# Emerging digital Technologies

# Initial Assessment OF 5G MOBILE COMMUNICATIONS (as specified by 3gpp)

## Introduction

The ENAV Committee has developed a staged process to conduct an initial assessment of new candidate technologies.

The purpose of the assessment is to gather high level information about a new candidate technology that members of WG3 will review. When a candidate technology receives a successful recommendation, WG3 will inform other working groups and/or committees within IALA of that technology as it may be of interest or relevant to their work. Where a candidate technology fails to receive a positive outcome, the details will be retained for future reference.

The 3 stages of the assessment outlined:

Stage 1 : High level Understanding

Stage 2 : Work group review

Stage 3 : Recommendation

## High level Understanding

The proposers of a new candidate Technology are requested to answer questions in ‘Technology Candidate Response’ column within the following table.

Working group members will evaluate the ‘Candidate Response’ and comment within the ‘Working Group Response’ column.

Where appropriate the working group will invite new candidate providers and/or relevant parties, to present and demonstrate on their subject matter.

A ‘status’ will be applied by the working group for each line of information within the table.

Once the table has been completed, the working group will review the findings and provide a recommendation.

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|  | **Question** | **Technology Candidate Response** | **Working Group Response** | |  |  |  | | --- | --- | --- | | **Green** | **Amber** | **Red** | |
|  | **Completion Status** |
| 1 | Where has the referral come from? | 3GPP | No further comments |  |
| 2 | Name of technology and product name | 5G | No further comments |  |
| 3 | Functional description | High Bandwidth mobile infrastructureless mesh connection | Request more technical detail required, however we understand it can be a public, private or in its own standalone environment |  |
| 4 | What are its Key limitations | Terrestrial based – current range limited. Satellite latency issues to be resolved.  No current interface into the GMDSS on board and VSAT environments. | Request future standards roadmap and clarify if any development in the area of GMDSS and satellite coverage. Clarification over spectrum allocation required. |  |
| 5 | Where is it currently used? | Just rolling out, US 5 major cities, Korea, UK trials | Would be nice to see a Maritime test bed. Are there any plans in the future to do this. |  |
| 6 | How is it currently used? | Mobile Phone and Data | We understand that the scope of this is wider covering wireless data connectivity for mobile devices. |  |
| 7 | How could it be used within the maritime sector? | Transport layer for VDES, Pilotage, sea traffic management data. large data pipe for transfer of files. Smart port systems. | Request more information of its capabilities in terms of Broadcast Communications, push to talk and group communications functionality. |  |
| 8 | Who developed it? | 3GPP | No further comments |  |
| 9 | Is it commercial, non-commercial or military? | It’s currently used commercially, it is used for Mission Critical application such as (Police, Fire, Coastguard, Ambulance). The difference would be that Mission critical has dedicated capacity. | Korea used for public safety for the Winter Olympic Games. There may be a misunderstanding as of today Oct-2018 we are not aware of its use commercially. |  |
| 10 | Are there similar products / services and what make this different? | Deep coverage, Reliability, point to point, private channel, private network | We are aware that it is also capable of multipoint connections |  |
| 11 | Ease of adaptation? | Works with any TCP IP path | Does this work with IP multicast traffic |  |
| 12 | Capability? | Works with any TCP IP path, 808 Mbps per cell site, | Impressive speed – we have learnt that speed could be greater than 1Gbps |  |
| 13 | Scalability? | Highly scalable – supply and demand will determine this | Popularity will only increase |  |
| 14 | Backward compatibility? | Yes with 4G,3G,2G mobile technologies | Only fully compatible with 4G – Very limited 3G compatibility and only with special interface. |  |
| 15 | Can it be demonstrated? | Yes using existing 3GPP technologies | We are aware of maritime use, the Italian port authorities has used 5G as a trial |  |
| 16 | What stage is it at (how mature)? | 2g, 3g, 4g mature – 5g being rolled out | Close to commercial rollout |  |
| 17 | Are there any results and test bed? Please List | US, Korea, UK and Europe all have 5g test beds | We have been advised Japan have a test bed |  |
| 18 | Compliance summary? | Fully compliant to 3GPP | Compliant to 4G – We might need to verify international compliance with Radio regulation and maritime appendix. Is the frequency allocation primary or secondary for any given jurisdiction. Check compliance with EU radio 2014/53/EU/RED |  |
| 19 | Legal | Countries sign up to 3GPP standards National regulation and legislation for frequency allocation and deployment. | It’s expected and understood there will be National spectrum regulation that may impact delivery |  |
| 20 | Safety | Currently no known radiation issues that could cause public health concerns. Phones will comply to standards. | Not aware of any other health concerns, however safety concerns with regards to current GMDSS frequency arrangements. Compatibility testing with the marine environment would be required to ensure that there is no conflict. Currently being investigated and progressed with CEPT, IMO and ITU. Intrinsic safety, in flammable and explosive environments should also be consider. |  |
| 21 | Environmental | 3GPP has the environmental standards built in. Unsure of interference between port and ship sensors, radar, VSAT, GMDSS Ship earth station, GNSS etc and the 5G technology. | Compatibility testing with the marine environment would be required to ensure that there is no conflict. Currently being investigated and progressed with CEPT, IMO and ITU. Intrinsic safety, in flammable and explosive environments should also be consider. ROHS considerations should also be taken into account from a Greening perspective |  |
| 22 | Ease of implementation | From a user perspective easy, from a maritime perspective could be complicated due to regulation. | Request further information the interfacing with other current technologies, standards and protocols, consider cyber security. |  |
| 23 | Financial | $$$$$ | Is the licencing model fair, reasonable and non-discriminatory to all. Request licence model, and are there multiple suppliers of the technology. |  |
| 24 | Security | Encrypted | Request more information as whether CIRM considerations have been taken into account, is it compliant to the CIRM (.org) standards. Request future security strategy. |  |
| 25 | Privacy | Can add applications layer encryption | Is it EU GDPR compliant |  |
| 26 | Readiness (EU Technology Readiness level) | 3GPP | This group believes that the technology is either TRL 6 or 7 (needs to be verified) |  |
| 27 | Can you provide independent References | Contained in 3GPP Presentation | List of identified references to be provided by 3GPP, IALA can then approach the referees for test bed results, independent views |  |

## Work group review

The working group will review the information held within the ‘New Candidate Technology’ questions table. Comments will be provided by the working group based on the high-level understanding response along with any additional presentations and demonstrations that have taken place as a part of the review process. The output of this review will formulate the working group recommendation.

Where appropriate the working group will invite new candidate providers and/or relevant parties, to present and demonstrate their subject matter.

## Recommendation

Based on our preliminary review of this technology, the Committee recommends a that a more in depth evaluation by a group of experts be conducted for suitability of application within the remit of IALA.