



The Bahamas Telecommunications Company
Limited:

Response To

Draft Policy for New Spectrum Bands – 700 MHz,
11 GHz, 12 GHz and 42 GHz

Consultation Document
ECS 1/2012

Legal, Regulatory and
Carrier Services Division
20th February, 2012

BTC Response to

Draft Policy for New Spectrum Bands – 700 MHz, 11 GHz, 12 GHz and 42 GHz

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1 INTRODUCTION

BTC's response is organised according to the URCA Consultation Document, responding to the six questions posed by URCA.

BTC is pleased provide this response and thanks URCA for organising this public consultation. BTC will be pleased for its response to this consultation to be published.

2 EXECUTIVE SUMMARY

BTC generally approves of URCA's Draft Policy for New Spectrum Bands – 700 MHz, 11 GHz, 12 GHz and 42 GHz, but has some specific comments which it suggests URCA should take into account in finalising the Policy. BTC's comments align to URCA's questions and are summarised here.

URCA Question #1: Spectrum Pricing. BTC is pleased with the recommended interim pricing for the newly opened standard spectrum bands. For the future, BTC recommends that URCA should set prices which cover spectrum management costs in the standard bands.

For the pricing of the premium bands, BTC recommends that URCA should pursue a course which will result in cost-based prices for premium spectrum. Too high a price will depress the market and result in inefficient use of spectrum. A high price above the cost of spectrum management would also represent a 'sector specific tax' on communications, which would be to the detriment of the economy.

URCA Question #2: Geographic Aspects. BTC is pleased a 700 MHz nation-wide assignment of spectrum will be made. In the 11 and 12 GHz bands, BTC recommends that URCA also makes nation-wide assignments, in order to support the development of nation-wide roll-out of backhaul networks by operators.

URCA Question #3: 700MHz Band. BTC agrees with URCA's proposal to offer access to the 700MHz band through nation-wide assignments. BTC supports the proposed band plan as it aligns well with the operational bands defined by 3GPP for LTE as well as band plans defined by other regional administrations. BTC does note, however, that URCA has proposed limiting any single operator to a maximum of two blocks within the band plan. BTC notes that this removes the opportunity for an operator to make use of the wider operational band defined by 3GPP (699-716 MHz/ 729-746 MHz). BTC is of the view that an operator should be able to apply for this band, if it wishes and recognises that greater fees will be paid, as it will benefit The Bahamas through greater spectrum efficiencies and higher data rates.

Finally, if URCA intends to issue technology neutral licences for this band, BTC believes that a spectrum mask must be established in order to control interference between blocks and other services. BTC would welcome the opportunity to comment on any proposed spectrum mask.

URCA Question #4: 11GHz Band. BTC supports URCA's technical recommendations for the 11GHz band. BTC recommends that for commercial network use, URCA should make available nation-wide assignments of channels within the band to facilitate the roll-out of microwave backhaul networks with a consistent equipment type.

URCA Question #5: 12GHz Band. BTC supports URCA's technical recommendations for the 12GHz band. Again, BTC recommends that for commercial network use, URCA should make available nation-wide assignments of channels within the band to facilitate the roll-out of microwave backhaul networks with a consistent equipment type.

URCA Question #6: 42GHz Band. BTC is satisfied with URCA's proposals for the 42GHz band.

3 BTC RESPONSES TO URCA QUESTIONS

3.1 URCA Question #1

Do you agree with URCA's proposals for interim pricing of newly opened standard spectrum bands? Please provide detailed reasons for your response, including if appropriate, alternative proposals.

BTC Answer to URCA Question #1:

BTC is pleased with the recommended interim pricing for the newly opened standard spectrum bands. For the future, BTC recommends that URCA should continue to set prices which cover spectrum management costs in the standard bands.

For the pricing of the premium bands, BTC recommends that URCA should pursue a course which will result in cost-based prices for premium spectrum. Too high a price will depress the market and result in inefficient use of spectrum. A high price above the cost of spectrum management would also represent a 'sector specific tax' on communications, which would be to the detriment of the economy, as we argue below.

