

# Frequency Mixer

HJK-ED9491/1

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=238MHz<br>(dB) |       |      |
|---------------------|-------------|--------------------------------------------------------|-------|------|
|                     |             | @LO (dBm)                                              |       |      |
|                     |             | +14                                                    | +17   | +20  |
| 436.1               | 198.1       | 12.17                                                  | 10.40 | 8.92 |
| 516.1               | 278.1       | 10.53                                                  | 8.71  | 7.75 |
| 596.1               | 358.1       | 8.22                                                   | 7.49  | 7.09 |
| 676.1               | 438.1       | 7.41                                                   | 7.07  | 6.88 |
| 756.1               | 518.1       | 7.63                                                   | 7.60  | 7.62 |
| 836.1               | 598.1       | 7.17                                                   | 7.14  | 7.22 |
| 916.1               | 678.1       | 7.22                                                   | 7.05  | 6.98 |
| 996.1               | 758.1       | 7.54                                                   | 7.25  | 7.10 |
| 1076.1              | 838.1       | 7.86                                                   | 7.49  | 7.28 |
| 1156.1              | 918.1       | 8.34                                                   | 7.82  | 7.55 |
| 1236.1              | 998.1       | 8.64                                                   | 7.98  | 7.62 |
| 1316.1              | 1078.1      | 8.91                                                   | 8.07  | 7.63 |
| 1396.1              | 1158.1      | 9.17                                                   | 8.29  | 7.80 |
| 1476.1              | 1238.1      | 9.35                                                   | 8.43  | 7.94 |
| 1556.1              | 1318.1      | 9.50                                                   | 8.50  | 8.00 |
| 1636.1              | 1398.1      | 9.57                                                   | 8.55  | 8.03 |
| 1716.1              | 1478.1      | 9.50                                                   | 8.54  | 8.08 |
| 1796.1              | 1558.1      | 9.27                                                   | 8.41  | 8.04 |
| 1876.1              | 1638.1      | 8.98                                                   | 8.28  | 8.00 |
| 1936.1              | 1698.1      | 8.99                                                   | 8.34  | 8.08 |
| 2016.1              | 1778.1      | 8.79                                                   | 8.23  | 8.02 |
| 2076.1              | 1838.1      | 8.51                                                   | 8.13  | 8.00 |
| 2156.1              | 1918.1      | 8.33                                                   | 8.05  | 7.99 |
| 2216.1              | 1978.1      | 8.35                                                   | 8.08  | 8.03 |
| 2296.1              | 2058.1      | 8.32                                                   | 8.08  | 8.04 |
| 2356.1              | 2118.1      | 8.26                                                   | 8.08  | 8.07 |
| 2436.1              | 2198.1      | 8.31                                                   | 8.14  | 8.12 |
| 2496.1              | 2258.1      | 8.42                                                   | 8.18  | 8.11 |
| 2576.1              | 2338.1      | 8.58                                                   | 8.29  | 8.18 |
| 2636.1              | 2398.1      | 8.65                                                   | 8.36  | 8.26 |
| 2716.1              | 2478.1      | 8.76                                                   | 8.50  | 8.41 |
| 2776.1              | 2538.1      | 8.80                                                   | 8.57  | 8.50 |
| 2856.1              | 2618.1      | 9.01                                                   | 8.75  | 8.68 |
| 2916.1              | 2678.1      | 9.26                                                   | 8.94  | 8.86 |
| 2996.1              | 2758.1      | 9.49                                                   | 9.13  | 9.03 |
| 3056.1              | 2818.1      | 9.60                                                   | 9.19  | 9.06 |
| 3136.1              | 2898.1      | 9.98                                                   | 9.45  | 9.27 |
| 3196.1              | 2958.1      | 10.47                                                  | 9.78  | 9.52 |
| 3276.1              | 3038.1      | 10.95                                                  | 10.09 | 9.74 |
| 3336.1              | 3098.1      | 11.26                                                  | 10.28 | 9.87 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +14                | +17   | +20   |
| 436.1               | 198.1       | 17.94              | 18.03 | 20.21 |
| 516.1               | 278.1       | 22.11              | 22.47 | 24.54 |
| 596.1               | 358.1       | 25.10              | 30.38 | 30.89 |
| 676.1               | 438.1       | 23.99              | 25.84 | 28.12 |
| 756.1               | 518.1       | 27.81              | 31.43 | 36.03 |
| 836.1               | 598.1       | 29.05              | 31.82 | 35.84 |
| 916.1               | 678.1       | 28.32              | 31.24 | 33.66 |
