

FIJI'S EXPERIENCE WITH THE 4G LTE AUCTION AND IMPACT ON BROADBAND DEPLOYMENT

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BACKGROUND

- 333 islands across 1,290,000 square km. 110 are inhabited
- Population - 837,271 (Source : 2007 Census)
- GDP = \$4.03 billion USD (2013)
- 49% of population in rural / maritime areas
- Telecommunications sector liberalized as of 2008

Telecommunications Service Providers:

- Telecom Fiji Limited – fixed line provider
 - Connect Fiji Limited (Subsidiary) - ISP
- Vodafone Fiji Limited – mobile and ISP
- FINTEL- International Gateway Operator
 - Kidanet (Subsidiary) - ISP
- Digicel Fiji Limited – mobile and ISP
 - Unwired Fiji (Common Ownership) – ISP through 4G Wimax

HISTORY OF SPECTRUM MANAGEMENT IN FIJI

- Poorly managed resource
- Allocated without proper band planning and interference engineering
- Not realized as a limited national resource that can earn good return for state
- No commercial pricing strategy
- Often bundled together with operating licenses, therefore no payment received for spectrum allocation
- Management Rights not defined
- Standards and Technical limits poorly defined
- Corruption was widespread, accessibility and ICT penetration rates were poor

TIME FOR A CHANGE

- Change was initiated through the vision of the Bainimarama Government, and under the direct leadership of the Attorney General and Minister for Communications

The following legislations and policies were implemented

- Telecommunications Promulgation 2008
- Regulations of National Spectrum Decree 2009 (amendment – 2013)
- Determinations
 - Telecommunications Licensing Regulations (2011)
 - Telecommunications Licensing Fees (2012)
- Policies
 - National Broadband Policy (2011)
 - Reviewed National ICT Policy (2012)

TIME FOR A CHANGE

- Proper mechanisms were put in place to govern the allocation of spectrum.
- Modernization and reform of spectrum management practices
- Standards were established and defined
- A new licensing framework was established
- Open telecommunications licenses are now issued, and spectrum is licensed separately from operating license
- A separate annual spectrum management fee is also charged to spectrum users

GOVERNMENT INITIATIVES/PROJECTS TO IMPROVE THE ICT SECTOR AND ACCESSIBILITY

- Government Community Telecentre Project
- Universal Service Access Programme
- Modernization of Spectrum Management Practices:
 - 4G Spectrum Auction

4G LTE BAND PLANNING

- This was undertaken simultaneously with the band planning for DTV
- 700 MHz band was vacated by broadcasters that previously were using the spectrum
- Fiji adopted a modified version of the APT Band Plan for 700MHz. This modification further meant that we had the option of using 800MHz for future deployment of 4G LTE once equipment becomes available
- NFT documents for 700MHz, 800MHz and 1800MHz were established
- 4G Band Plan was endorsed by Cabinet in Jan 2013
- Cabinet also endorsed that auction be used to allocate management rights for 4G LTE spectrum

RESERVE PRICES FOR AUCTION

- Things we considered our pricing :

| Technical Factors | Non- technical factors |
|---|--|
| National Table of Frequency Allocation | Population density |
| Occupied Bandwidth | Radio Stations Density |
| Number of Frequency Channels | GDP |
| Polarization | User's income |
| Service Area | Duration of use |
| Coverage Area | Inflation |
| Power (EIRP) | Type of Radio Licence |
| Antenna Height | Geographical and Regional issue |
| Antenna Pattern | Interconnections among International users |
| Modulation | |
| Type of Radio Service | |
| Service priority | |
| Type of Radio Application | |
| Quality of Service | |
| Coordination | |

