|  |  |  |
| --- | --- | --- |
| X,£fY | DUALBAND VHF - UHF\* ANTENNA 155-165 MHz, 440-470 MHz | BFRD2 |
| /vCvA | LeAntenne offers a very wide range of multi-band antennas. Our products can be tailored according to the customer’s need. Antenna includes international patent for safety and  security system | BFRD2- 3V |
| LEANTENNE |  |

**ELECTRIC CHARACTERISTICS**

**MAIN**

Frequency range: 155-165 MHz

Input impedance: 50 Q

V.S.W.R.: <1,6:1 GROUNDING

Maximum rated RF power: 30 W ( AND HIGH-VOLTAGE \

Polarization: vertical V )

Gain: 0 dB over A/4 monopole SNCF APPROVED

**MECHANICAL CHARACTERISTICS**

Dimensions: 360x80x145 mm

Total weight: abt. 0,8 kg

Mounting: on metallic surface (600x600 mm minimum)

Body material: Aluminium with SURTEC 650 treatment

Radome material: High impact polycarbonate

Connectors: Silver plated brass

Type of connection: N female

Operating temperature range: -40°to+70°C MOI IMTIMTi FI A NrSF

Reliability: above to 200,000 hours ivivun i iriva ri\_MMvac:

Mounting: on a conductive surface with a minimum size of 1500x1500 mm; it’s advisable to keep the mounting surface clean for a better electrical contact.

MUD 4 holes flange: flange with 4 M10 studs included; see mounting flange A on page 39. MUD-3V 3 screws flange: flange with 3 screws \_ \_ \_ \_ included, according to FEDERTRASPORTI

ENVIRONMENTAL CHARACTERISTICS 00104/5; see mounting flange C on page 39.

**ATMOSPHERIC and CLIMATIC CONDITIONS according to NF EN 60068**

Temperature conditions -40°C, +70°C

Atmospheric pressure -40°C, +70°C, 95% HR at 2000 mt Grounding and high voltage protection:

Rain, hail, snow, frost 1000 mm/h, 1 J impact, 0.5 m, 3 cm Our antennas have passed the strict SNCF’s

Combined wind and train speed 530 km/h tests that approved our products as protected

against lighting and high-tension voltage thanks

**MECHANICAL CONDITIONS according to NF EN 60068, 61373 and 15-818** to our patented DC and AC grounded system.

Free falls 1 m ‘Advantage: UHF frequency range could be

Hits (vertical, cross-sectional, longitudinal) 30 g, 30 g, 50 g, 30ms modlfy on Chent reduest'

Impacts 50 J

**GROUNDING and HIGH VOLTAGE PROTECTION according to NF EN 50388 and NF EN 50123**

Short-circuit currents flow/time before 70 kA/5 ms-40 kA/100 ms (DC) Approved by: SNCF, SNCB, TRENITALIA

breaking 31,5 kA / 10 ms - 15 kA / 100 ms (AC)

**Complete datasheet with full characteristics and radiation patterns on request**

**Eaton 9PX 1:1 UPS**

6 - 11kVA



**Energy efficient power protection**



**Performance and Efficiency**

* Double conversion topology. The Eaton 9PX constantly monitors power conditions and regulates voltage and frequency.
* With up to 95% efficiency in online double conversion mode and 98% in high-efficiency mode the 9PX provides the highest efficiency level in its class to reduce energy & cooling costs.
* With a 0.9 power factor the 9PX delivers 28% more power than other UPS in it's class. It powers more servers than other UPSs with equivalent VA ratings and lower power factors.
* With a RT (Rack/tower) versatile form factor the 9PX is the most compact solution in its class delivering up to 5.4kW in only 3U and 10kW in only 6U.

**Manageability**

* The new graphical LCD provides clear information on the UPS's status and measurements on a single screen (in seven languages). LCD display position can be adjusted to offer the best viewable angle for tower and rack usage.
* The 9PX can meter energy consumption. kWh values can be monitored using the LCD or Eaton's Intelligent Power®

Software Suite.

* Load segment control enables prioritised shutdowns of non-essential equipment to maximise battery runtime for critical devices. It can also be used to remotely reboot locked-up network equipment orto manage scheduled shutdowns and sequential start-ups.
* The 9PX offers Serial, USB and relay connectivity, plus an

extra slot for an optional card (Ethernet Network, Voltage Free Contact

Relay, or Modbus & Network). Eaton's Intelligent Power®

Software Suite compatible with all major OS including virtualisation software such as VMware and Hyper-V is included with each UPS.

**Availability and Flexibility**

* The internal bypass allows service continuity in case of

internal fault, a Maintenance Bypass Module is also available for easy UPS replacement without interruption to the critical load" for easy replacement of the UPS without powering down critical systems.

* The Eaton 9PX can be paralleled to achieve twice the power of unitary product using Eaton's proprietary Hot Sync® technology.
* Stronger, longer battery life: Eaton ABM® battery management technology uses an innovative three-stage charging technique that extends battery life by up to 50%.
* More run time can be added with up to 12 external hot swappable battery modules, able to run systems for hours if

necessary. The additional battery modules are automatically recognised by the UPS.

**Advanced protection for:**

* Small & medium data centre
* IT, Networking, Storage and Telecom
* Infrastucture, Industrial and Medical



Rack/Tower versatile (6kVA model depicted)



9PX 11kVAwith

Maintenance

ByPass

■ 9PX LCD tilts 45° for ease-of-viewing



*Powering Business Worldwide*



What's in the box:

* **Pedestal feet**
* **USB cable**
* **Serial cable**
* **Cable retention brackets**
* **Safety instruction guide**
* **Software suite CD**
* **User manual**



Eaton 9PX 8-11kVA UPS

Eaton 9PX 6kVA UPS

1. Remote Off/On and Remote Power Off connectors
2. Slot for Network-MS, ModBus-MS or Relay-MS cards
3. Parallel operation port (DB15)
4. External battery module (EBM) connector with automatic detection (RJ11)
5. 8 IEC 10A sockets (2 groups of 4 manageable sockets) with cable retention system
6. 2 IEC 16A sockets with cable retention system
7. DB 9 with output contacts
8. USB and serial ports
9. Input/Output connection



*&*

Windows 7



|  |  |  |  |
| --- | --- | --- | --- |
| Technical Specifications | 6kVA | 8kVA | 11kVA |
| Rating (kVA/kW) | 6kVA/5.4kW | 8kVA/7.2kW | 11kVA/10kW |
| Electrical Characteristics | | | |
| Technology | On-line double conversion with Power Factor Correction (PFC) system | | |
| Nominal voltage | 200/208/220/230/240V | 200/208/220/230/240V/250V |  |
| Input voltage range | 176-276V without derating (up to 100-276V with derating) | | |
| Output voltage/THDU | 200/208/220/230/240V +/- 1%; THDU <2% | 200/208/220/230/240/250V +/- 1%; THDU <2% | |
| Input frequency range/THDI | 40-70Hz, 50/60Hz autoselection, frequency converter as standard, THDI < 5% | | |
| Efficiency | Up to 94% in Online mode, 98% in Hi-Efficiency mode | Up to 95% in Online mode, 98% in Hi-Efficiency mode | |
| Crest factor/short circuit current | 3:1/90A | 3:1/120A | 3:1/150A |
| Overload capacity | 102-110% : 120s, 110-125%: 60s, 125150%: 10s, >150%: 500ms | 102-110% : 120s, 110-125%: 60s, 125-150%: | 10s, >150%: 900ms |
| Connections | | | |
| Input | Terminal block (up to 10 mm2) | Terminal block (up to 16mm2) | |
| Outputs | Terminal block + 2 controlled groups of 4 IEC C13 (10A) + 2 IEC C19 (16A) | Terminal block | |
| Outputs with optional HotSwap Maintenance Bypass | Terminal block + 3 IEC C13 (10A) + 2 IEC C19 (16A) | Terminal block + 4 IEC C19 (16A) | |
| Batteries | | | |
| Typical backup times at 50 and 70% load\* | | | |
| 9PX (8 & 11 kVA = 1 Power Module + 1 EBM) | 11/8 min | 20/15 min | 13/9min |
| 9PX + 1 EBM (8 & 11 kVA = Total 2 EBM) | 48/34 min | 48/32 min | 32/21 min |
| 9PX + 4 EBM (8 & 11 kVA = Total 5 EBM) | 170/120 min | 140/100 min | 100/70 min |
| Battery management | ABM® and temperature compensated charging method (user selectable), automatic battery test, deep discharge protection, automatic recognition of external battery units. | | |
| Communication | | | |
| Communication ports | 1 USB port, 1 RS232 serial port (USB and RS232 ports cannot be used simultaneously), 4 dry contacts (DB9), 1 mini terminal block for remote On/Off and 1 for Remote Power Off, 1 DB15 for parallel operation. | | |
| Communication slot | 1 slot for Network-MS card, ModBus-MS or Relay-MS cards. | | |
| Operating conditions, standards and approvals | | | |
| Operating temperature | 0 to 40°C continuous | | |
| Noise level | <45dB | <48db | <50db |
| Safety | IEC/EN 62040-1, UL 1778, CSA 22.2 | | |
| EMC, performance | IEC/EN 62040 -2 , FCC Class A, IEC/EN 62040-3 (Performance) | | |
| Approvals | CE, CB report (TUV), UL (6kVA UPS, 8 and 11kVA power module) | | |
| Dimensions H x W x D/Weight | | | |
| UPS (8 & 11 kVA = 1 Power Module + 1 EBM) | 440(19")\*130(3U)\*685mm/48kg | 440(19'')\*260(6U)\*700mm/84kg | 440(19'')\*260(6U)\*700mm/86kg |
| EBM | 440(19")\*130(3U)\*645mm/68kg | 440(19")\*130(3U)\*680mm/65kg | 440(19")\*130(3U)\*680mm/65kg |
| Power module | - | 440(19")\*130(3U)\*700mm/19kg | 440(19")\*130(3U)\*700mm/21kg |
| Customer Service and Support | | | |
| Warranty | 3 years electronics, 2 years battery |  |  |

\* Runtimes are shown at 0.7 power factor. Backup times are approximate and may vary with equipment, configuration, battery age, temperature, etc

|  |  |  |  |
| --- | --- | --- | --- |
| Part Numbers | 9PX 6kVA | 9PX 8kVA | 9PX 11kVA |
| UPS | 9PX6Ki |  |  |
| Power Module | - | 9PX8KiPM | 9PX11KiPM |
| EBM | 9PXEBM180 | 9PXEBM240 | 9PXEBM240 |
| HotSwap Maintenance Bypass | MBP6Ki | MBP11Ki | MBP11Ki |
| Transformer Module | TFMR11Ki | TFMR11Ki | TFMR11Ki |
| Supercharger with Rack Kit | - | SC240RT | SC240RT |
| 1.8m Battery Connection Cable | EBMCBL180 | EBMCBL240 | EBMCBL240 |
| Battery Integration System | BINTSYS | BINTSYS | BINTSYS |
| Rack Kit | 9RK | 9RK | 9RK |
| Parallel & bypass module | 9PXMEZ6Ki | 9PXMEZ11Ki | 9PXMEZ11Ki |

**F;T>N**

*Powering Business Worldwide*

**Switch &N to Eaton**

Eaton Australia

1300 UPS UPS

[www.eaton.com/powerquality](http://www.eaton.com/powerquality)

[aupqsales@eaton.com](mailto:aupqsales@eaton.com)

Eaton New Zealand

0508 EATON NZ

[www.eaton.com/powerquality](http://www.eaton.com/powerquality)

[NZSales@eaton.com](mailto:NZSales@eaton.com)

In the interests of continuous product improvement all specifications are subject to change without notice. © 2013 Eaton, All Rights Reserved. 779PQ

**Train Antenna**

**790 - 2700 MHz and GPS 1575 MHz 87010003**

Antennen • Electronic

• Multi-band antenna: 800/900/1800/1900/UMTS/ UMTS II/W-LAN and GPS.

The antenna can be operated in all frequency ranges simultaneously. Low profile antenna in fiberglass radome.

The antenna fulfils the requirements according to EN 50155.

|  |  |
| --- | --- |
| Type No. | 87010003 |
| Antenna multi-band  Input | N female |
| Frequency range | 790 - 2700 MHz |
| VSWR | 790 - 806 MHz: < 2.2 |
| Gain | 806 - 870 MHz: < 2.0 870 - 2550 MHz: < 1.5 2550 - 2700 MHz: < 2.0 0 dB (ref. to the quarter-wave antenna) |
| Impedance | 50 Q |
| Polarization | Vertical |
| Max. power | 100 W (at 50° C ambient temperature) |
| Inner conductor | D.C. grounded |
| Antenna GPS  Input | Cable RG 316/U of 225 mm length |
| Frequency range | with TNC male connector 1575.42 ±1 MHz |
| VSWR | < 1.5 |
| Polarization | Right hand circular |
| Gain (90° elevation) | 2 dB (ref. to the circularly polarized |
| Impedance | isotropic antenna) 50 Q |
| Inner conductor | D.C. grounded |
| Weight | approx. 0.5 kg |
| Packing size | 152 x 91 x 125 mm |
| Height | 81 mm |



Mounting flange:

Material: Radiator: Copper and brass.

Flange: Aluminum. Radome: Fiberglass.

All screws and nuts: Stainless steel.

Colour: Grey.

Mounting: On a conductive surface with a minimum size

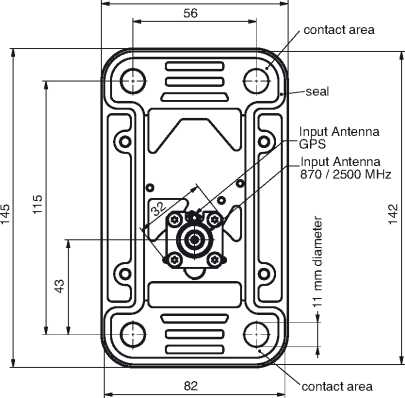
of 50 x 50 cm using 4 M10 bolts.

Grounding and This antenna, tested by an independent institute

high voltage protection: and approved by the “Deutsche Bahn AG”, is

D.C. grounded to protect against lightning and high-tension lines.

85



Mounting hole for the connector: 33 mm (max. 35 mm)

Accessories:

Warning:

Low noise amplifier GPS 86010142 (please order separately).

If the antenna is operated without the preamplifier type no. 86010142, please note the following points.

* Due to the fact that the inner conductor of the antenna GPS is DC grounded, the input of the GPS receiver is loaded with a DC short circuit. If the GPS receiver provides a remote DC power supply, this could damage the GPS receiver.
* At the input of the antenna GPS a level of -25 dB below the signal applied at the input of the antenna multi-band appears. Depending on the level of the signal applied at the input of the antenna multi-band, the GPS receiver may be overloaded or damaged.

Note: Mounting surface must be free from paint for electrical contact.

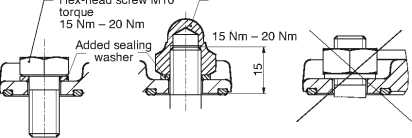
Evenness of opposite surface 0.2 mm.

U/\v ium a

Cap nut

M10 DIN 1587

torque



Situation of mounting

Use a cap nut or hex-head screw plus the enclosed sealing washer.

**Train Antenna 790 - 2700 MHz 87010007**

* Multi-band antenna: 800/900/1800/1900/UMTS/UMTS II/W-LAN.
* The antenna can be operated in all frequency ranges simultaneously.
* Low profile antenna in fiberglass radome.
* The antenna fulfils the requirements according to EN 50155.

|  |  |
| --- | --- |
| Type No. | 87010007 |
| Antenna multi-band |  |
| Input | N female |
| Frequency range | 790 - 2700 MHz |
| VSWR | 790 - 806 MHz: < 2.2 806 - 870 MHz: < 2.0 870 - 2550 MHz: < 1.5 |
|  | 2550 - 2700 MHz: < 2.0 |
| Gain | 0 dB (ref. to the quarter-wave antenna) |
| Impedance | 50 Q |
| Polarization | Vertical |
| Max. power | 100 W (at 50° C ambient temperature) |
| Inner conductor | D.C. grounded |
| Weight | approx. 0.5 kg |
| Packing size | 152 x 91 x 125 mm |
| Height | 81 mm |

Material: Radiator: Copper and brass.

Flange: Aluminum. Radome: Fiberglass.

All screws and nuts: Stainless steel.

Colour: Grey.

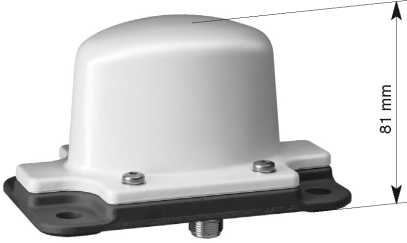
Mounting: On a conductive surface with a minimum size

of 50 x 50 cm using 4 M10 bolts.

Grounding and This antenna, tested by an independent institute

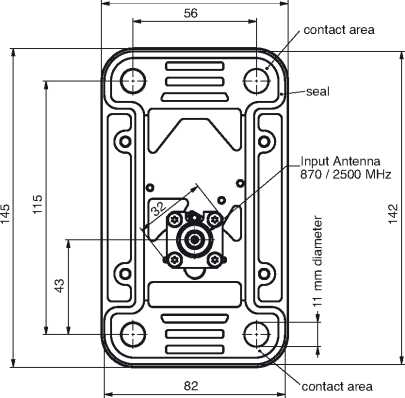
high voltage protection: and approved by the “Deutsche Bahn AG”, is

Antennen • Electronic



Mounting flange:

85



D.C. grounded to protect against lightning and high-tension lines.

Mounting hole for the connector: 33 mm (max. 35 mm)

Note: Mounting surface must be free from paint for electrical contact.

Evenness of opposite surface 0.2 mm.

Use a cap nut or hex-head screw plus the enclosed sealing washer.

- Cap nut M10 DIN 1587

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 15 Nm - | 20 Nm | \ti=n / | | | |
|  |  | y/j'l m |  | \ | z |  |
|  | | | |
|  |  |  | | | | | |

Hex-head screw M10 torque

15 Nm - 20 Nm

Situation of mounting

<$>

**Certificate Number 4180-12361/2014**

**ROHDE&SCHWARZ** Calibration Certificate

|  |  |  |
| --- | --- | --- |
| Unit Data |  | This calibration certificate documents, that the named item is tested and measured |
| Item | Spectrum Analyser | against defined specifications. Measurement results are located usually In the corresponding interval with a probability |
| Manufacturer | ANRITSU  S331A | of approx. 95% (coverage factor k=2). Calibration is performed with test equipment and standards directly or |
| Type | indirectly traceable by means of approved calibration techniques to the PTB/DKD or |
|  |
| Material No. | 0001.0001.00 Serial No. 708019 | other national/international standards, which realize the physical units of measurement according to the |
| Asset No. |  | International System of Units (SI). In all cases where no national standards are |

Order Data

available, measurements are referenced to standards of the R&S laboratories. Principles and methods of calibration correspond with ISO / IEC 17025. The

|  |  |  |  |
| --- | --- | --- | --- |
| Metalcom Közép-Európai Technológiai és Szolgáltató Customer Holding Zrt.  Nagynyomás 16.  Szentes  6600  Hungary  Order No. | | | metrological confirmation system for the measuring equipment used is in compliance with DIN ISO 10012-1.  The applied quality system is certified to DIN EN ISO 9001.  This calibration certificate may not be reproduced other than In full. Calibration certificates without signatures are not valid. The user is obliged to have the object recalibrated at appropriate Intervals. |
| Date of Receipt 2014-09-15 |  |  |  |
| Performance  Place and date of calibration | 1.RSHU, 2014-09-22 |  |  |
| Scope of calibration | Standard Calibration |  |  |
| Statement of Compliance (Incoming) | All measured values are within the data sheet specifications | |  |
| Statement of Compliance (Outgoing) | All measured values are within the data sheet specifications | |  |
| Extent ofCalibration Documents | 3 pages test report |  |  |
| Rohde & Schwarz Hungária Szolgáltató Kft.  Date of issue Head of laboratory | | Person Responsible |  |
|  |  | /fí(- |  |
| 2014-09-22 | Bíró Zsolt | Török Attila | Page 1 / 3  PT 3583.9833.00 |

ROHDE & SCHWARZ Hungária Szolgáltató Kft. H-1138 Budapest, Madarász Viktor utca 47-49.

**Calibration instruction**

**Page 2 / 3**

**Material Number 0001.0001.00**

**Serial No 708019**

Certificate Number 4180-12361/2014

**Ambient temperature**

**23 +/- 3° C**

**Relative humidity 20%-60%**

**UGB1 A compliance statement may be possible where a confidence level of less than 95 % is acceptable. UGB2 A non-compliance statement may be possible where a confidence level of less than 95 % is acceptable.**

According to Performance Test

This Calibration fulfils the requirements of the standard / guidelines

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Working Standards used | | | | |
| Item | Type | Serial No. | Certificate No. | Cal. due |
| Spectrum analyzer | FSP7 | 100133 | -11738/2014 | 2016-06-15 |
| Cal.kit N, 50Ohm | ZV-Z21 | 100642 | 10-300319959 | 2016-01-23 |
| RF step attenuator 50 Ohm, 1 | RSG | 843247/0012 | 10-300312774 | 2016-05-12 |
| W, DC-5.2 GHz, 139 dB |  |  |  |  |
| Average power sensor 10 MHz - | NRP-Z21 | 102142 | -9999/2013 | 2015-07-16 |
| 18 GHz, 200 pW - 200 mW,N(m) |  |  |  |  |

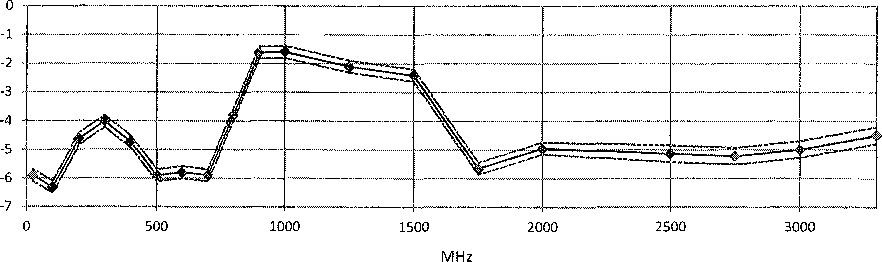
Notes

Installed options are included in calibration. Depending on installed options, number of pages of the record are not consecutive.

|  |  |  |  |
| --- | --- | --- | --- |
| Object | Anritsu Site Master |  |  |
| Type | S331A | Serial No. | 708019 |
| Date | 2014-09-22 | Material No. | — |
| Page | 3 of 3 | Certificate No. | 4180-12361/2014 |

EXE-Vers: 2.11.1.1/MeaOp6 2.01/2014-09-18 10:21 INI-Vers: V1-14/243580/2014-09-22 V1-01/Ams1/TOE/2013-10

Output Level Accuracy



KÖHDE& SCHWARZ Hungária Szolgáltató Kft.

