Appendix 1 - Specifications

Chapter Introduction

This chapter contains specifications for the CyberTest Analyzer System. These specifications are subject to change at any time due to product or software updates. This is intended as a guide for the current system.

RF Generator

TABLE 1: RF Generator Specifications

Specification Name	Value Range
Freq Range (TX) - Cellular Model	800 MHz - 1GHz
Freq Range (TX) PCS Model	1700 - 2000 MHz
Frequency Resolution	50 Hz
Frequency Accuracy	timebase
Lock Time	100 msec (within 100 Hz)
RF I/O Port	
Output Power	-130 to -26 dBm
Resolution	0.1 dB
Accuracy	+/-1.0 dB
Reverse Power	50 W

MOTOROLA

RF Generator (cont)

Specification Name	Value Range
Duplex/Generator Port	
Output Power	-110 to 0 dBm
Resolution	0.1 dB
Accuracy	+/-1.0 dB
Reverse Power	10 W
Output Level Units	dBm, dBu, dBf, uW, mW, W, uV, mV, V
Spurious	<-60 dBc
Harmonics	<-50 dBc
Residual FM	<20 Hz rms (300 - 3000 Hz BW)
	<40 Hz rms (50 - 15 KHz BW)
Residual AM	<0.5% (300 - 3000 Hz BW)
SSB Phase Noise	<-105 dBc/Hz @ > 25 KHz offset

AMPS/TACS Analog Cellular Smart Module

TABLE 2: Modulation - Analog Smart Module Specifications

Specification Name	Value Range
Type	FM
Accuracy	+/- 4%
Range	+/-100 Hz to +/-20 KHz
Resolution	100 Hz
Mod Frequency Range	20 Hz to 15 KHz
Mod Sources	Internal Audio Generators, Mic, Ext Sources

CDMA Infrastructure Smart Module

TABLE 3: Modulation - CDMA Infrastructure S.M. Specifications

Specification Name	Value Range
Type	OQPSK per IS-95A/ANSI J-STD-008
Residual rho	>0.96
Carrier Feed-through	<-25 dBc
Mod Sources	
Channel Data	

CDMA Infra-structure Smart Module (cont)

Specification Name	Value Range
Channel Coding	CDMA Reverse Link per IS-95A/ANSI J-STD-008 Rate Set 1 (9.6 Kbps) or Rate Set 2 (14.4 Kbps)
Long Code Mask	42 Zeros
Output Mode	Continuous Loop
Transmit Data Files	9.6 Kbps Random Data 14.4 Kbps Random Data
AWGN Source	
Noise Bandwidth	>1.8 MHz
Eb/No Resolution	0.5 dB
Eb/No Range	0 to 15 dB
Eb/No Accuracy	+/-1.0 dB

RF Analyzer

TABLE 4: RF Analyzer Specifications

Specification Name	Value Range
Freq Range (RX) - Cellular Model	800 MHz - 1 Ghz
Freq Range (RX) - PCS Model	1700 - 2000 MHz
Frequency Resolution	50 Hz
Lock Time	100 msec (within 100 Hz)
Residual FM	<20 Hz rms (300 - 3000 Hz BW)
	<40 Hz rms (50 - 15 KHz BW)
	typically <10 Hz rms
Residual AM	<0.5% (300 - 3000 Hz BW)
RF I/O Port	
Input Impedance (nominal)	50 Ohm
VSWR	1.2:1
Wattmeter - Standard Unit	
Maximum Power	50 W cont
Meas Range	1mW to 50 W
Accuracy	+/- 5% (.1W to 50W over full temp) +/- 10% (1 mW to .1 W)

RF Analyzer (cont)

Specification Name	Value Range
Wattmeter - Low Power Option	
Maximum Power	4 W cont
Meas Range	30 uW to 4 W
Accuracy	+/- 5% (8 mW - 4 over full temp) +/- 10% (30 uW to 8 mW)
Antenna Port	
Input Impedance (nominal)	50 Ohm
VSWR	2.0:1
Noise Figure	< 15 dB
Max Operating Input Level	0 dBm
Port Protection	5 Watts
Frequency Measurement	
Accuracy	timebase

AMPS/TACS Analog Cellular Smart Module

TABLE 5: FM Deviation Measurement - Analog S.M.Specifications

Specification Name	Value Range
Meas Range	+/- 0.1 KHz - +/- 20.0 KHz
Resolution	1 Hz
Accuracy	+/- 4%
Mod Freq Range	20 Hz - 15 KHz

