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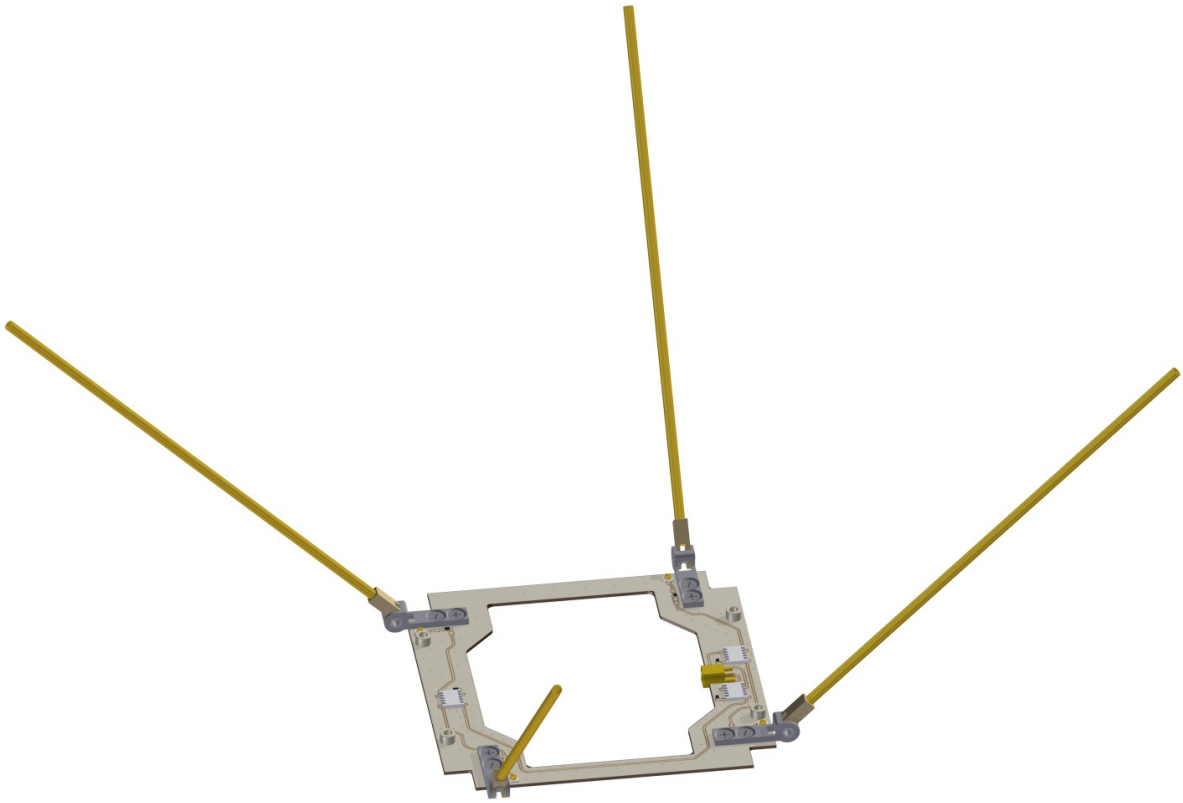

NanoCom ANT430 Datasheet
70 cm band cubesat antenna

Omnidirectional UHF antenna for pico satellites

NanoCom ANT430 Antenna

A reliable antenna is paramount for safe operations of a satellite. The GomSpace NanoCom ANT430 Antenna for the 70cm band is a deployable, omnidirectional, canted turnstile antenna system with rigid antenna elements, which eliminates the risk of antenna deformation while

Feature Overview

Omnidirectional Canted Turnstile Cubesat Antenna
400 - 480 MHz
Gain: 1.5 dBi to -1 dBi
Rigid antenna tubes (no risk of antenna deformation while stowed)
Matched to 50Ω
IPC-A-610 Class 3 assembly

Applications

1U, 2U, 3U CubeSat satellites

Compatibility

GomSpace products
CubeSat Kit products
Innovative Solutions in Space products

Functional Description

The turnstile antenna system consists of four monopole aerials combined in a phasing network in order to form a single circular polarized antenna. The antenna radiation pattern is close to omnidirectional and there are no blind spots, which can cause fading with tumbling satellites.

The antennas are compatible with the 1U, 2U or 3U ISIS CubeSat structures and can be mounted on either the top or bottom of the structure.

The antenna PCB is designed to be the least obstructive to any top or bottom mounted payload or panels. It has a low profile that allows a solar panel to be mounted on top, and a large aperture in the center suited for a protruding camera lens, propulsion hardware or similar.

