OnBoard NB-IoT - Antenna

PRO-OB-585

Request Samples | Check Inventory

50.00 x 25.00 x 10.00 mm
RoHS/RoHS II Compliant
MSL Level = 1

Features

- Supports 791~960 MHz + 1710~2170 MHz
- Profile of 10 mm
- Linear Polarization
- Gain of 3.2 dBi
- Efficiency > 44%
- Surface Mount
- Durable-Shelf life of upto 10 years

Applications

- LPWA/NB-IoT/4G/LTE/3G/2G/GSM Applications
  Automotive, UAV, V2X
- IoT, M2M
  - Industrial
  - Infrastructure IoT
- Consumer electronics
- Wireless modules
- Video and surveillance
- Broadband cellular connectivity
- Networking & Telecommunication

EOL

Product Image

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Electrical Specification

Parameter	Specification		Unit
	NB-IoT	GSM/UMTS	
Operating Frequency	791 – 960, 1710 - 2170		MHz
Return Loss	< -5.8	< -5.1	dB
Polarization	Linear		
Peak Gain	1.9	3.6	dBi
Efficiency	> 51	> 44	%
Impedance	50		Ω

Note: All test measurements were conducted with the antenna on a 120 x 52 mm Evaluation board. Please note that the performance is dependent on the ground plane dimensions, tuning components and application environment.

Mechanical Specification

Parameter	Specification
Antenna Dimension	50.00 x 25.00 x 10.00 mm
Evaluation board Dimension	120 x 52 mm
Mounting Type	Surface Mount

Environmental Specification

Parameter	Specification
Operating Temperature	-40˚C to +125˚C
Storage Temperature	
Maximum Temperature	400˚C
RoHS Compliance	Yes Compliant with EU directive 2011/65/EU and 2015/863
Shelf life	10 years
MSL	Level 1, unlimited
Mechanical resistance	Immunity to vibrations IEC/EN 60068-2-6, Fc test Immunity to shock IEC/EN 60068-2-27, Ea test

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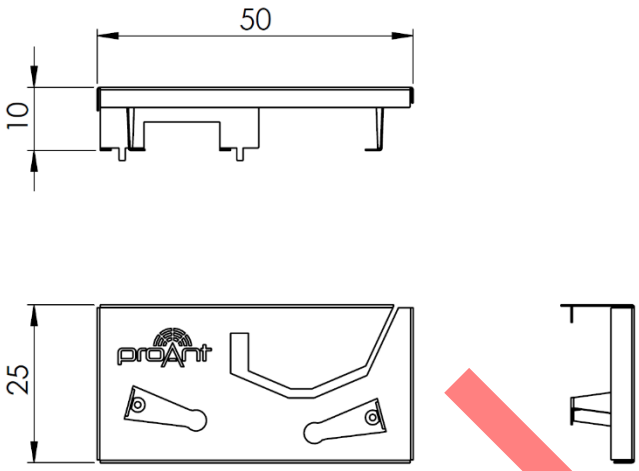
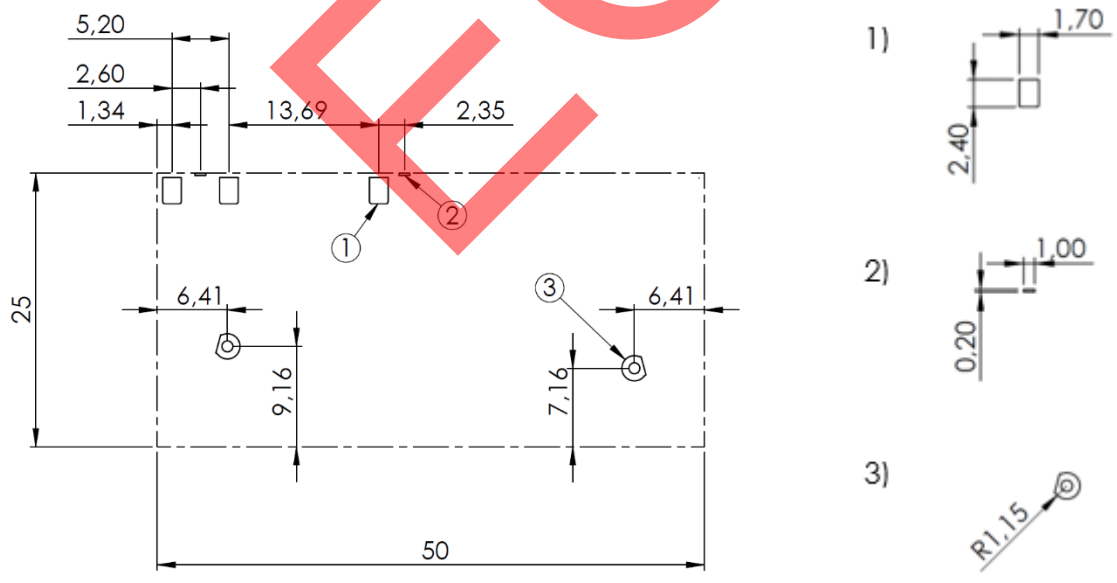
Product Dimension



Unit : mm

Antenna pins and keep-out block



Unit : mm

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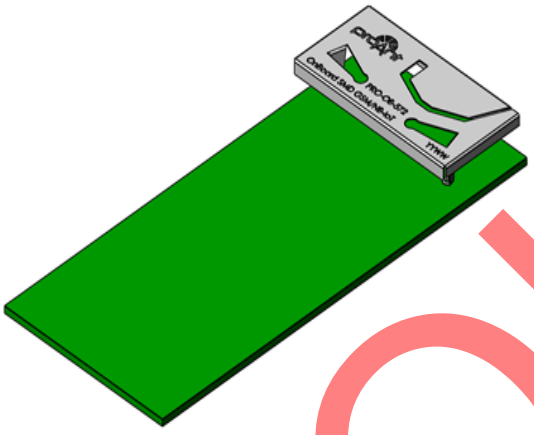
Measurement Setup

The antenna measurements were done with the OnBoard SMD GSM/NB-IoT evaluation board (120 x 52 mm) - measured in free space.



