



Digicel

Digicel's Response to Ministry of Education and Economic Development Spectrum Policy
Consultation

Consultation Matter: SC-1695-2014

23 May 2014



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We thank you for inviting Digicel to provide its comments on this consultation and of course are available for any questions you may have.

Please do not hesitate to refer any questions or remarks that may arise as a result of these comments by Digicel to: -

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Introduction

We agree with a comparative selection (or beauty contest approach) for the allocation of spectrum where there is a shortage of spectrum. The Ministry must do its best to plan ahead in terms of freeing up suitable spectrum to ensure that: a/there are as few spectrum shortages as possible; b/ that there are as many alternatives (in terms of spectrum ranges available) as possible over which to provide particular services. This will avoid spectrum shortages in the first place, reduce the level of investment risk imposed on the industry that would otherwise occur, and in turn reduce the dampening effect on investment which results from uncertainties about future spectrum availability.

The Ministry will also we hope want to be reasonable in terms of the overall cost burden on the communications sector. As the Ministry is aware, unlike in other Caribbean jurisdictions, there is imposed upon the mobile industry alone a handset fee. The handset fee by itself represents substantially more than the total spectrum fees paid in other jurisdictions. The handset fee is impacting the sector, and changing the overall market because it raises the cost of mobile ownership and raises the price of owning a mobile in comparison with obtaining telecommunications services via, for example, fixed lines. Spectrum fees would be another cost that would have to be recovered by increasing the cost of mobile ownership, or at the very least by slowing the rate of decline of the price of mobile ownership. In this light we believe that if the Government is to progress with spectrum fees for the mobile industry, it needs to consider the overall picture in terms of spectrum fees, and/or the Government reduce or bring an end to the handset fee for the mobile industry.

Digicel hopes that the Ministry's appraisal of spectrum policy will seek to level the playing field in the mobile sector by equalizing the distribution of the 850MHz mobile band. Currently CellOne has several unfair advantages over Digicel as a result of CellOne's current holding of all the available 850MHz mobile spectrum. In order to overcome CellOne's spectrum advantage Digicel has to build more cell sites because Digicel's higher band 1900 MHz spectrum will not travel as far or penetrate buildings as effectively. That approach however dramatically raises Digicel's costs compared to those of CellOne. In any event, however, as a result of the very high population density in Bermuda it is extremely difficult to find additional sites acceptable for the location of cell sites. The only practical way forward that avoids market distortion is to fairly divide the 850MHz spectrum between operators.



CONSULTATION QUESTIONS

Consultation Question 1: Do you agree that it is reasonable and proportionate for the Regulatory Authority to define “High Demand Spectrum” and subject it to more stringent spectrum management procedures with respect to allocations, assignments, and fees? Please explain your answer.

Spectrum policy should be aimed at maximizing the amount of spectrum available for certain purposes such as mobile broadband for which it is anticipated there will be a high demand. This means making spectrum available in as many mobile broadband capable bands as possible so that operators in the market are not subjected to excessive risks from not obtaining specific bands. The downsides from not getting first choice spectrum can be made less severe if more alternative choices are made available. The increasing levels of uncertainty and risk placed on potential investors in this industry because of increasingly rapid and unknowable technological changes has to be borne in mind.

If fewer bands for mobile broadband spectrum available, operators are forced down a kind of high risk spectrum funnel which is to the loss of everyone. If only a small amount of mobile broadband spectrum is made available it puts operators in a kind of all or nothing situation and with the following predicament:

a/ get the available spectrum at all costs as there is no other choice;

however,

b/ technology is changing increasingly rapidly and possible returns on investment are becoming more and more uncertain so there is an increasing prospect that any spectrum obtained may prove to be the wrong choice;

however,

c/ if there is no other possible spectrum available or little such spectrum the operator risks being frozen out of the market by technological developments;

and

d/ if spectrum is expensive a wrong step (which is becoming increasingly likely) can cause a great deal of damage to the company that guesses incorrectly about the future.



Therefore the first objective should be to widen the number of bands available for high demand applications such as mobile broadband to reduce investment risks, and prices should be kept down for the same reasons.

Consultation Question 2: Do you agree that the frequencies shown in Table 1 are those where the potential for demand to exceed supply and the need to ensure efficient spectrum assignments are the greatest? Please explain your answer.

