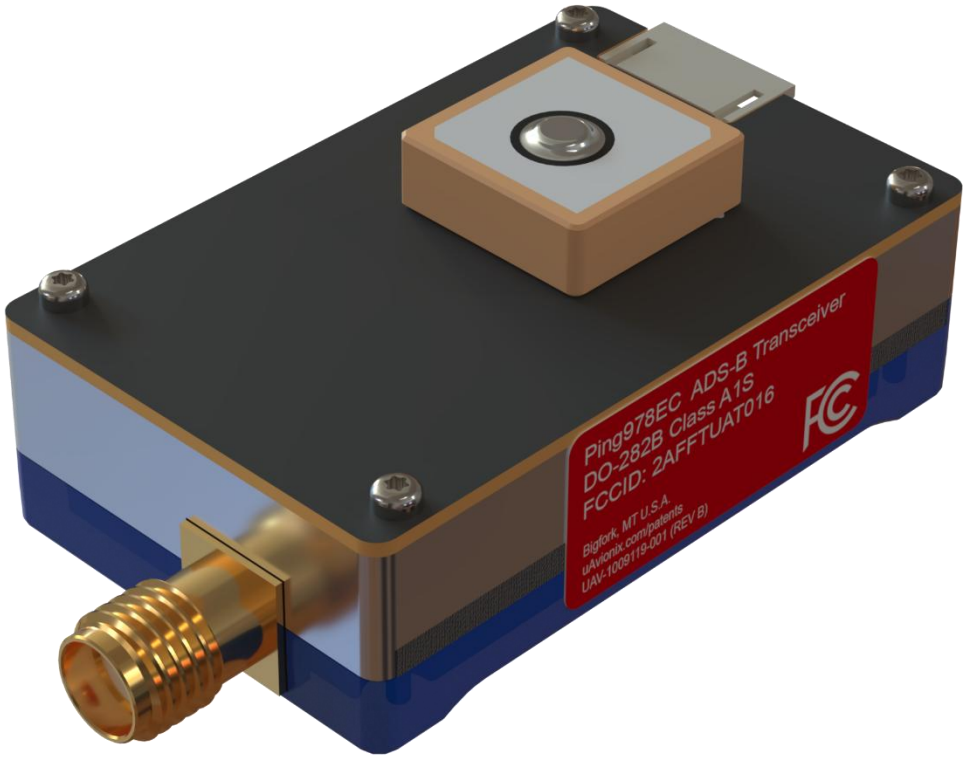
ping978EC™

User and Installation Guide



UAV-1009498-001
Rev B

1 Revision History

Revision	Date	Comments
A	1/20/2026	Initial release
B	3/23/2026	Updated ADS-B IN/Control guidance

2 Warnings / Disclaimers

All device operational procedures must be learned on the ground.

uAvionix is not liable for damages arising from the use or misuse of this product.

This equipment is classified by the United States Department of Commerce's Bureau of Industry and Security (BIS) as Export Control Classification Number (ECCN) 7A994.

These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

3 Limited Warranty

uAvionix products are warranted to be free from defects in material and workmanship for one year from the installation of ping978EC on the aircraft. For the duration of the warranty period, uAvionix, at its sole option, will repair or replace any product which fails in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost.

Restrictions: This warranty does not apply to cosmetic damage, consumable parts, damage caused by accident, abuse, misuse, fire or flood, theft, damage caused by unauthorized servicing, improper installation or product that has been modified or altered.

Disclaimer of Warranty: IN NO EVENT, SHALL UAVIONIX BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Warranty Service: Warranty repair service shall be provided directly by uAvionix. Proof of purchase for the product from uAvionix or authorized reseller is required to obtain and better expedite warranty service.

Please email or call uAvionix support with a description of the problem you are experiencing. Also, please provide the model, serial number, shipping address and a daytime contact number.

You will be promptly contacted with further troubleshooting steps or return instructions. It is recommended to use a shipping method with tracking and insurance.

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5 System Information

This user and installation guide provides mechanical and electrical information necessary to install ping978EC. It is not equivalent to an approved airframe-specific maintenance manual, installation design drawing, or installation data package. The content of this manual assumes use by competent and qualified personnel using standard maintenance procedures in accordance with Title 14 of the Code of Federal Regulation and other related accepted procedures, e.g. for UK Specific Category UAS, regulations such as SORA and UK CAA CAP 722L. The conditions and tests required for approval of this article are minimum performance standards. Those installing this article either on or within a specific type or class of aircraft must determine that the aircraft installation conditions are within the standards which include any accepted integrated functions not specified by the standards. This is an incomplete system intended to provide the functions identified in, and when installed according to this installation guide.

