Digital Frequency Guide

LOSING YOUR VOICE

What you need to know about Wireless Audio

www.losingyourvoice.be

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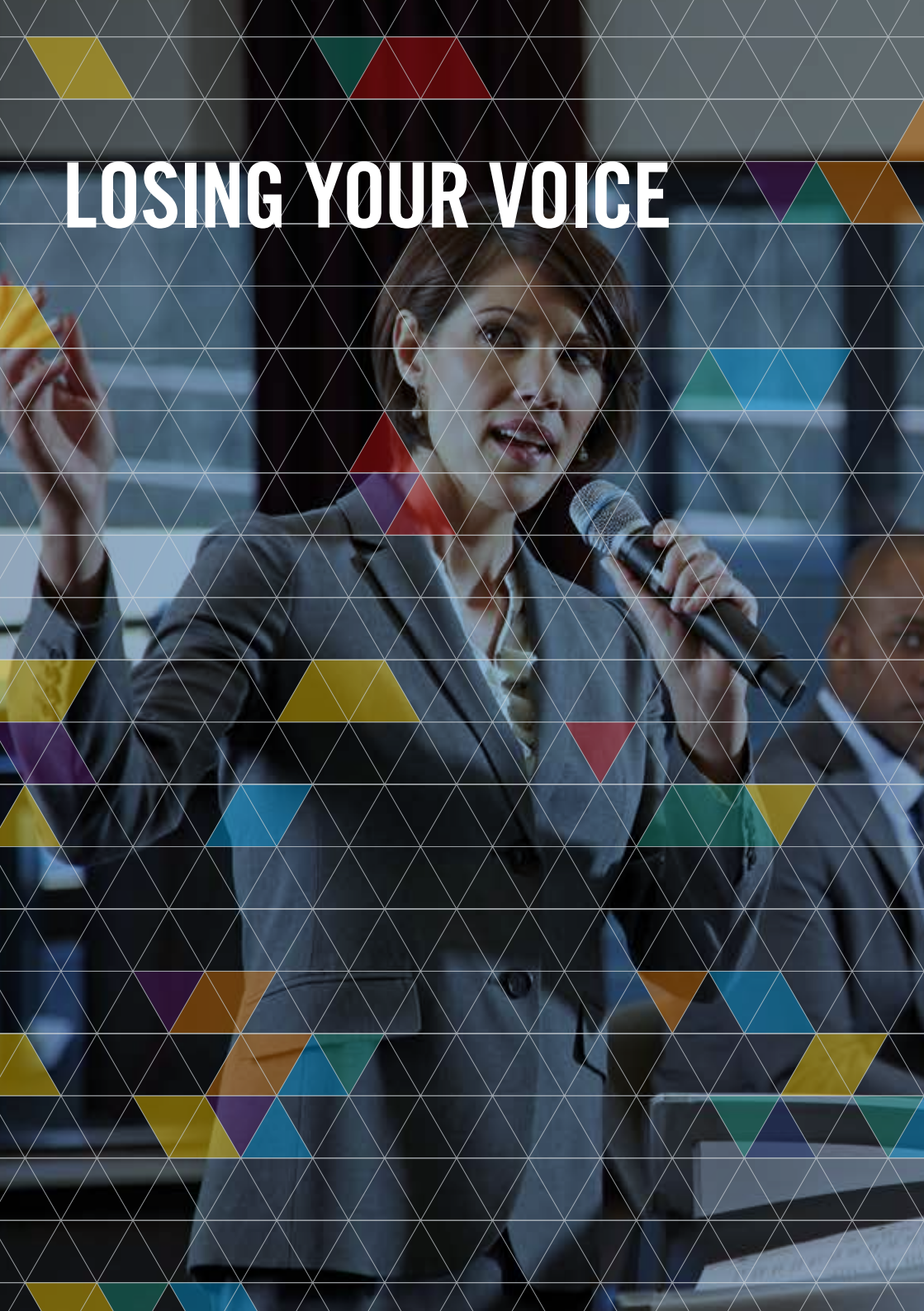
LOSING YOUR VOICE



Discover why the single biggest threat to wireless audio is in your pocket.

Wireless microphones are essential to modern production values. From live performances to big events, corporate conferences to your local house of worship, wireless systems are everywhere.

The world's first model was the Shure Vagabond, which was first introduced in 1953. Early designs were primitive, but thanks to modern and more affordable technology, we now see wireless microphones and in-ear monitors used by virtually every live event across the globe. Irrespective of their venue or event, uninterrupted high quality audio is critical. Any interference experienced that causes audio failure has severe repercussions for both the production and audience alike.

For wireless systems to work without interruption, we need access to clean RF (radio frequency) spectrum; this is fundamental rule number one. Until recently, we've enjoyed access to relatively large amounts of high-quality spectrum for the operation of wireless systems. However, recent years have turned the entire industry on its head. Our ability to use wireless systems in any capacity is now under immense strain, and there could soon be insufficient clean spectrum available to reliably operate wireless equipment across the Benelux countries.

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THE IMPORTANCE OF UHF

Wireless microphones have been in regular production since 1957, operating primarily in VHF and UHF spectrum. UHF in particular is the preferential space in which to operate; the gold mine of spectrum if you will, and subsequently it has become subject to exploitation in recent years.

Why UHF?

Although we cannot directly compare radio frequencies to sound waves, one characteristic they do share in common with is wavelength. Much like sound waves, lower frequencies have a longer wavelength, and therefore their propagation characteristics are stronger, which means they penetrate surfaces better and traverse greater distances without the need for a boost.