V1-01/Temo/RSHU/2013-09

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Description | Lower Limit | Result Measured | Upper Limit | Uncertainty |
| 1 Frequency Accuracy |  |  |  |  |
| 1000 MHz | -75000.00 Hz | -8001.83 Hz | 75000.00 Hz | 0.06 Hz |
| 2 Output Level Accuracy  Center: |  |  |  |  |
| 25 MHz | — | -5.90 dBm | \_\_ | 0.21 dB |
| 100 MHz | -- | -6.30 dBm | — | 0.21 dB |
| 200 MHz | - | -4.63 dBm | — | 0.21 dB |
| 300 MHz | ~ | -4.01 dBm | \_\_ | 0.21 dB |
| 400 MHz | — | -4.73 dBm | — | 0.21 dB |
| 500 MHz | — | -5.90 dBm | - | 0.21 dB |
| 600 MHz | — | -5.79 dBm | -- | 0.21 dB |
| 700 MHz | — | -5.89 dBm | — | 0.21 dB |
| 800 MHz | — | -3.80 dBm |  | 0.21 dB |
| 900 MHz | — | -1.62 dBm |  | 0.21 dB |
| 1000 MHz | \_\_ | -1.59 dBm | — | 0.21 dB |
| 1250 MHz | — | -2.10 dBm | — | 0.21 dB |
| 1500 MHz | — | -2.40 dBm | — | 0.21 dB |
| 1750 MHz |  | -5.65 dBm | \_\_ | 0.21 dB |
| 2000 MHz | -- | -4.94 dBm | -- | 0.21 dB |
| 2500 MHz | — | -5.14 dBm | \_\_ | 0.29 dB |
| 2500 MHz | ~ | -5.14 dBm | - | 0.29 dB |
| 2750 MHz | — | -5.22 dBm | - | 0.29 dB |
| 3000 MHz | -- | -4.99 dBm | ~ | 0.29 dB |
| 3300 MHz | - | -4.49 dBm | - | 0.29 dB |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3 Return Loss Accuracy  6 dB (Worst Case) 20 dB (Worst Case) | -1.00 dB -1.50 dB | -0.58 dB -0.75 dB | 1.00 dB 1.50 dB | 0.20 dB 0.20 dB |
| 4 Dynamic Range  25MHz-3.3GHz (Worst Case) | -- | 50.46 dB | — | 1.7 dB |

Declaration of Conformity

Manufacturer,

Eaton Industries France 110 rue Blaise Pascal 38330 Montbonnot Saint Martin France

declare under our sole responsibility that product family,

Eaton 9PX

Model(s) listed on page 2,

Product Description : Uninterruptible Power Supply (UPS)

provided that it is installed, maintained and used in the application intended for, with respect to the relevant manufacturers instructions, installation standards and “good engineering practices”,

complies with the provisions of Council directive(s):

2006/95/EC Low Voltage Directive

2004/108/EC EMC Directive

2011/65/EU RoHS - Restriction of Hazardous Substances

CE mark affixed on the product in 2013, based on compliance with European standards:

EN 62040-1 : 2008

Uninterruptible power systems (UPS) - Part 1: General and safety requirements for UPS EN 62040-2 : 2006

Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements EN 50581 : 2012

Technical documentation for the assessment of electrical and electronic products with respect to the restricts of hazardous substances

Date : 29/08/2014



Nicolas Samman Engineering Director

**F:T'N**

Powering Business Worldwide

**Orrl ARaTIOIM CJ■ CCî^ IRIVI**1**T DE.I**

Types within the range

The declaration of conformity applies to the following types within the product family:

|  |  |
| --- | --- |
| Eaton 9PX | Part Number  9PX5KÍBP |
| Eaton 9PX | 9PX5KÍRTN |
| Eaton 9PX | 9PX5K |
| Eaton 9PX | 9PXM10KÍRTN |
| Eaton 9PX | 9PX6KÍBP |
| Eaton 9PX | 9PX6KÍRTN |
| Eaton 9PX | 9PX6K |
| Eaton 9PX | 9PX6KÍBP31 |
| Eaton 9PX | 9PX6KÍRTNBP31 |
| Eaton 9PX | 9PX6KÍPM31 |
| Eaton 9PX | 9PXM12KÍRTN |
| Eaton 9PX | 9PX8KÍBP |
| Eaton 9PX | 9PX8KÍRTNBP |
| Eaton 9PX | 9PX8KÍPM |
| Eaton 9PX | 9PX8K |
| Eaton 9PX | 9PX8KÍBP31 |
| Eaton 9PX | 9PX8KÍRTNBP31 |
| Eaton 9PX | 9PX8KÍPM31 |
| Eaton 9PX | 9PXM16KÍRTN |
| Eaton 9PX | 9PX1 IKiBP |
| Eaton 9PX | 9PX1 IKiRTNBP |
| Eaton 9PX | 9PX1 IKiPM |
| Eaton 9PX | 9PX11K |
| Eaton 9PX | 9PX11KÍBP31 |
| Eaton 9PX | 9PX11KÍRTNBP31 |
| Eaton 9PX | 9PX11KÍPM31 |
| Eaton 9PX | 9PXM22KÍRTN |
| Eaton 9PX Battery Module | 9PXEBM180 |
| Eaton 9PX Battery Module | 9PXEBM240 |
| Eaton 9PX Battery Module | 9PXEBM240RT |
| Eaton 9PX Battery Module | 9PXEBM240NB |
| Eaton HotSwap MBP | MBP6KÍ |
| Eaton HotSwap MBP | MBPllKi |
| Eaton HotSwap MBP | MBP11KÍ31 |
| Eaton 9PX ModularEasy | 9PXMEZ6K.Í |
| Eaton 9PX ModularEasy | 9PXMEZ11 Ki |
| Eaton Accessories | SC240RT |
| Eaton Accessories | SC240RT6A |
| Eaton Accessories | TFMR11 Ki |
| Eaton 9PX Accessories | 9PXPPDM1 |
| Eaton 9PX Accessories | 9PXPPDM2 |
| Eaton 9PX Accessories | 9PXTFMR5 |
| Eaton 9PX Accessories | 9PXTFMR11 |

Description

Eaton 9PX 5000i HotSwap

Eaton 9PX 5000i RT3U Netpack

Eaton 9PX 5000 RT3U Netpack NEMA

Eaton 9PX lOKi 5Ki Redundant RT9U Netpack

Eaton 9PX 6000i HotSwap

Eaton 9PX 6000i RT3U Netpack

Eaton 9PX 6000 RT3U Netpack NEMA

Eaton 9PX 6000i 3:1 HotSwap

Eaton 9PX 6000i 3:1 RT6U HotSwap Netpack

Eaton 9PX 6000i 3:1 Power Module

Eaton 9PX 12Ki 6Ki Redundant RT9U Netpaek

Eaton 9PX 8000i HotSwap

Eaton 9PX 8000i RT6U HotSwap Netpack

Eaton 9PX 8000i Power Module

Eaton 9PX 8000 RT6U Netpack 208V

Eaton 9PX 8000i 3:1 HotSwap

Eaton 9PX 8000i 3:1 RT6U HotSwap Netpack

Eaton 9PX 8000i 3:1 Power Module

Eaton 9PX 16Ki 8Ki Redundant RT15U Netpack

Eaton 9PX l lOOOi HotSwap

Eaton 9PX 1 lOOOi RT6U HotSwap Netpack

Eaton 9PX 1 lOOOi Power Module

Eaton 9PX 11000 RT6U Netpack 208V

Eaton 9PX 1 lOOOi 3:1 HotSwap

Eaton 9PX 1 lOOOi 3:1 RT6U HotSwap Netpack

Eaton 9PX 1 lOOOi 3:1 Power Module

Eaton 9PX 22Ki 11 Ki Redundant RT15U Netpack

Eaton 9PX EBM 180V

Eaton 9PX EBM 240V

Eaton 9PX EBM 240V RT

Eaton 9PX EBM 240V Empty

Eaton HotSwap MBP 6000i

Eaton HotSwap MBP 1 lOOOi

Eaton HotSwap MBP 1 lOOOi 3:1

Eaton 9PX ModularEasy 6000i

Eaton 9PX ModularEasy 1 lOOOi

Eaton Supercharger 240VDC

Eaton Supercharger 240VDC 6A

Eaton Transformer 1 lOOOi

Eaton Transformer & Maintenance Bypass NEMA Eaton Transformer & Maintenance Bypass HW Eaton Transformer Stepdown Eaton Transformer Stepdown

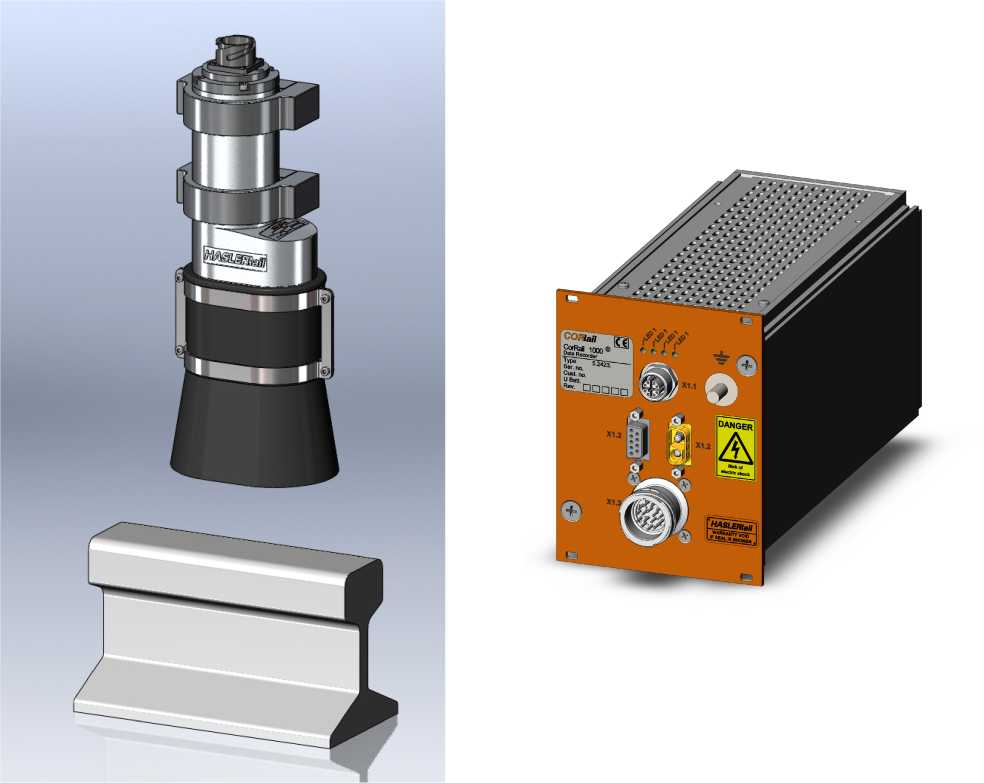
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Powering Business Worldwide

***HASLERtail***

CORRail-IOOO

List of the relevant laws and standards



CORRail-1000 - List of the relevant laws and standards

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***H AS LE Ria il***

List of the relevant laws and standards

|  |  |
| --- | --- |
| # | Name of the law |
| 01 | Environmental requirements according  EN50155:2007  EN50125-1:1999 |
| 02 | Requirements regarding humidity EN50155, §4.1.4 EN50125-1, §4.4 |
| 03 | Requirements regarding pollution EN50155, §4.2.1 EN50125-1, §4.11 |
| 04 | Requirements regarding electromagnetic compatibility EN50155, §3.2-5 |
| 05 | EMC tests must guarantee the requirements as described in  EN50121-3-2  IEC62236-3-2  RIA12 |
| 06 | Requirements regarding shock and vibration according EN61373:1999 Sensor head:  Category 2 Filter electronics:  Category 1, class B  Acceleration sources as specified in EN50125-1, §4.12.3 |
| 07 | Thermal requirements according EN50155, §4.1.2 EN50125-1, §4.3 Sensor head:  Class TX (outside the vehicle -40qC to +70qC) Filter electronics:  Class T3 ( inside cabinet -25qC to +70qC) |
| 08 | Average case ambient temperature according to EN50125, §4.3 is 25°C,  which means an inside cubicle (housing) temperature of 45qC (useful for the choice of components and reliability calculation) (to be verified) |
| 09 | Fire and smoke requirements according EN 45545-2 |
| 10 | EBO §22 Regellichtraum |
| 11 | UIC 505-1 Railway transport stock - Rolling stock construction gauge |

References

[ 1 ] User Requirement Specification - Project ORION [ 2 ] Technical System Requirement Specification - Project ORION

CORRail-1000 - List of the relevant laws and standards

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Revision

A00

2/2

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**triorail**

**special products for special customers**



Approved Technology for the GSM-Rail System

Datasheet



The TRM-3aT USB is a reliable and high-performance terminal with ASCI features for GSM-R, the new radio system for railways. Due to long standing product experience and innovative technologies this professional device is the high-end ASCI modem for GSM-R.

Technical Data

Data Services

* Dimensions
* Weight
* Power supply
* Power consumption

45 x 40 x 20 mm (L x W x H)

(not including the antenna connector)

70 g via USB

Idle mode 30 mA

Speech mode 200 mA (average),

450mA (peak)

GPRS (class 8) 200mA (average),

450mA (peak)

GPRS (class 10) 320 mA (average),

700mA (peak)

• Temperature range

Inrush current Normal operation Restr. operation Storage

900mA

-20°C to +55°C -25°C to +70°C -40°C to +70°C

* GPRS class 10 max. 86 kbps (downlink)
* PBCCH support
* Coding scheme CS 1-4
* CSD data transmission

Up to 14.4 kbps USSD

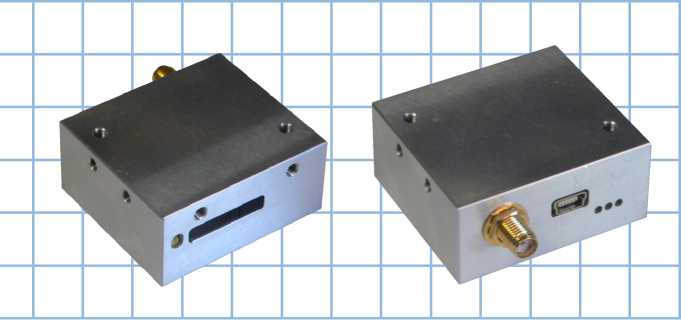
Non transparent mode V.110

* PPP stack for GPRS data transfer
* Fax group 3, class 2
* TCP/IP stack access via AT command protocols:

TCP, UDP, HTTP, FTP, SMTP, POP3

Interfaces

* USB Interface (USB Mini B connector)



* AT commands via USB CDC ACM interface
* Digital audio via USB
* Voltage supply via USB
* Antenna connector (SMA)
* Indication LED
* Miniature SIM card holder

Specifications for Voice

* Triple-rate for HR, FR, EFR
* Adaptive multi-rate (AMR)
* Hands-free operation
* Noise reduction and echo cancellation

System / Standards

* Quad-band GSM-R / EGSM 900 / GSM 1800 / GSM 1900
* GSM Phase 2 / Phase 2+
* GPRS multi-slot class 10
* Mobile station class B
* Output power

Class 4 (2 W) for GSM-R / EGSM 900 Class 1 (1 W) for GSM 1800 / GSM 1900

* Control with AT commands via virtual COM-Port

(USB CDC ACM interface)

* SIM Application Toolkit

SMS via GSM and GPRS

* Point-to-point MO and MT
* SMS cell broadcast
* Text and PDU mode

ASCI Features

* VGCS (Voice Group Call Service)
* VBS (Voice Broadcast Service)
* UUS1 (User-to-User Signalling type 1)
* eMLPP (Enhanced Multi-Level Precedence and Preemption)

Target Applications

EIRENE Features

The TRM-3aT USB can be easily and ad hoc applied for GSM-R data and voice terminal or modem solutions within PC, notebook or other process computing environment.

FN supported (Functional Number)

PFN supported (Presentation Functional Number) REC (Railway Emergency Call)

triorail

Triorail GmbH & Co. KG > Sonnenstraße 16a > D-85304 Ilmmuenster > Germany > [www.triorail.com](http://www.triorail.com) > [info@triorail.com](mailto:info@triorail.com) The manufacturer reserves the right to modify the specifications of the product without prior notice.

**<n>**

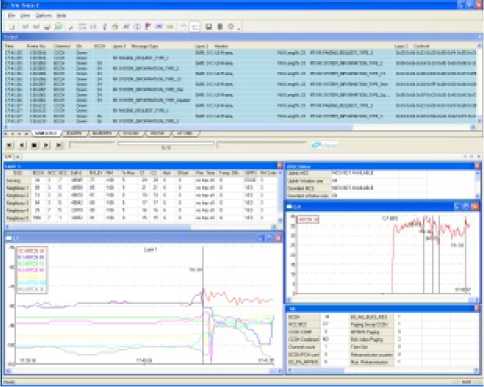
**trioroil**

**special products for special customers**



Approved GSM Test Technology

Datasheet



Features

* Weight: 99 g
* Dimensions: 103 x 47 x 18.5 mm
* TFT colour display:

132 x 176 pixels,

262144 colours

* Li-Ion battery (820 mAh)

Standby time: 300 h Talktime: 300 min

Charging time: Less than 2 h for 100%

* 1.3-megapixel camera with integrated LED flash
* 24 MB internal memory
* Integrated RS-MMC slot for up to 1GB
* Interfaces: USB 2.0, Bluetooth®
* Integrated hands free feature
* TTS-S75 supports GSM 900 / 1800 /1900

TTS-S75R additionally supports GSM-R

* GPRS class 10 up to 53.6 Kbps
* EDGE up to 384 Kbps
* CSD up to 14.4 Kbps, fax group 3, class 2
* Voice coding:

half rate, full rate, enhanced full rate adaptive multi rate

* MMS, EMS, SMS, cell broadcast, instant messaging
* Mobile Internet access (WAP 2.0)
* E-mail client SMTP, POP3

Triotrace PC Application

* Trace log recording
* Online/offline protocol analysis

Special Features

Two serial ports over USB for simultaneous trace information and data transfer (CSD/GPRS) or AT-Cellular-Commands.

GSM Traces

* Radio environment information
* Received level
* Idle and transfer parameters
* Serving / neighbour cell frequency
* Cell reselection parameters
* Mobility management information
* Authentication
* Ciphering
* Location (Cell Identity, LAC, MCC, MNC)
* Protocol messages monitoring
* Layer 2: LAPD-m
* Layer 3: RR, MM, CM
* Quality of Service
* Downlink signalling
* RLC and Handover Counter
* Codec state (HR, FR, EFR,AMR)
* DTX state

GPRS Traces

* GPRS Mobility management information
* Identity
* SNDCP compression
* GPRS Session management information
* PDP QoS
* IP Address

•Location: Cell Identity, RAC, LAC, MCC, MNC

* RLC/MAC information
* Packet channel information:

frequency, timing advance time slots

* Protocol messages monitoring
* RLC/MAC: control blocks, data blocks
* GMM/SM: GPRS attach, PDP activation
* Quality of Service
* RLC throughput, Block error rate,

Block retransmission rate

* LLC throughput, frame retransmission rate

GSM/GPRS forcing functions

* Channel
* Band
* Voice Codec

Scanning capabilities

* single ARFCN
* set of frequencies
* complete band

Triorail GmbH & Co. KG • Sonnenstrasse 16a D-85304 Ilmmünster • [www.triorail.com](http://www.triorail.com) • [info@triorail.com](mailto:info@triorail.com)

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**rrAS-CE - ES VYHLASENIE** VUSOSÜARATSÏOQN^F

- jF¿J:FORSA KH AISi^CHMVs^Stftl \™Z%$£^Êmr//VG **-** DEC LA **RA TION CE DE,** mrnmÆv- EÇi**DECLARATION OF CONFO**0

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**EL-tCLARACION CE DECiÖÄ**

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,^^S»MCUANC

ÏÆk’iiSOEKLARATS l - EY-VAATIMUSTI

**Declaration of Origin**

Manufacturer,

Eaton Industries France SAS 110 rue Blaise Pascal 38330 Montbonnot Saint Martin France

declare that products within the families,

Eaton

Protection Strip / Box / Station Nova AVR Ellipse ECO / PRO Eaton 3S

Eaton 5S / 5SC / 5P / 5PX / 5E Eaton 9SX / 9PX /9E Eaton EX E series DX / NV 5115/5130 9130

STS 14/STS 16

Network Card - MS

Relay Card - MS

Network and MODBUS Card - MS

Environment Sensor (EMP)

Hot swap MBP / Flex PDU Eaton Transformer Eaton Marine Filter

February, 04th 2014



J. MELÓT

Certification Manager

Doc.ld.: DO\_EATON\_MadelnCHINA\_February2014

110, me Blaise Pascal 38330 Montbonnot-Saint-Martin Tel : +33 (0)4 76 00 65 00

are manufactured in CHINA.

