

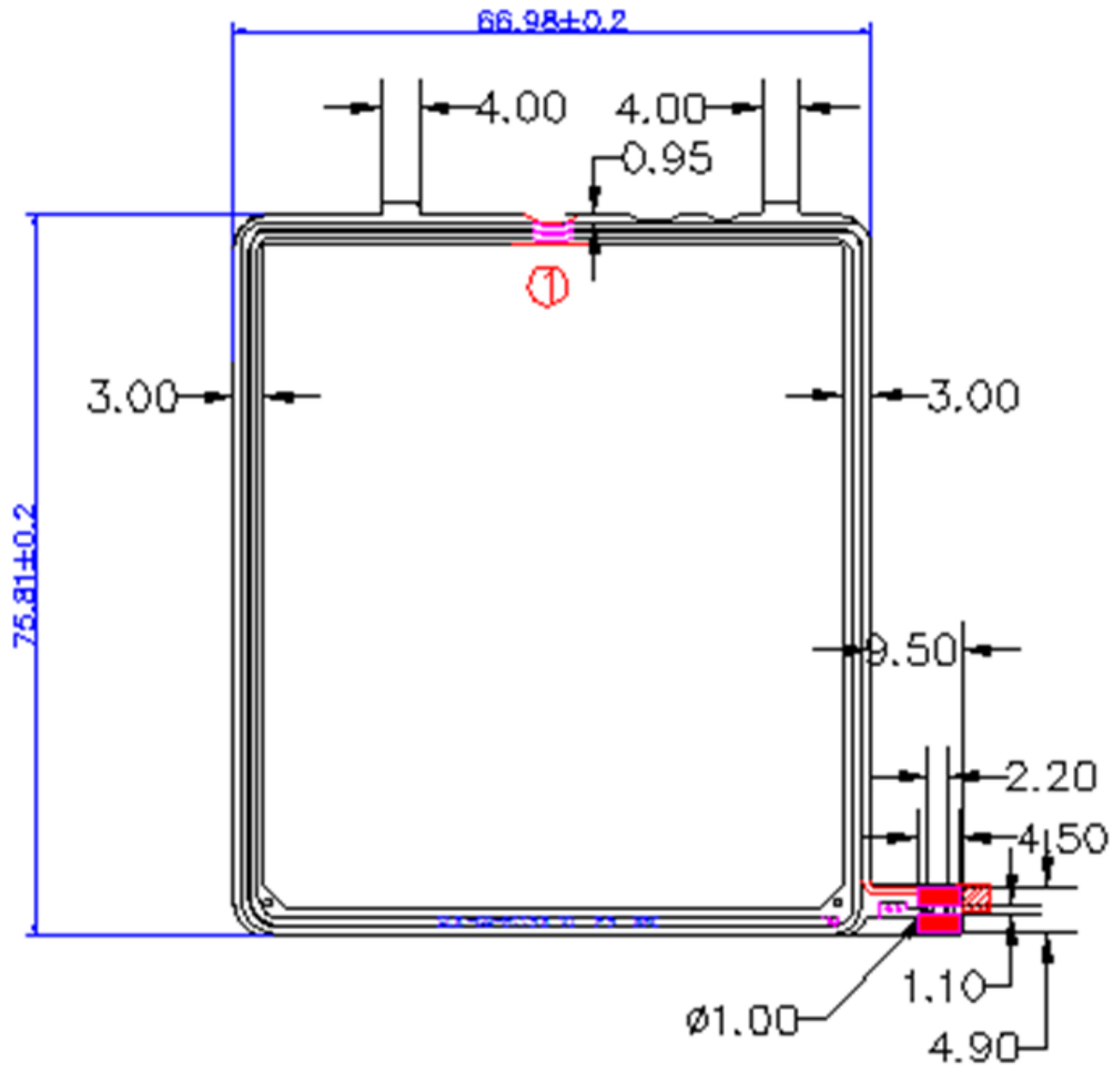
## BlueCash-5000 Antenna Report

### 1. RFID Antenna

#### 1.1 Specifications

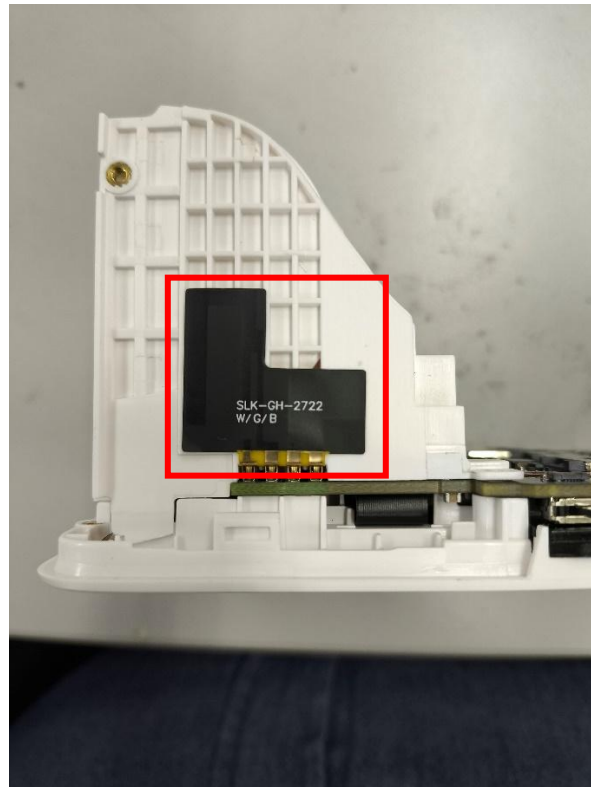
| Specifications            |          |
|---------------------------|----------|
| Operating frequency (MHz) | 13.56    |
| Antenna type              | Flex FPC |
| Antenna gain              | 0 dBi    |

