COMMENT #102
Cable Assembly
Common Mode to Common Mode Return Loss Limit

Bruce Champion, TE

Overview

- Comment Overview
- Issues with existing limit
- Proposed limit
- Questions

Comment Overview

- Comment addresses issues with existing limit expressed in equation 162-11 concerning cable assembly common-mode to common-mode return loss

162.11.6 Common-mode to common-mode return loss

The cable assembly common-mode to common-mode return loss shall meet Equation (162–11).

$$Return\_loss(f) \geq 2 \qquad\qquad (162\text{–}11)$$
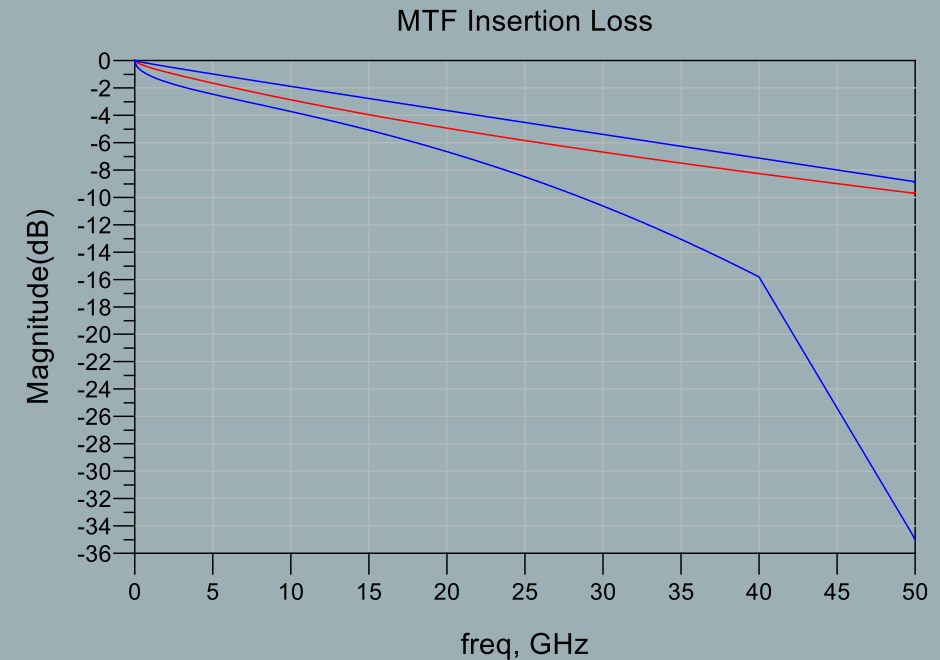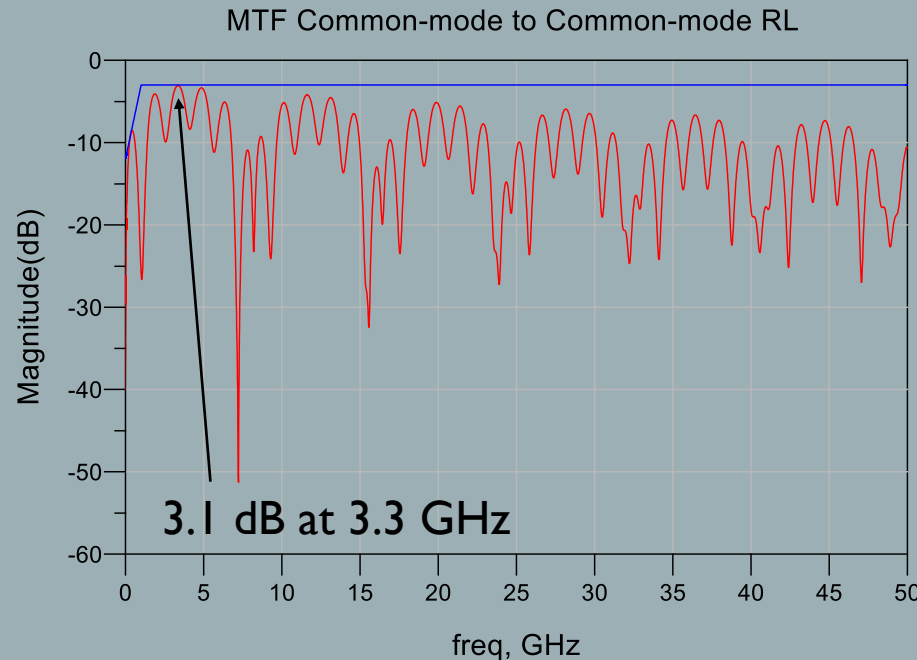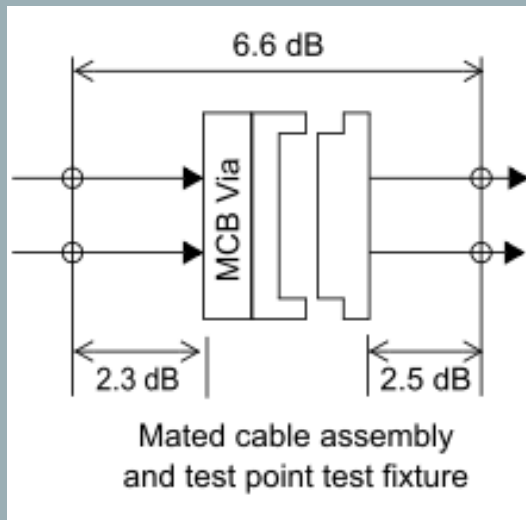
for $0.05 \leq f \leq 40$ GHz

