



# BUILDING A NEXT GENERATION ACCESS NETWORK FOR IRELAND

## ISSUES AND OPTIONS

A REPORT BY THE TELECOMMUNICATIONS AND INTERNET FEDERATION



*An affiliate association within IBEC* | the Irish Business and Employers Confederation

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**NEXT  
GENERATION  
ACCESS**



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Building a Next Generation Access Network for Ireland - Issues and Options  
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# NEXT GENERATION ACCESS

## INTRODUCTION



Next Generation Access - or NGA for short – has become in the space of the past two years a ‘hot’ topic of debate in telecommunications as policy makers recognised that the deployment of high speed broadband capability has the potential to drive economic recovery and the development of knowledge industries.

However, much of the debate about NGA has been poorly informed with no agreed definition even as to what the term means other than that it refers to a new broadband capability, which is much faster than that currently available to most customers, and an understanding that this capability will cost a great deal of money to build.

It is not unusual for new services and technologies to be clouded in uncertainty; after all the pace of technological developments is such that what is considered ‘next generation’ today may be ‘legacy’ within two to three years. Nevertheless, it is important that the debate should be as well informed as possible and in particular that some shape is put on what actually constitutes an NGA, the benefits that it would bring, how much it would cost to deploy, and how it might be realised.

**John McKeon**  
Chair

TIF Broadband and Next Generation  
Networks Industry Group

Towards this end, TIF commissioned the respected international consultancy firm Analysys Mason to undertake a study on its behalf with a view to establishing the broad dimensions of an NGA for Ireland. This document summarises and draws out the main themes from the Analysys Mason study. It is not a definitive study of the position in Ireland, nor does it represent an agreed industry wide view of the way forward. What it was intended to do, and what it does provide, is an input into the debate regarding the roll-out of NGAs in Ireland. It is hoped that the study proves useful to the members of TIF and the wider stakeholder community in their consideration of the policy and commercial issues, which arise in undertaking and organising what could yet be the infrastructure investment to define 21st century Ireland.

**Peter Evans**  
Vice Chair

TIF Broadband and Next Generation  
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April 2010

## THE ECONOMIC/COMPETITIVENESS IMPERATIVE

The economic imperative to build and deploy NGA high speed broadband networks is now well accepted around the world and investment in high speed broadband networks that offer consumers innovation and choice is seen as providing an essential impetus to economic recovery<sup>1</sup>.

Given this prize, and notwithstanding that there is a 'gap' between the price which consumers are prepared to pay for network access and the actual cost of building and operating a high speed next generation broadband network, many of the leading world economies across the public and private sectors have announced, and in some cases have commenced, very large scale investments in NGA networks<sup>2</sup>. Such developments have not gone unnoticed in Ireland and with a number of policy papers and reviews produced by Government, ComReg and Forfás all identifying the need to support and incentivise NGA investments if the infrastructure underpinning economic development in Ireland is to provide a basis for national competitive advantage<sup>3</sup>.

While such papers and reviews provide a welcome recognition of the strategic importance for our country of NGA investments they will not of themselves lead to any significant investment. If Ireland, having just 'caught up', in the deployment of the current generation of broadband capabilities is not to be left behind again in the deployment of next generation capabilities, it is essential that we move quickly to make the large scale investments necessary to achieve a step change in capability and build a world leading next generation network.

1. For example see World Bank (2009) "Information and Communications for Development 2009: Extending Reach and Increasing Impact"

2. For example the Australian Government has committed to the build of a nationwide NGA costing A \$43bn; the Italian Government has committed to invest €1.47bn in NGA; the Greek Government has announced a €2.1bn investment in NGA plan, the Portuguese Government has negotiated a €800m credit facility from the European Investment fund to help finance NGA deployment, the UK Government is considering a £6 per line NGA tax to fund a £20bn investment in NGA and the Singaporean Government has provided funding of S\$750m to the build of NGA

3. For example see Forfás (2008), "Response to the DCENR Next Generation Broadband Consultation Paper"



## THE INVESTMENT CHALLENGE

As an economy we made such large scale investments before. We were the first country to move to a fully digitalised telecommunications network in the 1980's – at a cost in current day values of some €10bn. It was this investment which positioned our country to exploit the evolution of the services economy and attract many multi-national and 'off-shore' activities to Ireland. However, market conditions between the 80s and now are entirely different.

