Armata 3G FPC Antenna

Part No. SRFC011 flexiiANT ® Product Specification

1. Features

- Antenna for 3G applications including MIMO systems.
- GSM850, GSM900, DCS1800, PCS1900, WCDMA2100
- Small form factor, only 30.0 x 28.5mm
- 1.13mm diameter RF cable with IPEX MHF connector
- Self-adhesive mounted
- Quick and simple integration minimizes design cycle
- Available in 3 standard cable lengths
- Suited to smaller devices such as ODBII

2. Description

Armata is intended for use with 3G applications. Suited for small devices with limited space. Designed to work with small host PCB's while still maintaining full coverage of the 3G bands. This product specification shows the performance of the antenna to cover a typical penta-band reception: GSM850/900/1800/1900 and WCDMA.

3. Applications

- ODBII units
- Femto / Pico base stations
- Small Tracker devices
- Remote monitoring
- Machine to Machine communication

4. Part Number

Armata: SRFC011

5. General Data

Product name	Armata
Part Number	SRFC011
Frequency	824-960MHz; 1710-2170MHz
Polarization	Linear
Operating temperature	-40°C to 85°C
Impedance with matching	50 Ω
Weight	< 0.5 g
Antenna type	FPC Self-adhesive 3M 468P
Dimensions (Antenna)	30 x 28.5 x 0.15 (mm)
Connection	IPEX

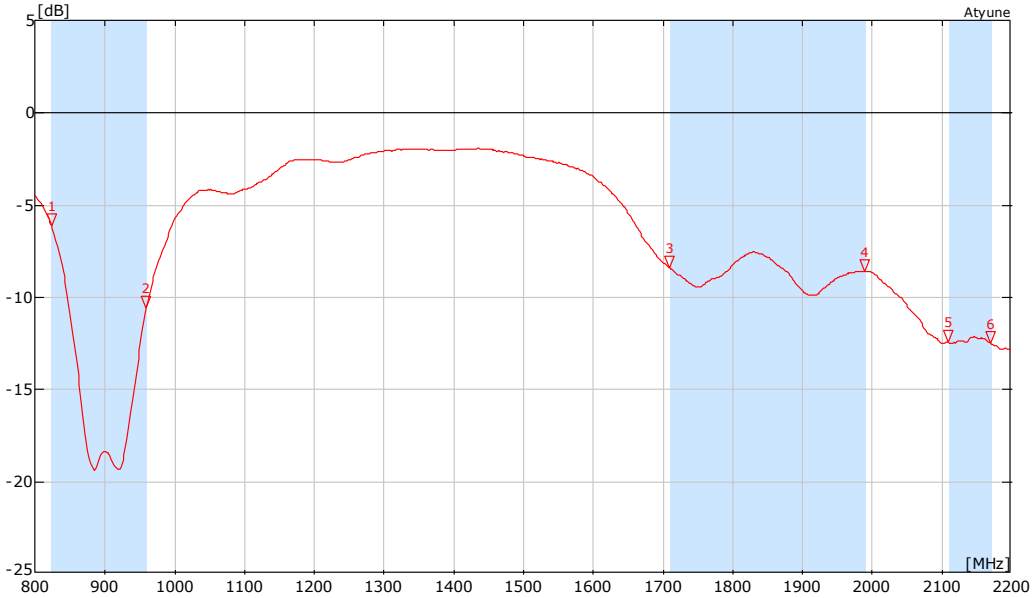
6. RF Characteristics

	824 – 960 MHz	1710 – 1990 MHz	2110 – 2170 MHz
Peak gain	2.46dBi	4.06dBi	3.89dBi
Average gain	-3.79dBi	-2.59dBi	-2.21dBi
Average efficiency	>40%	>55%	>60%
Maximum return loss	-6.0dB	-8.0dB	-12.0dB
Maximum VSWR	2.90:1	2.20:1	1.60:1

All data measured in a loaded condition
adhered to a plastic carrier free space.

