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GSG-2000 Specification

FREQUENCY SPECIFICATIONS				
FREQUENCY RANGE				
Frequency Range	**9 kHz to 6 GHz**	GSG-2160, GSG-2060		
Frequency Resolution		1 mHz		
Frequency Bands		**Band**	**Frequency Range**	**N**
		1	9 kHz to 5 MHz	digital synthesis
		1	< 5 MHz to 187.5 MHz	1
		2	< 187.5 MHz to 375 MHz	0.25
		3	< 375 MHz to 750 MHz	0.5
		4	< 750MHz to 1500 MHz	1
		5	< 1500 MHz to 3000 MHz	2
		6	< 3000 MHz to 6000 MHz	4
Frequency Switching		< 5 ms		
PHASE NOISE @ 20 KHZ OFFSET				
Frequency (MHz)	**Range**	**ALC on**	**ALC off**	
	5	-	-122	
	100	-112	-115	
	250	-112	-117	
	1000	-112	-117	
	2000	-108	-112	
	3000	-107	-110	
	6000	-102	-105	
Residual FM (0.3 kHz to 3 kHz) (1 GHz CW)		< 2 Hz		
NON HARMONICS				
Non Harmonics	**Level > -10 dBm, offset > 10 kHz**	< -65 dBc	1 MHz ≤ freq < 5MHz	
		< -72 dBc	5 MHz ≤ freq < 187.5 MHz	
		< -75 dBc	187.5 MHz ≤ freq < 750 MHz	
		< -72 dBc	750 MHz ≤ freq < 1500 MHz	
		< -66 dBc	1500 MHz ≤ freq < 3000 MHz	
		< -58 dBc	3000 MHz ≤ freq < 6000 MHz	
HARMONICS				
Range		Level < 4 dBm		
9 kHz ≤ Freq < 6000 MHz		< -35 dBc		
JITTER				
		SONET/SDH data rate	**rms jitter BW**	**Seconds, typical**
Carrier Frequency	**1 GHz**	1000 MB/s	1 Hz to 10 MHz	229 fs
	155 MHz	155 MB/s	100 Hz to 1 MHz	1.38 ps
	622 MHz	622 MB/s	1 kHz to 3 MHz	0.17 ps
	2.488 GHz	2488 MB/s	5 kHz to 10 MHz	0.12 ps
FREQUENCY REFERENCE				
Frequency Reference		10 MHz		
Temperature Stability		< 10 ppm, Standard	< 5 ppb, OCXO Option	
Aging		2 ppm/year, Standard	0.1 ppm/year, OCXO Option	
Output		1 Vpp, 50 Ohm Load		
Input		-3 dBm to 20 dBm, 50 Ohm Load		
Input Deviation		3 ppm, for GSG-2160		

		0.5 ppm, for GSG-2060		
AMPLITUDE SPECIFICATIONS				
AMPLITUDE				
Setting Range		20 dBm to -140 dBm		
Resolution		0.01 dB		
Amplitude Unit		dBm, dBuV, Vrms		
AMPLITUDE ACCURACY				
Absolute level accuracy in CW mode (ALC On)		**14 dBm to -60 dBm**	**-60 dBm to -90 dBm**	**-90 dBm to -110 dBm**
	9 kHz < freq < 3 GHz	± 0.6 dB	± 0.8 dB (0.6 dB typical)	± 1 dB (0.7 dB typical)
	3 GHz < freq < 6 GHz	± 0.8 dB	± 1 dB (0.6 dB typical)	± 1.2 dB (0.7 dB typical)
Addition level error		< 0.15 dB, at ALC Off, Power search run		
VSWR (5 MHz to 3 GHz)		< 1.8 (output ≤ -40 dBm)		
Amplitude Switching (ALC on, CW)		< 5 ms		
SWEEP SPECIFICATIONS				
SWEEP				
Mode		frequency, amplitude, list		
Dwell time		100 us to 100 s		
Number of points(step)		2 to 65535		
Number of points(list)		1 to 4096		
Triggering		free, trigger key, external, timer		
ANALOG MODULATION SPECIFICATIONS				
FM				
Source		internal, external		
Max. Deviation		N x 1 MHz		
Rate	**freq > 10 MHz**	0.1 Hz to 1 MHz		
	freq < 10 MHz	0.1 Hz to 100 kHz		
Resolution		1 mHz		
Accuracy (1 kHz rate)		2 % setting +20 Hz		
Distortion (1 kHz rate, N x 50 kHz deviation)		0.4 %		
PM				
Source		internal, external		
Max. Deviation		N x 1 MHz/rate or 5N rad		
Rate	**freq > 10 MHz**	0.1 Hz to 1 MHz		
	freq < 10 MHz	0.1 Hz to 100 kHz		
Resolution		0.001 rad		
Accuracy (1 kHz rate)		1 % of setting + 0.1 rad		
Distortion (1 kHz rate, max deviation)		0.2 %		
Response		0.1 Hz to 1 MHz		
AM				
Source		internal, external		
Resolution		0.01 %		
Depth		0 % to 100 %		
Accuracy (1 kHz, 0 dBm)	**< 5 MHz**	1.5 % setting + 1 %		
	5 MHz to 4 GHz	3 % of setting + 1 %		
	4 GHz to 6 GHz	5 % of setting + 1 %		
Distortion (1 kHz, 80 %, < 8 dBm)	**< 5 MHz**	1.5 %		
	5 MHz to 4 GHz	2 %		