| 996.1               | 758.1       | 27.21              | 30.32 | 32.06 |
| 1076.1              | 838.1       | 23.31              | 27.22 | 31.43 |
| 1156.1              | 918.1       | 22.34              | 27.46 | 35.90 |
| 1236.1              | 998.1       | 26.10              | 29.34 | 34.69 |
| 1316.1              | 1078.1      | 24.74              | 25.57 | 27.65 |
| 1396.1              | 1158.1      | 27.16              | 27.04 | 29.60 |
| 1476.1              | 1238.1      | 27.00              | 27.47 | 29.96 |
| 1556.1              | 1318.1      | 24.67              | 26.57 | 28.53 |
| 1636.1              | 1398.1      | 25.23              | 27.96 | 30.09 |
| 1716.1              | 1478.1      | 24.91              | 27.34 | 29.69 |
| 1796.1              | 1558.1      | 22.84              | 25.50 | 29.65 |
| 1876.1              | 1638.1      | 22.05              | 25.38 | 29.81 |
| 1936.1              | 1698.1      | 21.92              | 25.14 | 29.06 |
| 2016.1              | 1778.1      | 22.10              | 25.27 | 29.10 |
| 2076.1              | 1838.1      | 22.77              | 25.75 | 29.49 |
| 2156.1              | 1918.1      | 23.56              | 26.62 | 30.01 |
| 2216.1              | 1978.1      | 23.78              | 26.89 | 30.14 |
| 2296.1              | 2058.1      | 24.14              | 27.08 | 30.11 |
| 2356.1              | 2118.1      | 24.63              | 27.60 | 30.15 |
| 2436.1              | 2198.1      | 25.04              | 27.77 | 29.79 |
| 2496.1              | 2258.1      | 24.98              | 27.80 | 29.82 |
| 2576.1              | 2338.1      | 24.33              | 27.29 | 30.53 |
| 2636.1              | 2398.1      | 23.90              | 26.96 | 31.17 |
| 2716.1              | 2478.1      | 23.87              | 26.58 | 31.78 |
| 2776.1              | 2538.1      | 23.89              | 26.72 | 32.01 |
| 2856.1              | 2618.1      | 23.57              | 26.18 | 30.24 |
| 2916.1              | 2678.1      | 23.14              | 25.58 | 28.74 |
| 2996.1              | 2758.1      | 22.77              | 25.39 | 28.28 |
| 3056.1              | 2818.1      | 22.29              | 25.06 | 27.97 |
| 3136.1              | 2898.1      | 22.02              | 24.62 | 27.45 |
| 3196.1              | 2958.1      | 21.44              | 23.58 | 26.12 |
| 3276.1              | 3038.1      | 21.16              | 23.16 | 25.39 |
| 3336.1              | 3098.1      | 20.93              | 23.08 | 25.59 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+17dBm<br>(dB) |       |       |
|---------------------|-------------|--------------------------------------|-------|-------|
|                     |             | @LO (dBm)                            |       |       |
|                     |             | +14                                  | +17   | +20   |
| 436.1               | 198.1       | 4.50                                 | 3.68  | 2.68  |
| 516.1               | 278.1       | 0.70                                 | 0.95  | 0.68  |
| 596.1               | 358.1       | 0.71                                 | 0.39  | 0.16  |
| 676.1               | 438.1       | -0.08                                | -0.18 | -0.16 |
| 756.1               | 518.1       | 0.61                                 | 0.24  | 0.09  |
| 836.1               | 598.1       | 0.37                                 | 0.20  | 0.09  |
| 916.1               | 678.1       | 0.43                                 | 0.27  | 0.16  |
| 996.1               | 758.1       | 0.56                                 | 0.29  | 0.19  |
| 1076.1              | 838.1       | 0.55                                 | 0.33  | 0.19  |
| 1156.1              | 918.1       | 0.37                                 | 0.17  | 0.11  |
| 1236.1              | 998.1       | 0.60                                 | 0.25  | 0.11  |
| 1316.1              | 1078.1      | 0.82                                 | 0.39  | 0.16  |
| 1396.1              | 1158.1      | 0.91                                 | 0.62  | 0.39  |
| 1476.1              | 1238.1      | 0.89                                 | 0.71  | 0.44  |
| 1556.1              | 1318.1      | 0.64                                 | 0.67  | 0.44  |
| 1636.1              | 1398.1      | 0.52                                 | 0.60  | 0.40  |
| 1716.1              | 1478.1      | 0.55                                 | 0.60  | 0.41  |
| 1796.1              | 1558.1      | 0.58                                 | 0.60  | 0.41  |
| 1876.1              | 1638.1      | 0.62                                 | 0.55  | 0.32  |
| 1936.1              | 1698.1      | 0.63                                 | 0.53  | 0.29  |
| 2016.1              | 1778.1      | 0.70                                 | 0.54  | 0.26  |
| 2076.1              | 1838.1      | 0.74                                 | 0.50  | 0.22  |
| 2156.1              | 1918.1      | 0.70                                 | 0.39  | 0.17  |
| 2216.1              | 1978.1      | 0.62                                 | 0.33  | 0.16  |
| 2296.1              | 2058.1      | 0.56                                 | 0.29  | 0.14  |
| 2356.1              | 2118.1      | 0.55                                 | 0.27  | 0.13  |
| 2436.1              | 2198.1      | 0.50                                 | 0.24  | 0.11  |
| 2496.1              | 2258.1      | 0.46                                 | 0.20  | 0.11  |
