UID - Smartcard Reject Criteria

1. PURPOSE
   As a reject limit specification guidelines for Smartcard Assembly process in UID

2. SCOPE
   2.1 This Reject Criteria covers all Smartcard product in UID from Incoming to Packing area

   2.2 Smartcard products which are covered by this specification follow below :
      2.2.1 Contact 6
      2.2.2 Contact 8
      2.2.3 Contactless
      2.2.4 Epoxy Tag (E-TAG)
      2.2.5 Encapsulation CME Glob Top (Dam & Fill and Fill & Fill)

   2.3 This Reject Criteria is applied for both of Internal and External (Appearance) defect of Products

3. TERM AND DEFINITION
   3.1 Incoming Criteria - Reject unit that produce by supplier

   3.2 Die Bond reject - Rejection unit that is produced by Die Bond Process

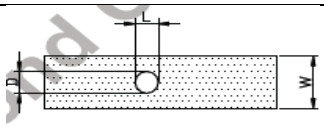
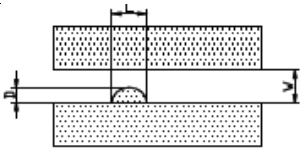
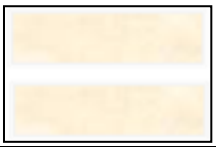
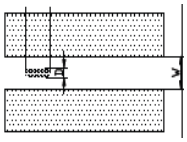
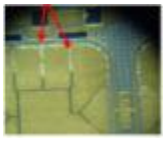
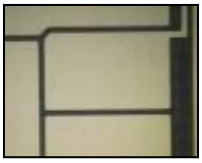
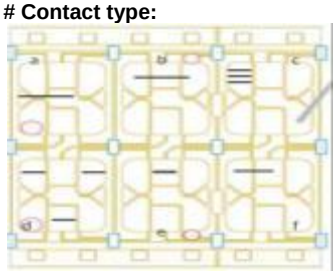
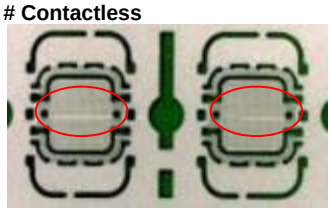
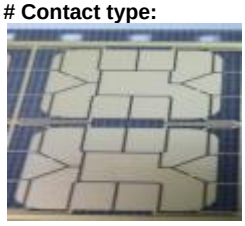
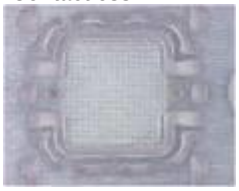
   3.3 Wire Bond reject - Rejection unit that is produced by Wire Bond Process

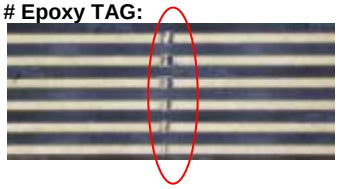
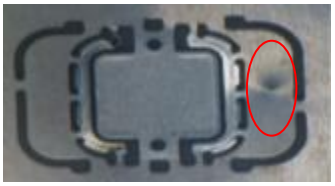
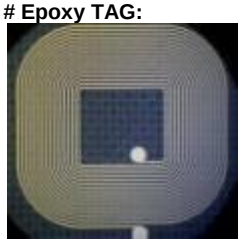
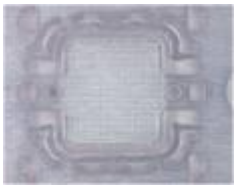
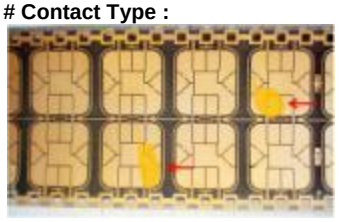
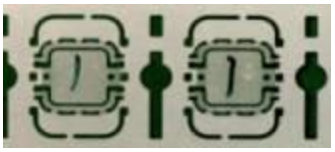
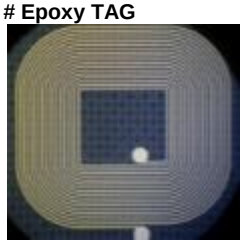
   3.4 Mold and Encapsulation reject - Rejection unit that is produced by Molding Process

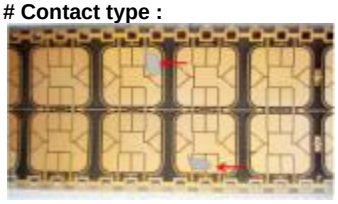
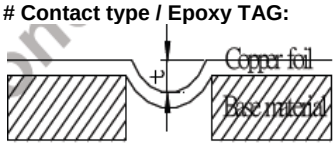
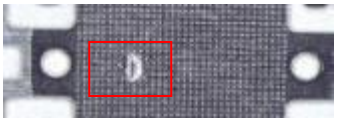
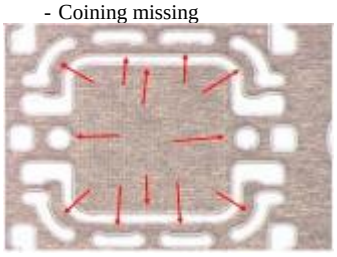
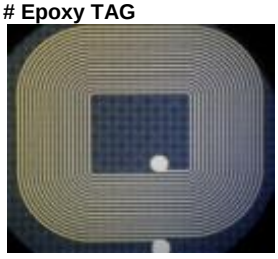
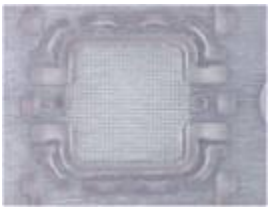
   3.5 Appearance and Splicing reject - Rejection units that can be produced by all assembly area from Incoming process until Out Going Process. Hence, Appearance reject Criteria is applied for all Assembly area.

