

Agilent

8960 Series 10 cdma2000 Mobile Test for the E5515C Mainframe and the E1962B Test Application Data Sheet

TX measurements

- Channel power
- Average power
- Access probe power
- Modulation quality
- Code Domain Power

RX measurements

- Sensitivity
- Dynamic range
- Demodulation of FCH with AWGN
- Service Option 002, 009, and 055 loop back support

IS-2000 Functionality

Call processing:

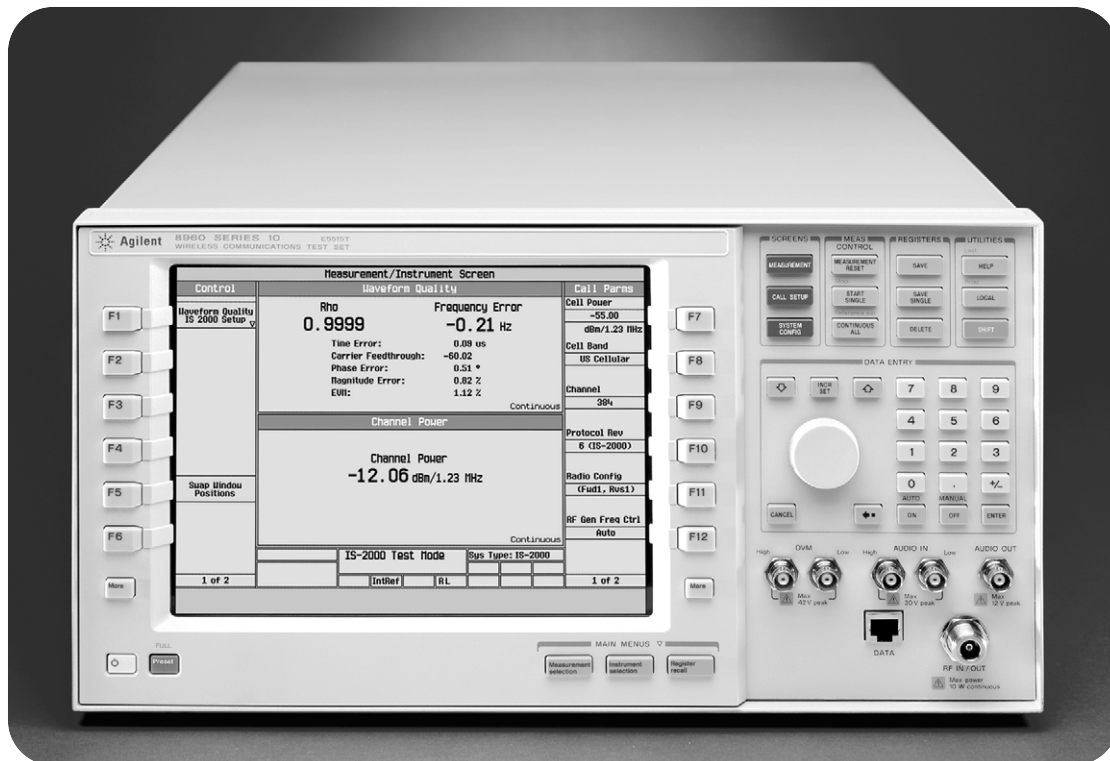
- Registration
- One-button page
- Auto answer MS origination
- Hard Handoff (Band & Channel)

RF generator:

Pilot, Sync, Paging, Quick Paging, FCH Channel, OCNS, and AWGN Channels

Radio configuration support:

1 through 5 supported



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Technical specifications

These specifications apply to an E5515C mainframe with serial prefix US41070101 or higher when used with an E1962B test application of firmware revision B.01.15. Specifications describe the test set's warranted performance and are valid over the entire operation and environmental ranges unless otherwise noted. All specifications are valid after a 30-minute warm-up period of continuous operation.

Supplemental characteristics are intended to provide additional information useful in applying the instrument by giving typical, but non-warranted performance parameters. 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.

