



**ELECTRONIC TECHNOLOGY SYSTEMS  
DR. GENZ GMBH**

# **FCC - TEST - REPORT**

**FCC RULES PARTS 22 and 24**

**FCC ID: QIXTANGO56I**

**Test report no.:**

**G0M20506-9605-P-2224**



**Certificate 1983-01**

## TABLE OF CONTENTS

|           |                                                                  |
|-----------|------------------------------------------------------------------|
| <b>1</b>  | <b>General information</b>                                       |
| 1.1       | Notes                                                            |
| 1.2       | Testing laboratory                                               |
| 1.3       | Details of approval holder                                       |
| 1.4       | Application details                                              |
| 1.5       | Test item                                                        |
| 1.6       | Test standards                                                   |
| <b>2</b>  | <b>Technical test</b>                                            |
| 2.1       | Summary of test results                                          |
| 2.2       | Test environment                                                 |
| 2.3       | Test equipment utilized                                          |
| 2.4       | General Test Procedure                                           |
| <b>3</b>  | <b>Test Results</b>                                              |
| <b>4</b>  | <b>RF Power Output, FCC 2.1046</b>                               |
| 4.1       | Test Procedure                                                   |
| 4.2       | Test Results                                                     |
| <b>5</b>  | <b>Radiated Power FCC 22.913, FCC 24.232</b>                     |
| 5.1       | Test Procedure                                                   |
| 5.2       | Test Results                                                     |
| <b>6</b>  | <b>Modulation Deviation Limiting, FCC 2.1047, 22.915(b)(c)</b>   |
| 6.1       | Test Procedure                                                   |
| 6.2       | Test Results                                                     |
| <b>7</b>  | <b>Audio Filter Characteristics, FCC 22.915(d)</b>               |
| 7.1       | Test Procedure                                                   |
| 7.2       | Test Results                                                     |
| <b>8</b>  | <b>Emission Limitations, , FCC 2.1049</b>                        |
| 8.1       | Test Procedure                                                   |
| 8.2       | Test Results                                                     |
| <b>9</b>  | <b>Occupied Bandwidth FCC 22.917(b)(d); FCC 2.1049</b>           |
| 9.1       | Test Procedure                                                   |
| 9.2       | Test Results                                                     |
| <b>10</b> | <b>Out of Band Emissions at Antenna Terminals, FCC 24.238(a)</b> |
| 10.1      | Test Procedure                                                   |
| 10.2      | Test results                                                     |
| <b>11</b> | <b>Field Strength of Spurious Radiation, FCC 2.1053, 24.236</b>  |
| 11.1      | Test Procedure                                                   |
| 11.2      | Test Results                                                     |

**12 Line Conducted Emissions, FCC 15.207**

12.1 Test Procedure

12.2 Test Results

**13 Frequency Stability vs Temperature, FCC 2.1055, 22.355, 24. 235**

13.1 Test Procedure

13.2 Test Equipment

**14 Frequency Stability vs Voltage, FCC 2.1055, 22.355, 24.235**

14.1 Test Procedure

14.2 Test Equipment

## 1 General Information

### 1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

The test report may only be reproduced or published in full.

Reproduction or publication of extracts from the report requires the prior written approval of the ELECTRONIC TECHNOLOGY SYSTEMS DR. GENZ GMBH.

### Tester:

18.08.2005

M. Handrik

i.s. 

Date

ETS-Lab.

Name

Signature

### Technical responsibility for area of testing:

18.08.2005

N. Kaspar



Date

ETS

Name

Signature

## 1.2 Testing laboratory

### 1.2.1 Location

ELECTRONIC TECHNOLOGY SYSTEM DR. GENZ GMBH (ETS)

Storkower Straße 38c

D-15526 Reichenwalde b. Berlin

Germany

Telephone : +49 33631 888 00

Telefax : +49 33631 888 66

### 1.2.2 Details of accreditation status

**ACCREDITED TESTING LABORATORY**

**DAR-REGISTRATION NUMBER:** TTI-P-G 126/96

**ACCREDITED COMPETENT BODY**

**DAR-REGISTRATION NUMBER:** BPT-ZE-026/96

**FCC FILED TEST LABORATORY** REG. No. 96970

**BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)**

ACCREDITED BY: BLUETOOTH QUALIFICATION REVIEW BOARD (BQRF)

**INDUSTRY CANADA FILED TEST LABORATORY** REG. No. IC 3470

**A2LA ACCREDITED** Certificate Number: 1983-01

## 1.3 Details of approval holder

|           |                       |
|-----------|-----------------------|
| Name      | : FALCOM GmbH         |
| Street    | : Gewerbering 6       |
| Town      | : 98704 Langewiesen   |
| Country   | : Germany             |
| Telephone | : +49(0)3677 8042-0   |
| Fax       | : +49(0)3677 8042-215 |

|         |                      |
|---------|----------------------|
| Contact | : Herr Ralf Leipoldt |
| E-Mail  | : ceo@falcom.de      |

## 1.4 Application details

Date of receipt of application : 27.06.2005  
Date of receipt of test item : 27.06.2005  
Date of test : 08.07.2005 – 11.07.2005

## 1.5 Test item

Description of test item : Embedded GSM Module  
Type identification : Tango 56i  
Serial number : Test model without serial number.  
Photos : See annex A.

### Technical data

Frequency range Tx – GSM 850 : 824.2 – 848.80 MHz  
Frequency range Tx – PCS : 1850.2 – 1909.8 MHz  
Frequency range Rx - GSM 850 : 869.2 – 893.8 MHz  
Frequency range Rx - PCS : 1930.2 – 1989.8 MHz  
Antenna transmitter : external antenna  
Antenna Gain : 1 dBi (max)  
Power supply : 12 V DC  
Operating mode : duplex  
Type of modulation : GMSK (GSM modulation)  
Emission : GXW

### Manufacturer: (if applicable)

Name :  
Street :  
Town :  
Country :

## 1.6 Test standards

Technical standard : FCC Parts 22, 24, 2, 15

Additional information : Because of using the GSM 850 as an alternative technology in 850 MHz band, not all test cases of FCC Part 22 are required. This device contains 900 MHz GSM and 1800 MHz DCS functions that are not operational in U.S. Territories. This filing is only applicable for 1900 MHz PCS operations

## 2 Technical test

### 2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified in 2.5 were ascertained in the course of the tests performed.



### 2.2 Test environment

Temperature : 23 °C

Relative humidity content : 20 ... 75 %

Air pressure : 86 ... 103 kPa

## 2.3 Test equipment utilized

| No.      | Test equipment                | Type                 | Manufacturer     |
|----------|-------------------------------|----------------------|------------------|
| ETS 0001 | ESD Gun                       | SESD 30000           | Schlöder         |
| ETS 0002 | Test receiver                 | ESVP                 | Rohde & Schwarz  |
| ETS 0003 | Diode power sensor            | NRV-Z2               | Rohde & Schwarz  |
| ETS 0004 | Spectrum and network analyzer | FSMS 26              | Rohde & Schwarz  |
| ETS 0005 | Test receiver                 | SMV 11               | MEB              |
| ETS 0006 | Test receiver system          | SME 12               | MEB              |
| ETS 0007 | Horn antenna                  | AT 4004              | ar               |
| ETS 0008 | Antenna                       | Loop antenna         | Siemens          |
| ETS 0009 | Antenna                       | ARA 2                | MEB              |
| ETS 0010 | Antenna                       | Loop antenna         | MEB              |
| ETS 0011 | Antenna                       | van Veen/ Frame      | Rohde & Schwarz  |
| ETS 0012 | Antenna                       | HK 116               | Rohde & Schwarz  |
| ETS 0013 | Antenna                       | HL 223               | Rohde & Schwarz  |
| ETS 0014 | Antenna                       | HL 025               | Rohde & Schwarz  |
| ETS 0015 | Antenna                       | HL 025               | Rohde & Schwarz  |
| ETS 0016 | Precision antenna kit         | VHAP                 | Schwarzbeck      |
| ETS 0017 | Precision antenna kit         | UHAP                 | Schwarzbeck      |
| ETS 0018 | Horn antenna                  | BBHA 9120 D          | Schwarzbeck      |
| ETS 0019 | Horn antenna                  | BBHA 9120 D          | Schwarzbeck      |
| ETS 0020 | Antenna                       | DP 21                | MEB              |
| ETS 0021 | Antenna                       | DP 3                 | MEB              |
| ETS 0022 | Antenna                       | SAS-200/ 521         | A.H. Systeme+D65 |
| ETS 0023 | Antenna                       | DP 1                 | MEB              |
| ETS 0024 | Antenna mast                  | AF 2                 | MEB              |
| ETS 0025 | Antenna mast                  | AF 2                 | MEB              |
| ETS 0026 | Tripod                        |                      | Heinrich Deisel  |
| ETS 0027 | Tripod                        |                      | Heinrich Deisel  |
| ETS 0028 | Tripod                        | STA 2                | C. Lorenz AG     |
| ETS 0029 | Tripod                        |                      | Berlebach        |
| ETS 0030 | Antenna                       | HK 116               | Rohde & Schwarz  |
| ETS 0031 | Turn table                    | DS 412               | Heinrich Deisel  |
| ETS 0032 | Controller                    | HD 050               | Heinrich Deisel  |
| ETS 0033 | Calibration Set CDN           | 3xAdapter 50-150 Ohm | ETS              |
| ETS 0034 | RF generator/ Amplifier       | SMLR                 | Rohde & Schwarz  |

