Aiding 17025 Laboratory Accreditation by Capturing Performance Trend Data on RF Amplifiers

Tom Mullineaux

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The Situation before IEC61000-4-3 Edition 3

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Relied on the Field Probe to Measure the Field Strength

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Will Sum Wanted and Unwanted Fields

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Measured the Field Strength of an Un-modulated Test Field

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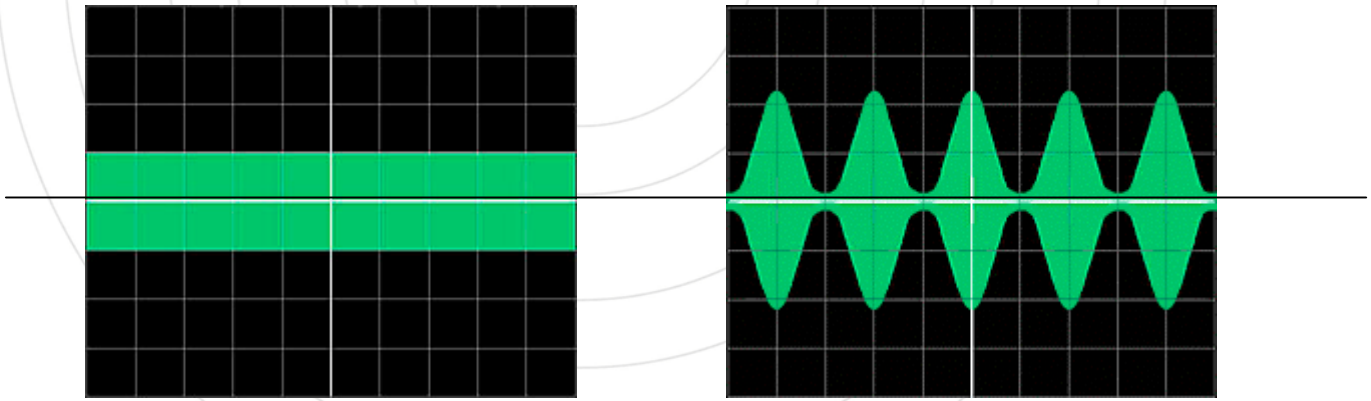
Measured the Field Strength of an Un-modulated Test Field