#### 1.2 Dimensions (Unit: mm) 75.81mm x 66.98mm x 0.12mm



#### 1.3 Manufacturer

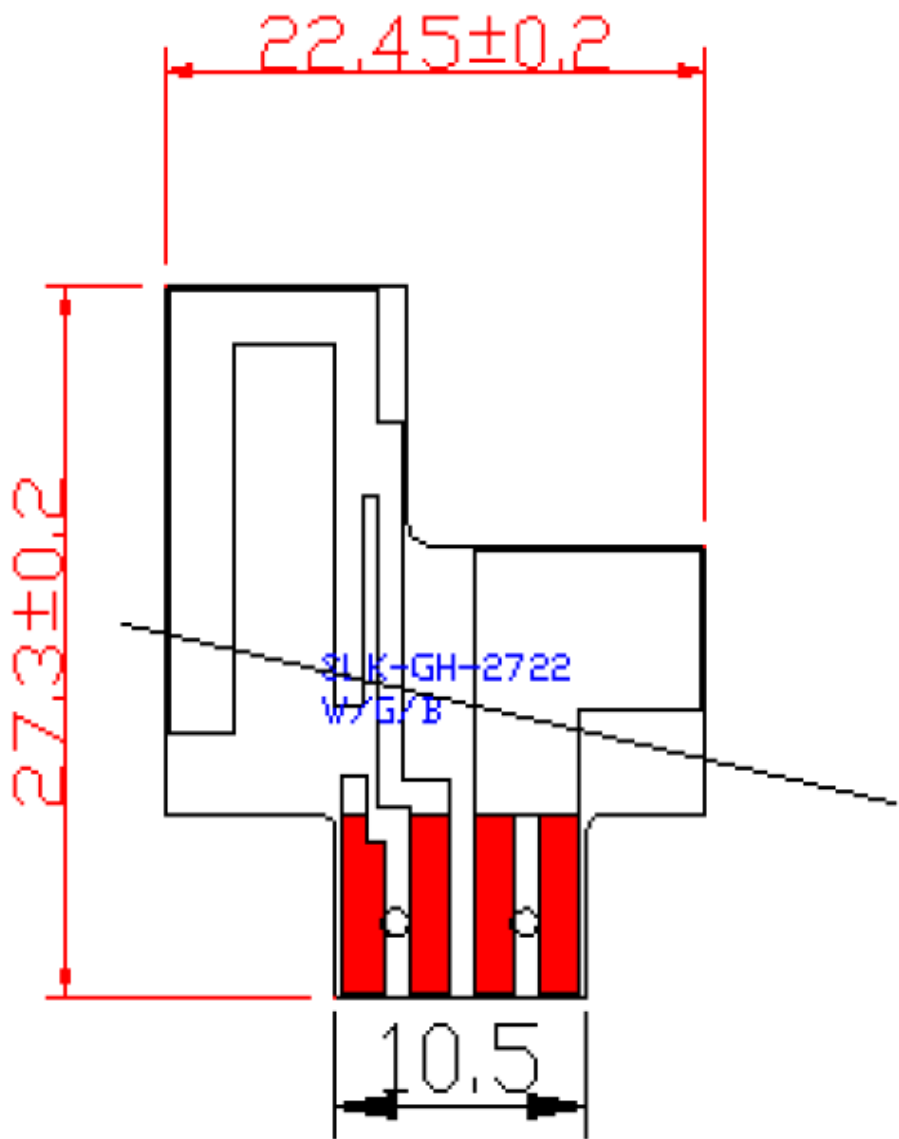
## 2. WiFi antenna



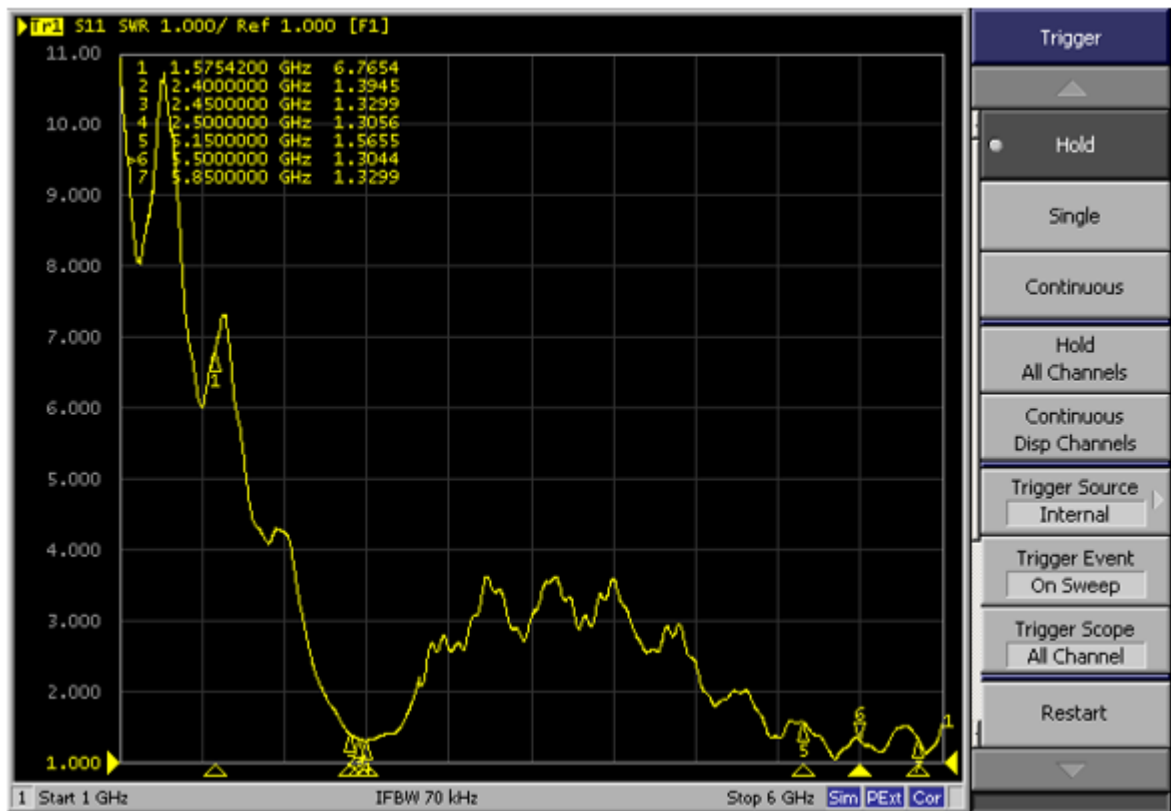
### 2.1 Specifications

| Specifications             |                                  |
|----------------------------|----------------------------------|
| WiFi Protocols             | <b>802.11 a/b/g/n/ac</b>         |
| Power supply               | <b>AVDD33 3.3V ±5%</b>           |
|                            | <b>AVDD28 2.8V ±5%</b>           |
|                            | <b>AVDD18 1.8V ±5%</b>           |
| Operating frequency        | <b>2412MHz to 2472MHz Global</b> |
|                            | <b>5150MHz to 5250MHz</b>        |
|                            | <b>5250MHz to 5350MHz</b>        |
|                            | <b>5470MHz to 5725MHz</b>        |
|                            | <b>5725MHz to 5850MHz</b>        |
| RF chip                    | <b>MT6631</b>                    |
| Modulations 2.4GHz         | <b>DSSS, OFDM, MCS0-7</b>        |
| Modulations 5GHz           | <b>OFDM, MCS0-7, MCS8, MCS9</b>  |
| Antenna type               | <b>FPC</b>                       |
| Antenna gain 2.4GHz / 5GHz | <b>2.4GHz - +2.29 dBi</b>        |
|                            | <b>5GHz - +1.73 dBi</b>          |

