Impact and Countermeasures to the Rejection of EU DSRC-centered V2X Bill

July 10th, 2019
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This report analyzes the ripple effect of the recent rejection of the V2X bill in the EU and suggests countermeasures in regard to this outcome. Because of the shift in V2X standards per country, it has become paramount that all V2X-related industries form a swift response to this situation. As Korea has formulated its V2X system around DSRC technology, it has become more important than ever to curate interoperability and coexistence based around DSRC, C-V2X, and other forms of communications technology. If Korea is able to create solutions based around interoperability and coexistence, it will give the country a chance to be at the forefront of global V2X standardization.

On July 4th, a bill drafted by the European Committee that would set DSRC (dedicated short-range communication) technology as the new standard for C-ITS system implementation was rejected by the European Council. Because this bill would have set DSRC as the standard for V2X communication for all parties in the EU, there was strong opposition from those that support C-V2X (cellular V2X) technology, the other technology considered in the standardization of V2X. Such trends in the legalization of V2X in the EU should have a large impact on countries that have been utilizing DSRC technology to advance C-ITS infrastructure such as the US, South Korea, and Japan, while China, who has already set C-V2X as its V2X standard, is completely unaffected by this decision. This outcome allows C-V2X proponents to keep the technology in consideration in the EU amidst the continuing debate between WiFi-based DSRC (WAVE, ITS-G5, IEEE 802.11p, etc.) and its cellular counterpart C-V2X (LTE-V2X, 5G-V2X, etc.) as the new standard of V2X communication in each country.

First, it is important to analyze the dispute between choosing the standard of V2X and the process of legalization in the EU, then look at the ripple effect this decision will cause and the means by which the industry should respond.

1. Progress in EU C-ITS Legalization

On March 13th, the European Commission for Mobility and Transport announced the Commission Delegated Regulation (EU) of 13.3.2019, which enacted the original C-ITS guidelines indicated in Directive 2010/40/EU. Because this bill enacts the existing instructions, it is not required to pass through the European Parliament, and instead must be enacted by the European Commission, which then notifies the European Parliament, and if there are no objections in the following 2 months, would have been operational starting May 13th.

After this, the European Commission and C-V2X stakeholders both began to heavily lobby the European Parliament. Individuals such as Harald Krüger, the CEO of BMW, and Timotheus Höttgeses, the CEO of Deutsche Telekom, openly criticized the European Commission's legislation, and countries such as Finland and interest groups such as GSMA and 5GAA have been heavily lobbying and voicing their opinions to the public. Their main arguments are that (1) there are issues with technical neutrality, (2) cellular technology is more contemporary than WiFi technology, (3) there is the possibility of lagging behind in competition to China, which has already chosen to follow C-V2X technology, and (4) can inhibit the growth of 5G industries. On the other hand, proponents of DSRC argue that waiting for new technology to be verified while there already exists another proven method would lead to even greater setbacks in traffic safety and any economic benefits.

On April 8th, the Transport Committee of the European Parliament issued a public statement against the ordinance. The subcommittee had hoped for a reversal by putting their rejection of the bill to the vote of the European Commission, but on April 17th the bill passed with a 304-270 vote by the European Commission to reject the subcommittee's proposal. The last hurdle was to pass the bill through the European Council, and because the Council is not a legislative body, it had the options to approve the bill passed by the European Congress, reject it and send it back to Congress, or push back the decision altogether. Even so, there was little reason to believe that the European Council would reverse the Committee's decision without a dire reason, and many thought that the bill would pass according to its original draft.

On May 3rd, however, the European Council decided to conduct a final review of the C-ITS related bill. While the initial prediction was that the original bill would pass without any setbacks, an addendum to the bill was added that pushed back the final decision by two months for a re-examination of the technical neutrality, set forth by a strong push from Span, Bulgaria, Denmark, and Finland. Because Germany and France backed the European Commission, the rest of the members of the EU voted in favor of the extension. Accordingly, on May 13th, the scheduled legal effect was postponed by eight weeks, and the European Council's final vote, using the findings of the Justice Committee, would decide the fate of the bill.

