



FORWARD CONCEPTS®

Electronics Market Research

1575 W. University Drive Suite 111 • Tempe, AZ 85281 • U.S.A.

Tel: +1-480-968-3759 Fax: +1-480-968-7145 E-mail: info@fwdconcepts.com

<http://www.fwdconcepts.com>

TABLE OF CONTENTS

SMARTPHONE DEVICE & CHIP MARKET OPPORTUNITIES '10

Strategies & Insight into the Advanced Class of Mobile Phones and the ICs that enable them

Authors:

Carter L. Horney

&

Satish Menon

Report No. 1010

February, 2010

Authors

Carter L. Horney, a recognized authority on microprocessor and DSP implementation in telecommunications. Mr. Horney is an independent consultant and Forward Concepts Associate specializing in semiconductor product strategy and market planning. He was formerly Division Planner for Rockwell International's Digital Communications Division and earlier Strategic Marketing manager for Rockwell's Semiconductor Products Division. Mr. Horney was responsible for the product planning, which led Rockwell (now Conexant Systems) to dominate the worldwide FAX and high-speed modem chip market. He was appointed a Rockwell Engineering Fellow and received many commendations for outstanding achievement in Computer Architecture, Engineering, Technical Marketing, Product Planning and Customer Relations. Mr. Horney has a B.S. in Mathematics and Physics and an M.S. in Mathematics from Western Illinois University.

Satish Menon is an independent consultant and Forward Concepts Associate specializing in communications electronics. Most recently, Satish was Chief Technology Officer for a facilities-based provider of wholesale and retail voice telecommunication services where he architected a distributed, high-availability voice network that unified several circuit-based and packet-based protocols into a single packet-core network based on SIP protocol. Prior to this, he was founder and VP Product Development for Nuntius Systems, Inc. where he was responsible for all engineering activities that included activities involving voice codecs, GSM/GPRS/EDGE baseband/MAC, DSP based lower-power Wi-Fi baseband/MAC and multimedia codecs. Mr. Menon led a multi-disciplinary team of over 120 engineers and was responsible for building several successful products from concept to completion, over a seven year period. His background includes product management in areas of wireless technology and platforms, real-time embedded systems, DSP implementations of wired/wireless technology and communication protocol stacks along with product positioning and strategic planning expertise. Mr. Menon has also consulted with several high-tech companies in the areas of communication and multimedia technology. He earned his Bachelor's degree in Electronics and Communication Engineering from REC, Trichy, India and his Master's degree in Computer Engineering from University of Southern California.

Copyright © 2010 by Forward Concepts Company. All rights, including that of translation into other languages are specifically reserved. No part of the this publication may be reproduced in any form, stored in a retrieval systems or transmitted by any method or means, electrically, mechanically, photographic or otherwise, without the express permission of Forward Concepts Company.

FORWARD CONCEPTS and the stylized FC Logo are registered trademarks of

Forward Concepts Co. ® Reg. U.S. Patent & Trademark Office

TABLE OF CONTENTS

Table of Contents

I. EXECUTIVE SUMMARY	1
A. What is a Smartphone?	1
B. Introduction	1
C. Mobile Internet Market Overview	3
D. Smartphone Device Market Overview	6
E. Smartphone Semiconductor Market Overview	10
II. THE SMARTPHONE DEVICE MARKET	12
A. Smartphone Market Segmentation	14
1. Business Smartphones	15
a) Large Enterprise	15
b) Small and Medium Business (SMB)	15
2. Consumer Smartphones	16
a) Performance Smartphones	16
b) Mid-Range Smartphones	18
i. Music Smartphones	18
ii. Camera Smartphones	20
iii. Navigation Smartphones	21
iv. Gaming Smartphones	22
c) Entry-Level Smartphones	24
B. Smartphone Device Market Trends	25
1. Architectural Trends	26
a) Processor	26
b) Input Methods	28
2. Hardware Trends	28
a) 3D Graphics	28
3. Supply Chain	28
4. Software and O/S Trends	30
5. Air Interface Trends	33
6. Mobile Operator Trends	37
C. Global Smartphone Suppliers	38
1. Acer/E-Ten	40

TABLE OF CONTENTS

2.	Amoi Mobile	40
3.	Apple	41
4.	ASUS/ASUSTeK	44
5.	CEC Telecom	44
6.	Gigabyte Communications	45
7.	Hewlett Packard	45
8.	HTC Corporation	46
9.	Huawei	50
10.	Kyocera	51
11.	Lenovo Mobile Communications	51
12.	LG Electronics	52
13.	Mitac	52
14.	Motorola	53
15.	Nokia	56
16.	Palm	60
17.	Pantech & Curitel	61
18.	Research In Motion (RIM)	62
19.	Sony Ericsson	65
20.	Samsung	67
21.	ZTE	71
D.	Regional Smartphone Markets and Forecast	73
1.	North America	73
2.	Western Europe	76
3.	Japan	78
4.	South Korea	81
5.	Asia Pacific	84
6.	China	86
7.	India	89
8.	Eastern Europe	91
9.	Central and Latin America (CALA)	94
10.	Middle East and Africa	98
E.	Smartphone Operating Systems	101
1.	Google Android	102
2.	Nokia Maemo	105
3.	Palm WebOS	108
4.	Symbian	109
5.	Windows Mobile	112
III.	THE SMARTPHONE SEMICONDUCTOR MARKET	115

