The 400 MHz Band Award in Ireland

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What will be covered

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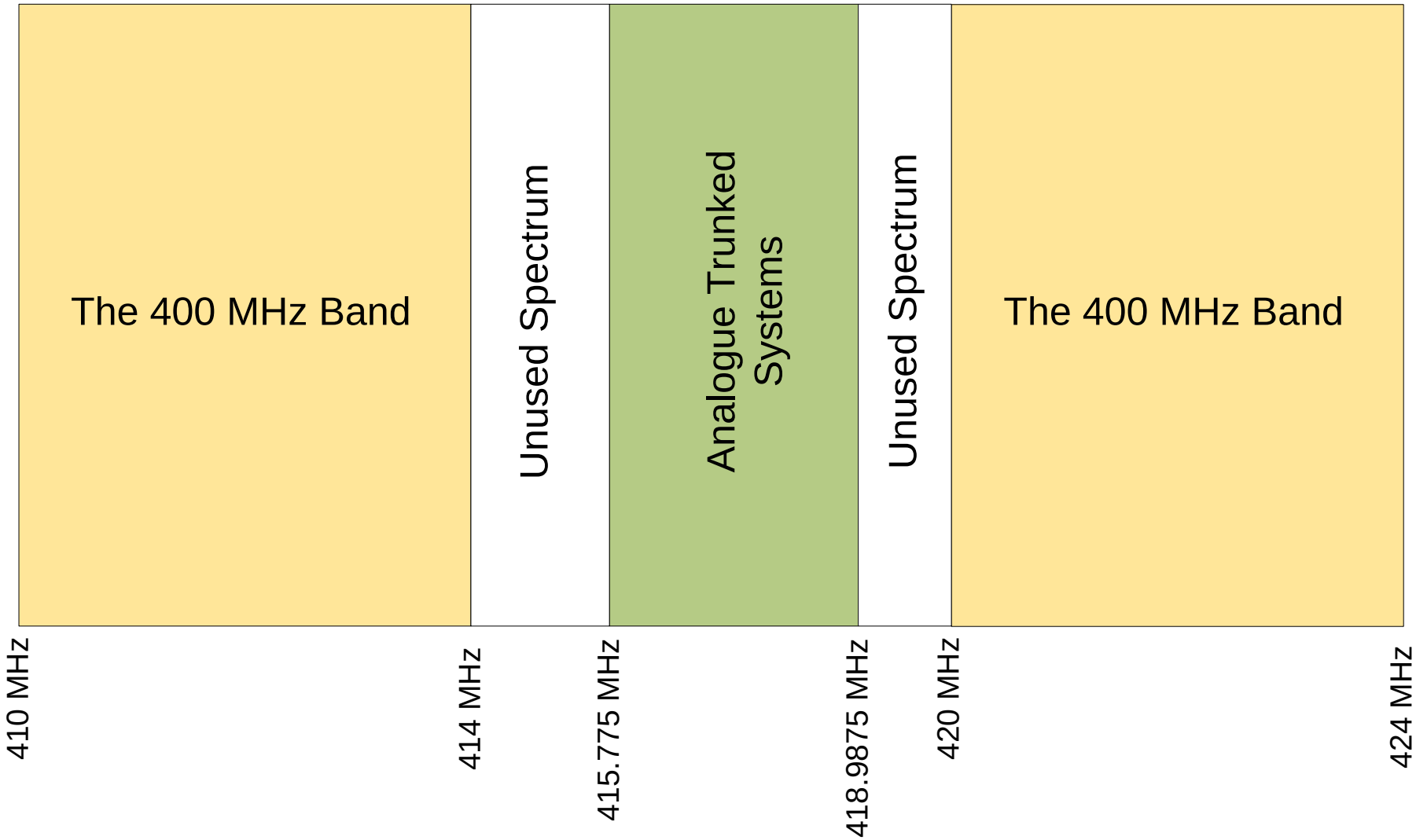
- Reserving spectrum for Smart Grid
  - ➢What is the 400 MHz band & its availability
- What did ComReg decide to do?
- How did ComReg do it?
  - ➢Outcome of Award

The 400 MHz Band



Radio Spectrum Management Strategy Statement 2016 – 2018

- Submissions to ComReg's RSMSS pointed at the potential value of the spectrum
- ComReg also noted that there were a number of possible uses for the 400 MHz band and would commence a public consultation on same

July 2017 – First Consultation

- ComReg published its first consultation process which examined the potential uses of the 400 MHz band and invited industry to comment on same;
- ComReg noted that the number of use cases including:

  - Smart Grid;
  - Smart Metering;
  - Digital Mobile Radio; and
  - Public Protection & Disaster Relief.