2.2 Dimensions (Unit: mm) 27.3 x 22.45 x 0.12 mm

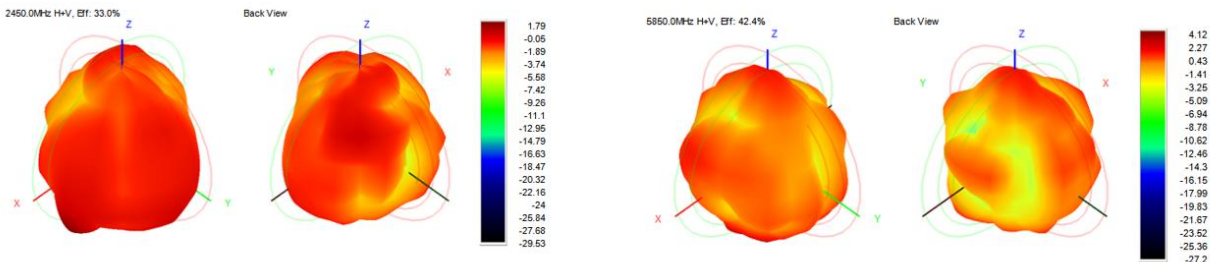


## 2.3 VSWR



## 2.4 Antenna gain and radiation Pattern of 3D

| Frequency (MHz)  | 2400  | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  | 2490  | 2500  | 5150  | 5250  | 5550  | 5750  | 5850  |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Efficiency (dBi) | -4.73 | -4.45 | -4.47 | -4.51 | -4.90 | -4.81 | -4.63 | -4.77 | -4.63 | -4.85 | -4.92 | -4.87 | -4.51 | -4.88 | -4.46 | -4.35 |
| Gain (dBi)       | 0.94  | 1.39  | 1.61  | 1.78  | 1.72  | 1.79  | 2.29  | 1.86  | 2.03  | 1.42  | 0.91  | -0.71 | -0.34 | -0.30 | 1.01  | 1.73  |
| Efficiency (%)   | 33.66 | 35.90 | 35.70 | 35.42 | 32.34 | 33.01 | 34.45 | 33.37 | 34.47 | 32.74 | 32.19 | 32.58 | 35.43 | 32.50 | 35.78 | 36.74 |



