

Keysight Technologies

E6702G cdma2000/IS-95/AMPS Lab Application

For use with the 8960 (E5515C/E) wireless
communications test set

Technical Overview

Call Setup Screen			
Inter-RAT	E-UTRAN / CDMA2000 Interworking Information		Call Parms
Ext EPC IP Addr	Evolved Packet Core (EPC) Connection Information		Cell 1 Power
192.168.1.60	External EPC Conn Status: Not Connected		-55.00
	Connected EPC IP Address:		dBm/1.23 MHz
Connect To External EPC	E-UTRAN / CDMA2000 Handoff Setup		Cell Band
	CS Fallback From E-UTRAN State: Off		US PCS
E-UTRAN/CDMA2k Handoff Setup	CS Fallback Mode: Normal		Channel
	E-UTRAN/CDMA2000 Handoff Setup		525
E-UTRAN Neighbor Config	CS Fallback From E-UTRAN State	Off	Protocol Rev
	CS Fallback Mode	Normal	6 (IS-2000-0)
			Radio Config
			(Fud3, Rvs3)
			S055 (Loopback
			FCH Service Option Setup
Close Menu			
	Active Cell	Sys Type: IS-2000	
	Idle	Logging: No Conn	
	ExtRef	Offset	L
			1 of 4

Key Features

- Data channel connectivity tests high-speed packet data connection to a network
- CDMA 1x Advanced capabilities including new radio configurations and service options (SO73 and SO75), smart blanking, early termination, and other enhanced measurements
- Hybrid mode support with full verification capabilities when used in conjunction with another E5515C/E running the E6706G 1xEV-DO lab application and the Software Concepts MOB-IP-SIM
- Ensure mobile applications and designs deploy as expected by utilizing the N5971A interactive functional test software for automating real-world user scenarios
- External protocol logging and analysis software finds and resolves difficult signaling functionality and timing issues faster
- Simulate two CDMA base station signals, giving you the flexibility to test soft and softer handoff capabilities
- Troubleshoot design issues or test setup problems with enhanced frame error rate measurement
- External, high-precision of digital fading when used with the Keysight Baseband Studio Channel Simulator
- Real-time Vocoder allows functional test of speech connections using the 13K, EVRC, EVRC-B, EVRC-WB, and EVRC-NW Vocoders
- InterRAT test such as cell selection/re-selection, CSFB from LTE to cdma2000, and RRC release with redirection (when used with E7515A UXM wireless test platform)

E6702G Functionality Overview

Meet aggressive time-to-market and production schedules

Growing demand for high-speed data services means the roll out of cdma2000 wireless devices is essential. The Keysight Technologies, Inc. E6702G cdma2000 lab application, combined with the E5515C/E (8960) test set provides the critical capabilities needed to verify and ensure quality RF performance in your cdma2000, IS-95, and AMPS devices. This lab application, designed for high-volume manufacturing and wireless device development, allows you to finalize product designs and minimize time-to-volume.

Comprehensive protocol support

The E6702G supports numerous protocol features to enable fast and accurate regression test of phones. For example, Service Option 033 support provides the ability for the test set to function as a live packet data network. Simply connect to an external server or the internet via the rear panel LAN port, and you can test packet data connections on IS-2000 mobile stations. Support for 1/8th rate traffic gating mode allows accurate talk time testing. Comprehensive SMS capability allows full testing of a mobile's SMS capabilities according to industry test standards. Other features include IS-2000 Release A protocol support, full hybrid mode test capability (in conjunction with another E5515C/E running the E6706G 1xEV-DO lab application), CDMA authentication capability, real time Vocoder that supports functional verification, and caller ID.

CDMA forward link emulation

Comprehensive signal generation capabilities including all applicable CDMA channels, modulation, and an AWGN source (1.8 MHz minimum bandwidth). Support is also included for the cdma2000 Release A forward link channels such as the F-BCCH and F-CCCH. Flexible user control of the forward link emulation is provided through easy-to-use front panel control and remote GPIB.

