



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE**

**REPORT OF
THE SECOND MEETING OF
THE SPECTRUM REVIEW WORKING GROUP
(SRWG/2)**

**Bangkok, Thailand
12 - 14 May 2015**

The views expressed in this report should be taken as those of SRWG/2 Meeting and not of the Organization. This report will be provided for review by CNS SG/19 for further action.

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1. Opening of the Meeting

1.1 The Second Meeting of the Spectrum Review Working Group (SRWG/2) of APANPIRG was held at the ICAO Regional Office facilities in Bangkok, Thailand.

1.2 Mr. Frederic Lecat, Regional Officer CNS, ICAO Asia and Pacific Regional Office, welcomed the participants on behalf of the Regional Director, Mr. Arun Mishra. Mr. Paul Dowsett, chairman of SRWG, introduced the objectives of the meeting.

2. Attendance

2.1 The meeting was attended by 17 participants from Australia, Bangladesh, India, Indonesia, Japan, Lao PDR, Malaysia, Singapore, and Thailand. The List of Participants is provided in **Attachment 1** to this Report.

3. Officers and Secretariat

3.1 Mr. Frederic Lecat, Regional Officer CNS, ICAO Asia and Pacific Regional Office acted as secretary for the meeting, and was assisted by Mr. Li Peng, Regional Officer CNS from the second day.

4. Organization, working arrangement, language and documentation

4.1 The SRWG/2 met as a single body. The working language for the meeting was English inclusive of all documentation and this Report. The List of Working and Information Papers is provided in **Attachment 2** to this Report.

4.2 A catch up session was organized on the first day for the new participants. The material used is available here:
http://www.icao.int/APAC/Meetings/2015%20SRWG2/SP01_ICAO%20Catch%20up%20session.pdf

4.3 A webconference for agenda items 4 and 5 was set up with Mr. Robert Witzen, expert in frequency management based in Montreal and retired from ICAO.

4.4 A session was set up on the third day around Frequency Finder to demonstrate the functionalities of the product and address the questions of the meeting.

Agenda Item 1: Adoption of agenda

➤ *WP/01 – Provisional Agenda (Secretariat)*

- 1.1 The provisional agenda introduced in WP/1 was adopted.

Agenda Item 2: Review of relevant meetings/conferences and drafting of SRWG Terms of Reference

➤ *IP/03- Outcome of CNS SG/18 and APANPIRG/25 (Secretariat)*

- 2.1 The SRWG/2 meeting noted the outcomes of CNS SG/18 and APANPIRG/25 meetings. It was discussed that the CNS/18 meeting discussed and commended the good practice for ANSPs to equip with mixed 25 KHz/8.33KHz radios, as they were now available at a reasonable price, and would be able to cater for any outcome of the SRWG's study. If the strategic planning was to indicate that a move to 8.33 KHz was necessary in the future, this would be one of the components of the implementation plan already in place to speed up the transition.
- 2.2 In the same spirit, it was also noted that in CNS SG/18 there had been a proposal for Administrations to consider replacement with 8.33 kHz capable transmission equipment when current ground VHF radio equipment is approaching its end of life cycle. However, the cost of avionics equipment should also be considered, and more globally the burden on airspace users.
- 2.3 The meeting noted that 8.33 kHz may not be possible for offset used at extended Remote Control Air/ground Communications (RCAG) stations, but opined that it may remain possible in certain limited configurations, whereby the number of stations participating in the extended VHF would be reduced to 2 or 3.

Agenda Item 3: Review of new Operational needs in VHF communications from States

- 3.1 The template and operational needs collected from States having participated in SRWG/1 were briefly introduced in the catch-up session. The operational needs are placed at **Appendix A**.
 - 3.2 A total of 255 new frequencies were identified as needed in APAC region, including 224 in the timeframe 2015-2020, and 31 in the timeframe 2020-2025.
- *IP/04 - Introduction of basic allocation in Japan (Japan)*
- 3.3 Japan introduced its basic pattern for allocation of VHF Frequencies in Japan whereby a group of 3 to 5 en route sectors are allocated individual frequencies plus one shared spare frequency. This shared spare frequency is used either in case of microphone stuck or harmful interference, or operated as an additional frequency in situations of high traffic, or to communicate with aircraft around while communications with an aircraft in emergency would use the main frequency.
 - 3.4 In heavy traffic airports, a frequency is allocated to each ATC service, and one additional common spare Frequency is allocated to the airport. This type of frequency is operated mainly at the some airports that are administrated by Ministry of Defense. It is also used when the main frequency in the airport cannot be operated because of microphone stuck.

3.5 It was discussed that the emergency frequency 121.5 MHz is to be used in conditions specified in Annexes 6, 10 and 11. An ad hoc presentation by ICAO was discussed by the meeting and is available here:

http://www.icao.int/APAC/Meetings/2015%20SRWG2/SP03_ICAO%20Emergency%20frequency.pdf

Agenda Item 4: Simulations with Frequency Finder

➤ *WP/03 Outcomes of the Simulations Addressing the VHF Frequency Needs for 2015-2020 and beyond in the APAC Region (Secretariat)*

4.1 Based on the operational needs submitted by States, work was conducted by ICAO to simulate if any required frequency assignment in the APAC Region for the period up to 2020 (and, as necessary, beyond) can be satisfied while continuing using 25 kHz channel spacing assignments. This was done using Frequency Finder software, and with the latest version of the frequency database available.

4.2 The outcomes were as follows:

- Hong Kong China:
 - A further test demonstrated that there is still adequate room within these pools for at least an additional 10 frequency assignments for each service in Hong Kong (with the exception of the pool for AS (aerodrome surface communications or surface movement control)).
- India:
 - The requirements for 50 TWR frequencies in India would not congest the available pool of frequencies for TWR.
 - APP-L All India frequency assignments require only a small part of the channels available within the pool for APP-L frequencies in the APAC Region. No congestion in this pool is expected in India or adjacent countries in the near or medium future. These frequency assignments fill the pool for APP-U in India for almost 50%. Enough channels are available for future requirements.
 - The ACC-U frequency assignments require and saturate about 50% of the available channels. No congestion is expected in the pool for ACC-U frequencies in the near future in the area of India and adjacent countries.
 - This is expected to leave room in the remaining 10 sub-bands for future use for ATIS or VOLMET requirements.
- Singapore:
 - It was noted that there is still adequate room within these pools for at least an additional 10 frequency assignments in Singapore. No frequency congestion is expected in Singapore or the area surrounding Singapore. The pool for TWR frequencies may become congested in the medium term (e.g. beyond 2020-2025)
- Thailand:
 - This provides an indication that for use in Thailand and adjacent countries, sufficient room is available for future TWR frequency assignments (e.g. beyond 2020). No congestion in the frequency pool for ATIS frequency assignments in the APAC region is detected
 - The conclusion for the case of Thailand is that the requirements for 10 ACC-U frequencies in Thailand do not congest the available pool of frequencies for ACC-U. This pool is expected to provide in the area of Thailand and adjacent countries sufficient space to accommodate future frequency requirements (e.g. beyond 2020).

