Oppo Electronics Corporation

Patent Portfolio Analysis

November 2018

Introduction

Oppo Electronics Corporation, commonly referred to as Oppo, is a Chinese consumer electronics and mobile communication company, known for its smartphones, Blu-ray players and other electronic devices.

For this report, we have analyzed a total of 20,176 currently active published patent applications in Oppo's portfolio. Unless otherwise stated, the report displays numbers for published patent applications. The analytics are presented in the various charts and tables that follow. These include the following,

- Portfolio Summary
- Published Applications – Growth
- Top Forward Citing (FC) Assignees
- Technology Focus of the FC Assignees
- Topic Map based on Concepts
- Patent Quality
- Key Patents in the Portfolio
- Top 20 CPC Codes
- Growth of the Top 10 CPC Codes
- Key Portfolio Acquisitions
- Portfolio Taxonomy
- Competitor Comparison
- Fast Charging - Growth
- Fast Charging - Key Patents
- Fast Charging - Patent Quality

Insights

- Oppo's year-wise published patents shown a sharp upward trend post-2014.
- China, with a 84% share of the published applications, is the preferred jurisdiction for Oppo to file in.
- Oppo's portfolio has an average Relecura Star rating of 1.93 out of 5. Typically, a patent with a Relecura Star rating of 3 or more is deemed as one of high-quality.
- Technologies covered by CPC codes such as, H04N 5/2257 (Cameras embedded in devices), H04M 1/0264 (Phones with a camera module), H02J 7/0029 (Battery charging with safety devices), H02J 2007/0096 (Phone charging) and H04M 1/026 (Phone display module) - show the highest year-on-year growth.
- Oppo has 343 currently active published applications covering fast charging technologies, which is is greater than the individual patent assets of competitors such as Samsung, Alphabet, Apple and Xiaomi in the same technology area.
- Oppo's published patent applications in fast charging exhibit a strong upward trend in recent years.

Published Applications - Summary

TOTAL DOCUMENTS COUNT (APPLICATIONS)
20,176

PUBLICATION TYPES
13,381 | 6,698
Applications | Grants

IP TYPES
18,113 | 2,044 | 6
Invention | Model | Design

PATENT BY STAR RATING
1.93
4
10
694
17,350
2,118

Peak Year of Activity
2018 (8,101)

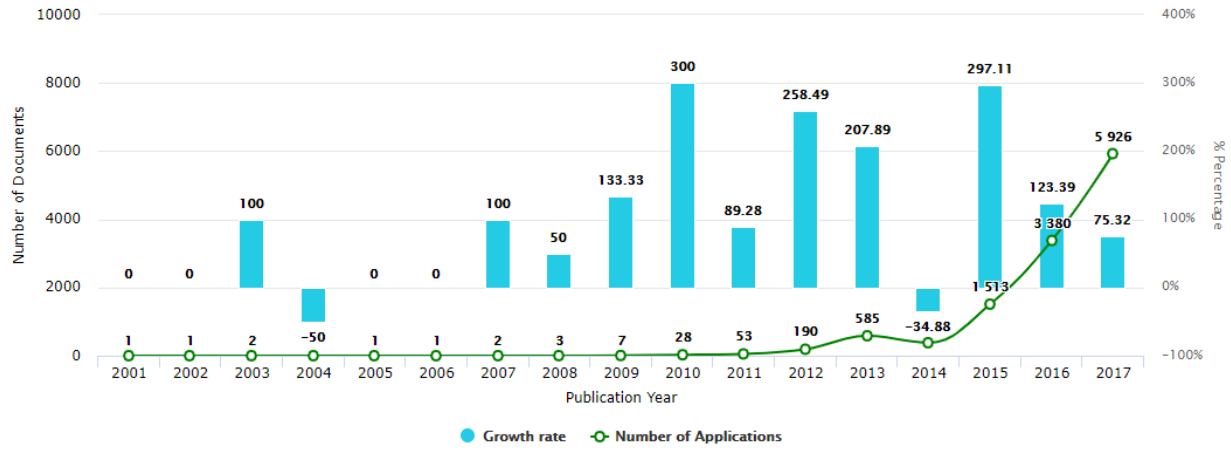
No of technologies (188)

Top Active Jurisdiction
CN (16,986)

Top Rated
US8693699B2 (4.5)

Top Cited
US8576784B2 (153)

