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Mounting a node

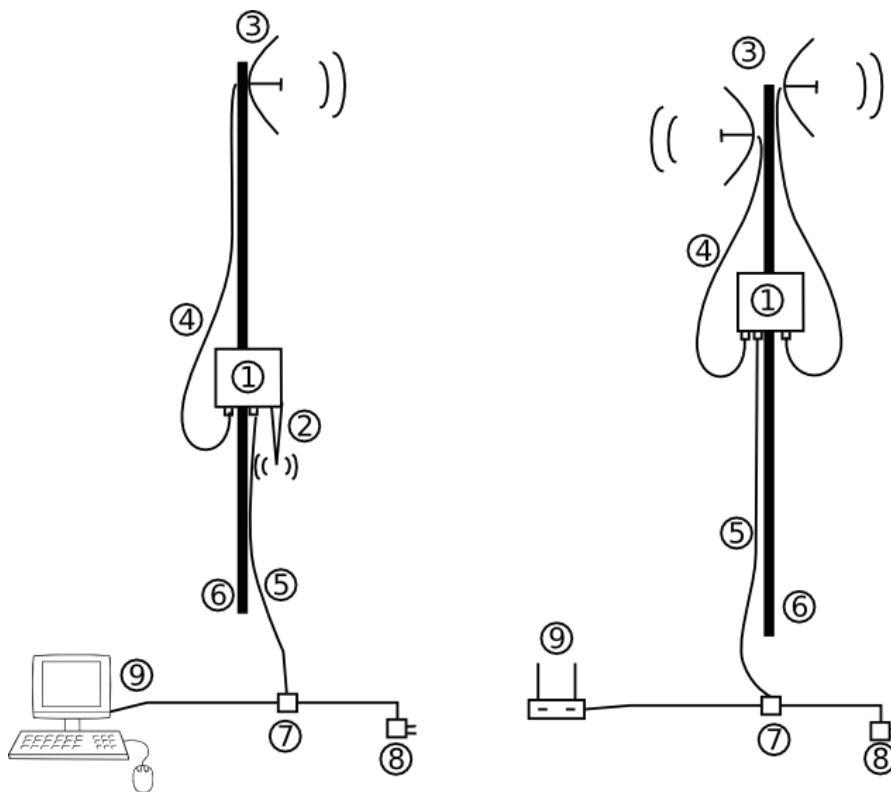
This guide shows you what items need to mount a node outside and how to prepare. It is based on the model used in QuintanaLibre.



This equipment will be a reference node WDR3500 TP-Link router, powered by PoE (Power THROUGH network cable), with an external antenna for each interface.

The guide does not provide installation and software configuration on the router or router modification to support PoE power; Topics covered in other guides.

We assume that the node will be installed in a location where it will be placed subject to a tack pipe (eg. A terrace).



1. Box
2. Omni Antenna
3. Directional Antenna
4. RG58 Pigtail
5. Ethernet Link
6. Torre or Caño
7. POE Injector
8. 12v transformer
9. PC connection or connection inside Acces Point

1. Box

Target

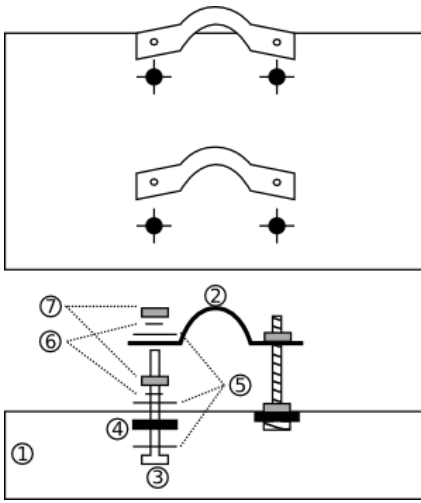
Contain and maintain the electronic equipment (router) isolated from moisture, dirt, solar radiation and atmospheric influences.

Items needed:

- PVC waterproof case 20x15x5cm
- AlterMesh router firmware installed
- 2 or 3 Cable gland 3/4 "
- 2 Omegas 1 "(or according to the pipe to be used (8))
- 4 bolts with double nut 4mm
- 12 metal washers
- 4 rubber washers (cueritos Quill)
- 8 washers Grower

1.1 Anchoring

The anchor of attaching the waterproof case with the router to the tower. The box must be drilled according to the diagram and incorporating the elements given the tightness of the interior. It is important that the waterproof case not to get water over the life of the node, but drilling Give you need for placement, so we ingenuity to prevent leaks. The preferred method here and tested in multiple installations, is to use cueritos bobbin (grommets) as a sealant.

