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Amocom Technologies Ltd proposal in response to "Call for WLAN Pilot Proposals" by Dept of Communications, Marine & Natural Resources

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Contents

Definitions and abbreviations

Definitions

For the purposes of the present document, the terms and definitions given in [1] and the following apply.

Access Point Site: Generic name used to refer a wireless node in the network, which connects wirelessly to subscriber modules.

Access Point Cluster: Motorola Canopy term for the equipment located at the Access Point Site with which all subscriber units communicate. Each Access Point Cluster can contain up to six Access Point Modules – each of provides coverage over a 60-degree radius of two miles.

Fixed Wireless: in this document is used to describe a system that distributes broadband wirelessly to a permanent location. Term is interchangeable with WLAN, where WLAN is used in the same “fixed” context.

Metro Fibre Ring (MFR): A number of digital fibre rings are planned around Cork City. Ring 1 is planned for completion early next year connecting the National Software Centre (NSC) to the city centre. The NSC will be at the heart of this infrastructure with the MFRs acting as arteries around the city and suburbs.

Abbreviations

For the purposes of the present document, the following abbreviations apply:

AP	Access Point
APS	Access Point Site
BH	Backhaul
BSU	Base Station Unit (Proxim)
CMM	Cluster Management Module (Motorola)
CPE	Customer Premise Equipment
FCC	Federal Communications Commission
GPS	Global Positioning System
IP	Internet Protocol
ISP	Internet Service Provider
LOS	Line of Sight
MFR	Metro Fibre Ring
NOC	Network Operations Centre
POP	Point of Presence i.e. location of WISPs gateway to the Internet backbone.
RF	Radio Frequency
SM	Subscriber Module
TBD	To Be Determined
WISP	Wireless Internet Service Provider
WLAN	Wireless Local Area Network

1 Introduction

1.1 Scope

This document provides the details of a proposal lead by Amocom Technologies Ltd in response to the Department of Communications, Marine and Natural Resources call for WLAN pilot trials.

It describes a twelve-month plan for 140 subscribers, with three operational Access Point Sites. The Amocom network base is located at the National Software Centre, itself a node on the first phase of the Cork Metro Fibre Ring (MFR). A central aspiration of the Amocom proposal is to use WLAN or Fixed Wireless as a means of connecting end-users to the MFR. The MFR replaces the need for long, multiple-hop wireless backhaul (and associated delays) enabling the scalability of a robust and efficient broadband network.

The financial details are presented in detail, but show a trend heading for break-even on month thirteen – even while maintaining a steady rollout.

A Government grant of €11,141 is requested.

1.2 WLAN / Fixed Wireless

For readers who are unfamiliar with the term, WLAN (Wireless LAN) is a recent technology that allows computers to connect to a LAN (local Area Network) via radio frequencies – without wire or fibre. While originally developed for in-building use, its use for bridging LANs of different buildings was quickly identified, avoiding the need to dig or pay leased-line charges. The term “Fixed Wireless” is also commonly used to describe such systems. The first generation 2.4GHz technology has been commercially deployed in the USA for some time. Many of the major vendors Proxim, 3COM, Nokia, Cisco, Motorola etc. all offer commercial grade second-generation solutions. A number of private networks have also been successfully deployed locally in Ireland.

Speeds of up to 50 Mbit/sec and distances of up to four miles are possible within the new ODTR limits in the 5.7GHz frequency band. Wireless point-to-multipoint products enable fast (10Mbit/sec) cheap distribution of high-speed always-on Internet access to a large number (~1000) of premises (homes, businesses) within a couple miles of the source. Note that the bandwidth source may be provided via backhaul wireless link to the wireless operators point of presence.

Another trait is that these systems utilize unlicensed frequency bands (2.4GHz or 5.7GHz in Ireland). In order to allow sharing of these unlicensed bands, power levels are kept extremely low resulting in small low powered transmitters and receivers. Consequently, one disadvantage is that Line of Sight is required between transmitter and receiver for the system to work making site selection a critical aspect in the rollout process.

In summary, WLAN or Fixed Wireless is a proven technology that can, within limits, bridge the connection from the kerb (fibre) to the home/office i.e. a potential “last mile” solution for urban, suburban and rural environments.

1.3 The “broadband famine”

There has been much debate about the need for lower cost broadband Internet access in Ireland. ISDN or regular analog remains the predominant Internet access medium used by SMEs (Small to Medium size Enterprises) and SOHO (Small Office Home Office). The primary issues with these systems are speed and cost. Both ISDN and regular dial-up require a call to be established for each Internet access i.e it is a “pull” service where the end-user pays for each check to determine if a new email has arrived, a new on-line booking has been made etc. Alternatively, “always-on” enables a “push” service where emails and updates are immediately delivered e.g. by a boss to his/her team which may include one teleworkers. The lack of “always-on” broadband has been identified as a major hindrance and expense for existing businesses that could benefit from “push”. Additionally, it is often cited as a major obstacle to attracting high-tech businesses. Often businesses are not aware of the potential savings or additional revenue streams that can be generated from broadband Internet access.

However, as more government services, business moves on-line (e.g. Bank of Ireland business-on-line has now over 20,000 subscribers) and file size of Microsoft applications continue to increase, the case for “fast”, “always-on”, reasonably priced internet access becomes even more compelling.

1.4 About Amocom Technologies Ltd

Amocom Technologies was founded last April by John O'Hare. John has over twelve years international wireless telecommunications experience primarily with Motorola. Before deciding to establish Amocom, he was one of the key players in establishing/defending Motorola's strategic position on the 3GPP Core Networks international industry standards committee. Amocom, a member of Graduate/Genesis Enterprise programme 2002, was established to explore the potential opportunities arising from the emergence of high bandwidth / low cost wireless technologies in the unlicensed frequency bands. There is little doubt that many already realize some of the benefits of "always-on broadband". Much of the backbone capacity is already in place. What is needed is an economically viable means for businesses and homes to connect to that backbone. Additionally, Amocom believes that the maximum value to the business and SOHO customer is derived through the applications/services enabled by "always-on broadband". In summary we propose to work with our trial customers to identify and sell benefits, avoiding the GPRS / 3G trap of simply selling technology. Amocom believes that the trials proposed by the Department, provides an excellent opportunity to promote the benefits of Fixed Wireless.

1.5 Amocom trial partners

Table 1.5-1 below provides a list of partners involved in the trial together with various roles.

Primary Contact	**Organisation / Company**	**Role**
Mr John O'Hare	Amocom Technologies Ltd	Lead
Mr Michael O'Connor	Cork BIC, National Software Centre	Back office and backbone infrastructure
Dr Dirk Pesch	Cork Institute of Technology	Consultancy + closed test bed
Mr Trevor O'Connell	Digital Technology Management	Applications and services
Mr Dennis Stipati	Motorola (Canopy)	OEM Vendor
Mr Tony Fleming	Cork City Council	Knowledge transfer and facilitation (e.g. Metro Fibre Ring)
Mr Michael Geary	Cork Chamber of Commerce	Support and dissemination of information with members

Table 1.5-1 Amocom trial partners

2 Location, target customer profile and focus

2.1 Introduction

The National Software Centre (NSC), Lough Mahon Technology Park is the proposed Amocom Network Operations Centre and Point of Presence (POP). The NSC designed to securely host a diverse range of high bandwidth demand software companies has ready access to extensive broadband reserves and IT hosting facilities. Additionally, it is a node on Ring 1 of the Metro Fibre Ring (planned to come on line in the new year), providing secure fibre connectivity to a number of nodes in to and out of the City Centre. Hence, it is planned to locate the first Access Point Site on the roof of the NSC. The trial offers an ideal opportunity to explore the advances in the latest Fixed Wireless technology together with the services and applications enabled by it. One application is enabling the rapid rollout of an efficient affordable service allowing end users ready access to the Metro Fibre Ring.

Figure 2.1-1 provides an aerial view over the Mahon peninsula, before the NSC and a number of adjoining facilities were constructed. Distance from site (A) to City Centre (B) is less than approximately four kilometres.

Fig 2.1-1 Aerial photograph of proposed site (A) and City Centre (B)

2.2 Site selection criteria

The following are the primary factors why the Mahon/Blackrock area was selected:

- Bandwidth: As described in the Introduction section above, the NSC provides ready access to ample bandwidth and many of the network and subscriber management features required by an ISP to operate an IP network.
- Artery to the heart: As mentioned earlier, the NSC is a node on Ring 1 of the Metro Fibre Ring (MFR). The MFR will feed into the heart of the city and a number of limbs along the way. While initially, a wireless backhaul link to the city centre may be adequate, ready access to the MFRs will greatly enhance the ability to scale and provide near carrier class service.
- Mahon is a suburb of Cork city, which is one of the towns prioritised under Phase 1 of the government's broadband programme in the NDP.
- Mahon provides an urban/suburban access environment that may be deemed to have a high demand, i.e. a "hotspot", for Internet access. Target business customers span from large hi-tech enterprises, through to SMEs – see list of target customers. Demand is predicted to further grow in light of the proposed development of the Mahon Point €455M "mixed" commercial and retail development.

? Topography is such that there is Line of Sight to several sites overlooking the city centre. Some of these sites are listed in our target customer profile and are ideal for locating an Access Point Cluster.

