

TSQA-80PME

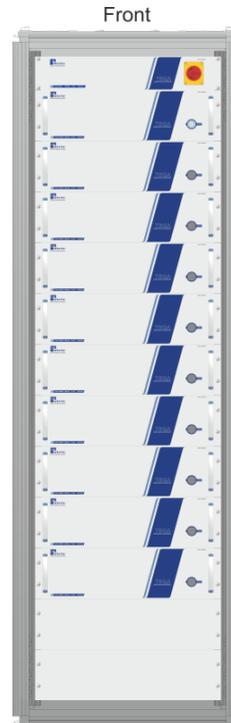
80 Channel, Precise High Power HTOL RF System, 600 MHz...6000 MHz

Features

- compact 19", 38 U design
- up to +35 dBm output power
- high level accuracy and stability
- high dynamic measurement
- LAN remote interface
- Graphic User Interface (GUI)
- CW and pulse mode (optional)

Applications

- qualification of e.g. active and passive cellular and wireless front-end components
- quality assurance (new designs, batch verification)
- research and development (R&D)

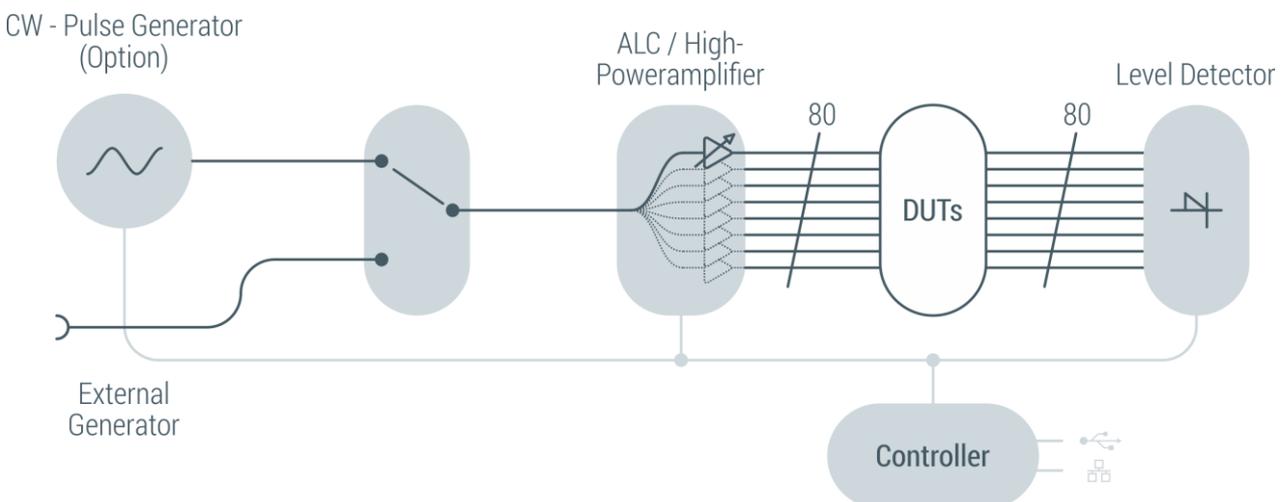


At a Glance

High-temperature Operating Life Time (HTOL) testing is an intense stress test performed to simulate aging and accelerate thermally activated failure mechanisms.

During HTOL testing a large set of devices under test (DUT) is put under extreme temperature and absolute maximum rating conditions. Typically, it is performed at 125°C and according to JEDEC JESD22-A108 specification.

Principle Circuit



Scope

Power stress tests and HTOL tests require RF systems with many output channels each delivering output power with high level precision and stability over time. TSQA-80PME is a compact, automatic HTOL RF testing subsystem, suitable for the frequency range 600 MHz...6000 MHz in 50 ohms technology. It offers 80 channels with an output power capability of up to +35 dBm (3 W). It also offers 80 input channels in order to monitor the DUT output power levels.

For remote control, the system offers Ethernet LAN interface. Via the remote interface the system can be controlled with simple ASCII socket commands inspired by SCPI99.

Minimizing RF cable losses

Losses of RF cables to and from the DUTs have important consequences with respect to performance. High cable losses must be compensated by the power stages to avoid reduction of power level at the DUT input. This causes high impact on the power consumption and heat generation of HTOL systems. Additionally, RF cables have temperature and frequency dependent effects which reduce the precision of the power level at the DUTs. The TSQA-80PME features RF output- and input ports on the right or left side of the system cabinet, to minimize cable length to the climate chamber.

High port isolation

HTOL systems must offer a high isolation between the RF output ports. A failing DUT should not have any influence to the other DUTs during the tests. The TSQA-80PME offers very high isolation between ports to avoid this effect.