The Amplifier Could Cause Distortion of the Peaks

The Test Field Purity Could be Poor

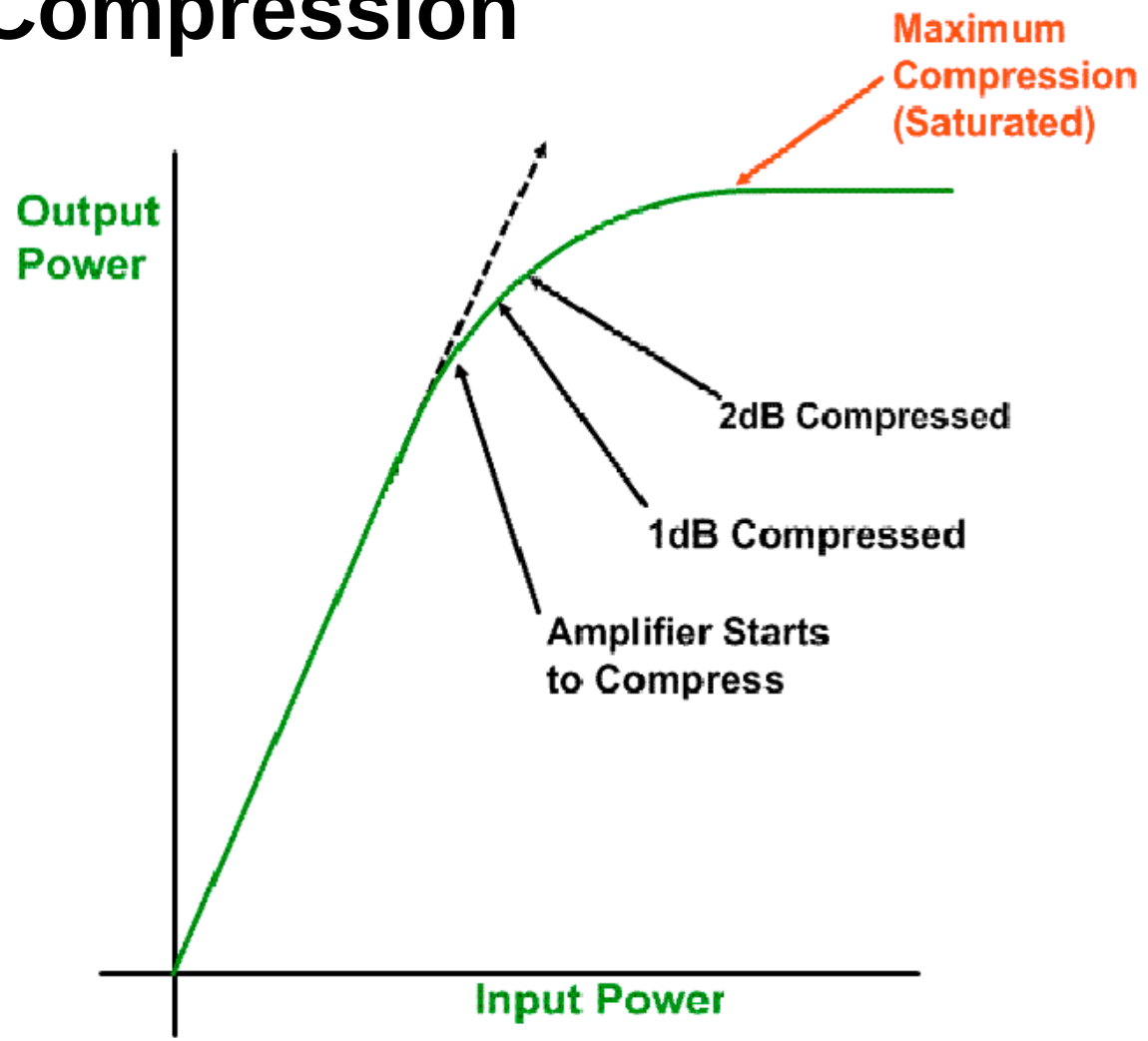
Test Repeatability Could be Jeopardized

So Two Key Issues

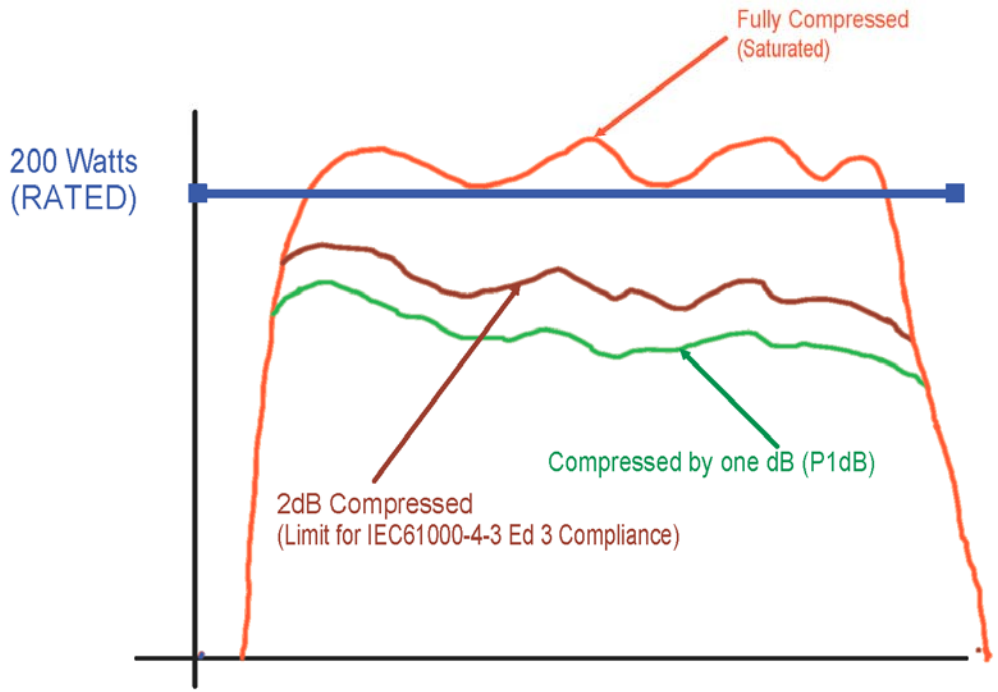
The Field Probe Included Harmonic Fields in the Measurement