**Diavia**

**Webasto**

**Feel the Drive**

Integrált klímamegoldások 9,0 - 11,9 kW-ig

15 üléses minibuszokba



i lila

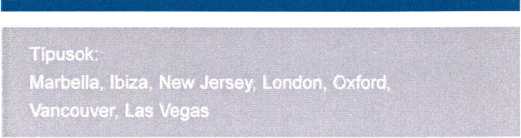
Az integrált klímamegoldás különleges kényelmet biztosít mind a sofőr, mind az utasok számára utazásaik során.

A készülék beépítés szempontjából igen rugalmas, beépíthető a műszerfal vagy a tető alá, illetve akár a hátfalra függőlegesen is. Nagy teljesítményű légbefúvásának köszönhetően folyamatos és egyenletes légeloszlást biztosít az utastérben.

Minőség, megbízhatóság, hosszú élettartam.

Tartozékok: kondenzátor, mely a tető vagy az alváz alá kerül beépítésre, úgy mint a vezérlőegység, a légcsatorna és a vevőspecifikus készlet.

* Klímaberendezések 9,0 - 11,9 kW hűtőteljesítménnyel
* Optimális, járműhöz illeszkedő design, sokoldalú beépítési lehetőség
* Nagy thermodinamikai hatásfok
* Jó minőségű, magas élettartamú alkatrészek
* Minimális karbantartási költség



Komplett klímamegoldás fűtés funkcióval a következő típusok esetén: Ibiza, London, Oxford és Las Vegas



transzporter busz munkagép speciális jármű

Műszaki adatok:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Klímaberendezés | Marbella | Ibiza | New Jersey | London | Oxford | Vancouver | Las Vegas |
| Névleges hűtőteljesítmény (kW) | 9.0 | 9,0 | 9.5 | 9,5 | 9,5 | 9,5 | 9,6 |
| Fűtőteljesítmény (kW) | - | 12,0 | - | 13,0 | 13,0 | \_ | 7,7 |
| Beépítési helyzet | függőleges | függőleges | tető vagy a műszerfal alá | tető vagy a műszerfal alá | tető vagy a műszerfal alá | tető vagy a műszerfal alá | tető vagy a műszerfal alá |

Hűtőközeg R134a

Feszültség (V) 12/24 V

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Max. áramfelvétel (A) 12 V-on | 20,5 | 21,2 | 23,0 | 21,0 | 17,0 | 22.0 | 11,4 |
| Max. légszállítás (m3/h) | 800 | 800 | 800 | 800 | 800 | 800 | 630 |
| Méret H x Sz x M (mm) | 640 x 180 x 355 | 640 x 180x 355 | 510 x 400 x 170 | 550 x 400 x 180 | 175 x 420 x 560 | 500 x365x 170 | 570 x 460 x 175 |
| Tömeg (kg) | 8,0 | 10,0 | 6,7 | 7,7 | 8,0 | 6,7 | 4,5 |

I I I II

Webasto Thermo & Comfort Hungária Kft. H-l 135 Budapest Szt. László út 73.

T: +36 1 350 2338 F: +36 1 350 2339

E-mail: [info@webasto.hu](mailto:info@webasto.hu)

[www.webasto.hu](http://www.webasto.hu)

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|  | [ode | Weiqht [kq] | Tolleroncetkq] |
| A | PATCH PANEL 1 | 1,5 | 0,005 |
| B | PATCH PANEL 2 | 1 | 0,005 |
| [ | NETPROBE CONNECT | 12 | 0,3 |
| D | MTB-R19-F | 14,4 | 0,3 |
| E | HTB-R19-F | 17,4 | 0,3 |
| F | STB-R19-F | 8 | 0,3 |
| h | PCI | 12,5 | 0,3 |
| H | IISU | 17 | NA |
| H | CAPI | 0,13 | 0,3 |
| L | UPS 9PX SERIES 6k | 71 | NA |
| M | BATTERY PACK 1 | 59 | NA |
| N | BATTERY PACK 2 | 59 | NA |
| 0 | BATTERY PACK 3 | 59 | NA |
| P | SOCKET GROUP | 2,2 | 0,005 |
| 0 | MATRIX KVM | 1,2 | NA |
| R | CB PANEL | 2,5 | NA |
| $ | UPS GUARDIAN | 0,7 | 0,005 |
| T | ACC WI-FI | 1,5 | NA |

FRONTAL VIEW

BACKVIEW

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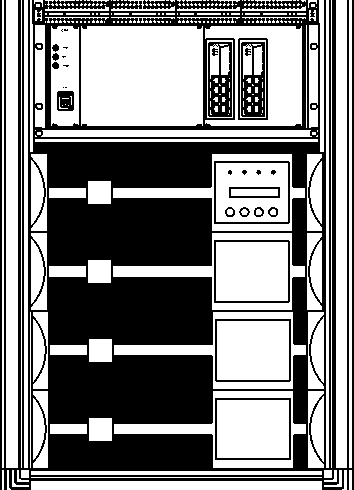
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| 3 |  |  |  |  |
| 2 | As-built | 21/11/14 | Pavan | Cotroneo |
| 1 | Accès point WiFi and NetProbe connect added | 28/10/14 | Pavan | Cotroneo |
| Rev, | Description | Date | Designer | Controller |

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Comtest

Wireless

ViaOrvieto 15,Torino ITALY

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| Customer  KCC | litte |  | GSM-R Cabinet | |  |  |
| Customer order reference | Substitute of | Date | Designer | Controller | Scale | A |
| / | EM-3-010-002.4 | 21/11/14 | Pavan | Cotroneo | 1:10 |
| Our order reference  31-2014-KCC-HU ex 010 | Sheet 1 of 1  0verall/ref.:... | | Design code  EM-31-2014-001 2 | | Rev.  2 |  |

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|  | [ode | Depth ImJ |
| A | PATCH PANEL 1 | 0,08 |
| B | PATCH PANEL 2 | 0,08 |
| [ | NETPROBE CONNECT | 0,44 |
| D | MTB-R19-F | 0,44 |
| E | HTB-R19-F | 0,44 |
| F | STB-R19-F | 0,44 |
| h | PCI | 0,5 |
| H | IISU | 0,44 |
| H | CAPI | / |
| L | UPS 9PX SERIES 6k | 0,65 |
| M | BATTERY PACK 1 | 0,65 |
| N | BATTERY PACK 2 | 0,65 |
| 0 | BATTERY PACK 3 | 0,65 |
| P | SOCKET GROUP | 0,04 |
| 0 | MATRIX KVM | 0,17 |
| R | CB PANEL | 0,18 |
| $ | UPS GUARDIAN | 0,05 |
| T | ACC WI-FI | 0,3 |

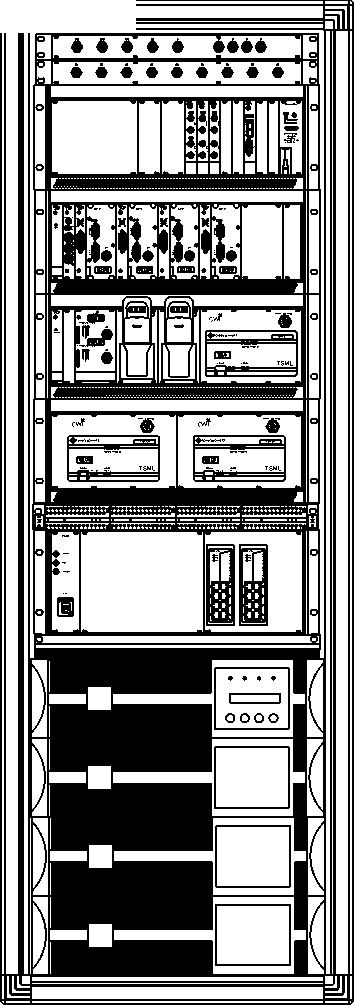
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FRONTAL VIEW

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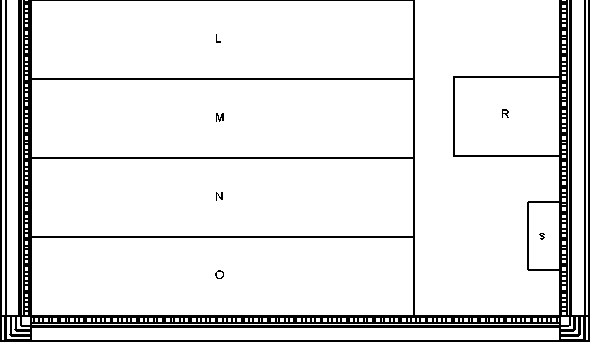
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| Rev, | Description | Date | Designer | Controller |

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Comtest

Wireless

ViaOrvieto 15,Torino ITALY

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| --- | --- | --- | --- | --- | --- | --- |
| Customer  KCC | Title | GSM-R Cabinet lateral view | | |  |  |
| Customer order reference 1 | Substitute of | Date  24/11/14 | Designer  Pavan | Controller  Cotoneo | Scale  1:10 | A |
| Our order reference  31-2014-KCC-HU ex 010 | Sheet 1 of 1  0verall/ref.:... | | Design code  EM-31-2014-002 0 | | Rev.  0 |  |

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| --- | --- | --- | --- | --- | --- | --- |
| 3 | A | 5 | 8 | 7 | 8 | 9 |

R. 2

Directives Conformity

The GSM-R MT2 has the CE-sign. With this sign, the manufacturer declares the GSM-R MT2, based on both its design and implementation, according to the Council Directive: 1999/5/EC.

Harmonised Standards:

|  |  |
| --- | --- |
| Reference | Date |
| EN 301 511 (900/1800) V9.0.2 | 2003 |
| EN 50 121-3-1 | 2000 |
| EN 50 121-3-2 | 2000 |
| EN 301 489-01 V1.4.1 | 2002 |
| EN 301 489-07 V1.2.1 | 2002 |
| EN 50 125-1 | 2001 |
| EN 60 950-1 | 2001 |
| EN 55022 | 2000 |
| EN 61000-4-2 | 2001 |
| EN 6100-4-3 | 2002 |
| EN 6100-4-4 | 2001 |
| EN 6100-4-6 | 2001 |
| EN 50155 | 2001 |
| IEC EN 60068-2-30 | 1999 |
| EN 61373 | 1999 |
| EN 60068-2-6 | 1995 |
| EN 50124-1 | 2001 |

GSM-R MT2 protocol complies to R97 and approved according GCF3.14.

Kapsch TrafficCom AG

kapsch

>

Dokumenten-Nummer/Ausgabe

34 01339 0009 CE/00

Monat Jahr Blatt

11.2004 1/2

Konformitätserklärung

Produktbenennung:

Art. Nr.:

GS:

GSM-R MT2 34 01339 0009 00

Hersteller: KAPSCH TrafficCom AG

Anschrift: Wagenseilgasse 1

1120 Wien

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:

Europäische Richtlinien: Nummer Text

1999/5/EG Richtlinie des Europäischen Parlaments und des

Rates vom 9. März 1999 über Funkanlagen und Telekommunikationendeinrichtungen und die gegenseitige Anerkennung ihrer Konformität.

Weitere Angaben über die Einhaltung dieser Richtlinie(n) enthält der Anhang auf der nächsten Seite:

Anbringung der

CE-Kennzeichnung:



Aussteller: w!e Hersteller

Kapsch TrafficCom AG

|  |  |  |  |
| --- | --- | --- | --- |
| Dokumenten-Numnrer/Ausgabe  34 01339 0009\_.CE/00 | | Anhang | Form: |
| Monat Jahr  11.2004 | Blatt  2/2 | zur Konformitätserklärung | N |
| Produktbenennung: |  | GSM-R MT2 |  |
| Art. Nr.: |  | 34 01339 0009 |  |
| GS: |  | 00 |  |
|  |  | Die Übereinstimmung des bezeichneten Produkts mit den Vorschriften der Richtlinie 1999/5/EG wird nachgewiesen nach Anhang IV durch die vollständige Einhaltung der nachfolgend angeführten Normen und Einschaltuna der benannten Stelle: PHOENIX TESTLAB GmbH.  Die erforderlichen Funktestreihen wurden durchgeführt. Damit erfüllt das Gerät | |

die grundlegenden Anforderungen. Die technische Dokumentation befindet sich beim Hersteller.

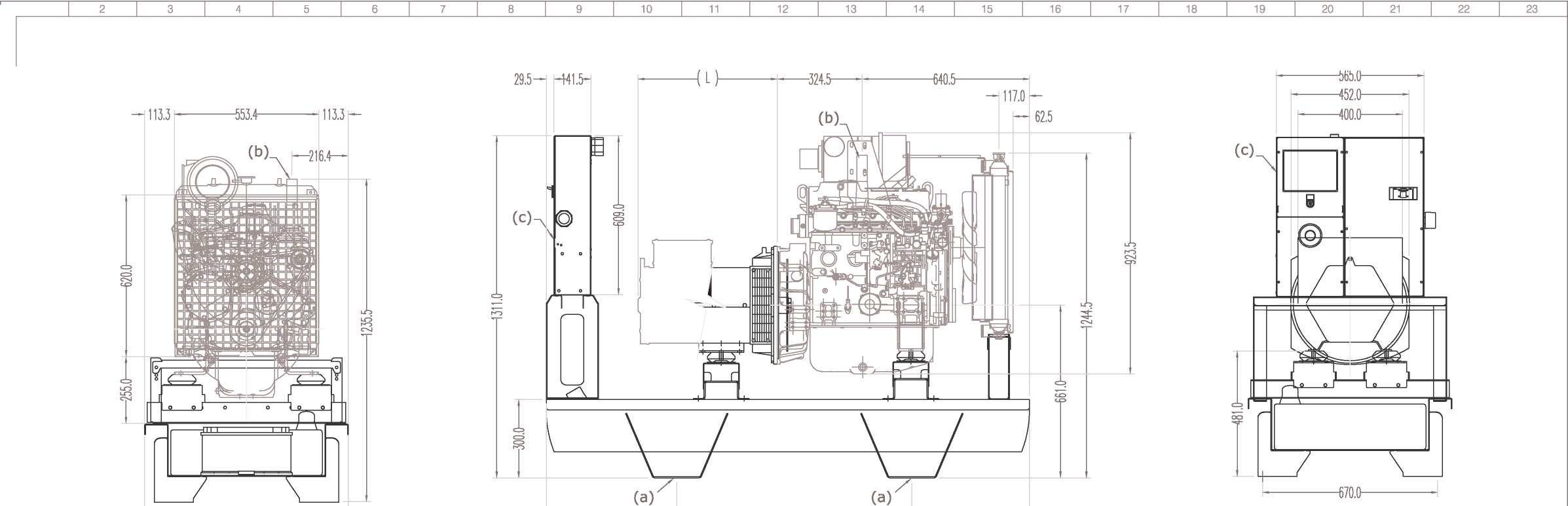
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Harmonisierte Europäische Normen | Referenznummer | Ausgabedatum | Referenznummer | Ausgabedatum |
|  | EN 301 | 2003 | EN 55022 | 2000 |
|  | 511(900/1800) |  | EN 61000-4-2 | 2001 |
|  | V9.0.2 |  | EN 61000-4-3 | 2002 |
|  | EN 50 121-3-1 | 2000 | EN 61000-4-4 | 2001 |
|  | EN 50 121-3-2 | 2000 | EN 61000-4-6 | 2001 |
|  | EN 301 489-01 | 2002 | EN 50155 | 2001 |
|  | V1.4.1 |  | IEC EN 60068-2-30 | 1999 |
|  | EN 301 489-07 | 2002 | EN 61373 | 1999 |
|  | V1.2.1 |  | EN 60068-2-6 | 1995 |
|  | EN 50 125-1 | 2001 | EN 50124-1 | 2001 |
|  | EN 60 950-1 | 2001 |  |  |
| Nicht harmonisierte Normen: | Referenznummer | Ausgabedatum | Referenznummer | Ausgabedatum |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nationale Normen (nach NSR oder | Referenznummer | Ausgabedatum | Referenznummer | Ausgabedatum |
| nach MSR Art.5 Abs.1 Satz2): |  | - " |  |  |
| Technische Spezifikationen (nur NSR): | Referenznummer | Ausgabedatum | Referenznummer | Ausgabedatum |
|  |  |  |  |  |

>

C € 0700

Gerätekennzeichnung:



780.0

VISTA LATERAL IZQUIERDA LEFT SIDE VIEW

■500.0 — 900.0 ~ 450.0

1850.0

VISTA FRONTAL FRONT VIEW

VISTA LATERAL DERECHA RIGHT VIEW

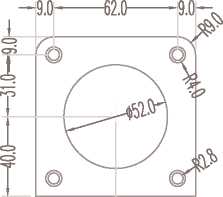
COTAS TOTALES / OVERALL DIMEN : W-780.L-I850, H-1500 CAPACIDAD DEL DEPOSITO / TANK CAPACITY : 120 LITRES

DETALLE BRIDA MOTOR / DETAIL EXHAUST FLANGE

NOTAS / NOTES

1. **FIJACIÓN GRUPO / FLOOR TO FASTENING (4x016mm)**
2. **SALIDA ESCAPE / EXHAUST OUTLET 040 mm**
3. **OPCIONAL / OPTIONAL**

50.0



-—40.0 -- 40.0—

**ESCALA / SCALE : 1/3**



**HIMQINSA**

**THE ENERGY**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Date: | Mame: |  | Old Code: | | |
| Designed: | 09/1 2/1 O | A. MARTÍNEZ |  | Mew Code: | | |
| Revised: | 09/1 2/1 O | IS/I. URREA |  | The actual design Is HIMOINSA S.L property. It con not be used for construction of the showed item, | r"1 r¡\ |  |
| Approved: | 09/1 2/1 O | A. PARDO |  | L— ^ | y |

Designación / Designation:



GRUPO ELECTROGENO EST-STD / OPEN SKID GENSET MOTOR/ENGINE: YANMAR 4TNV98 GGE CHASIS MODELO / BASE FRAME: K3

**Drawing Ne:**

|  |  |  |
| --- | --- | --- |
| Code: GEE-00015-K3 | | |
| Revision: 01 | | DIN- A3 |
| Unit: mm | 1/15 | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Motor/Engine | Alternador/Alternator | Modelo Alter. / Alternator model | L | |
| WITHOUT  PMG | WITH  PMG |
| 4TNV98 GGE | STAMFORD | BCI184G | 521.5 | - |
|  | STAMFORD | BCI 184J | 654.5 | - |
|  | MARELLJ | MJB160MB4 |  |  |
|  | MARELLJ | MJB200SA4 |  |  |
|  | MECCALTE | EC028 VL/4 |  |  |
|  | HIMOINSA | HA 200 SAA |  |  |
|  | SYNCRO | IB4 |  |  |

|  |  |  |
| --- | --- | --- |
| funkwerk))] | Formblatt | 1.05.4.03 |
| kölleda ▼ | EG - Konformitätserklärung |  |

EG-Konformitätserklärung

EC Declaration of Conformity

Für das folgend bezeichnete Erzeugnis, montiert in Fahrzeugen des schienengebundenen Verkehrs,

*We* declare that the following product to be mounted in vehicles of the rail-bound traffic

GSM-R MT2 Zeichn.-Nr. 1410.010-010XX

wird hiermit bestätigt, dass es den Anforderungen der folgenden Europäischen Richtlinie entspricht: complies with the demands which are laid down in the European directive:

* Richtlinie 1999/5/EG des Europäischen Parlaments und des Rates über Funkanlagen und

Telekommunikationsendeinrichtungen und die gegenseitige Anerkennung ihrer Konformität

Directive 1999/5/EC, Directive of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

Die Übereinstimmung des bezeichneten Erzeugnisses mit den Vorschriften der Richtlinie 1999/5/EG wird nachgewiesen nach Anhang IV durch die vollständige Einhaltung der nachfolgend angeführten Normen und Einschaltung einer Benannten Stelle. Die erforderlichen Funktestreihen wurden durchgeführt. Das Gerät befindet sich in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG. Dies wurde von der Benannten Stelle CETECOM ICT Services GmbH, Untertürkheimer Str. 6 - 10, D-66117 Saarbrücken, in dem Zertifikat E815969X, vom 06.04.2010 bestätigt.

The conformance of the designated product with the regulations of the directive 1999/5/EC will be proved according to appendix IV through exhaustive compliance with the standards mentioned below and the involvement of a Notified Body. All essential radio test suites have been carried out. The device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. This was confirmed by the Notified Body CETECOM ICT Services GmbH, Untertürkheimer Str. 6 - 10, D-66117 Saarbrücken, in the certificate E815969X, issued 06.04.2010.

Diese Erklärung gilt für alle Exemplare, die nach den o.g. Fertigungszeichnungen hergestellt werden. Zur Beurteilung des Erzeugnisses wurden folgende Normen herangezogen.

This declaration applies to all units which are produced in accordance with the above-mentioned manufacturing drawings. For the evaluation of the product the following standards were taken into consideration.

* EN 301 511 V9.0.2
* EN 50121-3-2:2006
* EN 55022:2010
* EN 301 489-01 V1.8.1
* EN 301 489-07 V1.3.1
* EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011
* EN 50155:2007

Wir erklären, dass das o.g. Erzeugnis bei bestimmungsgemäßer Verwendung entsprechend der Produktbeschreibung und des Installationshandbuches den grundlegenden Anforderungen des § 3 und den übrigen einschlägigen Bestimmungen des FTEG (Artikel 3 der R&TTE) entspricht.

For the intended usage according system description and installation manual we declare the above-mentioned product corresponds to the fundamental demands of § 3 and the other relevant regulations of the FTEG (article 3 of the R&TTE).

Die technische Dokumentation für das o.g. Erzeugnis wird beim u.g. Hersteller vorgehalten.

The technical documentation for the above-mentioned product will be stored by below-mentioned manufacturer.

