RF EXPOSURE REPORT

FCC

APPLICANT
Nike, Inc.

MODEL NAME
WC-04

FCC ID
QYU-WC04

REPORT NUMBER
HA220214-GGC-002-R02

TEST REPORT

Date of Issue
June 30, 2022

Test Site
Hyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Nike, Inc.
Applicant Address	One Bowerman Drive Beaverton, OR 97005, USA
FCC ID	QYU-WC04
Model Name	WC-04
DUT Type	Wireless Charger
FCC Classification	Part15 Low Power Transmitter Below 1705 kHz (DCD)
FCC Rule Part(s)	Part 1 (§1.1310 / §1.1307)
Test Procedure	KDB 680106 D01 v03r01

The measurements shown in this report was made in accordance with the procedures indicated, and the emission from this equipment were found to be within the limits applicable.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By	**Reviewed By**
Yongsoo Park	Sunwoo Kim
Test Engineer	Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA220214-GGC-002-R02	June 30, 2022	Initial Issue

Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA TEL: +1-510-933-8848 FAX: +1-510-933-8849

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Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA TEL: +1-510-933-8848 FAX: +1-510-933-8849

1. DUT DESCRIPTION

Model	WC-04
EUT Type	Wireless Charger
Power Supply	5 V d.c.
Travel Adapter Information	Model : ASUC88a-P20W12 Manufacturer : SHENZHENAQUILSTAR TECHNOLOGY CO., LTD. Input : 100-240 V~, 50/60 Hz, 0.7 A Output : 5 V d.c. 3.0 A or 9 V d.c., 2.22 A
RF Specification	Wireless Power Transfer
Frequency Range	131 kHz
Max. Transmit Power	13.4 dBuV/m @300 m
Number of Channels	1 each left and right
Antenna Specification	Loop antenna
Operating Environment	Indoor
Operating Temperature	0 °C ~ 45 °C

2. INTRODUCTION

2.1 KDB 680106 D01 v03r01 SECTION 5.b) EQUIPMENT APPROVAL CONSIDERATIONS

Requirement	Result + Remark
(1) Power transfer frequency is less than 1 MHz.	Operation frequency is 131 kHz
(2) Output power from each primary coil is less than or equal to 15 watts.	The output power of each left and right is 10W each.
(3) The system may consist of more than one source primary coils, charging one or more clients. If more than one primary coil is present, the coil pairs may be powered on at the same time.	The test was conducted under the condition that the left and right client devices were charged at the same time.
(4) Client device is placed directly in contact with the transmitter.	Yes
(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion)	Yes
(6) The aggregate H-field strengths anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the surface from all coils that by design can simultaneously transmit, and while those coils are simultaneously energized, are demonstrated to be less than 50% of the applicable MPE limit.	The aggregate H-field strengths were demonstrated to be less than 50 % of MPE limit (See test results)

2.2. LIMIT

The limit for Maximum Permissible Exposure (MPE), specified in FCC Rule Part §1.1310 listed in the table below, shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation specified in §1.1310 (b)

Frequency Range (MHz)	E- Field Strength (V/m)	H- 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

Note :
According to the KDB 680106 D01 v03r01, Emission between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz.

