WiTech

Simplify the wireless networks

LTE: a real disruptive technology and business opportunity?

July 2012

Review Pack

SUMMARY

Description

This report presents an in-depth analysis about the promising technology LTE taking into account not only technology aspects but also business aspects. In detail, it points out the key drivers that are continuously changing the Telecom market and analyzes LTE and its evolution, LTE Advanced, as technological response to the emerging market needs. In addition, it provides an overview of current trends in spectrum allocation, global status of the LTE ecosystem and worldwide initiatives to date. Finally, it explores LTE business case implications for incumbent and greenfield mobile operators through an accurate scenario and sensitivity analysis.

Topics Covered

- Emerging needs of the Telecom market
- LTE technology primer
- Candidate spectrum bands and licensing experience to date
- Availability of LTE equipment (eNodeB, UE, EPC components, wireless backhauling)
- Operator plans, commitments, trials, deployments, launches
- Critical factors for the LTE business case

Benefits of the report

- Value added: A set of guidelines and figures are provided to approach LTE and fully seize opportunities offered
- Accurate: The analysis is based on a superior business case modeling specific for LTE networks in incumbent and greenfield scenarios
- Unbiased: Assumptions are based on the standards, suggested by experience and gathered through audits with operators, vendors, manufacturers and regulators
- Plus: TEA|LTE is a unique and innovative application to perform LTE business case analyses taking into account all critical factors (market, technical, economic and financial) from the outset

Questions addressed

- Which are the Telecom market dynamics?
- How do LTE and its evolution LTE Advanced work?
- How to formulate properly spectrum licensing policies?
- Which are LTE equipment ready to support commercial deployments?
- How are mobile operators currently moving towards LTE?
- How to best achieve LTE profitability in incumbent and greenfield scenarios?

© 2012 WiTech www.witech.it Reproduction prohibited

Who could benefit

- Operators
- Vendors & Manufactures
- Regulators
- Analysts & Consulting Firms
- Universities

Vendors mentioned

Acer
Actiontec
Airspan
Alcatel-Lucent
Alvarion
AnyDATA
Athena
Aviat Networks
AVM
AXIS Network Technology
BandRich
BelAir networks
Blinq Networks
Bridgewave
Buffalo
Cambium Networks
Cambridge Broadband Networks
Ceragon
Cisco System
C-motech
CradlePoint
Dell
Dovado
DragonWave
Ericsson
Exalt
Franklin Wireless
Fujitsu
GammaTech
Gemtek
Gigabeam
GTC semiconductor
Hitachi
HP
HTC
Huawei
InfiNet Wireless
Ip.access
IPWireless
Juni
Juniper Networks
KLAS
LANCOM
LG
Lightpointe
Motorola
NEC
NetComm
Netgear
Nexaira
Nexpring
Nokia
Novatel Wireless
Panasonic
Pantech
Powerwave
Prolink
Qualcomm
RAD
RADWIN
Radiocomp
Renesas
RIM
Ruckus Wireless
Samsung
Sequans
Siae Microelettronica
Sierra wireless
Siklu
ST-Ericsson
Stratex Networks
Sumitomo Electrics
Tecore Networks
Tellabs
Teradek
Trango
Ventus
Vololink
ZTE
ZyXEL

© 2012 WiTech www.witech.it

Reproduction prohibited

Network operators and service providers mentioned

A1 Telekom Austria	Huchinson 3G Austria	T-Mobile Hungary
Belgacom	LMT	TDC
Deutsche Telekom	Mobyland & Center NET	TeliaSonera
DNA	Omnitel	Tele2
Elisa Corporation	Polkomtel	Telefonica
EMT	T-Mobile Austria	Telenor

© 2012 WiTech www.witech.it Reproduction prohibited

ABOUT WITECH

Founded in October 2003 as a spin-off of the University of Pisa, WiTech has quickly become a leading company operating in the telecommunication market with a focus on next generation wireless technologies.

WiTech provides high performance managed services and solutions to create a measurable business value for its international clients, including network operators & service providers, vendors & manufactures, regulators, analysts & consulting firms and universities.

