

# Frequency Mixer

HJK-ED9603/1

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=20MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +19                                                   | +21   | +23   |
| 110.1               | 90.1        | 5.36                                                  | 5.29  | 5.25  |
| 190.1               | 170.1       | 5.42                                                  | 5.37  | 5.33  |
| 270.1               | 250.1       | 5.65                                                  | 5.53  | 5.42  |
| 350.1               | 330.1       | 5.97                                                  | 5.70  | 5.50  |
| 430.1               | 410.1       | 6.45                                                  | 6.02  | 5.76  |
| 510.1               | 490.1       | 6.65                                                  | 6.25  | 6.02  |
| 590.1               | 570.1       | 6.47                                                  | 6.17  | 6.00  |
| 670.1               | 650.1       | 6.45                                                  | 6.20  | 6.04  |
| 750.1               | 730.1       | 7.02                                                  | 6.73  | 6.54  |
| 830.1               | 810.1       | 7.27                                                  | 7.00  | 6.82  |
| 910.1               | 890.1       | 7.38                                                  | 7.17  | 7.04  |
| 990.1               | 970.1       | 7.21                                                  | 7.07  | 6.98  |
| 1070.1              | 1050.1      | 6.90                                                  | 6.81  | 6.75  |
| 1150.1              | 1130.1      | 6.61                                                  | 6.54  | 6.51  |
| 1230.1              | 1210.1      | 6.42                                                  | 6.36  | 6.33  |
| 1310.1              | 1290.1      | 6.49                                                  | 6.41  | 6.38  |
| 1390.1              | 1370.1      | 6.88                                                  | 6.77  | 6.71  |
| 1470.1              | 1450.1      | 7.38                                                  | 7.20  | 7.10  |
| 1550.1              | 1530.1      | 7.66                                                  | 7.42  | 7.28  |
| 1630.1              | 1610.1      | 7.81                                                  | 7.52  | 7.35  |
| 1730.1              | 1710.1      | 7.90                                                  | 7.61  | 7.43  |
| 1810.1              | 1790.1      | 7.71                                                  | 7.47  | 7.32  |
| 1910.1              | 1890.1      | 7.60                                                  | 7.39  | 7.25  |
| 1990.1              | 1970.1      | 7.46                                                  | 7.28  | 7.15  |
| 2090.1              | 2070.1      | 7.41                                                  | 7.25  | 7.16  |
| 2170.1              | 2150.1      | 7.31                                                  | 7.19  | 7.13  |
| 2270.1              | 2250.1      | 7.32                                                  | 7.22  | 7.18  |
| 2350.1              | 2330.1      | 7.34                                                  | 7.24  | 7.20  |
| 2450.1              | 2430.1      | 7.44                                                  | 7.33  | 7.28  |
| 2530.1              | 2510.1      | 7.64                                                  | 7.54  | 7.48  |
| 2630.1              | 2610.1      | 7.92                                                  | 7.82  | 7.76  |
| 2710.1              | 2690.1      | 8.20                                                  | 8.08  | 8.01  |
| 2810.1              | 2790.1      | 8.60                                                  | 8.47  | 8.38  |
| 2890.1              | 2870.1      | 8.99                                                  | 8.84  | 8.74  |
| 2990.1              | 2970.1      | 9.51                                                  | 9.31  | 9.20  |
| 3070.1              | 3050.1      | 9.88                                                  | 9.68  | 9.53  |
| 3170.1              | 3150.1      | 10.50                                                 | 10.24 | 10.05 |
| 3250.1              | 3230.1      | 11.01                                                 | 10.66 | 10.41 |
| 3350.1              | 3330.1      | 11.68                                                 | 11.25 | 10.90 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +19                | +21   | +23   |
| 110.1               | 90.1        | 29.85              | 26.19 | 24.19 |
| 190.1               | 170.1       | 20.58              | 20.91 | 21.92 |
| 270.1               | 250.1       | 19.07              | 20.48 | 22.66 |
| 350.1               | 330.1       | 19.29              | 21.86 | 25.09 |
| 430.1               | 410.1       | 20.06              | 23.15 | 26.27 |
| 510.1               | 490.1       | 23.84              | 26.42 | 28.64 |
| 590.1               | 570.1       | 26.93              | 27.34 | 27.26 |
| 670.1               | 650.1       | 30.02              | 29.82 | 29.44 |
| 750.1               | 730.1       | 26.49              | 27.38 | 28.06 |
| 830.1               | 810.1       | 24.03              | 25.08 | 25.80 |
| 910.1               | 890.1       | 22.83              | 23.77 | 24.57 |
| 990.1               | 970.1       | 22.87              | 23.67 | 24.22 |
| 1070.1              | 1050.1      | 23.26              | 23.87 | 24.35 |
| 1150.1              | 1130.1      | 24.07              | 24.48 | 24.60 |
| 1230.1              | 1210.1      | 25.06              | 25.35 | 25.72 |
