

9 February 2000

Professor Richard Snape  
Presiding Commissioner  
Productivity Commission  
Locked Bag 2  
Collins Street East Post Office  
Melbourne VIC 8003

Dear Professor Snape

### **Additional Information from the ABA - The Importance of Spectrum Clearing**

In its draft report, *Broadcasting*, the Productivity Commission had identified 'spectrum clearing' as an important mechanism for ensuring that analog/digital simulcasting is confined to the statutory minimum period.

In its submission of 6 December 1999, the ABA reported that it was undertaking preliminary analysis of spectrum clearing opportunities and undertook to provide further advice on this issue as soon as practicable. During the subsequent public hearing in Sydney on 7 December, ABA witnesses stated that spectrum clearing was potentially an important initiative if a lengthy simulcasting period were to be avoided.

Experience with the political imperatives of broadcasting policy suggests the Productivity Commission is correct in its observation that the analog simulcasting period is likely to be extended until digital equipment has been very widely adopted. Indeed, the existence of any substantial pockets of analog-only receivers can be expected to result in pressure to postpone analog switch off. Such pockets may result from:

1. Reluctance or inability of a percentage of people in the market to 'trade up' to a digital set or set-top unit. A substantial 'tail' of analog-only viewers would appear inevitable if a simulcast period of only eight years is in contemplation; and
2. Gaps in the digital coverage area, within which viewers are forced to rely on analog reception. Even if the ABA and industry are successful in achieving 'same coverage and reception quality' as mandated in the conversion schemes, gaps in terrestrial reception are likely to remain, for example, where viewers in remote areas rely on so-called 'fortuitous' analog reception.

This suggests that a comprehensive spectrum clearing strategy may entail extension of digital signal coverage by terrestrial or other means as well as replacement or augmentation of domestic analog equipment.

More generally, the ABA submits that prior development of comprehensive strategies for managing analog switch-off is likely to be a prerequisite if the simulcasting period is not to extend beyond the statutory minimum period.

### **Timing of clearance**

As suggested in the most recent Fairfax submission to the Productivity Commission, spectrum clearing need not wait until the end of the statutory simulcast period if the market for digital spectrum will sustain the costs of earlier clearance either in areas or Australia-wide. As to whether this is the case, the market is a better judge than the regulators. However, the ABA or ACA should retain the public interest role of determining the standards to which spectrum clearing should be undertaken before analog switch-off.

A spectrum clearing policy framework and timetable may be best developed initially through an iterative process of consultation involving broadcasters, government agencies and potential purchasers of digital spectrum. The likely need for changes to the present legal framework might suggest a coordinating role for the Department.

Limited clearance ahead of the end of the simulcast period would raise additional policy issues to those arising in relation to the end of simulcasting Australia-wide. For example, early clearance in a metropolitan market may require adjacent-area regional broadcasters' plans for providing a digital signal to be brought forward by several years – perhaps at the new market entrant's expense. Also, any one-off distribution of portable equipment such as set-top units in a suburb or town (as opposed to fixtures such as external antennas) may create ongoing problems as new residents move into the area. Undoubtedly, solutions could be found if the market for digital channels were strong enough.

### **'Low fruit'**

As promised, the ABA's engineers have undertaken a preliminary search for individual channels in the Sydney region that could be made available for high power digital use for the price of relatively modest spectrum clearance before the end of the simulcast period. Further searches in other major markets could be undertaken.

The following observations are indicative only and more detailed planning would be required before reliable conclusions on spectrum planning options could be reached.

Based on the preliminary studies, the cheapest candidate for early spectrum clearing in the Sydney region may be UHF channel 35. This channel is currently in use to deliver analog television services in Wollongong (Brokers Nose), at Merewether and at Nowra North. The channel is also licensed for use at low power at Bouddi in the Central Coast area north of Sydney, however, the channel is not currently in use at this site.

Of the operating analog services on channel 35, Wollongong (Brokers Nose) would be most affected by a high power digital service from Sydney. It would need to be

either moved to an alternative analog channel (if one could be found) or cleared and reception restored through the distribution of digital set-top boxes. It may be possible for the other existing services to co-exist, providing the Sydney digital service is restricted in the power it may radiate towards these services.

