

| Type of application + services  | throughput p/s per session           | use per month per user                               | Number of users             | mobility (using while moving)     | quality of experience (can there be a hiccup in the connection) | Availability/start-up time            | timeliness/delay in delivering the data (high=no delay)    | continuous operational availability (mission critical level) | peripherals for field units | necessary screen for field units         | security (confidential + integrity)        | group calls + broadcast | urgente to introduce                              |
|---|--------------------------------------|--|-----------------------------|-----------------------------------|---|---------------------------------------|--|--|-----------------------------|--|--|-------------------------|---|
| <b>LOCATION DATA</b>  |                                      |  |                             |                                   |   |                                       |  |  |                             |  |  |                         |   |
| A(V)LS data to CCC (persons + vehicles positions)   | low                                  | high   | high                        | high                              | medium  | ready                                 | high   | high   | modem/gps receiver/router   | none                                     | medium                                     | no                      | now   |
| A(V)LS data return  | medium                               | high   | medium                      | high                              | medium  | ready                                 | high   | high   | modem/gps receiver          | graphic                                  | high                                       | yes, small + big groups | short (partly already in use)                     |
| <b>MULTI MEDIA</b>  |                                      |  |                             |                                   |   |                                       |  |  |                             |  |  |                         |   |
| Video from/to CCC for following + intervention  | high                                 | low  | medium (emergency vehicles) | high                              | low   | ready when vehicle is ready           | medium (has to be in line with speech; max 1 or 2 seconds) | high   | modem/router                | none by sending; graphics when receiving | low  | yes, medium number      | medium  |
| Low quality additional feeds  | low-medium (depending on quality)    | low (but more than above)                            | medium (emergency vehicles) | high                              | low   | ready when vehicle is ready           | medium (has to be in line with speech; max 1 or 2 seconds) | high   | modem/router                | none by sending; graphics when receiving | medium                                     | yes, medium number      | medium  |
| Video for fixed observation   | medium (high on hdd)                 | high   | low                         | low                               | low   | low (mostly enough time to switch on) | medium (has to be in line with speech; max 1 or 2 seconds) | medium   | modem/router                | none                                     | high                                       | yes, small number       | medium (partly already in use)                    |
| Low quality additional feeds  | low-medium (depending on quality)    | high   | low (but more than above)   | low                               | low   | low (mostly enough time to switch on) | medium (has to be in line with speech; max 1 or 2 seconds) | medium   | modem/router                | none                                     | high                                       | yes, small number       | medium  |
| Video on location (disaster or event area)  | high                                 | low  | low                         | low                               | medium  | Take along on ad hoc basis            | medium   | high; availability at Golden Hour essential                  | modem/router                | graphic (if receiving also)              | low  | yes, medium number      | now (partly already in use)                       |
| Video conferencing operations   | medium (high on hdd)/priority needed | low  | low                         | low                               | low   | low                                   | medium (has to be in line with speech; max 1 or 2 seconds) | low (but medium/high if used in crises)                      | special equipment           | graphic                                  | medium                                     | yes, small number       | long  |
| Non real time recorded video transmission   | high                                 | low  | low                         | low (but high when using in cars) | medium  | low (mostly enough time to switch on) | medium (has to be in line with speech; max 1 or 2 seconds) | medium   | modem/router                | none                                     | medium                                     | no                      | medium  |
| Photo broadcast   | medium                               | low  | medium                      | high                              | low   | ready                                 | low  | medium   | PDA/Smartphone              | graphic                                  | medium                                     | yes, big groups         | now (partly already in use)                       |
| Photo to selected group (e.g. based on location)  | medium                               | low  | low                         | high                              | low   | ready                                 | low  | medium   | PDA/Smartphone              | graphic                                  | medium                                     | yes, medium number      | now (partly already in use)                       |
| <b>OFFICE APPLICATIONS</b>  |                                      |  |                             |                                   |   |                                       |  |  |                             |  |  |                         |   |
| PDA PIMsync   | medium                               | high   | low                         | high                              | low   | ready                                 | low  | low  | PDA/Smartphone              | graphic                                  | high                                       | no                      | medium (partly already in use)                    |
| Mobile workspace + (incl public internet)   | medium                               | medium   | low                         | high                              | low   | ready                                 | low  | low  | laptop                      | graphic                                  | high                                       | no                      | medium (partly already in use)                    |
| <b>DOWNLOAD OPERATIONAL INFORMATION</b>   |                                      |  |                             |                                   |   |                                       |  |  |                             |  |  |                         |   |
| Incident information download (text + images) from CCC to fieldunits + Netcentric working | medium                               | low  | medium                      | low                               | high  | ready                                 | medium   | high   | PDA                         | graphic                                  | medium                                     | yes, medium number      | medium (partly already in use for small messages) |
| ANPR update hit list  | medium                               | medium   | medium                      | medium                            | low   | low (mostly enough time to switch on) | low  | low  | PDA/laptop                  | text                                     | medium                                     | yes, big groups         | medium (partly already in use)                    |
| Download maps with included information to field units                                    | medium                               | low  | low                         | high                              | medium  | medium                                | medium   | high   | PDA/laptop                  | graphic (if receiving also)              | medium / high at confidential applications | yes                     | medium  |
| Command & control information incl. task management + briefings                           | medium                               | medium (high when also operational task information) | high                        | high                              | medium  | ready                                 | high   | high   | PDA/laptop                  | text/graphic                             | medium                                     | yes, medium number      | short (partly already in use)                     |

