

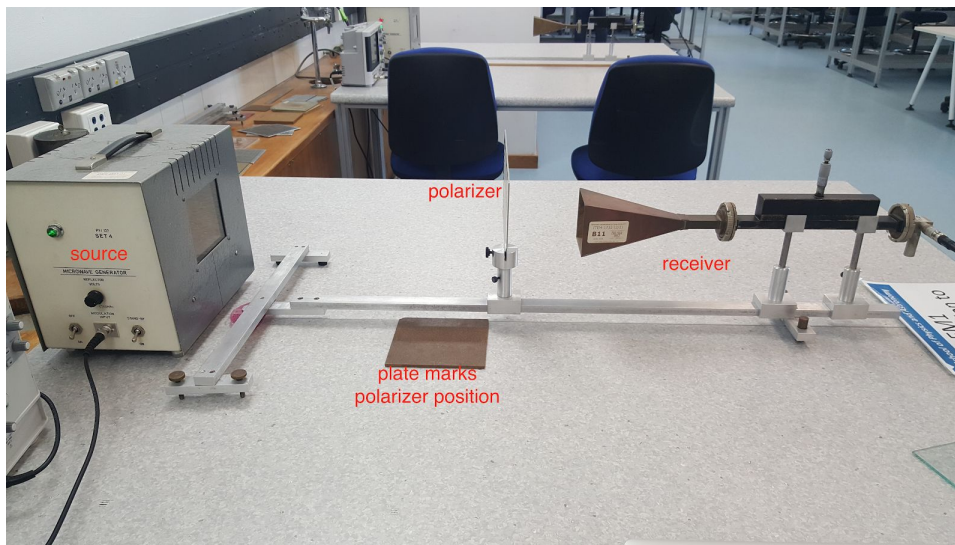
Data for EM1 experiment:

The data was taken after the video. The video only shows how the experiment was done, the data from the video will not match what is in this document.

Vp2p value is the peak to peak amplitude of the wave visible in on the DSO. It is measured using the DSO function Measure.

1. Polarization

The polarizer is placed in front of the receiver, ~10 cm away from it. The angle of the polarizer is measured with protractor while putting it in the holder and polarizer is clamped in the holder. The holder is placed on the rail, making sure that the position of the polarizer is the same for each measurement (marked with the masonite plate on the table).



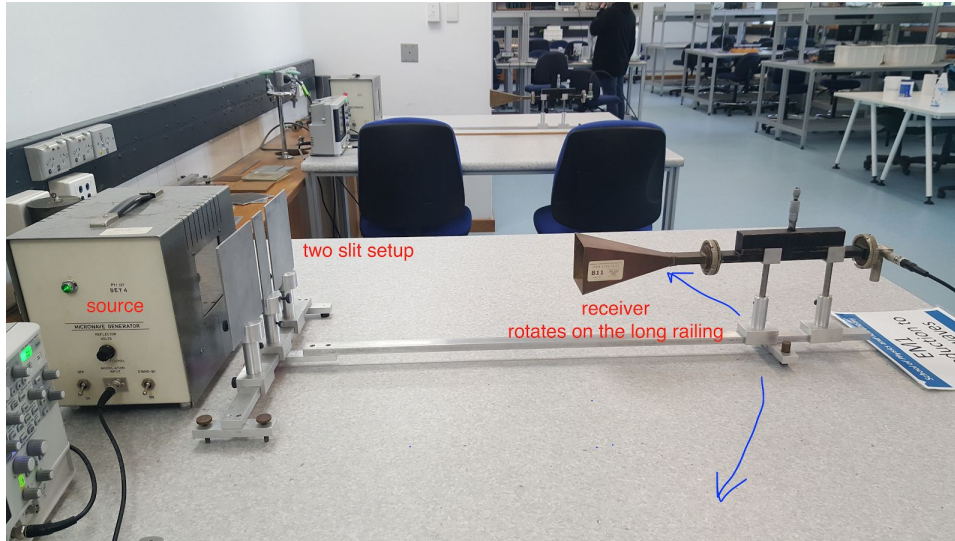
angle [deg]	u angle [deg]	Vp2p initial [mV]	uVp2p initial [mV]	Vp2p with polarizer [mV]	Vp2p with polarizer [mV]	comment
90	2	153	2	6	2	vertical
75	2	153	2	10	2	
60	2	153	2	12	2	
45	2	153	2	30	2	
30	2	153	2	88	2	
15	2	153	2	117	2	
0	2	153	2	137	2	horizontal

The uncertainty of the angle is based on how well I can align and measure the angle of the polarizer.

