



# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: NTT docomo P-09A

To: FCC Part 15.225: 2008 Subpart C

**Test Report Serial No:**  
RFI/RPT2/RP75009JD03A

**Supersedes Test Report Serial No:**  
RFI/RPT1/RP75009JD03A

<b>This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:</b>		
<b>Checked By:</b>	A.HENRIQUES	
<b>Signature:</b>		
<b>Date of Issue:</b>	30 April 2009	

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**1. Customer Information**










<b>Company Name:</b>	Panasonic Mobile Comms Dev of Europe Ltd
<b>Address:</b>	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP

## **2. Summary of Testing**

### **2.1. General Information**

<b>Specification Reference:</b>	47CFR15.225
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
<b>Specification Reference:</b>	47CFR15.107 and 47CFR15.109
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
<b>Site Registration:</b>	FCC: 209735
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Dates:</b>	15 April 2009 to 21 April 2009

### **2.2. Summary of Test Results**

<b>FCC Reference (47CFR)</b>	<b>Measurement</b>	<b>Port Type</b>	<b>Result</b>
Part 15.107(a)	Receiver / Idle Mode AC Conducted Spurious Emissions	AC Mains	
Part 15.109(a) 15.225(d)	Receiver / 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	
<b>Key to Results</b>  = Complied  = Did not comply			

**2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.4 (2003)
<b>Title:</b>	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)**

<b>Brand Name:</b>	NTT docomo
<b>Model Name or Number:</b>	P-09A
<b>Hardware Version:</b>	Rev C
<b>Software Version:</b>	B-WN908F-01.06.004 08-2H_CPF_Cv0513531
<b>IMEI Number(s)</b>	356755020022496
<b>FCC ID Number:</b>	UCE209018A

<b>Description:</b>	Micro-SD Memory Card
<b>Brand Name:</b>	Not stated
<b>Model Name or Number:</b>	Not stated

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

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

<b>Description:</b>	DC charger
<b>Brand Name:</b>	NTT docomo
<b>Model Name or Number:</b>	FOMA DC Adapter 02

<b>Description:</b>	Charge/USB data cable
<b>Brand Name:</b>	NTT docomo
<b>Model Name or Number:</b>	FOMA USB Cable with Charge Function 02

<b>Description:</b>	Battery
<b>Brand Name:</b>	NTT
<b>Model Name or Number:</b>	P19

### **3.2. Description of EUT**

The equipment under test was a dual mode UMTS/GSM cellular handset with *Bluetooth* and RFID.

### **3.3. Modifications Incorporated in the EUT**

During the course of testing the EUT was not modified.

### **3.4. Additional Information Related to Testing**

<b>Tested Technology:</b>	RFID	
<b>Channel Spacing:</b>	Single channel device	
<b>Transmit Frequency:</b>	13.56 MHz	
<b>Receive Frequency:</b>	13.56 MHz	
<b>Power Supply Requirement:</b>	Nominal	3.7 V
	Minimum	3.4 V
	Maximum	4.2 V
<b>Tested Temperature Range:</b>	Minimum	-20°C
	Maximum	+50°C

### **3.5. Support Equipment**

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

<b>Description:</b>	Dummy battery
<b>Model Name or Number:</b>	Not stated
<b>Serial Number:</b>	Not stated



## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating modes:

- 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:

- The RFID transmitter was enabled via a bespoke application running on the EUT in combination with a special SIM card supplied by the customer.
- Radiated spurious emissions tests were performed with the personal hands-free (PHF) 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.
- As the EUT is not capable of transmitting while charging, no AC Mains Conducted Emissions (150 kHz to 30 MHz) test was performed in transmit mode.
- The dummy battery was fitted during frequency measurement tests. This was connected to a bench power supply and the DC voltage level adjusted and monitored accordingly.

