

FX3100-1 Wi-Fi Antenna Specifications

1. Antenna Part#:

- Manufacturer: Inseego Corp.
- Wi-Fi Ant #0 Part Number: 12023299
- Wi-Fi Ant #1 Part Number: 12023300

2. Antenna Construction:

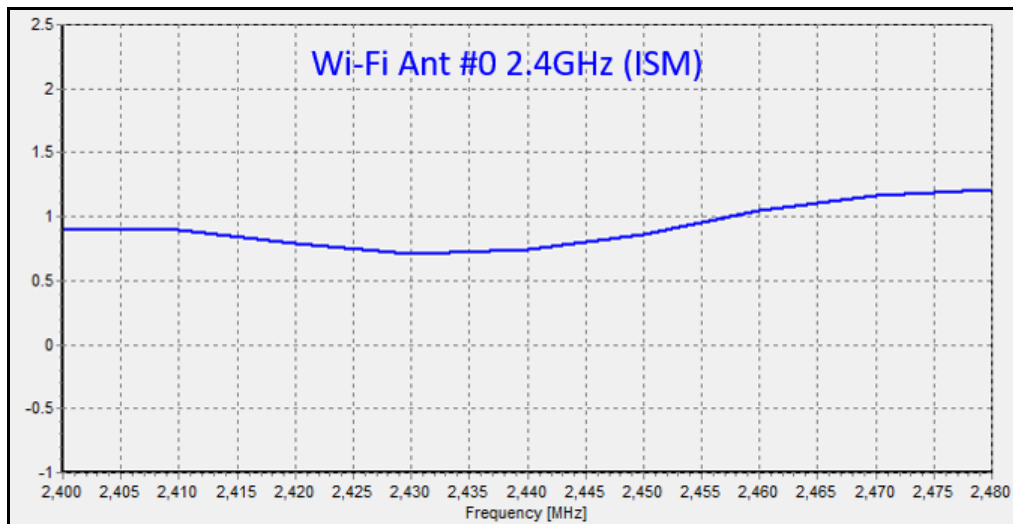
- Material: Flexible Printed Circuit (FPC) Design consisting of Copper, Polyimide, and Adhesive
- Type: Planar Inverted-F Antenna (PIFA)

