

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station

To: FCC Part 24: 2005

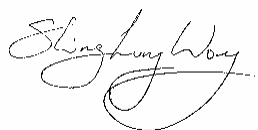
Test Report Serial No:
RFI/MPTE2/RP71978JD02A

Supersedes Test Report Serial No:
RFI/MPTE1/RP71978JD02A

This Test Report Is Issued Under The Authority
Of Andrew Brown, Operations Manager:



Tested By: Steven Wong



Checked By: Tony Henriques



Report Copy No: PDF01

Issue Date: 14 August 2006

Test Dates: 21 June 2006 to 11 July 2006

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RFI GLOBAL SERVICES LTD

TEST REPORT

S.No. RFI/MPTE2/RP71978JD02A

Page: 2 of 46

Issue Date: 14 August 2006

Test of: Panasonic Mobile Comms Dev of Europe Ltd.

VS70 Dual Mode (3G/GSM) Mobile Station

To: FCC Part 24: 2005

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Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Table of Contents

| | |
|--|----|
| 1. Client Information | 4 |
| 2. Equipment Under Test (EUT) | 5 |
| 3. Test Results | 9 |
| 4. Deviations from the Test Specification | 10 |
| 5. Operation of the EUT During Testing | 11 |
| 6. Summary of Test Results..... | 12 |
| 7. Measurements, Examinations and Derived Results..... | 13 |
| 8. Measurement Uncertainty | 33 |
| 9. Measurement Methods..... | 34 |
| Appendix 1. Test Equipment Used..... | 42 |
| Appendix 2. Test Configuration Drawings | 43 |

Test Report Serial No: RFI/MPTE2/RP71978JD02A

Supersedes Test Report Serial No: RFI/MPTE1/RP71978JD02A

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

1. Client Information

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

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

| | |
|-------------------------|-----------------|
| Brand Name: | Panasonic |
| Model Name or Number: | VS70 |
| IMEI Number: | 004401030025858 |
| Hardware Revision: | D |
| Software Revision: | V705PVA13 |
| FCC ID Number: | UCE206001A |
| Country of Manufacture: | Japan |
| Date of Receipt: | 21 June 2006 |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

2.2. Accessories

The following accessories were supplied with the EUT:

| | |
|-------------------------------|-------------------|
| Description: | DC Charger |
| Brand Name: | Panasonic |
| Model Name or Number: | EB-CD001 |
| Serial Number: | None Stated |
| Cable Length and Type: | 2 metre twin core |
| Connected to Port: | Comms/Charger |

| | |
|-------------------------------|-------------------|
| Description: | DC Charger |
| Brand Name: | Panasonic |
| Model Name or Number: | EB-CD002 |
| Serial Number: | None Stated |
| Cable Length and Type: | 2 metre twin core |
| Connected to Port: | Comms/Charger |

| | |
|-------------------------------|----------------------|
| Description: | Personal Hands Free |
| Brand Name: | Panasonic |
| Model Name or Number: | EB-EM003 |
| Serial Number: | None Stated |
| Cable Length and Type: | 1.8 metre multi-core |
| Connected to Port: | Audio |

| | |
|-------------------------------|---------------------|
| Description: | Mains AC Charger |
| Brand Name: | Panasonic |
| Model Name or Number: | EB-CA001 |
| Serial Number: | None Stated |
| Cable Length and Type: | 1.5 metre twin core |
| Connected to Port: | Comms/Charger |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

2.3. Description of EUT

The equipment under test is a dual mode (3G/GSM/GPRS) mobile station with *Bluetooth* technology incorporated.

2.4. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

2.5. Additional Information Related to Testing

| | | | |
|-----------------------------|--|----------------|-------------------------|
| Power Supply Requirement: | Internal battery supply of 3.7 V Nominal 110 V, 60 Hz AC mains supply (via AC charger) DC supply of 13.6 V (via car charger) | | |
| Equipment Category: | GSM 1900 | | |
| Type of Unit: | Portable Transceiver | | |
| Transmit Frequency Range: | 1850.2 to 1909.8 MHz | | |
| Transmit Channels Tested: | Channel ID | Channel Number | Channel Frequency (MHz) |
| | Bottom | 512 | 1850.2 |
| | Middle | 660 | 1879.8 |
| | Top | 810 | 1909.8 |
| Receive Frequency Range: | 1930.2 to 1989.8 MHz | | |
| Receive Channels Tested: | Channel ID | Channel Number | Channel Frequency (MHz) |
| | Bottom | 512 | 1930.2 |
| | Middle | 660 | 1959.8 |
| | Top | 810 | 1989.8 |
| Maximum Power Output (EIRP) | 31.9 dBm (measured) | | |

2.6. Port Identification

| Port | Description |
|------|------------------------|
| 1 | Hands free Port |
| 2 | USIM |
| 3 | Communications/Charger |

2.7. Support Equipment

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

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

3. Test Results

| | |
|-------------------|--|
| Reference: | FCC Part 24 Subpart E: 2005 (Broadband PCS) |
| Title: | Code of Federal Regulations, Part 24 (47CFR24) Personal Communication Services. |

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003

Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)

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

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.

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.

3.2. 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.

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

4. Deviations from the Test Specification

There were no deviations from the test specification.

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

5. Operation of the EUT during Testing

5.1. Operating Modes

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

Transmitter Modes:

All testing, with the exception of radiated band edge measurements, was performed in GSM mode only as this was found to be worst case mode of operation for output power, occupied bandwidth, and radiated spurious emissions.

Testing was performed at full power on the top, middle and bottom channels of the assigned frequency block. Frequency stability measurements were performed at full power on the top and bottom channels of the assigned frequency block at -30°C through to +50°C in 10° increments. All radiated spurious emissions pre-scans tests were performed at full power on the top channel of the assigned frequency block, final measurements were then performed on the top, middle and bottom channels if an emission was identified.

Receiver/Idle Modes:

Testing was performed with call terminated from the GSM test simulator and the phone left in its Idle mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration unless otherwise stated:

For all tests the EUT was configured with the PHF, model EB-EM003, and AC charger, model EB-CA001, connected. This configuration was tested as it was found to be the worst case configuration after radiated emissions pre-scans were performed with all the other supplied accessories.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

6. Summary of Test Results

Devices with an External Antenna Connector

| Range of Measurements | Specification Reference | Port Type | Compliance Status |
|---|--|------------------|--------------------------|
| Idle Mode AC Conducted Spurious Emissions (150 kHz to 30 MHz) | C.F.R. 47 FCC Part 15: 2005 Section 15.107 | AC Mains | Complied |
| Idle Mode Radiated Spurious Emissions | C.F.R. 47 FCC Part 15: 2005 Section 15.109 | Enclosure | Complied |
| Transmitter Effective Isotropic Radiated Power (EIRP) | C.F.R. 47 FCC Part 24: 2005 Section 24.232 | Antenna | Complied |
| Transmitter Frequency Stability (Temperature Variation) | C.F.R. 47 FCC Part 24: 2005 Section 24.235 | Antenna | Complied |
| Transmitter Frequency Stability (Voltage Variation) | C.F.R. 47 FCC Part 24: 2005 Section 24.235 | Antenna | Complied |
| Transmitter Occupied Bandwidth | C.F.R. 47 FCC Part 24: 2005 Section 24.238 | Antenna | Complied |
| Transmitter Out of Band Radiated Emissions | C.F.R. 47 FCC Part 24: 2005 Section 2.1053/24.238 | Antenna | Complied |
| Transmitter Band Edge Radiated Emissions | C.F.R. 47 FCC Part 2: 2005 Section 2.1053/24.238 | 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.

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2. Test Results

7.2.1. Idle Mode AC Conducted Spurious Emissions: Section 15.107

The EUT was configured as for AC conducted emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum emissions levels present on the ac mains line of the EUT.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

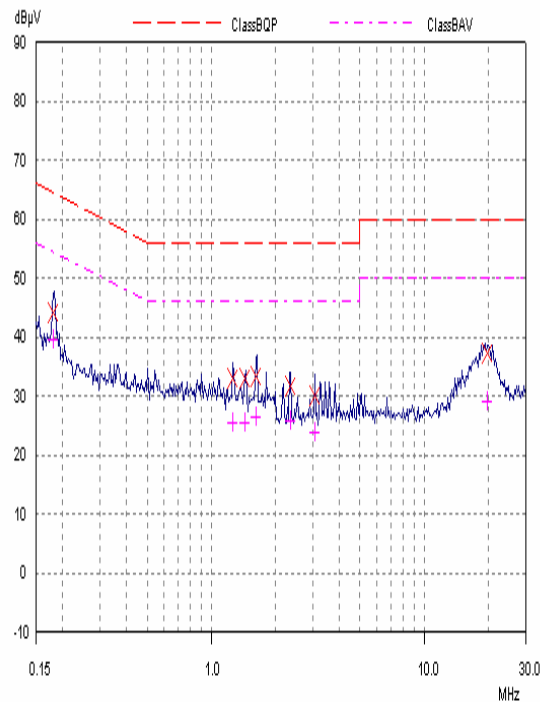
| Frequency (MHz) | Line | Level (dB μ V) | Limit (dB μ V) | Margin (dB) | Result |
|-----------------|---------|--------------------|--------------------|-------------|----------|
| 0.18025 | Neutral | 44.04 | 64.47 | 20.43 | Complied |
| 1.26731 | Neutral | 32.96 | 56.00 | 23.04 | Complied |
| 1.45062 | Neutral | 33.04 | 56.00 | 22.96 | Complied |
| 1.63188 | Neutral | 33.35 | 56.00 | 22.65 | Complied |
| 2.35601 | Neutral | 21.72 | 56.00 | 24.28 | Complied |
| 3.08307 | Neutral | 30.17 | 56.00 | 25.83 | Complied |
| 19.76298 | Neutral | 37.38 | 60.00 | 22.62 | Complied |

