

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Design Pool Limited
FCC ID:	X3QSN2IN101

1.2 EUT INFORMATION

Product Name:	
Model No.:	SN2IN101
Brand Name:	Native Union
DUT Stage:	<i>Production Unit</i>
Operating Frequency Range:	112-205kHz
Antenna Type:	Coil Antenna
Power Supply	USB-C Port of AC/DC Adaptor (Input: 110-240VAC 50/60Hz 0.5A; Output: 9.0VDC 2.22A).
Sample Received Date:	June 22, 2021
Sample Tested Date:	June 22, 2021 to September 27, 2021

1.3 OTHER INFORMATION

Support Equipment

- 1) iPhone 12 (Provided by Intertek)
- 2) 5W Loading (Provided by Applicant)
- 3) 1 x USB cable with length of 1.09m (Provided by Intertek)
- 4) AC/DC Adaptor with Type-C port (Provided by Applicant)
Input: 100-240VAC 0.5A 50-60Hz
Output: 9.0VDC 2.22A

1.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

According to KDB680106 D01 RF Exposure Wireless Charging Apps v03r1 (January 27, 2021), the requirement of RF exposure for the Wireless Charging device shall be met.

2. EQUIPMENT LIST

Test Equipment List						
Equipment No.	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
EW-3412	Electric and Magnetic Field Probe - Analyzer	NARDASAFETY	EHP-200A	170WX91004	Jan 23, 2021	Jan 23, 2022

3. MPE EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

According to KDB680106 D01 RF Exposure Wireless Charging Apps v03r1 (January 27, 2021), the requirement of RF exposure for the Wireless Charging device shall be met.

3.2 MPE COMPLIANCE REQUIREMENT

3.2.1 Limits

3.2.1.1

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

Limits for General Population/Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
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

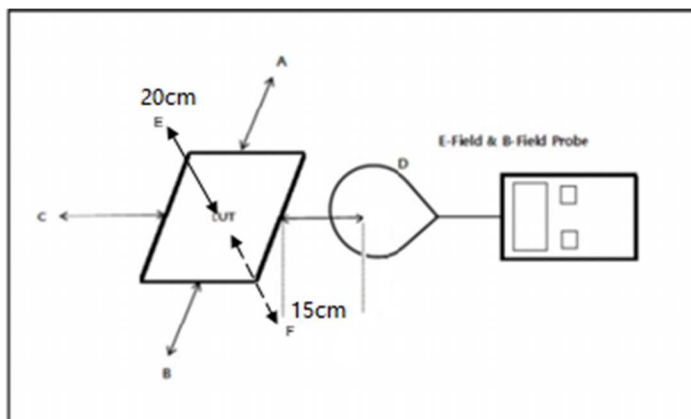
Note: f = frequency in MHz: * = Plane-wave equivalents power density.

3.2.2 Test Procedure

Enabled the EUT to transmit and receive data continue

- The field strength of both E-field and H-field was measured at 15 cm surrounding the device and 20 cm above the top surface using the equipment list above for determining compliance with the MPE requirements of FCC Part 1.1310.
- The RF power density was measured with the battery at 3 different charge conditions: battery at less than 1 % , battery at 50% charger, battery at 99% charger.
- Maximum E-field and H-field measurements were made 15cm from each side of the EUT. Along the side of the EUT and still 15cm away from the edge of the EUT, the field probes were positioned at the location where there is maximum field strength. The maximum E-field and H-field is reported below.
- This device uses a wireless charging circuit for power transfer operating at the frequency of 128 kHz. Thus, the 300 kHz limits were used: E-field Limit = 614 (V/m); H-field limit = 1.63 (A/m).

3.2.3 Test setup



Since this application applied short-term confidentiality, thus the outlook photos of the Coil Plates are saved with filename: test setup photo

Note

- The RF exposure test is performed in the shield room
- The test distance is between the edge of the charger and the geometric center of probe
- The aggregate at 15 cm surrounding the device and 20 cm above the top surface from transmitting coil is demonstrated.
- Test Position: Rear, Right, Front, Left, Top, Bottom