Clearance of analog channel 35 at Brokers Nose would affect up to 10,000 homes. As the cheapest clearance option in the short term would be simply to move the existing television service to another analog channel, the ABA's engineers have considered whether suitable analog capacity could be found. The only alternative analog channel for the Wollongong service, based on preliminary studies, appears to be channel 68, which is also under consideration as a high power Sydney channel.

The ABA intends to seek industry and public comment on the benefits and disadvantages of using either or both channels 35 and 68 for digital television or datacasting services in Sydney in the near future. This will occur as part of a process to vary the digital channel plan to add digital channel capacity for existing analog translator sites in the Sydney, Newcastle and Wollongong region. At the end of this process, the ABA will know whether there is an option of making channel 35 available in Sydney through early clearance of the Brokers Nose service to another analog channel.

If it proves impracticable to move the channel 35 service to another analog channel, channel 35 would remain a candidate for clearance through distribution of set-top boxes once a digital signal was available to all households served by the Brokers Nose facility. Any resultant additional channel in Sydney may still require either power limitations in the direction of the Merewether and Nowra North analog services or the clearance of those channels as well.

Early clearance of any other channel in the Sydney region is likely to come at a much higher cost. This is because most channels are in use either for high power services or at multiple locations for low power services. Thus, use of those channels for digital transmission would either require clearance across large areas or in several smaller areas served by co-channelled infill translators.

Attached is a report prepared for the ABA's Digital Committee in December last year into early clearance options. Note that channel 35 was not included in the analysis at the time the report was prepared because it was thought a suitable alternative analog channel could be found for Wollongong. (As discussed, this has since proved to be problematic). Hence, channel 35 did not appear to come within the scope of 'spectrum clearing' in the sense of analog reception being replaced by digital.

Also attached is a summary table of all available 7 MHz channels showing comments on their availability/suitability for use in Sydney for digital broadcasting or datacasting.

The ABA expresses no view as to whether or when early spectrum clearance in Sydney or the surrounding regions might be an attractive option to new market entrants.

Depending on the Productivity Commission's level of interest in these issues, it may be useful to meet with ABA staff to discuss the issues further. Alternatively, please feel free to telephone me on (02) 9334 7868 or Phyllis Fong on (02) 9334 7831 if you have any queries.

Yours sincerely

Giles Tanner  
General Manager

**Agenda Paper**

---

**Digital Committee**

---

Date: 10 December 1999

Agenda Item:

Contact Officer: Alastair Gellatly

File No.:

Cleared by: Fred Gengaroli / Jonquil Ritter

---

**Consideration of spectrum clearing options as raised by the Productivity Commission Report**

---

**Purpose:**

To inform the Digital Committee of initial analysis on spectrum clearing options undertaken by Planning and Licensing Branch.

**Background:**

1. The draft Productivity Commission report into Broadcasting Regulation suggested a process where aspirant digital broadcasters or datacasters could gain early access to spectrum through the clearing of analog television services.
2. A Fairfax submission to the Productivity Commission suggested that the Government could fund the supply of a digital television set-top box for every analog television set in Australia through revenue from spectrum sales.
3. The ABA's General Manager asked Planning and Licensing Branch to investigate opportunities for spectrum clearance on a smaller scale than the Fairfax proposal.

**Issues:**

1. One possible way of clearing spectrum would be to identify areas where a channel is used to provide coverage of relatively small areas with low population, and to provide Residents a digital set-top box. This would to permit reception of digital television services allowing one or more analog channels to be shut down. To evaluate the feasibility of such a proposal an analysis for spectrum usage in the vicinity of Sydney was undertaken.
2. The following analysis illustrates that most channels are in use either for high power services or at multiple locations for low power services. The Attachment provides a summary of channel usage within 200 km of Sydney. One difficulty with such a proposal is the timing of commencement of digital television services that could be used as an alternative source of services for areas being cleared of analog television. As many of the analog translators around Sydney are in regional television licence areas, there is unlikely to be an alternative digital service for a number of years after the commencement of Sydney digital services.
3. On the basis of a co-channel interference assessment only (not taking into account other interference mechanisms), two channels in use at Gosford appear to be possible spectrum clearance candidates. There are seven channels in use at Gosford with five of these channels also in use at Kings Cross. The two Gosford channels that are not also in use at Kings Cross, are channels 40 and 43. These

channels are used respectively by the NBN and NEN (Prime Television Ltd) regional services. There is no other usage of these channels within approximately 200 km of the Sydney high power sites.

