

# Review of the Viewer Access Satellite Television (VAST) Service

## Overview

This paper is in response to the Minister for Regional Communications, Senator the Hon. Bridget McKenzie, and the Department of Communications and the Arts review of the Viewer Access Satellite Television (VAST) service. The VAST program supports an ever increasing numbers of Australia's population living and travelling throughout the regional and remote locations – currently this account's for more than 30,000 travellers and 200,000 households who access the services.

These VAST services include both commercial and national broadcaster FTA TV and radio services via Optus's Aurora Digital satellite platform. The current services are well received and should continue but the technology within the VAST platform is old and needs updating/upgrading including NBN services etc.

Without this VAST service this rural and remote sector of Australians cannot receive satellite delivery of free-to-air (FTA) local television and radio transmissions. There may be a perception that the increase use of the internet and smart technologies may reduce the need for the VAST services in accessing transmissions but this does not account for the social and financial constraints in these areas. There is a need to updating/increasing the platform to include more to the Optus's Aurora Digital Satellite such as NBN SKY Muster etc, so that these viewers need to access similar TV programs as the City based viewers.

Any reduction in this support will only increase the regional "Digital Divide" in accessing news and other services thus impacting more on the farming and regional communities currently suffering from drought, health issues and other social problems.

## ADTIA Technical Communications Advisory Group (CAG) response

The CAG is an industry based committee of the Australian Digital and Telecommunication Industry Association (ADTIA) and it provides technical advice to industry on matters impacting these industries. The members are part of Standards Australia and Comms Alliance committees and provide advice to the Federal and State programs on technical requirements, workforce skills and ICT equipment.

The Association's CAG members have provided important technical and diverse viewpoints and experiences on the VAST services and these points can be expanded if required.

### Experiences:

- Users of the VAST services receive much of the TV we view via our 90cm VAST dish and our UEC receiver
- The service generally provides a good and reliable source of Free To Air TV particularly for the ABC and SBS where all of their programs that are broadcast in the capital cities via DVB-T are replicated on VAST's DVB-S platform.
- Preference is the reception of these programs via VAST over terrestrial because of the ability to also receive the time delayed versions of the ABC and SBS programs that are transmitted primarily for reception in the other Australian Time Zones. This means that during summer time one can watch the programs time delayed by 1/2 hour by switching to the SA service or by 2 hours by tuning to the WA version. During daylight saving it is even better as one can choose versions that are time delayed by 0.5, 1, 1.5 or 3 hours.

- User find the coverage of the Commercial programs on VAST is generally OK as the “Seven”, “NINE” and “TEN” networks are reasonably covered by the VAST channels supplied by “SCTV”, “Imparja” and “TEN Central” in areas such as the NSW area.
- The other “second” and “third” commercial channels are also carried on VAST and there are also about 20 channels that carry some regional news and special events for regions of Eastern Australia ranging from Townsville to Tasmania. Obviously other time zone versions of the commercial channels are also broadcast on the VAST service but for obvious commercial reasons these programs are not available for reception by viewers located out of that area.
- For people travelling around or living in remote regions in our vast country, there is only long range AM radio [The ABC], remote FM regionals with limited reach, DAB digital radio with very little reach and Satellite TV available to keep them informed and to provide entertainment, people in the big cities take for granted.
- With no other avenues available, especially for mobile users, the satellite appears the only option and with the amount of broadcasters streaming digital program and greater vision broadcasting demands of higher definition due to the capability of newer receivers in the market, the program delivery broadcast facilities such as satellite will need greater performance previously not considered necessary.
- Given the amount of data demand increasing within 10 years and broadcasting and two way data to remote users increasing, Satellite is possibly the most cost effective.
- Ultimately, if sufficient data bandwidth reach for broadcasting were available to all Australians via satellite, Free to Air TV streaming could potentially be delivered for very low cost or free everywhere and become the new norm freeing up valuable spectrum in the TV bands for increased mobile data reach [especially in the bush] but doubt this is on anyone’s radar in Government as there appears to be no means or structure to manage longer-term future, in the presently fragmented industry, to plan for the future Australia.
- This VAST platform services many mine sites for workers and communities, local councils for rebroadcasting to towns communities. There are many domestic remote homes and travelling Australians also using the service.

### **Technical**

- It's important to note that the VAST service like the Aurora service before it and the B-MAC encoded Remote TV service before that have all been securely encrypted and require every receiver to be “authorised” before one can receive any of the services.
- In the case of VAST the decoder contains a smartcard that is coupled to the serial number of the particular decoder in which it is located and that smartcard needs to be authorised by a “over the air” signal before one can watch any channels.
- In the case of Aurora the encryption system was basically the same as used for VAST but the smartcard was not “locked” to the particular decoder which I believe was a distinct advantage. At that time the Aurora encryption system was identical to the system used by Austar/Foxtel for their Pay TV service and as this motivated “hackers” to device ways of producing “pirate” smartcards so they could watch the Pay TV channels without paying, and as some of these “pirate” smartcards could also be used for watching the (free) Aurora channels and this was deemed by Optus who were transmitting the Aurora signals as undesirable.
- So when they changed over to the VAST system they insisted the smartcards be “locked” to only one particular decoder box. However as it appears that Foxtel now uses a completely different encryption system to VAST it is unlikely that there would be a significant problem of “hackers” developing pirate cards for VAST if the cards were unlocked from the particular decoder, so its recommend that this be done as it reduces the problem of having more than one satellite TV in a household (i.e. the smartcard can be moved from room to room instead of having to move the whole decoder). Also when a decoder fails it reduces the problem of replacing it.

- Better still it would be appropriate to remove the requirement for VAST services to be encrypted at all, after all it is a “Free to Air” TV service. Removing this encryption requirement (and the need for “smartcards” etc.) would probably also allow the currently rather high price of VAST “set top boxes” to be considerably reduced and possibly the special satellite circuitry could be built into some TV’s so the need for a separate “box” would be eliminated.
- In the current environment in many areas of Australia, where FTA TV can be received via terrestrial services, much of the “City versions” of those services can also be received via mobile phone “smartphone APP’s” it seems to be rather senseless to restrict reception of the same FTA services via satellite.
- There is of course the NBN satellite that may allow some streaming of program, if available, but their capacity is so limited for such use. Would it be capable of providing the overall data requirements of remote communities and mobile users – likely not with the data demands increasing at least 1.5 times every two years and the priority for internet of things services. Bottom line, the Australian Government needs to find a means to provide reliable communications for Australia.
- The Optus satellite, specifically Optus C1 was launched in 2003 and has a lifespan of 15 years, which makes it 2018 as the last year of operation. Optus D3 satellite (2009) was commissioned and is co-located with the Optus C1 @ 153<sup>deg</sup>E. These 2 satellites are outdated and are limited in scope and delivery. But for the current suite of VAST services, they work and work well.
- Currently Optus D10 @ 164<sup>deg</sup>E is providing high quality TV (Foxtel, CH 7, 9 and 10 as well and ABC & SBS, this satellite would certainly offer better VAST services as well as two-way voice, broadband communications which would give customers both TV and broadband, just not sure about the load on this satellite as its dependent on capacity and base station/footprint.
- The 2 NBN satellites SKY Muster have a combination of about 135Gpbs which would certainly cope with any steaming, data and voice transmission both ways - and the SKY satellites are Australian. Its footprint covers all of Australia and is perfectly positioned to deliver the same services as VAST – this includes major changes from DVD delivery to streaming delivery.
- Its recommend that the existing requirement that the VAST channels must be “hard encrypted” be re-reviewed with an aim to possibly removing or “softening” this requirement.
- Attachment 2 has some screen shots of the EPG to show what channels received in NSW using a VAST integrated/receiver/decoder (IRD).
- Currently the VAST signals are carried on satellites operated by Optus located north of eastern Australia that require a “dish antennae” equipped with a suitable LNB (Low Noise Block amplifier). The required dish size depends on the location and required reliability (during heavy rain) but generally is in the 60 cm to 1m range over all of mainland Australia and Tasmania.
- The dish has to be accurately pointed towards the particular satellite (which in NSW is generally nearly North at an elevation angle of about 40 deg.) with no conductive materials (such as metal roofs or wet trees) in the direct “line of sight” path.
- At the moment the VAST signals are transmitted from the satellite in a number of transponder RF channels each about 30MHz wide located in the 11.7 to 12.7 GHz range. The LNB down converts the frequency of this “block” of RF channels down to frequencies in the 1GHz to 2 GHz range that are fed to the VAST IRD by a length of coaxial cable. The cable also feeds DC power to the LNB.
- The IRD is controlled by a remote control (similar to those used for TV’s) and (like a DVD player) is connected to a TV via a single HDMI cable (providing a digital connection) or via three thin coax cables and RCA connectors for baseband (analogue) video and audio.

This paper have included Attachment 1 Guide to installing a satellite TV system for Optus C1 (Vast) and Attachment 2 includes VAST screenshots as a guide to the current situation and that

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with the new VAST program, which may include NBN satellites and other, will need to be ensure that the quality continues to the consumers in these rural and remote areas.

## Summary

VAST program should be continued as it provides a very good and efficient method of providing FTA TV services to those Australians who are in locations that are not well cover by the Australian DVB-T transmissions. Without this VAST service this rural and remote sector of Australians cannot receive satellite delivery of free-to-air (FTA) local television and radio transmissions.

There may be a perception that with the increase use of the internet and smart technologies this may reduce the need for the VAST services in accessing transmissions but this does not account for the socials and financial constraints in these areas.

There is a need to updating/increasing the platform to include more to the Optus's Aurora Digital Satellite such as NBN SKY Muster etc. so that these viewers need to access similar TV programs as the City based viewers.

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## Guide to installing a satellite TV system for Optus C1 (Vast)

Installing a satellite TV system is easy providing that you follow 3 basic alignment procedures:

- 1- Dish Elevation
- 2- LNB Skew
- 3- Direction Azimuth Angle with respect to magnetic North

The Optus C1 satellite is located at 156 degrees East. This doesn't mean that you point your dish towards 156E on a compass! It means that the satellite is located 156 degrees East of 0 longitude.

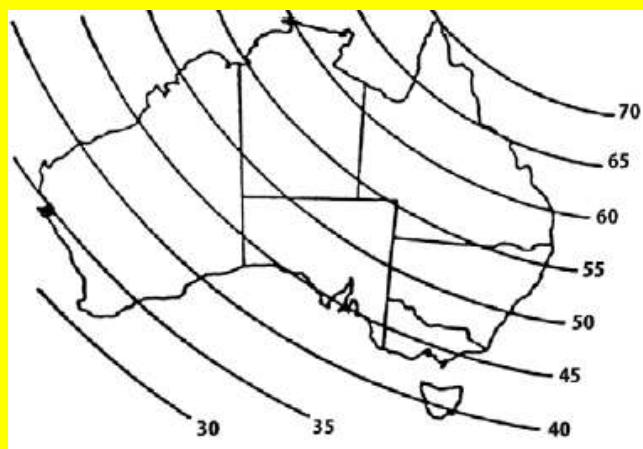
For example, I am located in Melbourne at 145 degrees longitude so if I look North (true North) the satellite is 11 degrees to the East of me ( $156 - 145 = 11$ ).

