

# Frequency Mixer

# HJK-21H+

## Typical Performance Data

| RF (IN) (MHz) | LO (MHz) | CONVERSION LOSS IF FIXED @IF(OUT)=240MHz (dB) |       |      |
|---------------|----------|---|-------|------|
|               |          | @LO (dBm)                                     |       |      |
|               |          | +14   | +17   | +20  |
| 760.1         | 1000.1   | 12.46   | 10.53 | 9.02 |
| 830.1         | 1070.1   | 11.24   | 9.67  | 8.49 |
| 900.1         | 1140.1   | 10.49   | 9.18  | 8.30 |
| 970.1         | 1210.1   | 9.78  | 8.72  | 8.15 |
| 1040.1        | 1280.1   | 8.99  | 8.03  | 7.54 |
| 1110.1        | 1350.1   | 8.59  | 7.62  | 7.18 |
| 1180.1        | 1420.1   | 8.40  | 7.47  | 7.12 |
| 1250.1        | 1490.1   | 7.96  | 7.28  | 7.06 |
| 1320.1        | 1560.1   | 7.76  | 7.22  | 7.11 |
| 1390.1        | 1630.1   | 7.82  | 7.38  | 7.36 |
| 1460.1        | 1700.1   | 7.67  | 7.44  | 7.51 |
| 1530.1        | 1770.1   | 7.50  | 7.36  | 7.43 |
| 1600.1        | 1840.1   | 7.44  | 7.36  | 7.44 |
| 1670.1        | 1910.1   | 7.51  | 7.45  | 7.55 |
| 1740.1        | 1980.1   | 7.59  | 7.59  | 7.70 |
| 1810.1        | 2050.1   | 7.58  | 7.61  | 7.73 |
| 1880.1        | 2120.1   | 7.61  | 7.65  | 7.80 |
| 1950.1        | 2190.1   | 7.80  | 7.82  | 7.95 |
| 2020.1        | 2260.1   | 7.94  | 7.94  | 8.05 |
| 2090.1        | 2330.1   | 7.91  | 7.85  | 7.92 |
| 2160.1        | 2400.1   | 8.03  | 7.87  | 7.89 |
| 2230.1        | 2470.1   | 8.28  | 8.04  | 8.01 |
| 2300.1        | 2540.1   | 8.45  | 8.04  | 7.94 |
| 2370.1        | 2610.1   | 8.55  | 7.98  | 7.78 |
| 2440.1        | 2680.1   | 8.79  | 8.14  | 7.86 |
| 2510.1        | 2750.1   | 9.09  | 8.32  | 8.01 |
| 2580.1        | 2820.1   | 9.36  | 8.44  | 8.03 |
| 2650.1        | 2890.1   | 9.50  | 8.53  | 8.08 |
| 2720.1        | 2960.1   | 9.70  | 8.72  | 8.31 |
| 2790.1        | 3030.1   | 9.86  | 8.94  | 8.48 |
| 2870.1        | 3110.1   | 10.07   | 9.05  | 8.61 |
| 2940.1        | 3180.1   | 10.07   | 9.05  | 8.60 |
| 3020.1        | 3260.1   | 10.13   | 9.14  | 8.72 |
| 3090.1        | 3330.1   | 10.32   | 9.34  | 8.93 |
| 3170.1        | 3410.1   | 10.55   | 9.51  | 9.03 |
| 3240.1        | 3480.1   | 10.60   | 9.46  | 8.94 |
| 3320.1        | 3560.1   | 10.52   | 9.47  | 8.91 |
| 3390.1        | 3630.1   | 10.82   | 9.68  | 9.07 |
| 3470.1        | 3710.1   | 11.30   | 10.00 | 9.23 |
| 3540.1        | 3780.1   | 11.62   | 10.23 | 9.29 |

