

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: OCR601

FCC ID: ZEROCR601

To: FCC Part 15.225: 2010 Subpart C

Test Report Serial No:
RFI-RPT-RP80115JD03A V3.0

Version 3.0 Supersedes All Previous Versions

**This Test Report Is Issued Under The Authority
Of Chris Guy, Head of Global Approvals:**



Checked By:	Ian Watch
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Date of Issue:	04 May 2011

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Table of Contents

1. Customer Information.....	4
2. Summary of Testing.....	5
2.1. General Information	5
2.2. Summary of Test Results	5
2.3. Methods and Procedures	5
2.4. Deviations from the Test Specification	5
3. Equipment Under Test (EUT)	6
3.1. Identification of Equipment Under Test (EUT)	6
3.2. Description of EUT	6
3.3. Modifications Incorporated in the EUT	6
3.4. Additional Information Related to Testing	6
3.5. Support Equipment	7
4. Operation and Monitoring of the EUT during Testing	8
4.1. Operating Modes	8
4.2. Configuration and Peripherals	8
5. Measurements, Examinations and Derived Results	9
5.1. General Comments	9
5.2. Test Results	10
5.2.1. Transmitter AC Conducted Spurious Emissions	10
5.2.2. Transmitter Fundamental Field Strength	12
5.2.3. Transmitter Radiated Spurious Emissions	13
5.2.4. Transmitter Band Edge Radiated Emissions	15
5.2.5. Transmitter 20 dB Bandwidth	16
5.2.6. Transmitter Frequency Stability (Temperature & Voltage Variation)	17
6. Measurement Uncertainty	18
Appendix 1. Test Equipment Used	19

1. Customer Information

Company Name:	Access-IS
Address:	18 Suttons Business Park Reading Berkshire RG6 1AZ United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) - Section 15.209
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	23 February 2011 to 28 February 2011

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	✓
Part 15.225(a)(b)(c)(d)	Transmitter Fundamental Field Strength	✓
Part 15.209(a)/15.225(d)	Transmitter Radiated Emissions	✓
Part 15.209(a)/15.225(c)(d)	Transmitter Band Edge Radiated Emissions	✓
Part 2.1049	Transmitter 20 dB Bandwidth	✓
Part 15.225(e)	Transmitter Frequency Stability (Temperature & Voltage Variation)	✓

Key to Results

✓ = Complied ✘ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

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:	Access-IS
Model Name or Number:	OCR601
Serial Number:	ENG 001
Hardware Version Number:	Camera board: PCBM2936D1 RFID board: PCBM2698 03 Antenna board: PCBP 2755 C Interface board: PCBP 2884E
Software Version Number:	RFID FW – 1.11 Camera FW - 04
FCC ID:	ZEROOCR601

3.2. Description of EUT

The equipment under test was an Open book ePassport reader – MRZ scan/decode and RFID. The unit is powered by USB from a Personal Computer. The EUT incorporates a USB camera with an internal frequency of 480 MHz.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	RFID	
Category of Equipment:	Transmitter	
Channel Spacing:	Single channel device	
Transmit Frequency Range:	13.56 MHz	
Power Supply Requirement:	Nominal	5.0V
	Minimum	4.75V
	Maximum	5.25 V
Tested Temperature Range:	Minimum	-20°C
	Maximum	50°C

3.5. Support Equipment

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

Description:	Dell Laptop
Brand Name:	Dell
Model Name or Number:	PP18L
Serial Number:	LW657 A02