- 4.3 Mr. Robert Witzgen was thanked for his significant work on the simulations. The outcomes were reviewed by the meeting. India noted that the simulations showed available frequencies, but not assignable frequencies as this would take more testing against all the current assignments done in India. Particularly the case of classified assignments, not known by ICAO and therefore missing in the global database, this would probably restrict the number of assignable channels. It was agreed that further testing would be done by India, based on the outcome in WP/03.
- 4.4 The meeting noted that the accuracy of simulations relied on the relevance of the database and that an effort to have the most comprehensive database should be pursued. This would be addressed during Agenda Item 5. All draft assignments identified by SRWG are stored in the global database and therefore protected.
- 4.5 The outcomes of simulations would also have to be updated on a regular basis based on the new operational needs of the States. For example, ATS authority in India is still projecting further requirements for TWR and APP functions in the next 5 years.
- 4.6 In terms of risk of congestion, the pool identified by SRWG was expected to provide sufficient space to accommodate future frequency requirements e.g. beyond 2020. It was considered possible to keep using the 25 KHz spacing scheme throughout APAC region in the next 5 years. But it was also discussed that such assessment should be revised on an annual basis.
- 4.7 As the simulations were conducted with an incomplete database, 2 actions were taken:

Action 2-1 (ICAO, RW, ASAP): to provide India with Frequency Finder runtime and operating manual

Action 2-2 (India, 26 June 2015): to assess outcomes of simulations in the context of the additional assignments not known from ICAO

- 4.8 It is proposed that a planning mechanism is consistently used by the APAC Region for the future. This mechanism would ensure that:
- Frequencies planned for a use in the next 5 years timeframe would be protected meanwhile. The protection includes protection from interference with neighboring regions as all the planning exercise would be done using the new global database;
 - The principle of first come first served would be replaced by an overall strategic planning giving visibility on the spectrum use, and providing equity in the allocation of spectrum.
- 4.9 While the reserved frequencies are protected, their effective use should start after tactical assignment coordinated with the ICAO Regional Office. In parallel a tactical coordination without strategic planning can always be done with the ICAO Regional Office but should be avoided as much as possible. It decreases the efficiency of the strategic planning and puts uselessly pressure on State, operator and ICAO Regional Office. A revision of the operational needs should be done on an annual basis for a 5-years sliding window so as to plan and mitigate any spectrum congestion sufficiently beforehand.
- 4.10 Considering the above, the following Draft Conclusion was agreed:

Draft Conclusion 2/1 - Strategic planning and tactical use of VHF frequencies in the APAC Region from 2015 onwards

That, considering that the simulations conducted by SRWG on the basis of the needs submitted, showed that congestion in the APAC region for VHF frequencies using a 25 kHz channel spacing was unlikely to happen until 2020, and considering the necessity to continue using 25 kHz channel spacing as long as possible,

1/ All APAC States should contribute to the strategic planning of VHF frequencies (planned use and release) for a 5-years sliding window so as to detect and mitigate any spectrum congestion sufficiently beforehand and optimize the efficiency of the available spectrum, by submitting and updating their operational needs in terms of VHF frequencies (international and national) on a yearly basis to the ICAO Regional Office;

2/ While the frequencies reserved as a result of strategic planning are protected, their effective use should start after tactical assignment coordinated with the ICAO Regional Office;

3/ The tactical coordination of frequencies without any prior strategic planning should be avoided as much as possible in congested areas;

4/ Both strategic planning and tactical assignments should be completed using the ICAO global tool Frequency Finder; and

5/ Strategic planning should be revised on an annual basis; in case of detected congestion within a 3 years timeframe based on the latest simulations made, the decision to move to 8.33 KHz spacing would need to be made by APANPIRG and implemented in a coordinated manner, after due consultation of airspace users.

Agenda Item 5: Recommendations for improvement of VHF frequency planning

- *WP06 - Recommendations for improvement of VHF frequency planning (India)*
- 5.1 India presented various issues concerning VHF utilization in the present 25 kHz channel spacing environment. Concerning the block allotment of frequencies in the frequency band 117.975-137.000 MHz, India noted that the discontinuation of sub-bands may bring in administrative and technical constraints to deal with, considering the classified assignments in these sub-bands for different services and supported continuance of the following block allotment of frequencies to National Aeronautical Mobile Services to meet national allotment requirements. It was discussed by the meeting that the assignment along the allotment plan would remain the main and preferred pattern, and assignment outside allotted sub bands would be done when no other possibility was to be found, in accordance with the revised ICAO Doc 9718.
- 5.2 Regarding the pool allotment of frequencies, frequency assignments for various functions in the APAC Region are made from separate pools of VHF channels provided in frequency list no.3 as per ASIA/PAC/3/RAN Meeting conclusion 11/4. It was noted by India that ICAO Doc 9718 Volume II Table 2-9 provides minimum geographical co-frequency separation distances between the edges of designated operational coverage (DOC) and a remedy whereby channels from different pools can be considered for assignment. While it was recognized by India that this may help to provide additional channels to cover the shortage to a certain extent, there was a need to exercise caution in APAC

region, as existing assignments have not taken consideration of adjacent channel criteria as well as offset carrier effects.

- 5.3 The meeting discussed that in Europe extensive study had been made to revise the planning criteria for adjacent channel, resulting in the recent abandon of channel protection in a 25 KHz spacing context. Europe had already relaxed the said criteria in its implementation, and a proposal to update to the handbook volume II had been presented in ACP WG-F this year, effective in August 2015. Frequency Finder excludes stations operating with the same channel spacing whose DOC is separated by less than 10 NM when performing a search.
- 5.4 The transient case of 2 aircraft operating in proximity on adjacent channels was discussed. It was confirmed by ICAO that no specific provision had been made to protect aircraft from interference, but that the hazard was very temporary in nature, hence a very short exposure time. However it was recognized that should this hazard occur, it would be in a scenario of proximity where the probability of collision would be the highest. As a protective means any message could be retransmitted, which could be considered in the local safety case performed by the ANSP.
- 5.5 Concerning the coordination of frequencies with ICAO APAC Region, India observed that in line with ASIA/PAC/3/RAN Meeting Conclusion 11/4, all new frequency assignments planned as per VHF utilization plan for Asia Pacific Regions were to be coordinated with ICAO Regional Office, which is promulgated in Frequency List No.3. The meeting discussed that this coordination had to include frequencies planned in national aeronautical mobile services.

