

**Test Report** FCC Part15 Subpart C

Product Name	:	Vehicle Dock
Model No.	:	CX80-VD-WL
FCC ID	:	HD5-CX80VDWL

Applicant : HONEYWELL INTERNATIONAL INC Honeywell Safety and Productivity Solutions Address : 9680 OLD BAILES RD FORT MILL SC 29707-7539

Date of Receipt	:	May. 14, 2018
Test Date	:	May. 14, 2018~ May. 30, 2018
Issued Date	:	Jun. 19, 2018
Report No.	:	1852085R-RF-US-P06V05
Report Version	:	V1.1

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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# Test Report Certification

Issued Date : Jun. 19, 2018 Report No. : 1852085R-RF-US-P06V05



Product Name	:	Vehicle Dock
Applicant	:	HONEYWELL INTERNATIONAL INC
		Honeywell Safety and Productivity Solutions
Address	:	9680 OLD BAILES RD
		FORT MILL SC 29707-7539
Manufacturer	:	1、 HONEYWELL INTERNATIONAL INC
		Honeywell Safety and Productivity Solutions
		2、Metro(Suzhou)Technologies Co.,Ltd
Address	:	1、9680 OLD BAILES RD
		FORT MILL SC 29707-7539
		2、No.221 Xinghai street China-Singapore Suzhou Industrial Park
Model No.	:	CX80-VD-WL
FCC ID	:	HD5-CX80VDWL
EUT Voltage	:	DC 12V
Test Voltage	:	DC 12V
Brand Name	:	Honeywell ECC CER Title 47 Part 15 Subpart C: ANSI C63 10: 2013
	•	KDB 680106 D01 RE Exposure Wireless Charging Apps v03
Performed Location	:	Complied DEKRA Testing and Certification (Suzhou) Co. 1 td
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## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1852085R-RF-US-P06V05	V1.0	Initial Issued Report	May. 30, 2018
1852085R-RF-US-P06V05	V1.1	Modified the bandwidth data	Jun. 19, 2018



## 1. General Information

#### 1.1. EUT Description

Product Name	Vehicle Dock		
Model No.	CX80-VD-WL		
Working Voltage	DC 12V		
Frequency Range	144kHz		
Channel Number	1		
Type of Modulation	ASK		
Component Device			
Product Name	Mobile Computer		
Model No.	CN80L1N		
FCC ID	HD5-CN80L1N		

Note: The Vehicle Dock was only used for charging the component device(CN80L1N), so we tested the WPT system(Vehicle Dock and ) for testing.



## **1.2. Working Frequency of Each Channel:**

Working Frequency of Each Channel:						
Channel	Frequency					
00	144kHz					



## 1.3. Antenna information

Model No.	N/A							
Antenna manufacturer	N/A	N/A						
Antenna Delivery	$\boxtimes$	1*TX+1*R	*TX+1*RX					
Antenna technology	$\square$	SISO						
				Basic				
				CDD				
		IVIIIVIO		Sectorized				
				Beam-forming				
Antenna Type			Dipole					
		External		Sectorized				
	Internal	Internal		PIFA				
				PCB				
				Ceramic Chip Antenna				
			$\square$	Loop antenna				
				Type F antenna				



#### 1.4. Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	
Mode 1: Transmit	

Note:

- 1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
- 2. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.



## 1.5. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 N/A	N/A	N/A	N/A	N/A



## 1.6. Configuration of Tested System





## 1.7. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Start to continue transmit.



#### 2. Technical Test

#### 2.1. Summary of Test Result

 $\boxtimes$  No deviations from the test standards

Deviations from the test standards as below description:

Performed Test Item	Normative References	Limit	Result
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C	FCC 15.207	N/A
	Section 15.207		
Field Strength of Spurious	FCC CFR Title 47 Part 15 Subpart C	FCC 15.209	PASS
	Section 15.209		
Channel Bandwidth	FCC CFR Title 47 Part 15 Subpart C	FCC 15.215	PASS
	Section 15.215(c)		
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C: Section	FCC 15.203	PASS
	15.203		

