

## 1. Frequency Stability

### 1.1 GSM850

#### 1.1.1 Test Result

| Band: GSM850 |                 |            |               |                  |                       |             |         |
|--------------|-----------------|------------|---------------|------------------|-----------------------|-------------|---------|
| Network      | Frequency (MHz) | Temp. (°C) | Voltage (VDC) | Freq. Error (Hz) | Freq. vs. Rated (ppm) |             | Verdict |
|              |                 |            |               |                  | Result                | Limit       |         |
| GSM          | 824.2           | 20         | 3.23          | -16.463          | -0.0200               | -2.5 to 2.5 | Pass    |
|              |                 |            | 3.8           | -13.800          | -0.0167               | -2.5 to 2.5 | Pass    |
|              |                 |            | 4.37          | -13.371          | -0.0162               | -2.5 to 2.5 | Pass    |
|              |                 | -30        | 3.8           | -16.663          | -0.0202               | -2.5 to 2.5 | Pass    |
|              |                 | -20        | 3.8           | -14.879          | -0.0181               | -2.5 to 2.5 | Pass    |
|              |                 | -10        | 3.8           | -17.313          | -0.0210               | -2.5 to 2.5 | Pass    |
|              |                 | 0          | 3.8           | -17.077          | -0.0207               | -2.5 to 2.5 | Pass    |
|              |                 | 10         | 3.8           | -15.158          | -0.0184               | -2.5 to 2.5 | Pass    |
|              |                 | 30         | 3.8           | -10.416          | -0.0126               | -2.5 to 2.5 | Pass    |
|              |                 | 40         | 3.8           | -11.045          | -0.0134               | -2.5 to 2.5 | Pass    |
|              |                 | 50         | 3.8           | -14.533          | -0.0176               | -2.5 to 2.5 | Pass    |
|              | 836.6           | 20         | 3.23          | -11.056          | -0.0132               | -2.5 to 2.5 | Pass    |
|              |                 |            | 3.8           | -9.000           | -0.0108               | -2.5 to 2.5 | Pass    |
|              |                 |            | 4.37          | -16.944          | -0.0203               | -2.5 to 2.5 | Pass    |
|              |                 | -30        | 3.8           | -11.812          | -0.0141               | -2.5 to 2.5 | Pass    |
|              |                 | -20        | 3.8           | -12.242          | -0.0146               | -2.5 to 2.5 | Pass    |
|              |                 | -10        | 3.8           | -8.027           | -0.0096               | -2.5 to 2.5 | Pass    |
|              |                 | 0          | 3.8           | -15.085          | -0.0180               | -2.5 to 2.5 | Pass    |
|              |                 | 10         | 3.8           | -13.477          | -0.0161               | -2.5 to 2.5 | Pass    |
|              |                 | 30         | 3.8           | -6.508           | -0.0078               | -2.5 to 2.5 | Pass    |
|              |                 | 40         | 3.8           | -15.566          | -0.0186               | -2.5 to 2.5 | Pass    |
|              |                 | 50         | 3.8           | -13.319          | -0.0159               | -2.5 to 2.5 | Pass    |
|              | 848.8           | 20         | 3.23          | -15.214          | -0.0179               | -2.5 to 2.5 | Pass    |
|              |                 |            | 3.8           | -2.881           | -0.0034               | -2.5 to 2.5 | Pass    |
|              |                 |            | 4.37          | -12.956          | -0.0153               | -2.5 to 2.5 | Pass    |
|              |                 | -30        | 3.8           | -14.203          | -0.0167               | -2.5 to 2.5 | Pass    |
|              |                 | -20        | 3.8           | -7.931           | -0.0093               | -2.5 to 2.5 | Pass    |
|              |                 | -10        | 3.8           | -10.455          | -0.0123               | -2.5 to 2.5 | Pass    |
|              |                 | 0          | 3.8           | -5.608           | -0.0066               | -2.5 to 2.5 | Pass    |
|              |                 | 10         | 3.8           | -15.841          | -0.0187               | -2.5 to 2.5 | Pass    |
|              |                 | 30         | 3.8           | -6.129           | -0.0072               | -2.5 to 2.5 | Pass    |
|              |                 | 40         | 3.8           | 0.507            | 0.0006                | -2.5 to 2.5 | Pass    |
|              |                 | 50         | 3.8           | -13.882          | -0.0164               | -2.5 to 2.5 | Pass    |
| GPRS         | 824.2           | 20         | 3.23          | -11.070          | -0.0134               | -2.5 to 2.5 | Pass    |
|              |                 |            | 3.8           | 1.424            | 0.0017                | -2.5 to 2.5 | Pass    |
|              |                 |            | 4.37          | 1.356            | 0.0016                | -2.5 to 2.5 | Pass    |
|              |                 | -30        | 3.8           | -1.753           | -0.0021               | -2.5 to 2.5 | Pass    |
|              |                 | -20        | 3.8           | -8.817           | -0.0107               | -2.5 to 2.5 | Pass    |
|              |                 | -10        | 3.8           | -10.182          | -0.0124               | -2.5 to 2.5 | Pass    |
|              |                 | 0          | 3.8           | -5.831           | -0.0071               | -2.5 to 2.5 | Pass    |
|              |                 | 10         | 3.8           | -10.919          | -0.0132               | -2.5 to 2.5 | Pass    |
|              |                 | 30         | 3.8           | -2.079           | -0.0025               | -2.5 to 2.5 | Pass    |
|              |                 | 40         | 3.8           | -5.598           | -0.0068               | -2.5 to 2.5 | Pass    |
|              |                 | 50         | 3.8           | -1.614           | -0.0020               | -2.5 to 2.5 | Pass    |
|              | 836.6           | 20         | 3.23          | -5.883           | -0.0070               | -2.5 to 2.5 | Pass    |
|              |                 |            | 3.8           | 4.435            | 0.0053                | -2.5 to 2.5 | Pass    |
|              |                 |            | 4.37          | -1.527           | -0.0018               | -2.5 to 2.5 | Pass    |