In a nutshell, UHF bands offer the largest quantity of good quality spectrum at the best frequencies required for large professional events. Furthermore, we can easily account for TV interference in the UHF bands as it is predictable - we cannot say the same for other parts of RF spectrum as these are often de-regulated and shared by technology such as GSM, 4G, Wi-Fi.

For years, professional wireless microphones and in-ear monitor systems happily shared UHF spectrum from 470 – 865 MHz as a secondary user alongside the transmission of analogue (later digital) television, albeit on a licenced basis. The aforementioned included TV channels 27 (518 - 526 MHz), 29 (534 - 542 MHz) and 69 (854 - 862 MHz) as a licence-exempt channels for microphone/IEM use by the creative AV and broadcasting industries.

This arrangement has now completely changed, and the reason for this is likely sat in your pocket; you might even be using it right now.

WHAT'S THE PROBLEM?

As you've probably guessed, it's related to your mobile. The last 15 years have seen the explosion of mobile phones, and then, in rapid succession, the demand to have fast wireless internet access available on these devices. We now live in a world where access to information has never been easier and digital content is more readily consumed than ever before. Let's face it; we're addicted to our mobile devices.

Nevertheless, mobile phones in isolation aren't the problem. We all use mobile phones; we all love the convenience and freedom that comes with mobile data. The problem stems from the recent expansion into next generation 4G services and how this affects the UHF spectrum we use.

Thanks to mobile phones, RF (Radio Frequency) spectrum has never been in such widespread use by the general public, and subsequently there is far more commercial interest in wireless RF spectrum than ever. The truth is, the allocation of rights and licenses to use spectrum is now big business, and the current battleground is UHF. The amount of this high-quality spectrum available for the reliable operation of wireless audio is rapidly decreasing, and the consequences for modern productions are severe.

HOW DID WE GET HERE?

In order to understand what's going on, we need to take a small step back. In the early years of this century, it was announced that television services would be switching from analogue to digital transmission on November 3rd, 2008. With the assumption that Digital TV would use less spectrum, the government immediately followed up with plans to auction off the usage rights. This process and the income it would generate for the Belgian Government from the highest bidders became known as the First Digital Dividend (DD1).

The auction was held on November 12th, 2013 with users of wireless equipment being the most severely affected group. Sadly, the entire 800 MHz band (790 - 862 MHz) of UHF spectrum (including channel 69) was cleared for eventual use by next generation 4G mobile broadband. Subsequently, anyone operating wireless systems in the 800 MHz band is now prone to high levels of interference, and more importantly are also breaking the law after January 1st, 2016.

Regrettably, without the same budget and lobbying power as the mobile phone industry, the future of spectrum for wireless audio is at significant risk. Through the Digital Dividend 1 process, a large amount of our operating space has simply disappeared overnight, and, unfortunately, it can happen again.

THE IRONY OF DIGITAL STREAMING

Looking at this from another angle, here's an interesting thought for you:

'The primary purpose of fast mobile broadband is to meet the growing demand for digital content.'

However, a significant amount of said content relies heavily on wireless systems to uphold production values.

Try to imagine a Cirque Du Soleil show without discrete wireless microphones, or a large concert without in-ear monitors. Ironically, you might get your HD content faster, but it will be at the expense of high-quality production values.

Furthermore, creative industries that rely on wireless systems are growing at an impressive rate. In Belgium, the creative industries are currently responsible for creating a lot of jobs and contribute a huge amount of money to the economy. Similarly, music festivals, theatre shows and live music concerts also contribute a significant amount to the Belgian purse; all of which need clean, reliable RF to operate.

Despite the above mentioned reliances, commercial pressure on the government to release even more UHF spectrum for mobile remains high, and subsequently; the future of RF spectrum (and our content production quality) remains uncertain. Somehow, we must establish a balance in order to retain production values.

SAVING OUR SOUND

Shure are at the forefront of discussions not only in Belgium, but also in Europe and the United States. To help secure a future for wireless audio, in Belgium we actively campaign as a member of the PMSE interest group (a body representing the interests of Belgian professional wireless Program Making and Special Events users), talking to and negotiating with the officials of the BIPT (Belgian Institute for Postal services and Telecommunications). Early and intensive talks resulted in the PMSE industry being listened to and granted access to discussions on future planning and developments. During the talks, quite a few issues were discussed and these discussions resulted in an adapted set of rules concerning the B10 Radio Interface, currently being prepared for official publication sometime during late 2015.

The new regulation should alleviate a lot of today's wireless users' paperwork duties and practical issues whilst at the same time taking into consideration the anticipated outcome of the WRC2015 Conference, which remains unknown at the time of this publication.

THE FUTURE

Unfortunately, the story doesn't end here. Despite significant steps to secure the remaining spectrum, additional bands are now subject to a similar review.

Towards the end of 2014, the BIPT launched a public survey searching comments about proposed changes to the regulation governing the B10 Radio Interface (see above). This survey was a precursor to a notification being published March, 2015. This is the final step before such notification will be transformed into a "Koninklijk Besluit" (Royal order) which effectively turns the notification into a document of law.