As Frequency Finder was considered to be a necessary tool for an efficient frequency management across ICAO regions, the need for securing the resources to maintain the tool and organize a SIP to train States was reinforced. Consequently the meeting adopted the following draft conclusion:

Draft Conclusion 2/2 – Transition to the new global database

Considering that Frequency Finder and the global database were a necessary toolkit for an efficient frequency management across ICAO regions, and the need to train States,

That,

a/ ICAO be urged to secure the resources to maintain the tool and organize a seminar on Frequency Finder in 2016,

b/ States secure the attendance of their Subject Matter experts to the Seminar

WP04 - Backup frequencies (ICAO)

- 5.6 India noted in WP06 that the use of back-up frequencies especially for TWR, APP and ACC functions requires moderation. Presently, there are no SARPs or guidelines for backup frequencies in ICAO Annex Volume V and Doc 9718. During the course of web conferences and email discussions, the secretariat circulated excerpts from Eurocontrol document. Section 2.7 of Part 2: "COM2 Best Practices" throw some light on the issue. In the absence of credible guidelines, the irrational use of back up frequencies is increasing which would lead to artificial shortfall of frequencies.

- 5.7 Guidance material on the use of backup frequencies based on the practices in the EUR Region was presented to the meeting by Secretariat and reviewed. The outcome is placed at **Appendix B**. Noting that the operational feasibility may not be ensured in all cases, but that the guidance would be quite useful to regulate the assignment of back up frequencies, the meeting adopted the following draft Conclusion

Draft Conclusion 2/3 – Assignment of back up frequencies in APAC Region

Considering that the assigned number of backup frequencies should be kept to a minimum,

That,

1/ the guidance placed at **Appendix B** be adopted as regional guidance;

2/ any State/Administration requiring back up frequencies, where operationally feasible:

- Shares backup frequencies either between different services (at the same ATC center) or between different facilities (e.g. different aerodromes or different ACC/FIS serves from different ATC centers).
- Follows the regional guidance for the backup frequencies to be assigned,
- Re-coordinates the backup frequencies already assigned as necessary.

- 5.8 In order to ease the submission of arguments backing the request for back up frequencies, Secretariat proposed to develop a template. The template would allow justifying the operational requirement, and summarizing the main lines of the safety case, backed on quantified data.

Action 2-3 (ICAO, FL, 26 Jun. 15): to develop a template for the submission of back up frequencies by States

➤ *WP/02 - Planning and Protection of the frequencies (ICAO)*

- 5.9 WP/02 introduced actions to take in the APAC Region regarding the aeronautical emergency frequency (121.500 MHz), the aeronautical auxiliary frequency SAR (123.100 MHz) and the air-to-air frequency (123.450 MHz).
- 5.10 Regarding the aeronautical emergency frequency, the meeting agreed to the following draft conclusion:

Draft Conclusion 2/4 – Amendment to the APAC frequency allotment plan

That, considering the effect of the reduction of the guard band around the frequency 121.500 MHz and the four new channels that can be used for ATC communications, and the necessity to map services previously defined in APAC region under ASIA/PAC/3 RAN conclusion 11/4 and ASIA/PAC/3 RAN

a/ the frequency allotment plan for the APAC Region be modified as follows:

| Current allotment | Current frequency band | New frequency band |
|------------------------|------------------------|-----------------------|
| APP-I | 121.100 – 121.400 MHz | 121.100 – 121.450 MHz |
| AS (aerodrome surface) | 121.600 – 121.975 MHz | 121.550 – 121.975 MHz |

b/ coordination be undertaken with ACP WG/F to update the ICAO Doc 9718 Volume II accordingly.

c/ the mapping between the services and designated operational coverages previously defined in APAC region under ASIA/PAC/3 RAN conclusion 11/4 and those defined in the global Database as per **Appendix C** be adopted.

➤ *WP/05 - Global and Regional Allotments (ICAO)*

5.11 Based on WP/05, different measures envisaged at the global level regarding allotments in the VHF-COM frequency band 117.975 – 137 MHz to increase the efficiency of frequency management were discussed for the APAC Region:

- Measure 1: Abandon the discrimination between national and international aeronautical mobile services within the band 117.975 – 137 MHz and consequently amend Annex 10. While it was recognized that a number of national assignments could not be disclosed to ICAO, the meeting appreciated the benefits that would result from being able to assign frequencies in the subbands currently allotted to national assignments. It was discussed that practically no distinction was now made in the coordination between international and national assignments, and that all assignments had to be coordinated with the ICAO regional office. However, due to the sensitivity of some assignments, the best way forward would be to consult the States by ICAO letter.
- Measure 2: Replace the notion of “protected service volume” with the definition for Designated Operational Coverage. As the notion of DOC is well defined and widely used and this replacement would release the risk of confusion in Annex 10 Vol V, the replacement was endorsed by the meeting.
- Measure 3: Revise the allotment plan in APAC Region, based on handbook volume II principles
 - 3a: reduction of the band for AOC

Current allotment is as follows in the different ICAO regions:

- a. AFI: 131.400 – 132.975 MHz
- b. APAC: 128.900 – 132.025 MHz
- c. CAR/SAM: 129.900 – 132.025 MHz
- d. EUR: 131.400 – 131.975 MHz
- e. MID: 128.900 – 132.025 MHz

The meeting agreed that a proposal could be circulated to the APAC States to reduce the band for AOC:

A-Proposed new sub band for ATS services in APAC 128.900 - 131.375 MHz,

B-Existing assigned AOC frequencies in this sub-band are subject to coordination, if required, between the Member State and ICAO regional office.

- 3b: in cases where allotment restricts efficient frequency assignment planning, specific services may use other frequency bands. This was considered to be the case already in the handbook volume II, which would become guidance for the region when the new eANP would be adopted (end 2015). No follow-up was considered necessary.
- 3c: incorporate in the APAC allotment plan the relevant DOC when missing. An action was raised for ICAO to do a proposal for AOC DOC.
- 3d: allot the sub-band 122.000 MHz – 123.575 MHz to TWR, AFIS and AS. This was considered to be covered by the project of ICAO State letter. No follow-up was considered necessary.
- 3e: introduce ATC services in a sub-band of 136.000 – 137.000; this was considered too early but could be kept as a potential solution in case of foreseen congestion.

Action 2-4 (ICAO, RW, 26 Jun. 15): to propose a DOC for AOC

Action 2-5 (ICAO, FL, 29 May 15); to circulate an ICAO letter to APAC states (Proposal to abandon the discrimination between ‘national’ and ‘international’ aeronautical mobile services - Proposed new sub band for ATS services in APAC 128.900 - 131.375 MHz)

➤ *IP/02 Information on Frequency Assignment Tool Used in India*

5.12 India provided background information and salient features on the frequency assignment tool used in India for planning selection and assignment of frequencies for CNS facilities. The current tool implemented the provisions of Conclusion 11/4, ICAO Third Asia/Pacific Regional Air Navigation (ASIA/PAC/3 RAN) Meeting on the Procedure for very high frequency (VHF) aeronautical mobile service (AMS) frequency assignments. India informed the meeting that has planned to examine an upgrade to the tool to embark the new ICAO document 9718 (Volume-II) in respect of VHF assignments.

