

Aprisa SR+

## SMART, SECURE POINT-TO-POINT RADIO



## Smart, secure, industry-leading speed licensed point-to-point for linking and backhaul of industrial monitoring and control – now with 256 QAM

- **High capacity:** to meet the growing number of data-intensive applications in the SCADA environment, the Aprisa SR+ PTP provides data rates of up to 1,152 kbit/s full duplex in 100 kHz licensed channels.
- Secure: with its defense in depth approach, including AES encryption, authentication, address filtering and user access control including RADIUS, the Aprisa SR+ PTP protects against vulnerabilities and malicious attacks.
- Future-proof: the Aprisa SR+ PTP supports dual serial and dual Ethernet ports in a single, compact form
  factor, designed to cryptographically secure legacy serial, protect existing device investment, and enable
  new applications. Old and new application protocols can be run side by side.
- Advanced L2 / L3 capabilities: selectable L2 bridge, L3 router, or advanced gateway router combination L2 / L3 modes with VLAN, QoS, NAT, and filtering attributes to maximize capacity in constrained bandwidth and prioritize mission critical traffic while meeting tough security and IP network policy imperatives.
- Flexible interfaces: the data interfaces can be configured for serial or Ethernet operation; a range
  of options are supported, including two serial and two Ethernet, one serial and three Ethernet, or four
  Ethernet ports. Support for NMEA GPS receiver option.
- Link efficiency: Adaptive Coding and Modulation (ACM) and forward error correction maintains the integrity of the wireless connection while an effective channel access scheme and IP routing ensures efficient transfer of data across a Aprisa SR+ PTP link. Automatic Transmit Power Control maintains the minimum transmit power required for effective communications enhancing both frequency reuse and power savings. Advanced payload and Ethernet / IP / TCP / UDP header compression.
- Reliable and robust: the Aprisa SR+ PTP requires no manual component tuning and maintains its performance over a wide temperature range using full specification industrially rated components and shared Aprisa family heritage.
- Easily managed: an easy to use GUI supports local element management via HTTPS and remote element
  management over the air and SNMP support allows network-wide monitoring and control via a variety of
  supported third party network management systems.

FCC / IC licensed bands VHF, 220 MHz, UHF, 900 MHz

Private market spectrum 220, 700, and 900 MHz

### Datasheet







- The Aprisa SR+ PTP in brief 135–175, 215–240, 400–520, 757–758 and 787–788, 896–902 and 928–960 MHz
- RS-232 and IEEE 802.3 with multiple port options
- Software selectable 12.5 kHz, 15 kHz, 25 kHz, 30 kHz, 50 kHz, and 100 kHz channel sizes
- (frequency band dependent)
  Full duplex operation, dual frequency
- Data rates of up to 1,152 kbit/s full duplex
- <u>256,</u> 192 or 128 bit AES encryption
- AES-CCM to NIST SP 800-38C
- Adaptive Coding and Modulation: QPSK to 256 QAM
- Automatic Transmit Power Control: reduces interference in large networks, improves power savings
- Advanced forward error correction
- Ethernet and IP / TCP / UDP header compression (ROHC) and payload compression
- Transparent to all common SCADA protocols
- Dedicated alarm port and optional USB connected GPS receiver
- Protected station option
- Layer 2 bridge (VLAN aware), layer 3 router, and advanced gateway router combination L2/L3 modes
- VLAN tagging and Q-in-Q
- Flexible QoS priority enforcement by port or traffic type, VLAN, PCP/DSCP, rule including SMAC/DMAC, IP address and IP protocol, and EtherType
- L2 / L3 / L4 filtering
- MEMS accelerometer motion sensing anti-tamper option
- IEEE 1613 and IEC 61850-3 substation protection
- 30 kV ESD antenna protection
- Class 1, Division 2 for hazardous protection
- -40 to +70 °C operational temperature without fans
   210 mm (W) x 130 mm (D) x 41.5 mm (H)
- FCC and IC standards compliant