|       |       |     |      |         |         |             |      |
|-------|-------|-----|------|---------|---------|-------------|------|
|       |       | -30 | 3.8  | -12.460 | -0.0149 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.8  | -10.124 | -0.0121 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.8  | 4.965   | 0.0059  | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.8  | -4.154  | -0.0050 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.8  | -0.976  | -0.0012 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.8  | -7.617  | -0.0091 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.8  | -6.023  | -0.0072 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.8  | -8.744  | -0.0105 | -2.5 to 2.5 | Pass |
|       | 848.8 | 20  | 3.23 | -0.445  | -0.0005 | -2.5 to 2.5 | Pass |
|       |       |     | 3.8  | -9.682  | -0.0114 | -2.5 to 2.5 | Pass |
|       |       |     | 4.37 | -2.417  | -0.0028 | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.8  | -1.901  | -0.0022 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.8  | -6.089  | -0.0072 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.8  | -3.044  | -0.0036 | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.8  | 2.069   | 0.0024  | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.8  | -6.583  | -0.0078 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.8  | -5.682  | -0.0067 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.8  | -0.498  | -0.0006 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.8  | -4.052  | -0.0048 | -2.5 to 2.5 | Pass |
| EGPRS | 824.2 | 20  | 3.23 | -7.505  | -0.0091 | -2.5 to 2.5 | Pass |
|       |       |     | 3.8  | -1.345  | -0.0016 | -2.5 to 2.5 | Pass |
|       |       |     | 4.37 | 0.743   | 0.0009  | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.8  | 8.258   | 0.0100  | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.8  | -4.963  | -0.0060 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.8  | -0.436  | -0.0005 | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.8  | -6.896  | -0.0084 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.8  | -0.980  | -0.0012 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.8  | -5.097  | -0.0062 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.8  | -1.688  | -0.0020 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.8  | 0.359   | 0.0004  | -2.5 to 2.5 | Pass |
|       | 836.6 | 20  | 3.23 | -6.668  | -0.0080 | -2.5 to 2.5 | Pass |
|       |       |     | 3.8  | -7.625  | -0.0091 | -2.5 to 2.5 | Pass |
|       |       |     | 4.37 | 0.541   | 0.0006  | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.8  | 3.923   | 0.0047  | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.8  | 1.391   | 0.0017  | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.8  | 4.533   | 0.0054  | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.8  | -5.930  | -0.0071 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.8  | -5.231  | -0.0063 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.8  | -6.867  | -0.0082 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.8  | 1.421   | 0.0017  | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.8  | 2.370   | 0.0028  | -2.5 to 2.5 | Pass |
|       | 848.8 | 20  | 3.23 | -5.877  | -0.0069 | -2.5 to 2.5 | Pass |
|       |       |     | 3.8  | -10.086 | -0.0119 | -2.5 to 2.5 | Pass |
|       |       |     | 4.37 | -3.087  | -0.0036 | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.8  | -3.671  | -0.0043 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.8  | 0.998   | 0.0012  | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.8  | 2.856   | 0.0034  | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.8  | 8.618   | 0.0102  | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.8  | -0.643  | -0.0008 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.8  | -3.516  | -0.0041 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.8  | -2.249  | -0.0026 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.8  | -6.768  | -0.0080 | -2.5 to 2.5 | Pass |

