rakon 2016 Review

Enabling Connectivity

sure, with its presentation not being in accordance with GAAP.

Performance Snapshot Financial Year 2016



the closest measure of how each operating segment within the Group is performing. Management uses the non-GAAP measure of Underlying Profit for the year is contained at Note B1 c) of the financial statements.

Advanced Timing for Our Connected World

All communication and location systems require precise electronic 'heart beats'. Rakon makes advanced clocking solutions. Its products provide extremely accurate clocking signals, which are then used to generate precise electrical, radio or optical signals in networks and systems around the globe. Rakon products enable the accurate and efficient transfer of data, time and frequency, at ever increasing speeds. Whether it be within wired, wireless and fibre telecommunications networks, navigation devices, or satellites in space - Rakon's products enable connectivity.

ralon

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Chairman's Report

Dear Shareholders.

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Welcome to this, the 11th Annual Report of your company, Rakon Limited.

The result for this financial year under review is a net loss after tax of NZ\$1.7 million – a big disappointment to Rakon's Board and management team. Significant restructuring over the past two years has brought much improved margins from New Zealand (NZ) manufacturing and controls, but unfortunately the large global telecommunications companies chose to invest in spectrum for their new 5G networks rather than build the infrastructure. This decision had a large impact on our customers' markets and hence their requirements to buy sufficient components from us; this led to a 25% reduction in revenue in our telecommunications market segment. Most of the products supplying this market come from Rakon France with manufacturing occurring at our joint venture, Centum Rakon India (CRI).

In the following table, you can see the impact of this market slowdown on the combined Rakon France and India Underlying EBITDA²: a downturn of NZ\$9.938 million over last year. Also highlighted in the table is the positive impact from the decision to consolidate the United Kingdom (UK) manufacturing to New Zealand, with Underlying EBITDA rising by NZ\$3.4 million over last year. This is due to a solid increase in the gross margin of products made in New Zealand resulting from reduced overheads, on a consolidated NZ/UK basis, closer controls and some currency gains.

Underlying EBITDA NZ\$000

	FY2016	FY2015	Change		
New Zealand	9,526	4,351	5,175		
United Kingdom	1,873	3,646	(1,773)		
NZ + UK	11,399	7997	3,402		
France	(4,481)	560	(5,041)		
India	1,026	5,923	(4,897)		
France + India	(3,455)	6,483	(9,938)		

The importance of more control resting with New Zealand has not escaped the Board's notice and it has been part of a plan over the past two years to strengthen that position during the next 12 months over both France and India.

While the NZ\$1.7m net loss is very disappointing, there have been a lot of positive developments at Rakon over the past year worthy of mention.

- **1.** Enhanced gross margins from manufacturing, controlled 100% by Rakon, grew from 32% of revenue in Financial Year (FY)2015 to 43% of revenue in FY2016
- 2. Operating cash flow for FY2016 was NZ\$7.3 million, up from NZ\$-3.6 million in FY2015
- 3. Net debt for the group stood at NZ\$12.6 million at 31 March 2016 compared to NZ\$13.4 million at 31 March 2015

- **4.** Despite making an after tax loss of NZ\$1.7 million for the 2016 fiscal year the group made a positive comprehensive income of NZ\$3.9 million compared to NZ\$0.4 million in the prior year. The increase results from valuation differences in Rakon's foreign subsidiaries from changing currencies and had the impact of increasing Rakon's total equity from NZ\$79.4 million at 31 March 2015 to NZ\$83.4 million at 31 March 2016
- 5. Growing business opportunities within both the global positioning and space & defence market segments
- 6. Rakon's investment in Thinxtra to build a low power, low data, wireless telecommunication network across Australia and New Zealand.

The Thinxtra Investment

Our investment into Thinxtra is a decision to be part of the coming tsunami of Machine-to-Machine (M2M) connections and the so called Internet of Things (IoT). The overall opportunity of this sea change is estimated by McKinsey Global Institute to be a market worth between US\$3.9 trillion to US\$11.1 trillion by 2025. Gartner, Inc. predicts the number of connected devices worldwide will be 20.8 billion by 2020, compared to 6.4 billion in 2016. By having a close association with SIGFOX – the global market leader in this new network space and the provider of the infrastructure for the Thinxtra network being deployed in Australia and New Zealand – Rakon will gain access to technology and market opportunities that it wouldn't get by sitting on the sidelines, watching this market's inevitable growth.

Besides gaining a return from the investment in the Australia and New Zealand Thinxtra network, Rakon also has plans to develop products and components to use in the IoT networks for itself and for other participants. These developments will be regularly updated to shareholders during our usual rounds of communication. In closing, I would like to thank the Rakon team for their efforts during the past year. The market hasn't delivered the rewards I know they would have all liked.

To you as shareholders I realise that owning a Rakon share has not been as financially rewarding in recent years as other opportunities, and I thank you for your patience.

As you will be aware, six of Rakon's seven Directors own substantial holdings in Rakon and we all are verv keen to enhance that value and see Rakon pay a dividend when it is fiscally prudent.

I look forward to meeting you at questions.

Brvan Mogridge Chairman

Core Strengths Why Customers Choose Rakon

the Annual Shareholders' Meeting in September and answering your



Managing Director's Report The Financial Year 2016 in Review

Brent Robinson Chief Executive Officer / Managing Director



While Rakon continues to pursue

opportunities to expand and diversify our business, just under half of our revenue is still generated by our telecommunications market segment.

