



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: DL-JOYA

To: FCC Part 15.247: 2009 Subpart C

Test Report Serial No:
RFI/RPT1/RP77023JD01A

<p>This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:</p> <div style="text-align: right; margin-top: 20px;">  </div>	
Checked By:	Nigel Davison
Signature:	
Date of Issue:	26 March 2010

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1. Customer Information












Company Name:	Datalogic Mobile SRL
Address:	Via Candini, 2 Lippo di Calderara di Reno Bologna 40012

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart C (Radio Frequency Devices) - Section 15.247
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	11 March 2010 to 17 March 2010

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107	Idle Mode AC Conducted Emissions	
Part 15.109	Idle Mode Radiated Spurious Emissions	
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.247(a)(1)	Transmitter 20 dB Bandwidth	
Part 15.247(a)(1)	Transmitter Carrier Frequency Separation	
Part 15.247(a)(1)(iii)	Transmitter Average Time of Occupancy	
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	
Part 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	
Part 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	
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.
Reference:	DA00-705 (2000)
Title:	Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

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:	Datalogic
Model Name or Number:	DL-JOYA
Serial Number:	D10A00148
FCC ID Number:	U4G0056

3.2. Description of EUT

The equipment under test was a mobile computer scanner containing a Bluetooth module.

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:	<i>Bluetooth</i>		
Power Supply Requirement:	Nominal	3.7V	
Type of Unit:	Transceiver		
Channel Spacing:	1MHz		
Mode:	Basic Rate		
Modulation:	GFSK		
Packet Type: (Maximum Payload)	DH5		
Data Rate (Mbit/s):	1		
Maximum Transmit EIRP:	-16.9		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480
Receive Frequency Range:	2402 MHz to 2480 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

3.5. Support Equipment

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

Description:	Charging Unit
Brand Name:	Datalogic mobile s.r.l.
Model Name or Number:	No stated
Serial Number:	D08P00041

Description:	AC mains adapter
Brand Name:	Power-win technology Corp
Model Name or Number:	PW-062A2-1Y15A
Serial Number:	PW72854283

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	Latitude D600
Serial Number:	PC 343NT

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Idle Mode
- Transmit Mode. Set to transmit on bottom, centre and top channels and hopping on all frequencies as necessary with the longest data packet size.

4.2. Configuration and Peripherals

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

- For transmit tests: connected via the serial port using CSR BlueTest in order to place the EUT into Bluetooth test mode.
- For Receive/Idle mode tests: Bluetooth mode active but not transmitting.
- The EUT was configured sat in the charger with the communication/charger port connected to a laptop PC via the serial port and to an external 120V AC supply via an AC charger.
- CSR BlueTest Power (Ext,Int) was set to 255/63 following the client's instructions.
- CSR BlueTest Power CFG PKT Packet type was set to 15 and packet Size set to 339
- For AC Conducted Emission the EUT was configured sat in the charger with the communication/charger port connected to a laptop PC via the serial port and to an external 120V AC supply via an AC charger.

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 AC Conducted Spurious Emissions****Test Summary:**

FCC Part:	15.107
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature Range (°C):	21
Relative Humidity Range (%):	31

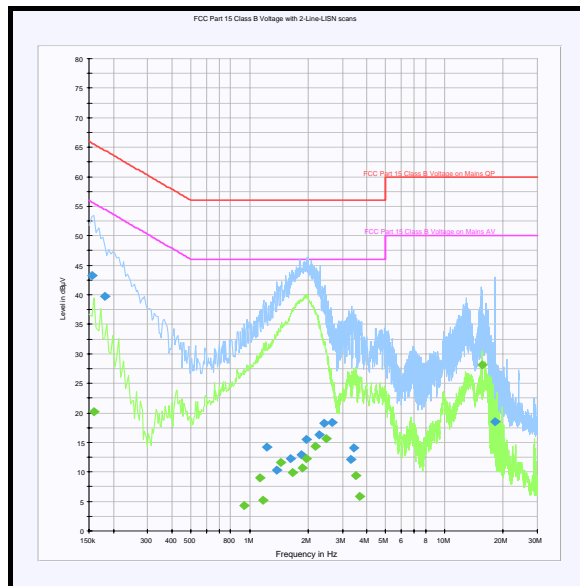
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.154500	Live 1	43.3	65.8	22.5	Complied
0.181500	Live 1	39.8	64.4	24.6	Complied
1.230000	Neutral	14.1	56.0	41.9	Complied
1.369500	Live 1	10.3	56.0	45.7	Complied
1.621500	Live 1	12.3	56.0	43.7	Complied
1.846500	Live 1	12.9	56.0	43.1	Complied
1.963500	Live 1	15.4	56.0	40.6	Complied
2.278500	Live 1	16.3	56.0	39.7	Complied
2.418000	Live 1	18.2	56.0	37.8	Complied
2.647500	Live 1	18.4	56.0	37.6	Complied
3.318000	Live 1	12.2	56.0	43.8	Complied
3.439500	Neutral	14.0	56.0	42.0	Complied
18.064500	Neutral	18.5	60.0	41.5	Complied

Idle Mode AC Conducted Spurious Emissions (continued)**Results: Average Detector Measurements**

