



**Global and China RF Industry Report,
2013-2014**

May 2014

STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES

- ◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- ◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- ◆ To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- ◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- ◆ To help company to succeed in a competitive market, and

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

Abstract

This report studies GaAs RF components, including:

- ✘ Introduction to GaAs
- ✘ Analysis on GaAs Industry
- ✘ Analysis on RF downstream market
- ✘ Trends of mobile RF systems
- ✘ 19 RF companies

Qualcomm's RF360 design is changing the entire mobile RF industry revolutionarily. GaAs PA is facing a fierce attack from CMOS PA. Qualcomm's CMOS PA subverts the opinion that CMOS PA can only be used on low-end phones. Specifically for CMOS PA, Qualcomm designs QFE1100, which is a front-end module involved with envelope tracking technology. QFE1100 can help CMOS PA improve thermal efficiency, reduce heat by 30% and cut down power consumption by 20%.

ZTE's flagship mobile phone Grand S II LTE uses Qualcomm's CMOS PA ----- QFE2320 and QFE2340 for the first time. The combination of QFE2320 and QFE2340 can cover all major cellular modes, including LTE TDD / FDD, WCDMA / HSPA +, CDMA 1x, TD-SCDMA and GSM / EDGE, with the RF band of 700MHz to 2700MHz. Qualcomm has basically monopolized smartphone Modem or CPU markets, and may dominate the PA field. However, mobile phone vendors will still cooperate with GaAs PA suppliers in order to ensure their equal status.

	Country	Revenue, 2011	Revenue, 2012	Revenue, 2013	Category	Note
Murata	Japan	1678	2260	2718	Fully Integrated	Including SAW Filter, Communication Module. PA was included in 2012.
Kopin	USA	125	138	250	Epilayer	
IQE				218		
VPEC	Taiwan	73	76	72	Epilayer	
AXT	USA	104	88	85	Substrate	Held by a Chinese mainland company
Win Semiconductor	Taiwan	294	379	351	Foundry	
AWSC	Taiwan	56	54	36	Foundry	
TRIQUINT	USA	896	829	893	IDM	
Avago Technologies	USA	888	1136	1278	IDM	Including BAW Filter revenue
Anadigics	USA	153	113	134	IDM	
RFMD	USA	902	872	1173	IDM	
SKYWORKS	USA	1477	1629	1844	IDM	Including analog device revenue
SEDI	Japan	308	560	450	IDM	Including Optics Module
M/A-COM Technology	USA	310	350	312	IDM	
RDA	Mainland China	289	391	345	IC Design House	
Hittite Microwave	USA	264	264	274	IC Design House	

Source: Global and China RF Industry Report, 2013-2014; ResearchInChina

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Nevertheless, the focus of mobile RF industry has been shifting from PA to filter. In the 4G era, the most valuable part of mobile RF system is filter, especially BAW, rather than PA. The biggest difference between 4G and 3G lies in BAW which is an essential part for 4G. A regional LTE phone needs a BAW valued USD1.25, a SAW worth USD2.25 and a PA which only costs USD1.75. As for a global roaming LTE phone, a SAW tagged with USD3, a BAW with USD3.5 and a PA with USD2 are required.

The biggest event in the RF industry in 2014 must be RFMD's takeover on Triquint. Triquint suffered consecutive losses in 2012-2013; in Q1 2014, its revenue fell by 3.6% year on year, and its operating margin was negative 11.3% (negative 18.8% in the same period of previous year, negative 3.2 % in the fourth quarter of previous year). The company's losses were mainly attributed to the aggressive capacity expansion (as much as seven manufacturing centers) before 2011 and excessive expectations. Additionally, Triquint showed serious dependence on large customers, particularly 57% of its revenue came from Apple. On the contrary, RFMD just went out of its predicament. RFMD placed undue reliance on its client NOKIA in its early years, but it witnessed poor performance in 2011-2012 under the impact of NOKIA. However, RFMD recovered in 2013 and its operating revenue increased substantially. RFMD took a fancy to Triquint's BAW technology.

1 Overview of GaAs

- 1.1 Introduction
- 1.2 Application
- 1.3 Comparison between GaAs, GAN and SIGE
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