Award of Spectrum in the 800 and 2600 MHz bands

A consultation issued by the Telecommunications Regulatory Authority

14 August 2018

Ref: TOD/0818/006

Purpose: to outline options for the proposed award of spectrum in the 800 and 2600 MHz bands for the holders of Individual Mobile Telecommunications Licences.
Legal disclaimer

This Consultation is not a binding legal document and also does not contain legal, commercial, financial, technical or other advice. The Telecommunications Regulatory Authority is not bound by it, nor does it necessarily set out the Authority’s final or definitive position on particular matters. To the extent that there might be any inconsistency between the contents of this document and the due exercise by it of its functions and powers, and the carrying out by it of its duties and the achievement of relevant objectives under law, such contents are without prejudice to the legal position of the Authority. Inappropriate reliance ought not therefore to be placed on the contents of this document.
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Instructions for submitting a response

1. The Telecommunications Regulatory Authority ('the Authority') invites comments on this consultation document from all interested parties and, in particular, the holders of Individual Mobile Telecommunications Licences in the Kingdom of Bahrain.

2. Comments should be submitted no later than 4pm on 13/09/2018.

3. Responses should be sent to the Authority preferably by email (or by fax or post) to the attention of:

   Technical & Operations Director
   spectrum-rfp@tra.org.bh
   Telecommunications Regulatory Authority
   P.O. Box 10353, Manama, Kingdom of Bahrain
   Fax: +973 1753 2125

4. Responses should include:
   a. the name of the company/institution/association etc.;
   b. the name of the principal contact person;
   c. full contact details (physical address, telephone number, fax number and e-mail address); and
   d. in the case of responses from individual consumers, name and contact details.

5. The Authority expects respondents to provide a response to the questions raised throughout this consultation document (the consolidated list of questions can be found in Annex A of this document). The Authority also invites respondents to substantiate their responses, wherever possible by providing factual evidence to support the responses.

6. In the interest of transparency, the Authority intends to make all submissions received available to the public. The Authority will evaluate a request for confidentiality in line with relevant legal provisions and the Authority’s published guidance on the treatment of confidential and non-confidential information.¹

7. Respondents are required to mark clearly any information included in their submission that is considered confidential. Where such confidential information is included, respondents are required to provide both a confidential and a non-confidential version of their submission. If a part or a whole submission is marked confidential, reasons should be provided. The Authority may publish or refrain from publishing any document or submission at its sole discretion.

8. Once the Authority has received and considered responses to this consultative document, it will publish a public consultation report on its website with a general review of the responses received, as well as the Authority's decision and the reasoning thereof.
List of acronyms and definitions

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>Telecommunications Regulatory Authority of the Kingdom of Bahrain</td>
</tr>
<tr>
<td>Authorized Third Parties</td>
<td>The persons and entities mentioned in paragraph 83 of this Consultation Document</td>
</tr>
<tr>
<td>Batelco</td>
<td>Bahrain Telecommunications Company B.S.C</td>
</tr>
<tr>
<td>BHD</td>
<td>Bahraini Dinar</td>
</tr>
<tr>
<td>Bid amount</td>
<td>The parameter in a bid that specifies the price that an Eligible Bidder offers to pay for the lots included in the bid package</td>
</tr>
<tr>
<td>Bid package</td>
<td>The parameters in a bid that specify the number of lots in each lot category included in the set of lots for which the Eligible Bidder offers to pay the bid amount</td>
</tr>
<tr>
<td>Eligible Bidders</td>
<td>The three holders of an IMTL in the Kingdom of Bahrain</td>
</tr>
<tr>
<td>FDD</td>
<td>Frequency Division Duplex</td>
</tr>
<tr>
<td>Frequency block</td>
<td>A frequency range offered in the auction, which will include 2×5 MHz of paired spectrum for spectrum offered for FDD use, or 10 MHz of unpaired spectrum for spectrum offered for TDD use</td>
</tr>
<tr>
<td>GCC countries</td>
<td>Gulf Cooperation Council countries</td>
</tr>
<tr>
<td>IMTL</td>
<td>Individual Mobile Telecommunications Licence</td>
</tr>
<tr>
<td>KSA</td>
<td>Kingdom of Saudi Arabia</td>
</tr>
<tr>
<td>Lot</td>
<td>An item offered in the auction, consisting of a frequency block of a determined bandwidth within a given frequency range</td>
</tr>
<tr>
<td>Lot categories</td>
<td>Groups of lots of similar value.</td>
</tr>
<tr>
<td>MNO</td>
<td>Mobile Network Operator</td>
</tr>
<tr>
<td>NTP4</td>
<td>Fourth National Telecommunications Plan(^2)</td>
</tr>
<tr>
<td>Release Bands</td>
<td>The spectrum to be awarded</td>
</tr>
<tr>
<td>TDD</td>
<td>Time Division Duplex</td>
</tr>
<tr>
<td>Telecommunications Law of the Kingdom of Bahrain, promulgated by Legislative Decree No. 48 of 2002</td>
<td></td>
</tr>
<tr>
<td>VIVA</td>
<td>VIVA Bahrain B.S.C</td>
</tr>
<tr>
<td>Zain</td>
<td>Zain Bahrain B.S.C</td>
</tr>
</tbody>
</table>

1 Executive Summary

9. As confirmed by the NTP4 of the Kingdom of Bahrain, demand for spectrum for the provision of mobile broadband services is growing at a rapid pace. It is therefore necessary for the Government to release and allocate new frequencies for use in offering mobile telecommunications services, and for the Authority to allot and assign these frequencies as and when appropriate.

10. In addition, the three MNOs in the Kingdom of Bahrain have asked the Authority to release additional spectrum in order for them to ensure better quality of services, which will enhance customers’ experience.

11. In line with the NTP4 and given the current structure of mobile market, the Authority is not to issue an IMTL to any new applicants during the period covered by the NTP4, as long as there are no significant changes in the structure of the market.

12. The Authority is required by the Telecommunications Law to act in a manner consistent with the objectives of the National Telecommunications Plan, and promote effective and fair competition among new and existing Licensed Operators and protect the interests of subscribers and end-users. In line with these obligations, the Authority, through this consultation document, seeks comments on its proposals for the award of spectrum to IMTL holders.

13. The spectrum to be awarded (in the “Release Bands”) includes:
   a. 60 MHz in the 800 MHz band (791–821 MHz and 832–862 MHz), available as 2×30 MHz of paired spectrum; and
   b. 140 MHz in the 2600 MHz band (2500 – 2570 MHz and 2620 – 2690 MHz), which can be offered as paired or unpaired spectrum.

14. The Authority intends to award the spectrum licences through an auction procedure, based on the provisions of the recently introduced Article 44(f) of the Telecommunications Law. In an auction, the distribution of spectrum is determined by the bids made for different portfolios by Eligible Bidders.

15. An auction process is consistent with international best practice and provides a transparent and non-discriminatory mechanism for determining how to distribute the available spectrum amongst applicants, and the fees to be paid for licences. As the auction process distributes the available lots amongst bidder on the basis of their willingness to pay for different portfolios, it can improve efficiency – and thus welfare – relative to an administrative award in which applicants are given a predefined package, in particular if bidders have materially different preferences.

16. The provisional timetable for the award envisages 13/09/2018 as the deadline for the submission of responses to this consultation, and the period for interested parties to make their applications for spectrum licences would run from 11/11/2018 to 15/11/2018. Further details about the provisional timetable for the award are provided in the document.

17. The Release Bands, once awarded, may be used solely for the purposes of the services provided under the assignees’ IMTL in place. Each of the spectrum assignees will be granted a Frequency Licence for the new spectrum. The licence conditions will be similar,
Award of Spectrum in the 800 and 2600 MHz bands

in most material respects, to those of the Frequency Licences associated with IMTL currently held by the three MNOs, also including their duration and renewal terms.

18. The Authority proposes to award spectrum in both bands as paired spectrum for FDD use. Following this approach, the Authority proposes to divide the 800 MHz band into six blocks of 2×5 MHz, and the 2600 MHz into fourteen blocks of 2×5 MHz. Further details are provided below.

19. As regards the 2600 MHz band, the Authority’s preference for FDD use can be revisited if MNOs express a clear preference for unpaired, i.e. TDD in that band. If the band were to be used for TDD, then the available spectrum in that band could be offered unpaired.

20. The 800 MHz and the 2600 MHz bands are both used in the Kingdom of Saudi Arabia and in the State of Qatar. It is incumbent upon the MNOs to investigate and assess the implications, if any, of any such cross-border interference issues that could affect their operations and, potentially, the value of the spectrum bands for which they wish to apply.

21. The Authority intends to offer all the Release Bands in a sealed-bid, first-price, combinatorial auction, in which only the Eligible Bidders will be allowed to participate.

22. The spectrum blocks defined in each band will be grouped into Lot categories. Eligible Bidders will not be able to make bids for specific frequencies, but only for frequency-generic lots. Once the Authority has established the assignment of frequency-generic lots, it will assign specific frequencies in relation to the lots assigned with a view to minimise fragmentation of spectrum holdings.

23. There will be at least two lot categories, in order to differentiate between blocks in the 800 MHz band and the 2600 MHz band. The Authority may further differentiate between blocks within a band if there is a consensus view amongst respondents that some frequencies in a band are more valuable than others, and that the value difference is so large that it outweighs the benefits of contiguous (rather than fragmented) assignment of blocks within a band. The Authority is seeking views with respect to this possible differentiation.

24. A highly asymmetric outcome in this award could affect the long-term viability of the three mobile operators. Such an outcome would not be aligned with the objective to mitigate regulatory uncertainty in order to promote competition and long-term investment. As discussed below, the Authority proposes to mitigate the risk of highly asymmetric outcomes by adopting spectrum caps to ensure that:

a. no single bidder can acquire more than half of the available spectrum in the 800 MHz band;

b. no single bidder can acquire more than 2×50 MHz in the 2600 MHz band (or more than 100 MHz in the 2600 MHz band if this band is offered as unpaired frequency blocks);

c. each bidder who bids for spectrum in the 800 MHz band is guaranteed to be able to acquire at least 2×5 MHz in this band; and

d. each bidder who bids for two or more lots of spectrum in the 2600 MHz band is guaranteed to be able to acquire at least 2×10 MHz in this band (or 20 MHz if this band is offered as unpaired frequency blocks).

25. The Authority has set reserve prices with reference to its expectation of the price at which licences would be sold in a competitive process, based on international benchmarks of the
price at which similar licences have sold in other jurisdictions. This approach is aligned with the guidelines set out in NTP4, according to which the revenue from the sale of spectrum should reflect the value of the spectrum. However, reserve prices are below expected competitive prices in order to reduce the risk of choking off demand. Specifically, the Authority has set the following reserve prices:

a. 1,226,000 BHD for each 2×5 MHz block in the 800 MHz band; and
b. 166,000 BHD for each 2×5 MHz or 10 MHz block in the 2600 MHz band.