However, too low a price could result in a "first-come first served" approach by URCA, and so again would be economically inefficient. Therefore BTC recommends that URCA's objective should be to achieve prices for premium spectrum which cover administrative costs. If URCA feels that such prices would be too low, it should attach universal service requirements to the use of spectrum, rather than pushing the spectrum price up. Such an approach will be in the best interests of the Bahamian economy and society, and will ensure that there is no 'digital divide' since all areas will have access to good high-speed mobile broadband services.

Universal Service Requirements

BTC observes that in The Bahamas the relatively small size of the local market, and the requirement for universal coverage mean that the deployment of mobile broadband access in the 700 MHz band, combined with backhaul in the 11 GHz band, will generate excellent economic and social benefits, provided the spectrum is made available at cost-based prices.

There is an important requirement for universal coverage of the 32 populated islands and surrounding sea areas with mobile broadband services. If affordable spectrum is made available, this will enable BTC to expand coverage even to areas where demand is relatively light. This in turn will assure a high level of mobile broadband service to all areas and citizens, and thus will avoid the "digital divide" between areas that have access to higher speed broadband services, and those that do not. People living on the smaller more remote islands will have an equal chance to participate in and use high-speed services as those on the large islands.

This equal access for all will generate the maximum achievable economic and social benefits for all Bahamians.

Keeping payments for spectrum aligned to spectrum management costs

BTC submits that too high a price for spectrum will depress the market for spectrum and hence for services which utilise that spectrum; and this would be inefficient with spectrum

lying idle. However, too low a price could lead to a “first-come first served” approach, and so again would be economically inefficient.

Public Telecommunications Service Providers in The Bahamas should not be required to pay prices for radio spectrum, whether by means of spectrum fees or through auction payments, which exceed the costs of administering the spectrum. BTC already pays taxes in the form of Business Licence and Communications fees and, so any additional payment is, in effect, a sector specific tax which is not paid by other industry sectors, and therefore distorts the economy. Our arguments against high spectrum charges are as follows:

- In a knowledge-based global economy, effective use of high quality broadband is an essential input to social and economic development. Therefore charging excessively for radio spectrum would be a disincentive to effective use, which would raise the cost of supply of mobile and broadband services, and thus raise the price of them, and hence reduce their demand. High spectrum charges are inconsistent with development of the economy as a whole. We note here the recommendation of the ITU's Broadband Commission for Digital Development. At its meeting in Geneva in October 2011 it called for *“governments to avoid taxing ICT services unnecessarily to enable both fixed and mobile broadband markets to realise their full growth potential”*.
- Narrow sectoral taxes are an inefficient means of raising government revenue as they distort economic activity. In this case, activity is diverted from the telecoms sectors to other areas of the economy. Given that the Electronic Communications sector is a key driver of economic activity, this is not efficient. Telecommunications services such as mobile and broadband are likely to face elastic¹ demand and imposing levies on these services will have a highly distortionary impact, compared to levying taxes on all products or on highly price-inelastic goods such as fuel and tobacco.
- There are also social benefits from keeping the price of premium spectrum low. The operators will be able to compete on the basis of wide coverage and innovative services, so consumers will benefit from using services wherever they may be and from a wide choice of services and equipment.
- In the long term effective use of mobile and broadband will boost the Bahamian economy, encourage diversification and substantially grow the tax base from which the government can raise revenues.

We therefore recommend that spectrum charges are kept at a level which recovers spectrum management and administrative costs.

¹ 'Elastic demand' means that the demand for the good or service varies strongly with the price at which it is offered. High prices mean low demand and vice versa.

3.2 URCA Question #2

Do you agree with URCA's approach to the geographical categories for licensing of newly opened spectrum bands? Please provide detailed reasons for your response, including if appropriate, alternative proposals.

BTC Answer to URCA Question #2:

URCA proposes a nation-wide approach to licensing 700MHz. BTC agrees with this approach.

