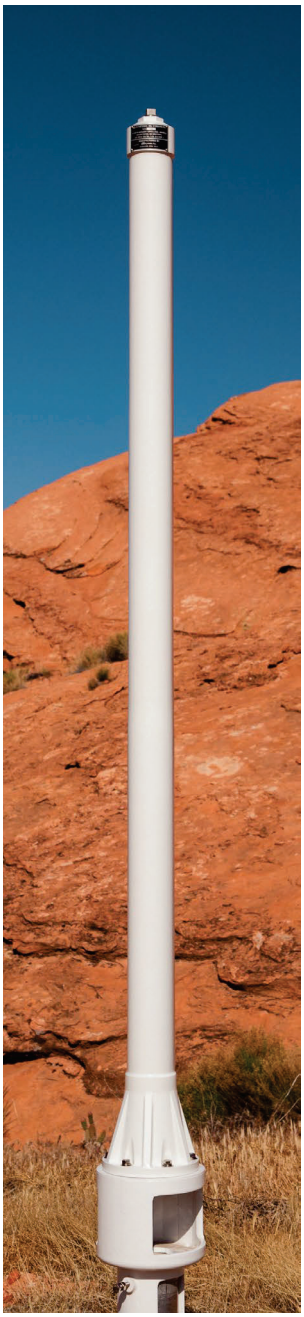
dB Systems Inc.

2501 S. Antenna Avenue
Hurricane, Utah 84737 USA

SPECIFICATION SHEET

DME ANTENNA, UNI-DIRECTIONAL
MODEL dBs 5100A-HS/210º

dBs PART NUMBER 500300-108
APPROVED FOR USE BY FAA UNDER FAR PART 171



The dBs 5100A-HS/210º is a uni-directional broadband, 10 element, higher performance, collinear dipole phased array designed specifically for use as a Distance Measuring Equipment (DME) antenna. It includes a high strength radome capable of surviving 180 mph wind loads. It exhibits very low side lobe levels and negative angle radiation (minimizes multipath). The above-the-horizon null-filled pattern minimizes the radiated cone of silence. The antenna handles input power to 5,000 watts at standard DME pulse duty cycle and operates over its entire frequency range with an input VSWR at 50 Ω of less than 2.5:1.

This antenna exhibits the same vertical pattern as the dBs 5100A; however, the horizontal pattern has been modified to produce an additional 6 dB gain on one side of the pattern as compared to the other side. This type of pattern is very useful in areas where twice the range is needed on one side of the antenna. This horizontal beam shaping is accomplished via integral reflecting elements embedded in the oblong section of the radome.

This antenna provides vertically polarized, uni-directional coverage with the main beam of radiation tilted upward to minimize the effects of ground reflections. The array has two integral monitor probes which constantly sample the RF signal delivered to the antenna.

The array is enclosed and effectively weatherproofed within a lightweight, small diameter, filament wound, and ground smooth fiberglass radome for prolonged trouble-free use under severe environmental conditions. Mounting is made by means of an integral base flange with 6 each mounting bolt holes. All RF input/output ports are type N receptacles.

Obstruction light power is fed through the array and provision is made for mounting an obstruction light and/or lightning arrestor at the top of the array. Lightning rod kit, obstruction light, pipe adapter (with or without cover), and plate adapter are available option items.

The model dBs 5100A-HS/210° DME antenna has been designed for ruggedness, lightweight, minimum size, long life, and in accordance with FAA-E2754 and FAA-G-2100. Exceeds requirements of the UK CAA specification.

dBs 5100A-HS/210º with Marine Option (P/N: 500300-128): The dBs 5100A-HS/210º with Marine option is available upon request. The RF transmission assembly is completely sealed and weatherproofed to protect in harsh environments such as salt water, extreme humidity, wind, sand, snow, and ice. Contact our factory for more details.

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DME ANTENNA, OMNI-DIRECTIONAL

Model dBs 5100A-HS/210º
dBs PART NUMBER 500300-108

SPECIFICATIONS/CHARACTERISTICS

TYPE: Uni-Directional

CIRCULARITY: 210º Nominal HPBW – Reflecting element located within radome unit. Front-to-back ratio ~6 dB.

FREQUENCY RANGE: 962 through 1213 MHz (no adjustments or tuning required)

ARRAY: 10 active radiator assemblies (77.8” tall)

POLARIZATION: Vertically Polarized

GAIN, MAIN BEAM: >12 dB/iso, minimum

GAIN, HORIZON: >9 dB/iso, minimum

MAIN BEAM ELEVATION LOCATION: Between 3º ± 1º above horizon

SLOPE (VICINITY OF HORIZON): 1 dB/º (0.1v/v/º) minimum

POWER HANDLING CAPABILITY: Up to at least 5 KW peak RF power at 3% duty cycle

IMPEDANCE: 50 Ω nominal

VSWR: Not greater than 2.5:1 (962-1213 MHz) measured at end of low loss cable not exceeding 5 feet in length.

