



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: NTT docomo P-02C

To: FCC Part 15.225: 2009 Subpart C

Test Report Serial No:
RFI-RPT-RP78769JD07A V2.0

Version 2.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Scott D'Adamo, Operations Manager Global Approvals:	
	
Checked By:	Ian Watch
Signature:	
Date of Issue:	16 September 2010

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1. Customer Information










Company Name:	Panasonic Mobile Communications Development of Europe Ltd
Address:	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: 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) 2009: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	01 September 2010 to 03 September 2010

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107(a)	Receiver/Idle Mode AC Conducted Spurious Emissions	
Part 15.109, 15.225(d)	Receiver/Idle Mode Radiated Spurious Emissions	
Part 15.225(a)(b)(c)(d)	Transmitter Fundamental Field Strength	
Part 15.209(a), 15.225(d)	Transmitter Radiated Spurious 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 C63.10 (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:	NTT docomo
Model Name or Number:	P-02C
IMEI:	352172040013568 (<i>Radiated sample</i>)
Hardware Version Number:	Rev C
Software Version Number:	B-D02WP1-00.01.014 D02WP1_Cv10092802*
FCC ID Number:	UCE110033A

**The Customer stated this software version is identical to D02WP1_Cv18092802 but allows the EUT to operate in UMTS band V mode when connected to an Agilent network simulator. RFID mode is not affected.*

Brand Name:	NTT docomo
Model Name or Number:	P-02C
IMEI:	352172040013865 (<i>Conducted RF port sample</i>)
Hardware Version Number:	Rev C
Software Version Number:	B-D02WP1-00.01.014 D02WP1_Cv18092802
FCC ID Number:	UCE110033A

Description:	Battery
Brand Name:	NTT docomo
Model Name or Number:	P20*

Description:	AC Charger
Brand Name:	NTT docomo
Model Name or Number:	FOMA AC Adapter 01 for Global use / MAS-BH0008-A 002

Description:	DC Charger
Brand Name:	NTT docomo
Model Name or Number:	FOMA DC Adapter 02

Description:	Charge/USB Data cable
Brand Name:	NTT docomo
Model Name or Number:	FOMA USB Cable with Charge Function 01

Description:	Personal Hands-Free
Brand Name:	NTT docomo
Model Name or Number:	Stereo Earphone Set 01

3.2. Description of EUT

The equipment under test was a UMTS cellular handset with RFID.

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:	Transceiver	
Channel Spacing:	Single channel device	
Transmit Frequency Range:	13.56 MHz	
Receive Frequency Range:	13.56 MHz	
Power Supply Requirement:	Nominal	3.7 V
	Minimum	3.4 V
	Maximum	4.2 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:	Micro SD memory card
Brand Name:	Not stated
Model Name or Number:	Not stated

Description:	Dummy battery
Brand Name:	Not Stated
Serial Number:	Not Stated

Description:	USB Hub
Brand Name:	Buffalo
Model Name or Number:	BSH3U01

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Receiver/Idle mode
- Constantly transmitting at full power with a modulated carrier in RFID test mode.

4.2. Configuration and Peripherals

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

- The RFID transmitter test mode was enabled by fitting a test USIM, supplied by the client, to the EUT and selecting the test mode from a menu in the User Interface.
- Receiver Idle/standby mode radiated spurious emission tests were performed with the AC Charger connected to the EUT as this was found to be the worst case during pre-scans. All accessories were individually connected and measurements made during pre-scans to determine the worst case combination.
- Transmitter radiated spurious emission tests were performed with the Charge/USB Data cable connected to the EUT as this was found to be the worst case during pre-scans. All appropriate accessories were individually connected and measurements made during pre-scans to determine the worst case combination.
- As the EUT is not capable of transmitting while charging, no AC Mains conducted emissions (150 kHz to 30 MHz) test were performed in transmit 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. Receiver/Idle Mode AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	02 September 2010
Test Sample Serial No:	352172040013865		

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

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	27

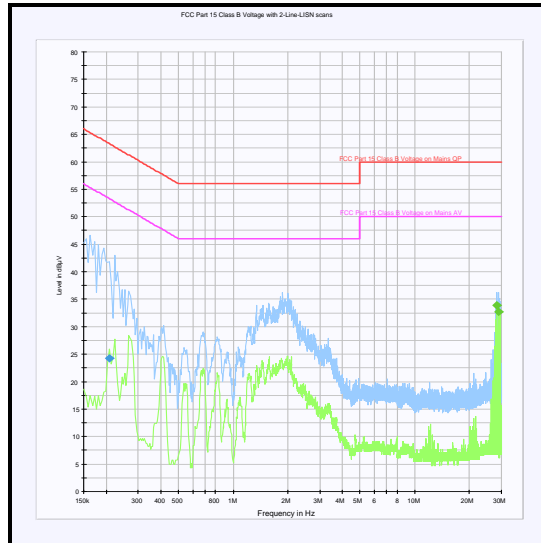
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.208500	Neutral	24.2	63.3	39.1	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
28.459500	Neutral	33.9	50.0	16.1	Complied
28.855500	Neutral	32.7	50.0	17.3	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 tables.

