

10.15.10

INTRODUCTION

360° RF has performed measurements upon a sample wall material, and a sample fabric (shown at the right), which might be used to reduce the radar reflectivity of an aircraft hangar to be built by the client. The materials were measured from 1.0 to 1.1 GHz at 0°, 30° and 45° incidence angles. The following presents our results.



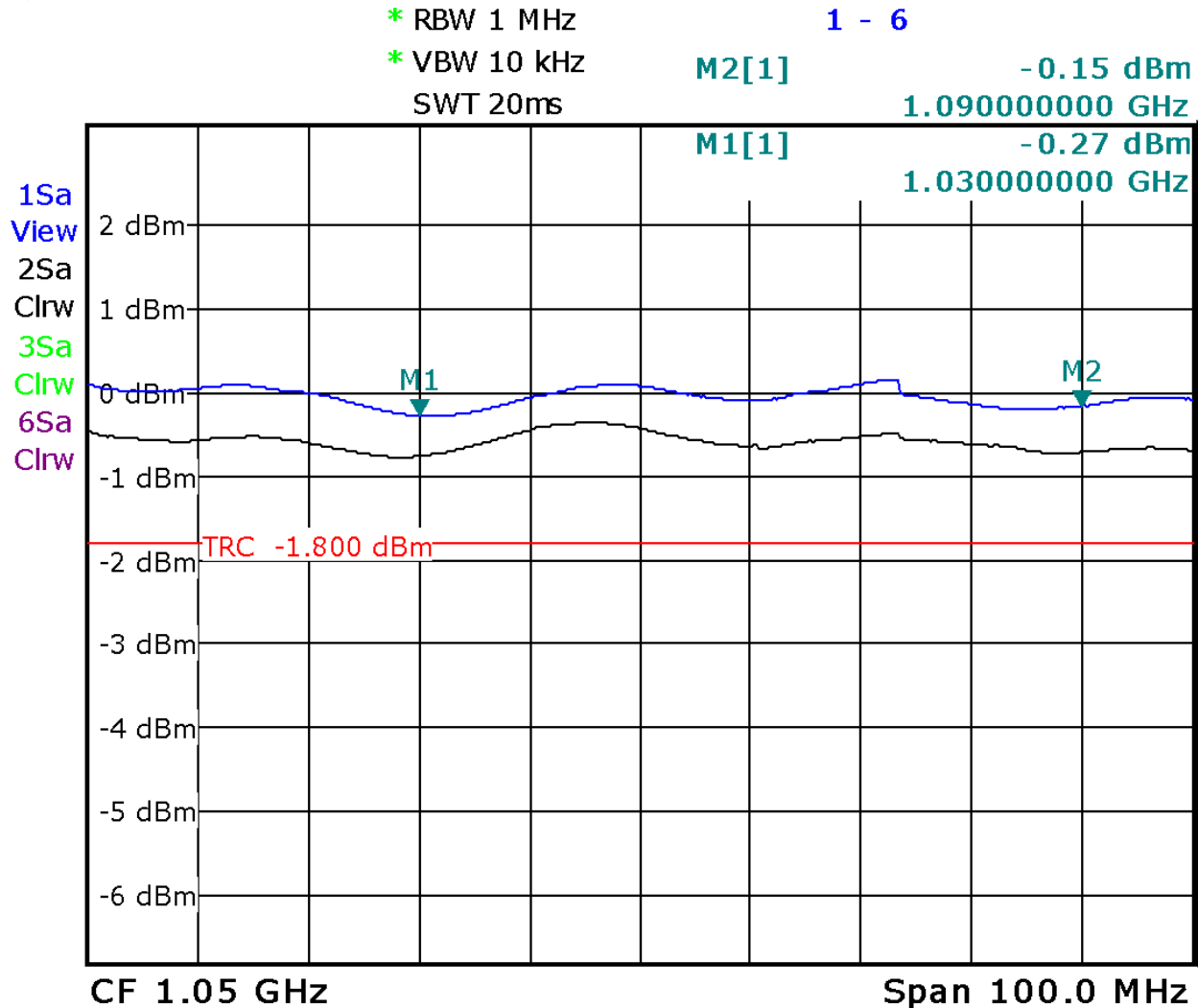
PROCEDURE & MEASUREMENT

In a controlled setting, substrate samples were placed in a specialized near-field test fixture. Then, using a spectrum analyzer with tracking generator and precision tuned antennas, the signal attenuation from 1.0 to 1.1 GHz (to cover the frequencies of interest of 1030 and 1090 MHz), was measured at three angles of incidence. The photo below (left) shows the test fixture with the provided sample EIFS wall material in place. The right photo shows the paired precision antennas.

