




TEST REPORT


Test Report No. : UL-RPT-RP80115JD03A V4.0

Manufacturer : Access-IS
Model No. : OCR601
FCC ID : ZEROOCR601
Technology : RFID – 13.56 MHz
Test Standard(s) : FCC Part 15.225 Subpart C

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 4.0 supersedes Test Report Serial Number RFI-RPT-RP80115JD03A V3.0. The original test report was issued under the previous company name of RFI Global Services Ltd

Date of Issue: 16 July 2015

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This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its terms of accreditation.

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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: | UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom |
| 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 V |
| | Minimum | 4.75 V |
| | 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

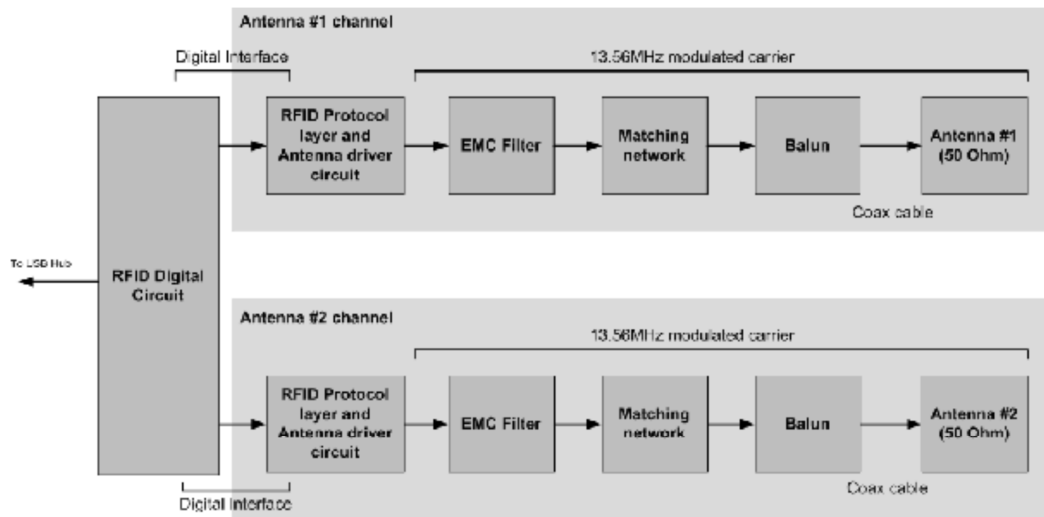
The EUT was tested in the following operating mode(s):

- 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 field strength 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 |

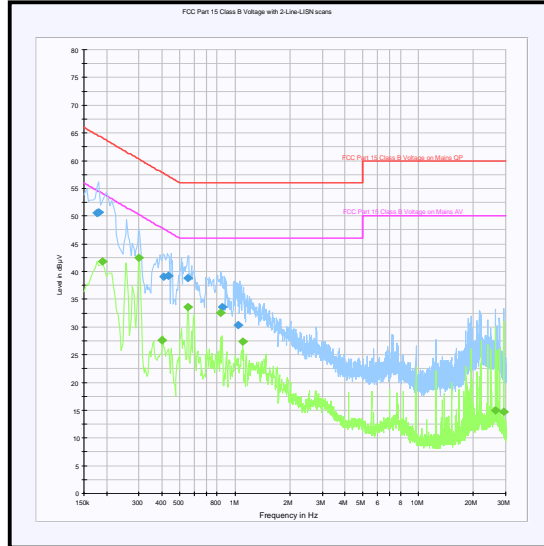
Results: Average

| 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):

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 | 36.9 | 84.0 | 47.1 | Complied |

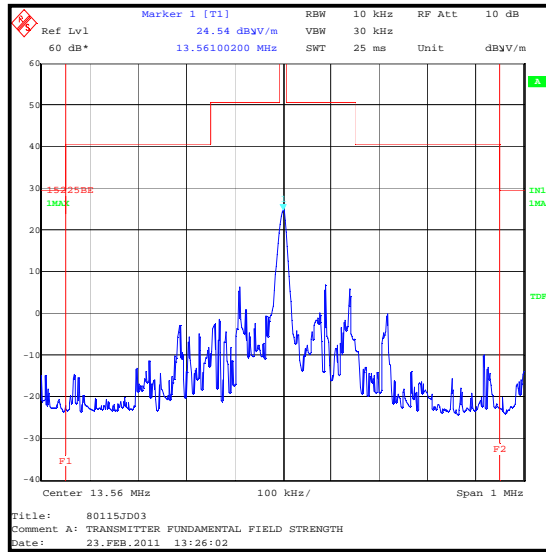
Note(s):

