



AD511-2 Active Iridium Antenna User Manual

northernaccess
SATELLITE COMMUNICATIONS

333 H Street, Suite 5007 Chula Vista, CA 91910
PH: 1.877.299.9931 Fax: 1.866.657.5671
Email: info@northernaccess.com
Website: www.northernaccess.com

FEBRUARY 2018 | V2.0

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1. FCC Approval

1.1. FCC 15.19 (a) (3)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: -

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

1.2. FCC 15.105 (b)

The equipment has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: -

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1.3. ICES-003

This Class B digital apparatus complies with Canadian ICES-003.

1.4. User Manual Notice for License-Exempt Radio Apparatus

This device complies with Industry Canada license-exempt RSS Standard(s). Operation is subject to the following two conditions: -

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.



2. Introduction

Iridium telephones were originally designed to operate with a passive antenna, either an element attached directly to the handset, or a remote aerial connected with a short length of coaxial cable. Unfortunately, a signal loss of more than 3dB in a remote antenna's connecting cable degrades performance due to attenuation of both the received and transmitted signals. A 3dB loss corresponds to approximately 10m of RG213U or 3m of RG58U coaxial cable, lengths that clearly restrict the mounting options for the antenna using standard down-leads.

AD511-2 active Iridium antenna (figure 1 & figure 2) is designed for use with up to 160 meters of coaxial cable terminated with type 'N' connectors, and with coax lengths starting from 27meters – subject to AST advice.

Designed for harsh environments, the AD511-2 consists of two RHCP dipole antenna housed within a 4mm thick GRP radome mounted on a common base. One antenna is for signal transmission and one for reception.

AD511-2 has a linear power amplifier within the base and connected to the transmitting antenna compensates for signal loss incurred mainly by the connecting cable. Similarly, a low noise amplifier is attached to the receiving antenna via a low loss interdigital filter to boost the signal sent to the telephone. The interdigital filter has a bandwidth of 25 MHz centered on the Iridium band designed to attenuate any out of band interference that may arise, for example from nearby Inmarsat uplinks.

Using manufacturing techniques proven for a range of extremely rugged GPS/DGP active antenna, the base is milled from aluminium and hard anodised, giving an attractive grey finish, which is mechanically resilient and resistant to corrosion. The antenna's mass is 0.8kg.



3. Mounting and Operation

AD511-2 should be mounted with an unobstructed view of the sky. An aluminium bracket with V-bolts is provided to attach the antenna to horizontal or vertical masts or spars up to 50mm in diameter, [figure 2](#). The bracket is shipped inverted at the centre of the AD511-2 antenna and should be detached, inverted, then reattached to antenna case using the mounting holes in the base.

The coaxial down-lead is attached to the N-type connector on the underside of the antenna, [figure 2](#). Wrapping the connectors with self-amalgamating tape is recommended for permanent installations and the cable should be taped or strapped to the spar as appropriate.

AD511-2 antenna supplied with coaxial down-leads must be used with the accompanying AD511-3 DC Power Break-In Box (figure 3), which accepts +18V to +36V DC at 500mA. The down-lead must not be shortened by the user.

AD511-3 Power Break-In should be positioned close to the telephone base- station or handset. The coaxial down-lead is then attached to the N type connector on the AD511-3 ([figure 3](#) & [figure 4](#)).

Earthing: - the AD-511-3 power breaking box is provided with an earth terminal. The box should be earthed via this connection with a short earthing lead connection to the system earth.

Connection between the telephone and the AD511-3 is made with a coaxial cable terminated with TNC connectors. An adapter is provided with the Iridium handset, which enables a TNC terminated cable to be attached to the telephone. AD511-3 case has drilled flanges to enable permanent fixing.

A 1m flying lead for the AD511-3 Power Break-In Box is provided for connection to the DC supply (+18 to 36 v DC at 500mA), which can be trimmed (or extended) if necessary. The red wire is connected to supply positive, whilst the blue wire is for either an isolated or grounded negative supply. AD511-3 is protected against output short-circuiting by a fuse, which is resettable by disconnecting the unit from the +18 to +36 v DC supply.

With all connections made, the telephone can then be turned on and used as normal - it is transmitting into a load impedance equivalent to a matched passive antenna. The gains of the antenna transmitter and receiver are factory set to compensate for the total attenuation between the telephone and the antenna, mainly determined by the coaxial down-lead. Consequently, the signal output level and frequency from the antenna is equivalent to that radiating from a passive antenna mounted directly on the handset, subject to the antenna transmitter being a linear device. Transmitter linearity is verified with test protocols using an HP 8591 EMC analyser that also ensure there are no spurious out of band emissions.

4. Figures



Figure 1. AD511-2 Active Iridium antenna



Figure 2. AD511-2 Active Iridium antenna with mounting bracket and coaxial down-lead



Figure 3. AD511-3 Power Break-In Box for use with +18 to +36 v DC supply.

The case is hard anodised aluminium and has fixing flanges. A 40m coil of RG213U cable is shown connected to an AD511-2 active antenna (top). The handset interconnect is shown trailing from the TNC to the bottom left, whilst the flying lead for connection to 18 to 36 v DC supply is shown cutting the frame to the left.

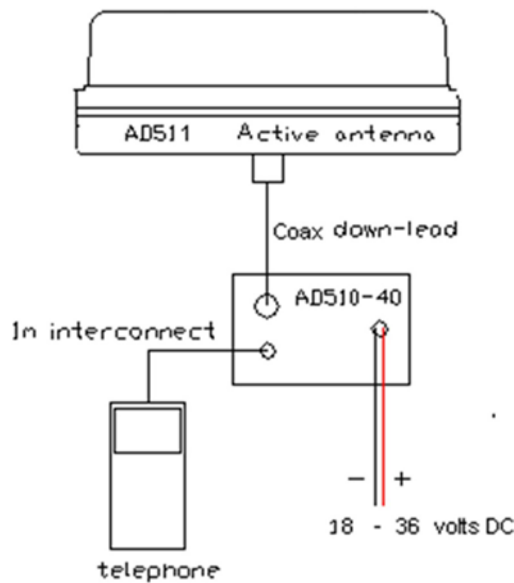


Figure 4. Schematic diagram for system connections

- Mount AD511-2 active antenna with clear view of sky using bracket supplied.
- Attach top end of coax down-lead to N type connector on underside of antenna.
- Attach bottom end of down-lead to N type connector to the Power Break-In Box AD511-3. The down-lead must not be shortened by the user.
- Attach interconnect between TNC on AD510-40 and telephone (or base station) using the antenna adapter provided with the phone.
- Attach DC supply lead to +18 to +36 v DC supply (600mA max). Red lead to +supply, Blue to – supply.
- Turn on Iridium telephone and log-in.
- The AD511-2 should only be used with the AD511-3 Break-In Box. It is not to be used with AD511 or AD510-40 Break-In Boxes.