

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i

To: FCC Part 15.225: 2006

Test Report Serial No:
RFI/RPTE3/RP49463D10A

Supersedes Test Report Serial No:
RFI/RPTE2/RP49463JD10A

This Test Report Is Issued Under The Authority
Of Brian Watson, Operations Director:

A handwritten signature in black ink, appearing to read 'Brian Watson'.

Checked By: Steven Wong

Report Copy No: PDF01

A handwritten signature in black ink, appearing to read 'Steven Wong'.

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Issue Date: 18 October 2007

Test Dates: 18 September 2007 to 24 September 2007

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Test of: **Panasonic Mobile Comms Dev of Europe Ltd**
 NTT DoCoMo P905i
To: **FCC Part 15.225: 2006**

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Test of: Panasonic Mobile Comms Dev of Europe Ltd
 NTT DoCoMo P905i
To: FCC Part 15.225: 2006

Table of Contents

1. Client Information..... 4

2. Equipment Under Test (EUT) 5

3. Test Specification, Methods and Procedures..... 8

4. Deviations from the Test Specification 8

5. Operation of the EUT During Testing 9

6. Summary of Test Results 10

7. Measurements, Examinations and Derived Results 11

8. Measurement Uncertainty 24

Appendix 1. Test Equipment Used 25

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

1. Client Information

Company Name:	Panasonic Mobile Comms Dev of Europe Ltd
Address:	2 Gables Way Colthrop Thatcham Berkshire RG19 4ZB UK
Contact Name:	Mr M Hargreaves

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

2. Equipment Under Test (EUT)

The following information (with the exception of the date of receipt) has been supplied by the customer:

2.1. Description of EUT

The equipment under test is a dual mode (W-CDMA/GSM) cellular mobile telephone with Bluetooth and RFID technology.

2.2. Identification of Equipment Under Test (EUT)

Description:	Mobile Handset
Brand Name:	NTT DoCoMo
Model Name or Number:	P905i
Serial Number:	None stated
IMEI Number:	355282010026081 and 355282010026099*
Hardware Version Number:	Rev C
Software Version Number:	APCU: B-WN905A-01.05.002 CCPU: P7Cv01.01.06.00
FCC ID Number:	UCE207002A
Country of Manufacture:	Japan
Date of Receipt:	17 September 2007

*Note that 355282010026099 was used only to confirm the EUT was in RFID mode.

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Accessories

The following accessories were supplied with the EUT during testing.

Description:	AC Charger
Brand Name:	JET Kyushu Mitsumi
Model Name or Number:	MAS-BH0008-A-001
Serial Number:	Not Supplied
Cable Length and Type:	1.5 m, twin core
Connected to Port	Charge/Data port

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

Accessories (Continued)

Description:	DC Charger
Brand Name:	NTT DoCoMo
Model Name or Number:	FOMA DC Adapter 01
Serial Number:	Not applicable
Cable Length:	80 cm
Connected to Port:	Charge/Data port

Description:	Personal Hands Free (Stereo)
Brand Name:	NTT DoCoMo
Model Name or Number:	Stereo Earphone Set P001
Serial Number:	Not applicable
Cable Length:	80 cm
Connected to Port:	Audio PHF

Description:	USB Charge Data Cable
Brand Name:	NTT DoCoMo
Model Name or Number:	FOMA USB cable with charge function 01
Serial Number:	Not applicable
Cable Length:	50 cm
Connected to Port:	Charge/Data port

Description:	Micro SD Memory Card
Brand Name:	None stated
Model Name or Number:	Not applicable
Serial Number:	Not applicable
Cable Length:	Not applicable
Connected to Port:	Dedicated micro-SD

2.5. Support Equipment

No support equipment was used to exercise the EUT during testing.

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

2.6. Additional Information Related to Testing

Intended Operating Environment:	Within GSM coverage
Equipment Category:	Bluetooth, GSM/GPRS, Short Range Device and UMTS FDD I
Type of Unit:	Portable (standalone battery powered transceiver)
Power Supply Requirement:	Nominal 110 V, 60 Hz AC Mains Supply DC Supply of 12/24V Internal Battery Supply of 3.7 V (nominal)
Transmitter Output Power:	23.7 dB μ V/m
Transmit Frequency:	13.56 MHz (Single Channel)

2.7. Port Identification

Port	Description
1.	Charge/Data
2.	Audio PHF
3.	USIM
4.	Micro-SD

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

3. Test Specification, Methods and Procedures

3.1. Test Specifications

Reference:	FCC Part 15 Subpart B: 2006 (Sections 15.225).
Title:	Code of Federal Regulations, Part 15 (47CFR225) Radio Frequency Devices.

