




TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Satellite Tracking Of People LLC
BluTag4

To: FCC Part 15.249

Test Report Serial No:
RFI/MPTE1/RP48270JD02A

This Test Report Is Issued Under The Authority Of Andrew Brown, Operations Manager: 	
Tested By: Steven Wong 	Checked By: Tony Henriques 
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1. Client Information

Company Name:	Satellite Tracking Of People LLC
Address:	4801 Woodway Drive Suite 110W Houston Texas 77056-1828 USA
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)

Brand Name:	STOP
Model Name or Number:	BluTag4
Serial Number:	BB11-TRI002
FCC ID:	S5EAA90048
Country of Manufacture:	UK
Date of Receipt:	12 May 2006

Description:	Charging cradle
Brand Name:	STOP
Model Name or Number:	None stated
Serial Number:	None stated
Country of Manufacture:	Not Stated
Date of Receipt:	12 May 2006

Description:	AC Charger
Brand Name:	mpw
Model Name or Number:	SA071113
Serial Number:	None stated
Country of Manufacture:	China
Date of Receipt:	12 May 2006

2.2. Description of EUT

The equipment under test is a personal tracking device incorporating GSM, GPRS, 915 MHz and GPS technologies.

2.3. Modifications Incorporated in the EUT

During testing the EUT was not modified.

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2.4. Additional Information Related to Testing

Power Supply Requirement:	Internal battery supply of 3.7 V (Supplied with dedicated 110V AC charger)		
Equipment Category:	Portable (Standalone battery powered device)		
Type of Unit:	Transceiver		
Transmit Frequency Range:	915 MHz, single frequency operation		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Single	Not Applicable	915
Receive Frequency Range:	915 MHz, single frequency operation		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Single	Not Applicable	915
Highest Unintentionally Generated Frequency:	915 MHz		
Highest Fundamental Frequency:	915 MHz		
Occupied Bandwidth:	392.786 kHz		

2.5. Port Identification

Port	Description	Type/Length	Applicable
1	Charger Port	-	Y

2.6. Support Equipment

No support equipment was used to exercise the EUT during testing.

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3. Test Specification, Methods and Procedures

3.1. Test Specifications

Reference:	FCC Part 15 Subpart C: 2005 (Sections 15.249).
Title:	Code of Federal Regulations, Part 15 (47CFR215) 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.

3.2. 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 (1996)

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.

DA00-705 (2000)

Title: Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

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.

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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.

The EUT was set to transmit continuously on 915 MHz with modulation.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

The EUT was configured with the AC charger cradle connected and in charging mode. This was found to be the worst case configuration.

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6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliance Status
Transmitter Fundamental Fieldstrength	C.F.R. 47 FCC Part 15: 2005 Section 15.249(a)	Antenna	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 2: 2005 Section 2.1049	Antenna	Complied
Transmitter Radiated Spurious Emissions	C.F.R. 47 FCC Part 15: 2005 Section 15.249(a)(d)(e) & 15.209	Antenna	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 15: 2005 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, England.

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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.

7.1.3. No testing of Receiver AC conducted emissions or radiated spurious emissions was performed as the EUT continuously transmits and is never in a 'Receive' only condition.

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7.2. Transmitter Fundamental Fieldstrength Section 15.249(a)

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

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

Results:

Powered by Internal Battery Supply

Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
914.985	Vertical	89.6	94.0	4.4	Complied

Powered by External AC Charger

Frequency (MHz)	Antenna Polarity	Input Voltage (AC)	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
914.985	Vertical	110.0	94.0	94.0	0.0	Complied
914.985	Vertical	93.5	94.0	94.0	0.0	Complied
924.985	Vertical	126.5	94.0	94.0	0.0	Complied

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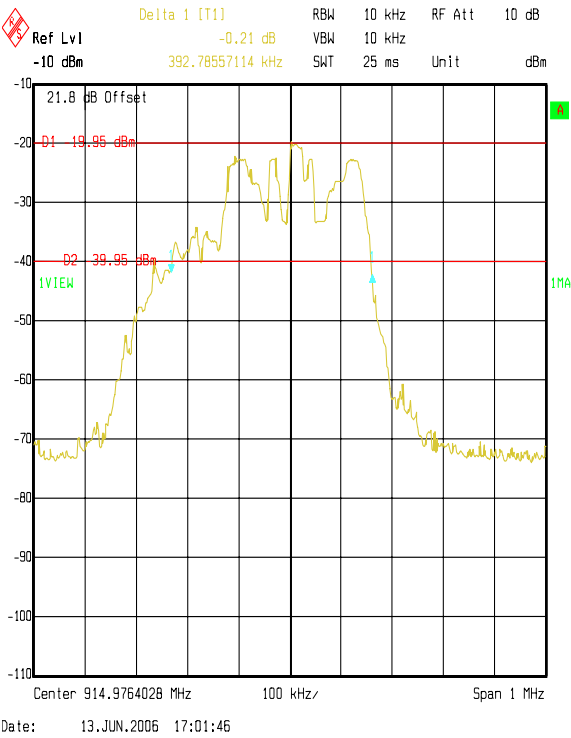
7.3. Transmitter 20 dB Bandwidth: Section 2.1049