In this notification, the BIPT explicitly states that it is very likely that during the WRC2015 the decision will be taken that the 700 MHz-band (694-790 MHz) will be re-allocated from a Broadcasts to a Telecomms allocation and thus access to this part of the UHF-spectrum will be limited commencing January 1st, 2017. This is effectively a first step to remove PMSE users from the 700 MHz band. The decision to reallocate this spectrum to Mobile Network Operators by 2020 at the earliest is a considerable blow to users of wireless systems and puts additional strain on our industry. The WRC's decision is not yet known at the time of this publication.

While we recognise that mobile broadband brings benefits to consumers in the future, this should not be at the expense of other incumbent users of UHF spectrum. The clearance of 800 MHz has already placed considerable technical and financial burdens on our industry and without sufficient access to spectrum, the ability to produce content for consumers will be severely hindered. Therefore, it is in the interest of new users to recognise, respect and co-exist with PMSE users to ensure that we satisfy the requirements of modern productions.

One thing is certain: electromagnetic spectrum is a national resource. Just like gold or oil, there is only so much of it, and if the government continues to clear more UHF spectrum, we will eventually run out. Everyone, including the mobile industry, must be more efficient to ensure we make the most of a finite resource.

HOW WE'RE MAKING WIRELESS AUDIO MORE EFFICIENT

Our journey to achieve a new standard of excellence for wireless began the minute we learnt what was going to happen to UHF spectrum. We combined extensive research with our knowledge of wireless systems spanning over 50 years to help develop the ultimate wireless system, and the result was Axient® Wireless Management Network.

Axient pioneered a range of technologies, including interference detection and avoidance, advanced power management, and networked control to deliver a purpose-built system for difficult RF environments. For the first time, engineers could be truly confident that their system would work in the most hostile of RF scenarios.

Given the uncertainty for RF spectrum, having an efficient wireless solution is essential. So what do you do if your budget doesn't stretch to a system like Axient?

Recognising how critical the new Axient features have become, we have set upon (wherever possible) bringing the same advanced technology to our entire wireless product range. The rollout began with ULX-D, which sets a new standard for spectrum efficiency, and more recently with new QLX-D and GLX-D wireless systems; both of which bring advanced wireless technology to a more obtainable price bracket.

Throughout the rest of this guide, you will discover a host of solutions to the challenges facing our industry. Each system is designed to deliver flawless audio, no matter what your budget, and in all cases; audio quality is non-negotiable. It must meet our exacting standards.

Details of all Shure products that are compatible with the currently available spectrum can be found on foldout at the end of this publication; alternatively, visit **www.shure.be** or call the Shure Customer Service Team in Belgium on **+32 (0)2 704 91 50** for more information or advice.

More up to date information and the latest news can be found on the website (**www.pmse.be**) of the PMSE interest group (Program Making & Special Events).

SHURE AUDIO INSTITUTE

MASTER YOUR WIRELESS WITH SHURE AUDIO INSTITUTE

If you're still feeling a little confused, you're not alone! The changes to RF spectrum covered in this guide are complex at the best of times. To help users of wireless systems understand and operate their setup more effectively, we regularly run a "Wireless Mastered" seminar.

Wireless Mastered provides an in-depth look into RF Technology and hands-on training with Shure's industry leading wireless products. When combined with the information in this guide, you'll be well on your way to becoming a wireless expert.

Visit **sai.shure.be** for a list of upcoming dates.

FREQUENCIES YOU CAN USE FOR WIRELESS MICROPHONES & IEMS

Wireless microphones and in-ear monitors operate in dedicated blocks of spectrum. The majority of systems operate in the so-called UHF-band but there are a few other parts of spectrum that are available for wireless systems.

1 **174 – 209 MHz**

Old VHF frequency bands, still available under license for wireless microphones and IEMs. This spectrum may be revived due to shortages in the future. Channel 9 (202 – 209 MHz) is available for licence-exempt use.

2 **470 – 790 MHz, with the exclusion of 608 – 614 MHz**

Available for secondary users on a licenced basis. Shared with DVB-T terrestrial digital TV transmitters and primary users (mainly broadcast facilities). Licence allocation differs region per region in Belgium.

Exception: Channels 27 (518 – 526 MHz) and 29 (534 – 542 MHz): available on a licence-exempt basis. This applies to both wireless microphones and wireless in-ear monitoring systems. Maximum output power: 50 mW EIRP. Channel 29 however is not recommended for use in the Hainaut region of Belgium, due to a nearby DVB-T transmitter in France.

3 **608 – 614 MHz**

This band is expected to be released for licence-based operation in the northern part of Belgium at the time of publication of the new B10 regulation, which is due to be published soon.

4 822 – 832 MHz

Deregulated license free spectrum which can be used in all EU member states for wireless microphones and IEMs.

Max RF Power:

Handheld transmitters:	822 – 826 MHz: 20 mW EIRP 826 – 832 MHz: 100 mW EIRP
Beltpack transmitters:	822 – 832 MHz: 100 mW EIRP

Note: this is an FDD Guard Band susceptible to interference caused by mobile cellular networks – not advisable for professional use.

5 863 – 865 MHz

Deregulated licence-exempt spectrum can be used in most parts of Europe. Has to be shared with other users with a max RF power of 10mW EIRP – not advisable for professional use.

6 1785 – 1805 MHz

Deregulated license free spectrum can be used in all EU member states for wireless microphones and IEMs, with a maximum RF power of 50 mW EIRP.

7 2.4 GHz

This band is available for use across large parts of the world and is licence-exempt. This band is shared with Wi-Fi and many other users. It is ideal for small channel counts and environments where a long distance transmission is not required.