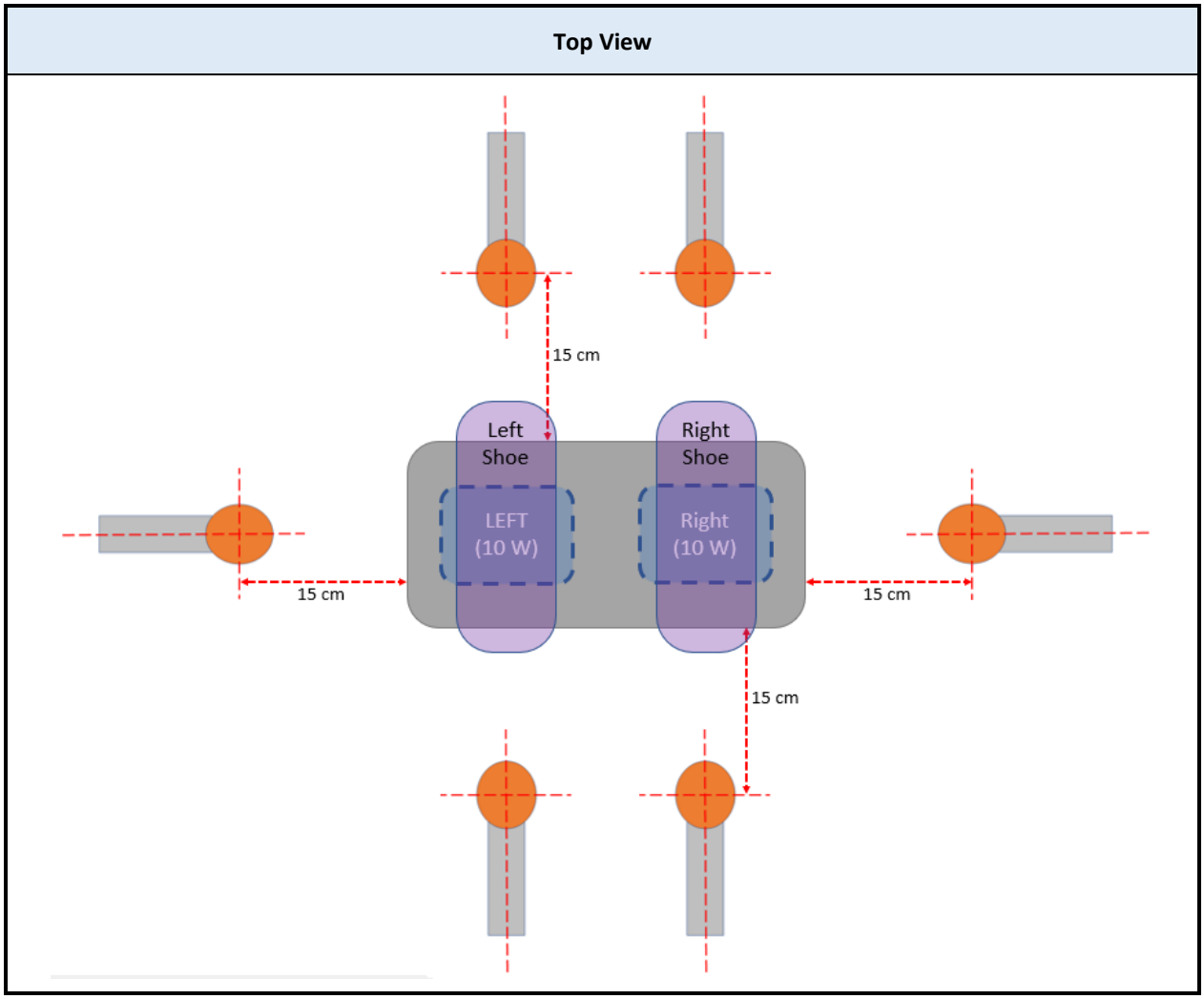
3. TEST SETUP

The measurement is taken using a probe place 15 cm surrounding the device and 20 cm above the top surface of the EUT. Measurements are taken the top and all sides of the EUT per KDB 680106 D01 v03r01 and RF Exposure Procedures.

