

Purpose of Submission: Conduct High-Altitude Balloon testing using Mobile Networked MIMO (MN-MIMO) radios in support of DoD programs. Testing supports the development of a persistent surveillance platform to combat homeland security threats, deter narcotics trafficking, and provide other national defense support. Ground station is a temporary fixed platform in place for the duration of the balloon flight only and will be used to downlink high-rate payload data from the balloon. Balloons may also relay data to other balloons in a mesh network, but at a much lower EIRP.

Three types of temporary fixed tracking antenna platforms will be used:

Antenna Characteristic	Config 1	Config 2	Config 3
Description	Dual 2-channel dish	Dual 2-channel MIMO patch	2-channel dish
Part Number	2x AirFiberX AF-2G24-S45	ITELITE PAT2319DPX2	AirFiberX AF-2G24-S45
Half-power beamwidth	13.4°	20°	13.4°
Horiz orientation	Variable, direction of flight	Variable, direction of flight	Variable, direction of flight
Vertical orientation	Variable, typ. 10-60°	Variable, typ. 10-60°	Variable, typ. 10-60°
Gain	24dBi	19dBi	24dBi

The antennas are mounted on a tracking system that points towards the balloon based on its GPS location. Typically, the antenna vertical orientation is at max (60°) shortly after launch during balloon climbout; angle decreases beneath 30° at a ground distance of about 5nm, beneath 20° at a ground distance of about 25nm, and beneath 10° at a ground distance of about 50nm.

The horizontal orientation depends on the direction of flight for that day, which varies based on customer program, time of year, and direction of winds. The max expected ground-to-airborne distance is approximately 200nm.

