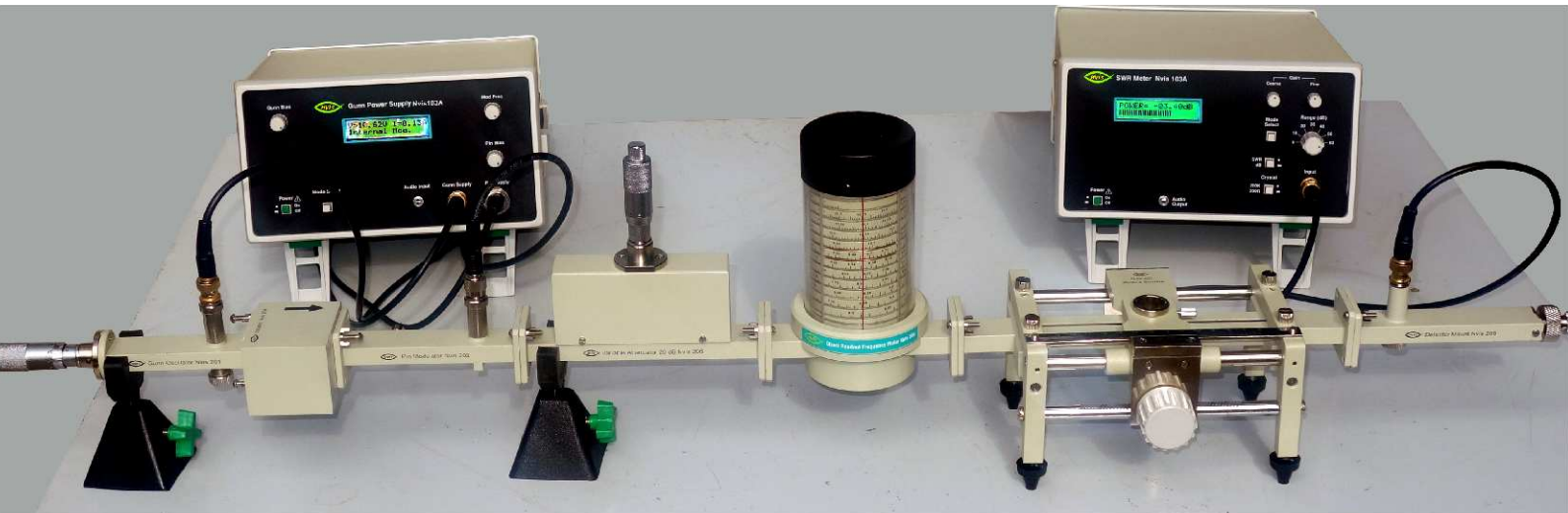




Microwave Test Bench Series

Nvis 9000 Series



The **Nvis 9000 series of Microwave Test Benches** are precision made microwave systems, which use standard type rectangular wave-guide components to illustrate the essential elements of this field for study.

Microwave Component Technical Specification

Nvis 201 **Gunn Oscillator**

Gunn Oscillators are used to generate the microwave signal and its Micrometer is used to tune the output frequency of Gunn oscillator.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Pushing Factor	--
Bias Voltage max.	10V
Normal Power Output	10mW
Temp. Coefficient	--
Output Connection	BNC(F)
Frequency Adjustment	By Micrometer

Nvis 216 **Waveguide Twist**

Waveguide Twist is used to change the plane of Polarization of a wave Guide transmission line . Twist is made from a section of waveguide which has been precisely twisted. 900 twist is a standard available model.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR	1.09 At 10.5GHz
Return Loss	-26.9dB At 10.5GHz



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Nvis 212 Matched Termination

Matched terminations are used to terminate the waveguide transmission line operating at low average power. The loads are carefully designed to absorb all the applied power and VSWR of matched termination is low. These are used in the measurement of reflection coefficient and where the matched load is required.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR	1.03 At 10.5GHz
Return Loss	-33dB At 10.5GHz
Av. Power	2W
Type	Fixed