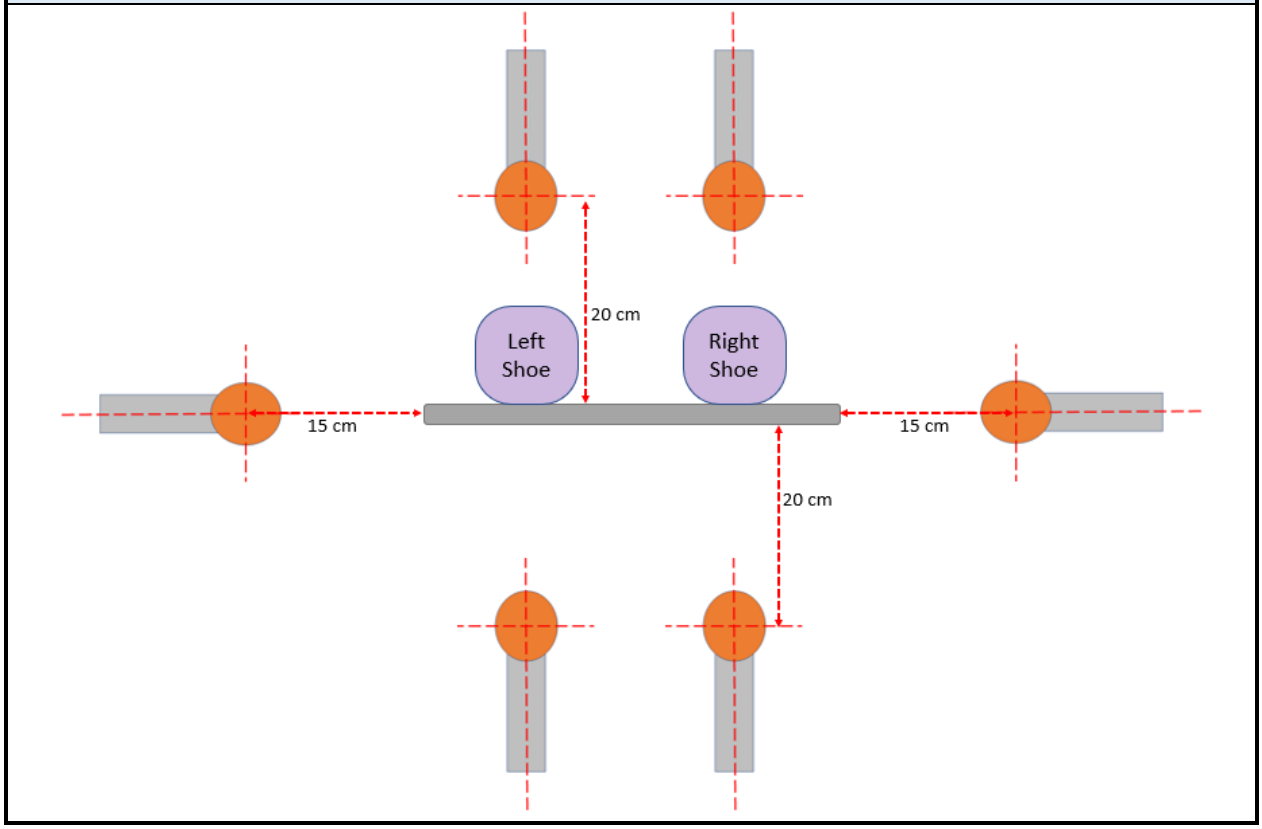
The probe is moved along the edges or above/below the EUT to a position that showed the maximum field strength. This position is used for the reported result.

SETUP DIAGRAM

Top View



Side View



4. RESULT

4.1. Test Results

Operating Condition	Frequency	Measurement distance [cm]	Position	Electric Field [V/m]	Magnetic Field [A/m]
Standby Mode (Without shoes)	131 kHz	15	Left	6.816	0.177
		15	Right	6.120	0.186
		15	Front / Left	6.504	0.255
		15	Front / Right	6.488	0.254
		15	Rear / Left	6.416	0.227
		15	Rear / Right	6.414	0.227
		20	Above / Left	7.760	0.475
		20	Above / Right	7.304	0.436
		20	Below / Left	7.448	0.247
		20	Below / Right	7.728	0.259
RF Field Strength limits for General Population / Uncontrolled Exposure				614	1.63

Operating Condition	Frequency	Measurement distance [cm]	Position	Electric Field [V/m]	Magnetic Field [A/m]
Charging Mode (With shoes)	131 kHz	15	Left	7.880	0.282
		15	Right	7.464	0.276
		15	Front / Left	7.696	0.438
		15	Front / Right	7.548	0.427
		15	Rear / Left	7.472	0.438
		15	Rear / Right	7.474	0.430
		20	Above / Left	7.858	0.748
		20	Above / Right	7.884	0.751
		20	Below / Left	7.672	0.698
		20	Below / Right	7.548	0.696
RF Field Strength limits for General Population / Uncontrolled Exposure				614	1.63

4.2. Summary of Results

Operating Condition	Max. Position	Max. Electric Field [V/m]	Max. Magnetic Field [A/m]	Ratio [%] (Electric Field)	Ratio [%] (Magnetic Field)
Standby Mode	Above / Left	7.760	0.475	1.264	29.141
Charging Mode	Above / Right	7.884	0.751	1.284	46.074
RF Field Strength results were less than 50 % of MPE limit					

Sample Calculation

Electric Field Radio [%] at Charging Mode = 7.884 / 614 x 100 = 1.284 < 50
Magnetic Field Radio %] at Charging Mode = 0.751 / 1.63 x 100 = 46.074 < 50

5. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	EM Field Meter	SMP2	11/17/2022	Wavecontrol	18SN0802
☒	Probe	WP400-3	11/17/2022	Wavecontrol	20WP120074

