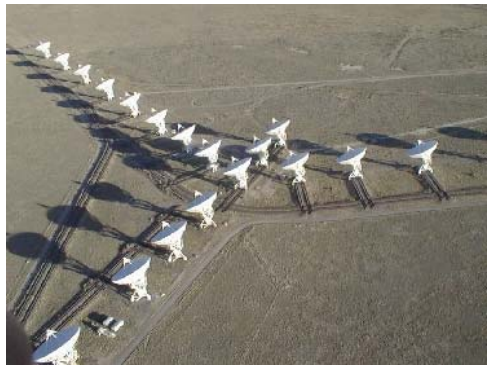

Feed & Front End PDR

System Requirements

On-Axis Efficiency

Band	Req'd	Target
1.2-2	.50	.55
2-4	.55	.60
4-8, 8-12, 12-18	.60	.65
18-26	.55	.60
26-40	.50	.55
40-50	.45-.40	.50-.45

System Temperatures

Band	Trx	Tsys*
1-2	9	20
2-4	11	25
4-8	16	31
8-12	21	34
12-18	22	35
18-26	28	52
26-40	38	56
40-50	45	76 - 104

* Above atmosphere

Polarization

- Circular polarization will be used.
- On-axis voltage axial ratios better than 0.9
  - (ellipticity better than 0.92 dB)
- On-axis LCP & RCP major axes orthogonal within 10°
- All antennas same within above tolerances.
- *Change* in axial ratio < 0.002 over 8 hour period.
- *Change* in position angle < 2° over 8 hour period.

Beam

- Beam illumination:
  - Illumination centroid to be within 10 cm of the antenna center.
- Beam Similarity:
  - Power gain variations between antennas to vary less than 1% of the peak, within the inner 6 dB of the primary beam.

Beam Similarity (phase)

- Phase variations between antennas to vary, within 3 dB beamwidth:
  - 1-2 GHz: < 0.2 degree
  - 2-4 GHz: < 0.5 degree
  - 4-8 GHz: < 1.0 degree
  - other bands: < 5 degrees

Gain Linearity

- Better than 0.5% over 15 dB range.
- 1 to 2% over “solar” range.

Delay

- Variations < 0.5 ps, up to one second.
- Mean slope < 0.2 ps per minute, up to ½ hour
  - Deviation from mean slope < 1.4 ps
- Max change 0.7 ps for change < 10°in antenna position.
  - < 0.07ps change per degree change in antenna position, for elevations < 60 degrees

Bandpass Characteristics

- Power bandpass varies < .01% per hour, for frequency ranges up to RF/1000
- Phase variations <0.01° per 1 hour for frequency ranges up to RF/1000
- Power gain slope < 3 dB over full bandwidth.

Bandpass Characteristics

Bandpass slope < 0.3 dB

Bandpass ripple <0.25 dB p-p

Phase variations < 2 degrees rms

For frequency ranges smaller than:

- 0.5 MHz in 1-2 GHz
- 1 MHz in 2-4 GHz
- 2 MHz in 4-8 and 8-12
- 4 MHz in other bands.