

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Satellite Tracking of People LLC STOP Drive-By Unit

To: FCC Part 15.249: 2006 (Subpart C)

Test Report Serial No: RFI/EMCE1/RP49493JD01A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	
Checked By: Brian Watson	Report Copy No: PDF01
Issue Date: 28 November 2007	Test Dates: 05 November 2007 to 08 November 2007

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1. Client Information

Company Name:	Satellite Tracking of People LLC		
Address:	4801 Woodway Drive Suite 110W Houston Texas 77056-1828		
Contact Name:	Mr S Freathy		

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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:	Tracker
Brand Name:	Satellite Tracking of People LLC
Model Name or Number:	STOP Drive-by Unit
Serial Number:	06-000010
Hardware Version:	CC91 Rev 002
Software Version:	1
FCC ID Number:	S5EDB11107
Country of Manufacture:	USA
Date of Receipt:	05 November 2007

Description:	PSU
Brand Name:	Sunny
Model Name or Number:	SYS1298-1812-W2
Serial Number:	06002138432
FCC ID Number:	None Stated
Country of Manufacture:	China
Date of Receipt:	05 November 2007

2.2. Description of EUT

The equipment under test is a 915 MHz portable / vehicular system to track offender tags.

2.3. Modifications Incorporated in 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:	Nominal 110 V 60 Hz AC Mains supply and Internal battery.				
Intended Operating Environment:	Residential, Comr	Residential, Commercial and Light Industry			
Equipment Category:	902 to 928 MHz B	Band			
Type of Unit:	Portable (Standale	one battery power	ed device)		
Transmit Frequency Range:	915 MHz				
Transmit Channels Tested:	Channel ID Channel Fred (M				
	Single - 915 M				
Receive Frequency Range:	915 MHz				
Receive Channels Tested:	Channel ID Channel Frequency (MHz)				
	Single	-	915 MHz		
Highest Fundamental Frequency:	915 MHz				
Occupied Bandwidth:	300.000 kHz				

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3. Test Results

Reference:	FCC Part 15.249: 2006 (Subpart C)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices.

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003

Land Mobile Communications Equipment, Measurements and performance Standards

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.

3.2. 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.

Transmitter and Receiver continuous modes.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

Standalone (connected to PC for port termination).

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6. Summary of Test Results

Range Of Measurements	Specification Reference	Port Type	Compliancy Status
Receiver AC Conducted Spurious Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2006 Section 15.107	AC Mains Input	Complied
Receiver Radiated Spurious Emissions	C.F.R. 47 FCC Part 15: 2006 Section 15.109	Enclosure	Complied
Transmitter Fundamental Fieldstrength	C.F.R. 47 FCC Part 15: 2006 Section 15.249(a)	Antenna	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 2: 2006	Antenna	Complied
Transmitter AC Conducted Spurious Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2006 Section 15.207	AC Mains Input	Complied
Transmitter Radiated Spurious Emissions	C.F.R. 47 FCC Part 15: 2006 Section 15.249(a)(d)(e) & 15.209	Antenna	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 15: 2006 Section 15.249(d) & 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.

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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.

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7.2. Test Results

7.2.1. Receiver AC Conducted Spurious Emissions

The EUT was configured as for ac conducted emission measurements as described in section 8 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
0.162000	Neutral	40.9	65.4	24.5	Complied
0.186000	Neutral	28.9	64.2	35.3	Complied
0.230000	Neutral	24.2	62.4	38.2	Complied
0.322000	Neutral	17.6	59.7	42.1	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBµV)	Margin (dB)	Result
0.162000	Neutral	36.3	55.4	19.1	Complied
0.322000	Neutral	10.4	49.7	39.3	Complied
0.482000	Live	-1.8	46.3	48.1	Complied

