1NCE INDUSTRIAL IOT ESIM

MFF2 Datasheet & Packaging

Cologne, 2020

CONTENT

INTRODUCTION

The 1NCE Industrial IoT eSIM is an industrial embedded SIM. This document provides an overview of the SIM specifications as well as the components, moisture protection, assembling and packaging and labelling.

TECHNICAL DATA SHEET

KEY STANDARD COMPLIANCE

- Global Platform 2.3
- ETSI TS 101 220
- ETSI TS 102 221
- 3GPP TS 31.101
- 3GPP TS 31.111
- 3GPP TR 31.900
- 3GPP TR 31.919

HARDWARE FEATURES

- Ruggedized Form Factors
  - MFF2
  - QFN8
- Operating Voltage
  - Class A,B,C (1.8V – 5.0V +-10%)
- Environmental Temperature Range
  - -40°C + 105°C

SOFTWARE FEATURES

- Supported Bearers
  - 2G
  - 3G
  - 4G
  - LTE-M
  - NB-IoT
- Data Retention
  - 10 years
- Read/Write Cycles
  - 500,000

COMPONENTS

SMD Devices: MFF2 package dimensions according to ETSI 102 671.

Symbol				
	Min.	Typ.	Max.	Unit
E	5.85	6.00	6.15	mm
D	4.85	5.00	5.15	mm
L	0.45	0.60	0.75	mm
b	0.30	0.40	0.50	mm
E2	3.30			mm
D2	3.90			mm
k	0.20			mm
e		1.27		mm

Table 1: Dimensions of MFF2 package

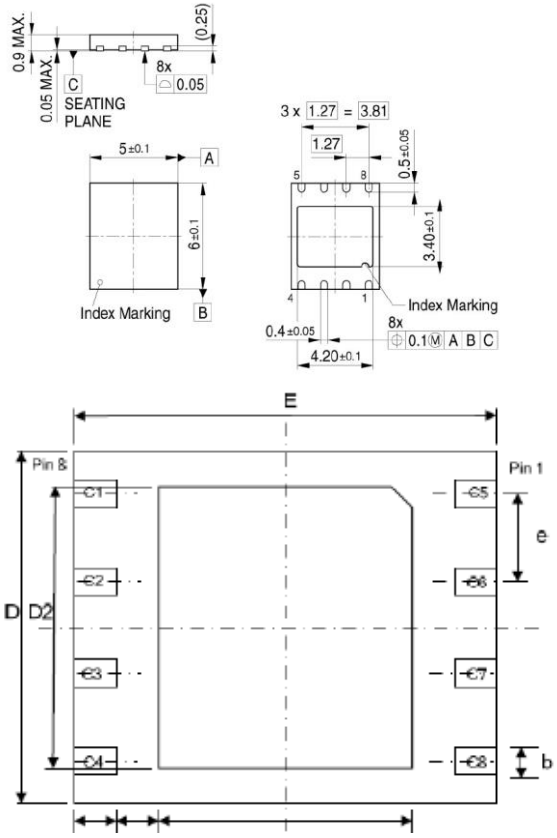


Figure 1: MFF2 package

CARRIER TAPE

Tri-Laminate PS+C (polystyrene with carbon) carrier tape for devices provides maximum protection from physical and ESD damage during shipping and storage. Tri-Laminate PS+C carrier tape is 12mm wide and 0,3mm thick.

