

## FCC Part 15B Compliance Test Report

|                                                         |                                                                                                                                                                                                                                                                               |                                   |                                                                                                               |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Test Report no.:</b>                                 | Tre_FCC_0736_01.doc                                                                                                                                                                                                                                                           | <b>Date of Report:</b>            | 7.9.2007                                                                                                      |
| <b>Number of pages:</b>                                 | 20                                                                                                                                                                                                                                                                            | <b>Customer's Contact person:</b> | Ernest Mayer                                                                                                  |
| <b>Testing laboratory:</b>                              | TCC Nokia Tampere Laboratory<br>P.O. Box 68<br>Sinitaival 5<br>FIN-33720 TAMPERE, FINLAND<br>Tel. +358 (0) 7180 46800<br>Fax. +358 (0) 7180 46880                                                                                                                             | <b>Customer:</b>                  | Nokia Corporation<br>Frederikskaj<br>1790 COPENHAGEN V<br>DENMARK<br>Tel. +45 33 292929<br>Fax. +45 33 292934 |
| <b>FCC listing no.:</b>                                 | 94436                                                                                                                                                                                                                                                                         |                                   |                                                                                                               |
| <b>IC recognition no.:</b>                              | 3608                                                                                                                                                                                                                                                                          |                                   |                                                                                                               |
| <b>Tested devices/ accessories:</b>                     | <b>GSM phone RM-242/ Battery BP-5M, Audio adapter AD-56, Headset HS-45, AC-Charger AC-3E, Data cable CA-101, Laptop IBM Thinkpad T22, AC adapter 02K6543, Printer HP deskjet 1600CC3540A, Digital camera FUJI DS-7, Serial cable for camera, Parallel cable for printer</b>   |                                   |                                                                                                               |
| <b>FCC ID:</b>                                          | QTKRM-242                                                                                                                                                                                                                                                                     | <b>IC:</b>                        | 661AD-RM242                                                                                                   |
| <b>Supplement reports:</b>                              | -                                                                                                                                                                                                                                                                             |                                   |                                                                                                               |
| <b>Testing has been carried out in accordance with:</b> | <b>CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2003), ICES-003, CISPR 22 and IC standards RSS-132, RSS-133 and RSS-210. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".</b> |                                   |                                                                                                               |
| <b>Documentation:</b>                                   | The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.                          |                                   |                                                                                                               |
| <b>Test Results:</b>                                    | <b>The EUT complies with the requirements in respect of all parameters subject to the test.</b><br>The test results relate only to devices specified in this document.                                                                                                        |                                   |                                                                                                               |
| <b>Date and signature for the contents:</b>             |                                                                                                                                                                                                                                                                               |                                   |                                                                                                               |

Jari Jantunen, System Manager

## 1. Summary for FCC Part 15B Compliance Test Report

|                               |                                                        |
|-------------------------------|--------------------------------------------------------|
| Date of receipt               | 20.8.2007                                              |
| Testing completed             | 4.9.2007                                               |
| The customer's contact person | Ernest Mayer                                           |
| Test Plan referred to         | T:\Projects\                                           |
| Notes                         | -                                                      |
| Document name                 | T:\Projects\RM-242\EMC\Results\FCC\Tre_FCC_0736_01.doc |

### 1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band I/V(850)) mobile phone with GPRS, EGPRS and Bluetooth. GSM and WCDMA bands are tested in idle mode. Bluetooth is tested with maximum rated TX power.

| Product                    | Type                   | SN              | HW   | MV  | SW        | DUT   |
|----------------------------|------------------------|-----------------|------|-----|-----------|-------|
| GSM phone                  | RM-242                 | 004401015292382 | 0210 | -   | Vp tk3.10 | 41223 |
| Battery                    | BP-5M                  | -               | -    | -   | -         | 41228 |
| Charger                    | AC-3E                  | -               | -    | -   | -         | 40843 |
| Audio adapter              | AD-56                  | 1272            | 0.5  | 1.0 | -         | 41230 |
| Headset                    | HS-45                  | -               | -    | -   | -         | 41232 |
| Data cable                 | CA-101                 | -               | 1.2  | 1.1 | -         | 41152 |
| Laptop                     | IBM Thinkpad T22       | 555V2PT         | -    | -   | -         | 40201 |
| AC Adapter                 | 02K6543                | -               | -    | -   | -         | 40202 |
| Printer                    | HP deskjet 1600CC3540A | USB8302546      | -    | -   | -         | 40077 |
| Digital camera             | FUJI DS-7              | 7102516         | -    | -   | -         | 40076 |
| Serial cable for camera    | -                      | -               | -    | -   | -         | 40088 |
| Parallel cable for printer | -                      | -               | -    | -   | -         | 40087 |

## 1.2. Summary of Test Results

### GSM 850:

| Section in CFR 47 | Section in ICES-003 (RSS-132) | Name of the test                 | Result |
|-------------------|-------------------------------|----------------------------------|--------|
| 15.107, a         | 5.3                           | AC powerline conducted emissions | PASSED |
| 15.109, a         | 5.5 (6.6)                     | Radiated emissions               | PASSED |