| No.      | Test equipment               | Type            | Manufacturer        |
|----------|------------------------------|-----------------|---------------------|
| ETS 0035 | RF generator/ Amplifier      | SMLM            | Rohde & Schwarz     |
| ETS 0036 | Zirc. Antenna                | 3102            | EMCO                |
| ETS 0037 | Zirc. Antenna                | 3102L           | EMCO                |
| ETS 0038 | RF amplifier                 | 150L            | Amplifier Research  |
| ETS 0039 | Absorbing clamp              | MDS 21          | Rohde & Schwarz     |
| ETS 0040 | Artificial mains Network     | ESH3-Z5         | Rohde & Schwarz     |
| ETS 0041 | Artificial mains             | ESH3-Z4         | Rohde & Schwarz     |
| ETS 0042 | Artificial mains             | ESH3-Z6         | Rohde & Schwarz     |
| ETS 0043 | Directional coupler          | 1850            | KRYTAR              |
| ETS 0044 | Artificial mains             | NNB 111         | MEB                 |
| ETS 0045 | Stripe line                  | IEC 801-3       | ETS                 |
| ETS 0046 | Power supply                 | LTS 006         | RFT                 |
| ETS 0047 | Power supply                 | TG 20/ 1        | Statron             |
| ETS 0048 | Power supply                 | TG 20/ 1        | Statron             |
| ETS 0049 | Power supply                 | T 102           | TPW                 |
| ETS 0050 | Power supply                 | T 101b          | TPW                 |
| ETS 0051 | Oscilloscope                 | TDS 640A        | Tektronix           |
| ETS 0052 | Attenuator                   | 776B-10         | Narda               |
| ETS 0053 | ECAT Control center          | CE 40           | Keytek/ EMV         |
| ETS 0054 | EFT simulator                | E 412           | Keytek/ EMV         |
| ETS 0055 | Module network coupler       | E 4551          | Keytek/ EMV         |
| ETS 0056 | Blank plug-in                |                 | Keytek/ EMV         |
| ETS 0057 | Module SURGE with DC coupler | E 501           | Keytek/ EMV         |
| ETS 0058 | Capacitive coupling clamp    | E 502 B         | Keytek/ EMV         |
| ETS 0059 | Kikusui amplifier            | PCR 2000L       | Keytek/ EMV         |
| ETS 0060 | Xitron power analyzer        |                 | Keytek/ EMV         |
| ETS 0061 | Power/ Arb (Harm., Ramp)     |                 | Keytek/ EMV         |
| ETS 0062 | Reference impedance          |                 | Keytek/ EMV         |
| ETS 0063 | Blank plug-in                |                 | Keytek/ EMV         |
| ETS 0064 | CDN IEC 1000-4-6             |                 | Keytek/ EMV         |
| ETS 0065 | ESD-generator minizap        |                 | Keytek/ EMV         |
| ETS 0066 | EM Injection Clamp           |                 | FCC/ EMV            |
| ETS 0067 | Calibration Fixture          | IEC 801-2031 CF | FCC/ EMV            |
| ETS 0068 | CDN IEC 1000-4-6             | CDN             | FCC/ EMV            |
| ETS 0069 | EM Radiation Monitor         | EMR-20          | Wandel & Goltermann |

| No.      | Test equipment                   | Type           | Manufacturer              |
|----------|----------------------------------|----------------|---------------------------|
| ETS 0070 | PC Transfer set EMR-20           | EMR-20         | Wandel & Goltermann       |
| ETS 0071 | Video camera system              | KMB012         | Kocom                     |
| ETS 0072 | Interphone system                | JS-1400        | Jiuh Sheng                |
| ETS 0073 | Audio noise meter                | GSM 2          | MKD/ RFT                  |
| ETS 0074 | RF Millivoltmeter                | QRV 2          | MKD/ RFT                  |
| ETS 0075 | NF generator                     | GF 22          | Präcitronic               |
| ETS 0076 | Feeding bridge A                 | SBA 1000       | ESP                       |
| ETS 0078 | LCR meter                        | SR 720         | SRS                       |
| ETS 0079 | Functional generator             | MX-2020        | Maxcom                    |
| ETS 0080 | EMI Software                     | ES-K1          | Rohde & Schwarz           |
| ETS 0081 | EMI Software                     | ES-K10         | Rohde & Schwarz           |
| ETS 0082 | PC system                        | Novell         | Esotronic                 |
| ETS 0083 | Apple computer system            | Performa 630   | Macintosh                 |
| ETS 0084 | Process controller               | PSA 15         | Rohde & Schwarz           |
| ETS 0085 | Shielded room                    | SR 1           | Frankonia                 |
| ETS 0086 | Anechoic chamber                 | AC 1           | Frankonia                 |
| ETS 0087 | Climatic cell                    | HC 4033        | Heraeus                   |
| ETS 0088 | Color TV pattern generator       | PM 5518-TX VPS | Philips                   |
| ETS 0089 | Radio communication tester       | CMS 54         | Rohde & Schwarz           |
| ETS 0090 | DECT type approval CTR06         | TS 8930        | Rohde & Schwarz           |
| ETS 0091 | RF signal generator              | SME 03         | Rohde & Schwarz           |
| ETS 0092 | Power amplifier                  | 150W1000       | AR Amplifier Research     |
| ETS 0093 | Attenuator                       | 57-20-33       | Weinschel                 |
| ETS 0094 | Power sensor                     | NRV-Z55        | Rohde & Schwarz           |
| ETS 0095 | DECT system controller           | PSMD           | Rohde & Schwarz           |
| ETS 0096 | DECT Signaling unit              | PSMD-B11       | Rohde & Schwarz           |
| ETS 0097 | Rack, 19", 36 HU                 | TS 89RA        | Rohde & Schwarz           |
| ETS 0098 | System engineering and software  | CS 893BE       | Rohde & Schwarz           |
| ETS 0099 | Extension unit for basic version | TS 8930B       | Rohde & Schwarz           |
| ETS 0100 | RF signal generator              | SME-06         | Rohde & Schwarz           |
| ETS 0101 | Power amplifier                  | 50W1000B       | AR Amplifier Research     |
| ETS 0102 | CDN                              | M3-801/6       | MEB                       |
| ETS 0103 | Magnetic field test set          | MF1000         | EMC Partner               |
| ETS 0105 | High power synthesizer/ sweeper  | SMP 22 / 02    | Rohde & Schwarz           |
| ETS 0106 | Antenna                          | VAMP 9443      | Schwarzbeck Meßelektronik |

| No.      | Test equipment                        | Type          | Manufacturer    |
|----------|---------------------------------------|---------------|-----------------|
| ETS 0108 | DECT protocol tester TBR 22           | TS 1220       | Rohde & Schwarz |
| ETS 0109 | Process controller                    | PSM 2         | Rohde & Schwarz |
| ETS 0110 | Real time signaling unit              | PSMD-B2       | Rohde & Schwarz |
| ETS 0111 | PCM Real-time audio interface for PSM | PSMD-B3       | Rohde & Schwarz |
| ETS 0112 | Synthesizer Module                    | PSMD-B4       | Rohde & Schwarz |
| ETS 0113 | Keyboard                              | PSA-Z2        | Rohde & Schwarz |
| ETS 0114 | RF step attenuator                    | RSG           | Rohde & Schwarz |
| ETS 0115 | Glide path                            |               | Rohde & Schwarz |
| ETS 0116 | Protocol Tester                       | PTW 70        | Rohde & Schwarz |
| ETS 0117 | Insertion unit                        | URV-Z2        | Rohde & Schwarz |
| ETS 0118 | Mixer                                 | MFC 1000      | Avcom           |
| ETS 0119 | Mixer                                 | MFC 2000      | Avcom           |
| ETS 0120 | RF step attenuator                    | TRI-50-20     | INCO            |
| ETS 0121 | Oscilloscope                          | EO 147A       | Serute          |
| ETS 0122 | Oscilloscope                          | 5201          | Dagatron        |
| ETS 0123 | RF step attenuator                    | RBU           | Rohde & Schwarz |
| ETS 0124 | Tripod                                | STA 2         | Rohde & Schwarz |
| ETS 0125 | Small components                      |               |                 |
| ETS 0126 | Uninterruptible power supply          | UPS - 1500    | Sendon          |
| ETS 0127 | Uninterruptible power supply          | UPS - 1000 LC | Sendon          |
| ETS 0128 | Uninterruptible power supply          | UPS - 1000    | Sendon          |
| ETS 0129 | Uninterruptible power supply          | UPS - 500     | Sendon          |
| ETS 0130 | Uninterruptible power supply          | Power saver   | Sendon          |
| ETS 0131 | Telephone connection box              |               | Systel          |
| ETS 0132 | Frequency doubler                     | TR-0616       | EMG             |
| ETS 0133 | Probe body                            | P6015         | Tektronix       |
| ETS 0135 | Measuring switching point             | AK 11         | RFT             |
| ETS 0136 | Attenuator                            | 33-6-34       | Weinschel       |
| ETS 0137 | Multimeter                            | YX-360TRA     | Mastech         |
| ETS 0138 | Multimeter                            | DT-9410       | Diditec         |
| ETS 0139 | Multimeter                            | ST-9202       | Standard        |
| ETS 0140 | High voltage generator                | IP 6Wa        | TPW             |
| ETS 0141 | Sliding bridge                        | J 573         | RFT             |
| ETS 0142 | Impedance converter                   | TK 11         | RFT             |
| ETS 0143 | Impedance converter                   | TK 12         | RFT             |