AF Generators

TABLE 6: AF Generators (2) Specifications

Specification Name	Value Range
Frequency Range	10 Hz to 25 KHz
Frequency Resolution	0.1 Hz
Frequency Accuracy	+/- 0.01%
Output Level Range - Generator #1	0.01 Vp-p to 10 Vp-p
Output Level Range - Generator #2	0.01 Vp-p to 18 Vp-p
Output Level Resolution	0.01 Vp-p
Output Level Accuracy	2% for loads > 500 ohms

AF Generators (cont)

Specification Name	Value Range
Audio Function	
Sine Wave Generator	
Total Harmonic Distortion	<1%
Square Wave Generator	
Asymmetry	+/- 5%
Pulse Generator	
Duty Cycle	0.1 +/- 5%
Ramp Generator	
Reset Time	<5 usec
DTMF Generator	
Tone Freq Accuracy	+/- 1%
Digit Duration	0.01 to 9.99 sec in .01 sec steps
Inter-Digit Duration	0.01 to 9.99 sec in .01 sec steps

AF Analyzer

TABLE 7: AF Analyzer Specifications

Specification Name	Value Range
Frequency Measurement	
Measurement Range	20 Hz to 25 KHz
Accuracy	timebase
Resolution	0.1 Hz
AC Voltage Measurement	
RMS	
Measurement Range	1 mV - 35 Volts rms
Accuracy	+/- 3% plus 1 least sig.digit
Resolution (absolute)	Three Digits
Resolution (relative)	0.1 dB
PEAK	
Measurement Range	0.05 V - 50 Volts peak
Accuracy	+/- 2% plus 1 least sig.digit

AF Analyzer (cont)

Specification Name	Value Range
Resolution (absolute)	Three Digits
Resolution (relative)	0.1 dB
Peak Modes	
	+Peak
	-Peak
	+Peak Hold
	-Peak Hold
	(|+Peak|+|-Peak|)/2
	(|+Peak|+|-Peak|)/2 hold
	Larger of +Peak or -Peak
	Lrgr of +Peak or -Peak hold
DC Voltage Measurement'	
Measurement Range	1 mV to 50 V (pos or neg)
Accuracy	+/-1% +/- 1 least sig digit
Resolution (absolute)	three digit
Resolution (relative)	0.1 dB
Distortion Measurement	
Test Frequency	1 KHz
Input Level Range	0.05 to 50 Vpeak (35mv to 35 Vrms)
Display Range	1% to 100%
Accuracy	+/-0.5% distortion for values between 1% & 10% +/-2% distortion for values between 10% & 50%
Resolution	0.1%
SINAD Measurement	
Fundamental Frequency	1 KHz +/- 10 Hz
Input Level Range	0.05 to 50 Vpeak (35mv to 35 Vrms)
Display Range	0 dB to 60 dB
Accuracy	+/- 1.0 dB (6 to 13dB SINAD) +/- 2dB (13 to 40 dB SINAD)
Resolution	0.1 dB

AF Analyzer (cont)

Specification Name	Value Range
Audio Filters	
	<20 Hz High Pass
	50 Hz High Pass
	300 Hz High Pass
	300 Hz Low Pass
	3 KHz Low Pass
	15 KHz Low Pass
	25 KHz Low Pass
	750 usec de-emphasis
	1 KHz Notch
	C-Message Weighting
	6 KHz Bandpass - **
	CCITT Filter

Oscilloscope

TABLE 8: Oscilloscope Specifications

Specification Name	Value Range
Frequency Range	DC to 50 kHz (DC Coupled) 75 Hz to 50 kHz (AC Coupled) *Usable to 175 kHz (3 dB BW)*
Scale/Division	10 mV to 10 V
Amplitude Accuracy	+/- 5%
Time/Division	10 usec to 1 sec
Time Base Accuracy	+/- 1%

Spectrum Analyzer

TABLE 9: Spectrum Analyzer Specifications

Specification Name	Value Range
Frequency Range - Cellular Model	800 MHz to 1 GHz
Frequency Range - PCS Model	1700 - 2000 MHz
Frequency Scan Width	0 to full band (in min 1 kHz steps)
Frequency Span/Resolution BW	**SpanRes Bandwidth**

Spectrum Analyzer (cont)

Specification Name	Value Range
	<20kHz300 Hz
	<200 KHz1 kHz
	<2 MHz3 kHz
	<20 MHz30 kHz
	<200 MHz300 kHz manual override
Amplitude Display	Log with 10 or 2 dB/Div
Amplitude Display Range	80 dB
Reference Level Range	-30 to +50 dBm (in 10 dB steps)
Residual Responses (w/ no input)	below displayed noise level
Image Rejection	60 dB
Spurious Responses	> 70 dB
Intermodulation Response	<-75 dBc
Level Accuracy	+/- 1.5 dB (using Res BW <300 kHz and for inputs > -90 dBM (ant) or for inputs > -50 dBM (RF I/O)) +/- 2.5 dB elsewhere (typical)
Displayed Average Noise Level	<-113 dBm (for 300 Hz Res BW)
Log Scale Linearity	0.5 dB
Dual Band Capability	two independent S/A displays
Display Modes	
	Normal
	Max Hold
	Average
	Peak
	Freeze
Marker Modes	
	Absolute
	Delta
	Peak Search

