

# Frequency Mixer

# SIM-193H+

## Typical Performance Data

| RF (IN) (GHz) | LO (GHz) | CONVERSION LOSS IF FIXED @IF(OUT)=0.030GHz (dB) |       |       |
|---------------|----------|---|-------|-------|
|               |          | @LO (dBm)                                       |       |       |
|               |          | +14   | +17   | +20   |
| 7.22          | 7.25     | 11.41   | 7.31  | 6.72  |
| 7.30          | 7.33     | 8.37  | 6.99  | 6.55  |
| 7.52          | 7.55     | 7.36  | 6.63  | 6.25  |
| 7.86          | 7.89     | 7.09  | 6.50  | 6.11  |
| 8.20          | 8.23     | 8.08  | 7.44  | 6.90  |
| 8.52          | 8.55     | 9.02  | 8.04  | 7.21  |
| 8.86          | 8.89     | 8.94  | 8.11  | 7.51  |
| 9.20          | 9.23     | 8.40  | 7.57  | 7.02  |
| 9.54          | 9.57     | 7.40  | 6.58  | 6.11  |
| 9.86          | 9.89     | 7.76  | 6.78  | 6.30  |
| 10.20         | 10.23    | 7.72  | 6.65  | 6.08  |
| 10.54         | 10.57    | 7.81  | 6.57  | 5.93  |
| 10.88         | 10.91    | 7.21  | 6.03  | 5.47  |
| 11.22         | 11.25    | 7.06  | 6.01  | 5.57  |
| 11.54         | 11.57    | 6.70  | 5.73  | 5.30  |
| 11.88         | 11.91    | 6.88  | 6.01  | 5.59  |
| 12.22         | 12.25    | 6.57  | 5.80  | 5.37  |
| 12.56         | 12.59    | 6.80  | 5.95  | 5.46  |
| 12.88         | 12.91    | 6.65  | 5.76  | 5.29  |
| 13.22         | 13.25    | 7.10  | 6.05  | 5.58  |
| 13.56         | 13.59    | 7.37  | 6.31  | 5.84  |
| 13.90         | 13.93    | 7.48  | 6.48  | 6.03  |
| 14.22         | 14.25    | 7.94  | 6.86  | 6.41  |
| 14.56         | 14.59    | 8.22  | 6.90  | 6.45  |
| 14.90         | 14.93    | 9.93  | 7.57  | 6.96  |
| 15.24         | 15.27    | 9.76  | 7.31  | 6.79  |
| 15.58         | 15.61    | 9.29  | 7.52  | 7.14  |
| 15.90         | 15.93    | 9.25  | 7.97  | 7.57  |
| 16.24         | 16.27    | 9.37  | 8.62  | 8.02  |
| 16.58         | 16.61    | 10.00   | 8.66  | 8.08  |
| 16.92         | 16.95    | 10.61   | 8.83  | 8.60  |
| 17.24         | 17.27    | 9.95  | 8.49  | 8.22  |
| 17.58         | 17.61    | 10.16   | 8.57  | 8.29  |
| 17.92         | 17.95    | 9.61  | 8.66  | 8.38  |
| 18.26         | 18.29    | 9.20  | 8.67  | 8.41  |
| 18.58         | 18.61    | 9.07  | 8.60  | 8.36  |
| 19.00         | 19.03    | 9.20  | 8.78  | 8.58  |
| 19.26         | 19.29    | 9.62  | 9.13  | 8.93  |
| 19.60         | 19.63    | 10.89   | 10.15 | 9.94  |
| 19.94         | 19.97    | 12.12   | 10.84 | 10.62 |

