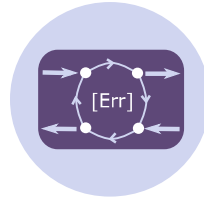
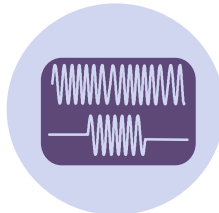
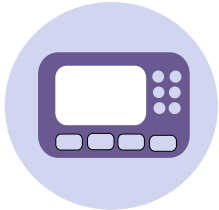




IQSTAR

Accelerate and Automate your Circuit Test Flow



INTRODUCTION

IQSTAR is an advanced measurement software designed for efficient and accurate test of circuits, verification, analysis or tuning of filters, RF amplifiers (LNA, MPA, HPA)... The software is equally suited for S-parameters, CW, Pulsed, 2-tones or modulated signal.

IQSTAR requires no programming skills to set it up. It supports developers to design the best products and it also allows production to guaranty and document products quality.

IQSTAR's Key Features

- ▶ Turn-Key software to set instrument's agnostic test bench
- ▶ Automated Characterization Test Flow from S-parameter to Modulated signal measurements
- ▶ Advanced an customizable data visualization & data processing

Applications

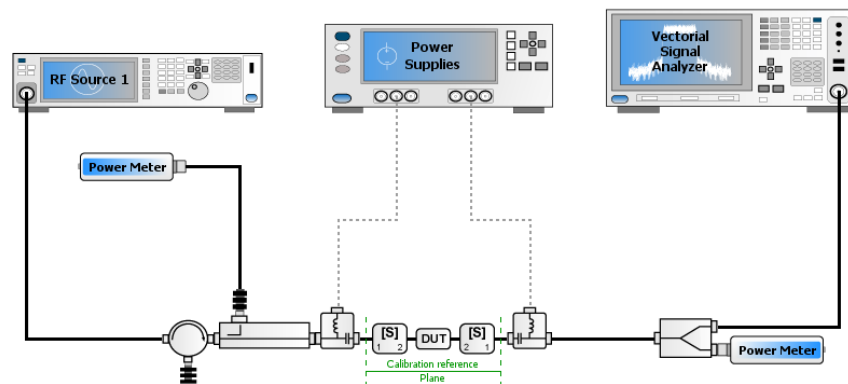
- ▶ Telecommunication Amplifier (LTE, OFDM, UMTS)
- ▶ Radar, MRI amplifier ▶ T&M ▶ RF Filter



SCHEMATIC-one set-up multi-configuration

The flexibility of the schematic editor allows to build a test set function of the application and available instruments.

Scalar Measurement

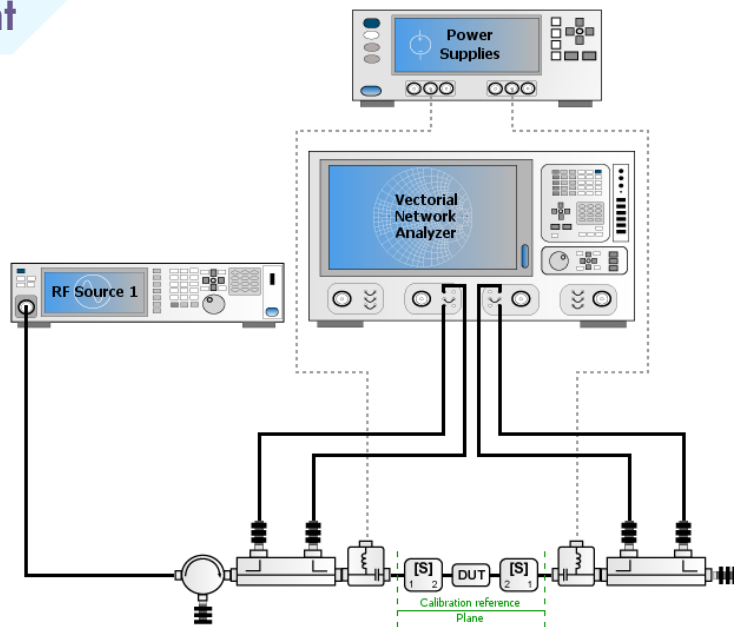




SCHEMATIC-one set-up multi-configuration

The flexibility of the schematic editor allows to build a test set function of the application and available instruments.

Vectorial Measurement

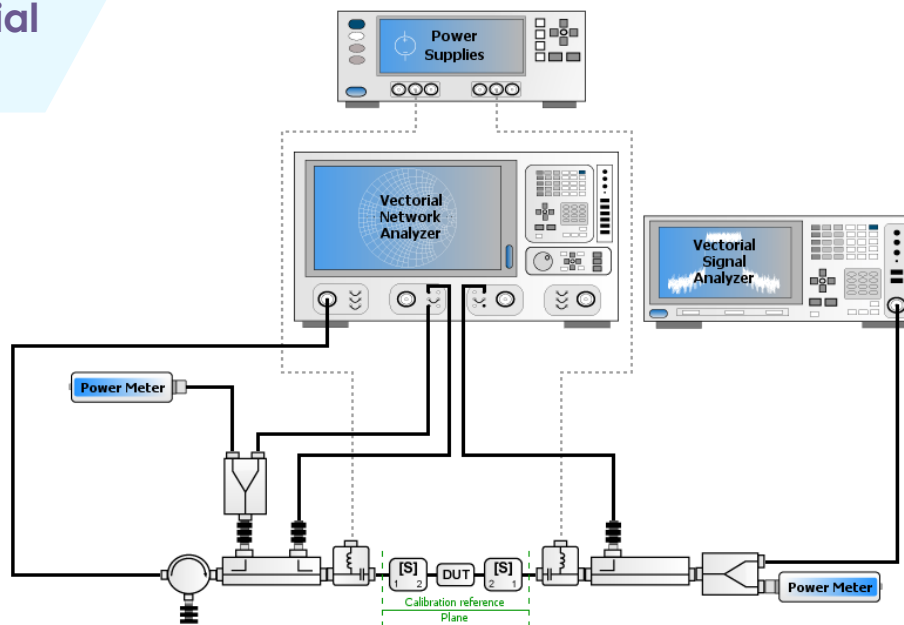




SCHEMATIC-one set-up multi-configuration

The flexibility of the schematic editor allows to build a test set function of the application and available instruments.