| No.      | Test equipment                         | Type           | Manufacturer    |
|----------|----------------------------------------|----------------|-----------------|
| ETS 0146 | Active RF probe                        | ESH2-Z2        | Rohde & Schwarz |
| ETS 0147 | Probe                                  | TK 103         | MEB             |
| ETS 0148 | RF Current Probe                       | F-65           | FCC             |
| ETS 0149 | Power divider                          | ZAPD-21        | MCL             |
| ETS 0150 | Switcher                               | HR07-720       | Wisi            |
| ETS 0151 | Interference pulse generator           | NSG 500C       | Schaffner       |
| ETS 0152 | Simulator for load-dump Impulse        | NSG 506C (I)   | Schaffner       |
| ETS 0153 | Simulator for load-dump Impulse        | NSG 506C (I)   | Schaffner       |
| ETS 0155 | Signal generator                       | SMG            | Rohde & Schwarz |
| ETS 0156 | Adjacent channel power meter           | NKS            | Rohde & Schwarz |
| ETS 0157 | TV and Sat-Signal generator            | VTG 700        | Grundig         |
| ETS 0158 | TV and Sat Signal generator            | VTG 700        | Grundig         |
| ETS 0159 | Programmable power supply              | TOE 8815       | Toellner        |
| ETS 0160 | Protective wire and isolation tester   | PI 6001 D      | SPS electronic  |
| ETS 0161 | Harmonic / Flicker Analyzer            | HFA 3000       | Schlöder        |
| ETS 0162 | Acoustic chamber                       | 403-A          | IAC             |
| ETS 0163 | Test head                              | BK 4602        | Brüel & Kjær    |
| ETS 0164 | Simulator ear                          | BK 4185        | Brüel & Kjær    |
| ETS 0165 | Simulator mouth                        | BK 4227        | Brüel & Kjær    |
| ETS 0166 | Acoustic calibrator                    | BK 4231        | Brüel & Kjær    |
| ETS 0167 | Communication Analysis System          | CAS TE I       | HEAD acoustics  |
| ETS 0168 | Acoustical test for DECT               | CTR 10         | HEAD acoustics  |
| ETS 0169 | Measurement - Front-end (analogue)     | MFE III        | HEAD acoustics  |
| ETS 0170 | Measurement - Front-end (digital)      | MFE IV         | HEAD acoustics  |
| ETS 0171 | Electronic test cradle                 | TEH            | HEAD acoustics  |
| ETS 0172 | Noise generator                        | HNG III.1      | HEAD acoustics  |
| ETS 0173 | Speaker                                | Canton S Pluss | HEAD acoustics  |
| ETS 0174 | Measurement - Front-end line interface | MFE V          | HEAD acoustics  |
| ETS 0175 | Software line interface (analogue)     | COPTZV5        | HEAD acoustics  |
| ETS 0176 | Acoustic volt meter                    | COP 4          | HEAD acoustics  |
| ETS 0177 | Feeding bridge B                       | SBB 1000       | ESP             |
| ETS 0178 | Open area test side                    | 10m            | ETS             |
| ETS 0179 | Open area test side                    | 3m             | ETS             |
| ETS 0180 | Artificial mains                       | NNB01/RFZ      | RFZ             |

| No.      | Test equipment                    | Type      | Manufacturer    |
|----------|-----------------------------------|-----------|-----------------|
| ETS 0181 | Test pin for protective wire      | PE 156-i  | SPS electronic  |
| ETS 0182 | Power supply                      | MX-9300   | Maxcom          |
| ETS 0183 | Frequency counter                 | MX-9300   | Maxcom          |
| ETS 0184 | Function generator                | MX-9300   | Maxcom          |
| ETS 0185 | Digital multimeter                | MX-9300   | Maxcom          |
| ETS 0186 | Power supply                      | DF 1730   | WJG             |
| ETS 0187 | Power supply                      |           | TPW/RFT         |
| ETS 0188 | High voltage generator            |           |                 |
| ETS 0189 | Spectrum analyzer                 | FSEB      | Rohde & Schwarz |
| ETS 0190 | Function generator                | MX 2020   | Maxcom          |
| ETS 0191 | Sweep function generator          | 7202      | Dagatron        |
| ETS 0192 | Audio generator                   | 7101      | Dagatron        |
| ETS 0193 | Vibration table                   | N1-201-M  | Sandbox         |
| ETS 0194 | Digital multimeter                | PMM 208   | Dagatron        |
| ETS 0195 | Thermo hygro recorder             |           | Amarell         |
| ETS 0196 | Digital thermometer               | AK-688    | KD              |
| ETS 0197 | Digital thermometer               |           | Prima           |
| ETS 0198 | Digital thermometer               | ad 170th  | ama-digit       |
| ETS 0199 | Digital thermometer               | ad 31th   | ama-digit       |
| ETS 0200 | Digital thermometer / hygro meter | ad 90h    | ama-digit       |
| ETS 0201 | Digital thermometer / hygro meter | 37950-10  | Cole Parmer     |
| ETS 0202 | Digital thermometer               | ad 15th   | ama-digit       |
| ETS 0204 | Digital thermometer               | ad 20th   | ama-digit       |
| ETS 0205 | High voltage test generator       | HA 3300 D | SPS electronic  |
| ETS 0206 | High voltage test accessories     | HVGZ 312  | SPS electronic  |
| ETS 0207 | Socket outlet torque balance      | F 37.13   | PTL             |
| ETS 0208 | Unjointed Finger probe            | P 10.05   | PTL             |
| ETS 0209 | Flexible Finger probe             | P 10.01   | PTL             |
| ETS 0210 | Spring operated impact hammer     | P 22.50   | PTL             |
| ETS 0211 | Metallic ball                     | F 53.32   | PTL             |
| ETS 0212 | Hazardous live probe              | P 10.06   | PTL             |
| ETS 0213 | Hazardous live probe              | P 10.11   | PTL             |
| ETS 0214 | Ball pressure test apparatus      | T 10.02   | PTL             |
| ETS 0215 | Glow Wire tester                  | T 03.14   | PTL             |
| ETS 0216 | Force indicator 50N               | P 10.31   | PTL             |

| No.      | Test equipment                            | Type        | Manufacturer       |
|----------|-------------------------------------------|-------------|--------------------|
| ETS 0218 | RF probe                                  | URV5-Z7     | Rohde & Schwarz    |
| ETS 0219 | Power sensor                              | NRV-Z2      | Rohde & Schwarz    |
| ETS 0221 | ISDN-S0-Analyzer                          | K1403       | Siemens            |
| ETS 0222 | ISDN Protocol Analyzer                    | TE965       | Tekelec Teleco.    |
| ETS 0223 | GSM/ PCN/ PCS-Simul.                      | TS8915B     | Rohde & Schwarz    |
| ETS0224A | Millivoltmeter                            | URV5        | Rohde & Schwarz    |
| ETS0224B | Diode Power Sensor                        | NRV-Z1      | Rohde & Schwarz    |
| ETS0224C | Programmable high resolution time counter | PM6654G     | Philips            |
| ETS0224D | RF Step Attenuator                        | RSP         | Rohde & Schwarz    |
| ETS 0225 | SIM Simulator                             |             | Orga               |
| ETS 0226 | SIM Editor                                |             | Orga               |
| ETS 0227 | Vibration table                           | TIRA vib    | GenRad             |
| ETS 0228 | Climatic chamber                          | VT 4010     | Vötsch             |
| ETS 0229 | Radio communication tester                | CMT 54      | Rohde & Schwarz    |
| ETS 0230 | Radio communication tester                | CMD 65      | Rohde & Schwarz    |
| ETS 0232 | Radiation test source                     | VSQ 1       | MEB                |
| ETS 0233 | Direction coupler                         | RK 100      | MEB                |
| ETS 0234 | Power meter                               | NRVD        | Rohde & Schwarz    |
| ETS 0235 | RF network-analyzer                       | 8752 C      | Hewlett Packard    |
| ETS 0236 | RF amplifier                              | 100A100     | Amplifier Research |
| ETS 0237 | RF amplifier                              | 100W1000M1  | Amplifier Research |
| ETS 0238 | Field strong meter                        | FM 2000     | Amplifier Research |
| ETS 0239 | Isotropic field probe 40 GHz              | FP 2080 Kit | Amplifier Research |
| ETS 0240 | Isotropic field probe 1 GHz               | FP 2000 Kit | Amplifier Research |
| ETS 0241 | Pulse Generator                           | 4050        | PicoSecond PL      |
| ETS 0242 | Harmonics analyzer                        | F 41B       | Fluke              |
| ETS 0243 | AC-clamp 1000 A                           | 80i 1000s   | Fluke              |
| ETS 0244 | Burst generator                           | EFT 200     | EM-Test            |
| ETS 0245 | Load dump generator                       | LD 200      | EM-Test            |
| ETS 0246 | Voltage drop simulator                    | VDS 200     | EM-Test            |
| ETS 0247 | Microsecond generator                     | MPG 200     | EM-Test            |
| ETS 0248 | Switch unit                               | AN 200      | EM-Test            |
| ETS 0249 | Coupling network                          | CNA 200     | EM-Test            |
| ETS 0250 | Coupling clamp                            | ACC         | EM-Test            |
| ETS 0251 | Climatic chamber                          | VT 4004     | Vötsch             |

