Test point proposals for CR4/10

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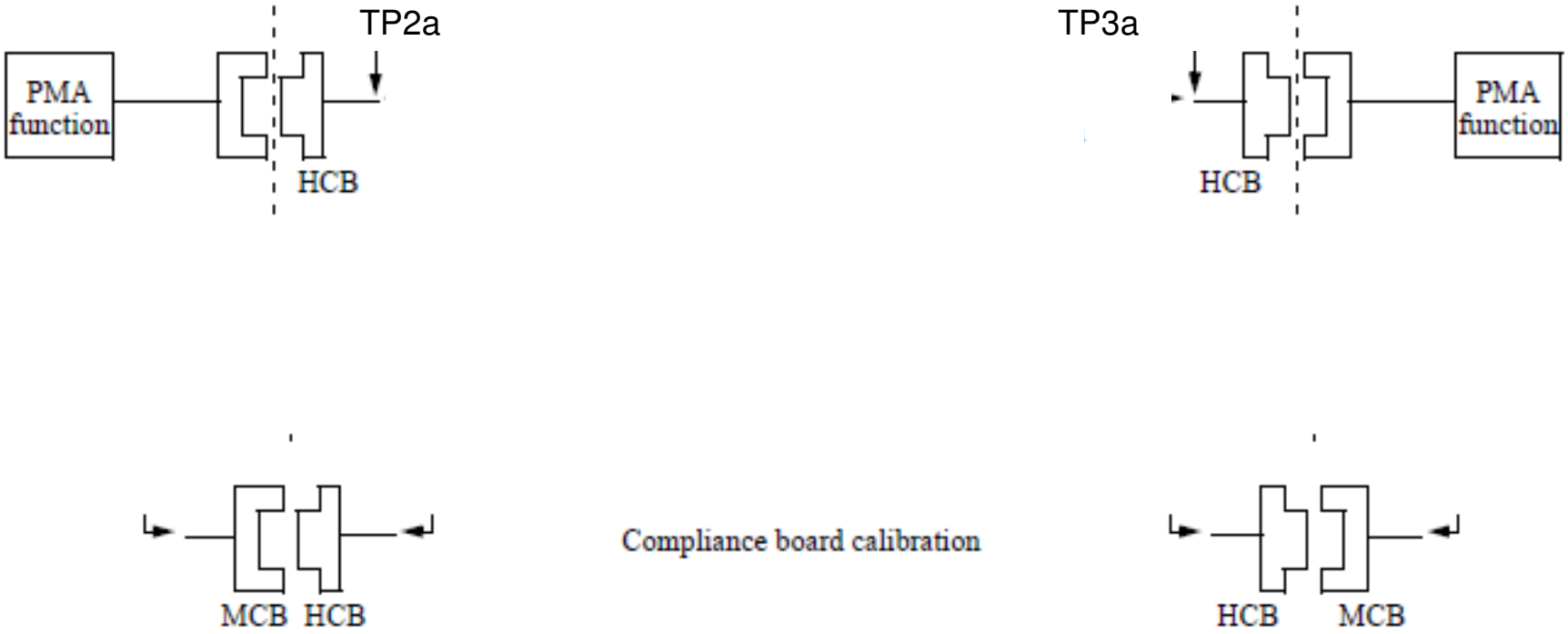
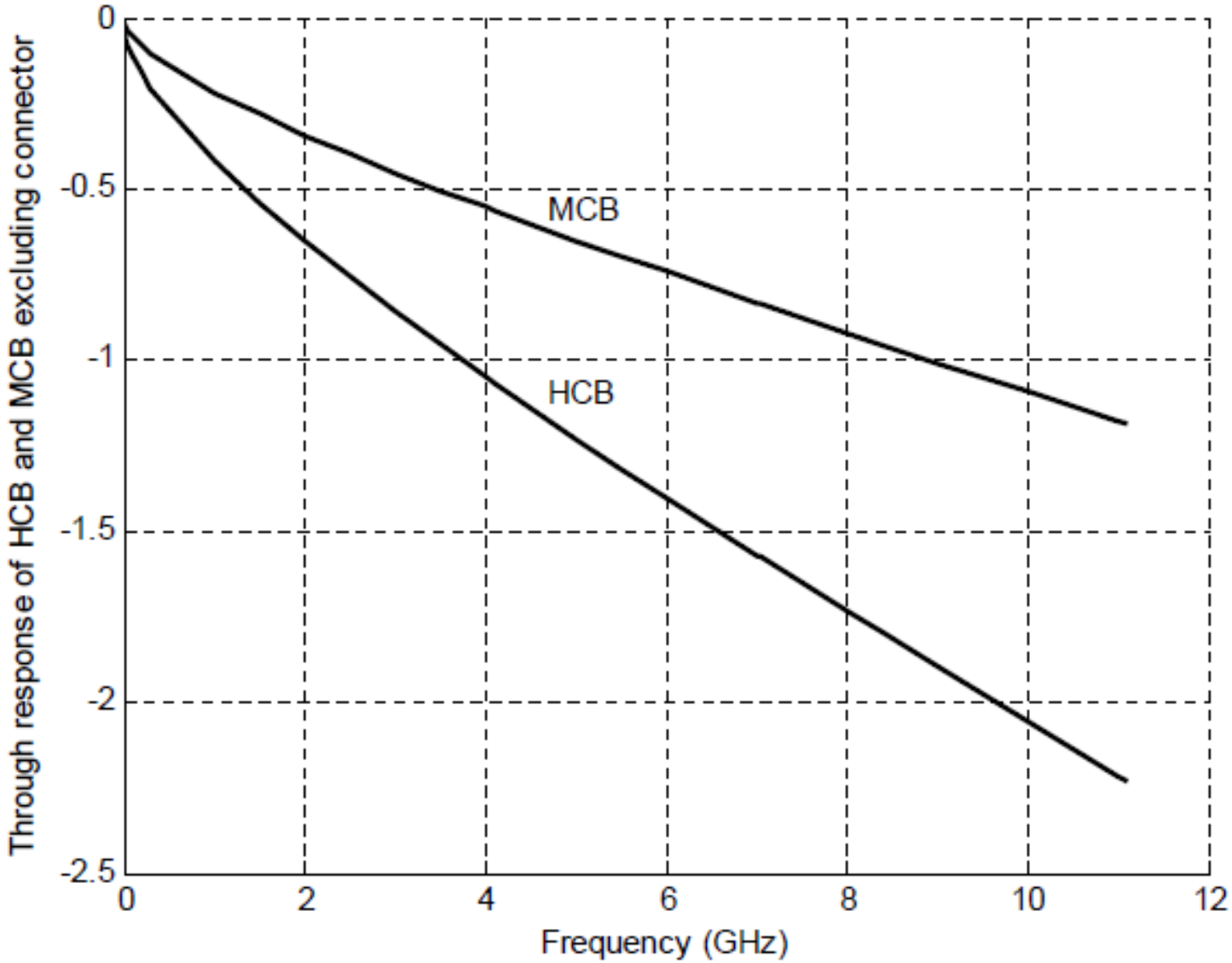
CR4/10 compliance boards