Consequently, the decision by major network operators around the world to delay capital expenditure on base stations and other infrastructure during the past year and instead invest in 5G spectrum and in mergers and acquisitions significantly affected our total earnings, and led to our recording what was a disappointing result.

The impact was particularly hard on our joint venture in India and our business unit in France. We have begun restructuring these businesses in response to the shifting demand from legacy products to the new, higher specification products, which are largely manufactured in New Zealand.

We expect telecommunications network operators and Original Design Manufacturers (ODMs) will remain significant customers for Rakon in the years to come. Demand for voice, video, and data services continues to grow,

as do expectations around connectivity and speed: demand for greater network capacity and performance is essential. Speed and quality will prove the key to network operators' ability to differentiate themselves, and Rakon components will provide the means for them to do so.

Our global positioning and space & defence market segments both posted increased revenue, and further opportunities exist in both sectors.

The increasing range of potential applications for global positioning, which include meteorology (quiding drones into the middle of storms to collect data that can be used to improve weather forecasting), conservation (tracking and surveying at-risk animal populations), agriculture (enabling spot applications of fertiliser or other soil supplements). surveying and construction, are driving significant growth opportunities for the many Global Navigation Satellite System (GNSS) module manufacturers who are our customers. Our involvement with China's BeiDou Navigation Satellite System has also been a notable success.

The need for greater precision and

reliability to effectively deliver the many new applications – and applications still being developed, such as driverless cars – is likely to drive demand for higher specification components, which in turn allows Rakon to generate increased margins. The trend towards higher performance solutions is also apparent among customers designing products for industrial applications operating in harsh environments.

Activity in the space and defence sectors has been flat in recent years; however, the successful development of new product platforms has seen an increase in orders during the past six months, and an increased average revenue across our top ten customers, which we are confident of maintaining.

As well as new products, the space & defence market segment is also expanding into new markets, with a particular focus on Asia and the U.S.

Rakon's entry into the Internet of Things business, via a cornerstone shareholding in Thinxtra, is covered in more detail on pages 16 and 17. The IoT is a potential game changer comparable to the switch from analogue to digital or from cellphone to smartphone: in the same way, our involvement with Thinxtra, and through them with a global network of potential customers, is a potential game changer for our business.

countries.

As we near our 50 year anniversary, Rakon has consistently been at the forefront of technological change; our involvement with the IoT revolution continues that tradition.

Financial Summarv

For the year to 31 March 2016, Rakon recorded a net loss after tax of NZ\$1.7 million, on revenue of NZ\$112.7 million.

As noted on page 6, the 14.2 percent reduction in revenue compared to the previous financial year is attributable to the performance of our telecomunications segment, which recorded a 25 percent drop in revenue from FY2015 to NZ\$53.4 million. Lower than expected investment

³ See the footnote on page 2 for the definition of 'Underlying EBITDA' as a measure of non-GAAP financial information, referred to in this document.

As the operator of the global SIGFOX network in Australia and New Zealand, Thinxtra is well positioned to become the IoT network of choice across both

in infrastructure by major network operators around the world was also reflected in reduced sales volumes, which were down 32 percent.

Revenue from our New Zealand operations increased 22 percent to NZ\$74.7 million, in line with the transfer of production and sales from our former UK manufacturing facility to New Zealand.

Underlying EBITDA³ of NZ\$9 million (down from NZ\$15.4 million in FY2015) was in line with the forecast issued in January this year. Reduced sales in the telecommunications segment are reflected in decreased Underlying EBITDA in our Indian joint venture, Centum Rakon India. (NZ\$1 million. down from NZ\$5.9 million) and our business in France (NZ\$4.5 million loss, down from NZ\$0.5 million). This also resulted in a greater proportion of sales volumes being made up of higher value products, which is reflected in our improved gross profit (up 15 percent from FY2015 to NZ\$47.9 million) and positive operating cashflow of NZ\$7.3 million, (an increase of NZ\$10.9 million on FY2015).

Operating expenses of NZ\$47.8 million were up 3 percent on the previous year due to currency translation, meaning we have maintained the significant reductions achieved in FY2015.

Net debt was reduced by 6 percent to NZ\$12.6 million (including an initial NZ\$1.7 million investment in Thinxtra), and our bank facility has been renewed and extended to include a new facility to support growth initiatives.

Looking Ahead

The technology shift away from legacy components is set to continue, and Rakon is well placed to benefit from that.

In the past year, we have successfully developed various new proprietary, high performance technologies as outlined under 'Strategies and Achievements' on page 11. Products which are built around these technologies are now moving into production. These new technology developments will ensure Rakon continues to lead the way within all of our market segments, now and in the future. Continued investment in research and development to develop new technologies remains a core strategy; at

the same time, we will ensure resources are directed to support the operations that generate the highest margins, and that costs are aligned with returns.

We will also maintain the strong focus on continuous improvement in operational excellence and efficiency that has seen us reduce defect rate targets by 50 percent across the board, and build on our standardised global quality systems to ensure ongoing best-in-class quality.

