Antena Dipolo 80/40 mts

Taller de Antenas Radio Club La Plata

2014

Por: LU4EME

Taller de Antenas 2014

OBJETIVO:

construir una antena que pueda ser utilizada tanto en las bandas de 40 como 80 Metros y de esta forma poner operativas la mayor cantidad de estaciones posibles de la Ciudad de La Plata y alrededores.

Lograr dimensiones apropiadas para poder instalarla en superficies reducidas.

Taller de Antenas 2014

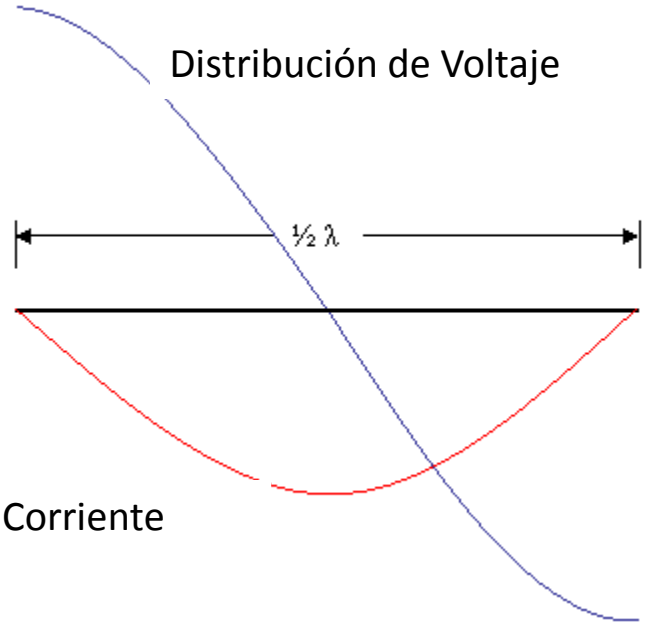
BANDA DE 80 METROS							
FRECUENCIAS (kHz.)		DESTINOS	CATEGORÍAS				
DESDE	HASTA		IC	N	I	G	S
3500	3515	CW -PRIORIDAD"DX"-			X	X	X
3515	3525	CW		X	X	X	X
3525	3580	CW - AM - SSB		X	X	X	X
3580	3620	CW - AM - SSB - DIGIMODOS - RTTY (PRIORITARIO)		X	X	X	X
3620	3635	CW - AM - SSB - DIGIMODOS - PACKET (PRIORITARIO)		X	X	X	X
3635	3650	CW - AM - SSB (PRIORITARIO)		X	X	X	X
3650	3740	CW - SSB (PRIORITARIO)		X	X	X	X
3740	3750	CW - SSB (PRIORITARIO) - PRIORIDAD "DX"-		X	X	X	X
3790	3800	CW - SSB (PRIORITARIO) - EXCLUSIVO DX-				X	X

BANDA DE 40 METROS							
FRECUENCIAS (kHz.)		DESTINOS	CATEGORÍAS				
DESDE	HASTA		IC	N	I	G	S
7000	7015	CW -PRIORIDAD "DX"-			X	X	X
7015	7035	CW		X	X	X	X
7035	7040	CW - DIGIMODOS - RTTY (PRIORITARIO)		X	X	X	X
7040	7050	CW - DIGIMODOS - PACKET (PRIORITARIO DX)		X	X	X	X
		SSB			X	X	X
7050	7100	CW - SSB (PRIORITARIO) (7055/7085 -PRIORIDAD "DX"-)			X	X	X
7100	7120	CW - SSB - DIGIMODOS - PACKET REGIONAL (PRIORITARIO)			X	X	X
7120	7300	CW - AM - SSB (PRIORITARIO) (7170 + / - 5 kHz. SSTV)			X	X	X

