Data Collection and Analysis for the 7/16 Series Connector Use in Wireless Telecom Market

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ABSTRACT

The 7/16 series connector is a high quality, 50-Ohm product designed to achieve excellent RF (radio frequency) performance and withstand the vibration, shock, moisture and temperatures of adverse outdoor environments. Kings Electronics wanted to be the sole supplier of this product to its existing customers as well as to seek new opportunities to serve potential customers. The objective of our project is to qualify the current 7/16 connector design by testing for three main electrical properties: Dielectric Withstanding Voltage (DWV), Voltage Standing Wave Ratio (VSWR) and Passive Inter-modulation (PIM). Upon obtaining the internal qualification for the product in the form of the ETR (Engineering Test Report), the marketing department will begin introducing these connector samples to Kings' existing and new customers.

The solution method for the first testing phase was to use the high voltage test equipment in the laboratory to check the dielectric withstanding voltage up to 2500 VRMS for adapters between series with type N and 4000 VRMS, for adapters between series with 7/16 connectors. The cables were then prepped and terminated to the connectors using the equipment and crimping tools provided by Kings' laboratory. This became the gateway to our next set of qualifications, VSWR and Passive Intermodulation. For the return loss (VSWR) specification the HP 8510 network analyzer was calibrated and gauged to ensure accuracy. The various configurations were connected to the network analyzer for measurements. The network analyzer injected a signal through the cabling assembly or adapter and the resulting return loss (VSWR) curve was displayed on the analyzer's screen for frequencies up to 4 GHz. The curves were then printed for data records.

The final specification to be tested for was Passive Intermodulation. Since the return loss test is not destructive, the same connectors and cabling assemblies were used from the previous test. In this test the various configurations were connected to the Passive Intermodulation Distortion Analyzer for measurements. Two fixed frequency carriers were emitted from the analyzer into the connector under test and the intermodulation levels at the predicted frequencies were measured.

Our test results were all positive in a sense that all of the connectors that were tested qualified to Kings specifications. These results have been compiled into a formal ETR report and sent to the engineering department for final approval. Once this has been achieved, the final stages of the design process will continue.