BLX Wireless

Shure BLX wireless systems combine professional quality sound with simple setup and an intuitive interface for legendary audio performance right out of the box. Precision-built and available in a variety of configurations.

BLX Wireless Frequency Bands:

H8E	covers **TV channels 27 – 29**	**518 – 542 MHz**	BE standard band
K3E	covers **TV channels 38 – 40**	**606 – 630 MHz**	
K14	covers **TV channels 39 – 41**	**614 – 638 MHz**	NL standard band
M17	covers **TV channels 45 – 47**	**662 – 686 MHz**	
Q25	covers **TV channels 55 – 57**	**742 – 766 MHz**	Advise against use*
T11	covers **TV channels 70 – 70**	**863 – 865 MHz**	Max. 4 compatible channels!

12 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **H8E**

Standard frequency band for the Netherlands: **K14**

*Advise against use due to future DD2 developments


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GLX-D Digital Wireless

Revolutionary Shure GLX-D digital wireless systems combine leading-edge LINKFREQ Automatic Frequency Management technology with best-in-class intelligent lithium-ion battery rechargeability (16 hours continuous use from one charge) to define the new standard for seamless operation and digital audio clarity.

Available in a variety of configurations, including the first Shure pedal-mounted guitar option

GLX-D Wireless Frequency Band:

Z2* covers the **2.4 GHz band**

How many systems can I use together?

Up to **5** systems can be used together with Interference Detection and Avoidance. This technology seamlessly moves away from interference to backup frequencies without audio interruption.

8 systems can be used together without backup frequencies.
This should only be used in controlled Wi-Fi environments.

What's the key benefit of choosing 2.4 GHz?

GLX-D operates within the 2.4 GHz band which is utilised by Wi-Fi, Bluetooth and other wireless devices. The benefit of 2.4 GHz is that it's a global band that can be used anywhere in the world, license-free.
There is only one frequency version of GLX-D available. **Z2** – 2.4 GHz band

There is only one frequency version of GLX-D available. **Z2** – 2.4GHz band

*No licence is required for GLX-D


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SLX® Wireless

Unparalleled ease of set-up and exceptional audio quality.

With included accessories, SLX is also installation-ready out-of-the-box and has a wide selection of legendary Shure microphones to choose from. SLX offers a tailored solution for virtually any application where rack mounted units and remote antennas are required.

SLX Wireless Frequency Bands:

G4E	covers	**TV channels 21 – 23**	**470 – 494 MHz**	
G5E	covers	**TV channels 24 – 26**	**494 – 518 MHz**	
H5	covers	**TV channels 27 – 29**	**518 – 542 MHz**	BE standard band
K3E	covers	**TV channels 38 – 40**	**606 – 630 MHz**	NL standard band
L4E	covers	**TV channels 42 – 44**	**638 – 662 MHz**	
P4	covers	**TV channels 50 – 52**	**702 – 726 MHz**	Advise against use*

12 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **H5**
Standard frequency band for the Netherlands: **K3E**

*Advise against use due to future DD2 developments

Larger installations or systems:

In case you need more than **12** compatible systems to run simultaneously, multiple frequency bands can be combined to achieve this. Call the Shure Customer Service Department for frequency co-ordination information and assistance.

See page 31 for contact information.

FP Portable Wireless

Featuring proven wireless technology, including Shure patented Audio Reference Companding, and intuitive, flexible components such as portable receivers and XLR plug-on transmitters, FP Wireless is the perfect choice when portability is required to capture professional sound in demanding and dynamic broadcast or field production environments.

FP Portable Wireless Frequency Bands:

G4E	covers	**TV channels 21 – 23**	**470 – 494 MHz**	
G5E	covers	**TV channels 24 – 26**	**494 – 518 MHz**	
H5	covers	**TV channels 27 – 29**	**518 – 542 MHz**	BE standard band
K3E	covers	**TV channels 38 – 40**	**606 – 630 MHz**	NL standard band
L4E	covers	**TV channels 42 – 44**	**638 – 662 MHz**	
P4	covers	**TV channels 50 – 52**	**702 – 726 MHz**	Advise against use*

12 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **H5**
Standard frequency band for the Netherlands: **K3E**

*Advise against use due to future DD2 developments


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QLX-D™ Wireless

QLX-D digital wireless systems delivers defined, streamlined performance with transparent 24-bit digital audio. Combining professional features with simplified setup and operation, QLX-D offers outstanding wireless functionality for demanding live sound events and installations.

QLX-D Wireless Frequency Bands:

G51	covers	**TV channels 21 – 28**	470 – 534 MHz	BE standard band
H51	covers	**TV channels 29 – 36**	534 – 598 MHz	BE standard band
K51	covers	**TV channels 38 – 45**	606 – 670 MHz	NL standard band
L51	covers	**TV channels 41 – 49**	632 – 696 MHz	
P51	covers	**TV channels 51 – 59**	710 – 782 MHz	Advise against use*

22 compatible frequencies per TV Channel, 67 in total band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **G51 & H51**
Standard frequency band for the Netherlands: **K51**

*Advise against use due to future DD2 developments


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QLXD4
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ULX-D® Wireless

ULX-D wireless systems for professional installed sound reinforcement. Shure ULX-D offers a premium 24-bit / 48kHz digital audio quality combined with spectrum-efficient and intelligent RF performance, meeting the needs of the most demanding applications. ULX-D offers a host of groundbreaking technologies which make the product perfectly suited for large installations, corporate AV rentals or professional PA rental companies.

