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Testing of 80 GHz QFN Packages With Waveguide Interfaces

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Waveguide Packages

Microstrip to WR12 waveguide transition (Chip#2) Mold (reflector & EM shielding)

Introduction

Waveguide packages shown in Figures to left show how a very high frequency signal generated by a chip in package is propagated out of the package. They are typically used for frequencies above 40 GHz as higher the frequency the smaller the waveguide opening. Most applications are automotive or point-topoint applications.



Figure : Formation of 77GHz SMT package with WG aperture (courtesy UMS)



Solution

- Testing QFN E-Band Radar
- Used Compliant Waveguide Approach for Production Testing Design can align DUT repeatably
- Scalable to any waveguide band
- Can calibrate without removing from test board

Compliant Waveguide Solution Minus Special Device Calibration



Alignment Plate / Performance Plus Housing

Load Board

Waveguide Insert / Waveguide Adapter



Simulated Results





Measurement Test Fixture



Test Procedure

- Measured Setup
- Two assemblies inserted into system
 Tested assemblies back-toback
- Used standard waveguide flange dimensions

Package is modified QFN with hole in bottom to radiate out high frequency signal. Effectively a waveguide output.



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Measured Results





Measured S₂₁ of Waveguide



Waveguide Flange Side View

Spacer used to test two compliant interfaces in parallel

Summary

Waveguide connections are best way to propagate high frequency Millimeter wave signals Compliant Waveguide portion of Contactor has more compliance than ROL100A Performance Plus portion of Contactor Contactor is designed to work in production environment with \bullet temperature range defined by contactor Used Performance Plus contactor with coaxial inserts for high lacksquarefrequency signals to optimize performance on non-waveguide connections Contactor maintains constant low inductance connection between device and waveguide output Calibration portion allows for accurate calibration without removing contactor from load board