**Date: 2/5/2014**

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| **Group Number and Name** | **#14 Low Cost RF power meter** |
| **Client/Advisor** | **Dan Stieler/ Prof Neihart** |
| **Attendees/Role** | **Silu Feng/leader Xiaoshuo Li,Yusi Xie/Key idea holder Yijia Huang/webmaster Boyang Hu,Cong Han/Communicater** |

# Past week accomplishments

What was done, who did it, and when it was done

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| * All of the group members review the knowledge of traveling waves, standing waves, transmission line, characteristic impedance and max power transfer. * We all search the RF power meter online and read their tech descriptions. * Yijia Huang create a dropbox group to share the documents we found. * The three groups give a presentation about diode, thermistor, thermocouple detector. We introduce the basic theory and advantages of the three different detectors in the presentation. Finally, we decided to choose diode as the detector. Because diode is cheap, fast response and can measure large scale. * We meet together to share our resources and discuss the knowledge on Jan 28th. |

# Plan for coming week

What to do, who, and when should it be done

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| * We divide into two groups to research directional coupler and diode detector. Boyang Hu,Xiaoshuo Li and Cong Han will research diode detector. Yijia Huang, Silu Feng and Yusi Xie will research directional coupler. * The directional coupler group will look up tandem directional coupler online. Figure out what torid transformer to use, where to get it and how many turns should we use in the transformer. * We all will look up what kind of transmission line to use, where to get it and the price. * The diode group will come up with a detailed plan of how to build the diode detector and run the simulation of ideal system on ADS software. * The diode group will research which range is in diode I-V characteristic graph and draw the initial circuit. They will also start to look at Schottky diode, because this diode fits the demand. * We all need to figure out the exact values of electronic element in the directional coupler and diode detector and understand how it works. * Xiaoshuo Li will combine the directional coupler and diode detector from system level. * The directional coupler group should finish the calculation and circuit design in the next week. The diode detector group will finish the design and calculation in the week after week. The simulation of the system will be done in the week after week. |

# Pending Issues

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| * We need to know about the different kinds of power that power meters are used to measure. We need to know types of power, dB, dBm, power, average power, pulse power, peak envelope power. * We need to figure out which kind of power mentioned above is important to our client. * We need to design the circuit of directional coupler and diode detector. * We need to simulate on ADS software. |

# Individual Contributions

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| * Silu Feng communicate with Prof Neihart and search the RF power meter online, also divide the six group members into three different groups to research diode-based detector, thermistor-based detector, and thermocouple-based detector. She also research the information about thermocouple-based detector, including definition, how it works, what is the frequency range and power range. Fully understand what is dBm, Power, Average Power, Pulse Power and Peak Envelop Power. * Xiaoshuo Li research the diode theory, the way of sensing, filter circuit and the I-V characteristic graph of diode in breakdown, reverse and forward region. * Yijia Huang concluded the basic knowledge about 2-port network theory, reactance, transformers and Wheatstone bridge circuits. Identified dB, dBm, Power, Average Power, Pulse Power and Peak Envelope Power.Created a PowerPoint presentation about thermocouples. Then trying to figure out concepts about directional coupler(what kind of toroids to use? How many turns(N)? what is transmission line? where to get? what size of wire do we need? which kind of connectors(B,C)? And do simulation with ADS ). * Boyang Hu has research the diode detector. The theory of diode, the basic diode detector blueprint and search the tech description of diode detector. Compare the diode detector with thermistor and thermocouple detector. * Cong Han has research the thermistor theory, found the datasheet of thermistor detector online. Compare the advantage and disadvantage with the other two detectors. Fully understand the definition of dB, dBm, average power and peak envelope power. * Yusi Xie has research the thermistor theory, come up with the basic thermistor detector design. Found the datasheet of thermistor detector. Compare their advantage and disadvantage. |

Individual hourly Contributions

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| **NAME** | **Hours this week** | **HOURS**  **Cumulative** |
| Silu Feng | 8 | 14 |
| Xiaoshuo Li | 8 | 14 |
| Yijia Huang | 8 | 14 |
| Boyang Hu | 8 | 14 |
| Cong Han | 8 | 14 |
| Yusi Xie | 8 | 14 |

# Comments and extended discussions:

We did a great work in the past week. We need to review a lot of knowledge in the coming week and researched the three different types of detector. We already decided to use diode to do the detector. For the coming week, we will separate to two group, one group design directional coupler including design circuit and simulation. Another group design diode detector, including design circuit and simulation.