

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

Tom Mullineaux



The Situation before IEC61000-4-3 Edition 3



**Relied on the Field Probe to
Measure the Field Strength**

Relied on the Field Probe to Measure the Field Strength

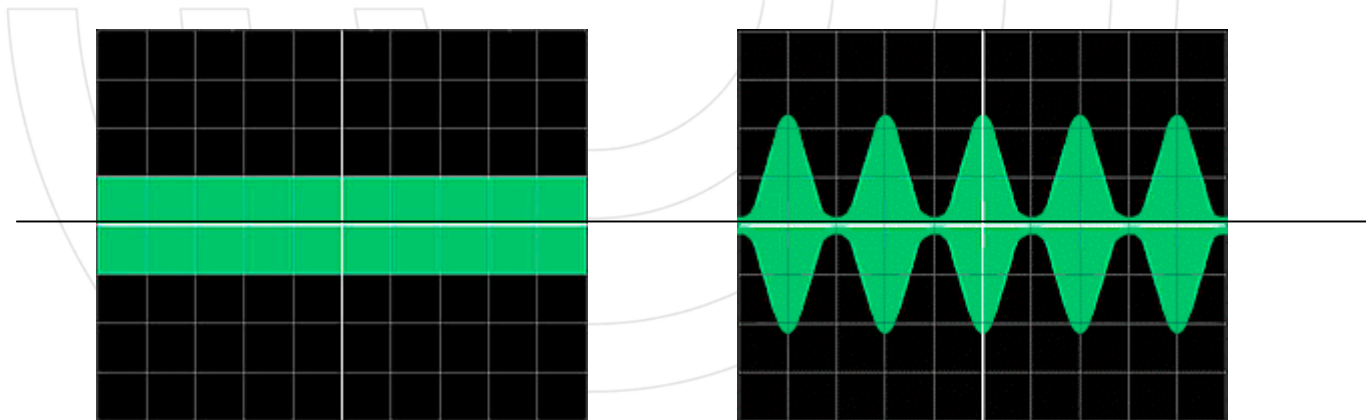


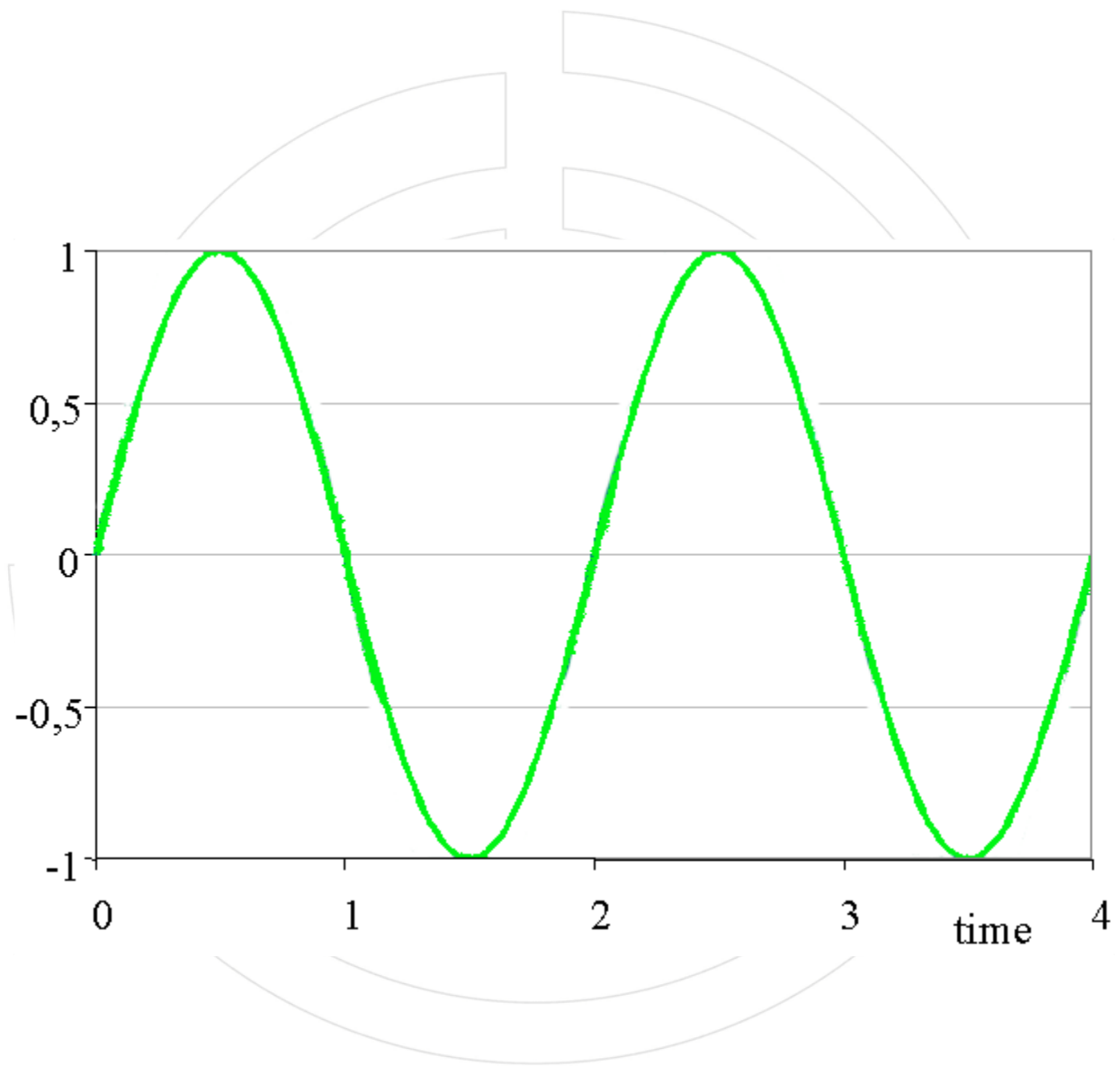