| No.      | Test equipment            | Type      | Manufacturer    |
|----------|---------------------------|-----------|-----------------|
| ETS 0252 | System controller         | PSM 12    | Rohde & Schwarz |
| ETS 0253 | Spectrum analyzer         | FSIQ      | Rohde & Schwarz |
| ETS 0254 | RF generator              | SMIQ 03   | Rohde & Schwarz |
| ETS 0255 | RF generator              | SMIQ 03   | Rohde & Schwarz |
| ETS 0256 | RF generator              | SMP 03    | Rohde & Schwarz |
| ETS 0257 | Step attenuator           | RSP       | Rohde & Schwarz |
| ETS 0258 | Rubidium standard         | RSTU      | DATUM GmbH      |
| ETS 0259 | Power meter               | NRVD      | Rohde & Schwarz |
| ETS 0260 | Power sensor              | NRVD-Z1   | Rohde & Schwarz |
| ETS 0261 | Power sensor              | NRVD-Z1   | Rohde & Schwarz |
| ETS 0262 | Switching unit            | SSCU      | Rohde & Schwarz |
| ETS 0263 | Signaling unit            | PTW60     | Rohde & Schwarz |
| ETS 0264 | Spectrum analyzer         | F 1048    | HAMEG           |
| ETS 0265 | Loop antenna              | HFRA 9150 | Schwarzbeck     |
| ETS 0266 | Measurement adapter 1:100 | 50 Ohm    |                 |
| ETS 0267 | RF signal generator       | SMT 03    | Rohde & Schwarz |
| ETS 0268 | RF signal generator       | SMP 02    | Rohde & Schwarz |
| ETS 0269 | RF bridge 50 Ohm          | 86205 A   | Aglient         |
| ETS 0270 | RF signal generator       | SMP 04    | Rohde & Schwarz |
| ETS 0271 | Spectrum analyzer         | FSEK30    | Rohde & Schwarz |
| ETS 0272 | RF signal generator       | SME 03    | Rohde & Schwarz |
| ETS 0273 | RF signal generator       | SME 03    | Rohde & Schwarz |
| ETS 0274 | RF signal generator       | SMY 01    | Rohde & Schwarz |
| ETS 0275 | Power sensor              | NRV-Z51   | Rohde & Schwarz |
| ETS 0276 | Audio analyzer            | UPL       | Rohde & Schwarz |
| ETS 0277 | Power sensor              | NRV-Z1    | Rohde & Schwarz |
| ETS 0278 | Power sensor              | NRV-Z31   | Rohde & Schwarz |
| ETS 0279 | Step attenuator           | RSP       | Rohde & Schwarz |
| ETS 0280 | Power meter               | NRVD      | Rohde & Schwarz |
| ETS 0281 | Spectrum analyzer         | FSM       | Rohde & Schwarz |
| ETS 0282 | RF bridge 75 Ohm          | 86207 A   | Hewlett Packard |
| ETS 0283 | RF bridge 50 Ohm          | 86205 A   | Hewlett Packard |
| ETS 0284 | Field probe               | 11940 A   | Hewlett Packard |
| ETS 0285 | Field probe               | 11941 A   | Hewlett Packard |
| ETS 0286 | Limiter                   | 11867 A   | Hewlett Packard |

| No.      | Test equipment          | Type         | Manufacturer       |
|----------|-------------------------|--------------|--------------------|
| ETS 0287 | Test receiver           | ESHS 10      | Rohde & Schwarz    |
| ETS 0288 | Artificial mains        | ESH2-Z5      | Rohde & Schwarz    |
| ETS 0289 | Audio generator         | TAG 101      | Troneer            |
| ETS 0290 | Audio generator         | TAG 101      | Troneer            |
| ETS 0291 | Loop antenna            | HFH2-Z2      | Rohde & Schwarz    |
| ETS 0292 | RF generator            | SMHU         | Rohde & Schwarz    |
| ETS 0293 | Artificial mains        | NNBM 8125    | Schwarzbeck        |
| ETS 0294 | Biconical antenna       | HK 116       | Rohde & Schwarz    |
| ETS 0295 | LPD antenna             | HL 223       | Rohde & Schwarz    |
| ETS 0297 | Power pulse generator   | IGUF 2910    | Schwarzbeck        |
| ETS 0298 | ICO tester              | TS 1232      | Rohde & Schwarz    |
| ETS 0299 | DECT protocol tester    | TS 1220      | Rohde & Schwarz    |
| ETS 0300 | RF amplifier            | 75 A 250     | Amplifier Research |
| ETS 0301 | Relay switch unit       | RSU          | Rohde & Schwarz    |
| ETS 0302 | Data line CDN           | CM-I/O CD    | Keytek             |
| ETS 0303 | Telecom line CDN        | CM-TEL CD    | Keytek             |
| ETS 0304 | Test receiver           | ESHS 10      | Rohde & Schwarz    |
| ETS 0305 | Test receiver           | ESVS 10      | Rohde & Schwarz    |
| ETS 0306 | Function generator      | HP 33120A    | Hewlett Packard    |
| ETS 0307 | Commu. Sign. Analyzer   | CSA 803 A    | Tektronix          |
| ETS 0308 | Spectrum analyzer       | R 3361A      | Advantest          |
| ETS 0309 | Anechoic chamber        | AC 2         | Frankonia          |
| ETS 0310 | Anechoic chamber        | AC 3         | Frankonia          |
| ETS 0311 | Anechoic chamber        | AC 4         | Frankonia          |
| ETS 0312 | Climatic chamber        | VC 0033      | Vötsch             |
| ETS 0313 | Power sensor            | NRV-Z51      | Rohde & Schwarz    |
| ETS 0314 | LPD antenna             | HL 223       | Rohde & Schwarz    |
| ETS 0315 | Biconical antenna       | HK 116       | Rohde & Schwarz    |
| ETS 0316 | Switcher                | Hr 07-720    | WISI               |
| ETS 0318 | Dial pulse/ DTMF tester | 210          | HE                 |
| ETS 0319 | Opto link               | GPIB 140     | NI                 |
| ETS 0320 | Opto link               | GPIB 140     | NI                 |
| ETS 0322 | Insertion unit          | URV5-Z4      | Rohde & Schwarz    |
| ETS 0323 | DECT portable part      | Gigaset 1000 | SIEMENS            |
| ETS 0324 | DECT fix part           | Gigaset 1000 | SIEMENS            |

| No.      | Test equipment                | Type              | Manufacturer             |
|----------|-------------------------------|-------------------|--------------------------|
| ETS 0325 | DECT portable part            |                   | Philips                  |
| ETS 0326 | DECT fix part                 |                   | Philips                  |
| ETS 0327 | Blue Unit                     | V 2.0             | Nokia                    |
| ETS 0328 | ELF Field Strength System     | HI-3604           | Holaday Industries, INC. |
| ETS 0329 | VDT/VLF Radiation System      | HI-3603           | Holaday Industries, INC. |
| ETS 0330 | Fiber Optic Remote Control    | HI.3616           | Holaday Industries, INC. |
| ETS 0331 | TS 1220                       |                   |                          |
| ETS 0332 | PSM                           |                   |                          |
| ETS 0333 | Turn table                    | DE 350            | Heinrich Deisel          |
| ETS 0334 | Controller                    | HD 100            | Heinrich Deisel          |
| ETS 0335 | BT development kit            | CASIRA            | CSR                      |
| ETS 0336 | LPD Antenna                   | HL 223            | Rohde & Schwarz          |
| ETS 0337 | Professional Power Amplifier  | SE-1200           | Wharfedale Pro           |
| ETS 0338 | Coupling network              | KN002             | ETS                      |
| ETS 0339 | Isolating transformer         | KN003             | ETS                      |
| ETS 0340 | Thermometer                   |                   | Proficell                |
| ETS 0341 | Thermometer                   |                   | Proficell                |
| ETS 0342 | Thermometer                   |                   | Proficell                |
| ETS 0343 | Thermometer                   |                   | Proficell                |
| ETS 0344 | Thermometer                   |                   | Proficell                |
| ETS 0345 | Thermometer                   |                   | Proficell                |
| ETS 0346 | Thermometer                   |                   | Proficell                |
| ETS 0347 | Current Probe                 | EZ-17             | Rohde & Schwarz          |
| ETS 0348 | RF Millivoltmeter             | URV 55            | Rohde & Schwarz          |
| ETS 0349 | Temperature / humidity logger | OPUS10 THI        | LUFFT                    |
| ETS 0350 | Horn Antenna                  | BBHA 9120-C       | Schwarzbeck              |
| ETS 0351 | RF amplifier                  | DWT-1857          | Microwave                |
| ETS 0354 | RF amplifier                  | DBS-0408N423      | Microwave                |
| ETS 0355 | high pass                     | H03G12G3          | Microwave                |
| ETS 0356 | high pass                     | H03G12G3          | Microwave                |
| ETS 0357 | high pass                     | H08G18G3          | Microwave                |
| ETS 0358 | RF amplifier                  | AFD3-010040-15-ln | MITEQ                    |
| ETS 0359 | RF amplifier                  | M/N AM-1331       | MITEQ                    |
| ETS 0360 | RF amplifier                  | DBS-0408N423      | Microwave                |
| ETS 0361 | RF amplifier                  | DBS 1826N515      | Microwave                |