- ComReg received 12 responses to this consultation showing that there was justification to further examine potential uses of the band

The Plum Report

ComReg commissioned Plum Consulting to:

1. analyse the potential uses of the 400 MHz band;
2. assess the amount of spectrum that may be required for each use, and the availability of alternative frequency bands, solutions and future availability of same; and
3. assess the technical requirements that may be needed to provide for those uses.

Plum assessed the following broad potential uses:

- PMR;
- PPDR;
- Mobile Networks & fixed wireless access;
- Smart Grids; and
- Smart Meters.

What is a Smart Grid?

ComReg's definition came from Plums definition which based, in part, on the ITU definition:

"a term used for advanced delivery systems for utility services (electricity, gas and water) from sources of generation and production to key elements in the grid networks and includes all supervisory and control necessary for their effective management"

Summary of Plum's Findings

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Potential Use	Spectrum Requirements	Identified Demand?	Other Bands / Solutions Available?
Private Mobile Radio type uses	2 × 100 kHz	No	Has other spectrum bands available to cater for these services
Public Protection & Disaster Relief	2 × 3 MHz – 2 × 5 MHz	Potential need for a future BB-PPDR network	Has other spectrum bands available to cater for these services
Mobile Networks & Fixed Wireless Access	LTE – minimum of 2 × 3 MHz	Yes but other bands available	MNO's have a lot of spectrum assigned to them already, and will have further opportunity with "5G auctions" upcoming
Smart Meters	2 × 200 kHz	No, solutions readily available	Other solutions were becoming available such as services from MNOs & short range device solutions

Summary of Plum's Findings – Smart Grid

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Potential Use	Spectrum Requirements	Identified Demand?	Other Bands / Solutions Available?
Smart Grid	2 × 3 MHz	Yes	• No, sub-1 GHz spectrum to achieve connections to remote locations. Whilst 450 – 470 MHz may be available in other countries, this is not the case in Ireland; • Could use scanning telemetry for control and monitoring but cannot support requirements for changes to supply networks

International Developments

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Revision of ITU-R SM.2351-2 8 developed by CEPT FM 54 according to the **proposed revision that 2 × 3 MHz is required in the 400 MHz frequency band for the provision of Smart Grids**

ETSI Technical Report TR 103 401 and work item 'DTR/ERM-562' identify the future requirements for **Smart Grids that are necessary to meet Europe's need for the reliable provision of utilities**. ETSI examines Smart Grid systems and other radio systems suitable for utility operations, and the long-term spectrum requirements for electricity, gas and water Smart Grids. **ETSI is of the view that 2 × 3 MHz of spectrum is required in the 400 MHz band** for Smart Grid use

Work on a then new ECC Decision (19)02 which replaced ECC Decision (04)06 and ECC Decision (06)06. Draft **ECC Decision (19)02 specifies the Least Restrictive Technical Conditions for narrowband and wideband land mobile systems operating within a number of frequency ranges including the 410 – 430 MHz frequency range**

Regulatory Impact Assessment (RIA)

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A RIA is an analysis of the likely effects of a proposed new regulation or regulatory change, and, indeed, of whether regulation is necessary at all. A RIA should help identify the most effective and least burdensome regulatory option and should seek to establish whether a proposed regulation or regulatory change is likely to achieve the desired objectives, having considered relevant alternatives and the impacts on stakeholders.

ComReg noted that there were important policy issues that arose as a result of the Plum Report and the recent international developments:

1) Is there a likely requirement for Smart Grids in Ireland?; and
2) Are there alternative solutions that could deliver a Smart Grid(s)?