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)

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.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

- There were no deviations from the test specification.

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

5. Operation of the EUT During Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

The RFID radio was activated and set to transmit continuously for all transmitter tests.

The RFID radio was set to Standby/Idle mode for the receiver tests.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

Pre-scans were performed with each accessory connected to investigate the worst case condition.

The investigation showed little variation in emissions per accessory.

The EUT was connected to the AC charger during the final measurements.

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliance Status
Receiver AC Conducted Emissions	Section 15.107	AC Mains	Complied
Receiver Radiated Spurious Emissions	Section 15.109	Enclosure	Complied
Transmitter Fundamental Field strength	Section 15.225(a)	Antenna	Complied
Transmitter Radiated Spurious Emissions	Section 15.209	Enclosure	Complied
Transmitter Band Edge Radiated Emissions	Section 15.209	Antenna	Complied
Transmitter 20 dB Bandwidth	Section 2.1049	Antenna	Complied
Transmitter Frequency Stability (Temperature Variation)	Section 15.225(c)	Antenna	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, UK.

FCC Site Registration Number: 90895

IC Site Registration Number: 3485

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

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 8 for details of measurement uncertainties.

Test of: Panasonic Mobile Comms Dev of Europe Ltd
 NTT DoCoMo P905i
 To: FCC Part 15.225: 2006

7.2. Test Results

7.2.1. Receiver AC Mains Conducted Emissions

Tests were performed in accordance with C63.4 Section 7.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

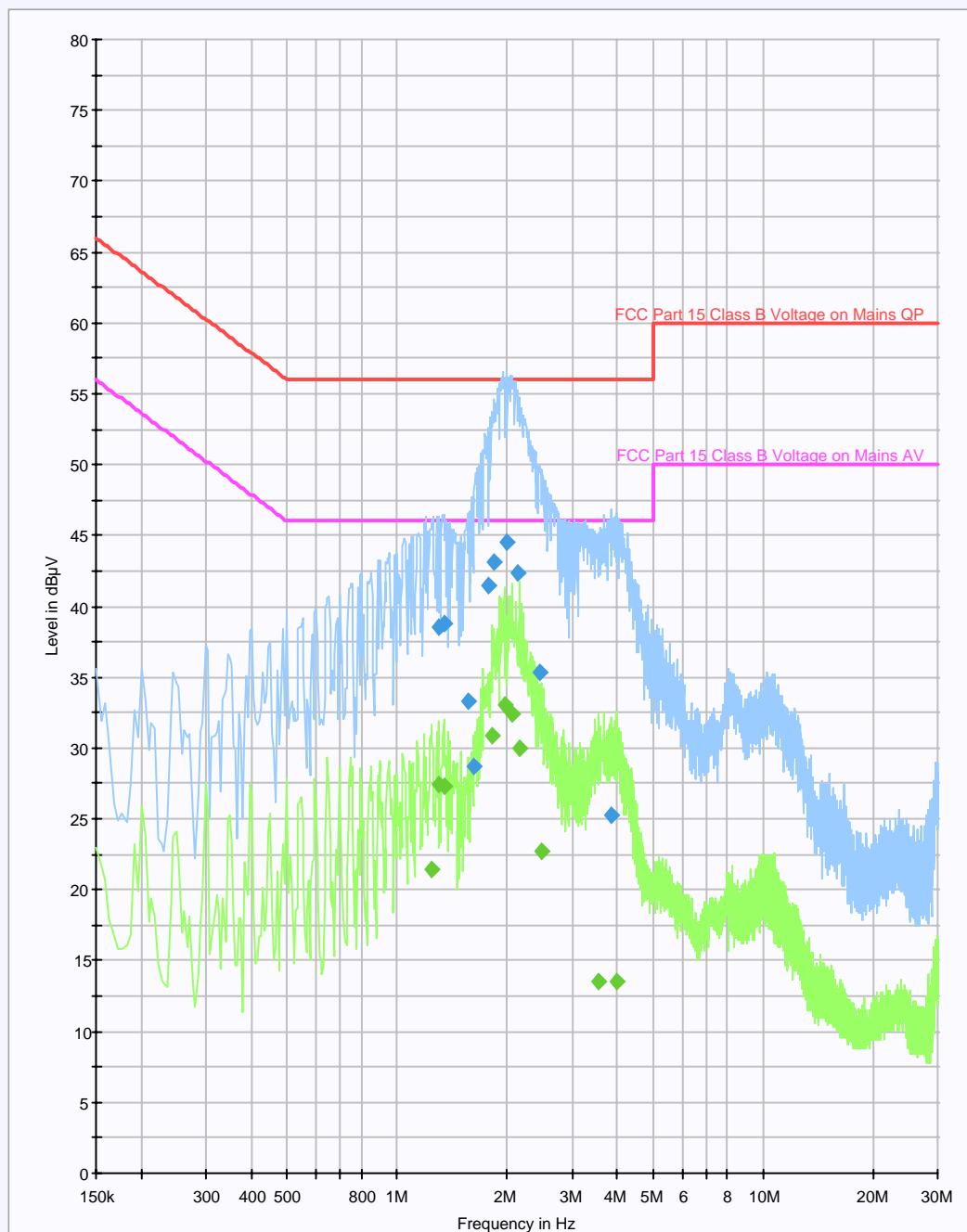
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)
1.297500	Live	38.6	56.0	17.4
1.342500	Live	38.8	56.0	17.2
1.567500	Live	33.3	56.0	22.7
1.626000	Neutral	28.7	56.0	27.3
1.765500	Live	41.5	56.0	14.5
1.842000	Live	43.1	56.0	12.9
1.990500	Live	44.6	56.0	11.4
2.130000	Live	42.3	56.0	13.7
2.449500	Live	35.3	56.0	20.7
3.831000	Live	25.3	56.0	30.7

