

# Frequency Mixer

TAK-5+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------------------------|-------|-------|---------------------|-------------|--------------------|-------|-------|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                                             |       |       |                     |             | @LO (dBm)          |       |       |                     |             | @LO (dBm)                           |      |      |
|                     |             |                                                       |       |       |                     |             |                    |       |       |                     |             |                                     |      |      |
| +4                  | +7          | +10                                                   | +4    | +7    | +10                 | +4          | +7                 | +10   |       |                     |             |                                     |      |      |
| 0.01                | 30.0        | 7.28                                                  | 7.11  | 6.93  | 10.1                | 40.1        | 19.18              | 19.80 | 21.53 | 10.1                | 40.1        | 1.83                                | 1.43 | 1.12 |
| 0.2                 | 30.2        | 4.89                                                  | 4.71  | 4.57  | 20.1                | 50.1        | 20.03              | 17.51 | 20.51 | 20.1                | 50.1        | 1.76                                | 1.29 | 0.98 |
| 1.0                 | 31.0        | 4.71                                                  | 4.56  | 4.42  | 30.1                | 60.1        | 20.18              | 21.52 | 24.35 | 30.1                | 60.1        | 1.58                                | 1.24 | 0.99 |
| 5.0                 | 35.0        | 4.87                                                  | 4.60  | 4.47  | 40.1                | 70.1        | 17.90              | 21.11 | 22.61 | 40.1                | 70.1        | 1.55                                | 1.20 | 0.96 |
| 10.1                | 40.1        | 4.50                                                  | 4.31  | 4.22  | 50.1                | 80.1        | 18.36              | 26.29 | 22.45 | 50.1                | 80.1        | 1.53                                | 1.13 | 0.89 |
| 20.1                | 50.1        | 4.83                                                  | 4.63  | 4.53  | 60.1                | 90.1        | 19.23              | 26.61 | 21.15 | 60.1                | 90.1        | 1.43                                | 1.06 | 0.84 |
| 30.1                | 60.1        | 4.85                                                  | 4.73  | 4.58  | 70.1                | 100.1       | 21.05              | 26.60 | 22.66 | 70.1                | 100.1       | 1.39                                | 1.03 | 0.86 |
| 40.1                | 70.1        | 4.93                                                  | 4.76  | 4.60  | 80.1                | 110.1       | 19.20              | 18.32 | 16.52 | 80.1                | 110.1       | 1.39                                | 1.05 | 0.78 |
| 50.1                | 80.1        | 4.94                                                  | 4.75  | 4.62  | 90.1                | 120.1       | 20.89              | 18.17 | 17.20 | 90.1                | 120.1       | 1.26                                | 0.98 | 0.79 |
| 60.1                | 90.1        | 4.95                                                  | 4.78  | 4.64  | 100.1               | 130.1       | 23.07              | 21.24 | 19.10 | 100.1               | 130.1       | 1.20                                | 0.96 | 0.76 |
| 70.1                | 100.1       | 4.96                                                  | 4.81  | 4.66  | 110.1               | 140.1       | 19.70              | 19.27 | 19.56 | 110.1               | 140.1       | 1.21                                | 0.95 | 0.76 |
| 80.1                | 110.1       | 4.88                                                  | 4.76  | 4.65  | 120.1               | 150.1       | 18.87              | 17.64 | 15.26 | 120.1               | 150.1       | 1.29                                | 1.03 | 0.81 |
| 90.1                | 120.1       | 4.88                                                  | 4.75  | 4.64  | 130.1               | 160.1       | 20.07              | 17.00 | 16.63 | 130.1               | 160.1       | 1.42                                | 1.05 | 0.86 |
| 100.1               | 130.1       | 4.95                                                  | 4.77  | 4.62  | 140.1               | 170.1       | 18.92              | 16.33 | 15.72 | 140.1               | 170.1       | 1.54                                | 1.13 | 0.88 |
| 120.1               | 150.1       | 5.16                                                  | 4.98  | 4.83  | 150.1               | 180.1       | 15.77              | 15.63 | 17.66 | 150.1               | 180.1       | 1.74                                | 1.21 | 0.92 |
| 130.1               | 160.1       | 5.19                                                  | 5.02  | 4.91  | 160.1               | 190.1       | 15.22              | 16.17 | 18.76 | 160.1               | 190.1       | 1.90                                | 1.33 | 1.02 |