GSM\_R\_MT2\_20120730\_DE\_EN .doc

Seite 1 von 2

Rev. 6

|  |  |  |
| --- | --- | --- |
| funk werk))) | Formblatt | 1.05.4.03 |
| kölleda ▼ | EG - Konformitätserklärung |  |

Diese Erklärung wird verantwortlich für den Hersteller Representing the manufacturer



Tel. +49 (36 35) 458 300 Telefax +49 (36 35) 458 399

Hörmann Funkwerk Kölleda GmbH Im Funkwerk 5 D-99625 Kölleda

abgegeben durch

this declaration is confirmed by

Kölleda, 30.07.2012

\ Uwe Lehmann Geschäftsführer **managing director**

GSM R MT2 20120730 DE EN.doc

Seite 2 von 2

Rev. 6

Antennen • Electronic

Installation Guidelines for Train and Bus Antennas



Antennen • Electronic

1. Abstract



* 1. Quality is the key

Train antennas made by Kathrein are well known as reliable and highly sophisticated products. Our antennas are distinguished by excellent voltage protection against accidentally high voltage contacts due to well developed grounding elements implemented in the overall design.

Train antennas are faced to extreme environmental conditions and need to withstand tremendous operational conditions. The following documents should help to understand functionality and learn more about proper installation procedures.

1. **Design**

Depending on frequency and design constrains Kathrein antennas are designed as X/4 radiators or as X/2 radiators. For proper functionality X/4 radiators have to be mounted on a conductive surface creating a ground plane. Train antennas are usually vertical polarized. Impedance is 50 Ohm.

Kathrein antennas are type approved by the “Deutsche Bundesbahn” (German Railway).



GSM 900 + GPS (incl. amplifier)

410 - 470 MHz

Key features of Kathrein antennas to pass the “Deutsche Bundesbahn” requirements is the ability to limit connector voltage to 60 V in case of contract with the high tension lines. Current flow of 40 kA over a time frame of 100 ms and high voltages of up to 42 kV could be applied under worst case conditions.

Antennen • Electronic

1. Installation
   1. Ground Plane

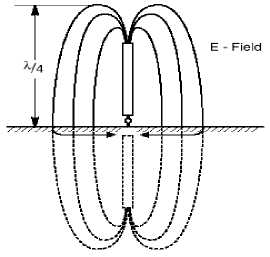
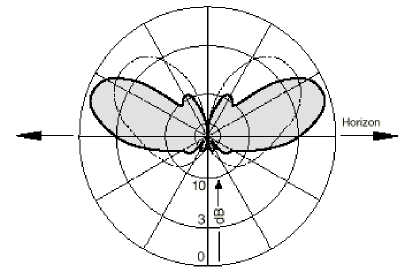


Figure 1: Electrical field and radiation pattern of a À/4 antenna design



Fundamental RF basics require metallic surfaces for certain antenna designs. Utilizing X/4 technologies depends on a sufficient ground plane surface to finally distribute RF wave into the surroundings. Thus those particular antennas need to be mounted against a conductive surface to create the required ground plane.

Each data sheet leaves detailed information about surface size. We strongly recommend not to stay under the minimum mounting requirements. Antennas easily will loose VSWR performance, and radiation pattern may change dramatically.

* + 1. Metallic Surfaces

In most of the cases the roof of trains is made out of metallic materials. These materials have a reasonable conductivity to achieve best radiation results. For safety reasons these surfaces need to offer sufficient grounding to finally guide high voltages and currents to the ground.

* + 1. Non-Metallic Surfaces

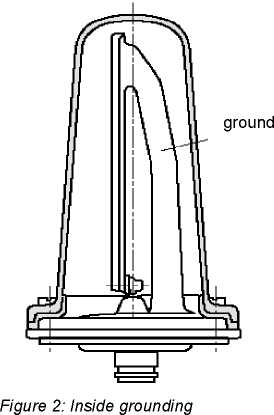
Trains designs appear more and more with non-metallic surfaces mostly present at the front or the end of a train. Apparently those areas are preferred installation areas for antennas.

As explained previously antennas require ground planes made out of conductive material. Several designs may apply to create such a plane. Metallic foils might be placed underneath a non-metallic train body. Other metals might be laminated into Fiberglass constructions. The antenna flange needs to have good electrical contact to these additional ground planes

The same mandatory rule applies as with metallic surfaces: A sufficient grounding of the antenna needs to be considered in the design. Any kind of grounding needs to handle high currents and voltages, and finally lead it to the ground.

Antennen • Electronic

* 1. Grounding



In case of an accident or a failure of the high tension line (overhead contact line) high voltage and current might be applied to the antenna. To protect personal and equipment, connector voltage of the antenna is supposed not to exceed 60 V. To guarantee low connector voltages, antenna flanges need to be grounded thoroughly.

* unpainted areas near the four mounting holes of the antenna flange.

To achieve best conductivity mounting surfaces at the antenna socket and the mating surface of the train should be clean. Any paint residues or other pollution needs to be removed prior to the mounting process.

* In case of non-metallic roof surfaces with an additional ground plane of e. g. thin material, a separate grounding of the antenna mounting flange is required.
  1. Mounting

Most antennas are designed with a standardized foot print of the mounting socket. Dimensions are stated in the data sheets.

3.3.1 Mounting Sockets

Antenna sockets offer four screw holes to tighten the flange against the mounting surface. We recommend the following:



Figure 3: Low profile broad band antenna with mounting screws

• Mounting against a separate flange with integrated mounting bolts. This flange is usually welded to the train. In general, mounting screws or nuts should not add more than 15 mm to the mounting surface.

In case of an antenna installation with screws through the antenna socket into the vehicle, particular attention should be paid to the sealing of the screws under consideration of the grounding instructions.

1. ***Mounting Position***

Antennen • Electronic



Figure 4: Challenging, but inadequate installation of a train antenna

The antennas have to be mounted directly to the ground plane.

Depending on the overall mounting situation (please refer to paragraph 3.6) it’s tempted to elevate antennas against the trains roof with high flanges or other challenging constructions. To avoid mistuning and malfunctioning antennas it is mandatory not to follow these installation ideas. Resonance frequency, radiation pattern, and VSWR would change dramatically or could be lost completely.

* 1. Sealing

To avoid corrosion and leaky into the vehicle, antenna connectors need to be sealed against the mounting plate. Every Kathrein antenna is supplied with detailed mounting instructions. An O-ring is supplied with each antenna to seal the through hole into the vehicles body against the antennas connector. To achieve advanced sealing mating surfaces between the antenna socket and mounting flange/mounting surface are supposed of being flat.

Sealing also needs to be performed around mounting holes if no mounting flanges are used. Corrosion at mating surfaces between the antenna and the mounting plane is critical for proper function of the antenna.

* 1. Painting

For optical reasons the color of train antennas sometimes has to match certain colors. Kathrein antennas are particularly suitable for subsequent, long-lasting painting since the visible parts (radomes) are generally made of fiberglass (polyester), to which paint adheres very well. A thin layer of paint eventually has only a negligible influence on the electrical characteristics.

General remarks:

* We recommend that painting is only performed by qualified professional painting companies. If required painting on site may also be possible (and permissible).
* We recommend that painting should only be applied to visible surfaces: e.g.
* Fiberglass radome
* Antenna socket, upper surface - please refer to instructions stated in our data sheets
* Suitable commercial paints consist of one or two components. The manufacturer's instruction for use and processing must be observed. Paints with metallic effects or metallic components are not permissible.

Antennen • Electronic

1. Obstacles close to the antenna



For proper wave propagation from the antenna into the surroundings a flat roof without any obstacles would be preferred.

Trains sometimes have a number of structures for multiple purposes on the trains top. Any obstacles close to the antenna may impact radiation pattern and radiated waves. It is difficult to leave general guidelines about minimum distances. As a rule over the thumb antennas should face no obstacles within a radius of approximately 1 m or more.

1. Distances to other antennas

The distance to other antennas depends on the required antenna isolation. This value has to be clarified with the suppliers of the installed mobile communication system.

An isolation of 30 dB is a preferred value. As a rule over the thumb, a distance of approximately 5 - 7 Lambda is required for antennas operating the same frequency band.

Due to the selectivity of different systems, antennas operating in different frequency bands require distances that can be even smaller.

|  |  |  |
| --- | --- | --- |
| FB-KAL-1-0 | Kalibrierzertifikat  calibration certificate | HASLERtail |
|  | | |

|  |  |
| --- | --- |
| Auftraggeber | Kapsch CarrierCom AG |
| customer | Lehrbachgasse 11 |
|  | 1120 Vienna |
|  | Austria |

|  |  |
| --- | --- |
| Hersteller | HaslerRail AG Bern |
| manufacturer | Freiburgstr. 251 |
|  | 3018 Bern |
|  | Switzerland |

|  |  |  |  |
| --- | --- | --- | --- |
| Sensor | 5.7100.001/02 | Seriennummer | 14031769 |
| sensor type | 5.7100.050/01 | serial number | 14100109 |
| Projekt | J0243A | Auftrag | 3019665 |
| project |  | order |  |

|  |  |  |
| --- | --- | --- |
| Prüfmittel / Rückführung über test equipment type / traced via | | Rollenprüfstand Astro / DKD-K-25801 |
| Linearität 10...400km/h Linearity 10...400km/h | | ± 0,2% |
| Messung OK measurement ok | | ja (yes) |
| Prüfer |  | |
| Calibrated by |  |  |
|  |  | |
| Kalibrierdatum date of calibration | 29.10.2014 | |
| Das empfohlene Kalibrierintervall beträgt 12 Monate a calibration interval of 12 month is recommended | | |

Kalibriernformation

Information concerning calibration

Die Sensoren werden an einem Rollenprüfstand unter genauer Betrachtung der Herstellervorgaben kalibriert. Alle Messwerte der zum Prüfverfahren benötigten Messmittel sind rückführbar auf nationale Normale.

Die Kalibrierung erfüllt die Anforderungen der DIN EN ISO 9001 und wurde gemäß der internen Prüfspezifikation durchgeführt.

The sensors are calibrated on a roller test stand in accordance with the producers’ instructions. All measurement values needed for the calibration can be derived from national standards.

The calibration meets the requirements of the DIN EN ISO 9001 and was carried out according to the internal test specifications.

Dieses Zertifikat ist ein Herstellerzertifikat „M" nach DIN 55350 Teil 18

This calibration certificates is a manufacturer certificate type “M" according to DIN 55350 part 18

|  |  |  |
| --- | --- | --- |
| FB-KAL-1-0 | Kalibrierzertifikat  calibration certificate | HASLERtail |
|  | | |

|  |  |
| --- | --- |
| Auftraggeber | Kapsch CarrierCom AG |
| customer | Lehrbachgasse 11 |
|  | 1120 Vienna |
|  | Austria |

|  |  |
| --- | --- |
| Hersteller | HaslerRail AG Bern |
| manufacturer | Freiburgstr. 251 |
|  | 3018 Bern |
|  | Switzerland |

|  |  |  |  |
| --- | --- | --- | --- |
| Sensor | 5.7100.001/02 | Seriennummer | 14031775 |
| sensor type | 5.7100.050/01 | serial number | 14100111 |
| Projekt | J0243A | Auftrag | 3019594 |
| project |  | order |  |

|  |  |  |
| --- | --- | --- |
| Prüfmittel / Rückführung über test equipment type / traced via | | Rollenprüfstand Astro / DKD-K-25801 |
| Linearität 10...400km/h Linearity 10...400km/h | | ± 0,2% |
| Messung OK measurement ok | | ja (yes) |
| Prüfer |  | |
| Calibrated by |  |  |
|  |  | |
| Kalibrierdatum date of calibration | 29.10.2014 | |
| Das empfohlene Kalibrierintervall beträgt 12 Monate a calibration interval of 12 month is recommended | | |

Kalibriernformation

Information concerning calibration

Die Sensoren werden an einem Rollenprüfstand unter genauer Betrachtung der Herstellervorgaben kalibriert. Alle Messwerte der zum Prüfverfahren benötigten Messmittel sind rückführbar auf nationale Normale.

Die Kalibrierung erfüllt die Anforderungen der DIN EN ISO 9001 und wurde gemäß der internen Prüfspezifikation durchgeführt.

The sensors are calibrated on a roller test stand in accordance with the producers’ instructions. All measurement values needed for the calibration can be derived from national standards.

The calibration meets the requirements of the DIN EN ISO 9001 and was carried out according to the internal test specifications.

Dieses Zertifikat ist ein Herstellerzertifikat „M" nach DIN 55350 Teil 18

This calibration certificates is a manufacturer certificate type “M" according to DIN 55350 part 18

|  |  |
| --- | --- |
| S4E315-AP18-30 | AC 9Xi8l f3n with guard grille for short nozzle |
|  | sickleil«?»®^“™ |

ebm-papst Mulfingen GmbH & Co. KG



Bachmühle 2 74573 Mulfingen Phone: +49 7938 81-0 Fax:+49 7938 81-110 [www.ebmpapst.com](http://www.ebmpapst.com) infol @de.ebmpapst.com

Nominal data

Type S4E315-AP18-30

Motor M4E068-DF

|  |  |  |  |
| --- | --- | --- | --- |
| Phase |  | 1~ | 1~ |
| Nominal voltage | M | 230 | 230 |
| Frequency | [Hz] | 50 | 60 |
| Type of data definition |  | rfa | rfa |
| Valid for approval / standard |  | CE | CE |
| Speed | [min-1] | 1410 | 1650 |
| Power input | **m** | 102 | 120 |
| Current draw | [A] | 0,52 | 0.53 |
| Motor capacitor | [mFJ | 4 | 4 |
| Capacitor voltage | [VDB] | 400 | 400 |
| Max. back pressure | [Pa] | 120 | 120 |
| Max. ambient temperature | [°C] | 55 | 55 |
| Air flow | [m3/h] | 2440 | 2840 |
| Back pressure | [Pa] | 0 | 0 |
| Sound pressure level | [dB (A)] | 59 | 64 |

ml = max. load • me = max. efficiency • rfa = running at free air • cs = customer specs • cu = customer unit Subject to alterations

Web data sheet D - Page 1 of 6

**ebmpapst**

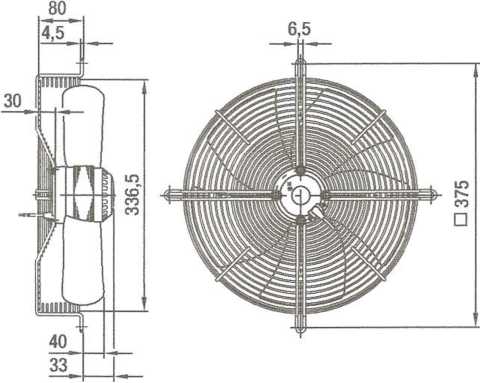
**om**

|  |  |
| --- | --- |
| Technical features | |
| Size | 315 mm |
| Operation mode | Continuous operation (S1) |
| Direction of rotation | Counter-clockwise, seen on rotor |
| Direction of air flow | "V" |
| Insulation class | "B" |
| Cable exit | Axial |
| Bearing motor | Ball bearing |
| Mass | 2.4 kg |
| Material of electronics housing | Rotor: Coated in black |
| Material of impeller | Sheet steel, coated in black |
| Motor protection | Thermal overload protector (TOP)' |
| Product conforming to | CE |
| standard |  |
| Number of blades | 5 |
| Type of protection | IP 44 - depending on position |
| Protection class | I |
| Approval | CCC; GOST |

Web data sheet D - Page 2 of 6

**ebmpapst**

|  |  |
| --- | --- |
| S4E315-AP18-30 | AC axial fan with guard grille for short nozzle sickle#ttl£$W^?ra |
| Product drawing |  |

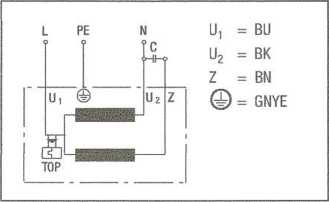


Web data sheet D - Page 3 of 6

**ebmpapst**

AC axial fan with guard sickletfi»gf»mWm

Connection screen

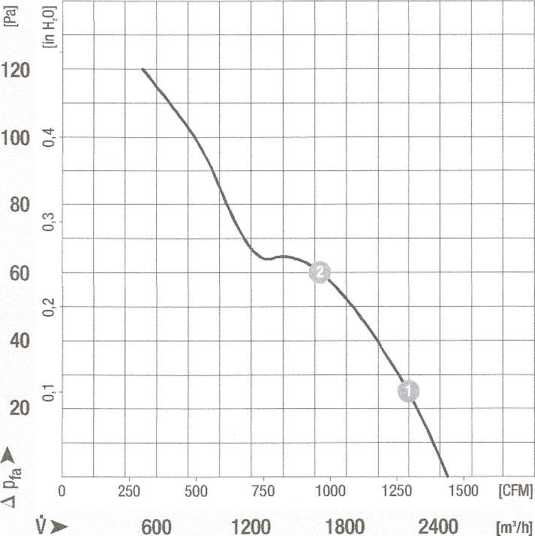


Web data sheet D ■ Page 4 of 6

**ebmpapst**

|  |  |
| --- | --- |
| S4E315-AP18-30 | AC 3xial Î3R with guard grille for short nozzle |
|  | sicklertM^«§“ra |

Charts: Airflow 50 Hz



Measured values

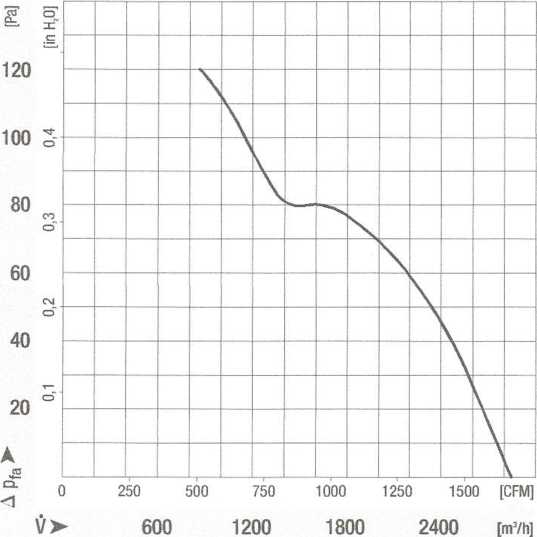
|  |  |  |  |
| --- | --- | --- | --- |
|  | n | Pi | 1 |
|  | [min-1] | m | [A] |
| 1 | 1400 | 108 | 0.54 |
| 2 | 1380 | 120 | 0.57 |

Web data sheet D Page 5 of 6

**ebmpapst**

om

Charts: Airflow 60 Hz



Web data sheet D ■ Page 6 of 6

**ebmpapst**

NEC MultiSync® E223W

**Order Code:** 60003334 **(bk),** 60003335 **(wh)** NEC LCD 22" Commercial Display

**OUTSTANDING PERFORMANCE**

**. Ultra-modern and slim design.** The product design is discrete and puts priority on the screen image and function.

**. Excellent ergonomics.** The ergonomic stand with 110 mm height adjustability allows greatest set-up flexibility.

**. Low energy consumption** with LED backlight and unique Carbon Savings Meter.



Administrator 2



NEC MultiSync E223W features an extremely thin LED backlight panel which results in an ultra-modern and slim design in combination with a perfect feature set for the standard corporate office. The display offers 110 mm height adjustment and a broad connectivity wiht three inputs DisplayPort, DVI-D and D-Sub.

Ideal for the corporate that demand style and future proof technology.

**DELIVERING GENUINE BENEFITS**

**Image display -** 22inch 16:10 TN with LED backlight.

**Ergonomic Office -** full height adjustability (110 mm), swivel, tilt and pivot functionality ensures perfect individual ergonomic set-up.

**Vesa Mount (100 mm) -** allows to install the monitor via various mounting solutions.

**Free Download of Multi-Display Management Software -** with NaViSet Administrator 2 you can manage all your connected display devices from a centralized location.

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[www.nec-display-solutions.com](http://www.nec-display-solutions.com)



**SPECIAL CHARACTERISTICS**

|  |  |
| --- | --- |
| **Technical Specification NEC MultiSync® E223W** | |
| DISPLAY |  |
| Panel Technology | W-LED TN TFT |
| Screen Size [inch/cm] | 22 / 55.87 |
| Screen Aspect Ratio | 16:10 |
| Pixel Pitch [mm] | 0.282 |
| Brightness (typ.) [cd/m2] | 250 |
| Contrast Ratio (typ.) | 1000:1 (25000:1 dynamic contrast ratio) |
| Viewing Angle [°] | 170 horizontal / 160 vertical (typ. at contrast ratio 10:1); 178 horizontal / 178 vertical (typ. at contrast ratio 5:1) |
| Response Time (typ.) [ms] | 5 |
| Colours [Mio.] | 16.7 |
| SYNCHRONISATION RATE |  |
| Horizontal Frequency [kHz] | 31.5 - 82.3 |
| Vertical Frequency [Hz] | 56 - 75 |
| RESOLUTION |  |
| Optimum Resolution | 1680 x 1050 at 60 Hz |
| Supported | 1680 x 1050; 1600 x 1200; 1440 x 900; 1400 x 1050; 1366 x 768; 1360 x 768; 1280 x 1024; 1280 x 960; 1280 x 768; 1280 x 720; 1024 x 768; 800 x 600; 640 x 480 |
| CONNECTIVITY |  |
| Digital | 1 x DVI-D (with HDCP); 1 x DisplayPort |
| Analog | 1 x mini D-sub 15 pin |
| ELECTRICAL |  |
| Power Consumption on Mode [W] | 17 (typ.); 12 (Eco Mode); 24 (max.) |
| Power Savings Mode [W] | 0.35 |
| Power Supply | 100-120 V/220-240 V; 1 A/0.5 A; integrated power supply |
| ENVIRONMENTAL CONDITIONS |  |
| Operating Temperature [°C] | +5 to +35 |
| Operating Humidity [%] | 20 to 80 |
| ERGONOMICS |  |
| Height adjustable stand [mm] | 110 |
| Screen Tilt / Swivel [°] | -5 to +20; -45 to +45 |
| Screen Rotate [°] | 0 to 90 (landscape to portrait mode) |
| MECHANICAL |  |
| Bezel Width [mm] | 13.9 (left and right); 15.8 (top and bottom) |
| Dimensions (W x H x D) [mm] | 503.5 x 383.3 x 213.9 |
| Weight [kg] | 5.6 |
| VESA Mounting [mm] | 100x 100 |
| ADDITIONAL FEATURES |  |
| Colour Versions | White Front Bezel, White Back Cabinet; Black Front Bezel, Black Back Cabinet |
| Cable Management | yes |
| Kensington security slot | yes |
| Plug and Play | VESA DDC/CI; DDC2B/2Bi |
| Adjust Functions | Auto Adjust; Brightness; Colour Temperature Control; Contrast; DV Mode; EcoMode; Fine Adjust (analog); Intelligent Power Management; Language Select; LED Brightness; Monitor Information; NTAA (Non-Touch-Auto-Adjustment); OnScreen-Display (OSD) lock-out; Power-Off Timer; sRGB |
| Shipping Content | Monitor; Power Cable; CD-ROM; Sales Office List; User Manual Signal Cable: VGA - VGA; DVI-D - DVI-D |
| Safety and Ergonomics | EPEAT Silver™; EPEAT™ Gold (black version); CE; ErP; TCO 6.0; TUV Ergonomics; TUV GS; GEEA/Energy Label; Energy Star 5.0; FCC Class B; PCT/Gost; UL/C-UL or CSA; ISO 9241-307 (pixel failure class I); MPR II/ MPR III; RoHS |
| Warranty | 3 years warranty incl. backlight |

Energy Efficiency Carbon Footprint Meter / Carbon Savings

Carbon Footprint Meter, Carbon Savings Meter, EcoModes, ErgoDesign®: Height adjustable stand (110 mm) with 90° Pivot features, NaViSet Administrator 2, sRGB Support, Touch Sensor Keys, WindowsVistaCertifiedLogo



|  |  |
| --- | --- |
|  | Meter; ECOMode; Intelligent Power |
|  | Management; LED backlight technology |
| Ecological | Downloadable manuals |
| Materials |  |
| Ecological | TCO 5.2 |
| Standards |  |

NEC MultiSync® E424

**Order Code: 60003484 NEC LCD 42" Large Format Display**

**OUTSTANDING PERFORMANCE**

**. 3 HDMI Inputs -** The displays can be used for presentation of multiple different sources

like TV-receivers, media players or PCs, This feature can help customers to use the displays in a very flexible way.