Specification Name	Value Range
	Center Freq to Marker
	Occupied Bandwidth
Trigger Modes	
	Automatic
	Single Sweep

Tracking Generator

TABLE 10: Tracking Generator Specifications

Specification Name	Value Range
Frequency Range - Cellular Model	800 MHz to 1 GHz
Frequency Range - PCS Model	1700 - 2000 MHz
Frequency Offset	any frequency as long as the offset and freq span are within the band coverage
Output Level Range	Same as Sig Gen
Sweep Modes	Normal and Inverted

CDMA Forward Link Analyzer - Inf S.M.

CDMA Infrastructure Smart Module

TABLE 11: CDMA Forward Link Analyzer - Inf S.M. Specifications

Specification Name	Value Range
Frequency Range - Cellular Model	800 MHz to 1 GHz
Frequency Range - PCS Model	1700 - 2000 MHz
RF Input Level Range	-75 dBm to + 0 dBm (Antenna Port) 0 dBm to + 47 dBm (RF I/O Port)
Input Frequency Error Range	+/-900 Hz
Waveform Quality Measurement (rho)	
Measurement Range	0.500 to 1.000
Measurement Interval	12.5 msec
Accuracy	+/-0.005
Frequency Error Measurement	

CDMA Forward Link Analyzer (cont)

Specification Name	Value Range
Accuracy	+/-10 Hz (using 12.5 mesec meas interval)
Pilot Time Offset Measurement	
Accuracy	+/- 135 nsec
Code Domain Power Measurement	
Dynamic Range	30 dB (relative to total)
Resolution	0.01 dB
Accuracy	+/- 0.005 dB (using 12.5 msec measurement interval)
Code Domain Time Measurement	
Range	+/- 200 nsec (relative to pilot)
Resolution	0.1 nsec
Accuracy	+/- 10 nesc (relative to pilot) (using 12.5 msec measurement interval)
Code Domain Phase Measurement	
Range	+/- 200 mrad (relative to pilot)
Resolution	1 mrad
Accuracy	+/- 10 mrad (relative to pilot) using 12.5 msec measurement interval

Error Vector Analyzer -

CDMA Infrastructure Smart Module

TABLE 12: Error Vector Analyzer CDMA S.M. Specifications

Specification Name	Value Range
Carrier Feed-Through Measurement	
Range	-30 dBc
Accuracy	+/- 1.0 dB
Error Vector Magnitude Measurement	
Range	0% to 50%
Accuracy	+/- 1%
Amplitude Error Measurement	

Specification Name	Value Range
Range	0% to 50%
Accuracy	+/- 1%
Phase Error Measurement	
Range	10.0 deg
Accuracy	+/- 0.5 deg

Prime Power

TABLE 13: Prime Power Specifications

Specification Name	Value Range
AC Voltage Range	90 Vrms - 126.5 Vrms and 207 Vrms - 264 Vrms
DC	
Voltage Range	+10 V to +32V DC
Current	<8 Amps

Frequency Standard

TABLE 14: Frequency Standard Specifications

Specification Name	Value Range
High Stability Oscillator	
Stability	+/- 0.01 ppm over temp
Aging	<+/- 0.5 ppm/yr.
Warm-Up Time	< 5 Minutes
External Oscillator Input	
Input Frequencies	1, 2, 5 and 10 MHz
Input Level	30 mVrms to 2.5 Vrms
Frequency Standard Output	
Output Frequency	10 MHz
Output Level	180 mVrms to 350 mVrms

CDMA Reference

CDMA Infrastructure Smart Module

TABLE 15: CDMA Reference Specifications

Specification Name	Value Range
Even Second Time Reference Port	
Input Impedance	50 Ohm nominal
Clock Reference Port	
Input Frequency	19.6608 MHz
Input Impedance	50 Ohm nominal

General Specifications

TABLE 16: General Specifications

Specification Name	Value Range
Dimensions (H x W x D)	5.2" x 17.5" x 15.25"
Weight	
Analyzer	24 lbs
AMPS / TACS Smart Module	<2.8 lbs
CDMA BTS Test Smart Module	<2.8 lbs
typical Notepad Computer	6.5 lbs
Operating Temperature	0 to +50 deg C
Storage Temperature	-40 to +71 deg C