

---

Next Generation Mobile  
Service Award (NGMSA) in  
Pakistan (2100 MHz, 1800  
MHz & 850 MHz  
Spectrum)

---

Expected Winners &  
Post Auction  
Scenarios

---

**PHONE WORLD**

[www.phoneworld.com.pk](http://www.phoneworld.com.pk)

---

**Note:**

*This paper may include predictions, estimates or other information that might be considered forward-looking. While these expected post-auction scenarios represent our current judgment on what the future holds, they are subject to risks and uncertainties that could cause actual results to differ materially. You are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this paper.*

## Table of Contents

1. Introduction .....	3
Mobile Industry to continue on it Growth Path .....	3
2. Pakistan Existing & Post NGSMA Spectrum .....	5
3. General Scenario 1 .....	7
3.1 Scenario 1-A .....	7
3.2 Scenario 1-B .....	8
3.3 Scenario 1-C: .....	10
3.4 Scenario 1-D .....	11
4. General Scenario 2 .....	12
4.1 Scenario 2-A .....	13
4.2 Scenario 2-B .....	14
4.3 Scenario 2-C .....	15
5. General Scenario 3 .....	16
5.1 Scenario 3-A .....	17
5.2 Scenario 3-B .....	18
5.3 Scenario 3-C .....	19
5.4 Scenario 3-D .....	20
5.5 Scenario 3-E .....	21
5.6 Scenario 3-F .....	22
6. General Scenario 4 .....	23
6.1 Scenario 4-A: .....	24
6.2 Scenario 4-B: .....	25
6.3 Scenario 4-C: .....	26
6.4 Scenario 4-D: .....	27
6.4 Scenario 4-D: .....	28
6.5 Scenario 5-D: .....	29
7. Conclusions: .....	30

## 1. Introduction

Pakistan's telecommunications and specifically mobile industry holds tremendous potential for growth, investment and development. This is due to the fact that mobile broadband penetration remains very low and there remains great potential not only for people to people, but people to systems and system to systems. Also, on the consumer side just a couple of years back the cost of smartphone handsets was quite high so much so that only upper and middle class of our country were able to benefit from it but today, things have changed to a great extent. With the passage of time, technology advancements have made the production of smartphones affordable which is one of the major reasons why Pakistan is currently one of the fastest growing mobile market in the world and this will continue to be in the foreseeable future.

There are 134 million active SIMs in Pakistan by January, 2014 as per PTA, which corresponds to a mobile market penetration of 74%. The mobile subscriber base is expected to increase and will surpass 200 million by 2020. More, importantly, the broadband penetration is expected to reach around 50 million by 2020 i.e. in the next six years. All this expansion and developments are expected if harmonised wireless spectrum is released on time for the mobile ECO System to grow. The first of these efforts lies with the spectrum auction planned for 23<sup>rd</sup> April, 2014 named as Next Generation Mobile Services Award (NGSMA). The auction includes not only 2X30 MHz spectrum in 2100 MHz which is the most harmonised band for deployment of 3G Technology but also 2X20 MHz of Spectrum in 1800 MHz that is the most widely used spectrum for LTE. With this auction Pakistan is all set to further gear up the Telecom development in the country. PTA has released an Information Memorandum which contains all the rules, process, planned timetable and other background information to help prospective applicants and other stakeholders.

Government of Pakistan through its regulator the PTA is planning to undertake the auction to award Licenses to use spectrum in the 2100 MHz, 1800 MHz and 850 MHz ranges with the base price USD 295 million per 10 MHz for 2100 MHz spectrum and \$210 million per 10 MHz for 1800 MHz spectrum. Currently, there are 2X30 MHz of spectrum in 2100 MHz band whereas in 1800 MHz band there are slots of 2X20 MHz of Spectrum to be

### Mobile Industry to continue on its Growth Path

The mobile subscriber base is expected to increase and will surpass 200 million by 2020. More, importantly, the broadband penetration is expected to reach around 50 million by 2020 i.e. in the next six years. All this expansion and developments are expected if harmonized wireless spectrum is released on time for the mobile ECO System to grow

auctioned through two-stage bidding process. Also, for any new entrant that will bid for the 2100 MHz can get a lot of 7.38 MHz spectrum from 850 MHz band which has been made available that will be auctioned in case of multi new entrants otherwise it will be given out at base price of USD 291 million.

