



# **Next-generation Nødnett in commercial networks**

## Approach for further work

Memorandum prepared jointly by the Norwegian Directorate for Civil Protection (DSB) and the Norwegian Communications Authority (Nkom)

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## The current Norwegian Emergency Public Safety Network (Nødnett)

Today's Nødnett provides voice services for its users. The state has a contract with Motorola Solutions for the operation and maintenance of the current Nødnett at a fixed price until the end of 2026. In the period up to 2026, it has been agreed that the core network will be upgraded, which will allow the lifespan of Nødnett to be extended by five years, up to the end of 2031. However, it is highly uncertain how much this extension will cost.

If the contract with Motorola Solutions is not extended to allow the continued operation of the network after 2026, a new solution for the emergency services and preparedness agencies will have to be in place no later than the second half of 2026. Emergency services and preparedness agencies already have a growing need for good, mobile broadband services that cannot be provided by the current Nødnett. The authorities must therefore find a solution for a Next Generation Nødnett (NGN) that can offer mobile broadband services.

Irrespective of whether or not the plan is to extend the contract with Motorola Solutions, there is an expectation among emergency services and preparedness agencies that mobile broadband for critical data communication will be implemented in parallel with the current Nødnett.

## Emergency and preparedness functionality in commercial networks

In «Digital Agenda for Norway»<sup>1</sup>, the government stated, and the national assembly (the Storting) approved, that the electronic communications authority shall facilitate good communications solutions for the emergency services and preparedness agencies, and that the government will work to ensure that, as far as possible, the commercial electronic communications networks will be capable of carrying future services for the emergency services and preparedness agencies.

The electronic communications authority is currently preparing the allocation of frequency resources in the 700 MHz band for mobile services. In this context, Nkom has obtained a socioeconomic analysis<sup>2</sup>. This looks at how the current frequency resources can be allocated so as to make the most efficient use of the frequency spectrum and that is the most socioeconomically beneficial, including whether parts of the frequency band should be reserved for a new, dedicated Nødnett.

The socioeconomic analysis concludes that a solution should be facilitated which safeguards Nødnett users' needs for mobile broadband services in commercial mobile networks. The conclusion is based on socioeconomic principles and is not a complete estimate of what NGN will cost. The analysis therefore does not provide the full costs relating to measures that improve robustness or security, or other measures that would be occasioned by the use of commercial networks for NGN.

Nkom's recommendation to the Ministry of Transport and Communications (SD) of June 2017 on the use of the 700 MHz band is that the frequency resources be allocated to commercial actors and that NGN be implemented in commercial mobile networks.

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<sup>1</sup> Meld. St. 27 (2015-2016) Report to the Storting «Digital Agenda for Norge – IKT for en enklere hverdag og økt produktivitet». (In English: «Digital agenda for Norway in brief – ICT for a simpler everyday life and increased productivity».)

<sup>2</sup> Nexia Management Consulting AS (now Analysys Mason AS) and Menon Economics: «Anvendelse av 700 MHz-båndet – samfunnsøkonomisk analyse», February 2017. (In English: «Future use of the 700 MHz band, Executive summary».)

An important condition of allowing the commercial mobile networks to support the NGN is that the networks must provide the necessary functionality, coverage and security, and also a robustness that allows emergency services and preparedness agencies to communicate, even when the networks are subject to extreme strain.

The digitalisation of society has led to increasingly higher expectations that the commercial electronic communications networks should be secure and always available. This also means that the requirements the authorities set for security and robustness are becoming increasingly strict. In contrast to the current Nødnett however, the commercial mobile networks of today are not constructed with a robustness and security that is tailored for the needs of the emergency services and preparedness agencies.

If the commercial networks are to carry the NGN, it may therefore be necessary to implement measures regarding coverage, functionality, robustness and security. Such measures will benefit common users and can thereby also be considered as a way to ensure more robust mobile networks for the country.