## 2. Frequency Stability

### 2.1 PCS1900

#### 2.1.1 Test Result

| Band: PCS1900 |                 |            |               |                  |                       |             |         |
|---------------|-----------------|------------|---------------|------------------|-----------------------|-------------|---------|
| Network       | Frequency (MHz) | Temp. (°C) | Voltage (VDC) | Freq. Error (Hz) | Freq. vs. Rated (ppm) |             | Verdict |
|               |                 |            |               |                  | Result                | Limit       |         |
| GSM           | 1850.2          | 20         | 3.23          | 11.391           | 0.0062                | -2.5 to 2.5 | Pass    |
|               |                 |            | 3.8           | -8.586           | -0.0046               | -2.5 to 2.5 | Pass    |
|               |                 |            | 4.37          | -24.340          | -0.0132               | -2.5 to 2.5 | Pass    |
|               |                 | -30        | 3.8           | -19.647          | -0.0106               | -2.5 to 2.5 | Pass    |
|               |                 | -20        | 3.8           | -4.902           | -0.0026               | -2.5 to 2.5 | Pass    |
|               |                 | -10        | 3.8           | -5.629           | -0.0030               | -2.5 to 2.5 | Pass    |
|               |                 | 0          | 3.8           | 1.382            | 0.0007                | -2.5 to 2.5 | Pass    |
|               |                 | 10         | 3.8           | -22.572          | -0.0122               | -2.5 to 2.5 | Pass    |
|               |                 | 30         | 3.8           | -17.797          | -0.0096               | -2.5 to 2.5 | Pass    |
|               |                 | 40         | 3.8           | -1.464           | -0.0008               | -2.5 to 2.5 | Pass    |
|               |                 | 50         | 3.8           | -29.397          | -0.0159               | -2.5 to 2.5 | Pass    |
|               | 1880            | 20         | 3.23          | -4.571           | -0.0024               | -2.5 to 2.5 | Pass    |
|               |                 |            | 3.8           | -5.887           | -0.0031               | -2.5 to 2.5 | Pass    |
|               |                 |            | 4.37          | -7.120           | -0.0038               | -2.5 to 2.5 | Pass    |
|               |                 | -30        | 3.8           | -8.722           | -0.0046               | -2.5 to 2.5 | Pass    |
|               |                 | -20        | 3.8           | -17.167          | -0.0091               | -2.5 to 2.5 | Pass    |
|               |                 | -10        | 3.8           | -10.919          | -0.0058               | -2.5 to 2.5 | Pass    |
|               |                 | 0          | 3.8           | -8.499           | -0.0045               | -2.5 to 2.5 | Pass    |
|               |                 | 10         | 3.8           | -7.781           | -0.0041               | -2.5 to 2.5 | Pass    |
|               |                 | 30         | 3.8           | 0.830            | 0.0004                | -2.5 to 2.5 | Pass    |
|               |                 | 40         | 3.8           | -15.801          | -0.0084               | -2.5 to 2.5 | Pass    |
|               |                 | 50         | 3.8           | -12.641          | -0.0067               | -2.5 to 2.5 | Pass    |