Scalar & Vectorial Measurement

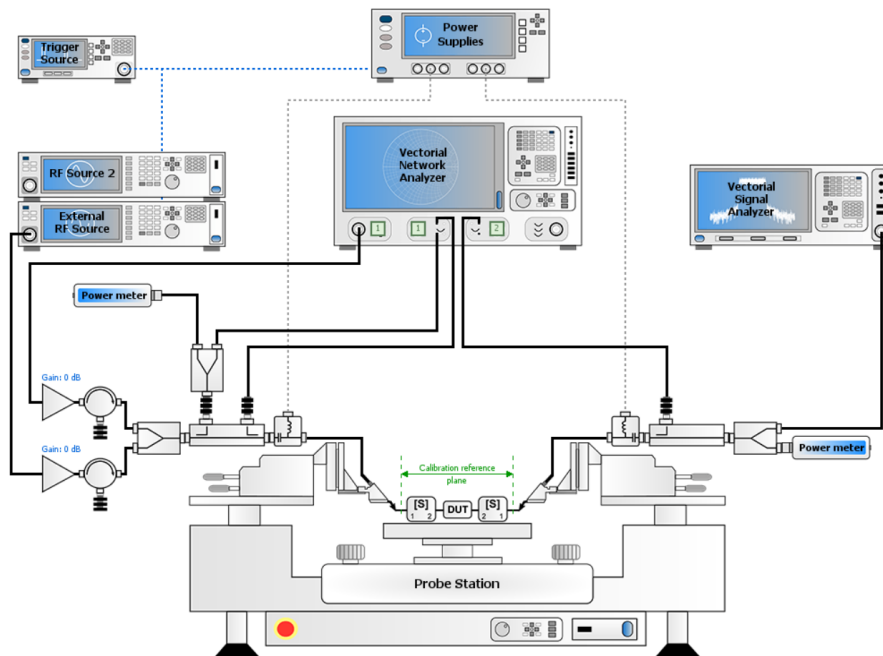




SCHEMATIC-one set-up multi-configuration

The flexibility of the schematic editor allows to build a test set function of the application and available instruments.

On-wafer Measurements

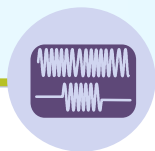




SCHEMATIC-one set-up multi-configuration

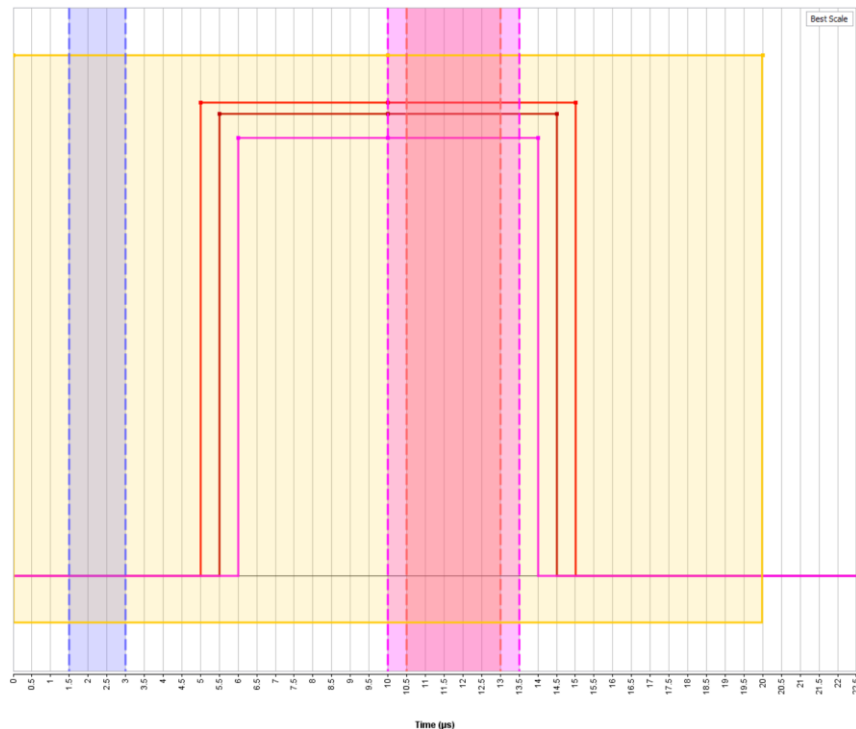
Measurement Parameter	SR*1 Power Sweep	VR*2 Power Sweep
S-Parameters (S11,S12,S21,S22)	✗	✓
Input Return Loss (IRL)	✗	✓
Available Input Power	✓	✓
Delivered Input Power	✗	✓
Power Gain (Gp)	✗	✓
Transducer Gain (Gt)	✓	✓
Power Added Efficiency (PAE)	✗	✓
Transducer Efficiency (Trans_Eff)	✓	✓
AM/PM	✗	✓
Calibrated Harmonic Power	✗	✓
2-tones Measurements (IMD, VBW ...)	✗	✓
Modulated Measurement (ACPR, Output PAPR, CCDF...)	✓ VSG & VSA required	✗

IQSTAR combines advantages of
Scalar and Vectorial measurements



CHRONOGRAM-one set-up multi-test signal

Modularity of IQSTAR allows to switch easily from CW to pulsed mode using chronogram editor.

