

SAFEGUARDING



SAFETY

PROTECTION

PREVENTION

DUTY OF CARE

STUDENT AND
STAFF
PROTECTION

RESPONSIBILITY

EMERGENCY
PROCEDURES

FIRE

FIRST AID

RESPONSE

LOCK DOWN

TERRORISM

SPEED

COMMUNICATIONS

CO-ORDINATION

EFFICIENCY



Professional
Two-Way Radio for
Education
Establishments

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However it is labelled safeguarding of students and staff alike are a vital part of school and college life and effective communication is paramount for safety and operational efficiency.

Whatever the protocol adopted, good communications is key and two-way radio is a proven tool for instant one to one and one to many communication in an emergency or just for day to day operational needs.

Welcome to this special edition catalogue where we have focussed on just a few of the most popular products for schools, colleges and all education establishments.

Using some of our vast 30+ years experience in the field of professional two-way radio communications we have adopted an old fashioned approach that a well informed client generally ends up making the right choices and so we have included some detailed technical information to help you, without (hopefully) being too “nerdy”, so that you can make your own informed choices.

Of course, if you need our no obligation, consultative advice, we are here to help.

We offer unbiased recommendations based upon individual requirements and budget and we always do our utmost to give you the best initial advise, product, price and after-sales support.

We are authorised suppliers to a large number of the purchasing groups for schools, and will always approve accounts for such so delivery is fast.

As independent suppliers for all the major manufacturers we believe in offering you the freedom of choice of equipment from our wide portfolio of products including our own branded and award winning “Lynx” series of full featured radios.

Let us know how we can help you!

Regards



John French
General Manager



John French
General Manager
Technical Author for this
publication

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What is PMR446?

The Pan European PMR446 service is a licence exempt service for short range UHF radio communication “two-way radios”, sometimes referred to as “walkie talkies”. It has created a huge market for low cost, low power communications without the hassle of in-country licensing and there is a wealth of manufacturers making PMR446 radios, costing from literally a few £ to over £200, and catering for a wide range of users.

Analogue PMR446 is useable across UK and the rest of the European Union. The newer digital services are “non harmonised” and as a result are only best useable in UK for equipment purchased in UK.

The Regulations for PMR446 Equipment

All PMR446 radios must comply to regulation (Radio Equipment Directive) 2014/53/EU, and the UK Interface requirement IR2030. In a nutshell:

All equipment must have the correct conformity markings, either the **UK CA** marking or/and the **CE** marking for EU (and UK currently) to indicate the equipment conforms and has passed all the regulatory requirements.

Some may have a mark such as: **CE 0678** ⓘ which indicates the Test House number, which independently tested the equipment, and the ! in a circle indicates that it is “non harmonised” which may be applicable on digital PMR446 radios and licensed radios where the pan European agreement is non valid.

Power and Antenna Regulations

All PMR446 radios are limited to 0.5W/ 500mW Transmitter (TX) power, compared to a typical 4W or 5W TX power from a licensed two way portable radio and as a result the effective range of a PMR446 radio is less than its licensed counterpart. The general regulation for PMR446 is that the antenna (aerial) must be fixed and non removeable by the user to avoid people connecting to more powerful antenna or amplifiers. This is all to keep the range of the radio service small and thus the operational area of specific groups small.

PMR446 Band

PMR446 uses channels in the UHF band in the range from 446.000 to 446.200MHz.

There is a channel list, although this DOES NOT mean that all radio manufacturers adopt it exactly, so some equipment is not immediately interoperable.

8 Analogue 12.5Khz channels were initially introduced with an additional 8 channels made available from 2018 and an additional Digital Channel Plan using 32 channels of 6.25KHz channel spacing for dPMR radios and 16 channels of 12.5KHz spacing for DMR “Tier 1” products.

Plan for most Analogue radios

CH	Frequency in MHz
1	446.00625
2	446.01875
3	446.03125
4	446.04375
5	446.05625
6	446.06875
7	446.08125
8	446.09375

Additional Analogue Channels

CH	Frequency in MHz
9	446.10625
10	446.11875
11	446.13125
12	446.14375
13	446.15625
14	446.16875
15	446.18125
16	446.19375

The first 8 channels above are the typical channel plan for most manufacturers. Earlier radios and indeed some of today's only use 8 channels to keep them backwards compatible and radios with a 16 channel selector switch double up on the channels with a different set of "Sub-Codes", effectively creating a separate set of channels, but there is an irony with radios on the market today that few actually use these new, additional 8 channels, so radios that have them or can add them are beneficial as the new allocation will have less risk of interference.

Analogue, DMR and dPMR are not compatible! They use different "modulation" so you must have all equipment operating the same.

See the section "All about Digital Radios" for more information and further additional information in *Appendix A*.

In summary:

PMR446 walkie talkies are a great low cost communications tool to improve operational efficiency. safety and security.