Risk of Peak Distortion Due to Amplifier Compression

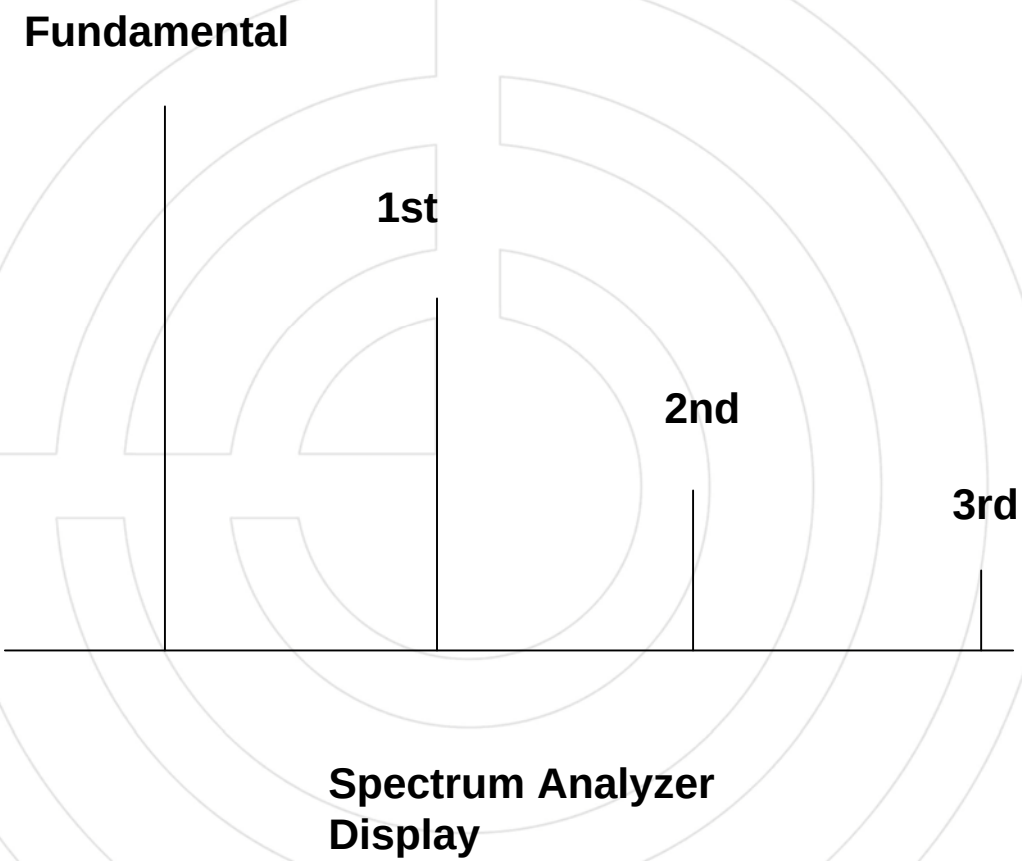
Amplifier Gain Compression



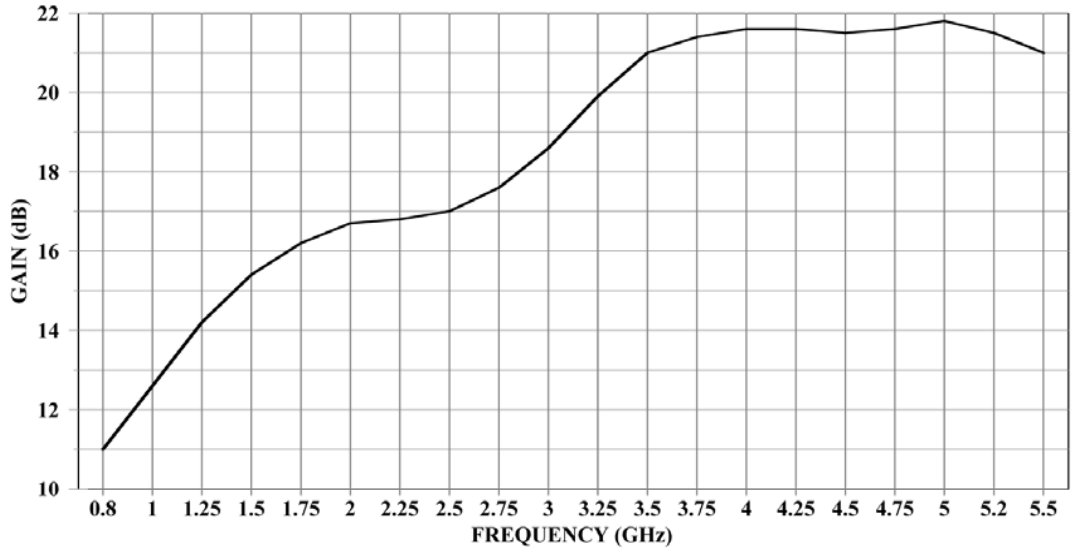
Amplifier Gain Compression