Focusing on Technology Consulting, WiTech has an in-depth expertise in developing the cost modeling of telco networks to understand the actual costs and improve pricing and market entry decisions. Moreover, WiTech has a global track record with the assessment of business cases for telco initiatives ensuring the best possible alignment between business and technology strategies from the outset. In addition, WiTech manages efficiently the entire RFI/RFQ process, developing accurate RFI/RFQ documents and evaluating submitted proposals, as well as selecting the vendor best suited to requirements and negotiating the contract. Furthermore, WiTech has extensive experience in preparing reports and white papers on the hottest topics in the telco industry, driven by both clients' and WiTech's interest.

Thanks to its R&D team, WiTech has developed TEA (Technical & Economic Analyses), a family of business case analysis tools, which enable thorough techno-economic analyses in support of accurate and reliable business cases for 4G initiatives (e.g. LTE and WiMAX) in a fast and dependable manner.

WiTech has earned several industry recognitions, both national and international, thanks to its hard work made of an inborn innovative and creative inclination.

For additional information you can visit us at www.witech.it, or you can contact us at info@witech.it or at +39 050 77 50 56.

© 2012 WiTech www.witech.it Reproduction prohibited

THE AUTHORS OF THE REPORT

Elena Briola is VP of Technology Consulting at WiTech. She has in-depth technical and economic expertise in wireless access technologies, such as GSM, UMTS/HSPA, LTE, WiMAX, TETRA/TEDS and Wi-Fi, as well as in high-capacity wireless backhauling solutions. She is well-skilled to develop cost modelings for telco network and she is the product manager for the family of business case analysis tools TEA. She has written several articles and reports on new generation wireless technologies. She earned a Degree in Telecommunications Engineering (Summa Cum Laude) from the University of Pisa, Italy. She can be contacted at elena.briola@witech.it.

Andrea Calcagno is CEO and founder of WiTech. He has a strong technical and economic background in the telecommunication industry with a focus on next generation networks and services. Thanks to his expertise, he has been the leader of more than fifty projects concerning wireless next generation networks and services (WiFi, 3G/HSPA, WiMAX, LTE, Smart Metering) for several telco operators, system integrators, vendors and consulting firms in the domestic market and international arena. He has written several articles and reports on new generation wireless technologies. He earned a Degree in Telecommunications Engineering (Summa Cum Laude) from the University of Pisa, Italy. He can be contacted at andrea.calcagno@witech.it.

© 2012 WiTech – All rights reserved. No selection of this material can be copied, photocopied, duplicated in any form or by any means, or redistributed without express written permission from WiTech. While the report is based upon information that we consider accurate and reliable, WiTech makes no warranty, express or implied, as to the accuracy of the information in this document. WiTech assumes no liability for any damage or loss arising from reliance on this information. Names of companies and products here mentioned may be the trademarks of their respective owners.

HOW TO SCHEDULE YOUR FREE CONSULTATION

The purchase of the report entitles you to a free one-hour consultation with the authors of the report through a GoToMeeting session. This will give you the possibility to ask any questions you may have about the report findings and methodology or to discuss related topics.

To schedule your consultation, simply send us an email at armida.kaloti@witech.it.