**. Digital Audio Output -** A must in large venue installations since analogue audio outputs are mostly subject to noise.

**. RS232 -** Displays in large or remote installations can be easily maintained and checked

remotely which reduces cost and effort.

**. LED Backlight** for a more compact design and reduced power consumption.



For affordable digital signage applications yet with impressive screen performance, the MultiSync® E424 features the latest edge LED backlight technology for an ultra slim design, light weight and very low power consumption.

This display is suitable for light retail environments, leisure and museums, hospitality, education and conferencing applications with limited requirements for brightness and operating hours up to 12/7.

**DELIVERING GENUINE BENEFITS**

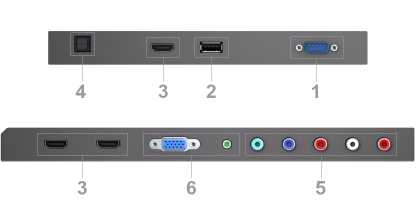
**Reduced Installation and Operating Costs -** featuring LED backlight technology the display is highly energy efficient with a low power consumption, longer backlight lifetime and a lighter design for easy and flexible transportation, mounting and integration.

**Slim Design and Integrated Speakers -** the aesthetic design is pleasing to the eye and enables easy, low cost installation.

**Future Ready Connectivity -** featuring multiple industry standard digital and analogue signal inputs for flexible integration into AV infrastructures.

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[www.nec-display-solutions.com](http://www.nec-display-solutions.com)



1. RS232C Input

|  |  |
| --- | --- |
| **Technical Specification NEC MultiSync® E424** | |
| DISPLAY |  |
| Panel Technology | S-PVA with edge LED backlights |
| Active Screen Area (W H) [mm] | 939x531 |
| Screen Size [inch/cm] | 42 / 107 |
| Aspect Ratio | 16:9 |
| Brightness (shipping) [cd/m2] | 350 |
| Contrast Ratio (typ.) | 3000:1 |
| Viewing Angle [°] | 176 horizontal / 176 vertical (typ. at contrast ratio 20:1) |
| Response Time (typ.) [ms] | 6.5 (grey-to-grey) |
| Panel Refresh Rate [Hz] | 60 |
| SYNCHRONISATION RATE |  |
| Horizontal Frequency [kHz] | 31 - 83 (analog and digital) |
| RESOLUTION |  |
| Native Resolution | 1920 x 1080 at 60 Hz |
| Supported on digital and analogue inputs (PC) | 1920 x 1080; 1366 x 786; 1280 x 800; 1280 x 720; 1024 x 768; 800 x 600; 720 x |
|  | 400; 640 x 480 |
| Supported on digital inputs (Video) | 1920 x 1080i (60Hz); 1920 x 1080p (60/30/24Hz); 1280 x 720p (60Hz); 720 x 480i (60Hz); 720 x 480p (60Hz) |
| CONNECTIVITY |  |
| Input Video Analogue | 1 x D-sub 15 pin; Component (RCA); Composite (RCA) |
| Input Video Digital | 3 x HDMI |
| Input Audio Digital | 3 x HDMI |
| Output Audio Digital | 1 x SPDIF |
| Remote Control | RS-232C (9-pin D-sub) Input; Remote Control IR |
| ELECTRICAL |  |
| Power Consumption on Mode [W] | 86 (max.) |
| Power Savings Mode [W] | < 0.5 (ECO Standby) |
| Power Management | VESA DPMS |
| ENVIRONMENTAL CONDITIONS |  |
| Operating Temperature [°C] | +0 to +40 |
| Operating Humidity [%] | 10 to 80 |
| Storage Humidity [%] | 5 to 85 |
| Storage Temperature [°C] | -10 to +60 |
| MECHANICAL |  |
| Dimensions (W x H x D) [mm] | Without stand: 957 x 573 x 63 (centre depth 37) |
| Weight [kg] | Without stand: 11.7 |
| Bezel Width [mm] | 32.4 (bottom); 9.9 (left, right and top) |
| VESA Mounting [mm] | 400 x 400 (FDMI); 4 holes; M6 |
| AVAILABLE OPTIONS |  |
| Accessories | Trolley (PDMHM-L); Wall mount (PDW S 32-55L, PDW T M L) |
| ADDITIONAL FEATURES |  |
| Colour Versions | Black Front Bezel, Black Back Cabinet |
| Safety and Ergonomics | C-tick; CE; Energy Star 6.0; FCC Class B; PSB; UL/C-UL or CSA; RoHS |
| Audio | Integrated Speakers (10 W + 10 W) |
| Shipping Content | Foot; Display; Power Cable; VGA cable; Remote Control |
| Warranty | 3 years warranty incl. backlight |

1. USB
2. HDMI-Input
3. SPDIF Output (Fiber Optical)
4. Component/Composite + Audio
5. PC Input/D-sub + Audio

**SPECIAL CHARACTERISTICS**

Audio settings with equalizer, Colour temperature mode, Energy saving picture mode, Mac and Windows compatible, USB Viewer for JPEG



EnergyStar 6.0

Ecological Standards



**PPC-4151W**

**15.6" Fanless Wide Screen Panel PC with Intel Core i5 / Celeron Processor**



**Features**

* 15.6" WXGA entirely flat panel with Projected capacitive touchscreen
* High perofrmance Intel Core i CPU with Fanless design
* PCIe x1 or PCI expansion support
* Automatic data flow control over RS-485
* Wide Range DC 9-32V support
* Dual Gigabit ethernet, support IEEE1588

**susiÂccess**

igu Windows «««H Embedded

0CC

* 3 x Independent display

**Introduction**

The PPC-4151W is a new generation Panel PC with WXGA (1366 x 768) screen. The most important, system equips with high performacne Intel Core i CPU but the heat can be dispatched easily by high effeciency fanless thermal design. This makes HMI a big step forward to consolidate performance and reliability in one system. Besides, with rich I/O as 5xCOM, 5xUSB and dual Gigabit ethernet make it easier to connect to devices and be integrated into machine building industry. In addition, PCIe/PCI expansion to add on field bus or propiretary card makes more application posibility. The last but not least, the multi touch screen makes the HMI more intuitive, brings you the best operate experience.

**Specifications**

|  |  |  |
| --- | --- | --- |
| **Processor system** | CPU | Intel 4th Generation Core i CPU i5-4300U, 2C, 3M, up to 2.9GHz Celeron 2980U, 2C, 2M, 1.6GHz |
| Memory | SO-DIMM x 1, DDR3L1333/1600, Max 8GB |
| 2nd Cache Memory | 3 MB/2 MB |
| Storaae | mSATA\*1 |
| HDD | 1 x 2.5" SATA HDD Bay |
| I/O Ports | 5 x Serial ports: 4 x RS-232, 1 x RS-422/485 with isolation 1K Vdc 4 x USB 3.0 ports in rear side, 1 x USB 2.0 in right side 1 x Line-out, 1x MIC-in 1 x DB15 VGA 1 x Display Port (1.2) |
| Bus Expansion | 1 x MINI PCIe,  1 x PCIe x1 or 1 x PCI(either one) |
| Network (LAN) | 2 x 10/100/1000 Mbps Ethernet, Intel I211-AT, Intel I218LM |
| Speaker | 2 x 1W |
| Watchdoa Timer | 255 timer levels; setup by software |
| Dimensions | 419.7 x 269 x 59 mm |
| Weiaht | 5.8 Kg |
| **OS support** | OS Support | WIN7 / WIN 8 / Linux |
| **Power supply** | Input Voltaae | DC 9-32V |
| Power consumption | i5-4300U: 56W,  Celeron 2980U: 45W (8G DDR3L, USB x 4, COM x 4, USB mouse, 2.5" HDD 500G, Win7 64bit, Burn-in 7.0 ) |
| **LCD Display** | Display Type | 15.6" TFT LCD (LED Backlight) |
| Max. Resolution | 1366x768 |
| Colors | 16.7M |
| Viewina Anale | 85 (left), 85 (right), 85 (up), 85 (down) |
| Luminance(cd/m2) | 300 |
| Brightness Control | Yes (by BIOS) |
| Backliaht Lifetime | 50, 000 hrs(typ.) |
| **Touchscreen** | Touch Type | Projected Capacitive multi touch 4 point |
| Resolution | 2048x2048 |
| Liaht Transmission | 88 % ± 2 %. |
| Controller | USB interface |
| Software Driver Support | Windows7 , Windows8 |
| **Environment** | Operatina Temperature | 0 - 50° C (32 - 122° F) for SSD, 0-45° C for HDD |
| Storaae Temperature | -20 - 60° C (-4 - 140° F) |
| Relative Humidity | 10 - 95% @ 40° C (non-condensing) |
| Shock | Operating 10 G peak acceleration (11 ms duration), follow IEC 60068-2-27 |
| Vibration | Operating Random Vibration Test 5-500Hz, 1Grms, follow IEC 60068-2-64 |
| EMC | BSMI, CE, FCC Class B |
| Safety | CB, CCC, BSMI, UL |
| Front Panel Protection | IP65 compliant |

**Industrial Panel Computers & Panel PC**

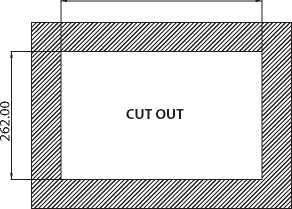
Date updated: 20-Jun-2014

All product specifications are subject to change without notice

**Dimensions**

Unit: mm

413.00



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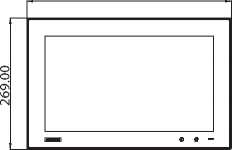
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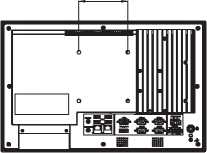
419.70



59.00

|  |  |  |  |
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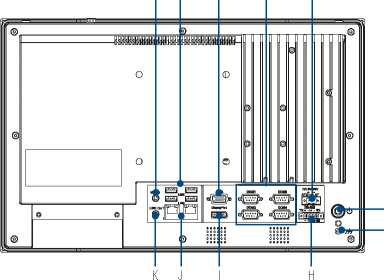
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**Ordering Information**

**I/O Appearance**

|  |  |
| --- | --- |
| Part NO | Description |
| PPC-4151W-P5AE | 15.6 Wide screen PPC with PCT Multi-touch, Intel Core i5-4300U up to 2.9GHz |
| PPC-4151W-PCAE | 15.6 Wide screen PPC with PCT Multi-touch, Intel Celeron 2980U 1.6GHz |
| PS-DC19-L157E | 19V DC power Adapter Module |
| 1700001524 | POWER Cord 3P UL 10A 125V 180cm |
| 170203183C | POWER Code 3P Europe (WS-010+083)183cm |
| 1700008921 | POWER CORD 3P/3P POWER SUPPLY 1.8M PSE |
| PPC-174T-WL-MTE | Wall mount kit A800B for PPC series |
| PPC-4150W-STANDE | Desktop stand kit for PPC-4150W series |
| PPC-ARM-A03 | PPC ARM VESA Standard |

ABC D E



1. Mic-in
2. 4 x USB 3.0
3. VGA Port
4. 4x RS-232
5. DC Inlet
6. Power Button
7. Ground Line
8. 1 x RS-422/485
9. Display Port
10. 2 x 10/100/1000 Mbps Ethernet
11. Line Out

**Online Download**

[www.advantech.com/products](http://www.advantech.com/products)

**ÂDHNTECH**

HUBER+SUHNER® DATA SHEET Coaxial Cable: S 10162 B-11

Rev.: N



Description

PE Foam - 50 Ohm - high screened

Technical Data **Construction**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Material | Detail | Diameter | |
| Centre conductor | Copper clad Aluminum | Wire | 3.8 | mm |
| Dielectric | SPE (Foamed Polyethylene) |  | 9.9 | mm |
| Outer conductor | Copper | longitudinal Foil, 100 % | 10 | mm |
| Outer conductor | Copper | Braid, 80 % | 10.8 | mm |
| Jacket | LSFH (modified polyethylene) | RAL 9005 - bk | 12.9 | mm +/- 0.2 |

Print HUBER+SUHNER S 10162 B-11 50 Ohm (PA no.)

Electrical Data

50 Q +/- 2

7.5 GHz

77 pF/m

87 %

3.85 ns/m

* 1 x 108 MQm
* 90 dB (up to 7.5 GHz)

1.7 kVrms (at sea level)

3.4 kVrms (50 Hz/1 min)

Impedance

Max. operating frequency Capacitance

Velocity of signal propagation Signal delay Insulation resistance Min. screening effectiveness Max. operating voltage Test voltage

Mechanical Data

|  |  |  |  |
| --- | --- | --- | --- |
| Weight |  | 15 | kg/100 m |
| Min. bending radius | static | 100 | mm |
|  | repeated (for max. 50 bendings) | 200 | mm |

Environmental Data

-40 °C... + 85 °C

-20 °C... + 60 °C

IEC 60332-1, EN 60332-1-2, BS 4066-3, NF C 32-070 C2 EN 61034-2, NF X 10-702 IEC 60754 ISO 4892-2A

BS 6853 Annex B, NF X 70-100 compliant

Temperature range Installation temperature Flammability Smoke density Halogen free Uv resistance test Toxic fume 2002/95/EC (RoHS)

Ordering Information

Order as S 10162 B-11

Additional Information **Remarks**

(For details refer to the HUBER+SUHNER RF CABLES GENERAL CATALOGUE or contact your nearest HUBER+SUHNER partner)

Suitable Connectors

Cable group crimped (S39) clamped (on request) soldered —

**HUBER+SUHNER® DATA SHEET Coaxial Cable: S\_10162\_B-11**

Matrix Attenuation [ formula: (a\*ro.5 + b\*f) ] and Power CW [ formula: (p\*/ f»o.5) ]

Rev.: N

Coefficients:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a= | 0.0826 | b= | 0.0129 | fmax.= | 7.5 | Pat  1GHz = | 700 |
|  |  |  |  |  |  |  |  |
|  | Frequency |  | Nom. attenuation |  | Nom. attenuation |  | Max. CW power |
|  | (GHz) |  | (dB / m) |  | (dB / ft) |  | (watt) |
|  |  |  | sea level 25° C ambient temperature |  | sea level 25° C ambient temperature |  | sea level 40° C ambient temperature |
|  |  |  |  |  |  |  |  |
|  | 0.4 |  | 0.06 |  | 0.018 |  | 1107 |
|  | 0.8 |  | 0.08 |  | 0.024 |  | 783 |
|  | 1.1 |  | 0.10 |  | 0.030 |  | 667 |
|  | 1.5 |  | 0.12 |  | 0.037 |  | 572 |
|  | 1.9 |  | 0.14 |  | 0.043 |  | 508 |
|  | 2.3 |  | 0.15 |  | 0.046 |  | 462 |
|  | 2.6 |  | 0.17 |  | 0.052 |  | 434 |
|  | 3.0 |  | 0.18 |  | 0.055 |  | 404 |
|  | 3.4 |  | 0.20 |  | 0.061 |  | 380 |
|  | 3.8 |  | 0.21 |  | 0.064 |  | 359 |
|  | 4.1 |  | 0.22 |  | 0.067 |  | 346 |
|  | 4.5 |  | 0.23 |  | 0.070 |  | 330 |
|  | 4.9 |  | 0.25 |  | 0.076 |  | 316 |
|  | 5.3 |  | 0.26 |  | 0.079 |  | 304 |
|  | 5.6 |  | 0.27 |  | 0.082 |  | 296 |
|  | 6.0 |  | 0.28 |  | 0.085 |  | 286 |
|  | 6.4 |  | 0.29 |  | 0.088 |  | 277 |
|  | 6.8 |  | 0.30 |  | 0.091 |  | 268 |
|  | 7.1 |  | 0.31 |  | 0.094 |  | 263 |
|  | 7.5 |  | 0.32 |  | 0.098 |  | 256 |

HUBER+SUHNER is certified according to ISO 9001 and ISO 14001

WAIVER!

It is exclusively in written agreements that we provide our customers with warrants and representations as to the technical specifications and/or the fitness for any particular purpose. The facts and figures contained herein are carefully compiled to the best of our knowledge, but they are intended for general informational purposes only.

**HUBER+SUHNER**

HUBER+SUHNER AG RF Industrial

9100 Herisau, Switzerland

Phone +41 (0)71 353 41 11 Fax +41 (0)71 353 45 90 [www.hubersuhner.com](http://www.hubersuhner.com)

HUBER+SUHNER - Excellence in Connectivity Solutions

>



**triorail**

Triorail GmbH & Co. KG > Sonnenstraße 16 a > 85304 Ilmmünster

**Declaration of Conformity**

**Directive 99/5/EC ÍR&TTED)**

Manufacturer or

Authorised representative: Triorail GmbH&Co KG

Address:

**Sonnenstraße 16 a 85304 Ilmmünster**

We declare under our sole responsibility that the product

**Cellular Terminal TR:S75, TTS-S75 and TM-S75**

Is in compliance with the essential requirements of §3of the R&TTED.

- Health and safety requirements pursuant to §3(l)a:

Applied Standard(s) or other means of providing conformity:

**EN60950-1:**

2001

* Protection requirements concerning EMC §3(l)b:

Applied Standard(s) or other means of providing conformity:

**EN301 489-7 V1.2.1: 8/2002**

* Measures for the efficient use of the radio frequency spectrum §3(2) Applied Standards or other means of providing conformity:

**R&TTE EN 301 419-7 V.5.0.2**



Ludwig Hofmann

Manufacturerez Authorized representaive name and signature

Ilmmünster 2.October 2006

place and date of issue

Geschäftsführer: Jürgen & Ludwig Hofmann

Bankverbindung: Raiffeisenbank Ingolstadt/Pfaffenhofen > Kto-Nr. 1907360 > BLZ 721 608 18 > Bank BIC: GENODEF1INP > IBAN: DE28 7216 0818 0001 9073 60 Geschäftsführung und persönliche Haftung Triodata GmbH Ingolstadt HRB 3094 > VAT Nr.: DE226936798

Triorail GmbH & Co. KG > Sonnenstraße 16 a > 85304 Ilmmünster > T:++49(0)8441/4 07 38 24 > F:++49(0)8441/4 98 02 27 > [info@triorall.com](mailto:info@triorall.com) > [www.triorail.com](http://www.triorail.com)

**«**2**»**

**triorail**

Triorail GmbH & Co. KG :> Sonnenstraße 16 a > 85304 Ilmmünster > Germany

DECLARATION OF CONFORMITY DIRECTIVE 99/5/EC

Manufacturer or

Authorized representative: Triorail GmbH & Co. KG

Address: SonnenstraBe 16a

85304 Ilmmiinster Germany

DecI are under our sole responsibility that the products

Triorail Terminals TRM-3T USB, TRM-3aT USB and TTS-TRM-3aT USB

-Frequency range: GSM-R, GSM 900/1800/1900

-Transmitted power: max. 2W

to which this declaration relates, are in conformity with the following standards and/or other normative documents, by specific reference to the essential requirements of Article 3 of the Directive 1999/5/EC.

Health and Safety (Art. 3.1 a): EN 60950-1:2006+All:2009

EMC (Art. 3.1 b): EN 301489-l:vl.8.1

EN 301 489-7:vl.3.1

RF spectrum efficiency (Art. 3.2): EN 301 511:v9.0.2

(ref. to 3GPP TS 51.010-1)

We hereby declare that all essential radio tests have been earned out and that the above named products are in conformity to all the essential requirements of Directive 1999/5/EC.