Characteristics

Parameter	Condition	Min	Typ	Max	Unit
RF impedance	Deployed	-	50	-	Ω
Input RF power		-	-	10	W
VSWR at matching point	Individual antennas	-	1.1	1.15	
VSWR at feed point		-	1.2	1.3	
Antenna system insertion loss	@ 435 MHz	0.7	1	1.6	dB
Frequency range		400	435	550	MHz
Bandwidth	@ 435 MHz	-	5	-	MHz
Temperature range		-55	-	100	°C

Frequency

The antennas can be tuned to work with any frequency in the range from 400 to 450 MHz. Each antenna is individually tuned to the frequency chosen by the customer.

Polarization

Then antenna is circular polarized when seen from top (left hand) and bottom (right hand).

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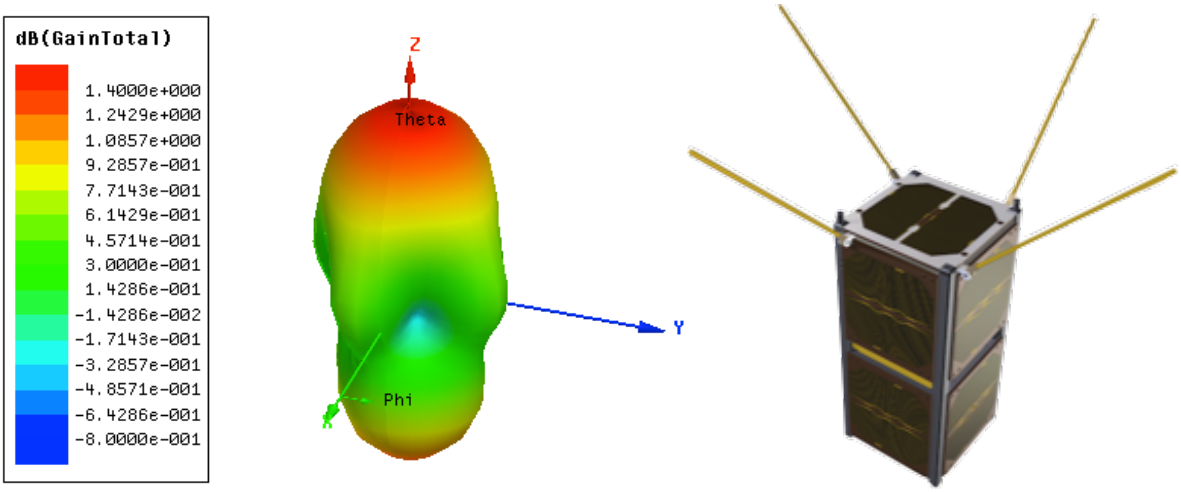
Connector
50 Ohm MCX Jack.

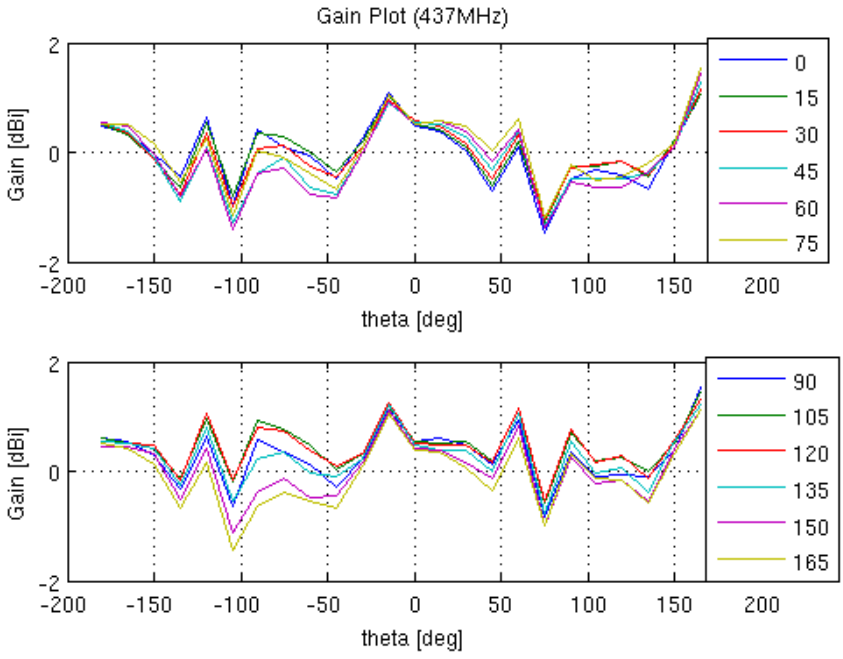
Gain
The antenna is designed with the goal of avoiding dead spots in the radiation pattern making it close to omnidirectional. The actual gain characteristics depend on the shape of the spacecraft and its deployables. For a uniform 2U cubesat the simulated gain is show below.