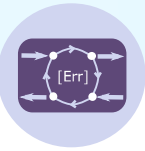


Period: 100.0 μs , PRF: 1.0E-5 MHz
Trace definition: 0.0 μs to 20.0 μs
Trace sampling: 101

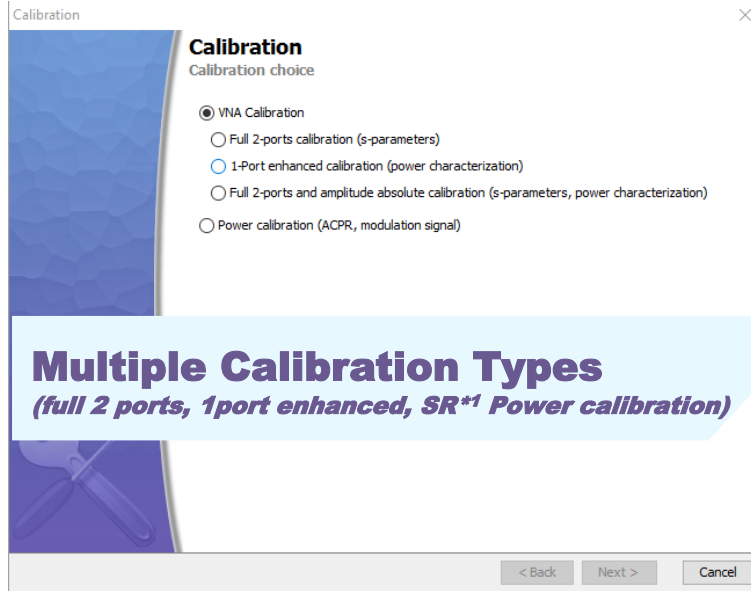
Hardware	Delay	Width	Pulse End	Unit
Generators				
IV power supplies				
Input	5.0	10.0	15.0	μs
Output	5.5	9.0	14.5	μs
VNA				
Internal RF source	6.0	8.0	14.0	μs
Measurers				
VNA	10.0	3.5	13.5	μs
IV Measurement				
Quiescent	1.5	1.5	3.0	μs
Pulse	10.5	2.5	13.0	μs

IQSTAR sets automatically all triggers in function of your timings setting

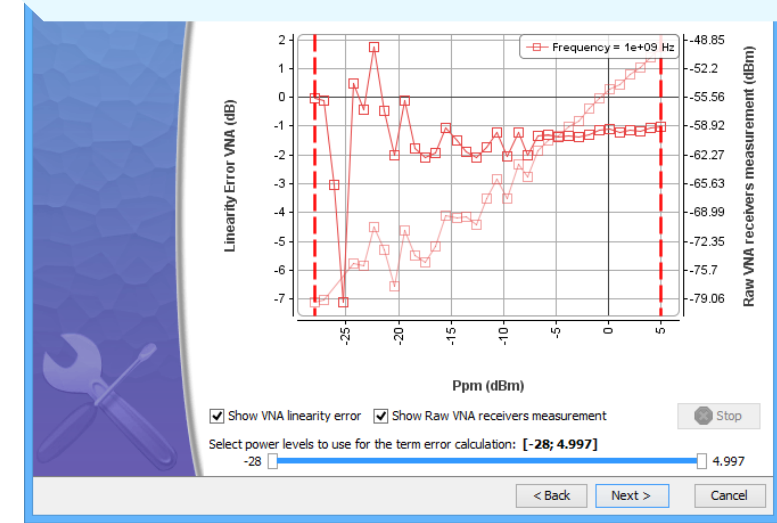
CALIBRATION- multi-test signal one calibration



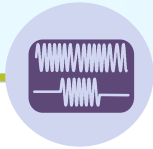
IQSTAR calibration tool is designed to limit the number of connection manipulations and avoid passive S-parameters characterization. The wizard based user interface, helps the users through the calibration process.



Calibration checking (Vectorial calibration & Receiver Linearity verification)