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

Note: An additional 20dB has been added to attain the final value shown in the table; this is to account for a transducer factor that was not included during the original measurement.

$$i.e.: 16.9 \text{ dB}\mu\text{V/m} + 20 \text{ dB} = 36.9 \text{ dB}\mu\text{V/m}$$

Transmitter Fundamental Field Strength (continued)



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 |

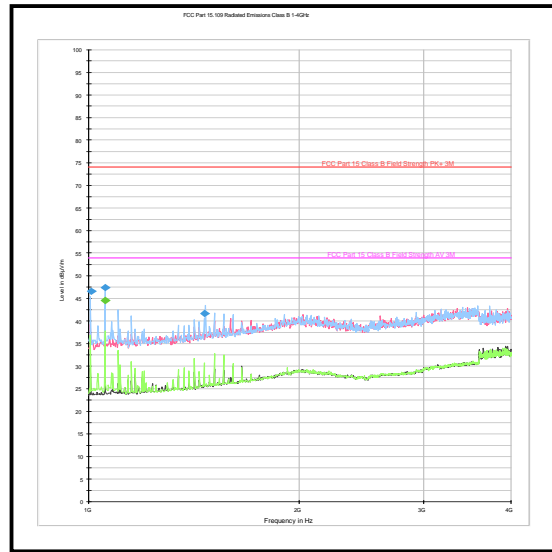
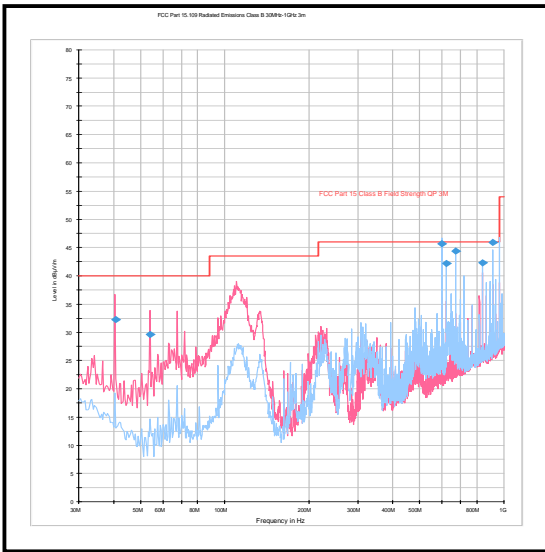
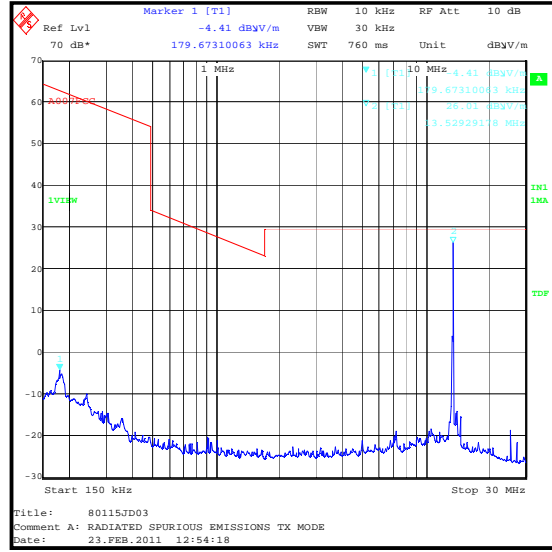
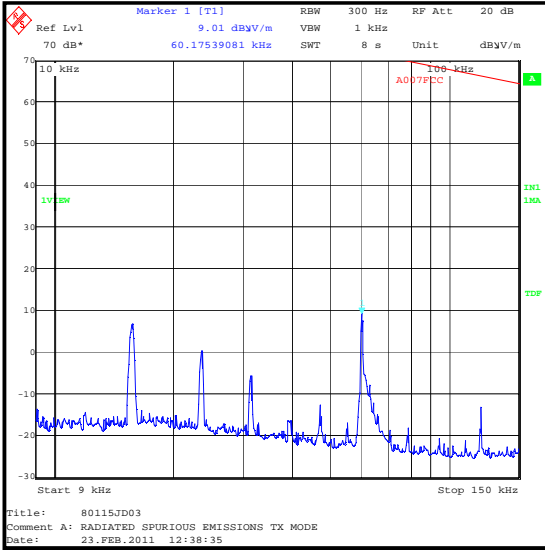
Results: Quasi Peak

| 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):

