



BERMUDA
**REGULATORY
AUTHORITY**

**ECA Section 78
Transitional Spectrum Investigation**

**Spectrum Efficiency and
Usage Self-Assessments**

Notice and Information Request
Matter: SC-1222/2013
Date: 7 October 2013
Responses Due: 29 October 2013

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1 INTRODUCTION

1.1 Purpose

1. The purpose of this Notice and Information Request (“Notice”) is to provide holders of Individual Communications Operating Licences (“ICOLs”) and associated Spectrum Licences with instructions regarding the format and the minimum content of the submissions required by Clause 7.4(b) of their Spectrum Licences. All ICOL holders with associated Spectrum Licences are required to submit, by 29 October 2013:

a report approved by the Licensee’s Board of the Directors containing a detailed analysis of spectrum usage by the Licensee, in the format prescribed by the Authority, in relation to services that were provided using the Assigned Frequencies for the Authorized Uses as at the date of the commencement of Part 12 of the ECA.

2. For the purposes of this Notice, these submissions will be referred to as Spectrum Efficiency and Usage Self-Assessments (“SEUSAs”). The information contained in the SEUSAs will be considered by the Regulatory Authority (“RA” or “Authority”) together with evidence received from interested third parties and data collected independently by the Authority, in conformity with Section 78 of the Electronic Communications Act 2011 (“ECA”).
3. This Notice also sets out the information that all ICOL holders required to provide SEUSAs in accordance with paragraph 11 below must provide to the Authority to enable it to perform its duties under the ECA.
4. Finally, the Notice invites submissions from any parties with material and credible information relevant to the Section 78 investigations in accordance with paragraph 14.

1.2 Legislative Background

5. ECA Section 73(2)(c) provides for the award of 18-month transitional spectrum licences to ICOL holders reflecting their respective spectrum assignments (if any) at the time of the ECA’s commencement (*i.e.*, 28 January 2013). These transitional Spectrum Licences were duly awarded to eligible ICOL holders by the Authority on 29 April 2013.
6. ECA Section 78 requires that during the 18-month transitional period:

The Authority shall conduct an investigation of the spectrum assignments reflected in the spectrum licences granted to ICOL holders pursuant to section 73(2)(c) and any other COL holders pursuant to section 76 for the purpose of determining whether the frequencies assigned are being utilized efficiently, and the Authority may, upon expiry of the 18 month term—

(a) decline to renew the spectrum licence; or

(b) modify the spectrum licence to authorize the use of a reduced amount of spectrum,

if the licence holder fails to demonstrate a reasonable need for some or all of the spectrum assigned to it, and the Authority

concludes that such measures are necessary to ensure the efficient use of spectrum.

7. Accordingly, Clause 7.4 of each transitional Spectrum Licence issued in connection with an ICOL requires that:

The Licensee shall cooperate fully with the Authority in identifying whether and to what extent the Assigned Frequencies are being used efficiently and whether the Licensee has a reasonable need for all or a portion of the Assigned Frequencies in accordance with Section 78 of the ECA, including as follows:

- (a) The Licensee shall promptly provide any information requested by the Authority concerning the Licensee's actual or proposed use of the Assigned Frequencies and other Radio Spectrum resources.*
- (b) The Licensee shall submit to the Authority, no later than six months following the effective date of this Licence, a report approved by the Licensee's Board of the Directors containing a detailed analysis of spectrum usage by the Licensee, in the format prescribed by the Authority, in relation to services that were provided using the Assigned Frequencies for the Authorized Uses as at the date of the commencement of Part 12 of the ECA.*
- (c) The Licensee shall comply fully with any timetables established by the Authority for the release of any of the Assigned Frequencies if required by the Authority, provided that the timetable for release shall commence no sooner than 29 October 2014.*

8. RAA Section 91(1) also provides that

Where necessary to perform its obligations under this Act or under sectoral legislation, the Authority may issue an order requiring a person to take any or all of the following actions—

