Statement of Compliance – uAvionix ping978EC

UAV-1009505-001 Rev A

Statement of Compliance – ping978EC

To Whom it May Concern:

This Statement of Compliance (SoC) outlines the performance characteristics of the uAvionix ping978EC ADS-B transceiver with integrated position source.

The purpose of this SoC is to aid UAS operators and manufacturers in understanding the existing authorisations, performance characteristics, and limitations with respect to the equipment to aid in their operations or in their application for Operational Authorisations, e.g. for BVLOS operations in an Atypical Air Environment (AAE) in the UK.

ping978EC Product Overview

ping978EC shares a common hardware platform with the longstanding uAvionix ping2020i 978MHz ADS-B transceiver. Like ping2020i, ping978EC is a 978MHz UAT ADS-B OUT transceiver with capability to receive ADS-B IN messages on both 978MHz and 1090MHz. ping978EC is intended as a standalone "squitter", not to be paired with a 1090MHz transponder. The ADS-B transmitter incorporates a GNSS position source meeting the performance requirements of TSO-C199 (Traffic Awareness Beacon System (TABS), Class B), allowing it to transmit a Source Integrity Level (SIL) value of "1" and System Design Assurance (SDA) value of "1". This allows the ping978EC to be visible to 978MHz ADS-B receivers which do not filter out SIL and SDA values of "1".

ping978EC does **not** transmit ADS-B messages with a ICAO 24-bit Aircraft Address. Instead, ping978EC transmits ADS-B messages at all times with a non-ICAO temporary Self-Assigned 24-bit Aircraft Address, which is dynamically generated at power-on once a GNSS fix is achieved. The GNSS latitude, longitude and time are utilised to seed the address generation algorithm.

Transmissions on the 978 MHz ADS-B from Specific Category UAS operating BVLOS in the UK

UK operators wishing to carry out Beyond Visual Line of Sight (BVLOS) operations in the UAS Specific Category may choose to propose an AAE to the UK CAA during their application. "Using an ADS-B transmitter and receiver or transceiver on 978 MHz/UAT" is one of the conditions of AAE specified by the CAA.

UK CAA maintain a CAP 1391 Approved List of **1090MHz** ADS-B devices. This is not the case for 978MHz UAT ADS-B devices. CAP 1391 Appendix E[1] 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 authorisation."*

Use this SoC to declare ping978EC specification to UK CAA RPAS sector team

Operators may find this ping978EC SoC of use in making this declaration.

We hope this information is helpful. If you have further questions, please contact uas@uavionix.com

Steve Hutt
uAvionix Corporation

[1] first published on 28th November 2025 in CAP 1391 Supplementary Amendment 2025/02

APPENDIX 1 - UK CAA ADS-B regulations for BVLOS UAS Operations

CAP 1391 Electronic conspicuity devices

CAA's primary regulation for the specification of Electronic Conspicuity devices is documented in CAP 1391. This document was first written to address low power 1090 MHz ADS-B devices. In 94 pages, CAP 1391 First (2016), Second (2017)and Third (2021) Editions make no mention of 978MHz UAT ADS-B or the underlying UAT standard, RTCA DO-282B.

On 25th November 2025 CAA published CAP 1391 Supplementary Amendment 2025/02, which added the two page Appendix E into CAP 1391. Appendix E specifies requirements to be met by 978MHz UAT ADS-B transceivers for use by Specific Category UAS when flying BVLOS. CAP 1391 SA 2025/02 states *"The purpose of this Supplementary Amendment (SA) to Electronic Conspicuity Devices (CAP 1391) is to authorise the use of the 978 MHz Universal Access Transceiver (UAT) frequency for airborne transmission onboard Unmanned Aircraft Systems (UAS) applications, under the RTCA minimum performance standards DO-282B."*

CAP 1391 Appendix E does not provide guidance as to how CAP 1391 Chapter 6 Technical Specification Requirements or Appendix A Acceptable Means of Compliance should be interpreted for 978MHz UAT ADS-B devices. CAA have acknowledged that, in the light of the new Appendix E, the remainder of CAP 1391 requires revision.

