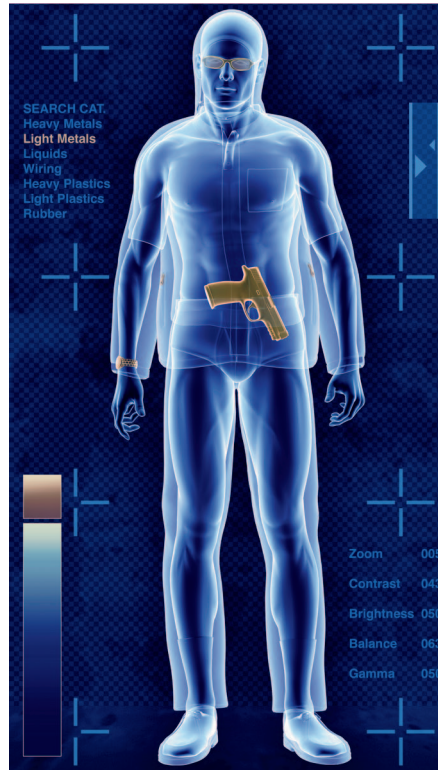


Thintri, Inc. announces the release of **Millimeter Waves: Emerging Markets**, a new market study that explores the current state of millimeter wave technology and market opportunities for systems operating in the millimeter wave range. This in-depth investigation discusses millimeter wave technologies already creating significant markets, emerging market opportunities, and overall market development. The report surveys today's technologies and applications, separates hype from reality and assesses the applications where millimeter wave technology will open up significant new markets, with market forecasts going out to 2018.

Thintri Inc.

Thintri Inc. provides business and market intelligence for a wide range of technologies through custom consulting, technology assessments, and published market studies.

- Semiconductors
- Electronics
- Photonics
- Telecommunications
- Materials engineering



Contents

Millimeter Wave Systems Overview

- Technology Background
- Technical Issues (GaAs vs. SiGe/CMOS, packaging, components, etc.)
- Public Policy, Regulation, Licensing
- Standards (Wireless HD, WiGig, etc.)
- Established Markets

Prime Applications

- Imaging
- Telecommunications
- Consumer Products
- Defense & Security

Imaging

- Active vs. Passive Systems
- Markets in Checkpoint Security – Airports, concerts, sports events, etc.
- Markets in Loss Prevention/Inventory Control
- Markets in Through-Wall Imaging

- Markets in Consumer Retail/Clothing Sales
- Issues of Privacy and Public Perception
- Competition in X-ray backscatter

Telecommunications

- Established Lower-Frequency Applications
- Applications for Millimeter Waves (Enterprise, Backhaul, PtP, etc.)
- Licensed vs. Lightly Licensed vs. Unlicensed
- Performance and Availability
- 23 to 39 GHz Bands
- 60 GHz Band Markets
- E-Band Markets

Consumer Markets

- 60 GHz: Consumer, Home Media Markets
 - Data Compression
 - Hardware Considerations
 - Market Growth

- Automotive Radar
 - 24 GHz vs. 77 GHz
 - Market Growth: Trucks, Automobiles

Defense & Security Radar Markets

- Smart Munitions
- Perimeter & Surveillance Radar, Intrusion Detection
 - Defense vs. non-Defense
 - Range Considerations, Long Range vs. Short Range
- Marine Radar
- Defense & Intelligence Communications

Emerging Millimeter Wave Markets

- Commercial Ka-Band Satellite (VSAT) Communications
- Medicine and Health
- Chemical Monitoring
- Construction & Infrastructure
- Manufacturing

Background on Millimeter Wave Systems and Their Markets

Millimeter wave radiation, that portion of the electromagnetic spectrum generally defined as 20 GHz to 300 GHz, has been exploited only in some relatively limited markets. Now, developments in technology and the regulatory environment have expanded existing millimeter wave applications and opened new, potentially large markets. The millimeter wave band is a large slice of the microwave spectrum that encompasses radiation with a range of different capabilities. Consequently, the applications enabled by millimeter waves are quite diverse, ranging from security imaging to telecommunications to smart munitions and many others.

