CX300

ComXpert

General Specifications

General	
Display	
Size	10 in (25.4 cm)
Timebase	
Accuracy	0.02 ppm (0°C to 50°C)
Aging	±0.1 ppm/year
Warm-up time	3 minutes: within ±0.01 ppm
Accuracy with GPS	±25 ppb (GPS Lock)
	±50 ppb (Hold over 72 hours)
External Reference	10 MHz
RF Generator	
Frequency	
Range	100 kHz to 3GHz (Standard)
	3 GHz to 6 GHz (CX300-F6GHz)
Resolution	1 Hz
Accuracy	Same as timebase
Output Level	
RF Duplex Port Range	-140 dBm to -30 dBm (10 MHz to 1 GHz); -37 dBm for AM and Complex modulation
RF Output Port Range	-130 dBm to +17 dBm (10 MHz to 1 GHz); +10 dBm for AM and Complex modulation
Resolution	0.1 dB
Accuracy	±1.0 dB (output level >-120 dBm, 1 MHz to 6 GHz)
	±2.0 dB (output level >-130 dBm, 1 MHz to 6 GHz)
	±1.0 dB typical
Bandwidth	100 MHz
VSWR	
RF Duplex Port	<1.1 (1 MHz to 1 GHz); <1.2 (1 GHz to 6 GHz)
RF Output Port	<1.4 (1 MHz to 1 GHz); <1.5 (1 GHz to 6 GHz)

Spectral Purity (Frequency ≥1 MHz and Level ≤+10 dBm)	
Phase Noise	-112 dBc/Hz at 10 kHz offset at 500 MHz
	-110 dBc/Hz at 10 kHz offset at 1000 MHz
Harmonics	-35 dBc
Non-Harmonics	-45 dBc
Residual AM	<0.1% RMS
Residual FM	<3 Hz RMS 300 Hz to 3 kHz
Analog Modulation	
Modulation	
Modes	AM, FM, PM, SSB
Frequency Range	20 Hz to 20 kHz
Distortion	<1% THD
AM	
Range	0% to 100%
Resolution	0.1%
Accuracy (internal source)	≤±5% of settings
FM	
Range	0 Hz to 100 kHz
Resolution	1 Hz
Accuracy (internal source)	≤±2.5% of setting with frequency response of ±0.5 dB 20 Hz to 10 kHz
PM	
Range	0 rad to 6.3 rad
Resolution	0.1 rad
Accuracy	<±2.5% of setting with frequency response of ±0.5 dB 20 Hz to 10 kHz
SSB	
Modulation frequency	30 Hz to 20 kHz
Carrier suppression	>70 dB
Sideband suppression	>60 dB
Internal Modulation Sources	
Number of sources	3
Sources	
Waveforms	Sine, Square, Triangle, Ramp, DTMF, DCS, CTCSS, Tone Remote, Tone Sequential, Two-Tone Sequential
Sine Wave	
Range	20 Hz to 20 kHz
Resolution	0.1 Hz

Square Wave	
Range	20 Hz to 20 kHz
CTCSS tone	Tone 1 (67) to Tone 50 (254.1) Hz
Distortion	THD <1.0%
Frequency Response	Level flatness ≤0.5 dB 20 Hz to 10 kHz
RF Receiver	
Frequency	
Range	9 kHz to 3 GHz (Standard)
	3 GHz to 6 GHz (CX300-F6GHz)
Maximum Input Level	
RF Input Port Maximum Input Level	+27 dBm (500 mW) max preamp and frequency ≥1 MHz
	+13 dBm (20 mW) max preamp on or frequency <1 MHz
RF Duplex Port Maximum Input Level	+47 dBm (50 Watts) continuous, +<35°C
	+51 dBm (125 Watts) Cyclical (Max "ON" of 30 sec and Min "OFF" for 90 sec) for power levels >50 Watts
Shutdown	Alarm sounds (no auto shutdown)
VSWR	
RF Duplex Port	≤1.2 (100 kHz to 1 GHz)
RF Input Port	≤1.6 (100 kHz to 1 GHz) with 10 dB input attenuation
Harmonic Response	
Spurious Response	Input related ≤-65 dBc typical
	Non-input related ≤-95 dBm typical
Phase Noise	-112 dBc/Hz at 10 kHz offset at 500 MHz
	-110 dBc/Hz at 10 kHz offset at 1000 MHz
Dynamic Range	2/3 * (TOI-DANL) = 109 dB
TOI	+20 dBm (0 atten), >+1 dBm (preamp), 1 MHz to 1 GHz
DANL	900 MHz: <-146 dBm (0 dB attenuation),-162 dBm (preamp)
	1000 MHz: <-142 dBm (0 dB attenuation), <-160 dBm (preamp)
Sensitivity	
Analog	10 dB SINAD, <-105 dBm with preamp (300 Hz to 3 kHz audio filter, 2.5 kHz FM deviation, 12.5 kHz IF BW)
Bandwidth	100 MHz (wideband VSA), 8 MHz (narrowband)
RF Bandpass Filter (IF Filters)	5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 25 kHz, 30 kHz, 100 kHz, 300 kHz
Power Meter	
Frequency	
Range	100 kHz to 3 GHz (Standard)
	3 GHz to 6 GHz (CX300-F6GHz)
Measurement Modes	RMS, average RMS, minimum, maximum
Bandwidth	5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 25 kHz, 30 kHz, 100 kHz, and 300 kHz

