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DW3000 Errata

Version 1.1

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DOCUMENT INFORMATION

Disclaimer

Decawave reserves the right to change product specifications without notice. As far as possible changes to functionality and specifications will be issued in product-specific errata sheets or in new versions of this document. Customers are advised to check with Decawave for the most recent updates on this product.

LIFE SUPPORT POLICY

Decawave products are not authorized for use in safety-critical applications (such as life support) where a failure of the Decawave product would reasonably be expected to cause severe personal injury or death. Decawave customers using or selling Decawave products in such a manner do so entirely at their own risk and agree to fully indemnify Decawave and its representatives against any damages arising out of the use of Decawave products in such safety-critical applications.

Caution! ESD sensitive device. Precaution should be used when handling the device in order to prevent permanent damage.

REGULATORY APPROVALS

The DW3000 or DW3000 based products, as supplied from Qorvo, have not been certified for use in any particular geographic region by the appropriate regulatory body governing radio emissions in that region although it is capable of such certification depending on the region and the manner in which it is used.

All products developed by the user incorporating the DW3000 must be approved by the relevant authority governing radio emissions in any given jurisdiction prior to the marketing or sale of such products in that jurisdiction and user bears all responsibility for obtaining such approval as needed from the appropriate authorities.

1 INTRODUCTION

This errata document details known issues with the DW3000 product. Where available workarounds are presented.

1.1 *Package Marking Definitions*

The diagram below shows the package markings for DW3210, DW3220, DW3110 and DW3120.

Figure 1 - Original Device Package Markings

Legend:

DW3xx0	Part number
XXXXXXXX	Lot number
ZZYYWW	Assembly site ID (ZZ); A2 for QFN B2 for WLCSP Year (YY) and Week (WW) number

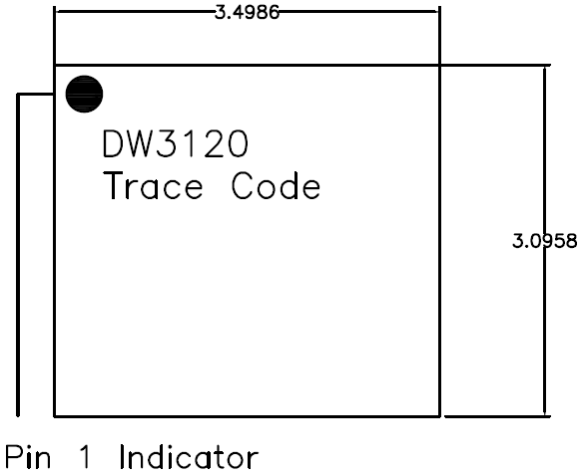

Figure 2 - New Device Package Markings (after PCN 2026)

2 ERRATA OVERVIEW

Functional Problem	Short Description	Silicon Revision Identifier	Detailed Description
JPN-PSD-1	Parts could fail the Japan ARIB ST-T91 regulatory maximum PSD limits	C	3.1
TEMP-ADC-1	The calibration and readings of the temperature and VDD1 voltage with the SAR ADC are not correct	C	3.2

Revisions A and B of the DW3000 were pre-production silicon variants and not released to mass production.

3 FUNCTIONAL PROBLEMS DETAIL

3.1 JPN-PSD-1

3.1.1 Introduction

The DW3000 UWB transceiver family is designed to operate in multiple regions each of which have specific regulatory requirements for in band and out of band emissions. The channel of interest for Japan is CH9, 8GHz. The relevant peak power emission limits for Japan (ARIB STD-T91) are shown below:

Frequency Range	Peak Power Limit	Measurement Resolution Bandwidth
2700 MHz to 7250 MHz	-64 dBm	1 MHz
7250 MHz to 10250 MHz	0 dBm	50 MHz

Although emissions requirements are usually tested in a radiated test environment, in Japan these tests are typically performed by a conducted test with stated antenna gains added to the result.

