# With potential

# Specification

| | | |
|---|---|---|
| Part No. | : | **AA.180.301111** |
| Product Name | : | Compact Low Axial Ratio<br>GPS/GLONASS/Galileo/BeiDou<br>Magnetic Mount Antenna |
| Features | : | Dual-Pin Patch for Lowest Axial Ratio<br>Magnetic Mount<br>IP67 Rated<br>3000mm RG-174<br>SMA(M) Connector<br>Cable and Connector Customizable<br>Dimensions: 35 x 35 x 15mm<br>**RoHS Compliant** |

# 1. Introduction

The compact AA.180 magnetic mount external antenna is ideal for robust, covert installations where durability and small size is paramount. This low-profile antenna is tuned for stable operation over GPS-GLONASS-Galileo-BeiDou L1 frequency bands and is used in the following typical applications. At only 35mm square and 15mm in height, it is the most compact high accuracy antenna in the market for L1 operation.

- Advanced telematics and M2M applications
- Fleet management
- High accuracy positioning systems

Integration of a Taoglas Dual-pin patch enables the axial ratio to be 3 at the centre of the band, delivering good right hand circular polarization, which increases location accuracy and speed of time to first fix in the GNSS system. A front-end SAW reduces out-of-band interference from any nearby wireless transmitters, helping prevent LNA compression and burnout.

Cable length and connector type are customizable upon request.

# 2. Specification

| BeiDou-GPS-GLONASS | | | | |
|---|---|---|---|---|
| Center Frequency | Beidou: 1561.098±2.046 MHz<br>GPS: 1575.42±1.023 MHz<br>GLONASS: 1602±8 MHz | | | |
| Passive Antenna Efficiency | Beidou: 59.4%<br>GPS: 51.4%<br>GLONASS: 35.1% | | | |
| Passive Antenna Average Gain | Beidou:-2.26dBi<br>GPS: -2.88dBi<br>GLONASS: -4.54dBi | | | |
| Passive Antenna Peak Gain | Beidou: 3.31dBi<br>GPS: 2.71dBi<br>GLONASS: 1.08dBi | | | |
| VSWR | 2.0 Max | | | |
| Impedance | 50Ω | | | |
| Axial Ratio | Beidou: 6.18 dB(typ) @zenith<br>GPS: 2.19 dB(typ) @zenith<br>GLONASS: 2.22 dB(typ) @zenith | | | |
| Polarization | RHCP | | | |
| Cable | 3 meter RG174 standard, fully customizable | | | |
| Connector | SMA(M), standard, fully customizable | | | |
| **LNA and Filter Electrical Properties** | | | | |
| Center Frequency | Beidou: 1561.098±2.046 MHz<br>GPS: 1575.42±1.023 MHz<br>GLONASS: 1602±8 MHz | | | |
| Pout 1dB gain Compression point | -6dBm Min. -2 dbm Typ. (1561MHz,1575.42MHz,1602MHz) | | | |
| Output Impedance | 50Ω | | | |
| VSWR | 2.0 MAX | | | |
| Return Loss | 10 dB Min. | | | |
| LNA Gain, Current Draw, and Noise Figure@GPS | Voltage | Frequency | LNA Gain(Typ) | Noise Figure(Typ) |
| | 1.8V | 1561 MHz | 31.3 dB | 3.1 dB |
| | | 1575.42 MHz | 30.2 dB | 2.7 dB |
| | | 1602 MHz | 29.8 dB | 3.1 dB |
| | Typ 3.0V | 1561 MHz | 33.1 dB | 3.3 dB |
| | | 1575.42 MHz | 32.5 dB | 2.9 dB |
| | | 1602 MHz | 32.0 dB | 3.3 dB |
| | 5V | 1561 MHz | 33.5 dB | 3.3 dB |
| | | 1575.42 MHz | 33.0 dB | 2.9 dB |
| | | 1602 MHz | 33.1 dB | 3.2 dB |

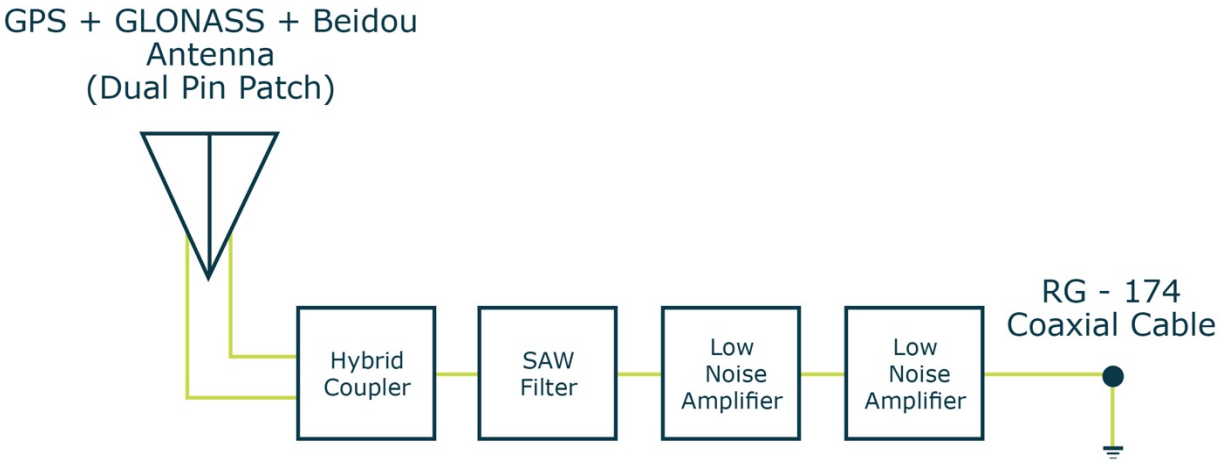
| MECHANICAL | |
|---|---|
| Antenna Dimensions | 35.74 x 35.75 x 15mm |
| Casing | ASA |
| Cable | 3000mm RG174 (fully customizable) |
| Connector | SMA(M) (fully customizable) |
| Weight | 92g |
| Ingress Protection Rating | IP67 |
| Magnetic Pull Force | Pull horizontal max pull force(kgf) : 0.52<br>Pull vertical max pull force(kgf) : 0.48 |
| ENVIRONMENTAL | |
| Operation Temperature | -40°C to 85°C |
| Storage Temperature | -40°C to 85°C |
| Humidity | Non-condensing 40°C 95% RH |