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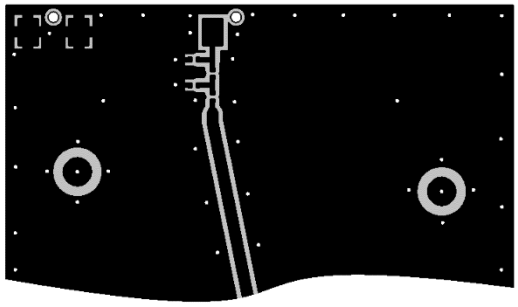
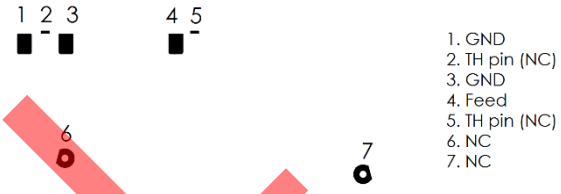
MSL Level = 1

PCB Layout

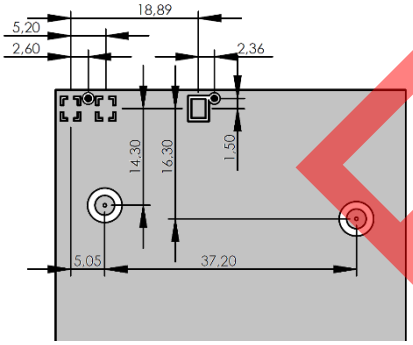
The antenna is developed for optimum performance when mounted on a ground plane and is therefore very suitably mounted on a printed circuit board, where all empty space in the layout shall be filled solid copper. This also means that no ground cutout area is required under the antenna. If there are several layers in the PCB, there is an advantage to add via holes for interconnection of the ground areas. It is also very important that there is a ground clearance around the NC pads and the RF feed pad, through all layers of the PCB. Otherwise there will be capacitive coupling which may detune the antenna.



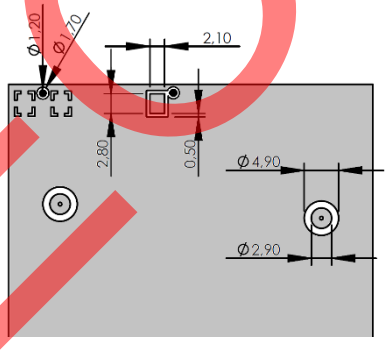
PCB Layout (from evaluation board)



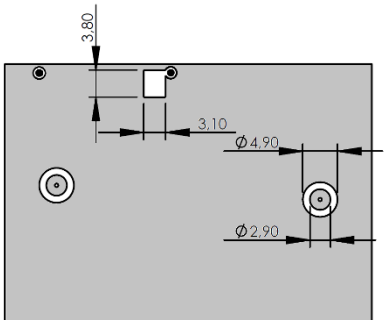
Pin configuration



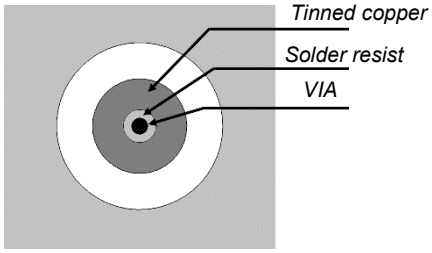
Distance between pads



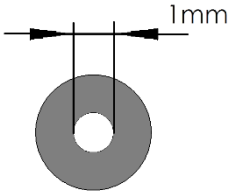
Pad dimensions (top layer). 1,3 and 4 are identical. 2 and 4 are identical. 6 and 7 are identical.



Bottom layer. Clearance through all layers. Pad 6 and 7 have identical layout as top layer and are connected by VIA



The sketch shows recommended design for pad 6 & 7 at top-layer.



Solder mask as an annular ring with inner diameter of 1mm, the solder resist in center will prevent solder paste/tin to flow down the VIA.

Unit: mm

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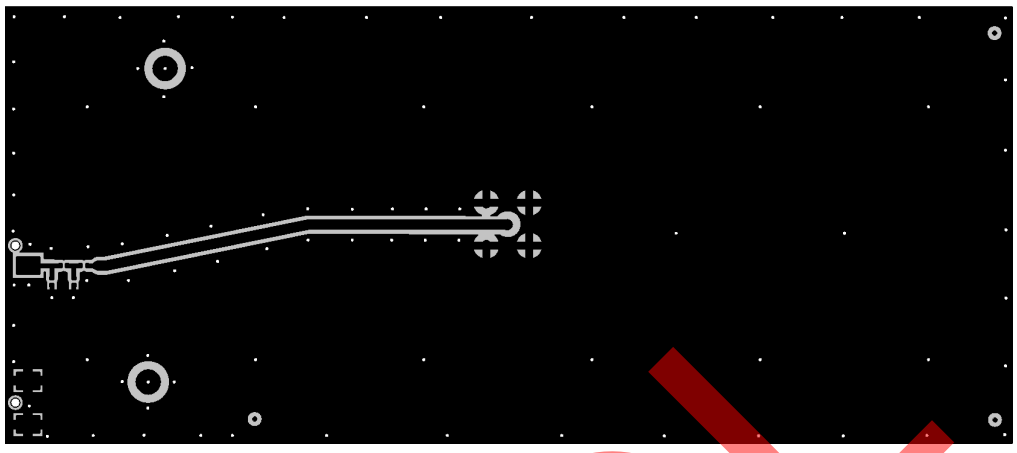
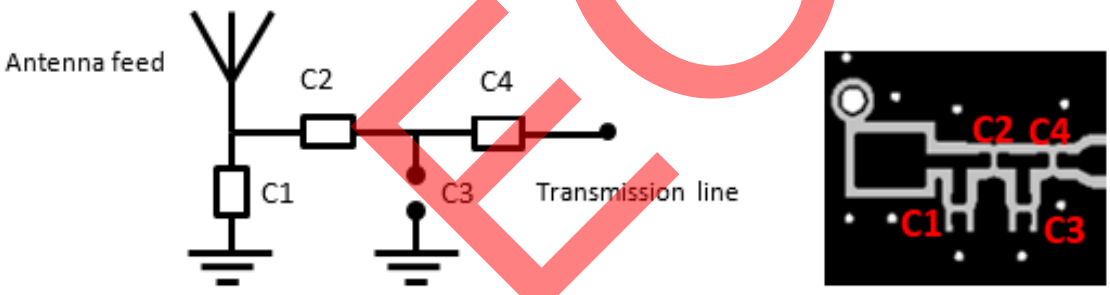
Evaluation Board Outline & Matching Circuit (NB-IoT)

The evaluation board is developed to simplify antenna testing and evaluation. It has an arbitrary size of 120 x 52 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



Evaluation board outline

The evaluation board has a matching circuit implemented next to the antenna. This is aimed to enable optimization possibilities for the user. The component positions are sized for 0402 (1005 metric) SMD components.



