

# Solving Network Congestion & Efficiency with Small Cells

Qorvo® Addresses Congested RF Airwaves



**qorvo**  
all around you



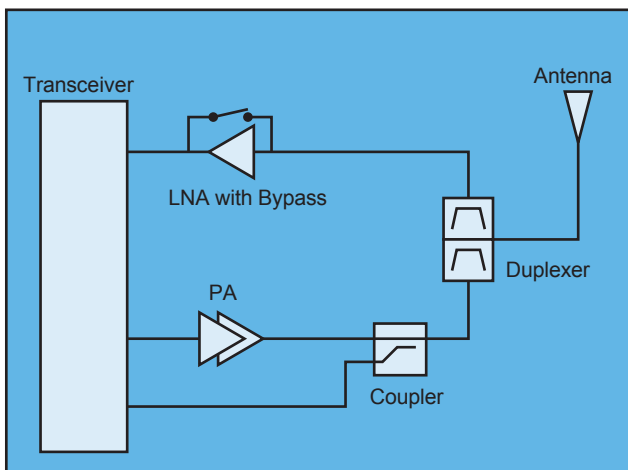
## Small Cells & Densification

Carriers can add capacity and make better use of their networks by deploying more spectrum. Densification of small cell outdoor technology increases existing carrier capacity and improves cell edge performance, 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).

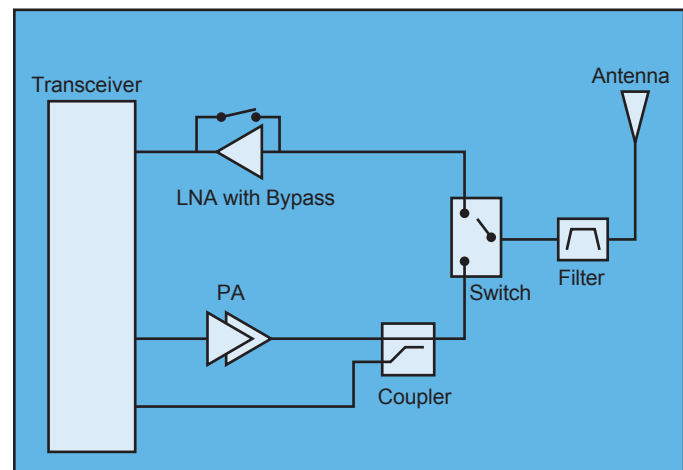
## Qorvo's Small Cell Solution and Product Response

Qorvo's continuous innovation of its core RF solutions such as filters, amplifiers, switches and antenna tuning devices enables 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	800MHz	900MHz	1800MHz	1900MHz	2100MHz	2300MHz	2600MHz	LTE-U/LAA	Package
		Freq	729-821MHz	851-960MHz	1.805-1.88GHz	1.93-2GHz	2.11-2.17GHz	2.3-2.4GHz	2.5-2.7GHz	5.1-5.9GHz	(mm)
Duplexer		857182	QPQ6108	TQQ6103		QPQ1282	QPQ1288	TQQ6107			2.5x2
								QPQ1293, QPQ1285			2x1.6
LNAs		TQP3M9037, TQL9092								QPL9503	2x2
		SPF-5043									SOT-143
		TQP3M9036									2x2
Bypass LNAs		TQL9063, RF2374								RFFM4527	2x2
Requires DPD	PA Avg	PAE			TQP9218	QPA9219	TQP9221	TQP9224	QPA9226	QPA9501	7x7
	0.25	16			TQP9418	QPA9419	TQP9421	TQP9424	QPA9426		7x7
	0.5	15									
	0.25	25	RFPA0802		RFPA1802	RFPA2002				QPA9501	2x2.5
	0.5	25	RFPA0805	RFPA0875	RFPA1805	RFPA1905	RFPA2025	RFPA2355	RFPA2625		5x5
0.5	27	TQP9309			TQP9321			TQP9326			3.5x4.5

## 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	0.01-4	0.3	26	32	5	SOT-363	RF3023
SPDT	R	0.005-3.8	0.3	37	37	3	2x2	RFSW1012
SPDT	R	0.15-5	0.6	26	40	2.5 to 5	3x3	RFSW6023
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

## 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](http://www.qorvo.com/design-tools).



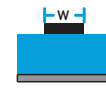
Bandpass Filter  
Response Calculator



dBm-Volts-Watts  
Conversion



Pad Attenuator  
(Pi & Tee) Calculator



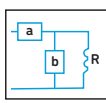
Trace Width  
Calculator



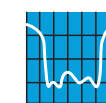
Cascade Calculator



Noise Figure & Noise  
Temperature Calculator



RF Impedance  
Matching Calculator



VSWR / Return Loss  
Conversion