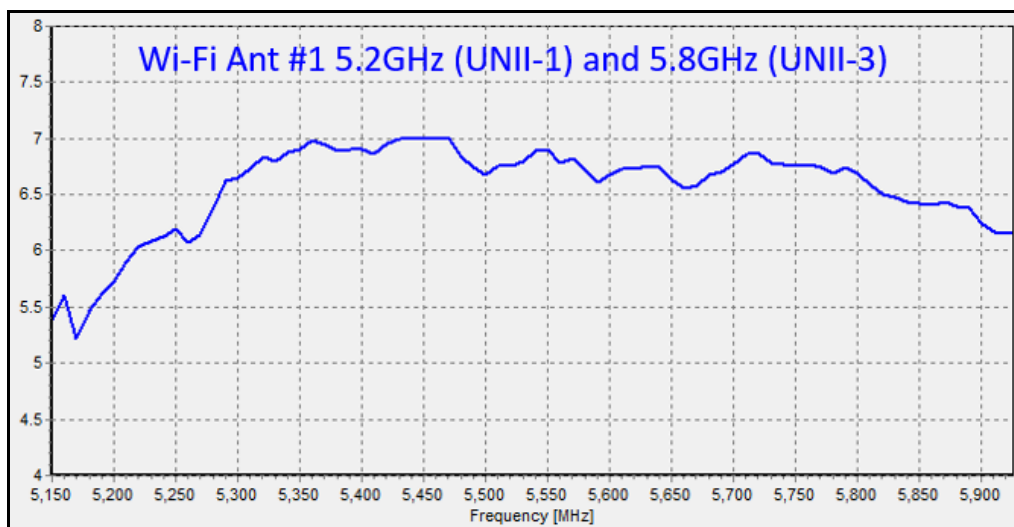
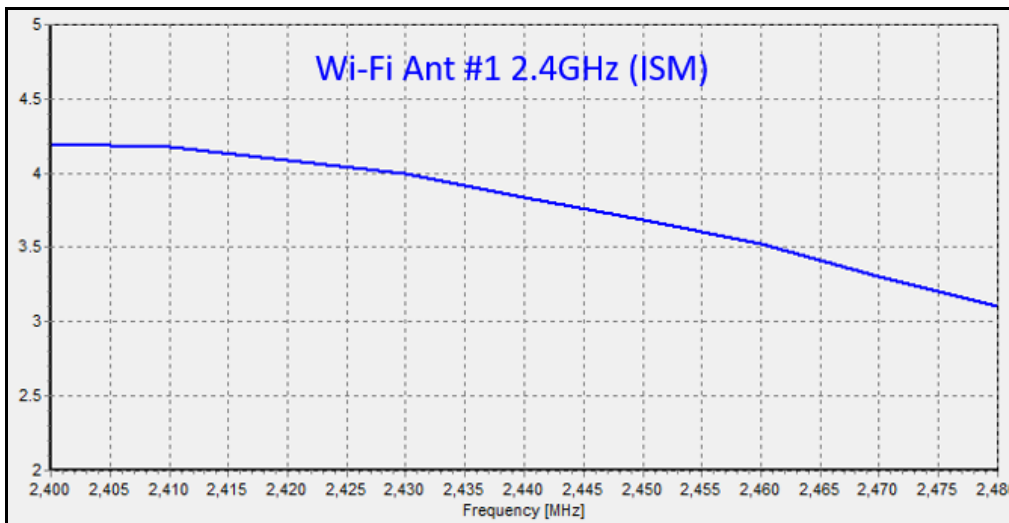
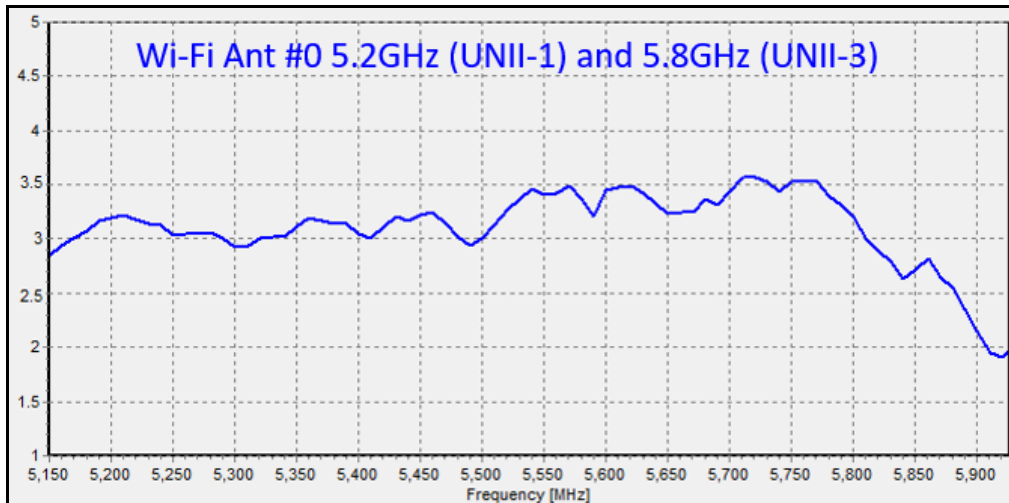
3. Antenna Passive Gain Table:

| Wi-Fi Ant #0 | Frequency Range | Gain |
|--------------|------------------------------|---------|
| ISM | 2440MHz (2412MHz to 2462MHz) | 1.2 dBi |
| UNI-1 | 5200MHz (5170MHz to 5250MHz) | 3.2 dBi |
| UNI-3 | 5700MHz (5735MHz to 5835MHz) | 3.5 dBi |
| Wi-Fi Ant #1 | Frequency Range | Gain |
| ISM | 2440MHz (2412MHz to 2462MHz) | 4.2 dBi |
| UNI-1 | 5200MHz (5170MHz to 5250MHz) | 6.2 dBi |
| UNI-3 | 5700MHz (5735MHz to 5835MHz) | 6.8 dBi |

4. Antenna Passive Gain (dBi) Charts:

- Antenna Engineer: Younghwan Park
- Passive Measurement Date: 11-22-2022





5. Antenna Passive Measurement Setup:

Passive Performance Test System components and diagram:

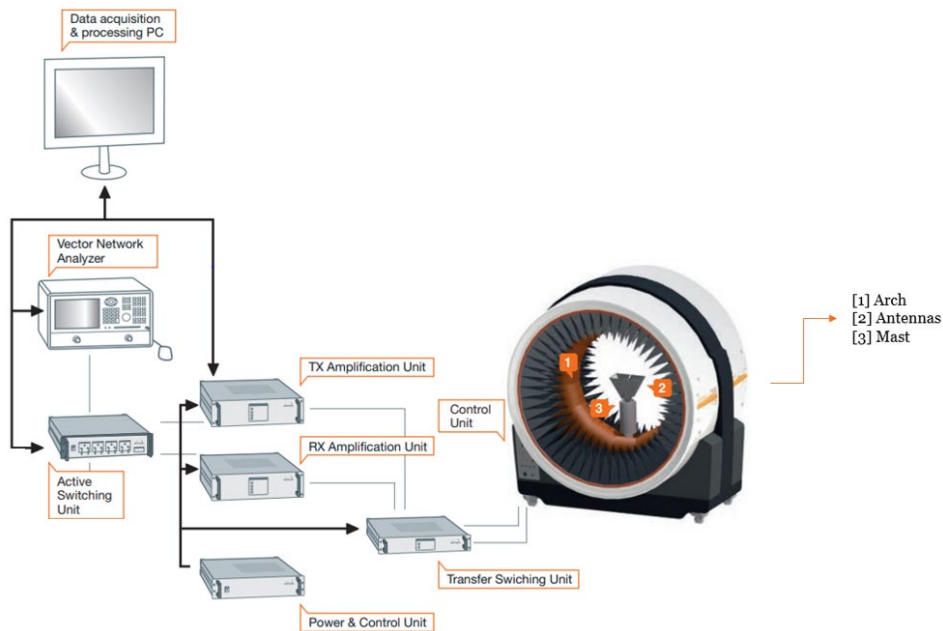
Frequency Bands: 600 MHz to 10 GHz

Max. Size of DUT: 450mm for spherical set-up

Max. Weight of DUT: 10 kgs

The system is capable of the following measurements:

- Gain
- Directivity
- Beamwidth
- Cross polar discrimination
- Sidelobe levels
- 3D radiation pattern
- Radiation pattern in any polarization (linear or circular)
- Antenna efficiency test



Inseego Corp.

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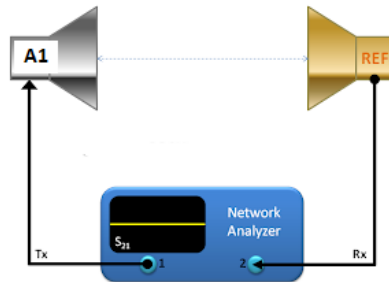
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Gain Measurement Method Explained:

- a) **Calibration:** Use Two Antennas (one has to have a known gain [In this case Ref]) to measure and record the S parameter S_{21} which is the input/output relationship between the ports on the Network analyzer
 - a. Normalize the calibration to produce 0 DB reference on the network Analyzer.
 - b. All cable loss factors are accounted for in the system.

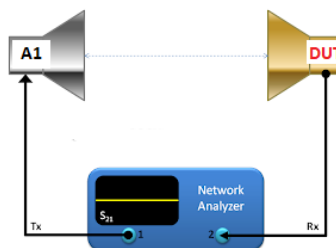
Notes: A1 represents Arch antennas in system

The software instructs the VNA to produce a sweep signal over the frequency range specified. The it will generate the signal is a swept CW between the start and end frequency and pausing at predetermined points long enough to collect measurement.



Calibration diagram

- b) **DUT Measurements:** Replace reference Antenna with DUT Antenna (maintaining the same conditions) distance etc.