| RF (IN) (MHz) | LO (MHz) | IP3 INPUT (dBm) |       |       |
|---------------|----------|-----------------|-------|-------|
|               |          | @LO (dBm)       |       |       |
|               |          | +14             | +17   | +20   |
| 760.1         | 1000.1   | 19.11           | 21.80 | 22.07 |
| 830.1         | 1070.1   | 19.43           | 21.70 | 22.34 |
| 900.1         | 1140.1   | 19.85           | 21.65 | 22.79 |
| 970.1         | 1210.1   | 21.72           | 23.02 | 23.87 |
| 1040.1        | 1280.1   | 19.49           | 22.00 | 23.45 |
| 1110.1        | 1350.1   | 17.80           | 20.55 | 22.97 |
| 1180.1        | 1420.1   | 18.24           | 20.38 | 22.77 |
| 1250.1        | 1490.1   | 20.27           | 21.44 | 24.08 |
| 1320.1        | 1560.1   | 20.87           | 22.01 | 24.87 |
| 1390.1        | 1630.1   | 21.86           | 23.12 | 25.93 |
| 1460.1        | 1700.1   | 22.48           | 24.63 | 27.31 |
| 1530.1        | 1770.1   | 23.30           | 26.14 | 28.34 |
| 1600.1        | 1840.1   | 24.28           | 27.49 | 29.03 |
| 1670.1        | 1910.1   | 25.29           | 29.11 | 30.28 |
| 1740.1        | 1980.1   | 26.35           | 30.67 | 32.15 |
| 1810.1        | 2050.1   | 27.83           | 33.09 | 34.34 |
| 1880.1        | 2120.1   | 27.78           | 33.57 | 35.47 |
| 1950.1        | 2190.1   | 27.93           | 33.76 | 37.47 |
| 2020.1        | 2260.1   | 27.68           | 33.03 | 37.21 |
| 2090.1        | 2330.1   | 26.45           | 31.69 | 35.43 |
| 2160.1        | 2400.1   | 25.16           | 30.40 | 34.56 |
| 2230.1        | 2470.1   | 24.39           | 29.40 | 33.42 |
| 2300.1        | 2540.1   | 22.77           | 26.70 | 31.98 |
| 2370.1        | 2610.1   | 21.99           | 24.91 | 30.19 |
| 2440.1        | 2680.1   | 21.73           | 24.50 | 29.36 |
| 2510.1        | 2750.1   | 21.47           | 24.22 | 28.22 |
| 2580.1        | 2820.1   | 21.01           | 23.33 | 27.16 |
| 2650.1        | 2890.1   | 21.17           | 23.47 | 27.38 |
| 2720.1        | 2960.1   | 21.18           | 23.61 | 27.89 |
| 2790.1        | 3030.1   | 21.08           | 23.42 | 27.53 |
| 2870.1        | 3110.1   | 21.09           | 23.33 | 27.30 |
| 2940.1        | 3180.1   | 21.38           | 23.68 | 27.58 |
| 3020.1        | 3260.1   | 21.85           | 24.29 | 27.98 |
| 3090.1        | 3330.1   | 22.26           | 24.54 | 28.36 |
| 3170.1        | 3410.1   | 22.61           | 24.50 | 27.99 |
| 3240.1        | 3480.1   | 22.96           | 24.32 | 27.60 |
| 3320.1        | 3560.1   | 23.60           | 24.59 | 27.87 |
| 3390.1        | 3630.1   | 24.52           | 25.00 | 27.84 |
| 3470.1        | 3710.1   | 24.65           | 24.64 | 26.99 |
| 3540.1        | 3780.1   | 23.83           | 24.13 | 25.89 |

| RF (IN) (MHz) | LO (MHz) | COMPRESSION @RF IN=+20dBm (dB) |      |      |
|---------------|----------|--------------------------------|------|------|
|               |          | @LO (dBm)                      |      |      |
|               |          | +14                            | +17  | +20  |
| 760.1         | 1000.1   | 3.11                           | 2.85 | 2.52 |
| 830.1         | 1070.1   | 3.98                           | 3.36 | 2.76 |
| 900.1         | 1140.1   | 4.46                           | 3.64 | 2.83 |
| 970.1         | 1210.1   | 5.01                           | 3.96 | 2.91 |
| 1040.1        | 1280.1   | 6.19                           | 4.73 | 3.37 |
| 1110.1        | 1350.1   | 7.98                           | 5.78 | 3.94 |
| 1180.1        | 1420.1   | 7.01                           | 5.59 | 3.76 |
| 1250.1        | 1490.1   | 5.11                           | 3.83 | 2.55 |
| 1320.1        | 1560.1   | 4.23                           | 3.00 | 1.89 |
| 1390.1        | 1630.1   | 3.62                           | 2.47 | 1.53 |
| 1460.1        | 1700.1   | 3.09                           | 2.02 | 1.14 |
| 1530.1        | 1770.1   | 2.59                           | 1.62 | 0.89 |
| 1600.1        | 1840.1   | 2.26                           | 1.38 | 0.77 |
| 1670.1        | 1910.1   | 1.99                           | 1.20 | 0.65 |
| 1740.1        | 1980.1   | 1.66                           | 0.92 | 0.48 |
| 1810.1        | 2050.1   | 1.48                           | 0.76 | 0.36 |
| 1880.1        | 2120.1   | 1.42                           | 0.73 | 0.31 |
| 1950.1        | 2190.1   | 1.38                           | 0.72 | 0.30 |
| 2020.1        | 2260.1   | 1.56                           | 0.80 | 0.34 |
| 2090.1        | 2330.1   | 1.93                           | 1.02 | 0.47 |
| 2160.1        | 2400.1   | 2.12                           | 1.20 | 0.61 |
| 2230.1        | 2470.1   | 2.13                           | 1.30 | 0.65 |
| 2300.1        | 2540.1   | 2.44                           | 1.54 | 0.89 |
| 2370.1        | 2610.1   | 2.66                           | 1.78 | 1.09 |
| 2440.1        | 2680.1   | 2.35                           | 1.57 | 1.02 |
| 2510.1        | 2750.1   | 2.29                           | 1.56 | 1.04 |
| 2580.1        | 2820.1   | 2.40                           | 1.65 | 1.13 |
| 2650.1        | 2890.1   | 2.28                           | 1.62 | 1.05 |
| 2720.1        | 2960.1   | 1.86                           | 1.33 | 0.93 |
| 2790.1        | 3030.1   | 1.94                           | 1.31 | 0.95 |
| 2870.1        | 3110.1   | 1.86                           | 1.34 | 0.91 |
| 2940.1        | 3180.1   | 1.81                           | 1.32 | 0.88 |
| 3020.1        | 3260.1   | 1.68                           | 1.22 | 0.83 |
| 3090.1        | 3330.1   | 1.46                           | 1.05 | 0.76 |
| 3170.1        | 3410.1   | 1.47                           | 1.08 | 0.79 |
| 3240.1        | 3480.1   | 1.62                           | 1.18 | 0.82 |
| 3320.1        | 3560.1   | 1.52                           | 1.11 | 0.80 |
| 3390.1        | 3630.1   | 1.15                           | 0.90 | 0.66 |
| 3470.1        | 3710.1   | 0.92                           | 0.83 | 0.67 |
| 3540.1        | 3780.1   | 1.01                           | 0.90 | 0.68 |