26. Eligible Bidders can make multiple, alternative offers for combinations of lots (‘package’). If an Eligible Bidder is assigned a package it has bid for it will be required to pay the amount of its bid. Alternatively, an Eligible Bidder may be assigned fewer lots than it has bid for, at reserve.

27. The Authority will assign the available lots with a view to maximising the value from the spectrum, subject to satisfying the spectrum caps.

28. As part of their application, Eligible Bidders will be allowed to express their preferred placement within each frequency band. In order to assign specific frequencies, the Authority will try to satisfy the preferences expressed by Eligible Bidders, starting with those who are required to pay a higher price.
2 Introduction

29. This consultation document sets out, for comment by interested parties, the available options and the Authority’s preliminary preferences for the award of spectrum in the 800 and 2600 MHz bands to the holders of IMTL in the Kingdom of Bahrain.

30. The spectrum to be awarded (the “Release Bands”) includes:

   a. 60 MHz in the 800 MHz band (791-821 MHz and 832-862 MHz), available as 2×30 MHz of paired spectrum; and

   b. 140 MHz in the 2600 MHz band (2500 – 2570 MHz and 2620 – 2690 MHz).

31. The remainder of this consultation document includes details on the relevant legal framework (Section 3), information on the Release Bands (Section 4), a description of the proposed auction and licence award process (Section 5), a list of all the questions formulated in the document (Annex A), a template for the frequency licences to be awarded (Annex B) and a template application form (Annex C).
3 Legal framework

32. The Telecommunications Law provided for the liberalization of the sector and established the Authority as an independent regulatory body with responsibility for overseeing the sector. In accordance with the provisions of the Telecommunications Law, the Authority has a direct role in promoting competition and administering the grant of Telecommunications Licences and Frequency Licences.

33. Article 3 of the Telecommunications Law describes the duties and powers of the Authority, including the requirement for the Authority, when carrying out its duties, to do so in a non-discriminatory and transparent manner and in the way best calculated to:

   a. protect the interests of subscribers and users;
   b. promote effective and fair competition; and
   c. ensure, when assessing applications involving provisions of Public Telecommunications Services, that any applicant, or any person who is assigned the responsibility of provisions of such services, will be capable of providing that service.

34. Article 15 of the Telecommunications Law requires the Minister with responsibility for the Telecommunications sector to publish, periodically, the National Telecommunications Plans approved by the Council of Ministers. Pursuant to this Article, NTP4 was issued on 8 May 2016 and was promulgated as Resolution 29 of 2016 of the Council of Ministers.

35. Article 3(e) of the Telecommunications Law further requires the Authority in the fulfilment of its duties and the exercise of its power to act “in a manner that is consistent with the objectives of the National Plan for Telecommunications; provided that this shall not be construed to derogate from the independence of the Authority in accordance with the provisions of this Law”.

36. Paragraph 28 of the NTP4 provides that, given the current structure of the market, and subject to the exception set out in paragraph 28(b), the Authority is not to issue an individual mobile telecommunications licence to any new applicants during the period covered by the NTP4.

37. NTP4 also comments that the demand for spectrum for the provision of mobile broadband services is growing at a rapid pace and it will be therefore

   “necessary for the Government to release and allocate new frequencies for use in offering mobile telecommunications services and for the Authority to allot and assign these frequencies pursuant to Article 42 of the Telecommunications Law as and when appropriate.”

38. Accordingly, the Authority, in consultation with the Government, must ensure

   “that the award of the required spectrum for commercial telecommunications services is in line with international best practices. The award shall be carried out in a manner, and pursuant

\^3 NTP4, paragraph 29.
to a timetable, that supports the efficient use of spectrum, the development of advanced mobile technologies, sustainable competition and Government's objectives for the sector, whilst taking into account the priority placed by Government on the roll-out and uptake of fibre services. Additionally, Government requires that Bahrain directly benefit financially from any spectrum award, at levels that properly reflect the value of this scarce national resource.\textsuperscript{4}

39. The Telecommunications Law was very recently amended through Decree Law No (38) of 2017. Its third article adds, among other provisions, a new paragraph (f) to Article 44 (‘Grant of a Frequency Licence’), which provides that

\textquote{Without prejudice to the foregoing, the Authority may, with the approval of the Council of Ministers, hold an auction for the grant of Frequency Licences in accordance with rules and procedures issued by the Authority. Such auction shall be announced in such manner as the Authority deems appropriate at least thirty days prior to the date of holding such auction.}\textsuperscript{5}

40. This provision will be relied upon by the Authority for the award of the Release Bands through the auction procedure announced through this document and described in its Section 5.

41. An auction process is consistent with international best practice and provides a transparent and non-discriminatory mechanism for determining how to distribute the available spectrum amongst applicants, and the fees to be paid for licences. As the auction process distributes the available lots amongst bidder on the basis of their willingness to pay for different portfolios, it can improve efficiency – and thus welfare – relative to an administrative award in which applicants are given a predefined package, in particular if bidders have materially different preferences.

42. This is of particular relevance in this award, as the use of frequencies in neighbouring countries varies across the different frequency blocks in each band and, as a result, valuations could also vary across different blocks, and in turn valuation differences could vary across bidders. An auction process will allow bidders to express their preferences and priorities across different types of spectrum (for example between 800 MHz and 2600 MHz, or between the lower and higher part of the 2600 MHz band) and between additional spectrum and prices.

\textsuperscript{4} NTP4, paragraph 31.

Q1. Please set out if you agree with the Authority’s proposed award process. If you disagree with any elements please explain why and set out alternative proposals which you believe will better meet the objectives of the Fourth NTP.
4 Provisional timetable

43. The provisional timetable for the award is as follows:

- 14/08/2018: publication of this consultation document;
- 13/09/2018: deadline for submission of responses to this consultation document;
- 08/10/2018: publication of the Authority’s report of the responses received to this consultation document and the Authority’s decision and the Invitation for Applications;
- 07/11/2018: Council of Ministers approval to hold an auction for the grant of the Frequency Licences;
- 08/11/2018: information session for interested parties;
- 11/11/2018: start of period for submission of applications;
- 15/11/2018: deadline for submission of applications; and

This timetable is indicative only, and subject to change if the Authority considers this appropriate.
5 Information on the Release Bands

5.1 Existing spectrum assignments and spectrum needs

44. The three MNOs operating in the Kingdom namely (Batelco, Zain and VIVA) have been assigned FDD\(^6\) spectrum in the 900 MHz, 1800 MHz and 2100 MHz bands. In line with the obligations set out in the MNOs’ Frequency Licences, this spectrum may be used only for the purposes of each MNO’s IMTL.

45. As the table below shows, the three MNOs have similar amounts of FDD spectrum in these three frequency bands:

<table>
<thead>
<tr>
<th>MHz (downlink + uplink) per operator and band</th>
<th>900 MHz</th>
<th>1800 MHz</th>
<th>2100 MHz</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batelco</td>
<td>23.6</td>
<td>50.0</td>
<td>40.0</td>
<td>113.6</td>
</tr>
<tr>
<td>Zain</td>
<td>24.0</td>
<td>50.0</td>
<td>40.0</td>
<td>114</td>
</tr>
<tr>
<td>VIVA</td>
<td>22.4</td>
<td>50.0</td>
<td>40.0</td>
<td>112.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>70.0</td>
<td>150.0</td>
<td>120.0</td>
<td>340.0</td>
</tr>
</tbody>
</table>

46. Primarily as a result of the rapid growth of mobile data traffic, the spectrum currently assigned to MNOs is now insufficient. Solutions such as the re-farming of existing spectrum assignments or the offloading of traffic between different communications technologies used by the MNOs (2G, 3G and 4G) are temporary in nature and cannot address expected spectrum needs, which are bound to increase with the introduction of advanced wireless technologies. Moreover, the information available to the Authority suggests that spectrum scarcity is most likely impeding MNOs’ network operations already.

47. MNOs have asked the Authority to release additional spectrum, in order for them to ensure better quality of service, which will enhance customer experience.

Q2. Do you agree with the Authority’s views on the need for the award of additional spectrum and the expected benefits?

5.2 Release Bands and conditions of use

48. The spectrum available in the Release Bands include:

\(^6\) Frequency Division Duplex – the de facto standard duplex mechanism used for mobile communications. FDD separates uplink and downlink traffic by using two spectrum channels (one from each paired band).
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a. 60 MHz in the 800 MHz band (791-821 MHz and 832-862 MHz), available as 2×30 MHz of paired spectrum; and

b. 140 MHz in the 2600 MHz band (2500 – 2570 MHz and 2620 – 2690 MHz).

49. In line with the Authority’s regulatory framework in force today and the provisions of existing Frequency Licences, the Release Bands, once awarded, may be used solely for the purposes of the services provided under the assignees’ IMTL in place, with any of the mobile technologies they use (2G, 3G, 4G or, in the future, 5G). In view of this condition and the policy principles set out in NTP4 and mentioned above, the spectrum available will only be offered to the three current holders of IMTL in Bahrain.

50. Each of the spectrum assignees will be granted a Frequency Licence for the new spectrum. The licence conditions will be similar, in all material respects, to currently held by the three MNOs, also including their duration and renewal terms (but obviously not the effective date). A template of the new Frequency Licence is attached as Annex B.

51. The Authority proposes to award spectrum in both bands as paired spectrum, in 2×5 MHz blocks. The block size of 2×5 MHz is aligned with international practice.

52. The 800 MHz band will be divided into six paired frequency blocks of 2×5 MHz, as shown in the figure below.

Figure 1: Paired frequency blocks in the 800 MHz band

53. The 2600 MHz band will be divided into fourteen paired frequency blocks of 2×5 MHz, as shown in the figure below.

Figure 2: Paired frequency blocks in the 2600 MHz band

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7 See paragraph 36.

8 Many countries have adopted this approach, including for instance Iceland, Italy, Poland, Portugal, Serbia, Slovakia, Spain, Sweden, Turkey and the United Kingdom. From a technical perspective this is appropriate, as offering the spectrum in 2×10 MHz blocks instead of 2×5 MHz blocks does provide relevant improvement in spectral efficiency, whilst the smaller block size provides greater flexibility with respect to the possible assignments, allowing bidders to compete at the margin for additional blocks according to their specific needs.
54. The Authority’s preference for the award of paired frequency blocks in both bands is not irreversible as regards the 2600 MHz band. It can be revisited if, in the response to this consultation, MNOs express a clear preference for unpaired spectrum in the 2600 MHz band. However, the operators concerned must be aware that if such a change is to be adopted it will also require adjustments to the proposed auction that will delay the overall spectrum award process.

