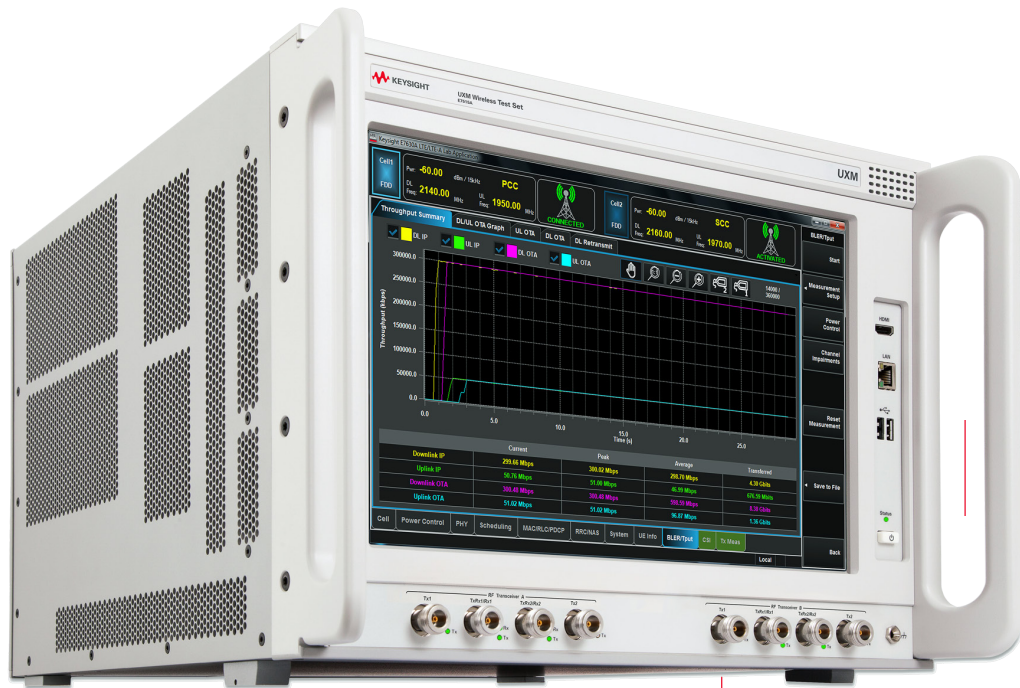


Keysight E7515A UXM Wireless Test Set



[Data Sheet](#)

Make a Clear Call

The team looks to you: will a new chipset or UE pass the crucial tests? Clarity comes from accumulated insights, and that's the idea behind the Keysight Technologies, Inc. UXM wireless test set. The UXM is the most highly integrated signaling test set created for functional and RF design validation in the 4G era and beyond. It provides the capabilities you need to test the newest designs, delivering LTE-Advanced category 7 now and handling increasingly complex test cases in the future. When the team counts on you, count on the UXM to help you assess design readiness with greater confidence and make a clear call.

Definitions and Conditions

Specification

Specifications describe the performance parameters covered by the product warranty and are valid from 15 to 35 °C unless otherwise noted.

Typical

Typical describes additional product performance information that is not covered by the product warranty. It is performance beyond specifications that 95 percent of the units exhibit with a 95 percent confidence level. This data, shown in italics, does not include measurement uncertainty, and is valid only at room temperature, 23 °C.

Nominal

Nominal values indicate expected performance, or describe product performance that is useful in the application of the product, but are not covered by the product warranty.

