



Internal TRIUMPH Radio

Internal TRIUMPH Land Mobile/Cell Radio is a half duplex, 1 W UHF Radio Transceiver with built-in quad band 2.5G GSM/GPRS/EDGE module developed to be integrated in new JAVAD GNSS TRIUMPH-1 and TRIUMPH-4X Receivers.

It takes incoming data from a JAVAD GNSS receiver through the standard asynchronous serial port (CMOS/ TTL compatible), modulates it with GMSK, FSK, PSK or most spectrum efficient QAM modulation and transmits it at RF power output levels from 15 dBm up to 30 dBm operating in UHF frequency band (406 to 470 MHz).

The UHF transceiver is also capable of receiving RF signals through a 50 Ohm impedance external antenna port. These signals are demodulated and output to the JAVAD GNSS receiver.

The UHF transceiver delivers a reliable radio link at up to 38.4 kbps over the air for the 25 kHz channel spacing, 30 kbps for 20 kHz, 19.2 kbps for 12.5 kHz, and 9.6 kbps for 6.25 kHz.

The incoming data could be also sent over the cellular network using built-in 2.5G GSM/ GPRS/ EDGE if such operation mode is selected.

The unit's user settings can be changed through the built-in Command Line interface (CLI), Tracy Software or through ModemVU.

The system built-in diagnostic features provide the information required to monitor and maintain user's communications link. The output transmit power, receive signal strength (RSSI), antenna/feed line condition, and data decode performance will be transmitted online without application interruption.

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General Radio Specifications

| Component | Details |
|---|--|
| Operating Frequency Range | 406 - 470 MHz |
| Channel Spacing | 25/20/12.5/6.25 kHz |
| Data Rate (25kHz Channel Spacing) | 9600 bps – DBPSK/GMSK 19200 bps – DQPSK/4FSK 28800 bps – D8PSK 38400 bps – D16QAM |
| Data Rate (20kHz Channel Spacing) | 7500 bps – DBPSK/GMSK 15000 bps – DQPSK/4FSK 22500 bps – D8PSK 30000 bps – D16QAM |
| Data Rate (12.5kHz Channel Spacing) | 4800 bps – DBPSK/GMSK 9600 bps – DQPSK/4FSK 14400 bps – D8PSK 19200 bps – D16QAM |
| Data Rate (6.25 kHz Channel Spacing) | 2400 bps – DBPSK 4800 bps – DQPSK 7200 bps – D8PSK 9600 bps – D16QAM |
| System Gain for DBPSK modulation (Antenna gain is not included) | 146 dB (for 25 kHz Channel Spacing) 146 dB (for 20 kHz Channel Spacing) 148 dB (for 12.5 kHz Channel Spacing) 149 dB (for 6.25 kHz Channel Spacing) |
| Roaming Speed for DBPSK modulation | 75 mph / 120 km/h |
| Modulation | GMSK/4FSK/DBPSK/DQPSK/D8PSK/D16QAM |
| Nominal Impedance | 50 Ohms |
| End to End delay | 60 ms |
| Communication Mode | Time Division Duplex (TDD) Time Division Multiple Access (TDMA) |
| Maximum Distance Range | 8 miles / 13 km |
| Electromagnetic Compliance | FCC Part 90 ETSI EN 300-113-2 V1.5.1 |
| Compatibility with other manufacturers | Pacific Crest Compatible (TX/RX) Trimble Compatible (TX/RX) Satel Compatible (TX/RX) |

Transmitter Specifications

| Component | Details |
|------------------------------------|--|
| Output Power | 15 dBm to 30 dBm in 1 dB steps |
| Output Power Control Accuracy | ±1.5 dB (at normal test conditions) +2.0 dB and -3.0 dB (under extreme test conditions) |
| Carrier Frequency Stability | ±1.5 ppm initial stability over temp with ±3 ppm aging/year |
| Max. Frequency Error | ±1.0 kHz (at normal test conditions) ±1.5 kHz (under extreme test conditions) |
| Adjacent Channel Power (Conducted) | 70 dBc for 25 kHz Channel Spacing 70 dBc for 20 kHz Channel Spacing 60 dBc for 12.5 kHz Channel Spacing 50 dBc for 6.25 kHz Channel Spacing |
| Spurious Emission (Conducted) | -36 dBm (9 kHz to 1 GHz) -30 dBm (1 GHz to 4 GHz) |
| Spurious Emission (Radiated) | -36 dBm (9 kHz to 1 GHz) -30 dBm (1 GHz to 4 GHz) |
| Compliance | FCC Part 90 §90.210(c) for 25 kHz Channel Spacing §90.210(d) for 12.5 kHz Channel Spacing §90.210(e) for 6.25 kHz Channel Spacing ETSI EN 300-113-1 V1.5.1 Clause 5.1.4 Clause 8.6.1 |

Receiver Specifications

| Component | Details |
|---|---|
| Noise Figure | 4 dB |
| Receiver Sensitivity (BER 1x10 ⁻⁴ , 25 kHz CS) | DBPSK -116 dBm 25kHz / -117 dBm 12.5kHz DQPSK -115 dBm 25kHz / -116 dBm 12.5kHz D8PSK -110 dBm 25kHz / -111 dBm 12.5kHz D16QAM -106 dBm 25kHz / -107 dBm 12.5kHz GMSK -113 dBm 25kHz / -114 dBm 12.5kHz |
| Dynamic Range | -115 to -15 dBm |
| Max. Input Signal Level | -10 dBm |
| Co-channel Rejection | -8 dB for 25 kHz Channel Spacing -8 dB for 20 kHz Channel Spacing -12 dB for 12.5 kHz Channel Spacing -16 dB for 6.25 kHz Channel Spacing |
| Adjacent Channel Selectivity | 70 dB for 25 kHz Channel Spacing 70 dB for 20 kHz Channel Spacing 60 dB for 12.5 kHz Channel Spacing 50 dB for 6.25 kHz Channel Spacing |
| Intermodulation Response Rejection | 65 dB |
| Blocking Ratio | 84 dB |

G24 GSM Module Specification

| Component | Details |
|--------------------------|--|
| Operating Systems | Quad band: 850/900/1800/1900 MHz |
| Tx power | 850/900 MHz – Class 4 (2 Watt) 1800/1900 MHz – Class 1 (1 Watt) |
| Typical RX sensitivity | -106dBm (4dB margin on top of spec) |
| GPRS | Multi-slot class 10 (4 down; 2 up; 5 Total) Max BR 85.6 Kbps Class B GSM 07.10 multiplexing protocol Coding scheme CS1-CS4 Embedded TCP/IP and UDP/IP protocol stack Embedded FTP Embedded SMTP/POP3 – e-mail SSL – Secure Connection |
| EDGE – Model Dependent | Multi-slot class 10 (4 Down; 2 Up; 5 Total) Max BR Downlink 236.8 Kbps (Over RS232) Coding Scheme MCS1-MCS9 |
| CSD | Max BR 14.4 Kbps |
| SMS | MO/MT Text and PDU modes Cell broadcast |
| One serial port | Data and Command port |
| UART | BR from 300 bps to 460 Kbps, Auto BR |
| SIM Card | 2 SIM cards support, 3.0 V, STK 3.1 |
| Connectors | RF MMCX |
| Regulatory and Approvals | FCC, IC, CCC FTA, PTCRB R&TTE GCF EMC QS9000 manufacturing RoHS/WEEE |

Specifications are subject to change without notice.



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