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)*
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.

Contents

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 … 6 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 27 dB gain and 1.8 dB noise figure
- 5 m coaxial cable
- Magnetic base suitable for mounting on car roof
- Industrial temperature range: –40 … +85°C
- Wide range of supply voltage: 2.7 … 6 V

2 Mechanical specification

2.1 Dimensions

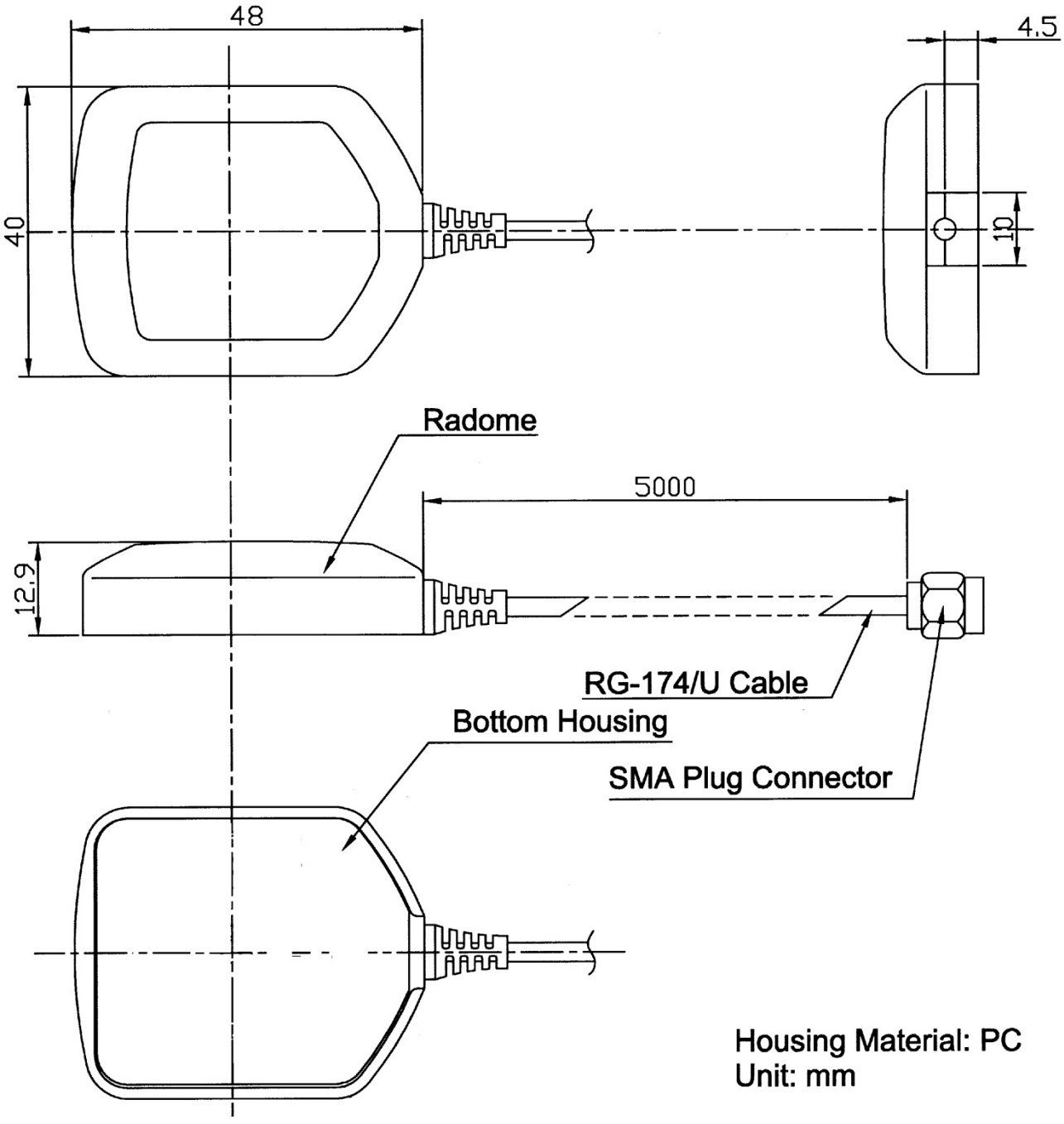

Figure 1: Mechanical outline

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 specification

2.3 Connectors

Connector types overview	
	
SMA Plug (MB): ANN-MS-0	**SMB Plug (MC): ANN-MS-1**
	
MCX Plug (ME): ANN-MS-2	**FAKRA SMB Jack (Blue) (FN): ANN-MS-3**

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 vrms 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 specification

