

TSQA-1X80PM

80 Channel 2.5 W Precise Automatic HTOL RF Testing System, 20 MHz...3000 MHz

Features

- wideband
- automatic test procedure
- high output level accuracy
- high measurement accuracy
- compact 19", 43 U design
- LAN remote interface
- web control interface
- optional pulse signal mode

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-1X80PM is a compact, automatic HTOL RF testing system, suitable for the frequency range 20 MHz...3000 MHz in 50 ohms technology. It offers 80 RF channels with up to 3 watts output power per channel, translating to 2.5 W at the input of the DUT.

For connection of DUTs, the TSQA-1X80PM offers two RF panel terminals optionally located on the right or the left side dependant of location of the oven.

Each panel has 40 outputs and 40 inputs. 160 RF cables with 1 m length for connecting of DUTs are part of delivery.

The TSQA-1X80PM implements software for automatic testing of e.g. electronic components like semiconductors or SAW filters. It allows the configuration of up to five test frequencies, the insertion loss of RF cables and the level tolerances at the output of the DUTs. The system sequences automatically through all 80 DUTs and verifies that signal levels are within specification.

Integrated RF Signal Source

The integrated signal source generates CW signals over the full frequency range with high level and frequency stability.

Optional a pulse modulator can be installed to generate pulsed signals similar to GSM. Repetition rate and pulse length are configurable in a wide setting range.

Flexible Control Interfaces

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 allows the remote operation of the system without any additional

effort of application software development and regardless of a remote location.

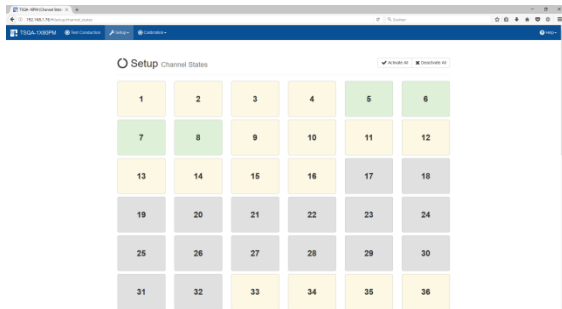


Figure shows Setup Menu of the web-interface

Easy Maintenance

The TSQA-1X80PM features a very modular design for easy maintenance. Every module can be replaced by unfastening the screws on the front panel and removing the RF cables on the rear side of the module. Voltage supply and data bus connections do not require any manual wiring when modules are swapped.

System Self-Monitoring

The system can run without human intervention during entire test periods of multiple months. It contains automatic self-checking, output power monitoring with automatic adjustment in case of deviation and logging of errors.

Software Functionalities

- **Up to 5 Test Frequencies**

The software allows the entry of up to 5 test frequencies. All DUTs are cyclically exposed to these RF frequencies and checked simultaneously. Power and dwell time can be configured for each frequency individually.

- **ALC (Automatic Level Control)**

The RF power levels at the input of the DUTs are monitored continuously for each channel. In

case of any deviation the power level will be corrected automatically. To avoid level overshoots, the ALC algorithm uses a smooth transition.

- **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.

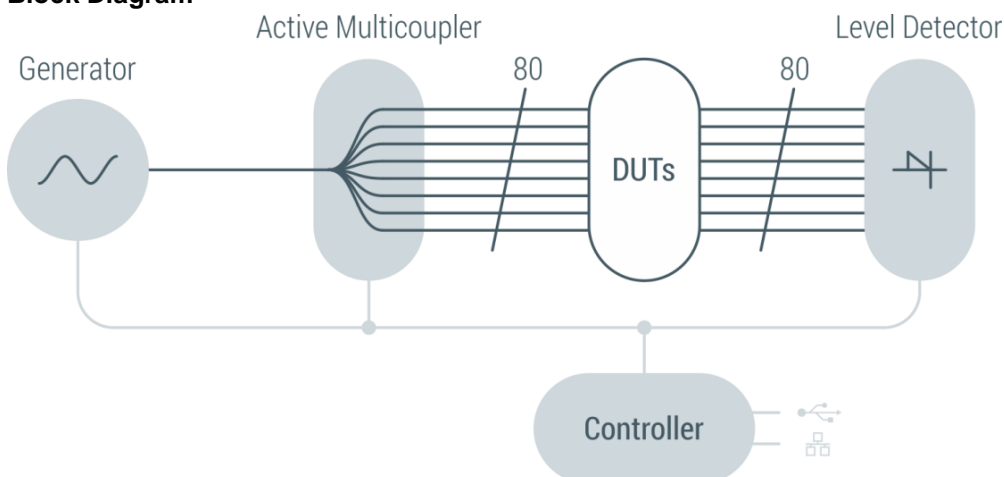
- **Transparent Operation**

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.