CW RF generator

Frequency

Available frequency range: 292 MHz to 2700 MHz

Specified frequency ranges: 800 MHz to 960 MHz, and 1700 MHz to 2000 MHz

Accuracy and stability: Same as timebase reference

Amplitude

Available output level range: -127 to -10 dBm

Specified output level range: -116 to -15 dBm

Absolute output level accuracy: $<\pm 1.0$ dB, typically $<\pm 0.5$ dB
(Level accuracy at RF generator output levels > -30 dBm may be degraded by simultaneous reception and transmission when applied TX power is > 32 dBm.)

Audio generator

Frequency

Operating range: 100 Hz to 20 kHz, typically 1 Hz to 20 kHz

Accuracy: Same as timebase reference

Frequency resolution: typically 0.1 Hz

Output level (from AUDIO OUTPUT connector)

Ranges: 0 to 1 V peak, 1 to 9 V peak (into > 600 ohms)

Accuracy: $<\pm(1.5\%$ of setting + resolution) when output is DC coupled

Distortion: $< 0.1\%$ for 0.2 to 9 V peak into > 600 ohms

Coupling mode: User-selectable as DC or AC (5 μ F in series with output)

Typical maximum output current: 100 mA peak into 8 ohms

Typical output impedance: < 1.5 ohms at 1 kHz when output is DC coupled

Typical DC offset (when output is DC coupled):

< 1 mV peak for 0 to 1 V peak

< 10 mV peak for 1 to 9 V peak

Output level resolution: typically < 0.5 mV for 0 to 1 V peak output, < 5.0 mV for 1 to 9 V peak output

CW RF analyzer

Frequency stability measurement

Types of signals measured: Analog signals without modulation

Frequency capture range: Signal must be within ± 200 kHz of test set's expected frequency

Minimum input level: Signal at test set's RF in/out must have analog TX power > -30 dBm

Frequency and frequency error measurement

Accuracy: $< \pm(1$ Hz + timebase accuracy), 800 to 960 MHz

Measurement trigger source: Immediate

Available results: RF frequency and RF frequency error

Multi-measurement capabilities: 1 to 999 measurements, minimum, maximum, average and standard deviation in Hz for all results and worst case RF frequency error in ppm result.

Concurrency capabilities: Frequency stability measurements can be made concurrently with all analog and audio measurements.

Measurement resolution for frequency and frequency error measurement results in Hz: typically 1 Hz.

Measurement resolution for frequency error measurement result in ppm: typically 0.01 ppm.

IS-2000 active cell call processing functionality

Resident formats: IS-2000 SR1

Call processing timing tolerance: mobile transmissions must be typically within ± 6 usec of test set's transmitted pilot channel clock timing for proper reverse channel acquisition.

Overhead channels:

F-pilot - with user settable PN offset

F-sync - with real-time long code and system time update and updates for user entered parameters such as SID, NID, PRAT, CDMA_FREQ, and PN OFFSET

F-paging - with real-time overhead messages

F-QPCH - indicates if active page will be in the next paging channel slot

Protocol stack: IS-2000 revision 0 with addendum (PREV = 6)

Base station parameters: NID, SID, country code (MCC), network code (MNC), paging rate, max slot cycle index, CDG esc mode, F-QPCH state, F-QPCH relative level, and reverse link traffic pilot gain

Call control ("one button commands"):

Register

BS call originate

BS call disconnect

MS call originate (auto answer)

MS call disconnect

Access parameters: Nom_pwr, nom_pwr_ext, init_pwr, pwr_step, num_step, max_req_seq, max_rsp_seq and pam_size

Registration support: User initiated (zone based), power up, timer based, implicit registration (mobile originated call), or direct user entry of mobile IMSI

Registration reported mobile information: ESN, MCC, MNC, MSIN, slot class, slot cycle index, protocol revision, band class, operating mode, max EIRP, registration type, QPCH support, enhanced RC support, minimum power control step size, MS called party number

Query mobile capabilities function: Uses signaling to request the mobile's capabilities.