*Antenna measured on 70x70mm ground plane

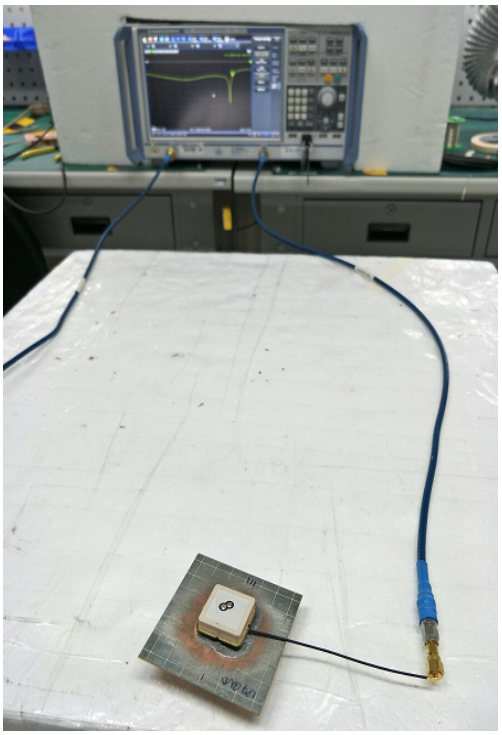
# 3. Antenna Characteristics

## 3.1 GPS-GLONASS-Beidou Antenna

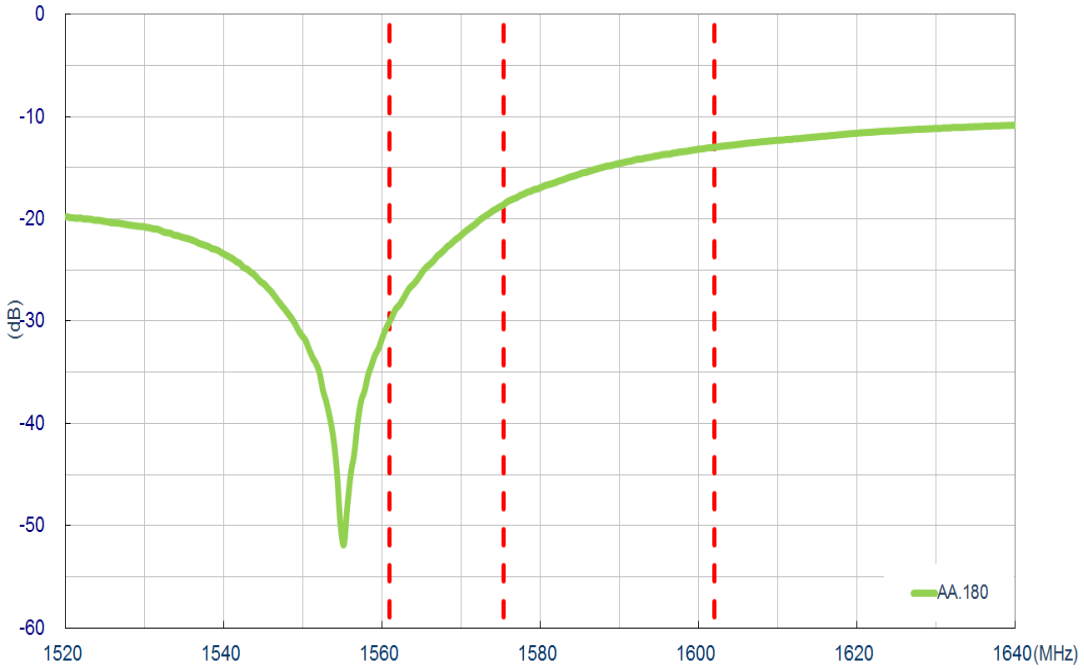
### 3.1.1 Block Diagram (Active Antenna)