- Assumes normative TP2/3 test points
- Leverages SR compliance board specs
  - MCB is only used to establish S parameters. It is not required for compliance testing
- Same specs for both CR4 and CR10
  - May require modifications to clause 86 specs
- Based on existing hardware
- Replaces text and diagrams in 85.8.3.1,2 (Fig. 85-3)

Test points for CR4/10



CR4/10 Compliance board parameters



HCB/HCB equations

For the HCB,

$$20\times\log_{10}(|SDD21|) = -0.01 - 0.3 \times \sqrt{(f)} - 0.11 \times f \qquad 0.01 \le f \le 11.1 \qquad (86\text{–}4)$$

where f is the frequency in gigahertz.

For the MCB,

$$20\times\log_{10}(|SDD21|) = -0.0006 - 0.16 \times \sqrt{(f)} - 0.0587 \times f \qquad 0.01 \le f \le 11.1 \qquad (86\text{–}5)$$

where f is the frequency in gigahertz.

The recommended limits on the differential through response of the mated HCB and MCB (in either direction) are given in Equation 86–6 and Equation 86–7 and shown in Figure 86–6.

$$20\times\log_{10}(|SDD21|) \le 0.109 - 0.654 \times \sqrt{(f)} - 0.12 \times f \qquad 0.01 \le f \le 11.1 \qquad (86\text{–}6)$$