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)
1.239000	Neutral	21.5	46.0	24.5
1.293000	Live	27.5	46.0	18.5
1.338000	Live	27.3	46.0	18.7
1.819500	Live	30.8	46.0	15.2
1.959000	Live	33.0	46.0	13.0
2.058000	Live	32.4	46.0	13.6
2.161500	Live	30.0	46.0	16.0
2.467500	Live	22.7	46.0	23.3
3.534000	Live	13.5	46.0	32.5
3.993000	Live	13.5	46.0	32.5

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

Receiver AC Mains Conducted Emissions (Continued)



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

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7.2.2. Receiver Radiated Spurious Emissions**Electric Field Strength Measurements (Frequency Range: 9 kHz to 1000 MHz)**

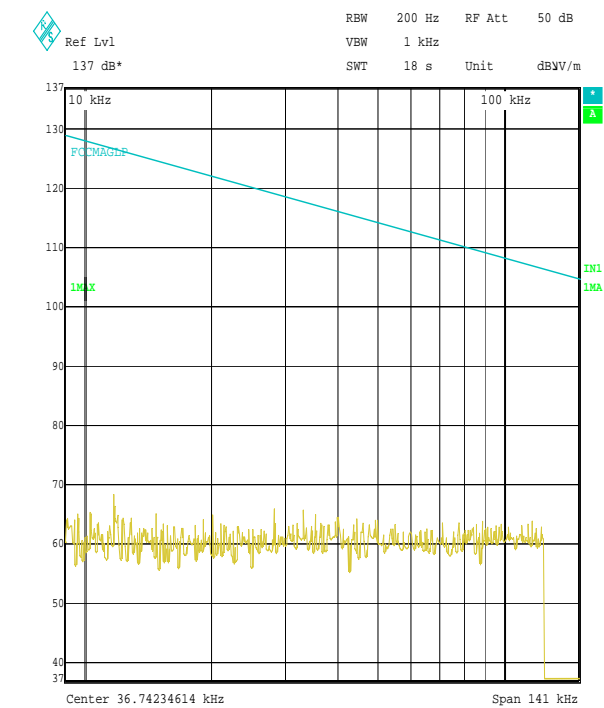
Tests were performed in accordance with C63.4 Section 8 and relevant annexes.

Results:

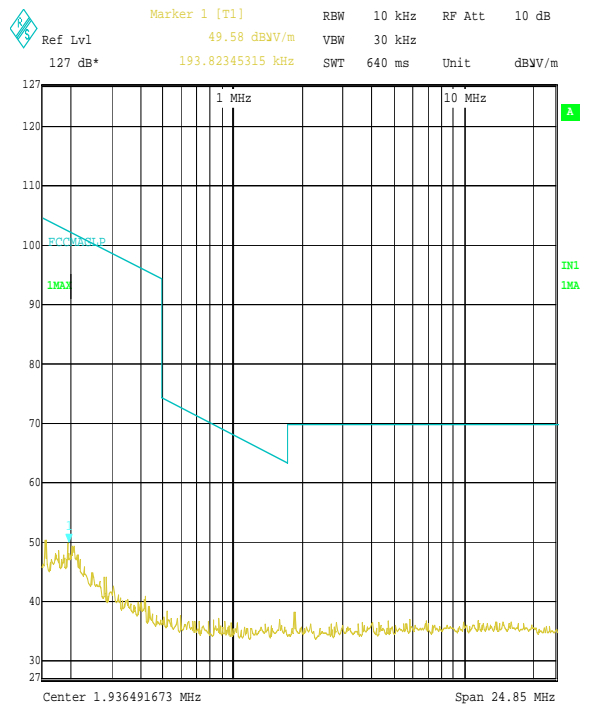
Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
49.839	Horizontal	16.4	40.0	23.6
108.156	Horizontal	13.5	43.5	30.0
322.965	Horizontal	16.4	46.0	29.6

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

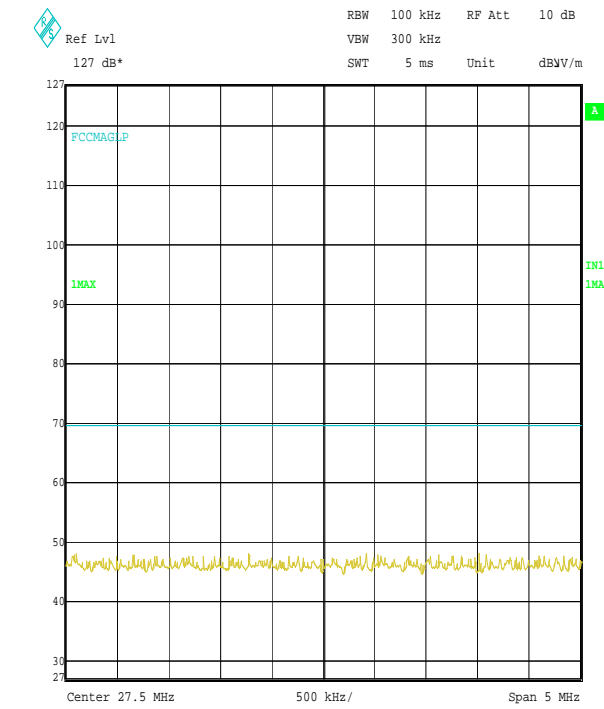
Receiver Radiated Spurious Emissions (Continued)



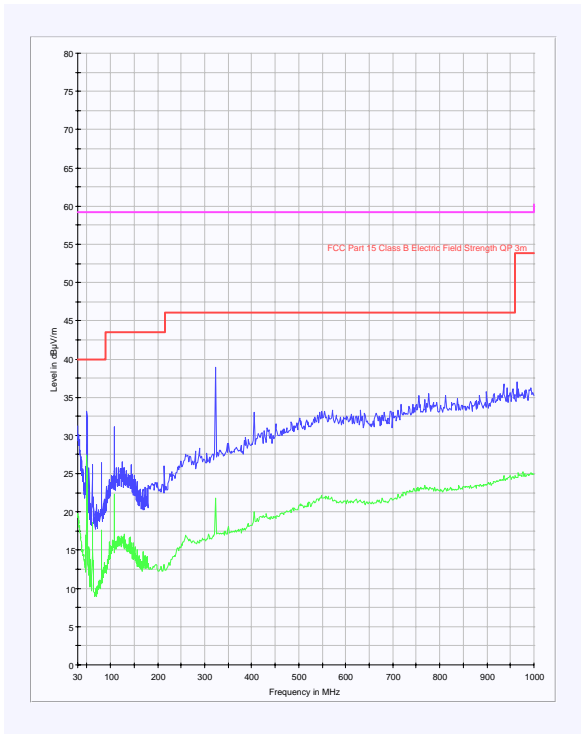
Date: 18.SEP.2007 12:50:19



Date: 18.SEP.2007 12:56:37



Date: 18.SEP.2007 12:52:59



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

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7.2.3. Transmitter Fundamental Fieldstrength Section 15.225 (a)

Tests were performed in accordance with C63.4 Section 8 and relevant annexes.

Results:

The limit is specified at a test distance of 30 metres. However as specified by 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 (40 dB/decade).

Frequency (MHz)	Q-P Level (dB μ V/m)	Limit at 30 metres (dB μ V/m)	Margin (dB)
13.56	23.7	84.0	60.3

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7.2.4. Transmitter Radiated Spurious Emissions

Electric Field Strength Measurements (Frequency Range: 9 kHz to 1000 MHz)

Tests were performed in accordance with C63.4 Section 8 and relevant annexes.

