



# TAOGLAS®



# Datasheet

## Taoglas Invisible Antenna™

**Part No:**  
TFX125.A

### Description

TFX125.A – Multiband GNSS Invisible Antenna

### Features:

- Multiband GNSS
- Transparent Polymer Antenna
- Dimensions: 176mm\*37mm
- Connector: FAKRA Code C (M) Blue
- RoHS & Reach Compliant

|           |                                |           |
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# 1. Introduction



The TFX125.A is a first of its kind, invisible antenna designed to cover multi GNSS bands. The TFX125.A has been expertly engineered by Taoglas with innovation in mind, the design is based on our excellent design history in pioneering flexible PCB antenna technology. TFX125.A is supplied with pre adhered adhesive for ease of installation and has an enclosed carrier terminated with a FAKRA connector.

The invisible flexible antennas are an alternative to standard Flexible PCB antennas where the user may want to install an antenna in a covert area or on a surface, they may want to keep visible. The performance of the antenna is based on the environment where it is placed, care should be taken to mount at least 20mm from metal components where possible.

Typical Applications Include:

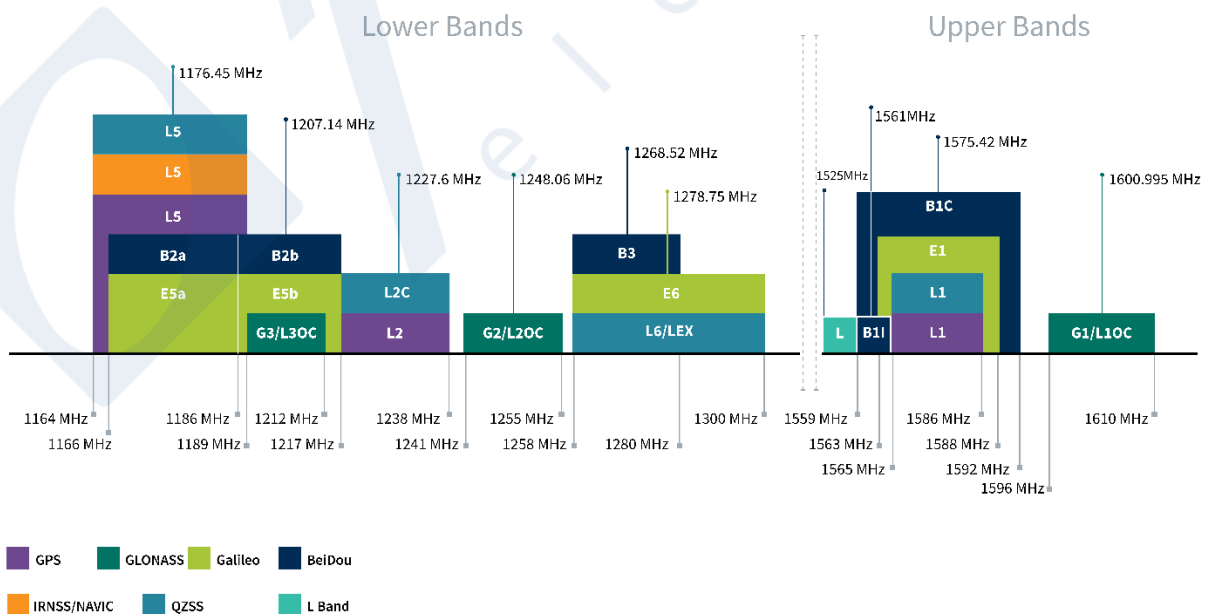
- Automotive and Commercial Transportation
- EV Charging and Parking Bays
- Digital Signage and Display screens
- Point Of Sale Kiosks

The installation of the Taoglas Invisible Antenna™ series follows a similar installation method to flexible PCB antennas. Installing a transparent material may show obvious flaws/debris, take care to wipe the area clean before adhering the antenna. The flexible antenna can be disconnected from the body to make installation easier. Where support may be an issue, we would advise using a double-sided adhesive on the housing to ensure the housing body installation does not add any additional pull force to the antenna as this will affect the antennas performance and the adhesive's performance. The feed is not designed to be load bearing and loads of over 0.5Kg can break or damage the feed resulting in the antenna disconnecting.

The TFX125.A is connected via a FAKRA Code C male connector for ease of installation. If a custom connector is required, please contact your regional Taoglas customer support team.

## 2. Specification

| GNSS Frequency Bands |                         |                           |                    |                    |                   |
|----------------------|-------------------------|---------------------------|--------------------|--------------------|-------------------|
| GPS                  | L1<br>1575.42 MHz       | L2<br>1227.6 MHz          | L5<br>1176.45 MHz  |                    |                   |
| GLONASS              | G1<br>1602 MHz          | G2<br>1248 MHz            | G3<br>1207 MHz     |                    |                   |
| Galileo              | E1<br>1575.24 MHz       | E5a<br>1176.45 MHz        | E5b<br>1201.5 MHz  | E6<br>1278.75 MHz  |                   |
| BeiDou               | B1C<br>1575.42 MHz      | B1I<br>1561 MHz           | B2a<br>1176.45 MHz | B2b<br>1207.14 MHz | B3<br>1268.52 MHz |
| QZSS (Regional)      | L1<br>1575.42 MHz       | L2C<br>1227.6 MHz         | L5<br>1176.45 MHz  | L6<br>1278.75e6    |                   |
| IRNSS (Regional)     | L5<br>1176.45 MHz       |                           |                    |                    |                   |
| SBAS                 | L1/E1/B1<br>1575.42 MHz | L5/B2a/E5a<br>1176.45 MHz | G1<br>1602 MHz     | G2<br>1248 MHz     | G3<br>1207 MHz    |



