**Spec Tracking Number: PIS2054**

**V2X Infotainment Requirement**

**Document Owner**

This specification is owned by:

ZHENG Fanglei

Infotainment Group, ELEC, PATAC

+86 21 50165016 - 511320

[fanglei\_zheng@patac.com.cn](mailto:fanglei_zheng@patac.com.cn)

目录/Contents

[1 概要/Overview 3](#_Toc47437945)

[2 定义范围/Scope of Definition 3](#_Toc47437946)

[3 V2X告警提示 4](#_Toc47437947)

[4 故障车辆地图标识及语音提示/Map Identification and Voice Prompt for Malfunctioning Vehicle 5](#_Toc47437948)

[5 V2X数据分析/V2X Data Analysis 6](#_Toc47437949)

[6 V2X个性化设置/V2X Personalization Setting 7](#_Toc47437950)

[7 V2X氛围灯联动/V2X Ambient Light Linkage 7](#_Toc47437951)

[8 其他说明/Miscellaneous 7](#_Toc47437952)

[9 V2X数据收集/V2X Data Collection 7](#_Toc47437953)

[9.1 V2X数据收集系统框图/V2X Data Collection Diagram 7](#_Toc47437954)

[9.2 V2X数据收集支持上传的数据 8](#_Toc47437955)

[9.3 数据上传机制 9](#_Toc47437956)

[9.4 上传通道与安全机制 9](#_Toc47437957)

[**Revision Log** 10](#_Toc47437958)

# 概要/Overview

V2X即指车辆通过与外界进行信息交互从而实现环境感知，帮助驾驶员在复杂驾驶状况下根据紧急程度提炼关键信息，在短时间内做出相应驾驶动作；帮助驾驶员了解视距以外的道路状况，提前关注和规避。这些外界信息包括其他交通参与者如周边车辆、行人等，同时也包括基础设施如智能信号灯、智能限速牌、智能路障等。

V2X enables the vehicle to realize environmental perception via information interaction with the outside world and helps the driver, in a complicated driving scenario, to extract the key information based on the urgent degree and then take an appropriate driving action within a short period; it also assists the driver to learn the road conditions beyond range of visibility, helping the driver to show early attention and drive properly to dodge. Such external information involves both other traffic participants, such as surrounding vehicles and pedestrians, and infrastructure, such as intelligent traffic lights, intelligent speed limitation boards, and intelligent roadblocks.

# 定义范围/Scope of Definition

V2X在国家行业标准T/CSAE 53-2017《合作式智能运输系统 车用通信系统应用层及应用数据交互标准》中定义了17项基本应用。MY23 458项目实现的场景如下：

The national industry standard T/CSAE 53-2017 *Cooperative Intelligent Transportation System, Vehicular Communication, Application Layer Specification and Data Exchange Standard* defines 17 basic applications of V2X. The onboard infotainment system implements ten of them, namely:

* 交叉路口碰撞预警
* Intersection Collision Warning
* 紧急制动预警
* Emergency Brake Warning
* 异常车辆提醒
* Abnormal Vehicle Warning
* 车辆失控预警
* Control Lost Warning
* 道路危险状况提示
* Hazardous Positioning System
* 闯红灯预警
* Signal Violation Warning
* 绿波车速引导
* Green Light Optimal Speed Advisory
* 紧急车辆提醒
* Emergency Vehicle Warning
* 道路施工区域提醒
* Work Zone Warning
* 车内标牌
* In-vehicle Signal
* 前方拥堵提醒
* Traffic Jam Warning

~~以上功能的详细定义请参系统设计文档，此外其中还定义了预警等级、Chime音及诊断相关内容。~~

~~Please refer to System Specification for detailed definition of above functions; it also defines the warning level, Chime tone, and diagnosis-related content.~~

本文档主要定义了V2X与车载信息娱乐系统主屏幕进行交互的功能，包含以下四大内容：

This Document mainly defines the functions of V2X interacting with the main screen of the onboard infotainment system, which mainly includes the following four aspects:

* V2X预警
* V2X warning
* 故障车辆地图标识及语音提示
* Map identification and voice prompt for malfunctioning vehicle
* V2X数据分析
* V2X data analysis
* V2X个性化设置
* V2X personalization setting
* V2X氛围灯联动
* V2X ambient light linkage

# V2X告警提示

V2X功能在娱乐系统上的表现形式为图片告警和chime音，比如交叉碰撞的场景，V2X模块会通过CAN总线发送V2X warning indication request= $2 Intersection Collision Warning给IPC时，IPC会结合HUD进行图片、文字和chime音的预警，具体请参考IPC文档PIS-2069、PIS2085文档。