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

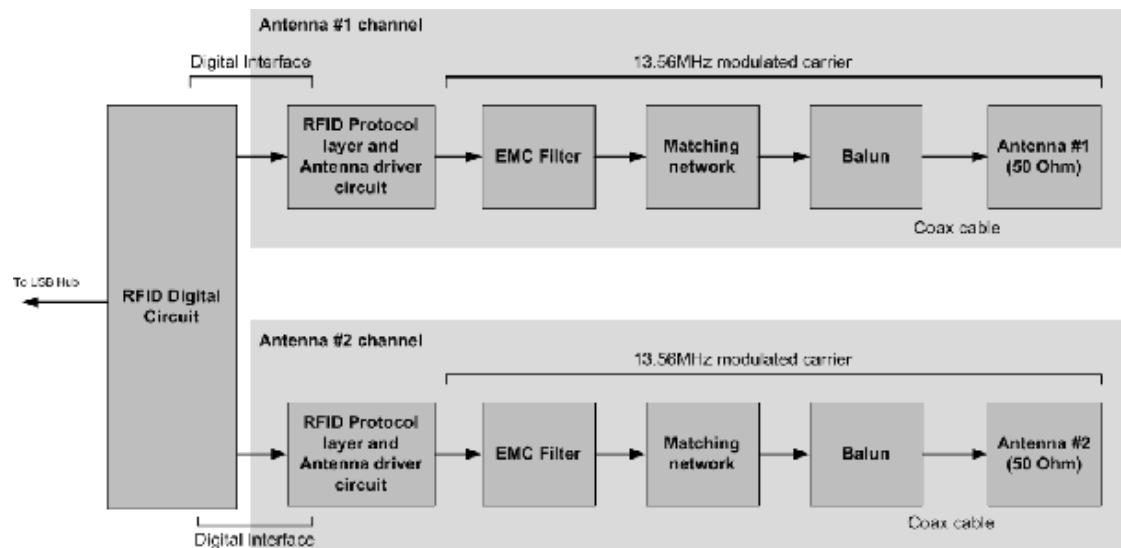
The EUT was tested in the following operating mode(s):

- Constantly transmitting and receiving at maximum power with a modulated carrier in RFID test mode.

4.2. Configuration and Peripherals

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

- The EUT was configured by the Customer to constantly transmit at when powered on for test purposes only. The EUT was powered by a USB cable from the laptop, once its powered the drivers are loaded up and it will start to transceiver
- AC conducted emissions tests were performed with a dummy load attached to the antenna port in accordance with FCC KDB 174176.
- A modified USB cable with DC breakout was used for voltage extremes tests. This cable was connected to a bench power supply in order to vary the voltage to the EUT.
- The unit has two integral antennas with two identical transmit paths as per the block diagram below. The carrier is continually switched between the two paths.
- Antenna#2 was used to make the measurements as it emitted a higher level RF fieldstrength than Antenna #1.



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 Uncertainties* for details.

5.2. Test Results

5.2.1. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	23 February 2011
Test Sample Serial No:	ENG 001		

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	28

Results: Quasi Peak

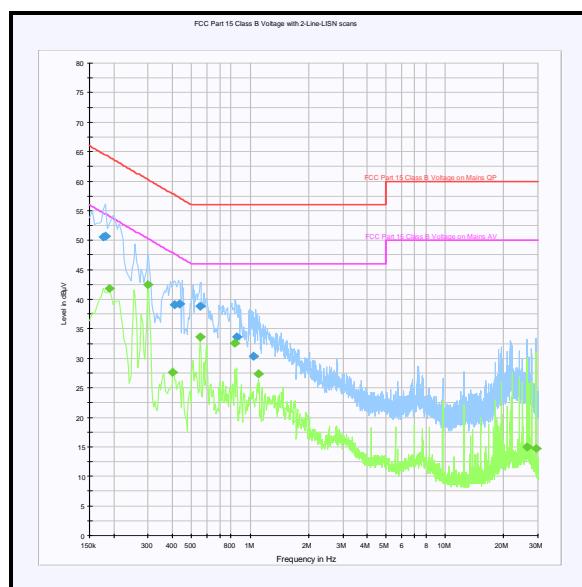
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.177000	Neutral	50.6	64.6	14.0	Complied
0.181500	Neutral	50.6	64.4	13.8	Complied
0.411000	Live	39.1	57.6	18.5	Complied
0.433500	Neutral	39.2	57.2	18.0	Complied
0.555000	Live	38.9	56.0	17.1	Complied
0.852000	Neutral	33.7	56.0	22.3	Complied
1.045500	Live	30.4	56.0	25.6	Complied

Results: Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.190500	Neutral	41.8	54.0	12.2	Complied
0.298500	Neutral	42.5	50.3	7.8	Complied
0.402000	Neutral	27.7	47.8	20.1	Complied
0.555000	Neutral	33.6	46.0	12.4	Complied
0.834000	Neutral	32.6	46.0	13.4	Complied
1.108500	Neutral	27.4	46.0	18.6	Complied
26.407500	Neutral	15.0	50.0	35.0	Complied
29.193000	Live	14.8	50.0	35.2	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Note(s):**

1. AC conducted emissions are measured on Live and Neutral lines during pre-scans. The pre-scan plot shows composite measurements on the Live and Neutral lines. The blue trace is the Live and Neutral composite measured using a peak detector. The green trace is the Live and Neutral composite measured using an average detector. Final measurements are made on Live or Neutral line emissions that exhibited the highest level during pre-scans. Final measurements were made using quasi-peak and average detectors and the results are displayed in the above tables.