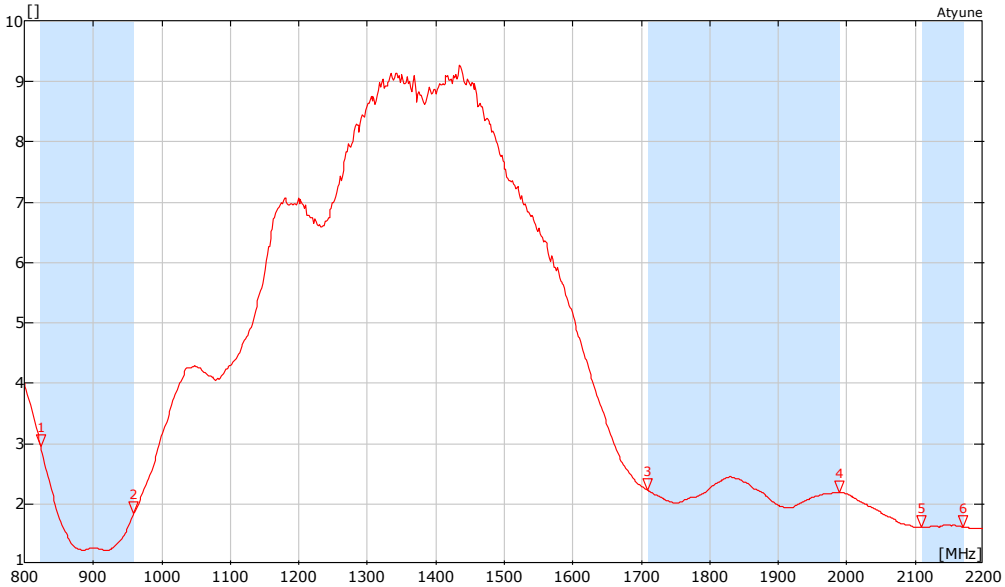
7. RF Performance

7.1 Return Loss



MARKERS:	MHz	dB	MHz	dB	MHz	dB
RD8011-MP.S1P - S11						
	1: 824	-6.10	3: 1710	-8.37	5: 2110	-12.42
	2: 960	-10.52	4: 1990	-8.56	6: 2170	-12.45

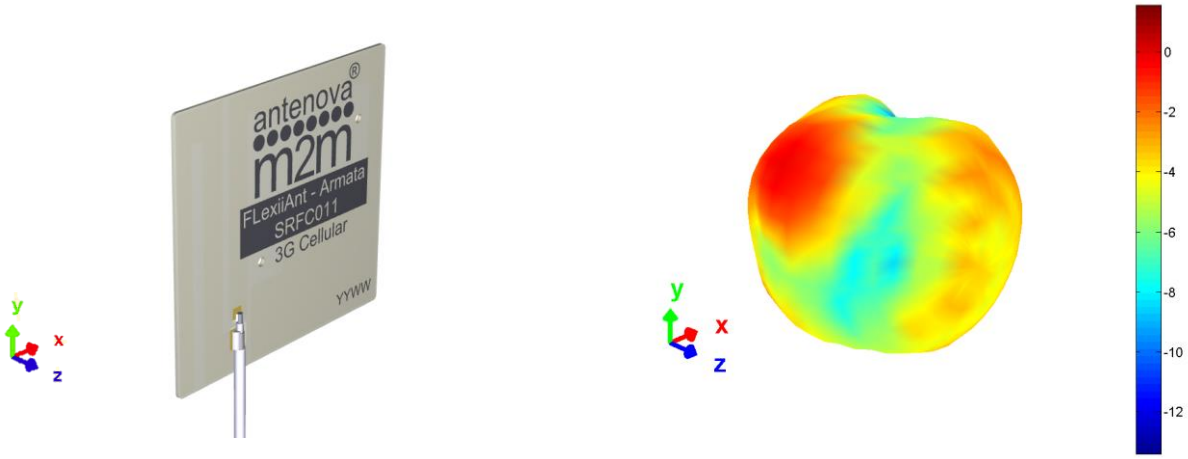
7.2 VSWR



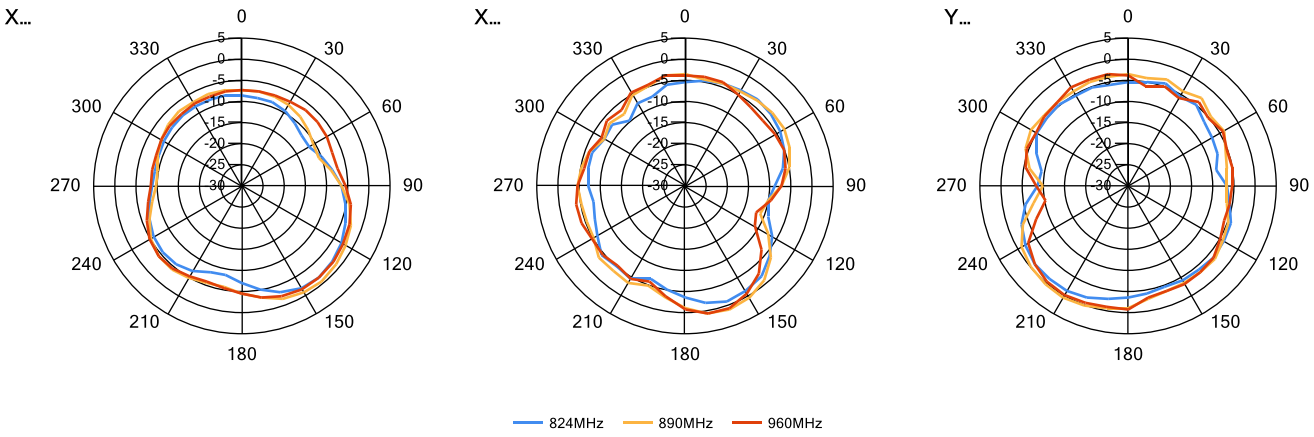
MARKERS:	MHz		MHz		MHz	
RD8011-MP.S1P - S11						
	1: 824	2.96	3: 1710	2.23	5: 2110	1.63
	2: 960	1.85	4: 1990	2.19	6: 2170	1.63