| RF (IN) (GHz) | LO (GHz) | IP-3 INPUT (dBm) |       |       |
|---------------|----------|------------------|-------|-------|
|               |          | @LO (dBm)        |       |       |
|               |          | +14              | +17   | +20   |
| 7.22          | 7.25     | 15.09            | 17.08 | 20.23 |
| 7.30          | 7.33     | 14.95            | 18.15 | 21.34 |
| 7.52          | 7.55     | 16.39            | 18.96 | 21.06 |
| 7.86          | 7.89     | 16.99            | 18.97 | 21.01 |
| 8.20          | 8.23     | 19.75            | 22.64 | 24.97 |
| 8.52          | 8.55     | 23.22            | 25.07 | 26.81 |
| 8.86          | 8.89     | 24.95            | 26.77 | 27.81 |
| 9.20          | 9.23     | 25.05            | 27.29 | 27.02 |
| 9.54          | 9.57     | 24.69            | 25.96 | 26.46 |
| 9.86          | 9.89     | 24.88            | 24.97 | 25.79 |
| 10.20         | 10.23    | 23.48            | 23.25 | 24.50 |
| 10.54         | 10.57    | 22.20            | 21.89 | 23.12 |
| 10.88         | 10.91    | 21.82            | 21.47 | 22.64 |
| 11.22         | 11.25    | 22.35            | 21.42 | 22.84 |
| 11.54         | 11.57    | 22.14            | 21.25 | 22.62 |
| 11.88         | 11.91    | 23.06            | 21.98 | 22.76 |
| 12.22         | 12.25    | 20.84            | 20.62 | 21.29 |
| 12.56         | 12.59    | 18.53            | 19.70 | 20.24 |
| 12.88         | 12.91    | 16.75            | 18.81 | 19.75 |
| 13.22         | 13.25    | 15.78            | 19.01 | 20.18 |
| 13.56         | 13.59    | 16.04            | 19.55 | 21.20 |
| 13.90         | 13.93    | 16.75            | 19.88 | 21.63 |
| 14.22         | 14.25    | 16.94            | 20.77 | 22.74 |
| 14.56         | 14.59    | 16.77            | 21.70 | 23.21 |
| 14.90         | 14.93    | 19.32            | 22.09 | 23.20 |
| 15.24         | 15.27    | 20.79            | 24.45 | 23.68 |
| 15.58         | 15.61    | 21.10            | 26.38 | 24.01 |
| 15.90         | 15.93    | 21.68            | 23.68 | 22.09 |
| 16.24         | 16.27    | 14.85            | 24.59 | 24.91 |
| 16.58         | 16.61    | 14.87            | 25.98 | 27.97 |
| 16.92         | 16.95    | 17.97            | 24.72 | 28.37 |
| 17.24         | 17.27    | 19.16            | 26.04 | 28.82 |
| 17.58         | 17.61    | 19.01            | 28.08 | 30.04 |
| 17.92         | 17.95    | 20.76            | 29.28 | 30.65 |
| 18.26         | 18.29    | 21.83            | 30.09 | 31.29 |
| 18.58         | 18.61    | 22.57            | 29.43 | 31.79 |
| 19.00         | 19.03    | 23.27            | 27.91 | 31.35 |
| 19.26         | 19.29    | 23.21            | 27.59 | 30.89 |
| 19.60         | 19.63    | 22.15            | 27.87 | 29.93 |
| 19.94         | 19.97    | 19.93            | 28.32 | 29.88 |

| RF (IN) (GHz) | LO (GHz) | COMPRESSION @RF IN=+14dBm (dB) |      |      |
|---------------|----------|--------------------------------|------|------|
|               |          | @LO (dBm)                      |      |      |
|               |          | +14                            | +17  | +20  |
| 7.22          | 7.25     | 1.89                           | 0.79 | 0.44 |
| 7.30          | 7.33     | 2.49                           | 1.06 | 0.54 |
| 7.52          | 7.55     | 1.94                           | 0.80 | 0.44 |
| 7.86          | 7.89     | 2.02                           | 0.94 | 0.57 |
| 8.20          | 8.23     | 1.22                           | 0.79 | 0.58 |
| 8.52          | 8.55     | 0.74                           | 0.53 | 0.40 |
| 8.86          | 8.89     | 0.42                           | 0.34 | 0.22 |
| 9.20          | 9.23     | 0.51                           | 0.39 | 0.31 |
| 9.54          | 9.57     | 0.37                           | 0.29 | 0.22 |
| 9.86          | 9.89     | 0.37                           | 0.29 | 0.23 |
| 10.20         | 10.23    | 0.52                           | 0.42 | 0.35 |
| 10.54         | 10.57    | 0.45                           | 0.35 | 0.31 |
| 10.88         | 10.91    | 0.48                           | 0.40 | 0.34 |
| 11.22         | 11.25    | 0.33                           | 0.30 | 0.24 |
| 11.54         | 11.57    | 0.45                           | 0.38 | 0.34 |
| 11.88         | 11.91    | 0.18                           | 0.19 | 0.15 |
| 12.22         | 12.25    | 0.42                           | 0.36 | 0.30 |
| 12.56         | 12.59    | 0.30                           | 0.28 | 0.23 |
| 12.88         | 12.91    | 0.39                           | 0.32 | 0.25 |
| 13.22         | 13.25    | 0.29                           | 0.24 | 0.20 |
| 13.56         | 13.59    | 0.29                           | 0.24 | 0.19 |
| 13.90         | 13.93    | 0.16                           | 0.19 | 0.17 |
| 14.22         | 14.25    | 0.18                           | 0.20 | 0.15 |
| 14.56         | 14.59    | 0.19                           | 0.19 | 0.16 |
| 14.90         | 14.93    | 0.22                           | 0.18 | 0.14 |
| 15.24         | 15.27    | 0.27                           | 0.19 | 0.14 |
| 15.58         | 15.61    | 0.38                           | 0.33 | 0.31 |
| 15.90         | 15.93    | 0.58                           | 0.64 | 0.54 |
| 16.24         | 16.27    | 0.46                           | 0.40 | 0.32 |
| 16.58         | 16.61    | 0.64                           | 0.34 | 0.24 |
| 16.92         | 16.95    | 0.68                           | 0.31 | 0.21 |
| 17.24         | 17.27    | 0.20                           | 0.16 | 0.11 |
| 17.58         | 17.61    | 0.22                           | 0.15 | 0.09 |
| 17.92         | 17.95    | 0.55                           | 0.26 | 0.15 |
| 18.26         | 18.29    | 0.23                           | 0.16 | 0.09 |
| 18.58         | 18.61    | 0.16                           | 0.14 | 0.08 |
| 19.00         | 19.03    | 0.22                           | 0.16 | 0.09 |
| 19.26         | 19.29    | 0.24                           | 0.18 | 0.10 |
| 19.60         | 19.63    | 0.21                           | 0.15 | 0.11 |
| 19.94         | 19.97    | 0.19                           | 0.13 | 0.06 |

