H.VM-VMIA Implementation of Vehicular Multimedia Systems

Connectivity & HMI

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Following normative sections are covered in this presentation:

- *6.1 Connectivity*
  - ☐ *WLAN*
  - ☐ *Bluetooth(BT)*
  - ☐ *In-vehicle networks*
- *6.2 HMI*
  - ☐ *Voice assistant*
  - ☐ *Auditory interaction*

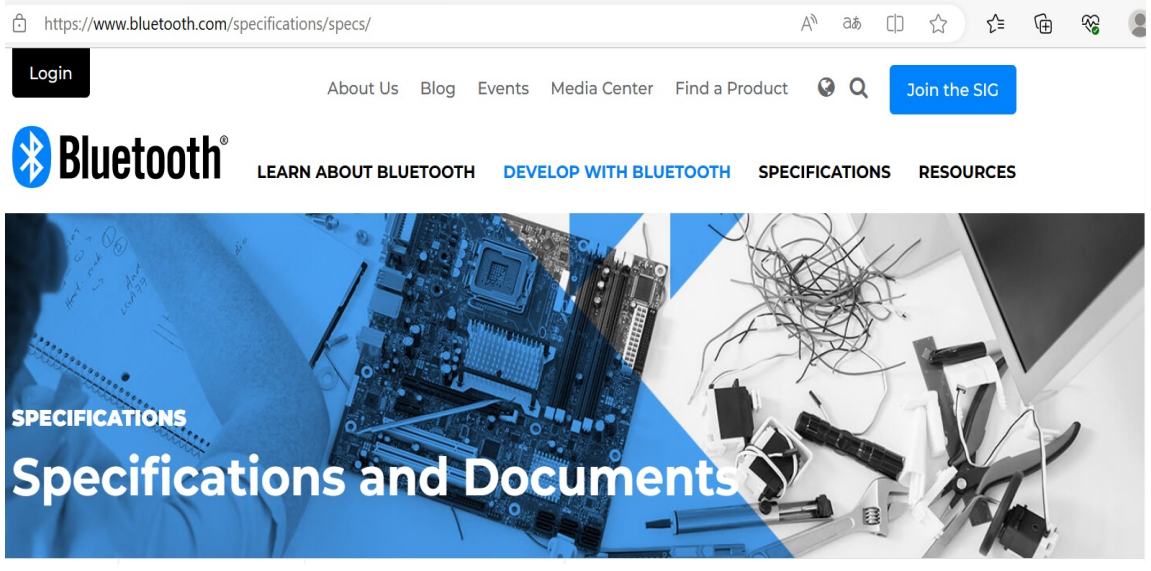
6.1 Connectivity：*WLAN*

- 3 protocols are recommended to used in Vehicular Multimedia System(VMS): **IEEE 802.11b/g/n.**
- 3 protocols are permitted to used in VMS: **IEEE 802.11a/ac/ax**
- Some Radio Frequency(RF) performances are recommended over these protocols: (details see in draft)
  - *Transmit power*
  - *Transmitter constellation error*
  - *Transmit spectrum mask*
  - *Transmit center frequency leakage*
  - *Transmit center frequency tolerance*
  - *Receiver minimum input sensitivity*
  - *Receiver maximum input level*
- It is recommended that VMS meet the user performance defined in the following table

Performance item	Description	Value
Connection success rate	Minimum WLAN connection establishment success rate	90%
Connection stability	Minimum time without WLAN disconnection	4 hours
Transmission rate	Minimum WLAN downlink transmission rate	20Mbps

6.1 Connectivity：*Bluetooth*

- It is recommended that the VMS supports Bluetooth communication technology according to the Bluetooth specifications and test documents, as published on the Bluetooth SIG (Special Interest Group) website: https://www.bluetooth.com/specifications/specs/
- BT RF **transmitting** & **receiving** performances are recommended in the draft (details see in draft)
- It is recommended that VMS meet the user performance defined in the following table.