Accordingly while the level of investment required to build a Next Generation Network capable of serving 90% of our citizens may, at c €2.5bn (as estimated by Analysys Mason), seem relatively modest, the challenge involved in making this investment is much more complex:

- ▶ First, a Next Generation Access Network will not be just one network but will in fact consist of many networks – including Fibre to the Home/Fibre to the Cabinet, Cable TV, and 4G Wireless networks. A key issue arises, therefore, as to how much of what type of network should be built and in what locations. In particular, how investment resources can be deployed in the most efficient way possible to avoid unnecessary 'overbuild' of multiple networks in the same locations.
- ▶ Second, the investment in these networks will not be made and co-ordinated by one single Government controlled entity (as was the case with the digitalisation investment of the 1980's) but will involve multiple operators all with different business strategies.
- ▶ Third, the investment is required at a time when telecommunications network revenues are under pressure, as value is increasingly absorbed by content and media providers. This is in stark contrast to the 1980's when telecommunications network revenues were rising.
- ▶ Fourth, although the regulatory policy approach to NGA is still developing and further guidance from Europe is expected over the coming year, it remains to be seen how this policy will translate into practical actions to balance the goal of incentivising investment with the goal of supporting sustainable competition
- ▶ Fifth, the pace of technological change is such that early investments in NGA equipment and assets carry higher risk than investments made during the 1980's.
- ▶ Sixth, the role of Government in sponsoring and supporting investments must take account of EU State-Aid rules.

TIF believes, as set out in its statement of "Principles to inform the development of Next Generation Networks and Services" that the members of industry working together are best positioned to resolve these complexities in collaboration with other stakeholders including Government and Regulators.

Towards this end, and in order to inform the dialogue necessary as part of such an approach, TIF commissioned Analysys Mason to undertake high level scenario modelling of NGA network alternatives and prepare a report highlighting some of the key issues that arise and identifying potential options for addressing these issues.

## KEY ISSUES

The Analysys Mason report, which we summarise in this document, does not claim to be a definitive analysis of the position in Ireland nor does it identify a single right answer or recommend a particular approach or mix of approaches, but simply identifies some generic alternatives and provides an order of magnitude in terms of cost. There are, however, some clear conclusions which can be drawn:

### **Network sharing / collaborative investments:**

Given that any large scale NGA is likely to comprise a mix of technologies, and in order to reduce overall cost of building an NGA and maximise the utilisation of existing assets, it is possible, if not probable, that some form of collaboration between the existing fixed and radio access network operators in Ireland may evolve. A number of potential 'collaborative' models including Single Entity/open network access, Joint Venture models, Layered Infrastructure models and Complementary/Geographic investment models can be identified and it remains to be seen which of these models will take shape in the Irish market. Ultimately, no particular model can be mandated and it will be a matter for the key network/platform owners to determine if a collaborative model can be found which supports risk and investment sharing but still enables widespread deployment of NGA, retail competition between operators and service differentiation for consumers.

### **Forward looking regulatory approach:**

Whatever form of NGA is ultimately built, it is clear that the network(s) should be operated in manner which protects and support sustainable competition at the retail level. In particular, regulated Wholesale access may continue to be required where any undertaking is found to have Significant Market Power (SMP). However, given the scale and risks associated with the network investments required for NGA, it is important that the necessary checks and balances established by regulation do not go so far as to sustain inefficient competition at the expense of lowering returns to investors in network assets. In this regard, regulatory policy should strive to find the correct balance between pro-investment and pro-competition regulation and, in particular, if it is to support collaborative investments by operators, it should take account of the convergence in technologies to migrate from market definition/regulation based on technology to market definition/regulation based on consumer markets uses and applications.



### **Forward looking and pro-investment public policy:**

Even in a market characterised by collaborative investments by network operators and a supportive pro-competition regulatory regime, it is clear that the scale of investment is such that it is highly unlikely that a ubiquitous NGA will be built offering 50mbps+ broadband to all people in all areas of the State. In order to make progress towards a vision of widespread NGA, Government needs to support industry by taking what steps it can to reduce network build costs and incentivise investment. In addition, the Government can, through its management of 'public assets' including spectrum, public ducts, and other infrastructure, take steps to help operators maximise what they can achieve, in terms of depth and breadth and coverage, from the investment funds available to them. For example, the approach taken to the allocation of Digital Dividend spectrum will be critical to determining the level of investment in 4G broadband capability. Finally, the Government must be prepared to support the development of NGA by allowing state funding to support NGA in those areas that industry will not reach.