➤ *WP/07 India Harmonic interference (India)*

5.13 India explained that they recently suffered from harmonic interference and encouraged the meeting to request that relevant capability be added to the Frequency Finder tool.

5.14 The meeting discussed that while this was desirable, the situation may happen that Frequency Finder would not be able to find frequencies in certain cases where too many constraints would apply. The algorithm may also be difficult to implement.

5.15 The meeting opined that potential cases of harmonic interference could be flagged for further analysis by the expert using the tool.

Action 2-6 (ICAO, RW, 25 Sep. 15): to assess the feasibility and relevance to flag the potential cases of harmonic interference in Frequency Finder

➤ *WP/08 - Maintenance of Frequency database in the Frequency Finder (Japan)*

5.16 Japan presented the result of the comparison between their national VHF frequency database, the frequency list 3 issued by the ICAO regional office in January 2015, and the content of the global database.

5.17 The outcome is that there are discrepancies between the national VHF frequency database and the frequency list 3 which can be explained because not all assignments were coordinated, or were coordinated after assignment and found not suitable by ICAO. There were also discrepancies between the frequency list 3 and the content of the global database, although the source of data was unique in that case. The reasons for those gaps were that in the global database the functions had been harmonized and in some cases different from the ones used in APAC region.

5.18 The meeting opined that there would be a need for a comprehensive cross check.

Action 2-6 (ICAO, FL, 26 June 15): to provide frequency data from the global database (link) and service mapping from the frequency list 3 (link) to the States for checking

Action 2-7 (all states, 15 Dec.15): to check consistency between global database and frequency list 3

Agenda Item 6: Action list and planning

➤ *WP/09_ SRWG Action list and planning ICAO*

6.1 Actions 1-2, 1-3, 1-6, 1-7 and 1-8 were closed. The updated version of action list is placed at **Appendix D**.

6.2 The planning was updated concerning the progress. The updated version of the SRWG planning is placed at **Appendix E**.

Agenda Item 7: Next meeting(s)

7.1 Next meetings were scheduled as follows:

- Webconference - 02 July 2015
- Webconference - Jan. 2016
- SRWG/3 - May 2016

Agenda Item 8: Any other Business.

8.1 Thailand presented a tool developed for an automated VHF Coverage plotting.

8.2 The meeting warmly thanked Mr. Robert Witzgen for his contribution to the success of the meeting.

| State/Administration | Service concerned | Number of new frequencies | Release of frequencies | Location | Time Horizon | Justification: airspace or routes creation/restructuring, new facilities,etc | Remarks |
|----------------------|-------------------|---------------------------|------------------------|---|--------------|--|--|
| Australia | TWR | 5 | None | New/Existing Control Towers | 2014-2019 | New Control Towers | Over the next 5 years we expect to need up to 5 new tower frequencies for use at towers for new SMC (Split) or ACD Functions - We use our own internal system for analysis and use of frequencies - there are no issues expected as these will be low power (10W) No coordination required with ICAO or Neighbour Agencies |
| Australia | APP-L | 5 | None | Approach Services to New/Existing Towers | 2014-2019 | As part of our (Surveillance Approach for Regional Airports Projects) We may install some additional VHF for use as Regional APP Service | Over the next 5 years we expect to need up to 5 new approach frequencies for use at regional towers - We use our own internal system for analysis and use of frequencies - there are no issues expected as these will be low power (10W) No coordination required with ICAO or Neighbour Agencies |
| Australia | ACC-L | 10 | None | Western Australia - Locations to be determined by project and Operational Coverage Requirements | 2014-2019 | Review of Airspace over Western Australia may be required with respect to operations into mining areas - Operational Requirements to be defined and examined | Over the next 5 years we expect to need up to 5 new Area frequencies for use in the Northern / Southern FIR (Brisbane/Melbourne Centre) - We use our own internal system for analysis and use of frequencies - there are no issues expected - No coordination required with ICAO or Neighbour Agencies |
| Hong Kong China | ACC-SR-I | 4 | 0 | Hong Kong (22°18'32" N 113°54'53" E) | 2015-2020 | For new Terminal radar control position | |
| Hong Kong China | TWR | 1 | 0 | Hong Kong (22°18'32" N 113°54'53" E) | 2015-2020 | For new TWR position for apron expansion | |
| Hong Kong China | ACC-SR-I | 10 | 0 | Hong Kong (22°16'33" N 114°08'41" E) | 2020-2025 | For PDR Operations 2020 | |
| Hong Kong China | APP-SR-L | 14 | 0 | Hong Kong (22°16'33" N 114°08'41" E) | 2020-2025 | For PDR Operations 2020 | |
| Hong Kong China | ACC-SR-U | 2 | 0 | Hong Kong (22°16'33" N 114°08'41" E) | 2020-2025 | For PDR Operations 2020 | |
| Hong Kong China | TWR | 2 | 0 | Hong Kong (22°18'32" N 113°54'53" E) | 2020-2025 | For 3rd Runway | |
| Hong Kong China | SMC | 1 | 0 | Hong Kong (22°18'32" N 113°54'53" E) | 2020-2025 | For 3rd Runway | |
| Hong Kong China | CDC | 2 | 0 | Hong Kong (22°18'32" N 113°54'53" E) | 2020-2025 | For 3rd Runway | |
| India | TWR | 50 | 0 | New Control Towers | 2015-2020 | New Airstrips/Green Field Airports | New airstrips/Greenfield airports across India as per Government Policy. The requirement is to grow significantly over the next 5 years including B/up for TWR. Out of 50, we propose to use 25 frequencies as B/UP for both TWR and APP-L |
| India | APP-L | 30 | 0 | Approach Services to New Airports | 2015-2020 | New Airstrips/Green Field as well as Existing Airports | We expect there are needs over the next 5 years to meet proposed new Approach Control Centres vis-à-vis new airstrips/Greefield airports as well as B/Up requirments |
| India | APP-U | 5 | 0 | Operational coverage requirements to supplement upper area harmonization | 2015-2020 | Due to introduction of primary radars at many airports, additional VHF's for enhanced terminal APP Surveillance Service | Requirement for Mumbai Upper Area Harmonization |
| India | ACC-U | 20 | 0 | Operational coverage requirements for upper area harmonization | 2015-2020 | Upper Area Harmonization as a result of airspace harmonization plan over Indian FIR | Requirement projected for Mumbai _Upper Area Harmonization. All offset carriers will be used to augment VHF coverage. Out of 20, we propose to use 10 frequencies as B/Up for both APP-U & ACC-U for existing as well as new proposal |
| India | ATIS | 25 | 0 | New airstrips/ Greenfield airports | 2015-2020 | Requirements New Airstrips/Greefield airports | No B/Up will be considered |
| Japan | | 0 | | | 2015-2020 | | Japan may need a few new frequencies after 2020. |
| New Zealand | | 0 | | | 2015-2023 | Possible airspace changes | |
| New Zealand | | | 2 ? | | 2015-2023 | Increasing use of offset frequencies - Release of frequencies to be confirmed by NZ | |
| Singapore | TWR | 11 | None | New/Existing Control Towers - Estimated location? | 2014-2019 | New Control Towers | Over the next 5 years we are expecting to have 2 new ATC control towers for new runways and ramp control areas, to support the establishment of new passengers terminals. |
| Singapore | APP-SR-I | 5 | None | Approach Services into Changi | 2014-2019 | Re-sectorisation of APP services | Over the next 5 years we expect to need up to 5 new approach frequencies for use at APP services due to re-sectorisation. |
| Singapore | ACC-U | 4 | None | ACC | 2014-2019 | Re-sectorisation of ACC services | Over the next 5 years we expect to need up to 4 new area frequencies due to re-sectorisation. |
| Singapore | ATIS | 2 | None | Changi | 2014-2019 | Establishment of new ATIS services for Changi and Seletar Aerodromes | Over the next 5 years we are expecting to establish new ATIS services for Changi and Seletar Aerodromes |
| Thailand | ACC-U | 10 | | Bangkok,Cheingmai ,Phuket,Samui,Udon | 2015 | Backup Frequency | |
| Thailand | APP-U | 10 | | Bangkok,Cheingmai ,Phuket,Samui,Udon | 2015 | Backup Frequency | |
| Thailand | TWR | 5 | | Cheingmai ,Phuket,Udon , Pisanulok,Ubol,Hatyai | 2015 | Backup Frequency | |
| Thailand | AFIS | | 2 | Maehongson,Tak,Payao ,Nan,Trang,Narathiwat,Loei,Burirum,Samui,Chonburi,Karnjanaburi,Phuket | 2015 | Low Level Aircraft Advisory | |
| Thailand | ATIS | 22 | | Bangkok,PHETCHABUN,CHUMPHON,CHIANG RAI,NAN,BURI RAM,ROI ET,SAKON NAKHON,NARATHIWAT,RANONG,LAMPANG,PHRAE,KHON KAEN,UDON THANI,UBON RATCHATHANI,PHITSANULOK,NAKHON RATCHASIMA,LOEI,Mae Sot,MAE HONG SON,Hua Hin | 2015 | Automatic terminal information service | For replace ATIS from old NDB Station which will be obsold in neraly 2015 |
| Total | | 255 | 2 | | | | |