CAP 3040 Unmanned Aircraft Operations in an Atypical Air Environment: Policy Concept

CAA's CAP 3040 Third Edition, published 27th November 2025, states the following with regard to Electronic Conspicuity:

"To help mitigate the MAC risk between UA and other aircraft operating at very low level in the vicinity of an AAE, an UA operating within an AAE should be equipped with a Universal Access Transceiver (UAT) device transmitting on 978MHz and receiving on dual frequencies 978 MHz and 1090 MHz. The device should function, in accordance with the RTCA DO-282B/C performance standards as specified in CAP 1391 Supplementary Amendment 2025-02. In March 2025, the CAA and Ofcom issued a joint statement that made the 978MHz frequency available for airborne transmission onboard UA. An application for an UAS license from Ofcom can be found here.

As per International Civil Aviation Organisation (ICAO) Document 9924, the UK CAA will not normally assign an ICAO 24-bit aircraft address for an UA. UAS operators using a 978 MHz UAT device should use a time-based self-assigned temporary 24-bit aircraft address that is generated once the device is powered up and obtains a Global Navigation Satellite System fix. The device firmware must have the address qualifier set to 001 indicating that the 24-bit address is NOT an ICAO address."

CAP 3140 Electronic Conspicuity – Initial Technical Concept of Operations (EC ConOps) 2025

CAA's CAP 3140 First Edition, published 14th July 2025, states the following with regard to equipage requirements for Unmanned Specific Category UAS operating BVLOS:

"Unmanned specific

Position 7. Within non - segregated airspace, UAS in the Specific Category operating BVLOS, must emit a 978MHz UAT ADS-B signal. The device should function in accordance with the RTCA minimum performance standards DO-282B, (It is expected that DO-282C will be the standard from 2027) and of a minimum power yet to be set out within CAP1391 supplementary amendment 2025/01. Emissions must meet SIL and SDA of at least 1.

Position 8. Specific category UAS operating BVLOS in non - segregated airspace must be equipped to receive ADS-B 1090 MHz and 978 MHz UAT in order to detect both manned and unmanned aircraft."

APPENDIX 2 – uAvionix ping978EC Detailed Specification

Compliance with CAP 1391 Appendix E Licensing Conditions

List of CAP 1391 Appendix E Licensing Conditions for 978MHz UAT ADS-B transceivers		
Para	**Licensing Conditions**	**Ping978EC Compliance**
1.1	The license is subject to the following conditions:	
	Transmissions on the 978 MHz frequency are only to be made from Specific Category UAS operating beyond visual line of sight (BVLOS).	Responsibility of the operator
	The device should function in accordance with the RTCA minimum performance standards DO-282B.	Yes
	As per ICAO Doc 9924, the CAA will not normally issue a permanent ICAO 24- bit aircraft address (ADDRp) to Unmanned Aircraft. Instead, the time-based self-assigned temporary aircraft address function (ADDRt) should be enabled.	Yes – ping978EC permanently operates in time-based self-assigned aircraft address (ADDRt) mode.
	The detailed specification of the UAT equipment is declared to the CAA RPAS sector team during application for a Specific Category authorisation.	This SoC has been written to enable operators to meet this condition. Please include a copy of this SoC with your application.
	A 978 MHz UAT shall not transmit from a manned aircraft.	Responsibility of the operator
1.2	UAS operators can apply for a 978 MHz UAT license through the Ofcom UAS licensing product.	Responsibility of the operator
1.3	UAS operators should only request an ICAO 24-bit hexadecimal aircraft address when directed to do so.	Responsibility of the operator
1.4	SSR Mode A codes (‘squawks’) differ in the UK to those required by DO-282B/C. Where Mode A codes are used for flights in the UK, they should adhere to UK AIP ENR 1.6.	Responsibility of the operator. ping978EC enables the operator to set ‘Squawk’ codes in the configuration App. ping978EC assumes there is no additional Mode S transponder installed on the UAS, therefore the ‘Squawk Code’ is programmable into the ping978EC using the uAvionix configuration app prior to flight and is transmitted in the Flight Plan ID field of the UAT extended squitter when CSID logic is enabled. If no ‘Squawk Code’ is set (field in configuration app left blank) then CSID logic is disabled and no Squawk Code is broadcast. There is a means to change Squawk Code during flight, but this may not be supported by all autopilots.