| 140.1               | 170.1       | 5.24                                                  | 5.06  | 4.97  | 170.1               | 200.1       | 15.37              | 16.03 | 23.04 | 170.1               | 200.1       | 2.10                                | 1.50 | 1.11 |
| 150.1               | 180.1       | 5.32                                                  | 5.15  | 5.10  | 180.1               | 210.1       | 12.21              | 18.05 | 19.42 | 180.1               | 210.1       | 2.19                                | 1.65 | 1.24 |
| 160.1               | 190.1       | 5.46                                                  | 5.22  | 5.15  | 190.1               | 220.1       | 10.11              | 12.58 | 18.82 | 190.1               | 220.1       | 2.26                                | 1.74 | 1.34 |
| 170.1               | 200.1       | 5.60                                                  | 5.34  | 5.25  | 200.1               | 230.1       | 8.82               | 10.26 | 14.17 | 200.1               | 230.1       | 2.29                                | 1.88 | 1.60 |
| 180.1               | 210.1       | 5.93                                                  | 5.53  | 5.30  | 210.1               | 240.1       | 9.02               | 9.98  | 11.63 | 210.1               | 240.1       | 2.35                                | 1.99 | 1.74 |
| 190.1               | 220.1       | 6.05                                                  | 5.70  | 5.36  | 220.1               | 250.1       | 8.87               | 10.16 | 11.75 | 220.1               | 250.1       | 2.21                                | 1.95 | 1.75 |
| 200.1               | 230.1       | 6.30                                                  | 5.99  | 5.54  | 230.1               | 260.1       | 9.56               | 10.60 | 12.34 | 230.1               | 260.1       | 2.19                                | 1.85 | 1.65 |
| 220.1               | 250.1       | 6.68                                                  | 6.34  | 5.97  | 240.1               | 270.1       | 9.87               | 10.85 | 13.16 | 240.1               | 270.1       | 2.20                                | 1.86 | 1.62 |
| 230.1               | 260.1       | 6.57                                                  | 6.31  | 6.07  | 250.1               | 280.1       | 10.49              | 12.22 | 13.87 | 250.1               | 280.1       | 2.14                                | 1.67 | 1.46 |
| 240.1               | 270.1       | 6.70                                                  | 6.48  | 6.24  | 260.1               | 290.1       | 11.33              | 13.65 | 16.52 | 260.1               | 290.1       | 2.10                                | 1.67 | 1.52 |
| 250.1               | 280.1       | 6.69                                                  | 6.52  | 6.40  | 270.1               | 300.1       | 12.55              | 16.03 | 24.05 | 270.1               | 300.1       | 1.95                                | 1.56 | 1.41 |
| 260.1               | 290.1       | 6.78                                                  | 6.56  | 6.38  | 280.1               | 310.1       | 13.97              | 19.54 | 20.88 | 280.1               | 310.1       | 2.15                                | 1.71 | 1.56 |
| 270.1               | 300.1       | 6.78                                                  | 6.62  | 6.51  | 290.1               | 320.1       | 15.71              | 19.93 | 18.13 | 290.1               | 320.1       | 2.12                                | 1.62 | 1.40 |
| 280.1               | 310.1       | 6.71                                                  | 6.57  | 6.44  | 300.1               | 330.1       | 15.11              | 18.53 | 16.68 | 300.1               | 330.1       | 2.22                                | 1.67 | 1.36 |
| 290.1               | 320.1       | 6.85                                                  | 6.75  | 6.70  | 310.1               | 340.1       | 16.70              | 16.48 | 19.57 | 310.1               | 340.1       | 2.16                                | 1.53 | 1.20 |
| 300.1               | 330.1       | 6.90                                                  | 6.82  | 6.81  | 320.1               | 350.1       | 16.41              | 15.36 | 17.58 | 320.1               | 350.1       | 2.09                                | 1.41 | 1.07 |
| 320.1               | 350.1       | 8.40                                                  | 9.06  | 7.39  | 330.1               | 360.1       | 15.20              | 15.35 | 16.11 | 330.1               | 360.1       | 1.99                                | 1.35 | 1.01 |
| 330.1               | 360.1       | 7.74                                                  | 7.81  | 7.88  | 340.1               | 370.1       | 13.62              | 13.99 | 14.50 | 340.1               | 370.1       | 1.83                                | 1.16 | 0.88 |
| 340.1               | 370.1       | 8.22                                                  | 8.29  | 8.39  | 350.1               | 380.1       | 12.30              | 12.36 | 14.00 | 350.1               | 380.1       | 1.82                                | 1.15 | 0.96 |
| 350.1               | 380.1       | 8.60                                                  | 9.26  | 9.10  | 360.1               | 390.1       | 13.71              | 12.40 | 13.95 | 360.1               | 390.1       | 1.72                                | 1.08 | 0.98 |
