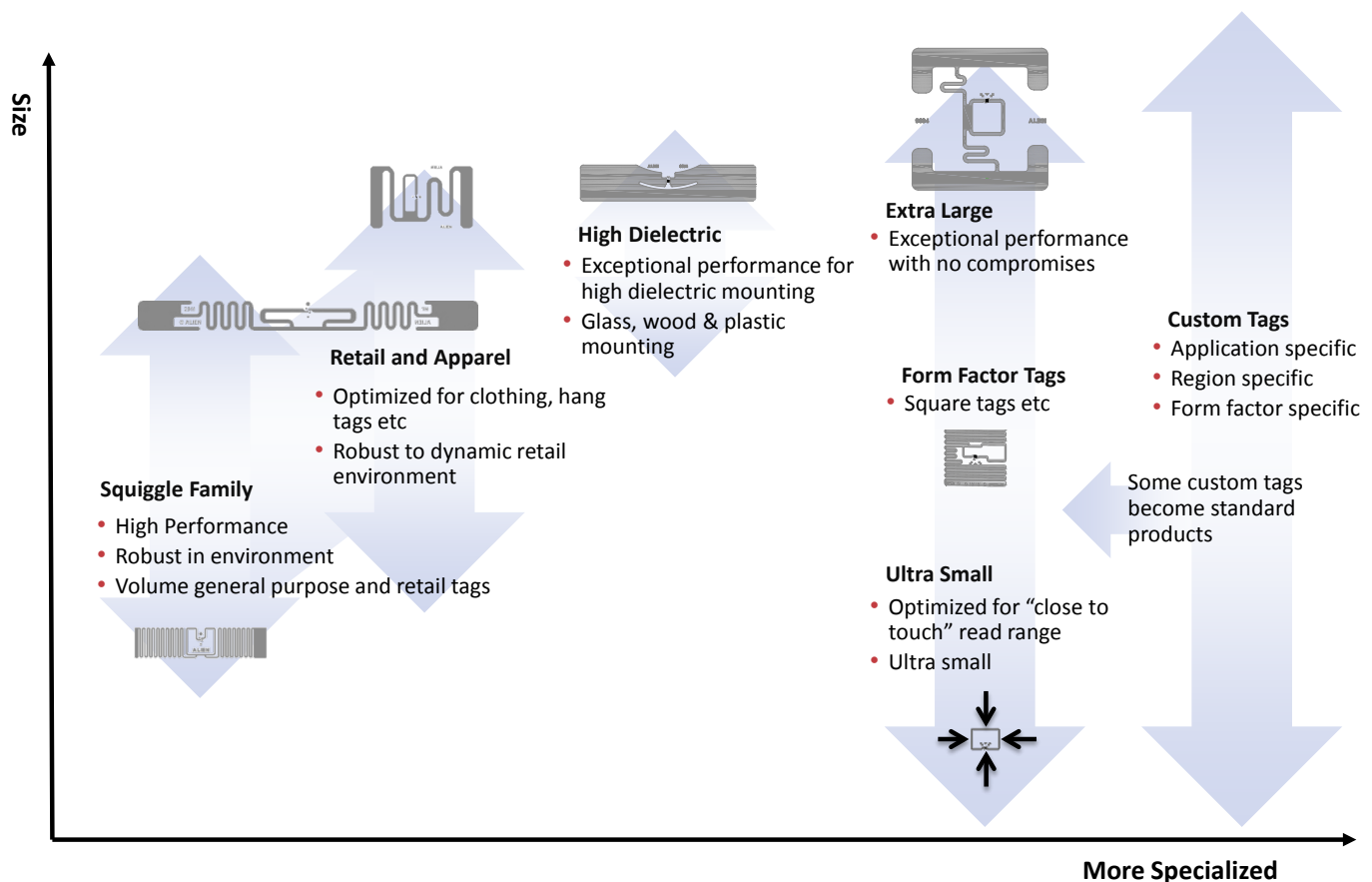




# ALIEN FAMILY OF EPC GEN 2 RFID INLAYS

Alien Technology® manufactures a range of EPC Gen 2 inlays designed to deliver optimal performance in a variety of applications.

