# NOTICE OF RECOMMENDATIONS

SEPTEMBER 7, 2021

SPECTRUM MANAGEMENT AUTHORITY

KINGSTON, JAMAICA

**NOTICE OF RECOMMENDATIONS**
**SPECTRUM SCREEN**

Dear Valued Stakeholder,

The Spectrum Management Authority ('the SMA') thank all participants in the recently concluded consultation on the development of a Mobile Spectrum Screen in Jamaica. The comments received by the SMA were reviewed objectively, in collaboration with the Fair Trading Commission ('the FTC'), and the Office of Utilities Regulation ('the OUR'). The review was conducted on the basis of the need to attract new players to the Information and Communications Technology ("ICT") sector, and the fair, efficient and effective management of the spectrum. The SMA also gave thought to the policy goals, principles and objectives of the Government of Jamaica's (GoJ's) ICT Policy 2013, in particular, the following:

- ***ICT Policy Goal - Section 2.3(ii)***: Increased local and international investments. It is anticipated that the establishment of world-class high capacity ICT infrastructure and services across the island will facilitate increased investments in the country;
- ***ICT Policy Main Principles - section 2.4(i)***: ICT as a development instrument. The intention is that ICT will be utilized as a key enabler for human, social and economic development and improve the quality of life of all Jamaicans;
- ***ICT Policy Main Principles - section 2.4(ii)***: Universal Service - ICT is to be widely available and utilized by the general population;
- ***ICT Policy Main Principles – Section 2.4(iii)***: Technological Neutrality - There will be a neutral approach in technology selection and regulation;
- ***ICT Policy Main Principles – Section 2.4(iv)***: Competition within the ICT Sector - The focus of this policy is to promote competition and innovation for the benefit of consumers, producers and service providers; and,
- ***Section 4 – Spectrum***: A Natural Resource

In light of the above policy context and considerations, and the availability of related spectrum, it is the considered view of the SMA that the general guidelines, evaluation process and criteria, consulted on were fair and consistent with the desired objectives. Notwithstanding, recognising that the screen and the nature of how it is to be implemented, is at a minimum, "greenfield" to Jamaica, and giving consideration to the contributions from the operators, the SMA in collaboration with the FTC and the OUR saw the need to amend the original evaluation proposal only as it relates to the Competitive Analysis criteria. There were no other areas whereby a compelling position was presented, requiring amendment. As it relates to the Competitive Analysis criteria, the Porting Rate has been amended to reflect the following:

- If the porting rate is less than 0.391%, then 0 point is assigned;
- If the porting rate is between 0.391% and 3.863%, then 3 points are assigned; and,
- If the porting rate exceeds 3.863%, then 5 points are assigned.

Based on the amendment, the SMA will be recommending the following to the MSET, in addition to the amended evaluation mechanism, (**see Appendix 1 – Evaluation Sheet**).

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**The SMA's recommendations for the Spectrum Screen**:

The Spectrum Screen ('the screen') shall act as a benchmark to determine reasonable levels of spectrum holdings. The screen considers the total spectrum suitable and available for commercial mobile services and establishes a trigger point at which the SMA will conduct a more detailed analysis for assignment of additional spectrum above this level. Therefore, mobile service providers will be able to acquire spectrum up to the predetermined threshold without the implementation of the screen. Subsequently, each transaction that goes beyond the threshold will be evaluated on a case-by-case basis utilizing the recommended evaluation mechanism.

*Recommended Framework*:

1. A trigger point for assignments above 120 MHz of spectrum in the listed frequency bands: 700MHz, 850MHz, 900MHz, 1900MHz, and 1700/2100 MHz (AWS Band);
2. A pass mark of 70%, based on the stated evaluation mechanism, for applicants to be recommended for the licence;
3. Removing the 1800 MHz frequency band from the original list of frequency bands under the 120 MHz trigger point;
4. A trigger point at 30% in-band Screen on the listed bands allocated for mobile services, (1500 MHz, 25 GHz, 37 GHz, 43 GHz, and 66 GHz); and,
5. Review shall be conducted as necessary, in the first 2 years, but shall start no later than 6 months after a World Radiocommunications Conference.

**Further Clarification**

The SMA notes that further clarification was sought to responses provided in certain categories and wishes to respond accordingly.