## 2.5 Manufacturer

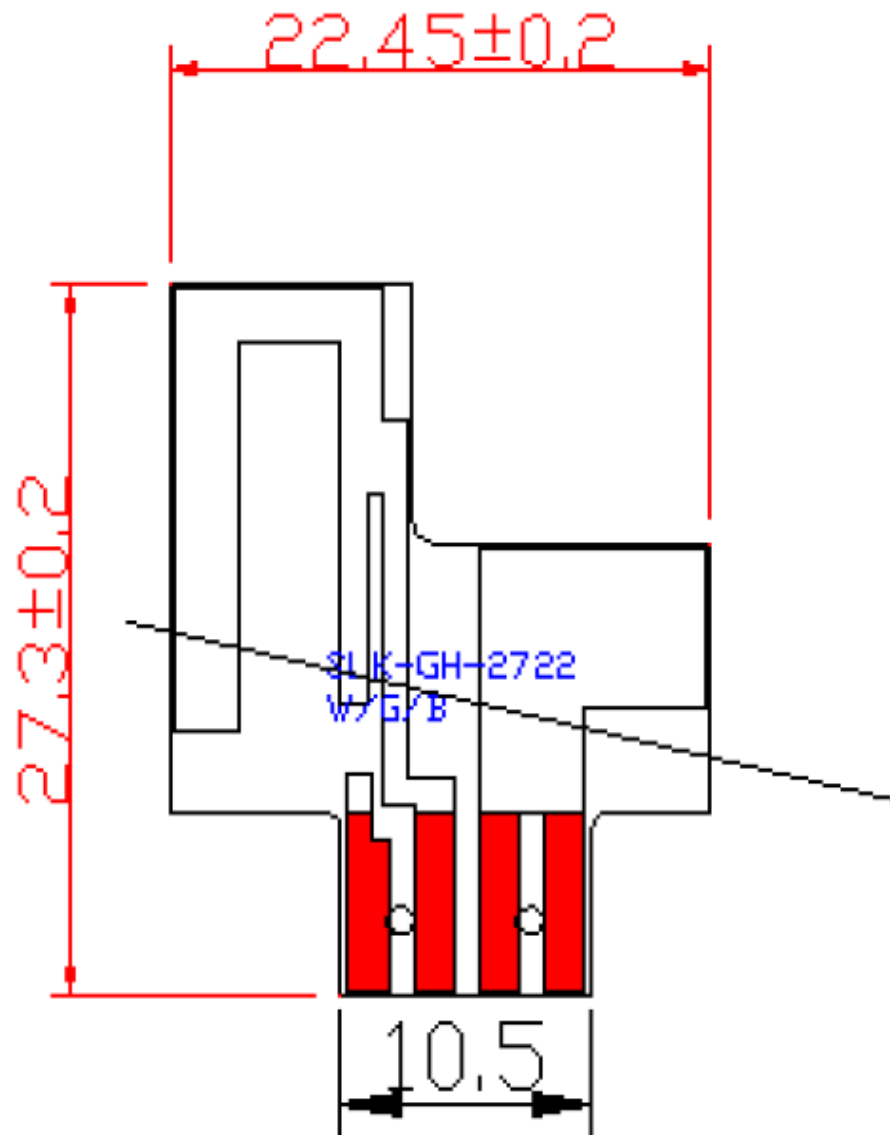
### 3. GPS antenna



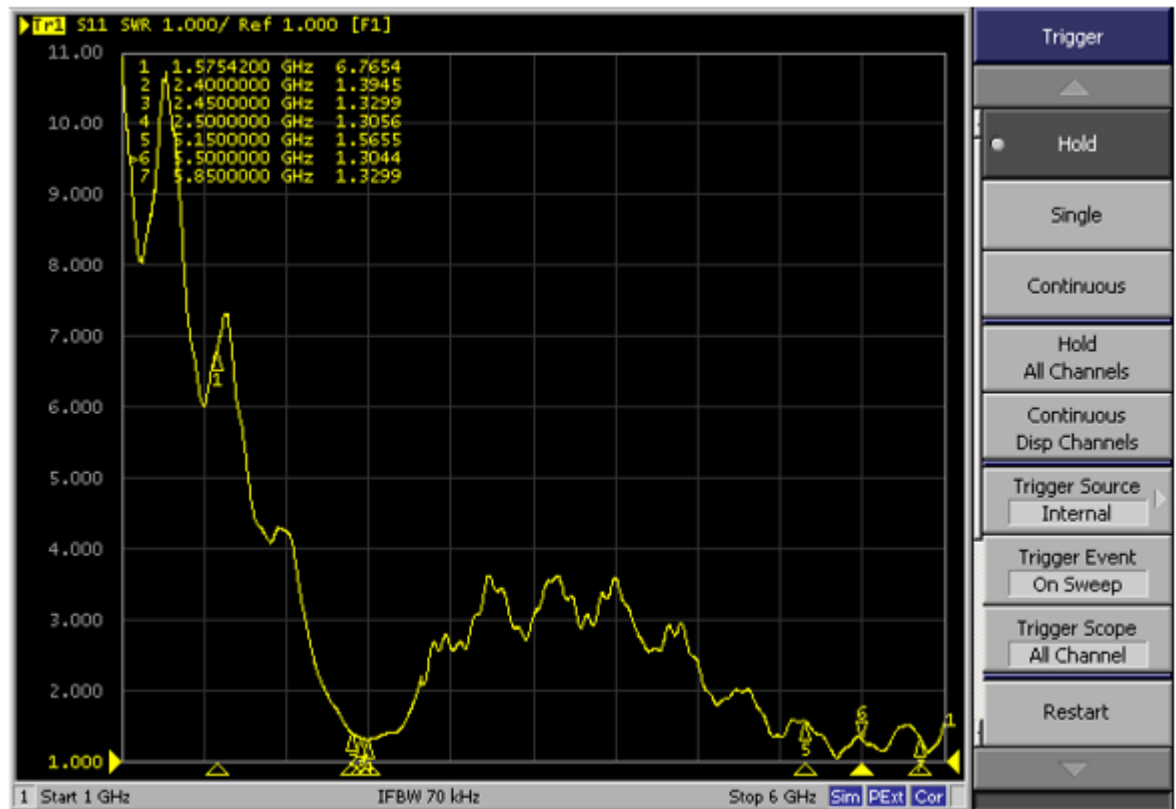
#### 3.1 Specification

| Specifications      |                                                               |
|---------------------|---------------------------------------------------------------|
| GNSS support        | <i>GPS, Galileo, Glonass and Beidou</i>                       |
| Power supply        | <i>AVDD33 3.3V ±5%</i>                                        |
|                     | <i>AVDD28 2.8V ±5%</i>                                        |
|                     | <i>AVDD18 1.8V ±5%</i>                                        |
| Receiving frequency | <i>GPS/Galileo mode 1575.42MHz</i>                            |
|                     | <i>GPS/Glonass mode 1575.42/1601.71MHz</i>                    |
|                     | <i>GPS/Beidou mode 1575.42/1561MHz</i>                        |
|                     | <i>GPS/Galileo/Glonass/Beidou<br/>1575.42/1601.71/1561MHz</i> |
| RF chip             | <i>MT6631</i>                                                 |
| Antenna type        | <i>FPC</i>                                                    |

3.2 Dimensions (Unit: mm) 27.3 x 22.45 x 0.12 mm

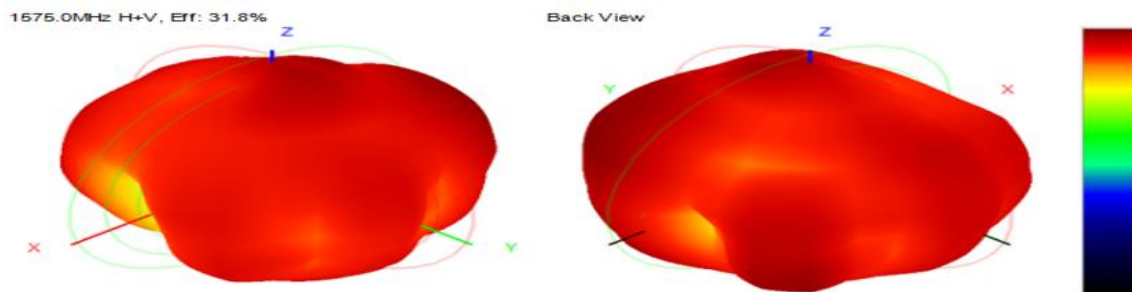


### 3.3 VSWR



### 3.4 Antenna gain and radiation pattern of 3D

| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|
| 1570.0          | -4.88            | 1.81       | 32.52          |
| 1575.0          | -4.97            | 1.83       | 31.84          |
| 1580.0          | -5.21            | 1.85       | 30.14          |