GUIDANCE ON THE IMPLEMENTATION AND USE OF BACKUP FREQUENCIES

1. Assessment for the need for backup frequencies.

1.1 Backup frequencies may be operationally required to provide an alternative air/ground communication channel in cases where an operational radio frequency is not available.

Examples include intentional interference, unintentional interference (e.g. badly designed FM broadcasting stations), stuck microphone, phony air traffic controllers.

1.2 Implementation of backup frequencies should be limited only to the following ATC services:

- Aerodrome Surface communications AS
- Tower services TWR
- Approach services APP-L, APP-I and APP-U
- Area control services ACC-L, ACC-U
- Meteorological information VOLMET
- Flight Information services FIS-L, FIS-U

Other air/ground communication services such as ATIS, AFIS, generic unspecified air-to-air (A/A), generic unspecified air-to-ground (A/G) services, generic unspecified General Purpose (GP) services and aeronautical operational control services (AOC) do not require backup communication channels.

1.3 Backup frequencies should not be provided when communication channels are lost due to malfunctioning of the ground infrastructure. Adequate backup facilities in cases of malfunctioning of the ground infrastructure (or parts the-of) should be in place.

Examples are equipment failure, power loss and loss of ground communication links to remote transmitter / receiver sites.

1.4 The assessment of the required number of backup frequencies should be kept to a minimum. Where possible, it should be based on experience (e.g. number of days per year that a communication channel is not available).

1.5 Where operationally feasible, arrangements should be in place to share backup frequencies either between different services (at the same ATC center) or between different facilities (e.g. different aerodromes or different ACC/FIS serves from different ATC centers).

1.6 In the ICAO COM list, backup frequencies are as such identified.

2. Backup frequency for short distance communications

2.1 Short distance communications that may require backup frequencies include AS, TWR and APP services

2.2 Backup frequencies should only be implemented at aerodromes with a clear operational requirement.

2.3 The number of backup frequencies for the combined services in 2.1 above should not exceed two (with a maximum of one backup frequency for TWR and one backup frequency for APP services).

Note: a single backup frequency can in principle be used to provide for a backup communications channel for both a TWR and an APP service or for a TWR and an AS service.

2.4 Adjacent ATS units are encouraged and where possible, operationally feasible and spectral efficient to make suitable arrangements to share backup frequencies.

3. Backup frequencies for long distance communications

3.1 A study or safety case should be presented to justify the number of backup frequencies required for ACC and FIS services.

3.1 Adjacent ATS units are encouraged and where possible, operationally feasible and spectral efficient to make suitable arrangements to share backup frequencies.

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1. Mapping

| Services / DOC as specified in current APAC COM list 3 | | | Services /DOC as specified in Handbook Volume 2 and used in Global COM list 3 | | |
|--|------------------|---|--|--------|------------------------------|
| Service | Symbol | Service Range/Height (NM/feet) | Service | Symbol | Service Range/Height (NM/FL) |
| Aerodrome Control | TWR | 25/4000 | Aerodrome Control Tower | TWR | 25/40 |
| | | | Aerodrome Flight Information Service | AFIS | 25/40 |
| | | | Precision Approach radar | PAR | 25/40 |
| Surface Movement Control | SMC | Limit of aerodrome | Aerodrome Surface Communications | AS | 5/1 |
| Approach Control (Upper) | APP-U | 150/45000 | Approach Control Service (Upper) | APP-U | 150/450 |
| Approach Control (Intermediate) | APP-I | 75/25000 | Approach Control Service (Intermediate) | APP-I | 75/150 |
| Approach Control (Lower) | APP-L | 50/12000 | Approach Control Service (Lower) | APP-L | 50/120 |
| Area Control or Flight Information Service ((Upper) | ACC-U FIS-U | Specified area + 50 NM; Height 45000 | Area Control Centre (Upper) | ACC-U | 260/450 or specified area |
| | | | Flight Information Service (Upper) | FIS-U | 260/450 or specified area |
| Area Control (Lower) | ACC-L | Specified area + 50 NM; Height 25000 | Area Control Service (Lower) | ACC-L | 195/250 or specified area |
| | | | Flight Information Service (Lower) | FIS-L | 185/250 or specified area |
| Area Control or Flight Information (Extended Range) | ACC-ER FIS-ER | To be specified; Height 45000 | Not used; extended range stations are grouped in families of extended range stations and identified in the Global COM list as ER | | |
| VOLMET/ATIS | VOLMET ATIS | Omnidirectional; Height 45000 | VOLMET | VOLMET | 260/450 |
| | | | ATIS | ATIS | 260/450 |

Mapping of Service and DOC in current APAC COM List 3 with Service and DOC in Global COM list 3

Note 1: Values for SST (Super Sonic Transport) operations not shown.

