



Consultation Report on the Award of Spectrum in the 800 and 2600 MHz bands

31 December 2018

Ref: TOD/1218/008

This document provides detailed responses to the comments received by the Telecommunications Regulatory Authority (the “TRA” or “Authority”) in the context of the public consultation on the Award of Spectrum in the 800 and 2600 MHz bands with reference number TOD/0818/006.

The consultation was issued on 14 August 2018 and sought stakeholders’ views on the process for awarding spectrum in the 800 MHz and 2600 MHz bands. Stakeholders were asked to submit their comments in response to the Public Consultation Document not later than 13 Sep 2018. Based on requests for extension received, this deadline was subsequently extended to 25 Oct 2018.

Within the provided deadline, the TRA received comments from five respondents (Batelco, Viva, Zain, Samena and Huawei), which availed themselves of the opportunity to provide their opinions on the award process.

Below is a table that includes a summary of the comments received for the specific questions formulated in the consultation document, and the Authority’s response to these comments. Some respondents have submitted confidential information to support the arguments presented in their response – such information are noted by the Authority, but have not been included in the summary below.

Samena provided general comments on the scope for cross-border interference, alerting of the risks that would arise if Bahrain were to use the 2600 MHz band for FDD and KSA opted for TDD and recommending prior coordination with neighbouring administrations and using trigger field strengths in CEPT/ECC recommendations. These comments are noted by the Authority. However, it did not provide specific comments to any of the questions formulated in the consultation document, and thus Samena is not included in the summary of responses per question below.

Summary of the comment received	The Authority’s view and conclusion
<p>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.</p>	
<p>Batelco</p>	
<p>Batelco expressed its disagreement over three elements of the award process:</p> <ul style="list-style-type: none"> • Batelco is of the view that an administrative assignment is better suited for the award. • Batelco believes that in the event that the Authority goes ahead with an auction process, a second-price sealed bid format would be most beneficial. • Batelco recommends bringing forward the publication of the Authority’s decision on the auction rules by one week and the 	<p>The Authority has taken into account the feedback received and will consider the possibility of administratively assigning to each MNO a spectrum portfolio including 2x10 MHz in the 800 MHz band and 40 MHz in the 2600 MHz band. The remaining 20 MHz of spectrum in the 2600 MHz band would be offered by auction.</p>

<p>information session by two weeks relative to the timetable proposed in the consultation document.</p>	
<p>VIVA</p>	
<p>VIVA's main concern about the proposals is the risk that any bidder may only obtain 2x5 MHz of 800 MHz spectrum. Therefore, it proposes that the TRA adopts a managed assignment process for the 800 MHz spectrum with 2x10 MHz being assigned to each operator.</p> <p>Viva also requests that if the TRA decides to go ahead with an auction for the entire 2600 MHz band, then each operator should be guaranteed 20 MHz in this band.</p> <p>VIVA recommends that the TRA removes the bank guarantee requirement and that payment of the annual Spectrum Usage Rights Fee (SURF) becomes a condition for the award and retention of the license.</p>	<p><i>See the Authority's view on the response from Batelco.</i></p> <p>The Authority will maintain the requirement for applicants to provide a bank guarantee, as in previous awards.</p>
<p>Zain</p>	
<p>Zain argues that an asymmetric assignment should be avoided, and expresses a preference for using a managed assignment instead of an auction, in which each MNO would be assigned 2 x 10 MHz in the 800 MHz band to be allocated to each operator and 40 MHz to be allocated to each operator in the 2600 MHz band. Zain proposes that the remaining 20 MHz in the 2600 MHz be excluded from this award, and offered at a later date when the centre block of the 2600 MHz band becomes available. It also argues that in the event that it was not possible to assign contiguous spectrum in the 2600 MHz band to an MNO, then all MNOs should receive equally fragmented frequencies in order to maintain symmetry across the different MNOs.</p>	<p><i>See the Authority's view on the response from Batelco.</i></p> <p>The Authority has decided to award the 2600 MHz band for TDD, which is the expected use in KSA.</p> <p>The Authority will endeavour to take all the necessary measures to ensure (to the farthest possible extent) that it assigns contiguous assignments in each band to each of the MNOs.</p>

