













**Table A.4** Summary of Mainland system frequency outcomes for an island within the Mainland other than during [system restoration](#)s

<b>CONDITION</b>	<b>CONTAINMENT BAND (HZ)</b>	<b>STABILISATION BAND (HZ)</b>	<b>RECOVERY BAND (HZ)</b>	<b><u>RATE OF CHANGE OF FREQUENCY</u></b>
No <i>contingency event</i> or <b>load event</b>	49.5 – 50.5	N/A		
<b>Generation event, load event</b> or <b>network event</b>	49.0 – 51.0	49.5 – 50.5 within 5 minutes		<a href="#">±1Hz/s (measured over any 500ms period)</a>
The <b>separation event</b> that resulted in the <b>island</b>	49.0 – 51.0 <sup>1</sup>	49.0 – 51.0 within 2 minutes	49.5 – 50.5 within 10 minutes	
<i>Protected event</i>	47.0 – 52.0	49.0 – 51.0 within 2 minutes	49.5 – 50.5 within 10 minutes	<a href="#">As per the protected event declaration</a>
<b>Multiple contingency event</b> including a further <b>separation event</b>	47.0 – 52.0 (reasonable endeavours)	49.0 – 51.0 within 2 minutes (reasonable endeavours)	49.5 – 50.5 within 10 minutes (reasonable endeavours)	<a href="#">±3Hz/s (measured over any 300ms period)</a> <a href="#">(reasonable endeavours)</a>

Note: 1. Or a wider band as notified to AEMO by a JSSC for a region.

Table A.5 applies in the **Mainland** during **supply scarcity system restoration** if:

1. Following a *contingency event*, the *frequency* has reached the **Recovery Band** set out in Table A.3<sup>1</sup>, and *AEMO* considers the *power system* is sufficiently secure to begin *reconnection of load*.
2. The estimated *load* available for *under frequency schemes* within the **island** is more than the amount required to ensure that any subsequent *frequency excursion* would not go below the **Containment Band** and **Stabilisation Band** set out in Table A.5 as a result of a subsequent **generation event, load event, network event** or a **separation event** during *reconnection of load*.
3. The *generation reserve* available for *frequency* regulation is consistent with *AEMO's* current practice.

**Table A.5:** Summary of Mainland system frequency outcomes during **supply scarcity system restoration**

<b>CONDITION</b>	<b>CONTAINMENT BAND (HZ)</b>	<b>STABILISATION BAND (HZ)</b>	<b>RECOVERY BAND (HZ)</b>	<b><u>RATE OF CHANGE OF FREQUENCY</u></b>
No <i>contingency event</i> or <b>load event</b>	49.5 – 50.5	N/A		±1Hz/s (measured over any 500ms period) (reasonable endeavours)
<b>Generation event, load event</b> or <b>network event</b>	Qld and SA: 48.0 – 52.0 NSW and Vic.: 48.5 – 52.0 <sup>1</sup>	49.0 – 51.0 within 2 minutes	49.5 – 50.5 within 10 minutes	
<i>Protected event</i>	47.0 – 52.0	49.0 – 51.0 within 2 minutes	49.5 – 50.5 within 10 minutes	<u>As per the protected event declaration</u>
<b>Multiple contingency event</b> or <b>separation event</b>	47.0 – 52.0 (reasonable endeavours)	49.0 – 51.0 within 2 minutes (reasonable endeavours)	49.5 – 50.5 within 10 minutes (reasonable endeavours)	±3Hz/s (measured over any 300ms period) (reasonable endeavours)

Note: 1. For the operation of an **island** that incorporates *power system* elements from more than one *region*, the Containment Band for a **generation event**, a **load event** or a **network event** is the narrower of the Containment Bands for the affected *regions*. For example, following a **generation event, load event** or **network event** during **supply scarcity system restoration** for an **island** that is partly within the *Victoria region* and partly within the *South Australia region*, the Containment band would be 48.5 – 52.0Hz.

<sup>1</sup> Note: In the FOS that came into effect on 1 January 2020, the Table was incorrectly listed as Table A.2.3.



The frequency outcomes for Tasmania during **system restoration** are equivalent to the requirements set out in Table A.6 for an intact *power system* and in Table A.7 for an island within the *Tasmanian power system*.

