

# **TEST REPORT**

**Report Number:** R15562135-E1

**Applicant :** Elkay MFG Co  
1333 Butterfield Rd, Suite 200  
Downers Grove, IL 60515, USA

**Model :** NFC4

**FCC ID :** 2AC8R-NFC4

**IC :** 12430A-NFC4

**EUT Description :** Module

**Test Standard(s) :** FCC 47 CFR PART 1 SUBPART I  
FCC 47 CFR PART 2 SUBPART J  
OET BULLETIN NO. 65  
IEEE C95.3 – 2021  
ISED RSS-102 Issue 6

**Date Of Issue:**

2025-07-14

**Prepared by:**

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2025-07-14	Initial Issue	Chandler Stanley

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Elkay MFG Co  
1333 Butterfield Rd, Suite 200  
Downers Grove, IL 60515, USA

**EUT DESCRIPTION:** Module

**MODEL:** NFC4

**SERIAL NUMBER:** NA

**SAMPLE RECEIPT DATE:** 2025-06-24

**DATE TESTED:** 2025-07-02

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
IEEE C95.3-2021	Complies
OET BULLETIN NO. 65	Complies
FCC 47 CFR PART 1 SUBPART I & PART 2 SUBPART J	Complies
ISED RSS-102 Issue 6	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For  
UL LLC By:



Sarah Kuhaneck  
Engineer Project Associate  
Consumer, Medical and IT Segment  
UL LLC

Prepared By:



Chandler Stanley  
Engineer  
Consumer, Medical and IT Segment  
UL LLC

## 2. TEST METHODOLOGY

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for correctly integrating customer-provided data with measurements performed by UL LLC.

All testing / calculations were made in accordance with.

- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 447498 D03 Supplement C Cross-Reference v01
- FCC Parts 1.1310, 2.1091, 2.1093, IEEE Std C95.1-2005, IEEE Std C95.3-2021
- RSS-102 Issue 6
- IC Safety Code 6

## 3. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building: 12 Laboratory Dr Durham, NC 27713, USA	US0067	2180C	825374
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY (RF EXPOSURE)

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	$U_{Lab}$
Magnetic Field Reading (A/m)	+/-0.3 dB
Electric Field Reading (V/m)	+/-0.3 dB

Uncertainty figures are valid to a confidence level of 95.45%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a module with NFC capabilities. This report covers RF exposure testing of the 13.56 MHz RFID radio.

### 5.2. SOFTWARE AND FIRMWARE

Firmware Version: 2.11  
Hardware Version: NFC4

### 5.3. WORST-CASE CONFIGURATION AND MODE

The following configurations were tested as worst-case position:

Config	Descriptions	Frequency
1	Tag Off	13.56 MHz
2	Tag On (Centered)	
3	(Offset to WC Positioning)	

Additionally, testing in five orientations at each of the three configurations were performed. These include edge top, edge right, edge left, edge bottom and front. Only the worst-case data per configuration is included in the report.

### 5.4. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Badge 13.56MHz		NXP Semiconductors	NA	NA		NA
I/O CABLES (RADIATED EMISSIONS)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Power	1	Banana	Unshielded	<3m	Powers EUT

### 5.5. MEASUREMENT SETUP

The measurements were taken using a probe placed 20 cm surrounding the device for all configurations.

20cm distance E-field and H-field are evaluated from the center of the Narda probe.

For measurement setup and all testing photos, refer to external photos exhibit R15562135-EP1

## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was used for the tests documented in this report:

Test Equipment Used (Morrisville – Small Conference Room)

Test Equipment List					
Description	Manufacturer	Model	Label ID	Cal Due	Cal Date
Electric and Magnetic Field Probe	Narda	EHP-200AC	FA0001	2025-08-19	2024-08-19
DC Power Supply	Elektro-Automatik GmbH & Co	EA-PSI 9040-60 T	NA	NA	NA



## 7. MAXIMUM PERMISSIBLE RF EXPOSURE

### 7.1. FCC LIMITS AND SUMMARY

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Table 1 to § 1.1310(e)(1) - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(i) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
<b>(ii) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. \* = Plane-wave equivalent power density.

Using the table above, the limits for uncontrolled exposure to 13.56 MHz RFID radio is 60.77 V/m and 0.16 A/m.

### **RESULT:**

Test Engineer:	105193/84740	Test Date:	2025-07-02
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## 7.2. IC LIMITS

Radio Standards Specification 102, Issue 6 Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands), sets out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radio communication apparatus designed to be used within the vicinity of the human body

The electric and magnetic field strength reference levels, power density reference levels, and associated reference period for devices employed by the general public (uncontrolled environment) and controlled-use devices (controlled environment) are specified in table 7 and table 8. Note that the power density limits specified in these tables apply to whole body exposure conditions.