Zain also expresses a preference for selecting a duplexing method for the 2600 MHz that ensures cross-border alignment.	
Huawei	
Huawei reported not having any comments in relation to this question.	Noted.
Q2. Do you agree with the Authority's views on the need for the award of additional spectrum and the expected benefits?	
Batelco	
Batelco agrees that award of additional spectrum is necessary.	Noted.
VIVA	
VIVA supports the TRA plans to award spectrum as soon as possible and agrees with the proposed timing of the award of 800 and 2600 MHz spectrum.	Noted.
Zain	
Zain agrees with the Authority's position on the release of spectrum in the 800 MHz and 2600 MHz bands. Zain recommends the allocation of 2 x 10 MHz FDD in the 800 MHz band and a total of 40 MHz in the 2600 MHz band.	Noted.
Huawei	
Huawei strongly agrees on the TRA approach awarding more spectrum to the MNOs.	Noted.

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

Batelco

Batelco does not agree with this proposal, suggesting that the band be divided into three paired frequency blocks of 2×10 MHz instead.

See the Authority's view on the responses to Question 1.

VIVA

VIVA does not agree with this proposal, suggesting that the band be divided into three paired frequency blocks of 2×10 MHz instead, and that each bidder be guaranteed to win 2×10 MHz unless it specifically wishes to bid for 2×5 MHz only.

See the Authority's view on the responses to Question 1.

Zain

Zain believes that a 2×10 MHz block size is more appropriate for the 800 MHz band. This, combined with a managed assignment process, will allow each operator to acquire the same spectrum allocation.

See the Authority's view on the responses to Question 1.

Huawei

Huawei agrees with the TRA in general on dividing the 800 MHz into minimum blocks of 2×5 MHz. However, though an MNO would be interested in getting as minimum as 2×5 MHz block, Huawei would like to point that the main stream in other markets is to allocate consecutive blocks of 2×10 MHz to each operator.

See the Authority's view on the responses to Question 1.

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.

Batelco

Batelco expresses a preference for FDD technology in 2600 MHz band based on evaluation of the implications of both FDD and TDD duplexing modes across five key areas:

- Maturity of device ecosystem
- Maturity of network ecosystem
- Technical advantages and drawbacks of each duplexing mode
- Management of any potential interference
- Risks of delaying the award of spectrum
- 5G deployment

Batelco also argues that any delay in the award resulting from modifying proposals to licence the band as TDD should be avoided.

The Authority has decided to award the 2600 MHz band for TDD, as:

- The majority of respondents argued in favour of TDD use on the basis of greater efficiency of spectrum use, and the lower risk of interference from users in KSA;
- The majority of respondents have argued that there is no technical advantage for using FDD over TDD, as both technologies are well-developed at present;
- Saudi Administration has communicated to the Authority that it plans to use the 2600 MHz band for TDD, and thus using the band also for TDD in Bahrain will facilitate cross-border coordination and mitigate interference issues.

VIVA

VIVA believes that the entire 2600 MHz band should be configured for TDD given its multiple technical benefits such as:

- Higher spectral efficiency
- Greater compatibility with a future release of the 50 MHz centre gap
- Facilitated use of advanced antenna techniques
- Better compatibility with future 5G deployment in the band

VIVA also expresses concern about cross-border interferences and suggests harmonization.

See the Authority's view on the response from Batelco.