As noted above, this year's result has been a disappointment for Rakon's management team, particularly given the progress the company made last year, and we recognise that you, our shareholders, will also be disappointed. I remain confident we have the people and the products to translate our technical capabilities into improved financial results in the coming year, and thank you for your continued support.

Brent Robinson CEO / Managing Director

Board of Directors



Brvan Mogridge ONZM. Independent Chairman

Age 70 Appointed Chairman in 2005

Bryan has been a public company Director since 1984.

Formerly Chief Executive Officer (CEO) of Corporate Investments and Montana Wines.

Has chaired BUPA Care Services NZ Limited, Yealands Wine Group Limited, Momentum Energy PTY Limited, Waitakere City Holdings Limited, Enterprise Waitakere, Lantern Hotel Group PTY Limited, Pyne Gould Corporation Limited. The New Zealand Food and Beverage Exporters Council. The New Zealand Wine Institute and The New Zealand Tourism Board. among many other companies.

Was also Vice Chairman of UBS New Zealand and a former Director of Heartland Building Society Limited.

Other Current Directorships: BUPA Australia PTY Limited (Director), Mainfreight (Director) and Adherium (NZ) Limited (Director).

Brvan is also Chairman of the Starship Foundation.

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Brent Robinson Executive Director

Bruce Irvine

other companies.

Trust.

capacity as a trustee of

Age 60

Independent Director

Appointed to Board in 2005.

Managing Partner of Deloitte

Christchurch from 1995 to 2007.

Has chaired Canterbury Business

Recovery Group Limited, House

of Travel Limited and Pyne Gould

Corporation Limited among many

Formerly involved in a voluntary

Canterbury Business Recovery

Other Current Directorships:

Christchurch City Holdinas

of Travel Holdings Limited

Limited (Director), PGG

(Director).

Symphony Trust.

(Director), Market Gardeners

Wrightson Limited (Director).

Scenic Hotels Limited (Director)

Involved in a voluntary capacity

as a trustee of Christchurch

and Skope Industries Limited

Limited (Chairman), Heartland

Hirst Limited (Director), House

Bank Limited (Chairman), Godfrey

Age 57 Appointed to Board in 2005. 37 years at Rakon which includes establishing a global business.

30 years as CEO / Managing Director.

Under Brent's leadership Rakon has grown into a global and diversified business with revenues increasing from NZ\$1 million to in excess of NZ\$100 million.

Honorary Fellow of the Institution of Professional Engineers New Zealand.

Awarded the New Zealand Hi-Tech Trust – Flving Kiwi Award in 2011.



Sir Peter Maire KNZM Non-Executive Director

Age 64 Appointed to Board in 2005

Co-Founder and former President of Navman NZ Limited.

Honorary Fellow of the Institution of Professiona Engineers New Zealand.

Made a Knight Companion of the New Zealand Order of Merit (KNZM) in 2008.

Formerly a Director of Orion Health Limited, Fusion Electronics Limited, Callaghan Innovation Research Limited and a board member of New Zealand Trade and Enterprise.

Other Current Directorships: Invenco Group Limited (Director).



Darren Robinson Executive Director

Age 55 Appointed to Board in 2005.

26 years at Rakon as Sales and Marketing Director.

Darren has driven sales for Rakon through exploring new markets, applications and establishing business with many of the world's largest companies.

Under Darren's sales and marketing leadership, Rakon now has sales revenue in excess of NZ\$100 million and a full portfolio of frequency control solutions



Herb Hunt Warren Robinson Non-Executive Director and Founder Independent Director

Age 68

Appointed to Board in 2012.

Over 40 years experience in

senior global operational and

strategic roles in the technology

industry with leading companies

32 year career with IBM including

culminating as Chairman and CEO

in Australia, Asia, Europe and the

before rising to more senior roles

United States of America.

Currently heads his own

company, Transformation

and product development

companies.

Group Limited.

Limited (Director).

for international technology

Other Current Directorships:

Project Manager Holdings

Services, in the United States

performance in sales, services

Formerly a Director of Wynyard

which focuses on improving

including IBM, Siebel Systems

12 years at IBM New Zealand,

and Symphony Group.

Aae 81 Appointed to Board in 2005.

Founded Rakon in 1967 and spent 19 years as Managing Director. Chairman until November 2005.

A member of the Institute of Electrical and Electronics Engineers.

A senior member of the New Zealand Electronics Institute.

A member of The Roval Society of New Zealand.

Warren has a First Class Certificate in Radio Technology.



Innovating Since 1967

Rakon has a proud history of delivering industry 'firsts', including: miniature GNSS Temperature Compensated Crystal Oscillator (TCXO), stratum 3 TCXO, high g-shock TCXO and lowest *q*-sensitivity Surface Mount Device (SMD) TCXO, emergency beacon TCXO, Long Term Evolution (LTE) small cell TCXO, ASIC based Oven Controlled Crystal Oscillator (OCXO), high stability OCXO ultra low phase noise Oven Controlled Surface Acoustic Wave Oscillator (OCSO) and Digital Pulse Compression Sub-Systems (DPCSS) for radars.

In-House ASIC and Test Equipment Teams

Rakon designs its own oscillator integrated circuits (ASICs) and develops its own production test equipmen This is a unique capability in the Frequency Control Products (FCP) domain - enabling next generation technologies.