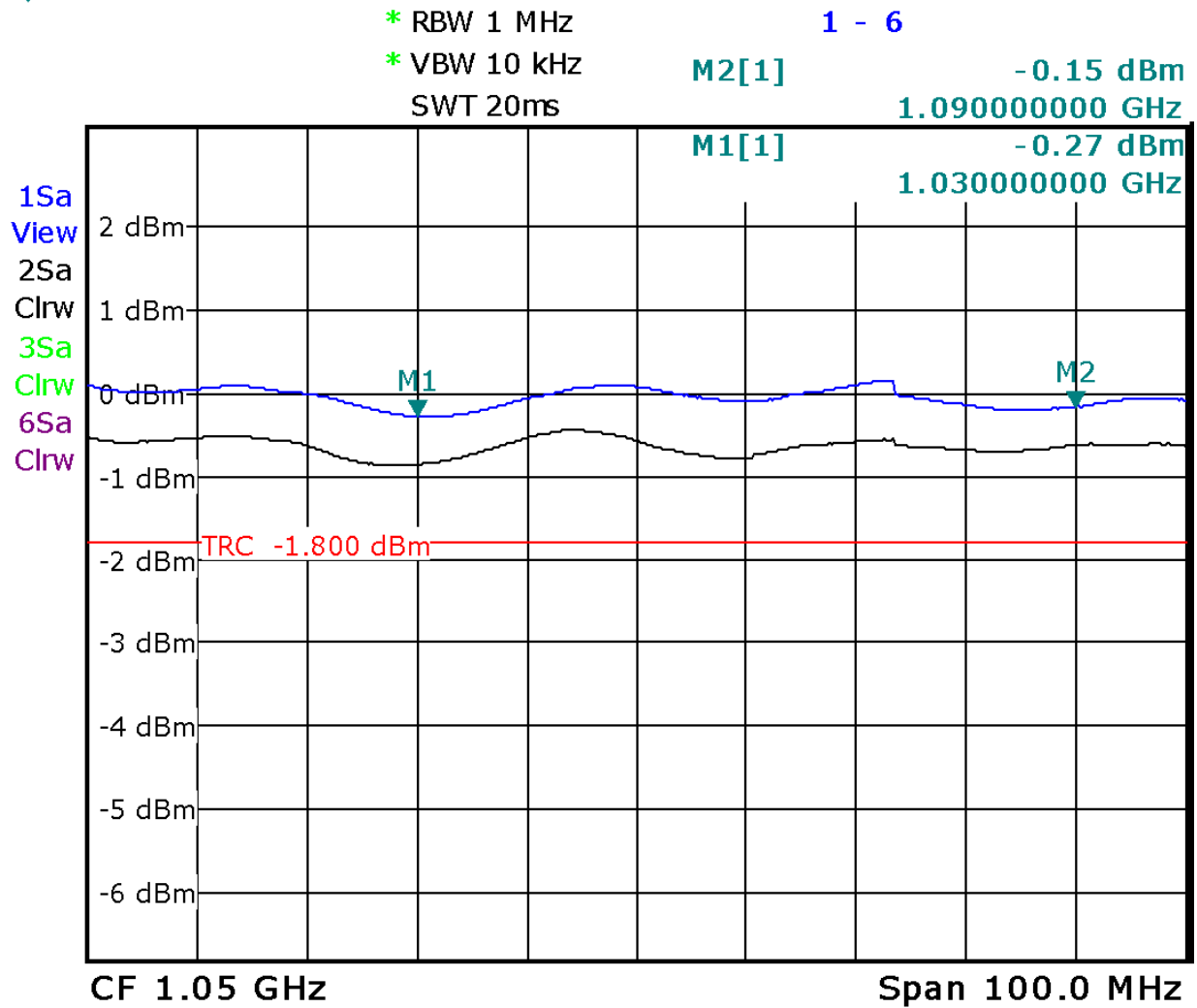


RESULTS

The plot below shows the insertion loss of the provided wall sample. On average, the wall measured about 0.6 dB insertion loss, which would provide a reflection of about -1.2 dB.

