RF Connector Handling Guidelines
A compilation of information found on the internet.
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**Connector handling** (SMA, 3.5mm, K, 2.92, 2.4mm, 1.85mm)

- NEVER use adapters from a Cal kit for anything but calibration.

- NEVER use damaged connectors. **Damaged connectors should be thrown in the garbage immediately.** Worn plating, defective threads, scratched or dented outer conductor, bent or damaged inner conductor

- The center pin and the ground plain are one unit and must not be rotated when making connections. Only the nut should be turned. Turning the center pin when connectors are mated causes damage to the connector. A damaged connector can damage other connectors.

- Connectors must be kept clean. Dirty connectors should be brought to Jeffrey Landry for cleaning in H941. Phone 3115, jlandry@encs.concordia.ca

- Connectors must be stored properly so the threads do not get damaged. Keep and use the protective caps that come with connectors, cables, etc.

- Use connector savers (an adapter) to protect equipment connectors when connecting lower precision connectors and to prevent wear of equipment connectors which are expensive to repair.

- Connectors should be torqued to specification or hand tight. Over torquing causes damage and poor connections

  - **SMA**  4-5in.lbs
  - **3.5mm**  8-9in lbs
  - **2.92mm**  8-9 in.lbs.
  - **7 mm**  12in.lbs
• 2.4mm  8in,lbs
• 1.85mm  8in,lbs
<table>
<thead>
<tr>
<th></th>
<th>SMA (1)</th>
<th>2.92mm</th>
<th>3.5mm</th>
<th>2.4mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIELECTRIC</td>
<td>TEFLOM</td>
<td>AIR</td>
<td>AIR</td>
<td>AIR</td>
</tr>
<tr>
<td>OUTER COND. INNER DIA.</td>
<td></td>
<td>2.92mm</td>
<td>3.5mm</td>
<td>2.4mm</td>
</tr>
<tr>
<td>MALE PIN DIA. (2) MAX/MIN</td>
<td>0370/.03 55</td>
<td>0365/.03 55</td>
<td>0365/.03 55</td>
<td>0205/.019 5</td>
</tr>
<tr>
<td>MALE PIN DIA. (3)</td>
<td></td>
<td>0.05</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>NORMAL F-MAX</td>
<td>18 GHZ</td>
<td>40 GHZ</td>
<td>34 GHZ</td>
<td>50 GHZ</td>
</tr>
</tbody>
</table>

Connector compatibility: Use the lower torque spec


- **SMA - 3.5mm - 2.92mm (K):** SMAS, 2.92’s, & 3.5mm’s can be mated. However a damaged or out of spec SMA can damage a 2.92 or 3.5, their air dielectric construction makes them fragile. With SMA's the pin engages first, the threads second; 2.92’s & 3.5’s are the opposite, the threads mate first, pins second. For very precise measurements, connecting different types of connectors results in a small but measurable discontinuity; VNA work should usually use adapters of similar construction.

- **1.85mm - 2.4mm**

**APC7**

Connecting and Disconnecting

RF and microwave connectors are precision-made parts, and can be easily damaged by mistreatment. You should start with all connector surfaces as clean as possible, using a solvent such as alcohol or a special-purpose cleaner to do the job. Use as little as you can, and in no event contact dielectric spacers or resistive materials (as used in loads) with the solvent, since these can be irreparably damaged by the solvent. As a general rule, if the connectors have threaded sleeves, you should rotate these to tighten, leaving the rest of the connector (and cable) stationary. If other parts of the connector are twisted while tightening or loosening, damage can easily occur.
Connecting 7 mm connectors is somewhat different, and perhaps counterintuitive. These are sexless connectors, and the mating surfaces mount flush and are held together by a single rotating sleeve. The mating sequence is:

1. Each connector has an outside rotating sleeve. On one connector, rotate the outer sleeve so that the threaded connector sleeve extends completely out from the outer sleeve. Do this on any fixed-mounted connectors, such as those on the test ports of a network analyzer. On the other connector, rotate the outer sleeve so that the threaded connector sleeve recedes completely into the outer sleeve.

2. Mate the surfaces flush and rotate the forward sleeve to engage the threads of the other connector.

3. Complete connection is made when the forward rotating sleeve is tight and the other sleeve is loose.
Caution: one sleeve must be loose. Tightening down both sleeves can cause connector damage.
NEVER under any circumstance, use Cal Kit parts as adapters. Don’t do it!
This is adhered to by all respectable RF engineers.
A damaged Cal kit can cause expensive damage to test equipment.