

| | | | | |
|-------------|-------------|-------------|-----------------|----------|
| Date | Prepared by | Approved by | Document nos | Revision |
| 12 Aug 2022 | Ray Ling | Pavel | MS-24F90-IM-001 | 1 |

INSTRUCTION MANUAL MS-24F90

TABLE OF CONTENTS:

1.00 BEAMS & CONNECTORS:

- 1.10 Plan View Resultant Beam Direction
 - 1.11 Beam 1-12 (Top Row 1)
 - 1.12 Beam 13-24 (Second Row 2)
- 1.20 Rear View Connector Layout
- 1.30 Connector Port Table (From Rear View)
 - 1.31 Beam 13-24
 - 1.32 Beam 1-12

2.00 BEAM PATTERN

- 2.10 Vertical Beam Pattern
- 2.20 Horizontal Beam Pattern (Row 1)
- 2.30 Horizontal Beam Pattern (Row 2)

3.00 TRANSPORTATION / INSTALLATION

- 3.10 Transportation (From Point to Point)
- 3.20 Bracket Mounting
- 3.30 Installation using a crane
 - 3.31 Lifting the Antenna
- 3.40 Antenna Installation
 - 3.41 Antenna Leveling
 - 3.42 Digital Level Gauge Calibration
 - 3.43 Adjustment Requirement

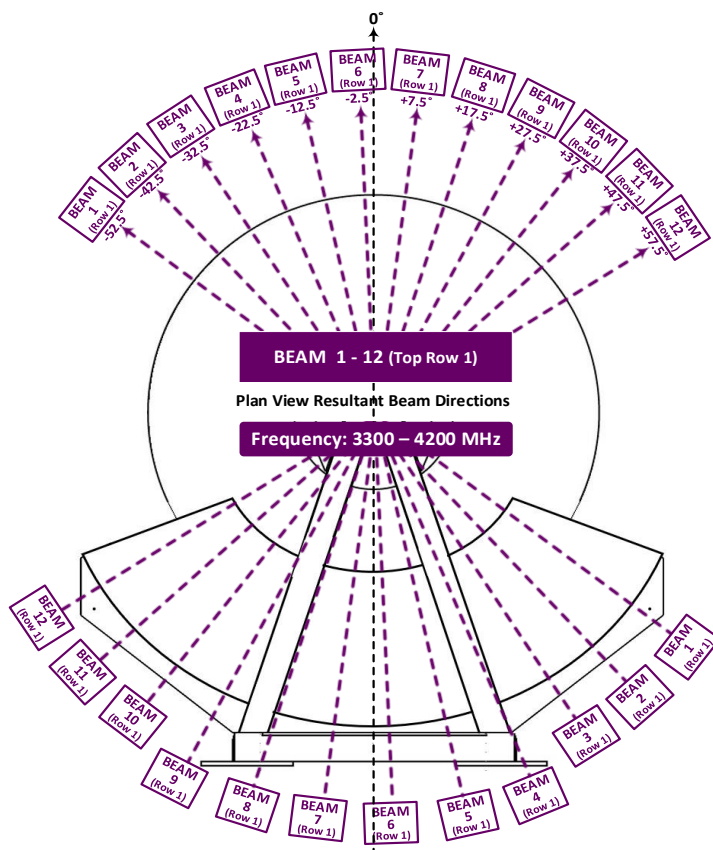
Revision History:

| Date | Description | Revised by | Rev nos |
|-----------|---------------------|------------|---------|
| 12-Aug-22 | Update pattern file | Ray Ling | 1 |
| | | | |
| | | | |