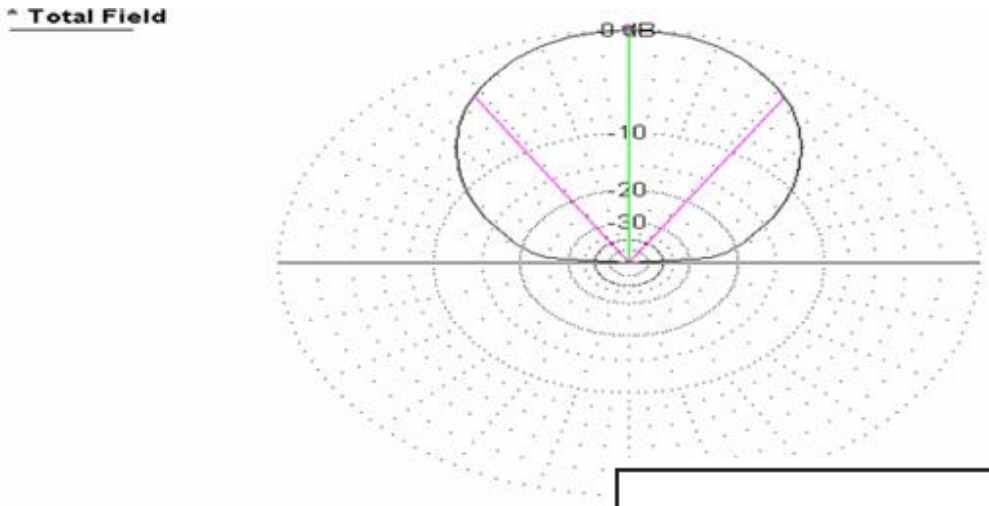
Dipolo de ½ Onda

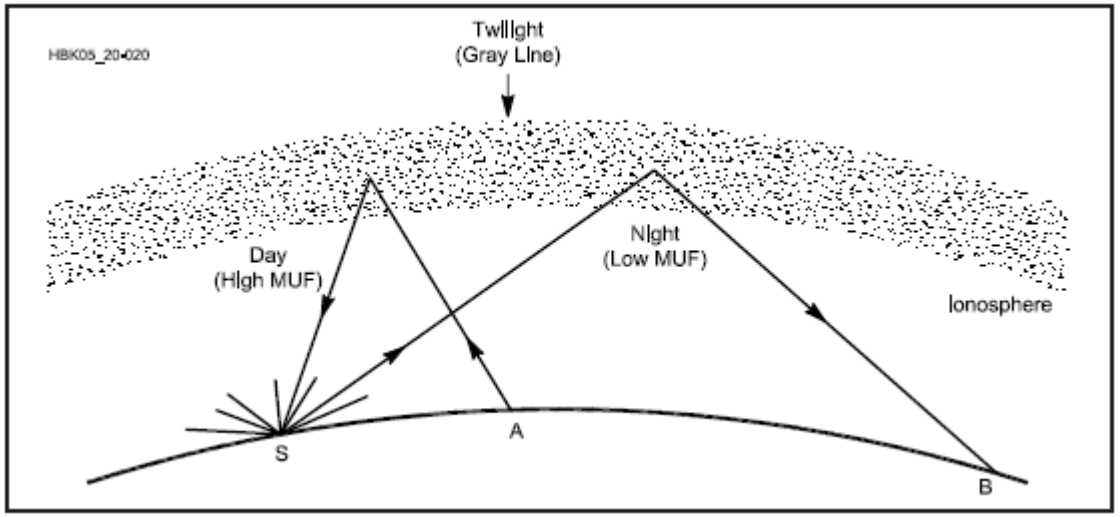
Formula para el calculo:

L [mts]=142,5/F [Mhz]



