80 Channel Automatic True Power RF Level Analysis System, 1 MHz … 8000 MHz

Features
- extends multichannel RF power
  sources to automatic test systems
- time efficient testing
- transparent HTOL test procedures
- up to 3 watts RF power capability
- high measurement accuracy
- LAN remote interface

Applications
- precise HTOL tests
- qualification of active and passive
  electronic components
- quality assurance
- research and development (R&D)

At a Glance

High Temperature Operating Life (HTOL) testing is an intense stress test performed to accelerate thermally activated failure mechanisms through the application of extreme temperature and dynamic biasing conditions. Typically it is performed at 125°C with a bias level at the maximum data sheet specifications. It is described in the AEC-Q100/Q200 standard.

Power stress tests and HTOL tests require RF systems which offer multichannel high RF power capability and high level precision.

As a main function, the TSQA-RFLD80 contains 80 channel RF wideband power detectors, each with a power capability of up to 3 watts. Thus the TSQA-RFLD80 is able to handle RF power of up to 80 x 3 = 240 watts.
The software inside the controller unit supports the control of an external signal generator which is the common RF source for RF multi power sources. Additionally the TSQA contains the cabling for mains, data, RF and a LAN switch.

Automatic HTOL Tests

The TSQA-RFLD80 extends existing RF multi power sources to a powerful automatic HTOL test system with a lot of useful functions.

The set offers time efficient, automatically controlled HTOL RF tests (CW, continuous wave) for DUTs like semiconductors or SAW filters.

TSQA-RFLD80 can cycle over up to five test frequencies in order to check the behaviour at multiple points in the spectrum. It continuously checks the insertion loss of the devices under test versus a SW configurable tolerance mask specific for each frequency. It takes into account automatically the influence of RF cable losses in the system.

In the case of violating a specified value, the channel number of the faulty DUT is recorded together with a time stamp. The system can be controlled by SCPI99 orientated ASCII strings via LAN remote interfaces or by a graphical web interface.

The software of the TSQA-RFLD80 supports the control of the signal generator R&S SMBV100A as standard.

Compact design

The TSQA-RFLD80 is a modular design integrated in a compact a 19" rack 9 U housing. It includes 80 RF wideband power detector channels, a controller unit and a temperature controlled fan unit.

Software Functionalities

The TSQA-RFLD80 offers several functionalities to enable time and cost efficient operation of the automatic RF HTOL system.

- **Up to 5 Test Frequencies**

The software allows the entry of up to 5 test frequencies. All DUTs are cyclically tested at these frequencies.

- **High Power Detection**

The TSQA-RFLD80 offers 80 detector channels with large signal capabilities of up to 3 watts per channel with a dynamic range of approx. 40 dB. The large signal capability allows level detection of signals with high RF power.

- **Control of Signal Generator**

The software supports the control of the signal generator Rohde & Schwarz SMBV100A via LAN interface. (The signal generator is not part of the delivery of the TSQA-RFLD80 system).

The control of other types of signal generators can be included in the controller software on demand.

- **Insertion Loss Tolerances of DUTs**

The software allows the input of a pair of lower/upper tolerance limit per frequency.

In operation the tolerances will be tested on violation. In the case of exceeding the tolerances during the DUT tests, the software generates automatically a message with a time stamp.

- **Consideration of Cable Losses**

Type and length of the RF cables from the detectors to the DUTs are included in the software. The insertion loss of the cable is calculated and considered in the measurements by the software.

- **Scalable Test Channels**

The TSQA-RFLD80 system offers the RF level analysis of up to 80 channels. For smaller batches unused channels can be skipped. Skipped channels are not considered in the test procedure.

- **RF Power Calibration**

For precise levelling of the input power of the DUTs the software provides a function for RF power calibration. By starting this process the software sets RF level of the signal generator to reach the target RF power based on average power calculations.

- **Normalize Function**

For evaluation the insertion losses of the DUTs, all losses can be set to "0 dB". By using the NORMALIZE function the deviations of the RF output power of all used (not skipped) channels are mathematically corrected by calculated offsets. The calculated deviations can be read out.

- **Automatic Test Stop**

After the predefined test time has elapsed, the test procedure stops automatically and the RF level of the signal generator will be turned down to remove the RF stress from the DUTs.