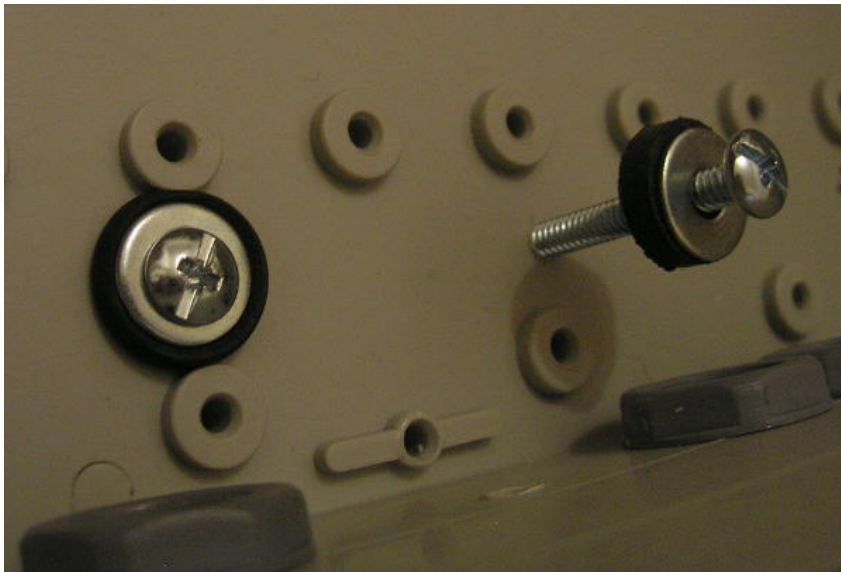


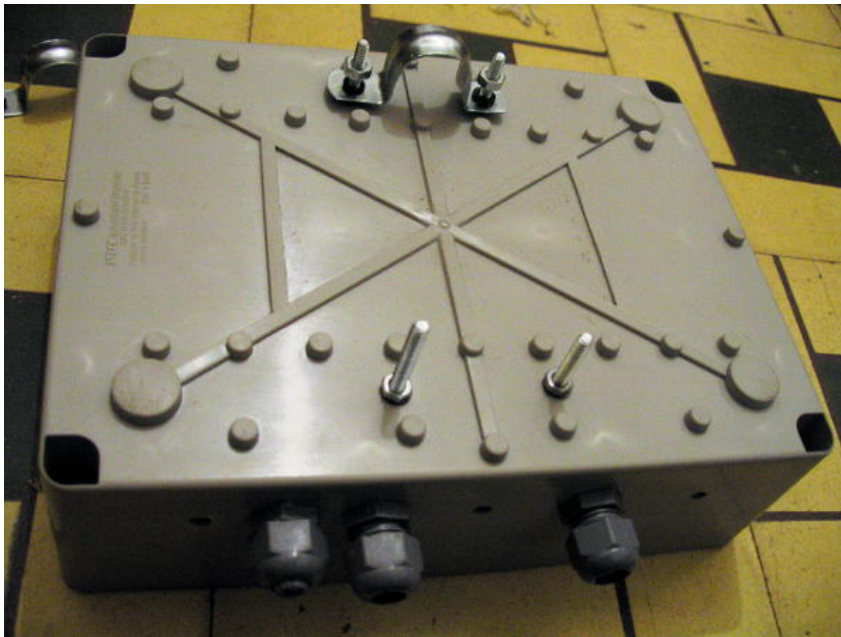
1. Waterproof case
2. Omega
3. Bolt
4. Grommet
5. Metal washers
6. Grover washers
7. Nuts

Steps to follow:

1. Mark the back of the box where the bolts will be subject our omegas; You can use the same template omegas.
2. Pierce the back of the box with a wick as accurate as possible in relation to the bolts use (in our case 4mm). There will be four holes in total.
3. Place a bolt in each hole with metal washer and rubber washer inside nut and washer on the outside.
4. Adjust so that the washer (leather bag) to collapse and seal.