Our top tips for choosing PMR446 radios:

- **Opt for pre-programmed radios to avoid user error.**
- **Avoid "leisure" types, unless you want them for occasional use.**
- **Take into account GDPR and risk of interference in your usage.**
- **The higher the IP rating, the more resistant to weather the radio is.**
- **The Higher the "mAh" or "Wh"* of the battery, the longer it will last.**

* Wh is a better measure as it takes into account the voltage of the battery pack.

We are happy to discuss your potential requirements, without obligation, and can also offer free trials of most equipment.

Call us on 01582 481114 or email sales@red-radio.co.uk



MOTOROLA XT185

Leisure 446 TWIN-pack

- Easy & Simple to use
- LCD Display
- 16 Channels - 38 CTCSS & 83 DCS Codes
- IP54 Rated
- Small - 136(H) x 47(W) x 21mm(D) & <120g
- Li-ion Battery - 3.7V @ 1130mAh/ 4.2Wh
- Low Cost



Comes with: 2x radios 2x Li-ion battery packs, 2x charger pod, 2x lanyard, 2x earbud earpieces, 1x UK PSU & guide. 1 year warranty.

Price (+VAT)

£73.00



MOTOROLA TLKR T82 Extreme

Leisure 446 TWIN-Pack

- Hidden LCD Display
- 16 Channels - 38 CTCSS & 83 DCS Codes
- IPX4 rated
- Compact - 181(H) x 57(W) x 33mm(D) & 197g
- Easy Pairing/ VOX/ Scan/ Monitor
- Nimh Battery - 3.6V @ 800mAh/ 2.9Wh
- Inbuilt LED Torch



Comes with: 2x radios, 2x Nimh battery packs, 2x belt-clip, 2x headsets, 1x Plug In Charger (UK), 1x carry case, 2x lanyards. 1 year warranty.

Price (+VAT)

£75.00



MOTOROLA T92 H²O

Leisure 446 TWIN-Pack

- LCD Display
- 16 Channels - 38 CTCSS & 83 DCS Codes
- IP67 rated
- Compact - 180(H) x 61(W) x 38mm(D) & 246g
- Floats in Water + Inbuilt Torch
- VOX/ Scan/ Monitor/ Dual Watch
- Nimh Battery - 3.6V @ 1300mAh/ 4.68Wh



Comes with: 2x radios, 2x Nimh battery packs, 2x belt-clip, 2x USB-C to USB-A charging cables, 1x carry case. 1 year warranty.

Price (+VAT)

£83.00



PT400 Professional 446 Portable

- **Up to 32 Channels** - 16 std. Optional new channels
- **IP65 Rated**
- **Programmable** - CTCSS/ DCS/ Scanning/ Channels
- **Compact** - 96.5(H) x 54(W) x 34mm(D) & <235g
- **Programmable** - VOX/ Panic Alarm/ Lone Worker
- **Voice Annunciation** - Channel & Battery level
- **Loud Audio** - >1W Output
- **Li-ion Battery** - 7.4V @ 1500mAh/ 11.1Wh

Comes with: 1x radio & fixed antenna, belt-clip, 1500mAh Li-ion battery, drop in rapid charger, UK wall PSU & guide. 2 year warranty / 1 year on accessories.

Price (+VAT)

£95.00



KENWOOD TK3501T Professional 446 Portable

- **Slimline** - 117(H) x 54(W) x 26mm (D) & 210g
- **IP54 Rated**
- **16 Channels** - 2 lots of 8 std 446 frequencies
- **Li-ion Battery** - 7.2V @ 1130mAh/ 8.1Wh
- **Loud 1.5W Audio**
- **Programmable** - CTCSS/DCS/Scanning
- **Call Alerts**

Comes with: 1x radio & fixed antenna, belt-clip, 1130mAh li-ion battery, drop in rapid charger with UK PSU, guide.

Price (+VAT)

£120.00

1 year warranty.



MOTOROLA XT420 Professional 446 Portable

- **Upgrade from XTNi**
- **16 Channels** - 2 lots of 8 std 446 frequencies
- **IP55 Rated**
- **Rugged** - 180(H) x 58(W) x 40mm(D) & 244g
- **Li-ion Battery** - 3.7v @2200mAh/8.1Wh
- **Programmable** - CTCSS/DCS/Scanning
- **1.5W Audio**

Comes with: 1x radio & fixed antenna, 2200mAh Li-ion battery, belt-clip, drop in rapid charger with UK PSU, guide.

Price (+VAT)

£112.00

2 year warranty / 1 year on accessories.



Licensed Radios and Licensing in UK

PMR446 radios sometimes just do not have the “oomph” to give the desired coverage due to their limited 500mW transmitter power. “Licensed” radios have much higher transmitter power, from 4-5W for a portable radio and up to 25W for a mobile radio and therefore better range, albeit not necessarily an exponential function.

There has been an increase in online sales of illegal two way radios, especially PMR446 and some higher power units. Our advice is to avoid sellers on auction sites or bulk selling sites that end up being not that “Amazing”, unless they can prove the equipment is approved and that they can prove they are authorised to sell it. It is very unlikely these sellers can offer technical advice or assist with programming or licensing unless they are an authorised radio dealer.