Compliance with CAP 1391 Chapter 6 Technical Specification Requirements

CAP 1391 Appendix E does not provide guidance as to how CAP 1391 Chapter 6 Technical Specification Requirements should be interpreted for 978MHz UAT ADS-B devices. As CAP 1391 Chapter 6 addresses 1090MHz ADS-B and RTCA DO-260B, compliance of 978MHz UAT ADS-B devices is open to reinterpretation. Many RTCA DO-260B 1090MHz ADS-B standards have equivalents in RTCA DO-282B 978MHz UAT ADS-B, **but not all**. ping978EC compliance with RTCA DO-282B, confirmed above, addresses many of the RTCA DO-260B requirements specified in CAP 1391 Third Edition.

List of CAP 1391 Chapter 6 requirements of possible of relevance to 978MHz UAT ADS-B transceivers		
Para	**Requirement**	**ping978EC Compliance**
6.1	This chapter provides manufacturers with a comprehensive technical specification for portable, low-power EC devices utilising ADS-B extended squitter transmitters or transceivers employing DF=18 (Downlink Format 18) squitter. Only devices that meet this specification will be approved for use in the UK	ping978EC is a 978MHz UAT ADS-B transceiver compliant with DO-282B. In the context of the DO-282B standard, Downlink Format 18 is not a native UAT message structure. Instead, it is a 1090 MHz Mode S message format that is often cross-referenced because of its role in ADS-B and TIS-B services. The statement that "*Only devices that meet this specification will be approved for use in the UK*" has been rendered false by the addition of CAP 1391 Appendix E.
6.2 & 6.3	EC devices are intended for voluntary carriage on registered and nonregistered UK Annex II23 aircraft, non-complex EASA aircraft of <5700kg MTOM and for gliders and balloons (including those covered under ELA 1 and ELA 2) within uncontrolled UK airspace. & The specification is not applicable to EC devices used in any other category of aircraft.	The statement that "*The specification is not applicable to EC devices used in any other category of aircraft*" clouds how CAP 1391 Chapter 6 should be interpreted in light of CAP 1391 Appendix E.
6.13	GNSS meets TSO-C199 Class B for Traffic Awareness Beacon Systems (TABS)	Yes
6.14	DF=18 capable device	N/A – This is a DO-260B concept
6.15	Transmit Airborne Position, Aircraft Identification and Category and Aircraft Operational Status messages	Yes – as per DO-282B ping978EC provides the ability to configure the aircraft call sign using the uAvionix configuration application prior to flight. There is a means to change this during flight, but may not be supported by all autopilots. The aircraft's latitude and longitude are provided by the integrated position source. The length and width of the aircraft are programmable into the ping978EC using the uAvionix configuration app. Velocity is a calculated GPS ground speed using filtered position data.

