

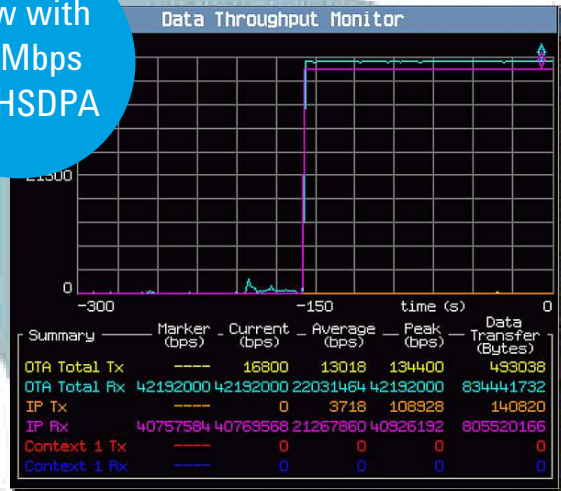
# E6703H W-CDMA/HSPA Lab Application

For the E5515C/E (8960)  
Wireless Communications Test Set

## Technical Overview



Now with  
42 Mbps  
DC-HSDPA



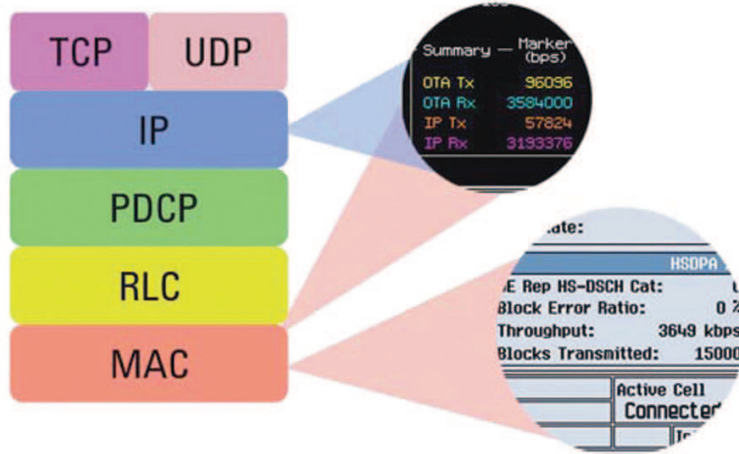
Combining the benefits of W-CDMA/HSPA network emulation with Agilent's global leadership in analysis technologies, the E5515C/E wireless communications test set and the E6703H lab application provide mobile development engineers with a single desktop instrument—helping you accelerate development and get better devices to market sooner.



Develop, integrate, and validate devices at data rates up to:

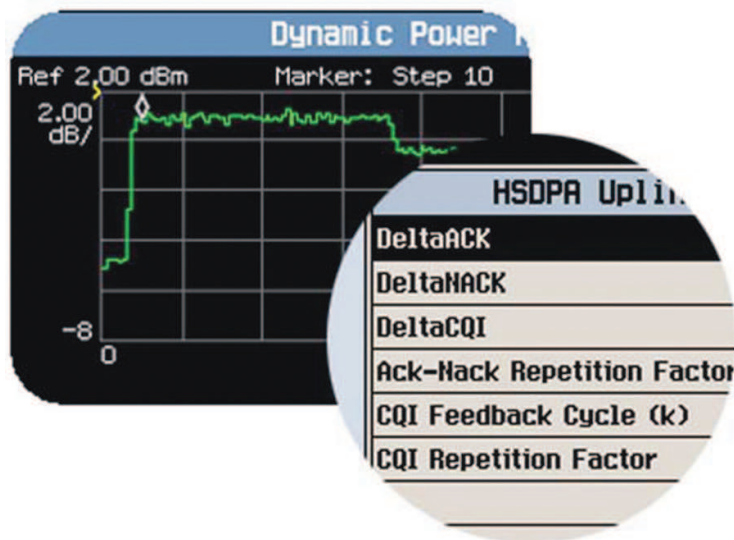
- 42 Mbps (DC-HSDPA)
- 21 Mbps (HSPA+)
- 14.4 Mbps (HSDPA)
- 11.5 Mbps (HSUPA)

With the Agilent Technologies E6703H W-CDMA/HSPA lab application, developers have the only instrument available that provides a systematic approach to root-cause analysis of high throughput issues in the mobile protocol stack; from MAC to IP.



