



深圳市海德门电子有限公司

ShenZhen Deman Electronics Technology Co., Ltd

# P5 Antenna Test Report

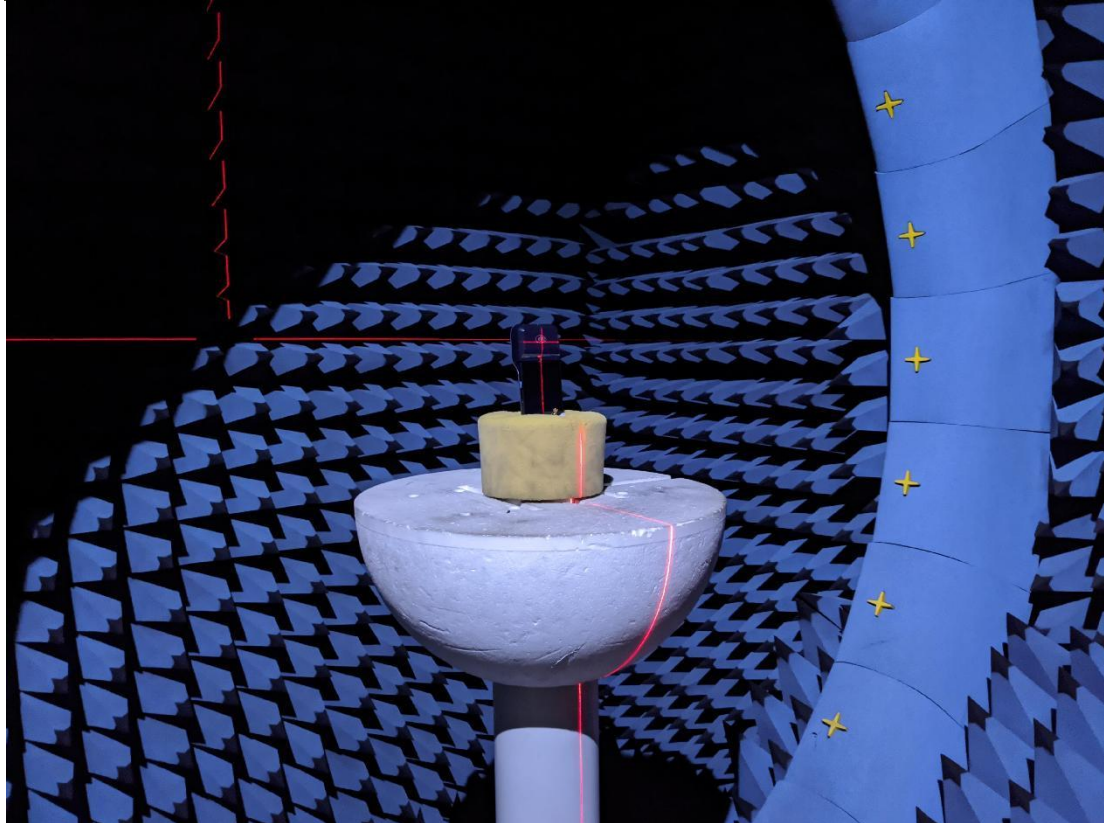


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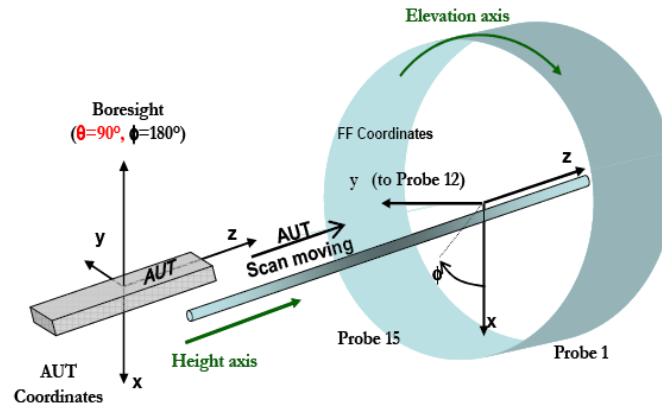
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## 1.TEST INSTRUMENTATION

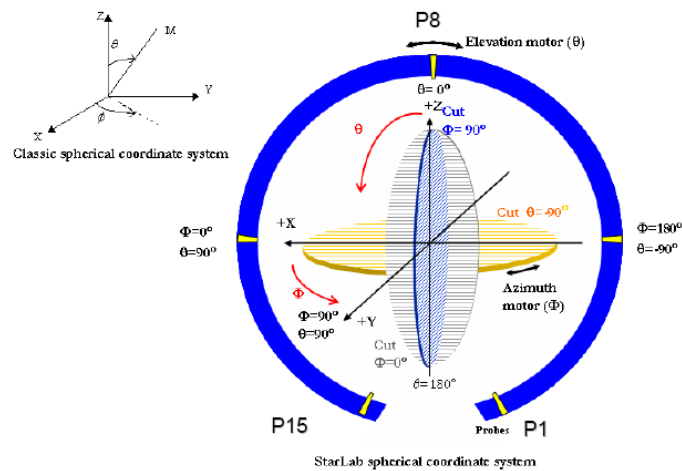
| CHAMBER                      | SATIMO Chamber     |
|------------------------------|--------------------|
| Wireless Networking Test Set | Agilent 8960 5515C |
| NETWORK ANALYZER             | Agilent 5072AD     |
| COMPREHENSIVE TESTER         | R&S CMW500         |
| TEMPERATURE                  | 20±2℃              |
| HUMIDITY                     | 50±20%rh           |



## Coordinate system – Cylindrical geometry



## Coordinate system – Spherical geometry





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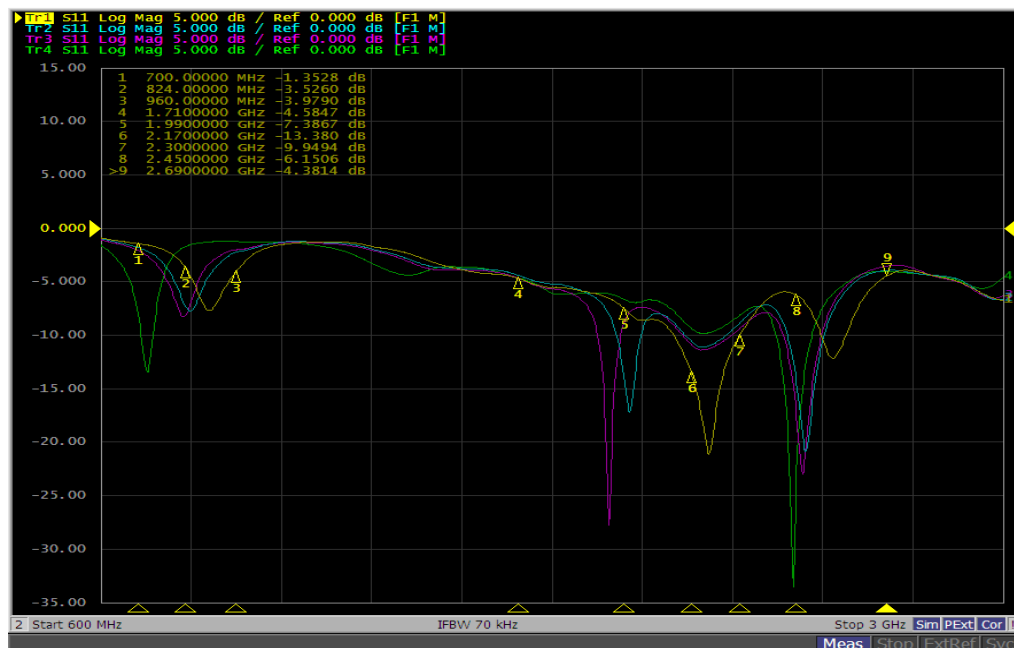
## 2. ANTENNA Name