Knowing this info helps you locate the direction to the satellite but don't take it too seriously. As long as you know roughly where North is, then you can find a spot for your mount easily. Remember that the Optus C1 satellite is always East or true North and obviously the number of degrees East will vary depending on your location. Make sure that you locate your dish in a position that permits light of sight to the satellite with no obstruction such as trees or buildings.

### Dish Elevation

Remember that the degree of elevation (angle to the satellite from horizontal) also varies. This is because the satellite is located above Papua New Guinea and the closer to PNG, the higher the elevation angle. This angle can vary from 30 degrees in Western Australia to 70 degrees in Northern Queensland. View below chart for elevation.

**QUICK REFERENCE ELEVATION MAP**

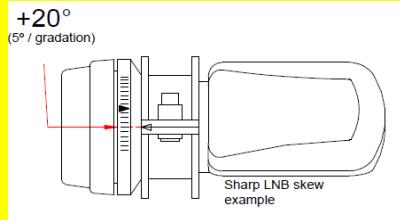


The above map also provides a quick reference to the elevation angle required for the Optus C1 satellite. The numbers above refer to the angle in degrees that your dish must be set to. Remember to always set your dish to around 5 degrees lower than the specified elevation angle and work your way up in 1 degree increments as you pan from left to right.

## Skew

The LNB needs to be rotated. This is called LNB SKEW. Skew angle changes depending on your location. You have to travel a considerable distance for the LNB SKEW to change.

Below is showing the LNB rotated clockwise around +20 degrees (straight down would be 0 degrees). There are some areas of Australia that have a negative skew. This would mean the LNB should be rotated anti clockwise.



It is very important to be aware of LNB SKEW as you will not be able to acquire signal from the satellite if the skew is incorrect.

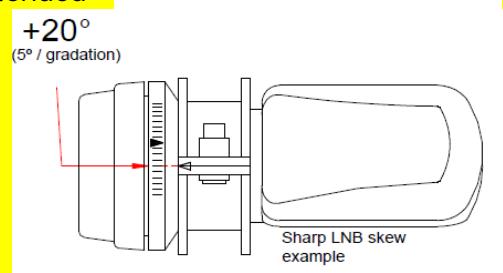
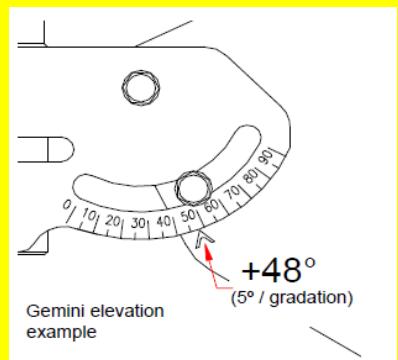
Three alignment settings of the satellite dish must be accurately made for optimum reception of the Foxtel or Vast service from the Optus C1 satellite.

1. Elevation angle - the vertical angle to the satellite above the horizon. This angle is indicated by the scale and pointer on the dish back bracket, as shown in the example at right. Note that the dish mounting pole must be plumb vertical.

2. Azimuth angle - the horizontal angle to the satellite with respect to magnetic north. The dish feed arm should be oriented in this horizontal direction using a magnetic compass. A positive angle is East of North (to the right looking towards the satellite).

3. LNB skew - the angle of rotation of the LNB within its clamp. The polarization angle of the LNB must be aligned with that of the satellite. This angle is set by means of the scale on the LNB, as shown in the example at right.

Alignment settings are listed in the table below. Use the data for your nearest location to make the initial alignment settings for the Foxtel or Vast service from the Optus C1 satellite. The setting angles are intended to provide an approximate initial alignment for the dish.



Location	Elevation	Mag. azimuth	LNB skew	Location	Elevation	Mag. azimuth	LNB skew	Location	Elevation	Mag. azimuth	LNB skew
Abercrombie, NSW	53°	1°	35°	Ararat, Vic	48°	11°	29°	Balladonia, WA	42°	49°	5°
Aberdeen, NSW	55°	-2°	37°	Arcoona, SA	51°	27°	17°	Ballandean, Qld	59°	-2°	37°
Adaminaby, Vic	50°	0°	35°	Ardlethan, NSW	52°	5°	32°	Ballarat, Vic	48°	9°	30°
Adavale, Qld	60°	17°	23°	Ardrossan, SA	49°	23°	21°	Ballina, NSW	59°	-6°	41°
Adelaide, SA	48°	21°	22°	Ariah Park, NSW	52°	5°	32°	Balmoral, Vic	47°	13°	27°
Adelaide River, NT	60°	60°	-16°	Armadale, WA	36°	61°	-1°	Balranald, NSW	51°	12°	28°
Adelong, Vic	51°	2°	34°	Armidale, NSW	57°	-3°	38°	Balumbah, SA	49°	27°	18°
Agnew, WA	42°	56°	-3°	Arno Bay, SA	48°	26°	19°	Bamaga, Qld	73°	47°	-6°
Aileron, NT	56°	43°	2°	Ashford, NSW	58°	-1°	36°	Banka Banka, NT	60°	47°	-3°
Alawoona, SA	49°	18°	24°	Ashley, NSW	58°	2°	34°	Baradine, NSW	56°	3°	34°
Albany, WA	36°	57°	4°	Atherton, Qld	69°	25°	15°	Baratta, SA	51°	22°	20°
Alberga, SA	54°	34°	11°	Augathella, Qld	61°	12°	26°	Barcaldine, Qld	63°	18°	22°
Albert, NSW	54°	5°	32°	Augusta, WA	34°	62°	1°	Barellan, NSW	52°	6°	31°
Albury, Vic	50°	4°	33°	Aurukun, Qld	70°	42°	-1°	Barham, Vic	50°	10°	29°
Alexandra, Vic	48°	7°	31°	Austral Downs, NT	61°	37°	5°	Barmedman, NSW	52°	4°	33°
Alice Springs, NT	56°	41°	4°	Avoca, Vic	48°	10°	29°	Barmera, SA	50°	18°	24°
Alpha, Qld	63°	14°	25°	Avon Downs, NT	61°	39°	4°	Barnato, NSW	54°	11°	28°
Alroy Downs, NT	61°	43°	1°	Ayr, Qld	68°	16°	22°	Barraba, NSW	57°	-5°	39°
Amery, WA	38°	60°	-1°	Baan Baa, NSW	57°	1°	35°	Barringun, NSW	57°	12°	27°
Andamooka, SA	52°	28°	16°	Babakin, WA	38°	58°	1°	Barrow Creek, NT	57°	43°	1°
Angaston, SA	49°	21°	22°	Bacchus Marsh, Vic	48°	8°	30°	Barrow Is., WA	41°	67°	-14°
Anna Creek, SA	53°	31°	13°	Badu Is., Qld	73°	49°	-8°	Batchelor, NT	60°	60°	-16°
Anna Plains, WA	48°	63°	-13°	Baerami, NSW	55°	-1°	36°	Batemans Bay, Vic	51°	-3°	37°
Annuello, Vic	50°	13°	27°	Bairnsdale, Vic	48°	1°	34°	Bathurst, NSW	53°	0°	35°
Apollo Bay, Vic	46°	9°	30°	Balaklava, SA	49°	22°	21°	Bathurst Is., NT	60°	64°	-19°
Apsley, Vic	47°	15°	26°	Baleanoona, SA	53°	23°	19°	Batlow, Vic	51°	2°	34°
Aramac, Qld	63°	18°	21°	Balfour Downs, WA	45°	60°	-9°	Beachport, SA	46°	17°	25°
Beaudesert, Qld	60°	-5°	39°	Boorindal, NSW	56°	9°	29°	Buronga, NSW	51°	15°	26°
Beaufort, Vic	48°	10°	29°	Booroorban, NSW	51°	9°	29°	Burra, SA	50°	21°	21°
Bedourie, Qld	59°	29°	13°	Boorowa, NSW	52°	1°	35°	Burracoppin, WA	39°	57°	0°
Beechworth, Vic	50°	4°	33°	Boort, Vic	49°	10°	29°	Burrinjuck, Vic	52°	1°	35°
Beenleigh, Qld	60°	-5°	40°	Bootra, NSW	55°	17°	24°	Burta, NSW	52°	18°	23°
Bega, Vic	50°	-2°	37°	Bopeechee, SA	53°	28°	16°	Burtundy, NSW	51°	15°	26°
Bejoording, WA	37°	60°	-1°	Borden, WA	37°	57°	3°	Busselton, WA	35°	61°	1°
Belka, WA	38°	58°	0°	Bordertown, SA	48°	16°	25°	Bute, SA	50°	23°	20°
Bellata, NSW	57°	2°	34°	Borrika, SA	49°	18°	24°	Byrock, NSW	56°	9°	29°
Bellbrook, NSW	57°	-5°	39°	Borroloola, NT	63°	48°	-5°	Byron Bay, NSW	59°	-6°	41°
Bellingen, NSW	57°	-5°	39°	Boulder, WA	41°	53°	2°	Caboolture, Qld	61°	-4°	39°
Belmont, NSW	54°	-4°	38°	Boulia, Qld	61°	30°	12°	Cadoux, WA	38°	60°	-2°
Beltana, SA	52°	25°	18°	Bourke, NSW	56°	10°	28°	Cairns, Qld	70°	25°	14°
Belton, SA	51°	23°	20°	Bowelling, WA	36°	60°	1°	Caiwarro, Qld	57°	14°	25°
Benagerie, SA	53°	21°	21°	Bowen, Qld	68°	14°	25°	Calingiri, WA	37°	60°	-2°
Benalla, Vic	49°	6°	32°	Bowral, NSW	52°	-2°	37°	Caloundra, Qld	62°	-4°	39°
Benanee, Vic	50°	13°	27°	Bowser, Vic	50°	5°	32°	Cambray, SA	49°	20°	22°
Bencubbin, WA	38°	58°	-1°	Box Tank, NSW	53°	16°	24°	Camooweal, Qld	62°	38°	5°
Bendemeer, NSW	57°	-2°	37°	Boyanup, WA	35°	61°	1°	Campbell Town, Tas	44°	-1°	36°
Bendigo, Vic	49°	9°	30°	Boyup Brook, WA	35°	60°	1°	Campbelltown, NSW	53°	-3°	37°
Bendoc, Vic	49°	-1°	36°	Braidwood, Vic	51°	-2°	36°	Camperdown, Vic	47°	10°	29°
Bentinck Is., Qld	65°	40°	2°	Bramfield, SA	48°	29°	17°	Canbelego, NSW	55°	8°	30°
Beresford, SA	53°	30°	14°	Bredbo, Vic	51°	0°	36°	Canberra, Vic	51°	0°	35°
Bermagui, Vic	50°	-3°	37°	Bremer Bay, WA	37°	55°	4°	Cann River, Vic	49°	-1°	36°
Bernier Is., WA	38°	66°	-11°	Brewarrina, NSW	57°	6°	31°	Canonba, NSW	55°	6°	31°
Berri, SA	50°	18°	24°	Bribbaree, NSW	52°	3°	33°	Canopus, SA	51°	18°	24°
Berridale, Vic	50°	0°	35°	Bridgetown, WA	35°	60°	1°	Canowindra, NSW	53°	2°	34°
Berrigan, Vic	50°	7°	31°	Bright, Vic	49°	4°	33°	Cape Barren Is., Tas	46°	-1°	36°
Beulah, Vic	49°	13°	27°	Brinkworth, SA	49°	22°	21°	Cape Borda, SA	47°	24°	20°
Beverley, WA	37°	59°	0°	Brisbane, Qld	61°	-4°	39°	Cape Crawford, NT	63°	48°	-4°
Biloela, Qld	64°	4°	33°	Broad Arrow, WA	41°	53°	1°	Captains Flat, Vic	51°	-1°	36°
Binbee, Qld	67°	14°	24°	Broadford, Vic	48°	7°	31°	Caragabal, NSW	53°	4°	33°
Bingara, NSW	58°	0°	36°	Broadmere, Qld	62°	5°	32°	Cardwell, Qld	69°	22°	18°
Binnaway, NSW	56°	2°	34°	Broken Hill , NSW	53°	18°	23°	Carinda, NSW	56°	6°	31°
Birchip, Vic	49°	12°	28°	Brookton, WA	37°	59°	0°	Carmila, Qld	66°	8°	29°

