

# Frequency Mixer

HJK-ED11431/1

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +12                                                   | +15   | +18   |
| 380.1               | 410.1       | 13.12                                                 | 10.41 | 8.60  |
| 440.1               | 470.1       | 12.20                                                 | 9.57  | 8.12  |
| 500.1               | 530.1       | 10.40                                                 | 8.49  | 7.45  |
| 560.1               | 590.1       | 9.01                                                  | 7.63  | 6.86  |
| 620.1               | 650.1       | 8.35                                                  | 7.26  | 6.67  |
| 680.1               | 710.1       | 8.76                                                  | 8.28  | 7.75  |
| 740.1               | 770.1       | 8.00                                                  | 7.27  | 7.03  |
| 800.1               | 830.1       | 7.37                                                  | 6.87  | 6.68  |
| 860.1               | 890.1       | 6.93                                                  | 6.60  | 6.47  |
| 920.1               | 950.1       | 6.74                                                  | 6.50  | 6.42  |
| 980.1               | 1010.1      | 6.64                                                  | 6.50  | 6.49  |
| 1040.1              | 1070.1      | 6.53                                                  | 6.44  | 6.47  |
| 1100.1              | 1130.1      | 6.47                                                  | 6.39  | 6.43  |
| 1160.1              | 1190.1      | 6.48                                                  | 6.40  | 6.41  |
| 1220.1              | 1250.1      | 6.56                                                  | 6.46  | 6.46  |
| 1280.1              | 1310.1      | 6.68                                                  | 6.56  | 6.54  |
| 1340.1              | 1370.1      | 6.76                                                  | 6.64  | 6.61  |
| 1400.1              | 1430.1      | 6.81                                                  | 6.67  | 6.63  |
| 1460.1              | 1490.1      | 6.93                                                  | 6.78  | 6.75  |
| 1520.1              | 1550.1      | 6.99                                                  | 6.87  | 6.88  |
| 1580.1              | 1610.1      | 7.04                                                  | 6.86  | 6.84  |
| 1640.1              | 1670.1      | 7.13                                                  | 6.92  | 6.90  |
| 1700.1              | 1730.1      | 7.14                                                  | 6.94  | 6.92  |
| 1760.1              | 1790.1      | 7.23                                                  | 6.92  | 6.85  |
| 1820.1              | 1850.1      | 7.39                                                  | 7.10  | 7.04  |
| 1880.1              | 1910.1      | 7.49                                                  | 7.21  | 7.18  |
| 1940.1              | 1970.1      | 7.72                                                  | 7.36  | 7.27  |
| 2000.1              | 2030.1      | 7.98                                                  | 7.68  | 7.65  |
| 2040.1              | 2070.1      | 8.03                                                  | 7.68  | 7.63  |
| 2100.1              | 2130.1      | 8.40                                                  | 8.07  | 8.03  |
| 2140.1              | 2170.1      | 8.41                                                  | 8.03  | 7.97  |
| 2200.1              | 2230.1      | 8.89                                                  | 8.46  | 8.36  |
| 2240.1              | 2270.1      | 8.88                                                  | 8.45  | 8.37  |
| 2300.1              | 2330.1      | 9.41                                                  | 8.90  | 8.72  |
| 2340.1              | 2370.1      | 9.44                                                  | 8.95  | 8.79  |
| 2400.1              | 2430.1      | 10.09                                                 | 9.43  | 9.17  |
| 2440.1              | 2470.1      | 10.17                                                 | 9.58  | 9.37  |
| 2500.1              | 2530.1      | 10.91                                                 | 10.13 | 9.80  |
| 2540.1              | 2570.1      | 11.01                                                 | 10.31 | 10.06 |
| 2600.1              | 2630.1      | 11.66                                                 | 10.75 | 10.37 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +12                | +15   | +18   |
| 380.1               | 410.1       | 10.34              | 14.94 | 16.23 |
| 440.1               | 470.1       | 12.67              | 16.89 | 18.41 |
| 500.1               | 530.1       | 14.87              | 17.11 | 18.26 |
| 560.1               | 590.1       | 14.75              | 16.29 | 17.69 |
| 620.1               | 650.1       | 12.05              | 13.63 | 15.64 |
| 680.1               | 710.1       | 11.06              | 15.77 | 18.93 |
| 740.1               | 770.1       | 15.36              | 19.76 | 24.80 |
| 800.1               | 830.1       | 18.06              | 22.67 | 27.01 |
| 860.1               | 890.1       | 20.42              | 25.00 | 28.98 |
