NFC Antenna Documentation

SAYME Dumpster Lock

Document Code:	Title:
SISA-250110-01	NFC Antenna Documentation SAYME Dumpster Lock

1. Introduction

1.1. Document

Table 1 - General information of document

Doc Name	NFC Antenna Documentation SAYME Dumpster Lock
Doc Code	SISA-250110-01
Client	SAYME (Internal)
Review	1
Doc Status	Completed
Last Updated	01/10/2025
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1.2. Review

Table 2 - Review of document

Edition	Date	Author	Changes description
1	01/10/2025	JCG	Document Creation

1.3. Documentary authorization

Table 3 - Documentary authorization document

Role	Name	Title	Signature	Date
Author	Juan Carlos Gonzalez	HW Engineer		01/13/2025
Author	Juan Manuel Fernandez	Solutions Director		01/14/2025

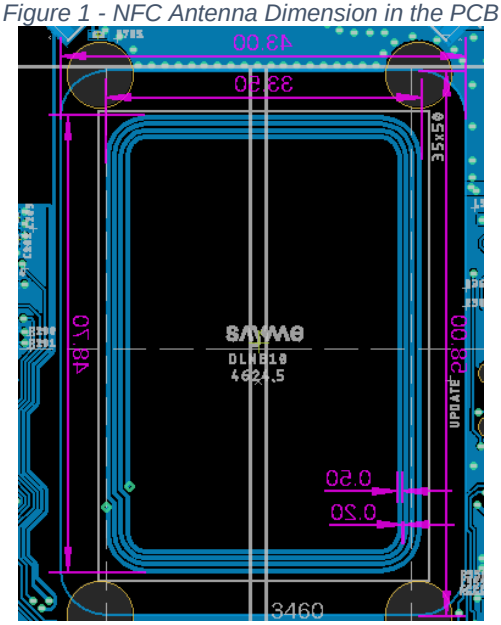
2. Introduction

This NFC antenna document has described the main features, its parameters and the necessary matching components. The type of antenna, its physical characteristics, dimensions and equivalent parameters are also indicated.

3. Dimension of Antenna

The external and copper dimensions of NFC antenna is 58 x 43 mm and 48,70 x 33,50 mm respectively, as shown in Figure 1.

Figure 1 - NFC Antenna Dimension in the PCB



The rest of the physical dimension parameters of this antenna are:

- Loops numbers are 4.
- Wide of the track is 0.5 mm.
- Separate between tracks is 0.2 mm.

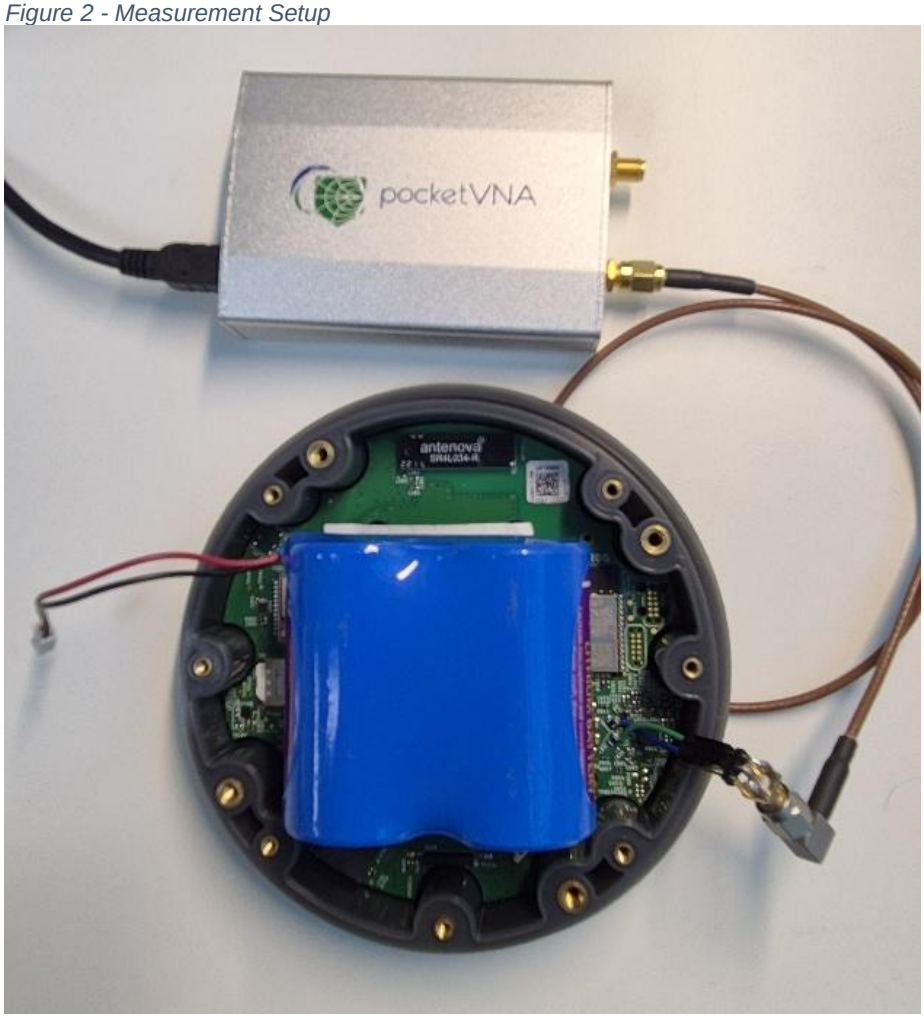
The Antenna is placed in the center of the PCB.