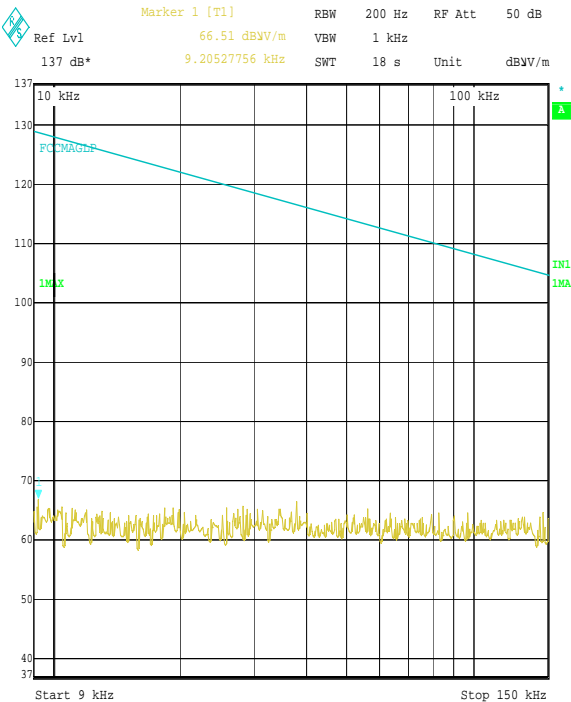
Results:

Limits below 30 MHz are specified at test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However as specified by 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 (40 dB/decade).

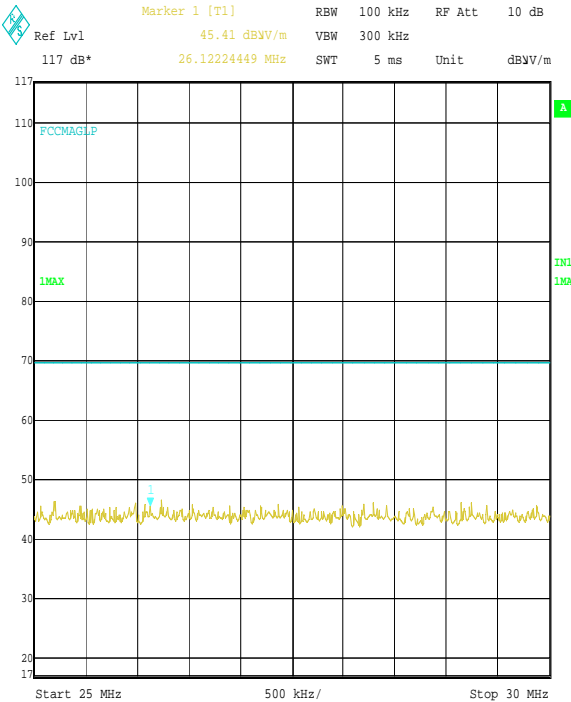
Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Measurement Distance (m)	Margin (dB)
54.238	Vertical	24.3	40.0	3	15.7
67.791	Vertical	16.9	40.0	3	23.1
81.347	Horizontal	17.1	40.0	3	22.9
108.001	Vertical	31.0	43.5	3	12.5
122.025	Vertical	23.2	43.5	3	20.3
271.196	Horizontal	35.8	46.0	3	10.2
352.566	Vertical	19.4	46.0	3	26.6
433.924	Horizontal	30.5	46.0	3	15.5
474.600	Horizontal	46.0	46.0	3	0.0

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

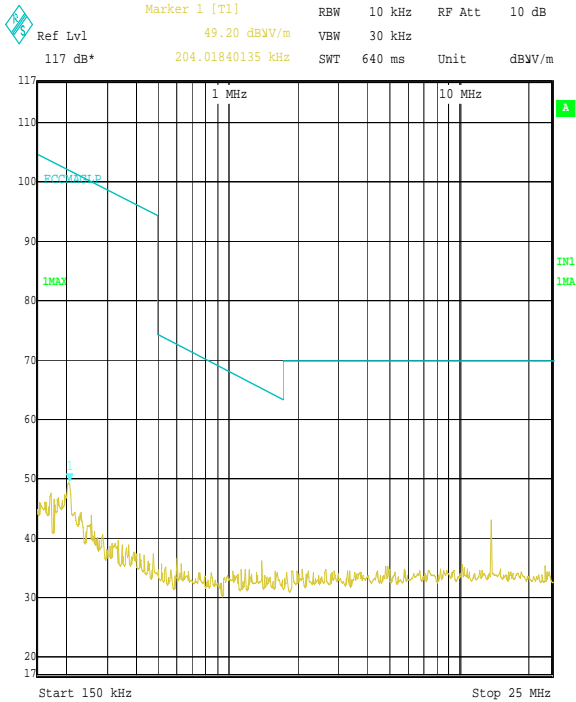
Transmitter Radiated Spurious Emissions (Continued)