Red Radio are licensed by Ofcom to supply radio equipment, service and hire equipment and we can assist with all aspects of licensing.

All bona-fide two way radio dealers in UK must have a licence, issued by Ofcom, called a “Suppliers Licence”.

The difference between PMR446 radios and licensed Radios is that you need to obtain a Licence to operate these higher power radios and it is your responsibility for obtaining and maintaining a suitable licence. The penalties for not having a licence can be severe.

In the UK Ofcom issue the licenses, check radio installations and investigate when interference is being caused or received by a licensed two way radio system. They have the powers to seize equipment which does not comply with licensing (ie if the user does not have a licence), or if the equipment does not comply with the technical requirements and type approvals.

In the UK currently all two way radio equipment, including licensed and PMR446 radios, must comply with CE, R.E.D. (Radio Equipment Directive) and RTTE. More recently, and for UK only, the UKCA mark will appear on equipment.

Proper Labelling on equipment will look something like this:

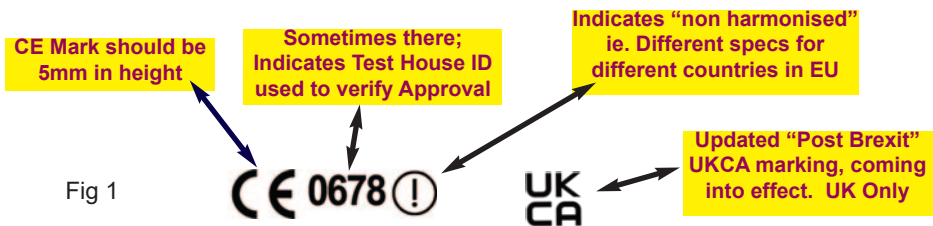


Fig 1

As a rule of thumb, if it does not have markings similar to Fig 1 it's possibly illegal. If you bought from “Exxx” or “Axxxxx”, and are unsure, then ask the seller for the certificate!

UK Licensing

Ofcom have made licensing much simpler and more cost effective, with a range of licences to suit various applications - from simple on-site communications to wide area linked equipment. The main licenses available are:

Business Radio Simple Site Light Licence - Allows use of a base station and portables & mobile units within a small geographical area (typically <1km). Specific for one site only. Shared channels. Licence cost is £75 for a 5 year period.

Business Radio Simple UK Light Licence - Allows use of portables/mobile units, but NO base unit, anywhere in UK. Shared channels. Licence cost is £75 for 5 years.

Business Radio Technically Assigned Licence - A more complex licence allowing on-site or wide area fixed base equipment or talk-through (repeater) equipment and portables/ mobile units running higher power. Channels are more exclusive (useful when a specific requirement for privacy such as security). Licence cost is typically from £100 for a 1 year period, but determined on application subject to location.

The most common form of licence and simplest is the “UK Light” or “Simple Site Light” licence and Red Radio can arrange either licence with your order for radio equipment. Just add it to your order and we will do the rest.

We can normally get a UK light licence issued same day, and charge you no extra for this service apart from the licence fee. We may need to talk to you so that renewals are kept up to date, but generally that's it sorted.

The frequencies that we can use are issued by Ofcom and we, as the radio dealer will allocate the channels and CTCSS/DCS (for analogue radios) or Colour Codes (for digital radios) for your equipment. These frequencies are set in stone, but a technical assigned licence could allow specific channels. *See Appendix B.*

In summary:

Licensed radios give you higher power and therefore range/ coverage as well as more features than PMR446 radios. Licensed radios are more secure as the channels are not as prone to interference.

Your radio licence will cover you for analogue and/ or digital radios.

You probably only need a UK Light Licence - ask us for advice

- **Consider your environment - Is it multi-story?**
- **Is there lots of concrete?**
- **What “distance“ are you looking to achieve?**
- **What features do you need or want?**

When choosing a radio, either digital or analogue:

- The higher the IP rating, the more resistant to weather the radio is.
- The Higher the “mAh” or “Wh”* of the battery, the longer it will last.

* Wh is a better measure as it takes into account the voltage of the battery pack.

Call us on 01582 481114 or email sales@red-radio.co.uk



ICOM

IC-F1000 / IC-F2000
Licensed Portable Radio

- 16 Channels
- Programmable - CTCSS / DCS
- IP67 Rated & MILSTD 810
- Programmable Signalling
- Variants for Display and Keypad
- Motion Sensor Alarm
- Compact - 112(H) x 53(W) x 25mm(D) & 240g
- Li-ion Battery - 7.2V @1485mAh/10.7Wh
- Man Down & Lone Worker
- Voice Annunciation - Channel
- Loud Audio - 1.5W
- VHF (IC-F1000) or UHF (IC-F2000)

Comes with: 1x radio, antenna, belt-clip, 1485mAh Li-ion battery, drop in charger and UK wall PSU and guide.
 2 year warranty / 1 year on accessories

Price (+VAT)
£140.00



MOTOROLA **R2 Analogue**
Licensed Portable Radio

- 64 Channels - in 4 banks of 16
- Analogue Only
- 2 Programmable Buttons
- Programmable - CTCSS / DCS
- IP55 Rated & MILSTD 810
- Built in Signalling
- Compact - 125(H) x 55(W) x 37mm(D) & 286g
- Li-ion Battery - 7.4V @2300mAh/17Wh
- Loud Audio - 1W
- Programmable Audio Profiles
- VHF or UHF
- Voice Announcement

Comes with: 1x radio, stubby antenna, 2300mAh li-ion battery, desk top rapid charger with UK wall PSU.
 2 year warranty / 1 year on accessories.