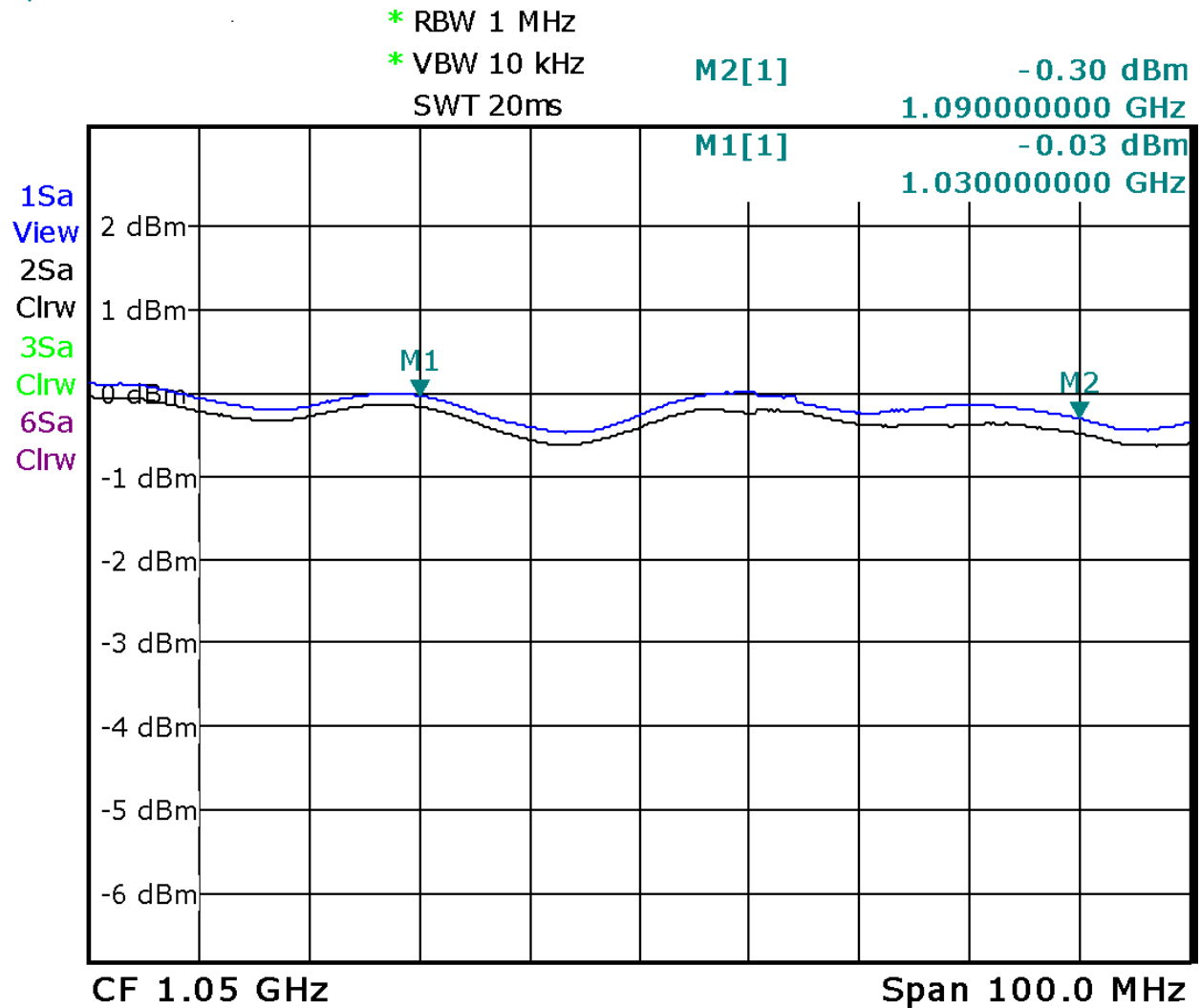


Insertion loss plot looking directly at the wall (90° incidence angle). The blue trace is the signal strength without the wall between the measurement antennas, and the black trace is the signal strength with the wall between the antennas. The difference between the blue and black traces is the one-way insertion loss. The two-way reflectance would be twice that value, since the radar signal first penetrates the wall, reflects off the background, then the reflected passes through the wall back to the radar.

