



E6702E cdma2000/IS-95/AMPS Lab Application

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

Technical Overview

Accelerate your design of cdma2000® wireless devices



Key Features

- Data channel connectivity tests high-speed packet data connection to a network
- Hybrid mode support with full verification capabilities when used in conjunction with another E5515C/E running the E6706E 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 Agilent Baseband Studio Channel Simulator
- The E6702E includes all E1962B test application manufacturing-specific features and measurements, helping smooth the transition from development to manufacturing

What's new?

- **CFDT enhancement** for more applications
- **AWGN extending** for more test case
- **PESQ audio measurements** in a single one-box solution (external Audio Analyzer is not required)
- **WAP push via http SMS** allows sending messages to DUT over data burst message pipe
- **A-GPS message pipe** allows send/receive PDDM to the DUT
- **Settable CDMA system time** with trigger allows syncing GPS signals to the 8960 system time
- **Band class 11, 12, 18, and 19 support**
- **Real time vocoder** allows functional test of speech connections using the 13 k, EVRC, EVRC-B, and EVRC-WB vocoders
- **cdma 1x Advanced capabilities** including new radio configurations and service options (S073 and S075), smart blanking



E6702E 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 Agilent E6702E 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 E6702E 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 $\frac{1}{8}$ th 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 E6706E 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 new 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
- 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 Agilent 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 E6702E 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", or "supplemental." 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

- 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
http://Command option enables "PASSTHROUGH" mode:
 - http://111.222.333.444/sms/send/?DATA=<content of the file>&PASSTHROUGH=TRUE&IGNORELENLIMIT=TRUE

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

- Send control plane messages for GPS acquisition assistance
- Support for TIA-801 messaging
- RUI interface over GPIB

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

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 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

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

S068 encoder operating point: MS specified (default), 0, 1, 2, 3, 4, 5, 6, 7

S070 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: 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

- 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 S03 – EVRC, S068 – EVRC-B and S070 – 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

Multi-unit synchronization

Functionality: Allows any test set to be time synchronized to another running either the E6706E or E6702E; 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

Synchronization accuracy: Typically < 1 μ s

Hybrid mode

Functionality: Supports cdma2000/1xEV-DO hybrid mode operation when used with an E5515C/E running the E6706E 1xEV-DO lab application; requires that the two units are synchronized using the built-in multi-unit synchronization capability

Basic hybrid mode test capabilities:

- 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):

- 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

E6702E 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: Agilent Wireless Protocol Advisor PC software included with the purchase of the E6702E

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): CDMA system time message was sent or received with frame accuracy (20 ms), event type (PDU or duplicate PDU), and channel type

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:

- 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:

- 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

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:

- 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 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

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

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-RS 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:

- Forward RC1 + reverse RC1
- Forward RC2 + reverse RC2
- Forward RC3 + reverse RC3
- Forward RC4 + reverse RC3
- Forward RC5 + reverse RC4

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

F-SCH data rate:

RC3: 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:

- Alternating – alternating 0 and 1 power bits
- Alt 20 up/down – alternating 20 up/20 down bits
- All up
- All down

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:

- Up
- Down
- Up-down-up

Cell 1 transient number of steps: 1 to 400

Cell 2 reverse link closed loop power control modes:

- 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):

< ± 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)



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