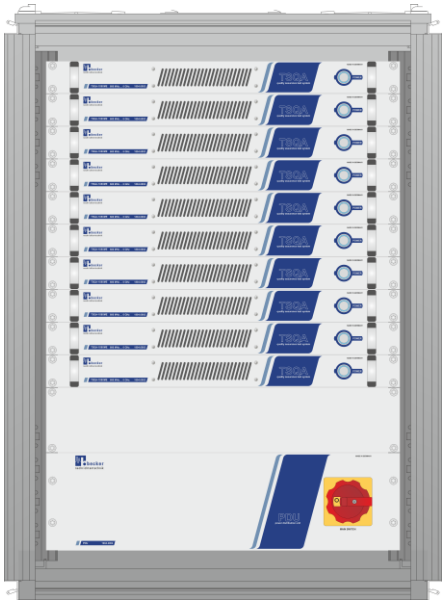
becker nachrichtentechnik

TSQA-80XME

80 Channel 500 mW Precise High Power Automatic HTOL RF System, 300 MHz…6000 MHz

Features

- compact 19”, 15 U design
- LAN remote interface
- Graphic User Interface (GUI)
- high level accuracy and stability
- high dynamic level measurement
- integrated CW signal source



Options:

- pulse modulator
- automatic test sequencing
- integrated PC control console

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. Details are described in JEDEC standard JESD22-A108.
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-80XME is a compact, automatic HTOL RF testing system, suitable for the frequency range 300 MHz… 6000 MHz in 50 ohms technology. It is built up with 10 identical sub devices, each offers 8 RF channels. Each RF output has an output power capability of up to +27 dBm (500 mW). The system offers 10 x 8 input channels in order to monitor the DUT RF 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 to DUT

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-80XME 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 TX to TX 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 of 60 dB type between ports to avoid this effect.

High Level Precision

TSQA-80XME 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 avoid 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. RF amplifiers as well as passive components with low insertion loss e.g. SAW / BAW filters and LTCC (Low Temperature Cofired Ceramics).

Harmonic Suppression

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-80XME has an adaptive harmonic filter for effective suppression of harmonics.

High Precision RF Level Detection

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

Versatile RF Test Signal Types

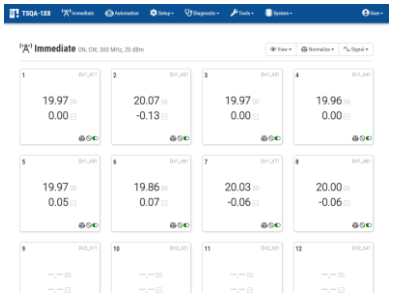
The TSQA-80XME features an internal CW source and an optional pulse modulator. The signal source and the pulse parameters can be also controlled via LAN remote interface.

Compact and Versatile

The entire TSQA-80XME with 80 output RF power and 80 measurement channels is realized as 19" rack with a total height of 15 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.



GUI appearance (example)

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.

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.

Option Automatic Test Sequencing

The Automatic Test Sequencing option reduces significantly the number of operator interventions. The operator defines all test parameters before starting the test: E.g. test duration, warm up time, insertion loss limits. After that the system runs autonomously over the entire test time, displaying test status and statistics and writing protocol data for later analysis.

In order to allow optimal failure analysis the system offers the possibility to take off the RF stress from failed DUTs individually and immediately after the failure occurs.

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

Option Integrated PC Control Console

On customer request the TSQA-80XME can be delivered with an integrated control PC. It is installed in a 1 U drawer.

Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number of outputs	n_{DUT}		80			
low frequency	f_{min}		300	400	MHz	
high frequency	f_{max}	6000			MHz	
min. output power	$P_{TX\ MIN}$			-20	dBm	
max. output power	$P_{TX\ MAX}$		+27		dBm	
ALC resolution	ΔP_{OUT}			0.05	dB	
output power accuracy	dP_{OUT}		±0.2		dB	CW, RMS detection
harmonics	d		-30		dBc	f = 3 GHz, P_{TX} = +23 dBm
output isolation	S_{23}		-60		dB	full gain
number of inputs	n_{IN}		80			power measurement
detection			RMS			CW (continous wave)
			Peak			envelope
measuring level range	$P_{RX\ MIN}$			-15	dBm	RF level measurement inputs
measuring level range	$P_{RX\ MAX}$	+15			dBm	
abs. meas. accuracy	ΔP_{RX}		±0.3		dB	RMS detection
rel. meas. accuracy*	dP_{RX}		±0.2		dB	DUT I.L. < 2 dB
RF connectors	X_{RF}		SMA female			outputs and inputs
CW signal source						
low frequency	f_{min}			300	MHz	
high frequency	f_{max}	6000			MHz	
frequency resolution	Δf_{GEN}		10		kHz	
frequency accuracy	df_{GEN}		±2.5		ppm	
Pulse modulator option						
pulse length range	t_W	577		2300	µs	
Period range	t_P	4.6		1000	ms	