| 920.1               | 950.1       | 22.48              | 26.73 | 29.38 |
| 980.1               | 1010.1      | 24.95              | 26.94 | 30.11 |
| 1040.1              | 1070.1      | 24.91              | 27.13 | 30.76 |
| 1100.1              | 1130.1      | 25.75              | 27.73 | 31.86 |
| 1160.1              | 1190.1      | 26.11              | 27.87 | 31.55 |
| 1220.1              | 1250.1      | 25.87              | 28.07 | 31.26 |
| 1280.1              | 1310.1      | 24.84              | 27.93 | 30.65 |
| 1340.1              | 1370.1      | 24.15              | 27.44 | 31.07 |
| 1400.1              | 1430.1      | 23.89              | 27.42 | 31.38 |
| 1460.1              | 1490.1      | 23.52              | 26.97 | 31.33 |
| 1520.1              | 1550.1      | 23.56              | 27.37 | 32.03 |
| 1580.1              | 1610.1      | 22.82              | 26.82 | 31.07 |
| 1640.1              | 1670.1      | 22.43              | 25.85 | 29.85 |
| 1700.1              | 1730.1      | 22.45              | 25.55 | 29.29 |
| 1760.1              | 1790.1      | 21.58              | 24.48 | 27.71 |
| 1820.1              | 1850.1      | 21.36              | 24.29 | 27.57 |
| 1880.1              | 1910.1      | 21.03              | 24.08 | 27.85 |
| 1940.1              | 1970.1      | 19.89              | 23.06 | 27.14 |
| 2000.1              | 2030.1      | 19.89              | 23.11 | 27.26 |
| 2040.1              | 2070.1      | 19.28              | 22.59 | 26.53 |
| 2100.1              | 2130.1      | 19.35              | 22.68 | 26.86 |
| 2140.1              | 2170.1      | 18.82              | 22.30 | 26.51 |
| 2200.1              | 2230.1      | 18.47              | 22.07 | 26.25 |
| 2240.1              | 2270.1      | 18.34              | 22.04 | 26.26 |
| 2300.1              | 2330.1      | 18.19              | 21.54 | 25.79 |
| 2340.1              | 2370.1      | 18.31              | 21.90 | 26.12 |
| 2400.1              | 2430.1      | 17.90              | 21.38 | 25.34 |
| 2440.1              | 2470.1      | 18.46              | 21.97 | 26.17 |
| 2500.1              | 2530.1      | 18.05              | 21.67 | 25.58 |
| 2540.1              | 2570.1      | 18.72              | 22.30 | 26.52 |
| 2600.1              | 2630.1      | 18.13              | 21.82 | 26.21 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+14dBm<br>(dB) |      |      |
|---------------------|-------------|--------------------------------------|------|------|
|                     |             | @LO (dBm)                            |      |      |
|                     |             | +12                                  | +15  | +18  |
| 380.1               | 410.1       | -0.71                                | 0.12 | 0.42 |
| 440.1               | 470.1       | -0.17                                | 0.48 | 0.35 |
| 500.1               | 530.1       | 0.83                                 | 0.70 | 0.33 |
| 560.1               | 590.1       | 1.72                                 | 0.96 | 0.43 |
| 620.1               | 650.1       | 2.20                                 | 1.38 | 1.00 |
| 680.1               | 710.1       | 3.40                                 | 2.45 | 1.70 |
| 740.1               | 770.1       | 1.91                                 | 1.74 | 0.76 |
| 800.1               | 830.1       | 1.52                                 | 1.00 | 0.39 |
| 860.1               | 890.1       | 1.06                                 | 0.55 | 0.25 |
| 920.1               | 950.1       | 0.76                                 | 0.43 | 0.20 |
| 980.1               | 1010.1      | 0.48                                 | 0.25 | 0.13 |
| 1040.1              | 1070.1      | 0.41                                 | 0.22 | 0.11 |
| 1100.1              | 1130.1      | 0.41                                 | 0.22 | 0.11 |
| 1160.1              | 1190.1      | 0.42                                 | 0.22 | 0.11 |
| 1220.1              | 1250.1      | 0.45                                 | 0.24 | 0.11 |
| 1280.1              | 1310.1      | 0.54                                 | 0.28 | 0.15 |
| 1340.1              | 1370.1      | 0.63                                 | 0.33 | 0.17 |
| 1400.1              | 1430.1      | 0.64                                 | 0.33 | 0.15 |
| 1460.1              | 1490.1      | 0.70                                 | 0.36 | 0.16 |
| 1520.1              | 1550.1      | 0.70                                 | 0.37 | 0.15 |
| 1580.1              | 1610.1      | 0.78                                 | 0.48 | 0.20 |
| 1640.1              | 1670.1      | 0.85                                 | 0.53 | 0.25 |
| 1700.1              | 1730.1      | 0.89                                 | 0.56 | 0.28 |
| 1760.1              | 1790.1      | 0.93                                 | 0.64 | 0.35 |
| 1820.1              | 1850.1      | 0.92                                 | 0.63 | 0.36 |
| 1880.1              | 1910.1      | 0.88                                 | 0.57 | 0.32 |
| 1940.1              | 1970.1      | 0.82                                 | 0.56 | 0.31 |
| 2000.1              | 2030.1      | 0.74                                 | 0.48 | 0.26 |
| 2040.1              | 2070.1      | 0.76                                 | 0.51 | 0.28 |