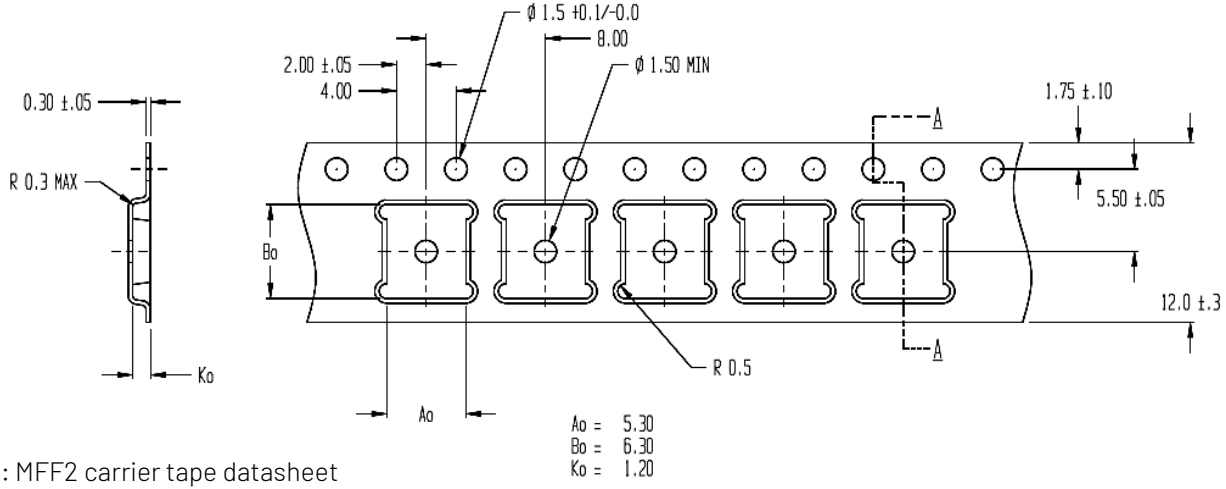


Figure 2: MFF2 carrier tape datasheet

COVER TAPE

Heat-activated antistatic cover tape is constructed in two layers, a 0.0010" thick polyester base film covered by a 0.0011" thick heat-activated adhesive coating layer. Both layers are antistatic to protect static sensitive devices. Cover tape is 9,2mm wide.

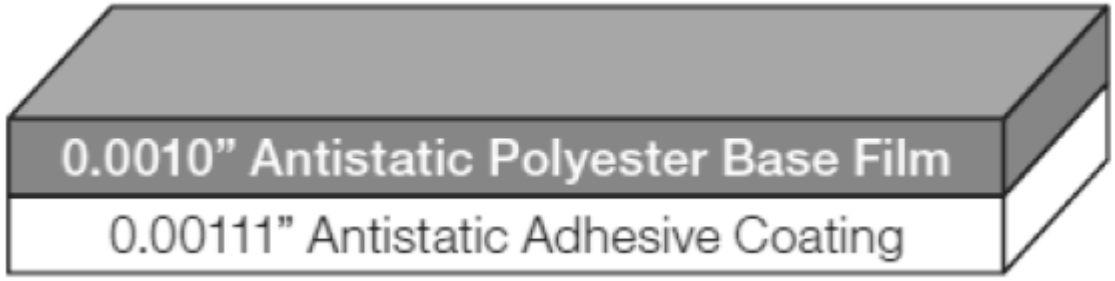


Figure 3: Cover tape structure

SIM REELS

High-impact injection molded polystyrene construction reels offer exceptional protection to devices.

Two different sizes are available 7inch (178mm) and 13inch (330mm). 13inch reels are assembled from two halves 8mm and 4mm.

Capacity of 7inch reel is 100 or 500 devices and 13inch reel is 3.000 devices.

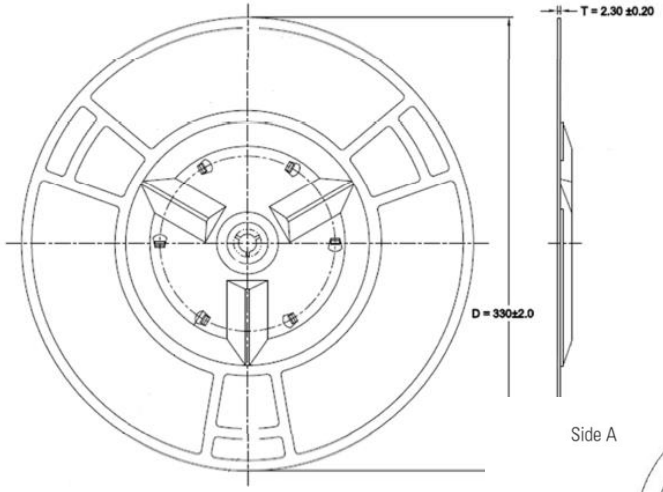


Figure 4: 13" reel

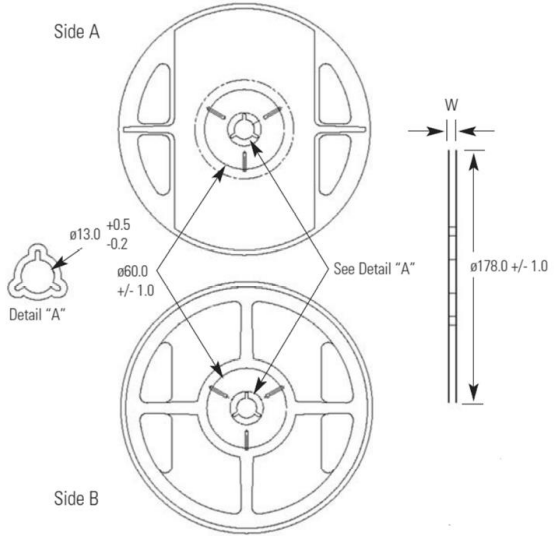


Figure 5: 7" reel

PROTECTIVE BAND

The Protective band is made of carbon-loaded polystyrene designed to be wound around the diameter of standard size shipping reels of loaded carrier tape. The band covers the outermost wrap of carrier tape to provide added protection for packaged components.