#### Aprisa SR+ PTP applications

- Electricity grid: distribution automation control and protection in MV / HV distribution / transmission
- Smart grid, DA, DFA, DER, cap bank control
   Oil & Gas: production metering, lift pump automation
- AMI / AMR: high density data concentrator backhaul
- Renewables: wind farm, tidal, hydro automation
- Water and wastewater: flow, level, pressure modulation automation and pump status
- Ultra low latency for feeder protection 6 ms at 100 kHz and 8 ms at 50 kHz



# Aprisa SR+

#### SYSTEM SPECIFICATION

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| ADJACEN<br>CO-CHAN<br>CO-CHAN                                                                                                                     | TY (BER <<br>T CHANNE<br>NEL REJEC<br>NEL REJEC                                                                                                                 | L SELECT<br>TION ma<br>TION min                                                                                                                           | max code<br>max code<br>max code<br>min code<br>IVITY<br>x coded 2                                                                                       | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM                                                                                                                                                                                                                                                                                                                                              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| ADJACENT<br>CO-CHAN<br>CO-CHAN                                                                                                                    | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>NEL REJEC<br>DULATION                                                                                                    | L SELECT<br>TION ma<br>TION min<br>RESPON:                                                                                                                | max code<br>max code<br>min code<br>IVITY<br>x coded 2<br>SE REJEC                                                                                       | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM                                                                                                                                                                                                                                                                                                                                              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| ADJACENT<br>CO-CHAN<br>CO-CHANI<br>INTERMOI<br>BLOCKING                                                                                           | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>& OR DESEI                                                                                      | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI                                                                                                   | max code<br>max code<br>min code<br>IVITY<br>x coded C<br>a coded 2!<br>SE REJEC<br>ION                                                                  | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM                                                                                                                                                                                                                                                                                                                                              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| ADJACENT<br>CO-CHAN<br>CO-CHAN<br>INTERMOI<br>BLOCKINC<br>SPURIOUS                                                                                | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>& OR DESEI<br>& RESPONS                                                                         | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT                                                                                       | max code<br>max code<br>max code<br>ivitry<br>x coded 0<br>coded 2!<br>SE REJEC<br>ION                                                                   | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM<br>TION                                                                                                                                                                                                                                                                                                                                      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                                                           | Hz 50 k<br>dBm -88<br>dBm -96<br>7 dBm -100<br>2 dBm -100<br>0 dBm -100<br>37 dBm > -3<br>8 dB] [> 5                                                                                                         | dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| ADJACENT<br>CO-CHAN<br>CO-CHANI<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM                                                                      | TY (BER <<br>T CHANNE<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>& OR DESEI<br>& RESPONS<br>12.5 KHz                                                              | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT                                                                                       | max code<br>max code<br>min code<br>IVITY<br>x coded C<br>a coded 2!