7.3 Antenna patterns

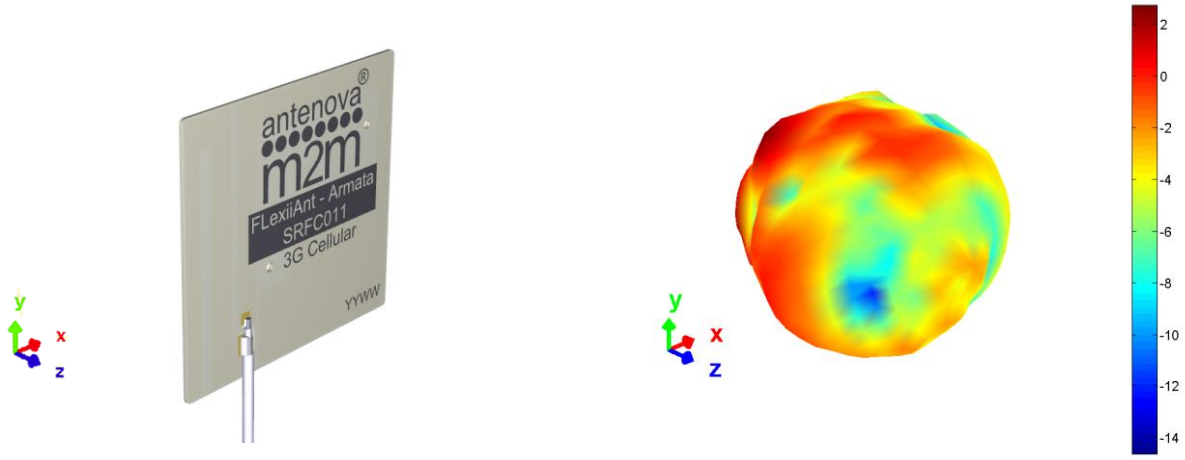
7.3.1 824 MHz – 960 MHz



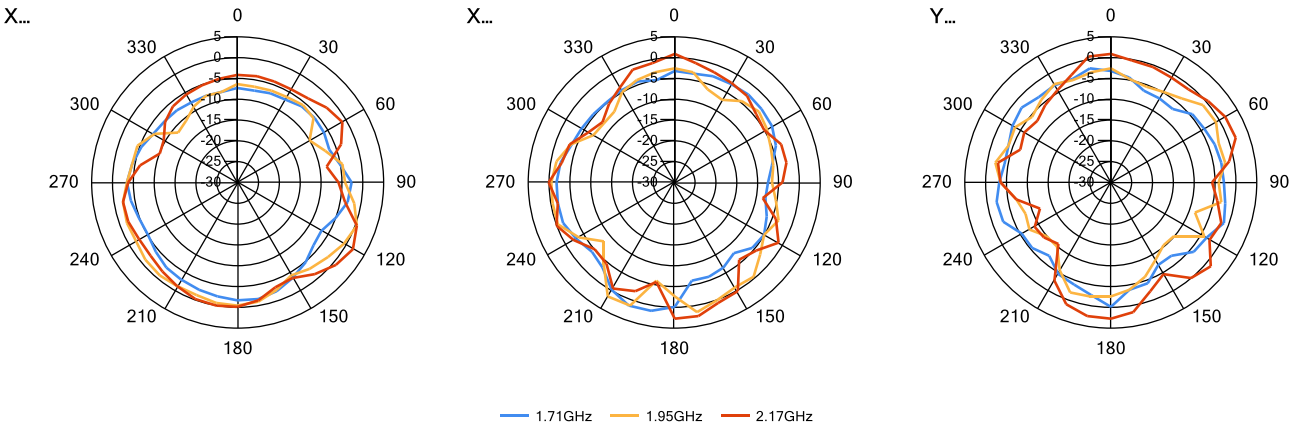
3D pattern at 890 MHz
Drag to rotate pattern and PCB by using Adobe Reader
(Click to Activate)