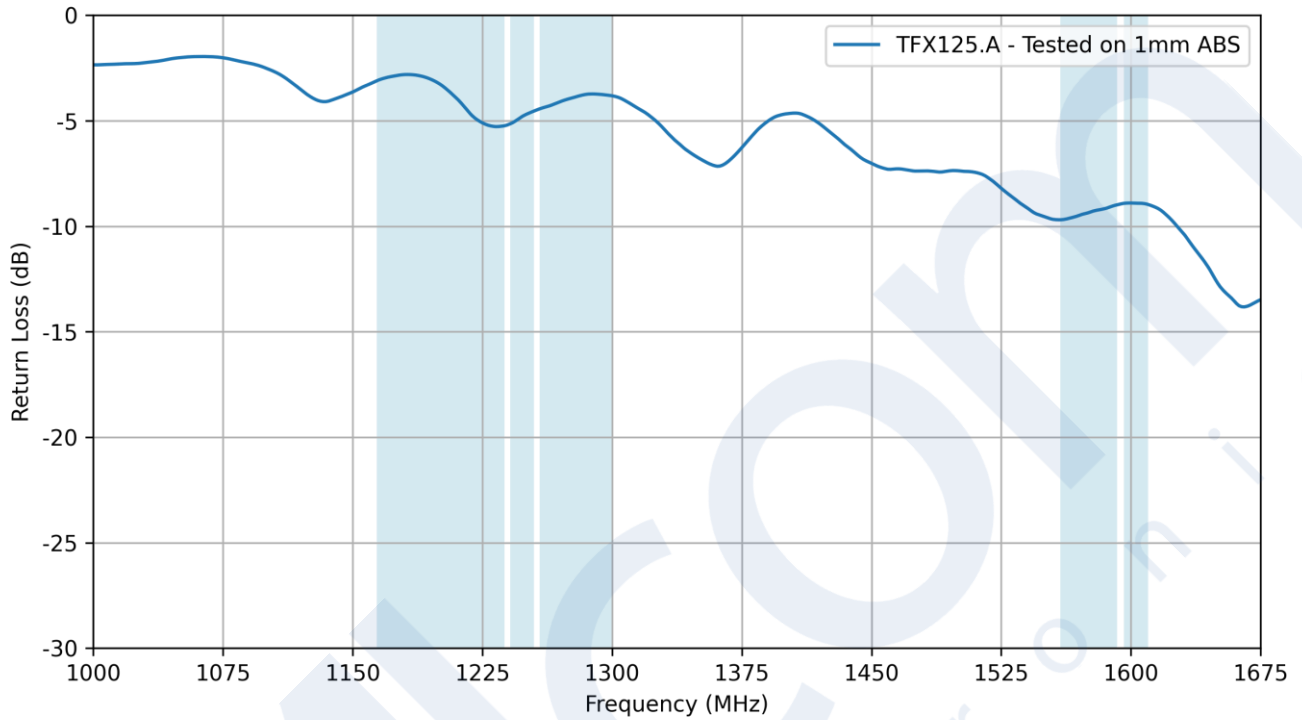
| GNSS Electrical   |         |        |         |       |         |       |
|---|---------|--------|---------|-------|---------|-------|
| Frequency (MHz)   | 1176.45 | 1227.6 | 1278.75 | 1561  | 1575.42 | 1602  |
| VSWR (max.)   | 6:1     | 3:1    | 4:1     | 2:1   | 2:1     | 2:1   |
| Passive Antenna Efficiency (%)<br>(Without cable loss)        | 27.45   | 32.36  | 36.32   | 48.88 | 49.29   | 49.78 |
| Passive Antenna Gain at Zenith (dBic)<br>(Without cable loss) | -5.67   | -5.46  | -4.71   | -9.09 | -9.09   | -9.88 |
| Polarization  | Linear  |        |         |       |         |       |
| Impedance   | 50 Ω    |        |         |       |         |       |

| Mechanical                       |   |
|----------------------------------|---|
| Dimensions                       | 176 x 37mm                              |
| Weight                           | 5g                                      |
| Material (Housing)               | ABS/PC                                  |
| Material (Antenna)               | PET                                     |
| VLT (Visible Light Transmission) | 78.1% TCF (Transparent Conductive Film) |
| Connector                        | Code C FAKRA (M) Blue                   |

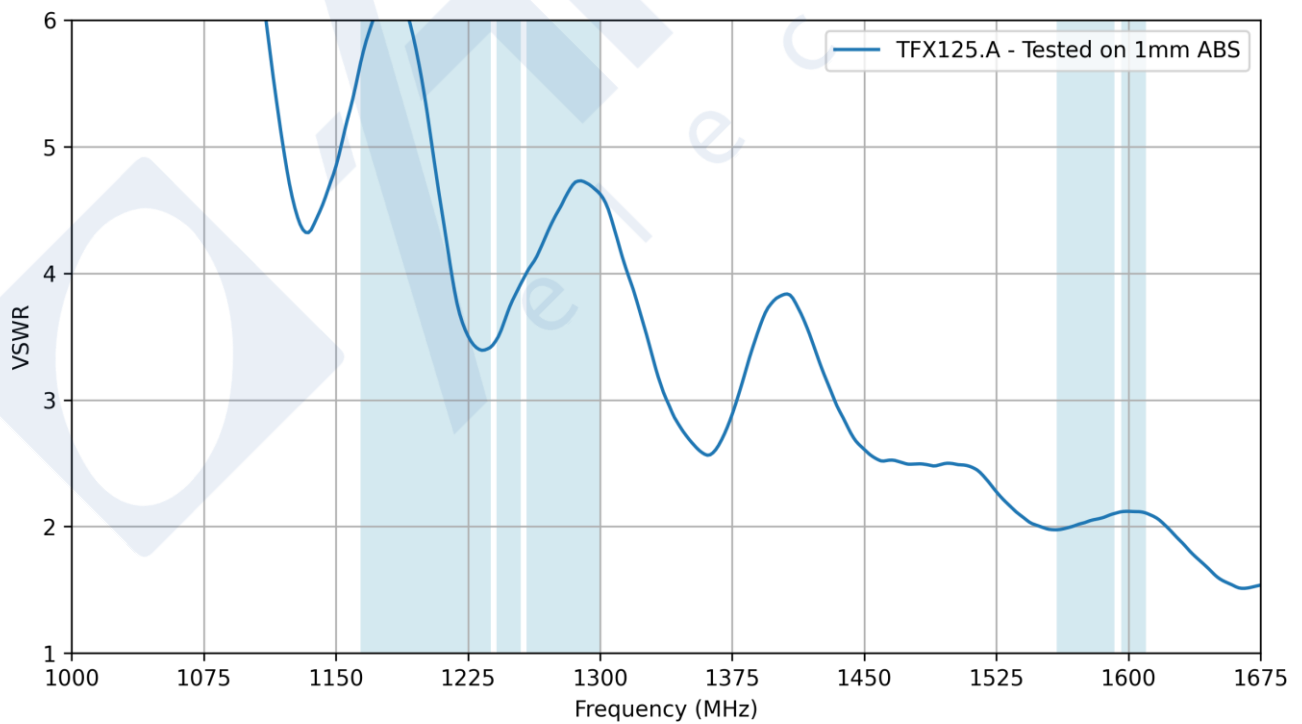
| Environmental         |                              |
|-----------------------|------------------------------|
| Operation Temperature | -40°C to 85°C                |
| Storage Temperature   | -40°C to 85°C                |
| Relative Humidity     | Non-condensing TBD°C TBD% RH |

