TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: 1619-20XPL in host NY MTA Bus

To: FCC Part 15.225: 2008 Subpart C

Test Report Serial No:
RFI/RPT1/RP75001JD03A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	pp R. Graham
Checked By:	R. Graham
Signature:	R. Graham
Date of Issue:	09 October 2009

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1. Customer Information

Company Name:	VeriFone Inc.
Address:	Salamander Quay South Park Lane Harefield Middlesex UB9 6NY

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	23 June 2009 to 25 June 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
Part 15.109(a)	Idle Mode Radiated Spurious Emissions	Enclosure	✓
Part 15.225(a)(b)(c)(d)	Transmitter Fundamental Field Strength	Antenna	✓
Part 15.209(a), 15.225(d)	Transmitter Radiated Spurious Emissions	Antenna	✓
Part 15.209(a) 15.225(c)(d)	Transmitter Band Edge Radiated Emissions	Antenna	✓
Part 2.1049	Transmitter 20 dB Bandwidth	Antenna	✓
Part 15.225(e)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	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.

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Verifone
Model Name or Number:	1619-20XPL
Serial Number:	None Stated
FCC ID:	B321619-20XPL

3.2. Description of EUT

The equipment under test was a 13.56 MHz RFID card reader module fitted in DC powered host NY MTA Bus.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Support Equipment

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

Description:	Keypad with LCD Interface
Brand Name:	Verifone
Model Name or Number:	NY MTA Bus Contactless Card Pin Entry
Serial Number:	None Stated

Description:	RFID Demo Card
Brand Name:	Mastercard
Model Name or Number:	MT MYA Subway Contactless Demo Card
Serial Number:	None Stated

3.5. Additional Information Related to Testing

Tested Technology:	RFID	
Transmit Frequency:	13.56 MHz	
Power Supply Requirement:	Nominal	24.0 V
	Minimum	20.4 V
	Maximum	27.6 V
Tested Temperature:	Minimum	-20°C
	Maximum	50°C

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at 13.56 MHz with a modulated carrier at maximum power.
- Idle mode with the EUT in monitor mode

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Transmitter Tests - The EUT ran a number of common functions which involved the transmitter polling for a 13.56 MHz RFID chip. This mode was in a continuous cycle of approximately 5 seconds.
- Idle Tests – The EUT was set into Monitor Mode.

5. Measurements, Examinations and Derived Results

5.1. General Comments

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 6. Measurement Uncertainty* for details.

5.2. Test Results

5.2.1. Idle Mode Radiated Spurious Emissions

Test Summary:

FCC Part:	15.109(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	30

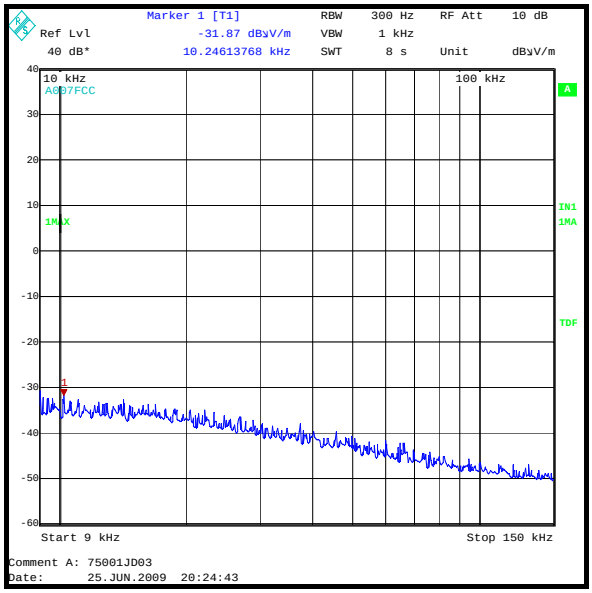
Results:

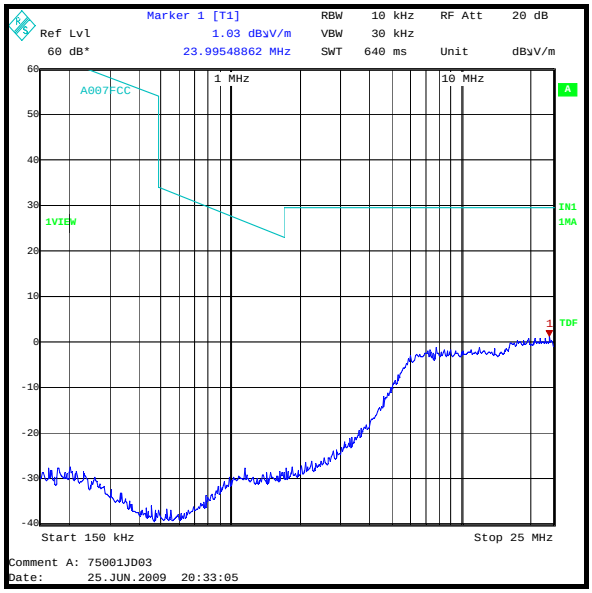
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
50.205	Vertical	33.9	40.0	6.1	Complied
132.699	Vertical	36.9	43.5	6.6	Complied
166.237	Horizontal	36.3	43.5	7.2	Complied
332.532	Vertical	32.6	46.0	13.4	Complied

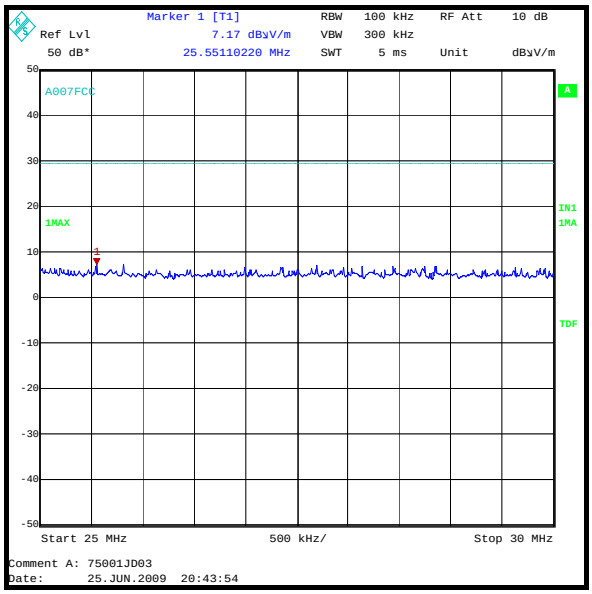
Note(s):

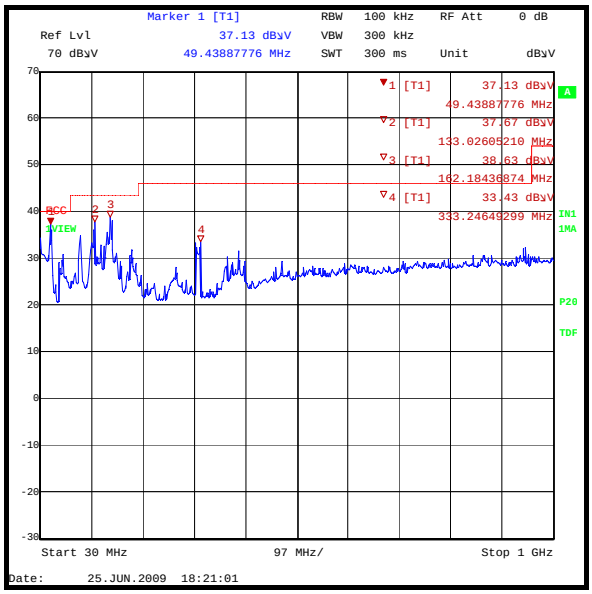
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.