In this memorandum, DSB and Nkom outline an approach towards realising the NGN in commercial networks in a way that addresses all these factors.

## Implementation of the NGN: Means and responsibility

In both the current electronic communications legislation and in the proposal for a new Security Act, there are regulatory mechanisms that will enable the authorities to stipulate requirements regarding functionality, coverage, robustness and security that will be necessary to realise the NGN in commercial networks. Measures imposed by the authorities will include continuing and developing the requirements for security and robustness that will have to be paid for by commercial actors. In addition comes special orders aimed at addressing the needs of the emergency services and preparedness agencies, the additional costs of which must be borne by the state.

However, it is outside the scope of the electronic communications legislation to impose specific technical solutions regarding how the NGN is to be realised in commercial networks. The NGN must therefore be realised through a *combination* of commercial procurements and requirements imposed by the authorities, arranged in order to ensure competition between the commercial mobile operators.

The primary responsibility of ensuring the realisation of the NGN should be clearly assigned to one unit within the public administration. This responsibility currently lies with the Ministry of Justice and Public Security, based on its role of overarching responsibility for societal safety and emergency preparedness. The responsibility should remain with the justice and public security sector. The unit responsible for NGN must obtain and harmonise user requirements and be responsible for the commercial procurements.

The electronic communications authority has a responsibility to assess and if necessary enforce the implementation of any special measures pursuant to Electronic Communications Act that will not be included in the commercial contracts. This can be accomplished under to existing grant schemes and the electronic communications authority's current legislation, but will necessarily require the allocation of funds in order to implement these measures. In addition, the electronic communications authority is responsible for concretizing expectations regarding the providers'

compliance with requirements for proper security — i.e. the basic security of the networks — in line with digitalisation, technological developments and developments in the threat situation.

## The NGN and coverage

According to the Electronic Communications Act, coverage requirements can be attached to frequency licences when these are allocated. In previous allocations, special coverage obligations have been tied to a specific frequency block ('coverage block') that operators can bid for. Nkom has recommended that special coverage requirements are not attached to the NGN when the 700 MHz band is allocated.

Nkom has made calculations based on information from the mobile operators about their current mobile networks and planned future developments. These show that the total coverage for mobile broadband in the biggest commercial mobile networks will most likely be in line with the current Nødnnett or better, during the course of 2018. In practice, coverage requirements associated with the NGN may also 'lock' the NGN to the operator who has been allocated a particular coverage block. This will in turn restrain competition and increase the risk that it will cost more to implement the public-protection and disaster-relief functions in the network.

It is the view of Nkom and DSB that coverage should instead be part of the competitive parameters involved in negotiating commercial contracts with the relevant mobile operators. These can also be combined with the strategy that the state, through the annual, direct funding of the national budget's provision for telecommunications security and preparedness, covers the additional costs of measures imposed by Nkom for the establishment of coverage in areas that are essential for the emergency services and preparedness agencies.

There are currently no satisfactory solutions in the mobile networks for special needs such as air-ground-air communication and direct device-device communication. These needs must be addressed, regardless of whether a new, dedicated Nødnnett will be constructed, or whether it will be implemented in the commercial networks.

## The NGN and functionality

The transfer of data in the commercial networks is currently achieved mainly by the use of LTE. In the last three years, there has been extensive, international standardisation work in order to bring the required functionality for public protection and disaster relief to the LTE standard. Developing unique solutions solely for Norwegian emergency services and preparedness agencies would be extremely costly, so if there is any need for functionality in addition to those which have been standardised, these will have to be addressed in the standardisation track.

Essential requirements for public protection and disaster relief functionality should be included as competitive parameters in negotiations for commercial contracts with the relevant mobile operators.

Pursuant to sections 2-10 of the Electronic Communications Act, the electronic communications authority is authorised to instruct providers of electronic communications networks and services to implement measures in order to ensure compliance with national requirements regarding functionality. This may be relevant if it becomes necessary to impose measures on several mobile providers, such as facilitating priority or national roaming functions.