TABLE OF CONTENTS

A. Smartphone Semiconductor Market Trends	115
1. Processor	115
2. Image Sensors and Image/Video Processors	116
3. Wireless Peripherals	117
4. Volatile and Non-Volatile Memory	118
B. Communication Processors/Platforms	120
1. Overview	120
2. 2.5G Communication Processors/Platforms	121
a) Overview	121
b) 2.5G Communication Processor Vendor Market Share & Forecast	121
c) 2.5G Communications Processor Vendor Profiles	124
i. Freescale (EGPRS Platform)	124
ii. Marvell (Single-Die EGPRS Baseband Communications Processor)	125
iii. Texas Instruments (Single-chip EGPRS Baseband Applications Processor)	127
iv. Texas Instruments (Single-die EGPRS Baseband Multimedia Applications Processor)	131
1. 3G Communication Processors/Platforms	134
a) Overview	134
b) 3G Communication Processor Vendor Market Share & Forecast	134
c) 3G Communications Processors/Platforms Vendor Profiles	137
i. Broadcom (Single-die HSDPA/EDGE Low-Def ARM11 Baseband Processor)	139
ii. Freescale Semiconductor (Multimode, Multiband ARM11 HEDGE Platform)	141
iii. Marvell (Single-Die HEDGE XScale Baseband Communications Processor)	144
iv. NEC Electronics (Single-chip HEDGE Std-Def Baseband Communications Processor)	144
v. Panasonic (GPRS/HSDPA High-Def Baseband Communication Processors)	147
vi. Qualcomm (ARM11 HEDGE Low-Def Multimedia Platforms)	149
vii. Qualcomm (ARM11 HEDGE and EV-DO Std.-Def Multimedia Platforms)	150
viii. Qualcomm (Scorpion HEDGE, EV-DO and LTE High-Def Multimedia Platforms)	153
ix. Renesas Technology (FOMA and HEDGE High-Def Multimedia Platforms)	157
x. ST-Ericsson (NXP Vintage) (ARM9 WEDGE Low-Def Multimedia Platform)	159
xi. ST-Ericsson (EMP) (ARM 11/Cortex-A8/A9 HEDGE Std.-/High-Def Multimedia Platforms)	161
C. Stand-alone Applications Processors	165
2. Overview	165
3. Standalone Applications Processor Vendor Market Share & Forecast	166
3. Low-Definition Multimedia Applications Processor Vendor Profiles	169
a) Marvell (Standalone Applications Processors)	169
b) Samsung (Stacked Memory MCP Applications Processor)	171
c) ST-Ericsson (NXP Vintage) (Standalone Applications Processor)	173
d) ST-Ericsson (STMicro Vintage) (Standalone Applications Processors)	175
e) Texas Instruments (Standalone Applications Processors)	176

TABLE OF CONTENTS

4. Standard-Definition Multimedia Applications Processor Vendor Profiles _____	179
a) Broadcom (Multimedia Applications Processor) _____	179
b) Core Logic (Multimedia Applications Processor) _____	181
c) Freescale (90 nm Multimedia Applications Processor) _____	183
d) Marvell (90 nm Standalone Applications Processor) _____	185
e) Nvidia (130 nm Standalone Applications Processor) _____	188
f) Panasonic (65 nm Standalone Applications Processor) _____	189
g) Renesas Technology _____	190
h) Samsung (65 nm Standalone Applications Processor) _____	194
i) ST-Ericsson (STMicro Vintage) (130 nm and 90 nm Standalone Applications Processors) _____	197
j) Texas Instruments (90 nm Standalone Applications Processors) _____	200
5. High-Definition Multimedia Applications Processor Vendor Profiles _____	204
a) Freescale (65nm Standalone Multimedia Applications Processor) _____	204
b) Intel (45nm Atom Processors and SoCs) _____	206
c) Marvell (55nm Standalone Applications Processors) _____	209
d) Nvidia (65nm Standalone Applications Processors) _____	209
e) Samsung (65nm and 45 nm Standalone Applications Processors) _____	213
f) Texas Instruments (65nm and 45nm Standalone Applications Processors) _____	214
D. Media Co-Processors _____	218
6. Overview _____	218
7. Media Co-Processor Forecasts _____	218
8. Supplier Profiles _____	219
a) AMD/ATI Technologies (Std. Definition Media Co-Processor) _____	219
b) Broadcom (High-Def Media Co-Processor) _____	220
c) Marvell (Std.-Definition Media Co-Processor) _____	223
d) MtekVision (Std.-Definition Media Co-Processor) _____	224
e) Nvidia (Std.-Definition Media Co-Processor) _____	226
f) Nvidia (Low-Definition Media Co-Processor) _____	231
g) Texas Instruments (Low-Definition & Std.-Definition Media Co-Processors) _____	234
h) Toshiba (Std.-Definition Media Co-Processor) _____	237
E. Non-Captive Cellular Baseband & RF Transceivers _____	239
9. Technology Overview _____	239
10. 3G Stack Market Overview _____	240
a) LTE Software _____	243
11. Smartphone Digital Baseband & RF Transceiver Forecast _____	244
12. LTE Supplier Landscape _____	248
13. Cellular Baseband and RF Transceiver Supplier Profiles _____	249
a) 4M Wireless (LTE Protocol Stack) _____	251
b) Altair Semiconductor (LTE Baseband/MIMO RF & TD-LTE MIMO RF) _____	252
c) AKM (WCDMA RF Xceivers) _____	252

