1 Introduction
This document describes the known exceptions to the functional and performance specifications to TI CMOS Radar Devices (AWR1843).

2 Device Nomenclature
To designate the stages in the product development cycle, TI assigns prefixes to the part numbers of Radar / millimeter Wave sensor devices. Each of the Radar devices has one of the two prefixes: X1x or AWR1x (for example: X1642BiGABL). These prefixes represent evolutionary stages of product development from engineering prototypes (X1x) through fully qualified production devices (AWR1x).

Device development evolutionary flow:

X1x — Experimental device that is not necessarily representative of the final device’s electrical specifications and may not use production assembly flow.

AWR1x — Production version of the silicon die that is fully qualified.

X1x 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 AWR1843 Radar Device’s package symbolization.

![Device symbolization example](image)

Figure 1. Example of Device Part Markings

This identifying number contains the following information:

- **Line 1**: Device Number
- **Line 2**: Temperature and Security Grade
- **Line 3**: Lot Trace Code
  - YM = Year/Month Code
  - PLLL = Assembly Lot
  - S = Assembly Site Code
- **Line 4**:
  - 502 = AWR1843 Identifier
  - ABL = Package Identifier
  - G1 = “Green” Package Build (must be underlined)
4 Usage Notes

Usage notes highlight and describe particular situations where the device's behavior may not match presumed or documented behavior. This may include behaviors that affect device performance or functional correctness. These usage notes will be incorporated into future documentation updates for the device (such as the device-specific data sheet), and the behaviors they describe will not be altered in future silicon revisions.

4.1 MSS: SPI Speed in 3-Wire Mode Usage Note

The maximum SPI speed under 3-wire operation was only tested up to 33 MHz. This affects AWR1843 ES1.0.
## Advisory to Silicon Variant / Revision Map

### Table 1. Advisory to Silicon Variant / Revision Map

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<th>Advisory Number</th>
<th>Advisory Title</th>
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<td>MSS#17</td>
<td>Invalid Pre-fetch from MSS CR4 Processor (due to Speculative Read Operation from Tightly Coupled Memory Instance) Leads to Generation of MSS_ESM Group 3 Channel 7: MSS_TCMA_FATAL_ERR</td>
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<td>MSS#18</td>
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## 6 Known Design Exceptions to Functional Specifications

**Table 2. Advisory List**

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MSS#17  
**Invalid Pre-fetch from MSS CR4 Processor (due to Speculative Read Operation from Tightly Coupled Memory Instance) Leads to Generation of MSS_ESM Group 3 Channel 7: MSS_TCMA_FATAL_ERR**

**Revision(s) Affected:** AWR1843 ES1.0  
**Description:** The CR4 processor may perform an invalid pre-fetch access due to speculative TCM read leading to an invalid address access. This can result in a TCERROR and also a 2-bit ECC fatal error. The TCERROR is ignored by the processor since these correspond to instructions that are pre-fetched but never executed. However, the invalid MSS_TCMA_FATAL_ERR is generated on the ESM group 3 channel-7.

*Implication:* In case of a genuine TCMA ECC fatal error, nERROR will not be generated directly through ESM.

**Workaround(s):**
- Mask Group 3 channel 7: MSS_TCMA_FATAL_ERR to ESM can be masked by writing into MSS_RCM:ESMGATE0 register. CR4F abort handler should handle the nERROR generation
- OR
- Disable branch prediction for MSS-CR4F

MSS#18  
**Core Compare Module (CCM-R4F) may Cause nERROR Toggle After First Reset De-assertion Subsequent to Power Application**

**Revision(s) Affected:** AWR1843 ES1.0  
**Description:** The CCM-R4F module compares the outputs of the two Cortex-R4F CPU cores and generates an error on any mis-compare. This ensures the lock-step operation of the two Cortex-R4F CPUs. The nERROR signal should only be set by the CCM-R4 module by a valid core mismatch. At power-on, some uninitialized circuits may cause the CCMR4-F to falsely detect a mis-compare.

**Workaround(s):** The anomalous nERROR toggle would need to be ignored by the external monitoring circuit (if deployed).

MSS#19  
**DMA Read from Unimplemented Address Space may Result in DMA Hang Scenario**

**Revision(s) Affected:** AWR1843 ES1.0  
**Description:** The MSS DMA generates a BER (Bus Error) interrupt when the DMA detects a bus error due to a read from unimplemented address space. This interrupt is available on VIM Interrupt Channel-70 for DMA1 and VIM Interrupt Channel-51 for DMA2. This read from unimplemented address space results in a hang condition in the DMA infrastructure bridge that connects it to the main interconnect.

*Implication:* A DMA read from an unimplemented address can result in a DMA hang condition. In the resulting state the DMA will not respond to any further DMA requests.

**Workaround(s):** The MSS CR4F processor will have to invoke a warm reset or generate an nERROR if it receives a DMA BER error.
ANA#08  Doppler Spur Observed for Narrow Chirps Spanning 79.2 GHz

Revision(s) Affected: AWR1843 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#09  Synthesizer Frequency Nonlinearity at 76.8 GHz when Synthesizer (Chirp) Frequency Monitor Enabled

Revision(s) Affected: AWR1843 ES1.0
Description: When the synthesizer (chirp) frequency monitor is enabled and the synthesizer chirp reaches 76.8 GHz, the frequency error can be as high as 500 kHz due to coupling between the monitor and the synthesizer.

Implication: Increased nonlinearity in the chirp can lead to up to 20 dB degradation in the noise floor surrounding large objects, including the bumper reflection. This leads to potential loss of dynamic range when large and small objects are present simultaneously.

Workaround(s):
1. Disable the synthesizer frequency monitor during profiles where the LO crosses 76.8GHz.
2. Use non-functional chirps to detect nonlinearities in the synthesizer.

ANA#10  Unreliable Readings from Synthesizer Supply Voltage Monitor

Revision(s) Affected: AWR1843 ES1.0
Description: During monitoring, the thresholds used to determine if the synthesizer supply voltage is within limits are much stricter than necessary for proper circuit operation. This can lead to occasional, erroneous reporting of supply failures even when there is no adverse impact on circuit or system behavior.

Implication: The user cannot rely on supply failure indication from the supply monitors of PM, Clock and LO subsystems. The affected field is STATUS_SUPPLY_PMCLKLO in the monitoring report message: AWR_MONITOR_PMCLKLO_INTERNAL_ANALOG_SIGNALS_REPORT_AE_SB.

Workaround(s): Ignore the field STATUS_SUPPLY_PMCLKLO in the monitoring report message: AWR_MONITOR_PMCLKLO_INTERNAL_ANALOG_SIGNALS_REPORT_AE_SB.

1-dB Compression Point is –16dBm
ANA#12  Second Harmonic (HD2) is Present When Receiver is Tested Standalone Using CW Input

Revision(s) Affected: AWR1843 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.
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