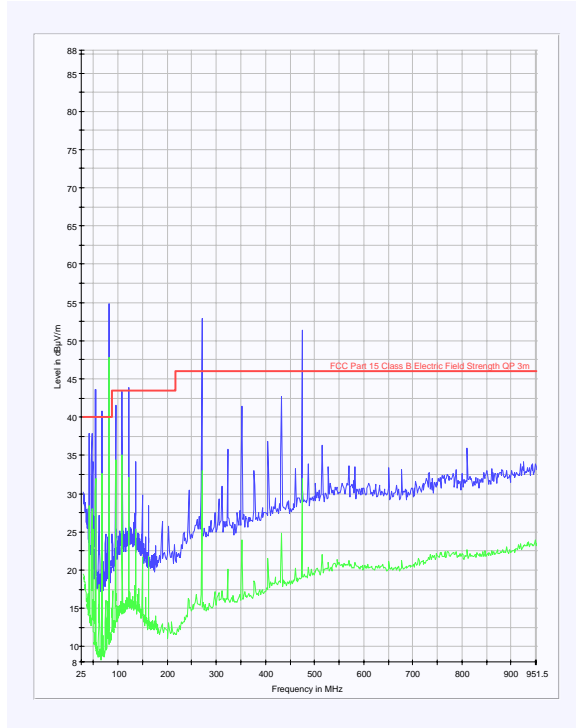
Date: 18.SEP.2007 12:12:49



Date: 18.SEP.2007 12:18:53



Date: 18.SEP.2007 12:17:37



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

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7.2.5. Transmitter Radiated Emissions at Band Edges

Tests were performed in accordance with C63.4 Section 8 and relevant annexes.

Results:

Limits below 30 MHz are specified at test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However as specified by 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 (40 dB/decade).

Tests were performed at 3m.

Bottom Band Edge

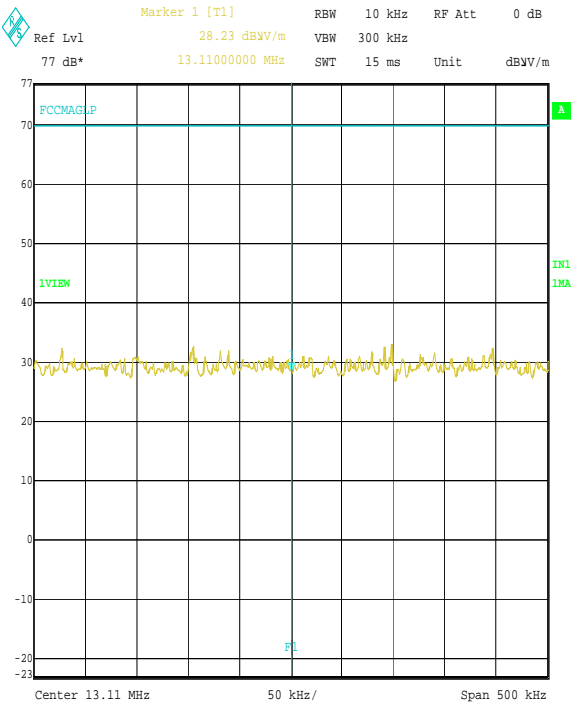
Frequency (MHz)	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
13.11	19.2	29.5	10.3