CDMA transmitter tests

- Maximum power
- Minimum power
- Multi-code waveform quality
- Handoff waveform quality
- Open loop power accuracy
- Open loop power calibration
- Access probe power
- Graphical access probe power
- Code domain power
- Gated power
- Code channel timing and phase
- Spurious emissions
- Time response of open loop
- DTX support
- Uplink
- Tx dynamic power

CDMA receiver tests

- Fundamental/traffic channel sensitivity
- Demodulation of F-FCH in multipath fading
- Demodulation of F-FCH in multipath fading with closed loop power control (FPC_Mode=000)
- Demodulation of F-FCH in multipath fading with outer loop and closed loop power control (FPC_Mode=000)
- Supplemental channel sensitivity
- Dynamic range
- Demodulation with AWGN
- Slotted paging channel MER

AMPS transmitter tests

- RF power output
- RF frequency and frequency error
- FM modulation limiting
- FM deviation and distortion
- Audio frequency response
- Audio distortion
- FM hum and noise
- SAT deviation and frequency error
- Compressor response
- Signaling tone frequency and deviation
- DTMF symbol, frequency, and deviation
- Wideband data deviation

AMPS receiver tests

- SINAD
- Audio frequency response
- Audio distortion
- FM hum and noise
- Expander response

Fading tests

Option 004 adds a rear panel digital bus that enables fading when used with the N5106A PXB baseband generator and channel emulator. This solution provides receiver fading tests with unprecedented accuracy and repeatability at a very attractive price point. Baseband I/Q data from the E5515C/E is sent via the digital bus to the PXB, where real-time fading is applied based on user-selected fading profiles. After digital fading, AWGN can be digitally added to the waveform. The resulting waveform is then returned to the test set via the digital bus for modulation. This solution eliminates almost all associated calibrations and provides rock-solid repeatability. Typical E_b/N_t repeatability for fading tests with fast forward power control enabled is less than 0.1 dB.

Get the proven benefits of the Keysight 8960 test set

Because this cdma2000 test solution is based on the high-performance 8960 Series 10 test set, you gain the additional benefits of extremely fast measurement speed, ease of programming, accuracy, reliability, and worldwide service and support. These proven features help you shorten test development time, increase throughput, and minimize support costs.

Technical Specifications

These specifications apply to E5515E, or an E5515C mainframe with Option 003, for serial number US40410101, GB40410101, or higher when used with an E6702G lab application of firmware.

Specifications describe the test set's warranted performance and are valid for the unit's operation within the stated environmental range unless otherwise noted. All specifications are valid after a 30-minute warm-up period of continuous operation.

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". All units shipped from the factory meet these typical numbers at 25 °C ambient temperature without including measurement uncertainty.

Additionally, these specifications apply to an E5515C/E mainframe with Option 003 running an E6702T lab application with firmware revision T.01.12 over the 25 °C ±5 °C ambient temperature range. The E6702T operating conditions are 0 to 35 °C.

WAP push message pipe

Functionality: Used to send user-defined messages over the data burst message channel	<ul style="list-style-type: none"> – Send custom automation commands to the phone for application control and automation – Call must be connected for the data burst message to be sent – Use standard web browser to send command <p>http://Command option enables "PASSTHROUGH" mode:</p> <ul style="list-style-type: none"> – <code>http://111.222.333.444/sms/send/?DATA=<content of the file>&PASSTHROUGH=TRUE&IGNORELENLIMIT=TRUE</code>
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A-GPS message pipe

Functionality: Send any desired, externally coded, PDDM message. Receive and retrieve up to 10 PDDM messages from the DUT. Received message must also be externally decoded	<ul style="list-style-type: none"> – Send control plane messages for GPS acquisition assistance – Support for TIA-801 messaging – RUI interface over GPIB
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Instrument IP addresses

User parameters	IPv6 prefix, IPv6 default router address
Displays	IPv6 link-local prefix, LAN IPv6 IID (derived from MAC ID), LAN 2 IPv6 IID (derived from MAC ID)

S033 data channel

S033 data channel operation	Allows the test set to emulate a complete data network by providing transparent connectivity to a packet data capable mobile; supports simple IP and mobile IP connections; requires that the test set be connected to an external server via the rear panel LAN connector
S033 dormant mode	Supported
IP throughput monitor	Displays a graph of the data throughput for forward and reverse packets at the IP layer and at the RLP layer
IP throughput monitor numeric results	Provides numeric results for the current, average, and peak data rates in bits per second as well as total number of bytes transferred for forward and reverse IP packets and forward and reverse OTA (over the air-RLP) packets
IP throughput monitor display axis controls	Time span: 0 to 600 s Start data rate: 0 to 600 kbps Stop data rate: 0 to 600 kbps
IP throughput monitor trace controls	On/off function and marker function for IP Tx trace, IP Rx trace, OTA (RLP) Tx trace, and OTA (RLP) Rx trace
IP throughput monitor graph controls	Clear display and freeze display