TABLE OF CONTENTS

d) Broadcom (EDGE Multimedia Baseband Processor)	254
e) Comsys Communications (LTE Baseband)	255
f) Datang Telecom Technology (TD-LTE Baseband)	255
g) Freescale (WEDGE & EDGE RF Subsystems)	256
h) Freescale (Multi-Mode LTE Baseband)	259
i) HiSilicon Technologies (TD-LTE Baseband)	260
j) Icera Semiconductor (Multimode HSPA/EDGE Baseband/RF and LTE/HSPA+ Basebands)	260
k) Infineon Technologies (EDGE, WEDGE & LTE RF Xceivers)	261
l) Infineon Technologies (Multimode/Multiband HEDGE BB/RF/PM Platforms)	264
m) Infineon Technologies (65nm Programmable Baseband Processor)	269
n) LG Electronics (LTE Baseband)	269
o) MediaTek (Multimode WCDMA and GPRS/EGPRS Basebands)	269
p) MediaTek (TD-SCDMA Baseband Processor and Dual-Band RF)	271
q) mimoOn GmbH (LTE SDR Baseband and Protocol Stack)	272
r) NEC (LTE Baseband)	272
s) Qasara (LTE Protocol Stack)	272
t) Qualcomm (WCDMA/EV-DO Baseband/RF + Multimedia Co-Processors)	272
u) Qualcomm (Multimode LTE Basebands)	280
v) Renesas Technology (Single-chip Multiband WEDGE/HSPA RF Xceiver)	281
w) Renesas (LTE Software Reconfigurable Radio)	282
x) Sandbridge Technologies (LTE Baseband Processor)	282
y) Skyworks Solutions (Multiband, Direct Conversion HEDGE RF Xceivers)	283
z) Spreadtrum Communications (Multimode 3GPP R4/R5 TD-SCDMA Basebands and Single-Chip RF)	284
aa) ST-Ericsson (EMP Vintage) (HSPA, HSPA+ and LTE Modems)	285
bb) ST-Ericsson (EMP Vintage) (UMTS/HSPA BB/RF + Multimedia Co-Processors)	286
cc) ST-Ericsson (LTE Baseband and RF Xceiver)	289
dd) SySDSoft (LTE Protocol Stack)	289
ee) T3G Technology/ST-Ericsson (Multimode 3GPP R4/R5 TD-SCDMA Basebands)	290

IV. ANCILLIARY SMARTPHONE CHIPS, MEMORY AND DISPLAYS 293

A. Overview	293
B. Bluetooth	293
1. Overview	293
2. Smartphone Bluetooth Market Share & Forecast	295
3. Bluetooth Supplier Profiles	297
a) Broadcom (130nm/65nm BT 2.1+EDR + FM-RDS Xceiver + 802.11b/g/n)	298
b) CSR/SiRF (130nm BT 2.1+EDR, BT 2.1 +EDR+Wibree+FM/RDS+GPS)	299
c) Infineon Technologies AG (130nm BT 2.0/2.1 EDR)	301
d) Qualcomm (130nm BT 2.0 EDR)	302

TABLE OF CONTENTS

e) Staccato (110nm BT 3.0, USB over UWB)	303
f) ST-Ericsson (NXP Vintage) (BT 2.0 EDR, BT 2.0 EDR + Wi-Fi)	303
g) ST-Ericsson (STMicro Vintage) (130 nm Single-Chip BT 2.1 EDR, BT 2.1 EDR + FM-RDS Xceiver)	304
h) Texas Instruments (Single-Chip 130/90/65nm BT 2.0/2.1 EDR + FM Xceiver)	306
C. Mobile Wireless LAN	308
1. Overview	308
2. Mobile WLAN Market Share and Forecast	310
3. Mobile Wireless LAN Supplier Profiles	311
a) Atheros Communications (Single-Chip Wi-Fi and GPS)	314
b) Broadcom (Single-Chip Wi-Fi+Bluetooth+FM)	315
c) Marvell (Single-Chip Wi-Fi+BT2.0 EDR, Wi-Fi+BT2.0 EDR+FM)	316
d) Qualcomm	317
e) ST-Ericsson (NXP Vintage) (Wi-Fi/UMA, Wi-Fi+Bluetooth SIP)	318
f) ST-Ericsson (STMicro Vintage) (SIP-based Wi-Fi)	319
g) Texas Instruments (Single-Chip Wi-Fi + BT 2.1 EDR + FM/RDS)	320
A. GPS	322
1. Overview	322
a) Alternate Satellite Navigation Systems	324
b) Navigation Software for Smartphones	325
2. GPS Market Share and Forecast	326
3. GPS Chip Supplier Profiles	328
a) Atheros/u-Nav (One-Chip SoC)	330
b) Broadcom/Global Locate (A-GPS)	331
c) Infineon (65nm Single-chip GPS)	334
d) Qualcomm (Embedded A-GPS)	335
e) RFMD (Software-assisted GPS Receiver)	335
f) CSR/SiRF Technology (Stand-alone and Assisted 65nm and 90nm Single-Die GPS)	336
g) ST-Ericsson (NXP Vintage) (GloNav)	338
h) ST-Ericsson (STMicro Vintage) (2-Chip Set)	339
i) Texas Instruments (Single-Chip A-GPS)	340
B. FM Radio	341
1. Overview	341
2. FM Radio Market Share and Forecast	342
3. FM Radio Supplier Profiles	343
a) Airoha Technologies (FM Stereo Receiver + RDS/RBDS)	344
b) Silicon Labs (CMOS FM Stereo RDS/RBDS Xceiver, AM/FM Receiver)	345
c) ST-Ericsson (NXP Vintage) NXP (Single-Chip FM Stereo Receiver + RDS + AM)	346
d) ST-Ericsson/STMicroelectronics (FM RDS Receiver)	347
e) Texas Instruments (FM RDS Transceiver)	348