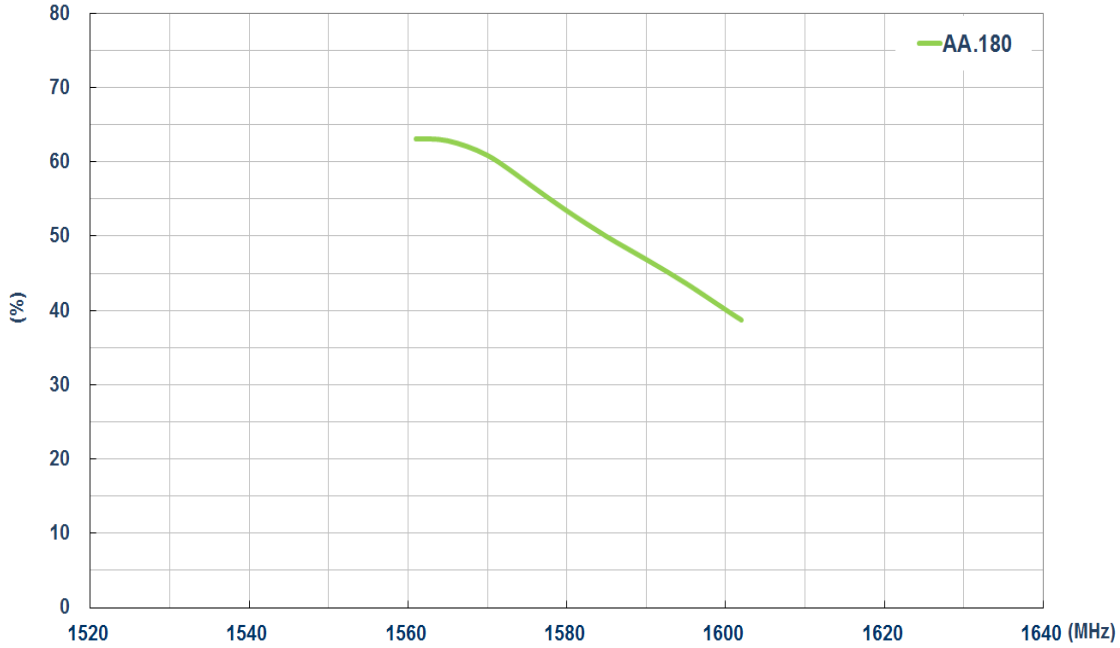

### 3.1.2 Test Setup



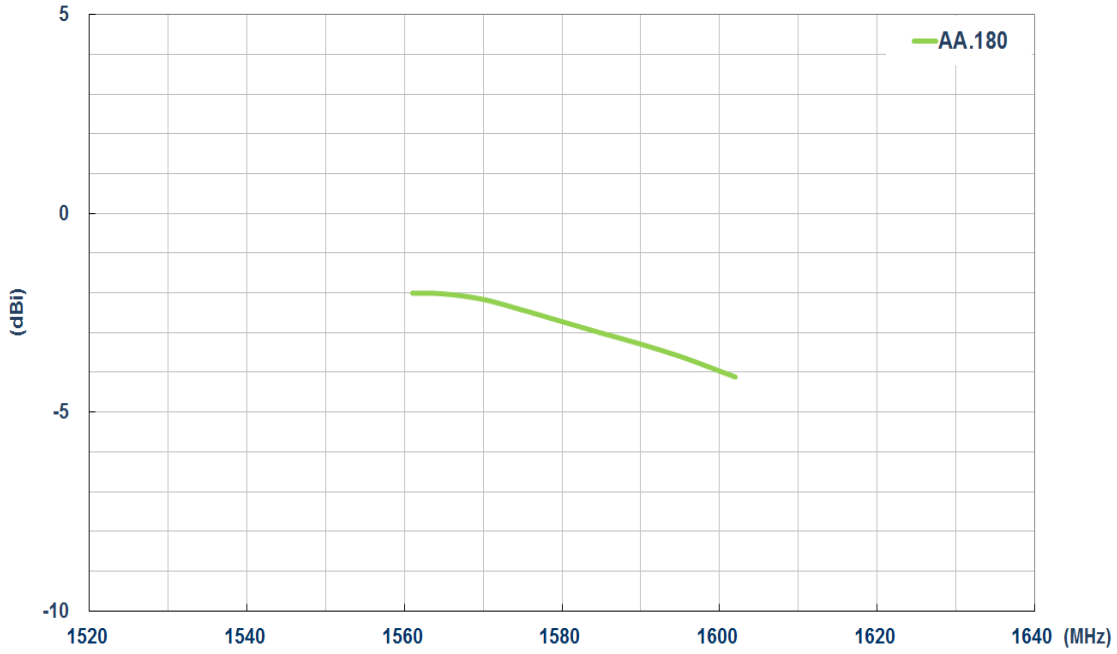
### 3.1.3 Return Loss (Passive Antenna)



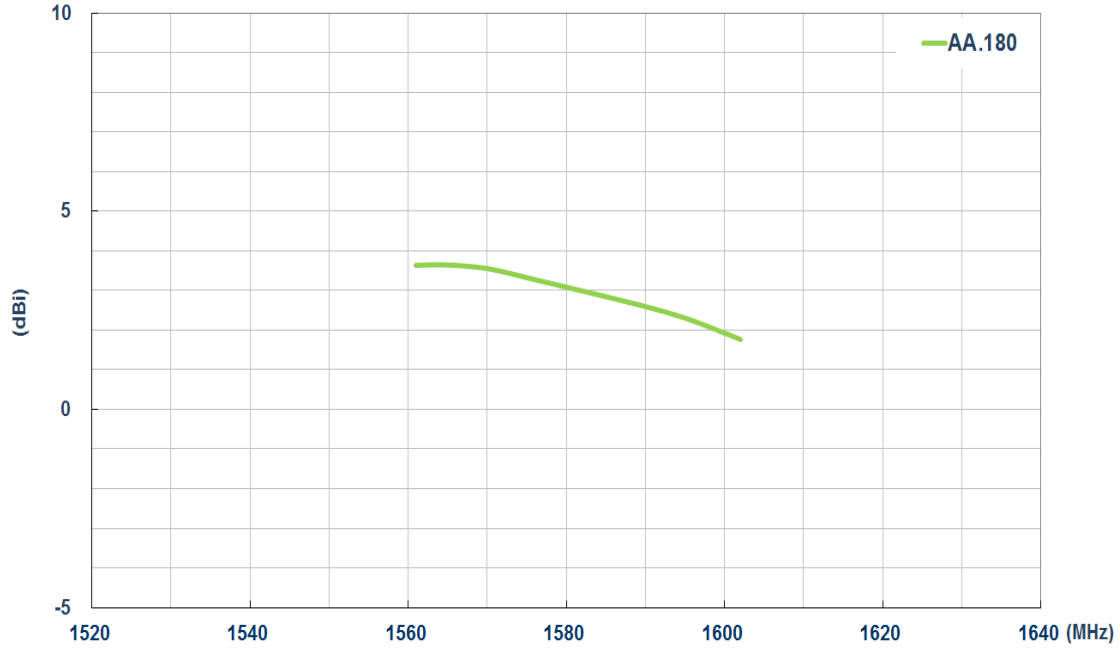

### 3.1.4 Efficiency (Passive Antenna)



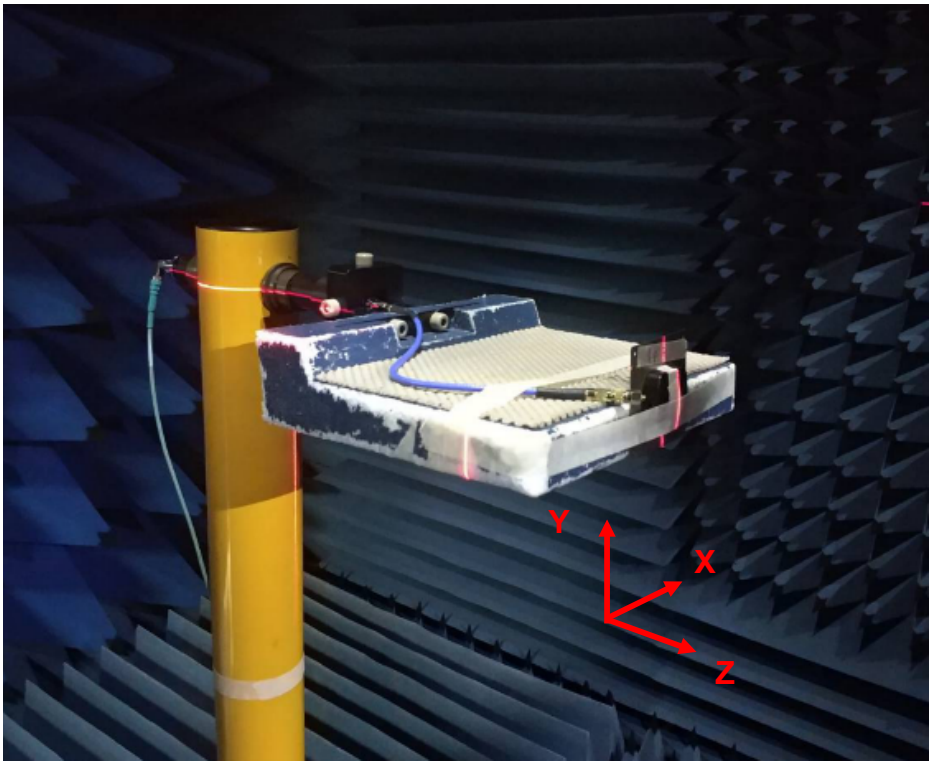
### 3.1.5 Average Gain (Passive Antenna)