<br>SE REJEC<br>ION                                                                  | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM<br>TION                                                                                                                                                                                                                                                                                                                                      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                                                                                                                                                                                                                                                                                      | Hz 25 k<br>im -91<br>IBm -99<br>IBm -100<br>IBm -110<br>IBm -100<br>IBm -99<br>IBm -100<br>IBm -100                                                                                                                                                                                                                                                                                  | Hz 50 k<br>dBm -88<br>dBm -96<br>7 dBm -104<br>2 dBm -105<br>0 dBm -10<br>37 dBm > -3                                                                                                                        | dBm                                                                                                                                        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| ADJACENT<br>CO-CHAN<br>CO-CHANI<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>GROSS DA                                                          | TY (BER <<br>T CHANNE<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>G OR DESEI<br>G RESPONS<br>12.5 kHz<br>TA RATE                                                   | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT<br><sub>2</sub> (Note 3)                                                              | max code<br>max code<br>min code<br>IVITY<br>x coded 2<br>SE REJEC<br>ION<br>TON<br>15 F                                                                 | ed<br>ed<br>ed<br>(Note 1)<br>(Note 1)<br>(No                                                                                        | 256 QAM<br>64 QAM<br>16 QAM<br>QPSK<br>4-CPFSK<br>> -10 dE<br>> -26 dE<br>> -35 dE<br>> -17 dE<br>> -32 dE<br>25                                                                                            | 12.5 kl<br>-95 dE<br>-103 d<br>-110 d<br>-115 d<br>-113 d<br>-113 d<br>-113 d<br>-113 d<br>-113 d<br>-13 d<br>M [> 60 dE<br>m [> 60 dE<br>m [> 63 dB<br>kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hz 25 k<br>m –91<br>Bm –99<br>Bm –100<br>Bm –110<br>Bm –111<br>Bm –111<br>Bm –112<br>Bm –111<br>Note 1<br>Note 1<br>Note 1<br>Note 1<br>Note 1<br>Note 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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dBm<br>87 dBm ><br>8 dB] [><br>8 dB] [>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| ADJACENT<br>CO-CHAN<br>CO-CHANI<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM                                                                      | TY (BER <<br>T CHANNE<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>& OR DESEI<br>& RESPONS<br>12.5 kHz<br>XTA RATE                                                  | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT                                                                                       | max code<br>max code<br>max code<br>ivitry<br>x coded 0<br>coded 2!<br>SE REJEC<br>ION                                                                   | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM<br>TION                                                                                                                                                                                                                                                                                                                                      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                                                                                                                                                                                                                          | Hz 50 k<br>dBm -88<br>dBm -96<br>7 dBm -100<br>2 dBm -100<br>0 dBm -100<br>37 dBm > -3<br>8 dB] [> 5                                                                                                         | dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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dBm<br>37 dBn<br>> 58 