2.3 Target customer profile

The trial will initially target thirty customers from across the community spectrum including enterprise, SME, retail, services, community and local government. The intention is to keep customer base manageable while the cross spectrum provides maximum feedback on benefits, issues, and needs. This feedback is then used in subsequent commercial rollout. The philosophy behind the Amocom strategy is to maximise number of users on each Access Point Site before expanding service footprint i.e. a “pay as you grow” Vs “build it and they will come” approach.

Table 2.3-1 lists potential trial customers, primarily in the vicinity of the NSC / Mahon Area. However, the last few entries are for premises near the city centre with a focus to establish a second Access Point Site. These provide the option of targeting the city centre, after gaining initial confidence in the system.

All potential clients contacted are listed in this table. As can be seen from the level of interest of those polled, there is significant demand in the area. One of the main objectives of the trial will be to determine what proportion of this interest can be converted to users, how many can be served (given the Line of Sight requirements) and their willingness to pay.

Number	**Company Name**	**CONTACT**	**Phone**	**Level of interest** **1 – Definitely wanting** **2 – Keen interest** **3 – requested more information** **4 – little use of internet** **5 – no use** **TBC – To Be Contacted)**
1.	Flexible Learning Mahon Industrial Estate, Blackrock, Cork	Ike Remo	+353-21-431-7435	1
2.	Sifco Ireland, Loughmahon Tech Park & Mahon Ind estate		+353-21-4521200	1 Two sites.
3.	Motorola Ireland Ltd Mahon Ind Estate Blackrock	Tom Moore IT Engineering Manager	+353 21 4357101	1 Very interested as backup link and for applications not suited to Motorola intranet
4.	CSO, Loughmahon	Pascal Hayes	+353 21 435 9000	3 Already have system in place, but still interested.
5.	PM (Project Management)	Niall Twomey	+353 21 435 8922	1
6.	Blackrock Citizens Information Centre, Convent Rd, Blackrock, Cork	Co-coordinator	+353 21 435 8352	2 – interested in discussing further.
7.	Healy's Blue Bin Waste Disposal, Skehard Rd, Blackrock	Aidan	021-4357444	1
8.	Blackrock National Hurling Club		+353 21 435 7377	TBD
9.	St. Michael's Credit Union, Skehard Road, Blackrock, Cork	Eileen	+353 21 435 7771	4
10.	Ridge Tool Company, Blackrock, Cork.		+353-21-4515400	TBD
11.	Hormann Electronics Ltd,		+353-21-435-7201	TBD

Number	Company Name	CONTACT	Phone	Level of interest 1 – Definitely wanting 2 – Keen interest 3 – requested more information 4 – little use of internet 5 – no use TBC – To Be Contacted)
	Mahon Industrial Est. Blackrock, Cork			
12.	Jacob's Engineering, Mahon Industrial Estate, Blackrock, Cork		+353-21-451-5777	TBD
13.	Hele PVC Windows, Mahon Industrial Estate, Blackrock, Cork		+353-21-435-7116	TBD
14.	Marathon Ireland Mahon Industrial Estate, Blackrock		+353-21-4357301	TBD
15.	Tyco/MA Com Lough Mahon Technology Park Blackrock		+353-21-480-8300	TBD
16.	Bourns Electronics Mahon Industrial Estate. Blackrock.		+353-21-451-5221	TBD
17.	Texaco Garage, Skehard Rd, Blackrock.			TBD
18.	RCI Call Centre Limited, Cendant,		+353 21 452 6000	TBD
19.	Ballinure Hurling & Football Club		Not listed	TBD
20.	Ringmahon Rangers Football Club		Not listed	TBD
21.	Gaelscoil Mhachan Avenue de Rennes, Mahon Cork		+353-21-435-7688	TBD
22.	Blackrock National Hurling Club, Church Road, Blackrock, Cork		+353-21-435-7377	TBD
23.	Castlemahon Nursing Home, Castle Road, Blackrock, Cork		+353-21-435-8478	TBD
24.	Scoil na Croise Naofa, Mahon, Blackrock,Cork		+353-21-435-7852	TBD
25.	Mahon Medical Centre	Dr Sean Browne or Dr J Flynn	+353-21-435-9349	TBD
26.	Cypress Semiconductor Ireland Mahon Technology Park Blackrock		+353-21-435-9977	TBD
27.	Proteus Solutions Ltd. IT & GIS Consultants, Systems Design & Development Services, Versyss			TBD

Number	Company Name	CONTACT	Phone	Level of interest 1 – Definitely wanting 2 – Keen interest 3 – requested more information 4 – little use of internet 5 – no use TBC – To Be Contacted)
	Building Mahon Technology Park Blackrock			
28.	Silver Springs Hotel, Tivoli, Cork		+353-21-450-7533	TBD. Potential for in-building wireless.
29.	Rochestown Park Hotel, Rochestown Rd, Douglas		+353-21-489-0800	TBD. Potential for in-building wireless.
30.	The Maryborough House Hotel, Maryborough Hill, Douglas.		+353-21-436-55555	TBD. Potential for in-building wireless.
31.	Proteus Solutions Ltd. IT & GIS Consultants, Systems Design & Development Services, Versyss Building Mahon Technology Park Blackrock			TBD
32.	Cork Chamber of Commerce,	Michael Geary Chief Executive	+353-21-450-9044	1 Indicated as partner above, but also a possible trial site.
33.	Cork City Council	Tony Fleming Senior Engineer Broadband	+353-21-492-4247	1 Indicated as partner above, but also possible trial sites (provided no charge).
34.	St Patrick's Hospital, Wellington Rd, Cork	Kevin O'Dwyer IT	+353-21-450-1201	4
35.	Christian Brothers College, Sidney Hill, Wellington Road, Cork.	Tony Mc Carthy Vice Principle	+353-21-450-1653	1
36.	Bruce College, Audley House, St. Patrick's Hill, Cork.	Vincent Healy	+353-61-214399 / +353-21-450-4122	1

Table 2.2-1 Potential trial clients – direct NSC vicinity only

2.3 Focus

Amocom and partners intend to use this opportunity to determine:

a) If Fixed Wireless is indeed a viable option for “last mile” broadband distribution.

b) One immediate opportunity is the efficient distribution of broadband from the new Metro Fibre Ring (MFR). Amocom, NSC and Cork City Council as partners, will share information on the deployment of it. On commercial rollout, the MFR will provide secure backhaul feed from Access Point Sites to the POP at the NSC.

c) Amocom has already engaged in trials using LOS (Line of Sight) 802.11b technology. From this experience the company appreciates the tremendous benefits of high-speed, always-on Internet access. However, it also became

apparent that commercial rollout of this technology requires very careful site planning and robust install/configuration friendly equipment. Hence, Amocom intends to use this opportunity to invest in more technically advanced 5.7GHz commercial solutions with the objective of reducing installation and on-going field maintenance.

d) Back office support: determination of tools and protocols best suited to the management and operation of fixed wireless networks to meet the needs of a broad spectrum of users and applications. We believe that this component is essential in order to grow next

e) Value added services: Amocom firmly believes that always-on bandwidth is simply an enabler, which by itself means very little to the majority of potential beneficiaries. We intend to work closely with trial customers to determine, source and deliver those services (enabled through always-on broadband) that truly meet their needs. Digital Technology Management with extensive knowledge of the IT needs of many in the customer base will play a key role in determining customized services. Example services include:

   ? ISP services: Email, Web hosting, Security, remote access, VPN, database services (NSC)

   ? IT Support Services: While it is not viable for many smaller businesses to maintain their own in-house IT personnel, always-on broadband enables many of the routine tasks to be outsourced e.g. critical information back-up, central maintenance of software and applications

   ? Integrated Services: For example Unified messaging, Fax over email. See Nortel's Call Pilot product already operational at the NSC http://www.nortelnetworks.com/products/01/callpilot/ for more details

   ? Dynamic allocation of bandwidth: One of the flexibilities offered by high capacity wireless subscriber gear is the ability to increase bandwidth for a preset period of time and is a major differentiator from DSL where the physical limits of the copper transmission to the customer premises are met. Digital Technology Management plan to trial applications that make use of this attribute.

   ? VoIP (Voice Over IP): SIP (Session Initiation Protocol) and H323 based services enabling integrated multimedia applications

   ? Voice over broadband, is a term used to describe how trunk adapters are used to connect voice circuits using IP. Figure 2.3-1 shows a solution where the trunk adapters may communicate over a wireless IP network. The difference here versus Voice Over IP, is that the systems interfaces with existing phone systems.