### 3.1.6 Peak Gain (Passive Antenna)

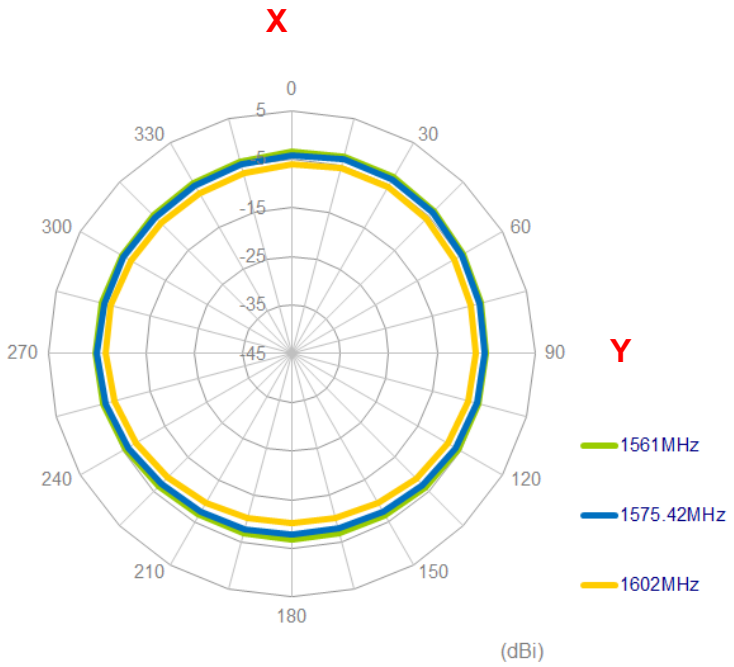


## 3.1.9 GPS-GLONASS Radiation Pattern (Passive Antenna)Test Setup

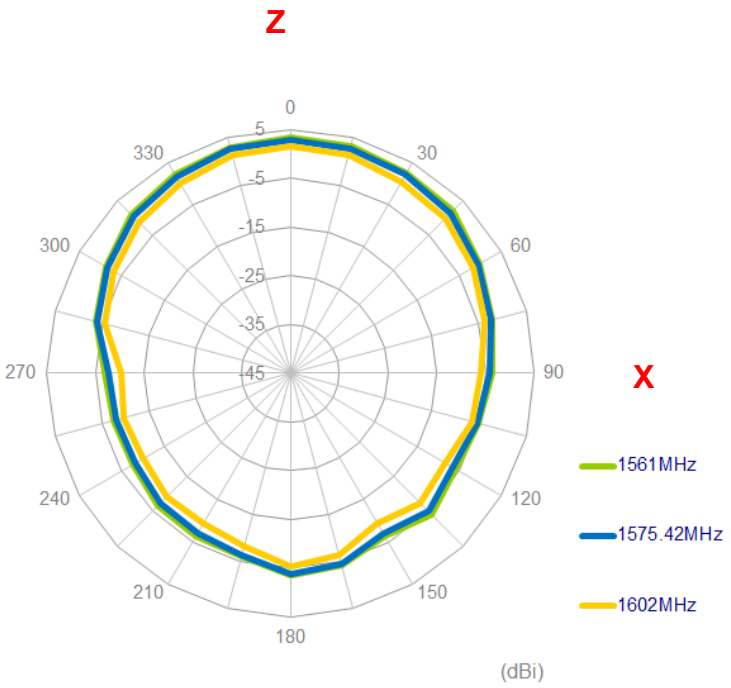



### 2D Radiation Pattern

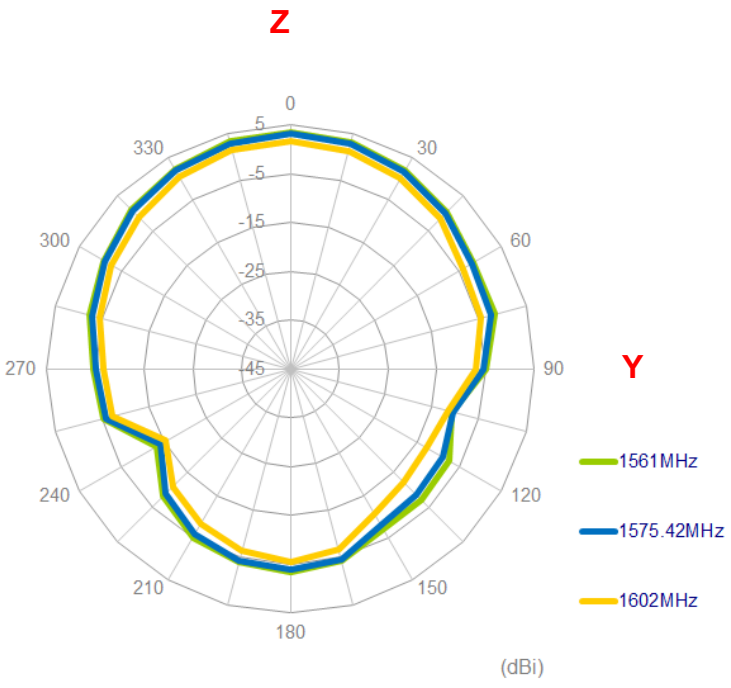
XY Plane