### 3. Antenna Characteristics

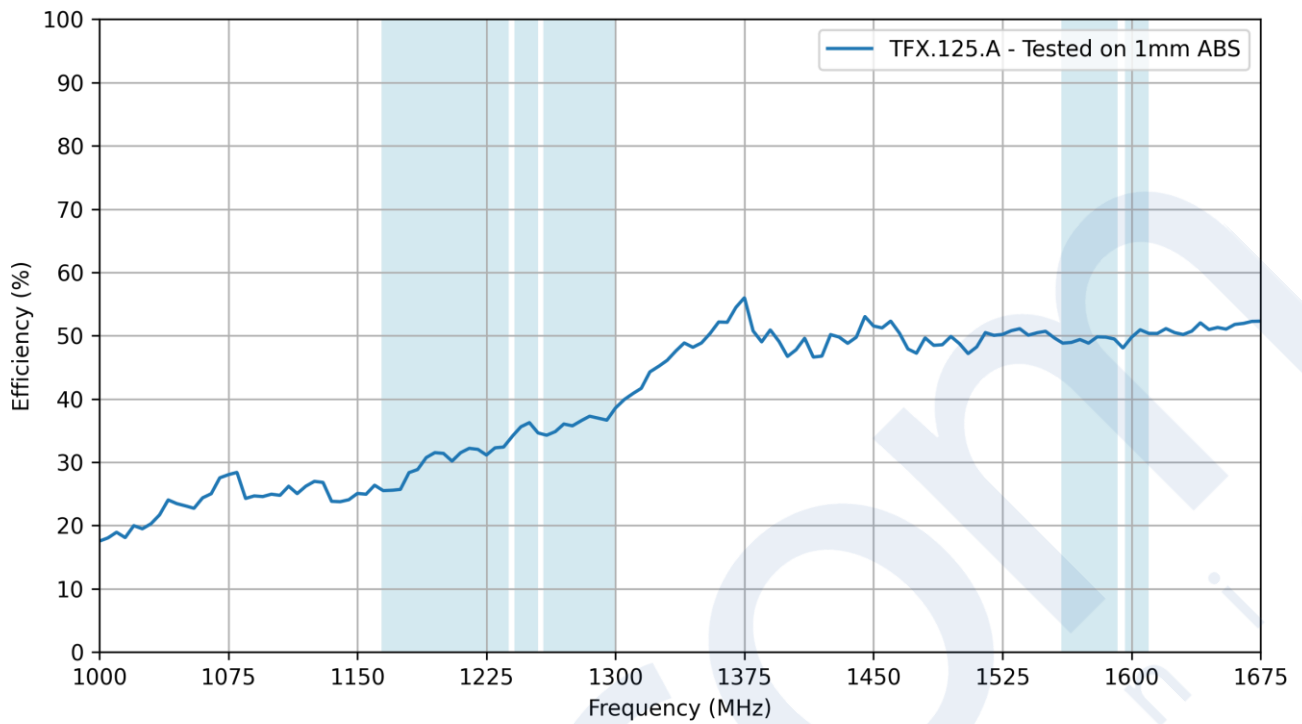
#### 3.1 Return Loss



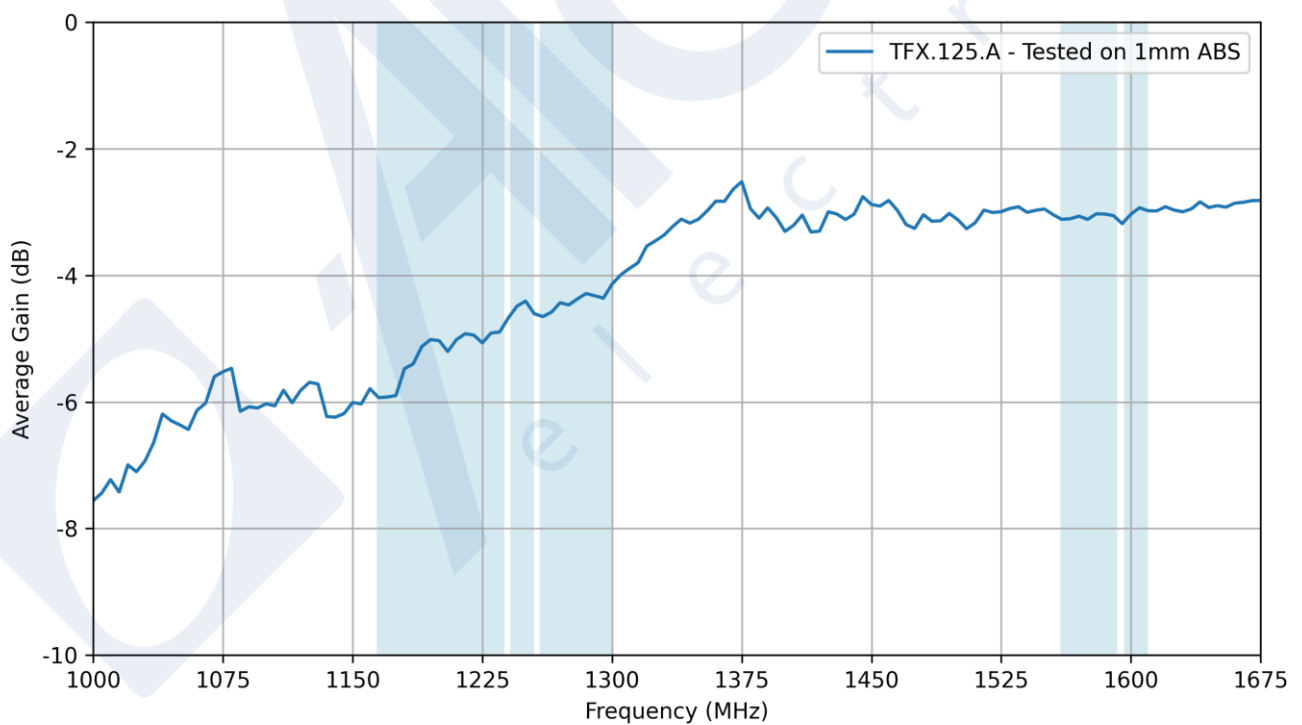
#### 3.2 VSWR



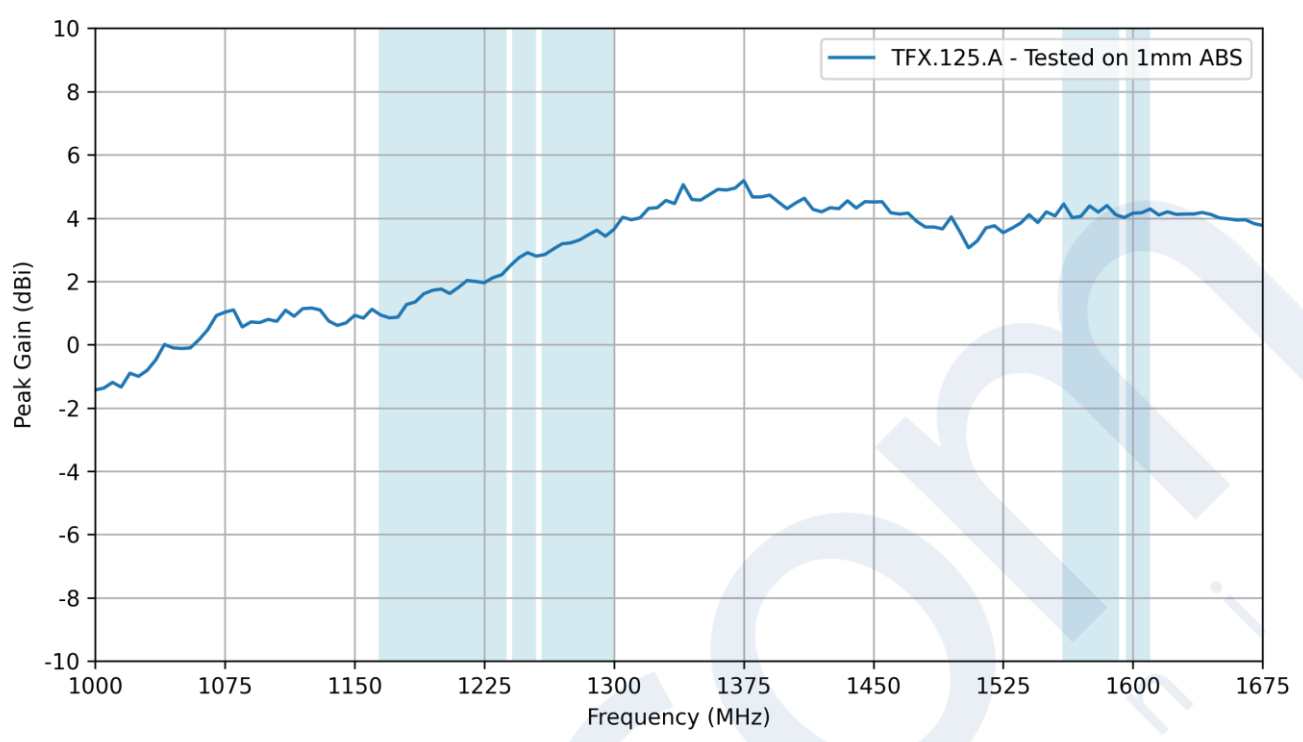