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

5.2.2. Transmitter Fundamental Field Strength

Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	23 February 2011
Test Sample Serial No:	ENG 001		

FCC Part:	15.225(a)(b)(c)(d)
Test Method Used:	As detailed in ANSI C63.10 Section 6.4

Environmental Conditions:

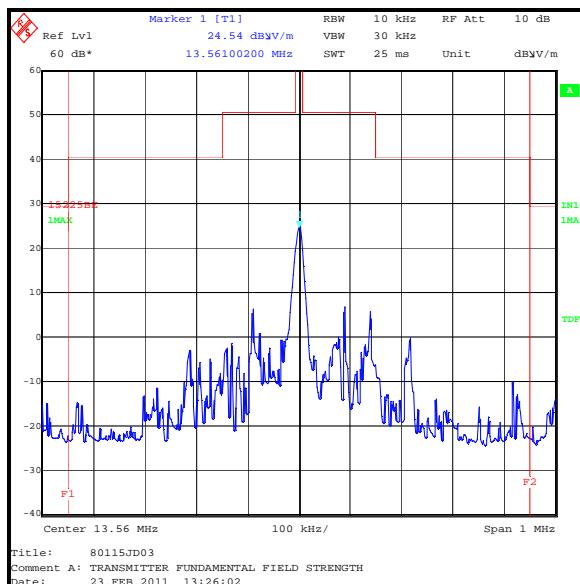
Temperature (°C):	25
Relative Humidity (%):	28

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit at 30 m (dB μ V/m)	Margin (dB)	Result
13.56	45° to EUT	16.9	84.0	67.1	Complied

Note(s):

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 using the square of an inverse linear distance extrapolation factor (40dB/decade).
3. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres. A distance extrapolation factor of 40 dB was used.
4. The fundamental field strength was maximised when the tips of the measurement antenna were positioned at 45°/225° with respect to the direction of the EUT.



5.2.3. Transmitter Radiated Spurious Emissions

Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	23 February 2011
Test Sample Serial No:	ENG 001		

FCC Part:	15.225(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3, 6.4 and 6.5 referencing ANSI C63.4
Frequency Range:	9 kHz to 2400 MHz

