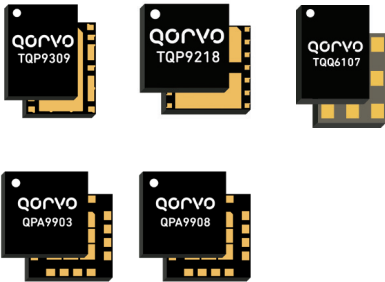


Solving Network Congestion & Efficiency with Small Cells

Qorvo® Addresses Congested RF Airwaves



qorvo
all around you



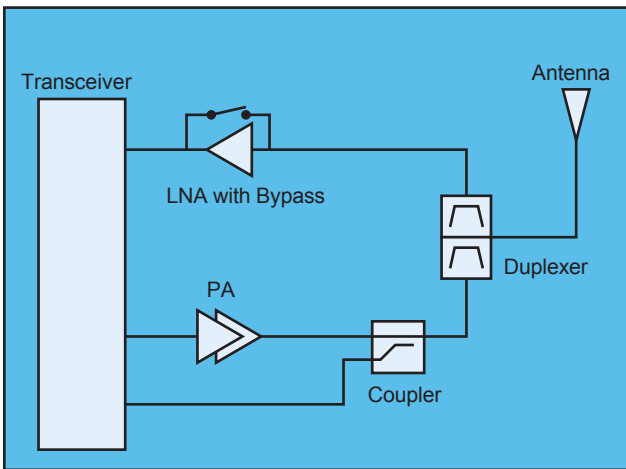
Small Cells & Densification

Carriers can add capacity and make better use of their networks by either deploying more spectrum or densification of existing networks. Regardless of the choice, the need for more small-cell deployments is happening with 5G rollout providing the tailwinds. Densification of small cells, both indoor and outdoor, greatly increases capacity for different use cases and also improves cell edge performance, therefore increasing value of their existing spectrum. In the small cell arena no one size fits all. Small cells differ in their power level, geographical coverage, regional band allocation and the number of users serviced. Therefore, OEMs must produce small cells to accommodate several SKUs (stock keeping unit).

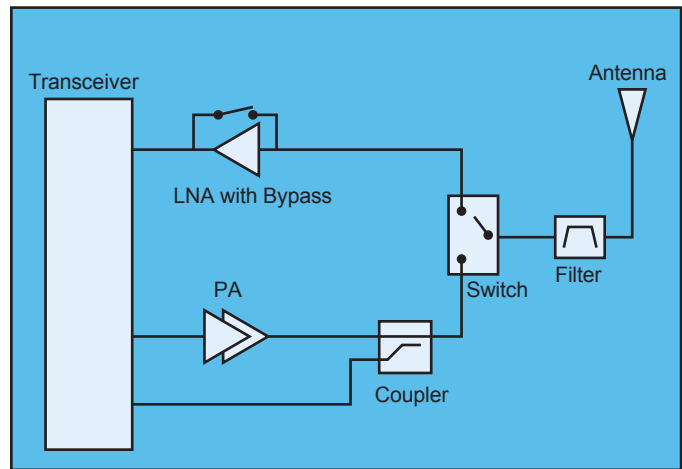
Qorvo's Small Cell Solution and Product Response

Qorvo's continuous innovation of its core RF solutions such as filters, amplifiers and switches enable our customers to meet new design requirements for small cell applications.

Small Cells FDD



Small Cells TDD



Qorvo System Solutions for FDD and TDD Small Cell Front-End Designs

Band		12,13,14,17,20	5,18,19,26,8	3	2,25	1,4,10,66	30,40,75	7,41	42	Package		
Freq		729-821 MHz	851-960 MHz	1.805-1.88 GHz	1.93-2 GHz	2.11-2.2 GHz	2.3-2.4 GHz	2.5-2.7 GHz	3.3-3.7 GHz	5.1-5.9 GHz	(mm)	
Duplexer		857182	QPQ6108	QPQ1297		QPQ1282 QPQ1289		QPQ1270			2.5x2	
							QPQ1030 QPQ1281 QPQ1286 QPQ1287 QPQ1288	QPQ1280 QPQ1284 QPQ1285			2x1.6	
LNAs		TQP3M9036		TQP3M9037, TQL9092, QPL9057				QPL9503			2x2	
Bypass LNAs		QPL9095			TQL9063							2x2
					QPL9096				QPL9097	QPL9098		
PA Pavg												
Power Amplifiers Non-linear* Linear (Required DPD)	Linear PA	0.25 W		TQP9218	QPA9219	TQP9221	TQP9224	QPA9226	QPA9501		7x7	
		0.5 W		QPA9418	QPA9419	QPA9421	QPA9424	QPA9426			7x7	
		0.6 W		QPA9908	QPA9903							5x5

* Non-linear family in progress; other band solutions will be released over the next year.

