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TEST REPORT
47 CFR § 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

Applicant:	A.R. Hungary, Inc. Alkotas utca 41. Budapest 1123, HUNGARY
Test item:	Passport Reader and ID scanner
Identification / Type No.:	Osmond N
IC:	XCW-OSMOND-R
Order content:	Radiofrequency radiation exposure evaluation according to the following standard(s):
Test specification:	**47 CFR § 2.1091**
Date of receipt:	05/05/2022
Internal storage No.:	A003255761-008
Testing period:	27/02/2023
Place of testing:	TÜV Rheinland Italia S.r.l. Via E. Mattei, 3 20005 Pogliano Milanese (MI) - IT
Testing laboratory:	TÜV Rheinland Italia S.r.l. Via E. Mattei,3 20005 Pogliano Milanese (MI) - IT
Test result:	*Pass*

Photos were removed for confidentiality as demanded by the customer

Tested by:	Roberto Radice	**Authorized by:**	Andrea Bortolotti
Date: 19/01/2024	(Laboratory technician)	**Date:** 19/01/2024	(Reviewer)
Position	Sachverständige(r)/Expert	**Position**	Sachverständige(r)/Expert

Other:	---
Condition of the test item at delivery:	*Test item complete and undamaged*

The test results reported in this test report shall refer only to the samples tested as received.
TÜV Rheinland Italia is not responsible for the sampling phase.
This report may not be partially reproduced, except with the prior written permission of the issuing Laboratory
TÜV Rheinland refuses any responsibility about information supplied by the customer contained in this test report
(#) Test sample(s), as well sample information, description, product details and intended usage was provided by customer.

1	*The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.* *Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
2	*As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.*
3	*Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	*Unless otherwise agreed with the customer, a conformity assessment is always carried out based on the applied standards.* *At the customer's request, the statement on the conformity of the product tested in this test report is carried out according to the criteria/requirements of the applied standards.* *Evaluation conditions deviating from these are documented separately in the respective chapters.*

0. Table of Contents

1. General description of test item(s)	
Identification / Type No.:	Passport Reader and ID scanner Osmond N
Serial number	1215319
Manufacturer	A.R. Hungary, Inc. Alkotas utca 41. Budapest 1123, HUNGARY
Trade Mark	ADAPTIVE RECOGNITION
Rated voltage / frequency	100-240 V AC, 50/60 Hz via universal external power supply
Rated current / power	Input Max 1.5 A
Equipment type	Mobile equipment
Number of phases	1ph.
Hardware version (#)	ASM-1054.19
Software version (#)	PR 2.1.10.3
Dimensions	178 × 203 × 157 mm
Weight	2.25 kg
Temperature Range	5 °C to 40 °C
Test sample obtaining:	☒ Sampling by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

2. Reference documents	
47 CFR § 1.1310	Radiofrequency radiation exposure limits
47 CFR § 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
447498 D01 General RF Exposure Guidance v06	RF exposure procedures and equipment authorization policies for mobile and portable devices

3. Equipment used during test

Equipment under test

No.	Product type	Manufacturer	Model	Comments
1	Passport Reader and ID scanner	A.R. Hungary, Inc.	Osmond N	—
2	—	—	—	—

Auxiliary Equipment / Peripherals

No.	Product type	Manufacturer	Model	Comments
1	—	—	—	—
2	—	—	—	—
3	—	—	—	—

4. Radio type identification	
Brand name and model of radio module	highly integrated NFC Initiator / HF Reader IC, AMS mod. AS3911-BQFT
Antenna model and Gain	LC antenna
Antenna type	☐ External antenna ☐ Dedicated antenna ☒ Integral antenna
Type of equipment	☐ stand-alone equipment ☒ combined equipment ☐ multi-radio equipment
Type of modulation	OOK
Nominal voltage of stand-alone or combined equipment	voltage range from 2.4 V to 5.5 V
Operatig frequency	13.56MHz
Number of channels	1
Transmit operating mode	☒ single antenna ☐ multiple antennas
Temperature range	-40°C to 125°C

5. Operating modes

No.	Description
1	Continuous modulated transmission at 13.56MHz.