SIZE: 80” long, 10 radiator assemblies (driven elements) plus an RF choke assembly at each end, 3 1/4” O.D. radome. Has top cap and base flange.

WEIGHT: 25 lbs. (excluding obstruction light, lightning rod assembly, and mounting fixtures)

PHYSICAL DESIGN: A metal tube, 1.5” O.D. x 1.43” I.D. (0.035” wall thickness) runs through center of antenna for full length. RF transmission lines are located within this tube. Tube also used as lightning down conductor.

WEATHER PROOFING: Entire antenna, including all cable connectors, is weather proofed such that removal/replacement of radome is possible without sealing compounds. Antenna has a guarantee of water resistance IP5, so long as antenna is mounted vertically with Pipe Adapter and Stainless Steel Cover.

ANTENNA MOUNTING: The configuration of the antenna base is such that the antenna can be mounted directly or indirectly through use of optional adapter(s).

WIND LOADING: Withstands without damage 180 mph gusts. Has ruggedized radome and base.

MONITOR PORTS: Two coupling ports for monitoring the signal radiated by the antenna. Located within the radome. 50 Ω nominal impedance. Probe output level is 25 dB ± 1 dB (for J2 and J3) below power level applied to main RF input connector.

CONNECTOR RF: Type N Female

OPTIONAL ITEMS:

- **OBSTRUCTION LIGHT:** Optional, red dual lamp obstruction light fixture with two red globe covers. Connector is MS-3112E8- (P/N 510600-102: 9.38" H x 14.75" W x 4.62" D @ 4.6 LBS.)
- **LIGHTNING ROD ASSEMBLY:** Optional, air terminal and bracket, powder coat painted white, aluminum (P/N 510625-100: Rod 18” L x 0.5” Dia @ 6 oz. Bracket 4.5” L x 2.5” W x 0.75” H @ 1 lb.)
- **PIPE ADAPTER:** Optional, solid cast aluminum (A356-T6) Powder coat painted white. Adapts 4” O.D. pipe to antenna base (P/N 510500-100: 12” H x 8” Dia @ 8.3 lbs.)
- **COVER FOR PIPE ADAPTER:** Optional, Stainless Steel, protects connector area from environment (P/N 510490-100: 25.5” L x 5” H @ 1.5 lbs.)
- **PLATE ADAPTER:** Optional, interfaces with pipe adapter for mounting antenna to building side, steel weldment, powder coat painted white (P/N 510460-100: 12” x 12” with 18” L, 4” O.D. pipe @ 37.5 lbs.)

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DME ANTENNA, OMNI-DIRECTIONAL

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dBs PART NUMBER 500300-108

SPECIFICATIONS/CHARACTERISTICS

ENVIRONMENTAL NON-OPERATING SPECIFICATIONS:

- **Temperature:** Withstands a temperature range of -50°C to +71°C.
- **Altitude:** Withstands atmospheric pressure of 575 to 1025 mbar (equivalent to approximately 15,000 feet above sea level in a standard atmosphere down to approximately 300 feet below sea level).
- **Vibration:** Will not be damaged when subjected to the vibrations listed in Table 514.8C-I, Method 514.8 Annex C of MIL-STD-810, and the exposure durations provided in Annex C paragraph 2.1.4.
- **Shock:** Will not be damaged when subjected to the mechanically induced shock as specified in Method 516.8, Procedure II of MIL-STD-810.

ENVIRONMENTAL OPERATING CONDITIONS:

- **Outdoor Temperature:** Operates in the temperature range of -50°C to +71°C.
- **Rain:** Operates while exposed to wind-blown rain, at a rate of 1.7 mm/minute (4 inches/hour), and up to 18 m/s (40 mph) blowing wind.
- **Altitude:** Operates over the atmospheric pressure range of 700 to 1025 mbar (equivalent to approximately 10,000 feet above sea level in a standard atmosphere down to approximately 300 feet below sea level).
- **Ice Loading:** In operation, withstands without damage 180 mile per hour gusts and ice loading of up to 1/2" radial ice.
- **Humidity:** Operates within a relative humidity range from 5% to 100% when the temperature is 40°C or less. Above 40°C, operates with a relative humidity based upon a dew point of 40°C.
- **Fine Sand (Dust):** Impervious to sand and dust intrusion. In operation, withstands sand/dust concentrations up to 1 g/m3, particle size up to 20 micrometers, max speed 20m/s.

