

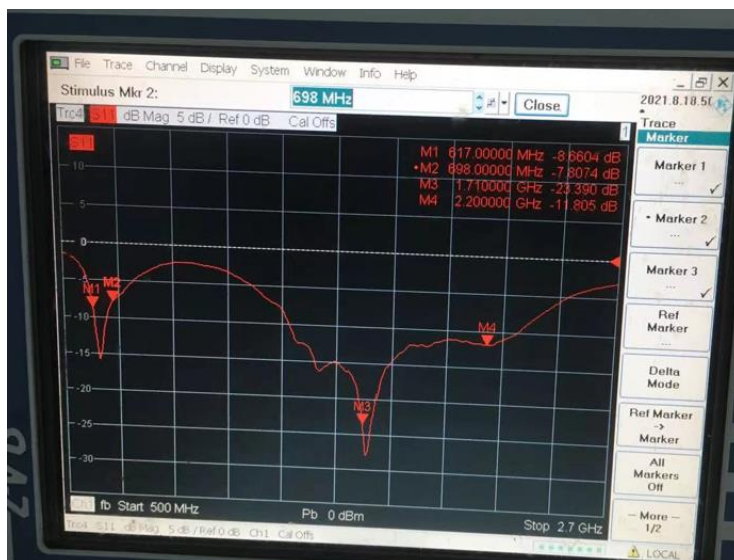
# SolarGaurdX 100 Antenna Report

|               |                     |
|---------------|---------------------|
| Device Model: | SolarGuardX 100     |
| FCC ID:       | 2ASWYSOLARGUARDX100 |

| Antenna Detail    | Antenna Type           | Bands & Frequency                                                                                                                                                                         |
|-------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Primary Antenna   | Internal Steel Antenna | Cat-M1 / Cat-NB2:<br>LTE-FDD B1/B2/B3/B4/B5/B8/B12/B13/B14/B18/B19/B20/<br>B25/B26/B27/ B28/B66/B71/B85<br>EGPRS:<br>GSM850/900/1800/1900 MHz<br><br>Frequency: 617~960MHz / 1710~2180MHz |
| GPS Antenna       | Internal Steel Antenna | GPS: 1574.4~1576.44 MHz<br>GLONASS: 1598~1606 MHz<br>BeiDou: 1559~1563 MHz                                                                                                                |
| Bluetooth Antenna | PCB Printed Antenna    | 2402~2480MHz                                                                                                                                                                              |