| 2576.1              | 2338.1      | 0.44                                 | 0.20  | 0.12  |
| 2636.1              | 2398.1      | 0.46                                 | 0.22  | 0.14  |
| 2716.1              | 2478.1      | 0.52                                 | 0.25  | 0.14  |
| 2776.1              | 2538.1      | 0.51                                 | 0.24  | 0.13  |
| 2856.1              | 2618.1      | 0.54                                 | 0.29  | 0.13  |
| 2916.1              | 2678.1      | 0.57                                 | 0.34  | 0.15  |
| 2996.1              | 2758.1      | 0.52                                 | 0.36  | 0.17  |
| 3056.1              | 2818.1      | 0.50                                 | 0.38  | 0.19  |
| 3136.1              | 2898.1      | 0.42                                 | 0.38  | 0.20  |
| 3196.1              | 2958.1      | 0.32                                 | 0.36  | 0.23  |
| 3276.1              | 3038.1      | 0.23                                 | 0.33  | 0.27  |
| 3336.1              | 3098.1      | 0.08                                 | 0.26  | 0.24  |

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# Frequency Mixer

HJK-ED9491/1

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=971MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=685.9MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1256.1MHz<br>(dB) |
|----------------------|-------------|---------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                     |                      |             | @LO (dBm)                                                       |                      |             | @LO (dBm)                                                        |
|                      |             | +17                                                           |                      |             | +17                                                             |                      |             | +17                                                              |
| 670.0                | 301.0       | 10.13                                                         | 10.1                 | 696.0       | 6.69                                                            | 790.1                | 466.0       | 9.93                                                             |
| 631.2                | 339.8       | 9.43                                                          | 70.1                 | 756.0       | 6.82                                                            | 770.1                | 486.0       | 9.30                                                             |
| 592.4                | 378.6       | 9.04                                                          | 130.1                | 816.0       | 6.89                                                            | 750.1                | 506.0       | 8.73                                                             |
| 563.2                | 407.8       | 8.69                                                          | 190.1                | 876.0       | 6.99                                                            | 730.1                | 526.0       | 8.53                                                             |
| 524.4                | 446.6       | 8.49                                                          | 250.1                | 936.0       | 7.31                                                            | 710.1                | 546.0       | 8.36                                                             |
| 495.3                | 475.7       | 9.30                                                          | 310.1                | 996.0       | 7.42                                                            | 690.1                | 566.0       | 8.25                                                             |
| 456.5                | 514.5       | 8.16                                                          | 370.1                | 1056.0      | 7.55                                                            | 670.1                | 586.0       | 8.20                                                             |
| 427.4                | 543.6       | 7.76                                                          | 430.1                | 1116.0      | 7.74                                                            | 650.1                | 606.0       | 8.13                                                             |
| 388.5                | 582.5       | 7.46                                                          | 490.1                | 1176.0      | 8.08                                                            | 630.1                | 626.0       | 7.80                                                             |
| 359.4                | 611.6       | 7.34                                                          | 550.1                | 1236.0      | 8.26                                                            | 610.1                | 646.0       | 8.17                                                             |
| 320.6                | 650.4       | 7.18                                                          | 610.1                | 1296.0      | 8.54                                                            | 590.1                | 666.0       | 8.10                                                             |
