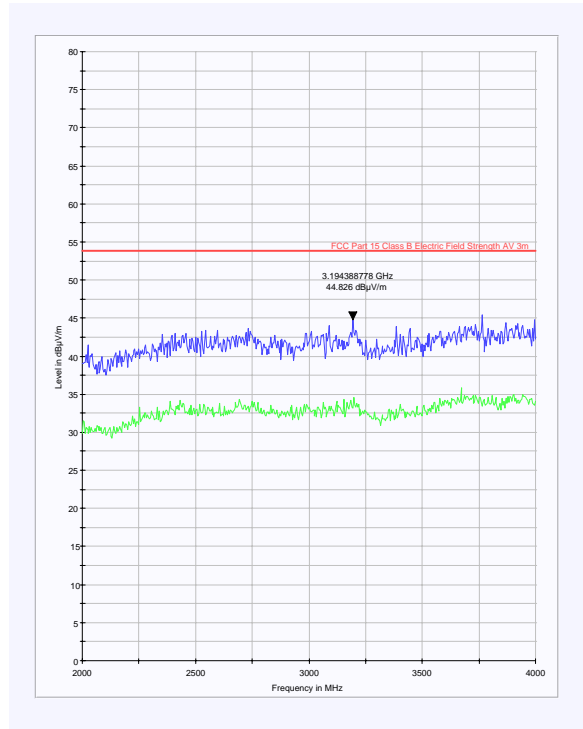
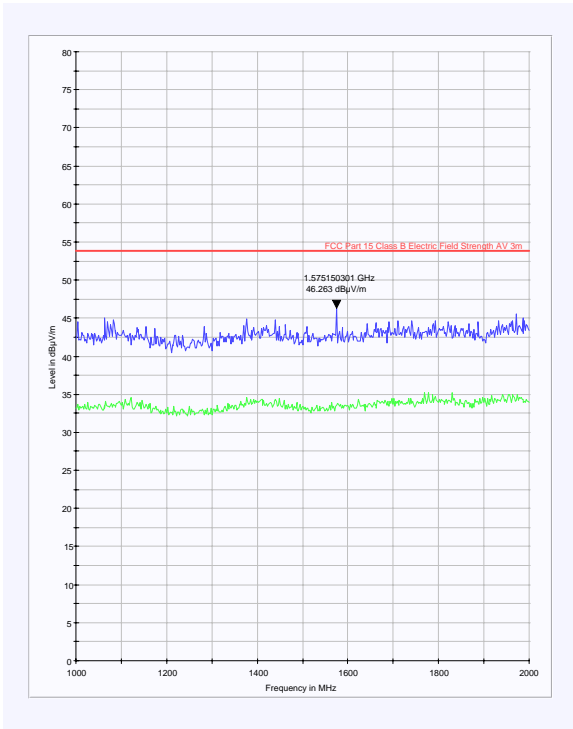
**Note: -50 dBc limit*

Highest Average Level:

Frequency (MHz)	Antenna Polarity (H/V)	Average Detector level (dB μ V)	Transducer factor (dB)	Actual Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Result
4957.915	Horizontal	48.3	-3.8	44.5	54.0	9.5	Complied