4. Further analysis shows that the Manly/Mosman translators operate on adjacent channels (39 and 42). If high power digital services were to operate in Sydney on adjacent channels to the Manly/Mosman services interference to the reception of the Manly/Mosman services would be the likely result. The area of interference would be outside the immediate vicinity of Manly. Affected viewers would be those further West who rely on the Manly/Mosman translators to overcome shadowing or ghosting reception problems of the high power VHF services.
5. The potential for adjacent channel interference to Manly/Mosman also applies to channel 61 as the Seven Network service operates on channel 60. Channel 61 is the unused Gosford channel licensed to NRN (Telecasters Australia Ltd). NTL has proposed channel 61 as a high power Sydney digital channel, in their proposal for wide area single frequency networks.
6. The problem of interference to adjacent channel services would also apply to Kings Cross services and eliminates all channels between 38 and 67 inclusive from use as Sydney high power services. It may be possible to use such adjacent channels at lower power levels. Further analysis and possible test transmissions would be needed to determine a safe operating power level.
7. Planning and Licensing Branch intends to do further analysis of spectrum clearance options for Brisbane and then prepare a supplementary submission to the Productivity Commission on this issue.

**Summary:**

The relationship of channels in any area is complex. It is not simply a matter of clearing co-channel services. Even if a number of small translators could be cleared by some means (such as supplying digital set-top boxes to viewers of analog services in the translator coverage areas) there are likely to be other interference issues to block access to a channel for a high power service.

**Recommendation:**

**The digital committee note the above issues and the proposed course of action at issue 7.**

**FOR INFORMATION**

**NOT CONFIDENTIAL**

## Sydney Digital TV Channel Search

Site ID : 4045

<i>TV Channel / Digital ERP</i>	<i>Availability of additional high power digital channel(s) for Sydney</i>			
<b>BAND III</b>	<b>CO-CHANNEL INTERFERENCE</b>			
<b>6</b> ERP : 50 kW 174 to 181 MHz	Analog TS90006      CBN6 Lithgow (Lic) Com TS3002      ABCN/6 Bathurst (Lic) ABC Digital <b>TS10008984 Sydney (Lic) 13      50 kW      0 km</b> <i>Not Available : due to co-channel digital Sydney</i>	30 W      102 km 505 W      156 km		
<b>7</b> ERP : 50 kW 181 to 188 MHz	Analog <b>TS86001      ATN7 Sydney (Lic) Com      200 kW      0 km</b> TS86005      ATN7/S Sydney (Lic) Com      200 kW      2 km <i>Not Available : due to co-channel analog Sydney</i>			
<b>8</b> ERP : 50 kW 188 to 195 MHz	Analog TS6002      ABHN/8 Upper Hunter (Lic) ABC      3 kW      189 km TS90001      CBN8 Central Tablelands (Lic) Com      200 kW      210 km Digital <b>TS10008985 Sydney (Lic) 13      50 kW      2 km</b> <i>Not Available : due to co-channel digital Sydney</i>			
<b>9</b> ERP : 50 kW 195 to 202 MHz	Analog TS87005      TCN9/S Sydney (Lic) Com      200 kW      0 km TS87001      TCN9 Sydney (Lic) Com      200 kW      2 km <i>Not Available : due to co-channel analog Sydney</i>			
<b>9A</b> ERP : 50 kW 202 to 209 MHz	Analog <b>TS10008986 Sydney (Pro) 13      100 kW      0 km</b> <b>Not Available unless TEN10 Sydney changes frequency</b>			
<b>10</b> ERP : 50 kW 209 to 216 MHz	Analog <b>TS85004      CTC10 Goulburn (Lic) Com      160 W      168 km</b> <b>TS94005      NBN10 Upper Hunter (Lic) Com      2400 W      189 km</b> <b>TS88001      TEN10 Sydney (Lic) Com      200 kW      0 km</b> <b>TS90004      CBN10 Kandos (Lic) Com      40 W      152 km</b> <i>Not Available : due to co-channel analog Sydney</i>			
<b>11</b> ERP : 50 kW 216 to 223 MHz	Analog TS90002      CBN11 Bathurst (Lic) Com      400 W      156 km Digital <b>TS10008987 Sydney (Lic) 13      50 kW      0 km</b> <i>Not Available : due to co-channel digital Sydney</i>			
<b>12</b> ERP : 50 kW 223 to 230 MHz	Digital <i>TS10008988 Sydney (Ava) 13</i> <b>Not available : due to co-channel digital Sydney</b>	50 kW      0 km		

