A Textron Company

October 8, 2021

Federal Communications Commission
445 12th Street SW
Washington, DC 20554
(316) 821-9516

Title: Bell Textron STA License Request for Test & Evaluation of Airborne Video Downlink Transmission Hardware.

Dear FCC,

This request for Special Temporary Authority (STA) is submitted pursuant to 47 CFR 5.61 to request authorization to perform a series of flight tests for the purpose of evaluating video downlink transmission hardware from Domo Tactical Communications (DTC). Transmitting hardware under evaluation consists of an airborne transmitter (DTC Sol7) as well as a relay station (DTC Sol7MRRRTR) for extended range from ground-based receive station. This testing is for the sole purpose of evaluating the performance of the DTC hardware.

Location:

Sierra Blanca, HUDSPETH county, Texas
Maximum Flight Altitude: 12,000 feet AGL
MIRAD: 10 miles (16 KM) – center point (31°17'38.2"N 105°26'14.8"W)

Project detailed in attachment 1.

Dates of operation: Two month starting 11/01/2021 to01/01/2022

Frequency:

Airborne mobile:	2.43 GHz, Emission designator – 8M60M0D
Relay fixed:	2.12 GHz, Emission designator – 8M60M0D

Stop Buzzer Contact:

Bell Data Operations
Bell Textron
(817) 280-4862

Kind Regards,

Mark Stoufflet
Bell Frequency Coordinator

Post Office Box 482
Fort Worth, Texas 76101
Tel: 817 280 4862

Test Objective:

The STA request supports the evaluation of DTC video downlink hardware as well as a DTC relay station for extend range.

Concept of Operation:

Figure 1 shows an overall map view of the testing area including the ground-base station, relay station, intended flight path and the west end of the flight path. This area is located just north of Sierra Blanca, Texas in Hudspeth county. Bell has coordinated with landowner for testing in this area.

Figure 1: Map View of Testing Area Showing Intended Flight Path and Ground-Base Station

Figure 2 shows the requested operational area covered by the FCC STA. This area is centered around the relay station and extends out a radius of 10 miles (16 km) in all directions. However, the flight path is intended to be along the indicated line in figure 1.

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Figure 2: Area of Operation. 10 mile (16 km) radius around center point 31°17'38.2"N 105°26'14.8"W