**Will Sum
Wanted and
Unwanted
Fields**

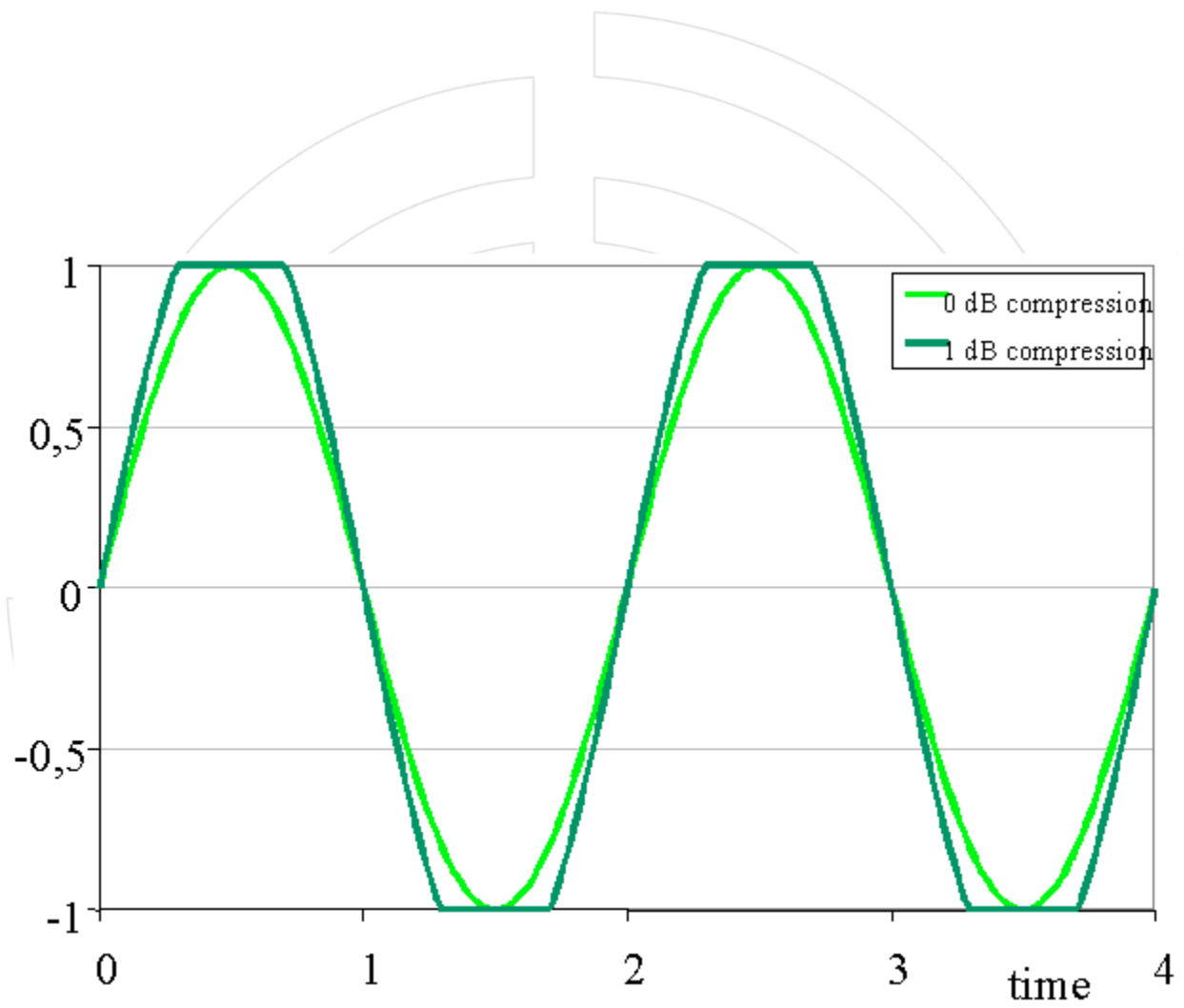


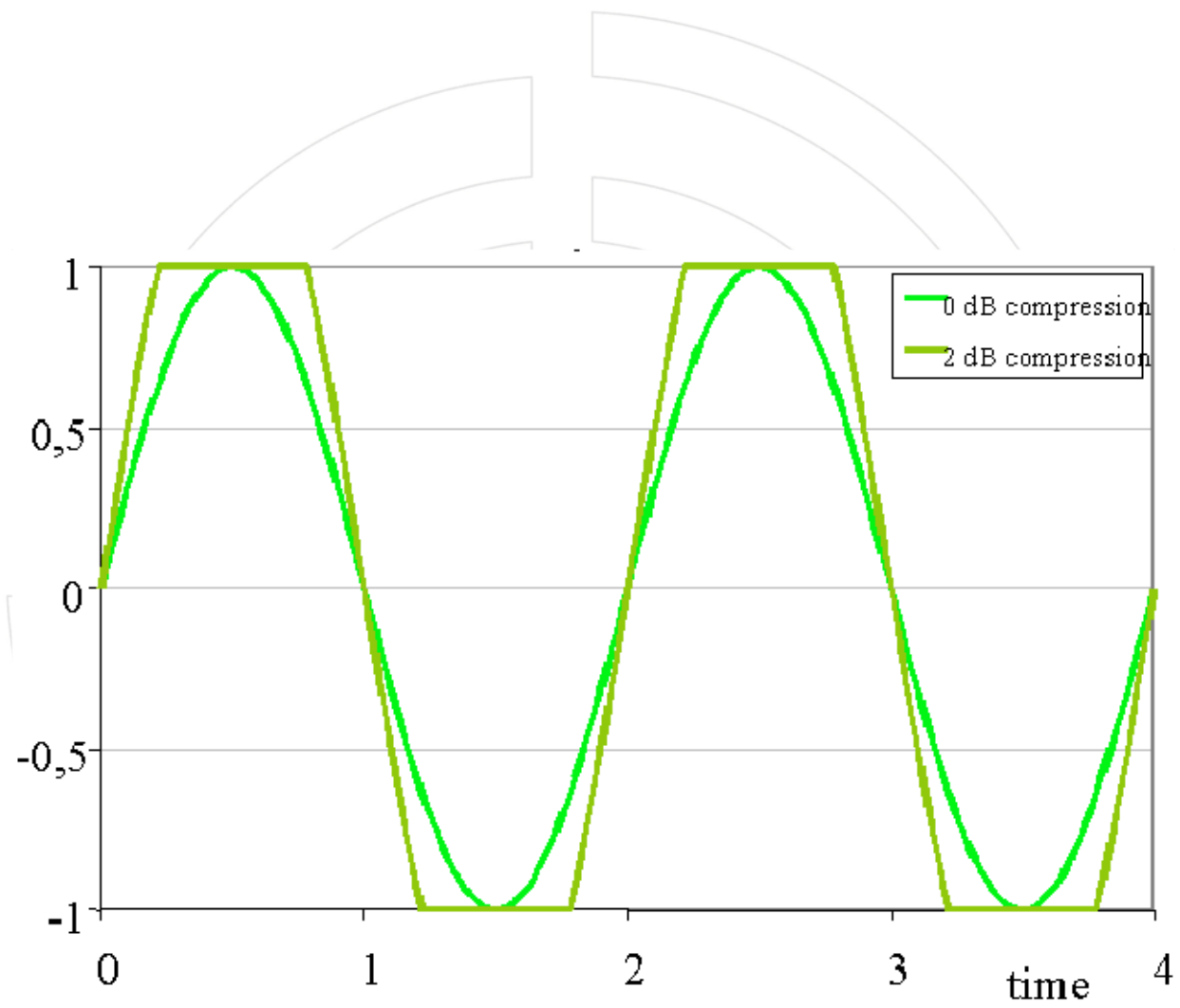
Measured the Field Strength of an Un-modulated Test Field

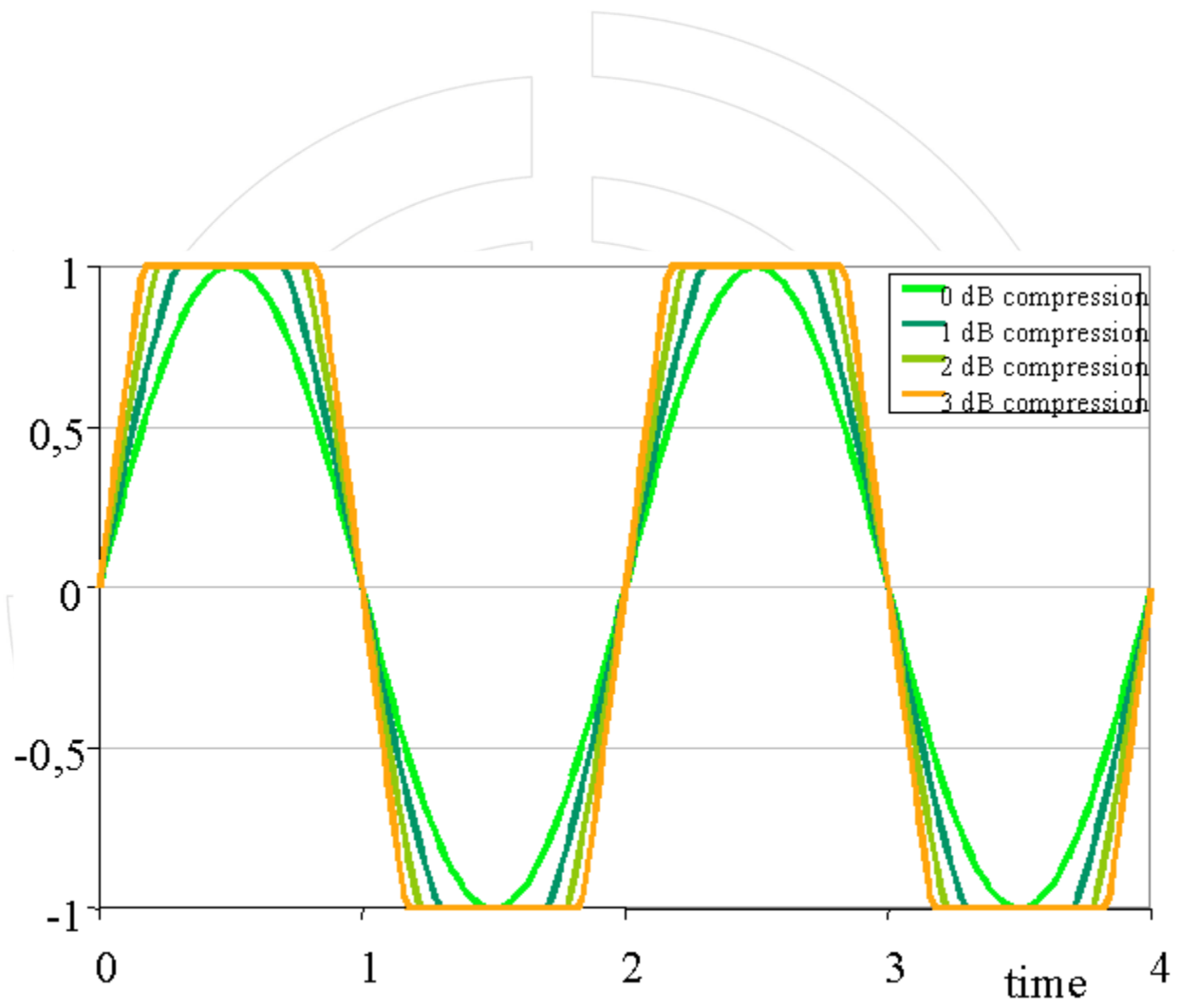
Measured the Field Strength of an Un-modulated Test Field













