STA-014-22-20-SMA is an L-Band bi-directional half duplex module that delivers high quality TX signals while amplifying the RX signal with an advanced LNA to produce the highest possible data rates. The amplifier operates in the 1350 to 1390 MHz frequency range and offers 5 Watts typical Power for 64 QAM and 20 Watts typical Power for 16 QPSK. High efficiency and advanced switching technology meets the requirements of some of the most demanding RF radio systems. The module provides 22 dB typical small signal gain with gain flatness of ±0.5 dB typical. The connectorized SMA module is unconditionally stable, requires typically +28V DC, and operates over the temperature range of -40°C and +80°C. A Cable Assembly with DC Socket connector is available (FMAMK5000) as an accessory specific to this model. See the illustration below.

### Electrical Specifications (TA = +25°C, DC Voltage = 28Volts DC Current = 2.4A)

#### Transmit

<table>
<thead>
<tr>
<th>Description</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>1.35</td>
<td>1.39</td>
<td>GHz</td>
<td></td>
</tr>
<tr>
<td>Power for 802.11b</td>
<td></td>
<td>20</td>
<td>Watts</td>
<td></td>
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<tr>
<td>Power for 802.11g</td>
<td></td>
<td>5</td>
<td>Watts</td>
<td></td>
</tr>
<tr>
<td>Gain</td>
<td>21</td>
<td>22</td>
<td>23</td>
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<tr>
<td>Gain Flatness</td>
<td>±0.5</td>
<td>±1.3</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>-12</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Operating DC Voltage</td>
<td>24</td>
<td>28</td>
<td>30</td>
<td>Volts</td>
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<tr>
<td>Current Draw 802.11b</td>
<td>2.4</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>Current Draw 802.11g</td>
<td>900</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>Current Draw</td>
<td>2.4</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Switching Time</td>
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<td>2</td>
<td></td>
<td>uSec</td>
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#### Receive

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<th>Min</th>
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<tr>
<td>1 dB Compression Point</td>
<td>+0</td>
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<td></td>
<td>dBm</td>
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<tr>
<td>Gain</td>
<td>10</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Gain Flatness</td>
<td>±0.5</td>
<td>±1.3</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Input Return Loss</td>
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<td>-8</td>
<td></td>
<td>dB</td>
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<tr>
<td>Noise Figure</td>
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<td></td>
<td>dB</td>
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<tr>
<td>Current Draw</td>
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<td>70</td>
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<td>mA</td>
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### Protections

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<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Operating Temp. (Housing Temp.)</td>
<td>-40</td>
<td>+80</td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temp Range</td>
<td>-65</td>
<td>+150</td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>Weatherproofing</td>
<td>IP64 Equivalent</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>0-30,000</td>
<td></td>
<td></td>
<td>ft.</td>
</tr>
<tr>
<td>Max RF Input</td>
<td>+30</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Load VSWR @ P1dB</td>
<td>∞</td>
<td></td>
<td>at all amplitudes / phase angles</td>
<td></td>
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</tbody>
</table>

**Features:**
- 1350 MHz to 1390 MHz Frequency Range
- 20 Watts typ Power for 16 QPSK
- 5 Watts typ Power for 64 QAM
- Small Signal Gain: 22 dB min
- Gain Flatness: ±0.5 typical
- 50 Ohms Input and Output Matched
- Unconditionally Stable
- Half Duplex Design

**Applications:**
- L-band Military Radio
- Communication Systems
- High Gain Driver Power Amplifier
- High Gain Output Power Amplifier
- Unmanned Aerial Vehicles (UAV)
- Unmanned Ground Vehicles
- L and S Band Radar
- Commercial Air Traffic Control
- Weather and Earth Observation
- Satellites
**Mechanical Specifications**

**Size**
- Length: 3.33 in [84.58 mm]
- Width: 2.69 in [68.33 mm]
- Height: 0.65 in [16.51 mm]
- Weight: 0.34 lbs [154.22 g]

**RF Connector (Input)**: SMA Female

**RF Connector (Output)**: SMA Female

**DC Connector**

**Cooling**: HEATSINK REQUIRED use FMAMC5013 or FMAMC5011F

**Compliance Certifications** (see product page for current document)

**Plotted and Other Data**

**Notes:**
- Values at +25 °C, sea level
- ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.
- Heat Sink Required for Proper Operation, Unit is cooled by conduction to heat sink.
Amplifier Power-up Precautions

1.) Confirm that proper ESD precautions and controls are always in place before handling any Amplifier module.