© 2012 WiTech www.witech.it Reproduction prohibited

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. A SMOOTH MIGRATION TOWARDS 4G
   - 1.1 LTE: a promising technology
   - 1.2 Structure of this report
2. THE DRIVERS TO LTE
   - 2.1 The Internet for people and beyond
   - 2.2 The need for changes for the Telecom market
     - 2.2.1 The imperative for network operators and service providers
     - 2.2.2 A forward-looking spectrum management
     - 2.2.3 The importance of an industry alignment for network deployments
     - 2.2.4 Becoming the suppliers of feature-rich and cost competitive solutions
3. LTE TECHNOLOGY PRIMER
   - 3.1 A clear standardization path
   - 3.2 How LTE works
     - 3.2.1 Targets
     - 3.2.2 Evolved radio air interface
     - 3.2.3 Simplified core network
     - 3.2.4 QoS differentiation
     - 3.2.5 Security
     - 3.2.6 Mobility
     - 3.2.7 SON
     - 3.2.8 Voice and SMS services over LTE
   - 3.3 LTE Advanced and beyond
     - 3.3.1 Targets
     - 3.3.2 Additional technology components
   - 3.4 Performance in a nutshell
4. LTE DEPLOYMENT: WHICH SPECTRUM?
   - 4.1 Candidate spectrum bands
   - 4.2 Current trends in spectrum allocation
     - 4.2.1 The most attractive spectrum bands
     - 4.2.2 Licensing experience to date
5. STATUS OF THE LTE ECOSYSTEM
   - 5.1 The main players of the LTE ecosystem
   - 5.2 User equipment vendors

© 2012 WiTech www.witech.it Reproduction prohibited

5.2.1 Module
5.2.2 Tablet
5.2.3 Laptop
5.2.4 PC-card
5.2.5 Smartphone
5.2.6 Router
5.2.7 USB Dongle
5.3 Network infrastructure suppliers
5.3.1 eNB suppliers
5.3.2 EPC component suppliers
5.4 Wireless backhauling solution providers
6. WHAT'S ON GLOBAL LTE INITIATIVES
6.1 The whole picture
6.2 Europe
6.3 Americas
6.4 Middle East & Africa
6.5 Far East
6.6 Oceania
7. CRITICAL FACTORS FOR THE LTE BUSINESS CASE
7.1 Framework
7.2 A LTE business case sample
7.2.1 The whole picture
7.2.2 Business potentialities of LTE
7.3 What factors can undermine the LTE success?
8. CONCLUSIONS
ACRONYMS
REFERENCES
Annex A – OVERVIEW OF VENDORS
Annex B – TEA|LTE: THE LTE BUSINESS CASE ANALYSIS TOOL

© 2012 WiTech www.witech.it Reproduction prohibited

LIST OF FIGURES

Figure 1 – Structure of this report
Figure 2 – Samples of disruptive applications
Figure 3 – Internet of things
Figure 4 – Global mobile broadband traffic forecast
Figure 5 – Mobile broadband traffic sources
Figure 6 – The imperative for network operators and service providers3
Figure 7 – Main strategies to foster the adoption of LTE
Figure 8 – Main standardization and industry bodies
Figure 9 – The dictate for vendors
Figure 10 – Standardization timeline for LTE and beyond
Figure 11 – LTE features
Figure 12 – Frequency representation of OFDM
Figure 13 – Spatial multiplexing and transmit diversity
Figure 14 – Beamforming
Figure 15 – OFDMA scheme
Figure 16 – High PAPR challenge
Figure 17 – SC-FDMA scheme
Figure 18 – FFR
Figure 19 – SFR
Figure 20 – High level view of EPS
Figure 21 – Possible hardware configurations of EPC
Figure 22 – SAE bearer model
Figure 23 – Timeline for IMT Advanced and LTE Advanced
Figure 24 – Additional LTE Advanced features
Figure 25 – Attractive spectrum bands for LTE deployments
Figure 26 – Revised 700 MHz band plan in the US
Figure 27 – 800 MHz band plan options in Europe
Figure 28 – AWS-1 band plan in US and Canada
Figure 29 – PCS band plan in the US
Figure 30 – 2600 MHz band plan options in Europe
Figure 31 – LTE ecosystem
Figure 32 – Focus on vendors
Figure 33 – Breakdown of LTE UE by form factor
Figure 34 – AnyDATA DTP-960S
Figure 35 – BandRich BandLuxe M500 Series
Figure 36 – Cisco Systems EHWIC family
Figure 37 – GTC GDM7240
Figure 38 – Huawei Technologies EM920
Figure 39 – Novatel Wireless Expedite E162, E362 and E373
Figure 40 – Qualcomm MDM9615, MDM9625 and MDM9225
Figure 41 – Renesas SP2531 and MP5225
Figure 42 – Sequans SQN3010
Figure 43 – Sierra Wireless AirPrime MC Series
Figure 44 – ST-Ericsson Thor Family
Figure 45 – Acer Iconia Tab A500
Figure 46 – Cisco Systems Cius
Figure 47 – Motorola XOOM MZ602
Figure 48 – Blackberry RIM 4G Playbook