5.1 Performance Standards

5.1.1 ping978EC

ping978EC complies with the following performance standards when properly installed and interfaced with equipment as detailed in this guide.

System Function	RTCA MOPS	Class/Type
Minimum Operational Performance Standards (MOPS) for Universal Access Transceiver (UAT) Automatic Dependent Surveillance – Broadcast (ADS-B)	DO-282B	A1S ADS-B OUT ADS-B IN
Minimum Operational Performance Standards (MOPS) for 1090 MHz Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Services - Broadcast (TIS-B)	DO-260B	ADS-B IN

5.2 Deviations

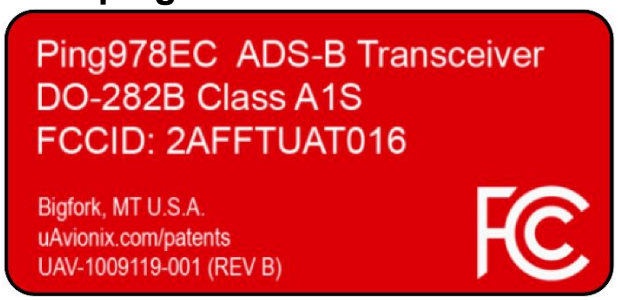
MOPS	Deviation
RTCA/DO-282B	Based on UK CAA CAP1391 Appendix E, ping978EC utilizes Self-Assigned Aircraft Address (AA) continuously. This is a non-ICAO based AA.
RTCA/DO-282B	ping978EC only transmits once a GNSS lock is determined by the integrated GNSS receiver.

5.3 FCC ID

Model	FCC ID
ping978EC	2AFFTUAT016

5.4 Device Marking

5.4.1 ping978EC Hardware



5.4.2 ping978EC ADS-B Software

The ADS-B software contained in the ping978EC is identified by electronic marking.

See uAvionix support website for software updates and service bulletins.

5.5 Continued Airworthiness

Maintenance of the ping978EC is "on condition" only.

Periodic regulatory function checks must be performed. The UAS aircraft must be returned to service in a means acceptable to the appropriate CAA authority.

5.6 System Limitations

TCAS II System

ping978EC does not support installation on aircraft with an active TCAS II system.

SatCom

The ping978EC GNSS has not been demonstrated as compatible with specific SatCom equipment and should not be installed on SatCom equipped aircraft unless additional interference testing is performed to verify GNSS operation during SatCom transmissions.

Note 1: SatCom equipment is defined as radio transmitters transmitting on or near the L1/L2 frequency bands. This does not include

passive receive-only systems such as additional GNSS receivers or unidirectional satellite data link receivers.

6 System Specifications

6.1 System Functionality

ping978EC is a UAT (978MHz) ADS-B dual frequency transceiver (ADS-B OUT and ADS-B IN), integrated with an internal SBAS/WAAS. It is designed to meet the ADS-B requirements of CAP 1391 Appendix E for UAS operations in the United Kingdom.

6.2 ping978EC Specifications

6.2.1 Physical Specifications

Characteristics	Specifications
Width	25.40mm
Height	17.90mm
Depth	49.90mm
Weight	22 grams
Operating temperature range	-35°C to +70°C
Maximum pressure altitude	50,000ft
Input voltage range	11 to 28 VDC
14V current	0.096A nominal
28V current	0.051A nominal