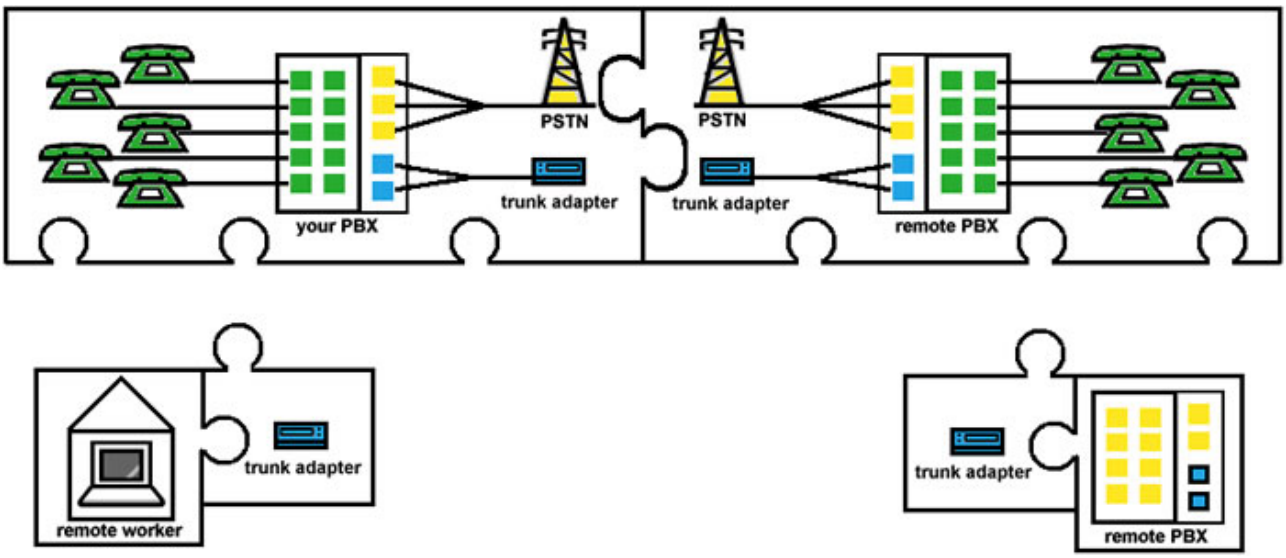

Figure 2.3-1 Voice over broadband configuration taken from http://www.e-telcorp.com/apps_TC2000.htm

f) A Blueprint for broadband rollout. The knowledge, experiences gained etc. will be recorded in "living" plan document, which will evolve to a blueprint for similar deployments nationally.

3 Technical overview

3.1 Introduction

The purpose of this section is to provide an overview of the proposed technical solutions. First details of the Motorola Canopy system are described. An overview of the proposed trial configuration is given followed by some of the key performance criteria used to evaluate the provided equipment.

3.2 [SECTION DELETED]

3.3 Evaluation criteria

The following are some of the factors on which vendor equipment will be evaluated

- ? Actual throughput
- ? Reliability
- ? Costs (capital and on-going)
- ? Performance and resiliance to interfernce (Near Line of Sight capability – if any)
- ? Operation and maintenance
- ? Ability to meet feature commitments and ease of integration/rollout of software updates to existing subscribers
- ? Support of realtime applications
- ? Most efficient use of spectrum
- ? Customer support
- ? Just-in-time availability of equipment
- ? Support structures for WISPs and VARs (where we resell CPEs to subscribers)

4 Project milestones and deliverables

4.1 Overview

This section provides details of key milestones and deliverables. Table 4.1-1 provides an overall view of the planned rollout of equipment and subscriber take-up rates. Key points of project plan are:

? 60 Subscribers are offered a three month 50% subscription fee reduction. After this period of time, they can decide to pay sign-up costs and pay normal rates.

? Each month a new “lifetime” free subscription is allocated, subject to terms and conditions. These subscriptions will be assigned to community / non-profit organisations e.g. Citizens Information Centres, Public Libraries etc. The purpose of this scheme is to target locations where on-line community, government, banking, bill-paying services would be used.

	Jan 03	Feb 03	Mar 03	Apr 03	May 03	Jun 03	Jul 03	Aug 03	Sep 03	Oct 03	Nov 03	Dec 03
Subscribers added	+2	+10	+6	+12	+10	+16	+16	+16	+16	+4	+16	+16
Business subs (total)	1	10	15	26	35	50	51	52	53	57	73	89
SOHO subs (total)	0	0	0	0	0	0	14	28	42	41	40	39
Community/free subscriptions	1	2	3	4	5	6	7	8	9	10	11	12
Total subscribers	2	12	18	30	40	56	72	88	104	108	124	140
50% subsidy	2	12	18	28	28	38	30	20	4	0	0	0
Number of Access Point sites deployed	1	1	2	2	2	2	2	2	2	3	3	3

Table 4.1-1 Subscriber and Access Point Site rollout

4.2 Project plan and timescales

[SECTION DELETED]

4.3 Risk analysis

The following table will be maintained in the rolling project plan, to record all risks and associated mitigation/fallback plan.

Risk #	Description	Action
R1	Project rollout delayed due to unforeseen circumstances	Trial rollout condensed into 4 months may be extended without significant impact.
R2	Competition from ADSL, flat-rate dial-up etc	With respect to ADSL, Amocom believes that there is significant first mover advantage. Should ADSL be rolled out, focus should be moved to an area that remains underserved. Such areas will be selected in co-operation with the City Council

		and Chamber of Commerce. With respect to flat-rate dial-up, we believed that this would ultimately drive demand for broadband.
R3	Line of Sight issues, resulting in unhappy potential customers and bad PR.	Very careful site selection and targeted advertising.
R4	Supplier issues.	Relationships have been established with a number of other vendors have also offered Amocom support for the trial. For now, these have not been pursued.

5 Project phasing costs, Government funding and seeding aspects

5.1 Project phasing and Government Funding

Table 5.1-1 below extracts the key Government funding information from the Business Case under Annex C. These figures are compared with funds put up by Vendor and Amocom during Month 1.

Key points are as follows:

- Total Government grant requested = **€11,757**
- Government grant is calculated at 20% of capital expenditure during Month 1.
- As detailed in Section 4, the trial is planned to take place in the first four months.

Description	**Month 1**	
Capital Expenditure Month 1 (M1)		€58,785.86
Vendor Discount		€17,856.05
Government Funding: Capital Expenditure M1 x 20%		**€11,757.17**
Amocom - Capital Expenditure Funding	€29,172.64	
Amocom - Operational Expenditure	€1,770.00	€30,942.64

Table 5.1-1 Government funding summary

Table 5.1-2 below provides a more detailed synopsis of the financials taken from Annex C. Note that the plan shows the need for Amocom cash reserves in excess of €60,805 during month six. While feasible, another option to be explored is use of leasing subscriber equipment.

Cumulative	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month12
Total Subscribers	2	12	18	30	40	56	72	88	104	108	124	140
Number of Access Point Sites	1	1	2	2	2	2	2	2	2	3	3	3
Total Cost	€60,555.86	€61,725.86	€63,094.86	€64,863.86	€82,397.61	€104,810.22	€127,382.83	€150,115.43	€173,208.04	€198,652.56	€222,283.10	€246,873.64
Motorola discount	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05	€17,856.05
Government support = Capital Expenditure x 20%	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17	€11,757.17
Sales (Income)	€0.00	€0.00	€0.00	€0.00	€6,631.00	€14,392.00	€39,585.00	€67,598.00	€100,081.00	€129,861.00	€164,426.00	€201,976.00
Amocom Cash Funds	€30,942.64	€32,112.64	€33,481.64	€35,250.64	€46,153.40	€60,805.00	€58,184.61	€52,904.22	€43,513.82	€39,178.34	€28,243.88	€15,284.42

NB: All Cash entries in above table are cumulative

Table 5.1-2 Costing and phasing overview

5.2 Seeding aspects

As indicated in Table 5.1-1, and Annex F, the thrust of the Amocom proposal is utilize the trial period to seed a calculated viable broadband rollout. The decision to proceed with commercial rollout is planned for Month 5, based on trial results from thirty subscribers. The testimonials of these trial subscribers will be evident from the percentage that will continue with paid subscription after the initial trial period of three months.

Revenue will not be collected from any subscriber, until a decision for commercial roll out has been reached – hence the first two subscribers in Month 1 will avail of four months trial period.

From Month Five onwards, all subscribers will need to pay sign-up fee upfront and service monthly.

Twelve subscriptions are provided free for community and non-profit organisations.

Table 5.2-1 shows example pricing, though this may be revised based on trial feedback. In any case, emphasis will be on adding value added features Vs price reductions, where possible.

	Business Lite	SOHO	Community
Services	TBD	TBD	TBD
Speed	512KB/s	256KB/s	256KB/s
Contention	20/1	20/1	TBD
Fee	€199	€99	€0

Table 5.2-1

6 Leadership team and past experience

6.1 Experience

While Amocom Technologies is a recently formed company, its founder John O'Hare has an extensive range of international telecommunications expertise. Aspects of this expertise are highlighted below. For further details see Annex D.

- ? WLAN and Fixed Wireless: Since founding Amocom last April, the company has been studying the business and technical aspects of WLAN. Part of this involved successful design, development and deployment of an 802.11b based Fixed Wireless trial service, at a time when commercial products were not yet available.
- ? 3GPP –John O'Hare represented Motorola on the Core Networks standardization team. He held rapporteurship/editor for an IP Multimedia Call Flows specification (TS 24.228), an adaptation of the Session Initiation Protocol (SIP) for cellular networks (3G). [ETSI is one of the key members in 3GPP.]
- ? Co-ordinated Motorola's international participation in the OPIUM Fifth Framework project.
- ? Established a Wireless Multimedia Applications joint research project between Motorola, CIT and WIT.
- ? One of the key leaders in establishing the Aspira group in Motorola Cork (and transfer of expertise from USA)
- ? Managed aprox twenty engineers involved in the multi-site development, test, rollout and customer support of cellular switching features for EXX software release rv270

6.2 Collaborative partners

The rollout of a trial such as being proposed, would not be possible without the support of the following key participants

6.2.1 NSC (National Software Centre)

Born out of a series of public meetings between Cork Corporation and the IT industry in Cork to ascertain the underlying issues and concerns of the IT sector in the Cork region, The National Software Centre is a direct reply to one of the main issues raised at these meetings i.e. the need for a physical building and appropriate infrastructure that would go towards making Cork a centre of IT excellence.