TABLE OF CONTENTS

C. Mobile TV	348
1. Mobile TV Standards Overview	348
2. MTV Semiconductor Market Share and Forecast	352
3. Mobile TV Semiconductor Vendor Profiles	355
a) Auvitek (DTMB Demodulators)	355
b) Broadcom (DVB-H & DVB-T Monolithic Tuner)	356
c) DiBcom (DVB-H/T/SH Tuners & Demods)	357
d) Imagination Technology (Multi-Standard MTV Demodulator IP Core)	357
e) Infineon (DVB-H, DVB-T Tuner & Demod)	358
f) Innofidei (CMMB Demod & Decode)	359
g) Legend Silicon (DTMB Demodulators)	359
h) LG Electronics (ATSC-M/H Demod)	360
i) Maxim (ISDB-T 1Seg & 3Seg Tuners)	361
j) Mirics Semiconductor (Multi-standard Tuner and Software Demodulator)	361
k) MegaChips (ISDB-T Demod)	362
l) Newport Media (DVB-H, ISDB-T Tuner & Demod)	363
m) Qualcomm (MediaFLO™, ISDB-T, DVB-H Tuner & Demod)	364
n) Samsung (Multi-Mode DVB-T/H, DAB-IP, ISDB-T/T-DMB Tuner & Demod)	365
o) Siano Mobile Silicon (DVB-T/H, T-DMB, ISDB-T, CMMB Tuner & Demod)	366
p) Spreadtrum (CMMB Demod and Decode)	368
q) ST-Ericsson (NXP Legacy) (Analog TV Output Processor)	368
r) Telegent Systems (Analog TV & DVB-T/H Tuner, Demod & Decode)	369
s) Texas Instruments (DVB-H, ISDB-T Tuner & Demod)	371
D. Full-Screen Touch Controllers	372
1. Overview	372
a) Resistive Touchscreens	375
b) Capacitive Touchscreens	377
2. Smartphone Full-screen Touch Controller Market Share and Forecast	379
3. Touch-Screen Controller Suppliers	382
a) Analog Devices (Resistive Touchscreen Controllers)	382
b) Atmel (Capacitive Touchscreen Controllers)	383
c) Broadcom (Custom Full-Screen Capacitive Touchscreen Controller)	385
d) Cypress (Capacitive Touchscreen Controllers)	385
e) ELANTECH (Capacitive Touchscreen Modules & Controllers)	386
f) IDT/Leadis Technology (Capacitive Touchscreen Controllers With Integrated Haptics Driver)	390
g) Maxim (Resistive Touchscreen Controllers)	391
h) National Semiconductor (Resistive Touchscreen Controllers)	393
i) ST-Microelectronics (Resistive & Capacitive Touchscreen Controllers)	394
j) Synaptics (Capacitive & Resistive Touchscreen Controllers)	395
k) Texas Instruments (Resistive Touchscreen Controllers)	397

