

**VODAFONE NEW ZEALAND LIMITED  
SUBMISSION TO THE MINISTRY OF  
ECONOMIC DEVELOPMENT**



**vodafone**

**Digital Futures : Planning for Digital Television and New  
Uses**

**30 September 2009**

## Summary

1. Vodafone is pleased to have the opportunity to comment on the Ministry of Economic Development's (MED) discussion paper titled "Digital Futures: Planning for Digital Television and New Uses".
2. The ultra fast mobile broadband networks rolled out using the digital dividend spectrum will complement the Government's Ultra-fast Broadband Initiative. However, to ensure that these benefits and synergies are maximised, the digital dividend spectrum must be released as early as possible to allow for redeployment as part of new ultra-fast mobile networks. Vodafone urges the MED to release this spectrum by early 2013 at the latest.
3. Vodafone is concerned about interference from high powered television transmitters into base station receivers. Vodafone proposes that MED make it a requirement for the broadcasters to install at least a 45dB transmit filter. This will provide adequate protection for the services operating in bands above and below the television band.
4. Vodafone continues to question the amount of spectrum reallocated to broadcast services. With popularity of satellite and fibre television increasing, terrestrial television will not have the revenues to justify significant expansion in the future. Noting that the growth of broadband will result in services that will substitute the services provided by terrestrial television, Vodafone is concerned that spectrum allocated to terrestrial television will not be used efficiently. Vodafone continues to believe that the MED should prioritise allocations according to the most efficient and economically beneficial purposes, rather than according to incumbent interests.

## Introduction

5. Vodafone welcomes the opportunity to comment on MED's discussion paper titled "Digital Futures: Planning for Digital Television and New Uses".

## Key Issues

6. There are two key issues that are not explicitly addressed in the discussion paper which Vodafone would like to address. Vodafone is of the opinion that these two issues are critical to the successful Digital Switch Over (DSO) and the allocation of digital dividend spectrum. These two issues are
  - the timing of the DSO; and
  - managing interference between broadcast services and the services likely to operate in the digital dividend spectrum.

## Timing of DSO

7. The digital dividend spectrum can play a critical part in contributing to the New Zealand Economy as a whole. The primary use of the digital dividend spectrum is to roll out ultra fast mobile broadband networks.
8. The Government's Broadband Investment Initiative is expected to deliver huge gains in productivity, innovation, and global reach for New Zealanders through the rollout of fibre networks in New Zealand. The ultra-fast mobile services in the digital dividend spectrum will complement the Government's Ultra-fast Broadband Investment Initiative and deliver part of these gains, as the new mobile technologies that Vodafone will deploy with this spectrum provide ultra-fast connections outside of the home and office, and around the world via our global roaming arrangements.
9. International research and Vodafone's international experience show that mobile broadband will positively impact the following aspects of New Zealand economy:

### Improve productivity

Productivity is improved through less 'down-time' and more connectivity to functions, co-workers and customers. For example, a study undertaken in 2008 by Ovum, titled "The Increasingly Important Impact of Wireless Broadband Technology and Services on the U.S. Economy", made the following observations:

- by analysing industry data, the study found that between 2004 and 2005 the productivity enhancements generated by the use of Mobile Broadband equalled US\$28 Billion;

- that Mobile Broadband was having a particularly significant impact on small businesses and the health sector, which accounted for US\$6.9 Billion of these improvements; and
- the study also found that the actual productivity improvement in 2008 was higher than that predicted in 2005 due to higher than expected broadband wireless uptake.

Cost savings for Government, businesses, and consumers.

The same Ovum study also found that significant cost savings may be made due to adopting Mobile Broadband technologies. These savings have been estimated to total \$528 Billion between 2005 and 2016. The specific sectors of the U.S. economy that may benefit most from these technologies are:

- \$197 Billion in the health care industry;
- \$119 Billion from field service applications;
- \$32 Billion from enterprise replacement of desk phones with mobile devices; and
- \$26 Billion from inventory loss reduction.
- \$17 Billion from sales force automation

Complement the Government's Broadband Investment Initiative

Mobile Broadband is increasingly popular with consumers and businesses:

- Berg Insight found that High Speed Pack Access (HSPA) accounted for 11.6% of the new broadband connections in Europe at the end of 2008. The number of HSPA mobile broadband subscribers (connected PCs) grew by 74% year-on-year to reach 14.6 million in 2008; and
- IDC found that the usage statistics provided by European mobile operators shows that Mobile Broadband usage is doubling every six months.