### 2.1 Model: P5\_Main\_ANTENNA

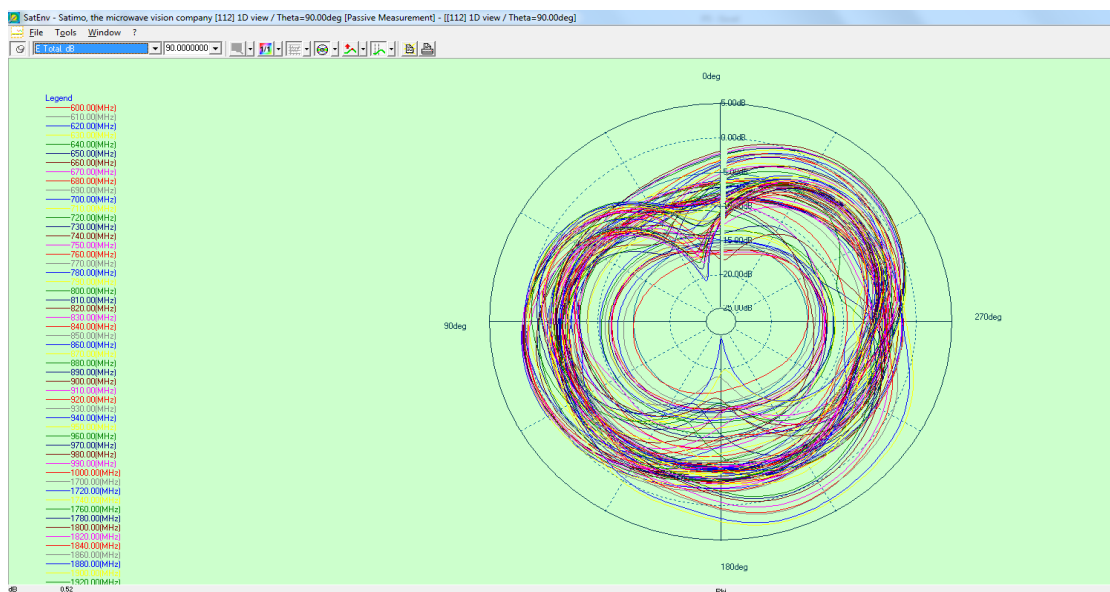
Maximum Gain: 1.65dBi

Measurement: 93\*11.8mm

VSWR: Voltage Standing Wave Rate



1D view:

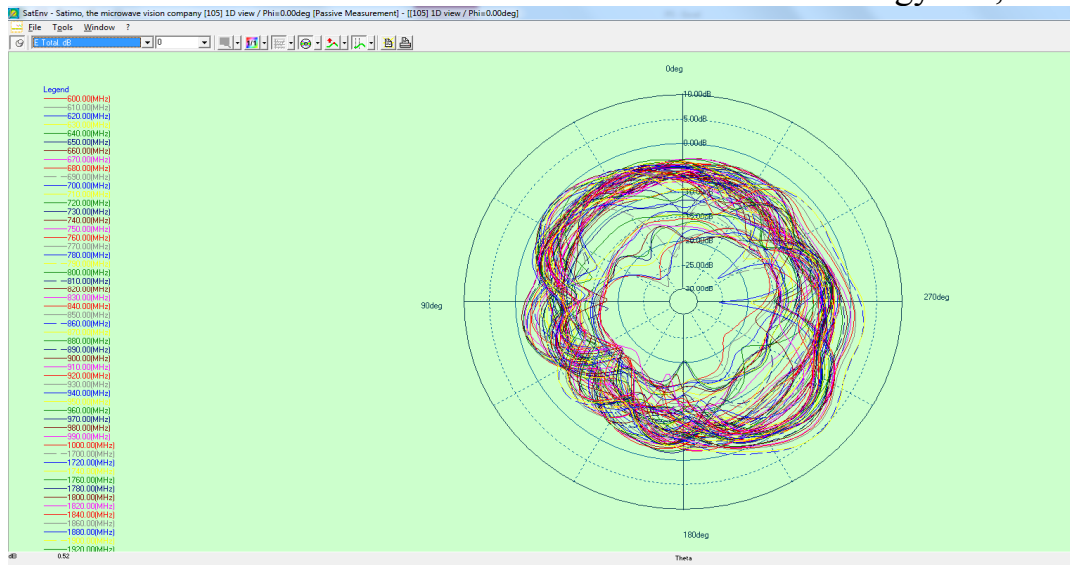


Theta = 90

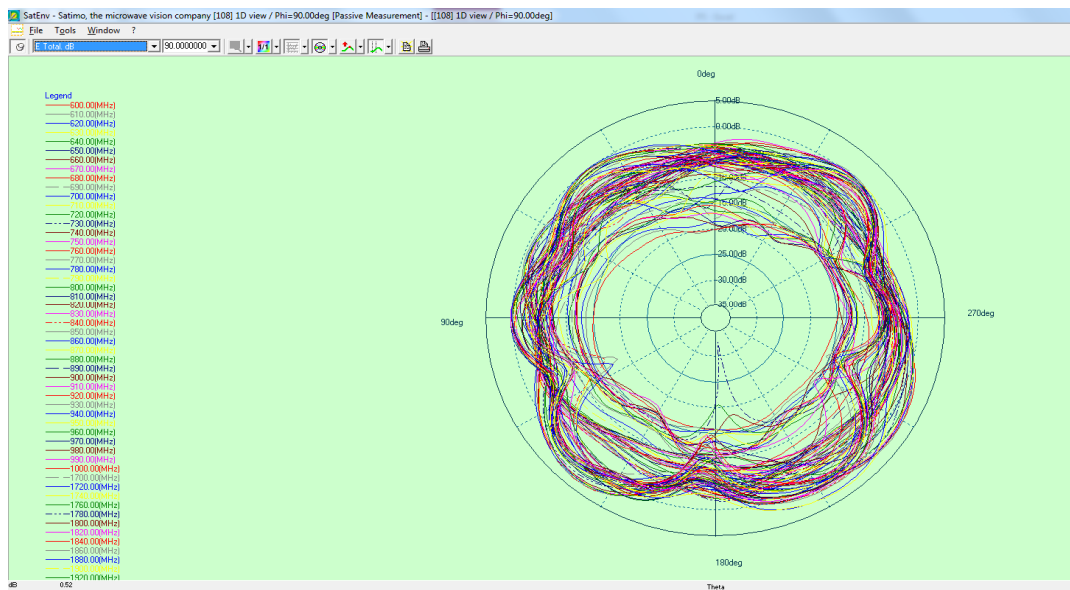


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Theta = 0



Phi = 90

## Efficiency test results

|               | RF1                   |                        |               | RF2                   |                        |               | RF3                   |                        |               | RF4                   |                        |               |
|---------------|-----------------------|------------------------|---------------|-----------------------|------------------------|---------------|-----------------------|------------------------|---------------|-----------------------|------------------------|---------------|
| Frequ<br>ency | Effici<br>ency(<br>%) | Efficie<br>ncy<br>(dB) | Gain<br>(dBi) | Effici<br>ency<br>(%) | Efficie<br>ncy<br>(dB) | Gain<br>(dBi) | Effici<br>ency(<br>%) | Efficie<br>ncy<br>(dB) | Gain<br>(dBi) | Effici<br>ency(<br>%) | Efficie<br>ncy<br>(dB) | Gain<br>(dBi) |