Average Detector Measurements on Live and Neutral Lines

| Frequency (MHz) | Line | Level (dB μ V) | Limit (dB μ V) | Margin (dB) | Result |
|-----------------|---------|--------------------|--------------------|-------------|----------|
| 0.18025 | Neutral | 39.62 | 54.47 | 14.85 | Complied |
| 1.26731 | Neutral | 25.37 | 46.00 | 20.63 | Complied |
| 1.45062 | Neutral | 25.40 | 46.00 | 20.60 | Complied |
| 1.63188 | Neutral | 26.36 | 46.00 | 19.64 | Complied |
| 2.35601 | Neutral | 25.70 | 46.00 | 20.30 | Complied |
| 3.08307 | Neutral | 23.87 | 46.00 | 22.13 | Complied |
| 19.76298 | Neutral | 28.95 | 50.00 | 21.05 | Complied |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Idle Mode AC Conducted Spurious Emissions: Section 15.107 (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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.2. Idle Mode Radiated Spurious Emissions: Section 15.109

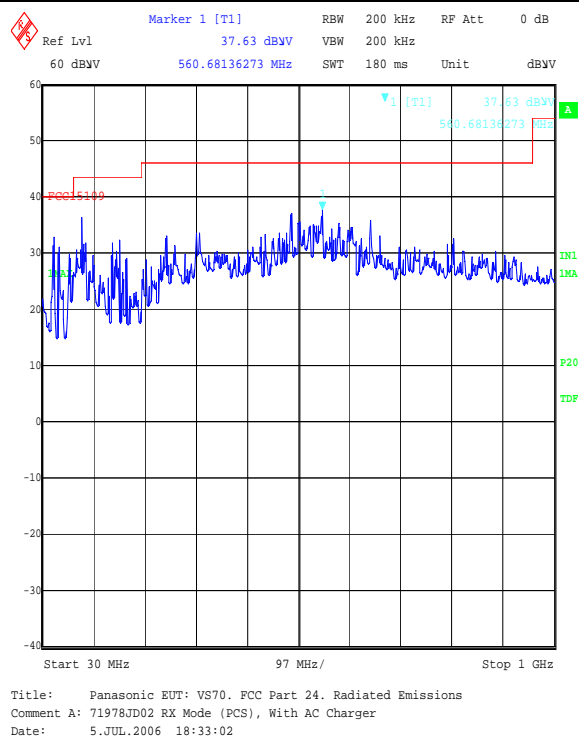
The EUT was configured as for receiver radiated emission testing as described in section 9 of this report.

Tests were performed to identify the maximum receiver or standby radiated emission levels.

Results:

Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

| Frequency (MHz) | Antenna Polarity | Quasi Peak Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|------------------|---------------------------------|----------------------|-------------|----------|
| 52.720 | Vertical | 23.1 | 40.0 | 16.9 | Complied |
| 104.033 | Vertical | 21.1 | 43.5 | 22.3 | Complied |
| 175.466 | Vertical | 15.7 | 43.5 | 27.8 | Complied |
| 264.263 | Vertical | 16.6 | 46.0 | 29.4 | Complied |
| 327.520 | Vertical | 20.5 | 46.0 | 25.5 | Complied |
| 500.035 | Vertical | 23.5 | 46.0 | 22.5 | Complied |
| 558.682 | Horizontal | 26.9 | 46.0 | 19.1 | Complied |
| 667.389 | Vertical | 25.2 | 46.0 | 20.8 | Complied |
| 809.499 | Vertical | 29.3 | 46.0 | 16.7 | Complied |



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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.3. Idle Mode Radiated Spurious Emissions: Section 15.109**Results:****Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz)****Highest Peak Level:**

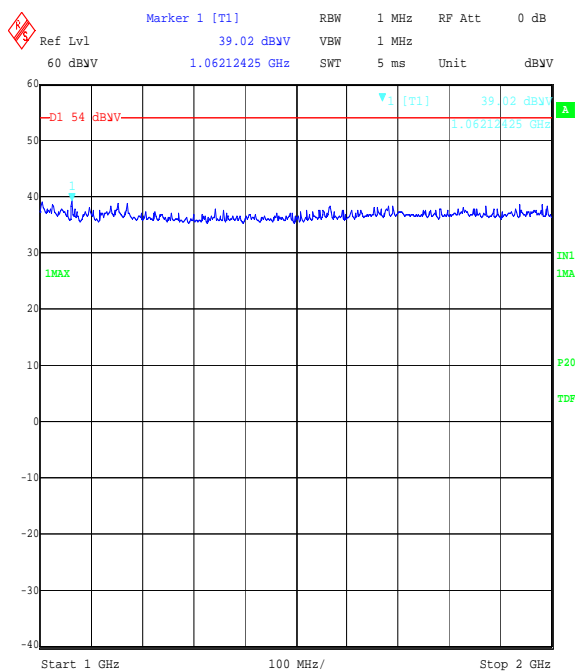
| Frequency (GHz) | Antenna Polarity | Detector Level (dB μ V) | Transducer Factor (dB) | Actual Level (dB μ V/m) | Average Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|------------------|-----------------------------|------------------------|-----------------------------|------------------------------|-------------|----------|
| 3.991984 | Vertical | 48.9 | -9.6 | 39.3 | 54.0 | 14.7 | Complied |

Note(s):

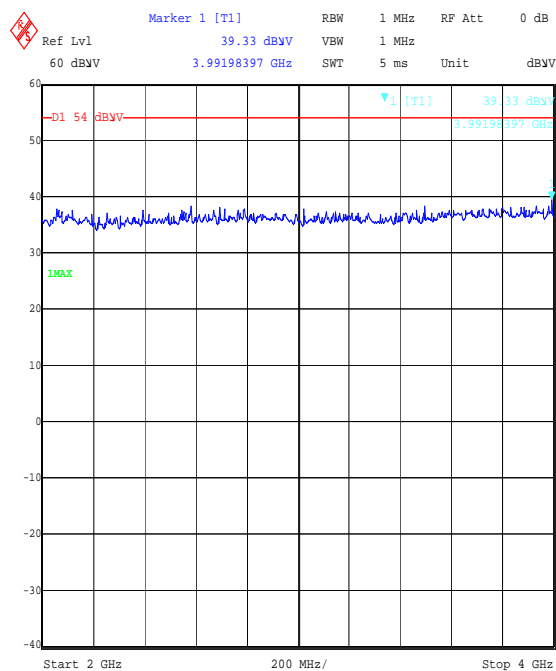
1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
VS70 Dual Mode (3G/GSM) Mobile Station
To: **FCC Part 24: 2005**

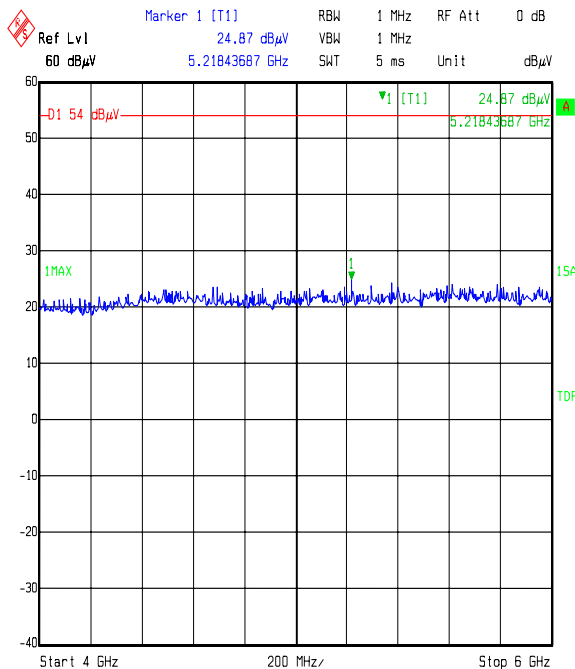
Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)



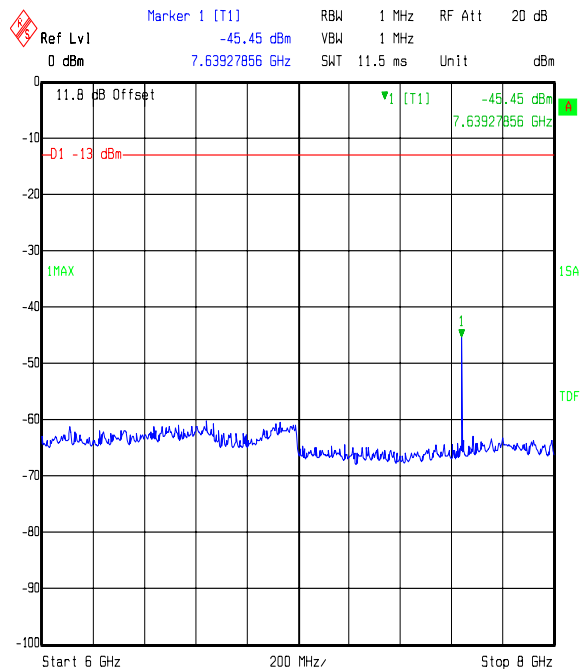
Title: Panasonic EUT: VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 RX Mode (PCS), GSM Mode
Date: 5.JUL.2006 18:15:21