© 2012 WiTech www.witech.it Reproduction prohibited

Figure 49 – Samsung Electronics Galaxy Tab 10.1 4G LTE tablet
Figure 50 – ZTE Light Series and V11
Figure 51 – Dell Latitude E-Family
Figure 52 – GammaTech D12C
Figure 53 – HP Pavilion DM1-3010NR and Compaq CQ10-688NR
Figure 54 – Panasonic Toughbook CF 53 laptop
Figure 55 – Samsung Electronics N150, N350 and X430
Figure 56 – Fujitsu Xi F-06C
Figure 57 – IPWireless PC-card
Figure 58 – HTC Thunderbolt
Figure 59 – LG Electronics VS910 Revolution
Figure 60 – Motorola Droid Bionic
Figure 61 – Samsung Electronics LTE smartphones
Figure 62 – ZTE V5L
Figure 63 – Actiontec Electronics 4GRN 4G LTE router family
Figure 64 – AVM FritzBox 6840
Figure 65 – BandRich BandLuxe PR50 and R500 Series
Figure 66 – Buffalo Xi BF-01C
Figure 67 – C-motech CLR-960
Figure 68 – Cradlepoint CBA750, CRT500 and MBR1200
Figure 69 – Dovado Tiny, 4GR and 3GN
Figure 70 – Fujitsu Si-R G200
Figure 71 – Gemtek router
Figure 72 – Huawei Technologies B390, B593 and B1000
Figure 73 – Lancom 1681-4G
Figure 74 – LG Electronics FM300 and L-90C
Figure 75 – NEC BBRide
Figure 76 – NetComm Liberty Series
Figure 77 – Netgear MBR Series
Figure 78 – Nexaira Business Class II routers
Figure 79 – Novatel Wireless MiFi 4510L
Figure 80 – Prolink PWH2004
Figure 81 – Samsung Electronics SHV-E100L and SCH-LC11
Figure 82 – Sierra Wireless AirCard 754S and AirLink GX400
Figure 83 – Teradek Cube 150 and Cube 250
Figure 84 – Ventus V4500 and V2000
Figure 85 – Vololink VoloAccess VA126
Figure 86 – ZyXEL ZLR-2070S, MWR-211 and MWR-222
Figure 87 – AnyDATA ADU-960S
Figure 88 – BandRich C500 Series
Figure 89 – Franklin Wireless U700
Figure 90 – Gemtek USB dongle
Figure 91 – Huawei Technologies E392, E397 and E398
Figure 92 – IPWireless USB dongle
Figure 93 – LG Electronics L-02C, LD100, VL600 and AD600
Figure 94 – Motorola 7110
Figure 95 – Nexpring LTE USB dongle
Figure 96 – Nokia Siemens Network RD-3
Figure 97 – Novatel Wireless Ovation MC551 and USB551L
Figure 98 – Pantech UML290
Figure 99 – Samsung Electronics B3710, B3730 and B3740
Figure 100 – Sierra Wireless AirCard 313U