RESERVE PRICES

- Using benchmark prices that were established for GSM services we determined that prices for LTE spectrum should be at least 1.75 times more expensive.
- We assigned coefficient for the 3 different bands based on the relative capital expenditure. Results were as follows:

| Suggested spectrum cost based on increase factor of 1.75 times | | | | |
|--|--------------------|------------------|----------------|------------------|
| Band | Available spectrum | Band coefficient | FJ \$ per 1MHz | Total band value |
| LTE 700 | 43 MHz | 0.98 | \$84k | \$ 3,549,840.00 |
| LTE 800 | 20 MHz | 0.8 | \$70k | \$ 1,400,000.00 |
| LTE 1800 | 75 MHz | 0.3 | \$26.25k | \$ 1,968,750.00 |
| Total | 138 MHz | | | \$ 6,918,590.00 |

COVERAGE OBLIGATIONS FOR THE LOTS

- OPERATORS ARE TO ROLL OUT LTE SERVICES ON THEIR NETWORK WITHIN 12 MONTHS
- EACH OF THE THREE LOTS HAD THEIR OWN SETS OF OBLIGATIONS
 - LOTS 1 – 12 REQUIRED A POPULATION COVERAGE OBLIGATION OF 80%.
 - LOTS 13- 20 REQUIRED A POPULATION COVERAGE OF 95%
 - LOTS 21 – 28 HAD NO RESERVED PRICES. HOWEVER THE OPERATORS NEED TO CONVINCED GOVERNMENT THAT THEY WILL USE THE SPECTRUM FOR ACHIEVING MAXIMUM COVERAGE TOWARDS 100%. THESE LOTS WERE LATER WITHDRAWN FROM THE AUCTION AND ARE BEING HELD IN RESERVE FOR FUTURE USE.

TEST TO COMMENCE AFTER 5 YEARS FROM DATE THE MANAGEMENT RIGHTS WERE ISSUED

AUCTION RULES

- A comprehensive information pack comprising of a set of 11 documents were drafted which included information on
 - Auction Rules
 - Description of Lots
 - Coverage Obligation and Testing Methodology
 - Coverage incentives
 - Sample of Management Rights
 - Forms and deposit information

ON THE DAY OF AUCTION

- A simple open ascending price auction
- 30MHz cap applied to all participants. We had received EOI from 7 parties of which 3 registered for the auction.
- A deposit of \$100,000 was required from each registered party
- Rounds were held at 9.00am , 11.00am, 1.00pm and 3.00pm.
- Bidding took place in a series of scheduled rounds and the highest bid placed for each Lot were notified to Registered Parties within 15 minutes of close of round.
- Rounds continued until there are no further bids on any Lots. At that time Lots were awarded to the highest bidder.
- Should a bidder have acquired more than the allowable limit for spectrum ownership they will be required to fill their quote from the highest value Lots first. Then the Auction will restart with the next lowest bid on any remaining Lots being the opening bid.
- This process continued until all Lots were sold or passed in.

FINAL RESULTS

- All their operators fulfilled their quota of 30 MHz each
- They were equally placed to compete in the market for LTE services
- Government raised over FJ\$5 million

HOW WE FARED AGAINST OUR OWN EXPECTATIONS

- We had not expected that the auction will yield results for the 700MHz lots, as per the high reserved price
 - The decision by the operators to go after these lots reflected their commitment to providing services to the rural areas
- Due to the unavailability of equipment for LTE 800, we did not expect immediate demand for the spectrum
 - As expected, no active bids for 80MHz spectrum was received
- Revenue
 - Due to decision by operators to go after 700MHz bands and the price war for the 1800MHz band, we exceeded our projected income significantly.
 - Our initial revenue projection was approx. 1.5 Million FJD.
 - Its worth noting that if we were to allocate spectrum as per schedule costs, we would have raised less then FJ\$1. million
 - Auction had considerably raised the returns to state

SOME REASONS FOR OUR SUCCESS

- Uncomplicated, manual auction process- no need to invest in expensive auction software, neither a need to hire expensive auctioneers
- Information pack was essential in ensuring everyone understood the processes and requirements
- Governments decision to withdraw some lots and announce that no further spectrum will be available for the next three years
- Constant meeting between Government and the operators, prior to and during the auction to address concerns and clarify issues
- The willingness of the operators to adopt new technology to achieve Governments Broadband vision and to increase accessibility
- Possibility of operators benefiting from securing LTE spectrum for use under the Governments Universal Service Access subsidy scheme.
- Clear coverage obligations and incentives