### GSM 1900:

| Section in CFR 47 | Section in ICES-003 (RSS-133) | Name of the test                 | Result |
|-------------------|-------------------------------|----------------------------------|--------|
| 15.107, a         | 5.3                           | AC powerline conducted emissions | PASSED |
| 15.109, a         | 5.5 (9)                       | Radiated emissions               | PASSED |

### Bluetooth:

| Section in CFR 47 | Section in ICES-003 | Name of the test                 | Result |
|-------------------|---------------------|----------------------------------|--------|
| 15.107, a         | 5.3                 | AC powerline conducted emissions | PASSED |
| 15.109, a         | 5.5                 | Radiated emissions               | PASSED |

PASSED

FAILED

NP

The EUT complies with the essential requirements in the standard.

The EUT does not comply with the essential requirements in the standard.

The test was not performed by the TCC Nokia Tampere Laboratory.

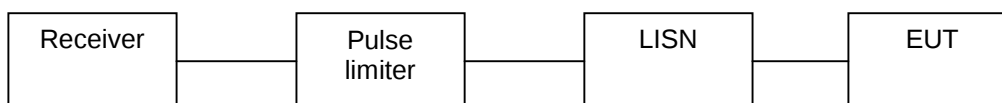
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## 2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

|                                                        |                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-242 DUT 41223                                                                                                                                                                                                                                                    |
| <b>Accessories with DUT numbers</b>                    | AC-3E DUT 40843, BP-5M DUT 41228, AD-56 DUT 41230/ HS-45 DUT 41232, CA-101 DUT 41152, IBM Thinkpad T22 DUT 40201, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, FUJI DS-7 DUT 40076, Serial cable for camera DUT 40088, Parallel cable for printer DUT 40087 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                                                                                                                                                                                                                                            |
| <b>Result</b>                                          | PASSED                                                                                                                                                                                                                                                              |
| <b>Remarks</b>                                         | Continuous data transfer was active between the phone and the computer during the test.                                                                                                                                                                             |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 19 / 52 / 99.2                                                                                                                                                                                                                                                      |
| <b>Date of measurements</b>                            | 3.9.2007                                                                                                                                                                                                                                                            |
| <b>Measured by</b>                                     | Jari Jantunen                                                                                                                                                                                                                                                       |

### 2.1. Test setup



### 2.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$$U [dB\mu V] = U_{RX} + A_{TOT}$$

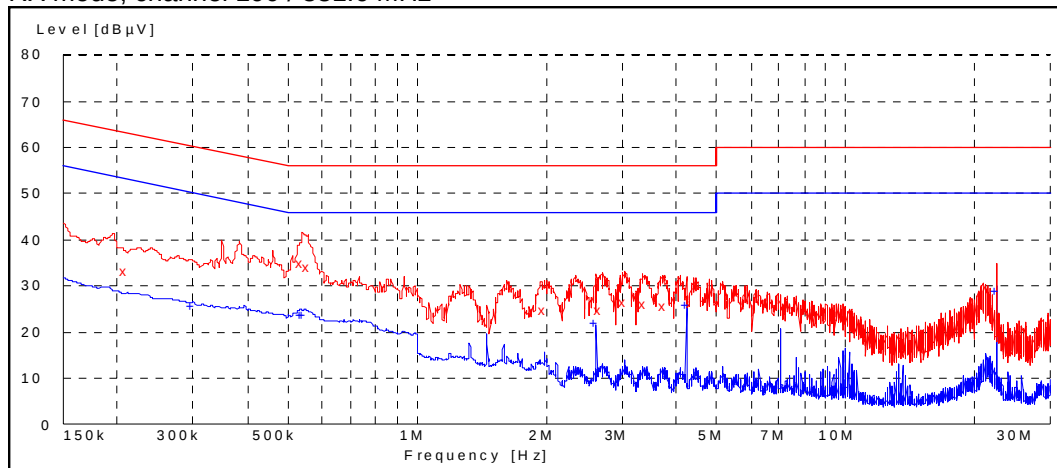
Where  $U_{RX}$  is receiver reading and  $A_{TOT}$  is total correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

| Frequency range [MHz] | Quasi peak limit [dBμV] | Average limit [dBμV] |
|-----------------------|-------------------------|----------------------|
| 0.15 - 0.5            | 66 - 56                 | 56 - 46              |
| 0.5 - 5               | 56                      | 46                   |
| 5 - 30                | 60                      | 50                   |

## 2.3. GSM 850 Test results

RX mode, channel 190 / 881.6 MHz



Quasi peak (RBW: 9 kHz)