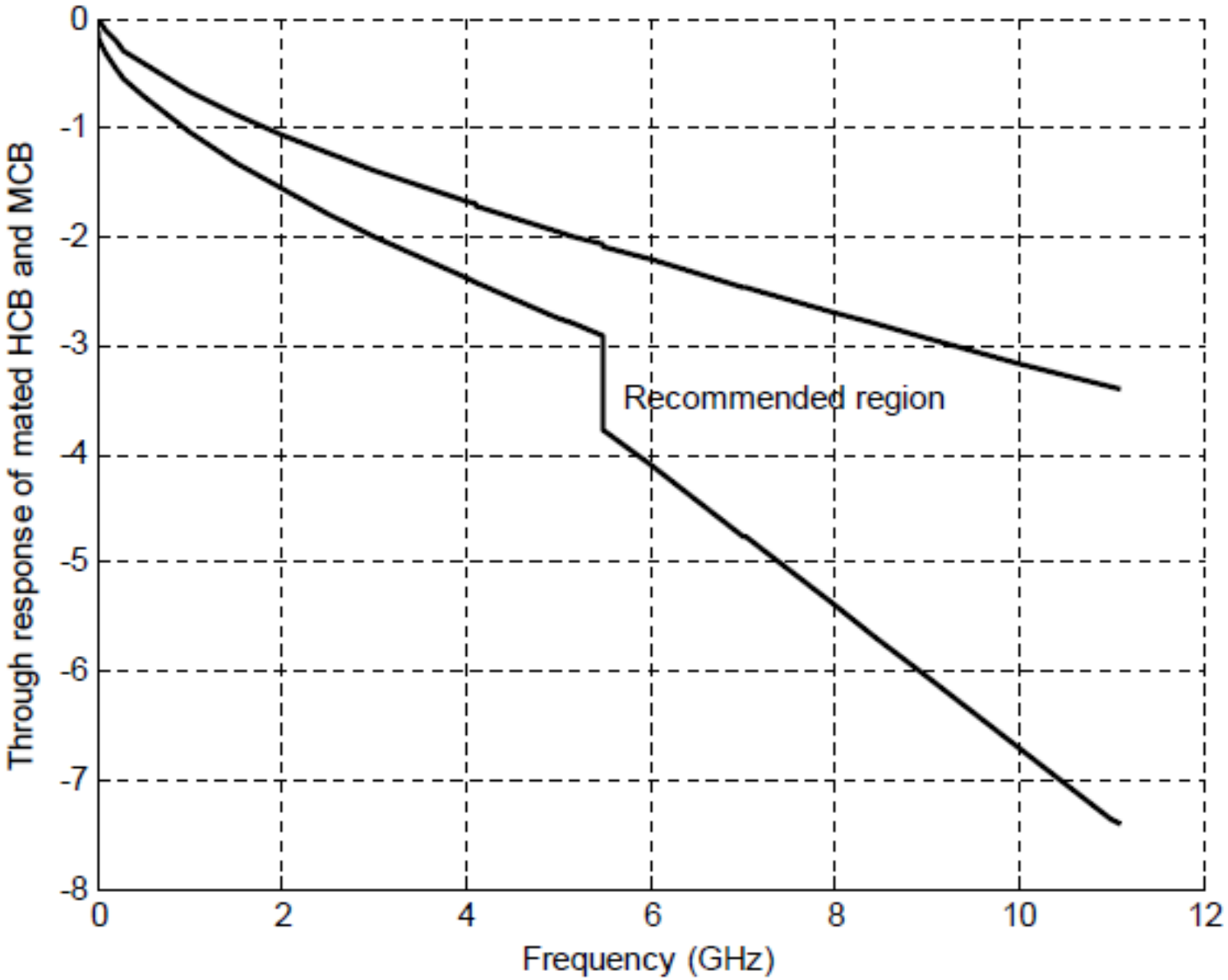
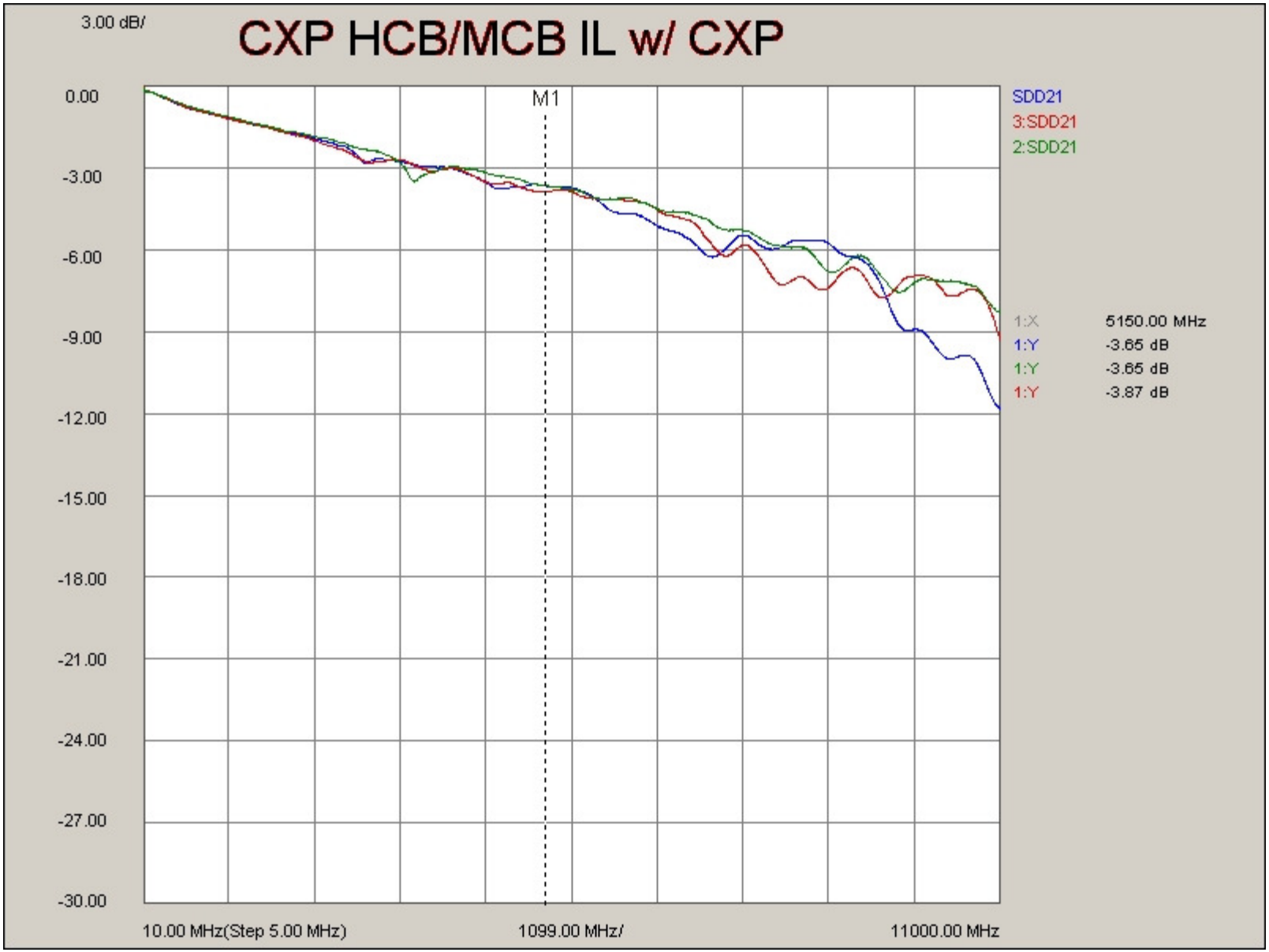