S033 data channel (continued)	
Ping function	Allows the user to test network connections required for S033 data channel capability; reports number of packets transmitted, number of packets received, percent lost, and round trip time min/avg/max
Mobile IP support	Provides support for Software Concepts Inc.'s Mobile IP simulator models MIP-5800 MOB-IP-SIM or MIP-5850 MOB-IP-SIM; user control for internal simple IP support or external mobile IP support for S033 operation; interfaces to the Mobile IP simulator through the test set's LAN port; when in external mobile IP mode, the test set sends the data out through the LAN port in PPP over Ethernet format
Mobile IP functions	
External PDSN state	On or off; when "on," outputs PPP data via the LAN connector to the external MIP-5800 or MIP-5850 Mobile IP simulators
External PDSN IP address	Accepts IPv4 standard address
External PDSN TCP port	0 to 65535
Mobile station reported frame error rate	
Mobile station reported frame error rate	Periodic report or threshold report
Frame interval of report	5, 7, 10, 14, 20, 28, 40, 56, 80, 113, 160, 226, 320, 452, 640, or 905 frames
Frame delay of report	0 to 124 frames in 4-frame steps
Bad frame threshold	1 to 31 frames
Mobile station reported frame error rate results	MS reported FER, MS reported bad frame, MS reported total frames
Calling party number	
Calling party number inclusion	Include or exclude
Calling party number	Up to 20 characters consisting of 0-9, *, #, a, b, or c
Number type	Unknown, international, national, network, subscriber, and abbreviated
Number plan	Unknown, ISDN/telephony, data, telex, and private
Presentation indicator	Allowed, restricted, and number not available
Screening indicator	User no screen, user verify pass, user verify fail, and network
CDMA authentication	
Functionality	Provides basic authentication capabilities for call processing; does not support encryption
Authentication commands	Unique challenge and SSD update
Global challenge	On or off
Authentication user parameters	A-key (decimal), RAND (hex), RANDU (hex), and RANDSSD (hex)
Global challenge results	AUTHU expected value, AUTHU received value and pass/fail result; RANDC expected value, RANDC received value and pass/fail result; COUNT (call history); AUTH_MODE
Unique challenge results	AUTHU expected value, AUTHU received value and pass/fail result
SSD update results	Pass/fail result
Real-time Vocoder	
Functionality	Provides real-time encoding of external audio applied to the front panel audio in port and real time decoding of audio output via the front panel audio out port
Real-time Vocoder operating mode	Normal (real-time Vocoding), Calibration (only in connected state)

Real-time Vocoder (continued)

Real-time Vocoder calibration type	Audio Output port (outputs a digital full scale Sine wave through the front panel audio output port), Audio Input port (reports the measured ADC headroom), internal codec (loops back the audio input port signal to the audio output port)
Audio Output frequency	User-settable from 300.0 Hz to 1.1 kHz, default 1KHz
Encoder headroom report	Displays the audio in headroom relative to the ADC full scale value
Real-time Vocoder support	13 k Vocoder in service options 17, and 32768, the EVRC Vocoder in service option 3, the EVRC-B Vocoder in service option 68, the EVRC-WB Vocoder in service Option 70 (fully support with special ADC hardware)
Encoder data rate mode	Auto, fixed or limited; in auto mode the Vocoder algorithm selects the rate based on the sampled audio; fixed mode locks the rate to the user-selected rate; limited allows the Vocoder to use the user-selected rate and any lower rate, if available
Encoder data rate	Full, half, quarter, or eighth
SO68 encoder operating point	MS specified (default), 0, 1, 2, 3, 4, 5, 6, 7
SO70 encoder operating point	MS-specified (default), 0, 4, 7
Expected input voltage	0 to 2 V; sets the input gain for external audio applied to the front-panel audio in port
Max output voltage	0 to 5 V; sets the output level of the decoded audio routed to the front-panel audio out port
Vocoder limitations	When active, no measurements are allowed during real-time Vocoding