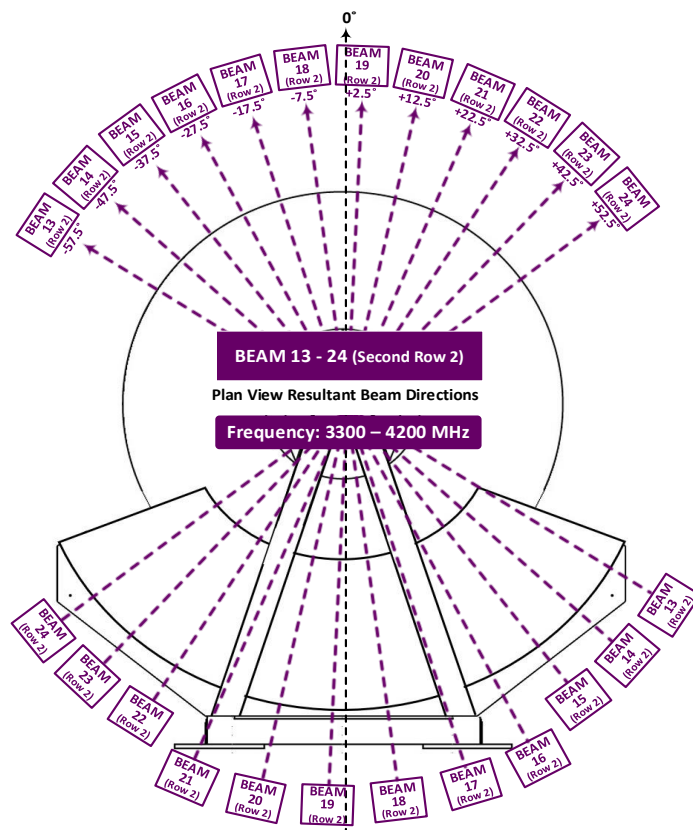
1.00 BEAMS & CONNECTORS:

1.10 Plan View Resultant Beam Direction

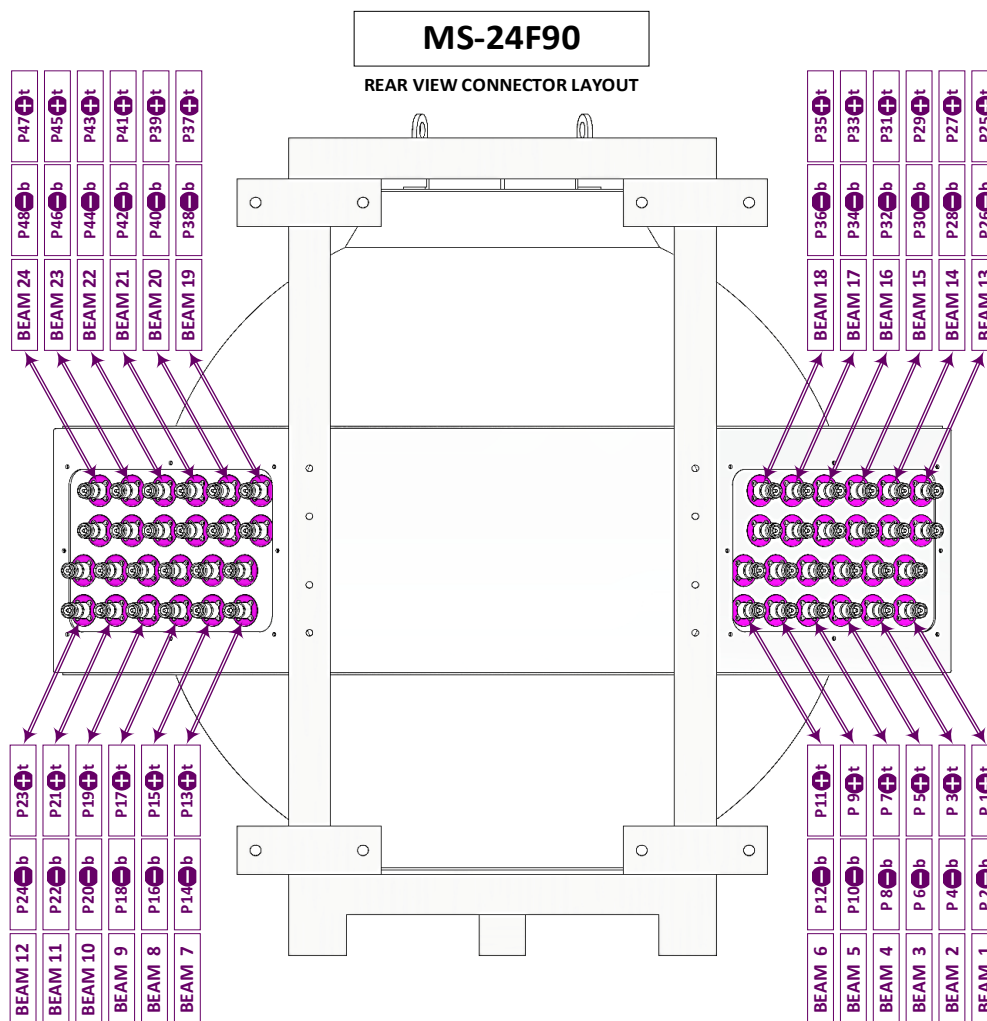
1.11 Beam 1-12 (Top Row 1)