Is there a likely requirement for Smart Grids in Ireland?

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"Smart Grid enabled electrical distribution systems could reduce electrical energy consumption by 5% - 10%"

EPRI ELECTRIC POWER RESEARCH INSTITUTE

"Smart Grids can help to mitigate climate change"

ITU

"By 2050. Smart Grids will see an accumulated reduction in energy related CO2 emissions of 250 million tonnes"

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

Is there a likely requirement for Smart Grids in Ireland?

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EUROPEAN COMMISSION

Directive 2009/72/EC - *Member States should encourage the modernisation of distribution networks, such as through the introduction of* ***smart grids****… In order to promote energy efficiency, Member States or, where a Member State has so provided, the regulatory authority shall strongly recommend that electricity undertakings optimise the use of electricity, for example by providing energy management services, developing innovative pricing formulas, or introducing intelligent metering systems or* ***smart grids****, where appropriate*

Policy framework for climate and energy in the period from 2020 to 2030 - *the EU and Member States will need to develop further their policy frameworks to facilitate the transformation of energy infrastructure with more crossborder interconnections, storage potential and* ***smart grids*** *to manage demand to ensure a secure energy supply in a system with higher shares of variable renewable energy*

Is there a likely requirement for Smart Grids in Ireland?

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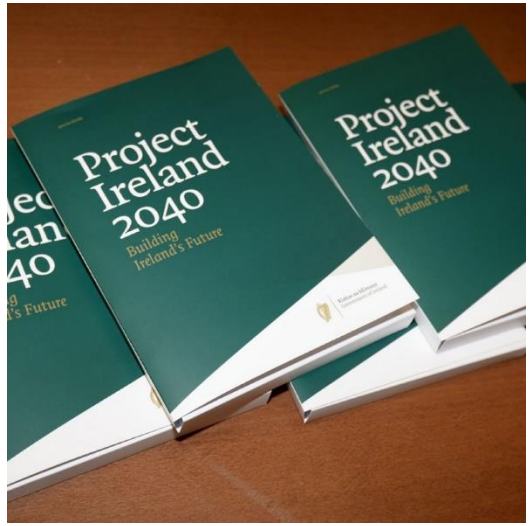
Rialtas na hÉireann
Government of Ireland

The National Energy and Climate Plan - **Smart Grids** are one of a number of key measures required to increase the flexibility of the existing energy system with regard to renewable energy production and the NECP includes a case study of pilot programme launched by ESBN as an example of the benefits of **Smart Grids**… **Smart Grids** are one of the key electricity and gas transmission infrastructure projects needed for the NECP to meet its objectives



The Department of Communications, Climate Action and Environment **National Mitigation Plan** observes that **smart operation** of the power system at both transmission and distribution level and energy efficiency will enable maximisation of the existing grid

Are there alternative solutions that could deliver a Smart Grid(s)?

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In considering this, ComReg first considered the technical requirements of Smart Grids, which included:

- Low to medium data rates including multiple Mbit/s if video is required;
- 10 – 20 year lifetime;
- Highly resilient;
- Extensive geographic coverage;
- Low latency; and
- High security.

Are there alternative solutions that could deliver a Smart Grid(s)?

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Alternative Solution	Notes
Telemetry systems	Does not provide enough control for Smart Grids Do not support the bandwidth requirements The shift to renewable energies means there are more points required in the network
Mobile Networks	ETSI opines that mobile networks would require resilience and power backup upgrades Unlikely to provide the geographic coverage, reliability, resiliency or latency needed ETSI further stated that a Smart Grid should be self owned / managed and that the spectrum remains under the control of the utility