| 291.5                | 679.5       | 7.10                                                          | 670.1                | 1356.0      | 8.70                                                            | 570.1                | 686.0       | 8.14                                                             |
| 252.6                | 718.4       | 7.14                                                          | 730.1                | 1416.0      | 8.88                                                            | 550.1                | 706.0       | 8.13                                                             |
| 223.5                | 747.5       | 7.16                                                          | 790.1                | 1476.0      | 9.19                                                            | 530.1                | 726.0       | 8.07                                                             |
| 184.7                | 786.3       | 7.17                                                          | 850.1                | 1536.0      | 9.24                                                            | 510.1                | 746.0       | 8.12                                                             |
| 155.6                | 815.4       | 7.15                                                          | 910.1                | 1596.0      | 9.36                                                            | 490.1                | 766.0       | 8.14                                                             |
| 116.8                | 854.2       | 7.19                                                          | 970.1                | 1656.0      | 9.46                                                            | 470.1                | 786.0       | 8.14                                                             |
| 87.6                 | 883.4       | 7.24                                                          | 1030.1               | 1716.0      | 9.34                                                            | 450.1                | 806.0       | 8.14                                                             |
| 48.8                 | 922.2       | 7.35                                                          | 1090.1               | 1776.0      | 9.37                                                            | 430.1                | 826.0       | 8.06                                                             |
| 19.7                 | 951.3       | 7.42                                                          | 1150.1               | 1836.0      | 9.39                                                            | 410.1                | 846.0       | 8.19                                                             |
| 71.2                 | 1042.2      | 7.42                                                          | 1210.1               | 1896.0      | 9.29                                                            | 390.1                | 866.0       | 8.16                                                             |
| 162.9                | 1133.9      | 7.66                                                          | 1270.1               | 1956.0      | 9.30                                                            | 370.1                | 886.0       | 8.16                                                             |
| 285.3                | 1256.3      | 8.05                                                          | 1330.1               | 2016.0      | 9.14                                                            | 350.1                | 906.0       | 8.21                                                             |
| 377.1                | 1348.1      | 8.27                                                          | 1390.1               | 2076.0      | 9.12                                                            | 330.1                | 926.0       | 8.24                                                             |
| 499.4                | 1470.4      | 8.63                                                          | 1450.1               | 2136.0      | 9.17                                                            | 310.1                | 946.0       | 8.31                                                             |
| 591.2                | 1562.2      | 8.82                                                          | 1510.1               | 2196.0      | 9.06                                                            | 290.1                | 966.0       | 8.26                                                             |
| 713.5                | 1684.5      | 8.98                                                          | 1570.1               | 2256.0      | 9.04                                                            | 270.1                | 986.0       | 8.16                                                             |
| 805.3                | 1776.3      | 9.09                                                          | 1630.1               | 2316.0      | 9.02                                                            | 250.1                | 1006.0      | 8.07                                                             |