The purpose of the National Software Centre is to establish Cork City as the most preferred regional location outside of Dublin for IT inward investment and a leading centre in Europe for niche software development in collaborative teams and joint ventures.

One of the advantages of locating the trial's POP at the NSC is the availability of en extensive range of IT infrastructure. Trial participants will have the option to avail of the many advanced services that currently cannot extend beyond the physical building. The extension of the many advanced Internet based features and services beyond the physical building enabled by broadband, will be a further attraction for high value projects to the campus.

The following is a summary of the key features:

Phones: The telephony system is a Nortel Networks full IP phone system run by the Succession Call Manager on redundant servers

Unified Messaging Each client has access to a Unified Messaging System giving access to voice mail, fax and email from one mailbox (accessible over a Virtual Private Network (VPN)).

Switch: This is a Nortel Networks Passport 8600 - a layer 3 Enterprise Routing Switch. The Passport is a Data Centre standard non-blocking router capable of setting 8 different levels of quality of service (QoS). This is equipped with 10/100 base T full duplex and auto sensing switch modules and Gigabit Ethernet switch modules for fibre. This switch allows VPNs and VLANs to be configured on the Firewall.

Managed Firewall Services Check Point Software Technologies is used as a managed firewall service on Compaq servers over Gigabit Ethernet on fibre. This provides multiple VLAN's interoperating with the IP telephony VLAN's firewalled from the public Internet domain or DMZ. External VPN's are provided through the Check Point firewall with client connection via Check Point Secure Remote over leased lines or permanent connections to the IP Core network.

Broadband Access: Two carriers are resident and are live in the building. Each connects on fibre and copper over diverse routings to give multiple paths to the IP Core Network through different telco exchanges or switch sites. Therefore the failure of one routing to the Internet through cable damage or power outage will initiate a new routing through a diverse path automatically ensuring a permanent 'always on' connection. Traffic management and packet shaping is used to ensure prioritisation (e.g. access to hosting servers or VPN's).

Network Distribution: Each floor is equipped with a Digital Distribution Frame (DDF) and an Optical Distribution Frame (ODF) for patching client networks to the Main Network Switch and/or Telco access providers.

6.2.2 CIT (Cork Institute of Technology)

CIT's involvement with the WLAN trial will be carried out within the Adaptive Wireless Systems (AWS) group of the Department of Electronic Engineering at CIT. The AWS group conducts research mainly in the areas of RF transceiver design, integration, and miniaturisation, analysis and design of wireless systems and networks and wireless network management. The AWS group is lead by Dr Dirk Pesch and consists of four full-time academic staff two research staff, and a total of 15 postgraduate researchers at PhD/Masters level.

The group will play a consultative role for the proposed trial, helping to address performance issues, tools for Access Point Site selection, etc.

6.2.3 DTM (Digital Technology Management

Trevor O'Connell is the Managing Director of Digital Technology Management, and has worked in technical, process and strategic roles within many industries including telecommunications, financial, government and agriculture. Additionally, he has consulted for many of the top firms in these sectors, helping them develop various aspects of their business strategy.

Prior to forming Digital Technology Management, Trevor was Chief Technology Officer at Octagon Technologies, a consulting firm focused on providing eBusiness Consulting and Development Services to both the SME and enterprise.

Before this he held various technical roles with Sun Microsystems, Oracle, Lionbridge, Microelectronics Application Centre, Digital and General Health Information Services

Digital Technology Management's aim within the project will be to evaluate how businesses may improve their competitiveness through the use of WLAN (Wireless Local Area Network) technologies. In particular Digital Technology Management will assess the need for and examples of value add services in order to realize this competitiveness and create market demand for such a technology. It is intended that a number of these value add services will be developed and implemented over the duration of the project.

Digital Technology Management intends to assess service users', service providers' and service developers' requirements like independence from concrete network technologies, universal standardized programming interfaces and service support components. Other network services such as eLearning, eWork, eBusiness, eBanking, eEntertainment, etc will also form part of its scope.

7: Conclusion

In conclusion, the opportunity provided by the Department of Communications, Marine and Natural Resources coupled with the Vendors support, the NSC infrastructure and the commitment of all of the partners involved in this proposal can make this plan a reality.

From the Vendors perspective, the 50% initial discount is whittled down to 12% for the projected expenditure over the first twelve months. Additionally, it is an ideal opportunity to showcase their technology.

For Cork City Council and The Cork Chamber of Commerce the plan represents a viable, scalable rollout of broadband infrastructure with the minimum of disruption. It provides an additional unique selling point for the Cork area.

From the Departments perspective, a seeding of €11,757 will result in the significant growth of a network providing reliable high speed Internet to 140 users, whilst capitalizing on an already existing NDP backbone infrastructure. The network will be developed in partnership with the key infrastructure players in the region coupled with the expertise from a leading wireless research group. The vision does not stop at month twelve. We aim to deliver a national blueprint that can be readily applied on a phased basis to other towns and regions targeted under the NDP.

Annex A: Call for WLAN (Wireless Local Area Networks) Pilot Proposals

Background

The Government has identified the need for initiatives to promote the rollout of broadband infrastructure to facilitate the development of the Information Society. As part of this initiative, a pilot trial(s) of WLAN[1] technology has been identified as a potential factor for the successful and economic deployment of advanced broadband services. The trial(s) would evaluate WLAN technology as complementary to the existing access platforms. The envisaged project period is 12 months. This call for proposals is open to all players in the Information Technology and Communications (ICT) Sector who are capable of providing suitable WLAN infrastructure and application services. The Department of Communications, Marine and Natural Resources is funding the trial(s) with monies available for the promotion of broadband development. The total funding available for the trials is 300,000 Euro.

The fundamental aims of this call are:

1) To demonstrate the feasibility of using WLAN technology for the provision of broadband public local access networks.

2) To identify the different access environments and scenarios for which the technology is suitable.

3) To identify the potential constraints that could restrict the deployment of the technology for broadband public access.

The trial(s) should enable local industries, public services, educational institutions and the broader communities to obtain access to broadband networks and are intended to support the implementation of the Information Society in Ireland in accordance with the Action Plan, *New Connections, a strategy to realise the potential of the Information Society*, published by the Irish Government in March 2002.

Objectives

The objectives of this pilot trial(s) are:

- To explore the potential of this technology to meet local access requirements in deploying broadband networks using an alternative wireless based access platform;
- To identify the *different access environments* for which WLAN technology is suitable: Urban/suburban, town/rural;
- To identify the *different usage scenarios* for which WLAN technology is suitable:
  A large number of users each requiring low to medium capacity;
  A small number of users each requiring large capacity;
  A combination of the above.
- To identify the trade off between number of users, user capacity requirements and system performance;
- To identify the potential opportunities for promoting the use of the technology for broadband access;
- To identify the potential constraints that could restrict the deployment of the technology for broadband access;
- To identify compatibility of WLAN technology with other uses of license exempted spectrum;
- Companies participating in the pilot trial(s) will be required to make available to the Department the relevant information, learning experiences, findings, etc; for public dissemination and assist the Department as required in making it publicly available via such mechanisms as are appropriate, for example:
  - Working demonstrations
  - Publications
  - Internet sites, etc.

Spectrum Matters

It is normal practice within spectrum management to specify parts or bands- of the radio spectrum where it is not necessary to obtain an individual Wireless Telegraphy licence. These bands are often referred to as exempted spectrum or license-exempted spectrum. The main purpose for license-exempted spectrum is to cater for devices that may be deployed in large numbers, have a short range and typically a low power. The use of license-exempted spectrum is on the understanding that the equipment shall not be provided with the protection from interference that would otherwise be available to a licensed service.

Wireless Local Area Networks (WLANS) is one such technology that was developed to make use of license-exempted spectrum. For the purpose of these trials an applicant can propose the use of any license-exempted band designated by the ODTR for WLAN/ HIPERLAN type usage (Ref. ODTR document 01/23 Table of Frequency Allocations, Ireland Annex 4). www.odtr.ie/docs/odtr0123.pdf

However it is recognised that the 2.4 GHz and 5 GHz exempted bands are those currently under the most active international consideration by industry, both nationally and internationally, for the provision of broadband public access due to the ready availability of equipment.

Standards

The standards governing wireless LANS are currently evolving. At present they include the American 802.11 family of standards and the European HIPERLAN standards, offering speeds up 54 Mbps, depending on the band used.

In Europe the applicable parameters are normally harmonised by means of Decisions or Recommendations of the European Communications Committee (ECC)[2] and standards developed by the European Telecommunications Standards Institute (ETSI). Standards developed in other regions such as the American 802.11 family of standards may differ slightly from the European standards.