| 2100.1              | 2130.1      | 0.66                                 | 0.45 | 0.24 |
| 2140.1              | 2170.1      | 0.69                                 | 0.49 | 0.26 |
| 2200.1              | 2230.1      | 0.61                                 | 0.47 | 0.25 |
| 2240.1              | 2270.1      | 0.63                                 | 0.48 | 0.25 |
| 2300.1              | 2330.1      | 0.52                                 | 0.46 | 0.25 |
| 2340.1              | 2370.1      | 0.55                                 | 0.44 | 0.24 |
| 2400.1              | 2430.1      | 0.43                                 | 0.43 | 0.26 |
| 2440.1              | 2470.1      | 0.47                                 | 0.41 | 0.23 |
| 2500.1              | 2530.1      | 0.34                                 | 0.42 | 0.25 |
| 2540.1              | 2570.1      | 0.42                                 | 0.40 | 0.23 |
| 2600.1              | 2630.1      | 0.30                                 | 0.44 | 0.26 |

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# Frequency Mixer

# HJK-ED11431/1

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1250MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=489.9MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=2010.1MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                       |                      |             | @LO (dBm)                                                        |
|                      |             | +15                                                            |                      |             | +15                                                             |                      |             | +15                                                              |
| 770.0                | 480.0       | 10.14                                                          | 10.1                 | 500.0       | 8.69                                                            | 990.1                | 1020.0      | 10.50                                                            |
| 735.5                | 514.5       | 9.42                                                           | 70.1                 | 560.0       | 8.23                                                            | 970.1                | 1040.0      | 10.40                                                            |
| 700.9                | 549.1       | 8.97                                                           | 130.1                | 620.0       | 7.77                                                            | 950.1                | 1060.0      | 10.24                                                            |
| 666.4                | 583.6       | 8.25                                                           | 190.1                | 680.0       | 7.99                                                            | 930.1                | 1080.0      | 10.17                                                            |
| 631.8                | 618.2       | 7.29                                                           | 250.1                | 740.0       | 7.89                                                            | 910.1                | 1100.0      | 10.05                                                            |
| 597.3                | 652.7       | 7.44                                                           | 310.1                | 800.0       | 7.45                                                            | 890.1                | 1120.0      | 10.03                                                            |
| 562.7                | 687.3       | 8.31                                                           | 370.1                | 860.0       | 7.26                                                            | 870.1                | 1140.0      | 10.04                                                            |
| 528.2                | 721.8       | 8.62                                                           | 430.1                | 920.0       | 7.20                                                            | 850.1                | 1160.0      | 9.97                                                             |
| 482.1                | 767.9       | 8.05                                                           | 490.1                | 980.0       | 7.32                                                            | 830.1                | 1180.0      | 9.94                                                             |
| 447.6                | 802.4       | 7.73                                                           | 550.1                | 1040.0      | 7.39                                                            | 810.1                | 1200.0      | 9.86                                                             |
| 401.5                | 848.5       | 7.43                                                           | 610.1                | 1100.0      | 7.45                                                            | 790.1                | 1220.0      | 9.93                                                             |
| 367.0                | 883.0       | 7.24                                                           | 670.1                | 1160.0      | 7.56                                                            | 770.1                | 1240.0      | 9.92                                                             |
