

4. SPECIFICATION

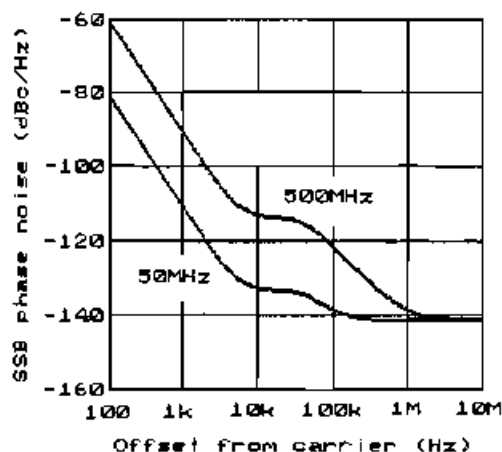
FREQUENCY

Range	100kHz to 2.4GHz. Extended range 50kHz to 2.5GHz (with error limits removed).
Resolution	5Hz (carrier 100 kHz to <37.5MHz), 1Hz (carrier 37.5MHz to <75 MHz), 2Hz (carrier 75 MHz to <150 MHz), 5Hz (carrier 150 MHz to <600 MHz), 10Hz (carrier 600 MHz to <1.2 GHz), 20Hz (carrier 1.2 GHz to 2.4 GHz).
Stability (standard)	$\pm 1\text{E}^{-6}$ (0 to +55°C), $\pm 2\text{E}^{-7}$ per month.
(option O)	$\pm 2\text{E}^{-7}$ (0 to +40°C), $\pm 8\text{E}^{-8}$ per month during first year, $\pm 4\text{E}^{-8}$ per month after first year.

RF OUTPUT

Range	-143.0dBm to +16dBm, (0.016 μ V to 1.41V rms pd). Overrange to +19dBm (carrier <600MHz).
Resolution	0.05dB (carrier \geq -100dBm), 0.1dB (carrier < -100dBm).
Units	dBm, dB μ V, V, mV, μ V (pd).
Absolute level accuracy	± 1 dB for carrier levels of +4dBm to +16dBm. For carrier levels of -127dB to <+4dBm: ± 1.5 dB (carrier <1.2GHz), ± 2.5 dB (carrier \geq 1.2GHz). For carrier levels of <-127dBm: ± 3.0 dB, typical.
Source impedance	50 Ω .
VSWR	<1.5:1 (carrier <+4dBm).

Third order intermodulation (modulation off)	<-50dBc for carrier levels of $\geq +4$ dBm with two PSG2400A signal generators combined in a resistive 6dB coupler (carrier separation ≥ 5 kHz). <-60dBc for carrier levels of $< +4$ dBm.
Reverse power protection	25W maximum (from 50 Ω source), 100kHz to 2.4GHz, user reset. 25V DC maximum.
Trip level	100mW typical.
SPECTRAL PURITY	For carrier levels of $< +10$ dBm.
Harmonics	<-30dBm.
Sub-harmonics	<-70dBc (carrier < 1.2 GHz), <-30dBc (carrier ≥ 1.2 GHz).
Non-harmonic spurious	<-60dBc at carrier offsets ≥ 3 kHz.
Residual FM	<20Hz rms at 2.4GHz (CCITT P53A weighting) reducing by 6dB/octave to <0.625Hz rms at 37.5MHz, <2.5Hz rms below 37.5MHz.
Residual AM	<0.1% rms, 50Hz to 15kHz bandwidth.
SSB phase noise	Typical characteristics shown for carrier frequencies of 50 and 500 MHz.



Noise floor <-135dBc/Hz.

AM on 20kHz FM	<0.5% at 1kHz rate, 50Hz to 15kHz bandwidth.
FM on 30% AM	<200Hz at 1kHz rate, 50Hz to 15kHz bandwidth.
Carrier leakage	<0.5 μ V (2 turn 25mm loop, 25mm away).

AMPLITUDE MODULATION

For carrier levels of <+10dBm:

Depth	0 to 99.9%. AM depth reduces in a linear fashion from 99.9% at <+10dBm to 10% at +15.0dBm .
Resolution	0.1%.
Accuracy	All at 1kHz rate: $\pm 5\%$ of reading up to 90% depth,(carrier <600MHz), $\pm 15\%$ of reading up to 50% depth,(carrier \geq 600MHz).
Modulation response	Relative to 1kHz rate: Internal: ± 1 dB 0.1Hz to 50kHz, External: ± 1 dB 50Hz to 50kHz, ± 1 dB DC to 50kHz (DCFM selected), -3dB typical at 100kHz, up to 50% depth.
Distortion (THD)	All at 1kHz rate, 50Hz to 15kHz bandwidth: <1% up to 30% depth (carrier <600MHz), <3% up to 80% depth (carrier <600MHz), <5% up to 50% depth (carrier \geq 600MHz).

FREQUENCY MODULATION

Maximum peak deviation	100kHz to <37.5MHz, 250kHz, 37.5MHz to <75MHz, 62.5kHz, 75MHz to <150MHz, 125kHz, 150MHz to <300MHz, 250kHz, 300MHz to <600MHz, 500kHz, 600MHz to <1.2GHz, 1MHz, 1.2GHz to 2.4GHz, 2MHz, Extended range of 5x the above, (with error limits removed).
Resolution	10Hz (<10kHz peak), 100Hz (<100kHz peak), 1kHz (<1MHz peak), 10kHz (\geq 1MHz peak).