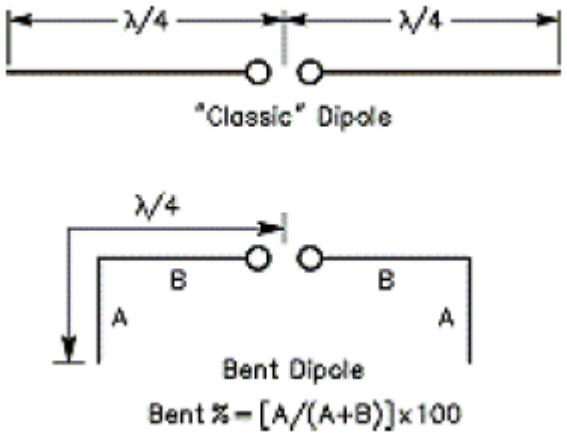
Características Antena Dipolo

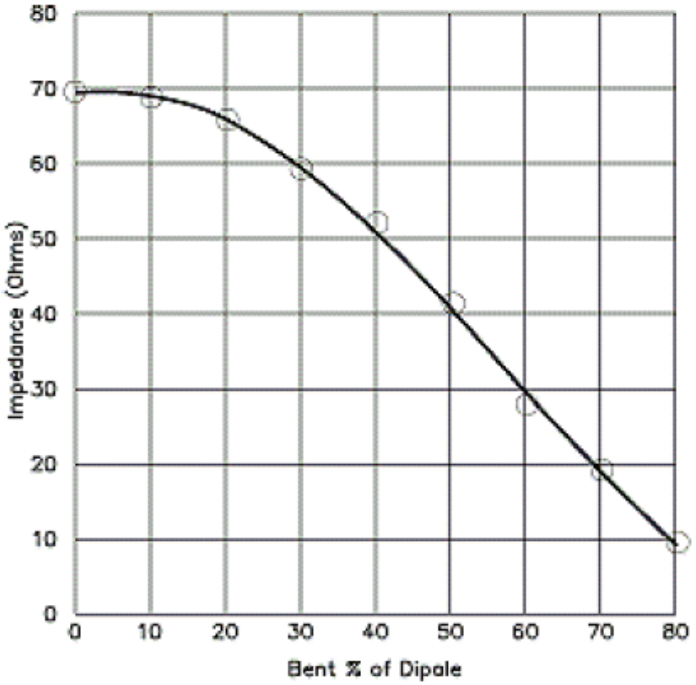




Alternativas ante espacios limitados

Dipolo Doblado





Asume que el dipolo esta a una altura de ½ onda sobre el terreno

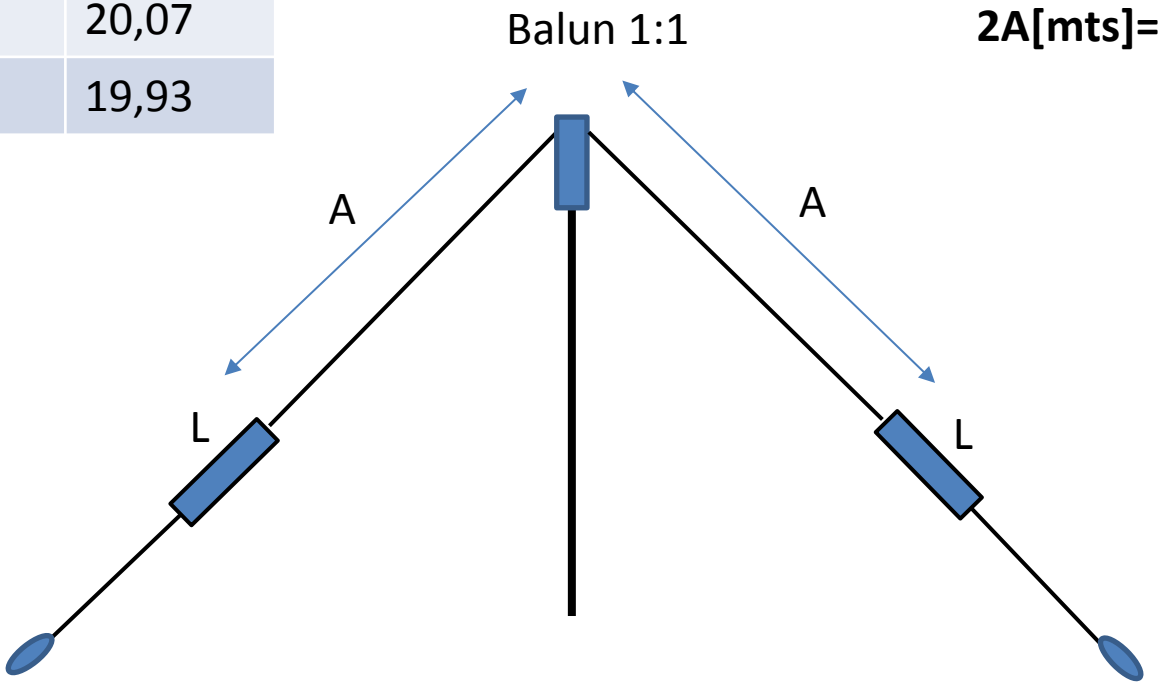
Dipolo acortado

Frecuencia	Largo 2A[mts]
7,050	20,21
7,100	20,07
7,150	19,93

2A = ½ Onda para 40 mts

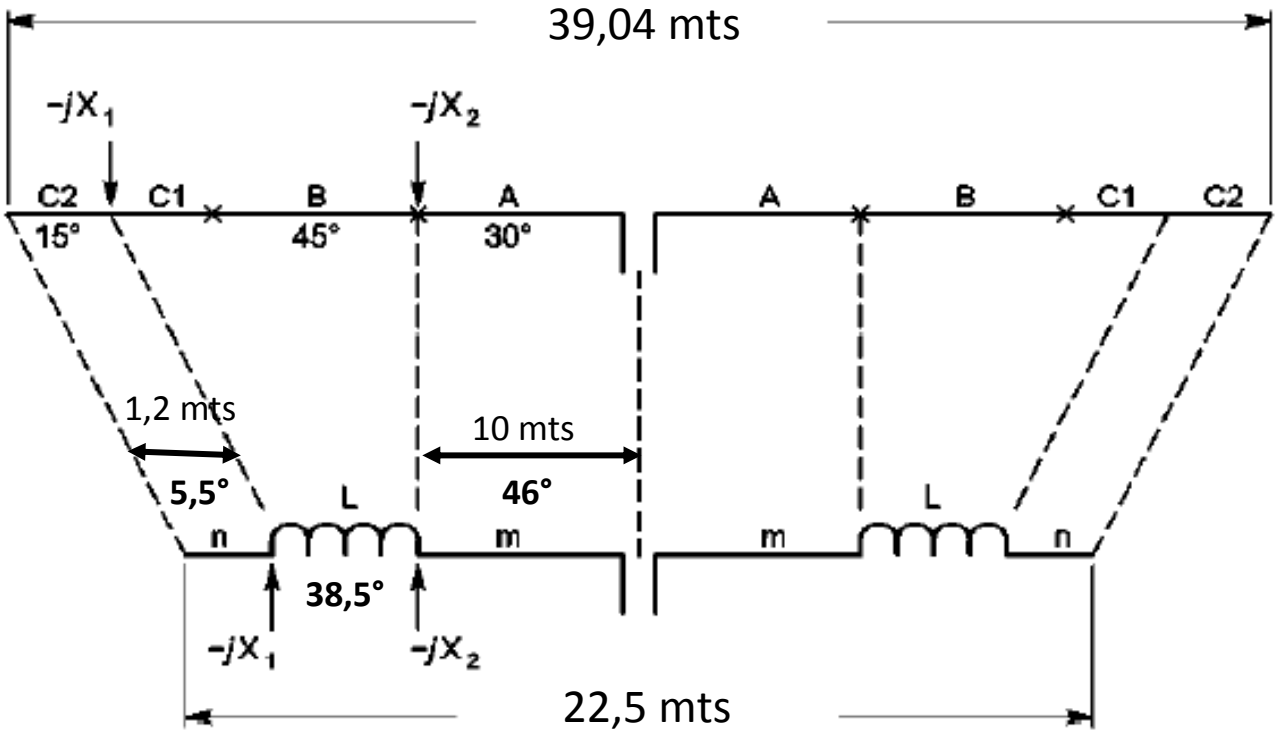
Formula para el calculo:

2A[mts]=142,5/F [Mhz]