© 2012 WiTech www.witech.it Reproduction prohibited

Figure 101 – ZTE AL600, AL621, MF820 and MF91
Figure 102 – Gartner Magic Quadrant
Figure 103 – LTE deployment scenario
Figure 104 – Airspan Networks AirSynergy, Air4G and AirHarmony
Figure 105 – Alcatel Lucent BBU and RRH
Figure 106 – Alvarion BreezeCompact
Figure 107 – Axis Network Technology AceAxis LTE 4x4 MIMO
Figure 108 – Ericsson MU with DUG/DUL and RRU (RRUS 01 and RRUS 11)
Figure 109 – Ericsson BelAir2100 and BelAir100LP
Figure 110 – Huawei Technologies DBS3900
Figure 111 – ip.access E-100 AP
Figure 112 – IP Wireless LTE v6 eNB
Figure 113 – Juni JL-920 and JL-7000
Figure 114 – KLAS Telecom KP4600
Figure 115 – NEC MB4300 and Macro eNB
Figure 116 – Nokia Siemens Networks Flexi Multiradio BTS
Figure 117 – Powerwave Technologies Universal RRH Platform
Figure 118 – Radiocomp RRH Platform
Figure 119 – Ruckus Wireless SmartCell 8800
Figure 120 – Sumitomo Electrics RRH Platform
Figure 121 – ZTE BBU and RRU
Figure 122 – Alcatel Lucent 7750 Service Router and 9471 Wireless Mobility Manager
Figure 123 – Cisco ASR 5000 Platform
Figure 124 – Ericsson CPG and SGSN-MME
Figure 125 – Hitachi ER5000
Figure 126 – Juniper MX Series
Figure 127 – NEC Compact EPC
Figure 128 – Nokia Siemens Networks Flexi NG and NS
Figure 129 – Tecore Networks iCore EPC
Figure 130 – Tellabs SmartCore 9100 Platform
Figure 131 – ZTE ZXUN xGW
Figure 132 – Alcatel Lucent MPR 9500
Figure 133 – Athena Wireless Communications A060-Mini and A080-Fatum
Figure 134 – Aviat Networks Eclipse, IRU600 and ODU600
Figure 135 – Aviat Networks WTM 3000 and E-Link 1000
Figure 136 – BLiNQ Compact Base Station Backhaul
Figure 137 – Bridgewave FE60U, AR80/AR80X and FlexPort 80-3000
Figure 138 – Cambium Networks PTP 500 and PTP 800
Figure 139 – Cambridge Broadband Networks VectaStar Gigabit AP and CPE
Figure 140 – Ceragon FibeAir IP-10Q, FibeAir IP-10C and FibeAir IP-10 E-Series
Figure 141 – DragonWave Horizon Series
Figure 142 – Ericsson Mini-Link PT 2010, Mini-Link CN and Mini-Link TN
Figure 143 – Exalt ExtendAir r5000
Figure 144 – GigaBeam Gi-CORE, Gi-FLEX-E/-F and Gi-LINX
Figure 145 – Huawei Technologies RNT600 and RNT900
Figure 146 – Infinet InfiLINK 2x2 PRO
Figure 147 – LightPointe Airebeam family
Figure 148 – NEC NLite and Pasolink
Figure 149 – Nokia Siemens Networks Flexi Series
Figure 150 – RAD Airmux-400 and Airmux-5000
Figure 151 – RADWIN 2000 C and 5000 HPMP
Figure 152 – Siae Microelettronica ALFOplus and ALFOplus80

