GPS

ANN-MS

Active GPS antenna

Data Sheet

Abstract

The ANN active GPS antenna with integrated low-noise amplifier (LNA) is the perfect match to the u-blox GPS receivers.

48 x 40 x 13 mm

Document Information		
Title	ANN-MS	
Subtitle	Active GPS antenna	
Document type	Data Sheet	
Document number	UBX-15025046	(previously GPS-X-02021)
Revision, date	R14	24-Nov-2017
Document status	Production Information	

Document status information	
Objective Specification	Document contains target values. Revised and supplementary data will be published later.
Advance Information	Document contains data based on early testing. Revised and supplementary data will be published later.
Early Production Information	Document contains data from product verification. Revised and supplementary data may be published later.
Production Information	Document contains the final product specification.

u-blox reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. Reproduction, use, modification or disclosure to third parties of this document or any part thereof without the express permission of u-blox is strictly prohibited.
The information contained herein is provided "as is" and u-blox assumes no liability for the use of the information. No warranty, either express or implied, is given, including but not limited, with respect to the accuracy, correctness, reliability and fitness for a particular purpose of the information. This document may be revised by u-blox at any time. For most recent documents, visit www.u-blox.com.
Copyright © 2017, u-blox AG.
u-blox is a registered trademark of u-blox Holding AG in the EU and other countries.

Contents

Contents **3**

1 Functional description **4**
1.1 Overview 4
1.2 Benefits 4
1.3 Features 4

2 Mechanical specification **5**
2.1 Dimensions 5
2.2 Mechanical data 6
2.3 Connectors 6
2.3.1 SMA connector specification 7
2.3.2 SMB connector 8
2.3.3 MCX connector 9

3 Electrical specification **10**

4 Environmental specification **10**

5 Product labeling **11**
5.1 Explanation of codes 11

6 Ordering information **12**

Revision history **12**

Contact **13**

1 Functional description

1.1 Overview

The ANN-MS is a high performance Active Antenna that enables the full capabilities of u-blox GPS receivers. This compact and easy to use antenna is simple to integrate and can be operated at a supply voltage of 2.7 V to 5.5 V.

1.2 Benefits

- Easy to use
- Compact size
- High performance
- Fast and easy integration
- No antenna know-how necessary

1.3 Features

- Built-in low noise amplifier with 29 dB gain and 0.9 dB noise figure
- 5 m coaxial cable
- Magnetic base suitable for mounting on car roof
- Industrial temperature range: –40 °C to +85 °C
- Wide range of supply voltage: 2.7 V to 5.5 V

