

The Boeing Company

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11/07/06

Submitted by:

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Purpose:

A Low Level Swept Continuous Wave (LLCW) test will be conducted to validate the lightning protection designs on aircraft wing sub-structure (wing box) and similar type aircraft components. LLCW testing measures voltage and currents transfer functions related to lightning attachments to the aircraft. This data can then be scaled and transformed to obtain estimates of the peak voltage and current transients that can be expected on the aircraft's systems. The tests will be performed at one of the locations listed in Exhibit Summary 1. It is important to note that the test design is such that this is a non-intentional radiator. The size, shape and composition of the articles under test make them very poor radiators, and the actual emission is very low level. These tests have been conducted at a number of locations, with no technical or interference issues ever occurring.

Exhibit 1 Summary
See Descriptions and Drawings for Details

Test System	Location	Frequency Band		EIRP
		Start Frequency	Stop Frequency	
LLCW	Seattle, WA NL 47-32-03 ; WL 122-19-01	DC	1MHz	50 Watts maximum into non-intentionally radiating transmission line (See Test Description)
LLCW	Seattle, WA NL 47-31-57; WL 122-19-00	DC	1MHz	50 Watts maximum into non-intentionally radiating transmission line (See Test Description)

Dates:

This experimental license application is being filed in conjunction with the STA extension of WC9XPC, file 0826-EX-ST-2006 refers. The testing will be conducted periodically over a two year period, as required to support aircraft testing and production.

Equipment:

The wing box will be located between two walls made of sheet aluminum. Several conductive wires will run both above and below the wing box structure and terminate at the two aluminum walls. A vector network analyzer, an HP 3577B or equivalent, will be used to inject low level swept CW currents into the wing box. The wing box will also be attached to the ground return structure. The ground plane returns the current back to the network analyzer. This forms a transmission line with a ground plane on four sides of the wing box. It will sometimes be necessary to amplify the injected current using a laboratory grade 25 or 50 Watt linear amplifier. (See Attachment 2 for a typical test setup). These tests are repeated with a variety of injection and exit configurations to represent various lightning attachment configurations.

Frequency:

The desired frequency range for this test is DC to 1 MHz. The sweep time will be approximately 10 seconds with a dwell time at any single frequency that will not exceed 50 mS. A typical data acquisition will require 1 to 8 sweeps. The RF drive current will be turned off between data acquisitions. The down time between data acquisitions can be anywhere from minutes to hours depending on the complexity of the test configuration changes.

Power:

The maximum transmit power will be 50 Watts CW.

Emissions:

The test setup is a non-intentional radiator. The wing box and ground plane form a transmission line, however parasitic emissions will occur. The emission type is CW.

Mitigating Features:

The test will be inside buildings and the target will be between two aluminum walls (see Attachment 2).

Stop Buzzer

Rob Steinle, 206-662-4836 desk, 206-797-9121 pager.