Title: Panasonic EUT: VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 RX Mode (PCS)
Date: 5.JUL.2006 18:21:29



Title: Panasonic EUT:VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 PCS Idle Mode
Date: 04.JUL.2006 15:14:43

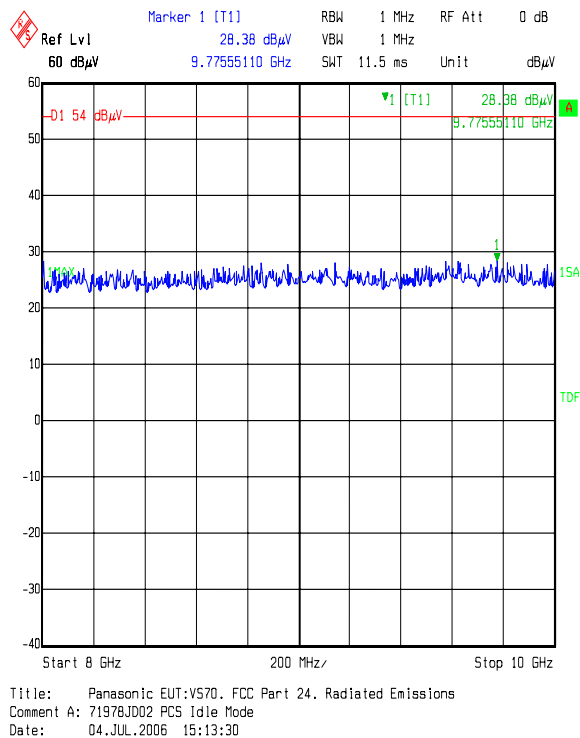


Title: Panasonic EUT:VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
Date: 04.JUL.2006 14:42:32

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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Idle Mode Radiated Spurious Emissions: Section 15.109 (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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.4. Transmitter Effective Isotropic Radiated Power (EIRP): Section 24.232

The EUT was configured as for effective isotropic radiated power as described in section 9 of this report.

Tests were performed to identify the maximum effective isotropic radiated power (EIRP).

Results:

| Channel | Measured Frequency (MHz) | Antenna Polarity | Maximum Transmitter EIRP (dBm) | Limit EIRP (dBm) | Margin (dB) | Result |
|---------|--------------------------|------------------|--------------------------------|------------------|-------------|----------|
| Bottom | 1850.2 | Horizontal | 30.6 | 33.0 | 2.4 | Complied |
| Middle | 1879.8 | Horizontal | 31.2 | 33.0 | 1.8 | Complied |
| Top | 1909.8 | Horizontal | 31.9 | 33.0 | 1.1 | Complied |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.5. Transmitter Frequency Stability (Temperature Variation): Section 24.235

The EUT was configured as for frequency stability measurements as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in ambient temperature.

Results:

Bottom Channel (1850.2 MHz)

| Temperature (°C) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| -30 | -52 | 1850.199948 | 1850.0 | 0.199948 | Complied |
| -20 | -38 | 1850.199962 | 1850.0 | 0.199962 | Complied |
| -10 | -44 | 1850.199956 | 1850.0 | 0.199956 | Complied |
| 0 | -61 | 1850.199939 | 1850.0 | 0.199939 | Complied |
| 10 | -92 | 1850.199908 | 1850.0 | 0.199908 | Complied |
| 20 | -20 | 1850.199980 | 1850.0 | 0.199980 | Complied |
| 30 | -21 | 1850.199979 | 1850.0 | 0.199979 | Complied |
| 40 | -32 | 1850.199968 | 1850.0 | 0.199968 | Complied |
| 50 | -24 | 1850.199979 | 1850.0 | 0.199976 | Complied |

Top Channel (1910.8 MHz)

| Temperature (°C) | Frequency Error (Hz) | Measured Frequency (MHz) | Upper Band Edge Limit (MHz) | Margin (MHz) | Result |
|------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| -30 | 5 | 1909.800005 | 1910.0 | 0.199995 | Complied |
| -20 | 5 | 1909.800005 | 1910.0 | 0.199995 | Complied |
| -10 | 6 | 1909.800006 | 1910.0 | 0.199994 | Complied |
| 0 | -2 | 1909.799998 | 1910.0 | 0.200002 | Complied |
| 10 | 5 | 1909.799995 | 1910.0 | 0.200005 | Complied |
| 20 | -2 | 1909.799998 | 1910.0 | 0.200002 | Complied |
| 30 | 1 | 1909.800001 | 1910.0 | 0.199999 | Complied |
| 40 | 8 | 1909.800008 | 1910.0 | 0.199992 | Complied |
| 50 | -3 | 1909.799997 | 1910.0 | 0.200003 | Complied |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.6. Transmitter Frequency Stability (Voltage Variation): Section 24.235

The EUT was configured as for frequency stability measurements as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in nominal operating voltage.

Results:**Bottom Channel (1850.2 MHz)**

| Supply Voltage (V) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|--------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| 4.2 | -13 | 1850.199987 | 1850 | 0.199987 | Complied |
| 3.2 | -39 | 1850.199961 | 1850 | 0.199961 | Complied |

Top Channel (1909.8 MHz)

| Supply Voltage (V) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|--------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| 4.2 | 29 | 1909.800029 | 1910 | 0.199971 | Complied |
| 3.3 | 10 | 1909.800010 | 1910 | 0.199990 | Complied |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.7. Transmitter Occupied Bandwidth: Section 24.238

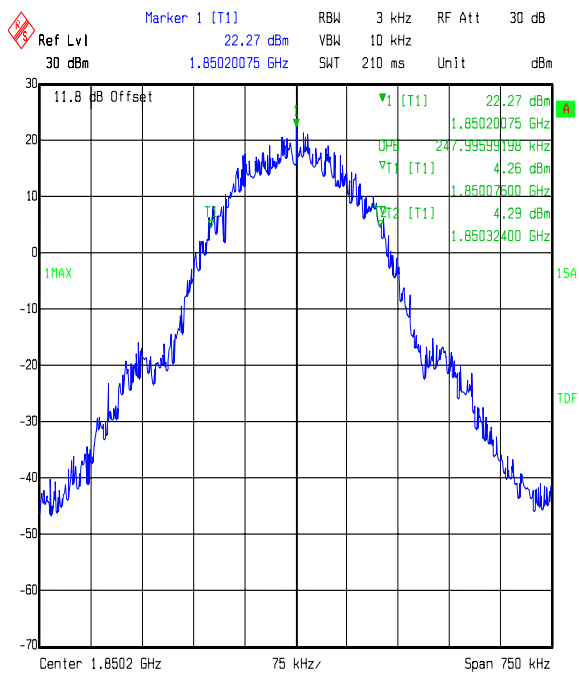
The EUT was configured as for occupied bandwidth measurements as described in section 9 of this report.

Tests were performed to identify the maximum bandwidth occupied by the fundamental frequency of the EUT.

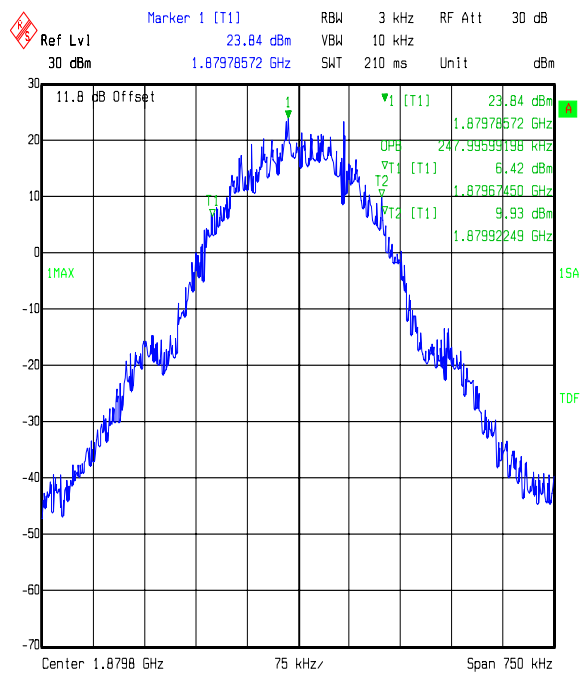
Results:

| Channel | Frequency (MHz) | Resolution Bandwidth (kHz) | Video Bandwidth (kHz) | Occupied Bandwidth (kHz) |
|---------|--------------------|----------------------------------|--------------------------|-----------------------------|
| Bottom | 1850.2 | 3.0 | 10.0 | 247.996 |
| Middle | 1879.8 | 3.0 | 10.0 | 247.996 |
| Top | 1909.8 | 3.0 | 10.0 | 244.990 |