Price (+VAT)
£200.00



PT500 Licensed Portable Radio

- **16/32 Channels in 2 Zones**
- **CTCSS & DCS** - Fully Programmable
- **IP65 Rated & MILSTD 810**
- **2 Tone / 5 Tone / MDC1200 Signalling**
- **Wide range of audio accessories**
- **Li-ion Battery** - 7.4V @ 1500mAh/ 11.1Wh
- **Optional Battery** - 7.4V @ 1700mAh/ 12.58Wh
- **Compact** - 96.5(H) x 54(W) x 34mm(D) & <235g
- **Programmable** - VOX/ PanicAlarm/ Lone Worker
- **Voice Annunciation** - Channel /Battery /Alarms
- **Loud Audio** - 1W Output
- **2 year Warranty**
- **Programmable Keys**



Comes with: 1x radio, stubby or whip antenna, belt-clip, 1500mAh Li-ion battery, drop in rapid charger with UK Wall PSU & guide.
2 year warranty / 1 year on accessories.

Price (+VAT)

£119.00

KENWOOD NX1200AT/NX1300AT Licensed Portable Radio

- **64 Channels in 4 Zones**
- **CTCSS & DCS** - Fully Programmable
- **IP54 Rated & MILSTD 810**
- **2 Tone / 5 Tone / MDC1200 Signalling**
- **Wide range of audio accessories**
- **Li-ion Battery** - 7.4V @ 2000mAh/ 14.8Wh
- **Costed Upgrade Option:** DMR or dPMR
- **Compact** - 123(H) x 54(W) x 34mm(D) & 295g
- **Programmable Audio Equalizer**
- **Loud Audio** - 1W Output
- **2 year Warranty**
- **Programmable Keys**
- **Voice Guide Function**



Comes with: 1x radio, antenna, belt Clip, 2000mAh Li-ion battery, drop in charger with UK Wall PSU and guide.

Price (+VAT)

£149.00

2 year warranty./ 1 year on accessories.

Digital Radio - DMR and dPMR

Digital radios give some significant benefits against analogue radios:

- **Better Audio Crispness**
- **Better Battery Life**
- **Better Range**
- **More Secure**
- **Increased Applications**

Digital radios have been in circulation since around 2006, with the major manufacturers starting the market trend but the initial costs for digital were quite often prohibitively expensive. As more and more manufacturers introduced digital radios in their portfolios the prices have crept down, and now some are almost as low in price as their analogue counterparts.

There are two types of **Common Air Interfaces/ CAI** for Digital Radios, just to confuse us all a little bit, dPMR and DMR - They are NOT interoperable so you have to choose carefully when looking to upgrade to digital. For those (like me) old enough to remember the technical vs marketing clashes for such things like Blu-ray vs DVD HD or even VHS tapes vs Betamax the manufacturers of digital PMR radios have been having the same quandary. Most have adopted the DMR standard and some dPMR, and even both!



dPMR is based on splitting a standard 12.5KHz channel into two 6.25KHz channels by using Frequency Division Multiplexing (FDMA), where two “streams” of FSK data can be transmitted at the same time within a 12.5KHz channel OR a single “stream” on a 6.25KHz channel.

In principle this CAI ticked the box for regulatory bodies such as Ofcom to reduce channel usage. It is a significant advantage for Digital PMR446 radios as obviously you now get many more channels available to use.

These are normally referred to as dPMR446 radios. [**dPMR Mode 1**, which is back-back without infrastructure].

dPMR Mode 2 allows additional data requirements for use when infrastructure such as repeaters are used in the system including IP linked base units using dynamic channel selection.

dPMR Mode 3 is the highest current mode, where multi-site protocols can be implemented for Digital Trunked Networks.



DMR is based on splitting a standard 12.5KHz channel into two different timeslots using TDMA (Time Division Multiple Access).

By chopping the channel into two different time slots (SLOT1 and SLOT2) it allows two simultaneous calls on one 12.5KHz Channel.

DMR is the most popular type of Digital Radio protocol and has been adopted by the majority of the major manufacturers, with only Icom and Kenwood adopting the dPMR protocol/ CAI as far as we know. Similar to dPMR, DMR adopts differing tiers:

Tier 1, which is back-back without infrastructure and only for PMR446 radios. This is specified in the ETSI standards and therefore Tier 1 radios are not allowed outside of Europe.