**Table A.6:** Summary of Tasmania system frequency outcomes where the Tasmanian power system is intact

<b>CONDITION</b>	<b>CONTAINMENT BAND (HZ)</b>	<b>STABILISATION BAND (HZ)</b>	<b>RECOVERY BAND (HZ)</b>	<b>RATE OF CHANGE OF FREQUENCY</b>
No <i>contingency event</i> or <b>load event</b>	49.75 – 50.25 49.85 – 50.15 <sup>1</sup>	49.85 – 50.15 within 5 minutes		±3Hz/s (measured over any 250ms period)
<b>Generation event, load event</b> or <b>network event</b>	48.0 – 52.0	49.85 – 50.15 within 10 minutes		
<b>Separation event</b>	47.0 – 55.0	48.0 – 52.0 within 2 minutes	49.85 – 50.15 within 10 minutes	As per the protected event declaration
<i>Protected event</i>	47.0 – 55.0	48.0 – 52.0 within 2 minutes	49.85 – 50.15 within 10 minutes	
<b>Multiple contingency event</b>	47.0 – 55.0 (reasonable endeavours)	48.0 – 52.0 within 2 minutes (reasonable endeavours)	49.85 – 50.15 within 10 minutes (reasonable endeavours)	±3Hz/s (measured over any 300ms period) (reasonable endeavours)

Note: : 1. ~~99% of the time~~. System frequency must not be outside the NOFB for more than 1% of the time over any 30-day period.

**Table A.7:** Summary of Tasmania system frequency outcomes where an island is formed within Tasmania

<b>CONDITION</b>	<b>CONTAINMENT BAND (HZ)</b>	<b>STABILISATION BAND (HZ)</b>	<b>RECOVERY BAND (HZ)</b>	<b><u>RATE OF CHANGE OF FREQUENCY</u></b>
No <i>contingency event</i> or <b>load event</b>	49.0 – 51.0	N/A		
<b>Generation event, load event</b> or <b>network event</b>	48.0 – 52.0	49.0 – 51.0 within 10 minutes		<u>±3Hz/s (measured over any 250ms period)</u>
<b>Separation event</b>	47.0 – 55.0	48.0 – 52.0 within 2 minutes	49.0 – 51.0 within 10 minutes	
<i>Protected event</i>	47.0 – 55.0	48.0 – 52.0 within 2 minutes	49.0 – 51.0 <sup>1</sup> within 10 minutes	<u>As per the protected event declaration</u>
<b>Multiple contingency event</b>	47.0 – 55.0	48.0 – 52.0 within 2 minutes (reasonable endeavours)	49.0 – 51.0 within 10 minutes	<u>±3Hz/s (measured over any 300ms period)</u> <u>(reasonable endeavours)</u>

Note: <sup>1</sup>. In the FOS that came into effect on 14 November 2017, the Recovery band following a protected event for an island within Tasmania was incorrectly listed as 49.85 Hz — 50.15 Hz.

## A.3 Definitions

In this document:

- *Italicised* terms are defined in the National Electricity Rules.
- **Bold** terms are defined in Table A.8.

**Table A.8: Definitions**

TERM	DEFINITION
<b>accumulated time error</b>	For a measurement of <b>system frequency</b> that <i>AEMO</i> uses, the integral over time of the difference between 20 milliseconds and the inverse of that <b>system frequency</b> , starting from a time <i>published</i> by <i>AEMO</i> .
<b>generation and load change band</b>	For the <b>Mainland</b> : <ol style="list-style-type: none"> <li>1. 49.0 – 51.0 Hz for an <b>island</b></li> <li>2. during <b>supply scarcity system restoration</b>: <ol style="list-style-type: none"> <li>a. 48.0 – 52.0 Hz in an island incorporating South Australia or Queensland; and</li> <li>b. 48.5 – 52.0 Hz in an island incorporating Victoria or New South Wales</li> </ol> </li> <li>3. 49.5 – 50.5 Hz otherwise.</li> </ol> For <b>Tasmania</b> : 48.0 – 52.0 Hz.
<b>generation event</b>	<ol style="list-style-type: none"> <li>1. <del>a synchronisation of a generating unit of more than 50 MW</del> <u>synchronisation of a generating unit of more than the generation event threshold of:</u> <ol style="list-style-type: none"> <li>a. <u>for the Mainland: 50MW</u></li> <li>b. <u>for Tasmania: 20MW.</u></li> </ol> </li> <li>2. an event that results in the sudden, unexpected and significant increase or decrease in the <i>generation</i> of one or more <i>generating systems</i> totalling more than <del>50MW</del> <u>the generation event threshold for the region</u> in aggregate within no more than 30 seconds; or</li> <li>3. the <i>disconnection of generation</i> as the result of a <i>credible contingency</i> event (not arising from a <b>load event</b>, a <b>network event</b>, a <b>separation event</b> or part of a <b>multiple contingency event</b>), in respect of either a single <i>generating system</i> or a single <i>dedicated connection asset</i> providing <i>connection</i> to one or more <i>generating systems</i>.</li> </ol>
<b>island</b>	A part of the <i>power system</i> that includes <i>generation, networks</i> and <i>load</i> , for which all of its alternating current <i>network connections</i> with other parts of the <i>power system</i> have been <i>disconnected</i> , provided that the