- (a) furnish such information as the Authority may reasonably require;*
- (b) produce to the Authority any documents specified or described; or*
- (c) keep such records as may be specified or described.*

2 INVESTIGATION PROCEDURE

10. This investigation is being undertaken in accordance with ECA Section 78.
11. A SEUSA must be submitted by any ICOL Holder that currently holds a transitional Wireless Cable Spectrum Licence, a Commercial Mobile Radio Service Spectrum Licence, and/or a Fixed Wireless Access Spectrum Licence, as explained below in Section 3.1. A separate SEUSA is required for each type of Spectrum Licence.
12. ICOL Holders need not submit a SEUSA in connection with Spectrum Licences for Point-to-Point Microwave or Other Mobile Radio Services, and compliance with Clause 7.4(b) of those Spectrum Licences is hereby waived by the Authority.
13. The SEUSAs, including any supporting comments, technical evidence, and analysis must be submitted before 5:00 pm (Bermuda time) on 29 October 2013.
14. Interested parties are also invited to provide any credible evidence in their possession of the efficient or inefficient use of part or all of the spectrum assigned to one or more ICOL holders. This evidence will be discussed with the affected ICOL holders during the course of the Authority's investigation; however, the identity of the party providing such evidence will remain confidential if so requested.
15. SEUSAs and other third-party evidence from other interested parties should be filed electronically in MS Word or Adobe Acrobat format. Parties filing or other evidence should go to the Authority's website, www.rab.bm, following the link to the "Consultations & Responses" page, and click the "Click here to submit a response" icon which appears at the top of the page. All responses should be clearly marked as: "SEUSA (or "Third-Party Evidence") in Response to Notice and Information Request: ECA Section 78 Transitional Spectrum Investigation SC-1222/2013" and should otherwise comply with Rules 18 and 30 of the Authority's Interim Administrative Rules.
16. The Authority intends to consider the evidence provided in the SEUSAs along with other relevant evidence, including benchmark studies, in preparing a report on the results of its investigation (the "Investigation Report") along with a draft decision on modifications to the transitional Spectrum Licences and the renewal of same for a period of ten years.
17. The Authority does not intend to publish the SEUSAs in light of their inherently confidential nature. However, non-confidential summaries of the information contained in the SEUSAs will form part of the Authority's Investigation Report, which will be published as part of a consultation process, as discussed below. An indicative timetable for the investigation, consultation and final disposition of the transitional Spectrum Licences is set out in Annex 1. The Chief Technical Officer is the principal point of contact at the Regulatory Authority for interested persons during this consultation. He may be contacted by email at mwells@rab.bm or by mail at:

Michael Wells
Chief Technical Officer
Regulatory Authority
Cumberland House – Third Floor South
1 Victoria Street,
Hamilton, Bermuda

18. In this document, except insofar as the context otherwise requires, words or expressions shall have the meaning assigned to them by the RAA, the ECA, and the Interpretation Act 1951.
19. This Notice is not a binding legal document and does not contain legal, commercial, financial, technical or other advice. The Authority is not bound by the notice, 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 the Authority of its functions and powers, and the carrying out of its duties and the achievement of relevant objectives under law, such contents are without prejudice to the legal position of the Authority.