How to divide up the available spectrum

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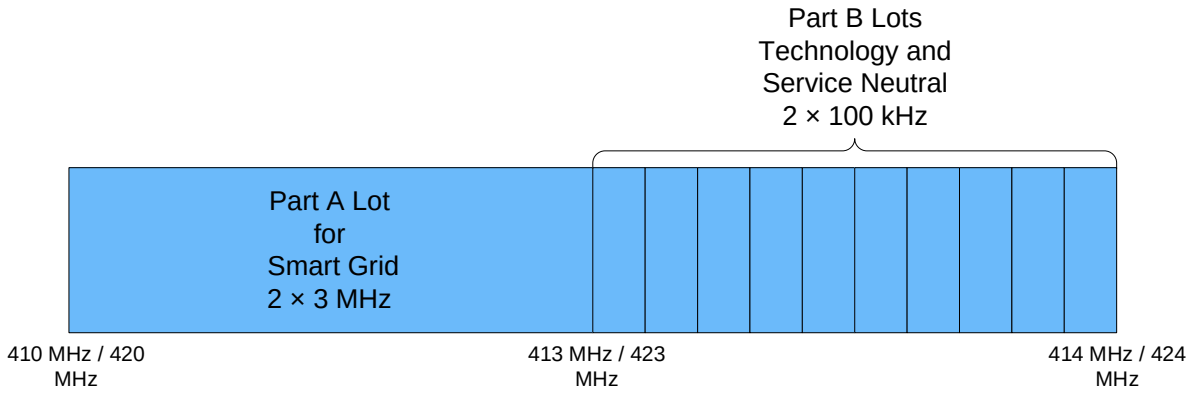
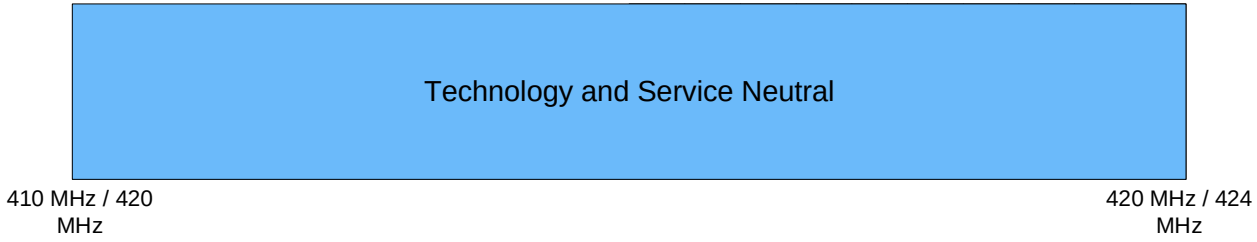
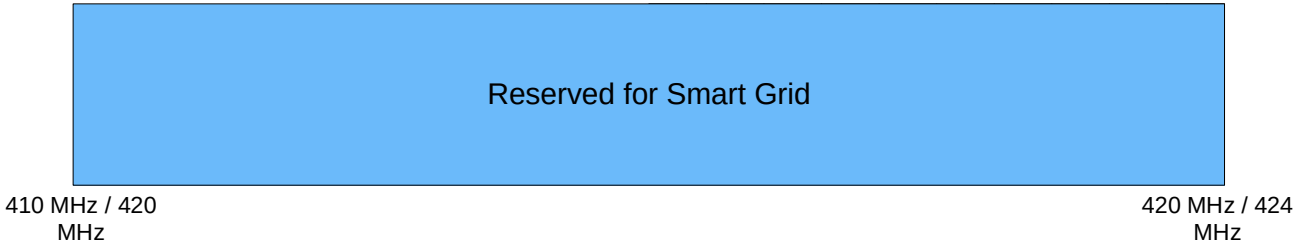
Option 1



Option 2



Option 3



Assessment of the Options

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Stakeholders

- Reserving some spectrum for Network Utility Operators is preferred as it allows other technologies and bidders access to the remaining 2 x 1 MHz, and allows a NUO to potentially use the 2 x 1 MHz for other services;
- Reduces the possibility of NUO not winning any spectrum;
- MNOs are unlikely to be interested in the band given the small quantum of spectrum, and there are little to no mobile handsets compatible with this band