List of CAP 1391 Chapter 6 requirements of possible of relevance to 978MHz UAT ADS-B transceivers		
Para	**Requirement**	**ping978EC Compliance**
6.16	Minimum Class A0	Yes – ping978EC meets the performance antenna and output requirements of Class A1S (A1 Single Antenna) INCOMP as referenced in TSO-C154c and defined in RTCA/DO-282B. The "INCOMP" refers to the following exception to TSO-C154C 3.a.(2).(a): • ping978EC receives ADS-B, ADS-R, TIS-B, and FIS-B messages, but only delivers ADS-B, ADS-R, and TIS-B reports (excluding FIS-B reports). • Specific deviations to DO-282B are identified in Appendix 3
6.20	The equipment does not affect the safety of persons, or the safe operation of the aircraft by causing interference to other radio users, and the equipment transmits data that is correct and appropriate for the device	Yes – See FCC FCC Grant of Equipment Authorization in Appendix 4
6.21	Receiver functionality	Yes – ADS-B IN on 1090MHz ADS-B and 978MHz UAT ADS-B
6.22	The manufacturer should maintain adequate records covering the manufacture, hardware and software development aspects, test requirements and test results for the EC device and hold these details in an appropriate technical file	Yes - There is no DoCC process for acceptance of 978MHz UAT devices onto the CAP 1391 Approved List, but uAvionix is an FAA Audited and Approved Avionics manufacturer holding full records of development, testing and manufacturing on file.
6.23	Subsequent modifications or changes to the EC device	Yes - There is no DoCC process for acceptance of 978MHz UAT devices onto the CAP 1391 Approved List so no modifications need to be reported to the CAA. However, this SoC will be updated whenever modifications affect this SoC.
6.24	The CAA will record the details of the EC device, its manufacturer and the declaration. The declaration will be reviewed for completeness and if considered satisfactory, the manufacturer will be formally advised that their EC device can be considered as conforming to CAA Equipment Approval LA301076. This is a single approval that will apply to any EC device manufactured according to this process and formally accepted by the CAA.	N/A – CAA is not using the CAP 1391 Compliance List for 978MHz UAT ADS-B devices.
6.28	1090MHz/RTCA DO-260B requirements	Yes – covered by DO-282B compliance
6.29	TABS Class B position source required setting[2]	
	NIC (Rc < 0.5nm)	Yes - less than 0.2 nm when installed with adequate GPS sky view.
	NAC_P	Yes – NAC_P less than 0.05 nm when installed with adequate GPS sky view.

[2] Note that Changes in NAC_P, NAC_V, SDA, and SIL are broadcast within 10 seconds and Changes in NIC are broadcast within 12 seconds.

List of CAP 1391 Chapter 6 requirements of possible of relevance to 978MHz UAT ADS-B transceivers		
Para	**Requirement**	**ping978EC Compliance**
	NAC_V – 1 (10m/s)	Yes – NAC_P less than 10 m/s when installed with adequate GPS sky view.
	SIL - 1 (1x10-3 /hr)	Yes - SIL=1 (TABS TSO-C199)
	SIL Supplement	Yes - The ping978EC is a highly integrated system, which accepts source data only from a known set of sensors. The SIL Supplement flag is set based on the geometric position source, where GNSS sources are based on exceeding NIC radius of containment on a “per hour” basis, versus “per sample” for inertial or DME/LOC systems. ping978EC GNSS compatibility is limited to “per-hour” solutions, and will encode and transmit its SIL Supplement as such.
	SDA - 1	Yes – SDA=1
6.30	Receiver recommendations for portable EC devices	Yes – As per DO-282B
6.34	Device Testing	Yes – As per DO-282B
6.35	Requirements for the EC device operating manual	Yes – where relevant for UAS operations.

Compliance with CAP 1391 Appendix A Acceptable Means of Compliance

CAP 1391 Appendix E does not provide guidance as to how CAP 1391 Appendix A Acceptable Means of Compliance should be interpreted for 978MHz UAT ADS-B devices. As CAP 1391 Appendix A addresses 1090MHz ADS-B and RTCA DO-260B, compliance of 978MHz UAT ADS-B devices is open to reinterpretation. Many RTCA DO-260B 1090MHz ADS-B standards have equivalents in RTCA DO-282B 978MHz UAT ADS-B, **but not all**. ping978EC compliance with RTCA DO-282B, confirmed above, addresses many of the RTCA DO-260B requirements specified in CAP 1391 Third Edition.