## **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****5.3. Receiver/Idle Mode AC Conducted Spurious Emissions****Test Summary:**

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	43

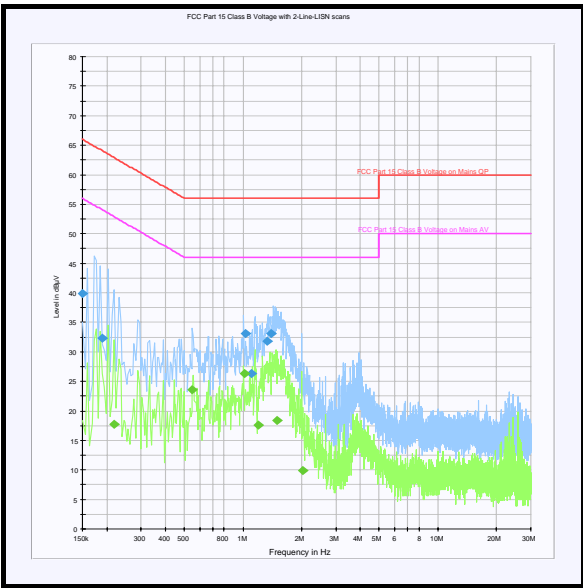
**Results: Quasi Peak Detector Measurements**

Frequency (MHz)	Line	Quasi Peak Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150000	Neutral	39.8	66.0	26.2	Complied
0.190500	Live	32.4	64.0	31.6	Complied
1.023000	Live	33.1	56.0	22.9	Complied
1.108500	Neutral	26.3	56.0	29.7	Complied
1.324500	Neutral	31.8	56.0	24.2	Complied
1.387500	Live	33.1	56.0	22.9	Complied

**Results: Average Detector Measurements**

Frequency (MHz)	Line	Average Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.217500	Live	17.7	52.9	35.2	Complied
0.550500	Live	23.5	46.0	22.5	Complied
1.018500	Live	26.4	46.0	19.6	Complied
1.198500	Neutral	17.6	46.0	28.4	Complied
1.500000	Neutral	18.4	46.0	27.6	Complied
2.031000	Live	10.0	46.0	36.0	Complied

**Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**



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

#### **5.4. Receiver/Idle Mode Radiated Spurious Emissions**

##### **Test Summary:**

<b>FCC Part:</b>	15.109(a) 15.225(d)
<b>Test Method Used:</b>	As detailed in ANSI C63.4 Section 8 and relevant annexes
<b>Frequency Range:</b>	9 kHz to 1000 MHz

##### **Environmental Conditions:**

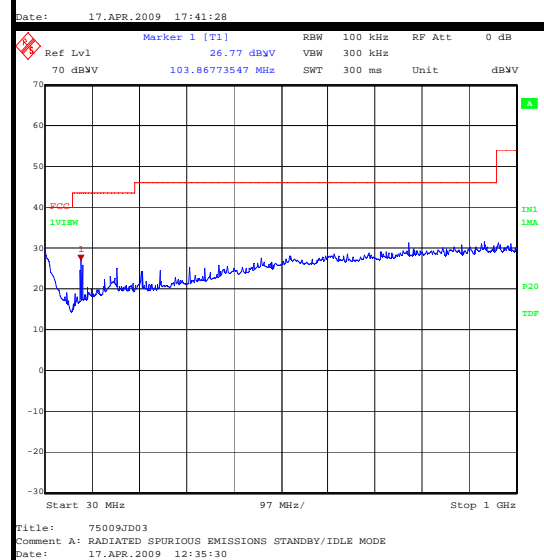
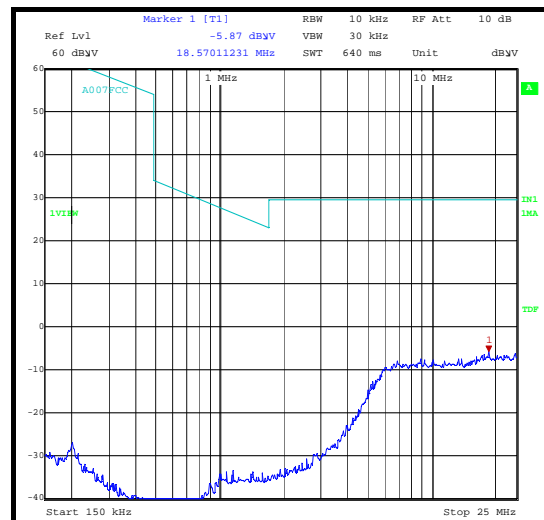
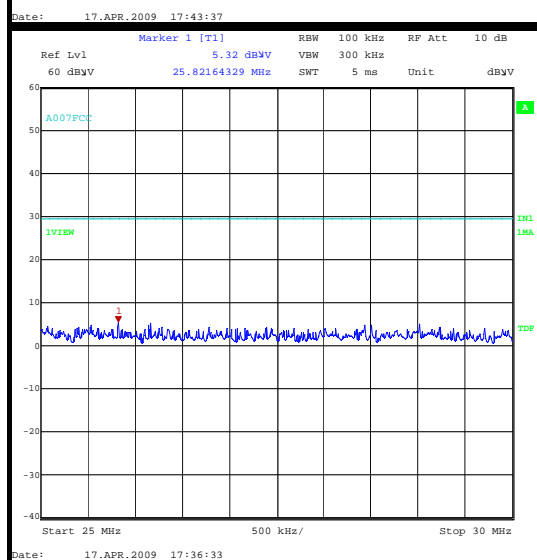
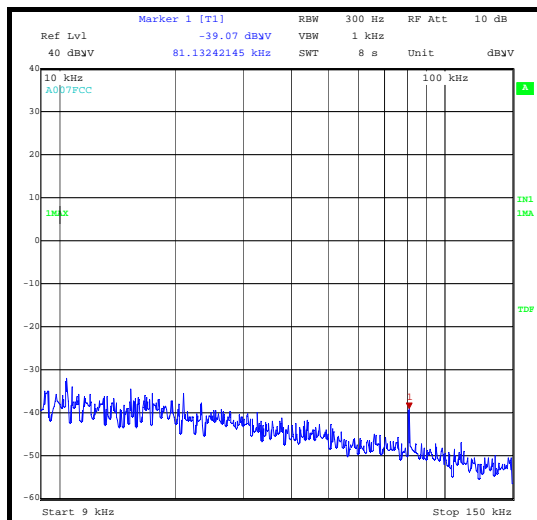
<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	30