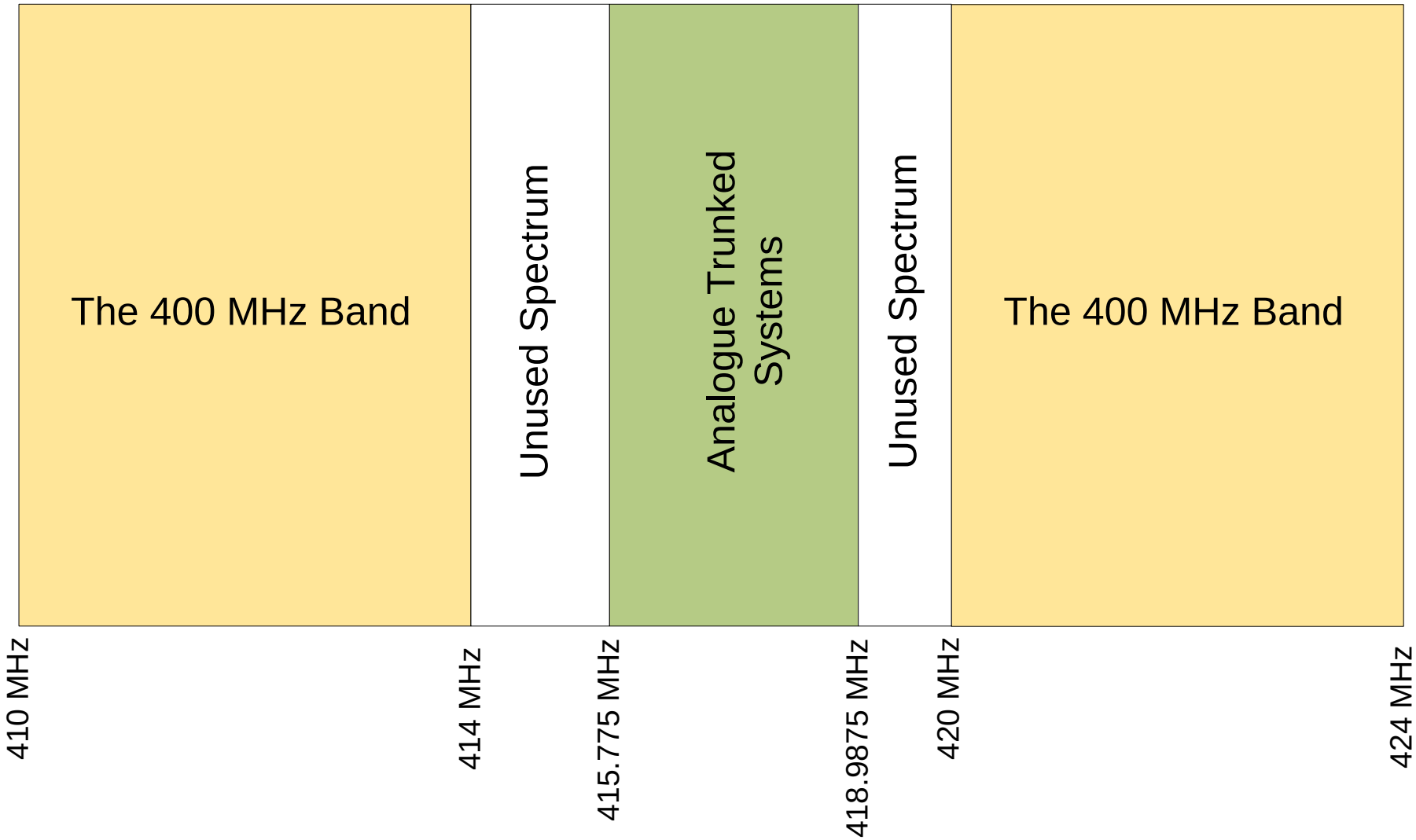
Competition

- ComReg noted that under option 2 there is a risk that a NUO may not win the spectrum and instead may be forced into using sub-optimal alternatives, or leasing the spectrum from the winning bidder and thereby distorting any auction process.