## Typical Performance Data

| IF (OUT) (GHz) | LO (GHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=13.150GHz (dB) |
|----------------|----------|---|
|                |          | @LO (dBm)   |
|                |          | +17   |
| 6.050          | 7.100    | 6.17  |
| 5.750          | 7.400    | 6.19  |
| 5.450          | 7.700    | 6.56  |
| 5.130          | 8.020    | 6.51  |
| 4.830          | 8.320    | 6.55  |
| 4.510          | 8.640    | 7.08  |
| 4.210          | 8.940    | 7.59  |
| 3.890          | 9.260    | 7.81  |
| 3.590          | 9.560    | 7.60  |
| 3.270          | 9.880    | 6.88  |
| 2.970          | 10.180   | 6.62  |
| 2.650          | 10.500   | 6.49  |
| 2.350          | 10.800   | 6.31  |
| 2.030          | 11.120   | 6.03  |
| 1.730          | 11.420   | 5.79  |
| 1.410          | 11.740   | 5.73  |
| 1.110          | 12.040   | 5.63  |
| 0.790          | 12.360   | 5.39  |
| 0.490          | 12.660   | 5.33  |
| 0.170          | 12.980   | 5.56  |
| 0.010          | 13.160   | 5.96  |
| 0.350          | 13.500   | 5.85  |
| 0.690          | 13.840   | 5.81  |
| 1.050          | 14.200   | 6.13  |
| 1.390          | 14.540   | 6.42  |
| 1.750          | 14.900   | 6.31  |
| 2.090          | 15.240   | 6.35  |
| 2.450          | 15.600   | 6.48  |
| 2.790          | 15.940   | 6.82  |
| 3.130          | 16.280   | 7.41  |
| 3.490          | 16.640   | 7.07  |
| 3.830          | 16.980   | 6.86  |
| 4.190          | 17.340   | 6.79  |
| 4.530          | 17.680   | 6.78  |
| 4.890          | 18.040   | 6.85  |
| 5.230          | 18.380   | 6.95  |
| 5.570          | 18.720   | 7.19  |
| 5.930          | 19.080   | 7.03  |
| 6.270          | 19.420   | 7.40  |
| 6.630          | 19.780   | 7.27  |

| IF (OUT) (GHz) | LO (GHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=7.300GHz (dB) |
|----------------|----------|--|
|                |          | @LO (dBm)  |
|                |          | +17  |
| 0.050          | 7.350    | 6.58   |
| 0.270          | 7.570    | 6.32   |
| 0.510          | 7.810    | 6.01   |
| 0.730          | 8.030    | 5.73   |
| 0.970          | 8.270    | 5.67   |
| 1.190          | 8.490    | 5.85   |
| 1.430          | 8.730    | 6.40   |
| 1.650          | 8.950    | 7.34   |
| 1.890          | 9.190    | 8.57   |
| 2.110          | 9.410    | 9.35   |
| 2.350          | 9.650    | 9.50   |
| 2.570          | 9.870    | 10.35  |
| 2.810          | 10.110   | 10.77  |
| 3.050          | 10.350   | 10.80  |
| 3.270          | 10.570   | 10.59  |
| 3.510          | 10.810   | 10.45  |
| 3.730          | 11.030   | 10.35  |
| 3.970          | 11.270   | 10.43  |
| 4.190          | 11.490   | 10.40  |
| 4.430          | 11.730   | 10.15  |
| 4.650          | 11.950   | 10.19  |
| 4.890          | 12.190   | 9.83   |
| 5.110          | 12.410   | 9.76   |
| 5.350          | 12.650   | 9.96   |
| 5.570          | 12.870   | 9.63   |
| 5.810          | 13.110   | 9.34   |
| 6.050          | 13.350   | 8.89   |
| 6.270          | 13.570   | 8.62   |
| 6.510          | 13.810   | 8.63   |
| 6.730          | 14.030   | 8.36   |
| 6.970          | 14.270   | 8.23   |
| 7.190          | 14.490   | 8.55   |
| 7.430          | 14.730   | 8.98   |
| 7.650          | 14.950   | 9.55   |
| 7.890          | 15.190   | 10.25  |
| 8.110          | 15.410   | 10.76  |
| 8.350          | 15.650   | 11.56  |
| 8.570          | 15.870   | 12.32  |
| 8.810          | 16.110   | 13.53  |
| 9.050          | 16.350   | 15.18  |