##### **Results:**

<b>Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
104.087	Vertical	27.9	43.5	15.6	Complied
178.875	Horizontal	27.3	43.5	16.2	Complied
327.935	Horizontal	28.3	46.0	17.7	Complied
357.749	Horizontal	28.8	46.0	17.2	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. All other emissions were >20 dB below the applicable limit or below the level of the 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.

## 5.5. 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:

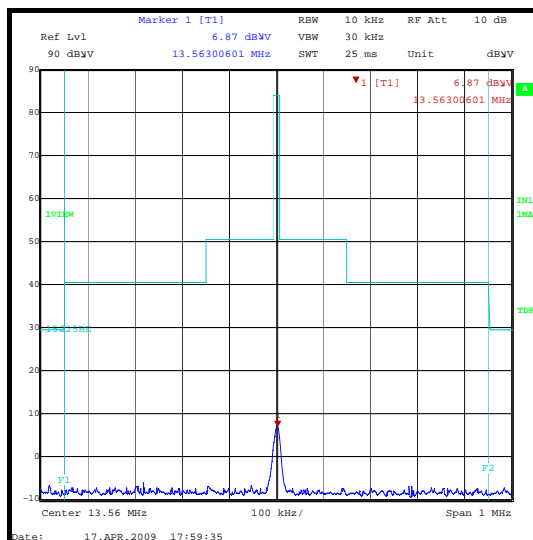
Temperature (°C):	25
Relative Humidity (%):	33

### Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dB $\mu$ V/m)	Limit at 30 m (dB $\mu$ V/m)	Margin (dB)	Result
13.56	90° to EUT	7.0	84.0	77.0	Complied

### Note(s):

- Measurements were performed at 3 metres and results extrapolated to 30 metres.
- 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.