| Type of application + services   | throughput p/s per session  | use per month per user                  | Number of users                    | mobility (using while moving)                         | quality of experience (can there be a hiccup in the connection) | Availability/start-up time            | timeliness/delay in delivering the data (high=no delay) | continuous operational availability (mission critical level) | peripherals for field units | necessary screen for field units | security (confidential + integrity)        | group calls + broadcast | urgente to introduce                              |
|--|-----------------------------|---|------------------------------------|---|---|---------------------------------------|---|--|-----------------------------|----------------------------------|--|-------------------------|---|
| <b>UPLOAD OPERATIONAL INFORMATION</b>  |                             |   |                                    |   |   |                                       |   |  |                             |                                  |  |                         |   |
| Incident information upload (text + images) to CCC + Netcentric working  | medium                      | low                                     | medium                             | low   | high  | ready                                 | medium  | high   | PDA                         | graphic                          | medium                                     | yes, small number       | medium (partly already in use for small messages) |
| Status information + location  | low                         | high                                    | high                               | high  | medium  | ready                                 | medium  | medium (during incidents high)                               | radio/PDA/laptop            | text                             | medium                                     | no                      | now (partly already in use)                       |
| ANPR / speed control automatic upload to data base incl. pictures (temporarily 'fixed' camera's + from vehicles) | medium (high on busy roads) | high (fixed equipment is constantly on) | low, but growing                   | Fixed + high when using driving                       | low   | ready                                 | medium  | fixed camera's low. If operational in cars medium            | special equipment           | graphic in cars                  | low  | no                      | medium (partly already in use)                    |
| Forward scanned documents  | medium                      | low                                     | low                                | medium  | low   | low (mostly enough time to switch on) | low   | medium   | modem/router                | graphic (if receiving also)      | medium                                     | no                      | medium  |
| Reporting incl. pictures etc   | medium                      | medium                                  | medium                             | low   | low   | low (mostly enough time to switch on) | low   | low  | PDA/laptop                  | graphic                          | high                                       | yes, small number       | now (partly already in use)                       |
| Upload maps + schemes with included information  | medium                      | low                                     | low                                | high  | medium  | medium                                | medium  | high   | modem/router                | graphic (if receiving also)      | medium / high at confidential applications | yes, small number       | medium  |
| Patient monitoring (ECC) to hospital   | medium                      | medium                                  | low                                | high  | high  | ready                                 | medium  | high   | special equipment           | not applicable                   | medium                                     | no                      | short (partly already in use)                     |
| Monitoring status of security worker (drop detection, stress level, carbon monoxide etc)                         | low                         | low                                     | Probably partially fire department | high  | high  | ready                                 | high  | ready  | special equipment           | not applicable                   | medium                                     | no                      | medium  |
| <b>ONLINE DATA BASE ENQUIRY</b>  |                             |   |                                    |   |   |                                       |   |  |                             |                                  |  |                         |   |
| Operational data base search (own + external)  | medium                      | high                                    | high                               | high  | high  | ready                                 | high  | high   | PDA                         | graphic                          | high                                       | no                      | now (partly already in use)                       |
| Remote medical database services   | medium                      | medium                                  | low (mainly ambulance cars)        | high  | high  | ready                                 | high  | high   | modem/router                | special equipment                | high                                       | no                      | medium (partly already in use)                    |
| ANPR checking number plate live  | low                         | medium                                  | medium                             | medium  | low   | low (mostly enough time to switch on) | medium  | medium   | PDA                         | text                             | medium                                     | no                      | now (partly already in use)                       |
| Biometric (eg fingerprint) check   | low                         | low                                     | low                                | low; high on the train                                | low   | ready                                 | low   | medium   | PDA-like device             | hit/no hit                       | low  | no                      | now (partly already in use)                       |
| Cargo data   | low                         | low                                     | medium                             | high  | high  | ready                                 | medium  | high   | PDA                         | text                             | medium                                     | no                      | medium  |
| Crash Recovery System (asking information on the spot)   | medium                      | low                                     | low (mainly fire trucks)           | high  | high  | ready                                 | medium  | high   | PDA                         | graphic                          | low  | no                      | short (partly already in use)                     |
| Crash Recovery System (update to vehicles from data base)  | medium                      | low                                     | low (mainly fire trucks)           | medium (fire truck in use can receive a little later) | high  | ready                                 | low   | high   | PDA                         | graphic                          | low  | no                      | short   |