| IF (OUT) (GHz) | LO (GHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=19GHz (dB) |
|----------------|----------|---|
|                |          | @LO (dBm)   |
|                |          | +17   |
| 9.3            | 9.7      | 15.30   |
| 9.1            | 9.9      | 14.89   |
| 8.8            | 10.2     | 14.28   |
| 8.6            | 10.4     | 13.74   |
| 8.3            | 10.7     | 13.13   |
| 8.1            | 10.9     | 12.30   |
| 7.9            | 11.1     | 11.22   |
| 7.6            | 11.4     | 10.28   |
| 7.4            | 11.6     | 9.74  |
| 7.2            | 11.8     | 9.86  |
| 6.9            | 12.1     | 9.87  |
| 6.7            | 12.3     | 9.95  |
| 6.4            | 12.6     | 10.01   |
| 6.2            | 12.8     | 10.00   |
| 6.0            | 13.0     | 10.05   |
| 5.7            | 13.3     | 10.37   |
| 5.5            | 13.5     | 10.78   |
| 5.3            | 13.7     | 11.09   |
| 5.0            | 14.0     | 11.36   |
| 4.8            | 14.2     | 11.66   |
| 4.6            | 14.4     | 11.63   |
| 4.3            | 14.7     | 11.34   |
| 4.1            | 14.9     | 11.03   |
| 3.8            | 15.2     | 11.03   |
| 3.6            | 15.4     | 10.79   |
| 3.4            | 15.6     | 10.93   |
| 3.1            | 15.9     | 11.62   |
| 2.9            | 16.1     | 11.94   |
| 2.7            | 16.3     | 11.26   |
| 2.4            | 16.6     | 11.20   |
| 2.2            | 16.8     | 11.05   |
| 1.9            | 17.1     | 10.94   |
| 1.7            | 17.3     | 10.81   |
| 1.5            | 17.5     | 10.57   |
| 1.2            | 17.8     | 10.29   |
| 1.0            | 18.0     | 9.96  |
| 0.8            | 18.2     | 9.72  |
| 0.5            | 18.5     | 9.64  |
| 0.3            | 18.7     | 9.47  |
| 0.0            | 19.0     | 9.41  |