ULX-D Wireless Frequency Bands:

G51 covers	**TV channels 21 – 28**	**470 – 534 MHz**	BE standard band
H51 covers	**TV channels 29 – 36**	**534 – 598 MHz**	BE standard band
K51 covers	**TV channels 38 – 45**	**606 – 670 MHz**	NL standard band
L51 covers	**TV channels 41 – 49**	**632 – 696 MHz**	
P51 covers	**TV channels 51 – 59**	**710 – 782 MHz**	Advise against use*

22 compatible frequencies per TV Channel, **67** in total band (region dependent). **High Density Mode** further enhances this efficiency and permits **63** channels to be simultaneously used in one TV band up to **560** in total band!

Which frequency version should I purchase?

Standard frequency band for Belgium: **G51 & H51**
Standard frequency band for the Netherlands: **K51**

*Advise against use due to future DD2 developments

Larger installations or systems:

In case you need assistance with the co-ordination of a large ULX-D system call the Shure Customer Service Department for frequency co-ordination information and assistance. See page 31 for contact information.

UHF-R® Wireless

Premier Wireless Technology

Shure UHF-R wireless microphone systems master the high pressure and extreme conditions of any large-scale touring or installations environment while delivering uncompromising Shure sound.

Rock-solid engineering and unparalleled RF performance provide sound professionals with all the features and flexibility they need to tightly control up to 150 systems for the most elaborate productions.

UHF-R Wireless Frequency Bands:

G1E	covers	**TV channels 21 – 28**	**470 – 530 MHz**	
H4E	covers	**TV channels 27 – 34**	**518 – 578 MHz**	BE standard band
J5E	covers	**TV channels 34 – 41**	**578 – 638 MHz**	
K4E	covers	**TV channels 38 – 45**	**606 – 666 MHz**	NL standard band
L3E	covers	**TV channels 42 – 49**	**638 – 698 MHz**	
P8	covers	**TV channels 51 – 60**	**710 – 790 MHz**	Advise against use*
Q5	covers	**TV channels 54 – 63**	**740 – 814 MHz**	Advise against use*

45 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium **H4E**
Standard frequency band for the Netherlands: **K4E**

*Advise against use due to future DD2 developments

Larger installations or systems:

In case you need more than **45** compatible systems to run simultaneously, multiple frequency bands can be combined to achieve this. UHF-R can be used to make extremely large systems (150 channels or more) for the most demanding performances. Call the Shure Customer Service Department for frequency co-ordination information and assistance.

See page 31 for contact information.

AXIENT® Wireless

Flagship Wireless Technology

Shure Axient wireless microphone systems include revolutionary new features and are changing the lives of wireless users. Reliable RF performance, even in changing conditions, gives the user a comfortable feeling although the spectrum is disappearing and clogging.

Brand new engineering, state of the art technology, and unparalleled RF and sound performance provide sound professionals with all the features and flexibility they need to tightly control up to 150 systems for the most elaborate productions.

AXIENT Wireless Frequency Bands (Transmitter only):

G1E covers **TV channels 21 – 28** 470 – 530 MHz **Receiver B**
H4E covers **TV channels 27 – 34** 518 – 578 MHz **Receiver B** BE standard band
J5E covers **TV channels 34 – 41** 578 – 638 MHz **Receiver B**
K4E covers **TV channels 38 – 45** 606 – 666 MHz **Receiver C** NL standard band
L3E covers **TV channels 42 – 49** 638 – 698 MHz **Receiver B**
P8 covers **TV channels 51 – 60** 710 – 790 MHz **Receiver C** Advise against use*
Q5 covers **TV channels 54 – 63** 740 – 814 MHz **Receiver C** Advise against use*

45 compatible frequencies per band (region dependent).

Which transmitter frequency version should I purchase?

Standard frequency band for Belgium **H4E**
Standard frequency band for the Netherlands: **K4E**

*Advise against use due to future DD2 developments

Larger installations or systems:

In case you need more than **45** compatible systems to run simultaneously, multiple frequency bands can be combined to achieve this even with the same receiver. Axient can be used to make extremely large systems (150 channels or more) for the most demanding performances. Call the Shure Customer Service Department for frequency co-ordination information and assistance.

See page 31 for contact information.

PSM® 300 In-Ear Monitoring

The PSM 300 stereo personal monitor system delivers detailed 24-bit digital audio processing and reliable wireless freedom to every corner of the stage. Dependable wireless coverage extends over 90 meters of range and eliminates dropouts.

Easy to setup and operate, PSM 300 systems offer one-touch frequency scan and sync to find and assign a clean wireless channel. Adjust the volume and use MixMode® technology or stereo mode to create a personal mix from two channels of audio.

PSM 300 Wireless Frequency Bands:

H8E	covers	**TV channels 27 – 29**	**518 – 542 MHz**	BE standard band
K3E	covers	**TV channels 38 – 40**	**606 – 630 MHz**	
K12	covers	**TV channels 39 – 41**	**614 – 638 MHz**	NL standard band
L19	covers	**TV channels 41 – 43**	**630 – 654 MHz**	
M16	covers	**TV channels 48 – 50**	**686 – 710 MHz**	Advise against use*
Q25	covers	**TV channels 55 – 57**	**742 – 766 MHz**	Advise against use*

15 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **H8E**
Standard frequency band for the Netherlands: **K12**

*Advise against use due to future DD2 developments

PSM® 900 In-Ear Monitoring

The PSM 900 in-ear personal monitoring system offers clear audio quality and robust RF performance for pro applications. Innovative features allowing for ease of use and quick setup make it the ideal solution for the most demanding professional applications.

