

SPECTRUM MANAGEMENT: Bangladesh Perspective

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BTRC



**TO GIVE YOU A COMPREHENSIVE IDEA ABOUT
BANGLADESH AND ISSUES RELATED TO SPECTRUM
MANAGEMENT MORE PERTAINING TO THE ECONOMIC
ASPECTS**



- a. Bangladesh – At a Glance**
- b. BTRC – National Regulatory Body**
- c. Evolution of BTRC and Telecommunication Profile of Bangladesh (Focusing on MNOs)**
- d. Spectrum Economics: Related Case Studies**
- e. Way Forward and Few Takeaways**



BANGLADESH – AT A GLANCE





**Father of the Nation
Bangabandhu Sheikh Muzibur Rahman**

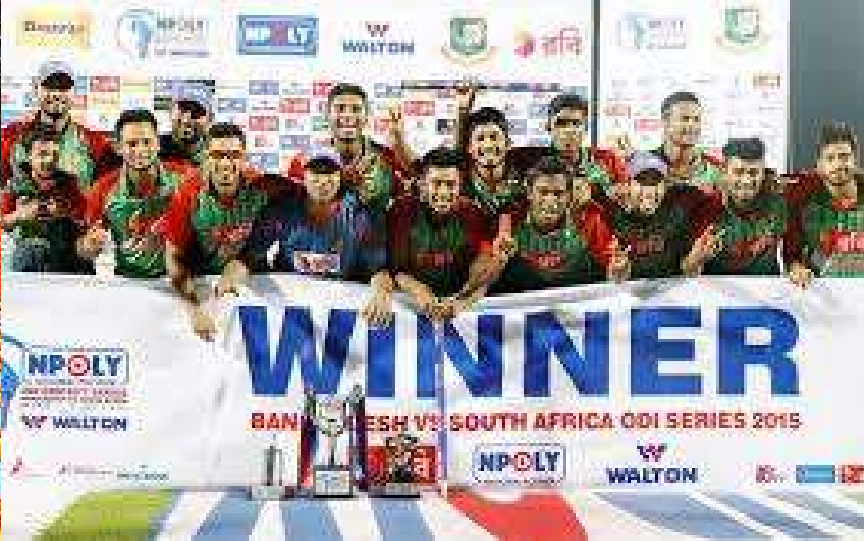


1,47,570 SQ Km



Divisional Headquarters : 08
Administrative Districts : 64
Sub Districts : 488

National Parliament Building - Dhaka





- 8th Most Populous Country
- Population is 159 Mn

- Density/Sq Km is 1049 persons
- 70% Live in Sub – urban and rural areas

- 70% Depend on Agriculture as Livelihood
- Per Capita income will increase by 11.36% to make \$1466

Bangladesh GDP Growth rate



SOURCE: WWW.TRADINGECONOMICS.COM | BANGLADESH BANK

Bangladesh GDP Per Capita



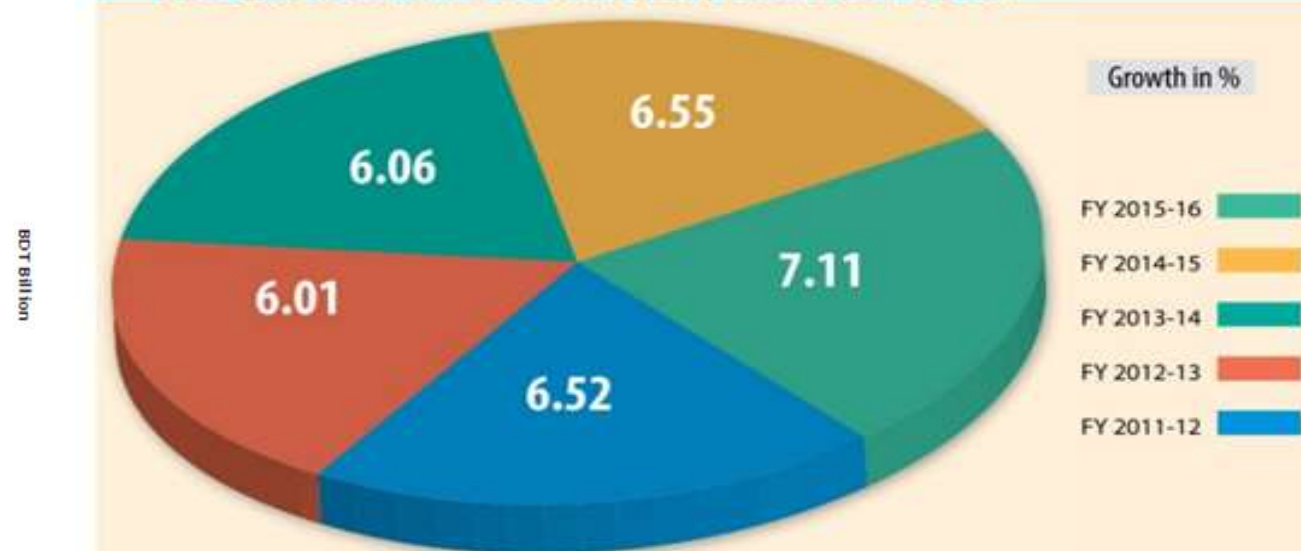
SOURCE: WWW.TRADINGECONOMICS.COM | WORLD BANK

Bangladesh GNP



SOURCE: WWW.TRADINGECONOMICS.COM | BANGLADESH BUREAU OF STATISTICS

GDP GROWTH RATE OF BANGLADESH (2011-2016)



Source: BBS

The ICT industry in Bangladesh is flourishing.

The number of mobile subscribers has grown by a compound annual growth rate of **54 percent** over the last ten years and there are now well over **116 M** subscribers.

The telecommunication market is competitive and the regulator has issued about **1948 licenses** till date.

Currently there are **5 mobile operators** and **03 BWA Operators**. Collectively these operators have rolled out more than **48000 base stations** covering **90 percent** of the population.

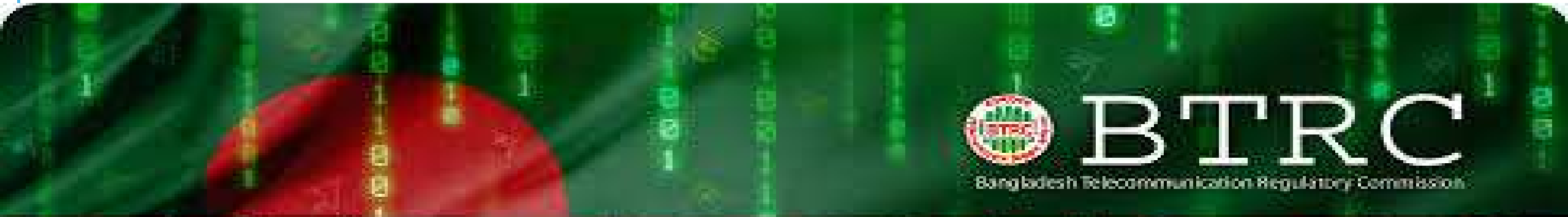
In terms of fixed telecom infrastructure, **fiber optic** footprint is underway and till now around **23000 km** is completed.