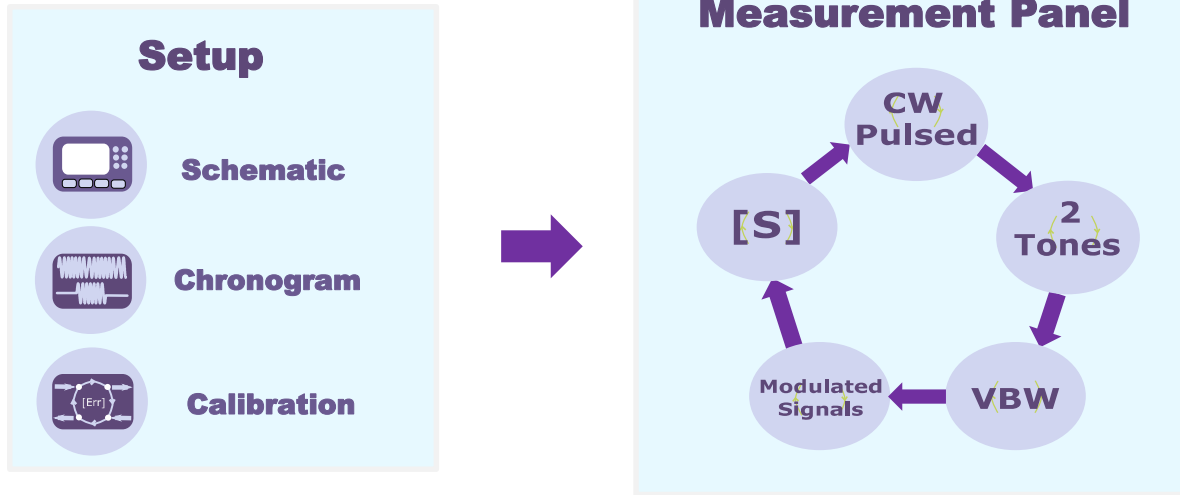


MEASUREMENTS- one setup multiple measurements



Depending on the defined setup and the active calibration, the measurement panel allows to choose different tabs to set and perform S-parameters measurements, power sweeps, frequency sweeps, 2-Tone and video-bandwidth analysis and modulated signal measurements.

An advanced and fully customizable real time visualization tool, embedding measurement history display and tuning target features, allows the user to verify the behavior of the circuit while the measurements are running.



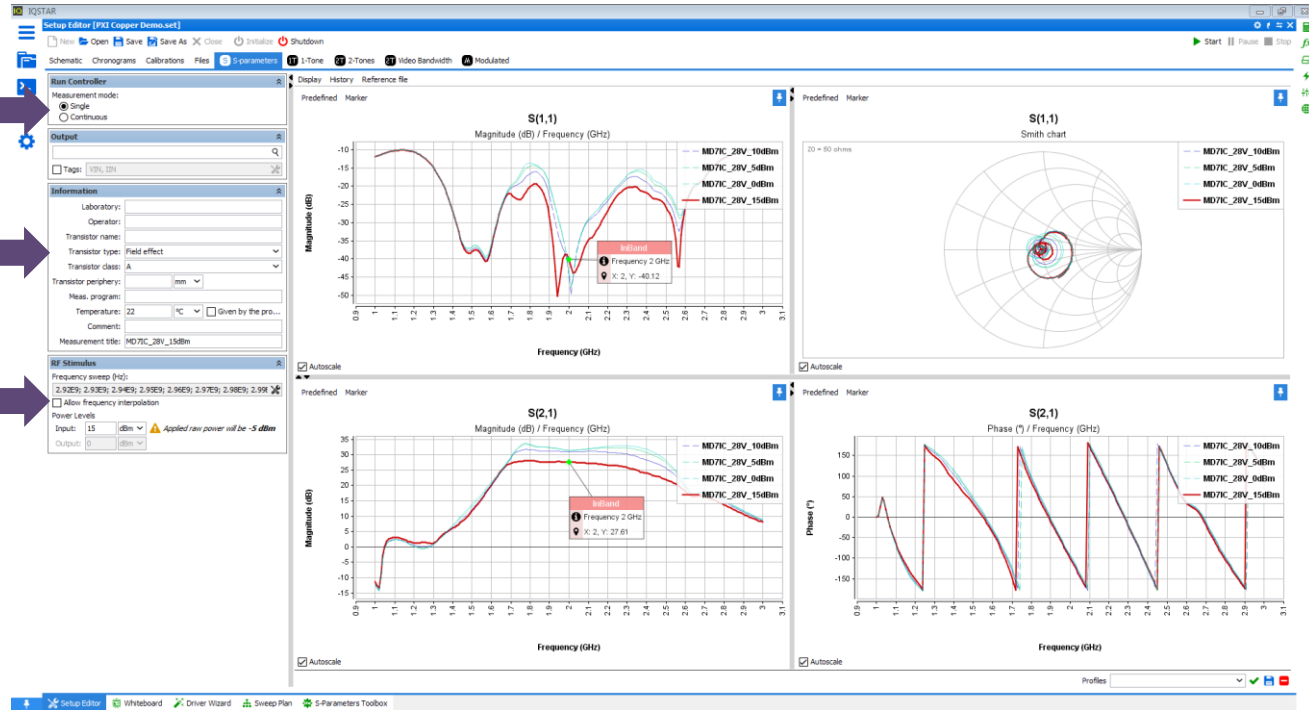
MEASUREMENTS- S-parameters

[S]

Single and Continuous Trigger modes

General Information about the measurements conditions

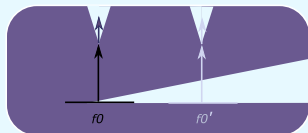
Frequency sweep and RF Stimulus



Historic display to simplify tuning

Simulation reference file import

MEASUREMENTS- power sweep



Measurement

Select measurement type:

Power sweep

Common Power sweep Tuning target

Acquisition mode

Smart measurement

Power sweep

Minimum power: -30 dBm

Maximum power: 10 dBm

Maximum step: 8 dB (max = 8 dB)

☒ Perform IV measurement only on last point

Fine mode

☒ Enabled

Maximum fine step: 1 dB

Compression threshold: 1.5 dB

Parametric method

☒ Enabled

Type: Gt compression (linear)

Point count: 1

Level: 3 dB

Quiescent current stabilization

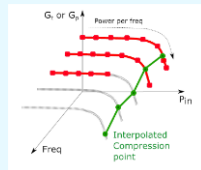
☒ Start measurement for: 95.0 %

Current access: Output

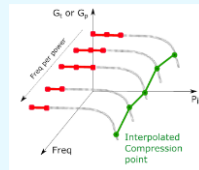
Stabilized value count: 5

- ▶ Center frequency & power sweep
- ▶ Power Optimization (Input Power, Output power...)
- ▶ Parametric Method to define the frequency visualisation (Gain Compression, Output power ...)
- ▶ 3 Power sweep Mode:

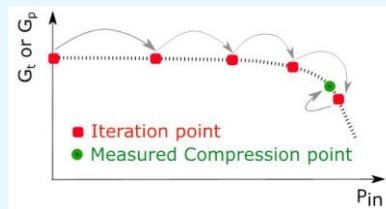
Power per frequency



Frequency per power



Smart Sweep



Smart Sweep :
IFBW= 10kHz
6 freq x 30 Power =180
points in 10'1 s

MEASUREMENTS- power sweep

Example of Power per Frequency sweep (Parametric Method = 3dB Gt Compression)



MEASUREMENTS- power sweep

Common Power sweep Tuning target

Acquisition mode

Smart measurement

Power sweep

Minimum power: -30 dBm

Maximum power: 10 dBm

Maximum step: 8 dB (max = 8 dB)

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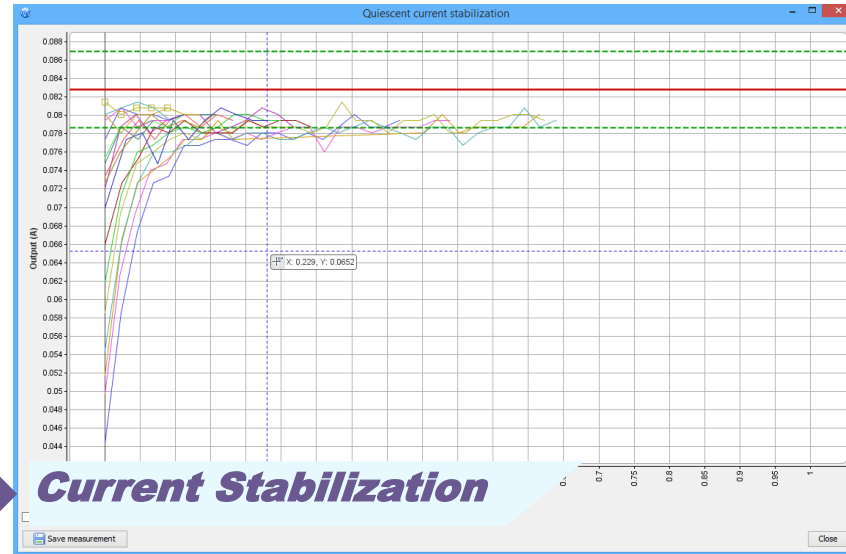
Quiescent current stabilization

☒ Start measurement for: 95.0 %

Current access: Output

Stabilized value count: 5

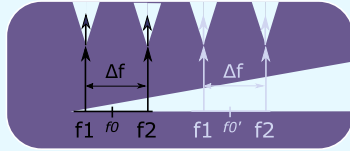
IQ.Star includes a customizable current stabilization feature that allows a recovery time between two power sweeps - Very useful for GaN device based circuits presenting trapping phenomena.