All major telecom operators including Mobilink, Zong, Ufone and Telenor are expected to participate in the auction process. There has been interest shown by new entrants as well. The press has already reported following high level delegations visit by two major players such as Turkcell and STC that they could be the possible new entrant to the otherwise very competitive Pakistani mobile market. The chances of Warid Telecom's active participation (while, it has indicated its keen interest, as well) in the auction process are not very bright, as it was until recently on sale.

This white paper contains different probable outcomes of the auctioning process. Various auctioning scenarios for each telecom operator have been created in order to forecast the results and outcomes while elucidating the options and outcomes for each operator in terms of available spectrum and price. The outcomes shown in this white paper does not necessarily come to be entirely true in future as these are only the calculated probabilities and there remain a lot more probabilities as well but they will certainly give a glimpse of auction results that is all set to take place on 23<sup>rd</sup> April, 2014 i.e. later this month.

DO NOT COPY

## 2. Pakistan Existing & Post NGSMA Spectrum

<b>Mobile Spectrum in Pakistan (Pre &amp; Post NGSMA in Mhz)</b>					
<b>FREQUENCY BANDS</b>	<b>850MHz</b>	<b>900MHz</b>	<b>1800MHz</b>	<b>2100MHz</b>	<b>Sub-Total</b>
China Mobile (Zong)		7.6	6		13.6
Mobilink (Vimplecom)		7.6	6		13.6
Telenor		4.8	8.8		13.6
Ufone (Etisalat)		7.6	6		13.6
Warid		4.8	8.8		13.6
NGSMA (New Allocations)	7.38		20	30	57.38
<b>Total</b>	<b>7.4</b>	<b>32.4</b>	<b>55.6</b>	<b>30</b>	<b>125</b>
<b>Mobile Spectrum Allocation in Pakistan (Pre &amp; Post NGSMA)</b>					
<b>FREQUENCY BANDS</b>	<b>850MHz</b>	<b>900MHz</b>	<b>1800MHz</b>	<b>2100MHz</b>	<b>Sub-Total</b>
China Mobile (Zong)		882.5-890.1	1739.7-1745.7		
Mobilink (Vimplecom)		907.3-914.9	1733.7-1739.7		
Telenor		902.5-907.3	1724.9-1733.7		
Ufone (Etisalat)		894.9-902.5	1718.9-1724.9		
Warid		890.1-894.9	1710.1-1718.9		
NGSMA (New Allocations)	824.2- 831.6			1920-1950	

The above table shows Pakistan mobile spectrum allocation for the existing and the new spectrum that has been offered for auction. It is interesting to note that Pakistan will be offering additional 57.38 MHz of Spectrum which comes to over 84% of spectrum already given out to the mobile industry for the past two and a half decade.

Most of the previous spectrum allocated has been in the 900 MHz and 1800 MHz. Those operator such as Telenor & Warid who are the late entrant than the other three they have been allocated lessor spectrum in 900 MHz and have been compensated with more spectrum in the 1800 MHz. However, all of the mobile companies have around 13.6 MHz in total (divided between 900 MHz & 1800 MHz) and some of the post auction scenario may see spectrum re-allocation within for newer services.

The following sections discusses the scenarios assuming that 2100 MHz spectrum will be utilized for 3G and 1800 MHz spectrum will be utilized for LTE/4G. While, the existing and new licenses (in the IM) are technology neutral the rollout obligations, QoS and market dynamic does encourage operators to move in the direction as indicated

**Pakistan will be offering additional 57.38 MHz of Spectrum which comes to over 84% of spectrum already given out to the mobile industry in the last 24 years**

above. As per earlier and the revised PTA IM while the 2100 MHz spectrum lots and its final allocation could be different depending on the interest shown by the operators during the sealed bid stage but the 1800 MHz spectrum will only have two slots of 2X10 MHz each to be taken up by only those who win spectrum in the 2100 MHz.

**Government of Pakistan will still fetch USD 1.3 Bn for 2100 MHz & 1800 MHz (if they are sold out even at base price) and 1.59 Bn if there is a new comer to take up the 850 MHz**

In terms of money to be generated, the base price for one spectrum of 2X10MHz bandwidth in 2100MHz is 295 Mn USD and for 10MHz bandwidth in 1800 MHz spectrum is 210 Mn USD. If we assume that all spectrum is sold out at base price the government will still fetch USD 1.3 Bn for 2100 MHz & 1800 MHz (if they are sold out even at base price) and 1.59 Bn if there is a new comer to take up the 850 MHz, as well.