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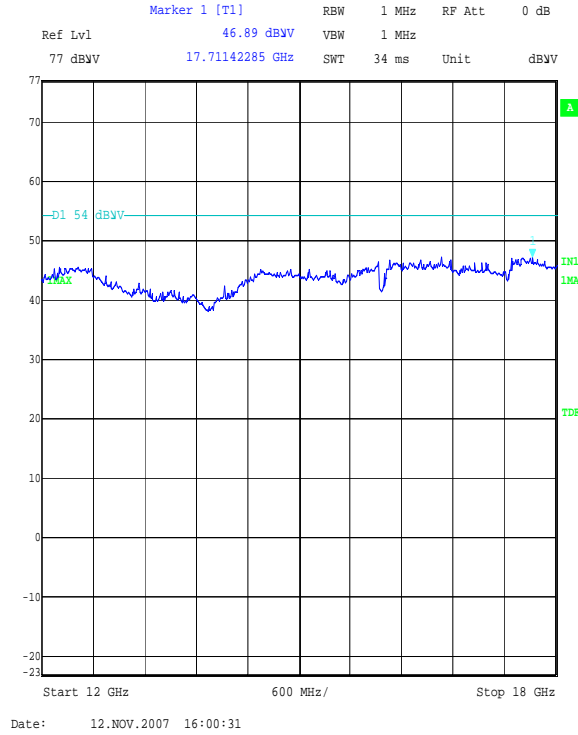
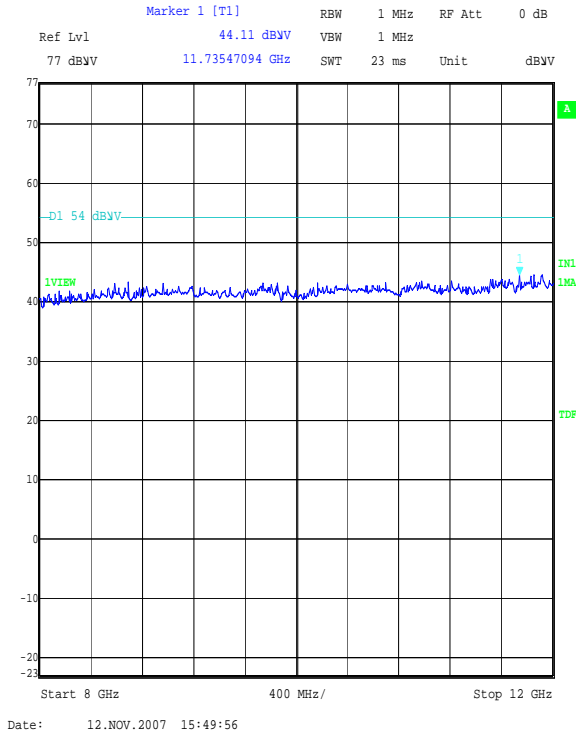
Transmitter Radiated Emissions (Continued)



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

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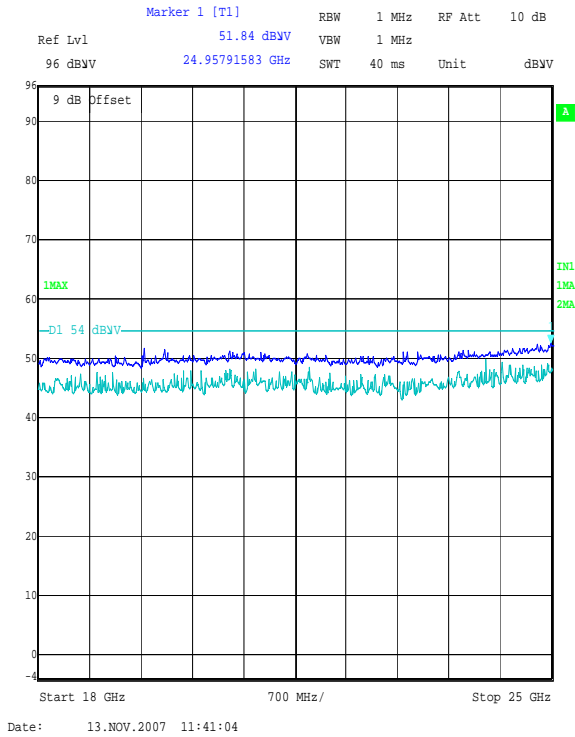
Transmitter Radiated Emissions (Continued)



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

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Transmitter Radiated Emissions (Continued)



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

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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 25Hz	95%	+/- 4.18 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.

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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

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9.2. Receiver Radiated Emissions

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

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to the upper frequency detailed in Section 15.33(b) were performed within a screened chamber in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT, which required further examination. In order to minimise the time taken for the swept measurements, a peak detector was used in conjunction with the appropriate detector 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 initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit. Levels within 20 dB of this limit were measured where possible, on occasion, the receiver noise floor came within the 20 dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a Quasi-Peak detector was used for measurements below 1000 MHz, for measurements above 1000 MHz average and peak detectors were used.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4.

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° and then varying the antenna height between 1 m and 4 m in the horizontal polarisation. 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. The procedure was repeated for the vertical polarisation.

