

Proper Handling of Unused RF Connector Ports

As cellular systems become more sophisticated and components such as duplexers, diplexers and multi-band/multi-port antennas are more common, questions often arise about how to handle ports that are not used at the time of initial installation.

To help answer these questions, Lou Meyer, Director, Applications Engineering for Base Station Antennas, describes three installation scenarios where unused ports are apt to occur and what to do with them.

Scenario #1: A duplexer is used in the receive-only path to benefit from the selectivity of the receive portion of the duplexer.

Question: What should be done with the unused transmit port?

Recommended Solution:

In the case of relatively high-Q devices like duplexers – particularly narrow-band duplexers – loading the unused port with a low power 50 Ohm load is recommended. Because the transmit and receive portions of the duplexer are connected with some sort of transmission line, reflections through the section with the un-terminated port can cause shifts in the insertion loss and/or return loss of the section being used – especially near the cutoff frequencies. Suggest Andrew model 245575 - 50 Ohm, 20 watts, with 7-16 DIN male connector.

Scenario #2: A diplexer is used to allow 800 MHz cellular and 1900 MHz PCS to share a single transmission line.

Question: If the unit is installed in anticipation of 1900 MHz being added at a later date, what should be done with the unused 1900 MHz ports on both the top-end and/or the bottom-end units?

Recommended Solution:

On relatively low-Q devices like the diplexer mentioned above where the high frequency band is more than an octave above the low frequency band, there are virtually none of the issues associated with the duplexer. The cutoff frequency is further from the desired band's edge, so slight variations there won't affect the desired band performance. However, to keep the inside of the connector clean, a connector cover with a gasket is strongly recommended – especially for outdoor use. The Andrew part number for the connector cover with gasket used to protect a 7-16 DIN female is DF-CAPKIT.

Scenario #3: A multi-band/multi-port antenna is installed in expectation of future growth, where initially all of the ports are not used.

Question: What should be done with the unused ports?

Recommended Solution:

In the world of multi-band/multi-port antennas, 30 dB minimum isolation between ports has become the industry standard, mainly based on the GSM specifications [ETS 300 577 (GSM 05.05 version 4.23.1)]. Since this is spatial isolation, there is no noticeable change to a given port's performance whether or not its neighbors are terminated or un-terminated. For the same reasons mentioned above, the connector cover DF-CAPKIT is strongly recommended to protect all unused 7-16 DIN female ports.

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