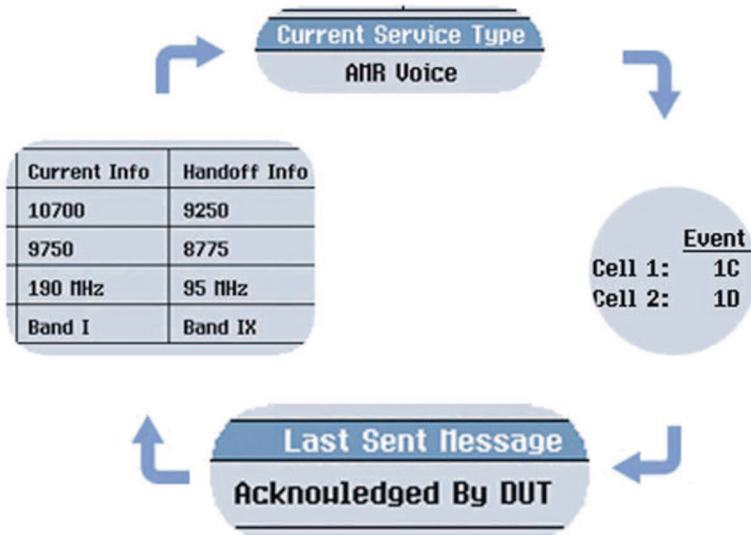
### Get to RF conformance faster

The E6703H is the only solution available providing both signaling variables and measurements for testing 3GPP TS34.121 Sections 5, 6, 7, and 9. Others can emulate HSPA, but only the Agilent solution drives the mobile into the correct state for the latest HSPA testing required by 3GPP.



### Quickly test any design change

With support for voice, video, short message service (SMS), multi-media messaging service (MMS), cell broadcast SMS (CBSMS), circuit-switched data, and packet data call connections, design changes in anything from RF to TCP can be quickly validated with a complete regression test of mobile functions right at your desk.



## Helping You Get Your Job Done Faster


### Fast and flexible signaling— with you in control of network operations

Our network emulation is designed to make connecting calls fast and simple—and give you choices. We have pulled some of the most commonly requested parameters up from the protocol stack, providing many different connection scenarios without requiring you to fully understand the 3GPP stack and a complex scripting language. The E6703H delivers the control you need to get your job done faster.


HSDPA RB Test Mode Settings	Value
User Defined Number of Active HS-PDSCHs	5
User Defined Transport Block Size Index	48
User Defined Modulation Type	16QAM
User Defined Inter-TTI Interval	1
User Defined Number of HARQ Process Setup Timing Int	6
User Defined UE IR Buffer Allocation	Sintersearch
User Defined Explicit UE IR Buffer Allocation	Sintrasearch
Domain	T3212 Periodic Location Domain
	Default DPCH Offset
	CTCH Allocation Period
	CBS Frame Offset
Network Mode of	50 frames
	0 frames
	1

### The world's wireless applications brought right to your fingertips


Agilent lab applications bring testing and tuning end-user applications right to your desk—without limiting how far your device may search when looking for real content. With our industry-leading SMS/MMS/cell broadcast messaging capabilities, live end-to-end video conferencing, and blazing fast packet connections to the Internet over RF, you have the capability to test most mobile applications fully without leaving your office.



MP3




WWW




Streaming

Cell Broadcast Message 3 Setup	Value
Geographical Scope	Cell / Normal
Message Code	0
Update Number	0
Message Identifier	0
Data Coding Scheme	Language
Data Coding Scheme	English
Data Coding Scheme	1
Content	Text1



MMS



Voice

### Developing more than just W-CDMA/HSPA devices?

#### Just hook it up and go!

If your development needs go beyond W-CDMA/HSPA, with additional firmware that same box on your desk can connect calls from GSM to EDGE Evolution and everything in between. What's more, Agilent leads the industry in support of 2G and 3G solutions for cdma2000®, 1xEV-DO, TD-HSUPA, and DC-HSDPA. Contact your Agilent sales engineer to learn how the E5515C/E test set gives you the flexibility to adapt quickly to emerging standards and technologies.