3 TRANSITIONAL SPECTRUM INVESTIGATION

3.1 Scope of Investigation

20. The RA is required by ECA Section 78 to conduct an investigation of the spectrum assignments granted to ICOL holders for the purpose of determining whether the assigned frequencies are being utilized efficiently. The ECA places the burden of proof on the licensee to demonstrate a reasonable need for the spectrum it has been assigned. If the licence holder fails to demonstrate a reasonable need for some or all of the spectrum is has been assigned the RA may decline to renew the spectrum licence, or modify the spectrum licence to authorize the use of a reduced amount of spectrum, if the RA concludes that such measures are necessary to ensure the efficient use of spectrum.
21. RAA Section 16(d) states that “In performing its duties under this Act, the Authority shall act in a reasonable, proportionate and consistent manner”. ECA Section 2 defines the term proportionate as “no more than reasonably necessary to achieve a given regulatory objective, taking into account the relative cost of compliance and the ultimate benefit to consumers.”
22. Given these guidelines the RA has determined that it is reasonable to limit the scope of this investigation to “high value” spectrum assignments, where the potential for demand to exceed supply and the need to ensure efficient spectrum assignments are greatest. Consistent with this approach the RA will limit this investigation to the spectrum associated with Wireless Cable Spectrum Licenses, Commercial Mobile Radio Service Spectrum Licenses, and Fixed Wireless Access Spectrum Licenses. Excluded from the scope of this investigation are the spectrum assignments associated with Other Mobile Radio Service Spectrum Licences and Point-to-Point Microwave Spectrum Licences.
23. The specific assignments that are the subject of this investigation are identified below in Section 4.

3.2 SEUSA Methodology

24. In this investigation the Regulatory Authority will consider multiple metrics when assessing efficiency, including Spectrum Efficiency Ratios and Spectrum Reuse, which are discussed below.
25. We also encourage any ICOL Holder that currently holds transitional Wireless Cable Spectrum Licence, a Commercial Mobile Radio Service Spectrum Licence, and/or a Fixed Wireless Access Spectrum Licence to provide any additional evidence that it believes demonstrates a reasonable need for the spectrum it has been assigned or wishes to retain following the conclusion of the ECA Section 78 investigation.¹

3.2.1 Spectrum Efficiency

26. Generally, efficiency can be described as a ratio, such as the output per unit of input. Using this simplified form a Spectrum Efficiency Ratio (“SER”) can be defined as:

$$\text{SER} = \text{Information Transmitted} / \text{Spectrum Impacted}$$

¹ This evidence must include sufficient supporting data so that the Regulatory Authority is able to verify results. Assumptions and calculations should be described in detail and supported by field measurements and network usage data.

or

$$\text{SER} = \text{Bits-per-second} / \text{megahertz of spectrum in use}^2$$

27. It follows then that “Spectrum efficiency occurs when the maximum amount of information (i.e., output) is transmitted within a given amount of spectrum (i.e., input), or equivalently, when the least amount of spectrum is used to transmit a given amount of information.”³
28. For each spectrum assignment provided in the tables found in Section 4 the Regulatory Authority will calculate a SER based on the information it receives from the relevant Licensee and other available data.⁴

3.2.2 Spectrum Reuse

29. The Regulatory Authority will also consider the degree to which licensees are employing the efficient reuse of the spectrum they have been assigned.

3.3 Information Required from Selected ICOL Holders

30. For each spectrum assignment provided in the tables found in Section 4 the assignee is required to provide a frequency-plan that, at minimum, contains the following information for each site:
 - (a) Site Name / ID;
 - (b) Latitude;
 - (c) Longitude;
 - (d) Height Above Sea Level;
31. And for each sector on each site:
 - (a) Site Name / Sector Name / ID;
 - (b) Antenna Height Above Ground Level (“RAD Center”);
 - (c) Azimuth;
 - (d) Frequency Band;
 - (e) Technology and Version / Revision number;
 - (f) Carrier Frequencies and Channels implemented;
 - (g) Transmitter Power (EIRP)⁵; and
 - (h) Which other sectors (Site Name / Sector Name / ID) have coverage which overlaps with this sector.

² This general form is consistent with Recommendation ITU-R SM.1046-2. The Regulatory Authority will initially consider the geometric space (or area) under consideration as the whole Bermuda. Analysis of smaller areas will be considered as needed.

³ Federal Communications Commission Spectrum Policy Task Force; Report of the Spectrum Efficiency Working Group; dated November 15, 2002; page 7.

