1.1.1 Magnetic field mapping

The following notes does refer to my effort in mapping the magnetic field existing outside this new ECD in order to get an idea about the situation also referring to safety issues.

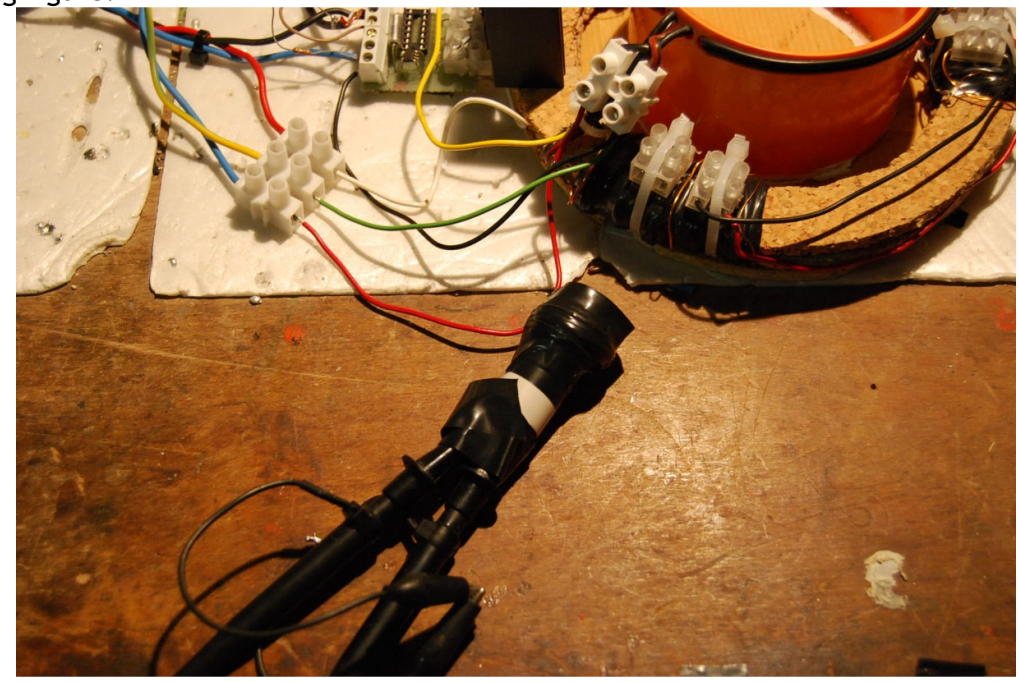
The tests has been run using the following ECD setup:

Test conditions:

Power Supply setting	+12V
Current delivered to ECD	1.8 A
F1	10.00 KHz
F2	20.00 KHz
F3	-
Primary winding	Serial connected.
Secondary winding	Serial connected.
Driving	ORed input signals

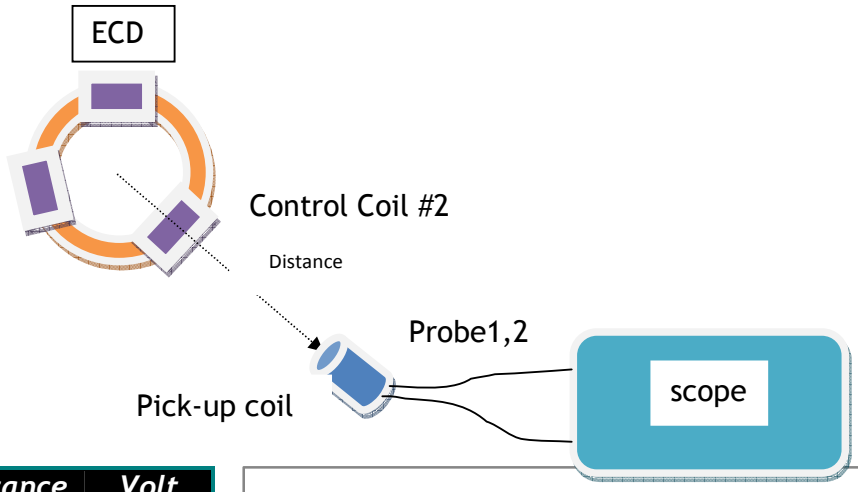
The unit has been firstly put in the best resonance conditions while delivering on lamp about 40-50W light equivalent.