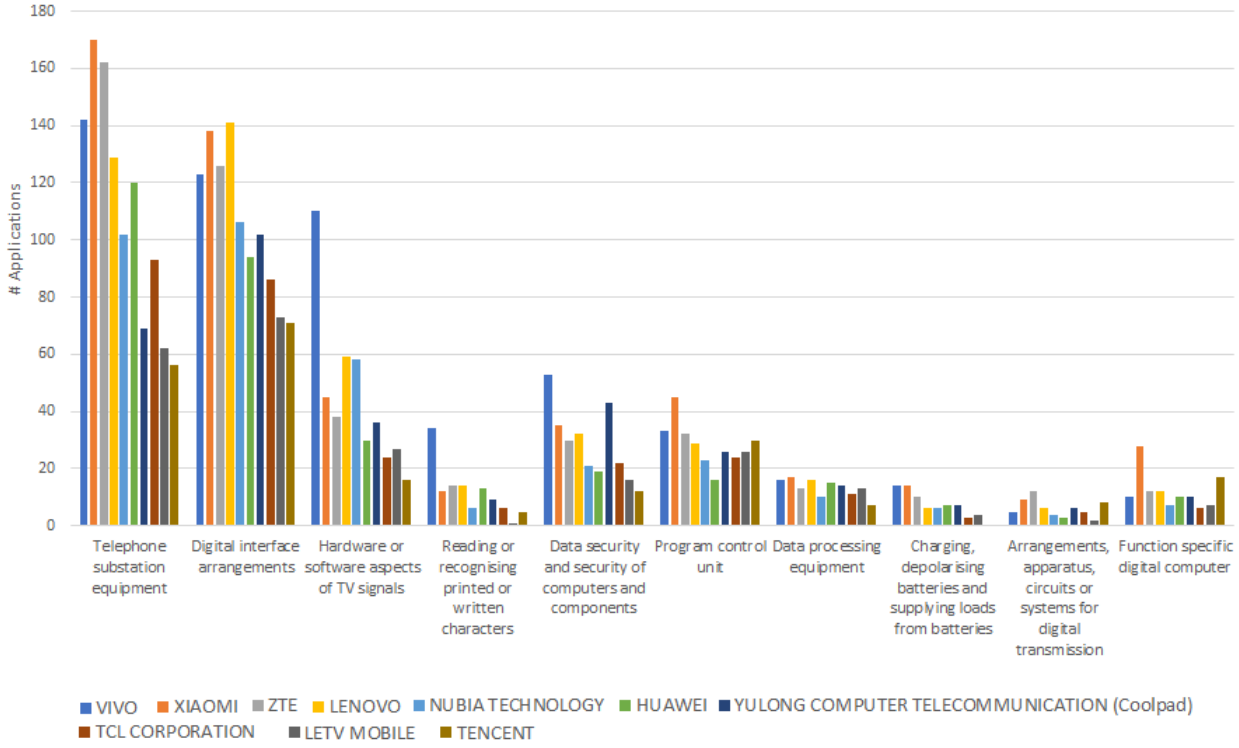
Published Applications - Growth



Top Forward Citing (FC) Assignees

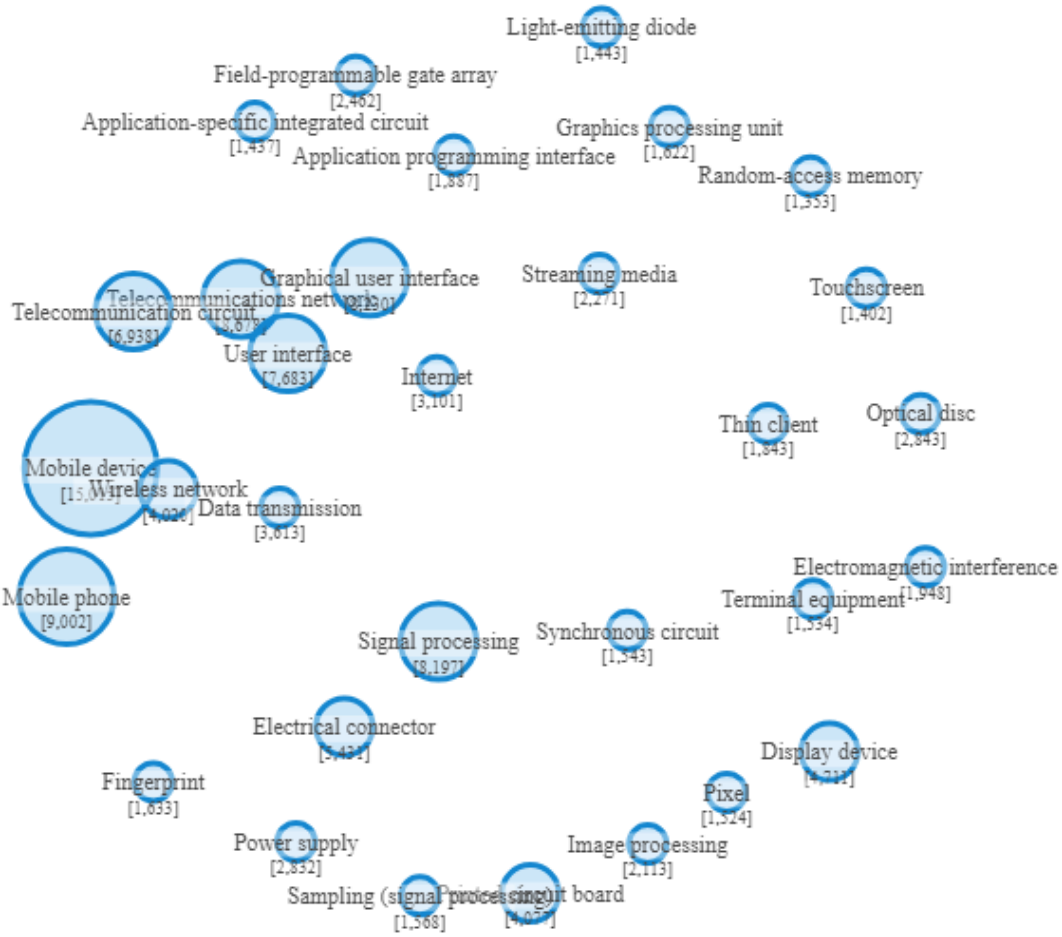
FC Assignee	# Applications cited
XIAOMI	559
VIVO	529
ZTE	463
LENOVO	443
HUAWEI	379
NUBIA TECHNOLOGY	345
YULONG COMPUTER TELECOMMUNICATION (Coolpad)	333
TCL CORPORATION	282
LETV MOBILE	233
TENCENT	218

