

AN-60-042

TD-SCDMA Base Station MMIC Amplifier

Mini-Circuits PHA-1+ Ultra High Dynamic Range MMIC Amplifier is designed specifically for applications which require extremely linear performance, particularly wideband, advanced digital communications systems such as TD-SCDMA which require excellent ACLR suppression and low EVM.

The E-PHEMT based PHA-1+ provides typically +42 dB OIP3 which translates to extremely linear performance in multi-carrier and complex signal environments such as TD-SCDMA supporting ACLR₁ Measurements of better than -60 dBc at +10 dBm output and EVM of 0.57% (rms) and 2.95% (pk) at the same power.



Figure 1 (PHA-1+ Test Board)

DUT Configuration:

Device: PHA-1+ Test board

Supply Voltage: 5.0V, 150 mA

Temperature: 25°C

Note: All data is referenced to the PCB connectors

Test Signal:

TD-SCDMA

Fc = 2000 MHz

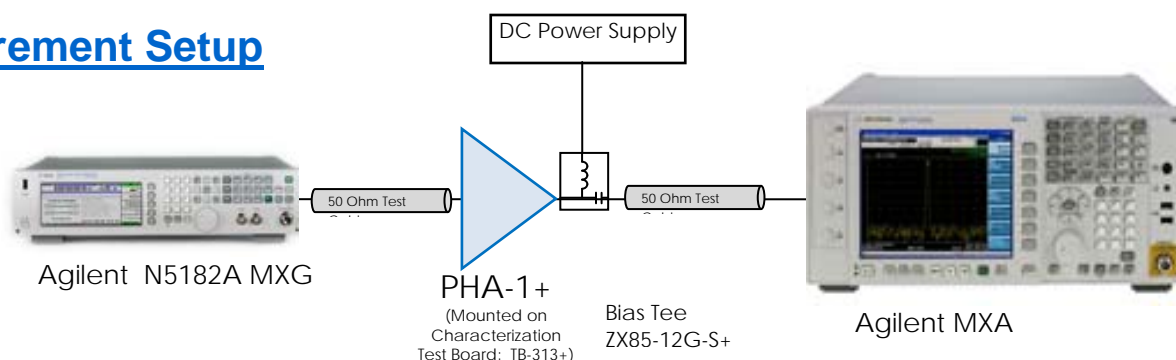
Single Channel

Channel bandwidth: 1.6 MHz

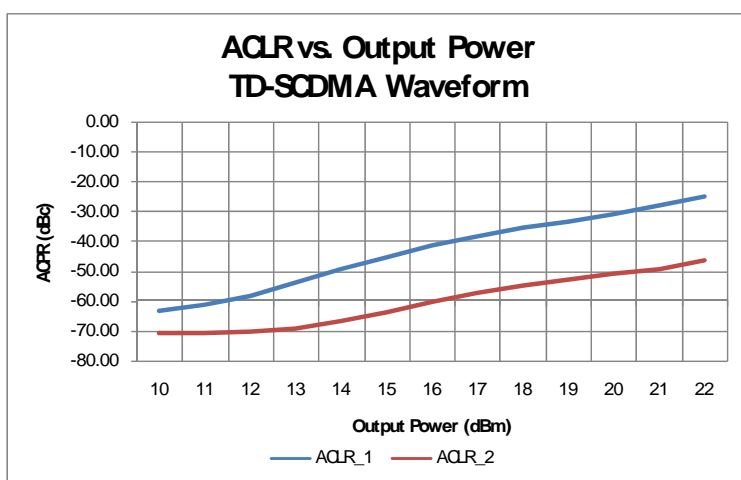
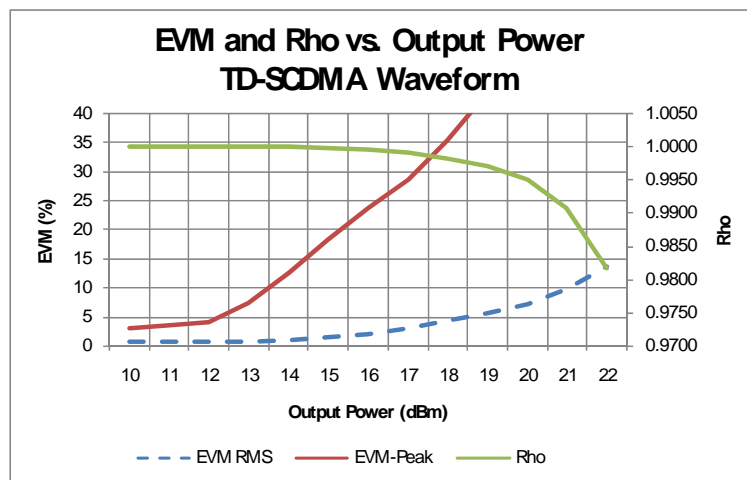
CCDF