7.3.2 1710 MHz – 2170 MHz

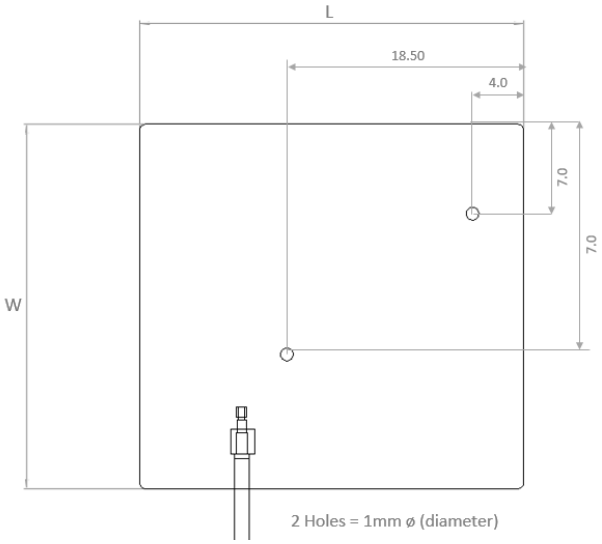


3D pattern at 1950 MHz
Drag to rotate pattern and PCB by using Adobe Reader
(Click to Activate)



8. Antenna Dimensions

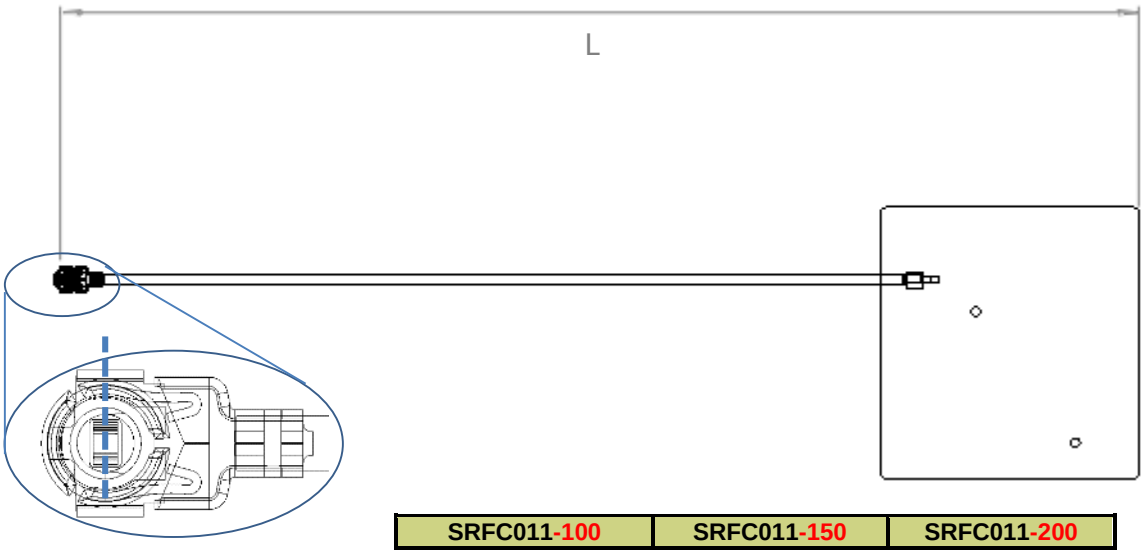
8.1 Dimensions FPC section



L	W	T
Length	**Width**	**Thickness**
30.0 ±0.2 (mm)	28.5 ±0.2 (mm)	0.15 (mm) nominal

