Report On

FCC CFR 47 Part 15B and Industry Canada RSS-Gen: 2007
Testing of the RDT Limited
Patient Monitoring System

COMMERCIAL-IN-CONFIDENCE

FCC ID: ROSTEMPUSIC
IC ID: 7845ATEMPUSIC

Document 75904058 Report 01 Issue 2 August 2008

Product Service

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

REPORT ON

FCC CFR 47 Part 15B and Industry Canada RSS-Gen: 2007
Testing of the RDT Limited
Patient Monitoring System

Document 75904058 Report 01 Issue 2

August 2008

PREPARED FOR

RDT Limited
The Old Coach House
Farleigh Wallop
Basingstoke
Hampshire
RG25 2HT

PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

J Adams
Authorised Signatory

DATED 08 August 2008

This report has be re-issued to Issue 2 to add the AC Conducted Emissions results, to add the Industry Canada ID Number, change the RSS-Gen reference and also to amend some typographical errors.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15B and Industry Canada RSS-Gen: 2007. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

A Guy

A Hubbard

UKAS TESTING 0141

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC CFR 47 Part 15B and Industry Canada RSS-Gen: 2007
Testing of the RDT Limited
Patient Monitoring System

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RDT Limited Patient Monitoring System to the requirements of FCC CFR 47 Part 15B: 2006 and Industry Canada RSS-Gen: 2007.

Objective	To perform FCC CFR 47 Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	RDT Limited
Model Number(s)	Patient Monitoring System
Model/Type Number(s)	Tempus IC
Serial Number(s)	000008
Software Version	V1.00
Hardware Version	Not Applicable
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B: 2006 Industry Canada RSS-Gen: 2007
Order Number Date	7824 26 June 2008
Start of Test	18 July 2008
Finish of Test	08 August 2008
Name of Engineer(s)	A Guy A Hubbard

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 15B: 2006 and Industry Canada RSS-Gen: 2007, is shown below.

Configuration 1 – EUT with ancillaries connected							
Section	FCC Spec Clause	IC Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.107	7.2.2	Conducted Emissions (AC Power Port)	Mode 1 –WiFi and Bluetooth Idle	0	Pass	FCC CFR 47 Part 15: 2006
2.2	15.109	7.2.3	Radiated Emissions (Enclosure Port)	Mode 1 –WiFi and Bluetooth Idle	0	Pass	FCC CFR 47 Part 15: 2006