James Daniels, 206-662-4842

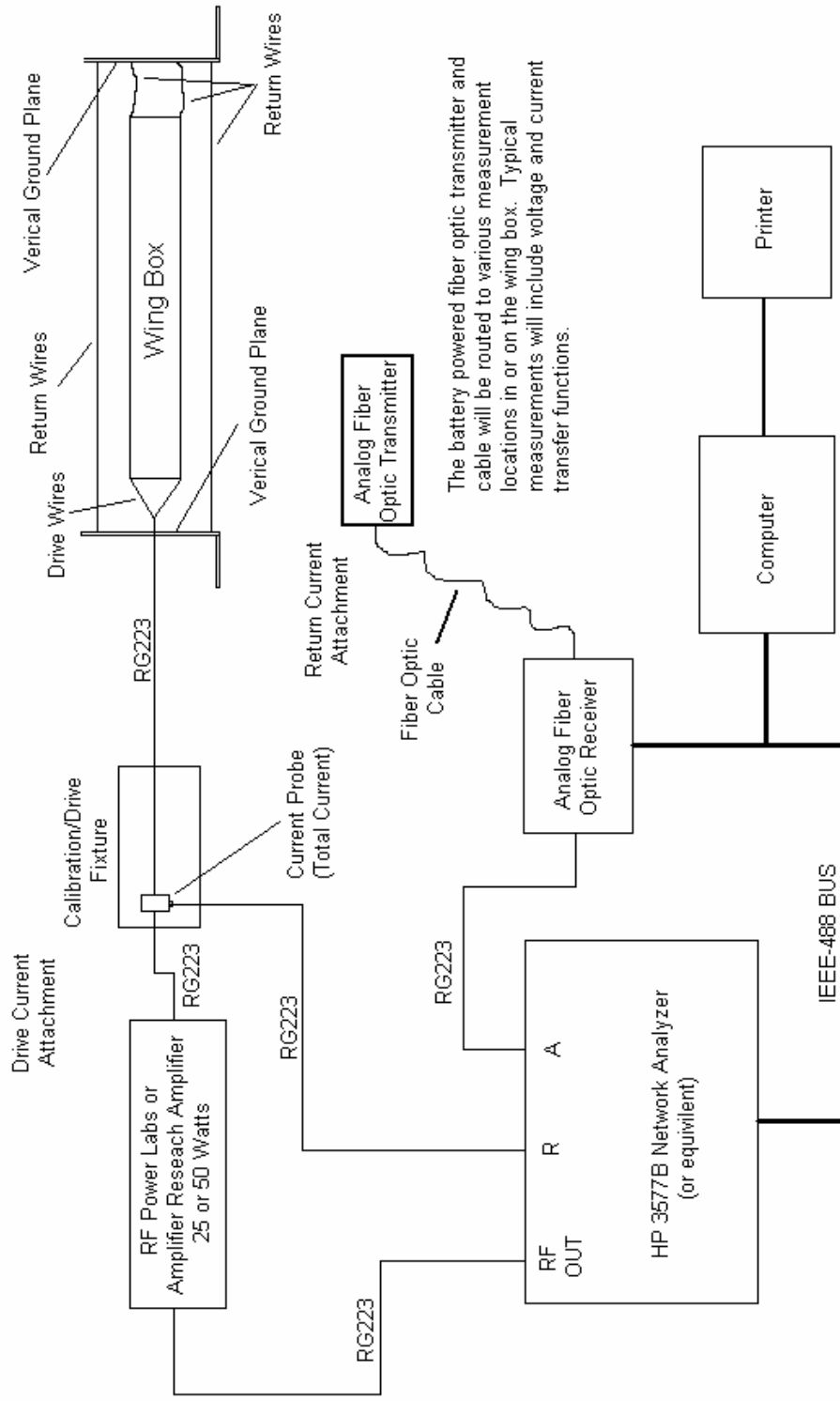
Don Dablestein, 206-655-6376

Attachment 1

Equipment List and Transmitter Locations

RF Equipment Used
RF Sources
Agilent/HP 3577B Vector Network Analyzer or equivalent
RF Amplifiers
RF Power Labs M125L 25 Watt CW Amplifier
Amplifier Research 50WD1000 50 Watt CW Amplifier
Transmitter Information
Location 1
2-122 building, Seattle, WA
Lat/Lon: N 47° 32' 03" W 122° 19' 01"
Antenna Height: Highest point on test fixture is approximately 10 feet
Location 2
2-122 building, Seattle, WA
Lat/Lon: N 47° 31' 57" W 122° 19' 00"
Antenna Height: Highest point on test fixture is approximately 10 feet