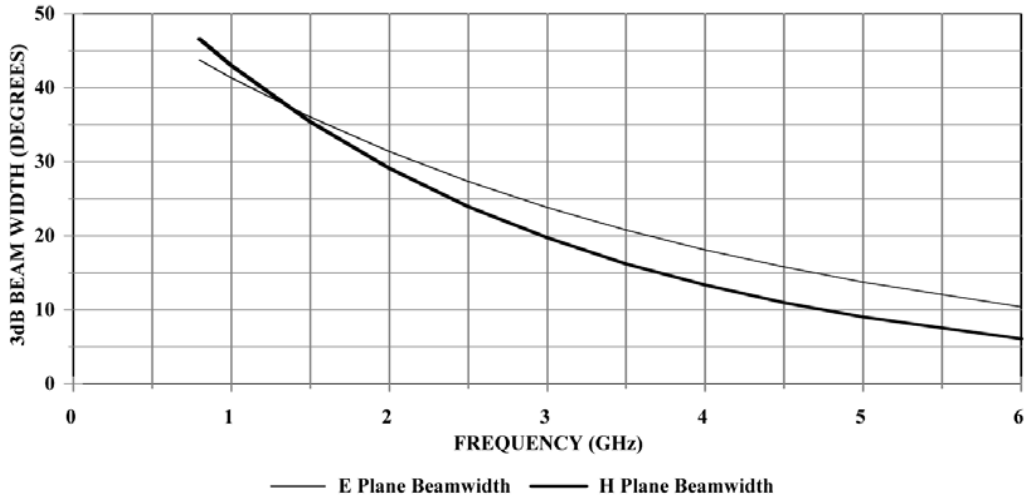
Harmonics


Fundamental
1st
2nd
3rd
Spectrum Analyzer
Display

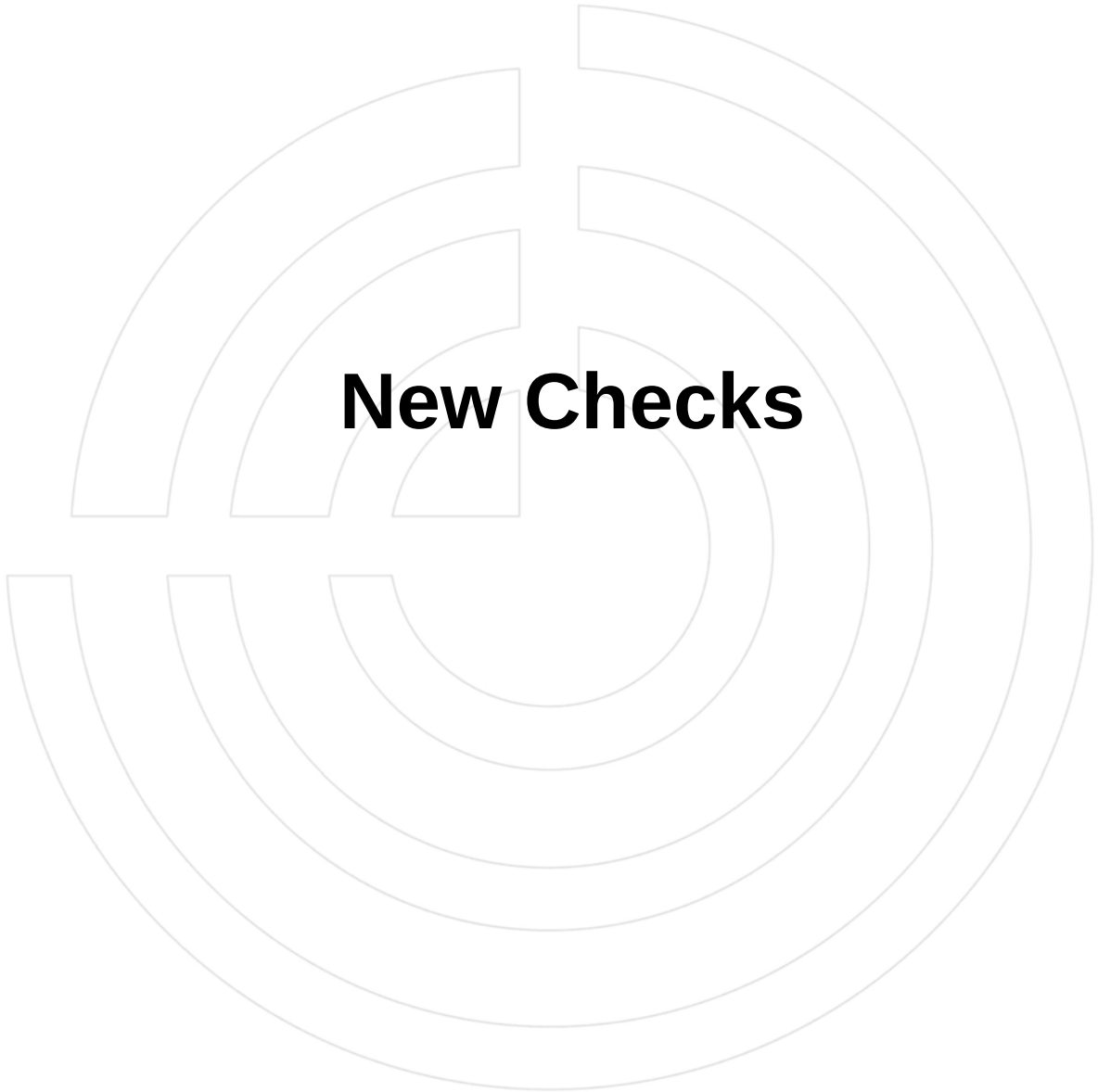
MODEL AT4002A GAIN VS FREQUENCY



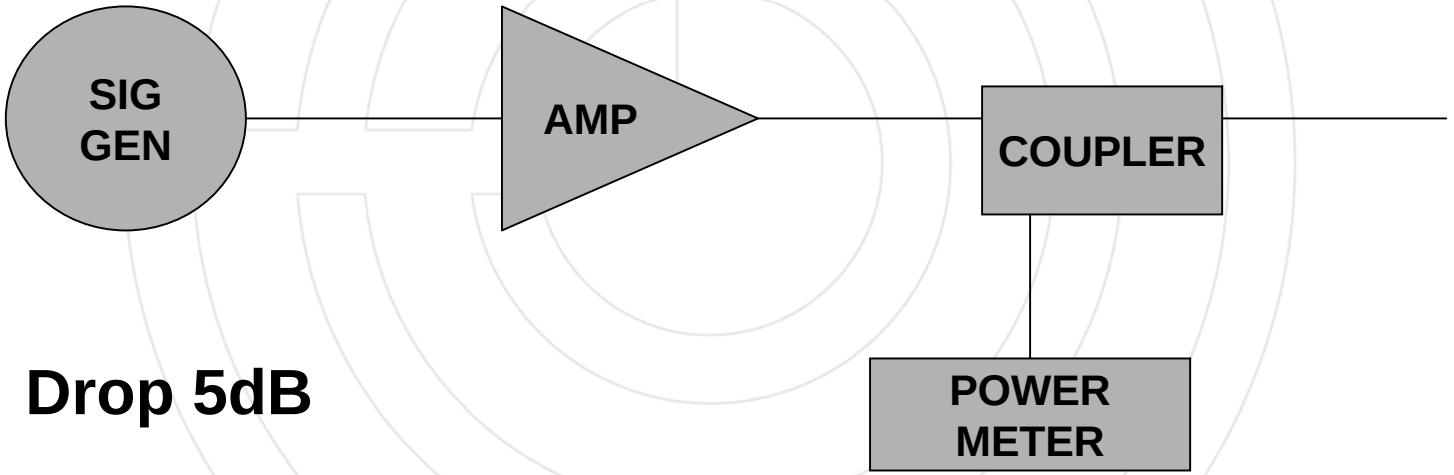