Matching Circuit

The antenna needs a matching circuit to adjust the resonant frequency balance. When delivered, the evaluation board is tuned for optimum balance at the NB-IoT frequency bands (band 8 and band 20) using four components. The component values for this setup are:

C1 = 1.2pF (Murata GJM1555C1H1R2WB01)
C2 = 0Ω
C3 = N/A
C4 = 0Ω

Only one matching component is needed for the implementation on the Proant evaluation board, but it is recommended to add component positions when implementing the antenna to your specific application. It is common that the resonant frequency will shift during implementation in an arbitrary device. Therefore, this matching may be changed for compensation of such effects and you may need these extra components. See General Implementation Guidelines section foe mote details.

OnBoard NB-IoT - Antenna

PRO-OB-585

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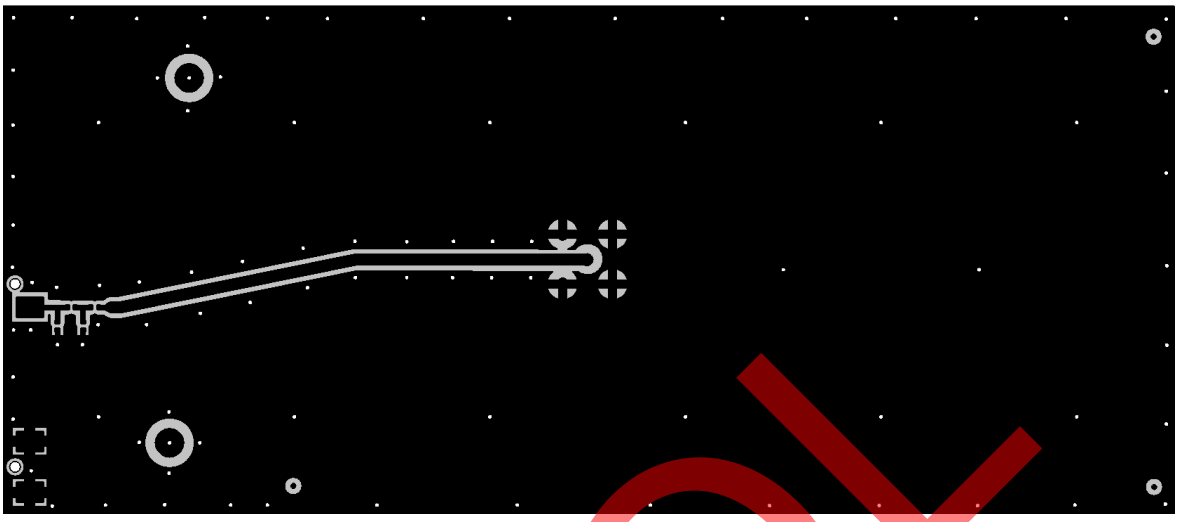
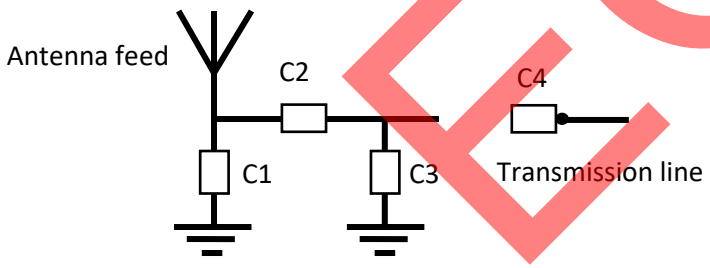
Evaluation Board Outline & Matching Circuit (GSM/UMTS)

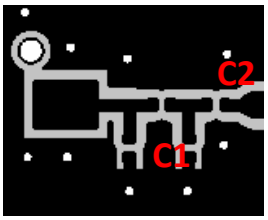
The evaluation board is developed to simplify antenna testing and evaluation. It has an arbitrary size of 120 x 52 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



Evaluation board outline

The evaluation board has a matching circuit implemented next to the antenna. This is aimed to enable optimization possibilities for the user. The component positions are sized for 0402 (1005 metric) SMD components.





Matching circuit

The antenna needs a matching circuit to adjust the resonant frequency balance. When delivered, the evaluation board is tuned for optimum balance at the GSM/UMTS frequency bands. The component values for this setup are:

C1 = 0.9pF (Murata GJM1555C1HR90WB01)
C2 = 6.8pF (Murata GJM1555C1H6R8WB01)
C3 = N/A
C4 = 2.4nH (Murata LQW15AN2N4B00)

However, it is common that the resonant frequency will shift during implementation in an arbitrary device. Therefore, this matching may be changed for compensation of such effects. This is further described in “General guidelines” section.

