



AIRSERVICES AUSTRALIA

Outcomes and Recommendations



VHF Communications Transmitting and Receiving Equipment Introduction of 25 kHz Channel Spacing

Radios displayed in this document are for illustration purposes only and may or may not meet the proposed standard.

Background

The aeronautical VHF band spanning 118 to 137 MHz is the primary band used for aviation related communications. This band is used by regular public transport, general aviation and recreational aircraft in all phases of flight including surface movement in most Australian continental airspace.

The aeronautical radio communications VHF band is divided into a number of channels. Each channel is used to conduct a voice conversation.

To satisfy increased demand and frequency congestion in high-density traffic areas, particularly in Europe and the USA, the International Civil Aviation Organisation (ICAO) has expanded the VHF band and developed channel spacing standards to provide additional channels as illustrated in Table 1.

Date	Frequency Band	Channel Spacing (kHz)	Number of Channels
1947	118-132 MHz	200	70
1958	118-132 MHz	100	140
1959	118-136 MHz	100	180
1964	118-136 MHz	50	360
1972	118-136 MHz	25	720
1979	118-137 MHz	25	760
1995	118-137 MHz	8.33	2280

Table 1: ICAO Standards

The date at which the new channelling arrangements are introduced is determined by each country. In 1972 the USA adopted the 25 kHz spacing standard and is now planning the introduction of VHF Data Link (VDL) Mode 3 which allows 4 channels to operate on each 25 kHz channel. In 1980, the UK adopted 25 kHz and in 2000 much of Europe adopted the 8.33 kHz spacing standard for upper airspace.

In Australia, frequencies were assigned with a 100 kHz channel spacing until 1991 and since then at 50 kHz spacing. In recent years frequencies based on the 25 kHz channel spacing have been assigned for company and Department of Defence use.

The number of channels required to provide aviation communication in the VHF band in Australia has now increased to the extent that it will not be possible to continue to allocate interference free frequencies for air traffic control in high-density traffic areas using the 50 kHz channel spacing.

Airservices' Initial Proposal (July 2004)

In order to provide capacity in the band for on-going assignments while allowing aircraft owners time to update their radio communications equipment, Airservices proposed that the 25 kHz (720 channel) standard be adopted for all flight classifications from July 2006.

In the interim and to provide some relief to the present frequency congestion it was proposed that the 25 kHz (720 channel) standard be adopted for aircraft operating in Class A airspace from July 2005.

Strategy Discussions within Airservices and with CASA

Discussions occurred between Airservices and CASA on the initial proposal. It was acknowledged that there was no information available on the current equipment fit in aircraft to understand the

impact on Australian aircraft. Thus a discussion paper was developed to inform and seek comment from the aviation industry on the proposed introduction of the 25 kHz channel spacing standard.

Responses from the Discussion Paper would assist Airservices Australia and CASA in refining the plan and in delivering the appropriate information to aircraft owners.

Release of Discussion Paper

The Discussion Paper was sent out on the 12th November 2004 with responses due by 20th December 2004. Aircraft owners and operators were asked to complete the attached Survey Form and were invited to comment on the proposal via the Response Form. In reality responses were accepted up to 11th February 2005.

In the Discussion Paper, Airservices proposed that the 25 kHz (720 channel) standard be adopted for aircraft operating in Class A airspace from November 2005 and all flight classifications from November 2006. The July to November slippage was due to additional consultation requested within Airservices.

Other Publicity and Discussion with industry

All Regional Airspace Users Advisory Committees (RAPACs) around Australia were provided with information related to the 25 kHz initiative, and Airservices' representatives were present to answer questions.

To encourage participation in the Discussion Paper process and to further educate industry, advertisements were taken out in the December 2004 editions of the AOPA magazine and Asia Pacific Aviation Newspaper.

Details were also placed on the Airservices' website that provided further information to aircraft owners on the proposed changes.

