

**Auburn Range 2 (Ground Reflection Range) RF Test System
EX Information for Boeing Auburn**

**Exhibit 1 Summary
See Descriptions and Drawings for Details**

Test System	Location	Frequency Bands		Radiated Power
		Start	Stop	
Range 2	17-81 Building	30 MHz	1.232 GHz	-0.7 to -5.4 dBm

This antenna range is currently operating using STA WB9XYE 0406-EX-ST-2004, with an expiration date of Jan. 01, 2005.

The purpose of this application is to obtain a full 2-year experimental license.

Boeing calls this site the Auburn Antenna Range. Technically the site is located in Algona, WA.

STOP BUZZER INFORMATION

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Exhibit 1

Auburn Range 2 (Ground Reflection Range)

Purpose: Range 2 is an open air ground reflection antenna range used to test the operational characteristics of commercial aircraft full scale antennas or to validate aircraft antenna patterns using scale models. These tests are used to qualify new antennas or new aircraft configurations, verify manufacturing processes or evaluate repairs to damaged antennas. Antenna radiation pattern, directivity, gain, side lobes and f/b ratio are some of the parameters that can be measured. Boeing also sells antenna measurement services to non-Boeing and non-aviation related industries.

Equipment: The 17-81 building is a small cubicle used as a control room for Range 2. The transmit antenna is mounted on a 40 foot tower (ASR# 0383317 and FAA 2004-ANM-573-OE) adjacent to the 17-81 building. The transmit antenna height can be varied from approximately 6 feet to 36 feet. Antennas or model aircraft are mounted on a 25 foot high antenna positioner located at a distance of 250 feet on a bearing of 143° true from the transmit antenna. An alternate antenna positioner location is at a distance 125 feet but requires the physical relocation of the antenna positioner to be used. Low level CW signals from calibrated laboratory grade synthesized RF sources are transmitted from the transmit antenna. The transmit antenna is raised or lowered to peak the received signal by matching the phase of the direct path and reflected path signals. The desired measurements are then taken. A partially wooded wetland extends an additional 1300 feet beyond the receive antenna tower.

An equipment list, block diagram and site layout are attached.

Frequency: Full scale or scale model antennas are tested from 30 MHz to 1.2 GHz.

Power: Operation of this range with a maximum of -0.7 dBm at 30 MHz to -5.4 dBm at 1.2 GHz radiated power or 0 dBm at the RF source is requested. The RF path loss between the RF source and the transmit antenna is 0.7 to 5.4 dB minimum.

Emissions: The emissions will be CW.

Mitigation Features: A partially wooded wetland extends an additional 1300 feet beyond the receive antenna tower.

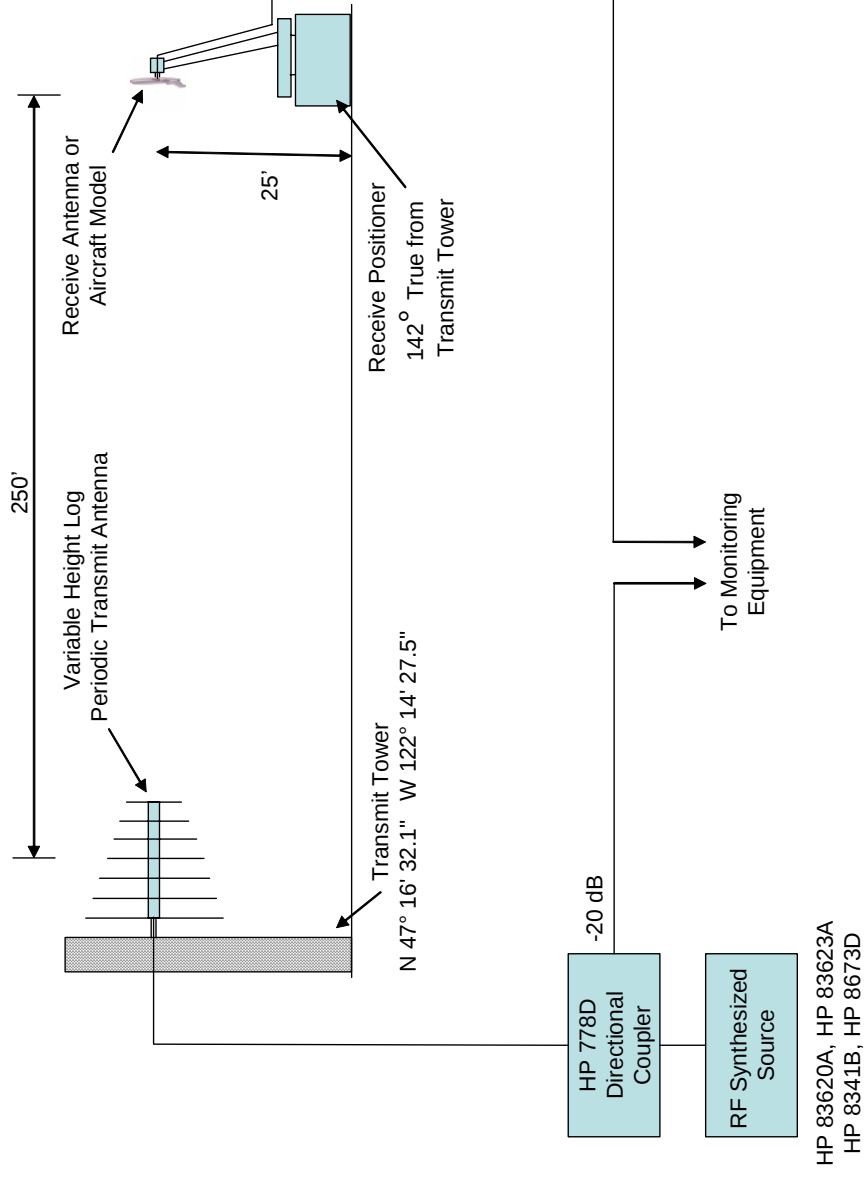
Pictures are attached.