PSM 900 Wireless Frequency Bands:

G6E	covers	**TV channels 21 – 25**	**470 – 506 MHz**	
G7E	covers	**TV channels 25 – 29**	**506 – 542 MHz**	BE standard band
K1E	covers	**TV channels 36 – 41**	**596 – 632 MHz**	
L6E	covers	**TV channels 44 – 48**	**656 – 692 MHz**	NL standard band
P7	covers	**TV channels 50 – 54**	**702 – 742 MHz**	Advise against use*
Q15	covers	**TV channels 56 – 60**	**750 – 790 MHz**	Advise against use*

20 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **G7E**
Standard frequency band for the Netherlands: **L6E**

Larger installations or systems:

In case you need more than **20** compatible systems to run simultaneously, multiple frequency bands can be combined to achieve this. Call the Shure Customer Service Department for frequency co-ordination information and assistance. See page 31 for contact information.

*Advise against use due to future DD2 developments

PSM® 1000 In-Ear Monitoring

PSM 1000, the flagship in-ear personal monitoring system with full rack dual channel wireless transmitter, Ethernet port for Shure network connectivity, internal power supply, up to 80 MHz tuning bandwidth and diversity bodypack receivers.

PSM 1000 Wireless Frequency Bands:

G10E	covers	**TV channels 21 – 29**	**470 – 542 MHz**	BE standard band
J8E	covers	**TV channels 31 – 40**	**554 – 626 MHz**	
K10E	covers	**TV channels 36 – 45**	**596 – 668 MHz**	
L8E	covers	**TV channels 40 – 49**	**626 – 698 MHz**	NL standard band
L9E	covers	**TV channels 46 – 54**	**670 – 742 MHz**	Advise against use*
P8	covers	**TV channels 51 – 60**	**710 – 790 MHz**	Advise against use*

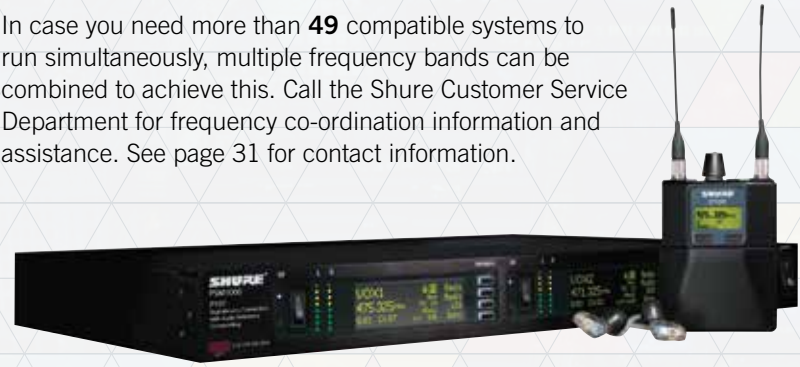
49 compatible frequencies per band (region dependent).

Which frequency version should I purchase?

Standard frequency band for Belgium: **G10E**
Standard frequency band for the Netherlands: **L8E**

Larger installations or systems:

In case you need more than **49** compatible systems to run simultaneously, multiple frequency bands can be combined to achieve this. Call the Shure Customer Service Department for frequency co-ordination information and assistance. See page 31 for contact information.



*Advise against use due to future DD2 developments

CONTACTS FOR INFORMATION AND SUPPORT

WHO TO CONTACT AT SHURE FOR FURTHER INFORMATION?

NEED WIRELESS ASSISTANCE?
+32 (0)2 704 91 50

Email: service@shure.be

PMSE Organisation

Working on behalf of all those who use wireless equipment, their key objective is to secure access to sufficient quality and quantity of spectrum so that our industry can carry on operating the wireless equipment we have become so dependent on for live performances to broadcasting.

www.pmse.be

BIPT (Belgian Institute for Postal services and Telecommunications)

The BIPT is a governmental body which regulates the allocation of radio frequencies in the Belgian market. Please contact the BIPT directly in order to request a licence for your wireless equipment.

www.bipt.be

TABLE SHOWING CURRENT AVAILABILITY OF BELGIAN TV CHANNELS FOR USE BY WIRELESS MICROPHONES AND IEMS.

TV Channel	21	22	23	24	25	26	27
Frequency Range	470 – 478 MHz	478 – 486 MHz	486 – 494 MHz	494 – 502 MHz	502 – 510 MHz	510 – 518 MHz	518 – 526 MHz

TV Channel	28	29*	30	31	32	33	34
Frequency Range	526 – 534 MHz	534 – 542 MHz	542 – 550 MHz	550 – 558 MHz	558 – 566 MHz	566 – 574 MHz	574 – 582 MHz

TV Channel	35	36	37	38	39	40	41
Frequency Range	582 – 590 MHz	590 – 598 MHz	598 – 606 MHz	606 – 614 MHz	614 – 622 MHz	622 – 630 MHz	630 – 638 MHz

TV Channel	42	43	44	45	46	47	48
Frequency Range	638 – 646 MHz	646 – 654 MHz	654 – 662 MHz	662 – 670 MHz	670 – 678 MHz	678 – 686 MHz	686 – 694 MHz

TV Channel	49	50	51	52	53	54	55
Frequency Range	694 – 702 MHz	702 – 710 MHz	710 – 718 MHz	718 – 726 MHz	726 – 734 MHz	734 – 742 MHz	742 – 750 MHz

TV Channel	56	57	58	59	60	61	62
Frequency Range	750 – 758 MHz	758 – 766 MHz	766 – 774 MHz	774 – 782 MHz	782 – 790 MHz	790 – 798 MHz	798 – 806 MHz

TV Channel	63	64	65	66	67	68	69
Frequency Range	806 – 814 MHz	814 – 822 MHz	822 – 830 MHz	830 – 838 MHz	838 – 846 MHz	846 – 854 MHz	854 – 862 MHz

TV Channel	70
Frequency Range	863 – 865 MHz

Interleaved spectrum available for wireless microphones and IEMs.
* Channel 29 not recommended for use in the Hainaut region of Belgium.

