



Maximon Solutions Ltd

Two Way Radio Buyers Guide

Helping you choose the best radio system for your needs and requirements.



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Maximon Solutions Two Way Radio Buyers Guide

Introduction:

Two way radios are a cost effective way of keeping in touch with all team members across numerous types of environments. Two way radio communications date back to the late 1800's. One of the first recorded uses of two way communication on land was in 1920's police cars which utilised mobile radios to pass information faster making the force significantly more efficient. Two way radio communications have evolved with advancing technology creating new ways to communicate faster and more effectively. The introduction of more powerful Li-ion batteries, and with new battery technologies emerging all the time, equipment is now lighter and more powerful than ever before.

Two way radios are used across all walks of business and have countless other applications throughout life. We hope that this guide will be capable of providing you with enough information to assist you in your decision. There are many questions that need to be asked when finding the radios that most suit your work environment and we hope to aid you in coming to the correct conclusion with the most up to date technology available.



Why should you opt for two way radios?

1. Two way radios are very easy to use. Merely push a button and start talking.
2. The most effective two way radio system will provide the coverage that you require with little to no dead spots.
3. Two way radios equipped with a "telephone interconnect" can make and receive telephone calls through your existing telephone equipment for no additional monthly charge, if required.
4. When you push the PTT on the radio you immediately reach everyone within the group.
5. Selective calling can be an option on certain types of radios. This enables you to make a one-to-one call and also enables one to converse with multiple. Some radios can even have caller ID, so you know visually who is calling you.
6. Two way radios (intrinsically safe versions) can be used in highly flammable or explosive areas without fear of sparking. ATEX is the approved European standard.
7. "Man down" and "Lone worker" options are available on some handsets which allow certain staff to work alone with the safety of other employees' support.
8. Two Way radios offer a very low and efficient fixed cost.
9. Two way radios will continue to work if the mobile network is down or even if a power cut occurs.
10. Two way radios are very flexible and with the correct accessories can be used in almost any environment.

To summarise - Two way radios are easy to use, have many options, are effective in a multitude of locations and have no monthly fee. Two way radios are simple, affordable and reliable. They will inevitably increase safety, boost productivity and improve efficiency wherever used.

**Please answer the following questions to help Maximon Solutions choose the best
Two Way radio system for you:**

1. Are you using two way radios already?

If so please confirm which make and model and whether they are Licensed or Licence Free.

2. Are you getting the coverage required?

If not then you may require a site survey to determine what other equipment you may need to improve the coverage i.e. a local base station or possibly a repeater base station.

3. Do you require Licence Free or Licenced radios?

Consider the benefits of having your own frequency rather than using the licence free frequency where there is the likelihood of more interference. Also consider the coverage, as Licence Free radio has a transmitting output power of 0.05mw and licensed radio produces 4Watt (UHF) and 5Watt (VHF). However, please do not assume that power translates into more distance.

4. Where will the 2 way radios be used?

Indoors/outdoors? Near water? I.e. swimming pools require waterproof radios and flammable environments ATEX.

5. Who will be using the Two Way radios?

Is training required? How simple or complicated the radios will be and what functionality do you require?

6. How many users will be operating the radios?

Is one channel sufficient or will more channels be required; if so for what reason?

7. What facilities would you like to have on your two way radios?

Man down, lone worker, emergency alerts, VOX and scan are just some of the options available.

8. What charging facilities do you have?

Do you have enough plug sockets? Would a six way multi charger be more useful than a single charger?

9. Do you require any accessories?

Leather cases protect the radios or do you need earpieces so that your conversations are not overheard or do you want them to be discreet?

10. What battery life would you like your Two Way radio to have?

Consider the hours of your working day and would you need spare batteries?

11. Do you require any further warranties or maintenance packages over and above the standard one year warranty to protect your investment?

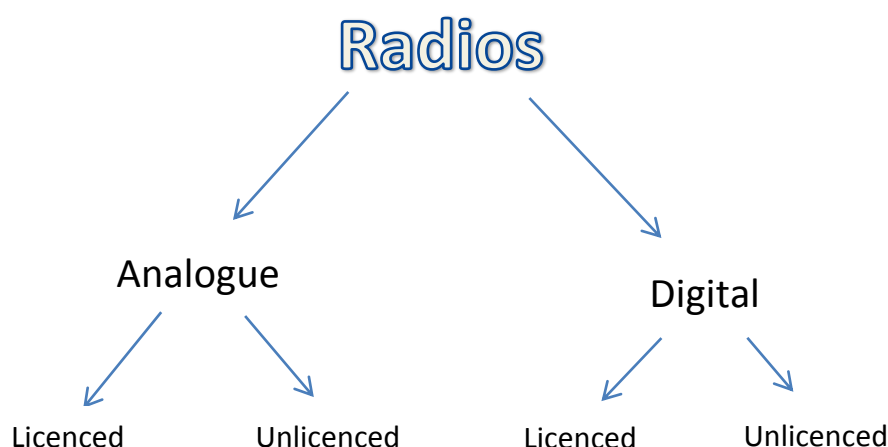
Consider the volatility of your work environment and the stress that this will place on the radios themselves.

