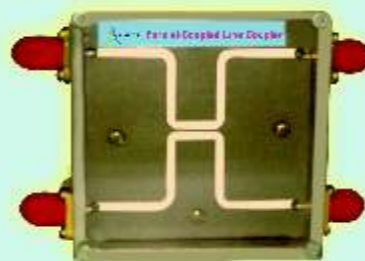


8. Parallel Coupled Line Coupler:

15 dB coupler consists of two close and parallel transmission lines. The coupled power depends on the separation between two lines.

Specifications:

	C - Band	S - Band
Operating frequency:	5.0 ± 0.15 Ghz	3.0 ± 0.2 Ghz
Insertion Loss (At Through port):	1.0 ± 0.5 dB	1.0 ± 0.5 dB
Coupling:	15.0 ± 2.0 dB	15.0 ± 2.0 dB
Isolation:	22.0 ± 2.0 dB	22.0 ± 2.0 dB
Directivity:	12.0 ± 2.0 dB	12.0 ± 2.0 dB
Return Loss (Through):	20 ± 2 dB	20.0 ± 2.0 dB

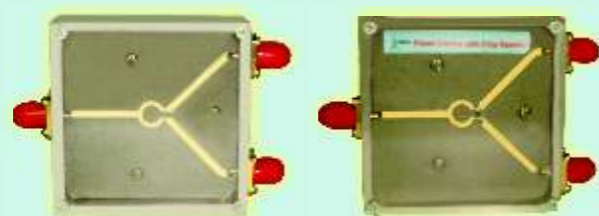


9. Power Divider (2):

It is a three-port network, which divides the input signal into two equal output signals. Here two types of power divider are available: one is with chip resistor and another without it. The isolation between output ports increases due to chip resistor.

Specifications:

	C - Band		S - Band	
	without resistor	with resistor	without resistor	with resistor
Operating frequency:	5.0 ± 0.15 Ghz	5.0 ± 0.15 Ghz	3.0 ± 0.2 Ghz	3.0 ± 0.2 Ghz
At O/P 1 I.L.	3.0 ± 0.4 dB	3.0 ± 0.4 dB	3.0 ± 0.5 dB	3.0 ± 0.5 dB
At O/P 2 I.L.	3.0 ± 0.4 dB	3.0 ± 0.4 dB	3.0 ± 0.5 dB	3.0 ± 0.5 dB
Isolation	8.0 ± 2.0 dB	30.0 ± 5.0 dB	8.0 ± 2.0 dB	30.0 ± 5.0 dB
Return Loss	30.0 ± 5.0 dB	40.0 ± 5.0 dB	30.0 ± 5.0 dB	40.0 ± 5.0 dB



10. Patch Antenna (2):

Same for transmission and reception. Two types of patch antennas are available: one is quarter wave transformer fed and another one is the inset fed.

Specifications:

	C - Band		S - Band	
	Transformer fed	Inset fed	Transformer fed	Inset fed
Operating frequency:	5.0 ± 0.15 Ghz	5.0 ± 0.15 Ghz	3.0 ± 0.2 Ghz	3.0 ± 0.2 Ghz
Return Loss	13.0 ± 2.0 dB	8.0 ± 2.0 dB	13.0 ± 2.0 dB	8.0 ± 2.0 dB



11. Amplifier:

Amplifies the level of the microwave input signal with or without any phase change at the output.

Specifications:

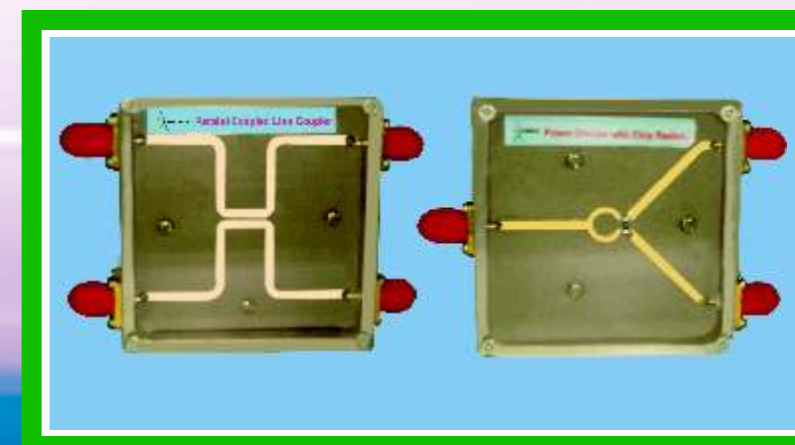
	C - Band	S - Band
Operating frequency:	5.0 ± 0.15 Ghz	3.0 ± 0.2 Ghz
Gain:	6.0 ± 2.0 dB	4.0 ± 2.0 dB
Return Loss:	13.0 ± 2.0 dB	12.0 ± 2.0 dB

- Specifications of the components are under standard conditions of temperature and pressure measured with network Analyzer in R & D Lab, Lambda Microwave Pvt. Limited, Faridabad

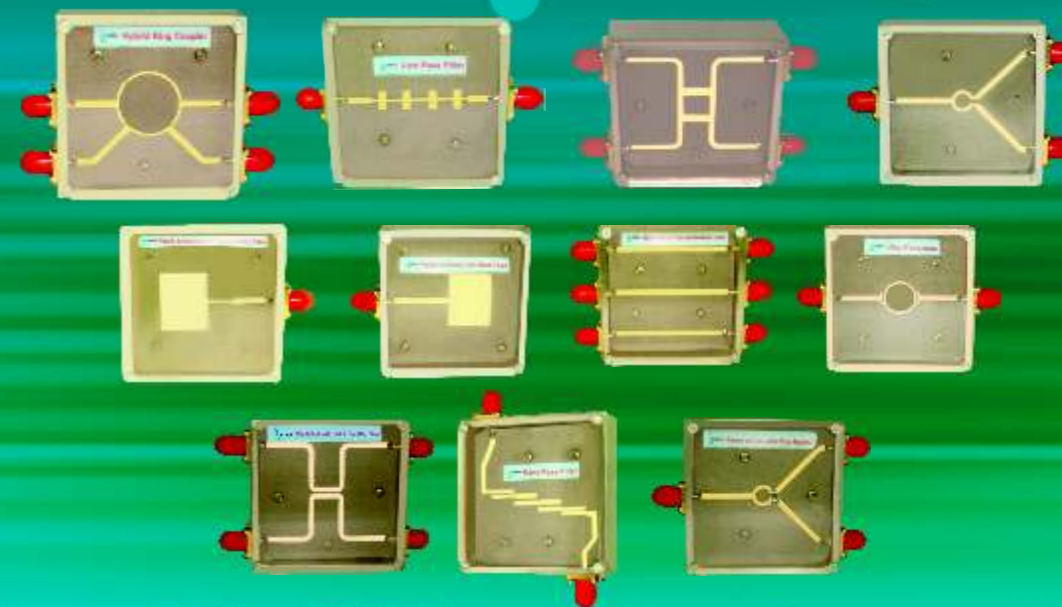
List of Experiments:

- Characteristics of different types of microstrip filters-
 - » Low pass filter
 - » Band pass filter
 - » Band Stop filter.
- Characteristics of a Ring resonator.
- Characteristics of different types of microstrip couplers-
 - » Branch Line Coupler
 - » Hybrid Ring Coupler
 - » Parallel Coupled Line Coupler.
- Characteristics of a Power divider.
- Characteristics of different types of microstrip patch antennae-
 - » Patch antenna with transformer feed
 - » Patch antenna with inset feed
- Characteristic of a microwave amplifier.

NOTE: - Microwave Source, Microwave Power Supply, Microwave Detector, Active Filter and receiver (VSWR meter/ CRO/ Power Meter) are not required for users having Network Analyzer.



MICROSTRIP TRAINING KITS



About Our Company

LAMBDA MICROWAVES PVT. LTD. is a team of Microwave Professionals. The company started its design and production activity on Microwave components in 1995.