Note 2: FL is height in feet divided by 100

Note 3: When for area services the area is not specified the DOC is assumed to extend up to the radio horizon

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2. In the Global COM list the specified DOC is preceded with a prefix as follows:

A- (e.g. A-260/250) – The prefix A- indicates that the frequency is for a protected area service for which a geographical area is specified.

B- (e.g. B-260/450) – The prefix B- indicates that the frequency is for a protected aeronautical broadcast service (VOLMET or ATIS) with a circular (omnidirectional) DOC of 260 NM and 45000 ft.

C- (e.g. C-25/40) – The prefix C- indicates that the frequency is for a protected service with a circular (omnidirectional) DOC of 25 NM and 4000 ft.

U- (e.g. U-260/450) The prefix U- indicates that the frequency is for an un-protected service with a circular DOC of 260 NM and 45000 ft.

3. Harmonization of Services

3.1 The current COM list 3 for the APAC Region includes a definition of special functions that apply to the operational use of the frequency. This additional information was added to the field Remarks in the Global COM list. When converting the APAC COM list into the ICAO Global COM list, the following actions were taken.

| APAC COM list | Global COM list | |
|---------------|-----------------|----------------------------|
| Service | Service | Remarks |
| ACC | ACC-U | |
| ACC-CDC | ACC-U | Clearance delivery |
| TWR/ACC | ACC-U | Also TWR |
| ACC-ER | ACC-U | Extended range |
| ACC-I | ACC-I | |
| ACC-L | ACC-L | |
| ACC-LU | ACC-U | Also ACC-L |
| ACC-LU-ER | ACC-U | Also ACC-L; Extended range |
| ACC-SR | ACC-U | Surveillance radar |
| ACC-SR-I | ACC-I | Surveillance radar |
| ACC-SR-L | ACC-L | Surveillance radar |
| ACC-SR-U | ACC-U | Surveillance radar |
| ACC-U | ACC-U | |
| ACC-U-ER | ACC-U | Extended range |
| ACC/APP | ACC-U | Also APP |
| ACC/APP/FIS | ACC-U | Also APP and FIS |
| ACC/DATA | ACC-U | Data |
| ACC/FIS | FIS-U | Also ACC |
| ACC-FIS-U | FIS-U | Also ACC |
| AFIS | AFIS | |
| AOC | AOC | |
| ACC/FIS/APP | FIS-U | Also ACC and APP |
| APP | APP-U | APP-U assumed |

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| APAC COM list | Global COM list | |
|---------------|-----------------|---------------------------------------|
| Service | Service | Remarks |
| APP-I | APP-I | |
| APP-L | APP-L | |
| APP-LU | APP-U | Also APP-L |
| APP-PAR-I | APP-I | PAR |
| APP-PR | APP-U | Precision radar |
| APP-PR-I | APP-I | Precision radar |
| APP-PR/TWR | APP-U | Precision radar; also TWR |
| APP-PR+DF | APP-U | Precision radar and DF |
| APP-R | APP-U | Radar |
| APP-SR | APP-U | Surveillance radar |
| APP-SR-I | APP-I | Surveillance radar |
| APP-SR-I/L | APP-I | Surveillance radar; also APP-L |
| APP-SR-L | APP-L | Surveillance radar |
| APP-SR-LU | APP-U | Surveillance radar; also APP-L |
| APP-SR-U | APP-U | Surveillance radar |
| APP-SR-U+DF | APP-U | Surveillance radar; direction finding |
| APP-U | APP-U | |
| APP/ACC | ACC-U | Also APP |
| APP/ACC/FIS | FIS-U | Also ACC and APP |
| APP/DF | APP-U | Direction finding |
| APP/DF-I | APP-I | Direction finding |
| APP/FIS | FIS-U | Also APP |
| APP/L | APP-L | |
| APP/PR | APP-U | Precision radar |
| APP/SR-I | APP-I | Surveillance radar |
| APP/TMA | APP-U | TMA |
| APP/TWR | APP-L | Also TWR |
| APP/TWR-PR | APP-L | Precision radar; also TWR |
| APP/TWR/FIS | FIS-L | Also APP and TWR |
| APP+DF | APP-U | Direction finding |
| APP+DF-I | APP-I | Direction finding |
| APP+DF-L | APP-L | Direction finding |
| APPI | APP-I | |
| ATIS | ATIS | |
| AWIB | TWR | AWIB |
| CD | APP-L | Clearance delivery |
| DATA-LINK | AOC | Data Link (VDL) |
| DATIS | ATIS | D-ATIS |
| DELIVERY | TWR | Delivery |
| DEP | TWR | Departure |
| ENROUTE | ACC-U | En Route |
| FIS | FIS-U | FIS-U assumed |

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| APAC COM list | Global COM list | |
|---------------|-----------------|--------------------------------------|
| Service | Service | Remarks |
| FIS-ER | FIS-U | Extended range |
| FIS-GP | FIS-U | General purpose |
| FIS-I | FIS-I | |
| FIS-L | FIS-L | |
| FIS-LU | FIS-U | Also FIS-L |
| FIS-LU/GP | FIS-U | General purpose; also FIS-L |
| FIS-U | FIS-U | |
| FIS-U/GP | FIS-U | General purpose |
| FIS/ACC-ER | ACC-U | Extended range |
| FIS/ER | FIS-U | Extended range |
| OP-CTL | AOC | |
| FLIGHT CHE | FIS-U | Flight checking |
| RCAG | FIS-U | Remote controlled A-G communications |
| SAR | SAR | |
| SITADATA | AOC | SITA DATA |
| SMC | AS | |
| SMC/CD | AS | Clearance delivery |
| SMC/DEP | AS | Departure |
| SMC/FIRE | AS | Fire |
| TMA | APP-U | TMA |
| TWR | TWR | |
| TWR/APP | APP-L | Also TWR |
| TWR/APP-I | APP-I | Also TWR |
| TWR/APP-L | APP-L | Also TWR |
| TWR/APP/DF | APP-L | Direction finding; also TWR |
| TWR/APP/FIS | APP-L | Also FIS and TWR |
| TWR/APP/VDF | APP-L | Direction finding; also TWR |
| TWR/DF | TWR | Direction finding |
| TWR/FIS | TWR | Also FIS |
| TWR/SMC | TWR | Also aerodrome surface |
| TWR/SMC/FIS | TWR | Also FIS and aerodrome surface |
| TWR/UNICOM | TWR | UNICOM |
| TWR+APP | APP-L | Also TWR |
| TWR+DF | TWR | Direction finding |
| TWR+PR | TWR | Precision radar |
| TWR+R | TWR | Radar |
| VDF/APP | APP-L | Direction finding |
| A/G LIGHT | A-G | A/G LIGHT |
| VOLMET | VOLMET | |

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4. Table of Services and DOC as identified for use in Frequency Finder.

