Input paper: [[1]](#footnote-1) DTEC 1-5.1.3.3

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

**□** ARM **□** ENG **□** PAP X Input

X DTEC **□** VTS **□** Information

Agenda item [[2]](#footnote-2) n.n

Technical Domain / Task Number 2

Author(s) / Submitter(s) China MSA

Proposal on the supplement of the ASM retransmission mechanism and other related content in ITU-R M.2092-1

# Summary

In light of the output documents from the official ITU VDES, changes to ITU-R M.2092-1 are proposed. It is requested that DTEC 1 consider these suggested modifications.

## 1.1 Purpose of the document

The purpose of this document is to provide recommendations on the revision of ITU-R M.2092-1.

## 1.2 Related documents

1. ITU-R M.2092-1, *Technical characteristics for a VHF data exchange system in the VHF maritime mobile band, February 2022*

# Background

ITU has published ITU-R M.2092-1 since Feb. 2022. At IALA ENAV 31, the Committee participants were requested to present their change proposals on ITU-R M.2092-1 at DTEC-1 meeting, which would be submitted to ITU in a liaison note after discussion. Hence, China MSA proposes some changes in this proposal.

# Discussion

We propose:

* add Section 6.5 Message Retransmission in Annex 3;
* modify the figure 20 and figure65 to eliminate the specified mistakes;
* modify the uplink short data message channel to RAC;
* clarify the bit mapping between the data fragment of the DC channel and the DSCH sub-channel ACK/NACK.

Input to revision of ITU-R M.2092-1 in detail is shown in the ANNEX.

# references

1. ITU-R M.2092-1, *Technical characteristics for a VHF data exchange system in the VHF maritime mobile band, February 2022*

# action requested of the committee

The Committee is requested to consider this document's proposal and take appropriate actions.

| **Comment Number：Name-#** | **Change Log ID #[[3]](#footnote-3)** | **Annex / Section** | **Section, Table, Figure** | **Type of change** | **Reason for the change, or what you want to accomplish** | **Proposed change to ITU-R M.2092-1, short editorial changes can be include here (large changes should be documented below)** |
| --- | --- | --- | --- | --- | --- | --- |
| *China MSA-1* | *NA* | *Annex 3* | Add Section 6.5 Message Retransmission | *Add Section* | In the current version of the standard, the ACK message enables the source end to identify the transmission failure of blocks in the transmission of scheduled addressing messages. However, the current standard lacks a defined data retransmission mechanism. It needs to be supplemented. Moreover, for scheduled broadcast messages, the highest 15 blocks and 43 slots of transmission result in a low transmission success rate. A block retransmission data combination mechanism should be introduced to significantly increase the success rate of scheduled broadcast data transmission. | Add section 6.5, see comments for details. |
| *China MSA-2* | *NA* | *Annex 3* | *Figure 20* | *editorial* | There is one excessive black dashed arrow from Tx 3.  The black solid arrow pointing to ACK has a mistaken start, not Tx n-1 but Tx n. | Modify the figure to eliminate the specified mistakes. |
| *China MSA-3* | *NA* | *Annex 5* | *Figure 65* | *technical correction* | The uplink short data message is transmitted on RAC channel instead of ASC channel according to table 62. | Modify the uplink short data message channel to RAC. |

**ANNEX**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *China MSA-4* | *NA* | *Annex 5* | *3.8* | *Add content* | In the current version of the standard, it is clear that downlink confirmation information (msg#29) is used to reply the downlink data fragment in DSCH logical channel. Since DSCH channel and DC logical channel have mapping relationship, it is necessary to show the bit mapping relationship between the data fragment of DC channel and DSCH sub-channel ACK/NACK. | Clarify the bit mapping between the data fragment of the DC channel and the DSCH sub-channel ACK/NACK. |

**Comments:**

***China MSA-1***

Annex 3

Technical characteristics of the application specific message

channels for the VHF data exchange system in the VHF maritime band

**6.5 Message Retransmission**

In the ASM message, scheduled broadcast message and scheduled addressed message are transmitted via Multiple incremental time division multiple access (MITDMA), enabling a chain up to 15 data block transmissions together. These two types of messages utilize data retransmission mechanisms to achieve efficient data transmission.

**6.5.1** **Scheduled broadcast message** **retransmission**

Scheduled broadcast messages can be transmitted multiple times. Retransmission should be initiated within 3 minutes after the first transmission. When retransmitting, the Retransmit flag should be set to 1, and the Session ID should remain consistent with that in the first transmission. Upon receiving a retransmitted message, the destination device should compare it with previously received messages having the same Session ID. Based on the Block Identifier, the device should ascertain whether any previously not received or failed verification blocks are correctly received this time. If so, they should be integrated into the message. If all blocks in the MITDMA chain are complete, they should be output through the PI. After the PI outputs the data, the device should ignore subsequent retransmitted data with the same Session ID. Scheduled broadcast message retransmission should be completed within 20 minutes referenced from the start of the first block.