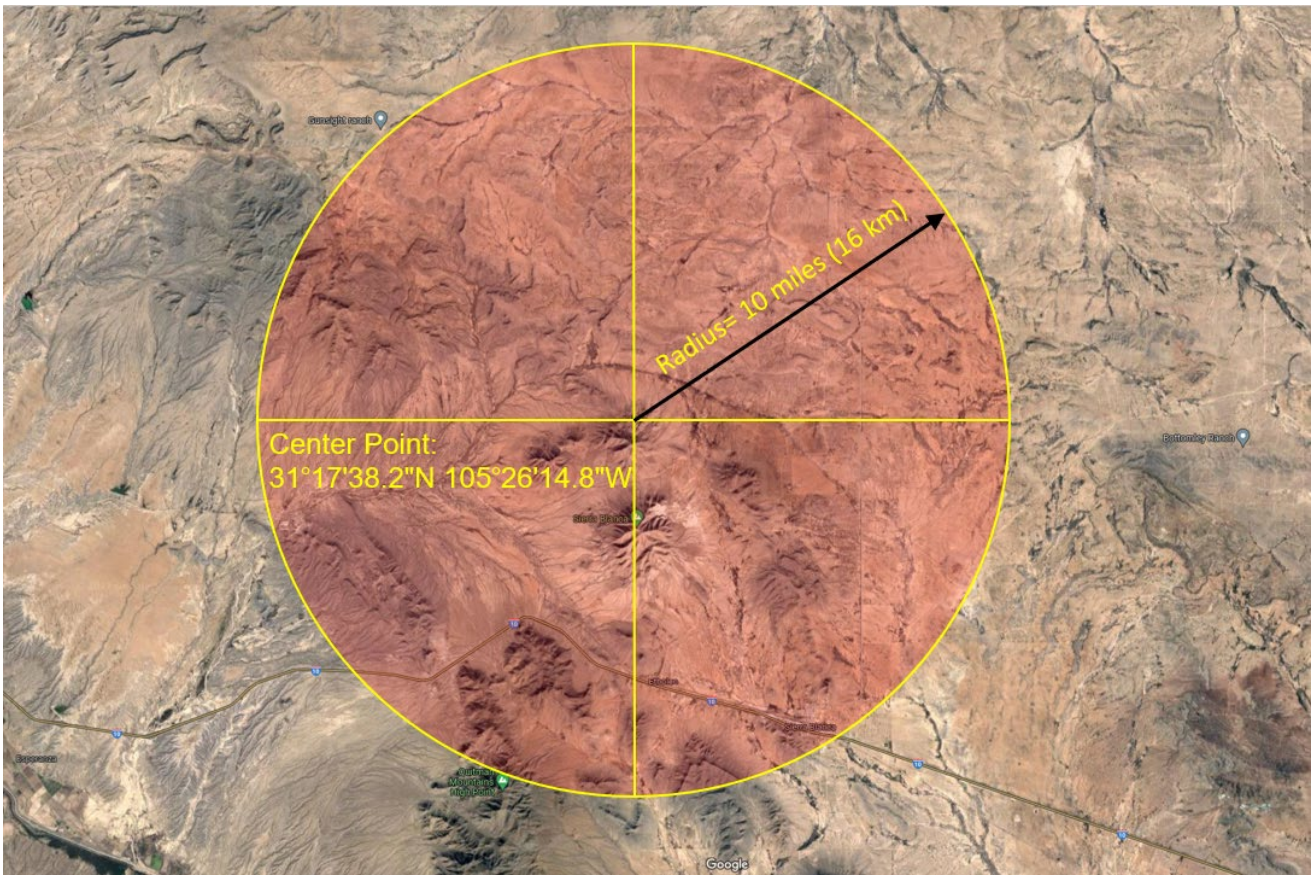

Figure 3 shows the ground elevation of the ground along the intended flight path. This arrangement provides the necessary test conditions to evaluate both the DTC video downlink as well as the relay station. The relay station will be located around the highest elevation shown in the sectional plot. The central peak in elevation and low height of the aircraft at the western point will provide blockage of direct line-of-sight with the ground-based station, relying on the relay station to provide the link. Performance of the DTC hardware will be evaluated throughout the entire flight process.

The aircraft will launch from the airstrip at the ground-based station after verifying the video system is working. Traveling west, toward the west end point, the aircraft will be transmitting video on 2.43 GHz. The aircraft transmission will be received by both the ground-based station as well as the relay station assuming they are within line-of-sight of the aircraft. Simultaneously, the relay station will be transmitting on 2.12 GHz to the ground-based station which can receive both the airborne transmission of 2.43 GHz and the relay station of 2.12 GHz. As the aircraft continues west toward the observation point, it will no longer be within line-of-sight with the ground-based station and the relay station will provided the means for relaying the video to the ground-based station. This event is only for the purpose of testing the performance of the airborne video downlink and video relay link hardware. Figure 4 shows the relationship between the transmit and receive units. Note that the airborne DTC SOL7 transmitter is a 2x2 MIMO and so it has two antennas.

As requested, there is natural terrain formation that in the opinion of the author will provide some attenuation/containment of the transmissions. Geographically, this is shown in Figure 5.

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Figure 3: Ground Elevation Along Intended Flight Path