Get started with the W-CDMA/HSPA lab applications today at;

[http://wireless.agilent.com/rfcomms/refdocs/wcdma/wcdma\\_getting\\_started.html](http://wireless.agilent.com/rfcomms/refdocs/wcdma/wcdma_getting_started.html)



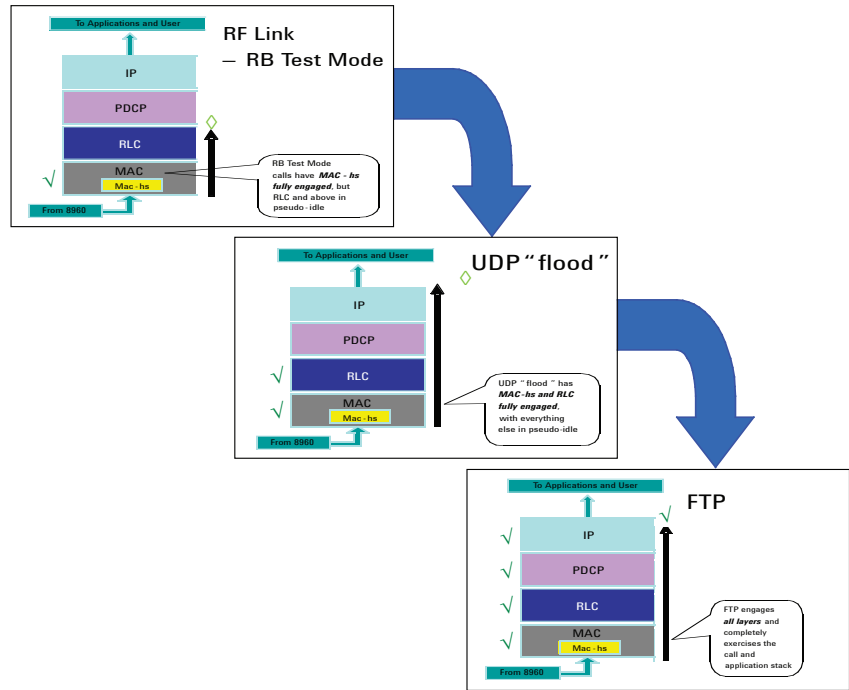
# Find Design Issues Earlier, Resolve Them Faster

## Functional test analysis

Reduce development and verification cycle time by systematically engaging mobile device layers “up the stack” to find design problems early—before they are found by your customers.

Validate a phone’s data throughput capability while using SMS, MMS, data transfer, video, or other 3G services, all in the presence of realistic network impairments.

Drive down defect resolution cost by finding complex hardware, protocol, and application related issues that are specific to how the phone will function on the network, early in the design cycle. All this for a price that is significantly less than traditional script-based test equipment.



## Base station emulation

From basic network settings like country code and cell ID, lab application variables for network emulation extend into such things as network operating mode, TMSI assignment, authentication, neighbor list management, and PDP context rejection; giving you the flexibility you need.

SIB11 Cell Info List	Current
Compressed Node Info	Calling Party Number
	Calling Party Number Inclusion
	Calling Party Number
	Number Type

## The pulse of mobile/network interactions

Wireless Protocol Advisor software gives you all messages for the mobile and network from MAC layer all the way to IP! And, with triggering and filtering functionality, you can set up troublesome scenarios that fail intermittently on Friday and come back Monday morning with a bounded and focused protocol log of exactly what happened surrounding the particular issue.

176	<- Rev/Up	RLC	RLC AM PDU
177	For/Dow...	RLC	RLC AM PDU
178	For/Dow...	MAC	DCCH
179	<- Rev/Up	RRC	uplinkDirectTransfer
180	<- Rev/Up	GMM/SM	GMM/SM - Activate PDP Context Request
181	For/Dow...	RRC	radioBearerSetup
182	For/Dow...	RLC	RLC UMD PDU
183	For/Dow...	MAC	DCCH

## RF conformance—mandatory in GCF

Today, with more availability of competitive mobile devices, network operators are becoming very selective and demanding validation. With the largest and most compliant set of RF measurements available among one-box-testers, the 8960 (E5515C/E) can get you into validation sooner. [http://wireless.agilent.com/rfcomms/refdocs/wcdma/wcdma\\_meas\\_navigation.html](http://wireless.agilent.com/rfcomms/refdocs/wcdma/wcdma_meas_navigation.html)

2A, 5.9A, and 5.10A with QPSK  
 5.7A and 5.13.1A with QPSK  
 6.3A with 16QAM  
 5.2A, 5.9A, and 5.10A with 16QAM  
 5.7A and 5.13.1A with 16QAM

Waveform Qual. EVM 6.16 %  
 Freq Error -2.46 Hz  
 Origin Offset -41.6 dB

## E6703 Family of Lab Applications

**E6703H** is our latest application release for the industry leading call box and the right choice for R&D engineers needing world class functionality in a single instrument. The E6703H added several new capabilities including:

- DC-HSDPA test modes and IP data support for 42 Mbps downlink
- LTE/3G interRAT handover
- Band XIX, XX, XXI support
- Fast dormancy
- IPv6 router

**E6703H with E6720A-003** is our emerging high-performance application. The Annual Contract is designed for engineers who need early access to leading-edge functionality such as HSDPA DL MIMO.