1.12 Beam 13-24 (Second Row 2)



1.20 Rear View Connector Layout



1.30 Connector Port Table (From Rear View)

1.31 Beam 13-24

| BEAM 24 | BEAM 23 | BEAM 22 | BEAM 21 | BEAM 20 | BEAM 19 |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| PORT 47 (+45°) | PORT 45 (+45°) | PORT 43 (+45°) | PORT 41 (+45°) | PORT 39 (+45°) | PORT 37 (+45°) |
| PORT 48 (-45°) | PORT 46 (-45°) | PORT 44 (-45°) | PORT 42 (-45°) | PORT 40 (-45°) | PORT 38 (-45°) |

| BEAM 18 | BEAM 17 | BEAM 16 | BEAM 15 | BEAM 14 | BEAM 13 |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| PORT 35 (+45°) | PORT 33 (+45°) | PORT 31 (+45°) | PORT 29 (+45°) | PORT 27 (+45°) | PORT 25 (+45°) |
| PORT 36 (-45°) | PORT 34 (-45°) | PORT 32 (-45°) | PORT 30 (-45°) | PORT 28 (-45°) | PORT 26 (-45°) |

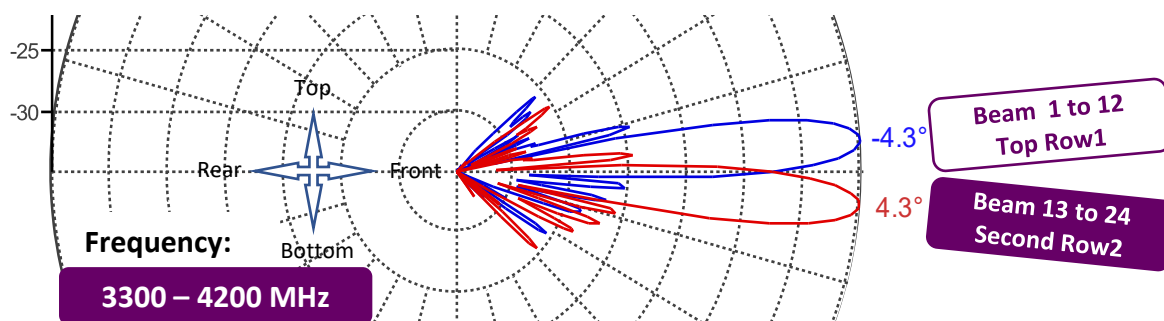
1.32 Beam 1-12

| BEAM 12 | BEAM 11 | BEAM 10 | BEAM 9 | BEAM 8 | BEAM 7 |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| PORT 23 (+45°) | PORT 21 (+45°) | PORT 19 (+45°) | PORT 17 (+45°) | PORT 15 (+45°) | PORT 13 (+45°) |
| PORT 24 (-45°) | PORT 22 (-45°) | PORT 20 (-45°) | PORT 18 (-45°) | PORT 16 (-45°) | PORT 14 (-45°) |