4.1 Frequency Finder has incorporated the following Table, identifying the Services, the Designated Operational Coverage and the Designated Operational Range and Height. Some of these Services are not used in the APAC Region.

| Service | DOC | Range | Height |
|----------------|----------------------|--------------|---------------|
| A-A | A-A C-261/450 | 261 | 45000 |
| A/G | A-G C-261/450 | 261 | 45000 |
| ACC-L | ACC-L C-194/250 | 194 | 25000 |
| ACC-U | ACC-U C-261/450 | 261 | 45000 |
| AFIS | AFIS C-25/40 | 25 | 4000 |
| AOC | AOC U-260/450 | 260 | 45000 |
| APP-I | APP-I C-75/250 | 75 | 25000 |
| APP-L | APP-L C-50/120 | 50 | 12000 |
| APP-U | APP-U C-150/450 | 150 | 45000 |
| ATIS | ATIS B-260/450 | 260 | 45000 |
| EMERG | EM | 0 | 0 |
| FIS-L | FIS-L C-194/250 | 194 | 25000 |
| FIS-U | FIS-U C-261/450 | 261 | 45000 |
| GUARD | REG. GUARD C-261/450 | 0 | 0 |
| RGA | REGION | 25 | 4000 |
| PAR | PAR C-25/40 | 25 | 4000 |
| SAR | SAR | 0 | 0 |
| SMC | SMC C-5/1 | 10 | 100 |
| TWR | TWR C-25/40 | 25 | 4000 |
| VOLMET | VOLMET B-260/450 | 260 | 45000 |
| ACC-I | ACC-I C-194/250 | 194 | 25000 |
| ACC | ACC-U C-265/450 | 261 | 45000 |
| APP | APP-U C-150/450 | 150 | 45000 |
| FIS | FIS-U C-261/450 | 261 | 45000 |
| FIS-I | FIS-I C-194/250 | 194 | 25000 |
| AS | AS C-5/1 | 5 | 100 |

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| Reference | Who | What | Due date | Status | Completed on | Result | Comment |
|-----------|-----------------------------|--|-----------|--------|--------------|---|--|
| A1-1 | Frederic Lecat | to check with other ICAO regions their intention regarding the implementation of 8.33 kHz spacing scheme | 30-Sep-14 | Closed | 24/09/14 | Document "8.33KHz spacing scheme in ICAO regions" | |
| A1-2 | all | To provide national views to the chairman on the impacts of adopting the ICAO Handbook Volume II provisions to replace the current regional RAN provisions (WP/4 refers) | 24-Apr-15 | Closed | | | |
| A1-3 | Paul Dowsett | Chair to combine inputs from Members into one impact analysis | 12-May-15 | Closed | | | |
| A1-4 | Paul Dowsett/Frederic Lecat | Chair and Secretariat to propose a structure for documentation kept on portal (19 sep.14) and upload a contact list | 19-Sep-14 | Closed | 30/09/14 | Document "SRWG - Documentation libraries - 02 Sep. 14" and "SRWG - email distribution list 02 September 14" | |
| A1-5 | Frederic Lecat | Secretariat to send a letter to China, Hong Kong China, Japan, New Zealand and Republic of Korea to convey the outcome of this meeting and urge them to attend future webconferences/meetings. | 30-Sep-14 | Closed | 09/04/14 | ICAO letter sent out to China, Hong Kong China, Japan, New Zealand and ROK, referenced T 8/8.4, 8.5, 8.6 & 8.10 :AP-CNS0066/14 | |
| A1-6 | all | submit operational needs in terms of frequencies for 2014-2019 and 2020+ using the excel template provided | 12-Oct-14 | Closed | 9/2/2015 | Ops Requirement Summary 09 Feb.15 | |
| A1-7 | Paul Dowsett | circulate an email to all participants offering more guidance on the operational needs | 30-Oct-14 | Closed | | | |
| A1-8 | Frederic Lecat | upload ICAO Handbook Volume II provisions on the SRWG portal | 30-Oct-14 | Closed | 6-Oct-14 | https://portal.icao.int/SRWG/Documents/3-%20Solutions%20study/ICAO%20Documentation/9718_Handbook%20on%20Radio%20Frequency%20Spectrum%20Requirements%20Vol_2_en.pdf | |
| A 2-1 | Robert Witzten | To provide India with Frequency Finder runtime and operating manual | ASAP | Open | | | |
| A 2-2 | N.R. Das | India, 26 June 2015): to assess outcomes of simulations in the context of the additional assignments not known from ICAO | 26-Jun-15 | Open | | | Target date is subject to change as action 2-2 needs action 2-1 to be completed to start |
| A 2-3 | Frederic Lecat | to develop a template for the submission of back up frequencies by States | 26-Jun-15 | Open | | | |
| A 2-4 | Robert Witzten | to propose a DOC for AOC | 26-Jun-15 | Open | | | |
| A 2-5 | Frederic Lecat | to circulate an ICAO letter to APAC states (Proposal to abandon the discrimination between 'national' and 'international' aeronautical mobile services - Proposed new sub band for ATS services in APAC 128.900 - 131.375 MHz) | 29-May-15 | Open | | | |
| A 2-6 | Frederic Lecat | to provide frequency data from the global database (link) and service mapping from the frequency list 3 (link) to the States for checking | 26-Jun-15 | Open | | | |
| A 2-7 | All | to check consistency between global database and frequency list 3 | 15-Dec-15 | Open | | | |