The company started its production in Passive wave guide components. Lambda is now serving major Microwave/BTS equipment manufactures & installers. The company is emerging as a single window for supply of all type of microwave components and installation accessories.

LAMBDA'S Products are Microwave components, Microwave Absorbers, EMI/EMC Shielded Chambers, Anechoic Chambers etc. Our customers are various telecom companies & Defence organizations. We supplied wave guide components in bulk to Andrew telecom(I) Pvt. Ltd., ITI, BEL and PUNCOM, NDTV, TV Today, HFCL, Essel Shyam, ISRO & DRDO etc. Lambda has also served Bharti Cellular Ltd., Bharti Mobile Ltd., Spice Telecom, Hutchinson Essar Ltd. Lucent Technologies Hindustan Ltd., Alcatel, Nortel, Erricson, Nortel Networks Ltd. On Installation material for BTS Equipments. The company supplied CDMA/GSM installation Kits for more than 20000 sites. Lambda also supplies band pass filters & Surge Arrestors in bulk. We have supplied Anechoic Chambers to Indian Air Force, Hindustan Aeronautics Limited, JNU & DRDO.

Lambda has supported Microwave labs of Technical Institutions with high quality Advanced training Kits.

In House Test Facilities

1. Agilent Network Analyzer PNA 8363b Upto 40GHz
2. Agilent Network Analyzer E 506206 Nos.
3. Agilent Spectrum Analyzer upto 26 GHz
4. Agilent Power Meter 4418 B
5. Anritsu Spectrum Analyzer Portable
6. Anechoic Chambers
7. Sumitek IM Analyzer
8. Agilent 87050E Multiport Analyzer

Goals

Our main goal as a company is to provide quality products & services to our customers while maintaining healthy work environment for our employees. We commit our customers full resource, experiences and talents to achieve these simple yet most important goals.

Commitment to Quality

LAMBDA is dedicated to provide the best service in the industry from initial inquiry till the product delivery and after sales support. In addition, Lambda strives to design and produce products that meet or exceed the performance specifications to which we have agreed upon and fully comply with all applicable quality standards. Lambda commitment to quality includes a formal Quality Assurance Program, Manual that addresses the various quality standards as per ISO 9001:2000.

Quality Policy

Ensure quality at all levels of production and maintain quality standards as per management objectives.

R F Design Centre

LAMBDA is equipped with state of art Software Tools such as Genesys & 3D Software, CAD/CAM, Pro-E Geber Plotter, Anechoic Chamber, Profile Projector etc.

RF Lab of LAMBDA Microwave Pvt. Ltd. Is recognized by Directorate of Scientific & Industrial Research (DSIR), Govt. of India as approved R&D Lab for Microwave Components & Systems under Regn. No. TU/IV-RD/2636/2007

LAMBDA'S NEW ADVANCE TRAINER

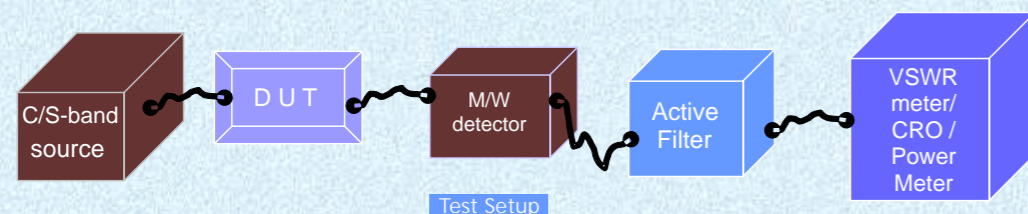
Lambda Microwave Pvt. Limited has come out with an innovative state of the art technology i.e. the Microstrip Integrated Circuit (MIC) technology. It launches the C- Band and S- Band Microstrip Trainer Kit (MSTK) by using IE3D design software for technical and research institutes.

The MSTK allows the students to study the principles of microstrip technology with specially made microstrip components and devices. It is a very high precision bench top system, which uses up to date microstrip components to illustrate the essential features of the MIC field. It is designed to experimentally analyze the characteristics of microstrip components.