The technical documentation relevant to the above equipment will be held at:

Triorail GmbH & Co. KG SonnenstraBe 16a 85304 Ilmmiinster Germany



Ilmmiinster, 2012-09-12 Horst Fenske

CEO

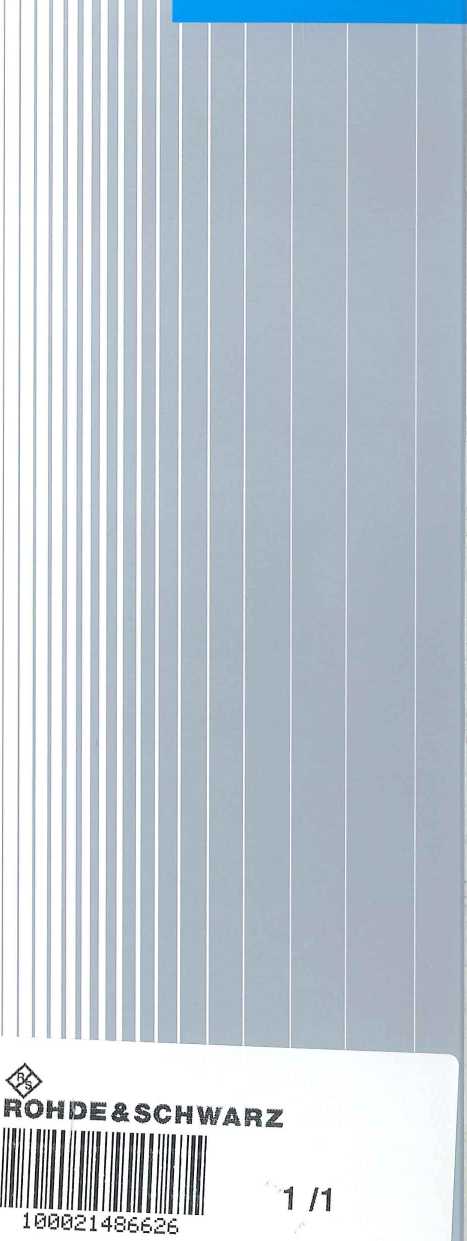
Geschäftsführer jürgen Hofmann und Horst Fenske

Triorail GmbH & Co.KG > Sonnenstraße 16 a > 85304 Ilmmünster > Germany >T:++49(0)8441/4073824 > F: ++49(0)8441/4 9802 27 > [info@triorail.com](mailto:info@triorail.com) > [www.triorall.com](http://www.triorall.com)

Bankverbindung: Volksbank Raiffeisenbank Bayern Mitte eG > Kto-Nr. 1907360 > BLZ 721 608 18 > Bank BIC: GENODEF1INP > IBAN: DE28 7216 0818 0001 9073 60 Geschäftsführung und persönliche Haftung Triodata GmbH Ingolstadt HRB 3094 > VAT Nr.: DE226936798

**Important Product Records**

i Worldwide i Local and personalized i Customized and flexible i Uncompromising quality i Long-term dependability



MLD

Material No.

**Service that adds value**

e. g. Calibration Certificate, License Keys List

**1173**.**6506.02**

**Serial No.**

**102416**

DCZPZP PAP!ERAUSDRUCK

**Calibration Certificate**

**Certificate Number 20-502125**

Kalibrierschein

Zertifikatsnummer

|  |  |  |
| --- | --- | --- |
| **Unit Data** |  |  |
| Item  Gegenstand | TSML-CW RADIO NETWORK ANALYZER | |
| Manufacturer  Hersteller | ROHDE & SCHWARZ |  |
| Type  Typ | TSML-CW |  |
| Material Number  Materialnummer | 1153.6000.15 Serial Number  Seriennummer | 100124 |
| Asset Number  Inventamummer |  |  |

Order Data

**Customer**

Auftraggeber



|  |  |
| --- | --- |
| Order Number 0000291929  Bestellnummer |  |
| Date of Receipt 2014-08-11  Eingangsdatum |  |
| Performance |  |
| Place and Date of Calibration  Ort und Datum der Kalibrierung | Memmingen, 2014-08-11 |
| Scope of Calibration  Umfang der Kalibrierung | Standard Calibration |
| Statement of Compliance (Incoming)  Konformitätsaussage  (Anlieferung) | New device |
| Statement of Compliance (Outgoing)  Konformitätsaussage  (Auslieferung) | Measurement results within specifications |
| Extent of Calibration Documents  Umfang des Kalibrierdokuments | 2 Pages Calibration Certificate 5 Pages Outgoing Results |

**Ref. No.20-502125**

|  |  |
| --- | --- |
| **Cal.** | **Custom. Due Date** |
| **2014-08-11** |  |

**This calibration certificate documents, that the named item is tested and measured against defined specifications.**

**Measurement results are located usually in the corresponding interval with a probability of approx. 95% (coverage factor k = 2).**

**Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national / international standards, which realize the physical units of measurement according to the International System of Units (SI).**

**In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories.**

**Principles and methods of calibration correspond and are conformant with EN ISO/IEC 17025, ANSI/NCSL Z540.1-1994 and ANSI/NCSL Z540.3-2006. The applied quality system is certified to EN ISO 9001.**

**This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.**

**The user is obliged to have the object recalibrated at appropriate intervals.**

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Werteintervall (Erweiterte Messunsicherheit mit k = 2).

Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstiriimung mit dem Internationalen Einheitensystem (Sl). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S- Laboratorien.

Grundsätze und Verfahren der Kalibrierung beziehen sich auf und entsprechen EN ISO/IEC 17025, ANSI/ NCSL Z540.1-1994 und ANSi/NCSL Z540.3-2006.

Das angewandte Qualitätsmanagement- System ist zertifiziert nach EN ISO 9001. Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.

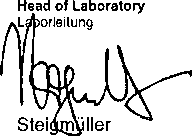
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

**Rohde & Schwarz Messgerätebau GmbH**

**Date of Issue**

Ausstellungsdatum

2014-08-11



**Person Responsible**

Bearbeiter

Gerald Nickel

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ver9815/MB0707

Rohde & Schwarz Messgerätebau GmbH • Postfach 1652 D-87686 Memmingen • Rohde-und-Schwarz-Str. 1 D-87700 Memmingen Telefon national: 08331/10-80; international: 0049 8331/10-80; Fax: 08331/10-811 24 Geschäftsführer: Jürgen Steigmüller • Aufsichtsratsvorsitzender: Roland Steffen Sitz der Gesellschaft: München • Registereintrag: Amtsgericht München HRB 1059

**Calibration Method** 1153.6000.01 -T- 08.01

**Relative Humidity 20%-60%**

Relative Luftfeuchte

Kalibrieranweisung

Ambient Temperature **(23 +3)°C**

**Conformity statements take the measurement uncertainties into account.**

Die Konformitätsaussagen berücksichtigen die Messunsicherheiten.

Umgebungstemperatur

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Working standards used (having a significant effect on the accuracy)  Verwendete Gebrauchsnormale (mit signifikantem Einfluss auf die Genauigkeit) | | | | |
| Item | Type | Serial Number | Calibration Certificate Number | Cal. Due |
| Gegenstand | Typ | Seriennummer | Kalibrierscheinnummer | Kalibr. bis |
| Average Power Sensor | NRP-Z11 | 100473 | 0410-D-K-15195-01 -00-2013-07 | 2015-07-31 |
| Vector Signal Generator | SMIQ06B | 838341/040 | 0082-DKD-K-15195-2013-05 | 2016-04-30 |

Notes

Anmerkungen

Installed options are included in calibration. Depending on installed options, numbers of pages of the record are not consecutive.

Outgoing Results

|  |  |
| --- | --- |
| Designation: | Radio Network Analyzer |
| Type:  Material No.: Serial No.: | TSML-CW  1153.6000.15  100124 |
| Referring to Test Documentation: | 1153.6000.01-T-08.01 |

|  |  |
| --- | --- |
| Test Department: ME1A Name: Nickel  Date: 2014-08-11 |  |

|  |  |
| --- | --- |
| ROHDE&SCHWARZ | Page  1/5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type | TSML-CW | Serial No. | 100124 |  |
| Test System | T10010 | Material No. | 1153.6000.15 | ROHDE&SCHWARZ |
| Temperature | (23 -3/+7)°C | Date | 2014-08-11 |
| File | 1153.6000.15\_100124\_10-.MF |  |  |  |
| Page | 2/5 |  |  |  |

**Table of contents**

Software used for measurement

3

1. Protocol

4

Type TSML-CW Serial No. 100124

Test System T10010 Material No. 1153.6000.15

Temperature (23-36-7)°C Date 2014-0&-11

File 1153.6000.15\_100124\_10-.MF

Page 3 / 5

|  |  |  |  |
| --- | --- | --- | --- |
| Software used for measurement Item | Type | Version | Remark |
| Suite  Test Program (010121J | Setup  Component | V10.10  V08.01 | Test Management Software G5 |

TSML-CW **T10010** (23 -3/+7)°C

**Type**

**Test System Temperature File Page**

1153.6000.15\_100124J O-.MF 4/5

1. Protocol

Report generated with mask: Skript5\_TSML-CW Begin:

Program Version Calibration Version

Auto Power On Mode

Power Off Mode

IEEE1394 Communication

IF-Filter Adjustment

Level Calibration

Bandwidth 3dB IF-Filter Valid Range

Level Accuracy Start Frequency Stop Frequency Frequency Step Calculation Interval

7 . 00

1.04

O.K.

O.K.

O.K.

O.K.

O.K.

4.541 MHz

4.275 MHz to 4.725 MHz

0080 MHz 3921 MHz 0001 MHz 0500 MHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Amplifier Setting | | Pre-Amp | on, IF | -Amp | | 15db |  |  |
| Input | Power | -50.00 dBm | |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | [dB/100] | |  |  |
|  |  | Average | Max |  |  | Frequ.[MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-01 | + 04 |  |  | 0115 | + /-70 | + /-30 |
| 0501 . . | .1000 MHz | + /-01 | + 04 |  |  | 0703 | + /-70 | + /-30 |
| 1001 . . | .1500 MHz | + /-01 | + 04 |  |  | 1317 | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-01 | + 04 |  |  | 1571 | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-01 | + 03 |  |  | 2009 | + /-70 | + /-30 |
| 2501.. | .3000 MHz | + /-01 | + 03 |  |  | 2507 | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-01 | + 04 |  |  | 3045 | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-00 | + 03 |  |  | 3573 | + /-70 | + /-30 |
| Amplifier Setting | | Pre-Amp | Of f, IF | Amp | | 15db |  |  |
| Input | Power | -40.00 dBm | |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | [dB/100] | |  |  |
|  |  | Average | Max |  |  | Frequ.[MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-00 | + 03 |  |  | 0129 | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-01 | + 03 |  |  | 0538 | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-00 | + 03 |  |  | 1245 | + /-70 | + /-30 |
| 1501.. | .2000 MHz | + /-00 | + 03 |  |  | 1938 | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-00 | + 03 |  |  | 2089 | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-00 | + 03 |  |  | 2580 | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-00 | + 04 |  |  | 3047 | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-00 | + 03 |  |  | 3605 | + / - 7 0 | + /-30 |

**Type**

**Test System Temperature File Page**

**TSML-CW T10010 (23 -3/+7)°C**

**1153.6000.15\_100124\_10- .M F 5/5**

**100124**

**1153.6000.15**

**2014-08-11**

<$>

ROHDE&SCHWARZ

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Amplifier Setting | | Pre-Amp | off | , IF-Amp | 5db |  |  |
| Input | Power | -30.00 | dBm |  |  |  |  |
| Frequency | | Measured Ac | | curacy [dB/100] | |  |  |
|  |  | Average |  | Max | Frequ.[MHz] | Rated | Uncer |
| 0080.. | .0500 MHz | + /-01 |  | + 05 | 0324 | + /-70 | + /-30 |
| 0501.. | .1000 MHz | + /-01 |  | + 06 | 0590 | + /-70 | + /-30 |
| 1001.. | .1500 MHz | + /-01 |  | + 04 | 1025 | + /-70 | + /-30 |
| 1501.. | .2000 MHz | + /-01 |  | + 05 | 1588 | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-02 |  | -06 | 2231 | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-03 |  | + 09 | 2666 | + /-70 | + /-30 |
| 3001.. | .3500 MHz | + /-03 |  | -10 | 3119 | + /-70 | + / - 3 0 |
| 3501.. | .4000 MHz | + /-04 |  | + 12 | 3846 | + /-70 | + /-30 |
| Amp1i f | ier Setting | Pre-Amp | off | , IF-Amp | off |  |  |

Input Power

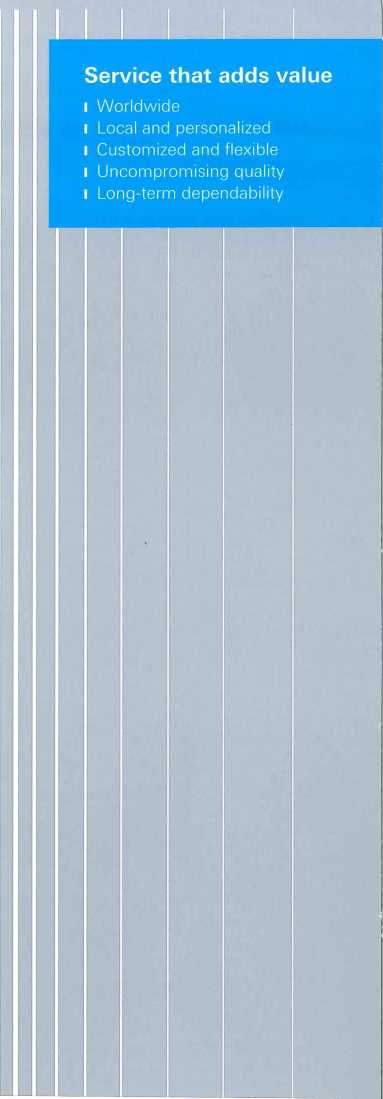
-25.00 dBm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency | |  | Measured | Accuracy | [dB/100] |  |  |
|  |  |  | Average | Max | Frequ.[MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 | MHz | + /-01 | + 06 | 0324 | + /-70 | + /-30 |
| 0501 . . | . 1000 | MHz | + /-03 | + 09 | 0835 | + /-70 | + /-30 |
| 1001 . . | . 1500 | MHz | + /-03 | + 11 | 1336 | + /-70 | + /-30 |
| 1501 . . | . 2000 | MHz | + /-02 | -09 | 1878 | + /-70 | + /-30 |
| 2001 . . | .2500 | MHz | + /-06 | -22 | 2361 | + /-70 | + /-30 |
| 2501 . . | .3000 | MHz | + /-07 | -20 | 2848 | + /-70 | + /-30 |
| 3001 . . | .3500 | MHz | + /-03 | -18 | 3298 | + /-70 | + /-30 |
| 3501 . . | .4000 | MHz | + /-01 | -07 | 3804 | + /-70 | + /-30 |
| Amplifier Setting | | | Low Level | Meas: Pre-Amp on, IF-Amp | | 15db |  |
| Input | Power |  | -69.70 dBm | |  |  |  |
| Frequency | |  | Measured | Accuracy | [dB/100] |  |  |
|  |  |  | Average | Max | Frequ.[MHz] | Rated | Uncertainty |
| 0080.. | . 0500 | MHz | + /-07 | + 16 | 0112 | + /-70 | + /-70 |
| 0501 . . | . 1000 | MHz | + /-07 | + 15 | 0750 | + /-70 | + /-70 |
| 1001 . . | . 1500 | MHz | + /-06 | + 15 | 1250 | + /-70 | + /-70 |
| 1501 . . | .2000 | MHz | + /-04 | + 13 | 1734 | + /-70 | + /-70 |
| 2001 . . | .2500 | MHz | + /-03 | + 13 | 2364 | + /-70 | + /-70 |
| 2501 . . | . 3000 | MHz | + /-03 | + 10 | 2564 | + /-70 | +/-110 |
| 3001 . . | .3500 | MHz | + /-03 | -20 | 3200 | + /-70 | +/-110 |
| 3501 . . | .4000 | MHz | + /-03 | -15 | 3923 | + /-70 | +/-110 |

O.K.

Filter Calibration End :

**Important Product Records**



¡ROHDE&SCHWARZ

e. g. Calibration Certificate, License Keys List

1 /t

**MLD**

100921486627 **Material No.**

**1173**.**6506.02**

**Serial No.**

102417

**GU DCV-ZP DCV-PAPIERAUSDRUCK**

OCV-ZP

Calibration Certificate

Kalibrierschein

Certificate Number 20-502127

Zertifikatsnummer

**Ref. No.20-502127**

|  |  |
| --- | --- |
| **Cal.** | **Custom. Due Date** |
| **2014-08-11** |  |

|  |  |
| --- | --- |
| Order Number 0000291929  Bestellnummer |  |
| Date of Receipt 2014-08-11  Eingangsdatum |  |
| Performance |  |
| Place and Date of Calibration  Ort und Datum der Kalibrierung | Memmingen, 2014-08-11 |
| Scope of Calibration  Umfang der Kalibrierung | Standard Calibration |
| Statement of Compliance (Incoming)  Konformitätsaussage  (Anlieferung) | New device |
| Statement of Compliance (Outgoing)  Konformitätsaussage  (Auslieferung) | Measurement results within specifications |
| Extent of Calibration Documents  Umfang des Kalibrierdokuments | 2 Pages Calibration Certificate 5 Pages Outgoing Results |

**Order Data**

**Customer**

Auftraggeber

Unit Data

**Item TSML-CW RADIO NETWORK ANALYZER**

Gegenstand

**Manufacturer ROHDE & SCHWARZ**

Hersteller

**Type TSML-CW**

Typ

**Material Number 1153.6000.15 Serial Number 100125**

Materialnummer Seriennummer

**Asset Number**

Inventarnummer

This calibration certificate documents, that the named item is tested and measured against defined specifications.

Measurement results are located usually in the correspohding interval with a probability of approx. 95% (coverage factor k = 2).

Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national / international standards, which realize the physical units of measurement according to the International System of Units (SI).

In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories.

Principles and methods of calibration correspond and are conformant with EN ISO/IEC 17025, ANSI/NCSL Z540.1-1994 and ANSI/NCSL Z540.3-2006. The applied quality system is certified to EN ISO 9001.

This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Werteintervall (Erweiterte Messunsicherheit mit k = 2).

Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (Sl). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S- Laboratorien.

Grundsätze und Verfahren der Kalibrierung beziehen sich auf und entsprechen EN ISO/IEC 17025, ANSI/ NCSL Z540.1-1994 und ANSI/NCSL Z540.3-2005.

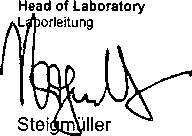
Das angewandte Qualitätsmanagement- System ist zertifiziert nach EN ISO 9001. Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

**Date of Issue**

Ausstellungsdatum

2014-08-11



**Person Responsible**

Bearbeiter

Gerald Nickel

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ver9815/MB0707

Rohde & Schwarz Messgerätebau GmbH

Rohde & Schwarz Messgerätebau GmbH • Postfach 1652 D-87686 Memmingen • Rohde-und-Schwarz-Str. 1 D-87700 Memmingen Telefon national: 08331/10-80; international: 0049 8331/10-80; Fax: 08331/10-811 24 Geschäftsführer: Jürgen Steigmüller • Aufsichtsratsvorsitzender: Roland Steffen Sitz der Gesellschaft: München • Registereintrag: Amtsgericht München HRB 1059

**Calibration Method** 1153.6000.01-T-08.01

**Relative Humidity 20%-60%**

Relative Luftfeuchte

Kalibrieranweisung

Ambient Temperature **(23 \*3)°C**

**Conformity statements take the measurement uncertainties into account.**

Die Konformitätsaussagen berücksichtigen die Messunsicherheiten.

Umgebungstemperatur

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Working standards used (having a significant effect on the accuracy)  Verwendete Gebrauchsnormale (mit signifikantem Einfluss auf die Genauigkeit) | | | | |
| Item | Type | Serial Number | Calibration Certificate Number | Cal. Due |
| Gegenstand | Typ | Seriennummer | Kalibrierscheinnummer | Kalibr. bis |
| Average Power Sensor | NRP-Z11 | 100473 | 0410-D-K-15195-01 -00-2013-07 | 2015-07-31 |
| Vector Signal Generator | SMIQ06B | 838341/040 | 0082-DKD-K-15195-2013-05 | 2016-04-30 |

Notes

Anmerkungen

Installed options are included in calibration. Depending on installed options, numbers of pages of the record are not consecutive.