**The Amplifier Could Cause
Distortion of the Peaks**

The Test Field Purity Could be Poor

**Test Repeatability Could be
Jeopardized**

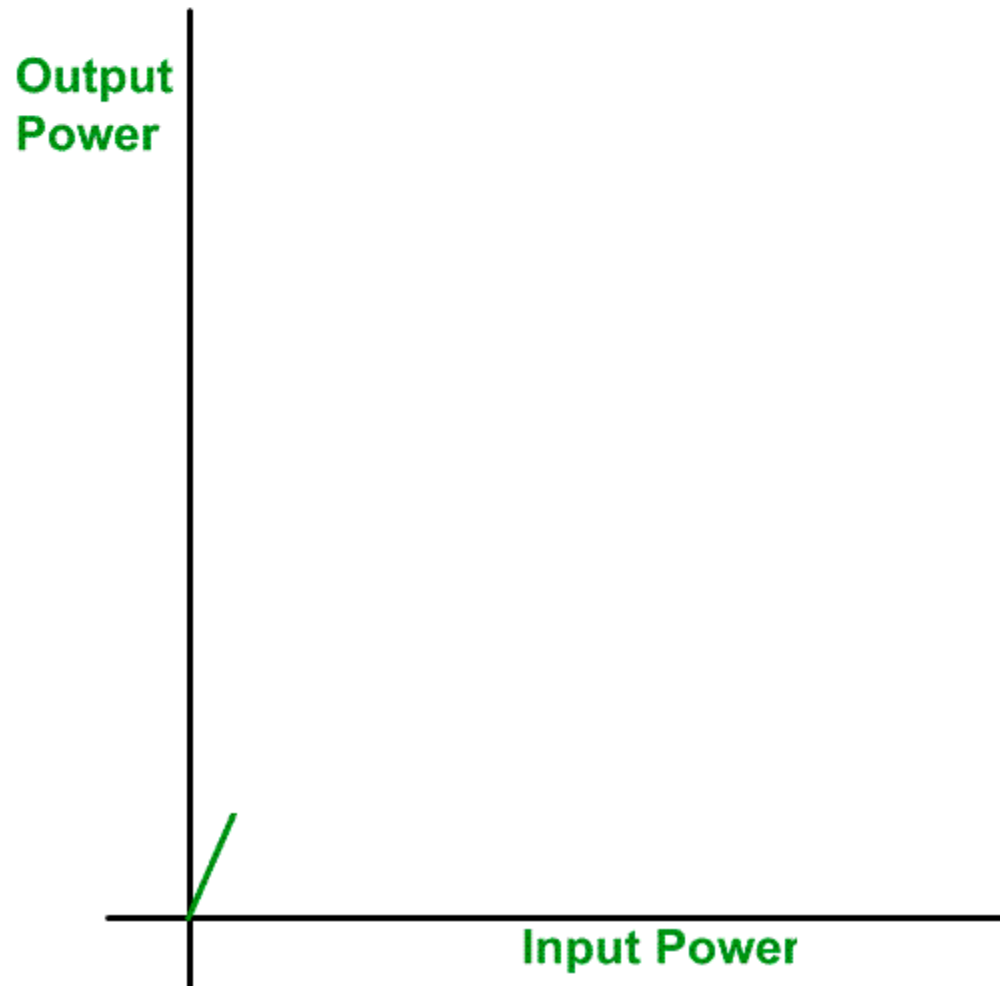


So Two Key Issues

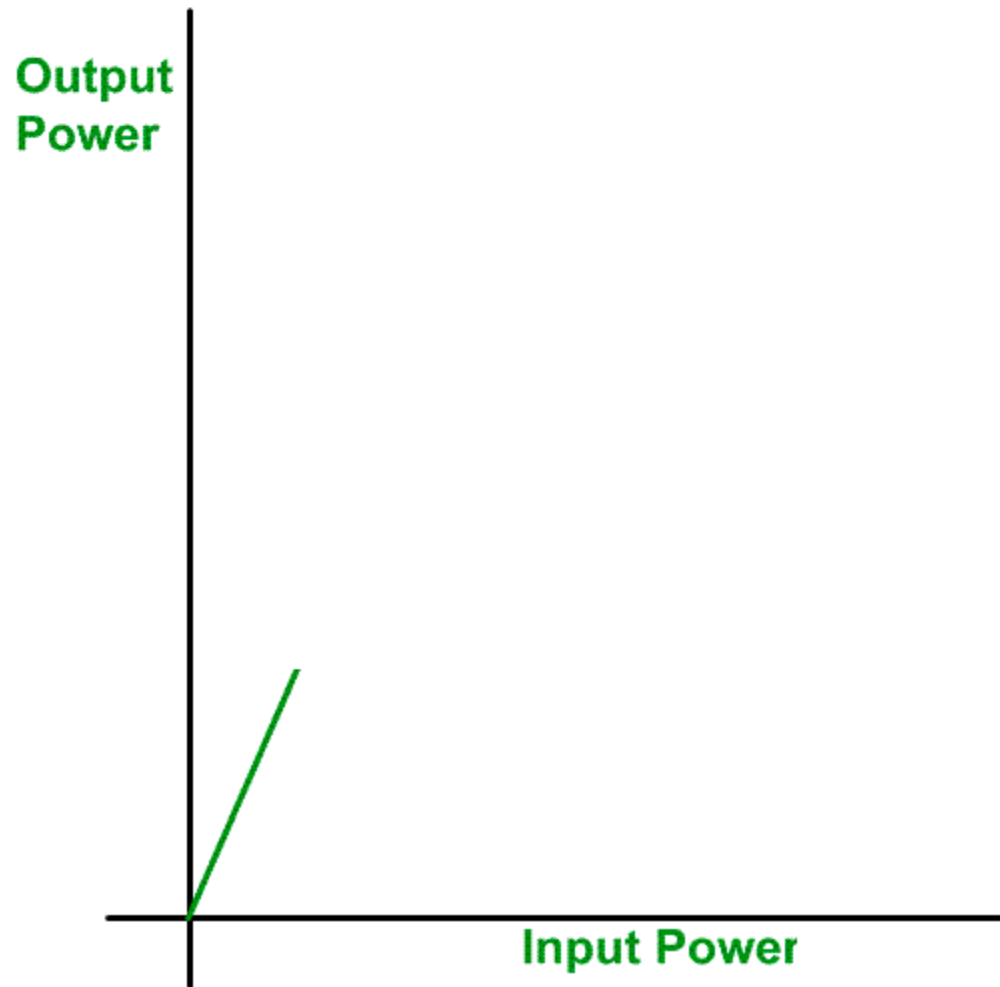
**The Field Probe Included Harmonic
Fields in the Measurement**