PESQ audio measurement option

Requires additional license E1999A-301

Functionality	<p>Provides an objective method for prediction of Vocoder speech quality using the PESQ algorithm recommended by ITU-T P.862 standard. In conjunction with the real-time Vocoders built into the 8960, the PESQ measurement applies a voice sample to the phone and compares the resultant voice signal from the phone to the reference voice sample. Audio input and output to/from the phone is handled via the 8960's front panel analog Audio In and Audio Out ports</p> <ul style="list-style-type: none"> - Provides PESQ scores for downlink and uplink voice quality from 1 to 5 - Includes a single male voice sample and a single female voice sample - Performs downlink, uplink, or simultaneous downlink and uplink PESQ measurements in a single one-box solution (external Audio Analyzer is not required) - Used with the 8960's internal SO3 – EVRC, SO68 – EVRC-B and SO70 – EVRC-WB real-time Vocoders - Test Vocoder speech quality without the need of additional audio analyzer instrumentation - Simplified test procedures and overall test stations for audio voice quality measurements
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Multi-unit synchronization

Functionality	Allows any test set to be time-synchronized to another running either the E6706G or E6702G; synchronization requires one unit be designated as the time server and one as the client; the timebase and trigger outputs of the server must be connected to the client's timebase and trigger inputs; the test sets must also be on a LAN using the same address segment
Sync to external test set	One button command to perform the synchronization
External test set LAN address	User entry of the time server's LAN address (IPv4 address)
Synchronization fanout	Maximum of four client test sets can be driven from a single timing server; unlimited number can be synchronized when they are daisy-chained together (one unit to another)
Synchronization results	Server operation complete and client operation complete
<i>Synchronization accuracy</i>	<i>Typically < 1 μs</i>

Hybrid mode

Functionality	Supports cdma2000/1xEV-DO hybrid mode operation when used with an E5515C/E running the E6706G 1xEV-DO lab application; requires that the two units are synchronized using the built-in multi-unit synchronization capability
Basic hybrid mode test capabilities	<ul style="list-style-type: none"> - Hybrid mode system acquisition - 1xEV-DO power save mode - Preferred control channel cycle negotiation - Dual-idle operation on CDMA and 1xEV-DO - CDMA voice call origination in dual-idle state - CDMA voice call origination in dormant 1xEV-DO state - CDMA voice call origination in 1xEV-DO connected state - CDMA voice call termination in dual-idle state - CDMA voice call termination in CDMA idle/1xEV-DO dormant state - CDMA voice call termination in 1xEV-DO connected state - SMS origination in dual-idle state - SMS origination in CDMA idle/1xEV-DO dormant state - SMS origination in 1xEV-DO connected state - SMS termination in dual-idle state - SMS termination in CDMA idle/1xEV-DO dormant state - SMS termination in 1xEV-DO connected state - 1xEV-DO packet data call origination in dual-idle state - 1xEV-DO packet data call re-origination in 1xEV-DO dormant state - 1xEV-DO packet data call termination in 1xEV-DO dormant state - CDMA packet data call when 1xEV-DO service is unavailable
Advanced hybrid mode test capabilities (requires the use of the Software Concepts MOB-IP-SIM)	<ul style="list-style-type: none"> - MIP call when using static home IP - MIP call when using dynamic home IP - MIP to SIP fallback if MIP call fails while trying packet data call on 1xEV-DO - MIP to SIP fallback if MIP call fails while trying packet data call on CDMA - Active 1xEV-DO to CDMA data session handoffs - Dormant 1xEV-DO to CDMA data session handoff - Dormant CDMA to 1xEV-DO data session handoff - 1xEV-DO to CDMA to 1xEV-DO data session hand-back