Powered either by the larger memory **Higgs™-3 UHF RFID IC**, the volume focused **Higgs™-4** or the new **Higgs™-EC** with increased range, reliability and robustness, Alien® offers a range of RFID inlays that fit a wide variety of sizes, applications, characteristics and needs.



**All Alien inlays are World Tag compliant**, enabling operation across the diverse frequencies of the Americas, Europe, Middle East, Asia, and Africa. Some tags are world tags with specially tuned performance for optimal behavior in certain regions. See the tag matrix on the following pages. Please refer to Alien's Higgs-3, Higgs-4 and Higgs-EC product overviews for details on the RFID IC capabilities.

Alien has the capability to design custom tags for appropriate volume applications (under appropriate business terms) and can offer reference designs under license.



## Alien Family of EPC Gen 2 RFID Inlays

### Inlays: Squiggle Family

| Product                                                                                                                                                                                                        | Higgs-3  | Higgs-4                             | Higgs-EC                                                                                   | Antenna Size <sup>1</sup>          | Application                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Squiggle™ (SQ)<br>                                                                                                             | ALN-9640 | ALN-9740                            | ALN-9840  | 3.732" x 0.319"<br>94.8mm x 8.1mm  | Item/asset tracking including: pallet placards, cases, baggage, denim, poly bags, electronics, apparel tags and boxed items. |
| Squiglette (ST) and Squiglette-E (STE)<br><br> | ALN-9630 | ALN-9730<br>ALN-9730-E <sup>2</sup> | ALN-9830  | 2.756" x 0.374"<br>70mm x 9.5mm    |                                                                                                                              |
| Short (SH)<br>                                                                                                                 | ALN-9662 | ALN-9762                            | N/A                                                                                        | 2.756" x 0.669"<br>70mm x 17mm     |                                                                                                                              |
| Squig (SG)<br>                                                                                                                | ALN-9610 | ALN-9710                            | N/A                                                                                        | 1.752" x 0.409"<br>44.5mm x 10.4mm |                                                                                                                              |
| Doc Tag (DOC)<br>                                                                                                            | N/A      | ALN-9741                            | N/A                                                                                        | 3.74" x 0.32"<br>95mm x 8.15mm     | Paper/cardboard tagging, Documents, file folders (e.g. medical, dental, legal etc), envelopes and booklets                   |

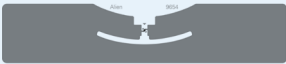
| Product                                                                             | Features                                                                                                                                                                                                                                                         | Benefits                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Squiggle (SQ)<br>Squiglette (ST) and Squiglette-E (STE)<br>Short (SH)<br>Squig (SG) | Squiggle is one of the most widely used general purpose tags.<br>Family extends the Squiggle features into different form-factors.<br>One of the best performing general purpose tag family on the market.<br>Designed to work well in challenging environments. | Well proven design for a broad range of worldwide applications.<br><b>All Alien tags are world-tags and work well in all regions.</b> Tags denoted with an "E" on the model number (and name) are <i>specially</i> tuned for optimal performance in Europe (but are still world tags).<br>A very robust general purpose tag (for ultimate robustness in high dielectric environments - see Aliens "G" or "BAT" tags). |
| Doc Tag (DOC)                                                                       | Dielectrically matched to papers, cardboards and similar printed stock. Extremely tolerant to close placement of multiple tags.                                                                                                                                  | Allows tags to be placed on documents or files where these documents will be tightly packed together with many tags in close proximity to each other. These tags have minimal chance of shadowing (hiding each other) from the reader.                                                                                                                                                                                |

<sup>1</sup> Sizes are approximate. **These are inlay antenna sizes.** Tags and labels will be larger. Please refer to specific product details available on Alien's website for exact measurements - [www.alientechnology.com](http://www.alientechnology.com)

<sup>2</sup> All Alien tags are world-tags and work well in all regions. However, tags denoted "E" are specially tuned for optimal performance in Europe.