Nvis 238 Phase Shifter

Many applications require phase shift to be introduced between two given position in a waveguide system. It consists of a dielectric slab or vane specially shaped to minimize reflection effect. Phase shifter are used to change the effective electrical length of transmission line without changing its physical length. They are particularly useful in microwave bridge circuit where the phase and amplitude must be adjusted independently.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR	1.15 At 10.5GHz
Return Loss	-23.1 At 10.5GHz
Calibration Accuracy	$\pm 2.5^\circ$

Nvis 210 Movable Shorts / Nvis 235 Precision Movable Short

Movable shorts are used to obtain a phase reference in the calibration of various experimental setups. These are also used to vary the effective plane of reflection and therefore the phase of reflected wave. Movable shorts are used to measure the impedance of a device. Movable shorts are of two types one has no provision to record position of short in the waveguide and other type of movable short is precision movable short in which position of short can be accurately recorded from micrometer.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Reflection Coefficient	0.98

Nvis 208 Tunable Probe

Tunable probes are very useful devices to measure the SWR and Impedances. Tunable probe is consists of a crystal detector and a small wire antenna in coaxial housing. Its depth of penetration into the slotted section is variable.



Band	X
Frequency(GHz)	8.2-12.4
Detector	IN23
Output connector	BNC(F)
Type	Tunable



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Nvis 220 Slide Screw Tuners

Slide Screw Tuner is a very useful component in a microwave laboratory. It is mainly used for Impedance measurement. Its tuner can be adjusted for low and high impedance position.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Max. VSWR	20 : 1.02

Nvis 202 Pin Modulator

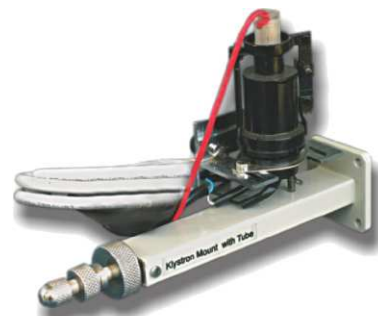
Pin diode modulators are used to provide amplitude or pulse modulation in wide range of microwave to study many applications. These modulators uses PIN diode which is mounted across the waveguide line with RF isolated DC bias lead passing to an external TNC(F)



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Bias Voltage	0-12 Vpp
Output Connector	TNC(F)

Nvis 203 Klystron Mount

Klystron mounts are used to transmit microwave power from reflex klystron tube to rectangular waveguide. Klystron mounts are designed by a section of waveguide, one end of waveguide is fitted with a movable short plunger. A small hole on the broad wall of waveguide is provided through which coupling pin of reflex klystron tube enters into the waveguide. By moving plunger (matching the impedance of klystron tube and waveguide) maximum output can be achieved.



Band	X
Frequency(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U

Nvis 205 Direct Reading Frequency Meter

Direct Reading frequency meters are used to measure the microwave frequency accurately. There long scale length and numbered calibration marks provide high resolution which is particularly useful when measuring frequency difference of small frequency changes.



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Calibration Accuracy	± 2%
Calibration Increment	5 MHz
Max. VSWR	1.28 At 10.5GHz
Return Loss	-18.2 At 10.5GHz



Microwave Test Bench Series

Nvis 9000 Series

Nvis 209 Wave Guide Detector Mount

The crystal detector can be used for the detection of microwave signal. At low level of microwave power, the response of each detector approximates to square law characteristics and may be used with a high gain selective amplifier having a square law meter calibration.



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Detector	IN21(any equivalent)
Output Connector	BNC (F)

Nvis 207 Slotted Section

Slotted section is used to measure various measuring parameter in microwave. for example to determine VSWR, phase and impedances. These consists of a slot in center of waveguide in which we can connect a probe and probe can be moved in slot and position of probe can be measured by its Varnier scale. The travel of probe carriage is more than three times of half wavelength.