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 specification

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 specification

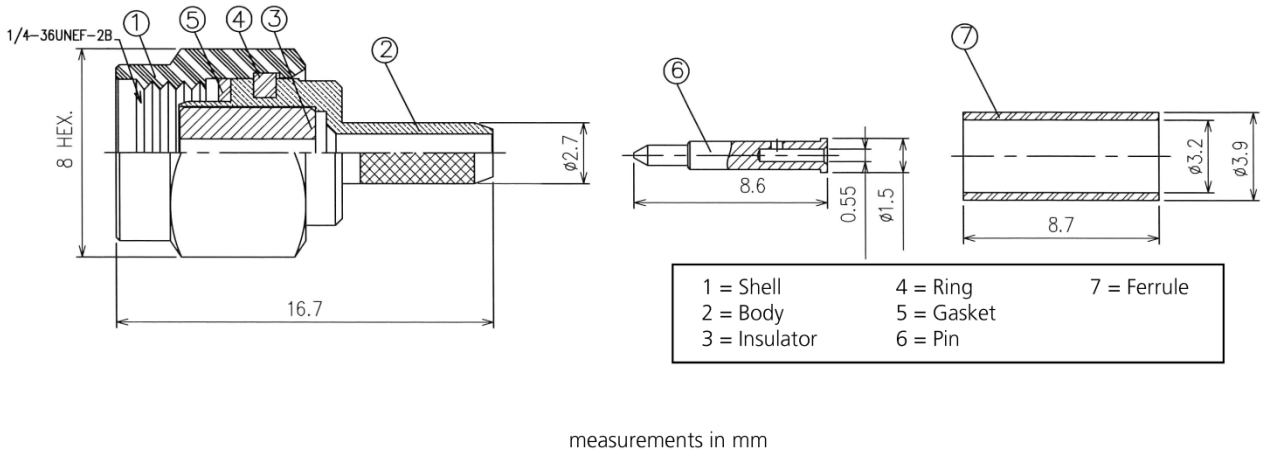

Figure 2: SMA connector

2.3.2 SMB connector

Parameter	Specification
Impedance	50 Ω
Frequency Range	0-4 GHz
Dielectric Withstanding Voltage	350 vrms 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 specification

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 specification

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 specification

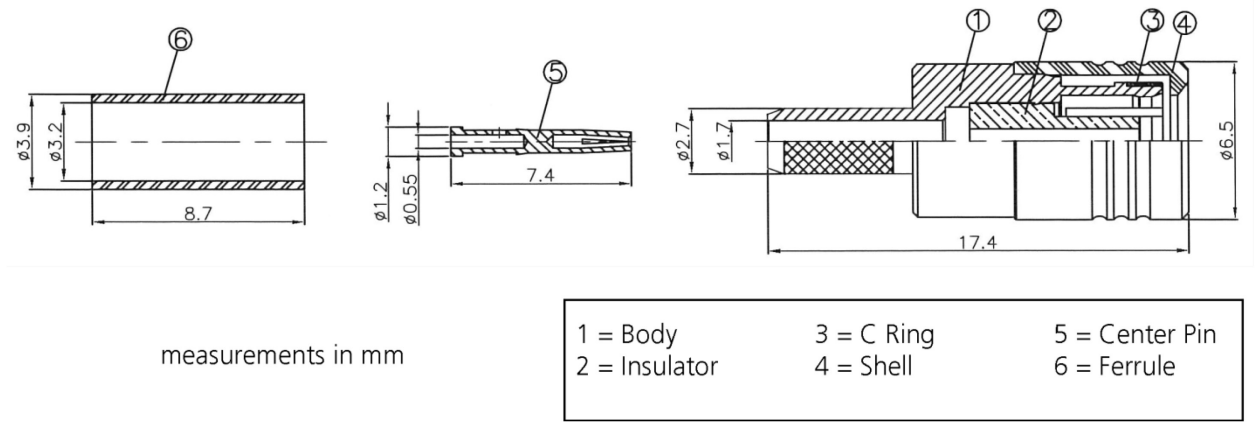

Figure 3: SMB connector

2.3.3 MCX connector

Parameter	Specification
Impedance	50 Ω
Frequency range	0-6 GHz
Dielectric Withstanding Voltage	335 vrms 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 specification