BTC observes that there are benefits to the sector to have nation-wide allocations, particularly in the 700 MHz band but also at the higher frequencies². At 700 MHz the most suitable application is mobile services with nation-wide coverage, so to sub-divide The Bahamas geographically at the same frequencies would lead to a large inter-operator coordination burden which in turn would lead to highly inefficient use of spectrum. Single assignments of bands will allow operators to design their networks for maximum spectrum re-use and will enable operators to offer customers services to be available everywhere. Nation-wide allocation will also enable operators to offer Universal Service.

In the 11 and 12 GHz bands similar arguments apply. For example BTC proposes to use the 11 GHz band across The Bahamas to tie the islands together for a backbone network.

Therefore, BTC recommends that regional or per-island licensing of the 11 and 12 GHz bands for commercial use is in general not practical from an economic standpoint. In addition to the resulting diseconomies, it would demand coordination of spectrum allotment and assignment between islands and impose an additional spectrum management burden on URCA for no real benefit. BTC therefore suggests that for commercial use, nation-wide assignments or allotments are superior in that:

- They result in more efficient use of spectrum
- Co-existence management between islands is avoided
- The cost-effectiveness of small markets which would result from an island-by-island approach would be poor.

Therefore BTC strongly recommends the use of nation-wide assignments or allotments where the envisaged service is commercial.

²For below 3.4GHz:

- (i) Licenses will be valid for the whole of The Bahamas. This aligns with BTC's previous response, and suggests that the position is maintained.
- (ii) Conditions will be placed on licences to cover the 5 main islands plus 6 others. This represents about 98% of population / 76% of land mass (assuming the most highly populated islands are those included).

3.3 URCA Question #3

Do you agree with URCA's proposals for licensing the 700 MHz band? Please provide detailed reasons for your response, including if appropriate, alternative proposals.

BTC Answer to URCA Question #3:

BTC sees itself as a leader in the region with respect to applying appropriate technologies in The Bahamas. BTC has a strong interest in the 700MHz band and is committed to offering public access services here, should BTC be granted a relevant spectrum licence. This interest and commitment is demonstrated by BTC's Expression of Interest submitted as part of BTC's response³ to URCA's Consultation Document "Opening New Spectrum Bands (URCA Consultation Document ECS 23/2010)", as well as BTC's application in July 2011 for a spectrum licence to operate in this band.

Packaging of the Band

With a relatively small population of 353,000, The Bahamas has to intelligently follow the technology paths established by industry leaders in the big markets in North America, Europe or Asia. BTC therefore expects that the paired portions of this band will be used to deploy 4G/ LTE technology. Globally, the rate of commercial network deployment is expected to be faster for 4G/LTE than for any previous wireless technology and 4G/ LTE is becoming the mobile communications standard of choice for next generation networks. The GSA⁴ states that, by January 2012, 49 LTE networks had commenced commercial operations, with a forecast that by the end of 2012 this figure will increase to over 110 commercial networks. Several of these live networks make use of the 700MHz band.

Network equipment and user terminals that support the 700MHz band are therefore becoming increasingly available. This is a key point for BTC given that service deployment in this band is critically dependent on the availability of appropriate equipment. Given this, BTC believes that 4G/ LTE services in this band should be available as soon as possible to ensure that The Bahamas is in step with other countries in offering high-speed mobile services, and can support roamers in the tourism and finance sectors as soon as they start arriving in any numbers. BTC therefore recommends URCA to licence this band as quickly as possible.

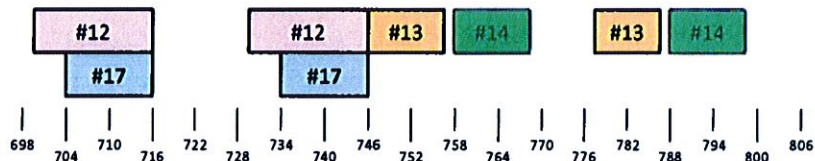
URCA has proposed a band plan for 700MHz based on a 6MHz raster which provides for mostly paired FDD carriers, with a smaller amount of spectrum set aside for TDD operation. URCA notes that this plan is based on those used in nearby administrations, including the USA, Trinidad and Tobago and those member administrations of ECTEL. This is a somewhat outdated and inefficient band plan, given that leading modern wireless technologies typically operate on a 5MHz raster.