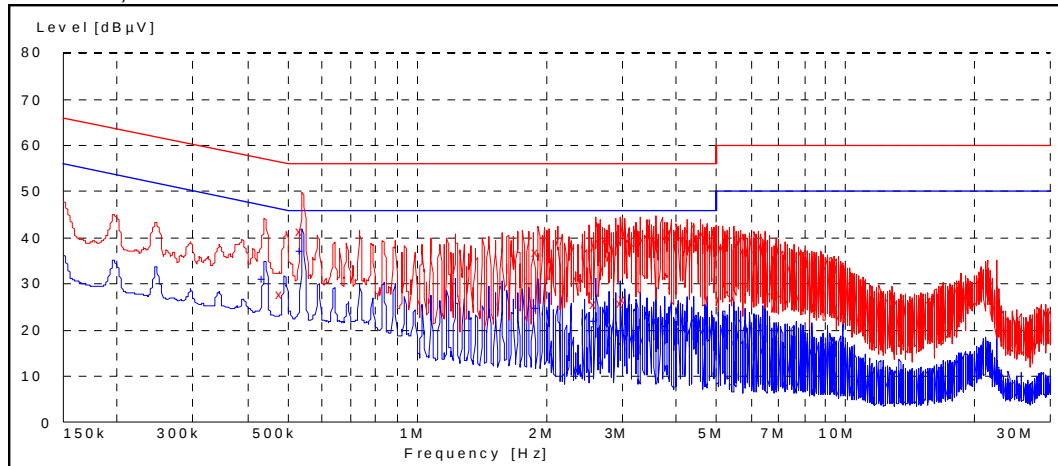
| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.210000        | 33.10    | N    | PASSED |
| 0.540000        | 34.80    | L1   | PASSED |
| 0.555000        | 34.00    | L1   | PASSED |
| 1.990000        | 24.80    | L1   | PASSED |
| 2.670000        | 24.80    | N    | PASSED |
| 3.040000        | 26.40    | L1   | PASSED |
| 3.395000        | 26.00    | L1   | PASSED |
| 3.760000        | 25.60    | L1   | PASSED |

Average (RBW: 9 kHz)

| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.300000        | 25.50    | N    | PASSED |
| 0.540000        | 23.50    | L1   | PASSED |
| 0.545000        | 23.50    | L1   | PASSED |
| 2.625000        | 22.00    | L1   | PASSED |
| 4.240000        | 25.90    | L1   | PASSED |
| 22.500000       | 29.00    | L1   | PASSED |

## 2.4. GSM 1900 Test results

RX mode, channel 661 / 1960.0 MHz



Quasi peak (RBW: 9 kHz)

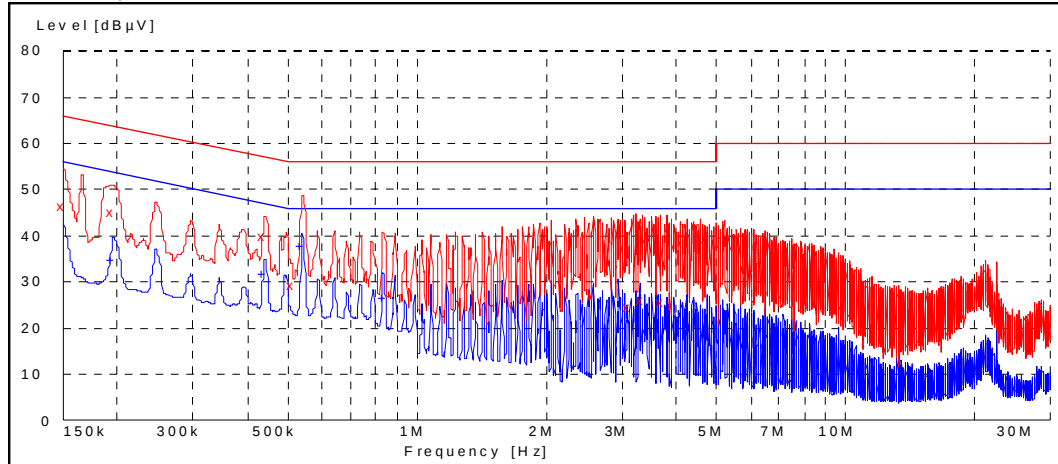
| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.480000        | 27.80    | L1   | PASSED |
| 0.535000        | 41.50    | N    | PASSED |
| 1.925000        | 36.90    | N    | PASSED |
| 2.625000        | 25.50    | N    | PASSED |
| 3.005000        | 25.80    | L1   | PASSED |
| 3.045000        | 26.60    | L1   | PASSED |

Average (RBW: 9 kHz)

| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.440000        | 31.00    | L1   | PASSED |
| 0.540000        | 37.30    | N    | PASSED |
| 1.925000        | 24.70    | N    | PASSED |
| 2.625000        | 21.80    | L1   | PASSED |

## 2.5. Bluetooth Test results

TX mode, channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.150000        | 46.60    | L1   | PASSED |
| 0.195000        | 45.20    | L1   | PASSED |
| 0.440000        | 40.10    | N    | PASSED |
| 0.515000        | 29.20    | L1   | PASSED |
| 3.130000        | 24.40    | L1   | PASSED |
| 3.380000        | 26.10    | L1   | PASSED |
| 3.740000        | 25.60    | L1   | PASSED |