### 3.3 Efficiency



### 3.4 Average Gain



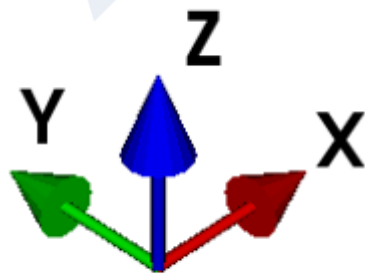
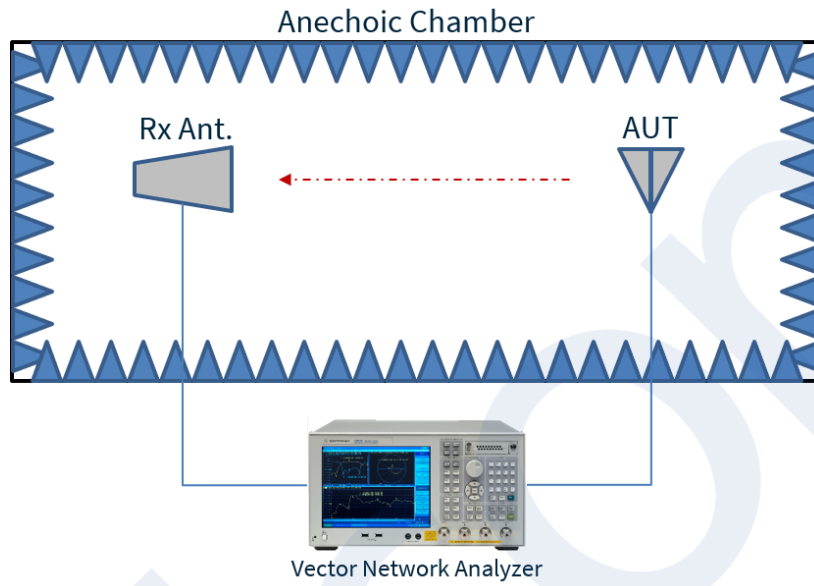
3.5 Peak Gain