Level	
RF Duplex Port	-20 dBm to +51 dBm
RF Input Port	-60 dBm to +10 dBm
Accuracy	
RF Duplex Port	±0.4 dB (1 MHz to 1 GHz); ±0.6 dB (1 GHz to 6 GHz)
RF Input Port	±0.8 dB (1 MHz to 1 GHz), ±0.9 dB (1 GHz to 6 GHz)
RF Error Meter	
Frequency	
Range	100 kHz to 3 GHz (Standard)
	3 GHz to 6 GHz (CX300-F6GHz)
Resolution	1 Hz
Accuracy	Frequency Reference
Input Level Range	
RF Duplex Port	-20 dBm to 51 dBm
RF Input Port	-60 dBm to +17 dBm (-80 dBm to -20 dBm w/pre-amp)
Analog Demodulation Measurements	
FM	
Modes	RMS, RMS*√2, +PK, -PK, ±PK/2
Measurement Range	0 Hz to 75 kHz
Accuracy	±1.0% for rate ≥1.5 kHz and ≤3 kHz
	±2.0% otherwise
FM Distortion	±0.5% for rate ≤3 kHz
	±1.0% otherwise
Residual FM	≤3 Hz (300 Hz to 3 kHz) and frequency <1 GHz
AF Frequency Range	10 Hz to 20 kHz
AM	
Modes	RMS, RMS*√2, +PK, -PK, ±PK/2
Measurement Range	0% to 100%
Accuracy	±1.0% for rate ≥1.5 kHz and ≤3 kHz ±2%
AM Distortion	±0.5% for rate ≤3 kHz
	±1.0% otherwise
AF Frequency Range	10 Hz to 20 kHz
Residual AM	<0.1% (300 Hz to 3 kHz)
PM	
Range	0 radians to 6.3 radians
Resolution	0.01 rad for ≤5 rad
	0.1 rad for >5 rad
Accuracy	±2.0%, ±1.0% (rate 1.5 kHz to 3 kHz)

SSB	
Modes	SSB-USB, SSB-LSB
Measurement Range	Frequency error, Power (RMS), Power (PEP)
Audio and Demodulation Meters	
Distortion Meter	
Frequency Range	50 Hz to 10 kHz
Measurement Range	0% to 100%
Accuracy	<3% of reading +0.1% distortion, 1% to 20%
SINAD Meter	
Frequency Range	50 Hz to 10 kHz
Measurement Range	0 dB to 63 dB
Accuracy	<±1 dB
Resolution	0.01 dB
S/N Meter	
Frequency Range	50 Hz to 10 kHz
Measurement Range	0 dB to 63 dB
Accuracy	<1 dB
AF Counter	
Frequency Range	50 Hz to 10 kHz
Accuracy	Timebase ±1 Hz
AF Tones Analyzer	
Modes	DTMF, DCS, CTCSS, Two-Tone, Tone Sequential, Tone Remote
Audio Level Meter	
Input Impedance	100 kΩ, 600 Ω
Level	
Range	0 Vrms to 30 Vrms
Audio Analyzer	
Frequency Range	DC to 100 kHz
Frequency Resolutions	0.8 Hz to 2.4 Hz RBW
FFT Windows	Flat top, rectangular, Hamming, Hann, Blackman-Harris
Level	
Range	50 mVrms to 30 Vrms
Accuracy	±5% (Audio) ±1% (DC)

Audio Filters	
Lowpass	300 Hz, 3 kHz, 3.4 kHz, 5 kHz, 15 kHz, 20 kHz, 40 kHz
Highpass	20 Hz, 50 Hz, 300 Hz
Other	C-MSG, CCITT
De-emphasis	75 µs, 750 µs
FFT / Channel Analyzer	
Span	2 kHz to 8 MHz
IF Bandwidth	10 MHz
RBW	1 Hz to 50 kHz
Detector	Normal, positive peak, negative peak, sample, average (RMS)
Accuracy	RF Duplex Port: ±0.7 dB (1 MHz to 1 GHz), ±1 dB (1 GHz to 6 GHz) for level >-10 dBm
	RF Input Port: ±1.0 dB (1 MHz to 1 GHz), ±1.1 dB (1 GHz to 6 GHz) for level >-50 dBm
Spectrum Analyzer	
Frequency Range	9 kHz to 3 GHz (Standard)
	3 GHz to 6 GHz (CX300-F6GHz)
RBW Range	25 Hz to 6 MHz
Span Range	0 Hz to (9 kHz to max frequency of each band)
VBW Range	5 Hz to 6 MHz
Sweep Time Range	0.4 ms to 1000 s
Spurious Free Dynamic Range	≥80 dB
Display Range	1 dB/div to 20 dB/div with 10 divisions
Trigger	Free run, external
DANL	<-142 dBm (0 atten), <-162 dBm (preamp)
Zero Span Analyzer	
Sweep Time	
Range	24 µs to 200 s
Tracking Generator	
Output Ports	RF Output Port, RF Duplex Port
Level	
Range	Same as RF Generator
Accuracy	Same as RF Generator