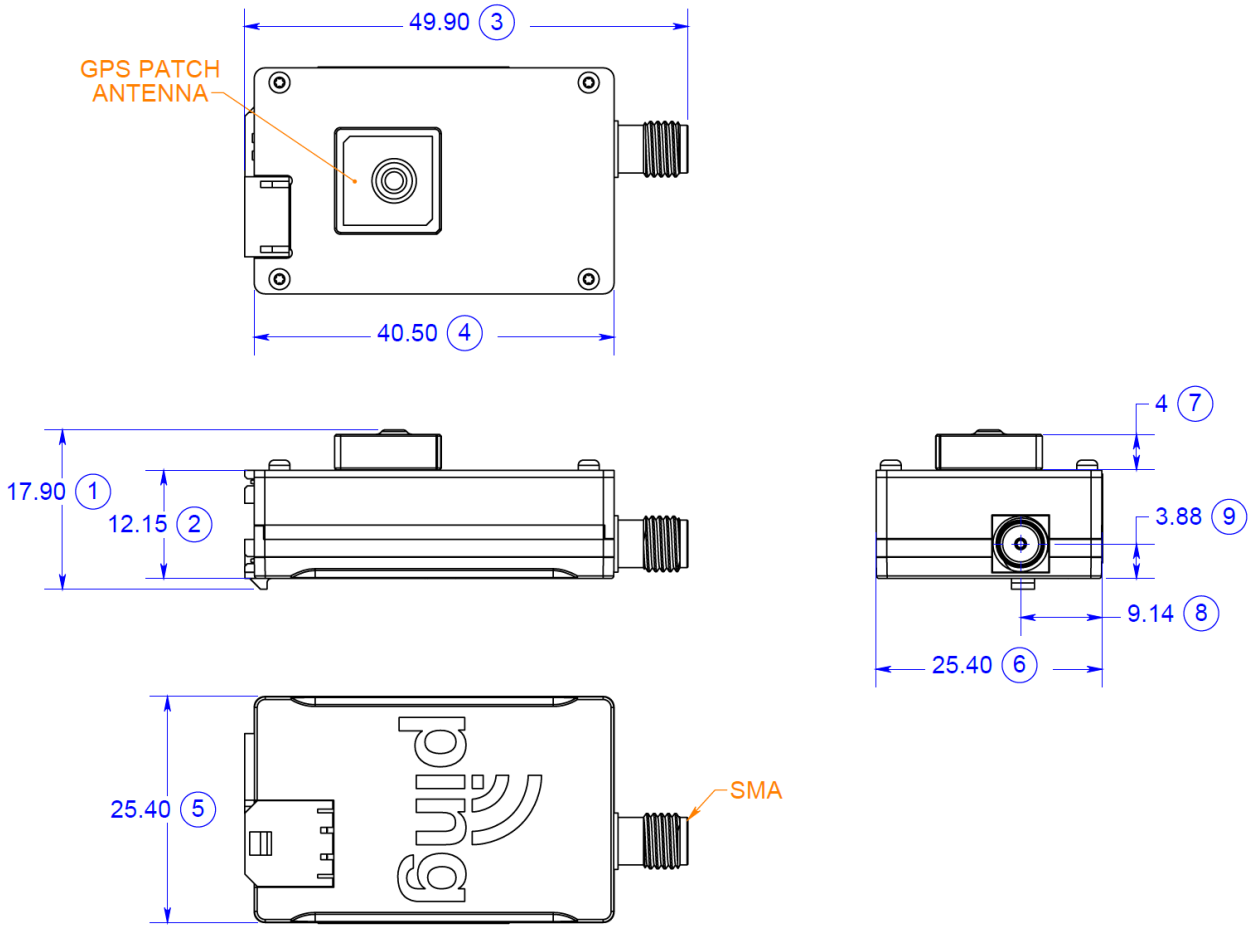


Figure 6-1 ping978EC Dimensional Drawing

6.2.2 Transceiver Specifications

Characteristics	Specifications
ADS-B OUT Transmit Frequency	978 MHz
ADS-B OUT Transmit Power	43dBm (20W)
ADS-B IN Receive frequency	1090 MHz and 978 MHz
RF Impedance	50 Ω
RF Connector	SMA

6.2.3 GNSS/SBAS Specifications

Characteristics	Specifications
GNSS L1C/A w. SBAS	12 GNSS Channel 3 SBAS Channels
HPA / VPA	5m / 7m
Velocity Accuracy	3 m/s
Time Accuracy	30 ns
Update Rate	5 Hz
SIL/SDA	1/1

6.2.4 System Interfaces

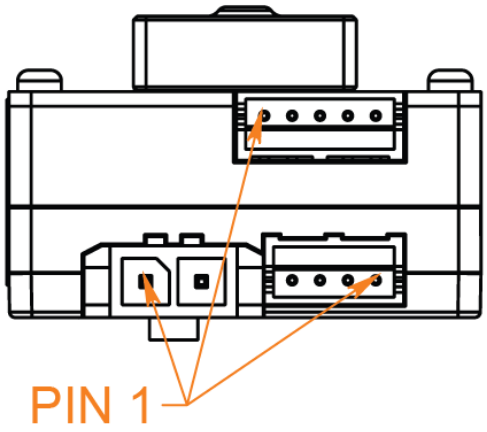


Figure 6-2 Pin 1 Definitions on ping978EC Interfaces

6.2.4.1 Power Interface

This interface is used to power the ping978EC.