# Frequency Mixer

# SIM-193H+

## Typical Performance Data

| LO<br>(GHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       | RF<br>(IN)<br>(GHz) | LO<br>(GHz) | RF-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|---------------------|-------------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |                     |             | @LO (dBm)               |       |       |
|             | +14                     | +17   | +20   | +14                     | +17   | +20   |                     |             | +14                     | +17   | +20   |
| 7.25        | 39.93                   | 40.01 | 40.26 | 14.58                   | 17.39 | 19.15 | 7.22                | 7.25        | 20.17                   | 20.18 | 19.98 |
| 7.33        | 39.90                   | 41.80 | 41.76 | 14.16                   | 17.13 | 19.08 | 7.30                | 7.33        | 20.11                   | 20.17 | 20.29 |
| 7.55        | 37.28                   | 38.55 | 38.73 | 15.57                   | 17.90 | 18.81 | 7.52                | 7.55        | 19.97                   | 19.68 | 19.34 |
| 7.89        | 29.65                   | 30.72 | 32.02 | 16.95                   | 18.26 | 18.44 | 7.86                | 7.89        | 17.94                   | 17.75 | 17.48 |
| 8.23        | 32.40                   | 34.36 | 36.16 | 17.84                   | 18.01 | 17.51 | 8.20                | 8.23        | 17.44                   | 17.79 | 17.98 |
| 8.55        | 39.39                   | 43.09 | 41.45 | 19.32                   | 17.89 | 16.89 | 8.52                | 8.55        | 21.11                   | 21.59 | 21.69 |
| 8.89        | 36.92                   | 38.18 | 38.18 | 20.18                   | 17.74 | 16.33 | 8.86                | 8.89        | 23.54                   | 23.96 | 24.11 |
| 9.23        | 37.38                   | 38.18 | 38.66 | 17.57                   | 15.11 | 13.76 | 9.20                | 9.23        | 25.32                   | 25.48 | 25.47 |
| 9.57        | 38.44                   | 39.52 | 40.41 | 17.50                   | 15.36 | 14.17 | 9.54                | 9.57        | 27.43                   | 27.34 | 27.15 |
| 9.89        | 39.78                   | 40.93 | 41.08 | 17.75                   | 15.43 | 14.23 | 9.86                | 9.89        | 29.82                   | 29.43 | 29.12 |
| 10.23       | 39.27                   | 40.85 | 40.72 | 16.80                   | 14.77 | 13.77 | 10.20               | 10.23       | 30.55                   | 30.00 | 29.63 |
| 10.57       | 38.89                   | 41.72 | 43.29 | 16.16                   | 14.49 | 13.63 | 10.54               | 10.57       | 31.60                   | 30.95 | 30.33 |
| 10.91       | 36.36                   | 38.67 | 39.57 | 16.19                   | 14.65 | 13.78 | 10.88               | 10.91       | 31.60                   | 30.77 | 30.00 |
| 11.25       | 35.25                   | 37.89 | 38.61 | 15.94                   | 14.57 | 13.80 | 11.22               | 11.25       | 31.03                   | 30.37 | 29.78 |
| 11.57       | 33.17                   | 34.04 | 34.30 | 16.35                   | 15.47 | 14.94 | 11.54               | 11.57       | 30.50                   | 30.04 | 29.59 |
| 11.91       | 34.78                   | 37.07 | 36.34 | 15.38                   | 14.69 | 14.32 | 11.88               | 11.91       | 30.07                   | 29.41 | 29.07 |
| 12.25       | 32.34                   | 35.36 | 37.83 | 16.42                   | 16.11 | 15.85 | 12.22               | 12.25       | 30.18                   | 29.41 | 28.92 |
| 12.59       | 31.46                   | 34.31 | 37.00 | 16.40                   | 16.13 | 15.88 | 12.56               | 12.59       | 29.87                   | 28.99 | 28.36 |
| 12.91       | 29.34                   | 31.73 | 34.04 | 16.71                   | 16.70 | 16.63 | 12.88               | 12.91       | 29.51                   | 28.57 | 27.88 |
| 13.25       | 29.06                   | 31.34 | 33.44 | 17.05                   | 17.28 | 17.35 | 13.22               | 13.25       | 28.94                   | 27.74 | 26.89 |
| 13.59       | 29.03                   | 31.35 | 33.22 | 17.30                   | 17.68 | 17.84 | 13.56               | 13.59       | 27.72                   | 26.42 | 25.64 |
| 13.93       | 29.56                   | 31.75 | 33.39 | 17.47                   | 17.97 | 18.22 | 13.90               | 13.93       | 26.22                   | 24.83 | 24.09 |
| 14.25       | 29.68                   | 32.17 | 33.91 | 17.93                   | 18.62 | 19.04 | 14.22               | 14.25       | 24.40                   | 23.04 | 22.32 |
| 14.59       | 28.91                   | 31.35 | 33.37 | 18.83                   | 19.83 | 20.47 | 14.56               | 14.59       | 22.63                   | 21.68 | 21.13 |
| 14.93       | 27.70                   | 29.60 | 31.17 | 21.23                   | 21.80 | 22.15 | 14.90               | 14.93       | 21.48                   | 20.64 | 20.12 |
| 15.27       | 25.07                   | 26.29 | 27.31 | 21.25                   | 20.84 | 20.49 | 15.24               | 15.27       | 20.31                   | 19.52 | 19.00 |
| 15.61       | 22.15                   | 22.88 | 23.50 | 18.06                   | 17.30 | 16.84 | 15.58               | 15.61       | 18.66                   | 18.09 | 17.72 |
| 15.93       | 18.33                   | 18.97 | 19.62 | 14.14                   | 13.38 | 13.15 | 15.90               | 15.93       | 17.78                   | 17.19 | 17.07 |
| 16.27       | 16.21                   | 17.53 | 18.91 | 10.87                   | 10.92 | 11.03 | 16.24               | 16.27       | 18.56                   | 19.30 | 19.87 |
| 16.61       | 18.78                   | 20.71 | 22.38 | 11.02                   | 10.44 | 9.85  | 16.58               | 16.61       | 24.03                   | 24.88 | 25.38 |
| 16.95       | 20.96                   | 22.59 | 23.98 | 11.81                   | 10.25 | 9.09  | 16.92               | 16.95       | 25.97                   | 26.30 | 26.51 |
| 17.27       | 24.92                   | 26.50 | 27.78 | 12.30                   | 10.90 | 9.97  | 17.24               | 17.27       | 24.84                   | 24.86 | 24.77 |
| 17.61       | 25.94                   | 27.43 | 28.41 | 17.05                   | 15.71 | 14.87 | 17.58               | 17.61       | 23.77                   | 23.55 | 23.41 |
| 17.95       | 27.03                   | 28.83 | 29.81 | 20.70                   | 19.90 | 19.09 | 17.92               | 17.95       | 22.58                   | 22.28 | 22.14 |
| 18.29       | 31.21                   | 33.98 | 36.28 | 21.30                   | 19.27 | 17.83 | 18.26               | 18.29       | 20.82                   | 20.63 | 20.52 |
| 18.61       | 30.22                   | 30.76 | 30.75 | 20.46                   | 18.92 | 18.04 | 18.58               | 18.61       | 19.94                   | 19.84 | 19.80 |
| 19.03       | 25.17                   | 24.89 | 24.66 | 20.49                   | 19.81 | 19.31 | 19.00               | 19.03       | 18.28                   | 18.25 | 18.25 |
| 19.29       | 22.95                   | 21.97 | 21.41 | 20.04                   | 19.03 | 18.27 | 19.26               | 19.29       | 16.42                   | 16.40 | 16.38 |
| 19.63       | 19.55                   | 18.62 | 18.14 | 19.06                   | 18.52 | 18.08 | 19.60               | 19.63       | 14.65                   | 14.65 | 14.64 |
| 19.97       | 16.25                   | 15.48 | 15.06 | 17.79                   | 17.69 | 17.47 | 19.94               | 19.97       | 13.44                   | 13.51 | 13.53 |