A Focus on Innovation **Enabling Next Generation** Technologies

A product display case used to promote Rakon products The full range of Rakon products can be viewed at: www.rakon.com.



High Performance and Competitive Pricing

Rakon has five R&D centres worldwide. Rakon's experience and in-depth knowledge of system requirements enables the development of innovative solutions, tailored to suit its customers' ecosystems. Manufacturing operations in India and China deliver competitiveness.

Winner of Prestigious Industry Awards

Awards include the coveted Queen's Award for Enterprise – International Trade, New Zealand's 'Hi-Tech Company of the Year' and 'Hi-Tech Company of the Decade', 'Supreme Award' and 'Hi-Tech Exporter of the Year Award' as well as a number of supplier awards.



Additional Products





Enabling

Technologies

Next Generation

899

. 1042122

-

Standard XDs

. 1739122

D 2/21912

Ineste-IVCXO

Almost Fifty Years of Innovation 1967–2016

Since the 1960s Rakon has continually developed product solutions, helping to enable the next wave of technology.

Global Executives



Brent Robinson CEO / Managing Director & Chief Technology Officer

Brent joined Rakon in the 1970s as a radio and electronics apprentice.

Subsequently, as a member of Rakon's engineering team, he developed various kev product and production technologies and in 1986 was appointed Managing Director and Chief Executive Officer.

Under Brent's leadership Rakon has grown into a global business with revenues increasing from NZ\$1 million to in excess of NZ\$100 million.

Brent also acts as Rakon's Chief Technology Officer, driving the business's technology and innovation.



Darren Robinson Simon Boslev Sales and Marketing Director Chief Financial Officer

Darren has been Simon joined Rakon in Marketing Director November 2012 and since 1990, having was appointed Chief Financial Officer in earlier held various roles with the February 2013.

company both in New Simon has had a lead Zealand and overseas. role in the structural He leads the sales and changes undertaken by Rakon in FY2014

marketing activities for Rakon globally and has been instrumental in Rakon's expansion into new markets, its commercialising of new applications and its developing business relationships

with many of the world's largest companies. Darren is also a strong advocate for fostering local application

engineering and

talent.

business development

In his current role. he is responsible for Rakon's finance. information systems and investor relations

and FY2015.

functions. Simon is also Rakon's Company Secretary. He previously spent ten years with Sony in executive

> management positions in New Zealand and Australia.

Simon is a member of Chartered Accountants Australia and New Zealand (CAANZ).



Dr. Sinan Altuq Managing Director, Europe

Sinan ioined Rakon in 2002. In his role as the Managing Director of Europe, he is responsible for all aspects of Rakon's European business units, which include manufacturing operations, R&D sites and sales contributing significantly to Rakon's

turnover. Prior to his current role, Sinan was Global Business Development and Applications Director, driving Rakon's entry and growth in multiple strategic business segments. Before joining Rakon, Sinan held various management positions in the frequency control products

Ph.D. EE and MBA dearees.



Nick Maire General Manager, New Zealand

Nick has over 19 years of experience within New Zealand founded high-tech, global manufacturing businesses including Navman, Invenco and Fusion Electronics.

Nick was appointed as New Zealand General Manager in 2013 and is responsible for leading the R&D, engineering, product and project management, manufacturing and supply chain operations along with the development and execution of the New



Margo Thomas General Manager, People and Capability

Margo joined Rakon in January 2016. In her role, she is responsible for all facets of the people function at Rakon.

Prior to joining Rakon, Margo worked in a variety of human resources management positions where she undertook large scale change and cultural transformation programmes.

Previous employers include Westpac New Zealand, Spark New Zealand and most recently Crowe Horwath New Zealand where she held the position of National Head of Human Resources.



Andrew McCraith General Manager, Global Marketing

Andrew joined Rakor in 2010. He was appointed General Manager of Global Marketing in March 2015.

In this role, Andrew is responsible for directing the following three core global marketing functions: strategic marketing, applications marketing and corporate marketing.

Andrew's prior roles at Rakon include Global Director - Strategic Marketing & Business Development and Product Manager Crystal Oscillators (XOs) and Voltage Controlled Crystal Oscillators (VCXOs)

Before joining Rakon he co-founded Silicon Clocks, a Micro-Electro-Mechanical Systems (MEMS) timing company, acquired by Silicon Labs.

FY2016



Scott Stemper Global Quality Manager

Scott joined Rakon in January 2015 as Global Quality Manager.

He leads the development and improvement of quality processes and systems to enhance Rakon's drive to be the leading provider of world class products.

Scott's background includes ten vears as Global Quality Manager with Raltron Electronics Corporation and 20 years with CTS Frequency Controls in oscillator product engineering and quality management roles.

> He has also held senior quality management positions with L-3 Communications and D&S Consultants Incorporated (DSCI).



Achievements FY2016 Telecommunications

- volatile market conditions.
- Strengthened relationships with key Original Design Manufacturers (ODMs) as the Business to Business (B2B) model transfers from Original Equipment Manufacturers (OEMs) to ODMs.
- Design wins through technology transition. Macrocell requirements transitioning
- to small cell requirements.
- High speed optical network requirements – demand for faster networks, resulting in new business for Rakon.

