Input paper: [[1]](#footnote-2) ENAV27-5.1.4

Input paper for the following Committee(s): Purpose of paper:

**□** ARM **□** ENG **□** PAP **X** Input

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Agenda item [[2]](#footnote-3) 5.1

Technical Domain / Task Number 2 …………………………………

Author(s) / Submitter(s) …………………………………

CML comments on Technical Requirements for Group B AMRD using channel 2006

# Summary

There has been significant debate regarding the usage of AMRD’s and the decision to split the population into two groups:

Group A: devices which affect the safety of navigation and so use AIS channels 1 and 2

Group B: other devices that do not directly affect the safety of navigation and so use channel 2006 (these could include fishing net markers, diver recovery etc.)

## Purpose of the document

This document has two aims:

1. To ensure that the usage of 2006 is maintained in an efficient and effective way that allows multiple devices access to the spectrum without denying its use to other devices.

2. To ensure that devices using channel 2006 do not adversely interfere with other devices in the same band, especially those channels used by the GMDSS and AIS channels 1 and 2.

# DISCUSSION

As Group A devices access the main AIS radio channels, they must abide by the existing technical standards outlined in ITU-R M. 1371-5 and the appropriate IEC test standards.

At present the only technical requirement proposed for Group B devices is that they should have a Tx power limit of 100 mW max (from ITU-R M.2135 December 2019) and suggestions that if they use AIS-style modulation, they should abide by ITU-R M.1371-5, though ii does not specify which particular sections of 1371-5 would be appropriate and so is open to interpretation.

Suggested minimum technical requirements (derived or based on ITU-R M.1371-5 and associated IEC Test standards):

Table 1 - Minimum technical requirements

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Limit | Test | Conditions |
| Tx Power | < 100 mW / 20 dBm rms | PRBS | Measured over the burst duration |
| Tx Frequency accuracy | < +/- 1000 Hz  < +/- 500 Hz | PRBS | For AIS-style modulations  For other modulations |
| Tx burst duration | < 26.667 ms |  |  |
| Tx repetition rate | < 1 burst every 30 s |  |  |
| Tx spurious emissions | < -36 dBm  < -30 dBm | PRBS | 9 kHz to 1 GHz  1 GHz to 4 GHz |
| Tx adjacent channel power – AIS style | ∆*fc* < ±10 kHz: 0 dBc  ±10 kHz < ∆*fc* < ±25 kHz: below the straight line between −20 dBc at ±10 kHz and –36 dBm at ±25 kHz  ±25 kHz < ∆*fc* < ±62.5 kHz: –36 dBm | PRBS | Measured using 300 Hz res bw, peak hold, over >= 200 bursts. |
| Tx adjacent channel power – other styles | ∆*fc* < ±12 kHz: 0 dBc  ±12 kHz < ∆*fc* < ±25 kHz: below the straight line between −20 dBc at ±12 kHz and –36 dBm at ±25 kHz  ±25 kHz < ∆*fc* < ±62.5 kHz: –36 dBm | PRBS | Measured using 300 Hz res bw , peak hold, over >= 200 bursts. |
| Tx power v .time | < -50 dBc at burst boundary |  |  |
| Channel Access | Carrier Sense / Random |  | No requirement for UTC sync |

The transmit mask for AIS-style is essentially taken from ITU 1371-5 modified to suit the 100mW limit specified in ITU-R M.2135 and uses the industry standard spurious level of -36 dBm. The transmit mask for non-AIS style follows the same process, but allows modulation closer to the band edges whilst still ensuring the -36 dBm limit in adjacent channels.

Additionally, limits are placed on the maximum duty cycle and burst length (in this case the same as AIS Class B, so as to minimise collisions between AIS-style and non-AIS style systems). This should allow sufficient data bandwidth for the devices expected to use the channel.

It is proposed that these additional parameters should be added to those currently existing in the draft ITU-R M.2135 and a liaison note sent to ITU to this effect.

# Action requested of the Committee

The Committee is requested to take note of the document.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-2)
2. Leave open if uncertain [↑](#footnote-ref-3)