*C-, X-, or Ku-Band Capabilities*

# 4.5 Meter Earth Station Antennas

Now communications system integrators and designers can bring their systems on line faster, more economically, and with superior performance with the Andrew 4.5-meter Earth Station Antenna (ESA). In use around the world in high-density data, voice, communications networks, and broadcast applications, the Andrew 4.5-meter ESA features an exclusively designed 2- or 4-port prime focus, beam-shaping feed and ground plane configuration. This combination provides extremely accurate surface contour, exceptionally high gain, superior efficiency, and closely controlled pattern characteristics. The antenna is versatile, and can be configured for transmit/receive as well as receive-only, and for either linearly- or circularly-polarized C-Band, linearly-polarized Ku-Band, Hybrid C-/Ku-Band, or X-Band operation. Both pedestal and tripod mount types are available (motorization for pedestal only).

Andrew 4.5-meter ESAs feature exceptionally easy and accurate assembly. When using our optional hoisting kit no crane is necessary for installation. Additionally, the main reflector requires no special field alignment.

Andrew ESAs provide maximum durability with minimal maintenance. The hot-dipped galvanized steel ground mount assembly ensures extended product life. Galvanized and stainless steel hardware maximize corrosion resistance. For cost effective system expansion, available modular equipment options include anti-icing equipment and pressurization systems. Microprocessor steptrack control and motorizable mount options are also available.

**Features:**

- High Gain, Excellent Pattern Characteristics
- Main Reflector—No special Field Alignment
- 3-year Warranty on All Structural Components

**Compliances:**

- INTELSAT E-2, E-1, F-1,G
- U.S. FCC regulation 25.209
- ITU-R, S.580-4 and S.465-5
- Approved for use in the territory of Russia by the Ministry of Communications of the Russian Federation (Reference: Homologation Certificate No OC/I-A -ϕ-1)

ANDREW®

## Electrical

**Operating Frequency Band**

| | |
|---|---|
| ***C-Band Receive*** | 3.400-4.2 GHz |
| ***C-Band Transmit*** | 5.850-6.725 GHz |
| ***X-Band Receive*** | 7.25-7.75 GHz |
| ***X-Band Transmit*** | 7.90-8.40 GHz |
| ***Ku-Band Receive*** | 10.7-13.25 GHz |
| ***Ku-Band Transmit*** | 13.75-14.8 GHz |

**Gain, with two port linear combiner (dBi, ±0.2 dB)**

| *Rx Frequency* | *Rx Gain* | *Tx Frequency* | *Tx Gain* |
|---|---|---|---|
| 3.400 GHz | 42.4 | 5.850 GHz | 46.0 |
| 3.625 GHz | 42.8 | 6.175 GHz | 46.3 |
| 4.000 GHz | 43.9 | 6.425 GHz | 46.6 |
| 4.200 GHz | 44.2 | 6.725 GHz | 47.0 |
| 7.250 GHz | 48.4 | 7.90 GHz | 49.2 |
| 7.500 GHz | 48.7 | 8.15 GHz | 49.5 |
| 7.750 GHz | 49.0 | 8.40 GHz | 49.8 |
| 10.700 GHz | 51.4 | 13.75 GHz | 53.2 |
| 10.950 GHz | 51.6 | 14.00 GHz | 53.4 |
| 11.950 GHz | 52.4 | 14.25 GHz | 53.6 |
| 12.750 GHz | 52.9 | 14.50 GHz | 53.7 |
| 13.25 GHz | 53.2 | 14.80 GHz | 53.8 |

**Polarization**
Linearly- or Circularly-Polarized

**Polarization Discrimination, (Linearly-Polarized):**
>35 dB on axis

**Voltage Axial Ratio,** C-Band, circularly-polarized with 2-port combiner
C-Band, <1.09:1 on axis,Tx
<1.20:1 on axis, Rx
X-Band, <1.20:1 on axis, Tx and Rx

| **Beamwidth, Mid-band, Degrees** | **C-Band** | **X-Band** | **Ku-Band** |
|---|---|---|---|
| ***3 dB Receive (Transmit)*** | 1.22 (0.85) | 0.66 (0.61) | 0.40 (0.85) |
| ***15 dB Receive (Transmit)*** | 2.47 (1.90) | 1.40 (1.29) | 0.84 (0.67) |

**Antenna Noise Temperature -** under clear sky conditions, at 68°F (20°C), at the circular waveguide flange of the feed.

| *Elevation* | *Kelvin (C-Band)* | *Kelvin (X-Band)* | *Kelvin (Ku-Band)* |
|---|---|---|---|
| 10° | 44 | 45 | 53 |
| 30° | 32 | 34 | 41 |
| 50° | 28 | 29 | 38 |