Global Positioning

- solutions.
- new design wins in China's BeiDou navigational satellite ecosystem.
- Dedicated tactical initiatives drove Expanded automotive customer base



Zealand business's redefined strategic

direction.

industry. Sinan holds M.S. EE.

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Strategies and Achievements

OBJECTIVE Grow market share in core markets and emerging

Maintained Tier One customers through

· Identified new opportunities within harsh environmental industrial applications driving demand for higher performance

beyond GNSS to address advanced connectivity applications for smart cars.

Space and Defence

- Expanded initiatives outside Europe into the U.S. and Asia resulting in new orders and new customers.
- Increased average revenue per account with top ten defence customers through targeted sales initiatives and strategic customer collaborations.

Other Markets

• Investment in emerging IoT market through investment in Thinxtra, enabling future business opportunities for Rakon.



OBJECTIVE Invest in R&D to develop new technologies

Achievements FY2016 **Technology Developments**

- Next generation strip crystal technology developed for ultra stable TCXOs. (NZ)
- Photolithography crystal technology developed for high frequency oscillator products. (NZ)
- An oscillator generating high frequencies (GHz) developed to support new products for higher data rate applications. (NZ)
- Transferred new ASIC technology into miniature OCXO product platforms. (NZ)

• Next generation ultra stable oscillator ASIC project commenced. (UK)

Inside the photolithography facility at Rakon NZ

New Products

- Mini ultra stable oscillator (OCXO) for satellite space applications at qualification stage (as at 31 March with full gualification by July 2016). First revenue for this product received in January 2016 for Non-Recurring Engineering (NRE). (France)
- Released three new products with high output frequencies (3.2 GHz, 4.8 GHz and 5 GHz) within the ultra low noise OCSO range for radar and instrumentation applications. (France)
- Next generation microprocessor controlled OCXO platforms launched. (France)



OBJECTIVE Continuous improvement in operational excellence and efficiency.

Achievements FY2016

- Standardised Rakon's global quality systems to ensure best-in-class quality
- Focused efforts to enhance and standardise key areas of design, qualification, production monitoring and control of discrete OCXO products, enabled Rakon to reduce defect rate targets by an average of 50% and



Above: Gregor SedImeier, Senior Process Engineer (Quartz Micro-machined Resonators) and leader of the photolithography project.

positioned the company well for increased business with key Tier One customers in FY2017.

- Manufacturing process optimisation initiatives undertaken at Centum Rakon India.
- Centralised employment performance management into a cloud based system (NZ and Asia)
- Implemented Human Resource Information System (HRIS), (NZ, Asia and U.S.)
- On-going evaluation of processes, capacities and capabilities at New Zealand operation has increased 'Delivery In Full On Time' (DIFOT) to ~94.5% in March 2016.

Financial Summary

Summary of Revenue and Profit/(Loss) For the year ended 31 March 2016	2016 \$000s	2015 \$000s	Balance Sheet As at 31 March 2016	2016 \$000s	2015 \$000s
Revenue	112,737	131,417	Assets		
Underlying EBITDA ⁴	9,008	15,369	Current assets		
Depreciation and amortisation	(6,620)	(7,938)	Cash and cash equivalents	3,370	4,858
Interest	(1,125)	(1,272)	Trade and other receivables	28,812	34,430
Adjustment for associates and joint venture share of interest,	(0.440)		Derivatives – held for trading	227	52
tax and depreciation	(2,118)	(3,600)	Derivatives – cash flow hedges	459	281
Other non cash items	(2)	(1,015)	Inventories	29,830	28,716
Income tax (expense)/credit	(874)	1,646	Current income tax asset	212	27
Net (loss)/profit after tax	(1,731)	3,190	Total current assets	62,910	68,364
Summary of Statement of Cash Flow	2016	2015	As at 31 March 2016	2016 \$000s	2015 \$000s
For the year ended 31 March 2016	\$000s	\$000s	Non-current assets		
Net cash flow			Derivatives - cash flow hedges	1,466	634
– Operating activities	7,285	(3,573)	Trade and other receivables	1,165	1,260
 Investing activities 	(6,994)	(3,601)	Property, plant and equipment	17,234	16,912
– Financing activities	_	711	Intangible assets	14,850	14,547
Net increase //decrease) in each and each equivalents	201	(6 /62)	Investment in associates	10,315	8,697
אפנ ווונו במשבי (עפט במשבי) ווו נמשוו מווע נמשוו פקעו עמופוונש	231	(0,403)	Interest in joint venture	6,798	7,015
Effect of exchange rate changes on cash and cash equivalents	378	433	Deferred tax asset	6,538	7,425
Cash and cash equivalents at the beginning of the period	(1,230)	4,800	Total non-current assets	58,366	56,490
Cash and cash equivalents at the end of the period	(561)	(1,230)	Total assets	121,276	124,854

⁴Refer to the footnote on page 2 for explanation of Underlying EBITDA.