# Primary Antenna Performance — S11

617~698MHz



698~803MHz



791~894MHz



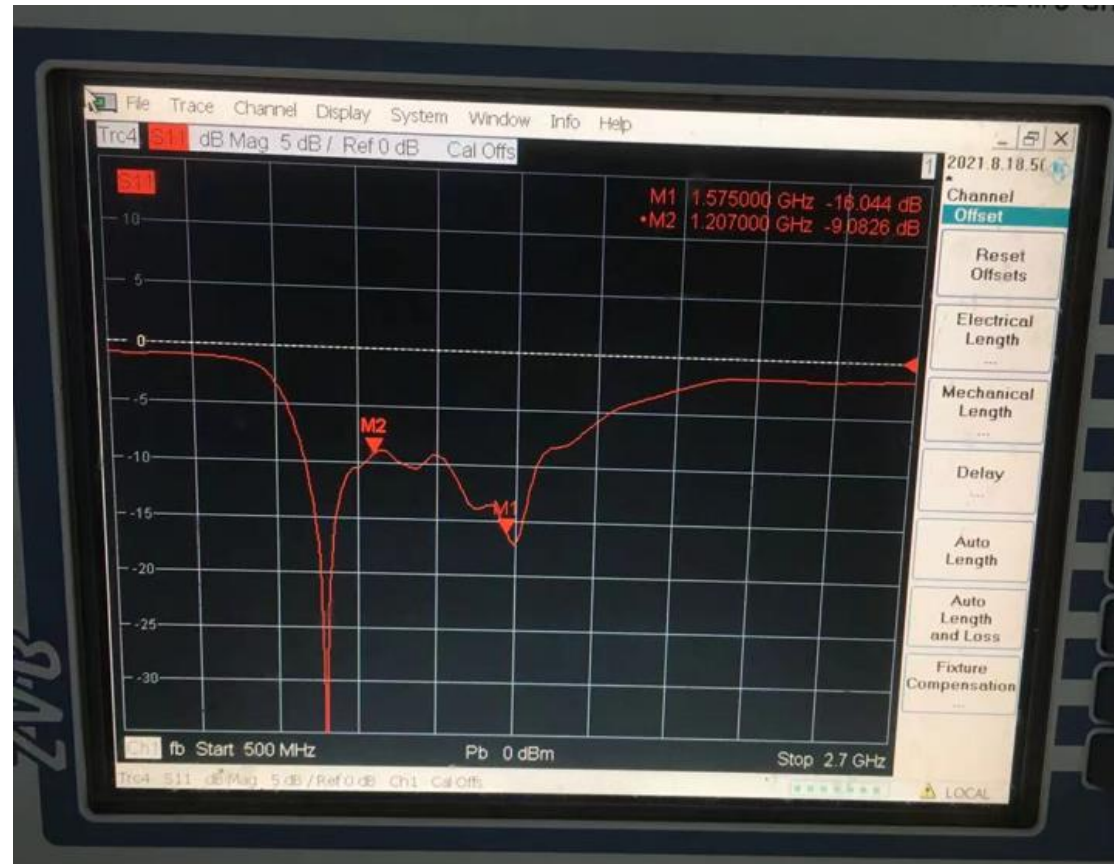
880~960MHz  
1710~2180MHz



# Primary Antenna Performance — Efficiency and Gain

| Freq.(MHz) | Efficiency (%) | Efficiency (dB) | Gain(dBi) |
|------------|----------------|-----------------|-----------|
| 610        | 20.8%          | -6.83           | -2.26     |
| 620        | 22.2%          | -6.54           | -1.93     |
| 630        | 24.2%          | -6.17           | -1.35     |
| 640        | 27.0%          | -5.69           | -1.03     |
| 650        | 28.9%          | -5.39           | -0.84     |
| 660        | 32.6%          | -4.87           | -0.65     |
| 670        | 34.2%          | -4.66           | -0.48     |
| 680        | 38.2%          | -4.18           | -0.21     |
| 690        | 39.8%          | -4.00           | 0.34      |
| 700        | 41.6%          | -3.81           | 0.51      |
| 710        | 41.8%          | -3.79           | 0.65      |
| 720        | 42.2%          | -3.74           | 0.50      |
| 730        | 42.5%          | -3.71           | 0.58      |
| 740        | 42.5%          | -3.71           | 0.80      |
| 750        | 42.5%          | -3.71           | 0.80      |
| 760        | 42.3%          | -3.74           | 0.80      |
| 770        | 41.3%          | -3.84           | 0.48      |
| 780        | 40.7%          | -3.90           | 0.47      |
| 790        | 39.6%          | -4.02           | 0.08      |
| 800        | 40.7%          | -3.90           | 0.27      |
| 810        | 42.1%          | -3.76           | 0.44      |
| 820        | 46.2%          | -3.35           | 0.57      |
| 830        | 48.4%          | -3.15           | 0.55      |
| 840        | 50.1%          | -3.00           | 0.59      |
| 850        | 50.5%          | -2.97           | 0.73      |
| 860        | 50.9%          | -2.93           | 0.80      |
| 870        | 51.0%          | -2.93           | 1.00      |
| 880        | 50.7%          | -2.95           | 0.86      |
| 890        | 50.2%          | -2.99           | 0.90      |
| 900        | 51.5%          | -2.88           | 0.98      |
| 910        | 54.1%          | -2.67           | 1.19      |
| 920        | 54.1%          | -2.67           | 1.16      |
| 930        | 54.5%          | -2.64           | 1.15      |
| 940        | 53.0%          | -2.75           | 1.06      |
| 950        | 51.5%          | -2.88           | 0.71      |
| 960        | 49.8%          | -3.03           | 0.90      |