© 2012 WiTech www.witech.it Reproduction prohibited

Figure 153 – Siklu EtherHaul
Figure 154 – Stratex Eclipse
Figure 155 – Trango Elite and Giga Series
Figure 156 – Map of LTE deployments
Figure 157 – A1 Telekom Austria LTE coverage area
Figure 158 – Telekom LTE devices
Figure 159 – DNA LTE commercial launch
Figure 160 – Elisa offering
Figure 161 – EMT LTE coverage area
Figure 162 – Huchinson 3G Austria pricing and packaging
Figure 163 – LMT LTE commercial launch
Figure 164 – CenterNet and Mobyland launch in Poland
Figure 165 – Omnitel LTE launch in Lithuania
Figure 166 – Polkomtel LTE launch in Poland through Plus Brand
Figure 167 – T-Mobile Austria LTE trial
Figure 168 – T-Mobile Hungary LTE trial
Figure 169 – TDC LTE launch advertisement
Figure 170 – Teliasonera LTE commercial launch
Figure 171 – Net4Mobility
Figure 172 – Telefonica pricing and packaging
Figure 173 – Telenor LTE packaging in Sweden
Figure 174 – Vodafone pricing and packaging in Germany
Figure 175 – Yota Bel LTE advertisement
Figure 176 – AT&T Mobility USBConnect and Momentum Elevate 4G devices
Figure 177 – Bell LTE commercial launchFigure 178 – Claro LTE commercial launch
Figure 179 – Cricket LTE commercial launch
Figure 180 – MetroPCS LTE commercial launch
Figure 181 – Rogers Wireless LTE commercial launch
Figure 182 – SKY Brazil LTE commercial launch
Figure 183 – Verizon LTE commercial launch and web site
Figure 184 – News about LTE deployment on Etisalat website
Figure 185 – MTC commercial launch announcement
Figure 186 – Mobily LTE launch announcements
Figure 187 – STC LTE commercial launch news
Figure 188 – Ucell LTE launch announcements
Figure 189 – VIVA LTE launch announcement
Figure 190 – Viva Bahrain LTE advertisement on company website
Figure 191 – Vivacell-MTS commercial launch
Figure 192 – Zain LTE news on the website
Figure 193 – CSL LTE Pricing and packaging
Figure 194 – KT LTE launch announcement
Figure 195 – LG Uplus commercial Launch
Figure 196 – M1 first deployment
Figure 197 – Xi Brand name for LTE NTT DOCOMO launch
Figure 198 – Smartphone launch for LTE services
Figure 199 – SingTel launch for LTE services
Figure 200 – Smart Communication news
Figure 201 – Telstra LTE announcements
Figure 202 – High level view of the technical-economic model TEA
Figure 203 – Italian territory
Figure 204 – Summary of Italian territorial and demographic data
Figure 205 – Service profiles

© 2012 WiTech www.witech.it Reproduction prohibited

Figure 206 – Penetration rate
Figure 207 – Net data rate @ 10 MHz
Figure 208 – Net data rate @ 20 MHz
Figure 209 – eNB configuration
Figure 210 – UE configuration
Figure 211 – Margins @ 800 MHz
Figure 212 – Network roll-out rate
Figure 213 – Summary of main CAPEX
Figure 214 – Summary of main OPEX COS
Figure 215 – Summary of the personnel cost
Figure 216 – Other assumptions
Figure 217 – Market forecast
Figure 218 – Revenue forecast
Figure 219 – Coverage performanceFigure 220 – Capacity performance
Figure 221 – Network dimensioning
Figure 222 – Network roll-out
Figure 223 – CAPEX breakdown
Figure 224 – OPEX COS breakdown
Figure 225 – OPEX SG&A breakdown
Figure 226 – Profit & Loss
Figure 227 – Cash Flow
Figure 228 – Conclusions in a nutshell
Figure 229 – Work flow for the Market Analysis
Figure 230 – Work flow for the Technical Analysis
Figure 231 – Work flow for the Economic and Financial Analysis
Figure 232 – Environment of TEA|LTE

© 2012 WiTech www.witech.it Reproduction prohibited

LIST OF TABLES

Table 1 – LTE key targets
Table 2 – LTE FDD vs LTE TDD
Table 3 – UE classes
Table 4 – QCI classes
Table 5 – IMT Advanced and LTE Advanced key targets
Table 6 – LTE and LTE Advanced performance at a glance
Table 7 – 3GPP FDD LTE spectrum bands
Table 8 – 3GPP TDD LTE spectrum bands
Table 9 – LTE spectrum bands SWOT analysis
Table 10 – Summary of licensing experience to date
Table 11 – UE vendors
Table 12 – AnyDATA DTP-960S
Table 13 – BandRich BandLuxe M500 Series
Table 14 – Cisco Systems EHWIC family
Table 15 – Huawei Technologies EM920
Table 16 – Novatel Wireless Expedite LGA
Table 17 – Novatel Wireless Expedite PCI Express Mini Card
Table 18 – Sequans SQN3010
Table 19 – Sierra Wireless AirPrime MC Series
Table 20 – ST-Ericsson Thor family
Table 21 – Acer Iconia Tab A500
Table 22 – Cisco Systems Cius
Table 23 – Motorola XOOM MZ602
Table 24 – Blackberry RIM 4G Playbook
Table 25 – Samsung Electronics Galaxy Tab 10.1 4G LTE tablet
Table 26 – ZTE Light Series and V11
Table 27 – Dell Latitude E-Family
Table 28 – GammaTech D12C
Table 29 – HP Pavilion DM1-3010NR and Compaq CQ10-688NR
Table 30 – Panasonic Toughbook CF 53 laptop
Table 31 – Samsung Electronics N150, N350, X430
Table 32 – IPWireless PC-card
Table 33 – HTC Thunderbolt
Table 34 – LG Electronics VS910 Revolution
Table 35 – Motorola Droid Bionic
Table 36 – Samsung Electronics LTE smartphones
Table 37 – Actiontec Electronics 4GRN 4G LTE router family
Table 38 – AVM FritzBox 6840
Table 39 – BandRich BandLuxe PR50 Series
Table 40 – BandRich BandLuxe R500 Series
Table 41 – C-motech CLR-960
Table 42 – Cradlepoint MBR Series
Table 43 – Cradlepoint CBA and CRT Series
Table 44 – Dovado Tiny, 4GR and 3GN
Table 45 – Fujitsu Si-R G200
Table 46 – LG Electronics FM300 and L-90C
Table 47 – NetComm Liberty Series