On the 11th November 2004 Airservices and CASA held a meeting with AOPA where Airservices' proposal was discussed. AOPA's main points of view were:

- They agreed that it was important to understand the extent of the problem - hence the survey was important.
- They doubted whether Australia has the same extent of congestion compared to the USA. It was explained that this is why the USA went to 25 kHz spacing in 1972 and we are following 30 years later.
- They did not support mandating the 25 kHz standard for all aircraft as they doubted whether 'Farmer Giles' out-of-spec 50 kHz radio at Oodnadatta would have any measurable impact on operations. They suggested that as part of the Survey we identify what environment/airspace the aircraft operate in. They also suggested we implement 25 kHz and monitor impact from out of spec 50 kHz sets on operations rather than mandate a compliance date on the transmitter tolerance.
- They suggested Airservices reduce the number of frequency changes on the East Coast which would increase the number of frequencies for reassignment.

Following the discussion with AOPA, Airservices and CASA held a meeting with a group of Licensed Aircraft Maintenance Engineers (LAMEs) at Bankstown Airport (organised with Pacific Avionics). The LAME's main points of view were:

- They asked why we were not going to 8.33 kHz channel spacing direct? We said this was unnecessary at this time and would be of considerable impact on the aviation community.
- They asked whether the change would be subsidised by Airservices? We said this was unlikely but no decision had been made until the effect on industry was known.
- They thought that the introduction was rapid compared to similar changes like the International DME which was 5 years.
- They acknowledge that 50 kHz radios were increasingly becoming more difficult to maintain.
- They were very supportive of the idea. They estimated that between 5-10% of radios would be non-compliant.

Summary of Proposal and Survey Results

Concurrently with the Airservices' Discussion Paper going out to aircraft owners, CASA sent out their '2004 Aircraft Equipment Survey'. CASA's Survey collected data on aircraft equipment fit including VHF communications radios.

The results of Airservices' Discussion Paper survey and CASA's Survey are included in the attached annex. Below is the summary of the results:

- It is estimated that 2,300 VH registered aircraft (19%¹ of total VH registered aircraft) may be affected by the 25 kHz channel spacing change.
- 8%² of respondents opposed the introduction of 25 kHz channel spacing for Class A airspace from November 2005.
- 72%³ of respondents supported the introduction of 25 kHz channel spacing for all flight classifications from November 2006.
 - 20% opposed the proposal

The 3 most common responses⁴ to the proposed introduction of 25 kHz channel spacing in all airspace from November 2006 were:

- *"Leave CTAF, MBZ, GAAP and Class G airspace at 50 kHz. This would make 360 ch VHF radios still usable by the significant proportion of GA that do not operate in CTA."*
- *"It would be more acceptable if some financial assistance was available with compulsory/enforced changes."*
- *"I find the proposal time line too short!! Would prefer 5 years notice."*

The most common response⁵ to the proposed introduction of 25 kHz channel spacing in Class A airspace from November 2005 was:

¹ CASA's 'Australian aircraft equipment survey' 2004

² Airservices' Survey attached to the Discussion Paper, November 2004

³ Airservices' Survey attached to the Discussion Paper, November 2004

⁴ Response to Airservices' Proposal attached to the Discussion Paper, November 2004

⁵ Response to Airservices' Proposal

“Aircraft we operate do not fly in Class A, so don’t care.”

Comments on the Survey Results

Of the 7693 Discussion Papers posted out, 558 survey responses (7.3%) were received either from the internet on-line or post. In contrast CASA’s 2004 Aircraft Equipment Survey response rate was 63%. The poor return rate of the Discussion Paper could be attributed to the complex nature of the issue and/or indifference of the industry. The Discussion paper and Survey form required significant amount of effort to understand while the CASA form was a one double sided page. The Discussion paper was intended to be an information and proposal document as well as a Survey.

Airservices fielded approximately 30 phone calls and emails related to the Discussion Paper. All of the aircraft owners that thought they had 50 kHz channel radios proved to have 25 kHz channel radios. This would indicate that a large number of people in the industry cannot correctly identify if their radios are capable of 25 kHz channel spacing. **Thus the actual total number of aircraft unable to operate on 25 kHz is expected to be much lower than the survey suggests.**

Airservices’ and CASA’s surveys both indicate that around 20% of aircraft could be affected by the proposal to introduce 25 kHz channel spacing for all flight classifications from November 2006. Thus any changes should be implemented in a way to minimise unnecessary financial burden on industry.