Top Band Edge

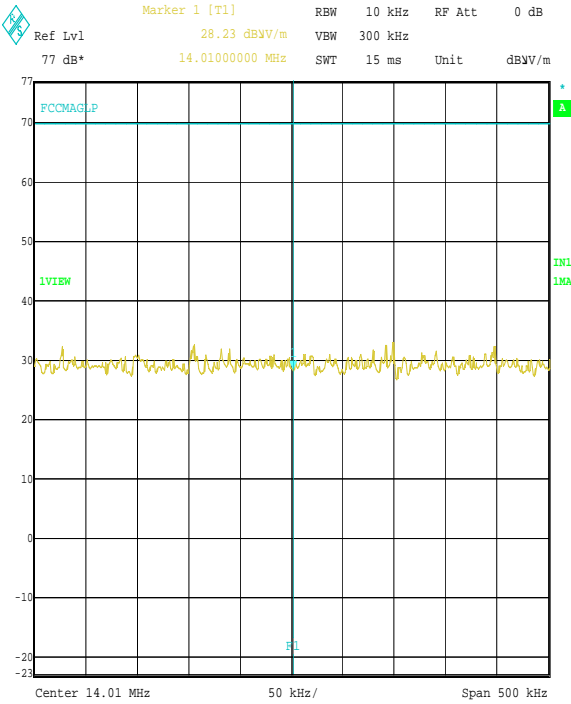
Frequency (MHz)	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
14.01	19.2	29.5	10.3

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

Transmitter Radiated Emissions at Band Edges (Continued)



Date: 18.SEP.2007 12:23:48



Date: 18.SEP.2007 12:24:37

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

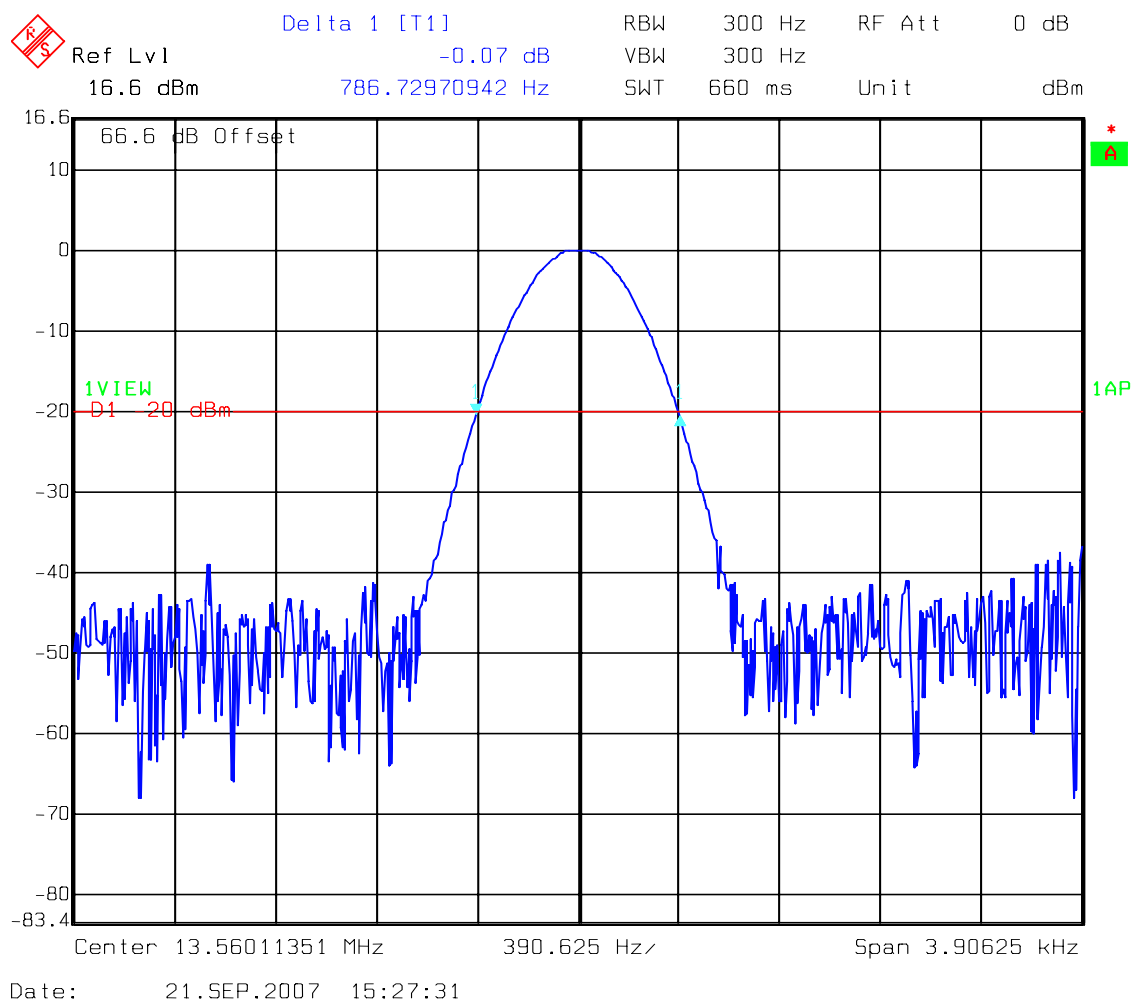
7.2.6. Transmitter 20 dB Bandwidth

This test is not required to show compliance to 15.225 but has been included for information sake to aid Industry Canada (IC) applications.