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159000	Live 1	20.2	55.5	35.3	Complied
0.942000	Live 1	4.3	46.0	41.7	Complied
1.126500	Neutral	8.9	46.0	37.1	Complied
1.176000	Live 1	5.1	46.0	40.9	Complied
1.450500	Neutral	11.5	46.0	34.5	Complied
1.653000	Live 1	9.9	46.0	36.1	Complied
1.873500	Live 1	10.7	46.0	35.3	Complied
1.950000	Live 1	12.3	46.0	33.7	Complied
2.170500	Live 1	14.3	46.0	31.7	Complied
2.467500	Live 1	15.6	46.0	30.4	Complied
3.511500	Live 1	9.3	46.0	36.7	Complied
3.682500	Live 1	5.8	46.0	40.2	Complied
15.616500	Neutral	28.2	50.0	21.8	Complied

Idle Mode AC Conducted Spurious Emissions (continued)



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

5.2.2. Idle Mode Radiated Spurious Emissions**Test Summary:**

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	30 MHz to 1000 MHz

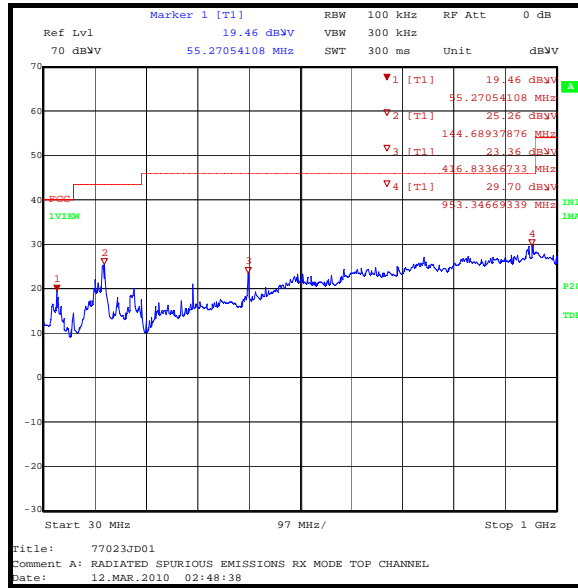
Environmental Conditions:

Temperature Range (°C):	23
Relative Humidity Range (%):	16

Results:

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
55.829	Horizontal	19.7	40.0	20.3	Complied
126.663	Horizontal	23.2	43.5	20.3	Complied
142.956	Horizontal	27.9	43.5	15.6	Complied
311.974	Vertical	21.8	46.0	24.2	Complied
415.975	Vertical	25.1	46.0	20.9	Complied
952.689	Horizontal	31.3	46.0	14.7	Complied

Idle Mode Radiated Spurious Emissions (continued)



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

Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	1GHz to 12.75GHz

Environmental Conditions:

Temperature Range (°C):	23
Relative Humidity Range (%):	16

Results: Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
12607.214	Horizontal	54.8	74.0	19.2	Complied

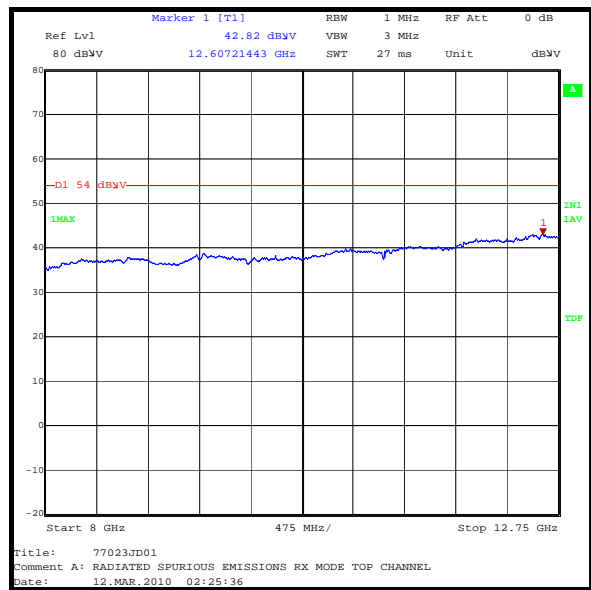
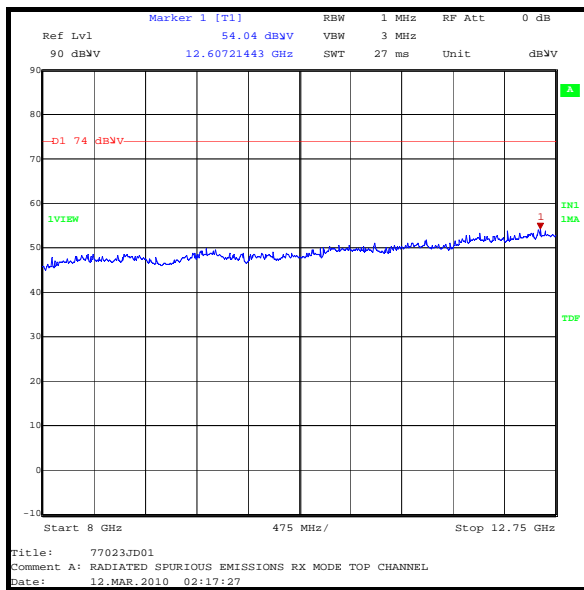
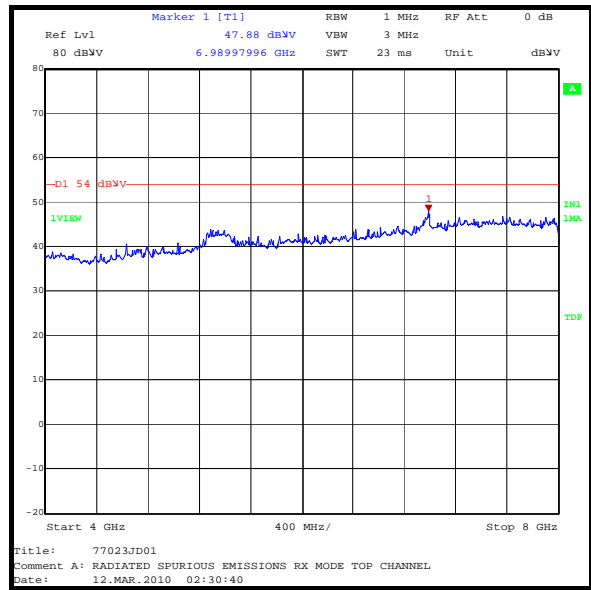
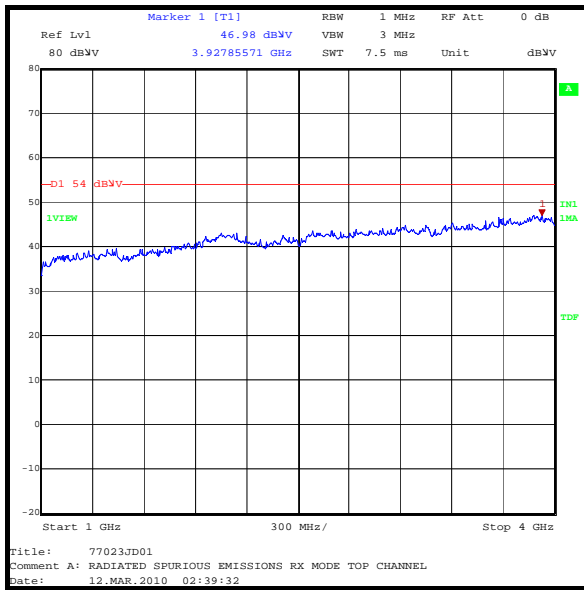
Results: Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
12607.214	Horizontal	42.8	54.0	11.2	Complied