Idle Mode Radiated Spurious Emissions (continued)









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

5.2.2. Transmitter Fundamental Field Strength

Test Summary:

FCC Part:	15.225 (a)(b)(c)(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

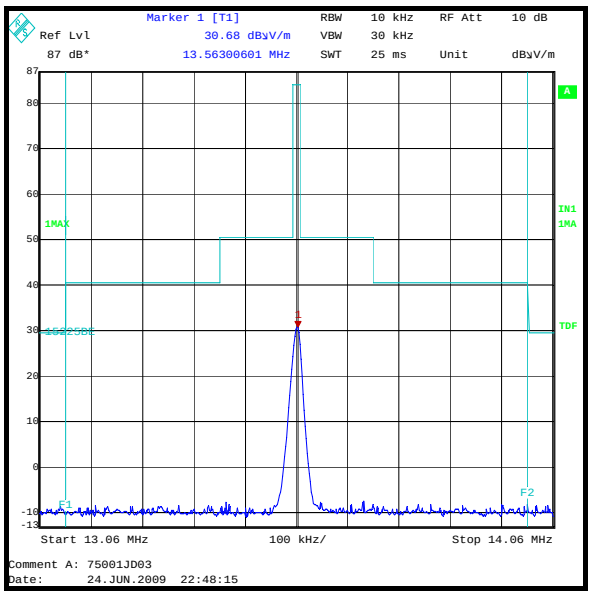
Temperature (°C):	26
Relative Humidity (%):	29

Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dBµV/m)	Limit at 30 m (dBµV/m)	Margin (dB)	Result
13.56	45° to EUT	30.8	84.0	53.2	Complied

Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. The limit is specified at a test distance of 30 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor. A transducer factor on the test equipment was used to extrapolate the result obtained at 3 metres to the required measurement distance.



5.2.3. Transmitter Radiated Spurious Emissions

Test Summary:

FCC Part:	15.209 (a), 15.225(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	29

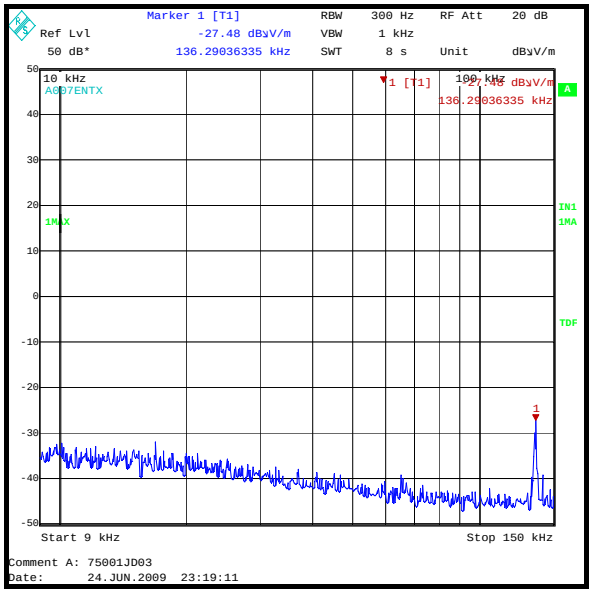
Results: Electric Field Strength Measurements

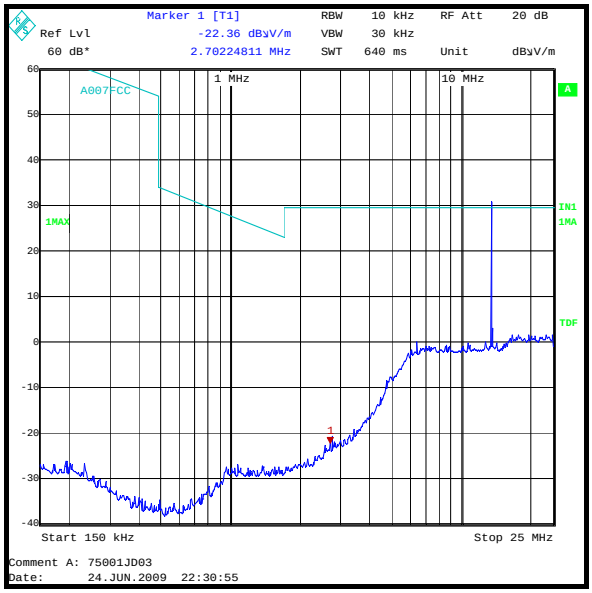
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
75.013	Vertical	33.3	40.0	6.7	Complied
166.209	Vertical	35.8	43.5	7.7	Complied
323.734	Vertical	32.5	43.5	11.0	Complied