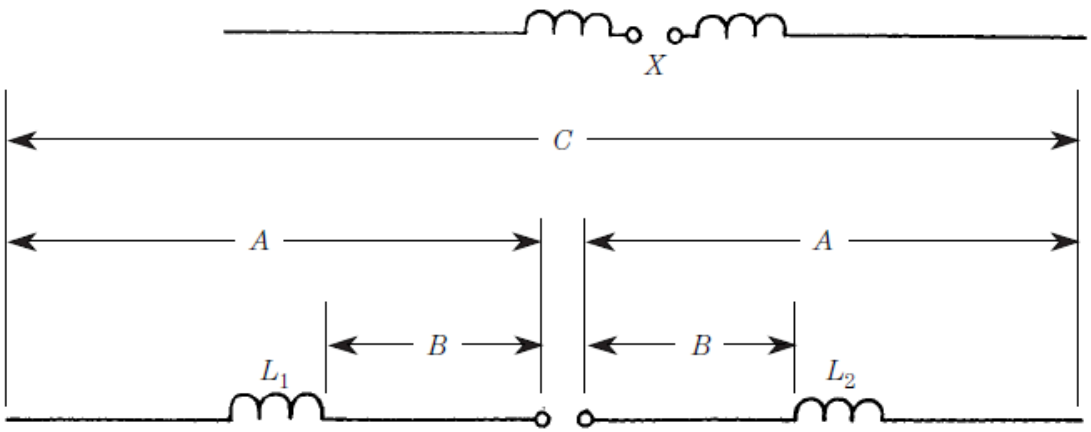


Acortamiento en 80 metros

Acortamiento del 58% en con respecto a un
Dipolo de ½ Onda para 80 metros



Acortamiento en 80 metros



$$L_{\mu H} = \frac{X_L \times 10^6}{6.28F}$$

$L_1 = L_2 = L$

$C = 2A$

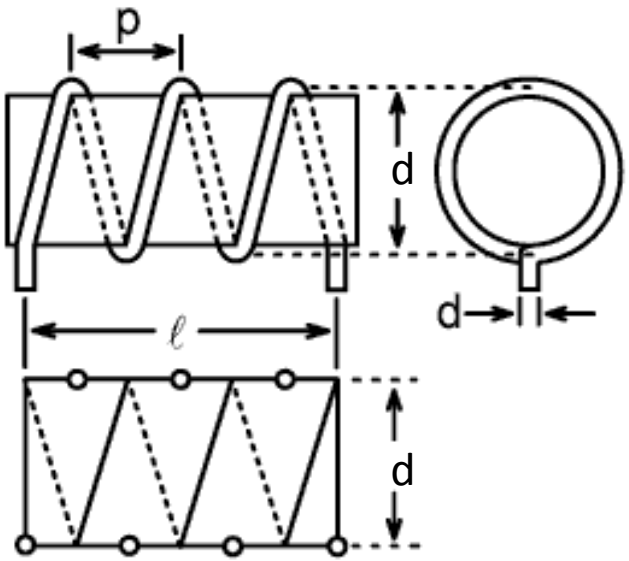
$A = \frac{1}{2}C$

$$C = \frac{468M}{F_{MHz}}$$

$O \leq M \leq 1$

Percent of half-wavelength	Coils at feedpoint (Ω)	Coils at middle of radiators (Ω)
20	1800	2800
30	950	1800
40	700	1800
50	500	1300
60	360	950
70	260	700
80	160	500
90	75	160
95	38	80
98	15	30

Inductor L

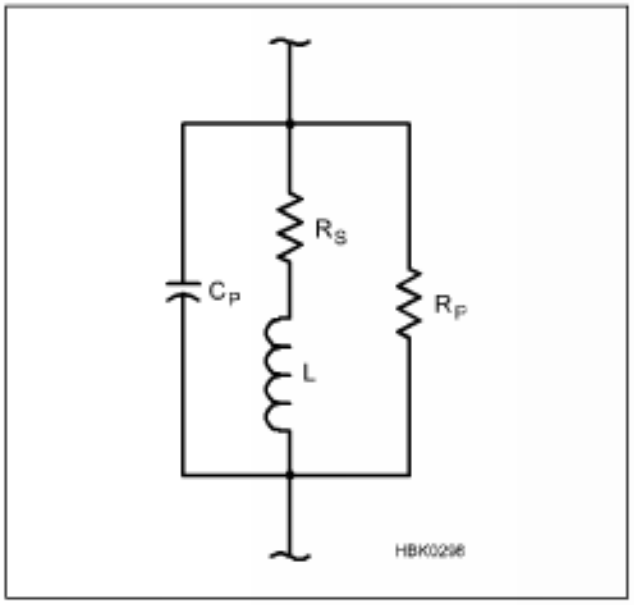


$$L(\mu H) = \frac{d^2 n^2}{18d + 40\ell}$$

Donde:
d= diámetro forma
l= longitud bobinado
n= número de espiras

Inductor L

Circuito equivalente:



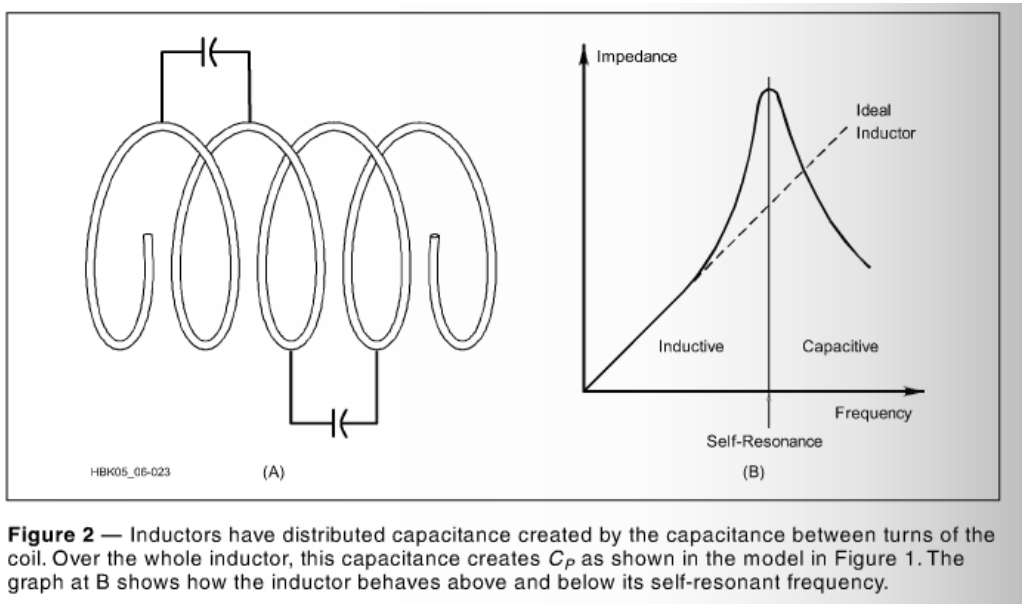


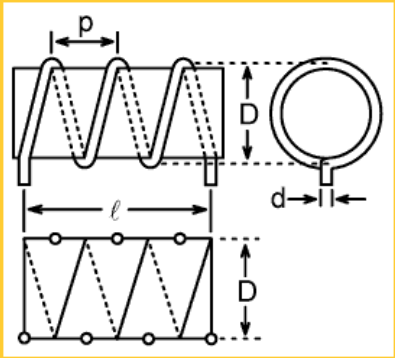
Figure 2 — Inductors have distributed capacitance created by the capacitance between turns of the coil. Over the whole inductor, this capacitance creates C_P as shown in the model in Figure 1. The graph at B shows how the inductor behaves above and below its self-resonant frequency.

