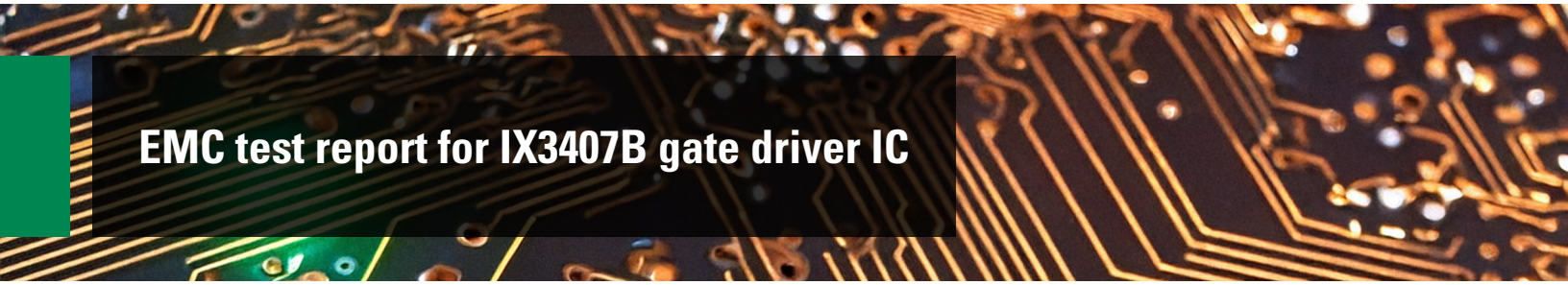

EMC test report for IX3407B gate driver IC

Objectives

This test report presents the electromagnetic emissions measurement results of the IX3407B gate driver IC, based on corner sample testing conducted on IX3407B. The tests were performed in accordance to CISPR 32 Class B standards. The IX3407B demonstrates compliance with emissions limits across all tested configurations, with worst-case emissions showing a margin of at least 9.8 dB below the regulatory mask.

Applications

Switched-mode power supplies and industrial motor drives that must comply with Class A and Class B EMC limits.

Target Audience

Engineers designing power electronics for commercial environments where low conducted and radiated emissions are mandatory.

Contact Information

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1. Introduction

The IX3407B is a high-performance galvanically isolated, single-channel gate driver IC that provides separate output pins for sourcing and sinking current, each capable of typically 7 A. Galvanic input to output isolation is provided by isolation technique where a low-voltage transmitter die and a high-voltage receiver die are isolated from each other by integrated high-voltage capacitors.
The RF input signal is transmitted through the capacitive barrier using a carrier frequency in the UHF band (300-600 MHz), employing the On/Off keying (OOK) modulation technique to enable/disable the transmitter for signal transmission. Figure 1 shows the simplified block diagram of the device.

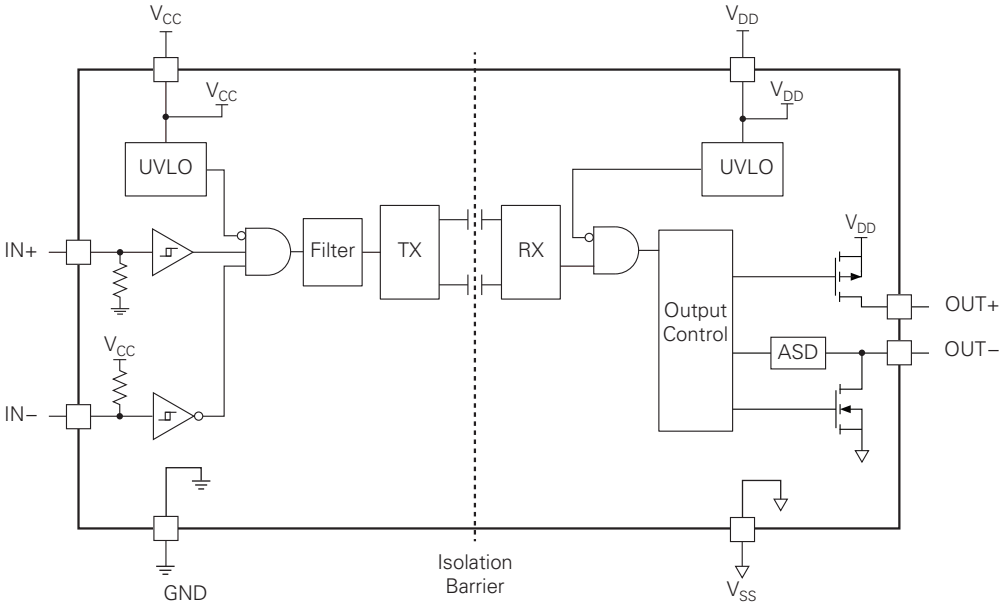

Figure 1. IX3407B Block Diagram

The high-impedance capacitive barrier and the presence of the RF carrier modulation technique creates challenges on radiated emissions that need to be addressed. The IX3407B driver employs two different techniques to minimize radiated emissions:

- Spread-spectrum principle applied to the RF carrier.
- A phase synchronizer stage in the RF link driver.