TABLE OF CONTENTS

l) Wolfson Microelectronics (Combo Resistive Touchscreen Controllers and Audio/Voice Codec) _____	397
E. Digital Camera Image Sensors & Processors _____	399
1. Overview _____	399
2. Image Sensor Market Share and Forecast _____	401
3. Image Sensor Supplier Profiles _____	406
a) Aptina Imaging (0.3 - 9 MP CMOS Image Sensors & SoCs) _____	408
b) MagnaChip Semiconductor (SXGA, UXGA & 3.2MP Image Sensors & Processors) _____	410
c) NEC (12MP Image Sensor, 1080p Video Processor) _____	410
d) OmniVision (VGA, 1.3, 2, 3.2, 5, 8 & 9MP CMOS Image Sensors) _____	411
e) Samsung (VGA, 1.3, 2, 3, 5 & 8.4 MP CMOS Image Sensors & SoCs) _____	413
f) Seti (VGA & 1.3 MP CMOS Sensors) _____	416
g) Sony (5, 8 & 12MP CMOS Sensors) _____	417
h) STMicroelectronics (1.3, 2 & 3.2MP Sensors & Processors) _____	418
i) Toshiba Electronic Components (VGA, 2, 3.2, 5 & 8MP CMOS Sensors) _____	420
F. Accelerometers and Gyroscopes _____	422
1. Overview _____	422
2. Accelerometer and Gyroscope Market Forecast _____	423
3. Accelerometer and Gyroscope Vendor Profiles _____	424
a) Analog Devices (3-axis MEMS Analog and Digital Accelerometers) _____	425
b) Bosch Sensortec (3-axis MEMS Analog and Digital Accelerometers) _____	427
c) Freescale (3-axis Digital Accelerometers) _____	428
d) Hitachi Metals (3-axis Digital Accelerometers) _____	429
e) Hokuriku Electric (3-axis Digital Accelerometer) _____	429
f) Kionix (3-axis MEMS Accelerometers) _____	430
g) MEMSIC (2- and 3-axis MEMS Accelerometers) _____	430
h) STMicroelectronics (3-axis Linear MEMS Accelerometers) _____	431
G. Volatile and Non-Volatile Memories _____	434
1. Overview _____	434
2. Smartphone Volatile and Non-Volatile Memory Forecast _____	436
3. Volatile and Non-Volatile Memory Supplier Profiles _____	440
a) Elpida (Mobile DRAM) _____	440
b) Hynix (Mobile DRAM, PSRAM, SRAM and Discrete NAND Flash) _____	440
c) Hynix-Numonyx (Managed NAND Flash) _____	441
d) Micron (Mobile DRAM and PSRAM) _____	442
e) Micron-Intel (Discrete NAND, Serial NAND and Managed NAND Flash) _____	442
f) Numonyx (Discrete NOR, Discrete NAND and Managed/Hybrid NAND Flash) _____	444
g) Samsung (Discrete NAND and Managed/Hybrid NAND Flash) _____	445
h) Spansion (Discrete NOR and Hybrid NAND Flash) _____	446
i) Toshiba-SanDisk (Discrete NAND and Managed/Hybrid NAND Flash) _____	447

TABLE OF CONTENTS

H. Smartphone Displays	449
1. Overview	449
a) TFT-LCD	450
b) Passive Matrix OLED (PM-OLED)	451
c) Active Matrix OLED (AM-OLED)	451
d) Light Emitting Polymer OLED (P-OLED)	452
e) MEMS Interferometric Modulator	453
f) MEMS Electronic Paper	453
2. Smartphone Display Forecast	454
3. Display Vendor Profiles	458
a) AU-Optronics (2.x/3.x TFT-LCD, 3.x AM-OLED Displays)	458
b) Chi Mei EL (2.x/3.x/4.x Low-res AM-OLED)	459
c) Eastman Kodak (AM-OLED Technology Licensing)	460
d) E-Ink/Primeview Corporation (Electronic Paper Display)	460
e) LG Display (2.x/3.x TFT-LCD, 3.x/4.x AM-OLED Displays)	461
f) Qualcomm MEMS Technologies (Interformatic Modulator Displays)	462
g) Samsung Mobile Display (2.x/3.x/4.x TFT-LCD, 3.x/4.x AM-OLED Displays)	463
h) Toshiba Mobile Display (2.x/3.x TFT-LCD, 2.2"/3.x" AM-OLED Displays)	464
i) TPO (2.x/3.x TFT-LCD, 3.x"/4.x" AM-OLED Displays)	465
I. Pico Projectors	466
1. Overview	466
2. Semiconductor Vendor Profiles	467
a) Microvision (Single-Mirror MEMS Pico Projector)	467
b) Texas Instruments (DLP Pico Projector)	468

TABLE OF CONTENTS

List of Figures

Figure 1: Mobile Device Market Share Forecast by Device Type – '08 – '14	3
Figure 2: Global Mobile Internet Subscriber Market Share by Air-Interface – '08 – '14	4
Figure 3: Global Mobile Internet Subscriber Market Share by Region – '08 – '14	5
Figure 4: Smartphone Shipments by OEM – '09	6
Figure 5: Smartphone Shipments by Air-Interface – '09 – '14.....	7
Figure 6: Smartphone Shipments by Device Category – '09 – '14	8
Figure 7: Smartphone O/S Market Share – '09 – '14.....	9
Figure 8: Smartphone Semiconductor/Display Revenue Forecast – '08 - '14	11
Figure 9: 2.5G (EDGE) Communications Processor and Non-Integrated DBB Shipments – '08-14	123
Figure 10: Freescale MXC275 EGPRS Platform	124
Figure 11: Marvell PXA901 Communications Processor Block Diagram.....	126
Figure 12: OMAP850 Communications Processor Block Diagram	128
Figure 13: OMAP850 Based Smartphone Reference Design	130
Figure 14: OMAPV1030 Communications Processor Block Diagram.....	132
Figure 15: 3G Communications Processor and Non-Integrated DBB Shipments – '08-'14	136
Figure 16: Broadcom HEDGE Baseband Processor	140
Figure 17: Freescale 3G Single-Core Modem Platform.....	141
Figure 18: NEC Electronics Medity2 Chipset.....	145
Figure 19: Qualcomm MSM7600 EV-DO/UMTS Chipset Solution	151
Figure 20: Qualcomm MSM7600 Chipset RF Options.....	152
Figure 21: NXP 7210 WEDGE Platform	160
Figure 22: Standalone Apps Processors and Comm. Processor Shipments – '08 – '14.....	168
Figure 23: Marvell PXA270 Block Diagram.....	170
Figure 24: NXP PNX4008 Block Diagram	173
Figure 25: STMicro STn8815 Block Diagram	175

