



# **Results of the Multi-Band Spectrum Auction**

## **Information Notice**

**Reference:** ComReg 12/123

**Date:** 15 November 2012

**An Coimisiún um Rialáil Cumarsáide**

**Commission for Communications Regulation**

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## **Additional Information**

Document No:

12/123

Date:

15 November 2012

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# **1 Results of the Multi-Band Spectrum Award**



## Results of the Multi-Band Spectrum Auction

### 1 Auction Results

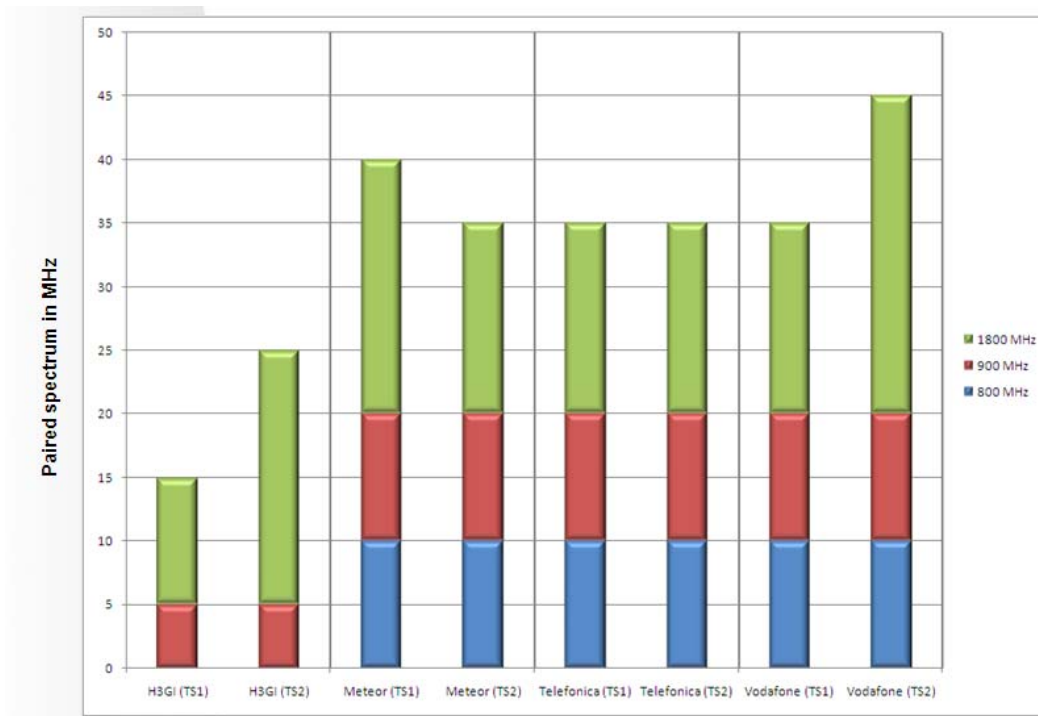
| Frequency Band   | Licence Period | Hutchison 3G Ireland Ltd. | Meteor Mobile Communications Ltd | Telefonica Ireland Ltd | Vodafone Ireland Ltd |
|--|----------------|---------------------------|----------------------------------|------------------------|----------------------|
| 800 MHz  | 2013-2015      | -                         | 2 x 10 MHz                       | 2 x 10 MHz             | 2 x 10 MHz           |
|  | 2015-2030      | -                         | 2 x 10 MHz                       | 2 x 10 MHz             | 2 x 10 MHz           |
| 900 MHz  | 2013-2015      | 2 x 5 MHz                 | 2 x 5 MHz                        | 2 x 10 MHz             | 2 x 10 MHz           |
|  | 2015-2030      | 2 x 5 MHz                 | 2 x 10 MHz                       | 2 x 10 MHz             | 2 x 10 MHz           |
| 1800 MHz   | 2013-2015      | 2 x 10 MHz                | 2 x 10 MHz                       | -                      | 2 x 15 MHz           |
|  | 2015-2030      | 2 x 20 MHz                | 2 x 15 MHz                       | 2 x 15 MHz             | 2 x 25 MHz           |
| Final Upfront Fees <sup>1</sup><br>(€ millions)        |                | €51.14 m                  | €144.78 m                        | €124.93 m              | €160.85 m            |
| Total Spectrum Usage Fees <sup>2</sup><br>(€ millions) |                | €53.87 m                  | €99.64 m                         | €99.64 m               | €119.79 m            |
| <b>TOTAL</b>   |                | <b>€ 854.64 million</b>   |                                  |                        |                      |

**Table 1: Auction Results<sup>3</sup>**

<sup>1</sup> Winning packages do not include non-liberalised spectrum lots in the first time slice - figures presented here are rounded off.

<sup>2</sup> Final Upfront Fees is contingent on: any Licence fee refunds or adjustments in respect of delayed commencement arising from Transition; Relocation Rebates; Early Liberalisation Rebates; and/or any Advanced Commencement fees due. These are detailed in the Information Memorandum. The amounts will be finalised over the course of the transition process.

<sup>3</sup> Winning packages do not include non-liberalised spectrum lots in the first time slice - figures presented here are rounded off.