## XZ Plane

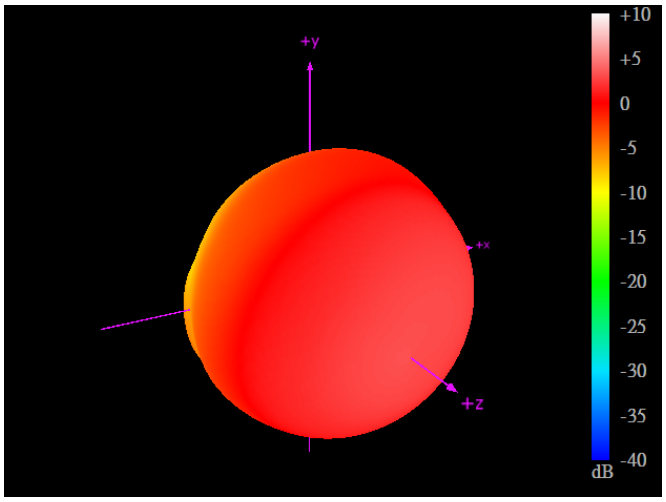



## YZ Plane

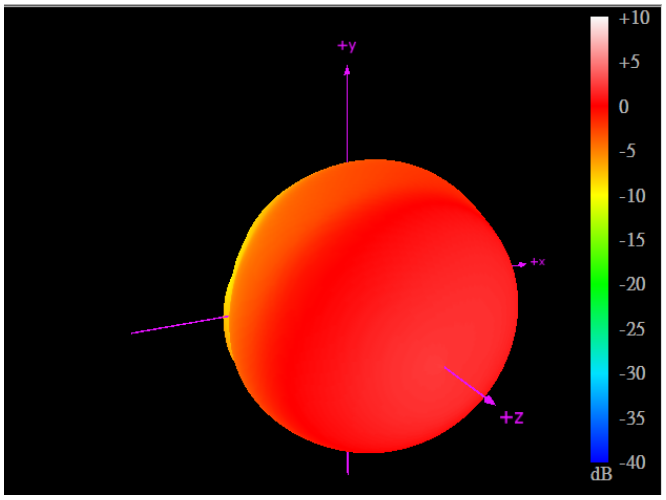


## 3D Radiation Pattern

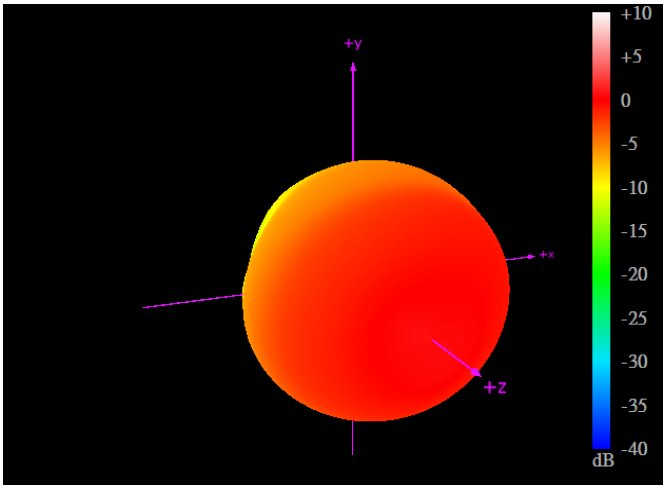
1561MHz



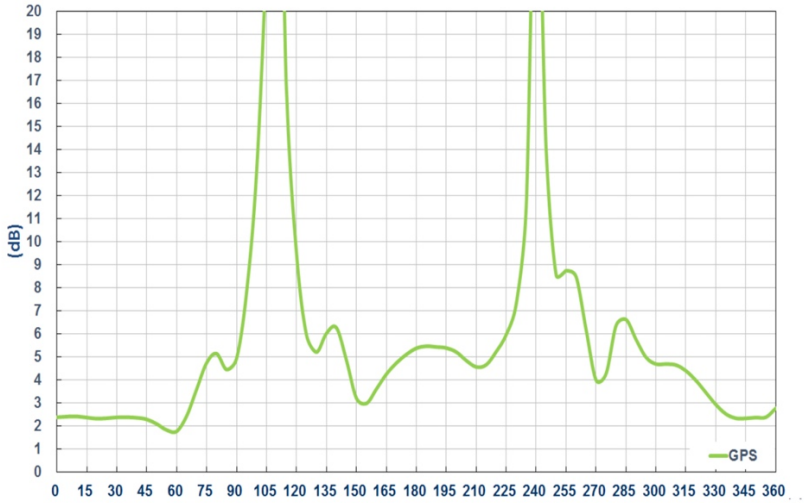

1575.42MHz

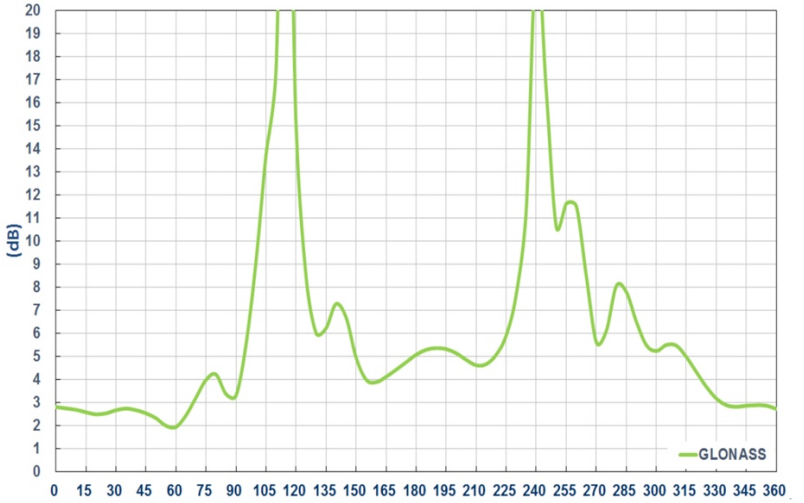