Cálculo Inductor L

Single-Layer Helical Round Wire Coil Inductor Calculator

ENTER:

D = 50	mm	Mean diameter of the air core coil, measured from wire centre to wire centre
N = 80		Number of turns
ℓ = 95	mm	Lenght of the coil, measured from the connecting wires centre to centre
d = 1	mm	Wire or tubing diameter
Cu, annealed		Plating material
ρ = 17.241	nΩ·m	Plating conductivity
μ_r = 0.99999044		Plating permeability
f = 7	MHz	Design frequency



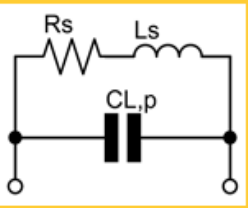
Round wire coil with dimensions and its current-sheet approximation[2]

Lumped circuit equivalent:

L_s = 130.63332	µH	Frequency-independent series inductance from the current-sheet coil geometrical formula, corrected for field non-uniformity and round wire[2,4-7]
$X_{L,s}$ = 5745.5537	Ω	Series reactance of round wire coil
$R_{L,s}$ = 4.3330710	Ω	Series AC resistance of round wire coil at design frequency
$Q_{L,ul}$ = 1325.9772		Unloaded quality factor of round wire coil at design frequency
$C_{L,p}$ = 1.3235277	pF	Parallel stray capacitance at design frequency[1]

Self-resonant frequency:

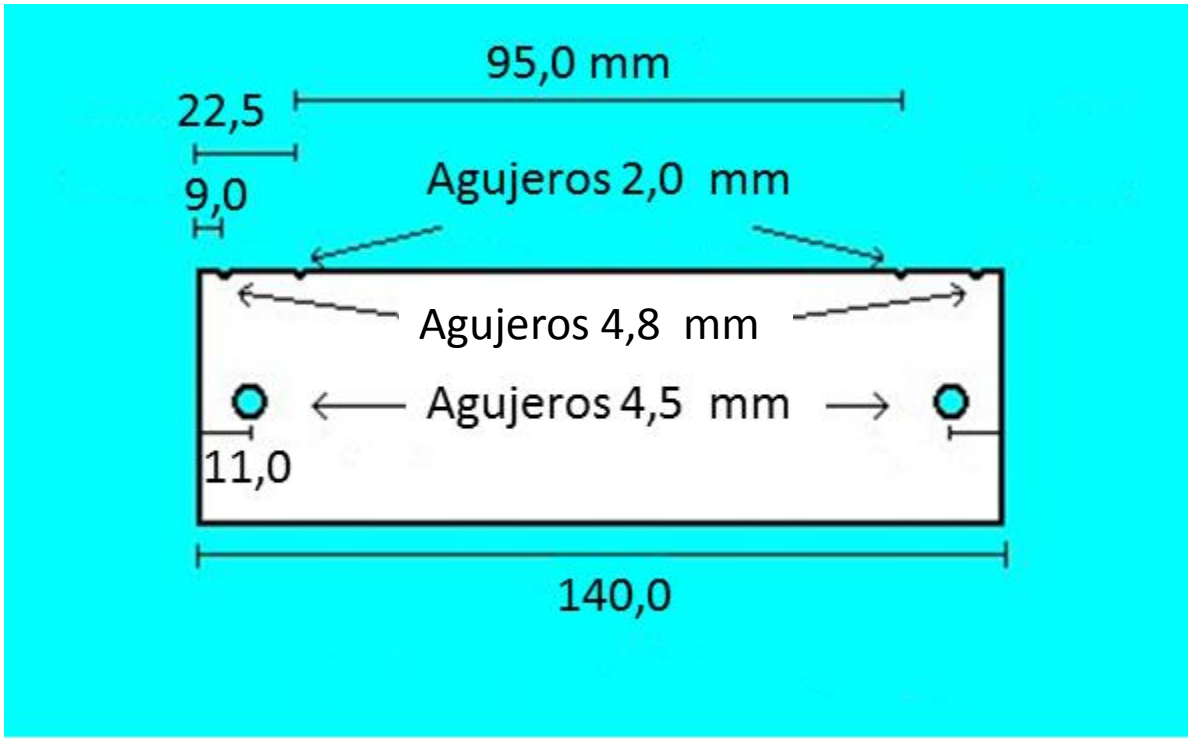
$f_{res,L}$ = 9.6491187	MHz	λ/4 (parallel) self-resonant frequency of n=0 sheath helix mode[1,8]



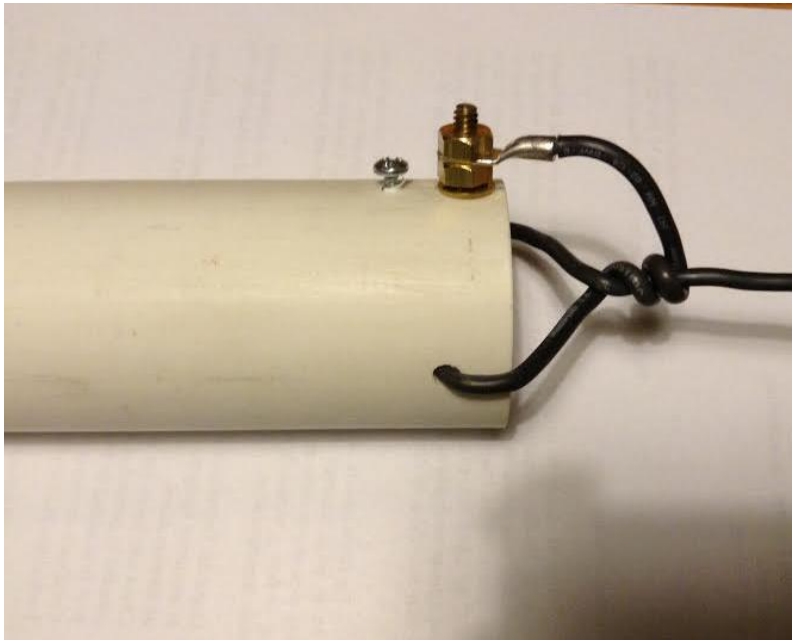
http://hamwaves.com/antennas/inductance.html