**Figure 1: Spectrum holdings in the MBSA Bands<sup>4</sup>**

Availability of individual frequencies (i.e. Lots) in each of the spectrum bands.

**800 MHz:** All Lots in the 800 MHz band are available for use with a commencement date of 1 February 2013, or earlier should “Advanced Commencement” be requested.

**900 / 1800 MHz:** The availability of Lots in the 900 MHz and 1800 MHz bands is subject to the completion of Transition activities to allow the Existing GSM Licensees in these bands, to adjust or “relocate” their respective networks to the new spectrum assignments determined by the Auction. This is likely to take a few months and is being progressed in accordance with section 3.8 of the Information Memorandum (ComReg Document 12/52)

## 2 Background – the Consultation Process

In 2008 ComReg commenced the process of determining how spectrum rights of use in some of these spectrum bands would be awarded. ComReg’s early consultations (Consultation 08/57,<sup>5</sup>

<sup>4</sup> This graphic combines the results of the MBSA process and unliberalised spectrum holdings in these bands.

<sup>5</sup> ComReg Document 08/57 – Liberalising the future use of the 900 MHz and 1800 MHz bands – 17 July 2008.



Consultation 09/14<sup>6</sup> and Consultation 09/99<sup>7</sup>) focused on the GSM bands (900 MHz and 1800 MHz), but particularly, on the release and liberalisation of the 900 MHz band.

In light of requests from interested parties for the inclusion of other spectrum bands into the award process and taking into account relevant subsequent developments in the market, ComReg, in 2010, proposed to broaden the award process to include other spectrum bands. In that regard, Consultation 10/71<sup>8</sup> proposed the inclusion of the 800 MHz band into the 900 MHz award process, and following this Consultation 10/105<sup>9</sup> proposed the inclusion of the 1800 MHz band in the award process.

To facilitate the implementation of ComReg's MBSA proposals, the issue of the expiry of certain GSM 900 MHz licences in 2011 was required to be addressed by ComReg<sup>10</sup> and, following this, the detailed proposals and processes concerning the MBSA process were set out and finalised in the following publications:

- Consultation 11/60<sup>11</sup> - which presented ComReg's comprehensive proposals for this award process, including a draft decision and supported by a draft regulatory impact assessment;
- Consultation 11/75<sup>12</sup> ('the Draft Information Memorandum') – which detailed the processes and procedures ComReg envisaged that it would employ if it were to implement its proposals as detailed in Document 11/60;
- Response to Consultation 12/25 and Decision 04/12<sup>13</sup> - which presented ComReg's response to consultation and Decision to hold a competitive award process for individual rights of use in the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands;
- Response to Consultation 12/50<sup>14</sup> - which set out ComReg's response to its consultation on the Draft Information Memorandum; and

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<sup>6</sup> ComReg Document 09/14 – Liberalising the future use of the 900 MHz and 1800 MHz bands & spectrum release options - published 10 March 2009.

<sup>7</sup> ComReg Document 09/99 – Response to consultation and further consultation on liberalising the future use of the 900 MHz and 1800 MHz bands: response to Consultation 09/14 and further consultation - published 21 December 2009.

<sup>8</sup> ComReg Document 10/71 – Consultation paper on 800MHz, 900 MHz & 1800 MHz spectrum release - published 17 September 2010.

<sup>9</sup> ComReg Document 10/105 – Consultation paper on inclusion of the 1800 MHz band into the proposed joint award of 800 MHz and 900 MHz spectrum - published 15 December 2010.

<sup>10</sup> See ComReg Document 11/11 and ComReg Document 11/29 and Decision 03/11.

ComReg Document 11/11 – Response to consultation and draft Decision: Interim licences for the 900 MHz band - published 17 February 2011.

ComReg Document 11/29 – Response to consultation and Decision: Interim licences for the 900 MHz band - published 13 April 2011

<sup>11</sup> ComReg Document 11/60 – Multi-band Spectrum Release Proposal - published 24 August 2011.

<sup>12</sup> ComReg Document 11/75 – Draft Information memorandum on Multi-band Spectrum Release - published 24 October 2011.

<sup>13</sup> ComReg Document 12/25 – Response to Consultation and Decision on the release of the 800 MHz, 900 MHz and 1800 MHz Radio Spectrum Bands - published 16 March 2012.



- Document 12/52<sup>15</sup> (‘the Information Memorandum’) – which detailed the final processes and procedures that ComReg would employ in its MBSA process to implement its substantive decisions as set out in Response to Consultation 12/25 and Decision 04/12.

In addition to, and informing, the above documents, ComReg published a number of expert reports commissioned by it.

ComReg’s MBSA process also gives effect to European legislation relating to the 3 spectrum bands, including:

- a) European Directive 2009/114/EC - which amends the existing GSM Directive and removes the exclusive reservation of the 900 MHz band for GSM services ( “GSM Amendment Directive”);
- b) European Commission (EC) Decision on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community (2009/766/EC), and its amending Decision (2011/251/EU)<sup>16</sup>; and
- c) EC Decision (2010/267/EU) - which harmonises the technical conditions of use in the 800 MHz band (the so called “Digital Dividend”), for terrestrial systems capable of providing electronic communications services in the European Union<sup>17</sup>.