|               | 1909.8          | 20         | 3.23          | -22.022          | -0.0115               | -2.5 to 2.5 | Pass    |
|               |                 |            | 3.8           | -4.115           | -0.0022               | -2.5 to 2.5 | Pass    |
|               |                 |            | 4.37          | -24.357          | -0.0128               | -2.5 to 2.5 | Pass    |
|               |                 | -30        | 3.8           | -14.480          | -0.0076               | -2.5 to 2.5 | Pass    |
|               |                 | -20        | 3.8           | -24.296          | -0.0127               | -2.5 to 2.5 | Pass    |
|               |                 | -10        | 3.8           | -6.431           | -0.0034               | -2.5 to 2.5 | Pass    |
|               |                 | 0          | 3.8           | -16.472          | -0.0086               | -2.5 to 2.5 | Pass    |
|               |                 | 10         | 3.8           | -18.349          | -0.0096               | -2.5 to 2.5 | Pass    |
|               |                 | 30         | 3.8           | 2.803            | 0.0015                | -2.5 to 2.5 | Pass    |
|               |                 | 40         | 3.8           | -20.066          | -0.0105               | -2.5 to 2.5 | Pass    |
|               |                 | 50         | 3.8           | -3.610           | -0.0019               | -2.5 to 2.5 | Pass    |
| GPRS          | 1850.2          | 20         | 3.23          | -19.883          | -0.0107               | -2.5 to 2.5 | Pass    |
|               |                 |            | 3.8           | -2.212           | -0.0012               | -2.5 to 2.5 | Pass    |
|               |                 |            | 4.37          | 11.219           | 0.0061                | -2.5 to 2.5 | Pass    |
|               |                 | -30        | 3.8           | -12.367          | -0.0067               | -2.5 to 2.5 | Pass    |
|               |                 | -20        | 3.8           | -5.772           | -0.0031               | -2.5 to 2.5 | Pass    |
|               |                 | -10        | 3.8           | -11.587          | -0.0063               | -2.5 to 2.5 | Pass    |
|               |                 | 0          | 3.8           | -9.691           | -0.0052               | -2.5 to 2.5 | Pass    |
|               |                 | 10         | 3.8           | -8.944           | -0.0048               | -2.5 to 2.5 | Pass    |
|               |                 | 30         | 3.8           | -8.160           | -0.0044               | -2.5 to 2.5 | Pass    |
|               |                 | 40         | 3.8           | 8.166            | 0.0044                | -2.5 to 2.5 | Pass    |
|               |                 | 50         | 3.8           | 8.486            | 0.0046                | -2.5 to 2.5 | Pass    |
|               | 1880            | 20         | 3.23          | 2.256            | 0.0012                | -2.5 to 2.5 | Pass    |
|               |                 |            | 3.8           | 1.885            | 0.0010                | -2.5 to 2.5 | Pass    |
|               |                 |            | 4.37          | -2.088           | -0.0011               | -2.5 to 2.5 | Pass    |
|               |                 | -30        | 3.8           | -12.164          | -0.0065               | -2.5 to 2.5 | Pass    |
|               |                 | -20        | 3.8           | -14.017          | -0.0075               | -2.5 to 2.5 | Pass    |