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 specification

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 specification

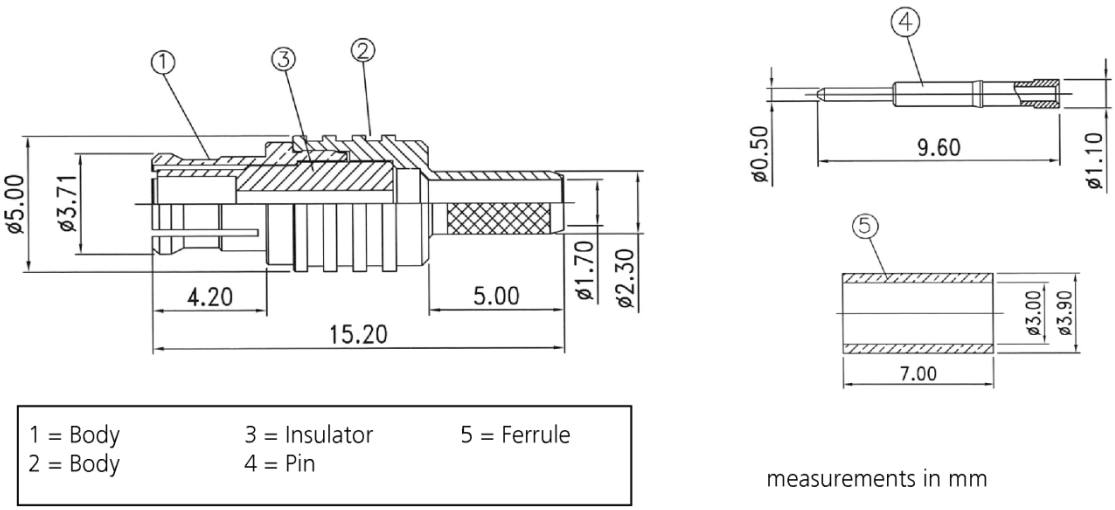

Figure 4: MCX connector

2.3.4 FAKRA connector

Parameter	Specification
Impedance	50 Ω
Frequency range	0-4 GHz
VSWR	Straight: 1.3 max.
Dielectric Withstanding Voltage	≥ 800 VRMS at sea level
Insulator resistance	1000 MΩ min.

Table 12: FAKRA connector electrical specification

Parameter	Material	Finish
Body	Brass	Nickel
Female center contact	Bronze	Gold
Insulation	Teflon	None
Ferrule	Brass	Nickel
Retaining Ring	Beryllium	None
Plastic housing	PA66	Blue

Table 13: FAKRA connector material specification

Parameter	Specification
Cable Retention Force	≥ 90 N
Contact Retention	≥ 100 N
Temperature Range	-40 - +85 °C
Durability (Matings)	25 min.

Table 14: FAKRA connector mechanical specification

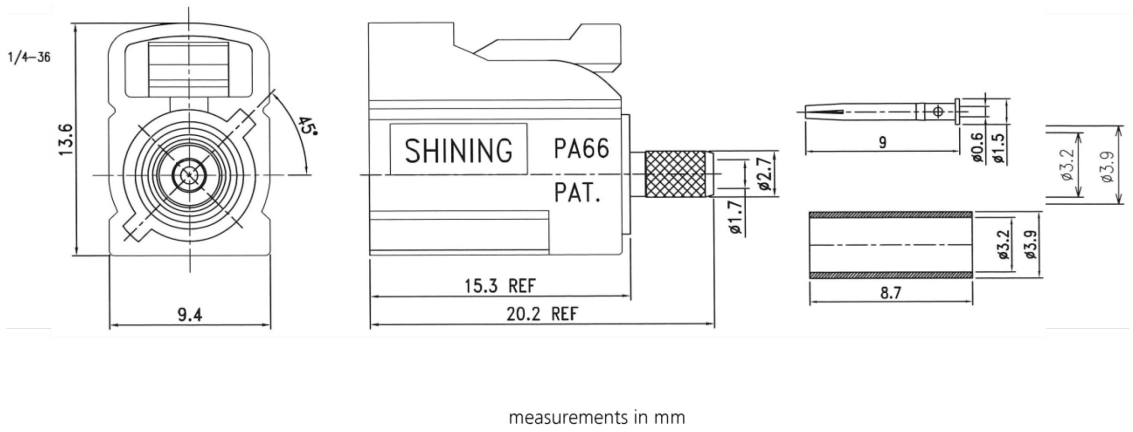

Figure 5: FAKRA connector

☞ Straight jack female, blue (RAL 5005), code C for GPS Telemetry and Navigation.