As, the number of spectrum lots being offered could be less than the number of prospective bidders ( almost all operators in Pakistan have publicly shown interest in acquiring the spectrum) we have taken the impact of 15%, 30% and 45% incremental increase on the base price (there is no econometric formulae except popular industry sentiment) . Overall impact for the two most after spectrum slots of 2100 MHz and 1800 MHz could be in the following range; For 2100 MHz it could be USD 1.0 Bn, 1.1 Bn and 1.3 Bn (for 15%, 30% & 45% incremental price increase). Similarly, if the price of 1800 MHz increases by 5% or 10% (the demand for 1800 MHz spectrum might be a bit lower than 2100 MHz) the government will be getting the total amount of USD 440 Mn and USD 462 Mn respectively. The following section looks at more detail discussion on the likely scenarios that could emerge from the auction both in terms of spectrum acquisition, the total spectrum available to an entity (that could trigger service/spectrum optimization) and the likely cost they need to pay for the same.

### 3. General Scenario 1

In this scenario, we have deliberate upon the likely scenario (most likely) that three operators will take one lot each of 10 MHz in 2100 MHz spectrum, whereas two operators may take an additional 10 MHz each of the 1800 MHz spectrum. Based on the above we discussed three most likely scenarios that are expected to emerge.

The spectrum lots and the resultant spectrum position discussed later in this section shall be as follows:

NGSMA Auction lots – 2014 General Scenario - 1	
Round 1	Round 2
Spectrum: 2100MHz 3X10 MHz lots	Spectrum: 1800MHz 2X10 MHz lots
License 1 – 10MHz x 2	License 1: 10 MHz x 2
License 2 – 10MHz x 2	License 2: 10 MHz x 2
License 3 – 10MHz x 2	

#### 3.1 Scenario 1-A

In this scenario, we have assumed that Zong, Ufone and Mobilink will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas Zong and Ufone (for likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement. Also, Telenor may share spectrum with Mobilink under some legal arrangement) may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, USD 383 Mn or USD 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and Ufone will be paying an additional USD 220 and USD 231 Mn respectively.



The price of the licenses for both spectrum occupied by Zong and Ufone may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for Mobilink the license price for single spectrum ranges will range from USD 295 to USD 428 Mn Dollars. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 1-A	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Ufone	License 2: Ufone (PTCL)
License 3 – Mobilink	

Frequency	Current Spectrum	New Spectrum	Total Spectrum
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

### 3.2 Scenario 1-B

In this scenario, we have assumed that Zong, Ufone and Mobilink will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas Zong and Mobilink (for likely scenario where Mobilink may consolidate/share spectrum specially with Telenor probably under an MVNO or some other legal arrangement) may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, USD 383 Mn or USD 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and Mobilink will be paying an additional USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for Ufone the license price for single spectrum ranges will range from USD 295 to USD 428 Mn Dollars.

This scenario may suit Ufone in its upcoming license and bid for 850 MHz at a later stage instead if a new entrant does not bid for the spectrum in the NGSMA. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 1-B	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Mobilink	License 2: Mobilink (Telenor)
License 3 – Ufone	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	-	-
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

### 3.3 Scenario 1-C:

In this scenario, we have assumed that Zong, Ufone and Mobilink will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas Ufone (again for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Mobilink (again it is very likely that that spectrum consolidation with Telenor will happen). In this and the above scenario Telenor may also take the lead instead of Mobilink for such consolidation) may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, USD 383 Mn or USD 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Ufone and Mobilink will be paying an additional USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Ufone and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for Zong the license price for single spectrum ranges will range from USD 295 to USD 428 Mn Dollars. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 1-C	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Mobilink	License 1: Mobilink (Telenor)
License 2 – Ufone	License 2: Ufone (PTCL)
License 3 – Zong (China Mobile)	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	-	-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

### 3.4 Scenario 1-D

In this scenario, we have assumed that Zong, Telenor and Mobilink will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas Zong and Telenor may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, USD 383 Mn or USD 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and Telenor will be paying an additional USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong and Telenor may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for Mobilink the license price for single spectrum ranges will range from USD 295 to USD 428 Mn Dollars.

