

Supplementary RF Exposure Report

Report No.: SA120720E09K

FCC ID: UZ7VC70N0

Test Model: VC70N0

Received Date: Sep. 25, 2012

Test Date: Sep. 25, 2012 and May 26, 2015

Issued Date: June 24, 2015

Applicant: Zebra Technologies Corporation

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Manufacturer: Zebra Technologies Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Report Issue History Record of EUT (VC70N0)

Attachment No.	Issue Date	Description
120720E09	Nov. 08, 2012	Original
120720E09K	June 24, 2015	Upgraded the versions of the standard to section 15.407 under new rule.

Release Control Record

Issue No.	Description	Date Issued
SA120720E09K	Original release.	June 24, 2015



1 Certificate of Conformity

Product: Vehicle Computer

Brand: Zebra

Test Model: VC70N0

Sample Status: MASS-PRODUCTION

Applicant: Zebra Technologies Corporation

Test Date: Sep. 25, 2012 and May 26, 2015

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D03

IEEE C95.1

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 : _____


Claire Kuan / Specialist

Date: _____ June 24, 2015 _____

Approved by : _____


May Chen / Manager

Date: _____ June 24, 2015 _____

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				
300-1500	F/1500	30
1500-100,000	1.0	30

F = Frequency in MHz

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

Pi = 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

The antennas provided to the EUT, please refer to the following table:

No.	Brand	Model	ANT Type	Connector Type (External only)	Freq. Range (MHz to MHz)	Gain (dBi) (Including cable loss)	Cable Loss (dB)	Cable Length
1	Aristotle	RFA-02-G78-1	PIFA	N/A	2400-2500	1.7 (for BT)	0.783	27cm
2	Aristotle	RFA-02-G78-1	PIFA	N/A	2400-2500	1.1 (for Main WLAN)	0.58	20cm
3	Aristotle	RFA-02-G78-1	PIFA	N/A	4900-5850	4.7 (for Main WLAN)	0.96 ~ 1.06	20cm
4	Aristotle	RFA-02-G78-1	PIFA	N/A	2400-2500	-0.5 (for Aux WLAN)	0.783	27cm
5	Aristotle	RFA-02-G78-1	PIFA	N/A	4900-5850	4.3 (for Aux WLAN)	1.296 ~ 1.431	27cm
6	PCTEL	GPSDBHF	Shark-shape	RRSMA	2400-2500	1.18 (for External WLAN)	2.28	12ft
7	PCTEL	GPSDBHF	Shark-shape	RRSMA	4900-5850	0.24 (for External WLAN)	3.36 ~ 3.84	12ft
8	CENTURION	WTS2450-RPSMA	Dipole (for External WLAN)	Reverse Polarity SMA-Male	2400-2500	2.1	NA	NA
					5150-5350	2.6		
					5470-5725	3.4		
					5725-5850	3.4		

3 Calculation Result Of Maximum Conducted Power

For Bluetooth & WLAN 2412-2472MHz, 5260-5320MHz, 5550-5700MHz (Reference original report: SA120720E09):

Bluetooth

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	1.774	1.7	20	0.00052	1

WLAN

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2472	218.776	1.18	20	0.05711	1
5180-5240	73.282	4.7	20	0.04303	1
5260-5320	87.096	4.7	20	0.05114	1
5500-5700	104.713	4.7	20	0.06148	1
5745-5825	72.946	4.7	20	0.04283	1

Conclusion:

1. WLAN: 2.4GHz and 5GHz technology cannot transmit at same time.
2. Both of the WLAN and Bluetooth can transmit simultaneously, the formula of calculated the MPE is:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 5GHz} + \text{Bluetooth} = 0.06148 + 0.00052 = 0.062$$

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

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