FMSN3903 is a Frequency Synthesizer Module that covers a wide frequency band from 10 GHz to 20 GHz with exceptional spurious rejection and phase noise performance. Maximum output power is > +10 dBm across the entire band and Attenuation range up to 30 dB is adjustable in 1 dB steps. This high quality signal source has several outstanding features including a USB 2.0 interface that is powered and command controlled directly by a host PC and a Female SMA output connector, and is VISA compliant which enables seamless cross platform use. The synthesizer can be GUI controlled via Windows®, Macintosh®, or Linux® platforms, or with SCPI compliant VISA commands (downloadable user manual), or with other system design software such as LabVIEW®. The compact size makes it ideal for bench top test and measurement use or for radar and communication systems. Frequency resolution of the FMSN3903 is available in integer and fractional operating modes and the user can select between an internal reference or externally applied reference. The module supports integrated phase locked loop (PLL) circuitry that the User can select between an internal reference (capable of phase locking) or externally applied reference. The RF Synthesizer Module comes complete with a USB 2.0 A extension and an SMA male to MMCX plug cable.

### Electrical Specifications (TA= 25°C, Id1 = 500 mA)

<table>
<thead>
<tr>
<th>Description</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>GHz</td>
</tr>
<tr>
<td>Output Power</td>
<td>-19</td>
<td>+18</td>
<td>dBm</td>
<td></td>
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<tr>
<td>Step Size (Integer Mode)</td>
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<td>MHz</td>
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<td>Step Size (Fractional Mode)</td>
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<td>MHz</td>
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<td>Phase Locked Speed</td>
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<td>µs</td>
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<tr>
<td>Phase Noise @100kHz Offset</td>
<td>-80</td>
<td></td>
<td>dBc/Hz</td>
<td></td>
</tr>
<tr>
<td>2nd Harmonic</td>
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<td></td>
<td>dBC</td>
<td></td>
</tr>
<tr>
<td>3rd Harmonic</td>
<td>-40</td>
<td></td>
<td>dBC</td>
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<td>4th Harmonic</td>
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<tr>
<td>Reference Frequency</td>
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<td>MHz</td>
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<tr>
<td>Reference Power (CW)</td>
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<td>+15</td>
<td>dBm</td>
</tr>
<tr>
<td>Internal Reference Frequency</td>
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<tr>
<td>Internal Reference Accuracy</td>
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<td>Operating DC Current 1</td>
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<td></td>
<td>mA</td>
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</table>

### Features:
- Wideband Output Frequency
- 10 GHz to 20 GHz
- Integer and Fractional operating modes
- +18 dBm max output power
- 30 dB Attenuation adjustable in 1 dB steps
- USB 2.0 Interface
- Female SMA output
- USBTMC VISA Compliant
- User Selectable internal reference or externally applied reference
- Small compact package size
- LED indicators
- Downloadable User Manual
- Accessory cables included

### Applications:
- Signal Generators
- Test Equipment
- RF System Integration
- Communication Systems
- EW Systems
- X-Band Systems
- Ku-Band Systems
- K-Band Systems
- Radar Systems
- Frequency Conversion
- SIGINT
### Performance by Frequency

<table>
<thead>
<tr>
<th>Description</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>GHz</td>
</tr>
<tr>
<td>Phase Noise @ 100 kHz Offset (With Internal Reference)</td>
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<td>-80</td>
<td>-82</td>
<td>dBc/Hz</td>
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<tr>
<td>2nd Harmonics</td>
<td>-15</td>
<td>-30</td>
<td>-45</td>
<td>dBc</td>
</tr>
<tr>
<td>3rd Harmonics</td>
<td>-40</td>
<td></td>
<td></td>
<td>dBc</td>
</tr>
<tr>
<td>4th Harmonics</td>
<td>-60</td>
<td></td>
<td></td>
<td>dBc</td>
</tr>
<tr>
<td>Output Power Range</td>
<td>-13 to +18</td>
<td>-14 to +16</td>
<td>-19 to +11</td>
<td>dBm</td>
</tr>
</tbody>
</table>

Electrical Specification Notes:
Step size specified under default conditions (a 50 MHz reference input with a reference divider of 1).

### Mechanical Specifications

- **Size**
  - Length: 4.1 in [104.14 mm]
  - Width: 0.9 in [22.86 mm]
  - Height: 0.645 in [16.38 mm]
  - Weight: 0.2622 lbs [118.93 g]

- **Configuration**
  - Package Type: Connectorized
  - Reference Connector: MMCX Female
  - Output Connector: SMA Female
  - Control Connector: USB Type A - Male
  - Reference Divider Out Connector: MMCX Female

Mechanical Specification Notes:
The USB Type A - Male connector is used for both Power and Control.

### Environmental Specifications

- **Temperature**
  - Operating Range: 0 to +55 deg C
  - Storage Range: -50 to +100 deg C

### Compliance Certifications
(visit www.FairviewMicrowave.com for current document)
- RoHS Compliant: Yes

### Plotted and Other Data

Notes:
Typical Performance Data

![15.9 GHz Phase Noise Comparison](image1)

![15.9 GHz Spectrum Comparison](image2)

![16 GHz Phase Noise Comparison](image3)

![Phase Noise - Carrier Frequency Comparison](image4)
USB Frequency Synthesizer PLL (Phase Locked Loop), Operating From 10 GHz to 20 GHz With SMA Output 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: USB Frequency Synthesizer PLL (Phase Locked Loop), Operating From 10 GHz to 20 GHz With SMA Output FMSN3903


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.
USB Frequency Synthesizer PLL (Phase Locked Loop), Operating From 10 GHz to 20 GHz With SMA Output