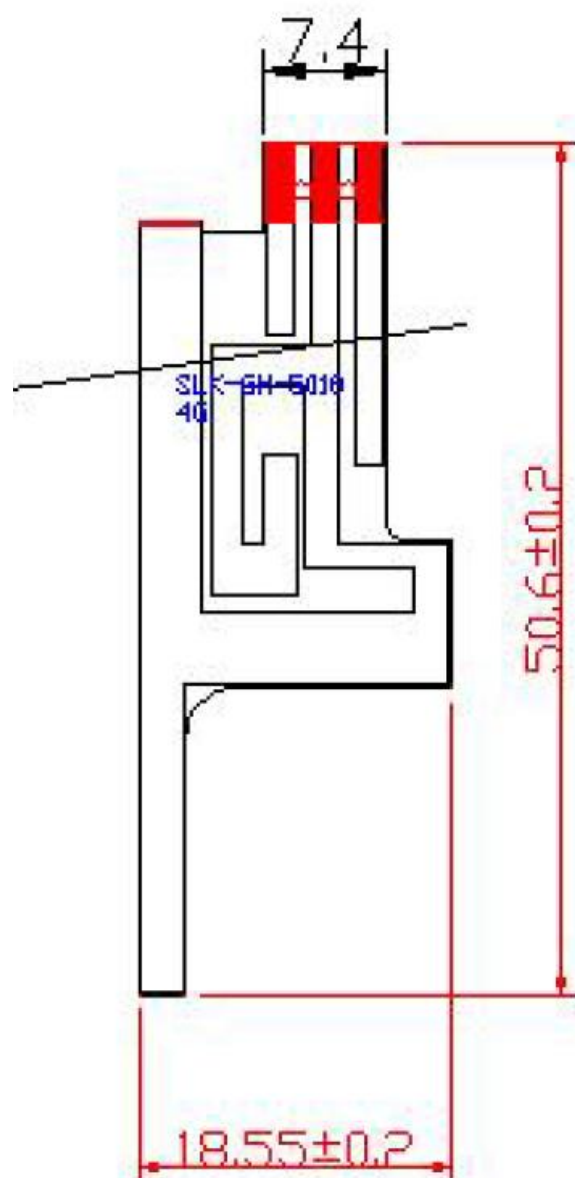


### 3.5 Manufacturer

#### 4. LTE/Diversity Antenna



4.1 Dimensions (Unit: mm) 50.6 x 18.55 x 0.12 mm



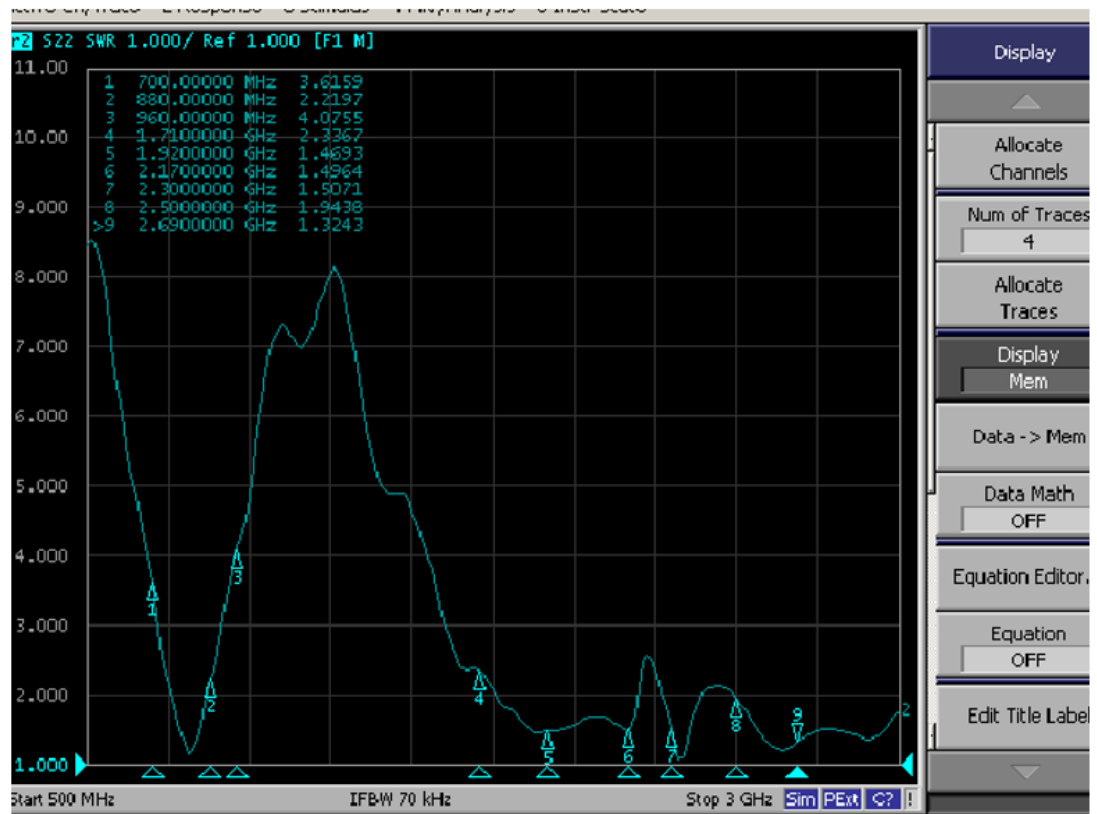
## 4.2 Specification

| Specifications         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Bands        | <p><b><i>LTE FDD Bands 1, 2, 3, 4, 5, 7, 12, 13, 17, 19, 20, 25, 26, 28, 66</i></b></p> <p><b><i>LTE TDD Bands 38, 40, 41</i></b></p> <p><b><i>WCDMA Bands 1, 2, 4, 5, 8</i></b></p> <p><b><i>GSM/EDGE PCS 1900, DSC 1800, GSM 850, E-GSM 900</i></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Transmitting frequency | <p><b><i>GSM850 824~849MHz</i></b></p> <p><b><i>E-GSM900 880~915MHz</i></b></p> <p><b><i>DCS1800 1710~1785MHz</i></b></p> <p><b><i>PCS1900 1850~1910MHz</i></b></p><br><p><b><i>WCDMA Band I 1920~1980MHz</i></b></p> <p><b><i>WCDMA Band II 1850~1910MHz</i></b></p> <p><b><i>WCDMA Band IV 1710~1755MHz</i></b></p> <p><b><i>WCDMA Band V 824~849MHz</i></b></p> <p><b><i>WCDMA Band VIII 880~915MHz</i></b></p><br><p><b><i>LTE Band 1 1920~1980MHz</i></b></p> <p><b><i>LTE Band 2 1850~1910MHz</i></b></p> <p><b><i>LTE Band 3 1710~1785MHz</i></b></p> <p><b><i>LTE Band 4 1710~1755MHz</i></b></p> <p><b><i>LTE Band 5 824~849MHz</i></b></p> <p><b><i>LTE Band 7 2500~2570MHz</i></b></p> <p><b><i>LTE Band 12 699~716MHz</i></b></p> <p><b><i>LTE Band 13 777~787MHz</i></b></p> <p><b><i>LTE Band 17 704~716MHz</i></b></p> <p><b><i>LTE Band 19 830~845MHz</i></b></p> <p><b><i>LTE Band 20 832~862MHz</i></b></p> <p><b><i>LTE Band 25 1850~1915MHz</i></b></p> <p><b><i>LTE Band 26 814~849MHz</i></b></p> <p><b><i>LTE Band 28 703~748MHz</i></b></p> <p><b><i>LTE Band 38 2570~2620MHz</i></b></p> <p><b><i>LTE Band 40 2300~2400MHz</i></b></p> <p><b><i>LTE Band 41 2496~2690MHz</i></b></p> |

