

**ELECTRONIC TECHNOLOGY SYSTEMS  
DR. GENZ GMBH**

# **FCC**

# **TEST - REPORT**

**FCC RULES PART 15 / SUBPART C**

**FCC ID:HQXFTR-2000**

**Test report no.:**

**W6M20405-5178-C-1**

Registration number: W6M20405-5178-C-1  
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## **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.

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

**Tester:**

01.06.2004




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| Date | ETS-Lab. | Name | Signature |
|------|----------|------|-----------|
|------|----------|------|-----------|

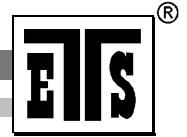
**Technical responsibility for area of testing:**

01.06.2004




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| Date | ETS | Name | Signature |
|------|-----|------|-----------|
|------|-----|------|-----------|



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## **1.2 Testing laboratory**

### **1.2.1 Location**

ELECTRONIC TECHNOLOGY SYSTEM DR. GENZ GMBH (ETS)  
Storkower Straße 38c  
D-15526 Reichenwalde b. Berlin  
Germany  
Telefon : +49 33631 888 00  
Telefax : +49 33631 888 660

### **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 : SYSGRATION LTD.  
Street : 10 FL. No. 868-3, Chung Cheng Rd.,  
Town : Chung Ho 235, Taipei  
Country : Taiwan, R.O.C.  
Telephone : +886-2-8221-7111  
Fax : +886-2-8221-7112  
  
Contact : Mark Lee  
Telephone : +886-2-8221-7111

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#### 1.4 Application details

Date of receipt of application : 14.05.2004  
Date of receipt of test sample : 14.05.2004  
Date of test : from 15.05.2004 to 25.05.2004

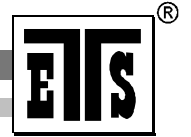
#### 1.5 General information of Test item

Type of test item : Wireless FM Modulator with DIP Switch  
Model Number : FTR-2000  
Serial number : without  
Transmitting frequency : 88.1 – 88.9 MHz  
Operation mode : simplex  
Modulation Type : FM  
Voltage supply : 9-16 VDC from vehicular battery  
Channel Numbers : 5  
Frequency of selectable Channel : 88.1MHz/88.3MHz/88.5MHz/88.7MHz/88.9MHz  
Antenna Type : Internal  
Photos : see Annex

#### Manufacturer: (if applicable)

Name : Nan-Kan Factory of SYSGRATION LTD.  
Street : No. 28-2, North Industry Rd., Nan-Kan Industrial Zone  
Town : Nan-Tou City, Nan-Tou County  
Country : Taiwan, R.O.C.

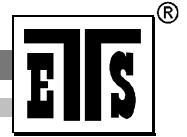
Additional information :



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## **1.6 Test standards**

Technical standard : FCC RULES PART 15 / SUBPART B § 15.109/ SUBPART C § 15.203,  
§ 15.209, § 15.239



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## **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                  |
| Details of power supply   | : 9-16 VDC from vehicular battery |