| No.      | Test equipment                  | Type          | Manufacturer    |
|----------|---------------------------------|---------------|-----------------|
| ETS 0362 | high pass                       | H03G12G3      | Microwave       |
| ETS 0363 | high pass                       | H08G18G3      | Microwave       |
| ETS 0364 | high pass                       | H08G18G3      | Microwave       |
| ETS 0365 | Notch filter 2.4 GHz            | WRCT2.40/248  | Wain Wright     |
| ETS 0366 | high pass                       | H08G18G3      | Microwave       |
| ETS 0367 | high pass                       | H03G12G3      | Microwave       |
| ETS 0368 | Notch filter 0.5-1 GHz          | BN86883       | Schomandl       |
| ETS 0369 | Notch filter 210-500 MHz        | BN86882       | Schomandl       |
| ETS 0370 | Notch filter 15-90 MHz          | BN86880       | Schomandl       |
| ETS 0371 | Notch filter 85-250 MHz         | BN86881       | Schomandl       |
| ETS 0372 | Direction coupler               | RK 100        | MEB             |
| ETS 0373 | Direction coupler               | DC3001        | EMV             |
| ETS 0374 | Power Supply                    | NGSM32        | Rohde & Schwarz |
| ETS 0375 | Vector Signal Generator         | SMIQ03B       | Rohde & Schwarz |
| ETS 0376 | Signal Generator                | SMP22         | Rohde & Schwarz |
| ETS 0377 | Advanced Signal Condi. Unit     | ASCU850       | Rohde & Schwarz |
| ETS 0378 | Advanced Signal Condi. Unit     | ASCU190       | Rohde & Schwarz |
| ETS 0379 | Advanced Signal Condi. Unit     | ASCU180       | Rohde & Schwarz |
| ETS 0380 | Advanced Signal Condi. Unit     | ASCU900       | Rohde & Schwarz |
| ETS 0381 | Ethernet HUB                    | CS-HUB        | Rohde & Schwarz |
| ETS 0382 | Vector Signal Generator         | SMIQ03B       | Rohde & Schwarz |
| ETS 0383 | Spectrum Analyzer               | FSU26         | Rohde & Schwarz |
| ETS 0384 | Main Frame Signal and Con. Unit | SSCU-GW       | Rohde & Schwarz |
| ETS 0385 | Universal Protocol Tester       | CRTU-RU       | Rohde & Schwarz |
| ETS 0386 | Power meter                     | NRVD          | Rohde & Schwarz |
| ETS 0387 | Power sensor                    | NRV-Z1        | Rohde & Schwarz |
| ETS 0388 | Power sensor                    | NRV-Z1        | Rohde & Schwarz |
| ETS 0389 | Fading Simulator                | ABFS          | Rohde & Schwarz |
| ETS 0390 | System PC PC3600                | TS-PC36       | Rohde & Schwarz |
| ETS 0391 | Rubidium Frequency Standard     | DATUM 8040    | DATUM GmbH      |
| ETS 0392 | RF Distribution                 | DATUM 6502    | DATUM GmbH      |
| ETS 0393 | Insertion unit                  | URV5-Z4       | Rohde & Schwarz |
| ETS 0394 | Advanced Signal Cond. Unit      | ASCUFDD-WCDMA | Rohde & Schwarz |
| ETS 0395 | Universal Protocol Tester       | CRTU-RU       | Rohde & Schwarz |
| ETS 0396 | Universal Protocol Tester       | CRTU-RU       | Rohde & Schwarz |

| No.      | Test equipment                          | Type              | Manufacturer    |
|----------|-----------------------------------------|-------------------|-----------------|
| ETS 0397 | Universal Protocol Tester               | CRTU-RU           | Rohde & Schwarz |
| ETS 0398 | Fading Simulator                        | ABFS              | Rohde & Schwarz |
| ETS 0399 | System Protocol Unit                    | CRTU-PU           | Rohde & Schwarz |
| ETS 0400 | Universal Protocol Tester               | CRTU-W            | Rohde & Schwarz |
| ETS 0401 | MPEG2 Generator                         | DVG               | Rohde & Schwarz |
| ETS 0402 | TV Messsender                           | SFQ               | Rohde & Schwarz |
| ETS 0403 | RF Current Probe                        | F-140             | Rohde & Schwarz |
| ETS 0404 | Exposure Level Tester                   | ELT-400           | NARDA           |
| ETS 0405 | Magnetic Field Probe 100cm <sup>2</sup> | 2300/90.10        | NARDA           |
| ETS 0406 | Signal Generator                        | SML02             | Rohde & Schwarz |
| ETS 0407 | EMC Emission tester                     | Harmonics 1000    | EMC Partner     |
| ETS 0408 | Transient 2000                          | TRA1Z191N         | EMC Partner     |
| ETS 0409 | Stripline                               | DC220             | Schwarzbeck     |
| ETS 0410 | BAN                                     | 1                 | ETS             |
| ETS 0418 | High pass filter 4-8GHz                 |                   | Microwave       |
| ETS 0419 | High pass filter 8-18 GHz               |                   | Microwave       |
| ETS 0420 | Amplifier 0.1-1 GHz                     | M/N AM-1331       | MITEC           |
| ETS 0421 | Amplifier 1-4 GHz                       | AFD3-010040-15-LN | MITEC           |
| ETS 0422 | Amplifier 4-8 GHz                       | DBS-0408N423      | Narda           |
| ETS 0423 | Amplifier 8-18 GHz                      | DWT-18057         | Narda           |
| ETS 0424 | Amplifier 18-26.5 GHz                   | DBS-1826N515      | Narda           |
| ETS 0425 | T-network                               | ESH 3-Z4          | Rohde & Schwarz |
| ETS 0426 | CDN                                     | T4 HF             | MEB             |
| ETS 0427 | Power sensor                            | NRV-Z6            | Rohde & Schwarz |
| ETS 0428 | 4-WIRE ISN with B1                      | ENY41             | Rohde & Schwarz |
| ETS 0429 | Current probe test Jig                  | SW14 7LY          | Chase           |
| ETS 0430 | RF signal generator                     | SML02             | R&S             |
| ETS 0431 | AC mains adapter                        | BS5733            | Travel Emporium |
| ETS 0432 | RF amplifier matrix                     | RSU-ETS-BT        | ETS             |
| ETS 0433 | RF amplifier matrix                     | RSU-ETS-CTR6      | ETS             |
| ETS 0434 | Reserved Tre                            | RSU-ETS-GSM       |                 |
| ETS 0435 | HP-Filter                               | H1G04G01          | Microwave       |
| ETS 0436 | HP-Filter                               | H1G04G01          | Microwave       |
| ETS 0437 | HP-Filter                               | H0G408G1          | Microwave       |
| ETS 0438 | HP-Filter                               | H0G408G1          | Microwave       |

| No.      | Test equipment                   | Type             | Manufacturer                |
|----------|----------------------------------|------------------|-----------------------------|
| ETS 0439 | Amplifier                        | DBS-1826N515     | Narda-DBS-Microwave         |
| ETS 0440 | Amplifier                        | AM-1331          | MITEQ                       |
| ETS 0441 | Bluetooth Protocol Tester        | PTW 60           | Rohde & Schwarz             |
| ETS 0442 | Nokia Tester for Bluetooth 1.1   | DTL - 1          | Nokia                       |
| ETS 0443 | IBM BT PC Card                   | BTPCN101         | IBM / Motorola              |
| ETS 0444 | Sony BT DUN Modem                | BTA- NW 1        | Sony                        |
| ETS 0445 | RF attenuator 6dB                | 50FH-006-300     | JFK                         |
| ETS 0446 | RF attenuator 30dB               | 50FH-030-300     | JFK                         |
| ETS 0447 | Motor vehicle artificial network | LN-KFZ/200       | R. Heine Hochfrequenztechn. |
| ETS 0448 | RF power amplifier               | AR 60S1G3        | AR Amplifier Research       |
| ETS 0449 | Stäubli robot                    | RX90B L          | Stäubli                     |
| ETS 0450 | Stäubli robot controller         | CS/MBs&p         | Stäubli                     |
| ETS 0451 | DASY 4 measurement server        |                  | Schmid & Partner            |
| ETS 0452 | Control pendant                  |                  | Stäubli                     |
| ETS 0453 | Compaq computer                  | Pentium IV 2 GHz | Schmid & Partner            |
| ETS 0454 | Data acquisition electronics     | DAE3V1           | Schmid & Partner            |
| ETS 0455 | Dummy probe                      |                  | Schmid & Partner            |
| ETS 0456 | Dosimetric E-field probe         | ET3DV6           | Schmid & Partner            |
| ETS 0457 | Dosimetric E-field probe         | ET3DV6           | Schmid & Partner            |
| ETS 0458 | Dosimetric H-field probe         | H3DV6            | Schmid & Partner            |
| ETS 0459 | System validation kit            | D900V2           | Schmid & Partner            |
| ETS 0460 | System validation kit            | D1800V2          | Schmid & Partner            |
| ETS 0461 | System validation kit            | D1900V2          | Schmid & Partner            |
| ETS 0462 | System validation kit            | D2450V2          | Schmid & Partner            |
| ETS 0463 | Probe alignment unit             | LBV2             | Schmid & Partner            |
| ETS 0464 | SAM twin phantom                 | V4.0             |                             |
| ETS 0465 | Mounting device                  | V 3.1            |                             |
| ETS 0466 | Directional coupler              | HP 87300B        |                             |
| ETS 0468 | Isotropic E-Field Probe          | ER3DV6           | Schmid & Partner            |
| ETS 0469 | Dielectric probe kit             | 85070D           | Agilent                     |
| ETS 0470 | Amplifier                        | AM-1300-1103     | MITEQ                       |
| ETS 0472 | Antenna                          | BTA-H            | Frankonia                   |
| ETS 0473 | GSM / UMTS system simulator      | TS 8950          | Rohde & Schwarz             |
| ETS 0474 | EMI test receiver                | ESCS30           | Rohde & Schwarz             |
| ETS 0475 | Amplifier                        | AFS4-00101800-U  | MITEQ                       |

| No.      | Test equipment                          | Type                    | Manufacturer          |
|----------|-----------------------------------------|-------------------------|-----------------------|
| ETS 0476 | Test receiver                           | ESCS 30                 | Rohde & Schwarz       |
| ETS 0477 | GPS system (active GPS antenna)         | 4490                    | HOPF                  |
| ETS 0478 | Crystal filter                          | MQF 127.50-2400/F       | Vectron International |
| ETS 0480 | Validation dipole                       | DB 3                    | EMCO                  |
| ETS 0481 | 40GHz standard gain horn with amplifier | 22240-25<br>CBL26402075 | Flann Microwave       |
| ETS 0482 | 40GHz high gain antenna                 | AT4560                  | Amplifier research    |
| ETS 0483 | Amplifier                               | AFD3010040-15-LN        | MITEQ                 |
| ETS 0485 | Radio Communication Tester              | CMU 200                 | Rohde & Schwarz       |
| ETS 0490 | Rubidium Frequency Standard             | 8040                    | DATUM                 |
| ETS 0491 | RF Distribution                         | 6502                    | DATUM                 |
| ETS 0492 | Indusrtial Cotroller                    | PSM12                   | R & S                 |
| ETS 0493 | Protokoll Tester                        | PTW60                   | R & S                 |
| ETS 0494 | Switching unit                          | SSCU                    | R & S                 |
| ETS 0495 | RF Step Attenuator                      | RSP                     | R & S                 |
| ETS 0496 | Spectrum Analyzer                       | FSP                     | R & S                 |
| ETS 0497 | Power Meter                             | NRVD                    | R & S                 |
| ETS 0498 | Diode Power Sensor                      | NRV-Z1                  | R & S                 |
| ETS 0499 | Diode Power Sensor                      | NRV-Z1                  | R & S                 |
| ETS 0500 | Signal Generator                        | SMIQ03                  | R & S                 |
| ETS 0501 | Signal Generator                        | SMIQ03                  | R & S                 |
| ETS 0502 | Power Splitter                          | DS-808-4                | Macom                 |

## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 $\mu$ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was ANSI STANDARD C63.4-2003 6.4 using a spectrum analyzer. The resolution bandwidth of the spectrum analyzer was 100 kHz for measurements below 1 GHz and RBW 1 MHz was used above 1 GHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**FORMULA OF CONVERSION FACTORS for Field strength:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

|             |                                                          |
|-------------|----------------------------------------------------------|
| Freq. (MHz) | METER READING + ACF + CABLE LOSS (to the receiver) = FS  |
| 33          | 20 dB $\mu$ V + 10.36 dB + 6 dB = 36.36 dB $\mu$ V/m @3m |

**ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES:** The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to at least 10<sup>th</sup> harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by ETS Dr. Genz GmbH at the registered open field test site located at Storkower Str. 38c, 15526 Reichenwalde, Germany.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

**ANTENNA & GROUND:**

This unit uses internal antenna.

### 3 Test results (enclosure)

| TEST CASE                                                                          |                   | Required                            | Test passed                         | Test failed              |
|------------------------------------------------------------------------------------|-------------------|-------------------------------------|-------------------------------------|--------------------------|
| RF Power Output                                                                    | 2.1046            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ERP, EIRP                                                                          | 22.913; 24.232    | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Modulation Requirements                                                            | 2.1047            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Audio Filter Characteristics                                                       | 22.915(d)(1)      | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Emission Limitation                                                                | 22.917(b)(d)      | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Occupied Bandwidth                                                                 | 2.1049            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Out of Band Emission at Antenna Terminals Mobile Emissions In Base Frequency Range | 2.1051, 24.238(a) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Field Strength of Spurious Radiation                                               | 2.1053            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Line Conducted Emissions                                                           | 15.207            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Frequency Stability vs. Temperature                                                | 2.1055            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Frequency Stability vs. Voltage                                                    | 2.1055            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

## 4 RF Power Output (conducted), FCC 2.1046

### 4.1. Test procedure

The transmitter output was connected to a calibrated coaxial attenuator, the other end of which was connected to a spectrum analyzer. Transmitter output was read off the spectrum analyzer in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the spectrum analyzer reading.

An HP power meter was also used to measure the RF power.

Tests were performed at three frequencies (low, middle, and high channels) and on all power levels, which can be set-up on the transmitters.

### 4.2. Test Results

#### PCS1900

| Frequency Channel | Peak Output Power |
|-------------------|-------------------|
| 512               | 27.43 dBm         |
| 661               | 27.57 dBm         |
| 810               | 28.16 dBm         |

#### GSM 850

| Frequency Channel | Peak Output Power |
|-------------------|-------------------|
| 128               | 31.51 dBm         |
| 188               | 31.69 dBm         |
| 251               | 31.82 dBm         |

Comment: See attached diagrams.

## 5 Radiated Power

### FCC 22.913

The Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

### FCC 24.232

The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

### 5.1 Test Procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane on an open test site.

The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer.

Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.

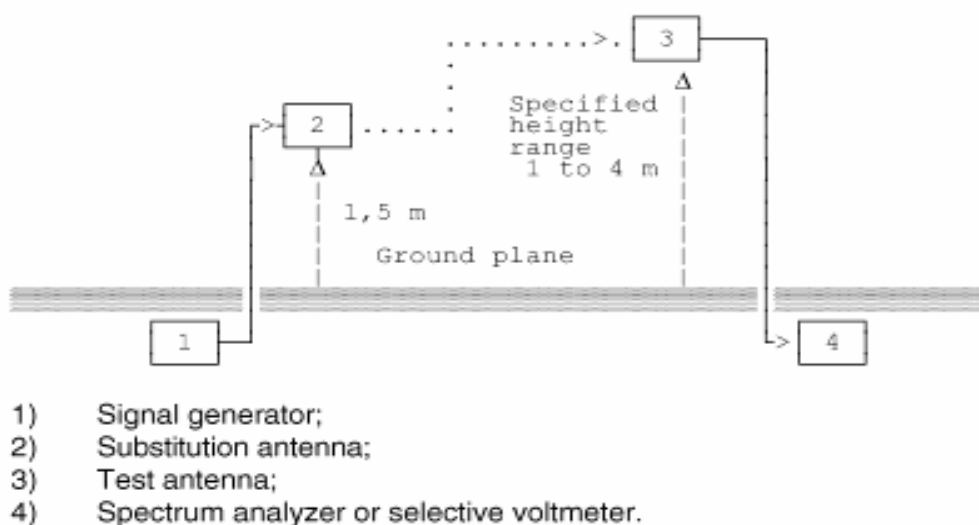
ERP in frequency band 824.2-848.8 MHz, and EIRP in frequency band 1850.2-1909.8 MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824.2-848.8 MHz) or horn antenna (1850.2-1909.8 MHz) connected to a signal generator.

#### Substitution RF power measurement at ETS Dr Genz GmbH

General:

The applied substitution method follows ANSI/TIA/EIA-603, ANSI/TIA/EIA-102.CAAA or the appropriate ETSI rules respectively.

The actual signal generated by the EUT can be determined by means of a substitution measurement in which a known signal source replaces the device to be measured.



The substitution antenna replaces the transmitter antenna at the same position and in vertical polarization. The frequency of the signal generator shall be adjusted to the measurement frequency.

The test antenna shall be raised or lowered, if necessary, to ensure that the maximum signal is still received. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the measurement receiver.

If a fully anechoic chamber is used as test site in order to provide free space conditions there is no need to change the height of the antenna.

The measurement will be repeated in horizontal position.

#### **Calibration:**

In order to make this kind of measurement more effective and to avoid subjective measurement faults ETS has installed automatic computer controlled measurement procedures.

With the above described substitution method a test site is calibrated over the full frequency range which is used in suitable frequency steps. For a certain power level on the substitution antenna the received power over the whole frequency range is documented. All necessary antenna gains, cable losses, filter losses and amplifications of preamplifiers are taken in consideration. The summary of this calibration measurement performs a transducer factor that is related to the considered test site and a certain measurement distance. Differences of the radiated power levels of different test samples are determined by internal attenuation of the measurement receiver. The proper function of such test site will be maintained by short term plausibility checks and periodical re-calibration.

#### **Testing:**

Now the test sample will be putted on the table at the defined position and the radiated power will be received and documented by the measurement receiver.

On test sites with ground plane the measurement antenna will be lowered and raised to maximum values at significant frequencies.

For peak power measurements the sample is turned by the turntable over 360 degree in order to find the direction with the maximum radiation or to document the max reading with the MAXHOLD function during the rotation.

## **5.2 Test results**

### PCS1900

| <b>Radiated Power</b> |           |
|-----------------------|-----------|
| Channel 512           | 26.61 dBm |
| Channel 661           | 27.07 dBm |
| Channel 810           | 25.65 dBm |

### GSM 850

| <b>Radiated Power</b> |           |
|-----------------------|-----------|
| Channel 128           | 22.78 dBm |
| Channel 188           | 20.30 dBm |
| Channel 251           | 23.17 dBm |

Comment: see attached diagrams

## 6 Modulation Deviation Limiting, FCC 2.1047

Comment: not tested

## 7 Audio Filter Characteristics, FCC 22.915(d)

Comment: not tested

## 8 Emission Limitations FCC 22.917(b)(d)

Comment: not tested

## 9 Occupied Bandwidth, FCC 22.917(b)(d); FCC 2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 9.1 Test procedure

The RF output of the transceiver was connected to the input of the spectrum analyzer through sufficient attenuation.

Occupied Bandwidth was measured with a occupied bandwidth function of the analyzer.

To find the Emission Bandwidth (-26 dB) the delta markers were set -26 dB below transmitter power.

### 9.2 Test Results

#### PCS1900

|             | <b>Occupied Channel Bandwidth</b> | <b>Emission Bandwidth</b> |
|-------------|-----------------------------------|---------------------------|
| Channel 512 | 248.497 kHz                       | 316.633 kHz               |
| Channel 661 | 252.505 kHz                       | 316.633 kHz               |
| Channel 810 | 252.505 kHz                       | 316.633 kHz               |

#### GSM 850

|             | <b>Occupied Channel Bandwidth</b> | <b>Emission Bandwidth</b> |
|-------------|-----------------------------------|---------------------------|
| Channel 128 | 252.505 kHz                       | 318.637 kHz               |
| Channel 188 | 246.193 kHz                       | 314.629 kHz               |
| Channel 251 | 246.493 kHz                       | 314.629 kHz               |

Comment: See attached diagrams in appendix.