| 360.1               | 390.1       | 9.15                                                  | 9.21  | 9.27  | 370.1               | 400.1       | 15.16              | 13.42 | 12.64 | 370.1               | 400.1       | 1.92                                | 1.31 | 1.28 |
| 370.1               | 400.1       | 9.45                                                  | 9.57  | 9.71  | 380.1               | 410.1       | 16.26              | 14.35 | 12.28 | 380.1               | 410.1       | 2.16                                | 1.59 | 1.50 |
| 380.1               | 410.1       | 10.98                                                 | 12.01 | 14.27 | 390.1               | 420.1       | 16.46              | 15.32 | 14.98 | 390.1               | 420.1       | 2.53                                | 1.93 | 1.80 |
| 400.1               | 430.1       | 11.27                                                 | 11.07 | 11.22 | 400.1               | 430.1       | 14.22              | 15.32 | 15.24 | 400.1               | 430.1       | 2.78                                | 2.13 | 1.98 |

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# Frequency Mixer

**TAK-5+**

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=125.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=10.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=250.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                       |                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                       |
|                      |             | +7                                                              |                      |             | +7                                                             |                      |             | +7                                                              |
| 115.0                | 10.1        | 5.34                                                            | 10.0                 | 20.1        | 4.52                                                           | 240.0                | 10.1        | 7.87                                                            |
| 112.3                | 12.8        | 5.30                                                            | 15.9                 | 26.0        | 4.38                                                           | 234.1                | 16.0        | 7.82                                                            |
| 109.6                | 15.5        | 5.26                                                            | 21.8                 | 31.9        | 4.35                                                           | 228.2                | 21.9        | 7.69                                                            |
| 106.9                | 18.2        | 5.23                                                            | 27.7                 | 37.8        | 4.33                                                           | 222.3                | 27.8        | 7.58                                                            |
| 104.2                | 20.9        | 5.18                                                            | 33.6                 | 43.7        | 4.38                                                           | 216.4                | 33.7        | 7.50                                                            |
| 101.5                | 23.6        | 5.14                                                            | 39.5                 | 49.6        | 4.40                                                           | 210.5                | 39.6        | 7.43                                                            |
| 98.8                 | 26.3        | 5.12                                                            | 45.4                 | 55.5        | 4.45                                                           | 204.6                | 45.5        | 7.39                                                            |
| 96.2                 | 28.9        | 5.10                                                            | 51.3                 | 61.4        | 4.47                                                           | 198.7                | 51.4        | 7.30                                                            |
| 93.5                 | 31.6        | 5.07                                                            | 57.2                 | 67.3        | 4.47                                                           | 192.8                | 57.3        | 7.22                                                            |
| 90.8                 | 34.3        | 5.07                                                            | 63.1                 | 73.2        | 4.49                                                           | 186.9                | 63.2        | 7.18                                                            |
| 88.1                 | 37.0        | 5.07                                                            | 69.0                 | 79.1        | 4.51                                                           | 181.0                | 69.1        | 7.17                                                            |