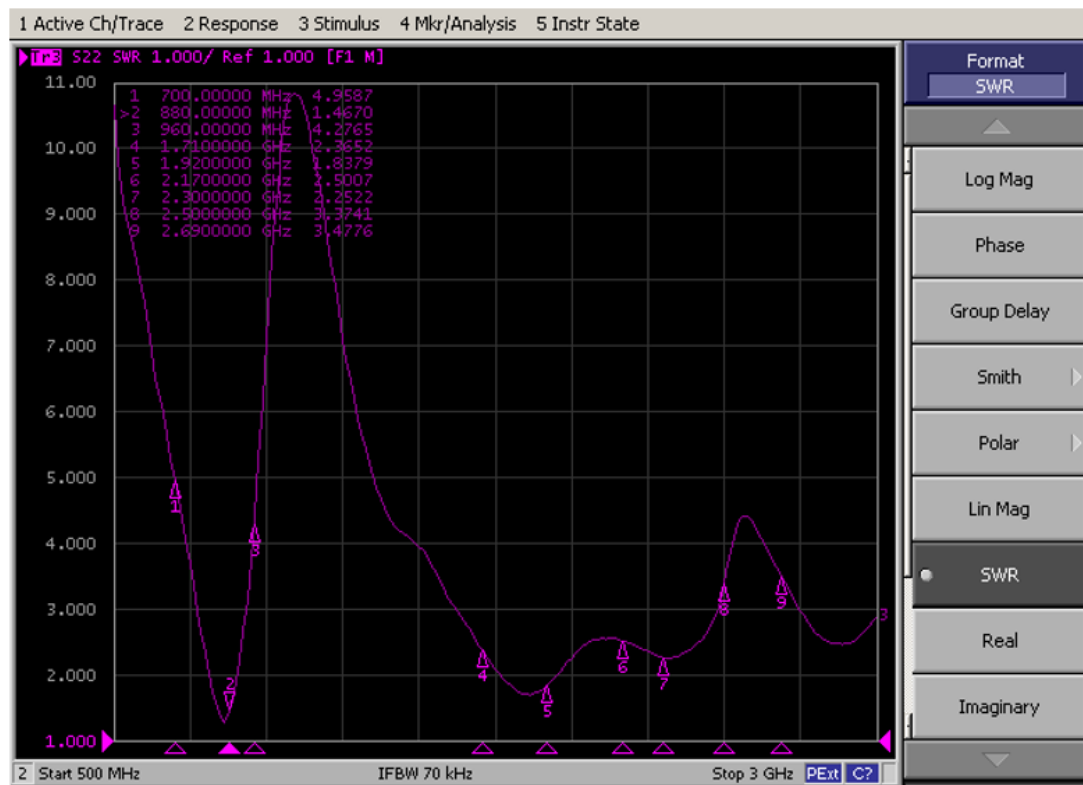
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | <b><i>LTE Band 66 1710~1780MHz</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Receiver frequency</b> | <b><i>GSM850 869~894MHz</i></b><br><b><i>E-GSM900 925~960MHz</i></b><br><b><i>DCS1800 1805~1880MHz</i></b><br><b><i>PCS1900 1930~1990MHz</i></b><br><br><b><i>WCDMA Band I 2110~2170MHz</i></b><br><b><i>WCDMA Band II 1930~1990MHz</i></b><br><b><i>WCDMA Band IV 2110~2155MHz</i></b><br><b><i>WCDMA Band V 869~894MHz</i></b><br><b><i>WCDMA Band VIII 925~960MHz</i></b><br><br><b><i>LTE Band 1 2110~2170MHz</i></b><br><b><i>LTE Band 2 1930~1990MHz</i></b><br><b><i>LTE Band 3 1805~1880MHz</i></b><br><b><i>LTE Band 4 2110~2155MHz</i></b><br><b><i>LTE Band 5 869~894MHz</i></b><br><b><i>LTE Band 7 2620~2690MHz</i></b><br><b><i>LTE Band 12 729~746MHz</i></b><br><b><i>LTE Band 13 746~756MHz</i></b><br><b><i>LTE Band 17 734~746MHz</i></b><br><b><i>LTE Band 19 875~890MHz</i></b><br><b><i>LTE Band 20 791~821MHz</i></b><br><b><i>LTE Band 25 1930~1995MHz</i></b><br><b><i>LTE Band 26 859~894MHz</i></b><br><b><i>LTE Band 28 758~803MHz</i></b><br><b><i>LTE Band 38 2570~2620MHz</i></b><br><b><i>LTE Band 40 2300~2400MHz</i></b><br><b><i>LTE Band 41 2496~2690MHz</i></b><br><br><b><i>LTE Band 66 2110~2200MHz</i></b> |
| <b>Power supply</b>       | <b><i>DCDC RX/TX/STX 1.8V ±5%</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                           | <b><i>DCDC RX/STX 1.2V ±5%</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                        |                                                                  |                                                    |
|------------------------|------------------------------------------------------------------|----------------------------------------------------|
| Main Antenna type      | <i>FPC</i>                                                       |                                                    |
| Diversity Antenna type | <i>FPC</i>                                                       |                                                    |
| Main Antenna gain      | <i>700~1900MHz</i><br><i>1980~2510MHz</i><br><i>2520~2700MHz</i> | <i>1.29dBi</i><br><i>1.60dBi</i><br><i>2.59dBi</i> |
| Modulations            | <i>GMSK, 8PSK, QPSK, 16QAM</i>                                   |                                                    |