Highest gain (1.4 dBi) is along the long (Z) axis of the cubesat with lower gains (0.6 to -0.3 dBi) along the X- and Y-axes.

Below is a plot of the measured gain for a specific satellite with the antenna. The satellite (GOM-X1) is a 2U cubesat with a deployed helical antenna in the opposite end of the UHF antenna. Each line indicates a phi angle and it can be seen that the measured gain relates well to the simulated



gain with a range of 1.6 to -1 dBi.



UHF antenna gain measured on GOM-X1.
Measurements performed by *Molex Antenna Unit Denmark*

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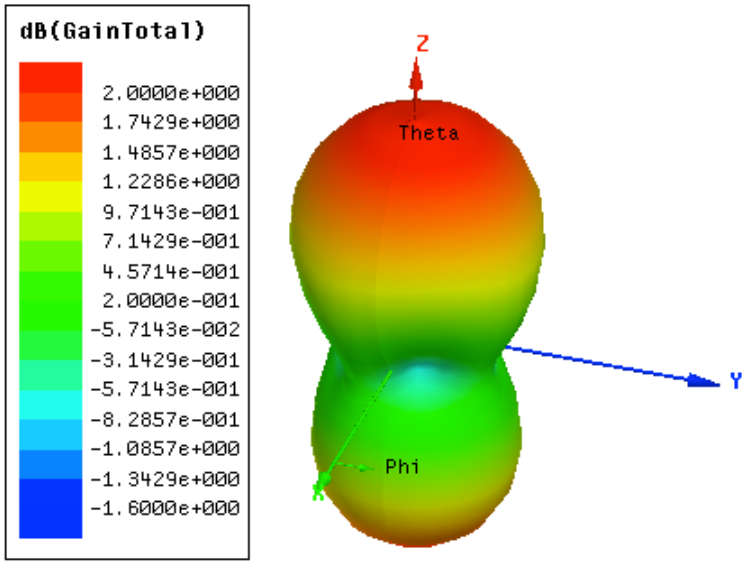
If you are in doubt that the shape of your satellite or deployables will affect the gain of the antenna, GomSpace can provide simulated gain plots for your specific satellite at a reasonable cost.

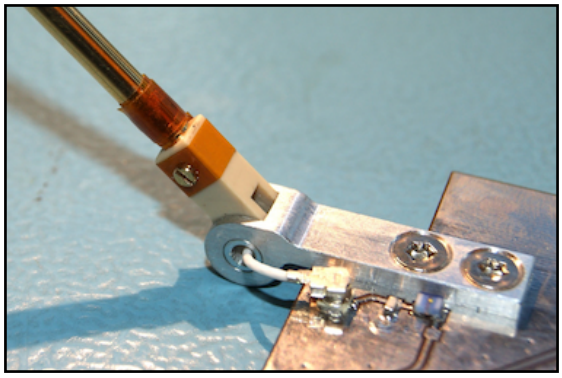
1U version

When fitted to a 1U cubesat structure the antenna tubes are physically shortened to fit the smaller structure. This alters the gain and performance of the antenna slightly. The gain is shown below with a slightly higher gain along the z-axis and smaller gain along the X- and Y-axis. A 10% higher loss compared to the full size antenna setup should be expected.



Deployment

All four antenna elements are individually mounted on torsion-spring loaded hinges which, when released, rotate the antenna elements to an angle of 45 degrees above the PCB. The spring is only tensioned to approximately half its safe rating in stowed mode, and it is thus safe to keep the antennas stowed indefinitely without effecting the reliable deployment.



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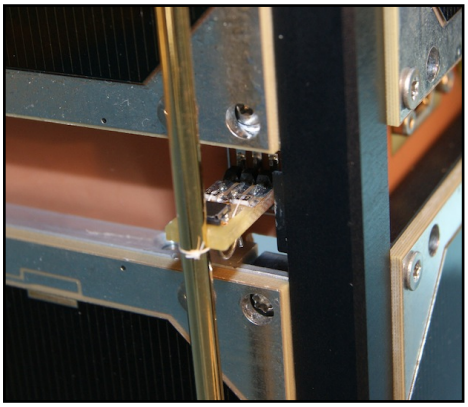
Parameter	Condition	Min	Typ	Max	Unit
Spring Torque	Deployed	-	8	-	Nmm
	Stowed	-	22	-	Nmm
Resonance frequency	@435MHz	30	40	50	Hz

NOTE: There is NO deployment system included in the antenna system. Please inquire on *info@gomspace.com* for availability and pricing of deployment systems.

Active deployment
The antennas are designed for active deployment and a reliable deployment mechanism is available for the NanoCom ANT430 for use with 2U and 3U structures. Individual release systems are fitted for each antenna element. The antenna element is tied to the deployment mechanism using Dyneema®. It is tied over redundant burn resistors and spring loaded to ensure a tight fit, even during vibrations. Then deployment PCB also includes a microswitch to sense deployment and is designed for seamless integration with the GomSpace Interface Hub.