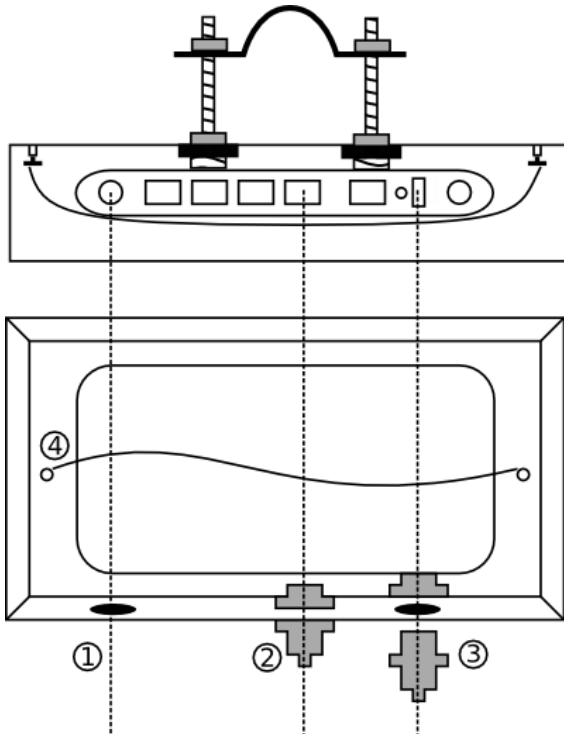
Upon mounting the cabinet, the omegas shall comply with other nut grower and these bolts; it is important that they have been well adjusted to not rotate when force.





1.2. Cable outlet

You must submit the router inside the box to mark it tight at the points where it was drilled to add the outputs of cables. It is preferable that are aligned as otherwise the wires may be deformed or have flaws in chips.



1. Omnidirectional Antenna output
2. Departure outdoor UTP cable gland to POE Injector
3. Gland output pigtail to RG-58 Directional Antenna
4. Securing router using common wire waterproof case

For example, our box has two outgoing cables. Either way, it may be practical to leave some extra innings, because in case you need it later more complicated drill once the box is mounted in its final position.

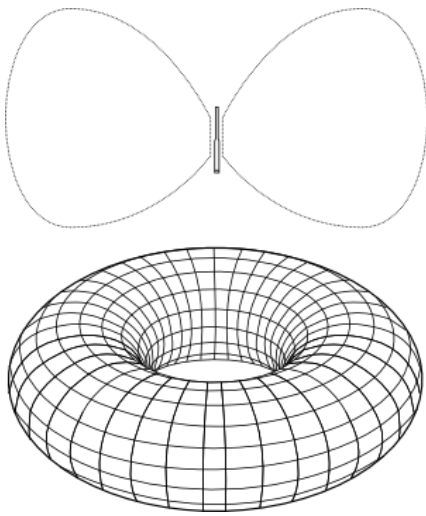
UTP "network" ethernet cable is RJ-45 chips at the ends. It is desirable that the cable gland where the cable will be the right size to allow passage of the tab, so avoid the complexity of assembling the cable inside the box. For the pigtail RG-58, the glands must allow the passage of the SMA sheet carrying on its end.

2. Omni Antenna

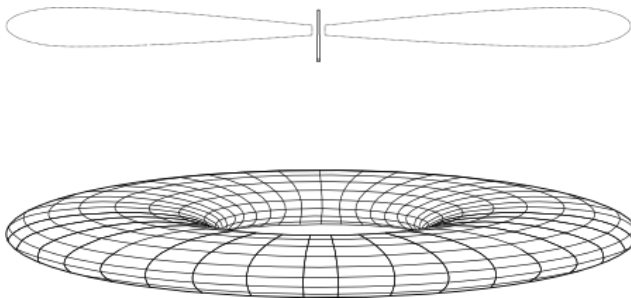
Target

Provide signal around for client connections, but also serves to link other nodes are AlterMesh.

The signal displays an omnidirectional antenna has the shape of a toroid, on the vertical axis of the antenna up and down projected low pollution sideways while its 360 displays the greatest intensity.



