

Achieving Optimum PIM in Wireless Networks

Using the Appropriate Torque to Tighten N and 7-16 mm DIN Connectors

One of the most critical parameters in today's congested wireless networks is Passive InterModulation or as it is commonly known, PIM. Not only is it necessary to select properly designed and tested low PIM components, but they must also be connected to the interconnecting coaxial cable with the appropriate torque. This means using a calibrated torque wrench.

If the amount of torque applied is insufficient, the connector may not be completely seated; equally if the applied torque is excessive, the connector threads begin to grind together forming loose particles or even cold welding together, making them impossible to undo at a later date. Both conditions can cause PIM and possibly permanently damage components.

The recommended Coupling Torque is very different for N and 7-16 mm connectors. It unfortunately further varies between connector manufacturers, because there is no generally agreed industry standard. Below we reference the IEC standard which is rather dated for the N connector but reasonably current for the 7-16 mm DIN.

Microlab has incorporated the different suggested values into the following recommendation:

Connector Type	7-16 mm DIN		Type N (brass based)	
	IEC Specification	Microlab recommends	IEC Specification	Microlab recommends
Metric Torque	35 Nm	15 - 20 Nm	1.1 Nm	1.4 Nm
Imperial Torque	25 ft-lb	11 - 14 ft-lb	9.7 in-lb	12 in-lb
Why?	<p>The IEC specification is more based on the size of the nut, and in Microlab's estimation is excessive. With a quality 7-16 mm DIN connector, excellent PIM and a secure connection is made with half the IEC recommended torque.</p> <p>However, all Microlab designs are proven to meet the IEC standard.</p>		<p>Microlab recommends a higher torque than the IEC standard, because it is based on the 50 year old intention that N connectors were to be hand tightened, a practice that does not meet today's PIM requirements.</p> <p>To facilitate proper torquing of connectors Microlab uses hex nuts.</p>	

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