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|     |     |        |        |     |        |        |     |        |        |     |        |        |
|-----|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| 600 | 1%  | -19.24 | -13.92 | 2%  | -17.75 | -12.02 | 2%  | -17.10 | -11.26 | 5%  | -13.17 | -9.12  |
| 610 | 2%  | -17.92 | -13.05 | 2%  | -16.40 | -11.12 | 3%  | -15.77 | -10.32 | 7%  | -11.63 | -8.09  |
| 620 | 2%  | -17.65 | -13.08 | 2%  | -16.09 | -11.35 | 3%  | -15.50 | -10.65 | 8%  | -11.20 | -8.16  |
| 630 | 2%  | -16.52 | -12.68 | 3%  | -14.92 | -11.02 | 4%  | -14.36 | -10.50 | 10% | -9.90  | -7.73  |
| 640 | 3%  | -15.98 | -12.43 | 4%  | -14.34 | -10.75 | 4%  | -13.76 | -10.51 | 12% | -9.19  | -7.58  |
| 650 | 2%  | -16.52 | -13.57 | 3%  | -14.77 | -11.80 | 4%  | -14.12 | -11.55 | 11% | -9.41  | -8.49  |
| 660 | 2%  | -16.13 | -13.63 | 4%  | -14.29 | -11.62 | 4%  | -13.55 | -11.00 | 13% | -8.79  | -7.84  |
| 670 | 3%  | -15.51 | -13.10 | 4%  | -13.54 | -10.92 | 5%  | -12.74 | -10.06 | 17% | -7.79  | -6.97  |
| 680 | 3%  | -15.20 | -12.22 | 5%  | -13.15 | -10.05 | 6%  | -12.30 | -9.29  | 19% | -7.18  | -5.76  |
| 690 | 4%  | -14.42 | -11.38 | 6%  | -12.27 | -8.98  | 7%  | -11.38 | -8.29  | 25% | -5.97  | -4.59  |
| 700 | 4%  | -14.12 | -11.16 | 6%  | -11.89 | -8.75  | 8%  | -10.94 | -7.99  | 29% | -5.45  | -4.20  |
| 710 | 4%  | -13.84 | -11.10 | 7%  | -11.52 | -8.55  | 9%  | -10.52 | -7.81  | 31% | -5.15  | -3.82  |
| 720 | 4%  | -13.55 | -11.38 | 8%  | -11.12 | -8.64  | 10% | -10.07 | -7.71  | 32% | -5.01  | -3.68  |
| 730 | 5%  | -13.25 | -11.55 | 8%  | -10.73 | -8.59  | 11% | -9.65  | -7.45  | 31% | -5.12  | -3.50  |
| 740 | 5%  | -12.99 | -11.43 | 9%  | -10.34 | -8.21  | 12% | -9.20  | -7.37  | 30% | -5.23  | -3.23  |
| 750 | 6%  | -12.52 | -10.80 | 10% | -9.82  | -7.40  | 14% | -8.63  | -6.73  | 27% | -5.73  | -3.01  |
| 760 | 6%  | -12.58 | -10.88 | 11% | -9.77  | -7.34  | 14% | -8.52  | -6.75  | 22% | -6.53  | -3.39  |
| 770 | 6%  | -12.04 | -10.00 | 12% | -9.16  | -6.65  | 16% | -7.87  | -5.73  | 18% | -7.33  | -3.20  |
| 780 | 7%  | -11.82 | -9.46  | 13% | -8.86  | -5.90  | 17% | -7.57  | -4.94  | 15% | -8.18  | -3.20  |
| 790 | 7%  | -11.36 | -8.42  | 15% | -8.36  | -4.79  | 19% | -7.10  | -3.98  | 12% | -9.26  | -3.44  |
| 800 | 8%  | -10.77 | -7.49  | 16% | -7.89  | -3.96  | 21% | -6.72  | -3.25  | 10% | -9.79  | -3.66  |
| 810 | 8%  | -10.73 | -7.19  | 16% | -7.86  | -3.65  | 21% | -6.73  | -2.93  | 8%  | -10.86 | -4.46  |
| 820 | 9%  | -10.45 | -6.71  | 17% | -7.78  | -3.36  | 21% | -6.79  | -2.85  | 7%  | -11.75 | -5.32  |
| 830 | 10% | -10.17 | -6.12  | 18% | -7.56  | -3.10  | 21% | -6.74  | -2.77  | 5%  | -12.61 | -6.12  |
| 840 | 11% | -9.52  | -5.26  | 18% | -7.35  | -2.93  | 20% | -6.91  | -2.94  | 5%  | -13.45 | -6.86  |
| 850 | 12% | -9.29  | -4.74  | 18% | -7.50  | -2.91  | 18% | -7.35  | -3.04  | 4%  | -14.06 | -7.24  |
| 860 | 14% | -8.52  | -3.69  | 18% | -7.36  | -2.64  | 17% | -7.61  | -3.00  | 4%  | -14.48 | -7.55  |
| 870 | 16% | -7.89  | -2.90  | 19% | -7.26  | -2.57  | 17% | -7.82  | -3.08  | 4%  | -14.45 | -7.66  |
| 880 | 20% | -6.96  | -2.03  | 20% | -7.05  | -2.63  | 16% | -7.96  | -3.34  | 4%  | -14.49 | -8.09  |
| 890 | 23% | -6.36  | -1.33  | 20% | -6.98  | -2.71  | 16% | -8.03  | -3.49  | 4%  | -14.12 | -7.95  |
| 900 | 26% | -5.91  | -1.20  | 21% | -6.84  | -2.92  | 16% | -7.97  | -3.57  | 4%  | -14.01 | -7.99  |
| 910 | 28% | -5.55  | -1.09  | 20% | -6.93  | -3.17  | 16% | -8.08  | -3.90  | 4%  | -14.13 | -8.03  |
| 920 | 28% | -5.51  | -1.17  | 19% | -7.22  | -3.58  | 15% | -8.35  | -4.43  | 4%  | -14.55 | -8.45  |
| 930 | 25% | -5.95  | -1.49  | 15% | -8.10  | -4.46  | 12% | -9.20  | -5.44  | 3%  | -15.40 | -9.17  |
| 940 | 24% | -6.24  | -1.99  | 15% | -8.34  | -4.52  | 12% | -9.36  | -5.47  | 3%  | -15.36 | -8.98  |
| 950 | 24% | -6.27  | -2.15  | 14% | -8.43  | -4.74  | 11% | -9.42  | -5.69  | 3%  | -15.30 | -9.25  |
| 960 | 23% | -6.42  | -2.83  | 14% | -8.46  | -5.23  | 12% | -9.38  | -6.17  | 3%  | -15.03 | -9.71  |
| 970 | 23% | -6.44  | -2.90  | 14% | -8.49  | -5.54  | 11% | -9.40  | -6.45  | 3%  | -14.97 | -9.95  |
| 980 | 21% | -6.78  | -3.35  | 13% | -8.74  | -5.99  | 11% | -9.58  | -6.85  | 3%  | -14.91 | -10.23 |
| 990 | 21% | -6.74  | -3.57  | 14% | -8.56  | -6.15  | 12% | -9.35  | -6.88  | 4%  | -14.50 | -10.05 |