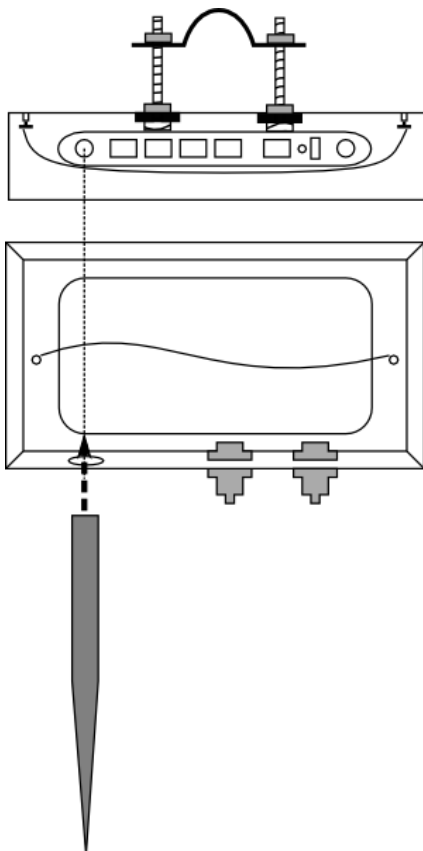
In dBi omnidirectional antennas parameter identifies the profit and this is relaiciona directly with the signal reaching distance. The higher dBi antennas allow extend the signal at the cost of reducing the height. This means that if this parameter is abused stations are close but below the antenna will not reach to detect.



In our model, we use the dual-band 5dBi antennas that come supplied with the router.



A good idea is to tape the weld joint itself to avoid moisture ingress and to give riguidez.



3. Directional Antenna

Target

Improve the signal to a specific node address to link to other (s) node (s) AlterMesh.

A directional antenna has the largest signal strength in one direction. In this case it is desirable to maximize the DBi parameter to achieve nodes over long distances. According to the design of the different types of antennas we can try to minimize construction costs trying to reach the highest performance.

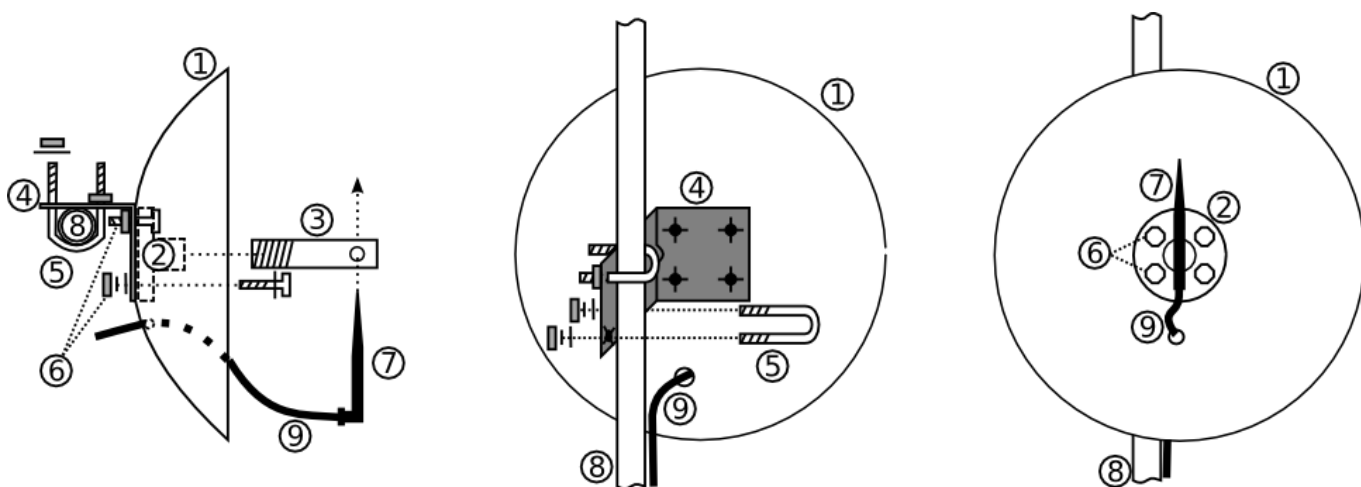
Dual-band antenna with parabolic reflector

Theoretical profit	> 20dBi
Approximate cost	\$ 80
Complexity Construction	Drop

When dual-band routers, which operate simultaneously in 2.4GHz and 5GHz, are used it is important that we use the antennas also support both bands. The simplest and cheapest way is to direct the energy of the omnidirectional antenna that brings the router itself. For this we use a parabolic reflector and will place its focus on the omni antenna.