FEW KEY FACTS OF BANGLADESH

Ser	Topic	Statistics
1.	Land Area	147570 sqKm
2.	Population	156.4 M
3.	Mobile Subscriptions	116871000 (11.6 Mn)
4.	Fixed Telephone Subscribers	1138946 (1.13 Mn)
5.	Fixed Broadband Subscriptions	989521
6.	Internet Density	27 %



BTRC - NATIONAL REGULATORY BODY



BTRC was formed on 31 Jan 2002 as an independent regulator established under BTR Act 2001. The objectives of the act are:

- a. To encourage the orderly development of a telecommunication system that enhances and strengthens the social and economic welfare of Bangladesh.
- b. To ensure, in keeping with the prevalent social and economic realities of Bangladesh, access to reliable, reasonable price and modern telecommunication services and internet services for the greater number of people, as far as possible.
- c. To ensure the efficiency of the national telecommunication system and its capability to complete in both the national and international spheres.

BTRC was formed on 31 Jan 2002 as an independent regulator established under BTR Act 2001. The objectives of the act are.....cont.....:

d. To prevent and abolish discrimination in providing telecommunication services, to progressively effect reliance and competitive market oriented system and in keeping with these objectives to ensure effective control of the Commission.

e. To encourage the introduction of the new services and to create a favorable atmosphere for local and foreign investors who intend to invest in the telecommunication sector in BD

Functions:

- Regulating telecommunication services in Bangladesh
- Protecting the interest of local consumers
- Encouraging R & D activities and investment, and promoting competition
- BTRC is also empowered under the act to allocate radio frequency and to authorize the use thereof, to monitor the use of radio frequency and spectrum management

BTRC

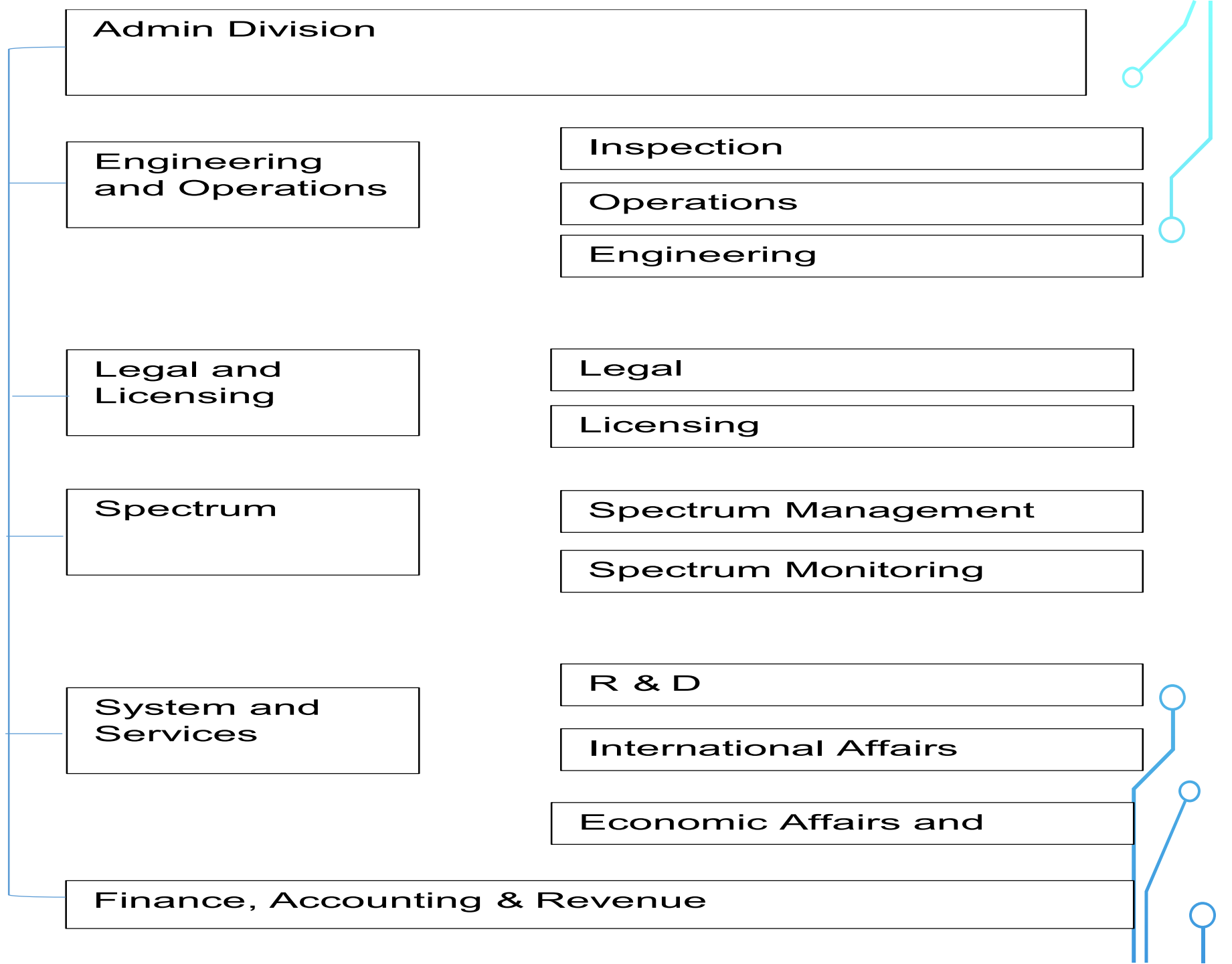
Functions:

- More specifically, section 55 of the Act states that BTRC shall have the exclusive authority to issue licenses and to allocate the radio frequency. Under the act a National Spectrum Management Committee(SMC) was formed to make recommendations to the commission on the principles of allocation and revocation of radio frequency and matters pertaining to these.
- While BTRC has been empowered to regulate the telecommunication industry, the Ministry of Post and Telecommunications retains the functions to determine the