where

$Return\_loss(f)$ is the common-mode to common-mode return loss at frequency f in dB

f is the frequency in GHz
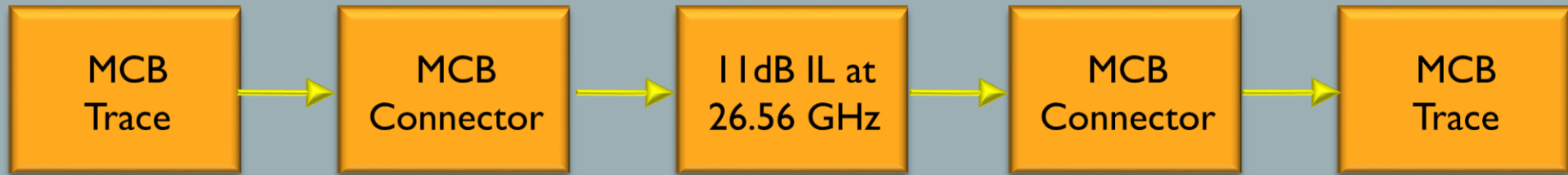
Issues with Existing Limit

- Existing cable assembly limit needs slight modification to correlate with existing MTF limit
- To demonstrate this, a MTF set-up was replicated using stripline trace such that the MTF is close to the 3dB limit for common-mode to common-model RL
- MTF insertion loss shown on bottom right for reference

$$Return\ Loss(f) \geq \begin{cases} 12 - 9f & for\ 0.01 \leq f < 1 \\ 3 & for\ 1 \leq f \leq 50 \end{cases}$$

MCB Trace → MCB Connector → HCB Trace

6.6 dB

MCB Via

2.3 dB | 2.5 dB

Mated cable assembly
and test point test fixture

MTF Common-mode to Common-mode RL

3.1 dB at 3.3 GHz

Magnitude(dB)

freq, GHz

MTF Insertion Loss

Magnitude(dB)

