

# EFFICIENCY AND QUALITY IMPROVEMENT OF THE COMPENSATED DUAL REFLECTOR COMPACT RANGE

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In 1984 MBB has started the design and development of a compensated dual reflector Compact Antenna Test Range (CATR) with a quiet zone of 5.5 x 5.0 m(w x h). Since early 1989 this test facility is fully operational and qualified for a frequency range from 2-204 GHz.

During the extensive qualification phase, two possible improvements were recognized:

1. Plane wave quality improvement by reducing the feed spillover in the direction of the quiet zone.
2. Increase of the CATR efficiency ratio and low frequency measurement accuracy by replacing the vertical main-reflector serrations by two specially shaped reflection walls.

The feed spillover interference problem is solved by applying two independent measures:

- a) Re-designing the axially corrugated CATR feed to minimize the radiation in the direction of the plane-wave zone,

- b) Installing a shaped absorber wall between the feed and the quiet zone. This wall has been experimentally optimized using a mock-up model.

A minimum decoupling of 48 dB has been realized between the plane wave signal and the feed direct radiation. This improvement guarantees real-time measurements of excellent accuracy without applying hardware-and/or software-gating.

The second improvement increases the efficiency ratio (quiet zone -verses CATR main reflector-dimensions) by about 10%, furthermore it improves the lowest frequency measurement accuracy by resolving a multi-path diffraction/reflection problem which is inherent to many types of dual-reflector compact ranges.

At the presentation measurement results will be shown indicating both effects.

The extremely good performance data of the compensated dual reflector compact range have been substantiated by two contracts with leading aerospace companies, SPAR Canada and Ford Aerospace Company in Palo Alto.

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