Tests were performed in accordance with C63.4 Section 10.1.8.8 and 13.1.7 and relevant annexes with the only deviation being that the 20 dBc bandwidth was reported.

Results:

Transmitter 20 dB Bandwidth (Hz)
786.7



Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7.2.7. Transmitter Frequency Stability (Temperature & Voltage Variation):

Tests were performed in accordance with FCC Part 2.1055 but over the frequency range specified in FCC Part 15.

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 (%)
-20	13.56	13.56009785	97.85	0.000722	0.01	0.009278
20	13.56	13.56005989	59.89	0.000442	0.01	0.009558
50	13.56	13.55993500	-65.00	0.000479	0.01	0.009521

Test of: Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i
To: FCC Part 15.225: 2006

7.2.8. Transmitter Frequency Stability (Voltage Variation):

Tests were performed in accordance with FCC Part 2.1055. The upper voltage is set to 115% of the nominal voltage. The lower voltage is set to 85% of the nominal voltage, or the EUT cut-off voltage.

Results:

Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)
4.2	13.56	13.56001483	14.83	0.000109	0.01	0.009891
3.7	13.56	13.56002463	24.63	0.000182	0.01	0.009818
3.4	13.56	13.56001267	12.67	0.000093	0.01	0.009907

Test of: **Panasonic Mobile Comms Dev of Europe Ltd**
NTT DoCoMo P905i
To: **FCC Part 15.225: 2006**

8. 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
Radiated Spurious Emissions	9 kHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 18 GHz	95%	+/- 4.18 dB
20 dB Bandwidth	Not Applicable	95%	± 11.4 ppm
Frequency Stability	Not applicable	95%	±11.4 ppm
Fundamental Field Strength	9 kHz to 1000 MHz	95%	± 5.26 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.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd**
NTT DoCoMo P905i
To: **FCC Part 15.225: 2006**

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A007	H-Field Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	14 Feb 2007	12
A008	Metal Tripod	Rohde & Schwarz	HFU-Z	None	Calibration not required	12
A028	Horn Antenna	Eaton	91888-2	304	08 Jun 2006	36
A1037	Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	20 Sep 2006	12 (Note 1)
A1069	LISN	Rohde & Schwarz	ESH3-Z5	837469/012	09 Feb 2007	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	08 Jan 2007	12
A259	Bilog Antenna	Chase	CBL6111	1513	13 Mar 2007	12
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	None	Calibration not required	-
C099	Cable	RFI	None	None	Calibrated before use	-
C1268	Cable	Rosenberger	FA210A007500 8080	49356-1	Calibrated before use	-
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Calibrated before use	-
C160	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Calibrated before use	-
C340	Cable	Andrews	None	None	Calibrated before use	-
C348	Cable	Rosenberger	UFA210A-1-1181-70x70	2993	Calibrated before use	-
C363	Cable	Rosenberger	RG142	None	Calibrated before use	-
C460	Cable	Rosenberger	UFA210A-1-1182-704704	98H0304	Calibrated before use	-
C468	Cable	Rosenberger	UFA210A-1-3937-504504	98L0440	Calibrated before use	-
E013	Temperature Chamber	Sanyo	ATMOS chamber	None	Calibration not required	-
M024	Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Calibrated before use	-
M044	Receiver	Rohde & Schwarz	ESVP	891 845/026	06 Mar 2007	12

Test of: **Panasonic Mobile Comms Dev of Europe Ltd
NTT DoCoMo P905i**
To: **FCC Part 15.225: 2006**

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
M1093	Communications Test Set	Will tek	4202S	0513018	Calibration not required	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	20 Dec 2006	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
M1269	Multimeter	Fluke	179	90250210	05 Mar 2007	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	15 Aug 2007	12
M173	Controller for site 1	R.H.Electrical Services	RH351	3510020	Calibration not required	-
S021	Power Supply	Thurlby Thandar Instruments	CPX200	061034	Calibration not required	-
S201	Open Area Test Site	RFI	1	None	25 May 2007	12
S207	Bench Site	RFI	7	None	Calibration not required	-
S212	Screened Room	RFI	12	None	Calibrated before use	-

Note 1: This item was used only before calibration expired.

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule. All equipment was within calibration at the time of use for this test.