**Antenna VSWR, Transmit and Receive <1.3:1**

## Typical Shipping Information

| | |
|---|---|
| **Shipping weight, typical** | |
| ***4.5m (P, MP, MPJ Types)*** | 6000 lb |
| ***4.5m (T Types) Tripod*** | 5600 lb |
| **Shipping Volume (typical)** | 690 ft³ (19.5m³) |
| **Shipping Container** | |
| ***4.5m (P, MP, MPJ Types)*** | |
| Quantity 2 | Standard 20 ft land/sea container |
| Quantity 4 | Standard 40 ft land/sea container |
| ***4.5m (T Types)*** | |
| Quantity 2 | Standard 20 ft land/sea container |
| Quantity 4 | Standard 40 ft land/sea container |

## G/T Performance (C-Band)

| | | | |
|---|---|---|---|
| **LNA/LNB Noise Temperature** | 65K | 45K | 30K |
| **ES45 G/T at 10° EL (dB/K)** | 23.4 | 24.3 | 25.0 |

Based on a 2-port, linearly-polarized antenna configuration at 4 GHz and at 10° elevation under clear sky conditions.

## G/T Performance (X-Band)

| | | | |
|---|---|---|---|
| **LNA/LNB Noise Temperature** | 50K | 75K | 100K |
| **ES45 G/T at 10° EL (dB/K)** | 28.1 | 27.2 | 26.5 |

Based on a 2-port, linearly-polarized antenna configuration at 7.50 GHz and at 10° elevation under clear sky conditions.

## G/T Performance (Ku-Band)

| | | | |
|---|---|---|---|
| **LNA/LNB Noise Temperature** | 165K | 125K | 90K |
| **ES45 G/T at 10° EL (dB/K)** | 29.1 | 29.9 | 30.8 |

Based on a 2-port, linearly-polarized antenna configuration at 12 GHz and at 10° elevation under clear sky conditions.

## Uplink EIRP Capability (C-Band)

| | | | |
|---|---|---|---|
| **HPA Output (Watts)** | 25 | 125 | 500 |
| **Uplink EIRP (dBW)** | 60.5 | 67.5 | 73.5 |

Based on a 2-port antenna configuration at 6.175 GHz and 0 dB allowance for waveguide (IFL) loss between the HPA and the antenna.

## Uplink EIRP Capability (X-Band)

| | | | |
|---|---|---|---|
| **HPA Output (Watts)** | 25 | 100 | 400 |
| **Uplink EIRP (dBW)** | 63.3 | 69.3 | 75.3 |

Based on a 2-port antenna configuration at 8.15 GHz and 0 dB allowance for waveguide (IFL) loss between the HPA and the antenna.

## Uplink EIRP Capability (Ku-Band)

| | | | |
|---|---|---|---|
| **HPA Output (Watts)** | 25 | 125 | 500 |
| **Uplink EIRP (dBW)** | 60.5 | 67.5 | 73.5 |

Based on a 2-port antenna configuration at 14.25 GHz and 0 dB allowance for waveguide (IFL) loss between the HPA and the antenna.

## Mechanical

| | |
|---|---|
| **Feed Type** | Prime Focus |
| **Reflector Material** | Precision-Formed Aluminum |
| **Reflector Segments** | 6 |
| **Mount Type** | El over AZ, Manual Tripod or Pedestal |
| **Antenna Pointing Range,** Pedestal Mount Coarse/(Continuous) | |
| ***Elevation*** | 0-90° (90°) |
| ***Azimuth*** | 180° (120°) |
| **Antenna Pointing Range,** Tripod Mount Coarse/(Continuous) | |
| ***Elevation (Standard)*** | 2-62° (15°) |
| ***Elevation (Extended)*** | 33-90° (15°) optional |
| ***Azimuth*** | 164° (15°) |
| **Wind Loading, Survival** | |
| 125 mph (200 km/h) in any position of operation | |
| **Wind Loading, Operational (Pedestal motorized)** | |
| 45 mph (72 km/h), gusting to 65 mph (105 km/h) (motor drives) | |
| **Temperature, Operational** | -40° to 125°F (-40° to 52°C) |
| **Rain** | 4 in (102 mm) per hour |
| **Solar Radiation** | 360 BTU/hr/ft² (1135 Watts/m²) |
| **Relative Humidity** | 100% |
| **Shock and Vibration** | As encountered by commercial air, rail and truck shipment |
| **Atmospheric Conditions** | Moderate coastal/industrial areas. Severe conditions require additional protection. |

## Pedestal/Tripod Slab Foundation Information

| | |
|---|---|
| **Soil Bearing Capacity** | 2000 lb/ft² (9770 kg/m²) |
| **Reinforcing Steel** | 284 lb (129 kg) |
| **Concrete Compressive Strength** | 3000 lb/in² (211 kg/cm²) |
| **Foundation Size:** | |
| ***Length*** | 10.0 ft (3.05 m) |
| ***Width*** | 10.0 ft (3.05 m) |
| ***Depth*** | 1.5 ft (0.5 m) |
| **Concrete Volume** | 5.56 yd³ (4.25 m³) |

Note: Other typical foundation designs are available.

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