3.1.2 Problem

DW3000 can transmit at power levels up to 9 dB in excess of the average power limit of -41.3 dBm/MHz in order to overcome losses outside of the chip (tracks, filters, antenna etc). As average power is measured over a 1 ms averaging window, the average power limits will not be exceeded. However, depending on the losses outside the chip and TX gain used, one could fail the Japan ARIB STD-T91 maximum Peak Power limits. The plot below shows a typical result at the IC RF pin when DW3000 is set to transmit at its maximum power level. The plot shows that the peak power limit is exceeded particularly in the 2700 MHz to 7250 MHz frequency band.

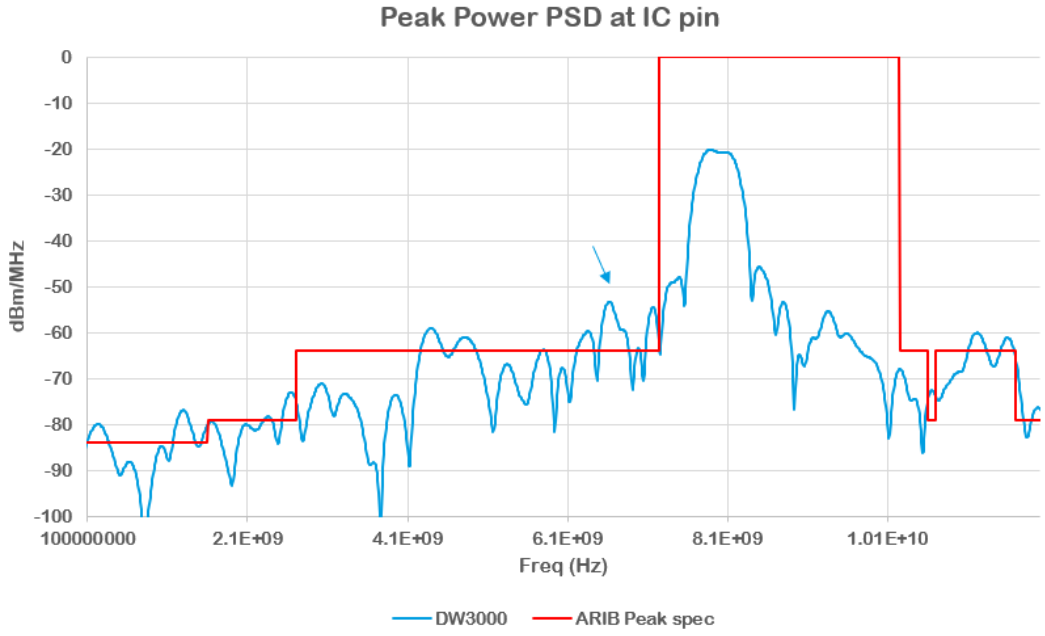

Figure 3 - Typical DW3000 Peak Power when operating at maximum power level

3.1.3 Workaround

Reducing the transmit power until the peak power limit is not exceeded will solve this problem although at the expense of reduced TX power and hence reduced link budget.

The Qorvo QM33100 series devices are pin compatible with the DW3000 series and are suitable for global operation thanks to a new pulse shape designed to meet Japanese and Korean regulations.

3.2 TEMP-ADC-1

3.2.1 Introduction

The DW3000 is equipped with a low speed 8-bit SAR A/D convertor (ADC) which can be configured to sample values from an internal IC temperature sensor and from a battery voltage monitor on the VDD1 power supply input. Both the temperature and battery voltage are calibrated during the chip production test and the calibrated values are stored in OTP memory.

3.2.2 Problem

Due to complexities associated with silicon thermal profiles across product variants, package types and operating modes, the temperature and battery voltage readback functions of the DW3000 IC are not supported.

3.2.3 Workaround

If temperature and/or voltage readings are required, it is suggested to implement this external to the DW3000 IC, e.g. with the host microcontroller or external ADC.

DOCUMENT HISTORY

Table 1: Document History

Revision	Date	Description
1.0	5 May 2021	Initial release
1.1	1 July 2022	Added TEMP-ADC-1 erratum

4 FURTHER INFORMATION

Decawave develops semiconductors solutions, software, modules, reference designs - that enable real-time, ultra-accurate, ultra-reliable local area micro-location services. Decawave's technology enables an entirely new class of easy to implement, highly secure, intelligent location functionality and services for IoT and smart consumer products and applications.

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