3.3 TEST DATA

Charging with specific receiver loading (iPhone 12) – Max. output power

E-Field Strength

Test Mode	Battery Status	Probe Position (V/m) C-Rear	Probe Position (V/m) B-Right	Probe Position (V/m) D-Front	Probe Position (V/m) A-Left	Probe Position (V/m) E-Top	Probe Position (V/m) F-Bottom	Limits (V/m)
Mode 1	<1 % Battery	4.7288	4.0326	4.4280	3.9761	3.0331	2.4022	614/2 = 307
Mode 2	50% Battery	1.4059	1.3247	1.3655	1.0280	1.7326	1.5870	614/2 = 307
Mode 3	99% Battery	1.3097	1.1650	1.1842	1.2557	1.5505	1.3776	614/2 = 307

H-Field Strength

Test Mode	Battery Status	Probe Position (A/m) C-Rear	Probe Position (A/m) B-Right	Probe Position (A/m) D-Front	Probe Position (A/m) A-Left	Probe Position (A/m) E-Top	Probe Position (A/m) F-Bottom	Limits (A/m)
Mode 1	<1% Battery	0.0620	0.0655	0.0617	0.0629	0.0538	0.0570	1.63
Mode 2	50% Battery	0.0513	0.0429	0.0435	0.0426	0.0677	0.0602	1.63
Mode 3	99% Battery	0.0480	0.0492	0.0517	0.0549	0.0599	0.0551	1.63

Charging with specific receiver loading (5W) – Max. output power

E-Field Strength

Test Mode	Battery Status	Probe Position (V/m) C-Rear	Probe Position (V/m) B-Right	Probe Position (V/m) D-Front	Probe Position (V/m) A-Left	Probe Position (V/m) E-Top	Probe Position (V/m) F-Bottom	Limits (V/m)
Max 5W Power	<1% Battery	1.2281	1.1046	1.2220	0.7420	0.4567	0.4292	$614/2 = 307$

H-Field Strength

Test Mode	Battery Status	Probe Position (A/m) C-Rear	Probe Position (A/m) B-Right	Probe Position (A/m) D-Front	Probe Position (A/m) A-Left	Probe Position (A/m) E-Top	Probe Position (A/m) F-Bottom	Limits (A/m)
Max 5W Power	<1% Battery	0.0492	0.0520	0.0890	0.0920	0.1032	0.0547	1.63

Charging with specific receiver loading (iPhone 12 & 5W Loading) – Max. output power

E-Field Strength

Test Mode	Probe Position (V/m) C-Rear	Probe Position (V/m) B-Right	Probe Position (V/m) D-Front	Probe Position (V/m) A-Left	Probe Position (V/m) E-Top	Probe Position (V/m) F-Bottom	Limits (V/m)
Max 5W Power	4.1120	3.9438	3.6127	4.4367	4.5793	1.0792	$614/2 = 307$

H-Field Strength

Test Mode	Probe Position (A/m) C-Rear	Probe Position (A/m) B-Right	Probe Position (A/m) D-Front	Probe Position (A/m) A-Left	Probe Position (A/m) E-Top	Probe Position (A/m) F-Bottom	Limits (A/m)
Max 5W Power	0.0695	0.0713	0.3801	0.0798	0.0898	0.1147	1.63

Charging with specific receiver loading (Standby) – Max. output power

E-Field Strength

Test Mode	Probe Position (V/m) C-Rear	Probe Position (V/m) B-Right	Probe Position (V/m) D-Front	Probe Position (V/m) A-Left	Probe Position (V/m) E-Top	Probe Position (V/m) F-Bottom	Limits (V/m)
Standby	0.2566	0.3840	0.3534	0.3808	0.3637	0.4093	$614/2 = 307$

H-Field Strength

Test Mode	Probe Position (A/m) C-Rear	Probe Position (A/m) B-Right	Probe Position (A/m) D-Front	Probe Position (A/m) A-Left	Probe Position (A/m) E-Top	Probe Position (A/m) F-Bottom	Limits (A/m)
Standby	0.0617	0.0920	0.0843	0.0544	0.0938	0.1727	1.63

Remark:

The device meets the KDB680106 D01 RF Exposure Wireless Charging Apps v03r1 (January 27, 2021), the requirement of RF exposure for the Wireless Charging device.

Transmitting coil is demonstrated to be less than 50% of the MPE limit.

Test Setup Photo:

Since this application applied short-term confidentiality, thus the setup photo of RF exposure test are saved with filename: test setup photo.pdf