10%	3.21 dB
1.0%	6.09 dB
0.1%	7.95 dB
0.01%	8.53 dB
0.001%	8.56 dB
0.0001%	8.56 dB

Measurement Setup



Summary Data



Mini-Circuits®
ISO 9001 ISO 14001 CERTIFIED

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



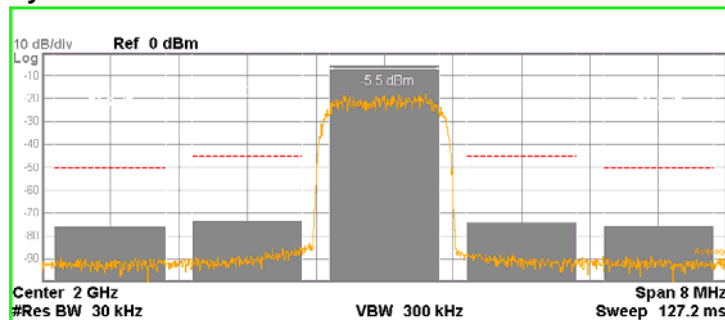
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS



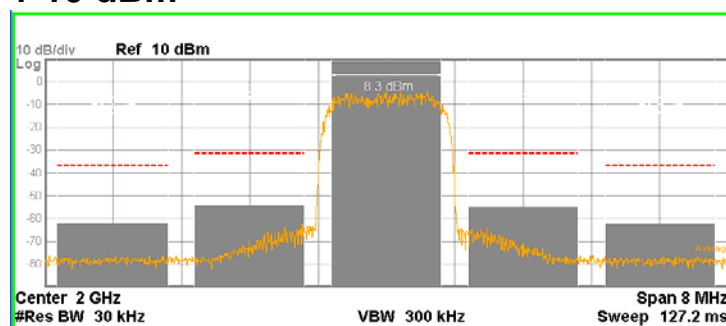
ACLR_1 Plots vs. Output power

System Reference



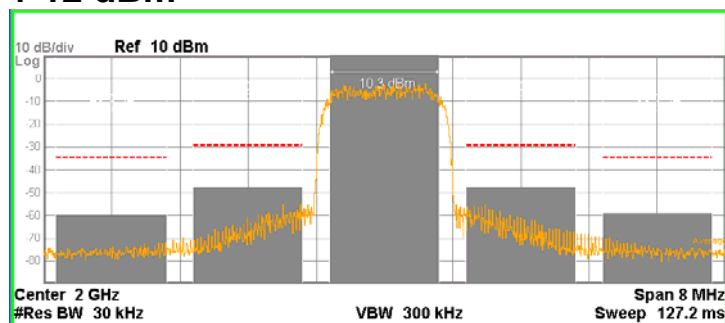
Offset Freq	Integ BW	dBc	Lower dBm	dBc	Upper dBm
1.600 MHz	1.280 MHz	-68.03	-73.57	-69.08	-74.63
3.200 MHz	1.280 MHz	-70.66	-76.21	-70.46	-76.01