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	The Tempus IC is a patient monitor which comprises off-the-shelf modules for wireless communications, these include a WiFi SD card (Socket Communications GoWiFi P300i) and a Bluetooth module (Bluegiga WT11).
MANUFACTURER	RDT Ltd
TYPE	Tempus IC
PART NUMBER	00-1001
SERIAL NUMBER	000008
HARDWARE VERSION	N/A
SOFTWARE VERSION	V1.00
TRANSMITTER OPERATING RANGE	WIFi – 100m open field Bluetooth – 100m open field
RECEIVER OPERATING RANGE	WIFi – 100m open field Bluetooth – 100m open field
COUNTRY OF ORIGIN	UK
INTERMEDIATE FREQUENCIES	**WiFi -** 2.412-2.484 GHz (channels 1 - 14) **Bluetooth -** 2.4 – 2.4835 GHz
ITU DESIGNATION OF EMISSION	N/A – Idle Mode
HIGHEST INTERNALLY GENERATED FREQUENCY	2.4GHz
OUTPUT POWER (W or dBm)	**WiFi -** 12dBm CCK 9dBm OFDM (63mW designation RSS210) **Bluetooth -** -9dBm - +18dBm (22mW designation RSS210)
FCC ID	**TEMPUS IC -** ROSTEMPUSIC **WIFi Module -** FCC ID LUBP300SD-1 **Bluetooth Module -** FCC: Part 15, FCC ID QOQWT11
INDUSTRY CANADA ID	**TEMPUS IC -** 7845ATEMPUSIC **WIFi Module -** Industry Canada license 2529A-WLANSDIO **Bluetooth Module -** Industry Canada license 5123A-BGTWT11E
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The Tempus IC is a portable patient monitor. It is intended to be run off a proprietary battery or from a COTS external dc supply. The device measures a variety of medical parameters e.g. blood pressure and pulse rate, and transmits the data in real time over a wired or wireless link. The device can currently communicate over WiFi for WAN communications. It uses Bluetooth for LAN communications with local peripherals such as with a Bluetooth-enabled glucometer or thermometer. Wireless peripherals supplied for use with the device are not part of this test or FCC application.
BATTERY	
MANUFACTURING DESCRIPTION	2S 3P proprietary lithium-ion cell pack using Varta 2.6Ah 18650 cells and a Varta protection circuit
MANUFACTURER	Varta
TYPE	Tempus IC Lithium-ion Battery
PART NUMBER	01-1001
VOLTAGE	7.4V nominal 6.5V min - 8.4V max
COUNTRY OF ORIGIN	Indonesia
POWER SUPPLY	
MANUFACTURING DESCRIPTION	AC Adapter; Model TR60M12
MANUFACTURER	Cincon Electronics Co. Ltd
TYPE	Tempus IC Mains Power Supply
PART NUMBER	01-1017
VOLTAGE	Input 100-240V, 1.5-0.55A, 47-63Hz / Output 12V 5A
COUNTRY OF ORIGIN	China

Signature 
Date: 7 August 2008
Declaration of Build Status Serial Number: 75904058/01

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a RDT Limited Patient Monitoring System as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.

Equipment Under Test

Product Service

1.4.2 Test Configuration

Configuration 1: EUT with ancillaries connected

The EUT was configured in accordance with FCC CFR 47 Part 15B: 2006 and Industry Canada RSS-Gen: 2007.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – WiFi and Bluetooth Idle

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a 7.4V nominal internal battery.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Product Service

SECTION 2

TEST DETAILS

FCC CFR 47 Part 15B and Industry Canada RSS-Gen: 2007
Testing of the RDT Limited
Patient Monitoring System

Product Service

2.1 CONDUCTED EMISSIONS (AC POWER PORT)

2.1.1 Specification Reference

FCC CFR 47 Part 15B: 2006, Clause 15.107
Industry Canada RSS-Gen: 2007, Clause 7.2.3

2.1.2 Equipment Under Test

Patient Monitoring System, , S/N: 000008

2.1.3 Date of Test and Modification State

08 Augsut 2008 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.1.6 Environmental Conditions

	08 August 2008
Ambient Temperature	21°C
Relative Humidity	62%
Atmospheric Pressure	1007mbar

Product Service

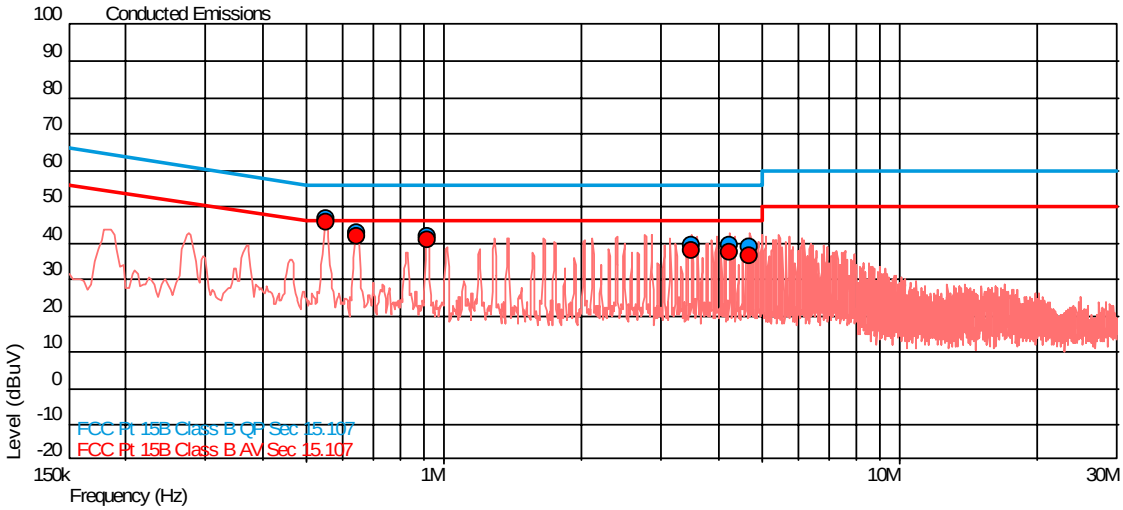
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B: 2006 and Industry Canada RSS-Gen: 2007 for Conducted Emissions (AC Power Port).