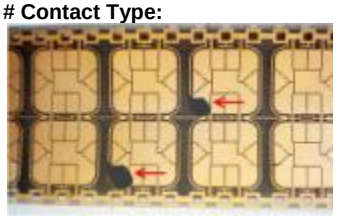
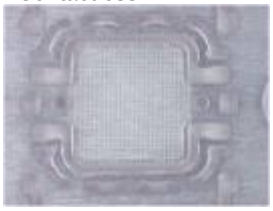
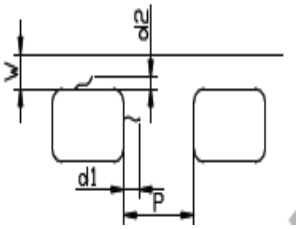
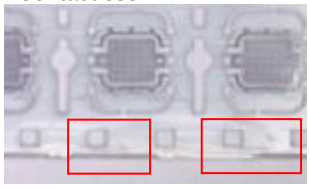
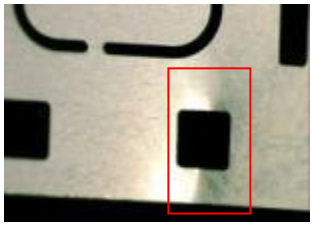
4. CONTENT

4.1 INCOMING CHECK REJECT CRITERIA

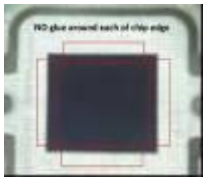
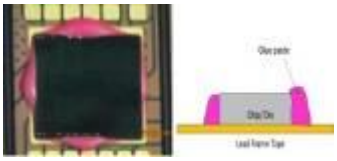
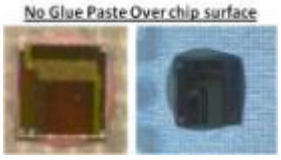
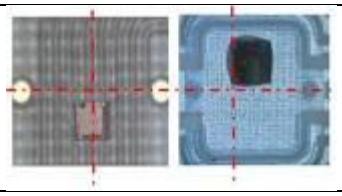
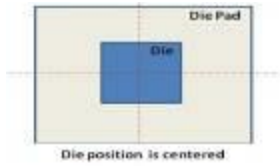
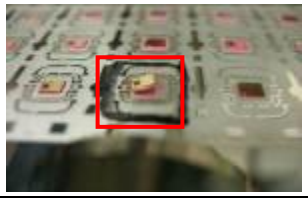
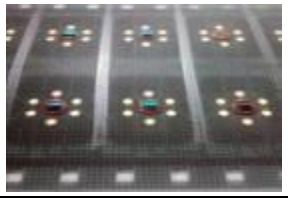
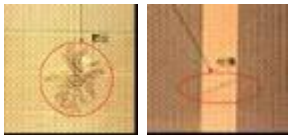
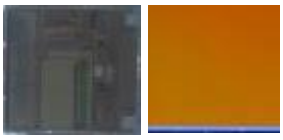
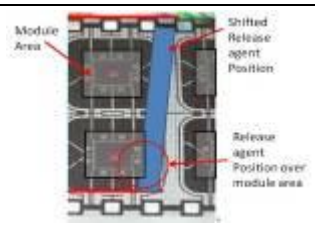
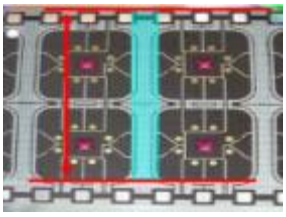
Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Reduction of pattern / over etching	Any reduction of pattern/over etching on lead frame metal surface			Microscope	Reject if the range of pattern reduction/over etching a ≥ 50 um is not allowed
Pin Hole on Contact side	Pin hole size too small on side of lead frame			Microscope	Reject if Pin hole size/width D or L > W/3
Reduction of space / under etching	Any reduction of pattern/under etching on lead frame metal surface			Microscope	Reject if the range of pattern reduction / under etching D ≥ W/3 L ≥ 2W
Metal residue between pattern	Any metal residue on the lane between contact pattern cause short circuit	 		Microscope	Reject if the range of metal residue on the lane between contact pattern D ≥ W/3 L ≥ 2W
Scratch	Any scratch condition on metal pattern area of lead frame.	**# Contact type:**  **# Epoxy TAG**  **# Contactless** 	**# Contact type:**  **# Epoxy TAG**  **#Contactless** 	Magnification Lamp	**# Contact Type** Reject if : a.Scratch length ≥ 5 mm b.Scratch goes through over 2 continuos pad c.Scratch ≥ 2 line in one pad side d. Scratch ≥ 2 line in one unit (module) e.Scratch width ≥ 0.1 mm f. Scratch length ≥ 5mm, but within two continous pad **# TAG** Reject for any scratch at antenna area **# Contactless** Nickel Exposure due to scratch unacceptable