| 1310.1              | 1290.1      | 28.52              | 27.60 | 27.35 |
| 1390.1              | 1370.1      | 34.87              | 33.49 | 31.55 |
| 1470.1              | 1450.1      | 34.92              | 39.37 | 34.94 |
| 1550.1              | 1530.1      | 31.93              | 35.69 | 32.69 |
| 1630.1              | 1610.1      | 32.68              | 31.50 | 30.48 |
| 1730.1              | 1710.1      | 28.27              | 26.90 | 26.94 |
| 1810.1              | 1790.1      | 26.16              | 25.76 | 25.89 |
| 1910.1              | 1890.1      | 24.89              | 25.07 | 25.14 |
| 1990.1              | 1970.1      | 26.06              | 24.71 | 24.65 |
| 2090.1              | 2070.1      | 24.86              | 25.08 | 25.18 |
| 2170.1              | 2150.1      | 24.49              | 24.03 | 24.51 |
| 2270.1              | 2250.1      | 23.68              | 23.24 | 23.27 |
| 2350.1              | 2330.1      | 22.75              | 22.93 | 23.02 |
| 2450.1              | 2430.1      | 22.84              | 23.23 | 23.46 |
| 2530.1              | 2510.1      | 22.87              | 23.33 | 23.74 |
| 2630.1              | 2610.1      | 22.94              | 23.52 | 23.89 |
| 2710.1              | 2690.1      | 24.11              | 23.58 | 24.05 |
| 2810.1              | 2790.1      | 23.32              | 23.60 | 24.00 |
| 2890.1              | 2870.1      | 23.94              | 23.88 | 24.49 |
| 2990.1              | 2970.1      | 23.82              | 24.62 | 25.56 |
| 3070.1              | 3050.1      | 24.61              | 25.68 | 26.68 |
| 3170.1              | 3150.1      | 26.89              | 31.42 | 28.07 |
| 3250.1              | 3230.1      | 29.87              | 29.49 | 29.13 |
| 3350.1              | 3330.1      | 30.57              | 32.65 | 30.03 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+16dBm<br>(dB) |      |      |
|---------------------|-------------|--------------------------------------|------|------|
|                     |             | @LO (dBm)                            |      |      |
|                     |             | +19                                  | +21  | +23  |
| 110.1               | 90.1        | 1.87                                 | 1.65 | 1.45 |
| 190.1               | 170.1       | 1.64                                 | 1.44 | 1.27 |
| 270.1               | 250.1       | 2.05                                 | 1.84 | 1.66 |
| 350.1               | 330.1       | 2.47                                 | 2.33 | 2.14 |
| 430.1               | 410.1       | 2.60                                 | 2.52 | 2.32 |
| 510.1               | 490.1       | 2.53                                 | 2.42 | 2.25 |
| 590.1               | 570.1       | 2.63                                 | 2.44 | 2.24 |
| 670.1               | 650.1       | 2.61                                 | 2.43 | 2.25 |
| 750.1               | 730.1       | 2.14                                 | 2.00 | 1.87 |
| 830.1               | 810.1       | 1.81                                 | 1.69 | 1.58 |
| 910.1               | 890.1       | 1.54                                 | 1.42 | 1.30 |
| 990.1               | 970.1       | 1.52                                 | 1.38 | 1.24 |
| 1070.1              | 1050.1      | 1.47                                 | 1.34 | 1.21 |
| 1150.1              | 1130.1      | 1.19                                 | 1.10 | 1.01 |
| 1230.1              | 1210.1      | 0.84                                 | 0.74 | 0.68 |
| 1310.1              | 1290.1      | 0.62                                 | 0.46 | 0.37 |
| 1390.1              | 1370.1      | 0.72                                 | 0.57 | 0.45 |
| 1470.1              | 1450.1      | 0.85                                 | 0.74 | 0.64 |
| 1550.1              | 1530.1      | 0.96                                 | 0.86 | 0.78 |
| 1630.1              | 1610.1      | 1.07                                 | 0.98 | 0.90 |
| 1730.1              | 1710.1      | 1.09                                 | 1.03 | 0.96 |
| 1810.1              | 1790.1      | 1.26                                 | 1.18 | 1.10 |
| 1910.1              | 1890.1      | 1.45                                 | 1.35 | 1.28 |
| 1990.1              | 1970.1      | 1.61                                 | 1.49 | 1.40 |
| 2090.1              | 2070.1      | 1.58                                 | 1.47 | 1.37 |
| 2170.1              | 2150.1      | 1.63                                 | 1.49 | 1.39 |
| 2270.1              | 2250.1      | 1.63                                 | 1.48 | 1.36 |
| 2350.1              | 2330.1      | 1.62                                 | 1.43 | 1.31 |
| 2450.1              | 2430.1      | 1.52                                 | 1.30 | 1.17 |
| 2530.1              | 2510.1      | 1.40                                 | 1.18 | 1.06 |
| 2630.1              | 2610.1      | 1.29                                 | 1.03 | 0.88 |
| 2710.1              | 2690.1      | 1.33                                 | 0.98 | 0.77 |
| 2810.1              | 2790.1      | 1.39                                 | 0.92 | 0.69 |
| 2890.1              | 2870.1      | 1.42                                 | 0.88 | 0.60 |
| 2990.1              | 2970.1      | 1.35                                 | 0.75 | 0.48 |
| 3070.1              | 3050.1      | 1.31                                 | 0.80 | 0.47 |
| 3170.1              | 3150.1      | 1.21                                 | 0.77 | 0.47 |
| 3250.1              | 3230.1      | 1.14                                 | 0.73 | 0.50 |
| 3350.1              | 3330.1      | 0.98                                 | 0.67 | 0.47 |

