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Technical Domain / Task Number …………………………………

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Initial Review of 3GPP 4G Technology

# Summary

The ENAV 22nd committee has developed a staged process to conduct an initial assessment of new candidate technologies to ‘ENAV22-12.2.1 Initial Stage proposal IALA template.docx’. The Republic of Korea has submitted the initial assessment document of LTE-Maritime to the ENAV 23rd committee in Singapore, APR 2019 which include the response of template questionnaire for LTE-Maritime based on 3GPP 4G technologies. (ENAV23-9.3)

The WG 2 of ENAV 23rd committee has discussed the document for agreeable understanding whether the IALA have a position of recognizing the emerging technology as being useful to the IALA members and its domain.

After the effort of WG2 participants, WG2 produced the revised initial review process template (ENAV23-12.1.7) and reported the plenary.

In the discussion of WG2, the Republic of Korea has explained that LTE-Maritime was a kind of brand name of the project based on LTE technology which was same technology of China’s presentation on use of LTE. Based on the common understanding of that time, we submit the revised initial review table for LTE-Maritime titled on ‘Initial Review of 3GPP 4G Technology’ on this document in order to reflect the consistency of terminology considering 3GPP 5G review

## Purpose of the document

The use of mobile communication has been being recognized as a very useful communication channel in maritime field more in recent days. This document is to support the decision of IALA’s position to the mobile communication based on 3GPP 4G technology as an emerging technology for the IALA and related maritime domain.

# Discussion

Next page is the revised initial review response of technology candidate, 3GPP 4G, especially experienced and tested for maritime use in the project of LTE-Maritime in the Republic of Korea.

Digital Technologies – Initial Review Table

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Question** | **Technology Candidate Response** | | **Working Group Response** | |  |  |  | | --- | --- | --- | | **Green** | **Amber** | **Red** | |
| **Infrastructure** | **User** |  | **Status** |
|  | Where has the referral come from? | Technically, 3GPP 4G(LTE) standard is origin  SMART-Navigation project in the R.O.K has tested and is developing the LTE(4G) network in the Korean coastal area within 100km.  The brand name of this project is LTE-Maritime | Technically, 3GPP 4G(LTE) standard is origin  \* Use LTE-Maritime router(like AP) with high-gain antenna for 100km coverage |  |  |
|  | Name of technology and product name | 3GPP 4G(LTE & LTE-A)  Project Name :  LTE-Maritime | 3GPP 4G(LTE & LTE-A) |  |  |
|  | Functional description | Providing LTE coverage up to 100 km from the coastline in maximum depends on the LOS condition  LTE-Maritime assure the communication quality, more than 3Mbps in downlink and 90% Tx/Rx success rate | Mobile phone\* is available within 30-40km range from the coastline.  Digital data communication is available up to 100km from the coastline with LTE-Maritime router.  \* It means the dedicated phone of public safety service in Korean project |  |  |
|  | Proposed user group | - | Public servants and all maritime people for public maritime safety and Korean e-Navigation services |  |  |
|  | What are its Key limitations | Maximum coverage is about 100km in 3GPP standards | Mobile phone doesn’t work over 30-40km by weak signal strength, so Router is necessary for 100km coverage |  |  |
|  | Where is it currently used (geographic and/or industry)? | Almost costal country use 3G/4G signal in vicinity of the land station  But, no official 3GPP 4G infrastructure assuring maximum coverage | 3G/4G service may be available almost coastal country within only a few decades of kilometres |  |  |
|  | How is it currently used? | - | Any user can 3G/4G service using special USIM by roaming technology in the commercial base |  |  |
|  | How could it be used within the maritime sector? | As a base data network for high-rate communication way for any services and applications | As a maritime data network on mobile phone or through the Router with high gain antenna as a Access Point |  |  |
|  | Who developed it? | Republic of Korea: LTE-Maritime as a assured network for maximum coverage | Router(AP) in LTE-Maritime project |  |  |
|  | Is it commercial, non-commercial or military? | Any 3G/4G commercial network may be available.  But LTE-Maritime is not commercial network | Same to the left |  |  |
|  | Is there an existing technology that meets the same requirements?  If so, what make this different? | There are no legacy maritime communication system to meet LTE 4G performance | Same to the left |  |  |
|  | Ease of implementation? | For wide coverage, LOS is important depends on the height of base station of LTE | Commercially available |  |  |
|  | What are the constraints for implementation? | More than 500m of base station for maximum coverage | For maximum coverage use, high-gain antenna of 1.2m length on the mobile phone power output |  |  |
|  | what is the capability of the technology? | 75Mbps(Max.) available on 10MHz bandwidth  A cell serving more than a few hundreds of users | Same situation on mobile phone use in the land |  |  |
|  | What is the scalability of the technology? | Network performance like speed is scalable to the dedicated bandwidth | Mobile phone use or Router(AP) use |  |  |
|  | Is the technology backward compatible? | 3GPP 4G has backward compatibility in 4G standard release | Same to the left |  |  |
|  | Is the technology dependant on another technology? | No. | No. |  |  |
|  | Can the technology be demonstrated? | Already demonstrated in 2017 as a test-bed project  LTE-Maritime will be available from the 2021 | Same to the left |  |  |
|  | Are there any results and test bed? Please List | Test-bed project in 2017 in the Republic of Korea  Refer to ENAV23-9.4 | Same to the left |  |  |
|  | Is there a compliance summary? | 3GPP 4G Release 1x and domestic compliance rule by each country | Same to the left |  |  |
|  | Are there legal issues associated with the implementation of the technology? | No legal issue for implementation  Only related to the frequency allocation for LTE use by regional rule | Safe to the left |  |  |
|  | Are there any intellectual property rights (essential patents) associated with the technology? | No severe obstacle to implement and use 3GPP 4G in aspects of IP | Safe to the left |  |  |
|  | Is the technology safe to use | Already proven | Safe to the left |  |  |
|  | Does the use of the technology require extra training? | - | No extra training |  |  |
|  | Are there environmental considerations with the technology? | LOS is important so signal can be blocked by islands or big wave in bad weather | Same to the left |  |  |
|  | What are the financial considerations for implementation and use? | Initial capital investment required to implement the network infrastructure | Router(AP) relatively expensive rather than mobile phone |  |  |
|  | Is the technology secure (i.e. protected against hacking; privacy of data)? | LTE system is secure itself with its unique protocol | Same to the left |  |  |
|  | Readiness (EU Technology Readiness level - TRL) (level of maturity of technology) | 9 (already commercially available technology( | Same to the left |  |  |
|  | Can you provide independent References | Yes, ENAV23-9.4  Further status report will be submitted next year | Safe to the left |  |  |

1. Leave open if uncertain [↑](#footnote-ref-1)