List of CAP 1391 Appendix A Acceptable Means of Compliance items of possible of relevance to 978MHz UAT ADS-B transceivers		
AMC	**Requirement**	**ping978EC Compliance**
1391-4.1	Polarisation The operating manual should contain sufficient information to allow the user to set up the device antenna in such a way that it provides vertical polarisation and thereby effectively allows the EC device to operate at its intended, optimal performance level.	Yes
1391-4.2	Maximum total number of extended squitters	Yes – DO-282B equivalent applies
1391-4.3	Spurious emission radiation	Yes – DO-282B equivalent applies. Also see FCC Grant of Equipment Authorization in Appendix 4.
1391-4.4	ADS-B out requirements Due to the reduced transmitter power of EC devices covered by this requirement, it is accepted that the minimum air-to-air range specified in ICAO Annex 10, 5.1.1.3 for extended squitter transmitting and receiving systems in the classes specified, may not be supported.	Yes
1391-4.5	RF peak output power (maximum) The maximum RF peak output power of each pulse of each transmitted message at the antenna terminals of the EC device shall not exceed 16 dBW (40W). The operating manual should contain sufficient information to allow the user to set up the device antenna in such a way that it effectively allows the EC device to operate at its intended, optimal performance level.	Yes - 20W Nominal (43dBm)
1391-4.6	ADS-B message baseline format and structures ADS-B messages shall use Extended Squitter format for DF = 18 transmissions in which CF=0 or 1 (that is, DF=18 Extended Squitters that carry ADS-B messages).	N/A - DO-282B equivalent applies. ping978EC is a 978MHz UAT ADS-B transceiver compliant with DO-282B. In the context of the DO-282B standard, Downlink Format 18 is not a native UAT message structure.
1391-4.7	ADS-B Aircraft Identification and Category Messages The device shall have the facility to programme/reprogramme the ICAO 24 bit address.	Yes – ping978EC complies with CAP 1391 Appendix E requirement to permanently operate in time-based self-assigned aircraft address (ADDRt) mode. ping978EC provides the ability to configure the emitter category using the uAvionix configuration application prior to flight. Emitter category when installed on a UAS should be “UAV”.
1391-4.8	Mode A Code 1000 Refer to RTCA DO-260B	N/A - DO-282B equivalent applies

List of CAP 1391 Appendix A Acceptable Means of Compliance items of possible of relevance to 978MHz UAT ADS-B transceivers		
AMC	**Requirement**	**ping978EC Compliance**
1391-4.9	Extended Squitter Aircraft Status Message with TYPE Code=28 If the EC device supports Extended Squitter Aircraft Status Message TYPE Code=28 for "Emergency/Priority Status" Subfield and/or "Mode A (4096) Code" Subfield in Aircraft Status Messages, the device should comply with RTCA DO260B	Yes – covered by DO-282B ping978EC provides a means to set the 'Squawk Code' to indicate the RPIC has identified an emergency, radio communication failure, or unlawful interference provided the autopilot supports the interface necessary to change the 'Squawk Code' appropriately.
1391-4.10	Power-on initialization RTCA DO-260B/EUROCAE ED-102A §2.2.3.3.2.1.1 a and b are applicable, but c is not applicable. For b, given that appropriate message data is provided to the ADS-B Transmit stage, the EC device, should be capable of transmitting ADS-B messages within a reasonable time period after power-on.	Yes - DO-282B equivalent applies
1391-4.11	ADS-B Transmission Device Message Processor characteristics The EC device should process the available data and format the appropriate messages in accordance with the relevant subsections of RTCA DO260B	Yes - DO-282B equivalent applies
1391-4.12	Altitude data Refer to RTCA DO-260B/EUROCAE ED-102A §2.2.5.1.5 a. for pressure altitude or b. for GNSS HAE. It is envisaged that a Basic/transmit-only device would report GNSS height, whereas a more elaborate Intermediate device may use a barometric altitude sensor. Suitable provision to set up an EC device incorporating a barometric altitude sensor should be made, i.e. as part of a status display. Also, the operating manual should provide sufficient information for this to be practically achievable.	Yes - DO-282B equivalent applies ping978EC assumes there is no additional Mode S transponder with altitude encoder installed on the UAS, therefore: • ping978EC has an integrated barometric pressure sensor for inclusion of barometric pressure altitude in the ADS-B message set • The integrated barometric pressure sensor is of similar quality to sensors utilised in other uAvionix certified TSO-C88b products but does not hold TSO-C88b certification.
1391-4.13	Transponder controls which are not intended to be operated in flight	N/A
1391-4.14	EMI compatibility All EC device operating manuals should contain instructions on how to:	Yes
	▪ deactivate the EC device transmitter when the EC device is used on an aircraft with an ATCRBS or Mode-S transponder;	N/A – Not relevant to UAVs, where ping978EC will not be used alongside a Mode S transponder
	▪ mount the device antenna(s) so that it does not compromise the operation of any other proximate antenna or system;	Yes
	▪ carry out checks to ensure that the EC device does not compromise the operation of any co-located communication or navigation equipment.	Yes
	It is the responsibility of the operator to ensure the EC device causes no harmful interference to other onboard equipment	Operator responsibility