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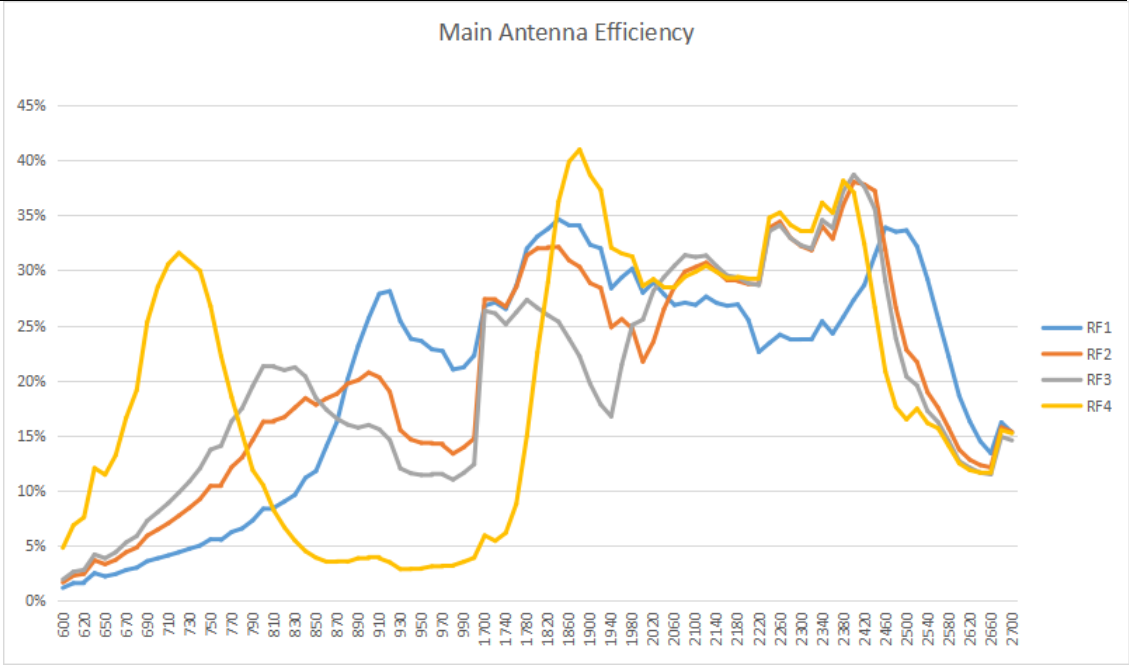
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|      |     |       |       |     |       |       |     |       |       |     |        |       |
|------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|--------|-------|
| 1000 | 22% | -6.52 | -3.68 | 15% | -8.32 | -6.05 | 12% | -9.07 | -6.82 | 4%  | -14.08 | -9.74 |
| 1700 | 27% | -5.72 | -1.72 | 27% | -5.63 | -0.74 | 26% | -5.80 | -0.72 | 6%  | -12.26 | -6.14 |
| 1720 | 27% | -5.67 | -1.76 | 27% | -5.63 | -0.52 | 26% | -5.84 | -0.86 | 5%  | -12.64 | -6.99 |
| 1740 | 26% | -5.77 | -1.87 | 27% | -5.73 | -0.82 | 25% | -6.00 | -1.24 | 6%  | -12.09 | -7.56 |
| 1760 | 29% | -5.44 | -1.55 | 28% | -5.45 | -0.33 | 26% | -5.82 | -0.94 | 9%  | -10.55 | -7.34 |
| 1780 | 32% | -4.95 | -1.01 | 31% | -5.04 | -0.06 | 27% | -5.64 | -0.65 | 15% | -8.25  | -5.64 |
| 1800 | 33% | -4.80 | -0.72 | 32% | -4.95 | 0.12  | 27% | -5.75 | -0.45 | 23% | -6.47  | -3.97 |
| 1820 | 34% | -4.72 | -0.82 | 32% | -4.93 | 0.02  | 26% | -5.86 | -1.04 | 29% | -5.39  | -2.68 |
| 1840 | 35% | -4.61 | -1.10 | 32% | -4.93 | -0.30 | 25% | -5.96 | -1.26 | 36% | -4.41  | -1.99 |
| 1860 | 34% | -4.67 | -1.32 | 31% | -5.10 | -0.37 | 24% | -6.24 | -2.02 | 40% | -4.00  | -1.64 |
| 1880 | 34% | -4.69 | -1.56 | 30% | -5.18 | -0.35 | 22% | -6.54 | -2.82 | 41% | -3.88  | -1.23 |
| 1900 | 32% | -4.91 | -1.41 | 29% | -5.40 | -0.06 | 20% | -7.06 | -3.25 | 39% | -4.13  | -1.47 |
| 1920 | 32% | -4.95 | -1.25 | 28% | -5.47 | -0.67 | 18% | -7.49 | -2.37 | 37% | -4.28  | -1.61 |
| 1940 | 28% | -5.47 | -1.82 | 25% | -6.05 | -3.16 | 17% | -7.76 | -2.56 | 32% | -4.94  | -1.87 |
| 1960 | 29% | -5.32 | -1.56 | 26% | -5.92 | -3.76 | 21% | -6.69 | -2.69 | 32% | -5.01  | -2.39 |
| 1980 | 30% | -5.21 | -0.88 | 25% | -6.07 | -3.13 | 25% | -6.01 | -2.50 | 31% | -5.05  | -2.33 |
| 2000 | 28% | -5.53 | -0.43 | 22% | -6.63 | -3.31 | 26% | -5.93 | -2.66 | 29% | -5.44  | -2.58 |
| 2020 | 29% | -5.39 | -0.15 | 24% | -6.29 | -2.59 | 28% | -5.51 | -2.07 | 29% | -5.35  | -1.88 |
| 2040 | 28% | -5.56 | -0.40 | 26% | -5.77 | -2.26 | 29% | -5.32 | -1.63 | 28% | -5.46  | -1.51 |
| 2060 | 27% | -5.71 | -0.38 | 29% | -5.45 | -1.82 | 30% | -5.17 | -1.23 | 28% | -5.46  | -1.01 |
| 2080 | 27% | -5.68 | 0.09  | 30% | -5.24 | -1.34 | 31% | -5.03 | -0.83 | 29% | -5.31  | -0.72 |
| 2100 | 27% | -5.71 | -0.01 | 30% | -5.19 | -1.28 | 31% | -5.06 | -0.55 | 30% | -5.25  | -0.61 |
| 2120 | 28% | -5.59 | 0.02  | 31% | -5.13 | -0.52 | 31% | -5.04 | 0.27  | 30% | -5.17  | 0.03  |
| 2140 | 27% | -5.68 | -1.00 | 30% | -5.24 | -0.07 | 30% | -5.18 | 0.43  | 30% | -5.25  | 0.51  |
| 2160 | 27% | -5.72 | -2.61 | 29% | -5.36 | 0.15  | 30% | -5.30 | 0.69  | 29% | -5.33  | 0.92  |
| 2180 | 27% | -5.70 | -3.25 | 29% | -5.37 | 0.44  | 29% | -5.32 | 0.99  | 29% | -5.31  | 1.20  |
| 2200 | 26% | -5.93 | -3.87 | 29% | -5.41 | 0.49  | 29% | -5.40 | 0.95  | 29% | -5.34  | 1.05  |
| 2220 | 23% | -6.46 | -3.44 | 29% | -5.42 | 0.70  | 29% | -5.43 | 1.31  | 29% | -5.33  | 1.27  |
| 2240 | 23% | -6.31 | -2.69 | 34% | -4.70 | 1.97  | 34% | -4.74 | 2.39  | 35% | -4.59  | 2.25  |
| 2260 | 24% | -6.17 | -1.89 | 34% | -4.63 | 2.62  | 34% | -4.67 | 2.77  | 35% | -4.53  | 2.28  |
| 2280 | 24% | -6.25 | -1.43 | 33% | -4.82 | 2.20  | 33% | -4.83 | 2.47  | 34% | -4.67  | 1.63  |
| 2300 | 24% | -6.25 | -0.94 | 32% | -4.92 | 2.62  | 32% | -4.91 | 2.28  | 34% | -4.74  | 1.54  |
| 2320 | 24% | -6.25 | -0.72 | 32% | -4.97 | 2.76  | 32% | -4.95 | 2.23  | 34% | -4.75  | 0.92  |
| 2340 | 25% | -5.96 | -0.31 | 34% | -4.68 | 2.71  | 35% | -4.62 | 2.13  | 36% | -4.42  | 0.56  |
| 2360 | 24% | -6.15 | -0.20 | 33% | -4.83 | 2.69  | 34% | -4.71 | 1.56  | 35% | -4.53  | 0.30  |
| 2380 | 26% | -5.89 | 0.15  | 36% | -4.45 | 2.26  | 37% | -4.30 | 0.92  | 38% | -4.19  | -0.17 |
| 2400 | 27% | -5.64 | 0.67  | 38% | -4.20 | 1.06  | 39% | -4.13 | -0.26 | 37% | -4.31  | -1.52 |
| 2420 | 29% | -5.43 | 1.00  | 38% | -4.23 | -0.33 | 38% | -4.25 | -1.49 | 32% | -4.89  | -2.76 |
| 2440 | 31% | -5.04 | 1.19  | 37% | -4.29 | -2.23 | 36% | -4.49 | -2.99 | 27% | -5.75  | -4.15 |
| 2460 | 34% | -4.70 | 1.30  | 32% | -4.97 | -3.25 | 29% | -5.38 | -3.43 | 21% | -6.82  | -4.83 |