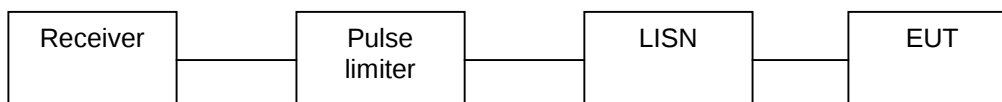
Average (RBW: 9 kHz)

| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.195000        | 34.60    | N    | PASSED |
| 0.440000        | 31.70    | L1   | PASSED |
| 0.540000        | 37.60    | L1   | PASSED |
| 0.835000        | 26.50    | L1   | PASSED |

### 3. AC powerline conducted emissions, FM radio on (FCC §15.107, ICES-003 section 5.3)

|                                                 |                                                                    |
|-------------------------------------------------|--------------------------------------------------------------------|
| EUT with DUT number                             | RM-242 DUT 41223                                                   |
| Accessories with DUT numbers                    | AC-3E DUT 40843, BP-5M DUT 41228, AD-56 DUT 41230/ HS-45 DUT 41232 |
| Operation Voltage [V] / [Hz]                    | 115 / 60                                                           |
| Result                                          | PASSED                                                             |
| Remarks                                         | FM radio on                                                        |
| Temp [°C] / Humidity [%RH] / Air Pressure [kPa] | 19 / 52 / 99.2                                                     |
| Date of measurements                            | 3.9.2007                                                           |
| Measured by                                     | Jari Jantunen                                                      |

#### 3.1. Test setup



#### 3.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$$U [dB\mu V] = U_{RX} + A_{TOT}$$

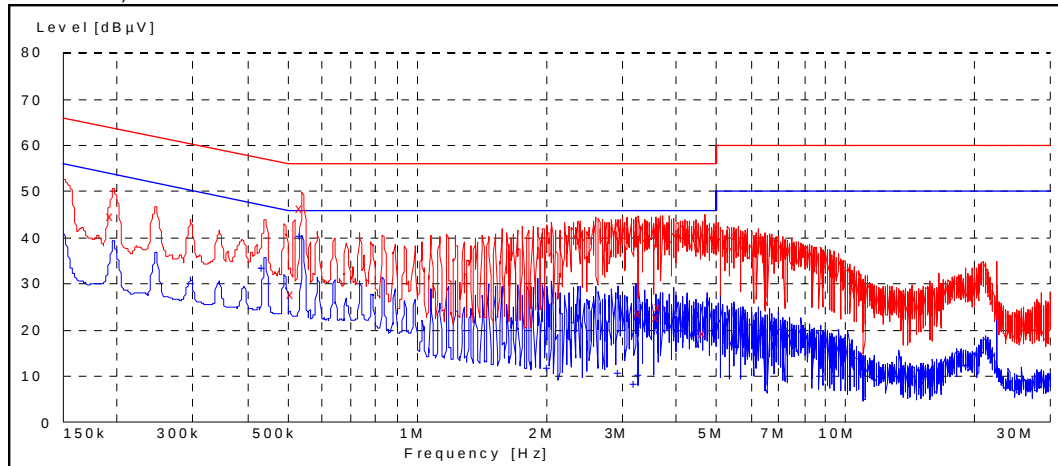
Where  $U_{RX}$  is receiver reading and  $A_{TOT}$  is total correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

| Frequency range [MHz] | Quasi peak limit [dBμV] | Average limit [dBμV] |
|-----------------------|-------------------------|----------------------|
| 0.15 - 0.5            | 66 - 56                 | 56 - 46              |
| 0.5 - 5               | 56                      | 46                   |
| 5 - 30                | 60                      | 50                   |

### 3.3. GSM 850 + FM radio on Test results

RX mode, channel 190 / 881.6 MHz



Quasi peak (RBW: 9 kHz)

| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.195000        | 44.80    | L1   | PASSED |
| 0.515000        | 27.70    | L1   | PASSED |
| 0.540000        | 46.60    | N    | PASSED |
| 3.310000        | 23.60    | L1   | PASSED |
| 3.660000        | 22.80    | L1   | PASSED |
| 3.715000        | 25.10    | L1   | PASSED |
| 4.670000        | 19.30    | L1   | PASSED |

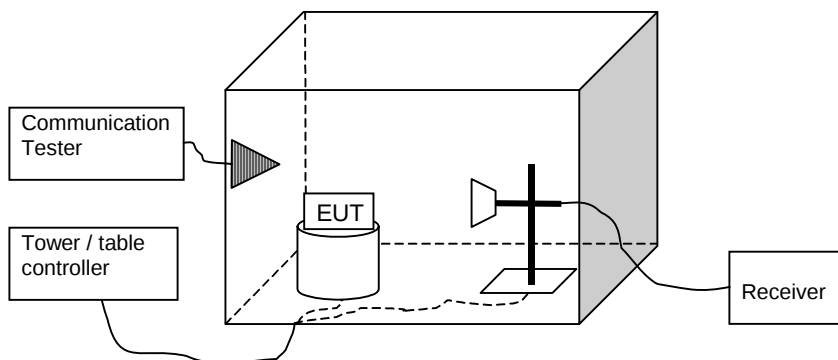
Average (RBW: 9 kHz)

| Frequency [MHz] | U [dBμV] | Line | Result |
|-----------------|----------|------|--------|
| 0.440000        | 33.40    | N    | PASSED |
| 0.540000        | 40.40    | N    | PASSED |
| 2.025000        | 11.60    | L1   | PASSED |
| 2.990000        | 10.70    | L1   | PASSED |
| 3.230000        | 8.40     | L1   | PASSED |
| 3.330000        | 10.30    | L1   | PASSED |

