Front panel

5. The instrument settings are displayed by three liquid crystal displays that include annunciators to show the units of the displayed data. All data is entered on a keyboard that has been designed to be simple and logical to use. Non-volatile store and recall facilities are also provided by using an electrically alterable read only memory (EAROM) store that does not require a battery back-up system. Carrier frequency, f.m., a.m., and r.f. level functions may be incremented or decremented using the up/down keys.

6. Second function mode of operation. This includes the means of setting the GPIB address, selection of alternative r.f. level calibration units, access to various calibration routines and a facility to aid diagnostic fault finding.

PERFORMANCE DATA

7. The performance specifications for 2018 and 2019 are in most respects identical, therefore the following data applies to both versions of the instrument except where otherwise stated.

Characteristic	*Performance*	
	2018 version	*2019 version*
Carrier frequency		
8. Range :	80 kHz-520 MHz (usable down to 30 kHz).	80 kHz-1040 MHz (usable down to 30 kHz.
Resolution :	10 Hz	10 Hz up to 520 MHz. 20 Hz above 520 MHz.
VSWR :	<1.2:1 (for output levels below 300 mV e.m.f.)	<1.2:1, up to 520 MHz, <1.5:1, 520 MHz to 1040 MHz (for output levels below 300 mV e.m.f.).
Output level accuracy :	±1 dB.	±1 dB from 80 kHz to 520 MHz, ±2 dB from 520 MHz to 1040 MHz.
Harmonically related signals : (for output levels <1 V e.m.f.)	-30 dBc for carrier frequencies from 80 kHz to 520 MHz.	-30 dBc for carrier frequencies from 80 kHz to 520 MHz. -20 dBc for carrier frequencies from 520 MHz to 1040 MHz.

Characteristic	*Performance*	
	2018 version	*2019 version*
Frequency modulation		
9. Range	(i) Peak deviation from 10 Hz to up to 1% of carrier frequency for carrier frequencies above 2.03126 MHz.	(i) Peak deviation from 10 Hz to up to 1% of carrier frequency for carrier frequencies from 2.03126 MHz to 520 MHz.
	(ii) Peak deviation from 10 Hz to 100 kHz for carrier frequencies ≤2.03125 MHz.	(ii) Peak deviation from 10 Hz to 100 kHz for carrier frequencies ≤2.03125 MHz.
		(iii) Peak deviation from 20 Hz to up to 1% of carrier frequency for carrier frequencies above 520 MHz.

10. The remaining characteristics are common to both 2018 and 2019.

Characteristic	*Performance*
Carrier frequency	
11. Selection :	By keyboard entry.
Frequency indication :	8 digit l.c.d. - for details see under Keyboard and displays.
Accuracy :	Equal to the frequency standard accuracy - see under Frequency standard.
RF output	
12. Level :	0.2 µV to 2 V e.m.f.; c.w. and f.m. 0.2 µV to 1 V e.m.f.; when a.m. is selected.
Selection :	By keyboard entry - units may be (i) µV, mV, V, e.m.f. or p.d. or (ii) dB relative to 1 µV, 1 mV, 1 V, e.m.f. or p.d. or (iii) dBm.
Display :	4 digit l.c.d. with units annunciators - see under Keyboard and displays.
Output impedance :	50 Ω, Type N female socket.
Reverse power protection :	An electronic trip protects the generator output against reverse power of up to 50 W from d.c. to 1 GHz. The trip may be reset from the front panel or via the GPIB.

Characteristic	*Performance*

Spurious signals

13. Non-harmonically related signals :	-70 dBc above 2.03126 MHz, -60 dBc from 80 kHz to 2.03125 MHz.
Residual f.m. :	Less than 6 Hz r.m.s. in CCITT telephone psophometric band at 520 MHz and improving by approximately 6 dB/octave with reducing carrier frequency down to 2.5 MHz.
Single side band phase noise :	Better than -130 dBc/Hz at 90 MHz and 20 kHz offset from carrier.
RF leakage :	Less than 0.5 µV p.d. generated in a 50 Ω load by a 2 turn 25 mm loop, 25 mm or more from the case of the generator with the output level set to less than -10 dBm and the output terminated in a 50 Ω sealed load.

Frequency modulation

14. Selection :	Internal modulation oscillator or external modulation input may be selected by the front panel keyboard.
Display :	3 digit l.c.d. - see under Keyboard and displays.
Deviation accuracy :	±5% of deviation at 1 kHz modulating frequency excluding residual f.m.
Frequency response :	±1 dB from 50 Hz to 100 kHz relative to 1 kHz. Usable down to 10 Hz with reduced deviation.
Distortion :	<3% total harmonic distortion at 1 kHz modulating frequency and a deviation of up to 70% of the maximum available at any carrier frequency. <0.3% total harmonic distortion at 75 kHz deviation at carrier frequencies from 88 MHz to 108 MHz at 1 kHz modulating frequency.
External modulation :	With modulation a.l.c. on, the deviation is calibrated for input levels between 0.8 V and 1.2 V p.d. With modulation a.l.c. off, the deviation is calibrated for an input level of 1 V p.d. Input impedance is nominally 100 kΩ.