### **Re-balancing of market returns:**

In common with other countries, the market for broadband services in Ireland evolved on the basis of 'incremental' value add. In other words broadband capability was added onto an existing service; be it fixed voice, mobile voice, or Cable TV and the prices set for broadband services tended to reflect the incremental nature of the service. The so called

'legacy' services, for example telephone line rental and call charges, contributed most of the revenues of the industry. However, as demand for 'legacy' services declines, the incremental revenues from broadband provision are not sufficient to cover the cost of building or maintaining the underlying network platform essential to carry this broadband capability. The Analysys Mason study indicates that at current prices, it would take over 12 years for a NGA network operator to recover its investment costs – not to mention earn a return on this investment.

Such returns are unsustainable to the private investor. Simply put, extra funding must be found to deliver widespread NGN roll out as envisaged. Three possible sources of such funding can be identified:

1. From consumers and businesses through higher prices
2. From the state who will derive significant benefit from the more efficient and competitive national economy that NGNs deliver
3. From somehow applying charges to online service providers who undoubtedly derive benefit from better communications infrastructure - the so-called net neutrality debate

Each option has significant merits and demerits – but choices must be made through engagement and partnership.

TIF commends this report to its members, to Government and to ComReg and urges that it be used as an input to the consideration of policy and commercial decisions. For its part, TIF will continue to promote and facilitate intra-industry debate and dialogue in line with the eight core principles for NGN development agreed in April 2008.





TIF NGN Subgroup



# Summary of Analysys Mason Report

February 2010





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## BACKGROUND - TIF REQUIREMENT

A subgroup of the TIF NGN Workgroup commissioned Analysys Mason to produce a report into the options for NGA in Ireland, as an input into a TIF paper on its recommendations.

The Terms of Reference requested the output of the report to comprise:

1. the most likely network topography to deliver a high availability of NGA for Ireland
2. whether Ireland can achieve an NGA rollout of this standard in the timeframes set out
3. whether any one operator, or a number of operators individually can make the investment and develop this NGA
4. if not, what other options are there, or how might it be brought about
5. what are the regulatory and competition law issues posed by any such approach; how to establish open and fair downstream competition and innovation
6. what type of support framework needs to be provided by Government / Regulators to facilitate such arrangement
7. whether key regulatory policy decisions (in particular in respect of; promoting platform competition, investment risk mitigation and spectrum allocations) need to be accelerated
8. whether such support should include financial/fiscal subvention from Government (including an assessment of the wider socio-economic benefits of any NGA investment).



## TECHNOLOGY OPTIONS

- ▶ FTTH (GPON/PtP), FTTC (VDSL) and Wireless (LTE with Fibre Backhaul) were the primary technologies considered \*

### FTTC

- ▶ Existing Eircom duct, poles and cabinets re-used, plus new cabinets deployed
- ▶ All copper wiring between premises and cabinet remains in place
- ▶ Interconnect via bitstream in Exchange (no sub-loop unbundling)

### FTTH

- ▶ Both PtP and GPON considered (PtP ~20% more expensive)
- ▶ Legacy services over copper remain in place in parallel with fibre
- ▶ Network passes all homes, but last drop (~40m) connected upon request