C / S- BAND MICROSTRIP TRAINER KIT (MSTK)-2008 C / 2008 S

Experimental Set Up:

The system contains a VCO based source in C/S band, a microwave detector, an active filter and the VSWR meter and 13 Microstrip components (12 Passive and 1 Active) will available in a well polished enclosures with standard SMA connectors.



Microstrip components:

1. Microstrip Transmission Line (50 Ohm Line)

It passes all the signals in full band and this component is the reference for rest of the components.

Specifications:	C - Band	S - Band
The cut off freq.:	5.0 ± 0.15 Ghz	3.0 ± 0.2 Ghz
Insertion Loss:	0.5 ± 0.2 dB	0.5 ± 0.2 dB
Return Loss:	35.0±5.0 dB	30.0 ± 5.0 dB

2. Ring Resonator

It transmits the signal at the resonance (design) frequency only.

Specifications:	C - Band	S - Band
The resonance freq.:	5.0±0.15 Ghz	3.0± 0.2 GHz
Resonant Factor (Q):	5.0±0.5 dB	3.0± 0.2 GHz
Return Loss:	16.0±0.5 dB	3.0± 0.2 GHz

3. Low Pass Filter

It passes the signals between zero freq. to some limit called the cut off frequency only.

Specifications:	C - Band	S - Band
The cut off freq.:	5.0±0.15 Ghz	3.0 ± 0.2 Ghz
Insertion Loss:	3.0±0.3 dB	3.0 ± 0.2 Ghz
Return Loss:	16.0±0.5 dB	3.0 ± 0.2 Ghz

4. Band Pass Filter

It passes the frequencies in the frequency band between the lower cut off frequency to the upper cut off frequency and rejects the signals of other frequencies outside this band.

Specifications:	C - Band	S - Band
The center freq.:	5.0±0.15 Ghz	3.0±0.2 GHz
Insertion Loss:	1.0±0.5 dB	1.0 ± 0.5 dB
Return Loss:	22.0±2.0 dB	22.0±2.0 dB
Bandwidth:	1.0±0.2 Ghz	1.0 ±0.2 GHz

5. Band Stop Filter

It passes the frequencies outside the frequency band between the lower cut off frequency to the upper cut off frequency and rejects the signals of other frequencies inside this band.

Specifications:	C - Band	S - Band
The center freq.:	5.0±0.15 Ghz	3.0 ± 0.2 Ghz
Insertion Loss:	45.0±2.0 dB	40.0 ±2.0 dB
Return Loss:	1.0±0.5 dB	1.0 ± 0.5 dB
Bandwidth:	1.0± 0.2 Ghz	1.0 ± 0.2 GHz

6. Branch Line Coupler

It is a four-port and 3-dB directional coupler with 90 phase difference in the through port and coupled port whereas the fourth port remains isolated.

Specifications:	C - Band	S - Band
Operating frequency:	5.0±0.15 Ghz	3.0 ± 0.2 Ghz
Insertion Loss (At Through port):	3.0±0.4 dB	3.0 ± 0.5 dB
Coupling:	3.0±0.4 dB	3.0 ± 0.5 dB
Isolation:	2.0±2.0 dB (min)	22.0±2.0 dB (min)
Directivity:	18.0±2.0 dB	18.0± 2.0 dB
Return Loss (Through):	30.0±5.0 dB	30.0 ± 5.0 dB

7. Rat Race Coupler

It is a four-port coupler with a 180 phase shift and equal power division in the through port and coupled port whereas the fourth port remains isolated.

Specifications:	C - Band	S - Band
Operating frequency:	5.0±0.15 Ghz	3.0 ± 0.2 Ghz
Insertion Loss (At Through port):	3.0±0.4 dB	3.0 ± 0.5 dB
Coupling:	3.0±0.4 dB	3.0 ± 0.5 dB
Isolation:	30.0±5.0dB	30.0±5.0dB
Directivity:	25.0±5.0 dB	25.0 ± 5.0 dB
Return Loss (Through):	25.0±5.0 dB	25.0±5.0 dB