Tier 2, allows additional data requirements for use when infrastructure such as repeaters are used in the system including IP linked base units. To comply with spectral efficiency, Tier 2 radios have both Slot 1 and Slot 2 available. Some radios have “pseudo trunk” or similar functions which allow a sort of scanning between slots. This allows in some cases the addition of Single Frequency Repeaters, which flip the slots to extend range.

Tier 3, is the highest current mode, where multi-site protocols can be implemented for digital Trunked networks including messaging and packet data. Ideal for large networks and fleet operation, and simplistically is a digital alternative to MPT1327 Trunked systems.

In summary:

Digital radios tend to work better than analogue radios as they use real time audio processing which gives crisp and clear speech even at very low signal levels. Digital radios are now more cost effective so are a viable option when next looking at radios as they give some significant technical benefits;

- **Better Range.**
- **Better Audio.**
- **Better Battery life.**
- **Enhanced Features such as Calling Groups.**
- **Inherent encryption to avoid eavesdropping.**

When choosing a radio, either Digital or Analogue:

- The higher the IP rating, the more resistant to weather the radio is.
- The Higher the “mAh” or “Wh”* of the battery, the longer it will last.
* Wh is a better measure as it takes into account the voltage of the battery pack.

You will still need a licence - A UK Light Licence is ideal in most cases.

We are happy to discuss your potential requirements, without obligation.

Call us on 01582 481114 or email sales@red-radio.co.uk



MOTOROLA R2 (Digital)
DMR Digital Portable Radio

- **64 Channels** - in 4 banks of 16
- **DMR Digital**
- **2 Programmable Buttons**
- **Programmable** - CTCSS /DCS (Analogue mode)
- **IP55 Rated & MILSTD 810**
- **Lone Worker Function**
- **Compact** - 125(H) x 55(W) x 37mm(D) & 286g
- **Li-ion Battery** - 7.4V @2300mAh/ 17Wh
- **Loud Audio** - 1W
- **Programmable Audio Profiles**
- **VHF or UHF**
- **Pre-Programmed Texts**
- **Emergency Function**

Comes with: 1x radio, stubby antenna, 2300mAh Li-ion battery, desk top rapid charger with UK wall PSU.
2 year warranty / 1 year on accessories.

Price (+VAT)
£250.00



MOTOROLA DP2400E
DMR Digital Portable Radio

- **Superb Audio Quality**
- **16 Channels**
- **IP67 rated**
- **Rugged** - 122(H) x 56(W) x 39mm(D) & 350g
- **500mW Audio**
- **Li-ion Battery** - 2100mAh/ 15.5Wh
- **DMR Digital & Analogue**
- **Voice Annunciation of Channels**
- **Programmable Lone Worker**
- **Emergency Function**

Comes with: 1x radio, stubby antenna, 2100mAh Li-ion battery, Impress desk top rapid charger with UK wall PSU.
2 year warranty / 1 year on accessories.

Price (+VAT)
£295.00



BD505 DMR Portable Radio

- 16 Channels
- Low Cost
- DMR Digital & Analogue Modes
- 1 Programmable Side Button
- Programmable - CTCSS/ DCS (Analogue mode)
- IP54 Rated
- Lightweight - 108(H) x 54(W) x 28mm(D) & 250g
- Li-ion Battery - 7.2V @1500mAh/ 10.8Wh
- 500mW Audio
- VHF or UHF
- Channel Annunciation
- 2 year warranty



Comes with: 1x radio, whip antenna, 1500mAh Li-ion battery, desk top charger with UK wall PSU.

2 year warranty/ 1 year on accessories

Price (+VAT)

£139.00



KENWOOD NX1200DE3/1300DE3 DMR Portable Radio

- 64 Channels in 4 Zones
- CTCSS & DCS - (Programable in Analogue mode)
- IP54 Rated & MILSTD 810
- 2 Tone / 5 Tone / MDC1200 Signalling
- Wide range of audio accessories
- Li-ion Battery - 7.4V @ 2000mAh/ 14.8Wh
- Compact - 123(H) x 54(W) x 34mm(D) & 295g
- Programmable Audio Equalizer
- Loud Audio - 1W Output
- 2 year Warranty
- Programmable Keys
- Voice Guide Function



Comes with: 1x radio, antenna, belt clip, 2000mAh Li-ion battery, drop in charger with UK Wall PSU and guide.

2 year warranty/ 1 year on accessories.

Price (+VAT)

£175.00





MOTOROLA **EVX-S24**
DMR Portable Radio

- Up to 256 Channels - in 16 banks of 16
- DMR Digital & Analogue
- 4 Programmable Buttons
- Programmable CTCSS /DCS (Analogue mode)
- IP67 Rated & MILSTD 810
- Emergency Call (Digital Mode)
- Compact - 91(H) x 55(W) x 32mm(D) & 215g
- Li-ion Battery - 3.7V @2300mAh/ 8.5Wh
- 500mW Audio
- Black or Yellow Versions
- VHF or UHF
- Lone Worker & Emergency

Comes with: 1x radio, antenna, belt-clip, 2300mAh Li-ion battery, USB Charger lead, wall PSU and guide.

1 year warranty.

