## Application Note

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

## GSM-EDGE Drop-In Low Noise Amplifier Module

**] Mini-Circuits** 

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.

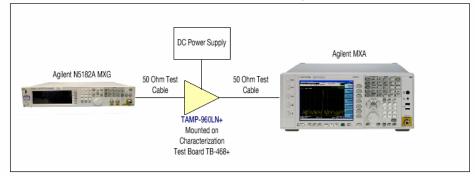
Click here for data sheet and other technical information



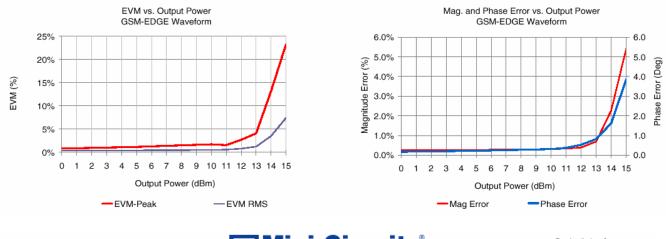
DUT CONFIGURATION Device: TAMP-960LN+ Test Board Supply Voltage: 5.0V, 40mA Temperature: 25°C

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

### Measurement Set-up



Summary Data



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For detailed performance specs & shopping online see web site

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#### AN-60-044

#### **APPLICATION NOTE**

## IQ Polar Plots vs. Output Power

+5 dBm

at symbol 105.00

Mag Error:

Freg Error:

Amplitude Droop:

I/Q Offset:

TSC:

T0 Offset:

AM PM

Offset

EVM:

2.71 % pk

95%ile EVM

Mag Error:

Phase Error

Freq Error:

I/Q Offset

TSC:

TO Offset:

AM PM

Offset:

Amplitude Droop

at symbol 93.00

95%ile EVM: 0.75 %

Phase Error: 0.22

Avg

0.27 %

-0.85 Hz

-49.48 dB

-0.04 dE

283.381 µs

0

Mod Scheme: NB 8PSK

+12 dBm

Avg

2.71 % pk

1.35 %

0.39 %

0.53

1.31 Hz

-47.90 dE

-0.04 dB

283.390 µs

0

0.81 % rms 0.81 % rms

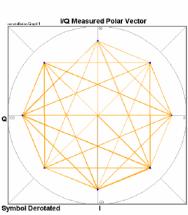
0.43 % rms 0.43 % rms 1.19 % pk 1.19 % pk

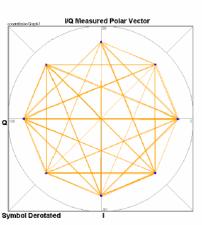
EVM:

Max

#### System Reference

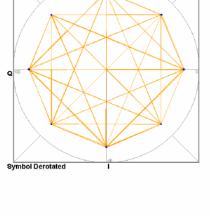
EVM: Max Avg 0.31 % rms 0.31 % rms 0.86 % pk 0.86 % pk at symbol 93.00 95%ile EVM: 0.61% Mag Error: 0.22 % Phase Error: 0.12 ° Freq Error: -1.68 Hz I/Q Offset: -54.55 dB Amplitude Droop: -0.03 dB TSC: 0 TO Offset: 283.385 µs AM PM Offset ----Mod Scheme: NB 8PSK



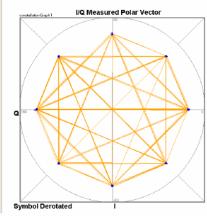


# I/Q Measured Polar Vector larikon Graph T 1.24 % rms 1.24 % rms 4.10 % pk 95%ile EVM: 2.24 % -48.72 dB -0.02 dB 283.378 µs Mod Scheme: NB 8PSK



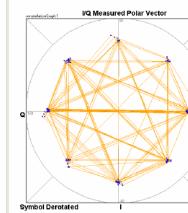


I/Q Measured Polar Vector



#### +14 dBm

Mod Scheme: NB 8PSK



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Symbol Derotated

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#### Ava 0.53 % rms 0.53 % rms 1.75 % pk 1.75 % pk at symbol 105.00 95%ile EVM: 0.93%

+10 dBm

EVM:

Max

Mag Error: 0.31 % Phase Error: 0.31° Freg Error: 2.42 Hz IIO Offset: 48.52 dB Amplitude Droop -0.04 dB TSC: 0 283.381 µs T0 Offset AM PM Offset: Mod Scheme: NB 8PSK

+13 dBm

EVM:

4.10 % pk

Mag Error:

Freq Error: l/Q Offset:

TSC

T0 Offset:

AM PM

Offset:

at symbol 105.00

Phase Error: 0.82 °

Amplitude Droop

0.69 %

1.60 H;

0

Max



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For detailed performance specs

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