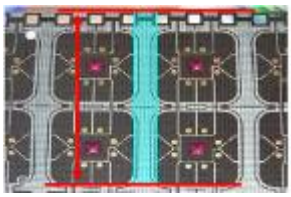
Dented	Any dented / tool mark on metal pattern area of lead frame / contact pad area	**# Contact Type :**  **# Epoxy TAG:**  **# Contactless:** 	**# Contact Type**  **# Epoxy TAG:**  **# Contactless:** 	Magnification Lamp	**# Contact and Contactless Type:** Reject if : Length > 0.5mm or depth > 0.1 mm **# TAG :** Reject if : Diameter < 0.1 mm, Depth < 1/3 of foil copper thickness
Discoloration/ Contamination	Any discoloration/ contamination on metal pattern area of lead frame	**# Contact Type :**  **# Epoxy TAG :**  **# Contactless:**  	**# Contact Type:**  **# Epoxy TAG**  **# Contactless:** 	Magnification Lamp.	Any discoloration and contamination is not allowed.

Foreign material	Any foreign material on metal pattern area of lead frame	**# Contact type :**  **# Epoxy TAG :**  **# Contactless:** 	**# Contact type**  **# Epoxy TAG :**  **# Contactless:** 	Magnification Lamp	Any visible protrusion of foreign material stick is not allowed
Deformation of contact pads	Deformation metal pattern area of contact pad like a dented condition.	**# Contact type / Epoxy TAG:**  **# Contactless :** - Die pad Area deformed   - Coining missing 	**# Contact type :**  **# Epoxy TAG**  **# Contactless :** 	Magnification Lamp	Deformation of contact pads t ≥ 40µm is not allowed

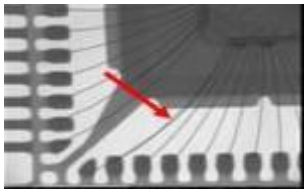
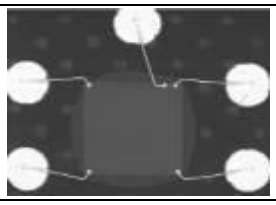
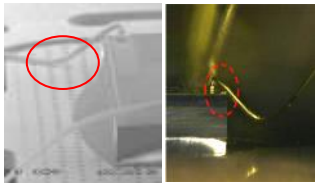
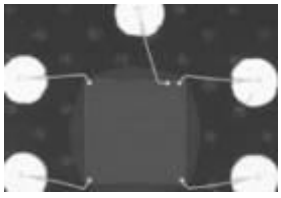
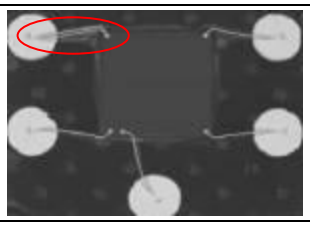
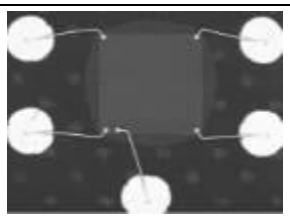
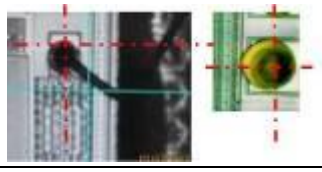
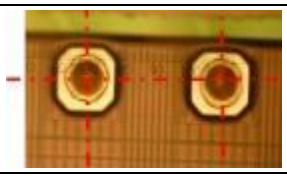
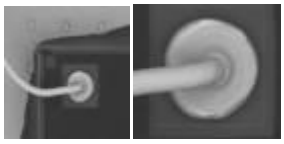
Incomplete plating	Any incomplete plating on copper foil is not allowed	**# Contact Type:**  **# Contactless :** 	**# Contact type:**  **# Contactless :** 	Microscope	Incomplete plating on copper foil is not allowed.
Broken Sprocket Hole	Any Broken or Deformation on sproket hole area	**# Contact & Epoxy TAG:**  **# Contactless:**  	**# Contact & Epoxy TAG:**  **# Contactless:** 	Magnification Lamp	Sprocket dimension : d2 ≦ W/3 d1 ≦ P/2 Any deformation of rail or sprocket hole is not allowed

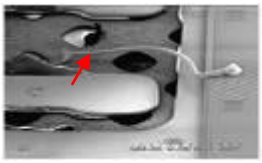
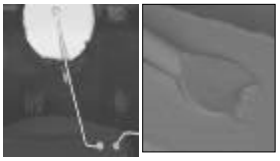
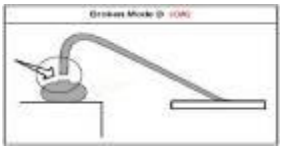
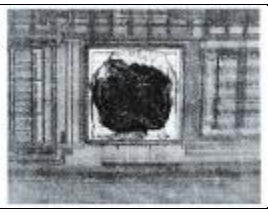
4.2 DIE BOND REJECT CRITERIA