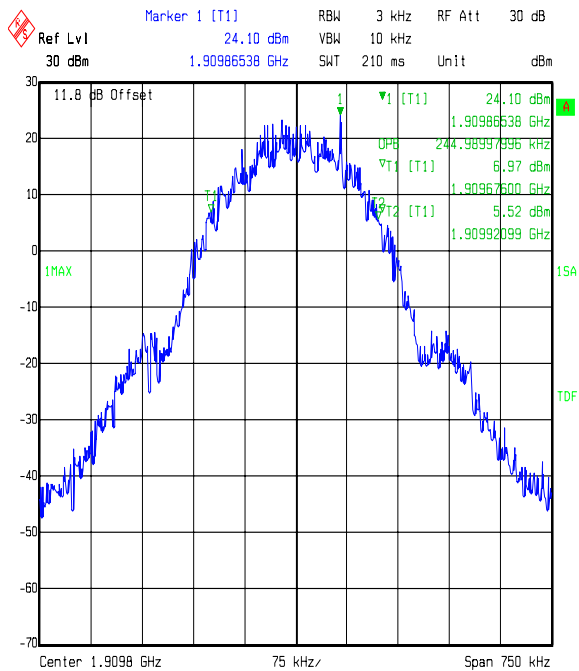
Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
VS70 Dual Mode (3G/GSM) Mobile Station
To: **FCC Part 24: 2005**

Transmitter Occupied Bandwidth: Section 24.238 (Continued)

Title: Panasonic EUT:VS70. FCC Part 24. 20dB Bandwidth
Comment A: 71978JD02 Tx Mode (PCS), Bottom Channel.
Date: 04.JUL.2006 14:20:56



Title: Panasonic EUT:VS70. FCC Part 24. 20dB Bandwidth
Comment A: 71978JD02 Tx Mode (PCS), Middle Channel.
Date: 04.JUL.2006 14:19:16



Title: Panasonic EUT:VS70. FCC Part 24. 20dB Bandwidth
Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
Date: 04.JUL.2006 14:21:57

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.8. Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238

The EUT was configured as for transmitter conducted emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum transmitter conducted emission levels.

Results:**Bottom Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|---------------------------|-------------|-------------|----------|
| 3700.415 | -34.9 | -13.0 | 21.9 | Complied |

Middle Channel

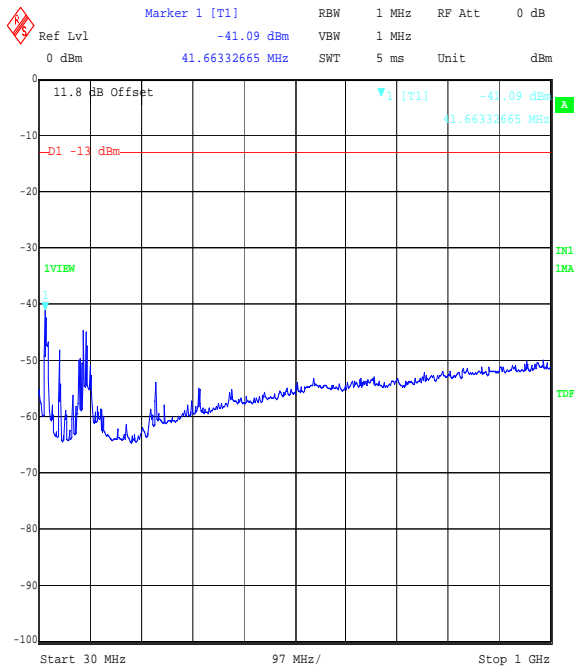
| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|---------------------------|-------------|-------------|----------|
| 3759.735 | -33.5 | -13.0 | 20.5 | Complied |

Top Channel

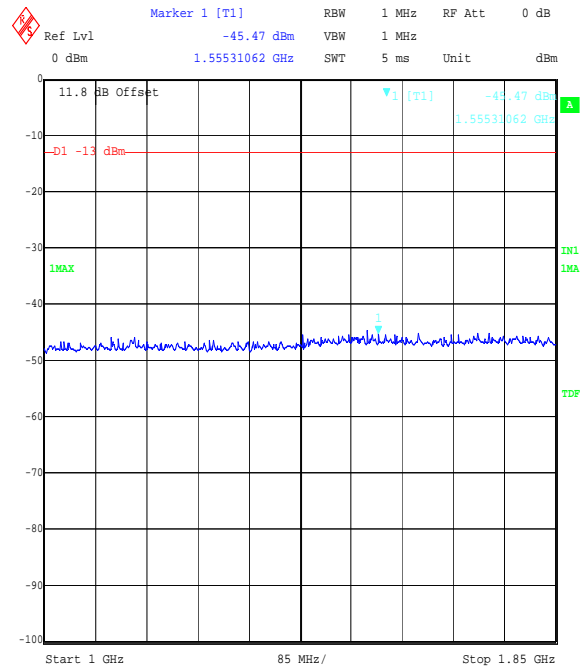
| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|---------------------------|-------------|-------------|----------|
| 3819.755 | -34.1 | -13.0 | 21.1 | Complied |

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
VS70 Dual Mode (3G/GSM) Mobile Station
To: **FCC Part 24: 2005**

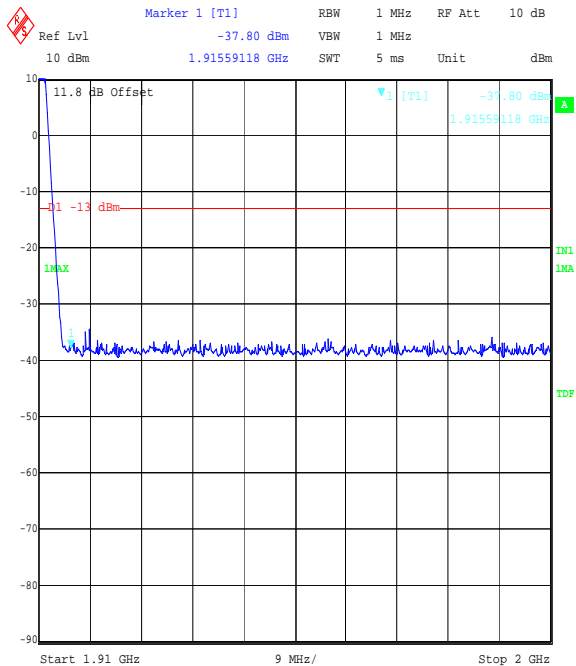
Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)



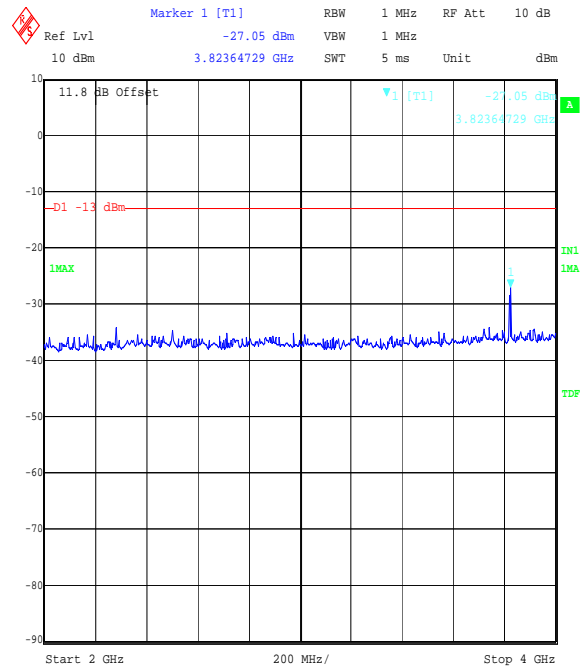
Title: Panasonic EUT: VS70, FCC Part 24, Radiated Emissions
Comment A: 71978JD02 TX Mode (PCS), Top Channel, GSM Mode
Date: 5.JUL.2006 17:10:25



Title: Panasonic EUT: VS70, FCC Part 24, Radiated Emissions
Comment A: 71978JD02 TX Mode (PCS), Top Channel, GSM Mode
Date: 5.JUL.2006 18:10:30



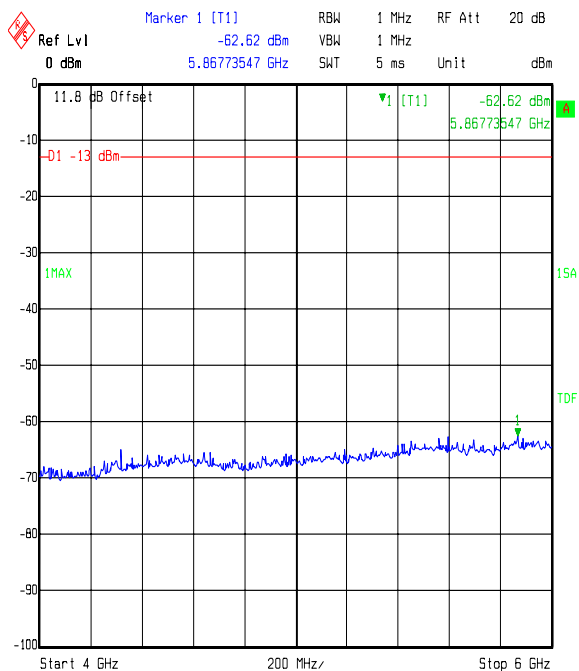
Title: Panasonic EUT: VS70, FCC Part 24, Radiated Emissions
Comment A: 71978JD02 TX Mode (PCS), Top Channel, GSM Mode
Date: 5.JUL.2006 18:13:31