12. Do you wish to Rent or Buy?

There are many options: leasing/renting and of course outright purchase, whichever option suits your budget. Whatever your specific need we can design a program to suit.

Types of Two Way Radios

Predominately there are 3 types of two way radios which are available in Digital or Analogue frequencies. These consist of hand portables, mobile radios and base stations, these can all work together and be added to any radio fleet at any time.



Hand portables – There are 3 main types of hand portables, the PMR446 licence free radios, which are categorised into leisure and business radios. These radios produce a transmit power output of 0.5W or 500mw, which means they transmit a half of a Watt. There are also licensed radios which are categorised into UHF and VHF. As a rule, UHF hand portable radios are the most popular radios in built up areas, as they achieve a greater range in this environment. VHF radios tend to work better where there are greater open spaces. This is not always the case but 90% UHF radios tend to be sold as opposed to 10% VHF.





Mobile Radios – These are used in vehicles and powered by the 12 or 24 volt supply. They will achieve greater distances, due to them having a higher transmit power output, but also because of the fact that the vehicle antenna is higher and more efficient from the hand portables antenna. You would expect a greater range, because the antenna has less obstructions and is mounted outside of the vehicle.

Base stations – There are 2 main types of base station, the local base station and the repeater base station (Talk-through). The local base station will extend the coverage area from the control room i.e. where the local base station is, to the hand portables, however, it will not extend the range of the hand portables. If the local base station does not give the coverage you require then a repeater 'talk-through' base station is required, this automatically re-transmits received signals enabling radios to communicate directly. This will significantly increase your range and would be mounted as high and central to the coverage area as possible. It requires a clean, dry location with a 13 AMP power source.



Licensing

Essentially, there are two licences: the Simple UK Light and the Technically Assigned Licences; both are issued by OFCOM. The main advantage of using licensed radio is that you get the maximum range available from your radio system and there is limited or no interference. If you suffer interference on your technically assigned licence you can approach OFCOM and they will endeavour to resolve the issue. If we manage your licence, we will carry out all the liaison with OFCOM for you.



Simple UK Light

This licence authorises the use of hand- portable or mobile radio equipment anywhere within the UK. Base station use is not permitted. Licensees have access to fifteen frequencies spread across four business radio frequency bands and must self- coordinate with other simple UK Light licensees.



Technically Assigned

This licence is a flexible licence that authorises the use of a wide variety of business radio equipment. Licensees can choose from a wide range of frequencies across all business radio bands and a wide range of coverage areas, from very small (e.g. in-building coverage) to very large (e.g. a county). Local base stations and repeater (Talk – Through) stations can be authorised.

Batteries

Most radios now use Lithium ion batteries which weigh less than the NiMH and NiCD batteries. Li-ion batteries are more compact and do not develop any “memory loss”, they do however have a specific number of charges they are capable of receiving and this does depend on the manufacturer’s specification. Once the battery has experienced the specific charging cycles it will not accept another charge. Li-ion batteries also require a more advanced charger that is typically able to recharge the battery in a couple of hours, rather than the traditional overnight charger.

The industry standard ratio for measuring duty cycle is “5 – 5 – 90.” This assumes you talk 5% of the time, listen 5% of the time and you are on stand-by for 90% of the time. The duty cycle takes into consideration the capacity of the battery and the consumption rate of the radios.

Most faults with radios after the first year are battery problems, therefore we recommend that batteries should be put into a maintenance programme, which we can supply with the use of our Cadex analyser. All you need to do is send the batteries to us every 6 months. Carrying out this type of maintenance can add years to your batteries life.



Accessories

The most common accessories for two way radios are audio accessories, protective cases and special charging units.