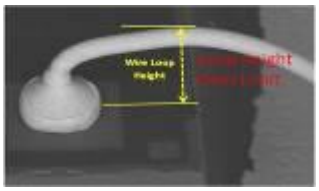
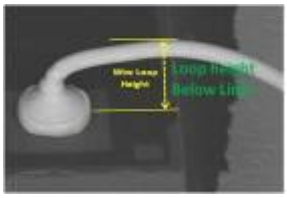
Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Insufficient Glue filling	The glue paste that un-fills on chip side. It can be seen by any glue around each edge of chip			Microscope	Reject if the amount Glue paste around edge of chip < 80%
Glue Coverage	The glue paste coverage area on the chip backside after die peel off test			Microscope	Reject if the coverage/wettability glue paste located on the backside of chip < 75%.
Glue Overfilled	The glue paste that overfilled on chip surface			Microscope	Reject glue paste spreading exceed of the chip thickness
Shifted Bond Position	Chip placement position is shifted from the center area of die pad			Measuring Microscope	Reject if Chip bonding position shifted > 0.5mm in XY direction
Lifted Die	Chip / die is lifted off during die bonding process			Microscope	Reject if any chip / die is lifted off from Lead frame tape
Chip dent	Any chip that shows dented point of chip surface			Microscope	Any dented on chip is not allowed.
Shifted Release agent position (For Contact type)	Release agent position should be center on sprocket hole area / not shifted			Naked eye / Microscope	Reject if release agent shifted and reach final module punch area.

Release agent width (For Contact type)	Release agent width should be proportional on writing area / unit			Naked eye / Microscope	OK if Release agent width writing Contact 8 = 2.4 – 2.8 mm, Contact 6 = 1.4-1.6 mm (not bold and not thin)

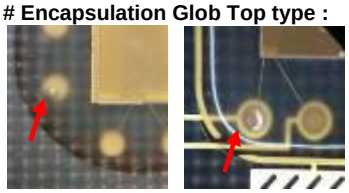
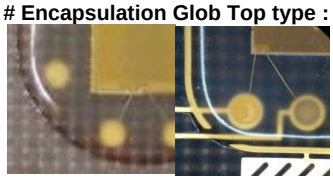
4.3 WIRE BOND REJECT CRITERIA

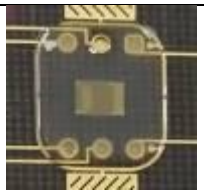
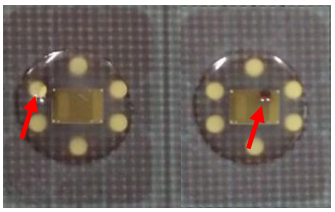
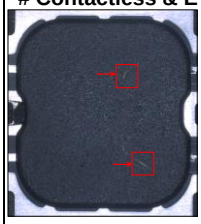
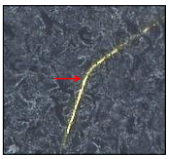
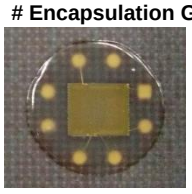
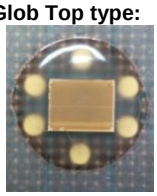
Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Wire Short	Any wire touches other wire			Microscope / Monitor	Any wire short is not allowed
Wire Sagging	Wire is sagged down and touch L/F surface			Microscope	Any wire loop sagging is not Allowed
Double bonding	Bonding process more than 1X in the same pad position			Microscope	Any double wire is not allowed
Shifted ball bond	1st ball bond was out from aluminum pad of die			Microscope	Reject if any Shifted ball condition > 20% out of aluminum pad.
Ball non-stick	Ball lifting from the bond pad completely.			Microscope	Any lifting ball from bond pad is not allowed