Accuracy	±5% of reading at 1kHz rate, excluding residual FM.
Modulation response	Internal/external relative to 1kHz rate: ±1dB 50Hz to 100kHz, ±1dB 0.1Hz or DC to 100kHz (DCFM selected), ±3dB up to 500kHz.
Distortion (THD)	All at 1kHz rate, 50Hz to 15kHz bandwidth: <0.5% up to 10kHz peak deviation, <1% up to 100kHz peak deviation, <2% up to maximum peak deviation typical.
DCFM frequency drift	After 30 minutes warm up and under constant ambient temperature conditions <±250Hz/10 minutes at 100MHz, typical.
DCFM frequency offset	<±150Hz at 100MHz, typical.
WIDEBAND FM	Using the external modulation input, (no internal level adjustment).
Bandwidth (6dB)	50kHz to 10MHz.
Impedance	50Ω nominal.
Sensitivity	1V peak for maximum peak deviation, (see frequency modulation).
PHASE MODULATION	
Deviation	0 to 9.99 rads.
Resolution	0.01 rad.
Accuracy	±10% of reading at 1kHz rate, excluding residual PM.
Modulation response	Internal/external relative to 1kHz rate: ±2dB 100Hz to 10kHz.
Distortion	<2% at 1kHz rate, 300Hz to 3kHz bandwidth.

**INTERNAL MODULATION
(SOURCE ONE AND TWO)**

Synthesizer range	0.1Hz to 500kHz.
Resolution	0.1Hz, frequency <1kHz, 1Hz, frequency <10kHz, 10Hz, frequency <100kHz, 100Hz, frequency \geq 100kHz.
Waveform	Sine or square.
Accuracy	As internal standard.
Distortion (THD)in sinewave mode	<0.2% at 1kHz rate (50Hz to 15kHz bandwidth), <2% for rates <100kHz, <3% up to 500kHz rate, typical.

MODULATION OUTPUT

Fixed level	1V rms into 50 Ω .
Variable level	0 to 1V rms in 1mV steps, into 50 Ω .
Accuracy	\pm 5% of reading for levels \geq 100mV rms, at 1kHz rate.
Source impedance	50 Ω nominal.
Distortion	As internal modulation source, (load impedance \geq 10k Ω).

MODULATION SYSTEMS

User defined tones	User defined tone frequencies and durations with up to 16 consecutive tones.
SELCALL	CCIR, EEA, ZVEI, DZVEI, EIA and NATEL standards selectable.
DTMF	The standard low group/high group matrix tones are generated internally.
CTCSS	The audio synthesizers may be mixed internally or with an external input, both levels independantly adjustable.
Simultaneous modulation	AM plus FM or phase modulation, modulation levels independantly adjustable.

EXTERNAL MODULATION

Impedance	>5k Ω .
Level	1V peak for calibration.
Indication	Four digit display,range 0 to 1.000Vrms.
Simultaneous tones	The external input may be mixed with either or both internal sources.

SINAD

Input frequency	1kHz \pm 1Hz.
Input level	30mV to 3V rms.
Impedance	<u>\geq</u> 10k Ω .
Indication	Three digit logarithmic display (true rms detection), with user defined digital averaging. Usable range 0 to 40dB.
Resolution	0.1dB.
Bandwidth	Wideband, 60Hz to 6kHz (-3dB) or CCITT P53A weighting.

SWEEP

Functions	Carrier frequency, carrier level, modulation frequency, modulation level.
Range (start, stop)	Any within setting range.
Total sweep time	1 to 999 seconds.
Sweep sync output	Available on back panel auxiliary socket. Analogue ramp proportional to sweep position with a range of 0 to +10V nominal corresponding to sweep start, stop respectively.

GENERAL

Programmability	<p> GPIB (IEEE 488.2). Functions supported: SH1, AH1, T6, TEO, L4, LEO, SR1, RL1, PPO, DC1, DT0, CO, E2. Setting time (after receipt of last GPIB character): <200ms typical, to within 100Hz of final carrier frequency. <100ms typical, for carrier level and modulation functions. </p>
Memory (non-volatile)	100 complete front panel set ups including last front panel settings. IEEE-488 address.
Internal crystal reference	TCXO, 10MHz.
Internal reference output	0.6V pk-pk into 50Ω, nominal.
External reference frequency	10MHz.
External reference level	0.3 to 3V pk-pk.

POWER REQUIREMENT

AC input	100, 120, 220, 240V AC $\pm 10\%$ 45 to 440 Hz.
DC input (standard)	11.5 to 15V DC.
(option A)	23 to 30V DC.
Consumption	50VA maximum.

RF output level	All carrier level specifications reduced by 3dB. Minimum carrier level -143.0dBm. For example: Maximum level reduced from +16dBm to +13dBm, and spectral purity/amplitude modulation specifications apply for carrier levels of < +7dBm.
Minimum pulse width	50ns.
Maximum pulse repetition frequency	10MHz.
External control (via back panel BNC)	TTL High = carrier on, TTL Low = carrier off. +5V peak maximum.

ACCESSORIES SUPPLIED

Part Number	Description
HC22V2	Detachable AC power cable.
TR201A	N to BNC adaptor.
HC0264	BNC to BNC coaxial cable.
TG212	DC input plug.
HW3114003	Extractor for power selector.
9HPSG2400A	Instruction/service manual.

ORDER CODES/OPTIONS/ACCESSORIES

Standard model

1ERPSG2400A	PSG2400A Portable Signal Generator.
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Factory fitted optional versions

1ERPSG2400A/A	As standard but 23 to 30V DC input.
1ERPSG2400A/F	RF output moved to rear panel.
1ERPSG2400A/M	Adds pulse modulation.
1ERPSG2400A/O	High stability frequency reference.

Accessories

1EXA10120	Rechargeable 12V 4Ah add-on battery pack for use with standard 11.5 to 15V DC input only.
15A20100	Rack mounting kit.
1EXA20180	Protective padded carrying case.
1ERA30320	Remote operation foot switch.

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