**Risk of Peak Distortion Due to
Amplifier Compression**

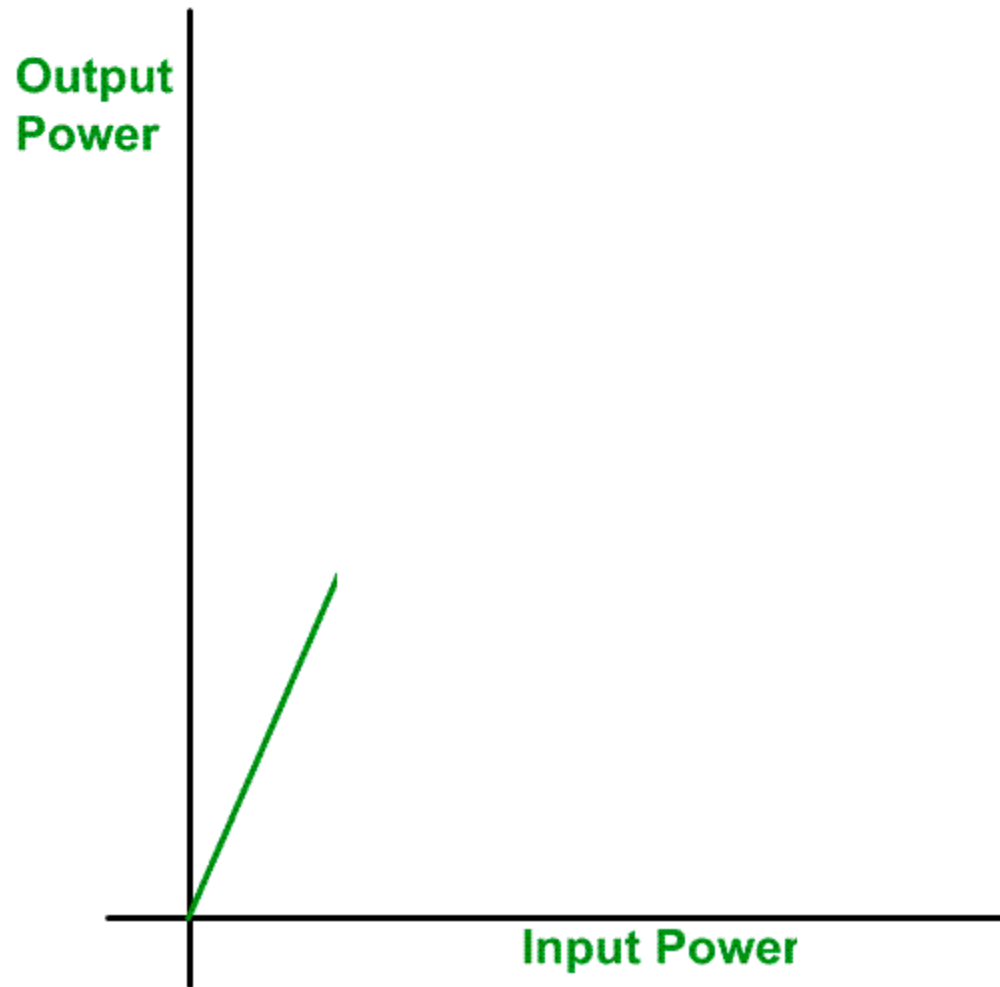
Amplifier Gain Compression



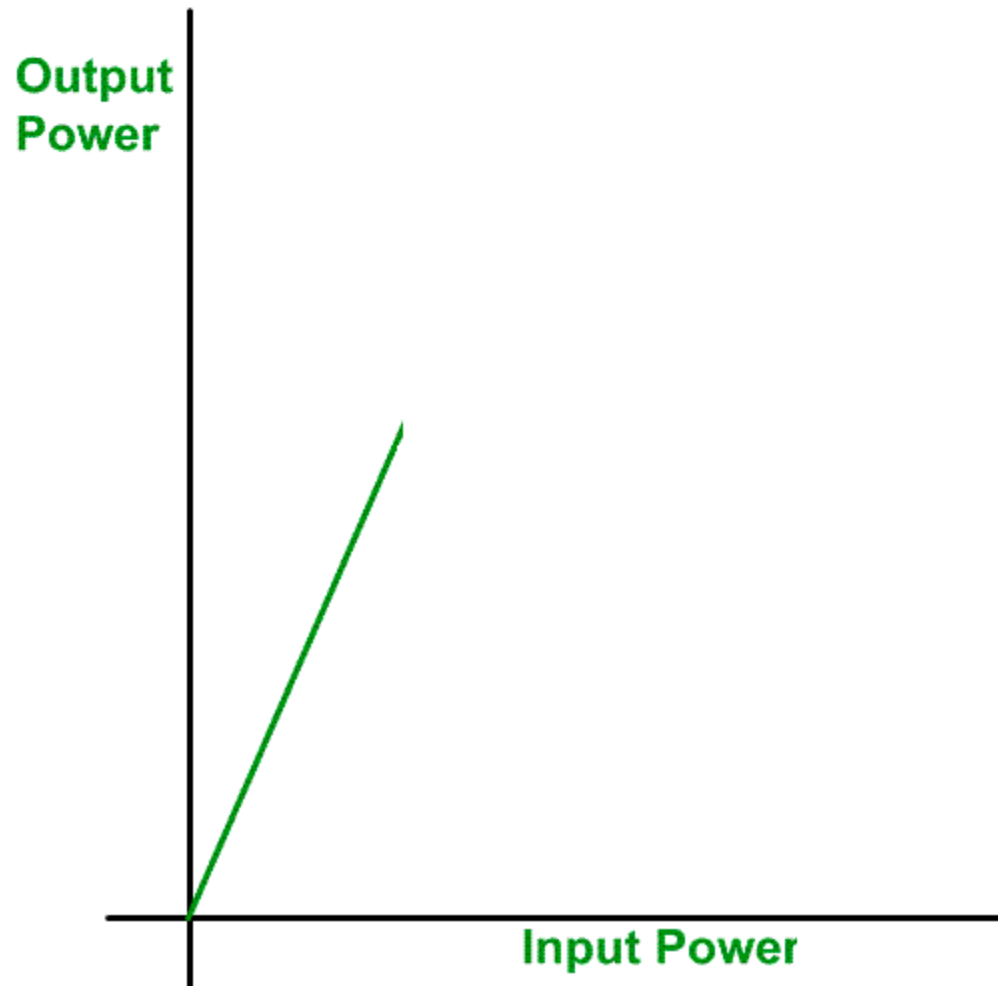
Amplifier Gain Compression



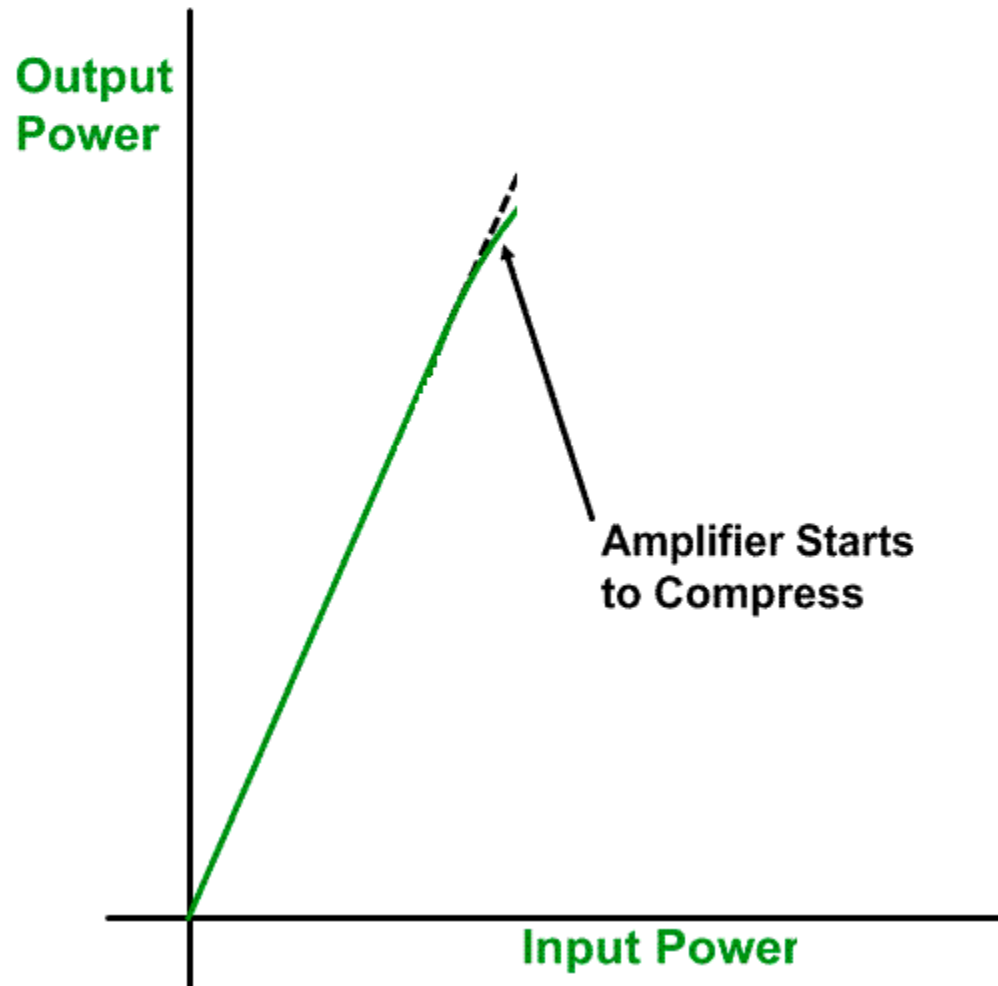
Amplifier Gain Compression



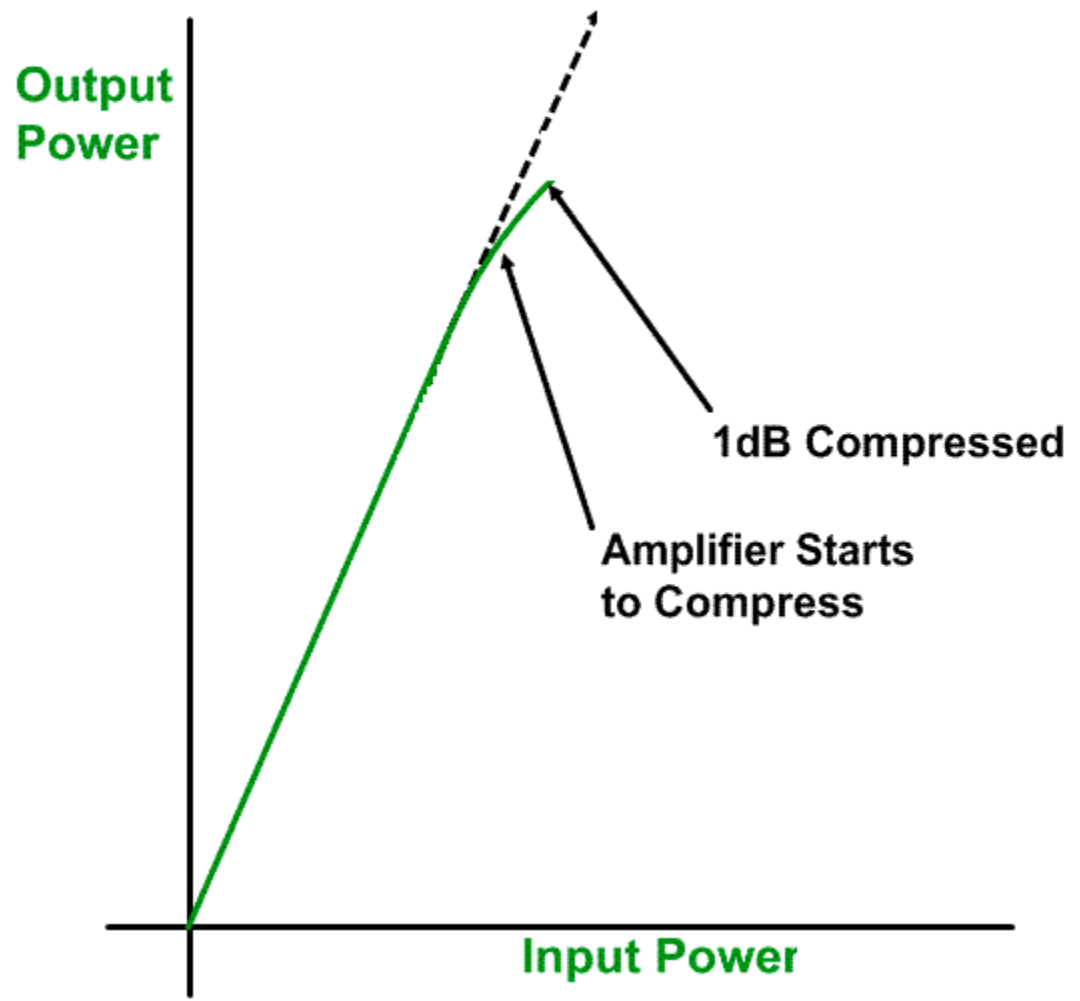
Amplifier Gain Compression



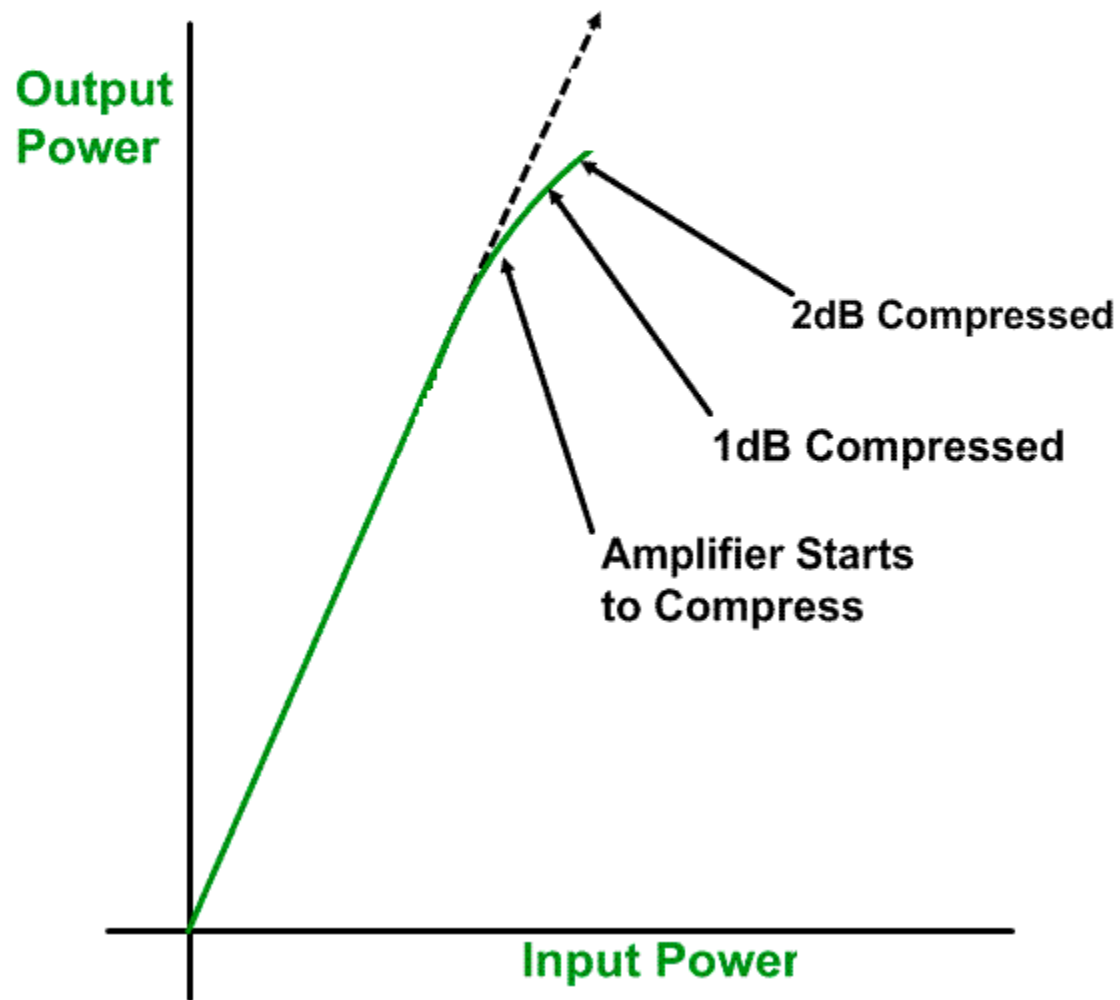
Amplifier Gain Compression