The uncertainty in the V_{p2p} is estimated based on how much the amplitude value fluctuates.

2. Double slit

The double-slit setup is carefully aligned in front of the source. Proper alignment is very important in this case. We look for the position of central max and first min and max on each side of the central max. Since the rails are not attached to the table the whole setup can shift slightly when the receiver is moved.

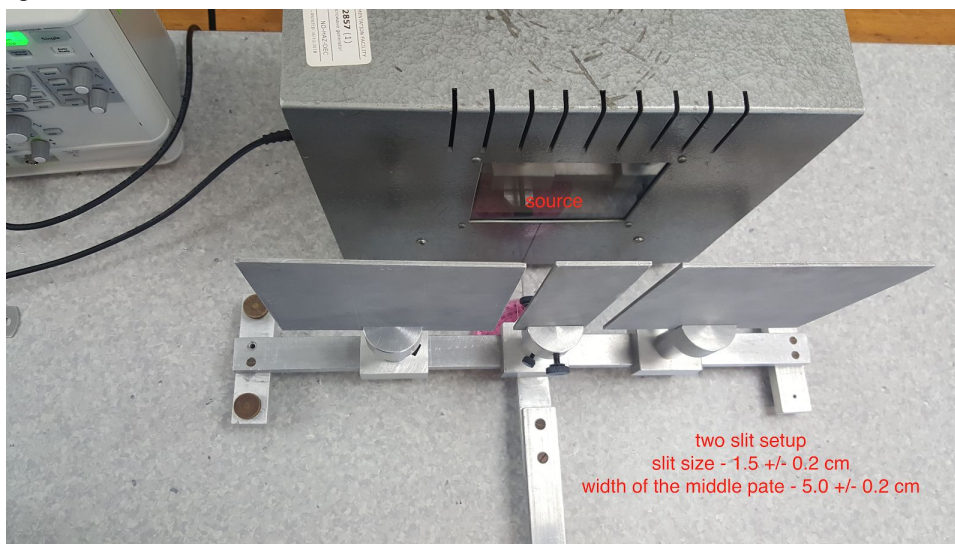


The dimensions of the double slit (measured with a ruler, uncertainty based on how well I can align the ruler with the setup)

left slit: 1.5 ± 0.2 cm

middle plate: 5.0 ± 0.2 cm

right slit: 1.5 ± 0.2 cm

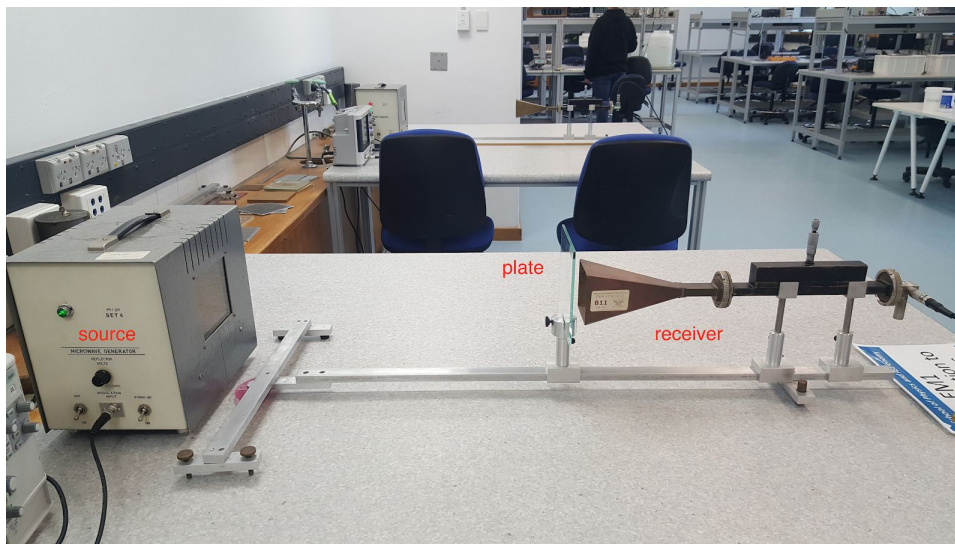


min/max	angle [deg]	u_angle [deg]	Vp2p [mV]	uVp2p [mV]
0 max	0	2	29	2
1 min	15	2	1.2	2
1 max	30	2	25	2
-1 min	-16	2	1.2	2
-1 max	-30	2	20	2