As at 31 March 2016	2016 \$000s	2015 \$000s
Liabilities		
Current liabilities		
Bank overdraft	3,931	6,088
Borrowings	15	139
Trade and other payables	17,526	21,759
Derivatives – held for trading	3	103
Derivatives - cash flow hedges	813	911
Derivatives – interest rate swaps	330	112
Provisions	414	1,071
Total current liabilities	23,032	30,183
Non-current liabilities		
Derivatives - cash flow hedges	421	752
Borrowings	12,000	12,013
Provisions	2,361	2,098
Deferred tax liabilities	34	399
Total non-current liabilities	14,816	15,262
Total liabilities	37,848	45,445
Net assets	83,428	79,409
Equity		
Share capital	173,881	173,881
Other reserves	(20,793)	(26,543)
Accumulated losses	(69,660)	(67,929)
Total equity	83,428	79,409

> This financial summary provides partially summarised financial information only, regarding the financial performance of Rakon Limited for the year ended 31 March 2016. Please refer to Rakon Limited's 2016 Annual Report for the full financial statements and accompanying notes.

Telecommunications



Rakon Everywhere Precision Frequency Control on the Ground, in the Air and in Space

The Global Navigation Satellite System (GNSS) module inside a drone might very well have a Rakon crystal oscillator at its heart. World-leading GNSS module manufacturers are Rakon customers, and their products go into everything from drones to vehicle fleet management systems. These and other new uses create significant opportunities for Rakon's global positioning business.

Telecommunications infrastructure relies on precise timing and synchronisation.

Rakon is a preferred supplier to nearly all the major providers: Rakon components can be found in the stand alone base stations that are at the core of traditional Radio Access Networks (RAN), as well as in the Distributed Antenna Systems (DAS) deployed in facilities such as university campuses or shopping centres, and in the latest Centralised Radio Access Network solutions (C-RAN).

As the volume of data and the need for speed continues to grow, so will demand for Rakon technology.

The need for greater frequency control than could be provided by the tuned circuits originally used by radio stations was the starting point for Rakon. Today, precise frequency control lies at the heart of SIGFOX's Low Power, Wide Area Network (LPWAN), the only global network dedicated to the IoT. Rakon is a cornerstone shareholder in the SIGFOX Network Operator (SNO) for Australia and New Zealand, and well positioned to supply the sophisticated semiconductors that will be required to manage the volume of data generated by the IoT.

Precision is also the defining advantage of Rakon's space & defence business. Rakon's range of crystal and oscillator solutions can be found on the ground, in calibration and meteorology laboratories, in the air, in airborne radar applications, and in space.



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Rakon's Core Markets

Rakon's precision CXO (HT700) for an agricultural GNSS application. Newer designs use Rakon's ultra stable TCXOs featuring patented Pluto+™ ASIC technology.



Telecommunications The equipment which enables communications networks to operate. Includes base stations, microwave transmission. fibre-optics, small cells and network timing. OCXOs, TCXOs, VCXOs and XOs.



Global Positioning

Includes all GNSS equipment and other location and positioning systems. Applications include Personal Navigation Devices (PNDs), high precision positioning (surveying, mining, and agriculture), rescue beacons, automotive and sport and recreation products. TCXOs, XOs and Crystals.



Space & Defence Applications where reliability as well as precision and performance are critical. This market also includes aviation and other high reliability applications. DPCSSs, OCSOs, OCXOs, TCXOs, VCXOs, XOs and Crystals.



including the following: wireless control, test and measurement, smart grids and metering, Machine-to-Machine (M2M) and IoT, as well as other new and emerging markets. OCSOs, OCXOs, TCXOs, VCXOs, XOs and Crystals.



Space Product Range and Heritage

Rakon has a long history of providing highreliability products, with some customers having an association with Rakon for 30 years or more. Its high-reliability solutions are found in applications which require the most stringent performance criteria. Many government and commercial programmes use Rakon oscillators across the globe, in systems where high performance is required under the most demanding conditions.

Kounotori 5 also known as HTV5, was an uncrewed Japanese cargo spacecraft launched to resupply the International Space Station (ISS). It berthed at the ISS on 25 August 2015. Rakon's customised space OCXOs were in the S-band transponder of the transfer vehicle.

Images: European Space Agency (ESA), International Ocean Agency (JAXA), Korea Aerospace Research Institute (KARI), and National Aeronautics & Space Administration (NASA).



Rakon Products Can be Found in Many International Programmes

Global GNSS Chipset and Module Market Size

Colour Coordinating Group (IOCCG), Japan Aerospace Exploration Alphabus, AMOS, ATV, BepiColombo, CBERS, Chandrayaan, Cryosat, DORIS, EarthCARE, EgyptSat, ELISA, ENVISAT, Galileo, Globalstar, Herschel-Planck, Himawari, HTV, Iridium, Jason, JUNO, KOMPSAT, LEOStar, Mars Express, METOP, MTG, O3B, PARASOL, PLEIADES, PRISMA, Rosetta, SARAL, SAR-Lupe, SATCOM, Sentinel, SeoSar, Spacebus, SPOT, SWARM, Syracuse, TanDEM-X. THEOS and Venus Express.



The graph above shows estimated global revenue generated from the GNSS chipset and module market. Usage of GNSS technology in a whole range of industries is generating significant opportunities for Rakon. Changing technologies, including the decline of PNDs in favour of other solutions, are helping to drive increased margins in Rakon's global positioning business.

Global Positioning



The Internet of Things (IoT) A Significant Opportunity for Rakon

What if your fridge could tell you the voghurt on the back shelf was past its use-by date? What if your clothes dryer could text you that it was time to change the lint filter?

Everyday examples, but they demonstrate the value a fully realised Internet of Things (IoT) will generate, savs Brent Robinson.

