

**GSG-2000 SERIES SPECIFICATIONS**

FREQUENCY RANGE			
Frequency Range	9kHz ~ 6GHz	GSG-2160, GSG-2060	
Frequency Resolution	1mHz		
Frequency Bands	<b>Band</b>	<b>Frequency Range</b>	<b>N</b>
	1	9kHz to 5MHz	digital synthesis
	1	<5MHz to 187.5MHz	1
	2	<187.5MHz to 375MHz	0,25
	3	<375MHz to 750MHz	0,5
	4	<750MHz to 1500MHz	1
	5	<1500MHz to 3000MHz	2
	6	<3000MHz to 6000MHz	4
Frequency Switching	≤5ms		
SSB PHASE NOISE, CW at 20kHz OFFSET(dBc/Hz)			
Frequency (MHz)		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 (0.3kHz ~ 3kHz)(1GHz CW)	<2Hz		
NON HARMONICS			
Non Harmonics	Level > -10dBm, Offset > 10kHz	<-65dBc	1M ≤ freq. ≤ 5M
		<-66dBc,-70dBc(typ)	5M < freq. ≤ 187.5M
		<-75dBc	187.5M < freq. < 750M
		<-70dBc,-74dBc(typ)	750M ≤ freq. < 1500M
		<-62dBc,-66dBc(typ)	1500M ≤ freq. < 3000M
		<-58dBc,-60dBc(typ)	3000M ≤ freq. < 6000M
HARMONICS			
Range	Level < 4dBm		
9k ≤ Freq < 6000M	<-35dBc		
FREQUENCY REFERENCE			
Frequency Reference	10MHz		
Temperature Stability	<10ppm, Standard	<10ppb, OCXO Option	
Aging	2ppm/year, Standard	0.1ppm/year, OCXO Option	
Output	1Vpp, 50 Ohm Load		
Input	-3 ~ 20dBm, 50 Ohm Load		
Input Deviation	Standard: 3ppm	OCXO Option: 0.5ppm	
AMPLITUDE SPECIFICATIONS			
AMPLITUDE			
Setting Range	20dBm ~ -140dBm		
Resolution	0.01dB		
Amplitude Unit	dBm, dBμV, Vrms		
AMPLITUDE ACCURACY			
Absolute Level Accuracy in CW Mode (ALC On)	<b>14dBm to -60dBm</b>	<b>-60dBm to -90dBm</b>	<b>-90dBm to -110dBm</b>
9k < freq. < 3GHz	±0.6dB	±0.8dB (±0.6dB typical)	±1dB (±0.7dB typical)
3GHz < freq. < 6GHz	±0.8dB	±1dB (±0.6dB typical)	±1.2dB (±0.7dB typical)
Addition Level Accuracy in CW Mode (ALC Off, Power Search Run, Relative to ALC On)	0.15dB		
VSWR (5M ~ 3GHz)	<1.8 (output ≤ -66dBm)		
Amplitude Switching (ALC on, CW)	≤5ms		
SWEEP SPECIFICATIONS			
SWEEP			
Mode	Frequency, amplitude, list		
Dwell Time	100μs ~ 100s		
Number of Points (Step)	2 ~ 65,535		
Number of Points (List)	1 ~ 4,096		
Triggering	Free, trigger key, external, timer		
ANALOG MODULATION SPECIFICATIONS			
FM			
Source	Internal, external		
Max. Deviation	N*1MHz		
Rate	freq ≥ 10MHz	0.1Hz ~ 1MHz	
	freq < 10MHz	0.1Hz ~ 100kHz	
Resolution	1mHz		
Accuracy (1kHz rate, N*50kHz deviation)	2% setting + 20Hz		
Distortion (1kHz rate, N*50kHz deviation)	0,40%		
PM			
Source	Internal,external		
Max. Devitaion	N* 1MHz/rate or 5N rad		
Rate	freq ≥ 10MHz	0.1Hz ~ 1MHz	
	freq < 10MHz	0.1Hz ~ 100kHz	
Resolution	0.001rad		
Accuracy (1kHz rate)	1% of setting+0.1rad		
Distortion (1kHz rate, max deviation)	0,20%		
Response	0.1Hz ~ 1MHz		
AM			
Source	internal, external		
Resolution	0,01%		
Depth	0 ~ 100%		
Accurcay (1kHz, 0dBm)	<5MHz	1.5% setting +1%	
	5M ~ 4GHz	3% of setting+1%	
	4GHz ~ 6GHz	5% of setting + 1%	
Distortion (1kHz, 80%, <8dBm)	<5MHz	1,50%	
	5M ~ 4GHz	2%	
	4GHz ~ 6GHz	3%	
Response	0.1Hz ~ 20kHz		
PULSE SPECIFICATIONS			
PULSE			
Mode	Free-run, square, triggered, adjustable doublet, trigger doublet, gated, pulse train, and external pulse		
Source	Internal,external		
Pulse Input	-0.5V ~ 5V, V <sub>IL</sub> =V <sub>IH</sub> =1.5V (typ)		
Edge Time	<20ns		
On/Off Ratio	70dB, 5M ~ 3GHz		
	45dB, 3G ~ 6GHz		
Repetition Rate	0.1Hz ~ 10MHz		

