



# Assessment of the Commercial Availability of LTE-V2X Equipment According to the 5G Automotive Association (5GAA)

Release 1, 10<sup>th</sup> of April 2019

**Executive Summary:** results of the JRC assessment of commercial availability of LTE-V2X equipment according to the 5G Automotive Association (5GAA)

This document presents current results of a JRC assessment of commercial availability of LTE-V2X equipment according to the 5G Automotive Association (5GAA). In particular, JRC assessed the commercial availability of LTE-V2X equipment based on desk research on the list of commercial LTE-V2X equipment proposed by the [5GAA<sup>1</sup>](#) in their [feedback<sup>2</sup>](#) to the EC Delegated Regulation on the Deployment and Operational Use of C-ITS.

The present market analysis is a work in progress. **The JRC will be willing to update this analysis in the future as and when manufacturers are able to make available to the JRC such physical existing equipment as evidence to support their claims.**

**Main results of the analysis (further details in the assessment below):**

- The 5GAA feedback on page 15 stated “*a non-exhaustive list of currently available LTE-V2X products and their respective commercial providers including links to purchasing platforms.*” **The JRC at the time of publishing of this report, could not verify any commercial LTE-V2X equipment able to be purchased for operational use in the EU according to this list.** In particular,
  - some of the equipment that were listed **as commercially available** are not fully-fledged commercial-off-the-shelf RSUs/OBUs, **but only system components instead**
  - Equipment suppliers **contradicted themselves in public announcements** on the availability of commercial products, correcting themselves after questioning that their equipment would not be available after all
  - Several URL **links were either broken / unreachable**, or leading to misleading or incomplete information.
  - Some of the equipment that was listed as commercially available **does not support LTE-V2X at all**
- For several months, the JRC has tried to get access to LTE-V2X equipment for testing and research purposes. Despite widespread claims from some mobile communications stakeholders, the JRC has

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<sup>1</sup> <http://5gaa.org/>

<sup>2</sup> [https://ec.europa.eu/info/law/better-regulation/feedback/25936/attachment/090166e5c16411a0\\_en](https://ec.europa.eu/info/law/better-regulation/feedback/25936/attachment/090166e5c16411a0_en)

encountered multiple obstacles in obtaining such equipment from market players. **The JRC at the time of publishing of this report, could not obtain any LTE-V2X equipment for testing and research purposes in the EU.**

- The JRC has not conducted any research on availability of 5G-V2X equipment, as the availability of LTE-V2X equipment is considered a first step towards 5G networks which are still in the phase of pre-commercial trials. Considering that 5G-V2X standards have not been finished yet according to available presentations by 5GAA, it is hence assumed that no such equipment exists at present. However, 5G is fast-evolving technology and we remain optimistic of being able to acquire such equipment once it becomes available.

This document is based on the best available information and does not assume to have the inside knowledge in the industry and is shared in good faith.

## Background

On 8 February 2019, the 5GAA board submitted their [feedback](#)<sup>3</sup> on the [EU Delegated Regulation on Specifications for the Provision of Cooperative Intelligent Transport Systems \(C-ITS\)](#)<sup>4</sup>. An executive summary of the 5GAA feedback can be downloaded [here](#)<sup>5</sup>.

In Table 2 of the aforementioned feedback, the 5GAA provided a sample list of commercially available LTE-V2X products and providers. The following subsections provide some initial observations on each one of these LTE-V2X products.

Further, this document has been updated based on public statements of industry representatives at the 10<sup>th</sup> ETSI ITS Workshop on 5th of March 2019 in Sophia Antipolis following direct questions of the JRC, in the presence of 5GAA representatives. Further product assessments have not been undertaken by JRC yet, as no equipment was able to be obtained. The JRC will be willing to update this analysis in the future as and when manufacturers are able to make available to the JRC such physical existing equipment as evidence to support their claims.

### List of commercial LTE-V2X equipment shared by the 5GAA:

Ecosystem Partner	Commercially available products
WNC	CV2X module & mPCIe cardEVK RR3 C-V2X platform
Quectel	AG15: C-V2X Module
ZTE	ZM8350: C-V2X Module
SIMCOM	SIM8100: C-V2X Module
LG Innotek	LAM-V500: C-V2X Module
Kapsch	RIS 9260: C-V2X Roadside Unit

<sup>3</sup> [https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-2592333/feedback/F25936\\_en?p\\_id=351850](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-2592333/feedback/F25936_en?p_id=351850)

<sup>4</sup> [https://ec.europa.eu/info/law/better-regulation/initiative/1381/publication/351850/attachment/090166e5c08e86e9\\_en](https://ec.europa.eu/info/law/better-regulation/initiative/1381/publication/351850/attachment/090166e5c08e86e9_en)

<sup>5</sup> [https://ec.europa.eu/info/law/better-regulation/feedback/25936/attachment/090166e5c16411a0\\_en](https://ec.europa.eu/info/law/better-regulation/feedback/25936/attachment/090166e5c16411a0_en)