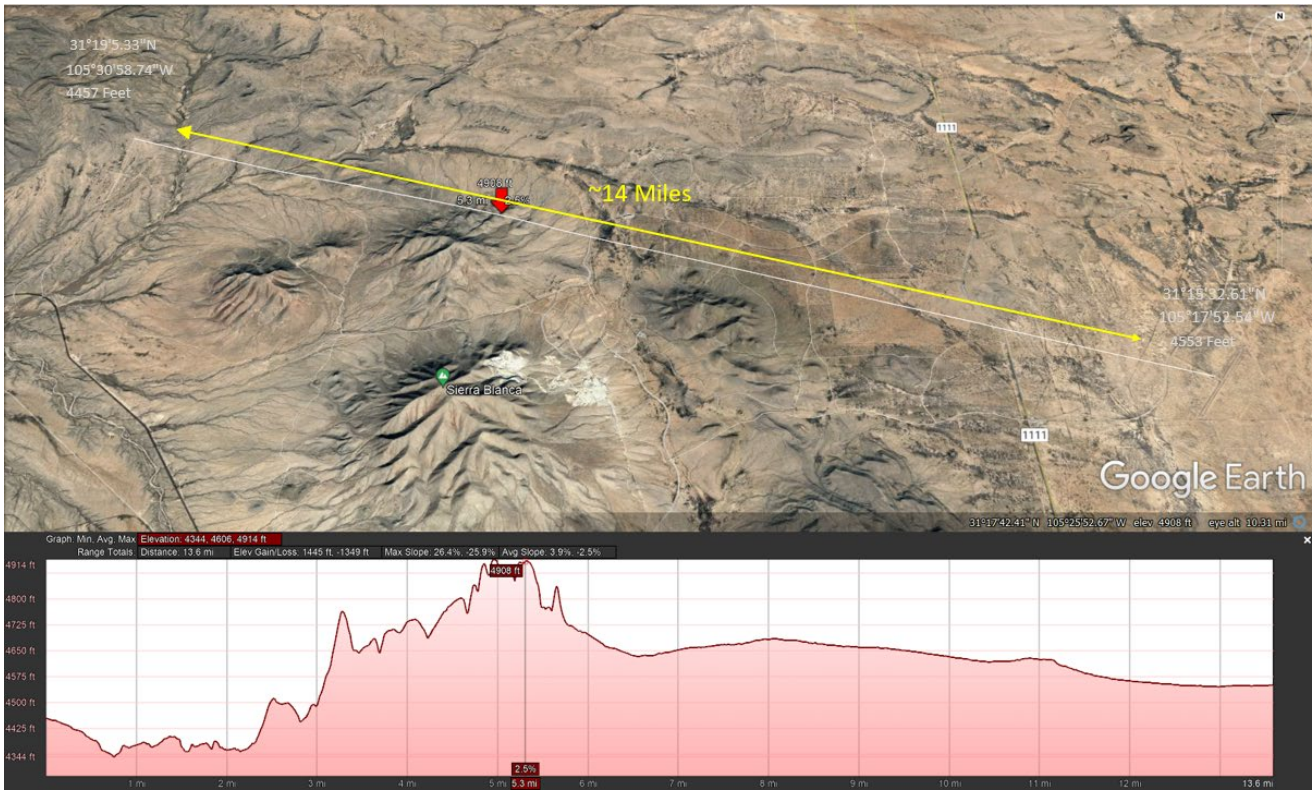

Figure 4: Relationship Between Transmit and Receive Units

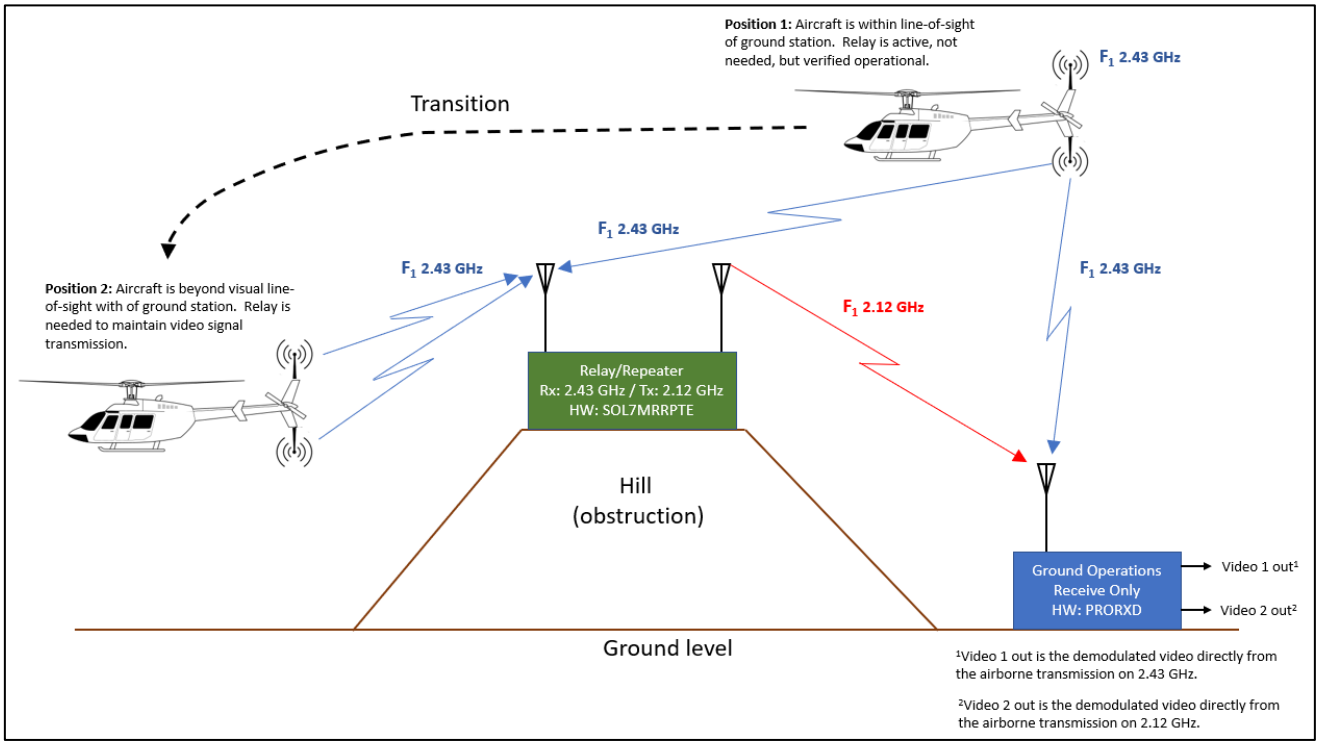

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Figure 5: Natural Terrain Formation Provides RF Attenuation In Areas Indicated in Red