#### 4. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9)

|                                                        |                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-242 DUT 41223                                                                                                                                                                                                                                                    |
| <b>Accessories with DUT numbers</b>                    | AC-3E DUT 40843, BP-5M DUT 41228, AD-56 DUT 41230/ HS-45 DUT 41232, CA-101 DUT 41152, IBM Thinkpad T22 DUT 40201, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, FUJI DS-7 DUT 40076, Serial cable for camera DUT 40088, Parallel cable for printer DUT 40087 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                                                                                                                                                                                                                                            |
| <b>Result</b>                                          | PASSED                                                                                                                                                                                                                                                              |
| <b>Remarks</b>                                         | Continuous data transfer was active between the phone and the computer during the test.                                                                                                                                                                             |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 21-22 / 51-53 / 99.2-99.8                                                                                                                                                                                                                                           |
| <b>Date of measurements</b>                            | 3-4.9.2007                                                                                                                                                                                                                                                          |
| <b>Measured by</b>                                     | Jari Jantunen                                                                                                                                                                                                                                                       |

##### 4.1. Test setup



##### 4.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.  
The measurement results are obtained as described below:

$$E [\mu\text{V/m}] = U_{RX} + A_{TOT}$$

Where  $U_{RX}$  is receiver reading and  $A_{TOT}$  is total correction factor including cable loss, antenna factor and preamplifier gain ( $A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$ ).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

| Frequency range [MHz] | Quasi peak limit [dBμV/m] | Average limit [dBμV/m] | Peak limit [dBμV/m] |
|-----------------------|---------------------------|------------------------|---------------------|
| 30 – 230              | 40                        | -                      | -                   |
| 230 – 1000            | 47                        | -                      | -                   |
| Above 1000            | -                         | 54                     | 74                  |

#### 4.3. GSM 850 Test results

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3476.800000     | 38.70      | 86.10    | 44.00                  | -5.3                  | HORIZONTAL   | PASSED |
| 6953.600000     | 44.20      | 162.18   | 42.70                  | 1.5                   | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3476.800000     | 25.80      | 19.50    | 31.10                  | -5.3                  | HORIZONTAL   | PASSED |
| 6953.600000     | 30.70      | 34.28    | 29.20                  | 1.5                   | HORIZONTAL   | PASSED |

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 120 kHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 348.396994      | 26.50      | 21.13    | 57.80                  | -31.3                 | HORIZONTAL   | PASSED |
| 448.297395      | 28.20      | 25.70    | 57.40                  | -29.2                 | VERTICAL     | PASSED |
| 616.932465      | 32.90      | 44.16    | 58.80                  | -25.9                 | VERTICAL     | PASSED |
| 646.692585      | 31.00      | 35.48    | 56.20                  | -25.2                 | VERTICAL     | PASSED |
| 896.293587      | 35.40      | 58.88    | 57.40                  | -22.0                 | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 1232.966934     | 34.90      | 55.59    | 54.00                  | -19.1                 | VERTICAL     | PASSED |
| 1260.019038     | 36.80      | 69.18    | 55.50                  | -18.7                 | VERTICAL     | PASSED |
| 1297.599198     | 24.60      | 16.98    | 42.50                  | -17.9                 | VERTICAL     | PASSED |
| 1492.487976     | 33.00      | 44.67    | 49.70                  | -16.7                 | VERTICAL     | PASSED |
| 1666.832665     | 29.40      | 29.51    | 44.50                  | -15.1                 | HORIZONTAL   | PASSED |
| 1992.483968     | 38.20      | 81.28    | 50.10                  | -11.9                 | VERTICAL     | PASSED |

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3575.200000     | 39.00      | 89.13    | 43.90                  | -4.9                  | HORIZONTAL   | PASSED |
| 7150.400000     | 42.00      | 125.89   | 39.80                  | 2.2                   | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3575.200000     | 25.90      | 19.72    | 30.80                  | -4.9                  | HORIZONTAL   | PASSED |
| 7150.400000     | 28.80      | 27.54    | 26.60                  | 2.2                   | HORIZONTAL   | PASSED |

#### 4.4. GSM 1900 Test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3860.000000     | 40.10      | 101.16   | 42.90                  | -2.8                  | HORIZONTAL   | PASSED |
| 7720.000000     | 43.40      | 147.91   | 39.90                  | 3.5                   | VERTICAL     | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3860.000000     | 27.30      | 23.17    | 30.10                  | -2.8                  | HORIZONTAL   | PASSED |
| 7720.000000     | 30.00      | 31.62    | 26.50                  | 3.5                   | HORIZONTAL   | PASSED |