| 927.6                | 1898.6      | 9.19                                                          | 1690.1               | 2376.0      | 9.01                                                            | 230.1                | 1026.0      | 8.00                                                             |
| 1019.4               | 1990.4      | 9.20                                                          | 1750.1               | 2436.0      | 9.06                                                            | 210.1                | 1046.0      | 7.99                                                             |
| 1141.8               | 2112.8      | 9.36                                                          | 1810.1               | 2496.0      | 9.18                                                            | 190.1                | 1066.0      | 7.95                                                             |
| 1233.5               | 2204.5      | 9.42                                                          | 1870.1               | 2556.0      | 9.26                                                            | 170.1                | 1086.0      | 7.95                                                             |
| 1355.9               | 2326.9      | 9.44                                                          | 1930.1               | 2616.0      | 9.25                                                            | 150.1                | 1106.0      | 7.94                                                             |
| 1447.6               | 2418.6      | 9.43                                                          | 1990.1               | 2676.0      | 9.34                                                            | 130.1                | 1126.0      | 7.96                                                             |
| 1570.0               | 2541.0      | 9.33                                                          | 2050.1               | 2736.0      | 9.46                                                            | 110.1                | 1146.0      | 7.96                                                             |
| 1661.8               | 2632.8      | 9.27                                                          | 2110.1               | 2796.0      | 9.59                                                            | 90.1                 | 1166.0      | 8.03                                                             |
| 1784.1               | 2755.1      | 9.37                                                          | 2170.1               | 2856.0      | 9.83                                                            | 70.1                 | 1186.0      | 8.06                                                             |
| 1875.9               | 2846.9      | 9.49                                                          | 2230.1               | 2916.0      | 10.09                                                           | 50.1                 | 1206.0      | 8.06                                                             |
| 1998.2               | 2969.2      | 9.84                                                          | 2290.1               | 2976.0      | 10.56                                                           | 30.1                 | 1226.0      | 8.00                                                             |
| 2090.0               | 3061.0      | 10.35                                                         | 2350.1               | 3036.0      | 11.09                                                           | 10.1                 | 1246.0      | 8.03                                                             |

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## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +14                     | +17   | +20   | +14                     | +17   | +20   |
| 308.1       | 53.78                   | 52.94 | 52.43 | 53.49                   | 52.46 | 51.75 |
| 388.1       | 49.53                   | 49.00 | 48.71 | 48.48                   | 48.83 | 49.05 |
| 468.1       | 39.81                   | 39.39 | 39.21 | 41.28                   | 41.72 | 42.13 |
| 548.1       | 39.96                   | 40.18 | 40.62 | 37.21                   | 37.97 | 38.50 |
| 628.1       | 39.90                   | 40.44 | 41.13 | 32.68                   | 33.29 | 33.85 |
| 708.1       | 40.33                   | 41.00 | 41.63 | 31.73                   | 32.40 | 32.89 |
| 788.1       | 39.92                   | 40.76 | 41.46 | 31.25                   | 32.07 | 32.65 |
| 868.1       | 38.86                   | 39.53 | 40.12 | 30.99                   | 31.64 | 32.15 |
| 948.1       | 39.32                   | 40.37 | 41.26 | 30.51                   | 31.11 | 31.48 |
| 1028.1      | 42.26                   | 43.15 | 43.89 | 29.62                   | 30.22 | 30.71 |
| 1108.1      | 42.53                   | 44.65 | 46.66 | 29.44                   | 29.80 | 30.22 |
| 1188.1      | 40.47                   | 41.82 | 42.86 | 29.19                   | 29.53 | 29.86 |
| 1268.1      | 38.68                   | 39.46 | 40.13 | 29.39                   | 29.73 | 29.97 |
| 1348.1      | 38.09                   | 38.94 | 39.68 | 30.03                   | 30.33 | 30.64 |
| 1428.1      | 38.73                   | 40.29 | 41.67 | 31.90                   | 32.32 | 32.66 |
| 1508.1      | 40.53                   | 42.35 | 43.35 | 35.68                   | 35.64 | 35.24 |