Temporary regional licensing possible. Please contact the BIPT.

Harmonised European spectrum. Only 2 MHz of channel 70 is available, with maximum power of 10 mW.

Cleared spectrum as result of DD1. Usage of wireless microphones and IEMs not permitted after 1-1-2016.

Use of this spectrum is not recommended, due to expected DD2 developments after 2020.

Currently reserved for radioastronomy. Soon to be released for licence-based operation in the northern part of Belgium.

FAQ

What was the 2008 Digital Switchover (Digital Dividend 1)?

The analogue to digital TV switchover was government policy in compliance with European regulation. It resulted in almost everyone being able to receive digital TV through an aerial. The DD1 announcement was followed by plans to auction off the rights to use this “now free” spectrum. This process and the income it would generate for the government from the highest bidders became known as the Digital Dividend (DD).

Why did the DD1 affect wireless microphone & IEM users?

The 800 MHz band was previously used by wireless microphones alongside analogue TV broadcast. European legislation auctioned the 800 MHz band to match spectrum being released in all European countries (European Harmonisation). Today, the 800 MHz band is used for 4G mobile data networks by various operators and is no longer available for use by wireless microphones and in-ear monitoring systems.

What frequencies were affected by the DD1?

790 – 862 MHz (TV channels 61 – 69). The 800 MHz band was auctioned and repurposed for 4G.

What happened to the European harmonised deregulated licence-free spectrum between 863 – 865 MHz?

The deregulated license-free spectrum (863 – 865 MHz) remains untouched by DD1. If you are currently operating in this area of spectrum, you are free to carry on using it.

What is 2.4 GHz and when should I use it?

The 2.4 GHz band is a deregulated block of spectrum available worldwide for a variety of services including wireless microphones. 2.4 GHz systems are ideal for small systems typically not exceeding more than five channels. One of the advantages of the 2.4 GHz band is that it is license free and available for use worldwide. The use of the 2.4 GHz spectrum has to be shared with several other users as Bluetooth, Wi-Fi and many others.

What is the current status of the 700 MHz band?

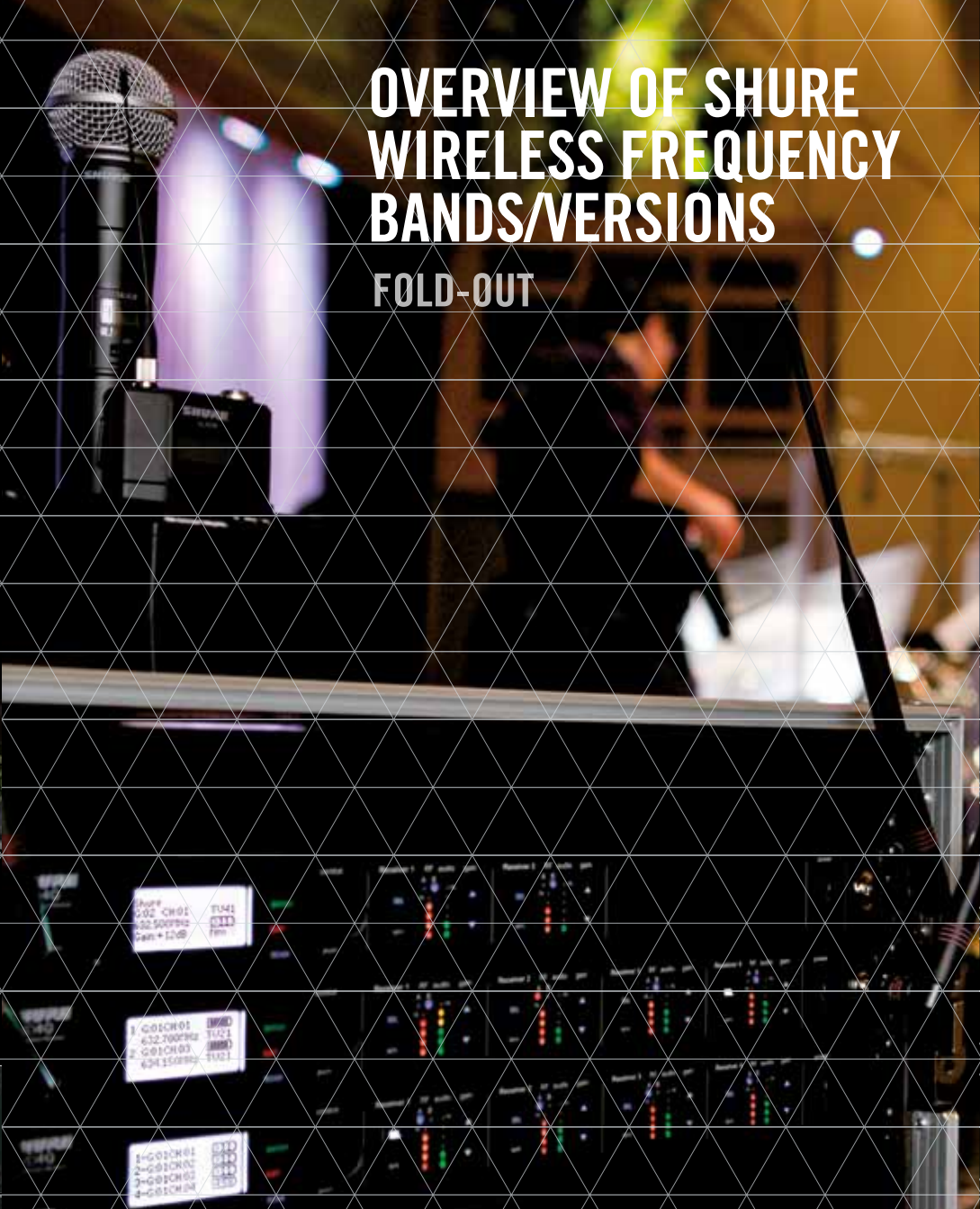
The future of the 700 MHz band is currently a hot topic. In 2015, the BIPT announced the decision to remove PMSE users from the 700 MHz band. The decision to reallocate this spectrum to Mobile Network Operators by 2020 at the earliest is a considerable blow to users of wireless systems and puts additional strain on our industry. The World Radio Conference discussed its future in November 2015 and are expected to announce the outcome of the 700 MHz band very soon.