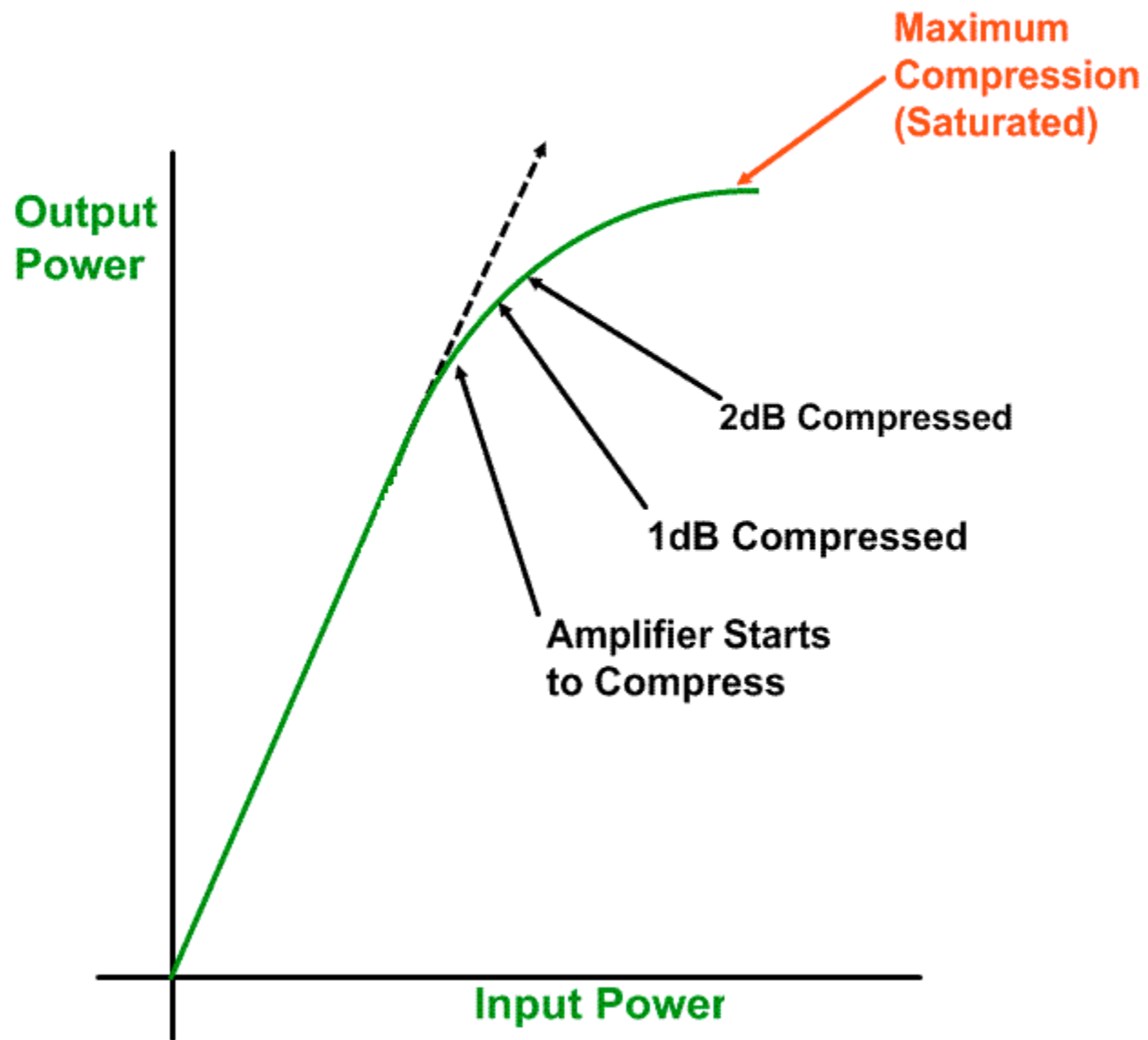


Amplifier Gain Compression

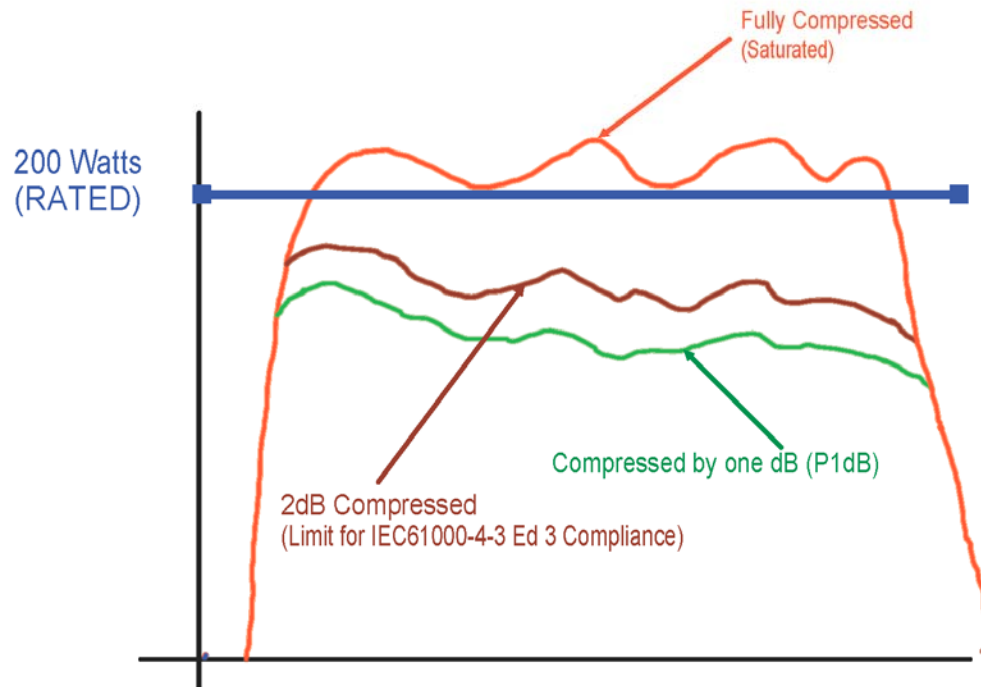


Amplifier Gain Compression



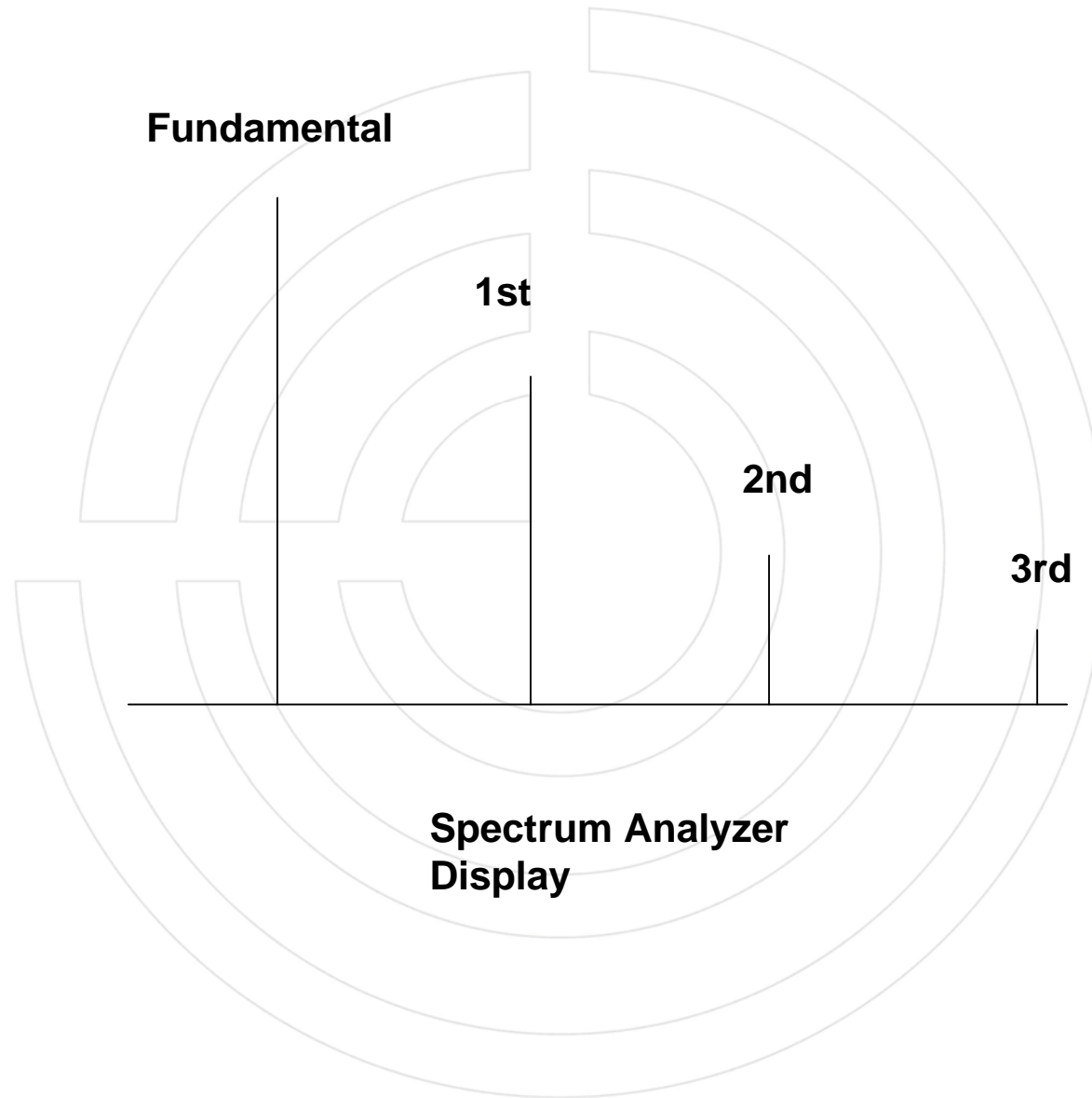


Amplifier Gain Compression

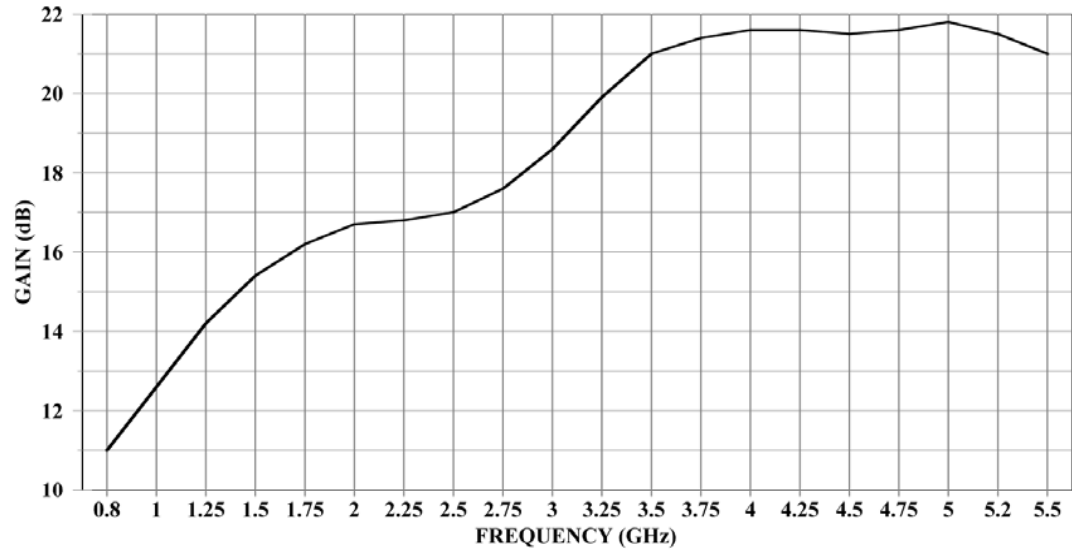




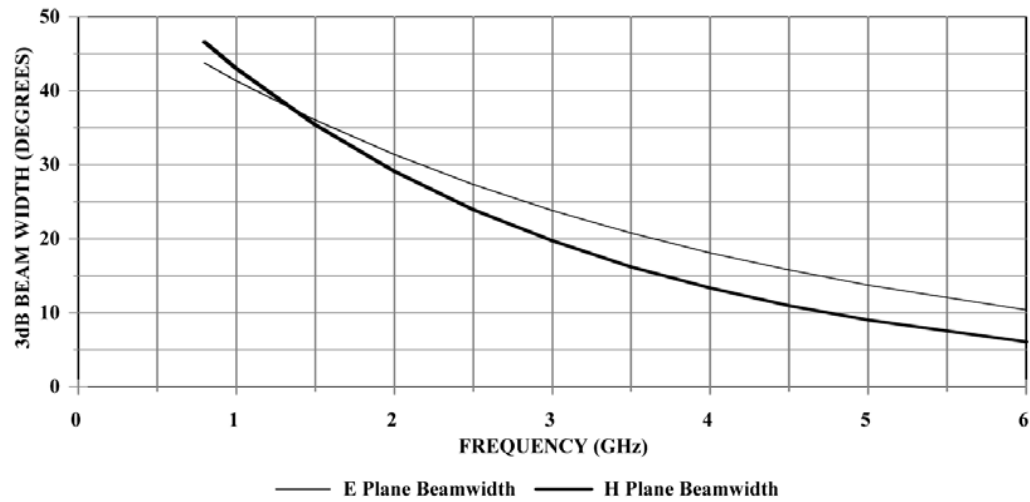
Harmonics



MODEL AT4002A GAIN VS FREQUENCY



Model AT4002A BEAMWIDTH VS FREQUENCY