Zain	
Zain advocates that cross-border coordination of duplexing method with other regulators in the neighbouring countries should be the primary deciding factor on which duplexing method to use, rather than the generic benefits of a given method.	<i>See the Authority's view on the response from Batelco.</i>
Huawei	
<p>Huawei recommends that the band be used for TDD in Bahrain on the basis of:</p> <ul style="list-style-type: none"> • cross-border interference mitigation • 5G Deployment Trend and Industry Maturity on 2500 MHz TDD Band • TDD Massive MIMO as a Key Mature Spectrum Efficiency Technology Trend • Eco-system Evolution 	<i>See the Authority's view on the response from Batelco.</i>
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.	
Batelco	
<p>In the event that TDD is offered for use, Batelco is of the technical view that it would be difficult to agree at this stage on proposed DL:UL ratio or propose an alternative ratio with substantiated justification as it will require agreements from local and cross-border operators in order to synchronise.</p> <p>While a 3:1 ratio for LTE TDD deployment is reflective of smartphone-driven usage, the eventual downlink/uplink ratio which operators in Bahrain may have to use would be more dependent on most optimal</p>	The Authority has decided to adopt a downlink/uplink ratio of 3:1. The ratio may be reviewed in the future as per MNOs' requests and in coordination with neighbouring administrations if required.

DL:UL ratio for cross-border and inter-operator synchronization, mutually agreed DL for best avoidance of interference.	
VIVA	
<p>VIVA supports the use of an initial 3:1 ratio for TDD as this is the most used standard for TDD mode.</p> <p>VIVA further proposes that the ratio be reviewed if there is consensus amongst TDD users in the 2600 MHz band. One possible reason for such a review could be to improve cross border coordination with operators in the KSA</p>	<i>See the Authority's view on the response from Batelco.</i>
Zain	
Zain suggests that the downlink/uplink ratio should be determined in alignment with neighbouring countries.	<i>See the Authority's view on the response from Batelco.</i>
Huawei	
A downlink/uplink ratio of 3:1 (configuration 2 in TD-LTE) is currently the mainstream configuration for commercial LTE TDD deployments, and adapts well to real world traffic environments.	<i>See the Authority's view on the response from Batelco.</i>
<p>Q6. Do you agree with the proposed division of the band into paired 2x5 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)?</p>	
Batelco	
Batelco's preferred option is paired blocks for FDD technology, and considers a block size of 2x5 MHz to be reasonable. A non-contiguous assignment to one of the operators could have performance and implementation cost implications.	<i>See the Authority's view on the responses to Questions 1 and 4.</i>

VIVA	
VIVA proposes that the band is configured in 10 MHz unpaired lots. VIVA further proposes that a floor of 20 MHz be adopted for any isolated TDD block of 2600 MHz spectrum within a single lot category	<i>See the Authority's view on the responses to Questions 1 and 4.</i>
Zain	
Zain notes that it is extremely critical to ensure that, in the allocation of spectrum, all operators are treated fairly – either make all blocks contiguous or make all blocks non-contiguous irrespective of duplexing method. No operator should have a competitive advantage over any other operator.	<i>See the Authority's view on the responses to Questions 1 and 4.</i>
Huawei	
Huawei recommends the TRA to i) award spectrum blocks of at least 20 MHz block in the 2.5 GHz band, and ii) avoid fragmentation by planning future allocation.	<i>See the Authority's view on the responses to Questions 1 and 4.</i>
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.	
Batelco	
Batelco believes that there is no practical difference between the propagation characteristics of different blocks within the 800MHz band, and that there are no value difference across the different blocks.	Noted.
VIVA	
VIVA does not believe that there are significant differences in the value of different blocks in the 800 MHz band.	Noted.

Zain	
Zain subscribes to the position that all bands in the 800 MHz have the same value.	Noted.
Huawei	
Huawei reported not having any comments in relation to this question.	Noted.
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?	
Batelco	
Batelco sees no need for inclusion of lot categories within 800MHz if there are no significant interference issues across various blocks of 800MHz band. However, their preference is to offer this band in paired spectrum without any separate lot categories and in a manner, which guarantees contiguous assignment.	Noted. The Authority has decided not to define different lot categories for this band. The Authority will ensure that each bidder receives its spectrum as contiguous blocks in each band.
VIVA	
VIVA does not believe that there are significant differences in the value of lots in the 800 MHz band.	Noted. <i>See the Authority's view on the response from Batelco.</i>
Zain	
Zain subscribes to the position that all bands in the 800 MHz have the same value.	Noted.
Huawei	
Huawei reported not having any comments in relation to this question.	Noted.