Figure 86–6—Through response of mated HCB-MCB

Hardware measurement verification



S parameters of mated HCB/MCB

$$
\begin{aligned}
20\times\log_{10}(|\mathrm{SDD21}|) &\geq -0.029 - 0.861 \times \sqrt{(f)} - 0.158 \times f && 0.01 \leq f \leq 5.5 \\
&\geq -0.2 - 0.65 \times f && 5.5 \leq f \leq 11.1
\end{aligned}
\qquad (86\text{–}7)
$$

where f is the frequency in gigahertz.

The recommended limits on the differential reflection response of the mated HCB and MCB are given in Equation 86–8 and Equation 86–9, and shown in Figure 86–7.

$$
\begin{aligned}
20\times\log_{10}(|\mathrm{SDD}hh|) &\leq -20 + 2 \times f && 0.01 \leq f \leq 2.5 \\
&\leq -15 && 2.5 \leq f \leq 5 \\
&\leq -13.8 + 28.85 \times \log_{10}(f/5.5) && 5 \leq f \leq 11.1
\end{aligned}
\qquad (86\text{–}8)
$$

$$
\begin{aligned}
20\times\log_{10}(|\mathrm{SDD}mm|) &\leq -20 + 2.75 \times f && 0.01 \leq f \leq 2 \\
&\leq -14.5 && 2 \leq f \leq 5 \\
&\leq -23.25 + 1.75 \times f && 5 \leq f \leq 11.1
\end{aligned}
\qquad (86\text{–}9)
$$

where SDDhh is SDD11 or SDD22 looking into the HCB,
SDDmm is SDD11 or SDD22 looking into the MCB, and
f is the frequency in gigahertz.

The recommended limit on the common-mode reflection response of the mated HCB and MCB is given in Equation 86–10 and shown in Figure 86–7.