<b>TV Channel</b>	<b>Restrictions / Availability of channel</b>			
<b>BAND IV</b>	<b>CO-CHANNEL INTERFERENCE</b>			
<b>28</b> ERP : 200 kW 526 to 533 MHz	Analog			
	TS10008118	SBS28 Vacy (Lic) SBS	100 W	148 km
	TS136001	SBS28 Sydney (Lic) SBS	600 kW	2 km
	<b>Not Available : due to co-channel analog Sydney</b>			
<b>29</b> ERP : 200 kW 533 to 540 MHz	Analog			
	TS10008264	SBS29 Lithgow (Lic) SBS	300 W	102 km
	TS2233006	SBS/29 Nowra North (Lic) SBS	3200 W	124 km
	Digital			
	<b>TS10008990</b>	<b>Sydney (Ava) 13</b>	<b>200 kW</b>	<b>0 km</b>
	<b>Not Available : due to co-channel digital Sydney</b>			
<b>30</b> ERP : 200 kW 540 to 547 MHz	Analog			
	TS95019	NEN30 Wyong (Lic) Com	5 kW	52 km
	TS2233003	SBS/30 Ulladulla (Lic) SBS	80 kW	181 km
	TS2233005	SBS/30 Stanwell Park (Lic) SBS	40 W	50 km
	TS10008315	SBS/30 Central Tablelands (Lic) SBS	2 MW	210 km
	<b>TS2233004</b>	<b>SBS/30 Bowral/Mittagong (Lic) SBS</b>	<b>4 kW</b>	<b>101 km</b>
	<b>Not Available : due to co-channel analog Wyong, Bowral/Mittagong Stanwell Park</b>			
<b>31</b> ERP : 200 kW 547 to 554 MHz	Analog			
	TS10008119	ABN31 Vacy (Lic) ABC	100 W	148 km
	<b>TS10004600</b>	<b>CTV31 Sydney (Lic) ONC</b>	<b>10 kW</b>	<b>5 km</b>
	<b>Not Available : due to co-channel analog Sydney</b>			
<b>32</b> ERP: 200 kW 554 to 561 MHz	Analog			
	TS2103001	ABN/32 Lithgow (Lic) ABC	300 W	102 km
	TS2204003	SBS/32 Merewether (Lic) SBS	400 W	112 km
	TS15008	ABWN/32 Nowra North (Lic) ABC	3200 W	124 km
	TS2233002	SBS/32 Wollongong (Lic) SBS	5 kW	68 km
	TS95020	NEN32 Bouddi (Lic) Com	2500 W	39 km
	<b>Not Available : due to co-channel analog Bouddi, Wollongong, Lithgow &amp; Merewether</b>			
<b>33</b> ERP : 200 kW 561 to 568 MHz	Analog			
	TS96010	NRN33 Wyong (Lic) Com	5 kW	52 km
	TS15005	ABWN/33 Ulladulla (Lic) ABC	80 kW	181 km
	TS15007	ABWN/33 Stanwell Park (Lic) ABC	40 W	50 km
	TS85012	CTC33 Central Tablelands (Lic) Com	2 MW	210 km
	TS15006	ABWN/33 Bowral/Mittagong (Lic) ABC	4 kW	101 km
	<b>Not Available : due to co-channel analog Wyong, Bowral/Mittagong Stanwell Park</b>			
<b>34</b> ERP : 200 kW 568 to 575 MHz	Digital			
	<b>TS10008991</b>	<b>Sydney (Ava) 13</b>	<b>200 kW</b>	<b>0 km</b>
	<b>Not Available : due to co-channel digital Sydney</b>			
<b>35</b> ERP : 200 kW 575 to 582 MHz	Analog			
	TS6005	ABHN/35 Merewether (Lic) ABC	400 W	112 km
	TS99036	WIN35 Nowra North (Lic) Com	3200 W	124 km
	<b>TS15002</b>	<b>ABWN/35 Wollongong (Lic) ABC</b>	<b>5 kW</b>	<b>68 km</b>
	<b>TS96011</b>	<b>NRN35 Bouddi (Lic) Com</b>	<b>2500 W</b>	<b>39 km</b>
	<b>Not Available : due to co-channel analog Bouddi (not operating), Wollongong &amp; Merewether. Note Merewether would be ok if Sydney digital power restricted to 10 kW ERP.</b>			



