

2018 COMMERCIAL PRODUCT GUIDE (ENCLOSED/OEM)



FREEWAVE

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FreeWave Technologies is a leading provider of wireless Machine-to-Machine (M2M) solutions that deliver reliable Voice, Video, Data and Sensor Data (VVDS™) access to leading companies in the industrial Internet of Things (IIoT) markets.

As the #1 provider of wireless IIoT to the oil and gas industry, FreeWave's fast, flexible and easy-to-deploy solutions streamline connectivity over long distances to also create significant operational efficiencies for government, defense and UAV/Drone contractors, agriculture equipment manufacturers, energy and smart grid networks, municipalities and more.

With more than 25 years of experience in the M2M market and millions of radios deployed in the field, customers repeatedly turn to FreeWave to maximize value in connecting devices to optimize real-time decision making. FreeWave's best-in-class, outdoor, ruggedized radios have seen action in some of the most harsh and dangerous places in the world.

If it's mission-critical intelligent wireless, it's FreeWave.

| | ZumLink 900 Series | ZumLink 900 OEM | ZumiQ App Server | WaveContact Series | WavePro Wi-Fi Series | FGR2 Plus Series | FGR2 C Series | FGR2-IOS Series | LRS140 Series | LRS455 Series | MM2 Series OEM | GXM Series OEM | GX Series | I2 Series |
|-------------------------------|--------------------|-----------------|------------------|--------------------|----------------------|------------------|---------------|-----------------|---------------|-----------------|------------------|------------------|--------------|------------------|
| Frequency | 900 MHz | 900 MHz | - | 900 MHz | 2.4 GHz 5 GHz | 900 MHz | 900 MHz | 900 MHz | 1.4 GHz | 455 MHz | 900 MHz | 2.4 GHz | 2.4 GHz | 2.4 GHz |
| RF Output | 1.0 W | 1.0 W | - | 40- 500 mW | 800 mW | 1.0 W | 1.0 W | 1.0 W | 1.0 W | 2.0 W | 1.0 W, 5.0 W | 500 mW | 1.0 W | 500 mW |
| Over the Air Data Rate | Up to 4 Mbps | Up to 4 Mbps | - | 10 kbps | Up to 1.3 Gbps | 153.6 kbps | 153.6 kbps | 153.6 kbps | 19.2 kbps | Up to 18.0 kbps | Up to 153.6 kbps | Up to 153.6 kbps | 153.6 kbps | Up to 153.6 kbps |
| Range (Miles - LOS) | 60 | 60 | - | .5 - 3 | 15 PTP | 60 | 60 | 60 | 30 | 70 | 60 | 20 | 20 | 20 |
| Operating Temp (C) | -40° to +85° | -40° to +85° | -40° to +75° | -40° to +85° | -40° to +60° | -40° to +75° | -40° to +75° | -40° to +75° | -30° to +70° | -30° to +60° | -40° to +85° | -40° to +85° | -40° to +85° | -40° to +75° |
| Certifications | C1D2 | C1D2 | C1D2 | C1D1-C1D2 | IP67 | C1D2 | C1D2 | C1D2 | C1D2 | C1D2 | C1D2 | C1D2 | C1D2 | C1D2 |
| Voltage (VDC) | +6 - +30 | +3.0 - +5.0 | +6 - +30 | +6 - +36 | 48 | +6 - +30 | +6 - +30 | +6 - +30 | +6 - +30 | +6 - +27 | +6.5 - +30 | +3.3 - +5.0 | +6 - +27 | +6.5 - +30 |

POWER CONSUMPTION

| | | | | | | | | | | | | | | |
|-----------------|--------|--------|-----|--------|------|---------|--------|--------|---------|---------|--------|-------|--------|--------|
| Transmit | 355 mA | 843 mA | 2 W | 150 mA | 13 W | 1100 mA | 700 mA | 800 mA | 1000 mA | 1500 mA | 900 mA | 700mA | 375 mA | 295 mA |
| Receive | 100 mA | 30 mA | | 23 mA | | 252 mA | 85 mA | 90 mA | 150 mA | 200 mA | 100 mA | 135mA | 120 mA | 80 mA |
| Idle | 30 mA | 30 mA | | - | | 140 mA | 19 mA | 24 mA | 40 mA | 50 mA | 42 mA | 19mA | 9 mA | 5 mA |

PROGRAMABILITY

| | | | | | | | | | | | | | | |
|---------------------------------|--------|--|--------|------|------|---|--|--|--|--|--|--|--|--|
| Application Programmable | ✓ | | ✓ | | | | | | | | | | | |
| ZumBoost | ✓ | | | | | | | | | | | | | |
| Network Management | SNMP | | | SNMP | SNMP | ✓ | | | | | | | | |
| RAM | 512 MB | | 512 MB | | | | | | | | | | | |
| Storage | 1 GB | | 1 GB | | | | | | | | | | | |
| Operating System | Linux | | Linux | | | | | | | | | | | |

SECURITY

| | | | | | | | | | | | | | | |
|-----------------|---|--|--|---|---|---|---|--|--|--|---|---|---|---|
| AES 128 | ✓ | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ |
| AES 256 | ✓ | | | | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ |
| WPA/WPA2 | | | | | ✓ | | | | | | | | | |

INTERFACES

| | | | | | | | | | | | | | | |
|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TTL Serial | | ✓ | | | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| RS-232/485 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| RS-422 | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Ethernet | ✓ | | ✓ | | ✓ | ✓ | | | | ✓ | | | | |

FORM FACTOR

| | | | | | | | | | | | | | | |
|--------------------------|---------------------------------------|-----------------------------|-----------------|--|-----------|-------------------|-----------------------------|---|-------------------------|-----------------------------------|--|--|-----------------------|---|
| Enclosed | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Board-level | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Radio Module | | ✓ | | | | | | | | | ✓ | ✓ | | |
| Available Models* | Z9-P Z9-PE Z9-PC Z9-PC-SR001 | Z9-T Z9-C Z9-T-DEVKIT | ZIQ-P ZIQ-PE | WC45i WC40i WC30i-PSI WC30i-AXIS WC20i | WP201-100 | FGR2-P FGR2-PE | FGR2-C FGR2-CE FGR2-T | FGR2-IOS-C FGR2-IOS-CE FGR2-IO-IOE FGRIO-M | LRS-140CSU LRS-140RC | LRS455-C LRS455-T LRS455-CE | MM2-MR-R MM2-MR-T MM2-P MM2-T MM2-LV-T MM2-9X5W | GXM-T14 GXM-T24 GXM-MR-R GXM-MR-T | GX-C GX-CE GX-T | I2-C-U I2-G-RG I2-IOM-U I2-IOS-C-U |

*May not reflect complete model offerings.