Birdsville, Qld	57°	28°	14°	Broome, WA	49°	63°	-15°	Carnarvon, WA	38°	66°	-10°
Blackall, Qld	62°	16°	23°	Broomehill, WA	36°	58°	2°	Carnegie, WA	46°	55°	-4°
Blackville, NSW	56°	0°	36°	Bruce Rock, WA	38°	58°	0°	Carrathool, NSW	51°	8°	30°
Blackwater, Qld	64°	8°	29°	Brunswick Junction, WA	35°	61°	0°	Carrieton, SA	51°	23°	20°
Blair Athol, Qld	65°	13°	26°	Bruthen, Vic	48°	1°	35°	Carrum, Vic	47°	6°	31°
Blanchetown, SA	49°	20°	23°	Buckleboo, SA	49°	27°	17°	Casino, NSW	59°	-5°	40°
Blayney, NSW	53°	1°	35°	Budda, NSW	54°	13°	26°	Cassilis, NSW	55°	0°	35°
Bligh Entrance, Qld	75°	37°	-6°	Bugaldie, NSW	56°	3°	34°	Casterton, Vic	47°	14°	27°
Blinman, SA	52°	25°	18°	Bulahdelah, NSW	55°	-5°	39°	Castlemaine, Vic	48°	9°	30°
Bobadah, NSW	54°	7°	31°	Bullabulling, WA	41°	54°	1°	Cathcart, Vic	50°	-2°	36°
Bodalla, Vic	51°	-2°	37°	Bullara, WA	39°	67°	-13°	Ceduna, SA	49°	32°	14°
Bodallin, WA	39°	57°	0°	Bullfinch, WA	39°	57°	0°	Cessnock, NSW	54°	-3°	38°
Bogan Gate, NSW	53°	4°	33°	Bulli, NSW	53°	-3°	38°	Charleville, Qld	60°	13°	26°
Boggabilla, NSW	59°	1°	35°	Bulloo Downs, WA	57°	18°	22°	Charlton, Vic	49°	11°	29°
Boggabri, NSW	57°	1°	35°	Bunbury, WA	35°	61°	0°	Charters Towers, Qld	67°	19°	20°
Boigu Is., Qld	74°	41°	-11°	Bundaberg, Qld	64°	-1°	37°	Childers, Qld	63°	-1°	37°
Bollon, Qld	59°	8°	29°	Bundaleer, Qld	58°	10°	28°	Chillagoe, Qld	69°	28°	12°
Bomaderry, NSW	53°	-2°	37°	Bundarra, NSW	57°	-1°	37°	Chiltern, Vic	50°	5°	32°
Bombala, Vic	50°	-1°	36°	Bundella, NSW	56°	0°	35°	Chinchilla, Qld	61°	2°	35°
Bon Bon, SA	51°	31°	14°	Buninyong, Vic	48°	9°	30°	Chinkapook, Vic	50°	13°	27°
Bonaparte Is., WA	54°	65°	-18°	Bunyan, Vic	50°	-1°	36°	Christmas Creek, WA	52°	58°	-11°
Bonnie Rock, WA	39°	58°	-1°	Burakin, WA	38°	60°	-2°	Clackline, WA	37°	60°	-1°
Bonshaw, NSW	59°	0°	36°	Burcher, NSW	53°	5°	32°	Clare, NSW	52°	12°	27°
Bookaloo, SA	51°	26°	18°	Burketown, Qld	65°	39°	3°	Clare, SA	49°	22°	21°
Booligal, NSW	52°	10°	29°	Burngup, WA	38°	57°	2°	Clarke Is., Tas	45°	-1°	36°
Boorabbin, WA	40°	55°	1°	Burnie, Tas	44°	3°	34°	Clermont, Qld	65°	12°	26°
Cleve, SA	49°	26°	18°	Creswick, Vic	48°	9°	30°	Duchess, Qld	62°	32°	10°
CliffyHead, WA	35°	59°	3°	Croker Is., NT	63°	62°	-19°	Duff Creek, SA	53°	32°	13°
Cioncurry, Qld	63°	32°	10°	Crookwell, NSW	52°	0°	36°	Dumbleyung, WA	37°	58°	2°
Clunes, Vic	48°	10°	29°	Croppa Creek, NSW	58°	1°	35°	Dunedoo, NSW	55°	1°	35°
Cobar, NSW	55°	9°	29°	Croydon, Qld	66°	32°	9°	Dungog, NSW	55°	-4°	38°
Cobargo, Vic	50°	-2°	37°	Crystal Brook, SA	50°	23°	20°	Dunk Is., Qld	69°	22°	17°
Cobden, Vic	47°	10°	29°	Cuballing, WA	37°	59°	1°	Dunkeld, Qld	47°	12°	28°
Cobram, Vic	50°	7°	31°	Cue, WA	40°	60°	-5°	Dunkeld, Vic	60°	8°	30°
Cockaleechie, SA	48°	27°	18°	Culcairn, Vic	51°	4°	33°	Dunmarra, NT	61°	51°	-7°
Cockburn, NSW	52°	19°	23°	Cummins, SA	48°	27°	18°	Dunolly, Vic	48°	10°	29°
Cocklebiddy, WA	44°	45°	6°	Cumnock, NSW	54°	2°	34°	Dunsborough, WA	35°	62°	0°
Coen, Qld	71°	37°	3°	Cunderdin, WA	37°	59°	0°	Dwarda, WA	36°	60°	0°
Cohuna, Vic	50°	10°	29°	Cungena, SA	49°	30°	15°	Dwellingup, WA	36°	61°	0°
Colac, Vic	47°	9°	30°	Cunnamulla, Qld	58°	12°	26°	Echuca, Vic	49°	9°	30°
Coleambally, NSW	51°	7°	31°	Curban, NSW	55°	3°	33°	Eden, Vic	50°	-3°	37°
Coleraine, Vic	47°	13°	27°	Curlewis, NSW	56°	0°	36°	Edenope, Vic	47°	14°	26°
Collarenebri, NSW	58°	5°	32°	Curnamona, SA	52°	22°	20°	Edeowie, SA	52°	24°	19°
Collerina, NSW	57°	9°	29°	Curralyapla, NSW	55°	12°	27°	Ediacara, SA	52°	27°	17°
Collie, NSW	55°	4°	33°	Currie, Tas	45°	8°	31°	Edithburgh, SA	48°	23°	21°
Collie, WA	36°	60°	1°	Curtin, WA	42°	52°	2°	Edjudlna, WA	42°	53°	1°
Collie Cardiff, WA	36°	60°	1°	Curtis Is., Qld	65°	2°	34°	Eidsvold, Qld	63°	1°	35°
Collinsville, Qld	67°	14°	24°	Daguragu, NT	57°	54°	-9°	Einasleigh, Qld	67°	27°	13°
Colona, SA	48°	36°	12°	Dajarra, Qld	61°	33°	10°	Elizabeth, SA	49°	21°	22°
Comboyne, NSW	56°	-5°	39°	Dalby, Qld	61°	0°	36°	Elleker, WA	36°	57°	3°
Condobolin, NSW	53°	5°	32°	Daly Waters, NT	61°	52°	-8°	Ellendale, WA	52°	60°	-13°
Coober Pedy, SA	52°	33°	12°	Dampier, WA	43°	66°	-14°	Elliott, NT	60°	50°	-5°
Cooktown, Qld	71°	29°	11°	Dandaragan, WA	37°	62°	-2°	Elliston, SA	48°	29°	17°
Coolabah, NSW	55°	8°	30°	Dandenong, Vic	48°	6°	32°	Elmore, Vic	49°	8°	30°
Coolah, NSW	55°	1°	35°	Daretton, NSW	51°	15°	25°	Emerald, Qld	64°	10°	28°
Coolamara, NSW	53°	13°	26°	Dargo, Vic	49°	2°	34°	Emmaville, NSW	58°	-2°	37°
Coolamon, NSW	51°	4°	33°	Darkan, WA	36°	59°	1°	Eneabba, WA	37°	63°	-4°
Coolangatta, Qld	60°	-6°	40°	Darlington Point, NSW	51°	7°	31°	Enngonia, NSW	57°	11°	28°
Coolgardie, WA	41°	53°	1°	Darnick, NSW	52°	13°	27°	Ensary, Vic	49°	1°	35°
Cooma, Vic	50°	-1°	36°	Dartmoor, Vic	46°	14°	27°	Eridunda, NT	54°	40°	6°
Coombah, NSW	52°	17°	24°	Darwin, NT	60°	62°	-18°	Erudina, SA	52°	22°	20°
Coomberdale, WA	37°	61°	-2°	Daylesford, Vic	48°	9°	30°	Esperance, WA	39°	51°	5°
Coonabarabran, NSW	56°	2°	34°	Deep Well, NT	55°	39°	6°	Etadunna, SA	54°	26°	16°
Coonalpyn, SA	48°	18°	24°	Deepwater, NSW	58°	-3°	38°	Ethel Creek, WA	45°	60°	-9°
Coonamble, NSW	56°	4°	33°	Delegate, Vic	49°	-1°	36°	Euabalong, NSW	53°	7°	31°
Coonana, WA	42°	51°	3°	Delungra, NSW	58°	0°	36°	Eucla, WA	46°	41°	9°