Having long been confined to scientific research, i.e., radio astronomy and sensing, millimeter wave technology has established itself in defense, where it is used in satellite-to-satellite communications and smart munitions. More recently developing markets include consumer satellite communications that bring broadband Internet access to businesses and rural consumers, wireless broadband media transfer within the home, automotive radar for tasks such as adaptive cruise control and collision avoidance, and telecommunications links that are approaching the performance of optical fiber but at a fraction of the cost. Millimeter wave security imaging, such as that used to screen airline passengers and personnel at other checkpoints, is undergoing deployment at airports and businesses, where it is used for loss prevention and inventory control. Systems are even commercially available for retail clothing shoppers to conduct body measurements to determine clothing sizes and recommend appropriate products and brands.

Development of millimeter wave communications technologies was necessitated by the scarcity of available frequencies in the lower frequency microwave ranges, which have become congested in many locations due to demand from public and private communications, broadcasting, aircraft guidance and radar, and others. The advantage of millimeter waves in communications, however, is the greater capacity to carry information, due to the higher frequency. Another benefit to millimeter waves is a narrower beam, which permits much smaller antennas.

The main limitation of millimeter waves is range. Due to absorption by atmospheric oxygen and water vapor, signal strength drops off more rapidly with distance than in other bands. However, this attenuation is also one of the prime advantages of millimeter waves in communications. The limited range, combined with the narrow beam, prevents interference between neighboring links, even in congested environments like large cities. It also makes signal interception much more difficult, if not impossible. These features have led to a greatly reduced regulatory burden for millimeter wave communications, which has further encouraged widespread deployment. Consequently, telecommunications companies have seized on millimeter wave systems, with near-optical fiber performance but much lower cost, as an alternative to laying optical fiber in locations where it would be physically impossible or too costly, for emergency broadband provision when conventional fiber systems fail, and routine wireless backhaul deployments. Millimeter wave systems are also ideal in many campus and enterprise broadband networks.

Markets for millimeter wave technology are growing rapidly, and in some applications, more than 100% per year. Several markets will surpass \$1 billion in yearly global sales within the forecast period of the report. In others, millimeter wave technology will fill key applications, but with more modest overall sales.

The Thintri market study, Millimeter Waves: Emerging Markets, relies on extensive, in-depth interviews with industry executives, market development managers and government and academic researchers. The report provides a survey of the current state of the art in millimeter wave technology, an assessment of potential applications in terms of their commercial viability, discussion of market development and forecasts for individual markets from 2011 to 2018.

Understand the Markets

The outlook for millimeter wave technology is extraordinarily promising. Steady reductions in hardware cost and progress in system development are dovetailing with growing demand in a number of markets and, in some applications, greatly relaxed regulation, are all leading to growth in widely diverse markets. Depending on the application, that growth is already well underway, is starting now, or will start soon. Most

importantly, some of the most significant markets, including security and telecommunications, are not only potentially quite large but relatively immune to economic conditions. In many applications, technology requires little if any development to capture significant markets. In others, recent innovations are reducing costs dramatically and bringing millimeter wave systems within striking distance of mass markets.

Some emerging markets require little more than education of users in the capability of millimeter wave systems while in others, that case has already been made and equipment sales are growing rapidly. In most areas, technologies have matured to the extent that scientific understanding is not an issue; instead, the principal requirement is bringing prices in line with market demand.