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

Test Engineer:	Andrew Edwards Grant Mason	Test Dates:	01 September to 03 September 2010
Test Sample Serial No:	352172040013568		

FCC Part:	15.109, 15.225(d)
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 1000 MHz

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	36

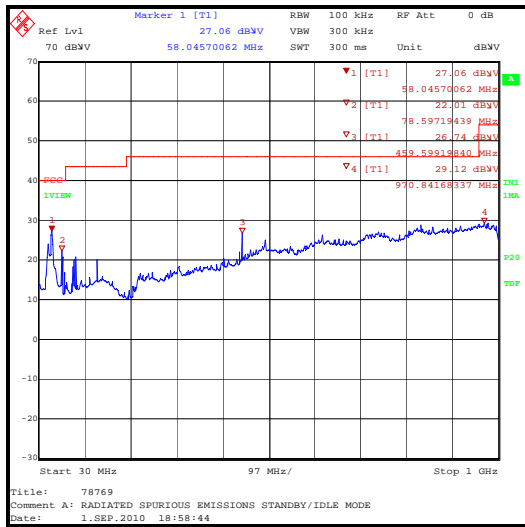
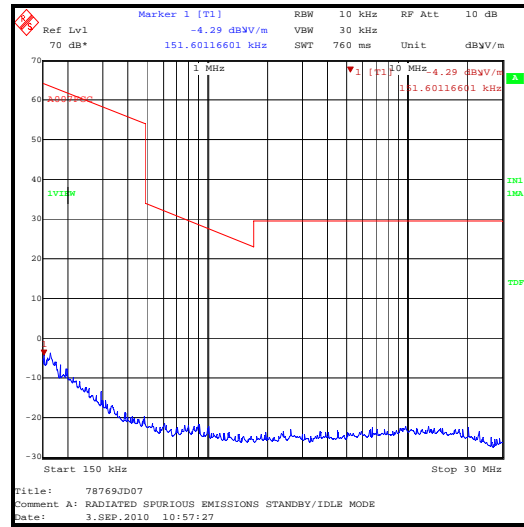
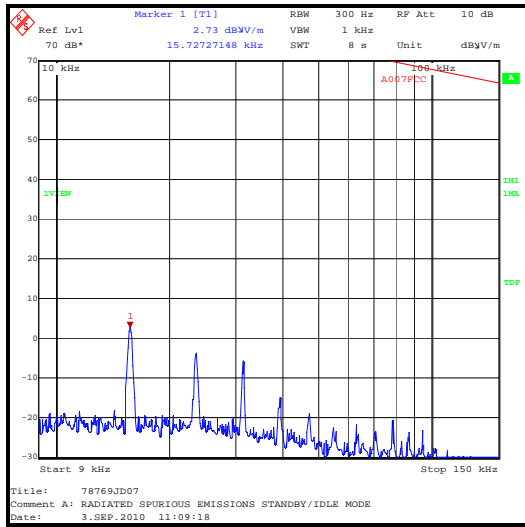
Results:

Frequency (MHz)	Antenna Polarity	Quasi peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
57.202	Vertical	22.7	40.0	17.3	Complied
79.986	Vertical	22.1	40.0	17.9	Complied
107.579	Vertical	22.0	43.5	21.5	Complied
153.306	Horizontal	19.7	43.5	23.8	Complied
458.789	Vertical	26.6	46.0	19.4	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 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 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.
- 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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



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

5.2.3. Transmitter Fundamental Field Strength

Test Summary:

Test Engineer:	Grant Mason	Test Date:	03 September 2010
Test Sample Serial No:	352172040013568		

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

Environmental Conditions:

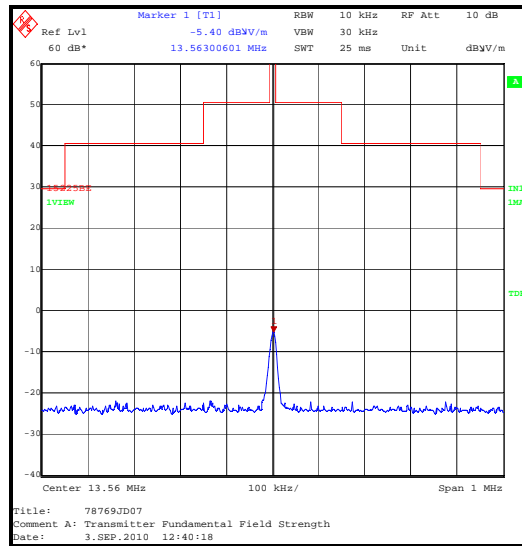
Temperature (°C):	27
Relative Humidity (%):	35

Results:

Frequency (MHz)	Antenna Polarity	Quasi peak Level (dBµV/m)	Limit at 30 m (dBµV/m)	Margin (dB)	Result
13.56	90° to EUT	-5.0	84.0	89.0	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. A distance extrapolation factor of 40 dB was used.
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.



5.2.4. Transmitter Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Grant Mason	Test Dates:	02 September to 03 September 2010
Test Sample Serial No:	352172040013568		

FCC Part:	15.209(a), 15.225(d)
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 1000 MHz

Environmental Conditions:

Temperature Variation (°C):	28
Relative Humidity Variation (%):	34

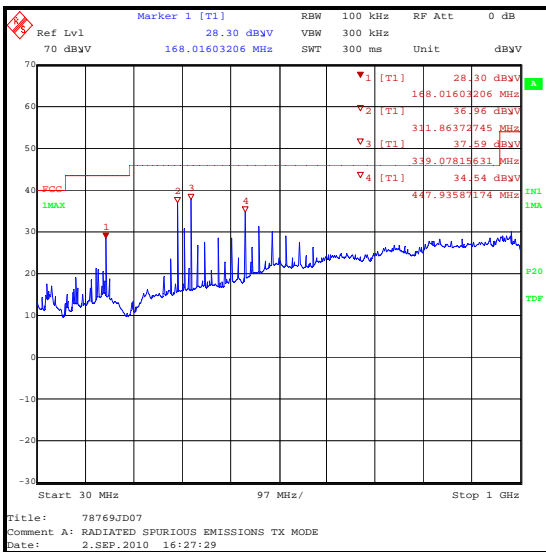
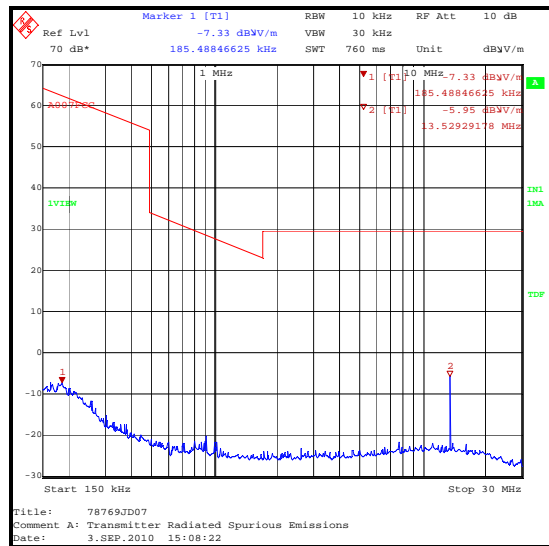
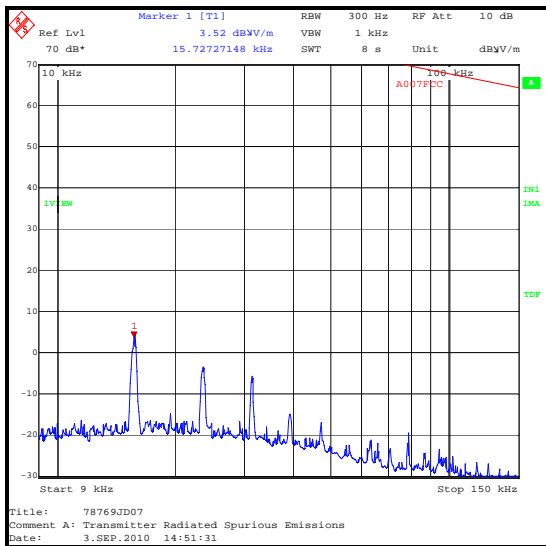
Results: Electric Field Strength Measurements

Frequency (MHz)	Antenna Polarity	Quasi peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
167.585	Horizontal	23.9	43.5	19.6	Complied
311.843	Horizontal	34.3	46.0	11.7	Complied
338.991	Vertical	33.6	46.0	12.4	Complied
447.457	Vertical	33.8	46.0	12.2	Complied
474.567	Vertical	24.4	46.0	21.6	Complied
501.683	Vertical	30.9	46.0	15.1	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 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 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.
- 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.