All dimensions in mm

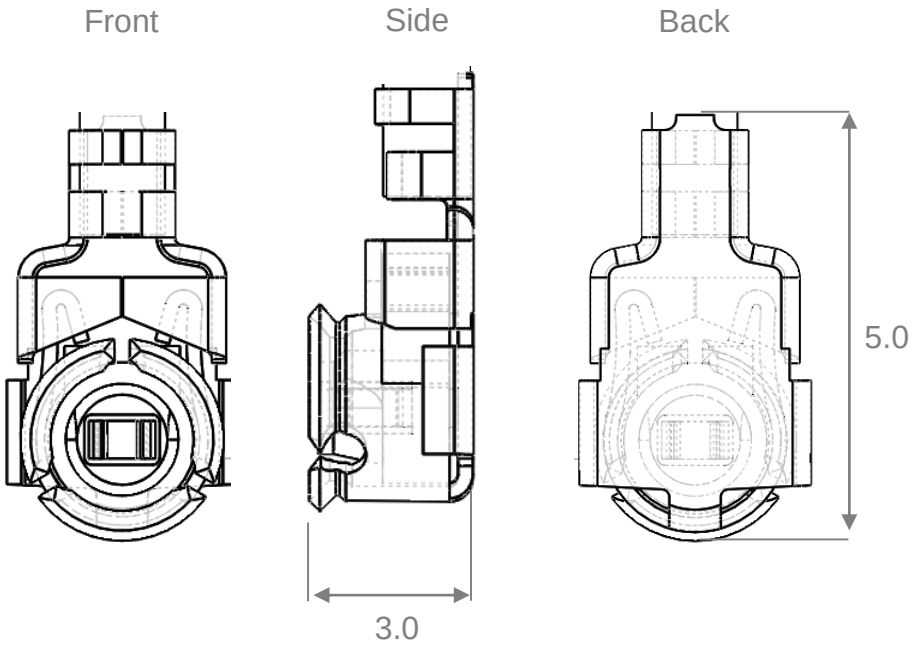
8.2 Dimensions assembled



SRFC011-100	SRFC011-150	SRFC011-200
L	**L**	**L**
122 ±2.0 (mm)	172 ±2.0 (mm)	222 ±2.0 (mm)

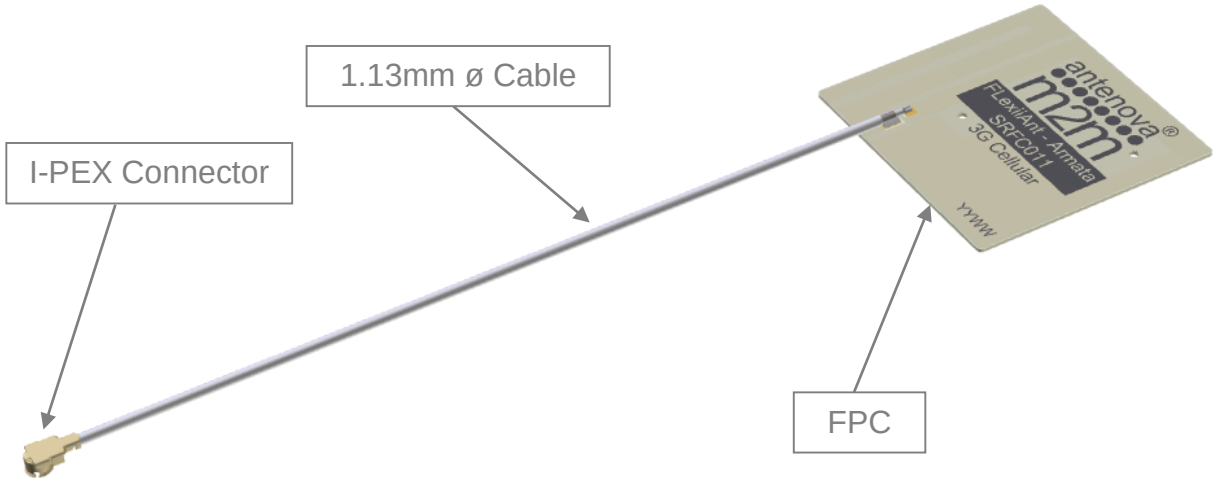
8.3 IPEX Connector

I-PEX	
Material	Copper Alloy
Plating	Ag



All dimensions in mm

8.4 Assembly



9. Electrical Interface

9.1 Host Interface

The host PCB requires the mating connector which is IPEX MHF (UFL) receptacle. The location should be close to the chip/modules pin for the RF. Any feed from this receptacle should be maintained at 50Ω impedance.

9.2 Transmission Line

All transmission lines should be designed to have a characteristic impedance of 50Ω.