© 2012 WiTech www.witech.it Reproduction prohibited

Table 48 – Netgear MBR Series
Table 49 – Nexaira Business Class II routers
Table 50 – Novatel Wireless MiFi 4510L
Table 51 – Prolink PWH2004 router
Table 52 – Sierra Wireless AirCard 754S and AirLink GX400
Table 53 – Teradek Cube 150 and Cube 250
Table 54 – Ventus V Series
Table 55 – Vololink VoloAccess VA126
Table 56 – ZyXEL ZLR-2070S, MWR-211 and MWR-222
Table 57 – AnyDATA ADU-960S
Table 58 – BandRich C500 Series USB
Table 59 – IPWireless USB dongle
Table 60 – Motorola 7110
Table 61 – Nexpring LTE USB dongle
Table 62 – Novatel Wireless Ovation MC551 and USB551L
Table 63 – Sierra Wireless AirCard 313U and 320U
Table 64 – eNB suppliers
Table 65 – Airspan Networks AirSynergy, Air4G and AirHarmony
Table 66 – Alcatel Lucent eNB
Table 67 – Alvarion BreezeCompact
Table 68 – Ericsson RBS 6000
Table 69 – Ericsson BelAir2100 and BelAir100LP
Table 70 – Huawei Technologies eNB
Table 71 – ip.access E-100 AP
Table 72 – IP Wireless LTE v6 eNB
Table 73 – Juni JL-920 and JL-7000
Table 74 – KLAS Telecom KP4600
Table 75 – NEC MB4300 and Macro eNB
Table 76 – Nokia Siemens Networks Flexi Multiradio BTS
Table 77 – Sumitomo Electrics RRH Platform
Table 78 – ZTE eNB
Table 79 – EPC component suppliers
Table 80 – Alcatel Lucent 7750 Service Router and 9471 Wireless Mobility Manager
Table 81 – Cisco ASR 5000 Platform
Table 82 – Ericsson CPG and SGSN-MME
Table 83 – Hitachi ER5000
Table 84 – Juniper MX Series
Table 85 – NEC Compact EPC
Table 86 – Nokia Siemens Networks Networks Flexi NG and NS
Table 87 – Tecore Networks iCore EPC
Table 88 – Tellabs SmartCore 9100 Platform
Table 89 – ZTE ZXUN xGW
Table 90 – PTP vs PMP wireless backhauling solutions
Table 91 – Wireless backhauling solutions providers
Table 92 – Alcatel Lucent MPR 9500
Table 93 – Athena Wireless Communications A060-Mini and A080-Fatum
Table 94 – Aviat Networks Eclipse, IRU600 and ODU600
Table 95 – Aviat Networks WMT300 and E-Link 1000
Table 96 – BLiNQ Compact Base Station Backhaul
Table 97 – Bridgewave FlexPort 80, FlexPort µwave, FlexPort 80-3000
Table 98 – Bridgewave FE80U/FE80XU, GE80/GE80X, BW80/BW80X and AR80/AR80X
Table 99 – Bridgewave FE60U, GE60 and AR60/AR60X