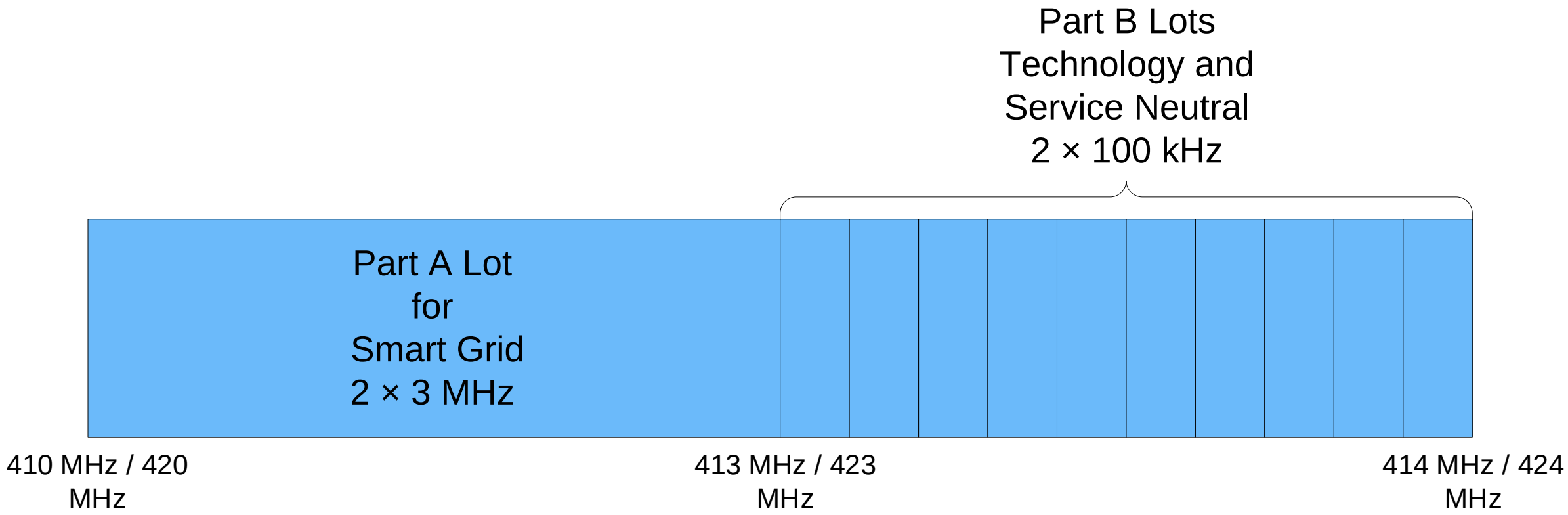
Consumers

- ComReg noted that consumers would benefit from the introduction of a Smart Grid in Ireland as it would reduce power outages, likely put downward pressure on energy prices, and lower carbon emissions

Recall…


The 400 MHz Band
Unused Spectrum
Analogue Trunked Systems
Unused Spectrum
The 400 MHz Band
410 MHz
414 MHz
415.775 MHz
418.9875 MHz
420 MHz
424 MHz