⁴ We note that Licensees may provide their own SER calculations for the Regulatory Authority to consider.

⁵ Equivalent or Effective Isotropic Radiated Power.

32. Where multiple sectors and frequency bands are deployed at a single site, each sector/frequency band combination should be individually identified. Where a carrier frequency contains multiple logical channels (e.g. for GSM) the number of control and number of traffic channels should be separately identified.
33. For each sector, licensees should provide evidence of the peak and average occupancy (or utilisation) of the sector as experienced during both the busiest and typical one hour period, respectively, for all dates between 14 October and 20 October.⁶
34. Additionally, licensees should provide any and all available network management data and documentation that will assist the Authority in determining the degree to which existing spectrum assignments are being used efficiently.

3.4 Affirmation by Board of ICOL Holders

35. The Board of each ICOL Holder submitting a SEUSA pursuant to Section 3.2 and the information required in Section 3.3 must provide, together with its submission, a duly executed Affirmation in the form set forth in Annex B. A similar affirmation in substantially the same form must also accompany any information provided in response to this Notice by other interested parties.

⁶ Specifically, using 24 hour time notation, 00:00 Monday 14 October to 23:59 Sunday 20 October.

4 ASSIGNMENTS

37. Each of the tables that follow is derived from the associated Spectrum License.⁷ For each table, the relevant Licensee should describe the services supported by the indicated frequencies. Respondents should indicate and explain why any frequency or channel is currently not being utilized and should document any plans for the future use of the spectrum.

4.1 Commercial Mobile Radio Service

38. Respondents may limit the scope of their responses to the frequencies associated with “Base Station to Mobile”.

4.1.1 Bermuda Digital Communications

| Band | Frequency (MHz) | | Block Size (MHz) | Frequency (MHz) | | Block Size (MHz) |
|----------------------|------------------------|--------|------------------|------------------------|--------|------------------|
| | Mobile to Base Station | | | Base Station to Mobile | | |
| Cellular A+ A" Block | 824.0 | 835.0 | 11 | 869.0 | 880.0 | 11 |
| Cellular B Block | 835.0 | 845.0 | 10 | 880.0 | 890.0 | 10 |
| Cellular A' Block | 845.0 | 846.5 | 1.5 | 890.0 | 891.5 | 1.5 |
| Cellular B' Block | 846.5 | 849.0 | 2.5 | 891.5 | 894.0 | 2.5 |
| PCS E | 1885.0 | 1890.0 | 5 | 1965.0 | 1970.0 | 5 |
| PCS F | 1890.0 | 1895.0 | 5 | 1970.0 | 1975.0 | 5 |
| PCS C | 1895.0 | 1910.0 | 15 | 1975.0 | 1990.0 | 15 |

4.1.2 Telecommunications (Bermuda & West Indies)

| Band | Frequency (MHz) | | Block Size (MHz) | Frequency (MHz) | | Block Size (MHz) |
|-------|------------------------|--------|------------------|------------------------|--------|------------------|
| | Mobile to Base Station | | | Base Station to Mobile | | |
| GSM A | 1850.0 | 1865.0 | 15 | 1930.0 | 1945.0 | 15 |
| GSM B | 1870.0 | 1885.0 | 15 | 1950.0 | 1965.0 | 15 |

⁷ See <http://rab.bm/radio-spectrum>. Respondents should contact the Regulatory Authority as soon as possible if there are inaccuracies or errors in these tables.

| | | | | | | |
|-------|--------|--------|---|--------|--------|---|
| GSM D | 1865.0 | 1870.0 | 5 | 1945.0 | 1950.0 | 5 |
|-------|--------|--------|---|--------|--------|---|

4.2 Fixed Wireless Access

39. Tables in this section may contain only the upper and lower bounds of given assignments. SEUSAs should indicate all frequencies which have been assigned and specify which are:

- (a) currently in use;
- (b) not currently in use; and
- (c) intended for future use.