| 85.4                 | 39.7        | 5.06                                                            | 74.9                 | 85.0        | 4.57                                                           | 175.1                | 75.0        | 7.18                                                            |
| 82.7                 | 42.4        | 5.07                                                            | 80.8                 | 90.9        | 4.61                                                           | 169.2                | 80.9        | 7.11                                                            |
| 80.0                 | 45.1        | 5.05                                                            | 86.7                 | 96.8        | 4.61                                                           | 163.3                | 86.8        | 7.09                                                            |
| 77.3                 | 47.8        | 5.04                                                            | 92.6                 | 102.7       | 4.63                                                           | 157.4                | 92.7        | 7.06                                                            |
| 74.6                 | 50.5        | 5.03                                                            | 98.5                 | 108.6       | 4.64                                                           | 151.5                | 98.6        | 7.08                                                            |
| 71.9                 | 53.2        | 5.03                                                            | 104.4                | 114.5       | 4.62                                                           | 145.6                | 104.5       | 7.03                                                            |
| 69.2                 | 55.9        | 5.01                                                            | 110.3                | 120.4       | 4.61                                                           | 139.7                | 110.4       | 6.99                                                            |
| 66.5                 | 58.6        | 4.98                                                            | 116.2                | 126.3       | 4.68                                                           | 133.8                | 116.3       | 6.93                                                            |
| 63.8                 | 61.3        | 4.96                                                            | 122.1                | 132.2       | 4.73                                                           | 127.9                | 122.2       | 6.84                                                            |
| 61.2                 | 63.9        | 4.97                                                            | 127.9                | 138.0       | 4.84                                                           | 122.1                | 128.0       | 6.87                                                            |
| 58.5                 | 66.6        | 5.00                                                            | 133.8                | 143.9       | 5.01                                                           | 116.2                | 133.9       | 6.83                                                            |
| 55.8                 | 69.3        | 5.01                                                            | 139.7                | 149.8       | 5.17                                                           | 110.3                | 139.8       | 6.77                                                            |
| 53.1                 | 72.0        | 5.00                                                            | 145.6                | 155.7       | 5.28                                                           | 104.4                | 145.7       | 6.72                                                            |
| 50.4                 | 74.7        | 4.99                                                            | 151.5                | 161.6       | 5.27                                                           | 98.5                 | 151.6       | 6.62                                                            |
| 47.7                 | 77.4        | 4.98                                                            | 157.4                | 167.5       | 5.33                                                           | 92.6                 | 157.5       | 6.57                                                            |
| 45.0                 | 80.1        | 4.95                                                            | 163.3                | 173.4       | 5.31                                                           | 86.7                 | 163.4       | 6.52                                                            |
| 42.3                 | 82.8        | 4.95                                                            | 169.2                | 179.3       | 5.37                                                           | 80.8                 | 169.3       | 6.42                                                            |
| 39.6                 | 85.5        | 4.94                                                            | 175.1                | 185.2       | 5.39                                                           | 74.9                 | 175.2       | 6.31                                                            |