# Frequency Mixer

# HJK-21H+

## Typical Performance Data

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1880MHz (dB) | IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1839.9MHz (dB) | IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1920.1MHz (dB) |
|----------------|----------|---|----------------|----------|---|----------------|----------|---|
|                |          | @LO (dBm)   |                |          | @LO (dBm)   |                |          | @LO (dBm)   |
|                |          | +17   |                |          | +17   |                |          | +17   |
| 570.0          | 1310.0   | 10.31   | 10.1           | 1850.0   | 7.72  | 570.1          | 1350.0   | 10.25   |
| 541.3          | 1338.7   | 9.98  | 30.5           | 1870.4   | 7.37  | 555.7          | 1364.4   | 10.01   |
| 512.6          | 1367.4   | 9.62  | 51.0           | 1890.9   | 7.42  | 541.4          | 1378.7   | 9.79  |
| 483.8          | 1396.2   | 9.24  | 71.4           | 1911.3   | 7.42  | 527.0          | 1393.1   | 9.66  |
| 455.1          | 1424.9   | 9.04  | 91.8           | 1931.7   | 7.46  | 512.7          | 1407.4   | 9.51  |
| 426.4          | 1453.6   | 8.68  | 112.2          | 1952.1   | 7.49  | 498.3          | 1421.8   | 9.43  |
| 397.7          | 1482.3   | 8.41  | 132.7          | 1972.6   | 7.50  | 483.9          | 1436.2   | 9.32  |
| 369.0          | 1511.0   | 8.26  | 153.1          | 1993.0   | 7.56  | 469.6          | 1450.5   | 9.11  |
| 340.3          | 1539.7   | 8.09  | 173.5          | 2013.4   | 7.56  | 455.2          | 1464.9   | 8.96  |
| 311.5          | 1568.5   | 7.87  | 193.9          | 2033.8   | 7.65  | 440.9          | 1479.2   | 8.78  |
| 282.8          | 1597.2   | 7.75  | 214.4          | 2054.3   | 7.67  | 426.5          | 1493.6   | 8.64  |
| 254.1          | 1625.9   | 7.67  | 234.8          | 2074.7   | 7.73  | 412.2          | 1507.9   | 8.60  |
| 225.4          | 1654.6   | 7.53  | 255.2          | 2095.1   | 7.79  | 397.8          | 1522.3   | 8.55  |
| 196.7          | 1683.3   | 7.42  | 275.6          | 2115.5   | 7.80  | 383.4          | 1536.7   | 8.42  |
| 167.9          | 1712.1   | 7.36  | 296.1          | 2136.0   | 7.88  | 369.1          | 1551.0   | 8.30  |
| 139.2          | 1740.8   | 7.33  | 316.5          | 2156.4   | 7.87  | 354.7          | 1565.4   | 8.20  |
| 110.5          | 1769.5   | 7.26  | 336.9          | 2176.8   | 7.97  | 340.4          | 1579.7   | 8.10  |
| 81.8           | 1798.2   | 7.26  | 357.3          | 2197.2   | 8.00  | 326.0          | 1594.1   | 8.02  |
| 53.1           | 1826.9   | 7.26  | 377.8          | 2217.7   | 8.06  | 311.6          | 1608.5   | 7.99  |
| 24.4           | 1855.6   | 7.25  | 398.2          | 2238.1   | 8.14  | 297.3          | 1622.8   | 7.93  |
| 10.0           | 1890.0   | 7.64  | 418.6          | 2258.5   | 8.17  | 282.9          | 1637.2   | 7.83  |
| 62.3           | 1942.3   | 7.32  | 439.0          | 2278.9   | 8.30  | 268.6          | 1651.5   | 7.75  |
| 114.6          | 1994.6   | 7.42  | 459.5          | 2299.4   | 8.35  | 254.2          | 1665.9   | 7.65  |
| 166.9          | 2046.9   | 7.49  | 479.9          | 2319.8   | 8.49  | 239.8          | 1680.3   | 7.60  |
| 219.2          | 2099.2   | 7.60  | 520.7          | 2360.6   | 8.60  | 225.5          | 1694.6   | 7.58  |
| 271.5          | 2151.5   | 7.72  | 541.2          | 2381.1   | 8.64  | 211.1          | 1709.0   | 7.54  |
| 323.8          | 2203.8   | 7.87  | 582.0          | 2421.9   | 8.73  | 196.8          | 1723.3   | 7.52  |
| 376.2          | 2256.2   | 8.04  | 602.4          | 2442.3   | 8.75  | 182.4          | 1737.7   | 7.46  |
| 428.5          | 2308.5   | 8.17  | 643.3          | 2483.2   | 8.82  | 168.0          | 1752.1   | 7.40  |
| 480.8          | 2360.8   | 8.37  | 663.7          | 2503.6   | 8.90  | 153.7          | 1766.4   | 7.41  |
| 533.1          | 2413.1   | 8.49  | 704.6          | 2544.5   | 8.94  | 139.3          | 1780.8   | 7.39  |
| 585.4          | 2465.4   | 8.63  | 725.0          | 2564.9   | 8.98  | 125.0          | 1795.1   | 7.37  |
| 637.7          | 2517.7   | 8.75  | 765.8          | 2605.7   | 9.14  | 110.6          | 1809.5   | 7.39  |
| 690.0          | 2570.0   | 8.86  | 786.3          | 2626.2   | 9.18  | 96.3           | 1823.8   | 7.37  |
| 742.3          | 2622.3   | 9.00  | 827.1          | 2667.0   | 9.28  | 81.9           | 1838.2   | 7.36  |
| 794.6          | 2674.6   | 9.11  | 847.5          | 2687.4   | 9.43  | 67.5           | 1852.6   | 7.38  |
| 846.9          | 2726.9   | 9.38  | 888.4          | 2728.3   | 9.58  | 53.2           | 1866.9   | 7.36  |
| 899.2          | 2779.2   | 9.57  | 908.8          | 2748.7   | 9.64  | 38.8           | 1881.3   | 7.36  |
| 951.5          | 2831.5   | 9.91  | 949.7          | 2789.6   | 9.92  | 24.5           | 1895.6   | 7.42  |
| 1030.0         | 2910.0   | 10.37   | 970.1          | 2810.0   | 10.05   | 10.1           | 1910.0   | 7.74  |

REV. X3  
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101012  
Page 2 of 5