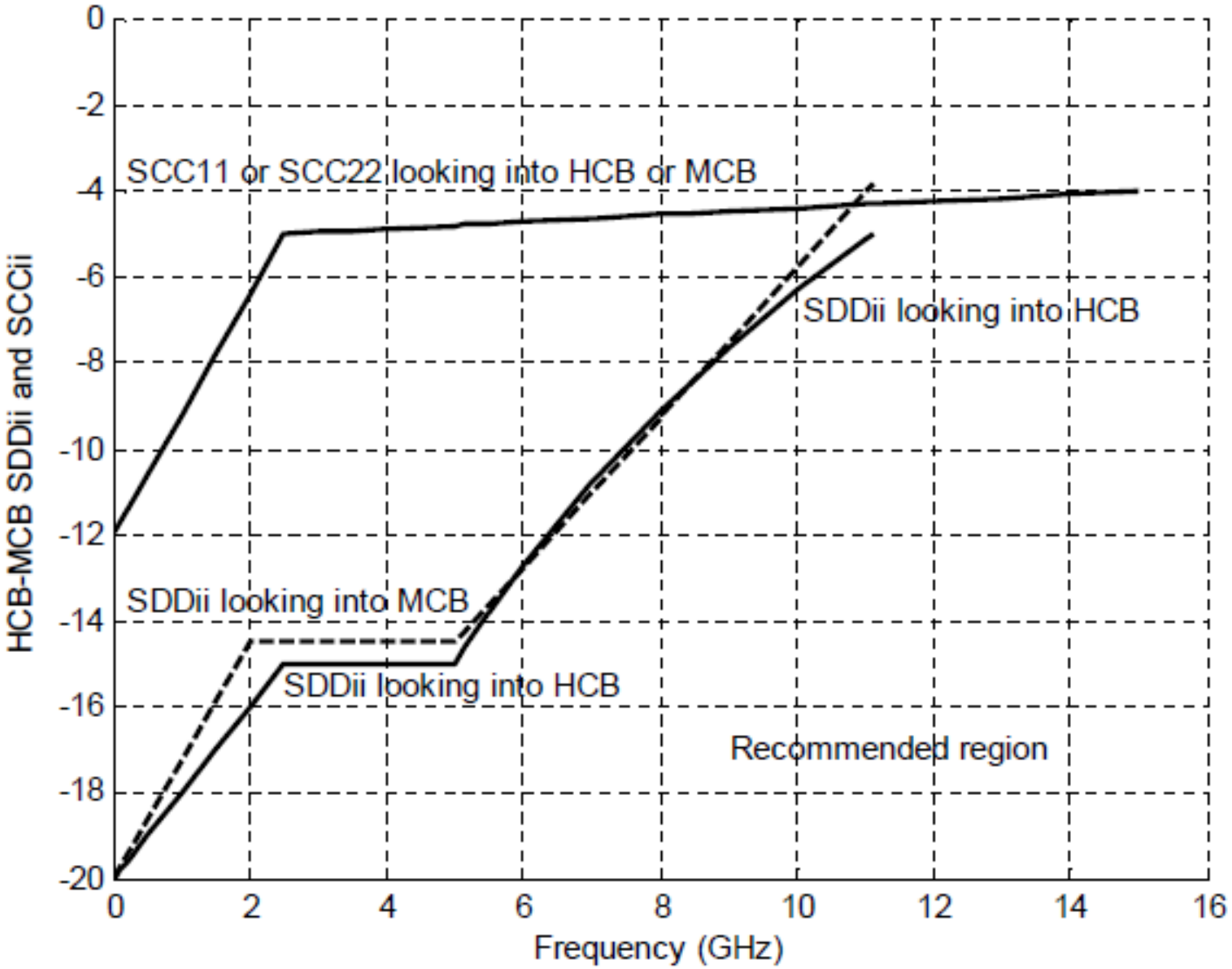