dB]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| ADJACENT<br>CO-CHAN<br>CO-CHAN<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>GROSS DA<br>BANDS<br>(Note 6)                                      | TY (BER < T CHANNEI T CHANNEI NEL REJEC DULATION G OR DESEI E RESPONS 12.5 kHz TA RATE 220, 400, 450                                                            | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E RESPECT<br><sub>2</sub> (Note 3)<br>700, 896,<br>928                                         | max code<br>max code<br>min code<br>IVITY<br>x coded C<br>a coded 2<br>SE REJEC<br>ION<br>TON<br>15 J<br>135                                             | ed<br>ed<br>ed<br>(Note 1)<br>2PSK<br>56 QAM<br>TION<br>KHz<br>220                                                                                                                                                                                                                                                                                                                        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                                                                                                                                                                                                                                                                                     | Hz 50 kt<br>dBm -88<br>dBm -96<br>7 dBm -100<br>2 dBm -100<br>0 dBm -100<br>37 dBm > -3<br>8 dB] [> 5<br>50 kt<br>135, 220, 400,<br>896, 928                                                                 | dBm            dBm            4 dBm            9 dBm            7 dBm            87 dBm            88 dB]         [>           1z            700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 85 dBm<br>93 dBm<br>101 dBm<br>106 dBm<br>104 dBm<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| ADJACENT<br>CO-CHAN<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>GROSS DA<br>BANDS                                                             | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>DULATION<br>G OR DESEI<br>RESPONS<br>12.5 kHz<br>12.5 kHz<br>220, 400,<br>450<br>72 kbit/s                               | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E RESPECT<br>2 (Note 3)<br>700, 896,<br>928<br>80 kbit/s                                       | max code<br>max code<br>min code<br>IVITY<br>x coded C<br>a coded 2<br>SE REJEC<br>ION<br>15 I<br>135<br>72 kbit/s                                       | ed<br>ed<br>ed<br>(Note 1)<br>2PSK<br>56 QAM<br>TION<br>KHz<br>220<br>80 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                                                                                                                                                                                                                                                                                                                                                                                                    | tz         25 k           im         -91           iBm         -99           iBm         -100           iBm         -110           iBm         -111           iNote 1         -111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hz 50 kd<br>dBm -88<br>dBm -96<br>7 dBm -100<br>2 dBm -100<br>2 dBm -100<br>37 dBm > -10<br>8 dB] [> 5<br>8 dB] [> 5<br>50 kf<br>135, 220, 400,<br>896, 928<br>288 kbit/s                                    | dBm<br>dBm<br>4 dBm<br>9 dBm<br>7 dBm<br>8 dB] [><br>8 dB] [><br>4<br>4<br>7 dBm<br>7 dBm<br>8 dB] [><br>7<br>8 dB] 3<br>8 dB] 3<br>8 dB] 3<br>8 dB] 4<br>7<br>8 dB 4<br>8 dB 5<br>8 dB 5 | 85 dBm<br>93 dBm<br>101 dBm<br>106 dBm<br>104 dBm<br>                                                                                                                                          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| ADJACENT<br>CO-CHAN<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>GROSS DA<br>BANDS<br>256 QAM<br>64 QAM                                        | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>6 OR DESEI<br>6 RESPONS<br>12.5 kHz<br>XTA RATE<br>220, 400,<br>450<br>72 kbit/s<br>54 kbit/s   | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT<br>z (Vote 3)<br>700, 896,<br>928<br>80 kbit/s<br>60 kbit/s                           | max code<br>max code<br>max code<br>IVITY<br>x coded Q<br>SE REJEC<br>ION<br>TON<br>135<br>72 kbit/s<br>54 kbit/s                                        | ed<br>ed<br>ed<br>(Note 1)<br>2PSK<br>56 QAM<br>TION<br>KHz<br>220<br>80 kbit/s<br>60 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | tz         25 k           im         -91           IBm         -99           IBm         -103           IBm         -111           Note 1         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hz 50 kd<br>dBm88<br>dBm96<br>7 dBm10-<br>2 dBm -10-<br>2 dBm -10-<br>0 dBm -10-<br>37 dBm > -3<br>8 dB] [> 5<br>8 dB] [> 5<br>50 kd<br>135, 220, 400,<br>896, 928<br>288 kbit/s<br>216 kbit/s               | dBm<br>dBm<br>9 dBm<br>7 dBm<br>7 dBm >-<br>8 dB] [2<br>42<br>700<br>320 kbit/s<br>240 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 85 dBm<br>93 dBm<br>101 dBm<br>106 dBm<br>104 dBm<br>37 dBm<br>-                                                                                                                                                                                                                         |