10. Vodafone has limited the studies presented to those primarily based on actual data and avoided presenting subjective studies based on projections.
11. Productivity, cost-savings and mobility means that Mobile Broadband has the potential to create jobs, promote competition and improve investment.
12. Investment in mobile infrastructure in New Zealand is only now catching up to the rest of the world. 2009 has seen the launch of a second 3G network by Telecom and seen Vodafone extend the coverage of our 3G network to 97% of the population. In fact, New Zealand is one of only two countries that have

nationwide 3G coverage and the only country where there are two nationwide 3G operators.

13. However, given the fast pace of change in the cellular industry, investment must continue if we are to keep ahead of the rest of the world.
14. By 2012 a number of cellular operators around the world would have launched long term evolution (LTE) networks e.g Verizon Wireless, NTT DoCoMo to launch in 2010. By 2012 New Zealand will be at least one year behind most of the lead operators in the world. New Zealand can't afford to delay if New Zealand wants to maximise the benefits from the digital dividend.
15. It is worth noting that the 2006 MCH study<sup>1</sup> concluded that the maximum value from digital dividend is delivered if the switch over happens in 2012.
16. In this context Vodafone encourages MED to complete the DSO by early 2013 at the latest so that New Zealand can maximise the value from digital dividend and keep pace with the rest of the world.
17. New Zealand has been behind in its DSO process compared to North American and European Union countries. Completing the DSO by early 2013 enables New Zealand to catch up with the lead countries.
18. Vodafone is heartened by the efforts of MED, Ministry for Culture and Heritage (MCH) and the broadcast industry in setting up the DSO Steering Group to promote the take up of digital television. This initiative will help speed up the digital television uptake which in turn will bring the DSO date forward delivering the benefits from digital dividend earlier.
19. Vodafone is also heartened by MED's announcement that the DSO date will be announced when the digital television penetration reaches 75% or end of 2012, whichever comes first. However, MED has not explicitly stated the threshold that must be reached before DSO will happen.
20. Vodafone understands the Governments concern that if DSO happens early then there could be large number of consumers stranded with analogue television who will not be able to take advantage of the digital service. However, if the digital television threshold for DSO is set high then this will prevent large number of consumers getting the benefit of broadband services provided using the digital dividend spectrum. Therefore Vodafone believes that the threshold should not be set close to 100%. MED should find a compromise that will ensure that majority of the users have migrated to digital television while the benefits of digital dividend is not held up by those who are unreasonably slow in migrating to the new technology.

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<sup>1</sup> Spectrum Strategy Consultants "Cost benefit analysis of the launch of digital free-to-air television in New Zealand", June 2006.

## Managing Interference

21. Vodafone is disappointed that very little consideration has been given to addressing the interference issue between broadcast services and services that will operate in the digital dividend band. This issue is not explicitly addressed by MED and has received little attention from Kordia in its report<sup>2</sup> produced for MED.
22. The services that are expected to operate in the digital dividend spectrum are low power services which are likely to be impacted by the high power broadcast services. Vodafone is concerned that high powered television transmitters may interfere with mobile base station receivers, and therefore impair the performance of mobile networks.
23. Vodafone has calculated the distance separation (in kilometres) required between the television transmitter and the cellular base station so that the noise rise at the cellular base station is less than 0.5dB (the same level specified in section 6.2 of Schedule 5 of the Commerce Commission mobile co-location standard terms determination). Details of this analysis are presented in the Appendix.
24. The analysis show that the number of Vodafone base stations affected by the main television transmitters can be limited to nine if a 45dB transmit filter is fitted on the television transmitter and a 45dB receive filter is fitted on the cellular base station.
25. Therefore Vodafone proposes that MED make it a requirement for the broadcasters to install at least a 45dB transmit filter.
26. In the case of infill television transmitters, 37 Vodafone base stations are affected even after fitting filters. Some of these sites are co-located on the television sites so no solution could be used. However, the other sites whose performance could be improved by coordinating television and mobile service frequency planning.
27. Vodafone proposes that once MED decides on the actual amount of spectrum to be allocated to television, that the MED then coordinates the frequency planning with cellular services.

## Questions

28. This section is focussed on providing answers to MED's questions. However, Vodafone is not in a position to answer all the questions in the discussion paper as it is not familiar with all the topics addressed in this discussion paper.

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<sup>2</sup> Kordia "A Frequency Plan for UHF Digital Terrestrial Television", August 2009.