+ 10 dBm



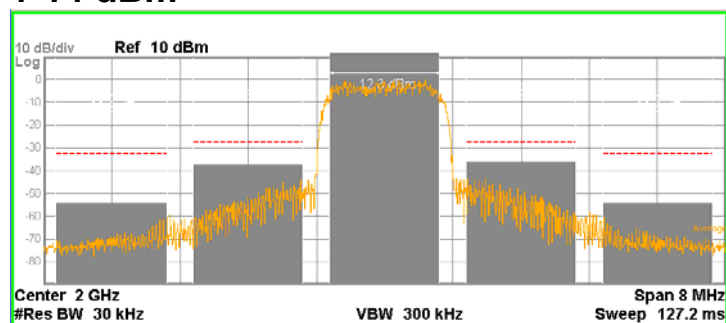
Offset Freq	Integ BW	dBc	Lower dBm	dBc	Upper dBm
1.600 MHz	1.280 MHz	-62.75	-54.48	-63.38	-55.11
3.200 MHz	1.280 MHz	-70.62	-62.35	-70.70	-62.43

+ 12 dBm



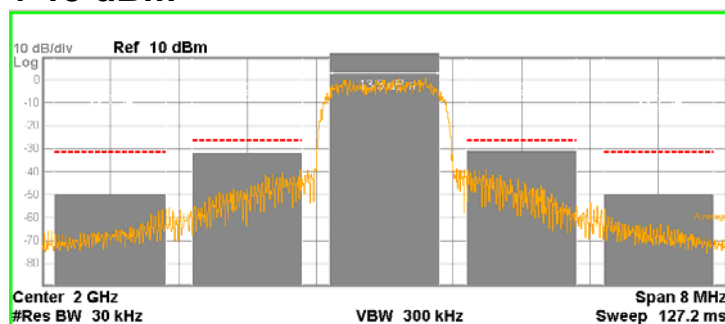
Offset Freq	Integ BW	dBc	Lower dBm	dBc	Upper dBm
1.600 MHz	1.280 MHz	-58.27	-47.97	-58.24	-47.94
3.200 MHz	1.280 MHz	-70.20	-59.90	-69.76	-59.47

+ 14 dBm



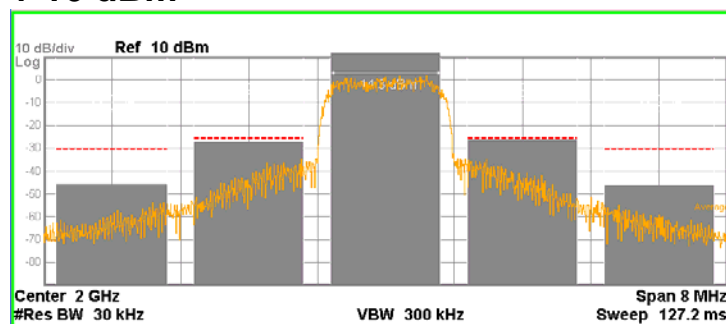
Offset Freq	Integ BW	dBc	Lower dBm	dBc	Upper dBm
1.600 MHz	1.280 MHz	-49.78	-37.51	-48.81	-36.54
3.200 MHz	1.280 MHz	-66.78	-54.50	-66.84	-54.56

+ 15 dBm



Offset Freq	Integ BW	dBc	Lower dBm	dBc	Upper dBm
1.600 MHz	1.280 MHz	-45.46	-32.17	-44.63	-31.35
3.200 MHz	1.280 MHz	-63.75	-50.47	-63.92	-50.64

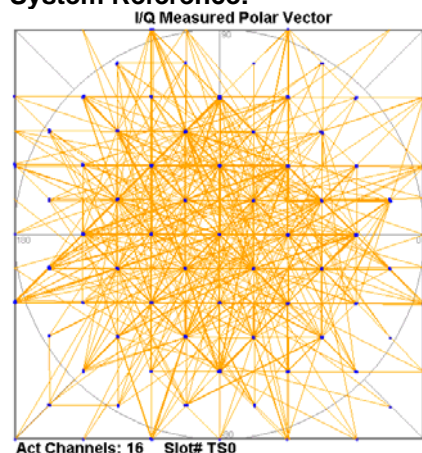
+ 16 dBm



Offset Freq	Integ BW	dBc	Lower dBm	dBc	Upper dBm
1.600 MHz	1.280 MHz	-41.60	-27.33	-40.94	-26.67
3.200 MHz	1.280 MHz	-60.17	-45.90	-60.53	-46.26