BTC has compared URCA's proposed band plan for 700MHz with the band plans used by these administrations, as well as with the band plans contained in 3GPP's LTE standard. Figure 1 below illustrates this comparison. The raised parts of each band plan show where differences exist when compared to URCA's proposed band plan.

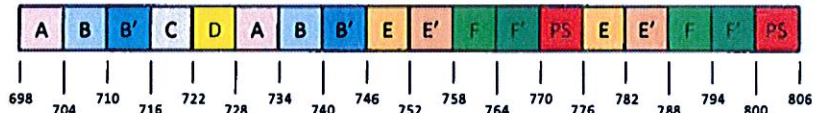
³ Dated 16 November 2010

⁴ The Global mobile Suppliers Association, www.gsmcom.com

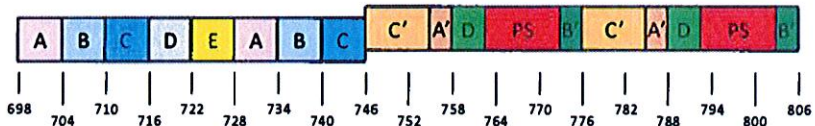
LTE 700MHz Frequency Bands (3GPP 36.104)



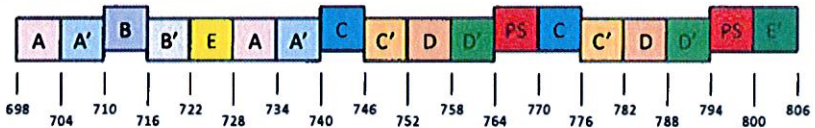
URCA Proposed 700MHz Band Plan



FCC 700MHz Band Plan



ECTEL 700MHz Band Plan



TATT 700MHz Band Plan

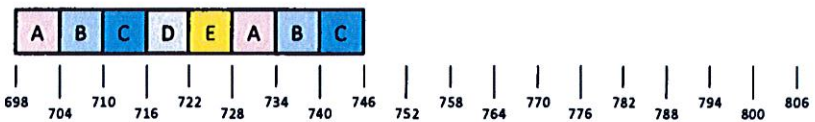


Figure 1: Comparison of Various Approaches to Allocation of the 700 MHz Band

From this comparison, BTC notes that the spectrum below 746MHz follows the same plan as the USA and Trinidad & Tobago. There are some differences in the channel locations and bandwidths in the spectrum above 746MHz, when compared to the USA plan, but there is generally a good overlap (with the exception of one or two of the bands). The Trinidad & Tobago plan does not extend above 746MHz. URCA's plan shows some alignment with the ECTEL plan, however there are a number of pairing variations (although the duplex spacings are maintained).

From BTC's viewpoint, the key comparison is with the band plans defined by 3GPP for 4G/LTE. URCA's band plan aligns well with the 4G/LTE standard band plan, in that the channel edges are coincident. However BTC does note that, due to the 6MHz raster proposed by URCA, the LTE bandwidths of 10MHz and 15MHz will be contained in 12MHz and 18MHz bandwidths, respectively. URCA's proposed band plan therefore represents a somewhat inefficient and outdated band architecture. BTC would prefer to see an architecture that is more reflective of the most modern technology, and hence is of the view that block sizes in multiple of 5 MHz would be preferable as this would be in-line with international norms for modern mobile broadband communications technologies systems.

Despite this, and whilst URCA's plan does not represent the most efficient use of spectrum, BTC recognises that it does provide some benefits in terms of controlling interference between blocks. However, what BTC would like to see more information on from URCA are proposals on how interference between blocks and adjacent users are to be controlled.

BTC understands that URCA intends to licence this band on the basis of technology neutrality. BTC therefore recommends that URCA consider the use of "spectrum masks" as the means of controlling harmful interference between spectrum users whilst allowing technology neutrality. The particulars of the spectrum mask used will impact the way that the spectrum can be used for network deployment.