| 320.9                | 929.1       | 7.07                                                           | 730.1                | 1220.0      | 7.63                                                            | 750.1                | 1260.0      | 9.90                                                             |
| 286.4                | 963.6       | 7.03                                                           | 790.1                | 1280.0      | 7.69                                                            | 730.1                | 1280.0      | 9.90                                                             |
| 240.3                | 1009.7      | 7.04                                                           | 850.1                | 1340.0      | 7.87                                                            | 710.1                | 1300.0      | 9.81                                                             |
| 205.8                | 1044.2      | 6.87                                                           | 910.1                | 1400.0      | 8.19                                                            | 690.1                | 1320.0      | 9.90                                                             |
| 159.7                | 1090.3      | 6.72                                                           | 950.1                | 1440.0      | 8.42                                                            | 670.1                | 1340.0      | 9.82                                                             |
| 125.2                | 1124.8      | 6.72                                                           | 1010.1               | 1500.0      | 8.76                                                            | 650.1                | 1360.0      | 9.80                                                             |
| 79.1                 | 1170.9      | 6.55                                                           | 1050.1               | 1540.0      | 8.89                                                            | 630.1                | 1380.0      | 9.75                                                             |
| 44.5                 | 1205.5      | 6.51                                                           | 1110.1               | 1600.0      | 9.08                                                            | 610.1                | 1400.0      | 9.63                                                             |
| 10.0                 | 1260.0      | 6.58                                                           | 1150.1               | 1640.0      | 9.10                                                            | 570.1                | 1440.0      | 9.51                                                             |
| 95.5                 | 1345.5      | 6.58                                                           | 1210.1               | 1700.0      | 9.28                                                            | 550.1                | 1460.0      | 9.48                                                             |
| 209.4                | 1459.4      | 6.78                                                           | 1250.1               | 1740.0      | 9.26                                                            | 510.1                | 1500.0      | 9.23                                                             |
| 294.8                | 1544.8      | 7.08                                                           | 1310.1               | 1800.0      | 9.33                                                            | 490.1                | 1520.0      | 9.19                                                             |
| 408.8                | 1658.8      | 7.79                                                           | 1350.1               | 1840.0      | 9.34                                                            | 450.1                | 1560.0      | 9.00                                                             |
| 494.2                | 1744.2      | 8.27                                                           | 1410.1               | 1900.0      | 9.32                                                            | 430.1                | 1580.0      | 8.80                                                             |
| 608.2                | 1858.2      | 8.70                                                           | 1450.1               | 1940.0      | 9.38                                                            | 390.1                | 1620.0      | 8.66                                                             |
| 693.6                | 1943.6      | 8.86                                                           | 1510.1               | 2000.0      | 9.37                                                            | 370.1                | 1640.0      | 8.53                                                             |
| 807.6                | 2057.6      | 8.84                                                           | 1550.1               | 2040.0      | 9.46                                                            | 330.1                | 1680.0      | 8.35                                                             |