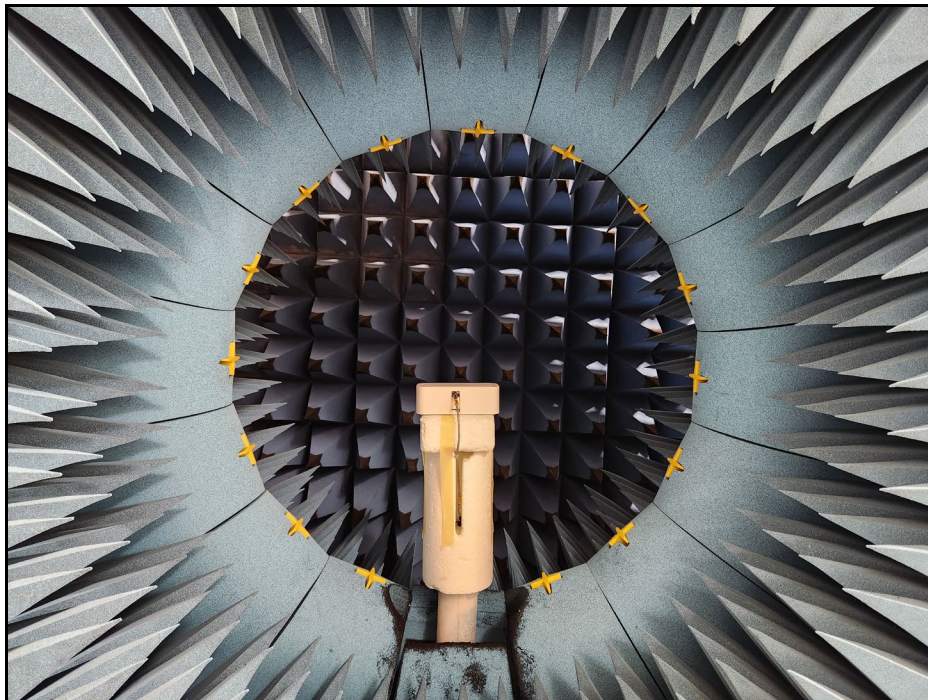
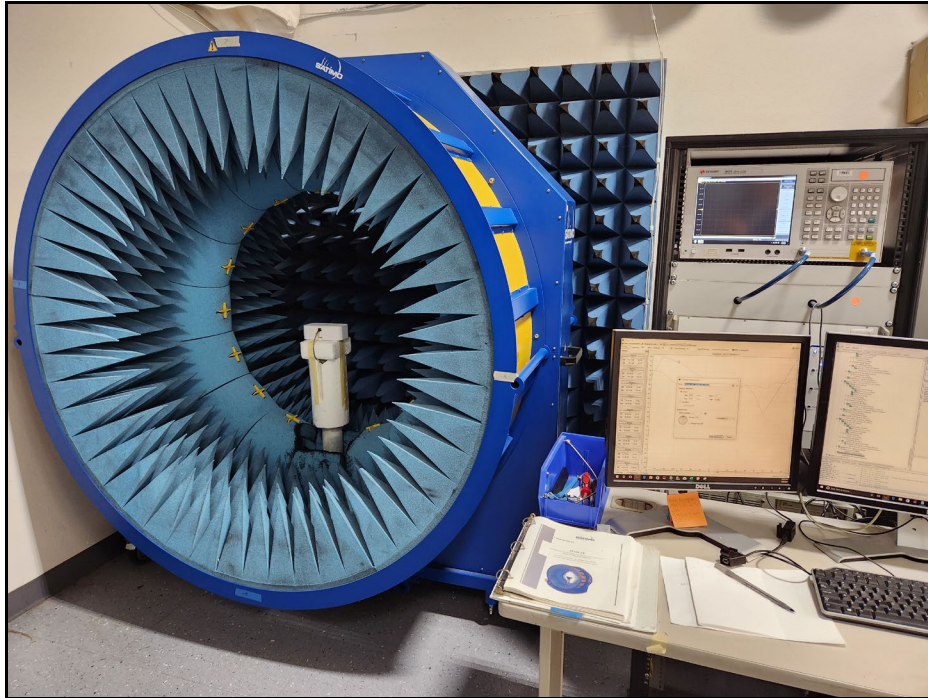
DUT Measurement diagram