Table 7: RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field ( $V_{RMS}/m$ )	Magnetic field ( $A_{RMS}/m$ )	Power density ( $W/m^2$ )	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000 / f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000 / f^{1.2}$

**Note:**  $f$  is frequency in MHz.

## 7.2.1. MAXIMUM RESULT SUMMARY RF EXPOSURE (FCC)

### CONFIGURATION 1: TAG OFF

Electric Field			Magnetic Field		
FCC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
60.77	1.0298	16.81	0.16	0.0231	10.94

### CONFIGURATION 2: TAG ON (CENTERED)

Electric Field			Magnetic Field		
FCC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
60.77	0.9685	7.00	0.16	0.0221	16.88

### CONFIGURATION 3: TAG ON (OFFSET)

Electric Field			Magnetic Field		
FCC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
60.77	1.0766	7.49	0.16	0.0221	17.88

## 7.2.2. MAXIMUM RESULT SUMMARY RF EXPOSURE (RSS 102)

### CONFIGURATION 1: TAG OFF

Electric Field			Magnetic Field		
IC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	IC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
27.46	1.0298	37.20	0.0728	0.0231	24.04

### CONFIGURATION 2: TAG ON (CENTERED)

Electric Field			Magnetic Field		
IC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	IC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
27.46	0.9685	15.49	0.0728	0.0221	37.09

### CONFIGURATION 3: TAG ON (OFFSET)

Electric Field			Magnetic Field		
IC RF Exposure Limit (V/m)	Maximum Average (V/m)	Percentage (%)	IC RF Exposure Limit (A/m)	Maximum Average (A/m)	Percentage (%)
27.46	1.0766	16.58	0.0728	0.0221	39.29

### 7.2.3. E- FIELD AND H- FIELD MEASUREMENTS (FCC)

Note: Peak measurements were performed. RMS values were calculated from the peak measurement. Please refer to the formula for calculating the RMS values: [Field Strength x  $\sqrt{\text{Duty Cycle}}$ ].

#### CONFIGURATION 1: TAG OFF

Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			FCC	Location	Peak	Duty Cycle %	FCC Average	FCC	Location	Peak	Duty Cycle %	FCC Average
1	NA	20	60.77	Top	1.0298	100	1.0298	0.16	Top	0.0190	100	0.0190
				Right	0.9726		0.9726		Right	0.0179		0.0179
				Bottom	0.6281		0.6281		Bottom	0.0186		0.0186
				Left	0.6970		0.6970		Left	0.0193		0.0193
				Front	0.6707		0.6707		Front	0.0231		0.0231
				Max	1.0298		1.0298		Max	0.0231		0.0231

#### CONFIGURATION 2: TAG ON (CENTERED)

Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			FCC	Location	Peak	Duty Cycle %	FCC Average	FCC	Location	Peak	Duty Cycle %	FCC Average
2	NA	20	60.77	Top	0.9685	100	0.9685	0.16	Top	0.0196	100	0.0196
				Right	0.8647		0.8647		Right	0.0183		0.0183
				Bottom	0.6106		0.6106		Bottom	0.0182		0.0182
				Left	0.6787		0.6787		Left	0.0184		0.0184
				Front	0.6639		0.6639		Front	0.0221		0.0221
				Max	0.9685		0.9685		Max	0.0221		0.0221

#### CONFIGURATION 3: TAG ON (OFFSET)

Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			FCC	Location	Peak	Duty Cycle %	FCC Average	FCC	Location	Peak	Duty Cycle %	FCC Average
3	NA	20	60.77	Top	1.0766	100	1.0766	0.16	Top	0.0190	100	0.0190
				Right	0.9261		0.9261		Right	0.0186		0.0186
				Bottom	0.6292		0.6292		Bottom	0.0185		0.0185
				Left	0.6762		0.6762		Left	0.0201		0.0201
				Front	0.6405		0.6405		Front	0.0221		0.0221
				Max	1.0766		1.0766		Max	0.0221		0.0221

## 7.2.4. E- FIELD AND H- FIELD MEASUREMENTS (IC)

Note: Peak measurements were performed. RMS values were calculated from the peak measurement. Please refer to the formula for calculating the RMS values: [Field Strength x  $\sqrt{\text{Duty Cycle}}$ ]. 100% duty cycle was used to represent the absolute worst-case.

### CONFIGURATION 1: TAG OFF

Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			IC	Location	Peak	Duty Cycle %	IC Average	IC	Location	Peak	Duty Cycle %	IC Average
1	NA	20	27.46	Top	1.0298	100	1.0298	0.0728	Top	0.0190	100	0.0190
				Right	0.9726		0.9726		Right	0.0179		0.0179
				Bottom	0.6281		0.6281		Bottom	0.0186		0.0186
				Left	0.6970		0.6970		Left	0.0193		0.0193
				Front	0.6707		0.6707		Front	0.0231		0.0231
				Max	1.0298		1.0298		Max	0.0231		0.0231

### CONFIGURATION 2: TAG ON (CENTERED)

Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			IC	Location	Peak	Duty Cycle %	IC Average	IC	Location	Peak	Duty Cycle %	IC Average
2	NA	20	27.46	Top	0.9685	100	0.9685	0.0728	Top	0.0196	100	0.0196
				Right	0.8647		0.8647		Right	0.0183		0.0183
				Bottom	0.6106		0.6106		Bottom	0.0182		0.0182
				Left	0.6787		0.6787		Left	0.0184		0.0184
				Front	0.6639		0.6639		Front	0.0221		0.0221
				Max	0.9685		0.9685		Max	0.0221		0.0221

### CONFIGURATION 3: TAG ON (OFFSET)

Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)			
			IC	Location	Peak	Duty Cycle %	IC Average	IC	Location	Peak	Duty Cycle %	IC Average
3	NA	20	27.46	Top	1.0766	100	1.0766	0.0728	Top	0.0190	100	0.0190
				Right	0.9261		0.9261		Right	0.0186		0.0186
				Bottom	0.6292		0.6292		Bottom	0.0185		0.0185
				Left	0.6762		0.6762		Left	0.0201		0.0201
				Front	0.6405		0.6405		Front	0.0221		0.0221
				Max	1.0766		1.0766		Max	0.0221		0.0221

## **8. RF EXPOSURE TEST SETUP AND SETUP PHOTO**

For measurement setup and all testing photos, refer to external photos exhibit R15562135-EP1

# **END OF REPORT**