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|      |     |       |       |     |       |       |     |       |       |     |       |       |
|------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|
| 2480 | 33% | -4.75 | 1.14  | 27% | -5.75 | -3.49 | 24% | -6.23 | -3.51 | 18% | -7.55 | -4.88 |
| 2500 | 34% | -4.73 | 1.50  | 23% | -6.42 | -3.49 | 20% | -6.91 | -3.58 | 16% | -7.83 | -4.47 |
| 2520 | 32% | -4.93 | 1.65  | 22% | -6.64 | -3.04 | 20% | -7.09 | -2.76 | 17% | -7.58 | -3.18 |
| 2540 | 29% | -5.35 | 0.97  | 19% | -7.23 | -3.13 | 17% | -7.64 | -2.97 | 16% | -7.92 | -2.91 |
| 2560 | 26% | -5.91 | 0.54  | 18% | -7.56 | -3.34 | 16% | -7.90 | -2.95 | 16% | -8.05 | -2.74 |
| 2580 | 22% | -6.54 | -0.03 | 16% | -8.05 | -3.08 | 15% | -8.38 | -2.97 | 14% | -8.51 | -2.65 |
| 2600 | 19% | -7.30 | -1.09 | 14% | -8.62 | -2.84 | 13% | -8.97 | -2.84 | 12% | -9.04 | -2.48 |
| 2620 | 16% | -7.88 | -1.68 | 13% | -8.92 | -2.62 | 12% | -9.18 | -2.64 | 12% | -9.26 | -2.60 |
| 2640 | 14% | -8.39 | -1.74 | 12% | -9.09 | -2.54 | 12% | -9.34 | -2.66 | 12% | -9.34 | -2.57 |
| 2660 | 13% | -8.73 | -1.51 | 12% | -9.17 | -2.25 | 11% | -9.40 | -2.41 | 12% | -9.32 | -2.38 |
| 2680 | 16% | -7.90 | -0.68 | 16% | -8.03 | -1.25 | 15% | -8.27 | -1.27 | 15% | -8.10 | -1.36 |
| 2700 | 15% | -8.15 | -1.06 | 15% | -8.14 | -1.40 | 15% | -8.37 | -1.41 | 15% | -8.18 | -1.54 |



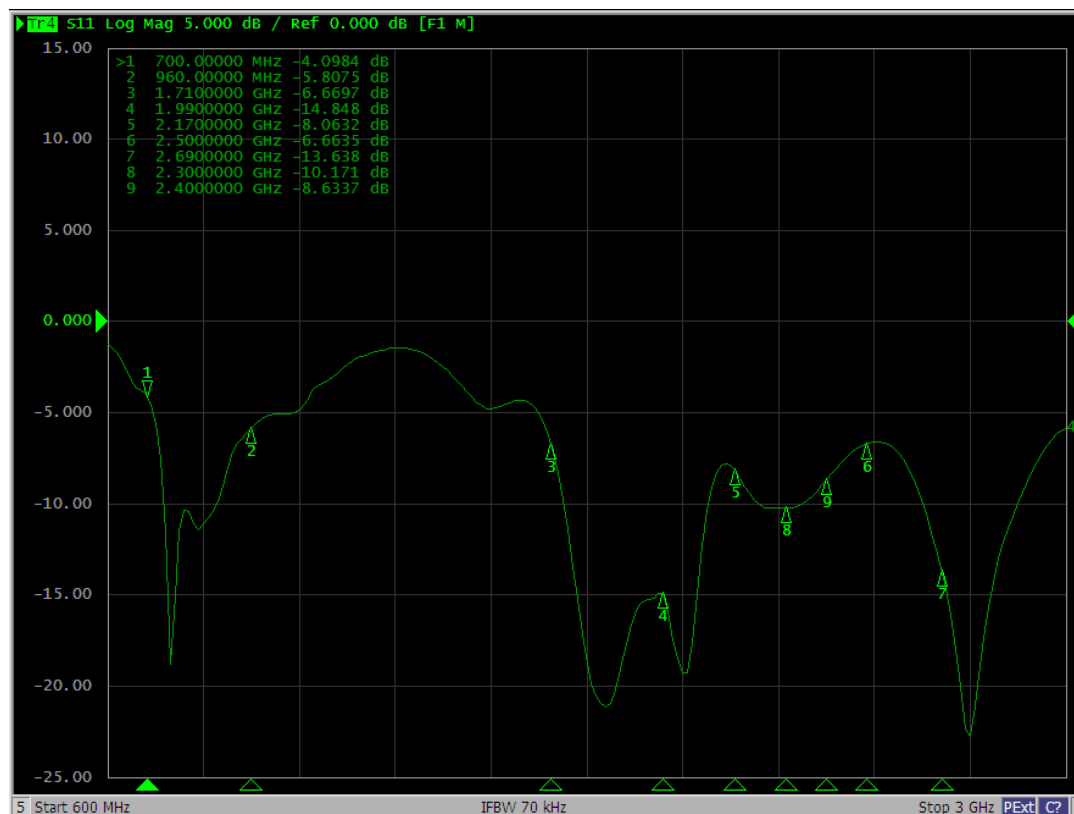


## 2.2 Model: P5\_DIVERSITY\_ANTENNA

**Maximum Gain: 1.65dBi**

**Measurement: 93\*11.8mm**

VSWR: Voltage Standing Wave Rate



## E.Efficiency test results

| Frequency | Efficiency (%) | Efficiency (dB) | Gain (dBi) | Frequency | Efficiency (%) | Efficiency (dB) | Gain (dBi) |
|-----------|----------------|-----------------|------------|-----------|----------------|-----------------|------------|
| 600       | 2%             | -16.40          | -14.08     | 1800      | 53%            | -2.77           | 2.95       |
| 610       | 3%             | -15.47          | -13.19     | 1820      | 53%            | -2.74           | 2.99       |
| 620       | 3%             | -14.98          | -12.37     | 1840      | 58%            | -2.37           | 3.53       |
| 630       | 4%             | -13.92          | -11.21     | 1860      | 60%            | -2.23           | 3.49       |
| 640       | 5%             | -13.01          | -9.39      | 1880      | 61%            | -2.15           | 3.27       |
| 650       | 4%             | -14.05          | -8.68      | 1900      | 60%            | -2.21           | 3.01       |
| 660       | 4%             | -14.45          | -8.95      | 1920      | 60%            | -2.25           | 3.02       |
| 670       | 4%             | -14.20          | -10.10     | 1940      | 51%            | -2.93           | 1.65       |
| 680       | 4%             | -14.16          | -11.43     | 1960      | 49%            | -3.10           | 1.64       |