general policy of the government in the telecommunication

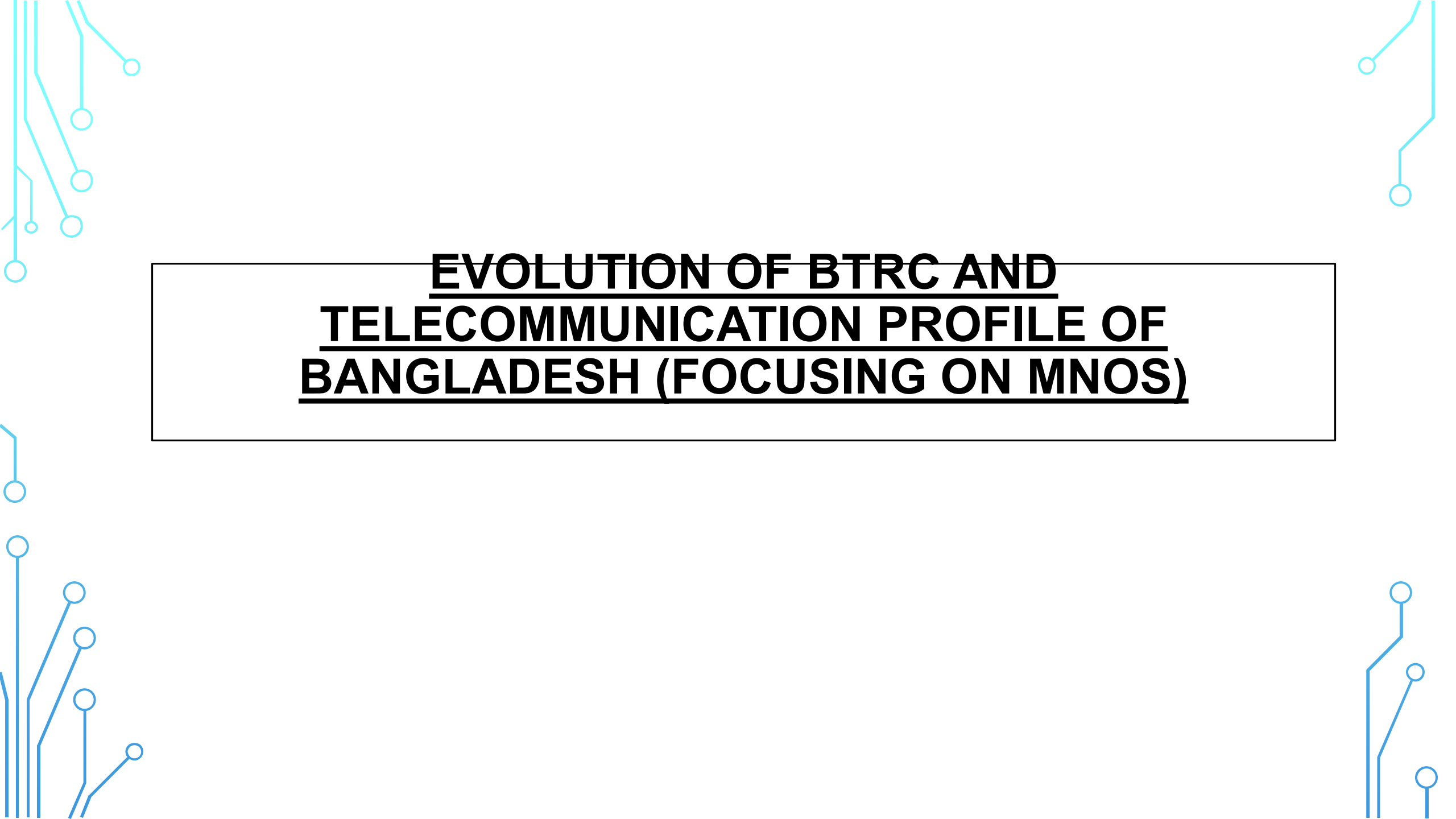
Outline Organogram

Chairman, Vice-Chairman, & Commissioners



Spectrum management activities are mainly undertaken by the Spectrum Division and distributed in two Directorates. The BTRC in consultation with the Spectrum Management Committee (SMC) has produced and published the National Freq Allocation Plan (NFAP). The NFAP details the services for which spectrum bands are allocated which are:

- Fixed services.
- Broadcasting services.
- Mobile services.
- Fixed-satellite services.
- Broadcasting-satellite services.
- Mobile-satellite services.
- Amateur.
- Scientific Services (radio astronomy)
- Radio determination (radio navigation and radio location)

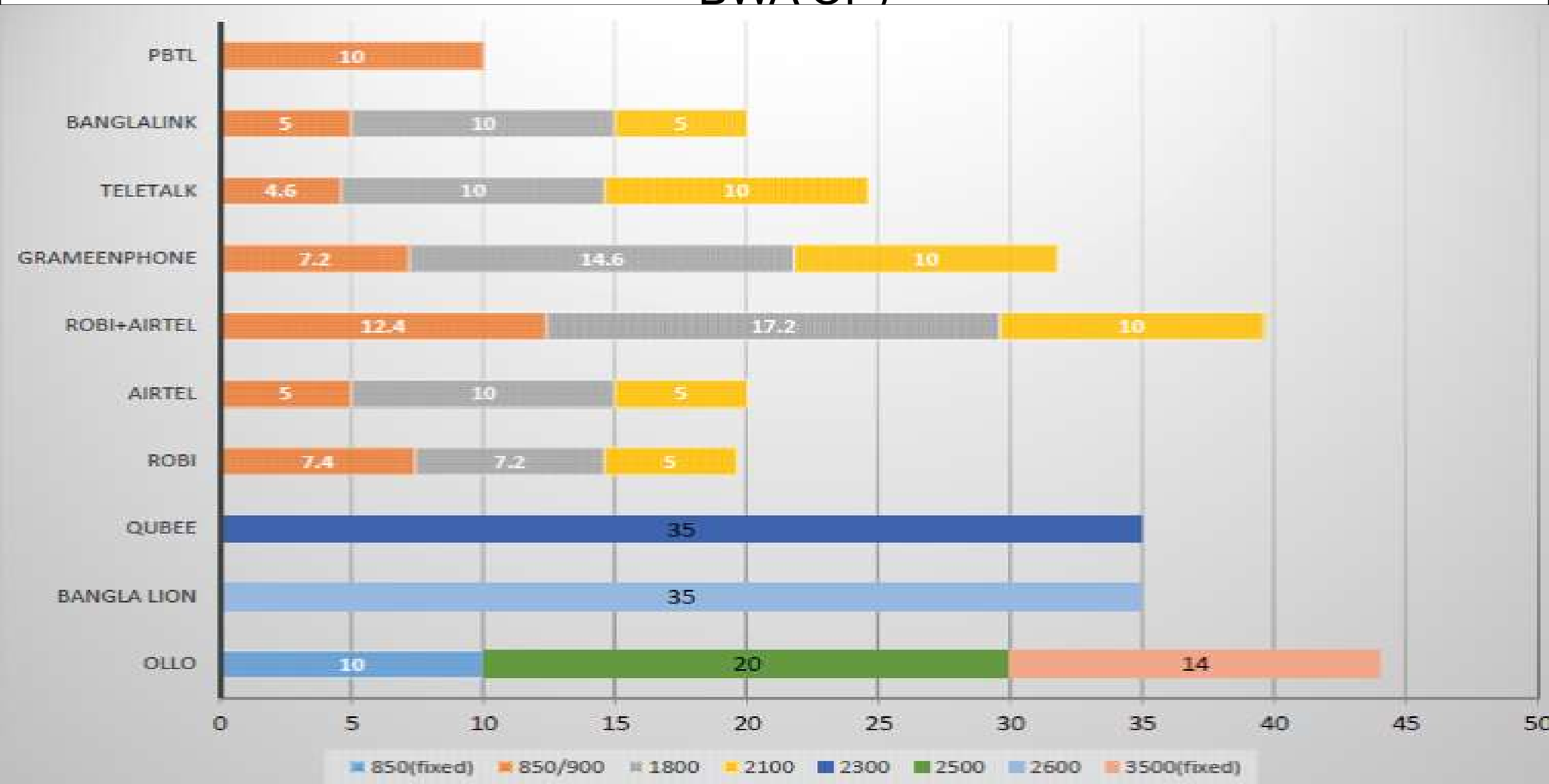


EVOLUTION OF BTRC AND
TELECOMMUNICATION PROFILE OF
BANGLADESH (FOCUSING ON MNOS)