The frequencies listed are in demand. The Government also needs to take in to account the exceptionally high population density and consequent enormous difficulties with locating cell sites in Bermuda. Bermuda has one of the very highest population densities globally. This means that more spectrum may be required than otherwise. As a part of an holistic approach to spectrum policy the Government should do everything it can to make existing infrastructure under the control of the Government available for cell site location.

a. If you disagree, please explain which frequency ranges should be added and/or deleted from the definition of HDS frequencies. Please explain why your proposed revision is justified.

As intimated previously the level of demand for these particular bands can be reduced to some extent by two things under the control of the Government:

- a/ making available other spectrum available for mobile services;
- b/ making it easier to locate transceivers for mobile services.

It should be the ambition of Government Policy to reduce the number of what it terms HDS frequencies by freeing up spectrum for mobile broadband use. The following table indicates some of the possible frequencies that could be made available in this regard.



New spectrum bands under consideration

Band	Being considered as preparatory work for WRC-15
694-790 MHz ('700 MHz)	Yes (agreed in principle at WRC-12)
1452-1492 MHz	Already allocated
2300-2400 MHz	Already allocated
3400-3600 MHz	Already allocated
450-470 MHz	Already allocated
470-694 MHz	Yes
1375-1400 MHz/1427-1452 MHz	Yes
2700-2900 MHz	Yes
3600-3800 MHz	Yes
3800-4200 MHz	Yes
5350-5470 MHz/5725-5925 MHz	Yes

Source: Ofcom Spectrum Management Strategy Paper¹

Consultation Question 3: Do you agree that the Minister should establish a Bermuda FAT for HDS frequencies based on the FCC's frequency allocations? Please explain your answer.

Yes, this is necessary for transparency and to enable communications providers and the public generally to provide constructive input about the way that spectrum is managed.

Consultation Question 4: Do you agree that the Minister should establish a BBP, based on the band plans adopted by the FCC, for each of the frequencies in the Bermuda FAT? Please explain your answer.

¹ Ofcom (UK) Spectrum Management Strategy – Ofcom's strategic direction and priorities for managing spectrum over the next 10 years



Yes. For reasons of equipment and handset compatibility and to provide the best chance for sufficient market demand to make investments viable.

Consultation Question 5: Are there instances, either general or specific, in which you believe that Bermuda would benefit by varying its frequency allocations and/or band plans from those adopted by the FCC? Please explain your answer.

At this time there are no variations we are aware of that would be suitable other than allowing the FCC 700MHz public safety bands to be used for commercial purposes if demanded, and if it seems unlikely a dedicated public safety network will be constructed and the security forces are more likely to use commercial services instead.

Consultation Question 6: Do you agree with the Minister's proposal to address the allocation of non-HDS frequencies at a later date? Please explain your answer.

Yes, as they are not a priority.

Consultation Question 7: Do you agree with the Minister's proposed allocation(s) for the 700 MHz band? Please explain your answer.

Yes

a. If you disagree with the Minister's proposal please explain which alternative allocation(s) should be adopted, and why.

Consultation Question 8: Do you agree with the Minister's proposal for the establishment of the 700 MHz BBP? Please explain your answer.

Yes, but band D (Downlink) should not be used if band C is allocated, since the DL of D would then be adjacent to UL of C and this will cause interference.

a. If you disagree with the Minister's proposal please explain which alternative band plan should be adopted, and why.



Consultation Question 9: Do you agree with the Minister's proposed allocation(s) for the 850 MHz band? Please explain your answer.

Yes

a. If you disagree with the Minister's proposal please explain which alternative allocations should be adopted, and why.

Consultation Question 10: Do you agree with the Minister's proposal for the establishment of the 850 MHz BBP? Please explain your answer.

No. It is not efficient and it is hard to utilize Lower A' and B'.

a. If you disagree with the Minister's proposal please explain which alternative band plan should be adopted, and why.

Split the band in two parts where each is 2x12.5MHz to be used for UMTS and GSM. This will allow for equal spectrum for Digicel and CellOne.

Consultation Question 11: Do you agree with the Minister's proposed allocation(s) for the 1900 MHz band? Please explain your answer.

Yes

a. If you disagree with the Minister's proposal please explain which alternative allocations should be adopted, and why.

Consultation Question 12: Do you agree with the Minister's proposal for the establishment of the 1900 MHz BBP? Please explain your answer.

Yes

a. If you disagree with the Minister's proposal please explain which alternative band plan should be adopted, and why.



Consultation Question 13: Do you agree with the Minister’s proposed allocation(s) for the 2100 MHz band? Please explain your answer.