| 1588.1      | 37.99                   | 37.26 | 36.68 | 33.04                   | 31.91 | 30.99 |
| 1668.1      | 36.68                   | 36.21 | 35.92 | 30.71                   | 29.93 | 29.44 |
| 1748.1      | 36.32                   | 36.15 | 35.99 | 30.13                   | 29.45 | 28.96 |
| 1808.1      | 36.16                   | 36.29 | 36.20 | 29.80                   | 29.39 | 28.97 |
| 1888.1      | 36.28                   | 36.34 | 36.52 | 30.05                   | 29.50 | 29.33 |
| 1948.1      | 36.47                   | 36.62 | 36.71 | 30.69                   | 30.30 | 30.08 |
| 2028.1      | 37.35                   | 37.43 | 37.57 | 32.21                   | 31.87 | 31.73 |
| 2088.1      | 38.46                   | 38.57 | 38.66 | 34.49                   | 34.28 | 34.17 |
| 2168.1      | 40.71                   | 40.68 | 40.40 | 43.23                   | 42.34 | 40.90 |
| 2228.1      | 42.43                   | 41.60 | 40.76 | 49.29                   | 41.98 | 38.59 |
| 2308.1      | 43.40                   | 41.51 | 40.61 | 39.13                   | 36.77 | 35.08 |
| 2368.1      | 44.51                   | 42.95 | 42.28 | 39.53                   | 38.53 | 36.94 |
| 2448.1      | 46.30                   | 45.65 | 45.43 | 41.14                   | 48.29 | 49.93 |
| 2508.1      | 44.39                   | 44.51 | 44.16 | 36.82                   | 40.48 | 42.99 |
| 2588.1      | 40.65                   | 40.85 | 40.52 | 31.92                   | 33.46 | 34.29 |
| 2648.1      | 38.74                   | 38.93 | 38.59 | 29.54                   | 30.59 | 31.12 |
| 2728.1      | 37.03                   | 37.10 | 37.01 | 27.29                   | 27.82 | 28.34 |
| 2788.1      | 35.70                   | 36.03 | 35.95 | 25.98                   | 26.38 | 26.78 |
| 2868.1      | 35.00                   | 35.63 | 35.86 | 24.84                   | 25.15 | 25.52 |
| 2928.1      | 35.14                   | 36.04 | 36.54 | 24.43                   | 24.76 | 25.14 |
| 3008.1      | 34.62                   | 35.86 | 36.60 | 24.17                   | 24.74 | 25.05 |
| 3068.1      | 34.08                   | 35.14 | 36.08 | 24.31                   | 24.66 | 25.15 |
| 3148.1      | 33.40                   | 34.23 | 35.08 | 24.64                   | 24.89 | 25.35 |
| 3208.1      | 33.24                   | 34.01 | 34.75 | 25.00                   | 25.20 | 25.60 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +14                     | +17   | +20   |
| 436.1               | 198.1       | 43.79                   | 42.58 | 40.99 |
| 516.1               | 278.1       | 42.34                   | 43.38 | 43.80 |
| 596.1               | 358.1       | 42.11                   | 41.93 | 42.03 |
| 676.1               | 438.1       | 40.07                   | 39.74 | 39.54 |
| 756.1               | 518.1       | 41.95                   | 43.05 | 43.91 |
| 836.1               | 598.1       | 39.93                   | 39.99 | 40.68 |
| 916.1               | 678.1       | 40.28                   | 40.38 | 40.54 |
| 996.1               | 758.1       | 38.91                   | 39.89 | 40.54 |
| 1076.1              | 838.1       | 36.72                   | 37.84 | 38.74 |
| 1156.1              | 918.1       | 32.63                   | 35.01 | 36.09 |
| 1236.1              | 998.1       | 33.16                   | 33.70 | 34.15 |
| 1316.1              | 1078.1      | 30.78                   | 32.15 | 33.08 |
| 1396.1              | 1158.1      | 30.37                   | 32.15 | 33.65 |
| 1476.1              | 1238.1      | 31.19                   | 33.75 | 36.03 |
| 1556.1              | 1318.1      | 32.02                   | 34.79 | 36.49 |
| 1636.1              | 1398.1      | 31.59                   | 34.15 | 35.36 |
| 1716.1              | 1478.1      | 30.97                   | 34.36 | 35.81 |
| 1796.1              | 1558.1      | 33.44                   | 38.08 | 40.00 |
| 1876.1              | 1638.1      | 36.67                   | 41.92 | 46.63 |
| 1936.1              | 1698.1      | 36.19                   | 40.56 | 45.27 |
| 2016.1              | 1778.1      | 34.87                   | 38.40 | 41.44 |
| 2076.1              | 1838.1      | 34.07                   | 36.95 | 39.36 |
| 2156.1              | 1918.1      | 32.46                   | 34.74 | 35.97 |
| 2216.1              | 1978.1      | 31.33                   | 33.09 | 34.02 |
| 2296.1              | 2058.1      | 30.71                   | 32.26 | 33.18 |
| 2356.1              | 2118.1      | 30.30                   | 31.50 | 32.13 |
| 2436.1              | 2198.1      | 30.40                   | 30.98 | 31.01 |
| 2496.1              | 2258.1      | 31.24                   | 31.65 | 31.51 |
| 2576.1              | 2338.1      | 31.80                   | 32.94 | 33.46 |
| 2636.1              | 2398.1      | 31.14                   | 32.75 | 33.76 |
| 2716.1              | 2478.1      | 29.94                   | 31.38 | 32.56 |
| 2776.1              | 2538.1      | 29.07                   | 30.30 | 31.33 |
| 2856.1              | 2618.1      | 28.16                   | 28.91 | 29.52 |
| 2916.1              | 2678.1      | 27.47                   | 27.84 | 28.24 |
| 2996.1              | 2758.1      | 27.13                   | 27.11 | 27.24 |
| 3056.1              | 2818.1      | 27.21                   | 27.04 | 27.05 |
| 3136.1              | 2898.1      | 27.68                   | 27.40 | 27.36 |