Note(s):

- No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
- All pre-scans were performed with a peak detector against average limits apart from measurements made in the range of 8 to 12.75GHz where pre-scans were performed with peak and average detectors and the applicable limit applied. This was due to the noise floor exceeding the average limit when using a peak detector.

Idle Mode Radiated Spurious Emissions (continued)



Peak Detector

Average Detector

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

5.2.3. Transmitter AC Conducted Spurious Emissions**Test Summary:**

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature Range (°C):	21
Relative Humidity Range (%):	31

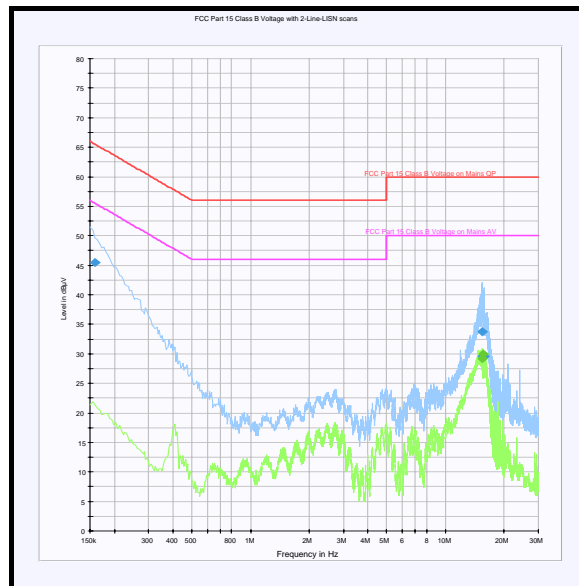
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159000	Neutral	45.4	65.5	20.1	Complied
15.436500	Live 1	33.8	60.0	26.2	Complied
15.481500	Live 1	29.6	60.0	30.4	Complied
15.738000	Live 1	29.5	60.0	30.5	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
15.432000	Live 1	29.2	50.0	20.8	Complied
15.616500	Live 1	30.0	50.0	20.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)



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

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

FCC Part:	15.247(a)(1)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000) and ANSI C63.4 Section 13.1.7 and relevant annexes (see notes below)