Coonawarra, SA	47°	15°	26°	Denham, WA	37°	65°	-9°	Eudunda, SA	49°	21°	22°
Coondambo, SA	50°	30°	15°	Deniliquin, Vic	50°	8°	30°	Eugowra, NSW	53°	3°	34°
Coorow, WA	37°	61°	-3°	Denman, NSW	55°	-2°	37°	Euriowie, NSW	53°	18°	23°
Cootamundra, NSW	52°	3°	34°	Denmark, WA	36°	58°	3°	Euroa, Vic	49°	6°	31°
Coraki, Qld	66°	-3°	39°	Derby, Tas	45°	-1°	36°	Euston, NSW	50°	13°	27°
Coral Bay, WA	39°	67°	-13°	Derby, WA	51°	62°	-15°	Exmouth, WA	40°	68°	-14°
Corfield, Qld	64°	24°	16°	Devonport, Tas	44°	2°	34°	Farina, SA	53°	26°	17°
Corindi, NSW	58°	-6°	40°	Diane Bank Is., Qld	73°	14°	24°	Fernlee, Qld	59°	9°	29°
Corowa, Vic	50°	5°	32°	Dimboola, Vic	48°	13°	27°	Finke, NT	55°	37°	8°
Corrigin, WA	37°	58°	1°	Dirk Hartog Is., WA	37°	66°	-10°	Finley, Vic	50°	7°	31°
Corryong, Vic	50°	2°	34°	Dirranbandi, Qld	59°	6°	31°	Fitzroy Crossing, WA	52°	59°	-12°
Cottonvale, Qld	59°	-2°	38°	Donald, Vic	49°	11°	28°	Flinders Is., SA	46°	-1°	36°
Cowangie, Vic	49°	15°	25°	Dongara, WA	37°	63°	-5°	Flinders Is., Tas	47°	30°	16°
Cowell, SA	49°	25°	19°	Donnybrook, WA	35°	61°	1°	Flinton, Qld	60°	4°	33°
Cowes, Vic	47°	6°	32°	Doodlakine, WA	38°	59°	0°	Florina, SA	52°	21°	21°
Cowra, NSW	53°	2°	34°	Dorre Is., WA	37°	66°	-10°	Forbes, NSW	53°	3°	33°
Cradock, SA	51°	24°	19°	Dorrigo, NSW	57°	-5°	39°	Ford's Bridge, NSW	56°	12°	27°
Cranbourne, Vic	47°	6°	32°	Dowerin, WA	37°	60°	-1°	Forsayth, Qld	67°	28°	12°
Cranbrook, WA	36°	58°	3°	Drake, NSW	59°	-4°	39°	Forster, NSW	55°	-5°	39°
Crescent Head, NSW	57°	-6°	40°	Duaringa, Qld	64°	6°	31°	Foster, Vic	47°	4°	33°
Cressy, Vic	47°	9°	30°	Dubbo, NSW	55°	3°	34°	Frances, SA	48°	15°	26°
Frankston, Vic	47°	6°	31°	Greenhills, WA	37°	59°	0°	Injune, Qld	62°	7°	30°
Frederick Hills, NT	65°	54°	-12°	Greenvale, Qld	67°	24°	16°	Innaminka, SA	57°	23°	18°
Fremantle, WA	36°	61°	-1°	Grenfell, NSW	53°	3°	34°	Innisfail, Qld	69°	23°	16°
French Is., Vic	47°	6°	32°	Griffith, NSW	52°	7°	31°	Inverell, NSW	58°	-1°	37°
Frewena, NT	60°	44°	0°	Groote Eylandt Is., NT	65°	51°	-8°	Inverway, NT	56°	55°	-9°
Frome Downs, SA	53°	22°	20°	Guildford, WA	36°	61°	-1°	Investigator Group, SA	47°	30°	16°
Furneaux Group Is., Tas	46°	-1°	36°	Gulargambone, NSW	56°	4°	33°	Ipswich, Qld	61°	-4°	39°
Galong, NSW	52°	2°	34°	Gulgong, NSW	55°	0°	35°	Iron Baron, SA	50°	25°	19°
Ganmain, NSW	51°	5°	32°	Gunbar, NSW	52°	8°	30°	Iron Knob, SA	50°	26°	18°
Garah, NSW	58°	3°	34°	Gundagai, Vic	51°	2°	34°	Irrapatana, SA	53°	30°	14°
Gascoyne Junction, WA	39°	65°	-9°	Gunnedah, NSW	56°	0°	36°	Israelite Bay, WA	41°	48°	6°
Gatton, Qld	61°	-3°	38°	Gunning, NSW	52°	0°	35°	Ivanhoe, NSW	53°	11°	28°
Gawler, SA	49°	21°	22°	Guya, NSW	57°	-3°	38°	Jabiru, NT	62°	59°	-15°
Gayndah, Qld	63°	0°	36°	Gwabegar, NSW	57°	3°	33°	Jamestown, SA	50°	22°	20°
Geelong, Vic	47°	8°	31°	Gympie, Qld	62°	-3°	38°	Jardee, WA	35°	60°	2°
Genoa, Vic	49°	-2°	37°	Hall's Creek, WA	54°	57°	-10°	Jenolan Caves, NSW	53°	-1°	36°
George Town, Tas	45°	1°	35°	Hamilton, Vic	47°	13°	28°	Jeparit, Vic	48°	14°	27°
Georgetown, Qld	67°	28°	12°	Hamley Bridge, SA	49°	21°	21°	Jerilderie, Vic	50°	7°	31°
Geraldton, WA	37°	64°	-5°	Hammond, SA	51°	24°	20°	Jerramungup, WA	37°	56°	3°
Gerringong, NSW	52°	-3°	38°	Harrington, NSW	56°	-6°	40°	Jindabyne, Vic	50°	0°	35°
Gibb River, WA	54°	61°	-14°	Harrismith, WA	37°	58°	1°	Jingellic, Vic	50°	3°	34°
Gibson, WA	40°	51°	5°	Harts Range, NT	57°	40°	5°	Jitarning, WA	37°	58°	1°
Gilgandra, NSW	55°	3°	33°	Harvey, WA	35°	61°	0°	Jubilee Downs, WA	52°	59°	-12°
Gilgunnia, NSW	54°	8°	30°	Hastings, Vic	47°	6°	32°	Julia Creek, Qld	64°	29°	12°
Gingin, WA	36°	61°	-2°	Hatches Creek, NT	59°	42°	2°	Jundah, Qld	61°	21°	19°
Girilambone, NSW	55°	7°	30°	Hatfield, NSW	51°	12°	28°	Junee, NSW	52°	3°	33°
Gladstone, Qld	65°	2°	34°	Hattah, Vic	50°	14°	26°	Kadina, SA	49°	24°	19°
Gladstone, SA	50°	23°	20°	Hawker, SA	51°	24°	19°	Kajabbi, Qld	63°	34°	8°
Glen Davis, NSW	54°	-1°	36°	Hawker Gate, NSW	55°	21°	21°	Kalabity, SA	52°	20°	21°
Glen Helen, NT	55°	43°	2°	Hay, NSW	51°	10°	29°	Kalannie, WA	38°	60°	-2°
Glen Innes, NSW	58°	-2°	38°	Hayes Creek, NT	61°	59°	-15°	Kalbarri, WA	39°	66°	-10°
Glenburnie, SA	46°	15°	26°	Healesville, Vic	48°	6°	32°	Kalgoorlie, WA	41°	53°	1°
Glencoe, SA	46°	16°	25°	Heathcote, Vic	49°	8°	30°	Kalumburu, WA	55°	63°	-18°
Glenmorgan, Qld	60°	4°	33°	Hebel, Qld	58°	7°	31°	Kambalda, WA	41°	53°	2°
Glenroy, WA	53°	60°	-13°	Henbury, NT	55°	41°	5°	Kandos, NSW	54°	2°	34°
Gloucester, NSW	56°	-4°	39°	Henty, Vic	51°	4°	33°	Kaniva, Vic	48°	15°	26°
Gnowangerup, WA	37°	57°	3°	Hermannsburg, NT	55°	42°	3°	Kanowna, WA	41°	53°	1°
Gnuca, WA	38°	59°	-1°	Hermidale, NSW	55°	7°	30°	Kapunda, SA	49°	21°	22°
Gold Coast, Qld	60°	-5°	40°	Hesso, SA	51°	25°	19°	Karkoo, SA	48°	27°	18°
Golden Ridge, WA	41°	53°	2°	Heywood, Vic	46°	13°	27°	Karonie, WA	42°	52°	2°
Goldsworthy, WA	46°	64°	-13°	Higginsville, WA	41°	52°	3°	Karoonda, SA	49°	18°	24°
Gongolgon, NSW	56°	8°	30°	Hill End, NSW	54°	1°	35°	Karragullen, WA	36°	61°	-1°
Goodooga, NSW	58°	7°	30°	Hillston, NSW	52°	9°	30°	Karratha, WA	43°	66°	-14°
Goolgowi, NSW	52°	8°	30°	Hinchinbrook, Qld	69°	21°	18°	Karridale, WA	34°	62°	1°
Goolma, NSW	55°	1°	35°	Hobart, Tas	43°	-1°	36°	Karumba, Qld	66°	36°	5°
Gooloogong, NSW	53°	2°	34°	Holbrook, Vic	50°	3°	33°	Katanning, WA	36°	58°	2°