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Report Contents

Part 1: Overview	1
1.1 Introduction.....	1
Figure 1-1 Primary US Microwave and Millimeter Wave Band Allocations.....	1
1.2 History.....	4
Figure 1-2 Prof. J.C. Bose with his millimeter wave equipment, 1897.....	5
1.3 Current Markets.....	6
1.3.1 Telecommunications.....	6
1.3.2 Radar.....	7
1.4 Technology Basics.....	8
Figure 1-3 Propagation of Millimeter Waves.....	8
Figure 1-4 Absorption of Millimeter Waves by Atmospheric Oxygen and Water Vapor.....	10
Figure 1-5 Overall Atmospheric Absorption Mechanisms of Electromagnetic Radiation.....	11
1.5 Why Millimeter Waves?.....	12
Part 2: Technology & Hardware	13
2.1 Semiconductors and Packaging.....	13
2.1.1 Material Systems: GaAs, GaN, SiGe and CMOS13	
2.1.2 Packaging: MCM vs. SMT.....	18
2.1.3 Devices, Circuits & Components.....	19
2.1.4 RF-MEMS Switches.....	19
2.2 Transmission Lines.....	20
2.3 Antennas.....	21
2.4 Transceivers & Receivers.....	22
2.5 Systems.....	22
2.6 Modulation.....	24
2.6.1 Amplitude Shift Keying.....	24
2.6.2 Frequency Shift Keying.....	24
2.6.3 Orthogonal Frequency Division Multiplexing.....	24
Part 3: Technical & Safety Issues	26
3.1 Technical Issues.....	26
3.2 Safety.....	28
Part 4: Public Policy, Regulation & Standards	30
4.1 Background: Growth of the Current Regulatory Climate.....	30
4.2 E-band Regulation.....	31
4.3 Standards.....	32
4.3.1 Low Frequency Options.....	33
4.3.2 Higher Frequency Standards.....	34
4.3.3 Summary.....	36
Part 5: Imaging	37
5.1 Introduction.....	37
5.2 Imaging Technology.....	37
Figure 5-1 Scissors Imaged Through a Closed Container.....	38
Figure 5-2 Cookies Imaged Through a Closed Container.....	38
5.3 Imaging Applications.....	40
5.3.1 Checkpoint Security: Airports & Other Public Venues.....	40
5.3.2 Inventory Control, Theft Prevention.....	42
5.3.3 Through-Wall Imaging.....	43
5.3.4 Consumer Retail.....	46
5.4 Active vs. Passive Systems.....	46
Figure 5-1 Checkpoint Security Imaging Market, Active vs. Passive System Share.....	49
5.5 Issues of Acceptance: Privacy & Public Perception.....	50

Figure 5-2 Active millimeter wave images.....	50
Figure 5-3 TSA Chart on Millimeter Wave Scanners.....	52
5.6 The Competition: Backscatter X-Ray.....	52
5.7 Millimeter Wave Imaging Markets.....	54
5.7.1 Checkpoint Security Imaging Markets.....	55
Figure 5-4 Millimeter Wave Imaging Systems Sales in Checkpoint Security, Unit Sales.....	56
Figure 5-5 Millimeter Wave Imaging Systems Sales in Checkpoint Security, Market Volume.....	56
5.7.2 Loss Prevention Imaging Markets.....	57
Figure 5-6 Imaging Systems Sales, Loss Prevention, Unit Sales.....	57
Figure 5-7 Imaging Systems Sales, Loss Prevention, Market Volume.....	58
5.7.3 Through-Wall Imaging Markets.....	58
Figure 5-8 Millimeter Wave Through-Wall Imaging Systems Market Volume.....	58
5.7.4 Consumer Retail Imaging Markets.....	59
Figure 5-9 Imaging Systems Sales in Consumer Retail, Market Volume.....	59
Part 6: Telecommunications	60
6.1 Introduction.....	60
6.1.1 Conventional Microwave Links.....	60
Figure 6-1 Conventional Microwave Links, Hardware Sales.....	61
Figure 6-2 Conventional Microwave Links, Hardware Sales by Component.....	61
Figure 6-3 Relative Share of Mobile vs. Enterprise Networks, 6 - 38 GHz, 2011.....	62
6.1.2 The advent of Millimeter Wave Systems in Telecommunications.....	62
6.2 Licensed vs. Lightly Licensed vs. Unlicensed.....	65
6.3 The 23, 24, 26 and 39 GHz Bands.....	66
6.3.1 23 and 26 GHz Bands.....	66
6.3.2 24 and 39 GHz Bands.....	67
6.4 60 GHz.....	68
6.4.1 60 GHz Telecommunications Applications.....	68
6.4.2 Benefits of 60 GHz Technology.....	69
6.5 The E-band.....	69
6.5.1 Background.....	69
6.5.2 Propagation Characteristics.....	70
6.5.3 Performance, Reliability and Availability.....	71
Table 6-1 Five Nines Link Range and Availability for Several Cities.....	72
6.5.4 Applications & Users.....	73
Table 6-2 Frequency vs. Beamwidth at 1 km using a 1-foot diameter antenna.....	74
Figure 6-4 Beamwidth comparisons for wireless backhaul solutions.....	76
6.5.5 E-band Licensing.....	78
6.6 The Competitive Technology Landscape.....	79
Figure 6-5 Telecommunications Backhaul: Shares by Technology.....	80
6.7 The Millimeter Wave Telecom Market.....	81
6.7.1 Past Market Growth.....	81
6.7.2 2009: The Shift to backhaul.....	82
6.7.3 Present and Future Market Growth.....	83
Figure 6-6 Markets, Millimeter Wave Telecommunications Links, 20 to 38 GHz.....	84
Figure 6-7 Markets, 20 to 38 GHz, by Component.....	84