55. The 800 MHz and the 2600 MHz bands are both used in the Kingdom of Saudi Arabia and in the State of Qatar. These bands are not among those covered by the multilateral arrangement concluded between Bahrain and a number of neighbouring countries to control cross border spillover and harmful interference.

56. The use of these bands by these two neighbouring countries may thus result in cross-border spillover and interference until a bilateral or multilateral agreement is reached between the countries concerned. While the Authority will endeavour to advance any required bilateral negotiations or other arrangements required for a solution, there can be no guarantee on the duration and outcome of this process.

57. It is incumbent upon the operators concerned to investigate and assess the implications, if any, of any such cross-border interference issues on their operations and, potentially, the value of the spectrum bands for which they wish to apply.

58. The exhibits below outline the publicly available\(^9\) allocation of the 800 and 2600 MHz bands in The Kingdom of Saudi Arabia\(^10\) and The State of Qatar\(^11\) according to their national frequency plans:

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\(^9\) Actual deployment in these bands may differ.


Award of Spectrum in the 800 and 2600 MHz bands

- **800 MHz band in the Kingdom of Saudi Arabia:**

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Use and Details</th>
<th>Main Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>809-821</td>
<td>FIXED MOBILE except aeronautical mobile 5.316 BROADCASTING</td>
<td>COM 1, 7, 9, 10</td>
</tr>
<tr>
<td>821-824</td>
<td>FIXED MOBILE except aeronautical mobile 5.316 BROADCASTING</td>
<td>CIV 1, 7, 9</td>
</tr>
<tr>
<td>828-831</td>
<td>FIXED MOBILE except aeronautical mobile 5.316 BROADCASTING</td>
<td>COMCIV 1, 7, 9</td>
</tr>
<tr>
<td>831-844</td>
<td>FIXED MOBILE except aeronautical mobile 5.316 BROADCASTING</td>
<td>COM 1, 7, 9</td>
</tr>
<tr>
<td>854-862</td>
<td>FIXED MOBILE except aeronautical mobile 5.316 BROADCASTING</td>
<td>COM 1, 7, 9</td>
</tr>
<tr>
<td>862-870</td>
<td>FIXED MOBILE except aeronautical mobile 5.317A</td>
<td>COMCIV 1, 7, 10</td>
</tr>
<tr>
<td>873-880</td>
<td>FIXED MOBILE except aeronautical mobile 5.317A</td>
<td>COMCIV 7</td>
</tr>
<tr>
<td>880-890</td>
<td>FIXED MOBILE except aeronautical mobile 5.317A</td>
<td>COM 7</td>
</tr>
<tr>
<td>890-915</td>
<td>FIXED MOBILE except aeronautical mobile 5.317A [Radiolocation]</td>
<td>COM 7</td>
</tr>
</tbody>
</table>

- **800 MHz band in Qatar:**

<table>
<thead>
<tr>
<th>Region 1 Allocation</th>
<th>Qatar's Allocation</th>
<th>Main Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>790 - 802 MHz</td>
<td>FIXED</td>
<td>- WLL Wireless Local Loop Systems (including Fixed Wireless Access)</td>
</tr>
<tr>
<td></td>
<td>MOBILE except aeronautical mobile 5.316A BROADCASTING</td>
<td>- Primary and Secondary</td>
</tr>
<tr>
<td></td>
<td>5.317A</td>
<td>- Telecommunications Systems</td>
</tr>
<tr>
<td>806 - 896 MHz</td>
<td>FIXED</td>
<td>- Non-Specific Mobile Systems</td>
</tr>
<tr>
<td></td>
<td>MOBILE except aeronautical mobile 5.317A BROADCASTING</td>
<td>- Radio Frequency Identification Equipment (RFID)</td>
</tr>
<tr>
<td></td>
<td>5.322</td>
<td>- GSM-R Railway Systems (876 - 880 MHz)</td>
</tr>
<tr>
<td></td>
<td>5.319 - 5.323</td>
<td>- GSM 850/855/880/885 MHz panels with 305-503 MHz</td>
</tr>
</tbody>
</table>
5.3 Choice between FDD and TDD

59. The Authority is aware that, in the deployment of recent telecommunications networks, there is an on-going debate on the relative merits of FDD vs. TDD technologies. While TDD solutions can help achieve higher spectral efficiency (as they allow for a more flexible adjustment of capacity for uplink and downlink than FDD), they still lag behind FDD owing
to certain technical complexities\textsuperscript{12}, and FDD is still the main duplexing mode used in all GCC and other countries in the region\textsuperscript{13}.

60. However, the deployment of LTE networks is not based on a snapshot assessment of the current situation, but on a long-term view. In fact, TDD is expected to become especially relevant upon the introduction of 5G (notably in millimetre bands), and some operators have already successfully implemented this technological solution in light of the upcoming developments\textsuperscript{14}.

61. Against this background, FDD is, and is likely to remain, the common mode used for the 800 MHz band. For the 2600 MHz band, however, spectrum may be used with either FDD or TDD duplexing:
   a. FDD use of 2×70 MHz of paired spectrum in the 2500-2570 MHz and 2620-2690 MHz frequency ranges, (corresponding to the 3GPP Band 7);
   b. TDD use of 140 MHz in the frequency ranges of 2500-2570 MHz and 2620-2690 MHz (corresponding to the 3GPP Band 41).

62. If MNOs preferred to deploy TDD networks in the 2600 MHz band, there are two options for awarding the spectrum in this band:
   a. One option would be to still award the band in the form of paired frequency blocks, which would imply that each user will have non-contiguous TDD frequencies, but would allow for a potential switch to FDD use in the future.
   b. Alternatively, the band could be awarded as unpaired spectrum, in which case the band would be divided into 10 MHz blocks. Note that because the available frequencies consist of two separate frequency ranges, it may not be possible for the three MNOs to obtain contiguous frequency blocks.

63. The decision adopted, at the end of this consultation process, in relation to the duplex mode to be used within the 2600 MHz band (i.e. FDD or TDD) will not be subject to modification once the spectrum award has been completed, unless otherwise indicated by the Authority.

64. Under both options, the Authority would specify a default downlink/uplink ratio in order to facilitate synchronised use of the band. Operators may use a different ratio and agree this with adjacent users, but will have to ensure that any non-synchronised use does not interfere with adjacent users by providing appropriate guard bands out of their respective frequency assignments.

\textsuperscript{12} The main challenges associated with TDD are i) the need for perfect synchronisation among base stations in terms of uplink and downlink transmissions, ii) the potential degradation of the RF power amplifier in the transmitter due to the requirement of discontinuous transmission, and iii) the guard period, necessary to prevent the clash of uplink and downlink traffic, which may become a limiting factor on capacity when it gets longer (i.e. when distances are increased).

\textsuperscript{13} As it may be inferred from the information summarized in http://www.spectrummonitoring.com/frequencies/.

\textsuperscript{14} For instance, STC in Saudi Arabia is using the 2300 MHz band for the provision of services over TDD, while in Bahrain Zain is using the 3500 MHz band for TDD usage.
The Authority proposes a default downlink/uplink ratio of 3:1. This is aligned with international practice. However, higher asymmetry ratios might be appropriate in the future, and operators are invited to comment on this. An alternative ratio may be specified if it is supported by all MNOs.

**Figure 3: Frequency blocks in the 2600 MHz band if offered as unpaired blocks**

<table>
<thead>
<tr>
<th>2500</th>
<th>2510</th>
<th>2520</th>
<th>2530</th>
<th>2540</th>
<th>2550</th>
<th>2560</th>
<th>2570</th>
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<tbody>
<tr>
<td>B1</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
<td>B5</td>
<td>B6</td>
<td>B7</td>
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<table>
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<tr>
<th>2620</th>
<th>2630</th>
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<th>2650</th>
<th>2660</th>
<th>2670</th>
<th>2680</th>
<th>2690</th>
</tr>
</thead>
<tbody>
<tr>
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<td>B9</td>
<td>B10</td>
<td>B11</td>
<td>B12</td>
<td>B13</td>
<td>B14</td>
<td></td>
</tr>
</tbody>
</table>

**Q3. Do you agree with the proposal to divide the 800 MHz band into six paired frequency blocks of 2×5 MHz?**

**Q4. Do you have a preference for FDD or TDD use in the 2600 MHz band? Please provide details on preferred duplexing mode and reasons.**

**Q5. If the spectrum were to be offered for TDD use, do you agree with the proposed default downlink/uplink ratio of 3:1? If not, please indicate the alternative ratio you would prefer with substantiated justification.**

**Q6. Do you agree with the proposed division of the band into paired 2×5 MHz frequency blocks, or do you think that the alternative division of the band into unpaired 10 MHz frequency blocks would be preferable (bearing in mind that, in this case, one operator might be assigned non-contiguous frequency blocks)?**

---

15 GTI’s TDD spectrum white paper (http://www.transcomwireless.com/wp-content/uploads/TDD-spectrum-white-paper-1.pdf, accessed on 17 February 2018) outlines that “Over 90 percent of commercial TDD networks have adopted DL/UL ratio = 3:1”. This ratio is also aligned with Ofcom’s approach for the award of spectrum in the 2.3 and 3.4 GHz bands (see https://www.ofcom.org.uk/__data/assets/pdf_file/0030/81579/info-memorandum.pdf for details, accessed on 17 February 2018).

6 Proposed Licence Award Process

6.1 Proposed general approach: award through auction

65. The Authority intends to offer all the Release Bands in a single, combined auction process, in which only current holders of an IMTL in the Kingdom of Bahrain are allowed to participate.

66. The procedure proposed will consist in a sealed-bid, first-price combinatorial auction. In a sealed bid auction, Eligible Bidders have a single opportunity to make their best offers for the lots available. Sealed bid combinatorial auctions allow Eligible Bidders to submit a list of multiple, mutually exclusive bids for alternative combinations of lots ("packages"). The winning bids are then selected by identifying the combination of bids that maximises the total bid value across all possible combinations of bids that include at most one bid from each Eligible Bidder and that can together be accommodated with the lots available.

67. The proposed approach is significantly facilitated through the recent amendment of Article 44 of the Telecommunications Law, which now includes an express reference to the possibility of auctions for Frequency Licences.\(^{17}\)

6.2 Definition of lots and lot categories

68. The frequency blocks defined in each band will be grouped into Lot categories. If all the frequency blocks in a band have similar value, then there will be a single lot category for that band; however, if some frequency blocks have greater value than others (as in the example below), then the available frequency blocks will be grouped according to their value and placement.