REV. X2

HJK-ED9603/1

101012

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant  
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## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=320MHz<br>(dB) |
|----------------------|-------------|---------------------------------------------------------------|
|                      |             | @LO (dBm)                                                     |
|                      |             | +21                                                           |
| 309.9                | 10.1        | 5.64                                                          |
| 298.8                | 21.2        | 5.60                                                          |
| 287.7                | 32.3        | 5.51                                                          |
| 276.6                | 43.4        | 5.52                                                          |
| 265.5                | 54.5        | 5.47                                                          |
| 254.4                | 65.6        | 5.44                                                          |
| 243.3                | 76.7        | 5.51                                                          |
| 232.1                | 87.9        | 5.42                                                          |
| 209.9                | 110.1       | 5.61                                                          |
| 198.8                | 121.2       | 5.59                                                          |
| 176.6                | 143.4       | 5.65                                                          |
| 165.5                | 154.5       | 5.65                                                          |
| 143.3                | 176.7       | 5.66                                                          |
| 132.2                | 187.8       | 5.76                                                          |
| 110.0                | 210.0       | 5.68                                                          |
| 98.9                 | 221.1       | 5.70                                                          |
| 76.6                 | 243.4       | 5.65                                                          |
| 65.5                 | 254.5       | 5.49                                                          |
| 43.3                 | 276.7       | 5.65                                                          |
| 32.2                 | 287.8       | 5.56                                                          |
| 10.0                 | 310.0       | 6.01                                                          |
| 10.0                 | 330.0       | 5.95                                                          |
| 69.3                 | 389.3       | 5.58                                                          |
| 98.9                 | 418.9       | 5.35                                                          |
| 158.2                | 478.2       | 5.45                                                          |
| 187.8                | 507.8       | 5.54                                                          |
| 247.1                | 567.1       | 5.64                                                          |
| 276.7                | 596.7       | 5.70                                                          |
| 336.0                | 656.0       | 5.57                                                          |
| 365.6                | 685.6       | 5.60                                                          |
| 424.9                | 744.9       | 5.80                                                          |
| 454.5                | 774.5       | 6.00                                                          |
| 513.8                | 833.8       | 6.76                                                          |
| 543.4                | 863.4       | 7.13                                                          |
| 602.7                | 922.7       | 8.26                                                          |
| 632.3                | 952.3       | 8.77                                                          |
| 691.6                | 1011.6      | 9.57                                                          |
| 721.2                | 1041.2      | 10.04                                                         |
| 780.5                | 1100.5      | 10.61                                                         |
| 810.1                | 1130.1      | 11.13                                                         |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=315.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                       |
|                      |             | +21                                                             |
| 10.0                 | 325.1       | 6.02                                                            |
| 30.0                 | 345.1       | 5.54                                                            |
| 50.0                 | 365.1       | 5.49                                                            |
| 70.0                 | 385.1       | 5.61                                                            |
| 90.0                 | 405.1       | 5.36                                                            |
| 110.0                | 425.1       | 5.56                                                            |
| 130.0                | 445.1       | 5.55                                                            |
| 150.0                | 465.1       | 5.46                                                            |
| 170.0                | 485.1       | 5.57                                                            |
| 190.0                | 505.1       | 5.53                                                            |
| 210.0                | 525.1       | 5.64                                                            |
| 230.0                | 545.1       | 5.64                                                            |
| 250.0                | 565.1       | 5.64                                                            |
| 270.0                | 585.1       | 5.66                                                            |
| 290.0                | 605.1       | 5.58                                                            |
| 310.0                | 625.1       | 5.60                                                            |
| 330.0                | 645.1       | 5.64                                                            |
| 350.0                | 665.1       | 5.65                                                            |
| 370.0                | 685.1       | 5.65                                                            |
| 390.0                | 705.1       | 5.67                                                            |
| 410.0                | 725.1       | 5.76                                                            |
| 430.0                | 745.1       | 5.81                                                            |
| 450.0                | 765.1       | 5.99                                                            |
| 470.0                | 785.1       | 6.10                                                            |
| 490.0                | 805.1       | 6.37                                                            |
| 510.0                | 825.1       | 6.61                                                            |
| 530.0                | 845.1       | 6.95                                                            |
| 550.0                | 865.1       | 7.25                                                            |
| 570.0                | 885.1       | 7.66                                                            |
| 590.0                | 905.1       | 8.06                                                            |
| 610.0                | 925.1       | 8.45                                                            |
| 630.0                | 945.1       | 8.78                                                            |
| 650.0                | 965.1       | 9.11                                                            |
| 670.0                | 985.1       | 9.38                                                            |
| 690.0                | 1005.1      | 9.62                                                            |
| 710.0                | 1025.1      | 9.89                                                            |
| 730.0                | 1045.1      | 10.09                                                           |
| 750.0                | 1065.1      | 10.31                                                           |
| 790.0                | 1105.1      | 10.79                                                           |
| 810.0                | 1125.1      | 11.13                                                           |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=326.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                       |
|                      |             | +21                                                             |
| 316.0                | 10.1        | 5.66                                                            |
| 310.0                | 16.1        | 5.61                                                            |
| 304.0                | 22.1        | 5.59                                                            |
| 298.0                | 28.1        | 5.57                                                            |
| 292.0                | 34.1        | 5.49                                                            |
| 286.0                | 40.1        | 5.54                                                            |
| 280.0                | 46.1        | 5.50                                                            |
| 274.0                | 52.1        | 5.44                                                            |
| 268.0                | 58.1        | 5.51                                                            |
| 262.0                | 64.1        | 5.47                                                            |
| 256.0                | 70.1        | 5.44                                                            |
| 250.0                | 76.1        | 5.51                                                            |
| 244.0                | 82.1        | 5.51                                                            |
| 238.0                | 88.1        | 5.44                                                            |
| 232.0                | 94.1        | 5.56                                                            |
| 226.0                | 100.1       | 5.55                                                            |
| 214.0                | 112.1       | 5.63                                                            |
| 208.0                | 118.1       | 5.64                                                            |
| 196.0                | 130.1       | 5.67                                                            |
| 190.0                | 136.1       | 5.68                                                            |
| 178.0                | 148.1       | 5.73                                                            |
| 172.0                | 154.1       | 5.70                                                            |
| 160.0                | 166.1       | 5.70                                                            |
| 154.0                | 172.1       | 5.73                                                            |
| 142.0                | 184.1       | 5.71                                                            |
| 136.0                | 190.1       | 5.79                                                            |
| 124.0                | 202.1       | 5.76                                                            |
| 118.0                | 208.1       | 5.77                                                            |
| 106.0                | 220.1       | 5.72                                                            |
| 100.0                | 226.1       | 5.69                                                            |
| 88.0                 | 238.1       | 5.64                                                            |
| 82.0                 | 244.1       | 5.62                                                            |
| 70.0                 | 256.1       | 5.58                                                            |
| 64.0                 | 262.1       | 5.64                                                            |
| 52.0                 | 274.1       | 5.70                                                            |
| 46.0                 | 280.1       | 5.74                                                            |
| 34.0                 | 292.1       | 5.63                                                            |
| 28.0                 | 298.1       | 5.71                                                            |
| 16.0                 | 310.1       | 5.68                                                            |
| 10.0                 | 316.1       | 6.03                                                            |