Price (+VAT)

£195.00



Hytera **PD405**
DMR Portable Radio

- VHF or UHF versions
- 16 Channels - Up to 256 Channels in 3 zones
- IP55 rated
- Rugged - 112(H) x 54(W) x 28mm(D) & <275g
- Simple Operation
- Li-ion Battery - 7.4V @ 1500mAh/11.1Wh
- Channel Annunciation
- Pseudo Trunk Option
- Programmable Keys / Features
- 500mW Audio

Comes with: 1x radio, stubby antenna, 1500mAh Li-ion battery, desk top rapid charger with UK wall PSU.

2 year warranty / 1 year on accessories

Price (+VAT)

£195.00



DR5100

DMR Portable Radio

- **16/32 Channels in 2 Zones**
- **DMR Digital & Analogue**
- **CTCSS & DCS** in Analogue Mode
- **Voice Annunciation**
- **Decoded Alarm Annunciation - Unique!**
- **Compact** - 96.5(H) x 54(W) x 34mm(D) & <235g
- **Panic Alarm/ Man Down/ Lone Worker**
- **Unique Programmable Features**
- **Full DMR Features** - Incl. Pseudo Trunk
- **Li-ion Battery** - 7.4V @1700mAh/ 12.58Wh
- **IP65 rated**
- **1W LOUD Audio Output**
- **2 year Warranty**



Comes with: 1x radio, stubby (or whip option) antenna, belt-clip, 1700mAh Li-ion battery pack, desk top charger with UK Wall PSU, guide.
2 year warranty / 1 year on accessories.

Price (+VAT)

£165.00



DR5600

DMR Portable Radio

- **Up to 2000 Channels in 250 Zones**
- **DMR Digital & Analogue**
- **CTCSS & DCS** in Analogue Mode
- **Voice Annunciation & Display**
- **Li-ion Battery** - 7.4V @1700mAh/ 12.58Wh
- **Compact:** 96.5(H) x 54(W) x 34mm(D) & <240g
- **Panic/ Man Down/ Lone Worker Alarms**
- **Unique Programmable Features**
- **Full DMR Features** - Incl. Pseudo Trunk
- **IP65 rated**
- **Loud Audio** - 1W Output
- **2 year Warranty**



Comes with: 1x radio, stubby (or whip option) antenna, belt-clip, 1700mAh Li-ion battery pack, desk top charger with UK Wall PSU, guide.
2 year warranty / 1 year on accessories.

Price (+VAT)

£175.00



DR5100 and DR5600- An ideal tool for schools and Colleges

The DR5100 (non display) and DR5600 (display) UHF DMR Digital radio are a popular choice for schools and colleges and have features which help security, operation and safety.

Some functions are available on most DMR radios, and some are specific to the DR5000 series as indicated by *.

Different Groups:

Many establishments will have a need for different groups, such as SLT, LSA, TA , ICT and Maintenance. There may be additional groups such as First Aid or Fire Wardens. With any DMR radio these groups can be defined on one digital channel and using unique identity numbers for the radios they can be assigned a group, allowing autonomous conversations without disturbing others.

Typically the radios are programmed something like this:

Channel	Group
1	SLT
2	ICT
3	LSA
4	CARETAKERS

Each group can either use a different RF channel (frequency) or better to use the same frequency and split the groups into different call groups.

By using different call groups, specific users can be included into them; eg. Head can be included in SLT and LSA group.

One significant advantage of taking the group approach is that multiple groups can be set up, and specifically for emergencies an ALL CALL group or set of Emergency groups can be set up.

We have supplied a number of establishments with this function, and has proved to be a benefit when Fire Alarms, Lock Downs or Evacuations are required.

Emergency and Full Lock Down events can also be communicated by setting an Emergency Channel (we normally set to Channel 16 as the last channel on most rotary channel switches), so when a user calls on this channel ALL radios will pick up the call, irrespective of which channel they are actually set to.

This is classed as an Emergency Broadcast.

Display or Not:

The DR5100 is designed to not have a display but still packs the capability to announce alarms as detailed on the next page.

The DR5600 and DR5800 have a LCD, which can show the details of all callers, either as their ID (unique number) or an alias, ie "Head".

Alarms

The DR5000 series (DR5100, DR5600 and DR5800) is the digital upgrade from our PT600 series and all have a set of alarm functions:

- **Panic Button**
- **Man-Down Alarm**
- **Lone Worker Alarm**

In addition and beyond the capability of all other non display radios the DR5100 has the unique and award winning ability to decode an alarm and annunciate it as a voice message*.

There are 32 standard pre-recorded messages:

Alarm 1	Alarm 11	Door Entry	Code Red
Alarm 2	Alarm 12	Fire Alarm Activated	Code Green
Alarm 3	Alarm 13	Alarm Clear	Refuse Entry
Alarm 4	Alarm 14	Evacuate	Security To Doors
Alarm 5	Alarm 15	Security Alarm	Urgent Assistance
Alarm 6	Alarm 16	Code Yellow	Emergency
Alarm 7	Alarm 17	We are able, subject to quantity to record and enable other voice prompts to order. Call for details or a chat about your requirements.	
Alarm 8	Alarm 18		
Alarm 9	Alarm 19		
Alarm 10	Alarm 20		

Bespoke Software and Hardware Options, unique to DR5000 range

We have a number of software options for the DR5000 series which have been developed based on School and College's requirements.