## Inlays: High Dielectric Family / Automotive (Tires, Windshields)

| Product                                                                                                     | Higgs-3  | Higgs-4  | Higgs-EC | Antenna Size <sup>1</sup>      | Application                                                                                      |
|-------------------------------------------------------------------------------------------------------------|----------|----------|----------|--------------------------------|--------------------------------------------------------------------------------------------------|
| <b>G Tag (G)</b><br>        | ALN-9654 | N/A      | N/A      | 3.66" x 0.748"<br>93mm x 19mm  | High density plastic totes, windshields, batteries etc.                                          |
| <b>BAT (BAT)</b><br>        | N/A      | ALN-9770 | N/A      | 3.25" x 1.25"<br>82.5mm x 32mm | Automotive batteries, fluid filled objects, plastic containers and metal filled objects.         |
| <b>Wonder Dog™ (WD)</b><br> | N/A      | ALN-9768 | N/A      | 3.30" x 0.91"<br>86mm x 23mm   | General purpose, automotive metalized windshields/ head lamp and consumer electronic devices.    |
| <b>Bio Tag (BIO)</b><br>  | N/A      | ALN-9714 | N/A      | 0.67" x 0.59"<br>17mm x 15mm   | Pharmaceuti-cals, Healthcare, vials/ampules, small glass objects and small liquid filled objects |

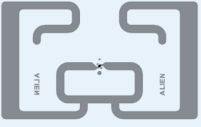
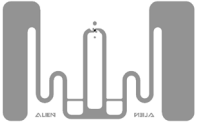
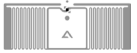
| Product          | Features                                                                                                                    | Benefits                                                                                                                                                                                                                                                               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G Tag (G)        | Exceptional performance for high dielectric mounting.                                                                       | Designed for use on glass, plastics, wood or other materials normally challenging for RF.                                                                                                                                                                              |
| BAT (BAT)        | Highly tuned for read rates and distances when amongst metal/water based objects contained in plastics, glass etc           | Designed for high read and write performance when applied to thin high-dielectric materials especially when these dielectrics contain challenging materials like metal and water based fluids.                                                                         |
| Wonder Dog™ (WD) | Both a good general purpose tag but also excellent near metal or fluids. Excellent with lower power readers (e.g. handheld) | Excellent general purpose high performance tag that can be also be used on metalized windshields, water filled bottles even with a low power handheld reader.                                                                                                          |
| Bio Tag (BIO)    | Small form factor, non-near field read tag and tuned for placement on glass containing water or oil based fluids.           | Offers read/write distances compatible with usage in pharmaceutical production facilities and handheld reader usage for logistics and supply chain. Designed to provide 30 cm / 12" or greater read distance even when applied to vials containing water based fluids. |

<sup>1</sup> Sizes are approximate. **These are inlay antenna sizes.** Tags and labels will be larger. Please refer to specific product details available on Alien's website for exact measurements - [www.alientechnology.com](http://www.alientechnology.com)



## Alien Family of EPC Gen 2 RFID Inlays

### Inlays: Specialized Retail

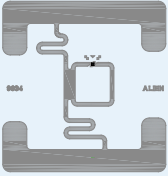
| Product                                                                                               | Higgs-3 | Higgs-4  | Higgs-EC                                                                                   | Antenna Size <sup>1</sup>                            | Application                                                                                                     |
|-------------------------------------------------------------------------------------------------------|---------|----------|--------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Spider-360 (SP)<br>  | N/A     | ALN-9726 | N/A                                                                                        | 1.97" x 1.18"<br>50mm x 30mm<br><b>aka "30 x 50"</b> | Retail, apparel, hang-tags, joker tags, airline baggage, labels and document tracking.                          |
| Garment Tag (GT)<br> | N/A     | ALN-9728 | ALN-9828  |                                                      | Retail, apparel, hang-tags, joker tags, labels and document tracking                                            |
| HiScan™ (HS)<br>     | N/A     | ALN-9720 | N/A                                                                                        | 1.57" x 0.61"<br>40mm x 15.5mm                       | Specialized tag designed for the most challenging retail and apparel applications and in handheld environments. |
| Glint™ (GL)<br>    | N/A     | ALN-9715 | N/A                                                                                        | 1.06" x 0.38"<br>27mm x 9.7mm                        | Jewelry, Cosmetics and other smaller metal or metalized objects                                                 |