Protocol logging functionality	
E6702G logging functions	Start protocol logging and stop protocol logging
Protocol support	PREV=6 and PREV=7 messages; provides correct binary output for lower PREVs, but decodes using PREV=6 messages formats
Wireless Protocol Advisor (WPA)	
Logging software	Keysight Wireless Protocol Advisor PC software included with the purchase of the E6702G
WPA hardware requirements	At least a Pentium III 700 MHz PC with 128 MB of memory, 500 MB of free disc space, and a TCP/IP LAN port
WPA supported operating systems	English versions of Windows 98, Windows NT 4.0 (with at least service pack 4), and Windows 2000
WPA connection	A 10 Mbps 10 Base T Ethernet connection (RJ-45 connector) using a crossover cable for direct connection to the PC or with a standard cable through a switch or hub
WPA operating modes	Real time or post capture
WPA display modes	Traffic overview of real-time messages, decode view with full detail of selected message, measurement setup view for trigger, and filter configuration
Traffic overview functionality	
Display	Provides a single line display of individual protocol messages in sequential order as received
Traffic overview configurable display columns	Message number, message direction, CDMA system time, event type, timestamp (based on PC's real-time clock), channel type, L2 message, L3 message, and order
Measurement setup functionality	
Display	Provides a graphical block diagram of the available test set filters, triggers, real-time filters, data log, and post-capture filters available to the user; also displays whether any triggers or filters are currently selected
Decode view functionality	
Decode view displayed information types	
Test set information (indicated by blue text)	(20 ms), event type (PDU or duplicate PDU), and channel type CDMA system time message was sent or received with frame accuracy
Message contents (indicated by green text)	Individual octet display of message or line per field display of each parameter in the message
Decode view configurable display columns	Octet number, decimal value, binary value, hex value, and field description (English)
Test filter functionality	
WPA test set filter	Selectable list of message types to be sent from the test set to the logging PC via the LAN connection; message types not selected are NOT transmitted to the PC
Test set filter message types	Sync channel messages, overhead messages, mobile station directed messages, access channel messages, forward traffic channel messages, reverse traffic channel messages, forward fundamental channel frames, reverse fundamental channel frames, and quick paging channel slots

Trigger functionality	
Logging triggers	Selectable start logging trigger and stop logging trigger; defined triggers may be saved and recalled
Trigger start and stop criteria	Start and stop triggers can be configured to pre-capture or post-capture a specific number of messages; stop trigger can also be defined as a time duration after the start trigger occurred
Trigger types	Event, message match, time, and trigger counts
Event trigger	Message dropped, received message, and received message overflow
Message match parameters	Triggers can be defined as any fields, not a match to, or any specific values for the following parameters: <ul style="list-style-type: none"> - F-csch (f-synch) MSG_TYPE - F-csch MSG_TYPE - CONFIG_MSG_SEQ - ACC_MSG_SEQ - F-csch/f-dsch ORDER - ORDQ - PAGE_CLASS - MSG_ID - R-csch/r-dsch ORDER - F-dsch MSG_TYPE - R-dsch MSG_TYPE - Paging indicator 1 - Paging indicator 2
Time trigger	Definable start trigger on specific timestamp and day based on PC real-time clock
Trigger counts	Specified number of start trigger occurrences before log capture begins
Log filter functionality	
Log filter	Definable filter for data is captured into the log file; defined filters may be saved and recalled
Filter types	Event, message match, and time
Event filter	Message received
Message match parameters	Filters can be defined as any fields, not a match to, or any specific values for the following parameters: <ul style="list-style-type: none"> - F-csch (f-synch) MSG_TYPE - F-csch MSG_TYPE - CONFIG_MSG_SEQ - ACC_MSG_SEQ - F-csch/f-dsch ORDER - ORDQ - PAGE_CLASS - MSG_ID - R-csch/r-dsch ORDER - F-dsch MSG_TYPE - R-dsch MSG_TYPE - Paging indicator 1 - Paging indicator 2
Time filter	Allows events to pass through if timestamp is after specified time, before specified time, or between specified start and stop time

Log file

WPA log file storage	Captured log file can be saved in proprietary binary format that allows full functionality of WPA features in the post capture mode; the real-time overview log can also be saved in a comma-separated file; the user can also select a range of messages in the overview mode to be saved in an ASCII text file using the decode view format
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View filter functionality

View filter	Definable filter that limits what data is displayed on a previously captured log file; defined filters may be saved and recalled
Filter types	Event, message match, time, and message validity
Event filter	Message dropped, received message, and received message overflow
Message match parameters	Filters can be defined as any fields, not a match to, or any specific values for the following parameters: <ul style="list-style-type: none"> - F-csch (f-synch) MSG_TYPE - F-csch MSG_TYPE - CONFIG_MSG_SEQ - ACC_MSG_SEQ - F-csch/f-dsch ORDER - ORDQ - PAGE_CLASS - MSG_ID - R-csch/r-dsch ORDER - F-dsch MSG_TYPE - R-dsch MSG_TYPE - Paging indicator 1 - Paging indicator 2
Time filter	Allows events to pass through if timestamp is after specified time, before specified time, or between specified start and stop time
Message validity	Show unsuccessfully decoded messages, and show successfully decoded messages