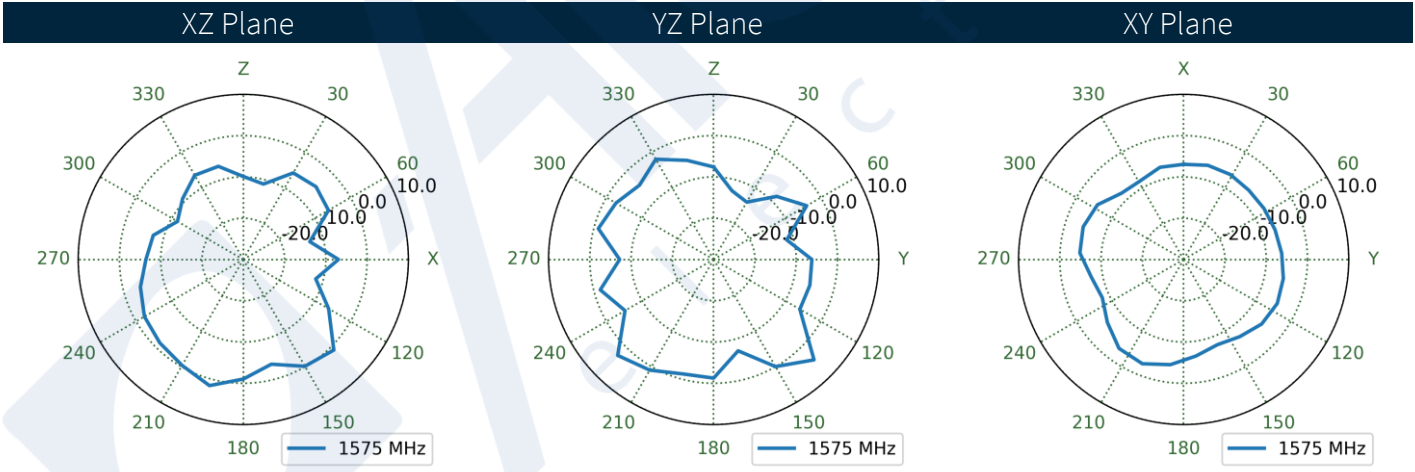
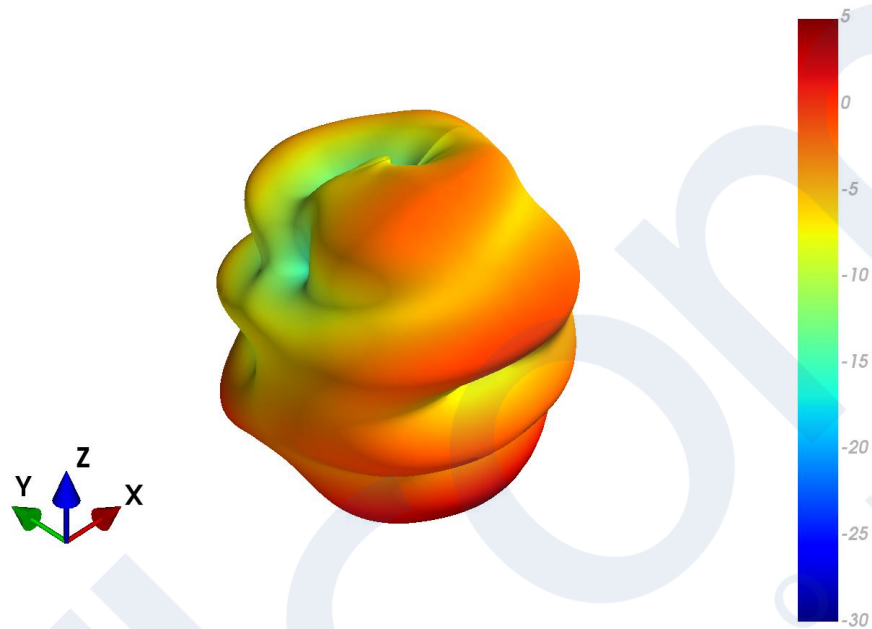


## 4. Radiation Patterns

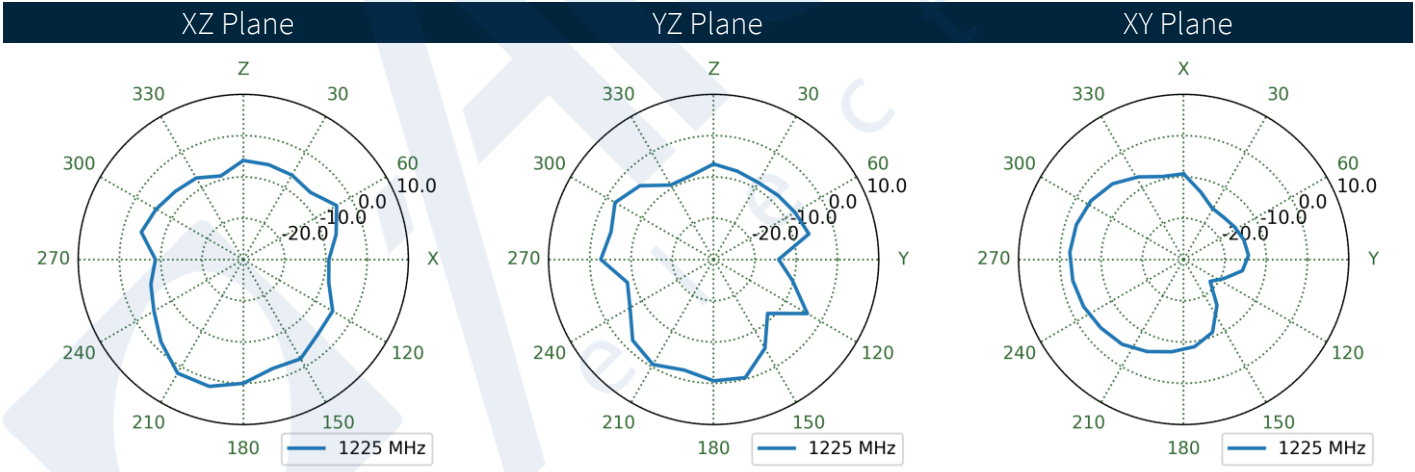
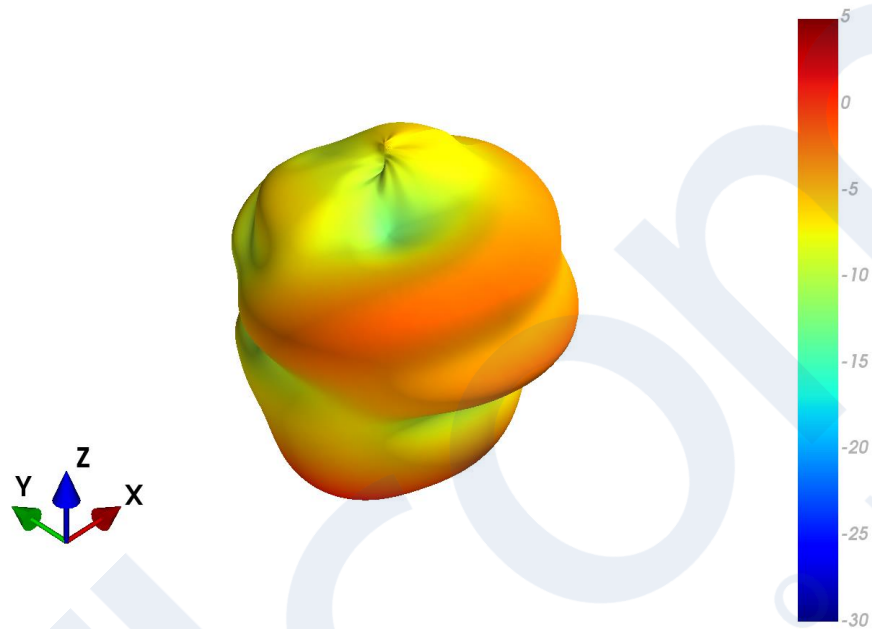
### 4.1 Test Setup