**Radio Network Analyzer TSML-CW 1153.6000.15 100125**

**1153.6000.01 -T-08.01**

**Designation:**

**Type:**

**Material No.:**

**Serial No.:**

**Referring to Test Documentation:**

Outgoing Results

Test Department: **ME1A**

**Name:** Nickel

**Date:**

2014-08-11

**Page**

**1/5**

ROHDE&SCHWARZ

TSML-CW T10010 (23 -3/+7)°C

ROHDE&SCHWARZ

**Type**

**Test System Temperature File Page**

1153.6000.15\_100125\_10- .M F 2/5

Table of contents

Software used for measurement

3

1. Protocol

4

Type TSML-CW Serial No. 100125

Test System T10010 Material No. 1153.6000.15

Temperature (23 -3/+7)°C Date 2014-08-11

File 1153.6000.15\_100125\_10-.MF

Page 3/5

|  |  |  |  |
| --- | --- | --- | --- |
| Software used for measurement Item | Type | Version | Remark |
| Suite  Test Program (010121\_) | Setup  Component | V10.10  V08.01 | Test Management Software G5 |

TSML-CW T10010 (23 -3/+7)°C

Type

Test System Temperature File Page

1153.6000.15\_100125\_10- .M F 4/5

1. Protocol

Report generated with mask: Skript5\_TSML-CW Begin:

|  |  |  |  |
| --- | --- | --- | --- |
| Program Version | 7 , | . 00 |  |
| Calibration Version | 1 . | . 04 |  |
| Auto Power On Mode | O. | , K . |  |
| Power Off Mode | O. | .K. |  |
| IEEE1394 Communication | O. | .K. |  |
| IF-Filter Adjustment | O. | . K . |  |
| Level Calibration | O. | .K. |  |
| Bandwidth 3dB IF-Filter | 4 . | 443 | MHz |
| Valid Range | 4 . | 275 | MHz |

Level Accuracy

Start Frequency 0080 MHz Stop Frequency 3921 MHz Frequency Step 0001 MHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Calculation Interval | | 0500 MHz |  |  |  |  |  |  |
| Amplifier Setting | | Pre-Amp | on, | IF | Amp 15db | |  |  |
| Input | Power | -50.00 dBm | |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/100 ] |  |  |
|  |  | Average |  | Max |  | Frequ.[MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-03 |  | + 06 |  | 0124 | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-03 |  | + 05 |  | 0509 | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-03 |  | + 06 |  | 1380 | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-03 |  | + 06 |  | 1550 | + /-70 | + /-30 |
| 2001 . . | . 2500 MHz | + /-02 |  | + 05 |  | 2338 | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-03 |  | + 06 |  | 2646 | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-02 |  | + 05 |  | 3219 | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-01 |  | + 05 |  | 3525 | + /-70 | + /-30 |
| Amplifier Setting | | Pre-Amp | off, | IF- | Amp 15db | |  |  |
| Input | Power | -40.00 dBm | |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/100] |  |  |
|  |  | Average |  | Max |  | Frequ.[MHz] | Rated | Uncertainty |
| 0080.. | . 0500 MHz | + /-01 |  | + 04 |  | 0313 | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-01 |  | + 04 |  | 0509 | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-02 |  | + 04 |  | 1026 | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-01 |  | + 04 |  | 1537 | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + / - 01 |  | + 04 |  | 2452 | + /-70 | + /-30 |
| 2501.. | .3000 MHz | + /-01 |  | + 05 |  | 2734 | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-01 |  | + 03 |  | 3013 | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-00 |  | + 03 |  | 3508 | + /-70 | + / - 3 0 |

Type

Test System Temperature File

Page

TSML-CW T10010 (23 -3/+7)°C

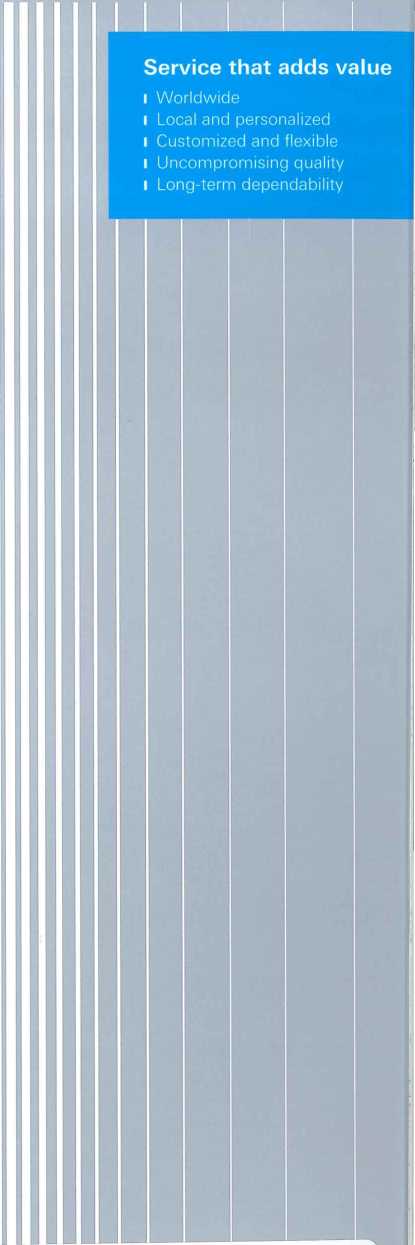
1153.6000.15\_100125\_10-.M F 5/5

<$>

ROHDE&SCHWARZ

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Amplifier Setting | | Pre-Amp | off | , IF | -Amp | | 5db |  |  |  |
| Input | Power | -30.00 dBm | |  |  |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/ 10 0] | |  |  |  |
|  |  | Average |  | Max |  |  | Frequ. | [MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-01 |  | + 04 |  |  | 0324 |  | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-01 |  | + 04 |  |  | 0590 |  | + /-70 | + /-30 |
| 1001 . . | .1500 MHz | + /-01 |  | + 05 |  |  | 1284 |  | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-01 |  | -06 |  |  | 1654 |  | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-02 |  | -06 |  |  | 2237 |  | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-03 |  | + 10 |  |  | 2958 |  | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-03 |  | -11 |  |  | 3108 |  | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-04 |  | -12 |  |  | 3998 |  | + /-70 | + /-30 |
| Arnplif | ier Setting | Pre-Amp | off | IF | Amp | | off |  |  |  |
| Input | Power | -25.00 dBm | |  |  |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/10 0] | |  |  |  |
| — | — | Average |  | Max |  |  | Frequ. | [MHz] | Rated | Uncertainty |
| 0080 . . | .0500 MHz | + /-01 |  | -04 |  |  | 0218 |  | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-03 |  | -10 |  |  | 0933 |  | + /-70 | + /-30 |
| 1001 . . | .1500 MHz | + /-03 |  | -10 |  |  | 1245 |  | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-02 |  | -11 |  |  | 1870 |  | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-07 |  | -25 |  |  | 2361 |  | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-08 |  | -20 |  |  | 2833 |  | + /-70 | + /-30 |
| 3001.. | .3500 MHz | + /-05 |  | -22 |  |  | 3297 |  | + /-70 | + /-30 |
| 3501.. | .4000 MHz | + /-03 |  | -09 |  |  | 3815 |  | + /-70 | + /-30 |
| Amplifier Setting | | Low Level Meas: | | | Pre | | Amp on | , IF-Amp | 15db |  |
| Input | Pov;er | -69.70 dBm | |  |  |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/10 0] | |  |  |  |
|  |  | Average |  | Max |  |  | Frequ. | [MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-09 |  | + 17 |  |  | 0087 |  | + /-70 | + /-70 |
| 0501 . . | . 1000 MHz | + /-09 |  | + 17 |  |  | 0800 |  | + /-70 | + /-70 |
| 1001 . . | . 1500 MHz | + /-09 |  | + 20 |  |  | 1423 |  | + /-70 | + /-70 |
| 1501 . . | .2000 MHz | + /-06 |  | + 13 |  |  | 1752 |  | + /-70 | + /-70 |
| 2001 . . | .2500 MHz | + /-05 |  | + 15 |  |  | 2369 |  | + /-70 | + /-70 |
| 2501 . . | .3000 MHz | + /-07 |  | + 14 |  |  | 2818 |  | + /-70 | +/-110 |
| 3001 . . | .3500 MHz | + /-04 |  | + 16 |  |  | 3275 |  | + / - 7 0 | +/-110 |
| 3501 . . | .4000 MHz | + /-02 |  | + 15 |  |  | 3525 |  | + /-70 | +/-110 |
| Filter | Calibration | O.K. |  |  |  |  |  |  |  |  |
| End : - - |  |  |  |  |  |  |  |  |  |  |

**Important Product Records**



<&>

R0HDE&SCHWARZ

e. g. Calibration Certificate, License Keys List



**Material Mo,**

**1173**.**6506.02**

**Serial No.**

**102419**

**GU DCV-ZP DCV-PAPIERAUSDRUCK**

DCV-ZP

**MLD**

Calibration Certificate

Kalibrierschein

Certificate Number 20-502371

Zertifikatsnummer

**Ref. No.20-502371**

|  |  |
| --- | --- |
| **Cal.** | **Custom. Due Date** |
| **2014-09-12** |  |

|  |  |
| --- | --- |
| **Order Data** |  |
| Customer  Auftraggeber |  |
| Order Number 0000292442  Bestellnummer |  |
| Date of Receipt 2014-08-12  Eingangsdatum |  |
| **Performance** |  |
| Place and Date of Calibration  Ort und Datum der Kalibrierung | Memmingen, 2014-08-12 |
| Scope of Calibration  Umfang der Kalibrierung | Standard Calibration |
| Statement of Compliance (Incoming)  Konformitätsaussage  (Anlieferung) | New device |
| Statement of Compliance (Outgoing)  Konformitätsaussage  (Auslieferung) | Measurement results within specifications |
| Extent of Calibration Documents  Umfang des Kalibrierdokuments | 2 Pages Calibration Certificate 5 Pages Outgoing Results |

|  |  |  |
| --- | --- | --- |
| **Unit Data** |  |  |
| Item  Gegenstand | TSML-CW RADIO NETWORK ANALYZER | |
| Manufacturer  Hersteller | ROHDE & SCHWARZ |  |
| Type  Typ | TSML-CW |  |
| Material Number  Materialnummer | 1153.6000.15 Serial Number  Seriennummer | 100126 |
| Asset Number  Inventarnummer |  |  |

This calibration certificate documents, that the named item is tested and measured against defined specifications.

Measurement results are located usually in the corresponding interval with a probability of approx. 95% (coverage factor k = 2).

Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national / international standards, which realize the physical units of measurement according to the International System of Units (SI).

In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories.

Principles and methods of calibration correspond and are conformant with EN ISO/IEC 17025, ANSI/NCSL Z540.1-1994 and ANSI/NCSL Z540.3-2006. The applied quality system is certified to EN ISO 9001.

This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Werteintervall (Erweiterte Messunsicherheit mit k = 2).

Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (Sl). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S- Laboratorien.

Grundsätze und Verfahren der Kalibrierung beziehen sich auf und entsprechen EN ISO/IEC 17025, ANSI/ NCSL Z540.1-1994 und ANSI/NCSL Z540.3-2006.

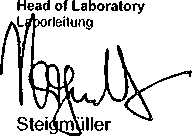
Das angewandte Qualitätsmanagement- System ist zertifiziert nach EN ISO 9001. Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

**Date of Issue**

Ausstellungsdatum

2014-08-12



**Person Responsible**

Bearbeiter

Gerald Nickel

**Page 1/2**

ver9815/MB0707

Rohde & Schwarz Messgerätebau GmbH

Rohde & Schwarz Messgerätebau GmbH • Postfach 1652 D-87686 Memmingen • Rohde-und-Schwarz-Str. 1 D-87700 Memmingen Telefon national: 08331/10-80; international: 0049 8331/10-80; Fax: 08331/10-811 24 Geschäftsführer: Jürgen Steigmüller • Aufsichtsratsvorsitzender: Roland Steffen Sitz der Gesellschaft: München • Registereintrag: Amtsgericht München HRB 1059

**Calibration Method** 1153.6000.01-T- 08.01

**Relative Humidity 20%-60%**

Relative Luftfeuchte

Kalibrieranweisung

Ambient Temperature **(23 +3)°C**

**Conformity statements take the measurement uncertainties into account.**

Die Konformitätsaussagen berücksichtigen die Messunsicherheiten.

Umgebungstemperatur

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Working standards used (having a significant effect on the accuracy)  Verwendete Gebrauchsnormale (mit signifikantem Einfluss auf die Genauigkeit) | | | | |
| Item | Type | Serial Number | Calibration Certificate Number | Cal. Due |
| Gegenstand | Typ | Seriennummer | Kalibrierscheinnummer | Kalibr. bis |
| Average Power Sensor | NRP-Z11 | 100473 | 0410-D-K-15195-01-00-2013-07 | 2015-07-31 |
| Vector Signal Generator | SMIQ06B | 838341/040 | 0082-DKD-K-15195-2013-05 | 2016-04-30 |

Notes

Anmerkungen

Installed options are included in calibration. Depending on installed options, numbers of pages of the record are not consecutive.

Outgoing Results

|  |  |
| --- | --- |
| Designation: | Radio Network Analyzer |
| Type:  Material No.: Serial No.: | TSML-CW  1153.6000.15  100126 |
| Referring to Test Documentation: | 1153.6000.01-T-08.01 |

|  |  |
| --- | --- |
| Test Department: ME1A Name: Nickel  Date: 2014-08-12 |  |

|  |  |
| --- | --- |
| ROHDE&SCHWARZ | Page  1/5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type | TSML-CW | Serial No. | 100126 |  |
| Test System | T10010 | Material No. | 1153.6000.15 | ROHDE&SCHWARZ |
| Temperature | (23 -3/+7)°C | Date | 2014-06-12 |
| File | 1153.6000.15\_100126J 0- .M F |  |  |  |
| Page | 2/5 |  |  |  |

**Table of contents**

Software used for measurement

3

1. Protocol

4

Type TSML-CW Serial No. 100126

<S>

ROHDE&SCHWARZ

Test System T10010 Material No. 1153.6000.15

Temperature (23-3/+7)°C Date 2014-08-12

File 1153.6000.15\_100126\_10-.MF

Page 3/5

|  |  |  |  |
| --- | --- | --- | --- |
| Software used for measurement Item | Type | Version | Remark |
| Suite  Test Program (010121\_) | Setup  Component | V10.10  V08.01 | Test Management Software G5 |

**Type**

**Test System Temperature File Page**

**TSML-CW T10010 (23 -3/+7)°C**

**1153.6000.15\_100126\_10-.MF**

**4/5**

**Serial No. 100126**

**Material No. 1153.6000.15**

**Date 2014-08-12**

<$>

ROHDE&SCHWARZ

1. Protocol

Report generated with mask: Skript5\_TSML-CW Begin:

|  |  |  |  |
| --- | --- | --- | --- |
| Program Version | 7 . | . 00 |  |
| Calibrat ion Version | 1 . | . 04 |  |
| Auto Power On Mode | O. | .K. |  |
| Power Off Mode | o. | .K. |  |
| IEEE1394 Communication | 0. | .K. |  |
| IF-Filter Adjustment | 0. | . K. |  |
| Level Calibration | 0. | , K. |  |
| Bandwidth 3dB IF-Filter | 4 . | . 443 | MHz |
| Valid Range | 4 . | 275 | MHz |

Level Accuracy

Start Frequency 0080 MHz

Stop Frequency 3921 MHz

Frequency Step 0001 MHz

Calculation Interval 0500 MHz

Amplifier Setting Pre-Amp on, IF-Amp 15db

Input Power -50.00 dBm

Frequency Measured Accuracy [dB/100]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Average | Max | Frequ.[MHz] | Rated | Uncertainty |
| 0080.. | . 0500 MHz | + /-00 | + 03 | 0101 | + /-70 | + /-30 |
| 0501.. | . 1000 MHz | + /-00 | + 02 | 0528 | + /-70 | + /-30 |
| 1001.. | . 1500 MHz | + /-00 | + 02 | 1061 | + /-70 | + /-30 |
| 1501.. | .2000 MHz | + /-00 | -03 | 1974 | + /-70 | + /-30 |
| 2001.. | .2500 MHz | + /-00 | -02 | 2029 | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-00 | -02 | 2589 | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-00 | -02 | 3008 | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-00 | -02 | 3584 | + /-70 | + /-30 |
| Amp1i f | ier Setting | Pre-Amp off | IF-Amp 15db | |  |  |
| Input | Power | -40.00 dBm |  |  |  |  |
| Frequency | | Measured Accuracy | | [dB/100] |  |  |
|  |  | Average | Max | Frequ.[MHz] | Rated | Uncertainty |
| 0080.. | . 0500 MHz | + /-00 | + 03 | 0402 | + /-70 | + /-30 |
| 0501.. | . 1000 MHz | + /-00 | + 02 | 0751 | + /-70 | + /-30 |
| 1001.. | . 1500 MHz | + /-00 | + 02 | 1027 | + /-70 | + /-30 |
| 1501 . . | . 2000 MHz | + /-00 | + 03 | 1602 | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-00 | -02 | 2019 | + /-70 | + /-30 |
| 2501 . . | . 3000 MHz | + /-00 | -03 | 2778 | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-00 | + 03 | 3057 | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-00 | + 02 | 3511 | + /-70 | + /-30 |

**Type**

**Test System Temperature File Page**

**TSML-CW T10010 (23 -3/+7)°C**

**1153.6000.15\_100126\_10-.M F 5/5**

**100126**

**1153.6000.15**

**2014-08-12**

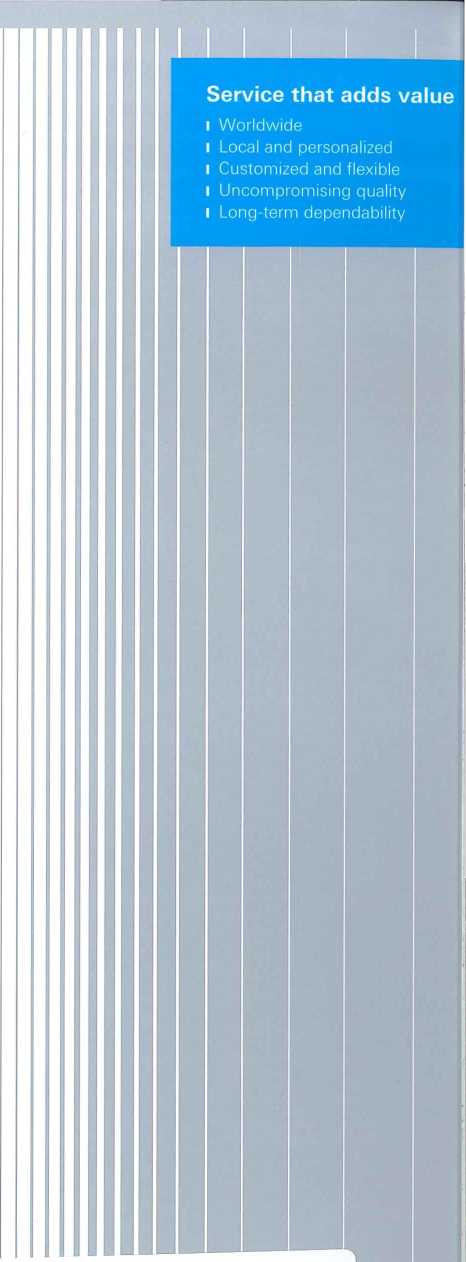
ROHDE&SCHWARZ

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Araplif | ier Setting | Pre-Amp | of f | , IF | -Amp | | 5db |  |  |  |
| Input | Power | -30.00 dBm | |  |  |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/100] | |  |  |  |
|  |  | Average |  | Max |  |  | Frequ. | [MHz] | Rated | Uncertainty |
| 0080.. | .0500 MHz | + /-01 |  | + 04 |  |  | 0324 |  | + / - 7 0 | + /-30 |
| 0501.. | . 1000 MHz | + /-01 |  | + 04 |  |  | 0564 |  | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-01 |  | + 05 |  |  | 1099 |  | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-01 |  | -06 |  |  | 1819 |  | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-02 |  | -06 |  |  | 2244 |  | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-03 |  | + 10 |  |  | 2962 |  | + /-70 | + /-30 |
| 3001 . . | .3500 MHz | + /-03 |  | -10 |  |  | 3118 |  | + /-70 | + /-30 |
| 3501.. | .4000 MHz | + /-04 |  | + 12 |  |  | 3846 |  | + / - 7 0 | + /-30 |
| Amplifier Setting | | Pre-Amp | off | IF | -Amp | | off |  |  |  |
| Input | Power | -25.00 dBm | |  |  |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/100] | |  |  |  |
|  |  | Average |  | Max |  |  | Frequ. | [MHz] | Rated | Uncertainty |
| 0080.. | . 0500 MHz | + /-01 |  | -04 |  |  | 0241 |  | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-03 |  | -08 |  |  | 0726 |  | + /-70 | + /-30 |
| 1001 . . | .1500 MHz | + /-03 |  | -10 |  |  | 1246 |  | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-02 |  | -11 |  |  | 1878 |  | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-07 |  | -23 |  |  | 2361 |  | + /-70 | + /-30 |
| 2501 . . | .3000 MHz | + /-07 |  | -21 |  |  | 2836 |  | + /-70 | + /-30 |
| 3001 . . | . 3500 MHz | + /-04 |  | -19 |  |  | 3297 |  | + /-70 | + /-30 |
| 3501 . . | .4000 MHz | + /-02 |  | -06 |  |  | 3801 |  | + /-70 | + /-30 |
| Amplifier Setting | | Low Level Meas: | | | Pre | | Amp on | , IF-Amp | 15db |  |
| Input | Power | -69.70 dBm | |  |  |  |  |  |  |  |
| Frequency | | Measured | Accuracy | | | [dB/100] | |  |  |  |
|  |  | Average |  | Max |  |  | Frequ. | [MHz] | Rated | Uncertainty |
| 0080.. | . 0500 MHz | + /-05 |  | + 19 |  |  | 0402 |  | + /-70 | + /-70 |
| 0501.. | . 1000 MHz | + /-05 |  | + 11 |  |  | 0584 |  | + /-70 | + /-70 |
| 1001 . . | . 1500 MHz | + /-04 |  | + 12 |  |  | 1233 |  | + /-70 | + /-70 |
| 1501 . . | .2000 MHz | + /-02 |  | + 09 |  |  | 1744 |  | + /-70 | + /-70 |
| 2001 . . | .2500 MHz | + /-02 |  | + 11 |  |  | 2349 |  | + /-70 | + /-70 |
| 2501 . . | .3000 MHz | + /-02 |  | -10 |  |  | 2753 |  | + /-70 | + / - 110 |
| 3001 . . | . 3500 MHz | + /-02 |  | + 13 |  |  | 3264 |  | + /-70 | +/-110 |
| 3501 . . | .4000 MHz | + /-02 |  | -15 |  |  | 3525 |  | + /-70 | +/-110 |

O.K.

Filter Calibration End :

**Important Product Records**



ROHDE&SCHWARZ

e. g. Calibration Certificate, License Keys List



Material No.

1173.6506.02

Serial No.

