

MEASUREMENT TECHNIQUES APPLIED

A special computer-controlled network analyzer was built to extend its measurement capability to 26.5 GHz in order to allow evaluation of the transmission and reflection characteristics of this new connector. A special slotted line was also constructed to measure the bead reflections up to 34 GHz using Sanderson's technique [4]. Furthermore, tuned waveguide reflectometers with waveguide-coax adapters were utilized to verify measurement results taken by the aforementioned techniques.

Insertion loss and repeatability measurements are taken with the automatic network analyzer to 26.5 GHz and above 26.5 GHz with detectors and ratio-measuring equipment.

Leakage tests of a connector pair were measured at frequencies up to 26.5 GHz. A triaxial test fixture was built that is similar to the fixtures described in [5] and [6]. It was built so that a bending moment could be applied to the 3.5-mm connector. Cutoff frequency of this triaxial fixture for the TE₁₁ mode is about 6 GHz.

Three test setups were used in the leakage test. First a standard spectrum analyzer setup was used. The dynamic range and frequencies of these measurements were from 110 dB at 100 MHz to 90 dB at 16 GHz. The second test method used a waveguide setup in K band similar to the modulated subcarrier described in [5]. The leakage test was performed across the full waveguide band from 18 to 26.5 GHz. The dynamic range of this test was 100 dB. The third test method was a double conversion setup using three synthesizers operating in a screen room from a common 10-MHz reference oscillator. The bandwidth of the measurement was 1 Hz yielding excellent test capabilities. Measurements were made at two frequencies—at 8 GHz the dynamic range was 148 dB; at 17.9 GHz it was 138 dB.

The swept measurements from 18 to 26.5 GHz were made under several conditions. The condition most likely to show leakage was: coupling nut tightened to 0.6 Nm with a 1-Nm bending moment applied to the outer conductor per [7]. The result of all measurements of leakage was that no discernable change in system noise level was observed (see Table II). Connector pair leakage was below the dynamic range of all measurements.

CONCLUSION

This connector has distinct advantages in performance and price as described previously. Furthermore, it is directly compatible with the most widely used SMA connector.

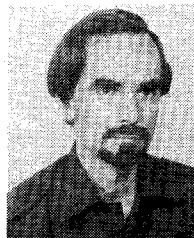
ACKNOWLEDGMENT

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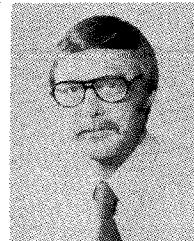
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Contributors



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Dr. Bosch was awarded the A.F.-Bulgin Premium of the Brit. IRE in 1962, and in 1969 he received an Annual Prize of the Nachrichtentechnische Gesellschaft. He is author or coauthor of about fifty scientific publications, inventor or coinventor of over forty issued patents, and coauthor (together with R. W. H. Engelmann) of *Gunn-Effect Electronics*.

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From 1963 to 1968 he was an engineering group leader with RCA Defense Electronics Products responsible for the development work in computer memories (ferrite core, plated wire, NDRO, and ROM); the automated test equipment studies including design and construction of an automated tester for computer tape recorders; and setting up a facility for the production of high-resolution photomasks to be used in the manufacture of integrated circuit devices. He was the Senior Engineer responsible for the initial design and process development for liquid crystal displays. As a member of the Technical Staff, his present assignment is the development of epitaxial growth processes and production of material for solid-state microwave devices with the Microwave Technology Center located at the David Sarnoff Research Center in Princeton, NJ. He holds two patents in the field of magnetic memories and magnetic recording.

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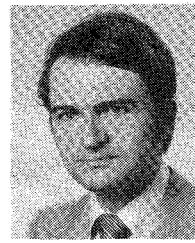


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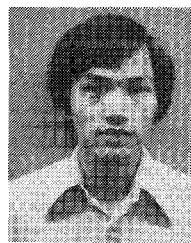


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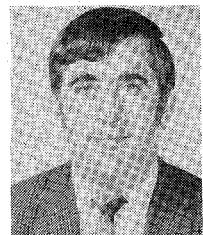


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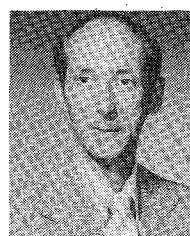
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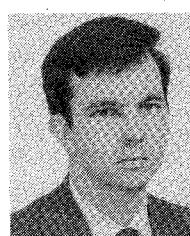
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