## The NGN and robustness

In the same way that imposing a coverage obligation on only one party could weaken competition, it would be unfortunate if the robustness measures were to be implemented in only one of the mobile networks. It is therefore considered most appropriate that the necessary requirements regarding robustness, back-up power and redundancy of transmission in the commercial networks are continued (and reinforced) through the orders imposed by the electronic communications authority. These may be general requirements regarding improved robustness of the networks, cf. Nkom's 2017 report<sup>3</sup> on robust and secure national transmission networks among other things. The report presents objectives and measures to improve availability and diversity in the Norwegian electronic communications infrastructure in 2025, which would facilitate improvements in robustness and options for future critical public service networks, such as the NGN.

It will also be necessary to impose measures to improve robustness in order to safeguard the particular needs of the NGN. The precise needs must be identified by the unit responsible for implementing the NGN, but could be managed by Nkom through the current grant scheme for telecommunications security and preparedness. Measures implemented as orders pursuant to the Electronic Communications Act will improve the general infrastructure, and not solely in one mobile network, which would benefit the society as a whole.

The robustness of the networks must be built up and maintained in the long term, and will not be a one-off investment. Networks are constantly changing, and out of a total turnover of NOK 34 billion in 2016 from electronic communications services, almost NOK 11 billion were ploughed back in the form of investments in networks and services. NOK 2.9 billion of these funds were invested in the mobile networks. In addition to the operators' own investments to improve robustness, public funds should also be added to ensure that the needs of the emergency services and preparedness agencies are safeguarded in the long term. The state contribution must necessarily be based on ongoing risk assessments.

## The NGN and security

The requirements for the availability, integrity and confidentiality of the electronic communications network and services must be specified and strengthened through the current proposal for new Security Act. In accordance with the proposal, the authorities in each sector will also be given a greater administrative and supervisory responsibility than is the case today. Telenor, Telia and ICE are already subject to the provisions of the Security Act. So is Broadnet, which provides a nationwide transmission network. The requirements regarding the integrity and confidentiality of the electronic communications network and services are further specified in electronic communications legislation.

Security requirements which may be implemented in accordance with the Security Act and electronic communications legislations will be attended to by the electronic communications authority, independently of the NGN. Nkom has also been commissioned by SD to study requirements for national autonomy in the Norwegian electronic communications network. Implementing the NGN in the commercial networks, together with the fact that other important societal values are provided by the commercial networks, mean that this work will become increasingly important for the electronic communications authority in the years ahead.

In addition to the requirements imposed by the authorities, it would be sensible for the requirements regarding security to be incorporated as key competitive parameters in negotiations

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<sup>3</sup> «Robuste og sikre nasjonale transportnett – målbilder og sårbarhetsreduserende tiltak», Nkom, 7 April 2017.

for commercial contracts with the relevant mobile operators. These may typically be physical and logical barriers between core networks and functions that are used by ordinary users and emergency services and preparedness agencies, access control, storage requirements, response times in the event of errors, etc.

## The way forward

As mentioned above, the authorities have the relevant instruments needed to facilitate the NGN in commercial networks. If NGN is to be realised in the commercial mobile networks, there will be more matters that need to be clarified. However, DSB and Nkom believe that the needs of the emergency services and preparedness agencies can be safeguarded through a combination of requirements imposed by the authorities and commercial procurements. This solution can adequately ensure that the requirements that must be imposed are met, while also ensuring that there will be competition between the operators. Such an approach is also in line with the guidelines presented in the «Digital Agenda for Norway».

A conceptual decision on how the NGN is to be implemented should be made at the same time as the decision on the use of the 700 MHz band. Clearly, it will be beneficial to clarify this quickly, so that the 700 MHz band can be allocated and brought into use. When the solution for the NGN is chosen, this must be accompanied by an intention for implementing the solution financially, in order to address the needs for coverage, functionality, robustness and security.