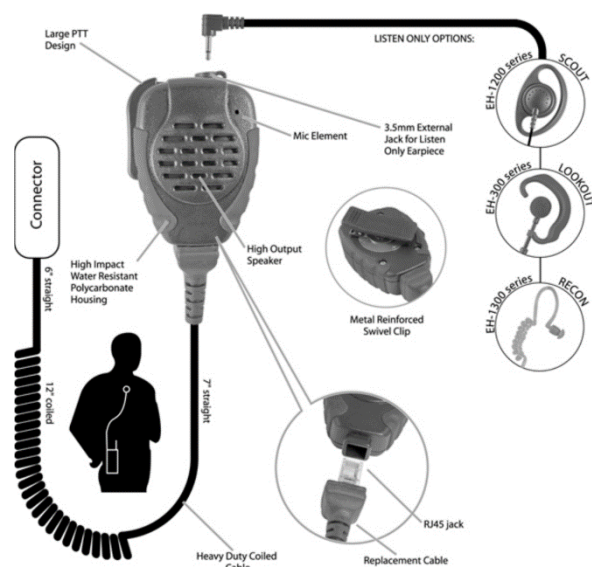
Protective Cases- Are usually made from nylon or leather both types of cases will protect your radio if it gets dropped and will offer great protection from the elements if you are working outside. There are many types of cases i.e. waterproof, shoulder holster, belt clips and belt loops. For a minimal charge they will protect your radio equipment, so they are a worthwhile consideration.

Earpieces and Earpieces with inline PTT-

These generally are more commonly used due to the nature of them being lightweight, comfortable and with the earpiece being on or in the ear giving greater clarity in most environments. An additional advantage to the ear piece is privacy. By wearing an earpiece others in the immediate area will not be able to hear what is being transmitted on the radio. This particularly useful in customer service situations, in hospitals, schools and most security environments.

Speaker Microphones- These come in several different styles and sizes but, in general, plug into the radio's audio socket and clip to the user's collar, shirt pocket or on their shoulder epaulet. The benefit of using a speaker microphone is that you can operate the radio without having to remove the radio from your belt, the speaker is closer to your ear and if that is not clear enough then you can add earpieces to the speaker microphone.

Charging Units- Most two way radios now come with a rapid charger. These chargers will charge your radio batteries in 2-4 hours. If you have a trickle charger, this can normally take between 12-16 hours. Most manufacturers now offer six way and eight way chargers. Although these cost more, it does mean that you can co-locate all of the radios in groups and make the radios easier to manage, with it only requiring one power socket in the office.



A Guide to Range

The range over which two portable radios can talk will largely depend upon the terrain or possible obstacles in their path.



Range is a very difficult thing to determine. For instance, talking between radios 20 miles apart from hilltop to hilltop is quite possible but the same radios may not manage 500 yards if large buildings are in the way, this is because radio waves travel in straight lines, very much like light waves and cannot bend, although they can be reflected and sometimes bounce.

Glossary

Man down – Alerts users if the man down radio is horizontal by sending an alarm to all of the other users. This is a selectable function on some radios.

Lone worker – Alerts other users if the lone worker's handset has not been used over a certain period of time. This is a selectable function on some radios.

Roger Beep - gives off a beep when you release the PTT on the receiving radio. This is a selectable function on some radios. Usually more consumer based

Scan – Scans all of the frequencies that are programmed into your handset. This is a selectable function on some radios.

Monitor – Listens out for other channels. This is a selectable function on some radios

VOX - Voice operated. So you talk and the radio will automatically transmit. This is a selectable function on some radios.

Low battery indicator – Indicates a low battery. This is a selectable function on some radios.

Stun/Un-Stun – The radio can be remotely stunned if it has been stolen. This is a selectable function on some radios

Tone - Selective calling allows one to one calling as well as one to all calling. This is a selectable function on some radios.

Whisper – If you whisper into the microphone the receiving radio will still receive normal voice. This is a selectable function on some radios.

High Low Power output - High and Low power can be selected on the side button of the radio. This is a selectable function on some radios.

UHF or VHF – UHF is the preferred option when operating in built up areas and woodlands because the UHF frequency has the ability to penetrate and go around large objects. VHF tends to be used in airplanes, boats or outside open spaces where there is very little between the transmitting station and the receiving station; under these conditions VHF travels further than UHF.

Range – There are so many factors that determine what range your radio equipment will give you which is why we offer Free Radio Trials or carry out site surveys. Be warned that if you see a range on the box of a two way radio for example 8-10kms we would suggest that you get them to prove it to you. We know from experience that depending on the terrain you can get as little as 500 metres in a town centre or up to a couple of miles on an open stretch of motorway, or up to 7 or 8 miles on a mountain. If you are in a reception area in a building with lots of fluorescent lighting or computers and servers this will also affect range and possibly will give you interference. If your site has had good communications in the past and now communications are poor and you know that the site has physically changed, i.e. a new building has just been built, the probability is the new build is causing the problem due to it being a physical barrier. If you are ever given the range without a site visit, it will only be an estimation at best.

**At Maximon Solutions we offer Free Site Surveys and Free
Radio Trials**

Please call 01628 878066 for yours!