102418

GU DCV-ZP DCV-PAPIERAUSDRUCK



DCV-ZP



**Calibration Certificate** Certificate Number 20-502128

Kalibrierschein Zertifikatsnummer

|  |  |
| --- | --- |
| **Cal.** | **Custom. Due Date** |
| **2014-08-08** |  |

ROHDSlSCHMnx

|  |  |
| --- | --- |
| Order **Data** |  |
| Customer  Auftraggeber |  |
| Order Number 0000291929  Bestellnummer |  |
| Date of Receipt 2014-08-08  Eingangsdatum |  |
| Performance |  |
| Place and Date of Calibration  Ort und Datum der Kalibrierung | Memmingen, 2014-08-08 |
| Scope of Calibration  Umfang der Kalibrierung | Standard Calibration |
| Statement of Compliance (Incoming)  Konformltätsaussage  (Anlieferung) | New device |
| Statement of Compliance (Outgoing)  Konformitätsaussage  (Auslieferung) | Measurement results within specifications |
| Extent of Calibration Documents  Umfang des Kalibrierdokuments | 2 Pages Calibration Certificate 5 Pages Outgoing Results |

**Ref. No.20-502128**

|  |  |  |
| --- | --- | --- |
| **Unit Data** |  |  |
| item  Gegenstand | TSML-G RADIO NETWORK ANALYZER | |
| Manufacturer  Hersteller | ROHDE & SCHWARZ |  |
| Type  Typ | TSML-G |  |
| Material Number  Materialnummer | 1153.6000.13 Serial Number  Seriennummer | 100141 |
| Asset Number  Inventarnummer |  |  |

This calibration certificate documents, that the named item is tested and measured against defined specifications.

Measurement results are located **usually in** the corresponding interval with a probability of approx. 95% (coverage factor k = 2).

Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national / international standards, which realize the physical units of measurement according to the International System of Units (SI).

In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories.

Principles and methods of calibration correspond and are conformant with EN ISO/IEC 17025, ANSI/NCSL Z540.1-1994 and ANSI/NCSL Z540.3-2006. The applied quality system is certified to EN ISO 9001.

This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Werteintervall (Erweiterte Messunsicherheit mit k = 2).

Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder Indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (Sl). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S- Laboratorien.

Grundsätze und Verfahren der Kalibrierung beziehen sich auf und entsprechen EN ISO/IEC 17025, ANSI/ NCSL Z540.1-1994 und ANSI/NCSL Z540.3-2006.

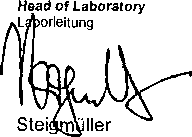
Das angewandte Qualitätsmanagement- System Ist zertifiziert nach EN ISO 9001. Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

**Date of** Issue

Ausstellungsdatum

2014-08-11



**Person Responsible**

Bearbeiter

Gerald Nickel

**Page 1**12

ver9815/MB0707

Rohde & Schwarz Messgerätebau GmbH

Rohde & Schwarz Messgerätebau GmbH • Postfach 1652 D-87686 Memmingen • Rohde-und-Schwarz-Slr. 1 D-87700 Memmingen Telefon national: 08331/10-80; international: 0049 8331/10-80; Fax: 08331/10-811 24 Geschäftsführer: Jürgen Steigmüller • Aufsichtsratsvorsitzender: Roland Steffen Sitz der Gesellschaft: München • Registereintrag: Amtsgericht München HRB 1059

**Calibration Method** 1150.6000.01-T- 08.01

**Relative Humidity 20%-60%**

Relative Luftfeuchte

Kalibrieranweisung

Ambient Temperature **(23 +J)°C**

**Conformity statements take the measurement uncertainties into account.**

Die Konformitätsaussagen berücksichtigen die Messunsicherheiten.

Umgebungstemperatur

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Working standards used (having a significant effect on the accuracy)  Verwendete Gebrauchsnormale (mit signifikantem Einfluss auf die Genauigkeit) | | | | |
| Item | Type | Serial Number | Calibration Certificate Number | Cal. Due |
| Gegenstand | Typ | Seriennummer | Kalibrierscheinnummer | Kalibr. bis |
| Average Power Sensor | NRP-Z11 | 100473 | 0410-D-K-15195-01 -00-2013-07 | 2015-07-31 |
| Vector Signal Generator | SMIQ06B | 838341/040 | 0082-DKD-K-15195-2013-05 | 2016-04-30 |

Notes

Anmerkungen

Installed options are included in calibration. Depending on installed options, numbers of pages of the record are not consecutive.

**Radio Network Analyzer**

**TSML-G**

**1153.6000.13**

**100141**

**1153.6000.01-T-08.01**

**Designation:**

**Type:**

**Material No.:**

**Serial No.:**

**Referring to Test Documentation:**

Outgoing Results

Test Department: **ME1A**

**Name:** Nickel

**Date:** 2014-08-11

|  |  |  |
| --- | --- | --- |
|  |  | Page |
| ROHDE&SCHWARZ |  | 1/5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type | TSML-G | Serial No. | 100141 |  |
| Test System | T10010 | Material No. | 1153.6000.13 | ROHDE&SCHWARZ |
| Temperature | (23 -3/+7)°C | Date | 2014-08-11 |
| File | 1153.6000.13\_100141\_10- .M F |  |  |  |
| Page | 2/5 |  |  |  |

**Table of contents**

Software used for measurement

3

1. Protocol

4

Type TSML-G Serial No. 100141

TestSystem T10010 Material No. 1153.6000.13

Temperature (23-3/+7)°C Date 2014-08-11

File 1153.6000.13\_100141\_10-.MF

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|  |  |  |  |
| --- | --- | --- | --- |
| Software used for measurement Item | Type | Version | Remark |
| Suite  Test Program (010121J | Setup  Component | V10.10  V08.01 | Test Management Software G5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type | TSML-G | Serial No. | 100141 |  |
| Test System | T10010 | Material No. | 1153.6000.13 | ROHDE&SCHWARZ |
| Temperature | (23 -3/+7)°C | Date | 2014-08-11 |
| File | 1153.6 000.13\_100141\_10- ,M F |  |  |  |
| Page | 4/5 |  |  |  |

1. Protocol

Report generated with mask: Skript3 Begin:

Program Version 7.00

0080 MHz 3000 MHz 0001 MHz 0500 MHz

O.K.

O.K.

O.K.

O.K.

O.K.

4 .395 MHz

4.275 MHz to 4.725 MHz

Auto Power On Mode

Power Off Mode

IEEE1394 Communication

IF-Filter Adjustment

Level Calibration

Bandwidth 3dB IF-Filter Valid Range

Level Accuracy- Start Frequency Stop Frequency Frequency Step Calculation Interval

Calibration Version 1.04

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Amplifier Setting | | Pre-Amp | on, | IF-Amp 15db | |  |  |
| Input | Power | -50.00 dBm | |  |  |  |  |
| Frequency | | Measured | Accuracy | | [dB/100] |  |  |
|  |  | Average |  | Max | Frequ.[MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-00 |  | + 03 | 0197 | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-00 |  | + 03 | 0623 | + /-70 | + /-30 |
| 1001.. | . 1500 MHz | + /-00 |  | + 03 | 1123 | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-00 |  | -02 | 1537 | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-00 |  | + 02 | 2462 | + /-70 | + /-30 |
| 2501.. | .3000 MHz | + /-00 |  | + 02 | 2540 | + /-70 | + /-30 |
| Amplifier Setting | | Pre-Amp | off | IF-Amp 15db | |  |  |
| Input | Power | -40.00 dBm | |  |  |  |  |
| Frequency | | Measured | Accuracy | | [dB/100] |  |  |
|  |  | Average |  | Max | Frequ [MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-00 |  | + 02 | 0108 | + /-70 | + /-30 |
| 0501.. | . 1000 MHz | + /-00 |  | + 02 | 0526 | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-00 |  | + 02 | 1021 | + /-70 | + /-30 |
| 1501.. | .2000 MHz | + /-00 |  | -02 | 1575 | + /-70 | + /-30 |
| 2001 . . | . 2500 MHz | + /-00 |  | -02 | 2037 | + /-70 | + /-30 |
| 2501 . . | . 3000 MHz | + /-00 |  | + 03 | 2883 | + /-70 | + /-30 |

**Type**

**Test System Temperature File Page**

TSML-G T10010 (23 -3/+7)°C

1153.6000.13\_100141\_10- .M F 5/5

**Serial No. Material No. Date**

100141

1153.6000.13

2014-08-11

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Amplifier Setting | | Pre-Amp | off, IF-Amp 5db | |  |  |  |
| Input | Power | -30.00 dBm | |  |  |  |  |
| Frequency | | Measured | Accuracy | [dB/100] |  |  |  |
|  |  | Average | Max | Frequ. | [MHz] | Rated | Uncertainty |
| 0080 . . | .0500 MHz | + /-01 | 4-04 | 0324 |  | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-01 | + 05 | 0590 |  | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-01 | -04 | 1138 |  | + /-70 | + /-30 |
| 1501 . . | .2000 MHz | + /-02 | -06 | 1807 |  | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-02 | -06 | 2037 |  | + / - 7 0 | + / - 3 0 |
| 2501 . . | . 3000 MHz | + /-03 | + 11 | 2964 |  | + /-70 | + /-30 |
| Amplifier Setting | | Pre-Amp | off, IF-Amp off | |  |  |  |
| Input | Power | -25.00 dBm | |  |  |  |  |
| Frequency | | Measured | Accuracy | [dB/100] |  |  |  |
|  |  | Average | Max | Frequ. | [MHz] | Rated | Uncertainty |
| 0080 . . | . 0500 MHz | + /-01 | -04 | 0272 |  | + /-70 | + /-30 |
| 0501 . . | . 1000 MHz | + /-03 | + 08 | 0842 |  | + /-70 | + /-30 |
| 1001 . . | . 1500 MHz | + /-03 | -09 | 1237 |  | + /-70 | + /-30 |
| 1501. . | .2000 MHz | + /-02 | -11 | 1878 |  | + /-70 | + /-30 |
| 2001 . . | .2500 MHz | + /-07 | -22 | 2350 |  | + /-70 | + /-30 |
| 2501.. | . 3000 MHz | + /-07 | -21 | 2836 |  | + /-70 | + /-30 |
| Amp1i f | ier Setting | Low Level Meas: Pre-Amp on | | | , IF-Amp | 15db |  |
| Input | Power | -79.70 dBm | |  |  |  |  |
| Frequency | | Measured | Accuracy | [dB/100] |  |  |  |
|  |  | Average | Max | Frequ. | [MHz] | Rated | Uncertainty |
| 0080.. | . 0500 MHz | + /-05 | + 23 | 0214 |  | + /-70 | + /-70 |
| 0501.. | . 1000 MHz | + /-05 | + 17 | 0521 |  | + /-70 | + /-70 |
| 1001 . . | . 1500 MHz | + / - 0 5 | + 20 | 1312 |  | + /-70 | + /-70 |
| 1501 . . | .2000 MHz | + /-03 | + 15 | 1743 |  | + /-70 | + /-70 |
| 2001 . . | .2500 MHz | + /-04 | + 18 | 2361 |  | + /-70 | + /-70 |
| 2501.. | . 3000 MHz | + /-05 | + 25 | 2833 |  | + /-70 | +/-110 |
| Filter | Calibration | O.K. |  |  |  |  |  |
| End : - - |  |  |  |  |  |  |  |

**Specifications**

|  |  |  |
| --- | --- | --- |
| RF data, measurement speed | | |
| Frequency range | R&S®TSML-G/-W/-C/-GW, R&S®TSMU, R&S®TSMQ | 80 MHz to 3 GHz |
| R&S®TSML-CW | | 80 MHz to 6 GHz |
| Noise figure | f < 2.2 GHz, preamplifier on | typ. 10 dB |
| Frequency accuracy | GPS/PPS synchronization | ±0.01 ppm |
| Frequency aging |  | 1 ppm/year |
| Frequency temperature drift | 0 °C to +30 °C | 2 ppm |
|  | +30 °C to +40 °C | additional 2 ppm/10 °C |
| IP3 | preamplifier on | typ. -9 dBm |
|  | preamplifier off | typ. +3 dBm |
| 1 dB compression |  | -15 dBm |
| Sensitivity | GSM | -112 dBm |
|  | WCDMA | -114 dBm |
|  | CDMA2000® 1xEV-DO | -131 dBm |
|  | spectrum | -115 dBm |
| Dynamic range | GSM (C/I) | 30 dB |
|  | WCDMA (Ec/I0: high speed/high dynamic range) | 20 dB/29 dB |
|  | CDMA2000® 1xEV-DO (Ec/I0) | 30 dB |
| R&S®TSML |  |  |
| Measurement speed | R&S®TSML-G (GSM) | 40 channels/s 11 |
|  | R&S®TSML-W (WCDMA) | 10 measurements/s 21 |
|  | R&S®TSML-C (CDMA2000® 1xEV-DO) | 5 measurements/s 31 |
|  | R&S®TSML-CW (CW) | 625 measurements/s |
|  | R&S®TSML-GW (GSM and WCMDA) | 40 channels/s 11 (GSM), 10 measurements/s (WCDMA) |
| R&S®TSMU | | |
| Measurement speed | GSM | 80 channels/s 1) |
|  | WCDMA | 20 measurements/s 2) |
|  | CDMA2000® 1xEV-DO | 10 measurements/s 3) |
|  | CW | 625 measurements/s |
| R&S®TSMQ | | |
| Measurement speed | GSM | 100 channels/s 1) |
|  | WCDMA | 50 measurements/s 2) |
|  | CDMA2000® 1xEV-DO | 10 measurements/s 3) |
| CW | | 625 measurements/s |

|  |  |  |
| --- | --- | --- |
| General data | | |
| Operating temperature range |  | 0 °C to +45 °C |
| Storage temperature range |  | -20 °C to +70 °C |
| Relative humidity | at +40 °C | 95 % |
| RF input | SNAP-N connector | 50 Q |
| Data interface |  | FireWire |
| Voltage supply |  | 9 V to 18 V DC |
| Current drain |  | 650 mA at 12 V DC |
| Dimensions | W x H x D | 150 mm x 80 mm x 170 mm (5.90 in x 3.15 in x 6.69 in) |
| Weight |  | 1.5 kg (3.3 lb) |
| System requirements | R&S®ROMES4 drive test software,  laptop/PC (multicore processor 2 GHz, 2 Gbyte RAM, FireWire, USB) | |

1. With SCH demodulation.
2. With SIB decoding.
3. With demodulation of CDMA2000® and EV-DO system information messages.

**Ordering information**

|  |  |  |
| --- | --- | --- |
| Designation | Type | Order No. |
| R&S®TSML | | |
| Scanner for GSM | R&S®TSML-G | 1153.6000.13 |
| Scanner for WCDMA | R&S®TSML-W | 1153.6000.11 |
| Scanner for CDMA2000® 1xEV-DO | R&S®TSML-C | 1153.6000.12 |
| Scanner for GSM and WCDMA | R&S®TSML-GW | 1153.6000.20 |
| Scanner for CW | R&S®TSML-CW | 1153.6000.15 |
| R&S®TSMU | | |
| Radio Network Analyzer | R&S®TSMU | 1153.6000K02 |
| R&S®TSMU Option for GSM | R&S®TSMU-K13 | 1153.4572.02 |
| R&S®TSMU Option for WCDMA | R&S®TSMU-K11  R&S®TSMU-K14 | 1153.4550.02  1153.4614.02 |
| R&S®TSMU Option for CDMA2000® 1xEV-DO | R&S®TSMU-K12 | 1153.4608.02 |
| R&S®TSMU Option for CW | R&S®TSMU-K15 | 1153.4595.02 |
| R&S®TSMQ | | |
| Radio Network Analyzer for GSM, WCDMA, CDMA2000® 1xEV-DO and CW | R&S®TSMQ | 1153.6000.50 |
| Accessories | | |
| Power Supply (2.5 A) | R&S®TSML-Z1 | 1503.4320.02 |
| Power Supply (6.5 A) | R&S®TSMU-Z1 | 1166.3786.02 |
| Rack Adapter | R&S®TSMU-Z2 | 1153.6700.02 |
| Backpack System | R&S®TSMU-Z3 | 1153.6900.02 |
| Additional software options | | |
| Drive Test Software | R&S®ROMES4 | 1117.6885.04 |
| R&S®TSMx Driver | R&S®ROMES4T1Q | 1117.6885.40 |

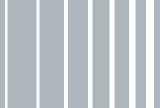
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i Continuous improvement in environmental sustainability i ISO 14001-certified environmental management system

Certified Quality System

ISO 9001

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[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

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FS

VERIFICATION OF COMPLIANCE

This Verification of Compliance is hereby issued to the product designated below.

Product

Model

Trade name Applicant

Applicable Standard(s)

Report No.

Test Laboratory

Computer

PPC-4151W; PPC-4151XXXXXXXXXXXXXXXX (where "X" may be any alphanumeric character, “-” or blank)

ADVANTECH

Advantech Co. Ltd.

No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.

FCC 47 CFR PART 15 SUBPART B (Class B),

ICES-003 Issue 5: 2012

T140312L07-D

Compliance Certification Services Inc.

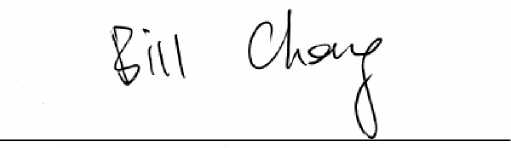
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Taoyuan County 33841,Taiwan, R.O.C.

Tel: +886-3-3240332/ Fax: +886-3-3245235

<

This device has been tested and found to comply with the stated standard(s), which is(are) required by the Federal Communications Commission. The test results are indicated in the test report and are applicable only to the tested sample identified in the report.



Bill Cheng / Section Manager of Linkou Laboratory Date: April 1, 2014

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**II Compliance Certification Services Inc.**

***CORRail 1000***



As wheel-slip influenced measurement technologies show non-negligible systematic measurement errors, they do not meet today’s technology demands.

Microwave- and Radar sensors, as well as GPS sensors have to deal with different external influences and quickly reach their limit.

For the first time, the Hasler® CORRail 1000 sensor offers a contact-less, track-bed independent, direct measurement of a rail vehicle’s speed and operating direction, using the railhead as a reference.

In order to work even in harshest environments, particular care was taken to ensure robustness as well as easy maintenance and care.

As an illumination source, robust high-power infrared LED are used. To increase operational safety, an optical channel indicates soiling on the front glass which can also be replaced easily in case of a damage.

Therefore, the Hasler® CORRail 1000 Sensor meets all demands for an objective, reproducible measurement of a railway vehicle’s longitudinal dynamics in the fields of:

* Drive Systems (slip-free measurement of speed, acceleration, wheel slip)
* Measurement of braking distance
* Navigation / positioning

The Hasler® CORRail 1000 Sensor at a glance:

* Track independent, highly dynamic direct measurement
* Speed range 0.2 ... 400 km/h
* Reliable data acquisition during braking and coasting to standstill
* Standstill detection (< 0.2 km/h)
* Direction detection
* Extremely robust design for sensor mounting on the bogie
* Illumination by robust and extremely long-life, high-power, infrared LED
* Optical soiling detection in %-steps for highest functional reliability
* Programmable analogue and digital standard outputs
* Low maintenance and service costs

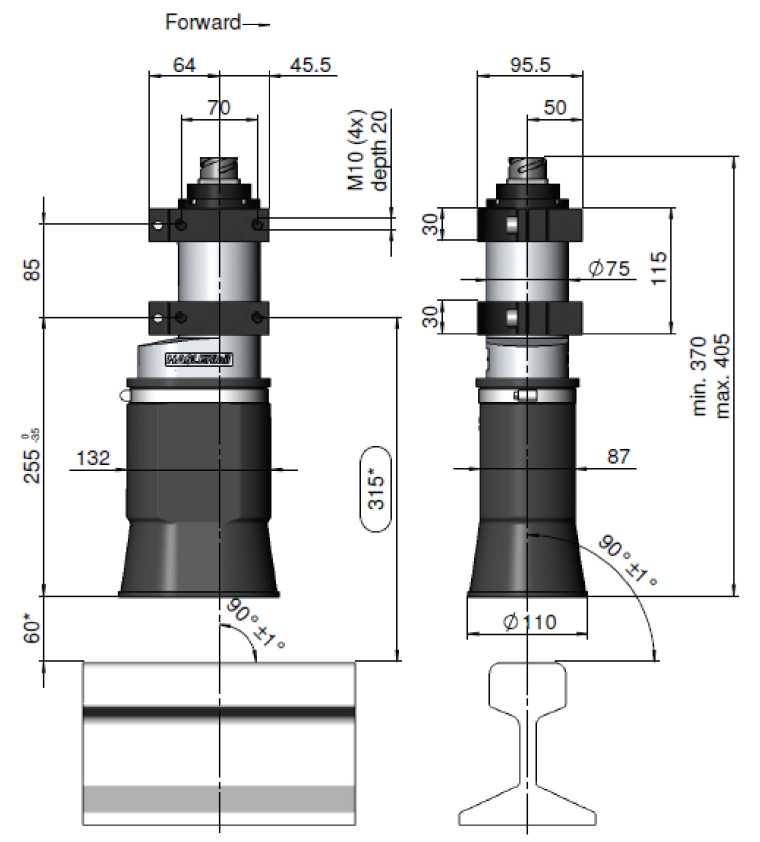
For further information about the product, please do

not hesitate to contact one of our collaborators, he

will be happy to help.

evaluate HaslerRail

***CORRail 1000***



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|  |  |
| --- | --- |
| Main technical data  Reference surface | Railhead |
| Speed measurement range | 0.2 to 400 km/h |
| Digital pulse output | 1440 pulses/meter (programmable from 1 ... 10’000 pulses/meter) |
| Working distance / -range | 125 ± 50 mm |
| Linearity in speed range | ± 0.1% (determined on a dynamometer at T = 20 °C) |
| Supply voltage | 24 ... 110 VDC |
| Power consumption | < 40 W |
| Illumination wavelength | 810 nm CAUTION! Invisible IR-radiation! |
| Dimensions excl. connector | 132 mm x 370 .. 405 mm |
| Dimensions filter electronics | 101 x 125 x 229,5 mm (W x H x D) |
| Weight sensor head, aluminium | approx. 3’500 g |
| Weight filter electronics | approx. 2’500 g |
| Life time | > 100’000 h |
| Degree of protection | Sensor: IP68 filter electronics: IP20 |

HaslerRail AG - a member of Secheron Hasler Group