A few thoughts on Clause P802.3bz D1.0, 126.5.4.3 (2.5G/5GBASE-T Receiver Common-Mode Noise Rejection)

Pete Cibula

Intel Corporation

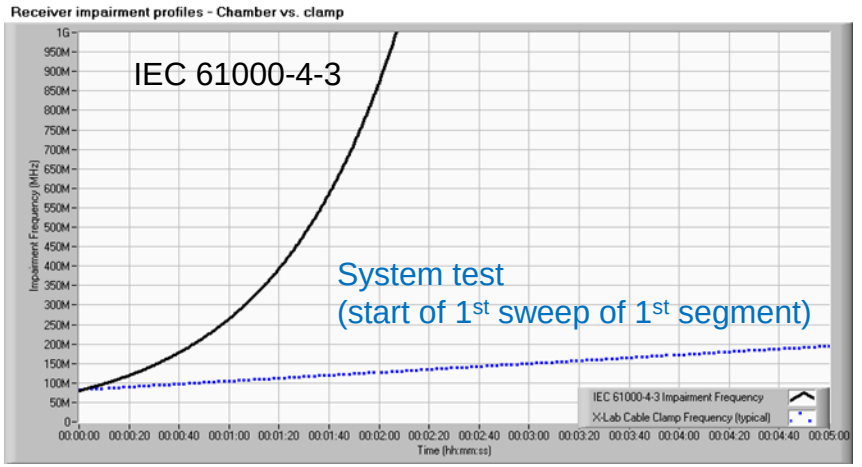
A few thoughts

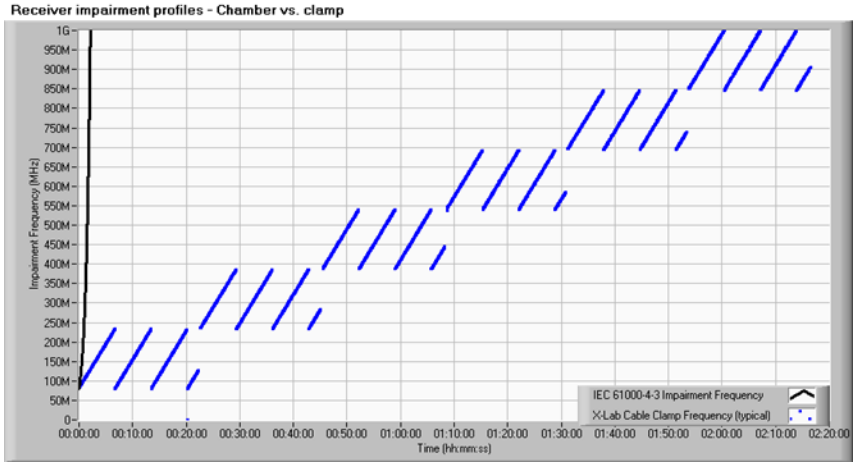
(Prompted by cohen_CMNR_Test_for_2.5G-5GBase-T_20150812.pdf)

- Should we add a CMNR test to the standard? **YES!**
- What frequency range should we use?
  - **Propose 80MHz to 1GHz**
    - Low frequency aligns with other MultiGBASE-T PHYs (Clause 55, Clause 113)
    - High frequency aligns with IEC 61000-4-3, 5.1 Test levels related to general purposes
- What set of frequency points and dwell time should we use?
  - Suggest using IEC 61000-4-3 for guidance.
    - **Propose minimum 500ms/step**
    - **Propose minimum 255 points for "1% maximum" step size**, but do not prohibit other frequency step spacing or number of points
  - Update to Annex 113A?
- Proposed required levels for signal generator output level
  - Suggest targeting "3V/m equivalent" source levels to align with other twisted pair standards, especially the 1000BASE-T/Cat5e system
  - **Propose injected source power level of +13dBm**