ICT Profile of Bangladesh		Statistics
1.	Name of the Policy Maker	MoPT and IT
2.	Name of the Telecom/ICT Regulator	BTRC
3.	Name of Chairman of BTRC	Dr Md Shajahan Mahmood
4.	Legal Document Creating the regulator	BTR Act 2001
5.	Budget Approving Authority	MoF
6.	Sources of Regulator's Budget and % financed from each source	a. Award/auction of mobile license, 1.05% b. License fees, 2.06% c. Fines/Penalties, 0.032% d. Contributions from regulated telecom operators based on turnover, 48.89% e. Others, 1.72%
7.	Definition of BB	5 Mbps
8.	Fixed-Telephone subscribers /100 Inhabitants	0.5
9.	Mobile-cellular subscriptions / 100 Inhabitants	83.5
10.	Fixed BB Subscriptions /100 Inhabitants	2
11.	Mobile Broadband Subscription per 100 inhabitants	13.4

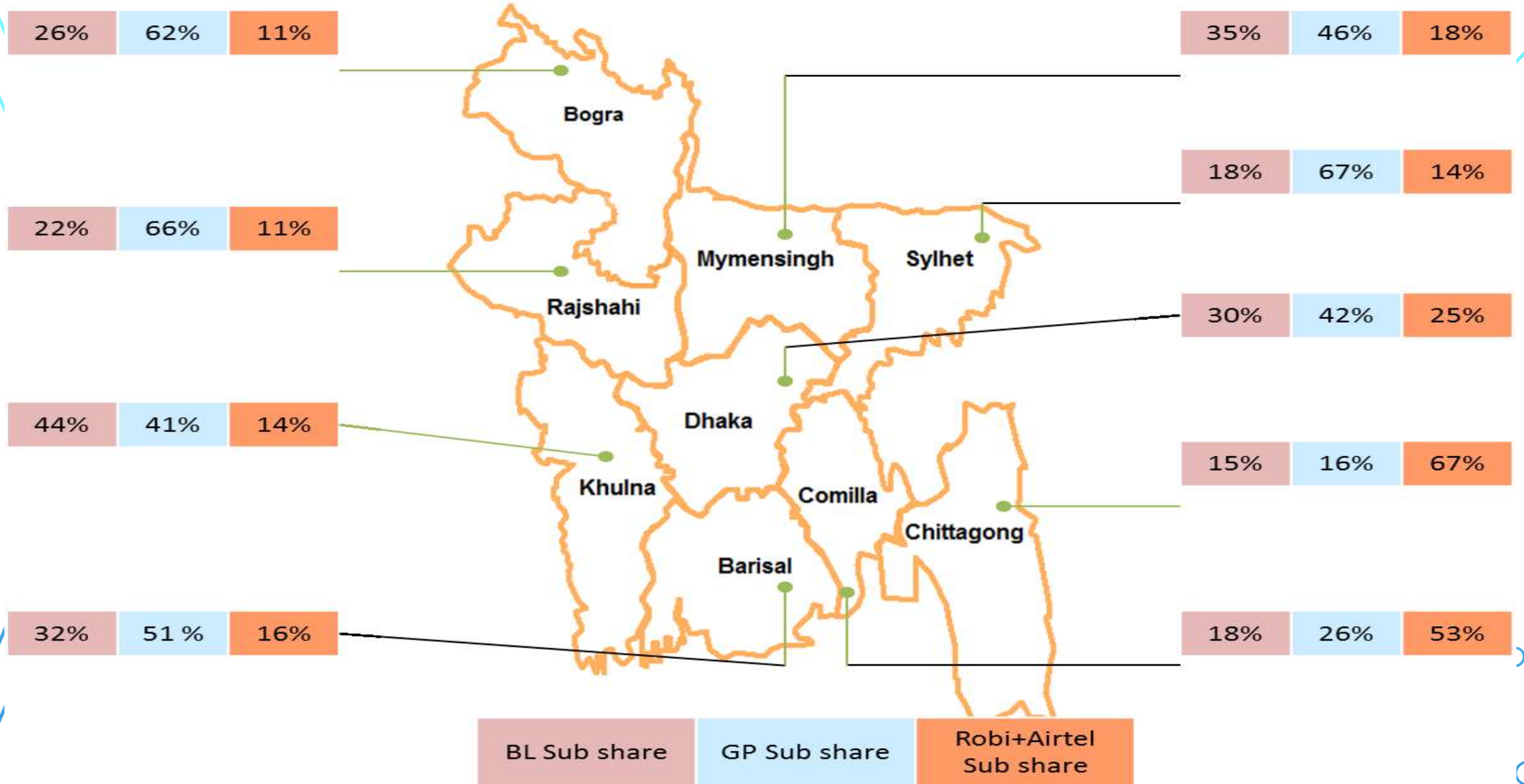
Ser	Bangladesh Mobile Sector	Statistics
1.	No of Operator	After merger 5
2.	Spectrum Allocation	CDMA 800, 900,1800,2100 MHz
3.	Operating License	Technology Specific less 2100
4.	Technology Neutrality, Sharing, Trading	Not Allowed till now
5.	Base Price per MHz	Proposed 25M USD (to be revised) for 1800 and 2100 MHz
6.	Unsold Spectrum	900: 5 MHz (New) 1800: 10.6 MHz 2100: 25 MHz
7.	Smart Phone Penetration	24%
8.	Voice Vs Data Revenue Mix	90% Vs 10%
9.	Tech Available	2G, 3G
10.	Population Coverage	2G 99% 3G 34%
11.	Internet Price	25 paisa/MB (0.32 cent)
12.	Voice Price	61 paisa/min (0.78 cent)

CURRENT SPECTRUM HOLDING SCENARIO IN BANGLADESH (MNOS + BWA OP)



