


**Notes from Workshop on Safety Assurance Case for Spectrum Sharing in 960-1164 MHz Band by Programme Making and Special Events
3rd September 2018, CAA House, London**

Attendees - External

 Bournemouth Airport (Regional and City Airports)
- ANS Edinburgh
- Blackbushe
- NATS
- NATS

CAA

Nick Hall
Stuart Rankin
Andy Wells

Ofcom

Martin Brock
Vaughan John

Summary of actions

- (i) Distribute slides and notes to attendees, wider distribution to be considered by CAA
 - a. Additional slide to be added by Ofcom, summarising SMRs
- (ii) Investigate release of slides from previous workshop
- (iii) Investigate release of testing report for London City testing
- (iv) ANSPs to formally request sight of documents referenced in the safety assurance case that are not publicly available.

Notes

1. Attendees were welcomed to the meeting and the agenda reviewed. Attendees were introduced.
2. NATS clarified that comments in the meeting were not to be considered an endorsement and they would be providing a full written response.
3. CAA noted that the workshop was directed principally at UK ANSP's and that the intention of the meeting was to inform written responses to that consultation. The focus of the work had been the protection of aeronautical Communications, Navigation and Surveillance (CNS) equipment in the UK. UK ANSPs were therefore best placed to consider the safety assurance case and invited to consider whether, in principle at least, any additional mitigations might be necessary in response to this potential change in the environment to inform our final assessment and decision. The safety assurance case would be subsequently published.
4. CAA delivered an overview of the safety management process (Slide pack 1)
5. Ofcom delivered an overview of the safety assurance case (slide pack 2). Ofcom highlighted the details of the number of expected users and how the figures were developed to inform the safety assurance case and explained how this information was derived and where it appeared in the safety assurance case. In particular, Ofcom noted that Ofcom's

PMSE licensing data confirms that approximately 90% of PMSE assignments are fixed and long-term. PMSE is therefore far less transient in nature than many assume. This also means that equipment tuning events are likely to be far more seldom than the safety assurance case assumes.

6. During the presentation Ofcom activated a radio microphone receiver connected to a speaker which was tuned to 1090 MHz to demonstrate the interference that would be experienced by a microphone operator, should they tune to the equipment to 1090 MHz. The equipment generated an audible 'click'; with fluctuating regularity. The equipment was left running whilst Ofcom presented, but then turned off after around 5 minutes.

7. Ofcom also provided a demonstration of their existing PMSE licensing platform.

Stakeholder questions and input

8. Had the studies followed an established process? It was confirmed that this work was not routine and that the operation of the military Joint Tactical Information Distribution System in the same frequency band, had some similarities but also a number of differences. The principles of performance-based regulation were also discussed.

9. Current use of the band by PMSE? This had been undertaken using a test and development process, on a case by case basis. The safety case was the next step to establish access to the band through an operational licensing process.

10. The concept of the band being 'available for use' by PMSE had not been made clear to other international administrations - CAA responded that while it was not the intention to mislead anyone, this workshop would focus on the specifics of the safety assurance case and UK ANSPs.

11. Need for ongoing monitoring of PMSE deployments – Ofcom confirmed that monitoring and review was incorporated in Ofcom's safety assurance case.

12. Alignment with CAA requirement for ANSPs to demonstrate service and business resilience? The CAA did not consider that this work precluded ANSPs demonstrating service and business resilience and it was recommended that any ANSP who had concerns in this regard include further details and justification in their consultation response so it could be considered.

13. Where is the most up to date version of the Spectrum Management Rules (SMR)? Further iterations of the SMR are still to be fully agreed between the CAA and Ofcom and would be released in the future and placed on the Ofcom web site. Ofcom also noted that the SMRs are a live document and subject to ongoing amendment. Ofcom went on to recap the spectrum management rules (SMR), and how assignments were identified. It was agreed that an additional slide will be added to their presentation material covering this.

14. Request for notes and slides to be made available. CAA responded that the slides would be made available and outcomes from the June 2017 workshop reflected in the subsequent work and therefore content of the safety assurance case.