The probe pick-up coil has been done using 20 turns of 40 copper strands Litz wire onto a PVC tube of 2cm diameter and 6cm long. The oscilloscope has been set in 'differential mode' so not using the ground probe connection. The setup used is in following figure.

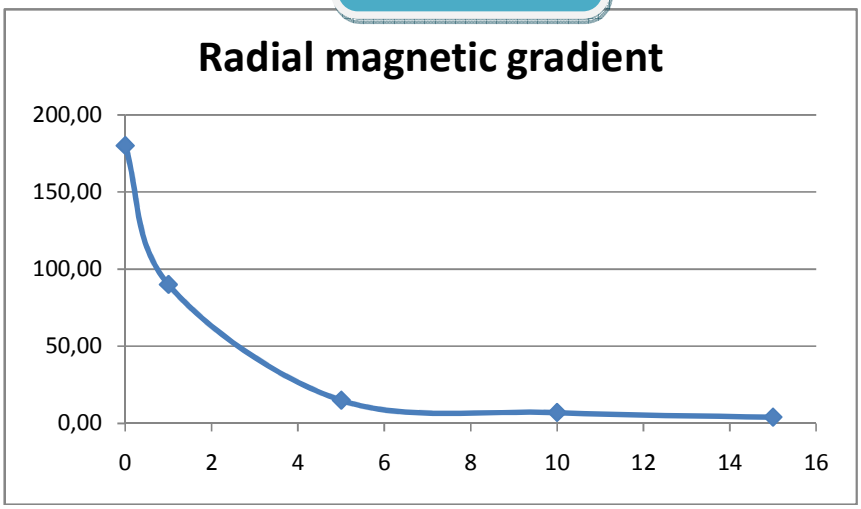


1st test - Radial field

This test does regard the magnetic field gradient measured on the horizontal plane and at the transverse of the second control coil like in following figure. The measure is done for different transverse distances.



Distance cm	Volt ptp
100	0.1
50	0.5
25	1.7
20	2.5
15	4
10	7
5	15
1	90
In con-tact	180

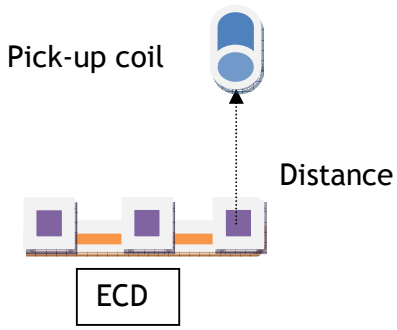


Considerations

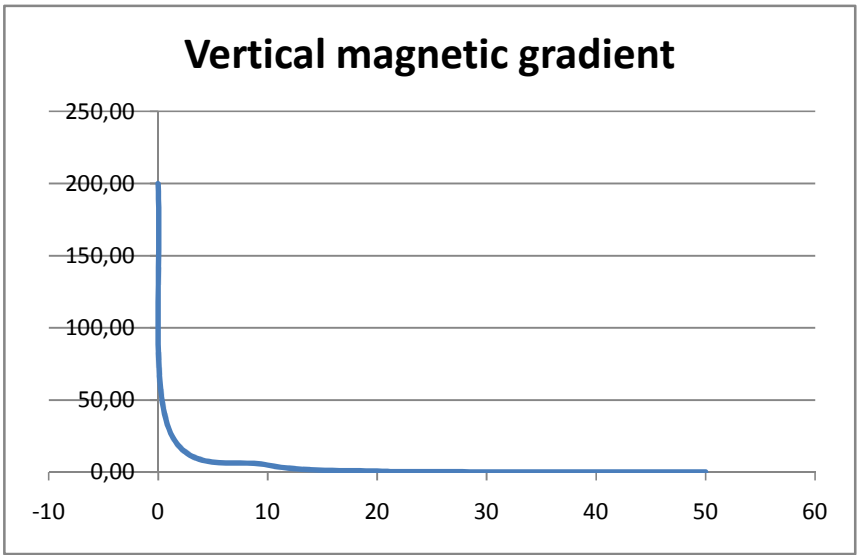
The field measured is extremely high till a distance of 5cm, after it goes asymptotically to low levels. It appears that at about 2 meters (where I put the instrumentation) the reading is below the noise.