Do I need a licence to operate my wireless microphones or IEMs?

Yes, except for use in TV channels 27 (518 - 526 MHz) and 29 (534 - 542 MHz) where short-range wireless devices can be used without licence with a maximum output power of 50mW EIRP.

OVERVIEW OF SHURE WIRELESS FREQUENCY BANDS/VERSIONS

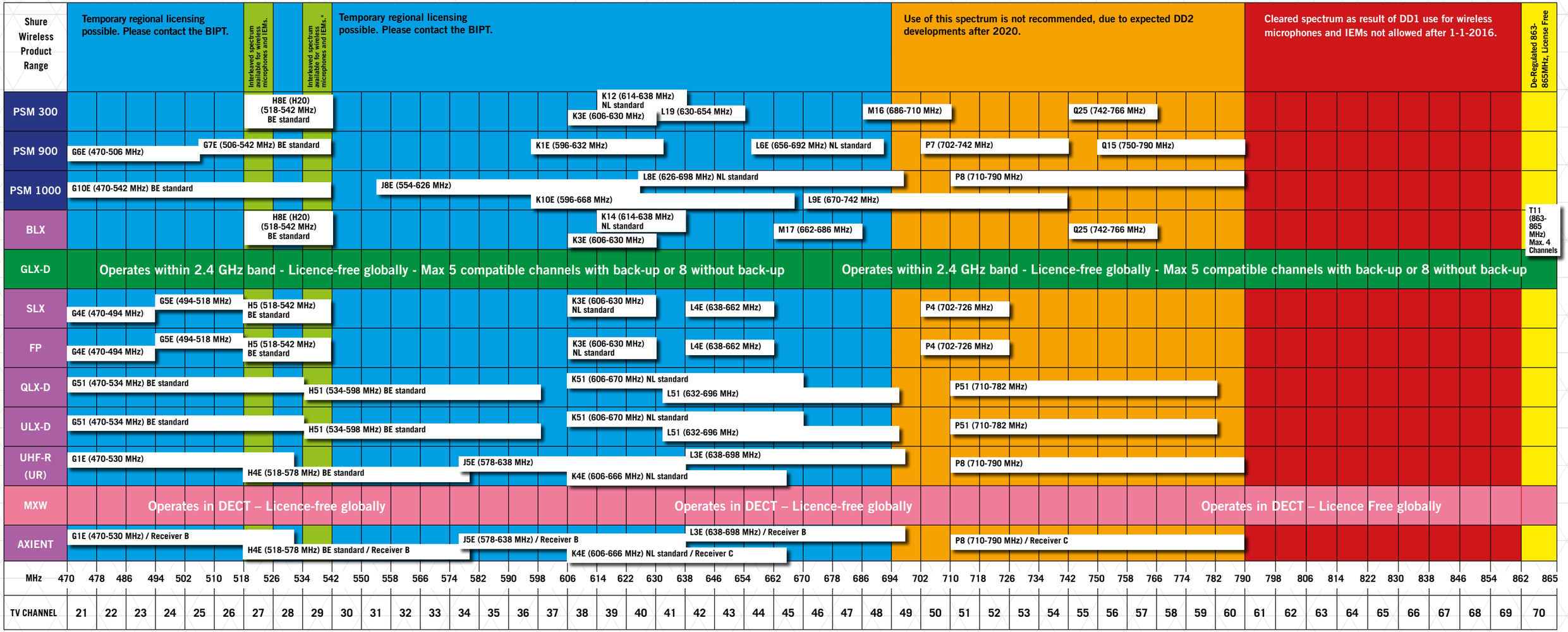
FOLD-OUT



Special thanks to Glenn Willems, member of the RF taskforce at PMSE.be, for his contribution to this publication.

OVERVIEW OF SHURE WIRELESS FREQUENCY BANDS/VERSIONS

This table illustrates all the usable frequency versions for Belgium. *Channel 29 not recommended for use in the Hainaut region of Belgium.

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