| Freq.(MHz) | Efficiency (%) | Efficiency (dB) | Gain (dBi) |
|------------|----------------|-----------------|------------|
| 1710       | 43.1%          | -3.65           | 1.54       |
| 1730       | 45.7%          | -3.40           | 1.64       |
| 1750       | 47.3%          | -3.25           | 1.70       |
| 1770       | 47.3%          | -3.25           | 1.58       |
| 1790       | 47.5%          | -3.23           | 1.42       |
| 1810       | 48.0%          | -3.19           | 1.46       |
| 1830       | 49.0%          | -3.10           | 1.52       |
| 1850       | 48.9%          | -3.11           | 1.45       |
| 1870       | 46.9%          | -3.28           | 1.48       |
| 1890       | 47.8%          | -3.20           | 1.39       |
| 1910       | 48.3%          | -3.16           | 1.42       |
| 1930       | 50.2%          | -3.00           | 1.50       |
| 1950       | 49.1%          | -3.09           | 1.40       |
| 1970       | 48.0%          | -3.19           | 1.42       |
| 1990       | 47.4%          | -3.24           | 1.42       |
| 2010       | 50.2%          | -3.00           | 1.49       |
| 2030       | 49.9%          | -3.02           | 1.50       |
| 2050       | 47.7%          | -3.21           | 1.59       |
| 2070       | 48.9%          | -3.11           | 1.64       |
| 2090       | 48.4%          | -3.15           | 1.59       |
| 2110       | 50.0%          | -3.01           | 1.67       |
| 2130       | 51.8%          | -2.85           | 1.74       |
| 2150       | 52.0%          | -2.84           | 1.80       |
| 2170       | 50.7%          | -2.95           | 1.75       |
| 2190       | 48.0%          | -3.19           | 1.73       |
| 2200       | 46.0%          | -3.38           | 1.72       |

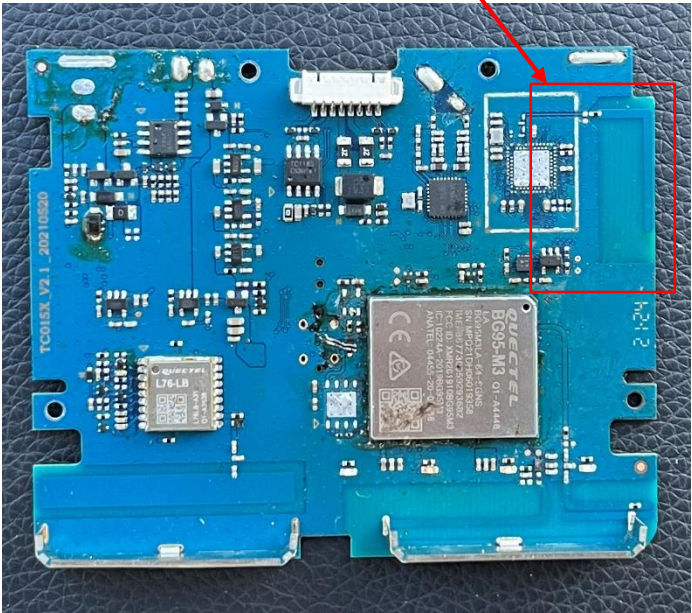


# GPS Antenna Performance — Efficiency and Gain

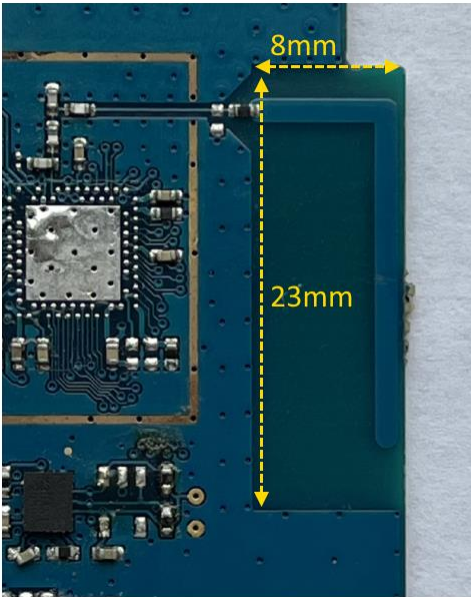
| Freq.(MHz) | Efficiency (%) | Efficiency (dB) | Gain(dBi) |
|------------|----------------|-----------------|-----------|
| 1550       | 54.6%          | -2.62           | 1.48      |
| 1554       | 54.5%          | -2.63           | 1.47      |
| 1558       | 54.5%          | -2.63           | 1.46      |
| 1562       | 55.6%          | -2.55           | 1.46      |
| 1566       | 55.6%          | -2.55           | 1.45      |
| 1570       | 55.4%          | -2.56           | 1.44      |
| 1574       | 55.3%          | -2.57           | 1.41      |
| 1578       | 55.2%          | -2.58           | 1.40      |
| 1582       | 55.2%          | -2.58           | 1.39      |
| 1586       | 55.2%          | -2.58           | 1.37      |
| 1590       | 55.1%          | -2.58           | 1.47      |
| 1594       | 54.9%          | -2.60           | 1.48      |
| 1598       | 54.9%          | -2.60           | 1.48      |
| 1602       | 54.9%          | -2.60           | 1.49      |
| 1606       | 54.8%          | -2.61           | 1.50      |
| 1610       | 54.7%          | -2.62           | 1.50      |
| Max        | 55.55%         | -2.55           | 1.50      |