| 36.9                 | 88.2        | 4.93                                                            | 181.0                | 191.1       | 5.33                                                           | 69.0                 | 181.1       | 6.20                                                            |
| 34.2                 | 90.9        | 4.93                                                            | 186.9                | 197.0       | 5.43                                                           | 63.1                 | 187.0       | 6.16                                                            |
| 31.5                 | 93.6        | 4.92                                                            | 192.8                | 202.9       | 5.36                                                           | 57.2                 | 192.9       | 6.06                                                            |
| 28.8                 | 96.3        | 4.93                                                            | 198.7                | 208.8       | 5.46                                                           | 51.3                 | 198.8       | 6.01                                                            |
| 26.2                 | 98.9        | 4.93                                                            | 204.6                | 214.7       | 5.45                                                           | 45.4                 | 204.7       | 5.95                                                            |
| 23.5                 | 101.6       | 4.95                                                            | 210.5                | 220.6       | 5.47                                                           | 39.5                 | 210.6       | 5.98                                                            |
| 20.8                 | 104.3       | 4.95                                                            | 216.4                | 226.5       | 5.51                                                           | 33.6                 | 216.5       | 6.12                                                            |
| 18.1                 | 107.0       | 4.95                                                            | 222.3                | 232.4       | 5.49                                                           | 27.7                 | 222.4       | 6.27                                                            |
| 15.4                 | 109.7       | 4.96                                                            | 228.2                | 238.3       | 5.51                                                           | 21.8                 | 228.3       | 6.46                                                            |
| 12.7                 | 112.4       | 5.01                                                            | 234.1                | 244.2       | 5.45                                                           | 15.9                 | 234.2       | 6.57                                                            |
| 10.0                 | 115.1       | 5.06                                                            | 240.0                | 250.1       | 5.50                                                           | 10.0                 | 240.1       | 6.71                                                            |

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## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +4                      | +7    | +10   | +4                      | +7    | +10   |
| 0.01        | 56.97                   | 58.08 | 57.43 | 52.65                   | 53.36 | 52.26 |
| 0.2         | 58.23                   | 59.34 | 59.43 | 51.70                   | 52.17 | 51.68 |
| 1.0         | 58.08                   | 59.46 | 59.35 | 51.73                   | 51.84 | 51.63 |
| 5.0         | 57.90                   | 59.26 | 59.05 | 51.61                   | 51.76 | 51.55 |
| 10.1        | 70.19                   | 71.47 | 73.53 | 64.35                   | 74.69 | 69.95 |
| 20.1        | 69.48                   | 71.93 | 74.91 | 67.39                   | 78.82 | 75.35 |
| 30.1        | 68.68                   | 72.32 | 75.08 | 64.74                   | 73.37 | 77.53 |
| 40.1        | 68.11                   | 71.97 | 75.68 | 61.71                   | 65.34 | 73.90 |
| 50.1        | 66.62                   | 71.84 | 76.30 | 57.28                   | 62.11 | 66.95 |
| 60.1        | 65.68                   | 70.35 | 74.83 | 54.23                   | 58.43 | 61.93 |
| 70.1        | 65.83                   | 71.72 | 72.13 | 51.83                   | 54.98 | 57.75 |
| 80.1        | 59.99                   | 64.10 | 69.19 | 52.36                   | 56.26 | 59.50 |
| 90.1        | 61.41                   | 64.37 | 68.18 | 50.06                   | 53.88 | 55.71 |
| 100.1       | 71.73                   | 71.02 | 68.09 | 46.97                   | 49.22 | 50.84 |
| 120.1       | 56.18                   | 56.84 | 56.06 | 50.51                   | 51.11 | 50.02 |
| 130.1       | 53.74                   | 55.75 | 55.36 | 48.39                   | 49.38 | 48.31 |
| 140.1       | 51.11                   | 54.42 | 57.06 | 47.18                   | 46.40 | 44.98 |
