



# RF EXPOSURE REPORT

**REPORT NO.:** SA120720E09

**MODEL NO.:** VC70N0

**FCC ID:** UZ7VC70N0

**RECEIVED:** July 20, 2012

**TESTED:** Sep. 21 to Oct. 02, 2012

**ISSUED:** Nov. 08, 2012

**APPLICANT:** Motorola Solutions, Inc.

**ADDRESS:** One Motorola Plaza  
Holtsville NY  
11742-1300 USA

**ISSUED BY:** Bureau Veritas Consumer Products Services  
(H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

**LAB ADDRESS:** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,  
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,  
R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by any government agencies.

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specifically mentioned, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.



## TABLE OF CONTENTS

RELEASE CONTROL RECORD .....	3
1. CERTIFICATION .....	4
2. RF EXPOSURE LIMIT .....	5
3. MPE CALCULATION FORMULA .....	5
4. CLASSIFICATION .....	5
5. ANTENNA GAIN .....	6
6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER .....	7



## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA120720E09	Original release	Nov. 08, 2012



## 1. CERTIFICATION

**PRODUCT:** Vehicle Computer  
**BRAND NAME:** MOTOROLA  
**MODEL NO.:** VC70N0  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** Motorola Solutions, Inc.  
**TESTED:** Sep. 21 to Oct. 02, 2012  
**STANDARDS:** FCC Part 2 (Section 2.1091)  
FCC OET Bulletin 65, Supplement C (01-01)  
IEEE C95.1

The above equipment (Model: VC70N0) 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 :** Phoenix Huang , **DATE:** Nov. 08, 2012  
( Phoenix Huang, Specialist )

**APPROVED BY :** May Chen , **DATE:** Nov. 08, 2012  
( May Chen, Deputy Manager )

## 2. RF EXPOSURE LIMIT

### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm <sup>2</sup> )	AVERAGE TIME (minutes)
<b>LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b>				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3. MPE CALCULATION FORMULA

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

### 4. 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**.

## 5. 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

## 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For WLAN: 15.247(2.4GHz)

### 802.11b

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412-2472	186.209	1.18	20	0.04861	1.00

### 802.11g

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412-2472	218.776	1.18	20	0.05711	1.00

### 802.11n (HT20)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412-2472	213.796	1.18	20	0.05581	1.00

For WLAN: 15.247(5GHz)

### 802.11a

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 ~ 5825	173.780	4.7	20	0.10203	1.00

### 802.11n (HT20)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 ~ 5825	173.780	4.7	20	0.10203	1.00

**For WLAN: 15.407(5GHz)  
802.11a**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 ~ 5700	104.713	4.7	20	0.06148	1.00

**802.11n (HT20)**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 ~ 5700	74.131	4.7	20	0.04352	1.00

**For Bluetooth:  
GFSK**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2402 ~ 2480	1.510	1.7	20	0.00037	1.00

**8DPSK**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2402 ~ 2480	1.774	1.7	20	0.00052	1.00

**CONCLUSION:**

1. 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:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

**CPD = Calculation power density**

**LPD = Limit of power density**

Therefore, the worst-case situation is  $0.10203 / 1 + 0.00052 / 1 = 0.10255$ , which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

**--- END ---**