Technology Focus of the Forward Citing Assignees

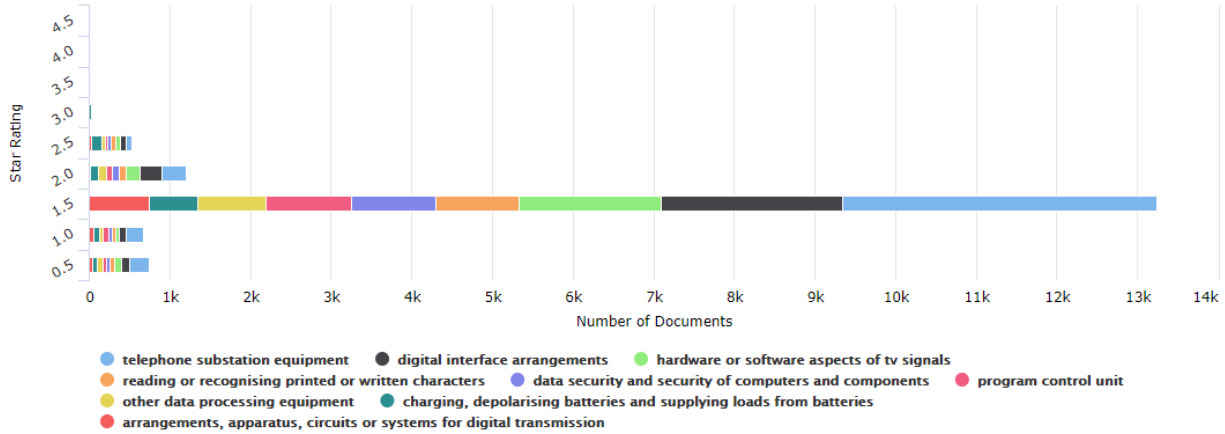


Topic Map – Concepts

- The bubble size corresponds to the total number of patent applications for each concept.
- The bubble proximity corresponds to the "relatedness" of the individual concepts.