| 150.1       | 49.39                   | 52.49 | 55.44 | 44.63                   | 43.51 | 42.43 |
| 160.1       | 49.67                   | 53.03 | 55.10 | 43.18                   | 41.82 | 40.59 |
| 170.1       | 51.17                   | 55.67 | 52.81 | 43.42                   | 40.52 | 38.04 |
| 180.1       | 54.39                   | 54.18 | 48.36 | 42.19                   | 37.79 | 34.94 |
| 190.1       | 58.34                   | 51.15 | 46.72 | 41.40                   | 36.29 | 33.51 |
| 200.1       | 59.95                   | 49.25 | 45.43 | 42.27                   | 35.99 | 32.80 |
| 220.1       | 50.42                   | 46.68 | 43.52 | 37.67                   | 34.57 | 31.48 |
| 230.1       | 49.94                   | 47.05 | 43.95 | 36.20                   | 33.76 | 30.79 |
| 240.1       | 52.01                   | 48.35 | 44.67 | 34.74                   | 32.49 | 29.82 |
| 250.1       | 49.42                   | 45.30 | 41.78 | 32.96                   | 31.00 | 28.65 |
| 260.1       | 48.68                   | 43.47 | 39.47 | 32.29                   | 29.89 | 27.01 |
| 270.1       | 46.68                   | 41.47 | 37.08 | 31.20                   | 28.48 | 24.92 |
| 280.1       | 42.78                   | 38.02 | 33.97 | 29.25                   | 26.24 | 22.63 |
| 290.1       | 39.53                   | 34.75 | 30.88 | 27.83                   | 24.20 | 20.57 |
| 300.1       | 37.20                   | 32.38 | 28.80 | 26.04                   | 22.19 | 18.84 |
| 320.1       | 32.46                   | 28.88 | 25.96 | 23.15                   | 19.92 | 17.04 |
| 330.1       | 30.03                   | 27.04 | 24.43 | 22.04                   | 19.06 | 16.34 |
| 340.1       | 27.79                   | 25.31 | 23.03 | 20.62                   | 18.01 | 15.54 |
| 350.1       | 25.44                   | 23.48 | 21.57 | 19.15                   | 16.81 | 14.65 |
| 360.1       | 23.79                   | 22.40 | 20.78 | 17.96                   | 16.11 | 14.17 |
| 370.1       | 22.27                   | 21.14 | 19.77 | 17.06                   | 15.40 | 13.68 |
| 380.1       | 21.25                   | 20.18 | 18.95 | 16.54                   | 14.95 | 13.37 |
| 400.1       | 19.92                   | 18.78 | 17.62 | 16.05                   | 14.27 | 12.76 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +4                      | +7    | +10   |
| 10.1                | 40.1        | 34.78                   | 34.18 | 34.25 |
| 20.1                | 50.1        | 30.88                   | 30.56 | 30.27 |
| 30.1                | 60.1        | 27.70                   | 27.73 | 27.64 |
| 40.1                | 70.1        | 25.80                   | 26.22 | 26.31 |
| 50.1                | 80.1        | 25.17                   | 25.43 | 25.76 |
| 60.1                | 90.1        | 24.56                   | 25.12 | 25.53 |
| 70.1                | 100.1       | 24.13                   | 24.86 | 25.46 |
| 80.1                | 110.1       | 24.16                   | 25.10 | 25.74 |
| 90.1                | 120.1       | 24.42                   | 25.11 | 25.70 |
| 100.1               | 130.1       | 24.20                   | 24.95 | 25.82 |
| 110.1               | 140.1       | 24.90                   | 25.84 | 26.59 |
| 120.1               | 150.1       | 25.44                   | 26.33 | 27.11 |
| 130.1               | 160.1       | 25.13                   | 26.14 | 26.94 |
| 140.1               | 170.1       | 23.89                   | 24.61 | 25.26 |
| 150.1               | 180.1       | 21.46                   | 21.87 | 22.04 |
| 160.1               | 190.1       | 19.43                   | 19.56 | 19.59 |
| 170.1               | 200.1       | 18.08                   | 18.14 | 18.11 |
| 180.1               | 210.1       | 16.95                   | 17.13 | 17.07 |
| 190.1               | 220.1       | 16.16                   | 16.32 | 16.47 |
| 200.1               | 230.1       | 15.82                   | 16.12 | 16.65 |
| 210.1               | 240.1       | 15.46                   | 15.71 | 16.32 |
| 220.1               | 250.1       | 15.38                   | 15.70 | 16.36 |
| 230.1               | 260.1       | 15.52                   | 15.81 | 16.35 |
| 240.1               | 270.1       | 15.53                   | 15.84 | 16.20 |
| 250.1               | 280.1       | 15.40                   | 15.53 | 15.63 |
| 260.1               | 290.1       | 15.46                   | 15.51 | 15.46 |
| 270.1               | 300.1       | 15.09                   | 14.82 | 14.51 |
| 280.1               | 310.1       | 14.61                   | 14.18 | 13.73 |
| 290.1               | 320.1       | 13.90                   | 13.25 | 12.61 |
| 300.1               | 330.1       | 13.14                   | 12.39 | 11.57 |
| 310.1               | 340.1       | 12.22                   | 11.35 | 10.47 |
| 320.1               | 350.1       | 11.07                   | 10.19 | 9.39  |
| 330.1               | 360.1       | 9.97                    | 9.26  | 8.63  |
| 340.1               | 370.1       | 8.90                    | 8.36  | 7.95  |
| 350.1               | 380.1       | 8.24                    | 7.71  | 7.42  |
| 360.1               | 390.1       | 7.68                    | 7.25  | 6.95  |
| 370.1               | 400.1       | 7.31                    | 6.89  | 6.62  |
| 380.1               | 410.1       | 6.99                    | 6.60  | 6.34  |