The test results are shown below.

Configuration 1 - Modes 1 and 2

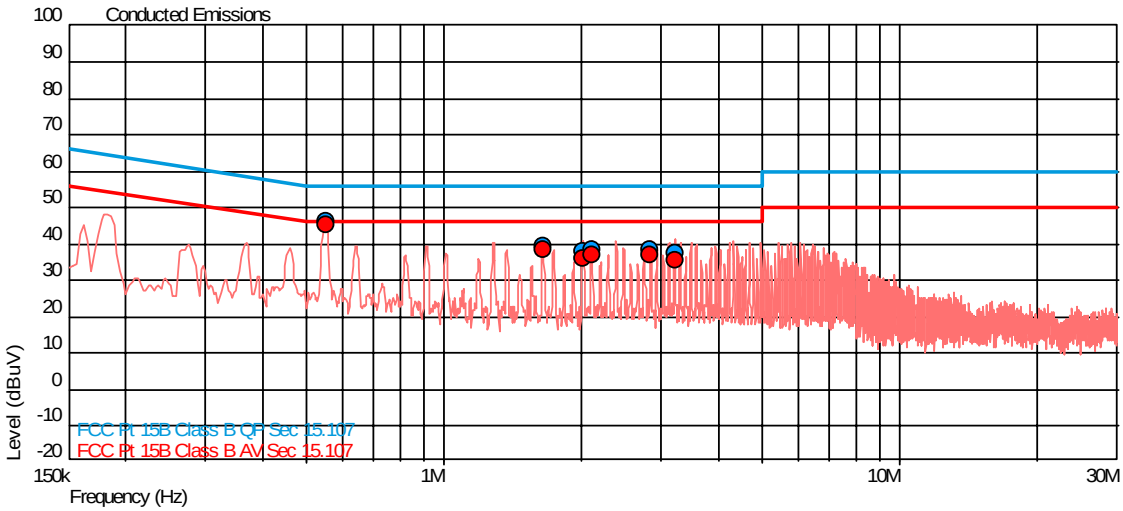
Live Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.552	46.5	56.0	-9.5	45.5	46.0	-0.5
0.644	42.6	56.0	-13.4	41.5	46.0	-4.5
0.919	41.9	56.0	-14.1	40.8	46.0	-5.2
3.493	39.4	56.0	-16.6	37.8	46.0	-8.2
4.227	39.1	56.0	-16.9	37.4	46.0	-8.6
4.685	38.8	56.0	-17.2	36.3	46.0	-9.7

Product Service

Neutral Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.550	46.3	56.0	-9.7	45.3	46.0	-0.7
1.648	39.4	56.0	-16.6	38.2	46.0	-7.8
2.015	37.7	56.0	-18.3	35.6	46.0	-10.4
2.104	38.5	56.0	-17.5	37.1	46.0	-8.9
2.834	38.3	56.0	-17.7	36.9	46.0	-9.1
3.201	37.5	56.0	-18.5	35.3	46.0	-10.7