6. EUT configuration

	The test setup was made in accordance with mentioned FF standards. Measurements and tests were executed under ”worst case” conditions. Typical EUT arrangements or operating modes were chosen or assumed which let suspect maximum emission or susceptibility (a so called ”unfavourable configuration”). Details of test setup or adjustments are (particularly) shown inside the photo documentation. As far as not mentioned otherwise these statements are valid for all following tests.

REVISION HISTORY

7. Change history

Test report number	List of revisions	Date
IT23SWZZ 001 Annex 4	First edition	19/01/2024

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8. Limits for Maximum Permissible Exposure (MPE)

(e) Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

TABLE 1 - LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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FCC SAR limits

Region	Occupational SAR values (W/Kg)	General public SAR values (W/Kg)
Whole body SAR averaging mass = entire body	0,4	0,08
Partial body SAR averaging mass = 1g	8,0	1,6
Hands, wrists, feet and akles SAR averaging mass = 10g	20	4

FCC SAR test exclusion

General SAR test exclusion guidance according to KDB 447498 (Par. 4.3)

Standalone SAR test exclusion considerations:

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.The minimum test separation distance defined in 4.1 f) is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander. To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified, typically in the SAR measurement or SAR analysis report, by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting are required, a statement of justification and compliance

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must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops and tablets, etc.

a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):32

1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by [1 + log(100/f(MHz))]

2) For test separation distances ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by ½

3) SAR measurement procedures are not established below 100 MHz.

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.

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***SAR Test Exclusion Thresholds* for 100 MHz – 6 GHz and ≤ 50 mm**

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	*SAR Test Exclusion Threshold* (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

MHz	30	35	40	45	50	mm
150	232	271	310	349	387	*SAR Test Exclusion Threshold* (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Note: 10-g Extremity SAR Test Exclusion Power Thresholds are 2.5 times higher than the 1-g *SAR Test Exclusion Thresholds* indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.

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SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and > 50 mm

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	mW
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

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SAR Test Exclusion Thresholds for < 100 MHz and < 200 mm

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	< 50	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	237	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	
50	308	617	625	634	643	651	660	669	677	686	695	703	712	721	729	738	
10	474	948	961	975	988	1001	1015	1028	1041	1055	1068	1081	1095	1108	1121	1135	
1	711	1422	1442	1462	1482	1502	1522	1542	1562	1582	1602	1622	1642	1662	1682	1702	mW
0.1	948	1896	1923	1949	1976	2003	2029	2056	2083	2109	2136	2163	2189	2216	2243	2269	
0.05	1019	2039	2067	2096	2125	2153	2182	2211	2239	2268	2297	2325	2354	2383	2411	2440	
0.01	1185	2370	2403	2437	2470	2503	2537	2570	2603	2637	2670	2703	2737	2770	2803	2837	

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9. SAR Exclusion

Evaluation date	27/02/2023
Applied Standard	47 CFR § 2.1091
EUT classification	☒ Mobile: transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons (47 cfr 2.1091)
Temperature	21.5° C
Humidity	46%
Evaluated by	Roberto Radice
Model	Osmond N
Internal Storage No.	A003255761-008
Remarks	None

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SAR TEST EXCLUSION					
Frequency (MHz)	Measured field strenght at 3 meter distance	Calculated Electric Field (E)*	ERP**	Sar test Exclusion Threshold at <50mm distance***	PASS/FAIL
	(dBuV/m)	(V/m)	(mW)	(mW)	/
13.56	74.77	0.0054	0.0090	442.65	P
VERDICT					

*E(V/m)= $10^{\left(\frac{dB\mu V/m-120}{20}\right)}$

**ERP (W) = (E x d)² / 30

where
ERP = equivalent radiated power in Watts
E = electrical field strength in V/m
d = measured distance in metres

The SAR exclusion threshold for <50mm at 10MHz is 474mW.
For separation distances between 50mm and 200mm, the power threshold is multiplied by a factor of: (1+log100/f(MHz))
Using 13.56MHz as the transmit frequency, the factor is 1.86

For test separation distance below 50mm, the power threshold determined with the previous formula, is multiplied by 0.5

***= [474 x (1+log100/f(MHz))] /2

The maximum output power, 0.0090 mW is much lower than the limit of 442.65 mW, thus SAR measurement is NOT necessary.

---END OF TEST REPORT---