| 390.1               | 420.1       | 6.78                    | 6.39  | 6.15  |
| 400.1               | 430.1       | 6.59                    | 6.22  | 5.97  |

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# Frequency Mixer

TAK-5+

## 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=250.1MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|---------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                       |      |      |
|                     |             | +4              | +7   | +10  |             | +4              | +7   | +10  |                      | +4                              | +7   | +10  |
| 5.0                 | 35.0        | 1.19            | 1.07 | 1.02 | 5.0         | 1.89            | 2.97 | 4.39 | 5.0                  | 1.64                            | 1.43 | 1.31 |
| 10.0                | 40.0        | 1.20            | 1.07 | 1.01 | 10.0        | 1.86            | 2.78 | 4.21 | 10.0                 | 1.65                            | 1.43 | 1.32 |
| 20.1                | 50.1        | 1.29            | 1.19 | 1.12 | 20.1        | 1.68            | 2.40 | 3.42 | 16.2                 | 2.32                            | 2.04 | 1.73 |
| 30.1                | 60.1        | 1.27            | 1.19 | 1.13 | 30.1        | 1.74            | 2.52 | 3.50 | 22.3                 | 2.25                            | 2.00 | 1.73 |
| 40.1                | 70.1        | 1.29            | 1.17 | 1.11 | 40.1        | 1.74            | 2.51 | 3.44 | 28.5                 | 2.31                            | 2.04 | 1.77 |
| 50.1                | 80.1        | 1.23            | 1.14 | 1.08 | 50.1        | 1.71            | 2.43 | 3.31 | 34.6                 | 2.28                            | 2.07 | 1.79 |
| 60.1                | 90.1        | 1.21            | 1.11 | 1.06 | 60.1        | 1.68            | 2.35 | 3.17 | 40.8                 | 2.24                            | 2.04 | 1.80 |
| 70.1                | 100.1       | 1.17            | 1.09 | 1.03 | 70.1        | 1.66            | 2.29 | 3.08 | 46.9                 | 2.21                            | 2.03 | 1.81 |
| 80.1                | 110.1       | 1.14            | 1.06 | 1.02 | 80.1        | 1.63            | 2.30 | 3.13 | 53.1                 | 2.18                            | 2.01 | 1.83 |
| 90.1                | 120.1       | 1.12            | 1.04 | 1.02 | 90.1        | 1.66            | 2.35 | 3.17 | 59.2                 | 2.21                            | 2.06 | 1.86 |
| 100.1               | 130.1       | 1.10            | 1.01 | 1.06 | 100.1       | 1.70            | 2.32 | 3.12 | 65.4                 | 2.24                            | 2.06 | 1.86 |
| 110.1               | 140.1       | 1.08            | 1.01 | 1.07 | 110.1       | 1.73            | 2.41 | 3.22 | 71.5                 | 2.31                            | 2.13 | 1.92 |
| 120.1               | 150.1       | 1.07            | 1.00 | 1.06 | 120.1       | 1.77            | 2.45 | 3.28 | 77.7                 | 2.38                            | 2.20 | 1.99 |
| 130.1               | 160.1       | 1.02            | 1.04 | 1.09 | 130.1       | 1.82            | 2.48 | 3.28 | 83.8                 | 2.46                            | 2.27 | 2.06 |
| 140.1               | 170.1       | 1.03            | 1.11 | 1.17 | 140.1       | 1.83            | 2.48 | 3.26 | 90.0                 | 2.52                            | 2.32 | 2.10 |
| 150.1               | 180.1       | 1.08            | 1.16 | 1.23 | 150.1       | 1.82            | 2.46 | 3.22 | 96.2                 | 2.57                            | 2.37 | 2.16 |
| 160.1               | 190.1       | 1.12            | 1.18 | 1.24 | 160.1       | 1.82            | 2.43 | 3.18 | 102.3                | 2.61                            | 2.42 | 2.21 |
| 170.1               | 200.1       | 1.17            | 1.21 | 1.25 | 170.1       | 1.83            | 2.48 | 3.26 | 108.5                | 2.63                            | 2.44 | 2.23 |
| 180.1               | 210.1       | 1.20            | 1.19 | 1.20 | 180.1       | 1.86            | 2.50 | 3.29 | 114.6                | 2.57                            | 2.40 | 2.22 |
| 190.1               | 220.1       | 1.22            | 1.18 | 1.18 | 190.1       | 1.92            | 2.51 | 3.27 | 120.8                | 2.54                            | 2.39 | 2.21 |
| 200.1               | 230.1       | 1.29            | 1.23 | 1.18 | 200.1       | 2.00            | 2.62 | 3.37 | 126.9                | 2.50                            | 2.37 | 2.21 |
| 210.1               | 240.1       | 1.30            | 1.24 | 1.19 | 210.1       | 2.07            | 2.71 | 3.45 | 133.1                | 2.48                            | 2.35 | 2.21 |
| 220.1               | 250.1       | 1.38            | 1.31 | 1.22 | 220.1       | 2.12            | 2.80 | 3.56 | 139.2                | 2.51                            | 2.36 | 2.23 |
| 230.1               | 260.1       | 1.31            | 1.22 | 1.13 | 230.1       | 2.14            | 2.78 | 3.53 | 145.4                | 2.54                            | 2.40 | 2.26 |
| 240.1               | 270.1       | 1.35            | 1.26 | 1.19 | 240.1       | 2.15            | 2.79 | 3.52 | 151.5                | 2.58                            | 2.44 | 2.29 |