This scenario may suit Ufone left out from the auction will try its utmost to bid for 850 MHz at a later stage instead if a new entrant does not bid for the spectrum in the NGSMA. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 1-D	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Telenor	License 2: Telenor
License 3 – Mobilink	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	10 MHz	10 MHz
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

## 4. General Scenario 2

In this scenario, we have assumed that one operator will take one lot of 15 MHz in 2100 MHz spectrum, second operator may take a lot of 10 MHz and the remaining 5 MHz will be taken-up by the third operator. In the case of 1800 MHz spectrum the two operators that have taken 15 MHz & 10 MHz of 2100 MHz may also take an additional 10 MHz each. However, it is very likely that the incremental increase in this scenario will be much more due to spectrum scarcity being produced by the winning operator for 15 MHz and shall push the upward the prices for all other lots than we anticipate in this paper.

The spectrum lots and the resultant spectrum position discussed later in this section shall be as follows:

NGSMA Auction lots – 2014 Scenario - 2	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – 15MHz x 2	License 1: 10 MHz x 2
License 2 – 10MHz x 2	License 2: 10 MHz x 2
License 3 – 5MHz x 2	

### 4.1 Scenario 2-A

In this scenario, we have assumed that Zong, Ufone and Mobilink will be able to take one lot each of 15MHz, 10 MHz and 5 MHz respectively in 2100 MHz spectrum, whereas Ufone (for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Zong may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 15 MHz bandwidth increases by increments of 15%, 30% or 45% then Zong will be paying around USD 509 Mn, USD 575 Mn or USD 642 Mn Dollars respectively. For 10 MHz if the price increases to 15%, 30% and 45% then the Ufone then they will be paying about USD 339 Mn, 384 Mn and 428 Mn. For 5 MHz if the price increases to 15%, 30% and 45% then the Mobilink then they will be paying about USD 170 Mn, USD 192 Mn and USD 214 Mn. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Ufone and Zong will be paying USD 220 and USD 231 Mn respectively.

However, according to our base assumption the price of the licenses for both spectrum occupied by Zong may range from USD 652 Mn to USD 853 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, Ufone (PTCL) the license price for single spectrum ranges from USD 505 Mn to 659 Mn. The license for Mobilink may range from USD 147 Mn to 214 Mn. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 2-A	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Ufone	License 2: Ufone (PTCL)
License 3 – Mobilink	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	15 MHz	15 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

## 4.2 Scenario 2-B

In this scenario, we have assumed that Zong, Mobilink and Ufone will be able to take one lot each of 15MHz, 10 MHz and 5 MHz respectively in 2100 MHz spectrum, whereas Mobilink (it is very likely that that spectrum consolidation with Telenor may happen) and Zong may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 15 MHz bandwidth increases by increments of 15%, 30% or 45% then Zong will be paying around USD 509 Mn, USD 575 Mn or USD 642 Mn Dollars respectively. For 10 MHz if the price increases to 15%, 30% and 45% then the Mobilink then they will be paying about USD 339 Mn, 384 Mn and 428 Mn. For 5 MHz if the price increases to 15%, 30% and 45% then Ufone then they will be paying about USD 170, USD 192 and USD 214 Mn.

On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Mobilink and Zong will be an additional USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong may range from USD 652 Mn to USD 853 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz) whereas, Mobilink the license price for single spectrum ranges from 505 to 659 Million Dollars. The license for Ufone ranges from 147 to 214 Million Dollars This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 2-B	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Mobilink	License 2: Mobilink (Telenor)
License 3 – Ufone	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	15 MHz	15 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	-	-
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

### 4.3 Scenario 2-C

In this scenario, we have assumed that Ufone, Mobilink and Zong will be able to take one lot each of 15MHz, 10 MHz and 5 MHz respectively in 2100 MHz spectrum, whereas Ufone (for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Mobilink (it is very likely that that spectrum consolidation with Telenor may happen and therefore Telenor may take lead instead of Mobilink- likely spectrum sharing of both 2100 MHz & 1800 MHz may happen) may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 15 MHz bandwidth increases by increments of 15%, 30% or 45% then Ufone will be paying around USD 509 Mn, 575 Mn or 642 Mn Dollars respectively. For 10 MHz if the price increases to 15%, 30% and 45% then the Mobilink then they will be paying about USD 339 Mn, 384 Mn or 428 Mn. For 5 MHz if the price increases to 15%, 30% and 45% then Zong then they will be paying about USD 170 Mn, 192 Mn or 214 Mn. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then both Ufone and Mobilink will be paying an additional USD 220 Mn or USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Ufone may range from USD 652 Mn to USD 853 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz) whereas, Mobilink the license price for single spectrum ranges from USD 505 Mn to 659 Mn. The license for Zong ranges from USD 147 Mn to USD 214 Mn. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 2 - C	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Ufone	License 1: Ufone (PTCL)
License 2 – Mobilink	License 2: Mobilink (Telenor)
License 3 – Zong (China Mobile)	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	-	-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	15 MHz	15 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-