*General Comments*

*"Paragraph 4 – Digicel is not clear and requires further clarity on the mechanism used to determine a spectrum award pass score of 70% and such clarification would assist in the discourse rather than wait for a review after implementation."*

**SMA's clarification** – The SMA wishes to reiterate certain points from the original response, namely; that the approach to the scoring **is not an exact science**, and is based on the SMA's best judgement, at this time, under the current circumstances. Additionally, the SMA's judgement was guided by the previously mentioned GoJ's policy positions, the nature of the transaction, and as well, the examination of each evaluation category to assess the points likely to be attained in conjunction with certain minimum expectations. As such, the entire process is subject to review. Consequently, as the instrument is used going forward the necessary adjustments will be made as the circumstances warrant.

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*Competitive Analysis*

*"Paragraph 1 to 3 – Digicel is open to discussing further on how the screening instrument could be improved and maintains that a mechanism that takes into account scope for expansion of customer base and the number of customers impacted by spectrum requested should be considered."*

**SMA's Response** - It is not immediately obvious at this moment how the excess capacity of mobile operators (with respect to installed customer based) could factor in the decision to assign additional mobile spectrum holdings, without unduly influencing the competitive landscape. However, the SMA remains open to discuss any specific insights stakeholders may have in this regard.

*"Paragraph 4 to 5 – Digicel appreciates the relaxing of the criteria. However, referencing Appendix 3, Paragraph 3 on pg 25, clarity is needed on how the total telecom subscriber number is determined."*

**SMA's clarification -** The total telecom subscriber is determined by adding the number of mobile telecom subscriptions across all telecoms providers. This information is maintained by the Office of Utilities Regulation.

*Spectrum Efficiency Calculations*

*"Digicel understands that the traffic volume used in the spectral efficiency calculation is the network peak hour. However, in SMA's calculation, while peak traffic volume is assumed to be 1/3 of total daily traffic, the duration "T" used is 24 hours. This is a contradiction with the formula on page 10, section 46 which defines T as the time over which the data bits are received. Please clarify the duration of the peak traffic that was assumed. Please reference Appendix 2 on Page 24, equation 4."*

**SMA's clarification –** The SMA concurs with Digicel and note that the 24 hours or 1 day used in the sample calculation for the traffic volume should be 1 week. The resulting calculation may be seen in **Appendix 2**

*"The CSE Evaluation Criteria requires Proposed CSE. Is the Proposed CSE to be calculated using future projected traffic anticipated with the additional spectrum? What period of forecast does the SMA require for the Proposed CSE calculation? As the SMA might appreciate, additional spectrum will improve the Quality of Service of the network and drive increased usage."*

**SMA's clarification –** The proposed CSE is to be calculated based on the future projected traffic anticipated with the use of the additional spectrum, and consistent with the current CSE requirement, the average within a week should be forecasted.

*Legacy Technologies and Public Interest*

*Digicel recommends that SMA could factor in the cost to Digicel and its customers to migrate from legacy, low spectral efficiency technology. Thus, incumbent should be awarded additional points rather than be placed at a disadvantage for having provided for the economically vulnerable in society*

**SMA's Response -** The SMA wishes to refer to its previous response to this matter under the same heading, in particular its mandate, which is to manage **the spectrum efficiently**.

*Spectral Efficiency*

*"Paragraph 2 – Digicel is requesting clarification on SMA's definition of "allowance of such circumstances" in this context. Suggestion that operators should deploy small carriers in underserved areas (capacity) is not practical in the dynamic nature of a mobile network based on unpredictability of customer behaviour"*

**SMA's clarification –** In response to FLOW's comment, the SMA, recognising that the CSE may be impacted significantly in underserved areas due to lower usage, a point also raised by Digicel, "*Digicel notes that including the underserved areas in the calculation for network spectral efficiency will tend to lower the spectral efficiency score as these areas tend to be lower usage."*, indicated that we would "*make allowance for such circumstances, whereby operators may deploy smaller carriers in those areas."*. The allowance for such circumstances, as referred here, is to provide an option to operators where these circumstances arise, to deploy smaller carriers, to account for existing/projected lower traffic volume in these areas.

**Closing Remarks**

The SMA, as mentioned previously, will recommend the proposed position, save and except for the amendment as it relates to the Competitive Analysis, to the MSET, since there were no other compelling arguments to the contrary. Additionally, the SMA takes this opportunity to reiterate its position to continue to regulate in a fair and transparent manner to the benefit of all operators/players in the wireless market, as well as the citizenry of Jamaica.