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.

Batelco

Batelco believes that there is no practical difference between the propagation characteristics of different blocks within the 2600MHz band, hence there should not be any price differential.

However, Batelco points out that in other jurisdictions, when there is scope for greater interference risks affecting only some blocks, the relevant regulatory authority has provided sufficient clarity on such potential interference, as well as comprehensive guidelines and any additional technical measures that users of such blocks might need to undertake, well ahead of the award of spectrum. Batelco requests that TRA should ensure that all blocks are usable without restrictions or interference, or otherwise disclose all relevant information on the potential factors that may affect the value of lots.

Noted.

In light of the responses received to the consultation, and CITC's plans for the use of the band in KSA, the Authority considers that it will be possible to achieve cross-border coordination to keep potential interference at the lowest possible levels, and thus there are no value differences between the different blocks in the 2600 MHz band.

VIVA

VIVA believes that there are significant differences in value between lots in the 2600 MHz. These mainly arise out of the potential use of spectrum in the KSA. If spectrum in the 2600 MHz band is assigned as FDD spectrum this has even more serious consequences for the value of FDD lots in the range 2500-2550 paired with 2620-2690 MHz.

The Authority has been informed that CITC in KSA has announced plans to licence the whole band for commercial TDD use. This eliminates the potential risk of greater interference on some blocks that might arise from alternative use of the band in KSA. As no other sources for value differences are presented, the Authority concludes that there are no value differences between different blocks in the band.

Zain

Zain subscribes to the position that all bands in the 2600 MHz have the same value.

Noted.

Huawei	
Huawei reported not having any comments in relation to this question.	Noted.
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?	
Batelco	
Batelco sees no need for defining different lot categories within 2600MHz, assuming that there are no interference issues across various blocks of 2600MHz band. However, its preference is to offer this band in paired spectrum without any separate lot categories and guaranteeing contiguous assignments.	Noted. The Authority has decided not to define different lot categories for this band. <i>See also the Authority's view on the responses to Questions 4 and 9.</i>
VIVA	
VIVA strongly believes that there are value differences between different parts of the 2600 MHz band. VIVA believes that lots affected by MOD usage in the range 2500-2550 MHz must be a separate category with reserve prices set at minimal levels (Category 1: 2500-2550 MHz, Category 2: 2550-2570 MHz and 2620-2690 MHz).	<i>See the Authority's view on the response from VIVA to Question 9.</i> <i>See the Authority's view on the response from Batelco.</i>
Zain	
Zain subscribes to the position that all bands in the 2600 MHz have the same value.	Noted. <i>See the Authority's view on the response from Batelco.</i>
Huawei	
Huawei reported not having any comments in relation to this question.	Noted.

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.

Batelco

Batelco disagrees with the proposed spectrum caps for both 800 MHz and 2600 MHz bands. In the case of 800 MHz, Batelco is of the view that the proposed spectrum cap of 2x15 MHz per eligible bidder should be reduced to 2x10 MHz. In the case of 2600 MHz, Batelco prefers a reduction of the spectrum cap per eligible bidder from 2x50 MHz to 2x30 MHz, or at least to 2x40 MHz.

See the Authority's view on the responses to Question 1.

VIVA

VIVA believes that there should be a managed assignment for the 800 MHz band. For the 2600 MHz band, VIVA believes that the spectrum cap for the 2600 MHz band shall be reduced from the currently proposed 100 MHz to 60 MHz. If the TRA adopts a separate lot category for the range 2500-2550 MHz, then VIVA proposes that an alternative cap of 50 MHz is applied to the remaining 90 MHz of spectrum to ensure that a minimum of 20 MHz can be obtained by each bidder.

See the Authority's view on the responses to Question 1.