ComReg received considerable interest in its consultation process, which has been demonstrated by the large volume of material received from interested parties (circa 2500 pages of submissions and correspondence).

### 3 Background - the Spectrum Bands

The 900 MHz band<sup>18</sup> and 1800 MHz band<sup>19</sup> are currently used for the provision of GSM or second generation (‘2G’) mobile services such as voice and SMS text messaging. These GSM services are mainly provided with 900 MHz spectrum while the 1800 MHz spectrum is used primarily to provide additional capacity in areas where demand is higher. Under the terms of their licences, Existing GSM Licensees in these bands can only provide GSM services.

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<sup>14</sup> ComReg Document 12/50 – Response to Consultation on the draft Information Memorandum - published 25 May 2012.

<sup>15</sup> ComReg Document 12/52 – Multi-band Spectrum Release, Information memorandum - published 25 May 2012.

<sup>16</sup> These set out the technical harmonisation measures for the introduction of other terrestrial systems capable of providing electronic communications services that can co-exist with GSM systems in the 900 MHz and 1800 MHz bands (the “EC Decision on the 900 and 1800 MHz bands”).

<sup>17</sup> Where an EU member state designates or makes available the 800 MHz band for networks other than high-power broadcasting networks, the said Decision obliges that member state to allow the 800 MHz band to be used for terrestrial systems capable of providing electronic communications services in compliance with the parameters set out in the Annex to the Decision.

<sup>18</sup> This comprises the frequency ranges 880 - 915 MHz and 925 - 960 MHz.

<sup>19</sup> This comprises the frequency ranges 1710 - 1785 MHz and 1805 - 1880 MHz.





The Liberalised Use Licences that will be awarded by the MBSA process will enable licence holders to deploy advanced technologies, such as UMTS or Long Term Evolution ('LTE') - see annex C) alongside GSM, thereby facilitating the introduction of advanced mobile services in these two spectrum bands.

Until 24 October 2012, the 800 MHz band<sup>20</sup> was used for the provision of analogue terrestrial television services. Following the introduction of digital terrestrial television services and the switch-off of analogue services on 21 October last, however, this band became available for use for the provision of other services. Similar to Liberalised Use Licences in the 900 MHz and 1800 MHz band, licensees in the 800 MHz band will be able to deploy advanced technologies such as UMTS or LTE thereby facilitating the introduction of advanced mobile services in this spectrum band also.

All three spectrum bands are universally regarded as highly suitable for the provision of mobile services by virtue of their propagation properties, enabling wide area coverage and effective in-building penetration, and hence facilitate the provision of high quality national mobile network coverage.

The MBSA process has made available 140 MHz of paired spectrum on a liberalised basis more than doubling the 64.8 MHz of spectrum currently assigned to the market in these bands, providing additional capacity to operators to provide new or improved services.

## 4 The Auction

As set out in its Document 12/25, ComReg held an open competitive selection process for the award of spectrum rights in the 800 MHz, 900 MHz and 1800 MHz bands.

Following extensive consultation and consideration of materials provided by interested parties, ComReg concluded that this approach was preferable to other award options before it (including administrative assignment of liberalised rights to incumbent operators).

Given the many complexities of a single award process across three spectrum bands, and the statutory objectives and duties relating to such a spectrum award, much work was required to devise the optimal award format and conditions. The key features of the MBSA process adopted by ComReg included that:

- a) It involved a number of discrete stages, including: an Application Stage, a Qualification Stage, a Main stage, an Assignment stage and, finally, a Notification and Grant Stage;
- b) in submitting a binding Application to ComReg to participate in the MBSA process, Bidders had to specify the number of Lots in each spectrum band that they wished to acquire at the respective minimum prices;

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<sup>20</sup> This comprises the frequency ranges 791 - 821 MHz and 832 - 862 MHz.



- c) as demand was greater than supply a Main Stage, which comprised of a Combinatorial Clock Auction (CCA), was held. The CCA is a price clock-based auction method used to sell multiple items in a single process. It provides bidders with the flexibility to bid on different combinations of spectrum rights across the three bands in response to changes in prices. The CCA format also creates good incentives for bidders to bid their full value for the spectrum and to compete over the amount of spectrum they acquire, leading to an efficient outcome;
- d) the Main Stage of the auction determined who won what amount of spectrum rights in the three bands, consistent with the Auction Rules set out in the Information Memorandum;
- e) the Assignment Stage determines the specific frequency assignments of the spectrum rights within each spectrum band awarded during the Main Stage;
- f) to accommodate the expiry dates of existing GSM rights of use in the 900 MHz and 1800 MHz bands<sup>21</sup>, spectrum rights in each of the spectrum bands were auctioned across two time periods (or 'Time Slices') as follows:

|              | Commencement Date             | Expiry Date                |
|--------------|-------------------------------|----------------------------|
| Time Slice 1 | 1 February 2013 <sup>22</sup> | 12 July 2015 <sup>22</sup> |
| Time Slice 2 | 13 July 2015 <sup>22</sup>    | 12 July 2030               |

- g) to safeguard competition, the following competition caps were placed on the spectrum rights that any individual Bidder could acquire:
- 2 × 20 MHz of sub-1 GHz spectrum (i.e. 800 MHz and 900 MHz spectrum);
  - 2 × 50 MHz of total spectrum in these three bands; and
  - 2 × 10 MHz of 900 MHz spectrum (Time Slice 1 only).

