

## Antenna Information for Antenna Registration #1

### Directionality/Beamwidth and Orientation of Antennas

The frequencies specified at Antenna Registration #1 relate to BAE Systems' proposed ground-based transmissions to be initiated from BAE Systems' Litchfield Antenna Test Range. As discussed in greater detail at Exhibit 3, these ground-based transmissions are comprised of:

- “Ground-Based CW Transmissions”;
- “Ground-Based FM Data Transmissions”; and
- “Ground-Based Data-Link (Uplink) Transmissions”.

The following information describes the directionality, beamwidth and orientation of the antennas associated with these Ground-Based Transmissions (all below 6m):

Ground-Based CW Transmissions  
and Ground-Based FM Data Transmissions:

#### Directional Antennas

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
KMA	26500	1	-6dBi	90°	90°
SA	26-0.1	1	+8 dBi	60°	120°
SA	29-0.1	2	+8 dBi	60°	120°
SA	27-1.0/8	1	+8 dBi	9°	1.5°
SA	28-1.0/8/10	1	+8 dBi	9°	4.5°
Sanders	1/2 Horn	1	+8dBi	60-30°	N/A
Sanders	Dual Horn	1	+8dBi	60-30°	60-30°
Sanders	1/2 Horn	1	+8dBi	60-45°	N/A
Condor	AS-48461	1	+5-18 dBi	60-10°	60-10°
AEL	H-1498	1	+8-12 dBi	60-30°	60-30°
SA	28-2.0/8/10	1	+8 dBi	60-30°	60-30°

#### Non-Directional Antennas

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
Sanders	1/4Mon	4	-5.2 dBi	OMNI	N/A
Electro Metrics	EM-6924	2	+2.6 dBi	OMNI	120°
Sanders	TASES 36	2	-60 to -5dBi	OMNI	N/A
Sanders	TASES 24	2	-31.5 to +1.1 dBi	OMNI	N/A
Sanders	TASES 12	2	-10 to -5	OMNI	N/A
Sanders	Slant	1	-20 to -5	OMNI	N/A

Ground-Based Data-Link (Uplink) Transmissions:

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
TCDL	9.5	1	+26 Dbl	7°	7°

## Antenna Information for Antenna Registration #1, cont.

### Transmitting Equipment and Additional Signal Amplification

#### **Transmitting Equipment:**

Transmitters associated with Ground-Based CW Transmissions and Ground-Based FM Data Transmissions (all non-experimental):

Manufacturer	Model	Quantity
HP	HP8645A	1
HP	HP8341	1
HP	HP8643A	1
HP	HP8340B	1
HP	HP8662A	1
HP	HP8671A	1
HP	HP8753A	1
HP	HP8753D	1
HP	HP8753E	1
HP	HP8510B	1
HP	HP8510C	1
Agilent	E8257D	1

Transmitters associated with Ground-Based Data Link (Uplink) Transmissions:

Manufacturer	Model	Quantity
TDL Control	TDLCLT	1

#### **Additional Signal Amplification:**

Additional signal amplification may be utilized as follows:

Ground-Based CW Transmissions and Ground-Based FM Data Transmissions:

Power Amplifiers	Model	Frequency Band	Power Output	Quantity
OPHIR	5163	.8GHz-4.2GHz	50W	1
OPHIR	5162	20-10000 MHz	50W	1
OPHIR	5127	20-1000 MHz	250W	1
OPHIR	5069	.5MHz to 500MHz	8W	1
OPHIR	5094	1MHz to 1000MHz	3W	1
OPHIR	5160	.8GHz to 4.2GHz	7W	1
CPI	VZV-2776K4/K6	4.0GHz to 18GHz	25W	1
ENI	510L	1.7MHz to 500MHz	9.5W	1
ENI	603L	.8 MHz to 1000MHz	3W	1

Amplification for Ground-Based Data Link (Uplink) Transmissions:

Power Amplifiers	Model	Frequency Band	Power Output	Quantity
TCDL	5W	14.4-15.35 GHz	5W	1

## Antenna Information for Antenna Registration #2

### Antenna Information (Air-Based Data Link (Downlink) Transmissions):

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
TCDL	SN09	1	3.5 dBi	OMNI	NA

### Transmitting Equipment and Additional Signal Amplification

#### Transmitting Equipment:

Transmitters associated with the Air-Based Data Link (Downlink) Transmissions (non-experimental):

Manufacturer	Model	Quantity
TDLC Control	TDLCLT	1

#### Additional Signal Amplification:

Amplification for Ground-Based Data-Link (Uplink) Transmissions:

Power Amplifiers	Model	Frequency Band	Power Output	Quantity
TCDL	5W	14.4-15.35 GHz	5W	1