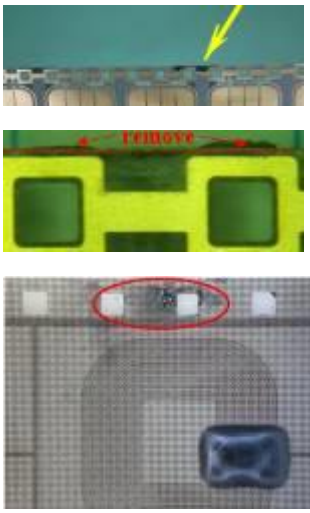
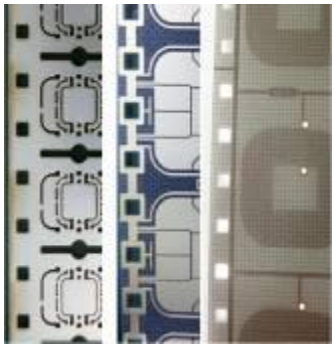
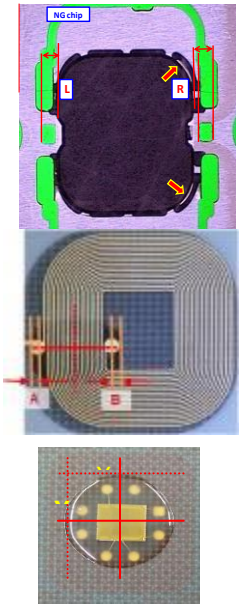
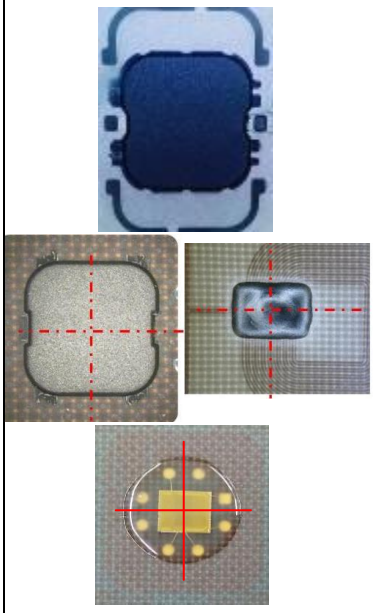
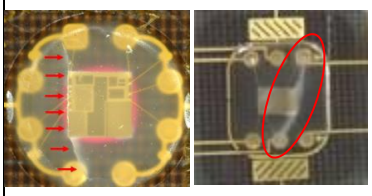
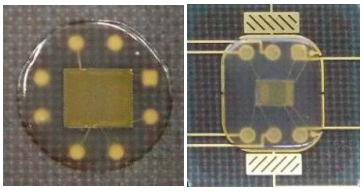
Lifted Wedge	Not bonding alloy was existed on the bonding area of lead frame (wedge).			Microscope	Any lifting wedge from Lead frame pad is not allowed
Wire Pull Mode	Case of breaking during Wire pull Test : 1. mode A (Ball bond lifted) 2. mode B (Break on ball neck) 3. mode C (Break between ball neck to wedge neck) 4. mode D (Break on wedge neck) 5. mode E (wedge lifted)			Wire Pull Tester	Reject if Mode breaking is A and E
Wire Pull Value	Value of wire pull test	N/A	N/A	Wire Pull Tester	**# Contact type use wire diameter 24.5 µm:** Reject if < 6.5gf **# Epoxy TAG & Contactless use wire diameter 18.5 µm:** Reject if < 2.8gf
Ball Shear	Case of ball lifted after ball shearing			Ball Shear Tester	Reject if Cratering condition : ball bond was lifted with aluminum peel off / oxide layer is exposed
Ball Shear value	Value of ball shear test result	N/A	N/A	Ball Shear Tester	**# Contact type mold use wire diameter 24.5 µm:** Reject if < 28gf **# Epoxy TAG & Contactless use wire diameter 18.5 µm:** Reject if < 23gf **# Contact type and dual interface glob top use wire diameter 18.5 µm / 19.5 µm:** Reject if < 23gf

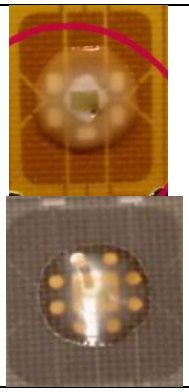
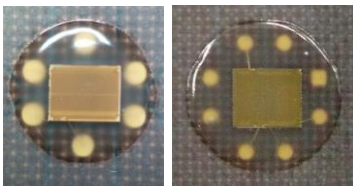
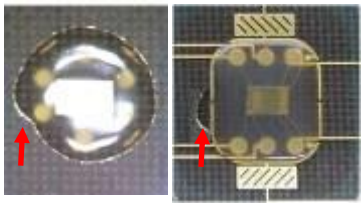
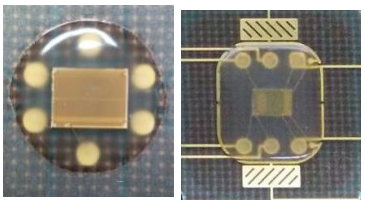
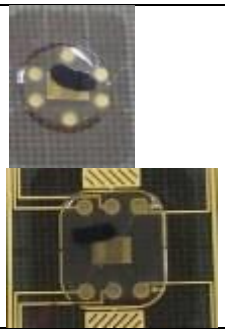
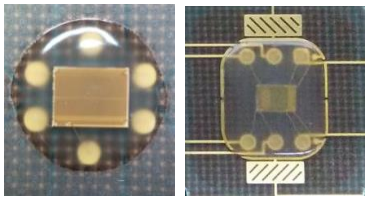
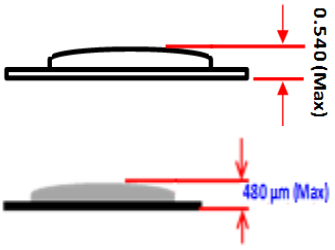
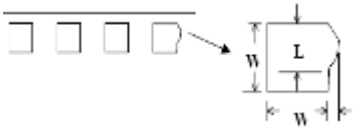
Excessive loop height	Loop height value that has exceeded specification limit			Hisomet	**# Contact type:** 40 – 85 µm **# Epoxy TAG :** 40 – 100 µm **# Contactless :** 35 – 60 µm **# Dual Interface :** 40 – 100 µm