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	24

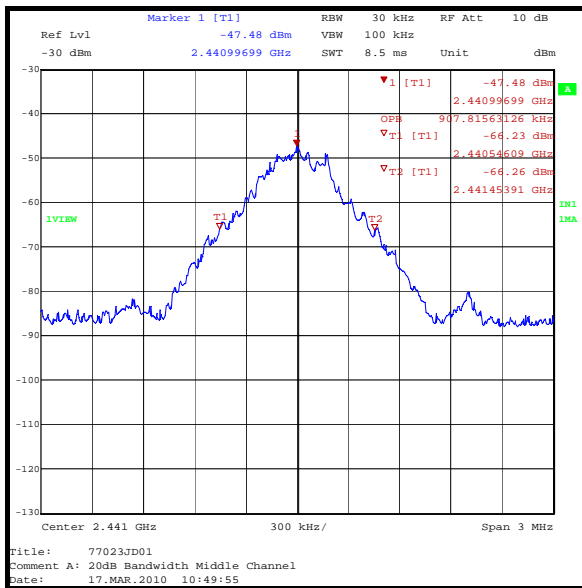
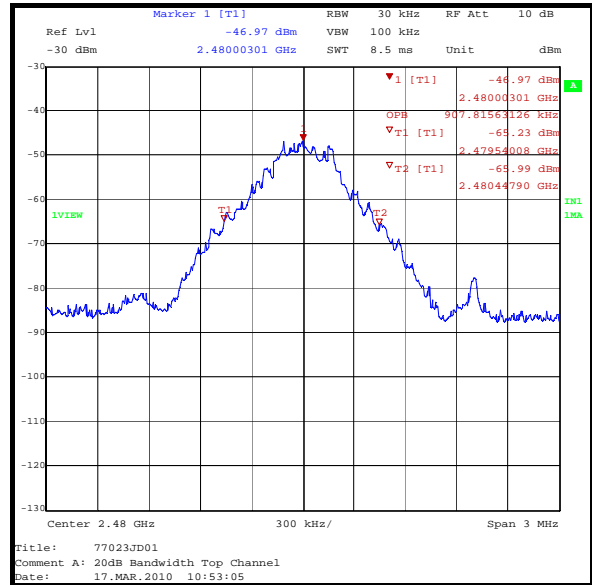
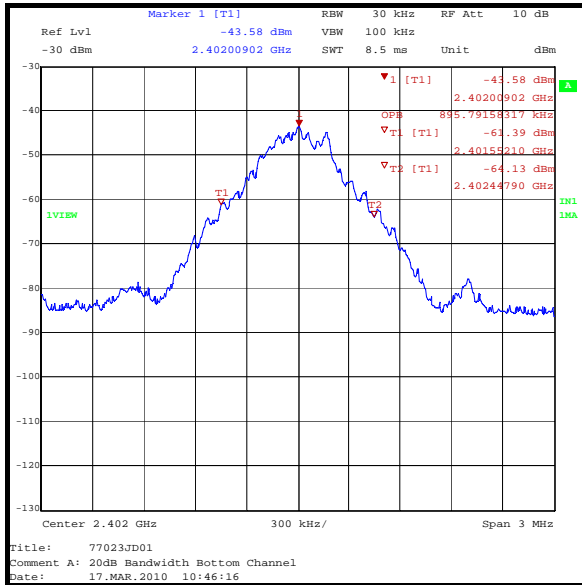
Results:

Channel	20 dB Bandwidth (KHz)
Bottom	859.792
Middle	907.816
Top	907.816

Note(s):

1. In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 20 dB bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.

Transmitter 20 dB Bandwidth (continued)



5.2.5. Transmitter Carrier Frequency Separation

Test Summary:

FCC Part:	15.247(a)(1)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

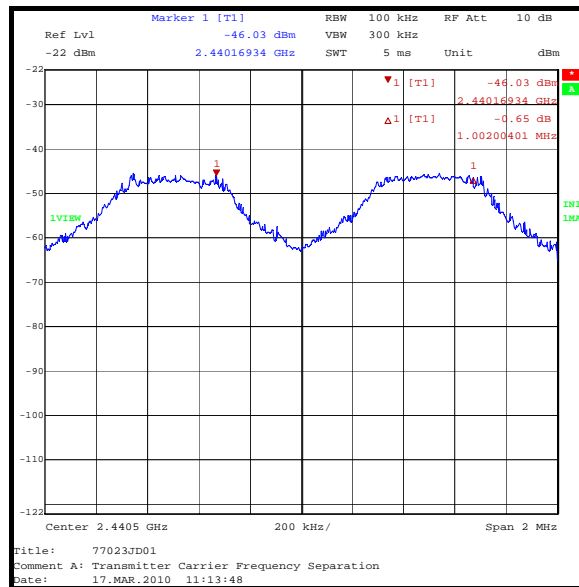
Temperature (°C):	26
Relative Humidity (%):	25

Results:

Transmitter Carrier Frequency Separation (kHz)	Limit ($2/3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1002.004	605.21	396.794	Complied

Note(s):

- The 20 db bandwidth limit was measured from the middle channel operating at 2441.



5.2.6. Transmitter Average Time of Occupancy**Test Summary:**

FCC Part:	15.247(a)(1)(iii)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	25