Key Frequency Bands

Operating Band	Uplink (UL) Operating Band Base Station (BS) Receive User Equipment (UE) Transmit FDL_Low - FDL_High (MHz)			Downlink (DL) Operating Band Base Station (BS) Transmit User Equipment (UE) Receive FDL_Low - FDL_High (MHz)			Duplex Mode
1	1920	-	1980	2110	-	2170	FDD
2	1850	-	1910	1930	-	1990	FDD
3	1710	-	1785	1805	-	1880	FDD
4	1710	-	1755	2110	-	2155	FDD
5	824	-	849	869	-	894	FDD
6	830	-	840	875	-	885	FDD
7	2500	-	2570	2620	-	2690	FDD
8	880	-	915	925	-	960	FDD
9	1749.9	-	1784.9	1844.9	-	1879.9	FDD
10	1710	-	1770	2110	-	2170	FDD
11	1427.9	-	1447.9	1475.9	-	1495.9	FDD
12	699	-	716	729	-	746	FDD
13	777	-	787	746	-	756	FDD
14	788	-	798	758	-	768	FDD
17	704	-	716	734	-	746	FDD
18	815	-	830	860	-	875	FDD
19	830	-	845	875	-	890	FDD
20	832	-	862	791	-	821	FDD
21	1447.9	-	1462.9	1495.9	-	1510.9	FDD
22	3410	-	3490	3510	-	3590	FDD
23	2000	-	2020	2180	-	2200	FDD
24	1626.5	-	1660.5	1525	-	1559	FDD
25	1850	-	1915	1930	-	1995	FDD
26	814	-	849	859	-	894	FDD
27	807	-	824	852	-	869	FDD
28	703	-	748	758	-	803	FDD
29	N/A	-	N/A	717	-	728	FDD
30	2305	-	2315	2350	-	2360	FDD
31	452.5	-	457.5	462.5	-	467.5	FDD
32	N/A	-	N/A	1452	-	1496	FDD
65	1920	-	2010	2110	-	2200	FDD
66	1710	-	1780	2110	-	2200	FDD
67	N/A	-	N/A	738	-	758	FDD
33	1900	-	1920	1900	-	1920	TDD
34	2010	-	2025	2010	-	2025	TDD
35	1850	-	1910	1850	-	1910	TDD
36	1930	-	1990	1930	-	1990	TDD
37	1910	-	1930	1910	-	1930	TDD
38	2570	-	2620	2570	-	2620	TDD
39	1880	-	1920	1880	-	1920	TDD
40	2300	-	2400	2300	-	2400	TDD
41	2496	-	2690	2496	-	2690	TDD
42	3400	-	3600	3400	-	3600	TDD
43	3600	-	3800	3600	-	3800	TDD
44	703	-	803	703	-	803	TDD
45	1447	-	1467	1447	-	1467	TDD
46	5150	-	5925	5150	-	5925	TDD
XGP	2545	-	2575	2545	-	2575	TDD
XGP	2545	-	2575	2545	-	2575	TDD

Switches for Small Cells

Type	Type	Frequency (GHz)	IL (dB)	Isolation (dB)	Max Pin (dBm)	Vcc (V)	Package (mm)	Part Number
SPDT	R	0.005-3.8	0.3	37	37	3	2x2	RFSW1012
SP3T	R	0.005-6	0.4	37	35	3 to 5	2.5x2.5	RFSW6032
SP4T	R	0.005-6	0.45	34	35	3 to 5	2.5x2.5	RFSW6042
SP6T	R	0.005-6	0.5	28	32	3 to 5	2x2	RFSW6062
SPDT	A	0.005-6	0.7	70	35	3 to 5	4x4	RFSW6024
2xSPDT	R	0.005-6	0.3	35	30	3	2x2	RFSW6222
SPDT	R	0.15-5	0.6	26	40	2.5 to 5	3x3	RFSW6023

dBm-to-Watts Conversion Table

dBm	Watts	dBm	Watts	dBm	Watts
0	1.0mW	16	40mW	32	1.6W
1	1.3mW	17	50mW	33	2W
2	1.6mW	18	63mW	34	2.5W
3	2.0mW	19	79mW	35	3W
4	2.5mW	20	100mW	36	4W
5	3.2mW	21	126mW	37	5W
6	4mW	22	158mW	38	6W
7	5mW	23	200mW	39	8W
8	6mW	24	250mW	40	10W
9	8mW	25	318mW	41	13W
10	10mW	26	398mW	42	16W
11	13mW	27	500mW	43	20W
12	16mW	28	630mW	44	25W
13	20mW	29	800mW	45	32W
14	25mW	30	1W	46	40W
15	32mW	31	1.3W	47	50W

Qorvo Design Tools

Qorvo continuously strives to provide assistance to the engineering community. Below is a collection of RF design tools to assist engineers during their critical design stages. Learn more at www.qorvo.com/design-tools.



Bandpass Filter
Response Calculator



dBm-Volts-Watts
Conversion



Pad Attenuator
(Pi & Tee) Calculator



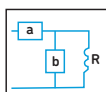
Trace Width
Calculator



Cascade Calculator



Noise Figure &
Noise Temperature
Calculator



RF Impedance
Matching Calculator



VSWR/Return
Loss Conversion