Yes

a. If you disagree with the Minister’s proposal please explain which alternative allocations should be adopted, and why.

Consultation Question 14: Do you agree with the Minister’s proposal for the establishment of the 2100 MHz BBP? Please explain your answer.

Yes

a. If you disagree with the Minister’s proposal please explain which alternative band plan should be adopted, and why.

Consultation Question 15: Do you agree with the Minister’s proposed allocation(s) for the 2500 MHz band? Please explain your answer.

Yes

a. If you disagree with the Minister’s proposal please explain which alternative allocations should be adopted, and why.

Consultation Question 16: Do you agree with the Minister’s proposal for the establishment of the 2500 MHz BBP? Please explain your answer.

Yes

a. If you disagree with the Minister’s proposal please explain which alternative band plan should be adopted, and why.

Consultation Question 17: Do you agree with the Minister’s proposed allocation(s) for the 3.5 GHz band? Please explain your answer.

Yes



a. If you disagree with the Minister's proposal please explain which alternative allocations should be adopted, and why.

Consultation Question 18: Do you agree with the Minister's proposal to not establish a BBP for the 3.5 GHz band at this time? Please explain your answer.

Yes

a. If you disagree with the Minister's proposal please explain which band plan should be adopted, and why.

Consultation Question 19: Do you agree with the Minister's proposal to maintain the FCFS approach to spectrum assignment for non-HDS spectrum going forward? Please explain your answer. If you disagree, please explain how this spectrum should be assigned, and why.

The qualifier here is that the Authority should keep track of the proposals made by the main regional groupings of ITU Members in terms of future use of spectrum. We have indicated some of the possible future bands for mobile broadband previously. While the future cannot be predicated we should like to ensure that the Authority makes a decision based on the best information available at the time. Therefore if spectrum falls in to the category of potential mobile broadband ranges, the Authority should consider what contingencies can be put in place to enable easier re-farming in future if it is at this time allocate for some other purpose.

Consultation Question 20: Do you agree that the Regulatory Authority should be permitted to assess non-trivial and non-refundable application fee, for example, in the range of \$10,000 to \$20,000 per applicant for HDS frequencies? Please explain your answer.

We agree as this will help to prevent frivolous applications.

a. If you disagree what level of fee do you believe is appropriate? Please explain your answer.

Consultation Question 21: The Minister has come to the tentative conclusion that a hybrid FCFS-Comparative Section assignment method for HDS frequencies is most practicable and in line with the Spectrum Management Objectives and general purposes of the ECA. Do you agree with this conclusion? Please explain your answer.



As indicated previously the starting point should be a policy which seeks to avoid spectrum shortages and the need to place any spectrum in what has been termed the High Demand Spectrum (HDS) category in the first place. The next step is to bear in mind based on the best current information what spectrum is likely to be used for in future when deciding whether a pure First Come First Served (FCFS) approach is to be adopted or whether contingencies need to be included in the licence allocations to allow for re-farming. Subject to these two initial approaches we agree on an FCFS approach (subject to a non-trivial application fee) where only one party seeks particular spectrum and a comparative selection (or beauty contest) approach where more than one party seeks the same spectrum.

Consultation Question 22: The Minister has identified a number of possible criteria for the comparative selection spectrum assignment process. Do you agree with the relevance of these criteria? Please explain your answer.

a. What criteria do you believe should be added or removed from consideration? Please justify your proposed revisions.

With respect to the criteria of local presence and ability to hold a licence under Jamaica law we believe these are better rounded in to one and in fact are not criteria at all: they become simply one absolute legal test as to whether someone can provide services or not. So these should be excluded from weightings.

The establishment of the most competitive and innovate telecommunications environment possible will require overseas investment and the ability to call on highly specialized technical persons in limited supply internationally. Consequently the criteria should include the ability of a communications provider operator to attract international investment to Bermuda and to maximize innovation in service provision.

Consultation Question 23: What approximate weighting should be attached to the criteria identified by the Authority and any others that you have identified in answering the previous question?

Criteria	Weight %
Promotion of Spectrum Management Objectives	15
Financial position	30
Technical Capability	30
Spectral Efficiency	10



Innovation	10
Other Benefits	5
Total	100

Consultation Question 24: The Minister proposes that no carrier can be assigned more than 50% of any HDS band. Do you agree with this proposal? Please explain your reasoning.