Detalles constructivos Inductor

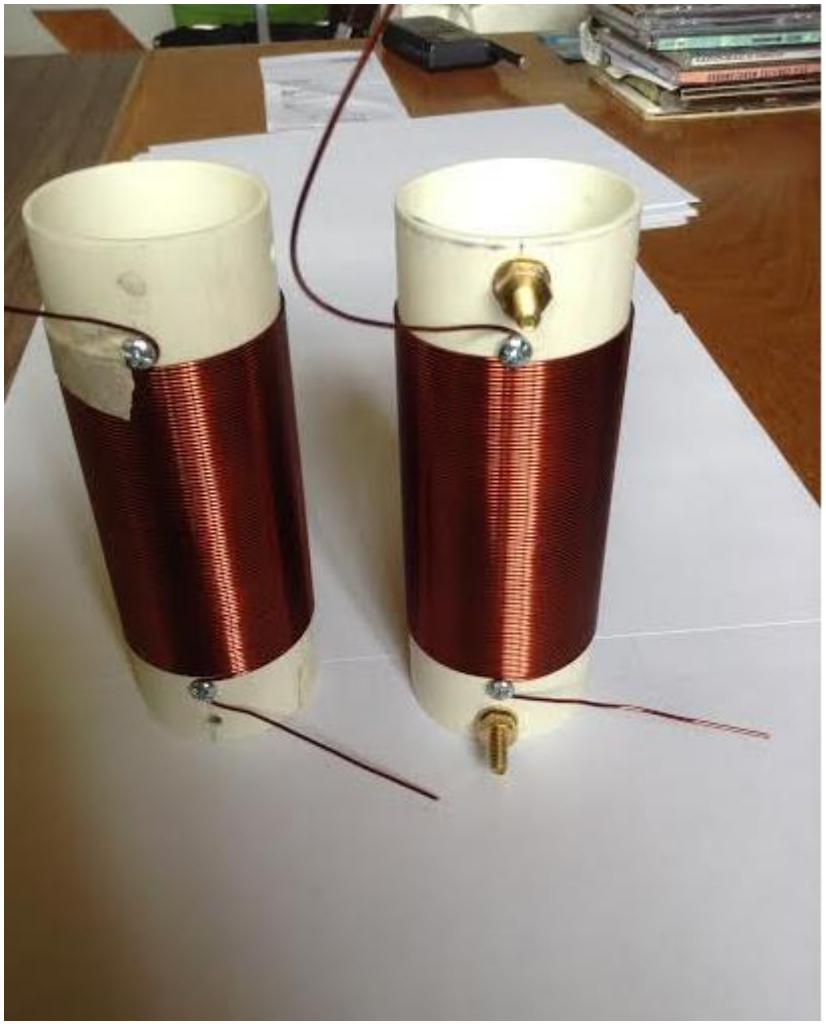
80 espiras juntas alambre esmaltado de 1,0 mm diámetro
¼ Kilo alambre esmaltado, longitud aproximada 13 metros