### 4.3 LTE Antenna VSWR

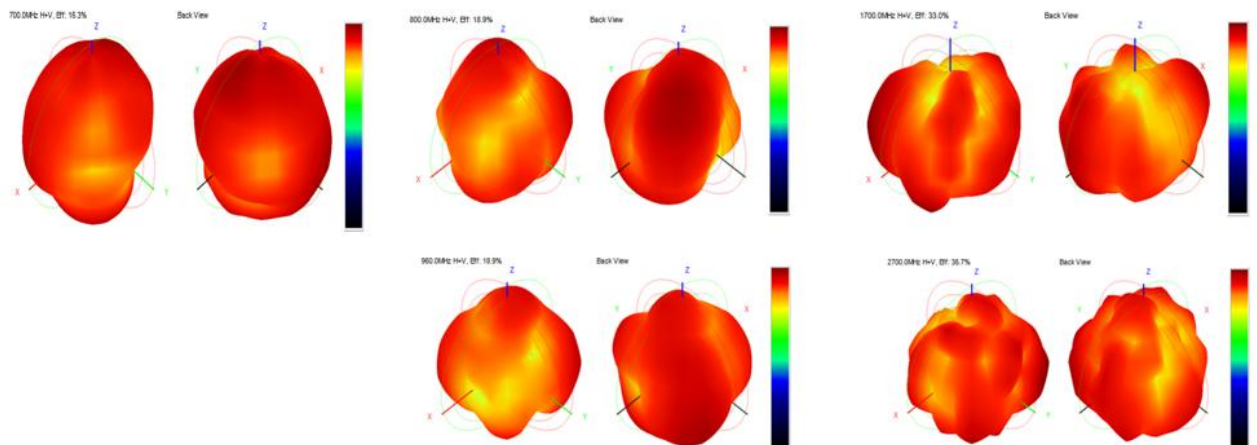


### 4.4 Diversity Antenna VSWR



#### 4.5 Antenna gain and radiation pattern of 3D

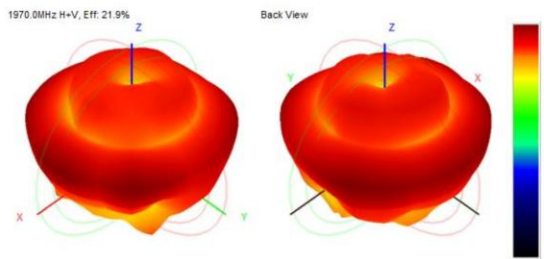
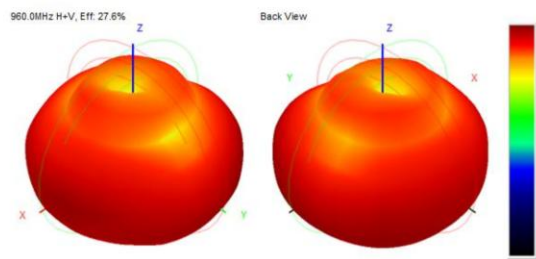
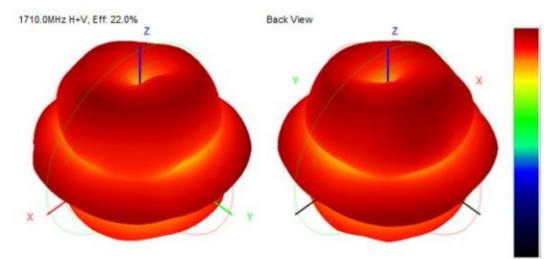
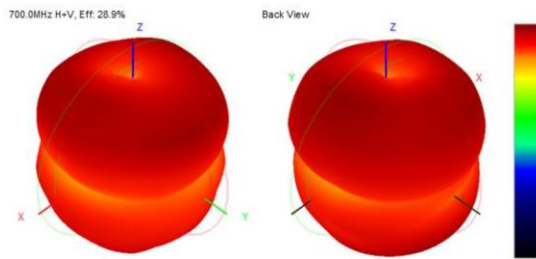
| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|
| 700.0           | -7.88            | -0.82      | 16.30          |
| 800.0           | -7.24            | -1.54      | 18.88          |
| 850.0           | -7.29            | -1.21      | 18.67          |
| 900.0           | -7.25            | -1.00      | 18.85          |
| 950.0           | -7.12            | -0.75      | 19.42          |
| 960.0           | -7.23            | -0.59      | 18.91          |
| 1700.0          | -4.56            | 1.29       | 33.00          |
| 1800.0          | -5.69            | 0.77       | 26.95          |
| 1900.0          | -5.97            | 0.70       | 25.29          |
| 2000.0          | -5.81            | 0.75       | 26.25          |
| 2100.0          | -5.53            | 1.27       | 28.00          |
| 2200.0          | -5.78            | 0.42       | 26.42          |
| 2300.0          | -5.34            | 1.56       | 29.21          |
| 2400.0          | -5.45            | 1.04       | 28.52          |
| 2500.0          | -5.32            | 1.60       | 29.35          |
| 2600.0          | -4.25            | 2.50       | 37.55          |
| 2700.0          | -4.48            | 2.59       | 35.66          |



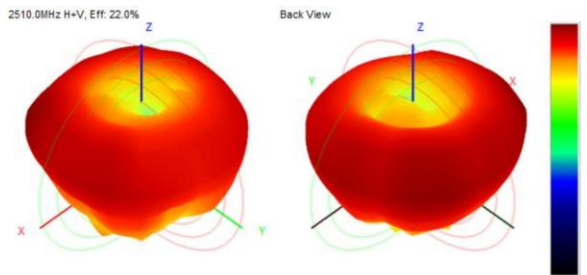
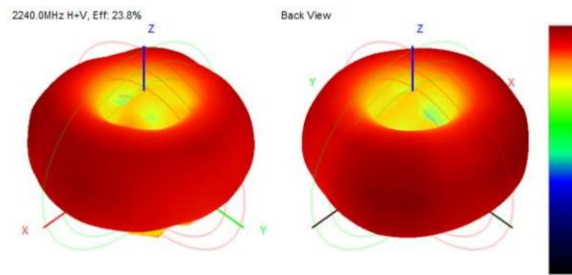
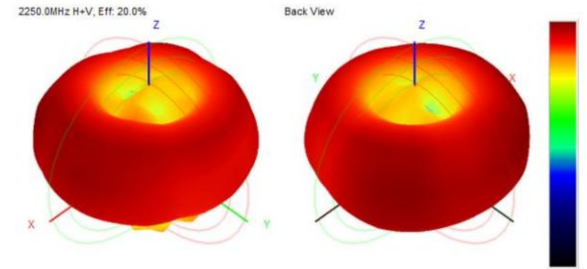
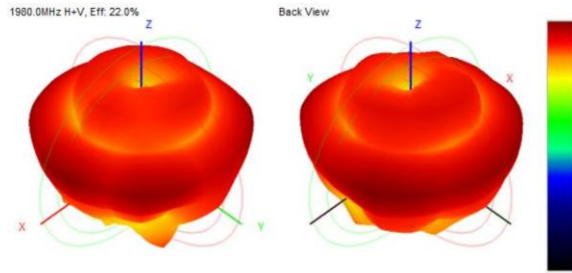
#### 4.6 Manufacturer