## **5.6. Transmitter Radiated Spurious Emissions**

### **Test Summary:**

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

### **Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	30

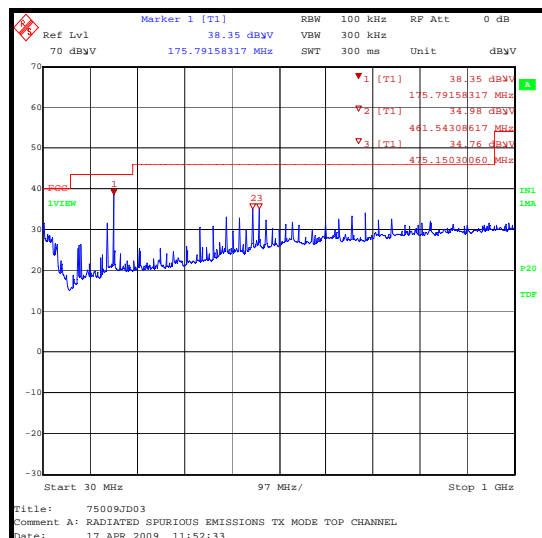
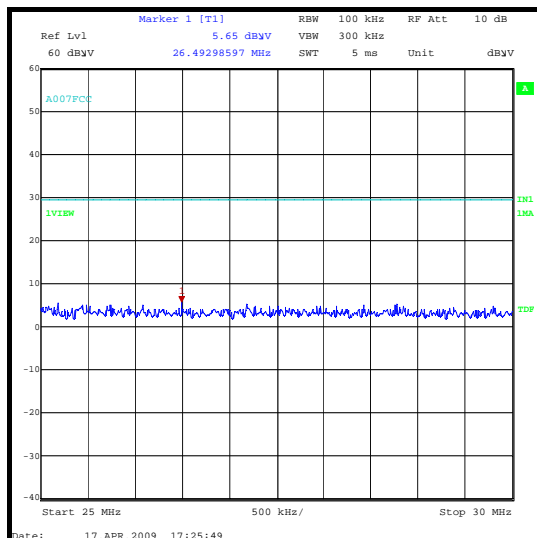
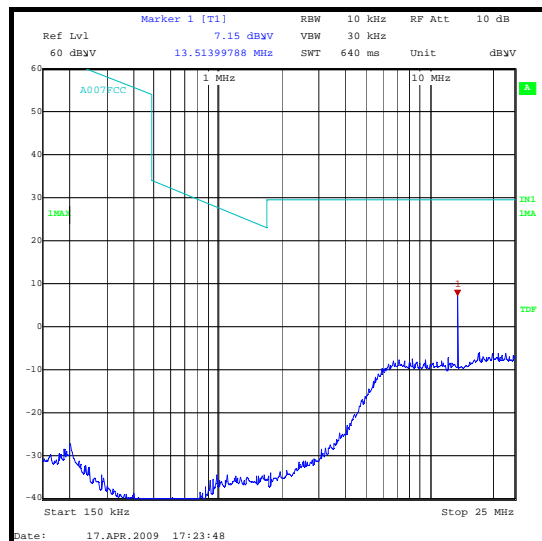
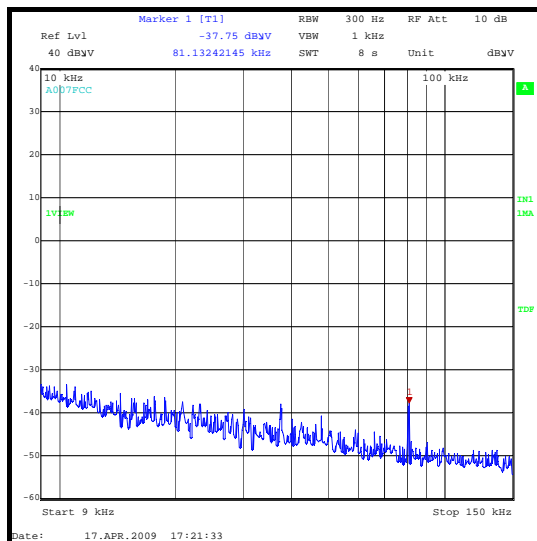
### **Results: Electric Field Strength Measurements**

<b>Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
162.690	Vertical	36.5	43.0	6.5	Complied
230.509	Vertical	30.4	46.0	15.6	Complied
271.164	Vertical	28.9	46.0	17.1	Complied
406.781	Vertical	34.8	46.0	11.2	Complied
433.901	Vertical	36.6	46.0	9.4	Complied
461.010	Vertical	37.9	46.0	8.1	Complied
474.572	Vertical	37.9	46.0	8.1	Complied
691.527	Vertical	34.8	46.0	11.2	Complied
800.022	Vertical	36.7	46.0	9.3	Complied
827.117	Vertical	37.5	46.0	8.5	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 emission shown at approximately 13.5 MHz is the fundamental.