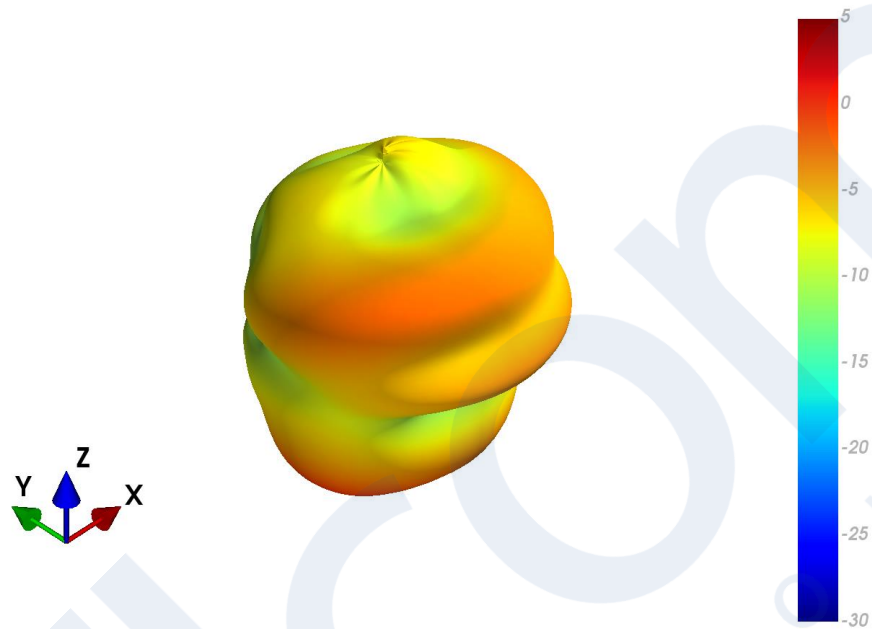
4.2 TFX.125.A - Tested on 1mm ABS Patterns at 1576 MHz



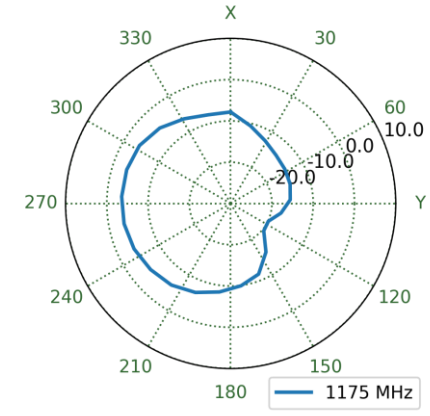
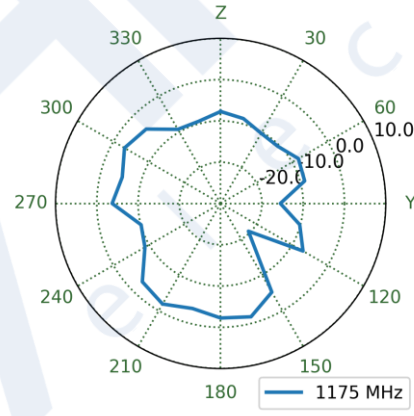
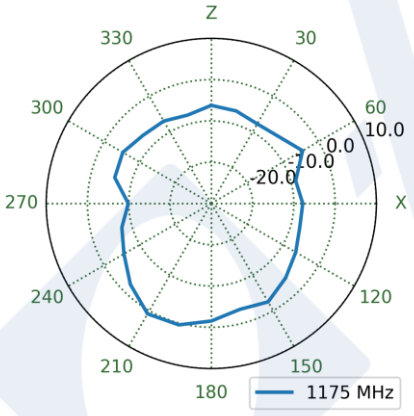
4.3 TFX.125.A - Tested on 1mm ABS Patterns at 1228 MHz