Example 1: Grouping of blocks into lot categories

For example, suppose that in the 800 MHz band:

1. A1 and A2 are deemed to have similar value;
2. A3 to A6 are deemed to have similar value; and
3. A1 and A2 are deemed to have different value from blocks A3 to A6.

In this case it may be appropriate to include the frequency blocks A1 and A2 in one lot category (lot category ‘A_L’) and the frequency blocks A3 to A6 in a different lot category (lot category ‘A_H’).

\[^{17}\] See paragraph 39, above.
69. Each block within a lot category will constitute a frequency-generic lot, i.e. a spectrum block of a given size but without necessarily specifying the exact frequencies associated with the lot. Therefore, Eligible Bidders will not be able to make bids for specific blocks, but only for lots within a category, specifying the number of lots they wish to acquire in each of the categories (the “package”) at a specified price. Under this approach, a package is defined as a number of lots in each of the lots category.

Example 2: Bidding for frequency-generic lots

Following the previous example in which A1 and A2 are included in lot category A_L and A3 to A6 in lot category A_H, packages would be defined as a number of A_L lots and a number of A_H lots.

Bidders can then bid for different packages, but not for specific combinations of frequency blocks. For example, an Eligible Bidder can bid for a package consisting of one A_L lot and two A_H lots, and if it wins with this bid it will then receive:

1. one of A1 or A2; and
2. A3 and A4 or A4 and A5 or A5 and A6.

However, the Eligible Bidder cannot bid specifically for the combination of frequency blocks A2, A3 and A4.

70. The Authority will assign specific frequencies to each winner of frequency-generic lots based on the procedure described below in Section 6.5.5, with a view to minimising fragmentation of spectrum holdings. Therefore, the Authority will guarantee to assign contiguous frequency blocks to each winner to the fullest extent possible.

71. In the first instance, the Authority will define separate lot categories for blocks in the 800 MHz band and in the 2600 MHz band. It may separate the blocks within a band into more than one lot category if there is a consensus view amongst respondents that some specific blocks in a band are more valuable than others, and that the value difference is so large that it outweighs the benefits of contiguous (rather than fragmented) assignment of blocks within a band, as guaranteeing all winners a contiguous assignment within a band may no longer be possible with different lot categories.

72. Defining different lot categories within a band means that Eligible Bidders would have more certainty about the value of the lots they are bidding for. However, if the frequency blocks in a band are offered in different lot categories, then it may not always be possible to assign contiguous frequency blocks to all winners. Therefore, Eligible Bidders who bid for lots in more than one category would be exposed to uncertainty in relation to whether they will receive contiguous or non-contiguous frequency blocks.
Example 3: Risk of fragmented outcomes if there multiple lot categories in a band

Following the previous example in which A1 and A2 are included in lot category A_L and A3 to A6 in lot category A_H, suppose that two Eligible Bidders each win a package containing one lot in A_L and two lots in A_H. In this case it would only be possible to assign contiguous frequency blocks to one of the Eligible Bidders (by assigning blocks A2 and A3 to the Eligible Bidder). However, it would not be possible to assign contiguous frequency blocks to the Eligible Bidder who is assigned A1.

6.2.1 Lot categories within the 800 MHz band

There are six blocks in the 800 MHz band. The six blocks could be grouped into a single lot category (lot category “A”). In this case, Eligible Bidders will be able to specify the number of A lots included in a package, but not the specific frequency blocks to which these lots correspond. Alternatively, if the different frequency blocks in the 800 MHz band are deemed to have materially different value, then they could be divided into two or more lot categories.

Q7. Do you consider that there are value differences between the different blocks in the 800 MHz band? If this is the case, please provide a substantiated justification.

Q8. Do you consider that any potential value differences in the value of different blocks in the 800 MHz band justify the inclusion of blocks into different lot categories (bearing in mind that this might create the possibility that some Eligible Bidders may be assigned non-contiguous blocks)? If so, how would you group the blocks in the 800 MHz band into different lot categories?

6.2.2 Lot categories in the 2600 MHz band

There are fourteen blocks in the 2600 MHz band. The fourteen blocks could be grouped into a single lot category (lot category “B”). In this case, Eligible Bidders will be able to specify the number of B lots included in a package, but not the blocks to which these lots correspond. Alternatively, the blocks in the 2600 MHz band could be divided into two or more lot categories.

Q9. Do you consider that there are value differences between the different blocks in the 2600 MHz band? If this is the case, please provide a substantiated justification.
Q10. Do you consider that any potential value differences in the value of different blocks in the 2600 MHz band justify the inclusion of blocks into different lot categories (bearing in mind that this might create the possibility that some Eligible Bidders may be assigned non-contiguous blocks)? If so, how would you group the blocks in the 2600 MHz band into different lot categories?

6.3 Spectrum caps

The Authority considers that all three MNOs are likely to require some spectrum in order to be able to compete effectively in the long run. Therefore, the Authority proposes to use spectrum caps in order to mitigate the risk of highly asymmetric outcomes, and outcomes in which one of the three MNOs might fail to acquire spectrum in either of these bands. However, subject to such highly asymmetric outcomes being avoided, the auction mechanism should provide flexibility for bidders to express their demand for different levels of additional bandwidth in the different bands, as the three MNOs might have different requirements owing to different network design and/or expansion plans.

The Authority proposes the following spectrum caps:

a. a cap of 2×15 MHz on the amount of spectrum that each bidder can acquire in the 800 MHz band;

b. a cap of 2×25 MHz on the amount of spectrum that any combination of two bidders can acquire in the 800 MHz band;

c. a cap of 2×50 MHz on the amount of spectrum that each bidder can acquire in the 2600 MHz band (or 100 MHz if this band is offered as unpaired frequency blocks); and

d. a cap of 2×60 MHz on the amount of spectrum that any combination of two bidders can acquire in the 2600 MHz band (or 120 MHz if this band is offered as unpaired frequency blocks).

These spectrum caps ensure that:

a. no single bidder can acquire more than half of the available spectrum in the 800 MHz band;

b. no single bidder can acquire more than 2×50 MHz in the 2600 MHz band (or more than 100 MHz in the 2600 MHz band if this band is offered as unpaired frequency blocks);

c. each bidder who bids for spectrum in the 800 MHz band is guaranteed to be able to acquire at least 2×5 MHz in this band; and

d. each bidder who bids for two or more lots of spectrum in the 2600 MHz band is guaranteed to be able to acquire at least 2×10 MHz in this band (or 20 MHz if this band is offered as unpaired frequency blocks).
78. These caps should thus ensure that all three MNOs will be able to acquire a usable spectrum portfolio in each of the bands, whilst still allowing some flexibility with respect to the actual bandwidth assigned to each MNO.

**Q11.** Do you agree with the proposed spectrum caps? If not, provide any supporting evidence to justify setting the spectrum caps at a different level.

### 6.4 Reserve prices

79. The Authority has considered a number of elements to determine reserve prices, including international benchmarks on the price at which similar spectrum has sold in other jurisdictions (adjusted for differences in relation to bandwidth, population, license duration, year of auction, PPP exchange rates, etc). The proposed reserve prices take into account Annual Frequency License Fees due by MNOs as defined under the SoF.

80. When assessing international benchmarks, the Authority has considered the average price of licences (per MHz per capita) achieved in awards of the same band in other jurisdictions that took place within the last decade and in which licences were sold above reserve (so where the price was determined by the bids received rather than the reserve price set). The prices from different awards include all known payments (including upfront prices, deferred payments and on-going fees over the duration of the licence), and have been adjusted to reflect the expected value for a licence with a common duration. Prices have been adjusted for inflation and converted to Bahraini Dinars using PPP exchange rates. The Authority has deducted the present value of Annual Frequency Charges applicable to each lot from the estimated total price for the lot, in order to obtain an estimate of the upfront price of licences.

81. The reserve prices proposed by the Authority are below its estimates of the price that the lots would obtain in a competitive auction process, in order to mitigate the risk of choking off demand and to allow for actual auction prices to be determined within the bidding process. However, the Authority will not set reserve prices trivially low, but rather within a reasonable range of its estimates, in order to ensure mitigate the risk of licences selling much below their value in the event that competition in the auction were limited. The reason for this is that NTP4 require that the revenue obtained from the sale of spectrum should reflect the value of the spectrum.

82. Following this approach, the Authority expects to set the following reserve prices:

a. 1,226,000 BHD for each 2×5 MHz paired block in the 800 MHz band; and

b. 166,000 BHD for each 2×5 MHz paired block or each 10 MHz unpaired block in the 2600 MHz band.
6.5 Proposed auction procedure and rules

6.5.1 Bidders’ conduct, communications and possible exclusion from the award process

83. Each Eligible Bidder must comply, at all stages, with the present auction procedure’s rules and shall be responsible for ensuring compliance with these rules by its shareholders, affiliates, officers, directors, employees, agents, consultants, legal or financial advisors, or providers of finance for the bid (together, “Authorized Third Parties”).

84. Each Eligible Bidder shall not, and shall ensure that its Authorized Third Parties shall not, at any time:
   a. collude or attempt to collude with another Eligible Bidder, or person or entity to distort the outcome of the auction procedure; and
   b. violate any applicable Anti-Bribery Law or otherwise offer, promise or give to another person a financial or other advantage to induce that person to perform improperly a function or activity relating to the auction procedure.

85. Without prejudice to the generality of the above, none of the Eligible Bidders qualifying for participation in the auction may engage in any direct or indirect communication with (i) another Eligible Bidder or (ii) any other party (other than an Authorized Third Party bound by appropriate non-disclosure obligations), and may not make any public announcement insofar as such communication or public announcement includes any information on, or indication of,
   a. that Eligible Bidder’s preferred frequency blocks or combinations thereof, or the price that Eligible Bidder intends to offer, or has offered, for any of the Release Bands; or
   b. any other information on the conditions of the Eligible Bidder’s participation in the auction whose disclosure could materially affect the auction’s outcome or any Eligible Bidder’s bid.

86. The above prohibition shall not apply with regard to any views submitted by Eligible Bidders to the Authority in response to this public consultation document or any other communications with the Authority, provided that:

Q12. If you do not agree with the proposed reserve prices, please provide any supporting evidence to justify setting reserve prices at a different level.

Q13. If you consider that the blocks in the 800MHz and/or 2600 MHz band should be grouped into different lot categories, please provide any supporting evidence to justify setting reserve prices at a different level for each proposed lot category.
87. Without prejudice to the Authority’s powers of investigation and imposition of penalties under Article 65 (anti-competitive conduct) of the Telecommunications Law, the Authority may:

   a. Exclude an Eligible Bidder from the present award process, giving that Eligible Bidder notice in writing, if the Eligible Bidder or any of its Authorized Third Parties breaches the non-disclosure obligation under that paragraph or commits any material infringement of any other auction rule;

   b. Exclude one or more Eligible Bidders from the present award process, giving them notice in writing, or cancel the award process, in the event of any collusion between two or all Eligible Bidders, or the Authority’s reasonable suspicion of such collusion, based on evidence that renders any other explanations unlikely, such as the offering of identical (or near-identical) prices by two or all Eligible Bidders.

