Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Ferromagnetic Resonance on Micro- and Nano-Hexaferrites at Extremely High Frequencies KONSTANTIN KOROLEV, Tufts University, Extermely High Frequency Medical and Technical Association, SHU CHEN, Arent Fox LLP, MOHAMMED AFSAR, VALENCIA KOOMSON, Tufts University, VINCENT HARRIS, Northeastern University, TUFTS UNIVERSITY TEAM, EXTERMELY HIGH FREQUENCY MEDICAL AND TECHNICAL ASSOCIATION COLLABORATION, ARENT FOX LLP COLLABORATION, NORTHEASTERN UNIVERSITY COLLABORATION — Millimeter wave transmittance measurements have been successfully performed on micro- and nano-sized $BaFe_{12}O_{19}$ and $SrFe_{12}O_{19}$ hexaferrite powders. Broadband transmittance measurements have been performed using free space quasi-optical spectrometer, equipped with a set of high power backward wave oscillators covering the frequency range of 30 – 120 GHz. Real and imaginary parts of dielectric permittivity for both types of micro- and nanoferrites have been calculated using analysis of recorded high precision transmittance spectra. Frequency dependences of magnetic permeability of ferrite powders, as well as saturation magnetization and anisotropy field have been determined based on Schlöemann's theory for partially magnetized ferrites. Micro- and nano-sized ferrite powders have been further investigated by DC magnetization to assess magnetic behavior and compare with millimeter wave data. Consistency of saturation magnetization determined independently by both millimeter wave absorption and DC magnetization have been found for all ferrite powders. These materials seem to be quite promising as tunable millimeter wave absorbers and filters, based on size-dependent absorption.

Konstantin Korolev
Tufts University, Extermely High Frequency Medical and Technical Association

Date submitted: 09 Nov 2016 Electronic form version 1.4