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## APPENDIX 1 – EVALUATION SHEET

**Evaluation Sheet – A worked sample evaluation sheet is included in Appendix 2.**

| Evaluation Criteria | Weighting | Score |
|---|---|---|
| ***Efficient use of the spectrum*** | **40** | **300** |
| - **Population coverage and minimum download data rate as proposed by the operator.** | | |
| At **twelve (12)** months, proposed rollout plan satisfies the following: | | |
| I. 95% or more population coverage of the entire area proposed in application, at a minimum download data rate of five (5) Mbps under peak traffic conditions. | | **100** |
| II. 75% up to 94% population coverage of the entire area proposed in application, at a minimum download data rate of five (5) Mbps under peak traffic conditions. | | **75** |
| III. 60% up to 74% population coverage of the entire area proposed in application, at a minimum download data rate of five (5) Mbps under peak traffic conditions. | | **60** |
| IV. Below 60% population coverage. | | **0** |
| - **Cell Spectral Efficiency (CSE)** | | |
| Scores are awarded based on actual spectral efficiency in the area specified by the operator (under consideration) versus spectral efficiency objectives as established by 3GPP for that technology: | | **100** |
| For current CSE Bps/Hz/cell | | |
| $2.2 \leq$ CSE | | **50** |
| $1.6 \leq$ CSE $< 2.2$ | | **37.5** |
| $1.2 \leq$ CSE $< 1.6$ | | **25** |
| Proposed CSE Bps/Hz/cell | | |
| $2.2 \leq$ CSE | | **50** |
| $1.6 \leq$ CSE $< 2.2$ | | **37.5** |
| $1.2 \leq$ CSE $< 1.6$ | | **25** |
| The points awarded will be based on the level of spectral efficiency currently and proposed, for the area under consideration. | | |

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| Evaluation Criteria | Weighting | Score |
|---|---|---|
| - **Consideration of Alternatives**<br>**For each alternative considered, 25 points are awarded, with a maximum 100 points.** | | **100** |
| • To utilize other / new spectrum not under the screen for which the spectrum under consideration is to be assessed.<br>• More efficient use of existing spectrum holdings: | | **25** |
| i) the deployment of more spectrally-efficient wireless technologies and the migration of customers to these technologies; | | **25** |
| ii) increased reuse of available radio frequencies enabled both by cell site splitting (considering Open RAN, which helps to reduce cost) and LTE-A support for enhanced small cell and Wi-Fi integration; and, | | **25** |
| iii) tighter packing of offered data into available transmission capacity, etc. | | **25** |
| • the deployment of more stations / Network upgrade - hardware upgrade to network. | | **25** |
| Note that if the Applicant considers some other factor, which is deemed acceptable by the SMA, that factor may replace any of the abovementioned.<br><br>*(Where an alternative is not considered, 0 point is awarded and the SMA may conduct its own consideration and if found to be feasible, the SMA may make an unfavorable recommendation to the Minister/Ministry with responsibility for Telecommunication.)*<br><br>**Overall, for this criterion – Efficient use of the spectrum - the Applicant may attain a maximum of 300 points based on the different factors. Therefore, if actual score is 250 the calculation shall be as follows:**<br>**Score = (actual score/maximum score possible) times weighting**<br>**= (250/300) * 30**<br>**= 25** | | |

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<table>
<tr><th>Evaluation Criteria</th><th>Weighting</th><th>Score</th></tr>
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***Competitive Analysis***

- **Contestability**

<u>*Contestability Index*</u>: Points are awarded based on the change in this index (Δ) as a result of the requested assignment as follows:

| **Post Assignment Share** | |
|---|---|
| $s_0 \geq \max\{s_1, s_2, \dots, s_n\}$ | **6** |
| $min\{s_1, s_2, \dots, s_n\} \leq s_0 < \max\{s_1, s_2, \dots, s_n\}$ | **3** |
| $s_0 < \min\{s_1, s_2, \dots, s_n\}$ | **0** |

<u>*Rapid Entry Potential*</u>

| **Entry Potential** | |
|---|---|
| Telecom mobile licence granted | **9** |
| Mobile licence requested but decision pending | **5** |
| No requests for licence/Licence denied | **0** |

</td><td>**30**</td><td>**15**</td></tr>
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- **Competitiveness**