Requested parameters include:

FCH: FCH supported, FCH 5 ms frames supported, F-FCH radio configurations, R-FCH radio configurations

DCCH: DCCH supported, DCCH frame size, F-DCCH radio configurations, R-DCCH radio configurations

F-SCH: F-SCH supported, number of F-SCH channels supported, turbo encoder supported, turbo encoded rate set 1 max data rate, turbo encoded rate set 2 max data rate, convolutional encoder supported, convolutional encoded rate set 1 max data rate, convolutional encoded rate set 2 max data rate

R-SCH: R-SCH supported, number of R-SCH channels supported, turbo encoder supported, turbo encoded rate set 1 max data rate, turbo encoded rate set 2 max data rate, convolutional encoder supported, convolutional encoded rate set 1 max data rate, convolutional encoded rate set 2 max data rate

IMSI support:

Class 0 only
Supported IMSI class 0 types: MSIN only (00), MNC + MSIN (01), MCC + MSIN (10), or MCC + MNC + MSIN (11)

Paging channel data rate: User selectable from either full or half rate

Service option support:

SO1- 9.6 kbps voice echo

SO2- 9.6 kbps data loopback

SO3 - 9.6 kbps EVRC voice echo

SO9 - 14.4 kbps data loopback

SO17- 14.4 kbps voice echo

SO55 - RC1/2/3/4/5 data loopback

SO32768 14.4 kbps voice echo

Handoff support:

Hard handoff (new channel, band)

Supported radio configuration combinations:

Forward RC 1 + Reverse RC 1

Forward RC 2 + Reverse RC 2

Forward RC 3 + Reverse RC 3

Forward RC 4 + Reverse RC 3

Forward RC 5 + Reverse RC 4

Traffic data source: PRBS (CCITT 215-1 pattern)

Forward FCH data rate:

RC2: 1.8, 3.6, 7.2, 14.4 kbps

RC3: 1.5, 2.7, 4.8, 9.6 kbps

RC4: 1.5, 2.7, 4.8, 9.6 kbps

RC5: 1.8, 3.6, 7.2, 14.4 kbps

Forward SCH support: None

Reverse FCH data rate:

RC1: 1.2, 2.4, 4.8, 9.6 kbps

RC2: 1.8, 3.6, 7.2, 14.4 kbps

RC3: 1.5, 2.7, 4.8, 9.6 kbps

RC4: 1.8, 3.6, 7.2, 14.4 kbps

Reverse SCH support: None

Reverse link closed loop bit rate: fixed to 800 per second

Reverse link closed loop power control modes:

'ACTIVE'

'ALTERNATING' - Alternating 0 and 1 power bits

'ALL UP'

'ALL DOWN'

Forward link power control support: None, test set ignores all power control data sent by the mobile station

IS-2000 test mode functionality

Resident formats: IS-2000 SR1

Overhead channels:

F-pilot - with user settable PN offset

F-sync - with real-time long code and system time update and updates for user entered parameters such as SID, NID, PRAT, CDMA_FREQ, and PN OFFSET

F-paging -with real-time overhead messages

F-QPCH – all indicators on or all off

Protocol stack: Limited to IS-2000 revision 0 with addendum sync channel message and paging channel overhead messages

Base station parameters: NID, SID, country code (MCC), network code (MNC), paging rate, 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 RC 1 + Reverse RC 1

Forward RC 2 + Reverse RC 2

Forward RC 3 + Reverse RC 3

Forward RC 4 + Reverse RC 3

Forward RC 5 + Reverse RC 4

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 9.6kbps, or RC5 at 14.4 kbps per IS-2000

Traffic data source: PRBS (CCITT 215-1 pattern)

Forward FCH data rate:

RC1: 1.2, 2.4, 4.8, 9.6 kbps

RC2: 1.8, 3.6, 7.2, 14.4 kbps

RC3: 1.5, 2.7, 4.8, 9.6 kbps

RC4: 1.5, 2.7, 4.8, 9.6 kbps

RC5: 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, 153.6, or 307.2 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 loopbit rate: fixed to 800 per second

Reverse link closed loop power control modes:

'ALTERNATING' - Alternating 0 and 1 power bits

'ALL UP'

'ALL DOWN'

Forward link power support: None

Mobile station identification:

User Entry of ESN (hexidecimal). Entry of all 'F' hex data results in using a zero long code mask

CDMA RF generator

Additive white Gaussian noise source: Yes

AWGN bandwidth: typically 1.8 MHz < BW < 2.1 MHz

CDMA channels:

CDMA cell consisting of these code channels:

F-Pilot - fixed at Walsh Code 0

F-Sync - fixed at Walsh Code 32

F-Paging - fixed at Walsh Code 1

F-QPCH – fixed at Walsh Code 80

F-FCH - user selectable Walsh Code from the following set: 10, 14, 26, 30, 42, 46, 58, or 62

F-SCH - Fixed to Walsh Code 3

F-OCNS – user-selectable Walsh Code from the following set: 5, 13, 21, 29, 37, 45, 53, and 61

CDMA cell PN offset: User selectable from 0 to 511

Frequency

Frequency range:

US Cellular band (869.04 to 893.97 MHz)

Japan CDMA band (approx. 832 to 869.9875 MHz)

US PCS band (1930 to 1990 MHz)

Korean PCS band (1840 to 1870 MHz)

NMT- 450 band (approx. 421 to 494 MHz)

IMT- 2000 band (2110 to 2169.950 MHz)

Frequency setting: By channel number or MHz (IS-2000 test mode only)

Frequency setting resolution: 1 Hz

Amplitude

Composite signal level: Sum of the user set values of the CDMA Cell power and the AWGN source

CDMA cell output level range (AWGN off):

-120 dBm/1.23 MHz to -13 dBm/1.23 MHz

AWGN output level range (cell power off):

-120 dBm/1.23 MHz to -18 dBm/1.23 MHz.

Over-range available with reduced performance to -15 dBm/1.23 MHz

Absolute output level accuracy (AWGN off):

< 1 GHz Bands:

< ± 1.25 dB, -109 to -15 dBm/1.23 MHz.

Typically ± 0.62 dB, -109 to -15 dBm/1.23 MHz.

>1.5 GHz Bands:

< ± 1.35 dB, -109 to -15 dBm/1.23 MHz.

Typically ± 0.62 dB, -109 to -15 dBm/1.23 MHz

Absolute output level accuracy (AWGN on):

< 1 GHz bands:

< ± 1.5 dB, -109 to -20 dBm/1.23 MHz.

Typically ± 0.75 dB, -109 to -20 dBm/1.23 MHz

>1.5 GHz bands:

< ± 1.6 dB, -109 to -20 dBm/1.23 MHz.

Typically ± 0.75 dB, -109 to -20 dBm/1.23 MHz

Reverse power: <10 W continuous

VSWR at RF IN/OUT:

< 1.14:1, 400 MHz to 1000 MHz,

<1.2:1, 1700 MHz to 2000 MHz,

<1.32:1, 2010 MHz to 2180 MHz

F-Pilot relative level: -10 to 0 dB, or off

F-Sync relative level: -20 to 0 dB, or off

F-Paging relative level: -20 to 0 dB, or off

F-FCH channel relative level: User settable from -30 to 0 dB with 0.01 dB resolution, or off

AWGN channel relative level range: User- settable to ± 10 dB relative to the user set CDMA cell power with 0.01 dB resolution

F-OCNS Walsh Code length: fixed to 64 bits

F-OCNS relative level range: Automatically calculated from other code channel relative levels to provide the set CDMA cell power (range of -20 to 0 dB, or off)