Characteristic	*Performance*

Amplitude modulation

15.	Range :	0 to 99% in 1% steps.
	Selection :	Internal modulation oscillator or external modulation input may be selected by the front panel keyboard.
	Display :	2 digit (see under Keyboard and displays).
	Accuracy :	Better than ±(4% of depth setting + 1%) for modulation depths up to 95% and 1 kHz modulating frequency for carrier frequencies up to 400 MHz.
	Frequency response :	±1 dB from 20 Hz to 50 kHz relative to 1 kHz at 80% depth d.c. coupled.
	Envelope distortion :	Less than 3% total harmonic distortion for modulation depths up to 80% at 1 kHz modulating frequency for carrier frequencies up to 400 MHz. Less than 2% total harmonic distortion for modulation depths up to 90% at 1 kHz modulating frequency for carrier frequencies up to 32 MHz.
	External modulation input :	With the modulation a.l.c. on, the modulation depth is calibrated for input levels between 0.8 V and 1.2 V p.d. With the modulation a.l.c. off, the modulation depth is calibrated for an input level of 1 V p.d. Input impedance is nominally 100 kΩ, d.c. coupled.

Modulation oscillator

16.	Frequencies :	300 Hz, 400 Hz, 1 kHz, 3 kHz and 6 kHz selected sequentially by repetitive pressing of modulation oscillator key.
	Display :	Five l.e.d's indicate selected frequency.
	Frequency accuracy :	±5%.

Characteristic	*Performance*
Frequency standard	
17.	Internal or external frequency standard may be selected from the front panel. Annunciators show which is selected.
Internal standard :	High stability, oven controlled 10 MHz crystal oscillator.
Temperature stability :	<±0.1 p.p.m. over temperature range of 0 - 40°C.
Warm up time :	Within 0.5 p.p.m. of final frequency within 5 minutes from switch on at ambient 20°C.
Auxiliary inputs and outputs	
18. Modulation input/output :	A front panel BNC socket provides an output from the modulation oscillator when internal modulation is selected and becomes the external modulation input when external modulation is selected.
Internal modulation oscillator output :	Nominal 1 V e.m.f. sine wave from 1 kΩ source impedance at selected modulation frequency.
External modulation input :	Input level nominally 1 V into 100 kΩ - see under Frequency modulation and Amplitude modulation.
Frequency standard input/output :	A rear panel BNC socket provides an output from the internal frequency standard when internal standard is selected and becomes the external standard input when external standard is selected.
Internal standard output :	10 MHz, at nominally 3 V p-p square wave. Source impedance 100 Ω nominal.
External standard input :	Accepts a 10 MHz signal of at least 1 V r.m.s. Maximum input 2.5 V r.m.s.
Alternative outputs :	Blanked holes are provided so that the user can fit the r.f. output, and modulation input/output socket to the rear panel for systems use etc.

Characteristic	*Performance*

Keyboard and displays

19. Main and secondary keyboard functions : These are described in Chap. 3, Operation. All instrument settings are controlled by the front panel keyboard.

Displays : Three liquid crystal displays provide simultaneous readout of carrier frequency, modulation and r.f. level.

(i) Carrier frequency display - 8 digit with annunciators to show frequency units, external frequency standard, frequency limit exceeded, remote operation selected and instrument addressed.

(ii) Modulation display - 3 digit with annunciators to show modulation units, f.m., a.m., modulation off, external modulation selected, and modulation limit exceeded.

(iii) RF level display - 4 digit with annunciators to show r.f. level units, r.f. output off, reverse power trip operated, and r.f. level limit exceeded.

GPIB interface

20. A GPIB interface is available as an optional accessory and can be easily fitted by the user. All functions except the SUPPLY ON switch are remotely programmable.

Capabilities : Complies with the following subsets as defined in IEEE 488 - 1978 and IEC Publication 625-1 : SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, C0, E1.

Environmental

21. Conditions of storage and transport

Temperature : $-40^{o}C$ to $+70^{o}C$.

Humidity : Up to 90% relative humidity.

Altitude : Up to 2500 m (pressurized freight at 27 kPa differential i.e. 3.9 lbf/in^2).

Rated range of use temperature : 0 to $55^{o}C$.

Characteristic	*Performance*
Safety	
22.	Complies with Publication IEC 348.
Radio frequency interference	
23.	Conforms to the requirements of EEC Directive 76/889 as to limits of r.f. interference.
Power requirements	
24. Voltage :	AC supply. Voltage ranges (switchable)
	105 V - 120 V 210 V - 240 V } ±10%
Frequency :	45 Hz - 440 Hz.
Consumption :	70 VA max.
Weight and dimensions (over projections)	
25. Height :	152 mm (6 in).
Width :	425 mm (16 3/4 in).
Depth :	525 mm (20 3/4 in).
Weight :	16 kg (35 lb).

ACCESSORIES

Supplied accessories

	Code no.
26. AC supply lead	43123-076Y
Operating manual H 52018-900S (Vol. 1)	46881-419G

Optional accessories

27. Service manual H 52018-900S (Vol. 2)	46881-420J
GPIB module	54433-001U
Maintenance kit, includes r.f. extender cables, l.c.d. insertion and extraction tools etc.	54711-033E
Rack mounting kit	46883-506M
Front handle kit	46883-511R
GPIB manual H 54811-010P	46881-365R
GPIB lead assy.	43129-189U
GPIB IEEE/IEC connector adaptor	46883-408K
RF connecting cable TM 4969/3; 50 Ω, 1.5 m (5 ft) BNC	43126-012S
Impedance adaptor 50/75 Ω	54411-051X
Adaptor; type N male to BNC female	54311-092P