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +19                     | +21   | +23   | +19                     | +21   | +23   |
| 90.1        | 44.24                   | 45.03 | 45.55 | 55.02                   | 58.23 | 61.94 |
| 170.1       | 42.14                   | 42.10 | 42.09 | 56.51                   | 60.53 | 65.93 |
| 250.1       | 38.97                   | 38.95 | 38.99 | 57.17                   | 60.61 | 61.66 |
| 330.1       | 37.35                   | 37.38 | 37.25 | 56.42                   | 55.50 | 53.28 |
| 410.1       | 37.55                   | 37.38 | 37.04 | 52.72                   | 50.86 | 48.99 |
| 490.1       | 38.25                   | 37.77 | 37.29 | 48.94                   | 47.11 | 45.69 |
| 570.1       | 38.33                   | 37.88 | 37.43 | 46.38                   | 44.85 | 43.74 |
| 650.1       | 37.27                   | 37.02 | 36.70 | 43.24                   | 42.69 | 42.08 |
| 730.1       | 36.38                   | 36.51 | 36.55 | 42.08                   | 41.73 | 41.39 |
| 810.1       | 35.70                   | 36.15 | 36.48 | 41.84                   | 41.66 | 41.42 |
| 890.1       | 35.12                   | 35.70 | 36.19 | 42.08                   | 42.13 | 42.02 |
| 970.1       | 35.31                   | 35.95 | 36.41 | 41.83                   | 42.24 | 42.43 |
| 1050.1      | 35.32                   | 36.09 | 36.65 | 41.28                   | 42.05 | 42.70 |
| 1130.1      | 34.13                   | 34.99 | 35.65 | 40.92                   | 41.97 | 42.95 |
| 1210.1      | 33.17                   | 34.01 | 34.58 | 40.58                   | 41.79 | 42.96 |
| 1290.1      | 32.46                   | 33.27 | 33.89 | 40.29                   | 41.45 | 42.54 |
| 1370.1      | 32.20                   | 33.02 | 33.72 | 39.95                   | 40.87 | 41.63 |
| 1450.1      | 32.83                   | 33.88 | 34.83 | 39.59                   | 40.15 | 40.57 |
| 1530.1      | 33.71                   | 35.07 | 36.29 | 39.00                   | 39.20 | 39.23 |
| 1610.1      | 34.50                   | 36.01 | 37.48 | 38.32                   | 38.12 | 37.89 |
| 1710.1      | 35.02                   | 36.63 | 38.10 | 37.49                   | 37.03 | 36.58 |
| 1790.1      | 34.80                   | 36.28 | 37.66 | 36.80                   | 36.18 | 35.62 |
| 1890.1      | 33.90                   | 35.29 | 36.37 | 36.04                   | 35.34 | 34.70 |
| 1970.1      | 32.74                   | 34.13 | 35.25 | 35.44                   | 34.71 | 34.09 |
| 2070.1      | 31.64                   | 32.76 | 33.91 | 34.95                   | 34.22 | 33.78 |
| 2150.1      | 30.97                   | 31.92 | 32.93 | 34.28                   | 33.81 | 33.38 |
| 2250.1      | 30.32                   | 31.15 | 31.87 | 33.82                   | 33.48 | 33.00 |
| 2330.1      | 29.66                   | 30.51 | 31.22 | 33.55                   | 33.32 | 32.96 |
| 2430.1      | 29.13                   | 29.87 | 30.68 | 33.10                   | 32.93 | 32.89 |
| 2510.1      | 28.38                   | 29.15 | 29.82 | 32.61                   | 32.82 | 32.86 |
| 2610.1      | 28.13                   | 28.96 | 29.62 | 32.55                   | 32.92 | 33.12 |
| 2690.1      | 27.60                   | 28.35 | 28.92 | 32.41                   | 32.85 | 33.18 |
| 2790.1      | 27.87                   | 28.55 | 29.11 | 32.26                   | 32.74 | 33.22 |
| 2870.1      | 28.03                   | 28.77 | 29.42 | 32.21                   | 32.67 | 33.08 |
| 2970.1      | 28.53                   | 29.27 | 30.05 | 32.76                   | 33.09 | 33.32 |