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 617.834469      | 31.80      | 38.90    | 57.70                  | -25.9                 | VERTICAL     | PASSED |
| 636.072545      | 31.90      | 39.36    | 57.50                  | -25.6                 | VERTICAL     | PASSED |
| 898.197595      | 34.10      | 50.70    | 56.10                  | -22.0                 | VERTICAL     | PASSED |

Peak (RBW: 1 MHz, VBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 1296.587174     | 54.80      | 549.54   | 73.00                  | -18.2                 | VERTICAL     | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 1166.832665     | 32.20      | 40.74    | 51.60                  | -19.4                 | VERTICAL     | PASSED |
| 1234.466934     | 25.50      | 18.84    | 44.70                  | -19.2                 | VERTICAL     | PASSED |
| 1260.021042     | 36.70      | 68.39    | 55.50                  | -18.8                 | VERTICAL     | PASSED |
| 1295.587174     | 32.20      | 40.74    | 50.40                  | -18.2                 | VERTICAL     | PASSED |
| 1992.483968     | 34.10      | 50.70    | 46.10                  | -12.0                 | VERTICAL     | PASSED |
| 2411.831663     | 28.80      | 27.54    | 37.60                  | -8.8                  | HORIZONTAL   | PASSED |

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3980.000000     | 44.00      | 158.49   | 46.60                  | -2.6                  | VERTICAL     | PASSED |
| 7960.000000     | 43.80      | 154.88   | 39.60                  | 4.2                   | VERTICAL     | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3980.000000     | 28.80      | 27.54    | 31.40                  | -2.6                  | HORIZONTAL   | PASSED |
| 7960.000000     | 30.70      | 34.28    | 26.50                  | 4.2                   | HORIZONTAL   | PASSED |

## 4.5. Bluetooth Test results

TX mode, channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 4804.000000     | 40.80      | 109.65   | 42.60                  | -1.8                  | HORIZONTAL   | PASSED |
| 7206.000000     | 42.40      | 131.83   | 40.00                  | 2.4                   | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 4804.000000     | 27.80      | 24.55    | 29.60                  | -1.8                  | VERTICAL     | PASSED |
| 7206.000000     | 28.90      | 27.86    | 26.50                  | 2.4                   | HORIZONTAL   | PASSED |

TX mode, channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 150.000000      | 22.80      | 13.80    | 48.00                  | -25.2                 | HORIZONTAL   | PASSED |
| 249.398397      | 22.90      | 13.96    | 45.30                  | -22.4                 | HORIZONTAL   | PASSED |

Peak (RBW: 1 MHz, VBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 4883.769539     | 41.60      | 120.23   | 43.30                  | -1.7                  | HORIZONTAL   | PASSED |
| 4955.407816     | 41.00      | 112.20   | 42.10                  | -1.1                  | VERTICAL     | PASSED |
| 7277.553106     | 44.10      | 160.32   | 41.10                  | 3.0                   | VERTICAL     | PASSED |
| 7282.065130     | 42.90      | 139.64   | 39.90                  | 3.0                   | HORIZONTAL   | PASSED |
| 7421.841683     | 43.30      | 146.22   | 39.60                  | 3.7                   | HORIZONTAL   | PASSED |
| 17996.991984    | 55.40      | 588.84   | 33.90                  | 21.5                  | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 4884.269539     | 28.40      | 26.30    | 30.10                  | -1.7                  | HORIZONTAL   | PASSED |
| 4956.407816     | 27.60      | 23.99    | 28.70                  | -1.1                  | VERTICAL     | PASSED |
| 7277.553106     | 30.00      | 31.62    | 27.00                  | 3.0                   | VERTICAL     | PASSED |
| 7283.065130     | 30.20      | 32.36    | 27.20                  | 3.0                   | HORIZONTAL   | PASSED |
| 7416.841683     | 30.40      | 33.11    | 26.70                  | 3.7                   | HORIZONTAL   | PASSED |
| 17992.991984    | 42.50      | 133.35   | 21.00                  | 21.5                  | HORIZONTAL   | PASSED |

TX mode, channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 4960.000000     | 42.30      | 130.32   | 43.40                  | -1.1                  | HORIZONTAL   | PASSED |
| 7440.000000     | 42.60      | 134.90   | 39.10                  | 3.5                   | VERTICAL     | PASSED |

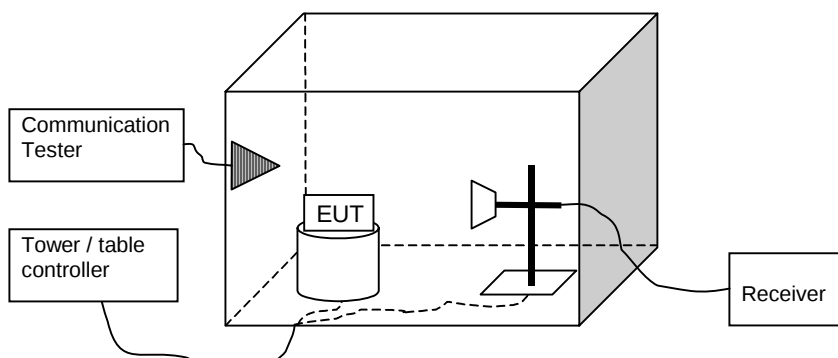
Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 4960.000000     | 29.40      | 29.51    | 30.50                  | -1.1                  | HORIZONTAL   | PASSED |
| 7440.000000     | 30.10      | 31.99    | 26.60                  | 3.5                   | HORIZONTAL   | PASSED |