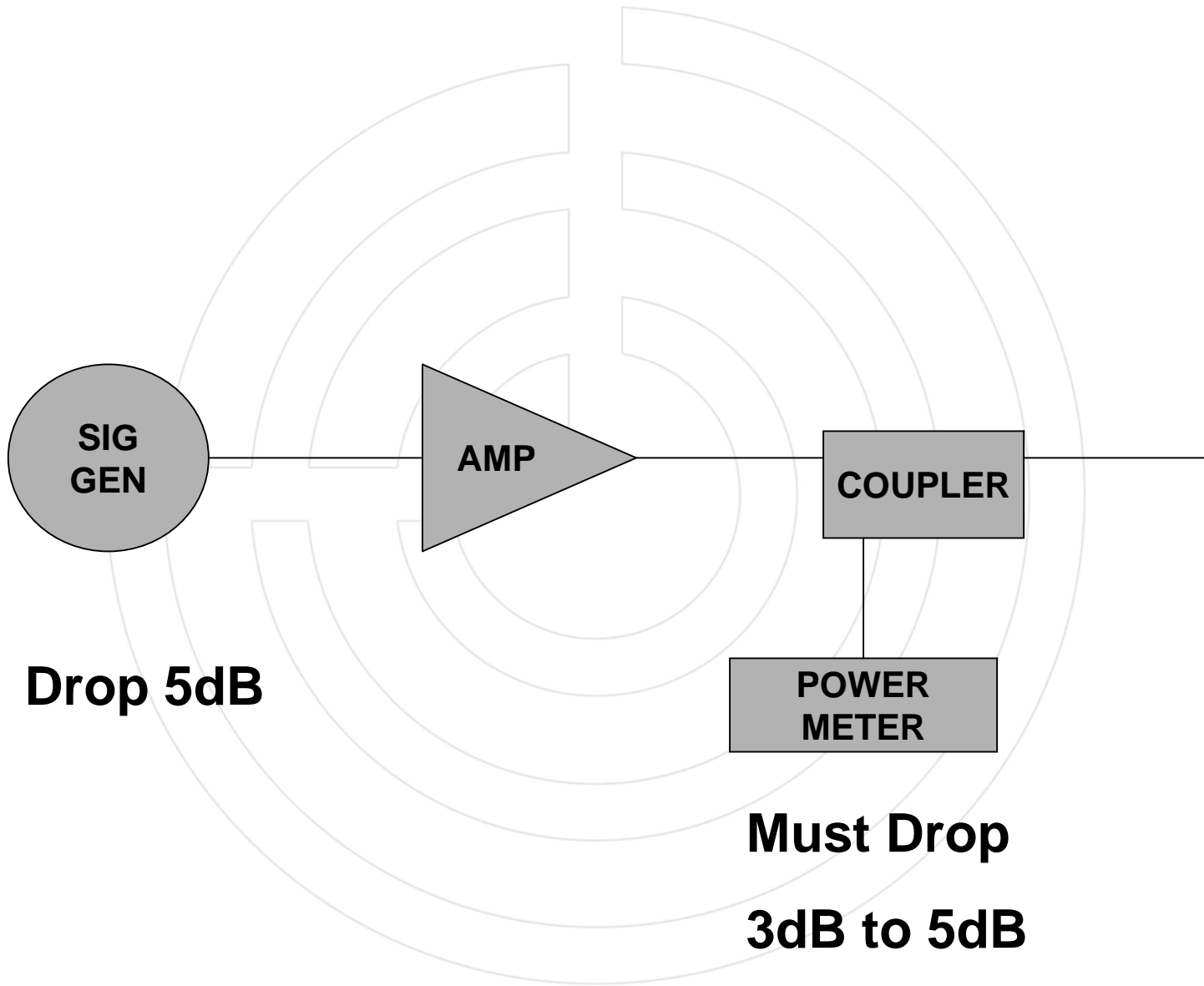




New Checks

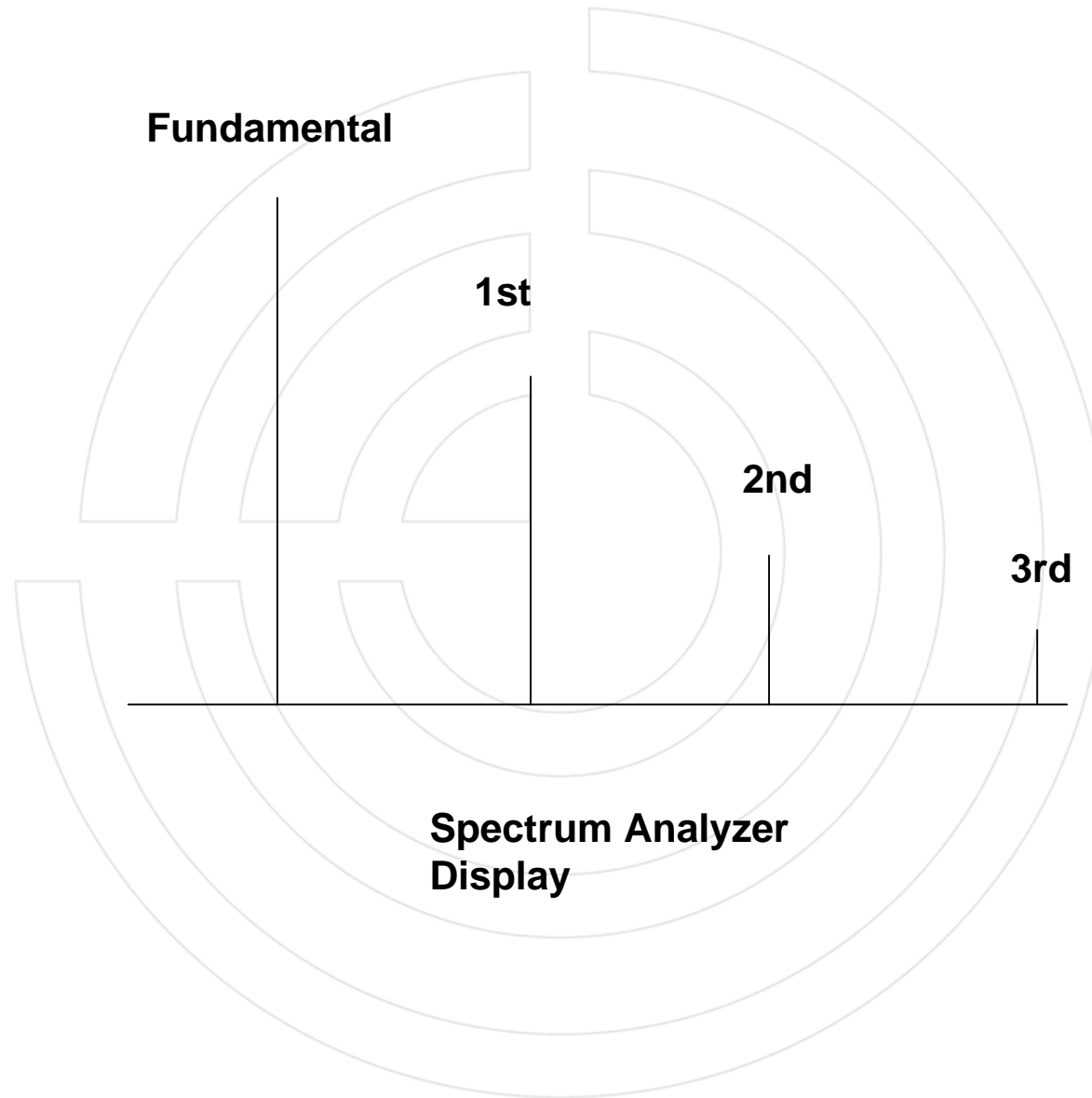


**Amplifier not More than 2dB
Compressed**



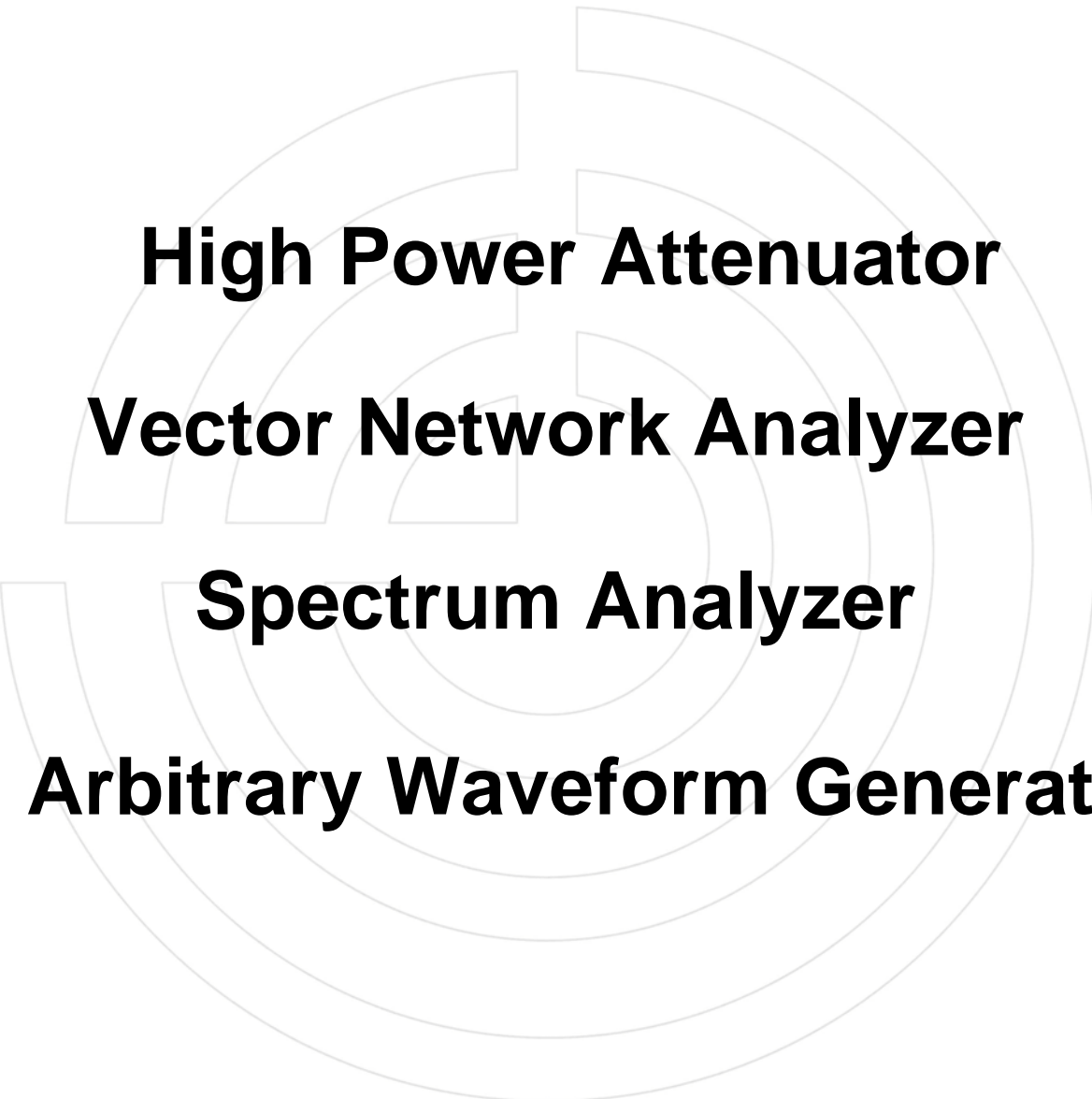


Harmonics not More than -6dBc





Equipment used at Amplifier House

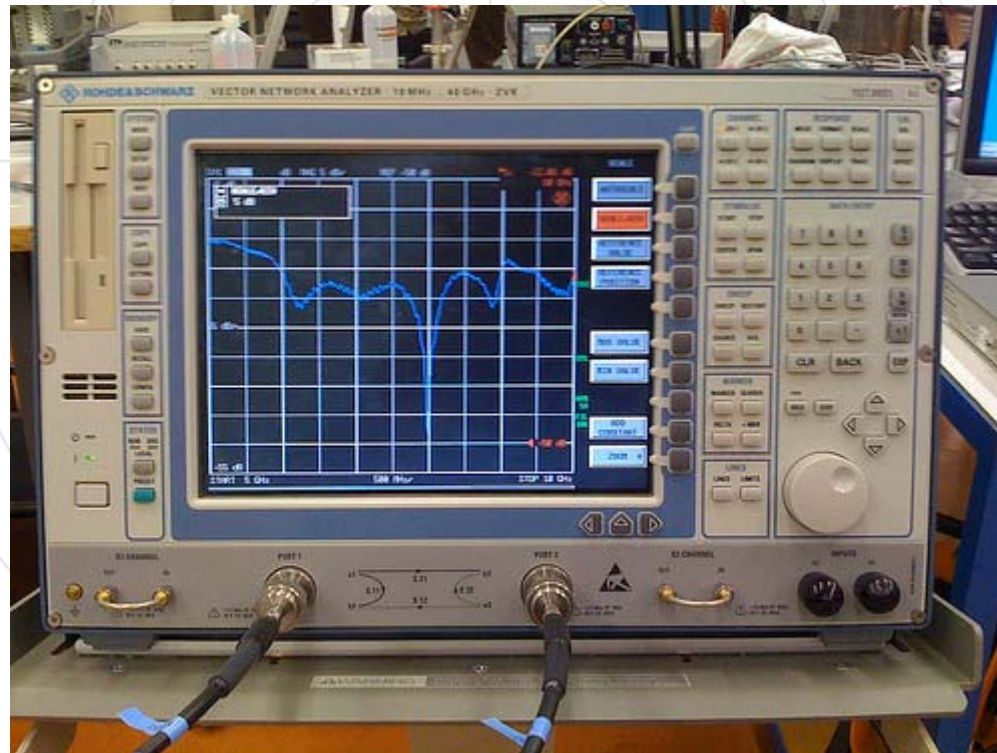


High Power Attenuator
Vector Network Analyzer
Spectrum Analyzer
Arbitrary Waveform Generator