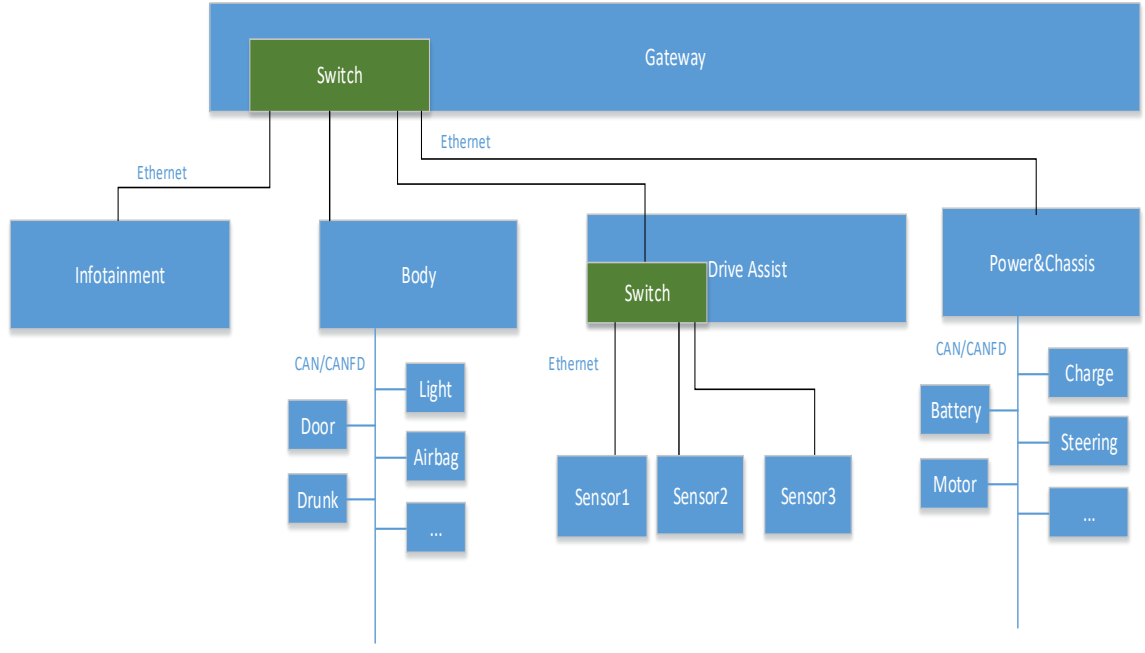


Performance item	Description	Value
Pairing and connection success rate	Minimum BT pairing and connection success rate	90%
Sound quality	Presence of echo or noise	0%