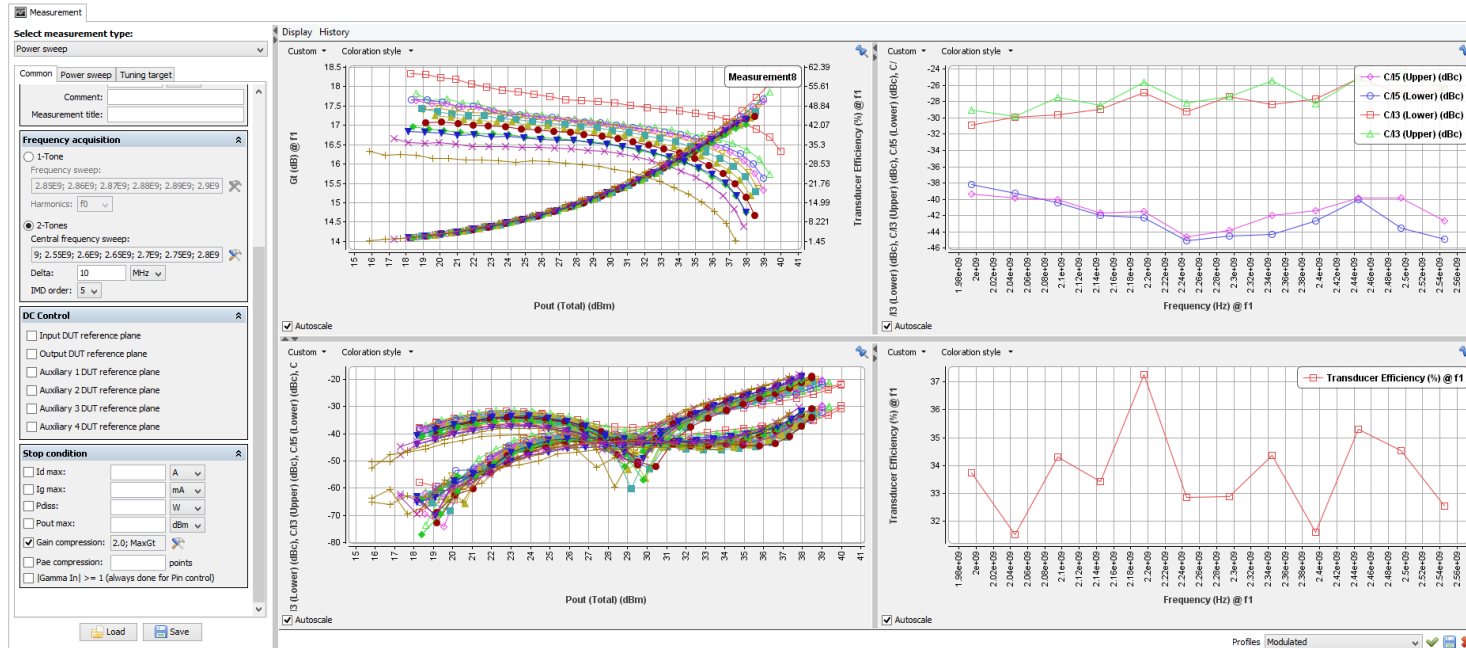
Current Stabilization

2 Tones

MEASUREMENTS- 2-Tones

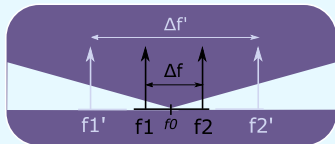


- ▶ Center frequency & power sweep
- ▶ Power Optimization (Input Power, C/I ...)
- ▶ 2-Tones Balanced Optimization