TABLE OF CONTENTS

Figure 26: TI OMAP1710 Applications Processor Block Diagram	178
Figure 27: Broadcom Multimedia Applications Processor.....	180
Figure 28: Core Logic Multimedia Device Block Diagram	182
Figure 29: Freescale Standard-Definition Applications Processor Block Diagram.....	184
Figure 30: Marvell PXA320 Standard-Definition SoC Block Diagram.....	186
Figure 31: Samsung Standard-Definition Apps Processor Block Diagram	194
Figure 32: STMicro Nomadik STn8815 Applications Processor Block Diagram	199
Figure 33: Texas Instruments Standard-Definition OMAP Apps Processor Block Diagram.....	202
Figure 34: TI OMAP44x Block Diagram	216
Figure 35: Broadcom High-Def Mobile Multimedia Co-Processor Block Diagram	222
Figure 36: Marvell 2700G Graphics and Multimedia Accelerator	223
Figure 37: MtekVision Multimedia Co-Processor Architecture	225
Figure 38: TI OMAP-DM500/OMAP-DM299 Media Co-processor.....	235
Figure 39: TI OMAP-DM510 Media Co-processor.....	236
Figure 40: Freescale's 4-chip WCDMA/EDGE Radio Block Diagram.....	257
Figure 41: Freescale's RFX300-30: 2-chip WCDMA/EDGE Radio Block Diagram	258
Figure 42: Infineon HSDPA Modem Platform	265
Figure 43: MSM6260 Cat. 6 HSDPA Multimedia Platform.....	273
Figure 44: MSM6280 Cat. 8 HSDPA Enhanced Multimedia Platform	275
Figure 45: MSM6500 EV-DO Rev 0 + GSM/GPRS Multimedia Platform	277
Figure 46: MSM6550 1X Rel 0/Rev A/EV-DO Rev 0 + GSM/GPRS Multimedia Platform.....	279
Figure 47: Texas Instruments WiLink 6.0 Single-chip WLAN, Bluetooth and FM Solution	321
Figure 48: A Typical GPS Receiver Block Diagram.....	323
Figure 49: Global Locate/Broadcom Hammerhead II A-GPS Chip Block Diagram	333
Figure 50: Smartphone Image Sensor Penetration by Resolution – '09.....	400

TABLE OF CONTENTS

TABLE OF CONTENTS

List of Tables

Table 1: Global Smartphone Unit Shipments and Revenue Forecast – '09 – '14	12
Table 2: Global Smartphone Shipment Forecast by Air-Interface Technology – '09 – '14.....	13
Table 3: Global Smartphone Shipment Forecast by Device Category – '09 – '14.....	14
Table 4: Intel MID/Smartphone Platform Roadmap - '08-'11	27
Table 5: Global Mobile Internet Subscriber Forecast by Region and Air-Interface - '08-'14.....	34
Table 6: Global Mobile Subscriber Forecast by Air-Interface Technology - '08-'14	36
Table 6: Global Smartphone Supplier Unit Shipments, Market Share and YoY Growth - '09	39
Table 7: Apple Smartphone Hardware and Software Overview.....	42
Table 8: Apple Smartphone Unit Shipments by Region – '09.....	43
Table 9: HTC Smartphone Hardware and Software Overview.....	48
Table 10: HTC Non-ODM Smartphone Unit Shipments by Region – '09	49
Table 11: Motorola Smartphone Hardware and Software Overview.....	54
Table 12: Motorola Smartphone Unit Shipments by Region – '09	55
Table 13: Nokia Smartphone Hardware and Software Overview.....	58
Table 14: Nokia Smartphone Unit Shipments by Region – '09.....	59
Table 15: RIM Smartphone Hardware and Software Overview.....	63
Table 16: RIM Smartphone Unit Shipments by Region – '09.....	64
Table 17: Sony Ericsson Smartphone Hardware and Software Overview	66
Table 18: Sony-Ericsson Smartphone Unit Shipments by Region – '09.....	67
Table 19: Samsung Smartphone Hardware and Software Overview.....	69
Table 20: Samsung Smartphone Unit Shipments by Region – '09.....	71
Table 21: Global Smartphone Shipment Forecast by Region- '09 – '14	73
Table 22: North America Smartphone Vendor Market Share - '09	74
Table 23: North America Smartphone Shipment Forecast by Air Interface - '09 – '14	74
Table 24: North America Smartphone Shipment Forecast by O/S - '09 – '14	75