Figure 6-8 Millimeter Wave Systems Markets, Telecom, 60 to 80 GHz.....	86
Figure 6-9 Telecom Systems Markets by Component, 60 to 80 GHz.....	86
Figure 6-10 Millimeter Wave Systems Markets, 60 to 80 GHz, by Application	87
Figure 6-11 Millimeter Wave Enterprise Markets, 60 to 80 GHz	87
Part 7: Consumer & Automotive.....	88
7.1 Introduction	88
7.2 60 GHz Systems: Consumer & Home Media	89
7.2.1 Background on 60 GHz	89
7.2.2 Data Compression.....	90
7.2.3 Hardware Considerations.....	91
7.2.4 60 GHz Consumer Media Markets	92
Figure 7-1 Markets for 60 GHz Consumer Multimedia Products	93
Figure 7-2 Markets for 60 GHz Consumer Multimedia Products, Unit Sales.....	93
7.3 Automotive Radar.....	93
7.3.1 Background.....	93
Figure 7-3 The 1959 Cadillac Cyclone with Radar.....	94
7.3.2 24 GHz vs. 77 GHz.....	98
Figure 7-4 Market Share, Auto Radar, 24 GHz vs. 77 GHz, .. Automobiles.....	99
Figure 7-5 Market Share, Auto Radar, 24 GHz vs. 77 GHz, .. Trucks	100
7.3.3 Automotive Radar Markets.....	100
Figure 7-6 Worldwide Unit Sales, Cars and Trucks.....	100
Figure 7-7 Unit Sales, Radar Systems, Trucks and Automobiles.....	101
Figure 7-8 Markets for Automotive Radar, 24 GHz and 77 GHz	101
Part 8: Millimeter Wave Radar: Defense & Security Markets .	102
8.1 Background.....	102
8.2 Millimeter Wave Radar for Security and Intrusion Detection.....	103
8.2.1 Perimeter and Surveillance Radar.....	103
8.2.2 Range Considerations.....	105
8.2.3 Technical Considerations.....	105
8.3 Munitions Applications	105
8.4 Marine Radar	106
8.5 Defense and Intelligence Communications	108
8.6 Defense & Security System Markets.....	108
Figure 8-1 Surveillance/Perimeter Radar, Defense vs. Non-Defense, 2011 and 2016	109
Figure 8-2 Millimeter Wave Surveillance/Perimeter Radar .. Markets	109
Figure 8-3 Millimeter Wave Munitions Radar Markets.....	110
Figure 8-4 Marine Radar Millimeter Wave Markets.....	110
Figure 8-5 Defense & Intelligence Millimeter Wave Communications Markets.....	111

Part 9: Other Millimeter Wave Markets.....	112
9.1 Commercial Ka-band Satellite Communications... ..	112
Figure 9-1 Unit Sales, VSAT Terminals.....	115
9.2 Medicine and Health	115
Figure 9-2 Millimeter Wave Markets in Medicine, Health and Safety	116
9.3 Chemical Monitoring.....	117
Figure 9-3 Markets for Millimeter Wave Systems in Chemical Monitoring.....	117
9.4 Construction & Infrastructure	118
Figure 9-4 Millimeter Wave Systems Markets in Construction and Infrastructure	118
9.5 Manufacturing	119
Figure 9-5 Millimeter Wave Markets in Manufacturing... ..	120
Part 10: Millimeter Wave Semiconductor Markets	121
10.1 Introduction	121
Figure 10-1 Overall MMICs by Application, All Frequencies, 2011	121
Figure 10-2 MMIC Sales by Application, Millimeter Wave ... Only, 2018	122
10.2 Consumer Applications.....	122
Figure 10-3 Semiconductor Markets in Car Radar, Multimedia.....	123
10.3 Imaging.....	123
Figure 10-4 Millimeter Wave Semiconductor Markets, Active Imaging Systems	123
Figure 10-5 Millimeter Wave Semiconductor Markets, Passive Imaging Systems.....	124
10.4 Defense and Security	124
Figure 10-6 Defense & Security Millimeter Wave Semiconductor Markets.....	124
10.5 Telecommunications	125
Figure 10-7 Telecommunications Millimeter Wave Semiconductor Markets.....	125
10.6 Other Millimeter Wave Applications.....	125
Figure 10-8 Semiconductor Markets in Other Millimeter Wave Applications.....	126