AWR2243 Device Errata Silicon Revision 1.0

1 Introduction

This document describes the known exceptions to the functional and performance specifications to TI CMOS Radar Devices (AWR2243).

2 Device Nomenclature

To designate the stages in the product development cycle, TI assigns prefixes to the part numbers of Radar / milli-meter Wave sensor devices. Each of the Radar devices has one of the two prefixes: XAx or AWR2x (for example: **AWR2243**ABIGABLRQ1). These prefixes represent evolutionary stages of product development from engineering prototypes (XAx) through fully qualified production devices (AWR2x).

Device development evolutionary flow:

XAx — Experimental device that is not necessarily representative of the final device's electrical specifications and may not use production assembly flow.

AWR2x — Production version of the silicon die that is fully qualified.

XAx devices are shipped with the following disclaimer:

"Developmental product is intended for internal evaluation purposes."

Texas Instruments recommends that these devices not to be used in any production system as their expected end –use failure rate is still undefined.

3 Device Markings

Figure 1 shows an example of the AWR2243 Radar Device's package symbolization.

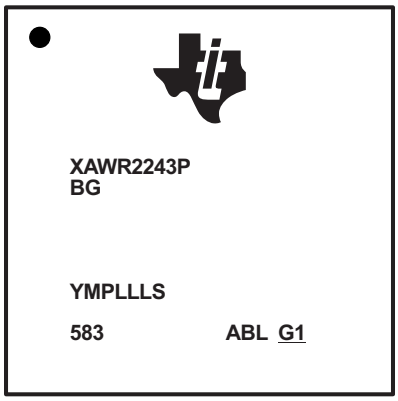

Figure 1. Example of Device Part Markings

This identifying number contains the following information:

- **Line 1:** Device Number
- **Line 2:** Safety Level and Security Grade
- **Line 3:** Lot Trace Code
  - YM = Year/Month Code
  - PLLL = Assembly Lot
  - S = Assembly Site Code
- **Line 4:**
  - 583 = AWR2243 Identifier
  - BLANK = ES1.0
  - ABL = Package Identifier
  - G1 = "Green" Package Build (must be underlined)

4 Advisory to Silicon Variant / Revision Map

Table 1. Advisory to Silicon Variant / Revision Map

Advisory Number	Advisory Title	AWR2243
		ES1.0
Master Subsystem		
MSS#37	Dual Clock Comparator Failure	X
Analog / Millimeter Wave		
ANA#08	Doppler Spur Observed for Narrow Chirps Spanning 79.2 GHz	X
ANA#11	TX, RX Gain Calibrations Sensitive to Large External Interference	X
ANA#12	Second Harmonic (HD2) is Present When Receiver is Tested Standalone Using CW Input	X
ANA#13	TX1 to TX3 Phase Mismatch Variation over Temperature is Double that of TX2/TX1 and TX3/TX2 Combinations	X

5 Known Design Exceptions to Functional Specifications

Table 2. Advisory List

MSS#37 *Dual Clock Comparator Failure*

Revision(s) Affected: AWR2243 ES1.0

Description: The Dual-Clock Comparator block, which is used to compare one clock frequency with respect to another clock frequency, can have an occasional failure at cold temperatures and report an incorrect frequency. This incorrect reporting, can cause failure in the DCC monitor used to monitor internal clock frequencies.

Workaround(s): Do not use the dual-clock comparator monitor.

ANA#08 *Doppler Spur Observed for Narrow Chirps Spanning 79.2 GHz*

Revision(s) Affected: AWR2243 ES1.0

Description: There is a nonlinearity of the synthesizer when crossing 79.2 GHz due to coupling from its reference to the VCO.

Implication: There is a spur in non-zero Doppler bin if the synthesizer crosses 79.2 GHz during a chirp. The exact Doppler bin depends on the slope of the ramp. This is not observed for wide bandwidth or higher ramp slopes.

Workaround(s): Avoid narrow, slow ramps near 79.2 GHz.

ANA#11 *TX, RX Gain Calibrations Sensitive to Large External Interference*

Revision(s) Affected: AWR2243 ES1.0

Description: External interference present on the RX or TX pins with level >-10dBm can lead to degraded accuracy or errors in the peak detector, TX, and RX gain calibrations. If the interference changes its level while these calibrations are actively running, the calibration algorithm may interpret this as a change in signal power, leading to incorrect convergence. This applies to boot-time PD, TX, and RX calibrations, as well as run-time TX output power calibration.

Workaround(s):

Workaround #1:

The incident power detector in the TX output power detector, along with the absolute level of the PA loopback used during the PA loopback monitors, are insensitive to this, and they can be used to check that the calibrations converged correctly. Calibration can be re-run if large interference was observed.

Workaround #2:

Another workaround is to save the boot time calibrations at production (done in a clean environment without interference) and during operation, the calibrations can be restored. For the runtime Tx output power calibrations, OLPC mode can be used instead of the CLPC mode.

ANA#12 *Second Harmonic (HD2) is Present When Receiver is Tested Standalone Using CW Input*

Revision(s) Affected: AWR2243 ES1.0

Description: When the receiver is tested standalone using a CW input, a second harmonic (HD2) can be observed in the final ADC output at a level of –55 dBc.

Workaround(s): No workaround available at this time. However, in many typical radar use-cases the HD2 does not affect the system performance due to two reasons

1. Since the HD2 comes from a coupling to the LO signal, there is an inherent suppression of the HD2 level due to the self-mixing effect (i.e., phase noise and phase spur suppression effect at the mixer).
2. In real-life scenarios there is often a double-bounce effect of the radar signal reflected from the target, which leads to a ghost object at twice the distance of the actual object. This effect is often indistinguishable from the effect of HD2 itself.

ANA#13 *TX1 to TX3 Phase Mismatch Variation over Temperature is Double that of TX2/TX1 and TX3/TX2 Combinations*

Revision(s) Affected: AWR2243 ES1.0

Description: TX3/TX1 combination exhibits a phase mismatch variation of ±6°C across the complete recommended operating temperature range per the data manual whereas, TX2/TX1 and TX3/TX2 combinations exhibit a lower variation of ±3°C over the same temperature range.

Workaround(s): In applications requiring high phase accuracy across TX channels, a background angle calibration or a 2-point calibration can be used to control phase variation over temperature.

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