Model AT4002A BEAMWIDTH VS FREQUENCY



New Checks



Amplifier not More than 2dB Compressed



Drop 5dB

Must Drop

3dB to 5dB

Harmonics not More than -6dBc

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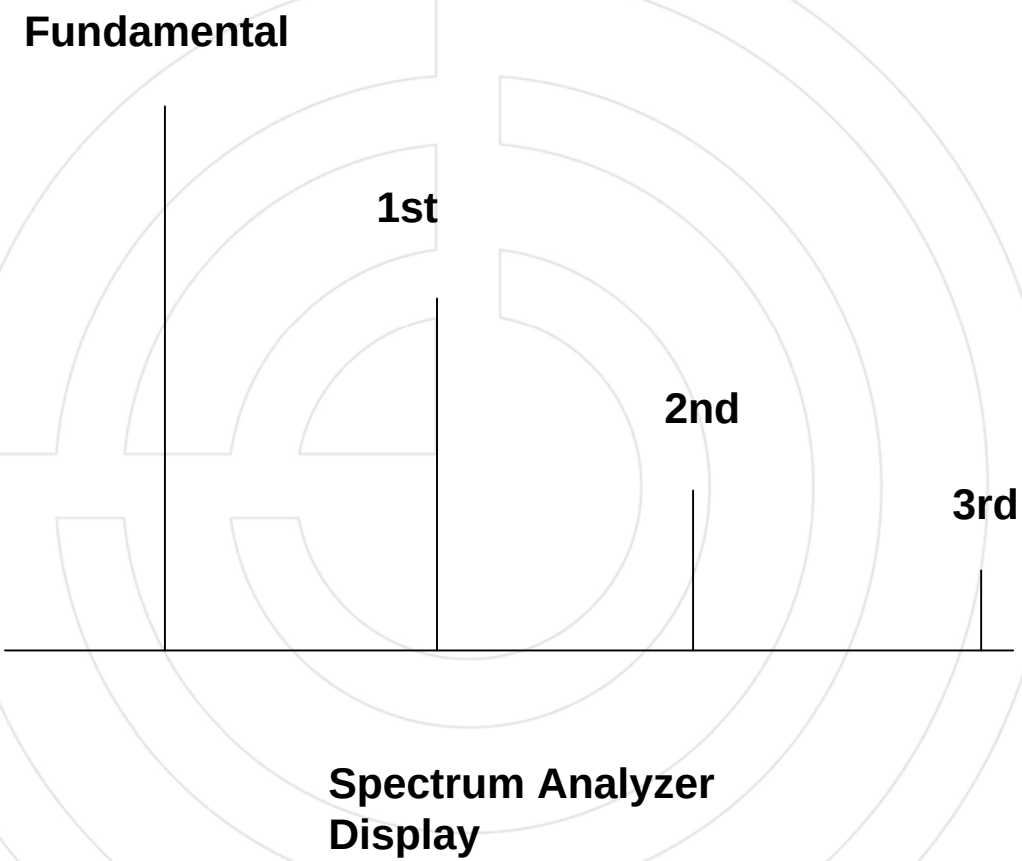
Fundamental
1st
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3rd
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Display