# Bluetooth Antenna Details

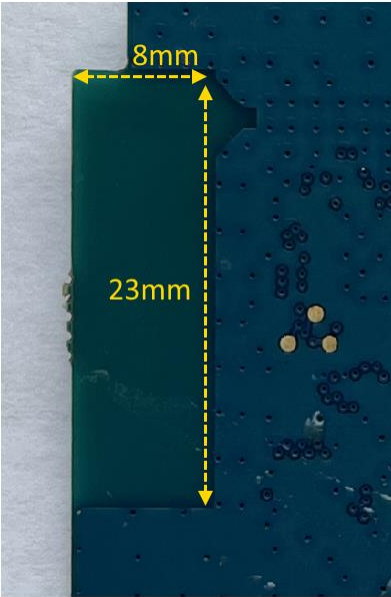
## Bluetooth Antenna Location



Top View

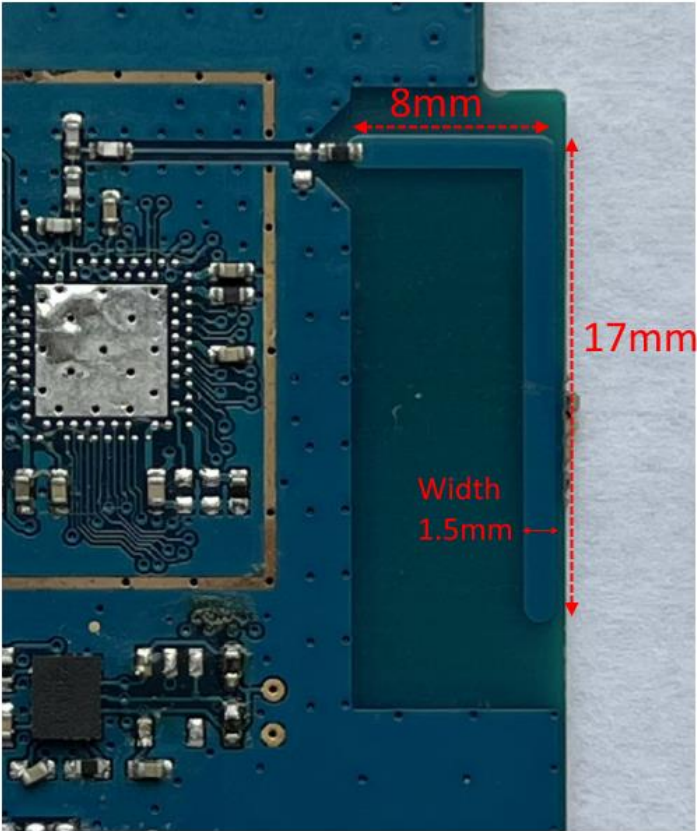