Relative CDMA channel level accuracy:

Typically < ± 0.2 dB

CDMA modulation

Modulation type: Parallel BPSK for Pilot, Sync, and Paging Channels and Complex QPSK for the F-FCH per IS-2000

Modulation quality:

RC1 & RC2 residual Rho: >0.98

RC3, RC4, and RC5 residual Rho (pilot only): > 0.98

Residual EVM: <10%

Carrier feedthrough: Typically < -25 dBc

CDMA RF analyzer (measurements only)

Frequency range (reverse channels):

US Cellular band
Japan CDMA band
US PCS band
Korean PCS band
NMT-450 band
IMT-2000 band

Input level range: -71 dBm/1.23 MHz to +35 dBm/1.23 MHz

Receiver ranging:

Auto mode: Autoranges to the ideal RF power level for the nominally expected open loop response. Provides calibrated results if actual received power is within ± 9 dB of the expected open loop power.

Manual mode: User enters expected power. If the "Active" mode is selected, the Test Set uses Closed Loop Power control to drive the mobile to the expected power. Otherwise, the mobile's TX power must be within ± 9 dB of the expected power to provide calibrated results.

CDMA analyzer

Average power measurement

Input frequency ranges:

411 MHz to 484 MHz
800 MHz to 1000 MHz
1700 MHz to 2000 MHz

Detector types:

Peak detector – in R-RC1 and R-RC2 modes
Thermal detector – in R-RC3 and R-RC4 modes

Maximum input level: +35 dBm (3 Watts continuous)

Measurement range: -10 to +35 dBm. Usable from -10 to -27 dBm with reduced accuracy (peak detector only).

Measurement level ranging: Auto

Measurement data capture period: 10 ms

Available results: Average power

Concurrency capabilities: Average power measurements can be made concurrently with all CDMA measurements. Peak detector measurement accuracy (20° C to 55° C, after calibration; reverse RC1, RC2):

-10 to +35 dBm:

400 to 500 MHz < $\pm 7.4\%$.	Typically < $\pm 3.0\%$
800 to 1000 MHz < $\pm 7.1\%$.	Typically < $\pm 3.0\%$
1700 to 2000 MHz < $\pm 7.5\%$.	Typically < $\pm 4.4\%$

-10 to -20 dBm:

400 to 500 MHz.	Typically < $\pm 4.4\%$
800 to 1000 MHz.	Typically < $\pm 4.2\%$
1700 to 2000 MHz.	Typically < $\pm 4.8\%$

Thermal detector measurement accuracy (accuracy with 10 internal averages; reverse RC3 or RC4):

-10 to +35 dBm:

400 to 500 MHz < $\pm 6.9\%$.	Typically < $\pm 3.0\%$
800 to 1000 MHz < $\pm 6.2\%$.	Typically < $\pm 3.0\%$
1700 to 2000 MHz < $\pm 7.4\%$.	Typically < $\pm 3.3\%$

Measurement resolution: 0.01 dBm

Auto zero function: Measurement automatically zeroes the average power meter (no user control)

Tuned channel power measurement

Input frequency ranges:

411 MHz to 420 MHz
450 MHz to 484 MHz
824 MHz to 934 MHz
1750 MHz to 1780 MHz
1850 MHz to 1980 MHz

Measurement method: Measures the total power in a 1.23 MHz bandwidth centered on the active reverse channel center frequency.

Measurement data capture period: 1.25 ms (fast mode) or 10 ms (normal mode)

Measurement trigger: 20 ms clock (frame trigger)

Maximum input level: +35 dBm (3 watts continuous)

Measurement range: -61 dBm to +30 dBm. Usable to < -69 dBm/1.23 MHz with reduced accuracy

Measurement level ranging: Auto and manual

Measurement accuracy: (Calibrated against average power and within 10 degrees of calibration temperature): < ± 1 dB 20° C to 55° C, typically < ± 0.5 dB

Measurement resolution: 0.01 dBm/1.23 MHz

Available results: Tuned channel power in a 1.23 MHz bandwidth

Concurrency capabilities: Channel power measurements can be made concurrently with all CDMA measurements.