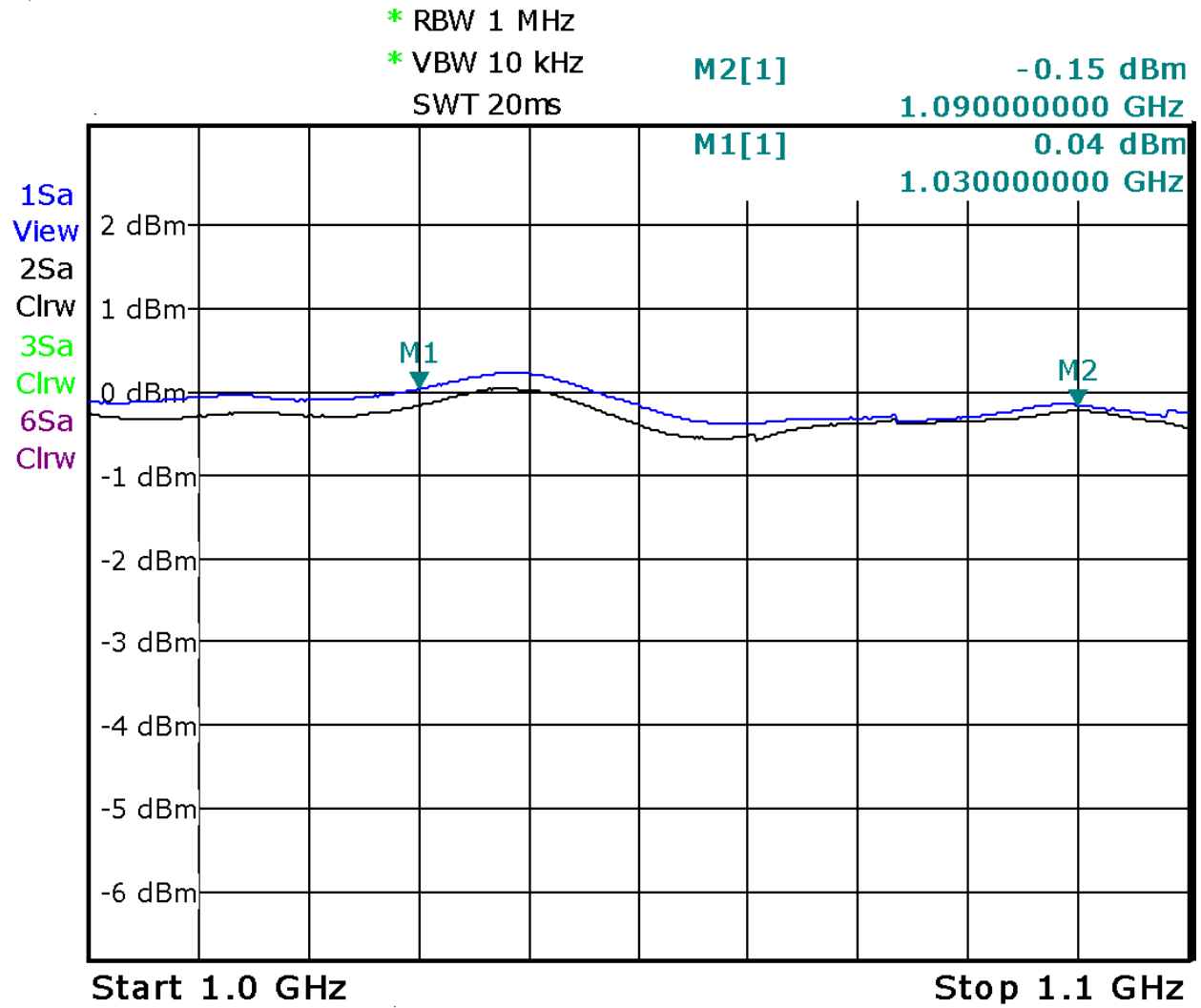


Insertion loss of provided sample wall at 60° incidence angle.