IMPACT OF MAKING 4G SPECTRUM AVAILABLE FOR BROADBAND DEPLOYMENT

- Increased uptake of mobile broadband services by Fijians and significant increase in mobile broadband subscriptions
- Broadband services are now available in greater geographical areas-21 out of 40 sites declared under the Universal Service Access programme have already been covered by the service providers on their own initiative.
- Migration of existing 3G users to 4G services to ease congestion on 3G networks, while giving consumers better value for money

THE EFFECTS OF OUR EFFORTS

ICT INDICATORS AS OF DEC 2012

ICT contribution economy - 6.5%. Source: 2011 Fijian Bureau of Statistics estimation

| ICT Indicators | 2010 | 2011 | 2012 | 2013 | 2014 |
|--|---------|---------|---------|---------|---------|
| Fixed Telephone subscription | 129,845 | 129,845 | 142,963 | 74,895 | 75,747 |
| Mobile-Cellular Telephone subscription | 697,920 | 727,000 | 858,809 | 930,406 | 923,368 |
| Wireless Broadband subscription | | | | 13,353 | 18,248 |
| Active Mobile Broadband subscription | | 135,000 | 94,742 | 892,014 | 904,743 |
| Fixed (wired) Broadband subscription | 23,250 | 23,250 | 13,516 | 10,927 | 12,819 |
| International Internet bandwidth in Mbit/s | 625 | 1,950 | 2,725 | 4,110 | 5,310 |

Mobile penetration: 110%

Figures for 2014 are up to Sept 2014

THANK YOU FOR YOU ATTENTION
AND INVITATION
TO COME AND SHARE OUR
EXPERIENCE WITH YOU

VINAKA VAKALEVU

AUCTION LOTS

Table of Standard Lots 1 to 12

| LTE 700 | | | | | | |
|----------------|------------------|-------------------|--------------------|--------------------|---------------|----------------------------|
| LOT # | FDD pairs | Channel BW | UP link | Down link | Remark | Minimum Opening Bid |
| | Ch. Name | MHz | Cent. (MHZ) | Cent. (MHz) | | |
| 1 | LTE700 -Ch1 | 5 | 705.5 | 760.5 | Duplex #1 | \$ 420,000.00 |
| 2 | LTE700 -Ch2 | 5 | 710.5 | 765.5 | Duplex #1 | \$ 420,000.00 |
| 3 | LTE700 -Ch3 | 5 | 715.5 | 770.5 | Duplex #1 | \$ 420,000.00 |
| 4 | LTE700 -Ch4 | 5 | 720.5 | 775.5 | Duplex #1 | \$ 504,000.00 |
| 5 | LTE700 -Ch5 | 5 | 725.5 | 780.5 | Duplex #1 | \$ 504,000.00 |
| 6 | LTE700 -Ch6 | 5 | 730.5 | 785.5 | Duplex #1 | \$ 504,000.00 |

| LTE 1800 | | | | | | |
|-----------------|------------------|-------------------|--------------------|--------------------|---------------|----------------------------|
| LOT # | FDD pairs | Channel BW | UP link | Down link | Remark | Minimum Opening Bid |
| | Ch. Name | MHz | Cent. (MHZ) | Cent. (MHz) | | |
| 7 | LTE1800-Ch10 | 5 | 1757.5 | 1852.5 | | \$ 131,250.00 |
| 8 | LTE1800-Ch11 | 5 | 1762.5 | 1857.5 | | \$ 131,250.00 |
| 9 | LTE1800-Ch12 | 5 | 1767.5 | 1862.5 | | \$ 131,250.00 |
| 10 | LTE1800-Ch13 | 5 | 1772.5 | 1867.5 | | \$ 131,250.00 |
| 11 | LTE1800-Ch14 | 5 | 1777.5 | 1872.5 | | \$ 131,250.00 |
| 12 | LTE1800-Ch15 | 5 | 1782.5 | 1877.5 | | \$ 131,250.00 |