• The length of the transmission lines should be kept to a minimum
• Any other parts of the RF system like transceivers, power amplifiers, etc, should also be designed to have an impedance of 50 Ω

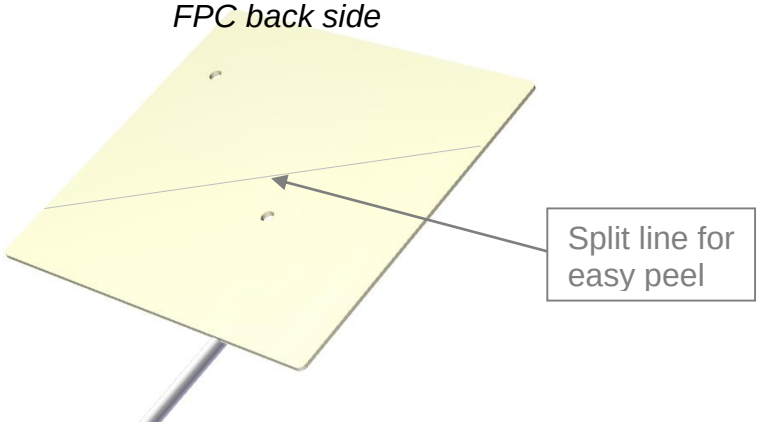
Once the material for the PCB has been chosen (PCB thickness and dielectric constant), a coplanar transmission line can easily be designed using any of the commercial software packages for transmission line design. For the chosen PCB thickness, copper thickness and substrate dielectric constant, the program will calculate the appropriate transmission line width and gaps on either side of the feed.

A DC blocking capacitor should be placed in line to protect the RF front end.

10. Mechanical Fixing

The antenna uses 3M 468MP adhesive on the reverse side of the FPC. The antenna has an easy access split line to peel off to reveal the adhesive side. It is designed for a one time fix to a clean smooth surface.

FPC back side



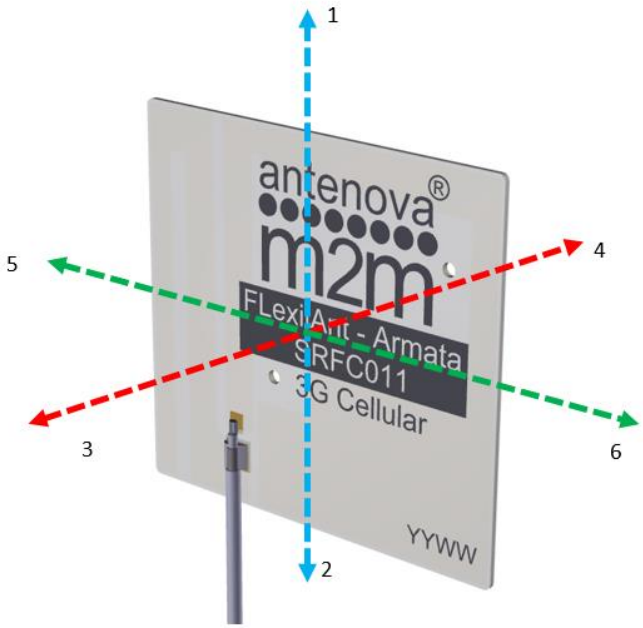
10.0 Antenna Integration Guide

10.1 Placement

For placing the FPC antenna within a device, the host PCB size is not a factor like with PCB mounted antennas. However placement still needs to follow some basic rules, as any antenna is sensitive to its environment.

Using six spatial directions shown below as a guide. The antenna FPC section should try to maintain a minimum of three directions free from obstructions to be able to operate effectively. The other directions will have obstacles in their paths, these directions still require a minimum clearance. These minimum clearances are further defined in this section. The plastic case is not included in this, only metal objects/components that will obstruct or come in close proximity to the antenna.

Six spatial directions relative to FPC

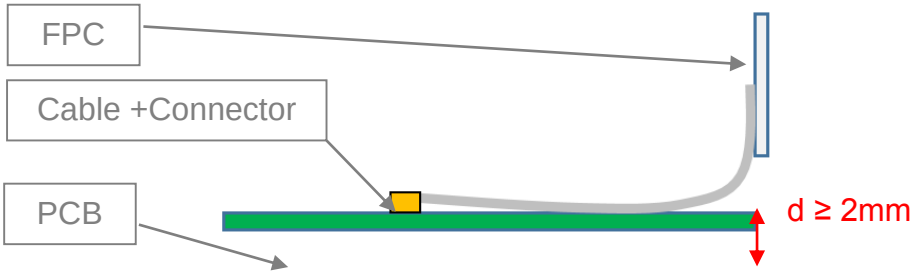


10.2 Orientation of FPC

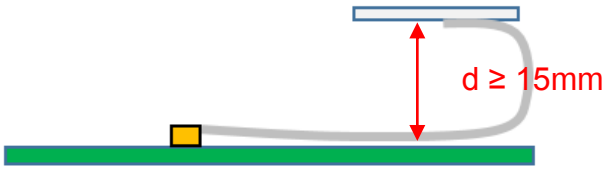
The orientation of the FPC with respect to the host PCB should be defined depending on the unit. The proximity of the GND will have an influence on the antenna so the PCB location relative to the antenna should be considered.