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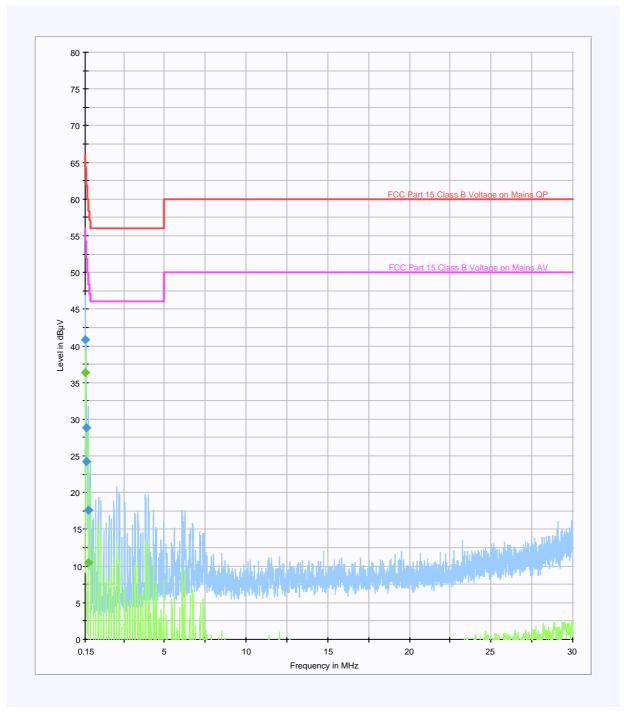
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Receiver AC Conducted Spurious Emissions (Continued)



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

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7.3. Receiver Radiated Spurious Emissions

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

The EUT was configured as for radiated emissions testing as described in Section 8 of this report.

Tests were performed to identify the maximum receiver or standby radiated emissions levels.

Result:

Frequency (MHz)	Ant. Pol.	Q-P Level (dB _μ V/m)	Limit (dBμV/m)	Margin (dB)	Result
46.834	Vertical	19.8	40.0	20.2	Complied
60.808	Vertical	16.0	40.0	24.0	Complied
100.729	Horizontal	26.7	43.5	16.8	Complied
108.123	Vertical	18.8	43.5	24.7	Complied
309.686	Horizontal	20.4	46.0	25.6	Complied
314.603	Horizontal	24.7	46.0	21.3	Complied

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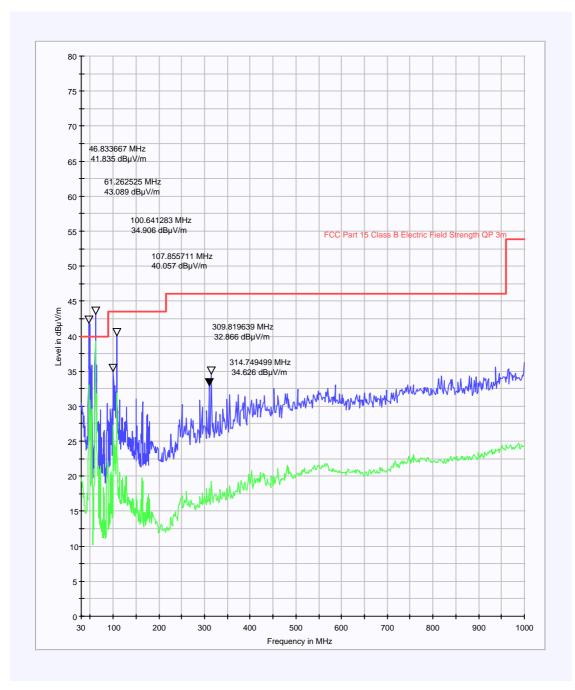
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Receiver Radiated Spurious Emissions (Continued)



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

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7.4. Receiver Radiated Emissions (Continued)

7.4.1. Electric Field Strength Measurements (Frequency Range: 1 to 6 GHz)

Highest Peak Level:

Frequency (MHz)	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
5795.591	Vertical	45.8	26.3	29.9	42.2	74.0	31.8	Complied

Highest Average Level:

Frequency (MHz)	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
5795.591	Vertical	45.8	26.3	29.9	42.2	54.0	11.8	Complied

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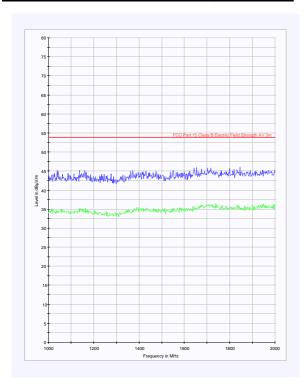
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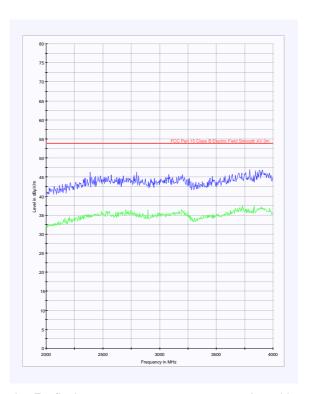
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Receiver Radiated Emissions (Continued)





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

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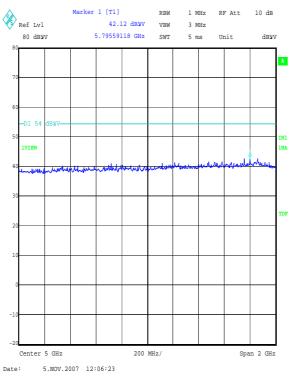
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Receiver Radiated Emissions (Continued)



Note: The measurement above was a noise floor measurement using a peak detector. As the emission passed the average limit with a peak detector, no further measurements were performed.

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

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7.5. Transmitter Fundamental Fieldstrength

The EUT was configured as for radiated emissions testing as described in Section 8 of this report.

Tests were performed to identify the maximum fieldstrength of the fundamental frequency.

Result: (AC powered devices)

Frequency (MHz)	Ant. Pol.	Input Voltage (AC)	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
914.989	Vertical	110.0	93.2	94.0	0.8	Complied
914.989	Vertical	93.5	93.4	94.0	0.6	Complied
914.989	Vertical	126.5	93.4	94.0	0.6	Complied

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7.6.Transmitter 20 dB Bandwidth

The EUT was configured as for 20 dB bandwidth measurements as described in Section 8 of this report. Tests were performed to identify the 20 dB bandwidth.

Transmitter 20 dB Bandwidth (kHz)
14.429

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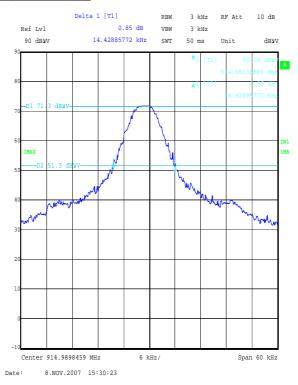
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Transmitter 20 dB Bandwidth (Continued)



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7.7. Transmitter AC Conducted Spurious Emissions

The EUT was configured as for AC conducted emissions measurements as described in Section 8 of this report.

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

Results:

Quasi-Peak Detector Measurements On Live And Neutral Lines

Frequency (MHz)	Line	Q-P Level (dBμV)	Q-P Limit (dBμV)	Margin (dB)	Result
0.150000	Live	37.8	66.0	28.2	Complied
0.182000	Neutral	28.2	64.4	36.2	Complied
0.202000	Neutral	26.2	63.5	37.3	Complied
0.234000	Neutral	24.0	62.3	38.3	Complied
0.274000	Neutral	18.9	61.0	42.1	Complied
0.294000	Live	19.3	60.4	41.1	Complied

Results:

Average Detector Measurements On Live And Neutral Lines

Frequency (MHz)	Line	Av. Level (dBμV)	Av. Limit (dBμV)	Margin (dB)	Result
0.150000	Neutral	29.4	56.0	26.6	Complied
0.290000	Live	2.0	50.5	48.5	Complied
0.294000	Live	2.4	50.4	48.0	Complied
0.442000	Live	-3.8	47.0	50.8	Complied
0.718000	Live	-6.3	46.0	52.3	Complied
0.734000	Live	-6.3	46.0	52.3	Complied
0.862000	Neutral	-6.2	46.0	52.2	Complied