High precision of RF output level

TSQA-80PME has 80 RF power outputs. Each output channel provides a very precise RF output level with closed-loop level control (ALC), and virtually no visible steps. Therefore, the symmetry between the 80 outputs as well as the long-term stability is guaranteed. Also, the control loop's smooth characteristic guarantees avoids any overshoot. The output level range is large to cover a big variety of DUT categories. HTOL tests can be run both with active components and gain (e.g. amplifiers) as well as passive components with low insertion loss (e.g. filters).

High precision RF level detection

Corresponding to each output channels the TSQA-80PME HTOL system provides an input channel to precisely measure the power at the DUT output matched to the specific range.

CW and pulse operation

The TSQA-80PME features an internal CW source and an optional pulse modulator. The signal source and the pulse parameters can be also controlled via LAN remote interface.

Suppression of harmonics

The RF energy in HTOL tests should be concentrated on the fundamental of the signal to avoid additional stress to the DUTs coming from harmonics. The TSQA-80PME has an adaptive harmonic filter for effective suppression of harmonics.

System self-monitoring

The system can run without human intervention during entire test periods of multiple months. It contains automatic self-checking like current consumption, module temperature and logging of errors.

Compact and versatile

The entire TSQA-80PME with 80 output RF power and 80 measurement channels is realized as 19" rack with a total height of only 38 U.

Software Functionalities

Physical remote interfaces: LAN or USB.
Control protocol: ASCII strings or browser-based using the integrated web server. It allows configuration of parameters and operating the system. Using the web-interface (GUI) allows the remote operation of the system without any additional effort of application software development and regardless of a remote location.

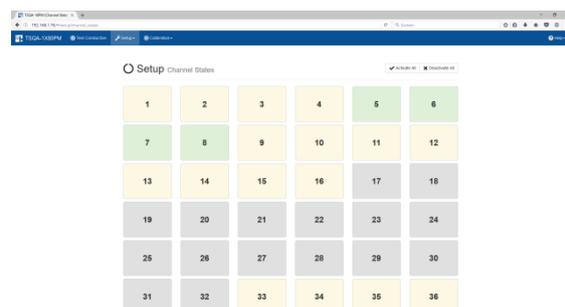


Figure shows Setup Menu of the web-interface

Up to 5 Test Frequencies

The software allows the entry of up to five test frequencies. All DUTs are cyclically exposed to these five RF frequencies and checked simultaneously. Power and dwell time can be configured for each frequency individually.



Insertion Loss Tolerances of DUTs

For each test frequency individually the permitted insertion loss of the DUT can be specified through an upper and a lower limit. Any violation of these limits will be logged together with a time-stamp.

Impact of Cable Losses

The unavoidable loss of the RF cables to and from the DUTs is taken into account by the software. Therefore cable type and length are configurable. The software calculates the input- and output power levels at the DUT. The difference of input- and output level is determined as insertion loss of the DUT.

Normalize Function

To evaluate e.g. the long term stability of DUTs the insertion losses in the test setup can be calibrated using 0 dB dummies or reference DUTs. The software offers then to normalize the deviations with respect to the reference.

Transparent Operation

Using the web-interface the operator can not only define all parameters of the complete test cycle (e.g. duration), but the web interface also displays continuously the overall test progress including failure statistics.

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

Build-In-Test

During system operation an integrated built-in-test measures continuously device temperatures and current consumptions in the subsystem parts and checks for failure conditions.

RF Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number of outputs	n_{DUT}		80			
low frequency	f_{min}			600	MHz	
high frequency	f_{max}	6000			MHz	
output power	P_{OUT}	+33	+35		dBm	f = 2 GHz
	P_{OUT}	+32	+34		dBm	f = 4 GHz
	P_{OUT}	+30	+32		dBm	f = 6 GHz
power setting range	dP_{OUT}		15		dB	
ALC resolution	ΔP_{OUT}			0,05	dB	
output power accuracy	dP_{OUT}		± 0.5		dB	RMS detection
harmonics	d		-30		dBc	
output isolation	S_{23}		-60		dB	adjacent channels, full gain
number of inputs	n_{IN}		80			power measurement
detection			RMS			CW (continuous wave)
			Peak			Envelope
measuring level range	P_{MEASHI}	+10		+ 40	dBm	high power inputs
abs. meas. accuracy	ΔP_{MEAS}		± 0.3		dB*	RMS detection
RF connectors			SMA female			outputs and inputs
CW RF generator / pulse modulator option						
frequency range	f_{GEN}	600		6000	MHz	
resolution	Δf_{GEN}		10		kHz	
accuracy	df_{GEN}		± 2.5		ppm	
pulse length	t_W	577		2300	μs	option
period	t_P	4.6		1000	ms	option