88. If an Eligible Bidder is excluded from the award process under any of the previous provisions, the Authority will determine if it should proceed with the award of spectrum to the other Eligible Bidders pursuant to the present rules or repeat the auction for part or the whole of the Release Bands.

6.5.2 Bids

89. A bid is a financial offer (the “bid amount”) for a package of frequency-generic lots (the “bid package”), where the bid package specifies a number of frequency-generic lots in each lot category for which the Eligible Bidder is making the financial offer.

90. A bid is:

   a. a commitment to pay the bid amount in exchange for a Frequency Licence containing a combination of blocks that corresponds to the bid package; and

   b. a commitment to pay the reserve price for any proper subset of the bid package\(^\text{18}\) in exchange for a Frequency Licence that includes a combination of blocks that corresponds to this subset.

91. Bidders cannot bid for any package that includes:

   a. more than three lots of 800 MHz spectrum; and/or

   b. more than ten lots of 2600 MHz spectrum.

92. The bid amount must be equal to at least the reserve price of all the frequency-generic lots included in the bid package. Any bids with a bid amount below the reserve price of the bid package will be invalid and ignored when selecting winning bids.

\(^{18}\) i.e. a set of lots that includes some but not all of the lots included in the bid package, and which does not include any lots not included in the bid package.
93. Each Eligible Bidder will be assigned at most one Frequency Licence in this award. For the avoidance of doubt, if an Eligible Bidder is assigned a Frequency Licence in relation to one of its bids (in exchange for a corresponding payment), then the Eligible Bidder will not be assigned any other Frequency Licences in this award and will not be required to make any other payments in relation to any other bid it has made.

Example 4: Possible implications from bid submission

For example, suppose that an Eligible Bidder makes a bid for two lots in the 800 MHz band, with a bid amount of X. In relation to this bid, the Eligible Bidder may be required to:

1. pay X in exchange for a Frequency Licence that includes two frequency blocks in the 800 MHz band; or
2. pay the reserve price of a single 800 MHz lot in exchange for a Frequency Licence that includes only one frequency block in the 800 MHz band.

If the Eligible Bidder is awarded a Frequency Licence in relation to this bid, then the Eligible Bidder will not be awarded any other Frequency Licences in this award. At the same time, if the Eligible Bidder had made other bids and is awarded a Frequency Licence in relation to any of its other bids, then the Eligible Bidder cannot be awarded a Frequency Licence in relation to this bid.

For example, suppose that, in addition to the bid above for two 800 MHz lots, the Eligible Bidder also made a bid for a package that includes two 800 MHz lots and four 2600 MHz lots, with a bid amount of Y. In relation to this bid, the Eligible Bidder may be required to:

1. pay Y in exchange for a Frequency Licence that includes two frequency blocks in the 800 MHz band and four frequency blocks in the 2600 MHz band; or
2. pay the reserve price of the corresponding lots in exchange for a Frequency Licence that includes up to two frequency blocks in the 800 MHz band and up to four frequency blocks in the 2600 MHz band.

However, if the Eligible Bidder is awarded a Frequency Licence in relation to this bid (for example a Frequency Licence that includes one 800 MHz block and two 2600 MHz blocks, and pays the reserve price for these lots), then the Eligible Bidder cannot be awarded a Frequency Licence in relation to its other bid (so, for instance, it could not be required to pay X for an additional Frequency Licence that would include an additional two frequency blocks in the 800 MHz band).

6.5.3 Submission of bids

94. Each Eligible Bidder can submit a list of mutually exclusive bids. Only one of these bids can be selected as a winning bid.

95. Bidders will submit their bids as part of their application, by filling in a bid form provided by the Authority as part of the application form. The Authority expects to provide Eligible Bidders with the application form by email. Eligible Bidders will then be required to deliver the completed application form as electronic files on a removable data storage device, along with a printed and signed copy. The Authority expects that the application form will consist
of a pdf form and a MS Excel spreadsheet (the bid form). The bid form will contain a list of all the packages for which the Eligible Bidder can make a bid, each with a corresponding input field for a bid amount. A template for the application form, including a screenshot of a template bid form, is provided as Annex C.

96. In order to make a bid, the Eligible Bidder will need to enter the bid amount for the corresponding package in the bid form. If the Eligible Bidder does not wish to make a bid for a package, then it should leave the corresponding input field blank.

6.5.4 Determination of the winning outcome

97. The Authority will consider the feasible assignments for each Eligible Bidder, which are those in which the Eligible Bidder is assigned:
   a. the bid package of one of its bids, at a price determined by the corresponding bid amount; or
   b. a proper subset of the bid package of one of its bids, at a price determined by the reserve price of the lots included in that subset.

98. The Authority will then consider feasible outcomes, which are those in which:
   a. at most one feasible assignment is selected for each Eligible Bidder;
   b. the feasible assignments are compatible (i.e. the number of lots that would need to be assigned across all Eligible Bidders in each lot category does not exceed the number of lots available in that category); and
   c. the spectrum caps specified in Section 6.3 are satisfied, which require that:
      i. the total amount of spectrum assigned to any Eligible Bidder in the 800 MHz band cannot exceed 2×15 MHz;
      ii. the total amount of spectrum assigned to any group of two Eligible Bidders in the 800 MHz band cannot exceed 2×25 MHz;
      iii. the total amount of spectrum assigned to any Eligible Bidder in the 2600 MHz band cannot exceed 2×50 MHz (or 100 MHz if this band is offered as unpaired frequency blocks); and
      iv. the total amount of spectrum assigned to any group of two Eligible Bidders in the 2600 MHz band cannot exceed 2×60 MHz (or 120 MHz if this band is offered as unpaired frequency blocks).

99. The value of each feasible outcome is calculated as the sum of:
   a. the prices that Eligible Bidders would be required to pay for their assignments (corresponding for each bidder to the bid package of the bid selected for that bidder in that feasible outcome); and
   b. the reserve price of any lots that would remain unassigned (after having assigned to each bidder its assignment in the feasible outcome).19

19 For the avoidance of doubt, the reserve price of lots that remain unassigned reflect the value for the Authority to retain the lots, and do not correspond to any payment from bidders.
100. The **winning outcome** will be the feasible outcome with the highest value. In the event of a tie, the winning outcome will be that in which the sum of reserve prices of unassigned lots is smallest. Any remaining ties will be broken at random.

### Example 5: Determination of winning outcome

Suppose that the available spectrum is offered in two lot categories, A (six lots, each including 2×5 MHz in the 800 MHz band) and B (fourteen lots, each including 2×5 MHz in the 2600 MHz band), with the reserve prices proposed in Section 6.4.

Suppose as a hypothetical example that Eligible Bidder X submits the following bids:

<table>
<thead>
<tr>
<th>A lots</th>
<th>B lots</th>
<th>Bid amount (BHD)</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>3,276,000</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>3,906,000</td>
</tr>
</tbody>
</table>

The feasible assignments for Eligible Bidder X would be as follows:

<table>
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<tr>
<th>Assignment ID</th>
<th>A lots</th>
<th>B lots</th>
<th>Bid amount (BHD)</th>
<th>Price (BHD)</th>
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<tr>
<td>X-21</td>
<td>1</td>
<td>6</td>
<td>-</td>
<td>2,222,000</td>
</tr>
</tbody>
</table>

X-3 to X-21 are the possible proper subsets of the bid packages contained in Eligible Bidder X’s bids, priced at the corresponding reserve prices.

Suppose that Eligible Bidder Y submits the following bids:

<table>
<thead>
<tr>
<th>A lots</th>
<th>B lots</th>
<th>Bid amount (BHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>3,176,000</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4,634,000</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>3,706,000</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>3,866,000</td>
</tr>
</tbody>
</table>

The feasible assignments for Eligible Bidder Y would be as follows:

<table>
<thead>
<tr>
<th>Assignment ID</th>
<th>A lots</th>
<th>B lots</th>
<th>Bid amount (BHD)</th>
<th>Price (BHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y-1</td>
<td>2</td>
<td>4</td>
<td>3,176,000</td>
<td>3,176,000</td>
</tr>
<tr>
<td>Y-2</td>
<td>3</td>
<td>4</td>
<td>4,634,000</td>
<td>4,634,000</td>
</tr>
</tbody>
</table>
Y-3 | 2 | 6 | 3,706,000 | 3,706,000  
Y-4 | 2 | 5 | 3,866,000 | 3,866,000  
Y-5 | 0 | 0 | - | -  
Y-6 | 1 | 0 | - | 1,226,000  
Y-7 | 2 | 0 | - | 2,452,000  
Y-8 | 0 | 1 | - | 166,000  
Y-9 | 1 | 1 | - | 1,392,000  
Y-10 | 2 | 1 | - | 2,618,000  
Y-11 | 0 | 2 | - | 332,000  
Y-12 | 1 | 2 | - | 1,558,000  
Y-13 | 2 | 2 | - | 2,784,000  
Y-14 | 0 | 3 | - | 498,000  
Y-15 | 1 | 3 | - | 1,724,000  
Y-16 | 2 | 3 | - | 2,950,000  
Y-17 | 0 | 4 | - | 664,000  
Y-18 | 1 | 4 | - | 1,890,000  
Y-19 | 3 | 0 | - | 3,678,000  
Y-20 | 3 | 1 | - | 3,844,000  
Y-21 | 3 | 2 | - | 4,010,000  
Y-22 | 3 | 3 | - | 4,176,000  
Y-23 | 0 | 5 | - | 830,000  
Y-24 | 1 | 5 | - | 2,056,000  
Y-25 | 0 | 6 | - | 996,000  
Y-26 | 1 | 6 | - | 2,222,000  

Y-5 to Y-26 are the possible proper subsets of the bid packages contained in Eligible Bidder Y’s bids, priced at the corresponding reserve prices.