| 3050.1      | 28.87                   | 29.81 | 30.56 | 32.98                   | 33.52 | 33.63 |
| 3150.1      | 29.59                   | 30.54 | 31.18 | 33.37                   | 33.87 | 33.99 |
| 3230.1      | 30.46                   | 31.36 | 31.92 | 33.76                   | 34.14 | 34.21 |
| 3330.1      | 30.74                   | 31.57 | 31.97 | 33.91                   | 34.31 | 34.39 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +19                     | +21   | +23   |
| 110.1               | 90.1        | 39.80                   | 39.75 | 39.63 |
| 190.1               | 170.1       | 43.06                   | 43.02 | 42.47 |
| 270.1               | 250.1       | 44.90                   | 44.67 | 45.34 |
| 350.1               | 330.1       | 45.22                   | 47.60 | 54.99 |
| 430.1               | 410.1       | 46.01                   | 48.21 | 55.96 |
| 510.1               | 490.1       | 44.68                   | 45.43 | 46.05 |
| 590.1               | 570.1       | 42.88                   | 42.81 | 42.35 |
| 670.1               | 650.1       | 41.66                   | 41.31 | 40.63 |
| 750.1               | 730.1       | 40.61                   | 40.47 | 40.14 |
| 830.1               | 810.1       | 38.81                   | 38.75 | 38.73 |
| 910.1               | 890.1       | 37.69                   | 37.62 | 37.55 |
| 990.1               | 970.1       | 37.16                   | 37.07 | 36.92 |
| 1070.1              | 1050.1      | 36.83                   | 36.73 | 36.52 |
| 1150.1              | 1130.1      | 36.61                   | 36.51 | 36.31 |
| 1230.1              | 1210.1      | 36.64                   | 36.60 | 36.41 |
| 1310.1              | 1290.1      | 37.01                   | 37.05 | 36.96 |
| 1390.1              | 1370.1      | 37.09                   | 37.10 | 37.06 |
| 1470.1              | 1450.1      | 36.55                   | 36.49 | 36.44 |
| 1550.1              | 1530.1      | 36.08                   | 36.03 | 35.98 |
| 1630.1              | 1610.1      | 36.01                   | 35.94 | 35.88 |
| 1730.1              | 1710.1      | 36.20                   | 36.18 | 36.15 |
| 1810.1              | 1790.1      | 36.57                   | 36.54 | 36.48 |
| 1910.1              | 1890.1      | 36.93                   | 36.82 | 36.70 |
| 1990.1              | 1970.1      | 36.95                   | 36.77 | 36.61 |
| 2090.1              | 2070.1      | 36.53                   | 36.23 | 35.96 |
| 2170.1              | 2150.1      | 35.88                   | 35.54 | 35.25 |
| 2270.1              | 2250.1      | 34.39                   | 34.02 | 33.63 |
| 2350.1              | 2330.1      | 33.32                   | 32.98 | 32.62 |
| 2450.1              | 2430.1      | 32.06                   | 31.71 | 31.35 |
| 2530.1              | 2510.1      | 31.30                   | 31.01 | 30.72 |
| 2630.1              | 2610.1      | 30.48                   | 30.21 | 29.95 |
| 2710.1              | 2690.1      | 30.16                   | 29.90 | 29.63 |
| 2810.1              | 2790.1      | 29.79                   | 29.59 | 29.31 |
| 2890.1              | 2870.1      | 30.04                   | 29.84 | 29.59 |
| 2990.1              | 2970.1      | 30.31                   | 30.18 | 30.02 |
| 3070.1              | 3050.1      | 30.35                   | 30.24 | 30.12 |
| 3170.1              | 3150.1      | 30.45                   | 30.40 | 30.29 |
| 3250.1              | 3230.1      | 30.18                   | 30.16 | 30.07 |
| 3350.1              | 3330.1      | 29.76                   | 29.69 | 29.58 |