Block Diagram



Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number of channels	n_{DUT}		80			
low frequency	f_{min}			20	MHz	
high frequency	f_{max}	2800	3000		MHz	
RF signal type		CW/pulse (continuous wave/pulse)				depending on variant
output power accuracy	dP_{OUT}		± 0.3	± 1.0	dB	
settable power range	P_{OUT}	+10		+35	dBm	actual function depends on hardware limits
max. output power	P_{MAX}	+33.5	+34.5		dBm	$f \leq 2200$ MHz, at panel interface
	P_{MAX}	+30.5	+31.5		dBm	$f > 2200$ MHz, at panel interface
min. output power	P_{MIN}			+10	dBm	CW
	P_{MIN}			+15	dBm	PULSE*
harmonics	d		-30		dBc	
output isolation	S_{23}		-80		dB	adjacent channels, full gain
measuring accuracy	S_{21}		± 0.3	± 1.5	dB	after zeroing, I.L. < 2 dB, CW
RF connectors	n_{OUT}	80				RF outputs
	n_{IN}	80				RF inputs
	X	SMA female				side panel
number of RF cables	n_{cable}		160		1	to/from DUTs
length RF cables	l_{cable}		1		m	RG316/U
pulse modulator option						
pulse length range	t_{pulse}	565		2300	μs	variants 3 and 4
period range	t_{period}	4.6		1000	ms	variants 3 and 4
detection		RMS and peak power				variants 3 and 4
measuring accuracy	S_{21}		± 0.5			GSM pulses*, variants 3 and 4

* $t_{pulse} = 565 \mu s$, $t_{period} = 4.6$ ms (duty cycle 0.125)

Common Specification

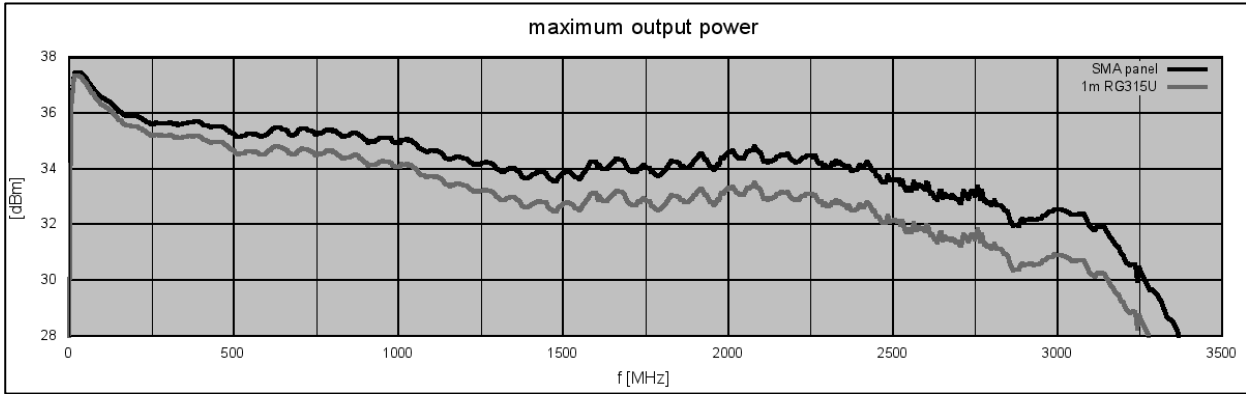
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	U_{AC}	90	230	260	V	50 / 60 Hz
power consumption	P_{AC}		1.5		kW	
power plug		type „F“ CEE7/4				
dimensions	W x H x D	approx. 600 x 2005 x 600			mm	19", 43 U
position RF_IN panel	h_{IN}		110		cm	from floor, RF input 1...80
position RF_OUT panel	h_{OUT}		145		cm	from floor, RF output 1...80
cable length to DUT	l_{IN}		1		m	from rack to DUT
cable length to DUT	l_{OUT}		1		m	from rack to DUT
weight	m		200		kg	
remote interface	X_{RM}	RJ45 10/100BaseT				ASCII commands
operating temp. range	T_o	+20		+30	$^{\circ}C$	within specification
storage temp. range	T_s	-40		+70	$^{\circ}C$	
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		