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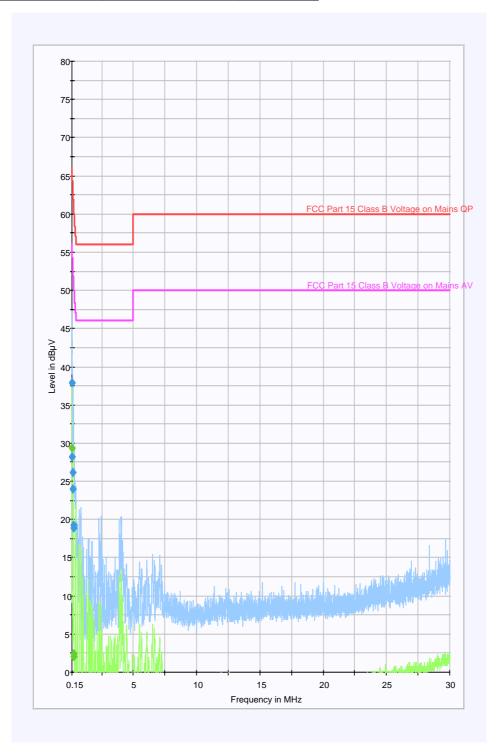
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Transmitter AC Conducted Spurious Emissions (Continued)



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

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7.8. Transmitter Radiated Emissions

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

The EUT was configured as for radiated emissions testing as described in Section 8 of this report.

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

Results:

Frequency (MHz)	Ant. Pol.	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
47.134	Horizontal	14.5	40.0	25.5	Complied
53.566	Vertical	19.0	40.0	21.0	Complied
61.263	Vertical	18.4	40.0	21.6	Complied
108.123	Vertical	19.2	43.5	24.3	Complied
285.126	Vertical	17.8	46.0	28.2	Complied
367.335	Vertical	24.0	46.0	22.0	Complied
419.920	Vertical	27.5	46.0	18.5	Complied
456.072	Vertical	26.1	46.0	19.9	Complied
477.276	Vertical	29.4	46.0	16.6	Complied
502.084	Horizontal	26.7	46.0	19.3	Complied
514.493	Vertical	30.8	46.0	15.2	Complied

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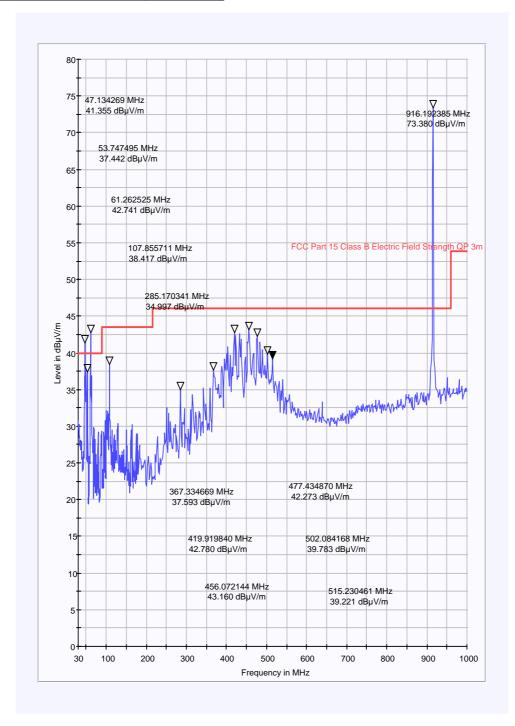
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Transmitter Radiated Emissions (Continued)



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)

7.8.2. Electric Field Strength Measurements: 1.0 to 12.5 GHz

Highest Peak Level:

Frequency (MHz)	Antenna Polarity (H/V)	Peak Detector level (dBμV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dΒμV/m)	Peak Limit (dΒμV/m)	Peak Margin (dB)	Result
1829.978	Vertical	60.6	23.9	30.4	54.1	74.0	19.9	Complied

Highest Average Level:

Frequency (MHz)	Antenna Polarity (H/V)	Average Detector level (dB _µ V)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dΒμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1829.978	Vertical	51.2	23.9	30.4	44.7	54.0	19.3	Complied

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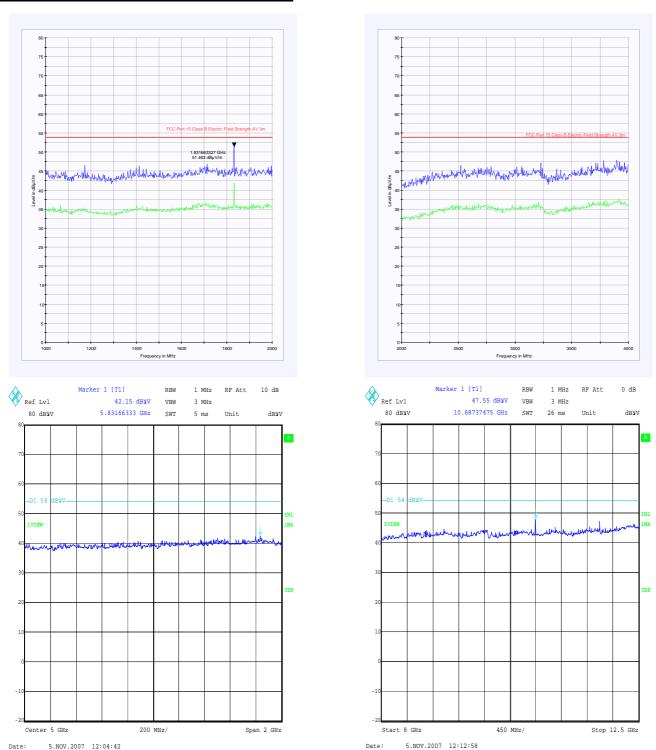
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Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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7.9. Transmitter Radiated Emissions At Band Edges

The EUT was configured as for transmitter radiated emissions testing described in Section 8 of this report.

Tests were performed to identify the maximum emissions level at the band edges of the frequency band that the EUT will operate over.

Results:

Bottom Band Edge

Frequency	Q-P Level	Limit	Margin	Result
(MHz)	(dBμV/m)	(dΒμV/m)	(dB)	
902	31.3	46.0	14.7	Complied

Top Band Edge

Frequency	Q-P Level	Limit	Margin	Result
(MHz)	(dBμV/m)	(dΒμV/m)	(dB)	
928	37.9	46.0	8.1	Complied

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8. Measurement Methods - Part 15.249

8.1. AC Mains Conducted Emissions

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

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 115V 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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8.2. Radiated Emissions

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

Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. Any emission within 20 dB of the limit were then measured on the open area test site, except in cases where the noise floor was within 20 dB of the limit, in these cases the highest point of the noise floor was measured.

In either case the measurement was made at the appropriate distance using a measuring receiver with a Quasi-Peak detector for measurements below 1000 MHz and an Average detector for measurements above 1000 MHz.

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.

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 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 horns.

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 $dB_{\mu}V$ 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	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

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8.3. Transmitter 20 dB Bandwidth

The EUT was connected to a spectrum analyser enabled with an occupied bandwidth function via an antenna test fixture.

Measurements were performed to determine the Occupied Bandwidth in accordance with FCC Part 2.1049. The Occupied Bandwidth was measured from the fundamental emission at the bottom and top channels. The Occupied Bandwidth was measured in line with the requirements of 2.1049 i.e. with the EUT modulated with a signal representing the maximum rated conditions under which it will operate (worst case)

The Occupied Bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz FSEB spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser settings were set as per those outlined in the FSEB user manual for this measurement, i.e. RBW <= 1/20 of occupied bandwidth. A value of 1kHz was used. 1% of Emission Bandwidth stated in Part 95.633(3)

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9. Measurement Uncertainty

9.1. 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.