Statement of Compliance – ping978EC

List of CAP 1391 Appendix A Acceptable Means of Compliance items of possible of relevance to 978MHz UAT ADS-B transceivers		
AMC	**Requirement**	**ping978EC Compliance**
1391-4.15	Operational characteristics and functional requirements It is recognised that EC devices will not be subject to routine maintenance and tests throughout their lifecycle in the same way that conventional avionics equipment would be. Therefore, the option of providing a simple form of built-in confidence checking and failure detection and indication, if the device is capable of supporting these, is highly recommended. It is highly recommended that a means be provided for the operator to establish confidence that the EC device is functioning correctly. The EC device should also incorporate some means of monitoring and alerting the operator to any failure condition associated with the transmission of erroneous data, for example data which indicates that the participant address or 24-bit aircraft address is all zeroes or all ones.	Yes – ping978EC provides an API interface enabling integration with the UAV's Autopilot/Flight Controller. ping978EC reports failure condition through this API. 24-bit aircraft address set to all zeros or all ones is one such reported failure condition.
1391-4.16	Lithium batteries	N/A – ping978EC does not include batteries

APPENDIX 3 – RTCA DO-282B Deviations

Software Qualification

Requirement Paragraph(s)	TSO-C154c Paragraphs 3.e, 5.m, 6.h and RTCA/DO-282B 2.1.10
Requirement Summary	Perform software qualification and submit documentation according to RTCA/DO-178B
Deviation	No use of RTCA/DO-178B
Equivalent Level of Safety (ELOS)	The latest issuance of DO-282(), DO-282C 2.1.10 removed the requirement to use DO-178, allowing the regulator to specify the Means of Compliance in TSO-C154(). The uAvionix ping978EC has been developed to uAvionix's software development processes and standards, and has undergone system level testing and verification. In recognition of this process and the ping978EC service history, uAvionix declares that the ping978EC meets the Minor failure classification. Subsequently, the SDA value of ping978EC value of "1", which is equivalent to DAL D.

Electronic Hardware Qualification

Requirement Paragraph(s)	TSO-C154c Paragraphs 3.f, 5.n, and 6.i
Requirement Summary	Perform electronic hardware qualification and submit documentation according to RTCA/DO-254
Deviation	No use of RTCA/DO-254
Equivalent Level of Safety (ELOS)	The uAvionix ping978EC has been developed to uAvionix's hardware development processes and standards, and has undergone system level testing and verification. In recognition of this process and the ping978EC service history, uAvionix declares that the ping978EC meets the Minor failure classification. Subsequently, the SDA value of ping978EC value of "1", which is equivalent to DAL D.

System Design Assurance (SDA) Field Encoding

Requirement Paragraph(s)	RTCA/DO-282B 2.2.4.5.4.8
Requirement Summary	Encode the SDA field according to Table 2-47, which includes notes specifying software and hardware design assurance levels per DO-178B and DO-254.
Deviation	ping978EC does not employ DO-178() nor DO-254 for design assurance. Instead, the system uses alternate means to comply with the Major failure condition classification. While not clearly part of the DO-282B "shall" statement, uAvionix warrants that ping978EC is capable of broadcasting an SDA of "1", which is equivalent to DAL D. Further, as described in RTCA/DO-282B Table 2-63, the SDA field is defined as an Input Data Element. Users are able to configure a ping978EC to broadcast an SDA value as appropriate for their installation. As a system integration requirement, the TSO does not and cannot directly address the requirement for position source design assurance through a "shall" statement.
Equivalent Level of Safety (ELOS)	The SDA field continues to be set as specified by the Input Data Element. The deviation request is to clarify notes to Table 2-47 which are prescriptive and presumptive in their means of compliance.