## 5. General Scenario 3

In this scenario, we have assumed that two operator will take one lot of 10 MHz each in 2100 MHz spectrum, while other two operators may take one lot of 5 MHz each. In the case of 1800 MHz spectrum two operators may take an additional 10 MHz each. This scenario enables four operators and maybe even five operators in certain scenarios (with consolidation) to move ahead with 3G & 4G deployments. While, we did take the case of 05 MHz spectrum auction scenario till 45% spectrum but affordability of lesser spectrum could push the cost higher because of likely interest by Warid for the smaller Spectrum. Addition of a new entrant could altogether change the dynamics of the spectrum auction.

This scenario and the resultant spectrum position shall be as follows:

NGSMA Auction lots – 2014 Scenario - 3	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – 10MHz x 2	License 1: 10 MHz x 2
License 2 – 10MHz x 2	License 2: 10 MHz x 2
License 3 – 5MHz x 2	
License 4 – 5MHz x 2	

## 5.1 Scenario 3-A

In this scenario, we have assumed that Zong and Mobilink will be able to take one lot each of 10MHz whereas Ufone and Telenor will be able to take one lot each of 5 MHz in 2100 MHz spectrum. Mobilink (Mobilink may consolidate/share 1800 MHz spectrum with Telenor later) and Zong may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 10 MHz bandwidth increases by increments of 15%, 30% or 45% then Zong and Mobilink will be paying around USD 339 Mn, USD 384 Mn or USD 428 Mn Dollars respectively. For 5 MHz spectrum if the price increases to 15%, 30% and 45% then Ufone and Telenor will be paying about USD 170 Mn, 192 Mn or 214 Mn respectively (based on the assumption that 5 MHz base price would be half of the full 10 MHz spectrum). On the other hand, if the base price for 1800 MHz spectrum increases by 5% or 10% then Zong and Mobilink will be paying USD 220 Mn or USD 231 Mn respectively.

The price of the licenses for both spectrum to be occupied by Zong and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz). The license of 05 MHz for Telenor and Ufone will range from USD 147 Mn to 214 Mn. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 3 - A	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Mobilink	License 2: Mobilink (Telenor)
License 3 – Ufone	
License 4 – Telenor	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	5 MHz	5 MHz
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

## 5.2 Scenario 3-B

In this scenario, we have assumed that Zong and Ufone will be able to take one lot each of 10MHz, whereas Mobilink and Telenor takes one lot each of 5 MHz in 2100 MHz spectrum. Additionally, Ufone also takes one lot of 10 MHz (Ufone for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Zong may take the other additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 10 MHz bandwidth increases by increments of 15%, 30% or 45% then Ufone and Zong will be paying around USD 339 Mn, USD 384 Mn or USD 428 Mn Dollars respectively. For 5 MHz spectrum if the price increases to 15%, 30% and 45% then Mobilink and Telenor will be paying about USD 170 Mn, 192 Mn and 214 Mn (based on the assumption that 5 MHz base price would be half of the full spectrum). On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Ufone and Zong will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong and Ufone may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz). The license for Telenor and Mobilink ranges from USD 147 Mn to 214 Mn. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 3 - B	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Ufone	License 2: Ufone (PTCL)
License 3 – Mobilink	
License 4 – Telenor	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz-	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz		8.8 MHz
2100	-	5 MHz	5 MHz-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

### 5.3 Scenario 3-C

In this scenario, we have assumed that Zong and Mobilink will be able to take one lot each of 10MHz whereas Ufone and Telenor takes one lot each of 5 MHz in 2100 MHz spectrum. Ufone (for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Zong may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 10 MHz bandwidth increases by increments of 15%, 30% or 45% then Mobilink and Zong will be paying around USD 339 Mn, USD 384 Mn or USD 428 Mn Dollars respectively. For 5 MHz spectrum if the price increases to 15%, 30% and 45% then Ufone and Telenor will be paying about USD 170 Mn, 192 Mn and 214 Mn. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Ufone and Zong will be paying USD 220 Mn and 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz) whereas for Ufone it would range from USD 390 Mn to USD 445 Mn each (from base price to 45% for 5 MHz 2100 & from base price to 10% for 1800 MHz). The license for Mobilink ranges from USD 339 Mn to 428 Million Dollars for its 10 MHz lot of 2100 MHz Spectrum whereas for Telenor it shall range from USD 170 Mn to USD 214 USD. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 3 - C	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Mobilink	
License 3 – Ufone	License 2: Ufone (PTCL)
License 4 – Telenor	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz		8.8 MHz
2100	-	5 MHz	5 MHz-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	5 MHz	5 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