# Frequency Mixer

HJK-ED9603/1

## 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=300MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|-------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                     |      |      |
|                     |             | +19             | +21  | +23  |             | +19             | +21  | +23  |                      | +19                           | +21  | +23  |
| 110.1               | 90.1        | 1.22            | 1.15 | 1.11 | 90.1        | 2.09            | 2.82 | 3.76 | 15.0                 | 1.34                          | 1.21 | 1.12 |
| 190.1               | 170.1       | 1.12            | 1.07 | 1.05 | 170.1       | 1.97            | 2.53 | 3.19 | 20.0                 | 1.34                          | 1.21 | 1.12 |
| 270.1               | 250.1       | 1.21            | 1.18 | 1.15 | 250.1       | 1.91            | 2.42 | 3.00 | 25.0                 | 1.32                          | 1.20 | 1.11 |
| 350.1               | 330.1       | 1.55            | 1.51 | 1.48 | 330.1       | 1.85            | 2.34 | 2.89 | 30.0                 | 1.29                          | 1.17 | 1.09 |
| 430.1               | 410.1       | 2.05            | 1.97 | 1.91 | 410.1       | 1.78            | 2.24 | 2.76 | 35.0                 | 1.27                          | 1.15 | 1.07 |
| 510.1               | 490.1       | 2.54            | 2.44 | 2.35 | 490.1       | 1.68            | 2.11 | 2.59 | 45.0                 | 1.29                          | 1.17 | 1.08 |
| 590.1               | 570.1       | 2.77            | 2.65 | 2.56 | 570.1       | 1.60            | 2.00 | 2.44 | 50.0                 | 1.32                          | 1.20 | 1.11 |
| 670.1               | 650.1       | 2.96            | 2.84 | 2.74 | 650.1       | 1.53            | 1.89 | 2.30 | 60.0                 | 1.34                          | 1.22 | 1.13 |
| 750.1               | 730.1       | 3.36            | 3.25 | 3.16 | 730.1       | 1.47            | 1.80 | 2.17 | 65.0                 | 1.34                          | 1.21 | 1.12 |
| 830.1               | 810.1       | 3.47            | 3.38 | 3.30 | 810.1       | 1.41            | 1.70 | 2.05 | 75.0                 | 1.32                          | 1.19 | 1.10 |
| 910.1               | 890.1       | 3.34            | 3.27 | 3.21 | 890.1       | 1.33            | 1.60 | 1.92 | 80.0                 | 1.35                          | 1.22 | 1.12 |
| 990.1               | 970.1       | 3.04            | 2.99 | 2.95 | 970.1       | 1.25            | 1.49 | 1.79 | 90.0                 | 1.42                          | 1.29 | 1.19 |
| 1070.1              | 1050.1      | 2.66            | 2.62 | 2.59 | 1050.1      | 1.18            | 1.40 | 1.69 | 95.0                 | 1.44                          | 1.31 | 1.22 |
| 1150.1              | 1130.1      | 2.37            | 2.33 | 2.29 | 1130.1      | 1.11            | 1.34 | 1.63 | 105.0                | 1.39                          | 1.27 | 1.18 |
| 1230.1              | 1210.1      | 2.09            | 2.02 | 1.96 | 1210.1      | 1.05            | 1.32 | 1.61 | 110.0                | 1.37                          | 1.24 | 1.16 |
| 1310.1              | 1290.1      | 1.93            | 1.83 | 1.76 | 1290.1      | 1.05            | 1.33 | 1.63 | 120.0                | 1.39                          | 1.26 | 1.16 |
| 1390.1              | 1370.1      | 2.04            | 1.96 | 1.88 | 1370.1      | 1.12            | 1.38 | 1.68 | 125.0                | 1.43                          | 1.29 | 1.20 |
| 1470.1              | 1450.1      | 2.28            | 2.20 | 2.14 | 1450.1      | 1.20            | 1.45 | 1.75 | 135.0                | 1.47                          | 1.33 | 1.24 |