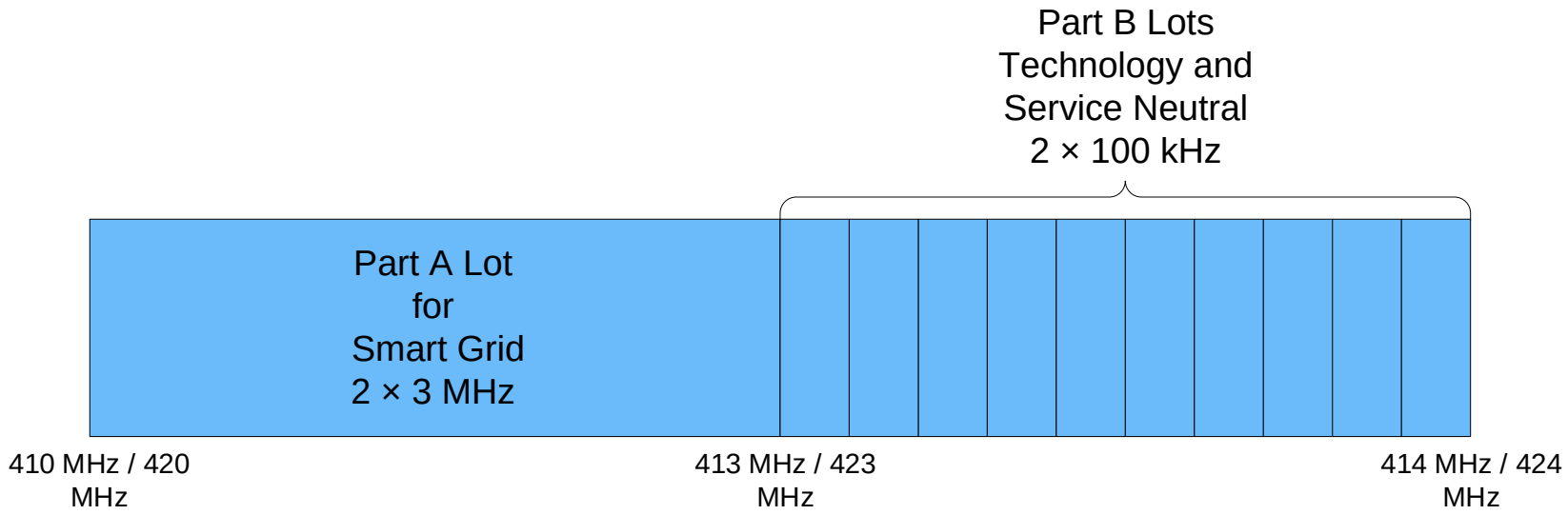
Breakdown for Spectrum Award



Decisions

PART A:

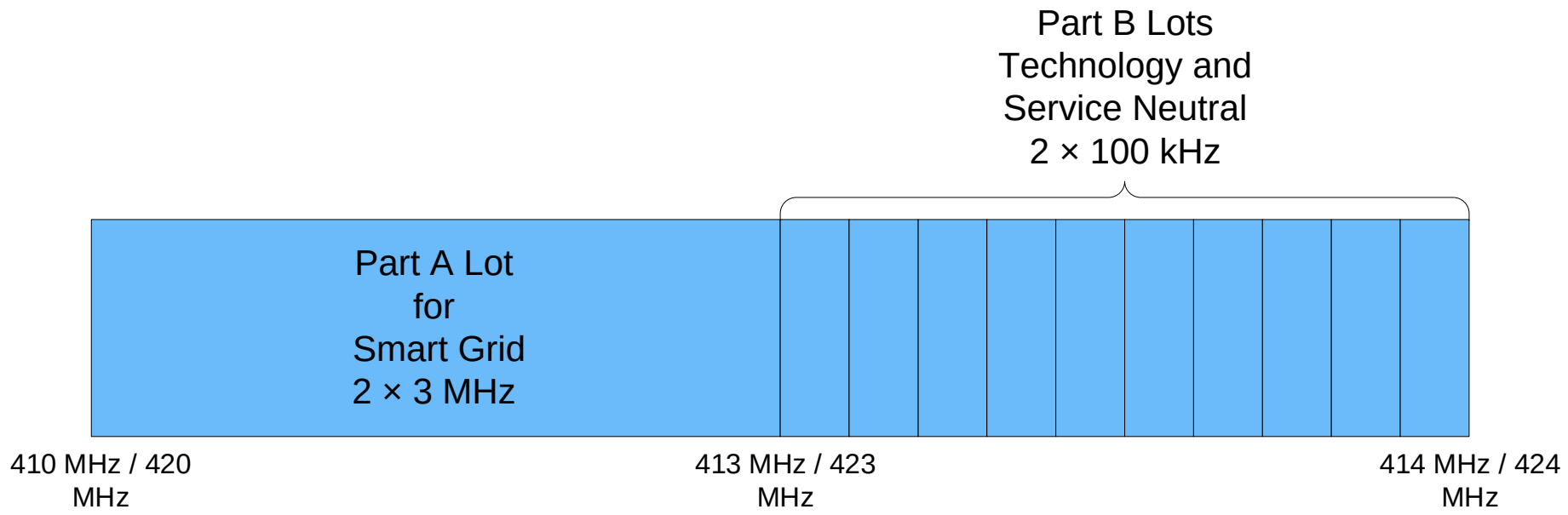
- You must be a Network Utility Operator to apply;
- 15 year licence;
- No applicants? Additional 30 Lots of 2 × 100 kHz on a technology and service neutral basis added to PART B award;
- Reserve price - €240 000; and
- Annual fees - €39 000 plus CPI