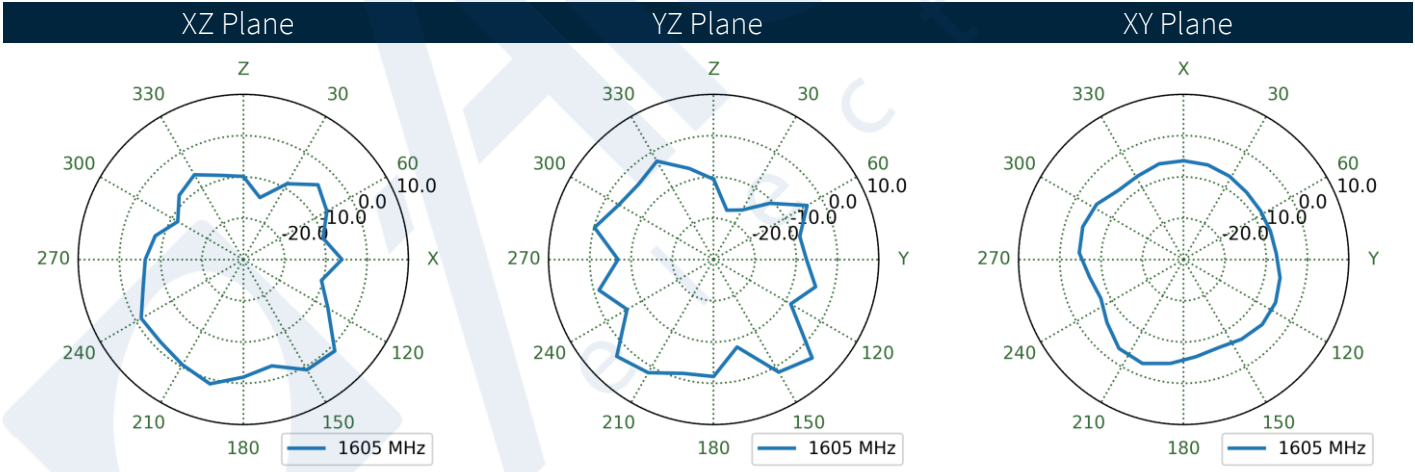
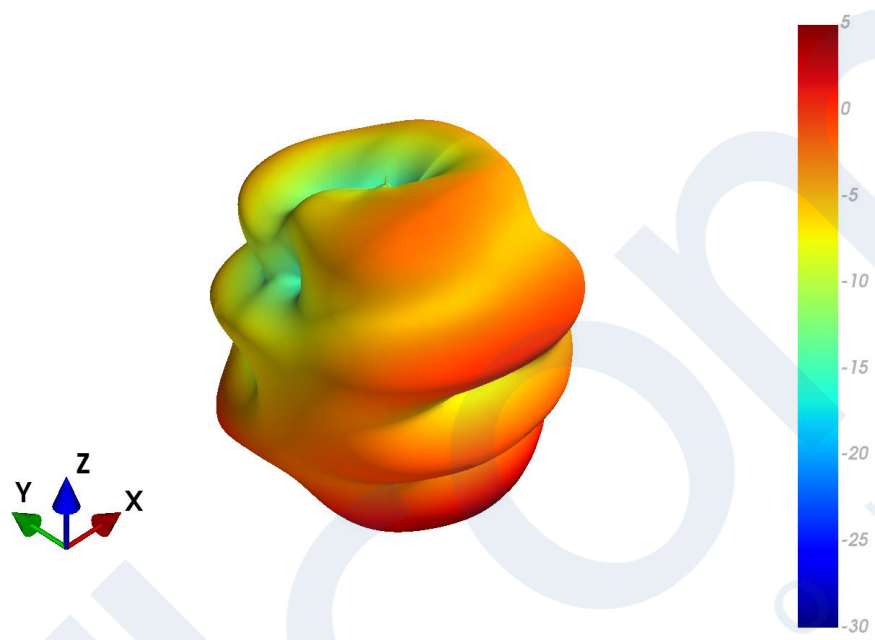
4.4 TFX.125.A - Tested on 1mm ABS Patterns at 1177 MHz



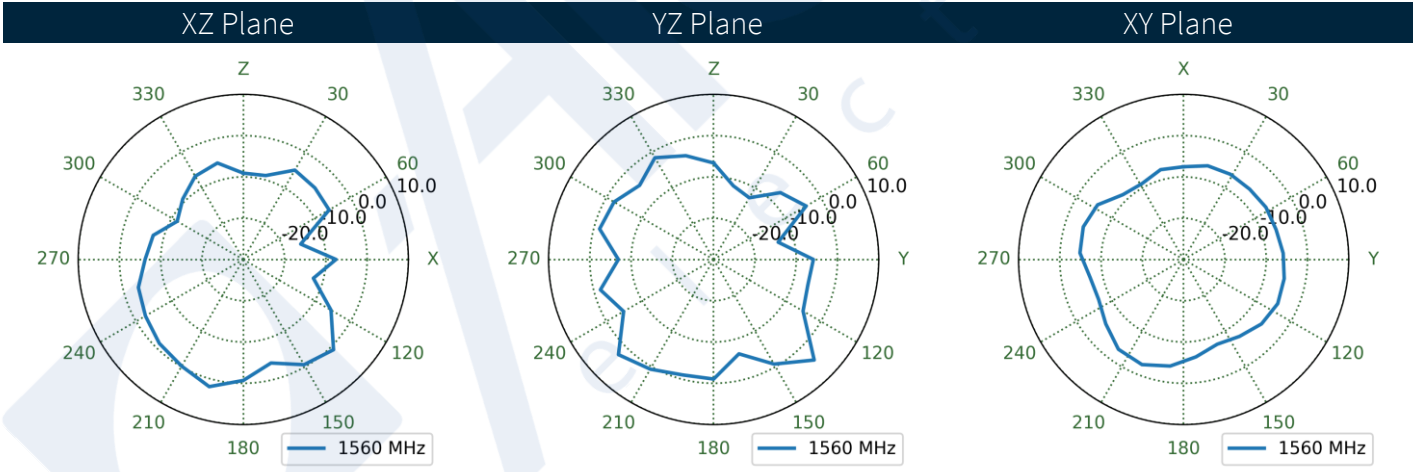
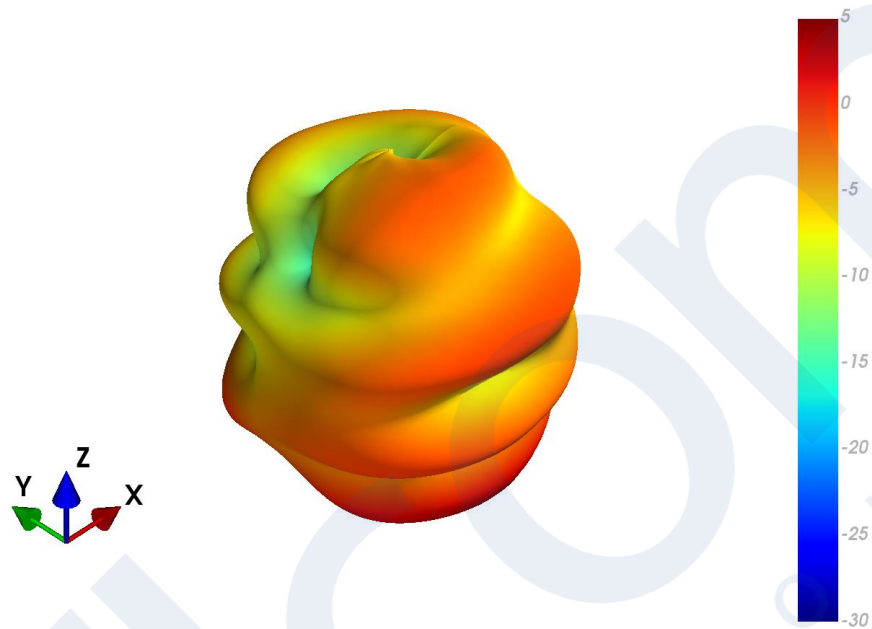
XZ Plane                      YZ Plane                      XY Plane