Construcción Inductor L



Construcción Inductor L



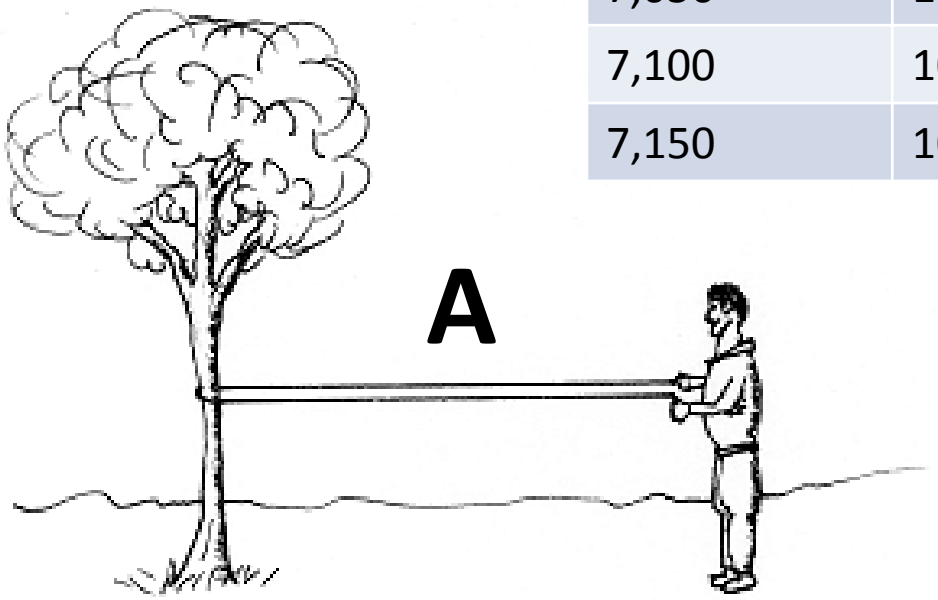
Construcción Inductor L

Detalles terminación Inductor L

Terminación con Barniz Poliuretanico

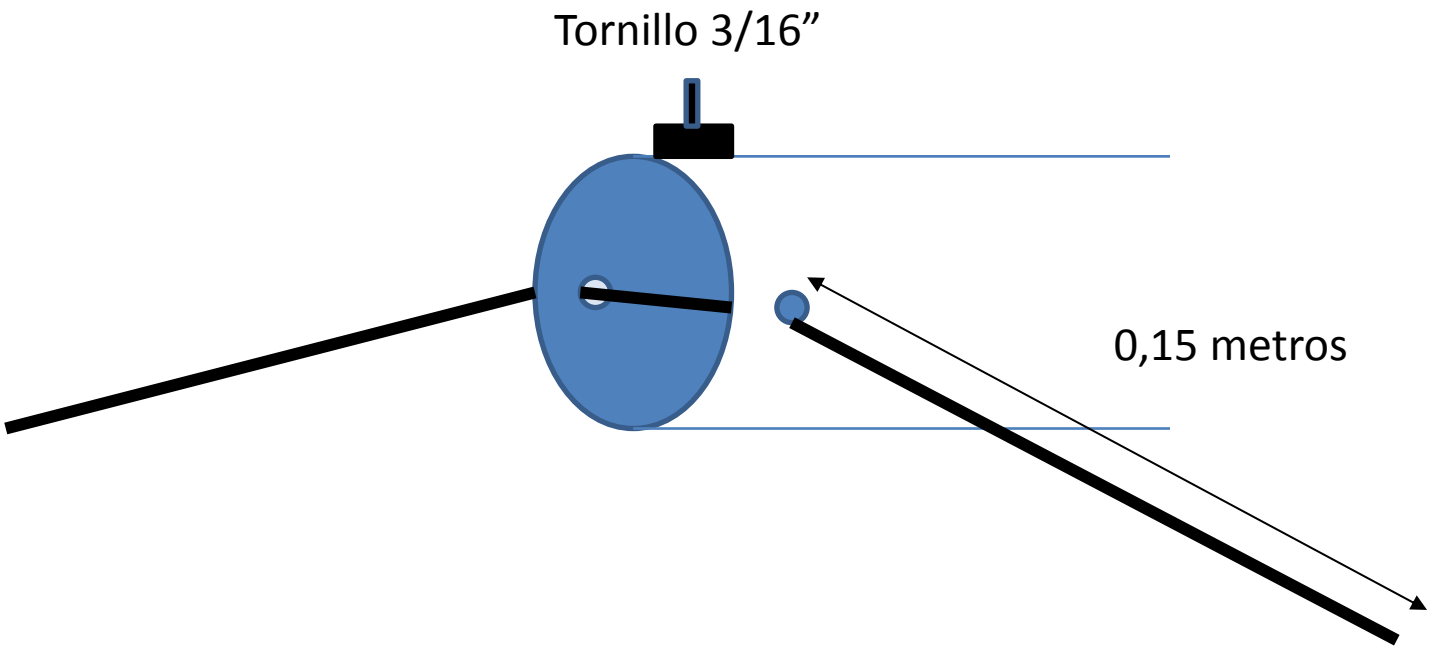
Armado Dipolo

Frecuencia	Largo A[mts]
7,050	10,405
7,100	10,335
7,150	10,265



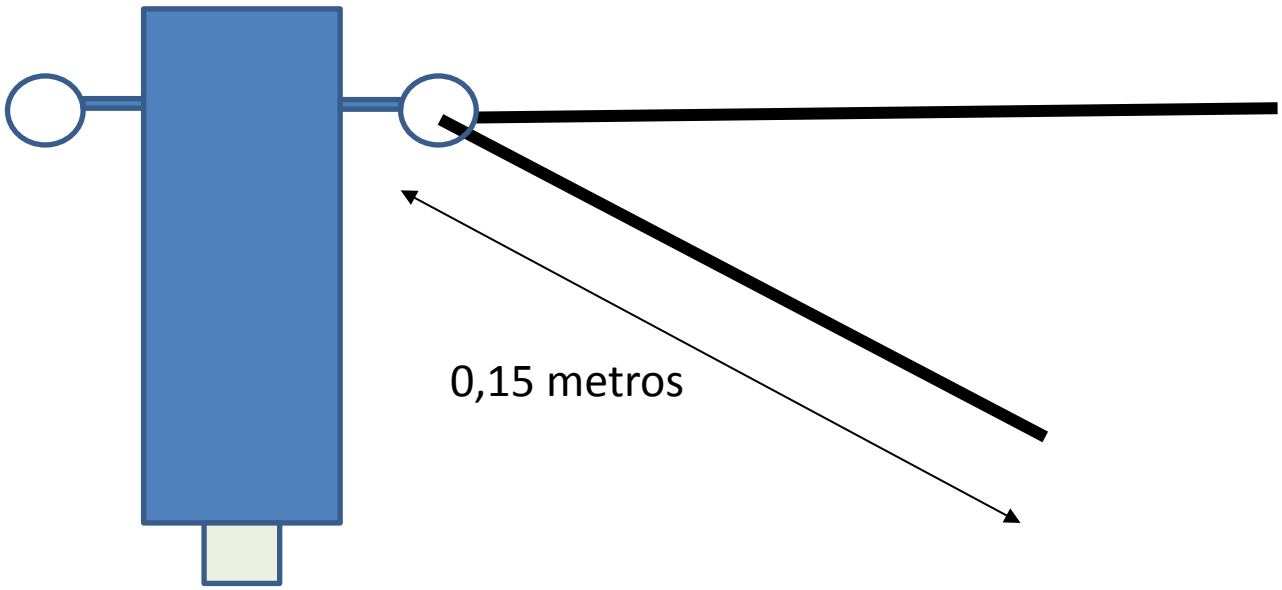
Armado Dipolo

Detalle Inductor



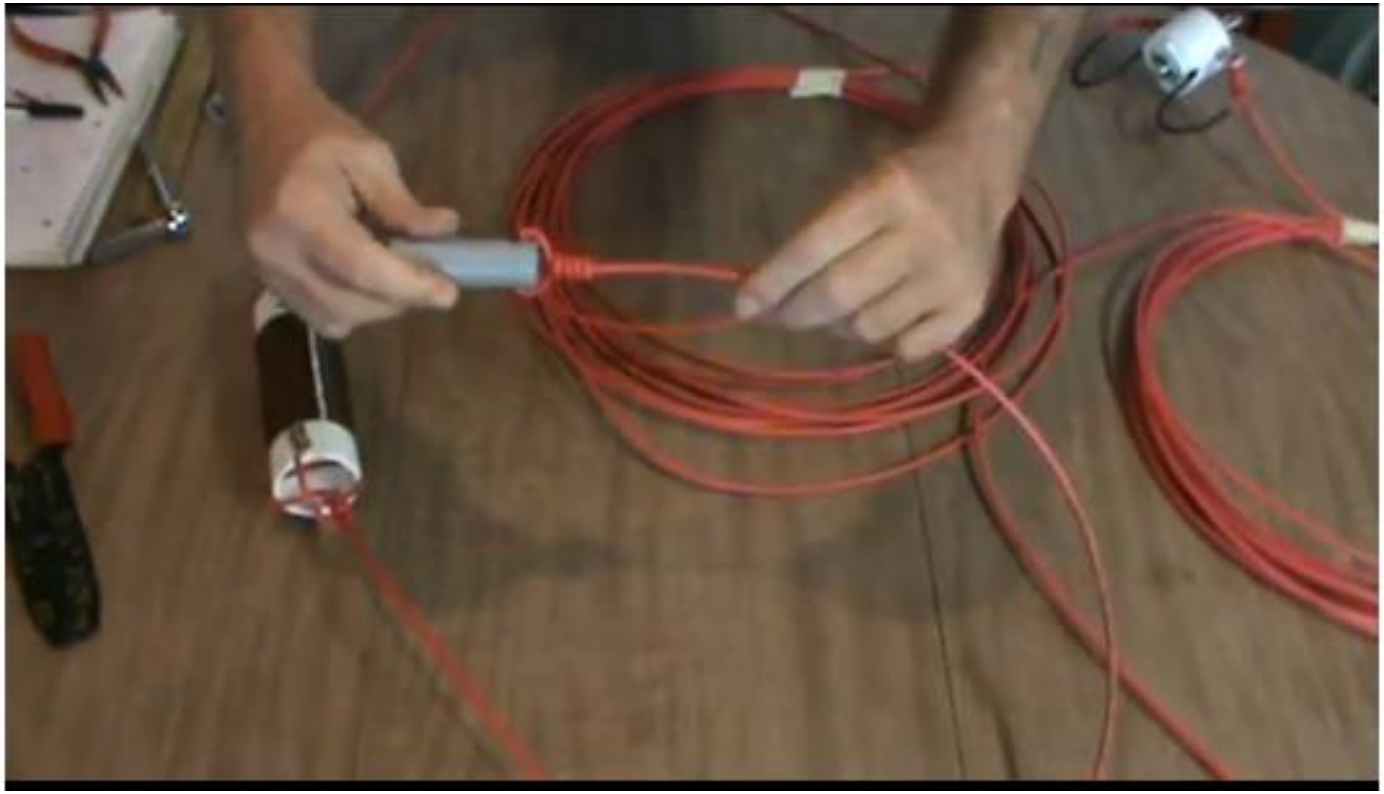
Armado Dipolo

Detalle Balun



Armado Dipolo

Armado Dipolo



Listado de Materiales

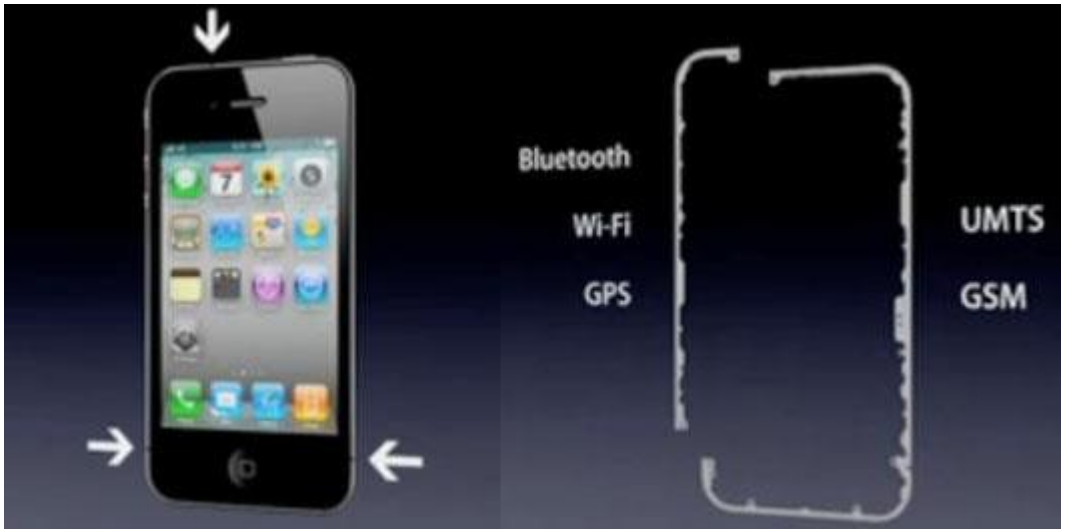
Electricidad:
24 metros cable 2,5 mm2 de sección
6 terminales para cable de 2,5 mm2
8 precintos plásticos
¼ Kilo de alambre esmaltado de 1,0 mm de diámetro

1 Balun 1:1
2 aisladores tipo huevo

Tornillería:
4 tornillos de bronce 3/16” x ¾”
4 tuercas para tornillo de 3/16”
8 arandelas planas de bronce
4 arandelas tipo estrella para tornillo de 3/16”

Ferretería:
30 centímetros de tubo de PVC blanco de 50 mm de diámetro ver que tenga buena pared
1 lija al agua Nro 280

El espacio para la antenas todo un problema



CALLE 34 Nro. 513

LA PLATA