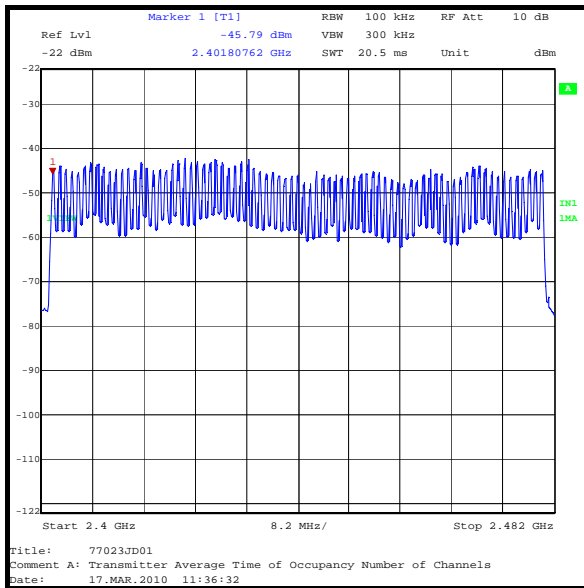
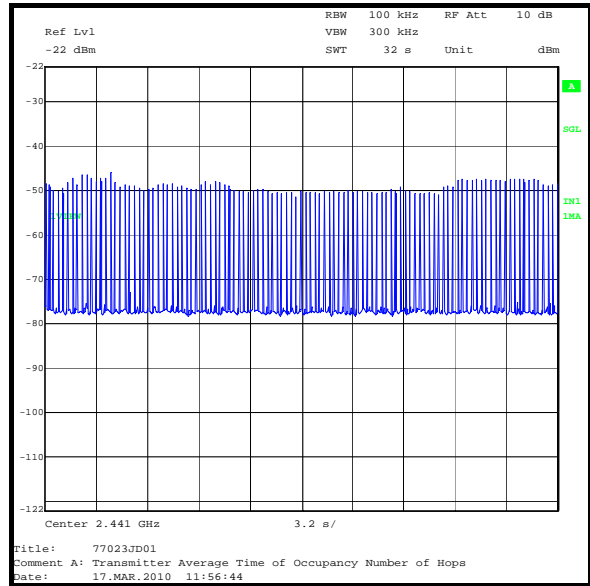
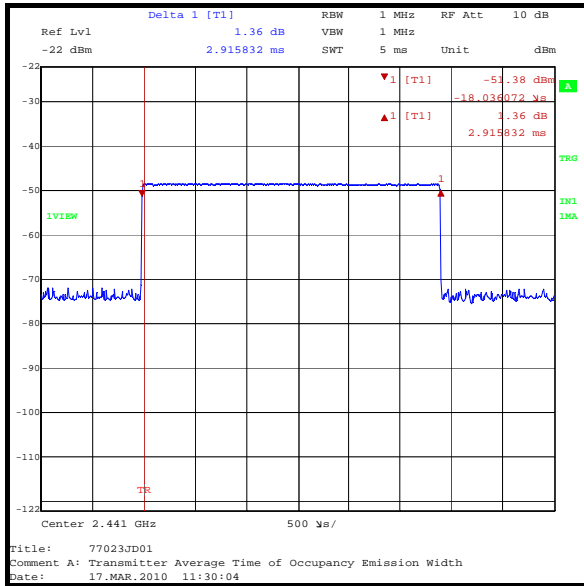
Results:

Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2915.832	111	0.324	0.4	0.076	Complied

Note(s):

1. Tests were performed to identify the average time of occupancy in number of channels 79 x 0.4 seconds. The calculated period is 31.6 seconds.

Transmitter Average Time of Occupancy (continued)



5.2.7. Transmitter Maximum Peak Output Power (EIRP)**Test Summary:**

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000),

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	18

Results: Battery Powered Devices

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	-17.0	30.0	47.0	Complied
Middle	-17.8	30.0	47.8	Complied
Top	-16.9	30.0	46.9	Complied

Note(s):

1. These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.

5.2.8. Transmitter Radiated Emissions**Test Summary:**

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)
Frequency Range	30MHz to 1000MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	16

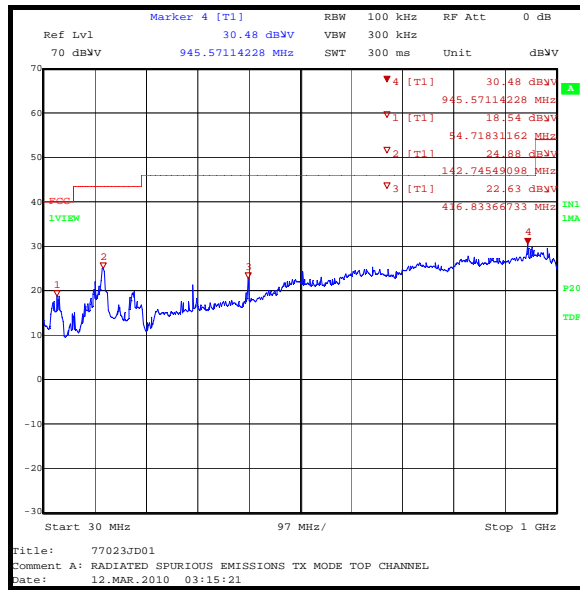
Results: Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
127.319	Vertical	23.1	43.5	20.4	Complied
142.158	Vertical	28.5	43.5	15.0	Complied
312.490	Vertical	19.9	46.0	26.1	Complied
416.105	Vertical	19.0	46.0	27.0	Complied
945.560	Horizontal	30.4	46.0	15.6	Complied

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.

Transmitter Radiated Emissions (continued)



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

Transmitter Radiated Emissions (continued)**Test Summary:**

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)
Frequency Range	1GHz to 26.5GHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	16