The test set will meet its specifications when

- The test set is within its calibration cycle
- The test set has been stored at an ambient temperature within the allowed operating range for at least two hours before being turned on; if it had previously been stored at a temperature range inside the allowed storage range, but outside the allowed operating range
- The test set has been turned on for at least 30 minutes

Vector Signal Analyzer Performance

Frequency and time specification	
Operating frequency range	
E7517A-504	300 MHz to 3.9 GHz
E7515A-506	300 MHz to 6.0 GHz
Frequency setting resolution	100 kHz
Frequency accuracy	See Timebase specifications
VSWR all RF inputs	
300 MHz to 2.0 GHz	1.4 nominal
> 2.0 to 5.0 GHz	1.5 nominal
> 5.0 to 6.0 GHz	1.8 nominal
Amplitude and range specifications	
CW level accuracy (-65 to +8 dBm)	
300 MHz to 3.5 GHz	± 0.5 dB typical
> 3.5 to 6.0 GHz	± 0.8 dB typical
Level flatness	± 0.3 dB typical over 100 MHz bandwidth
Noise floor	
For combined Tx and Rx	< -140 dBm/Hz nominal
For separate Tx and Rx	< -150 dBm/Hz nominal
Residual responses	
< -100 dBm	< -10 dBm nominal
< -90 dB below power setting	< -10 dBm nominal
Spurious responses	
300 MHz to 3.3 GHz	< -55 dBm nominal
> 3.3 to 6.0 GHz	< -40 dBm nominal
Inherent EVM, input signal	
-39 to +30 dBm, 20 MHz, 64QAM OFDM	2% RMS typical over 20 MHz bandwidth
Phase noise	-90 dBc/Hz at 10 kHz offset nominal
Maximum CW input level at connectors	
TxRx1 and TxRx2	+33 dBm nominal

Vector Signal Generator Performance

Frequency and time specification	< +30 dBm nominal
Operating frequency range	
E7515A-504	300 MHz to 3.9 GHz
E7515A-506	300 MHz to 6.0 GHz
Frequency setting resolution	100 kHz
Frequency accuracy	See Timebase specifications
VSWR all RF inputs	
300 MHz to 2.0 GHz	1.4 nominal
> 2.0 to 5.0 GHz	1.5 nominal
> 5.0 to 6.0 GHz	1.8 nominal
Amplitude and range specifications	
CW output power range	
TxRx1, TxRx2	-110 to -7 dBm nominal
Tx1, Tx2	
300 MHz to 5.0 GHz	-110 to +7 dBm nominal
5.0 to < 6.0 GHz	-110 to +5 dBm nominal
CW output level accuracy (TxRx1, TxRx2 and Tx1, Tx2)	
300 MHz to 3.5 GHz	± 0.5 dB typical
> 3.5 to 6.0 GHz	± 0.8 dB typical
Output level setting resolution	0.1 dB
Output level settling time	± 1.0 dB within 25 μ s nominal
Output flatness	± 0.3 dB typical over 100 MHz bandwidth
Residual EVM: peak-to-average ratios less than 15 dB	2% typical over 20 MHz bandwidth
Adjacent channel power	≤ -45 dBc nominal (or the absolute limit of -50 dBm/MHz)
Carrier feed through (IQ mismatch)	< -40 dBc of DAC full scale nominal
Harmonics	
Attenuation of 2 nd harmonic TxRx1, TxRx2	
300 MHz to 4.0 GHz, power < -10 dBm	> 30 dB nominal
> 4.0 to 6.0 GHz, power < -10 dBm	> 45 dB nominal
Attenuation of 2 nd harmonic Tx1, Tx2	
300 MHz to 4.0 GHz, power < 0 dBm	> 30 dB nominal
> 4.0 to 6.0 GHz, power < 0 dBm	> 45 dB nominal
Attenuation of 3 rd harmonic TxRx1, TxRx2	
300 MHz to 3.0 GHz, power < -10 dBm	> 40 dB nominal
> 3.0 to 6.0 GHz, power < -10 dBm	> 55 dB nominal
Attenuation of 3 rd harmonic Tx1, Tx2	
300 MHz to 3.0 GHz, power < 0 dBm	> 40 dB nominal
> 3.0 to 6.0 GHz, power < 0 dBm	> 55 dB nominal
Attenuation of non-harmonics TxRx1, TxRx2	
300 MHz to 6.0 GHz, -10 dBm > power > -40 dBm	> 40 dB nominal
Attenuation of non-harmonics Tx1, Tx2	
300 MHz to 6.0 GHz, -10 dBm > power > -40 dBm	> 40 dB nominal
I/Q image rejection	< -40 dB in 20 MHz bandwidth nominal
Phase noise	-90 dB at 10 kHz offset nominal
Maximum reverse power	
TxRx1, TxRx2	< +33 dBm nominal
Tx1, Tx2	< +30 dBm nominal