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## 2.3 Test Equipment List

| No.      | Measurement device:            | Type:           | Manufacturer:      |
|----------|--------------------------------|-----------------|--------------------|
| ETS 0001 | Test receiver                  | ESHS 10         | Rohde&Schwarz      |
| ETS 0002 | Test receiver                  | ESVP            | Rohde&Schwarz      |
| ETS 0003 | Test receiver                  | ESVS 10         | 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 | Spectrum analyzer              | PSA-65A         | Avcom              |
| ETS 0008 | Antenna                        | Loop antenna    | Siemens            |
| ETS 0009 | Antenna                        | Loop antenna    | MEB                |
| ETS 0010 | Antenna                        | Loop antenna    | MEB                |
| ETS 0011 | Antenna                        | van Veen/ Frame | ETS                |
| 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 | Antenna                        | VHAP            | Schwarzbeck        |
| ETS 0017 | Antenna                        | VHAP            | Schwarzbeck        |
| ETS 0018 | Antenna                        | UHAP            | Schwarzbeck        |
| ETS 0019 | Antenna                        | UHAP            | Schwarzbeck        |
| ETS 0020 | Antenna                        | DP 21           | MEB                |
| ETS 0021 | Antenna                        | DP 3            | MEB                |
| ETS 0022 | Antenna                        | SAS-200/ 521    | A.H. Systeme / USA |
| 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 | Turn table                     | TT 1            | ETS                |
| ETS 0031 | Turn table                     | DS 412          | Heinrich Deisel    |
| ETS 0032 | Controller                     | HD 050          | Heinrich Deisel    |
| ETS 0033 | RF generator                   | SMG             | Rohde&Schwarz      |
| ETS 0034 | RF generator/ Amplifier        | SMLR            | Rohde&Schwarz      |
| ETS 0035 | RF generator/ Amplifier        | SMLM            | Rohde&Schwarz      |
| ETS 0036 | RF amplifier                   | 10W 1000AM2     | Amplifier Research |
| ETS 0037 | RF amplifier                   | 50W 1000        | Amplifier Research |
| ETS 0038 | RF amplifier                   | 150L            | Amplifier Research |
| ETS 0039 | Absorbing clamp                | MDS 21          | Rohde&Schwarz      |
| ETS 0040 | Artificial mains               | ESH3-Z5         | Rohde&Schwarz      |
| ETS 0041 | Artificial mains               | ESH3-Z4         | Rohde&Schwarz      |
| ETS 0042 | Artificial mains               | ESH3-Z6         | Rohde&Schwarz      |
| ETS 0043 | Artificial mains               | NNB 11          | MEB                |
| 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                |



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| No.      | Measurement device:              | Type:           | Manufacturer:     |
|----------|----------------------------------|-----------------|-------------------|
| ETS 0050 | Power supply                     | T 101b          | TPW               |
| ETS 0051 | Oscilloscope                     | TDS 640A        | Tektronic         |
| ETS 0052 | Audio analyzer                   | UPA 4           | Rohde&Schwarz     |
| ETS 0053 | ECAT Control center              |                 | Keytek/ EMV       |
| ETS 0054 | EFT simulator                    |                 | Keytek/ EMV       |
| ETS 0055 | Module network coupler           |                 | Keytek/ EMV       |
| ETS 0056 | Blank plug-in                    |                 | Keytek/ EMV       |
| ETS 0057 | Module SURGE with DC coupler     |                 | Keytek/ EMV       |
| ETS 0058 | Capacitive coupling clamp        |                 | 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 | Filter system 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 | Filter system IEC 1000-4-6       | CDN             | FCC/ EMV          |
| ETS 0069 | EM Radiation Monitor             | EMR-20          | Wandel&Goltermann |
| 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 milivoltmeter                 | QRV 2           | MKD/ RFT          |
| ETS 0075 | NF generator                     | GF 22           | Präcitronic       |
| ETS 0076 | Feeding bridge A                 | SBA 1000        | ESP               |
| ETS 0077 | Audio/ Video Filter              | AV 55020        | ETS               |
| 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 Novell network 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 | DM-Coder                         | SME-B11         | Rohde&Schwarz     |
| ETS 0093 | Pulse Modulator                  | SM-B8           | Rohde&Schwarz     |
| ETS 0094 | Rear-panel connectors            | SME-B19         | 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     |

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| No.      | Measurement device:              | Type:         | Manufacturer: |
|----------|----------------------------------|---------------|---------------|
| ETS 0101 | DM-Coder                         | SME-B11       | Rohde&Schwarz |
| ETS 0102 | Pulse modulator                  | SM-B8         | Rohde&Schwarz |
| ETS 0103 | Pulse generator                  | SM-B4         | Rohde&Schwarz |
| ETS 0104 | Rear-panel connectors            | SME-B19       | Rohde&Schwarz |
| ETS 0105 | High power synthesizer/ sweeper  | SMP 22        | Rohde&Schwarz |
| ETS 0106 | Frequency extension              | SMP-B11       | Rohde&Schwarz |
| ETS 0107 | RF attenuator for SMP 22         | SMP-B15       | Rohde&Schwarz |
| 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 Realtime audio interface for | 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                       |               | ETS           |
| ETS 0116 | RF Millivoltmeter                | URV 55        | 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 0134 | Mains filter                     | MSF           | Erika Fiedler |
| 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           |
| ETS 0144 |                                  |               |               |
| ETS 0145 |                                  |               |               |
| ETS 0146 | Probe                            | TK 103        | MEB           |
| ETS 0147 | Active probe                     | ESH2-Z2       | Rohde&Schwarz |
| ETS 0148 | Test TV                          | 21PT4301/00   | Philips       |
| ETS 0149 | Power divider                    | ZAPD-21       | MCL           |
| ETS 0150 | Switcher                         | HR07-720      | Wisi          |
| ETS 0151 | Interference pulse generator     | NSG 500C      | Schaffner     |