Band	X
Frequency Range	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Residual VSWR	1.01
Slope (dB)	$\pm (0.2\text{dB})$

Nvis 206 Variable Attenuator 10 dB / 20 dB



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR Max.	1.25 At 10.5GHz
Av. Power	2 W
Return Loss	-19.23 At 10.5GHz

Nvis 217-219 Fixed Attenuators

Attenuators are required to adjust power or attenuate the power flowing in waveguide. There are two type of attenuators fixed and variable. Fixed attenuators available in various range like 3dB, 6dB, 10dB etc. These attenuators are calibrated at center frequency of respective frequency band. By Variable attenuators power can be adjusted for different level.



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR Max.	1.06 At 10.5GHz
Av. Power	2W
Accuracy	$\pm 0.5 \text{ dB}$
Return Loss	-31 dB At 10.5GHz



Microwave Test Bench Series

Nvis 9000 Series

Nvis 232 E-Plane Bends

In measurements it is often necessary to bend a waveguide by some angle. Waveguide bends in E and H plane of 90° is normally available. Waveguide bends designed by a section of rectangular waveguide and flange.



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR Max.	1.25 At 10.5GHz
Return Loss	-25.7 dB At 10.5GHz

Nvis 233 H Plane Bends



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR Max.	1.06 At 10.5GHz
Return Loss	-31 dB At 10.5GHz

Nvis 229 Cross Directional Coupler

Cross Directional Coupler consists of two waveguide sectional joint at (90°) with the coupling element mounted into the common broad wall.



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Coupling (dB)	20 dB
Directivity (Min)	25 dB
Coupling Accuracy	± 1 dB

Nvis 226, Nvis 253, Nvis 228 Multihole Directional Coupler

Directional coupler are designed to measure incident and reflected power values and also provide a signal path to a receiver or perform other desirable operation. In its most common form, the directional coupler is a four port waveguide junction consisting of a primary main waveguide and a secondary auxiliary waveguide. These are available in 3, 6,10, 20, 40 dB coupling.



For 10 dB

Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
VSWR Max.	1.06 At 10.5GHz
Return Loss	-31 dB At 10.5GHz
Coupling (dB)	10.1 ± 0.6
Directivity (Min)	46.0 dB (3%)



Microwave Test Bench Series

Nvis 9000 Series

TEE

Tees are used to combine power from two input or divided the microwave power from one input to two output lines. Tee is an intersection of three waveguides in the form of alphabet T.

Nvis 221 E Plane Tee



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Max. Length of cell	200 mm
Plunger Movement	65 mm

Nvis 222 H Plane Tee



Band	X
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U

Nvis 223 Magic Tee / Nvis 248 E-H Tee



Band	X
Frequency Range	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U

Nvis 204 Ferrite Isolator,

Nvis 230 T Circulator, Nvis 231 Y Circulator

The ferrites isolators and circulators are matched 2 port and 3 port devices respectively, which offer low insertion loss and high isolation over 1GHz band width. An isolator is a 2 port device which allows signals from port 1 to port 2 & provides maximum attenuation for transmission from port 2 to 1. A circulator is a three port device which has a peculiar property of coupling power to the adjacent port clockwise



Band	X
Frequency Range	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Max. VSWR	1.15
Min. Insertion Loss	0.46 dB
Min. Isolation	20 dB
Return Loss	22.4

Nvis 239-247 Waveguide Antennas

There are several types of microwave antennas like standard Gain, Pyramidal horn, Pick up horn, Dielectric antenna, Parabolic dish antenna etc. these are used to radiate microwave energy in the air and to receive the energy from air.



Frequency Range(GHz)	Flange Designation	Waveguide Type	Antennas Type	Gain
8.2-12.4 GHz	UG-39/U	WR-90	Pyramidal	16
8.2-2.4 GHz	UG-39/U	WR-90	Pick Up	10
8.2-12.4 GHz	UG-39/U	WR-90	E-Section	15
8.2-12.4 GHz	UG-39/U	WR-90	H-Section	15
8.2-12.4GHz	UG-39/U	WR-90	Parabolic dish	--
8.2-12.4GHz	UG-39/U	WR-90	Standard Gain	--
8.2-12.4GHz	UG-39/U	WR-90	Dielectric Antenna	--