| 3196.1              | 2958.1      | 28.14                   | 27.85 | 27.75 |
| 3276.1              | 3038.1      | 28.19                   | 28.05 | 27.95 |
| 3336.1              | 3098.1      | 28.11                   | 28.17 | 28.13 |

# Frequency Mixer

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## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF VSWR<br>(:1) |      |      | LO<br>(MHz) | LO VSWR<br>(:1) |       |       | IF<br>(OUT)<br>(MHz) | IF VSWR<br>@LO=1246MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|-------|-------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |       |       |                      | @LO (dBm)                      |      |      |
|                     |             | +14             | +17  | +20  |             | +14             | +17   | +20   |                      | +14                            | +17  | +20  |
| 436.1               | 198.1       | 2.48            | 2.15 | 1.95 | 308.1       | 18.11           | 17.75 | 18.70 | 10.0                 | 1.12                           | 1.09 | 1.25 |
| 516.1               | 278.1       | 2.32            | 2.02 | 1.90 | 388.1       | 12.52           | 12.18 | 12.44 | 50.7                 | 1.18                           | 1.08 | 1.21 |
| 596.1               | 358.1       | 2.10            | 1.97 | 1.92 | 468.1       | 5.41            | 5.20  | 5.06  | 91.4                 | 1.27                           | 1.19 | 1.27 |
| 676.1               | 438.1       | 2.05            | 1.99 | 1.96 | 548.1       | 2.68            | 2.62  | 2.53  | 111.7                | 1.30                           | 1.20 | 1.26 |
| 756.1               | 518.1       | 1.90            | 1.99 | 2.08 | 628.1       | 2.95            | 2.97  | 3.01  | 152.4                | 1.42                           | 1.33 | 1.37 |
| 836.1               | 598.1       | 1.86            | 1.91 | 1.97 | 708.1       | 5.17            | 5.20  | 5.33  | 172.7                | 1.47                           | 1.35 | 1.37 |
| 916.1               | 678.1       | 1.87            | 1.85 | 1.85 | 788.1       | 7.44            | 7.44  | 7.63  | 213.4                | 1.57                           | 1.44 | 1.45 |
| 996.1               | 758.1       | 2.01            | 1.91 | 1.86 | 868.1       | 9.18            | 9.13  | 9.43  | 233.7                | 1.68                           | 1.53 | 1.52 |
| 1076.1              | 838.1       | 2.18            | 2.03 | 1.95 | 948.1       | 10.25           | 10.13 | 10.56 | 274.4                | 1.75                           | 1.58 | 1.54 |
| 1156.1              | 918.1       | 2.35            | 2.16 | 2.06 | 1028.1      | 11.09           | 11.03 | 11.53 | 294.7                | 1.86                           | 1.68 | 1.64 |
| 1236.1              | 998.1       | 2.46            | 2.25 | 2.14 | 1108.1      | 11.53           | 11.38 | 11.77 | 335.4                | 1.99                           | 1.76 | 1.68 |
| 1316.1              | 1078.1      | 2.55            | 2.29 | 2.15 | 1188.1      | 11.77           | 11.53 | 11.77 | 355.8                | 2.08                           | 1.84 | 1.76 |
| 1396.1              | 1158.1      | 2.52            | 2.25 | 2.10 | 1268.1      | 11.69           | 11.38 | 11.46 | 396.4                | 2.24                           | 1.94 | 1.81 |
| 1476.1              | 1238.1      | 2.49            | 2.21 | 2.07 | 1348.1      | 11.09           | 10.89 | 11.03 | 416.8                | 2.33                           | 2.03 | 1.90 |
| 1556.1              | 1318.1      | 2.44            | 2.15 | 1.99 | 1428.1      | 10.25           | 10.02 | 10.19 | 457.5                | 2.54                           | 2.17 | 2.00 |
| 1636.1              | 1398.1      | 2.39            | 2.08 | 1.90 | 1508.1      | 9.23            | 8.99  | 9.08  | 477.8                | 2.57                           | 2.19 | 2.02 |
| 1716.1              | 1478.1      | 2.27            | 1.93 | 1.76 | 1588.1      | 9.04            | 8.81  | 8.77  | 518.5                | 2.83                           | 2.41 | 2.21 |
| 1796.1              | 1558.1      | 2.09            | 1.77 | 1.62 | 1668.1      | 8.64            | 8.39  | 8.27  | 538.8                | 2.85                           | 2.42 | 2.21 |
| 1876.1              | 1638.1      | 1.90            | 1.63 | 1.50 | 1748.1      | 7.83            | 7.60  | 7.44  | 579.5                | 3.06                           | 2.59 | 2.36 |
| 1936.1              | 1698.1      | 1.83            | 1.56 | 1.44 | 1808.1      | 7.14            | 7.00  | 6.94  | 599.8                | 3.16                           | 2.67 | 2.42 |
| 2016.1              | 1778.1      | 1.72            | 1.47 | 1.36 | 1888.1      | 6.19            | 6.09  | 6.03  | 640.5                | 3.25                           | 2.74 | 2.48 |
| 2076.1              | 1838.1      | 1.58            | 1.38 | 1.28 | 1948.1      | 5.54            | 5.41  | 5.27  | 660.8                | 3.39                           | 2.86 | 2.58 |
| 2156.1              | 1918.1      | 1.44            | 1.26 | 1.20 | 2028.1      | 4.73            | 4.62  | 4.50  | 701.5                | 3.43                           | 2.88 | 2.58 |
| 2216.1              | 1978.1      | 1.38            | 1.22 | 1.17 | 2088.1      | 4.13            | 4.06  | 4.00  | 721.9                | 3.57                           | 3.01 | 2.71 |