7.3.1. The EUT was configured for 20 dB bandwidth measurements as described in Section 8 of this report.

7.3.2. Tests were performed to identify the 20 dB bandwidth.

Results:

Transmitter 20 dB Bandwidth (kHz)
392.786



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7.4. Transmitter Radiated Emissions: Section 15.249(a)(d)(e) & Section 15.209

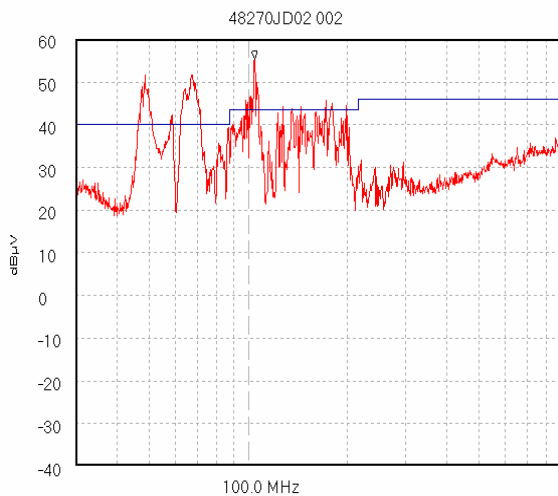
7.4.1. Electric Field Strength Measurements: 30 to 1000 MHz

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

7.4.1.2. Tests were performed to identify the maximum radiated spurious emission levels.

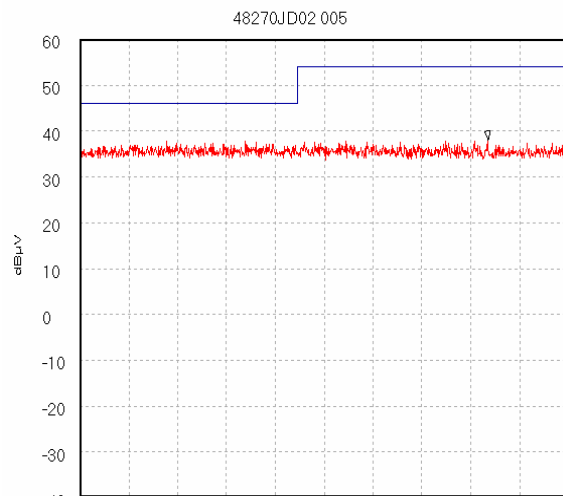
Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
48.550	Vertical	29.6	40.0	10.4	Complied
67.494	Vertical	29.2	40.0	10.8	Complied
103.800	Vertical	25.8	40.0	14.2	Complied
172.261	Vertical	27.6	40.0	12.4	Complied
198.916	Vertical	23.0	40.0	17.0	Complied



Trace 1
rad_30_to_1000

Start 30.0 MHz; Stop 902.0 MHz - Log Scale
Ref 60 dB μ V; Ref Offset 0.0 dB; 10 dB/div
RBW 120.0 kHz; VBW 3.0 MHz; Att 0 dB; Swp 340.0 mS
Peak 104.493 MHz, 55.28 dB μ V
Limit/Mask: rad_30_to_1000; ; Limit Test Failed
Transducer Factors: A490
13/06/2006 13:37:04



Trace 1
rad_30_to_1000

Start 928.0 MHz; Stop 1.0 GHz
Ref 60 dB μ V; Ref Offset 0.0 dB; 10 dB/div
RBW 120.0 kHz; VBW 3.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 988.16 MHz, 38.01 dB μ V
Limit/Mask: rad_30_to_1000; ; Limit Test Passed
Transducer Factors: A490
13/06/2006 14:39:28