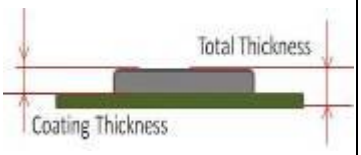
4.4 MOLD AND ENCAPSULATION REJECT CRITERIA

Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Void / Porosity (4W)	Visible hole or bubbles on package surface. caused by mold process related or sticking dirt at cavity surface Porosity : Group of small void on Package surface	**# Contact & Contactless type:**  **# Epoxy TAG:**  **# Encapsulation Glob Top type :** 	**# Contact & Contactless type:**  **# Epoxy TAG:**  **# Encapsulation Glob Top type :** 	Visual / Magnifier	**# Contact, Contactless and ETAG type:** Any void and porosity on package surface is not allowed **# Encapsulation Glob Top :** Reject if the void/ bubble size is > 0.4 mm and no happen at critical point of package (chip area and wire)
Incomplete Fill (LW)	Un-fill condition of package during molding / Encap process	**# Contact & Contactless type:**  **# Epoxy TAG:**  **# Encapsulation Glob Top type :**	**# Contact & Contactless type:**  **# Epoxy TAG:**  **# Encapsulation Glob Top type :**	Visual / Naked eyes	Any Incomplete Fill is not allowed

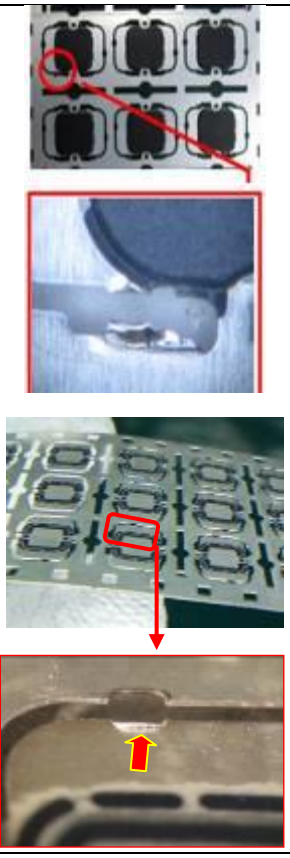
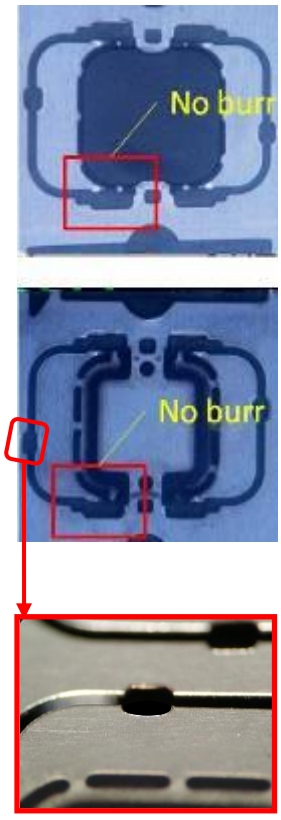
		 			
Exposed Die/Wire (HK)	Visible die/wire on package surface	**# Contactless & ETAG type:**    **# Encapsulation Glob Top type:**  	**# Contactless & ETAG type:**   **# Encapsulation Glob Top type:**  	Visual / Magnifier	**# ETAG and Encapsulation Glob Top type:** Any exposed die/wire can be seen by visual is not allowed **# Contact and Contactless :** Any exposed wire can be seen by luxo lamp (clearly visible) and not covered by mold compound.
Mold Bulging	Deformation of package with convex form.			Visual / Magnifier	Any Mold bulging is reject
Chip On Gate	Any chipping / crack portion at gate area of package			Visual / Magnifier	**# Contact type:** Reject if the X-axis length is > 0.5 mm **# Contactless :** Reject if more than 0.2 mm in X direction
Mold Flash	Any bleeding out of compound around package			Visual / Magnifier	Mold flash position : 4 sides of the body = reject if > 0.5 mm 1 side of body = Reject if > 2 mm air-vent flash at the corners of module & the runner area are acceptable

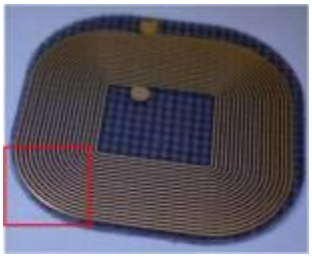
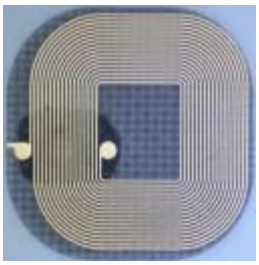
Mold Flash on Rail	Embedded flash compound at rail area			Visual/ Magnifier	Any mold flash around rail area is not allowed Flashes need to be removed.
Mold Body package shifted	Any shifted of package body to Lead frame tape position			Jig and Project Profile	**# Contact and Contactless Type:** Reject for any mold body shifted > 0.1 mm in X & Y direction **# TAG :** Reject for any mold body shifted > 0.3±0.2 mm in X & Y direction **# Encapsulation Glob Top type:** Reject for any package body shifted > 0.4 mm in X & Y direction from center position.
Package Glob Top Crack	Any chipping / crack portion at area of glob top package			Visual/ Magnifier	**# Encapsulation Glob Top type:** Reject for any package glob top crack / broken.