BTC therefore supports URCA's proposed band plan, whilst having some reservations around the 6MHz raster (in terms of spectrum efficiency) and interference management (in terms of its impact on network deployment).

URCA has also proposed that operators are limited to a maximum of two blocks each, and that preference will be given to the allocations of blocks B/ E/ F' to those operators who are allocated blocks B/ E/ F. BTC notes that these align well with the 3GPP 4G/LTE band plans discussed above. However, BTC does note that the limitation of two blocks per operator will preclude any operator from making use of 3GPP 4G/ LTE band #14 (which has a bandwidth of 15MHz). This will therefore preclude any operator realising the full benefits of higher spectral efficiency and increased data throughput rates that this wider band will offer. So, whilst BTC is supportive of URCA's proposals on block limitations and preference block allocations, BTC recommends that URCA considers allowing an operator the option to acquire the three blocks of A, B and B'.

The technical solution proposed will support URCA's published plans for the two operator model in The Bahamas.

Licence Terms and Conditions:

In its Consultation Document, URCA sets out its proposals for some of the key Licence Terms and Conditions. BTC largely supports these proposals, with a reservation on the proposed conditions that limit the services that may make use of the band.

URCA has proposed that the band be limited in its use, such that it can only be used to build and maintain a public "access" network with any usage for backhaul being secondary and incidental only. URCA has also proposed that the band must be used to provide electronic communications services available to the general public in all licensed areas in The Bahamas.

BTC urges URCA to consider a service neutral approach to licensing the band, in line with the Communications Act of 2009 which requires technology neutrality and encourages service neutrality, insofar as it is a means of achieving economically efficient spectrum use taking into account the evolution of new technologies and services. This will allow demand to determine what the most economically efficient use of this band may be, in terms of the technology used and the services offered, provided technical limitations are conformed to that control interference to other spectrum users. In defining these technical limitations to control interference, BTC recommends that URCA consider defining appropriate "spectrum masks". BTC recognises that some development effort is required on URCA's part to produce these spectrum masks, however BTC believes that URCA could simplify this by making good use of masks defined by other administrations around the world. BTC would request the opportunity to comment further on any proposed spectrum masks as the particulars of the mask will impact the way that the band can be used for network deployment.

Aside from this reservation, BTC supports the other licence terms and conditions proposed by URCA:

- Licensing on a national basis: BTC believes that it is only through licensing on a national basis that the true benefits of these bands to The Bahamas will be realised.
- Spectrum must be in commercial use within 18 months, and the proposed specific coverage conditions must be met. Being 'prime' spectrum, it is essential that this

band is not allowed to be acquired and not used. BTC supports these conditions to ensure that the band will be used to the full benefit of The Bahamas.

Application procedure:

BTC supports the application procedure proposed by URCA, and urges URCA to commence licensing this band as soon as possible to ensure that ensure that The Bahamas is in step with other countries in offering high-speed mobile services.

Licence Fees

URCA has proposed licence fees of \$8,000 per block for the majority of blocks, with blocks A, C and D benefitting from a reduced fee of \$6,000, and the Public Safety blocks having a fee yet to be decided. URCA also states that these fees will be payable until URCA revises its Fee Schedule.

In the light of the current fee structure, and the fact that URCA plans to revise the fees as part of its wider review of Fees, BTC supports this proposed fee structure.

Figure 2 below shows an analysis of licence fees (mainly auctions) for similar bands in various countries around the world over recent years. It should be recognised that many of the higher figures reflect a revenue maximising approach rather than one emphasising additional coverage and universal service. In this regard, the countries with low figures are of more interest to The Bahamas.

