School on Radio Digital Communications for Research and Trainining in Developing Countries.

LAB REPORT
Cable Measurements.
Group 5

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INTRODUCTION

The purpose of laboratory exercises is to provide skills in cable measurements and learning how to use different equipments.

EXPERIMENT 2: Measurements of Cable loss with Power meter.

In this experiment we are going to learn how to use a power meter to measure a reference signal produced by a signal generator.

Amplitud signal generator = 0 dBm.
Frequency = 2.4 GHz.
Attenuation of the attenuator = -20 dB.

The losses measured in the constructed cable is 3.4 dB. The cable length is 2,435 m, att/m **1,396 dB/m**. The connector attenuation was estimated as the difference between two measures using the same cable but with one more connector, we assumed all conectors has the same attenuation the conector attenuation is 0,3 dB.

EXPERIMENT 3: Power measurements with a Spectrum Analyzer.

Amplitud signal generator = -20 dB dBm.
Frequency = 2.4 GHz.
Attenuation input of the Spectrum Analyzer = 10 dB.
Central Frequency = 2.4 GHz.
Frequency span = 100 MHz.
Reference level = -40 dB.
RBW = 1 MHz.
VBW = 100 kHz.

Attenuation cable with this method is 4,12 dB, att/m = **1,69 dB/m** at 2,4 GHz.

EXPERIMENT 4: Measurements of Cable loss with Power meter.

Frequency response using power meter and signal generator.

Frequency (MHz)	cable5 ATT dB
300	0,3
1000	0,8
2400	1,396

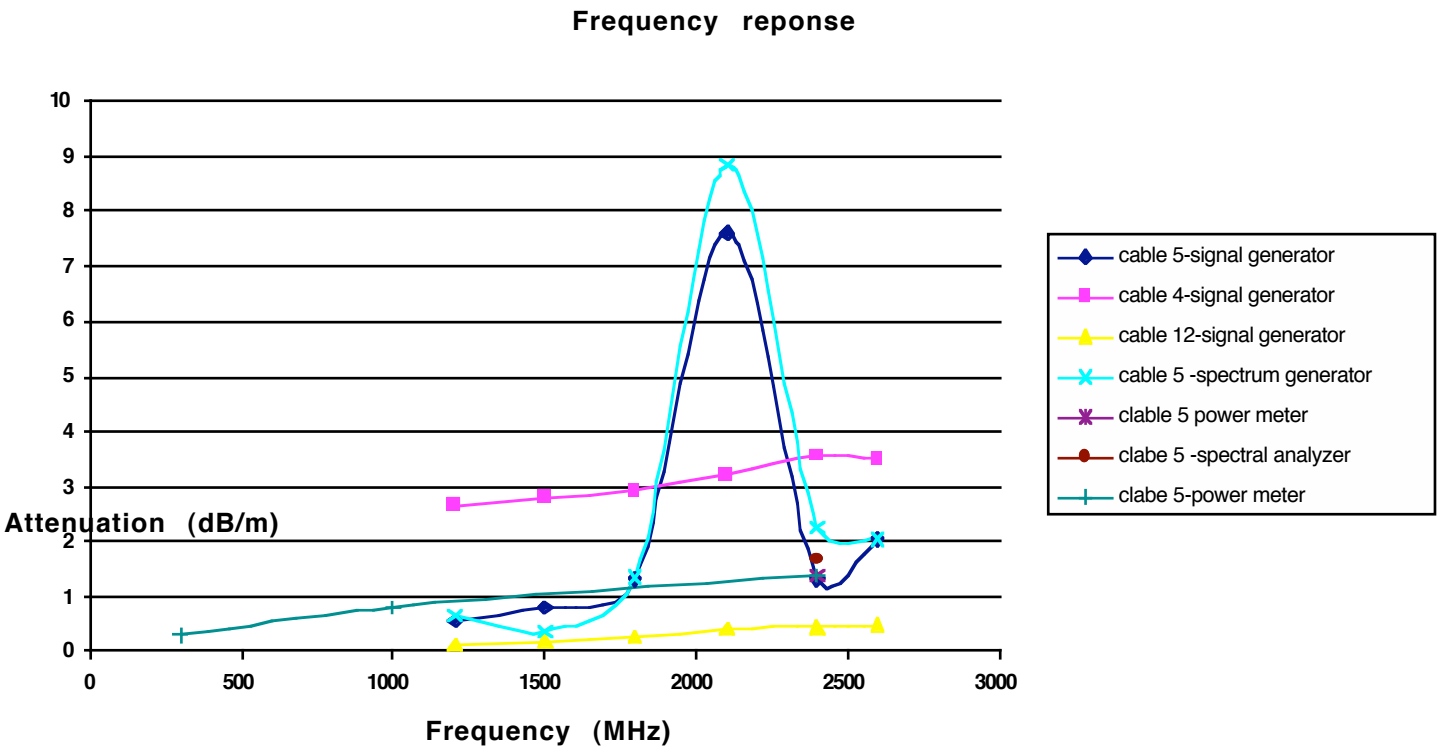
EXPERIMENT 5:

Frequency response using signal generator.

Frequency(MHz)	cable5	cable4	Cable12
1200	0,55	2,65	0,12
1500	0,8	2,8	0,2
1800	1,32	2,9	0,27
2100	7,6	3,2	0,4
2400	1,32	3,55	0,42
2600	2,05	3,5	0,47

EXPERIMENT 6:
Frequency response using spectrum analyzer internal generator.

Frequency (MHz)	cable5
1200	0,67
1500	0,35
1800	1,35
2100	8,85
2400	2,25
2600	2,02


Frequency reponse
10
9
8
7
6
5
4
3
2
1
0
Attenuation (dB/m)
0
500
1000
1500
2000
2500
3000
Frequency (MHz)
cable 5-signal generator
cable 4-signal generator
cable 12-signal generator
cable 5 -spectrum generator
clable 5 power meter
clabe 5 -spectral analyzer
clabe 5-power meter

EXPERIMENT 8: Measurement of the characteristic impedance of a coaxial cable with TDR(Time Domain Reflectometer).

The relation between amplitudes of incident voltage and reflected voltage and using a known load it is possible to know the characteristic impedance of a coaxial cable.

A1/A2=2*Zk/(Zk+Zo)

We used a load of 50 _. The relation between amplitudes is A2=60 mv and A1=62,5 mv, then Zo=54,16 _.

EXPERIMETN 9: Measurements of two unknown loads using TDR.

Using the same equation we use befor : A1/A2=2*Zk/(Zk+Zo), knowning Zo it is possible to know the value of any impedance connected at the end of the cable.

Blue load.
A1= 115 mv, A2=104,5mv, Zk=66,26 _

Read load.

A1= 92,5 mv, A2=104,5mv, Zk=43 _

Problems presented:
Some cables needed in some experiments does not work.
Lack of skills in equipment operating: powermeter (calibration) and TDR.