"The IoT is about getting good data early so you can anticipate a problem or an opportunity," he says.

Agriculture is one sector where the new technology could be a game changer.

"A lot of animals are already 'connected', via radio frequency identification technology, making it possible to follow an individual animal along the entire supply chain," says Brent.

"But imagine a tag that monitored the cow's temperature – and was linked to a sprinkler system in the dairy shed so a farmer could minimise heat stress in the herd and improve milk yields."

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Beyond improving the way we currently do things, the IoT will create new ways of working. For Rakon, the opportunities lie in the new products and technologies that will be required to bring it to life.

With smartphones and other mobile devices to connect the individual user to their IoT ecosystem and cloud computing to translate the vast amount of data generated into useful information, what else does the IoT need to flourish?

"The network technology currently available is based on traditional telecommunications technology. It works - but it is expensive to connect to and



very power hungry," says Brent.

"The SIGFOX network is a dedicated global network designed with the IoT in mind. It has the lowest deployment and maintenance costs of any system proposed, making it viable for a huge number of applications," he says.

"Based on current market forecasts, we expect Thinxtra's total number of network connections to overtake total population in Australia and New Zealand by 2022."

As a cornerstone shareholder in Thinxtra. the SIGFOX Network Operator (SNO) for



thinxtra Empowering Internet of Things

> Selling Subscriptions Annual network connection and monthly usage fees.

Selling & Distributing **Connected Hardware** Hardware may include Rakon designed and manufactured components.

Selling Services

Advising customers on the right solution to adopt, and how to implement it.

will be generated

ľ

Australia and New Zealand, Rakon will be part of a worldwide network of potential customers for its innovative component technology.

"Managing such massive amounts of data from such a wide variety of sources will need new infrastructure. Rakon's track record as an innovator in semiconductors puts us in an ideal position to be a supplier of choice."

SIGFOX offers the world's leading and most mature Low Power Wide Area (LPWA) IoT connectivity solution.

Rakon will continue to develop and expand an innovative product portfolio to meet the demand for products and services associated with connecting to the IoT.



Source: Analysys Mason, 2015. http://goo.gl/VNWzYU

Space & Defence







Glossary

Application Specific Integrated Circuit (ASIC)

Non-standard integrated circuits that have been designed for a specific use. Generally, they can be tailored to meet exact requirements for the product, which can significantly reduce the number of additional components used.

Base Station

Fixed communications stations, which form vital nodes to relay information in a wireless telecommunications network. They transmit and receive network data to and from users (e.g. mobile phone users). They are also known as cell towers or cell sites, and come in a range of coverage sizes.

Centralised Radio Access Network (C-RAN)

C-RAN is emerging as a way to arrange base stations, where the digital units (or baseband units) are placed in centralised locations. Remote radio units (which host the antenna) are then placed up to several kilometres away. The baseband and radio units can be connected via fibre-optic links, Ethernet or other technologies. This can enable significant cost savings and reduce wireless interference in the network.

Crvstal (Xtal)

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At the heart of XOs, VCXOs, TCXOs and OCXOs are quartz crystals.

Crystal Oscillator (XO)

An XO is a guartz crystal combined with basic oscillation circuitry. XOs can offer high frequencies with low noise performance. They are typically used in telecommunications networks and other communications applications.

Digital Pulse Compression Sub-System (DPCSS)

A DPCSS is fully programmable and is used to upgrade an existing radar and to extend its life. DPCSSs have high speed digital processing

capability, enabling remarkable increases in the overall system performance of radars.

Distributed Antenna System (DAS)

DAS is a system of hubs and antennas, where a wireless signal is distributed to a series of connected radio units. The main hub takes the cellular signal from the service provider, digitises and then distributes it to the other hubs and radio units. This mobile signal can be carried at full strength to any remote antenna connected. These systems are advantageous in populous areas such as stadiums, office buildings and other venues.

Drone

An unmanned vehicle that is automatically or remotely controlled. They are either groundbased or airborne. Drones are often used in environments that are hazardous or challenging for humans to operate in, including search and rescue, firefighting, surveillance, bomb detection and aerial photography. New commercial uses include goods delivery and traffic monitoring.

Emergency Beacon

Also known as Emergency Position-Indicating Radio Beacon (EPIRBs), these are tracking transmitters which aid in the detection and location of boats, aircraft and people in distress.

Fibre-Optic

Also known as optical fibre. Instead of sending electrical data signals with a voltage and current, fibre-optic technology transmits data using flashes of light along a glass or plastic wire. Compared with traditional copper wire, fibre-optics carries much more information and is better for long distance data transmission.

Fifth Generation (5G)

5G is the soon to arrive fifth generation wireless broadband technology, which will provide better speeds and bandwidth than current 3G and 4G networks.

Fourth Generation (4G)

Stands for Fourth Generation (4G) data

communications technologies. 4G provides for mobile broadband internet access, and allows for fast internet connections to smartphones, tablets and other wireless or mobile devices. 4G itself comprises of three standards: LTE (most common). Ultra Mobile Broadband and Worldwide interoperability for Microwave Access (WiMax).

Global Navigation Satellite System (GNSS)

A satellite navigation system with global coverage, that allows small electronic receivers to determine their location with high precision. Existing and upcoming systems include the United States NAVSTAR Global Positioning System (GPS), Russia's GLONASS, China's BeiDou Navigational Satellite System and the European Union's Galileo GNSS.

