White Paper

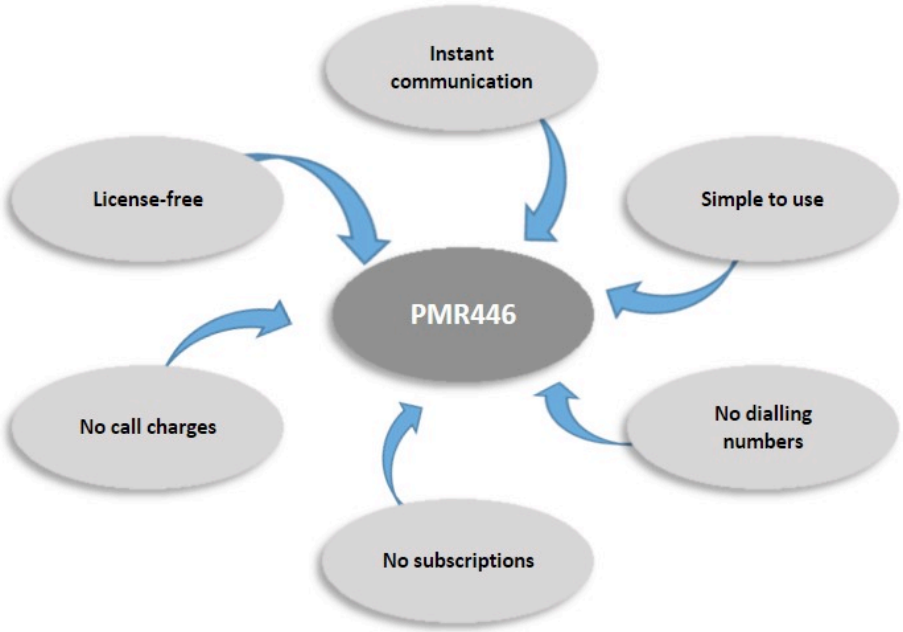
August 2016

A guide to the new PMR446 license-free radio frequencies following ECC Decision (15)05

and what it means to you

PMR446 (Personal Mobile Radio 446) was conceived as a European licence-free two-way radio system and was introduced in Ireland in 1998 and a year later in the UK; where it successively replaced the former licensed Short-Range Business Radio (SRBR) service.

It was intended as a simple and cost-effective basis for instant voice communication between users with both transmission and reception taking place on the same channel (single frequency, simplex traffic).



Unlike mobile phones, with PMR446, calls are unlimited and free and there are no subscription charges or licence applications to complete making them ideal in situations where instant voice communication is required over distances of up to 6km (actual PMR446 coverage depends on terrain and environment) and where GSM signals can be patchy. Another benefit of PMR446 is that compliant equipment may be used in the following CEPT (European Conference of Postal and Telecommunications Administrations) territories and their overseas or semi-autonomous territories without restriction:

Austria	Iceland	Portugal
Belgium	Ireland	Romania
Bosnia and Herzegovina	Italy	Russian Federation
Bulgaria	Latvia	Serbia
Croatia	Liechtenstein	Slovak Republic
Cyprus	Lithuania	Slovenia
Czech Republic	Luxembourg	Spain
Denmark	FYRO Macedonia	Sweden
Estonia	Moldova	Switzerland
Finland	Monaco	Turkey
France	Montenegro	Ukraine
Germany	Netherlands	United Kingdom
Greece	Norway	
Hungary	Poland	

Includes the overseas or semi-autonomous territories of Denmark, France, Greece, Italy, Netherlands, Norway, Portugal, Russian Federation, Spain plus the constituent parts of the United Kingdom as well as the Channel Islands and the Isle of Man

Please note: Assignments for use of licence free radios may change from time to time and the user is advised to check if PMR446 equipment can be used in the destination country.

PMR446 operates on frequencies that are shared by multiple users on an uncoordinated basis which means there is no control over the number of users sharing the same frequencies at any one time.

Features offered by PMR446 radios:

* Group call (unlimited users)
* Calls from radio to radio (individual call)
* Open calls or privacy calls using analogue or digital privacy codes

All equipment for use on PMR446 frequencies is required to be in hand portable / walkie-talkie form, feature a fixed integral antenna and operate with an effective radiated power not exceeding 500mW (0.5 watts), while the use of base station, mobile radio, repeater or fixed infrastructure is specifically excluded.

Existing PMR446 frequencies

Analogue:

446.0-446.1 MHz was the frequency band designated for analogue PMR446 by CEPT/ERC Decision (98)25 of 23rd November 1998.