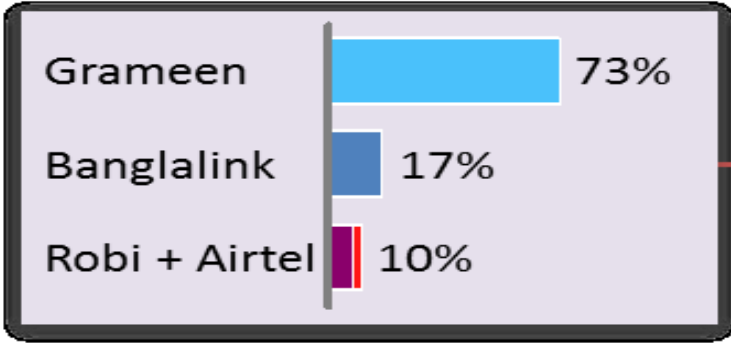
Spectrum/MHz	GP	BL	RobiAT	Teletalk
900	7.2	5	12.4	4.6
1800	14.6	10	17.2	10
2100	10	5	10	10
Total Spectrum	31.8	20	39.6	24.6
Subs (Mn)	54	29	31	2.9
Mn Sub/ MHz	1.69	1.45	0.78	0.12

SUBSCRIBER MARKET SHARE

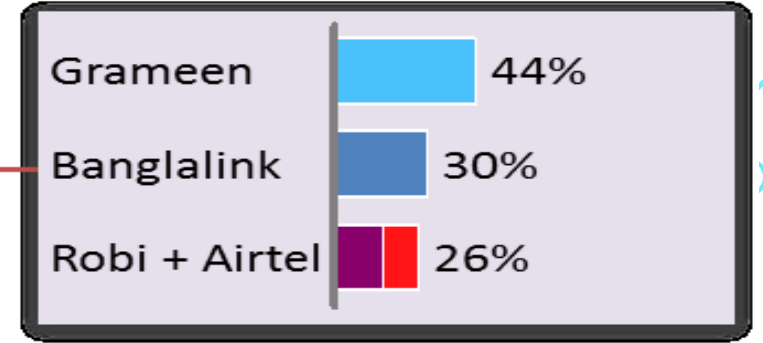


MARKET SCENARIO

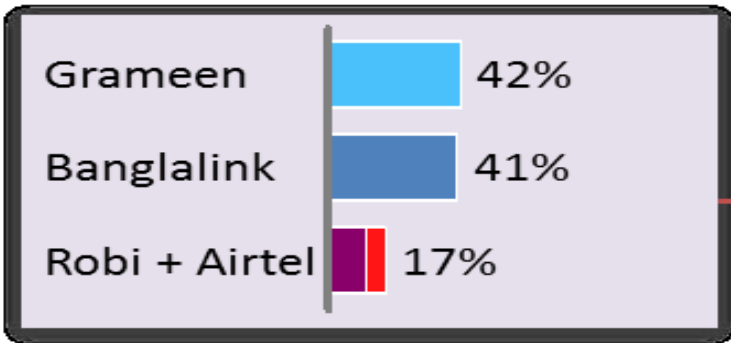
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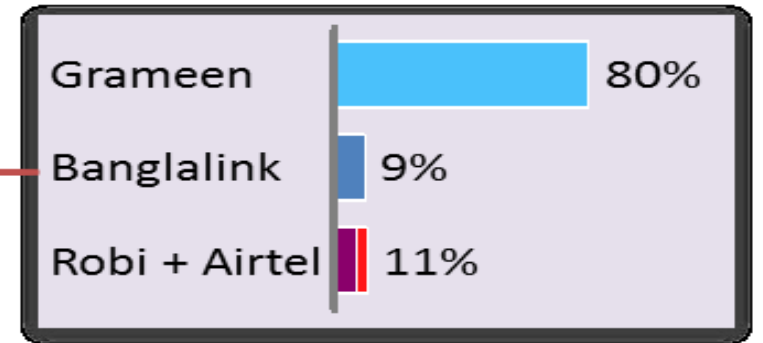
Dhaka



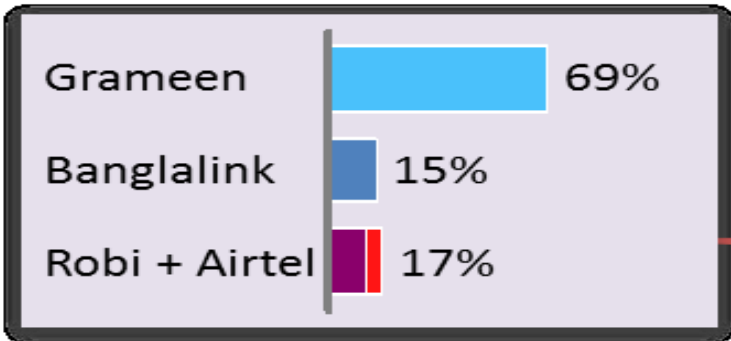
Khulna



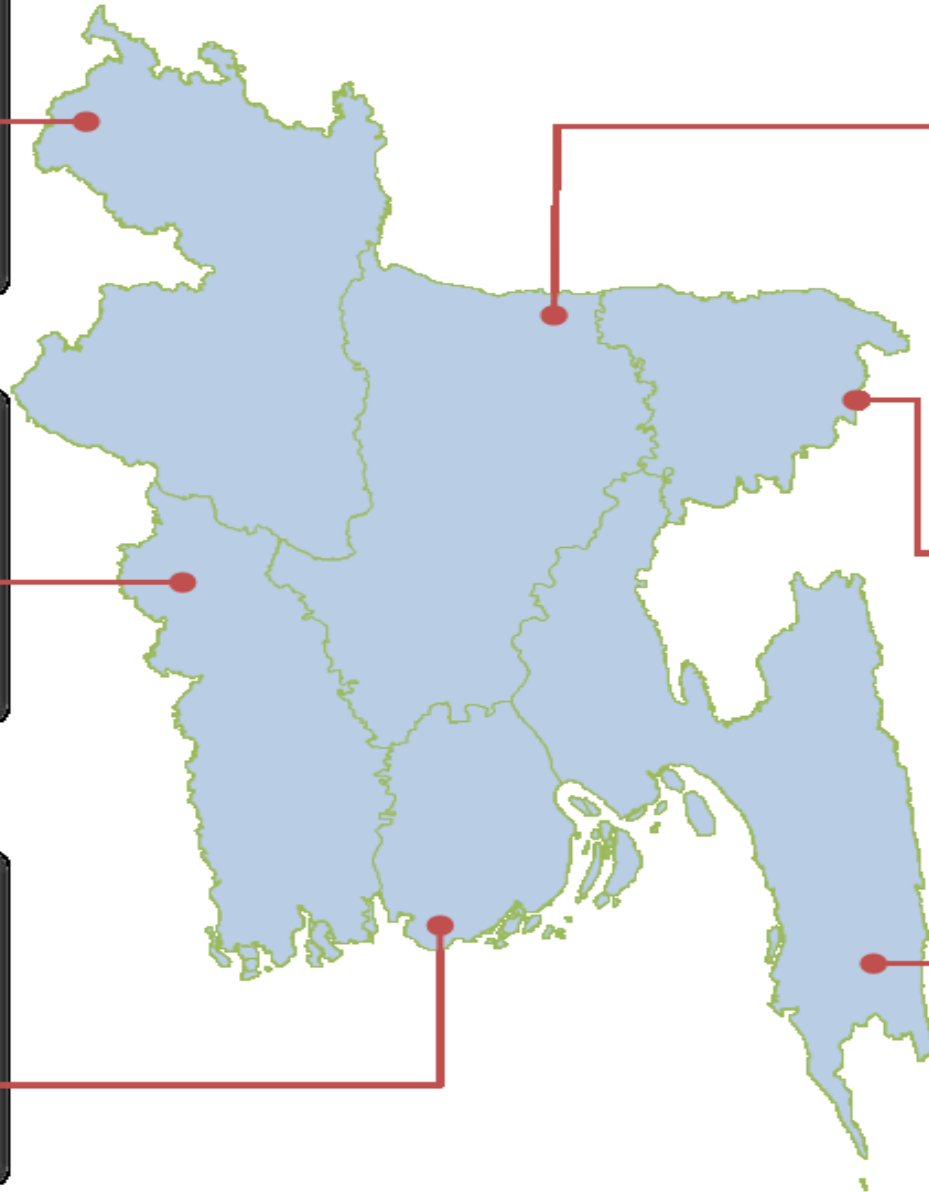
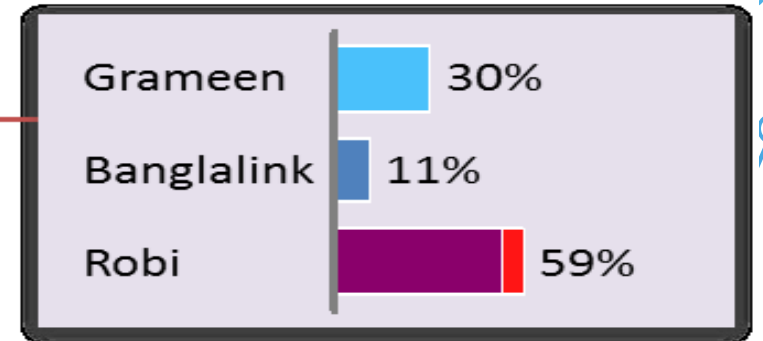
Sylhet