#### 2.2. Test Environment

Items	Required (IEC 68-1)	Actual		
Temperature (°C)	15-35	21		
Humidity (%RH)	25-75	50		
Barometric pressure (mbar)	860-1060	950-1000		



## 3. Conducted Emission

## 3.1. Test Equipment

Conducted Emission / TR-1							
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date		
EMI Test Receiver	R&S	ESCI	100726	2018.03.29	2019.03.28		
Two-Line V-Network	R&S	ENV216	100043	2018.03.29	2019.03.28		
Two-Line V-Network	R&S	ENV216	100044	2017.09.17	2018.09.16		
50ohm Coaxial	Apritou		6200464462	2018 02 02	2010 02 01		
Switch	Annisu	INIF 39D	0200404402	2016.03.02	2019.03.01		
50ohm Termination	SHX	TF2	07081401	2017.09.17	2018.09.16		
Temperature/Humidity	zhiohong	701.0		2019 01 04	2010 01 02		
Meter	Zhicheng	201-2		2016.01.04	2019.01.03		
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or							
international standards.							

## 3.2. Test Setup





#### 3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits							
Frequency (MHz)	QP (dBuV)	AV (dBuV)					
0.15 - 0.50	66 - 56	56 – 46					
0.50 - 5.0	56	46					
5.0 - 30	60	50					

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

#### 3.4. Test Procedure

The EUT was setup according to ANSI C63.10 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

#### 3.5. Uncertainty

The measurement uncertainty is defined as  $\pm$  2.02 dB



## 3.6. Test Result

The device was powered by DC source, so this test was not applied.

## 4. Radiated Emission

## 4.1. Test Equipment

Radiated Emission / AC-1							
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date		
EMI Test Receiver	R&S	ESCI	100573	2018.03.29	2019.03.28		
Loop Antenna	R&S	HFH2-Z2	833799/003	2017.11.26	2018.11.25		
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2017.10.11	2018.10.10		
		SUCOFLEX					
Coaxial Cable	Huber+Suhner	106	AC2-C	2018.03.02	2019.03.01		
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2018.01.08	2019.01.07		
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or							
international standards.							



#### 4.2. Test Setup





30MHz~1GHz Test Setup:





## 4.3. Limit

Field strength of emissions from intentional radiators operated under 15.209(a) shall not

FCC Part 15.209(a)							
Fundamental frequency	Field strength of	Field strength of spurious					
(MHz)	fundamental ( $\mu$ V/m)	emissions ( $\mu$ V/m)					
0.009-0.490	2400/F(kHz)	300					
0.490-1.705	24000/F(kHz)	30					
1.705-30.0	30	30					
30-88	100**	3					
88-216	150**	3					
216-960	200**	3					
Above 960	500	3					

exceed the following:

(1)The tighter limits apply at the band edges.

(2)Measurements were performed at 10m and the data was extrapolated to the specified measurement distance of 300m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2). Extrapolation Factor = 40 log<sub>10</sub>(300/10) = 59dB for example.

Measurements were performed at 10m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in 15.31(f)(2). Extrapolation Factor = 40  $\log_{10}(30/10) = 19$ dB for example.

(3)All measurements were performed using a loop antenna. The antenna was positioned in three orthogonal positions (X front, Y side, Z top) and the position with the highest emission level was recorded.

## 4.4. Test Procedure

The EUT was setup according to ANSI C63.10 for compliance to FCC 47CFR 15.209 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This



is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.

The frequency range from 9kHz to 10<sup>th</sup> harmonic is checked.