2 Mechanical specification

2.1 Dimensions

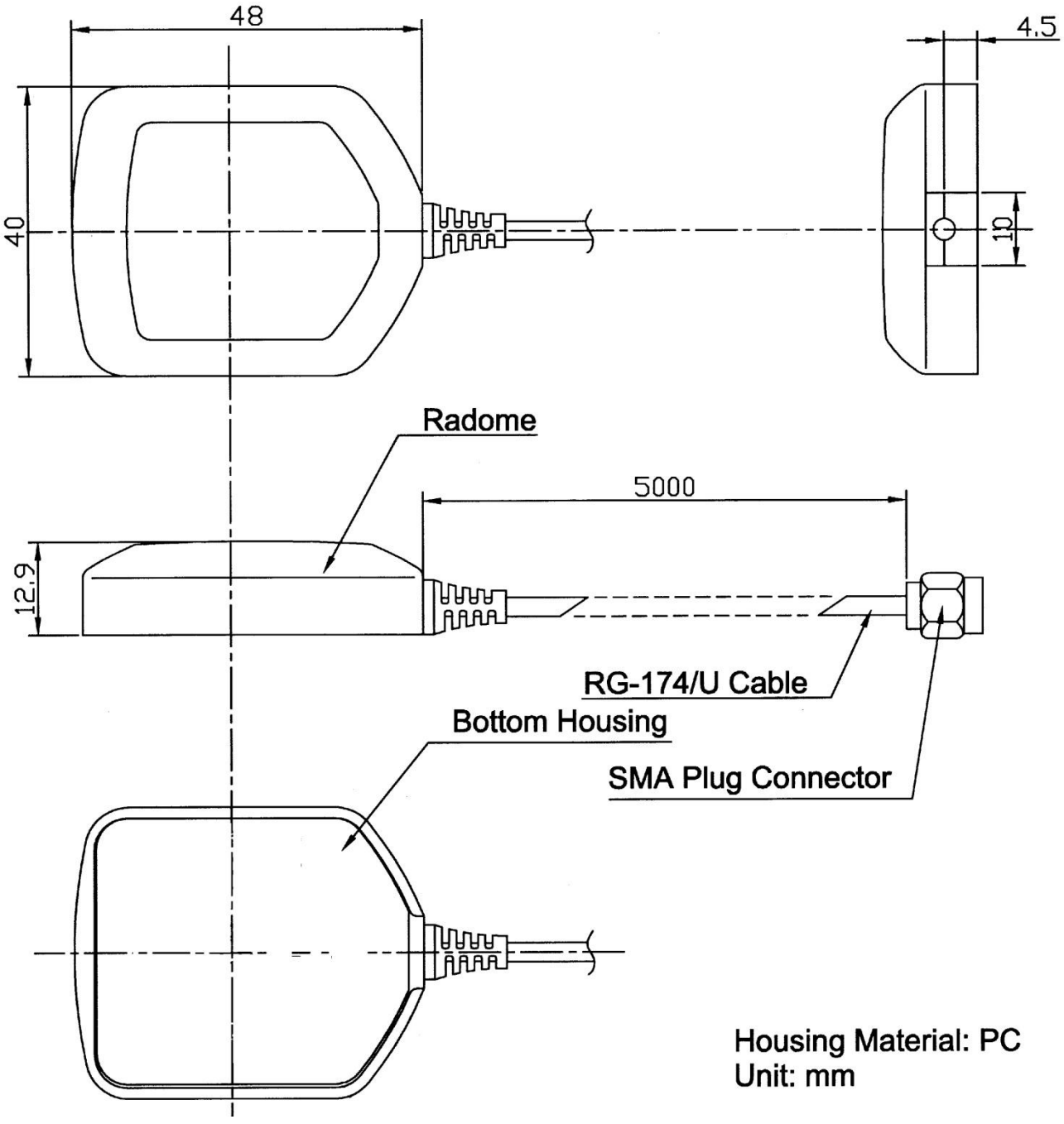

Figure 1: Mechanical outline

2.2 Mechanical data

Parameter	Specification
Weight	≤ 105 g
Size	48 x 40 x13 mm
Cable	5m RG174 standard
Connectors	SMA, SMB, MCX, FAKRA
Mounting	Magnetic base
Housing color	Black

Table 1: Mechanical specifications

2.3 Connectors

Connector types overview	
	
SMA Plug (MB): ANN-MS-0	**SMB Plug (MC): ANN-MS-1**
	
MCX Plug (ME): ANN-MS-2	

Table 2: Connector types

2.3.1 SMA connector specification

Parameter	Specification
Impedance	50 Ω
Frequency range	0 – 12.4 GHz on flexible cable
Dielectric withstanding voltage	RG-316: 250 V_{RMS} max. at sea level
VSWR	Straight: 1.3 max.
Contact resistance	Center contact: 6 mΩ max. Outer contact: 2 mΩ max.
Insulator resistance	5000 MΩ min.

Table 3: SMA connector electrical specifications

Parameter	Material	Finish
Connector body	Brass per JIS-C3604BD	Nickel or gold plating
Center contact male	Brass per JIS-C3604BD	Gold plating
Insulator	PTFE	None
Crimp ferrule	Annealed copper	Same as body

Table 4: SMA connector material specifications

Parameter	Specification
Engage force	0.23 Nm max.
Disengage force	0.23 Nm max.
Contact retention	2.7 kg min.
Durability	500 cycles min.