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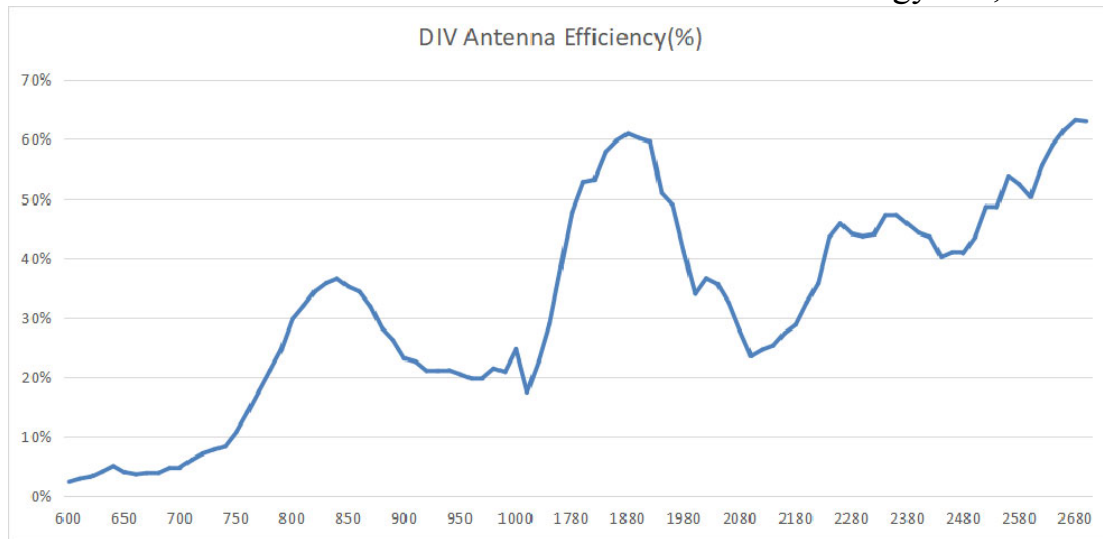
|      |     |        |        |      |     |       |       |
|------|-----|--------|--------|------|-----|-------|-------|
| 690  | 5%  | -13.31 | -10.64 | 1980 | 41% | -3.86 | 1.12  |
| 700  | 5%  | -13.14 | -10.04 | 2000 | 34% | -4.69 | 0.00  |
| 710  | 6%  | -12.16 | -8.31  | 2020 | 37% | -4.36 | 0.60  |
| 720  | 7%  | -11.48 | -7.28  | 2040 | 36% | -4.48 | 1.24  |
| 730  | 8%  | -11.11 | -6.80  | 2060 | 33% | -4.88 | 0.99  |
| 740  | 8%  | -10.81 | -6.49  | 2080 | 28% | -5.56 | -0.37 |
| 750  | 11% | -9.69  | -5.71  | 2100 | 23% | -6.29 | -1.45 |
| 760  | 14% | -8.51  | -5.07  | 2120 | 25% | -6.10 | -1.33 |
| 770  | 18% | -7.55  | -4.65  | 2140 | 25% | -5.97 | -1.21 |
| 780  | 21% | -6.76  | -4.20  | 2160 | 27% | -5.62 | -0.08 |
| 790  | 25% | -6.10  | -3.47  | 2180 | 29% | -5.41 | 0.02  |
| 800  | 30% | -5.27  | -2.38  | 2200 | 33% | -4.87 | 0.05  |
| 810  | 32% | -4.95  | -1.93  | 2220 | 36% | -4.46 | 0.60  |
| 820  | 34% | -4.64  | -1.53  | 2240 | 43% | -3.62 | 1.19  |
| 830  | 36% | -4.46  | -1.35  | 2260 | 46% | -3.39 | 1.04  |
| 840  | 37% | -4.37  | -1.36  | 2280 | 44% | -3.55 | 0.83  |
| 850  | 35% | -4.54  | -1.39  | 2300 | 44% | -3.60 | 0.95  |
| 860  | 34% | -4.64  | -1.58  | 2320 | 44% | -3.57 | 0.89  |
| 870  | 32% | -4.96  | -2.24  | 2340 | 47% | -3.26 | 1.14  |
| 880  | 28% | -5.50  | -2.59  | 2360 | 47% | -3.25 | 1.17  |
| 890  | 26% | -5.82  | -2.74  | 2380 | 46% | -3.40 | 1.31  |
| 900  | 23% | -6.36  | -3.29  | 2400 | 44% | -3.54 | 0.81  |
| 910  | 23% | -6.46  | -3.40  | 2420 | 44% | -3.61 | 0.59  |
| 920  | 21% | -6.77  | -3.78  | 2440 | 40% | -3.96 | 0.66  |
| 930  | 21% | -6.77  | -3.56  | 2460 | 41% | -3.88 | 0.70  |
| 940  | 21% | -6.75  | -3.42  | 2480 | 41% | -3.90 | 0.23  |
| 950  | 20% | -6.89  | -3.50  | 2500 | 43% | -3.62 | 0.63  |
| 960  | 20% | -7.05  | -3.70  | 2520 | 49% | -3.13 | 1.63  |
| 970  | 20% | -7.02  | -3.63  | 2540 | 49% | -3.13 | 2.16  |
| 980  | 21% | -6.69  | -3.23  | 2560 | 54% | -2.69 | 3.40  |
| 990  | 21% | -6.81  | -3.21  | 2580 | 52% | -2.80 | 3.56  |
| 1000 | 25% | -6.07  | -2.39  | 2600 | 50% | -2.98 | 3.86  |
| 1700 | 17% | -7.58  | -1.91  | 2620 | 56% | -2.55 | 4.50  |
| 1720 | 23% | -6.47  | -0.43  | 2640 | 59% | -2.28 | 4.84  |
| 1740 | 29% | -5.38  | 1.08   | 2660 | 62% | -2.11 | 5.04  |
| 1760 | 38% | -4.15  | 2.24   | 2680 | 63% | -1.99 | 5.43  |
| 1780 | 48% | -3.21  | 2.60   | 2700 | 63% | -2.00 | 5.51  |

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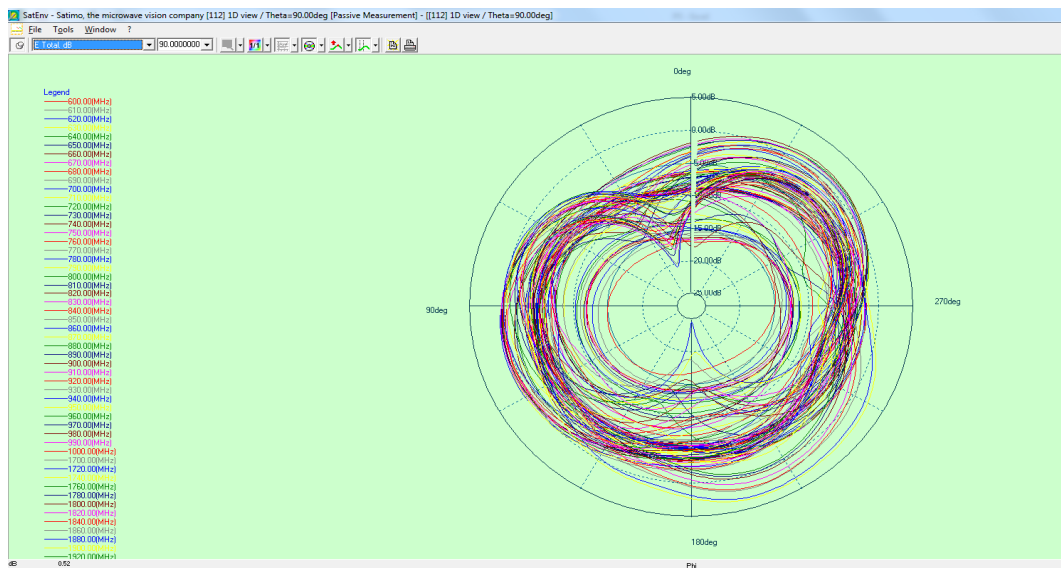


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1D view:



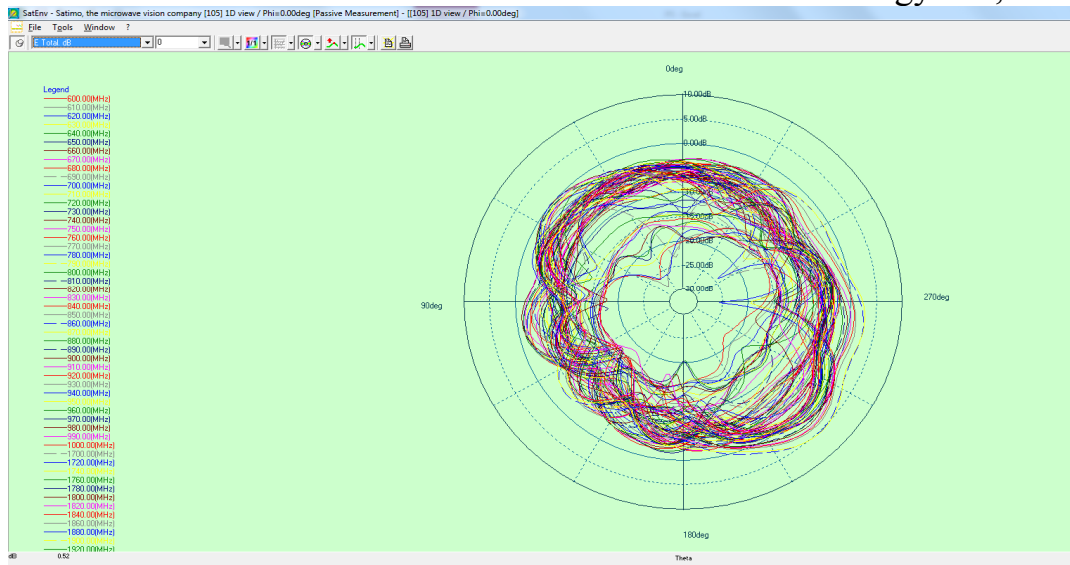
Theta = 90

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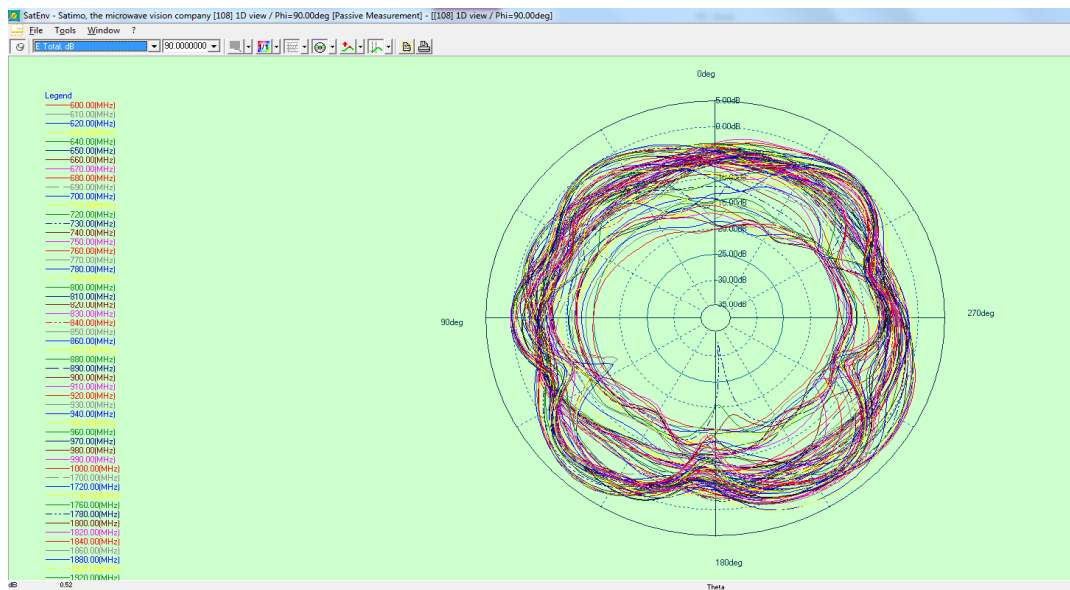


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**Theta = 0**



**Phi = 90**

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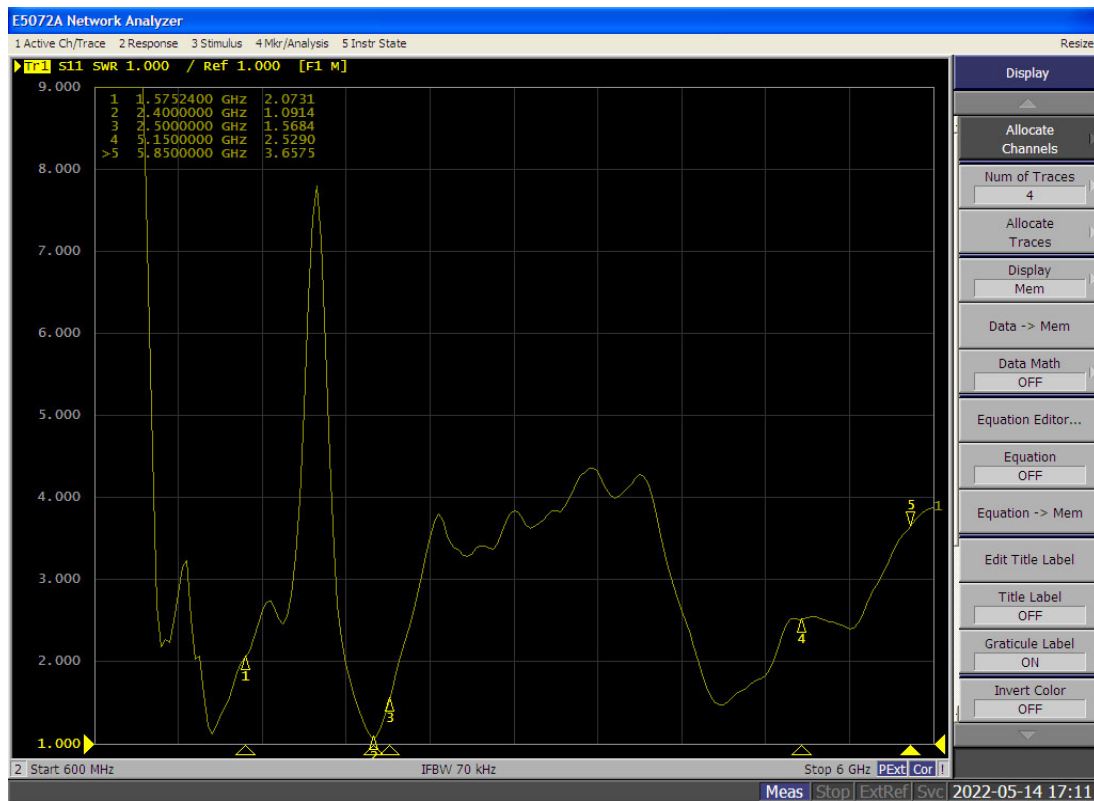
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## 2.3 Model: P5\_3IN1\_ANTENNA

**Maximum Gain: 1.30dBi**

**Measurement: 29.1\*9.2mm**

VSWR: Voltage Standing Wave Rate



**Efficiency test results**



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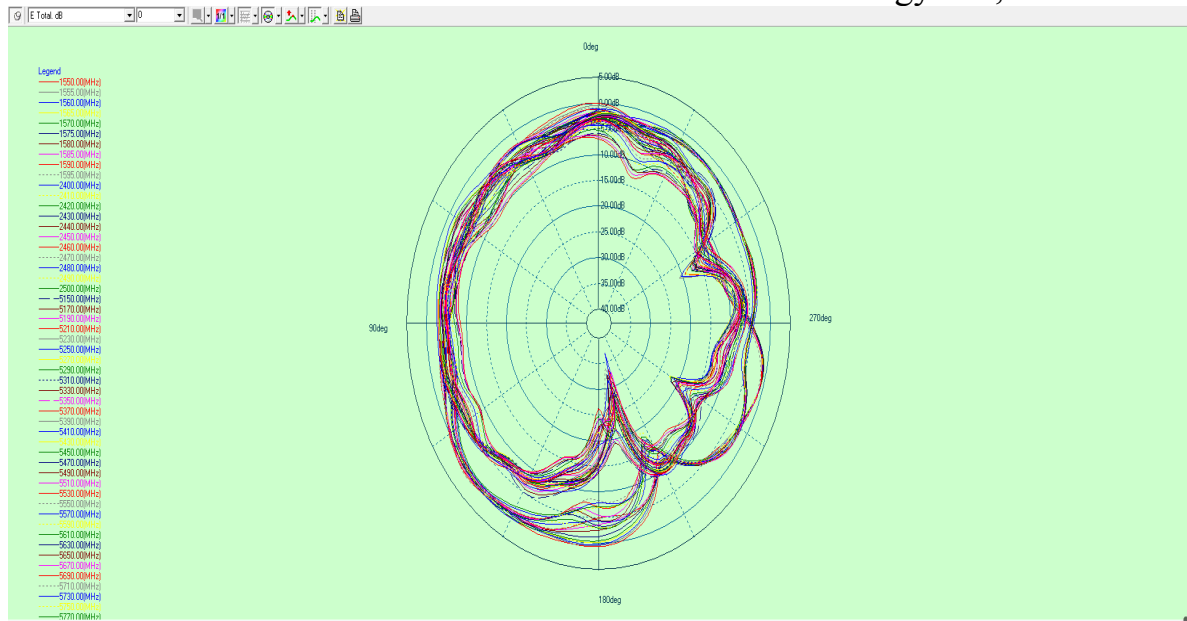
**Efficiency&Gain test dataset**