VERTICAL FIELD PATTERN:

- The radiation pattern of the antenna in the vertical plane has a lobe of energy not less than 6 degrees wide at the half-power beam width (HPBW), 3 dB down from the mian lobe maximum gain (0.707 Volts).
- The vertical angle of the maximum radiated energy, the main lobe maximum gain, is between 2.0 degrees and 5.0 degrees above the horizon.
- The gain on the horizon is at least 2 dBi.
- The relative gain at angles between 6 and 60 degrees below the horizon does not exceed 14 dB (0.2 Volts) down from the main lobe maximum gain.
- The slope of the main beam, the signal level rate of change, is greater than or equal to 0.10 V/V/degree from 1.0 degree below the horizon to 1.0 degree above the horizon. When the vertical pattern is normalized to 1 volt.
- The relative gain at angles between 6 and 15 degrees above the horizon is greater than 14 dB (0.2 Volts) below the main lobe maximum gain, peak of the major lobe, above the horizon.
- The relative gain at angles between 15 and 40 degrees above the horizon is greater than a level that is 20 dB (0.1 Volts) below the main lobe maximum gain, peak of the major lobe, above the horizon.
- The relative gain at angles between 40 and 60 degrees above the horizon is greater than 30 dB (0.032 Volts) below the main lobe maximum gain, peak of the major lobe, above the horizon.

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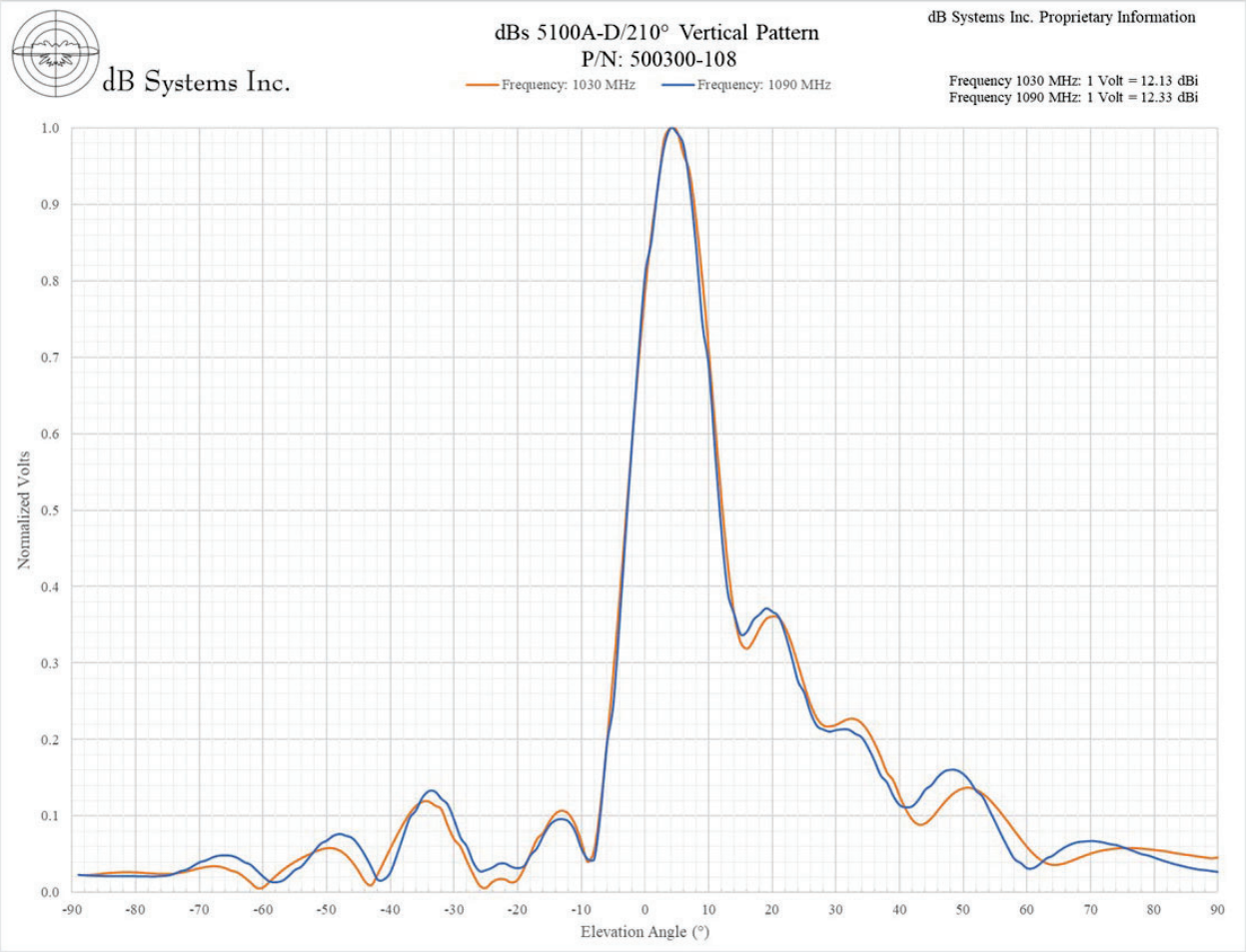
dBs 5100A-HS/210º Vertical Pattern