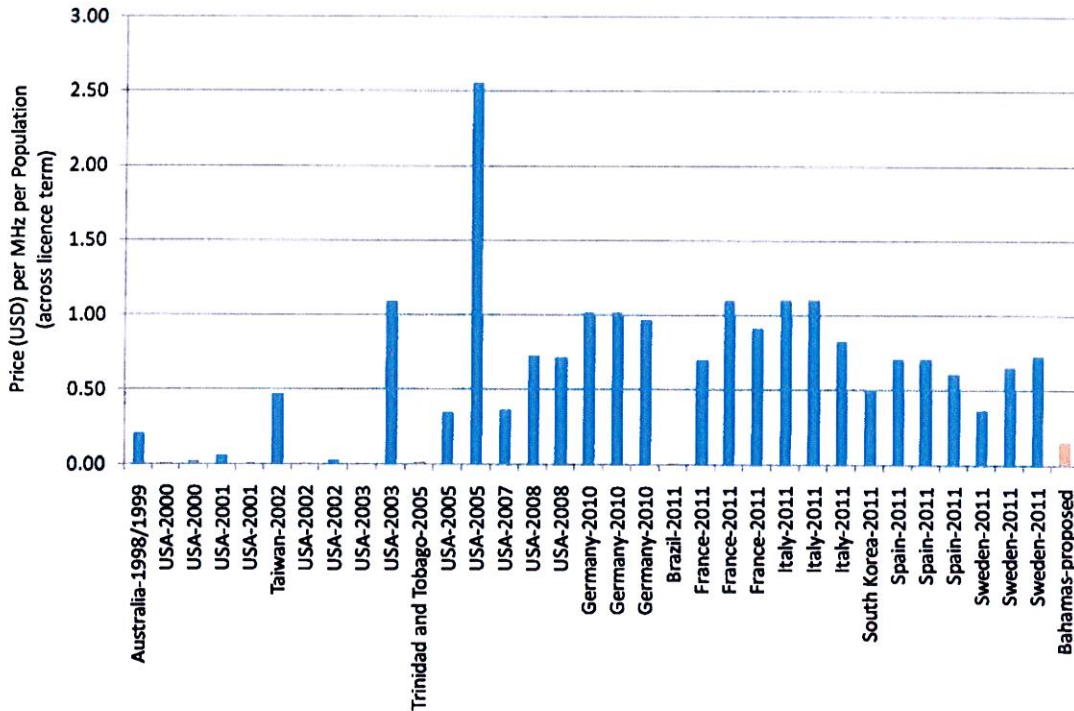


Figure 2: Comparison of Licence Fees for the 700 MHz Band

This figure shows that the proposed licence fees of \$8,000 per MHz are towards the lower end of international pricing. BTC notes that the small population of The Bahamas, together with its significant (relative to population) geographic spread, would also suggest that the lower end of benchmarks is the appropriate place to be. We also note that a similar licence in Trinidad & Tobago (which was the only specific data point that could be located for the region) attracts fees which are around 10% of URCA’s proposed interim fee.

Time Schedule for Application and Licensing:

BTC supports the time schedule for application and licensing proposed by URCA, and urges URCA to commence licensing this band as soon as possible to ensure that The Bahamas is in step with other countries in offering high-speed mobile services.

3.4 URCA Question #4

Do you agree with URCA's proposals for packaging, pricing and licensing the 11 GHz band? Please provide detailed reasons for your response, including if appropriate, alternative proposals.

BTC Answer to URCA Question #4:

BTC is interested in the 11 GHz band to be used primarily for backhaul links. While BTC has an extensive fibre networks (i.e., BDSNi – The Bahamas Domestic Submarine Network international), it still needs microwave links to facilitate middle-mile backhaul from the base stations. With increasing use of mobile and wireless broadband services, greater backhaul capacity will be needed.

The 11 GHz band can be used for point-to-point or point-to-multipoint services including base station backhaul purposes. For a block assignment on a nationwide basis, there should be a "use it or lose it" clause.

The ITU-R Region 2 primary allocation for the 11 GHz band is FIXED, FIXED-SATELLITE, MOBILE except aeronautical mobile. Therefore use for backhaul services is consistent with ITU. BTC observes that 11.7 to 12.7 GHz is used for Ku-band downlinks in Region 2, so URCA will have international obligations and there will be a need for co-ordination.