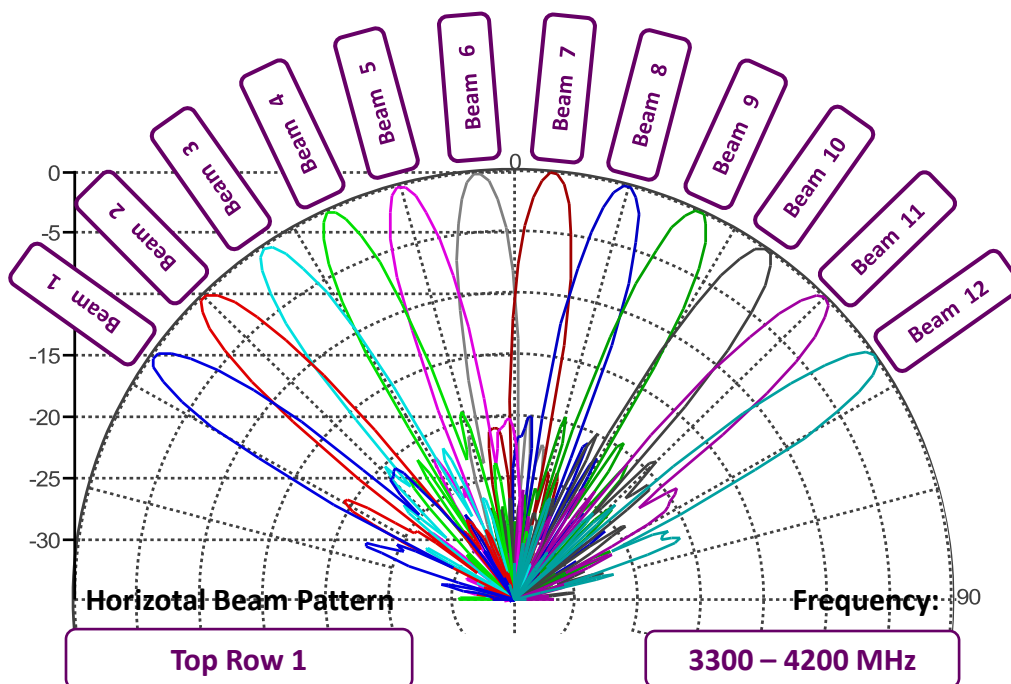
| BEAM 6 | BEAM 5 | BEAM 4 | BEAM 3 | BEAM 2 | BEAM 1 |
|-------------------|-------------------|------------------|------------------|------------------|------------------|
| PORT 11 (+45°) | PORT 9 (+45°) | PORT 7 (+45°) | PORT 5 (+45°) | PORT 3 (+45°) | PORT 1 (+45°) |
| PORT 12 (-45°) | PORT 10 (-45°) | PORT 8 (-45°) | PORT 6 (-45°) | PORT 4 (-45°) | PORT 2 (-45°) |