Barisal



Chittagong

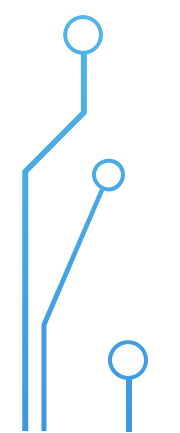
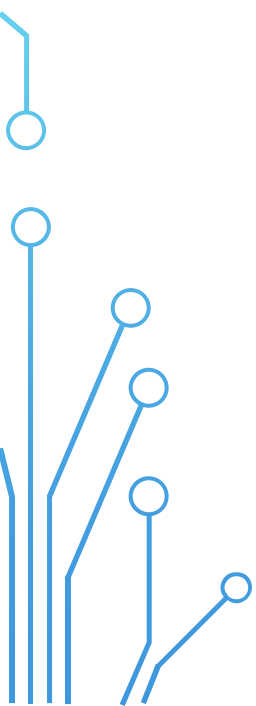
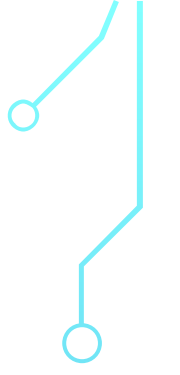
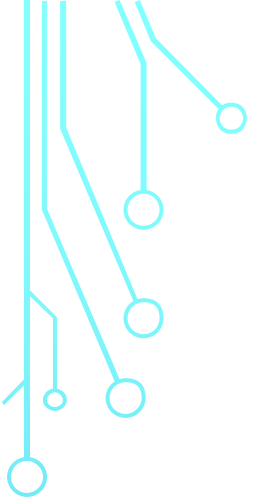


Reasonable Deductions:

- a. Market competition is concentrated within three major operators after merger.
- b. Spectrum allocation is significantly low compared to other countries leading to large amount of unsold spectrum.
- c. Affordability and literacy remain as key challenge for internet adoption.
- d. Smart phone penetration is another major challenge even for 4G/LTE.

Reasonable Deductions (Cont...):