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| No.      | Measurement device:                   | Type:          | Manufacturer:  |
|----------|---------------------------------------|----------------|----------------|
| ETS 0152 | Simulator for Load-Dump-Impulse       | NSG 506C (I)   | Schaffner      |
| ETS 0153 | Simulator for Load-Dump-Impulse       | NSG 506C (II)  | Schaffner      |
| ETS 0154 | Signal generator                      | SMG            | Rohde&Schwarz  |
| 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 | Filter system / consumer electronic   |                | Fiedler        |
| 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 - Frontend (analog)       | MFE III        | HEAD acoustics |
| ETS 0170 | Measurement - Frontend (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 - Frontend line interface | MFE V          | HEAD acoustics |
| ETS 0175 | Software Line interface (analog)      | COPTZV5        | HEAD acoustics |
| ETS 0176 | Acoustic volt meter                   | COP 4          | HEAD acoustics |
| ETS 0177 | Feeding bridge B                      | SBA 1000       | ESP            |
| ETS 0178 | Open area test side                   | 30m            | ETS            |
| ETS 0179 | Open area test side                   | 30m            | ETS            |
| ETS 0180 | Artificial mains                      | NNB01/RFZ      | ETS            |
| 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       | Sandex         |
| 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      |

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| No.      | Measurement device:           | Type:       | Manufacturer:      |
|----------|-------------------------------|-------------|--------------------|
| ETS 0203 | Digital thermometer           | Type K      | Amarell            |
| 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                |
| ETS 0217 | Millivolt meter               | URV 55      | Rohde&Schwarz      |
| ETS 0218 | RF probe                      | URV5-Z7     | Rohde&Schwarz      |
| ETS 0219 | Power sensor                  | NRV-Z2      | Rohde&Schwarz      |
| ETS 0220 | Insertion unit                | URV5-Z4     | Rohde&Schwarz      |
| ETS 0221 | ISDN-S0-Analyzer              | K1403       | Siemens            |
| ETS 0222 | ISDN Protocol Analyser        | TE965       | Tekelec Teleco.    |
| ETS 0223 | GSM/ PCN/ PCS-Simul.          | TS8915B     | Rohde & Schwarz    |
| ETS 0224 | GSM System Simulator          | FTA         | 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 Commun. Tester          | CMT 54      | Rohde & Schwarz    |
| ETS 0230 | Radio Commun. Tester          | CMD 65      | Rohde & Schwarz    |
| ETS 0231 | Testreceiver                  | ESVS 30     | Rohde & Schwarz    |
| ETS 0232 | Radiation test source         | VSO 1       | MEB                |
| ETS 0233 | Direction coupler             | RK 100      | MEB                |
| ETS 0234 | Power meter                   | NRVD        | Rohde & Schwarz    |
| ETS 0235 | RF-network-analyser           | 8752 C      | Hewlett Packard    |
| ETS 0236 | RF-amplifier                  | 100A100     | Amplifier Research |
| ETS 0237 | RF-amplifier                  | 100W1000M1  | Amplifier Research |
| ETS 0238 | Field strength meter          | FM 2000     | Amplifier Research |
| ETS 0239 | Isotr. field probe 40 GHz     | FP 2080 Kit | Amplifier Research |
| ETS 0240 | Isotr. field probe 1 GHz      | FP 2000 Kit | Amplifier Research |
| ETS 0241 | Pulse Generator               | 4050        | PicoSecond PL      |
| ETS 0242 | Harmonics analyser            | 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 0252 | System controller             | PSM 12      | Rohde & Schwarz    |
| ETS 0253 | Spectrum analyser             | FSIO        | Rohde & Schwarz    |
| ETS 0254 | RF generator                  | SMIO 03     | Rohde & Schwarz    |