There was only a small number of aircraft owners concerned (8% of respondents) with the introduction of 25 kHz channel spacing in Class A airspace. The CASA survey results indicate that less than 15% of aircraft with IFR rated radios do not have 25 kHz capable radios. In reality it is likely that the actual percentage of affected aircraft will be significantly less because:

- Not all IFR aircraft operate in Class A airspace, and
- Only 1 RPT airline responded to the Airservices’ survey. All RPT aircraft are expected to be 25 kHz IFR compliant.

The most common view from all sectors of industry (of those that wanted a change to the Proposal) was to consider the option of delaying the mandating of 25 kHz channel spacing radios and to introduce 25 kHz frequencies in GA airspace as a last resort.

Discussions related to Industry Feedback

An important part of the ICAO 25 kHz channel spacing standard is the requirement for a tighter transmitter tolerance (30 parts per million (ppm)) than is required for 50 kHz radios. Some 50 kHz channel spacing radios are capable of meeting this tighter standard.

Discussions within Airservices have identified that rather than mandating 25 kHz radios in 2005 and 2006, mandating the tighter transmitter tolerance requirement can be delayed to 2009. Airservices is also able to gradually introduce 25 kHz channel spacing frequencies on a case-by-case basis to overcome frequency congestion in areas of high traffic density in Class A airspace from November 2005 and other airspace from November 2006.

This method of introducing 25 kHz channel spacing frequencies will mean that:

- Aircraft operating in Class A airspace will only need to have 25 kHz radios fitted when 25 kHz frequencies are introduced in their area of operation. In remote areas this is unlikely to happen for a number of years. Thus aircraft operating 50 kHz radios will continue to be able to operate in Class A airspace where 25 kHz frequencies have not been introduced.

- Aircraft operating in all other airspace will only need to have 25 kHz radios fitted when 25 kHz frequencies are introduced in their area of operations. In remote areas of Australia this is unlikely to happen for a number of years. 25 kHz channel spacing frequencies will only be introduced in Class G airspace (including CTAF and MBZ - the main concern of the GA industry) after other frequency planning options are exhausted.
- When the tighter transmitter tolerance is mandated, aircraft operating 50 kHz radios that support the tighter transmitter tolerance will be able to continue to operate if 25 kHz frequencies have not been introduced in their area of operation.

For Airservices this will mean a mixture of transmitter tolerances to be taken into account which will reduce the total number of new frequencies available for assignment during the transition period.

Recommendations

Based on industry consultation to date and especially with the view to minimise the financial impact on industry, the following recommendations are made:

- CASA to advise the industry that Airservices will begin assigning 25 kHz channel spacing frequencies (in the range 118-136 MHz, i.e. 720 channels) for **Class A airspace frequencies from November 2005** beginning in areas of high traffic density as needed. This should not involve mandated change to equipment fit for aircraft⁶, but aircraft should continue to carry radios with channel spacing to support operations⁷. (In reality aircraft operating in some Class A airspace may continue to use 50 kHz radios for a number of years.)
- CASA to advise the industry that Airservices will begin assigning 25 kHz channel spacing frequencies (in the range 118-136 MHz, i.e. 720 channels) from **November 2006** beginning in areas of high traffic density as needed (**mainly Class C, D and E airspace**). 25 kHz should only be introduced in Class G (including CTAF and MBZ) after other frequency planning options are exhausted. This should not involve mandated change to equipment fit for aircraft⁸, but aircraft should continue to carry radios with channel spacing to support operations⁹. (In reality aircraft operating in a significant portion of Australian airspace may continue to use 50 kHz radios for a number of years.)
- CASA to enable regulation to **mandate the transmitter frequency tolerance standard** of 30 ppm¹⁰ for all aircraft transmitting radios (including Class G) from **November 2009**. Radios should have appropriate channel spacing to support aircraft operations¹¹. (Some 50 kHz radios can support this tighter tolerance and therefore in practice some aircraft may continue to operate these radios in low traffic density areas of Australian airspace for a number of years.)
- CASA to include in their education programme to aircraft owners clear methods to identify if their radios are compliant (ie provision of a list of compliant radios and/or diagrams).

⁶ For Airservices this will result in a mixture of transmitter frequency tolerances to be assumed when performing frequency assignments.

⁷ As per CAO Parts 103.24 and 103.25

⁸ For Airservices this will result in a mixture of transmitter frequency tolerances to be assumed when performing frequency assignments.