Being a small supplier we are more able and willing to look at specific requirements, and we are not expensive!

“Ring”; where a user can dial (using the rotary channel switch on the DR5100 or keys on DR5600/5800) a user in a small group and their radio will remain quiet until specifically called, thus useful for teachers and TAs in class or when sensitive information needs to be passed.

“Link”; where additional hardware modules can be added to the radio system such as an interface to a Fire Alarm Panel, Door, or Remote Panic Button.

In summary we can supply both simple “hoot and holler” systems using any of our wide range of products or we are happy to liaise and configure a system to meet all and every communication requirement you have.

The products in this brochure are a small selection of what we can offer. Please feel free to call us for a no obligation chat about your specific communications needs.

Plan for DMR radios

CH	Frequency in MHz
1	446.00625
2	446.01875
3	446.03125
4	446.04375
5	446.05625
6	446.06875
7	446.08125
8	446.09375
9	446.10625
10	446.11875
11	446.13125
12	446.14375
13	446.15625
14	446.16875
15	446.18125
16	446.19375

Plan for dPMR radios (6.25KHz Channel Spacing)

CH	Frequency in MHz
1	446.003125
2	446.009375
3	446.015625
4	446.021875
5	446.028125
6	446.034375
7	446.040625
8	446.046875
9	446.053125
10	446.059375
11	446.065625
12	446.071875
13	446.078125
14	446.084375
15	446.090625
16	446.096875

CH	Frequency in MHz
17	446.103125
18	446.109375
19	446.115625
20	446.121875
21	446.128125
22	446.134375
23	446.140625
24	446.146875
25	446.153125
26	446.159375
27	446.165625
28	446.171875
29	446.178125
30	446.184375
31	446.190625
32	446.196875

Most manufacturer's "Licensed" digital radios on the market use the **DMR** standard so there is a wide choice of products available. **dPMR** is slightly lesser used and hence there is not so much choice of manufacturer, but dPMR by virtue of its smaller channel spacing gives twice as many channels and less likely to have any interference as the channel plan is different to the Analogue and DMR plan which effectively uses the same frequencies. As a result dPMR 446 radios have a large channel capacity.

Analogue, DMR and dPMR are not compatible! They use different "modulation" so you must have all equipment operating the same.

See the section "All about Digital Radios" for more information.

What is the range of PMR446? (AKA How long is a piece of string?)

"Range" is always key to whether PMR446 radios will be adequate for your needs. We see some manufacturers market their radios with "Up to 10Km range" and even "up to 20Km range" DO NOT BE FOOLED by marketing hype.

The effective range is determined by several factors: Radio waves are an electromagnetic wave, just as light is, so PMR446 is line of sight and yes if you are on a mountain top you may very well get a good range in excess of a few miles but in a typical real world scenario, you probably just want to get hold of someone across a campus or warehouse.

As a rule of thumb, If you can see them, you can talk to them and PMR446 radios will work in open terrain up to around 1mile \pm 10%. If there are buildings or hills or trees in the way then range will be reduced maybe to less than a few hundred yards. In and around buildings we would normally say they would work fine for up to 2 or 3 storeys high and an area of around the size of a football ground. Steel and concrete in a building will "absorb" a lot of the signal so we would always recommend you try before you commit to large purchases.

Performance of any radio is down to the specification, build and quality of the product as well as the antenna, so a low cost “Leisure” device will rarely out perform a high quality “Professional” 446 radio as the professional types will have generally closer to the spec power output (500mW) coupled with better receivers and better antennas.

Digital PMR446 radios tend to have better range performance of around 10-15% than their analogue counterparts, but there are fewer Digital PMR446 radios available than Analogue types, and the costs are higher. We can get them, but have excluded them from this publication.

Security of PMR446?

The PMR446 band is very popular particularly in larger urbanisations. These radios can be used by anyone from schools, pubs & clubs, sports halls, leisure centres, security guards, retail units, shops, warehouses and even just kids or holiday makers. **You are not alone!**

There may be others that could, if within range and on the same channels, hear you and even talk to you. If as an example you are a school, then also be wary of GDPR in this scenario. It would be unwise to mention full names etc over air. That said, the probability may be small for the times, calls, channels, “codes” and indeed range to be close enough to be a major concern. If it is then Digital radios would be a better option as potential listeners would need very complex kit to hear you.

PRIVACY on Analogue 446

There is a slim chance that somebody outside of your group or “Network” might hear you on PMR446. These may be accidental listeners, radio enthusiasts with scanners or other businesses using PMR446 radios themselves.

One things for sure - You probably dont want to hear them!