The most widely used model MiniMaxi networks is a parabolic dish with the same curvature of a Ubiquiti NanoBridge of 25dBi manufactured in small-scale workshops with the method of embossing. Surely in your town or nearest town there will be a workshop that can do the job. Any parabolic dish between 20 and 25dBi can serve as a template for copying; It is important to know, calculate or measure the focus, then know where to locate the illuminator ..

You can also use parabolic rejillas, but always bearing in mind that the separation of the grid should be adequate. As a rule, a grid used to 5GHz serve our purpose, while an originally used to 2.4GHz, will be inadequate.



1. Parabolic dish
2. Brown PVC thread outlet water tank
3. PVC pipe threading and drilling brown water (see detail)
4. Fittings for crosspieces in the form of "L"
5. Threaded rod in a "U"
6. Screws, washers and nuts sugesión
7. Omni antenna that comes with the router
8. Galvanized pipe.
9. RG58 Pigtail

4. RG58 Pigtail

Target

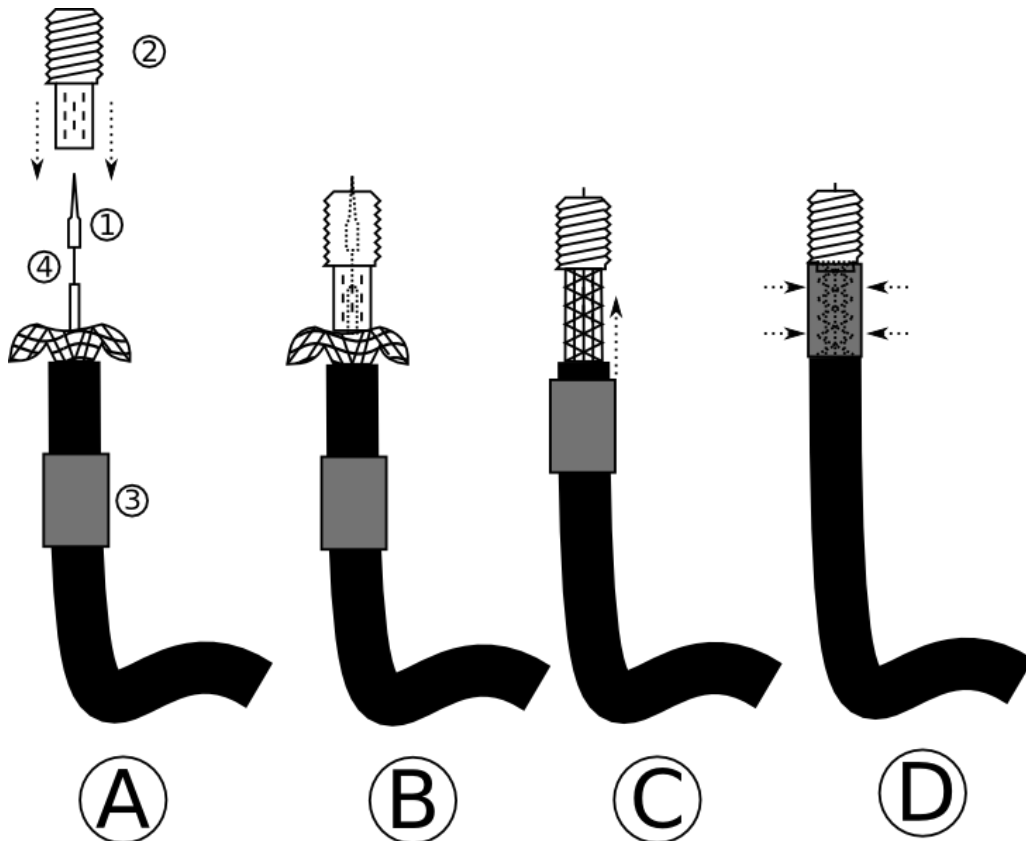
Connect the antenna to the radio device

This is a RG58 coaxial cable 50 ohms and corresponding tabs RP-SMA RP-SMA female and male **invested** .

The RP-SMA or SMA reverse chips should not be confused with normal SMA because they will not allow the connection. The golden or silver connectors does not matter.



Keep in mind that there are 2 types of RG58 RG-58 / U has a core of solid copper and RG-58 A / U core twisted wire. Must be used as the first SMA allows the adjustment tab to the cable reliable manner.