3 Electrical specification

The antenna electrical specification is provided in Table 15.

Parameter	Specification
Frequency	1575 ± 3 MHz
VSWR	max. 2
Bandwidth	min. 10 MHz
Impedance	50 Ω
Peak Gain	4 dBic min. (on 7cm x 7cm ground plane)
Gain Coverage	≥ -4dBic at –90°≤ θ ≤90°(over 75% volume)
Power Handling	1 watt
Polarization	RHCP
Amplifier Gain	typ. 27 dB (without cable)
Noise Figure	typ. 1.8 dB
Output VSWR	max. 2.0
DC Voltage	2.7 to 6.0 V DC
DC Current	typ 8.5 mA, ± 4.5 mA

Table 15: Antenna electrical specification

4 Environmental specification

The antenna environmental specification is provided in Table 16.

Parameter	Specification
Operating Temperature	-40 °C … +85 °C
Storage Temperature	-40 °C … +85 °C
Vibration	Sine Sweep,1G(0-P),10-150-10Hz each axis
Humidity	40%~95% RH
IP Code (IP Protection Rating)	IP56: protected against dust and powerful water jets

Table 16: Antenna environmental specification

5 Product labeling

The product information label is found on the underside of the ANN-MS GPS antenna (see Figure 6). The label includes the product type number, which provides important information about the product.

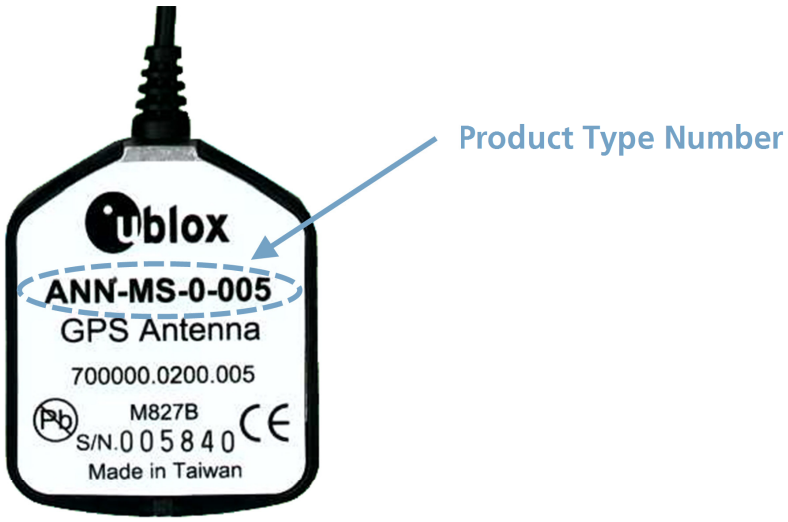

Figure 6: ANN-MS GPS antenna label

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 17 below details these 3 different formats:

Format	Structure
Product Name	PPP-GV
Ordering Code	PPP-GV-T
Type Number	PPP-GV-T-XXX

Table 17: Product code formats

The parts of the product code are explained in Table 18.

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 3 = Fakra connector
XXX	Product Detail	Describes cable length 005 = 5 m cable

Table 18: 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
ANN-MS-3-005-0	Active Antenna, 5m cable, FAKRA connector Single units

Table 19: Product Ordering Codes

Revision history

Revision	Date	Name	Status / Comments
-	4. Apr. 03	gzur	Initial Release
A	30. Oct. 03	gzur	New support address in Asia
B	02. Feb. 06	gzur	RoHS Statement, table 2 (wider supply voltage range, lower power consumption)
C	20. Jul 06	gzur	Section 2.3 and 5: New ANN-MS-3 with FAKRA connector
D	13. Dec. 07	tgri	Connectors, CI
D1	16. Jan 08	tgri	Connectors
D2	29 May 08	tgri	Electrical Specification
D3	16 Jan 09	tgri	IP Code
E	5 May 10	tgri	New CI, info FAKRA connector
E1	28 Oct. 10	tgri	Corrected voltage range in overview
F	8 Aug 11	tgri	Added labeling information
F1	6 Sept. 11	tgri	Added connector information Last revision with document number GPS-X-02021.
R13	14 Oct 15	julu	Updated humidity specification in section 4 and u-blox contact information

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