Suppose that Eligible Bidder Z submits the following bids:

<table>
<thead>
<tr>
<th>A lots</th>
<th>B lots</th>
<th>Bid amount (BHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>3,676,000</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4,734,000</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>5,264,000</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>4,206,000</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>3,891,000</td>
</tr>
</tbody>
</table>

The feasible assignments for Eligible Bidder Z would be as follows:

<table>
<thead>
<tr>
<th>Assignment ID</th>
<th>A lots</th>
<th>B lots</th>
<th>Bid amount (BHD)</th>
<th>Price (BHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-1</td>
<td>2</td>
<td>4</td>
<td>3,676,000</td>
<td>3,676,000</td>
</tr>
<tr>
<td>Z-2</td>
<td>3</td>
<td>4</td>
<td>4,734,000</td>
<td>4,734,000</td>
</tr>
<tr>
<td>Z-3</td>
<td>3</td>
<td>6</td>
<td>5,264,000</td>
<td>5,264,000</td>
</tr>
<tr>
<td>Z-4</td>
<td>2</td>
<td>6</td>
<td>4,206,000</td>
<td>4,206,000</td>
</tr>
<tr>
<td>Z-5</td>
<td>2</td>
<td>5</td>
<td>3,891,000</td>
<td>3,891,000</td>
</tr>
<tr>
<td>Z-6</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Z-7</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>1,226,000</td>
</tr>
<tr>
<td>Z-8</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>2,452,000</td>
</tr>
<tr>
<td>Z-9</td>
<td>0</td>
<td>1</td>
<td>-</td>
<td>166,000</td>
</tr>
<tr>
<td>Z-10</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1,392,000</td>
</tr>
<tr>
<td>Z-11</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>2,618,000</td>
</tr>
<tr>
<td>Z-12</td>
<td>0</td>
<td>2</td>
<td>-</td>
<td>332,000</td>
</tr>
<tr>
<td>Z-13</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1,558,000</td>
</tr>
<tr>
<td>Z-14</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2,784,000</td>
</tr>
<tr>
<td>Z-15</td>
<td>0</td>
<td>3</td>
<td>-</td>
<td>498,000</td>
</tr>
<tr>
<td>Z-16</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>1,724,000</td>
</tr>
</tbody>
</table>
Z-6 to Z-28 are the possible proper subsets of the bid packages contained in Eligible Bidder Z’s bids, priced at the corresponding reserve prices.

The feasible outcomes are obtained by considering all the possible combinations of feasible assignments that include at most one assignment for each Eligible Bidder, and checking whether the assignments in the combination could be accommodated with the lots available.

For instance, consider the combination that includes X-1, Y-1 and Z-1. This is a feasible outcome, as it is possible to assign to each Eligible Bidder the lots in its assignment with the available spectrum, and the spectrum caps are satisfied. This outcome would leave two B lots unassigned. The value of an outcome is the sum of the respective prices that would be paid by Eligible Bidders plus the reserve price for unassigned lots; therefore the value of this outcome would be BHD 10,460,000 (BHD 3,276,000 from X’s bid, BHD 3,176,000 from Y’s bid, BHD 3,676,000 from Z’s bid and 332,000 from the reserve price of the two B lots that remain unassigned).

By contrast, the combination that includes X-1, Y-2 and Z-1 is not feasible, as it would require assigning seven A lots, but there are only six A lots available. For a different reason, the combination that includes X-20, Y-2 and Z-2 is also not feasible – in this case because this outcome would not satisfy the spectrum caps, as the total amount of 800 MHz spectrum assigned to two Eligible Bidders (X and Y) would exceed 2×25 MHz.

The highest value that can be obtained across all feasible outcomes is BHD 11,033,000, which is obtained with the assignments X-1, Y-4 and Z-5.

### 6.5.5 Assignment of specific frequencies

101. As part of their application, Eligible Bidders will be allowed to express their preference for being assigned frequencies at the ‘bottom’, ‘middle’ or ‘top’ for each lot category, being able to rank these three positions. The assignment of frequencies will be determined for each band in turn, as follows:

a. First, the Authority will shortlist the frequency assignments in which all Eligible Bidders are assigned a number of blocks that corresponds to the winning outcome.

b. If any of the shortlisted frequency assignments satisfy the requirement that each Eligible Bidder is assigned contiguous blocks, then the Authority will discard any frequency assignments that do not satisfy this requirement. Otherwise (which
might be the case if the blocks in the band are grouped into different lot categories), the Authority will only retain those in which the number of Eligible Bidders who would be assigned non-contiguous blocks is smallest.

c. The Authority will then consider the preferences expressed by Eligible Bidders in turn, starting with the Eligible Bidder who is required to pay the highest price, and ending with the Eligible Bidder who is required to pay the lowest price (if two or one Eligible Bidders are required to pay exactly the same price, then the order in which these Eligible Bidders are considered will be determined at random), discarding any plans in which the Eligible Bidder does not obtain its preferred frequencies amongst the frequency plans still available (i.e. only considering plans that are compatible with choices from preceding Eligible Bidders).

d. Any unassigned blocks would be placed in the middle. If there are three winners in the band, then the Eligible Bidder in the middle (the ‘middle bidder’) would be allowed to indicate whether it prefers unassigned blocks to be placed below or above its assignment.

Example 6: Assignment of specific frequencies

Following from the previous example, suppose that Eligible Bidders expressed the following preferences with respect to being assigned frequencies at the bottom, middle or top:

Suppose that the following bids are received from three Eligible Bidders:

<table>
<thead>
<tr>
<th>Bidder</th>
<th>A lots</th>
<th>B lots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bidder X</td>
<td>Top, middle, bottom</td>
<td>Top, middle, bottom</td>
</tr>
<tr>
<td>Bidder Y</td>
<td>Top, middle, bottom</td>
<td>Bottom, middle, top</td>
</tr>
<tr>
<td>Bidder Z</td>
<td>Top, middle, bottom</td>
<td>Top, middle, bottom</td>
</tr>
</tbody>
</table>

Z is required to pay the highest price for its licence. Therefore, Z’s preference is considered first, and Z is assigned the top two blocks in the 800 MHz band and the top five blocks in the 2600 MHz band.

Y is considered next. The top position in the 800 MHZ band, which is Y’s preferred position, is already taken by Z; therefore Y is assigned its second preference, the middle position. However, Y’s preferred position in the 2600 MHz band (bottom) is still available, and thus Y is assigned the five 2600 MHz blocks at the bottom of the band.

X is assigned the bottom position in the 800 MHz band and the middle position in the 2600 MHz Band.

Q14. Do you have any comments on or objections to the auction rules proposed?

Q15. With respect to the information disclosed after the auction, do you think the Authority should disclose all of the bids received, or that these should be kept confidential?
6.6 Payment terms

102. A successful Eligible Bidder must pay the value of its Spectrum Usage Rights Fee resulting from the present auction procedure in annual instalments, as further specified in Schedule B (Spectrum Usage Rights Fee Payment Schedule) of the attached Annex B (Frequency Licence Template).

103. The grant of the new Frequency Licence to an Eligible Bidder shall not occur until that Eligible Bidder has:

   a. Paid to the Authority the first annual instalment of the Spectrum Usage Right Fee resulting from the present auction procedure; and

   b. Submitted to the Authority a bank guarantee in favour of the Authority in respect of the remaining instalments of the Spectrum Usage Right Fee, in the form set out in Annex 3 of the template Application Form.
ANNEX A – QUESTIONS FORMULATED IN THE DOCUMENT

Q1. Please set out if you agree with the Authority’s proposed award process. If you disagree with any elements please explain why and set out alternative proposals which you believe will better meet the objectives of the Fourth NTP.

Q2. Do you agree with the Authority’s views on the need for the award of additional spectrum and the expected benefits?

Q3. Do you agree with the proposal to divide the 800 MHz band into six paired frequency blocks of 2×5 MHz?

Q4. Do you have a preference for FDD or TDD use in the 2600 MHz band? Please provide details on preferred duplexing mode and reasons.

Q5. If the spectrum were to be offered for TDD use, do you agree with the proposed default downlink/uplink ratio of 3:1? If not, please indicate the alternative ratio you would prefer with substantiated justification.

Q6. Do you agree with the proposed division of the band into paired 2×5 MHz frequency blocks, or do you think that the alternative division of the band into unpaired 10 MHz frequency blocks would be preferable (bearing in mind that, in this case, one operator might be assigned non-contiguous frequency blocks)?

Q7. Do you consider that there are value differences between the different blocks in the 800 MHz band? If this is the case, please provide a substantiated justification.

Q8. Do you consider that any potential value differences in the value of different blocks in the 800 MHz band justify the inclusion of blocks into different lot categories (bearing in mind that this might create the possibility that some Eligible Bidders may be assigned non-contiguous
Award of Spectrum in the 800 and 2600 MHz bands

blocks)? If so, how would you group the blocks in the 800 MHz band into different lot categories?

Q9. Do you consider that there are value differences between the different blocks in the 2600 MHz band? If this is the case, please provide a substantiated justification.

Q10. Do you consider that any potential value differences in the value of different blocks in the 2600 MHz band justify the inclusion of blocks into different lot categories (bearing in mind that this might create the possibility that some Eligible Bidders may be assigned non-contiguous blocks)? If so, how would you group the blocks in the 2600 MHz band into different lot categories?

Q11. Do you agree with the proposed spectrum caps? If not, provide any supporting evidence to justify setting the spectrum caps at a different level.

Q12. If you do not agree with the proposed reserve prices, please provide any supporting evidence to justify setting reserve prices at a different level.

Q13. If you consider that the blocks in the 800MHz and/or 2600 MHz band should be grouped into different lot categories, please provide any supporting evidence to justify setting reserve prices at a different level for each proposed lot category.

Q14. Do you have any comments on or objections to the auction rules proposed?

Q15. With respect to the information disclosed after the auction, do you think the Authority should disclose all of the bids received, or that these should be kept confidential?
ANNEX B – FREQUENCY LICENCE TEMPLATE
Award of Spectrum in the 800 and 2600 MHz bands

Frequency Licence granted to

by the Telecommunications Regulatory Authority under articles 25, 29, 39(b)(1) and 44 of Legislative Decree No. 48 of 2002

promulgating the Telecommunications Law

Document Number: ………………….

Date of issue of this Licence: ………………….

Approved by the General Director:
Award of Spectrum in the 800 and 2600 MHz bands

1. GRANT OF LICENCE

1.1 The Telecommunications Authority (the "Authority") hereby grants this Frequency Licence pursuant to article 44 of the Telecommunications Law promulgated by Legislative Decree No. 48 of 2002 (the "Telecommunications Law"), by which the Authority assigns, without creating a precedent and without prejudice to future applications, to [...], Commercial Registration No. [...], the radio frequency spectrum described in Schedule A (the "Assigned Radio Frequency Spectrum").

1.2 The Licensee shall not use the Assigned Radio Frequency Spectrum unless the Licensee holds an Individual Mobile Telecommunications Licence (2013 Form) pursuant to article 29 of the Telecommunications Law and such licence is current, valid and authorises the provision of the radiocommunications services for which the Assigned Radio Frequency Spectrum may lawfully be used.

1.3 This licence shall be subject to the provisions herein stated, the Telecommunications Law and any applicable legal instruments issued thereunder, and the terms and conditions of the currently effective Individual Mobile Telecommunications Licence (2013 Form) with which this Frequency Licence is associated.