2nd test - vertical field

This test does regard the magnetic field gradient measured on the vertical plane from the middle of the second control coil like in following figure. The measure is done for different orthogonal distances.



Distance cm	Volt ptp
50	0.15
25	0.4
20	0.8
10	5
1	30
In con-tact	200

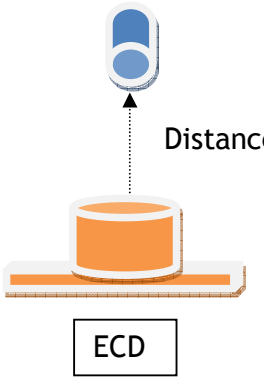


Considerations

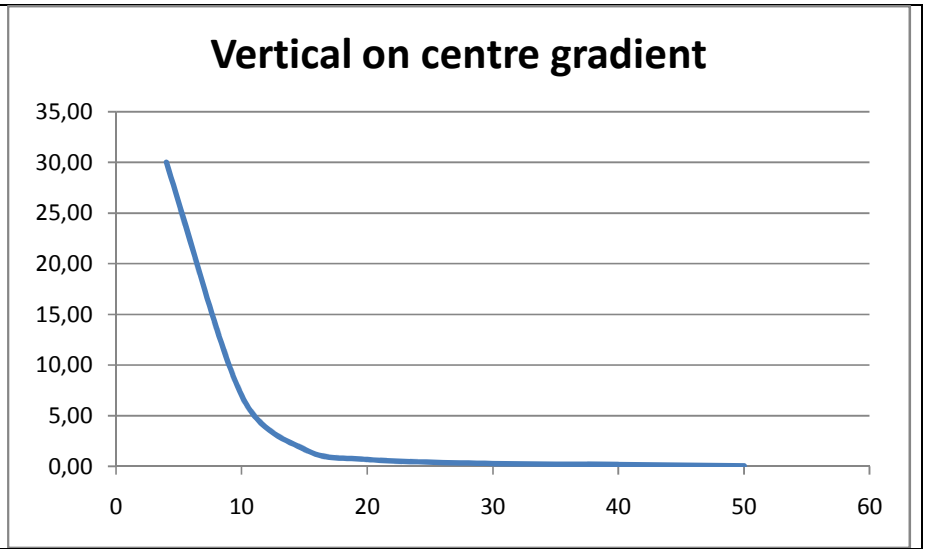
The field measured is extremely high in the CC nearing, after a couple of centimeters it goes asymptotically to low levels. It appears that at 1 meter the reading is below the noise.

3rd test - vertical field - on ECD centre

This test does regard the field gradient measure made on the vertical plane from the ECD centre like in following figure. The measure is done for different dista