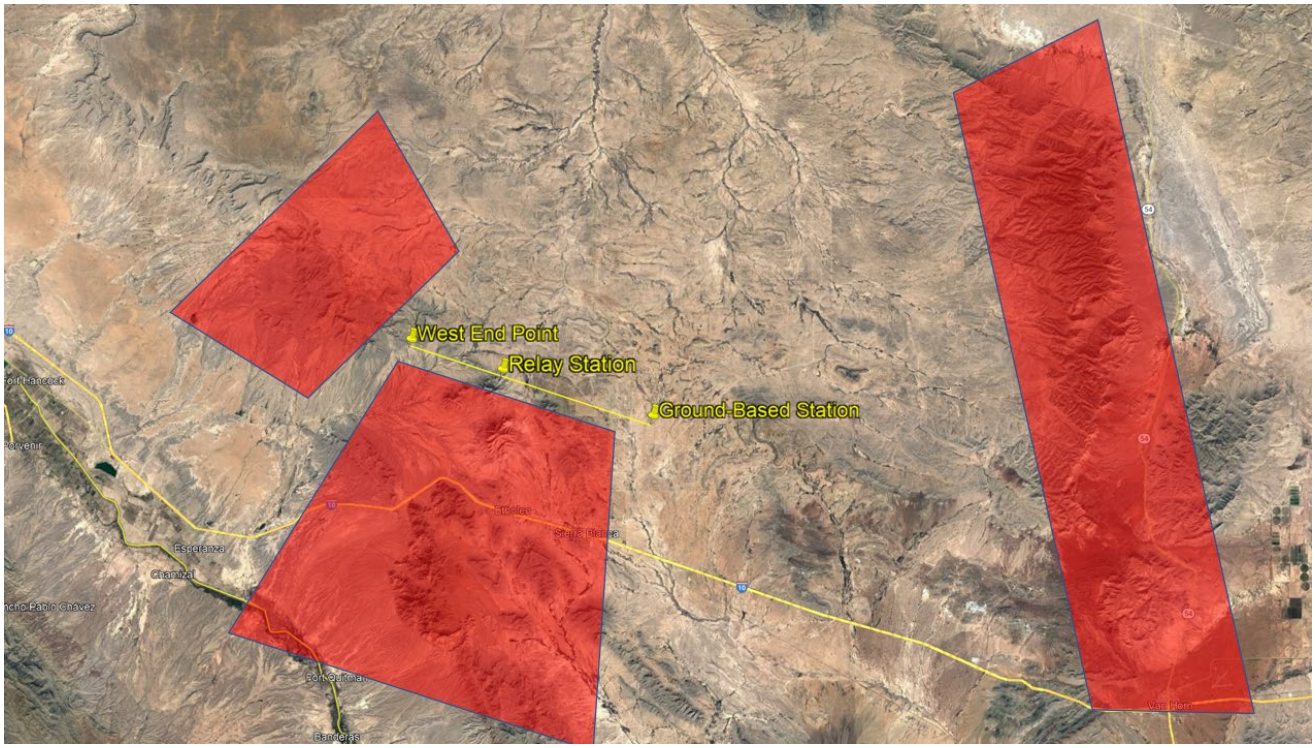

Table 1 contains a listing of all known RF hardware and Table 2 calculates the Effective Radiated Power in watts considering no path losses for both the airborne transmission and the relay transmission.

Table 1: RF Hardware Listing

Quantify	Supplier	Part Number	Function	Gain (dBi)	Tx Power (Watts)
RELAY					
1	Domo Tactical Communications	SOL7MRRPTR	Rx/Tx Relay	-	2
2	Southwest Antennas	1004-003	Relay Antenna	9	-
AIRBORNE TRANSMITTER					
1	Domo Tactical Communications	SOL7	Transmitter	-	2 (2x2) MIMO = 4
2	Domo Tactical Communications	DTC-OMNI	Airborne Antenna	1	-
GROUND-BASE STATION RECEIVE STATION					
1	Domo Tactical Communications	PRORXD-2RU	Dual Ch Receiver	-	Receive Only
2	Domo Tactical Communications	DTC-OMNI	Base Station Anten	1	-

Table 2: Lossless Effective Radiated Power in Watts

Path	TX Pwr $P_{(W)}$	Antenna Gain (dBi)	Lossless ERP (W)
Air-Omni	4.00	1	3.1
Relay-Directional	2.00	9	9.7

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Figure 6 shows the geographical alignment of the high gain antenna relative to the test area.

Figure 6: Graphical Depiction of Relay High Gain Antenna 3dB Coverage +/- 27.5 Degrees Off Center

Figure 7 shows the location of the fixed relay station located at a center point of 31°17'38.2"N 105°26'14.8"W and elevation of 4908 feet (1496 meters) above MSL.