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	29

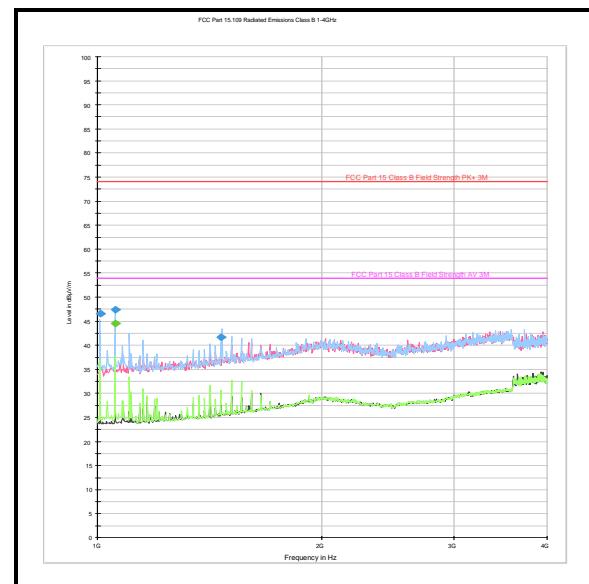
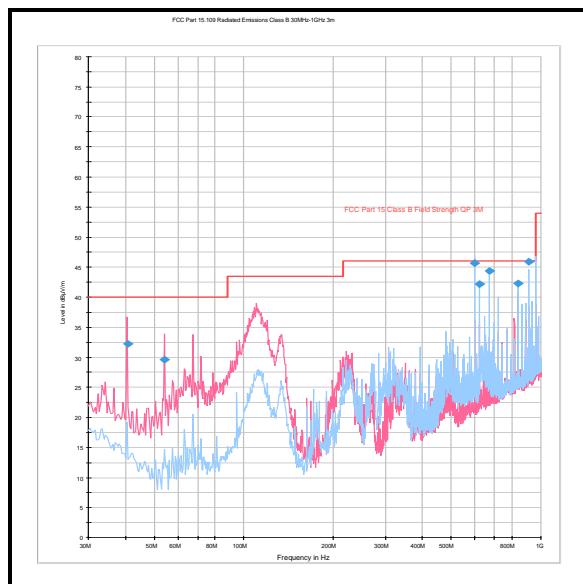
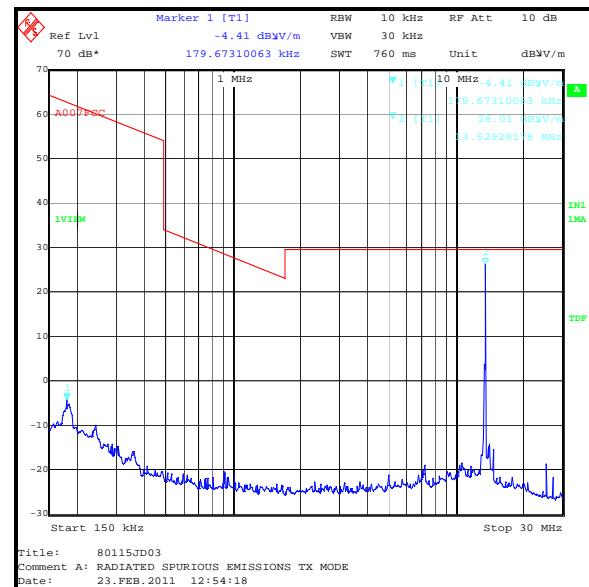
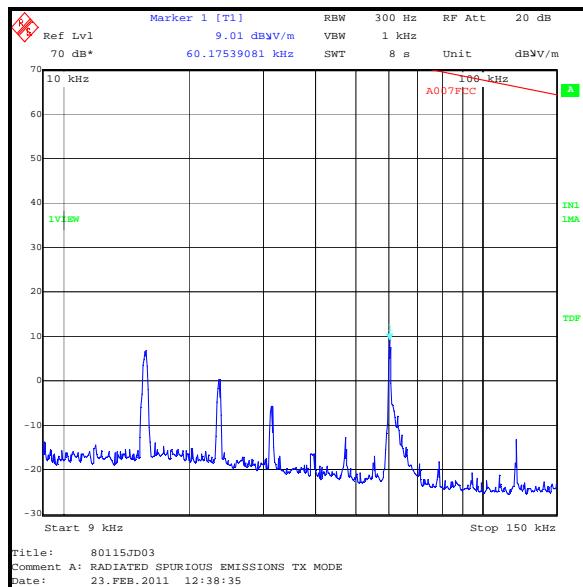
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
40.726	Vertical	32.3	40.0	7.7	Complied
54.252	Vertical	29.6	40.0	10.4	Complied
600.056	Horizontal	45.6	46.0	0.4	Complied
624.047	Horizontal	42.2	46.0	3.8	Complied
672.048	Horizontal	44.4	46.0	1.6	Complied
840.056	Horizontal	42.3	46.0	3.7	Complied
912.062	Horizontal	45.9	46.0	0.1	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 using the square of an inverse linear distance extrapolation factor (40dB/decade).
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. A distance extrapolation factor of 40 dB was used.
3. Final measurement values include corrections for antenna factor and cable losses.
4. The emission shown at approximately 13.56 MHz is the fundamental.
5. All emissions on the 9 kHz to 150 kHz plot were investigated and found to be radiating from the test site turntable.
6. All other emissions shown on the pre-scan plots were investigated and found to be >20 dB below the applicable limit or below the measurement system noise floor.
7. Measurements in the range 30 MHz to 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
8. Testing was performed to five times the USB camera operating frequency.

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 Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	23 February 2011
Test Sample Serial No:	ENG 001		

FCC Part:	15.225(c)(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.2

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	29

Results: Quasi Peak Lower Band Edge

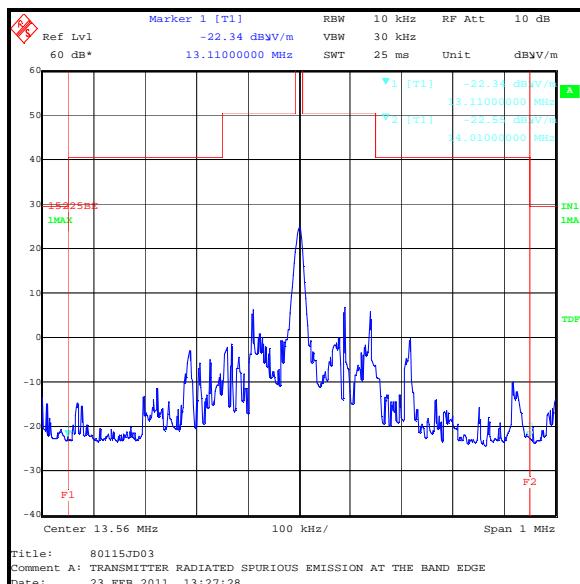
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
13.11	-22.3	29.5	51.8	Complied