2x Impairment Profiles

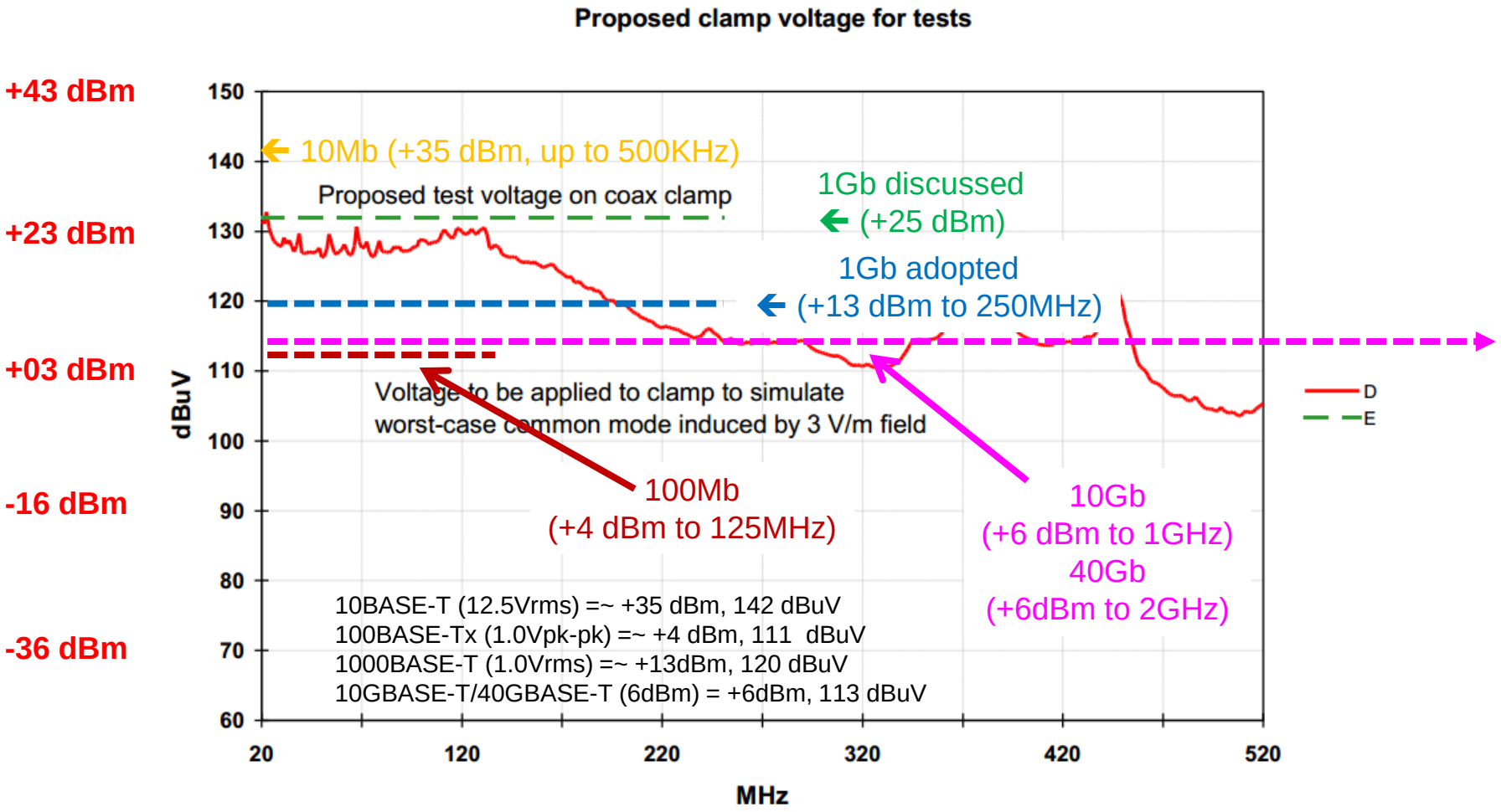
- Two examples of Rx CMNR impairment frequency vs. time
  - IEC 61000-4-3 “1% maximum” and representative system-level coaxial clamp tests
- IEC test is one frequency sweep, 255 points, ~2min sweep
- System test includes multiple sweeps per test segment, 4003 points, ~2h 20min “sweep”