Equipment used at Amplifier House

High Power Attenuator

Vector Network Analyzer

Spectrum Analyzer

Arbitrary Waveform Generator

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High Power Attenuator

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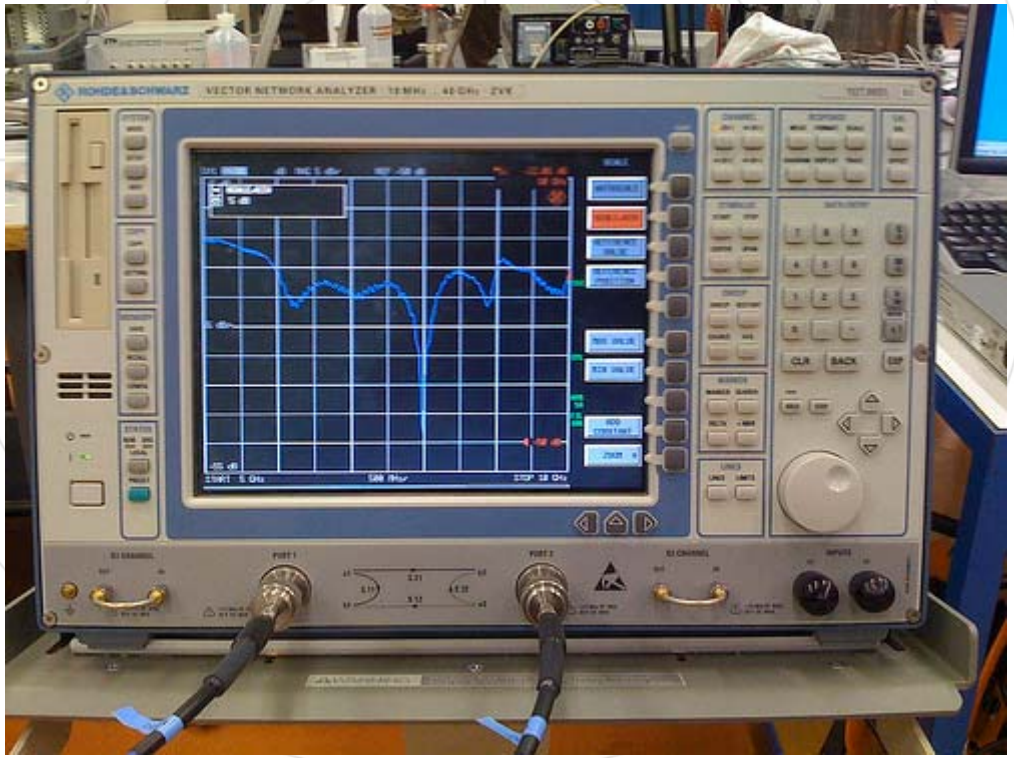
Vector Network Analyzer



Spectrum Analyzer

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Arbitrary Waveform Generator

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What Data is Actually Required to Prove Still Good?