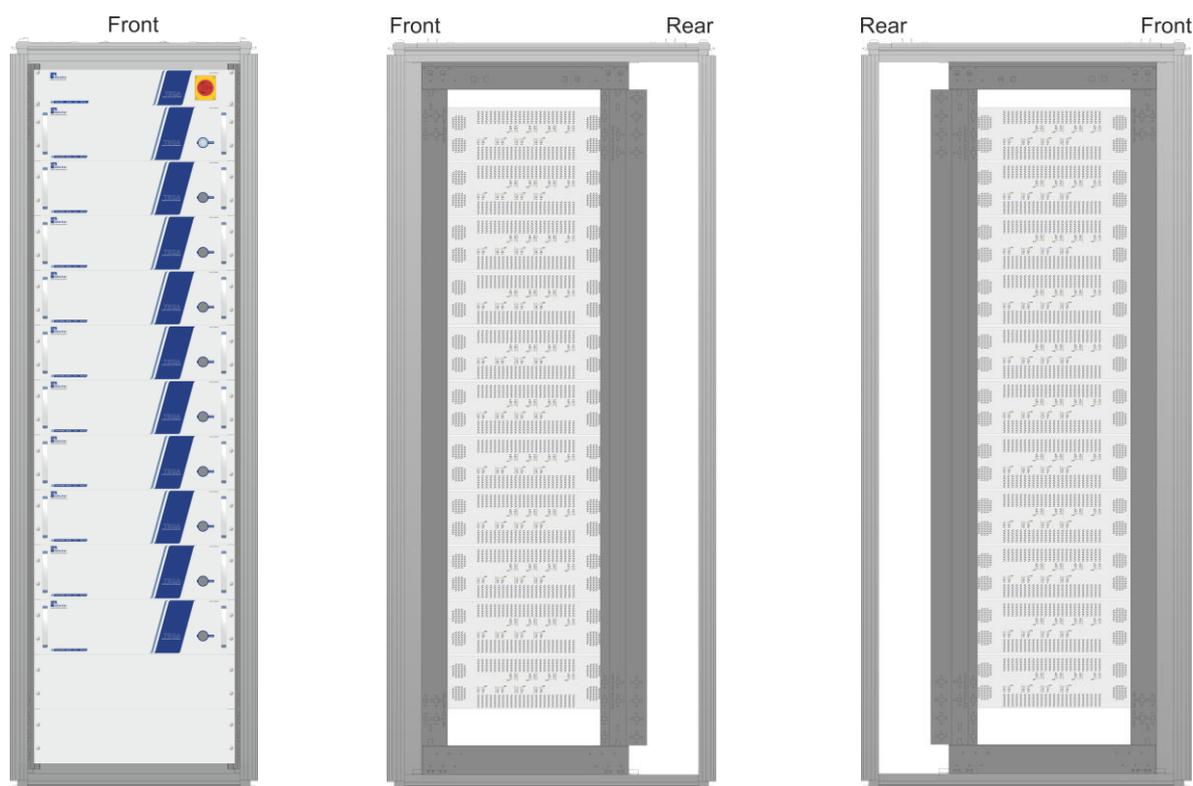
* After zeroing, I.L. < 2 dB



Common Specifications

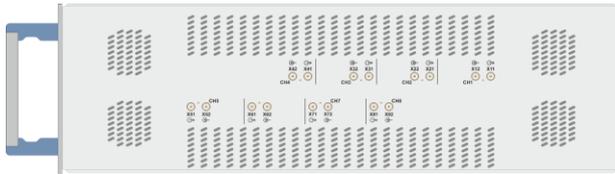
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	u_{AC}		400		V	3 phase network, 50 / 60 Hz
power consumption	P		5		kW	
power plug	X	CEE plug, red, 5-pole, 400 V / 16A				other plug types on request
power cable length	L		5		m	system to power plug
dimensions	W x H x D	approx. 600 x 1800 x 800			mm	19", 38 U
weight			150		kg	
remote interface		RJ45 10/100BaseT				ASCII commands
operating temp. range	T_o	+ 20		+ 30	°C	within specification
storage temp. range	T_s	- 40		+ 70	°C	
EMC		EN61326-1:2013				according directions: 2014/30/EU
safety		EN61010-1:2010				according directions: 2014/35/EU
ordering information	P/N	1804.6302.2	TSQA-80PME			RF connectors on right side
	P/N	1804.6302.3	TSQA-80PME			RF connectors on left side
	P/N	1804.6302.O1	TSQA-80PME-P			pulse option for generator

Appearances



Var. 2 (RF connectors on right side)

Var. 3 (RF connectors on left side)



RF connector arrangement of one HTOL section (Var. 2)

Related Products

Product	Description	P/N
TSQA-80XME	8 Channel, 0.5 W Precise Automatic HTOL RF Sub System, 600 MHz...6000 MHz	1804.6102
TSQA-1X16PM	16 Channel Precise Automatic HTOL RF Testing System, 2.5 W, 20 MHz...3000 MHz	1606.1027
TSQA-1X80PM	80 Channel Precise Automatic HTOL RF Testing System, 2.5 W, 20 MHz...3000 MHz	1606.1012
TSQA-16CH10	16 Channel High-Precision Automatic HTOL RF Testing System, 10 W, 600 MHz ... 2200 MHz	1507.1012
WSDU-1X232	232 Way HTOL RF Testing System, 125 mW, 350...2500 MHz	1004.1002