Rx CMNR Source Voltages

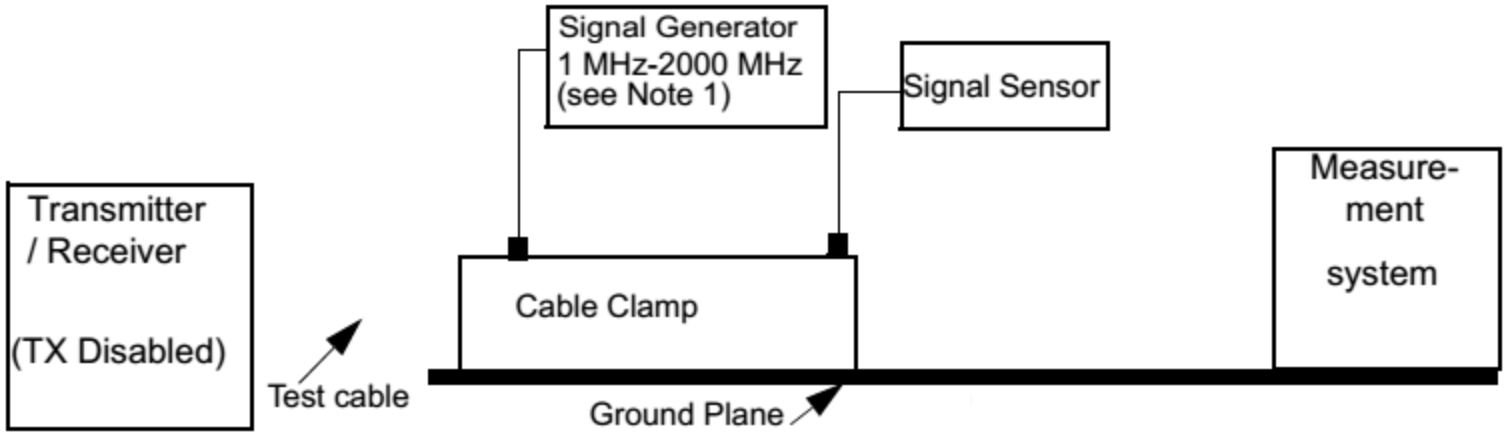
10Mb/100Mb/1Gb/10Gb/40Gb



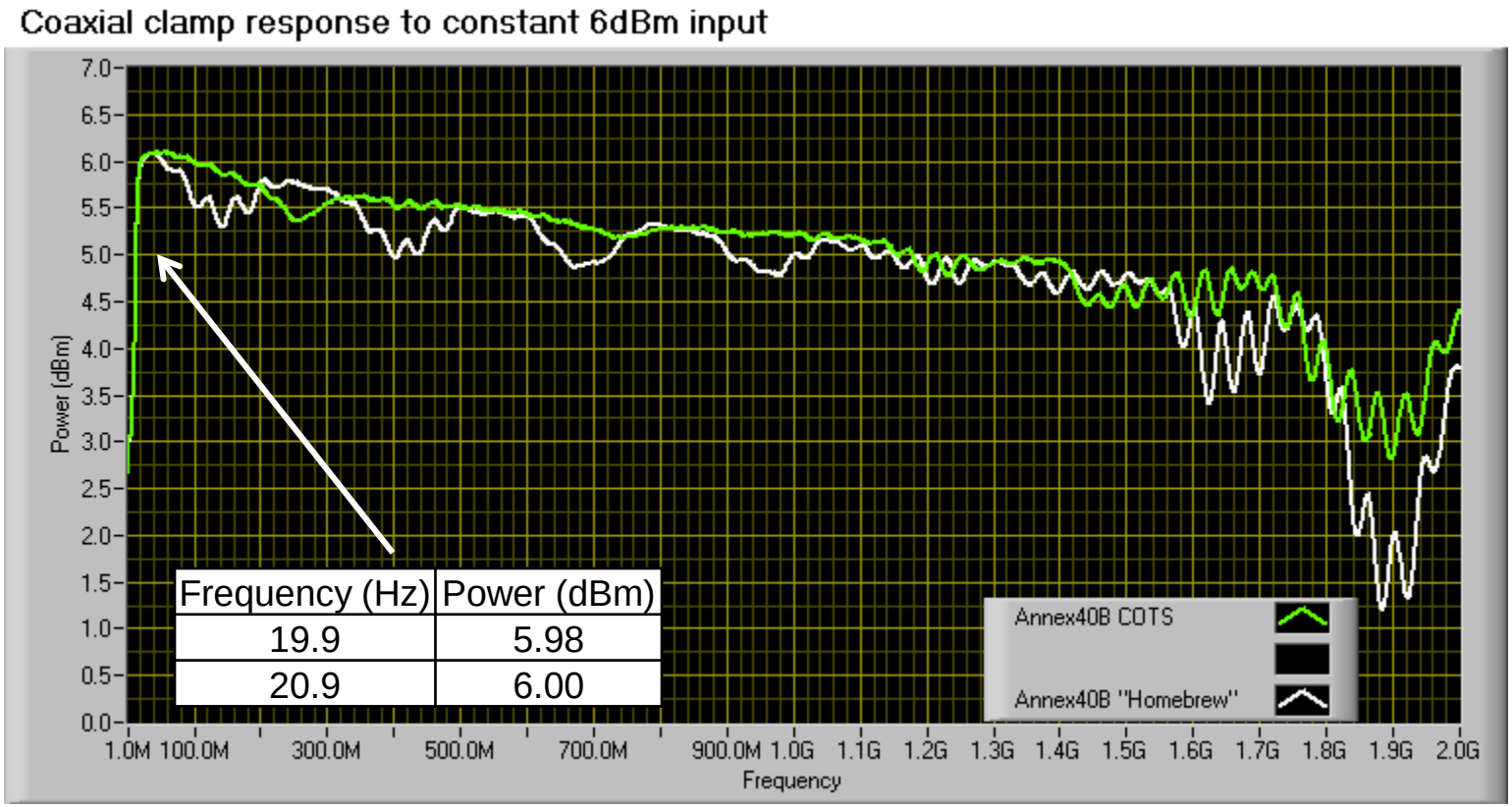
Specified receiver common-mode noise levels, IEEE 802.3 twisted pair standards

“NOTE 1” Test Configuration

NOTE 1 —Prior to making validation measurements or performing the test described in 113A.4, the cable clamp should be tested without the cable inserted to determine the variation of the signal generator voltage with frequency at the output of the clamp. The signal generator output should be adjusted to the specified signal power (for example 6 dBm for 40GBASE-T) at 20 MHz on the signal sensor. When the frequency is varied from 1 MHz to 2000 MHz, the measured power should not vary more than ±10 %. If the measured power varies more than ±10%, then a correction factor must be applied at each measurement frequency.

