Supplementary Materials: Long Carbon Fibers for Microwave Absorption: Effect of Fiber Length on Absorption Frequency Band

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Figure S1. Bundles of carbon fibers: (a) 3 mm, (b) 6 mm and (c) 12 mm supplied by Apply Carbon.

Figure S2. Microscopic images of (1) 3mm-CFs (2) 6mm-CFs (3) 12mm-CFs mixed with shear mixing during (a) 0 min (spatula) and (b) 5 min.
Figure S3. Epoxy foam loaded with 0.5 wt.% of 3mm-CFs and 6mm-CFs prepared with shear mixing for 
(a) 0 min, (b) 30 sec (c) 3 min and (d) 5 min.

Figure S4. Frequency dependence of the reflection coefficient for epoxy foams loaded with 0.5 wt.% of 
12mm-CFs for three times of shear mixing: 30 sec, 3 min and 5 min.

Figure S5. Photos of epoxy foams loaded with 0.25 wt.% of carbon fiber with length of (a) 3 mm (b) 6 
mm and (c) 12 mm, elaborated using ultrasounds, during 5 min, for CFs dispersion.
Figure S6. Microscopic images of (a) 3mm-CFs, (b) 6mm-CFs and (c) 12mm-CFs mixed with ultrasounds during 5 min.

Figure S7. Dielectric losses of epoxy foams loaded with 0.25 wt.% of 3, 6 and 12mm-CFs, presented in X-Band frequency range.
Figure S8. Proposed multiple reflections and backscattering in CF agglomerates as a function of the CF length and EM wavelength. Trapped waves (Red arrows); transmitted waves (blue arrows); reflected waves (green arrows).
Figure S9. Photo of epoxy foams loaded with 0.25 wt.% of 6+12mm-CFs.

Figure S10. The frequency dependence of the simulated reflection coefficients for pyramidal epoxy foams loaded with 0.25 wt.% of 3, 6, 12 and 6+12mm-CFs compared to the measurement and the simulation of a prototype loaded with 0.5 wt.% of 3mm-CFs.