Case Study-Q1163 TX/RX Sub-System

Overview

Phase 2 Customer required 4 different C Band Waveguide Combiners for installation into a C Band Doppler Weather Radar system.

Challenge

The main challenge was to produce a high performance, compact, low cost waveguide combiner into a very tight space, suitable for a 19-inch rack. Managing the heat dissipation in this high power unit as well as the restriction in the spec for the filter bandwidth presented some interesting challenges. One of which was defining the customer's true requirement, as the specifications provided were for component specs within the system with no overall system specification.

Solution

The solution required some significant testing before the real design of the product could begin, this was due to the heat dissipation requirements and the fact that we did not have the final frequencies for the 4 diplexers until late in the project.

Thermal modelling was carried out to assess the ability to dissipate the heat and to define the size and positions of holes in what was essentially a closed box. The testing consisted of building a physical model to test heat dissipation throughout the unit, as the high power generated a significant amount of heat and the customer requirement was for no holes in the top cover, see Fig 1 below.

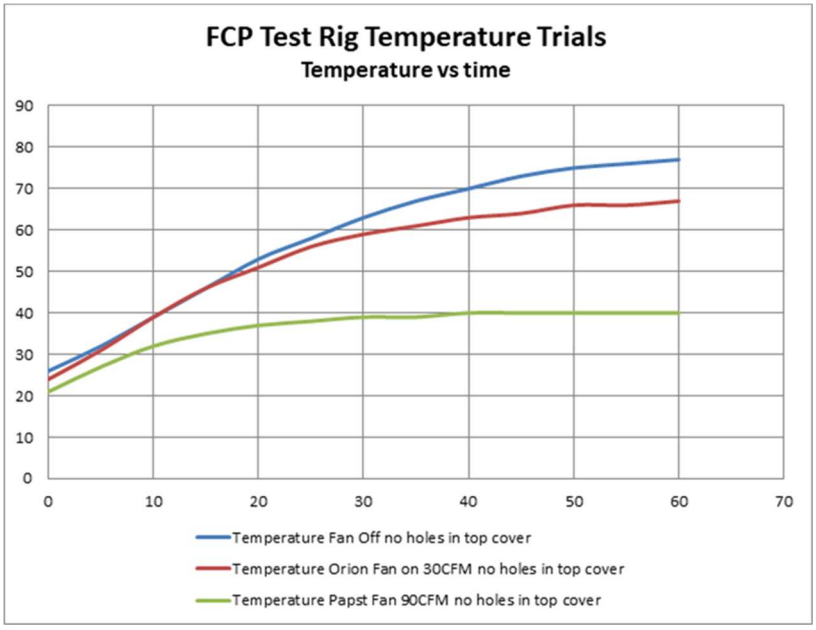

FIGURE 1

A suitable Circulator and Power Supply had to be defined of which all components had to be sourced that were ITAR free and free from custom controls and given the performance requirements this was not a simple task.

Next a prototype had to be built with little to no funding for the task, it was essential that the design be right first time I order to meet our expected margins on the completion of the project.

After significant effort by the team involved a successful product was developed and delivered to our customer, on time, on quality and on cost.