| ADJACEN<br>CO-CHAN<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>BANDS<br>256 QAM<br>64 QAM<br>16 QAM                                           | TY (BER <<br>T CHANNE<br>NEL REJEC<br>NEL REJEC<br>DULATION<br>6 OR DESEI<br>6 OR DESEI<br>72 kbit/s<br>72 kbit/s<br>36 kbit/s                                  | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT<br>z (Vote 3)<br>700, 896,<br>928<br>80 kbit/s<br>60 kbit/s<br>40 kbit/s              | max code<br>max code<br>max code<br>IVITY<br>x coded Q<br>SE REJEC<br>ION<br>ION<br>135<br>72 kbit/s<br>54 kbit/s<br>36 kbit/s                           | ed<br>ed<br>ed<br>(Note 1)<br>QPSK<br>56 QAM<br>TION<br>CHZ<br>220<br>80 kbit/s<br>60 kbit/s<br>40 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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dBm<br>7 dBm<br>7 dBm >-<br>8 dB] [2<br>4<br>700<br>42<br>700<br>320 kbit/s<br>160 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 85 dBm<br>101 dBm<br>104 dBm<br>104 dBm<br>104 dBm<br>37 dBm                                                                                                                                                                                                                             |
| ADJACEN<br>CO-CHAN<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>GROSS DA<br>BANDS<br>256 QAM<br>64 QAM<br>16 QAM<br>QPSK                       | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>DULATION<br>G OR DESEI<br>G OR DESEI<br>G OR DESEI<br>TA RATE<br>220, 400,<br>450<br>72 kbit/s<br>36 kbit/s<br>18 kbit/s | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT<br>700, 896,<br>928<br>80 kbit/s<br>60 kbit/s<br>40 kbit/s<br>20 kbit/s               | max code<br>max code<br>max code<br>iv/TY<br>x coded 2<br>SE REJEC<br>ION<br>TON<br>135<br>72 kbit/s<br>36 kbit/s<br>18 kbit/s                           | ed<br>ed<br>ed<br>d<br>vete 1)<br>vete 1)<br>vete 2)<br>vete 1)<br>vete 1)<br>vet | 256 QAM<br>64 QAM<br>16 QAM<br>QPSK<br>4-CPFSK<br>> -10 dE<br>> -26 dE<br>> -35 dE<br>> -37 dE<br>> -32 dB<br>220, 400, 45<br>896, 928<br>128 kbit/s<br>96 kbit/s<br>64 kbit/s<br>32 kbit/s                 | 12.5 kl<br>-95 dE<br>-103 d<br>-110 d<br>-115 d<br>-113 d<br>> -47<br>[> 48 d<br>m<br>[> 60 dE<br>m [> 60 dE<br>m [> 78 dE<br>m [> 63 dE<br>kHz<br>0, 700<br>; 160 kbit/s<br>; 120 kbit/s<br>; 80 kbit/s<br>; 40 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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         im         -91           IBm         -99           IBm         -101           IBm         -111           Note 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Hz 50 k<br>dBm88<br>dBm96<br>7 dBm10-<br>2 dBm -10-<br>2 dBm -10-<br>37 dBm > -2<br>8 dB] [> 5<br>8 dB] [> 5<br>8 dB] [> 5<br>135,220,400,<br>896,928<br>288 kbit/s<br>216 kbit/s<br>144 kbit/s<br>72 kbit/s | dBm<br>dBm<br>4 dBm<br>9 dBm<br>7 dBm >-<br>8 dB] [2<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 85 dBm<br>93 dBm<br>101 dBm<br>104 dBm<br>-37 dBm<br>-37 dBm<br>-37 dBm<br>-58 dB]<br>100 kHz<br>-37 dBm<br>-38 dB]<br>-37 dBm<br>-38 dB]<br>-38 dB]<br>-38 dB]<br>-38 dB]<br>-39 dBm<br>-39 d |
| ADJACENT<br>CO-CHAN<br>INTERMOI<br>BLOCKING<br>SPURIOUS<br>MODEM<br>GROSS DA<br>BANDS<br>256 QAM<br>64 QAM<br>16 QAM<br>16 QAM<br>QPSK<br>4-CPFSK | TY (BER <<br>T CHANNEI<br>NEL REJEC<br>DULATION<br>G OR DESEI<br>G OR DESEI<br>G OR DESEI<br>TA RATE<br>220, 400,<br>450<br>72 kbit/s<br>36 kbit/s<br>18 kbit/s | L SELECT<br>TION ma<br>TION min<br>RESPON:<br>NSITISATI<br>E REJECT<br>700, 896,<br>928<br>80 kbit/s<br>60 kbit/s<br>40 kbit/s<br>20 kbit/s<br>9.6 kbit/s | max code<br>max code<br>max code<br>iV/TY<br>x coded 0<br>coded 2!<br>SE REJEC<br>ION<br>TON<br>135<br>72 kbit/s<br>36 kbit/s<br>18 kbit/s<br>9.6 kbit/s | ed<br>ed<br>ed<br>d<br>vete 1)<br>vete 1)<br>vete 2)<br>vete 1)<br>vete 1)<br>vet | 256 QAM<br>64 QAM<br>16 QAM<br>QPSK<br>4-CPFSK<br>> -10 dE<br>> -26 dE<br>> -35 dE<br>> -37 dE<br>> -37 dE<br>220, 400, 45<br>896, 928<br>128 kbit/s<br>96 kbit/s<br>64 kbit/s<br>32 kbit/s<br>19, 2 kbit/s | 12.5 kl           -95 dE           -103 d           -110 d           -115 d           -113 d           -114 d           -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | tz         25 k           im         -91           IBm         -99           IBm         -103           IBm         -111           IBm         IBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hz 50 k<br>dBm88<br>dBm96<br>7 dBm10-<br>2 dBm -10-<br>2 dBm -10-<br>37 dBm >3<br>8 dB] [> 5<br>8 dB] [> 5<br>50 kb<br>135, 220, 400,<br>896, 928<br>288 kbit/s<br>216 kbit/s<br>144 kbit/s                  | dBm<br>dBm<br>4 dBm<br>9 dBm<br>7 dBm >-<br>8 dB] [><br>8 dB] [><br>4<br>700<br>320 kbit/s<br>240 kbit/s<br>160 kbit/s<br>80 kbit/s<br>38.4 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 85 dBm<br>93 dBm<br>101 dBm<br>106 dBm<br>104 dBm<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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### FCC and IC licensed bands