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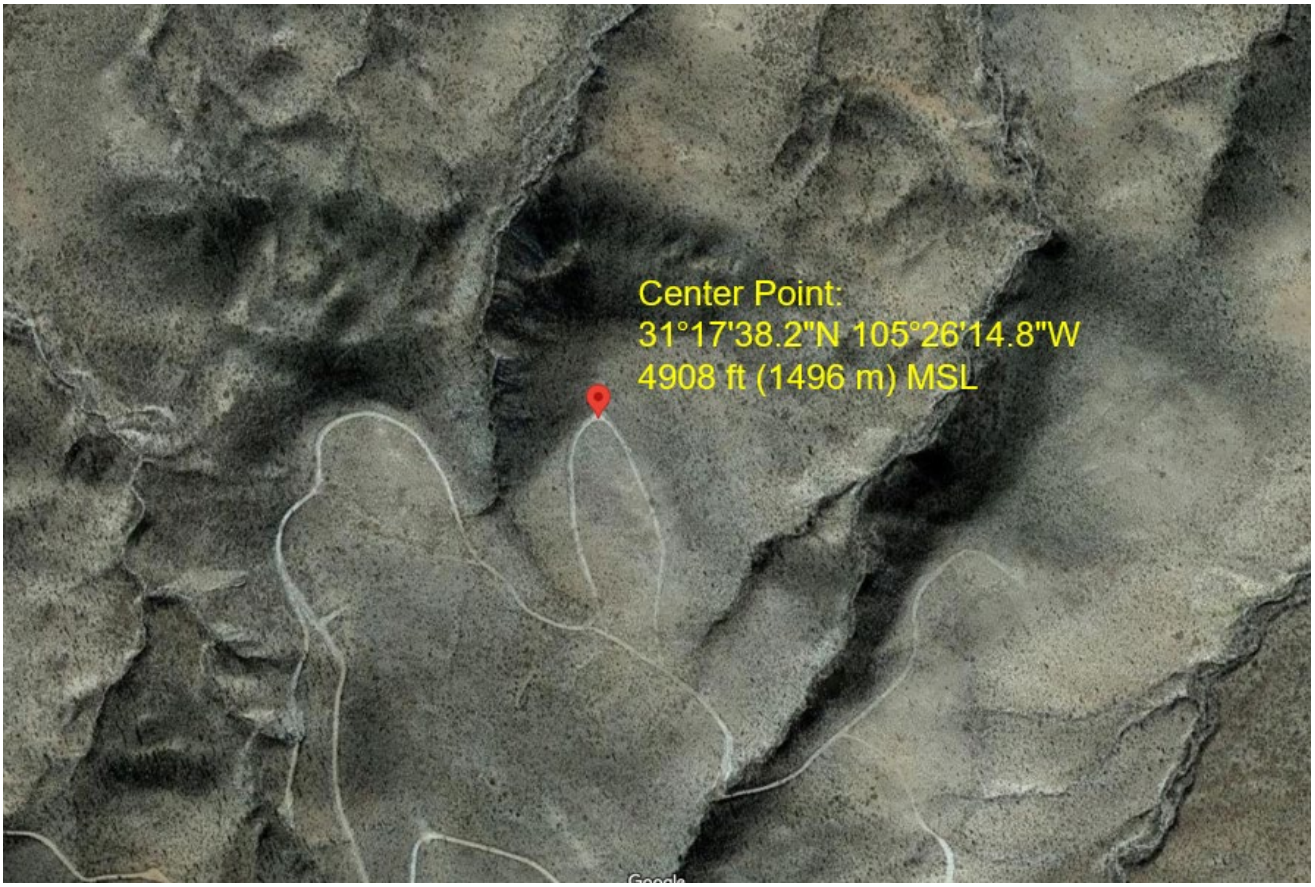
Figure 7: Fixed Location of Relay Station



Product information regarding the DTC relay and high gain antenna is provided below after page 7 in the Adobe Acrobat PDF document version.

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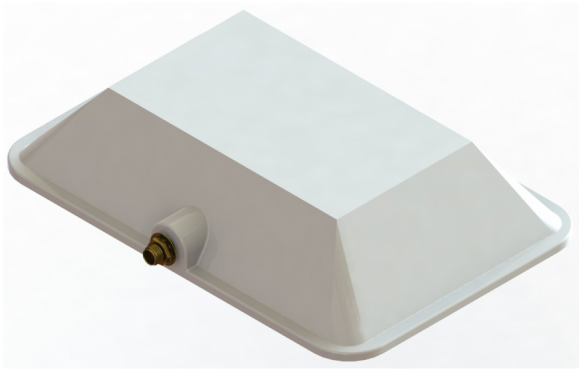
Part # 1004-003
Single Element Panel Antenna, 1.7 - 2.5 GHz, 9 dBi

Features:

- Broad Band Coverage
- 1.7 - 2.5 GHz
- 9 dBi
- White Polycarbonate Radome
- Designed for L&S Band communication in the following markets:
  - Law Enforcement
  - Surveillance
  - UAV & UGV Ground Stations



Antenna Specifications

Parameter	Value	Units	Tolerance
Antenna Pattern	Directional Antenna		
Frequency Band	L & S		
Impedance	50	Ohms	
Minimum Frequency	1.7 / 1,700	GHz / MHz	
Maximum Frequency	2.5 / 2,500	GHz / MHz	
Frequency Bandwidth	0.8 / 800	GHz / MHz	
Maximum VSWR	1.5:1		
Maximum Gain	9	dBi	
Polarization	Vertical		
Maximum RF Input Power	100	Watts	
Horizontal (AZ) Beamwidth	55	Degrees	
Vertical (EL) Beamwidth	65	Degrees	

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Parameter	Value	Units	Tolerance
Ground Plane Required	No		
Radome Material	Polycarbonate		
Color	White		
Maximum Wind Velocity	62 / 100	mph / kph	
RF Connector Type	SMA(f)		
Product Length	6.19 / 157.23	inches / mm	±.125"
Product Width	4.19 / 106.43	inches / mm	+ .020" / -.000"
Product Height	1.25 / 31.75	inches / mm	±.125"
Product Weight	4.0 / 113.4	oz / grams	