Patent Quality by Sub-technologies *(Relecura Star Rating on a scale of 5)*



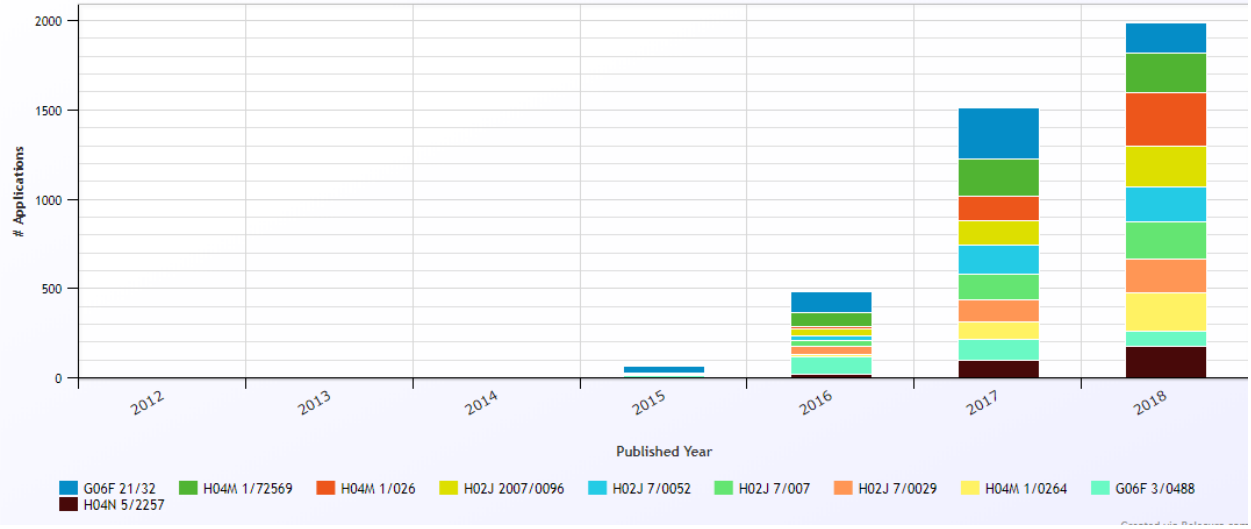
Key Patents in the Portfolio

Publication #	Title	Inventor(s)	Filing Date	Star Rating	# Forward Citations
US8693699B2	Method for adaptive control and equalization of electroacoustic channels	Matthew Fellers|Grant Davidson|Rongshan Yu|Eric Benjamin|Kenneth Gundry	7-29-2009	4.5	92
US8576784B2	Uplink resource allocation in a mobile communication system	Joachim LÅhr|Eiko Seidel	11-2-2006	4.5	153
US9135907B2	Method and apparatus for reducing the effect of environmental noise on listeners	Matthew C. Fellers|Alan J. Seefeldt|Brett G. Crockett|Grant A. Davidson|Louis D. Fielder	6-16-2011	4.5	64
US8014264B2	Methods and apparatus for communication with time-division duplexing	Xiaodong Li|Titus Lo|Kemin Li|Haiming Huang	4-29-2005	4.5	124
US8243790B2	Treating video information	Athanasios Leontaris|Alexandros Tourapis	9-8-2008	4	70
US9655164B2	Method and system for discontinuous reception operation for long term evolution advanced carrier aggregation	Mo-Han Fong|Sean McBeath|Zhijun Cai|Andrew Mark Earnshaw|Youn Hyoung Heo|Yi Yu	6-15-2010	4	36
US20110294491A1	Method and System for Discontinuous Reception Operation for Long Term Evolution Advanced Carrier Aggregation	Mo-Han Fong|Sean McBeath|Zhijun Cai|Andrew Mark Earnshaw|Youn Hyoung Heo|Yi Yu	6-15-2010	3.5	60
US9078008B2	Adaptive inter-layer interpolation filters for multi-layered video delivery	Yan Ye|Peshala V. Pahalawatta|Alexandros Tourapis	4-20-2010	3.5	42
US9729888B2	Speedup techniques for rate distortion optimized quantization	Yan Ye|Alexandros Tourapis	9-7-2010	3.5	19
US9369712B2	Buffered adaptive filters	Yan Ye|Alexandros Tourapis	1-5-2011	3.5	15

Published Applications - Top 20 CPC Codes

Class Code	Description	# Applications
G06F 21/32	Data security and security of computers and components >> using biometric data, e.g. fingerprints, iris scans or voiceprints	611
H04M 1/72569	Telephone substation equipment >> according to context or environment related information	504
H04M 1/026	Telephone substation equipment >> Details of the structure or mounting of specific components	449
H02J 2007/0096	Charging, depolarising batteries and supplying loads from batteries >> Charger exchanging data with an electronic device, i.e. telephone, whose internal battery is under charge	414
H02J 7/0052	Charging, depolarising batteries and supplying loads from batteries >> Charge circuits only	392
H02J 7/007	Charging, depolarising batteries and supplying loads from batteries >> Regulation of charging current or voltage	377
H02J 7/0029	Charging, depolarising batteries and supplying loads from batteries >> with safety devices	366
H04M 1/0264	Telephone substation equipment >> for a camera module assembly	322
G06F 3/0488	Digital interface arrangements >> using a touch-screen or digitiser, e.g. input of commands through traced gestures	313
H04N 5/2257	Hardware or software aspects of TV signals >> Mechanical and electrical details of cameras or camera modules for embedding in other devices	299
H04W 48/16	Access restriction, network selection, access point selection >> Discovering, processing access restriction or access information	290
H02J 7/04	Charging, depolarising batteries and supplying loads from batteries >> Regulation of charging current or voltage	289
H02J 7/045	Charging, depolarising batteries and supplying loads from batteries >> in response to voltage or current	283
H02J 2007/0059	Charging, depolarising batteries and supplying loads from batteries >> characterised by the converter	281
H04M 1/0266	Telephone substation equipment >> for a display module assembly	260
H02J 7/022	Charging, depolarising batteries and supplying loads from batteries >> characterised by the type of converter	248
H02M 3/33523	DC-DC converters >> with galvanic isolation between input and output	238
H02J 7/047	Charging, depolarising batteries and supplying loads from batteries >> in response to temperature	232
H02J 7/0045	Charging, depolarising batteries and supplying loads from batteries >> concerning the insertion or the connection of the batteries	226
H02M 2001/0009	Details of power converters >> Devices and circuits for detecting current in a converter	224