To promote efficient spectrum use, the following minimum prices applied to Lots in the Auction, based on a conservative lower bound estimate of the market value of liberalised spectrum in these bands, as derived from an international benchmarking analysis:

- €20M per 5 MHz band of paired sub-1 GHz spectrum (13 lots available); and
- €10M per 5 MHz band of paired 1800 MHz spectrum (15 lots available).

These minimum prices were used to determine:

- the upfront reserve price for Lots in each spectrum band; and
- the annual Spectrum Usage Fee (SUF) (before indexation) that is to be paid over the duration of a Liberalised Use Licence including these Lots:

|                       | 800 MHz / 900 MHz |              | 1800 MHz     |              |
|-----------------------|-------------------|--------------|--------------|--------------|
|                       | Time Slice 1      | Time Slice 2 | Time Slice 1 | Time Slice 2 |
| Reserve Price per Lot | €2.55M            | €8.26M       | €1.27M       | €4.13M       |
| Annual SUF (before    | €1.08M            | €1.08M       | €0.54M       | €0.54M       |

<sup>21</sup> The GSM 900 MHz and GSM 1800 MHz licences of Meteor Mobile Communications Ltd both expire on 12 July 2015. The GSM 1800 MHz licences of Telefónica O2 Communications (Ireland) Ltd and Vodafone Ireland Limited both expire on 31 December 2014.

<sup>22</sup> Or such other date as may be specified by ComReg.



|             | 800 MHz / 900 MHz |  | 1800 MHz |  |
|-------------|-------------------|--|----------|--|
| indexation) |                   |  |          |  |

The price to be paid by the Winning Bidders is set so that it corresponds to the minimum bid amount which would have led to the same auction result. The auction price therefore effectively corresponds to the amount of the lowest bid which a bidder would have been able to make in order to acquire the frequencies won by that bidder anyway. This removes any incentive to bid strategically, encouraging bidders to disclose their own willingness to pay.

A ‘world first’ was the inclusion of an ‘Early Liberalisation’ option in the Award Process which enabled Existing GSM Licensees to ‘liberalise’ some or all of their existing GSM 900 MHz and 1800 MHz rights in Time Slice 1 by way of open competition alongside cleared spectrum. This feature also ensured a level playing field for existing licensees of spectrum in these bands with different licence expiry dates.

All current mobile network operators obtained spectrum in this auction. Prices paid reflect valuations of packages of spectrum blocks, and so it is not possible to disaggregate prices to reveal valuations for individual blocks or bands. Nevertheless, the auction results obtained, which have been independently verified, reflect a sound competitive dynamic within a robust auction process. The overall revenue raised compares favourably with prices observed recently in other comparable European auctions adjusting for population size.

In total, two of the three Operators availed of their opportunity to liberalise existing spectrum holdings in the first Time Slice:

- Meteor partially liberalised its existing GSM 900 MHz and 1800 MHz rights of use by obtaining one 5 MHz ‘liberalised’ Lot of paired spectrum in the 900 MHz band and one 5 MHz ‘liberalised’ Lot of paired spectrum in the 1800 MHz band;
- Vodafone fully liberalised its existing GSM 1800 MHz rights of use by obtaining three 5 MHz ‘liberalised’ Lots of paired spectrum in the 1800 MHz band; and
- Telefonica chose not to liberalise any of its existing GSM 1800 MHz spectrum rights of use.

#### 4.1 Specialist Auction Advice

DotEcon, a global supplier of design and build services for complex, high-value auctions, advised ComReg on benchmark pricing, the choice of the auction format and associated rules along with the staging of the auction itself. The chosen auction model, a Combinatorial Clock Auction (CCA)<sup>23</sup>, has

<sup>23</sup>The CCA is a price clock-based auction model used to sell multiple items in a single process. It provides bidders with the flexibility to bid on different combinations of spectrum rights across the three bands in response to changes in prices. The CCA format also creates incentives for bidders to bid their full value for the spectrum



previously been used successfully in other countries including Denmark, United Kingdom, the Netherlands, Austria and Switzerland. It was adapted for the specific circumstances of the Irish auction and included some novel features – such as early liberalisation options and sophisticated activity rules – which were used for the first time in a spectrum auction.

The electronic auction system was developed by DotEcon to allow for secure bidding over the internet. This had the advantage that the auction could be held remotely, allowing bidding from Bidder's company headquarters.