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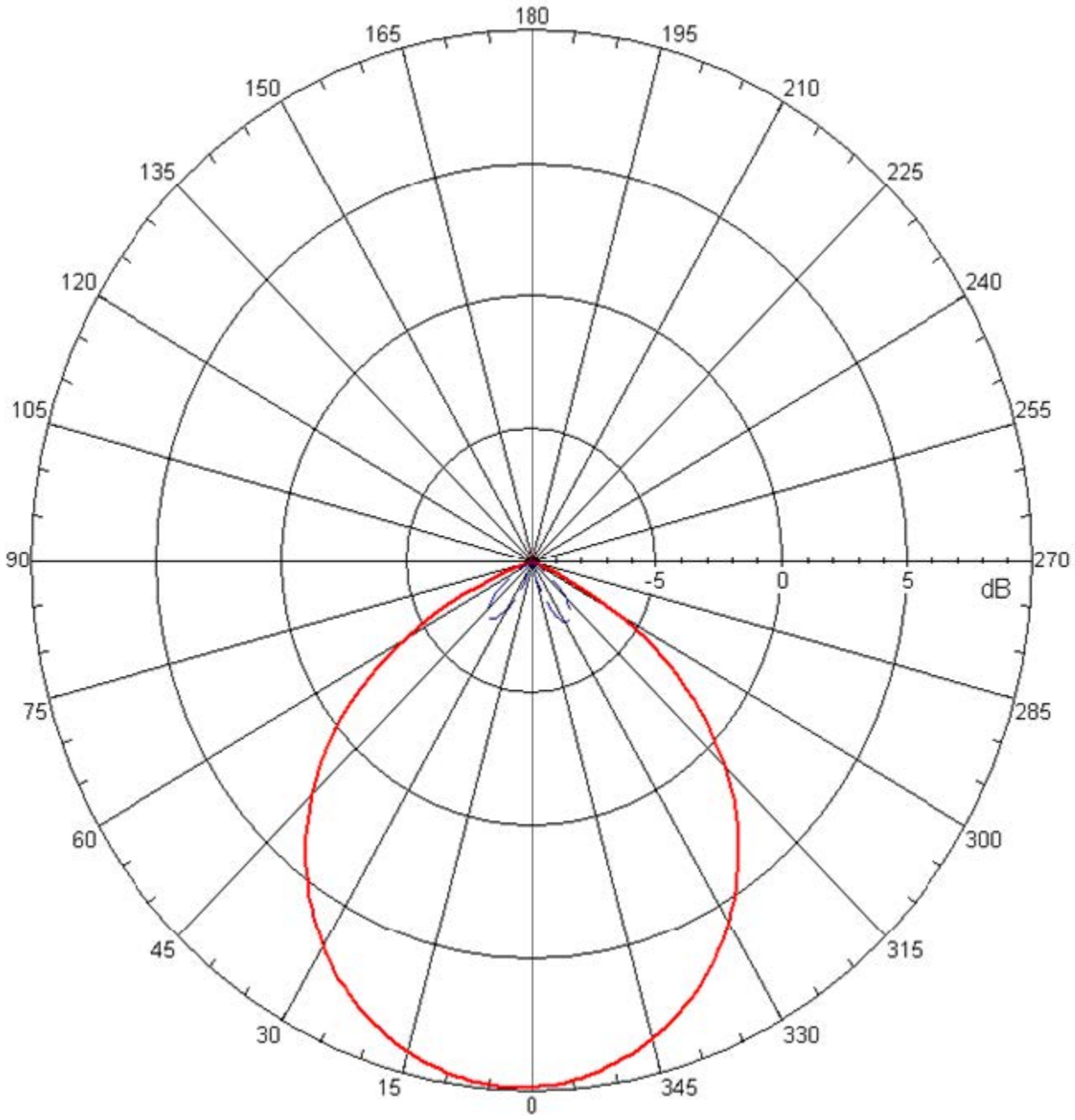