| 893.0                | 2143.0      | 8.85                                                           | 1610.1               | 2100.0      | 9.42                                                            | 310.1                | 1700.0      | 8.27                                                             |
| 1007.0               | 2257.0      | 8.94                                                           | 1650.1               | 2140.0      | 9.49                                                            | 270.1                | 1740.0      | 8.11                                                             |
| 1092.4               | 2342.4      | 9.01                                                           | 1710.1               | 2200.0      | 9.42                                                            | 250.1                | 1760.0      | 8.07                                                             |
| 1206.4               | 2456.4      | 9.01                                                           | 1750.1               | 2240.0      | 9.59                                                            | 210.1                | 1800.0      | 7.94                                                             |
| 1291.8               | 2541.8      | 9.08                                                           | 1810.1               | 2300.0      | 9.54                                                            | 190.1                | 1820.0      | 7.89                                                             |
| 1405.8               | 2655.8      | 9.05                                                           | 1850.1               | 2340.0      | 9.72                                                            | 150.1                | 1860.0      | 7.84                                                             |
| 1491.2               | 2741.2      | 9.10                                                           | 1910.1               | 2400.0      | 9.61                                                            | 130.1                | 1880.0      | 7.80                                                             |
| 1605.2               | 2855.2      | 9.21                                                           | 1950.1               | 2440.0      | 9.85                                                            | 90.1                 | 1920.0      | 7.72                                                             |
| 1690.6               | 2940.6      | 9.30                                                           | 2010.1               | 2500.0      | 9.88                                                            | 70.1                 | 1940.0      | 7.73                                                             |
| 1804.5               | 3054.5      | 9.70                                                           | 2050.1               | 2540.0      | 10.22                                                           | 30.1                 | 1980.0      | 7.69                                                             |
| 1890.0               | 3140.0      | 10.21                                                          | 2110.1               | 2600.0      | 10.30                                                           | 10.1                 | 2000.0      | 7.70                                                             |

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## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +12                     | +15   | +18   | +12                     | +15   | +18   |
| 410.1       | 54.01                   | 54.45 | 54.91 | 47.68                   | 46.75 | 46.06 |
| 470.1       | 51.36                   | 51.77 | 52.01 | 46.32                   | 45.70 | 45.18 |
| 530.1       | 48.76                   | 49.32 | 49.95 | 45.69                   | 45.02 | 44.30 |
| 590.1       | 47.31                   | 48.36 | 49.55 | 45.58                   | 44.80 | 44.02 |
| 650.1       | 44.95                   | 45.65 | 46.02 | 46.99                   | 46.84 | 46.27 |
| 710.1       | 41.47                   | 40.86 | 40.95 | 52.38                   | 50.05 | 47.56 |
| 770.1       | 40.00                   | 40.21 | 40.27 | 50.24                   | 48.10 | 46.46 |
| 830.1       | 39.06                   | 39.31 | 39.67 | 52.29                   | 50.01 | 48.53 |
| 890.1       | 38.82                   | 39.33 | 39.77 | 57.01                   | 55.31 | 53.51 |
| 950.1       | 40.42                   | 41.74 | 42.86 | 53.81                   | 52.02 | 50.86 |
| 1010.1      | 38.28                   | 38.85 | 39.28 | 62.56                   | 61.87 | 57.39 |
| 1070.1      | 36.83                   | 37.41 | 37.94 | 43.72                   | 44.32 | 44.52 |
| 1130.1      | 36.51                   | 37.56 | 38.51 | 38.97                   | 39.60 | 39.81 |
| 1190.1      | 36.40                   | 37.42 | 38.53 | 36.41                   | 37.12 | 37.63 |
| 1250.1      | 36.83                   | 37.66 | 38.58 | 35.04                   | 35.62 | 36.15 |
| 1310.1      | 37.21                   | 37.90 | 38.66 | 34.60                   | 35.16 | 35.72 |