|       |        |     |      |         |         |             |      |
|-------|--------|-----|------|---------|---------|-------------|------|
|       |        | -10 | 3.8  | -3.888  | -0.0021 | -2.5 to 2.5 | Pass |
|       |        | 0   | 3.8  | 1.897   | 0.0010  | -2.5 to 2.5 | Pass |
|       |        | 10  | 3.8  | -11.647 | -0.0062 | -2.5 to 2.5 | Pass |
|       |        | 30  | 3.8  | 8.893   | 0.0047  | -2.5 to 2.5 | Pass |
|       |        | 40  | 3.8  | -20.669 | -0.0110 | -2.5 to 2.5 | Pass |
|       |        | 50  | 3.8  | -20.691 | -0.0110 | -2.5 to 2.5 | Pass |
|       | 1909.8 | 20  | 3.23 | -13.657 | -0.0072 | -2.5 to 2.5 | Pass |
|       |        |     | 3.8  | -4.348  | -0.0023 | -2.5 to 2.5 | Pass |
|       |        |     | 4.37 | 3.601   | 0.0019  | -2.5 to 2.5 | Pass |
|       |        | -30 | 3.8  | -13.938 | -0.0073 | -2.5 to 2.5 | Pass |
|       |        | -20 | 3.8  | -33.256 | -0.0174 | -2.5 to 2.5 | Pass |
|       |        | -10 | 3.8  | 0.309   | 0.0002  | -2.5 to 2.5 | Pass |
|       |        | 0   | 3.8  | 0.763   | 0.0004  | -2.5 to 2.5 | Pass |
|       |        | 10  | 3.8  | -21.976 | -0.0115 | -2.5 to 2.5 | Pass |
|       |        | 30  | 3.8  | -0.121  | -0.0001 | -2.5 to 2.5 | Pass |
|       |        | 40  | 3.8  | -16.611 | -0.0087 | -2.5 to 2.5 | Pass |
|       |        | 50  | 3.8  | -12.250 | -0.0064 | -2.5 to 2.5 | Pass |
| EGPRS | 1850.2 | 20  | 3.23 | -26.259 | -0.0142 | -2.5 to 2.5 | Pass |
|       |        |     | 3.8  | -13.744 | -0.0074 | -2.5 to 2.5 | Pass |
|       |        |     | 4.37 | -14.781 | -0.0080 | -2.5 to 2.5 | Pass |
|       |        | -30 | 3.8  | -10.565 | -0.0057 | -2.5 to 2.5 | Pass |
|       |        | -20 | 3.8  | -3.485  | -0.0019 | -2.5 to 2.5 | Pass |
|       |        | -10 | 3.8  | -14.230 | -0.0077 | -2.5 to 2.5 | Pass |
|       |        | 0   | 3.8  | -21.030 | -0.0114 | -2.5 to 2.5 | Pass |
|       |        | 10  | 3.8  | -14.372 | -0.0078 | -2.5 to 2.5 | Pass |
|       |        | 30  | 3.8  | -22.317 | -0.0121 | -2.5 to 2.5 | Pass |
|       |        | 40  | 3.8  | -18.029 | -0.0097 | -2.5 to 2.5 | Pass |
|       |        | 50  | 3.8  | -3.844  | -0.0021 | -2.5 to 2.5 | Pass |
|       | 1880   | 20  | 3.23 | -4.064  | -0.0022 | -2.5 to 2.5 | Pass |
|       |        |     | 3.8  | -34.432 | -0.0183 | -2.5 to 2.5 | Pass |
|       |        |     | 4.37 | 1.598   | 0.0009  | -2.5 to 2.5 | Pass |
|       |        | -30 | 3.8  | -1.803  | -0.0010 | -2.5 to 2.5 | Pass |
|       |        | -20 | 3.8  | -4.227  | -0.0022 | -2.5 to 2.5 | Pass |
|       |        | -10 | 3.8  | -10.999 | -0.0059 | -2.5 to 2.5 | Pass |
|       |        | 0   | 3.8  | -19.558 | -0.0104 | -2.5 to 2.5 | Pass |
|       |        | 10  | 3.8  | -7.253  | -0.0039 | -2.5 to 2.5 | Pass |
|       |        | 30  | 3.8  | -13.902 | -0.0074 | -2.5 to 2.5 | Pass |
|       |        | 40  | 3.8  | -4.371  | -0.0023 | -2.5 to 2.5 | Pass |
|       |        | 50  | 3.8  | -6.250  | -0.0033 | -2.5 to 2.5 | Pass |
|       | 1909.8 | 20  | 3.23 | -19.724 | -0.0103 | -2.5 to 2.5 | Pass |
|       |        |     | 3.8  | -19.990 | -0.0105 | -2.5 to 2.5 | Pass |
|       |        |     | 4.37 | -24.820 | -0.0130 | -2.5 to 2.5 | Pass |
|       |        | -30 | 3.8  | -1.333  | -0.0007 | -2.5 to 2.5 | Pass |
|       |        | -20 | 3.8  | -16.055 | -0.0084 | -2.5 to 2.5 | Pass |
|       |        | -10 | 3.8  | -24.630 | -0.0129 | -2.5 to 2.5 | Pass |
|       |        | 0   | 3.8  | 5.862   | 0.0031  | -2.5 to 2.5 | Pass |
|       |        | 10  | 3.8  | 1.137   | 0.0006  | -2.5 to 2.5 | Pass |
|       |        | 30  | 3.8  | -22.571 | -0.0118 | -2.5 to 2.5 | Pass |
|       |        | 40  | 3.8  | -15.928 | -0.0083 | -2.5 to 2.5 | Pass |
|       |        | 50  | 3.8  | 1.678   | 0.0009  | -2.5 to 2.5 | Pass |