## 5.4 Scenario 3-D

In this scenario, we have assumed that Zong and Mobilink will be able to take one lot each of 10MHz whereas Ufone and Telenor takes one lot each of 5 MHz in 2100 MHz spectrum. Telenor and Zong may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 10 MHz bandwidth increases by increments of 15%, 30% or 45% then Mobilink and Zong will be paying around USD 339 Mn, USD 384 Mn or USD 428 Mn Dollars respectively. For 5 MHz spectrum if the price increases to 15%, 30% and 45% then Ufone and Telenor will be paying about USD 170, 192 Mn and 214 Mn. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Telenor and Zong will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz) whereas for Telenor it would range from USD 390 Mn to USD 445 Mn each (from base price to 45% for 5 MHz 2100 & from base price to 10% for 1800 MHz). The license for Mobilink ranges from USD 339 Mn to 428 Million Dollars for its 10 MHz lot of 2100 MHz Spectrum whereas for Ufone it shall range from USD 170 Mn to USD 214 USD. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 3 - D	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Zong (China Mobile)	License 1: Zong (China Mobile)
License 2 – Mobilink	
License 3 – Ufone	
License 4 – Telenor	License 2: Telenor

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	5 MHz	5 MHz
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

## 5.5 Scenario 3-E

In this scenario, we have assumed that Ufone and Mobilink will be able to take one lot each of 10MHz, whereas Zong and Telenor takes one lot each of 5 MHz in 2100 MHz spectrum. Ufone (for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Mobilink (it would make sense to consolidate this with Telenor) may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 10 MHz bandwidth increases by increments of 15%, 30% or 45% then Mobilink and Ufone will be paying around USD 339 Mn, USD 384 Mn or USD 428 Mn Dollars respectively. For 5 MHz spectrum if the price increases to 15%, 30% and 45% then Zong and Telenor will be paying about USD 170 Mn, 192 Mn and 214 Mn. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Mobilink and Ufone will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Ufone and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz). The license for Telenor and Zong ranges from USD 147 to 214 Mn. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 3 - E	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1 – Mobilink	License 1: Mobilink (Telenor)
License 2 – Ufone	License 2: Ufone (PTCL)
License 3 – Zong (China Mobile)	
License 4 – Telenor	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	5 MHz	5 MHz
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-

## 5.6 Scenario 3-F

In this scenario, we have assumed that Ufone and Mobilink will be able to take one lot each of 10MHz, 10 MHz whereas Zong and Warid takes one lot each of 5 MHz in 2100 MHz spectrum. Ufone (for a likely scenario where Ufone may consolidate/share spectrum specially 1800 MHz for LTE with PTCL probably under an MVNO or some other legal arrangement) and Mobilink (it would make sense to consolidate this with Telenor) may take an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum with 10 MHz bandwidth increases by increments of 15%, 30% or 45% then Mobilink and Ufone will be paying around USD 339 Mn, USD 384 Mn or USD 428 Mn Dollars respectively. For 5 MHz spectrum if the price increases to 15%, 30% and 45% then Zong and Warid will be paying about USD 170 Mn, 192 Mn and 214 Mn. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Mobilink and Ufone will be paying USD 220 Mn and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Ufone and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz). The license for Warid and Zong ranges from USD 147 Mn to 214 Mn. This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 3 - F	
Round 1	Round 2
Spectrum: 2100MHz	Spectrum: 1800MHz
License 1: Mobilink (Telenor)	License 1: Mobilink (Telenor)
License 2 – Ufone	License 2: Ufone (PTCL)
License 3 – Zong (China Mobile)	
License 4 – Warid	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	5 MHz	5 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor (Consolidation with TP)</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	10 MHz	18.8 MHz
2100	-	-	
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	5 MHz	5 MHz

## 6. General Scenario 4

In this scenario, we have assumed that three operator will take lot of 10 MHz in 2100 MHz spectrum. In the case of 1800 MHz spectrum two operators may take an additional 10 MHz each. However, in this case we are also considering a new entrant that is also allowed to bid and acquire 7.38 MHz bandwidth in 850 MHz spectrum that otherwise is not available to existing operators. A few dozen scenario could also be developed but here we taken some of them and leave upon the reader to establish any further scenario he feel like.