Calibrate function: Calibrates the channel power measurement over the entire operating frequency range of the test set against the average power measurement. No external cabling is required.

Calibration time: Typically < 120 seconds

Access probe power measurement

Input frequency ranges:

411 MHz to 420 MHz
450 MHz to 484 MHz
824 MHz to 934 MHz
1750 MHz to 1780 MHz
1850 MHz to 1980 MHz

Measurement method: Measures the total power in a 1.23 MHz bandwidth centered on the active reverse channel center frequency.

Measurement data capture period: 1.25 ms

Measurement trigger: Amplitude Rise only

Maximum input level: +35 dBm (3 watts continuous)

Measurement range: -54 dBm to +30 dBm

Measurement level ranging: Auto and manual

Measurement accuracy: (Calibrated against average power and within 10 degrees of calibration temperature): < ± 1 dB 20° C to 55° C, typically < ± 0.5 dB

Available results: Access probe power in a 1.23 MHz bandwidth

Concurrency capabilities: None, once an access probe power measurement is armed, all TX measurements are held off until the access probe power measurement completes.

Modulation quality measurement

Input frequency ranges:

411 MHz to 484 MHz
800 MHz to 1000 MHz
1700 MHz to 2000 MHz

Measurement chip rate: 1.2288 Mcps

Modulation measurement method:

RC1, RC2: Single code rho
RC3, RC4, and RC5: Multi-code rho and EVM with code domain results

Maximum input level: +35 dBm/1.23 MHz (3 Watts continuous)

Input level range: -25 to +30 dBm/1.23 MHz. Usable to -50 dBm/1.23 MHz with reduced accuracy.

Modulation quality measurement range (for signals with < ± 10 usec time error and < ± 1 kHz frequency error):

RC1, RC2: 0.40 to 1.00 rho
RC3, RC4, and RC5: 1% to 40% EVM

Measurement interval: 1.042 msec (5 Walsh symbols)

Modulation quality measurement accuracy:

RC1, RC2 rho: < ± 0.003 + residual error for $0.8 < \rho < 1.0$
RC3, RC4, and RC5 EVM: < $\pm 1.25\%$ rms + residual error for $1\% < \text{EVM} < 20\%$

Modulation quality measurement residuals:

Residual rho: >0.999

Residual EVM: < 4.2% rms, typically <2.8% rms

Residual time error: ± 0.11 usec

Frequency error: ± 15 Hz plus timebase error

Residual code domain power: <-35 dBc

Code domain results:

Code domain power graph: displays the power in all 16 Walsh coded channels (16 bit) for both the I channel and the Q channel. Reported power in each graph is relative to the total combined I and Q channel power. Red bars indicate active channels, while yellow bars indicate inactive channels.

Code domain power and noise graph: displays the power and noise in all 16 Walsh coded channels (16 bit) for both the I channel and the Q channel. Reported power in each graph is relative to the total combined I and Q channel power. Red bars indicate active channels, while yellow bars indicate noise in each channel.

Code domain power relative measurement accuracy (R-RC3 and R-RC4 only): < ± 0.005 relative to total power for linear code domain powers from 0.05 to 1.0.

Code domain power offset relative to reverse Pilot channel: < ± 0.20 dB

Available results (numeric rho): rho, frequency error, time error, carrier feedthrough, phase error, amplitude error, and EVM

Concurrency capabilities: Modulation quality measurements can be made concurrently with all CDMA measurements.