Internet of Things (IoT)

A connected network of physical objects with embedded electronics, software and sensors, Examples are numerous and include home control and security, heart monitoring implants, health monitoring sensors for farm animals, cars with built-in sensors, or devices that assist firefighters in search and rescue.

Long Term Evolution (LTE)

Refers to next generation telecommunications networks.

Long Term Evolution Advanced (LTE-A)

LTE and LTE-Advanced (LTE-A) are standards for wireless communication of high speed data for mobile phones and data terminals.

Low Power Wide Area (LPWA) & Low Power Wide Area Network (LPWAN)

The majority of IoT-connected devices do not need to send huge data loads; they can function perfectly

well using ultra narrow band technology. This type of solution can be set up and operated for as little as one-tenth of the cost of using a 3G/4G device, and because they are only 'on' when they are transmitting, power demand is negligible.

Machine-to-Machine (M2M)

A broad label that can be used to describe any technology that enables networked devices to exchange information and perform actions without the manual assistance of humans.

Macrocell

A base station designed to cover a larger area and number of users than smaller base stations.

Microprocessor

Electronic chips that form the 'brains' of most modern electronic devices. Used to process information and perform key functions, they are found in computers, communications devices and other digital devices.

Network

A group or system of interconnected people or things.

Network Timing

Refers to the systems and technologies that are put in place to ensure networks are running at the same time around the world. Network timing synchronisation helps control various functions including email, banking transactions, and air traffic control.

Oven Controlled Crystal Oscillator (OCXO)

Crystal oscillators where the internal temperature is kept constant, using a miniature oven. They're used in space and telecommunications applications where precision is paramount. Stabilities can be better than 1 part per billion (ppb).

Oven Controlled SAW Oscillator (OCSO)

An oven controlled oscillator using Surface Acoustic

They are commonly used in test and applications.

Personal Navigation Device (PND)

Portable devices specifically made to run navigation software, such as turn-by-turn road directions.

Photolithography

Radio Access Network (RAN)

Technologies that allow end-users to access the radio network, that is, they sit between user devices and the core network. These are the base stations and antennas in a cellular network.

Radio Detecting and Ranging (RADAR)

An object detection system that uses radio waves to determine the range, altitude, direction, or speed of objects.

Semiconductor

A substance that can conduct electricity in some conditions but not others, making it a good medium for the control of electrical current.

SIGFOX Network Operator (SNO)

their local country or region.

Small Cell

Wave (SAW) technology. SAW technology enables high frequency outputs (320 MHz up to 2 GHz) and ultra low phase noise performance. measurement equipment, high speed converters, radar systems and other precise communication

The process of depositing material onto the surface of another (usually a thin wafer of silicon) There are a number of techniques and materials that can form different shapes and structures.

Companies around the world who have partnered with SIGFOX to roll out the SIGFOX network in

A smaller version of a base station. With a range of 10 m to 2 km, they are integral parts of 3G

and 4G networks. Mobile operators use small cells to extend their wireless service coverage and increase network capacity. 'Small cell' is an umbrella term used by the industry, and covers femtocells, picocells, metrocells and microcells.

Smart Car

Generally, a car that has intelligent features beyond a standard automobile. Using sensors, wireless connectivity and other technology, they are able to provide a much richer driving and safety experience than their standard counterparts. Examples include automatic parking, internet connectivity, and automatic headlights.

Smart Grid

A modernised electrical grid that can detect and intelligently respond to changes in power supply and demand. Grid operators use smart grids to improve the efficiency, reliability, economics and sustainability of power generation and distribution.

Smart Meter

Used to record and transmit household power usage information, usually every half hour or hour, so that power companies can better plan the supply of power. They normally transmit using technology similar to that of older cell phones.

Surface Mount Device (SMD)

An electronic device that can be placed on printed circuit boards flat and on both sides of the board (in contrast to pins that go right through the board). This allows for denser and higher performing circuit boards.

Third Generation (3G) network

An improvement over 2G networks, 3G cellular networks were launched in the early 2000s. Drastically improving reliability and speed for voice and data, these networks allowed mobile users to access mobile broadband.

Temperature Compensated Crystal Oscillator (TCXO)

A TCXO is a guartz crystal combined with electronic circuitry. The circuitry is used to generate a stable frequency output, and to remove frequency variations due to temperature change.

High Stability Temperature Compensated **Crystal Oscillator**

Used in high volume, high performance markets such as GNSS devices, where small oscillator size is important. High Stability TCXOs have a typical performance of 0.5 parts per million (ppm) over wide temperature ranges. They are available in sizes as small as 1.6 x 1.2 mm.

Ultra Stable Temperature Compensated Crvstal Oscillator

Using unique technology, Rakon's Ultra Stable TCXOs can achieve stabilities better than 100 parts per billion (ppb, or 0.1 ppm) over temperature. They are used in telecommunications networks and other high precision applications.

Voltage Controlled Crystal Oscillator (VCXO)

An oscillator that, by varying a control voltage, has its oscillation frequency adjusted. Commonly used in communications infrastructure, VCXOs can offer much higher frequencies and very low phase noise performance.

Other Markets



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