2.00 BEAM PATTERN

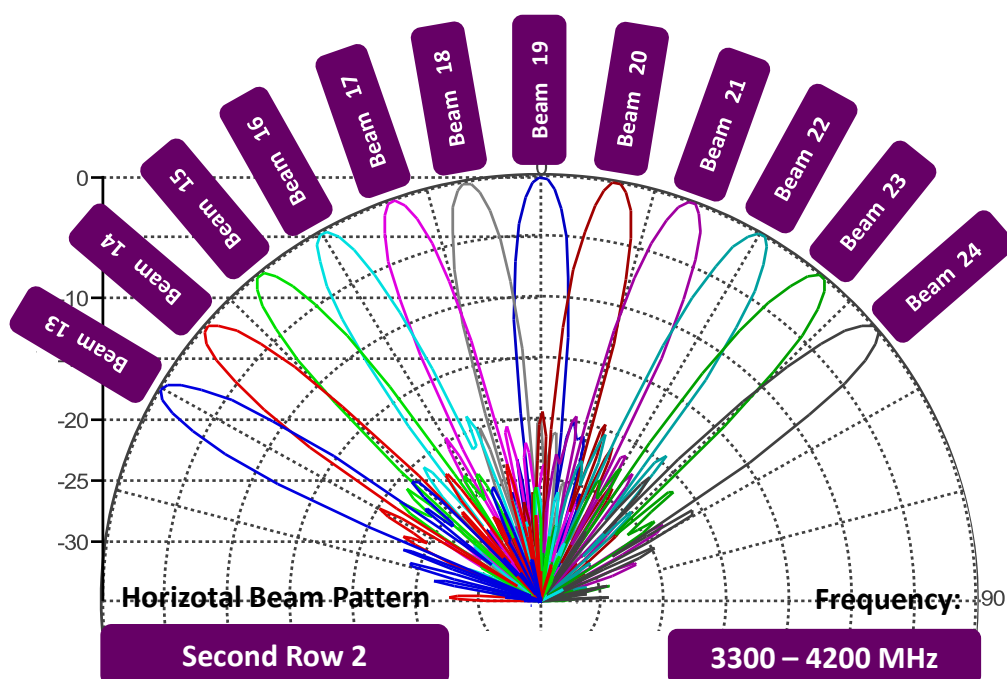
2.10 Vertical Beam Pattern



2.20 Horizontal Beam Pattern (Row 1)



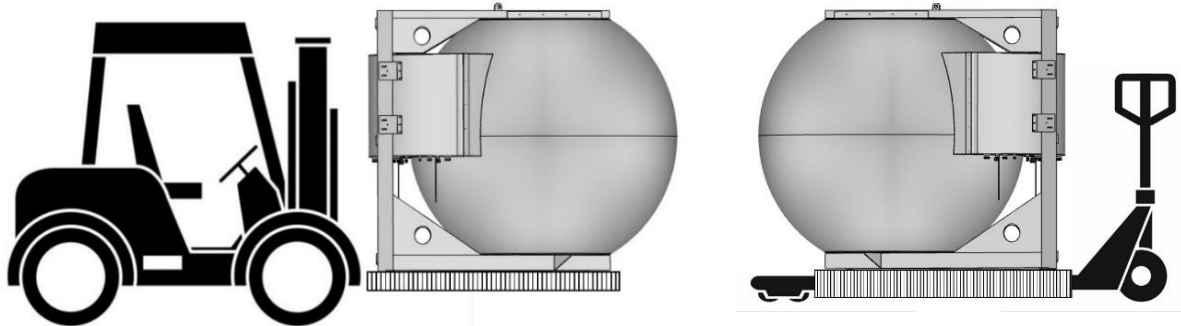
2.30 Horizontal Beam Pattern (Row 2)