© 2012 WiTech www.witech.it Reproduction prohibited

Table 100 – Cambium Networks PTP 500, PTP 600 and PTP 800
Table 101 – Cambridge Broadband Networks VectaStar Gigabit AP and CPE
Table 102 – Ceragon FibeAir IP-10Q, FibeAir IP-10C and FibeAir IP-10 E-Series
Table 103 – Dragonwave Horizon Series
Table 104 – Ericsson Mini-Link PT family
Table 105 – Ericsson Mini-Link CN family
Table 106 – Ericsson MiniLink TN family
Table 107 – Exalt ExploreAir, ExtendAir and EX-s Series
Table 108 – GigaBeam Gi-CORE, Gi-FLEX-E/-F and Gi-LINX
Table 109 – Huawei Technologies RNT600 and RNT900
Table 110 – Infinet InfiLINK 2x2 PRO
Table 111 – LightPointe Airebeam G60 and Airebeam G70
Table 112 – NEC NLite and Pasolink
Table 113 – Nokia Siemens Networks Flexi Series
Table 114 – RAD Airmux-400 and Airmux-5000
Table 115 – RADWIN 2000 C and 5000 HPMP
Table 116 – Siae Microelettronica ALFOplus and ALFOplus80
Table 117 – Stratex Eclipse
Table 118 – Trango Elite and Giga Series
Table 119 – Commercial networks
Table 120 – A1 Telekom Austria service profiles and pricing
Table 121 – Telekom service profiles and pricing
Table 122 – Elisa service profiles and pricing
Table 123 – EMT service profiles and pricing
Table 124 – Huchinson 3G Austria service profiles and pricing
Table 125 – LMT service profiles and pricing
Table 126 – Omnitel service profiles and pricing
Table 127 – T-Mobile Austria service profiles and pricing
Table 128 – T-Mobile Austria service profiles and pricing
Table 129 – TDC service profiles and pricing
Table 130 – TeliaSonera service profiles and pricing in Sweden
Table 131 – TeliaSonera service profiles and pricing in Norway
Table 132 – TeliaSonera service profiles and pricing in Denmark
Table 133 – TeliaSonera service profiles and pricing in Estonia
Table 134 – TeliaSonera service profiles and pricing in Finland
Table 135 – Tele2 service profiles and pricing in Sweden
Table 136 – Telefonica service profiles and pricing
Table 137 – Telenor service profiles and pricing in Sweden
Table 138 – Vodafone service profiles and pricing in Germany
Table 139 – AT&T Mobility service profiles and pricing
Table 140 – Bell service profiles and pricing
Table 141 – Cricket service profiles and pricing
Table 142 – MetroPCS service profiles and pricing
Table 143 – Rogers Wireless service profiles and pricing
Table 144 – Verizon service profiles and pricing
Table 145 – STC service profiles and pricing
Table 146 – VivaCell-MTS service profiles and pricing
Table 147 – Zain service profiles and pricing
Table 148 – CSL service profiles and pricing for 1010
Table 149 – CSL service profiles and pricing for one2free
Table 150 – M1 service profiles and pricing
Table 151 – NTT DOCOMO service profiles and pricing

© 2012 WiTech www.witech.it Reproduction prohibited

Table 152 – SK Telecom service profiles and pricing
Table 153 – SingTel service profiles and pricing
Table 154 – Telstra service profiles and pricing
Table 155 – Headcount
Table 156 – Market forecast
Table 157 – Revenue forecast
Table 158 – Network roll-out
Table 159 – CAPEX breakdown
Table 160 – OPEX COS breakdown
Table 161 – OPEX SG&A breakdown
Table 162 – TCO breakdown
Table 163 – Profit & Loss
Table 164 – Cash Flow
Table 165 – Economic and financial indicators

© 2012 WiTech www.witech.it Reproduction prohibited