The uncertainty of the angle is based on how well I can read the angle of the protractor.
The uncertainty in the Vp2p is estimated based on how much the amplitude value fluctuates.

3. Transmission

The plate sits in the holder, close to the receiver, so it fully covers the horn. It is measured twice in an upright position and rotated by 90 deg to see if there is a difference.



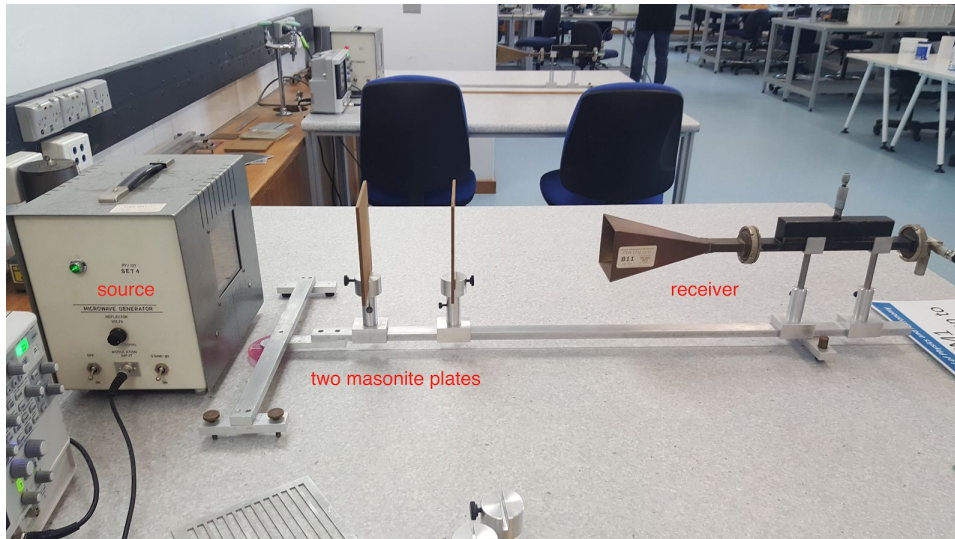
material	Vp2p initial [mV]	u Vp2p initial [mV]	Vp2p with material [mV]	uVp2p with material [mV]	comments
MDF	147	2	139	4	no change with the direction of the plate
Perspex	147	2	117	4	no change
Water	147	2	90	4	no change
Glass	147	2	96	4	no change

Copper grid	147	2	10 vertical stripes 117 horizontal stripes	4	the copper grid has copper stripes going in one direction
Masonite	147	2	103	4	no change
Hand	147	2	16	4	not rotated

The uncertainty in the V_{p2p} is estimated based on how much the amplitude value fluctuates.

4. F-P interferometer

Two masonite plates are placed between the source and receiver. The plates are parallel to each other and perpendicular to the source. The distance between the plates is measured with a ruler for cases where the transmission is max.



no of max	distance between the plates [cm]	u distance [cm]	V_{p2p} for max [mV]	uV_{p2p} for max [mV]
1	12.3	0.2	107	2
2	13.9	0.2	107	2
3	15.4	0.2	107	2
4	17.0	0.2	105	2
5	18.5	0.2	107	2
6	20.0	0.2	107	2

7	21.5	0.2	107	2
8	23.0	0.2	107	2
9	24.6	0.2	105	2
10	26.2	0.2	107	2

The uncertainty in the distance between the plates is based on how well I can measure the distance with a ruler.

The uncertainty in the V_{p2p} is estimated based on how much the amplitude value fluctuates.

5. Frequency measurement

$$f = 9745.3 \pm 0.2 \text{ MHz}$$

The uncertainty is based on the frequency value fluctuations.