- 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).
- 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.
- Final measurement values include corrections for antenna factor and cable losses.
- The emission shown at approximately 13.56 MHz is the fundamental.
- All emissions on the 9 kHz to 150 kHz plot were investigated and found to be radiating from the test site turntable.
- 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.
- 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.
- 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 | -2.3 | 29.5 | 31.8 | Complied |

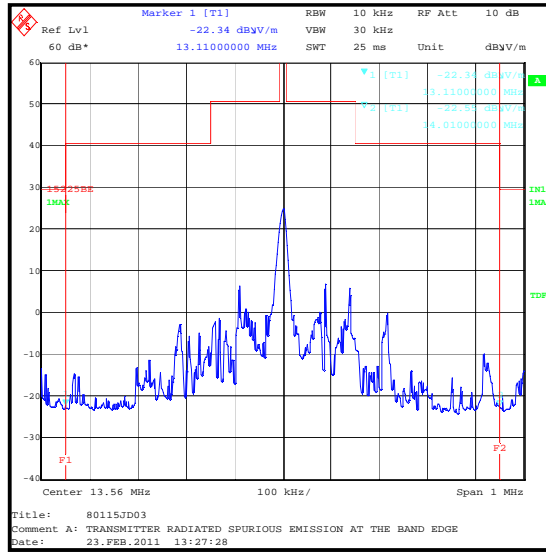
Results: Quasi Peak Upper Band Edge

| Frequency (MHz) | Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|----------------------|----------------------|-------------|----------|
| 14.01 | -2.6 | 29.5 | 32.1 | 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.
3. The band edge emission plot shown below is low by a factor of 20 dB, due to the absence of a transducer factor at the time of measurement. An additional 20 dB was subsequently added to any band edge measurements, for comparisons with the limit, when determining compliance.

Transmitter Band Edge Radiated Emissions (continued)



5.2.5. Transmitter 20 dB Bandwidth

Test Summary:

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

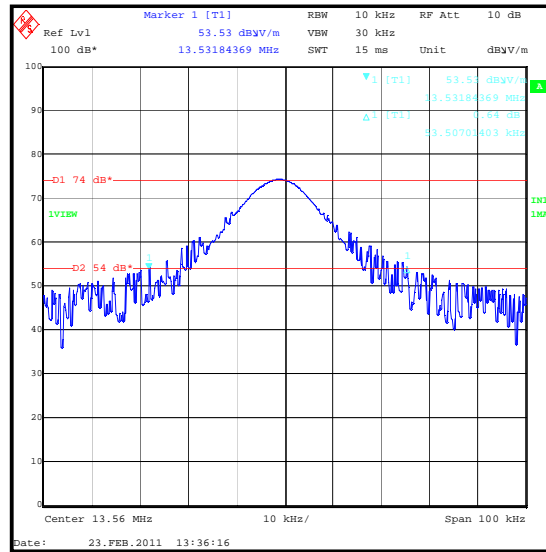
| | |
|--------------------------|--|
| FCC Part: | 2.1049 |
| Test Method Used: | As detailed in ANSI C63.10 Section 6.9.1 |

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.

7. Report Revision History

| Version Number | Revision Details | | |
|----------------|------------------|--------|--|
| | Page No(s) | Clause | Details |
| 3.0 | - | - | Previous Version |
| 4.0 | 11 & 15 | - | Corrected previously reported emissions levels by +20 dB |

Appendix 1. Test Equipment Used

| UL 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 | 58566072 720010 | Calibrated before use | - |
| M1229 | Digital Multimeter | Fluke | 179 | 87640015 | 15 Jul 2011 | 12 |
| M1242 | Spectrum Analyser | Rohde & Schwarz | FSEM30 | 845986/02 2 | 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.

--- END OF REPORT ---