Attachment 1

Radome 2 Equipment List

Frequency (GHz)	Efficiency	Gain (dBi)	Beam Width (Deg)	Antennas and Equipment Used on Range 2
30 MHz to 1.2 GHz	0.75	9	75	Two stacked AEL 534B Log Periodic Dipole Arrays Gain: 9 dBi Maximum Beamwidth: 75° Maximum
				Other RF Equipment Used
				RF Sources which are used interchangeably:
				Hewlett Packard 83620A (10 MHz - 20 GHz)
				Hewlett Packard 83623A (10 MHz - 20 GHz)
				Hewlett Packard 8341B (10 MHz - 20 GHz)
				Hewlett Packard 8673D (10 MHz - 26.5 GHz)
				Other Components:
				RG-214 Coaxial Cable - 60 feet
				HP 778D .1 - 2 GHz 20 dB Directional Coupler
				Transmitter Information:
				17-81 Building, Auburn, WA
				Lat/Lon: N 47° 16' 32.1" W 122° 14' 27.5"
				Antenna Height: 6 - 36 feet
				Beam Direction: 143° True
				Beam Elevation Angle: 0°
				Signal Modulation: CW
				Bandwidth: CW
				Maximum RF Source Power: 0 dBm
				Transmission Line Loss: 0.7 to 5.4 dB
				Maximum Power at Antenna Input: -0.7 to -5.4 dBm