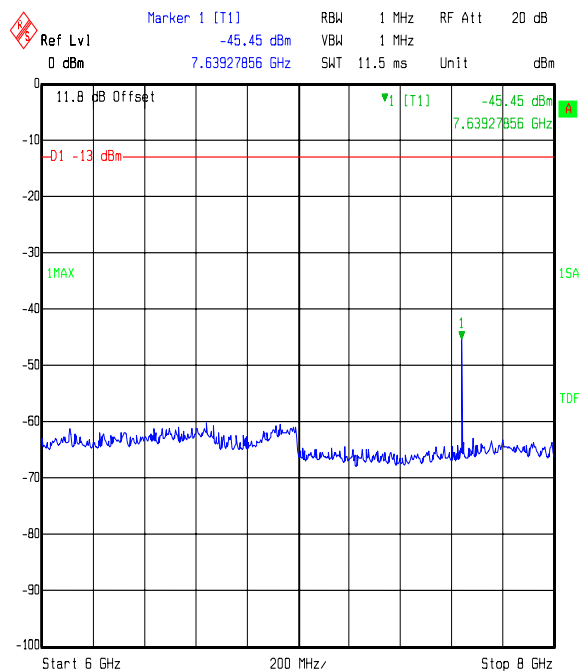
Title: Panasonic EUT: VS70, FCC Part 24, Radiated Emissions
Comment A: 71978JD02 TX Mode (PCS), Top Channel, GSM Mode
Date: 5.JUL.2006 18:20:39

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

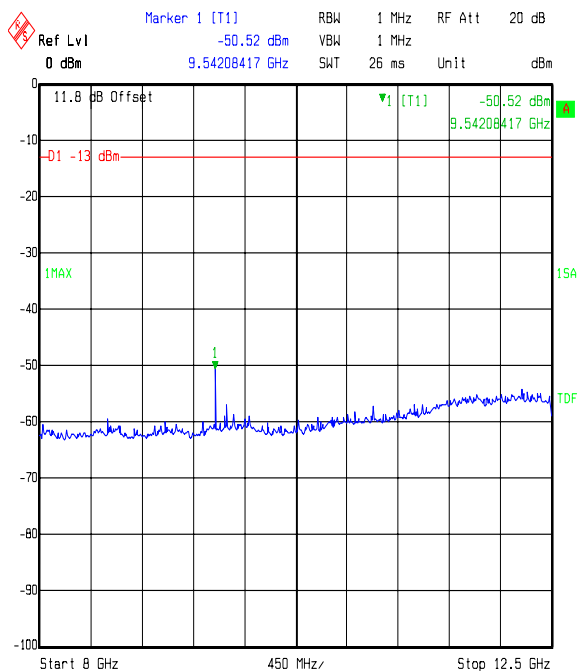
Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
VS70 Dual Mode (3G/GSM) Mobile Station
To: **FCC Part 24: 2005**

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)

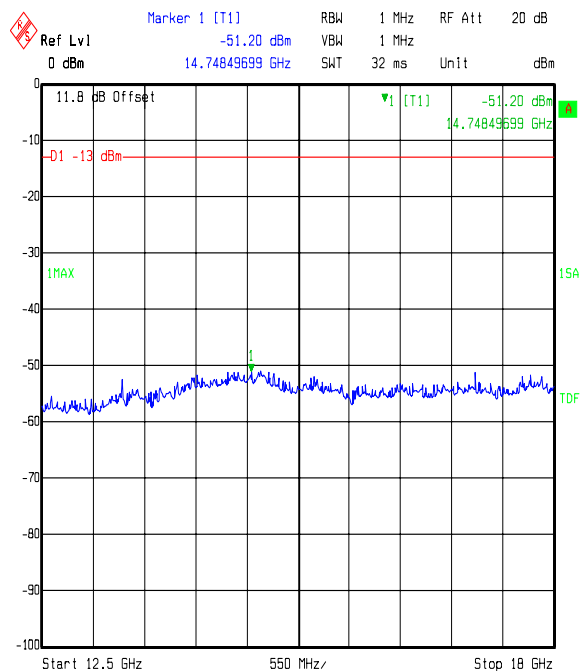
Title: Panasonic EUT:VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
Date: 04.JUL.2006 14:35:46



Title: Panasonic EUT:VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
Date: 04.JUL.2006 14:42:32



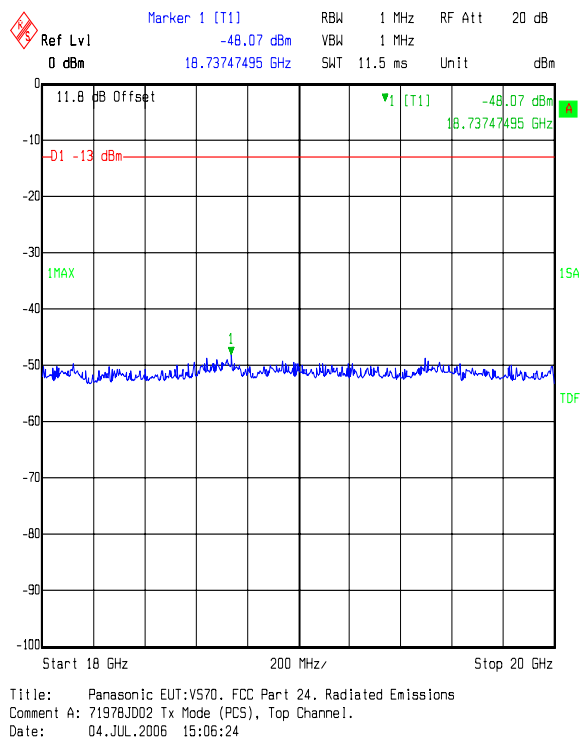
Title: Panasonic EUT:VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
Date: 04.JUL.2006 14:56:56



Title: Panasonic EUT:VS70. FCC Part 24. Radiated Emissions
Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
Date: 04.JUL.2006 15:02:33

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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)

Integrated Power Over 1 MHz Strip Band: 1911 to 1912 MHz

1st 1 MHz block immediately outside adjacent frequency block

| 100 kHz Strip Number | Peak Power (nW/100 kHz) | 100 kHz Strip Number | Peak Power (nW/100 kHz) |
|--------------------------|----------------------------|----------------------|----------------------------|
| 1 | 310.095 | 6 | 162.418 |
| 2 | 252.472 | 7 | 149.149 |
| 3 | 231.520 | 8 | 137.929 |
| 4 | 190.629 | 9 | 116.150 |
| 5 | 183.705 | 10 | 112.246 |
| Total Peak Power: | | 1846.313 nW/MHz | |

Integrated Power Over 1 MHz Strip Band: 1912 to 1913 MHz

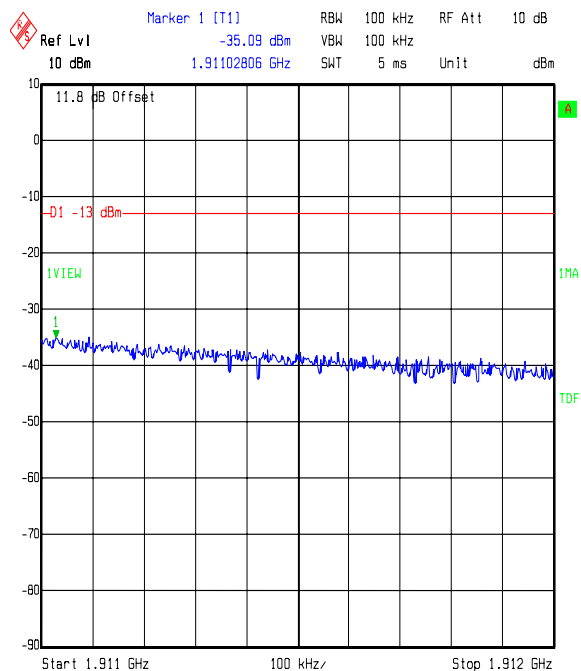
2nd 1 MHz block immediately outside adjacent frequency block

| 100 kHz Strip Number | Peak Power (nW/100 kHz) | 100 kHz Strip Number | Peak Power (nW/100 kHz) |
|--------------------------|----------------------------|----------------------|----------------------------|
| 1 | 68.422 | 6 | 48.634 |
| 2 | 56.761 | 7 | 49.183 |
| 3 | 55.525 | 8 | 37.084 |
| 4 | 54.470 | 9 | 37.520 |
| 5 | 45.654 | 10 | 32.269 |
| Total Peak Power: | | 485.522 nW/MHz | |

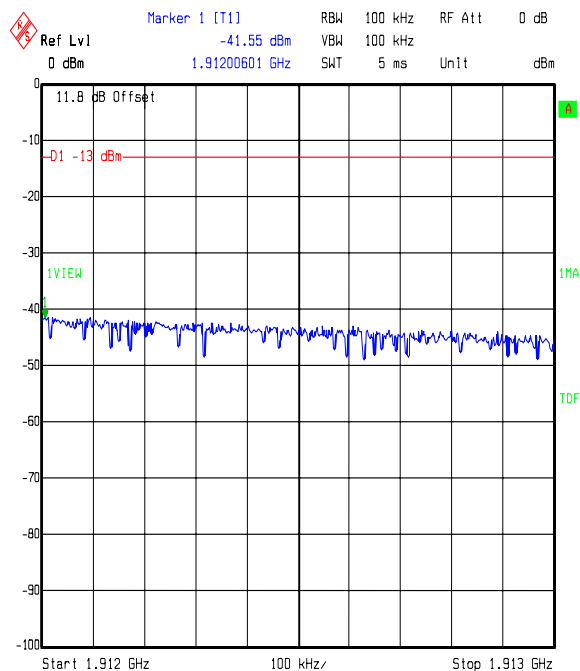
Results:

| Band (MHz) | Peak Power (nW/MHz) | Peak Power (dBm/MHz) | Limit (dBm/MHz) | Margin (dB) | Status |
|---------------|------------------------|-------------------------|--------------------|----------------|----------|
| 1911 to 1912 | 1846.313 | -27.3 | -13.0 | 14.3 | Complied |
| 1912 to 1913 | 485.522 | -33.1 | -13.0 | 20.1 | Complied |

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
VS70 Dual Mode (3G/GSM) Mobile Station
To: **FCC Part 24: 2005**

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)

Title: Panasonic EUT; VS70 FCC Part 24 Radiated Band Strip
Comment A: 71978JD03 Operating in Tx Mode, Top Channel (GSM Mode)
Date: 10.JUL.2006 16:04:26



Title: Panasonic EUT; VS70 FCC Part 24 Radiated Band Strip
Comment A: 71978JD03 Operating in Tx Mode, Top Channel (GSM Mode)
Date: 10.JUL.2006 16:18:44

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
VS70 Dual Mode (3G/GSM) Mobile Station
 To: **FCC Part 24: 2005**

7.2.9. Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238

The EUT was configured as for transmitter radiated emission testing as described in section 9 of this report.