Please inquire for details and prices.

Quality Assembly

GomSpace space hardware is hand-assembled in a procedure where all parts are cleaned with IPA and then soldered in an anti-static environment to “IPC-A-610 Class 3” specifications. All solder-work is done under a microscope with tin-lead 63/37 using rosin flux. All solder joints are re-checked for class 3 compliance and the PCB is finally cleaned with IPA and tested.

Materials

PCB-type is Glass/Polyamide from ESA approved manufacture, 4 layers, fused tin-lead surface, 1.1mm thick.
Hinges consist of static part in 7075-T6 aluminum, a polyether ether ketone (PEEK) rotating part, and stainless steel springs.
Antenna elements are aluminum tubes plated with gold.

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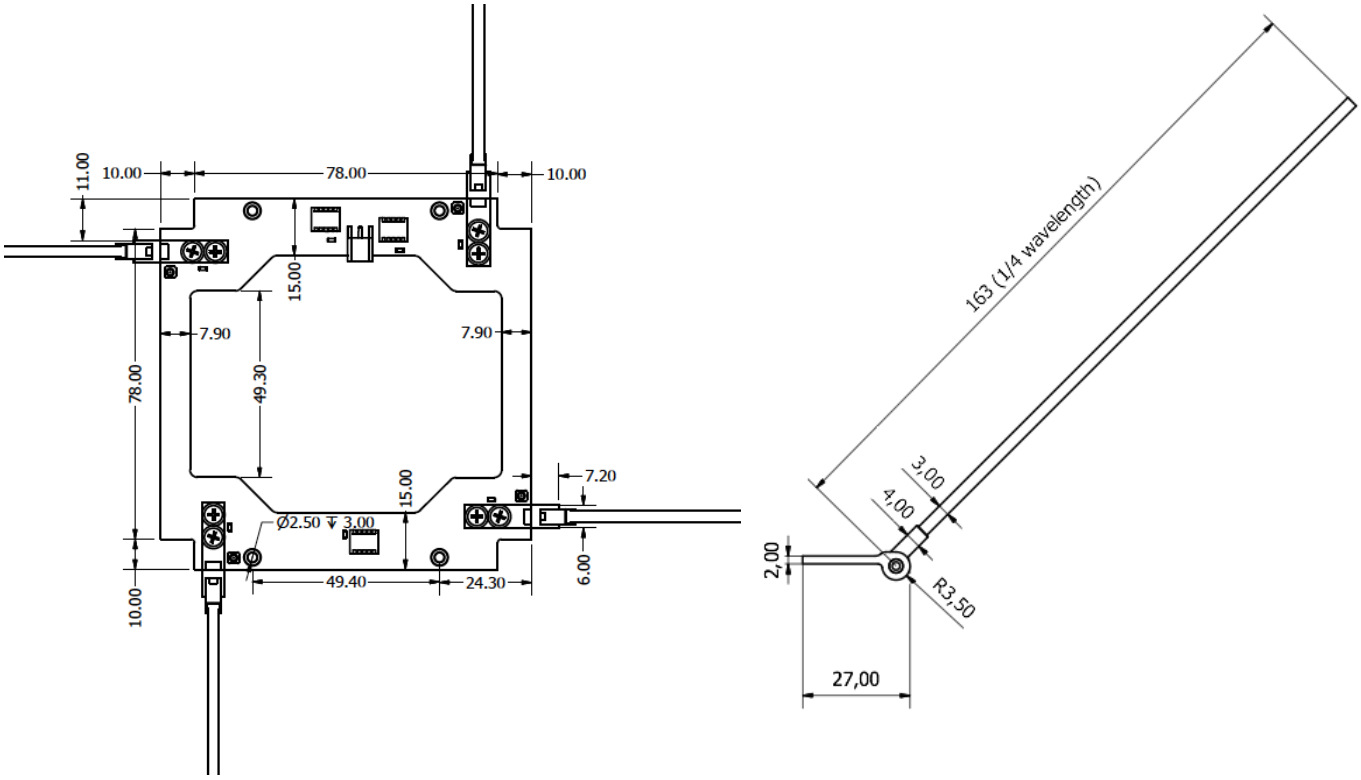
Physical Dimensions

Dimensions are given in mm.



Masses can vary depending on customer choices.

Model	Mass
Total with aluminum antenna rods	30 g
Individual antenna rod	1.5 g

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Please use *NanoCom Antenna ANT430 Options Form* to indicated desired options upon ordering - it can be downloaded from GomSpace's homepage.

Revision Date	Changes	Revision
10/12-2014	Updates to mechanical layout and RF connector	2.0

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