| 250.1               | 280.1       | 1.31            | 1.23 | 1.18 | 250.1       | 2.15            | 2.78 | 3.51 | 157.7                | 2.61                            | 2.48 | 2.33 |
| 260.1               | 290.1       | 1.35            | 1.28 | 1.25 | 260.1       | 2.19            | 2.90 | 3.64 | 163.8                | 2.62                            | 2.48 | 2.34 |
| 270.1               | 300.1       | 1.34            | 1.30 | 1.28 | 270.1       | 2.21            | 2.89 | 3.62 | 170.0                | 2.60                            | 2.45 | 2.32 |
| 280.1               | 310.1       | 1.36            | 1.33 | 1.31 | 280.1       | 2.24            | 2.89 | 3.59 | 176.2                | 2.61                            | 2.45 | 2.31 |
| 290.1               | 320.1       | 1.44            | 1.42 | 1.43 | 290.1       | 2.29            | 2.92 | 3.58 | 182.3                | 2.61                            | 2.43 | 2.29 |
| 300.1               | 330.1       | 1.45            | 1.45 | 1.47 | 300.1       | 2.31            | 2.92 | 3.55 | 188.5                | 2.61                            | 2.44 | 2.28 |
| 310.1               | 340.1       | 1.55            | 1.56 | 1.58 | 310.1       | 2.32            | 2.92 | 3.52 | 194.6                | 2.64                            | 2.45 | 2.27 |
| 320.1               | 350.1       | 1.55            | 1.58 | 1.62 | 320.1       | 2.32            | 2.85 | 3.42 | 200.8                | 2.66                            | 2.46 | 2.28 |
| 330.1               | 360.1       | 1.63            | 1.65 | 1.68 | 330.1       | 2.32            | 2.83 | 3.36 | 206.9                | 2.65                            | 2.46 | 2.27 |
| 340.1               | 370.1       | 1.66            | 1.69 | 1.72 | 340.1       | 2.33            | 2.82 | 3.32 | 213.1                | 2.65                            | 2.46 | 2.26 |
| 350.1               | 380.1       | 1.71            | 1.72 | 1.74 | 350.1       | 2.36            | 2.84 | 3.31 | 219.2                | 2.69                            | 2.48 | 2.28 |
| 360.1               | 390.1       | 1.75            | 1.75 | 1.76 | 360.1       | 2.38            | 2.80 | 3.24 | 225.4                | 2.73                            | 2.50 | 2.28 |
| 370.1               | 400.1       | 1.75            | 1.72 | 1.73 | 370.1       | 2.44            | 2.84 | 3.25 | 231.5                | 2.77                            | 2.54 | 2.28 |
| 380.1               | 410.1       | 1.78            | 1.74 | 1.73 | 380.1       | 2.50            | 2.87 | 3.25 | 237.7                | 2.76                            | 2.52 | 2.27 |
| 390.1               | 420.1       | 1.79            | 1.74 | 1.72 | 390.1       | 2.54            | 2.89 | 3.25 | 243.8                | 2.74                            | 2.50 | 2.24 |
| 400.1               | 430.1       | 1.83            | 1.77 | 1.74 | 400.1       | 2.59            | 2.93 | 3.26 | 250.0                | 2.66                            | 2.42 | 2.14 |

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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 16  | 22  | 12  | 45  | 19  | 44  | 34  | 47  | 44  | 45  |
| 1  | -      | 20     | +0  | 29  | 12  | 34  | 29  | 43  | 37  | 46  | 34  | 46  |
| 2  | >100   | 53     | 43  | 54  | 44  | 54  | 51  | 64  | 58  | 77  | 78  | 71  |
| 3  | >100   | 64     | 53  | 59  | 54  | 64  | 62  | 67  | 63  | 69  | 64  | 72  |
| 4  | >100   | >80    | 71  | >80 | 66  | 78  | 70  | >80 | 77  | >80 | >80 | >80 |
| 5  | >100   | >80    | >80 | >80 | >80 | 76  | >80 | >80 | >80 | >80 | >80 | >80 |
| 6  | >100   | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 7  | >100   | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 8  | >100   | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 9  | >100   | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 10 | >100   | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 120.1 MHz; -14.00 dBm.

LO IN: 150.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -19.72 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |    |    |     |    |     |     |
|----|--------|--------|-----|-----|-----|-----|----|----|-----|----|-----|-----|
| 0  | -      | -      | 25  | 35  | 24  | 50  | 31 | 54 | 50  | 57 | 58  | 68  |
| 1  | -      | 22     | +0  | 29  | 14  | 35  | 31 | 53 | 41  | 55 | 41  | 72  |
| 2  | 100    | 49     | 43  | 52  | 43  | 50  | 53 | 64 | 52  | 63 | 62  | 62  |
| 3  | >100   | 53     | 37  | 49  | 39  | 61  | 42 | 53 | 55  | 64 | 54  | 62  |
| 4  | >100   | 81     | 55  | 78  | 53  | 69  | 54 | 61 | 61  | 74 | 69  | 76  |
| 5  | >100   | 72     | 62  | 62  | 57  | 48  | 56 | 62 | 60  | 68 | 65  | 70  |
| 6  | >100   | 83     | 76  | 77  | 66  | 80  | 65 | 90 | 66  | 80 | 75  | 82  |
| 7  | >100   | 90     | 77  | 89  | 74  | 71  | 73 | 69 | 69  | 71 | 79  | 78  |
| 8  | >100   | 88     | >91 | 87  | 84  | 81  | 80 | 85 | 78  | 82 | 80  | >91 |
| 9  | >100   | >91    | 90  | >91 | >91 | >91 | 79 | 84 | 79  | 80 | 82  | 90  |
| 10 | >100   | >91    | >91 | >91 | >91 | >91 | 89 | 90 | >91 | 55 | >91 | 90  |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5  | 6  | 7   | 8  | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 120.1 MHz; -4.00 dBm.

LO IN: 150.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -9 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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