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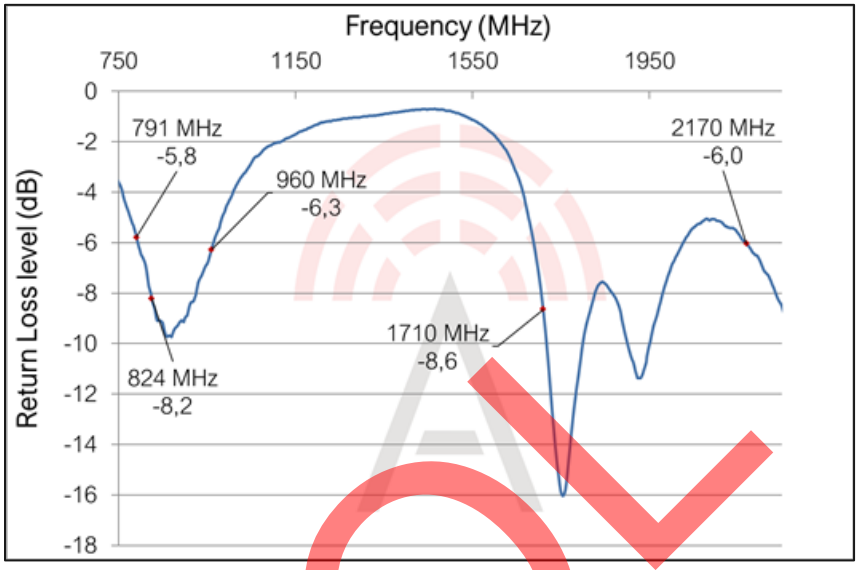
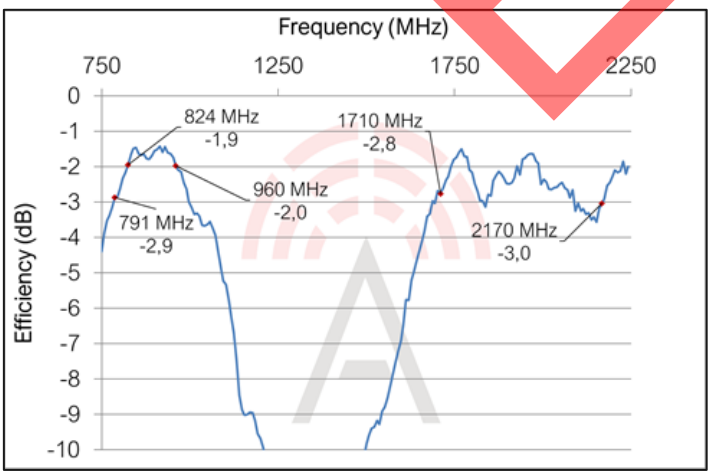
MSL Level = 1

Reflection Characteristics - Return Loss

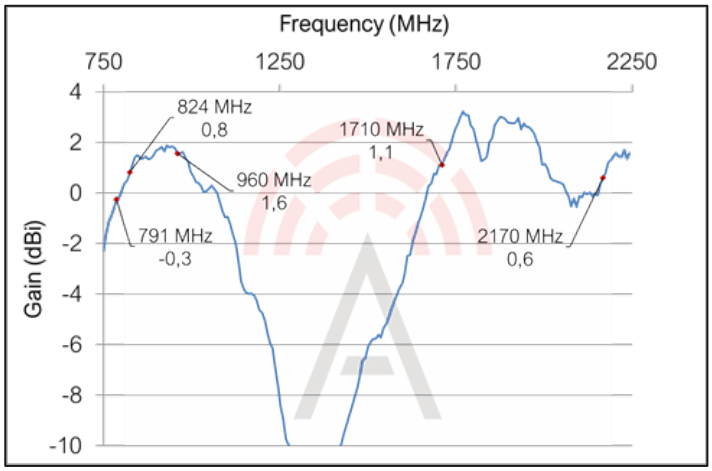
All results are measured with the antenna mounted on the evaluation board.



Total Radiation Efficiency



Maximum Radiation Gain



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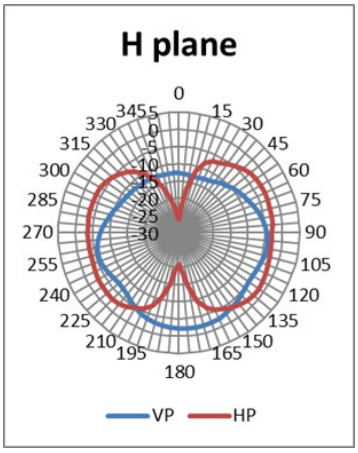
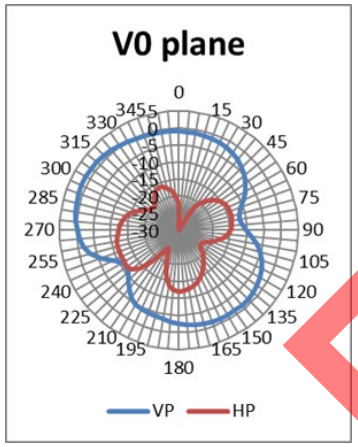
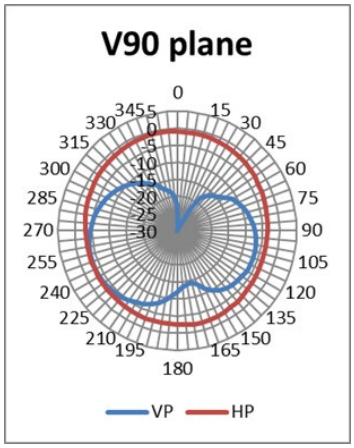
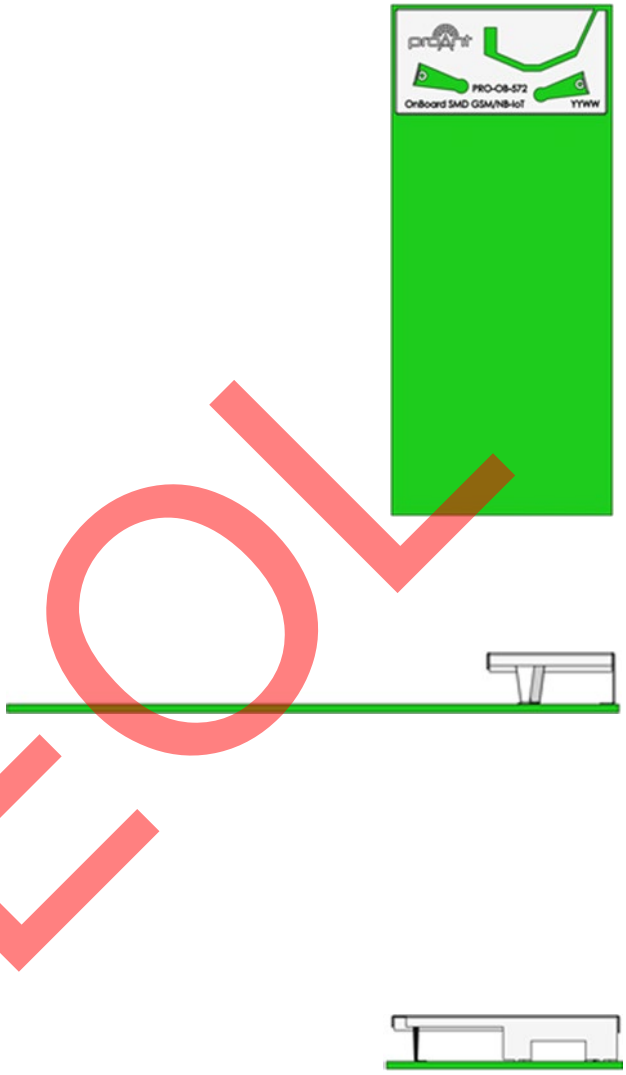
Radiation Characteristics - 2D Pattern (NB-IoT 800 MHz)