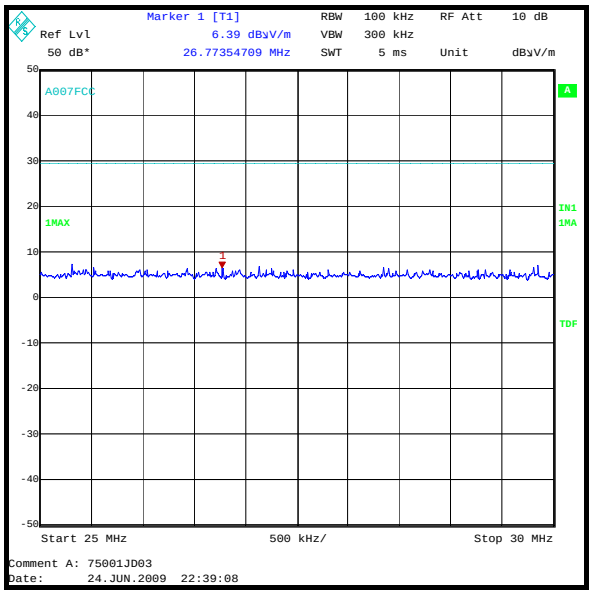
Note(s):

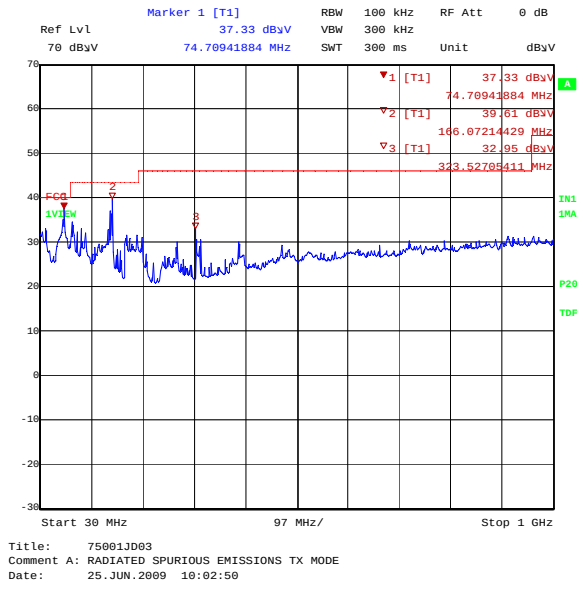
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.
3. The fundamental is displayed on the pre-scan 150 kHz to 25 MHz plot at approximately 13.5 MHz.

Transmitter Radiated Spurious Emissions (continued)









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

5.2.4. Transmitter Radiated Emissions at Band Edges

Test Summary:

FCC Part:	15.209(a) 15.225(c)(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	29