The FPC will normally be placed in one of the three following options for orientation. In each option a distance (d) is the critical dimension to consider. Below shows the minimum value of (d) for each. Other obstructions may increase this dimension.

1) Vertical mounted



1) Co-planar to PCB



2) Planar to PCB (Same plane)

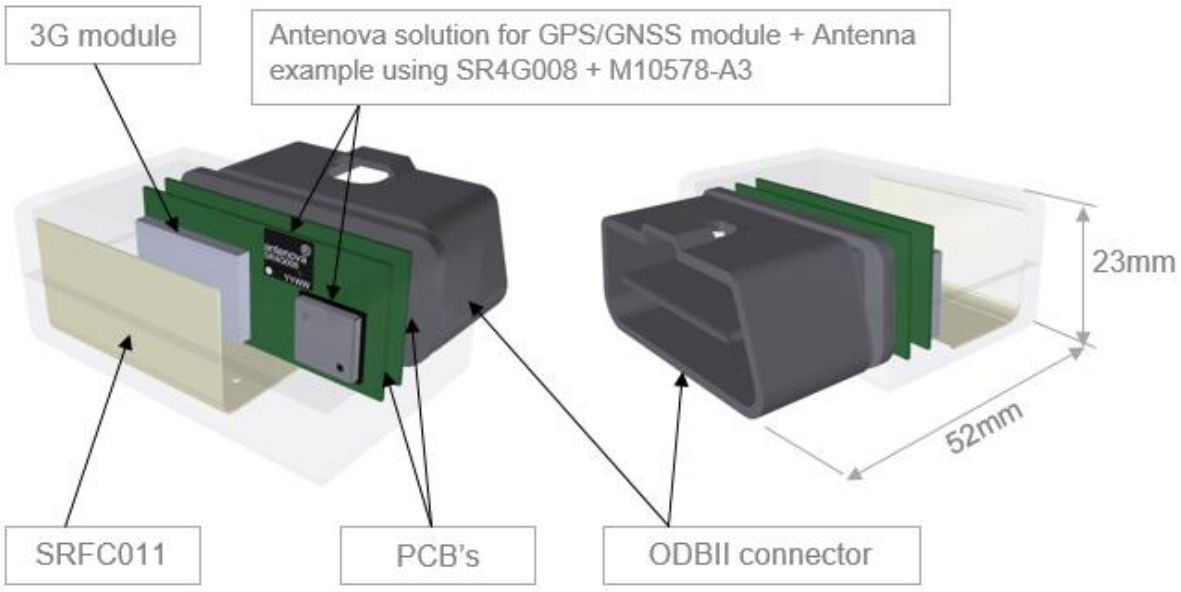
10.3 Host PCB size

SRFC011 is designed specifically for smaller devices. The host PCB size has a large effect on the performance. It is recommended for the host PCB to be <1600mm². Any PCB which is larger is advised to use Antenova SRFC025 as a suitable cellular FPC.

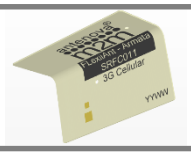
10.4 Device Integration example

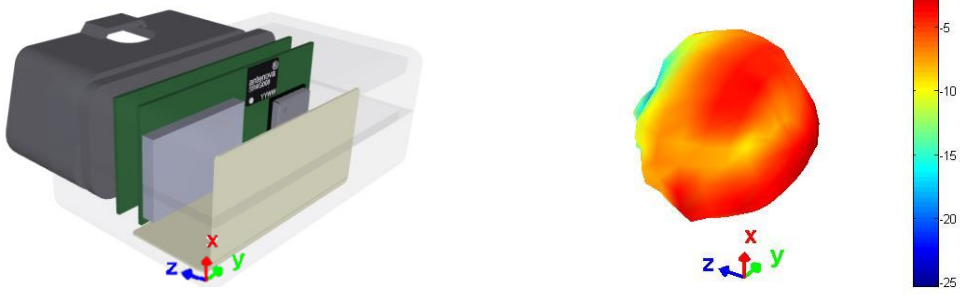
An example of integration within an ODBII unit is shown below. A simplified design highlights the antenna's integration. The FPC is shown adhered to the inside of the device's plastic housing. The length of the cable is sufficient to allow ease of assembly when produced (SRFC011-100).

Due to the limited internal space the FPC is adhered between two surfaces. The maximum allowable distance between the FPC and the PCBs is maintained.