Tests were performed to identify the maximum transmitter radiated emission levels.

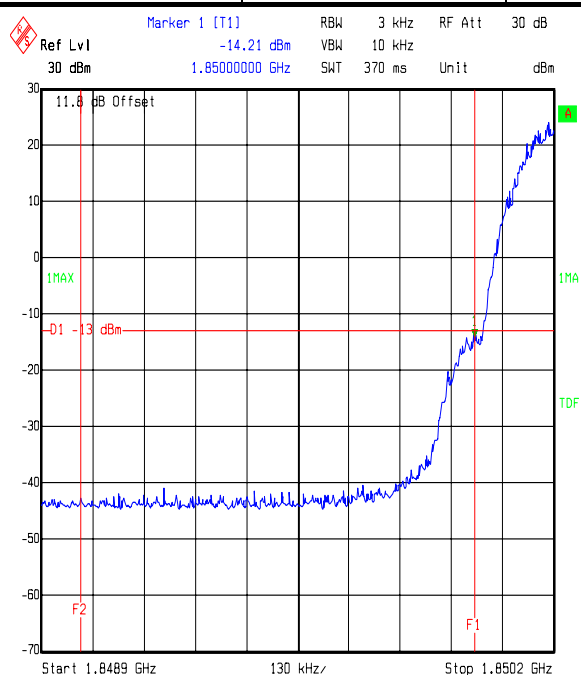
Results: (GSM Mode)

Bottom Channel

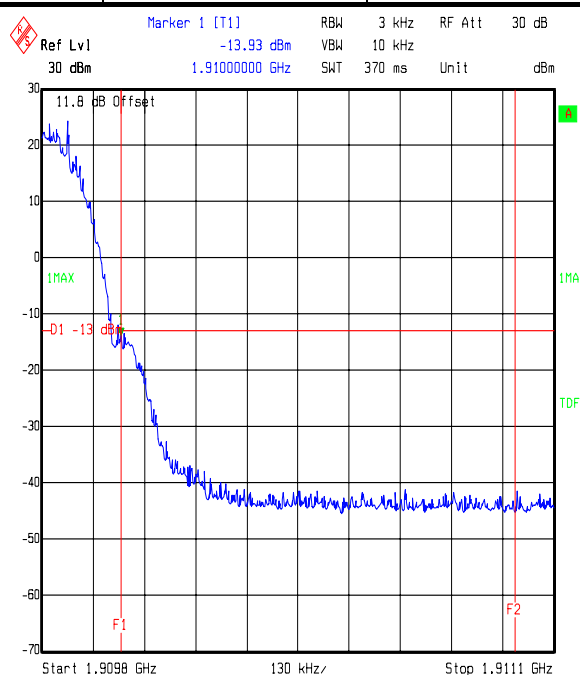
| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|---------------------------|-------------|-------------|----------|
| 1850 | -14.2 | -13.0 | 1.2 | Complied |

Top Channel

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|---------------------------|-------------|-------------|----------|
| 1910 | -13.9 | -13.0 | 0.9 | Complied |



Title: Panasonic EUT:VS70, FCC Part 24, Radiated BandEdge
 Comment A: 71978JD02 Tx Mode (PCS), Bottom Channel.
 Date: 04.JUL.2006 12:38:08



Title: Panasonic EUT:VS70, FCC Part 24, Radiated BandEdge
 Comment A: 71978JD02 Tx Mode (PCS), Top Channel.
 Date: 04.JUL.2006 12:43:36

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.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

7.2.10. Transmitter Radiated Emissions at Band Edges: Section 2.1053 & 24.238

The EUT was configured as for transmitter radiated emissions testing described in section 9 of this report.

Tests were performed to identify the maximum emissions level at the band edges of the frequency block that the EUT will operate over.

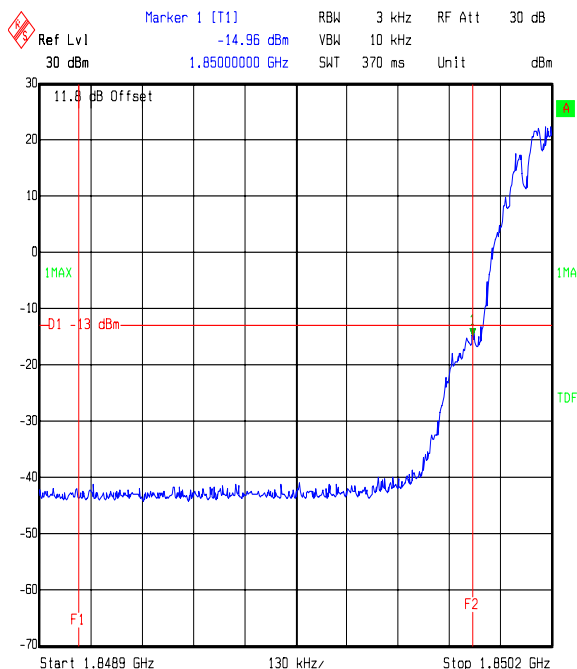
Results: (GPRS Mode)

Bottom Band Edge

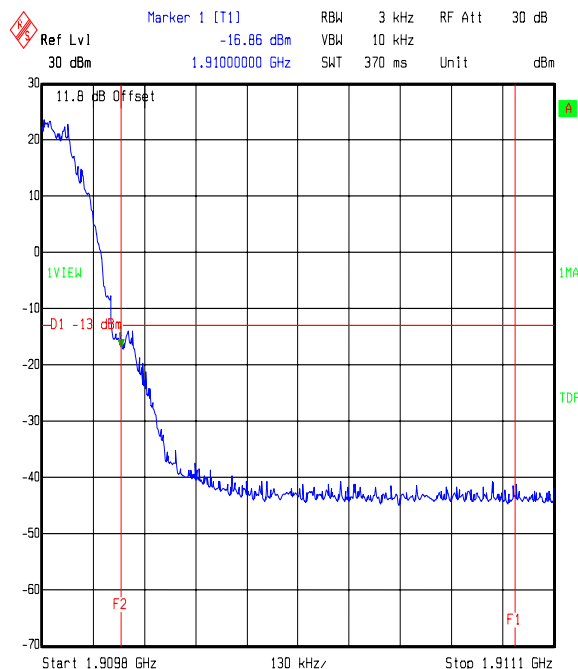
| Frequency (MHz) | Spurious Emission (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|-------------------------|-------------|-------------|----------|
| 1850 | -15.0 | -13.0 | 2.0 | Complied |

Top Band Edge

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|---------------------------|-------------|-------------|----------|
| 1910 | -16.9 | -13.0 | 3.9 | Complied |



Title: Panasonic EUT; VS70 FCC Part 24 Radiated Band Strip
Comment A: 71978JD03 Operating in Tx Mode, Top Channel (GSM Mode)
Date: 11.JUL.2006 10:34:55



Title: Panasonic EUT; VS70 FCC Part 24 Radiated Band Strip
Comment A: 71978JD03 Operating in Tx Mode, Top Channel (GSM Mode)
Date: 11.JUL.2006 10:25:13

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

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% | ±3.72 dB |
| Effective Isotropic Radiated Power (EIRP) | Not applicable | 95% | ±2.94 dB |
| Frequency Stability | Not applicable | 95% | ±11.4 ppm |
| Occupied Bandwidth | 824 to 849 MHz | 95% | ±11.4 ppm |
| Radiated Spurious Emissions | 30 MHz to 1000 MHz | 95% | ±4.64 dB |
| Radiated Spurious Emissions | 1 GHz to 26 GHz | 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.

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

9. Measurement Methods

9.1. Effective Isotropic Radiated Power (EIRP)

EIRP measurements were performed in accordance with the standard, against appropriate limits.

The EIRP was measured with the EUT arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2003 Clause 5.4. The transmitter was fitted with an integral antenna; therefore all radiated tests were performed with the unit operating into the integral antenna.

The level of the EIRP was measured using a spectrum analyser.

The test antenna was positioned in the horizontal plane. The EUT was oriented in the X plane. The test antenna was then raised and lowered until a maximum peak was observed. The turntable was then rotated through 360 degrees and the maximum peak reading obtained. The height search was then repeated to take into consideration the new angular position of the turntable. The maximum reading observed was then recorded. This procedure was then repeated with the EUT oriented in the Y and Z planes. The highest reading taken in all 3 planes was recorded. The entire procedure was then repeated with the test antenna set in the vertical polarity.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For EIRP measurements a Horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The EIRP was calculated as:-

$$\text{EIRP} = \text{Signal Generator Level} - \text{Cable Loss} + \text{Antenna Gain}$$

All measurements were performed using broadband Horn antennas.