15. Definition of professional users? The safety assurance case makes a number of assumptions. The term is used to identify the group of PMSE users and the safety assurance case identifies the events that are expected to utilise equipment in the band. Ofcom also described the market in which the equipment is expected to be sold within and the mechanisms around which existing equipment is purchased and deployed.
16. Protection of PMSE equipment from aircraft interrogations conducted from outside of the published DOC. Ofcom agreed that this was a risk, but that there was a high level of geographical margin included that would reduce the impact of such an event.
17. How were the 1090 and 1030 MHz guard bands determined? Ofcom explained that the recommendation from testing conducted by JCSys was that there should be a +/- 10MHz guard band. Following the public consultation, review of the MOPS and discussion with the CAA it was agreed to extend the guard band to +/- 15 MHz as a conservative approach to cover equipment not tested.
18. How is the height defined for a licence – is it the same process as for an Ofcom business radio licence? Meaning a device could be operated from a tall building. Ofcom confirmed this was the case; any additional height could be tolerated within the protection model due to the margin that is afforded to protect incumbent services.
19. How are changes to DME ground stations incorporated into the planning process for PMSE deployments? Ofcom confirmed that current DME information is included and that the CAA and Ofcom are in the process of confirming an agreement as to how this would be achieved. The CAA described how DME planning data was handled within Europe to provide further background.
20. How would access be granted where there are multiple small operators working to provide a larger event, citing a large airshow for example. Ofcom explained that generally spectrum planners are employed and often Ofcom assume the role of spectrum planner to provide such a service at major events. Ofcom provided a brief description of intermodulation issues and the spectrum planning process that is undertaken for such events.
21. Had work had been undertaken to include guard band tuning restrictions in international standards such as ETSI? Ofcom responded that efforts had been made but that several States had objected to this development.
22. Ofcom explained how spectrum monitoring and enforcement is conducted and explained that often, for major events, Ofcom's attendance is requested by the event organiser/owner. Ofcom listed examples such as the British F1 Grand Prix and Glastonbury where this is the case. In addition, Ofcom exercises its powers by conducting licence inspections and monitoring at a range of other events. CAA added that in addition to such activities, the CAA had agreement with Ofcom that they would also reserve the ability to conduct their own independent monitoring activities. CAA confirmed that they were appropriately equipped and prepared to carry out such exercises where necessary.

23. Is PMSE equipment capable of operating in the 960-1164 MHz band available commercially? Ofcom confirmed that no production equipment was available but that several pieces of prototype equipment are available, including the equipment demonstrated at this workshop. Trials are ongoing and have been very positive, with no reports of interference to or from aircraft.

24. Discussion on the risk and impact of interference – ANSP view that they need to consider the impact of an interference event even if the risk of occurrence was low. Ofcom described additional testing that was conducted at London City Airport that explored the impact of such an event on a DME ground station and interrogator. In answer to a request for a copy of the outcome of this work, Ofcom stated they would investigate if the report would be released.

25. Any additional testing planned? Ofcom confirmed that no further testing was planned.

26. Under an ongoing DME replacement programme, a new model of DME transponder was being introduced which had not been tested under the existing PMSE testing programme. CAA confirmed that they were aware of this.

Additional Questions

27. Had gain rejection been considered, where the DME transponder dynamically reduces its operational coverage area in the event that there are a significant number of interrogations? Ofcom responded that this is distinct from the earlier explanation of the interference geometries. Instead it concerns DME capacity and sensitivity (management of traffic load). It would not be an issue where equipment is operated in accordance with SMRs but is part of the overall risk of interference in the event of a failure to adhere to the SMRs.

28. Had deliberate (malicious) interference had been considered? Ofcom and the CAA responded that it had not, mainly because a person with malicious intent could cause interruptions to a DME service by other means, therefore this is not a new risk introduced by PMSE.

29. Further discussion took place on the guard bands around 1030 MHz and 1090 MHz and their implementation and the Interface Requirement (IR 2038) that defines spectrum authorised for use by PMSE and how this is enforced. A further question was raised regarding the possibility of importing equipment that does not meet the IR. Ofcom confirmed that this is addressed within the safety assurance case.

30. How would issues be dealt with further in the future if assumptions in the safety assurance case are incorrect? Ofcom and the CAA confirmed that the safety assurance case, along with the SMRs, are live documents and are subject to regular periodic and reactive review.

31. Impact of introduction of ADS-B equipment on 978 MHz, and a restrictive guard band was required which rendered the spectrum available to PMSE users too small to be viable? Ofcom and the CAA explained that it was too early to tell as nothing had been confirmed and that any guard band requirements had not been fully established. As and when required the SMRs and safety assurance case would be revised to incorporate additional requirements

for new systems. Equally, they could be revised if new evidence suggests existing restrictions could be reduced.

32. There was discussion on the figure used in the safety assurance case for the number of aircraft that are operating in the air in UK at any one time. Ofcom explained the origins of the data used, as listed in the document. NATS stated that data available to them suggested a higher figure and that the figure used should be investigated. The CAA stated that they would be happy to further investigate the figure.

33. There are a number of referenced documents within the safety assurance document that are not publicly available, including the JTIDS safety case. CAA agreed and asked ANSPs to formally request sight of any of the documents in the safety assurance case that are not publicly available so that their wider dissemination could be further investigated.

34. There was a question as to whether the most critical point associated with desired to undesired signal rejection case was the top of descent or the decision height. CAA noted that the maximum permissible rate for the loss of a DME facility reflects the same requirement from the JTIDS safety case and invited further input as part of the consultation responses.

35. CAA noted that the comments received during the workshop and any others received from other stakeholders not present in the room would inform the CAA's current safety assurance case review work and allow it to consider any additional mitigations that might be required. Ultimately, it would be a CAA decision alone to accept or not accept the safety assurance case.

36. Following the question and answer session, the full session was closed and attendees were thanked for their time and input.

Civil Aviation Authority
10 September 2018