



## **EUTC Response**

### **Ministry of Economy & Enterprise Madrid**

#### **{Public Consultation 700 MHz, 1.5 GHz and 26 GHz}**

EUTC welcomes the opportunity to respond to the consultation issued by the Ministry of Economy and Enterprise in relation to the proposed future use of frequency bands in the 700 MHz, 1.5 GHz and 26 GHz range.

#### **Introduction & Background Context**

The European Utilities Telecom Council (EUTC) is a non-profit organisation delivering education, collaboration, best practices and thought leadership in telecommunication technology to utilities and other critical infrastructure providers to ensure efficient, secure, sustainable and affordable smart infrastructure solutions.

EUTC membership comprises major gas and electricity transmission and distribution companies from across Europe as well as vendor partners representing telecommunications suppliers focused on utility telecoms provision.

The Telecommunications requirements of the utility sector are very specific with several highly demanding performance criteria –

- i) High Availability (minimum typically 99.999%)
- ii) High degree of security against malicious attack
- iii) Coverage across a very wide service area – including those in very remote rural areas and even underground locations
- iv) Resilience to failures caused by major power failures (so called ‘black start’) – with power autonomy of at least 72 hours
- v) Longevity of solutions closely aligned with asset life of utility infrastructure (typically 25 years or more)

The above is a non-exhaustive list and represents the minimum requirement to keep existing systems operational. Members of EUTC already make extensive use of wireless systems utilizing dedicated spectrum and as such have a deep interest in future changes which may provide access to additional spectrum or undermine access to existing spectrum.

Beyond the existing requirements for maintaining safe and efficient operation of utility infrastructure, electricity networks throughout Europe are now undergoing the most significant transition in over a century. This change is being driven by a huge move away from centralized fossil fuel production towards a very large number of distributed renewable sources of generation such as solar and wind. Additionally, the increase in distributed storage



systems and electric vehicle adoption are also significantly altering the way the electricity grid operates. These once in a generation changes in electricity networks are being driven by a combination of high-level policy drivers and commitments on climate change such as the EU Winter Package, & UN Climate Change agreements such as those in Paris and Kyoto. At EU level, an ambitious target has been set of 40% reduction in CO<sub>2</sub> emission by 2030.

In order that the desired reduction in carbon emissions can be achieved whilst simultaneously providing low cost energy in a highly reliable manner it is necessary to develop advanced smart grids i.e. real time, reliable data is constantly required about energy throughput and status of the entire energy network. Access to a suitable amount of radio spectrum in appropriate frequency bands is imperative to achieve this connectivity in a cost effective and timely manner. Without access to appropriate, dedicated radio spectrum the development of smart grids cannot be achieved and the aspirations for carbon reduction cannot be fully realized.

### **Answers to Specific Consultation Questions**

*(EUTC has restricted this response to those questions regarding frequencies in the 700 MHz and 1.5 GHz band as they are most relevant to our members in Spain. The 26 GHz band is used in some European countries for point to point or point to multipoint use. We understand that this is unlikely to affect utilities operating in Spain. However, EUTC has suggested to CEPT / ETSI that interoperability studies should be carried out between existing point to point links operating in the 26 GHz band and future 5G technology (especially those making use of highly directional steerable beams)*

## **SECTION 2 RESPONSE - 700 MHz**

### **2.1 – Interest in Band 700 MHz (694-790 MHz) and Services to be Delivered Over the Band**

#### **Question 1**

In common with other electric utilities around the world, EUTC members in Spain are making huge changes to their networks which require a massive increase in visibility (number of devices) and data volumes. These new connections can only be cost effectively delivered using wireless technology. Principal requirements of the network (mentioned in the introduction) are reliability, cyber security, scalability, longevity, coverage, throughput, latency and power autonomy.

Existing utility frequency allocations in Spain allow only a modest number of narrow band channels (12.5 kHz or 25 kHz) to be utilized in the VHF and UHF range. These technologies will not scale up to the levels required by the smart grid nor can they satisfy the principal requirements stated above.