Results: Lower Band Edge

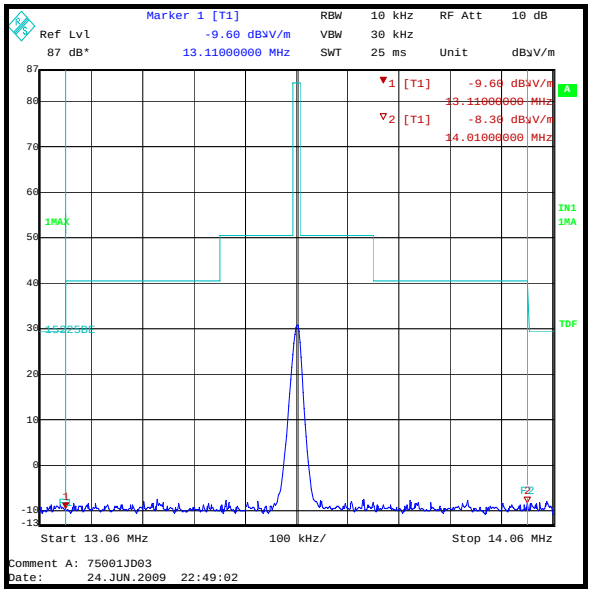
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
13.11	-9.6	40.5	50.1	Complied

Results: Upper Band Edge

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
14.01	-8.3	40.5	48.8	Complied

Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.



5.2.5. Transmitter 20 dB Bandwidth

Test Summary:

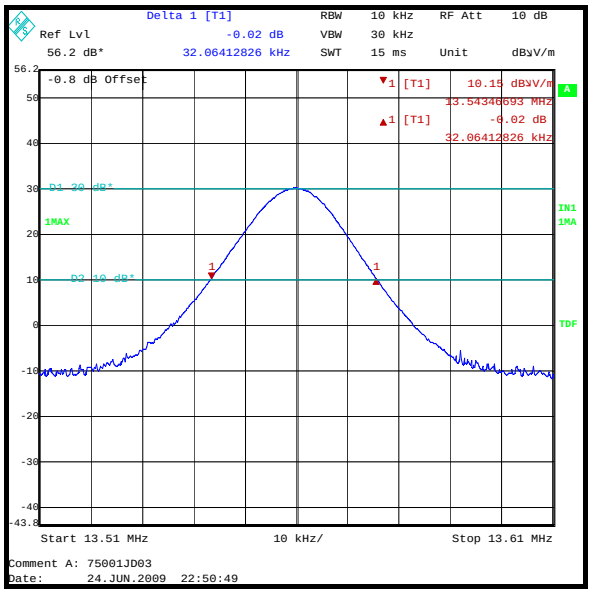
FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	29

Results:

Transmitter 20 dB Bandwidth (kHz)
32.064



5.2.6. Transmitter Frequency Stability (Temperature & Voltage Variation)

Test Summary:

FCC Part:	15.225 (e)
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.6 and relevant annexes

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	30

Results: Maximum frequency error of the EUT with variations in ambient temperature

Temp (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
-20	13.56	13.559794	206	0.001519	0.01	0.008481	Complied
20	13.56	13.559589	411	0.003031	0.01	0.006969	Complied
50	13.56	13.559783	217	0.001600	0.01	0.008400	Complied

Results: Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient temperature of 20°C

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
17	13.56	13.559586	414	0.003053	0.01	0.006947	Complied
24	13.56	13.559589	411	0.003031	0.01	0.006969	Complied
32	13.56	13.559585	415	0.003060	0.01	0.006940	Complied

6. 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
Occupied Bandwidth	13 MHz to 14 MHz	95%	±0.12 %
Frequency Stability	13 MHz to 14 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±2.94 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.

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	29 Mar 2009	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	12
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibrated before use	-
K0001	5m SA Chamber	Rainford EMC	N/A	N/A	04 May 2009	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Aug 2009	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	22 Apr 2009	12
M1249	Thermometer	Fluke	52II	88800049	09 Jul 2008	12
M1269	Multimeter	Fluke	179	90250210	09 Apr 2008	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	01 Apr 2009	12
S021	DC Power Supply	Thurlby Thandar Instruments	CPX200	061034	Calibrated before use	-
S0520	DC Power Supply	GW instek	GPC-3030	E835141	Calibrated before use	-

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