V2X预警功能使用的信号如下：

o 交叉路口碰撞预警：与PIS-2069和PIS-2085中的Warning #2260对应

Intersection Collision Warning: Corresponding to Warning #2260 in PIS-2069 and PIS-2085

o 紧急制动预警：与PIS-2069和PIS-2085中的Warning #2264对应

Emergency Brake Warning: Corresponding to Warning #2264 in PIS-2069 and PIS-2085

o 异常车辆提醒：与PIS-2069和PIS-2085中的Warning #2265对应

Abnormal Vehicle Warning: Corresponding to Warning #2265 in PIS-2069 and PIS-2085

o 车辆失控预警：与PIS-2069和PIS-2085中的Warning #2266对应

Control Lost Warning: Corresponding to Warning #2266 in PIS-2069 and PIS-2085

o 道路危险状况提示：与PIS-2069和PIS-2085中的Warning #2267对应

Hazardous Location Warning: Corresponding to Warning #2267 in PIS-2069 and PIS-2085

o 闯红灯预警：与PIS-2069和PIS-2085中的Warning #2269对应

Signal Violation Warning: Corresponding to Warning #2269 in PIS-2069 and PIS-2085

o 绿波车速引导：与PIS-2069和PIS-2085中的Warning #2271对应

Green Light Optimal Speed Advisory: Corresponding to Warning #2271 in PIS-2069 and PIS-2085

o 车内标牌：与PIS-2069和PIS-2085中的Warning #2272对应

Interior label: Corresponding to Warning #2272 in PIS-2069 and PIS-2085

o 前方拥堵提醒：与PIS-2069和PIS-2085中的Warning #2273对应

Congestion Imminent Warning: Corresponding to Warning #2273 in PIS-2069 and PIS-2085

o 紧急车辆提醒：与PIS-2069和PIS-2085中的Warning #2274对应

Emergency Vehicle Alert: Corresponding to Warning #2274 in PIS-2069 and PIS-2085

o 道路施工区域提醒：与PIS-2069和PIS-2085中的Warning #2276对应

Road Construction Area Warning: Corresponding to Warning #2276 in PIS-2069 and PIS-2085

# 故障车辆地图标识/Map Identification for Malfunctioning Vehicle

当V2X侧触发异常车辆提醒时，导航地图上会标识出异常/故障车辆的位置，具体描述请参考PIS-2070。

# ~~V2X数据分析/V2X Data Analysis~~

~~V2X模块应当支持向车载信息娱乐系统透传交叉路口碰撞预警的实时TTC（Time-To-Collision）状况。车载信息娱乐系统应当以不低于3Hz的频率接收该信息。具体应用请参考PIS-2033 Driving Behavior Analysis。信号名称如下，具体请参考Clea Family Infotainment Connectivity Electrical Interface：~~

|  |
| --- |
| **~~Signal~~** |
| ~~Intersection Time to Collision~~ |

~~The V2X module shall support transparent transmission of the real-time TTC (Time-To-Collision) information for the intersection collision warning to the onboard infotainment system. The onboard infotainment system shall receive this information at a frequency of no less than 3Hz. Refer to~~ *~~PIS-2033 Driving Behavior Analysis~~* ~~for specific application. The signal name is shown as below:~~

~~Refer to~~ *~~Clea Family Infotainment Connectivity Electrical Interface for details~~*~~.~~

# V2X个性化设置/V2X Personalization Setting

车载信息娱乐系统支持用户对于V2X的功能进行设置。具体请参考PIS-2083。若用户将相关功能Disable，则该V2X基础功能及其在车载信息娱乐系统端的提示及联动均不触发。

The onboard infotainment system allows users to set the basic functions of V2X. Refer to *PIS-2083 Customization f*or details. If a user disables a certain function, such basic function of V2X and its prompt and linkage on the onboard infotainment system shall not be triggered.

# V2X氛围灯联动/V2X Ambient Light Linkage

V2X模块应当支持向车载信息娱乐系统透传交叉路口碰撞预警、紧急制动预警、闯红灯预警的触发信号以支持氛围灯联动功能。具体请参考PIS-2045 Virtualized Switch。

The V2X module shall support transparent transmission of the triggering signals of intersection collision warning, emergency brake warning and signal violation warning to the onboard infotainment system to support the function of ambient light linkage. Refer to *PIS-2045 Virtualized Switch* for details.

# 其他说明/Miscellaneous

本文档定义的软件能力应当支持OTA升级。

The software capabilities as defined herein shall support OTA upgrade.