TABLE OF CONTENTS

Table 25: North America Smartphone Shipment Forecast by Device Category - '09 – '14	75
Table 26: Western Europe Smartphone Vendor Market Share - '09.....	76
Table 27: Western Europe Smartphone Shipment Forecast by Air Interface - '09 – '14.....	77
Table 28: Western Europe Smartphone Shipment Forecast by O/S - '09 – '14.....	77
Table 29: Western Europe Smartphone Shipment Forecast by Device Category - '09 – '14	78
Table 30: Japan Smartphone Vendor Market Share - '09.....	79
Table 31: Japan Smartphone Shipment Forecast by Air Interface - '09 – '14.....	80
Table 32: Japan Smartphone Shipment Forecast by O/S - '09 – '14.....	80
Table 33: Japan Smartphone Shipment Forecast by Device Category - '09 – '14.....	81
Table 34: South Korea Smartphone Vendor Market Share - '09	82
Table 35: South Korea Smartphone Shipment Forecast by Air Interface - '09 – '14	82
Table 36: South Korea Smartphone Shipment Forecast by O/S - '09 – '14	83
Table 37: South Korea Smartphone Shipment Forecast by Device Category - '09 – '14.....	83
Table 38: Asia Pacific Smartphone Vendor Market Share - '09	84
Table 39: Asia Pacific Smartphone Shipment Forecast by Air Interface - '09 – '14	85
Table 40: Asia Pacific Smartphone Shipment Forecast by O/S - '09 – '14	85
Table 41: Asia Pacific Smartphone Shipment Forecast by Device Category - '09 – '14.....	86
Table 42: China Smartphone Vendor Market Share - '09	87
Table 44: China Smartphone Shipment Forecast by O/S - '09 – '14.....	88
Table 45: China Smartphone Shipment Forecast by Device Category - '09 – '14.....	89
Table 46: India Smartphone Vendor Market Share - '09	89
Table 47: India Smartphone Shipment Forecast by Air Interface - '09 – '14.....	90
Table 48: India Smartphone Shipment Forecast by O/S - '09 – '14	91
Table 49: India Smartphone Shipment Forecast by Device Category - '09 – '14.....	91
Table 51: Eastern Europe Smartphone Shipment Forecast by Air Interface - '09 – '14	93
Table 52: Eastern Europe Smartphone Shipment Forecast by O/S - '09 – '14	93
Table 53: Eastern Europe Smartphone Shipment Forecast by Device Category - '09 – '14	94

TABLE OF CONTENTS

Table 54: CALA Smartphone Vendor Market Share - '09.....	95
Table 55: Central/Latin America Smartphone Shipment Forecast by Air Interface - '09 – '14	96
Table 56: CALA Smartphone Shipment Forecast by O/S - '09 – '14.....	97
Table 57: Central/Latin America Smartphone Shipment Forecast by Device Category - '09 – '14	97
Table 58: Middle-East/Africa Smartphone Vendor Market Share - '09.....	98
Table 59: Middle-East/Africa Smartphone Shipment Forecast by Air Interface - '09 – '14.....	99
Table 60: Middle-East/Africa Smartphone Shipment Forecast by O/S - '09 – '14.....	99
Table 61: Middle-East/Africa Smartphone Shipment Forecast by Device Category - '09 – '14.....	100
Table 62: Global Smartphone Unit Shipment Forecast by O/S - '09 – '14.....	102
Table 63: Android Mobile Smartphone Unit Shipments by Region – '09	105
Table 64: Symbian Smartphone Unit Shipments by Region – '09.....	111
Table 65: Windows Mobile Smartphone Unit Shipments by Region – '09.....	113
Table 66: 2.5G Communication Processor Vendor Market Share - '08-'09	122
Table 67: 2.5G Communication Processor Forecast '08-'14	122
Table 68: 2.5G Communication Processor Vendor Overview.....	124
Table 69: 3G Communication Processor Vendor Market Shares '08-'09.....	135
Table 70: 3G Communication Processor Forecast '08-'14	136
Table 72: 3G Communication Processor/Platform Vendor Overview	138
Table 73: Panasonic UniPhier 4M BB+ Specifications.....	148
Table 74: Qualcomm Snapdragon Communication Processors.....	154
Table 75: Stand-alone Applications Processor Vendor Market Share '07-'09.....	167
Table 76: Stand-alone Applications Processor Forecast '08-'14	167
Table 77: Panasonic UniPhier 4M Specification.....	190
Table 78: Renesas SH-Mobile 3A Specifications	192
Table 79: Intel MID Platform Roadmap 2008-2011.....	207
Table 80: Nvidia Tegra and APX Applications Processors	210
Table 81: Texas Instruments OMAP34x, OMAP36x & OMAP44x Applications Processors	215