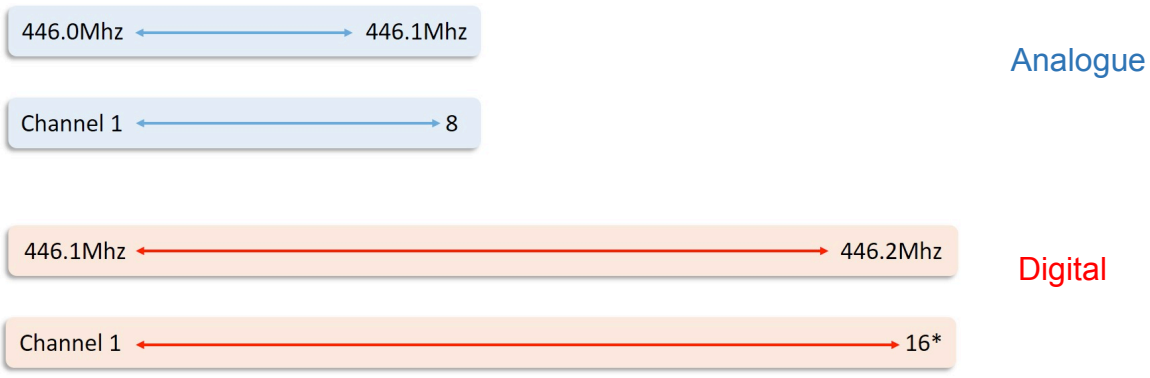
Digital:

On 28th October 2005 by CEPT/EEC Decision (05), the frequency band 446.1-446.2 MHz was designated for use by the new generation of digital PMR446 equipment in development by manufacturers.

The introduction of digital technology represented a major step forward for professional users and brought the additional benefits of:

- Improved audio quality
- Increased battery life
- Improved service quality extending the communication range limit

However, PMR446 has proven to be an extremely popular format and this success has led to instances of the overcrowding of PMR446 frequencies and restriction of service availability especially in the case of analogue usage in cities and major urban areas at times of peak demand, for example at large events, in confined geographic areas etc.



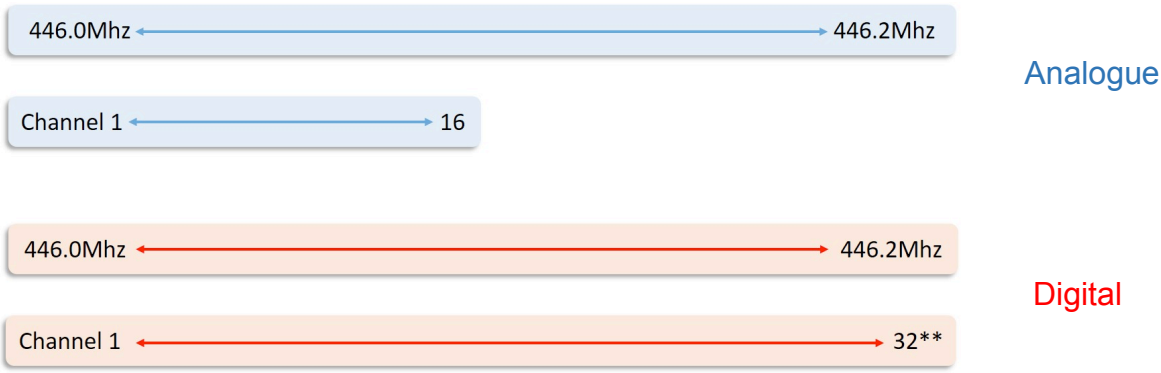
*Digital 446.1 – 446.2 provides 16 channels in 6.25 kHz and 8 channels in 12.5 kHz

The new PMR446 frequencies

To ensure continued availability of license-free analogue and digital PMR446 frequency bands and reduce congestion, new PMR446 frequencies are being introduced across Europe in line with Harmonised European Standards EN 300 296-2, EN 300 113-2 and EN 301 166-2.

The new frequencies, which follow ECC Decision (15)05, create greater capacity by allowing both analogue and digital equipment to effectively share the assigned frequency spectrum:

Analogue	**Digital**
446.0 - 446.2 MHz for the use of analogue PMR446 with a channel plan based on 12.5 kHz spacing where the lowest carrier frequency is 446.00625 MHz	446.0 - 446.2 MHz for the use of digital PMR446 with a channel plan based on 6.25 kHz and 12.5 kHz spacing where the lowest carrier frequencies are 446.003125 MHz and 446.00625 MHz respectively as of 1 January 2018
PMR446 equipment operating in the frequency range 446.1-446.2 MHz should use more robust receivers, as specified in ETSI TS 103 236 or equivalent technical specifications when placed on the market as of 1 January 2017	
Speech only	Speech and/or data



**Digital frequencies: 446.0 – 446.2 MHz provides 32 channels at 6.25 kHz

Benefits of the new 446.0-446.2MHz frequency spectrum

The new 446.0-446.2MHz extended frequency spectrum will double the number of license-free PMR446 channels available for equipment operating at 12.5 kHz and 6.25 kHz channel spacing:

- **Analogue*** equipment which can only operate on 12.5 kHz channel spacing increases from 8 to 16 channels
- **DMR Tier 1**** digital PMR446 which operates on 12.5 kHz channel spacing with a Time Division Multiple Access (TDMA) channel access method increases from 8 to 16 channels
- **dPMR446**** digital PMR446 equipment which operates on 6.25 kHz channel spacing with a Frequency Division Multiple Access (FDMA) channel access method increases from 16 to 32 channels
- Both DMR Tier 1 and dPMR446 digital radios can operate in both analogue and digital modes
- dPMR446 digital PMR446 equipment such as Kenwood ProTalk TK-3401D can switch between operating at 6.25 kHz digital and 12.5 kHz analogue simply at the press of a button

*All analogue PMR446 equipment including DMR Tier 1 and dPMR446 digital equipment operating in analogue mode will be compatible and offer full interoperability.
** Due to their different channel access methods, DMR Tier 1 and dPMR446 digital equipment are not compatible with each other when operating in digital mode.