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# Frequency Mixer

# HJK-21H+

## 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   |
| 1000.1      | 65.34                   | 65.61 | 62.26 | 44.68                   | 45.02 | 45.15 |
| 1070.1      | 60.07                   | 66.81 | 68.67 | 43.69                   | 43.87 | 43.91 |
| 1140.1      | 49.62                   | 52.07 | 55.39 | 43.78                   | 43.64 | 43.46 |
| 1210.1      | 43.39                   | 44.08 | 45.21 | 45.05                   | 44.33 | 43.92 |
| 1280.1      | 39.92                   | 40.62 | 41.61 | 47.73                   | 47.82 | 47.35 |
| 1350.1      | 36.96                   | 37.97 | 39.10 | 46.07                   | 50.27 | 53.60 |
| 1420.1      | 35.28                   | 36.37 | 37.64 | 41.38                   | 45.10 | 49.02 |
| 1490.1      | 34.86                   | 36.20 | 37.58 | 38.50                   | 41.32 | 43.82 |
| 1560.1      | 35.95                   | 38.55 | 41.15 | 35.56                   | 37.28 | 38.59 |
| 1630.1      | 35.86                   | 38.39 | 40.16 | 32.78                   | 33.96 | 34.95 |
| 1700.1      | 34.30                   | 35.65 | 36.43 | 30.70                   | 31.59 | 32.36 |
| 1770.1      | 32.99                   | 33.62 | 33.98 | 28.75                   | 29.45 | 29.96 |
| 1840.1      | 31.53                   | 31.83 | 31.85 | 26.85                   | 27.31 | 27.64 |
| 1910.1      | 31.15                   | 31.20 | 31.14 | 25.26                   | 25.52 | 25.69 |
| 1980.1      | 30.80                   | 30.72 | 30.75 | 24.43                   | 24.44 | 24.65 |
| 2050.1      | 30.86                   | 30.92 | 30.96 | 24.71                   | 24.64 | 24.63 |
| 2120.1      | 30.93                   | 30.95 | 31.07 | 25.91                   | 25.91 | 25.94 |
| 2190.1      | 30.52                   | 30.50 | 30.50 | 28.03                   | 28.04 | 27.99 |
| 2260.1      | 30.16                   | 29.95 | 29.95 | 32.06                   | 31.83 | 31.68 |
| 2330.1      | 31.49                   | 31.28 | 31.39 | 40.68                   | 39.91 | 39.45 |
| 2400.1      | 33.99                   | 33.85 | 33.95 | 57.84                   | 63.93 | 79.16 |
| 2470.1      | 35.00                   | 34.83 | 34.49 | 42.64                   | 43.24 | 43.61 |
| 2540.1      | 35.43                   | 35.04 | 34.61 | 38.71                   | 39.08 | 39.27 |
| 2610.1      | 35.52                   | 34.88 | 34.17 | 36.17                   | 36.56 | 36.66 |
| 2680.1      | 35.92                   | 35.22 | 34.53 | 34.22                   | 34.61 | 34.67 |
| 2750.1      | 36.12                   | 35.00 | 34.40 | 32.69                   | 32.87 | 33.16 |
| 2820.1      | 36.40                   | 35.14 | 34.39 | 31.21                   | 31.39 | 31.73 |
| 2890.1      | 36.62                   | 35.03 | 34.22 | 29.58                   | 29.81 | 30.17 |
| 2960.1      | 37.73                   | 35.97 | 35.23 | 28.09                   | 28.34 | 28.79 |
| 3030.1      | 39.23                   | 37.06 | 36.05 | 26.66                   | 26.97 | 27.50 |
| 3110.1      | 42.53                   | 39.81 | 38.17 | 25.69                   | 26.21 | 26.75 |
| 3180.1      | 45.13                   | 43.10 | 40.81 | 25.75                   | 26.39 | 26.97 |
| 3260.1      | 42.86                   | 43.34 | 42.17 | 26.87                   | 27.55 | 28.02 |
| 3330.1      | 40.66                   | 41.39 | 41.13 | 28.06                   | 28.61 | 28.87 |
| 3410.1      | 38.63                   | 39.34 | 39.53 | 29.32                   | 29.58 | 29.58 |
| 3480.1      | 36.84                   | 37.56 | 37.61 | 30.19                   | 30.10 | 29.87 |