3.00 TRANSPORTATION / INSTALLATION

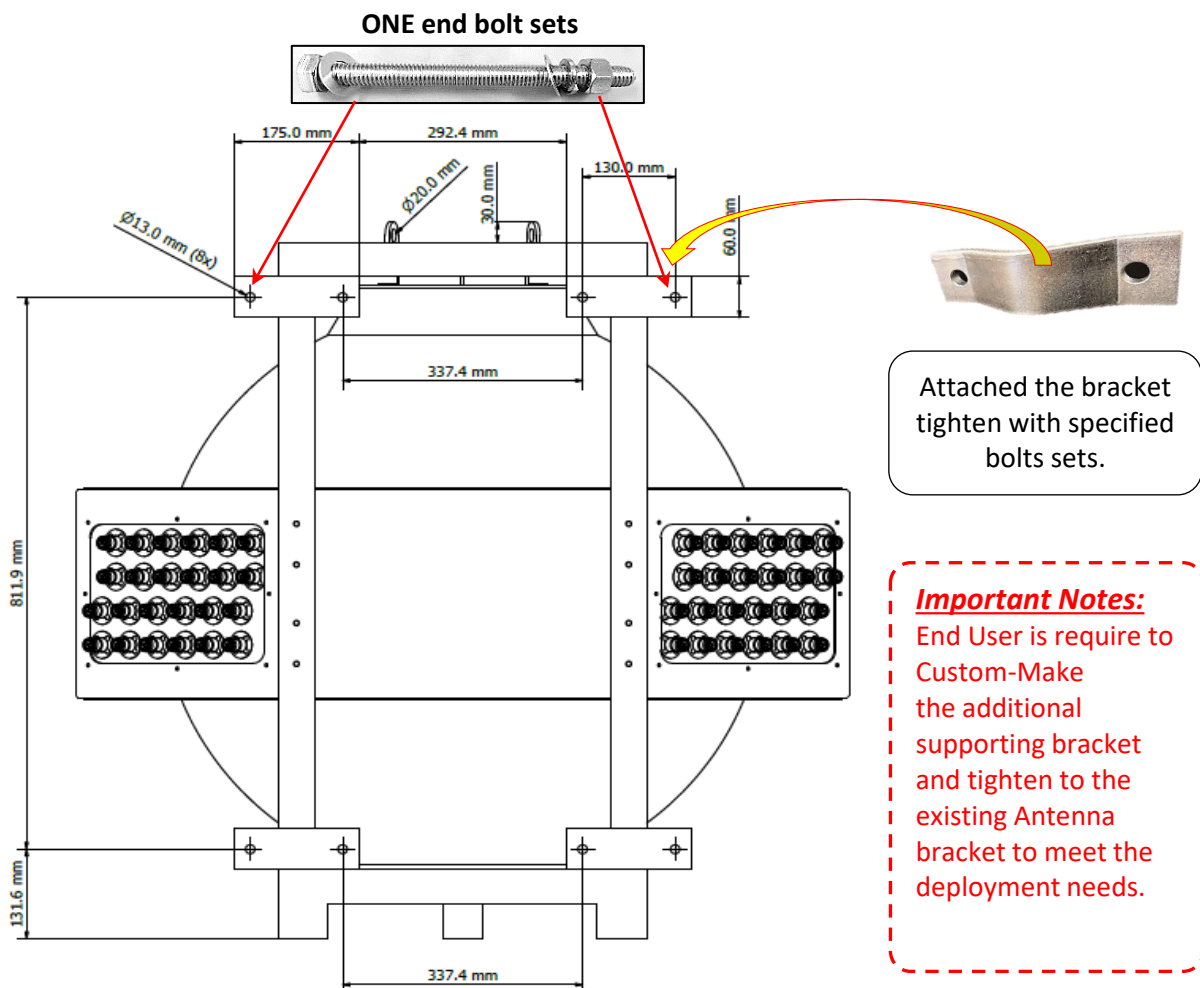
3.10 Transportation (From Point to Point)

Strictly comply to the Local authority and regulatory on Workplace Safety and Health Control and Measure when moving and transportation of large or heavy equipment, appropriate material handling machine should be use. **(Risk Assessment apply for Forklift or Pallet Truck Lifting)**



3.20 Bracket Mounting

| Item | Lens/Types | Holes Size | Bracket Qty | <u>OPEN</u> end bolt & nuts sets |
|------|---------------|------------|-------------|----------------------------------|
| 1 | 30cm to 120cm | Ø13mm x 8 | 4 | M12 x 15cm=8sets |