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| ID | Task Mode | Task Name | Duration | Start | Finish | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|----|-----------|--|-------------------|---------------------|--------------------|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|
| | | | | | | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 |
| 1 | | Dependencies | 565 days? | Wed 7/15/15 | Tue 9/12/17 | | | | | | | | | | | | | | | | | | |
| 2 | | CNS 19 | | Wed 7/15/15 | | | | | | | | | | | | | | | | | | | |
| 3 | | CNS 20 | | Mon 7/11/16 | | | | | | | | | | | | | | | | | | | |
| 4 | | CNS 21 | 1 day? | Tue 7/11/17 | Tue 7/11/17 | | | | | | | | | | | | | | | | | | |
| 5 | | APANPIRG 28 | 1 day? | Tue 9/12/17 | Tue 9/12/17 | | | | | | | | | | | | | | | | | | |
| 6 | | Stage 1: Identify VHF voice communications new needs and current limitations | 229 days? | Thu 6/26/14 | Tue 5/12/15 | | | | | | | | | | | | | | | | | | |
| 7 | | a-Draft a project planning for stages 1, 2 and 3 | 4 mons | Thu 6/26/14 | Wed 10/15/14 | | | | | | | | | | | | | | | | | | |
| 8 | | b-Gather new operational needs from Member States in terms of frequencies (and associated context: airspace or routes restructuring, new facilities etc) in the next 5 years short(2014-2019) and trends beyond, mid and long terms 2020 | 6 mons | Thu 6/26/14 | Wed 12/10/14 | | | | | | | | | | | | | | | | | | |
| 9 | | c-Identify current limitations with continuity of the current 25kHz spacing | 6 mons | Thu 6/26/14 | Wed 12/10/14 | | | | | | | | | | | | | | | | | | |
| 10 | | Needs and limitations | 1 day? | Thu 12/11/14 | Thu 12/11/14 | | | | | | | | | | | | | | | | | | |
| 11 | | d- Study impact of ICAO Handbook Volume II provisions on current provision of VHF voice communications | 229 days | Thu 6/26/14 | Tue 5/12/15 | | | | | | | | | | | | | | | | | | |
| 12 | | Stage 2: Identify Solutions | 1380 days? | Fri 12/12/14 | Thu 3/26/20 | | | | | | | | | | | | | | | | | | |
| 13 | | a-Simulate with the global database how this could meet the needs could be done based on 25 kHz spacing, and the new ICAO global frequency manager software tool and Handbook volume II provisions | 6 mons | Fri 12/12/14 | Thu 5/28/15 | | | | | | | | | | | | | | | | | | |
| 14 | | b-For limitations (potential interferences detected through the tool) with neighboring States, identify solutions using the ICAO global frequency manager software tool , based on the new ICAO frequency manager software tool and Hand | 6 mons | Sun 3/8/15 | Thu 8/20/15 | | | | | | | | | | | | | | | | | | |
| 15 | | c-If the need for 8.33 KHz kHz spacing is identified, study impacts on operations (including airspace users, ATC procedures and technical systems and ground installations) in the considered airspace and in the adjacent airspace to ensure continuous | 12 mons | Fri 8/21/15 | Thu 7/21/16 | | | | | | | | | | | | | | | | | | |
| 16 | | d-Optionally, consult with relevant national frequency authorities for about the feasibility of 25 kHz spacing continuity or 8.33 kHz spacing implementation | 6 mons | Fri 2/5/16 | Thu 7/21/16 | | | | | | | | | | | | | | | | | | |
| 17 | | e-Draft a high level implementation plan for continuity of 25 kHz spacing or implementation of 8.33 kHz spacing | 9 mons | Fri 7/22/16 | Thu 3/30/17 | | | | | | | | | | | | | | | | | | |

Project: planning SRWG - upda
Date: Mon 5/25/15

| | | | | |
|-----------|--------------------|-----------------------|--------------------|-----------------|
| Task | Project Summary | Manual Task | Start-only | Deadline |
| Split | Inactive Task | Duration-only | Finish-only | Progress |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress |
| Summary | Inactive Summary | Manual Summary | External Milestone | |

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| ID | Task Mode | Task Name | Duration | Start | Finish | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|----|-----------|---|------------------|--------------------|--------------------|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|--|
| | | | | | | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | H1 | H2 | |
| 18 | ★ | f-Review and update the project planning stage 3 according to the proposed solutions | 1 mon | Fri 3/31/17 | Thu 4/27/17 | | | | | | | | | | | | | | | | | | |
| 19 | ★ | g-Develop recommendations for CNS SG | 3 mons | Fri 4/28/17 | Thu 7/20/17 | | | | | | | | | | | | | | | | | | |
| 20 | ★ | Recommendations for CNS SG | 1 day? | Fri 7/21/17 | Fri 7/21/17 | | | | | | | | | | | | | | | | | | |
| 21 | ☰ | Stage 3: Implement in a coordinated manner | 707 days? | Wed 7/12/17 | Thu 3/26/20 | | | | | | | | | | | | | | | | | | |
| 22 | ★ | a-Finalise the implementation plan taking into account comments from CNS SG/other concerned groups into considerations | 3 mons | Wed 7/12/17 | Tue 10/3/17 | | | | | | | | | | | | | | | | | | |
| 23 | ★ | b-If no 8.33 KHz spacing is needed, States implement the new assignments in a coordinated manner (ANSP, CAA, national frequency Authorities) in line with the implementation plan and VHF new assignments are reflected in the global database | 1 day | Wed 9/13/17 | Wed 9/13/17 | | | | | | | | | | | | | | | | | | |
| 24 | ★ | Implement new frequencies | 6 mons | Wed 10/4/17 | Tue 3/20/18 | | | | | | | | | | | | | | | | | | |
| 25 | ☰ | c-If 8.33 KHz spacing is needed, States implement the new assignments according to the implementation plan, including transition provisions needed for airlines, ANSP and CAA as necessary | 661 days? | Wed 9/13/17 | Thu 3/26/20 | | | | | | | | | | | | | | | | | | |
| 26 | ★ | National mandates | 24 mons | Wed 9/13/17 | Wed 7/17/19 | | | | | | | | | | | | | | | | | | |
| 27 | ☰ | Safety case (regional/subregional) | 240 days | Wed 9/13/17 | Wed 8/15/18 | | | | | | | | | | | | | | | | | | |
| 28 | ★ | Common safety case | 6 mons | Wed 9/13/17 | Wed 2/28/18 | | | | | | | | | | | | | | | | | | |
| 29 | ★ | National safety cases | 6 mons | Thu 3/1/18 | Wed 8/15/18 | | | | | | | | | | | | | | | | | | |
| 30 | ★ | Upgrade of ATC procedures/technical systems | 12 mons | Fri 12/1/17 | Thu 11/1/18 | | | | | | | | | | | | | | | | | | |
| 31 | ★ | Training of operators | 12 mons | Fri 12/1/17 | Thu 11/1/18 | | | | | | | | | | | | | | | | | | |
| 32 | ★ | ANSP readiness | 1 day? | Fri 11/2/18 | Fri 11/2/18 | | | | | | | | | | | | | | | | | | |
| 33 | ★ | Frequencies freed for reuse | 1 day? | Thu 3/26/20 | Thu 3/26/20 | | | | | | | | | | | | | | | | | | |

Project: planning SRWG - upda
Date: Mon 5/25/15

| | | | | |
|-----------|--------------------|-----------------------|--------------------|-----------------|
| Task | Project Summary | Manual Task | Start-only | Deadline |
| Split | Inactive Task | Duration-only | Finish-only | Progress |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress |
| Summary | Inactive Summary | Manual Summary | External Milestone | |

SECOND MEETING OF SPECTRUM REVIEW WORKING GROUP (SRWG/2)

(12 – 14 May 2015 Bangkok, Thailand)

| STATE/ORGANIZATION/ NAME | DESIGNATION/ADDRESS | TEL/FAX/-EMAIL |
|---------------------------------|--|--|
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International Civil Aviation Organization

SECOND MEETING OF SPECTRUM REVIEW WORKING GROUP (SRWG/2)

Bangkok, Thailand 12 – 14 May 2015

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| WP/3 | 4 | Outcomes of the Simulations Addressing the VHF Frequency Needs for 2015-2020 and beyond in the APAC Region | Secretariat |
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