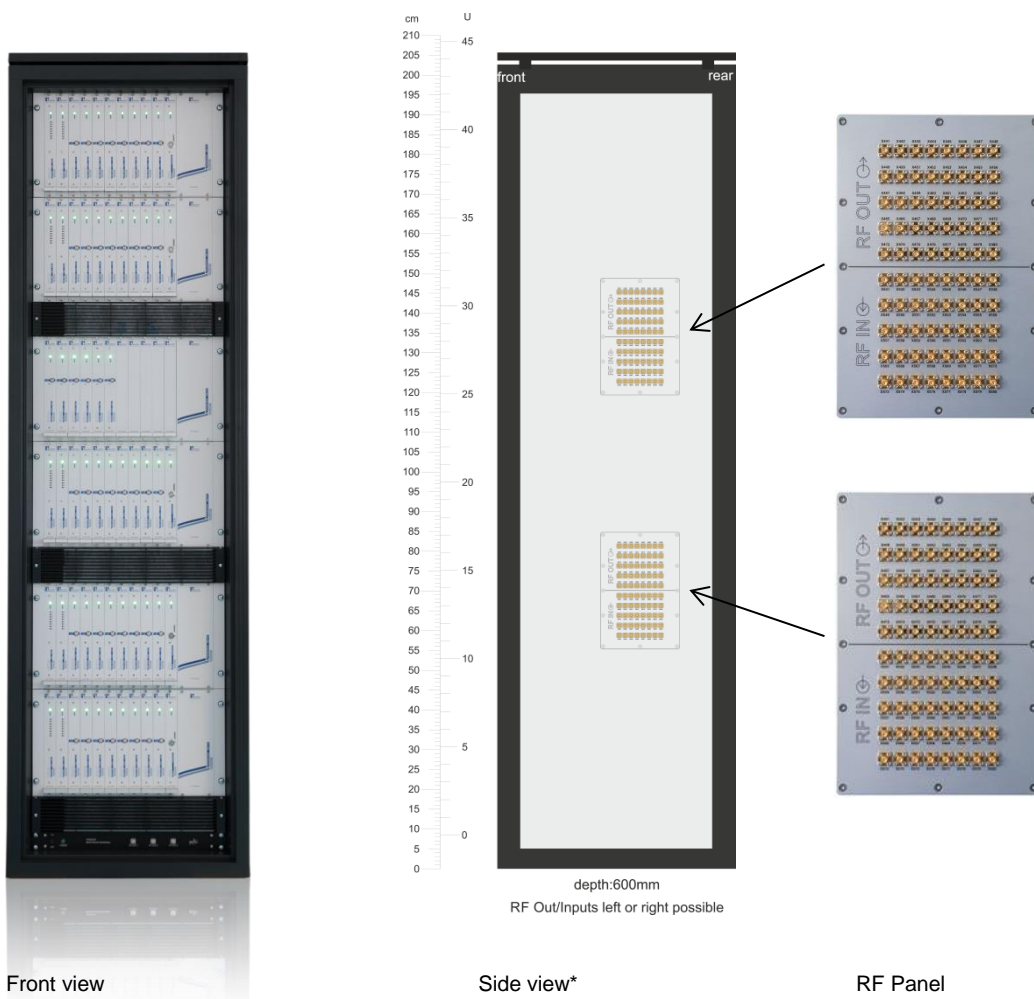
Ordering Information

Designation	P/N:	Description
TSQA-1X80PM	1606.1012.1	CW mode, RF connector panel on the right side
TSQA-1X80PM	1606.1012.2	CW mode, RF connector panel on the left side
TSQA-1X80PM	1606.1012.3	CW and pulse mode, RF connector panel on the right side
TSQA-1X80PM	1606.1012.4	CW and pulse mode, RF connector panel on the left side

Maximum Output Power (typical values)



Appearances



Side view shows variant with RF connectors right for oven position on the right side.



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
TSQA-1X4AP	4 Channel 16 W RF Precise RF Power Source 300 MHz...3000 MHz	1606.1202
TSQA-1X8PE	8 Channel 10 W Precise RF Power Source, 300 MHz...6000 MHz	1804.6502
TSQA-1X8XE	8 Channel 500 mW RF Precise RF Power Source, 300 MHz...3000 MHz	1804.6402