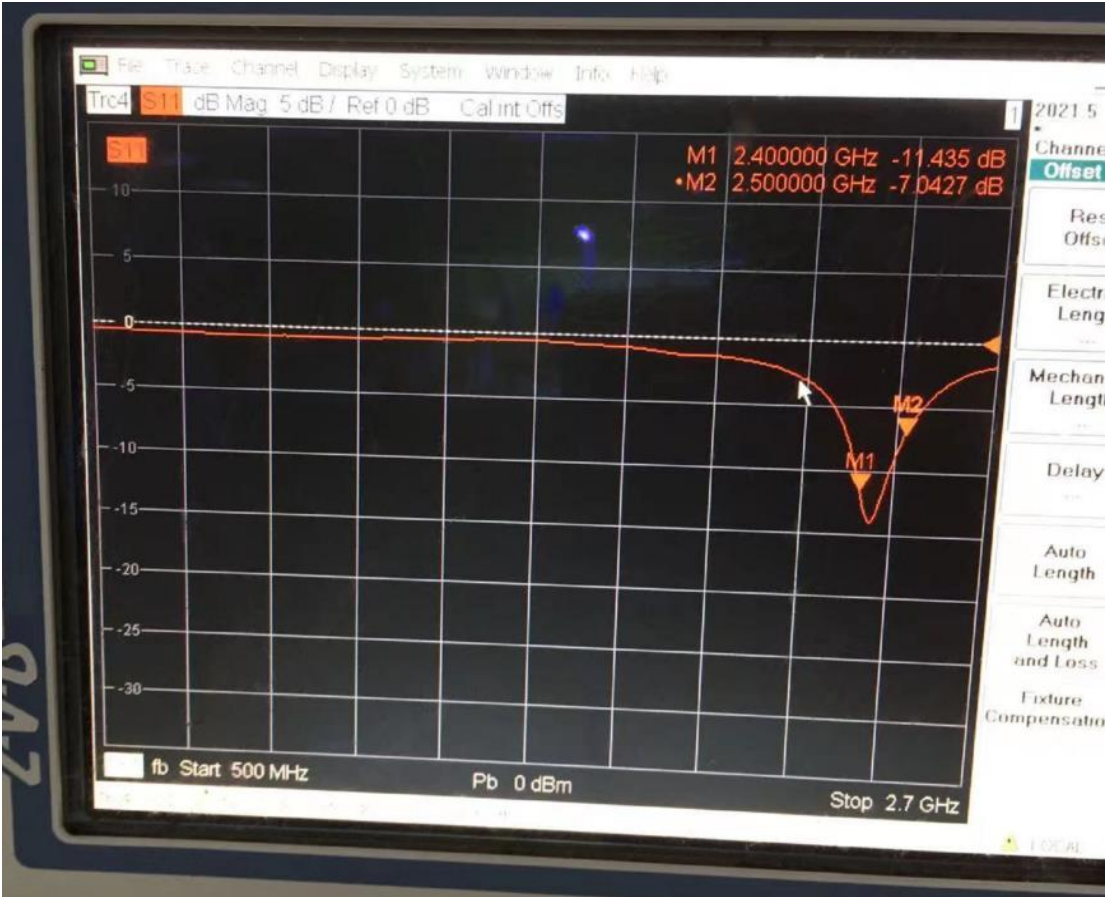
Bottom View



PCB Clearance Area for Antenna: 23mm\*8mm

## Antenna Dimensions:

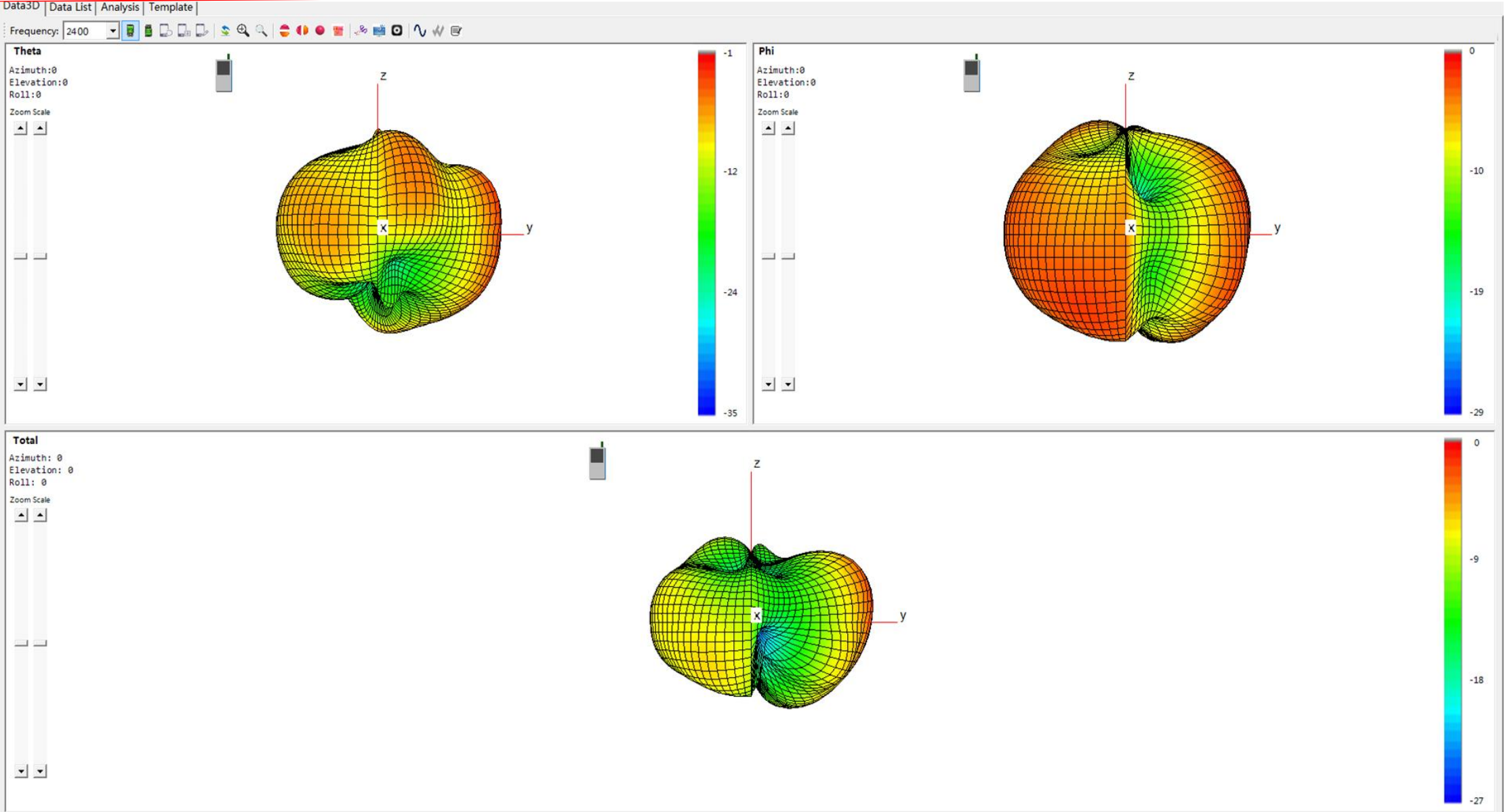




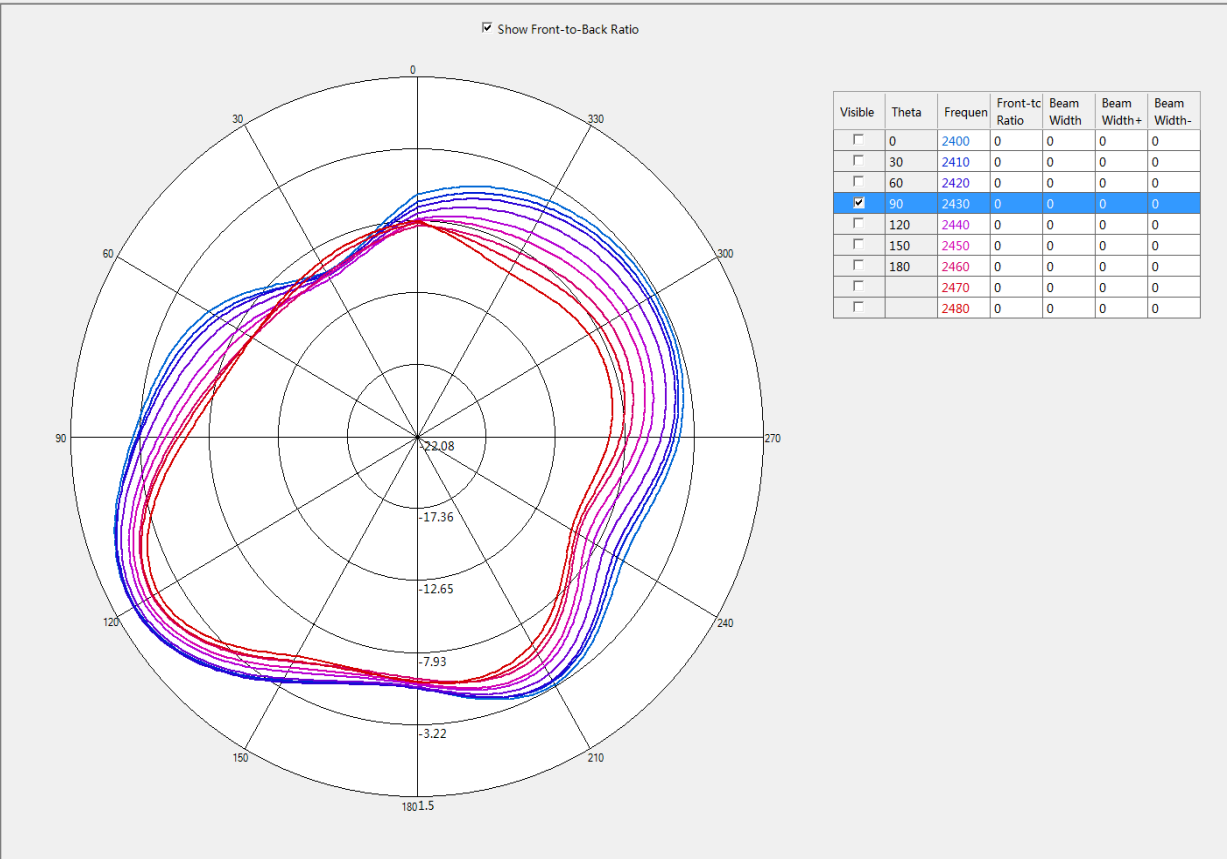
# Bluetooth Antenna Performance — Efficiency and Gain