## 5. Radiated emissions, FM radio on (FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9)

|                                                        |                                                                    |
|--------------------------------------------------------|--------------------------------------------------------------------|
| <b>EUT with DUT number</b>                             | RM-242 DUT 41223                                                   |
| <b>Accessories with DUT numbers</b>                    | AC-3E DUT 40843, BP-5M DUT 41228, AD-56 DUT 41230/ HS-45 DUT 41232 |
| <b>Operation Voltage [V] / [Hz]</b>                    | 115 / 60                                                           |
| <b>Result</b>                                          | PASSED                                                             |
| <b>Remarks</b>                                         | FM radio on                                                        |
| <b>Temp [°C] / Humidity [%RH] / Air Pressure [kPa]</b> | 21 / 53 / 99.8                                                     |
| <b>Date of measurements</b>                            | 4.9.2007                                                           |
| <b>Measured by</b>                                     | Jari Jantunen                                                      |

### 5.1. Test setup



### 5.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$$E [\mu V/m] = U_{RX} + A_{TOT}$$

Where  $U_{RX}$  is receiver reading and  $A_{TOT}$  is total correction factor including cable loss, antenna factor and preamplifier gain ( $A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$ ).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

| Frequency range [MHz] | Quasi peak limit [dBμV/m] | Average limit [dBμV/m] | Peak limit [dBμV/m] |
|-----------------------|---------------------------|------------------------|---------------------|
| 30 – 230              | 40                        | -                      | -                   |
| 230 – 1000            | 47                        | -                      | -                   |
| Above 1000            | -                         | 54                     | 74                  |

### 5.3. GSM 850 +FM radio

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3476.800000     | 38.70      | 86.10    | 44.00                  | -5.3                  | HORIZONTAL   | PASSED |
| 6953.600000     | 44.20      | 162.18   | 42.70                  | 1.5                   | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3476.800000     | 25.80      | 19.50    | 31.10                  | -5.3                  | HORIZONTAL   | PASSED |
| 6953.600000     | 30.70      | 34.28    | 29.20                  | 1.5                   | HORIZONTAL   | PASSED |

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 120 kHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 34.990581       | 30.40      | 33.11    | 58.30                  | -27.9                 | VERTICAL     | PASSED |
| 85.370140       | 20.90      | 11.09    | 57.50                  | -36.6                 | VERTICAL     | PASSED |
| 102.365731      | 18.50      | 8.41     | 53.70                  | -35.2                 | VERTICAL     | PASSED |
| 119.380361      | 6.70       | 2.16     | 40.50                  | -33.8                 | VERTICAL     | PASSED |
| 180.861924      | 34.40      | 52.48    | 70.60                  | -36.2                 | HORIZONTAL   | PASSED |
| 876.053507      | 44.00      | 158.49   | 66.40                  | -22.4                 | VERTICAL     | PASSED |

Peak (RBW: 1 MHz, VBW: 1 MHz)

| Frequency [MHz] | E [dBμV/m] | E [μV/m] | U <sub>RX</sub> [dBμV] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------|----------|------------------------|-----------------------|--------------|--------|
| 3527.554108     | 38.90      | 88.10    | 44.00                  | -5.1                  | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dB $\mu$ V/m] | E [ $\mu$ V/m] | U <sub>RX</sub> [dB $\mu$ V] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------------|----------------|------------------------------|-----------------------|--------------|--------|
| 1438.375752     | 22.80            | 13.80          | 39.80                        | -17.0                 | HORIZONTAL   | PASSED |
| 1496.989980     | 22.90            | 13.96          | 39.80                        | -16.9                 | HORIZONTAL   | PASSED |
| 2431.363727     | 28.80            | 27.54          | 37.40                        | -8.6                  | HORIZONTAL   | PASSED |
| 2993.489980     | 32.30            | 41.21          | 36.50                        | -4.2                  | HORIZONTAL   | PASSED |
| 3531.054108     | 25.70            | 19.28          | 30.70                        | -5.0                  | HORIZONTAL   | PASSED |

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz)

| Frequency [MHz] | E [dB $\mu$ V/m] | E [ $\mu$ V/m] | U <sub>RX</sub> [dB $\mu$ V] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------------|----------------|------------------------------|-----------------------|--------------|--------|
| 3575.200000     | 39.00            | 89.13          | 43.90                        | -4.9                  | HORIZONTAL   | PASSED |
| 7150.400000     | 42.00            | 125.89         | 39.80                        | 2.2                   | HORIZONTAL   | PASSED |