Pulse Period	100ns ~ 42s	
Resolution	10ns	
Width	50ns ~ period-10ns	
Pulse Train Number of Patterns	2047	
<b>LF PECIFICATIONS</b>		
LF		
Waveform	Sine, square, triangle, ramp, gaussian noise	
Frequency Range	Sine	0.1Hz ~ 10MHz
	Square, Triangle, Ramp	0.1Hz ~ 1MHz
	Gaussian Noise	10MHz BW
Resolution	1mHz	
Output	2mVpp ~ 6Vpp	
Impedance	50 Ohm	
<b>VECTOR MODULATION SPECIFICATIONS</b>		
VECTOR MODULATION (GSG-2160 only)		
Source	Internal, external	
Bandwidth (baseband)	60MHz	
Bandwidth (RF)	120MHz	
Carrier Frequency	<5MHz ~ 6,000MHz	
Carrier Suppression	25±5°C	>50dBc
Sideband Suppression	25±5°C	>50dBc
Modulation Mode	ASK, PSK, APSK, QAM, FSK, MSK, user define IQ, user define FSK	
ASK	2ASK(0 ~ 100%), 4ASK, 8ASK, 16ASK, 32ASK	
PSK	BPSK, QPSK, DQPSK, OQPSK, π/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, 4Msps, level ≤4dBm, ALC off)	0.8%, 10MHz < freq < 3GHz 1.2%, 3GHz < freq < 5GHz	
<b>IQ GENERATOR</b>		
Resolution	16bit	
Sample Rate	10kHz ~ 180MHz	
Baseband Bandwidth	60MHz	
ARB Memory	Waveform Length	16Msa
	Storage Capacity	16GB
Trigger Type	Free, single, gated, trigger and run	
Trigger Source	External, trigger key	
<b>INTERNAL IQ ADJUSTMENT</b>		
IQ Offset	±10%	
IQ Gain	±6dB	
IQ Skew	max 30ps ~ 100ps	
<b>EXTERNAL IQ OUTPUT</b>		
Impedance	50Ohm per output	
Maximum per Output	0.5Vpk	
Bandwidth	60MHz	
Common Mode Offset	±1.25V	
Differential Mode Offset	±50mV	
<b>EXTERNAL IQ INPUT</b>		
Bandwidth	60MHz	
Full Scale	±1V into 50Ohm	
IQ Offset	±10% full scale	
IQ Gain	±6dB	
<b>SIMULTANEOUS MODULATION</b>		
All modulation types (I/Q, FM, AM, ΦM, and pulse modulation) may be simultaneously enabled except: FM and phase modulation		
<b>GENERAL SPECIFICATIONS</b>		
Power Source	AC 100 ~ 240V, 50 ~ 60Hz	
Power Consumption	90VA Maximum	
Display	7 inch TFT LCD, 1024(RGB)*600	
Interface	GPIB (option), USB, LAN	
Operating Temperature	0 ~ 50°C	
Storage Temperature	-10 ~ 70°C	
Humidity	85% at 40°C	
Altitude	Up to 2000m	
Dimensions (W x H x D) & Weight	430(W) x 140(H) x 540(D)mm ; Approx. 13 kg	