Utilities need access to additional spectrum in the sub 1 GHz range. Preferably this would be in the 400 MHz region as is the case in Sweden, Holland, Ireland, Poland. However, the

700 MHz band also offers a potential opportunity for access to valuable spectrum to help facilitate smart grids.



One of the most attractive technology solutions to satisfy this set of criteria is a private LTE network. Such a network offers key qualities including-

- **Scalability** hundreds of thousands or even millions of devices
- **Interoperability** with multiple vendors (better value and security of supply)
- **Traffic prioritization** and ability to control every aspect of the network
- **Cyber security** – Inherent within the 3GPP standard
- **Longevity** – guaranteed by global eco system of suppliers and 3GPP
- **Throughput** - high level of spectral efficiency & frequency re-use
- **Resilience** – multiple base stations and control of transmission and power
- **Future proof** – 5G ready

The channel bandwidth available in the 700MHz region is sufficient for LTE technology (3MHz or 5 MHz channels) and the propagation at 700 MHz is favorable for long range and indoor communication using the minimum number of base stations.

## **Question 2**

As outlined in the answer to question 1, the primary applications would be digitalization of the grid (sensing, control, monitoring) i.e. smart grid associated with an increasingly decarbonized energy network.

## **2.2 Technical Conditions for Exploitation, Geographic Scope, License Award Duration**

### **Question 3**

EUTC believe that an allocation of 2 x 3 MHz would be most suitable for utility operators in Spain. This is consistent with EUTC's stated requirement of 2x3 MHz in sub 1 GHz spectrum and would facilitate the use of readily available LTE hardware (3GPP band 28 & 68).

### **Question 4**

The geographical area of any licenses should align with those currently employed for narrow band channels (UN-74) with exclusive use for utilities within their licensed area.

### **Question 5**

The license duration must be for a minimum of 15 years and preferably 20 years in order to align more closely with the asset life and investment cycles of utility infrastructure. Additionally, there must be a clear mechanism identified for extension beyond the initial term in (minimum) 5-year increments



## **2.3 Granting of Rights of Use and Associated Obligations**

### **Question 6**

Of the 2 x 30 MHz being made available (703-733 paired with 758-788 MHz) EUTC suggests that a minimum 2 x 3 MHz be made available exclusively for utility smart grids (this approach has recently been adopted by Comreg in Ireland in 410-415.5 & 420-425.5 MHz). The cost of the spectrum should be a nominal fee equivalent to that for existing licenses under UN-74. The benefits of a properly implemented smart grid to the Spanish economy and future generations as a whole is far greater than short term revenue generation from spectrum fees.

### **Question 7**

EUTC believes that there should be an upper limit to the amount of spectrum being held by one organisation in order to promote competition.

### **Question 8**

Coverage obligations should apply to those MNOs acquiring radio spectrum for providing services to the general public in rural areas, railways etc. Coverage obligations are not relevant for those operating private networks who need to provide coverage only in the areas where their assets are located.

### **Question 9**

Coverage commitments and timescales for MNOs acquiring spectrum are important. There are interesting approaches in recent allocations in Finland and Japan.

### **Question 10**

With regard to security within 5G networks it remains to be seen precisely how this will be implemented. However, the combination of user authentication via ever more complex AES systems, network authentication, SIMS and E-SIMS allows for the continual enhancement of hardened security throughout the lifetime of 5G networks.

## **2.4 Central Interval 733-758 MHz and Guard Bands (694-703 MHz & 788-791MHz)**

### **Question 11**

EUTC recognizes that there is the potential for these frequencies to be used in M2M applications with 2 x 3MHz as the minimum stated bandwidth according to ETSI TR103 492. An appropriate authorization model could be under similar terms to those of UN-74. Readily available equipment is available in LTE bands 28 and 68 (both frequency division duplex).