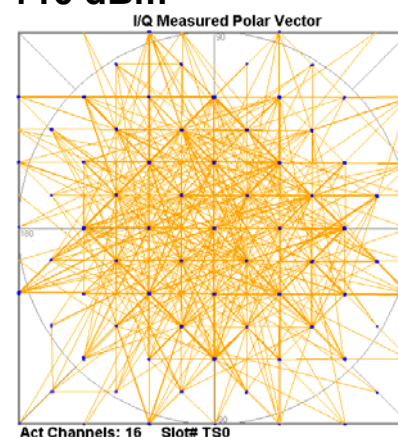
IQ Polar Plots vs. Output Power (EVM, Rho and PCDE)

System Reference:



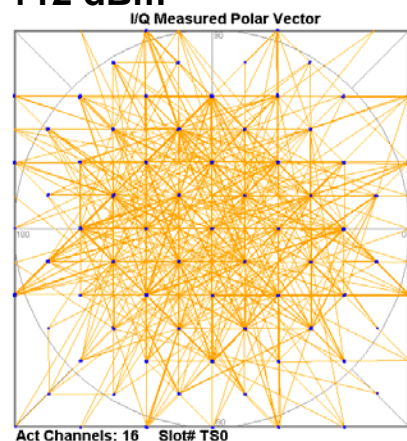
Slot# TS0
Rho: 0.99997
EVM: 0.57 % rms
3.25 % pk
Pk CDE: -54.03 dB
at S16(10)

+10 dBm



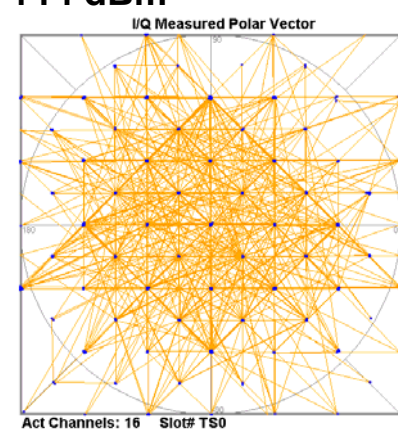
Slot# TS0
Rho: 0.99997
EVM: 0.57 % rms
2.95 % pk
Pk CDE: -54.39 dB
at S16(0)

+12 dBm



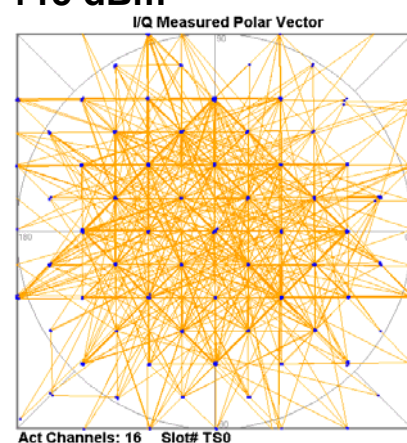
Slot# TS0
Rho: 0.99996
EVM: 0.60 % rms
3.87 % pk
Pk CDE: -53.92 dB
at S16(2)

+14 dBm



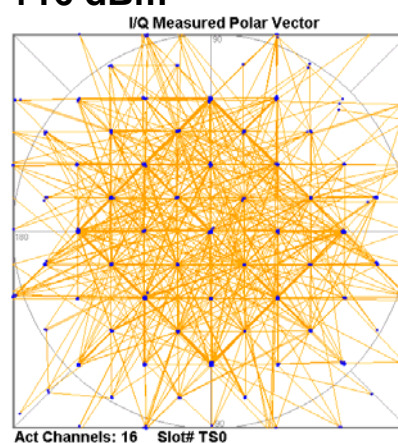
Slot# TS0
Rho: 0.99992
EVM: 0.89 % rms
12.45 % pk
Pk CDE: -50.30 dB
at S16(7)

+15 dBm



Slot# TS0
Rho: 0.99983
EVM: 1.32 % rms
18.25 % pk
Pk CDE: -47.51 dB
at S16(0)

+16 dBm



Slot# TS0
Rho: 0.99960
EVM: 2.00 % rms
23.75 % pk
Pk CDE: -44.10 dB
at S16(7)