Transmitter Radiated Spurious Emissions (continued)



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

5.2.5. Transmitter Radiated Emissions at Band Edges

Test Summary:

Test Engineer:	Grant Mason	Test Date:	03 September 2010
Test Sample Serial No:	352172040013568		

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

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	35

Results: Lower Band Edge

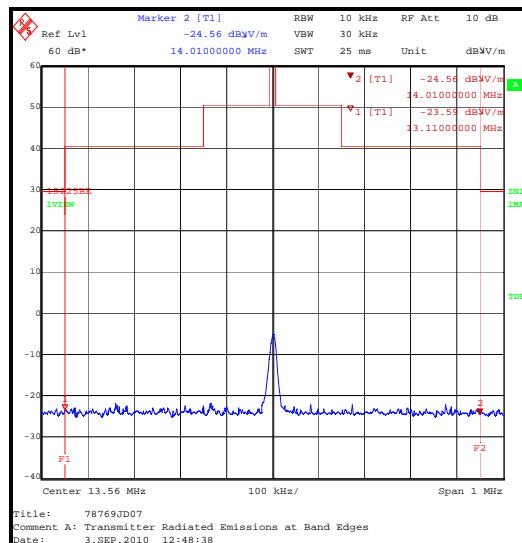
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
13.11	-23.6	30.0	53.6	Complied

Results: Upper Band Edge

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
14.01	-24.6	30.0	54.6	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. A distance extrapolation factor of 40 dB was used.
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.



5.2.6. Transmitter 20 dB Bandwidth

Test Summary:

Test Engineer:	Grant Mason	Test Date:	03 September 2010
Test Sample Serial No:	352172040013568		

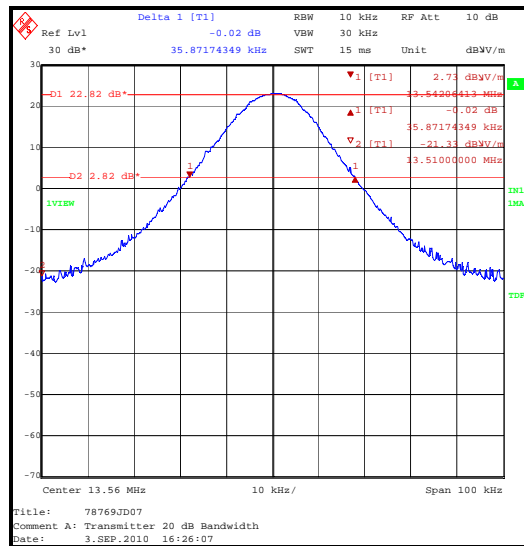
FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	35

Results:

20 dB Bandwidth (kHz)
35.872



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

Test Engineer:	Grant Mason	Test Date:	01 September 2010
Test Sample Serial No:	353172040013568		

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

Environmental Conditions:

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

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

Temperature (°C)	Time after Start-up			
	0	2	5	10
-20	13.560044	13.560049	13.560044	13.560027
20	13.560050	13.560050	13.560009	13.560008
50	13.559916	13.559913	13.559909	13.559907

Frequency with Worst Case Deviation (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
13.559907	93	0.00069	0.01	0.0093	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
3.4	13.56	13.560011	11	0.00008	0.01	0.0099	Complied
3.7	13.56	13.560009	9	0.00007	0.01	0.0099	Complied
4.2	13.56	13.560010	10	0.00007	0.01	0.0099	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
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 1000 MHz	95%	±3.53 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 (Months)
A007	Magnetic Loop	Rohde & Schwarz	HFH2-Z2	880 458/020	13 Apr 2011	12
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/012	13 Apr 2011	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	06 June 2011	12
A1818	Antenna	EMCO	3115	00075692	27 Nov 2010	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	01 Mar 2011	12
A288	Antenna	Chase	CBL6111A	1589	16 Mar 2011	12
C363	Cable	Rosenberger	RG142	None	23 Feb 2011	12
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibration not required	-
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Oct 2010	12
M1068	Thermometer	Iso-Tech	RS55	93102884	01 Oct 2010	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	22 Apr 2011	12
M1229	Digital Multimeter	Fluke	179	87640015	15 Jul 2011	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	08 Apr 2011	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	26 Aug 2011	12
S0520	DC PSU	GW instek	GPC-3030	E835141	Calibrated before use	-

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