2.2 RADIATED EMISSIONS (ENCLOSURE PORT)

2.2.1 Specification Reference

FCC CFR 47 Part 15B: 2006, Clause 15.109
Industry Canada RSS-Gen: 2007, Clause 7.2.3

2.2.2 Equipment Under Test

Patient Monitoring System, S/N: 000008

2.2.3 Date of Test and Modification State

18 July 2008 - Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

	18 July 2008
Ambient Temperature	20°C
Relative Humidity	54%
Atmospheric Pressure	1010mbar

Product Service

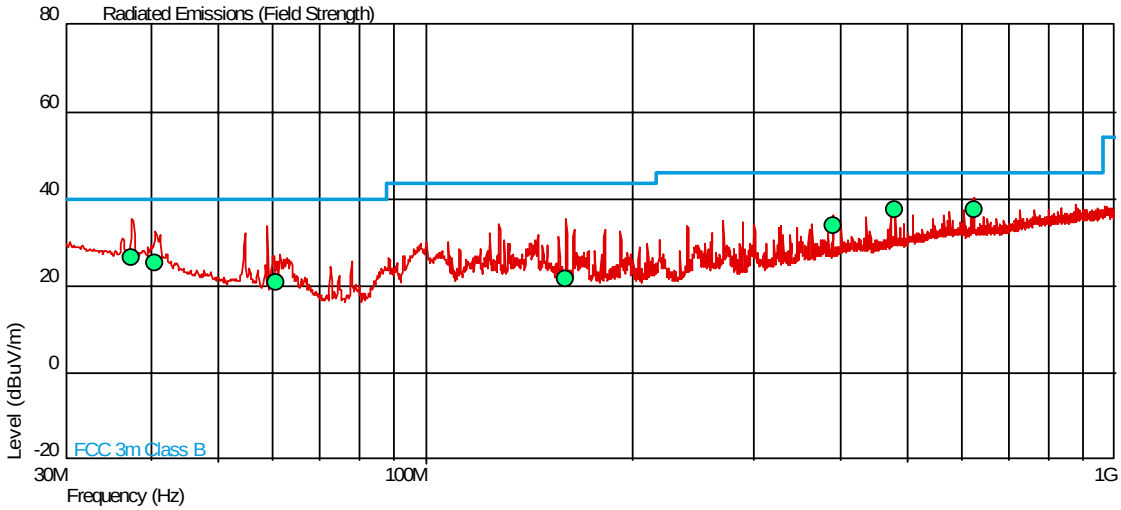
2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B: 2006 and Industry Canada RSS-Gen: 2007 for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1