High Power Attenuator



Vector Network Analyzer



Spectrum Analyzer

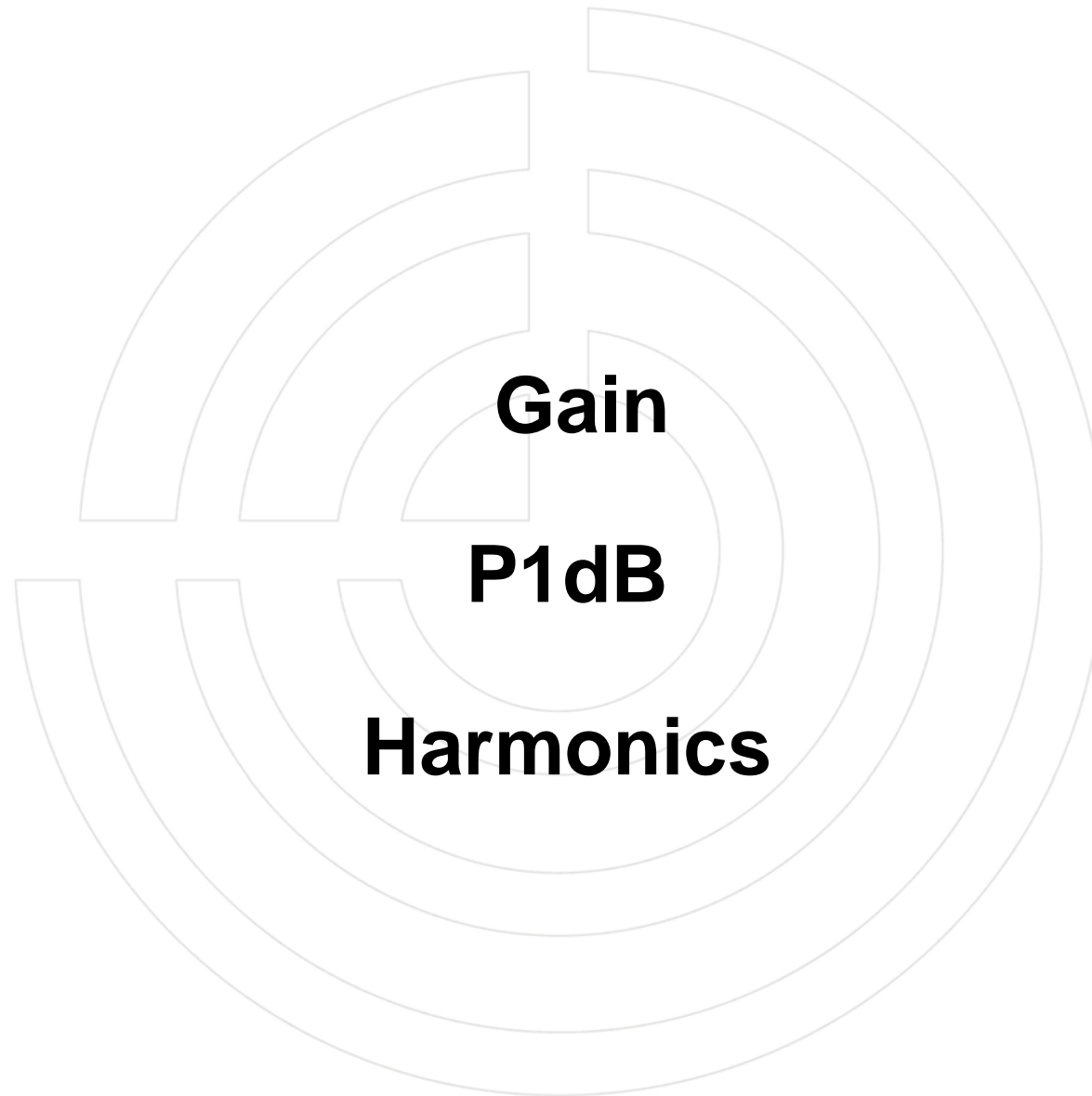


Arbitrary Waveform Generator





What Data is Actually Required to Prove Still Good?





Choose Say 5 Spot Frequencies

Include Lowest Test frequency

**Include Highest Input Power
Frequency**



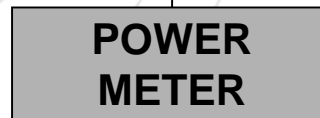
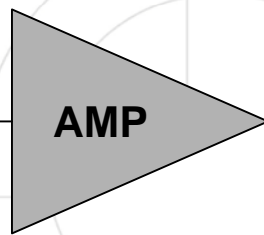
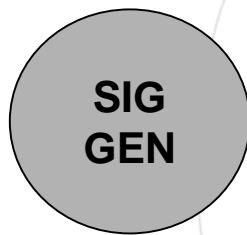
**OK to Drive Amplifier into Empty
Chamber if Suitable Coupler**



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

**80MHz Spot
Frequency**

Gain 54dB



**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**



Coupler Bandwidth Must Pick up Worst Harmonic



**Accuracy to 0.5dB is Actually
Pretty Good (Absolutes)**



QUESTIONS?

tom.mullineaux@milmega.co.uk