This scenario and the resultant spectrum position shall be as follows:

NGSMA Auction – Apr 2014		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – 10MHz x 2	License 1: 10 MHz x 2	
License 2 – 10MHz x 2	License 2: 10 MHz x 2	
License 3 – 10MHz x 2		License 1: 7.38 MHz x 2



### 6.1 Scenario 4-A:

In this scenario, we have assumed that Zong, Ufone and new Entrant will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas, Zong and Ufone may take the an additional 10 MHz each of the 1800 MHz spectrum. The New Entrant will also be acquiring 7.38 MHz bandwidth in 850 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, 383 Mn or 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and Ufone will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong and Ufone may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for new entrant the license price for 2100 MHz and 850 MHz spectrum ranges from 586 to 719 Million Dollars.

This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 4 - A		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – Zong	License 1: Zong	
License 2 – Ufone	License 2: Ufone (PTCL)	
License 3 – New Entrant		License 1: New Entrant

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	-
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>Ufone (PTCL for 1800 MHz)</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>New Entrant</b>			
850	-	7.38 MHz	7.38 MHz
1800	-	-	-
2100	-	10 MHz	10 MHz

## 6.2 Scenario 4-B:

In this scenario, we have assumed that Zong, Mobilink and new Entrant will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas, Zong and Mobilink (it would make sense to consolidate this with Telenor) may take the an additional 10 MHz each of the 1800 MHz spectrum. The New Entrant will also be acquiring 7.38 MHz bandwidth in 850 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, USD 383 Mn or USD 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and Mobilink will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for new entrant the license price for 2100 MHz and 850 MHz spectrum ranges from 586 to 719 Million Dollars.

This scenario and the resultant spectrum position shall be as follows:

Post Auction Scenario 4 - B		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – Zong	License 1: Zong	
License 2 – Mobilink (Telenor)	License 2: Mobilink (Telenor)	
License 3 – New Entrant		License 1: New Entrant

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	-
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>New Entrant</b>			
850	-	7.38 MHz	7.38 MHz
1800	-	-	-
2100	-	10 MHz	10 MHz

### 6.3 Scenario 4-C:

In this scenario, we have assumed that Ufone, Mobilink and new Entrant will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas, Ufone and Mobilink (it would make sense to consolidate this with Telenor) may take the an additional 10 MHz each of the 1800 MHz spectrum. The New Entrant will also be acquiring 7.38 MHz bandwidth in 850 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, 383 Mn or 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Ufone and Mobilink will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Ufone and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for new entrant the license price for 2100 MHz and 850 MHz spectrum ranges from 586 to 719 Million Dollars.

This scenario and the resultant spectrum position shall be as follows:

NGSMA Auction – Apr 2014		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – Ufone	License 1: Ufone	
License 2 – Mobilink (Telenor)	License 2: Mobilink (Telenor)	
License 3 – New Entrant		License 1: New Entrant

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	-	
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz		8.8 MHz
2100	-		
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>New Entrant</b>			
850	-	7.38 MHz	7.38 MHz
1800	-	-	-
2100	-	10 MHz	10 MHz

## 6.4 Scenario 4-D:

In this scenario, we have assumed that Zong, Mobilink and new Entrant will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas, Zong and the New Entrant (instead of 850 MHz he may opt for 1800 MHz for LTE instead and also block growth of competition in the high end market in year to come) may take the an additional 10 MHz each of the 1800 MHz spectrum The New Entrant will also be acquiring 7.38 MHz bandwidth in 850 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, 383 Mn or 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Ufone and Mobilink will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Ufone and Mobilink may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz), whereas, for new entrant the license price for 2100 MHz and 850 MHz spectrum ranges from 586 to 719 Million Dollars.

This scenario and the resultant spectrum position shall be as follows:

NGSMA Auction – Apr 2014		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – Ufone	License 1: Ufone	
License 2 – Mobilink (Telenor)	License 2: Mobilink (Telenor)	
License 3 – New Entrant		License 1: New Entrant

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	-	
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>New Entrant</b>			
850	-	7.38 MHz	7.38 MHz
1800	-	-	-
2100	-	10 MHz	10 MHz

## 6.4 Scenario 4-D:

In this scenario, we have assumed that Zong, Mobilink and new Entrant will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas, Zong and the New Entrant (instead of 850 MHz he may opt for 1800 MHz for LTE instead and also block growth of competition in the high end market in years to come) may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, 383 Mn or 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and New Entrant will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong and New Entrant may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz) whereas, for Mobilink the license price for 2100 MHz ranges from USD 339 to 719 Mn.