| 1370.1      | 37.81                   | 38.65 | 39.51 | 34.09                   | 34.79 | 35.37 |
| 1430.1      | 38.71                   | 39.64 | 40.51 | 33.52                   | 34.29 | 34.95 |
| 1490.1      | 39.58                   | 40.62 | 41.55 | 33.07                   | 33.79 | 34.47 |
| 1550.1      | 40.23                   | 41.44 | 42.30 | 32.96                   | 33.72 | 34.28 |
| 1610.1      | 40.30                   | 41.72 | 42.71 | 32.68                   | 33.50 | 33.98 |
| 1670.1      | 40.02                   | 41.44 | 42.65 | 32.63                   | 33.27 | 33.85 |
| 1730.1      | 39.55                   | 41.11 | 42.40 | 33.07                   | 33.62 | 34.18 |
| 1790.1      | 38.94                   | 40.68 | 42.11 | 33.86                   | 34.45 | 34.89 |
| 1850.1      | 39.20                   | 40.54 | 41.74 | 34.68                   | 35.59 | 36.19 |
| 1910.1      | 39.73                   | 40.81 | 41.77 | 35.06                   | 36.11 | 36.84 |
| 1970.1      | 39.78                   | 40.81 | 41.64 | 35.01                   | 36.02 | 36.71 |
| 2030.1      | 39.87                   | 40.89 | 41.60 | 35.36                   | 36.33 | 36.98 |
| 2070.1      | 39.97                   | 41.16 | 41.99 | 35.24                   | 36.18 | 36.89 |
| 2130.1      | 40.11                   | 41.38 | 42.24 | 35.64                   | 36.52 | 37.18 |
| 2170.1      | 40.48                   | 42.00 | 42.95 | 35.74                   | 36.55 | 37.11 |
| 2230.1      | 40.47                   | 41.99 | 43.12 | 36.25                   | 37.01 | 37.60 |
| 2270.1      | 40.74                   | 42.26 | 43.41 | 36.55                   | 37.24 | 37.81 |
| 2330.1      | 41.11                   | 42.76 | 44.14 | 36.88                   | 37.72 | 38.35 |
| 2370.1      | 41.78                   | 43.43 | 44.97 | 37.16                   | 37.90 | 38.68 |
| 2430.1      | 42.49                   | 44.33 | 46.14 | 37.48                   | 38.40 | 39.32 |
| 2470.1      | 43.90                   | 46.18 | 48.32 | 37.88                   | 38.93 | 39.94 |
| 2530.1      | 45.58                   | 47.73 | 50.03 | 38.08                   | 39.41 | 40.71 |
| 2570.1      | 46.63                   | 48.06 | 49.41 | 38.24                   | 39.75 | 41.19 |
| 2630.1      | 49.12                   | 48.06 | 47.90 | 37.60                   | 39.07 | 40.38 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +12                     | +15   | +18   |
| 380.1               | 410.1       | 42.30                   | 37.17 | 32.14 |
| 440.1               | 470.1       | 40.69                   | 38.11 | 36.83 |
| 500.1               | 530.1       | 39.94                   | 38.80 | 38.42 |
| 560.1               | 590.1       | 41.08                   | 44.76 | 48.93 |
| 620.1               | 650.1       | 39.65                   | 39.36 | 37.81 |
| 680.1               | 710.1       | 36.55                   | 36.79 | 42.71 |
| 740.1               | 770.1       | 38.46                   | 46.20 | 50.61 |
| 800.1               | 830.1       | 39.25                   | 41.96 | 43.23 |
| 860.1               | 890.1       | 43.05                   | 45.15 | 46.73 |
| 920.1               | 950.1       | 41.85                   | 42.55 | 42.79 |
| 980.1               | 1010.1      | 44.94                   | 46.93 | 47.65 |
| 1040.1              | 1070.1      | 45.34                   | 45.56 | 44.52 |
| 1100.1              | 1130.1      | 45.12                   | 44.88 | 43.84 |
| 1160.1              | 1190.1      | 45.39                   | 44.69 | 43.68 |
| 1220.1              | 1250.1      | 42.10                   | 40.51 | 38.76 |
| 1280.1              | 1310.1      | 39.94                   | 37.91 | 36.36 |
| 1340.1              | 1370.1      | 43.30                   | 41.61 | 40.30 |
| 1400.1              | 1430.1      | 47.16                   | 49.42 | 47.12 |
| 1460.1              | 1490.1      | 44.74                   | 49.76 | 52.58 |
| 1520.1              | 1550.1      | 45.58                   | 49.11 | 51.91 |
| 1580.1              | 1610.1      | 45.74                   | 47.84 | 49.83 |
| 1640.1              | 1670.1      | 47.40                   | 47.07 | 47.84 |
| 1700.1              | 1730.1      | 48.52                   | 46.86 | 46.84 |
| 1760.1              | 1790.1      | 44.56                   | 44.49 | 43.58 |
| 1820.1              | 1850.1      | 40.77                   | 43.03 | 42.98 |
| 1880.1              | 1910.1      | 37.78                   | 40.71 | 42.68 |
| 1940.1              | 1970.1      | 35.53                   | 37.95 | 40.54 |
| 2000.1              | 2030.1      | 35.33                   | 37.83 | 40.61 |
| 2040.1              | 2070.1      | 35.26                   | 37.71 | 40.43 |
| 2100.1              | 2130.1      | 35.79                   | 38.09 | 40.54 |
| 2140.1              | 2170.1      | 36.07                   | 38.24 | 40.44 |
| 2200.1              | 2230.1      | 36.48                   | 38.54 | 40.33 |
| 2240.1              | 2270.1      | 36.94                   | 39.03 | 40.69 |
| 2300.1              | 2330.1      | 37.60                   | 39.76 | 41.55 |
| 2340.1              | 2370.1      | 38.18                   | 40.70 | 42.68 |
| 2400.1              | 2430.1      | 38.11                   | 41.04 | 43.92 |