Package Glob Top Dented	Any dented portion at area of glob top package			Visual/ Magnifier	**# Encapsulation Glob Top type:** Reject for any package glob top dented.
Broken shape of package glob top	Any broken/ un-repetitive shape of glob top package			Visual/ Magnifier	**# Encapsulation Glob Top type:** Reject for any package glob top out of spec shape dimension / broken shape.
Contamination of package glob top	Any contamination/ stain at the surface of glob top package			Visual/ Magnifier	**# Encapsulation Glob Top type:** Reject for any contamination/stain size : 0.2 mm on the surface package glob top. Accept in case it is cleaned.
Encapsulation glob top over thickness	Condition where glob top resin thickness package over specification limit		NA	Micrometer / Dial Gauge	**# Encapsulation Glob Top type:** Reject if total module thickness Fill & Fill package > 480 µm. Reject if total module thickness Dam & Fill package > 540 µm.
Sprocket Hole Deformed	Any deformed of Sprocket shape of Lead frame tape			Visual/ Magnifier	Reject for any sprocket hole deformed > ½ Sprocket width/Length (W)

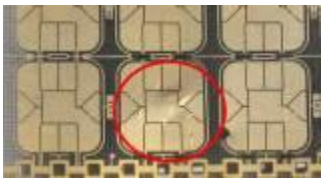
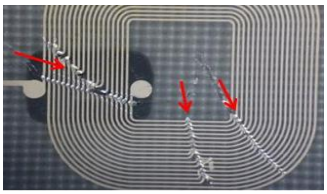
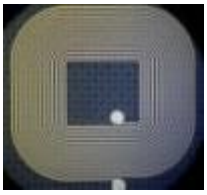
Coating Over Thickness (E-TAG)	Condition where coating resin thickness over specification limit		NA	Micrometer / Dial Gauge	Reject if coating thickness > 415 um Or total thickness > 580 um

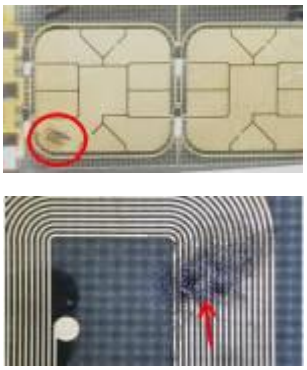
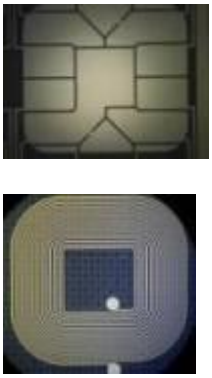
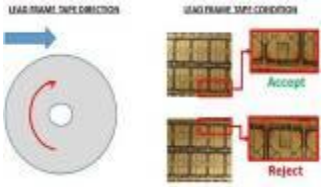
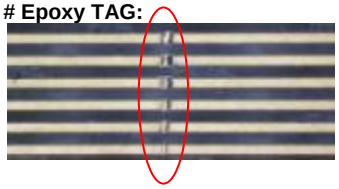
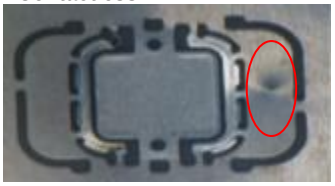
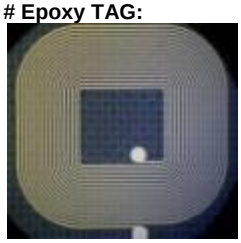
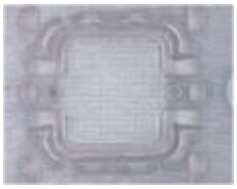
4.5 SHORT CIRCUIT PUNCH (SCP) REJECT CRITERIA

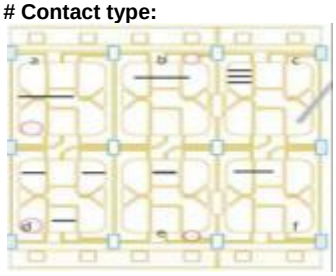
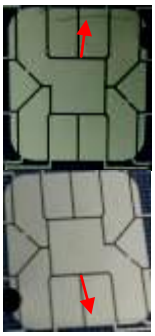
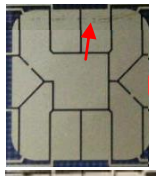
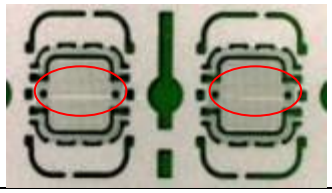
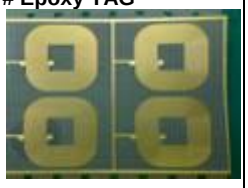
Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Burr	Metal residue that still stuck on the units after punching process			Microscope / Magnifier	Reject if the length and height of burr > 0.05 mm (if burr condition checked > 1/2 lead frame thickness)