SMS

SMS support	Mobile terminated or mobile originated
SMS mobile terminated service types	Point-to-point or broadcast
SMS mobile terminated teleservice types	Wireless paging teleservice, wireless messaging teleservice, voice mail notification, or WAP
SMS broadcast service categories	Unknown, broadcast emergency, administrative, maintenance, general news local, general news regional, general news national, general news international, business and financial news local, business and financial news regional, business and financial news national, business and financial news international, sports news local, sports news regional, sports news national, sports news international, entertainment news local, entertainment news regional, entertainment news national, entertainment news international, local weather, area traffic reports, local flight schedules, restaurants, lodgings, retail directory, advertisements, stock quotes, employment opportunities, medical, technology news, and multi-category
SMS mobile terminated originating address	Maximum of 14 numeric digits
SMS mobile terminated message priority	None, normal, interactive, urgent, and emergency

SMS (continued)	
SMS mobile terminated message privacy	None, not restricted, restricted, confidential, and secret
SMS mobile terminated message alert	Default, low, medium, high, and none
SMS mobile terminated message encoding	Octet, 7-bit ASCII, IA5, UNICODE, shift-JIS, Korean, Latin/Hebrew, Latin, and GSM 7-bit default alphabet
SMS mobile terminated message optional user data	Include or exclude
SMS mobile terminated call back number	Include or exclude; set to the originating address when included
SMS mobile terminated message entry	Hex or ASCII
SMS mobile terminated message length	Maximum of 255 ASCII characters or 510 hex characters
SMS mobile terminated message repeat	1 up to 255 repetitions of the entered data
SMS mobile terminated messaging editing	Append data, overwrite data, insert data, clear to end, backspace, and delete character
SMS mobile terminated message status	Provides status of SMS message transmission and reports cause codes
SMS mobile originated protocol control	Enabled, disabled, not supported, or unknown address
SMS mobile originated display	Auto, ASCII, or hex
SMS mobile originated message status	Message count, teleservice type, destination address, destination address encoding, priority, call back number, call back number encoding, message encoding, and message length
Paging message error rate	
Paging channel data rate	Selectable full or half rate
Paging channel MER report	Provides the calculated paging channel message error rate, the mobile reported PAG_3, the number of paging messages transmitted by the test set, and the paging MER test time
Paging MER procedure control	Start and stop; only available when a call is connected; "start" resets the phone's PAG_3 value and starts the paging MER timer and counter; "stop" retrieves the mobile's PAG_3 value and stops the paging MER timer and counter
Paging MER calculation	Computes the MER from the ratio of the mobile reported value of PAG_3 and the number of paging messages sent by the test set during the test interval
Audit order control	Settable on/off
Clear paging MER procedure parameters function	Clears all of the paging MER-related parameters
Paging channel E_b/N_t display	Displays the signal-to-noise ratio of the paging channel when AWGN is on
IS-2000 test mode functionality	
Resident formats	IS-2000 SR1
Control channel configuration	PCH/ACH or BCCH/CCCH/EACH
Cell 1 overhead channels (Control channels = PCH/ACH)	
F-pilot	With settable PN offset
F-sync	With real-time long code and system time update and updates for entered parameters
F-paging	With real-time overhead messages
F-QPCH	Indicates if active page will be in the next paging channel slot
Cell 1 overhead channels (Control channels = BCCH/CCCH/ EACH)	
F-pilot	With settable PN offset
F-sync	With real-time long code and system time update and updates for entered parameters