| 3560.1      | 35.52                   | 35.97 | 36.03 | 30.53                   | 30.32 | 29.92 |
| 3630.1      | 34.56                   | 34.92 | 34.85 | 30.83                   | 30.27 | 29.92 |
| 3710.1      | 33.56                   | 34.01 | 34.03 | 30.95                   | 30.25 | 29.54 |
| 3780.1      | 33.17                   | 33.73 | 33.84 | 31.06                   | 30.24 | 29.40 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +14                     | +17   | +20   |
| 760.1               | 1000.1      | 24.38                   | 22.72 | 22.23 |
| 830.1               | 1070.1      | 23.90                   | 21.82 | 21.17 |
| 900.1               | 1140.1      | 25.40                   | 22.43 | 21.56 |
| 970.1               | 1210.1      | 29.93                   | 25.35 | 23.48 |
| 1040.1              | 1280.1      | 42.43                   | 28.99 | 25.50 |
| 1110.1              | 1350.1      | 27.65                   | 26.71 | 27.37 |
| 1180.1              | 1420.1      | 24.66                   | 26.42 | 29.81 |
| 1250.1              | 1490.1      | 24.85                   | 27.88 | 31.54 |
| 1320.1              | 1560.1      | 26.46                   | 30.57 | 35.53 |
| 1390.1              | 1630.1      | 28.06                   | 33.24 | 37.66 |
| 1460.1              | 1700.1      | 29.70                   | 34.29 | 36.28 |
| 1530.1              | 1770.1      | 31.15                   | 34.94 | 36.83 |
| 1600.1              | 1840.1      | 31.92                   | 35.18 | 37.14 |
| 1670.1              | 1910.1      | 32.09                   | 34.86 | 36.78 |
| 1740.1              | 1980.1      | 32.30                   | 34.64 | 36.05 |
| 1810.1              | 2050.1      | 32.36                   | 33.86 | 34.74 |
| 1880.1              | 2120.1      | 31.79                   | 32.52 | 32.95 |
| 1950.1              | 2190.1      | 31.19                   | 31.46 | 31.51 |
| 2020.1              | 2260.1      | 30.72                   | 30.90 | 30.87 |
| 2090.1              | 2330.1      | 30.29                   | 30.70 | 30.88 |
| 2160.1              | 2400.1      | 30.27                   | 30.85 | 31.31 |
| 2230.1              | 2470.1      | 30.61                   | 31.41 | 32.19 |
| 2300.1              | 2540.1      | 30.34                   | 31.53 | 32.67 |
| 2370.1              | 2610.1      | 29.99                   | 31.34 | 32.77 |
| 2440.1              | 2680.1      | 29.94                   | 31.37 | 32.97 |
| 2510.1              | 2750.1      | 30.01                   | 31.62 | 33.28 |
| 2580.1              | 2820.1      | 30.08                   | 31.50 | 33.22 |
| 2650.1              | 2890.1      | 30.46                   | 31.86 | 33.57 |
| 2720.1              | 2960.1      | 31.33                   | 32.66 | 34.21 |
| 2790.1              | 3030.1      | 32.73                   | 33.84 | 35.21 |
| 2870.1              | 3110.1      | 35.99                   | 36.89 | 38.20 |
| 2940.1              | 3180.1      | 41.28                   | 42.13 | 44.17 |
| 3020.1              | 3260.1      | 42.61                   | 42.58 | 43.21 |
| 3090.1              | 3330.1      | 36.22                   | 36.04 | 36.28 |
| 3170.1              | 3410.1      | 32.09                   | 32.03 | 32.38 |
| 3240.1              | 3480.1      | 30.28                   | 30.36 | 30.78 |
| 3320.1              | 3560.1      | 29.32                   | 29.76 | 30.26 |
| 3390.1              | 3630.1      | 29.10                   | 29.48 | 29.98 |
| 3470.1              | 3710.1      | 29.04                   | 29.50 | 30.09 |
| 3540.1              | 3780.1      | 29.18                   | 29.65 | 30.29 |