**6.5.2** **Scheduled addressed message retransmission**

When the source device receives an Acknowledgment Message, it may initiate another MITDMA block chain if there are blocks that need to be retransmitted. The first transmission uses RATDMA and then use MITDMA to reserve slots for subsequent retransmissions and ACK. In the retransmitted blocks, the Retransmit flag should be set to 1, the Session ID should remain consistent with that in the first transmission, the Block Identifier should match the block number of the MITDMA chain in the first transmission, and the Transmit block counter should only count the number of retransmitted blocks. The schedule mechanism for ACK slots is the same as in the first transmission, as shown in Table 23. Within the ACK message, the bits corresponding to the Block Identifier of the retransmitted blocks should indicate whether the blocks were successfully transmitted, while all other bits should be set to 0.

*Table 23*

|  |  |
| --- | --- |
| Parameter | Description |
| Retransmit flag | Set to 1 |
| Session ID | Maintain consistency with that in the first transmission. |
| Transmit block counter | Only count the number of retransmitted messages. |
| Block Identifier | Maintain consistency with the blocks in the first transmission of the MITDMA chain. |
| Slot Increment | Reserve slots for subsequent retransmissions or ACK |
| Number of Slots |

During retransmission, the first block (Block 0) of the message should be transmitted regardless of whether it has been successfully transmitted before.

If the total time slots occupied by the blocks in the current retransmission exceed 22, or if adding the blocks from the current retransmission will result in the total time slots of all retransmitted blocks within one minute time span exceeding 22, the retransmission operation shall not be initiated. Instead, the whole message can be retransmitted in subsequent transmissions with a new session ID.



*Figure 21 Multiple incremental time division multiple access example in retransmission*

***China MSA-2***

Figure 20

**Multiple incremental time division multiple access example**



***China MSA-3***

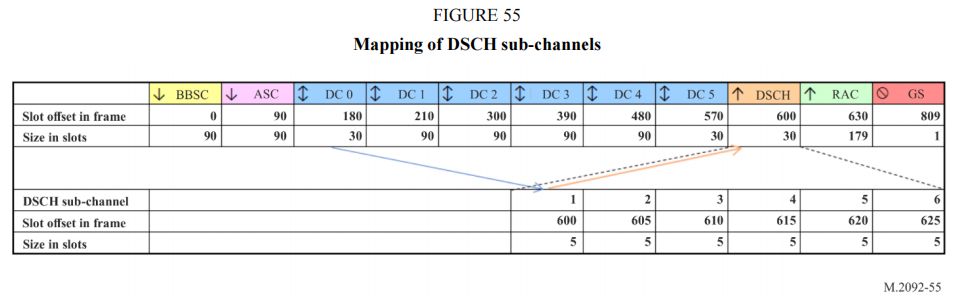
Figure 65

**Ship to satellite short data message (with acknowledgement)**



***China MSA-4***

In the present ITU-R M.2092-1 document, DSCH is divided into several sub-channels in which the corresponding DC channel data ACK is achieved in each sub-DSCH channel as shown in FIGURE 55. When the data in the DC channel is divided into multiple data fragments for transmission, the ship station confirm receipt of the transmitted data fragments on the corresponding uplink DSCH sub-channel.



We propose that the bit mapping between the DSCH sub-channel and the DC data fragment be as follows:

1. The default value of DC0 and DC5 is 30 slots. According to the feature of downlink transmission, a maximum of two 15-slot Link ID data fragments can be transmitted.

The ACK/NACK mapping for DSCH subchannel-1 and -6 is suggested as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ACK/NACK BITs | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| DSCH-1 | 0 | 0 | 0 | 0 | 0 | 0 | DC0-2 | DC0-1 |
| DSCH-6 | 0 | 0 | 0 | 0 | 0 | 0 | DC5-2 | DC5-1 |

Note:

1. DC0/5-1~2: Acknowledgement of the received downlink data fragment in DC0/5 channel;
2. Bit: 0 indicates receipt and 1 indicates nonreceipt.

2. The default value of DC1 to 4 is 90 slots. According to the Link ID of downlink transmission, a maximum of six data fragments can be transmitted using a 15-slot LINK ID.

The ACK/NACK mapping for DSCH sub-channels 2 to 5 with 90 slots is suggested as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ACK/NACK BITs | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| DSCH-2~5 | 0 | 0 | DCx-6 | DCx-5 | DCx-4 | DCx-3 | DCx-2 | DCx-1 |

Note:

1. Link ID32, 33,34 are using 15 slots for downlink data transmission;
2. DC1 to 4 channels can carry up to six data fragments.
3. DCx1~6: The DCx channel has a maximum of 6 data fragments to acknowledge receipt;
4. Bit: 0 indicates receipt and 1 indicates nonreceipt.

A maximum of one data fragment can be transmitted using a 90-slot LINK ID.

The ACK/NACK mapping for DSCH sub-channels 2 to 5 with 90 slots is suggested as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ACK/NACK BITs | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| DSCH-2~5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | DCx-1 |

Note:

1. Link ID25,26,27,28,29 are using 90 slots for downlink data transmission;
2. Bit: 0 indicates receipt and 1 indicates nonreceipt.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)
3. The latest version of the change log and M.2092-1 will be located on the IALA file share under the sub-folder:

   Committees/ENAV/WG3/Revision of M2092-1 [↑](#footnote-ref-3)