VP: Vertical Polarization
HP: Horizontal Polarization

Unit: dBi

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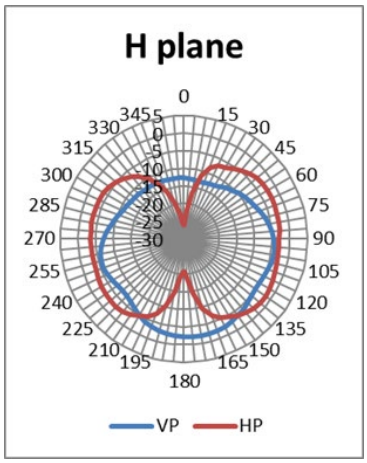
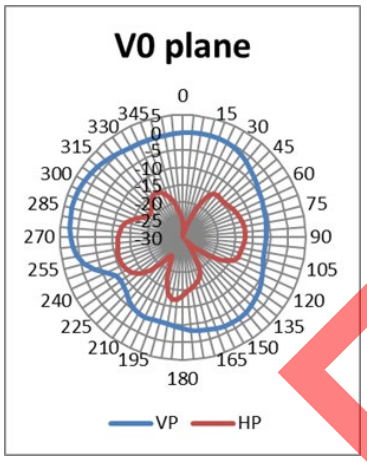
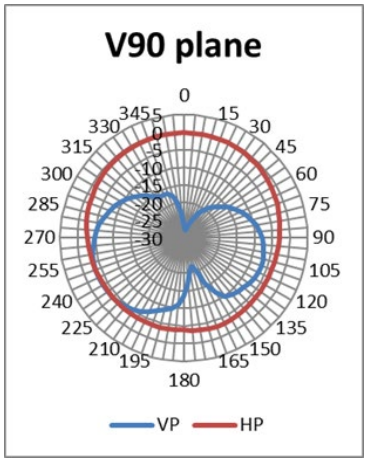
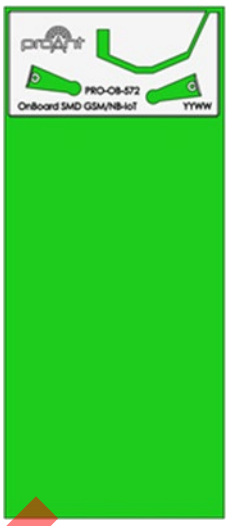
Radiation Characteristics - 2D Pattern (NB-IoT 880 MHz)









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Unit: dBi

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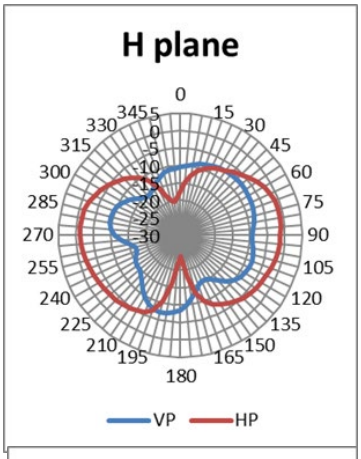
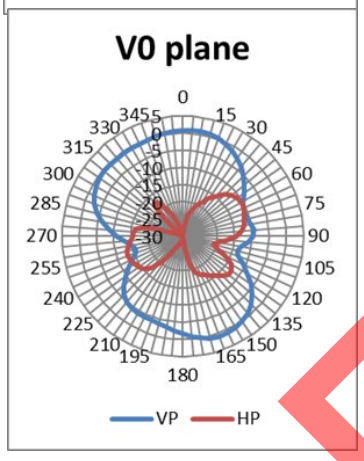
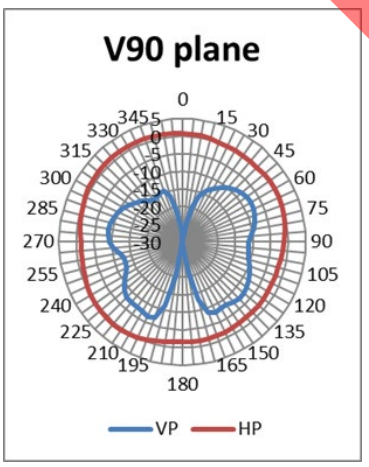
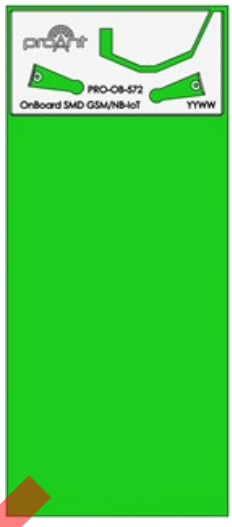
Radiation Characteristics - 2D Pattern (GSM/UMTS 890 MHz)