freq, GHz

Issues with Existing Limit & Proposed Limit

- MTF set-up from previous slide now used in cable assembly channel
- Cable assembly measurements using MTFs close to the CM-to-CM RL limit cause marginal failures
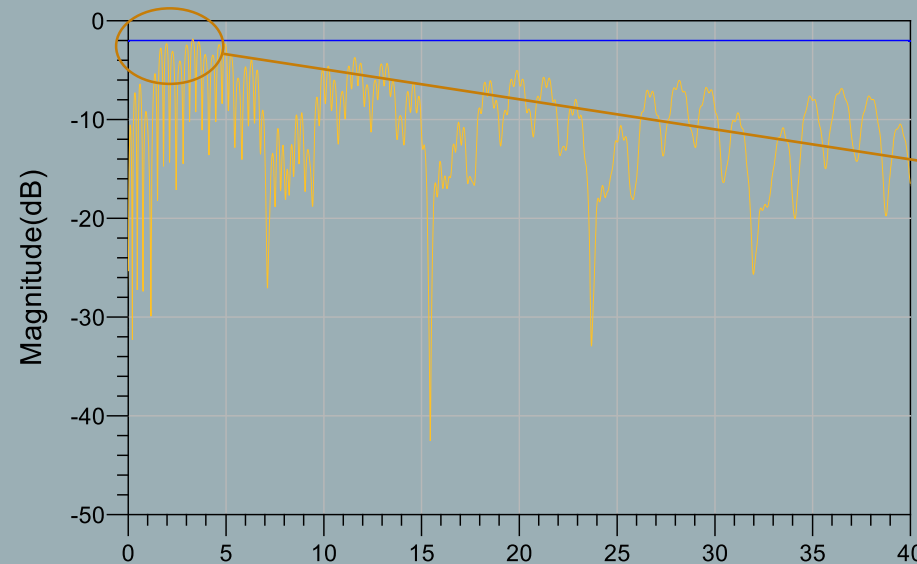- As a result, a limit of 1.8 dB is proposed for CM-to-CM RL

| MCB Trace | → | MCB Connector | → | 11dB IL at 26.56 GHz | → | MCB Connector | → | MCB Trace |

Existing Limit in Draft 1.4

$Return\ Loss(f) \geq 2\ for\ 0.05 \leq f \leq 40$

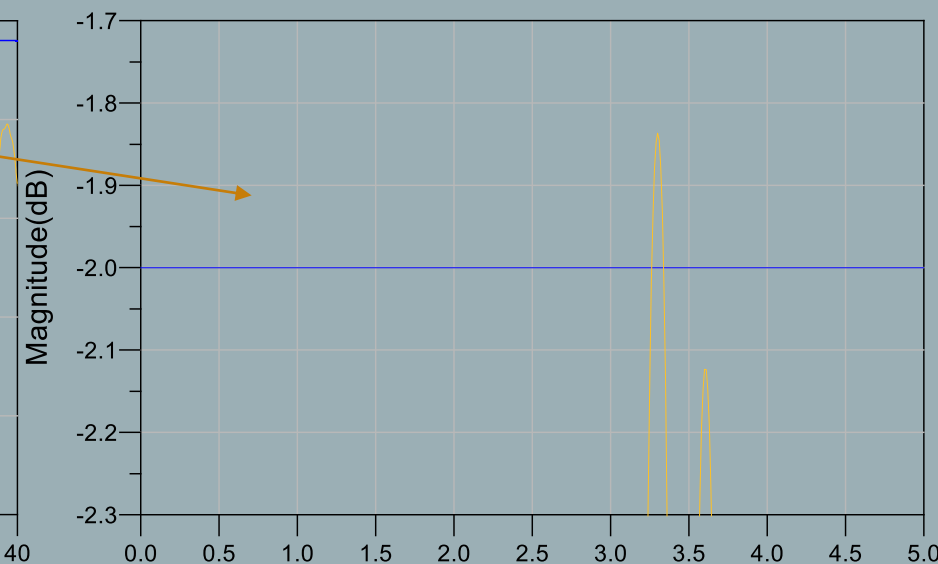### Proposed Limit

$Return\ Loss(f) \geq 1.8\ for\ 0.05 \leq f \leq 40$

Cable Assembly Common-mode to Common-mode RL

Cable Assembly Common-mode to Common-mode RL

Summary

- Comment Overview
- Issues with existing limit
- Proposed limit
- Questions