This call for proposals is technology neutral. However, it will be a requirement of the tender process that applicants satisfy themselves and can satisfy the Department that the equipment they propose, meets the requirements specified by the ODTR for the use of exempted spectrum in Ireland. Equipment manufactured to non-European standards can be used where there is compatibility with the European standard.

Role of the Department

The role of the Department of Communications, Marine and Natural Resources is principally to support and direct the objectives and activities of the pilot trial(s) so that it is successful and reflects Government policy for the sector, and to manage and disseminate information on completion. To this end grant support consistent with the Regional Aid Guidelines may be available for selected projects. The Departments role will include evaluating and selecting projects, monitoring the progress of the project, auditing project development and costs, the collection and collation from each participating company the project findings and learning experiences and the dissemination of information on completion of the trial(s). Where necessary the Department may be assisted by independent experts.

Date for Submission of Project Proposals

The issue date of the call for proposals and the date and time by which submissions must be received by the Department are indicated below. Submissions received after the time and date given below cannot be considered.

Particular details relevant to this call are:

Call Date: 31st July, 2002

Change in date for submission of proposals

The closing date for submissions of proposals was originally 4.00 pm on Friday 30th August 2002.

Following further consideration by the Department of the time scales involved, the closing date for submissions has been revised to **4.00 pm on Friday the 13th September 2002.**

Locations
Preferential selection will apply to proposals for trials in the Digital Hub, locations of high demand, -often referred to as Hotspots-, or those towns that have been prioritised for broadband development in the NDP. In considering the trial locations proposed by applicants, the Department will take into account the availability of broadband trunk capacity.

Eligible Sectors
The call for proposals is open to all players in the Information Technology and Communications (ICT) Sector who are capable of providing suitable WLAN infrastructure and application services.

Funding
In the case of this call, a grant in conformity with the regional aid guidelines may be payable to the successful applicant. The grants will be subject to the rules and regulations governing public funds. The rules require that grant payment will only be made on the basis of vouched expenditure. It will be necessary that all expenditures be independently certified. Successful grantees will be required to enter into contracts that will contain specific milestones. The Department of Communications, Marine and Natural Resources reserves the right to disaggregate any submission and part fund elements thereof.

The Department of Communications, Marine and Natural Resources reserves the right not to proceed with the trial(s) envisaged in this call.

Financial Records and Audits

The keeping of comprehensive financial records and appointment of a project auditor will be a requirement of project grant aiding. Detailed guidelines will be given to successful applicants in this regard.

Information to be included in submissions
The project submission should be adequately scoped and supported by a full project plan and resource requirements estimate. The project submission must include the following:

i) Compliance with the objectives of the call for proposals;

ii) A technical overview of the proposal including its feasibility to facilitate wider adoption in the marketplace.

iii) Detailed costs should be specified for proposed project including details of any phasing.

iv) Details of grant being sought and details of the level of co-funding proposed by the applicant.

v) Detailed project plan including proposals for continuation of use of the deployed equipment following the completion of the project.

vi) Project milestones.

vii) Details of experience in managing similar projects.

viii) Tax clearance certificate.

Selection Criteria.

The evaluation criteria to be used to assess the project submission will include:

Parameter	Evaluation Criteria
Objectives of call	• The extent to which the proposal addresses the call objectives.
Development of Information Society/Infrastructure	• Locations proposed taking into account the preferences indicated above; • Proposed subscriber access and services charges; • Demonstration of the potential of the technology to the development of the information society/infrastructure; • Connectivity to educational establishments,

	community and voluntary organisations, libraries, public access points; • Commitment to the continuation of use of the deployed equipment following the completion of the project;
Value for money	• Amount of grant sought with regard to anticipated benefits; • Evidence of additionality and avoidance of displacement;
Feasibility and Viability	• Financial viability including evidence of matching funds; • Technical and planning viability; • The feasibility of providing broadband access taking into account the availability of broadband trunk access; • The subscriber management and support systems proposed;
Milestones	• Proposed milestones;
Experience and Implementation	• Details of past experience and competence in managing such a project; • The project plan and implementation timescale;

Implementation

Projects must be implemented and all project expenses-for which grant aid is being sought-incurred by 30th November 2002.

Submissions

Three copies of proposals should be placed in a sealed envelope with a covering letter requesting acknowledgement of receipt of proposal and marked: **Call for WLAN Pilot Proposals**

The sealed envelope should be placed within a second envelope, which must be received, not later than 4.00pm, on Friday 30th August 2002, by:

Mr. John A. C. Breen

Assistant Director of Communications Business & Technology

Department of Communications, Marine and Natural Resources

44 Kildare Street

Dublin 2

Proposals will be evaluated by the Department of Communications, Marine and Natural Resources and recommendations made to a selection committee, which will make the final choice of successful proposals.

Queries

All queries in relation to this call should be expressed in writing and posted to:

Mr. John A. C. Breen

Assistant Director of Communications Business & Technology

Department of Communications, Marine and Natural Resources

44 Kildare Street

Dublin 2

or sent by e.mail to: JohnBreen@dpe.ie

Queries in relation to locating projects in the Digital Hub should be addressed to:

Mr. Fergal Marrinan

The Digital Hub

89 James's Street.

Dublin 8.

Tel:+353 1 408 4524

e.mail: fmarrinan@thedigitalhub.com

Annex B: ODTR Permitted Short Rage Devices in Ireland

Office of the Director of
Telecommunications
Regulation

Radio

Permitted Short Range Devices in Ireland

Document No: 02/71

Date: 30th July 2002

Oifig an Stiúrthóra Rialála Teileachumarsáide
Office of the Director of Telecommunications Regulation
Abbey Court, Irish Life Centre

Lower Abbey Street, Dublin 1, Ireland

INTRODUCTION

The term "Short Range Device" (SRD) is intended to cover the radio transmitters which provide either uni-directional or bi-directional communication and which have low capability of causing interference to other radio equipment. SRDs use either integral, dedicated or external antennas and all modes of modulation can be permitted subject to meeting the reference standard or equivalent.

ERC Recommendation 70-03 (ERC/REC/70-03) sets out the general position on common spectrum allocations for SRDs for countries within CEPT. It is intended as a reference document for member states and represents the most widely accepted position within CEPT. Appendix 3 of the document lists the National restrictions where member states indicate where their National regulations deviate from the CEPT position. The Recommendation describes the spectrum management requirements for SRDs relating to specific frequency bands, maximum power levels, channel spacing and duty cycle.

Table 1 of this document outlines the types of device, with associated parameters, detailed in ERC/REC/70-03 which may be used in Ireland without the requirement of an individual user licence under the Wireless Telegraphy Act 1926 except for those which are restricted and accordingly listed in 'Appendix 3 – National Restrictions' of the Recommendation. Those devices restricted in Ireland by Appendix 3 of the Recommendation have not been included in Table 1. The full text of ERC/REC/70-03 is available from the ERO web-site (www.ero.dk).

In addition to the types of devices described in ERC/REC/70-03 several other devices may be used in Ireland as SRDs. Table 2 of this document describes the types of device, beyond the scope of ERC/REC/70-03, permitted for use as Short Range Devices in Ireland without the requirement of an individual user licence under the Wireless Telegraphy Act 1926.

This exemption shall not absolve an operator from any requirement in law to obtain additional consents, permissions, authorisations or licences as may be necessary (e.g. for the provision of services to the public). All devices intended to be placed on the market in Ireland must meet the requirements of the R&TTE Directive, details of which are available from the ODTR web-site (Ref. Document No: 00/61).

Short Range Devices operate on a non-interference and non-protected basis i.e. they are not permitted to cause harmful interference to other users of the band and cannot claim protection from interference received. Due to the growing interest in the use of SRDs throughout Europe for a wide range of applications, it is necessary to harmonise frequencies and regulations for these devices and to distinguish between different applications.