1. Pin RP-SMA connector
2. RP-SMA connector
3. Metallic element p / crimpear and adjust the tab
4. Strand core or RG58
5. Metal mesh RG58

A: Strip the coax cable as shown and solder Pin connector to the cable strand

B: Intruduir the connector until the pin remains inserted.

C: Cover the connector with wire mesh

D: Cripear with pliers to adjust the metal mesh element.

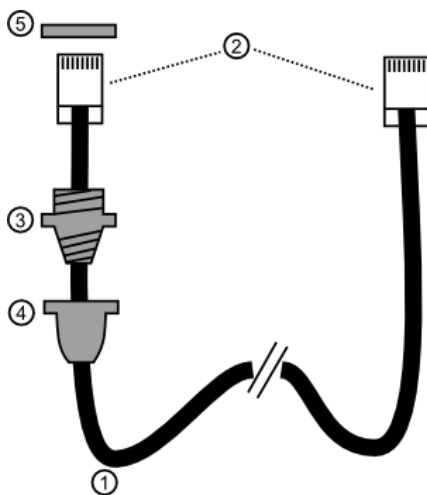
5. Link Ethernet

Target

Provide electrical power to the router via PoE (Power over Ethernet). It also allows to connect a PC or a home router directly to the Ethernet port.

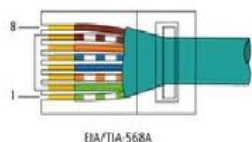
It is a cable shielded twisted pair (FTP) or unshielded (UTP), but always to the outside; cable inside work when installed but will deteriorate with solar radiation.

Whenever we can use as a power source provided with the router; in that case the cable length **should not exceed 25 ~ 30m** as the voltage of the injected current decay to the point that the router will not work or unstable. If the characteristics of the installation need to use a longer cable, we can change the source for a 12V voltage, without exceeding 24V to avoid damaging the router. The WDR3500 has an internal regulator that tolerates tensions between 12V and 24V; when using other models, you should check what they are designed voltage before testing sources other than provided or run the risk of disabling the computer.



1. FTP twisted pair cable
2. Sheets RJ45 Plug
3. Gland - central part (male threads)
4. Gland adjustment
5. Gland nut

At each end of the cable RJ45 chip is placed. If the gland is small and not allowed to pass the RJ-45 record, you will need to pass the thread of gland to attach it to the box before setting up the tab. The standard for crimpado is specified in the TIA / EIA-568-B.1-2001 standard using the connection order or optionally T568A or T568B pinout. This guide will use the first; It is important to use the same standard at both ends.



1. White / Green
2. Green
3. White / Orange
4. Blue
5. White / Blue
6. Orange
7. White Brown
8. Brown

8. Tower or Caño

Target

It supports all the elements of the node to be lifted at the installation site. The coupling elements are the same by anchors, seals, etc.

9. POE Injector

Target

Introducing electricity into the UTP cable that will take her to the router within the waterproof case.

10. Source 12V

Target

Transform 220V AC household current to that required to be injected into the UTP cable.

11. PC Connection

Target

Provide secure access to the router for configuration and maintenance.

Assembly

In the mounting pipe, antennas should be as close as possible to the router (short pigtails) to avoid loss in the cables.

Besides fixing the pipe to the wall with metal omegas, you should place a through bolt passing through all the pipe and fit the wall, so as to prevent rotation.

Annex I: Table of required elements and approximate costs

You should use the following table as a checklist of items to collect or shopping list to avoid improvisations during assembly.

Elements	Cant.	Cost Approx.	Remarks
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PVC waterproof case 25x15x5cm Approx.	1	\$ 80	Must fit within the router
Glands 3/4 "	3	\$ 24	
Omegas 1 "	5	\$ 15	
Pin approx. 4mm	4	\$ 8	
Metallic Washers	12	\$ 5	
Rubber washers	4	\$ 2	
Grover Arandelad	8	\$ 1	
Outdoor UTP Cable	20m	\$ 90	
Cable RG58	0,5m	\$ 6	
Tubular pipe 1 "x 3m	1	\$ 50	
RJ45 tab	4	\$ 2	
SMA Male and Hemb chips. p / RG58	2	\$ 50	
8mm screw and Tarugo	6	\$ 5	
Total		\$	

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