TERM	DEFINITION
	<p>part:</p> <ol style="list-style-type: none"> <li>1. does not include more than half of the combined <i>generation</i> of each of two <i>regions</i> (determined by available capacity before <i>disconnection</i>); and</li> <li>2. contains at least one whole <i>inertia sub-network</i>.</li> </ol>
<b>island separation band</b>	<p>For the <b>Mainland</b>:</p> <ol style="list-style-type: none"> <li>1. for a part of the <i>power system</i> that is not an <b>island</b>, the <i>operational frequency tolerance band</i>;</li> <li>2. for an <b>island</b> that includes a part of the <i>power system</i> to which no notice under paragraph (3) applies, the <i>operational frequency tolerance band</i>; and</li> <li>3. otherwise in respect of an <b>island</b>, the <i>frequency band</i> determined by the most restrictive of the high limits and low limits of <i>frequency ranges</i> outside the <i>operational frequency tolerance band</i> notified by a <b>JSSC</b> to AEMO with adequate notice to apply to a nominated part of the <b>island</b> within the <b>JSSC's region</b>.</li> </ol> <p>For <b>Tasmania</b>: the <i>extreme frequency excursion tolerance limits</i>.</p>
<b>JSSC</b>	<i>Jurisdictional System Security Coordinator</i>
<b>load event</b>	<p>For the <b>Mainland</b>: <i>connection</i> or <i>disconnection</i> of more than 50 MW of <i>load</i> not resulting from a <b>network event</b>, <b>generation event</b>, <b>separation event</b> or part of a <b>multiple contingency event</b>.</p> <p>For <b>Tasmania</b>: either a change of more than 20 MW of <i>load</i>, or a rapid change of flow by a <i>high voltage</i> direct current <i>interconnector</i> to or from 0 MW to start, stop or reverse its power flow, not arising from a <b>network event</b>, <b>generation event</b>, <b>separation event</b> or part of a <b>multiple contingency event</b>.</p>
<b>multiple contingency event</b>	Either a <i>contingency event</i> other than a <i>credible contingency event</i> , a sequence of <i>credible contingency events</i> within 5 minutes, or a further <b>separation event</b> in an <b>island</b> .
<b>mainland</b>	The Queensland, New South Wales, Victoria and South Australia <i>regions</i> .
<b>network event</b>	A <i>credible contingency event</i> other than a <b>generation event</b> , <b>load event</b> , <b>separation event</b> or part of a <b>multiple contingency event</b> .
<b>rate of change of frequency (RoCoF)</b>	<a href="#"><u>The change in <i>frequency</i> over a period of time (Hz/second).</u></a>
<b>separation event</b>	A <i>credible contingency event</i> affecting a <i>transmission element</i> that results in an <b>island</b> .
<b>system frequency</b>	The <i>frequency</i> of the <i>power system</i> , or an <b>island</b> (as applicable).

<b>TERM</b>	<b>DEFINITION</b>
<b><u>system restoration</u></b>	<u>Where <i>load</i> has been <i>disconnected</i> other than in accordance with <i>dispatch instructions</i> or a <i>direction</i> or <i>clause 4.8.9 instruction</i>, or the provision of a <i>market ancillary service</i>, and not yet restored.</u>
<b>Tasmania</b>	The Tasmania <i>region</i> .