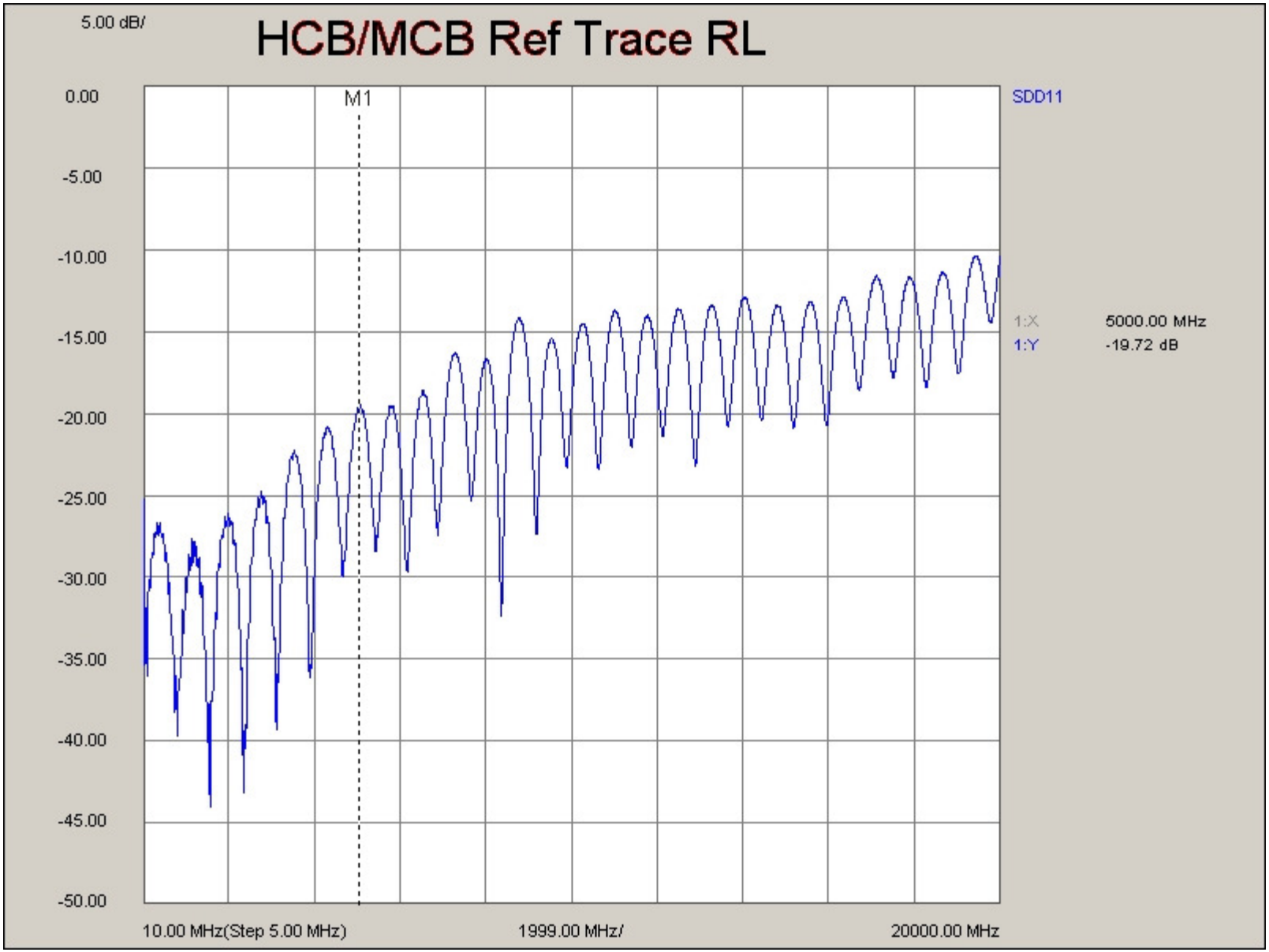