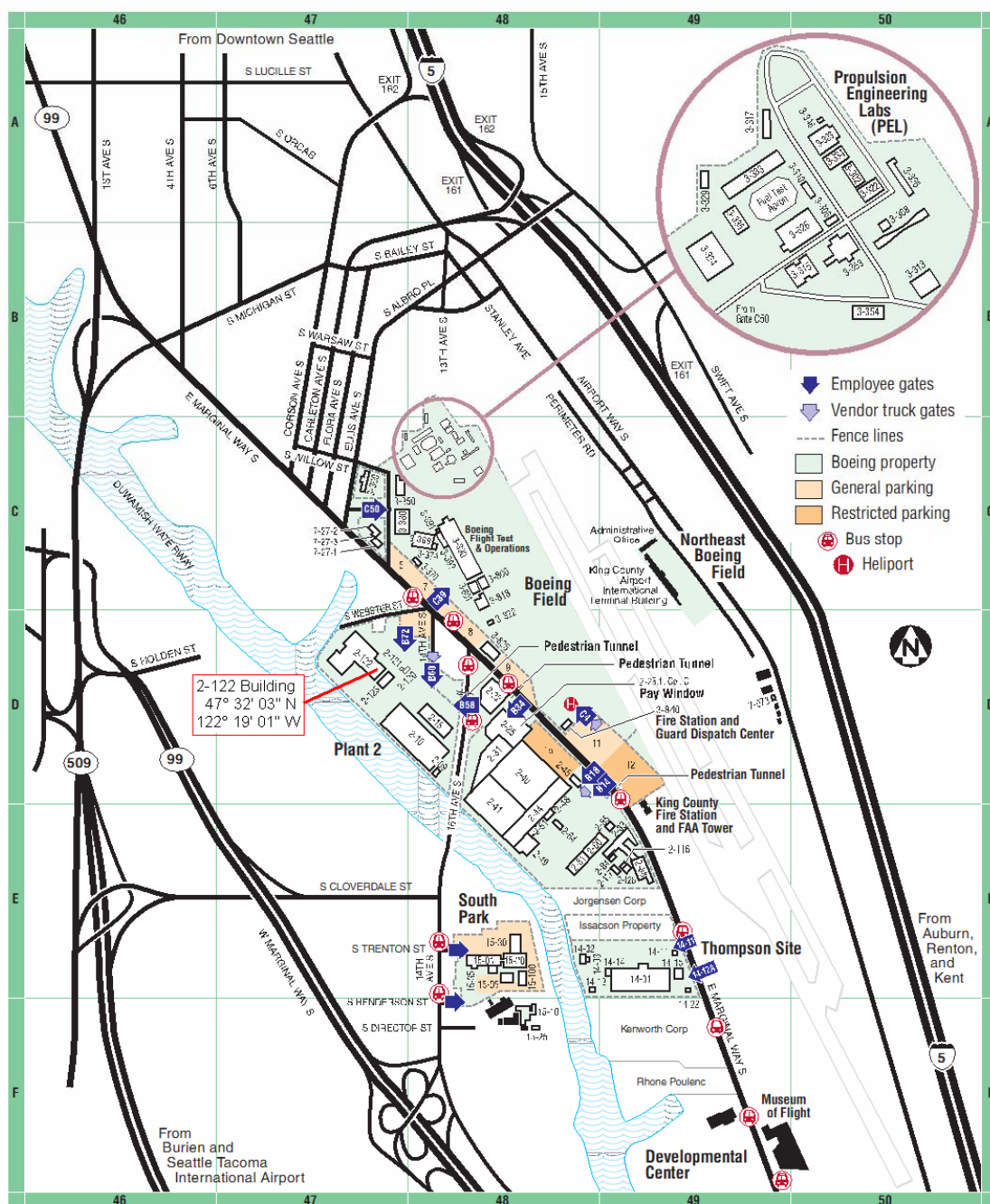
Attachment 2



Low Level CW Direct Drive Test Setup for a Wing Box Structure

Attachment 3

Washington – Plant 2/Boeing Field
7755 East Marginal Way South, Seattle, WA 98108



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