6. PROBE CALIBRATION

CERTIFICATE OF CALIBRATION Number **NE20/01309**

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LabCal - Wavecontrol
Radio-electric Calibration Laboratory
C/ Pallars 65-71
08018 Barcelona (Spain)

WAVECONTROL

ITEM	EM Field Meter + Isotropic EM Field Probe
BRAND	Wavecontrol
MODEL	Meter: SMP2 Probe: WP400-3
IDENTIFICATION	Probe: 20WP120074
APPLICANT	Wavecontrol Inc. 301 Route 17 North, Suite 402 Rutherford, NJ 07070 USA
DATE/S OF CALIBRATION	17/11/2020

Authorized Signatories: Date of issue: 19/11/2020

Álvaro Granero
Laboratory Technician

Signature Not Verified
Digitally signed by ALEJANDRO CARUSA MORENO
Date: 2020.11.19 10:52:20 CET
Reason: Wavecontrol
Location: Barcelona

Laboratory Director

This Certificate may not be partially reproduced, except with the prior written permission of Wavecontrol.

Measurement:

The calibration of a magnetic or electric field meter is done by introducing the probe into a nearly uniform magnetic or electric field of known magnitude and direction.

To calibrate the magnetic field sensor a Helmholtz coil system is used to generate the low frequency nearly uniform magnetic field needed.

To calibrate the electric field sensor a parallel plates system, energized with a centre-tapped transformer, is used.

In both cases, the probe is positioned on a low reflectivity mount inside the nearly uniform field area. The probe axis under test is placed perpendicular to the direction of the magnetic field when calibrating the magnetic field, and parallel to the electric field when calibrating the electric field.

Three calibration parameters are obtained:

1- Correction factor (CF)

For each measurement, the input power to the test facility is adjusted so that the actual field strength is set to a specific value. The field strength indicated by the probe under calibration is then read and the correction factor calculated using the following definition:

$$CF = \frac{Actual\ Field\ Strength}{Indicated\ Field\ Strength} \qquad CF^2 = \frac{Actual\ Power\ Density}{Indicated\ Power\ Density}$$

The indicated field strength must be multiplied by the appropriate correction factor to give the actual field strength.

2- Linearity

The linearity can be calculated as the variation of the Correction Factor as a function of the field strength applied to the probe for a frequency value.

3- Frequency response

The frequency response can be calculated as the variation of the Correction Factor as a function of the frequency for a fixed field value applied to the probe.

Traceability:

Swarzbeck Mess – Elektronik
PTB (Physikalisch-Technische Bundesanstalt)
Metaltest
LME – CIRCE
AT4 Wireless
Siemsa-Trescal

Reference standards:

IEC 61786-1:2013 "Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings - Part 1: Requirements for measuring instruments".

Uncertainties:

The uncertainty of calibration for this device is as follows:

Electric field:	**10 Hz – 100 kHz:**	**± 2.60 %**
	100 – 400 kHz:	**± 3.84 %**
Magnetic field:	**10 Hz – 3 kHz:**	**± 2.56 %**
	3 – 100 kHz:	**± 2.65 %**

The measurement uncertainties above apply only when the probe is supported in a low reflectivity mount. The user should be aware of the effects of reflections from nearby objects, including human body, and should allow additional measurement uncertainties accordingly.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with the EA-4/02 document.

Environmental conditions:

Humidity	Temperature
(52.2 ± 1.6) % rH	(22.7 ± 0.4) ºC

The results and uncertainties relate to the on-the-day values and make no allowance for drift or operation under other environmental conditions.

Procedure:

PC-1104 – Calibration of ELF electric field probes in the range 10 Hz – 400 kHz.
PC-1207 – Calibration of ELF magnetic field probes in the range DC & 10 Hz – 200 kHz.

Calibration engineer: Álvaro Granero

Calibration set-up:

The position of the probe inside the electric and magnetic field calibration systems is specified in Figure 1 and Figure 2 respectively.

The axis under test is placed perpendicular to the direction of the magnetic field when calibrating the magnetic field, and parallel to the electric field when calibrating the electric field. The probe is placed in the 1% field uniformity zone of the field generator.