<i>BAND V</i>	<i>Restrictions / Availability of channel CO-CHANNEL INTERFERENCE</i>			
<b>36</b> ERP : 500 kW 582 to 589 MHz	Digital TS10009008 Illawarra (Ava) 13 TS10008992 Newcastle (Ava) 13	250 kW 101 km 500 kW 107 km	<b>Not Available : due to co-channel digital Illawarra &amp; Newcastle</b>	
<b>37</b> ERP : 500 kW 589 to 596 MHz	Digital TS10009009 Illawarra (Ava) 13	250 kW 101 km	<b>TS10008993 Newcastle (Ava) 13 500 kW 107 km</b> <i>Not Available : due to co-channel digital Illawarra &amp; Newcastle</i>	
<b>38</b> ERP: 500 kW 596 to 603 MHz	Digital TS10009010 Illawarra (Ava) 13 TS10008994 Newcastle (Ava) 13	250 kW 101 km 500 kW 107 km	<b>Not Available : due to co-channel digital Illawarra &amp; Newcastle &amp; adjacent channel analog Manly/Mosman</b>	
<b>39</b> ERP : 500 kW 603 to 610 MHz	Analog TS2204002 SBS/39 Wyong (Lic) SBS TS99007 WIN39 Stanwell Park (Lic) Com TS99019 WIN39 Central Tablelands (Lic) Com TS136005 SBS/39 Manly/Mosman (Lic) SBS TS99009 WIN39 Bowral/Mittagong (Lic) Com	5 kW 52 km 40 W 50 km 2 MW 210 km 4 kW 11 km 4 kW 101 km	<b>Not Available : due to co-channel analog Manly/Mosman, Wyong, Stanwell Park &amp; Bowral</b>	
<b>40</b> ERP : 500 kW 610 to 617 MHz	Analog TS94006 NBN40 Gosford (Lic) Com TS10007134 ABC40 East Grove (Lic) ABC	400 W 45 km 10 W 171 km	<b>TS10007134 ABC40 East Grove (Lic) ABC 10 W 171 km</b> <i>Not Available : due to co-channel analog Gosford &amp; adjacent channel analog Manly/Mosman</i>	
<b>41</b> ERP : 500 kW 617 to 624 MHz	Analog TS85017 CTC41 Lithgow (Lic) Com TS94010 NBN41 Merewether (Lic) Com TS85037 CTC41 Nowra North (Lic) Com	300 W 102 km 400 W 112 km 3200 W 124 km	<b>TS99602 WIN41 Wollongong (Lic) Com 5 kW 68 km</b> <b>TS94009 NBN41 Bouddi (Lic) Com 2500 W 39 km</b> <i>Not Available : due to co-channel analog Bouddi, Wollongong, Lithgow &amp; Merewether &amp; adjacent channel analog Manly/Mosman</i>	
<b>42</b> ERP : 500 kW 624 to 631 MHz	Analog TS2604 ABN/42 Wyong (Lic) ABC TS10007386 SBS42 Dungog (Lic) SBS TS99010 WIN42 Ulladulla (Lic) Com TS85030 CTC42 Stanwell Park (Lic) Com TS2005 ABN/42 Manly/Mosman (Lic) ABC	5 kW 52 km 200 W 166 km 80 kW 181 km 40 W 50 km 4 kW 11 km	<b>TS85031 CTC42 Bowral/Mittagong (Lic) Com 4 kW 101 km</b> <i>Not Available : due to co-channel analog Manly/Mosman, Wyong, Bowral/Mittagong, Stanwell Park</i>	
<b>43</b> ERP : 500 kW 631 to 638 MHz	Analog TS95018 NEN43 Gosford (Lic) Com	400 W 45 km	<b>TS10007167 SBS43 East Grove (Lic) SBS 10 W 171 km</b> <i>Not Available : due to co-channel analog Gosford &amp; adjacent channel analog Manly/Mosman</i>	