# V2X数据收集/V2X Data Collection

信息娱乐系统需收集V2X模块产生的告警数据，并通过DBA数据上传的接口，与行程的DBA数据一并上传到SGM大数据平台。

## V2X数据收集系统框图/V2X Data Collection Diagram

V2X数据收集的流程参考如下/diagram of V2X data collection as bellow：

CLEA Arch:



## V2X上传的数据

因为DBA上传数据中已经包含了时间和VIN号，故V2X数据部分可以只上传各个V2X告警发生的次数。在同一个行程中，可能会发生多个V2X告警，系统需要将每个告警发生的次数保存下来，并跟随DBA数据上传。

支持上传的V2X告警如下表：

|  |
| --- |
| 前向碰撞FCW |
| 交叉路口碰撞ICW |
| 左转辅助LTA |
| 盲区预警/变道预警BPW |
| 逆向车预警DNPW |
| 紧急制动预警EBW |
| 异常车辆预醒ABW |
| 失控车辆预警CLW |
| 道路危状况预警HLW |
| 限速预警SLW |
| 闯红灯预警RLVW |
| 弱势交通参与者预警VRUCW |
| 车内标牌IVS |
| 交通拥堵预警TJW |
| 紧急车辆预警EVW |
| 道路施工区域提醒WZW |

发生了一次告警的定义：当V2X Warning Indication Request总线线号从其它的值变为代表对应告警的值。

例如：对于FCW告警来说，当总线信号V2X Warning Indication Request为非Forward Collision Warning变为Forward Collision Warning时表示产生了一次FCW告警，ICI/VCS需要将FCW告警次数加1；

V2X告警数据上传时具体的json格式follow DBA后台接口定义，举例如下：

“Gx”：“{“FCW”: “1”,“EBW”: “2”,“SLW”: “3”}” //代表本次行程发生了1次前向碰撞预警FCW，2次紧急制动预警EBW，3次 限速预警SLW；最多时会有16组键值(如上表所列)。

358项目V2X告警信号如下：

|  |  |
| --- | --- |
| V2X Warning Indication Request | $0=No Indication;$1=Forward Collision Warning;$2=Intersection Collision Warning;$3=Left Turn Assist Warning;$4=Blind Spot Warning/Lane Change Warning;$5=Do Not Pass Warning;$6=Emergency Brake Warning;$7=Abnormal Vehicle Warning;$8=Control Loss Warning;$9=Hazardous Location Warning;$10=Speed Limit Warning;$11=Red Light Violation Warning;$12=Vulnerable Road User Collision Warning;$13=Green Light Optimal Speed Advisory;$14=In-Vehicle Signage;$15=Traffic Jam Warning;$16=Emergency Vehicle Warning;$17=Vehicle Near-Field Payment;$18=Work Zone Warning;$19=Reserved 1;$1A=Reserved 2;$1B=Reserved 3;$1C=Reserved 4;$1D=Reserved 5;$1E=Reserved 6;$1F=Reserved 7; |

458项目V2X告警信号如下：

|  |  |
| --- | --- |
| V2X Warning Indication Request | $0=No Indication;$1=Forward Collision Warning;$2=Intersection Collision Warning;$3=Left Turn Assist Warning;$4=Blind Spot Warning/Lane Change Warning;$5=Do Not Pass Warning;$6=Emergency Brake Warning;$7=Abnormal Vehicle Warning;$8=Control Loss Warning;$9=Hazardous Location Warning;$A=Speed Limit Warning;$B=Red Light Violation Warning;$C=Vulnerable Road User Collision Warning;$D=Green Light Optimal Speed Advisory;$E=In-Vehicle Signage;$F=Traffic Jam Warning;$10=Emergency Vehicle Warning;$11=Vehicle Near-Field Payment;$12=Work Zone Warning;$13=Reserved 1;$14=Reserved 2;$15=Reserved 3;$16=Reserved 4;$17=Reserved 5;$18=Reserved 6;$19=Reserved 7;$1A=Reserved 8;$1B=Reserved 9;$1C=Reserved 10;$1D=Reserved 11;$1E=Reserved 12;$1F=Reserved 13; |

## 数据上传机制

V2X数据的上传时机完全follow DBA数据上传的时机。

**Revision Log**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Version** | **Date** | **Section** | **Description** | **Author** |
| 0.0.1.4 | Nov 18, 2020 | 9 | 重新描述第9章节，将V2X数据上传绑定至DBA | Zheng Fanglei |
| 0.0.1.3 | Augu 14, 2020 | 9.2 | 删除上传GPS位置 | Zheng Fanglei |
| 0.0.1.2 | July 14, 2020 | 2，3，6，9 | 1. 2章节更新场景范围到11个; 2. 增加3章节V2X告警提示； 3. 修改6章节的PIS号； 4. 增加8章节V2X数据上传； 5. 删除第5章节。 | Zheng Fanglei |
| 0.0.1.1 | June 4th, 2020 | 8 | Add V2X data upload chapter | Zheng Fanglei |
| 0.0.1.0 | June 20th, 2019 | All | New creation | Jie Gu |