4.2.1 Bermuda Digital Communications

| Frequency (MHz) | |
|-----------------|------------|
| Tx | Rx |
| 3300.0000 | 3400.0000 |
| 27500.0000 | 28350.0000 |

4.2.2 Electronic Communications Limited

| Frequency (MHz) | |
|-----------------|----------|
| Tx | Rx |
| 166.1250 | 170.9250 |

4.2.3 Logic Communications

| Frequency (MHz) | |
|-----------------|------|
| From | To |
| 3400 | 3600 |

4.2.4 Telecommunications (Bermuda & West Indies)

| Frequency (MHz) |
|-----------------|
|-----------------|

| Tx | Rx |
|-----------|-----------|
| 10157.25 | 10563.25 |

4.2.5 Telecommunications Networks Limited

| Frequency (MHz) | |
|------------------------|-----------|
| Tx | Rx |
| 452.0875 | 462.9125 |

4.3 Wireless Cable

4.3.1 BDB

| Frequency (MHz) | |
|------------------------|-----------|
| From | To |
| 2500.0 | 2686.0 |

4.3.2 Digital Mobile Television

| Frequency (MHz) | |
|------------------------|-----------|
| From | To |
| 500.0 | 506.0 |
| 506.0 | 512.0 |

4.3.3 World on Wireless

| Frequency (MHz) | |
|------------------------|-----------|
| From | To |
| 614.0 | 806.0 |

Appendix A – Investigation and Consultation Process, and Indicative Timetable

Illustrative Timetable

| Date | Action |
|----------------------------------|---|
| 7 October 2013 | RA issues Notice providing ICOL Holders the content and format requirements of the SEUSA being required by the RA as part of the Transitional Spectrum Investigation, inviting public comments, and requesting any technical evidence or analysis concerning the efficient or inefficient use of spectrum by individual ICOL holders. |
| 29 October 2013 | Deadline for submission of Responses (SEUSAs and Third-Party Evidence). |
| 30 October – 15 November 2013 | Follow up questions from RA and meetings with selected ICOL Holders to discuss: <ul style="list-style-type: none"> • spectrum identified for recovery; • timetable for vacating spectrum; and • any potential technical impediments that could delay release beyond 29 October 2014. |
| 19 December 2013 | RA publishes Investigation Report and initiates consultation on: <ul style="list-style-type: none"> • Report; and • Draft of Final Decision on Spectrum License Modifications. |
| 31 January 2014 | Deadline for comments on draft Final Decision and Draft Determination. |
| 28 February 2014 | RA issues Final Decision on Spectrum License. |
| 29 October 2014 | Spectrum licences terminate; earliest date for mandatory vacation of spectrum (per Spectrum Licence cl. 7.4(c)). RA issues renewed Spectrum Licences (modified or unmodified) for all spectrum classes with 10 year duration. |

Note: Dates are tentative and subject to change.

APPENDIX B – AFFIRMATION TEMPLATE

Affirmation

I, the undersigned, being the Chairman of the Board of Directors of **[INSERT ICOL HOLDER]**, hereby confirm that all of the information submitted in this report in response to the Authority's ECA Section 78 Transitional Spectrum Investigation, Spectrum Efficiency and Usage Self-Assessments Notice and Information Request (Matter SC-1222/21-3) has been verified by the company's Chief Operating Officer and Chief Technology Officer (or their equivalents) as being true, complete and accurate and that, accordingly, the report has been duly approved for submission to the Regulatory Authority by resolution approved by the Board of Directors of **[INSERT ICOL HOLDER]** as required by Clause 7.4(b) of **[INSERT ICOL HOLDER]**'s **[TYPE]** Spectrum Licence:

I, the undersigned, being the Chairman of the Board of Directors of [INSERT ICOL Holder]

Signed: _____

Name: _____

Date: _____

Witnessed by:

Signed: _____

Name: _____

Date: _____