	4 GHz to 6 GHz	3 %
Response		0.1 Hz to 20 kHz
PULSE SPECIFICATIONS		
PULSE		
Mode		Free-run, square, triggered, adjustable doublet, trigger doublet, gated, pulse train, and external pulse
Source		internal, external
Pulse Input		-0.5 V to 5 V, $V_{IL} = V_{IH} = 1.5$ V (typ.)
Edge Time		< 20 ns
On/Off Ratio		70 dB, 5 MHz to 3 GHz
		45 dB, 3GHz to 6 GHz
Repitition Rate		0.1 Hz to 10 MHz
Pulse Period		100 ns to 42 s
Resolution		10 ns
Width		50 ns to period - 10ns
Pulse Train Number of Patterns		2047
LF PECIFICATIONS		
LF		
Waveform		sine, square, triangle, ramp, gaussian noise
Frequency Range	Sine	0.1 Hz to 10 MHz
	Square, Triangle, Ramp	0.1 Hz to 1 MHz
	Gaussian Noise	10 MHz BW
Resolution		1 mHz
Output		2 mVpp to 6 Vpp
Impedance		50 Ohm
VECTOR MODULATION SPECIFICATIONS		
VECTOR MODULATION (GSG-2160 ONLY)		
Source		internal, external
Bandwidth (baseband)		60 MHz
Bandwidth (RF)		120 MHz
Carrier Frequency		< 5 MHz to 6000 MHz
Carrier Suppression	25 ± 5 ℃	> 50 dBc
Sideband Suppression	25 ± 5 ℃	> 50 dBc
Modulation Mode		ASK, PSK, APSK, QAM, FSK, MSK, user define IQ, user define FSK
ASK		2ASK(0 % to 100 %), 4ASK, 8ASK, 16ASK, 32ASK
PSK		BPSK, QPSK, DQPSK, OQPSK, $\pi/4$ DQPSK, 8PSK, D8PSK, 16PSK
APSK		16APSK, 32APSK
QAM		16QAM, 32QAM, 64QAM, 128QAM, 256QAM
FSK		2FSK, 4FSK, 8FSK, 16FSK
Internal Modulation EVM (16QAM, RRC filter, α = 0.25, 4 Msps, level ≦ 4 dBm, ALC off)		0.8 %, 10 MHz < freq < 3 GHz
		1.2 %, 3 GHz < freq < 5 GHz
IQ GENERATOR		
Resolution		16 bit
Sample Rate		10 kHz to 180 MHz
Baseband Bandwidth		60 MHz
ARB Memory	Waveform Length	16 Msa
	Storage Capacity	16 GB
Trigger Type		free, single, gated, trigger and run

Trigger Source	external, trigger key
INTERNAL IQ ADJUSTMENT	
IQ Offset	± 10 %
IQ Gain	± 6 dB
IQ Skew	max 30 ps ~ 100 ps
EXTERNAL IQ OUTPUT	
Impedance	50 Ohm per output
Maximum per Output	0.5 Vpk
Bandwidth	60 MHz
Common Mode Offset	± 1.25 V
Differential Mode Offset	± 50 mV
EXTERNAL IQ INPUT	
Bandwidth	60 MHz
Full Scale	± 1 V into 50 Ohm
IQ Offset	± 10 % full scale
IQ Gain	± 6dB
SIMULTANEOUS MODULATION	
All modulation types (I/Q, FM, AM, ΦM, and pulse modulation) may be simultaneously enabled except: FM and phase modulation.	
GENERAL SPECIFICATIONS	
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Power Source	AC 100 V to 240 V, 50 Hz to 60 Hz
Power Consumption	90 VA Maximum
Display	7-inch TFT LCD, 1024(RGB) x 600
Operating Temperature	0 ℃ to 50 ℃
Storage Temperature	-10 ℃ to 70 ℃
Humidity	85 % at 40 ℃
Altitude	Up to 2000m
Dimensions (W x H x D)	430 mm x 140 mm x 540 mm
Weight	Approx. 13 kg