# Frequency Mixer

# HJK-21H+

## 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=1910MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|-------|-------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |       |       |                      | @LO (dBm)                      |      |      |
|                     |             | +14             | +17  | +20  |             | +14             | +17   | +20   |                      | +14                            | +17  | +20  |
| 760.1               | 1000.1      | 4.61            | 3.76 | 3.24 | 1000.1      | 45.72           | 44.55 | 40.41 | 10.0                 | 1.05                           | 1.16 | 1.28 |
| 830.1               | 1070.1      | 3.27            | 2.78 | 2.51 | 1070.1      | 39.49           | 37.77 | 36.20 | 50.4                 | 1.11                           | 1.21 | 1.33 |
| 900.1               | 1140.1      | 2.45            | 2.14 | 2.03 | 1140.1      | 32.18           | 30.49 | 27.59 | 90.9                 | 1.13                           | 1.21 | 1.32 |
| 970.1               | 1210.1      | 1.90            | 1.70 | 1.77 | 1210.1      | 26.74           | 25.19 | 22.87 | 131.3                | 1.24                           | 1.29 | 1.39 |
| 1040.1              | 1280.1      | 1.55            | 1.45 | 1.61 | 1280.1      | 23.81           | 23.49 | 22.87 | 171.8                | 1.28                           | 1.33 | 1.42 |
| 1110.1              | 1350.1      | 1.29            | 1.27 | 1.49 | 1350.1      | 21.20           | 21.20 | 20.22 | 212.2                | 1.42                           | 1.44 | 1.50 |
| 1180.1              | 1420.1      | 1.08            | 1.24 | 1.51 | 1420.1      | 18.70           | 18.11 | 16.89 | 252.7                | 1.49                           | 1.51 | 1.57 |
| 1250.1              | 1490.1      | 1.11            | 1.37 | 1.65 | 1490.1      | 16.41           | 15.96 | 15.13 | 293.1                | 1.60                           | 1.60 | 1.63 |
| 1320.1              | 1560.1      | 1.26            | 1.51 | 1.80 | 1560.1      | 13.92           | 13.49 | 12.99 | 333.6                | 1.73                           | 1.73 | 1.76 |
| 1390.1              | 1630.1      | 1.38            | 1.64 | 1.96 | 1630.1      | 11.53           | 11.09 | 10.56 | 374.0                | 1.79                           | 1.77 | 1.78 |
| 1460.1              | 1700.1      | 1.51            | 1.74 | 2.05 | 1700.1      | 9.04            | 8.64  | 8.16  | 414.5                | 1.97                           | 1.93 | 1.94 |
| 1530.1              | 1770.1      | 1.66            | 1.86 | 2.13 | 1770.1      | 6.83            | 6.53  | 6.24  | 454.9                | 2.01                           | 1.95 | 1.95 |
| 1600.1              | 1840.1      | 1.76            | 1.94 | 2.19 | 1840.1      | 4.98            | 4.73  | 4.53  | 495.4                | 2.18                           | 2.10 | 2.08 |
| 1670.1              | 1910.1      | 1.84            | 1.99 | 2.20 | 1910.1      | 3.46            | 3.29  | 3.14  | 535.8                | 2.23                           | 2.15 | 2.12 |
| 1740.1              | 1980.1      | 1.95            | 2.07 | 2.25 | 1980.1      | 2.37            | 2.25  | 2.16  | 576.3                | 2.35                           | 2.24 | 2.18 |
| 1810.1              | 2050.1      | 2.01            | 2.13 | 2.29 | 2050.1      | 1.68            | 1.62  | 1.58  | 616.7                | 2.42                           | 2.32 | 2.27 |
| 1880.1              | 2120.1      | 2.04            | 2.12 | 2.25 | 2120.1      | 1.49            | 1.50  | 1.52  | 657.2                | 2.45                           | 2.32 | 2.25 |
| 1950.1              | 2190.1      | 2.08            | 2.10 | 2.20 | 2190.1      | 1.82            | 1.88  | 1.95  | 697.6                | 2.54                           | 2.41 | 2.34 |
| 2020.1              | 2260.1      | 2.10            | 2.07 | 2.13 | 2260.1      | 2.38            | 2.47  | 2.56  | 738.1                | 2.50                           | 2.36 | 2.27 |