**Transmitter Radiated Spurious Emissions (continued)**

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

**5.7. Transmitter Radiated Emissions at Band Edges****Test Summary:**

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	33

**Results: Lower Band Edge**

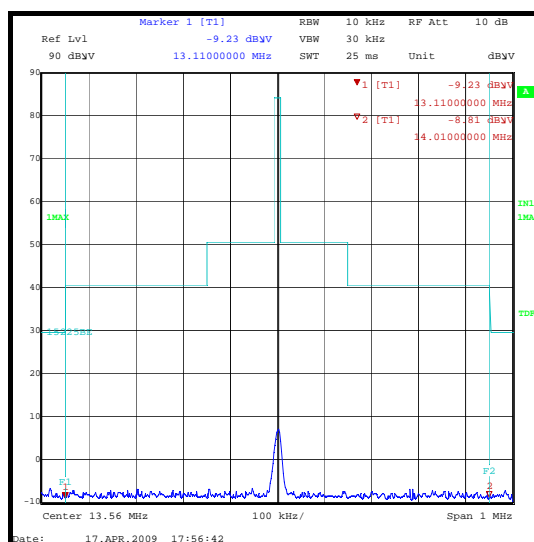
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
13.11	-9.2	40.5	49.7	Complied

**Results: Upper Band Edge**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
14.01	-8.8	40.5	49.3	Complied

**Note(s):**

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



## 5.8. 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 (see note below)

### Environmental Conditions:

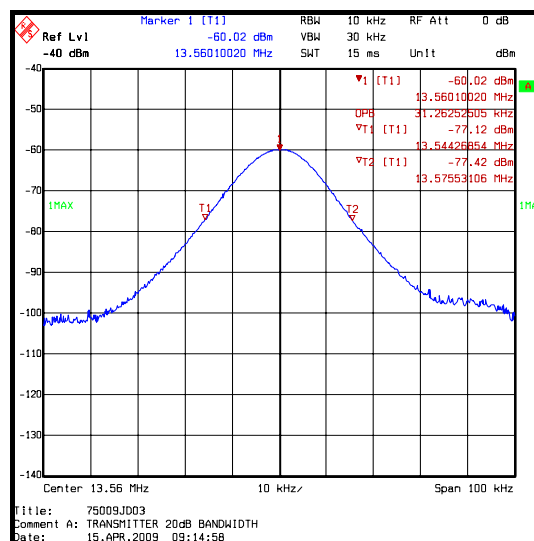
Temperature (°C):	23
Relative Humidity (%):	29

### Results:

Transmitter 20 dB Bandwidth (kHz)
31.263

### Note(s):

- 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.



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

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	16
<b>Relative Humidity (%):</b>	35

**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	13.559946	54	0.000398	0.01	0.009602	Complied
20	13.56	13.559896	104	0.000767	0.01	0.009233	Complied
50	13.56	13.559829	171	0.001261	0.01	0.008739	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	13.559896	104	0.000767	0.01	0.009233	Complied
3.7	13.56	13.559896	104	0.000767	0.01	0.009233	Complied
4.2	13.56	13.559895	105	0.000774	0.01	0.009226	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%	±0.92 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

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**

<b>RFI No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Type No.</b>	<b>Serial No.</b>	<b>Date Last Calibrated</b>	<b>Cal. Interval (Months)</b>
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	19 May 2008	12
A007	Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	29 Mar 2009	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
E0516	Environmental Chamber	TAS	LT1000	23880706	Calibrated before use	-
K0001	5m SA Chamber	Rainford EMC	N/A	N/A	13 Aug 2008	-
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	13 Aug 2008	-
M1068	Thermometer	Iso-Tech	RS55	93102884	09 Jul 2008	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	09 Dec 2008	12
M1269	Multimeter	Fluke	179	90250210	06 Apr 2009	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	21 Aug 2008	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	01 Apr 2009	12
M1379	Test Receiver	Rhode & Schwarz	ESIB7	100330	14 Aug 2008	12
S021	DC Power Supply	Thurlby Thandar Instruments	CPX200	061034	Calibrated before use	-

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