Datasheet

| SECURITY          |                             |                                                                                 |                                                           |                     |  |  |  |  |
|-------------------|-----------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------|--|--|--|--|
| DATA ENCRYPTI     | ON                          | 256, 192 or 128 bit AES                                                         |                                                           |                     |  |  |  |  |
| DATA AUTHENT      |                             | ССМ                                                                             |                                                           |                     |  |  |  |  |
| INTERFACES        |                             |                                                                                 |                                                           | <u>.</u>            |  |  |  |  |
| ETHERNET PORT     | ſS                          | RJ45 10/                                                                        | 100Base-T auto-neg MDI/M                                  | DIX                 |  |  |  |  |
| SERIAL PORTS      |                             | RJ45 RS-232                                                                     |                                                           |                     |  |  |  |  |
|                   |                             |                                                                                 | al RS-232 / RS-485 port via                               |                     |  |  |  |  |
| GPS RECEIVER      |                             |                                                                                 | for optional USB connected                                | GPS receiver        |  |  |  |  |
| MANAGEMENT        |                             |                                                                                 | micro type B (device port)<br>standard type A (host port) |                     |  |  |  |  |
| ANTENNA           |                             |                                                                                 | 50 ohm female                                             |                     |  |  |  |  |
| ALARM I/O         |                             | 1 x RJ45 Alarm I/O interface 2 x inputs + 2 x outputs                           |                                                           |                     |  |  |  |  |
| LEDs              |                             | Status: OK, MODE, AUX, TX, RX                                                   |                                                           |                     |  |  |  |  |
|                   |                             | Diagnostics: RSSI, traffic port status                                          |                                                           |                     |  |  |  |  |
| TEST BUTTON       |                             | Toggles LEDs between diagnostics / status                                       |                                                           |                     |  |  |  |  |
|                   | ONS (specified at order)    |                                                                                 |                                                           |                     |  |  |  |  |
| DATA PORT CON     | IFIGURATION OPTIONS         | 2 x Ethernet ports + 2 serial ports                                             |                                                           |                     |  |  |  |  |
|                   |                             | 3 x Ether<br>4 x Ether                                                          | net ports + 1 serial port<br>net ports                    |                     |  |  |  |  |
| PROTECTED STA     | TION OPTION                 |                                                                                 | j hot-swappable / hot-stand                               | lby redundant       |  |  |  |  |
|                   |                             |                                                                                 | e switching (10-30 VDC or 1                               |                     |  |  |  |  |
| POWER             |                             |                                                                                 |                                                           |                     |  |  |  |  |
| INPUT VOLTAGE     |                             | 10 – 30 \                                                                       | /DC                                                       |                     |  |  |  |  |
| RECEIVE           | All bands                   | < 3 W (2                                                                        | 17 mA at 13.8 VDC)                                        |                     |  |  |  |  |
| TRANSMIT          | 135 and 220 MHz             | < 26 W (                                                                        | 1884 mA at 13.8 VDC)                                      |                     |  |  |  |  |
|                   | 400, 450, 700, 896, 928 MHz | < 28 W (2                                                                       | 2028 mA at 13.8 VDC)                                      |                     |  |  |  |  |
| MECHANICAL        |                             |                                                                                 |                                                           |                     |  |  |  |  |
| DIMENSIONS        | Radio                       |                                                                                 | (W) x 130 mm (D) x 41.5 m                                 | m (H)               |  |  |  |  |
|                   | Protected Station           | 8.27" (W) x 5.12" (D) x 1.63" (H)<br>434 mm (W) x 372 mm (D) x 88.9 mm (H) 2 RU |                                                           |                     |  |  |  |  |
|                   | Hotected Station            |                                                                                 | ) 14.6" (D) 3.5" (H)                                      | 111 (11/ 2 110      |  |  |  |  |
| WEIGHT            |                             |                                                                                 | (2.81 lbs)                                                |                     |  |  |  |  |
| MOUNTING          |                             | Wall, Rac                                                                       | k or DIN rail                                             |                     |  |  |  |  |