| 2440.1              | 2470.1      | 38.45                   | 42.08 | 46.22 |
| 2500.1              | 2530.1      | 37.53                   | 41.59 | 47.46 |
| 2540.1              | 2570.1      | 37.66                   | 41.83 | 46.16 |
| 2600.1              | 2630.1      | 36.20                   | 39.26 | 40.79 |

# Frequency Mixer

# HJK-ED11431/1

## 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=2000MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|-------|-------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |       |       |                      | @LO (dBm)                      |      |      |
|                     |             | +12             | +15  | +18  |             | +12             | +15   | +18   |                      | +12                            | +15  | +18  |
| 380.1               | 410.1       | 3.17            | 2.57 | 2.15 | 410.1       | 33.42           | 32.79 | 32.79 | 10.0                 | 1.57                           | 1.36 | 1.20 |
| 440.1               | 470.1       | 2.93            | 2.37 | 2.03 | 470.1       | 29.46           | 29.46 | 28.96 | 50.0                 | 1.60                           | 1.39 | 1.24 |
| 500.1               | 530.1       | 2.58            | 2.12 | 1.84 | 530.1       | 24.83           | 24.48 | 24.14 | 90.0                 | 1.71                           | 1.52 | 1.39 |
| 560.1               | 590.1       | 2.30            | 1.97 | 1.75 | 590.1       | 20.45           | 19.98 | 19.54 | 130.0                | 1.79                           | 1.60 | 1.48 |
| 620.1               | 650.1       | 2.14            | 1.88 | 1.72 | 650.1       | 16.41           | 15.53 | 14.87 | 170.0                | 1.99                           | 1.80 | 1.67 |
| 680.1               | 710.1       | 1.88            | 1.43 | 1.28 | 710.1       | 12.89           | 12.61 | 12.52 | 210.0                | 2.10                           | 1.92 | 1.81 |
| 740.1               | 770.1       | 1.55            | 1.29 | 1.28 | 770.1       | 10.43           | 10.19 | 9.96  | 250.0                | 2.30                           | 2.12 | 1.98 |
| 800.1               | 830.1       | 1.41            | 1.25 | 1.27 | 830.1       | 7.90            | 7.70  | 7.53  | 310.0                | 2.60                           | 2.41 | 2.27 |
| 860.1               | 890.1       | 1.28            | 1.21 | 1.26 | 890.1       | 5.66            | 5.49  | 5.34  | 350.0                | 2.74                           | 2.55 | 2.41 |
| 920.1               | 950.1       | 1.19            | 1.21 | 1.28 | 950.1       | 3.93            | 3.76  | 3.64  | 410.0                | 2.97                           | 2.77 | 2.62 |
| 980.1               | 1010.1      | 1.17            | 1.29 | 1.41 | 1010.1      | 2.89            | 2.78  | 2.71  | 450.0                | 3.23                           | 3.00 | 2.84 |
| 1040.1              | 1070.1      | 1.19            | 1.33 | 1.46 | 1070.1      | 2.35            | 2.31  | 2.28  | 510.0                | 3.45                           | 3.21 | 3.05 |
| 1100.1              | 1130.1      | 1.20            | 1.36 | 1.51 | 1130.1      | 2.37            | 2.39  | 2.41  | 550.0                | 3.51                           | 3.26 | 3.10 |
| 1160.1              | 1190.1      | 1.21            | 1.37 | 1.53 | 1190.1      | 2.88            | 2.95  | 3.01  | 610.0                | 3.65                           | 3.38 | 3.21 |
| 1220.1              | 1250.1      | 1.21            | 1.39 | 1.54 | 1250.1      | 3.73            | 3.86  | 3.97  | 650.0                | 3.79                           | 3.53 | 3.34 |
| 1280.1              | 1310.1      | 1.21            | 1.38 | 1.54 | 1310.1      | 4.83            | 4.99  | 5.13  | 710.0                | 3.79                           | 3.54 | 3.36 |
| 1340.1              | 1370.1      | 1.22            | 1.40 | 1.55 | 1370.1      | 6.13            | 6.32  | 6.49  | 750.0                | 3.67                           | 3.43 | 3.26 |
| 1400.1              | 1430.1      | 1.24            | 1.43 | 1.59 | 1430.1      | 7.53            | 7.80  | 8.01  | 810.0                | 3.64                           | 3.37 | 3.20 |
| 1460.1              | 1490.1      | 1.25            | 1.45 | 1.62 | 1490.1      | 8.90            | 9.13  | 9.28  | 850.0                | 3.65                           | 3.39 | 3.22 |
| 1520.1              | 1550.1      | 1.31            | 1.53 | 1.72 | 1550.1      | 10.25           | 10.43 | 10.56 | 910.0                | 3.50                           | 3.24 | 3.07 |
| 1580.1              | 1610.1      | 1.32            | 1.56 | 1.77 | 1610.1      | 11.31           | 11.53 | 11.69 | 950.0                | 3.33                           | 3.07 | 2.90 |
| 1640.1              | 1670.1      | 1.35            | 1.62 | 1.84 | 1670.1      | 12.18           | 12.26 | 12.09 | 1010.0               | 3.18                           | 2.92 | 2.75 |
| 1700.1              | 1730.1      | 1.41            | 1.70 | 1.94 | 1730.1      | 12.80           | 12.89 | 12.80 | 1050.0               | 3.10                           | 2.83 | 2.67 |
| 1760.1              | 1790.1      | 1.44            | 1.73 | 2.00 | 1790.1      | 13.19           | 13.29 | 13.09 | 1110.0               | 2.89                           | 2.62 | 2.46 |