## **SECTION 3 RESPONSE - 1.5 GHz**

### **3.1 – Interest in use of 1.5 GHz Frequency Band (1.427–1.517 GHz) & Services to be Provided**

#### **Question 13**

EUTC members currently make extensive use of the 1.5 GHz frequency band for long distance ultra low latency tele-protection links. These links are essential to the safe operation of the electricity grid and facilitate the very rapid disconnection of electrical plant under fault conditions. The reallocation of the 1.5 GHz band to 5G services would cause serious disruption to existing services and the cost implication of moving to another band would be significant. Additionally, since the original proposals around 2011 for SDL (Supplemental Downlink) applications by the mobile operator community in this band, other technological advances in MNO technology have significantly reduced the likely demand from MNOs for spectrum in the 1.5 GHz range. Existing alternative frequency ranges in 700 MHz, 800 MHz, 900 MHz, 1.8 GHz, 2.1 GHz, 2.6 GHz and the imminent allocation of 3.4-4.2 GHz represent very significant (and more favorable) options for the MNO community. This is especially the case when the additional spectrum allocations are coupled with MIMO technology and highly directional, steerable antenna arrays. EUTC also note that the introduction of SDL would only be of benefit to an existing MNO since it cannot readily be used as a stand-alone solution by a new entrant to the market – only as an enhancement by an existing MNO. EUTC would like the current allocation to remain with the existing users with the potential for utility users to secure additional spectrum if possible.

#### **Question 14**

The existing provision of critical, high performance, low latency links should continue – the frequency band is used extensively for connecting very remote base stations (point to multipoint systems) and associated devices back to the core network. In addition, extra spectrum in this band could be made available for private networks (point to multipoint or LTE for instance) to support smart grid infrastructure for utility networks.

### **3.2 Technical Exploitation Conditions and Portions of Spectrum by Concession**

#### **Question 15**

Regarding the size of any allocation to be awarded through appropriate market mechanisms, EUTC suggest that 10 MHz blocks would be large enough to facilitate very useful communication data rates (existing links are operating in channel sizes of <1MHz). Any award process should allow for the combination of contiguous smaller allocations into larger total channels to allow for more efficient use of this valuable resource and minimize any wasteful 'guard bands'



### **3.3 Geographic Scope and Duration of the Concessions**

#### **Question 16**

With regard to geographical constraints from a utility perspective licenses should either be available on a national basis or aligned with the operating area of the utility holding the license. The propagation characteristics of signals in the 1.5 GHz allow significant distances between devices which requires coordination to ensure the most efficient use of the resource.

#### **Question 17**

EUTC believes that an absolute minimum time duration for any spectrum license needs to be 15 years and preferably 20 years. In addition, there needs to be a clearly identified process for securing the spectrum for an additional 5 years halfway through the license period. This is the only way in which sufficient certainty can be provided to allow significant investment in ongoing network deployment.

### **3.4 - Granting of Rights of Use and Associated Obligations**

#### **Question 18**

The allocation of spectrum in the 1.5 GHz band should be ideally based upon a combination of a rigorous plan of usage of the spectrum for the greatest overall benefit to society and a modest fee payable for its use. EUTC suggests that at least part of the band (10 MHz) should be set aside for use only by utility users (this approach has been adopted by Comreg in Ireland recently in the 410-412 MHz paired with 420-422 MHz). Previous non-utility holders of parts of the 1.5 GHz 'L band' spectrum in several countries in Europe have failed to make any use of the spectrum at all - even after previous users had been forced to invest significantly to vacate the spectrum

#### **Question 19**

It should be possible for a user to acquire only as much spectrum as they can demonstrate that they can constructively utilize. It is imperative that failure to implement networks in a given time frame results in revocation of any license in order that the spectrum cannot be left unused.

#### **Question 20**

As indicated in the answer to question 19 above, it is essential that a usage / coverage obligation is attached to any new spectrum award which is made in this band. The utility sector in Spain already satisfies this requirement – as demonstrated by the number of existing radio links operating in the band.