## 5 The Liberalised Use Licence

The following are the main licence conditions that will be included in Liberalised Use Licences issued by ComReg on foot of the Award Process:

- a) all Licence holders must attain and maintain a minimum coverage of 70% of the population and to attain this coverage obligation within 3 years;
- b) Licence holders may use spectrum rights in multiple bands to achieve the coverage targets, but at least 50% of the coverage requirement (i.e. 35% of the population) must be met using spectrum rights in the 800 MHz, 900 MHz and/or 1800 MHz bands;
- c) minimum Quality of Service conditions require that network unavailability will be less than 35 minutes per 6 month period and the minimum voice call quality standard will comply with the levels currently set out in Existing GSM Licences;
- d) technical requirements to facilitate the co-existence of services in the 800 MHz, 900 MHz or 1800 MHz bands with services in the same spectrum band or in adjacent spectrum bands; and
- e) compliance with International Memoranda of Understanding ('MoUs') applicable to the spectrum bands.

Trading of spectrum rights attached to Liberalised Use Licences will be permitted. In that regard, ComReg recently set out its proposals on the rules and procedures associated with spectrum trading (see ComReg Document 12/76), and will shortly finalise the rules in the light of the responses received to consultation.

All public documents related to this process are also referenced on a dedicated webpage:  
<http://www.comreg.ie/gsmlib>.



## Annex A: Summary of Timeline

The following provides a summary of the main MBSA milestone and their timeframes.

| Date   | MBSA Activity   |
|--|---|
| 16 March 2012  | <p>Publication of Response to Consultation 12/25 and Decision 04/12.</p> <p>This presented ComReg's response to consultation and decision for holding a competitive award process for individual rights of use in the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands</p>                      |
| 25 May 2012  | <p>Publication of Document 12/52 (the Information Memorandum) on ComReg's website</p> <p>This detailed the final processes and procedures that ComReg would employ in its MBSA process to implement its substantive decisions as set out in Response to Consultation 12/25 and Decision 04/12</p> |
| 8 June 2012  | <p>Auction Workshop - Presentation to Interested Parties on the Award Process and the Auction Rules</p>   |
| 22 June 2012   | <p>Final date for the submission of questions regarding the MBSA process</p>  |
| 6 July 2012  | <p>Publication of Document 12/73 – Questions &amp; Answers and Clarifications on the MBSA process</p>   |
| 20 July 2012   | <p>Final Date for submission of Application Forms to participate in the MBSA</p>  |
| <hr/> <p>Qualification Stage (e.g. assessment of Applications, Circulation of Bidder materials)</p> <p>Series of Mock Auctions with Bidders</p> <p>The Main Stage – i.e. running of the Auction via the Electronic Auction System to determine who wins what spectrum rights. This consisted of</p> <ul style="list-style-type: none"> <li>• Primary Bid Rounds; and</li> <li>• a Supplementary Bids Round</li> </ul> <p>The Assignment Round. This provisionally determines the spectrum assignment locations of the Winning Bidders and Existing GSM Licensees within the bands in which they have won spectrum rights of use.</p> <hr/> |   |
| 15 November 2012   | <p>Public Announcement of the Main Stage and Assignment Round results.</p>  |



## **Annex B: Additional Features of the MBSA process**

Aside from the key features as discussed in the section 6 above, below are a number of additional features included in the MBSA process adopted by ComReg.

Within the Assignment Stage of the MBSA process, and following the Assignment Round, a two-week “negotiation phase” has been included to allow winning bidders and existing GSM licensees the opportunity of agreeing among themselves alternative spectrum assignments to those provisionally determined by the Assignment Round.

‘Advanced Commencement’ provisions are included in relation to commencement date of Liberalised Use Licences in Time Slice 1, potentially allowing earlier use, on a liberalised basis, of the spectrum-use rights won in the award process, subject to certain conditions.

‘Preparatory Licences’ may also be acquired by Winning Bidders to enable them to prepare their respective networks in advance of the commencement of their liberalised rights of use.

‘Transitional Arrangements’ are included to address the activities required by the existing network operators to adjust their networks to the new spectrum assignments as determined in this award process. The availability of Lots in the 900 MHz and 1800 MHz bands is subject to the completion of Transition activities to allow the Existing GSM Licensees in these bands. i.e. to adjust or “relocate” their respective networks to the new spectrum assignments determined by the Auction. This is likely to take a few months and is being progressed in accordance with section 3.8 of the Information Memorandum (ComReg Document 12/52).



## Annex C: Advanced Mobile Technologies

In Ireland GSM services and enhanced GSM services (such as GPRS and EDGE) are currently provided in the 900 MHz and 1800 MHz bands via Existing GSM Licences.

UMTS, HSPA<sup>24</sup> and, HSPA+ services are provided in the 2100 MHz band via Existing 3G Licences.

In view of the rapid increase in global mobile data traffic, advanced mobile technologies with increased data rates and transmission capacities have been developed and these have been deployed in a number of countries.

The advanced mobile technologies include:

### **A. HSPA+ (Evolved High Speed Packet Access)**

Market-ready devices which support this standard are available today. The standard allows:

- a doubling of voice capacity and a tripling of data capacity on the existing UMTS networks;
- a doubling of the data rate from the network to the mobile device and vice versa, compared to the existing HSPA;
- a reduction in network costs thanks to purely packet-switched transmission of voice and data; and
- migration of networks to LTE.

### **B. LTE technology (Long Term Evolution of UMTS)**

LTE is a step further in the evolution of UMTS which has a completely new air interface.