| Type of application + services   | throughput p/s per session           | use per month per user | Number of users | mobility (using while moving)  | quality of experience (can there be a hiccup in the connection) | Availability/start-up time   | timeliness/delay in delivering the data (high=no delay)   | continuous operational availability (mission critical level) | peripherals for field units | necessary screen for field units | security (confidential + integrity)   | group calls + broadcast | urgente to introduce                    |  |
|--|--------------------------------------|------------------------|-----------------|--|---|--|---|--|-----------------------------|----------------------------------|---------------------------------------|-------------------------|---|--|
| <b>MISCELLANEOUS</b>   |                                      |                        |                 |  |   |  |   |  |                             |                                  |                                       |                         |   |  |
| Software update online   | medium                               | low                    | high            | medium (it has to be certain everyone receives, but a bit later is acceptable) | low   | low: it has to be certain everyone receives, but a bit later is acceptable | low   | low  | not applicable              | not applicable                   | high                                  | yes, big groups         | medium                                  |  |
| GIS maps updates   | medium                               | low                    | medium          | medium (it has to be certain everyone receives, but a bit later is acceptable) | low   | low: it has to be certain everyone receives, but a bit later is acceptable | low   | low  | not applicable              | not applicable                   | medium                                | yes, big groups         | medium                                  |  |
| Automatic telemetrics incl remote controlled devices + information from static sensors | low                                  | low                    | medium          | none at permanent static sensors; high with applications in/on cars            | medium  | ready  | medium for control processes; low while gathering information; high at time-critical applications | high   | modem                       | none                             | depends on kind of sensor application | no                      | medium (partly already in use)          |  |
| Hotspot on disaster or event area (e.g in mobile communication centre)                 | extrem high                          | low                    | medium          | low  | high  | have to be installed   | high  | high   | special equipment           | not applicable                   | medium                                | yes                     | medium                                  |  |
| Front office - back office applicaties   | low (medium if graphics is included) | high                   | high            | high   | low   | ready  | low   | medium   | PDA                         | graphic                          | medium                                | no                      | medium                                  |  |
| Under water communication scuba diver  | low                                  | low                    | low             | low  | high  | ready  | high  | high   | special equipment           | text                             | medium                                | yes                     | future                                  |  |
| Alarming / paging  | low                                  | medium                 | medium          | medium   | medium  | ready  | high  | high   | pager                       | text                             | medium                                | yes, medium number      | now (partly already in use)             |  |
| Traffic management system: information on road situations to units                     | low                                  | low                    | low             | high   | medium  | ready  | high  | high   | PDA/Smartphone              | graphic                          | medium                                | no                      | medium                                  |  |
| Radiobearing tracking or special agents operations                                     | medium                               | low                    | low             | high   | high  | ready  | high  | high   | special equipment           | graphic                          | high                                  | yes, small number       | now (partly already in use)             |  |
| IMSI Catcher information to units  | medium                               | low                    | low             | high   | medium  | ready  | high  | high   | special equipment           | graphic                          | high                                  | yes                     | now (partly already in use)             |  |
| Connectivity of abroad assigned force to local ccc                                     | medium                               | low                    | low             | medium   | medium  | ready  | high  | high   | SAT COM                     | graphic                          | high                                  | no                      | short                                   |  |
| low:<10x<br>medium:10-30x<br>high:>30x<br>BxCxD= network capacity indication           |                                      |                        |                 |  |   |  |   |  |                             |                                  |                                       |                         | low:<20%<br>medium: 20-70%<br>high:>70% | short: <2 years<br>medium: 2-5 years<br>long: >5 years |