<b>44</b> ERP : 500 kW 638 to 645 MHz	Analog TS85025 CTC44 Wollongong (Lic) Com 5 kW 68 km TS99024 WIN44 Lithgow (Lic) Com 300 W 102 km TS95034 NEN44 Merewether (Lic) Com 400 W 112 km TS86006 ATN44 Bouddi (Lic) Com 5100 W 39 km TS90033 CBN44 Nowra North (Lic) Com 3200 W 124 km <b>Not Available : due to co-channel analog Bouddi, Wollongong, Lithgow &amp; Merewether</b>
<b>45</b> ERP : 500 kW 645 to 652 MHz	Analog TS85032 CTC45 Ulladulla (Lic) Com 80 kW 181 km TS90030 CBN45 Stanwell Park (Lic) Com 40 W 50 km TS3676001 ABN/45 Crookwell (Lic) ABC 80 W 174 km TS90027 CBN45 Bowral/Mittagong (Lic) Com 4 kW 101 km TS2204001 SBS45 Newcastle (Lic) SBS 1200 kW 107 km <b>Not Available : due to co-channel analog Stanwell Park, Newcastle &amp; Bowral/Mittagong &amp; adjacent channel analog Kings Cross</b>
<b>46</b> ERP : 500 kW 652 to 659 MHz	Analog TS2003 ABN/46 Gosford (Lic) ABC 400 W 45 km TS7522001 SBS46 Bathurst (Lic) SBS 2 kW 156 km TS2002 ABN/46 Kings Cross (Lic) ABC 2600 W 9 km TS10007168 WIN46 East Grove (Lic) RT 10 W 171 km <b>Not Available : due to co-channel analog Kings Cross &amp; Gosford</b>
<b>47</b> ERP : 500 kW 659 to 666 MHz	Analog TS90032 CBN47 Wollongong (Lic) Com 5 kW 68 km TS96024 NRN47 Merewether (Lic) Com 400 W 112 km TS87006 TCN47 Bouddi (Lic) Com 5 kW 39 km TS2332001 Nowra North () Com 3200 W 124 km <b>Not Available : due to co-channel analog Wollongong &amp; Bouddi &amp; Merewether &amp; adjacent channel analog Kings Cross</b>
<b>48</b> ERP : 500 kW 666 to 673 MHz	Analog TS90031 CBN48 Ulladulla (Lic) Com 80 kW 181 km TS6001 ABHN48 Newcastle (Lic) ABC 1200 kW 107 km <b>Not Available : due to co-channel analog Newcastle &amp; adjacent channel analog Kings Cross</b>
<b>49</b> ERP : 500 kW 673 to 680 MHz	Analog TS86003 ATN49 Gosford (Lic) Com 400 W 45 km TS85013 CTC49 Bathurst (Lic) Com 2 kW 156 km TS86002 ATN49 Kings Cross (Lic) Com 2600 W 9 km TS10007174 CBN49 East Grove (Lic) RT 10 W 171 km <b>Not Available : due to co-channel analog Kings Cross &amp; Gosford</b>
<b>50</b> ERP : 500 kW 680 to 687 MHz	Analog TS88006 TEN50 Bouddi (Lic) Com 5100 W 39 km Digital TS10009011 Illawarra (Ava) 13 250 kW 101 km <b>Not Available : due to co-channel analog Bouddi &amp; co-channel digital Illawarra &amp; adjacent channel analog Kings Cross</b>
<b>51</b> ERP : 500 kW 687 to 694 MHz	Digital TS10009012 Illawarra (Ava) 13 250 kW 101 km TS10008995 Newcastle (Ava) 13 500 kW 107 km <b>Not Available : due to co-channel digital Illawarra &amp; Newcastle &amp; adjacent channel analog Kings Cross</b>