Establishing a single nation-wide network to support the wide coverage which BTC plans in mobile access in the 700 MHz band will have certain advantages. Use of a single type of equipment will enable a standard approach to be used and will mean that BTC will have some buying power and that lower prices for equipment can be reached.

URCA makes a number of proposals as regards the draft policy for the 11GHz band:

- URCA proposes to follow ITU-R Recommendation F.387-10, recommendation 1.2, for the packaging of this band, with a proposed maximum channel size of 40MHz. URCA further proposes that the technical parameters that will be established for this band will meet FCC CFRs 47 Part 101.
- URCA proposes issuing ISLs for this band.
- URCA proposes that the relevant Licensing Guidelines, in force at the time of application, will apply, and a 'First Come First Served' basis will be used for assignment of the spectrum.
- URCA proposes that licence fees will align with URCA's fee schedule.
- URCA proposes that applications will be accepted once the 11GHz band Policy is implemented.

BTC supports all of these proposals. BTC also believes that this band should be licensed on a national basis, as this will support the rapid establishment of backbone connectivity whilst minimising any inter-operator coordination issues.

3.5 URCA Question #5

Do you agree with URCA's proposals for packaging, pricing and licensing the 12 GHz band? Please provide detailed reasons for your response, including if appropriate, alternative proposals.

BTC Answer to URCA Question #5:

BTC has moderate interest in this band.

URCA makes a number of proposals as regards the draft policy for the 12GHz band:

- URCA proposes to follow the FCC plan given in the Code of Federal Regulations 47, Part 101.1405. It also proposes that licences be national or regional ('Single Family Island'). Any block size is permitted, within the restrictions of the band plan. The band will be technology neutral. Protection will be given to existing DBS and NGSO/FSS satellite services.
- EIRP, EPFD and PFD power limits are proposed, as are requirements to site antennas to avoid causing interference to DBS customers. One-way services are permitted, but not mobile and aeronautical operations.
- URCA proposes that the relevant Licensing Guidelines, in force at the time of application, will apply, and a 'First Come First Served' basis will be used for assignment of the spectrum.
- URCA proposes that interim licence fees of \$20 per MHz for a national licence and \$5 per MHz for a Single Family Island licence will apply, and that these will be revised when URCA's fee schedule is amended.
- URCA proposes that applications will be accepted once the 12GHz band Policy is implemented.

BTC supports all of these proposals, in particular that licences for this band should be assigned on a national basis.

3.6 URCA Question #6

Do you agree with URCA's proposals for packaging, pricing and licensing the 42 GHz band? Please provide detailed reasons for your response, including if appropriate, alternative proposals.

BTC Answer to URCA Question #6:

BTC has minimal interest in this band.

URCA makes a number of proposals as regards the draft policy for the 42GHz band:

- URCA proposes a band plan that will permit up to a 1 GHz contiguous block assignment, with a maximum of one block being assigned to an operator. It also proposes that licences be national or regional ('Single Family Island').
- URCA proposes issuing ISLs for this band, granted in line with URCA's Licensing Guidelines, in force at the time of application.
- URCA proposes that the relevant Licensing Guidelines, in force at the time of application, will apply, and a 'First Come First Served' basis will be used for assignment of the spectrum.
- URCA proposes that interim licence fees of \$10 per MHz for a national licence and \$2.50 per MHz for a Single Family Island licence will apply, and that these will be revised when URCA's fee schedule is amended.
- URCA proposes that applications will be accepted once the 42GHz band Policy is implemented.

BTC supports all of these proposals.

4 RESERVATION OF RIGHTS

BTC has addressed the issues but reserves the right to comment at any time on all issues and states categorically that the decision not to respond to any issue raised in this Consultation in whole or in part does not necessarily represent agreement in whole or in part with URCA's position, nor does any position taken by BTC in this consultation mean a waiver of any of BTC's rights in any way. BTC expressly reserve all its rights.

**Prepared by:
Regulatory Technical Department
Legal, Regulatory and Carrier Services Division
The Bahamas Telecommunications Company Limited (BTC)
20th February, 2012**