Figure 86–7—Reflection of mated HCB-MCB

Measured RL for verification



$$
\begin{aligned}
20\times\log_{10}(|SCCii|) &\le -12 + 2.8 \times f && 0.01 \le f \le 2.5 \\
&\le -5.2 + 0.08 \times f && 2.5 \le f \le 15
\end{aligned}
\qquad (86\text{–}10)
$$

where SCC*ii* is SCC11 or SCC22 looking into the HCB or looking into the MCB, and
f is the frequency in gigahertz.

The recommended limit on the differential to common-mode through response of the mated HCB and MCB is given in Equation 86–11 and shown in Figure 86–8.

$$
\begin{aligned}
20\times\log_{10}(|SCDij|) &\le -30 + 2.91 \times f && 0.01 \le f \le 5.5 \\
&\le -14 && 5.5 \le f \le 15
\end{aligned}
\qquad (86\text{–}11)
$$

where SCD*ij* is SCD21 or SCD12 looking into the HCB or looking into the MCB, and
f is the frequency in gigahertz.

The recommended limit on the differential NEXT (reflected crosstalk) response of the mated HCB and MCB is given in Equation 86–12 and shown in Figure 86–8.

$$
\begin{aligned}
20\times\log_{10}(|NEXT|) &\le -50 && 0.01 \le f \le 4 \\
&\le -70 + 5 \times f && 4 \le f \le 8 \\
&\le -30 && 8 \le f \le 15
\end{aligned}
\qquad (86\text{–}12)
$$

where NEXT is the differential response from any transmit lane to any receive lane or vice versa, looking into the HCB or looking into the MCB, and
f is the frequency in gigahertz.