Cell 1 overhead channels (Control channels = BCCH/CCCH/ EACH) (continued)	
F-BCCH	With real-time overhead messages
F-CCCH	With real-time signaling messages
F-QPCH	Indicates if active page will be in the next paging channel slot
IS-2000 test mode functionality	
Cell 2 overhead channels	F-pilot: With settable PN offset
Cell 1 overhead messages (Control channels = PCH/ACH)	System parameters message, channel list message, access parameters message, extended system parameters message, and extended neighbor list message
Cell 1 overhead messages (Control channels = BCCH/CCCH/ EACH)	ANSI-41 system parameters message, MM-RC parameters message, extended channel list message, enhanced access parameters message, and universal neighbor list message
F-BCCH rate (Control channels = BCCH/CCCH/ EACH)	4.8 kbps (1/2 rate coding, 160 ms slot), 9.6 kbps (1/2 rate coding, 80 ms slot), or 19.2 kbps (1/2 rate coding, 40 ms slot)
F-CCCH rate (Control channels = BCCH/CCCH/ EACH)	9.6 kbps (1/4 rate coding, 20 ms frame), 9.6 kbps (1/2 rate coding, 20 ms frame), and 19.2 kbps (1/2 rate coding, 20 ms frame)
F-QPCH data rate	Selectable from either full or half rate
Base station parameters	NID, SID, country code (MCC), network code (MNC), paging rate, and CDG esc mode, F-QPCH state, F-QPCH relative level, F-QPCH data bits (all on or all off), and reverse link traffic pilot gain
Call control ("one button commands")	None
Access parameters	None
Registration support	None
Service option support	None
Handoff support	None
R-Access channel	Not supported
Chip rate	1.2288 Mcps
Supported radio configuration combinations	<ul style="list-style-type: none"> – Forward RC1 + reverse RC1 – Forward RC2 + reverse RC2 – Forward RC3 + reverse RC3 – Forward RC4 + reverse RC3 – Forward RC5 + reverse RC4 – Forward RC11 + reverse RC8
Channel coding	Convolutional or turbo on all rates with the exception that turbo coding is not available on RC3 at 9.6 kbps, RC4 at 9.6 kbps, or RC5 at 14.4 kbps per IS-2000
Traffic data source	PRBS (CCITT 215-1 pattern)
Forward FCH data rate	RC1: Random (40% duty cycle), 1.2, 2.4, 4.8, 9.6 kbps RC2: Random (40% duty cycle), 1.8, 3.6, 7.2, 14.4 kbps RC3: Random (40% duty cycle), 1.5, 2.7, 4.8, 9.6 kbps RC4: Random (40% duty cycle), 1.5, 2.7, 4.8, 9.6 kbps RC5: Random (40% duty cycle), 1.8, 3.6, 7.2, 14.4 kbps
Forward SCH support	One supplemental channel
RF-SCH data rate	C3: 9.6, 19.2, 38.4, 76.8, or 153.6 kbps RC4: 9.6, 19.2, 38.4, 76.8, or 153.6 kbps RC5: 14.4, 28.8, 57.6, 115.2, or 230.4 kbps
Power control groups	16 per frame
Reverse link closed loop support	Transmits bits only (no reverse link demodulation)
Reverse link closed loop bit rate	Fixed to 800 per second
Cell 1 reverse link closed loop power control modes	<ul style="list-style-type: none"> – Alternating – alternating 0 and 1 power bits – Alt 20 up/down – alternating 20 up/20 down bits – All up – All down

IS-2000 test mode functionality

Cell 1 reverse link closed loop power control transient	User start function that interrupts the current cell 1 reverse link closed loop power control mode and substitutes the user-defined number and direction of closed loop power control bits; once the transient is sent, the closed loop power control reverts to the original state
Cell 1 reverse link closed loop power control transient modes	<ul style="list-style-type: none"> – Up – Down – Up-down-up
Cell 1 transient number of steps	1 to 400
Cell 2 reverse link closed loop power control modes	<ul style="list-style-type: none"> – Alternating – alternating 0 and 1 power bits – Alt 20 up/down – alternating 20 up/20 down bits – All up – All down – Cell 1 bits – sets cell 2's bits identical to cell 1's
Forward link power support	None
Mobile station identification	User entry of ESN (hex); entry of all "F" hex data results in using a zero long code mask on the source

F-FCH frame pattern

F-FCH frame pattern	Selectable repeating pattern of good, and corrupted frames with on and off control
F-FCH/Traffic good and bad frame pattern	Selectable on and off; "on" setting generates a pattern of good frames and bad (corrupted) frames
F-FCH/Traffic frame pattern good frames	Selectable from 1 to 300; default setting of 3 good frames
F-FCH/Traffic frame pattern bad frames	Selectable from 1 to 300; default setting of 3 bad (corrupted) frames (50% FER)
Signaling frame quality	Selectable from good (ignores the F-FCH/Traffic frame pattern) or bad (follows the F-FCH/Traffic frame pattern) for outer loop report; when a report is received, the mobile reported set point is displayed

Option 004 Digital Bus

Functionality	Allows baseband, digital I/Q data from the signal generator to be sent to an external N5101A Baseband Studio PCI card or N5106A (PXB) 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)	<ul style="list-style-type: none"> < ± 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)	<ul style="list-style-type: none"> < ± 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)

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