#### 4.5. Uncertainty

The measurement uncertainty is defined as ± 3.80 dB



## 4.6. Test Result

Site: AC1       Time: 2018/05/22 - 14:38         Limit: FCC-Part 15.209-Below 30MHz       Margin: 0         Probe: loop antenna(0.009-30MHz)       Polarity: Horizontal         EUT: Vehicle Dock       Power: DC 12V         Note: Mode1: Charging mode       Polarity: Horizontal         10000001       10000001         20000001       10000001	Engineer: Eric	
Limit: FCC-Part 15.209-Below 30MHz Margin: 0 Probe: loop antenna(0.009-30MHz) Polarity: Horizontal EUT: Vehicle Dock Power: DC 12V Note: Mode1: Charging mode	Site: AC1	Time: 2018/05/22 - 14:38
Probe: loop antenna(0.009-30MHz) Polarity: Horizontal EUT: Vehicle Dock Power: DC 12V Note: Mode1: Charging mode	Limit: FCC-Part 15.209-Below 30MHz	Margin: 0
EUT: Vehicle Dock Power: DC 12V Note: Mode1: Charging mode	Probe: loop antenna(0.009-30MHz)	Polarity: Horizontal
Note: Mode1: Charging mode	EUT: Vehicle Dock	Power: DC 12V
120 120 10 10 10 10 10 10 10 10 10 1	Note: Mode1: Charging mode	
Frequency(MHz)	120 80 70 60 50 40 30 20 10 0 -10 -20 -30 0.009 0.01	1 2 3 4 4 4 6.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0

No	Mark	Frequency	Measure Level	Reading Level	Over Limit Limit		Factor	Туре
		(MHz)	(dBuV/m)	(dBuV)	(dB)	(dBuV/m)	(dB)	
1		0.037	25.230	14.403	-70.095	95.325	10.827	QP
2		0.066	20.639	9.783	-69.659	90.298	10.856	QP
3		0.096	17.041	6.156	-70.003	87.044	10.885	QP
4	*	0.144	19.167	8.235	-64.355	83.522	10.932	QP

\*

2.038

3.355

22.854

22.485

3

4







-25.773

-26.142

48.627

48.627

11.592

11.614

QP

QP

11.262

10.871

Engineer: Eric	
Site: AC1	Time: 2018/05/22 - 14:45
Limit: FCC-Part 15.209-Below 30MHz	Margin: 0
Probe: loop antenna(0.009-30MHz)	Polarity: Vertical
EUT: Vehicle Dock	Power: DC 12V



No	Mark	Frequency	Measure Level	Reading Level	Over Limit	Limit	Factor	Туре
		(MHz)	(dBuV/m)	(dBuV)	(dB)	(dBuV/m)	(dB)	
1		0.037	25.218	14.391	-70.107	95.325	10.827	QP
2		0.065	22.028	11.173	-68.403	90.431	10.855	QP
3		0.093	16.375	5.493	-70.944	87.319	10.882	QP
4	*	0.145	16.732	5.799	-66.730	83.462	10.933	QP



Engineer: Eric					
Site: AC1	Time: 2018/05/22 - 14:46				
Limit: FCC-Part 15.209-Below 30MHz	Margin: 0				
Probe: loop antenna(0.009-30MHz)	Polarity: Vertical				
EUT: Vehicle Dock	Power: DC 12V				
Note: Mode1: Charging mode	·				



No	Mark	Frequency	Measure Level	Reading Level	Over Limit	Limit	Factor	Туре
		(MHz)	(dBuV/m)	(dBuV)	(dB)	(dBuV/m)	(dB)	
1		0.221	26.750	15.743	-53.051	79.801	11.007	QP
2	*	1.243	22.133	10.552	-22.666	44.800	11.581	QP
3		3.590	22.211	10.593	-26.416	48.627	11.618	QP
4		7.168	22.831	11.256	-25.796	48.627	11.575	QP



Engineer: Tirito										
Site: AC3			Time: 20	018/05/23						
Limit: FCC_Part15.209_RE(3m)			Margin:	0						
Probe: AC3_3m (30-1000MHz)			Polarity:	Horizonta	al					
EUT: Vehicle Dock			Power:	DC 12V						
Note: Mode1: Charging mode			1							
80 70 60 50 40 30 -10 -20 30			equency(MI						10	
No Mark Frequency Measure	Reading	Over	Limit	Probe	Cable	Amp	Ant	Table	Туре	