**For a complete comparison of our 8960 W-CDMA/HSPA products, please see:**

[http://www.home.agilent.com/upload/cmc\\_upload/All/E1963a\\_E6703x\\_FeatureComparison.pdf](http://www.home.agilent.com/upload/cmc_upload/All/E1963a_E6703x_FeatureComparison.pdf)

## Technical Specifications

These specifications apply to an E5515 mainframe with Option 003 installed when used with the latest shipping version of the E6703H lab application.

The above application also includes functionality described within the latest shipping version of E1963A W-CDMA test application with firmware. Please refer to the E1963A data sheet for details and specifications for all functionality covered within the E1963A at: <http://www.agilent.com/find/E1963A>

Specifications describe the test set's warranted performance and are valid for the unit's operation within the stated environmental ranges unless otherwise noted.

*Supplemental characteristics are intended to provide typical, but non-warranted, performance parameters that may be useful in applying the instrument. These characteristics are shown in italics and labeled as "typical" or "supplemental." All units shipped from the factory meet these typical numbers at +25 °C ambient temperature without including measurement uncertainty.*

## W-CDMA RF analyzer (measurements only)

### Change of TFC

#### Measurement method:

The measured results include the step-down and step-up relative power, along with the step-down and step-up error, for all symmetric reference measurement channels supported

#### Input center frequency ranges:

800 to 1000 MHz  
1700 to 1990 MHz

#### Input power level range:

–61 to +28 dBm

#### Change of TFC relative measurement accuracy:

< +3.0 dB for power range < 26 dB

#### Measurement interval:

617  $\mu$ s (= 1 timeslot (667  $\mu$ s) – 25  $\mu$ s transient periods at either side of the nominal timeslot boundaries)

#### Measurement triggers:

Protocol and external

#### Temperature range:

+2 to +55 °C

#### Concurrency capabilities:

Change of TFC measurements cannot be made concurrently with other measurements

### Out of sync handling of output power

#### Measurement method:

The E6703H provides signaling and parameter configuration for this measurement, but requires use of an external analyzer to perform the required measurement

#### Input center frequency ranges:

800 to 1000 MHz  
1700 to 1990 MHz

#### Input power level range:

–61 to +28 dBm

#### Temperature range:

+20 to +55 °C

#### Concurrency capabilities:

Out of sync handling of output power measurements cannot be made concurrently with other measurements

## PRACH preamble analysis measurement

### Measurement method:

The measured results include the same results as IQ tuning (excluding PCDE) done on UE PRACH preambles; relative power versus chip is also included

### Measurement chip rate:

3.84 Mcps

### Frequency range:

800 to 1000 MHz  
1700 to 1990 MHz

### Input level range:

–25 to +28 dBm

### EVM measurement range:

Up to 35% EVM

### EVM measurement accuracy:

2.3% residual EVM +0.5% algorithm EVM error valid within +10 °C of the temperature at which the previous “Calibrate Measurements” was executed

### Frequency error measurement range:

+1 kHz

### Frequency error measurement accuracy:

+5 Hz

### Timing error measurement range:

+25 µs

### Timing error measurement accuracy:

+130 ns (0.5 chips)

### Measurement interval:

All results except relative power (user-selectable to one of two)

1067 µs (= PRACH preamble burst = (4096 chips)

1017 µs (= PRACH preamble burst – 25 µs transient periods at beginning and end of bursts = 3904 chips)

Relative power (not user-settable):

1067 µs (= PRACH preamble burst = (4096 chips)

### Trigger mode:

Auto, protocol, external, RF rise

### RF rise trigger:

Nominal trigger range = expected power setting +9 dB

### Temperature range:

+20 to +55 °C

## Reporting of CQI measurement

### Measurement description:

The channel quality indicator (CQI) value is a measurement report sent to the network by the UE indicating that for the data block just received, if the downlink channel had been formatted as indicated by the reported or lower CQI value, the HSDPA block error ratio for the channel would not have exceeded 10%.

