Accurate measurement and modelling of ACS in reverberation chamber

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1 Backgrounds

1.1 Antenna efficiency

1.2 Human body ACS

basic knowledge of fat content link between ACS and fat percentage document study

2 Theory

2.1 Antenna efficiency measurement

models of time constant s21, power balance model, chamber time constant problems of linear curvefitting, fitting range VS final results given by the optimizer montecarlo method of evaluating accuracy, histogram of Q factor with and without frequency stirring, whats the difference ? how to calculate the uncertainty of antenna efficiency (whats the relation to independent number of variables, and the k factor)? how big the frequency step size should be used? theory of nonlinear curve fitting sweep times effect on the k factor

2.2 Human body ACS measurement

Relative equations, FD method diagrams of power flow, power balance model tissue dielectric properties human body models(analytical(slab, cylinder, sphere)) patching model numerical models(fdtd mom) the cst simulation of ACS effort of shorting measurement times. segmented sweeping(what is the best setup, experimental study) GA study of sphere and unclear malfunction of RC above 15 GHz. The GA fit result(not very stable when it goes to complex shape) penetration of microwave into tissues reverse problem(calculate the dielectric property with borns iteration) the 2d method of moments.

evaluation of accelerated measurement method. independent number of samples can be collected. uncertanty

3 Experiment

3.1 Antenna efficiency measurement

three antenna method: red horn, green horn, two blade antennas

3.2 Human body ACS measurement

the result of human body measurement using FD method sphere study on the ACS posture effect on the ACS the linear correlation between morphological properties table of fat layer thickness relation to the silhouette area of human(data extracted from virtual family models) uncertainty study sphere