⁹ As per CAO Parts 103.24 and 103.25

¹⁰ ICAO's standard for transmitter frequency tolerance for 25 kHz channel spacing airborne radios is 30 ppm and for 50 kHz is 50 ppm

¹¹ As per CAO Parts 103.24 and 103.25

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- Airservices to identify (by a notation) in AIP documentation (until CASA mandates the new standard in 2009) any frequencies on 25 kHz channel spacing.

Airservices plans to brief aviation industry including AOPA and the RAPACs on the outcomes of the Airservices and CASA Surveys and the recommendations.

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ANNEX

VHF Comms 25 kHz Channel Spacing

Airservices' Discussion Paper - Proposal and Survey Results & Extract from CASA's 2004 Aircraft Equipment Survey

1. Airservices' Discussion Paper - Proposal and Survey Results

Totals

Number of Survey Forms posted: 7693 (November 2004)¹²
Number of Survey Respondents (on-line, post and fax): 569 (7.4 % of total posted)
Number of Survey Forms returned undeliverable: 97 (1.3% of total posted)
Number of VH Registered aircraft: 12,229 (September 2004)

Response to Proposals

All flight classifications proposal

63% (358) The proposal presented **is acceptable without change**.
9% (52) The proposal presented **is acceptable but would be improved if changes were made**.
12% (69) The proposal presented **is not acceptable but would be acceptable if changes were made**.
8% (47) The proposal presented **is not acceptable under any circumstances**.
7% (37) No position

Most common comments

“Leave CTAF, MBZ, GAAP and Class G airspace at 50 kHz. This would make 360 ch VHF radios still usable by the significant proportion of GA that do not operate in CTA.”

“It would be more acceptable if some financial assistance was available with compulsory/enforced changes.”

“I find the proposal time line too short !! Would prefer 5 years notice.”

Class A proposal

65% (360) The proposal presented **is acceptable without change**.
3% (19) The proposal presented **is acceptable but would be improved if changes were made**.
4% (23) The proposal presented **is not acceptable but would be acceptable if changes were made**.
4% (21) The proposal presented **is not acceptable under any circumstances**.
25% (140) No position

Most common comments

“Aircraft we operate do not fly in Class A, so don't care.”

¹² Airservices' survey only covered VH registered aircraft. CASA's 2004 Aircraft Equipment Survey covered VH and other registered aircraft (eg ultra-lights and trikes).

Aircraft and Radio stats

Total Number of radios in response: 1918

Total Number of aircraft in response: 1064¹³

Number of aircraft with IFR radios in response: 547

Number of radios that can support 25 kHz operation: 1814 (95 % of total radios)

Number of aircraft that can support 25 kHz operation on at least one radio: 903 (85% of total aircraft)

Number of aircraft with IFR radios that can support 25 kHz operation: 500 (91 % of total aircraft with IFR radios)

2. Interim Results from CASA Survey

CASA's 2004 Aircraft Equipment Survey requested information on VHF communications transceivers in aircraft. As of 1 April 2005 the preliminary results were as follows.

Aircraft	Total Compliant	8.33 kHz (2280)	25 kHz (760)	25 kHz (720)	50 kHz (360)	100 kHz (180)	No Radio
*VH Registered	81%	7%	33%	40%	21%	4%	6%
# Other Aircraft	88%	4%	50%	34%	7%	6%	26%

Notes

* This data is based on VH register aeroplanes less than 5,700kg MTOW (aeroplanes, helicopters, balloons, gliders and VH ultralights)

'Other Aircraft' are RAA ultralights, ASRA gyros and HGFA trikes

Where an aircraft had a 25 kHz radio and a 50 kHz radio two entries were made into the data resulting in the total % exceeding 100%.

The preliminary results indicate that at least 81% of VH register aircraft will comply (shaded area of the table) with 25 kHz channel spacing (ie 19% of aircraft may be affected by the change to 25 kHz). It is assumed that all VH aircraft above 5,700kg MTOW would meet the 25 kHz mandate.

The CASA survey results also indicate that less than 15% of aircraft with IFR rated radios do not have 25 kHz capable radios.

¹³ Airservices' survey only covered VH registered aircraft. CASA's 2004 Aircraft Equipment Survey covered VH and other registered aircraft (eg ultra-lights and trikes).