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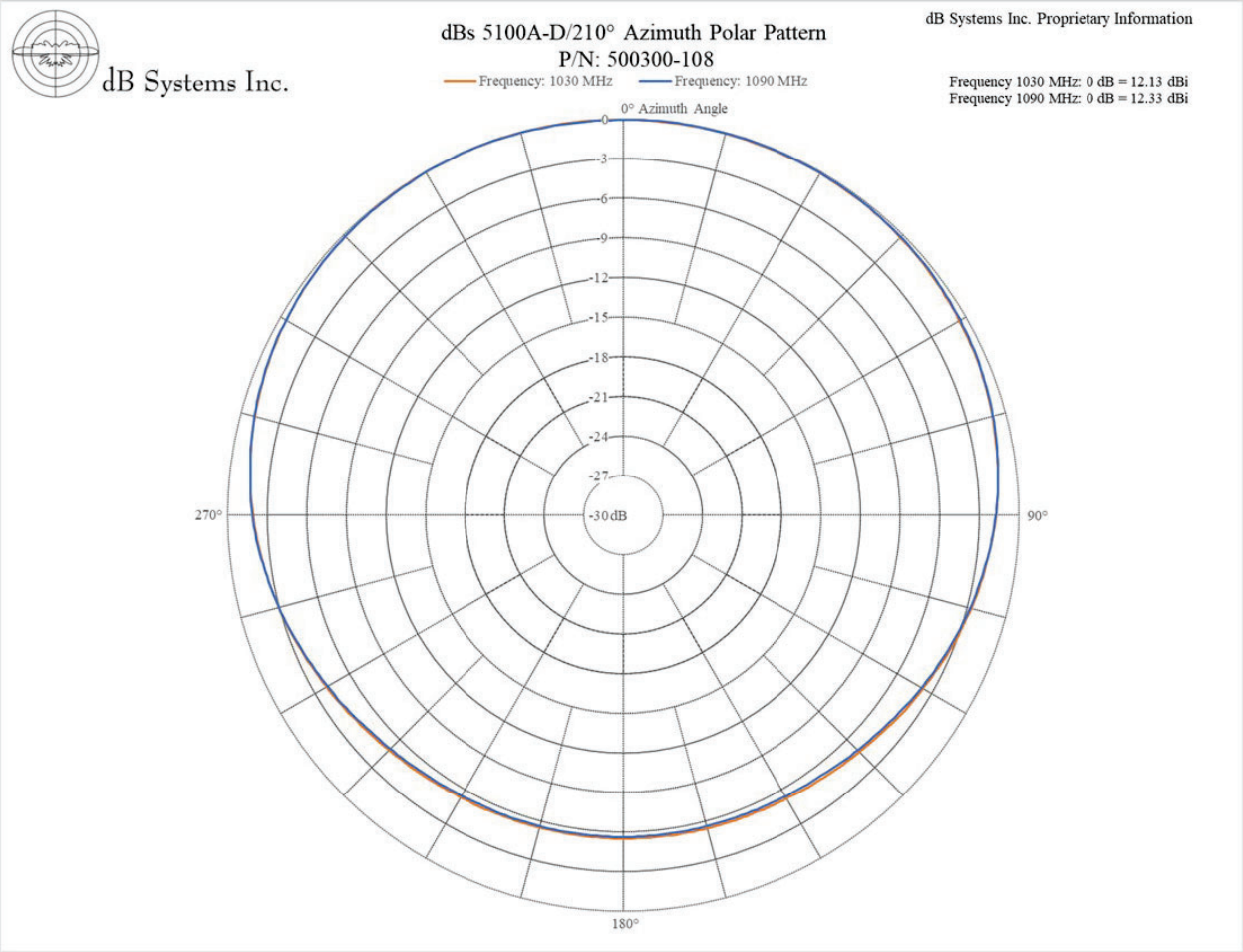
dBs 5100A-HS/210º Horizontal Pattern



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