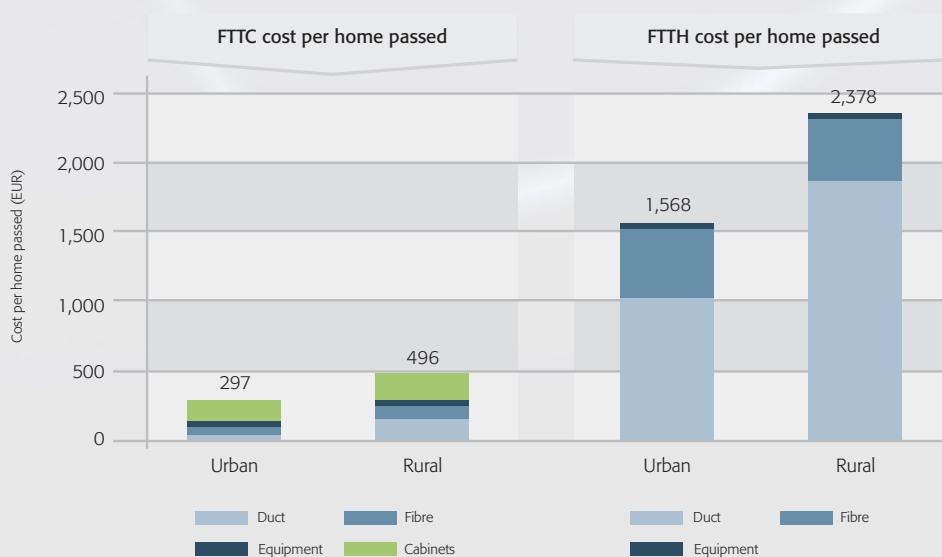
### LTE

- ▶ Coverage is provided via LTE on existing mobile base station sites
- ▶ Fibre deployed to the majority of base stations for backhaul

\* HFC DOCSIS, Wireless DOCSIS and Satellite were noted as potential contributors to NGA, but not costed

## COST ESTIMATES – FTTC/FTTH

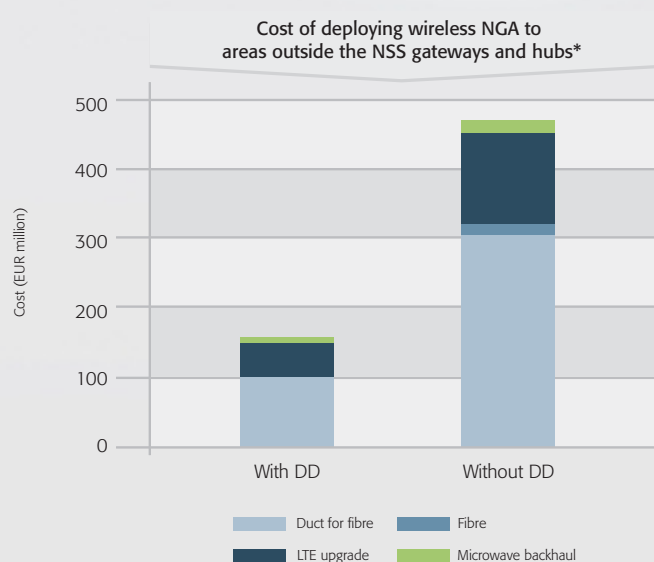
- ▶ Ireland's high proportion of rural and very rural population makes the business case for widespread fixed NGA less attractive
- ▶ Only costs from PoP to end user premises are considered
- ▶ Civil work is the main determinant of cost
- ▶ Cost of FTTC in Ireland is c.50% more expensive than BT's superfast broadband plan in the UK





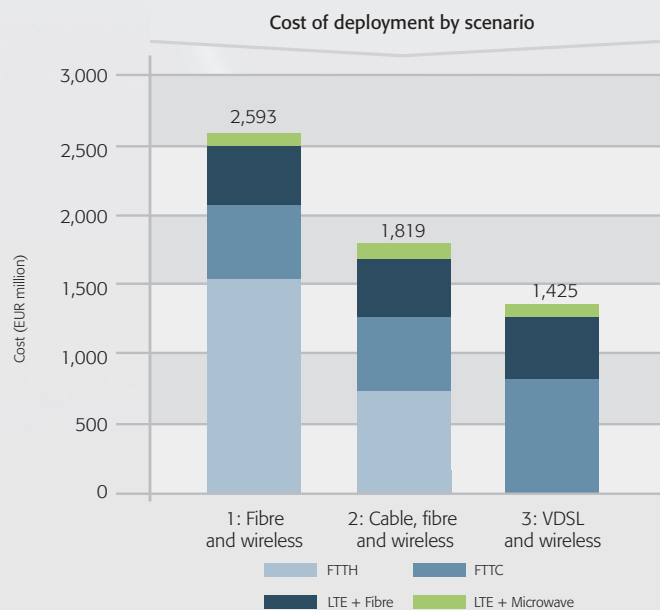
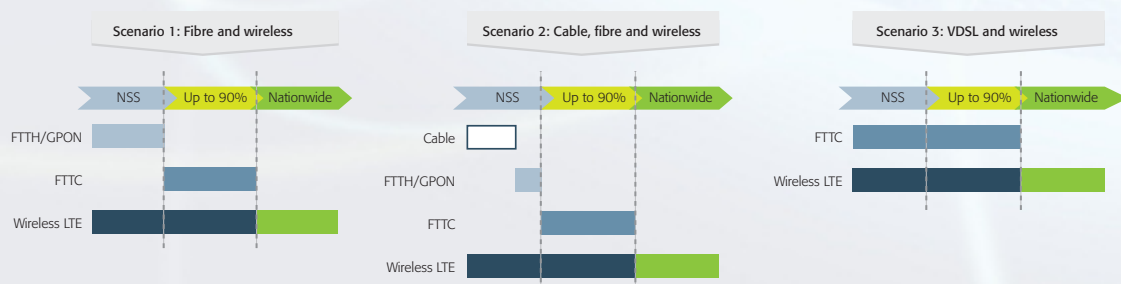
## COST ESTIMATES – WIRELESS LTE IN RURAL AREAS