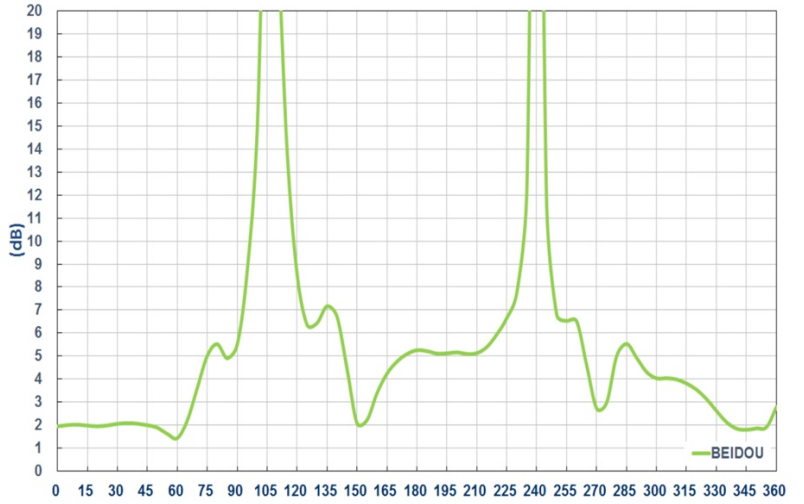

1602 MHz



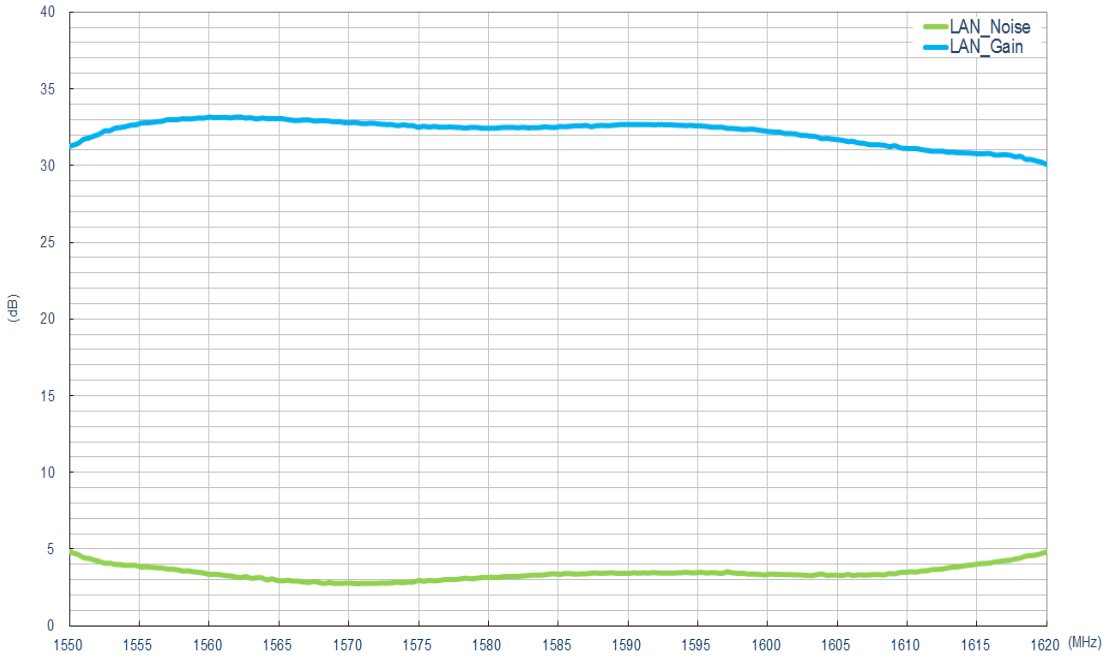
### 3.1.10 Axial Ratio Pattern (Passive Antenna)



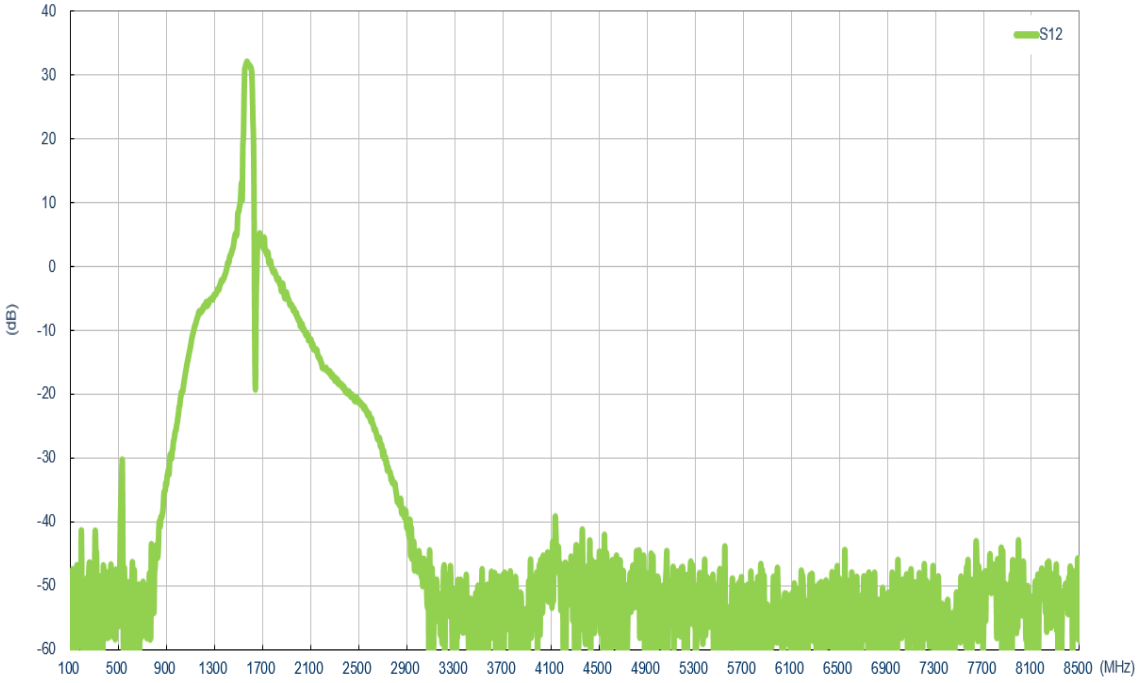



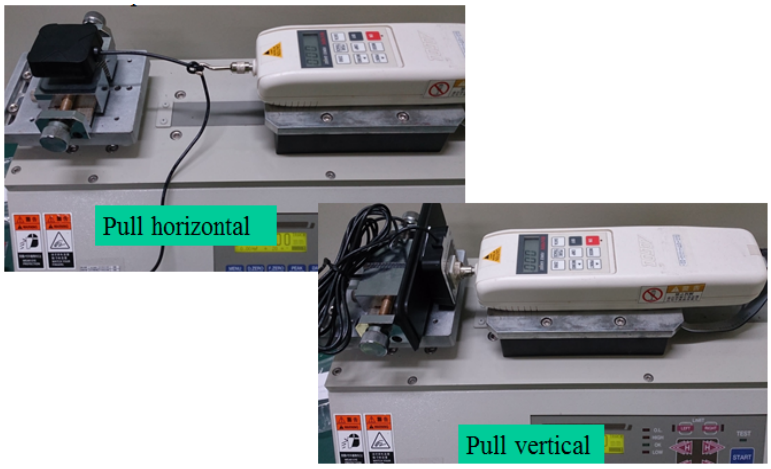
## 3.1.11 LNA Gain and Noise Figure (Active Antenna)




