

October 30 2014

Disklab Tests Results

28/10/2014

Overview

These initial results are for only the TabletShields. The photographs of the bags are presented in figure 1 and figure 2 respectively, to disambiguate which product is being tested.

A bow tie antenna constructed from enameled copper wire was used in order to provide a source with a wider bandwidth than that of a dipole. Noise level tests of various types were performed without the antenna and with a load instead. These provide a baseline for measurements.

When results were found to be noisier than expected, extra copper tape was added to cover the opening where the cable driving the antenna from the VNA entered the bag. (Clearly in real applications the source would be fully enclosed.).

The shielding effectiveness results compare the “naked” (unshielded) antenna with the shielded antenna.

The test method was to measure the shielding effectiveness by taking the difference between the exposed antenna and the antenna enveloped in the bag when placed in a reverberation chamber, as undertaken in previous tests.



Figure 1 TabletShield_No window



Figure 2 TabletShield_window

Results

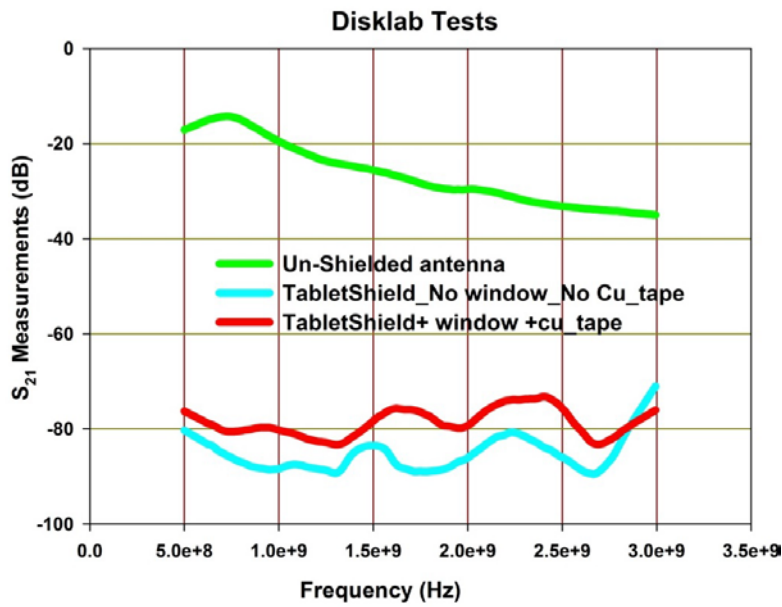


Figure 3: Showing the S₂₁ Measurements for the TabletShield bags – these are the measured results.

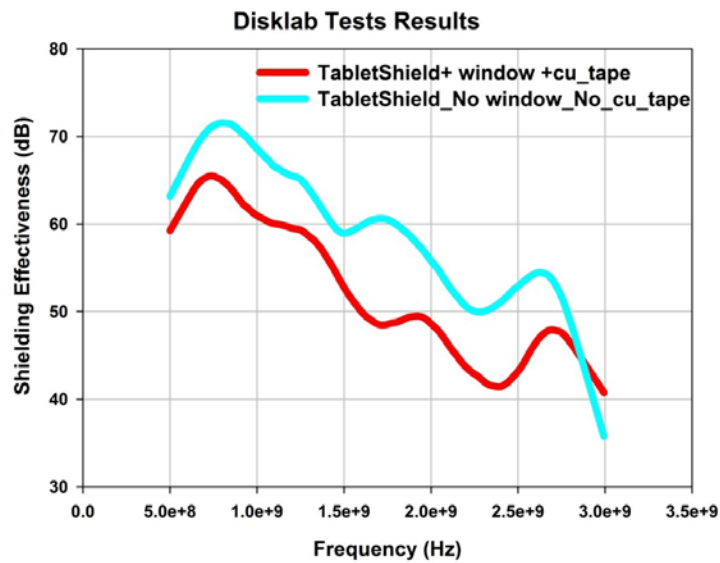


Figure 4: Showing the shielding effectiveness of the TabletShield bags – obtained by taking the difference between the exposed antenna and the measurements with the antenna in the bag.

Figure 5 superposes the approximate system noise floor on the results. This is, effectively, the minimum level that measurements can be taken. Without additional amplification, the difference between this line and the unshielded antenna line gives the maximum shielding effectiveness value that can be obtained. Figure 5 shows that the unwrapped tablet shield is approximately at that noise floor.