| 1550.1              | 1530.1      | 2.37            | 2.29 | 2.23 | 1530.1      | 1.28            | 1.53 | 1.83 | 140.0                | 1.45                          | 1.32 | 1.22 |
| 1630.1              | 1610.1      | 2.35            | 2.28 | 2.23 | 1610.1      | 1.36            | 1.61 | 1.91 | 150.0                | 1.46                          | 1.27 | 1.17 |
| 1730.1              | 1710.1      | 2.19            | 2.12 | 2.08 | 1710.1      | 1.45            | 1.71 | 2.01 | 155.0                | 1.45                          | 1.31 | 1.20 |
| 1810.1              | 1790.1      | 2.00            | 1.95 | 1.91 | 1790.1      | 1.51            | 1.77 | 2.07 | 165.0                | 1.54                          | 1.39 | 1.29 |
| 1910.1              | 1890.1      | 1.82            | 1.76 | 1.72 | 1890.1      | 1.57            | 1.84 | 2.13 | 170.0                | 1.55                          | 1.41 | 1.31 |
| 1990.1              | 1970.1      | 1.70            | 1.65 | 1.60 | 1970.1      | 1.64            | 1.92 | 2.21 | 180.0                | 1.52                          | 1.38 | 1.28 |
| 2090.1              | 2070.1      | 1.57            | 1.51 | 1.48 | 2070.1      | 1.70            | 1.98 | 2.25 | 185.0                | 1.51                          | 1.36 | 1.26 |
| 2170.1              | 2150.1      | 1.47            | 1.42 | 1.38 | 2150.1      | 1.78            | 2.07 | 2.34 | 195.0                | 1.56                          | 1.41 | 1.30 |
| 2270.1              | 2250.1      | 1.35            | 1.30 | 1.25 | 2250.1      | 1.84            | 2.11 | 2.36 | 200.0                | 1.61                          | 1.45 | 1.35 |
| 2350.1              | 2330.1      | 1.25            | 1.21 | 1.17 | 2330.1      | 1.89            | 2.15 | 2.40 | 210.0                | 1.64                          | 1.49 | 1.37 |
| 2450.1              | 2430.1      | 1.15            | 1.13 | 1.13 | 2430.1      | 1.96            | 2.21 | 2.44 | 215.0                | 1.62                          | 1.46 | 1.35 |
| 2530.1              | 2510.1      | 1.10            | 1.12 | 1.14 | 2510.1      | 1.99            | 2.22 | 2.43 | 225.0                | 1.58                          | 1.42 | 1.30 |
| 2630.1              | 2610.1      | 1.16            | 1.21 | 1.25 | 2610.1      | 2.03            | 2.25 | 2.44 | 230.0                | 1.61                          | 1.45 | 1.33 |
| 2710.1              | 2690.1      | 1.22            | 1.28 | 1.33 | 2690.1      | 2.03            | 2.22 | 2.39 | 240.0                | 1.71                          | 1.55 | 1.42 |
| 2810.1              | 2790.1      | 1.28            | 1.35 | 1.41 | 2790.1      | 2.04            | 2.20 | 2.35 | 245.0                | 1.73                          | 1.57 | 1.44 |
| 2890.1              | 2870.1      | 1.34            | 1.41 | 1.47 | 2870.1      | 2.09            | 2.24 | 2.34 | 255.0                | 1.69                          | 1.53 | 1.40 |
| 2990.1              | 2970.1      | 1.40            | 1.47 | 1.53 | 2970.1      | 2.17            | 2.30 | 2.41 | 260.0                | 1.68                          | 1.51 | 1.39 |
| 3070.1              | 3050.1      | 1.45            | 1.51 | 1.57 | 3050.1      | 2.20            | 2.31 | 2.40 | 270.0                | 1.75                          | 1.58 | 1.46 |
| 3170.1              | 3150.1      | 1.47            | 1.52 | 1.58 | 3150.1      | 2.22            | 2.31 | 2.38 | 275.0                | 1.82                          | 1.64 | 1.52 |
| 3250.1              | 3230.1      | 1.50            | 1.54 | 1.58 | 3230.1      | 2.25            | 2.34 | 2.41 | 285.0                | 1.84                          | 1.66 | 1.53 |
| 3350.1              | 3330.1      | 1.57            | 1.59 | 1.62 | 3330.1      | 2.25            | 2.32 | 2.37 | 290.0                | 1.81                          | 1.62 | 1.49 |