Suppression Bus Output

Requirement Paragraph(s)	RTCA/DO-282B 2.2.12
Requirement Summary	"UAT equipment **shall** provide an output signal suitable for sending suppression signals."
Deviation	To not provide a suppression bus output
Equivalent Level of Safety (ELOS)	The rationale for the mutual suppression bus output was explained by Tom Pagano from the FAA Tech Center in the following ICAO UAT paper, ICAO ACP WG-C UAT Subgroup, UAT SARPs development Meeting #8: The intention is to ensure that UAT transmissions, or more specifically their spurious emissions at 1030 MHz, are not detected as interrogation pulses. Should those pulses align in time and appear to be valid interrogation pulses, the transponder would transmit a reply, creating FRUIT (False Replies Unsynchronized In Time). The "typical (interrogation) receiver threshold for these transponders is around -80 dBm". The paper mentions allowance for diplexers with sufficient isolation to not require the suppression bus output. Analysis of the tailBeacon FCC Part 87 Test Report, which utilizes similar hardware to ping978EC, reveals spurious emissions during transmission of approximately 32 dbµV/m at 3m. That translates to an Effective Radiated Power of -65 dBm. To ensure the receiver does not receive a signal greater than -80 dBm, free space path loss must exceed 15 dB. The ping978EC is not intended to be installed with an existing transponder, and therefore the need for a suppression bus is negated.

Barometric Vertical Rate

Requirement Paragraph(s)	RTCA/DO-282B 2.2.7.1.a Table 2-63 Line 15
Requirement Summary	"The UAT ADS-B Transmitting Subsystem **shall** accept the input data elements listed in Table 2-63 via an appropriate data input interface and use such data to establish the corresponding ADS-B Message contents."
Deviation	To not provide a Barometric Vertical Rate input
Equivalent Level of Safety (ELOS)	The ping978EC is a highly integrated system, with an application specific transmitter, and accepts source data only from a known set of sensors. Barometric Vertical Rate is not one of these sensors. Further, the vertical velocity source may be reported as either Geometric or Barometric, and neither § 91.227 nor AC 20-165B Paragraph 3.9 requires a specific vertical velocity source. As such, the vertical velocity source is hardcoded to GNSS in this system, and the data is derived as appropriate from the Geometric Vertical Rate input. Having the Barometric Vertical Rate input available would be an unused function, and result in unnecessary verification activities.

SIL Supplement Flag Input

Requirement Paragraph(s)	RTCA/DO-282B 2.2.7.1.a Table 2-63 Line 24
Requirement Summary	"The UAT ADS-B Transmitting Subsystem **shall** accept the input data elements listed in Table 2-63 via an appropriate data input interface and use such data to establish the corresponding ADS-B Message contents."
Deviation	To not provide a SIL Supplement Flag input
Equivalent Level of Safety (ELOS)	The ping978EC is a highly integrated system, which accepts source data only from a known set of sensors. The SIL Supplement flag is set based on the geometric position source, where GNSS sources are based on exceeding NIC radius of containment on a "per hour" basis, versus "per sample" for inertial or DME/LOC systems. ping978EC GNSS compatibility is limited to "per-hour" solutions, and will encode and transmit its SIL Supplement as such.