#### 4.7 LTE Antenna gain and radiation pattern of 3D

| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) | Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|-----------------|------------------|------------|----------------|
| 700             | -5.39            | 1.09       | 28.92          | 1710            | -6.58            | 1.59       | 21.97          |
| 710             | -4.94            | 1.56       | 32.08          | 1720            | -6.37            | 1.33       | 23.06          |
| 720             | -6.02            | 1.23       | 25.00          | 1730            | -6.76            | 1.60       | 21.07          |
| 730             | -5.43            | 1.14       | 28.67          | 1740            | -7.01            | 1.68       | 19.92          |
| 740             | -5.26            | 1.78       | 29.76          | 1750            | -6.71            | 1.28       | 21.31          |
| 750             | -4.54            | 1.89       | 35.13          | 1760            | -6.55            | 1.04       | 22.13          |
| 760             | -5.06            | 1.07       | 31.18          | 1770            | -6.58            | 1.11       | 22.00          |
| 770             | -4.03            | 1.75       | 39.50          | 1780            | -6.81            | 1.28       | 20.83          |
| 780             | -3.46            | 1.04       | 45.11          | 1790            | -6.93            | 1.32       | 20.29          |
| 790             | -3.57            | 1.02       | 43.92          | 1800            | -6.83            | 1.16       | 20.73          |
| 800             | -3.08            | 1.38       | 49.24          | 1810            | -6.65            | 1.00       | 21.65          |
| 810             | -3.00            | 1.38       | 50.09          | 1820            | -6.72            | 1.22       | 21.28          |
| 820             | -2.93            | 1.54       | 50.92          | 1830            | -6.92            | 1.66       | 20.32          |
| 830             | -2.44            | 1.38       | 57.05          | 1840            | -6.64            | 1.63       | 21.69          |
| 840             | -2.96            | 1.87       | 50.61          | 1850            | -6.73            | 1.89       | 21.22          |
| 850             | -3.23            | 1.64       | 47.53          | 1860            | -6.05            | 1.13       | 24.82          |
| 860             | -3.07            | 1.89       | 49.32          | 1870            | -6.08            | 1.31       | 24.66          |
| 870             | -4.38            | 1.57       | 36.50          | 1880            | -6.18            | 1.57       | 24.10          |
| 880             | -4.17            | 1.18       | 38.32          | 1890            | -6.70            | 1.89       | 21.36          |
| 890             | -4.57            | 1.51       | 34.89          | 1900            | -6.93            | 1.76       | 20.28          |
| 900             | -4.94            | 1.86       | 32.05          | 1910            | -6.72            | 1.81       | 21.27          |
| 910             | -5.36            | 1.31       | 29.11          | 1920            | -6.52            | 1.34       | 22.25          |
| 920             | -5.65            | 1.52       | 27.20          | 1930            | -6.77            | 1.32       | 20.99          |
| 930             | -6.00            | 1.87       | 25.10          | 1940            | -6.76            | 1.57       | 21.08          |
| 940             | -5.48            | 1.36       | 28.33          | 1950            | -6.57            | 1.79       | 22.00          |
| 950             | -5.49            | 1.56       | 28.26          | 1960            | -6.62            | 1.64       | 21.76          |
| 960             | -5.59            | 1.44       | 27.62          | 1970            | -6.59            | 1.40       | 21.92          |



| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) | Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|-----------------|------------------|------------|----------------|
| 1980            | -6.57            | 1.25       | 22.02          | 2250            | -6.98            | 1.02       | 20.00          |
| 1990            | -6.77            | 1.52       | 21.00          | 2260            | -6.84            | 1.33       | 20.70          |
| 2000            | -6.50            | 1.62       | 22.38          | 2270            | -6.68            | 1.08       | 21.45          |
| 2010            | -6.91            | 1.33       | 20.34          | 2280            | -6.25            | 1.78       | 23.66          |
| 2020            | -6.73            | 1.95       | 21.19          | 2290            | -6.41            | 1.12       | 22.82          |
| 2030            | -6.74            | 1.19       | 21.15          | 2300            | -6.59            | 1.21       | 21.88          |
| 2040            | -6.61            | 1.60       | 21.82          | 2310            | -6.97            | 1.35       | 20.07          |
| 2050            | -6.58            | 1.62       | 21.93          | 2320            | -6.59            | 1.00       | 21.89          |
| 2060            | -6.95            | 1.59       | 20.17          | 2330            | -6.87            | 1.53       | 20.54          |
| 2070            | -6.74            | 1.90       | 21.17          | 2340            | -6.69            | 1.59       | 21.42          |
| 2080            | -6.70            | 1.94       | 21.36          | 2350            | -6.60            | 1.54       | 21.83          |
| 2090            | -6.38            | 1.99       | 22.98          | 2360            | -6.58            | 1.96       | 21.93          |
| 2100            | -6.37            | 1.44       | 23.06          | 2370            | -6.98            | 1.12       | 20.03          |
| 2110            | -6.67            | 1.29       | 21.51          | 2380            | -6.45            | 1.97       | 22.63          |
| 2120            | -6.87            | 1.90       | 20.55          | 2390            | -6.26            | 1.58       | 23.63          |
| 2130            | -6.86            | 1.52       | 20.57          | 2400            | -6.43            | 1.29       | 22.74          |
| 2140            | -6.92            | 1.69       | 20.31          | 2410            | -6.33            | 1.37       | 23.26          |
| 2150            | -6.59            | 1.81       | 21.92          | 2420            | -6.70            | 1.98       | 21.35          |
| 2160            | -6.94            | 1.47       | 20.23          | 2430            | -6.74            | 1.50       | 21.15          |
| 2170            | -6.54            | 1.30       | 22.16          | 2440            | -6.59            | 1.38       | 21.91          |
| 2180            | -6.60            | 1.61       | 21.84          | 2450            | -6.75            | 1.53       | 21.11          |
| 2190            | -6.85            | 1.91       | 20.63          | 2460            | -6.44            | 1.78       | 22.69          |
| 2200            | -6.58            | 1.02       | 21.93          | 2470            | -6.91            | 1.77       | 20.35          |
| 2210            | -6.66            | 1.74       | 21.56          | 2480            | -6.77            | 1.25       | 20.99          |
| 2220            | -6.80            | 1.44       | 20.86          | 2490            | -6.61            | 1.38       | 21.81          |
| 2230            | -6.69            | 1.48       | 21.40          | 2500            | -6.36            | 1.32       | 23.08          |
| 2240            | -6.24            | 1.99       | 23.76          | 2510            | -6.57            | 1.13       | 22.01          |



| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|
| 2520            | -6.96            | 1.95       | 20.12          |
| 2530            | -6.65            | 1.21       | 21.60          |
| 2540            | -6.71            | 1.37       | 21.33          |
| 2550            | -6.57            | 1.61       | 22.02          |
| 2560            | -6.32            | 1.67       | 23.33          |
| 2570            | -6.66            | 1.41       | 21.55          |
| 2580            | -6.68            | 1.26       | 21.43          |
| 2590            | -6.95            | 1.29       | 20.15          |
| 2600            | -6.61            | 1.06       | 21.80          |
| 2610            | -6.97            | 1.07       | 20.07          |
| 2620            | -6.74            | 1.18       | 21.17          |
| 2630            | -6.67            | 1.19       | 21.50          |
| 2640            | -6.28            | 1.06       | 23.53          |
| 2650            | -6.33            | 1.21       | 23.24          |
| 2660            | -6.39            | 1.41       | 22.94          |
| 2670            | -6.38            | 1.13       | 22.97          |
| 2680            | -6.85            | 1.56       | 20.62          |
| 2690            | -6.97            | 1.08       | 20.07          |
| 2700            | -6.94            | 1.66       | 20.20          |