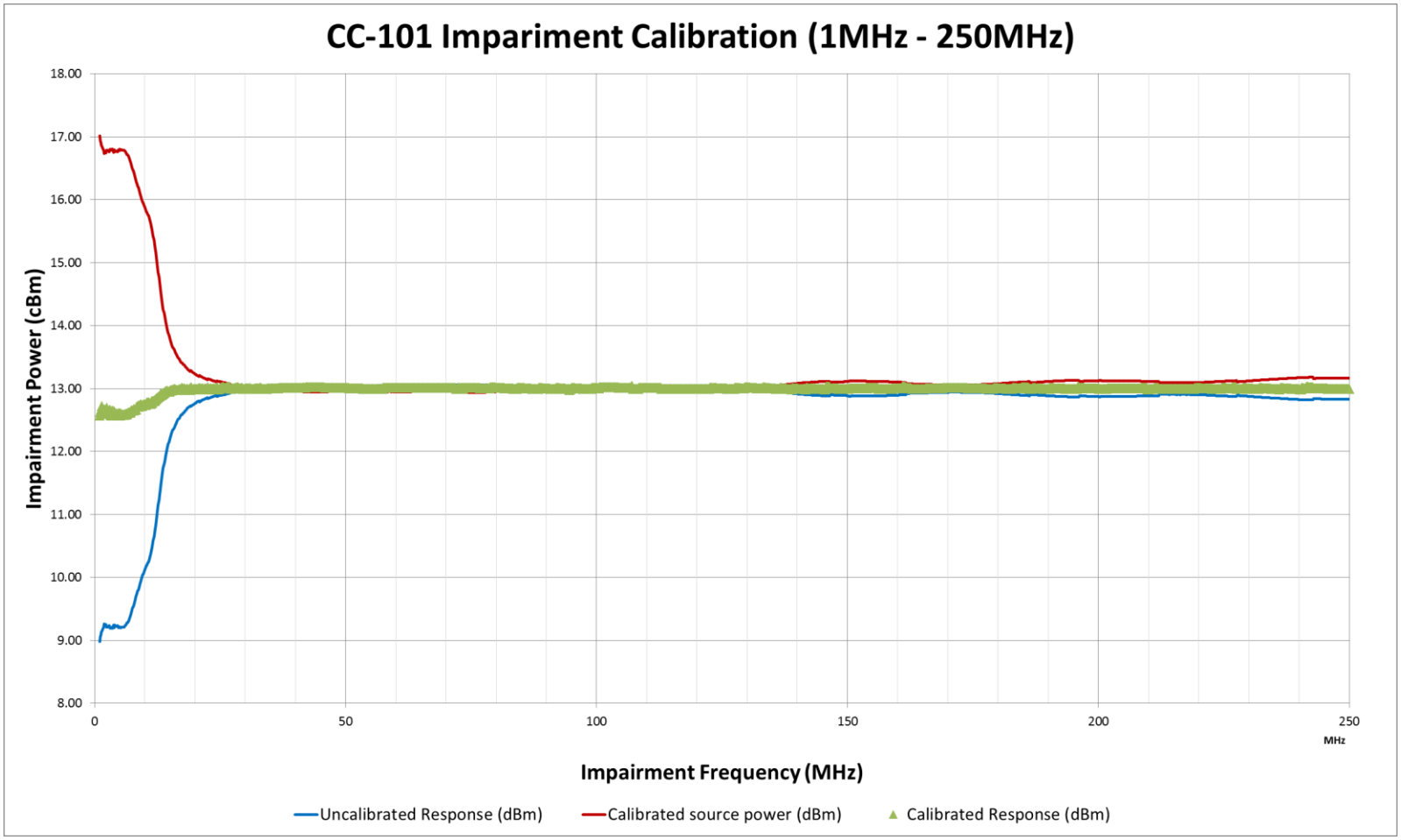


“NOTE 1” Results for Annex 40B Coaxial Clamps



Constant 6dBm input to two “empty” coaxial clamps
1MHz – 2000MHz, 2005 steps, 1MHz spacing
Losses can be easily corrected

Correction Factor Example



Thank You!