- ▶ Ireland's population density makes wireless a likely solution for many non - urban regions
- ▶ Costs of fibre backhaul to wireless sites and wireless access costs considered
- ▶ Use of lower - frequency spectrum greatly improves coverage, without Digital Dividend spectrum, coverage costs will increase by a factor of 3
- ▶ LTE would require a significant amount of spectrum to achieve 50Mbit/s throughput
- ▶ NGA performance is only possible if large pieces of spectrum are made available, which may be only feasible through collaboration



\* Based on average backhaul distance of 6km, some aerial fibre and microwave for very long links

# NGA ROLLOUT SCENARIOS

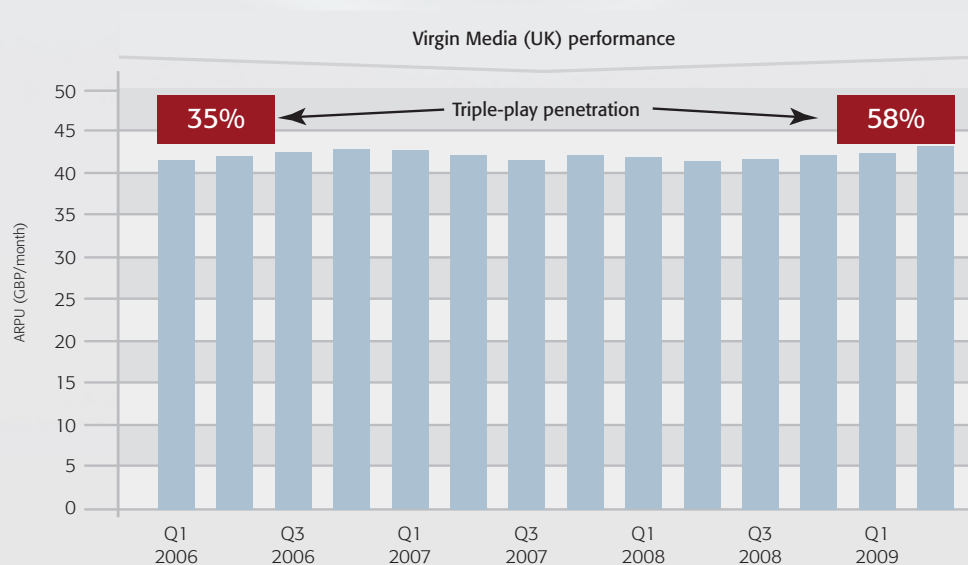


\* Wireless costs above are assumed without Digital Dividend Spectrum



## CUSTOMER DEMAND

- ▶ Set against significant costs, the demand-side business case for NGA is unclear
- ▶ Operators worldwide are facing the challenge of meeting ever-increasing customer demand for bandwidth without a commensurate increase in ARPU, as illustrated by the example shown in the chart
- ▶ This trend of flat ARPU indicates that the major investment needed to provide a step change in broadband capacity may not generate sufficient revenues to justify the expense
- ▶ There is currently no indication that the Irish market will be any different