Goolwa, SA	48°	20°	22°	Home Hill, Qld	68°	16°	22°	Katherine, NT	61°	56°	-12°
Goomalling, WA	37°	60°	-1°	Hopetoun, Vic	49°	13°	27°	Katoomba, NSW	53°	-2°	37°
Goombalie, NSW	56°	11°	27°	Hopetoun, WA	38°	54°	4°	Keith, SA	48°	17°	25°
Goondiwindi, Qld	59°	2°	35°	Hornsby, NSW	54°	-3°	38°	Kellerberrin, WA	38°	58°	0°
Goongarrie, WA	41°	54°	0°	Horsham, Vic	48°	13°	27°	Kempsey, NSW	57°	-6°	40°
Gordon Downs, WA	55°	55°	-9°	Hughenden, Qld	65°	23°	17°	Kendall, NSW	56°	-5°	40°
Gordonvale, Qld	70°	24°	15°	Hughes, SA	47°	41°	8°	Kendenup, WA	36°	58°	3°
Goroke, Vic	48°	14°	26°	Hungerford, Qld	57°	14°	25°	Kenebri, NSW	56°	3°	33°
Gosford, NSW	54°	-3°	38°	Huonville, Tas	43°	-1°	35°	Kerang, Vic	50°	10°	29°
Goulburn, NSW	52°	-1°	36°	Hyden, WA	38°	56°	1°	Kiama, NSW	52°	-3°	38°
Goulburn Is., NT	64°	60°	-17°	Iffracombe, Qld	63°	19°	20°	Kilcoy, Qld	61°	-3°	38°
Grafton, NSW	58°	-5°	40°	Ingham, Qld	68°	21°	18°	Killarney, VIC	60°	-3°	38°
Granite Peak, WA	44°	57°	-5°	Inglewood, Qld	59°	0°	36°	Kilmore, Vic	48°	7°	31°
Gravesend, NSW	58°	1°	35°	Inglewood, Vic	49°	10°	29°	Kimba, SA	49°	27°	18°
Greenbushes, WA	35°	60°	1°	Ingomar, SA	51°	33°	13°	Kingaroy, Qld	62°	-1°	37°
Kingoonya, SA	51°	31°	14°	Lightning Ridge, NSW	58°	6°	31°	Marvel Loch, WA	39°	56°	1°
Kings Canyon, NT	54°	44°	2°	Lihou Reef, Qld	72°	6°	31°	Maryborough, Qld	63°	-2°	38°
Kingscote, SA	47°	22°	21°	Lilydale, SA	51°	20°	22°	Maryborough, Vic	48°	10°	29°
Kingston, SA	47°	17°	25°	Limmen Bight, NT	64°	51°	-8°	Maryvale, NT	55°	39°	6°
Kitchener, WA	43°	49°	4°	Lismore, NSW	59°	-6°	40°	Matakana, NSW	53°	8°	30°
Kojonup, WA	36°	59°	2°	Lismore, Vic	47°	10°	29°	Mataranka, NT	61°	55°	-11°
Kondinin, WA	38°	57°	1°	Lithgow, NSW	54°	-1°	36°	Mathoura, Vic	50°	8°	30°
Kondut, WA	38°	60°	-2°	Little Topar, NSW	53°	17°	24°	Maude, NSW	51°	10°	29°
Koolyanobbing, WA	40°	56°	0°	Liverpool, NSW	53°	-3°	37°	Maydena, Tas	43°	0°	35°
Koondrook, Vic	50°	10°	29°	Lizard Is., Qld	72°	30°	10°	McDouall Peak, SA	51°	32°	13°
Koongawa, SA	49°	28°	17°	Lock, SA	48°	27°	17°	Meeberrie, WA	39°	63°	-7°
Koorawatha, NSW	53°	2°	34°	Lockhart, Vic	51°	5°	32°	Meekatharra, WA	41°	60°	-6°
Koorda, WA	38°	58°	-1°	Lockhart River, Qld	72°	39°	2°	Melbourne, Vic	48°	7°	31°
Koroit, Vic	46°	11°	28°	Lorne, Vic	47°	8°	30°	Melton, Vic	48°	8°	31°
Korong Vale, Vic	49°	10°	29°	Louth, NSW	55°	11°	27°	Melville Is., NT	61°	63°	-19°
Kowanyama, Qld	68°	38°	3°	Loxton, SA	50°	17°	24°	Mendooran, NSW	55°	2°	34°
Kukerin, WA	37°	57°	2°	Lubeck, Vic	48°	12°	28°	Menindee, NSW	53°	16°	25°
Kulgera, NT	54°	39°	6°	Lucindale, SA	47°	16°	25°	Menzies, WA	42°	54°	0°
Kulin, WA	38°	57°	1°	Lucy Creek, NT	59°	38°	6°	Merbein, Vic	51°	15°	25°
Kulja, WA	38°	59°	-2°	Lyndhurst, SA	53°	25°	18°	Meredith, Vic	47°	9°	30°
Kulpara, SA	49°	23°	20°	Lyons, SA	50°	34°	12°	Meribah, SA	50°	17°	24°
Kulwin, Vic	50°	13°	27°	Macarthur, Vic	47°	12°	28°	Merimbula, Vic	50°	16°	25°
Kumarl, WA	40°	52°	4°	Mackay, Qld	67°	10°	28°	Meringur, Vic	50°	-3°	37°
Kundip, WA	38°	54°	4°	Macksville, NSW	57°	-6°	40°	Merino, Vic	47°	13°	27°
Kununoppin, WA	38°	58°	-1°	Maclean, NSW	59°	-6°	40°	Merredin, WA	38°	58°	0°
Kununurra, WA	57°	59°	-13°	Maffra, Vic	48°	3°	34°	Merriwa, NSW	55°	-1°	36°
Kurri Kurri, NSW	55°	-4°	38°	Magnetic I., Qld	68°	19°	20°	Middle I., WA	40°	49°	6°
Kwinana, WA	36°	61°	-1°	Mainoru, NT	63°	55°	-11°	Midland Junction, WA	36°	61°	-1°
Kyabram, Vic	49°	8°	31°	Malpas, SA	49°	17°	24°	Mildura, Vic	51°	15°	26°
Kyalite, NSW	50°	12°	28°	Maitland, NSW	55°	-4°	38°	Miles, Qld	61°	3°	34°
Kyancutta, SA	49°	28°	17°	Maitland, SA	49°	23°	20°	Miling, WA	37°	61°	-2°
Kybybolite, SA	47°	15°	26°	Malbooma, SA	50°	33°	13°	Millicent, SA	46°	16°	26°
Kyneton, Vic	48°	8°	30°	Malcolm, WA	42°	54°	-1°	Millmerran, Qld	60°	0°	36°
Kynuna, Qld	63°	28°	13°	Mallacoota, Vic	49°	-3°	37°	Milparinka, NSW	55°	19°	22°
Kyogle, NSW	59°	-5°	39°	Manangatang, Vic	50°	13°	27°	Milton, Vic	52°	-3°	37°
Kywong, Vic	51°	5°	32°	Mandora, WA	47°	63°	-13°	Mindarie, SA	49°	18°	24°
Lagrange, WA	48°	63°	-14°	Mandurah, WA	36°	61°	0°	Minerva, Qld	64°	10°	28°
Lake Biddy, WA	38°	56°	2°	Manildra, NSW	54°	2°	34°	Mingary, SA	52°	19°	22°
Lake Boga, Vic	50°	11°	28°	Manilla, NSW	57°	-1°	36°	Mingela, Qld	67°	18°	21°
Lake Bolac, Vic	47°	11°	29°	Manjimup, WA	35°	60°	2°	Mingenew, WA	37°	63°	-4°
Lake Brown, WA	39°	58°	-1°	Manly, NSW	53°	-4°	38°	Minlaton, SA	48°	23°	21°
Lake Cargelligo, NSW	53°	7°	31°	Mannahill, SA	51°	20°	22°	Minnipa, SA	49°	29°	16°
Lake Grace, WA	37°	57°	2°	Mannum, SA	49°	20°	23°	Miriam Vale, Qld	64°	1°	35°
Lake King, WA	38°	55°	3°	Maralinga, SA	49°	38°	10°	Mistake Creek, NT	56°	57°	-11°
Lake Nash, NT	61°	37°	6°	Marble Bar, WA	45°	63°	-12°	Mitchell, Qld	61°	8°	29°
Lakes Entrance, Vic	48°	1°	35°	Mardie, WA	42°	67°	-14°	Mittagong, NSW	53°	-2°	37°
Lameroo, SA	49°	17°	24°	Mareeba, Qld	70°	25°	14°	Moa, Qld	73°	49°	-8°
Lancelin, WA	36°	62°	-2°	Margaret River, WA	34°	62°	1°	Moama, Vic	49°	8°	30°
Landor, WA	41°	63°	-8°	Margaret River, WA	53°	57°	-10°	Moe, Vic	48°	4°	33°
Lara, Vic	47°	8°	31°	Maria, NT	64°	51°	-8°	Mogumber, WA	37°	61°	-2°
Larrimah, NT	61°	53°	-9°	Marion Bay, SA	47°	24°	20°	Molong, NSW	54°	2°	34°
Launceston, Tas	44°	0°	35°	Marion Reef, Qld	70°	2°	34°	Mondrain, WA	40°	50°	6°
Laura, SA	50°	23°	20°	Marla, SA	53°	37°	9°	Monto, Qld	63°	2°	35°