## 3.1.12 Out-of-band Rejection

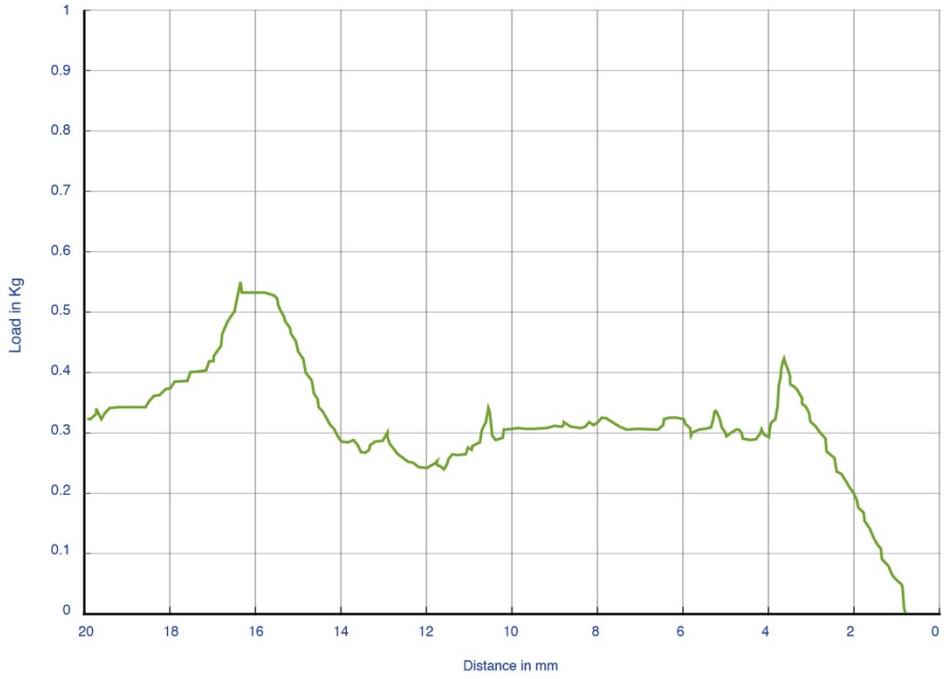


# 4. Magnetic Pull Force (Kgf)



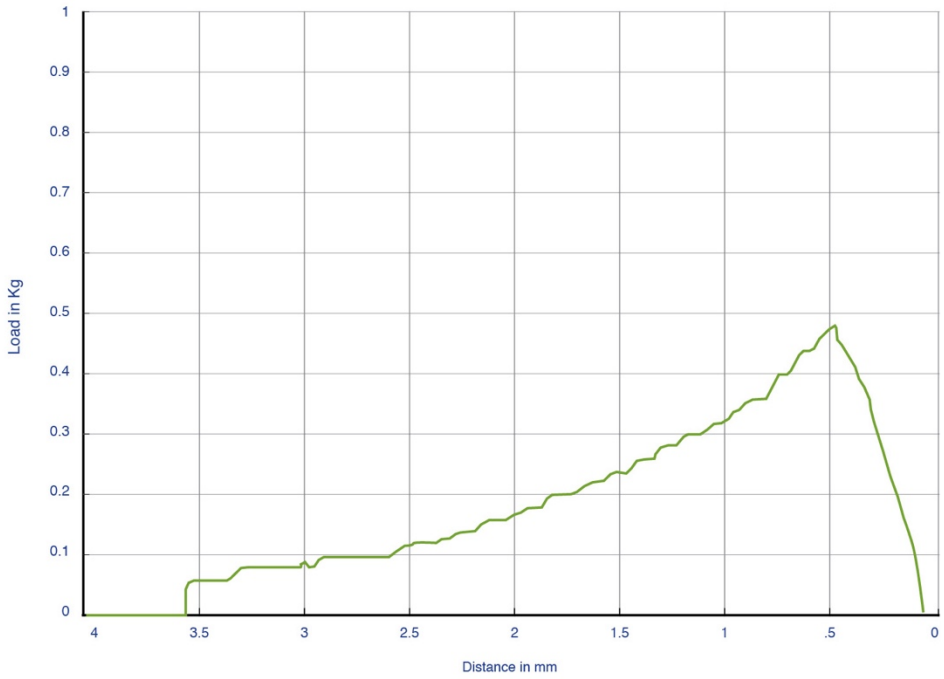

**Horizontal Pulling Force: 0.52kgf**

| Distance (mm) | 0.5 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pulling Force (Kgf) | 0 | 0 | 0.18 | 0.31 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Distance (mm) | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 | **16.0** | 16.3 | 17.0 | 18.0 |
| Pulling Force (Kgf) | 0.3 | 0.27 | 0.24 | 0.29 | 0.3 | 0.44 | **0.52** | 0.54 | 0.42 | 0.37 |