Frame error rate measurement

FER measurement method: Data loopback supporting confidence limits

FER input level measurement range: -65 dBm/1.23 MHz to + 30 dBm/1.23 MHz

FER measurement residual error rate: $< 1 \times 10^{-6}$ for inputs levels in the specified input level measurement range and within ± 9 dB of the expected input power

Confidence limit range: User definable from 80.0% to 99.9% and Off

Available results:

Intermediate results: Measured FER, number of errors, number of frames tested (every frame)

Final results: Measured FER, number of errors, number of frames tested, and one of the following: passed confidence limit, failed confidence limit, or max frames

Concurrency capabilities: FER measurements can be made concurrently with all CDMA measurements.

Conditions for terminating FER test:

Max frames: Maximum number of frames to test completed - test result is indeterminate

Failed: Measured FER failed the specified FER limit with specified confidence

Passed: Measured FER passed the specified FER limit with specified confidence

FER measurement indicators: Testing, passed, failed, and max frames. All indicators are available over GP-IB.

Timebase specifications

Internal high stability 10 MHz oven controlled crystal oscillator (OCXO)

Aging rates: $<\pm 0.1$ ppm per year, $<\pm 0.005$ ppm peak-to-peak per day during any 24-hour period starting 24 hours or more after a cold start

Temperature stability: $<\pm 0.01$ ppm frequency variation from 25° C over the temperature range 0° to 55° C

Warm-up times: 5 minutes to be within ± 0.1 ppm of frequency at one hour, 15 minutes to be within ± 0.01 ppm of frequency at one hour

Typical accuracy after a 30 minute warm-up period of continuous operation is derived from:

$\pm[(\text{time since last calibration}) \times (\text{aging rate}) + (\text{temperature stability}) + (\text{accuracy of calibration})]$

Typical initial adjustment: ± 0.03 ppm

External reference input

Input frequency: 10 MHz

Input frequency range: typically $<\pm 5$ ppm of nominal reference frequency

Input level range: typically 0 to +13 dBm

Input impedance: typically 50 Ohms

External reference output

Output frequency: Same as timebase (internal 10 MHz OCXO or external reference input)

Typical output level: typically ≥ 0.5 V rms

Output impedance: typically 50 Ohms

Trigger output

Frame clock output: User-selectable output of 20 ms, 80 ms, or 2 s

Remote programming

GPIB: IEEE Standard 488.2

Remote front panel lockout: Allows remote user to disable the front panel display to improve GPIB measurement speed.

Implemented functions: T6, TE0, L4, LE0, SH1, AH1, RL1, SR1, PP0, DC1, DT0, C0, E2

General specifications

Dimensions (H x W x D): 8.75 x 16.75 x 24.63 inches (222 x 426 x 625 mm), 7 rack spaces high

Weight: 66 lbs. (30 kg)

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

LAN (local area network) Port (for firmware upgrades only): RJ-45 connector, 10 Base T Ethernet with TCP/IP support

Operating temperature: 0 to +55° C

Storage temperature: -20 to +70° C

Power: 100 to 240 Vac, 50 to 60 Hz, 550 VA maximum

Calibration interval: 2 years

EMI: Conducted and radiated interference meets CISPR-11

Radiated leakage due to RF generator: *Typically <1 μ V 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 μ V 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 450W continuous*

Typical measurement speed: Measured using a 600 MHz Pentium II processor PC and with the display off mode selected on the E5515C. Measurement speeds include the total time from GPIB measurement request until the controller receives the result using the INT/FETCH commands. Due to variations of trigger latencies and internal test set processor loading, individual measurement times may be faster or slower. Measurement speeds also vary depending on the controller GPIB environment and processor speed.

Measurement name	One measurement	Ten Measurements
<i>Channel power (normal mode)</i>	<i>67 ms</i>	<i>820 ms</i>
<i>Channel power (fast mode)</i>	<i>21 ms</i>	<i>230 ms</i>
<i>Average power (RC3)</i>	<i>190 ms</i>	<i>1780 ms</i>
<i>Waveform quality RC3/4</i>	<i>261 ms</i>	<i>2220 ms</i>

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