Laurieton, NSW	56°	-6°	40°	Marlborough, Qld	65°	7°	31°	Moolawatana, SA	54°	23°	19°
Laverton, WA	43°	54°	0°	Marlo, Vic	48°	-1°	36°	Mooloogool, WA	42°	59°	-6°
Learmouth, WA	40°	67°	-14°	Marnoo, Vic	48°	12°	28°	Moomba, SA	56°	24°	18°
Leeton, NSW	52°	6°	31°	Maroochydore, Qld	62°	-4°	39°	Moonie, Qld	60°	2°	34°
Leigh Creek, SA	53°	25°	18°	Marra, NSW	54°	13°	26°	Moonta, SA	49°	24°	20°
Leinster, WA	42°	56°	-3°	Marrawah, Tas	44°	5°	32°	Moora, WA	37°	61°	-2°
Leongatha, Vic	47°	4°	33°	Marree, SA	53°	27°	17°	Moorarie, WA	41°	61°	-7°
Leonora, WA	42°	55°	-1°	Marsden, NSW	53°	4°	33°	Mooroopna, Vic	49°	7°	31°
Mootwingee, NSW	53°	19°	23°	Musgrave, Qld	70°	35°	6°	Nuriootpa, SA	49°	21°	22°
Moralana, SA	51°	25°	19°	Muswellbrook, NSW	55°	-2°	37°	Nuyts Archipelago, SA	48°	33°	14°
Morden, NSW	54°	17°	23°	Mutooroo, SA	52°	19°	23°	Nyabing, WA	37°	57°	2°
Moree, NSW	58°	2°	34°	Myrtleford, Vic	49°	4°	33°	Nyah West, Vic	50°	12°	28°
Moreton, Qld	61°	-5°	40°	Nagambie, Vic	49°	7°	31°	Nymagee, NSW	54°	8°	30°
Morgan, SA	50°	20°	22°	Nambour, Qld	62°	-4°	39°	Nymboida, NSW	58°	-4°	39°
Morrisett, NSW	54°	-4°	38°	Nambucca Heads, NSW	57°	-6°	40°	Nyngan, NSW	55°	6°	31°
Mornington, Qld	66°	41°	1°	Nanango, Qld	61°	-1°	37°	Nyngynderry, NSW	53°	14°	26°
Mornington Mission, Qld	65°	41°	1°	Nannine, WA	41°	60°	-5°	Oakbank, SA	51°	19°	23°
Mortlake, Vic	47°	11°	29°	Nannup, WA	35°	61°	1°	Oakey, Qld	61°	-1°	37°
Morundah, NSW	51°	6°	31°	Naracoorte, SA	47°	16°	26°	Oaklands, Vic	51°	6°	32°
Moruya, Vic	51°	-2°	37°	Naradhan, NSW	53°	7°	31°	Oakvale, SA	51°	19°	23°
Morven, Qld	61°	11°	28°	Narembeen, WA	38°	57°	1°	Oberon, NSW	53°	-1°	36°
Morwell, Vic	48°	4°	33°	Naretha, WA	44°	48°	4°	Olary, SA	52°	20°	22°
Moss Vale, NSW	52°	-2°	37°	Narooma, Vic	50°	-3°	37°	Old Bar, NSW	56°	-5°	40°
Mossgriel, NSW	52°	12°	28°	Narrabri, NSW	57°	2°	35°	Old Moolawatana, SA	54°	23°	20°
Mossman, Qld	70°	27°	13°	Narrabri West, NSW	57°	2°	35°	Omeo, Vic	49°	2°	34°
Moulamein, Vic	50°	10°	29°	Narrandera, NSW	52°	6°	32°	Ongerup, WA	37°	56°	3°
Mount Barker, SA	48°	20°	22°	Narrogin, WA	37°	59°	1°	Onslow, WA	41°	67°	-14°
Mount Barker, WA	36°	58°	3°	Narrornine, NSW	55°	4°	33°	Oodnadatta, SA	54°	34°	11°
Mount Beauty, Vic	49°	3°	33°	Naryilco, Qld	56°	20°	21°	Ooldea, SA	49°	37°	10°
Mount Drysdale, NSW	55°	10°	29°	Nathalia, Vic	50°	8°	31°	Ora Banda, WA	41°	54°	1°
Mount Eba, SA	51°	31°	14°	Navarre, Vic	48°	11°	29°	Orange, NSW	54°	1°	35°
Mount Gambier, SA	46°	15°	26°	Nelligen, Vic	51°	-2°	37°	Orbost, Vic	49°	0°	35°
Mount Hope, NSW	53°	9°	30°	Nelson, Vic	46°	14°	27°	Orroroo, SA	51°	23°	20°
Mount Hope, SA	48°	28°	18°	Nelson Bay, NSW	55°	-5°	39°	Ouyen, Vic	50°	14°	26°
Mount Hopeless, SA	54°	24°	19°	Nevertire, NSW	55°	5°	32°	Oxley, NSW	51°	11°	28°
Mount Isa, Qld	62°	34°	8°	New Angledool, NSW	58°	7°	31°	Packsaddle, NSW	54°	19°	22°
Mount Magnet, WA	40°	60°	-4°	New Norcia, WA	37°	61°	-2°	Padthaway, SA	47°	16°	25°
Mount Manara, NSW	53°	13°	27°	New Norfolk, Tas	43°	-1°	35°	Palm Is., Qld	68°	20°	19°
Mount Morgan, Qld	65°	4°	32°	Newcastle, NSW	54°	-4°	38°	Pannawonica, WA	42°	66°	-13°
Mount Murchison, NSW	54°	14°	26°	Newcastle Waters , NT	60°	50°	-6°	Papunya, NT	55°	44°	1°
Mount Vernon, WA	42°	62°	-9°	Newdegate, WA	38°	56°	2°	Paraburdoo, WA	42°	63°	-10°
Mount Walker, Qld	60°	-3°	38°	Newman, WA	44°	61°	-9°	Parachilna, SA	52°	25°	18°
Mount Willoughby, SA	52°	36°	10°	Nhill, Vic	48°	14°	26°	Paratoo, SA	51°	21°	21°
Moura, Qld	63°	5°	32°	Nhulunbuy, NT	66°	54°	-12°	Paringa, SA	50°	17°	24°
Muchea, WA	36°	61°	-1°	Nicholson, WA	56°	55°	-9°	Parkes, NSW	54°	3°	33°
Mudgee, NSW	54°	1°	35°	Nimbin, NSW	59°	-5°	40°	Parndana, SA	47°	23°	21°
Mukinbudin, WA	39°	58°	-1°	Nindigully, Qld	59°	5°	32°	Parrakie, SA	49°	18°	24°
Mulgathering, SA	50°	34°	12°	Ninety Mile Beach, Vic	48°	2°	34°	Parramatta, NSW	53°	-3°	38°
Mullaley, NSW	56°	1°	35°	Nonning, SA	50°	27°	17°	Patchewollock, Vic	49°	14°	26°
Mullengudgery, NSW	55°	6°	31°	Noojee, Vic	48°	5°	32°	Paynes Find, WA	39°	59°	-3°
Mullewa, WA	38°	63°	-5°	Noonamah, NT	61°	61°	-17°	Peak Hill, NSW	54°	3°	33°
Mullumbimby, NSW	60°	-6°	40°	Noongaar, WA	39°	57°	0°	Peebinga, SA	49°	17°	25°
Muloorina, SA	54°	28°	16°	Noonkanbah, WA	51°	60°	-12°	Pemberton, WA	35°	60°	2°
Mulyungarrie, SA	53°	20°	22°	Noosa Heads, Qld	62°	-4°	39°	Penneshaw, SA	47°	22°	22°
Mundaring Weir, WA	36°	61°	-1°	Normanton, Qld	66°	35°	6°	Penola, SA	47°	16°	26°
Mundiwindi, WA	44°	60°	-8°	Nornalup, WA	35°	59°	3°	Penong, SA	48°	34°	13°
Mungeranie, SA	55°	27°	16°	Norseman, WA	40°	52°	3°	Penrith, NSW	53°	-2°	37°
Mungindi, NSW	58°	4°	32°	North Bourke, NSW	56°	10°	28°	Penshurst, Vic	47°	12°	28°
Muntadgin, WA	38°	57°	0°	Northam, WA	37°	60°	-1°	Pentland, Qld	66°	21°	19°
Murchison, Vic	49°	7°	31°	Northampton, WA	37°	64°	-6°	Perth, WA	36°	61°	-1°
Murgon, Qld	62°	-1°	37°	Northcliffe, WA	35°	60°	2°	Peterborough, SA	46°	10°	29°
Murra Murra, Qld	58°	10°	28°	Northumberland Is., Qld	67°	7°	30°	Peterborough, Vic	50°	22°	21°
Murray Bridge, SA	48°	20°	23°	Nowendoc, NSW	56°	-3°	38°	Pialba, Qld	63°	-3°	38°
Murrayville, Vic	49°	16°	25°	Nowingi, Vic	50°	14°	26°	Piangil, Vic	50°	12°	28°
Murringo, NSW	52°	2°	34°	Nowra, Vic	51°	-3°	38°	Piawaning, WA	37°	61°	-2°