Published Applications – Top 10 CPC Codes – Growth

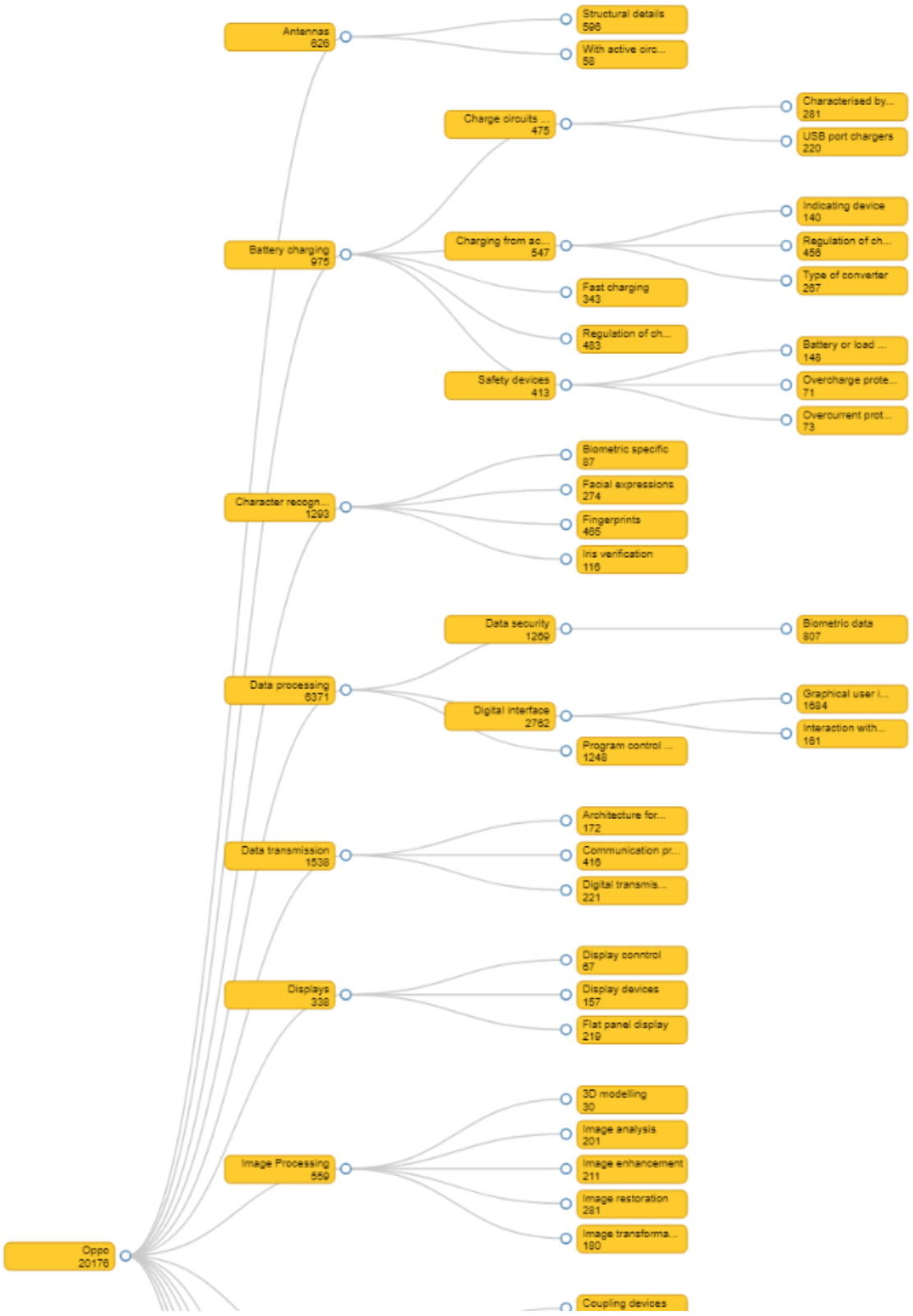


Key Portfolio Acquisitions

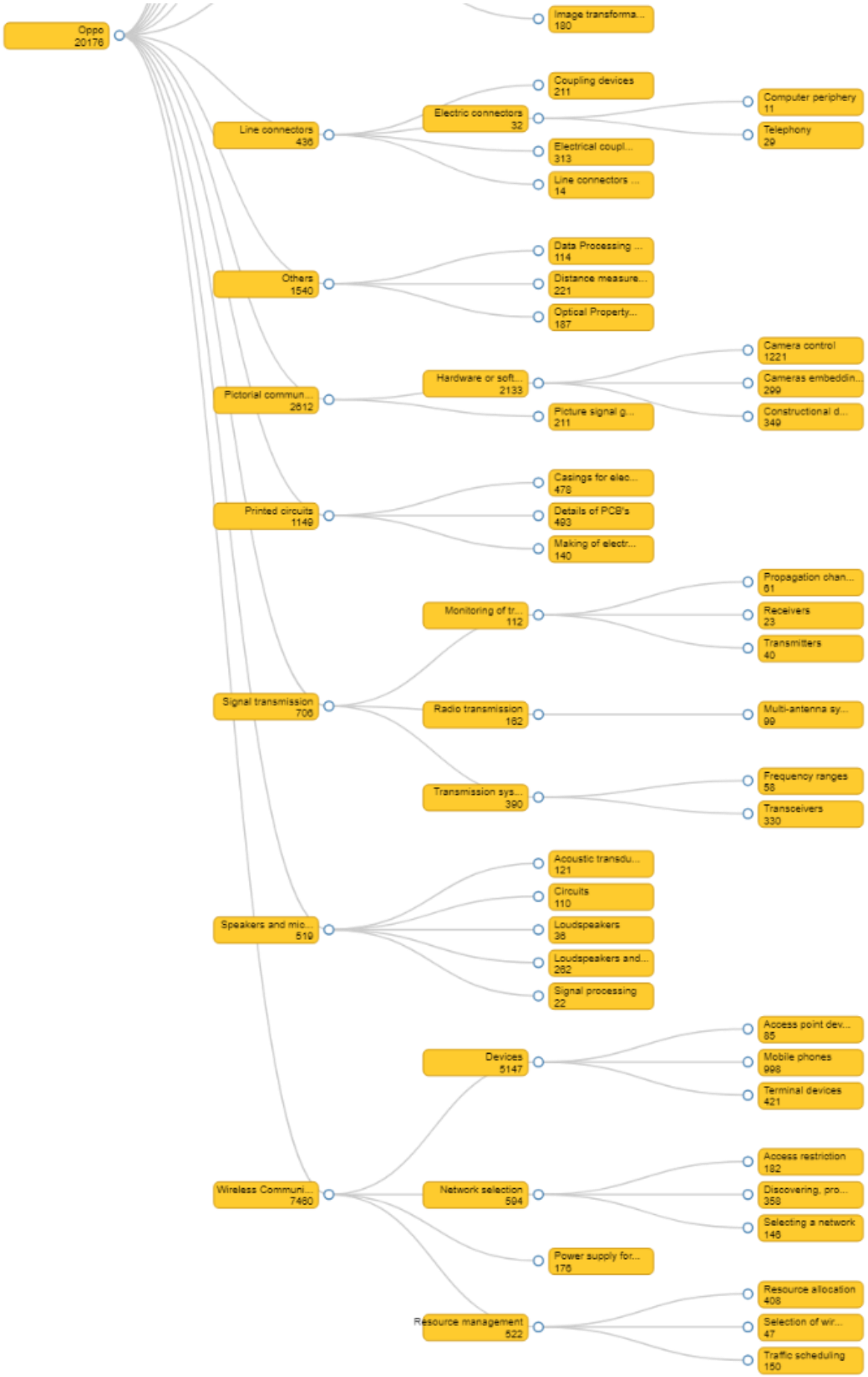
Transferred from	# Applications	Technologies
DOLBY LABORATORIES	30	pictorial communication (20) , speech synthesis (10) , speakers, microphones & acoustic transducers (6) , stereophonic systems (5) , digital data processing (2)
GOLDEN VALLEY HOLDINGS	21	wireless communication networks (69) , data transmission (52) , signal transmission (21) , multiplex communication (20) , signal transmission systems (3)
INTEL	20	data transmission (21) , wireless communication networks (21) , signal transmission (14) , multiplex communication (7) , amplifiers (4)
SKY ROYAL TRADING	18	data transmission (20) , wireless communication networks (20) , signal transmission (13) , multiplex communication (7) , amplifiers (4)
HILCO PATENT ACQUISITION	11	wireless communication networks (23) , data transmission (15) , multiplex communication (3) , signal transmission (2) , telephonic communication (2)
BLACKBERRY	8	wireless communication networks (23) , data transmission (15) , multiplex communication (3) , signal transmission (2) , telephonic communication (2)
GOLDEN TOWER	5	data transmission (6) , multiplex communication (6) , wireless communication networks (6)
INTELLECTUAL DISCOVERY	4	wireless communication networks (9) , data transmission (7) , signal transmission (7) , multiplex communication (3) , electric elements - aerials (1)
POSCO ICT CO LTD	4	data transmission (6) , wireless communication networks (5) , signal transmission (4) , multiplex communication (3) , secret communication (1)
WALTICAL SOLUTIONS	4	data transmission (9) , multiplex communication (9) , wireless communication networks (9) , signal transmission (5) , signal transmission systems (3)

