IEC TC 80 WG 15 MTG28

Liaison note to IALA

**18-May-2018**



**INTERNATIONAL ELECTROTECHNICAL COMMISSION**

**TECHNICAL COMMITTE 80: Maritime navigation and radiocommunication equipment and systems. Working Group 15.**

**Liaison note to IALA ENAV WG3**

**On technical clarifications to IALA Guideline G1139**

**IALA respond in track changes under the respective question**

**Version 20.07.2018**

# Discussion

IEC TC80 WG 15 started the work towards the development of VDES standards at IEC. WG15 developed a modular approach addressing the different functions of VDES, i.e. AIS, ASM, VDE TER, VDE SAT as lined out in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| Std# | Title | Content | |
| IEC 61993-2 | AIS | All relevant aspects for AIS as mandated by IMO | |
|  |  |  |  |
| IEC 6xxxx | VDES | Introduction and scope, normative references, terms and abbreviations, overview | |
| Module A | Common aspects related to mobile station |
| Common aspects related to shore station |
| Module B | ASM functionality on mobile station |
| ASM functionality on shore station |
| Module C | VDE TER functionality on mobile station |
| VDE TER functionality on shore station |
| Module D | VDE SAT functionality on mobile station |
| VDE SAT functionality on satellite |
| Module E | Interoperability of different functions in one mobile station (AIS, ASM, VDE) |
| Interoperability of different functions in one shore station (AIS, ASM, VDE) |

During its meeting in Koblenz 14th to 18th May 2018 WG 15 continued working on the development of Module A and Module B.

WG 15 drafted this liaison note to IALA requiring further clarification on regarding technical issues addressed in IALA Guideline 1139.

**Topic 1: Need to harmonize frequency error values with IALA G1139.**

Clause 4.2.3.7.1 Physical layer, Table 1:

WG15 proposal is to at least use same unit in all occasions where the requirements are defined. WG15 preference is that the unit shall be Hz or kHz.

Action: Liaison with IALA required:

* G1139 (general) Table 12 says 1,5 ppm under normal test conditions
* G1139 (ASM) Table 23 says 500 Hz under normal test conditions

WG15 requests advice from IALA ENAV WG3 on why different values for frequency error are used in G1139.

IALA: harmonized 1.5 ppm

**Topic 2: frequency error limit for extreme conditions.**

Clause 4.2.3.7.1 Physical layer, Table 1:

WG15 tentative proposal is to introduce relaxed requirement for extreme test condition. The proposed maximum frequency error under extreme conditions is +/- 1 kHz.

Action: WG15 requests advice from IALA ENAV WG3 on if 1 kHz frequency error may be allowed for VDES transmitter.

IALA: +/- 3ppm

**Topic 3: slotted modulation mask, definition of 0 dBc.**

WG15 requests IALA ENAV WG3 advice on definition of 0 dBc value on IALA G1139 Figure 16 (slotted transmission mask) when applied to non-constant envelope modulation. The advice is requested in detail on if 0 dBc limit on mask is for carrier power without modulation or if it is intended as an absolute limit for maximum peak power.

IALA: Amend Table 12 Transmitter Parameters:

* 0dBc refers to 12,5 W average
* Remove top line of transmission mask in Figure 14

**Topic 4: power setting for VDE**

WG15 acknowledges that IALA G1139 introduces requirements for ASM transmitter power in Clause B.2.10. (Low power setting: 1 W PEP, high power setting 12,5 W average). However the G1139 does not state explicit power levels for VDE transmissions.

WG15 requests IALA ENAV WG3 advice on allowable power levels for VDE transmissions. WG15 proposes two power settings for discussion:

* low power setting of 1 W average with note that this might however result in very low average power for example if using 16QAM;
* high power setting of 12,5 W average.

**Topic 5: request to Derek: amend ASM slotted modulation mask figure (Figure** 1) so that so that lines after +/- 62,5 kHz be deleted as they are on spurious domain where requirement is in dBm, not dBc.

**Topic 6: Modulation accuracy requirements**

**(Derek to pls revise following** **before liaising IALA)**

WG15 requests IALA ENAV WG3 advice on following proposed requirement for modulation accuracy of ASM transmissions (pi/4 QPSK):

1. the RMS error vector in any burst shall be less than 0,1 for any symbol;
2. the peak error vector magnitude shall be less than 0,3 for any symbol.

(we WG15 would prefer to include reference to the Error Vector Magnitude test method)

WG15 also acknowledges the need for similar limits for higher order modulations.

IALA: agreed in principle, modulation accuracy specification is needed,

for reference refer to TETRA specification for pi/4 QPSK and 16-QAM. (Proposal WG15 Derek)

**Topic 7: no modulation during ramp-up**

WG15 seeks advice from IALA ENAV WG3 on the benefit of modulation during ramp-up. WG15 see challenge in linearizing the modulation during the ramp-up period.

Another challenge is how to verify that the transceiver is behaving according to the requirement during ramp-up. WG15 is developing power versus time testing for the transmitter. Objective is to run such test using unmodulated carrier.

IALA: it allows a “clean” ramp up to full power and the transmitted carrier remains within the tx mask. (clean means inside the mask)

**Topic 8: MCS without coding for VDE testing purposes**

WG15 plans to perform physical layer radio tests using non-coded modulation in order to reduce test cases. The coded modulations would be tested separately in link layer tests. For this purpose, WG15 requests IALA ENAV WG3 to provide an MCS that does not have coding.

IALA: The definition of MCS 0 can be done by IEC for test purpose. (MCS 1 without coding with random values))

**Topic 9: reduce the amount of different MCS levels required for VDES equipment**

WG15 considers that developing into product and testing all MCS introduced in G1139 would result prohibitive cost. WG15 therefore invites IALA ENAV WG3 to reduce the amount of MCS required for VDES equipment down to practical minimum. WG15 invites IALA ENAV WG3 to select minimum amount of combinations from following:

* three modulations (pi/4 QPSK, 8PSK, 16QAM);
* three channel bandwidths (25 kHz, 50 kHz, 100 kHz);
* two power levels (low, high);
* minimum and maximum operating frequency
* FEC coding rate.1, ½, ¾ , 7/8,

IALA: to have choices is always good. ☺ However yellow highlights are subject for deletion

**Topic 10: CIR values in G1139 Table 39 may be too strict**

**(Derek to pls revise following before liaising IALA)**

WG15 is developing test for co-channel rejection. During development WG15 noted that CIR values in Table 39 of G1139 may be too strict assuming that the required values should be reached without coding.

WG15 tentatively suggests that required CIR values of [12] dB for QPSK, [19] dB for 8PSK and [24] dB for 16QAM may be more appropriate when testing physical layer without coding.

IALA: agreed for testing the uncoded case. For coded messages values in G1139 should apply.

# Action requested of IALA ENAV WG3

IALA ENAV Committee Workgroup 3 is invited to review the items in the liaison note and incorporate them into the next revision of Recommendation ITU-R M. 2092-0.