The transmitter maximum conducted output power, with tune-up tolerance, at the antenna connector (set in the factory), is:

- Maximum conducted output: 7dBm ± 1.5dB

The receiver path uses a low-IF scheme to down convert the received signal for demodulation in the digital demodulator and bit synchronizer. The receiver path provides a high degree of linearity, an extended dynamic range, and high-order on-chip channel filtering to ensure reliable operation in the noisy 2.4GHz ISM band. The front-end topology with built-in out-of-band attenuation enables the CYW20704 to be used in most applications with minimal off-chip filtering.

2.2 NFC

The NFC contactless payment technology uses a ST25R3916B IC. This NFC Initiator/HF Reader IC uses 13.56MHz RF operation from a 27.12MHz crystal.
External to the IC are filtering and 50 Ohm matching components. This technology allows the use of contactless payments cards which are passive devices and operate on the same 13.56MHz RF using load modulation techniques for communication. A block diagram of the NFC circuitry is shown in Figure 2.2.

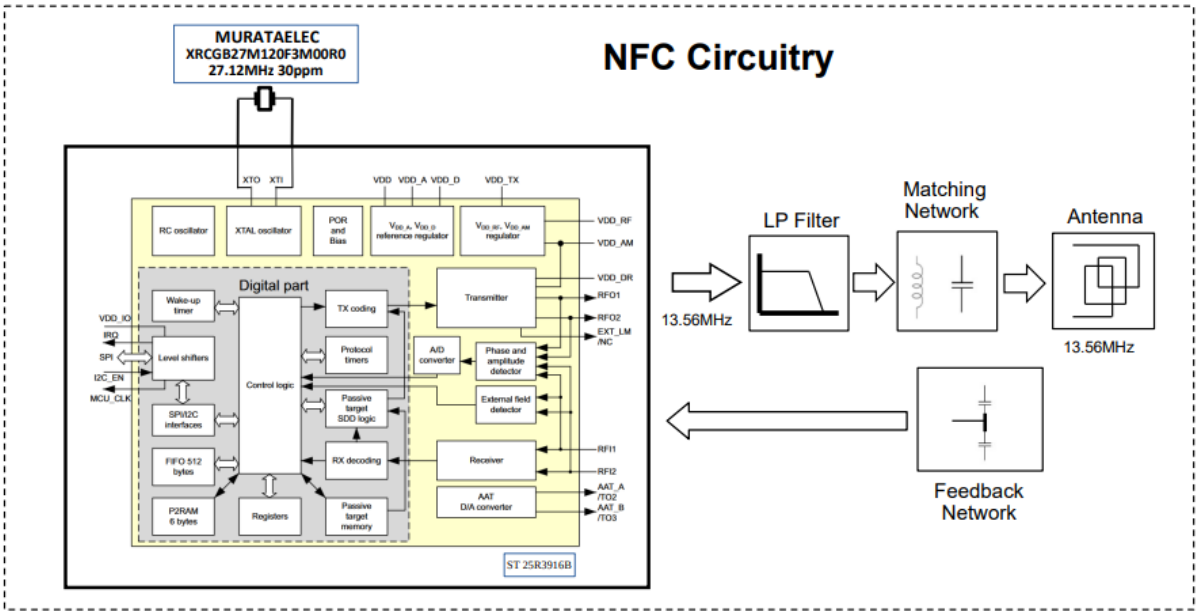

Figure 2.2 – Block diagram of the M010 NFC circuitry

The NFC antenna is looped around the top of the PCB making the highest near field in the middle of the M010 display. Figure 2.3 is a diagram of the loop antenna.