| Fre. (Mhz) | Eff. % | Eff. dB | Gain. dBi | Fre. (Mhz) | Eff. % | Eff. dB | Gain. dBi |
|------------|--------|---------|-----------|------------|--------|---------|-----------|
| 1550       | 50%    | -3.02   | 1.27      | 5150       | 29%    | -5.37   | -0.96     |
| 1555       | 49%    | -3.09   | 1.06      | 5170       | 37%    | -4.31   | -1.29     |
| 1560       | 48%    | -3.17   | 1.03      | 5190       | 35%    | -4.54   | -1.44     |
| 1565       | 48%    | -3.22   | 1.18      | 5210       | 34%    | -4.63   | -1.71     |
| 1570       | 50%    | -3.04   | 1.03      | 5230       | 34%    | -4.74   | -2.23     |
| 1575       | 49%    | -3.08   | 1.24      | 5250       | 32%    | -4.96   | -2.41     |
| 1580       | 50%    | -3.03   | 1.31      | 5270       | 32%    | -4.99   | -2.51     |
| 1585       | 50%    | -3.02   | 1.17      | 5290       | 31%    | -5.09   | -2.02     |
| 1590       | 52%    | -2.84   | 1.04      | 5310       | 32%    | -4.89   | -2.19     |
| 1595       | 51%    | -2.93   | 1.03      | 5330       | 32%    | -4.96   | -1.18     |
| 2400       | 55%    | -2.58   | 1.29      | 5350       | 36%    | -4.50   | -1.14     |
| 2410       | 54%    | -2.68   | 1.30      | 5370       | 35%    | -4.54   | -0.53     |
| 2420       | 54%    | -2.64   | 1.27      | 5390       | 38%    | -4.23   | -0.71     |
| 2430       | 53%    | -2.72   | 1.11      | 5410       | 37%    | -4.32   | 0.27      |
| 2440       | 51%    | -2.94   | 1.15      | 5430       | 43%    | -3.71   | -0.19     |
| 2450       | 51%    | -2.96   | 1.02      | 5450       | 39%    | -4.09   | -0.24     |
| 2460       | 48%    | -3.18   | 1.03      | 5470       | 39%    | -4.12   | -0.61     |
| 2470       | 48%    | -3.19   | 1.05      | 5490       | 37%    | -4.27   | -0.96     |
| 2480       | 47%    | -3.29   | 1.09      | 5510       | 37%    | -4.36   | -1.54     |
| 2490       | 46%    | -3.40   | 1.11      | 5530       | 34%    | -4.70   | -1.41     |
| 2500       | 46%    | -3.35   | 1.10      | 5550       | 35%    | -4.61   | -1.89     |
|            |        |         |           | 5570       | 33%    | -4.83   | -1.96     |
|            |        |         |           | 5590       | 33%    | -4.78   | -2.09     |
|            |        |         |           | 5610       | 33%    | -4.77   | -1.66     |
|            |        |         |           | 5630       | 35%    | -4.55   | -1.83     |
|            |        |         |           | 5650       | 35%    | -4.57   | -1.67     |
|            |        |         |           | 5670       | 36%    | -4.50   | -1.68     |
|            |        |         |           | 5690       | 35%    | -4.54   | -1.64     |
|            |        |         |           | 5710       | 36%    | -4.48   | -1.86     |
|            |        |         |           | 5730       | 34%    | -4.66   | -1.98     |
|            |        |         |           | 5750       | 33%    | -4.77   | -2.22     |
|            |        |         |           | 5770       | 32%    | -4.97   | -2.61     |
|            |        |         |           | 5790       | 30%    | -5.19   | -2.87     |
|            |        |         |           | 5810       | 29%    | -5.35   | -2.67     |
|            |        |         |           | 5830       | 29%    | -5.34   | -2.73     |
|            |        |         |           | 5850       | 21%    | -6.85   | -2.65     |

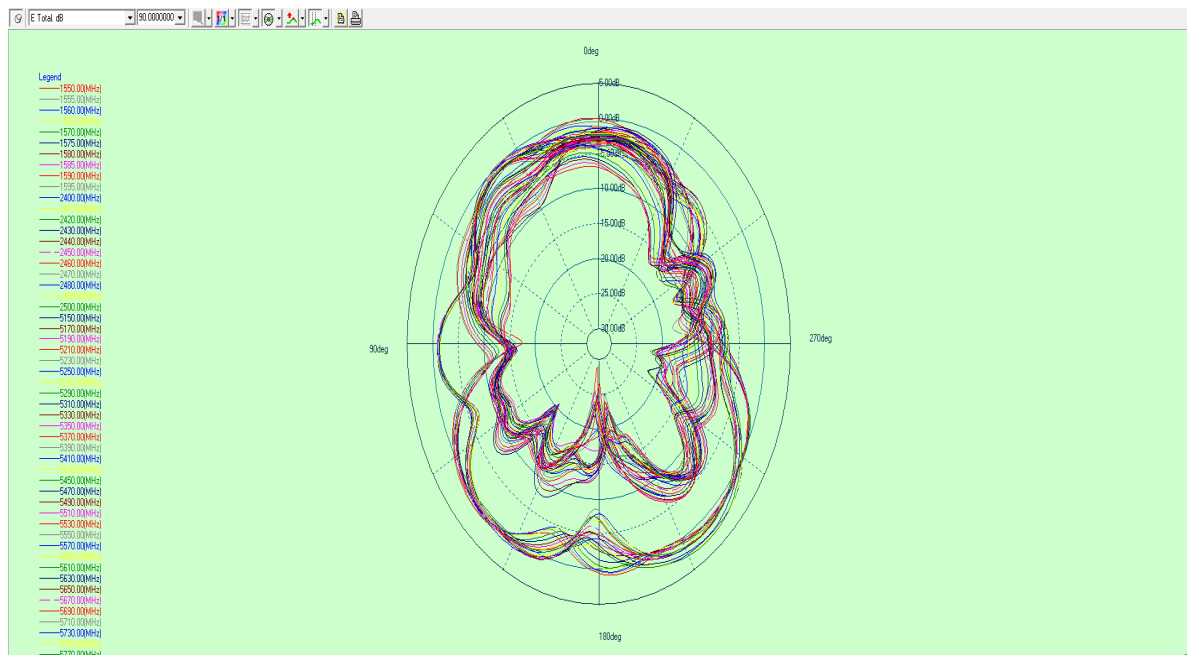


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**Pi=0**



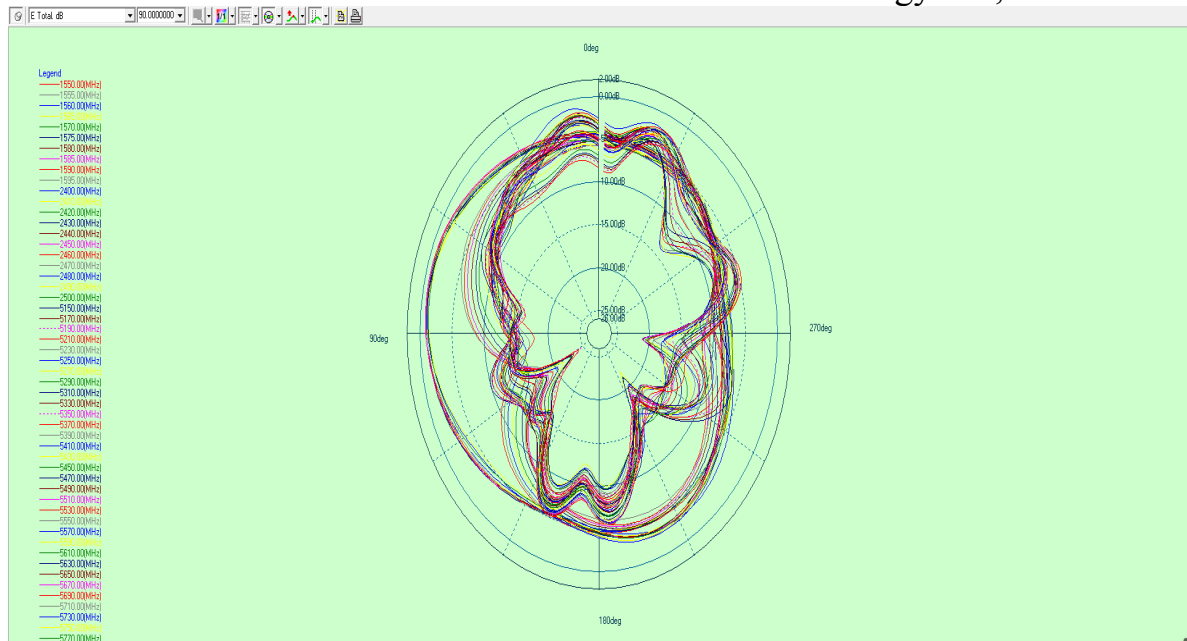
**Pi=90**





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**Theta=90**