|   |
|---|
| Most important parameter for this application   |
| Second important parameter for this application |
| Third important parameter for this application  |

| Type of application + services   | Short explanation   |
|--|---|
| <b>LOCATION DATA</b>   |   |
| A(V)LS data to CCC (persons + vehicles positions)  | Sending (automatically) location information from units to the control centre   |
| A(V)LS data return   | Sending (automatically) location information from the control centre (or software applications) to units (individual + groups)  |
| <b>MULTI MEDIA</b>   |   |
| Video from/to CCC for following + intervention   | Video information from and to special police units on suspects (hot pursuit etc)  |
| Low quality additional feeds   | Extra camera's for observation with lower quality, which can be switched to higher quality when relevant  |
| Video for fixed observation  | Video information to controlroom or special observation room from a fixed location (most time building under observation)   |
| Low quality additional feeds   | Extra camera's for observation with lower quality, which can be switched to higher quality when relevant  |
| Video on location (disaster or event area)   | Video information to controlroom or special crisis centre from units on the location and to the units on what is happening  |
| Video conferencing operations  | Video conferences between management, specialists etc (like in other businesses) + for coordination on the field  |
| Non real time recorded video transmission  | Sending a selected part from a recorded video in a later stage to controlroom or coordination centre  |
| Photo broadcast  | Picture (e.g. from wanted person) to a big group of officers  |
| Photo to selected group (e.g. based on location)   | Picture (e.g. from missed child) to those officers which are in the relevant search area  |
| <b>OFFICE APPLICATIONS</b>   |   |
| PDA PIMsync  | The 'normal' applications like mail, agenda etc.  |
| Mobile workspace + (incl public internet)  | The facility to do with a laptop 'on the street' the same as in the office (also the backoffice applications e.g. to fill in a file)  |
| <b>DOWNLOAD OPERATIONAL INFORMATION</b>  |   |
| Incident information download (text + images) from CCC to fieldunits + Netcentric working                      | Information regarding an incident from the controlroom to the fieldunits. Can be text, pictures, images, maps etc.  |
| ANPR update hit list   | Automatic update from the wanted cars (hit list) for the automatic numberplate recognition application  |
| Download maps with included information to field units   | Sending maps with additional information (extra info on buildings, location of officers, routes etc) from the controlroom to the field units  |
| Command & control information incl. task management + briefings  | Sending all kind of briefing information from the controlroom to the relevant units   |
| <b>UPLOAD OPERATIONAL INFORMATION</b>  |   |
| Incident information upload (text + images) to CCC + Netcentric working  | Information regarding an incident from the fieldunits to the controlroom. Can be text, pictures, images, maps etc.  |
| Status information + location  | (automatic) sending of status information (on route, arrived, incident closed etc) + location from field units to controlroom   |
| ANPR / speed control automatic upload to data base incl. pictures (temporaly 'fixed' camera's + from vehicles) | ANPR / speed control application: automatic upload to data base incl. pictures from relevant cars. Info is coming from temporaly 'fixed' camera's + from vehicles equipped with ANPR or speed measurement equipment |
| Forward scanned documents  | Making a scan from document(s) by field units and send that to controlroom or colleagues  |
| Reporting incl. pictures etc   | Making a report (can be pictures, images or map info included) by field units and send that to controlroom or colleagues  |
| Upload maps + schemes with included information  | Sending maps with additional information (extra info on buildings, location of officers, routes etc) from the fieldunits to the controlroom or other field units  |
| Patient monitoring (ECC) to hospital   | Sending patient information (e.g.ECC) from ambulance or from the field to hospital  |
| Monitoring status of security worker (drop detection, stress level, carbon monoxide etc)                       | Specific Fire application: Fireman are equipped with safety measurement equipment which will send out a warning when there is a risk for the fireman  |
| <b>ONLINE DATA BASE ENQUIRY</b>  |   |
| Operational data base search (own + external)  | Data base enquiry by field units from all the backoffice data bases + relevant external data bases  |
| Remote medical database services   | Data base enquiry by medical field units from the relevant (external) medical data bases  |
| ANPR checking number plate live  | On the spot numberplate control by field units via connection to the car registration data base   |
| Biometric (eg fingerprint) check   | With special equipment checking biometrics and sending this info to the relevant database to check (hit-check)  |
| Cargo data   | Data base enquiry by field units from the relevant external data bases with cargo information (by logic cargo numbers)  |
| Crash Recovery System (asking information on the spot)   | On the spot control by fire units where to use the hydrolic cissor for cutting a car open to resque people (via the car registration data base)   |
| Crash Recovery System (update to vehicles from data base)  | From the most common cars the car drawings are stored in the firetruck to save datacommunication. Updates are then needed.  |
| <b>MISCELLANEOUS</b>   |   |
| Software update online   | Online software updates for the terminals in use  |
| GIS maps updates   | Updates from geographical maps which are stored on the terminals  |
| Authomatic telemetrics incl remote controlled devices + information from (static) sensors                      | All kind of telemetric information: from and to remote control devices + information from (static) sensors (e.g. observation)   |
| Hotspot on disaster or event area (e.g in mobile communication centre)   | A temporaly hotspot for local broadband data on a crisis/disaster/investigation area or at a big planned event  |
| Front office - back office applicaties   | The possibility to work 'on the street' with the normal 'in the office' front and backoffice applications   |
| Under water communication scuba diver  | Via data communication contact with a scuba diver   |
| Alarming / paging  | Paging function to alarm PSS people (e.g. fire people to go to the fire centre)   |
| Traffic management system: information on road situations to units   | Information to the field units on which roads to used, blockages etc.   |
| Radiobearing tracking or special agents operations   | Special units applications like tracking via radiobearing   |
| IMSI Catcher information to units  | From telephones under surveillance (with the IMSI Catcher) information to the relevant police people  |
| Connectivity of abroad assigned force to local ccc   | Availability for forces from other countries to get in contact with the local controlroom via data communication  |