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| No.      | Measurement device:   | Type:     | Manufacturer:      |
|----------|-----------------------|-----------|--------------------|
| ETS 0255 | RF generator          | SMIO 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        |           | Wird               |
| ETS 0264 | Spectrum analyser     | F 1048    | HAMEG              |
| ETS 0265 | Loop antenna          | HFRA 9150 | Schwarzbeck        |
| ETS 0267 | RF signal generator   | SMT 03    | Rohde & Schwarz    |
| ETS 0268 | RF signal generator   | SMP 02    | Rohde & Schwarz    |
| ETS 0270 | RF signal generator   | SMP 04    | Rohde & Schwarz    |
| ETS 0271 | Test receiver         | ESI 40    | 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 analyser        | 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 analyser     | FSM       | Rohde & Schwarz    |
| ETS 0282 | RF bridge             | 86207 A   | Hewlett Packard    |
| ETS 0283 | RF bridge             | 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    |
| 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 0296 | Oscilloscope          | TDS 520 A | Tektronix          |
| 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 | Kevtek             |
| ETS 0303 | Telecom line CDN      | CM-TEL CD | Kevtek             |
| 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          |

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| No.      | Measurement device:          | Type:             | Manufacturer:   |
|----------|------------------------------|-------------------|-----------------|
| ETS 0308 | Spectrum analyser            | 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 0317 | 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 0321 | RF Millivoltmeter            | URV 55            | Rohde & Schwarz |
| ETS 0322 | Insertion unit               | URV5-Z4           | Rohde & Schwarz |
| ETS 0323 | DECT portable part           | Gigaset 1000      | SIEMENS         |
| ETS 0324 | DECT fix part                | Gigaset 1000      | SIEMENS         |
| ETS 0325 | DECT portable part           |                   | Philipps        |
| ETS 0326 | DECT fix part                |                   | Philipps        |
| ETS 0327 | Blue Unit                    | V 2.0             | Nokia           |
| ETS 0328 | BT Protocol tester           | PTW 60            | Rohde & Schwarz |
| ETS 0330 | Spectrum analyser            | FSM               | Rohde & Schwarz |
| 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 | Bluetooth test set           | TS8960            | Rohde & Schwarz |
| ETS 0341 | EN 61000-4-8 Test System     | F-1000-4-8/9/10-L | Fisher Custom   |

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## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2000 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 according to ANSI STANDARD C63.4-2000 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient. temperature of the UUT was 23°C with a humidity of 40 %.

**FORMULA OF CONVERSION FACTORS:** 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

The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2000 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

Measurements were made by ETS Dr. Genz GmbH, Germany at the registered open field test site located at Storkower Str. 38c, 15526 Reichenwalde Germany. The Registration Number: 96970.

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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.

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

The formula is as follows:

Average = Peak + Duty Factor

Duty Factor =  $20 \log(\text{dwell time}/T)$

T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

ANTENNA & GROUND:

**This unit uses internal antenna. There is no provision for an external antenna (see photo).**



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**3 Test results (enclosure)**

| TEST CASE                            | Required                            | Test passed                         | Test failed              |
|--------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| Emission bandwidth 15.239 (a)        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Carrier (Field Strength) 15.239 (b)  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Spurious Emissions 15.239 (c)        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Power Line Conducted Emission 15.207 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |

**The follows is intended to leave blank.**

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### 3.1 Emission Bandwidth

FCC Rule: 15.239(a)

| Test condition                        |                                 | Bandwidth (kHz) |
|---------------------------------------|---------------------------------|-----------------|
| $T_{\text{nom}} = 23^{\circ}\text{C}$ | $V_{\text{nom}} = 12 \text{ V}$ | 163.82765531    |
| Measurement uncertainty               |                                 | < 10 Hz         |

Limit: Within 200kHz

Remarks: See attached diagrams

Test equipment used: ETS 0080, ETS 0089, ETS 0114, ETS 0159, ETS 0189,  
ETS 0271**The following is intended to leave blank.**

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### 3.2 Carrier ( Field Strength)

FCC Rule: 15.239(b) , 15.35

| Test condition          |                  | Carrier Frequency<br>(MHz) | Field strength<br>(dB $\mu$ V/m) |
|-------------------------|------------------|----------------------------|----------------------------------|
| $T_{nom} = 23^{\circ}C$ | $V_{nom} = 12 V$ | 88.490                     | 46.77                            |
| Measurement uncertainty |                  | < 3 dB                     |                                  |

Limit:

| Frequency (MHz) | Field Strength of Fundamental |                   |
|-----------------|-------------------------------|-------------------|
|                 | ( $\mu$ V/m@3m)               | (dB $\mu$ V/m@3m) |
| 88-108          | 250                           | 48                |

The emission limit above is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

Remarks: See attached diagrams.