# Frequency Mixer

# SIM-193H+

## Typical Performance Data

| RF (IN)<br>(GHz) | LO<br>(GHz) | RF VSWR (:1) |      |      | LO<br>(GHz) | LO VSWR (:1) |      |      | IF (OUT)<br>(GHz) | IF VSWR @LO=19GHz (:1) |      |      |
|------------------|-------------|--------------|------|------|-------------|--------------|------|------|-------------------|------------------------|------|------|
|                  |             | @LO (dBm)    |      |      |             | @LO (dBm)    |      |      |                   | @LO (dBm)              |      |      |
|                  |             | +14          | +17  | +20  |             | +14          | +17  | +20  |                   | +14                    | +17  | +20  |
| 7.22             | 7.25        | 4.50         | 3.56 | 3.24 | 7.22        | 7.51         | 6.02 | 6.36 | 0.04              | 1.61                   | 1.45 | 1.35 |
| 7.30             | 7.33        | 4.99         | 3.50 | 3.12 | 7.33        | 8.14         | 5.58 | 5.74 | 0.24              | 1.68                   | 1.49 | 1.40 |
| 7.52             | 7.55        | 3.61         | 3.07 | 2.78 | 7.55        | 4.46         | 4.61 | 5.31 | 0.44              | 1.78                   | 1.59 | 1.50 |
| 7.86             | 7.89        | 3.13         | 2.68 | 2.41 | 7.89        | 3.04         | 3.75 | 4.59 | 0.64              | 1.94                   | 1.74 | 1.65 |
| 8.20             | 8.23        | 3.93         | 3.63 | 3.43 | 8.23        | 2.35         | 3.16 | 4.04 | 0.88              | 2.14                   | 1.93 | 1.83 |
| 8.52             | 8.55        | 5.55         | 5.05 | 4.67 | 8.55        | 2.27         | 3.04 | 3.85 | 1.08              | 2.35                   | 2.11 | 2.00 |
| 8.86             | 8.89        | 6.12         | 5.48 | 5.02 | 8.89        | 2.48         | 2.96 | 3.56 | 1.28              | 2.51                   | 2.25 | 2.13 |
| 9.20             | 9.23        | 4.91         | 4.35 | 3.97 | 9.23        | 2.87         | 3.13 | 3.61 | 1.48              | 2.63                   | 2.36 | 2.23 |
| 9.54             | 9.57        | 4.21         | 3.72 | 3.39 | 9.57        | 3.19         | 3.08 | 3.28 | 1.72              | 2.73                   | 2.45 | 2.31 |
| 9.86             | 9.89        | 4.09         | 3.52 | 3.12 | 9.89        | 3.72         | 3.11 | 3.08 | 1.92              | 2.79                   | 2.50 | 2.36 |
| 10.20            | 10.23       | 4.20         | 3.54 | 3.12 | 10.23       | 3.69         | 3.02 | 2.96 | 2.12              | 2.84                   | 2.54 | 2.39 |
| 10.54            | 10.57       | 3.79         | 3.16 | 2.75 | 10.57       | 3.91         | 2.97 | 2.75 | 2.32              | 2.87                   | 2.55 | 2.40 |
| 10.88            | 10.91       | 3.66         | 2.99 | 2.57 | 10.91       | 4.26         | 2.91 | 2.57 | 2.56              | 2.95                   | 2.61 | 2.45 |
| 11.22            | 11.25       | 3.26         | 2.66 | 2.26 | 11.25       | 4.29         | 2.81 | 2.43 | 2.76              | 2.97                   | 2.62 | 2.45 |
| 11.54            | 11.57       | 3.38         | 2.65 | 2.30 | 11.57       | 4.78         | 2.79 | 2.38 | 2.96              | 2.96                   | 2.59 | 2.42 |
| 11.88            | 11.91       | 2.43         | 2.00 | 1.73 | 11.91       | 3.46         | 2.44 | 2.21 | 3.16              | 2.98                   | 2.60 | 2.42 |
| 12.22            | 12.25       | 2.26         | 1.90 | 1.62 | 12.25       | 3.72         | 2.50 | 2.23 | 3.40              | 3.09                   | 2.70 | 2.51 |
| 12.56            | 12.59       | 2.03         | 1.72 | 1.49 | 12.59       | 3.42         | 2.50 | 2.34 | 3.60              | 3.21                   | 2.81 | 2.62 |