AUCTION LOTS

Table of Standard Lots 13 to 20

| LTE 800 | | | | | | |
|----------------|------------------|-------------------|--------------------|--------------------|---------------|----------------------------|
| LOT # | FDD pairs | Channel BW | UP link | Down link | Remark | Minimum Opening Bid |
| | Ch. Name | MHz | Cent. (MHZ) | Cent. (MHz) | | |
| 13 | LTE800 -Ch3 | 5 | 803.5 | 844.5 | | \$ 350,000.00 |
| 14 | LTE800 -Ch4 | 5 | 808.5 | 849.5 | | \$ 350,000.00 |
| 15 | LTE800 -Ch5 | 5 | 813.5 | 854.5 | | \$ 350,000.00 |
| 16 | LTE800 -Ch6 | 5 | 818.5 | 859.5 | | \$ 350,000.00 |

| LTE 1800 | | | | | | |
|-----------------|------------------|-------------------|--------------------|--------------------|---------------|----------------------------|
| LOT # | FDD pairs | Channel BW | UP link | Down link | Remark | Minimum Opening Bid |
| | Ch. Name | MHz | Cent. (MHZ) | Cent. (MHz) | | |
| 17 | LTE1800-Ch1 | 5 | 1712.5 | 1807.5 | | \$ 131,250.00 |
| 18 | LTE1800-Ch2 | 5 | 1717.5 | 1812.5 | | \$ 131,250.00 |
| 19 | LTE1800-Ch3 | 5 | 1722.5 | 1817.5 | | \$ 131,250.00 |
| 20 | LTE1800-Ch4 | 5 | 1727.5 | 1822.5 | | \$ 131,250.00 |

AUCTION LOTS

Table of Special Coverage Requirement Lots 21 to 28

| LTE 700 | | | | | | | |
|-----------------|------------------|-------------------|--------------------|--------------------|---------------|-----------------------------------|------------------------------------|
| LOT # | FDD pairs | Channel BW | UP link | Down link | Remark | Normal Minimum Opening Bid | Special Minimum Opening Bid |
| | Ch. Name | MHz | Cent. (MHZ) | Cent. (MHZ) | | | |
| 21 | LTE700 -Ch7 | 5 | 735.5 | 790.5 | Duplex #2 | \$ 336,000.00 | \$ 0.00 |
| 22 | LTE700 -Ch8 | 5 | 740.5 | 795.5 | Duplex #2 | \$ 336,000.00 | \$ 0.00 |
| 23 | LTE700 -Ch9 | 3 | 744.5 | 799.5 | Duplex #2 | \$ 105,840.00 | \$ 0.00 |
| | | | | | | | |
| LTE 1800 | | | | | | | |
| LOT # | FDD pairs | Channel BW | UP link | Down link | Remark | Normal Minimum Opening Bid | Special Minimum Opening Bid |
| | Ch. Name | MHz | Cent. (MHZ) | Cent. (MHZ) | | | |
| 24 | LTE1800-Ch5 | 5 | 1732.5 | 1827.5 | | \$ 131,250.00 | \$ 0.00 |
| 25 | LTE1800-Ch6 | 5 | 1737.5 | 1832.5 | | \$ 131,250.00 | \$ 0.00 |
| 26 | LTE1800-Ch7 | 5 | 1742.5 | 1837.5 | | \$ 131,250.00 | \$ 0.00 |
| 27 | LTE1800-Ch8 | 5 | 1747.5 | 1842.5 | | \$ 131,250.00 | \$ 0.00 |
| 28 | LTE1800-Ch9 | 5 | 1752.5 | 1847.5 | | \$ 131,250.00 | \$ 0.00 |