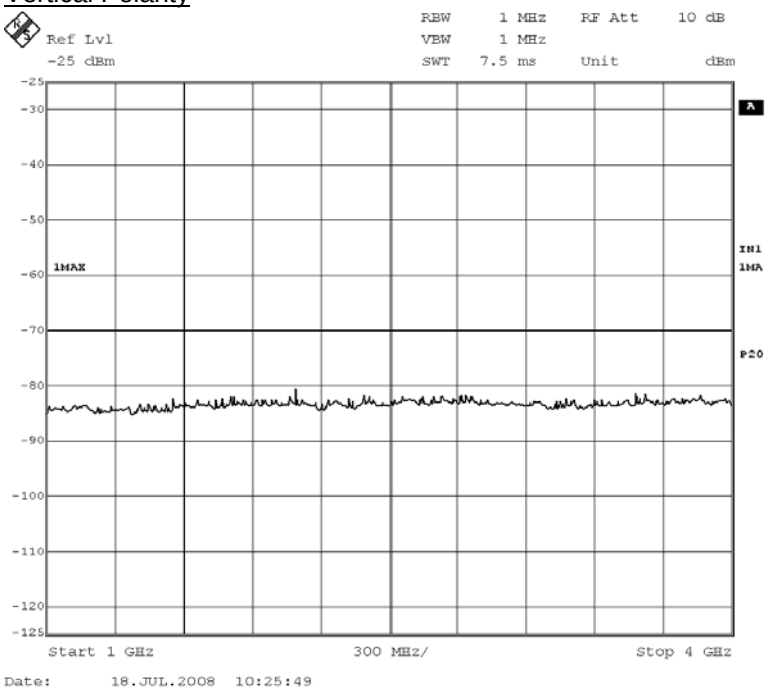
30MHz to 1GHz



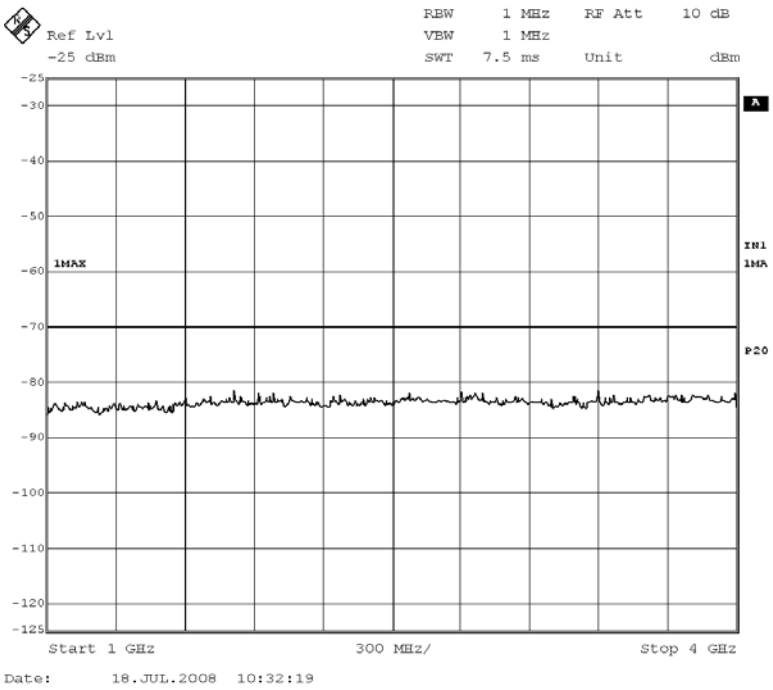
Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle(Deg)	Height (m)	Polarity
37.498	26.4	20.9	40.0	100	-13.6	-79.1	287	1.00	Vertical
40.501	25.2	18.1	40.0	100	-14.8	-81.9	360	1.00	Vertical
60.573	20.9	11.1	40.0	100	-19.1	-88.9	213	1.00	Vertical
160.058	21.8	12.3	43.5	100	-21.7	-137.9	175	1.00	Vertical
389.980	33.7	48.4	46.0	100	-12.3	-151.6	360	1.00	Horizontal
480.043	37.4	74.1	46.0	100	-8.6	-125.9	191	1.00	Vertical
624.044	37.5	74.9	46.0	100	-8.5	-125.1	184	1.00	Vertical