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 Below 1 GHz	Final Measurements Above 1 GHz
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak/Average
Mode:	Max Hold	Not applicable	Not applicable
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

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A007	Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	14 Feb 2007	12
A008	Tripod	Rohde & Schwarz	HFU-Z	None	Calibration not required	-
A088	Variable Transformer	Zenith	Y20-HM	9029	Calibration not required	-
C1029	Cable	Rosenberger	FA210B-1-010M-30X30	FA00C 7589	31 May 2007	12
C1193	Utiflex	Utiflex	FA147A1015 M2020A	BUA02C 0154	Calibration before use	-
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibration not required	-
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	15 Aug 2007	12
S012	DC Power Supply Unit	INSTEK	PS-6010	9564304	Calibration not required	-

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

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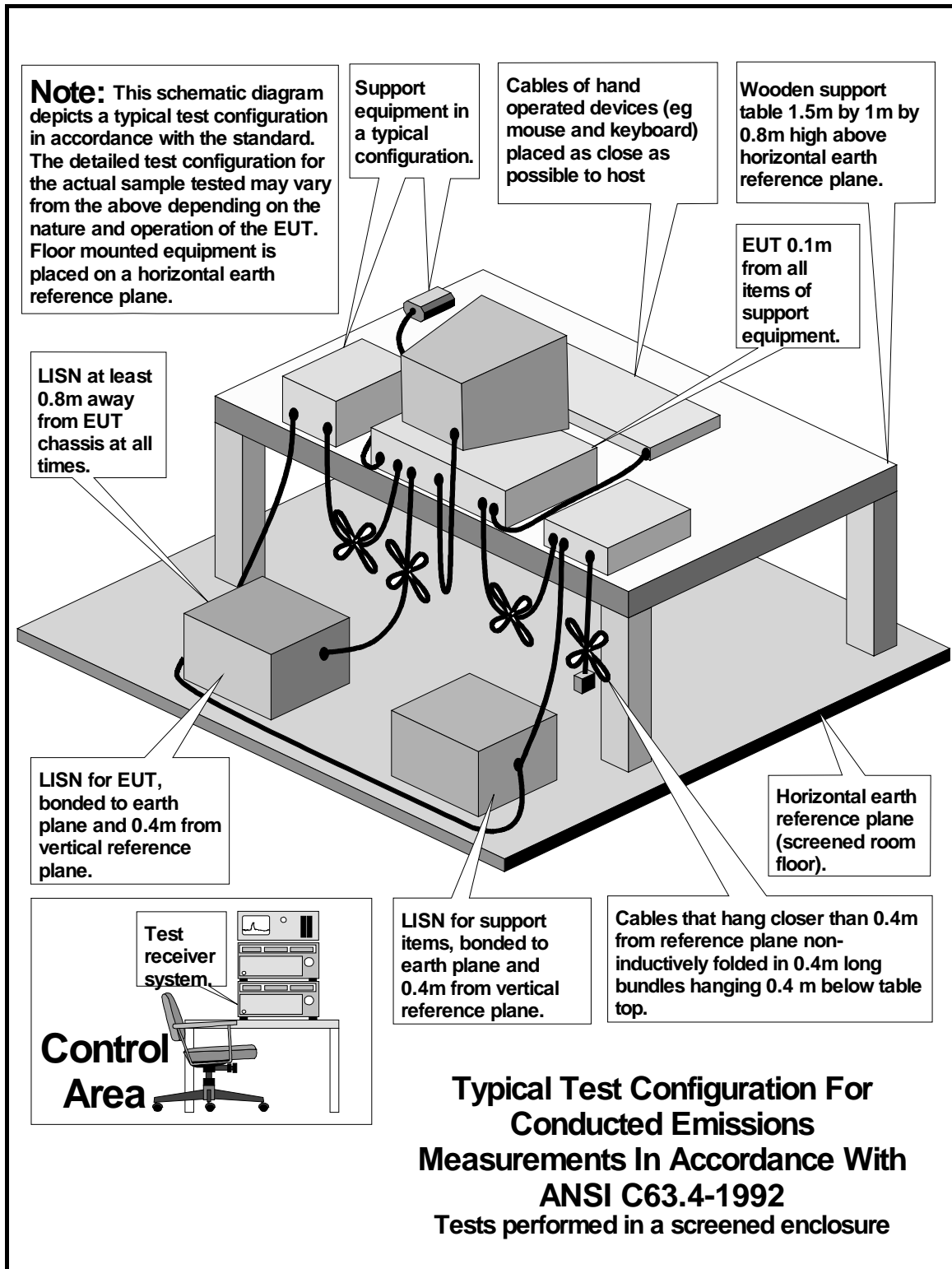
Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49342JD08\EMICON	Test configuration for measurement of conducted emissions.
DRG\49342JD08\EMIRAD	Test configuration for measurement of radiated emissions.

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DRG\49342JD08\EMICON



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DRG\49342JD08\EMIRAD