Test equipment used: ETS 0001, ETS 0003, ETS 0012, ETS 0013, ETS 0016,  
ETS 0017, ETS 0080, ETS 0159, ETS 0189, ETS 0291,  
ETS 309, ETS 0310, ETS 0311

**The following is intended to leave blank.**

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### 3.3 Spurious Emission

FCC Rules: 15.239 (c), 15.209

Radiated emission measurements were performed from 30 MHz to 1000 MHz.

For radiated emission tests, the analyzer setting was as followings:

Frequency  $\leq$  1 GHz, RBW: 100 kHz, VBW: 100 kHz (Peak measurements)

Frequency  $>$  1 GHz, RBW: 1 MHz, VBW: 1 MHz (Peak measurements)

Frequency  $>$  1 GHz, RBW: 1 MHz, VBW: 100Hz (Average measurements)

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

| Freq, | Used Ch, | Frequency Marker [MHz] | Polarization | corrections dB | Corrected Reading [dBuV/m] | Compliance Limit [dBuV/m] | Detector | BW [MHz] | Margin |
|-------|----------|------------------------|--------------|----------------|----------------------------|---------------------------|----------|----------|--------|
| 1     | 1        | 175,832                | V            |                | 21,02                      | 43,5                      | P        | 0,1      | -22,48 |
| 1     | 1        | 175,832                | H            |                | 20,11                      | 43,5                      | P        | 0,1      | -23,39 |
| 2     | 1        | 439,580                | H            |                | 25,08                      | 46                        | P        | 0,1      | -20,92 |
| 1     | 3        | 177,194                | H            |                | 18,64                      | 43,5                      | P        | 0,1      | -24,86 |
| 1     | 3        | 177,194                | V            |                | 18,89                      | 43,5                      | P        | 0,1      | -24,61 |
| 2     | 3        | 885,974                | V            |                | 28,12                      | 46                        | P        | 0,1      | -17,88 |
| 1     | 5        | 177,876                | V            |                | 19,54                      | 43,5                      | P        | 0,1      | -23,96 |
| 1     | 5        | 177,876                | H            |                | 18,89                      | 43,5                      | P        | 0,1      | -24,61 |
| 2     | 5        | 879,760                | V            |                | 28,13                      | 46                        | P        | 0,1      | -17,87 |

All other not noted test plots do not contain significant emissions in reference to the limits

Comment: See attached diagrams

Limits: 15.209

| Frequency of Emission (MHz) | Field strength (microvolts/meter) | Field Strength (dB microvolts/meter) |
|-----------------------------|-----------------------------------|--------------------------------------|
| 30 – 88                     | 100                               | 40.0                                 |
| 88 – 216                    | 150                               | 43.5                                 |
| 216 – 960                   | 200                               | 46.0                                 |
| Above 960                   | 500                               | 54.0                                 |



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Test equipment used:                    ETS 0001, ETS 0003, ETS 0012, ETS 0013, ETS 0016,  
   ETS 0017, ETS 0080, ETS 0159, ETS 0189, ETS 0291,  
   ETS 309, ETS 0310, ETS 0311

**The following is intended to leave blank.**

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### 3.4 Power Line Conducted Emission

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 in the table bellows 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.

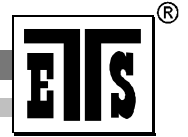
| Frequency | Level (dB $\mu$ V) |         |
|-----------|--------------------|---------|
|           | quasi-peak         | average |
|           | --                 | --      |
|           | --                 | --      |
|           | --                 | --      |
|           | --                 | --      |
|           | --                 | --      |
|           | --                 | --      |

#### Limits:

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |          |
|-----------------------------|------------------------|----------|
|                             | 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: For vehicular battery operated device, this test item is not applicable.**



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**Appendix**

- A Emission Bandwidth
- B Carrier Field Strength
- C Spurious Emissions
- D Power Line Conducted Emission
- E Pictures