Because the European Council operates on a majority basis, European ITS companies and parties of interest believed that there was little to no possibility of the bill being rejected without the opposition of France and Germany. Even on the day before the decision was made public, organizations such as the 5GAA believed that the bill would 'regrettably' pass based on the original proposal and would focus their attention on legislation that would be created later.

On July 4th, however, the European Council voted to reject the DSRC-based C-ITS bill. To quote a C-V2X lobbyist, this even was "more or less a miracle." Although this was a victory for C-V2X lobbyists, not even they could have predicted such an outcome. Out of the 28 member countries of the EU, 21 countries had voted against the DSRC-based C-ITS bill, including Germany, who had previously been a staunch supporter of DSRC technology, switching sides in fears of losing the initiative in the 5G industry.

2. Significance and Prospects of the Rejection of the C-ITS Related EU Bill

1) Post-Vote Direction of EU V2X Legalization
The recent decision to reject a DSRC technology-based C-ITS bill does not mean that C-V2X has become the new standard, and the European Council is requesting a new draft of the bill by the end of 2019 to the European Commission. While the amendment pushes for technological neutrality on paper, it in reality means that C-V2X will become the new standard for C-ITS tech due to the lack of any other competitive technology to DSRC besides C-V2X. There is, however, little possibility that a well-prepared legislative bill would be drafted by the end of this year, as any new bill would have to guarantee interoperability or coexistence between difference communication methodologies unless DSRC communication is completely overturned in favor of C-V2X. Securing coexistence or interoperability between different forms of communication would be an exceedingly difficult task, and even if a technological solution is found, verifying its plausibility in a real-life setting would require vast amounts of funding and time. As such, unless an alternative to interoperability or coexistence is found, it is likely that a revised bill would not be submitted by the end of 2019 or a makeshift bill would be created, therefore creating another wave of controversy. Interestingly, the rejection of this legislative bill not only gives ample opportunity to proponents of C-V2X, but it also removes previous restrictions on other forms of communication as well. In order to maintain technical neutrality, which was the main argument against DSRC technology from the C-V2X camp, any subsequently developed technology, such as 802.11bd NGV (Next Generation V2X), set to release in June of 2020[1], should have an equal chance of being chosen as a potential new standard as well. In any case, it seems that there will be intense political and technological confrontations between proponents of DSRC and C-V2X technology (frequency allocation, securing interoperability/coexistence, use cases, etc.) until a new legislative bill is put forward.

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1 IEEE P802.11-TASK GROUP BD (NGV) UPDATE : http://www.ieee802.org/11/Reports/tgbd_update.htm

2) Issues with Securing Interoperability and Coexistence

As stated above, because proponents of C-V2X used the argument for technical neutrality to reject the initial legislative bill, there is very small chance that the new standard will only operate under one form of communication. If so, the biggest key to the legalization of V2X will be the securing of interoperability and coexistence between many different forms of communication.

Interoperability is defined as the ability of different communication methods and protocols to mutually communicate with each other, or in the case of the 5.9GHz bandwidth, the ability of the seven different channels allocated for C-ITS purposes to run concurrently. In this instance, "concurrence" indicates the ability to utilize both DSRC and cellular signals at the same time. As of now, it is currently technically impossible to operate both DSRC and cellular communication concurrently due to their inherent characteristics.

Coexistence is the ability of different communication methods and protocols to communicate using different channels without interference from adjacent ones. In the case of the 5.9GHz bandwidth, coexistence is possible if each communication method utilizes difference channels or another bandwidth besides 5.9GHz is secured.

The issue, however, is that there is no established communication standard for interoperability and coexistence between DSRC and C-V2X technology and a distinct lack of real-world testing and data. Until now, proponents of each technology have argued heavily for their respective method of communication through reports or testing data, but neither have put much effort into testing for interoperability or coexistence between technologies. In Europe, organizations such as ERITCO – ITS Europe (European Road Transport Telematics Implementation Coordination Organization) have been working towards interoperability and coexistence of DSRC and C-V2X communication through projects such as CONCORDA and 5G-Mobix[2], but have had little success in obtaining substantial results, thus making interoperability and coexistence the next big hurdle for V2X legalization.