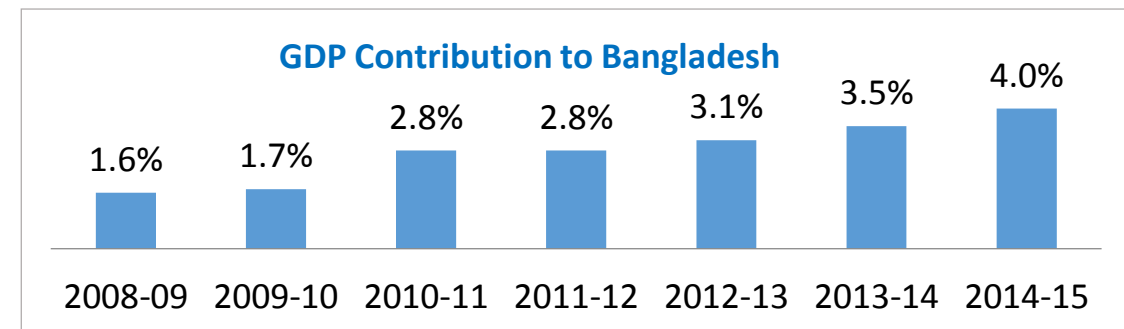
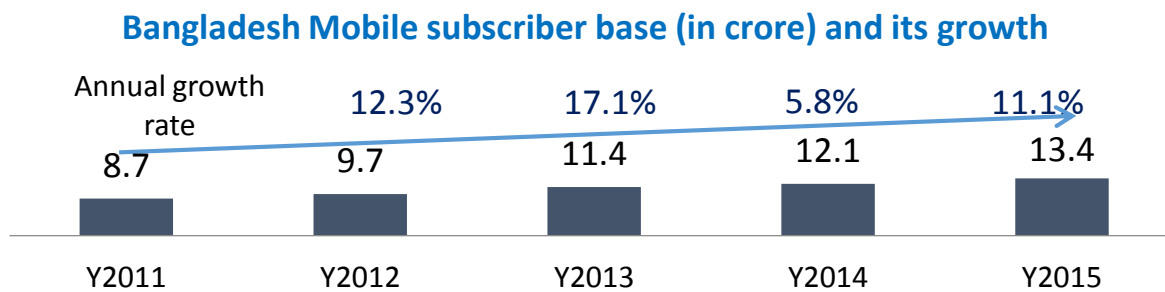
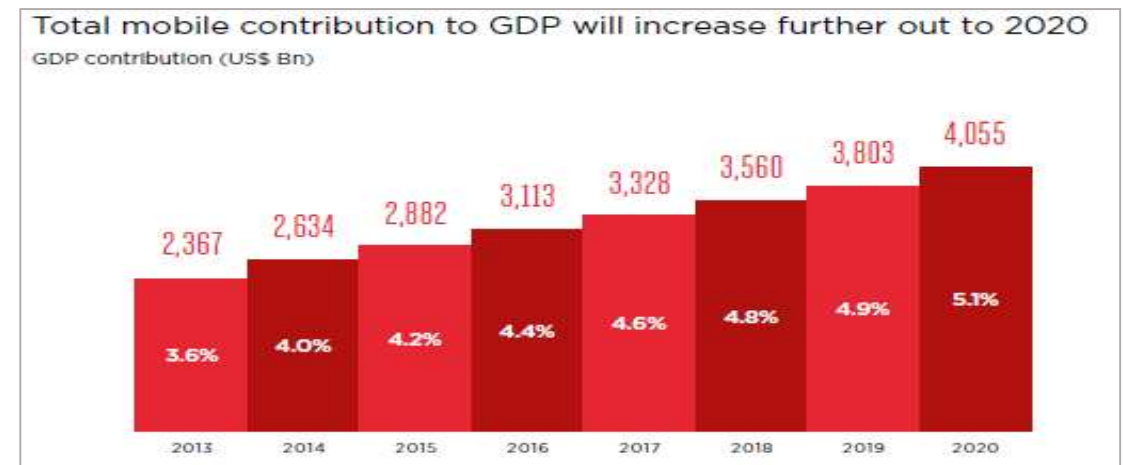
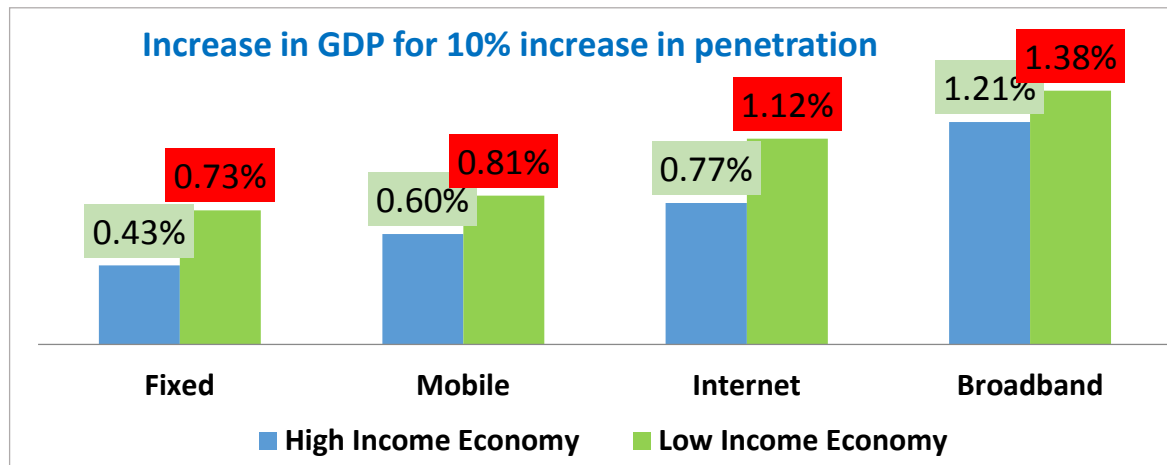
- e. Overall 4G/LTE handset penetration is approx. 2.5%
- f. Transmission preparedness for backhaul remain as a key challenge for deployment of 4G/LTE.
- g. Tech Neutrality needs to be allowed in 900 and 1800 MHz band as these are more economic to provide 4G/LTE.



EFFECTS OF MOBILE SECTOR ON GDP



Every **10%** increase in **Broadband Penetration** → economic growth by **1.38%**



South Asian countries have significant Economic Growth Opportunity through adoption of appropriate policy for proliferation of mobile penetration (essentially internet) and overcome other barriers of penetration



Spectrum Auction for BWA.

- a. The first spectrum auction was conducted in 2008 by BTRC to award three BWA license with three blocks of 35 MHz from 2.3 and 2.5/2.6 GHz.

- a. BWA licenses are tech neutral and can deploy LTE tech other than WiMAX.

Ser	3G Auction in 2013	Statistics
1.	Available Spectrum	40 MHz in 2100 MHz for 3G license
2.	License Period	15 years upto 2028
3.	Tech Neutrality	Yes
4.	Payment Terms	60% of total within 30 days Rest 40% of total in 180 days.
5.	Base Price /MHz	20M USD
6.	Spectrum Cap	15 MHz per Op
7.	Eligibility Condition	Existing mob op and new entrants. No new entrant showed up.
8.	Auction	Open Out Cry method with bid increment of 1M USD per bid. Auction ended with two rounds.
9.	Govt Realized	525 M USD
10.	Spectrum supply was higher than demand.	

Difficulties of Spectrum Auction in 2013.

- a. Presumably high price.
- b. Absence of specific instruction for the MNO to hold specific amount of spectrum for ensuring QoS.
- c. Supply was more than the demand.
- d. No competition.

Potential Measures for a better forthcoming Auction.

- a. Tech neutrality is planned to be declared at 900, 1800 MHz for which a national pricing committee is formed for declaration of appropriate base price.
- b. Fixation of base price for the existing tech specific spectrum that is potential to be declared tech neutral remain as one of the responsibilities of the committee.
- c. Compulsory FDI is a concern from the MNOs.
- d. Periodical consultation, workshop, seminars are being arranged.

Besides, few more aspects deemed necessary for Effective Auction Process.....

- a. Allocated Spectrum is **HARMONISED**
- b. **TECHNOLOGY NEUTRAL** not a technology specific spectrum allocation
- c. **PRIMARY GOAL** - maximizing the optimal use of spectrum and transfer the real benefit of spectrum to the customer
- d. Uses a "**MARKET-BASED**" allocation process
- e. At a **PRICE** that reflects the market value, not seek to maximize revenue for governments
- f. Allocation is competitively **NEUTRAL AND TRANSPARENT**
- g. **AUCTION'S EFFECTIVE METHOD** when there are competing demands.

Spectrum Re-Farming and Rearrangement. (FM, 1800, 700)

In GSM 1800 MHz the MNOs were provided with fragmented or non-contiguous blocks of spectrum. Example, **Grameen Phone in 3 spots, Robi Axiata in 2 Spots** and **Orascom in 2 Spots**. If an operator was assigned with spectrum in different spots in the same band, therefore, it has to reserve multiple of **200KHz Frequency** as Guard Band. So, for three GSM operators, where minimum **600 KHz** of Guard Band could have been enough, in reality for **7 Channels 1.4 MHz** Guard Band was occupied. That was not an efficient use of spectrum.

Re-Arrangement of 1800 MHz

Spectrum Allocation
(Previous)



Spectrum Allocation
(Current)



- Considering the potential of APT – 700 Band, ISP operators were removed and asked to get assignment in 3.5 or 5.4 GHz band for their service
- Still, BTRC is working to revoke long term unused spectrum from PSTN, ISP operators and use those for future IMT deployment
- The spectrum allocated for FM operators (87.5-108 MHz) were re-arranged to minimized the interference due to side-band emission and ensure uninterrupted transmission.