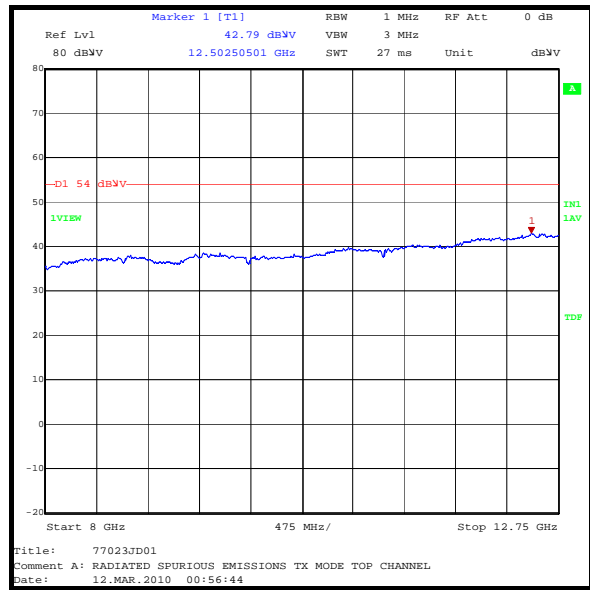
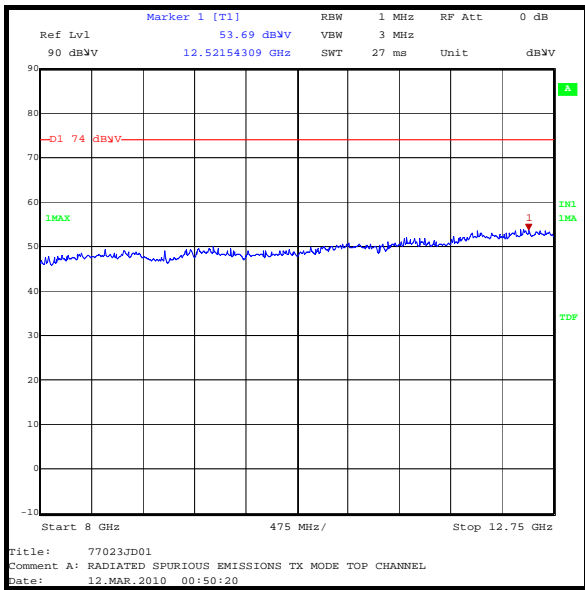
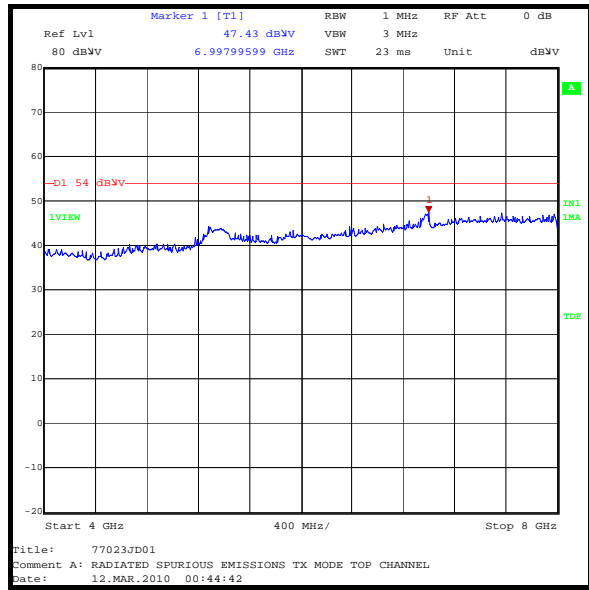
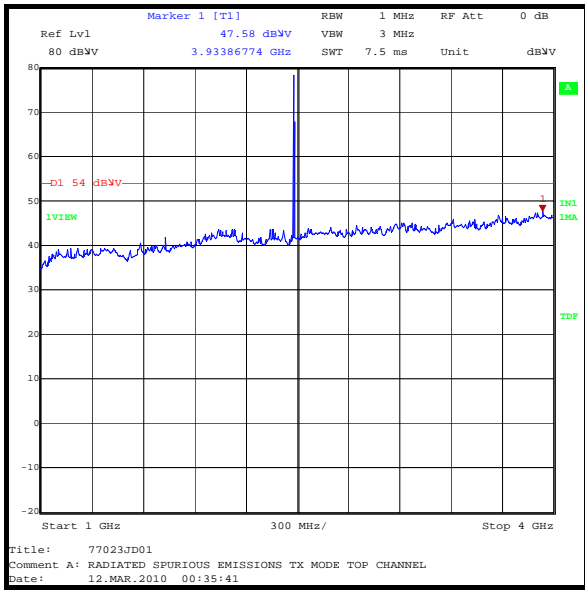
Results: Highest Peak Level. Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
3933.868	Horizontal	42.0	5.6	47.6	54.0	6.4	Complied

Note(s):

1. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
2. All pre-scans were performed with a peak detector against average limits apart from measurements made in the range of 8 to 26.5 GHz where pre-scans were performed with peak and average detectors and the applicable limit applied. This was due to the noise floor exceeding the average limit when using a peak detector.
3. The emissions at 2480 MHz shown on the 1 GHz to 4 GHz plot is the transmitter fundamental.

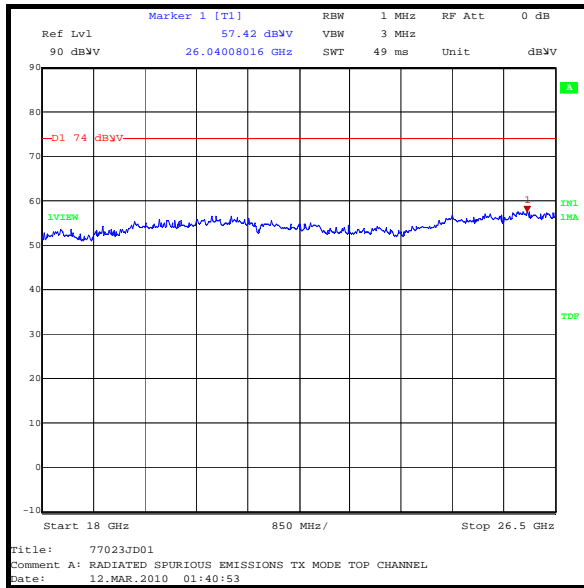
Transmitter Radiated Emissions (continued)