### 3.5 – Other aspects

#### Question 21

EUTC are surprised at the proposed repurposing of the 1.5 GHz band for several reasons –

- i) There remains uncertainty as to whether any other users (mobile operators) will make use of the band for SDL given the technological advances over the years since SDL was first discussed. These advances appear to have diminished the importance of SDL. I.e. the case for SDL usage remains unproven.
- ii) The large amount of spectrum now held for mobile broadband across many bands more than adequately provides for current and future needs (with carrier aggregation techniques, MIMO and beam steering providing even greater throughput)
- iii) The existing use case by utilities as part of smart grid is already proven by the existence of hundreds of links through Spain with more connectivity required each month as a cost effective, reliable alternative to expensive fibre connections in remote areas.

If the 1.5 GHz band is to be re-allocated to alternative uses, there will be significant costs associated with the migration away from this allocation. Moreover, no alternative frequency band has yet been suggested by the regulator in Spain or other European states affected by the same issue. The 1.5 GHz band has very unique propagation properties which allow for low profile unobtrusive antennas (low wind loading – crucial in mountainous regions of Spain), low cost support structures and long-range links (even with some intrusion into Fresnel zones). The 1.5 GHz band is also extremely robust in terms of resilience to rain-fade attenuation effects. This is unlikely to be the case with any alternative millimeter wave bands such as 15 or 18 GHz – which would require more substantial antenna support structures and possible intermediate repeater sites. It is not clear if incumbent users of the 1.5 GHz band will be financial compensated for any migration activities which will be necessary if the band has to be vacated.

EUTC would welcome further discussions with the Ministry of the Economy and Enterprise to further explore this important consultation around 700 MHz, 1.5 GHz and 26 GHz.





## Addendum...

Traditionally, electricity networks have been one-way systems to deliver power from large centralised generation sources into a transmission grid at high voltage, and then distributed to customers at low voltage.

The current challenge is to accommodate large numbers of intermittent sources of renewable generation connected into the distribution networks at their extremities where the power infrastructure is at its weakest; whilst at the same time reducing 'customer minutes lost' by increasing the reliability of the network.

## The European Utilities Telecom Council (EUTC)

*The European Utilities Telecom Council (EUTC) is the leading European Utilities trade association dedicated to informing its members and influencing policies on how telecommunication solutions and associated challenges can support the future smart infrastructures and the related policy objectives through the use of innovative technologies, processes, business insights and professional people.*

*This is combined with sharing best practices and learning from across the EUTC and the UTC global organization of telecommunication professionals within the field of utilities and other critical infrastructure environments and associated stakeholders.*

### CONTACT DETAILS:

European Utilities Telecom Council, Avenue Tervueren 188a, Postbox 4, 1150 Brussels, Belgium  
Tel: +32 2 761 16 59; email: [eutc@eutc.org](mailto:eutc@eutc.org)  
[www.eutc.org](http://www.eutc.org)

<b>EUTC Spectrum Proposal</b>	
<i>Within Europe, multiple small allocations within harmonised bands:</i>	
LESS INTENSE APPLICATIONS	
<ul style="list-style-type: none"><li>• <b>VHF spectrum (50-200 MHz)</b> for resilient voice comms &amp; distribution automation for rural and remote areas. [2 x 1 MHz]</li></ul>	
ANCHOR BAND	
<ul style="list-style-type: none"><li>• <b>UHF spectrum (400 MHz bands)</b> for SCADA, automation, smart grids and smart meters. [2 x 3 MHz]</li></ul>	
MORE DENSE APPLICATIONS	
<ul style="list-style-type: none"><li>• <b>Lightly regulated or licence-exempt shared spectrum</b> for smart meters and mesh networks. (870-876 MHz)</li><li>• <b>L-band region (1500 MHz)</b> for more data intensive smart grid, security and point-to-multipoint applications. [10 MHz]</li></ul>	
FOUNDATION BANDS	
<ul style="list-style-type: none"><li>• <b>Public microwave bands (1500 MHz – 58 GHz)</b> for access to utilities' core fibre networks/strategic resilient back-haul.</li><li>• <b>Public satellite bands</b> to complement terrestrial services for particular applications.</li></ul>	

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