Taxonomy (*Showing published applications in each category)*

Part A



Part B

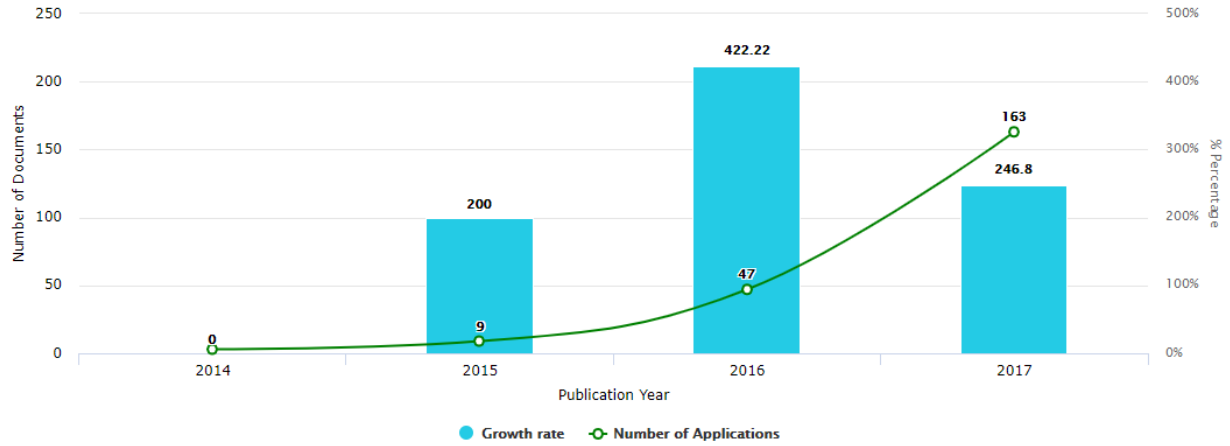

Oppo
20176
Image transforma...
180
Line connectors
436
Coupling devices
211
Electric connectors
32
Computer periphery
11
Telephony
29
Electrical coupl...
313
Line connectors ...
14
Others
1540
Data Processing ...
114
Distance measure...
221
Optical Property...
187
Pictorial commun...
2612
Hardware or soft...
2133
Camera control
1221
Cameras embeddin...
299
Constructional d...
349
Picture signal g...
211
Printed circuits
1149
Casings for elec...
478
Details of PCB's
493
Making of electr...
140
Signal transmission
706
Monitoring of tr...
112
Propagation chan...
61
Receivers
23
Transmitters
40
Radio transmission
182
Multi-antenna sy...
99
Transmission sys...
390
Frequency ranges
58
Transceivers
330
Speakers and mic...
519
Acoustic transdu...
121
Circuits
110
Loudspeakers
36
Loudspeakers and...
282
Signal processing
22
Wireless Communi...
7480
Devices
5147
Access point dev...
85
Mobile phones
998
Terminal devices
421
Network selection
594
Access restriction
182
Discovering, pro...
358
Selecting a network
146
Power supply for...
176
Resource management
522
Resource allocation
408
Selection of wir...
47
Traffic scheduling
150

Oppo - Competitor Comparison

(# Applications given for color-coded categories)

Technology categories			Oppo	Samsung	Alphabet	Apple	Xiaomi
Antennas	Structural details		596	2592	336	1133	219
	With active circuits		58	55	5	47	6
Battery charging	Charge circuits only	Characterised by the converter	281	56	9	35	0
		USB port chargers	220	90	11	68	34
	Charging from ac mains by converters	Indicating device	140	48	2	76	3
		Regulation of charging current or	456	498	28	98	19
		Type of converter	267	1546	57	480	17
	Fast charging		343	66	10	3	29
	Regulation of charging current or		483	620	42	144	65
	Safety devices	Battery or load disconnect circuits	148	318	15	27	11
		Overcharge protection	71	105	2	4	11
		Overcurrent protection	73	103	5	6	17
Character recognition	Biometric specific		87	331	68	113	35
	Facial expressions		273	920	428	182	351
	Fingerprints		465	739	48	483	306
	Iris verification		116	386	120	18	34
Data processing	Data security	Biometric data	807	821	272	352	248
	Digital interface	Graphical user interfaces	1684	13835	4812	6004	2224
		Interaction with human body	161	1823	863	323	191
	Program control unit		1247	6327	3489	2770	1369
Data transmission	Architecture for network security		172	3312	2521	1174	634
	Communication protocols		416	5510	4765	2012	1138
	Digital transmission path		221	6799	556	1099	96
Displays	Display conntrol		67	9949	167	810	347
	Display devices		157	7668	1108	1840	282
	Flat panel display		219	19774	225	1199	450
Image Processing	3D modelling		30	850	491	178	12
	Image analysis		201	4107	1150	613	334
	Image enhancement		211	3151	977	500	217
	Image restoration		280	2077	431	356	140
	Image transformations		180	1588	554	307	183
Line connectors	Coupling devices		211	544	53	345	73
	Electric connectors	Computer periphery	11	19	18	93	2
		Telephony	29	21	9	16	12
	Electrical coupling devices		313	809	138	1209	201
	Line connectors with four poles		14	90	34	204	7
Others	Data Processing Systems		114	2068	2479	445	398
	Distance measurement		221	2538	925	404	217
	Optical Property Modification		187	77260	909	1149	290
Pictorial communication	Hardware or software aspects	Camera control	1218	4851	804	848	617
		Cameras embedding in other devices	299	638	79	111	35
		Constructional details	349	1278	210	291	49
	Picture signal generator		211	777	132	224	11
Printed circuits	Casings for electric devices		477	1980	191	1023	115
	Details of PCB's		492	6266	206	731	63
	Making of electric apparatus		140	1572	401	520	74
Signal transmission	Monitoring of transmission system	Propagation channels	61	938	129	221	77
		Receivers	23	433	58	74	12
		Transmitters	40	164	36	72	14
	Radio transmission	Multi-antenna system	99	5106	414	863	46
	Transmission systems	Frequency ranges	58	264	17	88	4
		Transceivers	325	6001	652	1015	215
Speakers and microphones	Acoustic transducers		121	397	41	227	4
	Circuits		110	1419	193	342	88
	Loudspeakers		36	138	14	55	8
	Loudspeakers and microphones		262	1844	270	879	95
	Signal processing		22	363	60	76	24
Wireless Communication	Devices	Access point devices	85	2415	199	333	91
		Mobile phones	996	3115	420	1117	285
		Terminal devices	417	5078	760	1397	374
	Network selection	Access restriction	182	2034	231	297	257
		Discovering, processing access	358	1616	219	396	244
		Selecting a network	146	743	177	338	69
	Power supply for wireless devices		176	319	100	160	64
	Resource management	Resource allocation	408	7287	686	1238	189
		Selection of wireless resources	47	437	35	95	10
		Traffic scheduling	146	2657	275	528	85

