ERILLISVERKOT

Request for information

Virve 2.0 end user devices

Summary of responses

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Introduction

Erillisverkot published a Request for Information (RFI) on Virve 2.0 end user devices in September 2020. Our primary goal was to find out what kinds of devices the manufacturers are planning to produce and how they could respond to our end user needs.

We were pleased to receive in total 22 responses from all over the world, mainly from the industry and also from the supporting organizations, like test houses. The majority of the responses covered a limited part of the whole RFI scope, depending on each respondee's own interests and capabilities.

This document is a summary of our findings based on the received responses and related follow-up discussions. We believe that it provides a pretty accurate picture of the current situation and a reflection to the near future plans for the 3GPP-based mission critical devices industry. However, we expect to see a quick evolution in this market, and therefore anyone conducting a similar exercise in the future will likely receive responses that differ from ours.

This document covers the general findings for all categories, the operating system and SIM, followed with a more detailed description for each main category of end user devices. Words like "all", "many", "some" etc. are used, these refer to responses received i.e. excluding responses without respective answers.

What we learned will give us a good reference for starting the procurement process of end user devices.

We are very grateful for the received responses and we hope this summary will be of interest to similar projects in other countries.

1. End user devices – general findings from responses

We received 22 responses from all over the world, mainly from the industry and few from supporting organizations, like test houses.

Some devices have a support for priority QCI classes (65, 67, 69 and 70) already now but most of them will have MC priority classes in future SW releases. This functionality needs also HW support. This can be found only from the latest device models in market.

Described EMM (Enterprise Mobility Management) / MDM (Mobile Device Management) solutions offer support for wide range of end user devices. There may, however, be special new features and functions in the future device models which may cause special needs. There is a risk of compatibility problems with special features and therefore it is important to put sufficient emphasis on the selection of the management systems.

A common recommendation from Approval testing / Certification process part is that only devices and applications that are properly tested and approved should be accepted to log in to network.

Galileo PRS is not supported as of today. PRS requires a special chipset which is not available at the moment. It will take few more years to become available.

LEO (Low Earth Orbit) initial requirements (satellite 5G access) will be included in the 3GPP Rel. 17, in 2022. This means they are still at least two years away from commercialization.

TETRA Direct Mode Operation (DMO) in the TETRA-band (380-400 MHz) is widely supported by many manufacturers. There will be in-built solutions and also connected peripherals like Remote Speaker Microphones with DMO.

2. Operating system

According to the responses, Android is not the best option but since it is the most common operating system in phone-types of devices it has become the de-facto industrial standard. The latest versions of Android 10 or 11 are recommended for operational use with mission critical applications. The newest Android OS releases with Enterprise will provide better security than the older ones. Many manufacturers have added special features to make the devices even more secure. It seems that mission critical applications are developed mainly for the latest versions of Android.

Non-traditional devices have a wider selection of operating systems. Many of them are based on Linux.

iOS was not mentioned at all in the received responses.

A general summary is that it is not wise to lock down with one operating system only. The most suitable OS for each purpose should be selected.

3. SIM

Micro- and nano-SIM cards are most commonly used for all devices at the moment. eSIM is used only in some non-traditional devices like smart watches. At the moment micro-SIM seems to be the industry standard even in IoT devices and eSIM is available as an option for some devices.

4. Device categories

4.1. Rugged devices (handheld radio for field use)

4.1.1. Physical protection and features

Many of the rugged devices are IP68 certified. IP68 seems to be the target for future products as well.

The operational temperature range varies a lot depending on the manufacturer. Most of the manufacturers indicate temperature range from -20°C up to +50°C. Some have limited the coldest temperature to -25°C, -10°C or even 0°C.

The battery lifetime has been typically promised to be more than 10h at +20°C. Depending on the conditions of use, some manufacturers indicate a battery lifetime up to several tens of hours. The effect of cold temperature on battery lifetime is generally not clearly described but some responses indicate that it can decrease the lifetime dramatically.

Devices with physical PTT buttons for two separate talk groups and an emergency PTT button exist already today. We can see from the responses that the need for physical buttons is widely understood and we can expect more products with programmable buttons.

4.1.2. RF Performance

The RF performance seems to be at a similar level with the best smart phones. Some improvements can be expected but as long as an internal antenna construction prevails, the RF performance cannot become significantly better. It is expected that some manufacturers will design devices also with an external antenna connector. This would offer remarkably better OTA (Over The Air) RF performance in vehicle use. Devices with an external antenna are not expected to be widely offered in the foreseeable future.

4.1.3. Accessories & connectivity

A wide range of accessories will be available. These include all normal smartphone accessories and many accessories that are available for rugged TETRA terminals. New types of accessories, like haptic interface and wearable technologies will also be available in the future. Most probably it will take a few years before those will be available for operational use. Various alternatives for connectivity are available, depending on the manufacturer.

We also asked if the end user devices are possible to use "hands-free". According to the responses there will be such solutions in the future but in the short term a realistic option seems to be external accessories connected by Bluetooth or USB-C connector.

4.2. Smartphones

Secure smartphone features are similar to the features in rugged devices. The biggest difference is in the physical protection. Some of the smartphones fulfil IP68 but other physical characteristics are not necessarily at the same level. Some of the devices have no IP classification at all. There are also devices with programmable buttons (e.g for PTT) also in this category. Available accessories are quite same as with rugged devices as both of them use same Bluetooth and USB-C connection methods.

4.3. Vehicle mount device ("Mobile radio")

The main message from the RFI responses was that there are clear use cases for vehicle mount devices with external antenna and a wide range of connectivity and accessories. At least some manufacturers plan to bring Virve 2.0 compatible mobile radios to the market.

4.3.1. Physical protection and features

Operational temperature range seems to be wide, starting from -30°C up to +50°C and even to +80°C. Protection class varies from IP54 up to IP67. Typically, those devices will include a wide range of connectors for accessories and other peripherals. TETRA Direct Mode Operation (DMO) in the TETRA-band (380-400 MHz) will be supported.

4.3.2. RF Performance

OTA RF performance will be better than in hand held radios since they come with external antenna connectors and antennas installed outside the vehicle.

4.3.3. Accessories & Connectivity

Vehicle mount devices will come with a wide range of accessories and other peripherals. It seems that most of the accessories that are used with current TETRA mobile radios will also be available for future products. The new vehicle mount terminals can be installed in a traditional way with extension cables between the main and the control unit. Some of the devices could be connected to CAN (Controller Area Network) in vehicle.

4.4. Tablets

All responses for tablets were for Android devices only, with the operating system version 9 or 10. Protection class varies from device to device up to IP68. Operational temperature range varies from -35°C up to +70°C. Battery lifetime was typically promised to be more than 10h at internet usage and even tens of hours with voice call.

4.5. Vehicle mount communication router

Vehicle mount communication routers will be available also in the future. Most of the existing products do not offer support for priority QCI classes (65, 67, 69 and 70). The new versions and models will include the required features. RF OTA performance is better than in hand held radios as they come with external antenna connectors.

4.5.1. Operating system

Many of these devices have Linux operating system with a maintenance support for several years.

4.6. Non-traditional devices

4.6.1. Smart watch & other wearable technology

A lot of non-traditional devices will be available in the future but most of them will still need further development before they become available for the public safety sector. There already exist some devices for military use, and it is expected that we will see some devices in the market within few years.

4.7. IoT devices

There are already a wide range of standalone IoT devices in the market for many kinds of alarm purposes. According to the responses it is expected that the same functionalities will be made available with NB-IoT and LTE-M technologies in the future.

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