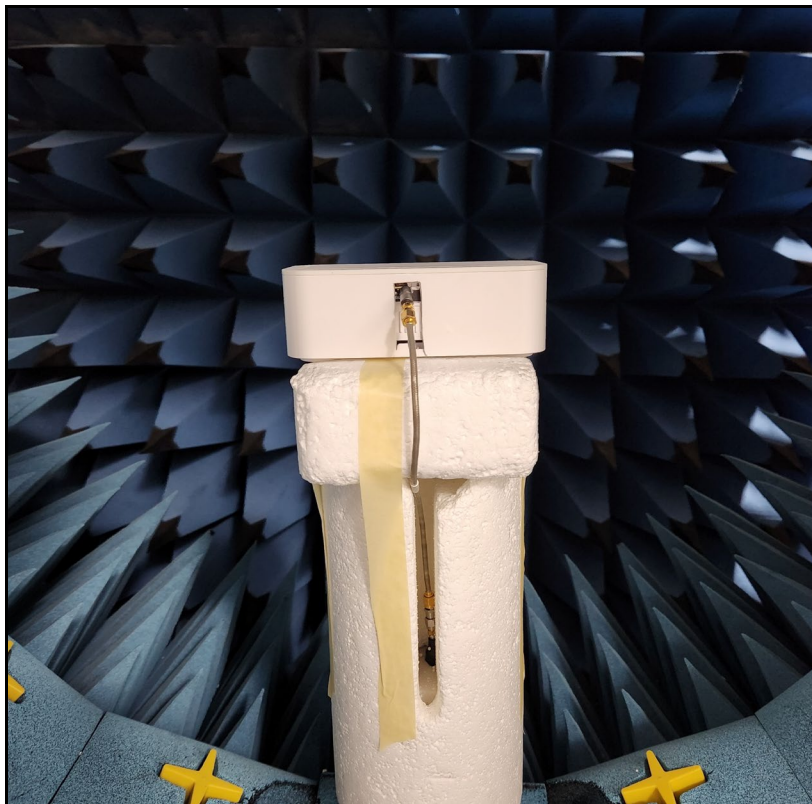
- c) Remeasure S_{21} response which now represents the gain relative to reference antenna. Collect $G(\text{Rel})$.
- d) Calculate $G(\text{Dut}) = G(\text{ref}) + G(\text{rel})$

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Note: The chamber measurement system is automated. The measurement is taken at multiple locations points by rotating the DUT and the Arch.

6. DUT Measurement Setup Photos:





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7. Measurement Equipment calibration:

- MVG StarLab Multi-Probe Compact Passive Antenna Measurement Chamber Calibration Certificate:

| | | |
|---|--|--|
|  |  | |
| <h3>Calibration Certificate</h3> | | |
| Manufacturer's Name : | MVG Industries | |
| Manufacturer's Address : | 13, rue du Zéphir Parc d'Activité de l'Océane 91140 Villejust FRANCE | |
| Declares that product | | |
| Customer name : | INSEEGO | |
| Product Name: | SL v1 | |
| Serial Number : | C253 | |
| Calibration date | 19/02/2022 | |
| Has been calibrated according MVG procedure and \ Or according ISO 9001 requirements. | | |
| 19 February, 2022 | MVG Quality Manager | |
|  | | |
| MICROWAVE VISION www.microwavevision.com | Société Anonyme Capital Social : 691 041€ RCS Evry B 340 342 163 Numéro SIREN : 340 342 163 | 47, Blvd St. Michel 75005 Paris, FRANCE Tel. : + 33 (0)1 75 77 58 50 Fax : +33 (0)1 46 38 39 02 |

- E5071C Network Analyzer Calibration Certificate:

| Certificate of Calibration | | |
|---|---|---|
|  | ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994 |  |
| | Certificate Number 1-13571508236-1 |  |
| Model Number | E5071C | Customer |
| Manufacturer | Keysight Technologies Inc | Inseego Corp |
| Description | ENA Series Network analyzer | 9710 Scranton Rd Ste 200 |
| Serial Number | MY46103762 | SAN DIEGO CA 92121-1744 |
| | | United States |
| Date of Calibration | 17 Dec 2020 | Location of Calibration |
| Procedure | STE-50114528-C.06.06 | Keysight Technologies Inc |
| Temperature | (23 ± 5) °C | 10090 Foothills Blvd. |
| Humidity | (50 ± 30) %RH | Roseville CA 95747-7102 |
| | | UNITED STATES |
| <p>This certifies that the equipment has been calibrated using applicable Keysight Technologies procedures and in compliance with ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994 (R2002). The quality management system is registered to ISO 9001:2015.</p> | | |