Table 5: SMA connector mechanical specifications

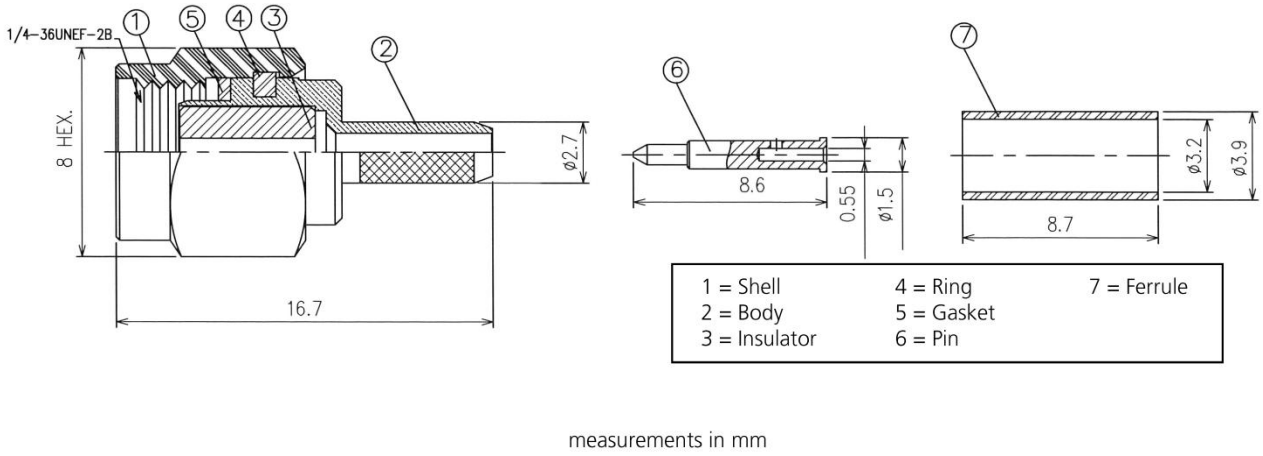

Figure 2: SMA connector

2.3.2 SMB connector

Parameter	Specification
Impedance	50 Ω
Frequency range	0-4 GHz
Dielectric withstanding voltage	350 V_{RMS} max. at sea level
VSWR	Straight: 1.3 max. Right angle 1.5 max.
Contact resistance	Center contact: 6 mΩ max. Outer contact: 2.5 mΩ max.
Insulator resistance	1000 MΩ min.

Table 6: SMB electrical specifications

Parameter	Material	Finish
Connector body	Brass per JIS-C3604BD	Nickel or gold plating
Insulator	PTFE	None
Crimp ferrule	Annealed copper	Nickel or gold

Table 7: SMB connector material specifications

Parameter	Specification
Engage force	6.4 kg max.
Disengage force	6.4 kg max.
Coupling nut retention	n/a
Coupling proof torque	n/a
Contact retention	1.8 kg min.
Durability	500 cycles min.

