

Denver.¹ Gaul 2013 comes to the same conclusion as Javor 2011; namely that counterpoise isolation is superior to detuning a resonant circuit. The Gaul 2013 approach was entirely different than employed in Javor 2011, and it is reassuring that the two entirely different techniques ended up with the same conclusion. Mr. Gaul used a method of moments code called FEKO, whereas Javor 2011 performed a closed form analysis calculating the coupling from the electric field from a wire above a ground plane to a 104 cm rod antenna, based on first principles – quasi-static electric field formulation based on Gauss’ Law. Both efforts compared the predictions with measured test data, but that is where the similarity ends.

Both Javor 2011 and Gaul 2013 evaluated several different antenna configurations between 20 – 30 MHz. These are complete isolation of the counterpoise, -461F, -461E, -462, and floor mounting of the rod antenna, as well as use of a vertical biconical.

Your author, a member of the Tri-Service Working Group on MIL-STD-461F, was aware of the precise damping ferrite described in the standard, and the test results in Figure 12 verify how well it works. MIL-STD-461 cannot identify any commercial product or service by trade name, and instead has to specify a device by its salient characteristics. Mr. Gaul unwittingly identified a (non-technical) flaw in MIL-STD-461F: part of the ferrite description is not in the main body of the standard, but in the appendix, which is not contractually obligatory. In the main body, the ferrite is identified as having an impedance of 20 – 30 Ohms at 20 MHz, and in the appendix the following statement is made: “Floating the counterpoise with the coaxial cable electrically bonded

¹ Gaul, Harry. Electromagnetic Modeling and Measurements of the 104cm Rod and Biconical Antenna for Radiated Emissions Testing Below 30 MHz. 2013 IEEE EMC Symposium Record. Denver, CO.

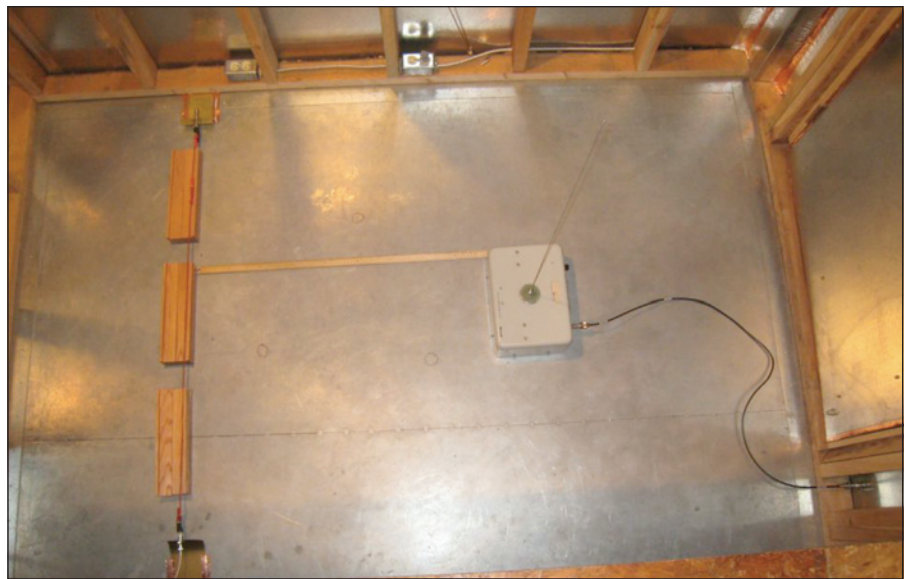


Figure 13: Both the radiating element (wire above ground on the left) and the measurement antenna are referenced to the shield room floor, ensuring a common potential for the measurement and the absence of any sort of resonant condition. Above ground rod antenna measurements such as MIL-STD-461, RTCA/DO-160 (obsolete versions), CISPR 25 et al. should all produce results commensurate with a common ground plane measurement. It is the gold standard.



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