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Unit: dBi

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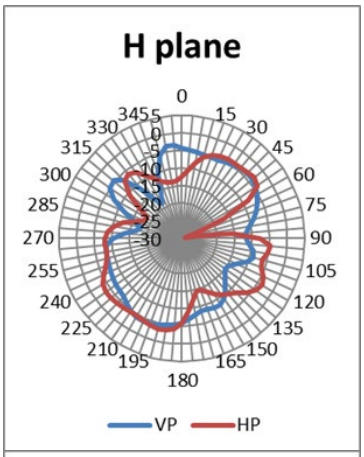
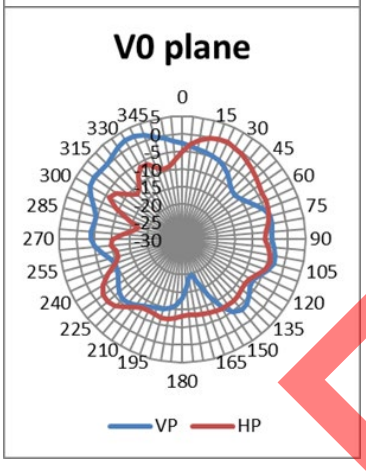
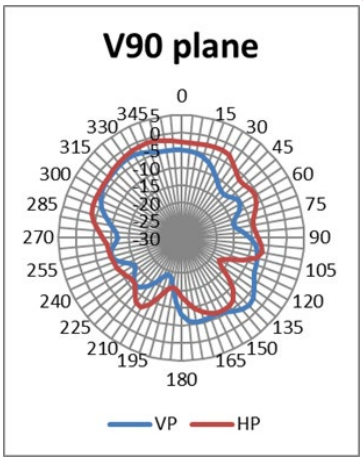
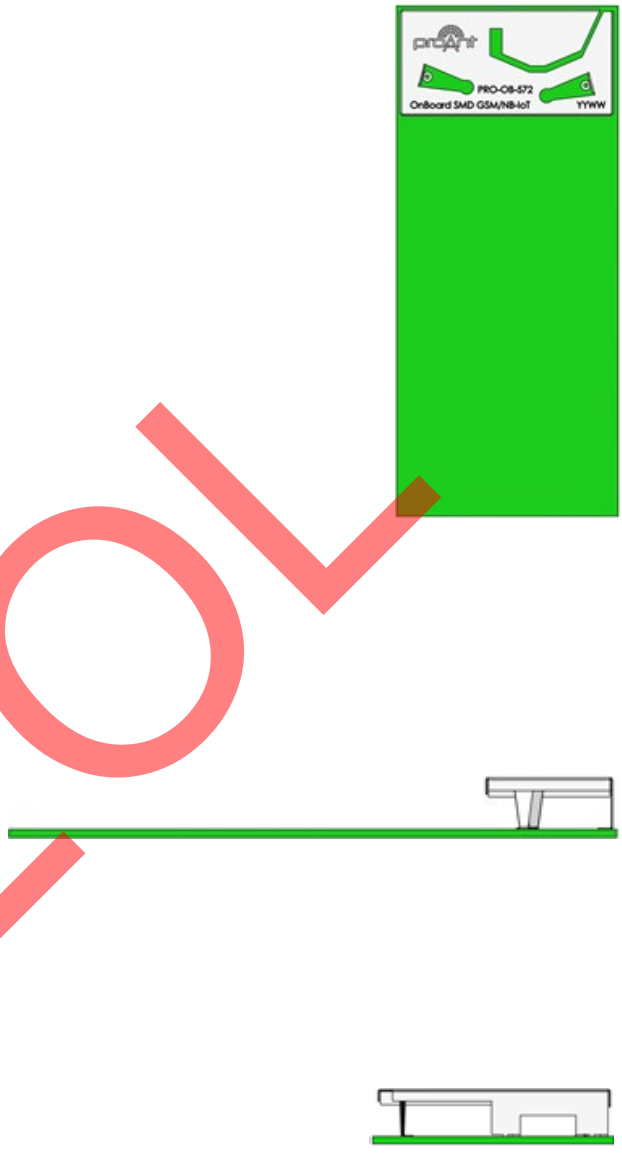
Radiation Characteristics - 2D Pattern (GSM/UMTS 1800 MHz)









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HP: Horizontal Polarization

Unit: dBi

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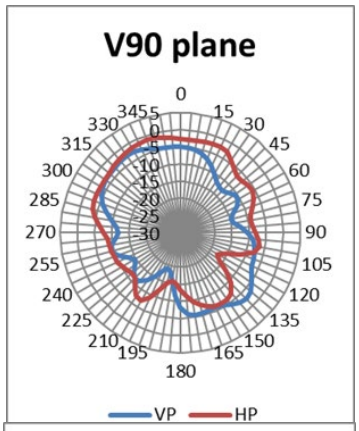
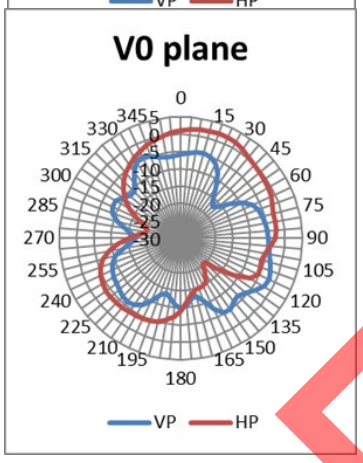
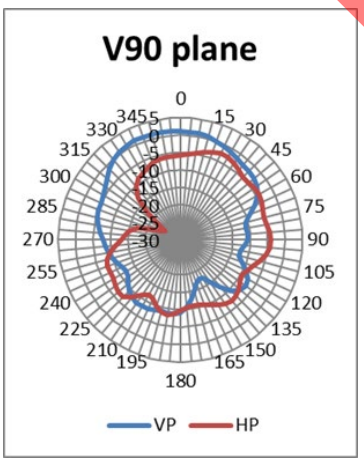
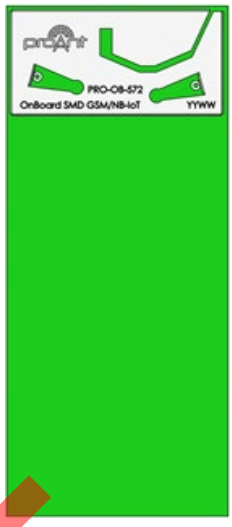
Radiation Characteristics - 2D Pattern (GSM/UMTS 1900 MHz)









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Unit: dBi

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ABRACON IS
ISO9001-2015
CERTIFIED