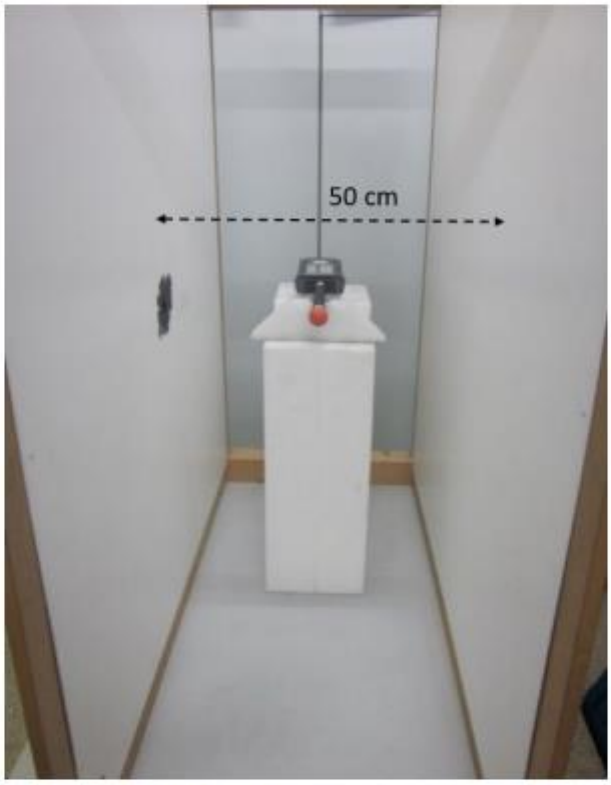

Figure 1: Calibration set-up in the parallel plates system – E field

Figure 2: Calibration set-up in the Helmholtz coils system – B field

Results:

The correction factors (CF) for the electric and magnetic field calibrations are shown.

The correction factors for each axis and the average correction factor are given. This average correction factor must be applied to the measured value for the total field. The average correction factor is the arithmetic mean of the correction factors for the three axes.

The correction factors given below must be multiplied by the measured value for the field in order to obtain the actual field value:

1. Electric field

Linearity						
Frequency (Hz)	E field (V/m)		FC			
			X axis	Y axis	Z Axis	Mean
50	800		1.00	1.00	1.00	1.00
50	750		1.00	1.00	1.00	1.00
50	500		1.00	1.00	1.00	1.00
50	250		1.00	1.00	1.00	1.00
50	100		1.00	1.00	1.00	1.00
50	50		1.00	0.99	1.00	1.00
50	20		0.96	0.99	0.98	0.98

Frequency response						
Frequency (Hz)	E field (V/m)		FC			
			X axis	Y axis	Z Axis	Mean
10	750		1.01	0.99	1.01	1.01
25	750		1.01	1.00	1.01	1.00
50	750		1.00	1.00	1.00	1.00
100	750		1.00	0.99	1.00	1.00
500	750		1.00	0.98	1.00	0.99
1 000	750		1.00	0.98	1.00	0.99
2 000	750		1.00	0.98	1.00	1.00
10 000	750		1.00	0.97	1.00	0.99
100 000	750		1.02	0.98	1.01	1.00
200 000	300		1.04	0.99	1.03	1.02
300 000	300		1.07	1.02	1.07	1.05
400 000	300		1.11	1.04	1.11	1.09

2. Magnetic field

Linearity						
Frequency (Hz)	B field (µT)		FC			
			X axis	Y axis	Z Axis	Mean
50	2 000		1.00	0.99	1.00	1.00
50	1 500		1.00	1.00	1.00	1.00
50	1 000		1.00	1.00	1.00	1.00
50	750		1.00	1.00	1.01	1.00
50	500		1.00	1.00	1.00	1.00
50	250		1.00	0.99	1.00	1.00
50	100		1.00	1.00	1.00	1.00
50	50		1.00	1.00	1.00	1.00
50	10		1.00	1.00	0.99	1.00
50	5		1.00	1.00	1.00	1.00

Frequency response						
Frequency (Hz)	B field (µT)		FC			
			X axis	Y axis	Z Axis	Mean
10	100		1.00	1.00	0.99	1.00
30	100		1.00	1.00	1.00	1.00
50	100		1.00	1.00	1.00	1.00
100	100		1.00	1.00	1.00	1.00
500	100		1.00	1.00	1.00	1.00
1 000	100		1.00	1.00	1.00	1.00
2 000	100		1.00	1.00	1.00	1.00
10 000	25		1.00	1.01	1.00	1.00
100 000	25		1.00	1.01	1.00	1.00
200 000	25		1.02	1.03	1.02	1.02

END OF TEST REPORT

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