



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.

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ISSUED BY: Bureau Veritas Consumer Products Services
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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 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

3. MPE CALCULATION FORMULA

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

where

P_d = power density in mW/cm²

P_{out} = 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

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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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.

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