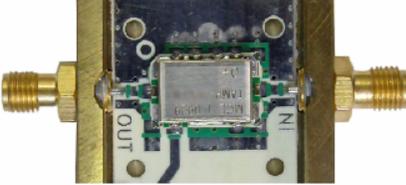# GSM-EDGE PERFORMANCE VS. OUTPUT POWER (TAMP-960LN+)
AN-60-044

GSM-EDGE Drop-In Low Noise Amplifier Module

Mini-Circuits TAMP-960LN+ Ultra-low Noise Drop-In Amplifier Module is an ideal low noise amplifier for use in GSM-EDGE Base Station or Tower Mounted Low Noise Applications. The TAMP-960LN+ provides a optimized combination of critical performance: Ultra Low Noise / High Dynamic Range/ Input & Output Match / Unconditional Stability.
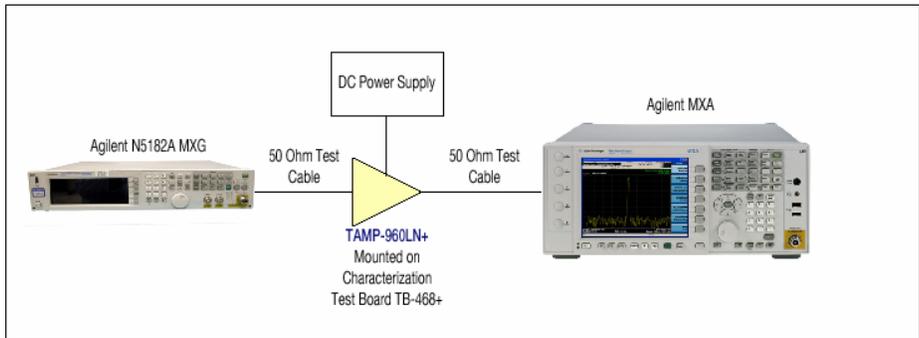
The High IP3 enables extremely low intermodulation and EVM distortion, making this an ideal high gain LNA for EDGE signals. The single stage E-PHEMT based module provides typically 0.55 dB noise figure and +30 dBm OIP3 which translates to extremely linear performance in systems that require high dynamic range.
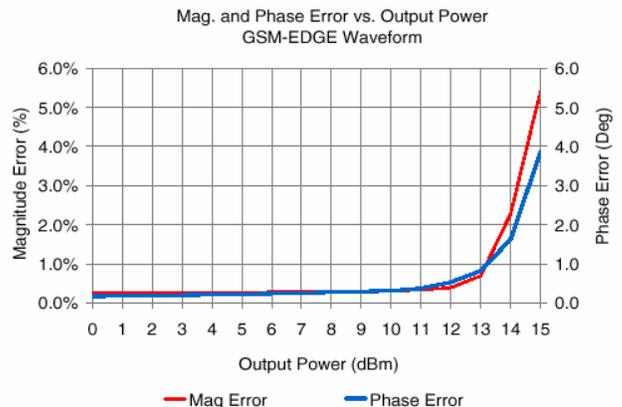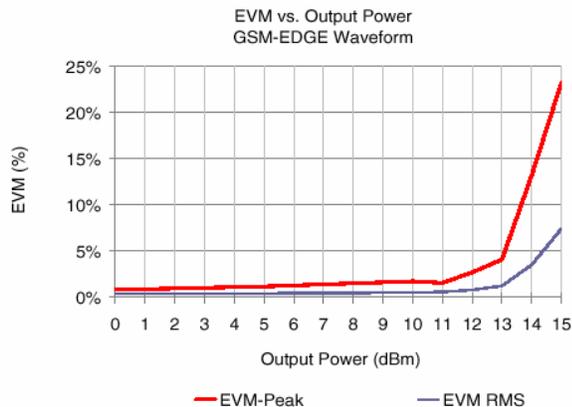
Click here for data sheet and other technical information

DUT CONFIGURATION
Device: TAMP-960LN+ Test Board
Supply Voltage: 5.0V, 40mA
Temperature: 25°C

TEST SIGNAL
GSM-EDGE
Fc=935.2 MHz
Single Carrier
Modulation: 8PSK
All time slots ON

Measurement Set-up

Summary Data

EVM vs. Output Power
GSM-EDGE Waveform

Mag. and Phase Error vs. Output Power
GSM-EDGE Waveform

IQ Polar Plots vs. Output Power

System Reference

EVM:

Max	Avg
0.31 % rms	0.31 % rms
0.86 % pk	0.86 % pk

at symbol 93.00

95%ile EVM: 0.61 %

Mag Error: 0.22 %

Phase Error: 0.12 °

Freq Error: -1.68 Hz

I/Q Offset: -54.55 dB

Amplitude Droop:
   -0.03 dB

TSC: 0

T0 Offset: 283.385 µs

AM PM
Offset: ---

Mod Scheme: NB 8PSK

I/Q Measured Polar Vector

Symbol Derotated
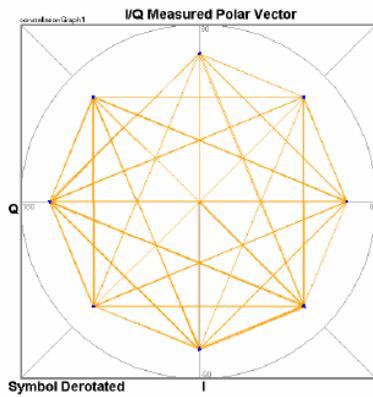
+5 dBm

EVM:

Max	Avg
0.43 % rms	0.43 % rms
1.19 % pk	1.19 % pk

at symbol 105.00

95%ile EVM: 0.75 %

Mag Error: 0.27 %

Phase Error: 0.22 °

Freq Error: -0.95 Hz

I/Q Offset: -49.48 dB

Amplitude Droop:
   -0.04 dB

TSC: 0

T0 Offset: 283.381 µs

AM PM
Offset: ---

Mod Scheme: NB 8PSK

I/Q Measured Polar Vector

Symbol Derotated

+10 dBm

EVM:
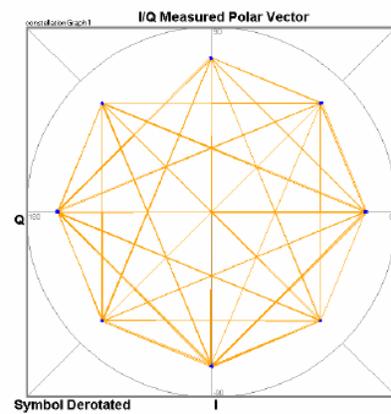
Max	Avg
0.53 % rms	0.53 % rms
1.75 % pk	1.75 % pk

at symbol 105.00

95%ile EVM: 0.93 %

Mag Error: 0.31 %

Phase Error: 0.31 °

Freq Error: 2.42 Hz

I/Q Offset: -48.52 dB

Amplitude Droop:
   -0.04 dB

TSC: 0

T0 Offset: 283.381 µs

AM PM
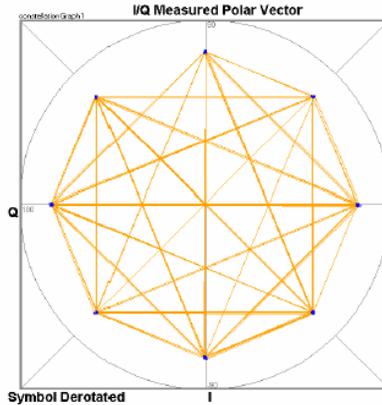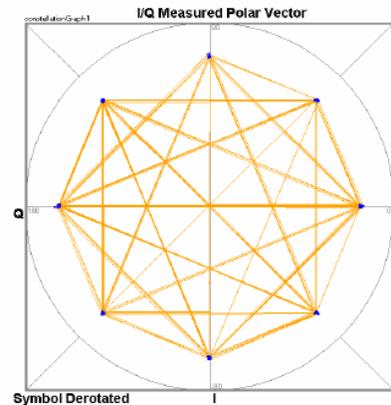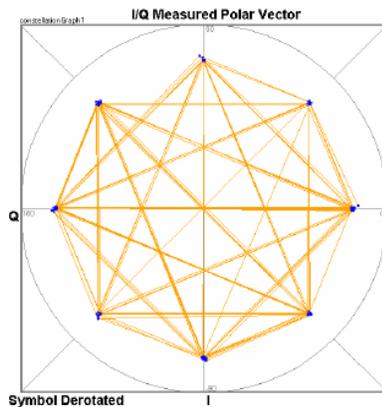Offset: ---

Mod Scheme: NB 8PSK

I/Q Measured Polar Vector

Symbol Derotated

+12 dBm

EVM:

Max	Avg
0.81 % rms	0.81 % rms
2.71 % pk	2.71 % pk

at symbol 93.00

95%ile EVM: 1.35 %

Mag Error: 0.39 %

Phase Error: 0.53 °

Freq Error: 1.31 Hz

I/Q Offset: -47.90 dB

Amplitude Droop:
   -0.04 dB

TSC: 0

T0 Offset: 283.390 µs

AM PM
Offset: ---

Mod Scheme: NB 8PSK

I/Q Measured Polar Vector

Symbol Derotated

+13 dBm

EVM:

Max	Avg
1.24 % rms	1.24 % rms
4.10 % pk	4.10 % pk

at symbol 105.00

95%ile EVM: 2.24 %

Mag Error: 0.69 %

Phase Error: 0.82 °

Freq Error: 1.60 Hz

I/Q Offset: -46.72 dB

Amplitude Droop:
   -0.02 dB

TSC: 0

T0 Offset: 283.379 µs

AM PM
Offset: ---

Mod Scheme: NB 8PSK

I/Q Measured Polar Vector

Symbol Derotated

+14 dBm

EVM:

Max	Avg
3.53 % rms	3.53 % rms
13.19 % pk	13.19 % pk

at symbol 105.00

95%ile EVM: 6.95 %

Mag Error: 2.28 %

Phase Error: 1.63 °

Freq Error: 4.80 Hz

I/Q Offset: -44.79 dB

Amplitude Droop:
   0.05 dB

TSC: 0

T0 Offset: 283.378 µs

AM PM
Offset: ---

Mod Scheme: NB 8PSK

I/Q Measured Polar Vector

Symbol Derotated
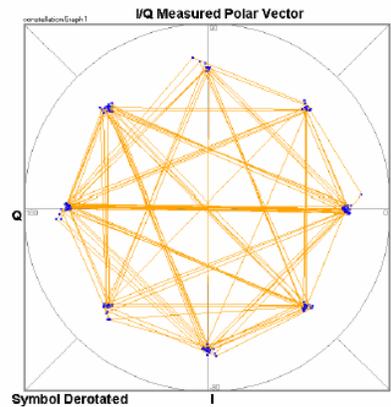
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