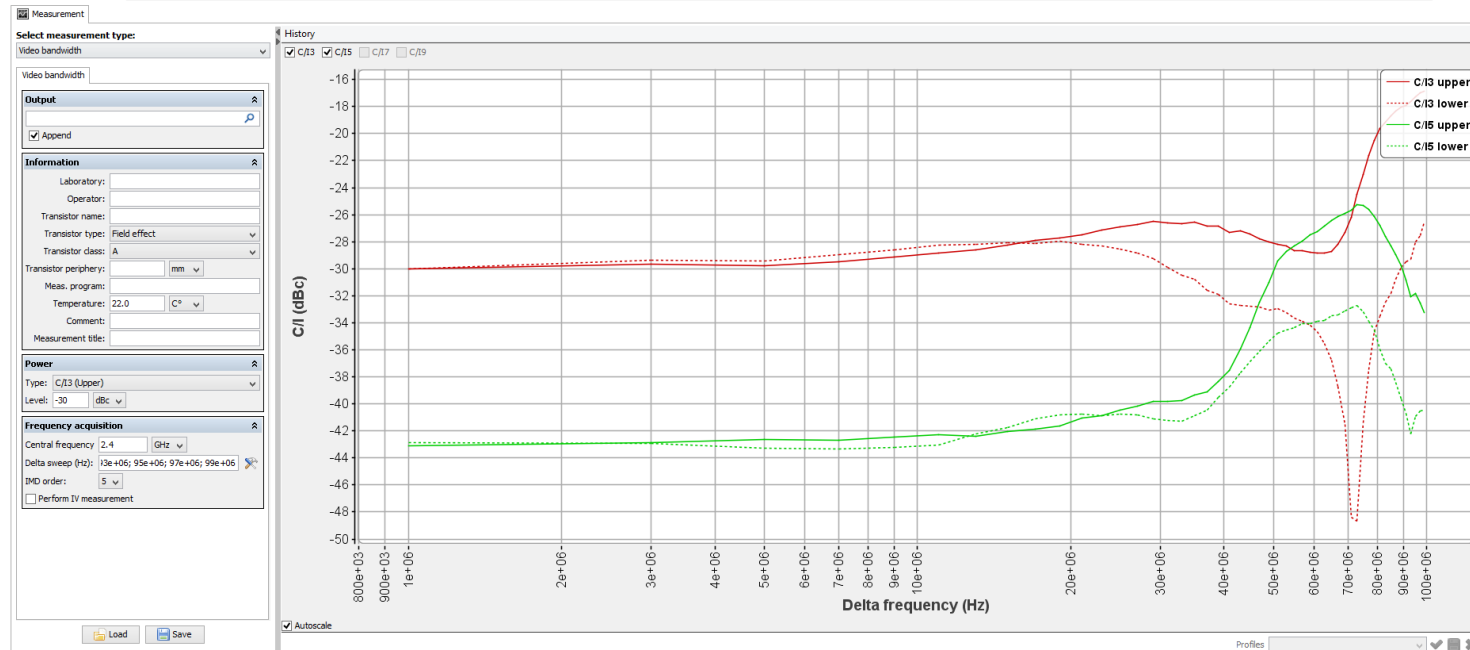


MEASUREMENTS- video bandwidth

VBW

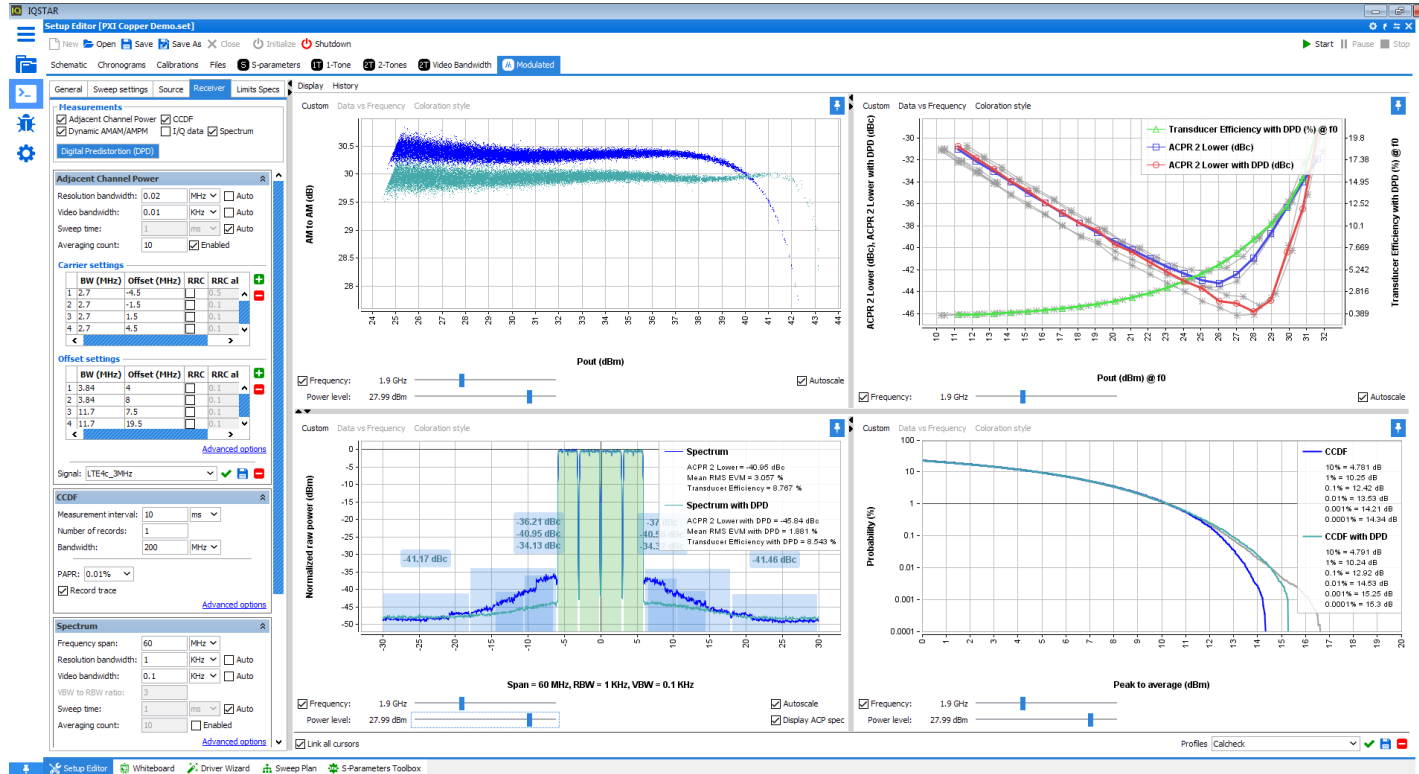


- ▶ Delta frequency sweep at constant power
- ▶ Power Optimization (Input Power, C/I ...)
- ▶ 2-Tones Balance Optimization



MEASUREMENTS- power sweep

Example of Measurements for Modulated Signal



Measurements sequencer

The Sweep Plan allows to define and customize an automated test flow (DUT biasing sweep, temperature sweep ...)

Multi- Setup

Drag and drop commands

Multi- configuration

DC Control

Probe station Control

SCPI Commands capabilities

Scripting capabilities

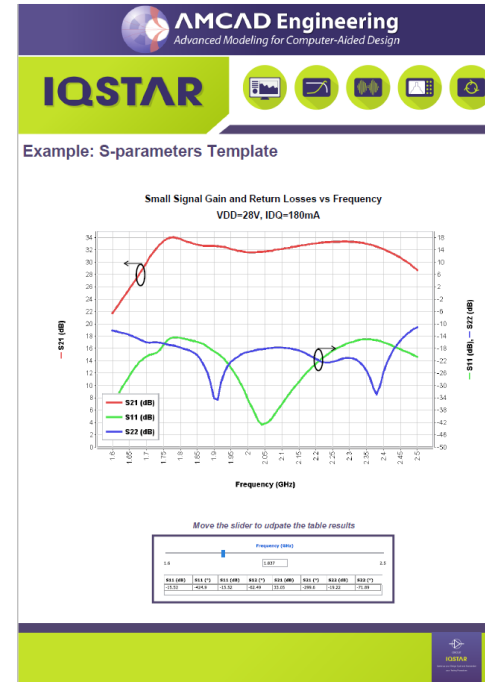
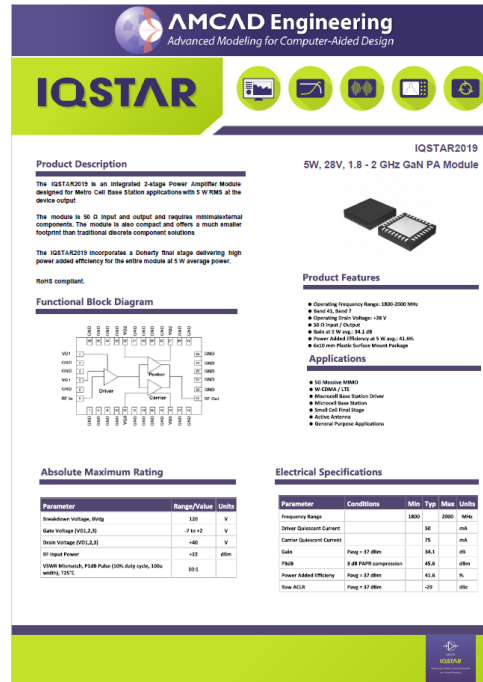
The screenshot displays the Measurements Sequencer interface. On the left, the 'Setup Manager' shows a 'virtual.set' configuration. Below it, the 'Actions: Basic' panel includes 'Change configuration', 'Perform measurement', 'Group', 'Wait', 'Message', and 'Event'. The 'Actions: DUT Biasing' panel includes 'DUT biasing', 'DUT biasing sweep (loop)', 'DUT power state', and 'DUT optimization'. The 'Actions: Probe Station' panel includes 'Change Wafer', 'Wafer plan (loop)', 'Move probe', 'Probe plan (loop)', 'Change chuck temperature', and 'Chuck temperature sweep (loop)'. The 'Actions: SCPI' panel includes 'SCPI Command' and 'SCPI Test (loop)'. The 'Actions: Scripting' panel includes 'Script (loop)'. The central 'My sweep plan' tree shows a sequence of actions: 'Change configuration: virtual.set > 5 parameters', 'Drain 1 biasing sweep (3 biasing)', 'DUT ON', 'Perform measurement', 'DUT OFF', 'Change configuration: virtual.set > 1-Tone', 'Drain 1 biasing sweep (3 biasing)', 'DUT ON', 'Perform measurement', 'DUT OFF', 'Change configuration: virtual.set > 2-Tones', 'Drain 1 biasing sweep (3 biasing)', 'DUT ON', 'Perform measurement', 'DUT OFF', 'Change configuration: virtual.set > Video Bandwidth', 'Drain 1 biasing sweep (3 biasing)', 'DUT ON', 'Perform measurement', 'DUT OFF', 'Change configuration: virtual.set > Modulated', 'Drain 1 biasing sweep (3 biasing)', 'DUT ON', 'Perform measurement', and 'DUT OFF'. On the right, the 'Run Controller' panel shows 'Measurement mode' set to 'Single'. The 'Measurement File' panel shows the file path 'D:\Users\jdelan\Desktop\SP-22p'. The 'Information' panel shows 'Laboratory: AMCAD-Engineering', 'Operator: User3', 'Device: IQSTAR2019', 'Description: Rev 1', 'Family: Amplifier', 'Type: HPA', and 'Transistor class: mm'. The 'Measurement' panel shows 'Title: Evaluation', 'Program: Automation', 'Temperature: 22 °C', and 'Description: Test'. The 'RF Stimulus' panel shows 'Frequency sweep (Hz): 1e+09; 1.005e+09; 1.01e+09; 1.015e+09; 1.02e+09; 1.025e+09; 1.03e+09; 1.035e+09; 1.04e+09; 1.045e+09; 1.05e+09; 1.055e+09; 1.06e+09' and 'Power Levels: Input: 0 dBm, Output: dBm'. A warning message states 'Applied raw power will be -20 dBm'.