**Question 4. Do you agree with approximately 1/3<sup>rd</sup> of band being considered for allocation to new uses on a nationwide basis? If not, what would you prefer and why?**

29. Vodafone is of the view that 1/3<sup>rd</sup> of the band is the minimum that should be allocated to new uses. The broadcast industry is being allocated spectrum that it cannot justify using. As noted in Vodafone's previous submissions, spectrum being reallocated to broadcast services can support 3-4 times the number of high definition channels as the analogue channels they currently support.
30. Vodafone understands that MED has contractual obligations with the television licence holders that it needs to honour. However, such a large amount of spectrum reallocation cannot be justified at a time when ;
- satellite is being increasingly used to provide television services in New Zealand and the percentage of households that are serviced by satellite will increase as Sky television penetration increases and rural areas are serviced by satellite after DSO;
  - with the Government's fibre to the home roll out, it is likely IPTV take up will increase in New Zealand. Extensive fibre roll out in Europe and North America helped IPTV take up;
  - when free to air broadcaster advertising revenues are flat or declining<sup>3,4</sup> it will be difficult to justify increasing the number of television channels significantly. Free to air broadcast revenues are likely to continue this trend with the likes of internet eating into advertising revenues.
  - the growth of broadband will result in services that will substitute the services provided by terrestrial television, which will continue to make it difficult to justify significant expansion in the number of terrestrial television channels.
31. This means that it is highly likely that the broadcasters will not be able to find economic reasons for expanding the number of television channels. This will result in a large part of this spectrum being not used efficiently.
32. Vodafone is surprised by the claims made by the broadcasters that imply that the spectrum needed for terrestrial television will continue to increase with the move to high definition and then to 3D television.
33. Overseas trends suggest that satellite and fibre will increasingly become the main mode of television delivery, and premium content is increasingly delivered by pay television.
34. MED should keep in mind the opportunity costs of allocating this spectrum to broadcasting at the expense of other, more economically beneficial, uses.

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<sup>3</sup> <http://www.stuff.co.nz/business/world/rest-of-world/2414397/Broadcasters-see-sales-fall>

<sup>4</sup> <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/05/16/MNH217LDF5.DTL>

**Question 5. Do you agree with a core reservation for digital television of approximately 1/3<sup>rd</sup> of the UHF band on a nationwide basis? If not, what would you prefer and why?**

35. Conceptually Vodafone supports the idea of using a core band to meet the nationwide capacity requirement needs of television.
36. Vodafone supports Concept 3 in the Kordia report because it uses the minimum amount of spectrum. Vodafone proposes that further optimisation should be done once MED has all the information on the accepted renewal offers.
37. Currently Vodafone understands that 22 channels or 176MHz of spectrum is required to meet the spectrum needs of MED's contractual obligations to the broadcasters. The total spectrum allocated to television should be no more than 176MHz.

**Question 6. Do you agree approximately 1/3<sup>rd</sup> of band being allocated on a geographic basis to meet television licence commitments in urban areas, and to allow new uses in other areas? If not what would you prefer and why?**

38. As noted above no more than 176MHz should be allocated in blocks A and B.

**Question 8. Do you agree with the N+2 basis for licensing of digital television? If not, what would you prefer and why?**

39. Vodafone does not have television frequency planning expertise. Therefore it accepts the work performed by Kordia at face value.
40. Vodafone, however, notes that an N+1 plan can be implemented in some parts as Kordia has used an N+1 plan in one part of Concept 3. Therefore Vodafone expects MED to use N+1 where appropriate.

**Question 9. Do you agree with placement at the upper end of the frequency range, from approximately 700MHz upwards? If not, what would you prefer and why?**

41. Vodafone agrees with the placement of upper end at 694MHz. The main use of the 700MHz band is for cellular use. This upper boundary lines up with the cellular allocation between 698 and 806MHz.
42. Vodafone also notes that if 176MHz is allocated to television then the upper end could be moved to 686MHz and the lower end moved to 510MHz. This movement will create guard band for lower power services that will operate below and above the television band.

**Question 10. Do you agree with placement of the spectrum released in geographic areas in two portions, i.e. from approximately 500 to 550MHz and from approximately 650 to 700 MHz? If not, what would you prefer and why?**

43. As noted above the lower end of the broadcast spectrum should be set at 510MHz and the upper end set at 686MHz.

44. If the optimisation of the TV channels reduces the spectrum needed below 176MHz then these boundaries can be moved further in.

**Question 13. What additional services might require further digital licences to be allocated in the transition to full digital broadcasting?**

45. Vodafone is not in a position to comment on the services that may require additional digital licences. However, Vodafone agrees with MED's analysis that no additional capacity is required due to the large amount of capacity currently available and will be available in the future.