Azimuth Pattern

Referenced to 10 dBi

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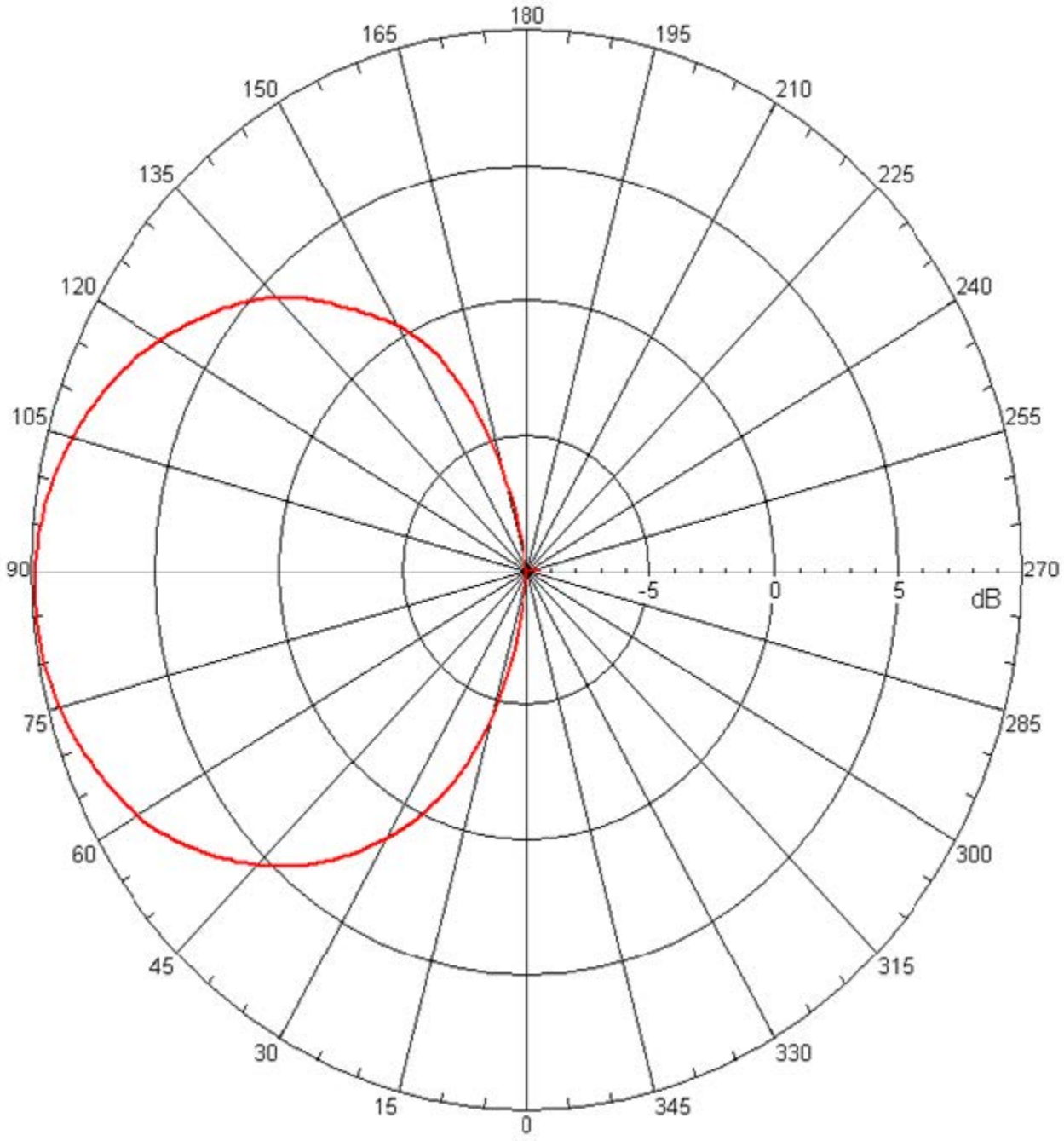

Elevation Pattern

Referenced to 10 dBi

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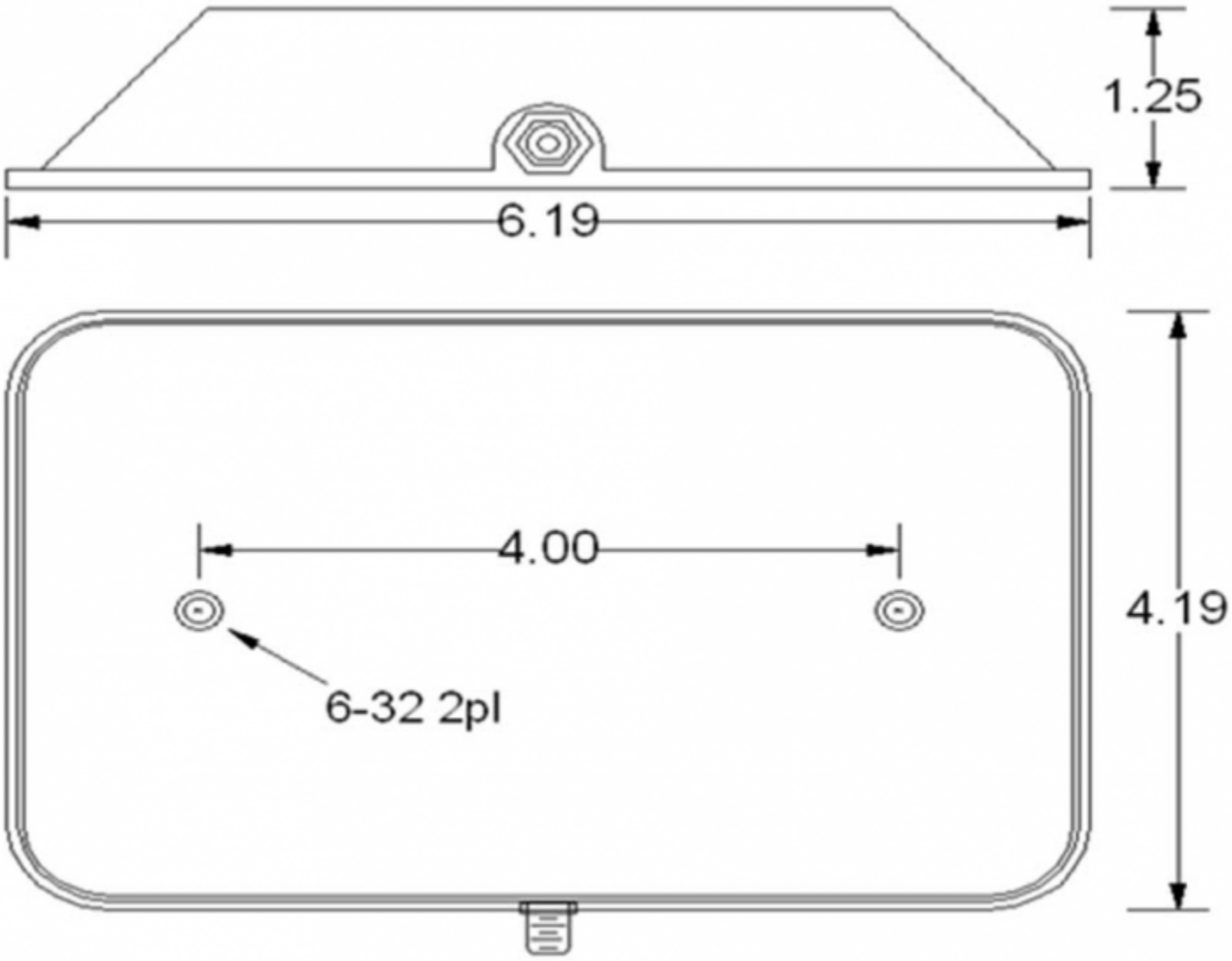