TABLE 1 – Description of Short Range Devices permitted for use in Ireland (from ERC/REC/70-03)

Frequency Bands K=kHz M=MHz G=GHz	Application	Max Radiated Power or Field Strength Limits & Channel spacing*	Reference ETSI Standard	Additional Information
9 – 59.75 K	**Inductive Applications**	72 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)13
59.75 – 60.25 K	**Inductive Applications**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)13

Frequency Bands K=kHz M=MHz G=GHz	Application	Max Radiated Power or Field Strength Limits & Channel spacing*	Reference ETSI Standard	Additional Information
60.25 – 70 K	**Inductive Applications**	72 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)13
70 – 119 K	**Inductive Applications**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)13
119 – 135 K	**Inductive Applications**	72 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)13
6765 – 6795 K	**Inductive Applications**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)14
6765 – 6795 K	**Non-specific SRD**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)01
7400 – 8800 K	**Inductive Applications**	9 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)15
13.553 – 13.567 M	**Inductive Applications**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)14
13.553 – 13.567 M	**Non-specific SRD**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)01
26.957 – 27.283 M	**Inductive Applications**	42 dBμA/m @ 10 m	300 330	ERC/REC/70-03 ERC/DEC/(01)16
26.957 – 27.283 M	Non-specific SRD	10 mW erp	300 220	ERC/REC/70-03 ERC/DEC/(01)02
26.99 – 27.20 M	Surface Model Control	100 mW erp : 10 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)10
34.995 – 35.225 M	Aircraft Model Control	100 mW erp : 10 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)11
40.66 – 40.7 M	Surface Model Control	100 mW erp : 10 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)12
40.66 – 40.7 M	Non-specific SRD	10 mW erp	300 220	ERC/REC/70-03 ERC/DEC/(01)03
173.965 – 174.015 M	Wireless Microphones	2 mW erp : 50 kHz	300 422	ERC/REC/70-03
402 – 405 M	Medical Implants	25 μW erp : 25 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)17

Frequency Bands K=kHz M=MHz G=GHz	Application	Max Radiated Power or Field Strength Limits & Channel spacing*	Reference ETSI Standard	Additional Information
433.05 – 434.79 M	Non-specific SRD	10 mW erp	300 220	ERC/REC/70-03 Duty Cycle <10%
433.05 – 434.79 M	Non-specific SRD	1 mW erp	300 220	ERC/REC/70-03 Duty Cycle = 100%
434.04 – 434.79 M	Non-specific SRD	10 mW erp : 25 kHz	300 220	ERC/REC/70-03 Duty Cycle = 100%
863 – 865 M	Wireless Audio Systems	10 mW erp	301 357	ERC/REC/70-03 ERC/DEC/(01)18
863 – 865 M	Wireless Microphones	10 mW erp : 200 kHz	301 357	ERC/REC/70-03
864.8 – 865 M	Wireless Audio Systems	10 mW erp : 50 kHz	300 220	ERC/REC/70-03
868 – 868.6 M	Non-specific SRD	25 mW erp	300 220	ERC/REC/70-03 ERC/DEC/(01)04
868.6 – 868.7 M	Alarms	10 mW erp : 25 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)09
868.7 – 869.2 M	Non-specific SRD	25 mW erp	300 220	ERC/REC/70-03 ERC/DEC/(01)04
869.2 – 869.25 M	Social Alarms	10 mW erp : 25 kHz	300 220	ERC/REC/70-03 ERC/DEC/(97)06
869.25 – 869.3 M	Alarms	10 mW erp : 25 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)09
869.4 – 869.65 M	Non-specific SRD	500 mW erp : 25 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)04
869.65 – 869.7 M	Alarms	25 mW erp : 25 kHz	300 220	ERC/REC/70-03 ERC/DEC/(01)09
869.7 – 870.0 M	Non-specific SRD	5 mW erp	300 220	ERC/REC/70-03 ERC/DEC/(01)04
1785.7 – 1799.4 M	Wireless Microphones	10 mW eirp : 200kHz	301 840	ERC/REC/70-03
2400 – 2483.5 M	Non-specific SRD	10 mW eirp	300 440	ERC/REC/70-03 ERC/DEC/(01)05
2400 – 2483.5 M **	Wideband Data Transmission Systems	100 mW eirp	300 328	ERC/REC/70-03 ERC/DEC/(01)07

Frequency Bands K=kHz M=MHz G=GHz	Application	Max Radiated Power or Field Strength Limits & Channel spacing*	Reference ETSI Standard	Additional Information
2400 – 2483.5 M	FDDA	25 mW eirp	300 440	ERC/REC/70-03 ERC/DEC/(01)08
2446 – 2454 M	AVI for railways	500 mW eirp	300 761	ERC/REC/70-03
2446 – 2454 M	RFID	500 mW eirp 4 W eirp (indoor use)	300 440	ERC/REC/70-03
5150 – 5350 M **	HIPERLAN: indoor use only (Nomadic)	200 mW eirp	301 893	ERC/REC/70-03 ERC/DEC/(99)23
5470 – 5725 M **	HIPERLAN: indoor/outdoor use (Nomadic)	1 W eirp	301 893	ERC/REC/70-03 ERC/DEC/(99)23
5725 – 5875 M	Non-specific SRD	25 mW eirp	300 440	ERC/REC/70-03 ERC/DEC/(01)06
5795 – 5805 M	RTTT	2 W eirp	300 674 201 674	ERC/REC/70-03 ECC/DEC/(02)01
5805 – 5815 M	RTTT (Expansion Spectrum)	2 W eirp	300 674 201 674	ERC/REC/70-03 ECC/DEC/(02)01
9200 – 9500 M	FDDA	25 mW eirp	300 440	ERC/REC/70-03
9500 – 9975 M	FDDA	25 mW eirp	300 440	ERC/REC/70-03
10.5 – 10.6 G	FDDA	25 mW eirp	300 440	ERC/REC/70-03
13.4 – 14 G	FDDA	25 mW eirp	300 440	ERC/REC/70-03
17.1 – 17.3 G	HIPERLAN	100 mW eirp		ERC/REC/70-03
24.00 – 24.25 G	Non-specific SRD	100 mW eirp	300 440	ERC/REC/70-03
24.05 – 24.25 G	FDDA	100 mW eirp	300 440	ERC/REC/70-03
76 – 77 G	RTTT	55 dBm peak eirp	301 091	ERC/REC/70-03

* Maximum Permitted Channel Spacing

** Provision of services to the public is permitted. Public service provider is required to hold an appropriate Telecommunications Licence (ref. ODTR 98/44R)

NOTE: ***When selecting parameters for new SRDs, which may have inherent safety of human life implications, manufacturers and users should pay particular attention to the potential for interference from other systems operating in the same or adjacent bands. Manufacturers should advice users on the risks of potential interference and its consequences***

TABLE 2 – Description of Short Range Devices permitted for use in Ireland (National SRDs)

Frequency Bands K=kHz M=MHz G=GHz	Application	Max Radiated Power or Field Strength Limits & Channel spacing*	Reference ETSI Standard	Additional Information
285 – 400 K	**Inductive Applications**	38 dBμA/m @ 10 m	300 330	
1650 – 1950 K	**Inductive Applications**	8 dBμA/m @ 10 m	300 330	
1800 – 2200 K	**Inductive Applications**	-8 dBμA/m @ 10 m	300 330	
2540 – 3560 K	**Inductive Applications**	-8 dBμA/m @ 10 m	300 330	
31.025 – 31.325 M	Analogue cordless phones	10 mW erp	-	Radio info in National Std TTE 9
39.925 – 40.225 M	Analogue cordless phones	10 mW erp	-	Radio info in National Std TTE 9
49.82 – 49.98[1] M	Baby Monitors	10 mW erp	300 220	
49.82 – 49.98 M	Low Power Radio Transmitters	10 mW erp	300 220	
173.2125 – 173.2375 M	Non-specific SRD - telecommand only	10 mW erp : 25 kHz	300 220	
173.2375 – 173.275 M	Non-specific SRD	100 mW erp : 25 kHz	300 220	
173.7 – 175.1 M	Wireless Microphones	10 mW erp	300 422	
864.1 – 868.1 M	CT2 cordless phones	10 mW erp	300 131	Subject to review
1880 – 1900 M	DECT cordless phones	250 mW erp (peak)		DIR 91/287/EEC, S.I 168, 1994
5150 – 5250 M **	Wideband Data Transmission Systems : Indoor use only (Nomadic)	30 mW (no TPC)	301 893	See Annex 1
5150 – 5250 M **	Wideband Data Transmission Systems : Indoor use only (Nomadic)	60 mW (with TPC)	301 893	See Annex 1
5150 – 5350 M **	Wideband Data Transmission Systems : Indoor use only (Nomadic)	60 mW (no TPC)	301 893	See Annex 1
5150 – 5350 M **	Wideband Data Transmission Systems : Indoor use only (Nomadic)	120 mW (with TPC)	301 893	See Annex 1
5725 – 5875 M **	Wideband Data Transmission (Fixed)	100mW/MHz up to a maximum of 2W eirp	TBA	Registration of base-stations required

[1] When operating short range devices on these frequencies in close proximity to domestic television receivers care must be taken as the domestic television receivers may suffer interference

* Maximum Permitted Channel Spacing

** Provision of services to the public is permitted. Public service provider is required to hold an appropriate Telecommunications Licence (ref. ODTR 98/44R)

NOTE: ***When selecting parameters for new SRDs, which may have inherent safety of human life implications, manufacturers and users should pay particular attention to the potential for interference from other systems operating in the same or adjacent bands. Manufacturers should advice users on the risks of potential interference and its consequences***

GLOSSARY OF TERMS (ODTR)

"Inductive Applications" means systems which operate by producing a controlled magnetic field within which a predetermined recognisable signal is formed;

"Non-specific SRD" means Non-specific Short Range Device which is an apparatus for wireless telegraphy including telemetry, telecommand, alarms and data;

"Model Control" means apparatus for wireless telegraphy used to control the movement of a model in the air, on land or over/under the surface of water;

"Baby Monitors" means apparatus for wireless telegraphy which transmit sound to a remote receiver and is commonly used to monitor infants;

"Low Power Radio Transmitter" means apparatus for wireless telegraphy for short range two-way voice communications;

"Wireless Microphones" means apparatus for wireless telegraphy which transmit audio or voice over short distances to a remote receiver;

"Duty Cycle" means the ratio, expressed as a percentage, of the maximum transmitter 'on' time on one carrier frequency, relative to a one hour period;