Murrumburrah, NSW	52°	2°	34°	Nullagine, WA	45°	62°	-11°	Picton, NSW	53°	-2°	37°
Murrurundi, NSW	56°	-2°	37°	Nullarbor, SA	47°	38°	10°	Piesseville, WA	36°	59°	1°
Murtoa, Vic	48°	12°	28°	Numurkah, Vic	50°	7°	31°	Pilliga, NSW	57°	4°	33°
Murwillumbah, NSW	60°	-6°	40°	Nundle, NSW	56°	-2°	37°	Pimba, SA	51°	28°	17°
Pine Creek, NT	61°	58°	-14°	Redhill, SA	50°	23°	20°	Stradbroke, Qld	61°	-6°	41°
Pingaring, WA	36°	56°	4°	Renmark, SA	50°	18°	24°	Strahan, Tas	43°	3°	33°
Pingelly, WA	37°	59°	0°	Renner Springs, NT	60°	48°	-4°	Strangways, SA	53°	30°	14°
Pingrup, WA	37°	57°	2°	Richmond, Qld	65°	26°	15°	Stratford, Vic	48°	2°	34°
Pinjarra, WA	36°	61°	0°	Riverton, SA	49°	22°	21°	Strathalbyn, SA	48°	20°	22°
Pinnaroo, SA	49°	16°	25°	Robe, SA	47°	17°	25°	Streaky Bay, SA	48°	31°	15°
Point Lookout, NSW	57°	-4°	39°	Robertstown, SA	50°	21°	22°	Stretton, WA	37°	58°	1°
Point Samson, WA	43°	66°	-14°	Robinvale, Vic	50°	13°	27°	Stroud, NSW	55°	-4°	39°
Polda, SA	48°	29°	17°	Rochester, Vic	49°	8°	30°	Struan, SA	47°	15°	26°
Poochera, SA	49°	30°	16°	Rockhampton, Qld	65°	4°	33°	Stuart Creek, SA	53°	29°	15°
Pooncarie, NSW	52°	15°	26°	Rockingham, WA	36°	62°	-1°	Stuart Town, NSW	54°	1°	35°
Port Albert, Vic	48°	3°	33°	Rocky Gully, WA	35°	59°	3°	Sunbury, Vic	48°	7°	31°
Port Arthur, Tas	43°	-2°	36°	Roebourne, WA	43°	66°	-14°	Surat, Qld	60°	5°	32°
Port Augusta, SA	50°	25°	19°	Rolleston, Qld	63°	9°	29°	Surfer's Paradise, Qld	60°	-6°	40°
Port Broughton, SA	49°	23°	20°	Roma, Qld	61°	6°	31°	Sutherland, NSW	53°	-3°	38°
Port Campbell, Vic	46°	10°	29°	Rosebud, Vic	47°	7°	31°	Swan Hill, Vic	50°	11°	28°
Port Curtis, Qld	65°	2°	34°	Roto, NSW	53°	9°	29°	Swansea, Tas	44°	-2°	36°
Port Fairy, Vic	46°	12°	28°	Rottnest Is., WA	36°	62°	-1°	Sydney, NSW	53°	-3°	38°
Port Germein, SA	50°	24°	20°	Rowena, NSW	57°	4°	33°	Tabulam, NSW	59°	-4°	39°
Port Hedland, WA	45°	65°	-14°	Roxby Downs, SA	52°	28°	16°	Tailem Bend, SA	48°	19°	23°
Port Keats, NT	58°	60°	-15°	Rushworth, Vic	49°	7°	31°	Talia, SA	48°	29°	16°
Port Kembla, NSW	53°	-3°	38°	Rystone, NSW	54°	0°	36°	Tallangatta, Vic	50°	3°	33°
Port Kenny, SA	48°	30°	16°	Saibal Is., Qld	74°	42°	-9°	Talwood, Qld	59°	4°	33°
Port Lincoln, SA	47°	26°	19°	Sale, Vic	48°	2°	34°	Tamala, WA	37°	65°	-8°
Port MacDonnell, SA	46°	15°	26°	Salmon Gums, WA	40°	52°	4°	Tambar Springs, NSW	56°	1°	35°
Port Macquarie, NSW	56°	-5°	39°	Sandgate, Qld	61°	-4°	39°	Tambellup, WA	36°	58°	2°
Port Neill, SA	48°	26°	19°	Sandstone, WA	41°	58°	-3°	Tambo, Qld	62°	14°	25°
Port Pirie, SA	50°	24°	20°	Sarina, Qld	67°	9°	28°	Tamworth, NSW	56°	-1°	37°
Port Victoria, SA	48°	23°	20°	Sawtell, NSW	57°	-6°	40°	Tarago, Vic	52°	0°	35°
Port Wakefield, SA	49°	22°	21°	Sayers Lake, NSW	52°	14°	26°	Tarcoola, SA	50°	32°	13°
Port Warrender, WA	54°	64°	-18°	Scone, NSW	55°	-2°	37°	Tarcoola, NSW	56°	8°	30°
Portland, NSW	54°	-1°	36°	Scottsdale, Tas	45°	0°	35°	Tarcutta, Vic	51°	3°	34°
Portland, Vic	46°	13°	28°	Sea Lake, Vic	49°	12°	27°	Taree, NSW	56°	-5°	39°
Portsea, Vic	47°	7°	31°	Serviceton, Vic	48°	15°	26°	Tarella, NSW	54°	16°	25°
Premer, NSW	56°	1°	35°	Seymour, Vic	49°	7°	31°	Taroom, Qld	62°	4°	32°
Prince of Wales Is., Qld	73°	48°	-7°	Shaw Is., Qld	68°	11°	27°	Tathra, Vic	50°	-3°	37°
Proserpine, Qld	68°	12°	26°	Shay Gap, WA	46°	63°	-13°	Tatong, Vic	49°	5°	32°
Puntabie, SA	49°	31°	15°	Shellharbour, NSW	52°	-3°	38°	Tego, Qld	58°	9°	29°
Pyramid Hill, Vic	49°	9°	30°	Shepparton, Vic	49°	7°	31°	Telfer, WA	47°	59°	-9°
Quairading, WA	37°	59°	0°	Sheringa, SA	48°	28°	17°	Temora, NSW	52°	4°	33°
Quambatook, Vic	49°	11°	28°	Silverton, NSW	53°	19°	23°	Tennant Creek, NT	59°	45°	-1°
Quambone, NSW	56°	5°	32°	Singleton, NSW	55°	-3°	38°	Tenterfield, NSW	59°	-3°	38°
Queanbeyan, Vic	51°	0°	36°	Sir Ed. Pellew Gro, NT	64°	47°	-5°	Terang, Vic	47°	11°	29°
Queenscliff, Vic	47°	7°	31°	Sir J. Banks Group, SA	48°	26°	19°	Termination Is., WA	39°	51°	6°
Queenstown, Tas	43°	3°	34°	Smithton, Tas	44°	4°	33°	Texas, Qld	59°	-1°	36°
Quilpie, Qld	59°	17°	23°	Smythtown, NSW	57°	-6°	40°	Thallon, Qld	59°	5°	32°
Quirindi, NSW	56°	-1°	36°	Smoky Bay, SA	48°	32°	14°	Thargomindah, Qld	58°	17°	23°
Quorn, SA	51°	24°	19°	Snowtown, SA	49°	23°	20°	The Rock, Vic	51°	4°	33°
Rabbit Flat, NT	55°	51°	-5°	Sofala, NSW	54°	0°	35°	The Twins, SA	51°	32°	13°
Radium Hill, SA	52°	19°	22°	South East Is., WA	40°	48°	7°	Theodore, Qld	63°	4°	33°
Rainbow, Vic	49°	14°	27°	Southern Cross, WA	39°	56°	0°	Thistle Is., SA	47°	26°	19°
Rame Head, Vic	49°	-2°	37°	Southport, Qld	42°	-1°	36°	Three Rivers, WA	43°	60°	-7°
Rand, Vic	50°	5°	32°	Southport, Tas	60°	-5°	40°	Thurloo Downs, NSW	56°	16°	24°
Rankins Springs, NSW	52°	7°	31°	Spalding, SA	50°	22°	21°	Thursday Is., Qld	72°	48°	-7°
Rapid Bay, SA	48°	21°	22°	Springsure, Qld	63°	10°	28°	Thursday Island, Qld	73°	48°	-7°
Ravenshoe, Qld	69°	24°	15°	St. Arnaud, Vic	48°	11°	29°	Ti Tree, NT	57°	44°	1°
Ravensthorpe, WA	38°	54°	4°	St. George, Qld	59°	6°	31°	Tibooburra, NSW	55°	19°	22°
Rawlinna, WA	44°	47°	5°	St. Marys, Tas	44°	-2°	36°	Tilpa, NSW	55°	13°	26°
Raymond Terrace, NSW	55°	-4°	38°	Stanthorpe, Qld	59°	-2°	37°	Timber Creek, NT	58°	57°	-12°
Recherche, WA	40°	50°	6°	Stawell, Vic	48°	11°	28°	Timboon, Vic	46°	10°	29°
Red Cliffs, Vic	50°	15°	26°	Stockinbingal, NSW	52°	3°	33°	Tingha, NSW	58°	-1°	37°
Tinnenburra, Qld	58°	12°	27°	Wanganella, Vic	50°	9°	30°	Wollongong, NSW	53°	-3°	38°

Tintinara, SA	48°	18°	24°	Wangaratta, Vic	50°	5°	32°	Wolseley, SA	48°	16°	26°
Tocumwal, Vic	50°	7°	31°	Wangary, SA	47°	27°	18°	Wondai, Qld	62°	-1°	37°
Tom Price, WA	43°	63°	-11°	Wangianna, SA	53°	28°	16°	Wongan Hills, WA	37°	60°	-2°
Tomingley, NSW	55°	4°	33°	Warialda, NSW	58°	0°	36°	Wonthaggi, Vic	47°	5°	32°
Tongo, NSW	55°	14°	25°	Waroona, WA	36°	61°	0°	Woocalla, SA	51°	26°	17°
Toobeah, Qld	59°	3°	34°	Warracknabeal, Vic	49°	13°	27°	Woodburn, NSW	59°	-6°	40°
Toodyay, WA	37°	60°	-1°	Warragul, Vic	48°	5°	32°	Woodenbong, NSW	60°	-4°	39°
Toolondo, Vic	48°	13°	27°	Warren, NSW	55°	5°	32°	Woodside, Vic	47°	3°	34°
Toowoomba, Qld	60°	-2°	37°	Warrina, SA	53°	32°	12°	Woolgoolga, NSW	58°	-6°	40°
Torquay, Vic	47°	8°	31°	Warrnambool, Vic	46°	12°	28°	Wooltana, SA	53°	23°	19°
Torrens Creek, Qld	66°	21°	18°	Warwick, Qld	60°	-2°	38°	Woomera, SA	51°	27°	17°
Tottenham, NSW	54°	6°	32°	Watervale, SA	49°	22°	21°	Wooramel, WA	38°	65°	-9°
Townshend Is., Qld	66°	5°	32°	Wauchope, NSW	56°	-6°	40°	Wubin, WA	38°	61°	-3°
Townsville, Qld	68°	19°	20°	Wauchope, NT	58°	44°	0°	Wudinna, SA	49°	28°	17°
Trangie, NSW	55°	4°	32°	Waukaringa, SA	51°	22°	21°	Wumbulgal, NSW	52°	7°	31°
Traralgon, Vic	48°	3°	33°	Wave Hill, NT	58°	54°	-8°	Wyalkatchem, WA	38°	59°	-1°
Trayning, WA	38°	58°	-1°	Wedderburn, Vic	49°	10°	29°	Wyalong, NSW	52°	5°	32°
Trida, NSW	53°	10°	29°	Wee Waa, NSW	57°	2°	34°	Wyandra, Qld	59°	12°	26°
Trundle, NSW	54°	5°	32°	Weemelah, NSW	58°	4°	33°	Wychaproof, Vic	49°	11°	28°
Truro, SA	49°	20°	22°	Weilmerringe, NSW	57°	9°	29°	Wynbring, SA	50°	34°	12°
Tullarnore, NSW	54°	5°	32°	Weipa, Qld	71°	43°	-2°	Wyndham, WA	56°	60°	-14°
Tully, Qld	69°	23°	17°	Wellesley Is., Qld	66°	40°	2°	Wyong, NSW	54°	-4°	38°
Tumbarumba, Vic	51°	2°	34°	Wellington, NSW	54°	2°	34°	Yaapeet, Vic	49°	14°	27°
Tumby Bay, SA	48°	26°	18°	Wellington, SA	48°	19°	23°	Yalgoo, WA	39°	61°	-5°
Tumut, Vic	51°	2°	34°	Wentworth, NSW	51°	15°	25°	Yallourn, Vic	48°	4°	33°
Tuncurry, NSW	55°	-5°	39°	Werribee, Vic	47°	7°	31°	Yamba, NSW	59°	-6°	40°
Turkey Creek, WA	55°	58°	-12°	Werris Creek, NSW	56°	-1°	36°	Yamba, SA	50°	17°	24°
Tweed Heads, NSW	60°	-6°	40°	Wessel Is., NT	67°	56°	-14°	Yanac, Vic	48°	15°	26°
Ulladulla, Vic	52°	-3°	37°	West Wyalong, NSW	52°	5°	32°	Yancannia, NSW	55°	17°	24°
Ultima, Vic	50°	12°	28°	Westmoreland, Qld	64°	42°	1°	Yancheep, WA	36°	62°	-2°
Ulverstone, Tas	44°	2°	34°	Whidbey Is., SA	47°	28°	18°	Yanco, NSW	52°	6°	31°
Underboot, Vic	49°	15°	26°	White Cliffs, NSW	54°	16°	24°	Yanco Glen, NSW	53°	18°	23°
Ungarie, NSW	53°	5°	32°	Whitemark, Tas	46°	-1°	36°	Yantabulla, NSW	57°	13°	26°
Uralla, NSW	57°	-2°	37°	Whitfield, Vic	49°	5°	32°	Yaraka, Qld	61°	19°	21°
Urana, Vic	51°	6°	32°	Whitsunday Is., Qld	68°	11°	27°	Yardea, SA	49°	29°	16°
Urandangi, Qld	61°	35°	7°	Whittlesea, Vic	48°	7°	31°	Yarram, Vic	47°	3°	33°
Urapunga, NT	63°	53°	-9°	Whyalla, SA	50°	25°	19°	Yarrawonga, Vic	50°	6°	32°
Urisino, NSW	56°	15°	25°	Wickepin, WA	37°	58°	1°	Yass, NSW	52°	1°	35°
Urunga, NSW	57°	-4°	39°	Widgiemooltha, WA	41°	53°	2°	Yea, Vic	48°	6°	31°
Utopia, NT	57°	41°	3°	Wilcannia, NSW	54°	14°	25°	Yeeda, WA	51°	62°	-14°
Vanderlin Is., NT	64°	47°	-4°	Wilgena, SA	50°	32°	14°	Yellowdine, WA	39°	56°	1°
Varley, WA	38°	55°	2°	Willeroo, NT	60°	56°	-12°	Yelma, WA	44°	56°	-4°
Victoria River Do, NT	58°	55°	-10°	William Creek, SA	53°	31°	14°	Yenda, NSW	52°	7°	31°
Victoria River, NT	59°	56°	-11°	Williams, WA	36°	59°	1°	Yeoval, NSW	54°	3°	34°
Vivonne Bay, SA	47°	23°	21°	Willis Group Is., Qld	73°	13°	25°	Yeppoon, Qld	65°	4°	33°
Waddikee, SA	49°	27°	18°	Willochra, SA	51°	24°	19°	Yerda, SA	50°	31°	14°
Wagga Wagga, Vic	51°	4°	33°	Willunga, SA	48°	21°	22°	Yetman, NSW	59°	0°	36°
Wagin, WA	36°	58°	1°	Wiluna, WA	43°	58°	-4°	Yilliminning, WA	37°	59°	1°
Waicha, NSW	57°	-3°	38°	Windorah, Qld	60°	22°	19°	Yinkanie, SA	50°	18°	23°
Waikerie, SA	50°	19°	23°	Windsor, NSW	53°	-2°	37°	York, WA	37°	60°	0°
Walgett, NSW	57°	5°	32°	Wingen, NSW	56°	-2°	37°	Yorketown, SA	48°	23°	21°
Walla Walla, Vic	50°	4°	33°	Wingham, NSW	56°	-5°	39°	Young, NSW	52°	2°	34°
Wallangarra, Qld	59°	-2°	38°	Winton, Qld	63°	24°	16°	Yuendumu, NT	55°	46°	0°
Wallaroo, SA	49°	24°	20°	Wirrabara, SA	50°	23°	20°	Yulara, NT	52°	44°	3°
Wallsend, NSW	54°	-4°	38°	Wirraminna, SA	51°	29°	16°	Yuleba, Qld	61°	5°	32°
Walpole, WA	35°	59°	3°	Wirrappa, SA	51°	27°	17°	Yungera, Vic	50°	12°	27°
Wanaaring, NSW	56°	14°	25°	Wirrega, SA	48°	16°	25°	Yunta, SA	51°	21°	21°
Wanbi, SA	49°	18°	24°	Wirulia, SA	49°	31°	15°	Zanthus, WA	43°	50°	3°
Wandana, SA	49°	32°	14°	Wittenoom, WA	43°	63°	-11°	Zeehan, Tas	43°	3°	33°
Wandoan, Qld	62°	4°	33°	Wodonga, Vic	50°	6°	32°				