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Effective Isotropic Radiated Power (EIRP) (Continued)

Circumstances where the signal generator could not produce the desired power substitution was performed with the signal generator set to 0 dBm. The radiated signal was maximised as previously described. The level indicated on the measuring receiver was noted. The delta between this level and the maximum level for the EUT was calculated and also noted. The EIRP of the signal generator was calculated using the above formulae. The recorded delta was added to the calculated EIRP to obtain the substituted EUT EIRP.

$$\text{Delta (dB)} = \text{EUT} - \text{SG}$$

where :

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual EIRP is calculated as:

$$\text{EIRP SG} = \text{Signal Generator Level} - \text{Cable Loss} + \text{Antenna Gain}$$

The EUT EIRP is calculated as:

$$\text{EIRP EUT} = \text{EIRP SG} + \text{Delta}.$$

The test equipment settings for EIRP measurements were as follows:

| Receiver Function | Setting |
|-------------------|----------------|
| Detector Type: | Peak |
| Mode: | Not applicable |
| Bandwidth: | 1 MHz |
| Amplitude Range: | 100 dB |
| Sweep Time: | Coupled |

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

9.2. Frequency Stability

The EUT was situated within an environmental test chamber and connected directly to the GSM test set via an access port.

Measurements were performed with the EUT operating under extremes of temperature in 10 degree increments within the range -30 to 50 °C.

Measurements were also performed at voltage extremes between the declared nominal supply voltage and at the declared endpoint voltage (for hand carried battery operated equipment) or by varying the primary supply voltage from 85% to 115% of the nominal value for all other equipment types.

The requirement was to determine the frequency stability of the device under specified environmental operating conditions and ensure they remained within specified operating parameters.

Measurements were made on the top and bottom channels.

The EUT was switched off for a minimum of 30 minutes between each stage of testing while the environmental chamber stabilised at the next temperature within the stated temperature range.

Once the environmental chamber had reached thermal equilibrium, the nominal frequency of the EUT was measured and recorded. The recorded frequency was compared to the applicants declared operating frequency band edges.

In order to show compliance, the measured frequency must remain within the declared frequency band.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

9.3. Occupied Bandwidth

The EUT was connected to a spectrum analyser enabled with an occupied bandwidth function and a GSM test set via a bi-directional coupler to its antenna port.

Measurements were performed to determine the occupied bandwidth in accordance with FCC Part 2.1049. The occupied bandwidth was measured from the fundamental emission at the bottom, middle and top channels.

As the EUT is a PCS phone, no modulation input port was available. A call was thus set up using the PCS/GSM simulator and using normal modulation. The Occupied Bandwidth was measured in this configuration.

The occupied bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz FSEB or ESIB spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser settings were set as per those outlined in the spectrum analyser user manual for this measurement, i.e., $RBW \geq 1\%$ of occupied bandwidth. A value of 3 kHz was used.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

9.4. AC Mains Conducted Emissions

AC mains conducted emission measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 110V 60 Hz AC mains supplied via a line impedance stabilisation network (LISN).

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

| Receiver Function | Initial Scan | Final Measurements |
|--------------------------|---------------------|----------------------------|
| Detector Type: | Peak | Quasi-Peak (CISPR)/Average |
| Mode: | Max Hold | Not applicable |
| Bandwidth: | 10 kHz | 9 kHz |
| Amplitude Range: | 60 dB | 20 dB |
| Measurement Time: | Not applicable | > 1 s |
| Observation Time: | Not applicable | > 15 s |
| Step Size: | Continuous sweep | Not applicable |
| Sweep Time: | Coupled | Not applicable |

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

9.5. Transmitter Radiated Emissions

Radiated emission measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to 10 times the highest fundamental frequency. The scans were performed within a screened chamber in order to identify frequencies on which the EUT was generating spurious. This procedure identified the frequencies from the EUT, which required further examination. Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit by characterising the screen room using a known signal source set at exactly the same location as the EUT. The signal source was derived from either a horn antenna or a dipole dependant on the frequency band under investigation. Any levels within 20 dB of this limit were measured where possible, on occasion; the receiver noise floor came within the 20 dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a peak detector was used for final measurements at each frequency recorded in the screen room.

The levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the vertical polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the horizontal polarisation.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For EIRP measurements a Horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The EIRP was calculated as:-

$$\text{EIRP} = \text{Signal Generator Level} - \text{Cable Loss} + \text{Antenna Gain}$$

The limit in the standard states that emissions shall be attenuated by at least $43 + 10 \log(P)$ dB below the transmitter power (P), where (P) is the maximum measured fundamental power for the channel under test. This limit always reduces to -13 dBm therefore, the limit line presented on the accompanying plots is set to -13 dBm.

Any spurious measured were then compared to the -13 dBm limit. The requirement is for the emission to be less than -13 dBm. The margin between emission and limit is recorded and should always be positive to indicate compliance.

All measurements were performed using broadband horn antennas.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

Transmitter Radiated Emissions (Continued)

It should be noted that FCC Part 24.238 states that the 1st MHz band immediately adjacent to the applicants declared frequency block may be measured using a resolution bandwidth of at least 1% of the emission bandwidth. This bandwidth was found by calculating 1% of the bandwidth measured in the transmitter occupied bandwidth section of this report. The next largest available bandwidth above this calculated figure was, therefore, used i.e. 3 kHz.

The measurements in the 2nd and 3rd 1 MHz blocks away from the adjacent 1 MHz block from 1911 MHz to 1912 MHz and 1912 MHz to 1913 MHz were carried out using an analyser span of 1 MHz and a 100 kHz receiver resolution bandwidth (RBW). 10 linear readings were taken for each 100 kHz strip across the 1 MHz band. These readings were integrated to give the emission level in an equivalent 1 MHz bandwidth.

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**
To: **FCC Part 24: 2005**

9.6. Receiver Radiated Emissions

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to the upper frequency detailed in Section 15.33(b) were performed within a screened chamber in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT, which required further examination. In order to minimise the time taken for the swept measurements, a peak detector was used in conjunction with the appropriate detector measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit. Levels within 20dB of this limit were measured where possible, on occasion, the receiver noise floor came within the 20dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a quasi peak detector was used for measurements below 1000 MHz, for measurements above 1000 MHz average and peak detectors were used.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2003 Clause 5.4.

On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the horizontal polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the vertical polarisation.

The final field strength was determined as the indicated level in dB μ V plus cable loss and antenna factor.

The test equipment settings for radiated emissions measurements were as follows:

| Receiver Function | Initial Scan | Final Measurements <1GHz | Final Measurements ≥1 GHz |
|--------------------------|---------------------------------|--|--------------------------------------|
| Detector Type: | Peak | Quasi-Peak (CISPR) | Peak/Average |
| Mode: | Max Hold | Not applicable | Not applicable |
| Bandwidth: | (120 kHz <1GHz) (1MHz ≥1GHz) | 120 kHz | 1 MHz (If applicable) |
| Amplitude Range: | 60 dB | 20 dB | 20 dB (typical) |
| Step Size: | Continuous sweep | Not applicable | Not applicable |
| Sweep Time: | Coupled | Not applicable | Not applicable |

Test of: **Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station**

To: **FCC Part 24: 2005**

Appendix 1. Test Equipment Used

| RFI No. | Instrument | Manufacturer | Type No. | Serial No. | Calibration Date: |
|---------|-------------------------------------|-----------------|------------|--------------------------------|-------------------|
| A027 | Horn Antenna | Eaton | 9188-2 | 301 | 08/06/06 |
| A031 | Horn Antenna | Eaton | 91889-2 | 557 | 08/06/06 |
| A1069 | LISN | Rohde & Schwarz | ESH3-Z5 | 837469/012 | 31/01/06 |
| A1361 | Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | A1361-20112003 | 29/04/06 |
| A1242 | Horn Antenna | Dorado | 12-GH-12-2 | 0002 | Cal not reqd. |
| A1534 | Preamplifier | Hewlett Packard | 8449B | 3008A00405 | Cal before use |
| A1537 | Dual Directional Coupler | Hewlett Packard | 778D | 1144A05122 | Cal before use |
| A254 | Horn Antenna | Flann | 14240-20 | 139 | 12/01/06 |
| A255 | Horn Antenna | Flann | 16240-20 | 519 | 12/01/06 |
| A259 | Bilog Antenna | Chase | CBL6111 | 1513 | 21/02/05 |
| A428 | Horn Antenna | Flann | 12240-20 | 134 | 12/01/06 |
| A430 | Horn Antenna | Flann | 18240-20 | 425 | 12/01/06 |
| A436 | Horn Antenna | Flann | 20240-20 | 330 | 12/01/06 |
| A442 | Horn Antenna | Narda | 645 | 8608 | 12/01/06 |
| A490 | Bilog Antenna | Chase | CBL6111A | 1590 | 09/09/2004 |
| A553 | Bilog Antenna | Chase | CBL6111A | 1593 | 18/10/2005 |
| L0816 | Environmental Chamber | Unitemp | None | None | Cal not reqd. |
| M003 | Spectrum Monitor | Rohde & Schwarz | EZM | 883 580/008 | Cal not reqd. |
| M023 | Test Receiver | Rohde & Schwarz | ESVP | 872 991/027 | 10/04/06 |
| M090 | Receiver / Spectrum Analyser System | Rohde & Schwarz | ESBI | DU:838494/005 RU:836833/001 | 08/11/05 |
| M1068 | Thermometer Digital | Iso-Tech | RS55 | 93102884 | 09/06/2006 |
| M1140 | Radio Communications Analyser | Anritsu | MT8820A | 6K0000647 | Cal not reqd. |
| M1242 | Spectrum Analyser | Rohde & Schwarz | FSEM30 | 845986_022 | 25/08/05 |
| M1263 | Spectrum Analyser | Rohde & Schwarz | ESIB7 | 100265 | 12/01/06 |
| S0520 | DC Power Supply | GW instek | GPC-3030 | E835141 | Cal not reqd. |
| S0529 | DC Power Supply | ISO-Tech | IPS2302A | 504E005G2 | Cal not reqd. |
| S201 | Site 1 | RFI | 1 | | 22/07/05 |
| S202 | Site 2 | RFI | 2 | | Cal before use |