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Gain

P1dB

Harmonics

Choose Say 5 Spot Frequencies

Include Lowest Test frequency

Include Highest Input Power Frequency

OK to Drive Amplifier into Empty Chamber if Suitable Coupler

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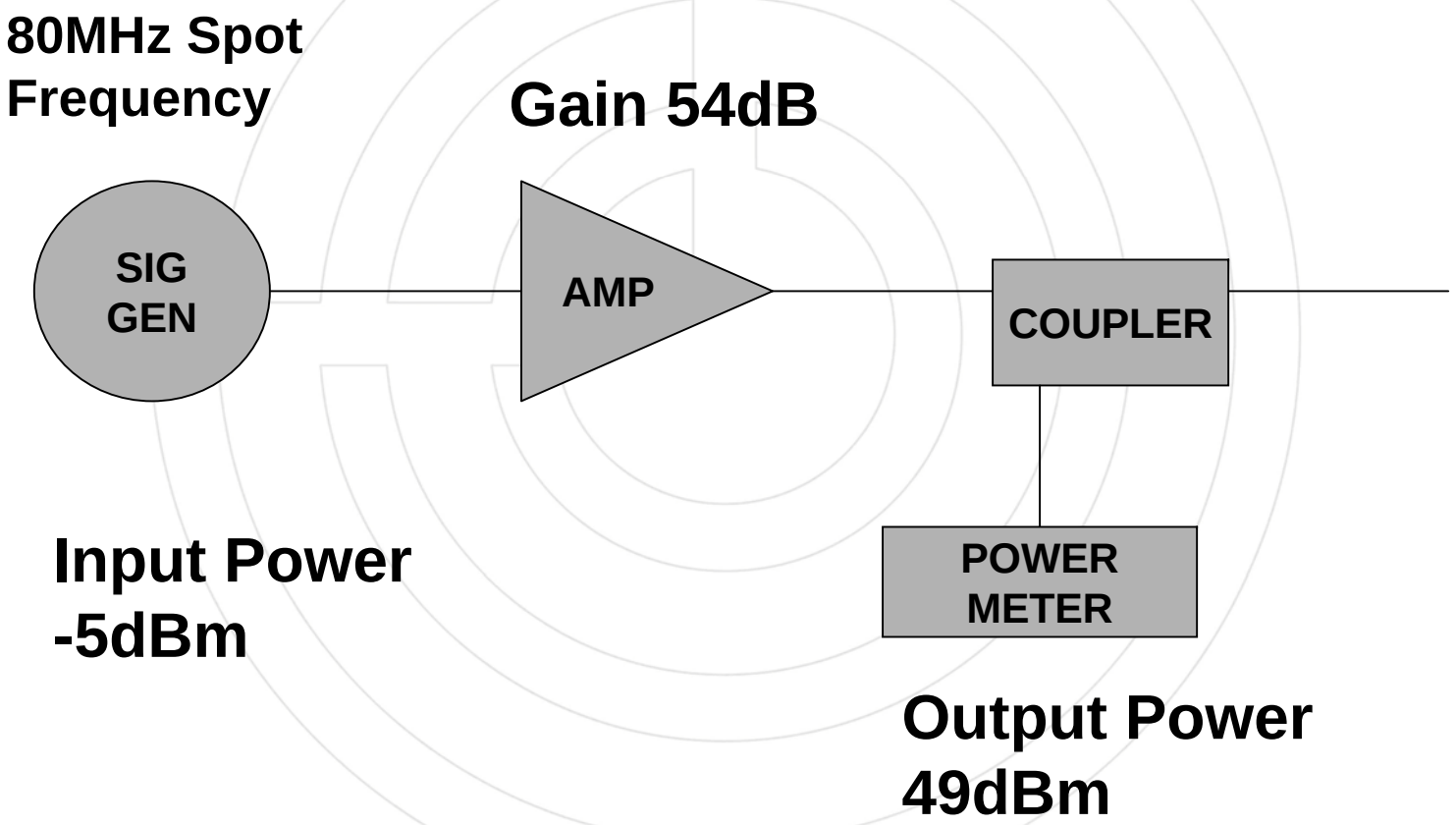
Gain is Simply Output Power in dBm Minus Input Power in dBm


80MHz Spot
Frequency
Gain 54dB
SIG
GEN
AMP
COUPLER
POWER
METER
Input Power
-5dBm
Output Power
49dBm

Trend Data so Absolute not Key as Long as First Data Capture is Sensible and Repeatable (Check)

Harmonics are Relative so No Absolute Required

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Coupler Bandwidth Must Pick up Worst Harmonic

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Accuracy to 0.5dB is Actually Pretty Good (Absolutes)

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QUESTIONS?