|   |  |
|---|--|
| Most important parameter for this application   | Some parameters are more relevant for an application than others. This differs per application. The colours indicates the 3 most relevant parameters for a certain application |
| Second important parameter for this application |  |
| Third important parameter for this application  |  |

| Transaction per peak hour per user | Reduction factor in emergency | Uplink users per cell (peak) for this application | Uplink users per cell (emergency) | Downlink users per cell (peak) for this application | Downlink users per cell (emergency) | Groups per cell instead of users (peak) | Groups per cell instead of users (emergency) | Data per transaction (bytes) | or one only! | Bit rate of transaction (kbps) | X Length of transaction (mins per hour) | Uplink load (peak) kbps | Uplink load (emergency) kbps | Data per transaction (bytes) | or one only! | Bit rate of transaction (kbps) | X Length of transaction (mins per hour) | Group loading factor | Downlink load (peak) | Downlink load (emergency) | Downlink load (peak) if group call used |
|------------------------------------|-------------------------------|---|-----------------------------------|---|-------------------------------------|---|--|------------------------------|--------------|--------------------------------|---|-------------------------|------------------------------|------------------------------|--------------|--------------------------------|---|----------------------|----------------------|---------------------------|---|
|------------------------------------|-------------------------------|---|-----------------------------------|---|-------------------------------------|---|--|------------------------------|--------------|--------------------------------|---|-------------------------|------------------------------|------------------------------|--------------|--------------------------------|---|----------------------|----------------------|---------------------------|---|

## ETSI notes and key to numerical portion of matrix

Below are listed the column headings in the 'Matrix' sheet, which are used to calculate the load offered by the various services.