Dis-tance cm	Volt ptp
50	0.08
40	0.2
30	0.3
20	0.7
15	1.7
10	7
4	30

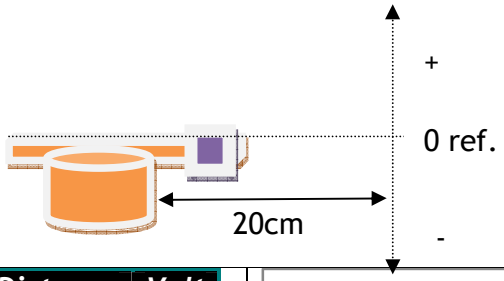


Considerations

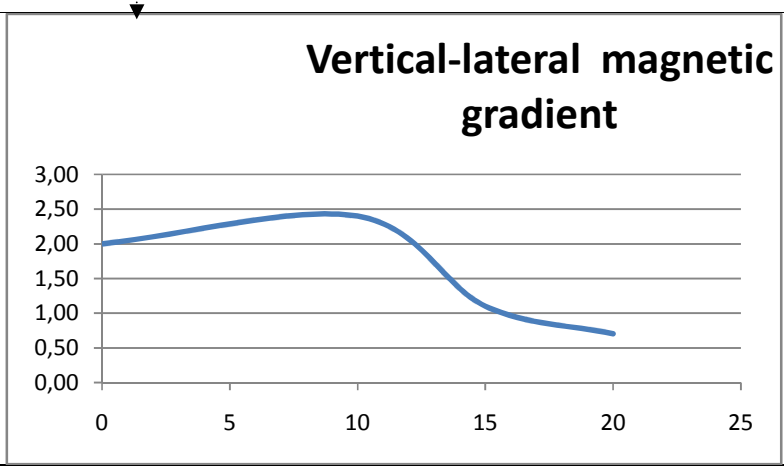
The field measured is high till 10 cm of highness, after it goes asymptotically to low levels. It appears that at 1 meter the reading is below the noise.

4th test - ECD upside down

In this test the ECD is finally set in its correct position i.e. with the small loop under the big mobius loop so to have the vertical field radiating to up. In said position I want to see how the magnetic field vary at a fix distance of 20cm from the ECD perimeter and then at different highness.



Distance cm	Volt ptp
+0	2,00
+10	2,40
+15	1,10
+20	0.70

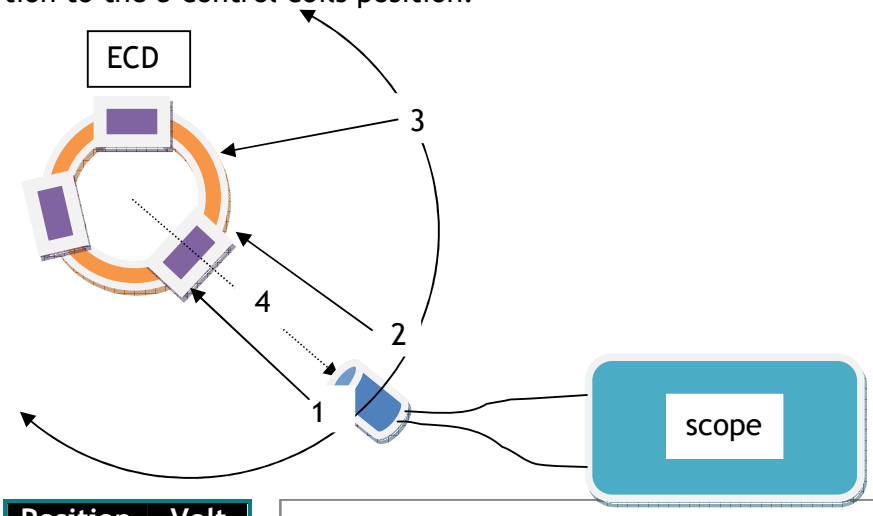


Considerations

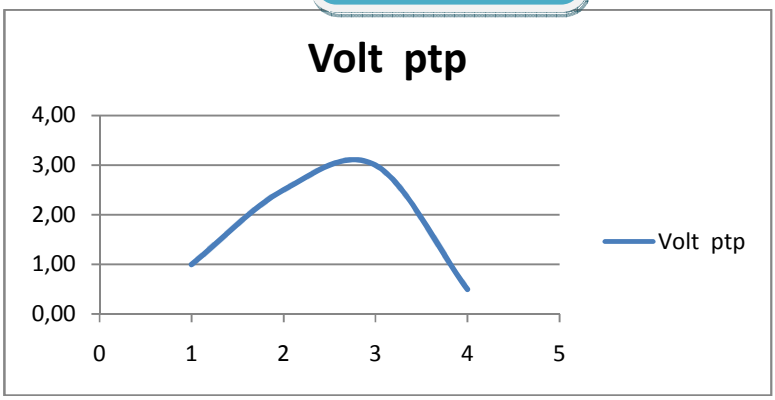
In this case the field measured is almost constant till 10-15cm of positive highness then abruptly fall down. It appears that at 1 meter the reading is below the noise. It has not been possible measure the position 'under' the ECD (negative) for the table did disturb the field…
It appears that the equatorial magnetic field is well spherical formed.

5th test - all around

With this test I want to check the magnetic field on the horizontal plane at ECD bottom level and all around the ECD itself just to gain knowledge of what happen in relation to the 3 control coils position.