| Product          | Features                                                                                   | Benefits                                                                                                                                                                                                               |
|------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spider-360 (SP)  | An orientation agnostic 30x50mm form-factor tag. Useful when end-on reads are required.    | For use in applications (especially but not limited to retail and airline baggage) where orientation of the tag is of greatest concern. This tag can be read 360 degrees around the plane of the tag.                  |
| Garment Tag (GT) | 30x50mm form-factor and tuned for use in retail with packed shelves or hanging garments.   | Extremely high read performance (distance/rates) in real-life, every day retail environments. Specifically designed and tested with stacked and hanging goods.                                                         |
| HiScan™ (HS)     | Tuned for high-performance reading in lower-power reading environments.                    | Extremely high read-rates in real-life, every day retail environments (e.g. rapid handheld movement, many tags close to each other etc). Especially effective with handheld RFID readers that have low transmit power. |
| Glint™ (GL)      | Very small non-near-field tag designed for close placement to metals or metallic surfaces. | Very small tag. Does not require a long "tail" like some other jewelry tags. Uses the close proximity to metalized objects to increase the range of the tag.                                                           |

<sup>1</sup> Sizes are approximate. **These are inlay antenna sizes.** Tags and labels will be larger. Please refer to specific product details available on Alien's website for exact measurements - [www.alientechnology.com](http://www.alientechnology.com)



## Inlays: Form-factor/Orientation Family

| Product                                                                                              | Higgs-3  | Higgs-4  | Higgs-EC | Antenna Size <sup>1</sup>                                                                                                                                          | Application                                                                                                                 |
|------------------------------------------------------------------------------------------------------|----------|----------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 2x2<br>             | ALN-9634 | N/A      | N/A      | 1.73" x 1.81"<br>44mm x 46mm                                                                                                                                       | Large items, baggage tagging, apparel and pharmaceutical bottles.                                                           |
| Square (1x1)<br>    | ALN-9629 | N/A      | N/A      | 0.89" x 0.89"<br>22.5mm x 22.5mm                                                                                                                                   | Item level tagging, apparel, pharmaceutical bottles and other high value consumables.                                       |
| SIT (SIT)<br>       | ALN-9613 | ALN-9713 | N/A      | 0.472" x 0.354"<br>12mm x 9mm                                                                                                                                      | Jewelry, pharma, bottles, liquids, foods, DVD's, access control, loyalty cards, and other anti-counterfeiting applications. |
| Slimline™ (SL)<br> | N/A      | ALN-9745 | N/A      | 3.701" x 0.228"***<br>94mm x 5.8mm**<br>***3.701" x 0.12" / 94mm x 3.05mm without inlay chip targets (not electrically significant - used for chip mounting only). | Book spines, door edges, cigarette boxes, small package labels, narrow form factor assets.                                  |

| Product        | Features                                                                         | Benefits                                                                                                                                                                               |
|----------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2x2            | Highest performance in a 2" form factor.                                         | A square form-factor for tracking of larger items.<br>Multiple-frequency sensitivity optimized for high performance in all world regions.                                              |
| Square (1x1)   | High performance when a longer tag form-factor is inappropriate.                 | The Square provides performance close to the 2x2 in a smaller form-factor.                                                                                                             |
| SIT (SIT)      | Ultra Compact. Near field access only. Can be used adjacent to metallic objects. | Fits very small objects normally challenging for RFID. Close proximity read zone for added security. Extended read range enabled through appropriate placement to conductive surfaces. |
| Slimline™ (SL) | Ultra slim form-factor at 5.8mm or 3.05mm thin (3.05mm without inlay targets).   | Extremely narrow form-factor enabling use where RFID is normally not possible. Approaches the well regarded Squiggle/Squiglette performance in an ultra narrow form-factor.            |