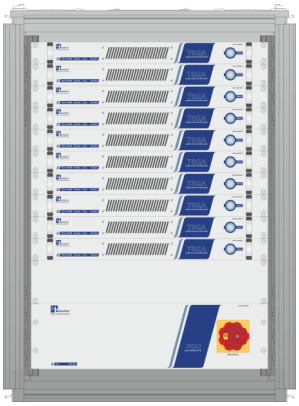
* After zeroing, I.L. < 2 dB

Common Specifications

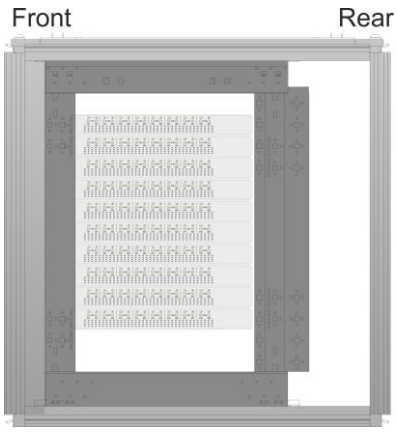
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	u_{AC3P}	90		260	V	50 / 60 Hz
power consumption	P		100		W	
power plug	X_{AC1P}		type „F“ CEE7/4			
power cable length	L		5		m	system to power plug
dimensions	W x H x D		approx. 600 x 800 x 800		mm	19”, 15 U
weight			80		kg	
remote interface			RJ45 10/100BaseT			ASCII commands
operating temp. range	T_o	+20		+30	°C	within specification
storage temp. range	T_s	-40		+70	°C	
Product conformity						
Electromagnetic compatibility	EU: in line with EMC directive (2014/30/EC)					applied harmonized standards: EN 61326-1 (for use in industrial environment), EN 61326-2-1, EN 55011 (class B), EN 61000-3-2, EN 61000-3-3
Electrical safety	EU: in line with low voltage directive (2014/35/EC)					applied harmonized standard: EN 61010-1

Ordering Information			
	TSQA-80XME	P/N: 1804.6102.1	RF connectors on right side
	TSQA-80XME	P/N: 1804.6102.2	RF connectors on left side
Option pulse modulator	TSQA-80XME-P	1804.6102.O1	
Option Automatic Test Sequencing	TSQA-80XME-TS	1804.6102.O2	
Option Integrated drawer with control PC		1804.6102.O3	

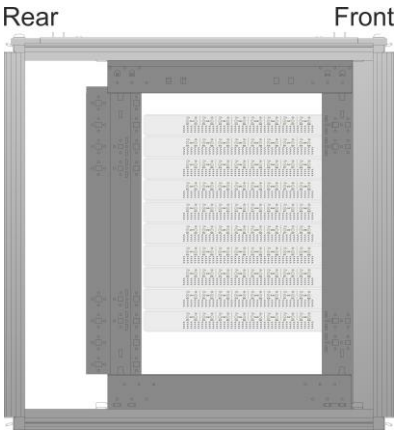
Appearances



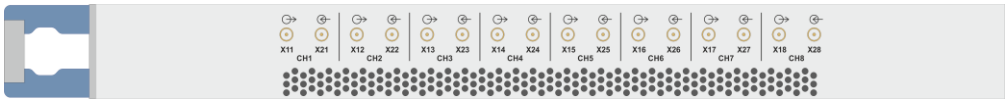
Front side



Var. 1 (RF connectors on right side)



Var. 2 (RF connectors on left side)



RF connector arrangement of one HTOL section (Var. 1)

Related Products

Product	Description	P/N
TSQA-80PME	80 Channel 10 W Precise Automatic HTOL RF Testing System, 300 MHz…6000 MHz	1804.6302
TSQA-80XME	80 Channel 500 mW Precise Automatic HTOL RF Testing System, 300 MHz…6000 MHz	1804.6102
TSQA-1X80PM	80 Channel 2.5 W Precise Automatic HTOL RF Testing System, 20 MHz…3000 MHz	1606.1012
TSQA-1X16PM	16 Channel 2.5 W Precise Automatic HTOL RF Testing System, 20 MHz…3000 MHz	1606.1027
WSDU-1X232	232 Channel 125 mW HTOL RF Testing System, 350 MHz…2500 MHz	1004.1002