Drag and drop actions into tree to build your sweep plan, double-click on an check box to select/deselect it.



VISUALISATION

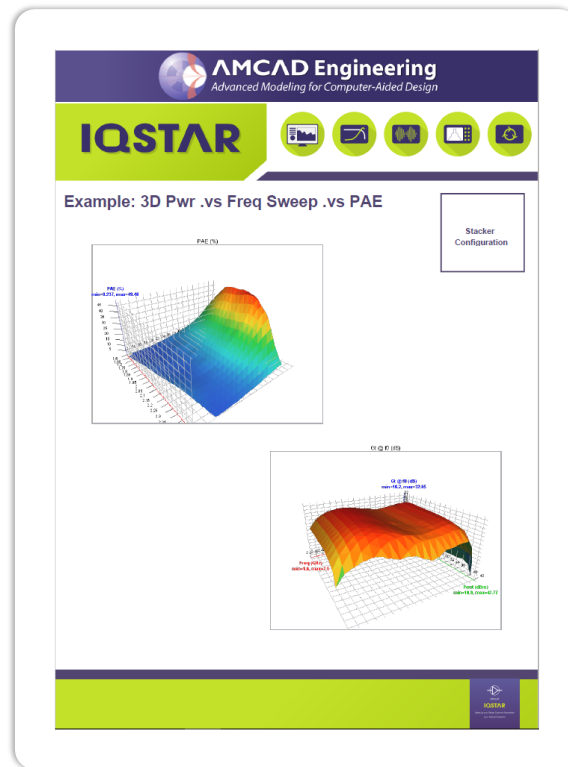
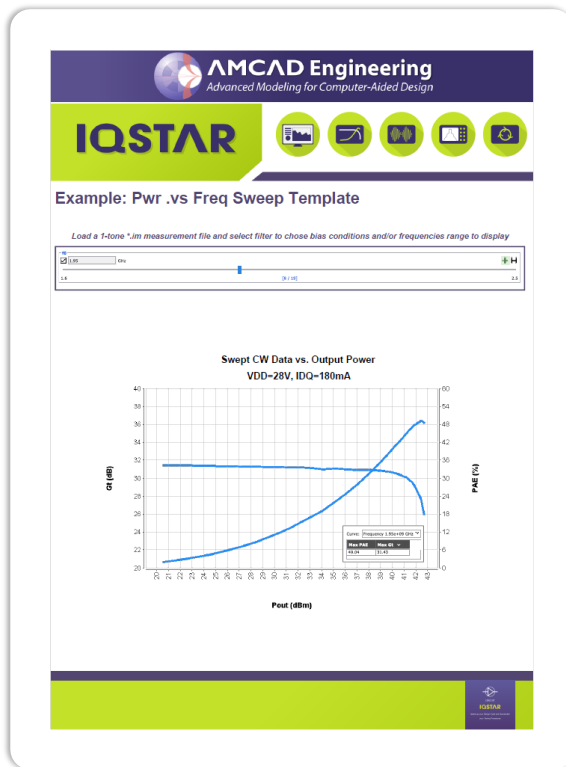
IQSTAR Whiteboard visualisation tool allows to configure a fully customizable data display (3D, Slider, Markers, Comments ...) in order to present circuit specifications in the format of a datasheet.





VISUALISATION

IQSTAR Whiteboard visualisation tool allows to configure a fully customizable data display (3D, Slider, Markers, Comments ...) in order to present circuit specifications in the format of a datasheet.





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