REV. X2

HJK-ED9603/1

101012

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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 33  | 17  | 29  | 38  | 39  | 49  | 43  | 55  | 50  | 49  |
| 1  | -      | 36     | +0  | 40  | 14  | 52  | 29  | 53  | 40  | 54  | 43  | 60  |
| 2  | 68     | 61     | 79  | 56  | >84 | 62  | 74  | 73  | 77  | 77  | 71  | 77  |
| 3  | >90    | >84    | 52  | >84 | 50  | >84 | 50  | >84 | 60  | 82  | 69  | 82  |
| 4  | >90    | >84    | >84 | 83  | 82  | 77  | 84  | 75  | >84 | >84 | >84 | >84 |
| 5  | >90    | >84    | >84 | >84 | 83  | >84 | 77  | >84 | 75  | >84 | 84  | >84 |
| 6  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 7  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 8  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 9  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 10 | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 320.1 MHz; 1.00 dBm.  
LO IN: 300.1 MHz; +21.00 dBm  
IF OUT: 20 MHz; -5.68 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |    |     |    |    |    |
|----|--------|--------|-----|-----|-----|-----|-----|----|-----|----|----|----|
| 0  | -      | -      | 41  | 29  | 40  | 53  | 50  | 64 | 57  | 71 | 64 | 71 |
| 1  | -      | 38     | +0  | 39  | 15  | 65  | 36  | 63 | 50  | 62 | 51 | 71 |
| 2  | 48     | 49     | 67  | 48  | 54  | 52  | 69  | 64 | 69  | 74 | 71 | 83 |
| 3  | 73     | 63     | 33  | 58  | 28  | 56  | 37  | 71 | 48  | 72 | 56 | 72 |
| 4  | >90    | 86     | 76  | 66  | 64  | 56  | 66  | 65 | 70  | 76 | 77 | 88 |
| 5  | >90    | 79     | 57  | 85  | 46  | 75  | 39  | 60 | 42  | 75 | 56 | 84 |
| 6  | >90    | 93     | 89  | 81  | 88  | 69  | 76  | 63 | 72  | 65 | 87 | 75 |
| 7  | >90    | >94    | 84  | >94 | 72  | 83  | 56  | 77 | 48  | 68 | 55 | 84 |
| 8  | >90    | >94    | >94 | >94 | 93  | >94 | 84  | 83 | 73  | 67 | 77 | 73 |
| 9  | >90    | 93     | 82  | 88  | 86  | >94 | 77  | 90 | 63  | 82 | 55 | 72 |
| 10 | >90    | >94    | >94 | >94 | >94 | >94 | >94 | 90 | >94 | 79 | 90 | 72 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8  | 9  | 10 |

### LO HARMONICS ORDER

Test conditions:

RF IN: 320.1 MHz; 11.00 dBm.  
LO IN: 300.1 MHz; +21.00 dBm  
IF OUT: 20 MHz; 4.32 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.