\* Source: Virgin Media, Analysys Mason

## POTENTIAL COLLABORATION MODELS

Model	Description	Challenge
Network Evolution	as per the UK model, the incumbent would upgrade its network and supply on an open access basis	The incumbent's ability to justify the business case
Layered	incumbent/others own infrastructure, a JV would own fibre/electronics, sold on an open or preferential access basis	Requires agreement from major infrastructure owners
Open joint venture	a joint venture providing wholesale services on an open access basis	Requires strong support from outside the telecoms sector
Preferential joint venture	a joint venture which only sells access to its shareholders, at least one of which must be a wholesale-only operator	Returns from equity invested in the network are minimal
Build and Share	multiple operators with existing assets offering access to one another on a reciprocal basis	May be viewed as a cartel



## KEY CONSIDERATIONS

- ▶ Typical speeds for FTTC (VDSL) will be ~30Mbit/s, with less than 50% of homes receiving a 50Mbit/s service
- ▶ Wireless is particularly suited for Rural areas where interference is lower, where there may be fewer concurrent users per cell, and where fixed antennas can be used
- ▶ The most significant driver of costs is the civil work, with dig costs representing up to 65% of total FTTH costs
- ▶ To deliver NGA, an investment of up to 35% over and above current levels of annual industry investment will be required for up to 10 years
- ▶ The demand-side business case for NGA is unclear, examples from other markets suggest that revenues remain flat as bandwidth increases
- ▶ Adaptation of an existing NGA collaboration model will be required in order to meet Ireland's unique local circumstances
- ▶ A holistic approach to NGA is needed, with government policy and regulation having a significant role to play in its deployment

## PUBLIC POLICY SUPPORT REQUIRED

- ▶ **Spectrum:** to enable high-speed wireless access, central government needs to give clear guidance on plans for spectrum particularly the digital-dividend spectrum
- ▶ **Civil Costs:** to avoid unnecessary costs in fibre deployment, local authorities should be encouraged (possibly with facilitation by government) to streamline works planning processes and avoid imposing disproportionate costs on operators
- ▶ **Infrastructure:** to maximise reuse of existing infrastructure, ducts owned by local authorities, government and state owned companies must be made available through the one-stop-shop
- ▶ **Regulation:** to support the investment case, ComReg needs to offer clarity and consistency in its approach to regulating NGA networks



## GLOSSARY OF TERMS

<b>DD</b>	Digital Dividend
<b>DOCSIS</b>	Data Over Cable Service Interface Specification
<b>FTTC</b>	Fibre To The Cabinet
<b>FTTH</b>	Fibre To The Home
<b>GPON</b>	Gigabit ethernet Passive Optical Network
<b>HFC</b>	Hybrid Fibre Coax
<b>LTE</b>	Long Term Evolution
<b>NGA</b>	Next Generation Access
<b>NGN</b>	Next Generation Network
<b>PoP</b>	Point of Presence
<b>PtP</b>	Point-to-Point
<b>TIF</b>	Telecommunications and Internet Federation
<b>VDSL</b>	Very high bit rate Digital Subscriber Loop

## ABOUT TIF

IBEC's **Telecommunications and Internet Federation (TIF)** is the representative body for leading industry and associated interest groups in the field of electronic communications in Ireland. TIF informs policy makers; namely the Government, the EU and ComReg, of the industry's needs in respect of relevant sectors including next generation broadband, mobile, wireless, cable, outsourcing services and Internet service provision.

### **TIF oversees:**

- The advocacy of the long-term interests of participants in the electronic communications industry in Ireland
- The publication and promotion of policy recommendations reflecting the views of operators and users in relation to telecommunications and internet issues
- The provision of a forum for discussion on relevant issues amongst network operators, telecommunications users, internet service providers, outsourcing service providers and other communities of interest.

TIF has identified seven key segments of the telecommunications industry. Each of these segments has a dedicated industry group made up of specialists from member companies and reporting to the TIF Council.

### **The Telecommunications and Internet Federation has the following industry groups:**

- Broadband and Next Generation Networks industry group
- Telecoms Technology industry group
- Mobile industry group
- Cable and Broadcasting industry group
- Regulatory Affairs industry group
- Outsourcing Services industry group
- Green Technology industry group

### **The Telecommunications and Internet Federation also has the following affiliates:**

- Irish Cellular Industry Association (ICIA)
- Mobile Operators Messaging Forum (MOMF)
- Irish Telecommunications Security and Fraud Forum (ITSFF)

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