## 10 Out of Band Emissions at Antenna Terminals, 24.238(a)

Comment: not tested

## 11 Field Strength of Spurious Radiation, FCC 2.1053

### 11.1 Test procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane.

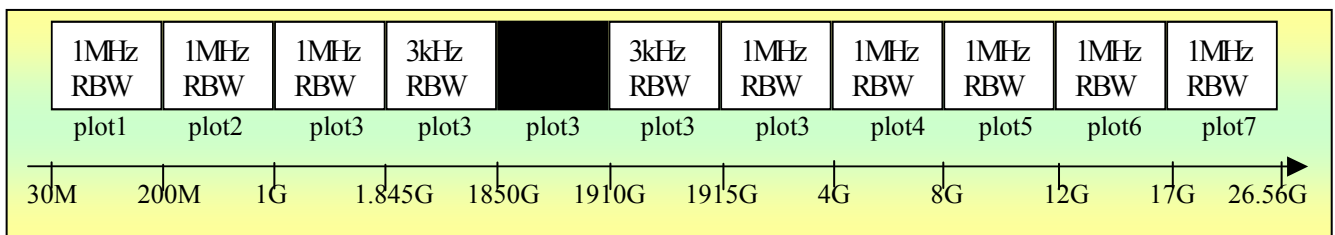
The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer.

Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.

ERP was measured using a substitution method. The EUT was replaced by horn antenna connected to a signal generator.

The frequency range up to tenth harmonic was investigated.

The tests of spurious radiated emission have been carried out with the EKS-Software from Rode & Schwarz.



The analyzer gives automatic the measurements of spectral plots to the EKS software.

In the 1st 1MHz band outside the band edge nearest the channel of interest a 3 kHz res. BW is used. The measurements from 30MHz to 1845 GHz and 1915GHz to 26.56GHz were performed with a measurement bandwidth of 1MHz.

### 11.2 Test Results

The radiated spurious emissions were measured for channel 512, channel 661 and channel 810, respectively the upper, center, and lower frequencies of the USPCS band (1850.2 MHz, 1880.0 MHz and 1909.8 MHz).

The measurement diagrams show that all significant spurs are well below the limit line.

### 11.3 Purpose

The measurements of the spurious emissions at the equipment output terminals were performed pursuant to § 2.1053 in order to verify that any emissions are below the limits given by § 24.238.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

### PCS 1900

#### Summary table with radiated data of the test plots for Carrier Test Frequency 1850.2 MHz

| Spectral Plot | Frequency Marker Indication [MHz] | Indication Power Level [dBm] | External Attn. [dB] | Worst Case Emission Level [dBm] | Compliance Limit [dBm] | Results |
|---------------|-----------------------------------|------------------------------|---------------------|---------------------------------|------------------------|---------|
| vertical      | 115,378                           | -45,19                       | 0                   | -45,19                          | -13                    | -32,19  |
| horizontal    | 69,100                            | -47,02                       | 0                   | -47,02                          | -13                    | -34,02  |
| vertical      | 984,889                           | -39,22                       | 0                   | -39,22                          | -13                    | -26,22  |
| horizontal    | 864,889                           | -37,93                       | 0                   | -37,93                          | -13                    | -24,93  |
| vertical      | 1.850,000                         | -20,4                        | 0                   | -20,4                           | -13                    | -7,4    |
| horizontal    | 3.998,000                         | -22,62                       | 0                   | -22,62                          | -13                    | -9,62   |
| vertical      | 7.573,000                         | -44,63                       | 0                   | -44,63                          | -13                    | -31,63  |
| horizontal    | 7.982,000                         | -44,26                       | 0                   | -44,26                          | -13                    | -31,26  |
| vertical      | 11.222,000                        | -40,59                       | 0                   | -40,59                          | -13                    | -27,59  |
| horizontal    | 10.667,000                        | -40,09                       | 0                   | -40,09                          | -13                    | -27,09  |
| vertical      | 17.433,000                        | -31,61                       | 0                   | -31,61                          | -13                    | -18,61  |
| horizontal    | 17.447,000                        | -31,15                       | 0                   | -31,15                          | -13                    | -18,15  |
| vertical      | 26.009,000                        | -26,66                       | 0                   | -26,66                          | -13                    | -13,66  |
| horizontal    | 26.396,000                        | -25,87                       | 0                   | -25,87                          | -13                    | -12,87  |

**Summary table with radiated data of the test plots for Carrier Test Frequency 1880.0 MHz**

| <b>Spectral Plot</b> | <b>Frequency Marker Indication [MHz]</b> | <b>Indication Power Level [dBm]</b> | <b>External Attn.[dB]</b> | <b>Worst Case Emission Level [dBm]</b> | <b>Compliance Limit [dBm]</b> | <b>Results</b> |
|----------------------|------------------------------------------|-------------------------------------|---------------------------|----------------------------------------|-------------------------------|----------------|
| vertical             | 115,756                                  | -45,01                              | 0                         | -45,01                                 | -13                           | -32,01         |
| horizontal           | 68,911                                   | -46,93                              | 0                         | -46,93                                 | -13                           | -33,93         |
| vertical             | 989,333                                  | -39,71                              | 0                         | -39,71                                 | -13                           | -26,71         |
| horizontal           | 855,111                                  | -37,9                               | 0                         | -37,9                                  | -13                           | -24,9          |
| vertical             | 3.937,000                                | -22,85                              | 0                         | -22,85                                 | -13                           | -9,85          |
| horizontal           | 3.476,000                                | -22,73                              | 0                         | -22,73                                 | -13                           | -9,73          |
| vertical             | 7.596,000                                | -43,39                              | 0                         | -43,39                                 | -13                           | -30,39         |
| horizontal           | 7.982,000                                | -43,67                              | 0                         | -43,67                                 | -13                           | -30,67         |
| vertical             | 10.756,000                               | -40,54                              | 0                         | -40,54                                 | -13                           | -27,54         |
| horizontal           | 10.711,000                               | -39,73                              | 0                         | -39,73                                 | -13                           | -26,73         |
| vertical             | 17.467,000                               | -30,78                              | 0                         | -30,78                                 | -13                           | -17,78         |
| horizontal           | 17.453,000                               | -31,09                              | 0                         | -31,09                                 | -13                           | -18,09         |
| vertical             | 26.387,000                               | -26,02                              | 0                         | -26,02                                 | -13                           | -13,02         |
| horizontal           | 26.406,000                               | -25,89                              | 0                         | -25,89                                 | -13                           | -12,89         |

### Summary table with radiated data of the test plots for Carrier Test Frequency 1909.8 MHz

| Spectral Plot | Frequency Marker Indication [MHz] | Indication Power Level [dBm] | External Attn.[dB] | Worst Case Emission Level [dBm] | Compliance Limit [dBm] | Results |
|---------------|-----------------------------------|------------------------------|--------------------|---------------------------------|------------------------|---------|
| vertical      | 115,756                           | -45,29                       | 0                  | -45,29                          | -13                    | -32,29  |
| horizontal    | 68,911                            | -46,5                        | 0                  | -46,5                           | -13                    | -33,5   |
| vertical      | 989,333                           | -40,21                       | 0                  | -40,21                          | -13                    | -27,21  |
| horizontal    | 864,889                           | -38,74                       | 0                  | -38,74                          | -13                    | -25,74  |
| vertical      | 1.910,000                         | -22,33                       | 0                  | -22,33                          | -13                    | -9,33   |
| horizontal    | 3.995,000                         | -22,63                       | 0                  | -22,63                          | -13                    | -9,63   |
| vertical      | 7.600,000                         | -44,47                       | 0                  | -44,47                          | -13                    | -31,47  |
| horizontal    | 7.973,000                         | -44,11                       | 0                  | -44,11                          | -13                    | -31,11  |
| vertical      | 11.182,000                        | -40,05                       | 0                  | -40,05                          | -13                    | -27,05  |
| horizontal    | 10.707,000                        | -39,7                        | 0                  | -39,7                           | -13                    | -26,7   |
| vertical      | 17.467,000                        | -31,38                       | 0                  | -31,38                          | -13                    | -18,38  |
| horizontal    | 17.440,000                        | -30,72                       | 0                  | -30,72                          | -13                    | -17,72  |
| vertical      | 26.434,000                        | -26,03                       | 0                  | -26,03                          | -13                    | -13,03  |
| horizontal    | 26.358,000                        | -25,62                       | 0                  | -25,62                          | -13                    | -12,62  |

### Limits

Compliance with § 24.238 requires that any emission be attenuated below the transmitter power by at least  $43 + 10 \log_{10} P$  ( $P$  = transmitter power in Watts).

The compliance limit was calculated as per the following table:

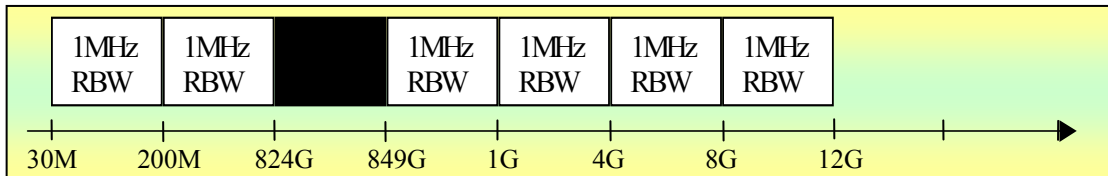
|                                                                                     |                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|
| Maximum transmitter output power                                                    | 0.654 W = 28.16 dBm                                    |
| Required attenuation                                                                | $43 + 10 \log_{10} 0.654 \text{ W} = 41.16 \text{ dB}$ |
| Maximum transmitter output power<br><u>Required attenuation</u><br>Compliance limit | 28.16 dBm<br>- 41.16 dB<br>-13 dBm                     |

Comment: See attached diagrams in appendix.