	Analogue (12.5 kHz Channel Spacing)	DMR	**Digital DMR Tier 1** (12.5 kHz Channel Spacing)	dPMR digital	**Digital dPMR446** (6.25 kHz Channel Spacing)
Ch1	446.00625Mhz *	Ch1	446.00625Mhz	Ch1	446.003125Mhz
Ch2	446.01875Mhz	Ch2	446.01875Mhz	Ch2	446.009375Mhz
Ch3	446.03125Mhz	Ch3	446.03125Mhz	Ch3	446.015625Mhz
Ch4	446.04375Mhz	Ch4	446.04375Mhz	Ch4	446.021875Mhz
Ch5	446.05625Mhz	Ch5	446.05625Mhz	Ch5	446.028125Mhz
Ch6	446.06875Mhz	Ch6	446.06875Mhz	Ch6	446.034375Mhz
Ch7	446.08125Mhz	Ch7	446.08125Mhz	Ch7	446.040625Mhz
Ch8	446.09375Mhz**	Ch8	446.09375Mhz*	Ch8	446.046875Mhz*
Ch9	446.10625Mhz	Ch9	446.10625Mhz	Ch9	446.053125Mhz
Ch10	446.11875Mhz	Ch10	446.11875Mhz	Ch10	446.059375Mhz
Ch11	446.13125Mhz	Ch11	446.13125Mhz	Ch11	446.065625Mhz
Ch12	446.14375Mhz	Ch12	446.14375Mhz	Ch12	446.071875Mhz
Ch13	446.15625Mhz	Ch13	446.15625Mhz	Ch13	446.078125Mhz
Ch14	446.16875Mhz	Ch14	446.16875Mhz	Ch14	446.084375Mhz
Ch15	446.18125Mhz	Ch15	446.18125Mhz	Ch15	446.090625Mhz
Ch16	446.19375Mhz	Ch16	446.19375Mhz	Ch16	446.096875Mhz
				Ch17	446.103125Mhz
				Ch18	446.109375Mhz
				Ch19	446.115625Mhz
				Ch20	446.121875Mhz
				Ch21	446.128125Mhz
				Ch22	446.134375Mhz
				Ch23	446.140625Mhz
				Ch24	446.146875Mhz
				Ch25	446.153125Mhz
				Ch26	446.159375Mhz
				Ch27	446.165625Mhz
				Ch28	446.171875Mhz
				Ch29	446.178125Mhz
				Ch30	446.184373Mhz
				Ch31	446.190625Mhz
				Ch32	446.196875Mhz
**Heavily used / Children's Channel / Data* ***DX & Calling Channel*		**DX & Calling Channel* *** Channels shown in red are available for use from 01 January 2018*		**Digital Calling Channel* *** Channels shown in red are available for use from 01 January 2018*	

In addition, EN 300 296-2, EN 300 113-2 and EN 301 166-2 stipulates the following technical characteristics shall be applied for PMR446 applications in order to reduce the risk of harmful interference:

i. PMR446 radio equipment having Push-To-Talk (PTT) functionality capable of being latched 'on' shall apply a 180 seconds maximum transmitter time-out
ii. PMR446 radio equipment having no Push-To-Talk (PTT) functionality shall apply a 180 seconds maximum transmitter time-out and VOX (Voice Activated Transmitter) control
iii. Compliance of PMR446 radio equipment with all technical requirements shall be demonstrated with the applicable Harmonised European Standards ETSI EN 300 113-2, EN 301 166-2, or EN 300 296-2
iv. All the permitted equipment should be 6.25 kHz (or equivalent) per voice channel

Changes to equipment to take advantage of the new frequencies

Existing analogue and digital PMR446 hand portable walkie talkies will **not** be able to take advantage of the increased capacity available unless modified and updated.

New V2 ProTalk and PKT-23 hand-portables

From September 2016, all Kenwood ProTalk TK-3501 and PKT-23 analogue and TK-3401D models will incorporate upgrades and be able to make use full use of the new frequency spectrum when available for instant congestion and license-free communication.

Model	Analogue / Digital	Firmware	Field Programming Unit (FPU)	Version
ProTalk TK-3401D	dPMR Digital/ Analogue	Ver.2.00	KPG-171D M	Ver.2.00
ProTalk TK-3501	Analogue	Ver.2.00	KPG-173D M	Ver.2.00
PKT-23	Analogue	Ver.2.00	KPG-182D M	Ver.2.00

All upgraded Kenwood models will feature a 'V2' graphic on their packaging.

For more information, please contact your Kenwood authorised distributor or reseller.

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