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

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station
To: FCC Part 24: 2005

Appendix 2. Test Configuration Drawings

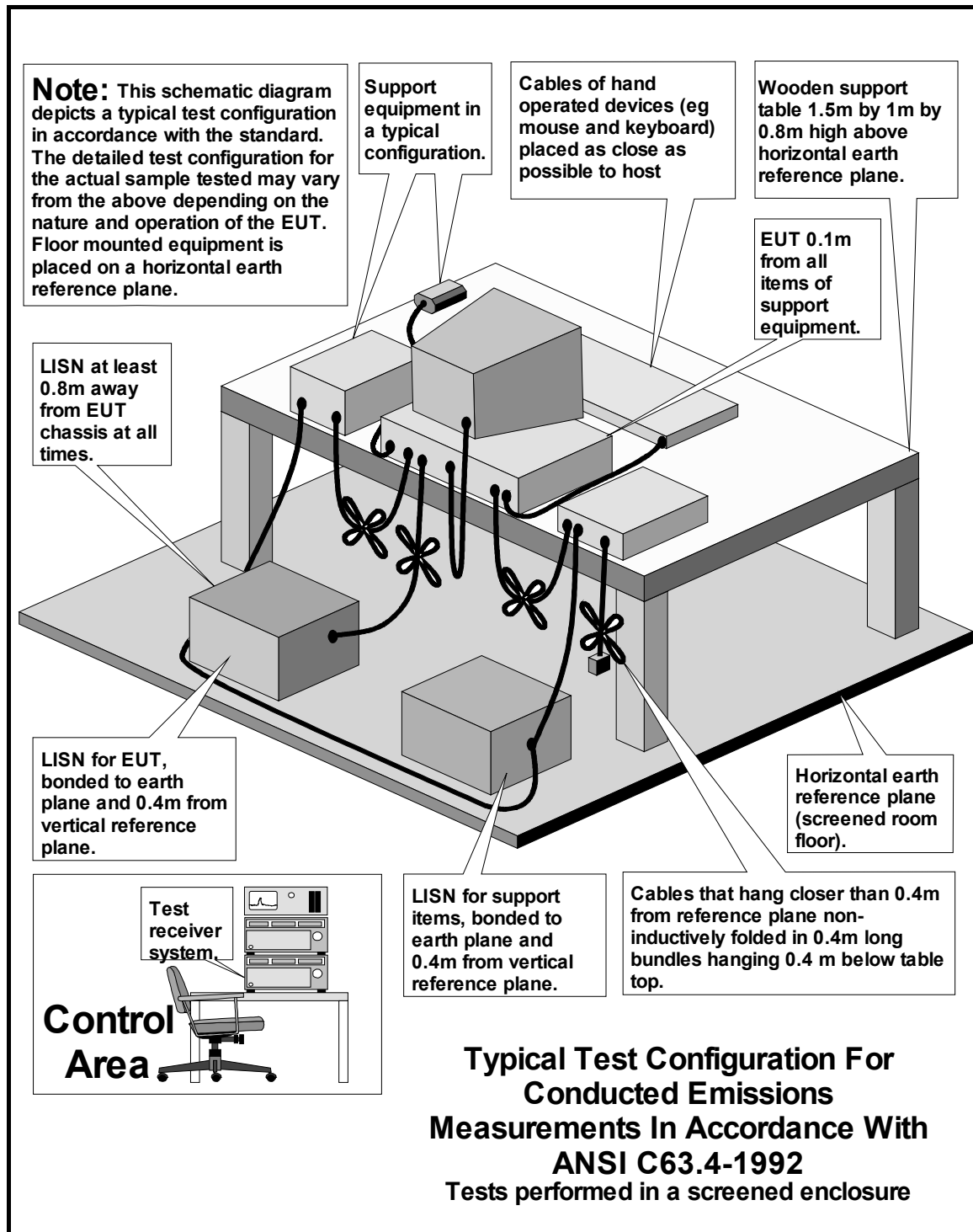
This appendix contains the following drawings:

| Drawing Reference Number | Title |
|--------------------------|--|
| DRG\71978JD02\EMICON | Test configuration for measurement of conducted emissions. |
| DRG\71978JD02\EMIRAD | Test configuration for measurement of radiated emissions. |

Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station

To: FCC Part 24: 2005

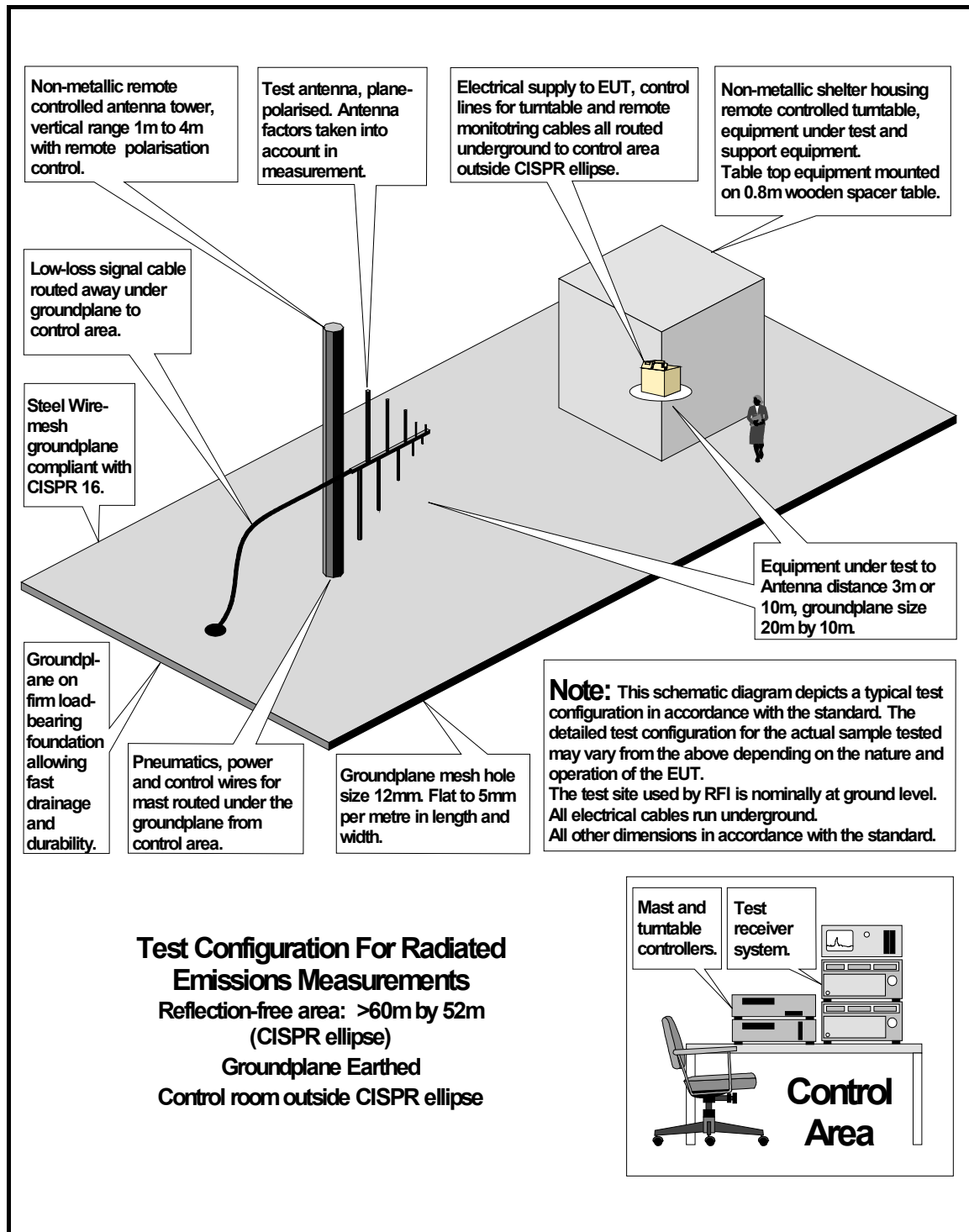
DRG\71978JD02\EMICON



Test of: Panasonic Mobile Comms Dev of Europe Ltd.
VS70 Dual Mode (3G/GSM) Mobile Station

To: FCC Part 24: 2005

DRG\71978JD02\EMIRAD



Test of: **Panasonic Mobile Comms Dev of Europe Ltd.**
 VS70 Dual Mode (3G/GSM) Mobile Station
To: **FCC Part 24: 2005**

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