| 12.88            | 12.91       | 2.15         | 1.81 | 1.59 | 12.91       | 4.22         | 2.81 | 2.52 | 3.80              | 3.32                   | 2.91 | 2.71 |
| 13.22            | 13.25       | 2.04         | 1.66 | 1.50 | 13.25       | 5.49         | 3.29 | 2.77 | 4.00              | 3.46                   | 3.03 | 2.82 |
| 13.56            | 13.59       | 2.56         | 1.87 | 1.76 | 13.59       | 7.48         | 3.89 | 3.00 | 4.23              | 3.83                   | 3.36 | 3.13 |
| 13.90            | 13.93       | 2.32         | 1.85 | 1.79 | 13.93       | 7.76         | 3.96 | 2.97 | 4.43              | 3.91                   | 3.44 | 3.22 |
| 14.22            | 14.25       | 2.57         | 2.18 | 2.18 | 14.25       | 8.23         | 4.26 | 2.99 | 4.63              | 4.11                   | 3.63 | 3.40 |
| 14.56            | 14.59       | 3.24         | 3.09 | 3.03 | 14.59       | 6.29         | 3.53 | 2.68 | 4.83              | 4.10                   | 3.65 | 3.43 |
| 14.90            | 14.93       | 3.51         | 3.02 | 2.82 | 14.93       | 5.68         | 3.36 | 2.54 | 5.07              | 4.02                   | 3.59 | 3.39 |
| 15.24            | 15.27       | 3.58         | 2.80 | 2.63 | 15.27       | 5.83         | 3.28 | 2.42 | 5.27              | 3.74                   | 3.38 | 3.21 |
| 15.58            | 15.61       | 3.89         | 2.99 | 2.76 | 15.61       | 4.54         | 2.76 | 2.17 | 5.47              | 3.46                   | 3.13 | 2.98 |
| 15.90            | 15.93       | 3.25         | 2.55 | 2.20 | 15.93       | 4.13         | 2.76 | 2.13 | 5.67              | 3.08                   | 2.79 | 2.66 |
| 16.24            | 16.27       | 2.08         | 1.69 | 1.68 | 16.27       | 3.23         | 2.59 | 2.17 | 5.91              | 2.61                   | 2.37 | 2.26 |
| 16.58            | 16.61       | 2.34         | 2.41 | 2.44 | 16.61       | 3.24         | 2.87 | 2.48 | 6.11              | 2.28                   | 2.09 | 2.02 |
| 16.92            | 16.95       | 3.45         | 3.29 | 3.32 | 16.95       | 3.38         | 2.98 | 2.65 | 6.31              | 2.09                   | 1.94 | 1.90 |
| 17.24            | 17.27       | 4.20         | 4.15 | 4.11 | 17.27       | 2.77         | 2.30 | 2.05 | 6.51              | 2.14                   | 2.04 | 2.01 |
| 17.58            | 17.61       | 5.66         | 5.51 | 5.42 | 17.61       | 2.49         | 2.07 | 1.81 | 6.75              | 2.35                   | 2.27 | 2.25 |
| 17.92            | 17.95       | 5.99         | 5.23 | 5.04 | 17.95       | 2.67         | 2.09 | 1.73 | 6.95              | 2.55                   | 2.48 | 2.45 |
| 18.26            | 18.29       | 4.26         | 3.98 | 3.84 | 18.29       | 2.07         | 1.49 | 1.24 | 7.15              | 2.47                   | 2.38 | 2.34 |
| 18.58            | 18.61       | 3.57         | 3.44 | 3.35 | 18.61       | 1.58         | 1.31 | 1.25 | 7.35              | 2.43                   | 2.42 | 2.40 |
| 19.00            | 19.03       | 3.52         | 3.44 | 3.38 | 19.03       | 1.77         | 1.53 | 1.43 | 7.59              | 2.29                   | 2.34 | 2.36 |
| 19.26            | 19.29       | 2.85         | 2.78 | 2.75 | 19.29       | 1.83         | 1.60 | 1.54 | 7.79              | 2.24                   | 2.36 | 2.41 |
| 19.60            | 19.63       | 3.60         | 3.48 | 3.42 | 19.63       | 2.09         | 1.87 | 1.78 | 7.99              | 2.22                   | 2.41 | 2.50 |
| 19.94            | 19.97       | 2.51         | 2.44 | 2.41 | 19.97       | 2.63         | 2.32 | 2.18 | 8.23              | 2.38                   | 2.66 | 2.79 |

## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm)  | (-dBc) |        |        |        |        |        |        |       |       |        |        |
|----|---------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|
| 0  | ---     | ---    | -15.92 | 32.30  | ---    | ---    | ---    | ---    | ---   | ---   | ---    | ---    |
| 1  | ---     | 25.12  | ---    | 32.76  | 38.32  | ---    | ---    | ---    | ---   | ---   | ---    | ---    |
| 2  | -104.18 | 77.79  | 69.93  | 59.81  | 70.54  | 76.72  | ---    | ---    | ---   | ---   | ---    | ---    |
| 3  | -126.21 | ---    | 92.49  | 100.15 | 80.34  | 95.23  | 93.11  | ---    | ---   | ---   | ---    | ---    |
| 4  | -124.18 | ---    | ---    | 92.05  | 101.08 | 105.11 | 101.18 | 92.86  | ---   | ---   | ---    | ---    |
| 5  | -122.93 | ---    | ---    | ---    | 93.07  | 102.01 | 91.44  | 101.31 | ---   | ---   | ---    | ---    |
| 6  | -123.50 | ---    | ---    | ---    | ---    | 91.84  | 89.03  | 95.06  | 89.54 | ---   | ---    | ---    |
| 7  | -125.26 | ---    | ---    | ---    | ---    | ---    | 91.81  | 89.72  | 95.90 | 91.46 | ---    | ---    |
| 8  | -125.01 | ---    | ---    | ---    | ---    | ---    | ---    | 92.89  | 99.03 | 96.14 | 97.00  | ---    |
| 9  | -124.81 | ---    | ---    | ---    | ---    | ---    | ---    | ---    | 92.80 | 99.47 | 98.19  | 98.08  |
| 10 | -126.17 | ---    | ---    | ---    | ---    | ---    | ---    | ---    | ---   | 90.62 | 100.82 | 103.18 |
|    | RF CAL  | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7     | 8     | 9      | 10     |

### LO HARMONICS ORDER

Test conditions: RF IN: 13150 MHz; -15 dBm.  
 LO IN: 13180 MHz; +17.00 dBm  
 IF OUT: 30 MHz; -21.14 dBm

RF HARMONICS ORDER

|    | (-dBm)  | (-dBc) |       |        |        |        |        |        |        |        |        |        |
|----|---------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0  | ---     | ---    | -5.99 | 43.11  | ---    | ---    | ---    | ---    | ---    | ---    | ---    | ---    |
| 1  | ---     | 25.69  | ---   | 32.80  | 38.06  | ---    | ---    | ---    | ---    | ---    | ---    | ---    |
| 2  | -91.45  | 67.62  | 60.04 | 49.89  | 60.78  | 67.58  | ---    | ---    | ---    | ---    | ---    | ---    |
| 3  | -113.83 | ---    | 82.64 | 81.07  | 60.37  | 78.67  | 89.18  | ---    | ---    | ---    | ---    | ---    |
| 4  | -114.17 | ---    | ---   | 102.36 | 104.36 | 89.73  | 103.71 | 98.09  | ---    | ---    | ---    | ---    |
| 5  | -111.38 | ---    | ---   | ---    | 102.59 | 111.69 | 93.95  | 111.21 | ---    | ---    | ---    | ---    |
| 6  | -114.65 | ---    | ---   | ---    | ---    | 103.17 | 99.67  | 95.69  | 100.33 | ---    | ---    | ---    |
| 7  | -114.09 | ---    | ---   | ---    | ---    | ---    | 102.30 | 99.78  | 95.63  | 101.48 | ---    | ---    |
| 8  | -113.95 | ---    | ---   | ---    | ---    | ---    | ---    | 100.31 | 107.72 | 100.28 | 107.42 | ---    |
| 9  | -112.34 | ---    | ---   | ---    | ---    | ---    | ---    | ---    | 100.85 | 110.44 | 99.48  | 109.14 |
| 10 | -113.17 | ---    | ---   | ---    | ---    | ---    | ---    | ---    | ---    | 102.69 | 111.37 | 113.77 |
|    | RF CAL  | 0      | 1     | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     |

### LO HARMONICS ORDER

Test conditions: RF IN: 13150 MHz; -5 dBm.  
 LO IN: 13180 MHz; +17.00 dBm  
 IF OUT: 30 MHz; -10.99 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.