| Freq.(MHz) | Efficiency (%) | Efficiency (dB) | Gain(dBi) |
|------------|----------------|-----------------|-----------|
| 2400       | 34.47%         | -4.63           | -0.23     |
| 2410       | 35.96%         | -4.44           | 0.01      |
| 2420       | 37.48%         | -4.26           | 0.23      |
| 2430       | 38.96%         | -4.09           | 0.32      |
| 2440       | 40.42%         | -3.93           | 0.42      |
| 2450       | 42.09%         | -3.76           | 0.67      |
| 2460       | 45.53%         | -3.42           | 1.03      |
| 2470       | 46.10%         | -3.36           | 1.10      |
| 2480       | 45.70%         | -3.40           | 1.05      |
| Max        | 46.10%         | -3.36           | 1.10      |

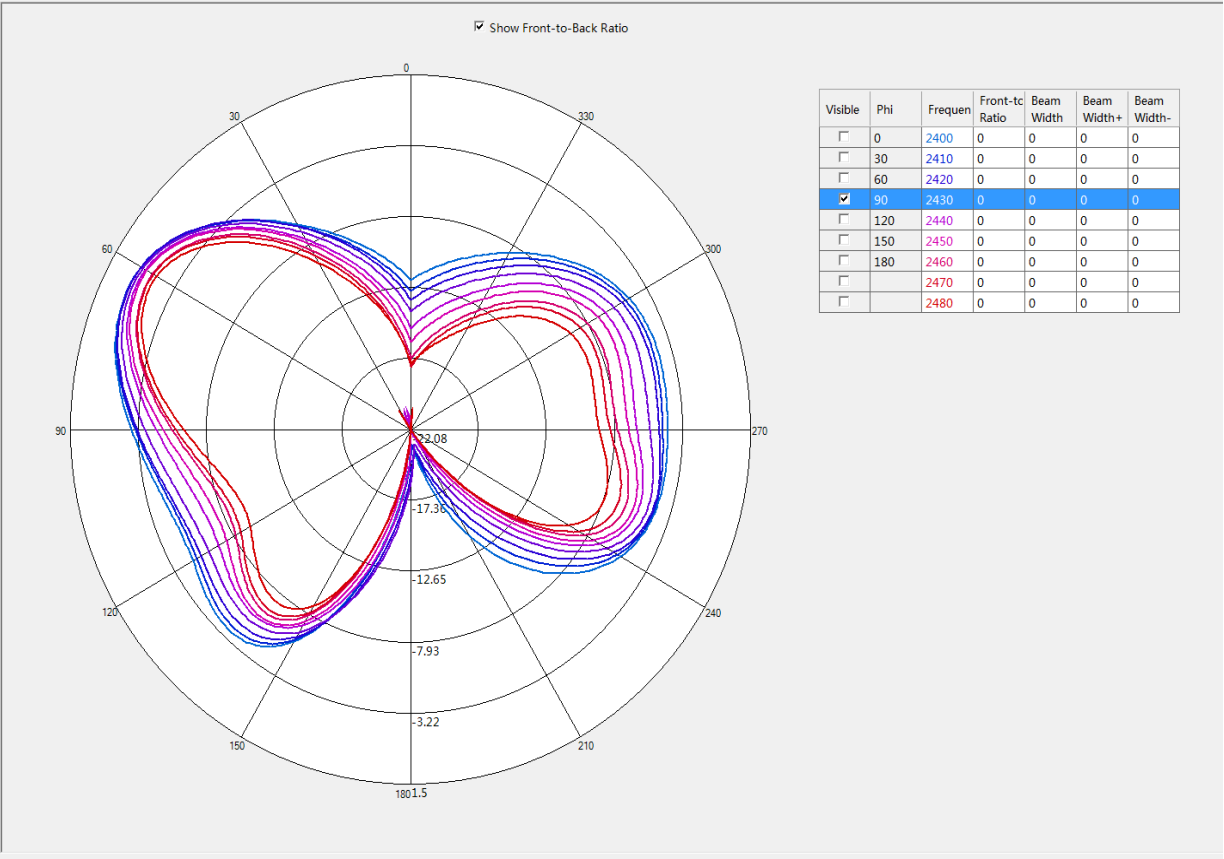
# Bluetooth Antenna Performance — Antenna Pattern 1