Characteristics of LTE are:

- 3 to 4 times higher spectrum efficiency than UMTS/HSPA (High Speed Packet Access) – at relatively low network costs (i.e. lower costs per transmitted bit);
- a significant increase in data rates on the downlink, up to 100 Mbps, and up to 50 Mbit/s on the uplink with a 20 MHz channel bandwidth; and
- flexible channel bandwidths of 1.4 MHz, 2.5 MHz, 5 MHz, 10 MHz, 15 MHz and 20 MHz, allowing the smallest possible fragmentation of the frequency bands.

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<sup>24</sup> HSPA (High Speed Packet Access) is an evolution of UMTS for the provision of higher data rates from the network to a mobile terminal and vice versa.



## Annex D: Provisional Frequency Assignments

| 800MHz in Time Slice 1      |                             |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| A<br>791-785MHz<br>Meteor   | B<br>796-801MHz<br>Meteor   | C<br>801-806MHz<br>O2       | D<br>806-811MHz<br>O2       |
| E<br>811-816MHz<br>Vodafone | F<br>816-821MHz<br>Vodafone | G<br>821-826MHz<br>Vodafone | H<br>826-831MHz<br>Vodafone |
| I<br>831-837MHz<br>Meteor   | J<br>837-842MHz<br>Meteor   | K<br>842-847MHz<br>O2       | L<br>847-852MHz<br>O2       |
| M<br>852-857MHz<br>Vodafone | N<br>857-862MHz<br>Vodafone | O<br>862-867MHz<br>Vodafone | P<br>867-872MHz<br>Vodafone |

| 800MHz in Time Slice 2      |                             |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| A<br>791-785MHz<br>Meteor   | B<br>796-801MHz<br>Meteor   | C<br>801-806MHz<br>O2       | D<br>806-811MHz<br>O2       |
| E<br>811-816MHz<br>Vodafone | F<br>816-821MHz<br>Vodafone | G<br>821-826MHz<br>Vodafone | H<br>826-831MHz<br>Vodafone |
| I<br>831-837MHz<br>Meteor   | J<br>837-842MHz<br>Meteor   | K<br>842-847MHz<br>O2       | L<br>847-852MHz<br>O2       |
| M<br>852-857MHz<br>Vodafone | N<br>857-862MHz<br>Vodafone | O<br>862-867MHz<br>Vodafone | P<br>867-872MHz<br>Vodafone |

| 900MHz in Time Slice 1      |                             |                        |                        |
|-----------------------------|-----------------------------|------------------------|------------------------|
| A<br>883-888MHz<br>Meteor   | B<br>893-898MHz<br>Meteor   | C<br>898-903MHz<br>O2  | D<br>903-908MHz<br>O2  |
| E<br>908-913MHz<br>Vodafone | F<br>913-918MHz<br>Vodafone | G<br>918-923MHz<br>H3G | H<br>923-928MHz<br>H3G |
| I<br>928-933MHz<br>H3G      | J<br>933-938MHz<br>H3G      | K<br>938-943MHz<br>H3G | L<br>943-948MHz<br>H3G |
| M<br>948-953MHz<br>H3G      | N<br>953-958MHz<br>H3G      | O<br>958-963MHz<br>H3G | P<br>963-968MHz<br>H3G |

| 900MHz in Time Slice 2      |                             |                        |                        |
|-----------------------------|-----------------------------|------------------------|------------------------|
| A<br>883-888MHz<br>Meteor   | B<br>893-898MHz<br>Meteor   | C<br>898-903MHz<br>O2  | D<br>903-908MHz<br>O2  |
| E<br>908-913MHz<br>Vodafone | F<br>913-918MHz<br>Vodafone | G<br>918-923MHz<br>H3G | H<br>923-928MHz<br>H3G |
| I<br>928-933MHz<br>H3G      | J<br>933-938MHz<br>H3G      | K<br>938-943MHz<br>H3G | L<br>943-948MHz<br>H3G |
| M<br>948-953MHz<br>H3G      | N<br>953-958MHz<br>H3G      | O<br>958-963MHz<br>H3G | P<br>963-968MHz<br>H3G |

| 1.8GHz in Time Slice 1      |                             |                             |                             |                                |                           |                           |                               |                           |                           |                           |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|---------------------------|---------------------------|-------------------------------|---------------------------|---------------------------|---------------------------|
| A<br>1710-1715MHz<br>O2     | B<br>1715-1720MHz<br>O2     | C<br>1720-1725MHz<br>O2     | D<br>1725-1730MHz<br>O2     | E<br>1730-1735MHz<br>H3G       | F<br>1735-1740MHz<br>H3G  | G<br>1740-1745MHz<br>H3G  | H<br>1745-1750MHz<br>Vodafone | I<br>1750-1755MHz<br>H3G  | J<br>1755-1760MHz<br>H3G  | K<br>1760-1765MHz<br>H3G  |
| L<br>1765-1770MHz<br>Meteor | M<br>1770-1775MHz<br>Meteor | N<br>1775-1780MHz<br>Meteor | O<br>1780-1785MHz<br>Meteor | P<br>1785-1790MHz<br>H3G       | Q<br>1790-1795MHz<br>H3G  | R<br>1795-1800MHz<br>H3G  | S<br>1800-1805MHz<br>H3G      | T<br>1805-1810MHz<br>H3G  | U<br>1810-1815MHz<br>H3G  | V<br>1815-1820MHz<br>H3G  |
| W<br>1820-1825MHz<br>H3G    | X<br>1825-1830MHz<br>H3G    | Y<br>1830-1835MHz<br>H3G    | Z<br>1835-1840MHz<br>H3G    | AA<br>1840-1845MHz<br>Vodafone | AB<br>1845-1850MHz<br>H3G | AC<br>1850-1855MHz<br>H3G | AD<br>1855-1860MHz<br>H3G     | AE<br>1860-1865MHz<br>H3G | AF<br>1865-1870MHz<br>H3G | AG<br>1870-1875MHz<br>H3G |