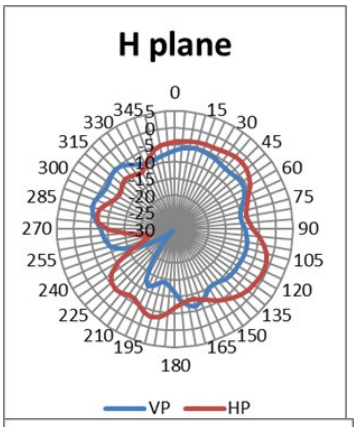
OnBoard NB-IoT - Antenna

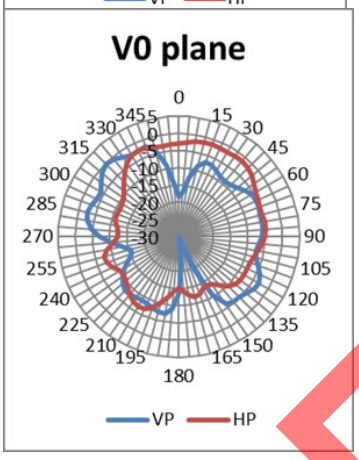
PRO-OB-585

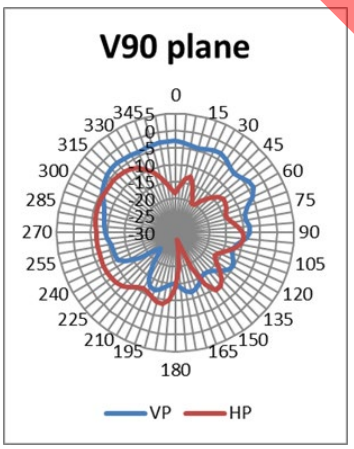
Request Samples | Check Inventory

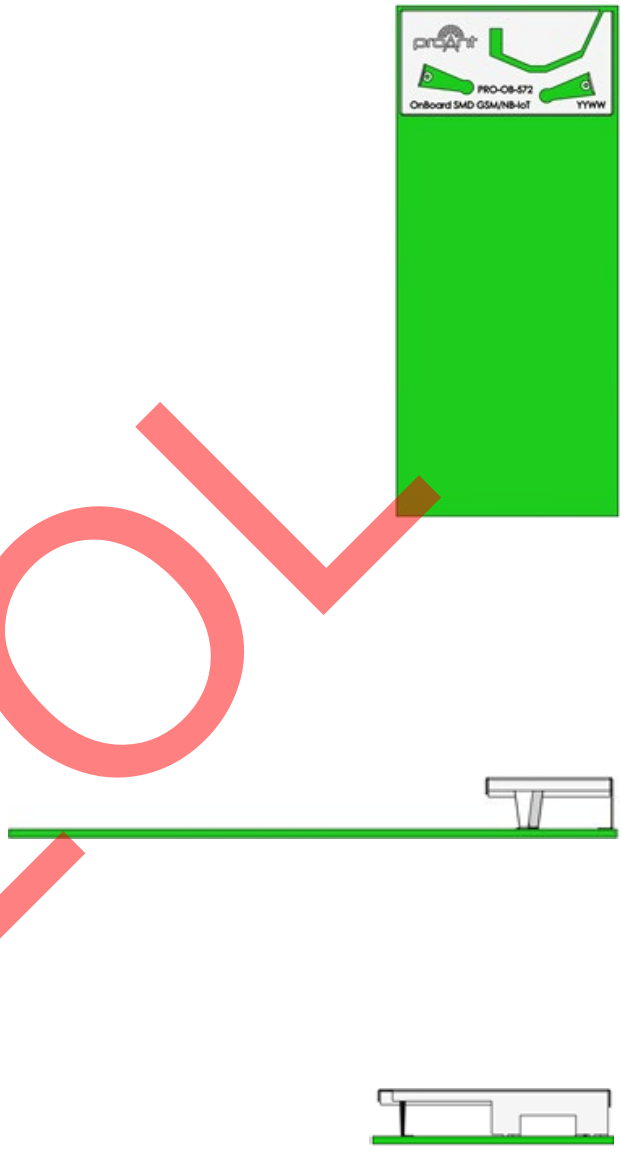
50.00 x 25.00 x 10.00 mm
RoHS/RoHS II Compliant
MSL Level = 1

Radiation Characteristics - 2D Pattern (GSM/UMTS 2100 MHz)









VP: Vertical Polarization
HP: Horizontal Polarization

Unit: dBi

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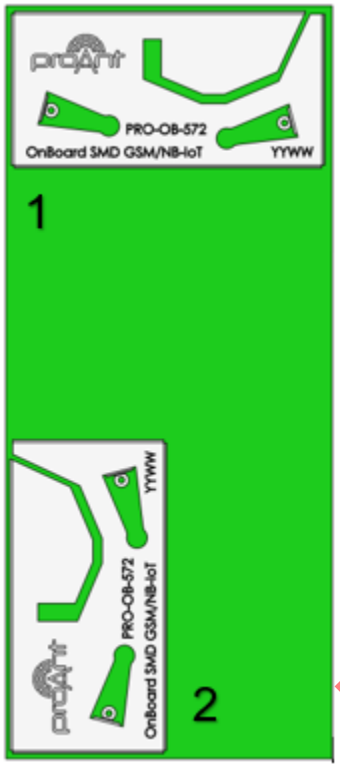
General Implementation Guidelines

The antenna can be positioned in different ways, although there are some positions which are more beneficial. Below picture shows a typical PCB with two possible antenna positions. The positions have been arranged according to the best general fit.



Optimal 1

2

The antenna should be aligned with the PCB edge if possible. It is also important to align pin 1, 2, 3 and 4 along the outer side of the PCB, and even more preferably close to a corner.

The OnBoard SMD GSM/UMTS // NB-IoT antenna enables that small electrical components are mounted inside the antenna keep-out block. This is a space-efficient solution which has very little influence on the performance. It may have an impact on the antenna tuning but is fully possible if there is limited space on the PCB.

Another general aspect on surface mounted antennas is regarding the PCB population. If other electrical components are positioned in the surrounding area of the antenna, some impact on the antenna tuning and radiated performance may be expected. It is recommended that such components are distributed below a topographical slope that starts on PCB level at the antenna keep-out block, and slowly increases the height.

It shall also be highlighted that plastic and metal parts in the near proximity of antennas may influence the antenna tuning and/or performance. This aspect should be noted as a general guideline for all antennas. The effects are difficult to estimate without detailed information, but it is common that a plastic housing above the antenna shifts the resonant frequency down. It is recommended to measure the antenna in the actual device after implementation.