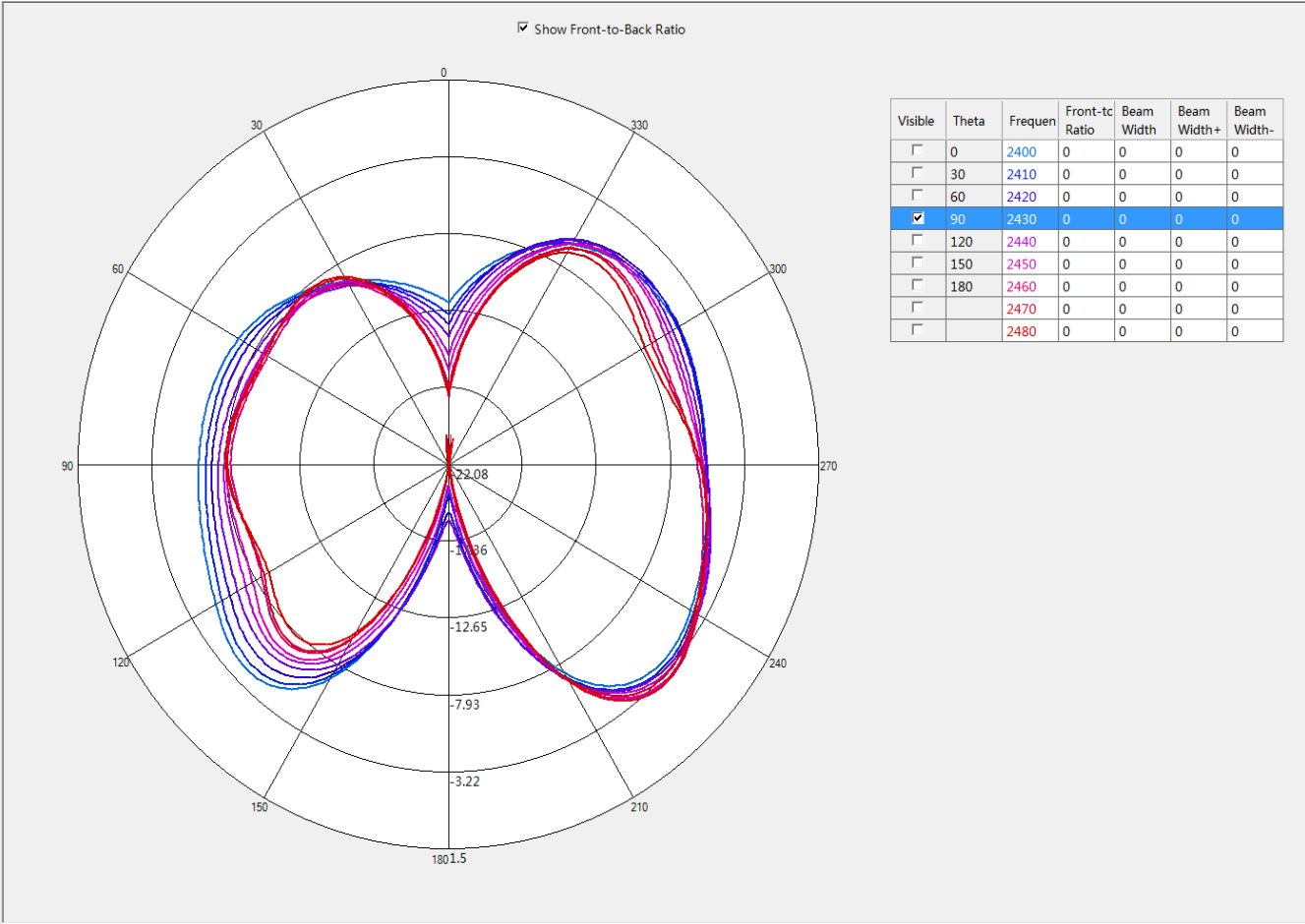
# Bluetooth Antenna Performance — Antenna Pattern 2



Theta=90°



Phi=90°



Phi=0°

# Thank you!



<https://www.linkedin.com/company/topflytech>



<https://www.youtube.com/channel/UCpb24abg40PMrJDeZLIbO5A>