| 2090.1              | 2330.1      | 2.13            | 2.02 | 2.03 | 2330.1      | 3.08            | 3.18  | 3.25  | 798.8                | 2.51                           | 2.37 | 2.28 |
| 2160.1              | 2400.1      | 2.25            | 2.06 | 2.02 | 2400.1      | 3.87            | 3.98  | 4.06  | 839.2                | 2.53                           | 2.38 | 2.29 |
| 2230.1              | 2470.1      | 2.34            | 2.10 | 2.00 | 2470.1      | 4.66            | 4.79  | 4.89  | 899.9                | 2.48                           | 2.35 | 2.26 |
| 2300.1              | 2540.1      | 2.53            | 2.18 | 1.99 | 2540.1      | 5.31            | 5.41  | 5.41  | 940.3                | 2.42                           | 2.29 | 2.20 |
| 2370.1              | 2610.1      | 2.80            | 2.36 | 2.07 | 2610.1      | 5.87            | 5.89  | 5.74  | 1001.0               | 2.31                           | 2.20 | 2.13 |
| 2440.1              | 2680.1      | 2.93            | 2.46 | 2.14 | 2680.1      | 6.42            | 6.49  | 6.42  | 1041.5               | 2.29                           | 2.19 | 2.12 |
| 2510.1              | 2750.1      | 3.09            | 2.56 | 2.23 | 2750.1      | 6.81            | 6.89  | 6.81  | 1102.1               | 2.13                           | 2.05 | 2.00 |
| 2580.1              | 2820.1      | 3.43            | 2.81 | 2.44 | 2820.1      | 6.91            | 6.89  | 6.63  | 1142.6               | 2.08                           | 2.01 | 1.96 |
| 2650.1              | 2890.1      | 3.64            | 3.01 | 2.62 | 2890.1      | 6.94            | 6.89  | 6.63  | 1203.3               | 1.94                           | 1.89 | 1.85 |
| 2720.1              | 2960.1      | 3.63            | 3.03 | 2.67 | 2960.1      | 7.05            | 7.05  | 6.97  | 1243.7               | 1.89                           | 1.85 | 1.82 |
| 2790.1              | 3030.1      | 3.82            | 3.20 | 2.81 | 3030.1      | 6.83            | 6.81  | 6.71  | 1304.4               | 1.77                           | 1.73 | 1.71 |
| 2870.1              | 3110.1      | 4.06            | 3.40 | 2.98 | 3110.1      | 6.37            | 6.28  | 6.09  | 1344.8               | 1.73                           | 1.71 | 1.70 |
| 2940.1              | 3180.1      | 4.06            | 3.42 | 3.00 | 3180.1      | 6.01            | 5.89  | 5.65  | 1405.5               | 1.64                           | 1.63 | 1.63 |
| 3020.1              | 3260.1      | 4.06            | 3.43 | 3.01 | 3260.1      | 5.56            | 5.46  | 5.30  | 1446.0               | 1.58                           | 1.59 | 1.60 |
| 3090.1              | 3330.1      | 4.23            | 3.58 | 3.14 | 3330.1      | 4.99            | 4.89  | 4.79  | 1506.6               | 1.52                           | 1.53 | 1.56 |
| 3170.1              | 3410.1      | 4.31            | 3.64 | 3.18 | 3410.1      | 4.31            | 4.18  | 4.05  | 1547.1               | 1.48                           | 1.51 | 1.55 |
| 3240.1              | 3480.1      | 4.34            | 3.66 | 3.18 | 3480.1      | 3.71            | 3.56  | 3.39  | 1607.8               | 1.45                           | 1.48 | 1.53 |
| 3320.1              | 3560.1      | 4.43            | 3.79 | 3.28 | 3560.1      | 3.11            | 2.99  | 2.88  | 1648.2               | 1.41                           | 1.46 | 1.52 |
| 3390.1              | 3630.1      | 4.61            | 3.92 | 3.40 | 3630.1      | 2.64            | 2.55  | 2.48  | 1708.9               | 1.39                           | 1.44 | 1.51 |
| 3470.1              | 3710.1      | 4.68            | 3.99 | 3.42 | 3710.1      | 2.19            | 2.12  | 2.06  | 1749.3               | 1.36                           | 1.43 | 1.51 |
| 3540.1              | 3780.1      | 4.86            | 4.18 | 3.56 | 3780.1      | 1.87            | 1.81  | 1.75  | 1810.0               | 1.34                           | 1.41 | 1.49 |

## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 6   | 11  | 25  | 30  | 37  | 44  | 59  | 54  | 68  | 62  |
| 1  | -      | 25     | +0  | 28  | 21  | 50  | 37  | 46  | 35  | 54  | 50  | 67  |
| 2  | 49     | 42     | 48  | 45  | 51  | 44  | 53  | 50  | 55  | 57  | 70  | 68  |
| 3  | 82     | 64     | 54  | 55  | 46  | 55  | 52  | 62  | 66  | 79  | 60  | 81  |
| 4  | >90    | 85     | 77  | 74  | 76  | 70  | 80  | 74  | 76  | 74  | 70  | >87 |
| 5  | >90    | >87    | >87 | 82  | >87 | 71  | 80  | 76  | 78  | 81  | >87 | >87 |
| 6  | >90    | >87    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 7  | >90    | >87    | >87 | >87 | >87 | >87 | >87 | 86  | >87 | >87 | >87 | >87 |
| 8  | >90    | >87    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 9  | >90    | >87    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 10 | >90    | >87    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 1880 MHz; 5.00 dBm.  
 LO IN: 2120 MHz; +17.00 dBm  
 IF OUT: 240 MHz; -2.8 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |    |     |    |    |     |    |    |    |    |    |
|----|--------|--------|----|-----|----|----|-----|----|----|----|----|----|
| 0  | -      | -      | 16 | 21  | 37 | 39 | 46  | 53 | 60 | 67 | 72 | 70 |
| 1  | -      | 25     | +0 | 31  | 23 | 51 | 41  | 49 | 41 | 63 | 58 | 73 |
| 2  | 29     | 33     | 40 | 37  | 49 | 40 | 47  | 46 | 61 | 55 | 71 | 67 |
| 3  | 53     | 52     | 35 | 41  | 28 | 43 | 37  | 55 | 53 | 68 | 51 | 72 |
| 4  | 71     | 64     | 63 | 49  | 51 | 48 | 58  | 54 | 58 | 56 | 59 | 72 |
| 5  | >90    | 67     | 57 | 62  | 51 | 50 | 44  | 54 | 50 | 63 | 69 | 66 |
| 6  | >90    | 75     | 69 | 71  | 67 | 62 | 58  | 60 | 63 | 65 | 71 | 69 |
| 7  | >90    | 77     | 74 | 83  | 82 | 76 | 65  | 57 | 57 | 63 | 63 | 69 |
| 8  | >90    | 94     | 78 | 79  | 78 | 81 | 77  | 77 | 72 | 67 | 74 | 76 |
| 9  | >90    | >97    | 91 | 81  | 87 | 82 | >97 | 78 | 70 | 64 | 68 | 70 |
| 10 | >90    | >97    | 97 | >97 | 87 | 87 | 89  | 89 | 82 | 87 | 80 | 75 |
|    | RF CAL | 0      | 1  | 2   | 3  | 4  | 5   | 6  | 7  | 8  | 9  | 10 |

### LO HARMONICS ORDER

Test conditions: RF IN: 1880 MHz; 15.00 dBm.  
 LO IN: 2120 MHz; +17.00 dBm  
 IF OUT: 240 MHz; 6.97 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.