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

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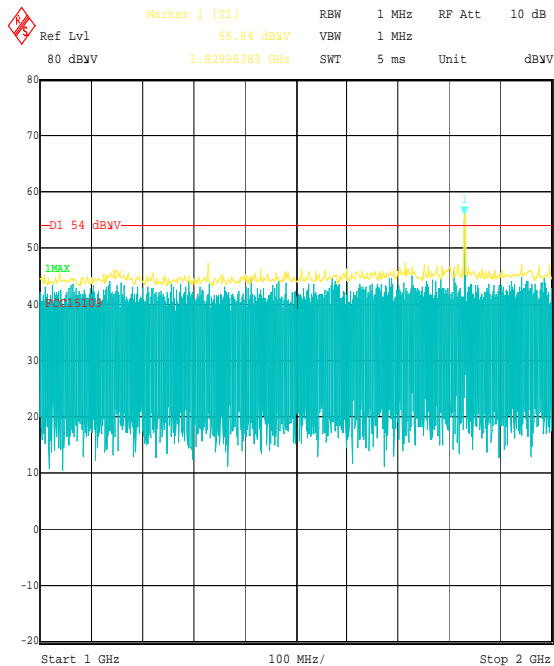
Transmitter Radiated Emissions: Section 15.249(a)(d)(e) & Section 15.209 (Continued)**7.4.2. Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz)****Results:****Highest Peak Level:**

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1830.61	Horizontal	71.0	-9.4	61.6	74.0	12.4	Complied
2744.96	Horizontal	57.4	-11.0	46.4	74.0	27.6	Complied
4307.44	Horizontal	37.2	-7.9	29.3	74.0	44.7	Complied
4515.34	Horizontal	64.0	-6.4	57.6	74.0	16.4	Complied
5417.71	Vertical	46.3	-5.6	39.7	74.0	34.3	Complied

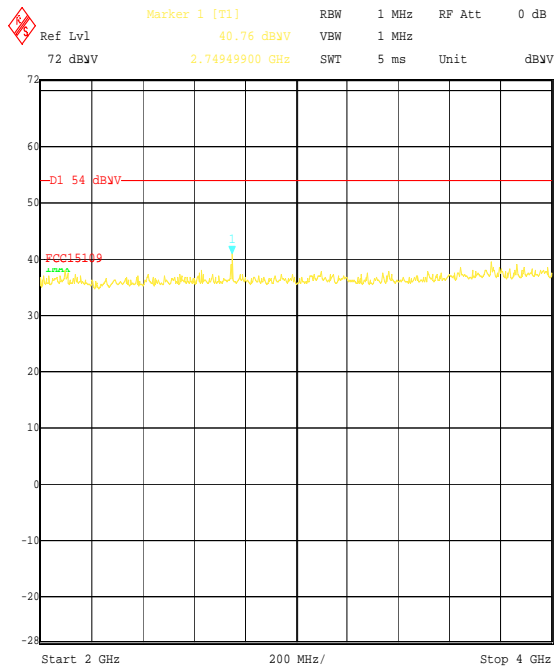
Highest Average Level:

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1830.61	Horizontal	50.0	-9.4	40.6	54.0	13.4	Complied
2744.96	Horizontal	38.0	-11.0	27.0	54.0	17.0	Complied
4307.44	Horizontal	32.8	-7.9	24.9	54.0	29.1	Complied
4515.34	Horizontal	21.7	-6.4	16.3	54.0	38.7	Complied
5417.71	Vertical	20.2	-5.6	14.6	54.0	39.7	Complied

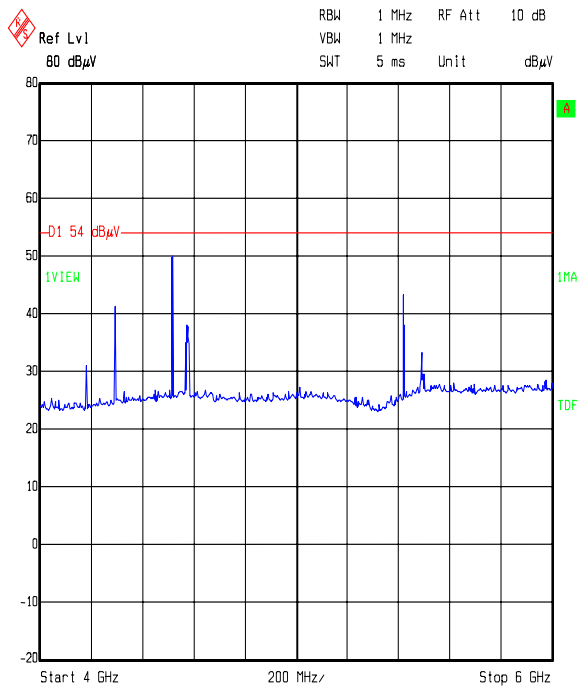
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Transmitter Radiated Emissions: Section 15.249(a)(d)(e) & Section 15.209 (Continued)