The loading is separated into 'peak busy hour', which is the normal highest loaded hour during a normal week, and 'emergency' peaks

Emergency peaks are intended to be those where the responders are dealing with a large scale incident.

Loading is separated into uplink and downlink, as many applications are asymmetric

Data is entered into the white columns, and calculated values are shown in the pale yellow columns.

The calculations will give the average throughput required in peak and emergency hours: we need to think how/if we generate an absolute peak figure (some applications will be averaged any way, and some may be throttled back during absolute peaks because of priority, but there may still need to be a way to give a higher absolute peak value).

Calculations are (number of users) \* (transactions per hour) \* ((size of transaction) or (bit rate \* duration)) for uplink and downlink, peak and emergency conditions, and group vs individual for downlink.

### Transaction per peak hour per user Reduction factor in emergency

Number of transactions per user (who makes use of this application) during the normal daily peak busy hour

Multiplier for how much this will be deprioritised during an emergency. Some less mission critical applications may be deprioritised by the system, and some will simply be used less by users as their attention will be on other duties. Initial figures: 1 = 'high' mission critical (no reduction); 0.5 = 50% reduction for 'medium' mission critical; 0.1 = 90% reduction for 'low' mission critical services (all in column I)

### Uplink users per cell (peak) for this application Uplink users per cell (emergency)

Number of users that make use of this application on the uplink during the normal daily peak busy hour

Number of users that make use of this application on the uplink during a peak emergency event. Differences from peak busy hour might be that more (or less) users are now within the cell during the event, or that more (or less) users who were already in the cell may now need to make use of it.

### Downlink users per cell (peak) for this application

Number of users that make use of this service on the downlink during the normal daily peak busy hour, assuming that the application uses an individual bearer service.

### Downlink users per cell (emergency)

Number of users that make use of this service on the downlink during a peak emergency event assuming that the application makes use of an individual bearer service

### Groups per cell instead of users (peak)

If the bearer service is group addressed instead of individually addressed, how many separate groups would need to receive the service in peak busy hour conditions

### Groups per cell instead of users (emergency)

If the bearer service is group addressed instead of individually addressed, how many separate groups would need to receive the service in peak emergency conditions

### (Uplink) Data per transaction (bytes) or one only!

For one transaction, if a short transaction, how much data is sent.

*(Column used as a warning. A transaction should either be counted as a set of fixed length data transactions, or as a streamed transaction of given time and bit rate. If both are entered, both sets of data will be added together).*

### Bit rate of transaction(kbps)

Alternatively, for long/streaming transactions, what is the bit rate of the transaction.

### XLength of transaction (mins per hour)

For long/streaming transactions, what is the length of the transaction.

### Uplink load (peak) kbps

Calculated uplink load in peak busy hour, averaged over the hour.

### Uplink load (emergency) kbps

Calculated uplink load in peak emergency conditions, averaged over the hour.

### (Downlink) Data per transaction (bytes) or one only!

*(Column used as a warning. A transaction should either be counted as a set of fixed length data transactions, or as a streamed transaction of given time and bit rate. If both are entered, both sets of data will be added together).*

### Bit rate of transaction(kbps)

Alternatively, for long/streaming transactions, what is the bit rate of the transaction.

### XLength of transaction (mins per hour)

For long/streaming transactions, what is the length of the transaction.

### Group loading factor

If the service is group addressed, what is the additional overhead. E.g. '2' indicates that twice as much downlink capacity is used than would be used for an individual transaction (for example, to gain resilience, the transmission is repeated once after its initial transmission).

### Downlink load (peak)

Calculated downlink load in peak busy hour, averaged over the hour if the transactions use an individually addressed downlink bearer service.

### Downlink load (emergency)

Calculated downlink load in peak emergency conditions, averaged over the hour if the transactions use an individually addressed downlink bearer service.

### Downlink load (peak) if group call used

Calculated downlink load in peak busy hour, averaged over the hour if the transactions use a group addressed downlink bearer service.

### Downlink load (emergency) if group call used

Calculated downlink load in peak emergency conditions, averaged over the hour if the transactions use a group addressed downlink bearer service.