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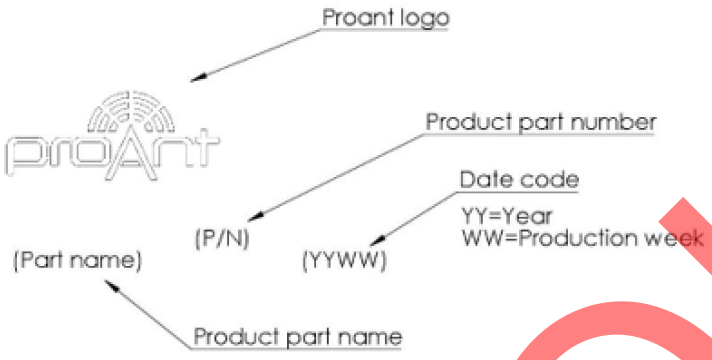
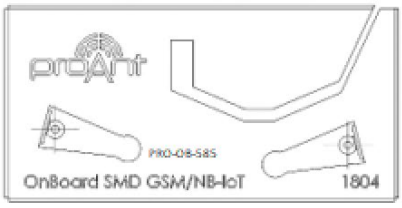
MSL Level = 1

Park Marking

The top marking of the antenna is arranged according to the following illustration.





Example top marking

Ordering Information

Part number	Part name	Details
PRO-OB-85	OnBoard SMD GSM/NB-IoT (low cost)	Antenna for NB-IoT and GSM/UMTS.

OnBoard NB-IoT - Antenna

PRO-OB-585

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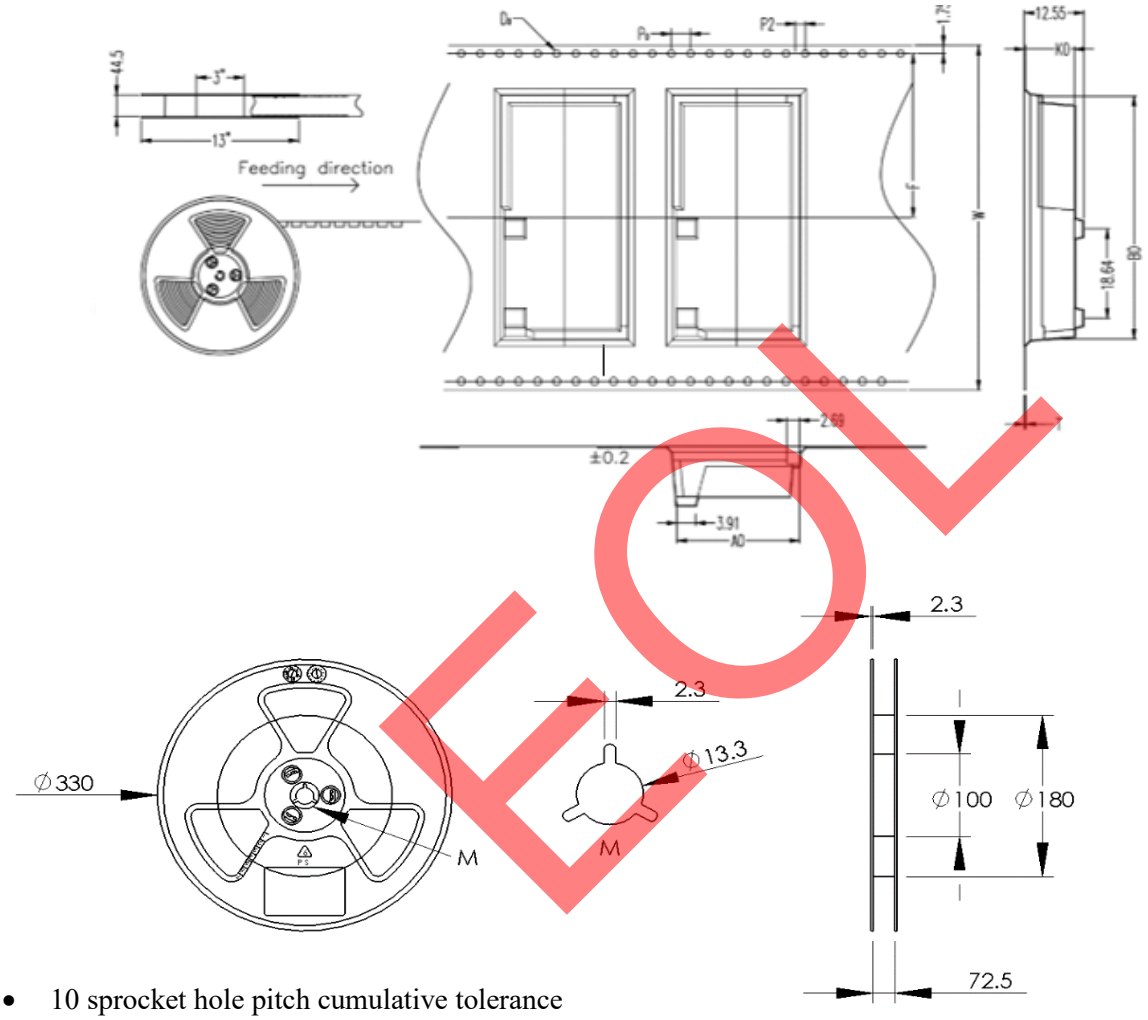
50.00 x 25.00 x 10.00 mm
RoHS/RoHS II Compliant
MSL Level = 1

Packaging

The antenna is delivered on tape and reel according to following specifications. The quantity per 13” reel is 100 pcs.



A_0	25.72 ±0.1
B_0	50.74 ±0.1
D_0	ø1.5 $^{+0.10}_{-0.00}$
E_1	1.75 ±0.1
F	34.2 ±0.15
K_0	10.5±0.1
P_0	4.0 ±0.1
P_1	12.0 ±0.1
P_2	2.0 ±0.15
S_0	
T	0.35 ±0.05
W	72.0 ±0.3

- 10 sprocket hole pitch cumulative tolerance
- Camber not to exceed 1mm in 100m
- A0 and B0 measured on a plane 0.35mm above the Bottom of the pocket
- K0 measured from a plane on the inside bottom of the Pocket to the top surface of the carrier
- Pocket position relative to sprocket hole measured as true Position of pocket, not pocket hole

- Component load per 13” reel: 100 pcs
- Packing length per 22” reel:

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