Commsignia	C-V2X Roadside Unit C-V2X On Board Unit Software stack
Nebulalink	V-Box: C-V2X Roadside Unit (C-SAE)
Genvict	LB-RD10: C-V2X Roadside Unit LB-LD10: C-V2X On Board Unit
Savari	StreetWAVE 2000 RSU MobiWAVE C-V2X Software Stack
Neusoft	V2X Roadside Unit V2X On Board Unit Ve Talk C-V2X software stack
Cohda Wireless	C-V2X Software Development Kit
Danlaw	C-V2X Aftermarket OBU
Sasken	C-V2X System Integration
Ficosa	Carcom – FITAX OBU
Telit	VE915C1 C-V2X Module

**Details of the analysis for each listed equipment:**

**WNC**

**CV2X module & mPCIe card**

The C-V2X module & mPCIe card seem to be essentially the same product with a different form factor (chip vs. mPCIe card). From the product description page, it is unclear if both modules implement the entire C-ITS protocol stack or just the access and PHY layers. In any case, these products are not fully-fledged commercial-off-the-shelf RSUs/OBUs, but system components instead.

## **EVK – RR3 C-V2X platform**

The hyperlink provided by the 5GAA for the RR3 C-V2X Evaluation Kit (EVK) is the same as the two modules mentioned above. The JRC has tried to find C-V2X evaluation kits from WNC; however the JRC has not been able to find any at this stage.

## **Quectel**

### **AG15: C-V2X Module**

Quectel's AG15 is a C-V2X system-on-chip (SoC), probably based on Qualcomm's 9150 LTE-V2X chip. This is not a fully-fledged commercial-off-the-shelf OBU/RSU, nor an evaluation kit.

## **ZTE**

### **ZM8350: C-V2X Module**

ZTE's ZM8350 is an LTE-V2X SoC, hence not a commercial-off-the-shelf (COTS) RSU/OBU nor an evaluation kit.

## **SIMCOM**

### **SIM8100: C-V2X Module**

The link provided by the 5GAA points to the SIM7800E SoC. This is not a C-V2X SoC, as (according to its datasheet) it does not support LTE-V2X/PC5 communications.

For the SIM8100 module the JRC has only found a [link<sup>6</sup>](#) to a press release from SIMCOM, but no tangible commercial-off-the-shelf product. As in some of the previous examples, this is an SoC only — not an end-user product nor an evaluation kit.

## **LG Innotek**

### **LAM-V500: C-V2X Module**

The link provided by the 5GAA points to an ITS-G5 communications module (a typo, perhaps?). The only online reference to the LAM-V500 that JRC has

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<sup>6</sup> <http://www.simcom.com/media/shownews.php?id=1029&lang=en>

been able to find is a [press release](#)<sup>7</sup> about an LTE-V2X SoC (not a fully-fledged commercial-off-the-shelf LTE-V2X RSU/OBU).

## **Kapsch**

### **RIS 9260: C-V2X Roadside Unit**

The link provided by the 5GAA points to the Kapsch public website and not to the actual RIS 9260 C-V2X RSU (a typo, perhaps?). After conducting some desk research, JRC has found the RIS 9260 C-V2X RSU [datasheet](#)<sup>8</sup> and it could seem that this is indeed a ready-to-use, 3GPP Rel.14-compliant C-V2X RSU commercial product. However, the datasheet includes the red term “preliminary” at the bottom in red colour, as well as the statement: “Experimental license needed for C-V2X”. Furthermore, this product is only available for the US market.

The RIS 9260 is the only 3GPP Rel.14-compliant product from Kapsch (no C-V2X OBUs, no C-V2X EVKs).

## **Commsignia**

### **C-V2X Roadside Unit**

### **C-V2X On Board Unit**

### **Software Stack**

Neither of the links provided by the 5GAA point to 3GPP-Rel.14 compliant products, just ITS-G5.

The JRC has found a [press release](#)<sup>9</sup> from Commsignia which describes a 3GPP Rel.14-compliant OBU. Unfortunately, there’s no mention of this product on Commsignia's public website.

During the 10<sup>th</sup> ETSI ITS Workshop in Sophia Antipolis (4-6 March), a question was posed by the JRC to Qualcomm regarding the availability of LTE-V2X devices in the EU. In particular, the question focused on naming a specific brand/model of LTE-V2X device that would be currently available on the market in the EU for experimental testing. Qualcomm replied that Commsignia

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<sup>7</sup> [http://www.lgcorp.com/news/prView.dev?news\\_id=10088&com\\_code=26](http://www.lgcorp.com/news/prView.dev?news_id=10088&com_code=26)

<sup>8</sup> <https://connectedvehicles.kapsch.net/download/KapschRIS-9260datasheet.pdf>