## Measurement procedure and results

The tests of spurious radiated emission have been carried out with the EKS-Software from Rode & Schwarz.

The analyzer gives automatic the measurements of plots to the EKS software.



The measurements from 30MHz to 824GHz and 849GHz to 12GHz were performed with a measurement bandwidth of 1MHz.

## Purpose

The measurements of the spurious emissions at the equipment output terminals were performed pursuant to § 2.1053 in order to verify that any emissions are below the limits given by § 22.917.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

## Summary table with radiated data of the test plots for Carrier Test Frequency 824,2 MHz

| Spectral Plot | Frequency Marker Indication [MHz] | Indication Power Level [dBm] | External Attn. [dB] | Worst Case Emission Level [dBm] | Compliance Limit [dBm] | Results |
|---------------|-----------------------------------|------------------------------|---------------------|---------------------------------|------------------------|---------|
| vertical      | 113,678                           | -44,94                       | 0                   | -44,94                          | -13                    | -31,94  |
| horizontal    | 68,911                            | -46,09                       | 0                   | -46,09                          | -13                    | -33,09  |
| vertical      | 823,994                           | -30,48                       | 0                   | -30,48                          | -13                    | -17,48  |
| horizontal    | 823,994                           | -29,84                       | 0                   | -29,84                          | -13                    | -16,84  |
| vertical      | 3.983,000                         | -23,08                       | 0                   | -23,08                          | -13                    | -10,08  |
| horizontal    | 3.410,000                         | -22,48                       | 0                   | -22,48                          | -13                    | -9,48   |
| vertical      | 7.960,000                         | -45                          | 0                   | -45                             | -13                    | -32     |
| horizontal    | 7.982,000                         | -43,87                       | 0                   | -43,87                          | -13                    | -30,87  |
| vertical      | 11.173,000                        | -40,25                       | 0                   | -40,25                          | -13                    | -27,25  |
| horizontal    | 10.764,000                        | -39,98                       | 0                   | -39,98                          | -13                    | -26,98  |

### Summary table with radiated data of the test plots for Carrier Test Frequency 836,2 MHz

| Spectral Plot | Frequency Marker Indication [MHz] | Indication Power Level [dBm] | External Attn.[dB] | Worst Case Emission Level [dBm] | Compliance Limit [dBm] | Results |
|---------------|-----------------------------------|------------------------------|--------------------|---------------------------------|------------------------|---------|
| vertical      | 114,433                           | -45,21                       | 0                  | -45,21                          | -13                    | -32,21  |
| horizontal    | 68,533                            | -46,26                       | 0                  | -46,26                          | -13                    | -33,26  |
| vertical      | 996,107                           | -39,41                       | 0                  | -39,41                          | -13                    | -26,41  |
| horizontal    | 854,487                           | -38,16                       | 0                  | -38,16                          | -13                    | -25,16  |
| vertical      | 3.547,000                         | -22,41                       | 0                  | -22,41                          | -13                    | -9,41   |
| horizontal    | 3.970,000                         | -22,1                        | 0                  | -22,1                           | -13                    | -9,1    |
| vertical      | 7.556,000                         | -44,7                        | 0                  | -44,7                           | -13                    | -31,7   |
| horizontal    | 7.978,000                         | -44,04                       | 0                  | -44,04                          | -13                    | -31,04  |
| vertical      | 10.742,000                        | -40,43                       | 0                  | -40,43                          | -13                    | -27,43  |
| horizontal    | 10.773,000                        | -39,96                       | 0                  | -39,96                          | -13                    | -26,96  |

### Summary table with radiated data of the test plots for Carrier Test Frequency 848,8 MHz

| Spectral Plot | Frequency Marker Indication [MHz] | Indication Power Level [dBm] | External Attn.[dB] | Worst Case Emission Level [dBm] | Compliance Limit [dBm] | Results |
|---------------|-----------------------------------|------------------------------|--------------------|---------------------------------|------------------------|---------|
| vertical      | 116,133                           | -45,04                       | 0                  | -45,04                          | -13                    | -32,04  |
| horizontal    | 68,344                            | -46,5                        | 0                  | -46,5                           | -13                    | -33,5   |
| vertical      | 849,022                           | -30,05                       | 0                  | -30,05                          | -13                    | -17,05  |
| horizontal    | 864,382                           | -38,57                       | 0                  | -38,57                          | -13                    | -25,57  |
| vertical      | 3.950,000                         | -22,93                       | 0                  | -22,93                          | -13                    | -9,93   |
| horizontal    | 3.967,000                         | -22,82                       | 0                  | -22,82                          | -13                    | -9,82   |
| vertical      | 7.591,000                         | -44,53                       | 0                  | -44,53                          | -13                    | -31,53  |
| horizontal    | 7.996,000                         | -44,39                       | 0                  | -44,39                          | -13                    | -31,39  |
| vertical      | 10.747,000                        | -40,7                        | 0                  | -40,7                           | -13                    | -27,7   |
| horizontal    | 10.760,000                        | -40,08                       | 0                  | -40,08                          | -13                    | -27,08  |

## Limits

Compliance with § 22.917 requires that any emission be attenuated below the transmitter power by at least  $43 + 10 \log_{10} P$  ( $P$  = transmitter power in Watts).

The compliance limit was calculated as per the following table:

|                                                                                     |                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|
| Maximum transmitter output power                                                    | 1.521 W = 31.82 dBm                                    |
| Required attenuation                                                                | $43 + 10 \log_{10} 1.521 \text{ W} = 44.82 \text{ dB}$ |
| Maximum transmitter output power<br><u>Required attenuation</u><br>Compliance limit | 31.82 dBm<br><u>- 44.82 dB</u><br>-13 dBm              |

## 12 Line Conducted Emissions, FCC 15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

### Test Results

| Frequency | Max. Level |         |
|-----------|------------|---------|
|           | quasi-peak | average |
| 150 kHz   | --         | --      |

### Limits:

| Frequency of Emission (MHz) | Conducted Limit (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi Peak                   | Average  |
| 0.15-0.5                    | 66 to 56                     | 56 to 46 |
| 0.5-5                       | 56                           | 46       |
| 5-30                        | 60                           | 50       |

Test equipment used: ETS 0003, ETS 0040, ETS 0109, ETS 0125

Comment: not required.

## 13 Frequency Stability vs. Temperature, FCC 2.1055, 22.355

### 13.1 Test Procedure

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable, exited the chamber through an opening made for that purpose.

After the temperature stabilized the frequency output was recorded from the counter.

### 13.2 Test Results

#### PCS1900

| $\vartheta$ / °C | Frequency Error (Hz) | Frequency Error (ppm) |
|------------------|----------------------|-----------------------|
| 50,0             | 39                   | 0.021                 |
| 40,0             | 31                   | 0.016                 |
| 30,0             | 35                   | 0.019                 |
| 20,0             | -27                  | -0.014                |
| 10,0             | 37                   | 0.020                 |
| 0,0              | -28                  | -0.015                |
| -10,0            | 34                   | 0.018                 |
| -20,0            | 36                   | 0.019                 |
| -30,0            | -24                  | -0.013                |

#### GSM 850

| $\vartheta$ / °C | Frequency Error (Hz) | Frequency Error (ppm) |
|------------------|----------------------|-----------------------|
| 50,00            | 53                   | 0.063                 |
| 40,00            | 53                   | 0.063                 |
| 30,00            | 55                   | 0.066                 |
| 20,00            | 53                   | 0.063                 |
| 10,00            | 52                   | 0.062                 |
| 0,00             | 50                   | 0.060                 |
| -10,00           | 52                   | 0.062                 |
| -20,00           | 55                   | 0.066                 |
| -30,00           | 50                   | 0.060                 |

Limit:  $\pm 2091$  Hz

Note: The measured frequency stability vs. temperature is identical (%difference) in all bands the above table since the Tx frequency is locked to the same TCXO.

## 14 Frequency Stability vs. Voltage, FCC 2.1055, 22.355

### 14.1 Test procedure

### 14.2 Test results

#### PCS 1900

| $U_B / V$ | Frequency Error (Hz) | Frequency Error (ppm) |
|-----------|----------------------|-----------------------|
| 12        | -27                  | -0.014                |
| 10.2      | 33                   | 0.018                 |
| 13.8      | 33                   | 0.018                 |

#### GSM 850

| $U_B / V$ | Frequency Error (Hz) | Frequency Error (ppm) |
|-----------|----------------------|-----------------------|
| 12        | 53                   | 0.063                 |
| 10.2      | 58                   | 0.070                 |
| 13.8      | 52                   | 0.062                 |

## **Appendix**

|   |                                                                                       |
|---|---------------------------------------------------------------------------------------|
| A | Pictures                                                                              |
| B | RF Power Output                                                                       |
| C | ERP, EIRP                                                                             |
| D | Modulation Requirements                                                               |
| E | Audio Filter Characteristics                                                          |
| F | Emission Limitation                                                                   |
| G | Occupied Bandwidth                                                                    |
| H | Out of Band Emission at Antenna Terminals Mobile Emissions In Base<br>Frequency Range |
| I | Field Strength of Spurious Radiation                                                  |
| J | Line Conducted Emissions                                                              |
| K | Frequency Stability vs. Temperature                                                   |
| L | Frequency Stability vs. Voltage                                                       |