The bands are slightly wider than the carrier tape, preventing the flanges from crushing together during dry-pack or handling to protect packaged components from impact damages. Width of protective tape is 12.3mm

HUMIDITY INDICATOR CARD

Humidity Indicator Cards (HICs) provide easy method of indicating humidity conditions inside a moisture barrier bag after vacuum packaging.

The indicator spots on the HICs change color with changes in humidity – providing information about conditions within the packaging system.

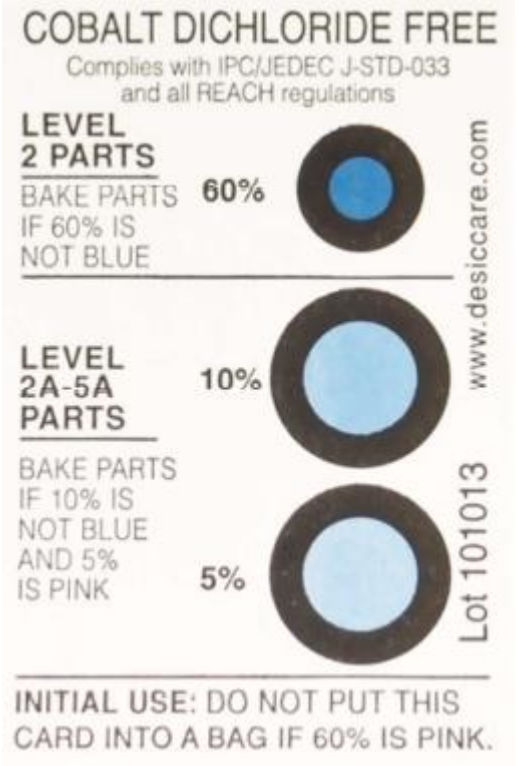


Figure 6: Humidity Indicator Card

DESICCANT

Desiccants protect moisture-sensitive devices by absorbing airborne moisture particles which may be present inside a moisture barrier bag after vacuum packaging.

Desiccant material is made of Silica Gel.

Figure 7: Desiccant pack

MOISTURE BARRIER BAG

Static Shielding/Moisture Barrier Bag is engineered to protect contents from electro-static shock and moisture and can control the moisture absorption from the ambient environment, thus maintaining the devices in a dry condition until used.

Its 6 mil construction prevents punctures, safeguards static- and moisture-sensitive devices during transport and storage.

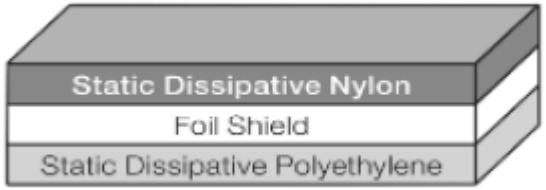


Figure 8: Barrier bag structure

SIM PACKING & SEQUENCING

The packing process and materials meet requirements defined in JEDEC J-STD-033 with ESD precautions and proper handling procedures.

The user direction of unreeling is according to EIA-481 standard.

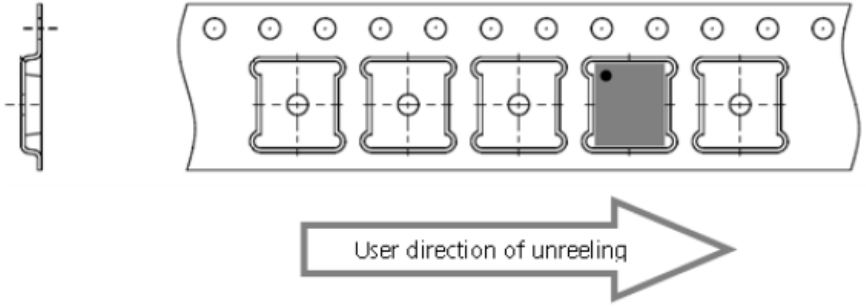
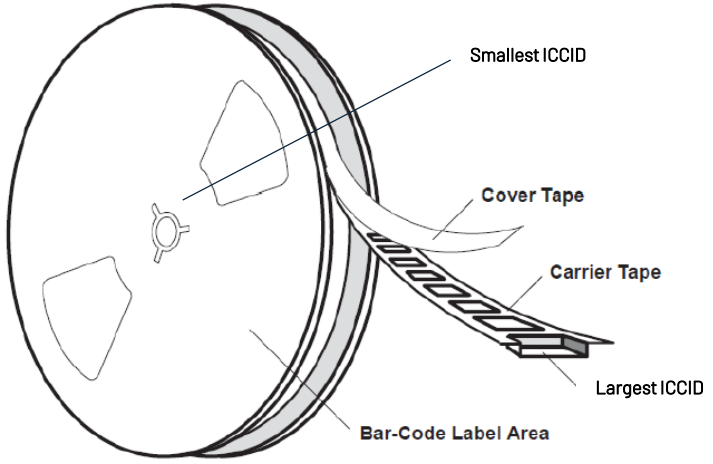