3) Substantial Delays to Commercialization of V2X Technology

Although C-V2X proponents were able to stop any DSRC-centered legislation through lobbying and gathering public opinion, they are currently unable to provide an immediate alternative. The primary objective of C-V2X proponents in this decision of V2X standards in the EU was to buy time until the completion of 5G NR V2X (Release 16). The only C-V2X chipset available in the current market is Qualcomm's 9150, and while companies such as Autotalks, Huawei, Datang, and Samsung are said to have their own C-V2X chipsets, they are currently unavailable on the open market (This could either be because the chipsets contain technical issues that bar them from being sold publicly, it is part of their marketing strategy not to sell to the open market, or the market itself is not yet mature enough). Even Qualcomm's 9150 chipset is only capable of supporting 3GPP Release-14 Mode4 (Sidelink/PC5), and although Release-15 was established in mid-2018, fixing issues present in 3GPP Release-14, there is currently no chipset that has applied Release-15 specifications. Even in deployment schedules listed in white papers published by the 5GAA, only scheduling based off Release-14 exists. Currently, Release-16 specifications, the next generation cellular V2X standard, is set to be finished towards the end of 2019, and there is no chipset that supports 5G NR V2X. Many of the 5G V2X use cases being reported by the media usually pertain to 5G-based V2N2V (Vehicle to Network to Vehicle) or V2N2I (Vehicle to Network to Infrastructure), with V2V, V2I, and direct communication, the core of V2X, not even having a 5G NR related standard. Even if a standard is chosen, it would be at least a year before a chipset is developed, another year to establish an ecosystem (ie. module creation), and once that system is established, it would take another few years until implementation into vehicles or infrastructure, therefore pushing back 5G NR V2X safety testing in real life scenarios to at least 2022. The only issue with this timeline is that it does not consider interoperability and coexistence. The biggest victory for C-V2X proponents through the recent block of V2X legalization is not the commercialization of LTE-V2X but gaining the time to fully implement 5G NR V2X. Regardless of the outcome, it will be years before full-scale deployment of V2X systems and market development.

4) Effect on Countries Building DSRC-Based C-ITS Systems (US)

In order to understand the effect that the EU's decision will have on the US's V2X communications standard, it is important to understand the underlying controversy surrounding V2X standardization and its different nature from its EU counterpart. While the EU's dispute mainly revolved around whether C-V2X technology could also be used as a standard in lieu of DSRC, which was already verified in the 5.9GHz bandwidth, the US's dispute revolves around whether the 5.9GHz would be allocated for ITS purposes at all or utilized for a different purpose. While the

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2 ERTICO Project : https://ertico.com/its-innovation-deployment/

telecommunications-backed C-V2X proponents were trying to be on equal footing in the previously DSRC-centric EU, telecommunications companies in the US were trying to completely change the playing field with the backing of the FCC. Last April, Ajit Pai, the chairman of the FCC, announced that he would add the issue of reallocation of the 5.9GHz frequency bandwidth, previously used for DSRC communication, to the monthly FCC Open Commission Meeting[3] in June. In response, US Secretary of Transportation Elaine Chao petitioned for an extension to include the 5.9GHz reallocation issue into the FCC Open Commission's agenda, therefore excluding it from the June meeting, but most likely leaving it up for discussion sometime this year.

Although the 5.9 GHz frequency has been allocated to DSRC usage since 1999, issues such as the lack of interest from automotive companies (ie. Toyota, GM), outright support of C-V2X from companies such as Ford, and delays in legalization have prevented the widespread use of the 5.9 GHz bandwidth in traffic safety purposes. Until now, cellular technology (telecommunications companies) and Gigabit WiFi technology (cable companies) had taken the vanguard in requesting that at least parts (top 20MHz) of the 5.9 GHz bandwidth were kept open, with C-V2X being the 'Trojan Horse' of the cellular proponents to gain leverage in the 5.9 GHz band.

Amid this controversy, Toyota, one of the strongest advocates for DSRC technology along with Volkswagen and GM, wrote a letter to the FCC[4] declaring its plans to equip all cars sold in North America after 2020 to have basic DSRC communications technology attached. If Toyota's goal was to defend DSRC technology, they would have sent the letter to the USDOT instead, but by sending the letter to the FCC, which is currently reshaping the entire 5.9 GHz band, Toyota has essentially stated that it is currently fighting to maintain the 5.9 GHz band for automotive purposes, whether it be through DSRC or C-V2X. The most prominent point from Toyota's letter was not that they would give up on DSRC communications, but that any other unproven communication method should not be allocated to the 5.9 GHz band, essentially directly challenging the communications industry and galvanizing the USDOT to act.