Instrument Specifications

Input power requirements	
Voltage and frequency	100/120/220/240 VAC, 50/60 Hz, nominal
Power consumption	1100 W max
Size and weight	
Dimensions (H x W x L)	
Without feet and handles	305 mm x 435 mm x 445 mm
With feet and handles	321 mm x 435 mm x 504 mm
Weight	
1-cell	33 kg
2-cell	36 kg
Operating temperature	5 to 45 °C, 30 g/m ³ absolute humidity, 5 to 85% non-condensing relative humidity
Storage temperature	40 to +65 °C, 50 g/m ³ absolute humidity, 5 to 85% non-condensing relative humidity
Altitude	Up to 2000 m
Radiated leakage due to RF generator	< 2.5 μ V induced in a resonant dipole antenna one inch from any surface except the underside and rear panel set RF generator output frequency and output level of -40 dBm typical
EMC	<p>Complies with European EMC Directive 2004/108/EC</p> <ul style="list-style-type: none"> - IEC/EN 61326-1 - CISPR Pub 11 Group 1, class A - AS/NZS CISPR 11 - ICES/NMB-001 - This ISM device complies with Canadian ICES-001. <p>Cet appareil ISM est conforme a la norme NMB-001 du Canada.</p> <ul style="list-style-type: none"> - 급 기기 (업무용 방송통신기 자재) <p>이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.</p>
Mechanical resistance	EN60068-2-6, EN60068-2-27, EN60068-2-64
Safety	<p>Complies with European Low Voltage Directive 2006/95/EC</p> <ul style="list-style-type: none"> - IEC/EN 61010-1, 3rd edition - Canada: CAN/CSA C22.2 No. 61010-1012 - USA: UL std no. 61010-1, 3rd Edition - Acoustic statement (European Machinery Directive 2002/42/EC, 1.7.4.2u) <p>Acoustic noise emission, LpA <70 dB, Operator position, Normal operation mode, Per ISO 7779</p>
RF connections	
Tx1, Tx2	N-type female, 50 Ω nominal
TxRx1, TxRx2	N-type female, 50 Ω nominal
Other connectors and interfaces	
Display/Manual user interface	15.4 in (391 mm) active matrix, color, 1280 x 800 pixel resolution TFT-LCD flat panel display with touch panel controls; single-touch capacitive touch-screen; HDMI port
USB ports	
Front panel	2 USB 2.0 ports
Rear	2 USB 2.0 ports
LAN (local area network) ports	<p>One external, 1 Gbps, LAN port rear panel</p> <p>One external, 1 Gbps, LAN port front panel</p>

Instrument Specifications (continued)

Digital data acquisition	
General memory budgets and considerations	
RCB available memory	512 MB
Memory allocation for digital acquisition	256 MB
Basic acquisitions	
IQ data acquisition channels	2 (one per BS Rx antenna)
Samples rates	30.72 MSa/s, 122.88 MSa/s
Maximum sample storage	32 MSa per BS Rx antenna
Fixed size buffers per channel and allocation	
Single or dual channel (RF Carrier)	30.72 MHz: 1092 ms
Single or dual channel (RF Input)	122.88 MHz: 273 ms
Maximum digitalized data size	128 MB per channel
Trigger control	Immediate, event-based Ethernet
Source selection	
RF Input (1 & 2)	100 MHz bandwidth (122.88 MSa/s)
RF Carrier (1 & 2)	20 MHz bandwidth (30.72 MSa/s)
Channel emulation	
Antenna configuration	1x1, 1x2, 2x2, 4x2
3GPP LTE Rel 8 for RF fading profiles	Bypass EPA 5 EVA 5 EVA 70 ETU 70 ETU 300 HST CQI
Gaussian noise generator	
Independent channels	2
Antenna output	No channel Channel 1 Channel 2 Channel 1 and 2
Power spectral density	
Combined Tx and Rx	-189 to -81 dBm/Hz
Separate Tx and Rx	-179 to 71 dBm/Hz
Digital frequency offset	-49.6 to 49.6 MHz
Bandwidth selection	
LTE	1.08, 2.7, 4.5, 9.0, 13.5, 18.0 MHz
Continuous wave generation	
Independent channels	2
Antenna output	No channel Channel 1 Channel 2 Channel 1 and 2
Digital frequency offset	-50 to 50 MHz