Position	Volt ptp
1	+1,00
2	+2,5
3	+3,0
4	+0,5

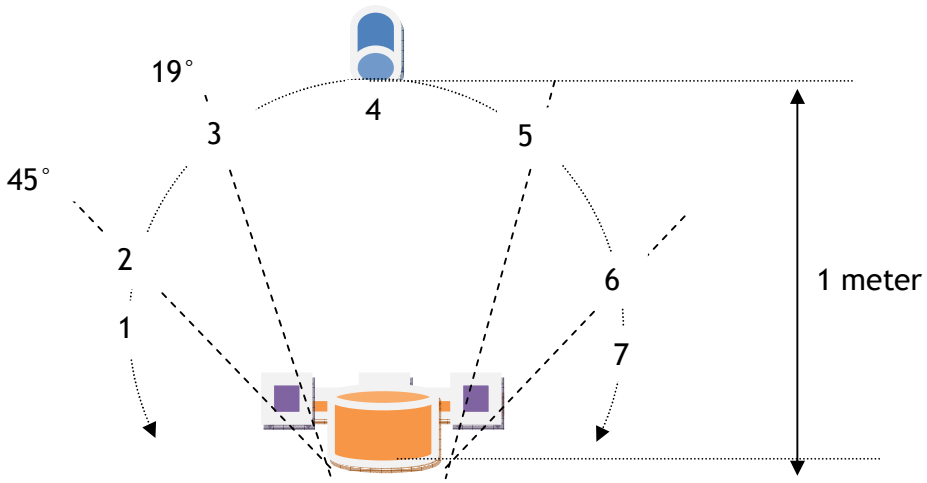


Considerations

In this case the field measured does follow very well the presence of the 3 control coils. It appears that the magnetic field is well spherical formed.

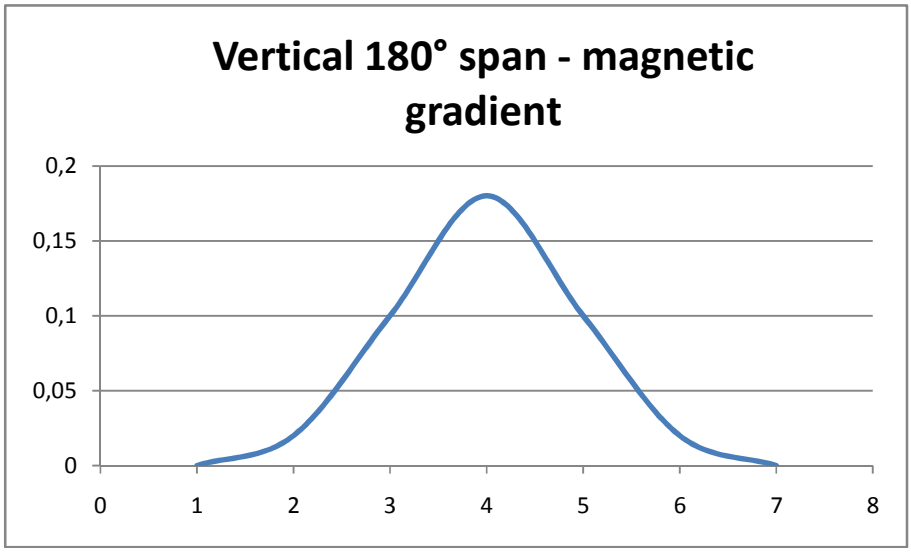
6th Test - all on top

This test is necessary to ascertain the magnetic field shape over the ECD and in particular the effect produced by the 44mm displacement by the two mobius loop which does create a slope of about 19 degrees.



In this case I move in a circular path the pick-up coil pivoting in the ECD bottom centre point and at a distance of 1 meter.

Position	Volt ptp
1	+0,00
2	+0,02
3	+0,10
4	+0,18
5	+0,10
6	0,02
7	0



Considerations

In this case the field measured does follow very well the presence of the two mobius coils showing that the field intensity is concentrated in the arc between the 2 19° limits, after that it decrease exponentially. It appears that the magnetic field is well spherical formed but has a bulge in the upper side.