## ATTACHMENT 2

### The Australian VAST TV Service

This photo shows my UEC brand VAST decoder located below my TV to which it is connected by a HDMI cable. It is connected to a 90cm satellite “dish” located on my roof via a 20m length of RG-6 coax cable.

The “screenshot’s” below show the EPG as at about 5pm this



evening. From this you will note that there are 22 “program channels” available in NSW (Chs 1 to 99) and an additional 33 channels (Chs 231 to 382) for the other states versions of the ABC and SBS programs. There are also 20 Regional News channels (Chs 401 to 420). For reasons that I’m not sure about some of the ABC and SBS channels seem to carry the same information as other channels and also the

“channels” for NSW, Victoria & Canberra seem to carry identical program. So it seems likely that the actual number of “channels” that are transmitted is less than 75 (i.e. 22+33+20) but it is still considerable and requires quite a number of satellite transponders. As each transponder costs several million dollars to lease each year (from Optus) it seems likely the Australian Govt may be thinking about saving quite an amount by reducing or eliminating the VAST service.

Today	17:00	17:30	18:00
1 ONE Central	Star Trek: The N..	Star Trek: The Next Generation	
2 ABC HD NS..	The Drum	Think Tank	
3 SBS ONE N..	Can We Contr..	2018 FIFA World Cup: World Cu..	
4 Regional N..	(No Information Available)		
7 SCTV Centr..	The Chase Australia	Seven News	
9 Imparja Sou..	Millionaire Hot Seat	National News	
Star Trek: The Next Generation Tasha Yar must fight for her life, and a vaccine that will save e...			16:31 – 17:32 PG

Today	17:00	17:30	18:00
10 TEN Centr..	TEN Eyewitness News First At F..	Family Feud	
11 ELEVEN – ..	Everybody Lo..	Frasier	Frasier
21 ABC HD N..	The Drum		Think Tank
22 ABCCome..	Go J..	P..	PJ M..
23 ABC ME SE	Teac..	Oct..	P..
24 ABC NEWS	The Next Ste..	The Adven..	Teenage ..
ABC News Afternoons			ABC..
15:02 – 18:00			

Today	17:00	17:30	18:00
30 SBS HD NS..	Can We Contr..	2018 FIFA World Cup: World Cu..	
31 SBS ONE ..	Can We Contr..	2018 FIFA World Cup: World Cu..	
32 SBS VICEL..	PBS Newshour	If You Are The One	
33 Food Netw..	Giada Entertai..	Bakers Vs. Fakers	
34 NITV	In The Frame	Kriol Kitchen	Despe..
70 7mate Cent..	Storage Wars	Storage Wars	American Pick..

Today	17:00	17:30	18:00
72 7TWO Cen..	Medical Emerg..	Escape To The Country	
90 GEM	Heartbeat	Four In A Bed	Keeping Up A..
91 Imparja So..	Millionaire Hot Seat		National News
99 GO! South	Adventure Time	Regular Show	Friends
231ABC HD VI..	The Drum		Think Tank
241ABC HD Q..	The Drum		Think Tank
The Dr...			17:12 – 18:01

Today	17:00	17:30	18:00
242ABCCome..	Go J.. .. P.. PJ M.. Teac.. Oct.. P..		
243ABC ME Q..	The Next Ste..	The Adven..	Teenage ..
244ABC NEWS	ABC News Afternoons		ABC.. The Dr..
251ABC HD SA	Pointless	AB.. The Drum	
252ABCCome..	Sara.. Luo.. Go J.. .. P.. PJ M.. ..		
253ABC ME SA	Officially Ama.. .. The Next Step	The Adve..	
			17:05 – 17:35

Today	17:00	17:30	18:00
254ABC NEWS	ABC News Afternoons		ABC.. The Dr..
261ABC HD W..	Doc Martin		Point..
262ABCCome..	Pab.. Play School	Ban.. .. Read..	
263ABC ME W..	Make It Po.. The.. .. Get BI.. Junior Vets		
264ABC NEWS	ABC News Afternoons		ABC.. The Dr..
271ABC HD T..	The Drum		Think Tank
The Drum			17:12 – 18:01

Today	17:00	17:30	18:00
282ABCCome..	Sara.. Luo.. Go J.. .. P.. PJ M.. ..		
283ABC ME NT	Officially Ama.. .. The Next Step	The Adve..	
284ABC NEWS	ABC News Afternoons		ABC.. The Dr..
330SBS HD VI..	Can We Contr..	2018 FIFA World Cup: World Cu..	
331SBS ONE ..	Can We Contr..	2018 FIFA World Cup: World Cu..	
340SBS HD Q..	Can We Contr..	2018 FIFA World Cup: World Cu..	
			16:30 – 17:30

Today	17:00	17:30	18:00
340SBS HD Q..	Can We Contr..	2018 FIFA World Cup: World Cu..	
341SBS ONE ..	Can We Contr..	2018 FIFA World Cup: World Cu..	
342SBS VICE..	PBS Newshour	If You Are The One	
350SBS HD SA	Can We Control Gravity?	2018 FIFA Wor..	
351SBS ONE ..	Can We Control Gravity?	2018 FIFA Wor..	
352SBS VICE..	PBS Newshour	If You Are ..	
			17:05 – 18:05

Today	17:00	17:30	18:00
360SBS HD WA	How Rolls Roy..	Insight	
361SBS ONE ..	How Rolls Roy..	Insight	
362SBS VICE..	Rugby League: Over The Black ..	Vice News ..	
370SBS HD T..	Can We Contr..	2018 FIFA World Cup: World Cu..	
380SBS NT HD	Can We Control Gravity?	2018 FIFA Wor..	
381SBS ONE ..	Can We Control Gravity?	2018 FIFA Wor..	
Can We Control Gravity?			17:00 – 18:00

Today	17:00	17:30	18:00
382SBS VICE..	PBS Newshour	If You Are ..	
401WIN: Cairn..	Returns 7:00 PM Wednesday		
402WIN: Mack..	Returns 7:00 PM Wednesday		
403WIN: Bund..	Returns 7:00 PM Wednesday		
404WIN: Oran..	Returns 7:00 PM Wednesday		
405WIN: W...	Returns 7:00 PM Wednesday		

## VAST Regional News

CH **WIN NEWS**

- 401. Cairns, Townsville
- 402. Rockhampton
- 403. Bundaberg, Sunshine Coast
- 404. Orange, Wagga Wagga
- 405. Wollongong, Canberra
- 406. Albury, Gippsland
- 407. Bendigo, Shepparton
- 408. Ballarat
- 409. Tasmania  Nine News Darwin

CH **Southern Cross NEWS**

- 410. QLD, NT, NSW, VIC
- 411. Tasmania, SA & Broken Hill

CH **7 LOCAL NEWS**

- 412. Cairns, Townsville
- 413. Mackay, Rockhampton
- 414. Wide Bay, Sunshine Coast & Toowoomba

CH **7NBN NEWS**

- 415. Gold Coast, Lismore
- 416. Coffs Harbour, Tamworth
- 417. Newcastle, Central Coast

CH **PRIME 7 NEWS**

- 418. NSW North Coast, Tamworth
- 419. NSW & VIC
- 420. Orange, Wagga Wagga, Albury