"Medical Implant" means apparatus for wireless telegraphy for programming and occasional communications with a medical device implanted in the body;

"Wireless Audio Systems" means apparatus for wireless telegraphy which transmit audio or voice over short distances to a remote receiver;

"CT2 Cordless Phones" means apparatus for wireless telegraphy which meets the European CT2 standard;

"Alarms" means apparatus for wireless telegraphy used exclusively for alarm systems including social alarms and alarms for security and safety;

"DECT Cordless Phones" means apparatus for wireless telegraphy which meets the European DECT standard;

"Wideband Data Transmission Systems" means a wireless local, metropolitan or personal area network utilising apparatus for wireless telegraphy;

"FDDA" means Field Disturbance and Doppler Apparatus which is apparatus for wireless telegraphy which operates by creating a radiated field and responding to disturbances/changes within that field;

"AVI for Railways" means Automatic Vehicle Identification for Railways which is apparatus for wireless telegraphy used to track and identify railway vehicles;

"RFID" means Radio Frequency Identification which is apparatus for wireless telegraphy used to identify tagged articles;

"HIPERLAN" means apparatus for wireless telegraphy which meets the ETSI harmonised standard EN 301 893;

"RTTT" means Road Transport and Traffic Telematics which are apparatus for wireless telegraphy for applications relating to road traffic and transport management including automatic road toll collection, route guidance systems, traffic information and advance incident warning;

"erp" means Effective Radiated Power and **"eirp"** means Effective Isotropic Radiated Power as defined in the Radio Regulations;

"Radio Regulations" means the Radio Regulations annexed to the Constitution of the International Telecommunications Union;

"Nomadic" means a communications network/topology which permits limited mobility of one or more devices within the network;

"Fixed" means a communications network/topology in which all devices are in a fixed geographical location within the network;

"TPC" means Transmitter Power Control which is a feature of an apparatus for wireless telegraphy which ensures a reduction in radiated power of 50% when the transmitting device is in close proximity to the intended receiver.

ANNEX 1

Current regulations in Ireland regarding the operation of Wireless Local Area Networks in the 5GHz band require equipment to comply with the technical conditions detailed in ERC/DEC/(99)23 and the draft harmonised standard for HIPERLAN Type 2 (EN 301 893).

The ODTR is aware that there are some technical difficulties at present in obtaining equipment that will operate Dynamic Frequency Selection (DFS), as mandated by ERC/DEC/(99)23, and that the specification for this facility has not yet been completed. Therefore in the interim period, prior to the completion of the specification of the DFS performance characteristics, it has been decided to permit the operation of suitable equipment without the DFS feature in accordance with the technical requirements detailed below (e.g. IEEE 802.11a). This interim solution shall be withdrawn on the completion of the DFS performance characteristics and the publication of the harmonised standard in the Official Journal of the European Communities.

Technical Requirements:

1. Equipment shall meet the draft harmonised standard EN 301 893 except for the requirement of DFS.
2. Equipment may only be used INDOORS.
3. The frequency band of operation may be either 5150 – 5250MHz or 5150 – 5350MHz. The maximum permitted radiated power shall vary depending on the selection of frequency band (see Table 3 below).
4. A random channel selection mechanism shall be implemented across the entire band selected, to ensure a uniform channel loading over the entire band.
5. Transmitter Power Control (TPC), where implemented, shall provide at least 3dB mitigation.

Table 3: Maximum Permitted Radiated Powers for Interim Solution

Frequency Band (MHz)	**Maximum Permitted Radiated Power (EIRP)**	
	TPC	**No TPC**
5150 – 5250	60 mW	30 mW
5150 – 5350	120 mW	60 mW

Annex C: Business Case / Financial Projections

[SECTION DELETED]

Annex D: CV of John O'Hare (Project Leader)

JOHN O'HARE

Email: oharej@amocom.com

EXPERIENCE

Mar 2002 to present: Amocom Technologies Ltd (Cork)

CEO

- Established Amocom Technologies Ltd.
- Participant on GEP 2002

11/2000-03/2002:
IP Networking Group / 3GPP Standards Motorola (USA & Cork)

Principal Staff Engineer (02/2002 to 03/2002)

- Represent Motorola at 3GPP CN1 in the protocol standardization aspects of the IMS (IP Multimedia Subsystem). Lead the Motorola effort to standardize the registration sequence. Role also includes rapporteurship of Technical Specification 24.228 "Signalling flows for the IP multimedia call control based on SIP and SDP"
- One of the primary contributors to the standardization effort of SIP compression within the IETF (ROHC) and 3GPP (CN1). This effort is part of an over-all Optimized Voice Service using where the IMS is used to deliver conversational voice over existing GPRS infrastructure.
- Co-ordinate resources across a number of sectors in the establishment of a 3GPP Services Vision and produced white paper on same.
- Leading establishment of collaborative research projects between Motorola Ireland, Cork Institute of Technology and Waterford Institute of Technology. Projects investigate impact of SIP over the air interface and delivery of advanced services to the mobile via the IMS.

  a) "IP Based Multimedia Communications and Applications in 3G Wireless"

  b) "OPIUM: Open Platform for Integration of UMTS Middleware" [IST]

09/98-11/00 Aspira (3G) Motorola (USA & Cork)

Senior Staff Engineer

- Represent Motorola at 3GPP UMTS SA2 (Architecture and System Aspects) Standards meetings, to bring a 3G perspective and understanding to the Aspira program.
- Lead the System Engineering Mobility Management requirements specification.
- Specified MGCP interface between Services Client (Soft switch) and Bearer Client.
- Lead the design and implementation of the interface between the Radio Access Network (RAN) and Core Network (Services Client). [Java implementation with JNI interface to quantix DPE.
- Developed Test Simulator for Radio Network Controller (RNC)
- Added message trace capability to a DPE (in-house Quantix)

- Radio Network Controller (RNC) development
- Initial task in this role was to be based in Chicago and to identify an area of new technology that would suit Cork and subsequently drive the setting up and growth of this new area in Cork (Group of 30+ now in Cork)

11/96–09/98 Cellular Switching Products Motorola (Cork)

Lead Engineer

- Managed the development portion of software release with a project team of 18 people (5 direct reports).
- Planned and resourced development tasks with the assistance of Project Mgmt and Requirements. Monitored project progress, anticipated problems, redeployed resources etc. to ensure the smooth running of the project.
- Regular communication with the development team to ensure that all are heading in the same direction, aware of the critical issues etc.
- Was an integral part of the Project Mgmt team.
- Liased with Requirements, CSPV, AH Development groups, Lab Support Group and DSC.
- Addressed day-to-day issues and provided technical guidance to the team.
- Presented release status to Senior Mgmt at Cork/AH meetings and ensured that important issues were raised and discussed.
- Active member of Development Process Improvement, Defect Prevention and Software Subcontractor Mgmt teams.
- Involved in the recruitment process for the team

06/95-11/96 Cellular Switching Products Motorola (USA & Cork)

Senior Software Engineer

- Feature Champion for "DTP" and "DMX Over C7" features for domestic and ROW markets (Cork/AH team of ~10 developers).
- Supported the rv27x release thru the Test and FOA cycle being one of the primary problem assessors.
- Researched and evaluated the benefits of automated code conversion of Z8000 to "C" for the EMX product.

01/94-06/95 Network Interface Dev. Tecnomen (Shannon)

Software Engineer

- SCCP - Designed, implemented, tested the Subsystem Mgmt, Global Title Translation and OMC interface modules of SCCP (Signalling Connection Control Part). SCCP forms the overall interface on the Tecnomen VMS required for the provision of the GSM short messaging service.
- ISDN Primary Rate Access: Specified, designed, implemented, tested Layer 3 of this protocol in accordance to the VN4 specification by France Telecom. Project components included interfacing to upper and lower layers, a circuit switched call control state machine, protocol conversion, subsystem mgmt and an OMC interface.
- Developed a number of minor utilities (DOS) to assist in test automation, source code mgmt etc.

06/93-01/94 OMC System Validation Motorola (Cork)

Software Engineer

- Made extensive enhancements to the BSS simulator which was used during test execution, to simulate the required number of Network Entities managed by the

OMC

- Worked on feature requirements verification, functional area and feature test design, test automation and analysis of results.

08/90-06/93 Cellular (Analog) Development Motorola (Cork)

Software Engineer

- Worked on all aspects of call processing development across five projects. The later projects included an active role in requirements specification and project planning phases.

04/88-01/89 Test Engineering Analog Devices (Limerick)

Co-op Student

- Software and hardware development on HP and Teradyne test equipment.
- Networking of HP system to VAX.

SOFTWARE

Proficient in Java, C++, C, Z8000 assembly, UNIX, Shell Scripts (csh, sed, awk, perl) DOS, Pascal, HP Basic.

SYSTEMS

3GPP IMS Architecture, 3G UMTS Architecture, Softswitch/Call Agent, Tecnomen Voice Msging System, Motorola EMX2500, Motorola GSM OMC-R, HP and Teradyne test equipment.