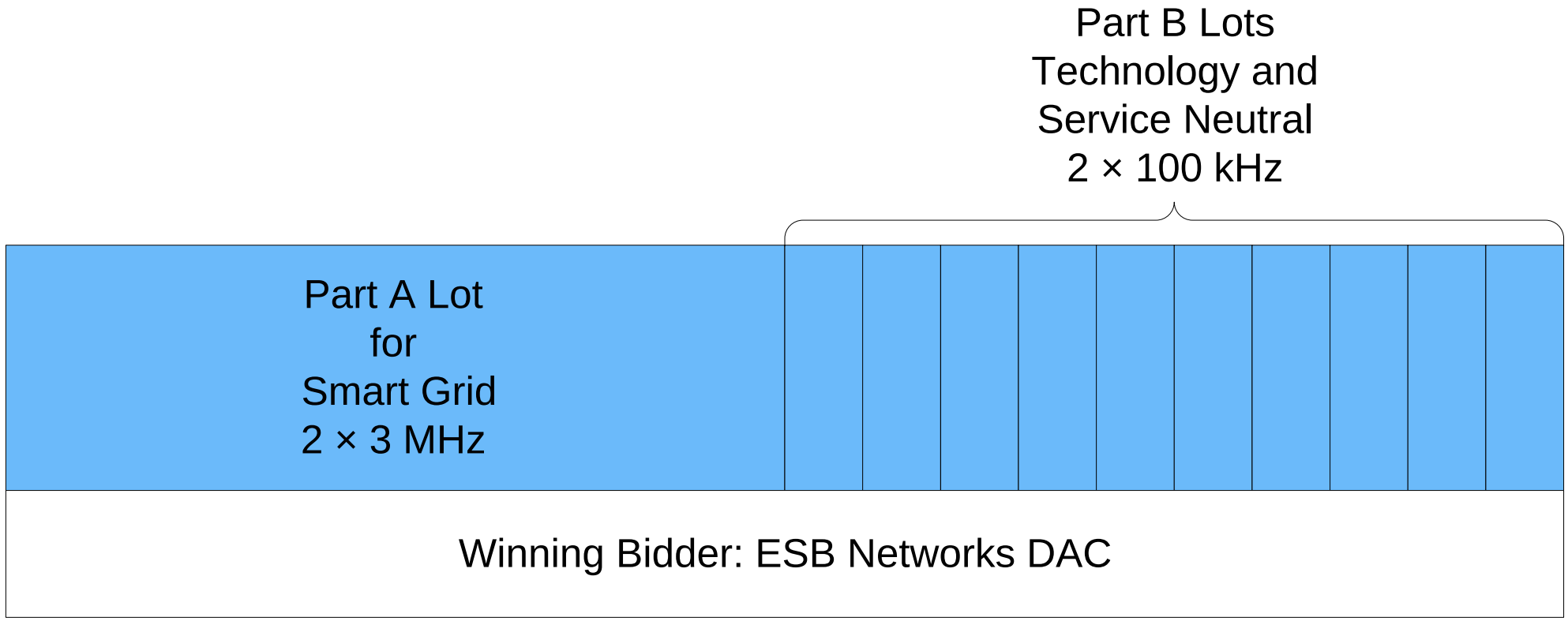
Decisions

PART B:

- 15 year licence;
- Reserve price - €8 000 per lot; and
- Annual fees - €1 300 plus CPI



Results


Part B Lots
Technology and
Service Neutral
2 × 100 kHz
Part A Lot
for
Smart Grid
2 × 3 MHz
Winning Bidder: ESB Networks DAC

Further reading

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- Documents concerning the 400 MHz Award

https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/400mhz-band-spectrum/

- ComReg's final positions on this award

Document 19/69 – Response to Consultation & Decision on the 400 MHz Band Award;

Document 19/80 – 400 MHz Band Spectrum Award – Information Memorandum; and

Document 19/99 – Results of the 400 MHz band spectrum award.

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