The efficiency of these techniques is demonstrated by the comparison shown in the figure below: on the left, results without applying any technique. On the right, current results with the two techniques described above.

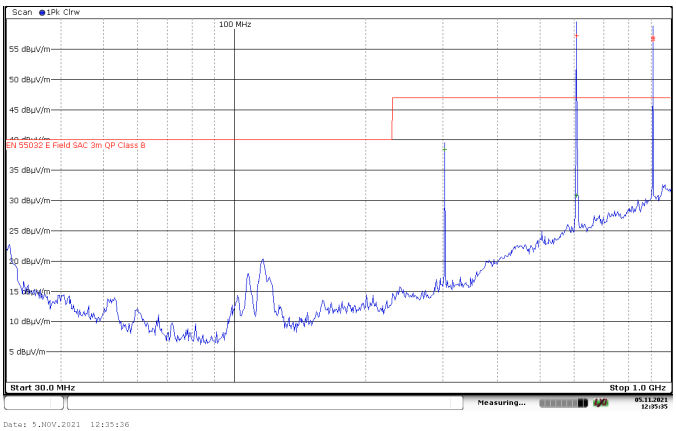

Figure 2. Emissions without EMI reduction

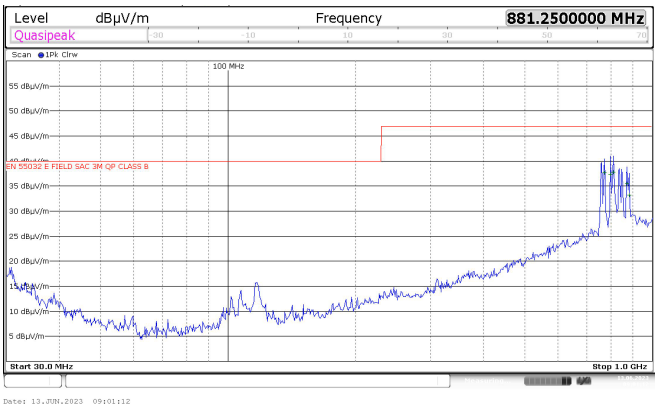

Figure 3. Emissions with EMI improvements

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Process-corner samples were tested to evaluate the product's electromagnetic interference (EMI) performance and to maximize coverage of self-generated interference.
This document summarizes the test setup, sample configurations, and key findings from the emissions scans.

2. Test Setup

Tests were conducted for emissions and immunity for both antenna orientations, 4 angles at a certified lab, using the IX3400_LAB_BOARD_EMC 2v1 with the following configuration:

- V_{CC}: ~5 V regulated
- V_{DD}: ~15 V regulated
- Decoupling capacitors: V_{CC} = 100 nF, V_{DD} = 1 µF

A basic printed circuit board without any specific technique for EMI reduction is used (shown in Figure 4 below), to test the behavior.

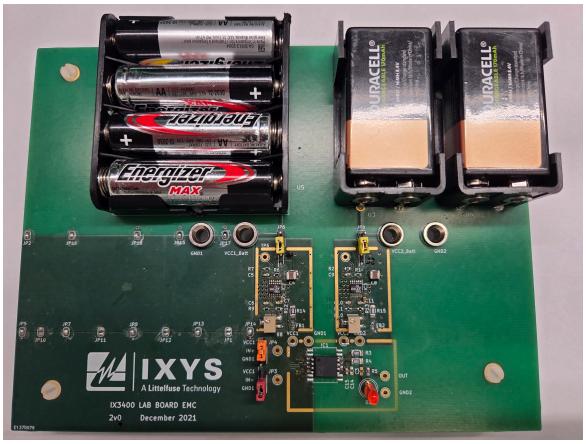

Figure 4. Printed Circuit Board

Figure 5. Radiated emission test chamber

3. Emissions Results

The tests were performed in accordance to CISPR 32 Class B standards (from 30 MHz to 6 GHz). All the values represent the difference in dB vs the most restrictive mask (class B, plotted in the Figure 6 and Figure 7).
All samples passed CISPR 32 Class B limits. Worst-case emissions were observed near 765 MHz:

- C1: 738 MHz (2nd harmonic), margin: 12.8 dB
- C2: 770.69 MHz (2nd harmonic), margin: 9.9 dB
- C3: 750 MHz (3rd harmonic), margin: ~12 dB
- C4: 761.25 MHz (3rd harmonic), margin: 9.8 dB

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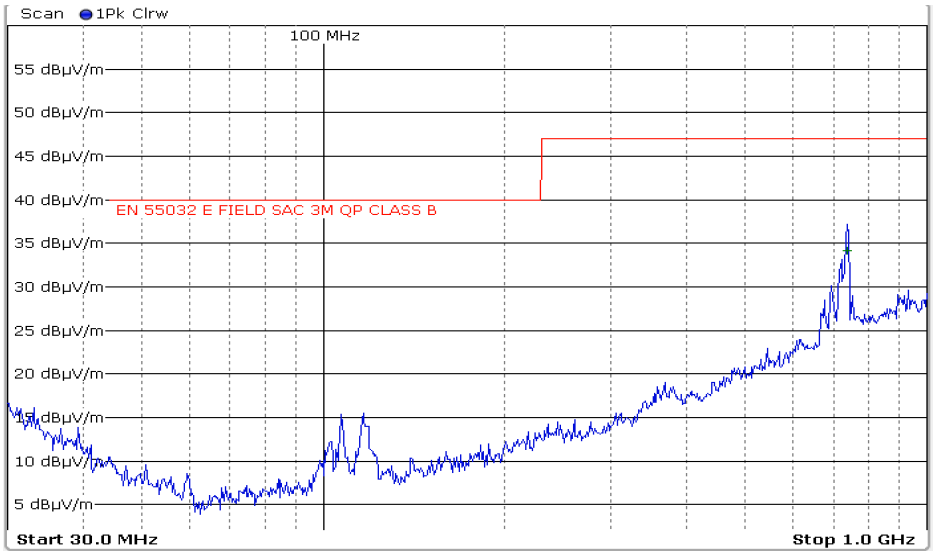

Figure 6. Worst case 30 MHz – 1 GHz range

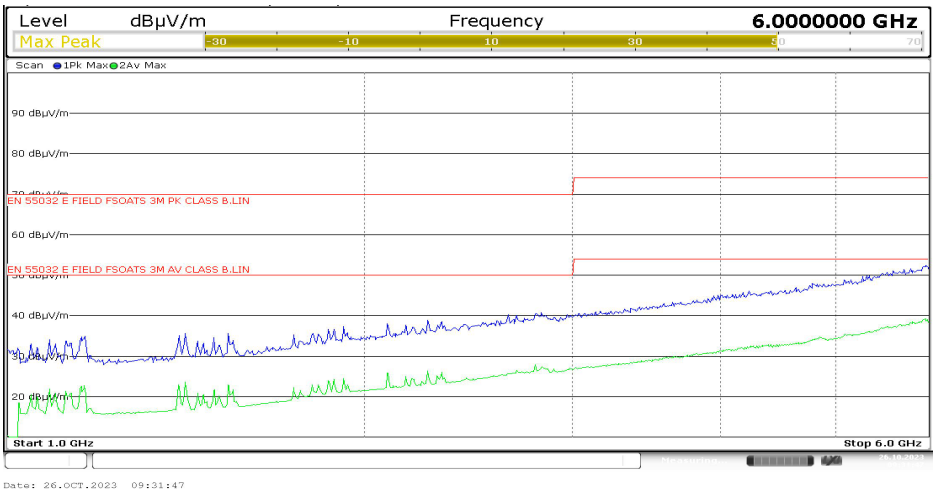

Figure 7. Worst case 1 GHz – 6 GHz range

4. Immunity Results

Immunity test was conducted as defined in the CISPR32 standard.
Test conditions:

- 80 MHz to 1 GHz at 10 V/m. Both antenna orientations, 4 angles. Both on and off conditions.
- 1 GHz to 6 GHz at 3 V/m. Both antenna orientations, 4 angles. Both on and off conditions.

No unintended transitions were observed, confirming robust immunity.

5. Conclusion

The IX3407B gate driver IC demonstrates excellent EMC performance, meeting the CISPR 32 Class B emissions requirements with comfortable margins. Its immunity behavior under high field strengths further supports its reliability in noisy environments.

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Revision History

Date	Revision	Changes
December, 2025	01	Initial release of test report

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