PATENT DISCLOSURES

- Auto registration of PSTN numbers in cellular networks using the IP multimedia subsystem (IMS)
- TCCB – Text-based-protocol Compression using Cache and Blank
- A global network of consumer producer transaction exchanges
- Use of GPS to automatically select correct frequency when roaming (2000)
- Handover control server to enable real time inter-systems handovers
- Roaming control server to enable roaming between fixed and cellular networks
- On-the-ground Intelligent Flight Recorder/Analyser
- Stand-alone, miniature, global, low-cost, low-powered tracking device using GPS and Iridium technology
- Automatic Speed detection and Correction
- Crash/Collision Prediction utilising device tracking system
- Unexpected Location Change
- Sequential Tracing of Code Coverage for real-time embedded systems
- Automated Design Method for Interface Changes
- Automated Code Method for Interface Changes

TRAINING

- GSM, GPRS and UMTS [IIR]
- Mobile IP [The Phillips Group]
- Requirements Mgmt, RUP [Rational]
- Understanding Wireless Internet Access [TRA]
- GSM World Congress [IBC]
- Understanding IP and Voice Over IP [TRA]

- Java Programming Language [SUN]
- OO Analysis and Design [Motorola]
- Quantix DPE [Motorola]
- Dale Carnegie [Dale Carnegie]
- Young Managers Programme [IMI]
- Technical Project Mgmt [Frost & Sullivan, London]
- Time Mgmt [Peter Hancock and Company]
- Interviewing Skills [Burke and Associates]
- Domain Analysis [Renaissance Team - AH]

EDUCATION

1986–1990 University of Limerick Limerick
B.Eng Electronic Engineering

- Specialisation in Computer Engineering
- First Class Honours

Secondary St Brendan’s College Killarney, Co Kerry

Annex E: CV of Dr Dirk H Pesch (CIT)

Qualifications: PhD in Electrical & Electronic Engineering, University of Strathclyde, Glasgow, Scotland, 1999

Dipl. Ing. (Master of Engineering) in Electrical & Electronic Engineering, RWTH Aachen (University of Technology), Aachen, Germany, 1993

Memberships: Member of the IEEE (Institute of Electrical and Electronics Engineers)
Member of the IEI (Institution of Engineers of Ireland)

Current Position: Cork Institute of Technology*:* Lecturer in Electronic Engineering (Communication and Computer Engineering) since February 1999,

Director, Adaptive Wireless Systems Group, Department of Electronic Engineering.

Previous Positions: Jan. 1996 – Dec. 1998: Research Fellow, University of Strathclyde, Glasgow, Scotland
Research into novel resource management and service management techniques for future mobile and wireless communication networks

Nov. 1993 – Dec. 1995: Design Engineer, Nokia Mobile Phones R&D Centre, Bochum, Germany and Camberley, England
Research and development of communication protocols for cellular and cordless communication systems such as GSM, DECT, PHS, PDC
Participation in DECT standardisation activities within ETSI as Nokia's representative.

Sept. 1993 – Oct. 1993: Research Assistant, COMNETS Institute, RWTH Aachen (University of Technology), Aachen, Germany
Research into computer simulation tools for mobile communication network simulation

Collaborative Research Experiences:

- European projects ACTS MOSTRAIN and IST OPIUM
- Several national research projects involving Motorola Ireland, Waterford Institute of Technology, and Trinity College Dublin

Consulting and other activities:

- Consultant to Motorola Ireland and Amocom Technologies
- Founding member of the TecNet Communications Software, Systems, and Networks (CSSN) R&D network
- Technical assessor for Enterprise Ireland's Innovation Partnership Programme

- **Senior editor, IEEE Vehicular Technology Society News Magazine**

- General Chair, CSSN IT&T Conference, Waterford, Oct. 2002
- Technical programme Co-chair, Irish Signals and Systems Conference, Cork, June 2002

- Member of Organising committee, CSSN IT&T Conference, Athlone, Sept. 2001
- Member of Programme committee, IEI/IEE Telecommunication Systems Symposium, Dublin, Nov. 2001
- Invited lecturer, Institution of Engineers of Ireland and University of Applied Sciences, Fulda, Germany

List of Refereed Publications

- S. Rea and D. Pesch, "Source Routing Based on Destination Frequency Analysis for Wireless Mobile Ad-Hoc Networks", Proc. of CSSN IT&T Conference, Waterford, Oct. 2002
- V. Kenneally, D. Pesch, and I. Majumdar, "Evaluation of SIP Compression for IP Based Wireless Multimedia Communications",Proc. of CSSN IT&T Conference, Waterford, Oct. 2002
- G. Foster, M. Pous, A. Sesum, V. Kenneally, D. Pesch, "Performance Estimation of Efficient UMTS Packet Voice Call Control", Proc. of IEEE Fall 2002 Vehicular Technology Conference, Vancouver, BC, Canada, Sept. 2002
- K. Murray and D. Pesch, "Adaptive Radio Resource Management for 2.5G Cellular Systems", Proc. of ISSC2002, Cork, June 2002
- M. Klepal, D. Pesch, and Zdenek Hradecky, "Optimising Motif Models for Indoor Radio Propagation Prediction using Evolutionary Computation", Proc. of ISSC 2002, Cork, June 2002
- K. Murray and D. Pesch, "Adaptive Radio resource Management for GSM/GPRS Networks", IEI/IEE Telecommunications Systems Research Symposium, Dublin, Nov. 2001
- K. Murray and D. Pesch, "Neural Network based Adaptive Radio Resource Management for GSM and IS136 Evolution", 54th IEEE Vehicular Technology Conference, Atlantic City, NJ, Oct. 2001
- K. Murray and D. Pesch, "Adaptive Radio Resource Management for GSM using Neural Networks and Genetic Algorithms", *CSSN IT&T Conference*, Athlone, Sept. 2001
- M. Perez, D. Pesch, and P. Stephens, "Genetic Algorithms as an Approach for Optimum Frequency Deployment in GSM", *CSSN IT&T Conference*, Athlone, Sept. 2001
- M. Perez, D. Pesch, and P. Stephens, "Optimum Frequency Deployment in Cellular Mobile Networks using Genetic Algorithms", *ISSC 2001*, Maynooth, June 2001
- J. Irvine and D. Pesch, "*Potential of DECT Terminal Technology for Providing Low-cost Wireless Internet Access through Infostations*", in Proc. of IEE Colloqium on UMTS Terminal Technology, Glasgow, Scotland, April 1999
- D. Pesch, D. Girma, and J. Dunlop, "*A Distributed Dynamic Channel Allocation Methodology for Packet-Switched Multimedia Services in a DQDB MAN based Wireless Access Network*", in Proc. EPMCC'99, Paris, France, March 1999
- J. Dunlop, D. Pesch, and J. Irvine, "*Aspects of Radio Resource Management in the Provision of UMTS Services to High Speed Trains*", in Proc. of ACTS Mobile Telecommunications Summit, Rhodes, Greece, June 1998
- J. Irvine, D. Pesch, D. Robertson and D. Girma, "*Efficient UMTS Data Service Provision using INFOSTATIONS*", in Proc. of IEEE Vehicular Technology Conference, Ottawa, Canada, May 1998
- D. Pesch, D. Girma, and J. Dunlop, "*Distributed Radio Resource Management in DQDB MAN Based PCS*", in Proc. of IEEE Vehicular Technology Conference, Ottawa, Canada, May 1998
- J. Irvine, D. Pesch, and J. Dunlop, "*INFOSTATIONS for UMTS*", in Proc. 5th IEEE Seminar on Communications and Vehicular Technology in the Benelux, Enschede, The Netherlands, Oct. 1997

- D. Pesch, J. Irvine, D. Girma, and J. Dunlop, "*Application of DQDB MAN in Radio Resource Management in High Speed Train Environments*", in Proc. 5th IEEE Seminar on Communications and Vehicular Technology in the Benelux, Enschede, The Netherlands, Oct. 1997

- D. Pesch, D. Girma, and J. Dunlop, "*Distributed Aggressive DCA in a DQDB MAN Based UMTS Access Network*", in Proc. Of EPMMC'97, Bonn, Germany, Sept./Oct. 1997 **(received *best paper award*)**

- D. Pesch, D. Girma, and J. Dunlop, "*Distributed Dynamic Channel Allocation in a DQDB MAN Based PCN*", in Proc. Of 47th IEEE Vehicular Technology Conference, Phoenix, AZ, USA, May 1997

Annex F: Change history

Change history				
Date	**Rev**	**Subject/Comment**	**Old**	**New**
15-08-02	010	Original Version	N/a	010
28-08-02	020	WIP (Work in Progress)	010	020
01-09-02	030	WIP	020	030
05-09-02	040	WIP	030	040
10-09-02	050	WIP	040	050
12-09-02	100	Final version to be submitted to the Department	050	100
26-09-02	110	Marked confidential. Added CVs	100	110
17-10-02	120	Changed language to “UK English”	110	120
21-10-02	130	Incorporate changes following meeting with DCMNR on 1-Nov-02	120	130
11-07-03	140	Prepared for DCMNR publishing	130	140

Annex G: Sign off and supporting letters

Signed by:

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John O'Hare Date
Amocom Technologies Ltd.

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Michael O'Connor Date
National Software Centre.

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Trevor O'Connell Date
Digital Technologies Management

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Dr. Dirk Pesch Date
Adaptive Wireless Systems,
Cork Institute of Technology