Pin	Type	Description
1	Power	11-28VDC

2	Ground	

Mating Connector P/N: Molex 0436450200
Pin P/N: 0462350001

6.2.4.2 Navigation (NAV) Interface (5-pin JST)

This interface is used to configure “personality” information via the Ping smartphone app (pingWiFi), including Callsign, Squawk Code/Flight Plan ID, Aircraft Length/Width, etc.

Pin	Type	Description
1	UTC Output	TTL Logic Level 50% duty cycle
2	FYXNAV TTL TX	Mavlink/GDL90
3	FYXNAV TTL RX	GDL90
4	Power Output (5VDC)	Accessory power (pingWiFi)
5	Ground	

Mating Connector P/N: JST ZHR-5
Pin P/N: SZH-002T-P0.5

6.2.4.3 Auto Pilot (AP) Interface (4-pin JST)

This interface is used by autopilot systems to enable/disable ADS-B operation in flight.

Pin	Type	Description
1	RX (57,600bps)	Mavlink - (N/A)
2	TX (57,600bps)	Mavlink (See 6.2.4.3.1 for protocol details)
3	Power Input (5VDC)	Used in reprogramming only
4	Ground	

Mating Connector P/N: JST ZHR-4
Pin P/N: SZH-002T-P0.5

6.2.4.3.1 Auto Pilot (AP) ADS-B IN Traffic Protocol

ping978EC receives both 978MHz and 1090Mhz ADS-B IN messages and outputs the following Mavlink Traffic Report Message(s) at 1Hz.

Position	Field	Type	Description
0	ICAO Address	uint32_t	ICAO Address
4	Latitude	int32_t	The reported latitude in degrees * 1E7

8	Longitude	int32_t	The reported longitude in degrees * 1E7
12	Altitude	int32_t	Altitude in Meters * 1E3 (up is +ve) - Check ALT_TYPE for reference datum
16	Heading	uint16_t	Course over ground in degrees * 10^2
18	Horizontal Velocity	uint16_t	The horizontal velocity in (m/s * 1E2)
20	Vertical Velocity	int16_t	The vertical velocity in (m/s * 1E2) (positive ascending, negative descending)
22	Validity Flags	uint16_t	Valid data fields
24	Mode A Code	uint16_t	Mode A Squawk code (0xFFFF = no code)
26	Altitude Type	uint8_t	Altitude Type
27	Callsign	char[9]	The callsign
36	Emitter Type	uint8_t	Emitter Category
37	Time Since Last Communication (TSLC)	uint8_t	Time since last communication in seconds

Table 6-1 uAvionix Mavlink Traffic Report Message

Additional Mavlink message definition details can be found in the uAvionix Mavlink OEM Protocol ICD UAV-1001912-001 Section 6. See uAvionix support website for latest ICD.

7 Installation

7.1 Unpacking and Inspecting

Carefully unpack the device and make a visual inspection of the unit for evidence of any damage incurred during shipment. If the unit is damaged, notify the shipping company to file a claim for the damage. To justify your claim, save the original shipping container and all packing materials.

7.2 Authorized Part Numbers

Item	P/N
ping978EC Hardware	UAV-1009118-()

7.3 Optional Equipment Part Numbers

Item	P/N
pingWiFi	UAV-1004380-()
120° Dipole SMA Antenna	UAV-1007557-()
RAMI Transponder/DME UHF Antenna	AV-22

7.4 Mounting

Ping978EC should be mounted in a location that minimizes vibration and moisture.

7.4.1 Transceiver Antenna Mounting

It's recommended to mount the ping978EC as close to the ADS-B transmit/receive antenna as reasonable to minimize the cable loss. If the provided di-pole antenna is not used, customers may utilize a TSO-C66, TSO-C74, TSO-C112 compatible antenna as long as the airframe provides an adequate ground plane.

7.4.2 GNSS Antenna Mounting

The PCB antenna located on the top of the ping978EC (yellow highlight below) should be mounted on the airframe with the broad face of the PCB antenna facing skyward. When installing on a new airframe, consideration should be given to any skyview shadowing due to fuselage, wings or other airframe components that may hinder the GNSS's skyview and associated performance.