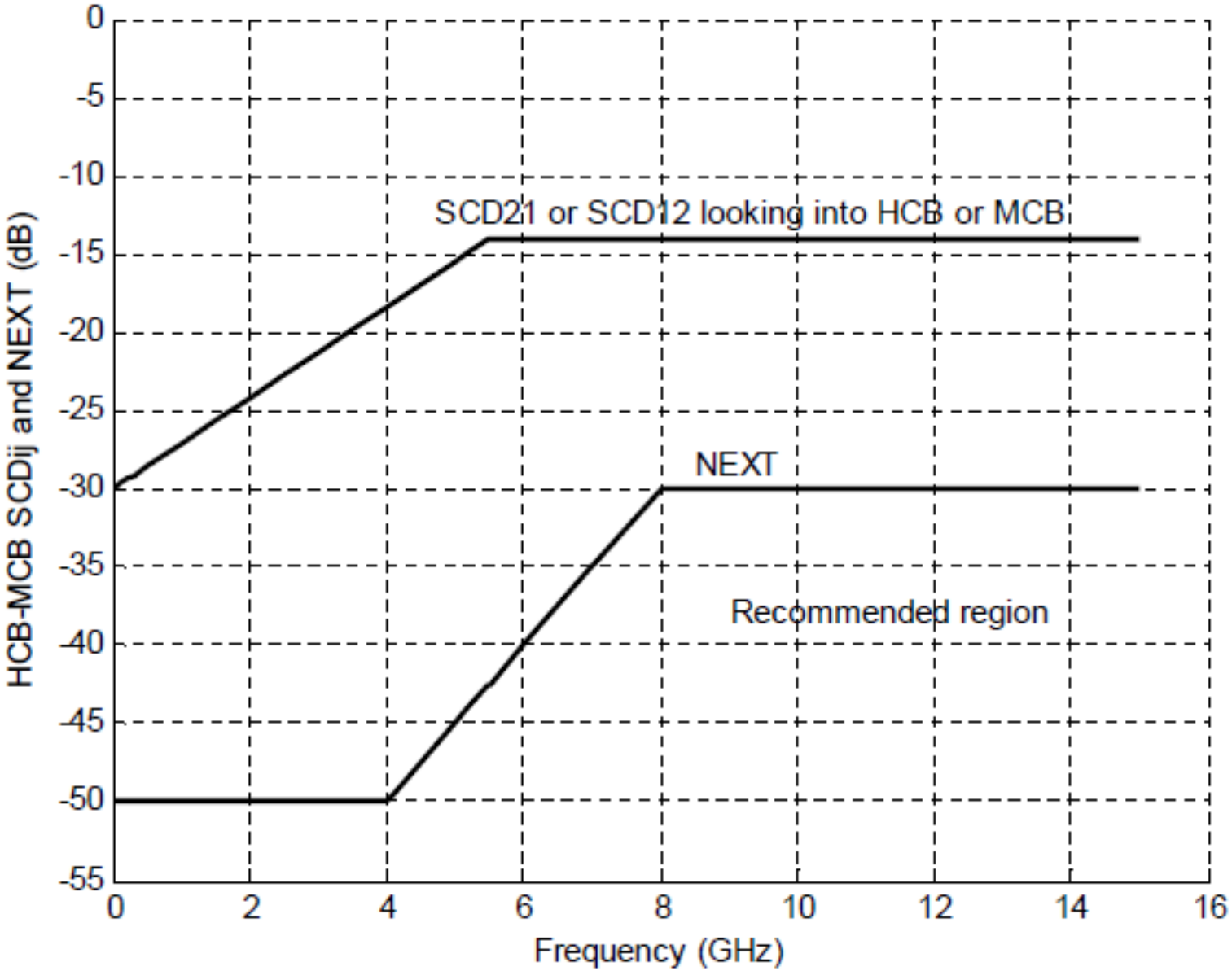


Figure 86–8—Mode conversion of mated HCB-MCB

NEXT, FEXT

The recommended limit on the differential FEXT (co-propagating crosstalk) response of the mated HCB and MCB is given in Equation 86–13.

$$
\begin{aligned}
20\times\log_{10}(|\mathrm{FEXT}|) &\le -50 && 0.01 \le f \le 4 \\
&\le -70 + 5 \times f && 4 \le f \le 8 \\
&\le -30 && 8 \le f \le 15
\end{aligned}
\qquad (86\text{–}13)
$$

where FEXT is the differential through response between one transmit lane and another, or between one receive lane and another, looking into the HCB or looking into the MCB, and

f is the frequency in gigahertz.