Graphical Web Interface

The internal web server of the TSQA-RFLD80 offers graphic interfaces for an easy control and a clear presentation of the evaluation results without the effort of software development at the customer site.
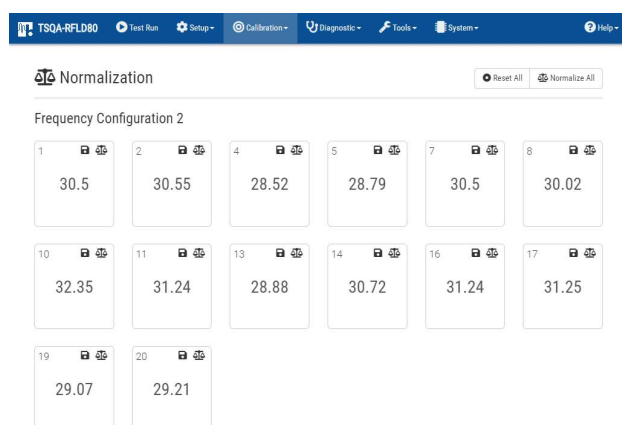
Example Calibration Page
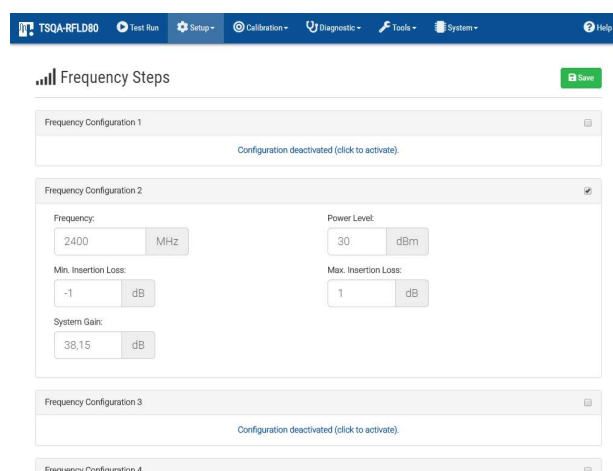
Example Frequency Setting Page

RF Specifications

| Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number of channels	n_{DUT}		80			
low frequency	f_{min}	1*		20	MHz	
high frequency	f_{max}	2800		8000*	MHz	
detection type			CW, continuous wave			
detection limit	P_{DET}	+37	+39		dBm	20 MHz ≤ f ≤ 1000 MHz
	P_{DET}	+36	+38		dBm	1000 MHz < f ≤ 2700 MHz
measurement accuracy	dP_{DET}		±0.5	±1.5**	dB	+5 dBm ≤ P_{IN} ≤ +36 dBm
noise floor	P_{NOISE}		-7	0	dBm	20 MHz ≤ f ≤ 2700 MHz
RF power	P_{RF}			3	W	per channel
DC voltage	U_{DC}			20	V	measurement inputs
ESD discharge resistor	R_{ESD}		4.7		kΩ	measurement inputs
RF connectors	X		SMA male			RF cable to DUT outputs

*: detection range of RFLD-8RE
**: over full dynamic range. Higher accuracy for limited range.

Common Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	u	90	230	260	V	50 / 60 Hz
power consumption	P		70		W	
power inlet			CEE 7/7 plug			approx. 1.5 m cable length
dimensions	W x H x D		approx. 520 x 420 x 400		mm	19", 9 U
weight			15		kg	
RF cable outlet			rear side			RF detector input 1…80
cable length to DUT	l_{OUT}		1		m	free length
boot time	t_{BOOT}		50		s	start time of controller
remote interface		RJ45	10/100BaseT			approx.. 3 m cable length
operating temp. range	T_o	+20		+30	°C	within specification
temperature range	T_T	+5		+45	°C	specification not guaranteed
storage temp. range	T_s	-40		+70	°C	
operating humidity	RH			70	%	
ordering information		TSQA-RFLD80		1606.1112.3		

Typical Test Setup
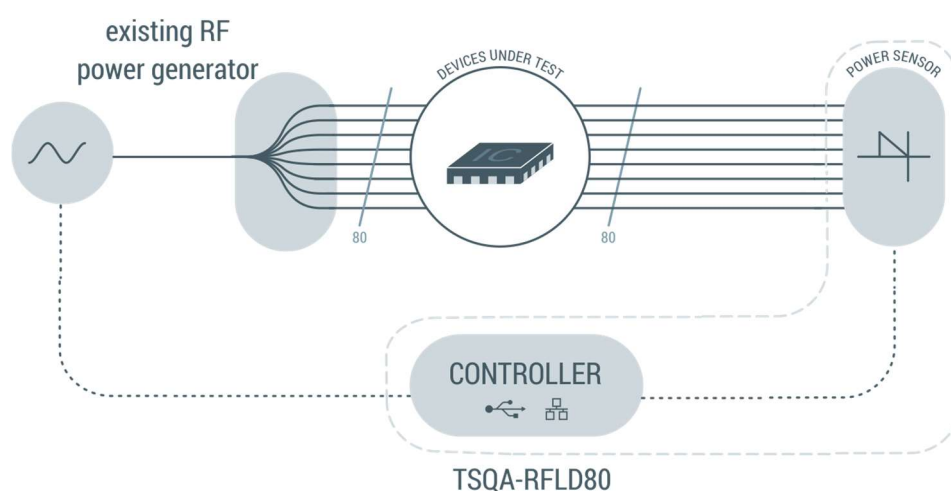
Appearances

Front View

Rear View, with RF cables
(80 pcs RF cables, l = 1.80 m, 1 m free length are part of delivery).

Related Products

Product	Description	P/N
WSDU-1X80PL	2.8 W 80 Way HTOL System 20 … 2800 MHz	1202.6002
WSDU-1X232	400 mW 232 Way Signal Distribution System, 350… 2500 MHz	1004.1002
TSQA-80PME	80 Channel, Precise High Power HTOL RF System, 600 MHz…6000 MHz	1804.6302
TSQA-80XME	80 Channel, Precise Medium Power HTOL RF System, 600 MHz…6000 MHz	1804.6102
TSQA-1X80PM	80 Channel Precise Automatic HTOL RF Testing System, 2.5 W, 20 MHz…3000 MHz	1606.1012