

RF Exposure Report

Report No.: SA180517E07

FCC ID: 2ACY3-IPOSPLUSSL

Test Model: BEETLE /iPOS plus SL

Received Date: May 17, 2018

Test Date: June 26, 2018

Issued Date: Aug. 08, 2018

Applicant: Diebold Nixdorf Singapore Pte Ltd.

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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA180517E07	Original release.	Aug. 08, 2018

1 Certificate of Conformity

Product: POS Terminal

Brand:



Test Model: BEETLE /POS plus SL

Sample Status: ENGINEERING SAMPLE

Applicant: Diebold Nixdorf Singapore Pte Ltd.

Test Date: June 26, 2018

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Mary Ko, **Date:** Aug. 08, 2018

Mary Ko / Specialist

Approved by : May Chen, **Date:** Aug. 08, 2018

May Chen / Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
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
300-1500	f/1500	30
1500-100,000	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user.

So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

WLAN antenna spec.						
Brand	Model	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Antenna Connector	Cable Length (mm)
Smart Approach	SE-EYISL-001 (Main)	-3.69	2.4~2.4835	PIFA	i-pex(MHF)	230
		3.08	5.15~5.35			
		3.14	5.47~5.725			
		3.14	5.725~5.85			
Bluetooth antenna spec.						
Brand	Model	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Antenna Connector	Cable Length (mm)
Smart Approach	SE-EYISL-002 (Aux)	-3.87	2.4~2.4835	PIFA	i-pex(MHF)	380
NFC antenna spec.						
Brand	Model	Frequency range (MHz)		Antenna Type	Antenna Connector	
Smart Approach	51-MYISL-001	13.56		Loop	None	

2.5 Calculation Result

For WLAN (FCC ID: PD93168NG)

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 2.4GHz	2412	57	-3.69	20	0.00485	1
WLAN 5GHz	5755	63	3.14	20	0.02583	1
Bluetooth	2402	10	-3.87	20	0.00082	1

For NFC

Field Strength Conversion:

Frequency (MHz)	Field Strength of Fundamental (dBuV/m) @3m	EIRP (dBm)	EIRP (mW)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
13.56	58.89	-36.34	0.0002323	20	0.00000005	0.9789

Note: 1. Pout EIRP (dBm) = Field Strength of Fundamental (dBuV/m) - 95.23 (dB)

2. Power Density Limit = $(180/t^2)$

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + Bluetooth + NFC = 0.00485 / 1 + 0.00082 / 1 + 0.00000005 / 0.9789 = 0.00567

WLAN 5GHz + Bluetooth + NFC = 0.02583 / 1 + 0.00082 / 1 + 0.00000005 / 0.9789 = 0.02665

Therefore the maximum calculations of above situations are less than the "1" limit.

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