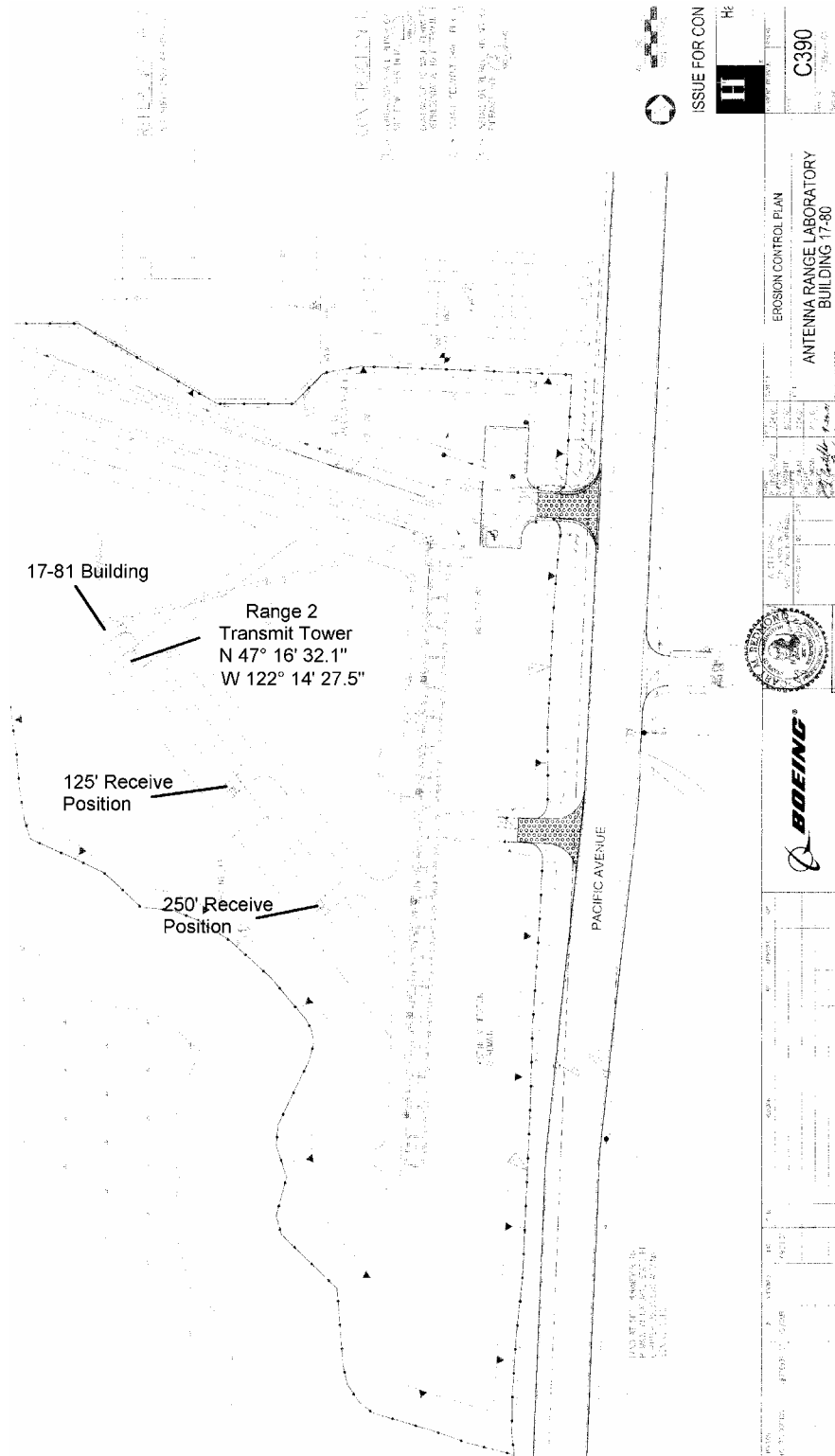
Attachment 2



Auburn Range 2 Block Diagram

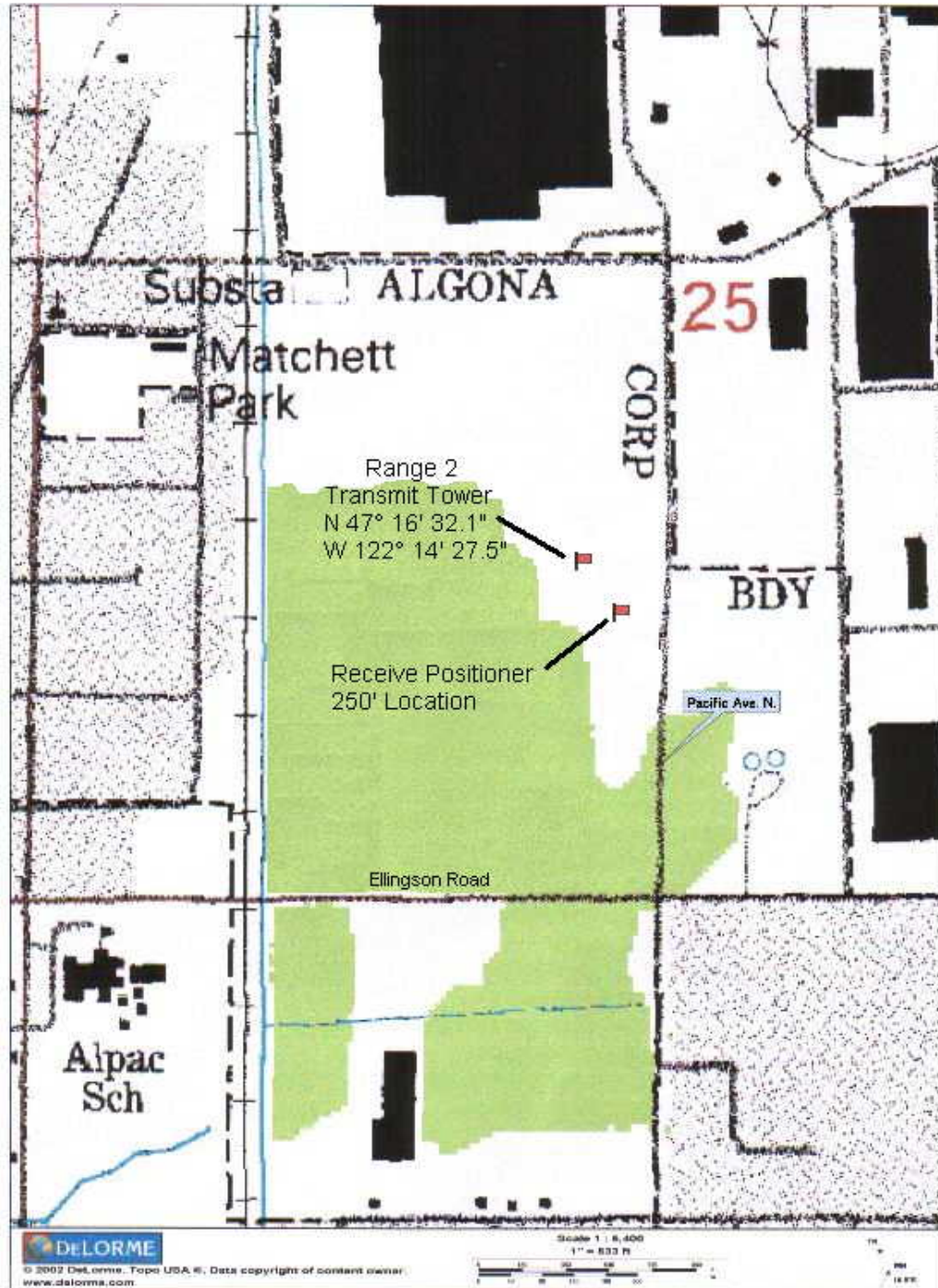
Attachment 3

Site Layout



Attachment 4

Site Map



Attachment 5

Range 2 Topography