Figure 9: Packing orientation and unreeling direction

Devices are produced in sequence in ascending order where smallest ICCID is produced first and is at the end of the tape (middle of the reel).

Figure 10: Device sequence in reel



ASSEMBLING

Devices are placed into the carrier tape. Leader and trailer tape is applied with a length of 560mm.

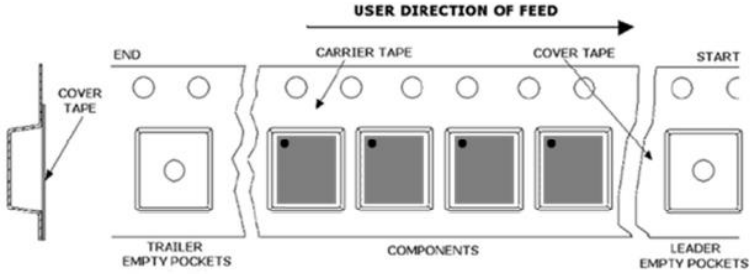


Figure 11: Trailer and leader empty pockets

The following actions then take place:

- Carrier tape is sealed with cover tape (see figure 12).
- Winding of carrier tape
- Protective band is attached to the end to leader tape.

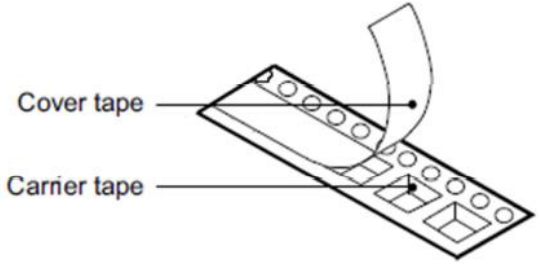


Figure 12: Cover tape and carrier tape sealing

PACKING METHOD

The packaging method consists of the following processes after assembly:

- Barcode label and humidity indicate card added on to the reel
- Desiccant (silica gel 25g * 2ea) is added and reel is inserted into a moisture barrier bag.
- Moisture bag is vacumn packaged and placed into Pizza box
- Barcode label attached to Pizza box

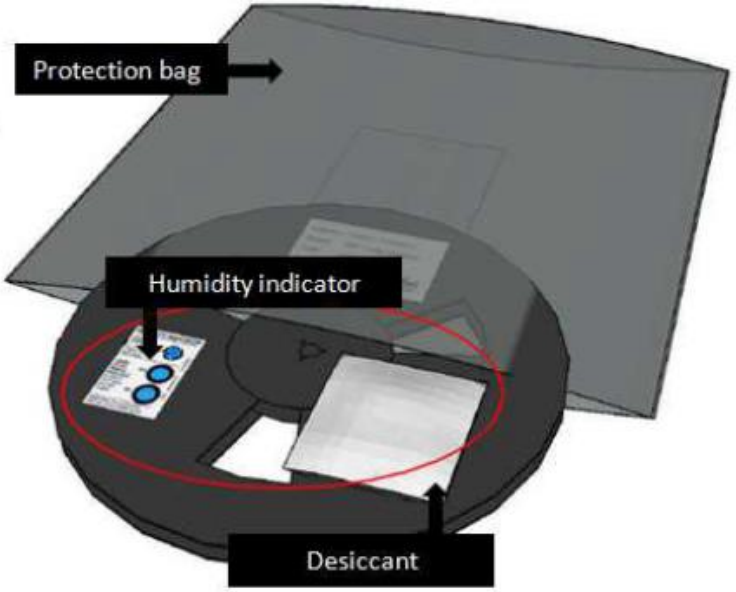


Figure 13: Reel and moisture protection bag

PACKAGING METHOD cont

The Pizza box is made of stiff paper to suit the dimensions of the reels. The dimensions of the boxes are:

- Small: (W x L x H): 212 x 197 x 55mm^3 (7″ reels)
- Large: (W x L x H): 355 x 354 x 58mm^3 (13″ reels)

4 Pizza boxes are packed in outer box with a maximum quantity of 12.000 devices (4 x 3,000 devices).

Figure 14: 7″ reel box

Figure 15: 13″ reel box

PACKAGING METHOD cont

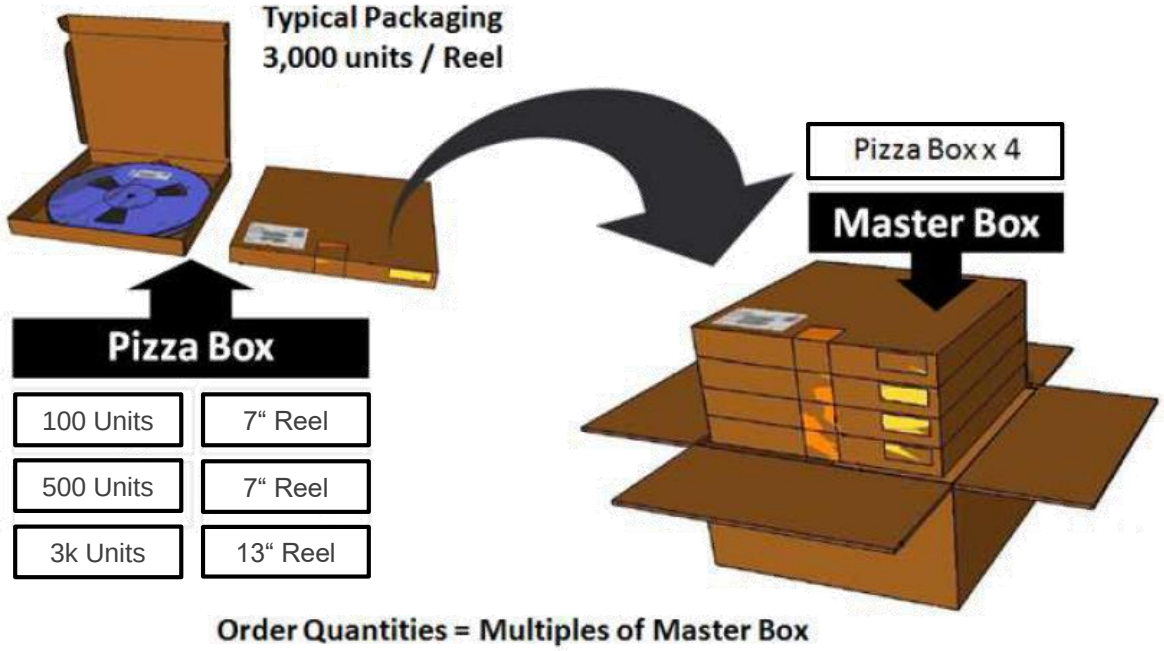


Figure 16: Pizza and Master box

LABELING

Labels are found on both the Pizza boxes and the Master box. The Pizza box label will contain details from the specific reel inside whereas the Master box label contains information from the 4 reels inside. Information includes a scannable first and last ICCID number and EAN code.

Figure 17: Pizza box sample label

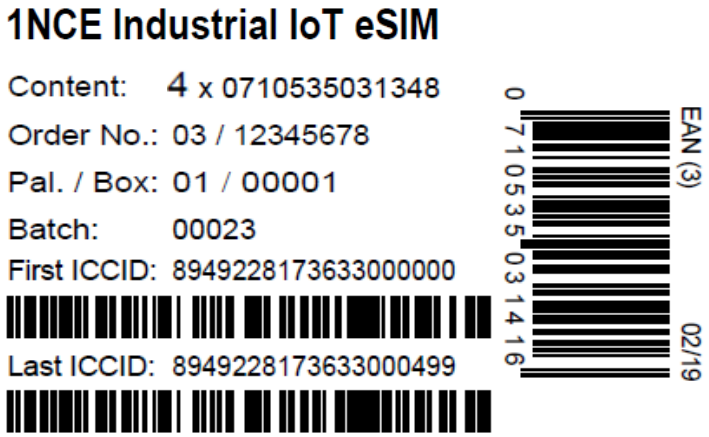


Figure 18: Master box sample label