2. DEFINITIONS

2.1 For the purposes of this Frequency Licence:

A meaning or definition provided for any word, phrase or expression under the Telecommunications Law shall also be applicable to such word, phrase or expression in this Frequency Licence; unless the context requires otherwise;

The following terms and expressions shall have the following meanings unless the context requires otherwise:

"Affiliate" means, as used with respect to any person, any other person directly or indirectly controlling, controlled by, or under common control with, that person. In the case where one person owns, directly or indirectly, 50% or more of the share capital, voting rights, securities or other ownership interest of another person, both such persons shall be deemed an affiliate;

"Applicable legal instrument" means a legal instrument that is promulgated by the Authority in accordance with article 3 subsection (c) and (f) of the Telecommunications Law, including any amendments that may be adopted by the Authority from time to time;

"Control" means, as applied to any person, the possession, directly or indirectly, of the power to direct or cause the direction of the management of that person, whether through ownership, voting or other ownership interest, whether by control or otherwise and "controlling" and "controlled" shall be construed accordingly;

"Effective date" means the date referred to in Section 11.1;

"Force majeure" means any event beyond the reasonable control of the Licensee, including but not limited to fire, storm, earthquake, flood or other extreme weather conditions, acts of God, failure or shortage of power supplies, lightning, war, military operations, civil unrest, acts of terrorism or riot;

"Harmful interference" means the effect of unwanted energy due to one or a combination of emissions, radiations inductions, conductions or another electromagnetic effect which endangers the functioning of a radionavigation service or other safety services or seriously degrades, obstructs or repeatedly interrupts any radiocommunication service operating in accordance with applicable regulations, licences or determinations of any frequency licensing authority within the Kingdom or in any other jurisdiction;

"Licensed area" means the territory of the Kingdom of Bahrain;

"Spectrum Usage Rights Fee" means a non-recurring fee imposed by the Authority for the right to use assigned frequencies which may be paid by the assignee in a single lump sum or in instalments, as determined by the Authority, and including the fee set out in Schedule B to this Frequency Licence.
Award of Spectrum in the 800 and 2600 MHz bands

Type approved" means telecommunications equipment which is compliant with the type approval process; and

"Type approval" means the process for establishing that telecommunications equipment complies with the technical standards issued by Authority, or by international standard—setting bodies designated from time to time by the Authority, in accordance with article 38 of the Telecommunications Law.

3 EXERCISE OF RIGHTS; SUBCONTRACTING

Without prejudice to articles 50.1 and 50.2 of the Telecommunications Law and subject to Section 7 of this Frequency Licence, the Licensee may, with the prior written approval of the Authority, exercise its rights under this Frequency Licence through an affiliate or sub-contract to another person; provided, however, that the Licensee shall remain the effective user of the Assigned Radio Frequency Spectrum continue to be fully liable for any obligation arising in relation to the provision of any such licensed activity. The Authority may revoke its approval at any time by providing reasonable advance notice to the Licensee in writing. The prior written approval of the Authority shall not be required if such affiliate is and remains wholly-owned by the Licensee, provided always that the Authority shall be notified of such arrangement.

4 USE OF RADIO FREQUENCY SPECTRUM

4.1 Without derogating from article 49 of the Telecommunications Law, the Licensee shall comply with any requirements, conditions or safeguards that may be established by the Authority in any applicable legal instruments to prevent harmful interference, promote interoperability or ensure the safe operation of the network. The Licensee shall also take all necessary steps to ensure that the use of the Assigned Radio Frequency Spectrum shall not cause damage or harmful interference to existing radiocommunications stations and telecommunications networks lawfully operating in the same geographical area and/or radio frequency band and in other geographical areas and/or radio frequency bands.

4.2 The Licensee shall take all appropriate measures to ensure that its operating licences and the radiocommunications stations and equipment they comprise are adequately protected from harmful interference that may be caused by radiocommunications stations and telecommunications networks lawfully operating in the same geographical area and/or radio frequency band and in other geographical areas and/or radio frequency bands.

4.3 The Licensee shall ensure that non-ionising radiation emissions from each radio installation which it operates under its licence(s) are within the limits set by the International Commission for Non-Ionising Radiation Protection (ICNIRP) and shall ensure that it complies with any future radiation emission standards which may be set by the ICNIRP, or have been or will be adopted in the Kingdom of Bahrain.

4.4 If the Authority is of the view that the spectrum, the rights of use of which is awarded by virtue of this Licence, is not being utilised efficiently, it will communicate its view in writing to the Licensee and the Licensee will have within such periods as the Authority may consider appropriate in the circumstances to rectify the situation, failing which the Authority will be entitled to terminate without further warning the rights of use being granted herein.

4.5 Where required for the efficient use of radio frequency spectrum in the licensed area, the Licensee shall comply with any applicable legal instruments issued by the Authority pertaining to migration from one band of frequencies to another or within the same band. Without prejudice to the generality of the above obligation, the Licensee shall migrate part or the whole of the Assigned Radio Frequency Spectrum within the same band if requested in writing to do so by the Authority, within a period to be determined by the Authority, if such migration is necessary to allow for the contiguous assignment of radio frequency spectrum to a future licensee of any currently unassigned radio frequency spectrum.

4.6 The Licensee shall co-operate with the Authority for the purposes of assisting the Authority in coordinating and managing the efficient use of radio frequencies in relation to neighbouring
Award of Spectrum in the 800 and 2600 MHz bands

countries, including but not limited to the provision of information to the Authority, and the reduction of emission levels of radiocommunications stations.

4.7 Without derogating from the Licensee’s ultimate rights under section 14 of this Frequency Licence, the Licensee shall take all reasonably necessary steps to ensure that any harmful interference is resolved amicably between the Licensee and the other party or parties within a reasonable time of the date on which the harmful interference is detected and brought to the relevant party’s or parties’ attention. In any event resolution should occur in:

(a) no more than ten (10) days if the party or parties are located within the Kingdom; or

(b) no more than fifteen (15) days if the party or one of the parties is located outside the Kingdom. However, if the timetable for resolution of harmful interference specified in an international agreement to which the Kingdom is a party is less than fifteen (15) days, then the number of days specified in the international agreement shall prevail.

The Licensee shall notify the Authority in writing as soon as practicable after it becomes aware of any harmful interference problems and shall keep the Authority informed of any steps taken to resolve such interference and the results obtained thereafter.

4.8 Where harmful interference problems have not been resolved between the Licensee and the other party or parties as detailed in 4.7 above, the Licensee or the interfered with party or parties may refer the matter to the Authority in writing.

4.9 Without prejudice to article 72 of the Telecommunications Law, the Authority shall investigate the matter and issue a decision, determination or order with respect thereto.

4.10 The Authority may direct the Licensee to take such actions as may be necessary to resolve any harmful interference, and the Licensee shall take the directed actions without delay.

4.11 The Licensee shall not permit or suffer any person to use its radiocommunications equipment comprising any of its radiocommunications stations unless the person is under the control of, and is authorised by, the Licensee.

5  INTEROPERABILITY AND TECHNICAL STANDARDS

The Licensee shall comply with any applicable legal instrument and technical specifications issued by the Authority in order to ensure interoperability of the licensed services (as defined in the operating licence) and its telecommunications facilities with telecommunications services and telecommunications networks provided by other licensees to the extent that it is technically feasible.

6  RADIOCOMMUNICATIONS EQUIPMENT

6.1 The Licensee shall ensure that the radiocommunications equipment comprising any of its radiocommunications stations:

(a) is type approved by the Authority and at all times complies with all applicable emission standards and technical specifications or requirements specified by the Authority, from time to time, in relation thereto; and

(b) is designed and constructed, used and maintained so as not to cause any harmful interference even when in use in compliance with the Telecommunications Law any applicable legal instruments.

6.2 Where applicable, the Licensee shall ensure that the operating licences and the radiocommunications stations and equipment comprised therein that are operated within the Assigned Radio Frequency Spectrum are not used for unlawful purposes or misused in any way where the Licensee has knowledge or should reasonably have knowledge of such use or misuse.

6.3 The Licensee shall ensure that all persons using its radiocommunications equipment comprising in any of its radiocommunications stations are made aware of the relevant terms of this Frequency Licence together with any other relevant licence and comply with such terms.
7  RADIO FREQUENCY SPECTRUM TRADING

The Licensee shall not, except with the prior written approval of the Authority, assign, transfer, trade, sell, lease, pool or otherwise dispose of the whole or any part of the rights, privileges, duties and/or obligations under this Frequency Licence to any person or persons.

8  RADIO FREQUENCY SPECTRUM SHARING

The Licensee shall not, except with the prior written approval of the Authority or in accordance with section 3, authorise any person or persons to operate a radiocommunications station and/or telecommunications network within the Assigned Radio Frequency Spectrum.

9  REQUIREMENT TO PROVIDE INFORMATION AND INSPECTION

9.1 Without derogating from articles 53 and 77 of the Telecommunications Law, the Licensee is required to maintain such information as will enable the Authority to carry out its functions under the Telecommunications Law in such manner as the Authority may from time to time request. The Authority shall have the right to request the Licensee to submit periodic reports, statistics and other data as well as request additional information in order to effectively supervise and enforce the terms of this Frequency Licence.

9.2 Without derogating from article 77 of the Telecommunications Law, the Licensee shall permit a person authorised by the Authority to have access to any of its radiocommunications stations and to inspect or test its radiocommunications equipment at a reasonable time, for the purposes of verifying compliance with the terms of the licence or for the purpose of investigating sources of harmful radiocommunications interference.

10  FREQUENCY LICENCE FEES

10.1 The annual fee for the frequencies listed under Schedule A of this Frequency Licence shall be calculated according to the Schedule of Fees for frequencies approved by the Board of the Authority.

10.2 The applicable Frequency Licence fee shall be payable to the Authority in Bahraini dinars:

(a) in advance for the period from the effective date until the end of the year in which this Frequency Licence is issued, on a pro rata basis for such period; and

(b) annually in advance no later than 31 January of each year thereafter.

10.3 The applicable Spectrum Usage Rights Fee shall be paid in accordance with Schedule B of this Frequency Licence.

11  DURATION AND RENEWAL

11.1 The effective date of this Frequency Licence is [...] and it shall be valid for a term of fifteen (15) years, subject to section 11.2, below.

11.2 This licence shall be valid for as long as the Individual Mobile Telecommunications Licence referred to in section 1.2 is effective, unless this Frequency Licence is modified, revoked or terminated in accordance with section 12 below.

11.3 The Authority shall endeavour to take a decision on the renewal of this Frequency Licence at least 12 months before its expiry under section 11, above.