I/Q Recorder	
Sample	
Length	4 Msamples
Rate	Variable to support up to 100 MHz of analog bandwidth
Trigger	
Trigger Source	Free run
AF Generator	
Output	
Impedance	<4 Ω
Max Output Current	100 mA
Frequency	
Range	0 Hz to 100 kHz
Resolution	0.1 Hz
Accuracy	Timebase
Level	
Range	0 Vpk to ±8 Vpk into 600 Ω
Accuracy	±2% (level >=200 mV and frequency from 20 Hz to 20 kHz)
Resolution	0.1 mV
Distortion	
THD+N	<-75 dB for frequency 1 kHz and level 1 Vrms
AF Composite Signals	Sine, Square, Triangle, Ramp, DC Plus, DC Minus, DTMF, DCS, CTCSS, Tone Remote, Tone Sequential, Two-Tone Sequential
Oscilloscope	
Display	
Traces	1
Markers	6
Horizontal	
Sweep per div	1 µs to 100 ms/div
Accuracy	<2%
Vertical	
Range	1 mV/div to 20 V/div
Accuracy	<5%
Bandwidth	20 kHz
Input Range	20 mV to 30 Vrms (42.4 Vpk)
Coupling	AC, DC
Input Impedance	300 Ω, 600 Ω, 100 kΩ single ended, ±1% shunted by <300 pF 200 kΩ differential, ±8%
Trigger	
Modes	Single, Normal, Automatic, Free run
Digital	
Modes	P25, P25 Phase 2

P25 Measurements	
Accuracy	
Modulation Fidelity	<5% of reading (2.5% to 12%)
Symbol Deviation	±1%
Frequency Error	Timebase ±0.5 Hz
Symbol Rate Error	Timebase ±0.1 ppm
DMR Measurements	
FSK Error	
Range	0 to 20%
Resolution	0.01%
Accuracy	<5% of reading (2.5 to 10%)
Symbol Deviation	
Range	1500 Hz to 2350 Hz
Resolution	0.1 Hz
Accuracy	±10 Hz (1745 to 2140 Hz)
Symbol Clock Error	
Range	±1000 mHz
Resolution	0.01 mHz
Accuracy	1 ppm (-48 to +48 mHz)
Frequency Error	
Range	±4000 Hz
Resolution	0.01 Hz
Accuracy	Frequency Standard ±1 count
Magnitude Error	
Range	0 to 5%
Resolution	0.01%
Accuracy	<10% of reading (0 to 2%)
UUT TX / RX Bit Error Rate	
Range	0 to 20%
Resolution	0.1%
Signal Power / Slot Power	
Range	Reference Port Range
Resolution	0.1 dB
Accuracy	±1 dB (typically better than ±0.6 dB)
Protocol	
Decode	Color Code, Call ID, Unit ID
Accuracy	Color Code, Call ID

Vector Network Analyzer

Frequency	
Range	1 MHz to 6 GHz
Resolution	0.1 Hz
Accuracy	Same as timebase
Test port Power	
Port 1	+10 dBm
Dynamic Range	90 dB
Measurements	
Parameters	S11
Graph Type	Log Magnitude (dB), SWR (Linear)
Domains	Frequency, Distance
Calibration Type	Full S11
Calibration Method	Short-Open-Load
Distance Domain	
Maximum distance	1000 ft (305 m)
Measurement Display	Return Loss, VSWR
Measurement Format	dB, VSWR

Environmental/Physical

Weight	15 lbs (6.8 kg)
Temperature, Not Operating	-40°C to +71°C
	Note: Battery must not be subjected to temperatures below -20°C, nor above +60°C
Temperature, Operating	0°C to 50°C
Relative Humidity	95% RH (non-condensing)
Altitude	4600 m
Vibration	MIL-PRF-28800F Class 3
Shock, functional	MIL-PRF-28800F Class 3
Bench handling	MIL-PRF-28800F Class 3
Transit Drop	MIL-PRF-28800F Class 3
Battery	
Type	Lithium Ion, 14.4 V, 6.8 Ah
Operating Time	2.3 hours typical with 2 batteries
Battery Charging Limits	0°C to 45°C (32°F to 113°F) ≤85% RH
Compliance	
EMC	EMC IEC/EN 61326-1:2013, CISPR11:2009 +A1:2010
Safety	EN 61010-1, 3rd Edition

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