Project Requirements Document – Carbon Fiber Parameterization

**Students:** Ha Tran, Thanh Le, Jeffrey Brown.

**Advisor:** Branimir Pejcinovic.

**Sponsor:** TangiTek, LLC

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| Document Modification History | |  |  |
| Version | **Date** | **Author** | **Description** |
| 1.0 | 02/01/2017 | Ha, Thanh, Jeffrey | Initial Version |
| 1.1 | 02/13/2017 |  | Added changes from advisor weekly meeting |

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# Project Description

A set up of measurements will be performed to extract the electromagnetic parameterization for Carbon Fiber composite microwave absorber.

## Problem/Need

Shielding materials are useful in protecting various products from electromagnetic interference (EMI) as well as satisfying FCC’s regulations and standards. // can link from sponsor problems???

## Project Purpose

The purpose of this project is to develop a testing protocols for CF composite material characterization and to design a testing fixture prototype for extraction of the electromagnetic parametrization data of the measured materials. The obtained materials’ electromagnetic properties will be validated and modeled using an electromagnetic simulation.

## Project Background

// This is for our proposal

# Requirements

## Functional Requirement

1. Frequency range of operation must cover a frequency spectrum from 300MHz to 30 GHz.
2. The project must be capable of extracting dielectric constants, complex electric permittivity magnetic permeability, loss tangent and layer thinness of the absorbers.
3. EM parametrization data must be validated with simulation software.

## Hardware Requirements

1. The project takes advantages of available equipment and components that are accessible in PSU and sponsor: VNAs, waveguide, antenna, RF chamber.
2. Ask sponsor for dimensions for test.
3. NRL Arch Reflectivity [Hyperlink for ref] must be developed

## Software Requirements

1. Software can be used by both design team and the sponsor

## Policy Requirements

1. All students in the design team must sign for non-disclosure agreement.

## Operation Physical Requirements (need???)

## Usability Requirements (need???)

# Project Constraints

Time constraints: At the end of Spring term 2017

Cost constraints: Update after meeting with sponsor

# Communication Plan

Student group meeting: Two days a week (about 2 hours each) at PSU

Advisor meeting: Monday from 9 to 10 at PSU

Sponsor meeting: After major phase finished, and when needed

# Documentation

All project documents are available at: Hyperlink

## Project schedule and progress

Project schedule: Hyperlink to Gantt Chart

Project progress: Hyperlink to Trello

## Technical Documentation

Operating principle: Hyperlink

Installation document: Hyperlink

Software user guide: Hyperlink

## End-User Documentation

End-User documentation: Hyperlink

# References and Related Documents

* Electromagnetic parameterization of carbon fiber composite microwave absorbers

Hyperlink to sponsor’s project description