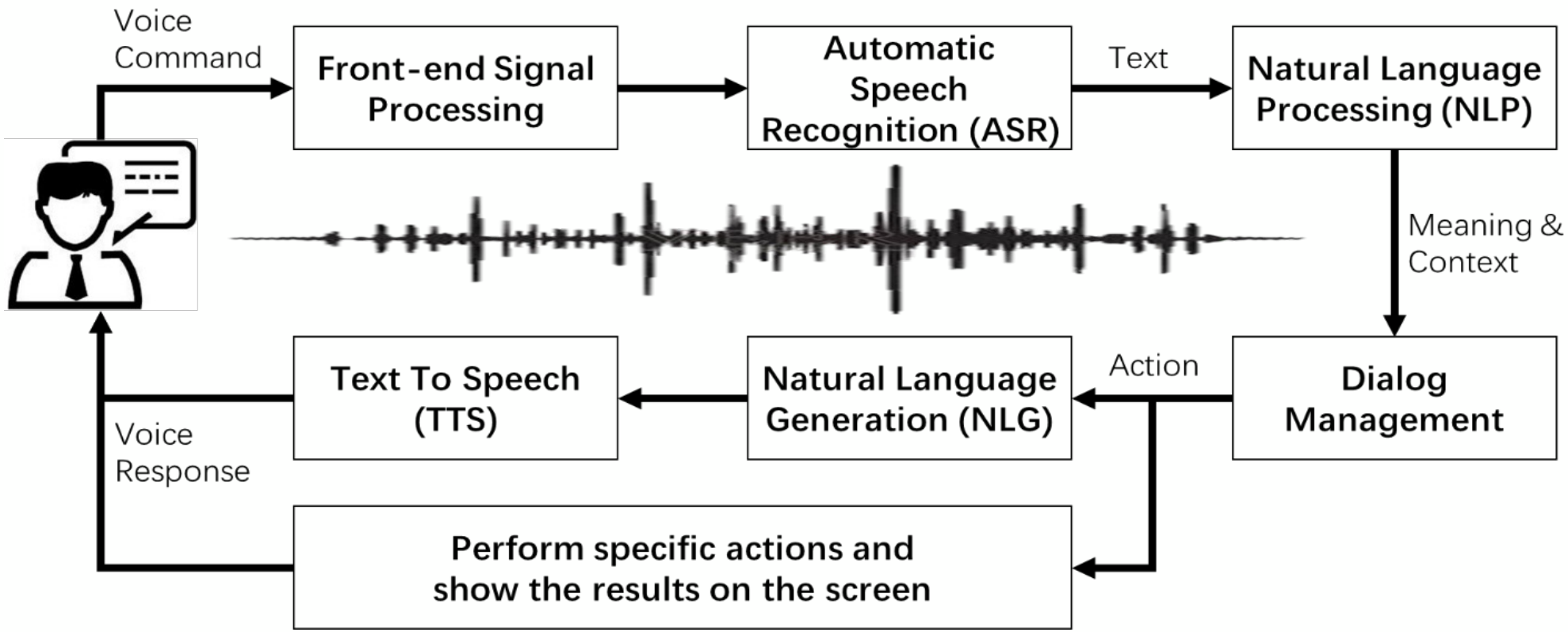
6.1 Connectivity：*In-vehicle networks*

- It is recommended that VMS are implemented with **CAN/CANFD** and **automotive ethernet,** to provide greater bandwidth and data rate, and support high-level assisted driving, OTA or big data functionalities.
- For solving the uncontrollable delay, it is recommended to use **time sensitive network(TSN)**
- For providing SOA communication, it is recommended to use **SOME/IP** or data distribution service protocol.
- Some in-vehicle network performance are recommended (details see in draft)

  - ***CAN/CANFD:*** *baud rate, data field length*
  - ***Automative Ethernet:*** *baud rate, cable, IP*
  - ***Application layer definition:***
  - ***CAN/CANFD:*** *diagnostic, network management*
  - ***Automative Ethernet:*** *diagnostic, network management,time synchronization(TSN), Time aware shaper(TSN), frame replication and elimination(TSN), port number, service ID(SOME/IP), domain ID(DDS), QoS(DDS) etc.*



6.2 HMI：*Voice assistant*



6.2 HMI：*Voice assistant*

- Some features are recommended to implement the voice assistant: **9 basic command features, 6 basic response, and 4 advanced features (listed below)**
- Some Characteristics are recommended in terms of Audio IO and system resources (details see in draft)
- Gives some performance recommendations (details see in draft)
  - ***Wake-up performances***
  - ***ASR performances***
  - ***Typer performances***
  - ***NLU performances***
  - ***TTS performances***

COMMAND FEATURES	RESPONSE FEATURES	ADVANCED FEATURES
ASR	Multi-lingual support	Voice localization
NLU	Natural language	Advanced noise reduction
Wake up	Flexible speech generation	Pro-active services
Language recognition	Direct phonetic input & seamless prompt insertion	Life assistant
Barge-in	User dictionaries	
Multi-lingual & partial search	SSML support	
One-shot voice destination entry		
All-inclusive main Menu		
Voice biometric		

6.2 HMI：*Auditory interaction*

- It is recommended that the auditory signals are detected and recognized as follows:
  - *The auditory signals is audible*
  - *Different system states use different auditory signals*
  - *The intent of the auditory signals is understood by the user*
- Auditory interaction performances are recommended in terms of (details see in draft) :
  - ***Frequency response***
  - ***Sound pressure level***
  - ***Auditory type***
  - ***Auditory signals parameters***

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THANK YOU