Instrument Specifications (continued)

Arbitrary wave generation	
Independent channels	2
Antenna output	No channel Channel 1 Channel 2 Channel 1 and 2
Peak envelope power	
Combined (300 MHz to 6 GHz)	-110 to +7 dBm
Separate (300 MHz to 5 GHz)	-110 to +7 dBm
Separate (> 5 to 6 GHz)	-110 to +5 dBm
Maximum waveform size	64 MB per channel
Time base	
Standard frequency reference	
Maximum frequency drift	± 0.7 ppm/year
Short term stability	± 0.005 ppm
Warm-up time	1 minute to be ± 0.1 ppm at 25 °C
External clock time reference	
Connector type	SMA connector SYNC IN, rear panel
Frequency	
Sine wave	10 MHz
Square wave (greater than 40% ON duty cycle)	10 MHz
Input voltage range	0.4 to 2 Vpp
Impedance	50 Ω nominal
Format alignment trigger	
External connector	SMA Channel 0
Trigger duration configurable according format LTE	Where samples resolution = $(1/30.72) \times 10^{-6}$ 0 to 30719 samples
Trigger offset delay	In terms of 1/6 of the period of the sample
Trigger period configurable according format LTE	1 to 10240 packets
Generic trigger	
External connector	SMA Channel 1, 2, 3 (Input, Output)
Arm channel for receiving trigger	Only input channels
External trigger generation	Only output channels
Warranty and calibration	
Standard warranty	Three years
Recommended calibration cycle	One year

LTE FDD Measurements

Modulation and channels	
Signal structure	FDD frame structure Type 1
Signal bandwidth	1.4, 3, 5, 10, 15, 20 MHz
LTE power measurements	
Level range (BW 20 MHz, OFDM, 64QAM)	-45 to +30 dBm, RMS
LTE channel power accuracy	
300 MHz to 3.5 GHz, input amplitude	± 0.5 dB nominal
≥ 3.5 to 6.0 GHz	± 1.3 dB nominal
LTE adjacent channel power	
E-UTRA	> 50 dB nominal
UTRA	> 52 dB nominal
LTE spectrum emissions mask	< -60 dB nominal
LTE occupied bandwidth	
1.4, 3 MHz	30 kHz nominal
5, 10 MHz	100 kHz nominal
15, 20 MHz	100 kHz nominal
LTE Tx On/Off level accuracy	± 1.5 dB nominal
LTE frequency and EVM	
Frequency error	± 15 Hz nominal
EVM	See General Analyzer specification

LTE TDD Measurements

Modulation and channels	
Signal structure	FDD frame structure Type 2
Signal bandwidth	1.4, 3, 5, 10, 15, 20 MHz
LTE power measurements	
Level range (BW 20 MHz, OFDM, 64QAM)	-45 to +30 dBm, RMS
CW channel power level accuracy	
300 MHz to 3.5 GHz, input amplitude	± 0.5 dB nominal
> 3.5 to 6.0 GHz	± 1.3 dB nominal
LTE adjacent channel power	
E-UTRA	> 50 dB nominal
UTRA	> 52 dB nominal
LTE spectrum emissions mask	< -60 dB nominal
LTE occupied bandwidth	
1.4, 3 MHz	30 kHz nominal
5, 10 MHz	100 kHz nominal
15, 20 MHz	100 kHz nominal
LTE Tx On/Off level accuracy	± 1.5 dB nominal
LTE frequency and EVM	
Frequency error	± 15 Hz nominal
EVM	See General Analyzer specification

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