Merger Issues

ISP

- a. Merger of Two ISPs. According to the verdict of Honorable High court, two ISPs namely BIEL and NGGL got merged back in 2014.
- b. The new merged entity BIEL got the ownership of all the **spectrum and radio equipment**.
- c. BIEL(ISP) got the ownership of NGGL's frequency 7+7 MHz from 3.5 GHz band and 10+10 MHz in 800 MHz band.
- d. **Free of acquisition cost**.

MNOs

For merger of two MNOs (Robi and Airtel), the total amount of spectrum in 2G was taken into prime consideration to keep the level playing field and maintain the discipline in the telecom sector, because of the following reason:

Op Name	Allotment of Freq per MNO in %				After Merger, Total Spectrum in %	Subscriber(Mn)/MHz	
	900 MHZ (30 MHZ)	1800 MHZ (52 MHZ)	2100 MHZ (35 MHZ)	Total Spectrum		Before Merger	After Merger
GP	24.67	28.08	28.58	27.36	27.36	1.756	1.756
Robi	24.67	14.23	14.28	16.92	34.01	1.404	0.962
AirTel	16.67	19.23	14.28	17.09		0.525	
Banglalink	16.67	19.23	14.28	17.09	17.09	1.618	1.618
TeleTalk	17.32	19.23	28.58	21.54	21.54	0.1671	0.1671

SALIENT ASPECTS/CONSIDERATIONS FOR MERGER

- Bringing back the market stability and discipline in use of spectrum. Where in Bangladesh Spectrum Sharing is not permissible.
- Airtel license expires on 2020, whereas, Robi Axiata continues for 2026. So, how to adjust the pricing of the spectrum assigned to Airtel for Robi for the last 04 years ie, from 2016 - 2020. Airtel's total holding was 15 MHz for 15 years.

Salient Aspects of Merger

Airtel was issued with 2G license and spectrum back in 2005 for 15 years up to 2020 at a lumpsum cost of 350 Crores BDT / 15 MHz. (100 Crores BDT = 12.5 M USD). Out of which 1 Crore is considered as License fee. So, spectrum charge = $350 - 1 = 349$ Crore BDT for 15 years

2G license of Robi was renewed back in 2011 for a cost of 150 Crores/MHz for 15 years up to 2026.

Accordingly, the price of 15 MHz (assigned to Airtel) for next 04 years was calculated as

Price of 1 MHz for 15 Years = 150 Crores BDT

So, price of 15 MHz for 4 Years = $((150/15) * 4 * 15) = 600$ Crore BDT

So, for those 4 Years the cost of Airtel Spectrum, was

$((349/15) * 4) = 93.06 \sim 93$ Crores.

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Therefore, the price of 15 MHz of Airtel Spectrum for 04 years would be = $600 - 93 = 507$ Crore BDT.

Airtel was asked to surrender 5 MHz from E-GSM at the cost of Spectrum renewal charge of 2011.

Cost of 1 MHz in 2011 was = $(150/15) = 10$ Crore BDT.

So, cost of 5 MHz for 4 Years = $(10 * 5 * 4) = 200$ Crore BDT

So, Robi will pay = $(507-200) + 100 = 407$ Crore BDT

Where, 100 Crore BDT was considered as Merger Fees.

Therefore, the Govt is earning a revenue of 407 Crores BDT along with that BTRC is ensuring a level playing field for the MNOs as far as spectrum is considered.

Other Methods of Revenue Earning out of Spectrum.

At present BTRC regulates 29 FM, 38 TV ,18 Community Radio Stations and one DTH operator.

For TV: Only license and equipment charge but no spectrum charge.

Earth Station: 100000 BDT and stand by unit: 25000 BDT

License Charge per station: 100 Taka

FM Station: Only license and equipment charge but no spectrum charge.

Equipment charge is calculated by Charge of FM frequency $BW = 1000 * 200$
BDT = 200000 BDT

Community Radio: Only license and equipment charge but no spectrum charge.

Earth Station Main: 1000 BDT, additional standby = 2500 BDT

DTH, BWA, MNOs Annual Spectrum Charge = $STU \times CFXBW \times AFXBF$

For Microwave frequency Annual Spectrum Charge = $STU \times CFXBW \times 0.273$
(link length)₂ XBF

Ser	Fees and Charges	Charge
1.	Annual License Fees	Fixed Fees (e.g BDT 50 M for MNOs)
2.	Revenue Sharing <small>*Fees and Charges.</small>	Applicable to mobile Op (5.5% of Annual Audited Gross Revenue) and BWA Op (exempted for the 1 st Year, 2 % of Annual Audited Gross Revenue in the 2 nd year, and 4% in each subsequent year.
3.	Social Obligation Fund	3G Op are also required to pay 1% of annual audited gross revenue to fund telecom infrastructure in underprivileged areas.

MITIGATING X – BORDER INTERFERENCE

- **A long term interference issue was continuing on the North, North-West and North – Eastern part of the country in the Fy band of MNOs (3G) from neighboring country India.**
- **Problem was raised at the highest level by Bangladesh through Ministerial, Regulatory and Diplomatic approach.**
- **Interstate coordination meeting took place in India where reports of physical monitoring were projected and solution was sorted.**
- **Finally, the major interference issues are completely resolved and decision was made to have periodic inter state regulatory coordination meeting to eradicate such difficulties.**

- **Bangladesh has successfully completed the Biometric SIM/RUIM registration and this is certainly going to be a continuous process.**
- **The initial phase was completed by an approximate duration of six months.**
- **There had been numerous challenges to ensure it for over 110M subscribers.**
- **The project could be implemented for having an NID database.**

ON GOING PROJECTS

- NEIR/NOC Automation and IMEI Database
- National Regulatory Laboratory

Few takeaways from Bangladesh perspective are appended below:

- a. Economic landscape gives us an indication of key challenges and opportunities.
- b. Though growing, still smart phone penetration is one of the key barrier for increasing internet penetration.
- c. Considering literacy rate and poverty level, further reduction in internet price is expected.
- d. Data is increasing exponentially leading to high demand of spectrum and advanced technology for QoS.
- e. There is increase pressure on the mobile operators for cost optimization. This is leading to big number of merger even.

Few takeaways from Bangladesh perspective are appended below

(Cont....):

- f. Increasing trend of Spectrum pricing is another key concern now. Reassessment is in dire need.
- g. Spectrum auction modality and pricing should be designed as such so that the operators are encouraged to take more spectrum with lesser price rather than lesser spectrum with more price.
- h. Auction of other favorable bands e.g. 700 MHz of course based on device availability
- j. **Involvement of FDI is a concern**
- k. Spectrum Trading, Spectrum Sharing and Active Sharing are aspects need elaborate study from Bangladesh perspective.



Welcome to Our Home Welcome to Bangladesh





BANGLADESH

THANKS