4. Measurement Setup of NFC antenna

The measurement setup to characterize the NFC antenna consists of pocketVNA version 2.0 as VNA equipment and its application Pockets VNA version 1.96. This instrument must be connected to the NFC antenna and its matching.

In the **¡Error! No se encuentra el origen de la referencia.** are shown the measurement s etup of the NFC antenna.

Figure 2 - Measurement Setup



This measurement setup allows us to obtain the resonance frequency of this antenna.

5. The measure of NFC antenna

In this section is shown the frequency response of the antenna measure is shown in the previous figures.

From Figure 3 to Figure 6 are shown the antenna loss value, and the following conclusions can be drawn:

- The resonance frequency is 13,64 MHz
- The gain in 13,56 MHz is -4,7 dBi as measured in the parameter S21
- Antenna coil inductance with matching is 18.35 uH

Figure 3 - Antenna Return Loss

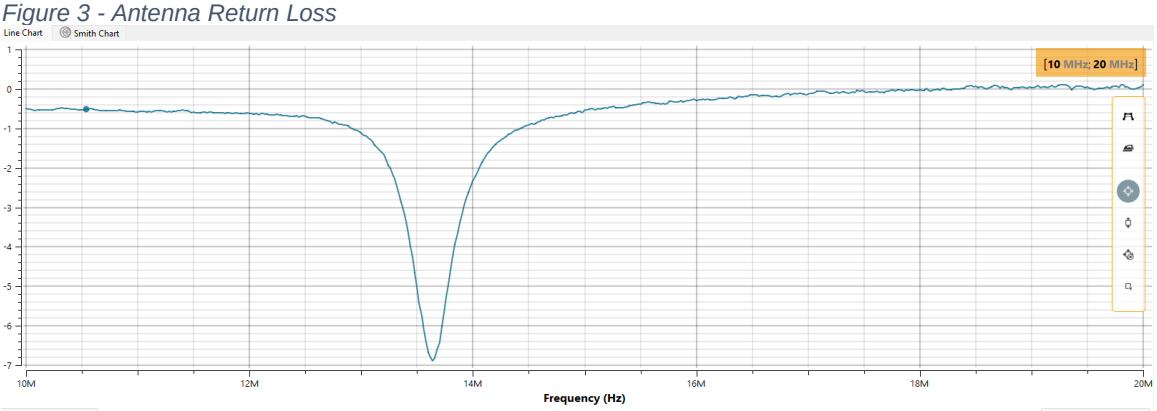


Figure 4 - Markers of Antena Return Loss

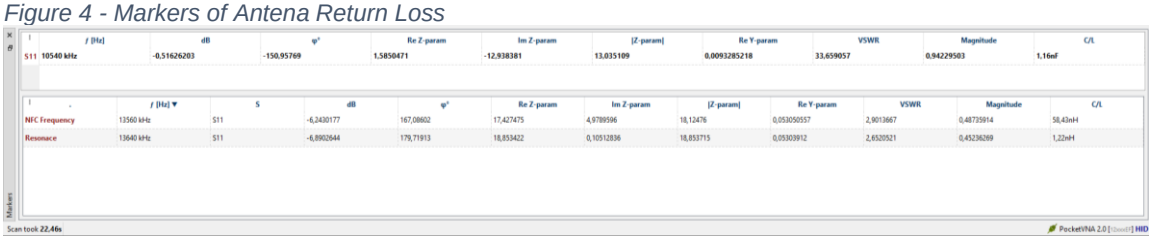


Figure 5 - Antenna Return Loss in smith chart

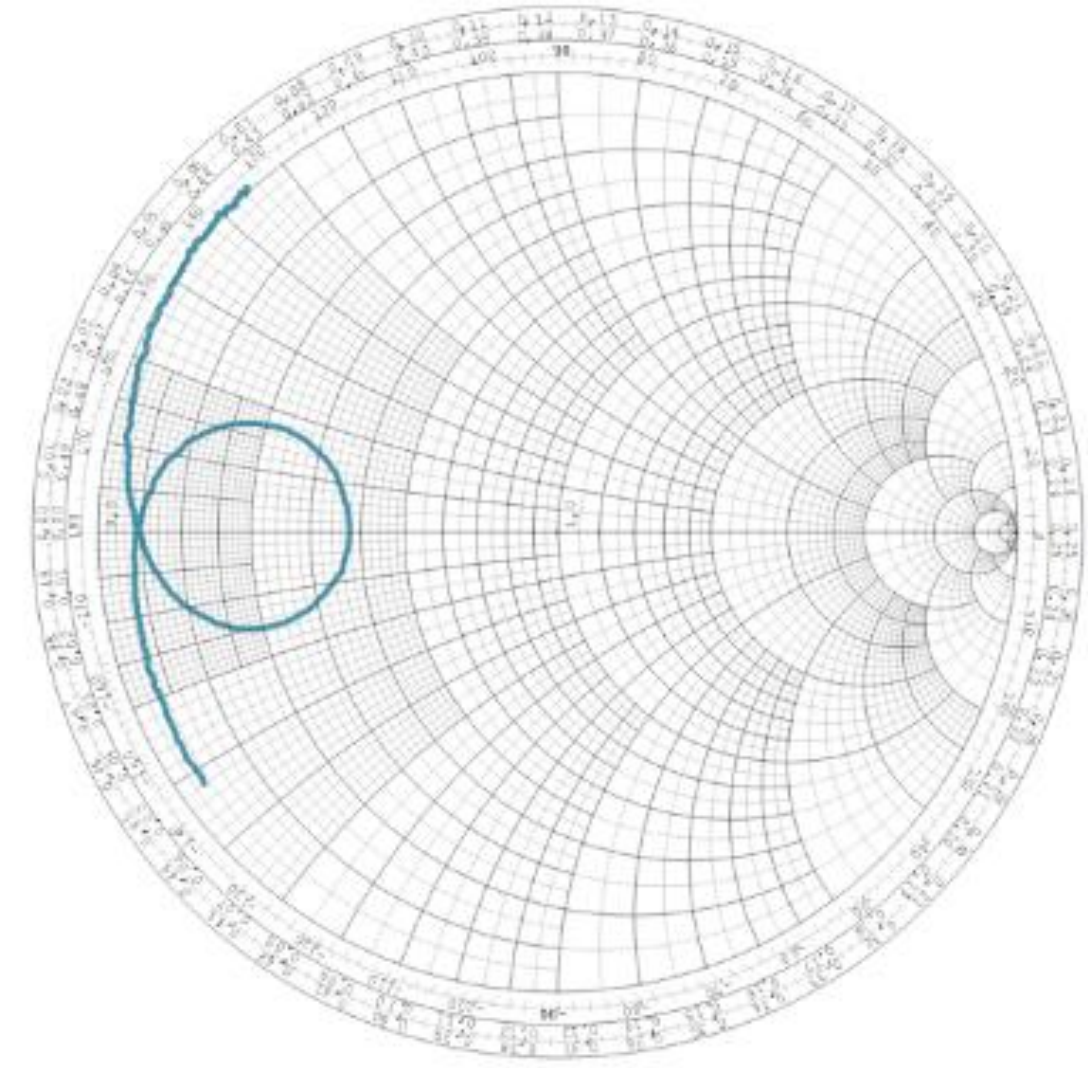
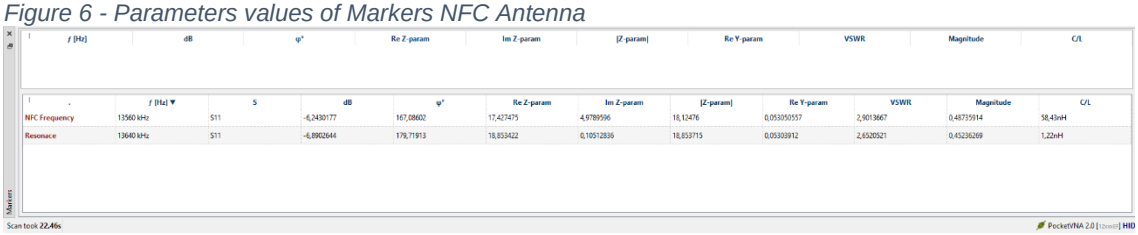