| ENVIRONMEN        | TAL                         |                                                                                 |                                                           |                     |  |  |  |  |
| OPERATING TEN     | IPERATURE                   | -40 to +70 °C (-40 to +158 °F)                                                  |                                                           |                     |  |  |  |  |
| HUMIDITY          |                             | Maximum 95 % non-condensing                                                     |                                                           |                     |  |  |  |  |
| MANAGEMENT        | & DIAGNOSTICS               |                                                                                 |                                                           |                     |  |  |  |  |
| LOCAL ELEMEN      | Т                           |                                                                                 | HTTP/S web servers with fu                                |                     |  |  |  |  |
|                   |                             |                                                                                 | agnostics via LEDs and test                               |                     |  |  |  |  |
| REMOTE ELEME      | NT                          |                                                                                 | upgrade from PC or USB fla<br>HTTP/S over-the-air remote  |                     |  |  |  |  |
| ILLIVIOIL LLLIVIE |                             |                                                                                 | trol / diagnostics                                        | cicinent management |  |  |  |  |
|                   |                             |                                                                                 | software upgrade over-the-                                | air                 |  |  |  |  |
| NETWORK           |                             | SNMPv2 and SNMPv3 security support for integration with                         |                                                           |                     |  |  |  |  |
| 60110             |                             | external                                                                        | network management syste                                  | ms                  |  |  |  |  |
| COMPLIANCE        |                             | 500.055                                                                         | 47 0 + 34 / 37 / 60 / 65 / 55                             | 1404                |  |  |  |  |
| RF                |                             |                                                                                 | 47 Part 24 / 27 / 80 / 90 / 95<br>I 9 / RSS 134           | 0/101               |  |  |  |  |
|                   |                             | BAN                                                                             |                                                           | IC:                 |  |  |  |  |
|                   |                             | 135                                                                             |                                                           | 6772A-SQ135M150     |  |  |  |  |
|                   | ·                           | 220                                                                             |                                                           | 6772A-SQ215M141     |  |  |  |  |
|                   |                             | 400                                                                             |                                                           | 6772A-SQ400M1311    |  |  |  |  |
|                   |                             | 450                                                                             |                                                           | N/A                 |  |  |  |  |
|                   |                             | 700                                                                             |                                                           | N/A                 |  |  |  |  |
|                   |                             | 896                                                                             | UIPSQ896M141                                              | 6772A-SQ896M141     |  |  |  |  |
|                   |                             | 928                                                                             | UIPSQ928M141                                              | 6772A-SQ928M141     |  |  |  |  |
| EMC               |                             | FCC CFR47 Part 15, EN 301 489-5, ICES-003                                       |                                                           |                     |  |  |  |  |
| SAFETY            |                             | UL / EN 60950, Class 1 division 2 for hazardous locations                       |                                                           |                     |  |  |  |  |
| ENVIRONMENT       | AL                          | ETS 300 019 Class 3.4, IEEE 1613 Class 2                                        |                                                           |                     |  |  |  |  |
|                   |                             |                                                                                 | IEC 61850-3, Ingress Protection IP51                      |                     |  |  |  |  |

#### Notes:

- 1. The receiver figures are shown in typical fixed interference dBm values and dB values [in brackets] relative to the sensitivity. Relative values are given for QPSK modulation and max coded FEC. Refer to the Aprisa SR+ User Manual for a complete list of modulation and coding levels.
- 2. Please consult 4RF for availability.
- The gross data rate for the 12.5 kHz channel size varies with regulatory compliance. 3.
- 4 The 450 MHz and 700 MHz bands are only available for FCC.
- The receive tuning range is specified. The transmit tuning range is 896 960 MHz.
   256 QAM available in selected frequency bands and channel sizes. Contact 4RF for availability.

4RF For more information please contact EMAIL sales@4rf.com URL www.4rf.com

#### **ABOUT 4RF**

Operating in more than 150 countries, 4RF provides radio communications equipment for critical infrastructure applications. Customers include utilities, oil and gas companies, transport companies, telecommunications operators, international aid organisations, public safety, military and security organisations. 4RF point-to-point and point-to-multipoint products are optimized for performance in harsh climates and difficult terrain, supporting IP, legacy analogue, serial data applications.

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