| 1.8GHz in Time Slice 2      |                             |                             |                             |                                |                           |                           |                               |                           |                           |                           |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|---------------------------|---------------------------|-------------------------------|---------------------------|---------------------------|---------------------------|
| A<br>1710-1715MHz<br>O2     | B<br>1715-1720MHz<br>O2     | C<br>1720-1725MHz<br>O2     | D<br>1725-1730MHz<br>O2     | E<br>1730-1735MHz<br>H3G       | F<br>1735-1740MHz<br>H3G  | G<br>1740-1745MHz<br>H3G  | H<br>1745-1750MHz<br>Vodafone | I<br>1750-1755MHz<br>H3G  | J<br>1755-1760MHz<br>H3G  | K<br>1760-1765MHz<br>H3G  |
| L<br>1765-1770MHz<br>Meteor | M<br>1770-1775MHz<br>Meteor | N<br>1775-1780MHz<br>Meteor | O<br>1780-1785MHz<br>Meteor | P<br>1785-1790MHz<br>H3G       | Q<br>1790-1795MHz<br>H3G  | R<br>1795-1800MHz<br>H3G  | S<br>1800-1805MHz<br>H3G      | T<br>1805-1810MHz<br>H3G  | U<br>1810-1815MHz<br>H3G  | V<br>1815-1820MHz<br>H3G  |
| W<br>1820-1825MHz<br>H3G    | X<br>1825-1830MHz<br>H3G    | Y<br>1830-1835MHz<br>H3G    | Z<br>1835-1840MHz<br>H3G    | AA<br>1840-1845MHz<br>Vodafone | AB<br>1845-1850MHz<br>H3G | AC<br>1850-1855MHz<br>H3G | AD<br>1855-1860MHz<br>H3G     | AE<br>1860-1865MHz<br>H3G | AF<br>1865-1870MHz<br>H3G | AG<br>1870-1875MHz<br>H3G |

Ends./



## **2 Media Announcement Presentation**



## Results of ComReg's Multi-Band Spectrum Auction

15 November 2012

*Alex Chisholm – Chairperson*



### Background

- ComReg commenced the auction process on 25 May 2012 with the publication of its Information Memorandum (Document 12/52).
- Individual spectrum rights of use in 3 key bands –the 800 MHz, 900 MHz and 1800 MHz spectrum bands - available in the Auction.
- Spectrum in the 800 MHz band became available for release following Digital Switchover (the 'Digital Dividend').
- Existing GSM rights of use in the 900 MHz and 1800 MHz bands expire over the next 3 years. This spectrum together with unreleased spectrum was made available in the Auction.
- European legislation harmonised use of the 3 bands for the provision of terrestrial systems capable of providing electronic communication services in the EU.
- A 'world first' was the inclusion of an 'Early Liberalisation' option in the Award Process which enabled Existing GSM Licensees to 'liberalise' some or all of their existing GSM 900 MHz and 1800 MHz rights in Time Slice 1 by way of open competition alongside cleared spectrum.

## The Auction

- Lots in the three bands were auctioned simultaneously which allowed for package bidding.
- To accommodate the liberalisation of existing GSM rights of use in the 900 MHz and 1800 MHz bands, spectrum rights in each of the three bands were auctioned across two time periods (or 'Time Slices') with all rights of use coming to an end on 12 July 2030.
- The Auction involved a number of stages, including an application stage, a qualification stage, a main stage, an assignment stage and a notification and grant stage.
- The main stage – which comprised a combinatorial clock auction - determined who won what Lots and the assignment stage determined the location of these Lots within each spectrum band.

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## The Auction

- To safeguard competition, competition caps were placed on the amount of Lots that Bidders could acquire.
- To promote efficient spectrum use, the following minimum prices were applied in the Auction, based on a conservative lower bound estimate of the market value of liberalised spectrum derived from an international benchmarking analysis:
  - €20M per Lot of paired sub-1 GHz spectrum (13 lots available);
  - €10M per Lot of paired 1800 MHz spectrum (15 lots available); and
  - Each Lot in each band comprised 2 × 5 MHz.
- Competition in the Auction led to all winners paying above these minimum prices.
- These minimum prices were used to determine :
  - upfront reserve price for the Auction; and
  - the Annual Spectrum Usage Fee (SUF) (before indexation) that applies over the duration of the spectrum rights of use.
- ComReg implemented robust confidentiality measures to ensure the integrity of the auction process and to protect participants.