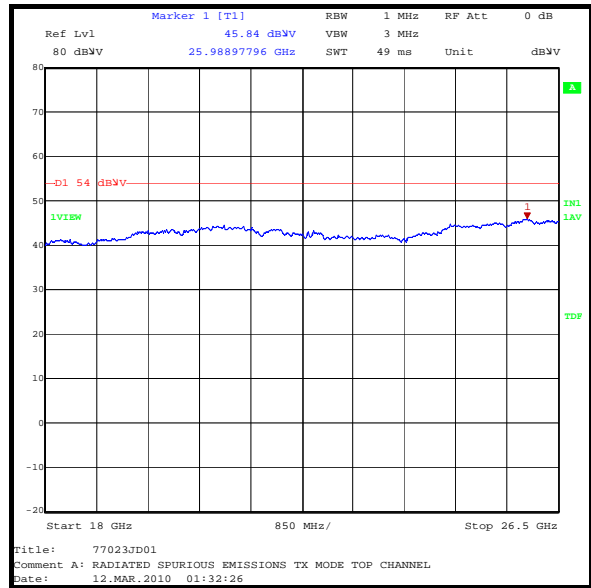
Peak detector

Average detector

Transmitter Radiated Emissions (continued)



Peak detector



Average detector

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

5.2.9. Transmitter Band Edge Radiated Emissions**Test Summary:**

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	16

Results: Peak Power Level Hopping Mode

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
2400.0	Horizontal	32.7	-0.2	32.5	*56.9	24.4	Complied
2483.5	Horizontal	44.1	-0.3	43.8	74.0	30.2	Complied

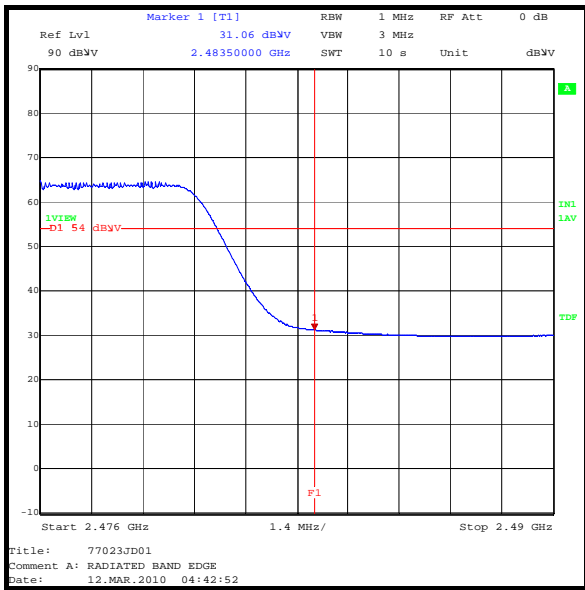
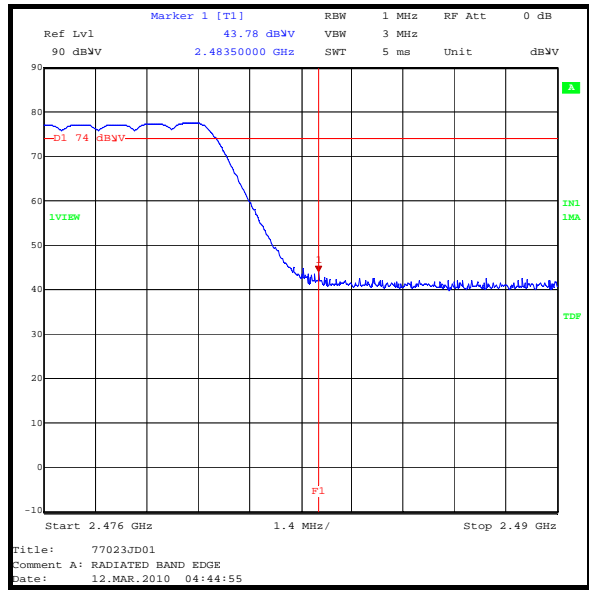
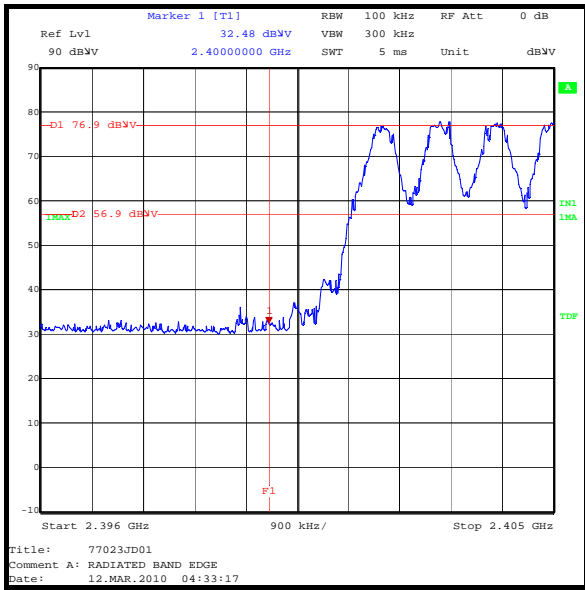
Results: Average Power Level Hopping Mode

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
2483.5	Horizontal	31.4	-0.3	31.1	54.0	22.9	Complied

Note(s):

- * -20 dBc limit.