Table 8: SMB connector mechanical specifications

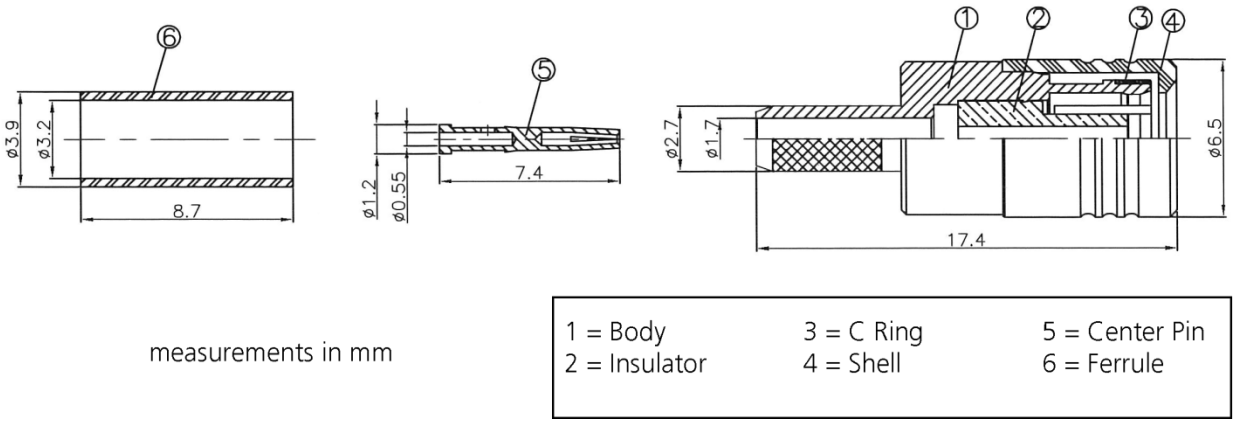

Figure 3: SMB connector

2.3.3 MCX connector

Parameter	Specification
Impedance	50 Ω
Frequency range	0-6 GHz
Dielectric withstanding voltage	335 V_{RMS} max. at sea level
VSWR	Straight: 1.3 max. Right angle: 1.5 max.
Contact resistance	Center contact: 5 mΩ max. Outer contact: 2.5 mΩ max.
Insulator resistance	1000 MΩ min.

Table 9: MCX connector electrical specifications

Parameter	Material	Finish
Connector body	Brass per JIS-C3604BD	Nickel or gold plating
Insulator	PTFE	None
Crimp ferrule	Annealed copper	Nickel or gold

Table 10: MCX connector material specifications

Parameter	Specification
Engage force	1.5 kg max.
Disengage force	2.0 kg max.
Contact retention	2.7 kg min.
Durability	500 cycles min.

Table 11: MCX connector mechanical specifications

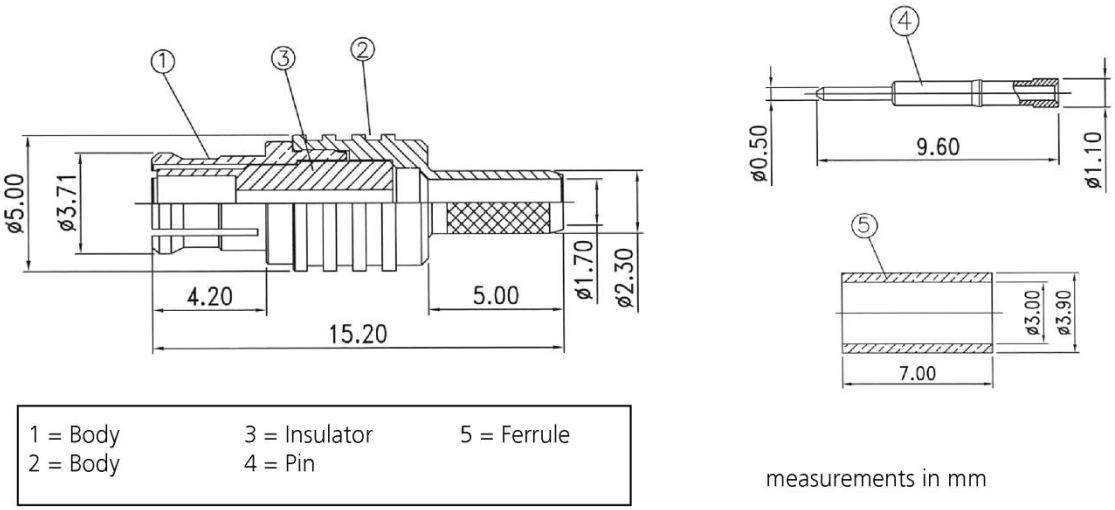

Figure 4: MCX connector

3 Electrical specification

The antenna electrical specifications are provided in Table 12.

Parameter	Specification
Frequency	1575 ± 3 MHz
VSWR	max. 2
Bandwidth	min. 20 MHz
Impedance	50 Ω
Peak gain	4 dBiC min. (on 7cm x 7cm ground plane)
Gain coverage	≥ -4 dBiC at –90°≤ θ ≤90° (over 75% volume)
Polarization	RHCP
Amplifier gain	typ. 29 dB (without cable)
Noise figure	typ. 0.9 dB
Output VSWR	max. 2.0
DC Voltage	2.7 V_{DC} to 5.5 V_{DC}
DC Current	typ 8.5 mA, ± 4.5 mA

Table 12: Antenna electrical specifications

4 Environmental specification

The antenna environmental specification is provided in Table 13.