The EU's rejection of DSRC-based C-ITS development came at a tumultuous time for V2X technology in the US, and has put immense pressure on the US to plan for interoperability and coexistence between C-V2X and DSRC technology and made it extremely difficult to maintain the 5.9 GHz band originally allocated for automotive purposes.

5) Effect on Countries Building DSRC-Based C-ITS Systems (South Korea)
The debate for V2X technology in South Korea has been analogous to those in the EU and US. The only difference is that because there number of departments involved severely complicate the issue, including: the Ministry of Land, Infrastructure, and Transport (road systems/infrastructure, C-ITS projects); the Ministry of Science, Technology, and Information (communication methods and frequency allocation); the Ministry of Commerce, Industry, and Energy (automobiles); and the Ministry of Public Administration and Security (signal systems).   Simply put, there is very little chance that South Korea establishes its own V2X standard before the EU and US do so first. The first reason is not because South Korea is technology-reliant on the US and EU, but because it cannot ignore the global standards set for telecommunications, as the automotive and communications industries are global in nature and must react readily to changing global standards. The second reason is that South Korea lacks real-life data obtained from use cases testing for various communication methods, making it difficult to make subjective decisions due to the lack of evidence showing interoperability and coexistence between different communication methods and the inability to draw conclusions from that data.

3. Response to the Rejection of the EU Bill

1) Securing Interoperability/Coexistence
On the technical side, there must be a focus on securing interoperability and coexistence between different communication standards. Neither the EU nor the US has enough empirical data to prove interoperability and coexistence between DSRC and C-V2X technology, and if South Korea is able to create a solution that prove the two communication methodologies can work in tandem, it will be able to establish itself as a leader in V2X-related global standard creation.

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3 https://www.fcc.gov/news-events/events/2019/06/june-2019-open-commission-meeting

4 https://static1.squarespace.com/static/596fb16003596e0fa70a232f/t/5cc36cda0d92970826c3655b/1556311258955/4-26-2019+Toyota+FCC+Comment.pdf

2) Obtaining Empirical Data

While it is important to keep an eye on global trends in V2X standardization, it is equally as important for the government and industry to acquire use cases and empirical data. Until now, much of the domestic V2X standardization debate within South Korea revolved around assumptions from global trends, not use cases specified for the country itself. The best communication standard should be found not through the power struggle of specific industries, but by seeking standards that work in Korea instead. Additionally, the obtained data should be able to bolster the domestic V2X and self-driving car industries, as shown in places like Wuxi in China, where 170 square kilometers of land was used to develop a LTE-V2X testing area and gathers 1.6 petabytes of data from two million vehicles.[5]

4. References

One of the companies that possesses both US (DSRC V2X) and EU (DSRC V2X, C-V2X) technology in response to the shifting global V2X standards is Ettifos. Ettifos was able to put out a V2X solution with combined DSRC and C-V2X technology in one platform last April into the market and displayed this solution at ITS European Congress 2019 in tandem with NXP, garnering widespread interest from ITS-related companies and groups. Ettifos will also be demonstrating its DSRC/C-V2X combined solution at ITS World Congress 2019 in Singapore this October with a global Tier 1 car electronics manufacturing firm.

Ettifos also provides research institutions with test platforms capable of DSRC/C-V2X interoperability and coexistence trials, and also aims to secure 5G NR V2X technology in tandem with 5G NR Release-16 by the end of 2019.

[Additional information]
1. Website : www.ettifos.com
2. Press : Ettifos to Launch World's First Mobile App Based V2X Solution at CES2019
   https://www.prnewswire.com/news-releases/ettifos-to-launch-worlds-first-mobile-app-based-v2x-solution-at-ces2019-300772499.html
3. Facebook : https://www.facebook.com/ettifos/
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[5] https://technode.com/2019/06/28/china-wuxi-v2x-2019/?fbclid=IwAR02CQooh-GrTcnNvy0fd5SZgN5prwR75gmczt-PEAwubQai6i9R_reBaQ8