<b>58</b> ERP : 500 kW 736 to 743 MHz	Analog TS136003 SBS/58 Gosford (Lic) SBS 400 W 45 km TS90007 CBN58 Lithgow East (Lic) Com 200 W 101 km TS6006 ABHN/58 Kotara (Lic) ABC 200 W 106 km TS136002 SBS/58 Kings Cross (Lic) SBS 2600 W 9 km TS232601 SBS58 Goulburn (Lic) SBS 1 kW 168 km <i>Not Available : due to co-channel analog Kings Cross, Gosford, Kotara &amp; Lithgow East</i>
<b>59</b> ERP : 500 kW 743 to 750 MHz	Analog TS99001 WIN59 Illawarra (Lic) Com 950 kW 101 km TS96008 NRN59 Upper Hunter (Lic) Com 20 kW 189 km TS96037 NRN59 East Rossgole (Lic) Com 1300 W 190 km <i>Not Available : due to co-channel analog Illawarra &amp; adjacent channel analog Kings Cross &amp; Manly/Mosman</i>
<b>60</b> ERP : 500 kW 750 to 757 MHz	Analog TS10004847 CTC60 Oberon (Lic) RT 20 W 124 km TS10007036 ABCN60 Kandos (Lic) ABC 600 W 152 km TS86004 ATN60 Wyong (Lic) Com 5 kW 52 km TS86007 ATN60 Manly/Mosman (Lic) Com 4 kW 11 km TS90005 CBN60 Portland/Wallerawang (Lic) Com 4 kW 122 km TS6007 ABHN/60 Dungog (Lic) ABC 200 W 166 km <i>Not Available : due to co-channel analog Manly/Mosman &amp; Wyong</i>
<b>61</b> ERP : 500 kW 757 to 764 MHz	Analog TS96009 NRN61 Gosford (Lic) Com 400 W 45 km TS85018 CTC61 Lithgow East (Lic) Com 200 W 101 km TS94011 NBN61 Kotara (Lic) Com 200 W 106 km TS99014 WIN61 Goulburn (Lic) Com 1 kW 168 km <i>Not Available : due to co-channel analog Gosford (Not operating), Kotara &amp; Lithgow East &amp; adjacent channel analog Manly/Mosman</i>
<b>62</b> ERP : 500 kW 764 to 771 MHz	Analog TS85024 CTC62 Illawarra (Lic) Com 950 kW 101 km TS937001 Kirkconnell () 1 W 130 km TS95017 NEN62 Upper Hunter (Lic) Com 20 kW 189 km TS95040 East Rossgole () Com 1300 W 190 km <i>Not Available : due to co-channel analog Illawarra &amp; adjacent channel analog Manly/Mosman</i>
<b>63</b> ERP : 500 kW 771 to 778 MHz	Analog TS10004848 WIN63 Oberon (Lic) RT 20 W 124 km TS85015 CTC63 Kandos (Lic) Com 600 W 152 km TS87004 TCN63 Wyong (Lic) Com 5 kW 52 km TS87007 TCN63 Manly/Mosman (Lic) Com 4 kW 11 km TS85016 CTC63 Portland/Wallerawang (Lic) Com 4 kW 122 km TS95016 NEN63 Dungog (Lic) Com 200 W 166 km <i>Not Available : due to co-channel analog Manly/Mosman &amp; Wyong</i>
<b>64</b> ERP : 500 kW 778 to 785 MHz	Analog TS10004300 SBS64 Patonga (Lic) RT 1 W 29 km TS136004 SBS/64 Bouddi/Broken Bay(Lic) SBS 5100 W 39 km TS95035 NEN64 Kotara (Lic) Com 200 W 106 km TS99025 WIN64 Lithgow East (Lic) Com 200 W 101 km TS90012 CBN64 Goulburn (Lic) Com 1 kW 168 km <i>Not Available : due to co-channel analog Patonga, Bouddi, Kotara &amp; Lithgow East &amp; adjacent channel analog Manly/Mosman</i>