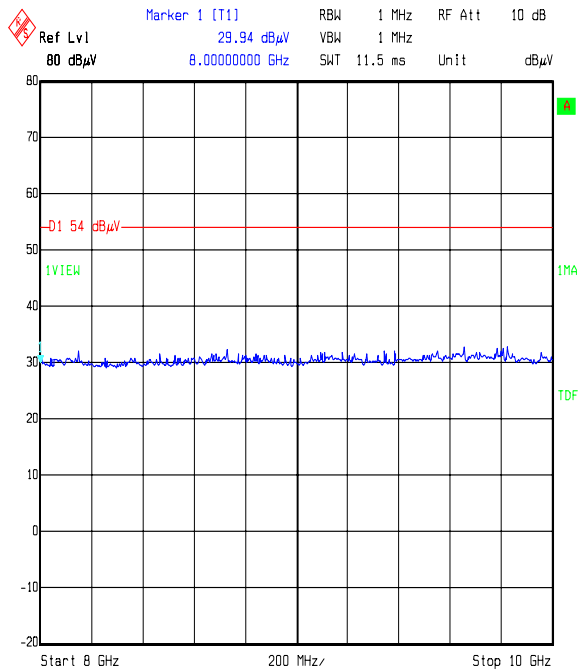
Title: ST 48270JD03 FCC 15.249
Comment A: 30MHz - 1GHz Mob Unit
Date: 4.MAY.2006 14:51:40



Title: ST 48270JD03 FCC 15.249
Comment A: 2GHz - 4GHz Mob Unit
Date: 4.MAY.2006 14:53:55



Comment A: Peak 4GHz to 6GHz
Date: 10.MAY 2006 11:57:41



Title: Satellite Tracking People FCC 15.249
Comment A: Peak 8GHz to 10GHz
Date: 10.MAY 2006 14:07:17

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

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7.5. Transmitter Radiated Emissions at Band Edges: Section 15.249(d) & 15.209

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

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

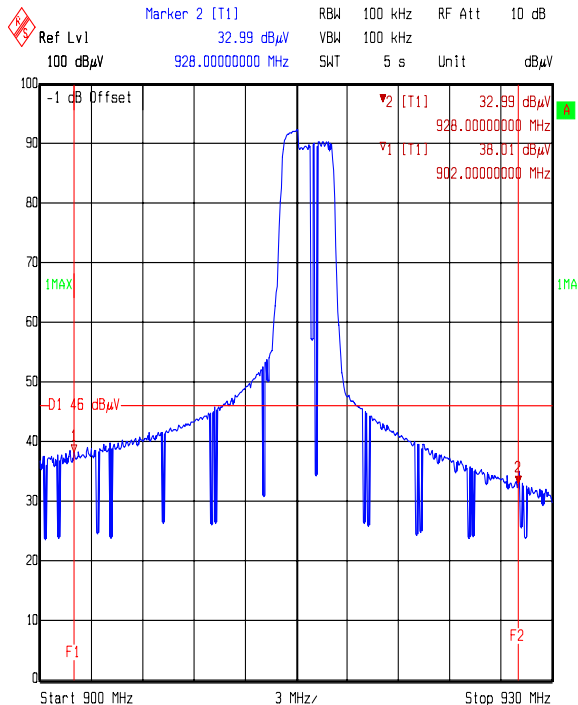
Results:

Bottom Band Edge

Frequency (MHz)	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
902	38.0	46.0	8.0	Complied

Top Band Edge

Frequency (MHz)	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
928	33.0	46.0	13.0	Complied



Date: 17.MAY 2006 15:22:22

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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
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%	+/- 2.94 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.

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9. Measurement Methods

9.1. 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.

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Radiated Emissions (Continued)

Scans were performed to the upper frequency limits as stated in Section 15.33

The final field strength was determined as the indicated level in dB μ V plus cable loss and antenna factor.

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

Receiver Function	Initial Scan	Final Measurements 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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9.2. Transmitter 20 dB Bandwidth

The EUT and spectrum analyser was configured for transmitter radiated emissions measurements.

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

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A028	Horn Antenna	Eaton	91888-2	304
A031	Horn Antenna	Eaton	91889-2	557
A059	Log Periodic Antenna	EMCO	3146	8902-2378
A254	Horn Antenna	Flann Microwave	14240-20	139
A255	Horn Antenna	Flann Microwave	16240-20	519
A259	Bilog Antenna	Chase	CBL6111	1513
A506	Log Periodic Antenna	Rohde & Schwarz	HL223	827154/12
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986_022
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016
S201	Site 1	RFI	1	
S212	Site 2	RFI	2	

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\48270JD02\EMIRAD	Test configuration for measurement of radiated emissions.

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DRG\48270JD02\EMIRAD