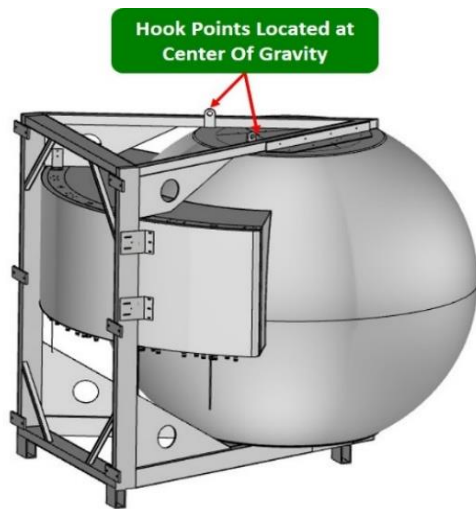
3.30 Installation using a crane

Strictly comply to the local authority and regulatory on Workplace Safety and Health Control and Measure when performing lifting of large or heavy equipment, appropriate material handling machine should be used and only certified personnel should perform the task.

(Risk Assessment requirement applies for both Up-Lifting and Down-Lifting.)

3.31 Lifting the Antenna

The antenna has 2 hook points installed on the top frame (located slightly behind the center of the sphere). These hooks are designed at the center of gravity point of the antenna. A cable, rope can be securely fastened to the hooks and the antenna can be lifted using a crane as pictured below.

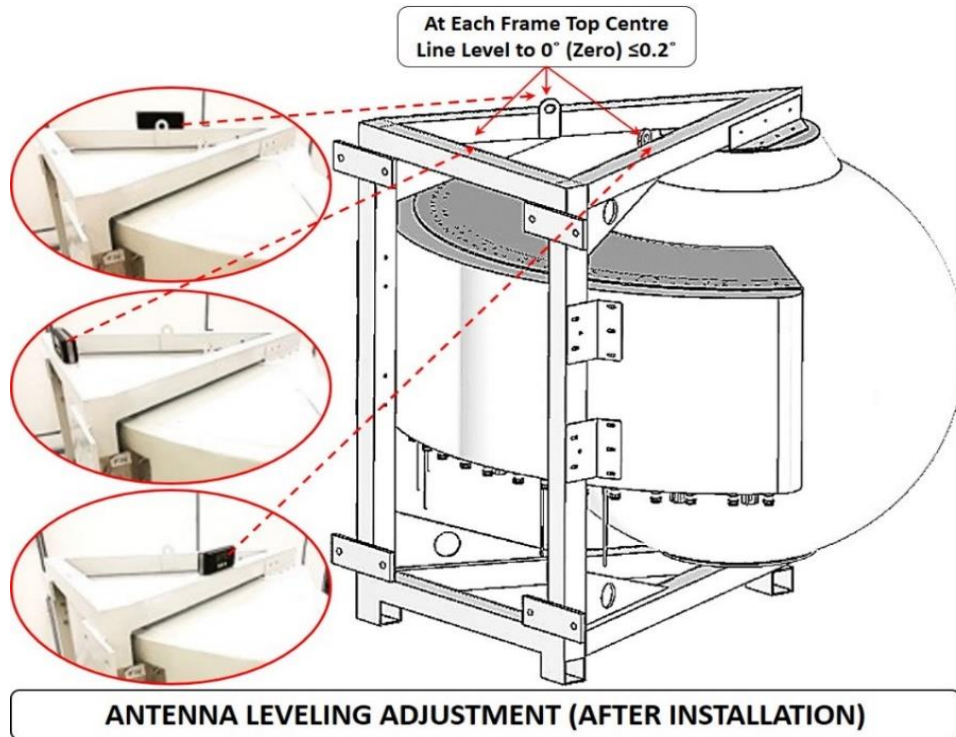


3.40 Antenna Installation

With reference to "**Bracket Mounting Procedure**", End user is required to Custom-Make the additional supporting bracket and tighten it to the existing Antenna bracket to meet the deployment needs.

3.41 Antenna Leveling

After the Antenna is mounted to the bracket, it is required to be adjusted to 0° (Zero Degree) with $\leq 0.2^\circ$ on 3 sides of the frame top level.(Rear, Right & Left=As shown in picture)



3.42 Digital Level Gauge Calibration



3.43 Adjustment Requirement