**Question 14. Is it desirable for the Crown to retain influence in the end use of any further digital licence set, and should this in turn influence the method of allocation. What method of allocation is preferred? Why?**

46. In principle Vodafone does not support the Crown retaining influence in the end use of any digital licences. This is unlikely to result in the most efficient outcome. It should be left to those who purchase the rights to decide.
47. However, Vodafone is of the view that MED should consistently apply the "use it or lose it" rule across the board. Since 2007 MED has consistently applied the "use it or lose it" provision on all the management rights. Vodafone requests that similar conditions should be applied on the television spectrum licences.

**Question 16. Do you agree that new radio microphone use should be restricted in the nationwide released spectrum with effect from 2010, and existing use discontinued after five years, as transitional measures? If not, what other provision should be considered?**

48. Vodafone does not support MED issuing incumbency licences to radio microphone users across the digital dividend band.
49. Vodafone's experience in the 2GHz band is that providing incumbency licences does not work for either party. Vodafone had to move out a number of licences before it could use the spectrum. This introduces significant delay and cost.
50. In the case of radio microphones, if cellular operators are not able to find another band for them to use then the cellular operators will be forced to abandon the valuable band of spectrum. This is not a desirable outcome as most of the value to be delivered to the New Zealand economy from the digital dividend spectrum comes from the roll out of broadband services using the UHF band. If this use is not possible then the benefit from digital dividend will be limited.
51. MED needs to find a permanent solution for the radio microphone users. In addition to the white spaces in the television band, there will be unused spectrum in the TV band and the digital dividend spectrum. Some of this spectrum should be used for servicing radio microphone users.

**Question 17. Do you agree with the proposal to establish a preferred band limit at 694MHz subject to finalisation as outlined below? If not, what alternative lower limit would you prefer, and why?**

52. As noted above the upper limit could be set at 686MHz.

**Question 18. Do you agree with the proposal to base New Zealand technical planning on the spectrum allocations used in the United States? If not, what alternative allocations would you prefer, and why?**

53. Vodafone believes it is important that decisions made in New Zealand are aligned with the other major markets in Region 3. The band plan for Region 3 has not yet been agreed, and more analysis of the various options is needed before a decision is made.

54. The channel plan used in the United States is one of the options. Proposals have been made to enhance the US band plan and provide up to 2x40MHz of spectrum in total and there are proposals for band plans which could provide up to 2x50MHz.

55. The other plans provide greater amount of spectrum which will benefit all operators in New Zealand.

56. Band plan for Region 3 will be finalised by the latter part of 2010. This fits in with MED's time frame for allocation in late 2011 or 2012.

57. Therefore Vodafone urges MED that all options should be carefully studied before any final recommendation is made. Any such decision is not possible until Region 3 band plan(s) are finalised at the end of 2010.

**Question 19. Do you agree with the concept of deferring detailed technical subdivision of the released nationwide spectrum, for completion in 2011 (when international trends are anticipated as being resolved), and allocation late in 2011 or 2012? If not what dates would you prefer for completion of planning and allocation?**

58. Vodafone supports deferring the detailed technical planning till 2011 for the reasons MED has outlined.

## Appendix

59. The parameters used in the calculation outlined below.

Main Tx Power	42 - 57dBW
Infill Tx Power	-11 - 41dBW
TV ACLR	40dB
3G ACS	33dB
LTE ACS	27dB
Tx Filter Isolation	40dB
Rx Filter Isolation	40dB

60. The following table outlines the distance separation required between main television stations and cellular base stations to keep the noise rise at the cellular base station below 0.5dB.

Main Tx Power	3G Separation	LTE Separation
41	0.62	0.87
42	0.66	0.92
44	0.74	1.05
45	0.79	1.11
46	0.84	1.19
47	0.9	1.26
50	1.09	1.53
52	1.23	1.73
53	1.31	1.85
57	1.69	2.38

61. The following table outlines the distance separation required between infill television stations and cellular base station to keep the noise rise at the cellular base station below 0.5dB.

Infill Tx Power	3G Separation	LTE Separation
-11	0.05	0.05
1	0.05	0.07
6	0.07	0.1
8	0.08	0.11
9	0.09	0.12
11	0.1	0.13
12	0.1	0.14
13	0.11	0.15
15	0.12	0.17
17	0.14	0.19
18	0.15	0.21
20	0.17	0.23
21	0.18	0.25
22	0.19	0.26
23	0.2	0.28
24	0.21	0.3
25	0.23	0.32
26	0.24	0.34
27	0.26	0.36
28	0.27	0.38
29	0.29	0.41
30	0.31	0.43
31	0.33	0.46
32	0.35	0.49
33	0.37	0.52
34	0.4	0.56
35	0.42	0.59
37	0.48	0.67

38	0.51	0.72
41	0.67	0.87