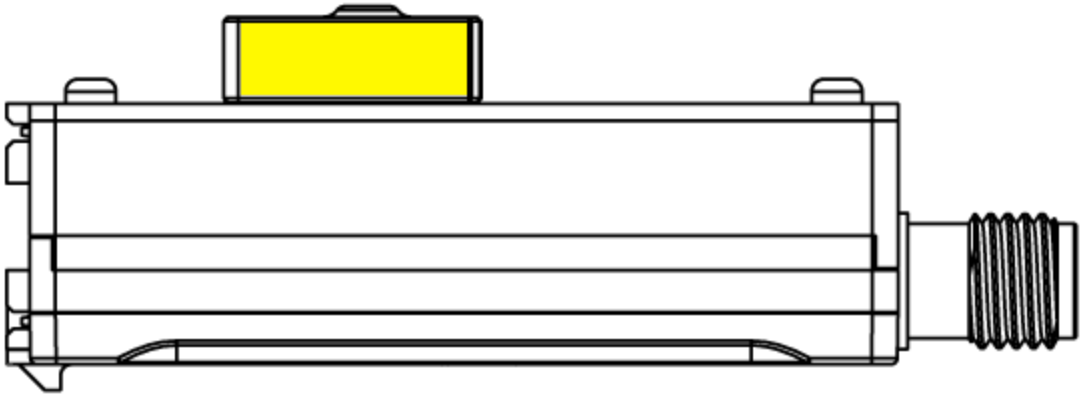


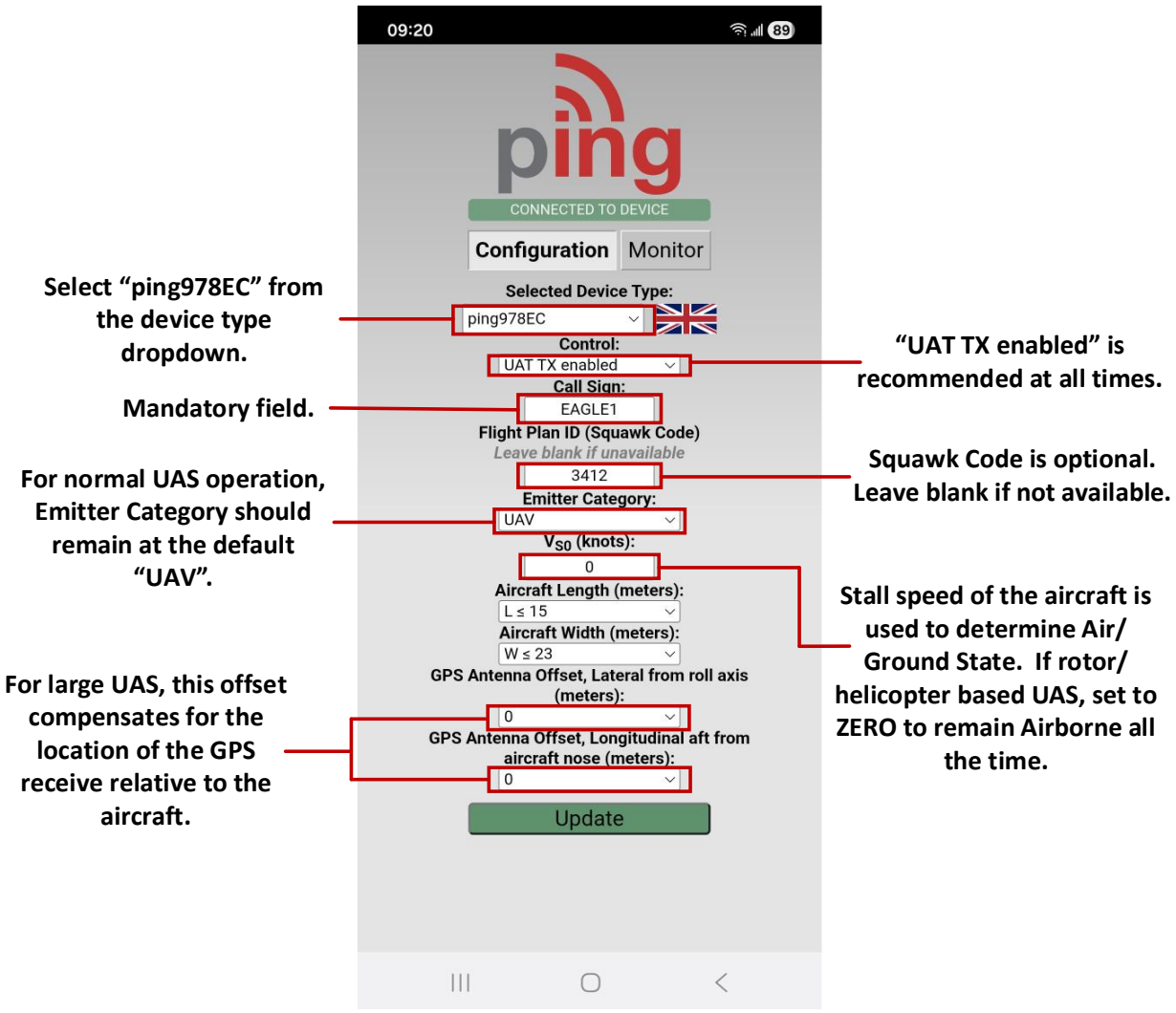
Figure 7-1 FYXNAV GNSS Antenna Location

8 Control

ping978EC does *not* require in-flight control. It is designed to be configured prior to flight via the Ping smartphone app.

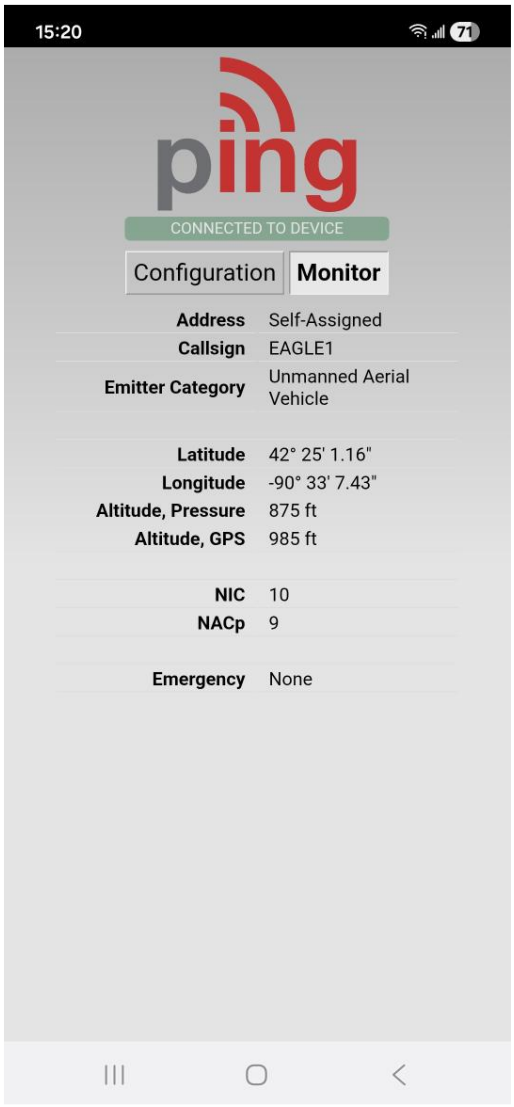
9 System Configuration

1. From a smartphone, search for “uAvionix Ping Installer” in your app store and install the configuration app. Links to these utilities can be found on the uAvionix product Support page (Section 12).
2. With the pingWiFi module installed to the 5-pin JST connector on the ping978EC, power on the ping978EC.
3. From a smartphone, connect to the pingWiFi module via 802.11 wireless. The SSID will be in the format: “Ping-VXYZ”
4. Once connected to pingWiFi, start the Ping smartphone app.
5. Configure as shown below.



6. Press the green Update button to commit configuration changes to the ping978EC. These changes are persistent across power cycles and do not require updating unless changes are necessary.

Monitoring GNSS reception can be done from the Ping smartphone app's Monitoring tab. Example shown below.



Anytime the Ping smartphone app is connected to the ping978EC, GNSS data is not available to the ADS-B OUT transmitter. Disconnect phone from pingWiFi SSID to resume normal UAT transmissions.

10 Normal Operation

Once the ping978EC has been configured (Section 9) with Control set to “UAT TX enabled”, the ping978EC will begin transmitting anytime the unit is powered ON and has a GNSS lock.

It is recommended to always have an antenna or dummy load attached to the SMA antenna to prevent damage.

11 Maintenance

The ping978EC is not a user serviceable product. All service must be performed either by uAvionix or an authorized uAvionix repair center.

12 Regulation

UK CAA CAP 1391 Appendix E addresses ‘Licensing of 978 MHz UAT frequency for airborne transmission by Unmanned Aircraft’, where it states that “*The detailed specification of the UAT equipment is declared to the CAA RPAS sector team during application for a Specific Category authorization.”*

uAvionix provides a ping978EC Statement of Compliance (SoC) to enable operators to meet this CAA requirement. The SoC is available on the ping978EC product support webpage.

13 Support

For additional questions or support please visit:

https://www.uavionix.com/support/