4.5 TFX.125.A - Tested on 1mm ABS Patterns at 1603 MHz



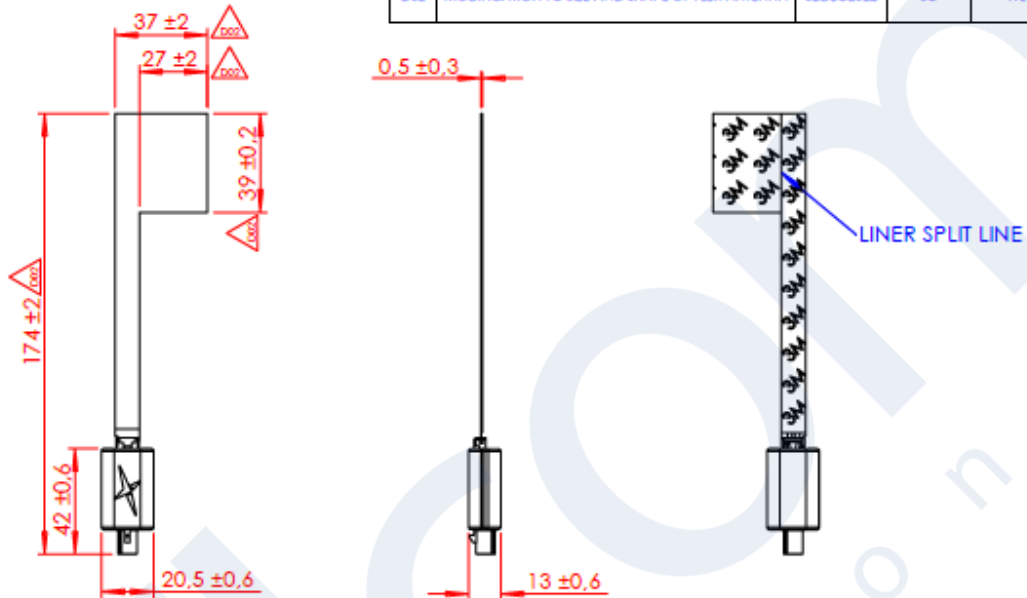
4.6 TFX.125.A - Tested on 1mm ABS Patterns at 1562 MHz



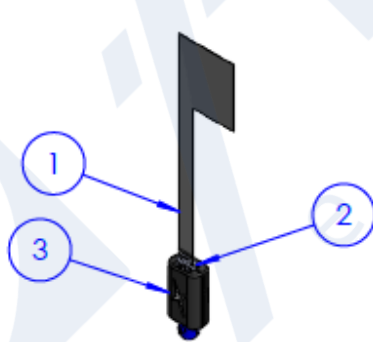
# 5. Mechanical Drawing

ISO NO.: EDW-22-8-0997  
 STATE: RELEASE  
 NOTES: 1.ALL MATERIAL MUST BE ROHS COMPLIANT.

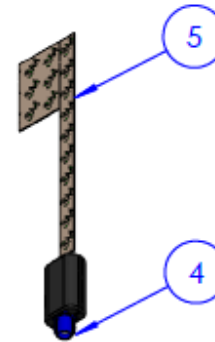
| REVISIONS |  |           |          |          |
|-----------|--|-----------|----------|----------|
| REV.      | DESCRIPTION                                    | DATE      | ENGINEER | APPROVED |
| D01       | FIRST ISSUE                                    | 17OCT2022 | SC       | WL       |
| D02       | MODIFICATION TO SIZE AND SHAPE OF FLEX ANTENNA | 02DEC2022 | SC       | WL       |



| ITEM NO. | DESCRIPTION                              | MATERIAL   | FINISH      | QTY |
|----------|--|------------|-------------|-----|
| 1        | TRANSPARENT FLEX GNSS ANTENNA            | PET        | CLEAR       | 1   |
| 2        | FPC-to-BOARD CONNECTOR ADAPTOR 2 CONTACT | LCP        | BLACK       | 1   |
| 3        | ANTENNA PCB HOUSING                      | ABS/PC     | BLACK       | 1   |
| 4        | FAKRA CODE C MALE                        | NYLON/ZINC | BLUE        | 1   |
| 5        | 3M ADHESIVE + LINER                      | 3M 8146    | BROWN LINER | 1   |



MODEL VIEW  
SCALE 1:3



MODEL VIEW  
SCALE 1:3

|  |  |  |          |
|--|--|--|----------|
| APPROVED BY:                               | NW   | <br><small>OMEA Design Centre</small><br>This drawing and its inherent design concepts are property of Taoglas. Not to be copied or given to third parties without the written consent of Taoglas. |          |
| CHECK BY:                                  | WL   |  |          |
| DRAWN BY:                                  | SC   |  |          |
| DATE:                                      | 17OCT2022  |  |          |
| UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: | <small>mm: 0,1<br/>         mm: 0,2<br/>         mm: 0,5<br/>         mm: 0,01</small> | TITLE:   |          |
| THIRD ANGLE PROJECTION                     |  | TRANSPARENT FLEX MULTIBAND GNSS ANTENNA<br>w/CONVERTER AND FAKRA CODE C MALE   |          |
|  |  | PART NO.:  | TFX125.A |
|  |  | UNIT:  | mm       |
|  |  | SCALE:   | 2:5      |
|  |  | PAGES:   | 1/1      |
|  |  | REV.:  | D02      |

## 6. Packaging

TBD





Changelog for the datasheet

**SPE-22-8-164 – TFX125.A**

**Revision: B (Current Version)**

|         |                        |
|---------|------------------------|
| Date:   | 2023-05-18             |
| Notes:  | Updated Specifications |
| Author: | Cesar Sousa            |

**Previous Revisions**

**Revision: A (Original First Release)**

|         |                 |
|---------|-----------------|
| Date:   | 2023-02-01      |
| Notes:  | Initial Release |
| Author: | Gary West       |

  
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