Misplaced cutting	Improper cutting due to punch and unit is not at same center position			Microscope / Magnifier	Reject if cutting portion already reached antenna area
Wrong Punch Hole	Punch hole is different with the product requirement	N/A	N/A	Microscope / Magnifier	Any wrong SCP punch hole is rejected

4.6 APPEARANCE REJECT CRITERIA

Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Damaged Contact	Deformed or damaged of contact pattern	 	 	Visual/ Magnifier	Reject for any damaged contact pattern

Contamination	Any stained dirt which is not part of the product on package			Visual/ Magnifier	Reject if all electrical contact areas (pattern side) display any evident contamination such as foreign materials dirt, ink, oil, grease, fingerprint or chemicals.
Wrong Lead Frame Tape orientation	Direction of Lead frame tape in the reel is different with the requirement		N/A	Visual/Magnifier	Wrong Lead Frame Tape Orientation is NOT ALLOWED
Dented	Any dented / tool mark on metal pattern area of lead frame / contact pad area	**# Contact Type :**  **# Epoxy TAG:**  **# Contactless:** 	**# Contact Type**  **# Epoxy TAG:**  **# Contactless:** 	Magnification Lamp	**# Contact and Contactless Type:** Reject if : Length > 0.5mm or depth > 0.1 mm **# ETAG :** Reject if : Diameter < 0.1 mm, Depth < 1/3 of foil copper thickness.

Scratch	Any scratch condition on metal pattern area of lead frame.	**# Contact type:**     **# Epoxy TAG**  **# Contactless** 	**# Contact type:**   **# Epoxy TAG**  **# Contactless** 	Magnification Lamp	**# Contact Type** Reject for any scratch at antenna area **# TAG** Reject for any scratch at antenna area **# Contactless** Nickel Exposure due to scratch unacceptable

4.7 PACKING REJECT CRITERIA

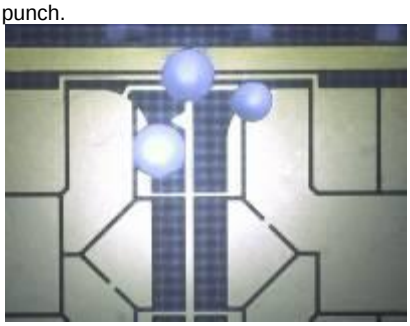
Reject Name	Description	Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT

Wrinkled Seal	The seal area has wringkled condition after vacuuming process			Naked Eyes	Reject for any wrinkled seal.
Tear Off Sealing Bag	Part of Sealing bag area has torn off / Leakage			Naked eyes	Reject for any torn off Sealing bag
Bending Reel	Any side of reel has deformed condition 1. Middle reel Shrinked and deformed 2. Outer reel bending (Deformed)	 		Naked Eyes	Reject for any bending Reel
Loosen Sealing Condition	The sealing bag looses and the condition is not tight (Less vacuumed)			Naked eyes	Reject for any Loosen Sealing bag

Un-Sealed	Some portion of sealing bag on selaing area is not sealed			Naked eyes	Reject for any Un-sealed Condition

4.8 SPLICING AND REJECT UNIT HANDLING

SPLICING AND REJECT UNIT HANDLING	
ITEM	**DESCRIPTION**
Splicing Method	The splicing position should be between two modules for smart card. Splicing is not allowed follow : - Without using splicing tool to connect or cut the tape - The adhesive tapes are not connected double sides and without reject punch - Tape overlap - The gap is more than 0.2 mm after tape splice - Observed bubble after splicing at tape area
Reject hole on tape	1. Do reject hole on tape only 2. Punch whole unit is not allowed, If completely punched unit is found, need to be cut and do splicing 

Burr of Punch hole on the spliced units	Any bur on the spliced unit must be re-punched, if not possible to be re-punched, must be re-splicing and do re-punch. 
Tape fold mark, broken ,twist condition	Product had any tape fold mark, broken or twist condition, it must be rejected at V/C stage inspection, and all production must be undergone 100% visual
Wrong dimension of punch reject hole	Wrong dimension of punch reject hole is not allowed. The affected unit must be punched reject again with correct dimension.
Pitch shift	Modules pitch shift after tape connection (splicing) is not allowed. Affected Splicing should be re-connected/Re-spliced
splicing positions	One lot (reel) must have less than or equal to 10 pcs splicing positions, if more than 10pcs splicing positions should be re-connecting
Splicing interval	Distance between two tape splicing positions must more than 1m, except for small quantity material < 2000 units/ reel
Shifted sprocket hole pitch after splicing	Any shifted of sprocket hole pitch after connecting lead frame tape must be re-connected / re-splicing
Shifted Reject Hole	Off set position of rejection hole on Lead frame tape If any hole shifted > 0.2 mm must do re-punching reject hole on defined location
Broken sprocket hole	Any damage sprocket hole which some portion of tape missing is not allowed, affected unit with this sprocket hole damaged must be removed Any damage sprocket hole without any portion of sprocket removed can be re-worked using splicing tape