Transmitter Band Edge Radiated Emissions (continued)



Transmitter Band Edge Radiated Emissions (continued)**Results: Peak Power Level Static Mode**

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
2400.0	Horizontal	39.0	-0.2	38.8	*56.9	18.1	Complied
2483.5	Horizontal	44.0	-0.3	43.7	74.0	30.3	Complied

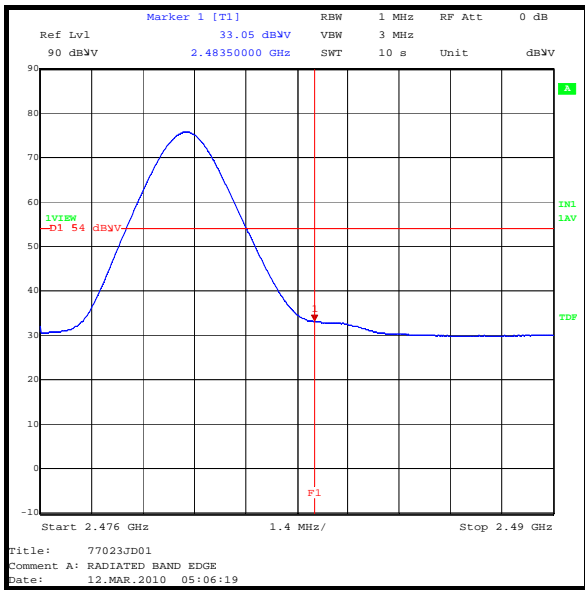
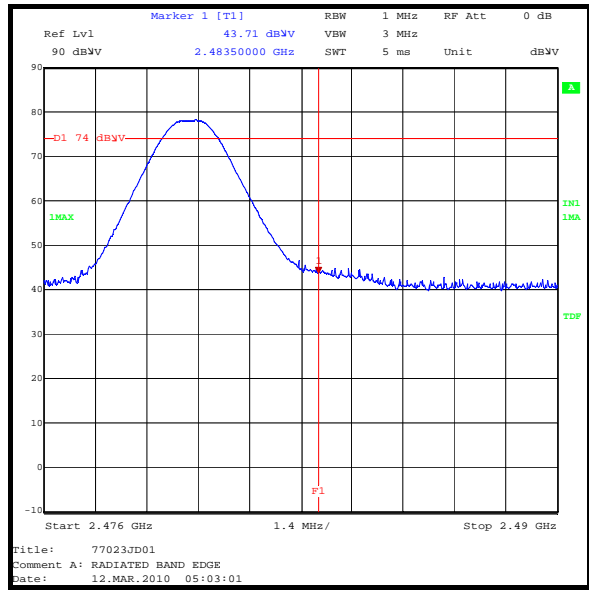
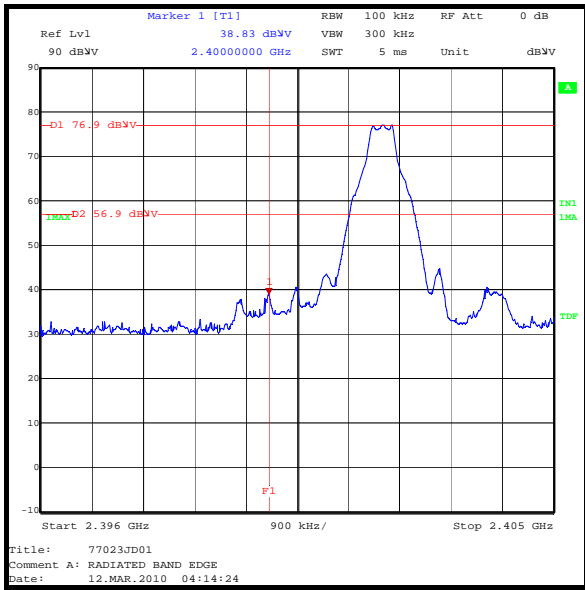
Results: Average Power Level Static Mode

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
2483.5	Horizontal	33.4	-0.3	33.1	54.0	20.9	Complied

Note(s):

- * -20 dBc limit.

Transmitter Band Edge Radiated Emissions (continued)



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
Transmitter Maximum Peak Output Power	Not Applicable	95%	±2.94 dB
Transmitter Carrier Frequency Separation	Not Applicable	95%	±0.92 ppm
Transmitter Average Time of Occupancy	Not Applicable	95%	±0.3 ns
20 dB Bandwidth	Not Applicable	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±3.53 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB
Transmitter Fundamental Field Strength	30 MHz to 1000 MHz	95%	±4.64 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)
A067	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890603/002	03 Jun 2009	12
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	27 Nov 2009	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	01 Mar 2010	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	16 Mar 2010	12
C363	Cable	Rosenberger	RG142	None	23 Feb 2010	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12
K0003	Bench Test Site	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
K0008	Site Reference 4422	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	01 Apr 2009	12
M172	Thermometer/ Barometer/Hygrometer	Oregon Scientific	BA-116	None	21 Jul 2009	12
M208	Thermometer/ Hygrometer	RS Components Ltd	RS212-124	M208- RS212-124	30 Apr 2009	12

Note that asset A288 indicates it went out of calibration during testing. It shall be noted however that the asset was in calibration for the test for which it was used.

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