| 1820.1              | 1850.1      | 1.53            | 1.83 | 2.11 | 1850.1      | 13.19           | 13.09 | 12.71 | 1150.0               | 2.74                           | 2.47 | 2.31 |
| 1880.1              | 1910.1      | 1.67            | 1.97 | 2.26 | 1910.1      | 13.39           | 13.39 | 13.19 | 1210.0               | 2.54                           | 2.28 | 2.13 |
| 1940.1              | 1970.1      | 1.79            | 2.09 | 2.39 | 1970.1      | 13.09           | 12.99 | 12.52 | 1250.0               | 2.44                           | 2.19 | 2.04 |
| 2000.1              | 2030.1      | 1.99            | 2.30 | 2.60 | 2030.1      | 12.89           | 12.71 | 12.35 | 1310.0               | 2.24                           | 2.00 | 1.87 |
| 2040.1              | 2070.1      | 2.10            | 2.40 | 2.71 | 2070.1      | 12.80           | 12.61 | 12.26 | 1350.0               | 2.12                           | 1.88 | 1.75 |
| 2100.1              | 2130.1      | 2.31            | 2.61 | 2.91 | 2130.1      | 12.61           | 12.35 | 11.93 | 1410.0               | 1.96                           | 1.74 | 1.62 |
| 2140.1              | 2170.1      | 2.43            | 2.71 | 3.02 | 2170.1      | 12.44           | 12.26 | 11.93 | 1450.0               | 1.86                           | 1.66 | 1.56 |
| 2200.1              | 2230.1      | 2.64            | 2.89 | 3.18 | 2230.1      | 12.18           | 11.93 | 11.46 | 1510.0               | 1.71                           | 1.53 | 1.44 |
| 2240.1              | 2270.1      | 2.81            | 3.03 | 3.31 | 2270.1      | 12.01           | 11.85 | 11.61 | 1550.0               | 1.61                           | 1.44 | 1.37 |
| 2300.1              | 2330.1      | 3.07            | 3.21 | 3.44 | 2330.1      | 11.77           | 11.46 | 10.96 | 1610.0               | 1.51                           | 1.37 | 1.32 |
| 2340.1              | 2370.1      | 3.26            | 3.38 | 3.58 | 2370.1      | 11.61           | 11.46 | 11.17 | 1650.0               | 1.43                           | 1.32 | 1.31 |
| 2400.1              | 2430.1      | 3.63            | 3.67 | 3.82 | 2430.1      | 11.24           | 10.89 | 10.37 | 1710.0               | 1.36                           | 1.28 | 1.32 |
| 2440.1              | 2470.1      | 3.86            | 3.89 | 4.02 | 2470.1      | 11.03           | 10.82 | 10.56 | 1750.0               | 1.31                           | 1.26 | 1.32 |
| 2500.1              | 2530.1      | 4.14            | 4.08 | 4.15 | 2530.1      | 10.43           | 10.07 | 9.48  | 1810.0               | 1.29                           | 1.29 | 1.38 |
| 2540.1              | 2570.1      | 4.52            | 4.45 | 4.52 | 2570.1      | 10.19           | 9.96  | 9.69  | 1850.0               | 1.28                           | 1.33 | 1.45 |
| 2600.1              | 2630.1      | 5.00            | 4.82 | 4.83 | 2630.1      | 9.48            | 9.13  | 8.64  | 1910.0               | 1.31                           | 1.42 | 1.56 |

REV. X3

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101012

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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 13  | 17  | 32  | 27  | 36  | 41  | 46  | 46  | 46  | 57  |
| 1  | -      | 34     | +0  | 42  | 18  | 51  | 26  | 47  | 38  | 61  | 47  | 71  |
| 2  | 66     | 62     | 51  | >83 | 50  | 68  | 59  | 69  | 64  | 66  | 68  | 67  |
| 3  | >90    | >83    | 62  | 78  | 62  | 74  | 65  | >83 | 68  | 82  | 78  | >83 |
| 4  | >90    | >83    | >83 | >83 | >83 | >83 | 80  | >83 | >83 | >83 | >83 | >83 |
| 5  | >90    | >83    | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 |
| 6  | >90    | >83    | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 |
| 7  | >90    | >83    | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 |
| 8  | >90    | >83    | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 |
| 9  | >90    | >83    | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 |
| 10 | >90    | >83    | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 | >83 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 1250 MHz; -1.00 dBm.  
LO IN: 1280 MHz; +15.00 dBm  
IF OUT: 30 MHz; -7.5 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 24  | 27  | 44  | 37  | 45  | 46  | 56  | 49  | 60  | 63  |
| 1  | -      | 33     | +0  | 44  | 19  | 49  | 27  | 48  | 40  | 62  | 50  | 76  |
| 2  | 46     | 51     | 40  | 71  | 41  | 61  | 49  | 60  | 56  | 58  | 60  | 60  |
| 3  | 74     | 81     | 44  | 60  | 41  | 59  | 46  | 73  | 50  | 68  | 58  | 78  |
| 4  | >90    | 88     | 68  | 77  | 64  | 78  | 60  | 75  | 66  | 78  | 69  | 74  |
| 5  | >90    | >92    | 86  | 88  | 65  | 81  | 65  | 73  | 68  | 86  | 69  | 80  |
| 6  | >90    | >92    | 89  | 90  | 78  | 82  | 77  | 78  | 69  | 81  | 78  | 88  |
| 7  | >90    | >92    | >92 | >92 | 90  | 91  | 83  | 92  | 82  | 83  | 83  | >92 |
| 8  | >90    | >92    | >92 | >92 | >92 | >92 | 88  | 88  | 89  | 85  | 82  | 91  |
| 9  | >90    | >92    | >92 | >92 | >92 | >92 | >92 | >92 | 92  | >92 | 85  | 92  |
| 10 | >90    | >92    | >92 | >92 | >92 | >92 | >92 | >92 | >92 | >92 | >92 | >92 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 1250 MHz; 9.00 dBm.  
LO IN: 1280 MHz; +15.00 dBm  
IF OUT: 30 MHz; 2.38 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.