2.) Confirm adequate thermal management is in place to effectively dissipate heat away from the Amplifier package. The Amplifier operational baseplate temperature must be within the operational temperature range stated in the Amplifier datasheet. Depending on the design and thermal requirements, using a heatsink with cooling fan is always recommended for safe reliable operation. A heat sink without a cooling fan may also be used. Damage caused from overheating will void the warranty.

3.) Confirm adequate system grounding is established. The DC power supply and Amplifier must have a common ground in order to operate properly.

4.) Power Amplifiers may require additional DC Current when initially powered-up. Depending on the design, the input current draw could range from an additional 10% to 100% above the maximum rated DC current of the Amplifier. This varies based on product part number.

5.) Confirm the DC power supply, if limited, is set to allow for additional start-up current that’s rated for the Power Amplifier.

6.) Confirm the system is designed and calibrated for 50 ohms. Any impedance mismatch may cause performance issues.

7.) Preform a CALIBRATION (if required) with the loads before connecting the Amplifier to the Network Analyzer to ensure proper performance.

8.) Use a fixed attenuator between the signal source and input port of the Amplifier to optimize the input VSWR match.

9.) Confirm the input power level at the input port of the amplifier does not exceed the maximum rated limit for input power (as stated in the Amplifier datasheet).
   - \( P_\text{in} \) for Small Signal Gain = \( P_{1\text{dB}-\text{SSG}} - 10 \text{ dB} \)
   - \( P_\text{in} \) for \( P_{1\text{dB}} = P_{1\text{dB}-\text{SSG}} + 1 \text{ dB} \)

10.) Confirm the Network Analyzer is always connected to the Amplifier first before DC power is applied to the Amplifier.

11.) As long as the input and output ports of the amplifier are connected to a 50Ohm load and RF signal power is applied, the Amplifier can be powered up with DC voltage.

12.) Confirm the Amplifier output load is matched for a 50 Ohm impedance and will not exceed the maximum rated VSWR or Return Loss limit for the Amplifier. Exceeding the maximum rated VSWR or Return Loss limit will result in reflected signal power that could damage the Amplifier and void the warranty.

13.) **Power Amplifier connected to an Antenna for signal transmission** - It’s strongly recommended to use a high power fixed attenuator pad or an Isolator between the output port of the Amplifier and input port to the antenna. Any reflected signal power due to impedance mismatch will likely damage the Amplifier and void the warranty.

14.) The attenuator or isolator used at the output port of the Amplifier must be rated to handle the output power level and operational frequency band of the amplifier.
illustration of Amplifier & Power and Control Cable. Cable Assembly model FMAMK5000 sold separately. (Picture shown for Reference Only)
Typical Performance Data

Gain and Input Return Loss

P1dB and Psat
Bi-Directional Amplifier, High Power 5/20 Watts Linear/CW, 1.35 GHz to 1.39 GHz, 1 us switching, 22 dB Gain, SMA from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: Bi-Directional Amplifier, High Power 5/20 Watts Linear/CW, 1.35 GHz to 1.39 GHz, 1 us switching, 22 dB Gain, SMA STA-014-22-20-SMA


The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Fairview Microwave reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Fairview Microwave does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Fairview Microwave does not assume any liability arising out of the use of any part or documentation.
Bi-Directional Amplifier, High Power 5/20 Watts
Linear/CW, 1.35 GHz to 1.39 GHz, 1 us switching, 22 dB Gain, SMA