As indicated, the underlying starting policy must be to make sufficient spectrum available as to minimize the chance of spectrum being categorized as HDS. Depending on the circumstances this may or may not make sense. For example if spectrum is split too finely it may not be possible to make use fully of the technologies that require it. With respect to LTE for example, 40MHz (20MHz paired) would be needed to reap the maximum benefits from the technology in terms of speed (speeds are roughly proportional to the amount of spectrum provided).

Therefore we do not think that the 50% allocation maximum can be imposed as a hard rule. Caps are best avoided and if imposed need to assess first the impact they will have on the usefulness of the spectrum that could subsequently be provided to one operator as well as proven need.

a. If you disagree, do you believe that HDS assignments should not be capped or that the cap should be set at a different level, or applied in a different manner? Please explain your answer.

See above.

Consultation Question 25: Do you agree with the Minister's proposal to calculate the total amount of spectrum in each HDS band based on commercially usable spectrum? Please explain.

Agreed.

a. If you disagree, please explain how you believe this calculation should be made.

Consultation Question 26: Do you agree with the Minister's proposal to allow the Regulatory Authority to waive strict compliance with the proposed spectrum cap only to accommodate the differences in block sizes within a band plan? Please explain.



See answer to previous question 24 – caps are best avoided if possible.

a. Do you believe the Regulatory Authority should be permitted to waive strict compliance under any other circumstances? If so, please explain.

Consultation Question 27: Do you agree that the AIP methodology are consistent with the requirements of the ECA and provide the best means of incentivising efficient use of spectrum? Please explain your answer.

a. If you disagree, please explain what alternative pricing scheme the Minister should consider for HDS bands.

As indicated previously there should be an underlying policy to maximize available spectrum and alternatives to first choice spectrum so that HDS categorisations are minimized. For example in an extreme case if the spectrum was not managed properly and less spectrum was made available than would have been possible, it would be Ministry's policy that would be responsible for forcing a band in to the HDS category and artificially creating a shortage of suitable spectrum.

By avoiding competition for suitable bands that would permit more spectrum to be subjected to administrative pricing only ie pricing that recovered only the cost of administering the spectrum. The Government's policy should be to seek to place as much spectrum in this category as possible. AIP pricing, which also seeks to recover opportunity costs, should be avoided if at all possible.

Consultation Question 28: The Minister proposes to establish the annual fee for the 850 MHz band at \$37,000. Do you agree that this level of fees is reasonable, and sufficient to encourage spectral efficiency? Please explain your answer.

We have looked at prices for 700MHz, 850MHz and 900MHz around the world to compare with the prices put forward by the Authority. We have assembled 61 different fees for 700, 800, 850 and 900MHz spectrum and these are detailed in the tables below. The averages of the 3 different tables all point to a reasonable spectrum price for Bermuda for 700MHz and 850MHz spectrum of less than US\$7,000 per annum per 2*1MHz.

Given that we think that the Government should be cautious in terms of introducing spectrum fees for the first time, and given other cost burdens on the industry, and the need to encourage



investment we believe that the lower boundary is more suitable and that spectrum fees should be no greater than US\$6,500 per annum for 700MHz and 850Mhz.

We detail each of the tables below:



The table below considers 700MHz and 800MHz spectrum². We have derived the average price of spectrum normalized to US\$ per number of MHz per capita per annum. The consequent fee is US\$6,528 per annum for 2MHz.

² Worldwide Sample

1. The total licence payments also include any annual licence fees that the licence holder may have to make. These are discounted to the start of the licence duration using a post-tax real discount rate of 4.1%, as applied by Ofcom in its recent UK consultation.
2. Different countries have issued licences for different durations, and where the duration was not consistent they were scaled first to 15 years.
3. Price/MHz/capita in local currency – We divided the auction proceeds by the amount of spectrum awarded and the population of the benchmark country, to arrive at a price per MHz per head of population in the local currency.
4. Price/MHz/capita in USD – We converted the normalised auction payments in the local currency to US dollars. However, rather than using the simple currency exchange rate, we use the purchasing power parity (PPP) exchange rate. This provides a measure of the difference in affluence between two countries as it takes into consideration both the standard exchange rate and the relative prices of goods in each country, as well as the earning power of inhabitants.
5. Price/MHz/capita inflated to 2014 – Finally, we inflated the resulting benchmarks to January 2014 real-terms values. As the benchmark awards have happened at different points in time and inflation has changed the nominal value of money since these times, we inflated each benchmark from the beginning of its licence period to January 2014 using USD monthly inflation figures.
6. Finally we converted the Price/MHz/pop for 15 years to annual payments.