<sup>1</sup> Sizes are approximate. **These are inlay antenna sizes.** Tags and labels will be larger. Please refer to specific product details available on Alien's website for exact measurements - [www.alientechnology.com](http://www.alientechnology.com)



## Inlay Application Guide:

This table is a guide to assist narrowing the inlay types that may be relevant in your application. Tags should always be tested in their application but this table should help narrow that initial selection.

|                        | Squiggle Family |            |                        |            |              | Specialized Retail |             |             |                 | High-Dielectric / Automotive |                 |           |          | Form-factor   |          |              |           |
|------------------------|-----------------|------------|------------------------|------------|--------------|--------------------|-------------|-------------|-----------------|------------------------------|-----------------|-----------|----------|---------------|----------|--------------|-----------|
|                        | Squiggle® (SQ)  | Short (SH) | Squiglette (ST)        | Squig (SG) | Doc Tag (DT) | Glint (GL)         | HiScan (HS) | GT-Tag (GT) | Spider-360 (SP) | BAT-Tag (BAT)                | Wonder-Dog (WD) | G-Tag (G) | Bio-Tag  | SlimLine (SL) | 2x2      | Square (1x1) | SIT (SIT) |
| Higgs™-EC Model #      | ALN-9840        | N/A        | ALN-9830               | N/A        | N/A          | N/A                | ALN-9820    | ALN-9728    | N/A             | N/A                          | N/A             | N/A       | N/A      | N/A           | N/A      | N/A          | N/A       |
| Higgs™-4 Model #       | ALN-9740        | ALN-9762   | ALN-9730<br>ALN-9730-E | ALN-9710   | ALN-9741     | ALN-9715           | ALN-9720    | ALN-9728    | ALN-9726        | ALN-9770                     | ALN-9768        | N/A       | ALN-9714 | ALN-9745      | N/A      | N/A          | ALN-9713  |
| Higgs™-3 Model #       | ALN-9640        | ALN-9662   | ALN-9630               | ALN-9610   | N/A          | N/A                | N/A         | N/A         | N/A             | N/A                          | N/A             | ALN-9654  | N/A      | N/A           | ALN-9634 | ALN-9629     | ALN-9613  |
| Retail                 |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Mobile Asset Tracking* |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Automotive             |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Pharma / Healthcare    |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Ultra compact          |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Wood/ Plastic/ Glass   |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Files/ Paper           |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| General Purpose        |                 |            |                        |            |              |                    |             |             |                 |                              |                 |           |          |               |          |              |           |
| Ref Design Available?  | Yes             | Yes        | Yes                    | Yes        | No           | Yes                | No          | No          | No              | Yes                          | No              | Yes       | No       | Yes           | Yes      | Yes          | Yes       |



\* Includes Consumer Electronic Devices (TV's, STB's etc)

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HANDLING PRECAUTIONS Observe standard handling practices to minimize ESD.

DISCLAIMER Application recommendations are guidelines only - actual results may vary and should be confirmed. This is a general purpose product not designed or intended for any specific application.

This product is covered by one or more of the following U.S. patents: 7967204, 7931063, 7868766, 7737825, 7716208, 7716160, 7688206, 7659822, 7619531, 7615479, 7598867, 7580378, 7576656, 7562083, 7561221, 7559486, 7559131, 7554451, 7551141, 7542301, 7542008, 7531218, 7522055, 7500610, 7489248, 7453705, 7425467, 7417306, 7411503, 7385284, 7377445, 7364084, 7353598, 7342490, 7324061, 7321159, 7301458, 7295114, 7288432, 7265675, 7262686, 7260882, 7253735, 7244326, 7218527, 7214569, 7199527, 7193504, 7173528, 7172910, 7172789, 7141176, 7113250, 7101502, 7080444, 7070851, 7068224, 7046328, 6998644, 6988667, 6985361, 6980184, 6970219, 6952157, 6942155, 6933848, 6927085, 6816380, 6780696, 6731353, 6693384, 6683663, 6665044, 6657289, 6623579, 6606247, 6606079, 6590346, 6586338, 6566744, 6555408, 6527964, 6479395, 6468638, 6420266, 6316278, 6291896, 6281038. Other patents pending.

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