“CTCSS*/ DCS” / “Sub-tone” / “Privacy tones” / “Sub codes”

**As Shakespeare once said: “A Rose by any other name.....”*

Most PMR446 radios other than the lowest cost units will have CTCSS which is useful to control any interference or other users “breaking’ into your channels.

*Continuous Tone Controlled Squelch System is the correct term; A very low frequency tone, inaudible or “Subaudible” of between 67Hz and 250Hz, sent alongside the transmitted speech which is “decoded” by all receiving units to control the “Squelch” - in essence to switch the speaker path on. If the receiving radio is not set to the same CTCSS code as the transmitting radio it will not hear the call.

DCS is technically similar to CTCSS but is classed as Digital Coded Squelch, albeit both are used only on analogue radio systems and still uses sub audible tones, this time modulated again (in a nutshell).

Using CTCSS/DCS is a great way to avoid hearing unwanted “interference” on your dedicated channels. With over 300 combinations, a clear channel is achievable.

APPROVALS

The CE and UK CA approvals allow legitimate manufacturers, importers and distributors to sell their equipment with confidence in its safety and performance and they will be happy to supply both the full CE or UKCA test certificates and indeed the plethora of test results which accompany them.

RTTE

The RTTE European directive was updated to the "Radio Equipment Directive" or "RED" also includes certain additional safety aspects of the equipment. All new two way radios must have some contact details for the manufacturer or importer on the label or product, generally this is contact or address details.

Range of Licensed Radios

Radio waves are an electromagnetic wave, similar to light, so in simple terms you can increase your range by either increasing the power (using a higher wattage light bulb) or placing the transmitter higher up (like a lighthouse on a hilltop) so a higher powered radio will have an increased range compared to a PMR446 radio.

There are some other physics principles to consider:

VHF (146-174MHz) and UHF (400-470MHz) radios have a short wavelength and travel in straight lines when compared to HF radios (1Mhz-30MHz) which tend to bounce off various layers of the ionosphere and can give almost global communications range without satellites. Most portable radios are VHF or UHF.

The Earth is Round! Thus the curvature of the earth will have an impact on range. Despite some manufacturers hype, physics tells us that if I am 6ft tall with my radio in hand, my range is limited to around 3 miles as I hit the horizon. Of course if we are higher up, and even better if the receiving station is also higher up, the range can be significantly extended.

Things get in the way! - Radio waves can struggle to pass through thick steel and concrete and the signal is reduced. VHF radios have a greater range than UHF in open terrain (as the wavelength is longer) and UHF radios work better in buildings as the shorter wavelength of the signal propagates and penetrates better - hence over 90% of radios used on site are UHF.

There is no magic equation for range in varying sites or building structures but as a rule of thumb a licensed UHF radio will work back-back (portable to portable) up to 2 miles in open terrain and in building around 4-6 storeys and area equivalent to a large football club's grounds.

Different levels of steel and concrete within buildings will reduce radio signal's penetration so we always recommend a free trial to assess your particular environment.

Range can be extended by using "Repeaters" which we can also advise on.

UK Light and UK Site Light Frequencies

Below is a table of all the channels currently available with a UK Light Licence in UK. Technically Assigned licences have the frequencies allocated on application.

Low Band Plan		VHF Band Plan		UHF1 Band Plan		UHF2 Band Plan	
CH	Frequency in MHz	CH	Frequency in MHz	CH	Frequency in MHz	CH	Frequency in MHz
1	77.6875	1	164.0500	1	449.3125	1	458.7875
2	86.3375	2	164.0625	2	449.4000	2	458.8000
3	86.3500	3	164.0875	3	449.4750	3	458.8125
4	86.3625	4	173.0500			4	458.8250
5	86.3750	5	173.0625				
		6	173.0875				

Older UK Light licence holders with UHF portable radios will generally only have the UHF1 channels as the UHF2 channel allocations are relatively new.

If you have equipment, using a UK Light Licence, and you are finding there is a high degree of interference on your channels it is most likely that you are picking up a similarly programmed UK Light channels.

Most suppliers historically programmed the channels numerically so this has compounded a risk of interference (ie programming Channel 1 as 449.3125, Channel 2 as 449.4000 and Channel 3 as 449.475).

Red Radio can re-program your existing equipment to include the new channels with less interference - Call for details.

Typically Low Band is used for longer range and only using mobile radios due to the longer length of antenna required for the lower frequencies.

It is an "old" band as there is very little equipment available and antenna sizes are quite often unpractical. (The lower the frequency the longer the wavelength and therefore the antenna, which is normally a 1/4 of a wavelength).

VHF Mid Band and VHF High Band are generally used in fleet and taxi radios as a "back to back" channel.

UHF1 and UHF2 are normally used for on-site radio systems as the equipment is readily available and the antenna (aerial) on the radios can be small. Most radios available can be programmed to have both UHF1 and UHF2.

Why customers buy from Red Radio:

- **Vast Experience & Knowledge**
- **Exceptional Technical Ability**
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- **Wide Product Range**
- **No Hard Sell**
- **Fast & FREE Delivery** (over £50 nett, UK)
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- **Full Servicing Facilities**
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