TABLE OF CONTENTS

Table 81: Media Co-Processor Smartphone Forecast – '08 – '14	218
Table 82: MtekVision's current lineup of MMP (Mobile Multimedia Platform) products	225
Table 83: Nvidia Standard-Definition Media Co-Processor Specifications	228
Table 84: Nvidia Low-Definition Media Co-Processor Specifications	232
Table 85: Toshiba T5G Specifications.....	238
Table 86: WCDMA Advanced Receiver Types.....	239
Table 87: 3G IP/Stack Source for Major UMTS Baseband Chip Suppliers.....	243
Table 88: Digital Baseband (Non-Integrated) Vendor Units Shipments and Market Share – '09.....	244
Table 89: RF Transceiver Vendor Market Share – '09.....	245
Table 90: Non-Integrated DBB Shipments/Forecast by Air-Interface Technology - '08-'14	246
Table 91: RF Transceiver Shipments/Forecast by Air-Interface Technology - '08-'14	247
Table 92: Non-Integrated Cellular Baseband Supplier Overview	249
Table 93: RF Transceiver Supplier Overview.....	250
Table 94: Bluetooth Penetration Rates in Smartphones by Vendor.....	295
Table 95: Bluetooth Vendor Unit Shipments and Market Share – '09	296
Table 96: Bluetooth Standalone and Combination Shipments/Forecast - '08-'14	297
Table 97: WLAN Smartphone Unit Shipments and Penetration by OEM – '09	309
Table 98: WLAN Vendor Unit Shipments and Market Share – '09	310
Table 99: Stand-alone & Combo Wi-Fi Chipset Forecast '08-'14	311
Table 100: WLAN Stand-alone and Combo Chipset Supplier Overview	313
Table 101: GPS Chipset Vendor Shipments and Market Share- '09	327
Table 102: GPS Chipset Forecast '08-'14.....	327
Table 103: GPS Smartphone Unit Shipments and Penetration by OEM – '09.....	329
Table 104: SiRF GPS Chipset Overview	336
Table 105: FM Unit Shipments and Penetration Rate in Smartphones by OEM - '09	342
Table 106: Stand-alone and Combo FM Chipset Vendor Unit Shipments and Market Share – '09	342
Table 107: Stand-alone and Combo FM Chipset Shipment Forecast - '08-'14	343

TABLE OF CONTENTS

Table 108: Stand-alone and Combo FM Chipset Supplier Overview	344
Table 109: Mobile TV Smartphone Vendor Shipments and Market Share – ‘09.....	352
Table 112: Mobile TV Penetration by Smartphone OEM.....	353
Table 111: Mobile TV Multicast Chipset and Subscriber Forecast by MTV Standard (‘09-‘14).....	354
Table 113: Mobile TV Demodulators & Tuners Product Overview.....	355
Table 114: Telegent Low-Power Analog TV and DVB-T/H Receiver Chip Sets.....	370
Table 115: Touchscreen Technology Comparison	372
Table 116: Capacitive Full Touch Screen Controller Market Share – ‘09.....	380
Table 116: Resistive Full-Touch Screen Controller Market Share – ‘09.....	381
Table 117: Resistive & Capacitive Full-Touch Screen Controller Forecast – ‘08-‘14.....	382
Table 118: Analog Devices’ 4-wire Resistive Touch-screen Controllers	383
Table 119: Cypress TrueTouch Capacitive Controller Characteristics	386
Table 120: ELANTECH Capacitive Full-Screen Multi-Touch Modules.....	388
Table 121: ELANTECH Capacitive Single-Touch Controllers.....	389
Table 122: Maxim’s Line of Resistive Touchscreen Controllers.....	391
Table 123: Primary and Secondary Image Sensor Unit Shipments and Market Share – ‘09	403
Table 124: Image Sensor Shipment/Revenue Forecast – ‘08-‘14	405
Table 125: Image Sensor Supplier Overview	406
Table 126: Toshiba Dynastron 1.75µm pixel size CMOS Image Sensors	421
Table 127: Accelerometer/Gyroscope Market Forecast ‘08-‘14.....	424
Table 128 ADI’s line of iMEMS Low g (up to ±18 g) accelerometers:	426
Table 129: Smartphone Mobile RAM Forecast by Applications – ‘08-‘14	436
Table 130: Smartphone Discrete NOR, Managed NAND and Hybrid NAND Flash Forecast – ‘08-‘14.....	438
Table 131: Smartphone OLED Penetration by OEM – ‘09.....	455
Table 132: Smartphone Display Penetration by Size and OEM – ‘09	456
Table 133: Smartphone Display Forecast by Size – ‘08-‘14	457

SMARTPHONE DEVICE & CHIP MARKET OPPORTUNITIES '10

出版社

フォワードコンセプト社 (米国)

To: データリソース

FAX: 03-3582-2861

価格	
<input type="checkbox"/> ハードコピー (白黒)	US\$3,850.00
<input type="checkbox"/> 電子媒体	US\$7,500.00

※上記および弊社サイト内で外貨価格で表示されているレポートのご請求/お見積り額は外貨価格を伝票作成日のTTSレート(三井住友銀行発表)で換算し、消費税を加えた金額となります。(日本国外からのご注文を除く)

上記資料を

お問い合わせ 見積もり依頼 購入申し込み

します。

ご氏名 _____

貴社名 _____

部署・役職名 _____

所在地 _____

Eメール _____

電話番号 _____ FAX 番号 _____

ご質問などございましたら、ご記入ください。

ご質問は下記までお気軽にどうぞ。

株式会社データリソース

〒107-0052 東京都港区赤坂 4-5-6 栄屋ビル 701 号

TEL:03-3582-2531

FAX:03-3582-2861

Email:info@dri.co.jp