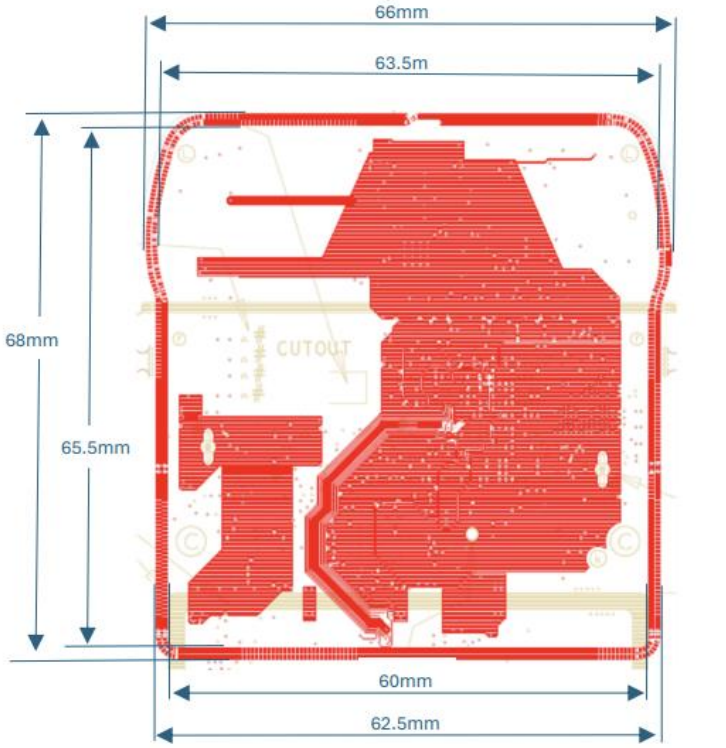

Figure 2.3 - NFC loop antenna

This antenna solution gives the strongest contactless operational field in the middle of the display.

The gain of the PCB NFC antenna is: 0dBi.

The ST 25R3916B IC just uses a single channel at 13.56MHz with deviations of ±7kHz. Using ASK (Amplitude Shift Keying), as the format for the NFC modulation, most of the RF energy is concentrated in the allowed 14kHz bandwidth, although the sidebands may extend out as far as ± 1.8MHz. The receiver detects transponder modulation superimposed on the 13.56MHz carrier signal. The receiver contains two receiving chains, one for AM and another for PM demodulation of data.

The NFC technology is design to generate an inductive near field over 4 to 5cm range. The RF power levels at 10m distance are very low.

The position of the NFC antenna within the payment terminal M010 is shown in Figure 2.4.

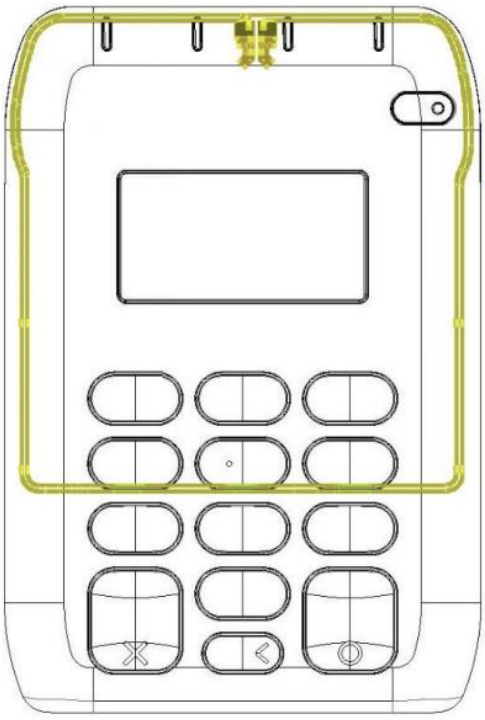

Figure 2.4 – NFC antenna position within the terminal M010

The measured radiated magnetic field is: 12.55dBµA/m at 10m (from NTC1911092EV00 ETSI 300 330 report).

The associated electric field E is: 64.08dBµV/m at 10m.

The Equivalent Isotropic Power can then be calculated using the formula:

$$EIRP = \frac{(E \times d)^2}{30}$$

where d is the distance in meters.

So the EIRP is: 8.52µW = -20.7dBm.