NO	wark	Frequency	weasure	Reading	Over	Limit	Prope	Capie	Атр	Ant	Table	туре
		(MHz)	Level	Level	Limit	(dBuV/m)	(dB/m)	(dB)	(dB)	Pos	Pos	
			(dBuV/m)	(dBuV)	(dB)					(cm)	(deg)	
1	*	33.362	26.387	0.200	-13.613	40.000	19.712	6.475	0.000	200	77	QP
2		100.921	15.182	-0.800	-28.318	43.500	9.125	6.857	0.000	200	336	QP
3		152.893	20.001	2.700	-23.499	43.500	10.214	7.087	0.000	199	360	QP
4		279.502	22.205	1.600	-23.795	46.000	13.056	7.549	0.000	100	360	QP
5		622.072	30.204	0.500	-15.796	46.000	21.222	8.483	0.000	200	183	QP
6		953.154	32.194	-0.600	-13.806	46.000	23.583	9.211	0.000	100	347	QP

Note:

1. " \* ", means this data is the worst emission level.

2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).





No	Mark	Frequency	Measure	Reading	Over	Limit	Probe	Cable	Amp	Ant	Table	Туре
		(MHz)	Level	Level	Limit	(dBuV/m)	(dB/m)	(dB)	(dB)	Pos	Pos	
			(dBuV/m)	(dBuV)	(dB)					(cm)	(deg)	
1		31.558	27.946	4.345	-12.054	40.000	17.137	6.463	0.000	100	36	QP
2	*	54.326	28.897	11.796	-11.103	40.000	10.481	6.620	0.000	100	359	QP
3		160.394	22.815	4.213	-20.685	43.500	11.474	7.127	0.000	100	331	QP
4		241.352	28.400	5.140	-17.600	46.000	15.837	7.423	0.000	116	360	QP
5		597.272	27.490	0.353	-18.510	46.000	18.716	8.421	0.000	100	306	QP
6		768.520	33.906	1.600	-12.094	46.000	23.490	8.816	0.000	100	267	QP

Note:

1. " \* ", means this data is the worst emission level.

2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Test Result

Pass



## 5. 20dB Occupied Bandwidth

## 5.1. Test Equipment

20dBc Occupied Bandwidth / /	AC-1				
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2018.03.29	2019.03.28
Loop Antenna	R&S	HFH2-Z2	833799/003	2017.11.26	2018.11.25
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2017.10.11	2018.10.10
		SUCOFLEX			
Coaxial Cable	Huber+Suhner	106	AC2-C	2018.03.02	2019.03.01
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2018.01.08	2019.01.07
Note: All equipment are calibra	ated with traceal	ole calibrations	. Each calibratio	on is traceable to	the national or
international standards.					



### 5.2. Test Setup







#### 5.3. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

#### 5.4. Test Procedure

The bandwidth of the fundamental frequency was measured by spectrum analyzer with the RBW 1%~5% of 20dBc bandwidth and the VBW three times of the RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### 5.5. Uncertainty

The measurement uncertainty is defined as ± 10 Hz



#### 5.6. Test Result

Product	Vehicle Dock				
Test Item	20dB Occupied Bandwidth				
Test Mode	Mode 1: Transmit				
Date of Test	2018/05/30	Test Site	AC-1		

Frequency	20dB Bandwidth	99% Bandwidth
(kHz)	(kHz)	(kHz)
144	1.237	1.197



Test Result
-------------



#### 6. Antenna Requirement

#### 6.1. Requirement

#### Antenna Requirement Limit

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

#### 6.2. Result

Antenna Connector Construction

The use of a permanently attached antenna  $\square$ 

The antenna use of a unique coupling to the intentional radiator

The use of a nonstandard antenna jack or electrical connector

Please refer to the attached document "Internal Photograph" to show the antenna connector.

The End