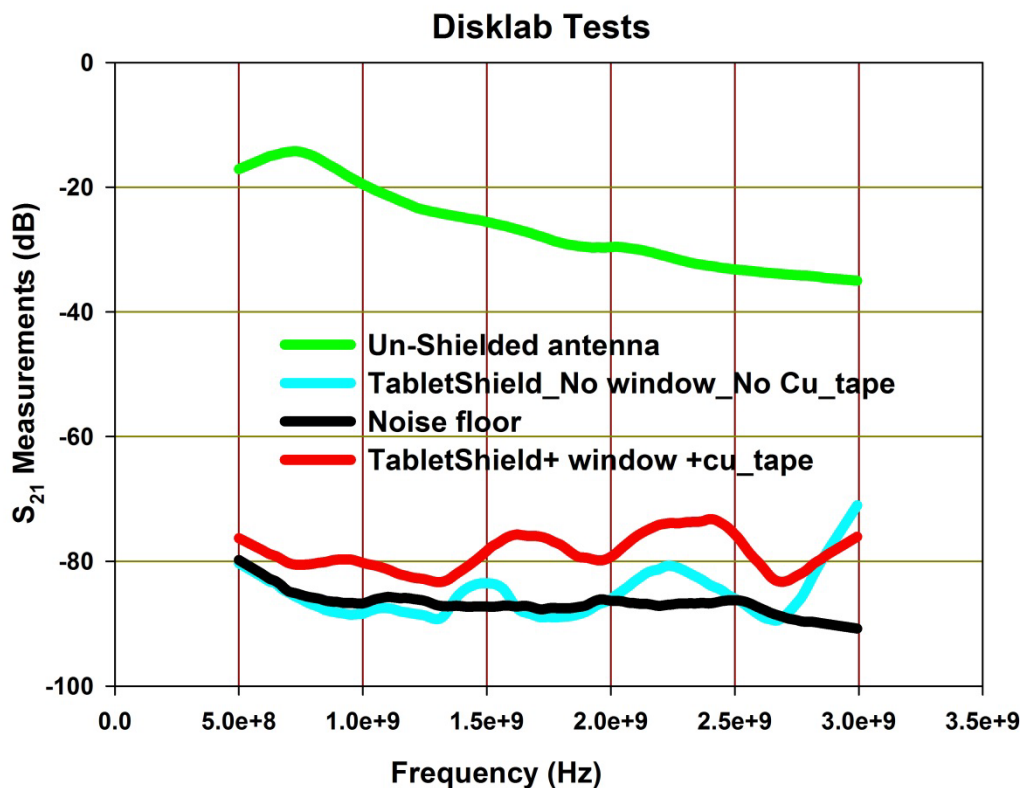


Figure 5: Illustrating the noise floor and subsequent dynamic range limits with the current setup.

As mentioned, some of the tests used copper tape to provide additional screening at the cable ingress. Figure 6 shows the effect on the shielding measurements of doing this. As can be seen, this has the effect of smoothing the results.

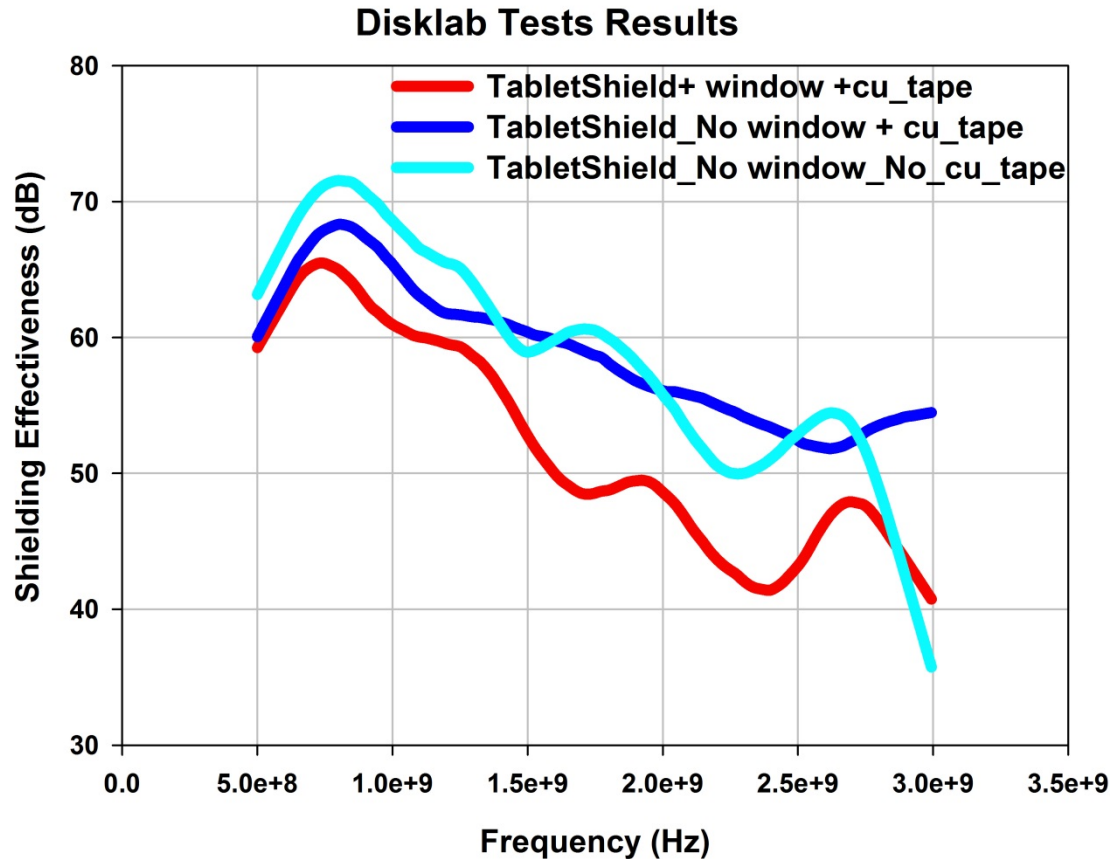


Figure 6: Illustrating the effect of the copper tape around the cable ingress

Conclusion

It seems clear that there is a noticeable difference in performance with the window being present in the design. The windowless tablet shield seems to have a shielding effectiveness in excess of 50dB, whereas the addition of a window appears to offer a shielding penalty of up to approximately 10 dB.

It should be noted that the measurements are at or near the system noise floor (in the current configuration).

Future improvements in the measurement method will include a signal generator that can be entirely enclosed by the bag (reducing the cable effects) and amplification added to the receive circuit to improve the dynamic range of the measurements.