TCAS/ACAS Operational Input

Requirement Paragraph(s)	RTCA/DO-282B 2.2.7.1.a Table 2-63 Line 29
Requirement Summary	"The UAT ADS-B Transmitting Subsystem **shall** accept the input data elements listed in Table 2-63 via an appropriate data input interface and use such data to establish the corresponding ADS-B Message contents."
Deviation	To not provide a TCAS/ACAS Operational Input
Equivalent Level of Safety (ELOS)	2.2.4.5.4.12.3 specifies that we shall accept information from an appropriate interface that indicates whether or not the TCAS/ACAS system is operational. AC 20-165B 3.6.2 requires equipment integration so that the "TCAS installed and operational" and the "TCAS traffic status" parameters indicate the real-time status of the TCAS II, if a TCAS II system is installed on the aircraft. ping978EC does not have an interface to TCAS II systems for providing operational and traffic status. ping978EC is not intended for installation on TCAS II equipped aircraft. This system limitation will be noted in the Installation Manual(s) as a System and/or Installation Limitation. **Note:** A previous deviation was approved for tailBeacon/skyBeacon with the wording that it does "not support installation on aircraft with an active TCAS/ACAS system". This should have been limited to "an active TCAS II system", as only that system provides resolution advisories and is subject to interconnect. ping978EC will encode TCAS/ACAS Operational to 0 (ZERO/NO). Per RTCA/DO-282B 2.2.7.1.a Table 2-63 Line 30, the TCAS/ACAS Resolution Advisory Active Flag will be set to 0 (ZERO/NO), as the input is "required only if ADS-B Transmitting Subsystem is intended for installation with TCAS/ACAS".

APPENDIX 4 – uAvionix ping978EC Hardware FCC Grant of Equipment Authorization

uAvionix ping978EC shares a common hardware platform with the ping2020i 978MHz UAT ADS-B transceiver. This hardware platform has an FCC Grant of Equipment Authorization.

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

TCB

TUV SUD BABT
Octagon House, Concorde Way,
Segensworth North,
Fareham, PO15 5RL
United Kingdom

Date of Grant: 05/09/2016

Application Dated: 05/09/2016

UAVIONIX Corporation
300 Pine Needle Ln
Bigfork, MT 59911

Attention: Paul Beard , CEO

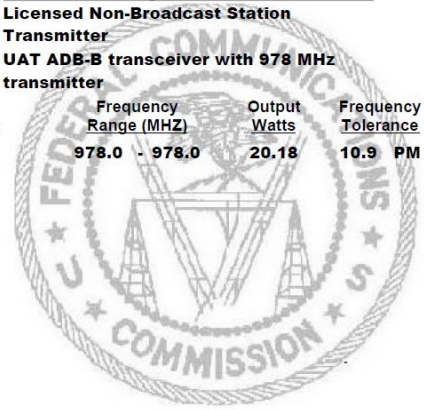
NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: 2AFFTUAT016
Name of Grantee: UAVIONIX Corporation
Equipment Class: **Licensed Non-Broadcast Station Transmitter**
Notes: **UAT ADB-B transceiver with 978 MHz transmitter**

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	87	978.0 - 978.0	20.18	10.9 PM	1M29G1D

Output power listed is conducted.



APPENDIX 5 – uAvionix ping2020i FAA Authorization

uAvionix ping978EC shares a common hardware platform with the ping2020i 978MHz UAT ADS-B transceiver. Ping2020i gained FAA Authorization in 2016.

U.S. Department
of Transportation
Federal Aviation
Administration

800 Independence Ave., S.W.
Washington, D.C. 20591

APR 29 2016

Mr. Andy Leimer
Federal Communications Commission
7435 Oakland Mills Road
Columbia, MD 21046

Dear Mr. Leimer:

The Federal Aviation Administration (FAA) has reviewed the Federal Communications Commission (FCC) Notifications of Authorization Request from EMI, Inc., and µAvionix, Inc., dated March 11, 2016 and April 12, 2016 respectively, for the µAvionix, Inc. Universal Access Transceiver (UAT) Automatic Dependent Surveillance - Broadcast (ADS-B) ID 2AFFT, model UAT016. The FAA Spectrum Engineering Services Group has no objection to a grant of the equipment certification by the FCC for the µAvionix, Inc. UAT/ADS-B transceiver for installation and use on Unmanned Aircraft Systems and General Aviation aircraft in the National Airspace System.

If you require any additional information, please contact Ms. Annette Allender, Electronics Engineer, Spectrum Planning and International Group, at (202) 267-3893 or via e-mail annette.allender@faa.gov.

Sincerely,

Michael Richmond
Acting Manager, Spectrum Planning
and International Group

cc:
EMI, Inc.
µAvionix, Inc.