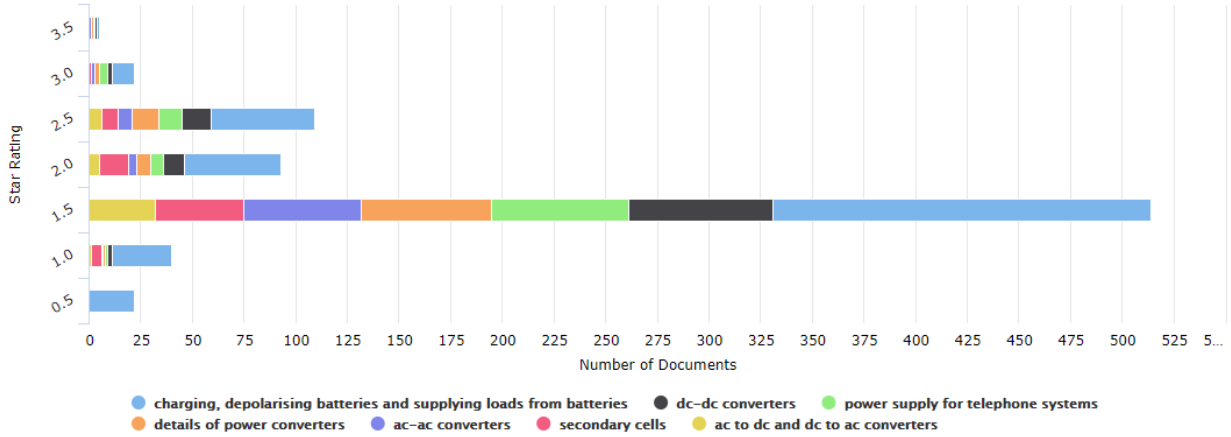
Fast Charging (Oppo) - Growth in Published Patents



Fast Charging (Oppo) - Key Patents

Publication #	Title	Inventor(s)	Filing Date	Star Rating	# Forward Citations
CN106026327B	Charging device, charging method, power adapter and terminal	ZHANG JIALIANG | ZHANG JUN | TIAN CHEN | CHEN SHEBIAO | LI JIADA | WAN SHIMING	7-26-2016	3.5	22
CN103762702B	Charging device of electronic equipment and power adapter of charging device	Jialiang Zhang	1-28-2014	3	46
US9985449B2	Communication method, power adapter and terminal	Jialiang Zhang	11-11-2014	3	2
US10110028B2	Quick-charging control method and system	Jialiang Zhang|Kewei Wu|Jun Zhang|Liangcai Peng|Fuchun Liao	5-15-2014	3	3
EP3264563A1	CHARGING SYSTEM, CHARGING METHOD, AND POWER ADAPTER FOR TERMINAL, AND CHARGER DEVICE	ZHANG JIALIANG|ZHANG JUN|TIAN CHEN|CHEN SHEBIAO|LI JIADA|WAN SHIMING	7-26-2016	3	0
US20170093189A1	POWER ADAPTER AND MOBILE TERMINAL	Yuanqing ZENG	12-14-2016	3	1
EP3142216A1	FAST CHARGING METHOD, POWER ADAPTER AND MOBILE TERMINAL	ZENG YUANQING	11-13-2015	3	0
US20170244265A1	COMMUNICATION METHOD, POWER ADAPTOR AND TERMINAL	Jialiang Zhang	11-11-2014	3	2
EP3142341A1	FAST CHARGING METHOD, POWER ADAPTER AND MOBILE TERMINAL	ZENG YUANQING	11-13-2015	3	0
EP3264561A1	CHARGING SYSTEM, CHARGING METHOD, AND POWER ADAPTER FOR TERMINAL	ZHANG JIALIANG|ZHANG JUN|TIAN CHEN|CHEN SHEBIAO|LI JIADA|WAN SHIMING	7-26-2016	3	1

Fast Charging (Oppo) - Patent Quality by Sub-technologies



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