Zain

Zain disagrees with the proposed spectrum cap and supports a managed assignment of 2x10 MHz in the 800 MHz band and 40 MHz in 2600 MHz band to each MNO.

See the Authority's view on the responses to Question 1.

Huawei

Huawei reported not having any comments in relation to this question.

Not applicable.

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.

Batelco

Batelco agrees with the proposed reserve prices, believing that they adequately reflect the policy objectives. However, Batelco would not find it inappropriate for the Authority to moderately review upwards the price for 800 MHz spectrum if this were assigned administratively.

Noted. If spectrum is assigned administratively, then this will be offered at a revised price, higher than the proposed reserve prices for an auction process, in order to ensure that the revenue from the award process reflect the value of the spectrum, as required by NTP4.

VIVA

VIVA believes that TRA should set prices conservatively and suggests that a much lower reserve price is required than is currently proposed for the 2600 MHz spectrum which should ideally be coupled with a reduction in the annual fees in the SoF.

VIVA supports the use of benchmarks when setting prices.

See the Authority's view on the response from Batelco.
See the Authority's view on the response from VIVA to Question 9.

Noted.

Zain

Zain is of the view that the lower the price, the more cash can be devoted to infrastructure build out.

Noted. *See the Authority's view on the response from Batelco.*

Huawei

Huawei reported not having any comments in relation to this question.

Noted.

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.

Batelco

Batelco considers that the Authority must ensure that the licensed blocks are useable without any limiting local or cross-border interference. If this

See the Authority's view on the response from VIVA to Question 9.

is not the case, the Authority should disclose any limitations on any impacted block prior to spectrum assignment to the licensed operators.	
VIVA	
VIVA suggests that the total cost of ownership of impaired spectrum should be very low to reflect usability. It recommends that the 2500 to 2550 MHz reserve prices should be reduced to zero and for spectrum in the range 2550-2570 and 2620-2690 MHz, if the band is configured in TDD, there should be moderate reserve price levels. If the band is configured in FDD, reserve prices should be reduced to 0.	<i>See the Authority's view on the response from VIVA to Question 9.</i>
Zain	
Zain subscribes to the position that all spectrum blocks in the 800 MHz and 2600 MHz have the same value.	Noted.
Huawei	
Huawei reported not having any comments in relation to this question.	Noted.
Q14. Do you have any comments on or objections to the auction rules proposed?	
Batelco	
Batelco prefers a second-price sealed bid format over first-price sealed bid.	<i>See the Authority's view on the responses to Question 1.</i>
VIVA	
VIVA would prefer a Simultaneous Multiple Round Ascending (SMRA) auction format to be applied to either or both bands. However, a managed assignment is highly recommended.	<i>See the Authority's view on the responses to Question 1.</i>

Zain	
Zain advocates a managed assignment process in place of the planned auction. Zain is of the view that an assignment process would promote fair, transparent and proper dialogue amongst the Authority, market participants and stakeholders to, collectively, arrive at an optimum valuation of the spectrum and consequential impacts in terms of infrastructure rollout, quality of service and pricing.	<i>See the Authority's view on the responses to Question 1.</i>
Huawei	
Huawei reported not having any comments in relation to this question.	Noted.
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?	
Batelco	
Batelco considers that only the winning bids should be disclosed to all stakeholders that have a direct interest.	Noted. The Authority considers that the potential sensitivity of information in bid data is limited given its proposal to use a managed process for the assignment of the greatest part of the spectrum available, and that only two blocks of 10 MHz are offered by auction. Given this, the Authority has decided to publish details of all submitted bids after the auction, in order to provide greater transparency.
VIVA	
VIVA believe that all submitted bids should be published after the auction to ensure maximum transparency.	Noted. <i>See the Authority's view on the response from Batelco.</i>
Zain	
Zain's argues that a managed assignment process would, by definition, involve clarity, transparency and full disclosure of pricing.	Noted. <i>See the Authority's view on the response from Batelco.</i>

Huawei

Huawei reported not having any comments in relation to this question.

Noted.