This scenario and the resultant spectrum position shall be as follows:

NGSMA Auction – Apr 2014		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – Zong	License 1: Zong	
License 2 – Mobilink (Telenor)		
License 3 – New Entrant	License 2: New Entrant	

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz		6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>New Entrant</b>			
850	-	-	
1800	-	10 MHz	10 MHz
2100	-	10 MHz	10 MHz

### 6.5 Scenario 5-D:

In this scenario, we have assumed that Zong, Mobilink and new Entrant will be able to take one lot each of 10MHz in 2100 MHz spectrum, whereas, Zong and the New Entrant (In addition to 850 MHz- he may opt for 1800 MHz for LTE to have as much spectrum to grow and also block growth of competition) may take the an additional 10 MHz each of the 1800 MHz spectrum. If the base price of 2100 MHz spectrum increases by increments of 15%, 30% or 45% then the single operator will be paying around USD 339 Mn, 383 Mn or 428 Mn Dollars respectively. On the other hand, if the base price for 1800 MHz spectrum increases to 5% and 10% then Zong and New Entrant will be paying USD 220 and USD 231 Mn respectively.

The price of the licenses for both spectrum occupied by Zong may range from USD 505 Mn to USD 659 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz). The price of the licenses for all three spectrum occupied by New Entrant may range from USD 800 Mn to USD 954 Mn each (from base price to 45% for 2100 & from base price to 10% for 1800 MHz & base price for 850 MHz). Mobilink shall pay the license price for 2100 MHz ranging from USD 339 to 428 Mn.

This scenario and the resultant spectrum position shall be as follows:

NGSMA Auction – Apr 2014		
Round 1	Round 2	Round 3
Spectrum: 2100MHz	Spectrum: 1800MHz	Spectrum: 850 MHz
License 1 – Zong	License 1: Zong	
License 2 – Mobilink (Telenor)		
License 3 – New Entrant	License 2: New Entrant	License 1: New Entrant

Frequency	Current	Acquire	Total
<b>Zong</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	10 MHz	16 MHz
2100	-	10 MHz	10 MHz
<b>Mobilink</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	10 MHz	10 MHz
<b>Telenor</b>			
900	4.8MHz	-	4.8MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	
<b>Ufone</b>			
900	7.6 MHz	-	7.6 MHz
1800	6 MHz	-	6 MHz
2100	-	-	
<b>Warid</b>			
900	4.8 MHz	-	4.8 MHz
1800	8.8 MHz	-	8.8 MHz
2100	-	-	-
<b>New Entrant</b>			
850	-	7.38 MHz	7.38 MHz
1800	-	10 MHz	10 MHz
2100	-	10 MHz	10 MHz

## 7. Conclusions:

We have discussed the various expected scenarios that may emerge from the NGSMA from the current IM of the expected Spectrum Lots that PTA will eventually make and mainly depending also upon operators strategies especially for post auction strategies. There definitely could be other scenarios as well that could be developed and we leave this to the able judgment of the readers. We shall update the scenarios if PTA decides to make public the way spectrum lots will be offered after the sealed bids are received to have a more focused assessment of the auction and post auction scenario. We may extend the scope of the current paper to project various other issues not currently addressed such as the likely approaches that operators can/may take after consolidation in the medium to long term. We have though taken consolidation (specially in the case of Mobilink & Telenor and also Ufone & PTCL) of spectrum into account mostly based on the premise that they have some element of common shareholding that has high probability of joining hands.

The moratorium of 18 Months on the request of the current operators that no new spectrum auction will be held after the NGSMA may work against the existing operators rather blocking new comers specially in a situation if a new entrant comes into play and for weaker operators who may not have the muscle as the other big players in the current market to aggressively bid for the spectrum. We however, look forward to a successful auction and hope that this shall be good for the entire mobile eco system growth in Pakistan.

---

Operators are likely to take spectrum consolidation in the medium to long term

---

Spectrum consolidation is very likely to happen in the case of Mobilink & Telenor as well as Ufone & PTCL based on the premise that they have some element of common shareholding that has high probability of joining hands.

---

The moratorium of 18 Months on the request of the current operators that no new spectrum auction will be held after the NGSMA may work against the existing operators rather block new comers

---

A successful NGSMA auction shall be good for the entire mobile eco system growth in Pakistan

---