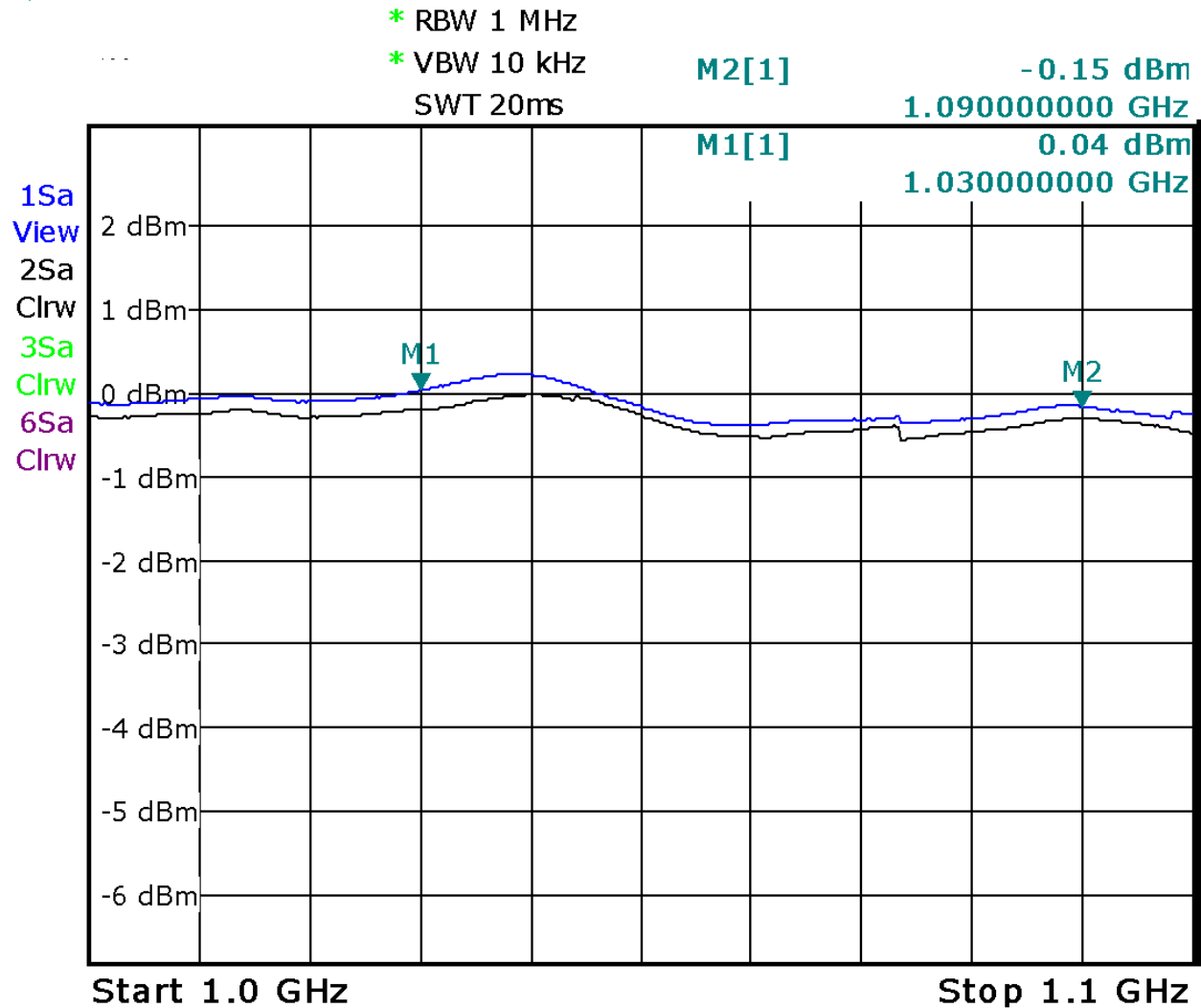
The tan material showed so little loss that it had to be folded over four times, and then showed an average of about 0.1 dB loss, or 0.025 dB per thickness.



Insertion loss of four thicknesses of the provided tan fabric material at normal incidence (90° angle). The insertion loss of a single layer of this material was too low to measure reliably, so it was folded. The insertion loss of a single layer is about 0.025 dB, which would be a reflectance to the radar of about -0.05 dB.



Insertion loss of four layers of the tan fabric material, looking at the material from a 45° angle.



Insertion loss of four layers of the tan fabric material, looking at the material from a 30° angle.

CONCLUSION

The measured insertion loss of the submitted EIFS wall material is about 0.6 dB, which will allow 93% of the radar signal to pass through the wall. The insertion loss of the tan material is about 0.025 dB, which will allow about 99.5% of the radar signal to pass through the wall. Both materials are functionally transparent to radar at 1.03 and 1.09 GHz.