Results: Quasi Peak Upper Band Edge

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
14.01	-22.6	29.5	52.1	Complied

Note(s):

1. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.
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. A distance extrapolation factor of 40 dB was used.



5.2.5. Transmitter 20 dB Bandwidth**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	23 February 2011
Test Sample Serial No:	ENG 001		

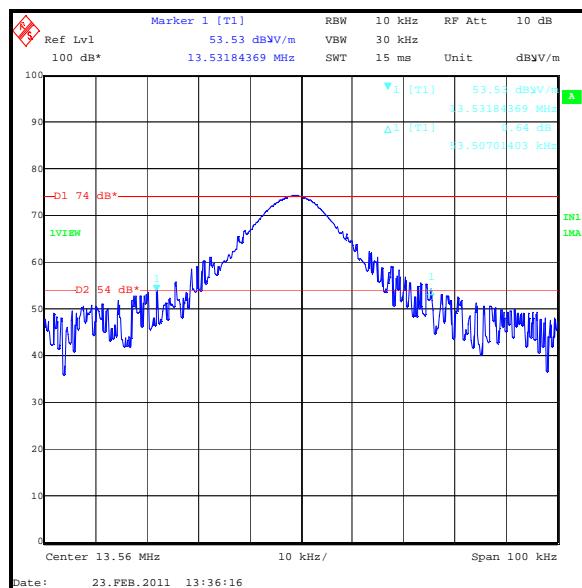
FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	29

Results:

20 dB Bandwidth (kHz)	
	53.507



5.2.6. Transmitter Frequency Stability (Temperature & Voltage Variation)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	28 February 2011
Test Sample Serial No:	ENG 001		

FCC Part:	15.225(e)
Test Method Used:	As detailed in ANSI C63.10 Section 6.8.1 and 6.8.2

Environmental Conditions:

Ambient Temperature (°C):	22
Ambient Relative Humidity (%):	31

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

Temperature (°C)	Time after Start-up			
	0 minutes	2 minutes	5 minutes	10 minutes
-20	13.558373 MHz	13.558374MHz	13.558386 MHz	13.558392 MHz
20	13.558344 MHz	13.558373 MHz	13.558349 MHz	13.558329 MHz
50	13.558340 MHz	13.558326 MHz	13.558325 MHz	13.558345 MHz

Frequency with Worst Case Deviation (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
13.558392	48	0.000354	0.01	0.0096	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
4.75	13.558344	13.558318	26	0.000192	0.01	0.0098	Complied
5.0	13.558344	13.558344	0	0.000000	0.01	0.01	Complied
5.25	13.558344	13.558355	11	0.000081	0.01	0.0099	Complied

Note(s):

1. The reference frequency was 13.558344 MHz. This was the frequency measured at ambient temperature and nominal voltage.
2. Frequency was measured using the frequency count function on a spectrum analyser.

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
20 dB Bandwidth	13 MHz to 14 MHz	95%	±0.92 ppm
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
Transmitter Fundamental Field Strength	13 MHz to 14 MHz	95%	±3.53 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 Calibration Due	Cal. Interval
A1817	Antenna	EMCO	3115	00075694	03 Feb 2012	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	01 Mar 2011	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Jun 2011	12
A1970	Pre-Amp	RFI	N/A	N/A	22 Mar 2011	3
A553	Antenna	Chase	CBL6111A	1593	16 Mar 2011	12
G0543	Amplifier	Sonoma	310N	230801	30 Jun 2011	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
L1001	Test Receiver	Rohde & Schwarz	ESU26	100239	16 Mar 2011	12
M1223	Environmental Chamber	Votsch	VT4002	58566072720010	Calibrated before use	-
M1229	Digital Multimeter	Fluke	179	87640015	15 Jul 2011	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	06 Dec 2011	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	28 Jun 2011	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12
M1568	Magnetic Loop	Rohde & Schwarz	HFH2-Z2	879284/2	27 Jan 2012	12

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