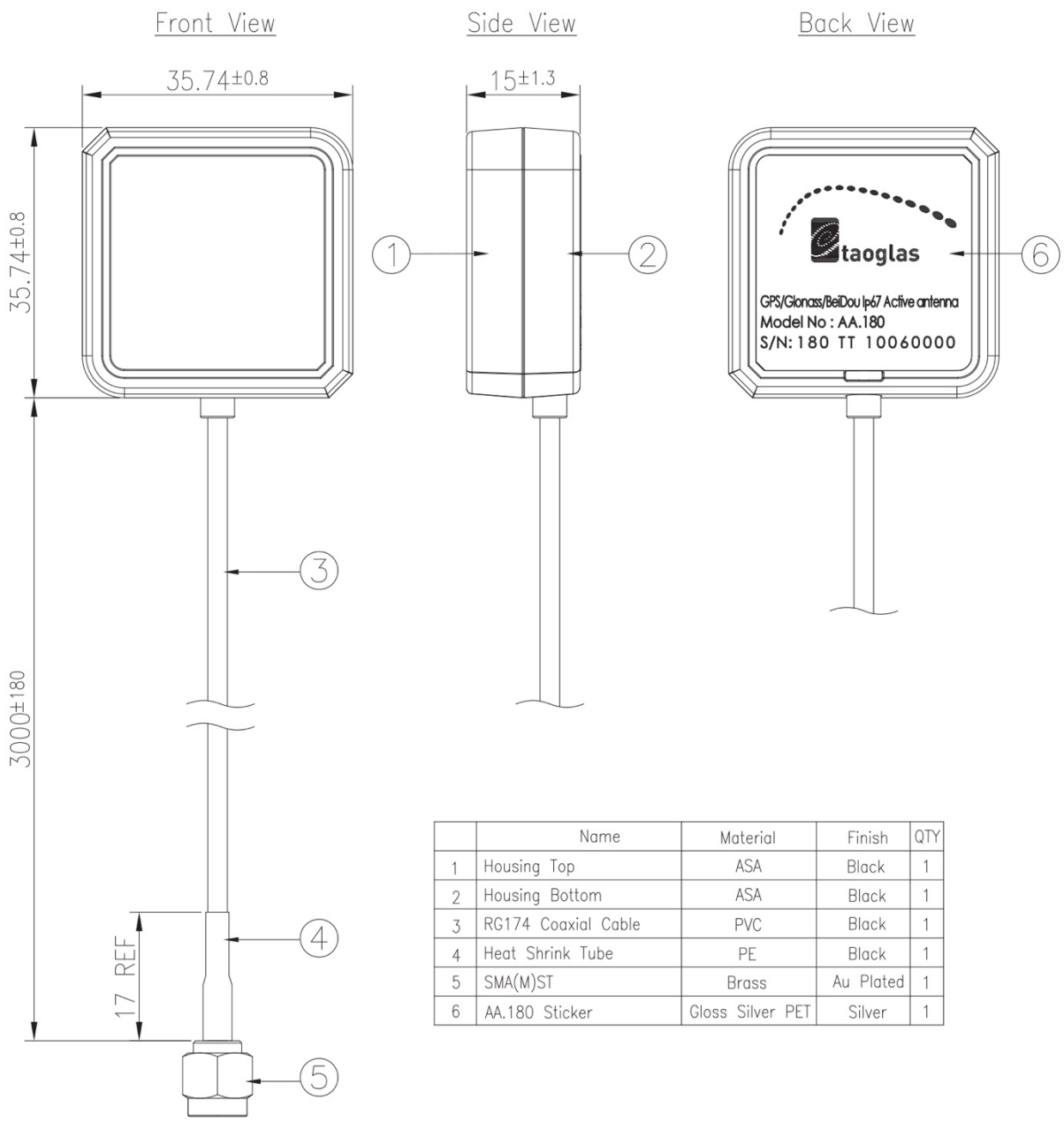


## Vertical Pulling Force: 0.48kgf

| Distance (mm) | 0.52 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
|---|---|---|---|---|---|---|---|---|
| Pulling Force (Kgf) | 0.48 | 0.33 | 0.24 | 0.17 | 0.12 | 0.08 | 0.06 | 0 |



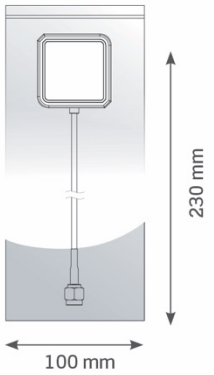
# 5. Mechanical Drawing (Unit:mm)



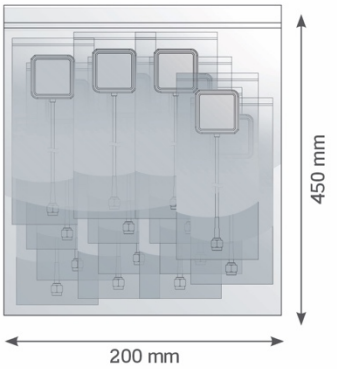

| | Name | Material | Finish | QTY |
|---|---|---|---|---|
| 1 | Housing Top | ASA | Black | 1 |
| 2 | Housing Bottom | ASA | Black | 1 |
| 3 | RG174 Coaxial Cable | PVC | Black | 1 |
| 4 | Heat Shrink Tube | PE | Black | 1 |
| 5 | SMA(M)ST | Brass | Au Plated | 1 |
| 6 | AA.180 Sticker | Gloss Silver PET | Silver | 1 |

# 6. Packaging

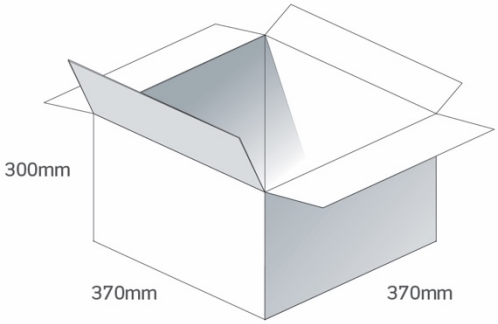
1 pcs AA.180.301111 per PE Bag
Bag Dimensions - 100 x 230 mm
Weight - 72g



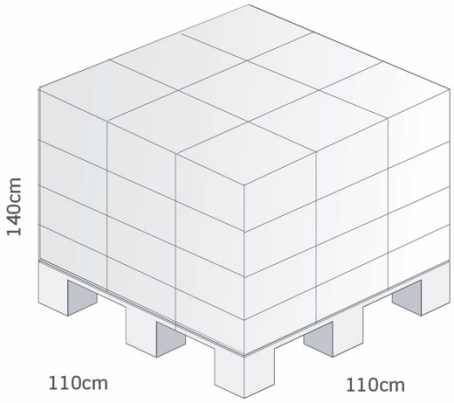

10 pcs AA.180.301111 per PE Large Bag
Bag Dimensions - 200x 450mm
Weight - 0.72kg




100 pcs AA.180.301111 per carton
Carton - 370 x 370 x 300mm
Weight - 8.23Kg




Pallet Dimensions 110x 110 x 140cm
36 Cartons per Pallet
9 Cartons per layer
4 Layers



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