- 9.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.
- 9.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.
- 9.4. 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
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	+/- 3.25 dB
Occupied Bandwidth	N/A	95%	+/- 0.12 %
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	+/- 1.78 dB

9.5. 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.

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A028	9188-2 Horn Antenna 1-2 GHz	Eaton	91888-2	304	08 Jun 2006	36
A031	2 to 4 GHz Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A039	HP 11693A Pulse Limiter	Hewlett Packard	11693A	06830	04 Jun 1998	12
A1037	Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	20 Sep 2006	12
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/012	09 Feb 2007	12
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	12
A1830	N-Type Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	Calibrated before use	12
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519	17 Nov 2006	36
A259	Bilog Antenna	Chase	CBL6111	1513	13 Mar 2007	12
A390	DC to 18 GHz	Suhner	6830.17.B	None	01 Nov 2006	12
C1155	Cable	Huber & Suhner	Sucoflex 104PA	1522/4PA	Calibrated before use	12
C1268	Cable	Rosenberger	FA210A00750 08080	49356-1	Calibrated before use	12
C151	Cable	Rosenberger	UFA210A-1- 1181-70x70	None	22 Sep 2005	12
C160	Cable	Rosenberger	UFA210A-1- 1181-70x70	None	29 Jan 2005	12
C341	Cable	Andrews	None	None	30 Jan 2005	12
C348	Cable	Rosenberger	UFA210A-1- 1181-70x70	2993	29 Jan 2005	12
C363	Cable	Rosenberger	RG142	None	29 Jan 2005	12
C461	Cable	Rosenberger	UFA210A-1- 1182-704704	98H0305	30 Jan 2005	12

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Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027	24 Apr 2007	12
M024	EZM Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	19 Nov 1999	12
M1124	ESIB Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	20 Dec 2006	12
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
M1391	Thermo Hygrometer	Oergon Scientific	BAR629HGU	N/A	23 Oct 2006	12

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\49493JD01\EMICON	Test configuration for measurement of conducted emissions.
DRG\49493JD01\EMIRAD	Test configuration for measurement of radiated emissions.

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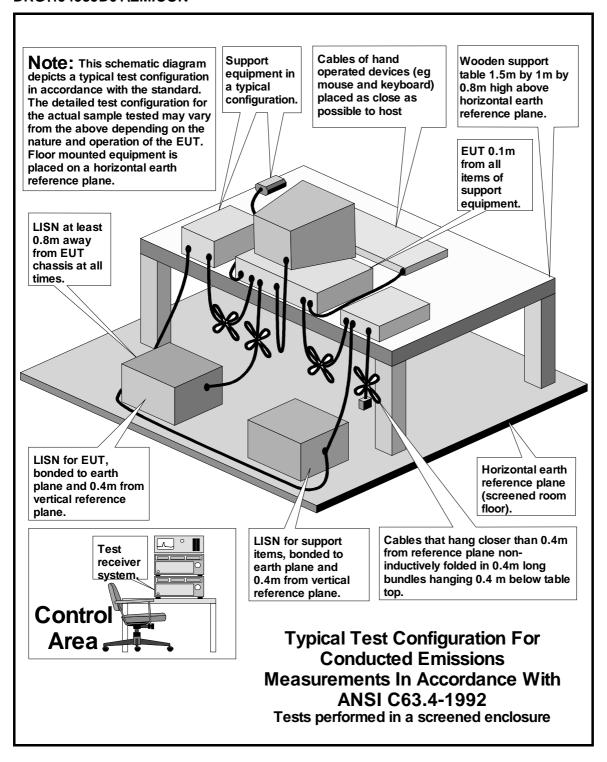
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