Figure 6 - Parameters values of Markers NFC Antenna



	f [Hz]	dB	φ°	Re Z-param	Im Z-param	|Z-param|	Re Y-param	VSWR	Magnitude	C/L
	f [Hz] ▼	S	dB	φ°	Re Z-param	Im Z-param	|Z-param|	Re Y-param	VSWR	Magnitude	C/L
NFC Frequency	13560 kHz	S11	-6,2430177	167,08602	17,427475	4,9789596	18,12476	0,053050557	2,9013667	0,48735914	58,43nH
Resonace	13640 kHz	S11	-6,8902644	179,71913	18,853422	0,10512836	18,853715	0,05303912	2,6520521	0,45236269	1,22nH

Markers

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PocketVNA 2.0 [close] HID

6. The Matching Components Value

The schematic structure of the matching antenna is shown in the Figure 5 and the Table 4 can be seen as the BoM this circuit's part.

Figure 7 -The antenna matching squematic

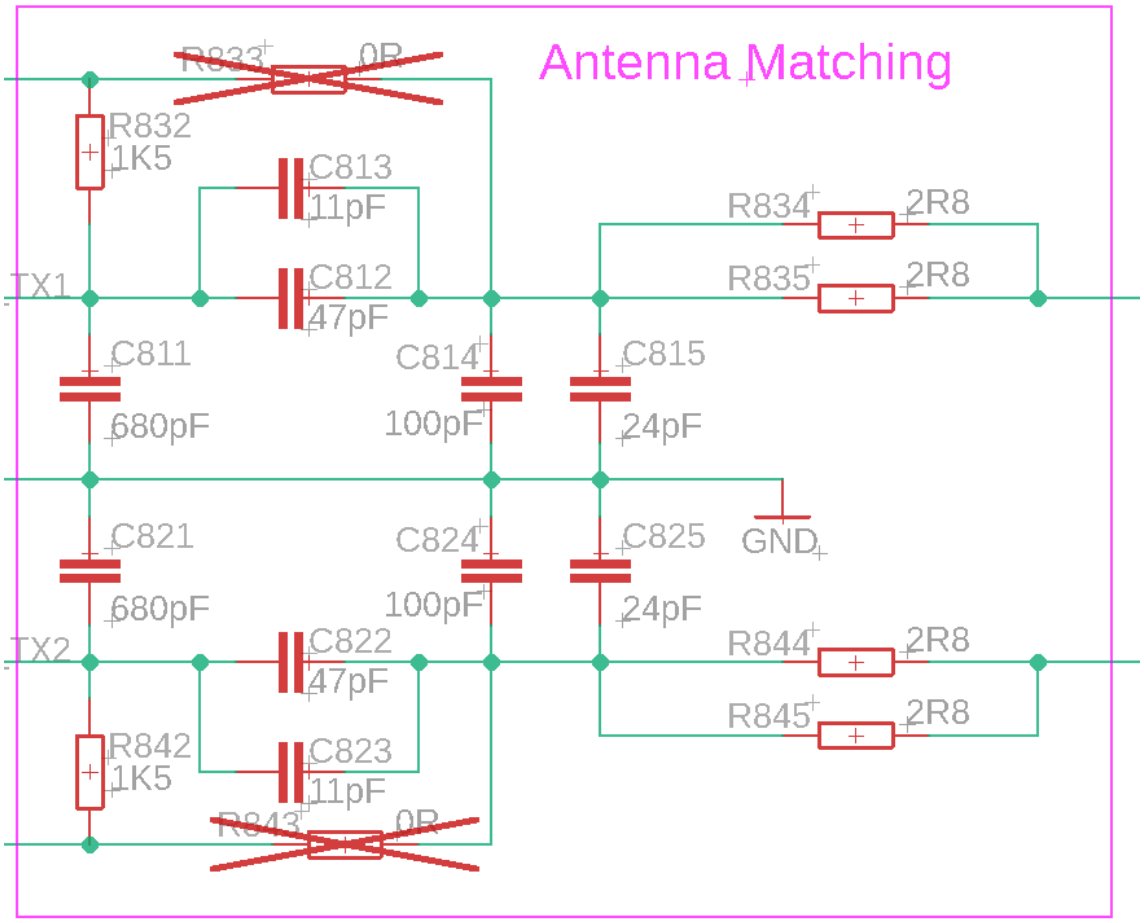

Table 4 - BoM Antenna Matching

Ref. Component	Part Number
R832, R842	RT0805FRE071K5L
C813, C823	600F110FT250XT
C812, C822	600F470FT250XT
C814, C824	600F101FT250XT
C815, C825	600F240FT250XT
R834, R835, R844, R845	RC0805FR-072R8L