Average (RBW: 1 MHz)

| Frequency [MHz] | E [dB $\mu$ V/m] | E [ $\mu$ V/m] | U <sub>RX</sub> [dB $\mu$ V] | A <sub>TOT</sub> [dB] | Polarisation | Result |
|-----------------|------------------|----------------|------------------------------|-----------------------|--------------|--------|
| 3575.200000     | 25.90            | 19.72          | 30.80                        | -4.9                  | HORIZONTAL   | PASSED |
| 7150.400000     | 28.80            | 27.54          | 26.60                        | 2.2                   | HORIZONTAL   | PASSED |

## 6. Test Equipment

### 6.1. Conducted measurements

| Eq. No  | Equipment                  | Type      | Manufacturer    | Used in    |
|---------|----------------------------|-----------|-----------------|------------|
| TM37610 | Spectrum analyzer          | FSU       | R&S             | 22/24, 15C |
| TM37678 | Radio communication tester | CMU-200   | R&S             | 22/24, 15C |
|         | Attenuator 10 dB           | 6251.17.A | Huber+Suhner AG | 22/24, 15C |
| TM37499 | Power splitter             | 11667A    | Agilent         | 22/24, 15C |
|         | Temperature chamber        | VT4002    | Vötsch          | 22/24, 15C |
| TM38112 | DC power supply            | 6632A     | Agilent         | 22/24, 15C |
| TM38111 | Multimeter                 | 34401A    | Agilent         | 22/24, 15C |
|         | EMI Test receiver          | ESPC      | R&S             | 15C, 15B   |
| TM37773 | Radio communication tester | CMU-200   | R&S             | 15C, 15B   |
| TM38631 | Signal generator           | 83640L    | Agilent         | 15C, 15B   |
| TM38114 | DC power supply            | 6632A     | Agilent         | 15C, 15B   |
| TM22835 | Multimeter                 | 87        | Fluke           | 15C, 15B   |
| TM30600 | Pulse Limiter              | ESH3-Z2   | R&S             | 15C, 15B   |
| TM26490 | LISN 50 µH                 | ESH3-Z5/  | R&S             | 15C, 15B   |
| TM30636 | LISN 50 µH                 | L2-16/    | PMM             | 15C, 15B   |

### 6.2. Radiated measurements

| Eq. No  | Equipment                       | Type                          | Manufacturer | Used in         |
|---------|---------------------------------|-------------------------------|--------------|-----------------|
| TM30599 | 3m semi-anechoic chamber        |                               | TDK          | 22/24, 15C, 15B |
| TM38845 | EMI receiver                    | ESI 40                        | R&S          | 22/24, 15C, 15B |
| TM37498 | Preamplifier                    | AMF-5D-020180-26-10P          | MITEQ        | 22/24, 15C, 15B |
| TM37523 | Preamplifier                    | AMF-4D-10M-3G-25-20P          | MITEQ        | 22/24, 15C, 15B |
| TM37516 | Biconilog antenna               | HL562                         | R&S          | 22/24, 15C, 15B |
| TM26496 | Double ridged waveguide antenna | 3115                          | EMCO         | 22/24, 15C, 15B |
| TM39158 | Horn antenna                    | 3116                          | EMCO         | 22/24, 15C, 15B |
| TM26492 | Reference dipole set            | UHAP/VHAP                     | Schwarzbeck  | 22/24, 15C, 15B |
| TM37501 | Dipole antenna                  | 3125-870                      | EMCO         | 22/24           |
| TM37502 | Dipole antenna                  | 3125-1880                     | EMCO         | 22/24           |
| TM37773 | Radio communication tester      | CMU-200                       | R&S          | 22/24, 15C, 15B |
| TM38631 | Signal generator                | 83640L                        | Agilent      | 22/24, 15C, 15B |
| TM38066 | High pass filter                | 4HC3000/18000-3-KK            | Trilithic    | 22/24, 15C, 15B |
|         | High pass filter                | WHK2010-10SS                  | Trilithic    | 22/24, 15C, 15B |
|         | Low pass filter                 | WLK1750-10SS                  | Trilithic    | 22/24, 15C, 15B |
| TM26511 | Tunable notch filter            | WRCA870                       | Wainwright   | 22/24           |
| TM38215 | Tunable notch filter            | WRCD1850/1910-0.2/40          | Wainwright   | 22/24           |
| TM38214 | Band reject filter              | WRCT 2402/2480-2400/2483.5-30 | Wainwright   | 15C             |
| TM30642 | Turntable controller            | HD-100                        | Deisel       | 22/24, 15C, 15B |
| TM26500 | Turntable                       | DS412                         | Deisel       | 22/24, 15C, 15B |
| TM38842 | Antenna mast controller         | 2090                          | EMCO         | 22/24, 15C, 15B |
| TM38843 | Antenna mast                    | 2075                          | EMCO         | 22/24, 15C, 15B |
| TM38114 | DC power supply                 | 6632A                         | Agilent      | 22/24, 15C, 15B |
| TM22835 | Multimeter                      | 87                            | Fluke        | 22/24, 15C, 15B |