Country	Licence Price USD/MHz/capita/year
Australia, 2013, 700MHz	0.0597
Austria, 2013, 800MHz	0.0834
Belgium, 2013, 800MHz	0.0348
Croatia, 2012, 800MHz	0.0375
Croatia, 2013, 800MHz	0.0425
Czech Republic, 2013, 800MHz	0.0561
Denmark, 2012, 800MHz	0.0142
Finland, 2013, 800MHz	0.0201
France, 2011, 800MHz	0.0446
Germany, 2010, 800MHz	0.0653
Iceland, 2013, 800MHz	0.0096
Ireland, 2012, 800MHz	0.0875
Italy, 2011, 800MHz	0.0633
Lithuania, 2013, 800MHz	0.0018
Netherlands, 2012, 800MHz	0.1047
New Zealand, 2013, 700MHz	0.0199
Panama, 2013, 700MHz	0.0296
Portugal, 2011, 800MHz	0.0618
Romania, 2012, 800MHz	0.0544
South Korea, 2011, 800MHz	0.0459
Spain, 2011, 800MHz	0.0444
Sweden, 2011, 800MHz	0.0185
Switzerland, 2012, 800MHz	0.0127
Taiwan, 2013, 700MHz	0.0642
United Kingdom, 2013, 800MHz	0.0346
United States, 2008, 700MHz	0.1040
Average	0.0467

The table below also considers 700MHz spectrum prices. In this case for the Caribbean. We have derived the average price of spectrum normalized to US\$ per number of MHz per capita per annum. This consequent fee is US\$7,618 per annum for 2MHz.



Country (700 MHz)	US\$/MHz/capita/year
Anguilla	0.240
Antigua and Barbuda	0.042
Bahamas	0.020
Barbados	0.040
Dominica	0.087
Grenada	0.057
Puerto Rico	0.041
St Kitts & Nevis	0.110
St Lucia	0.043
St Vincent & the Grena	0.054
TCI	0.079
Trinidad and Tobago	0.040
US Virgin Islands	0.041
Average	0.055

The table below considers 850 to 900MHz³. We have derived the average price of spectrum normalized to US\$ per number of MHz per capita per annum. The consequent fee is US\$7,076 per annum for 2MHz.

³ See footnote 2.



Country	Licence Price USD/MHz/capita/year
Austria, 2013, 900MHz	0.0763
Brazil, 2010, 950MHz	0.0004
Brazil, 2011, 850MHz	0.0006
Denmark, 2010, 900MHz	0.0031
Greece, 2011, 900MHz	0.0396
Hong Kong, 2011, 850MHz	0.1600
Hong Kong, 2011, 900MHz	0.1970
Hungary, 2012, 900MHz	0.1109
Iceland, 2012, 900MHz	0.0069
Ireland, 2012, 900MHz	0.0794
Netherlands, 2012, 900MHz	0.0910
Panama, 2013, 850MHz	0.0083
Peru, 2012, 900MHz	0.0018
Portugal, 2011, 900MHz	0.0460
Romania, 2012, 900MHz	0.0578
Slovenia, 2013, 900MHz	0.0394
Spain, 2011, 900MHz	0.0229
Spain, 2011, 900MHz	0.0361
Spain, 2011, 900MHz	0.0372
Switzerland, 2012, 900MHz	0.0228
Taiwan, 2013, 900MHz	0.0262
Average	0.0507

Consultation Question 29: Do you agree with the Minister’s proposal to rely on the values derived from the UK AIP Study (with minor modifications) to establish fees for other HDS band assignments? Please explain your answer.

We agree that spectrum value will decrease as the frequency increases. We have no alternative ratios to offer the Authority in this regard.

Consultation Question 30: Do you agree with the relative pricing per band based on the ratios provided in the table above? Please explain your answer.

a. If you disagree please propose alternative ratios and justify your revisions.



Consultation Question 31: The Minister has examined a number of means for levying spectrum fees and has tentatively concluded that the option that is most consistent with the objectives of the ECA is the levying of a periodic fee. Do you agree that a periodic fee per 2x1 MHz is preferable to an upfront fee for spectrum? Please explain your answer.

If a fee is levied we agree that we should pay on a quarterly basis.

a. Do you agree that this fee should be assessed on a quarterly basis? Please explain your answer.

If a fee is levied we agree that we should pay on a quarterly basis.