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## The Licences

- **The following are the main licence conditions applicable to the rights of use awarded:**
  - liberalised use for any suitable technology or service;
  - attain and maintain minimum coverage of 70% of population within 3 years;
  - at least 50% of this coverage requirement (i.e. 35% of the population) must be met using spectrum rights in the 800 MHz, 900 MHz and/or 1800 MHz bands;
  - minimum quality of service conditions which require that network unavailability will be less than 35 minutes per 6 month period and minimum voice call quality standard will comply with levels currently set out in existing GSM licences;
  - technical requirements to facilitate the co-existence of services in the 800 MHz, 900 MHz or 1800 MHz bands with services in the same spectrum band or in adjacent spectrum bands;
  - compliance with International Memoranda of Understanding relevant to the three spectrum bands; and
  - trading of spectrum rights will be permitted in these frequency bands.

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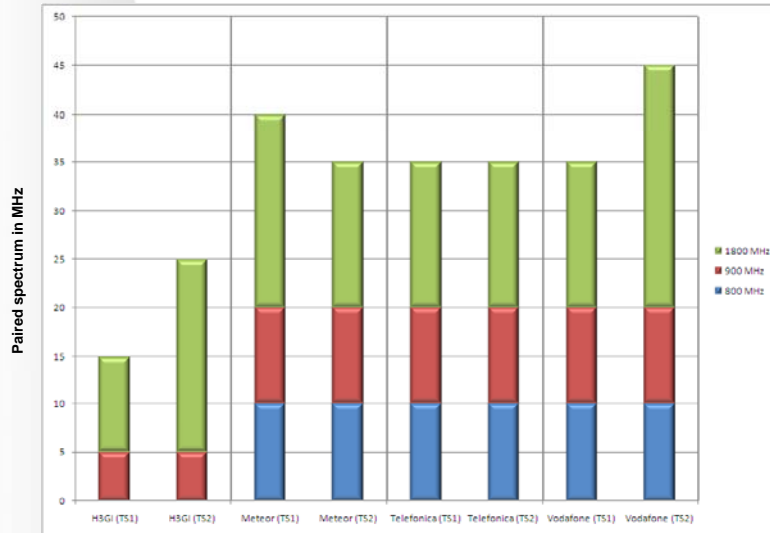
## Result of Multi-Band Spectrum Auction 2012

| Frequency Band | Licence Period                         | Hutchison 3G Ireland Ltd | Meteor Mobile Communications Ltd | Telefonica Ireland Ltd. | Vodafone Ireland Ltd. |
|----------------|--|--------------------------|----------------------------------|-------------------------|-----------------------|
| 800 MHz        | 2013 – 2015                            | -                        | 2 × 10 MHz                       | 2 × 10 MHz              | 2 × 10 MHz            |
|                | 2015 – 2030                            | -                        | 2 × 10 MHz                       | 2 × 10 MHz              | 2 × 10 MHz            |
| 900 MHz        | 2013 – 2015                            | 2 × 5 MHz                | 2 × 5 MHz                        | 2 × 10 MHz              | 2 × 10 MHz            |
|                | 2015 – 2030                            | 2 × 5 MHz                | 2 × 10 MHz                       | 2 × 10 MHz              | 2 × 10 MHz            |
| 1800 MHz       | 2013 – 2015                            | 2 × 10 MHz               | 2 × 10 MHz                       | -                       | 2 × 15 MHz            |
|                | 2015 – 2030                            | 2 × 20 MHz               | 2 × 15 MHz                       | 2 × 15 MHz              | 2 × 25 MHz            |
|                | Final Upfront Fee (€ million)*         | €51.14 m                 | €144.78 m                        | €124.93 m               | €160.85 m             |
|                | Total Annual Spectrum Usage Fees (€)** | €53.87 m                 | €99.64 m                         | €99.64 m                | €119.79 m             |
|                | <b>Total</b>                           | <b>€854.64 million</b>   |                                  |                         |                       |

\*Final Auction price is contingent on any Licence fee refunds or adjustments in respect of delayed commencement arising from Transition, Relocation Rebates, Early Liberalisation Rebates and any advanced commencement fees that may be due. The amounts will be finalised over the course of the transition process. All figures rounded.

\*\* Annual Usage Fees will be subject to Indexation. All figures rounded.

## Spectrum Holdings in the MBSA Bands



Combines the results of the MBSA process with existing unliberalised holdings in the bands.

## Conclusions

- Auction process has produced a competitive, fair and efficient outcome.
- The value placed on this spectrum by Winning Bidders reveals the competitive nature of the market and expresses confidence in the Irish mobile communications market.
- Doubling of spectrum assigned across these three key bands provides the opportunity for the winners to provide faster mobile broadband and other potential consumer benefits from 2013.
- The outcome of this award process provides regulatory certainty for winners of spectrum rights of use in these three bands which are now licensed until 2030.



Commission for  
**Communications Regulation**

## **Results of ComReg's Multi-Band Spectrum Auction**

**15 November 2012**

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