| 2296.1              | 2058.1      | 1.30            | 1.17 | 1.15 | 2168.1      | 3.42            | 3.37  | 3.31  | 762.5                | 3.59                           | 3.02 | 2.70 |
| 2356.1              | 2118.1      | 1.24            | 1.14 | 1.15 | 2228.1      | 3.00            | 2.94  | 2.89  | 782.9                | 3.72                           | 3.14 | 2.81 |
| 2436.1              | 2198.1      | 1.21            | 1.15 | 1.18 | 2308.1      | 2.59            | 2.58  | 2.56  | 823.6                | 3.73                           | 3.14 | 2.81 |
| 2496.1              | 2258.1      | 1.20            | 1.17 | 1.21 | 2368.1      | 2.44            | 2.45  | 2.48  | 843.9                | 3.77                           | 3.18 | 2.85 |
| 2576.1              | 2338.1      | 1.24            | 1.24 | 1.28 | 2448.1      | 2.39            | 2.43  | 2.49  | 884.6                | 3.85                           | 3.26 | 2.92 |
| 2636.1              | 2398.1      | 1.27            | 1.29 | 1.34 | 2508.1      | 2.47            | 2.52  | 2.59  | 904.9                | 3.81                           | 3.23 | 2.89 |
| 2716.1              | 2478.1      | 1.31            | 1.35 | 1.42 | 2588.1      | 2.69            | 2.75  | 2.82  | 945.6                | 3.89                           | 3.32 | 2.98 |
| 2776.1              | 2538.1      | 1.31            | 1.37 | 1.43 | 2648.1      | 2.91            | 2.97  | 3.07  | 965.9                | 3.85                           | 3.29 | 2.94 |
| 2856.1              | 2618.1      | 1.32            | 1.38 | 1.46 | 2728.1      | 3.24            | 3.30  | 3.41  | 1006.6               | 3.84                           | 3.30 | 2.97 |
| 2916.1              | 2678.1      | 1.36            | 1.42 | 1.50 | 2788.1      | 3.49            | 3.53  | 3.62  | 1026.9               | 3.81                           | 3.29 | 2.95 |
| 2996.1              | 2758.1      | 1.38            | 1.45 | 1.52 | 2868.1      | 3.80            | 3.81  | 3.86  | 1067.6               | 3.75                           | 3.23 | 2.91 |
| 3056.1              | 2818.1      | 1.39            | 1.44 | 1.52 | 2928.1      | 4.02            | 4.03  | 4.09  | 1088.0               | 3.75                           | 3.24 | 2.93 |
| 3136.1              | 2898.1      | 1.48            | 1.53 | 1.59 | 3008.1      | 4.22            | 4.23  | 4.30  | 1128.6               | 3.58                           | 3.10 | 2.80 |
| 3196.1              | 2958.1      | 1.56            | 1.59 | 1.64 | 3068.1      | 4.30            | 4.28  | 4.29  | 1149.0               | 3.61                           | 3.14 | 2.84 |
| 3276.1              | 3038.1      | 1.66            | 1.66 | 1.70 | 3148.1      | 4.34            | 4.29  | 4.23  | 1189.7               | 3.42                           | 2.97 | 2.68 |
| 3336.1              | 3098.1      | 1.78            | 1.77 | 1.79 | 3208.1      | 4.34            | 4.32  | 4.34  | 1210.0               | 3.38                           | 2.94 | 2.66 |

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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 10  | 18  | 39  | 26  | 54  | 39  | 62  | 53  | 65  | 64  |
| 1  | -      | 33     | +0  | 41  | 13  | 49  | 22  | 49  | 29  | 49  | 37  | 56  |
| 2  | 56     | 60     | 51  | 58  | 50  | 58  | 59  | 56  | 60  | 60  | 71  | 58  |
| 3  | >90    | 75     | 58  | 65  | 53  | 64  | 53  | 64  | 53  | 67  | 59  | 68  |
| 4  | >90    | >85    | >85 | >85 | 76  | >85 | 74  | >85 | 76  | >85 | 79  | >85 |
| 5  | >90    | >85    | >85 | >85 | >85 | >85 | 85  | >85 | >85 | >85 | >85 | 84  |
| 6  | >90    | >85    | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 |
| 7  | >90    | >85    | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 |
| 8  | >90    | >85    | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 |
| 9  | >90    | >85    | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 |
| 10 | >90    | >85    | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 | >85 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 971 MHz; 2.00 dBm.  
LO IN: 733 MHz; +17.00 dBm  
IF OUT: 238 MHz; -5.2 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |    |    |    |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|----|----|----|
| 0  | -      | -      | 20  | 28  | 39  | 35  | 46  | 46  | 50  | 51 | 53 | 54 |
| 1  | -      | 32     | +0  | 42  | 14  | 48  | 24  | 49  | 34  | 50 | 44 | 58 |
| 2  | 36     | 52     | 43  | 49  | 42  | 50  | 56  | 47  | 53  | 53 | 54 | 56 |
| 3  | 60     | 54     | 40  | 53  | 36  | 55  | 36  | 56  | 39  | 62 | 46 | 63 |
| 4  | 82     | 73     | 63  | 63  | 55  | 65  | 56  | 60  | 58  | 60 | 63 | 68 |
| 5  | >90    | 76     | 66  | 70  | 66  | 67  | 57  | 66  | 54  | 65 | 54 | 68 |
| 6  | >90    | 91     | 73  | 82  | 73  | 84  | 66  | 78  | 63  | 73 | 61 | 73 |
| 7  | >90    | 90     | >95 | 90  | 83  | 87  | 81  | 85  | 75  | 77 | 74 | 76 |
| 8  | >90    | >95    | 90  | >95 | 84  | 88  | 79  | 84  | 75  | 84 | 71 | 94 |
| 9  | >90    | >95    | >95 | >95 | >95 | >95 | 95  | 94  | >95 | 86 | 92 | 89 |
| 10 | >90    | >95    | >95 | >95 | >95 | >95 | >95 | >95 | 85  | 90 | 88 | 85 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8  | 9  | 10 |

### LO HARMONICS ORDER

Test conditions:

RF IN: 971 MHz; 12.00 dBm.  
LO IN: 733 MHz; +17.00 dBm  
IF OUT: 238 MHz; 4.72 dBm

- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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