FCC Operational Description

FMT

Product Name: SmartFill GEN 3

Contains Certified Module: Telit WE310G4-P

NFC Functionality: Based on NXP PN532 (Part 15.225-compliant)

1. Overview of Radio Operation

This product integrates two RF subsystems:
1. Wi-Fi-802.11 a/b/g/n (2.4GHz, 5GHz), which is handled by Telit WE310G4-P Wi-Fi module.
2. NFC using the NXP PN532 transceiver for short-range wireless interaction at 13.56 MHz. PN532 operates under FCC Part 15.225 for unlicensed use in the 13.56 MHz ISM band.

2. Frequency Control & Stabilization

- The Telit WE310G-P uses an internal crystal oscillator 40MHz and PLL to pull the frequency up for 2.4GHz band and 5GHz band, respectively.
- The PN532 NFC transceiver uses an external 27.12 MHz crystal oscillator, internally divided to generate the 13.56 MHz carrier.
- All frequency sources are fixed, trimmed, and not user-configurable.

3. Suppression of Spurious Emissions

- The Wi-Fi module is fully shielded. The emissions are verified from its origin from Telit, which complies with FCC radiation exposure limits.
- The NFC section uses a low-pass filter at its RF output, and PCB layout techniques (e.g., grounded guard traces) are employed to minimize coupling and radiated emissions.
- Power lines include ferrite beads and decoupling capacitors to suppress conducted noise.

4. Power Limiting

- The WE310G-P output power depends on different modulation schemes and is controlled by internal power amplifiers and managed by its internal baseband processor. The maximum output power is 17dBm@2.4GHz band and 13dBm@5GHz band, respectively.
- The PN532 output power is limited via an onboard driver stage and external passive tuning network. And no user-accessible method exists to change its power output.

5. Transmission Duty Cycle

- The WE310G-P Wi-Fi module transmission duty cycle is not configured directly from user. It is designed to set the limitation to comply with regulations within 1% duty cycle in the frequency bands.
- The NFC subsystem transmits short bursts (<10 ms) during polling cycles when checking for tag presence.
- The system never transmits continuously and meets duty cycle expectations for unlicensed operation.

6. NFC modulation scheme

- Modulation Type

  ASK (10% modulation index) with Load Modulation for passive tags.

- Modulating Signal

Digital data only.

- Data Encoding

  Miller coding (ISO/IEC 14443 Type A default).

- Max Data Rate

  106 kbps (PN532 default, compliant with ISO/IEC 14443 Type A).

- Transmit Time

  ⩽5 ms per packet, duty cycle <10% within any 100 ms window.

7. NFC tag

Passive tag only.

8. Communication Interfaces & Clock Summary

Component	Interface	Clock Frequency
Telit WE310G4-P	UART	115.2 kbps
PN532 NFC	I²C	27.12 MHz XTAL (internal use)

9. Antenna

- The Wi-Fi antenna is an external, pre-certified monopole antenna connected via U.FL connector. No internal antenna tuning or modification is applied.
- The NFC antenna is a PCB loop matched via passive components to the PN532 TX/RX pins. It’s tuned to resonate at 13.56 MHz.

10. FCC Compliance Notes

The Telit WE310G4-P module is integrated into the circuit without modification from origin.
The NFC subsystem operates within the 13.56 MHz ISM band under FCC Part 15.225, using low field strength, short-range transmissions.