Operational Description

Date: 2/13/2025
Revision: 3

Overview

This document provides an operational description for each radio type and supporting circuitry with specific focus regarding stabilizing frequency, limiting modulation and limiting power. The descriptions will match other documents supporting block diagrams and radio schematics within the system design.

WiFi / Bluetooth – Murata LBEE5HY1MW

This device has a built-in WLAN IEEE802.11 a/b/g/n/ac wireless and Bluetooth 5.0 Classic/BLE through a single ceramic PCBA mounted antenna. The ground is a central earth ground system connected to the mains supply. Under normal operating conditions (wall or pedestal mounted) the separation distance between radiator and body of user is 20 cm (7.87 inches).

The WiFi/BT radio is pre-approved under USA FCC ID: **VPYLBEE5HY1MW**, also approved under Evocharge Inc FCC ID: 2BEY0-HEVSE50.

The WLAN operates at both 5 GHz (OFDM technique) and 2.4 GHz (DSSS and OFDM technique) bands. Supports maximum data rates up to 433 Mbps.

5.0 VDC main power, 410 mA max current draw

RFID/NFC – NXP PN7150B0HN / C11006Y

The RFID module operates on the 13.56 MHz radio band, supporting, the transmitter of the EVSE is powered by a 3.3 Vdc rail driving 15 mA of current to the on-board copper trace antenna (built into the PCB). Maximum power applied to the antenna coil is 49.5 mW. Fixed power limit per resistor to antenna (not software variable).

Protocol for RFID is ISO/IEC 14443 data only.
ISO/IEC 14443-2: Radio frequency power and signal interface
ISO/IEC 14443-3: Initialization and anticollision
ISO/IEC 14443-4: Transmission protocol
Maximum Data Rate: 106 kbit/sec
Modulation Method: ASK – Amplitude Shift Key ; OOK- on-off keying

Maximum transmit time during any 100 ms period *- dependent on size of data being sent, typical tag transmit time is under 100ms – max is 90ms.*

Grounding, the RFID IC and by proxy the antenna loop are tied to earth ground from IC chip, through inter-board connectors to the lower base board which ties to earth ground via AC input ground connection. (see radio block diagram for board stackup configuration)

Cellular LTE – Quectel EM06A

The LTE solution within our EVC50 EVSE charger models utilizes a LTE-A (North America) Cat 6 module with a M.2 form factor. The EVSE design does not utilize voice or video nor support for geo location services. No changes to design from manufacturer to gain or power. 3.7 VDC main power, 680 mA max current draw.

The module IC is approved under FCC ID: **XMR201906EM06A**.

It supports the following frequency bands:

LTE – FDD	B2/ 4/ 5/ 7/ 12/ 13/ 25/ 26/ 29 ② / 30/ 66
LTE – TDD	B41
2CA	B2 + B2/ 5/ 12/ 13/ 29 ②; B4 + B4/ 5/ 12/ 13/ 29 ②; B5 + B5/ 7/ 25/ 30/ 66; B7 + B7/ 12/ 26; B12 + B12/ 25/ 30/ 66; B13 + B66; B25 + B25/ 26; B30 + B29 ②; B66 + B29 ②/ 66; B41 + B41
WCDMA	B2/ 4/ 5
GNSS	Not utilized in our design

Note: ②: LTE-FDD B29 and B32 support receiving only, and are only for secondary component carrier in 2CA.

With maximum data rates:

LTE-FDD (Mbps)	300 (DL) / 50 (UL)
LTE-TDD (Mbps)	226 (DL) / 28 (UL)
DC-HSPA+ (Mbps)	42 (DL) / 5.76 (UL)
WCDMA (Kbps)	384 (DL) / 384 (UL)

This is a pre-licensed and FCC approved parts with FCC ID: XMR201906EM06A.