Points awarded based on the change in the Index as well as the post-assignment competition Index (PACI) as follows:

| | | Post Assignment Competitive Index | | |
|---|---|---|---|---|
| | | $Index < 0.750$ | $0.750 \leq Index \leq 0.850$ | $0.850 < Index \leq 1.000$ |
| Change (Δ) | $\Delta < 0.010$ | 10 | 10 | 10 |
| | $0.010 \leq \Delta < 0.020$ | 3 | 8 | 10 |
| | $0.020 \leq \Delta < 0.030$ | 2 | 7 | 10 |
| | $0.030 \leq \Delta < 0.040$ | 1 | 6 | 10 |
| | $0.040 \leq \Delta < 0.050$ | 0 | 5 | 10 |
| | $0.050 \leq \Delta < 0.060$ | 0 | 4 | 10 |
| | $\sum_{i=0}^{n}$ | 0 | 3 | 10 |

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| Evaluation Criteria | Weighting | Score |
|---|---|---|
| **Consumer Behaviour**<br><br>This category is based the number of mobile numbers ported during the most recent six month period as a share of the number of subscriptions.<br><br>If the porting rate exceeds 3.863%<br>If the porting rate is between 0.391% and 3.863%,<br>If the porting rate is less than 0.391%,<br><br>A total of all sub-category scores under the competitive analysis will be the final score. | | **5**<br>**3**<br>**0** |
| ***Public Interest*** | **30** | **200%** |
| - **Expansion of coverage in unserved and or underserved areas as listed in Appendix 1** | | **100%** |
| I. 95% or more population coverage of the entire area proposed in application, at a minimum download data rate of five (5) Mbps under peak traffic conditions. | | 100 |
| II. 75% up to 94% population coverage of the entire area proposed in application, at a minimum download data rate of five (5) Mbps under peak traffic conditions. | | 75 |
| III. 60% up to 74% population coverage of the entire area proposed in application, at a minimum download data rate of five (5) Mbps under peak traffic conditions. | | 60 |
| IV. Below 60% population coverage. | | 0 |
| - **Improved coverage quality** | | **100%** |
| i. Minimum download rate of 12 Mbps at peak traffic | | 100 |
| ii. Minimum download rate of 8 Mbps at peak traffic | | 80 |
| iii. Under 8 Mbps at peak traffic | | 0 |
| **Score = (Actual Scores/Maximum Score Possible) times Weighting.** | | |

## APPENDIX 2 – CSE WORKED EXAMPLE

Consider a 700 MHz LTE network in which a 10 MHz carrier is implemented across 2400 cells. The average traffic volume carried by a user over a one-week period is 50 GB. The total number of users being served by the 700 MHz carrier across the 2400 cells is 100,000. What is the spectrum efficiency in bps/Hz/cell?

Assumptions:

- 800 Base Stations
- The total number of cells = 800*3 = 2400
- Average correctly received bits/user/week = 50 GB
- Number of users 100,000
- Frequency reuse of 1

| Item | Description | Unit | Value | Comment(s) |
|---|---|---|---|---|
| 1 | Number of users (N) | - | 100,000 | |
| 2 | Time period (T) | seconds | 604800 | Time over which bits are received |
| 3 | Traffic per user in a week | Gigabyte | 50 | |
| 4 | Traffic per user in a week | bits | 429,496,729,600 | Convert 50 Gigabyte to bits |
| 5 | Traffic for all users in a week | bits | 42949672960000000 | Item 1 * Item 4 |
| 6 | Number of cells (M) serving the subscribers | cells | 2400 | See assumptions |
| 7 | Bandwidth (ω) of the carrier | Hz | 10,000,0000 | |
| 8 | Spectral Efficiency (η) | bps/Hz/cell | - | - |

$$\text{Spectral Efficiency } (\eta) = \frac{\text{Traffic for all users in a week (bits)}}{T(\text{secs}) * \omega(\text{Hz}) * M(\text{cells})}$$

$$\text{Spectral Efficiency } (\eta) = \frac{4.29497 \times 10^{16}}{604800 * 10{,}000{,}000 * 2400}$$

$$\text{Spectral Efficiency } (\eta) = \frac{4.29497 \times 10^{16}}{1.45152 \times 10^{16}}$$

Spectral Efficiency (η) = 2.96 bps/Hz/cell

****End of Paper****