The reporting of channel quality Indicator test has two parts, which are run in sequential order:

Part 1: Measure CQI variance

Part 2: Measure HSDPA BLER vs. CQI sense

### Measurement results:

Graphical and numeric results are provided for cumulative frequency distributions

Part 1 numeric results provided are:

- Downlink TF CQI
- CQI reports
- Median CQI
- CQI in range (%)
- Pass/Fail

Part 2 numeric results provided are:

- Downlink TF CQI
- Median CQI
- statDTXs
- Filtered ACKs
- Filtered NACKs
- Filtered ACKs + NACKs
- Filtered BLER (%)

The existing HBLER measurement is used in the Reporting of CQI measurement. See E1963A data sheet for more details

### Measurement interval:

Defined in 3GPP TS 34.121

### Trigger mode:

HS-DPCCH

### Temperature range:

+20 to +55 °C

### Concurrency capabilities:

Reporting of CQI measurements cannot be made concurrently with other measurements

## Option 004 digital bus

### Functionality:

Allows baseband, digital IQ data from the signal generator to be sent to an external N5106A PXB Baseband generator and channel emulator for fading and then returned to the test set for modulation

### Connector:

Rear panel, 50 pin high density

### Signal generator ALC mode:

Closed or open (default of closed); open loop mode must be used during fading to maintain the desired signal characteristics

### ALC open loop calibration:

Calibrates the RF source when operating in the ALC open loop mode; the accuracy remains valid with a +5 °C window of the temperature at which the calibration was performed

ALC open loop RF in/out composite absolute output level accuracy degradation (must add this to the main level accuracy specification for temperatures within +5 °C of the last ALC open loop calibration):

< +0.75 dB, –109 to –70 dBm/1.23 MHz,  
< +0.50 dB, –70 to –35 dBm/1.23 MHz,  
< +0.75 dB, –35 to –13 dBm/1.23 MHz

ALC open loop RF out only composite absolute output level accuracy degradation (must add this to the main level accuracy specification):

< +0.75 dB, –109 to –70 dBm/1.23 MHz,  
< +0.50 dB, –70 to –35 dBm/1.23 MHz,  
< +0.75 dB, –35 to –13 dBm/1.23 MHz

ALC open loop carrier feedthrough:

*Typically < –40 dBc, (nominal ambient < –47 dBc after IQ calibration)*

## General Specifications

### Dimensions:

(H x W x D): 235 mm x 425 mm x 629 mm

### Weight:

31.8 kg

### Display:

10.5 inches (26.7 cm), active matrix, color, liquid crystal

### Manual user interface:

Traditional front panel type or remote computer driven with graphical UI

### LAN port:

LAN 1 port (for firmware upgrades only): RJ-45 connector, 100 Mbps;

LAN 2 port (for high data throughput): RJ-45 connector, 100 Mbps (for E5515C) or 1000 Mbps (for E5515E)

LAN 3 port (for future use): RJ-45 connector, 1000 Mbps

### Operating conditions:

0 to +55 °C, 30 g/m<sup>3</sup> absolute humidity (95%/+32 °C, 28 percent/+55 °C relative humidity)

### Storage conditions:

-20 to +70 °C, 50 g/m<sup>3</sup> absolute humidity, non-condensing (90%/+65 °C relative humidity)

### Power:

88 to 135 Vac, 193 to 269 Vac, 50 to 60 Hz, typically 550 VA maximum

### Calibration interval:

2 years

### EMI:

Conducted and radiated interference meets CISPR-11, susceptibility meets IEC 1000-4-2, 1000-4-3, and 1000-4-4

### Electrical safety:

Comply with CAN/CSA 22.2 No. 61010-1-04, UL Std. 61010-1 (2nd Edition), and IEC 61010-1 (2nd Edition)

### Radiated leakage due to RF generator:

Typically < 2.5 μV induced in a resonant dipole antenna one inch from any surface except the underside and rear panel at set RF generator output frequency and output level of -40 dBm

### Spurious leakage:

Typically < 5 μV induced in a resonant dipole antenna one inch from any surface except the underside and rear panel at frequencies other than the RF generator output frequency and output level of -40 dBm

### Power consumption:

Typically 400 to 450 W continuous



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