1GHz to 4GHz

Vertical Polarity

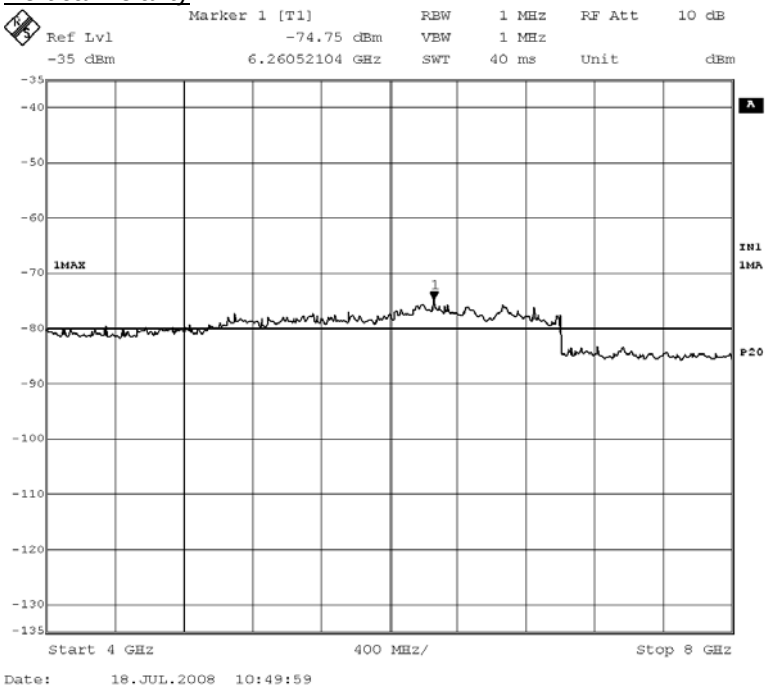


Horizontal Polarity

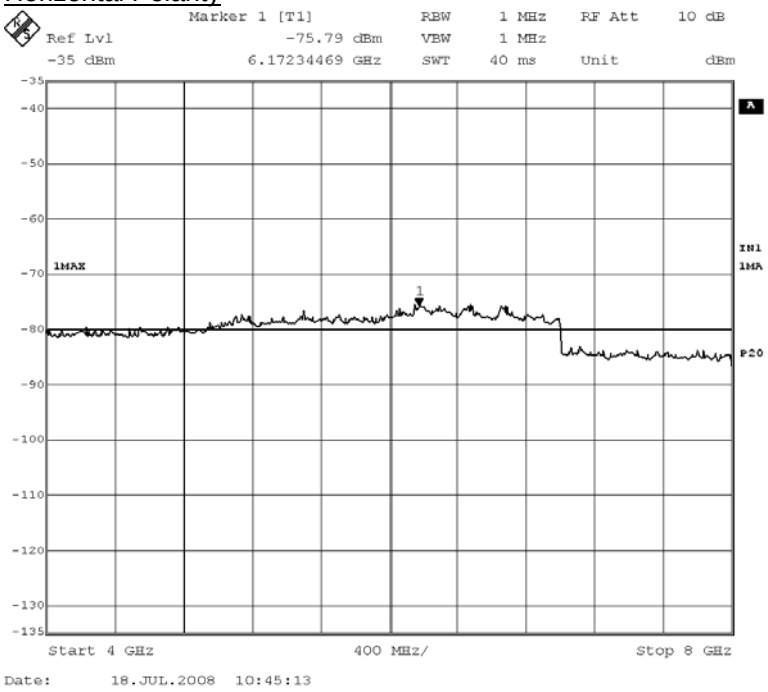


4GHz to 8GHz

Vertical Polarity



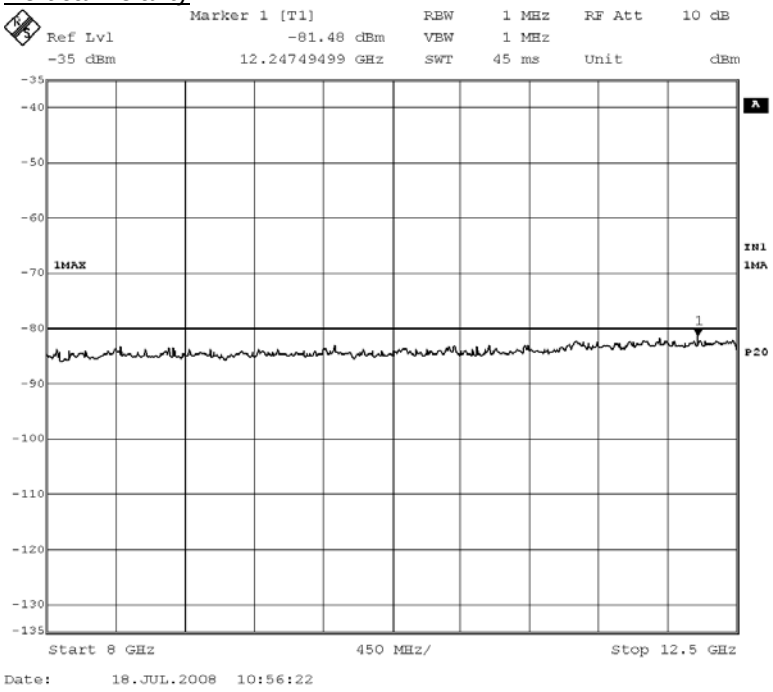
Horizontal Polarity



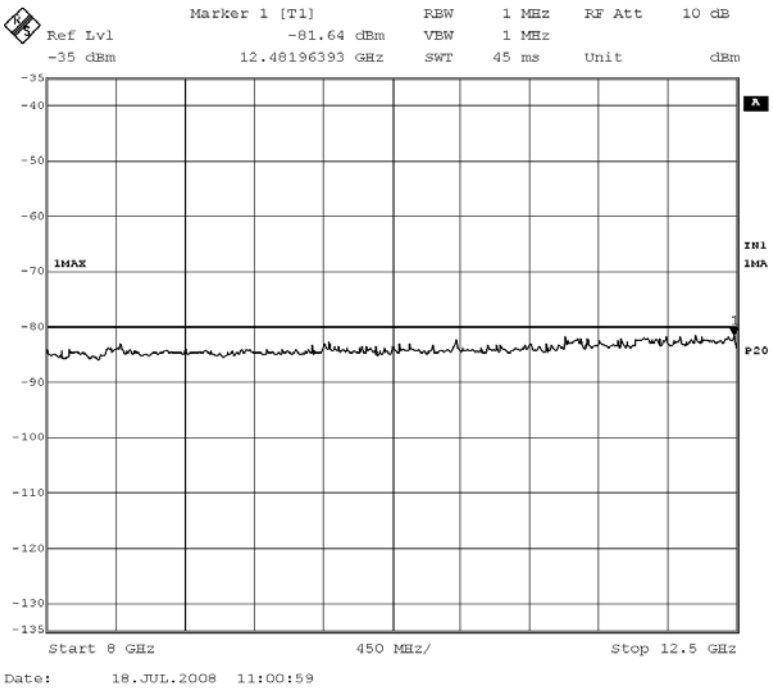
Product Service

8GHz to 12.5GHz

Vertical Polarity



Horizontal Polarity



Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 EMC - Radiated Emissions					
Signal Generator 10kHz to 2.7GHz	Marconi	2031	19	12	17-Jan-2009
Antenna (Double Ridge Guide,1GHz-18GHz)	EMCO	3115	35	12	9-Feb-2009
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	24-Aug-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-Sep-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	2-Sep-2008
Test Receiver	Rohde & Schwarz	ESIB40	1006	12	14-May-2009
Pre-Amplifier	Phase One	PS04-0085	1532	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	-	TU
Pre-Amplifier	Phase One	PSO4-0087	1534	-	TU
Tuneable Notch filter	K&L 5wave	3TNF-500/1000-N/N	1535	-	TU
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Signal Generator	Rohde & Schwarz	SMR40	1589	12	22-Oct-2008
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	3-Jun-2009
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
Section 2.2 EMC - Conducted Emissions					
Transient Limiter	Hewlett Packard	11947A	15	12	29-Sep-2008
LISN (1 Phase)	Chase	MN 2050	336	12	18-Mar-2009
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Compliance 3 Emissions	Schaffner	C3e Software V.4.00.00	3274	-	N/A - Software
EMI Receiver	Rohde & Schwarz	ESU26	3581	12	20-Jul-2009

TU – Traceability Unscheduled

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).