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[https://www.prweb.com/releases/commsignia\\_launches\\_c\\_v2x\\_on\\_board\\_units\\_for\\_the\\_us\\_transportation\\_and\\_automotive\\_industry/prweb16015383.htm](https://www.prweb.com/releases/commsignia_launches_c_v2x_on_board_units_for_the_us_transportation_and_automotive_industry/prweb16015383.htm)

had released an LTE-V2X OBU for the EU market which was already commercially available. However, further JRC discussions with Commsignia shed some light on this matter:

- Commsignia had announced their C-V2X enabled units at CES 2019 and are working to deliver the first units to US customers whom are possessing special (temporary) waiver from FCC (experimental license) which enables them to use the units for pilots and trials only in the US.
- Technically, the products will be available in near future (March-April) timeframe in the US market.
- Commsignia have not delivered any C-V2X units in Europe up till present day.

Hence, the statement from Qualcomm on commercial availability of LTE-V2X equipment in the EU, and in particular the statement towards the JRC that Commsignia had already released an LTE-V2X product for the EU market, turned out to be inaccurate.

## **Nebulalink**

### **V-Box: C-V2X Roadside Unit (C-SAE)**

Although most of the information is in Chinese, this link seems to describe an LTE-V2X device for the Chinese market (the form factor seems to suggest an OBU rather than a RSU). Also, since this product is addressed to the Chinese market, chances are that it does not support the message set used in the EU.

## **Genvict**

### **LB-RD10: C-V2X Roadside Unit**

### **LB-LD10: C-V2X On Board Unit**

These two devices are 3GPP Rel.14-compliant RSUs and OBUs (respectively) for the Chinese market. It is unclear if they support the message set used in the EU.

## **Savari**

### **StreetWAVE 2000 RSU**

This is a 3GPP-Rel.14 compliant RSU – one of the very few commercial-ready LTE-V2X devices from the 5GAA list. It is worth noticing that there is only a 3GPP Rel.14-compliant RSU available, and not an OBU.

Following up from a question posed by the JRC during the 10<sup>th</sup> ETSI ITS Workshop, Savari could until today not supply a unit to the JRC in the EU.

### **MobiWAVE C-V2X Software Stack**

This is a 3GPP-Rel.14 compliant software protocol stack – not a COTS (Commercial Off-the-Shelf) RSU/OBU.

### **Neusoft**

#### **V2X Roadside Unit**

#### **V2X On Board Unit**

#### **Ve Talk C-V2X Software Stack**

Unfortunately, all three links provided by the 5GAA are broken. Some desk research seems to suggest that Neusoft does provide 3GPP Rel.14-compliant RSUs and OBUs for the Chinese market (unclear if they support the message set used in the EU).

### **Cohda Wireless**

#### **C-V2X Software Development Kit**

This SDK from Cohda allows developers to compile and run applications on the so-called “9150 development board” (it is unclear whether this board is actually a Cohda Wireless product or, instead, a development board by Qualcomm). In any case, this is not a hardware product.

### **Danlaw**

#### **C-V2X Aftermarket OBU**

This OBU seems to support 3GPP Rel.14 LTE-V2X. Although the 5GAA document does not mention any LTE-V2X RSU, it seems that Danlaw also provides [LTE-V2X compliant RSUs<sup>10</sup>](https://www.danlawinc.com/wp-content/uploads/DS_RSU_Datasheet_V9.pdf).

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<sup>10</sup> [https://www.danlawinc.com/wp-content/uploads/DS\\_RSU\\_Datasheet\\_V9.pdf](https://www.danlawinc.com/wp-content/uploads/DS_RSU_Datasheet_V9.pdf)

## **Sasken**

### **C-V2X System Integration**

After reading Sasken's product portfolio in detail, JRC is unsure about what their C-V2X offer entails in practical terms. However, at this point it seems fairly clear that Sasken does not provide commercial-off-the-shelf C-V2X RSUs/OBUs.

## **Ficosa**

### **Carcom – FITAX OBU**

The link provided by the 5GAA points at what it seems to be a 3GPP Rel.14-compliant OBU evaluation platform, however no commercial-off-the-shelf product.

## **Telit**

### **VE915C1 C-V2X Module**

None of the products listed on the link provided by the 5GAA are 3GPP Rel.14-compliant.

## **Other Platforms beyond the 5GAA list**

### **Qualcomm's Roadrunner LTE-V2X Development Platform**

Following up from discussions at the 10<sup>th</sup> ETSI ITS Workshop, Qualcomm has initiated conversations with the JRC aimed at shipping a limited number of LTE-V2X development platform units to support our experimental activities in the context of the JRC institutional work programme. Notwithstanding their use in experimental research activities, these units are development platforms and not commercial-ready end-user products.

## **About the JRC**

As the European Commission's science and knowledge service, the Joint Research Centre (JRC) supports EU policies with independent scientific evidence throughout the whole policy cycle. The JRC hosts specialist laboratories and unique research facilities and is home to hundreds of scientists.