Engineering Drawing

All dimensions are in inches

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SOL7MRRPTR

SOLO7 Miniature Robust Repeater

Overview:

The SOLO7 Robust Repeater unit from Domo Tactical Communications is an integrated single box COFDM repeater which can operate in a variety of transmission bandwidths allowing the user to trade off image quality against range, to suit all types of missions.

The SOLO7 Robust Repeater has DTC technology at its core and is ideal for extending the range of wireless video links in harsh external environments, including mobile and urban. The incoming signal is re-transmitted without decoding and hence without the need for an encryption key at the repeater.

Supplied in a sealed IP67 rated aluminium enclosure, the SOLO7 Robust Repeater can achieve LOS range extensions of tens of miles and NLOS range extensions of greater than one mile thanks to its integral 2W RF power amplifier.

Features and Benefits:

- Single box COFDM repeater
- Environmentally sealed to IP67
- Retransmits both HD and SD video
- No need for storage of encryption keys - video is retransmitted without decoding
- Proprietary Narrowband COFDM modes down to 625KHz for extreme range performance
- Industry standard DVB-T modulation for interoperability with existing systems
- Integrated 2W RF amplifier
- Simple "fit and forget" deployment
- Internal cavity RF filters

Product Information:

Product Includes

AP010331	Ethernet RJ45 to RJ45 cable
CA3146	Power 6-way Amphenol to banana plugs cable
SA4581	USB support stick

Accessory Options (sold separately)

AP010310	2dBi omni half wave dipole, 1.98-2.7GHz, gooseneck TNC(m)
AP002164	Right-angle TNC (m-f) adaptor
SOL7HDMRTX	SOLO7 HD Miniature Robust Transmitter

Related Documents

Resource ID 100311	SOLO7 Miniature Robust Repeater User Guide

SOL7MRRPTR

SOLO7 Miniature Robust Repeater

Technical Specification:

IO

Power	6-way Amphenol
RF transmit	TNC 50Ω (f)
RF receive	TNC 50Ω (f) x 2
Control and programming	RJ45 Ethernet

RF

Power	2W (adjustable)
Tuning step	250kHz

* Frequency

198270	1.98-2.70GHz Transmit - 1.98-2.26GHz Receive - 2.42-2.70GHz

* Other frequencies available on request

DVB-T Modulation

Bandwidth	8MHz, 7MHz and 6MHz modes
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Constellation	QPSK, 16QAM, 64QAM
Guard interval	1/4, 1/8, 1/16, 1/32
Bitrates	3.732Mbps to 31.668Mbps

Narrowband/UMVL Modulation

NB bandwidth	2.5MHz, 1.25MHz and 625kHz modes
UMVL bandwidth	8MHz, 7MHz and 6MHz modes
FEC	1/3, 2/3
Constellation	QPSK, 16QAM, BPSK, 8PSK
Guard interval	1/8, 1/16
NB bitrates	144kbps to 4.879Mbps
UMVL bitrates	1.317kbps to 14.869Mbps

Power

DC input	10-16V (12V nominal)
Power consumption	42W max.

Physical

Dimension	175mm (L), 225mm (W), 70mm (H)
Weight	2.86kg approx.

Environment

Temperature range	-20°C to +50°C
Sealing	IP67 with mated connectors

Software License Code

Silver (included)	DVB-T, Ultra Mobile Video Link (UMVL)
Gold	Silver plus Narrowband 1.25MHz and 2.5MHz
Platinum	Gold plus Ultra Extreme Narrowband 625kHz

Export of encrypted products is subject to regulatory export controls.

For further information contact your Sales Account Manager, one of our Regional Sales Offices, or email solent.enquiries@domotactical.com

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