11.4 Irrespective of whether the Licensee is still using the Assigned Radio Frequency Spectrum, the Authority shall, at any time prior to the expiry of this Frequency Licence, have the right to commence any procedures necessary for the re-assignment of the rights of use of the Assigned Radio Frequency Spectrum upon the expiry of this Frequency Licence.

12  MODIFICATION, REVOCATION AND TERMINATION
12.1 Without derogating from article 51 of the Telecommunications Law, this Frequency Licence may be modified in any of the following ways at any time:

(a) by written agreement between the Authority and the Licensee; or

(b) by the Authority if the Authority determines that such modification is necessary to make the conditions of the licence consistent with conditions being imposed generally in respect of all licences issued in the same category, for the purpose of ensuring fair competition between licensees in that category or to the extent necessitated by technological development, provided that the Authority shall have consulted with the Licensee and shall have provided reasonable notice of the proposed modification.

12.2 The Authority may revoke this Frequency Licence:

(a) in accordance with article 51 of the Telecommunications Law; or

(b) if the individual service licence with which this Frequency Licence is associated is terminated or revoked.

12.3 This Frequency Licence shall terminate automatically upon the expiry of its term if it is not renewed in accordance with section 11.1 above.

13 **FORCE MAJEURE**

13.1 If the Licensee is prevented from performing any of its obligations under this Frequency Licence because of force majeure the Licensee shall notify the Authority of the obligations it is prevented from performing as soon as practicable after it becomes aware or reasonably should become aware of such force majeure.

13.2 The Authority shall suspend those obligations referenced to under section 13.1 and the Licensee will not be liable to perform those obligations, for so long as the force majeure continues, only if and to the extent that the inability to perform could not have been prevented by taking steps specifically required under the law or this Frequency Licence or other reasonable precautions and the inability cannot reasonably be circumvented by the Licensee at its expense through the use of alternate sources, work—around plans or other means.

14 **DISPUTE RESOLUTION**

14.1 All disputes between the Licensee and the Authority arising out of this Frequency Licence shall be resolved in accordance with the provisions of Chapter XVI of the Telecommunications Law.

14.2 The courts of the Kingdom of Bahrain shall have jurisdiction over disputes between the Licensee and other parties licensed by the Authority in connection with telecommunications activities which they are licensed to conduct, provided, however, that a party to such dispute may require the dispute to be referred to arbitration, in which case, unless the parties agree otherwise and provided that such agreement is not contrary to Chapter VII of the Civil and Commercial Procedural Law of 1971, the provisions of articles 67 to 71 of the Telecommunications Law shall apply mutatis mutandis.

15 **NOTICES**

15.1 All notices from the Licensee to the Authority and vice versa shall be in writing and shall be sent by registered mail with acknowledgement of delivery to the following addresses:

If sent to the Authority: P.O. Box 10353, Manama, Bahrain.

If sent to the Licensee: [...].

15.2 Either party may change its above address by notifying the other party in writing at least fifteen (15) days before such a change of address takes effect.
Award of Spectrum in the 800 and 2600 MHz bands

Accepted by:  [Licensed Operator’s Name]

___________________________________

Name:

Designation:

Date:
SCHEDULE A
ASSIGNMENT OF RADIO FREQUENCY SPECTRUM
(MOBILE)

The Assigned Radio Frequency Spectrum means, unless otherwise specified below, the radio frequency band(s) which comprise a range of radio frequencies between the upper and lower frequency limits of the radio frequency bands specified in the table below:
SCHEDULE B  
SPECTRUM USAGE RIGHTS FEE PAYMENT SCHEDULE

The Licensee shall pay the following instalments of the Spectrum Usage Rights Fee:

<table>
<thead>
<tr>
<th>Fee Amount</th>
<th>Payment Date</th>
</tr>
</thead>
</table>

The Licensee shall maintain a bank guarantee in accordance with Annex 3 of its Application Form for this Frequency Licence, equal to the value of the outstanding Spectrum Usage Rights Fee which will reduce over time as each instalment is paid.
ANNEX C – TEMPLATE APPLICATION FORM
Award of Spectrum in the 800 and 2600 MHz bands

Application Form

APPLICATION

FOR A 2018 FREQUENCY LICENCE
GRANTING SPECTRUM USAGE RIGHTS
IN THE 800 AND 2600 MHZ FREQUENCY BANDS
IN THE KINGDOM OF BAHRAIN

This Application Form must be completed and delivered by the eligible bidder as electronic files on a removable data storage device, along with a printed and signed copy, between 0900 and 1600 (Bahraini local time), by [DATE] at the latest, to:

Acting General Director
Telecommunications Regulatory Authority
5th Floor
Building No. 852
Road No. 3618
Seef 436
Kingdom of Bahrain

A scanned copy should be delivered on the same date to spectrum-rfp@tra.org.bh.
1 Applicant Details

Name of Applicant: ___________________________________________________________

Please complete the Applicant Information Sheet contained in Annex 1 to this Application.

2 Application

The Applicant hereby applies for the grant of a 2018 Frequency Licence pursuant to Article 44 of the Telecommunications Law of the Kingdom of Bahrain promulgated by Legislative Decree No. 48 in October 2002, in accordance with the application form for 2018 Frequency Licences auction in the 800 and 2600 MHz bands issued by the Telecommunications Regulatory Authority (the “Authority”).

3 Undertakings

The Applicant accepts and commits to the following undertakings as a condition of its participation in this Award Process:

1. The Applicant hereby accepts to comply with, and not challenge, the auction rules and procedures, based on the Authority’s objective of achieving, to the extent possible, contiguous spectrum holdings amongst the three existing IMTL holders.

2. If the Applicant is awarded a frequency licence by the Authority in relation to this Application, the Applicant shall:

   (a) agree to and accept the terms and conditions of the frequency licence;
   (b) exercise its spectrum usage rights in accordance with the frequency licence; and
   (c) make timely payment in full of all applicable fees stipulated in the Frequency Licence.

3. By executing and submitting this Application, the Applicant irrevocably and unconditionally agrees not to commence, or assist or encourage any third party to commence, any claim, action or proceedings against the Authority, its employees, agents, officers or advisors in relation to the legality of this Award Process, including any claim, action or proceedings which are designed (or have the effect of), in whole or in part, to hinder, prevent, delay, interrupt, postpone, cancel, overrule, change or vary the form of this Award Process.
4 Bid Form

Please enter the bid amounts for the packages for which you wish to make a bid in the bid form (see excel document provided as Annex 2 to the Application Form). Notice that bidding for a package also creates a commitment to be willing to accept any proper subset of that package. Please refer to the auction rules for further details.

Please (optionally) indicate your preference for a specific placement within each band, with number 1 for your preferred position in that band and 2 for your second preferred position in that band (please do not enter anything in your least preferred position blank).

<table>
<thead>
<tr>
<th>800 MHz band</th>
<th>2600 MHz band</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position</strong></td>
<td><strong>Preference</strong></td>
</tr>
<tr>
<td>Bottom</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td></td>
</tr>
<tr>
<td>Top</td>
<td></td>
</tr>
</tbody>
</table>
5 Attestation and Signature

The undersigned hereby attests that:

1. the information provided in this application is true and complete;

2. the Applicant accepts and commits to each and every undertaking set out in Section 3 of this Application Form; and

3. the Applicant has included with its Application Form a confirmation that the undersigned is duly authorised by the Board of the Applicant to execute and submit this Application Form to the Authority on the Applicant’s behalf.

Signed by Authorised Person*                Date

Name and Title

[Affix relevant company stamp/seal below]

* Application must be signed by the Applicant’s Chief Executive Officer or a senior executive of the Applicant.
## Award of Spectrum in the 800 and 2600 MHz bands

### ANNEX 1

### APPLICANT INFORMATION SHEET

<table>
<thead>
<tr>
<th>Full Legal Name of Applicant</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant C.R. number</td>
<td></td>
</tr>
<tr>
<td>Name and title of person</td>
<td></td>
</tr>
<tr>
<td>(Authorised Person) authorised to sign Application on behalf of Applicant</td>
<td></td>
</tr>
<tr>
<td>Name and title of contact person within Applicant</td>
<td></td>
</tr>
<tr>
<td>Telephone number of contact person</td>
<td></td>
</tr>
<tr>
<td>Fax number of contact person</td>
<td></td>
</tr>
<tr>
<td>Office address of contact person for hard copy delivery</td>
<td></td>
</tr>
<tr>
<td>Email address of contact person</td>
<td></td>
</tr>
</tbody>
</table>
Award of Spectrum in the 800 and 2600 MHz bands

ANNEX 2

BID FORM (will be provided in excel file format)

Please enter the bid amounts for the packages for which you wish to make a bid. Notice that bidding for a package also creates a commitment to be willing to accept any proper subset of that package. Please see the Information Memorandum for further details.

<table>
<thead>
<tr>
<th>Bid package</th>
<th>Spectrum included in package</th>
<th>Reserve (BHD)</th>
<th>Bid amount (BHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lots</td>
<td>B lots</td>
<td>800 MHz</td>
<td>2600 MHz</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>2×5 MHz</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>2×10 MHz</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>2×15 MHz</td>
<td>-</td>
</tr>
<tr>
<td>0</td>
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<tr>
<td>3</td>
<td>10</td>
<td>2×15 MHz</td>
<td>2×50 MHz</td>
</tr>
</tbody>
</table>

Highest bid amount in bid form: 0
The General Director
Telecommunications Regulatory Authority
P.O. Box 10353
Manama
Kingdom of Bahrain

Date

Re: Financial Guarantee

Dear Sir:

We, the undersigned [insert issuing bank] (“Bank”), irrevocably and unconditionally guarantee as primary obligor, and not merely as a surety, on behalf of [Insert Name of Bidder] which has successfully submitted a bid for a Frequency Licence in the Kingdom of Bahrain (the “Licence”), that a sum of [BHD] (amount in words) being the sum due in respect of the outstanding Spectrum Usage Rights Fee instalments (“Guarantee”) shall be payable to the Telecommunications Regulatory Authority (“Authority”) upon its written demand through the following [number of withdrawals] withdrawals:

[...]

Payment shall be made into an account to be specified by the Authority without objection or legal proceedings of any kind. We shall not delay the payment, nor shall we oppose it for any reason whatsoever. We shall inform you in writing as soon as the payment has been made.

We hereby agree that we shall not be discharged or released from this Guarantee by any arrangement between the Bidder and the Authority with or without our consent or by any alteration in the obligations undertaken by the Bidder or by any forbearance by the Authority.

The law and courts applicable to this Guarantee shall be those of the Kingdom of Bahrain. This Guarantee will come into force from [insert effective date of the Frequency Licence] and will be valid for the applicable periods outlined above.

Date

Signature