The FPC is adhered with a 90 degree bend to fit within the limited space





3D pattern at 880MHz
Drag to rotate pattern and PCB by using Adobe Reader (Click to Activate)

11. Hazardous Material Regulation Conformance

The antenna has been tested to conform to RoHS requirements. A certificate of conformance is available from Antenova M2M's website.

12. Packaging

The antennas are stored in individual plastic (PE) bags. Then stored within a second bag of 10pcs.

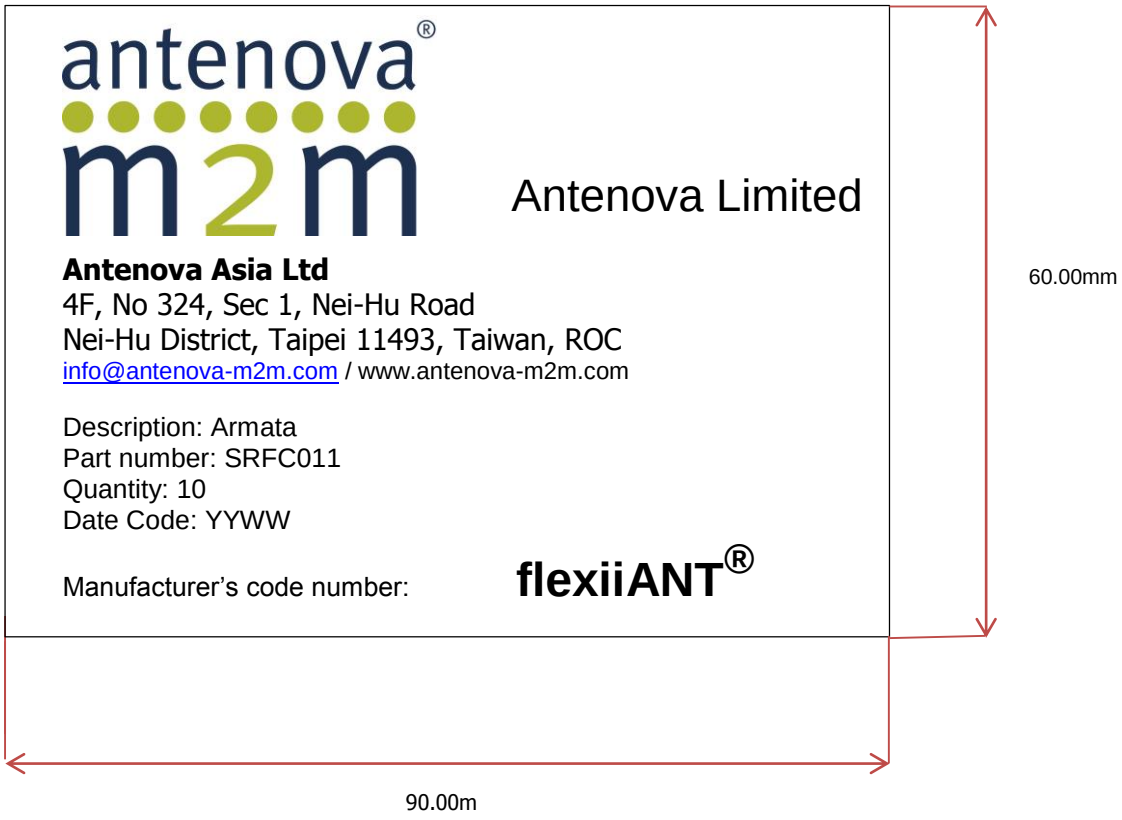
Single antenna per bag

10 units per second bag (Labelled)

12.1 Optimal Storage Conditions

Temperature	-10ºC to 40ºC
Humidity	Less than 75% RH
Shelf life	18 Months
Storage place	Away from corrosive gas and direct sunlight
Packaging	Antennas should be stored in unopened sealed manufacturer's plastic packaging.

12.2 Label Information



www.antenova-m2m.com

Corporate Headquarters

Antenova Limited
2nd Floor Titan Court
3 Bishop Square
Hatfield
AL10 9NA
UK

Tel: +44 1223 810600
Email: sales@antenova-m2m.com

North America Headquarters

Antenova Limited
100 Brush Creek Road, Suite 103
Santa Rosa
California 95404
USA

Tel: +1 707 890 5202
Email: sales@antenova-m2m.com

Asia Headquarters

Antenova Asia Limited
4F, No. 324, Sec. 1, Nei-Hu Road
Nei-Hu District
Taipei 11493
Taiwan, ROC

Tel: +886 (0) 2 8797 8630
Fax: +886 (0) 2 8797 6890
Email: sales@antenova-m2m.com

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Тел: +7 (812) 336 43 04 (многоканальный)
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www.lifeelectronics.ru