Parameter	Specification
Operating temperature	–40 °C to +85 °C
Storage temperature	–40 °C to +85 °C
Vibration	Sine sweep,1G (0-P),10-150-10 Hz each axis
Humidity	40%~95% RH
IP code (IP protection rating)	IP56: protected against dust and powerful water jets

Table 13: Antenna environmental specifications

5 Product labeling

The product information label is found on the underside of the ANN-MS GPS antenna (see Figure 5). The label includes the product type number, which provides important information about the product.

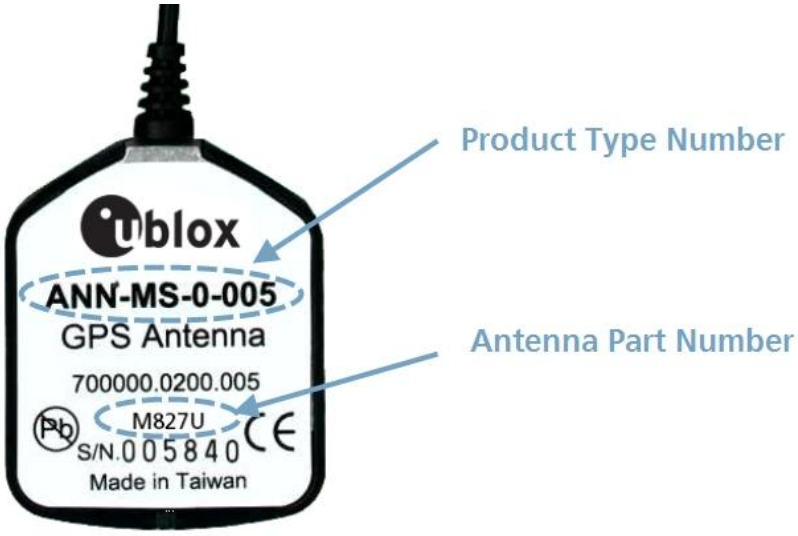

Figure 5: ANN-MS GPS antenna label(Antenna Part Number:M827U).

5.1 Explanation of codes

3 different product code formats are used. The **Product Name** is used in general communications about product families and variants. The **Ordering Code** includes options and quality, while the **Type Number** includes the hardware versions. Table 14 below details these 3 different formats:

Format	Structure
Product name	PPP-GV
Ordering code	PPP-GV-T
Type number	PPP-GV-T-XXX

Table 14: Product code formats

The parts of the product code are explained in Table 15.

Code	Meaning	Example
PPP	Product family	ANN
G	Product generation	M
V	Variant	S
T	Option	Defines connector type: 0 = SMA connector 1 = SMB connector 2 = MCX connector
XXX	Product Detail	Describes cable length 005 = 5 m cable

Table 15: Product code parts

6 Ordering information

Ordering No.	Product
ANN-MS-0-005-0	Active Antenna, 5m cable, SMA connector Single units
ANN-MS-1-005-0	Active Antenna, 5m cable, SMB connector Single units
ANN-MS-2-005-0	Active Antenna, 5m cable, MCX connector Single units

Table 16: Product ordering codes

Revision history

Revision	Date	Name	Status / Comments
-	4. Apr. 2003	gzur	Initial Release
A	30. Oct. 2003	gzur	New support address in Asia
B	02. Feb. 2006	gzur	RoHS Statement, table 2 (wider supply voltage range, lower power consumption)
C	20. Jul 2006	gzur	Section 2.3 and 5: New ANN-MS-3 with FAKRA connector
D	13. Dec. 2007	tgri	Connectors, CI
D1	16. Jan 2008	tgri	Connectors
D2	29 May 2008	tgri	Electrical Specification
D3	16 Jan 2009	tgri	IP Code
E	5 May 2010	tgri	New CI, info FAKRA connector
E1	28 Oct. 2010	tgri	Corrected voltage range in overview
F	8 Aug 2011	tgri	Added labeling information
F1	6 Sept. 2011	tgri	Added connector information Last revision with document number GPS-X-02021.
R13	14 Oct 2015	julu	Updated humidity specification in section 4 and u-blox contact information
R14	24 Nov 2017	rmak	Updated antenna specification in Section 1, Table 12, and u-blox India office contact information. FAKRA connector variant: ANN-MS-3 removed (EOL).